2017 Ski-Doo G4 850 E-Tec Snowmobile Series

This manual may cover later years than listed above.

SAFETY NOTICE

This manual has been prepared as a guide to servicing and repair the 2017 Ski-Doo® snowmobile from the REV™ G4 platform.

This edition was primarily published to be used by mechanical technicians who are already familiar with all service procedures relating to BRP products. Mechanical technicians should attend training courses given by BRPTI.

Please note that the instructions in this manual will apply only if proper hand tools and special service tools are used.

The contents of this manual depicts parts and/or procedures applicable to a particular product at the time of writing. Service and warranty bulletins may be published to update the content of this manual. Dealer modifications that were carried out after manufacturing of the product, whether or not authorized by BRP, are not included.

In addition, the sole purpose of the illustrations throughout the manual, is to assist identification of the general configuration of the parts. They are not to be interpreted as technical drawings or exact replicas of the parts.

The use of BRP parts is most strongly recommended when considering replacement of any component. Dealer and/or distributor assistance should be sought in case of doubt.

The engines and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

This manual emphasizes particular information which, is denoted by the following wording and symbols:

⚠ WARNING

Indicates a potential hazard that, if not avoided, could result in serious injury or death.

⚠ CAUTION Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE Indicates an instruction which, if not followed, could result in severe damage to vehicle components or other property.

NOTE: Indicates supplementary information required to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information provided will promote its correct use.

Always observe common shop safety practice.

Unless otherwise noted, the engine must be stopped and the tether cord must be removed prior to perform any services.

Torque wrench tightening specifications must be strictly adhered to. Use the torque values and service products as in the exploded views or in the procedures when noted.

Locking devices when removed must be replaced (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.

When ordering parts always refer to the specific model *PARTS CATALOGS*.

We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic.

It is understood that this manual may be translated into another language. In the event of any discrepancy, the English version shall prevail.

BRP disclaims liability for all damages and/or injuries resulting from the improper use of the contents of this publication.

INTRODUCTION

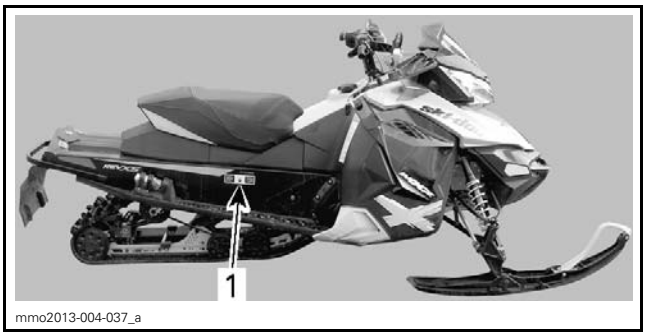
The information and component/system descriptions contained in this manual are correct at time of writing. BRP however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured.

Due to late changes, there may be some differences between the manufactured product and the description and/or specifications in this document.

BRP reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring obligation.

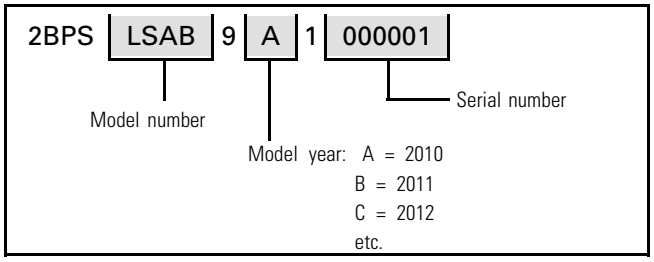
VEHICLE INFORMATION

VEHICLE IDENTIFICATION NUMBER (VIN)

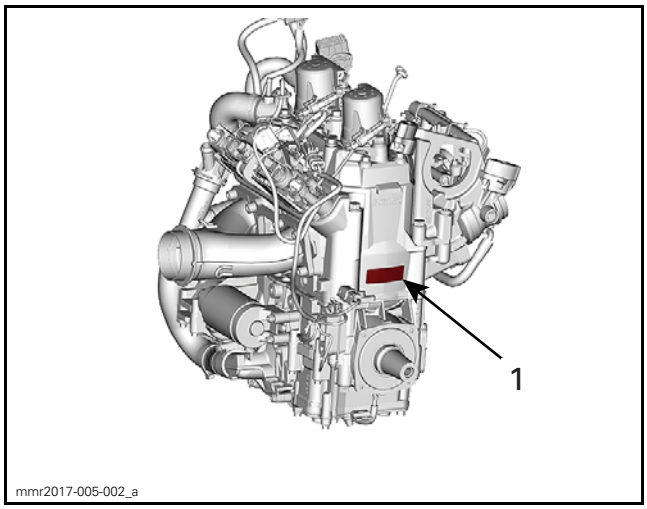


TYPICAL
1. Vehicle identification number

Identification Number Description



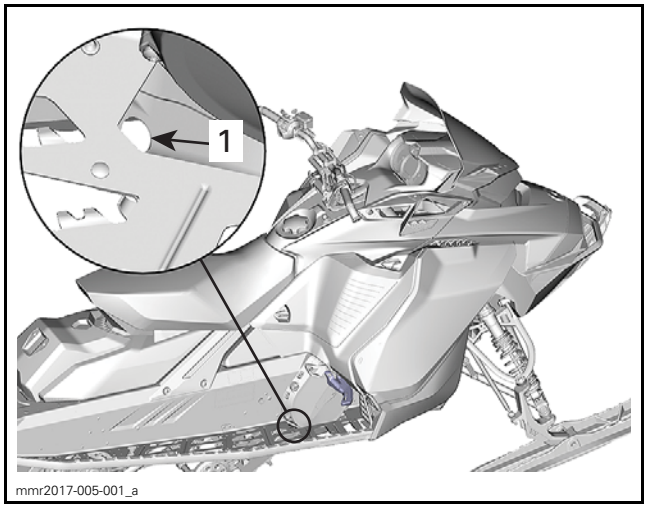
ENGINE IDENTIFICATION NUMBER (EIN)



850 E-TEC
1. Engine serial number

SNOWMOBILE LIFTING

To lift the snowmobile securely, it is important to place the hooks of the lifting tool into the reinforcement holes of the footrests.



1. Reinforced holes in footrest

NOTICE Do not use footrest opening or steering column to lift the snowmobile. Frame or steering system could be seriously damaged.

ENGINE EMISSIONS INFORMATION

MANUFACTURER'S RESPONSIBILITY

Manufacturers of engines must determine the exhaust emission levels for each engine horsepower family and certify these engines with the United States of America Environmental Protection Agency (EPA). An emissions control information label, showing emission levels and engine specifications, must be placed on each vehicle at the time of manufacture.

DEALER RESPONSIBILITY

When servicing any vehicle that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the engine in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturer's prescribed changes.

OWNER RESPONSIBILITY

The owner/operator is required to have engine maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone else to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

EMISSION REGULATIONS

The vehicle you are servicing may have been certified to applicable emission regulations in your country or state. Not as an exhaustive list; this may include standards for engine exhaust emissions, crankcase emissions, permeation emissions and evaporative emissions. Servicing procedures in this manual must be strictly followed in order to keep the vehicle within the factory specifications. Failure to follow servicing procedures in this manual may lead a vehicle to be out of compliance with applicable emission regulations.

When servicing any vehicle; adjustments must be kept within published factory specifications. Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the applicable certification standards. Nobody is allowed to modify the engine in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications. Exceptions include manufacturer’s prescribed changes.

The owner/operator is required to have engine maintenance performed to maintain emission levels within the prescribed certification standards. The owner/operator is allowed and should not allow anyone else to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

MANUAL INFORMATION

MANUAL PROCEDURES

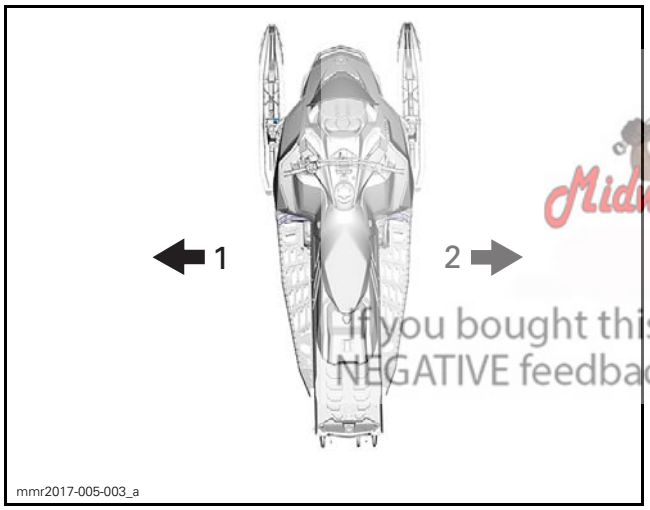
Many of the procedures in this manual are interrelated. Before undertaking any task, you should read and thoroughly understand the entire section or subsection in which the procedure is contained.

⚠ WARNING

Unless otherwise specified, the engine should be turned OFF and cold for all maintenance and repair procedures.

A number of procedures throughout the book require the use of special tools. Before starting any procedure, be sure that you have on hand all required tools, or their approved equivalents.

The use of RIGHT and LEFT indications in the text are always referenced to the driving position (sitting on the vehicle).



1. Left
2. Right

This manual uses technical terms which may be different from the ones of the *PARTS CATALOGS*.

When ordering parts always refer to the specific model *PARTS CATALOGS*.

NOTICE **Most fasteners are metric, and most components are built with parts dimensioned using the metric system. Consult the appropriate *PARTS CATALOG* to obtain and use the correct parts and fasteners. Mismatched or incorrect fasteners could cause damage to the vehicle.**

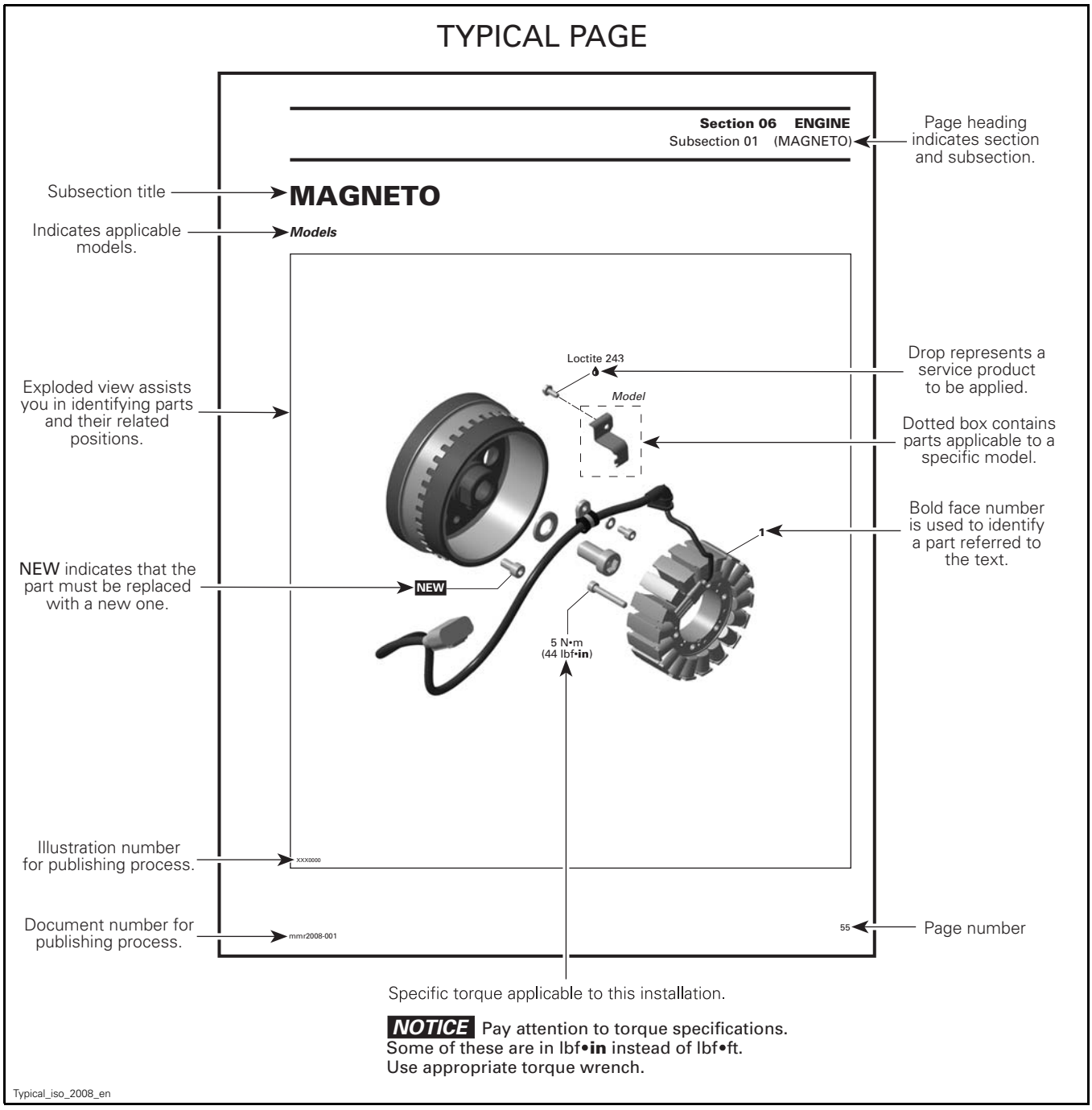
MANUAL LAYOUT

This manual is divided into many major sections as can be seen in the main table of contents at the beginning of the manual.

Each section is divided into various subsections, and again, each subsection has one or more divisions.

Illustrations and photos show the typical construction of various assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts used in a particular model vehicle. However, they represent parts which have the same or a similar function.

TYPICAL PAGE



Typical_iso_2008_en

TYPICAL PAGE

Tittle in bold indicates category of information to be carried out.

GENERAL

NOTE: The following procedures can be done without removing the engine.

During assembly/installation, use the torque values and service products as in the exploded views.

Reference to a specific section or subsection.

Clean threads before applying a threadlocker. Refer to the *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* sections at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, etc.) must be replaced with new ones.

PROCEDURES

Indicates component procedures apply to.

MAGNETO FLYWHEEL

Magneto Flywheel Cleaning

Clean all metal components in a non-ferrous metal cleaner.

CAUTION: Clean magneto flywheel using only a clean cloth.

Indicates specific procedure to be carried out.

Magneto Flywheel Removal

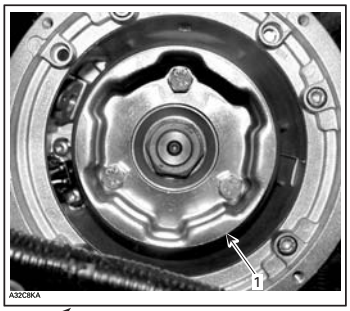
Remove muffler, refer to the *EXHAUST SYSTEM* section.

Remove acoustic panel.

Remove rewind starter.

Remove starting pulley **no. 2**.

Bold face number following part name refers to exploded view at beginning of subsection.



TYPICAL
1. Starting pulley

"TYPICAL" indicates a general view which may not represent exact details.

Call-outs pertaining to above illustration.

NOTE: To remove starting pulley bolts, hold magneto flywheel with a socket as shown.

TYPICAL

Illustration always follows text to which it applies.

Models

Remove the connecting flange retaining the rewind starter to the engine housing.

Italic bold face typesetting indicates a procedure applicable to a specific model(s).

typical_txt_2008_en

TIGHTENING TORQUE

Tighten fasteners to the torque specified in the exploded view(s) and/or in the written procedure. When a torque is not specified, refer to the following table.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

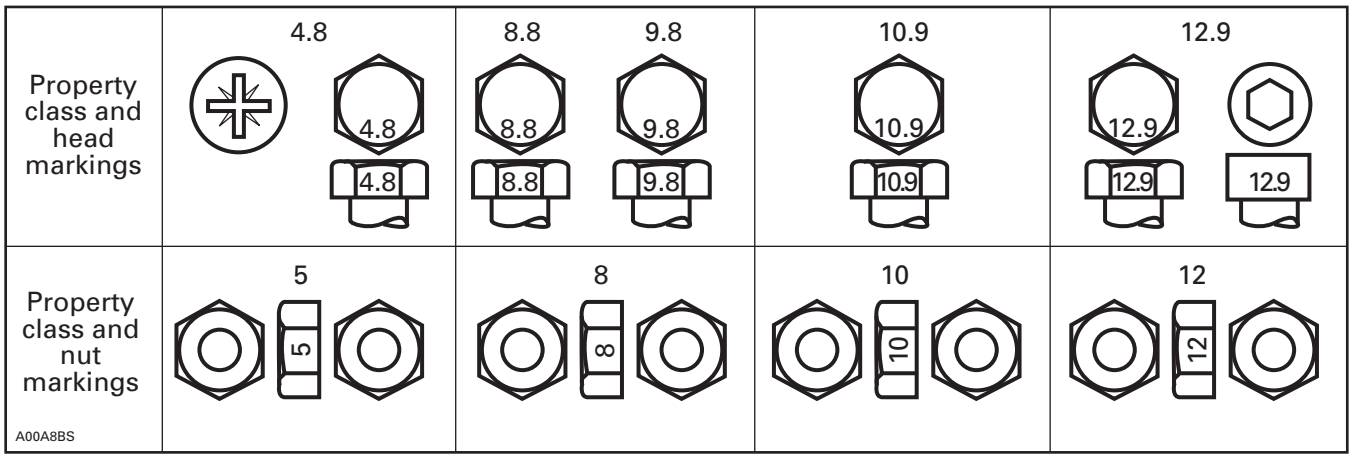
In order to avoid a poor assembly, tighten screws, bolts, or nuts in accordance with the following procedure:

1. Manually screw all screws, bolts and/or nuts.
2. Apply half the recommended torque value.
3. Tighten fastener to the recommended torque value.

NOTICE Be sure to use the recommended tightening torque for the specified fastener used.

NOTE: When possible, always apply torque on the nut.

NOTE: Always torque screws, bolts and/or nuts using a crisscross pattern when multiple fasteners are used to secure a part (eg. a cylinder head). Some parts must be torqued according to a specific sequence and torque pattern as detailed in the installation procedure.

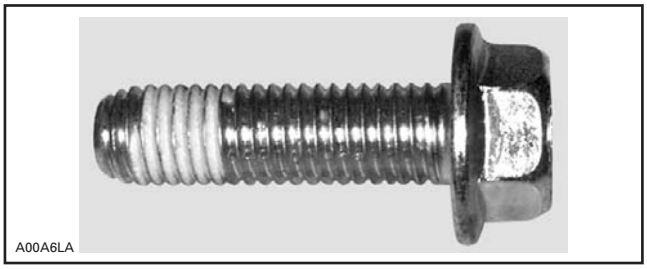


FASTENER SIZE	FASTENER GRADE/TORQUE			
	5.8 Grade	8.8 Grade	10.9 Grade	12.9 Grade
M4	1.5 – 2 N•m (13 – 18 lbf•**in**)	2.5 – 3 N•m (22 – 27 lbf•**in**)	3.5 N•m - 4 N•m (31 lbf•**in** - 35 lbf•**in**)	4 N•m - 5 N•m (35 lbf•**in** - 44 lbf•**in**)
M5	3 N•m - 3.5 N•m (27 lbf•**in** - 31 lbf•**in**)	4.5 N•m - 5.5 N•m (40 lbf•**in** - 49 lbf•**in**)	7 N•m - 8.5 N•m (62 lbf•**in** - 75 lbf•**in**)	8 N•m - 10 N•m (71 lbf•**in** - 89 lbf•**in**)
M6	6.5 N•m - 8.5 N•m (58 lbf•**in** - 75 lbf•**in**)	8 N•m - 12 N•m (71 lbf•**in** - 106 lbf•**in**)	10.5 – 15 N•m (93 – 133 lbf•**in**)	16 N•m (142 lbf•**in**)
M8	15 N•m (133 lbf•**in**)	25 N•m (18 lbf•ft)	32 N•m (24 lbf•ft)	40 N•m (30 lbf•ft)
M10	29 N•m (21 lbf•ft)	48 N•m (35 lbf•ft)	61 N•m (45 lbf•ft)	73 N•m (54 lbf•ft)
M12	52 N•m (38 lbf•ft)	85 N•m (63 lbf•ft)	105 N•m (77 lbf•ft)	128 N•m (94 lbf•ft)
M14	85 N•m (63 lbf•ft)	135 N•m (100 lbf•ft)	170 N•m (125 lbf•ft)	200 N•m (148 lbf•ft)

FASTENER INFORMATION

NOTICE Most components in the vehicles are built with parts dimensioned in the metric system. Most fasteners are metric and must not be replaced by customary fasteners or vice-versa. Mismatched or incorrect fasteners could cause damage to the vehicle or possible personal injury.

SELF-LOCKING FASTENERS PROCEDURE



TYPICAL — SELF-LOCKING FASTENER

The following describes common procedures used when working with self-locking fasteners.

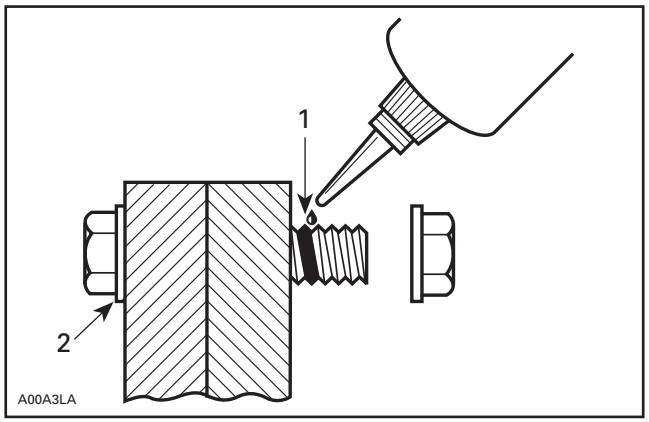
Use a metal brush or a tap to properly clean a threaded hole, then use a solvent. Allow the solvent time to act, approximately 30 minutes, then wipe off. Solvent utilization is to ensure proper adhesion of the product used for locking the fastener.

LOCTITE® APPLICATION PROCEDURE

The following describes common procedures used when working with Loctite products.

NOTE: Always use proper strength Loctite product as recommended in this shop manual.

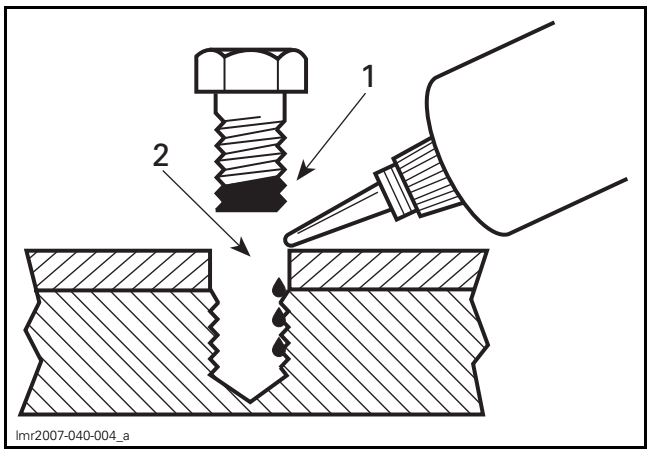
Threadlocker Application for Uncovered Holes (Bolts and Nuts)



1. Apply here
2. Do not apply

1. Clean threads (bolt and nut) with solvent.
2. Apply LOCTITE 7649 (PRIMER) (P/N 293 800 041) on threads and allow to dry.
3. Choose proper strength Loctite threadlocker.
4. Fit bolt in the hole.
5. Apply a few drops of threadlocker at proposed tightened nut engagement area.
6. Position nut and tighten as required.

Threadlocker Application for Blind Holes

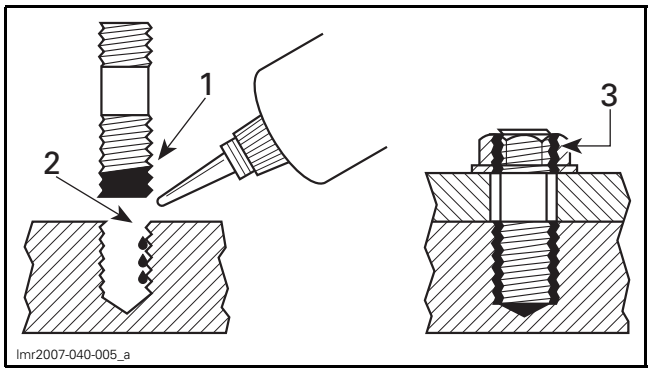


1. On fastener threads
2. On threads and at the bottom of hole

1. Clean threads (bolt and hole) with solvent.
2. Apply LOCTITE 7649 (PRIMER) (P/N 293 800 041) on threads (bolt and nut) and allow to dry for 30 seconds.
3. Choose proper strength Loctite threadlocker.

4. Apply several drops along the threaded hole and at the bottom of the hole.
5. Apply several drops on bolt threads.
6. Tighten as required.

Threadlocker Application for Stud Installation in Blind Holes



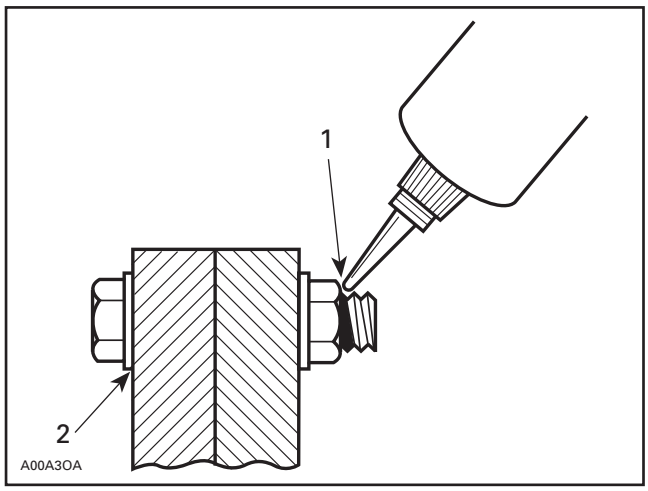
1. On stud threads
2. On threads and in the hole
3. On retaining nut threads

1. Clean threads (stud and hole) with solvent.
2. Apply LOCTITE 7649 (PRIMER) (P/N 293 800 041) on threads and allow to dry.
3. Put 2 or 3 drops of proper strength Loctite threadlocker on female threads and in hole.

NOTE: To avoid a hydro lock situation, do not apply too much Loctite.

4. Apply several drops of proper strength Loctite on stud threads.
5. Install stud.
6. Install cover, part, etc.
7. Apply a few drops of proper strength Loctite on uncovered stud threads.
8. Install and tighten retaining nut(s) as required.

Threadlocker Application for Pre-Assembled Parts

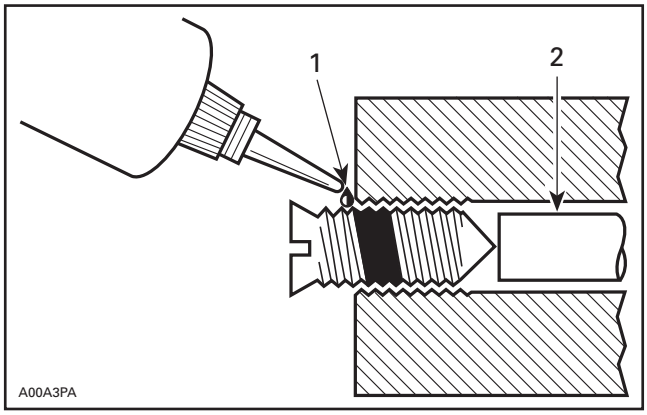


1. Apply here
2. Do not apply

1. Clean bolts and nuts with solvent.
2. Assemble components.
3. Tighten nuts.
4. Apply a few drops of proper strength Loctite on bolt/nut contact surfaces.
5. Avoid touching metal with tip of flask.

NOTE: For preventive maintenance on existing equipment, retighten nuts and apply proper strength Loctite on bolt/nut contact surfaces.

Threadlocker Application for an Adjustment Screw

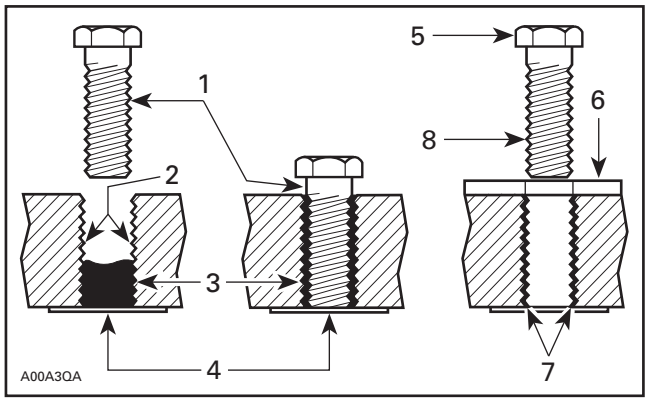


1. Apply here
2. Plunger

1. Adjust screw to proper setting.
2. Apply a few drops of proper strength Loctite threadlocker on screw/body contact surfaces.
3. Avoid touching metal with tip of flask.

NOTE: If it is difficult to readjust, heat screw with a soldering iron (232°C (450°F)).

Application for Stripped Thread Repair



1. *Release agent*
2. *Stripped threads*
3. *Form-A-Thread*
4. *Tapes*
5. *Cleaned bolt*
6. *Plate*
7. *New threads*
8. *Threadlocker*

Standard Thread Repair

Follow instructions on Loctite FORM-A-THREAD 81668 package.

If a plate is used to align bolt:

1. Apply release agent on mating surfaces.
2. Put waxed paper or similar film on the surfaces.
3. Twist bolt when inserting it to improve thread conformation.

NOTE: NOT intended for engine stud repairs.

Repair of Small Holes/Fine Threads

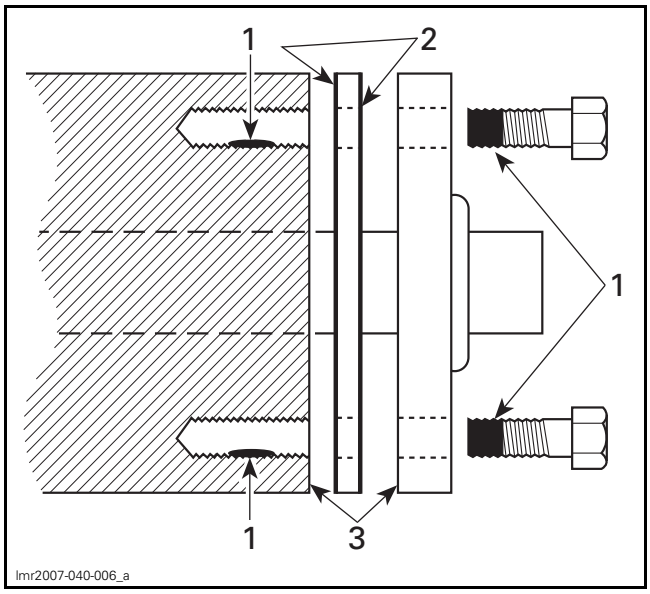
Option 1: Enlarge damaged hole, then follow *STANDARD THREAD REPAIR* procedure.

Option 2: Apply FORM-A-THREAD on the screw and insert in damaged hole.

Permanent Stud Installation (Light Duty)

1. Use a stud of the desired thread length.
2. DO NOT apply release agent on stud.
3. Follow Standard Thread Repair procedure.
4. Allow 30 minutes for Loctite FORM-A-THREAD to cure.
5. Complete part assembly.

Gasket Compound Application



1. *Proper strength Loctite*
2. *Loctite Primer N (P/N 293 800 041) and Gasket Eliminator 518 (P/N 293 800 038) on both sides of gasket*
3. *Loctite Primer N only*

1. Remove old gasket and other contaminants using LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500). Use a mechanical means only if necessary.

NOTE: Avoid grinding.

2. Clean both mating surfaces with solvent.
3. Spray Loctite Primer N on both mating surfaces and on both sides of gasket and allow to dry 1 or 2 minutes.
4. Apply LOCTITE 518 (P/N 293 800 038) on both sides of gasket, using a clean applicator.
5. Place gasket on mating surfaces and assemble parts immediately.

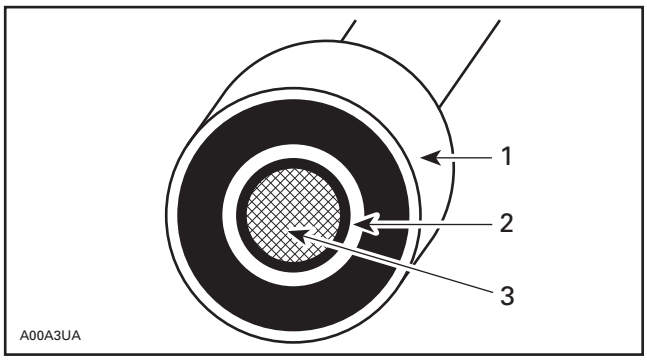
NOTE: If the cover is bolted to blind holes, apply proper strength Loctite in the hole and on threads. Tighten fastener.

If holes are sunken, apply proper strength Loctite on bolt threads.

6. Tighten as usual.

Threadlocker Application for Mounting on a Shaft

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

1. Clean shaft external contact surface.
2. Clean internal contact surface of part to be installed on shaft.
3. Apply a strip of proper strength Loctite on circumference of shaft contact surface at insertion or engagement point.

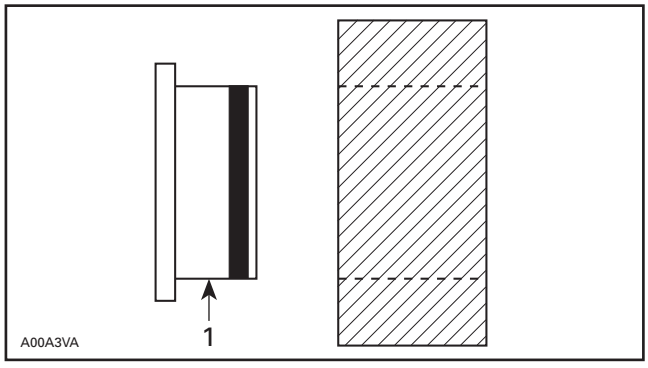
NOTE: Retaining compound is always forced out when applied on shaft.

4. DO NOT use antiseize Loctite or any similar product.
5. No curing period is required.

Mounting in Tandem

1. Apply retaining compound on internal contact surface (bore) of parts to be installed.
2. Continue parts assembly as per previous illustration.

Threadlocker Application for Case-In Components (Metallic Gaskets)



1. Proper strength Loctite

1. Clean inner housing diameter and outer gasket diameter.
2. Spray housing and gasket with LOCTITE 7649 (PRIMER) (P/N 293 800 041).
3. Apply a strip of proper strength Loctite on leading edge of outer metallic gasket diameter.

NOTE: Any Loctite product can be used here. A low strength liquid is recommended as normal strength and gap are required.

4. Install according to standard procedure.
5. Wipe off excess product.
6. Allow 30 minutes for product to cure.

NOTE: Normally used on worn-out housings to prevent leaking or sliding.

It is generally not necessary to remove gasket compound applied on outer gasket diameter.

PERIODIC MAINTENANCE SCHEDULE (REV G4)

All Models

Procedures are detailed in *PERIODIC MAINTENANCE PROCEDURES* subsection.

PRE RIDE INSPECTION	
Body including seat, footrests, lights, air filter, controls and instruments	Check condition and remove snow or ice
Skis and steering actions	Check for free movement and proper operation
Fuel and injection oil	Check for proper level and no leaks
Coolant	Check for proper level and no leaks
Brake fluid	Check for proper level and no leaks
Storage compartment	Check for proper latching and no heavy or breakable objects
Throttle lever	Check for proper action
Track	Check condition and remove snow or ice
Slider shoes	Check for proper operation
Brake lever	Check for proper operation
Parking brake, brake	Check for proper operation
Emergency engine stop switch and engine cut-off switch (tether cord cap)	Check for proper action. Tether cord must be attached to operator clothing eyelet
Lights	Check for proper operation
Ski and runners	Check for proper condition (and operation if adjustable)
Drive belt	Check condition for cracks, fraying or abnormal wear

Mountain Series Only

DURING THE FIRST 1500KM (1000MI)
Adjust and align track after first 75KM (50MI)
Inspect track tension every 500KM (300MI), adjust if necessary

Mountain Series Only

EVERY 1500KM (1000MI)
Adjust drive chain
Adjust and align track (if necessary)

All Models

EVERY YEAR AT PRESEASON OR 3 000 KM (2,000MI) (WHICHEVER COMES FIRST)
Perform *PRE-RIDE INSPECTION*
Check fault codes
Charge battery (on applicable models)
Adjust drive chain
Inspect track tension, adjust and align (if necessary)
Inspect brake hose, pads and disk
Check coolant density
Inspect drive belt
Inspect and clean drive pulley
Inspect and clean driven pulley
Lubricate rear suspension (lubricate whenever the vehicle is used in wet conditions (rain, puddles)
Inspect exhaust system and check for leaks
Tighten exhaust manifold screws or nuts to specified torque
Inspect fuel lines and connections
Inspect front suspension
Inspect rear suspension (including stopper straps and slider shoes)
Inspect tie-rod ends and ski alignment
Adjust headlight beam aiming

EVERY 2 YEAR OR 6 000KM (4,000 MI) (WHICHEVER COMES FIRST)
Replace brake fluid
Inspect throttle cable
Clean and lubricate rewind starter (on applicable models)
Change chaincase oil
Inspect engine rubber mounts

EVERY 3 YEARS OR 10 000KM (6,000 MI) (WHICHEVER COMES FIRST)
Replace spark plugs
Inspect oil injection pump strainer and clean if needed
Clean 3D rave valves

EVERY 5 YEARS
Replace engine coolant
Replace in-line fuel filter

PERIODIC MAINTENANCE PROCEDURES

SERVICE TOOLS

Description	Part Number	Page
OETIKER PLIER	295 000 070	5
TENSIOMETER	414 348 200	9

SERVICE PRODUCTS

Description	Part Number	Page
BRAKE FLUID GTLMA DOT4	293 600 131	11
LONG LIFE ANTIFREEZE	219 702 685	3
MOLYKOTE PG 54	420 899 763	2
PULLEY FLANGE CLEANER	413 711 809	6, 8
SUSPENSION GREASE	293 550 033	13
XPS SYNTHETIC CHAINCASE OIL	413 803 300	8
XPS SYNTHETIC GREASE	293 550 010	13

GENERAL

This subsection provides general maintenance instructions. Where detailed instructions for disassembly or reassembly is required, refer to the applicable subsection.

PROCEDURES

ENGINE

Cleaning and Lubricating the Rewind Starter

Refer to *REWIND STARTER ASSEMBLY* in *REWIND STARTER* subsection.

NOTICE It is of the utmost importance that the rewind starter spring be lubricated periodically using MOLYKOTE PG 54 (P/N 420 899 763). The use of standard multipurpose grease could result in rewind starter malfunction under very cold temperatures and component life will be shortened.

Cleaning the 3D RAVE Valve

NOTICE It is very important to perform *3D RAVE VALVE SYNCHRONIZATION* whenever link bar is removed. Refer to *RAVE* subsection.

Clean carbon deposits as required.

Thoroughly clean all *RAVE VALVES* components and cylinder slots.

Use a clean rag when cleaning the valve.

NOTE: Do not use any solvents or cleaners for cleaning the cylinder slots. Fluids can cause corrosion of the cylinder bore which may result in severe engine damage.

Inspecting the Rubber Mount

Check rubber mounts for cracks or other damages.

Adjusting the Engine Stopper

Refer to *REMOVING AND INSTALLING THE ENGINE* subsection.

EXHAUST SYSTEM

Inspecting the Exhaust System

Check the following components for leaks, cracks, or other damages:
- Springs and retainers
- Exhaust system mounts
- Muffler
- Tuned pipe
- Donut gaskets
- Shields
- Manifold.

LUBRICATION SYSTEM

Inspecting and Cleaning the Oil Injection Pump Strainer

Refer to *OIL INJECTION PUMP* in *LUBRICATION SYSTEM* subsection.

Lubricating the Engine

Engine Storage Mode (Summerization Function)

Refer to applicable *GAUGE* subsection as procedure varies depending on the gauge.

COOLING SYSTEM

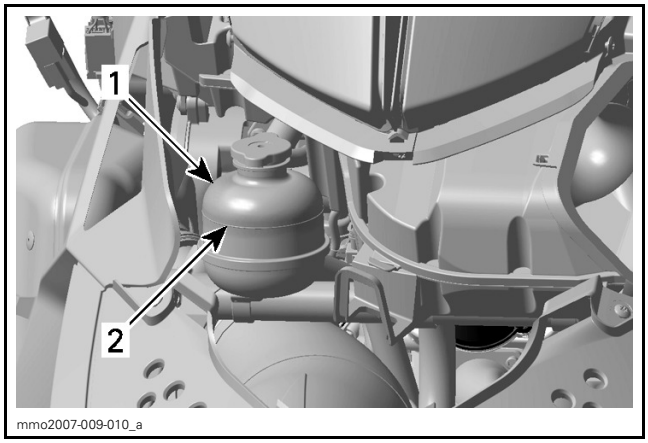
⚠ WARNING

Never open coolant tank cap when engine is hot.

Verifying the Engine Coolant Level

Check coolant level at room temperature with the cap removed. Liquid should be at cold level line (engine cold) of coolant tank.

NOTE: When checking level at low temperature it may be slightly lower then the mark.



TYPICAL
1. Coolant tank
2. COLD LEVEL line

Verifying the Engine Coolant Strength

Remove pressure cap.

Use an antifreeze tester to test coolant strength.

MINIMUM RECOMMENDED COOLANT STRENGTH
-30°C (-22°F)

Replacing the Engine Coolant

Recommended Engine Coolant

RECOMMENDED SERVICE PRODUCT	ACCEPTABLE
LONG LIFE ANTIFREEZE (P/N 219 702 685)	A blend of 50% distilled water with 50% antifreeze (especially formulated for aluminum engines

To prevent antifreeze deterioration, always use the same brand. Never mix different brands unless cooling system is completely flushed and refilled.

NOTICE To prevent rust formation or freezing condition, always replenish the system with the BRP premixed coolant or with 50% antifreeze and 50% distilled water. Do not use tap water, straight antifreeze or straight water in the system. Tap water contains minerals and impurities which build up in the system. During cold weather, straight water causes the system to freeze while straight antifreeze thickens (like slush ice) and does not have the same efficiency. Always use ethylene glycol antifreeze containing corrosion inhibitors specifically recommended for aluminum engines.

Draining the Cooling System

⚠ WARNING

Never drain or refill the cooling system when engine is hot.

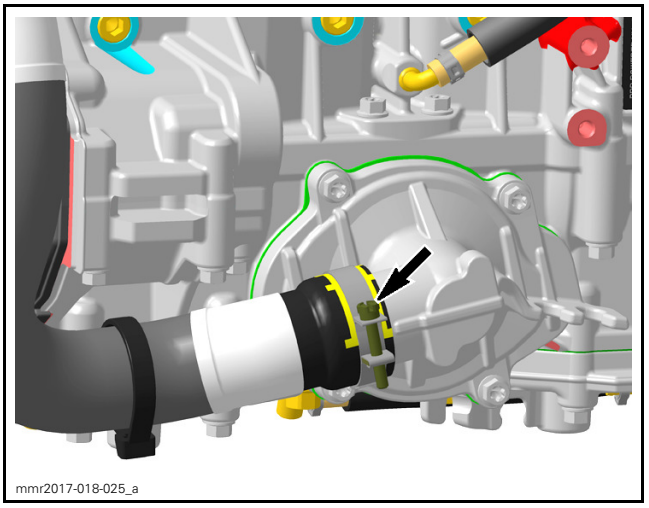
Remove RH side panel and hood. Refer to *BODY* subsection.

Remove muffler and tuned pipe. Refer to *EXHAUST SYSTEM* subsection.

Place a large drain pan under the vehicle bottom pan.

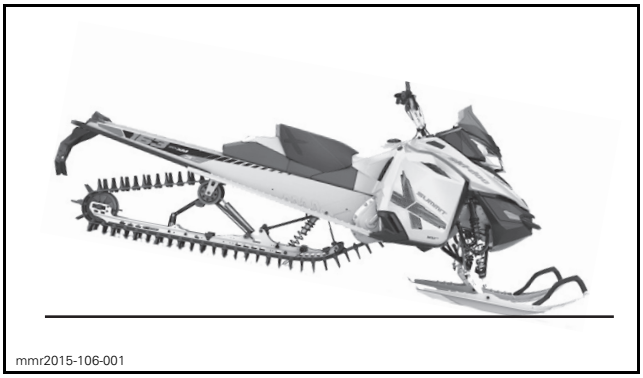
Remove clamp. Discard original installed gear clamp.

Unplug coolant hose from water pump to drain coolant.



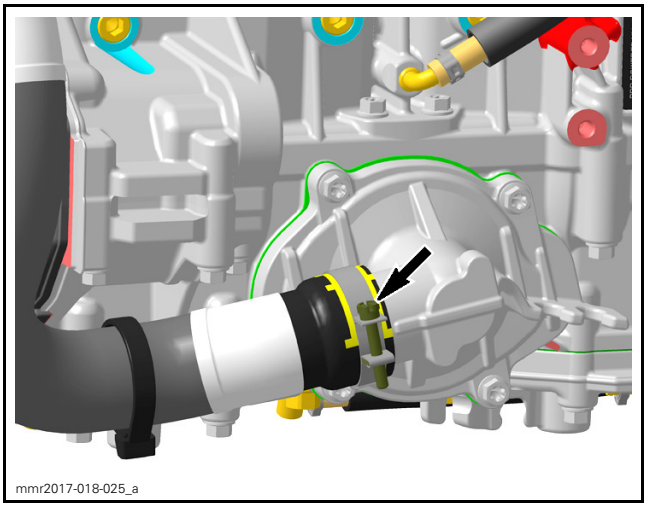
REMOVE CLAMP (DISCARD ORIGINAL INSTALLED 1–EAR CLAMP)

When coolant level is low enough, lift the rear of vehicle to drain the heat exchangers.



TYPICAL VIEW

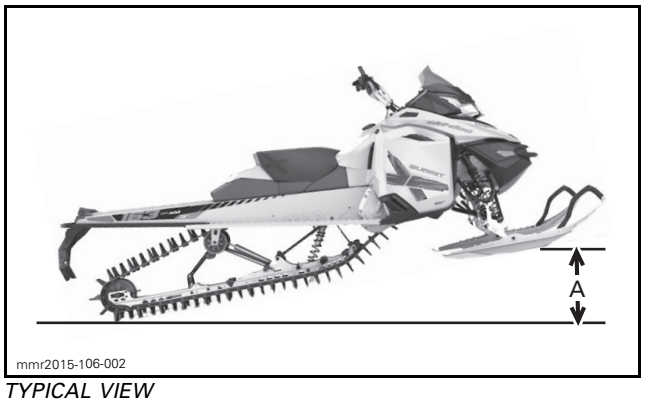
Install and tighten coolant hose clamp on water pump.



TIGHTENING TORQUE	
Coolant hose clamp	3 N•m ± 0.4 N•m (27 lbf•**in** ± 4 lbf•**in**)

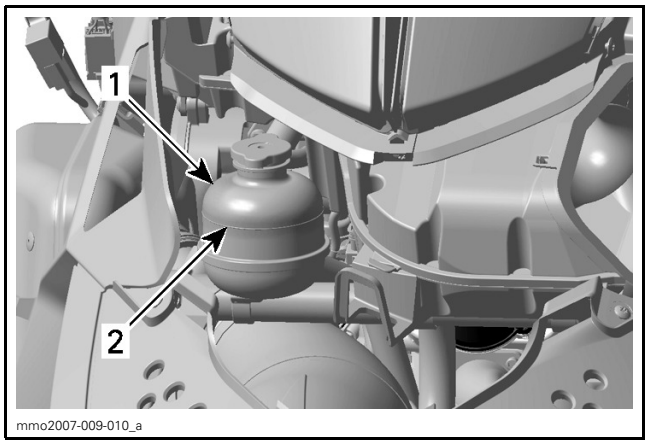
Refilling and Bleeding the Cooling System

1. Apply parking brake.
2. Lift front of vehicle as shown and support it safely.



TYPICAL VIEW
A. 25 cm ± 5 cm (10 in ± 2 in)

3. With engine cold, slowly fill coolant tank up to COLD LEVEL line allowing time for the air in the cooling system to seep out.

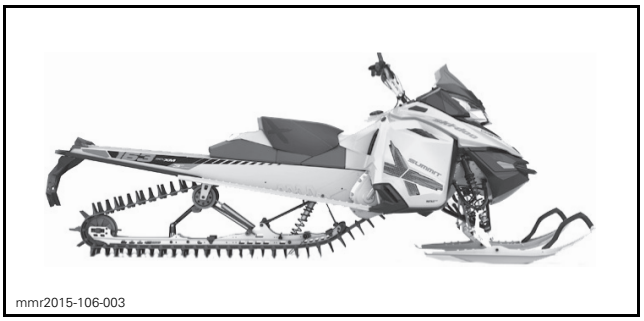


TYPICAL
1. Coolant tank
2. COLD LEVEL line

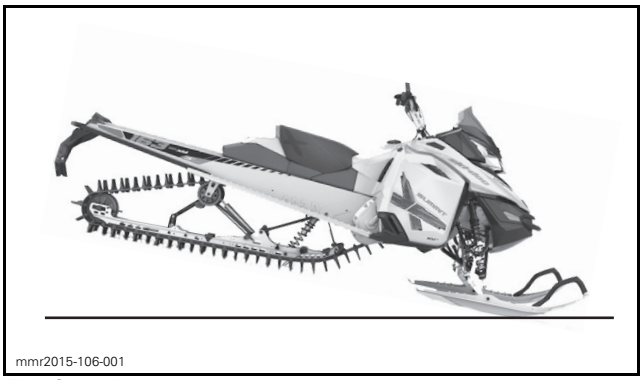
4. Start engine.
5. Refill coolant tank up to COLD LEVEL line while engine is idling until rear heat exchangers are warm to the touch (about 4 to 5 minutes).

NOTE: Always monitor coolant level while filling coolant tank to avoid emptying and thus allowing air to enter the system.

6. Install pressure cap.
7. Lower vehicle back to the ground.



8. Lift rear of vehicle and support it safely.

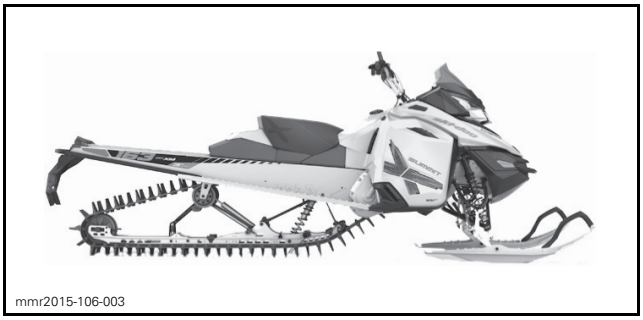


TYPICAL VIEW

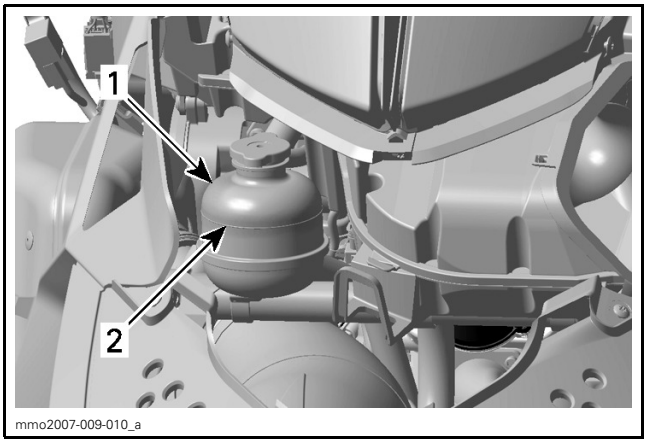
⚠ WARNING

Before revving engine, ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Always lift the snowmobile on a wide-base stand with a rear deflector panel. Ensure no one is standing in close proximity to the snowmobile, especially at the rear of the track. Centrifugal force could cause debris, damaged or loose studs, pieces of torn track, or an entire track to be violently thrown backwards out of the frame with tremendous force, possibly resulting in the loss of a leg or other serious injury.

9. Remove parking brake.
10. Activate throttle lever 3 - 4 times to bring engine speed to 7000 RPM.
11. Apply the brake.
12. Lower vehicle back to ground.
13. Stop engine.


mmr2015-106-003

14. Add coolant up to 15 mm (1/2 in) above the COLD LEVEL line.



mmo2007-009-010_a

TYPICAL
1. *Coolant tank*
2. *Coolant 15 mm (1/2 in) above COLD LEVEL line*

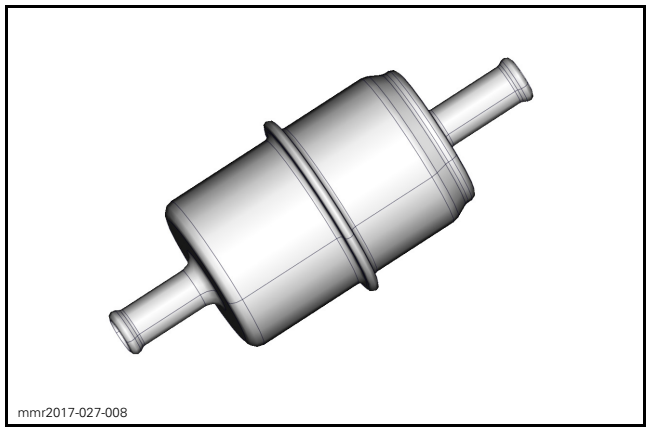
15. When engine has completely cooled down, recheck coolant level in coolant tank and refill up to line if needed.
16. Visual check for any leakages.
17. Perform *VERIFYING THE ENGINE COOLANT STRENGTH*. See procedure in this subsection.
18. Adjust mixture as necessary.
19. Reinstall removed parts.

FUEL SYSTEM

Inspecting the Fuel Lines and Connections

Visually inspect fuel lines and connections for cracks or leaks.

Replacing the In-Line Fuel Filter


mmr2017-027-008

Removing the In-line Fuel Filter

⚠ WARNING

Work in a well ventilated area. Wipe up all spilled fuel.

1. Release fuel pressure in the system. Refer to *FUEL TANK AND FUEL PUMP* subsection.
2. Remove the upper body module. Refer to *BODY* subsection.
3. Disconnect magneto connector.

⚠ WARNING

The magneto connector must be disconnected to prevent any spark in the engine compartment and to remove power from the fuel pump. Otherwise, if the engine is cranked, fuel vapors may ignite in presence of a spark creating a fire hazard.

4. Place a rag between fuel filter and oil injection tank.
5. Cut both Oetiker clamps securing the fuel filter.
6. Remove fuel filter from vehicle.

Dispose fuel filter as per your local environmental regulations.

Installing the In-Line Fuel Filter

The installation is the reverse of the removal procedure however, pay attention to the following.

Insert new Oetiker clamps on both hoses.

Install the new filter. Make sure printed arrow pointed towards the ECM.

Using OETIKER PLIER (P/N 295 000 070), close Oetiker clamps to secure the fuel filter.

⚠ WARNING

Ensure hose clamp is tight and that hose cannot turn on the fitting.

When installation is complete, carry out a fuel system leak test, refer to *FUEL SYSTEM PRESSURIZATION* in *FUEL TANK AND FUEL PUMP* subsection.

⚠ WARNING

After working on the fuel system, carry out a fuel system pressurization test to check for leaks. Failure to carry out a fuel system leak test could result in severe injury or a life threatening situation should a leak occur.

Reinstall all removed parts.

Inspecting and Cleaning the Throttle Body

Clean throttle plates and throttle body bores.

THROTTLE BODY CLEANING	
Service product	PULLEY FLANGE CLEANER (P/N 413 711 809)

Inspecting the Throttle Cable

Visually inspect cable sheath for kinks, wear or other damage.

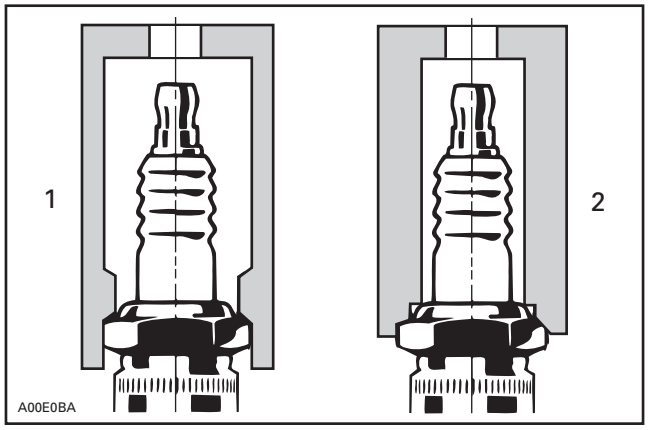
Visually inspect cable at throttle body/carburetor and at throttle lever for fraying or other damage.

Make sure the throttle cable operates smoothly.

SPARK PLUGS

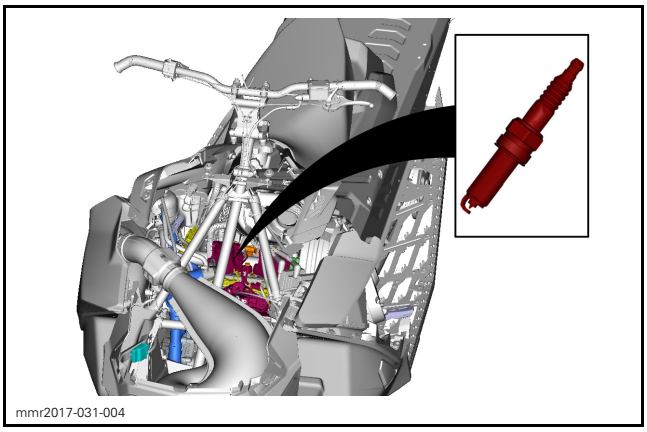
Replacing the Spark Plug

NOTE: Use only an approved spark plug socket for removal and installation. Extra care should be taken to avoid side stresses which could result in a broken spark plug.



TYPICAL
1. *Approved socket*
2. *Improper socket*

Removing the Spark Plugs

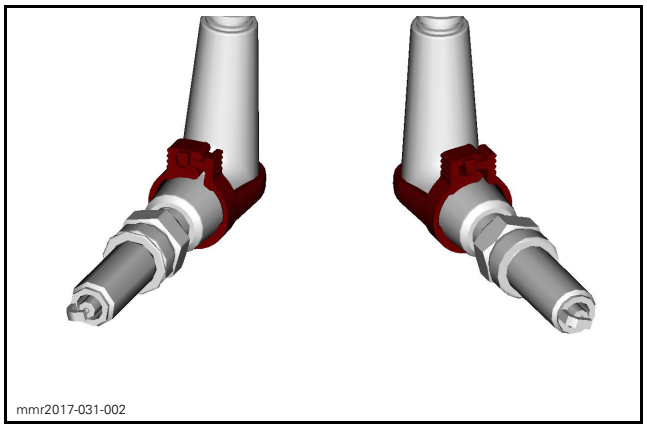


1. Disconnect the stator connector. Refer to *STATOR CONNECTOR ACCESS* in the *MAGNETO AND STARTER* subsection.
2. Remove the upper body module. For procedure, refer to *BODY* subsection.
3. Remove cover, refer to *TOP END* subsection.
4. Clean the spark plug and cylinder head with pressurized air.

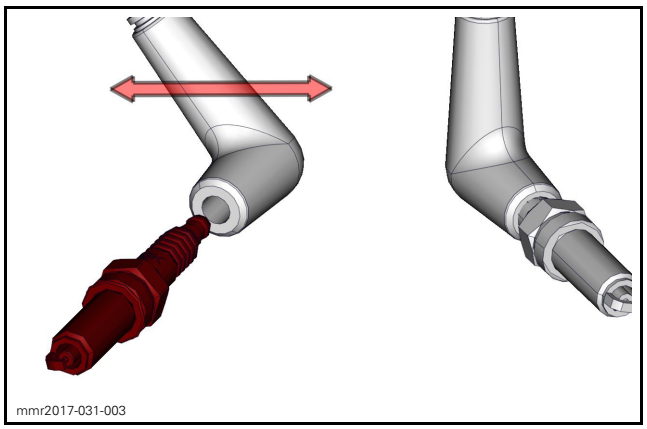
⚠ WARNING

Whenever using compressed air, always wear protective eye wear.

5. Remove lock securing spark plug wire to spark plug.


mmr2017-031-002

6. Remove spark plug cables by gently rotating the cap and pulling it off the plug.


mmr2017-031-003

7. Unscrew the spark plug sufficiently to break the applied torque using the appropriate tools.


mmr2017-031-001

8. Remove spark plugs by hand.

Installing the Spark Plugs (OEM)

1. Prior to installation, ensure the contact surfaces of the cylinder head and spark plug are free of grime.
2. Using a wire gauge, confirm electrode gap is as specified. Refer to *TECHNICAL SPECIFICATIONS*.

NOTE: If spark plug gap is incorrect, use another spark plug.

3. Hand screw spark plug into cylinder head until it bottoms out.
4. Apply specific torque using a torque wrench and approved spark plug socket.

NOTE: Spark plug tightening torque is particularly important on this engine as it contributes to the proper positioning of the negative electrode.

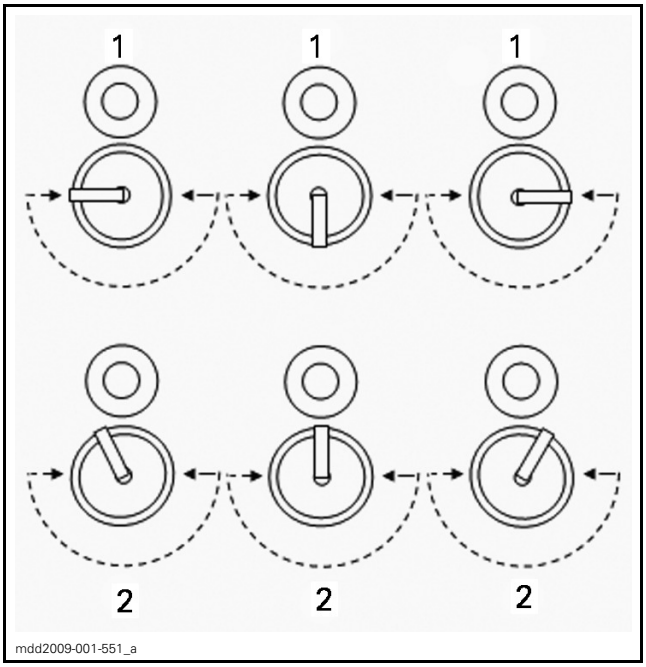
TIGHTENING TORQUE	
Spark plug	18 N•m ± 0.7 N•m (159 lbf•**in** ± 6 lbf•**in**)

Installing the Spark Plugs (Non-OEM)

NOTE: When using a non-OEM spark plug , it must be correctly indexed or engine may experience rough idling and higher emissions.

1. Using a marker, mark the open end of the negative electrode on the plug shell (above threads).
2. Ensure the contact surfaces of the cylinder head and spark plug are free of grime.
3. Install and torque the spark plug, refer to previous table for specific torque.
4. Visually check to ensure the open end of the negative electrode is facing the injector nozzle within 90° each side of nozzle.

NOTE: The following illustration uses the point of attachment of the negative electrode to depict the angle. The injector is illustrated above the spark plug.



SPARK PLUG INDEXING
1. *Acceptable installation*
2. *Unacceptable installation*

If the plug indexing angle is not within specification, repeat procedure with another spark plug until correct indexing is achieved.

LIGHTS

Adjusting the Headlights Beam Aiming

Refer to *LIGHTS* subsection.

DRIVE SYSTEM

Inspecting the Drive Belt

Refer to *DRIVE BELT* subsection.

Inspecting and Cleaning the Drive Pulley

Refer to *DRIVE PULLEY* subsection.

Drive Pulley Retaining Screw Tightening

Refer to appropriate *DRIVE PULLEY* subsection.

Replacing the Drive Pulley Wear Parts

Replace drive pulley wear parts as per *PERIODIC MAINTENANCE SCHEDULE*. Refer to *DRIVE PULLEY* subsection.

Inspection and Cleaning the Driven Pulley

Inspect pulley sheave for dirt, marks or scratches.

Test sliding sheave operation.

Use the PULLEY FLANGE CLEANER (P/N 413 711 809) and a clean rag to clean pulley sheaves as necessary.

CHAINCASE

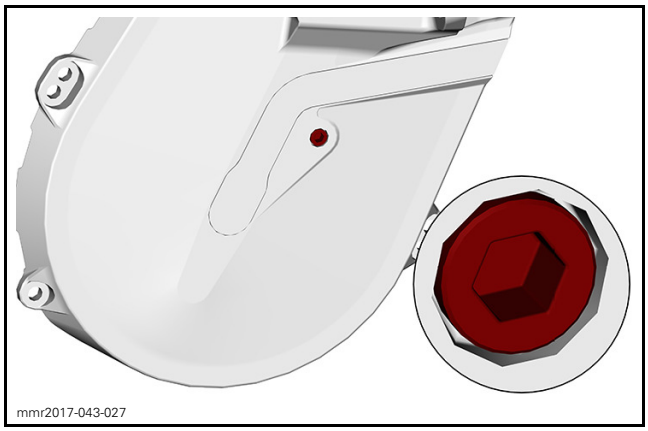
Recommended Chaincase Oil

RECOMMENDED SERVICE PRODUCT
XPS SYNTHETIC CHAINCASE OIL (P/N 413 803 300)

NOTICE **Use only the recommended type oil when servicing. Do not mix synthetic oil with other types of oil.**

Verifying the Chaincase Oil Level

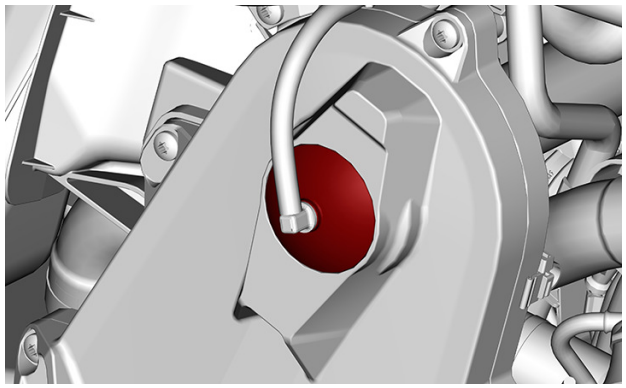
1. Place vehicle on a level surface.
2. Remove the check plug beside the speed sensor on the chaincase cover. Oil level must be equal with the lower edge.



3. Remove metal particles from magnetic check plug.

NOTE: It is normal to find metallic particles stuck to magnetic check plug. If bigger pieces of metal are found, remove the chaincase cover and inspect the chaincase parts.

4. To add oil, remove the filler cap on top of chaincase cover.

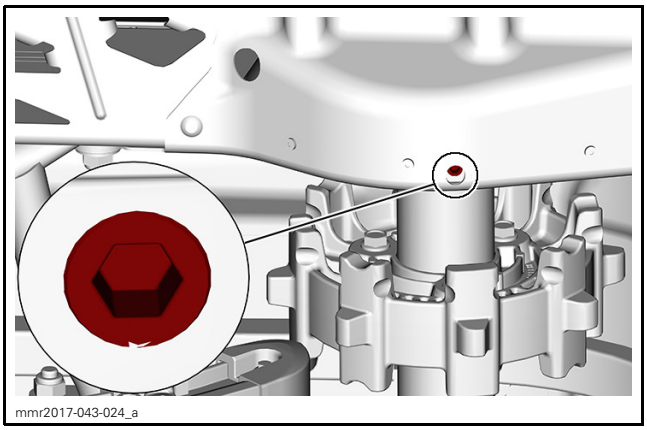

mmr2017-041-001

5. Pour recommended oil in chaincase by the filler hole until oil comes out by the magnetic check plug hole.
6. Reinstall magnetic check plug and torque to specification.

TIGHTENING TORQUE	
Magnetic check plug	6 N•m ± 1 N•m (53 lbf•**in** ± 9 lbf•**in**)

Replacing the Chaincase Oil

1. Place vehicle on a level surface.
2. Place a container under vehicle in line with chaincase to catch chaincase oil.
3. Remove the drain plug on the bottom of the chaincase.


mmr2017-043-024_a

4. Reinstall the drain plug.

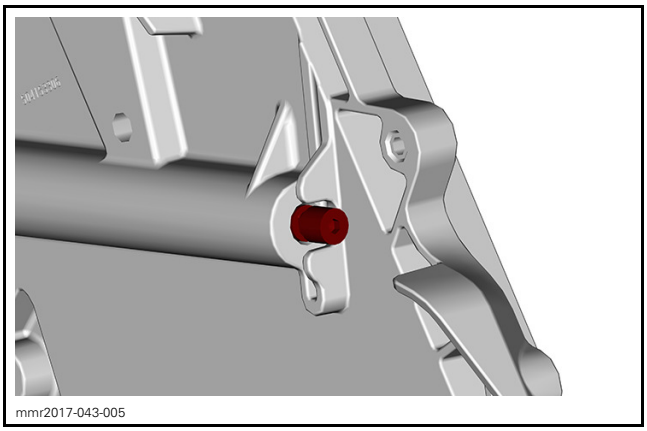
TIGHTENING TORQUE	
Drain plug	6 N•m ± 1 N•m (53 lbf•**in** ± 9 lbf•**in**)

5. Remove the magnetic check plug
6. Pour approximately 350 ml (12 U.S. oz) of recommended oil in chaincase through the filler hole until oil comes out by the magnetic check plug hole.
7. Clean the magnetic check plug. Refer to *CHAINCASE OIL LEVEL VERIFICATION*, see procedure in this subsection.

Adjusting the Drive Chain

1. Tighten tensioner adjustment screw **BY HAND**.

NOTE: Turn adjustment screw until resistance is strong enough that it can not be turned by hand.


mmr2017-043-005

TRACK

Adjusting and aligning the Track

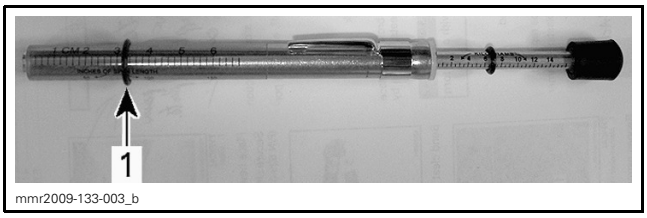
Track tension and alignment are interrelated. Do not adjust one without checking the other. Track tension procedure must be carried out prior to track alignment.

Verifying the Track Tension

1. Lift rear of vehicle and support it off the ground.
2. Allow rear suspension to fully extend.
3. Use a tensiometer.

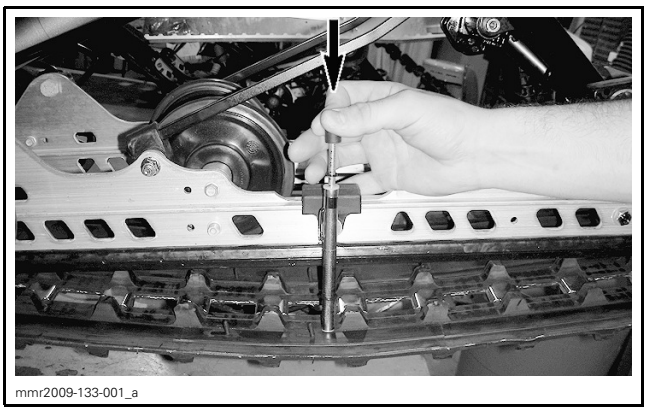
REQUIRED TOOL	
TENSIOMETER (P/N 414 348 200)	

4. Set deflection to 3.2 cm (1.26 in) using bottom O-ring.

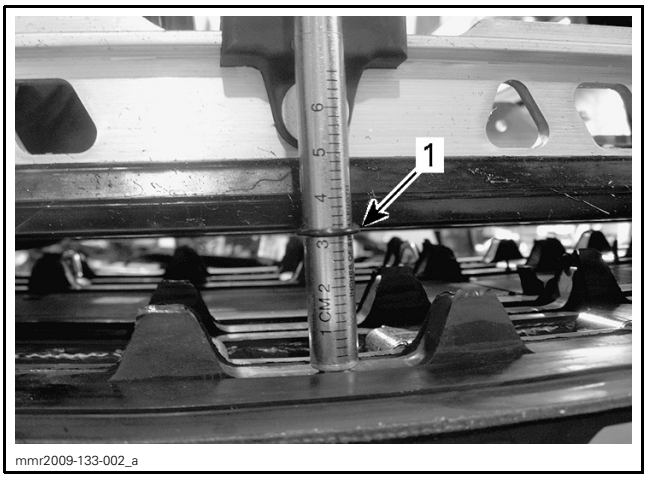


DEFLECTION SETTING
1. Bottom O-ring

5. Place upper O-ring to 0 kgf (0 lbf).
6. Position the tensiometer on track, halfway between runner ends.
7. Push the tensiometer downwards until bottom O-ring (deflection) is aligned with the bottom of slider shoe.

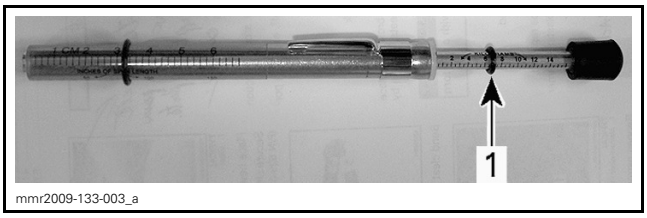


TYPICAL



1. Deflection O-ring aligned with slider shoe

8. Read load recorded by the upper O-ring on the tensiometer.



LOAD READING
1. Upper O-ring

Load reading must be as per the following table.

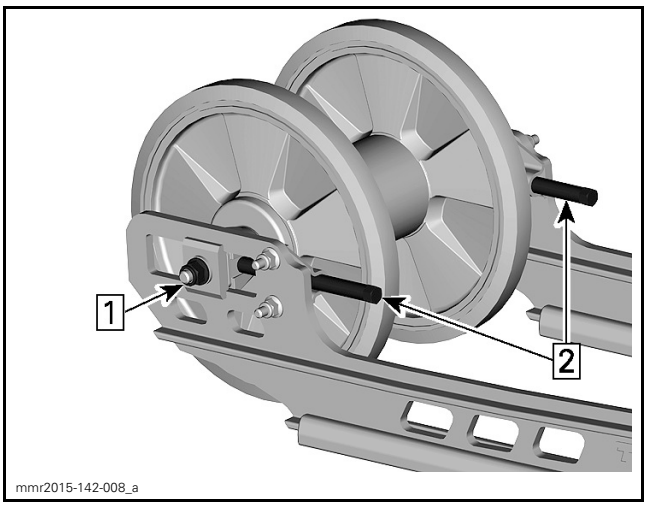
TRACK ADJUSTMENT SPECIFICATION	
Track deflection setting	3.2 cm (1.26 in)
Track load reading	6.0 kgf to 8.5 kgf (13 lbf to 19 lbf)

9. If load reading is not in accordance with the specification, adjust track tension. Refer to *ADJUSTING THE TRACK TENSION*.

NOTICE **Too much tension will result in power loss and excessive stresses on suspension components.**

Adjusting the Track Tension

1. Lift rear of vehicle and support it off the ground.
2. Loosen rear axle
   2.1 Loosen nut on 2 wheel idler system
   2.2 Loosen screw on 3 or 4 wheel idler system
3. Tighten or loosen both adjustment screws to increase or decrease track tension.



Step 1: Loosen axle nut
Step 2: Tighten or loosen adjustment screws

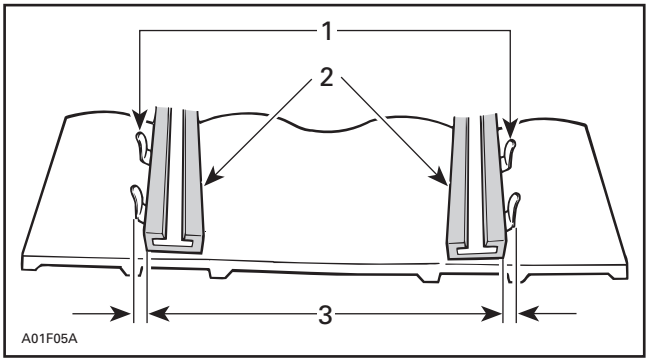
4. Verify track tension, refer to *VERIFYING THE TRACK TENSION*.
5. Ensure track is properly aligned, refer to *ALIGNING THE TRACK*.

Aligning the Track

⚠ WARNING

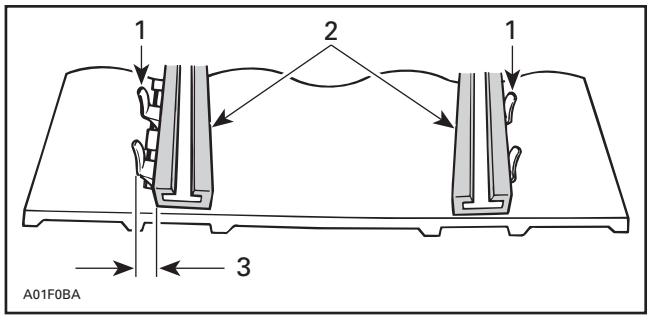
Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle. Never rotate at high speed.

1. Lift rear of vehicle and support it off the ground.
2. Start engine and accelerate slightly so that track barely turns. This must be done in a short period of time (10 seconds).
3. Check that the track is well centered; equal distance on both sides between edges of track guides and slider shoes.



1. Guides
2. Slider shoes
3. Equal distance

4. To correct track alignment:
   - 4.1 Stop engine.
   - 4.2 Loosen rear wheel nut.
   - 4.3 Tighten adjustment screw on side where the slider shoe is the farthest from the track insert guides.



1. Guides
2. Slider shoes
3. Tighten on this side

5. Restart engine.
6. Rotate track slowly and recheck alignment.
7. If satisfactory track alignment is achieved tighten idler wheels axle nut to specification:

TIGHTENING TORQUE	
Rear idler wheel retaining screws **(3 and 4 idler wheels system)**	48 N•m ± 6 N•m (35 lbf•ft ± 4 lbf•ft)
Rear idler wheel retaining nut and screw **(2 idler wheels system)**	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

BRAKE

Recommended Brake Fluid

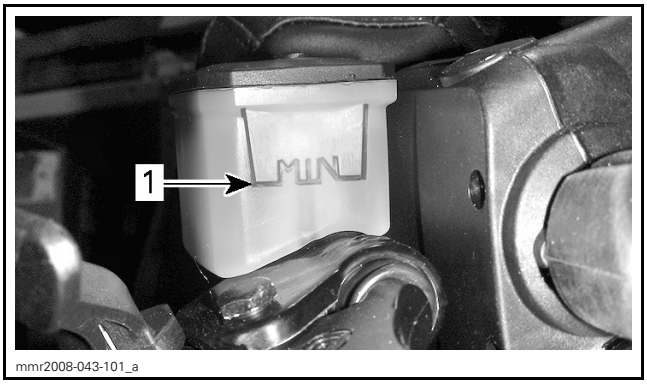
Always use brake fluid meeting the DOT 4 specification.

RECOMMENDED SERVICE PRODUCT
BRAKE FLUID GTLMA DOT4 (P/N 293 600 131) meeting DOT 4 specification

Verifying the Brake Fluid Level

With the vehicle on a level surface, position steering in the straight-ahead position to ensure reservoir is level.

Brake fluid must always be above the MIN. line when brake lever is squeezed.



TYPICAL
1. MINIMUM line

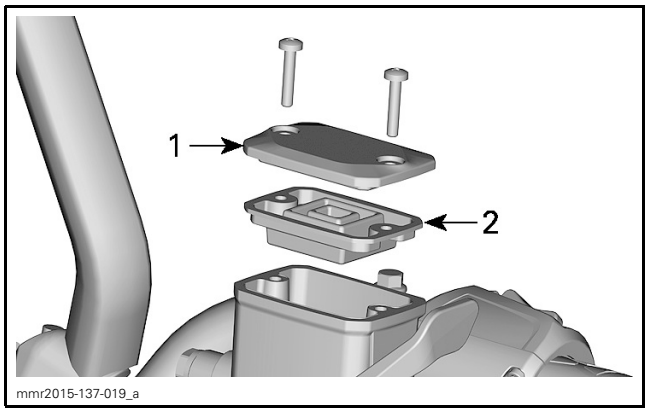
Add fluid as required. Do not overfill.

NOTE: A low level may indicate leaks or worn brake pads.

Replacing the Brake Fluid

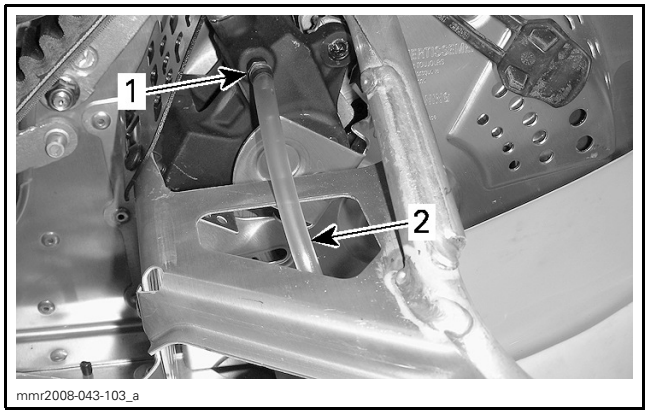
Draining the Brake Fluid

1. Place vehicle on a level surface.
2. Remove reservoir cover with its diaphragm.



1. Reservoir cover
2. Diaphragm

3. Connect a clear hose to caliper bleeder.
4. Place the other end of hose in a container.
5. Loosen bleeder and pump brake lever until no more fluid flows out of bleeder.

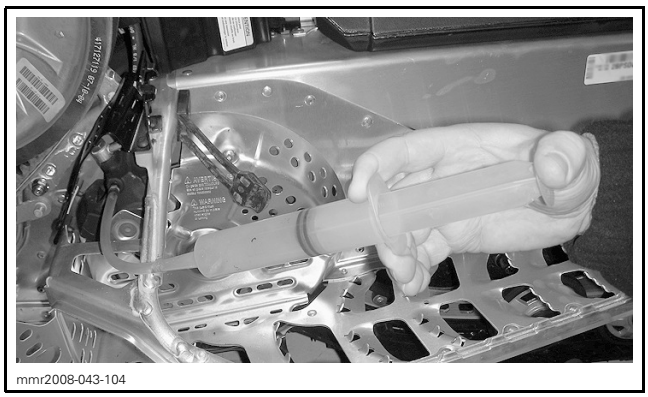


TYPICAL
1. Bleeder
2. Clear hose to catch used brake fluid

Filling the Brake Fluid

To fill brake circuit when it is empty do the following:

1. Ensure reservoir cover is removed.
2. Using a large syringe and a suitable tube, push brake fluid slowly into the caliper.



TYPICAL

3. Continue to push brake fluid until master cylinder reservoir is half full.
4. Close bleeder.
5. Fill up reservoir and install diaphragm and cover.
6. Squeeze brake lever.
   6.1 If brake lever is firm, the brake system does not require bleeding. Torque bleeder as specified.

TIGHTENING TORQUE	
Brake caliper bleeder	8.5 N•m ± 1.5 N•m (75 lbf•**in** ± 13 lbf•**in**)

   6.2 If brake lever is spongy, bleed brake system as per following procedure.

Bleeding the Brake System

1. Install a clear hose on bleeder.
2. Place the other end in a container partially filled with clean brake fluid.
3. Remove reservoir cover and diaphragm.
4. Pump up circuit pressure with brake lever until lever resistance is felt.
5. Squeeze brake lever and open bleeder. When lever touches the handlebar, do not release lever and close bleeder.
6. Release brake lever slowly.
7. Repeat the procedure until no more air bubbles appear in hose.

NOTE: Check fluid level often to prevent air from being pumped into the circuit.

8. Install cover and diaphragm on reservoir.
9. Squeeze brake lever.
   9.1 If brake lever is firm, bleeding procedure is completed. Torque bleeder as specified.
   9.2 If brake lever is still spongy, repeat step 2 to step 6.
10. Torque bleeder as specified.

TIGHTENING TORQUE	
Brake caliper bleeder	8.5 N•m ± 1.5 N•m (75 lbf•**in** ± 13 lbf•**in**)

11. Refill reservoir.
12. Install diaphragm and cover on reservoir.

Inspecting the Brake Hose, Pads and Disc

Break-In Inspection

Visually inspect the brake hose for leaks or any damage.

Visually inspect pads and disc for abnormal wear or any damage.

Scheduled Maintenance and Preseason

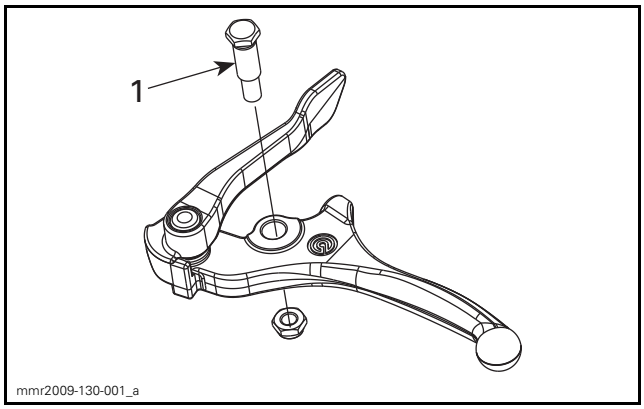
Visually inspect the brake hose for leaks or any damage.

Refer to *BRAKE* subsection and carry out:
– *INSPECTING THE BRAKE PAD*
– *INSPECTING THE BRAKE DISC*.

Lubricating the Brake Lever Pivot

1. Remove brake lever pivot.
2. Lubricate brake lever pivot using recommended product.

SERVICE PRODUCT	
Brake lever pivot	XPS SYNTHETIC GREASE (P/N 293 550 010)



1. Lubricate this surface

3. Install brake lever pivot.
4. Torque pivot nut of brake lever as specified.

TIGHTENING TORQUE	
Brake lever pivot nut	6 N•m ± 1 N•m (53 lbf•**in** ± 9 lbf•**in**)

SUSPENSION

Inspecting the Front Suspension

Visually inspect front suspension for tightness of components:
– Arms
– Stabilizer bar
– Shock absorbers
– Ball joints.

Rear Suspension, Stopper Strap and Slider Shoes

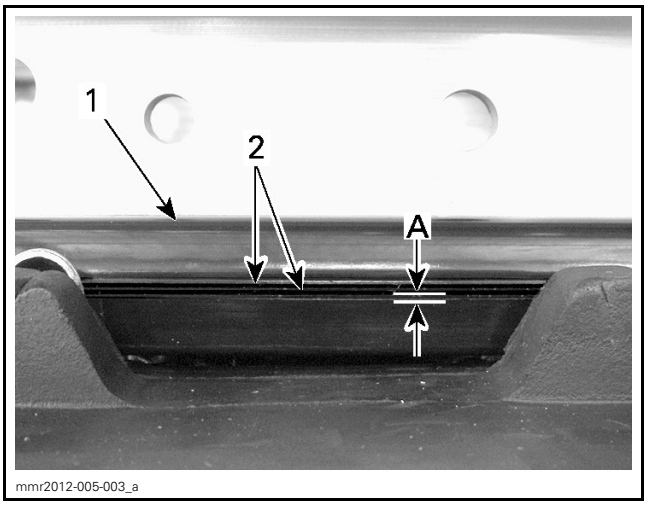
Inspecting the Rear Suspension Mechanism and Stopper Strap

1. Inspect rear suspension components for wear, deterioration or damage, replace defective parts if necessary.
2. Inspect stopper strap(s) for wear or cracks.
3. Check bolt and nut securing strap(s) for tightness. If loose, inspect strap holes for deformation. Replace strap if necessary.

Inspecting the Slider Shoes

Slider shoes are worn out and must be replaced when remaining material exceeding the 2 molding lines is as specified.

MINIMUM SLIDER SHOE THICKNESS
1 mm (.04 in) material remaining exceeding the 2 molding lines

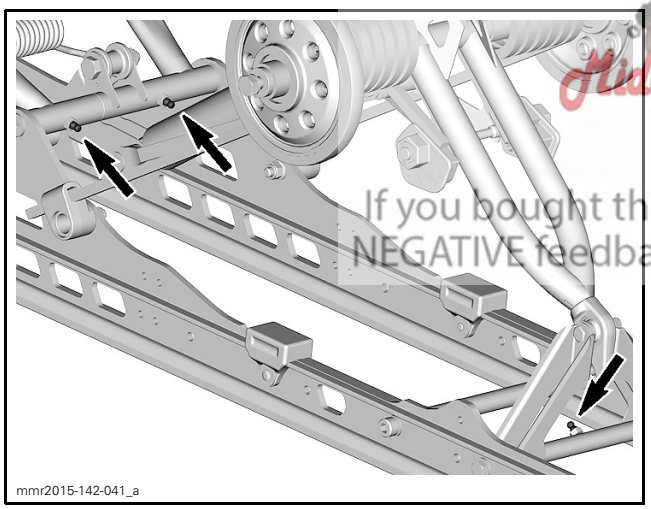


1. Slider shoe
2. Molding lines
A. Minimum thickness: 1 mm (.04 in)

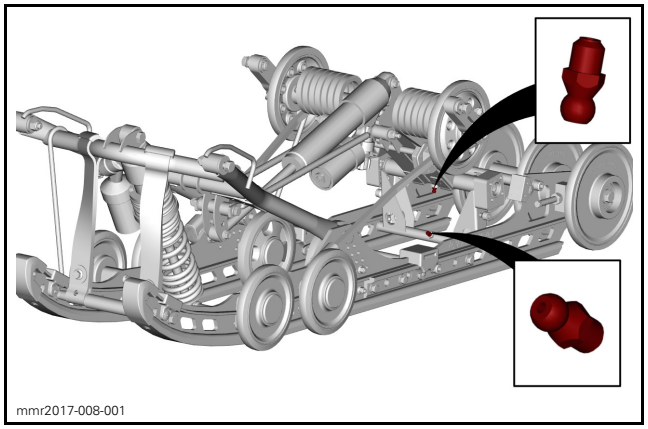
NOTICE **Slider shoes must always be replaced in pairs.**

Lubricating the Rear Suspension

Lubricate the following suspension pivots at grease fittings using SUSPENSION GREASE (P/N 293 550 033).



TYPICAL - tMOTION REAR SUSPENSION



TYPICAL - rMOTION REAR SUSPENSION

STEERING

Inspecting the Ski and Runner

Lift the front of vehicle and check ski runners for wear or damage (missing or broken carbide). Replace if necessary.

Inspect ski for excessive wear or other damage. Replace if necessary.

Refer to *STEERING SYSTEM* subsection for adjustable ski mechanism inspection.

Inspecting the Steering Mechanism

Visually inspect steering mechanism for tightness of components (steering arms, tie rods, ski bolts, ski legs, etc.).

STORAGE PROCEDURE

During summer, or when a snowmobile is not in use for more than three months, proper storage is a necessity.

Procedures are detailed in *PERIODIC MAINTENANCE PROCEDURES* subsection.

STORAGE
Clean the vehicle
Add fuel stabilizer to fuel following the product manufacturer recommendations. Run the engine after adding the product to the fuel
Lubricate engine
Lubricate brake lever pivot
Inspect and lubricate rear suspension
Charge battery monthly to keep it fully charge during storage (on applicable models)
Block muffler outlet with rags
Lift rear of vehicle until track is clear of the ground. Do not release track tension

⚠ CAUTION Use appropriate lifting device or have assistance to share lifting stress. If a lifting device is not used, use proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.

NOTICE The snowmobile has to be stored in a cool and dry place and covered with an opaque but ventilated tarpaulin. This will prevent sun rays and grime from affecting plastic components and vehicle finish.

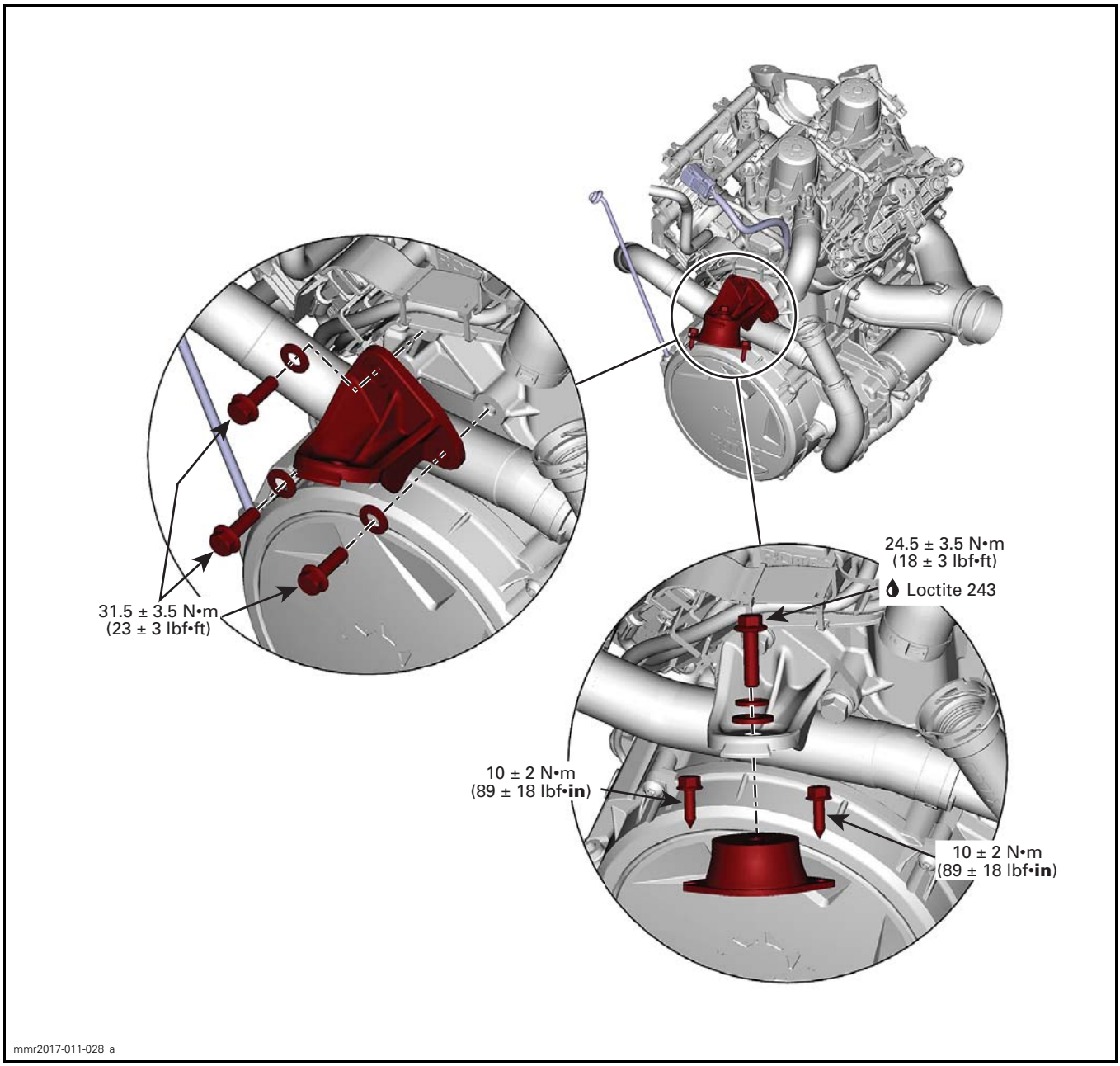
PRESEASON PREPARATION

Proper vehicle preparation is necessary when a vehicle has not been used for more than three months. Using the *MAINTENANCE SCHEDULE*, perform the items titled *EVERY YEAR AT PRESEASON*.

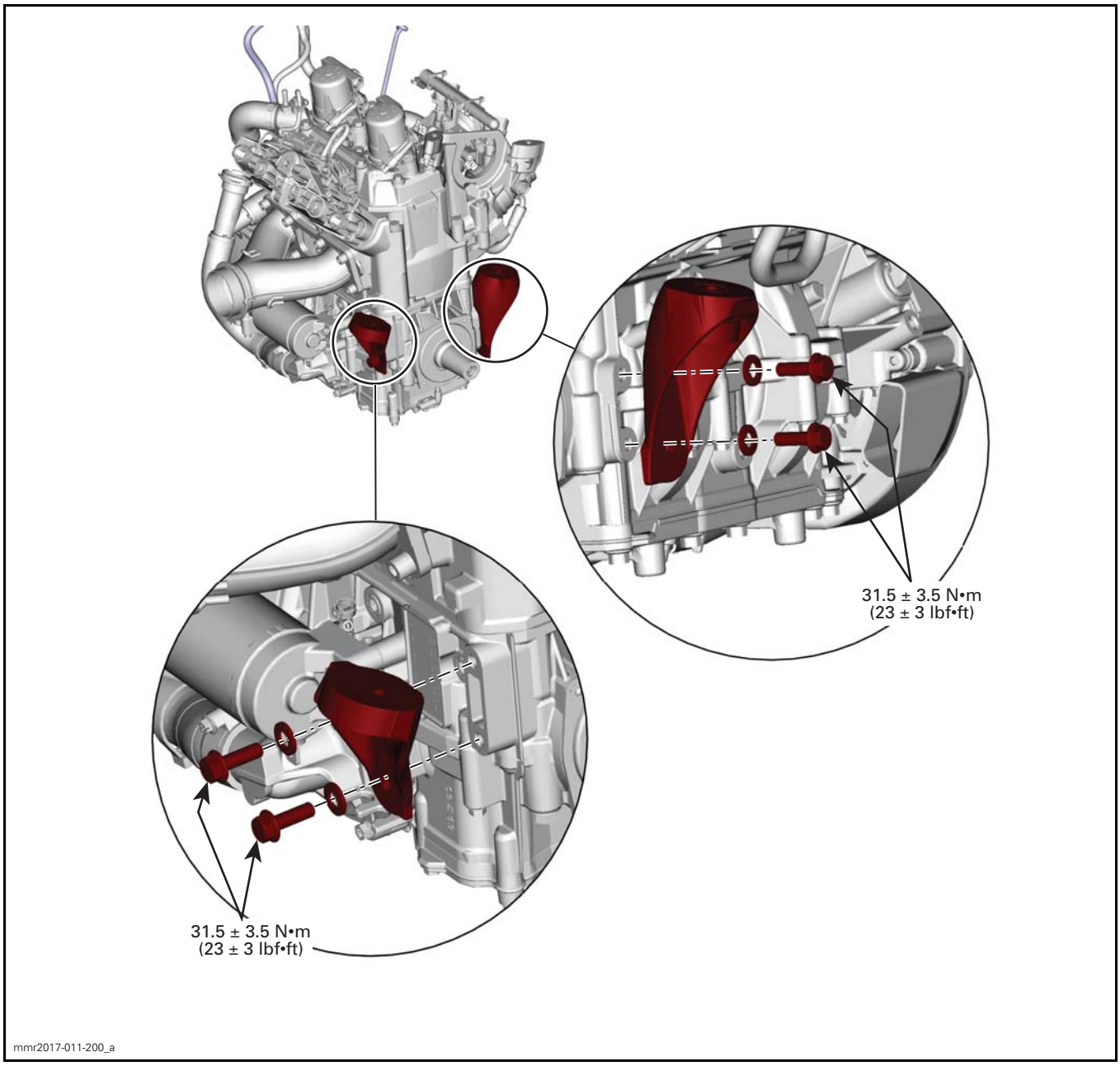
ENGINE REMOVAL AND INSTALLATION

SERVICE TOOLS

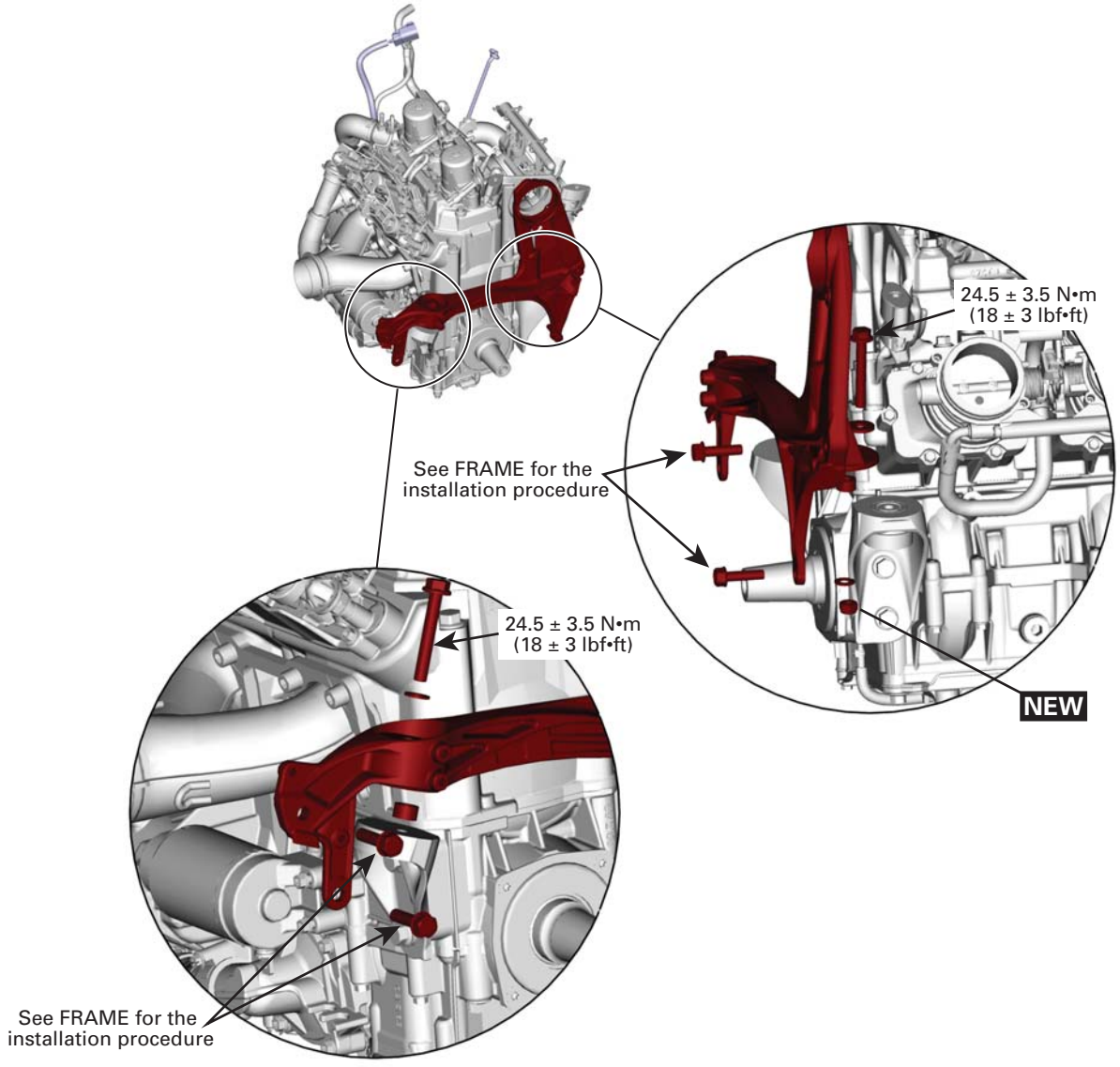
Description	Part Number	Page
ENGINE LIFTING HOOK	529 035 829	9
ENGINE LIFTING TOOL	529 036 402	9
UPPER GEAR RETAINING TOOL	529 036 110	7



mmr2017-011-028_a



mmr2017-011-200_a



NEW = Component must be replaced when removed.

mmr2017-011-201_a

GENERAL

During assembly/installation, use the torque values and service products as shown in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, cotter pin, etc.) must be replaced with new ones.

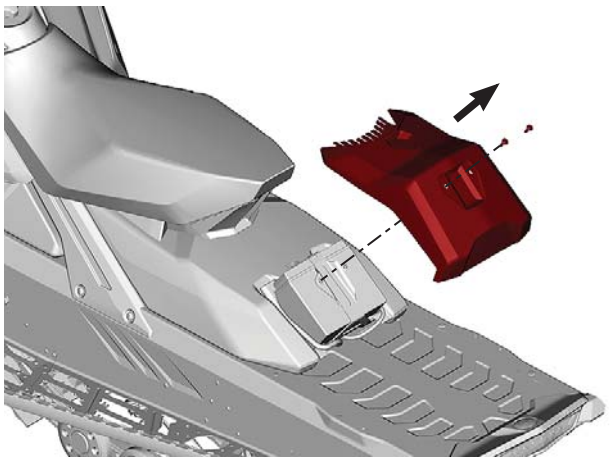
NOTICE **Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.**

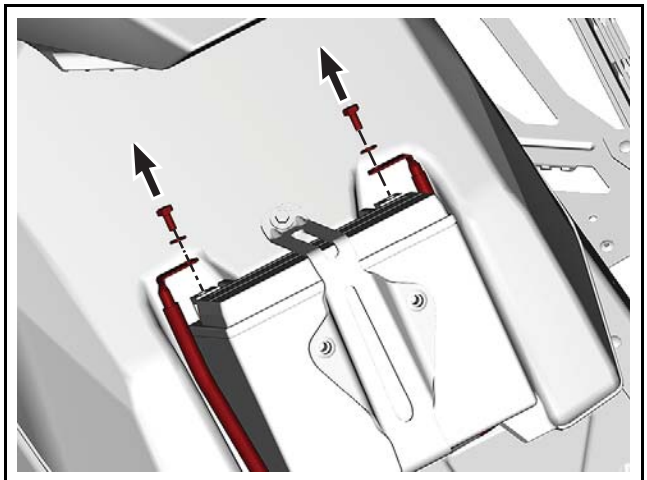
PROCEDURES

ENGINE

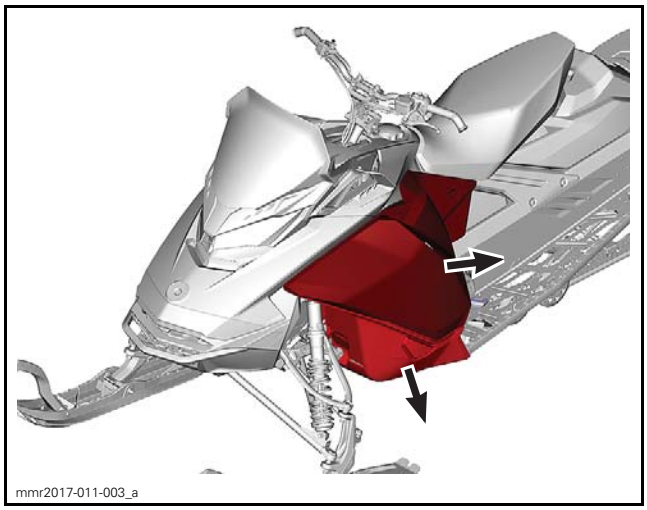
Removing the Engine

1. Place vehicle at workstation that will have access to an engine-lifting hoist.
2. Remove fuel pressure. Refer to *ELECTRIC FUEL PUMP* in *FUEL TANK AND FUEL PUMP* subsection.
3. Disconnect the battery.

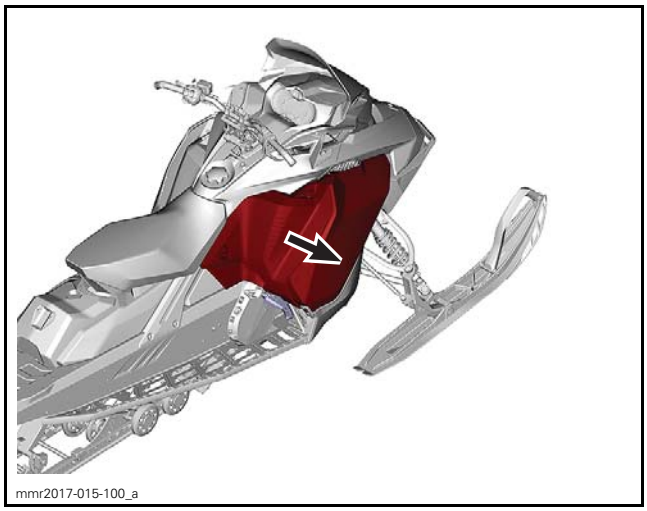

mmr2017-011-001_a


mmr2017-011-002_a

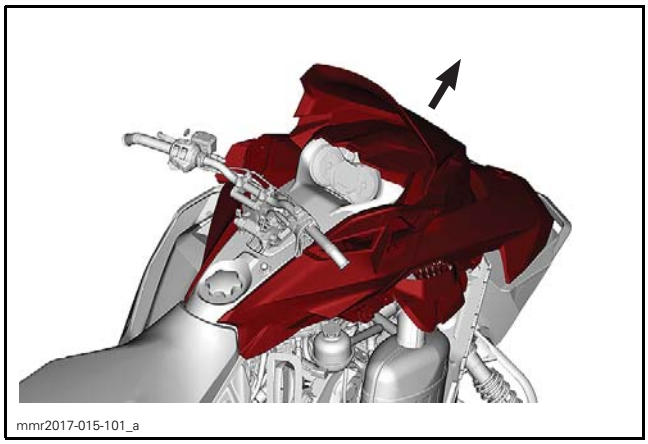
4. Remove the following parts. If required, refer to *BODY* subsection.


mmr2017-011-003_a

LH SIDE PANEL AND LH BOTTOM PAN

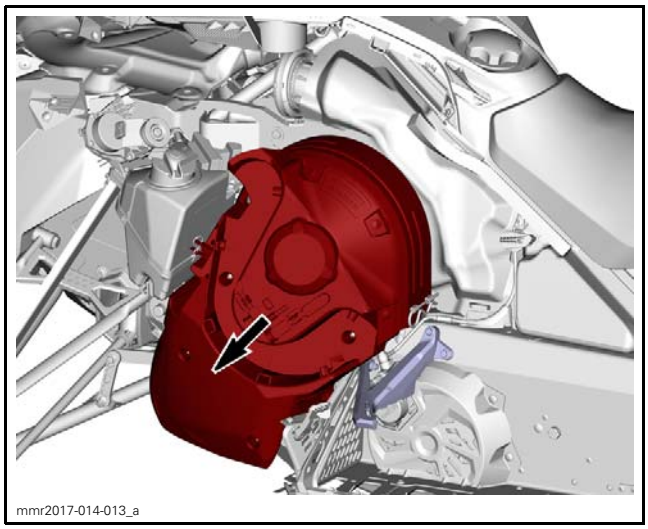

mmr2017-015-100_a

RH SIDE PANEL

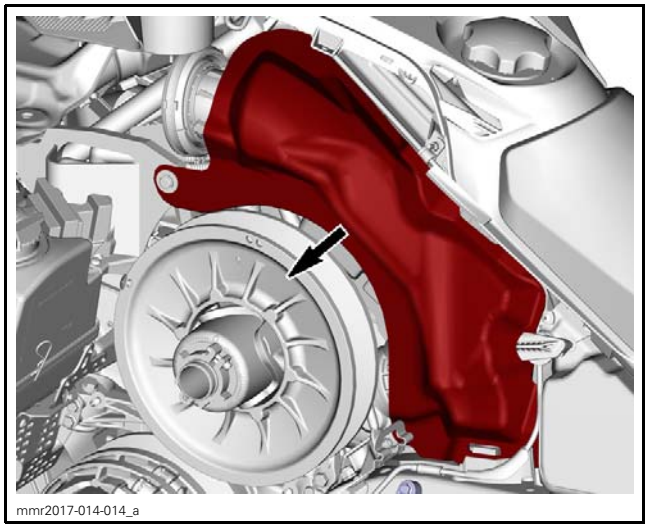


UPPER BODY MODULE

5. Remove the drive belt guard and acoustic panel.

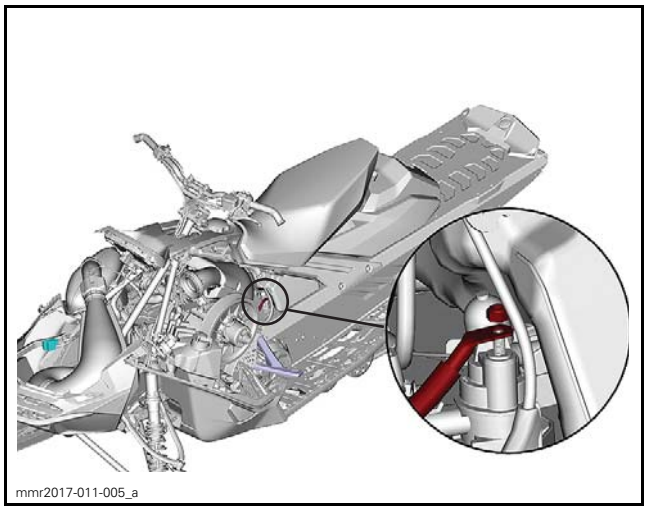


DRIVE BELT GUARD

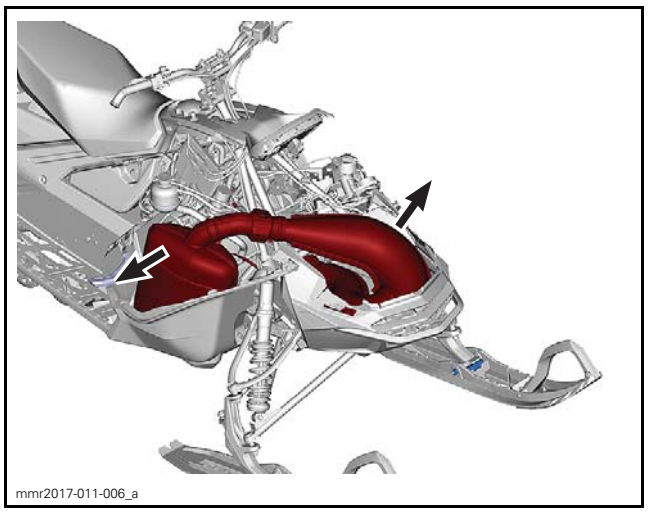


ACOUSTIC PANEL

6. Disconnect the BLACK wire from the starter solenoid.

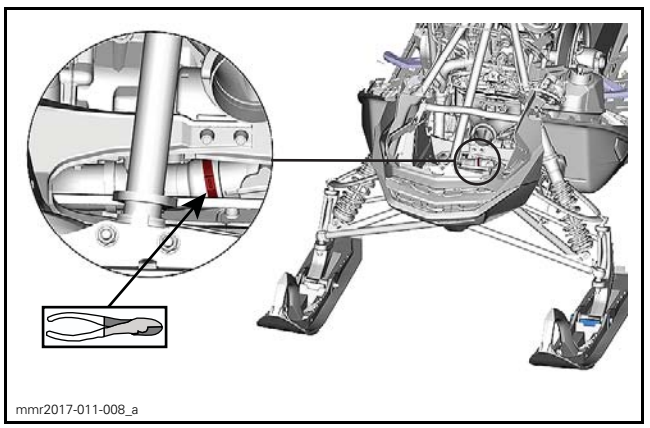


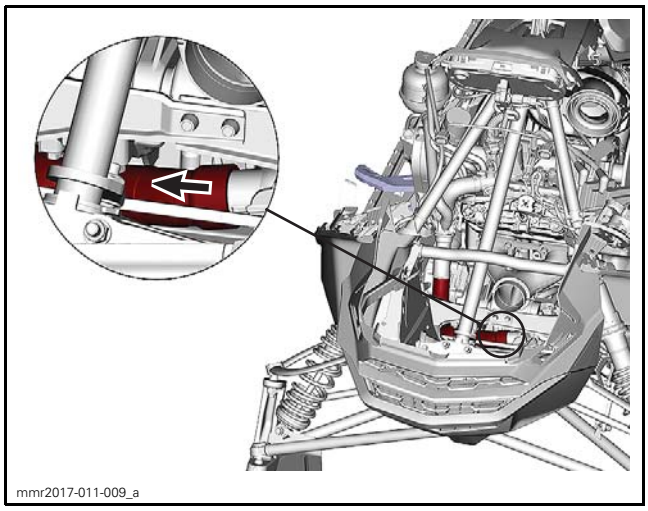
7. Remove the muffler and the tuned pipe. If required, refer to *EXHAUST SYSTEM* subsection.

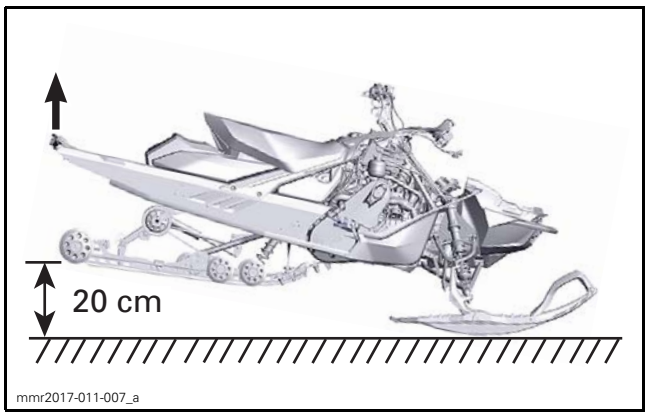


8. Place a drain pan under the front of the vehicle.
9. Drain the coolant by detaching the front cooling hose from the engine then lift the rear of the vehicle

NOTE: At the installation, replace the ear clamp by an hose clamp.

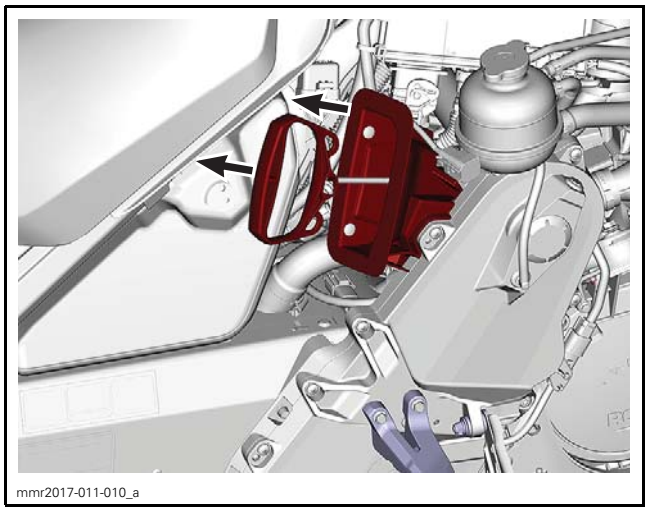



mmr2017-011-009_a

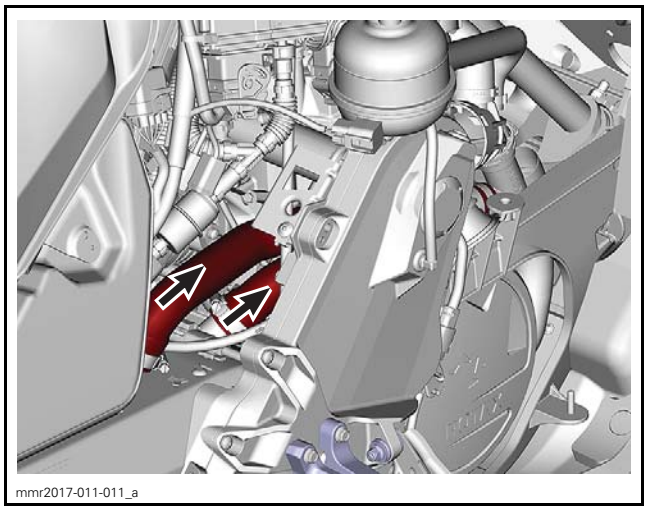


mmr2017-011-007_a

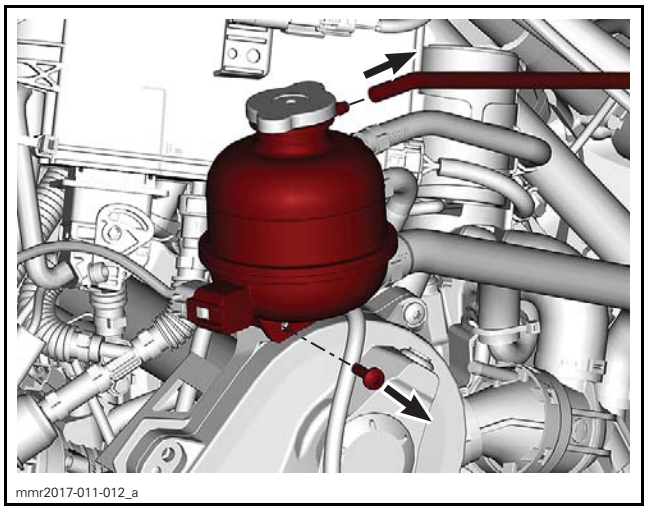
10. If equipped, remove the rewind starter handle and its housing.


mmr2017-011-010_a

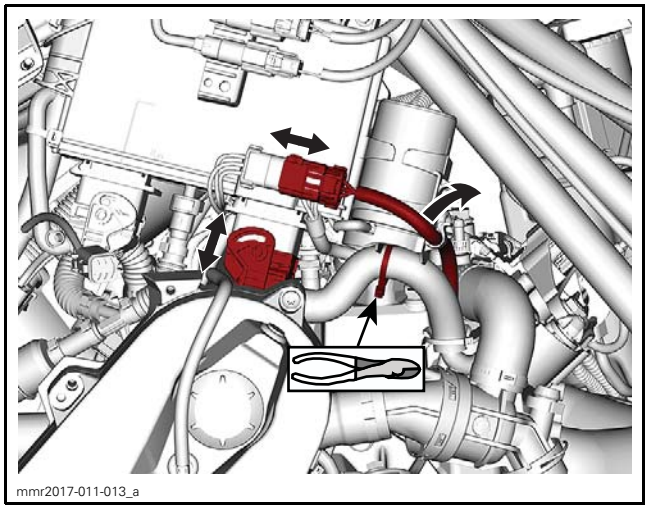
11. Unplug the inlet and outlet cooling hoses from the tunnel.


mmr2017-011-011_a

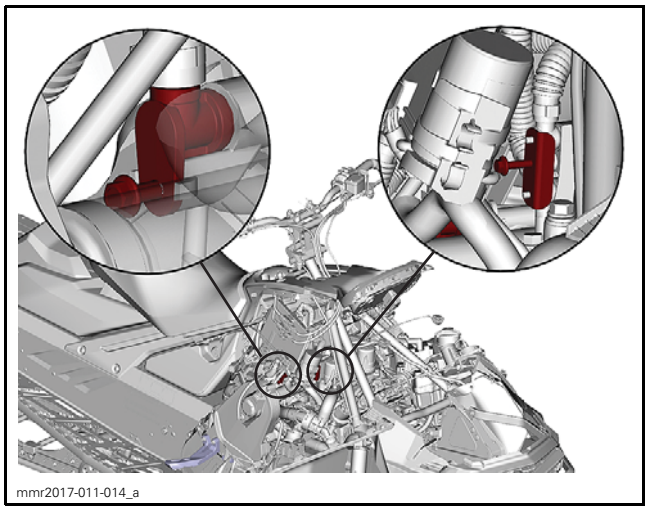
12. Detach the coolant tank from the top of the chaincase and unplug the vent hose from the tank.


mmr2017-011-012_a

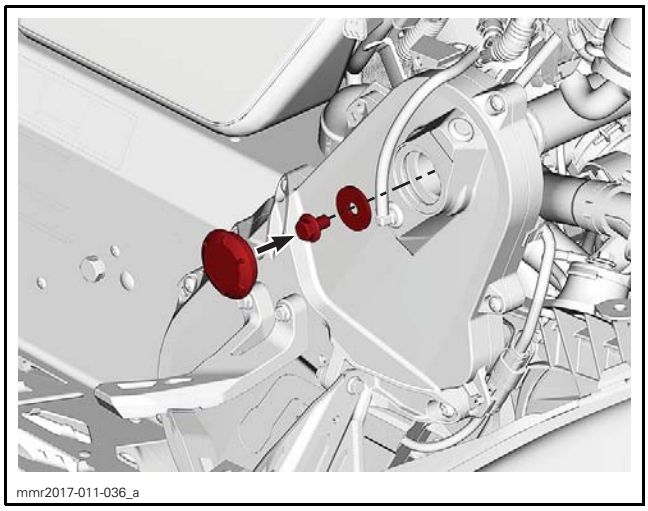
13. Disconnect the ECM connector A and the magneto connector.
14. Cut the locking tie retaining the engine harness to the capacitor support.


mmr2017-011-013_a

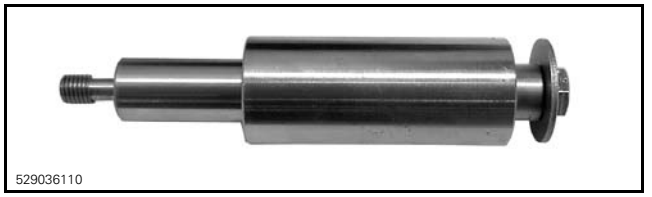
15. Unscrew fuel hoses from fuel rails.

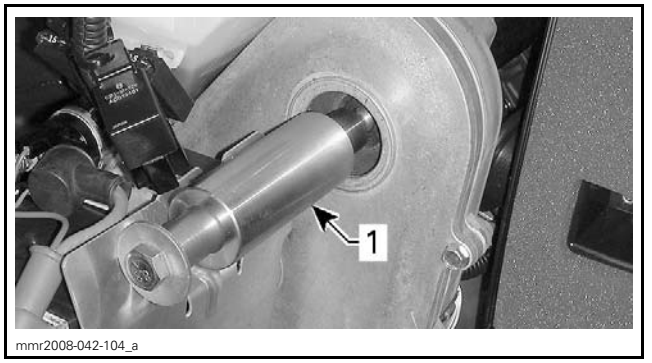

mmr2017-011-014_a

16. Apply parking brake and remove the upper gear screw and the conical spring washer.


mmr2017-011-036_a

17. Install the UPPER GEAR RETAINING TOOL (P/N 529 036 110) on countershaft end.

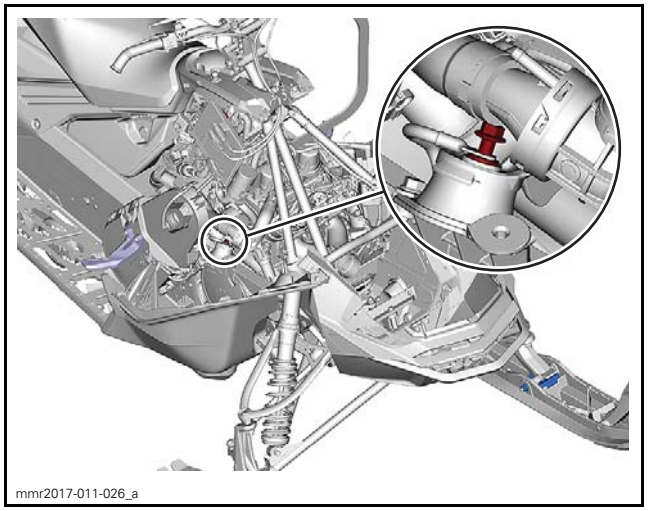

529036110



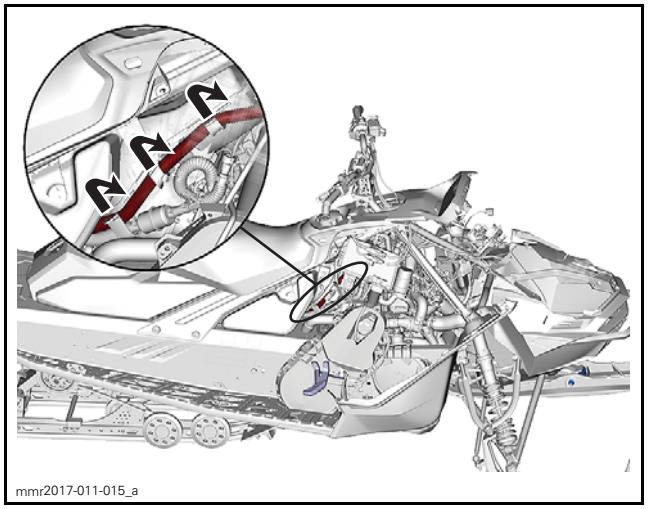
mmr2008-042-104_a

TYPICAL
1. Upper gear retaining tool

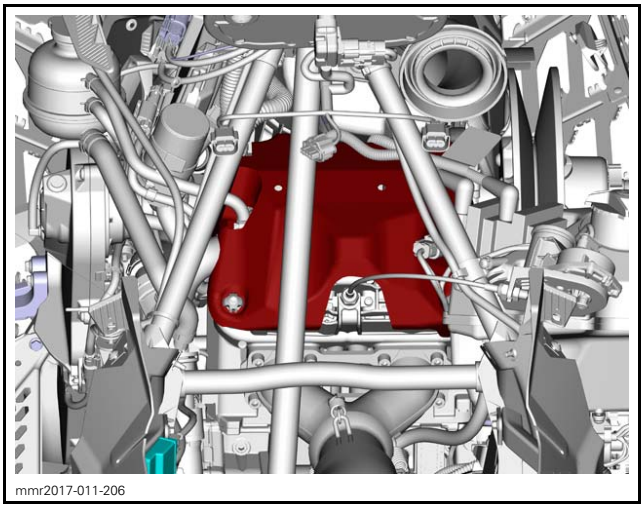
18. Remove the engine support screw.


mmr2017-011-026_a

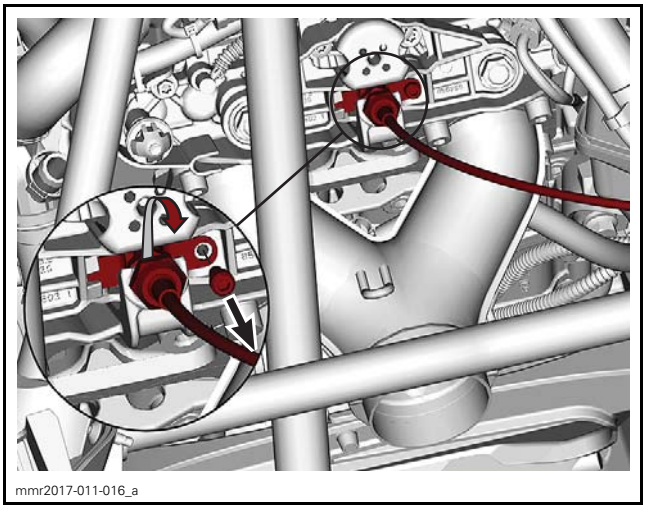
19. Unclip the fuel hose from the primary air silencer.


mmr2017-011-015_a

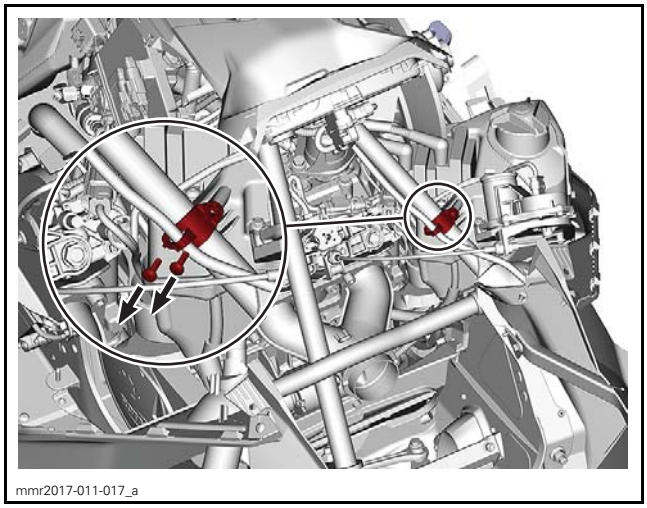
20. Remove engine cover.
    20.1 Remove the 3 screws.
    20.2 Pull on both halves of cover to remove.


mmr2017-011-206

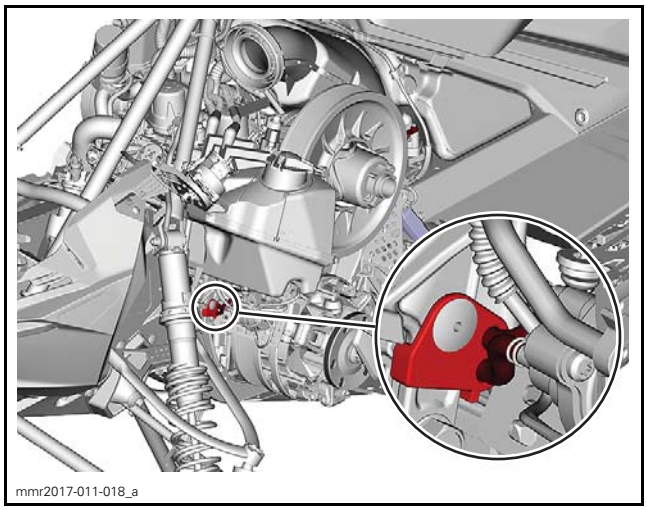
21. Detach the RAVE cable from the RAVE valve. Refer to *RAVE* subsection for proper procedure.


mmr2017-011-016_a

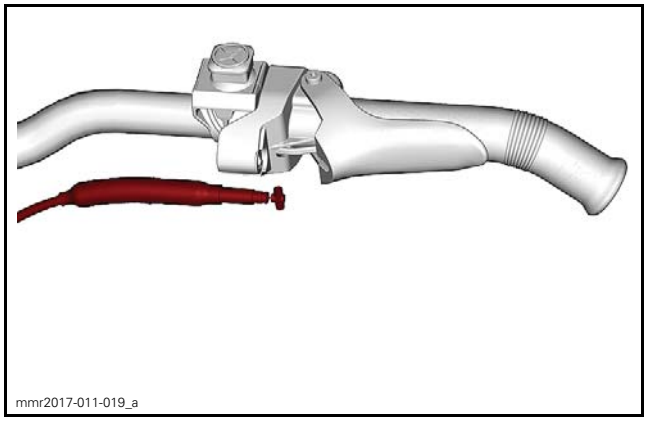
22. Unscrew the oil tank support.


mmr2017-011-017_a

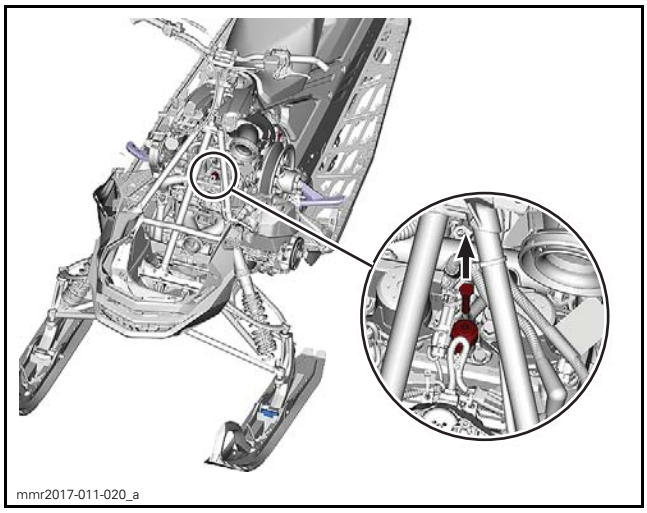
23. From underneath of the oil tank, detach both injection oil hoses from their support.


mmr2017-011-018_a

24. Detach the throttle cable from the throttle housing.

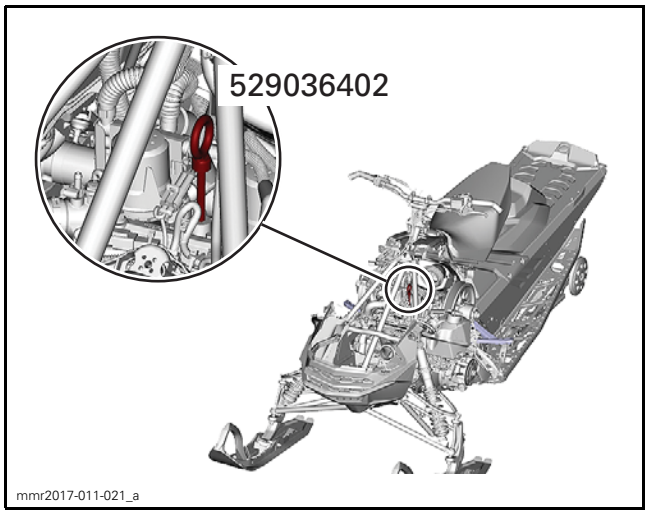

mmr2017-011-019_a

25. Remove the knock sensor from cylinder head cover.



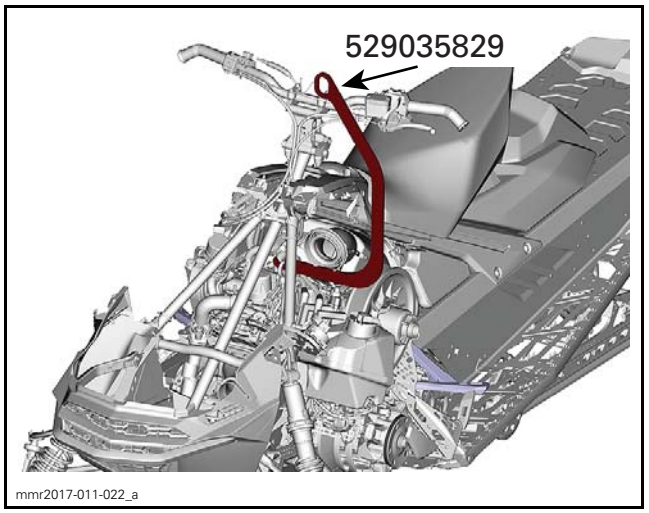
26. Install the engine lifting tool instead of knock sensor.

REQUIRED TOOL	
ENGINE LIFTING TOOL (P/N 529 036 402)	



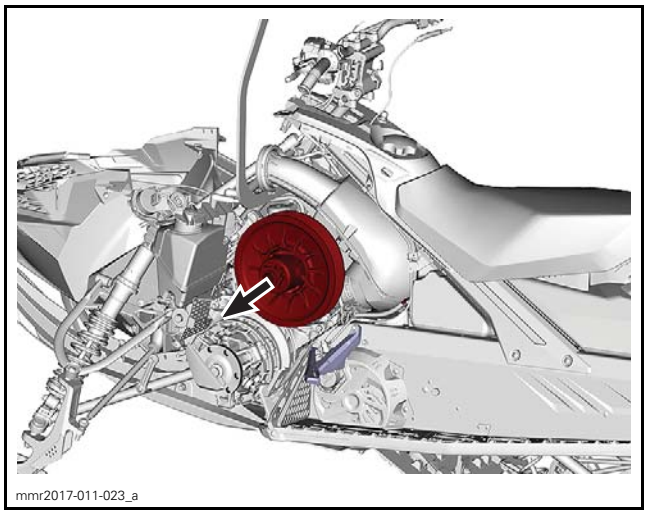
27. Install the engine lifting hook.

REQUIRED TOOL	
ENGINE LIFTING HOOK (P/N 529 035 829)	



28. Remove the driven pulley. Refer to appropriate *DRIVEN PULLEY AND COUNTERSHAFT* subsection.

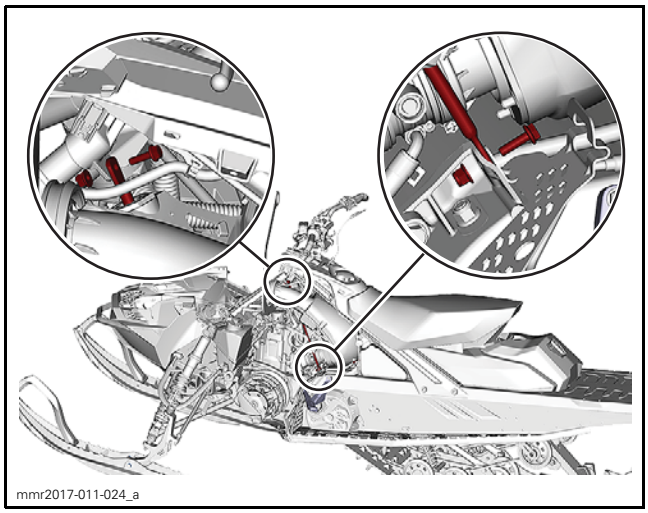
NOTE: If necessary, tap the upper gear retaining tool with a plastic hammer.



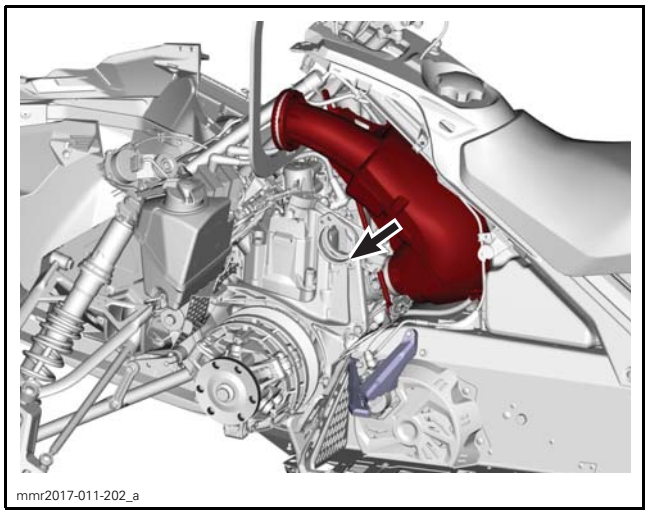
29. Unscrew countershaft from the upper gear retaining tool. **Do not** remove tool.

NOTE: While countershaft is removed from vehicle, the upper gear retaining tool maintains the drive chain and the upper gear in position inside chaincase.

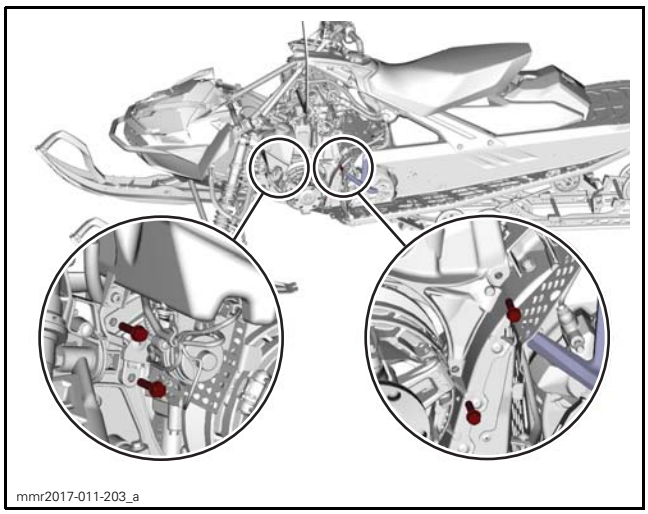
30. On LH side, remove the steering brace.


mmr2017-011-024_a

31. Remove the primary air silencer. Refer to *AIR INTAKE SYSTEM* subsection.


mmr2017-011-202_a

32. Remove engine support screws.


mmr2017-011-203_a

33. Lift engine and slide it out of vehicle.

Installing the Engine

To install engine, reverse the removal procedure. However, pay attention to the following.

- Install **NEW** self-locking fasteners (screw or nut) where required, refer to exploded views at the beginning of this subsection.
- When installing countershaft bearing support, refer to *FRAME* subsection for proper procedure.
- Install and tighten engine support bolts. Refer to *ENGINE SUPPORT INSTALLATION* in this subsection.
- If a new engine is installed or the engine was repaired, restart the break-in procedure using BUDS2.

ENGINE SUPPORT

Inspecting the Engine Support

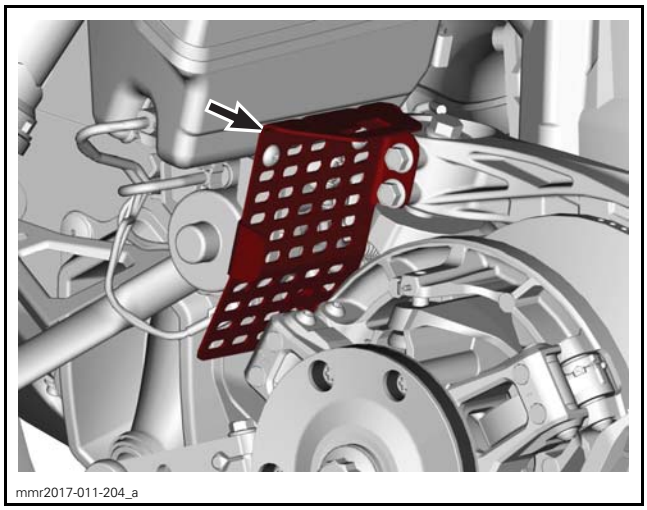
Check if engine supports are cracked, bent or damaged. Replace if necessary.

Replacing the PTO Side Engine Support

Remove the LH bottom pan. Refer to *BODY* subsection.

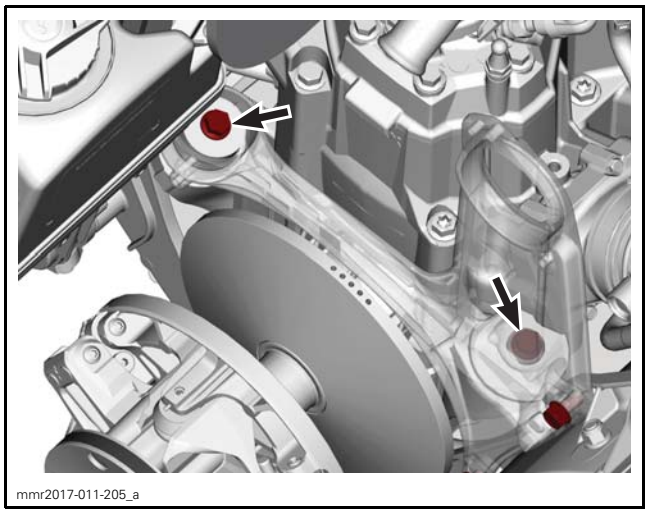
Remove driven pulley. Refer to appropriate *DRIVEN PULLEY AND COUNTERSHAFT* subsection.

Remove the injection oil tank support.

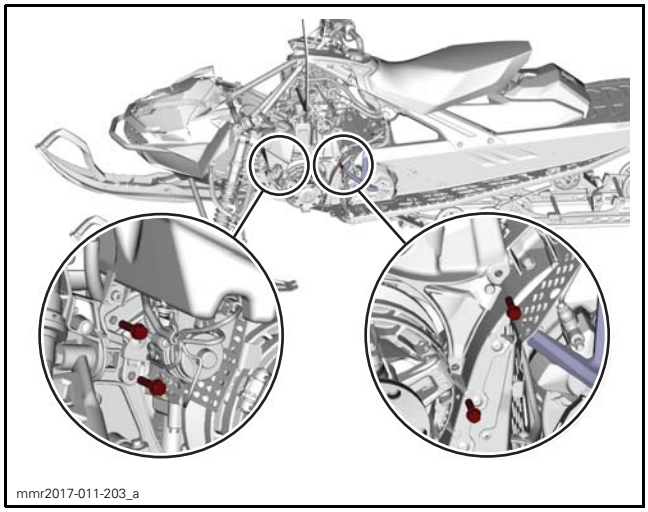

mmr2017-011-204_a

Place a piece of wood or any other appropriate tool under the engine to support it during engine support removal.

Remove screws securing engine support to rubber mount adapters.


mmr2017-011-205_a

Remove engine support screws.


mmr2017-011-203_a

Remove engine support.

To install the engine support, reverse the removal procedure.

Tighten screws as per the specifications indicated in the exploded views.

Replacing the MAG Side Engine Support

Remove muffler and tuned pipe. Refer to *EXHAUST SYSTEM* subsection.

Place a piece of wood or any other appropriate tool under the engine to support it during engine support removal.

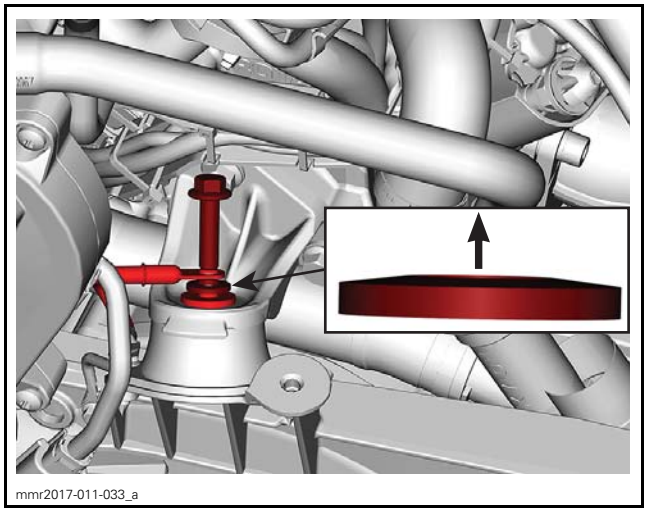
Remove screw securing engine support to rubber mount adapter.

Remove screw retaining engine support to engine.

Remove engine support.

To install the engine support, reverse the removal procedure.

Position the concave washer as shown.


mmr2017-011-033_a

SOME PARTS REMOVED FOR CLARITY

Tighten screws as per the specifications indicated in the exploded views.

ENGINE RUBBER MOUNTS

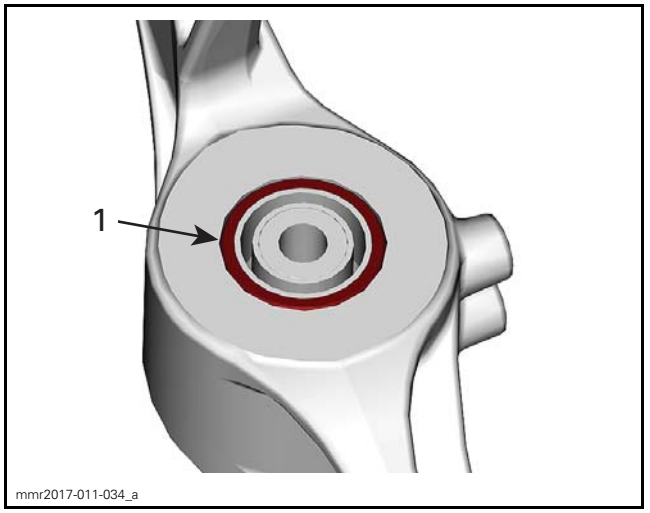
Inspecting the Engine Rubber Mount

Check rubber mounts. Replace them if brittle, cracked or damaged.

Replacing the PTO Side Engine Rubber Mount

Remove the PTO side engine support. See procedure in this subsection.

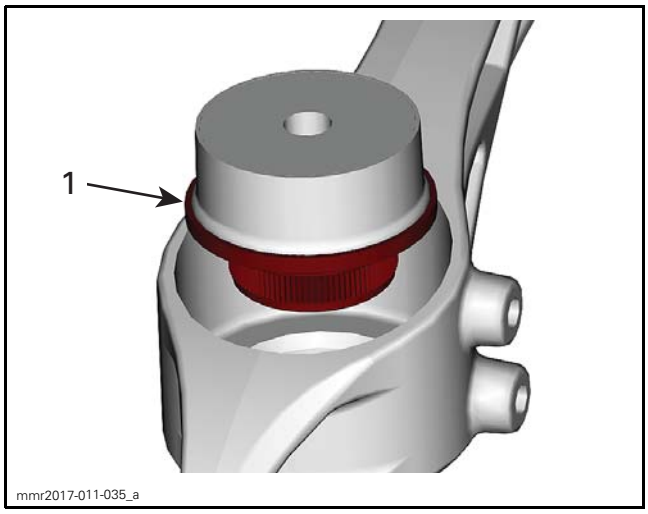
Using a press, extract the engine rubber mount from the engine support.



mmr2017-011-034_a

1. Press on this ring

Install the new engine rubber mount by pressing on the external metallic ring.



1. Press on this metallic ring

Replacing the MAG Side Engine Rubber Mount

Remove muffler and tuned pipe. Refer to *EXHAUST SYSTEM* subsection.

Place a piece of wood or any other appropriate tool under the engine to support it during engine support removal.

Remove screw securing engine support to rubber mount adapter.

Remove screw retaining rubber mount adapter to frame.

Remove rubber mount adapter.

To install the rubber mount adapter, reverse the removal procedure.

Tighten screws as per the specifications indicated in the exploded views.

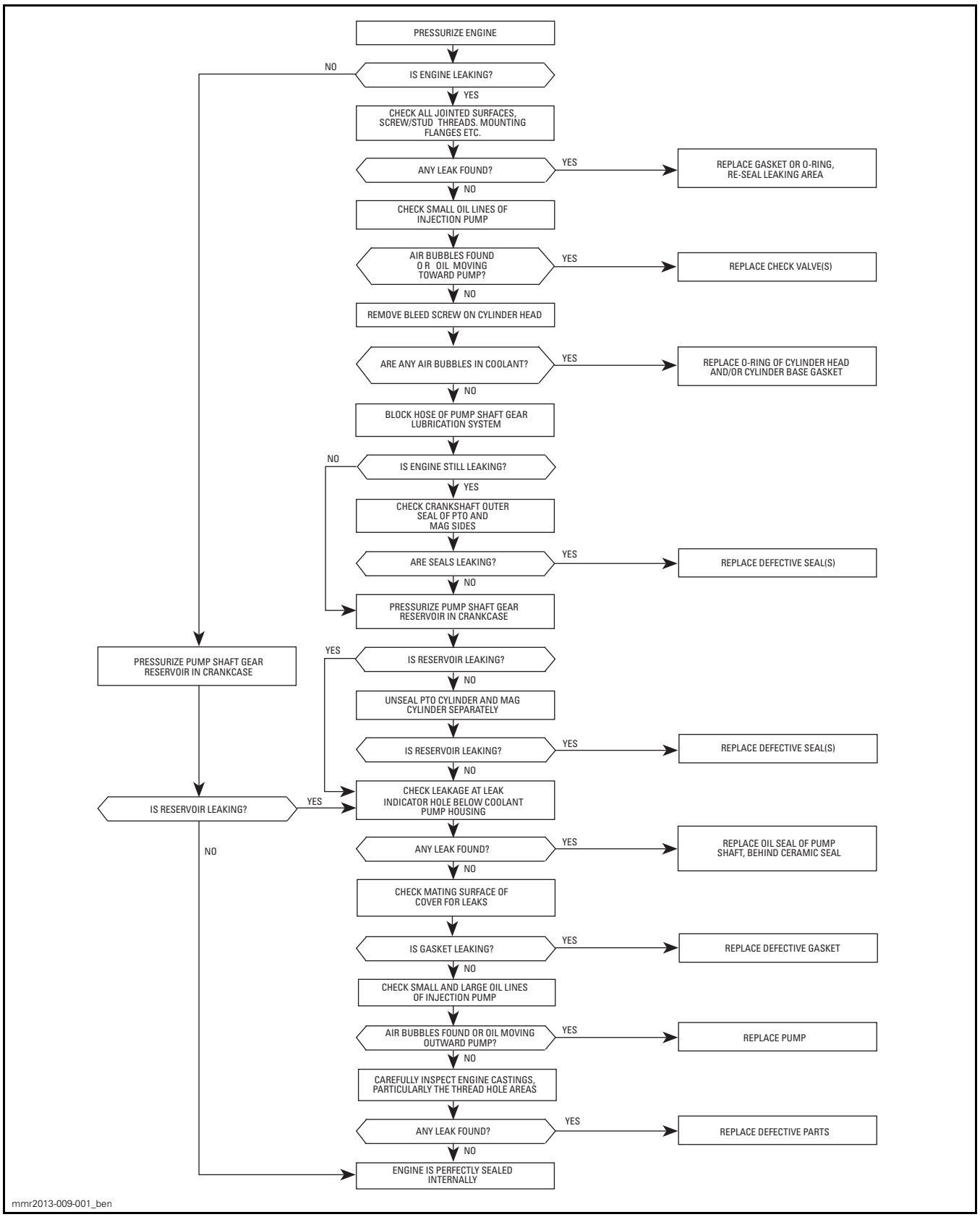
ENGINE LEAK TEST

SERVICE TOOLS

Description	Part Number	Page
INTAKE PLUGS	529 036 421	3
MANIFOLD PLUG 63 MM (2-1/2")	529 035 961	3
SMALL HOSE PINCHER	295 000 076	3
VACUUM/PRESSURE PUMP	529 021 800	4

PROCEDURES

NOTE: This flow chart must be used as a visual reference during the engine leak test procedure.

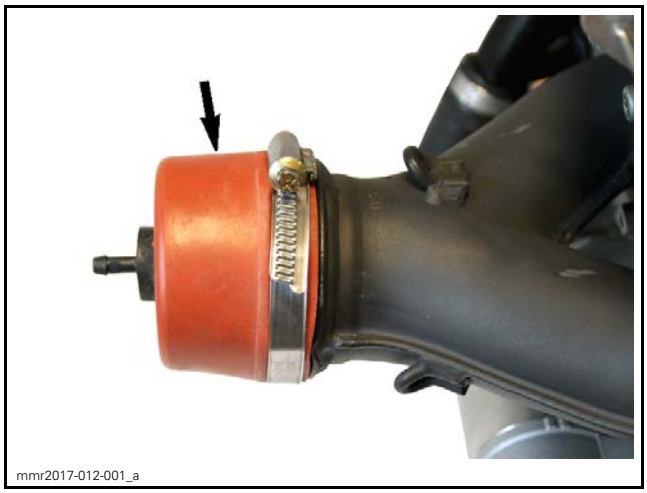


ENGINE LEAK TEST

Prior to take apart an engine, it is important to proceed with a leak test to diagnose engine problems. Whenever the engine is disassembled, a leak test should be performed after reassembly.

1. Remove engine. Do not remove the exhaust manifold. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
2. Remove throttle body, refer to *E-TEC DIRECT FUEL INJECTION* subsection.
3. Install appropriate plug over exhaust manifold and secure with a clamp.

REQUIRED TOOL	
MANIFOLD PLUG 63 MM (2-1/2") (P/N 529 035 961)	

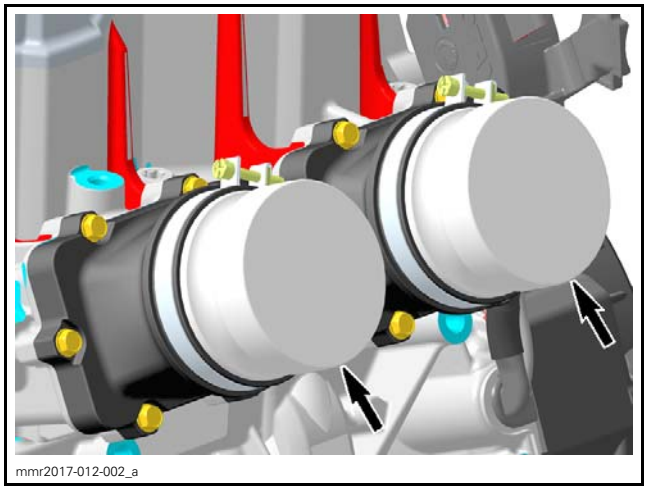


mmr2017-012-001_a

4. Insert an intake plug in each intake adapters.

REQUIRED TOOL	
INTAKE PLUGS (P/N 529 036 421)	

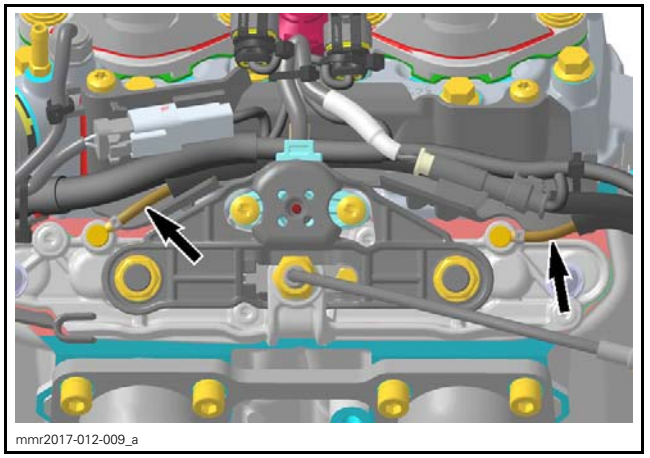
5. Tighten with existing clamps.



mmr2017-012-002_a

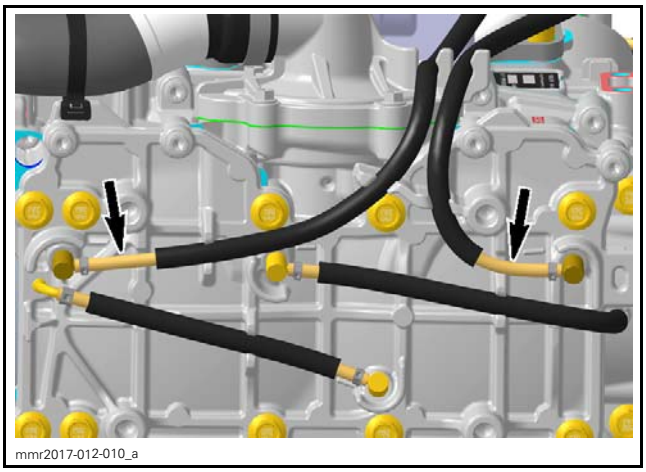
6. Block oil hoses connected to the oil pump:
   - 6.1 Partially remove corrugated tube from oil hoses.
   - 6.2 Install hose pincher right after check valve.

REQUIRED TOOL	
SMALL HOSE PINCHER (P/N 295 000 076)	



mmr2017-012-009_a

BLOCK OIL HOSES HERE

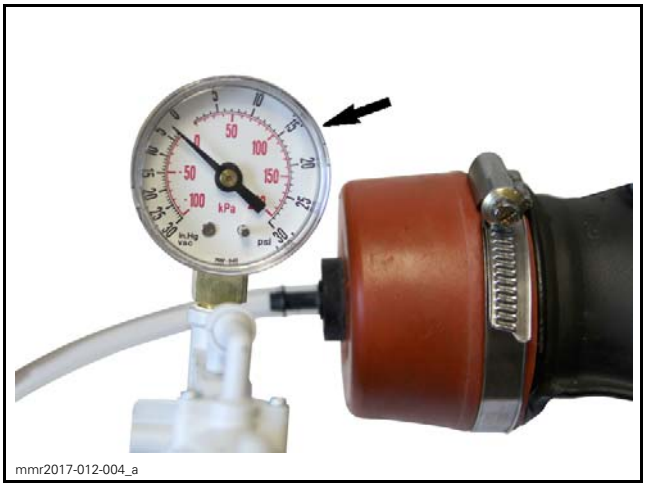

mmr2017-012-010_a

BLOCK OIL HOSES HERE

NOTICE Pay attention not to squeeze hose nipples.

7. Pressurize engine.

REQUIRED TOOL	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	


mmr2017-012-004_a

ENGINE LEAK TEST	
PRESSURE	TIME (WITHOUT PRESSURE DROP)
30 kPa (4.35 PSI)	3 minutes

NOTICE Do not exceed the specified pressure.

8. If pressure drops before 3 minutes, spray a soapy solution on tester kit (manifold and intake plugs, vacuum/pressure pump and its hose).
   - 8.1 If tester kit (manifold and intake plugs, hoses and pump) is leaking, bubbles will indicate where leak comes from.
   - 8.2 If tester kit is not leaking, check engine, see *ENGINE COMPONENTS TO BE VERIFIED*.

Engine Components to be Verified

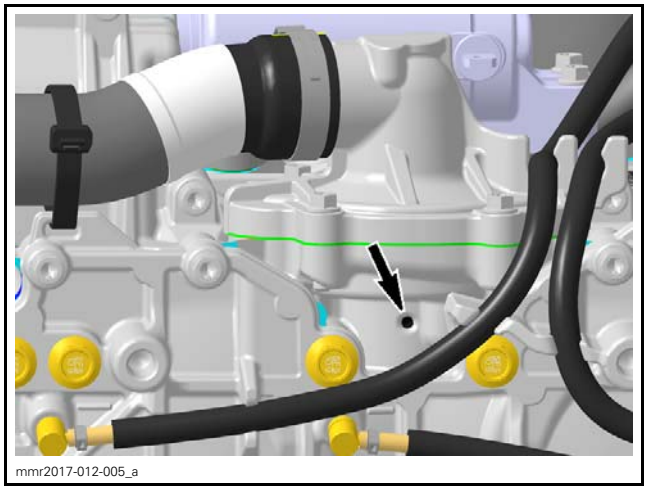
If air is escaping from engine check all jointed surfaces and screw or stud threads of engine:

- Spark plug base, insulator
- Cylinder head
- RAVE valve oil seals and housing
- Cylinder block
- Crankcase halves (joint)
- Crankshaft outer seals (PTO and MAG)
- Fuel injector gaskets
- Base plate gasket and base plate.

Troubleshooting Tips

Air bubbles in cooling system indicate a defective cylinder head O-ring or cylinder base gasket.

Check leak indicator hole for oil or coolant.


mmr2017-012-005_a

Leaking coolant indicates:

- A defective ceramic seal (on water pump side)
- Defective O-ring on bearing carrier, see *COOLING SYSTEM* subsection.

Leaking oil indicates:

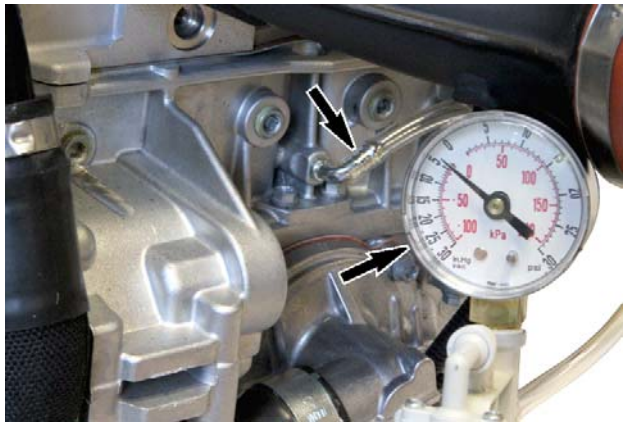
- A defective oil seal (behind ceramic seal)
- Defective O-ring on bearing carrier, see *COOLING SYSTEM* subsection.

PUMP SHAFT OIL GEAR RESERVOIR LEAK TEST

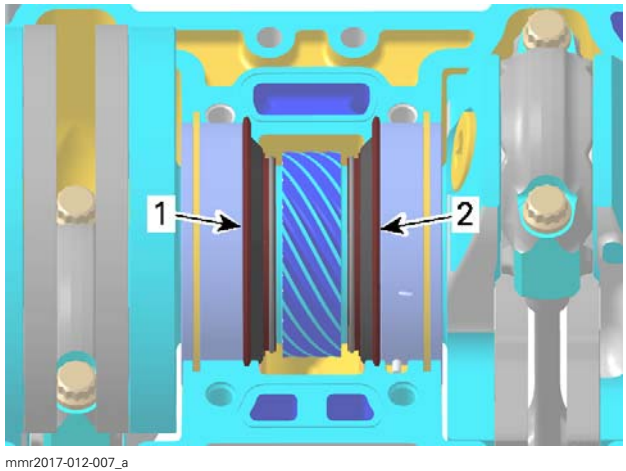
Install air pump on reservoir fitting and pressurize engine.

PUMP SHAFT OIL GEAR RESERVOIR LEAK TEST	
PRESSURE	TIME (WITHOUT PRESSURE DROP)
30 kPa (4.35 PSI)	3 minutes

NOTICE Do not exceed the specified pressure.

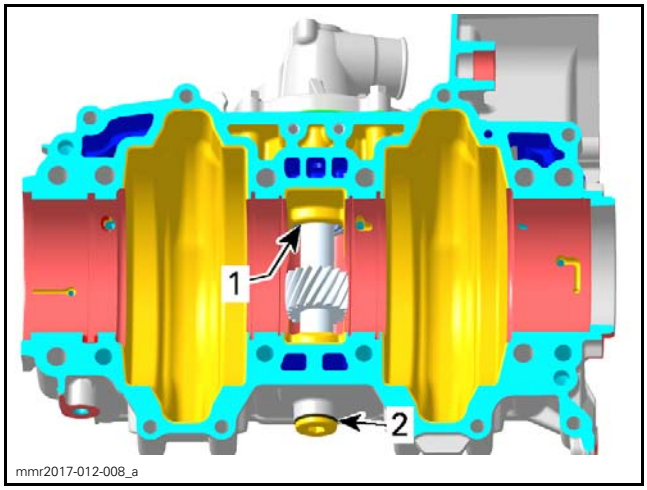

mmr2017-012-006_a

If pressure drops check for:
- Leaking plug screw gasket
- Defective O-ring on bearing carrier (see *COOLING SYSTEM* subsection)
- Defective oil seal on water pump side
- Defective crankshaft inner seal.



mmr2017-012-007_a

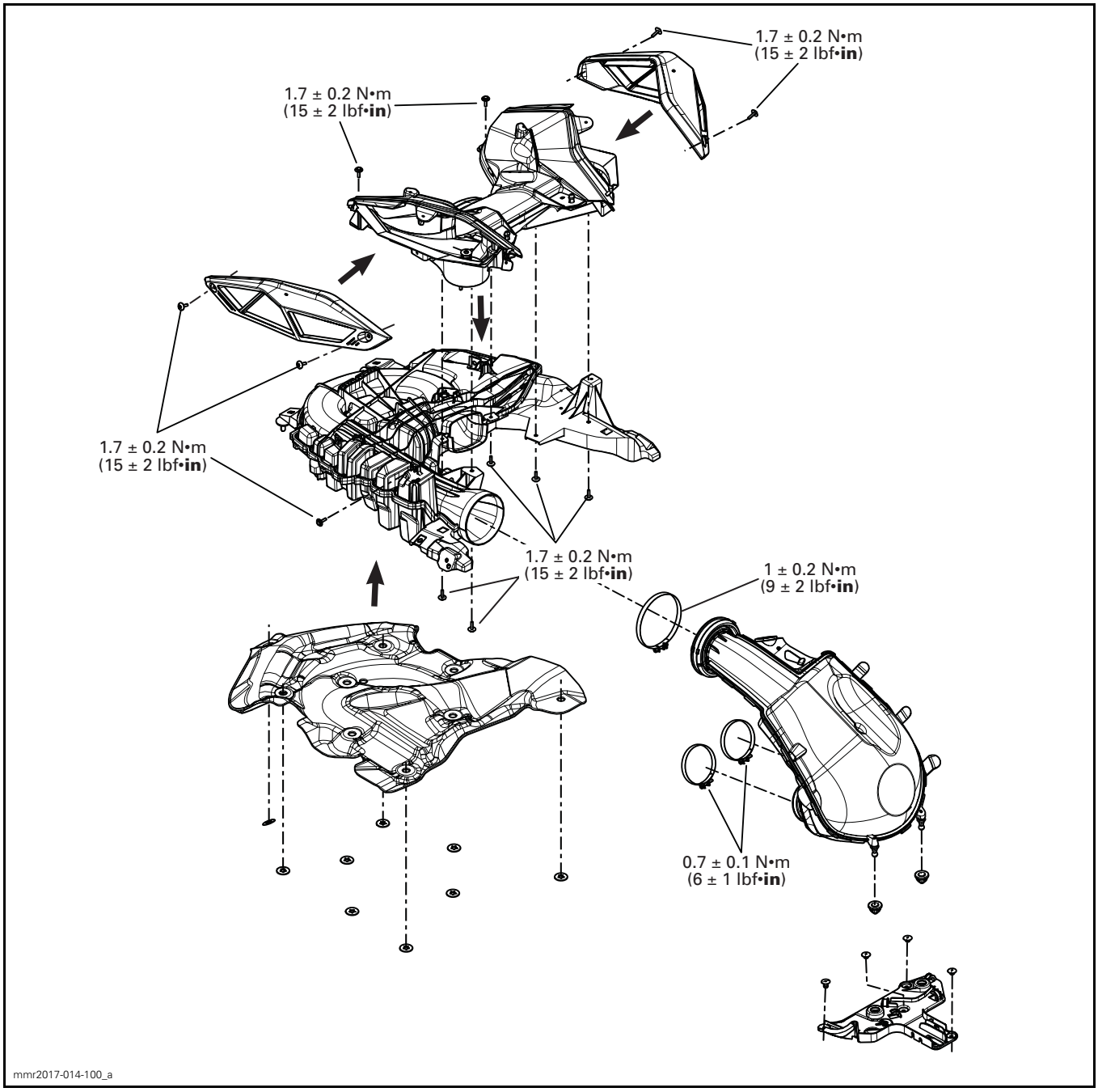
CRANKCASE INSIDE VIEW
1. *Leakage through inner seal on MAG side*
2. *Leakage through inner seal on PTO side*



mmr2017-012-008_a

CRANKCASE INSIDE VIEW
1. *Leakage through water pump oil seal (reservoir side)*
2. *Leakage on plug screw side (gasket)*

AIR INTAKE SYSTEM



GENERAL

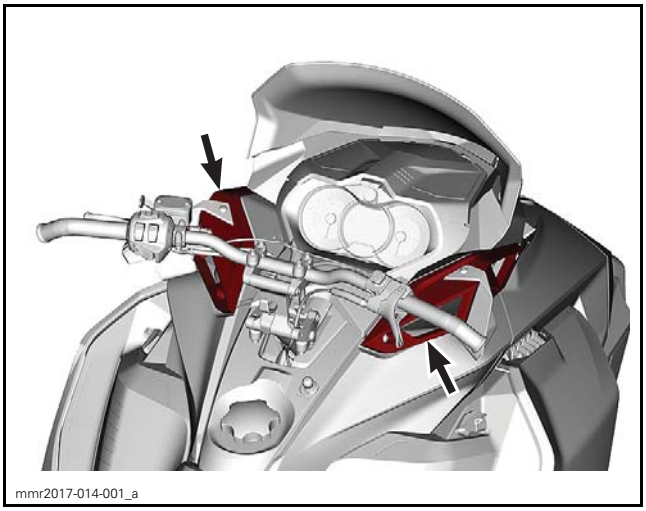
⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced with a new ones when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.).

NOTICE Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.

PROCEDURES

AIR FILTER (MESH)

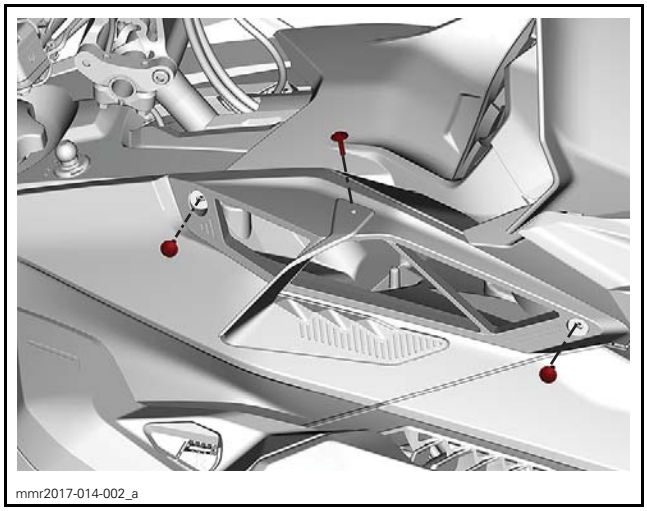


mmr2017-014-001_a

The same procedure applies for RH and LH side. Only one side is described in this procedure.

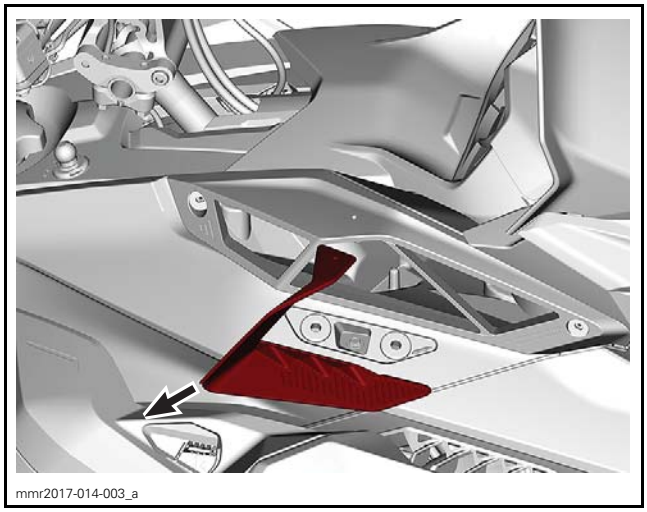
Removing the Air Filter

Remove screws from mesh filter housing.



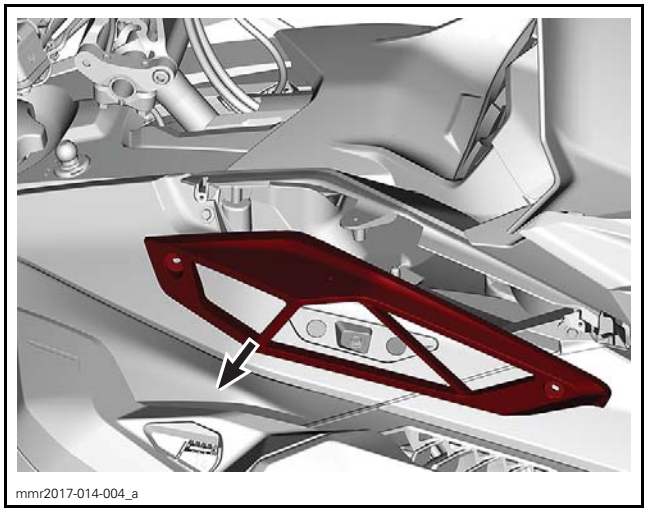
mmr2017-014-002_a

On some models, remove the air deflector.



mmr2017-014-003_a

Remove the mesh filter housing from the upper body module.



mmr2017-014-004_a

Cleaning the Air Filter

Clean with fresh water and mild soap.

Replace air filter if required.

NOTE: If the filter is very dirty, clean the interior of secondary air intake silencer at the same time.

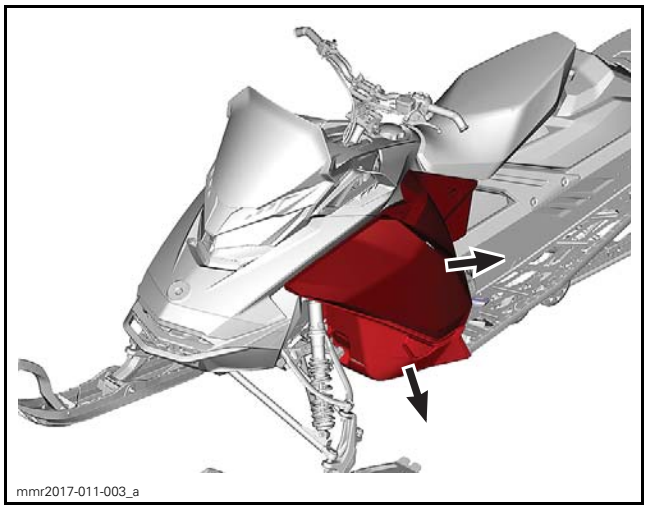
Installing the Air Filter

The installation is the reverse of the removal procedure.

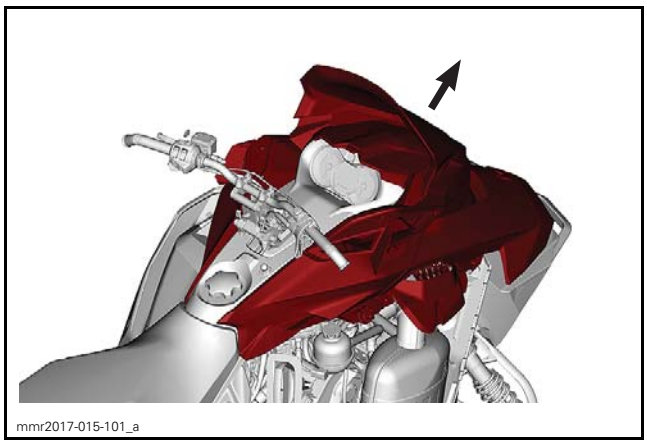
PRIMARY AIR INTAKE SILENCER

Removing the Primary Air Intake Silencer

1. Remove the following parts. If required, refer to *BODY* subsection.

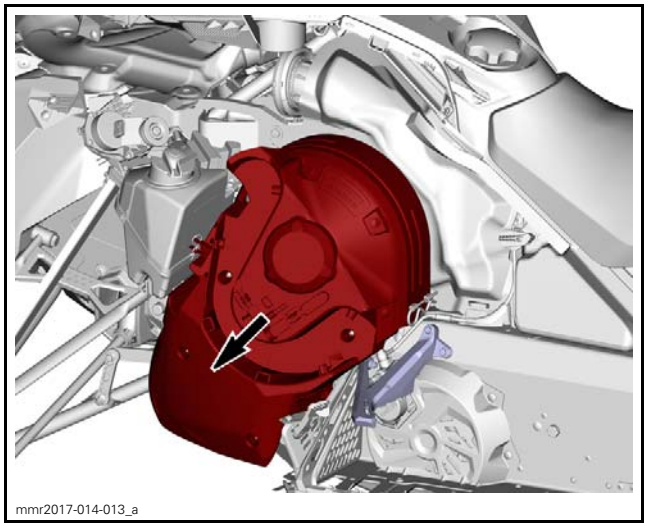


LH SIDE PANEL AND LH BOTTOM PAN

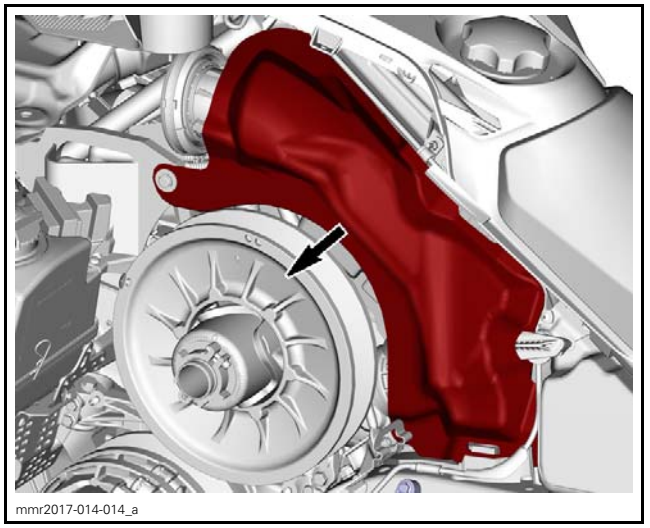


UPPER BODY MODULE

2. Remove the drive belt guard and acoustic panels.

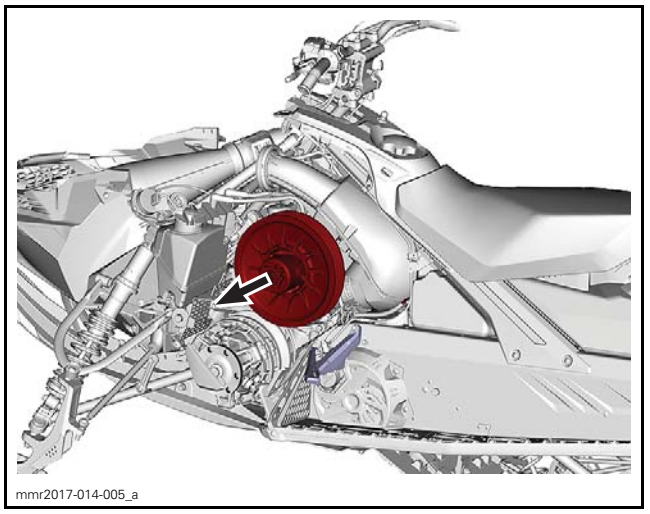


REMOVE DRIVE BELT GUARD

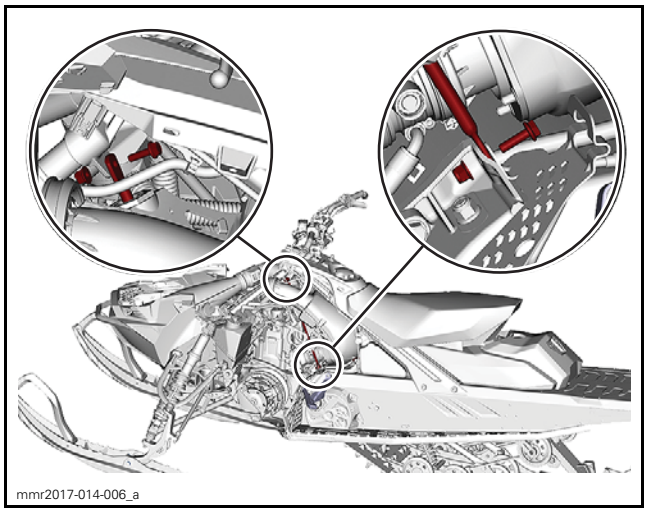


REMOVE ACOUSTIC PANEL

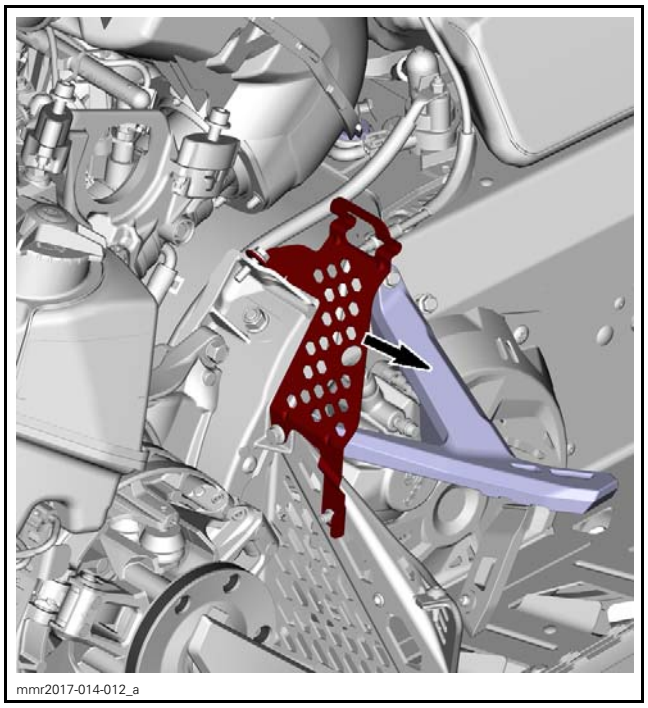
3. Remove the driven pulley. Refer to appropriate *DRIVEN PULLEY AND COUNTERSHAFT* subsection.



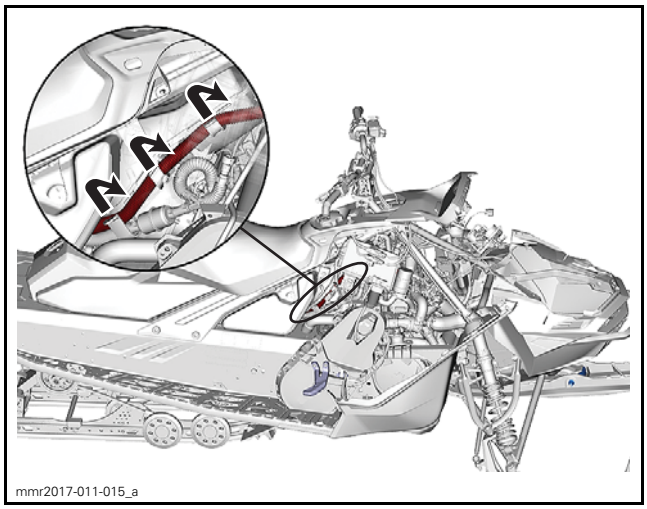
4. On LH side, remove the steering brace.


mmr2017-014-006_a

5. Remove the drive belt guard support.

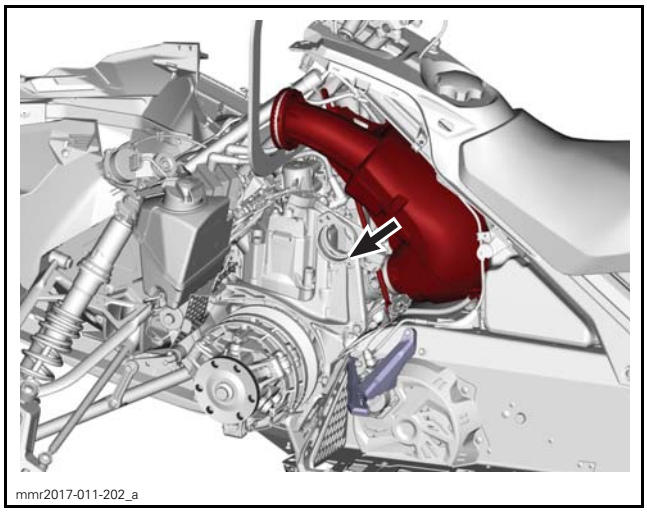

mmr2017-014-012_a

6. Unclip the fuel hose from the primary air silencer.


mmr2017-011-015_a

7. Remove the primary air silencer.
   - 7.1 Loosen clamps securing primary air silencer to intake adapters.
   - 7.2 Carefully pull out the primary air intake silencer with the steering brace.

NOTICE Make sure not touching the secondary injectors or their harnesses when removing the primary air intake silencer .

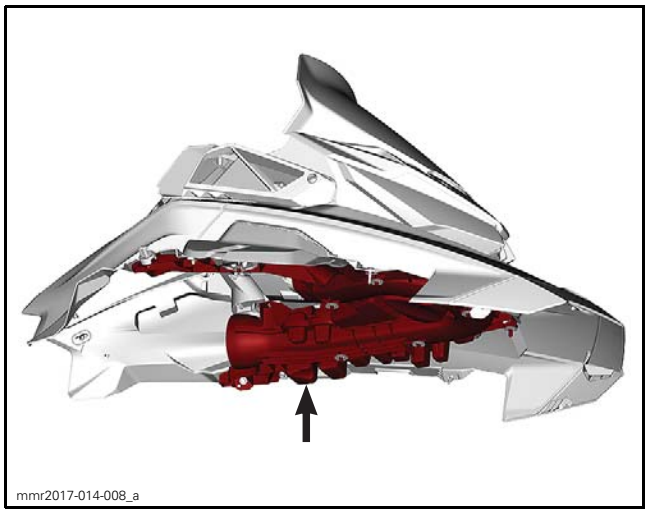

mmr2017-011-202_a

Installing the Primary Air Intake Silencer

The installation is the reverse of the removal procedure. However, pay attention to the following.

Make sure primary air intake is properly insert in the intake adapters before applying the tightening torque.

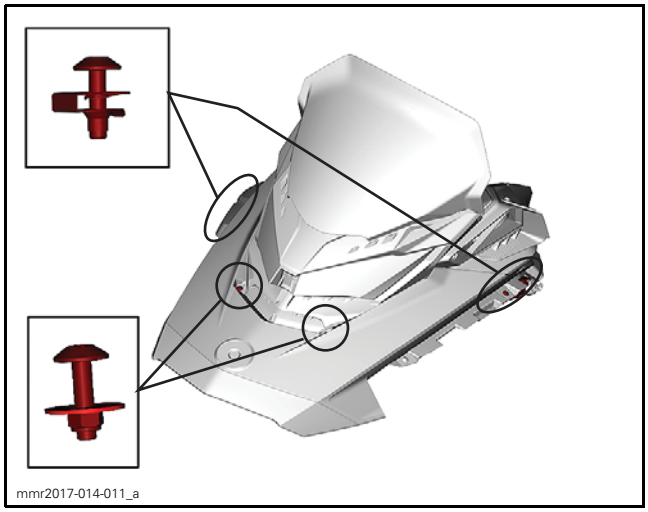
SECONDARY AIR INTAKE SILENCER



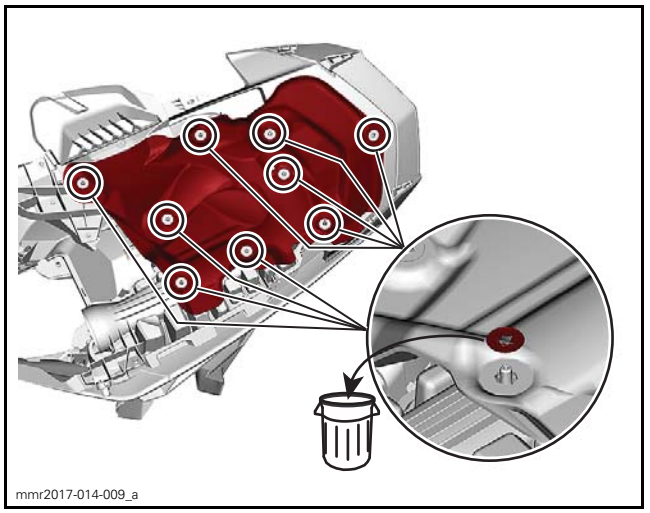
Removing the Secondary Air Intake Silencer

Referring to the *BODY* subsection, remove the upper body module.

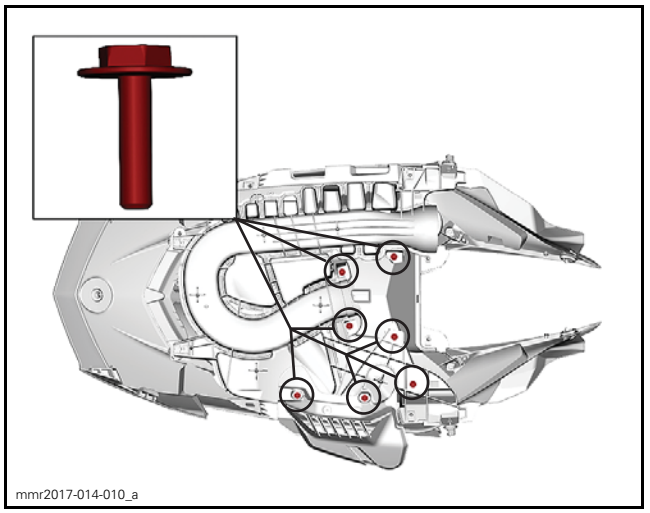
Remove the following screws.



Turn the upper body module upside down and remove the soundproofing panel.



Remove fasteners retaining secondary air intake silencer to upper body module.



Installing the Secondary Air Intake Silencer

The installation is the reverse of the removal procedure.

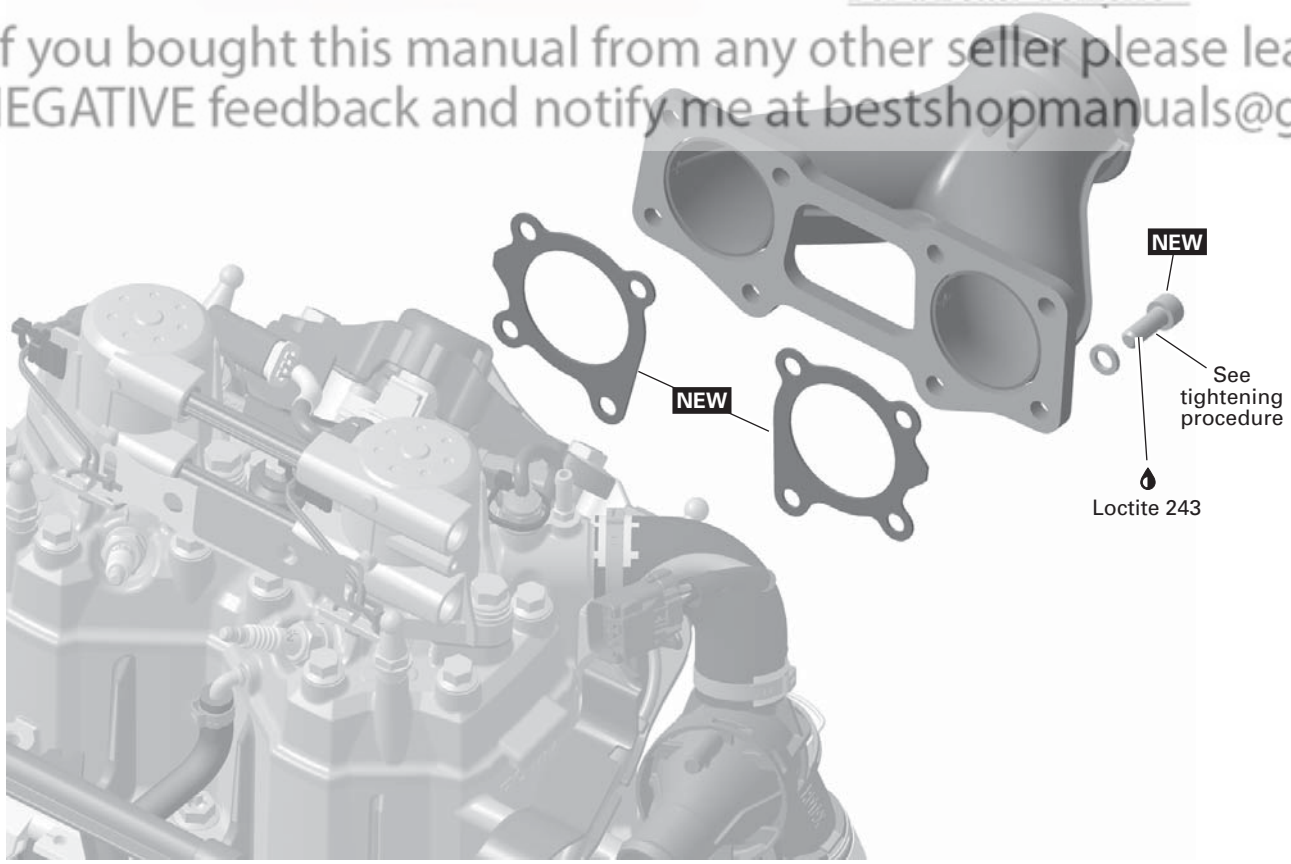
EXHAUST SYSTEM

SERVICE TOOLS

Description	Part Number	Page
SPRING INSTALLER/REMOVER	529 035 983	5, 7

SERVICE PRODUCTS

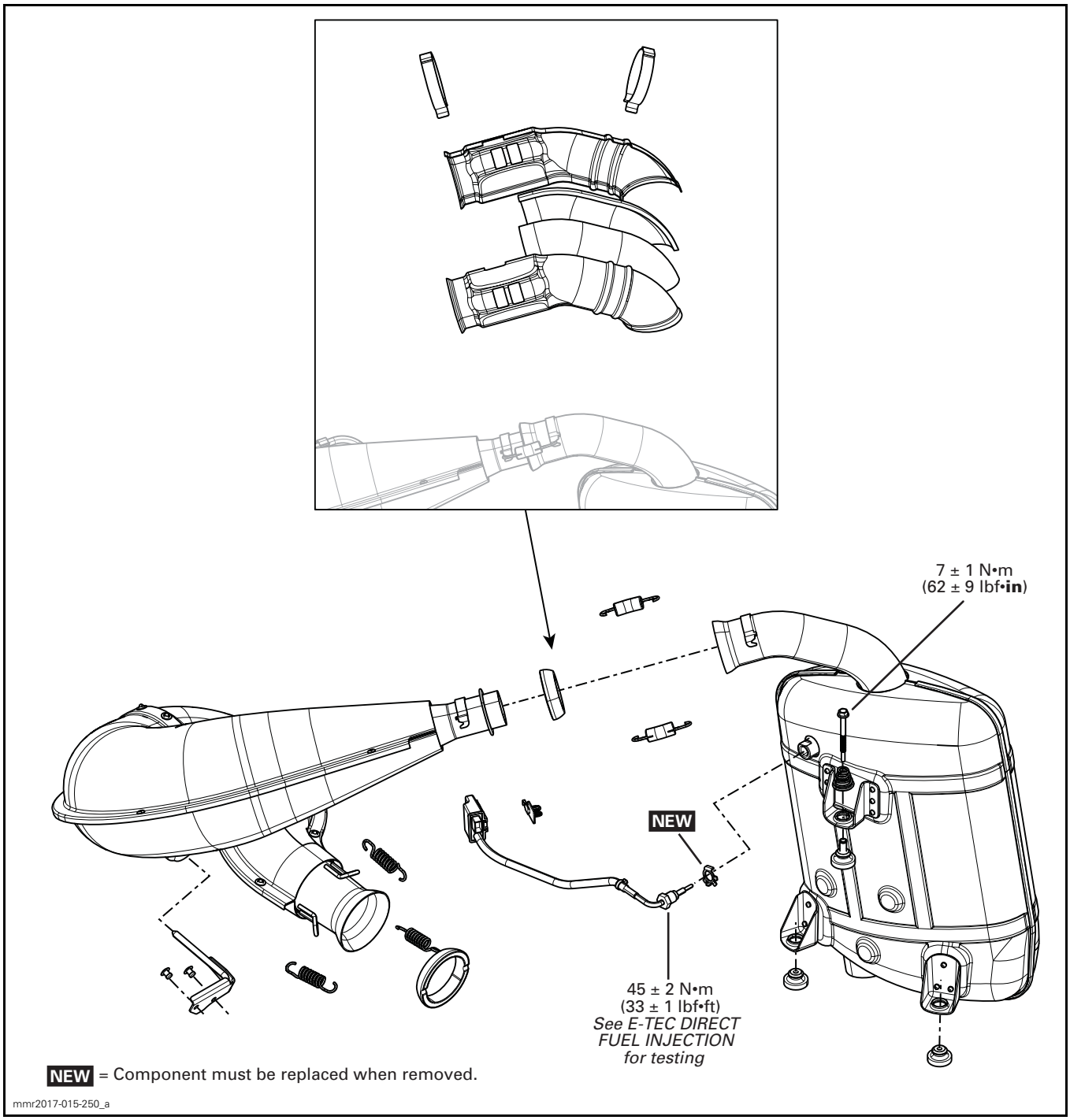
Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	9



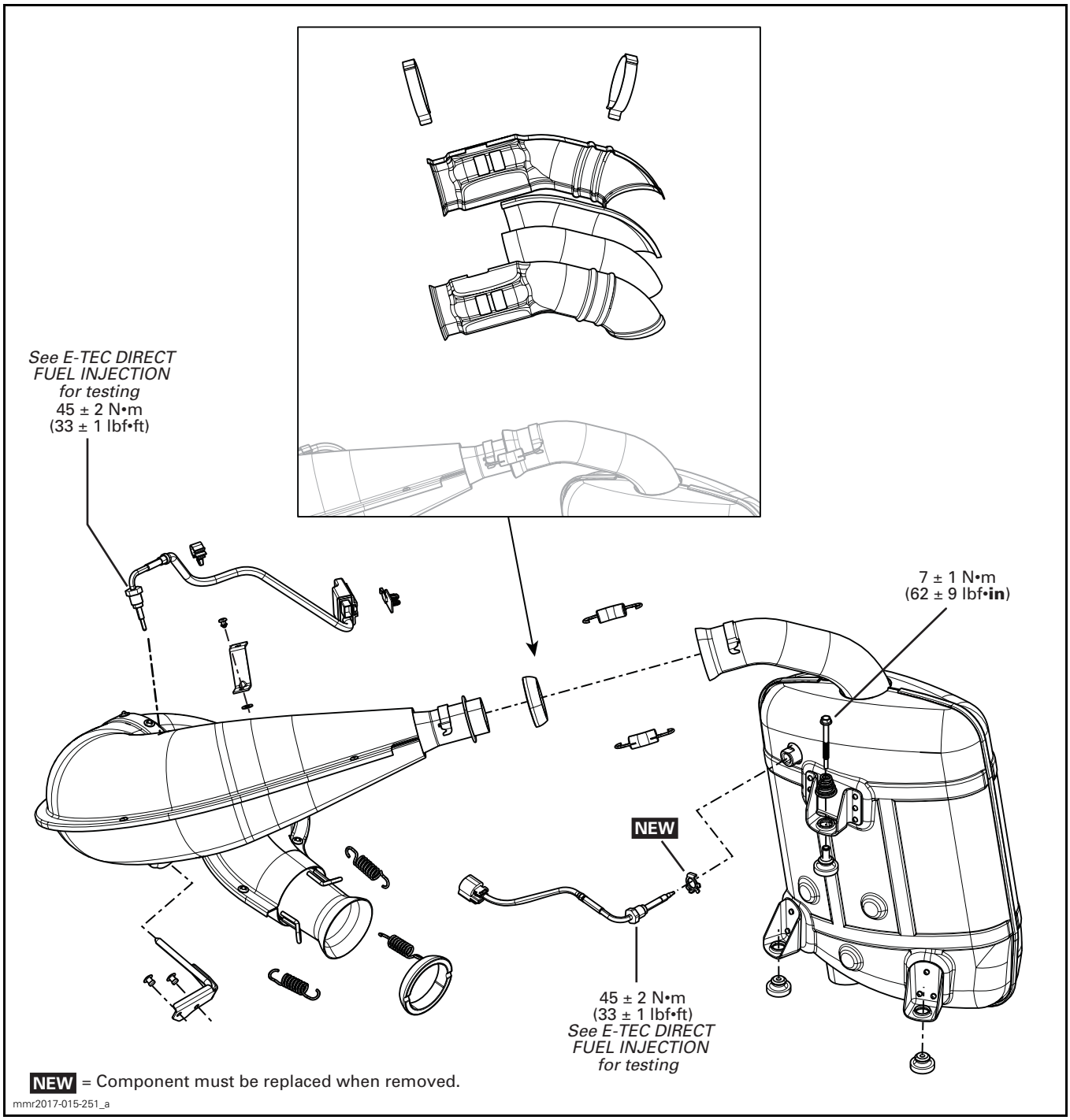
NEW = Component must be replaced when removed.

mmr2017-015-001_a

Models With One EGTS



Models With Two EGTS



GENERAL

⚠ WARNING

To avoid potential burns, never touch exhaust system components immediately after the engine has been running because these components are very hot. Let engine and exhaust system cool down before performing any servicing.

During assembly/installation, use the torque value and service products as in the exploded view.

⚠ WARNING

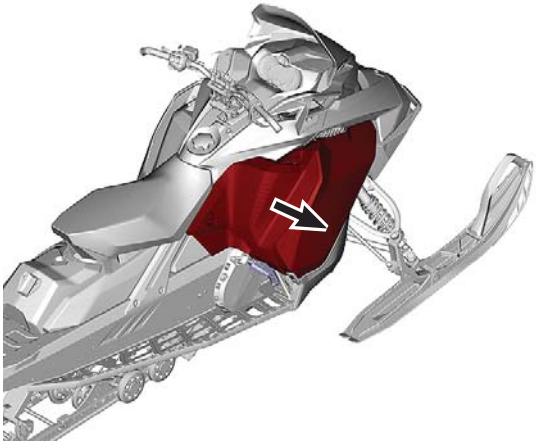
Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

PROCEDURES

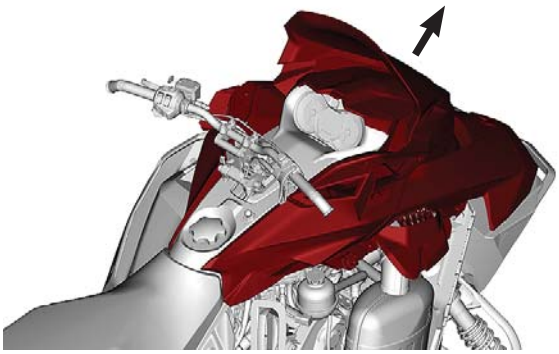
MUFFLER

Removing the Muffler

1. Refer to *BODY* subsection and remove the following parts.

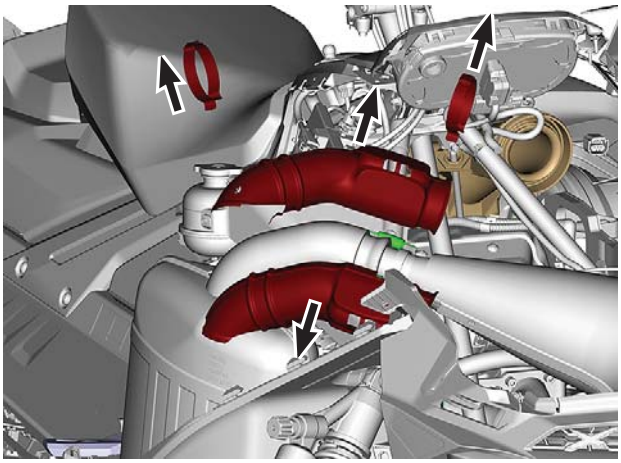


mmr2017-015-100_a



mmr2017-015-101_a

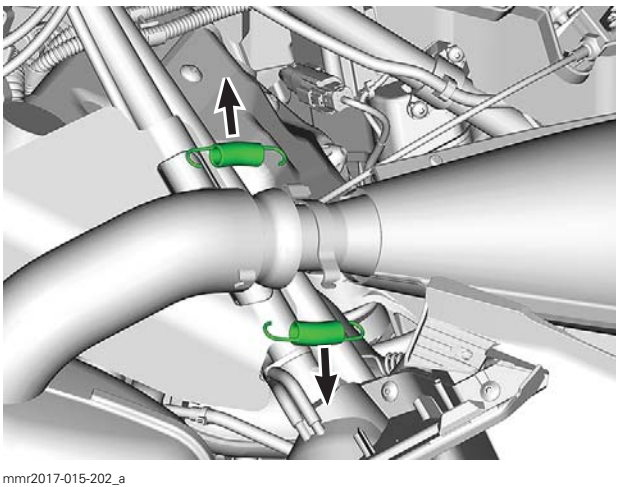
2. Remove heat shields from the muffler pipe.



mmr2017-015-201_a

3. Remove exhaust springs retaining the tuned pipe to the muffler.

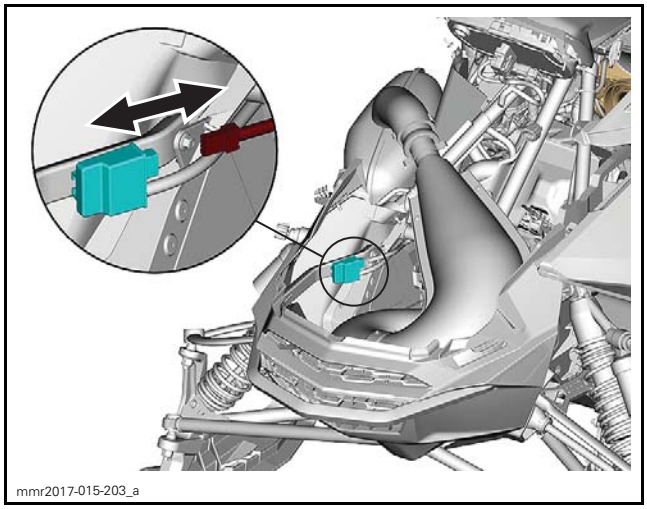
REQUIRED TOOL	
SPRING INSTALLER/REMOVER (P/N 529 035 983)	



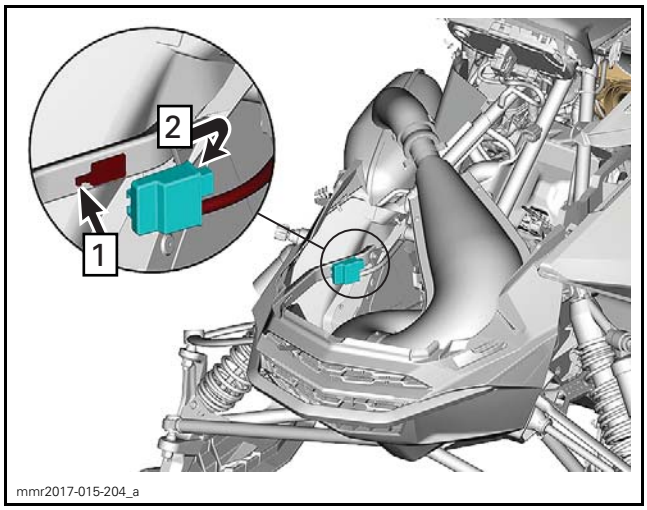
mmr2017-015-202_a

Models With One EGTS

4. Disconnect the power harness from the thermocouple module (THCM)


mmr2017-015-203_a

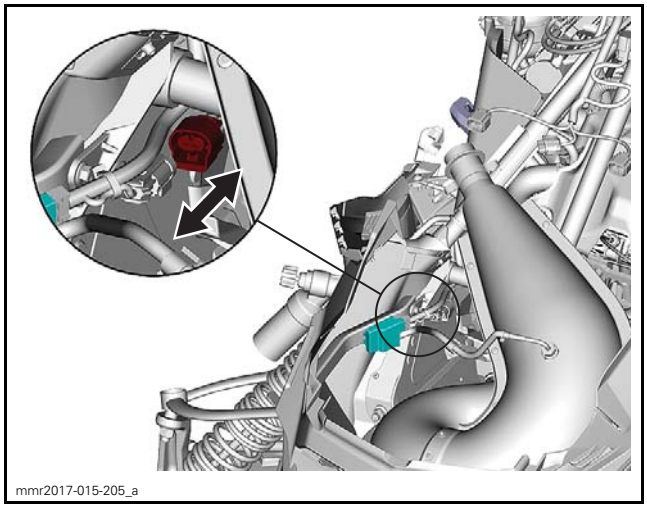
5. Detach the THCM module from the vehicle side member.



mmr2017-015-204_a

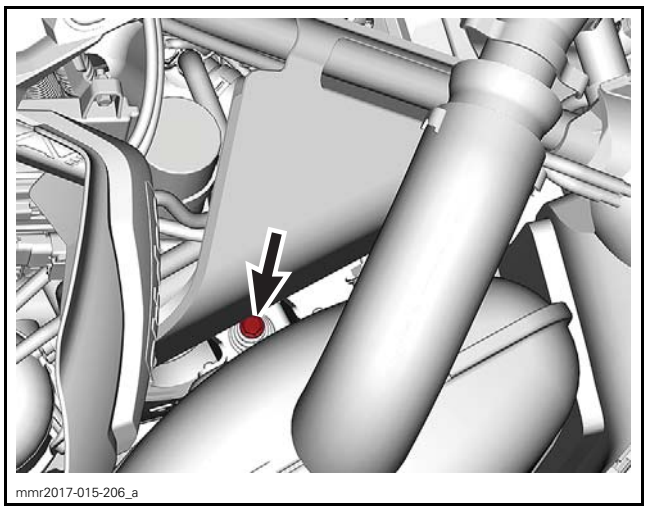
Models With Two EGTS

6. Disconnect the exhaust gas temperature sensor (EGTSm) from the THCM module harness.

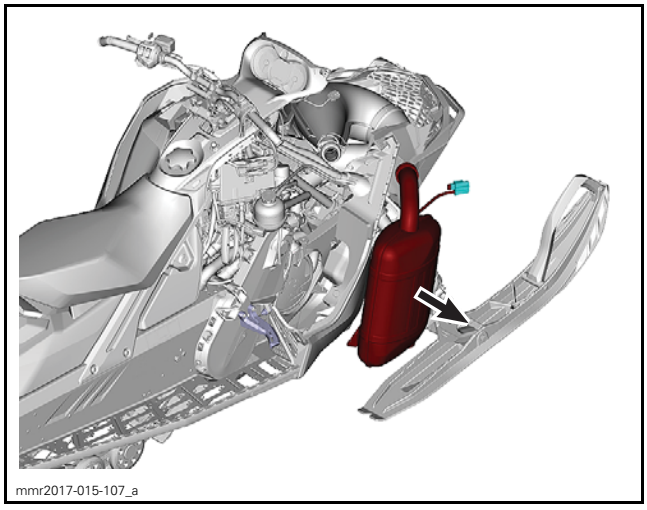

mmr2017-015-205_a

All Models

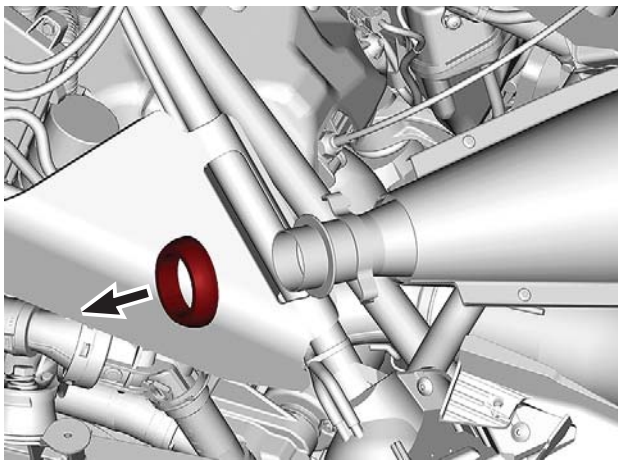
7. Behind the muffler, remove the retaining screw and its spring.


mmr2017-015-206_a

8. Remove the muffler.


mmr2017-015-107_a

9. Remove exhaust gasket.


mmr2017-015-207_a

Inspecting the Muffler

Check the muffler for cracks or other damages.

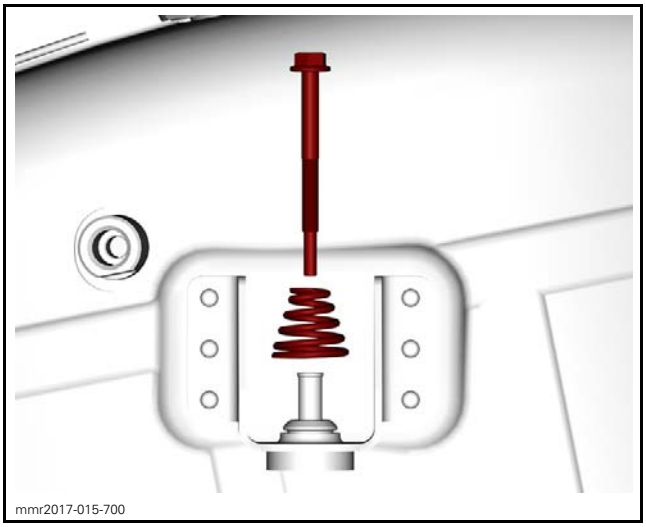
Check grommet condition.

Inspect exhaust gasket condition. Replace as required.

Installing the Muffler

For installation, reverse the removal procedure. However, pay attention to the following:

Muffler Retaining Screw


mmr2017-015-700

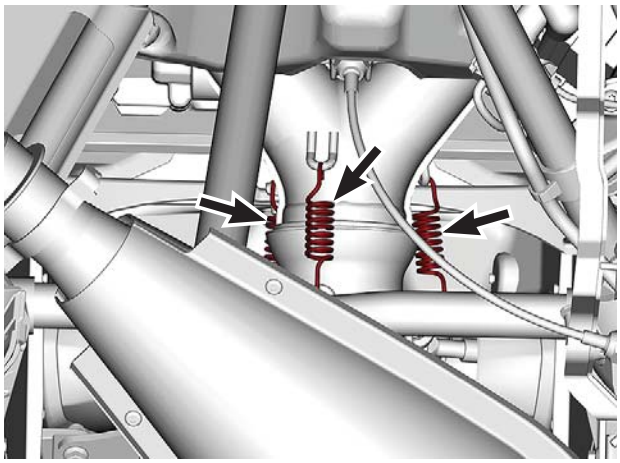
TIGHTENING TORQUE	
Muffler retaining screw	7 N•m ± 1 N•m (62 lbf•**in** ± 9 lbf•**in**)

TUNED PIPE

Removing the Tuned Pipe

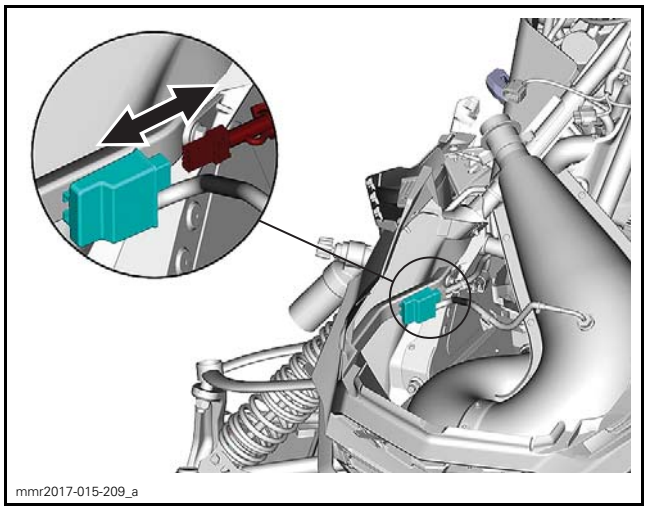
1. Remove the muffler.
2. Remove exhaust springs retaining the tuned pipe to the exhaust manifold.

REQUIRED TOOL	
SPRING INSTALLER/REMOVER (P/N 529 035 983)	

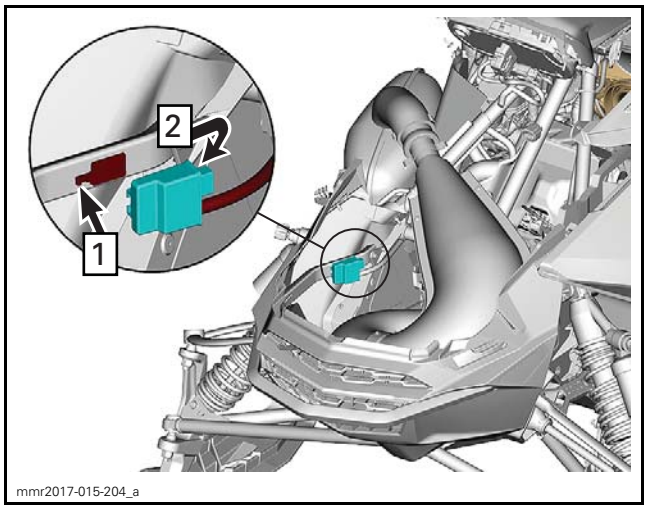

mmr2017-015-208_a

Models With 2 EGTS

3. Disconnect the THCM harness from the THCM module.

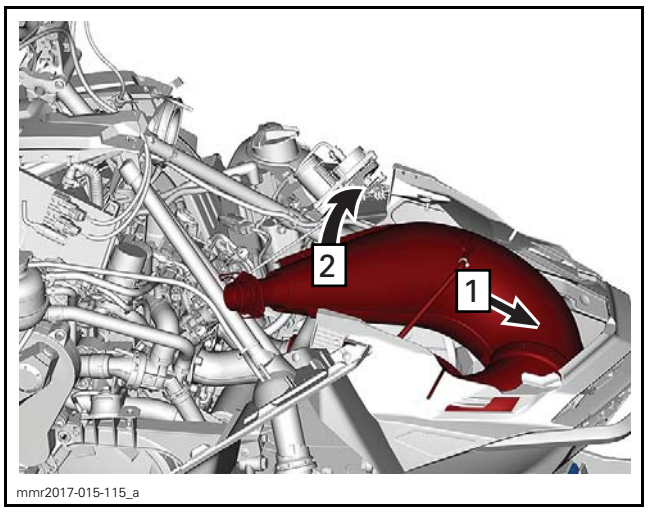

mmr2017-015-209_a

4. Detach the THCM module from the vehicle side member.

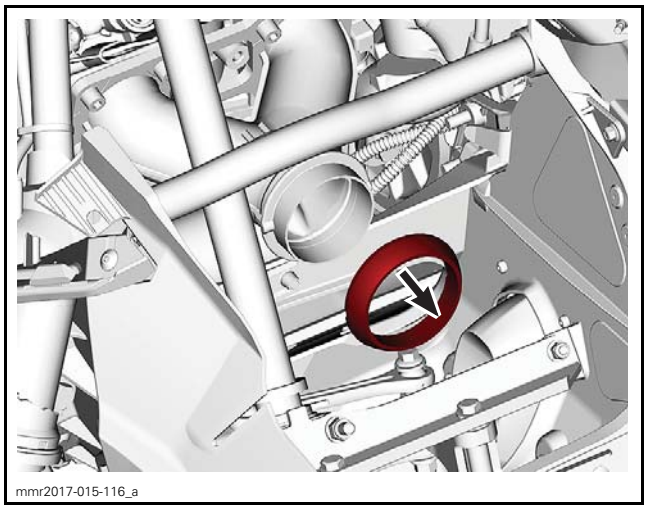


All Models

5. Remove tuned pipe.
   5.1 Move tuned pipe forwards until the hook gets out of the anti vibration rubber mount.
   5.2 Remove the tuned pipe by tilting it (engine side).



6. Remove exhaust gasket.



Inspecting the Tuned Pipe

Check exhaust pipe for:
– Damages
– Cracks.

Inspect exhaust gasket condition. Replace as required.

Installing the Tuned Pipe

For installation, reverse the removal procedure.

EXHAUST MANIFOLD

Removing the Exhaust Manifold

1. Remove tuned pipe. Refer to *REMOVING THE TUNED PIPE* in this subsection.
2. Remove:
   – Exhaust manifold screws (discard them)
   – Washers.

REQUIRED TOOL	
Allen spherical socket	

NOTICE Heat screws for 30 seconds before loosening to prevent screw breakage.

3. Remove:
   – Exhaust manifold
   – Gaskets (discard them).

Inspecting the Exhaust Manifold

Check if manifold is cracked or damaged. Replace if necessary.

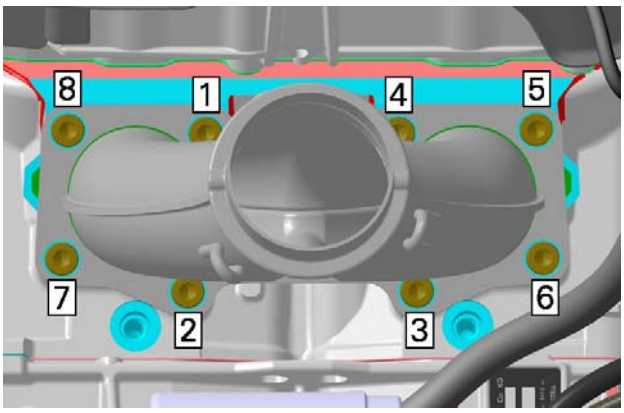
Installing the Exhaust Manifold

1. Install manifold with new gaskets.

2. Install new exhaust manifold screws with LOCTITE 243 (BLUE) (P/N 293 800 060) as per the following tightening sequence and procedure.
3. Tighten exhaust manifold screws to specification using the following pattern.

NOTICE **Do not use an impact wrench to tighten exhaust manifold screws.**

NOTE: Perform step A on all manifold screws before proceeding with step B.



TIGHTENING SEQUENCE

TIGHTENING PROCEDURE		
Exhaust manifold screws	Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
	Step A	7 N•m ± 0.5 N•m (62 lbf•**in** ± 4 lbf•**in**)
	Step B	34 N•m ± 4 N•m (25 lbf•ft ± 3 lbf•ft)

4. Install tuned pipe as the reverse of removal.

REWIND STARTER

SERVICE TOOLS

Description	Part Number	Page
SMALL HOSE PINCHER	295 000 076	3, 9

SERVICE PRODUCTS

Description	Part Number	Page
MOLYKOTE PG 54	420 899 763	6

mmr2017-016-001_a

INSPECTION

Due to dust accumulation, rewind starter must be periodically cleaned, inspected and lubricated. Refer to *MAINTENANCE* section.

NOTICE **It is of the utmost importance that the rewind starter spring is lubricated periodically using specific lubricant. Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.**

Check if starter rope is fraying, replace if necessary.

When pulling starter handle, starter mechanism must engage within 10 cm (3.94 in) of rope pull length. If not, disassemble rewind starter, clean and check for damaged plastic parts. Replace as required, lubricate, reassemble and recheck.

When releasing starter handle, it must return to its stopper and stay against it. If not, check for proper spring preload or damage. Readjust or replace as required.

When pulling starter handle 10 times in a row, it must return freely. If not, check for damaged parts or lack of lubrication. Replace parts or lubricate accordingly.

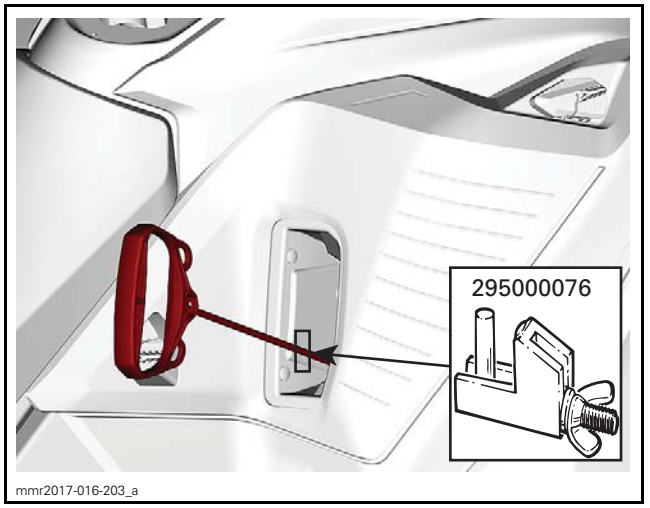
PROCEDURES

REWIND STARTER HANDLE

Removing the Rewind Starter Handle

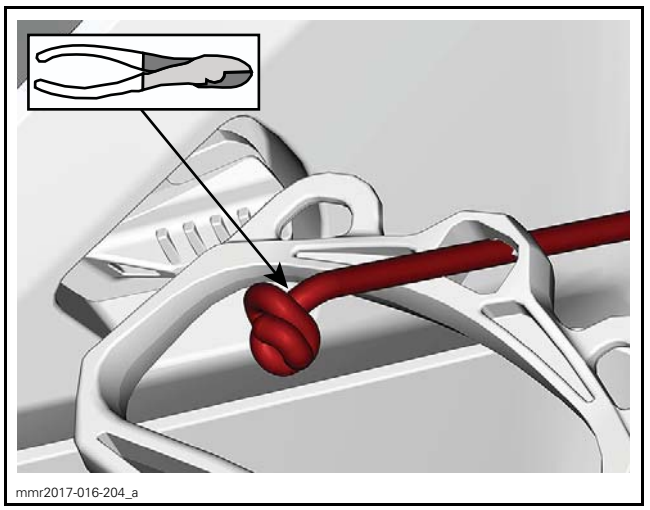
Pull out starter handle/rope for 50 cm (20 in) approximately and lock rope near rewind starter.

REQUIRED TOOL	
SMALL HOSE PINCHER (P/N 295 000 076)	



Using a small screwdriver, extract rope knot from stater handle.

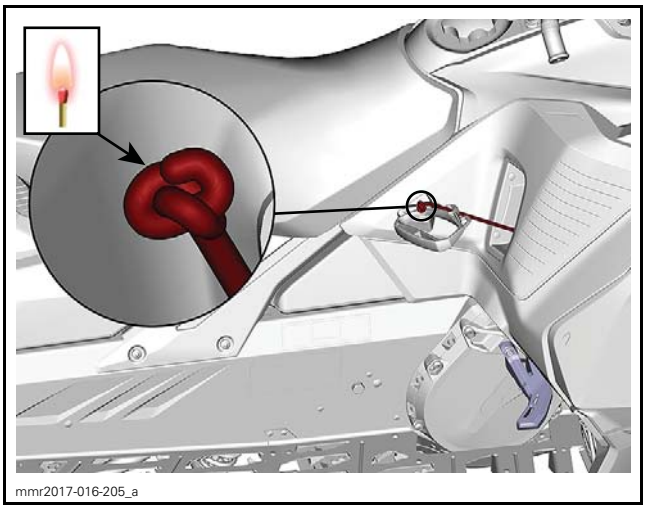
Cut rope close to knot.



Installing the Rewind Starter Handle

Before installing starter handle on the rope, it is necessary to fuse the rope end with a lit match. Pass rope through starter handle and tie a knot on the rope end.

Fuse the knot with a lit match then insert rope end down and pull the starter handle over the knot.

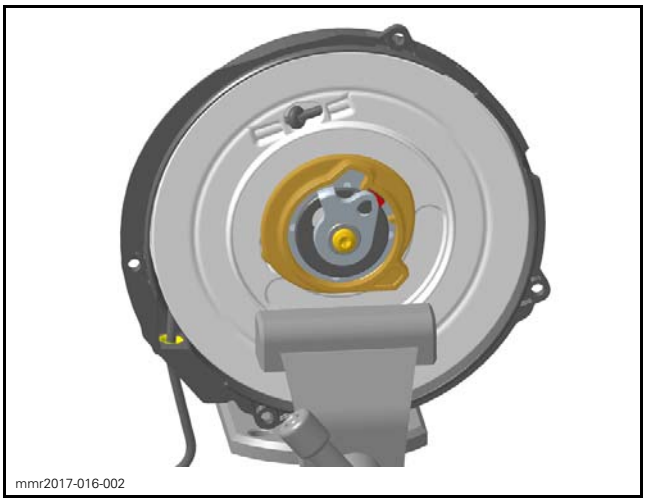

mmr2017-016-205_a

REWIND STARTER ROPE

Rewind Starter Rope Replacement

Remove rewind starter, refer to *REWIND STARTER* in this subsection.

Completely pull out rope. Hold rewind starter in a vise.


mmr2017-016-002

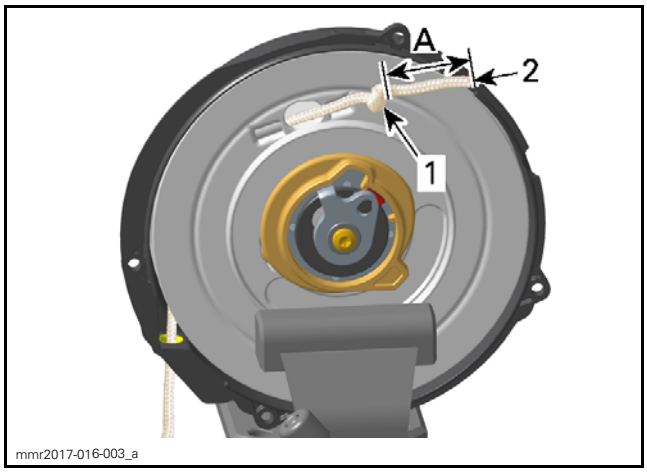
Slide rope and untie the knot.

Remove rope from rope sheave.

NOTE: A new rope must have a overall length of 200 cm (78.74 in).

Insert rope end in rope sheave orifice and lock it by making a knot, leaving behind a free portion of 30 mm to 35 mm (1.2 in to 1.4 in) in length.

Fuse rope end with a lit match



mmr2017-016-003_a

A. 30 mm to 35 mm (1.2 in to 1.4 in)
1. Knot
2. Fused rope end

Insert rope end into rope sheave.


mmr2017-016-004_a

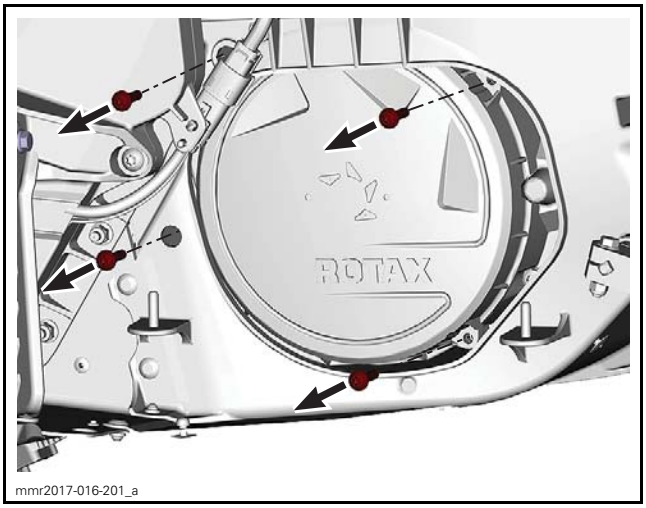
REWIND STARTER

Removing the Rewind Starter

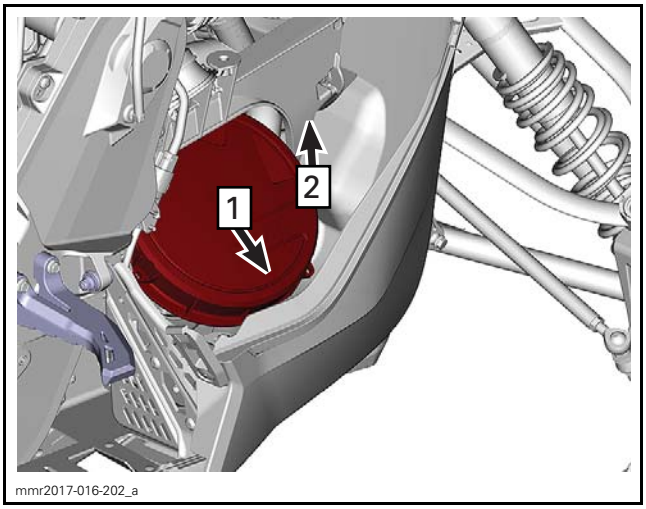
Remove starter handle.

Remove:
– Retaining screws
– Rewind starter.

Engine Inside the Vehicle



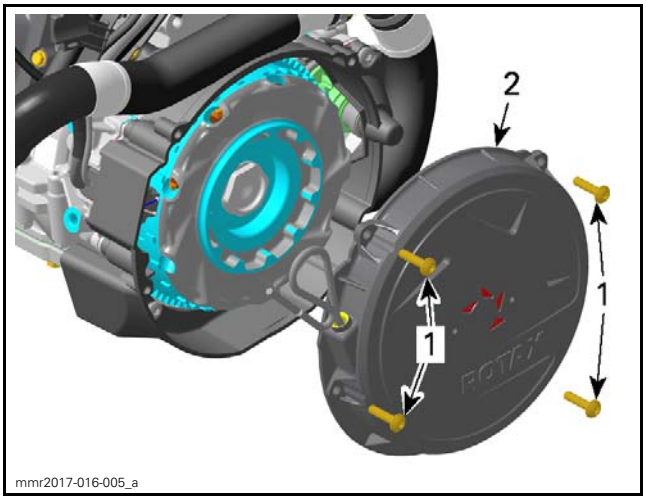
mmr2017-016-201_a



mmr2017-016-202_a

Step 1: Slide the bottom of the rewind starter out of frame
Step 2: Remove rewind starter from engine

Engine Out of the Vehicle



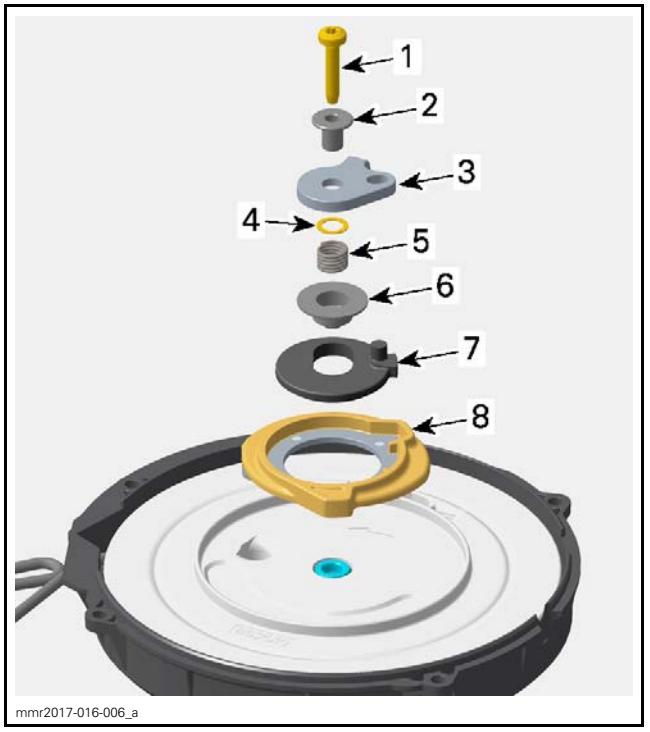
mmr2017-016-005_a

1. *Retaining screws*
2. *Rewind starter*

Disassembling the Rewind Starter

Remove the hose pincher previously installed on rope at rewind starter handle removal. Let rope sheave get free to release spring preload.

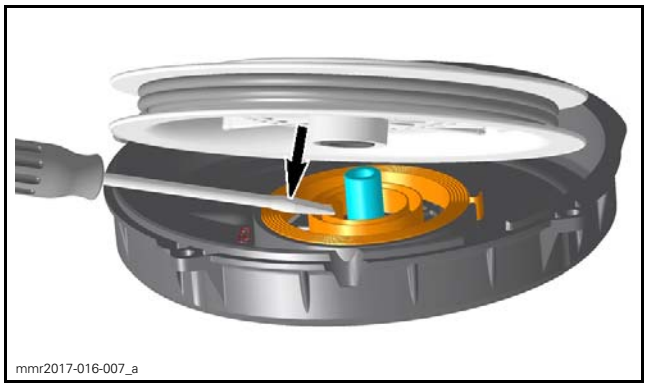
Remove the following parts:



mmr2017-016-006_a

1. *Taptite screw*
2. *Flange bushing*
3. *Lock lever*
4. *Thrust washer*
5. *Compression spring*
6. *Step collar*
7. *Pawl lock*
8. *Pawl*

Remove rope sheave from starter housing. Hold spring in starter housing using a screwdriver.


mmr2017-016-007_a

⚠ WARNING

Since the spring is tightly wound inside the guide it may fly out when rewind is handled. Always handle with care.

For removing the spring, it is of best practice to take the starter housing with the spring showing to the floor and than let the starter housing fall plane to the ground.

Discard spring.

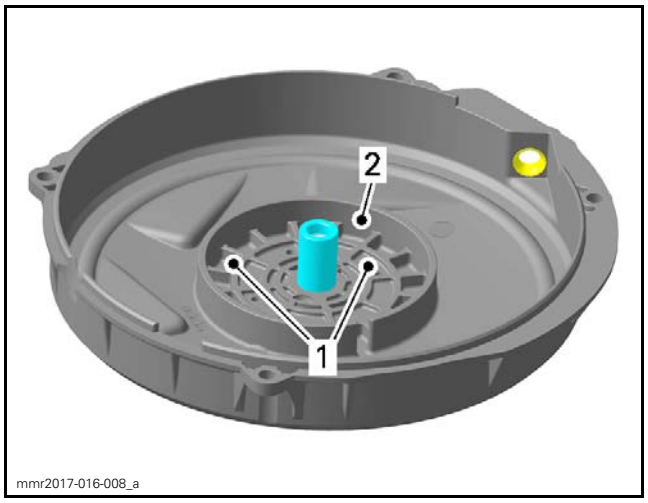
Check sleeve for wear or any other damage. Replace rope sheave if necessary.

Assembling the Rewind Starter

NOTICE For rewind starter parts lubrication use following specified service product. The use of standard multipurpose grease could result in rewind starter malfunction under very cold temperatures and component life will be shortened.

REWIND STARTER PARTS LUBRICATION	
Service product	MOLYKOTE PG 54 (P/N 420 899 763)

Apply the lubricant at these locations:

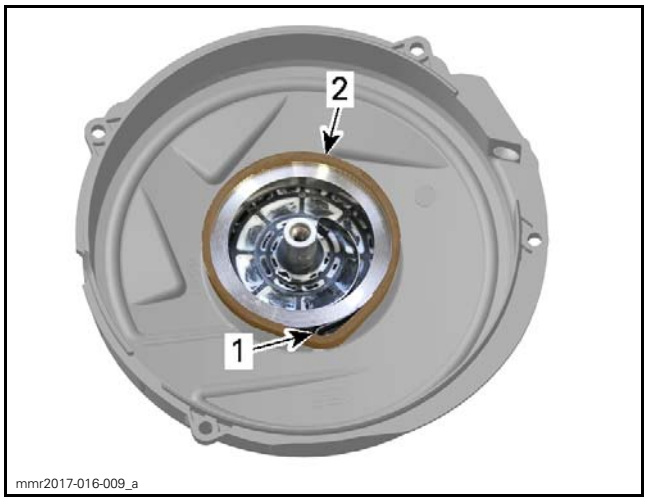


1. Spring contact area
2. Spring guide inside housing

Position spring outer end in spring guide notch with the opening of the spring clip pointing counterclockwise. Then push the spring evenly in the guide. Discard paper carrier.

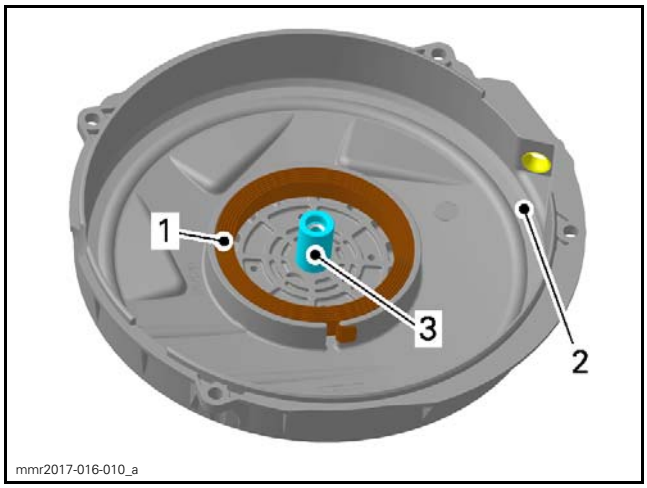
⚠ WARNING

Since the spring is tightly wound inside the guide it may fly out when rewind is handled. Always handle with care.



1. Outer spring end
2. Paper carrier (discard it)

Apply the lubricant at these locations:



1. Spring
2. 1 cm (1/2 in) wide on bottom of housing
3. Housing post

Wind rope on rope sheave

Place rope sheave in starter housing making sure the sheave hub notch engages in the rewind spring hook.

REWIND SPRING HOOK

SHEAVE HUB NOTCH

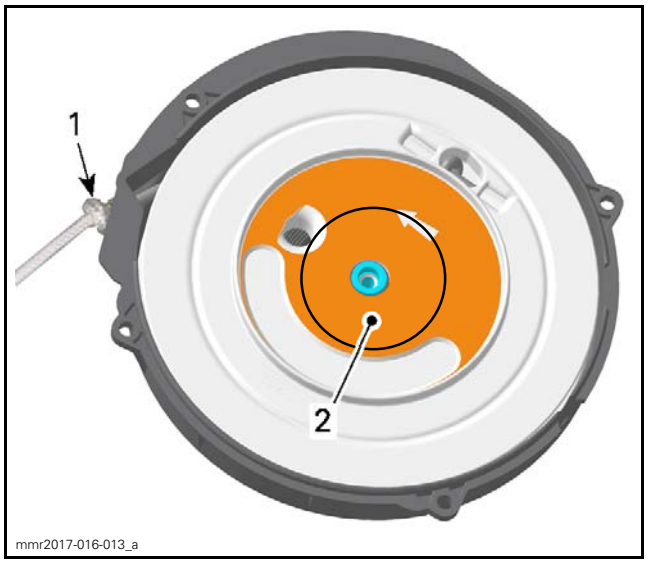
Rotate the rope sheave counterclockwise by about 1/2 turn until rope end is accessible through rope exit hole.

Pull rope out of starter housing.

Rotate the rope sheave counterclockwise 1 full turn.

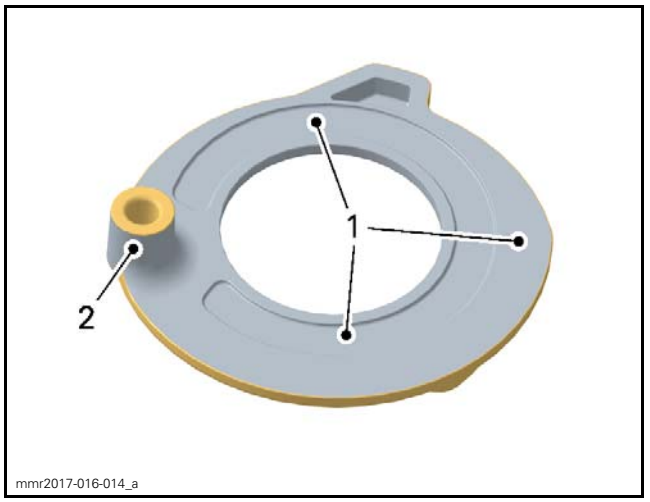
Temporarily make a knot to hold it.

Lubricate rope sheave at the contact surface of the pawl.



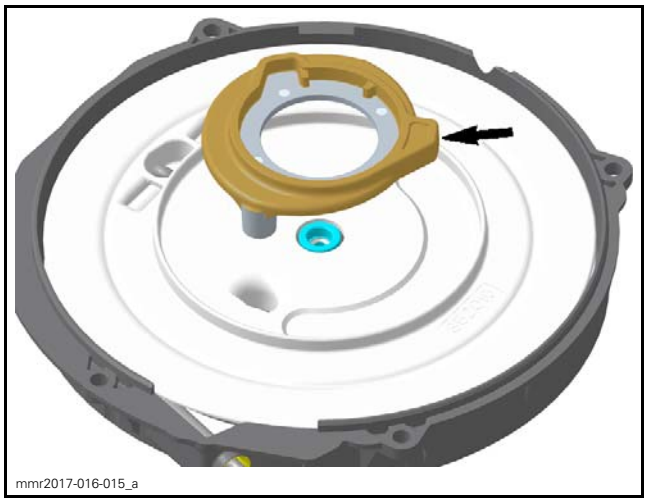
1. *Knot*
2. *Lubricate contact surface of the pawl*

Lubricate pawl at the contact surface and emboss.

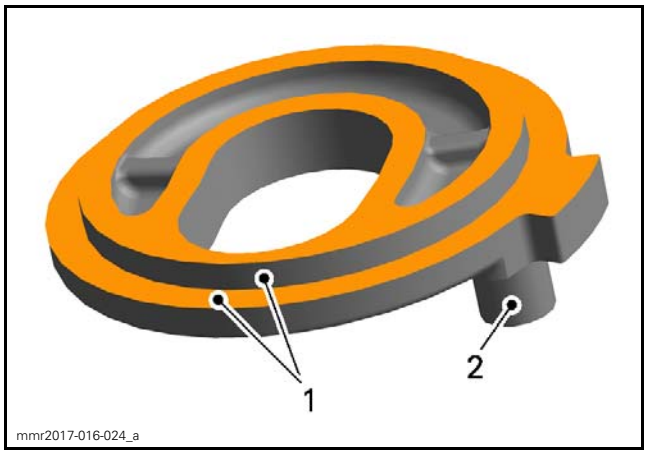


1. *Contact surface*
2. *Emboss*

Install pawl on rope sheave.



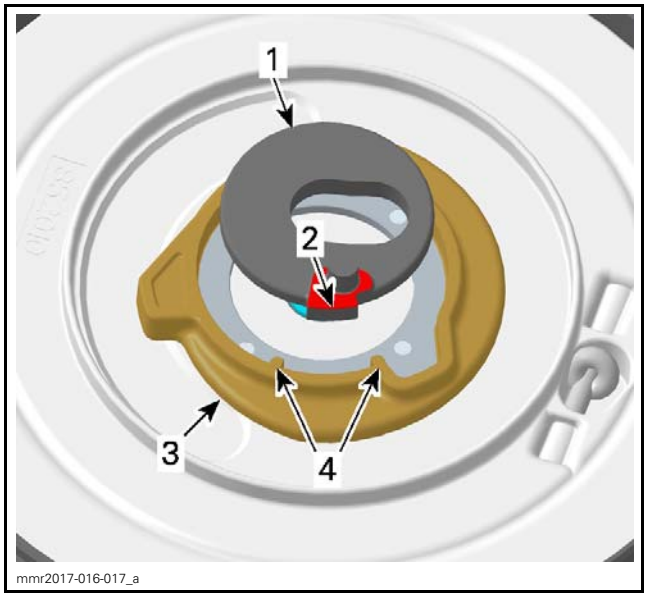
Lubricate pawl lock at the contact surfaces and emboss.



1. Contact surfaces
2. Emboss

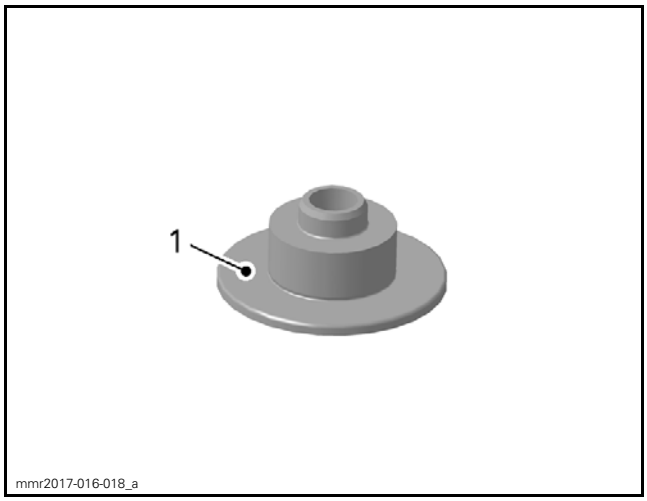
Install pawl lock on pawl.

NOTE: Pawl lock nose must engage between the pawl lock stoppers.



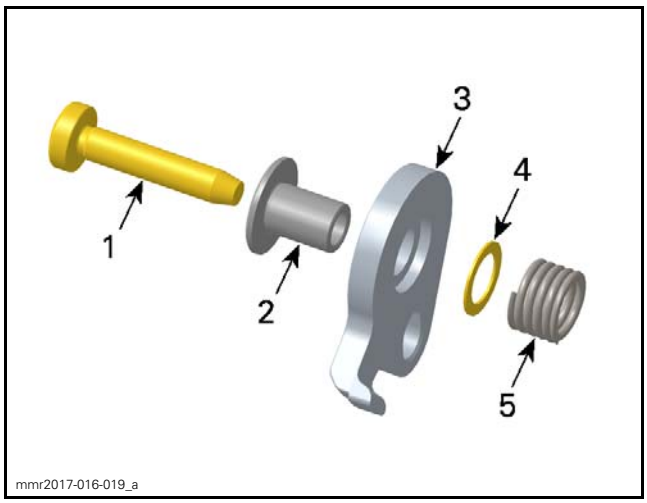
1. Pawl lock
2. Pawl lock nose
3. Pawl
4. Pawl lock stoppers

Lubricate step collar and install it on pawl lock.



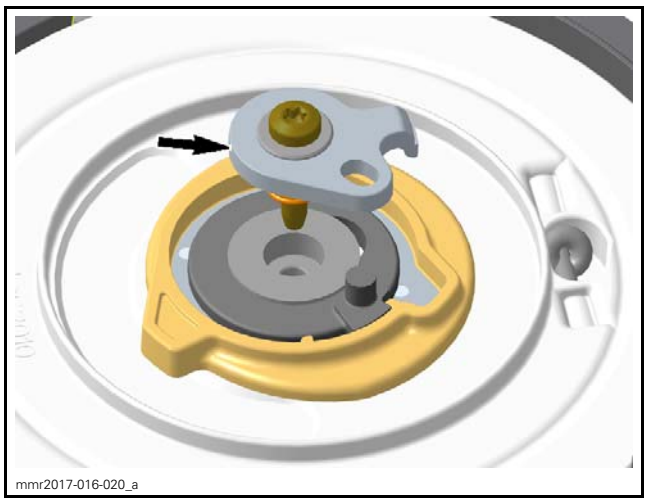
1. Contact surface

Preassemble as shown:



1. Taptite screw
2. Flange bushing
3. Lock lever
4. Thrust washer
5. Compression spring

Install preassembled unit on rewind starter.



Tighten Taptite screw to specification.

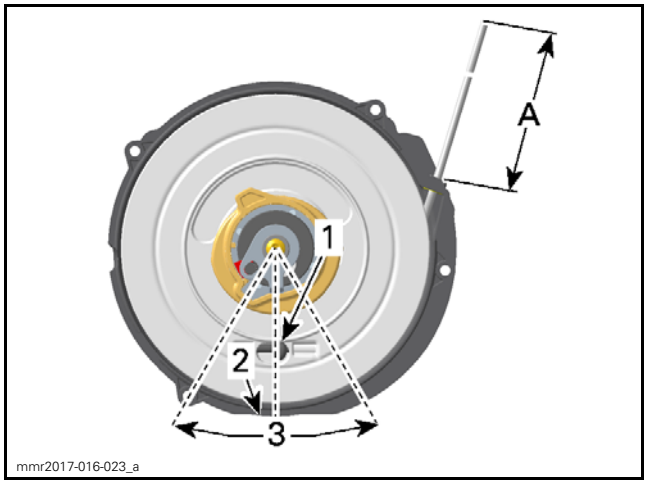
TIGHTENING TORQUE	
Taptite screw	8 N•m ± 0.5 N•m (71 lbf•**in** ± 4 lbf•**in**)

After completion, check if the pawl lock engages and the rope is pulled back completely after releasing the rope.

Installing the Rewind Starter

1. Loosen the temporary knot.
2. Check correct rope length:
   2.1 Pull out rope until recess for knot in the rope sheave is within the specified range.
   2.2 Measure rope length.

MINIMUM ROPE LENGTH
275 mm (10.8 in)

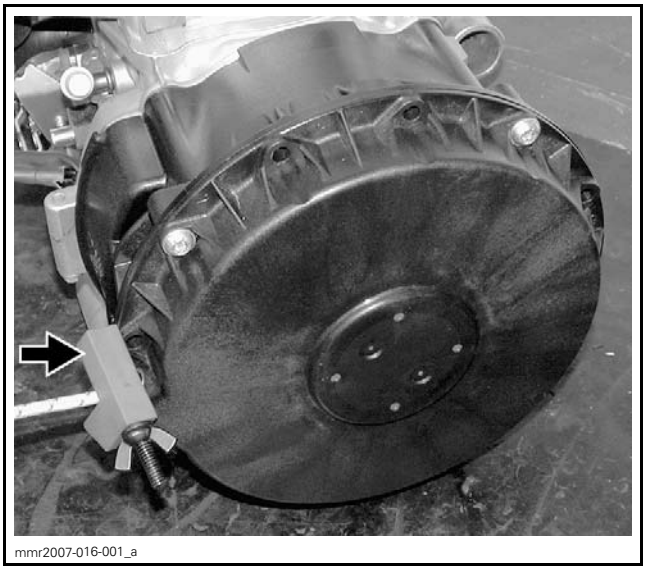


1. Knot
2. Bottom side of rewind starter
3. Range of ± 30°

If rope is too short replace rope, refer to *REWIND STARTER ROPE REPLACEMENT* in this subsection.

3. Lock rope near rewind starter housing.

REQUIRED TOOL	
SMALL HOSE PINCHER (P/N 295 000 076)	



4. Reinstall rewind starter assembly on engine.

TIGHTENING TORQUE	
Rewind starter retaining screws	9 N•m ± 0.6 N•m (80 lbf•**in** ± 5 lbf•**in**)

5. Thread starter rope through console.
6. Install handle, refer to *INSTALLING THE STARTER HANDLE* in this subsection.

LUBRICATION SYSTEM

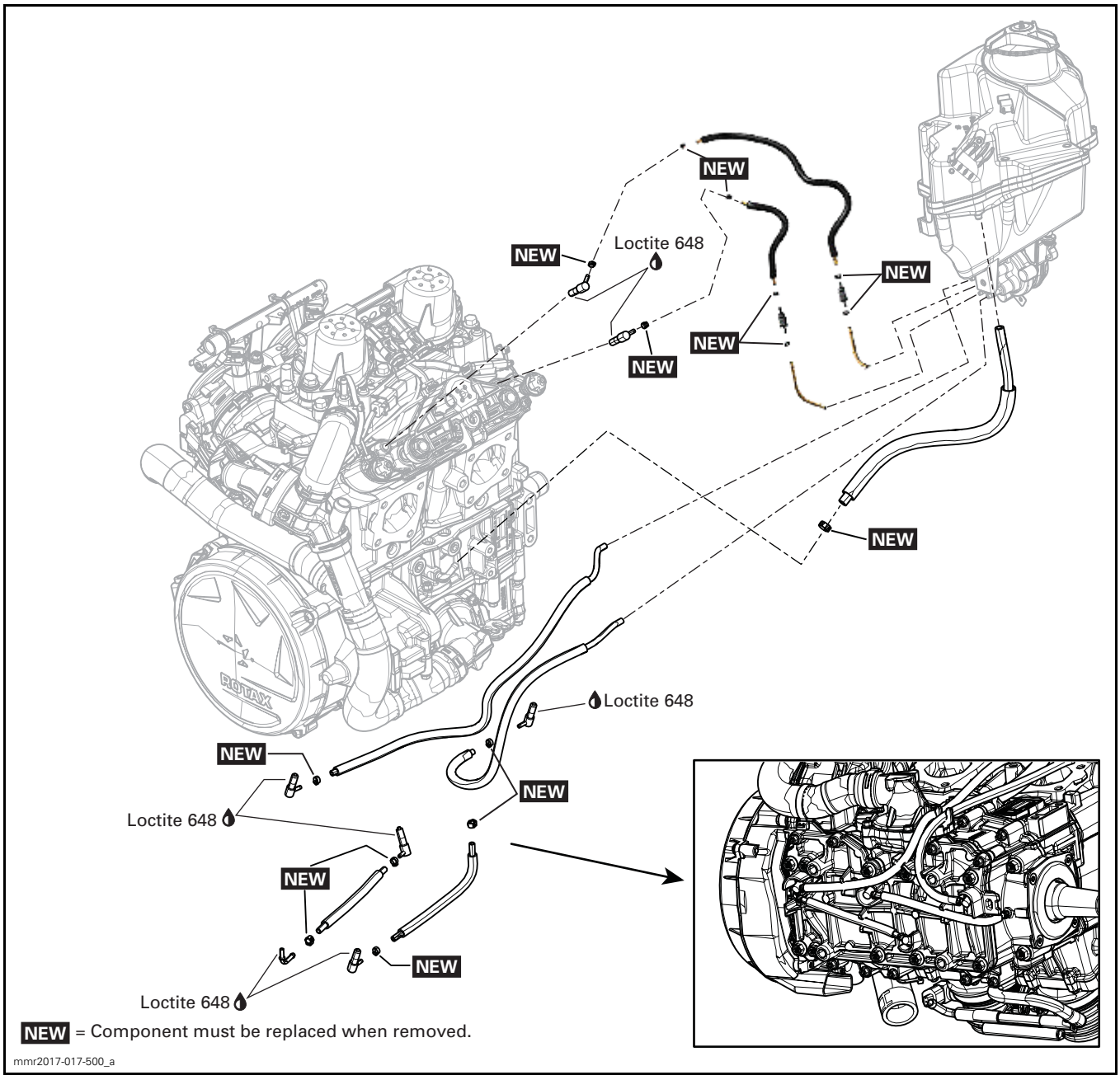
SERVICE TOOLS

Description	Part Number	Page
FLUKE 115 MULTIMETER	529 035 868	12
IMPULSE FITTING PUNCH (BIG)	529 036 412	16
IMPULSE FITTING PUNCH (SMALL)	529 036 413	16
LEAK TEST KIT	529 033 100	7
VACUUM/PRESSURE PUMP	529 021 800	7, 14, 16

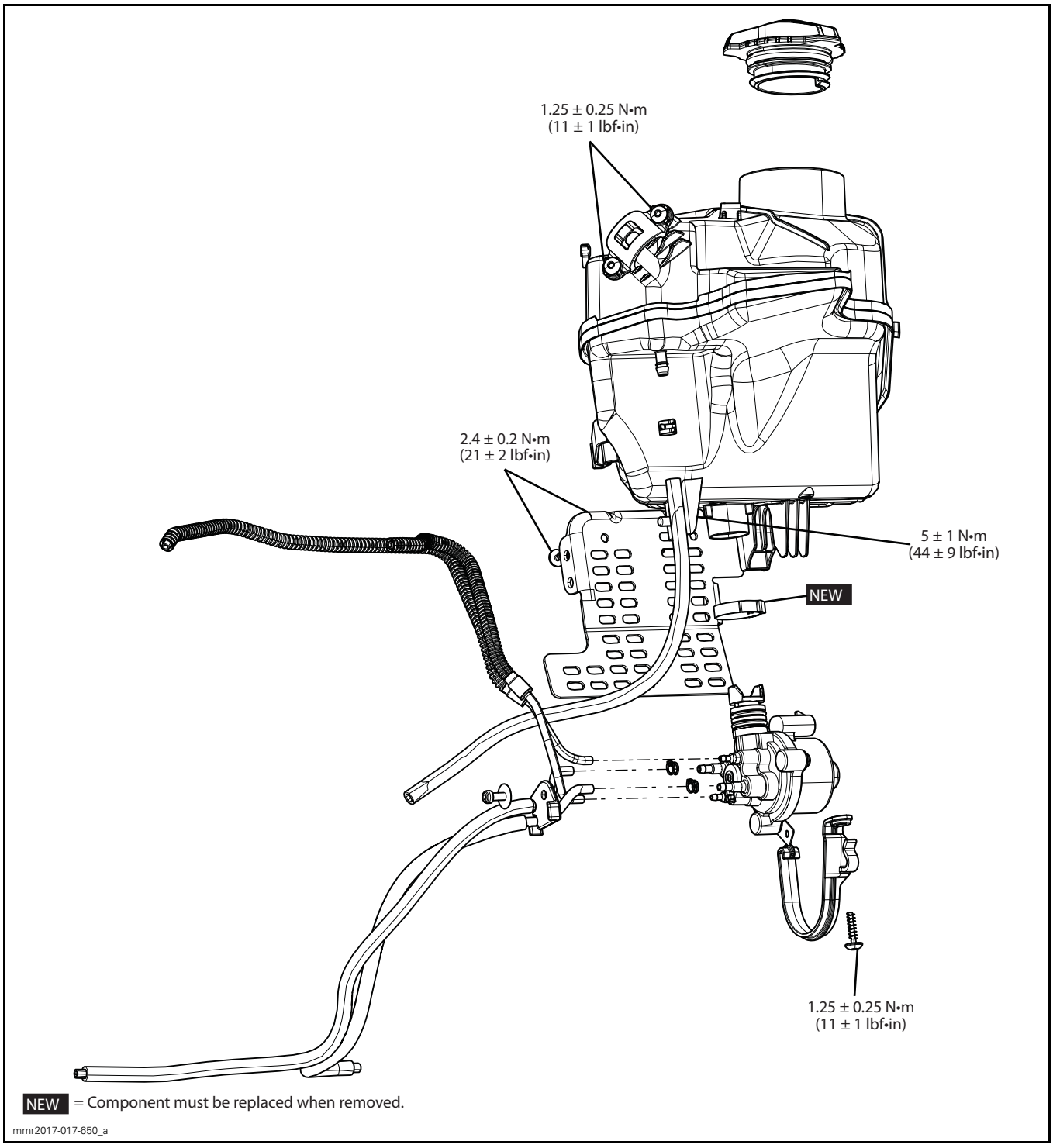
SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 648 (GREEN)	413 711 400	15
PULLEY FLANGE CLEANER	413 711 809	15
XPS INJECTION OIL	293 600 117	7
XPS SYNTHETIC 2-STROKE OIL	293 600 132	7

CHECK VALVES AND OIL HOSES



OIL INJECTION TANK AND OIL INJECTION PUMP



GENERAL

During assembly/installation, use the torque values and service products as shown in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, etc.) must be replaced with new ones.

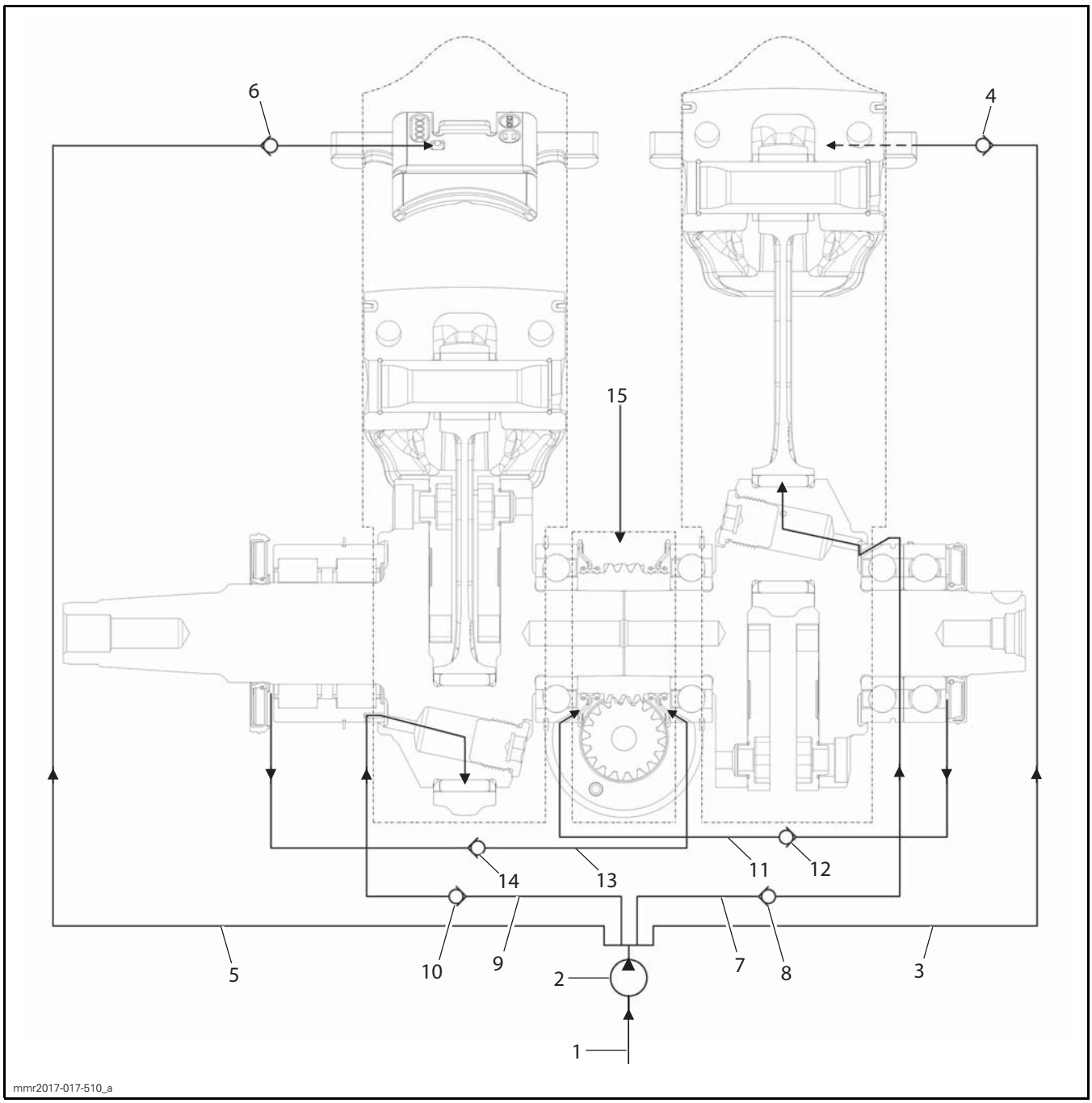
⚠ WARNING

Wipe off any oil spills. Oil is highly flammable.

NOTICE Do not use a hose pincher on outlet hose. This would damage the spring inside hose.

NOTICE Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.

ENGINE LUBRICATION SYSTEM DESCRIPTION



1. *Oil supply from oil tank*
2. *Oil pump*
3. *To 3D RAVE valve MAG side*
4. *Check valve RAVE MAG side*
5. *To 3D RAVE valve PTO side*
6. *Check valve RAVE PTO side*
7. *To engine MAG side*
8. *Check valve MAG side main bearing*
9. *To engine PTO side*
10. *Check valve PTO side main bearing*
11. *From MAG side outer main bearing to PTO inner main bearing*
12. *Check valve*
13. *From PTO side outer main bearing to MAG inner main bearing*
14. *Check valve*
15. *Oil supply from oil tank*

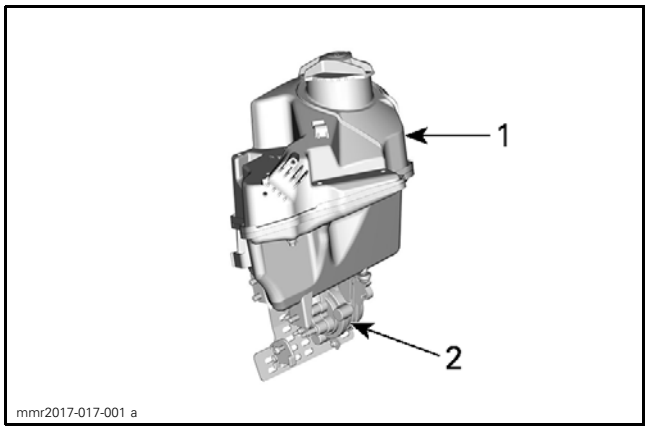
The engine oil supplied by the oil pump is going through check valves to the outer main bearings. Through oil collecting grooves in the outer crank webs, the main quantity of oil is going through the crank webs and by centrifugal force, the oil is directly transferred to the crank pins to lubricate the big end bearings. After this oil exits the big end bearings it lubricates the small ends, cylinder liners and pistons. A portion of the oil supplied to the outer main bearings is supplied to the opposite inner main bearings controlled by check valves. This oil supply happens by use of pressure difference between cylinder MAG and PTO.

RAVE valves are lubricated by the electronic oil injection pump.

SYSTEM DESCRIPTION

An electronic oil injection pump with a mechanical positive displacement type is used. An electronic pump is more accurate and injection rate can be changed according to engine requirements. This results in a greatly reduced oil consumption.

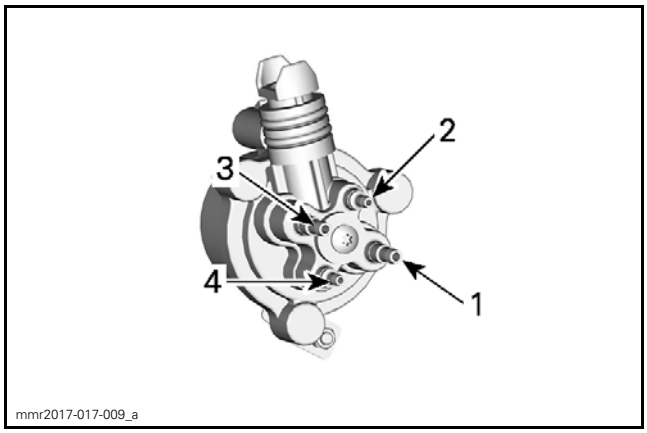
The electronic oil injection pump is directly attached under the oil injection tank.



1. Oil injection tank
2. Electronic oil injection pump

The E-TEC pump features a total of 4 outlets:

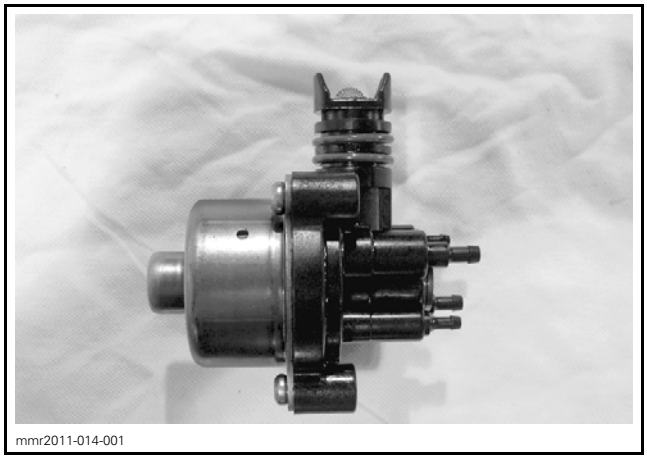
– 2 large outlets to the crankcase to lubricate engine internal parts.
– 2 small outlets to the 3D RAVE valves to lubricate valves to prevent carbon deposits.



1. To engine PTO side
2. To 3D RAVE valve PTO side
3. To engine MAG side
4. To 3D RAVE valve MAG side

NOTE: engine and 3D RAVE valve MAG side are interchangeable.

The 4 plungers in the pump work synchronized. They pump all at the same time.



TYPICAL

The ECM controls the pump to inject a variable amount of oil through the entire engine operating range and conditions.

Oil Injection Pump Operation

For the first 6 hours of engine break-in period, oil delivery is increased.

Oil/fuel ratio can go up to approximately 70:1 after the break-in period.

At idle, pump works at approximately less than 1 pulse per minute. A very low quantity of oil is injected to reduce engine smoke and to reduce engine emissions.

As engine speed increases, oil flow increases but not proportionally. It varies according to the specific engine requirements.

At 8000 RPM, pump works at approximately 180 pulses per minute.

When operating vehicle in high altitude area, oil flow is reduced proportionally as altitude increases.

Oil Warm-Up Mode

When injection oil is very cold and engine is above idle speed, the oil warm-up mode is active.

To warm-up the oil, the oil injection pump is kept ON after the oil delivery stroke, as long as possible, to then turn OFF for the return stroke. The extra time the pump is ON generates more heat that is dissipated through the oil.

NOTE: The premium gauge displays WARM UP whenever the oil warm-up or engine warm-up modes are active.

To determine if injection oil is cold, the ECM uses a feedback switch, located in oil injection pump, that closes at the end of the oil delivery stroke and opens when the oil injection pump coil is de-energized. Thus, the ECM can calculate the time it takes to deliver the oil which is related to the oil viscosity.

The ECM uses a complex algorithm to vary the warm-up time and the rev limiter according to oil pump requirements based on engine speed and TPS position. Therefore, the rev limiter is set dynamically as per the driver inputs.

NOTE: If a fault code related to the feedback switch is active (P1233, P1234), the oil injection warm-up mode uses data from the ATS but it uses the following parameter values. Engine lubrication does not change, only the warm-up time may be longer than usual.

OIL WARM-UP MODE STRATEGY WHEN FEEDBACK SWITCH IS FAULTY		
AIR TEMPERATURE	WARM-UP TIME	ENGINE SPEED LIMITATION
Warm-up starts below -20°C (-4°F)	Within approximately 8 and 11 minutes	Within approximately 4000 - 6000 RPM

Automated Engine Oil Fogging

An automated engine oil fogging has been implemented to automatically inject the required oil to protect the engine during vehicle storage. Engine speed will be increased to approximately 1600 RPM and excess oil will be injected for approximately 30 seconds then, the engine will automatically be stopped.

The storage mode can be activated either by using BUDS2 or the multifunction gauge on the vehicle. Refer to *STORAGE PROCEDURE* subsection.

RECOMMENDED INJECTION OIL

RECOMMENDED INJECTION OIL	
XPS INJECTION OIL (P/N 293 600 117)	XPS SYNTHETIC 2-STROKE OIL (P/N 293 600 132)

NOTICE **These engines have been developed and validated using the XPS™ 2-stroke oils. BRP strongly recommends the use of the applicable XPS 2-stroke oils at all times. Damages caused by oil which is not suitable for the engine will not be covered by the BRP limited warranty.**

INSPECTION

OIL SYSTEM LEAK TEST

1. Install the test cap on oil tank.

REQUIRED TOOL	
LEAK TEST KIT (P/N 529 033 100)	

mmr2017-017-710

TYPICAL
1. Test cap on tank

2. Connect the pressure pump to test cap.

REQUIRED TOOL	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

3. Pressurize oil system as follows.

PRESSURE	TIME TO HOLD PRESSURE
18 kPa (2.6 PSI)	3 minutes

If pressure drops, locate leak(s) and repair or replace leaking component(s).

If pressure does not drop, this validate the oil injection tank and the oil pump for leakage.

TROUBLESHOOTING

SYMPTOM	CAUSE	ACTION
	Damaged or disconnected oil injection pump.	Check oil injection pump wires and connectors on oil injection pump.
	Circuit wires, connectors or ECM output pins.	Check WHITE/RED wire on oil injection pump connector for 55 volts.
		Check system circuit to ECMA connector
		Repair or replace defective part(s).
Engine seizure (PTO or MAG side)	Damaged, kinked or obstructed inlet hose.	Repair or replace hose and test oil injection pump (oil outflow).
	Damaged oil injection pump inner piston.	Replace oil injection pump.
	Mechanical engine problem.	Repair or replace engine defective part(s).

PROCEDURES

OIL INJECTION PUMP

Oil Injection Pump Identification

Every pump is bench tested. Its electrical and flow characteristics are registered throughout all its operating range and are associated to a compensation number.

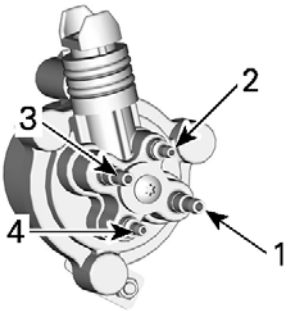
When a pump is replaced, the compensation number must be entered in BUDS2. so that the ECM properly controls the pump according to its optimized characteristics.

The compensation number is located on a label on the pump as shown.

mmr2009-014-034_a

Oil injection pump bleeding is done with BUDS2Refer to *BLEEDING OIL INJECTION PUMP* in this subsection.

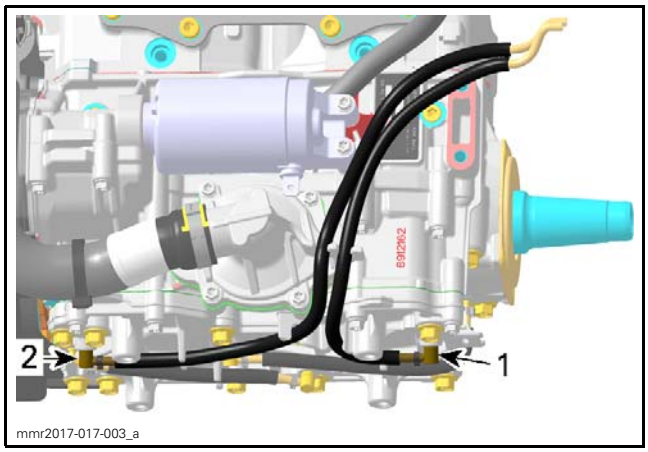
Oil Injection Pump Hoses Connection



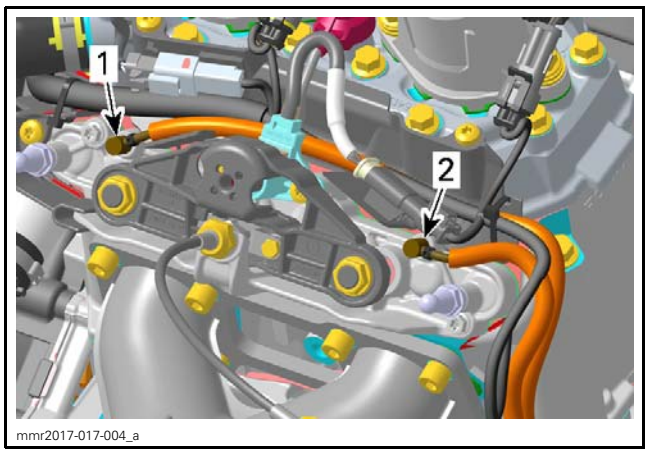
mmr2017-017-009_a

1. To engine PTO side
2. To 3D RAVE valve PTO side
3. To engine MAG side
4. To 3D RAVE valve MAG side

NOTE: engine and 3D RAVE valve MAG side are interchangeable.



1. *Oil inlet hose (PTO side)*
2. *Oil inlet hose (MAG side)*



1. *MAG 3D RAVE valve*
2. *PTO 3D RAVE valve*

Testing Oil Injection Pump with BUDS2

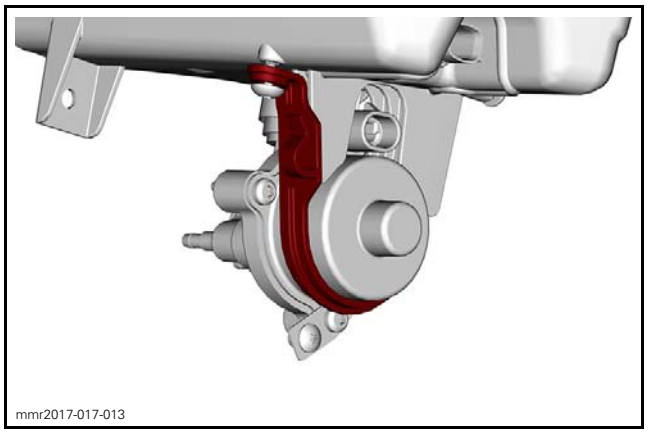
1. Connect BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Navigate to the **functions page**.
3. Start engine.
4. Activate oil pump
5. Listen if oil injection pump is activated.

NOTE: Touching the oil injection pump may help to feel if pump is activated.

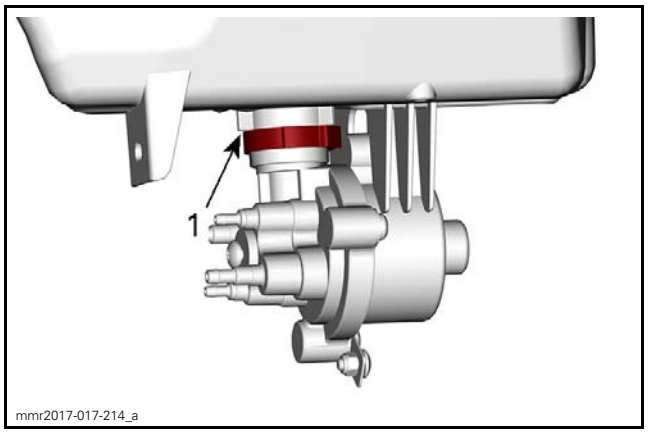
6. If test fails, check wires and connector.

Removing the Oil Injection Pump

1. Remove the pump bracket.

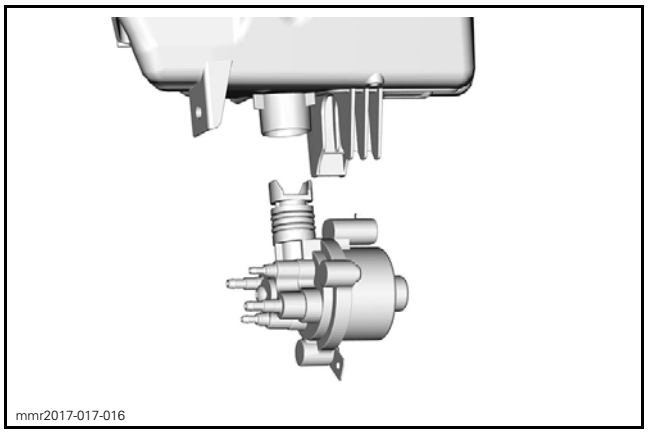


2. Remove and discard Oetiker clamp securing oil injection pump to oil tank.



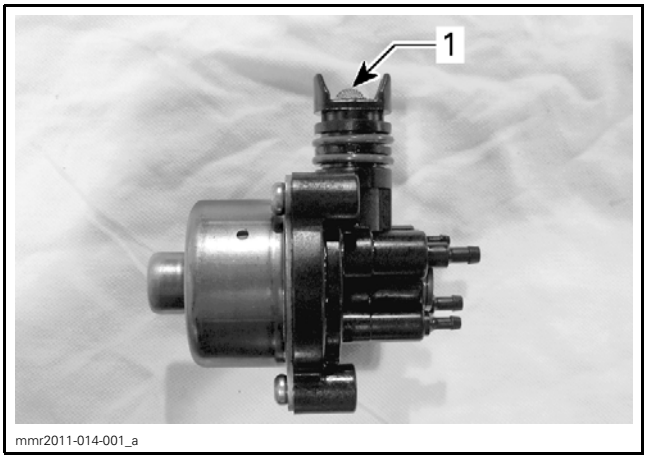
1. *Oetiker clamp*

3. Move oil injection pump downward to remove it from oil tank.



Inspecting the Oil Injection Pump

1. Check the strainer on the top of oil injection pump. Replace oil injection pump if the strainer is clogged.



1. Oil injection pump strainer

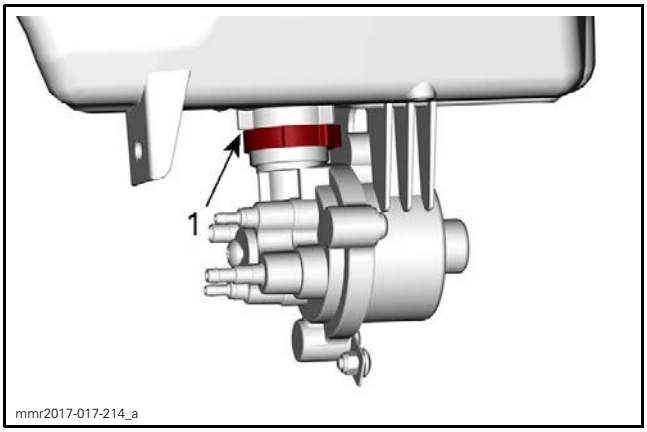
NOTE: Do not replace oil injection pump needlessly. If strainer is slightly dented, oil injection pump is still functional.

Installing the Oil Injection Pump

The installation is the reverse of the removal procedure. However, pay attention to the following.

Install NEW Oetiker clamp to secure oil injection pump.

Ensure Oetiker clamp makes contact with oil tank ribs.



1. Oil tank rib

Refer to *INSTALLING THE OIL TANK* to properly reinstall oil tank.

Bleeding Oil Injection Pump

1. Connect BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Navigate to the **settings page**.
3. Select **configuration** tab then the **ECM** tab.
4. Compare oil pump codes in B.U.D.S. and on oil injection pump sticker.

BACK OF OIL INJECTION PUMP
1. Oil injection pump code (0 to 9)

5. Correct oil injection pump code in BUDS2 if required.

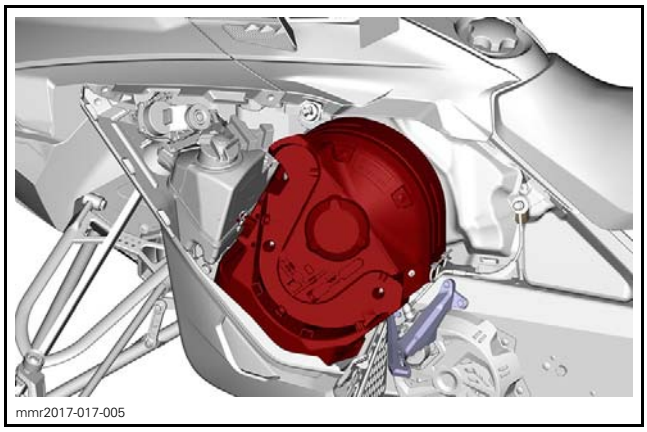
Write any changes.

6. Navigate to the **Functions** page.
7. Activate the oil pump.
8. Start engine.
9. Check for air into hoses. If so, the bleeding procedure must be repeated as often as needed until all air is pumped through entire system.

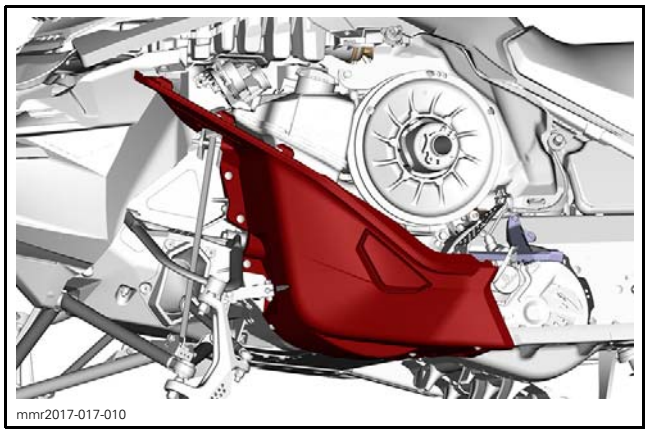
OIL INJECTION TANK

Removing the Oil Injection Tank

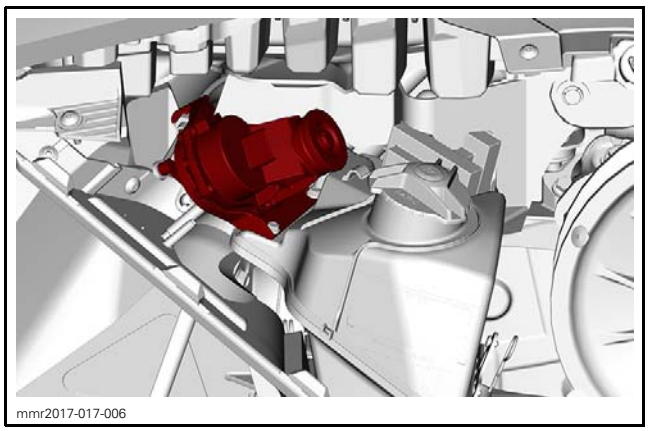
1. Remove upper body module. Refer to *BODY* subsection.
2. Remove side panel
3. Empty oil injection tank completely by siphoning injection oil.
4. Remove belt guard



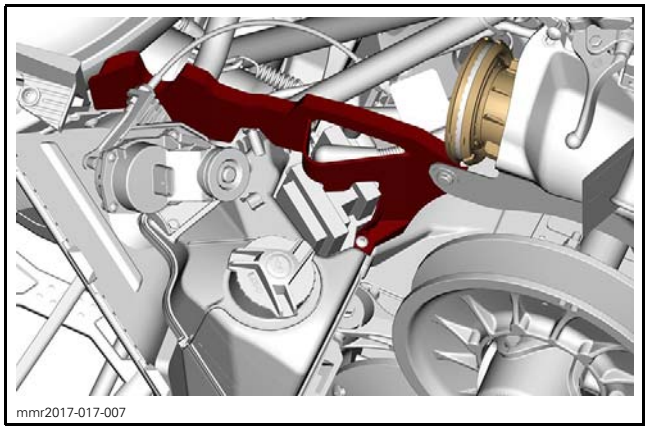
5. Remove bottom pan


mmr2017-017-010

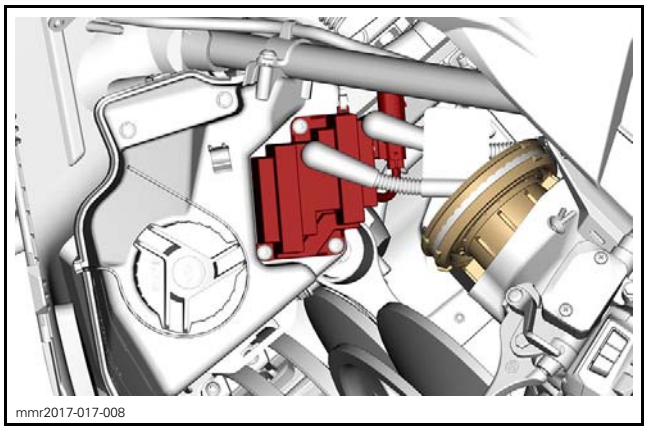
6. Unbolt Rave Valve actuator and set aside.


mmr2017-017-006

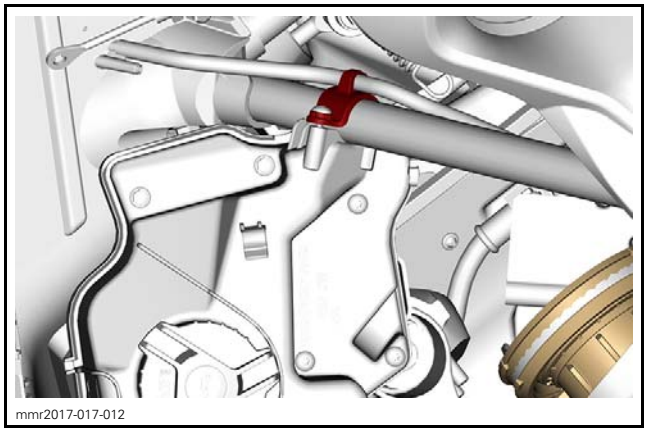
7. Remove acoustic panel.


mmr2017-017-007

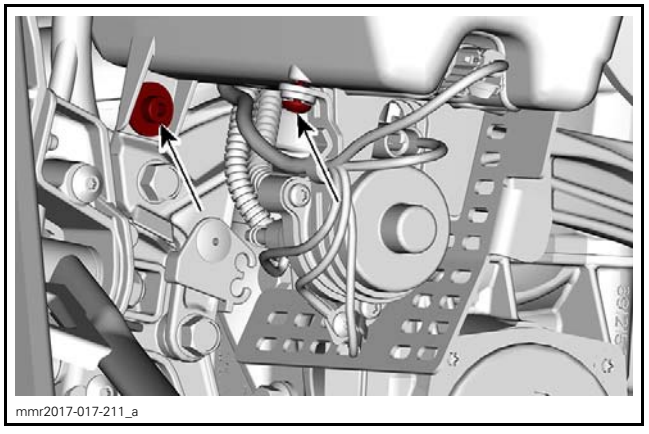
8. Remove Ignition coil.


mmr2017-017-008

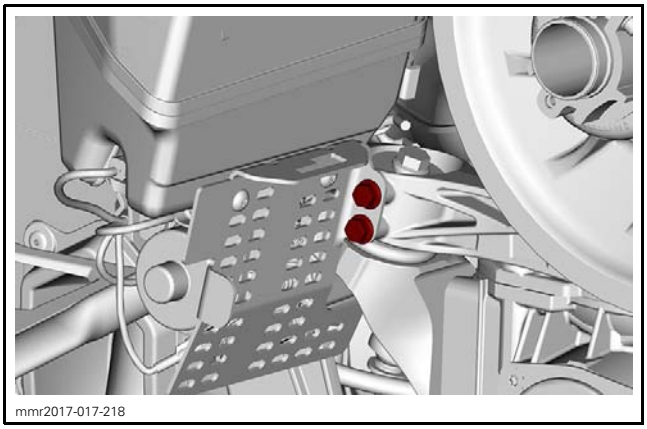
9. Remove bracket


mmr2017-017-012

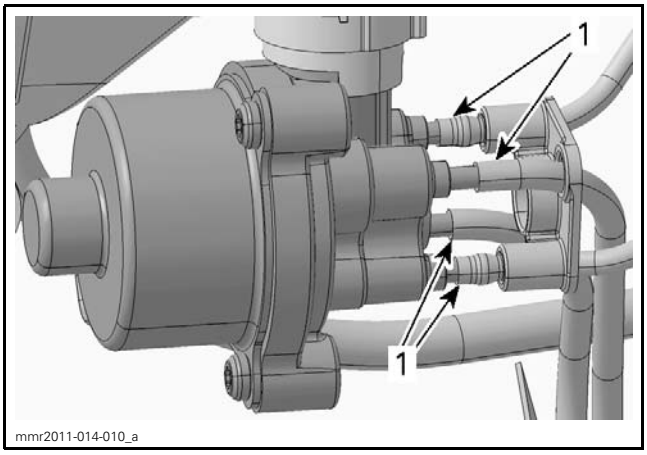
10. Remove screws


mmr2017-017-211_a

11. Remove Oil Tank support screw.


mmr2017-017-218

12. Disconnect crankcase vent hose on oil injection tank side.
13. Disconnect oil level sensor connector.
14. Place a rag under oil injection pump to catch oil spillage.
15. Carefully disconnect hoses from oil injection pump using a small screwdriver.



mmr2011-014-010_a

SOME PARTS REMOVED FOR CLARITY PURPOSE
1. Oil hoses (4x)

NOTICE **Oil injection pump fittings are very fragile, care must be taken when removing hoses from oil injection pump.**

16. Disconnect oil injection pump electrical connectors.
17. Slide out oil tank.
18. Remove oil injection pump from oil injection tank. Refer to *OIL INJECTION PUMP REMOVAL* in this subsection.

Installing the Oil Injection Tank

Before tightening oil injection tank on vehicle, proceed as follows.

1. Install oil injection pump on oil injection tank. Refer to *OIL INJECTION PUMP INSTALLATION*.
2. Apply injection oil on oil injection pump hoses.
3. Properly route and connect oil hoses into oil injection pump. Refer to *OIL INJECTION PUMP HOSES CONNECTION* in this subsection.

NOTICE **Oil injection pump fittings are very fragile, care must be taken when installing hoses on oil injection pump.**

Position oil injection tank on vehicle.

Tighten oil injection tank screws to specification. Refer to exploded view.

Reinstall all remaining components as the reverse of removal procedure.

Fill up oil injection tank using recommended oil. See *RECOMMENDED INJECTION OIL* in this subsection.

Bleed oil injection system. Refer to *BLEEDING OIL INJECTION PUMP* in this subsection.

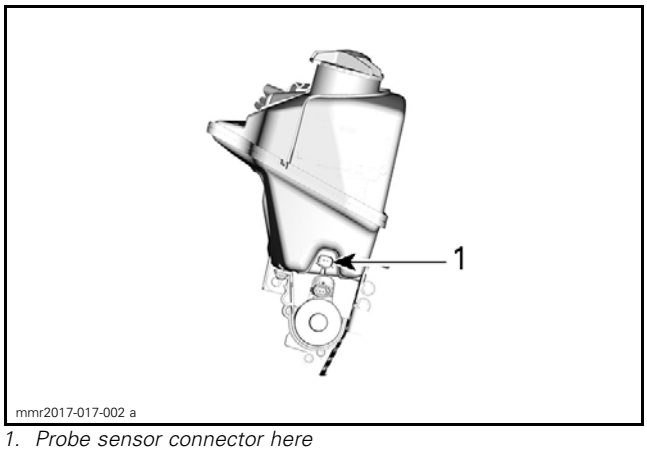
OIL LEVEL SENSOR

Testing the Oil Level Sensor

1. Measure resistance by probing sensor connector.

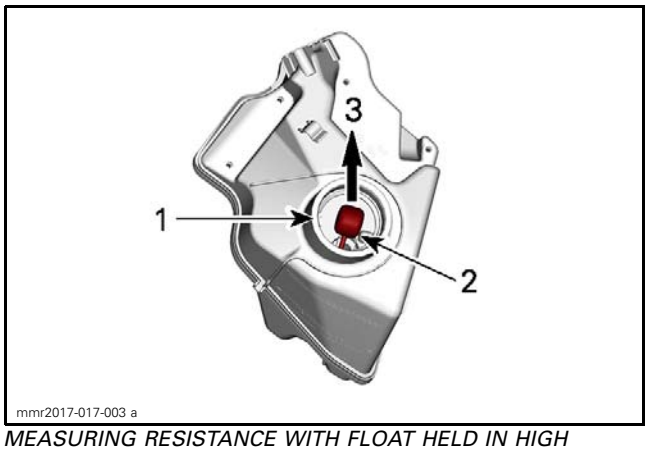
REQUIRED TOOL
FLUKE 115 MULTIMETER (P/N 529 035 868)

SENSOR TEST CONDITION		RESISTANCE
Empty oil tank	LOW float position	Closed circuit (close to 0 Ω)
	HIGH float position	Open circuit infinite (OL)



mmr2017-017-002 a

1. Probe sensor connector here



MEASURING RESISTANCE WITH FLOAT HELD IN HIGH POSITION
1. *Oil tank cap removed*
2. *Float*
3. *Use a locking tie to lift float*

If test fails, replace oil tank.

If test succeeds check float condition in oil tank.

Removing the Oil Level Sensor

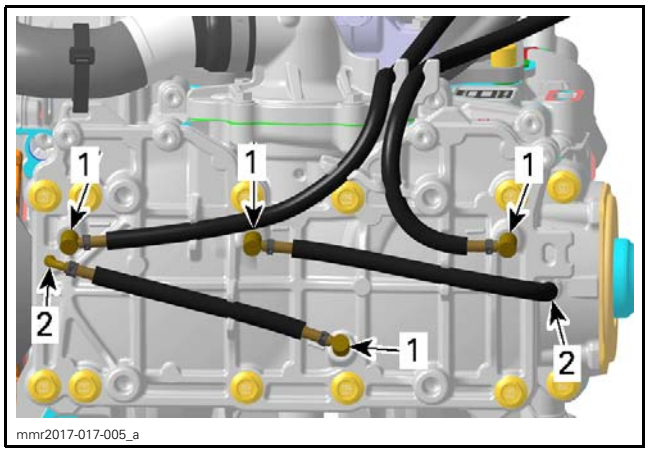
Oil level sensor is part of the oil tank and is not removable.

CHECK VALVES AND FITTINGS

Check Valves and Fittings Access

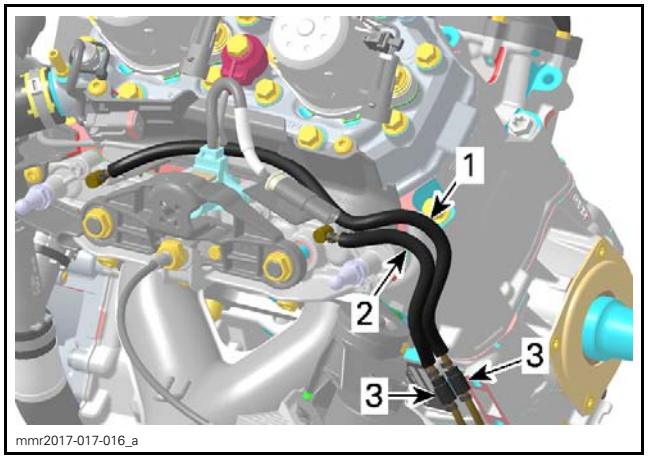
Check Valves and Fittings (Engine)

Lift engine to access the check valves and fittings at the bottom of the crankcase. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.



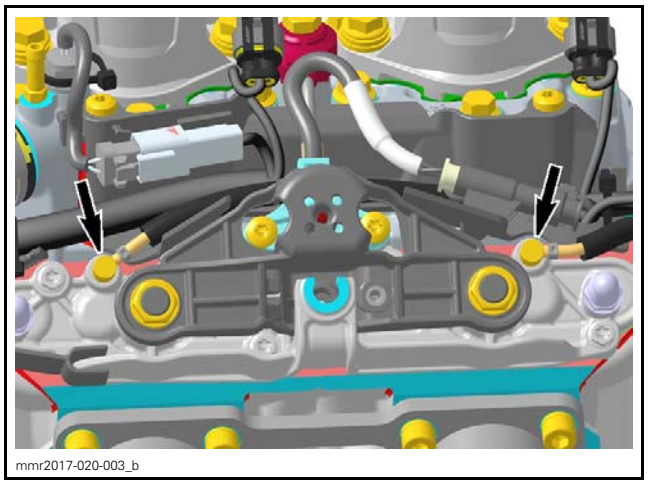
1. *Check valves*
2. *Fittings*

Check Valves and Fittings (RAVE)



RAVE CHECK VALVES
1. *Oil hose to MAG 3D RAVE valve*
2. *Oil hose to PTO 3D RAVE valve*
3. *RAVE check valves*

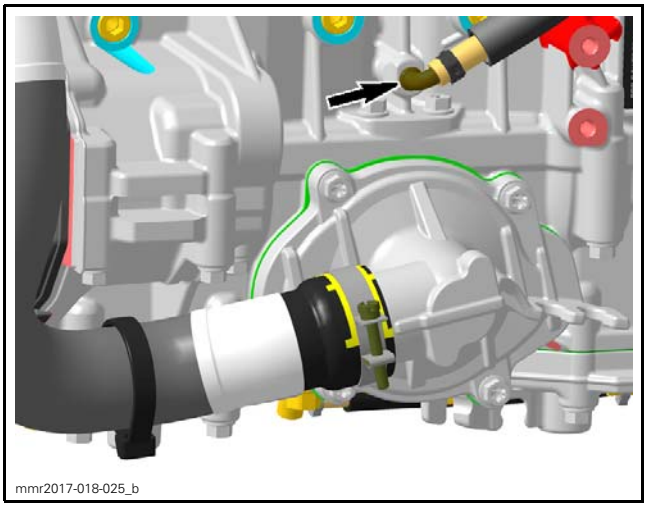
Remove cover, refer to *TOP END* subsection.



TYPICAL - RAVE FITTINGS

Fitting (Water Pump Drive)

Remove starter, refer to *MAGNETO AND STARTER* subsection.


mmr2017-018-025_b

Inspecting the Check Valves

Pressurize check valves at inlet side.

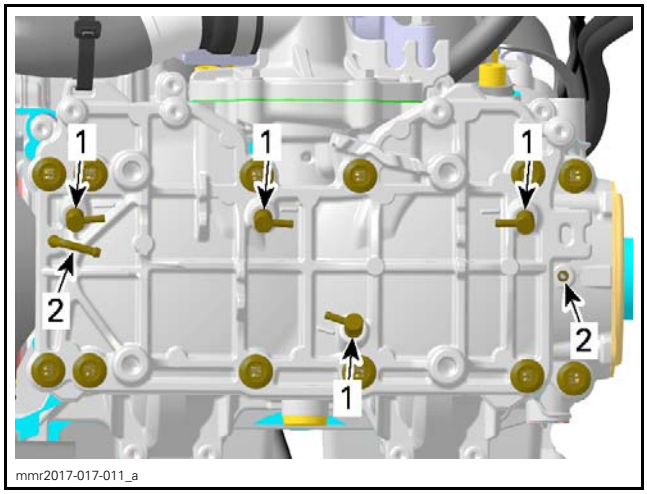
REQUIRED TOOL	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

PUMP SETTING	SET TO **VACUUM**	SET TO **PRESSURE**
TO DO	Activate pump several times	Slowly activate pump and listen to check valve
RESULT	Air must **NOT** flow through check valve	You should hear it release pressure at approximately 20.7 kPa (3 PSI)
ACTION	**Success:** Perform next test	**Success:** Check valve is good
	Failed: Replace check valve	**Failed:** Replace check valve

Removing the Check Valves and Fittings

NOTICE Do not remove check valve needlessly. It is likely to be damaged.

Check Valves and Fittings (Engine)



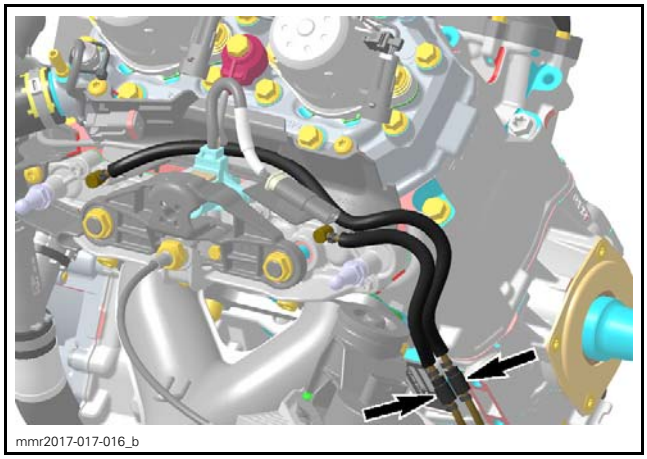
mmr2017-017-011_a

1. Check valves
2. Fittings

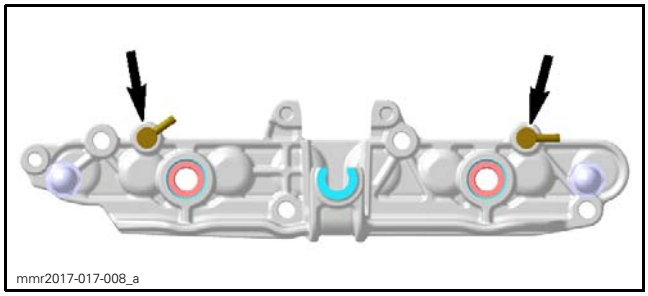
1. Clean area around check valve or fitting to remove oil or dirt.
2. Heat check valve or fitting then pull it out of crankcase.

Check Valves (RAVE)

1. Remove clamps and oil hoses from check valve.


mmr2017-017-016_b

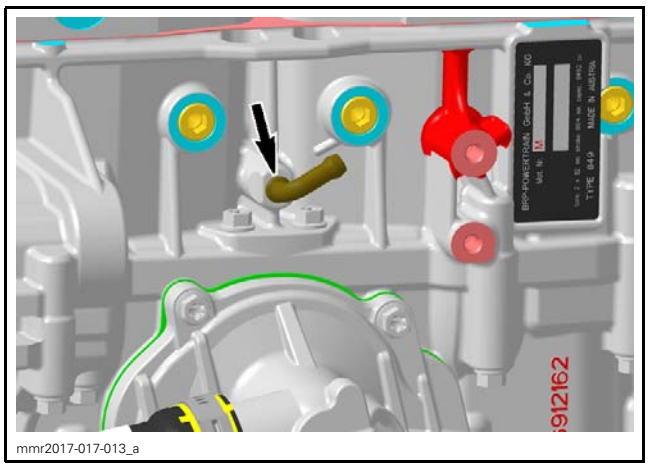
Fittings (RAVE)



TYPICAL - RAVE FITTINGS

1. Remove RAVE valve housing. Refer to *RAVE* subsection.
2. Clean area around fittings to remove oil or dirt.
3. Heat fitting then pull it out of RAVE valve housing.

Fitting (Water Pump Drive)



1. Clean area around fitting to remove oil or dirt.
2. Heat fitting then pull it out of crankcase.

Installing the Check Valves and Fittings

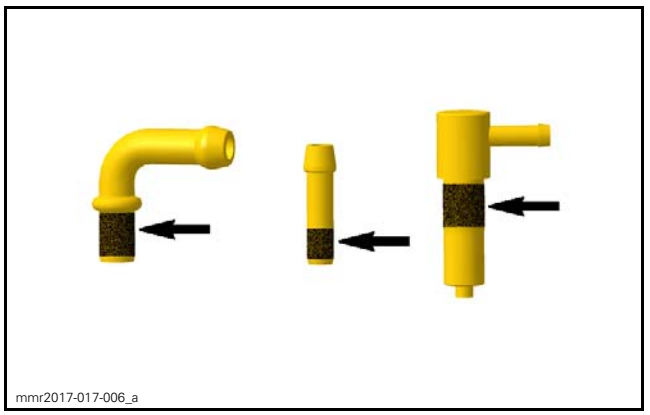
The installation is the reverse of the removal procedure. However pay attention to the following.

1. Ensure check valve bodies and fittings are clean from dirt or oil and dry.

CHECK VALVE CLEANING	
Service product	PULLEY FLANGE CLEANER (P/N 413 711 809)

2. Apply sealant on the outer diameter of the check valve (machined section) or fitting. Apply sealant ONLY in the specified area.

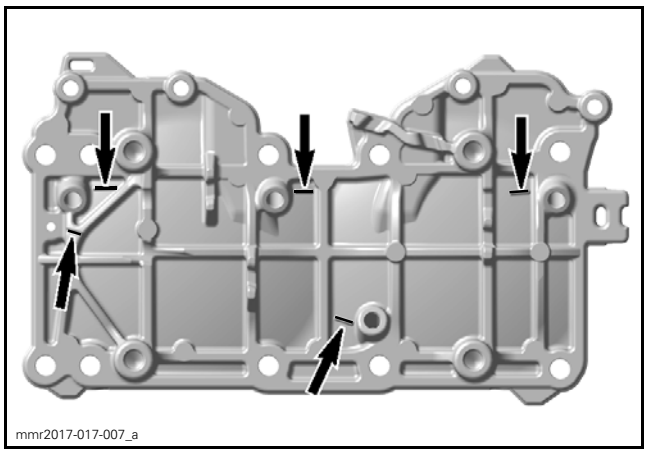
CHECK VALVE AND FITTING SEALANT	
Service product	LOCTITE 648 (GREEN) (P/N 413 711 400)



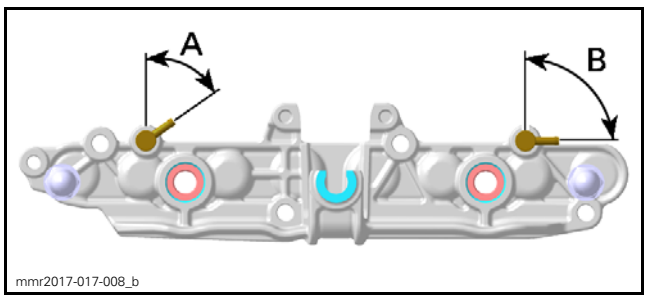
APPLY SEALANT ON INDICATED AREA ONLY

3. Punch in the check valves and fittings carefully with a plastic hammer by using a suitable punch.

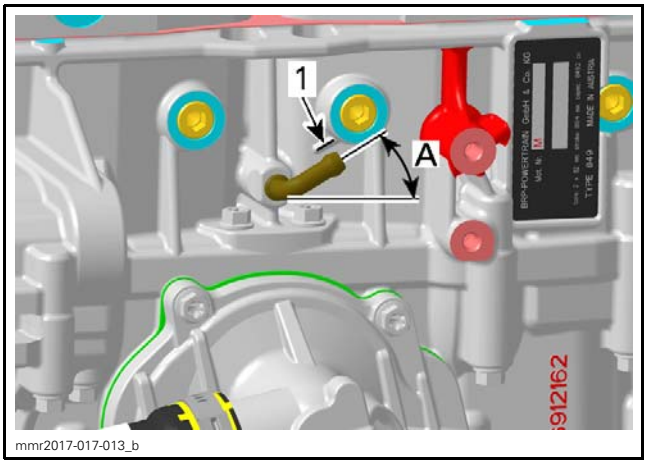
For correct orientation of the check valves and fitting refer to the next illustrations.



CAST MARKS FOR CHECK VALVES AND FITTING ORIENTATION



A. 55°
B. 90



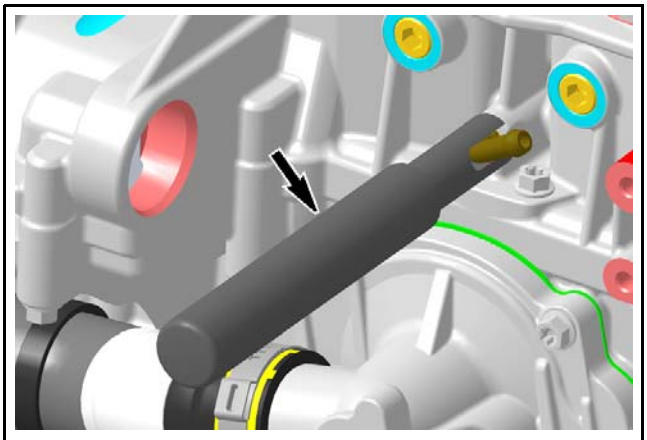
mmr2017-017-013_b

A. 30°

1. Cast mark for fitting orientation

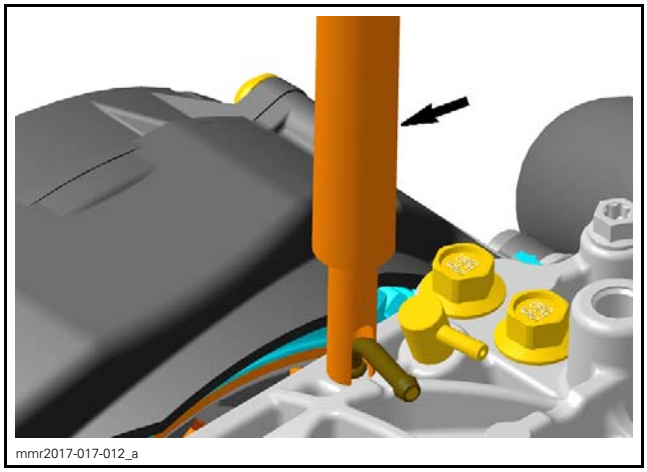
For bent fitting use following service tool for installation:

REQUIRED TOOL	
IMPULSE FITTING PUNCH (BIG) (P/N 529 036 412)	
IMPULSE FITTING PUNCH (SMALL) (P/N 529 036 413)	



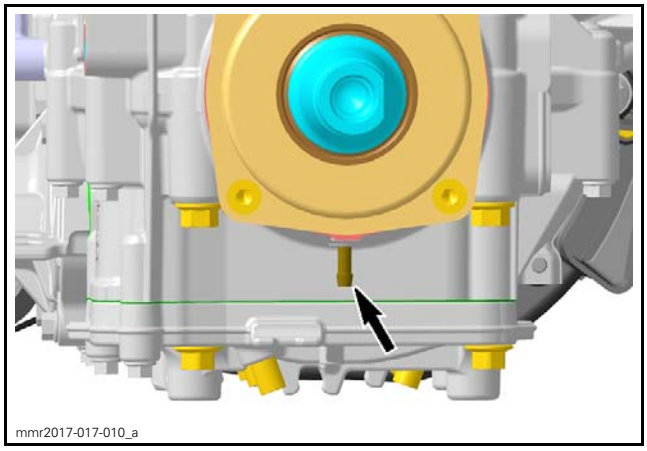
mmr2017-017-014_a

FITTING (WATER PUMP DRIVE) - IMPULSE FITTING PUNCH (BIG) (P/N 529 036 412)



mmr2017-017-012_a

FITTING (ENGINE) - IMPULSE FITTING PUNCH (SMALL) (P/N 529 036 413)



mmr2017-017-010_a

4. Clean area around check valve from surplus sealant with a rag.
5. Connect pressure pump and check if check valves and fittings are not blocked with glue after installation.

REQUIRED TOOL	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

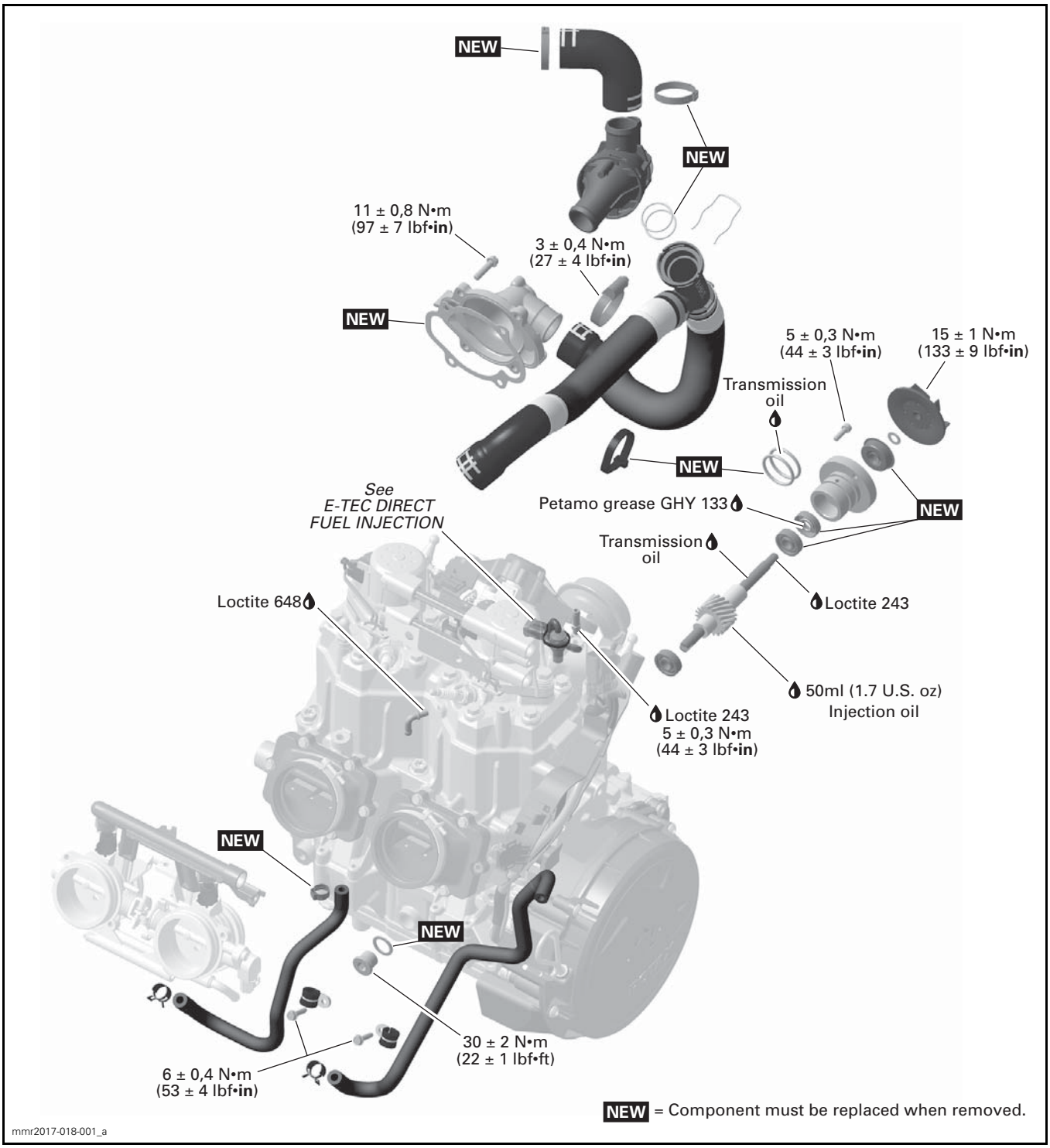
COOLING SYSTEM

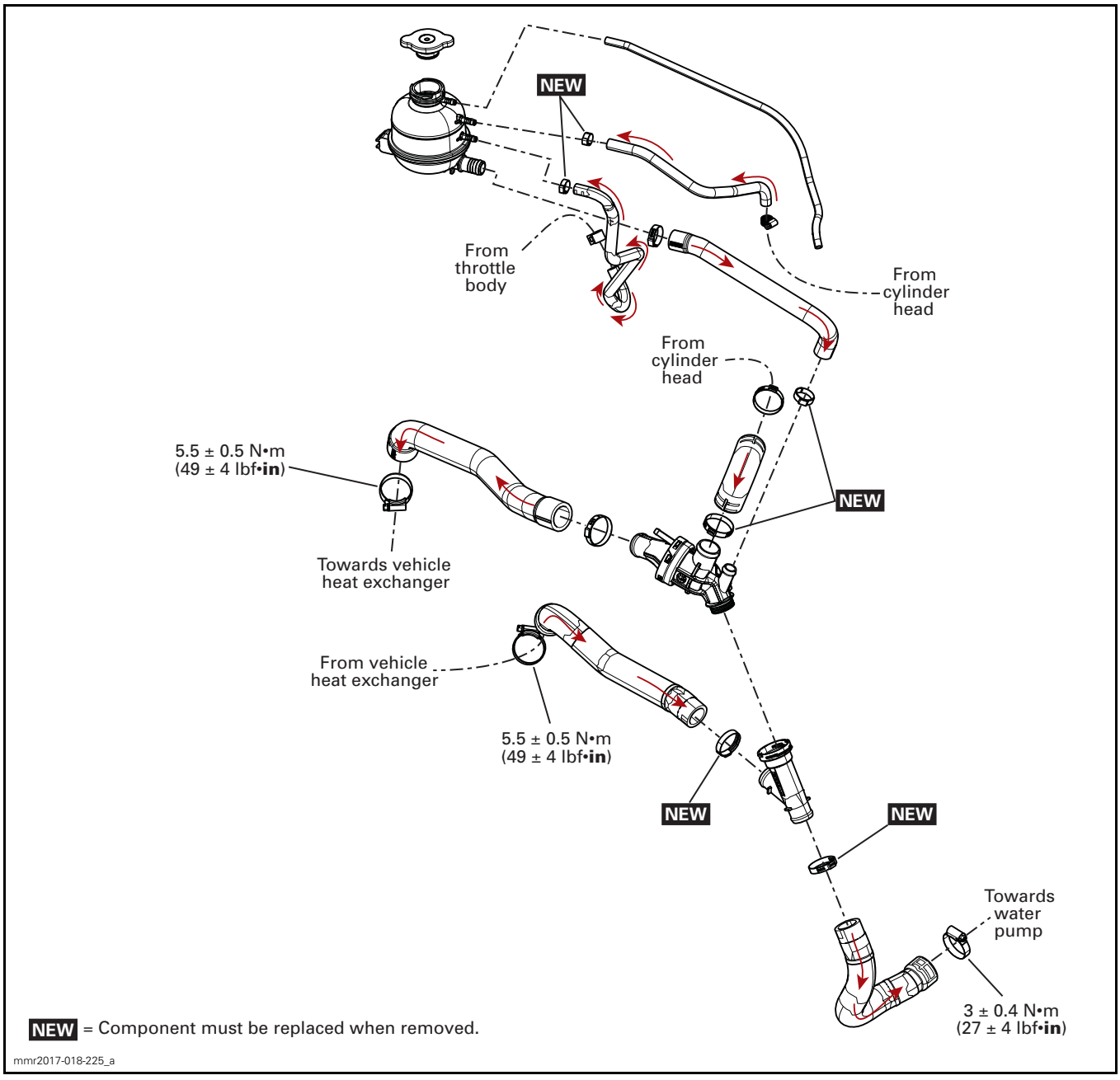
SERVICE TOOLS

Description	Part Number	Page
CERAMIC SEAL INSTALLER	529 036 014	10
HANDLE	420 877 650	9
IMPULSE FITTING PUNCH (BIG)	529 036 412	6
LARGE HOSE PINCHER	529 032 500	4–5
OIL SEAL PUSHER	529 035 757	9
PROTECTOR SLEEVE	529 036 406	10
SMALL HOSE PINCHER	295 000 076	5
TEST CAP	529 035 991	4
VACUUM/PRESSURE PUMP	529 021 800	4–5

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	7
LOCTITE 648 (GREEN)	413 711 400	5
PETAMO GREASE GHY 133N	420 899 271	10
PULLEY FLANGE CLEANER	413 711 809	5, 7, 11


NEW
NEW
11 ± 0,8 N•m
(97 ± 7 lbf•in)
3 ± 0,4 N•m
(27 ± 4 lbf•in)
NEW
5 ± 0,3 N•m
(44 ± 3 lbf•in)
15 ± 1 N•m
(133 ± 9 lbf•in)
Transmission
oil
NEW
See
E-TEC DIRECT
FUEL INJECTION
Petamo grease GHY 133
NEW
Transmission
oil
Loctite 648
Loctite 243
50ml (1.7 U.S. oz)
Injection oil
Loctite 243
5 ± 0,3 N•m
(44 ± 3 lbf•in)
NEW
NEW
30 ± 2 N•m
(22 ± 1 lbf•ft)
6 ± 0,4 N•m
(53 ± 4 lbf•in)
NEW = Component must be replaced when removed.
mmr2017-018-001_a


NEW
From throttle body
From cylinder head
From cylinder head
5.5 ± 0.5 N•m (49 ± 4 lbf•in)
NEW
Towards vehicle heat exchanger
From vehicle heat exchanger
5.5 ± 0.5 N•m (49 ± 4 lbf•in)
NEW
NEW
Towards water pump
3 ± 0.4 N•m (27 ± 4 lbf•in)
NEW = Component must be replaced when removed.
mmr2017-018-225_a

GENERAL

NOTE: It is a good practice to check for fault codes using BUDS2 software as a first troubleshooting step

During assembly/installation, use torque values and service products as shown in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

INSPECTION

COOLING SYSTEM LEAK TEST

NOTE: This test confirms if there is a leak in the cooling system, including the engine.

⚠ WARNING

To prevent potential burns, do not remove the coolant tank cap if the engine is hot.

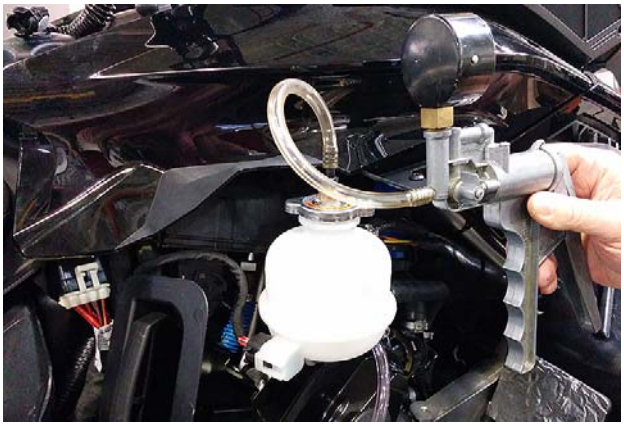
Remove the RH side panel.

Remove coolant tank cap.

Pressurize system through coolant tank.

REQUIRED TOOL	
TEST CAP (P/N 529 035 991)	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

TEST PRESSURE
100 kPa (15 PSI)



mmr2017-018-200

TYPICAL

If pressure drops, check all hoses and engine for coolant leaks. Spray a soap/water solution and look for air bubbles.

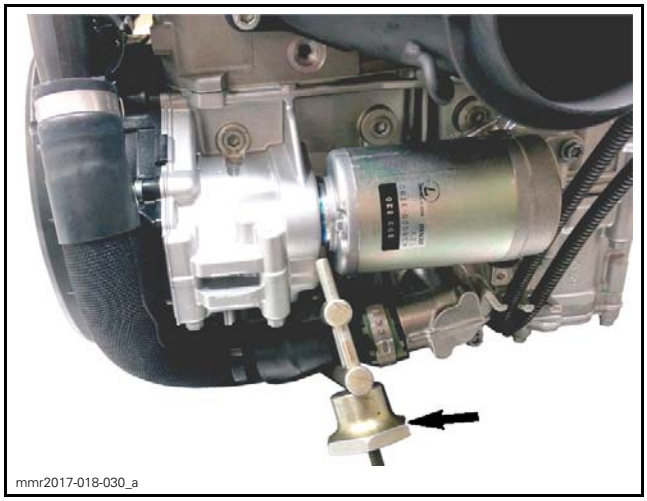
If no external leak is found and pressure drops, carry out the *ENGINE COOLING CIRCUIT LEAK TEST* to find a potential engine internal leak.

ENGINE COOLING CIRCUIT LEAK TEST

NOTE: An engine leak test should be performed prior to installing engine in vehicle each time the engine is disassembled.

Install a suitable hose on the water pump cover and block it.

REQUIRED TOOL	
LARGE HOSE PINCHER (P/N 529 032 500)	

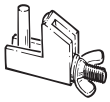


mmr2017-018-030_a

Install a suitable hose on the cylinder head and block it.

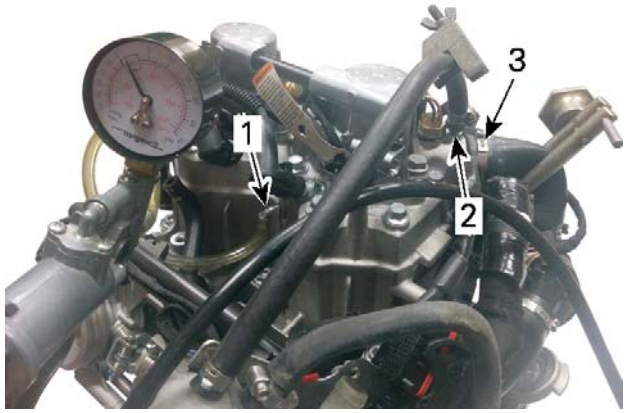
REQUIRED TOOL	
LARGE HOSE PINCHER (P/N 529 032 500)	

Install a suitable hose on the bleeder nipple and block it

REQUIRED TOOL	
SMALL HOSE PINCHER (P/N 295 000 076)	

Install the pressure pump on the bent fitting for throttle body heating.

REQUIRED TOOL	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	



mmr2017-018-029_a

1. Bent fitting for throttle body heating
2. Bleeder nipple
3. Cylinder head hose

Pressurize the engine.

TEST PRESSURE
100 kPa (15 PSI)

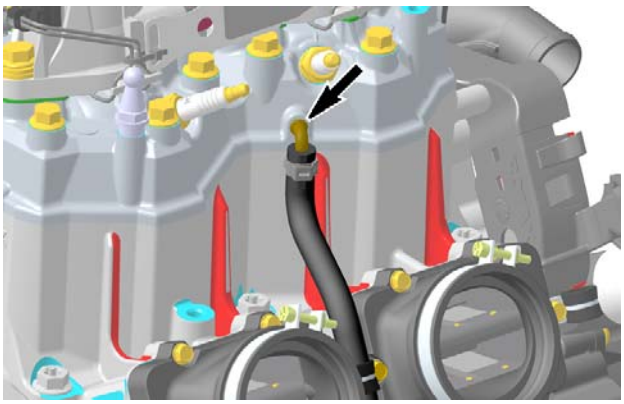
If pressure drops, spray a soap/water solution onto engine jointed surfaces and look for air bubbles.

PROCEDURES

FITTING (THROTTLE BODY HEATING)

Fitting Replacement

Remove throttle body from intake manifolds and put it aside.


mmr2017-018-026_a

TYPICAL - PARTS REMOVED FOR CLARITY

Clean area around fitting to remove oil or dirt.

Heat fitting then pull it out of cylinder head.

Ensure fitting is clean from dirt or oil and dry.

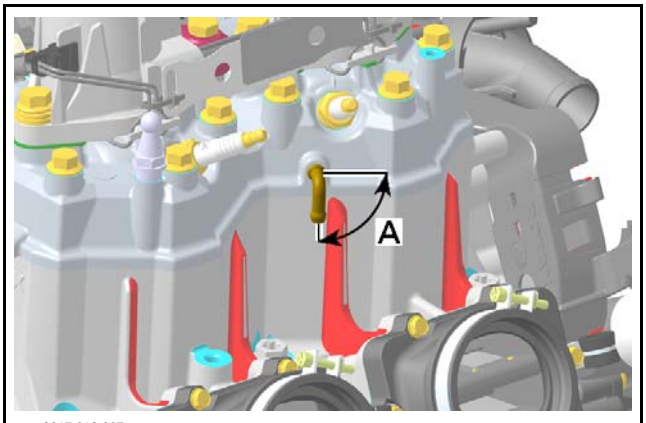
FITTING CLEANING	
Service product	PULLEY FLANGE CLEANER (P/N 413 711 809)

Apply sealant on the outer diameter of fitting.

CHECK VALVE AND FITTING SEALANT	
Service product	LOCTITE 648 (GREEN) (P/N 413 711 400)

Punch in the fitting carefully with a plastic hammer.

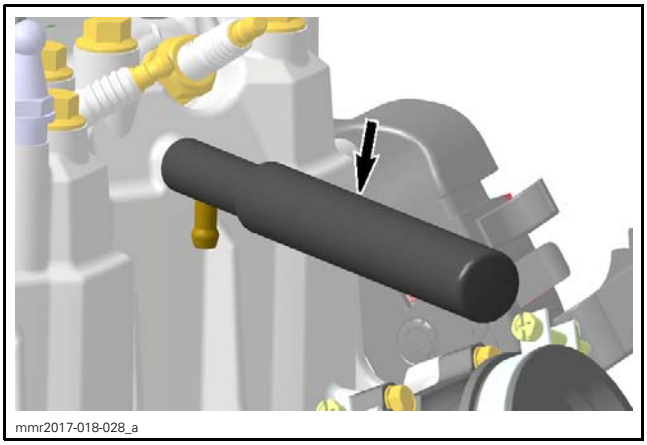
For correct orientation of the fitting refer to the next illustration.



mmr2017-018-027_a

A. 90°

REQUIRED TOOL	
IMPULSE FITTING PUNCH (BIG) (P/N 529 036 412)	



FITTING - IMPULSE FITTING PUNCH (BIG) (P/N 529 036 412)

WATER PUMP

Water Pump Location

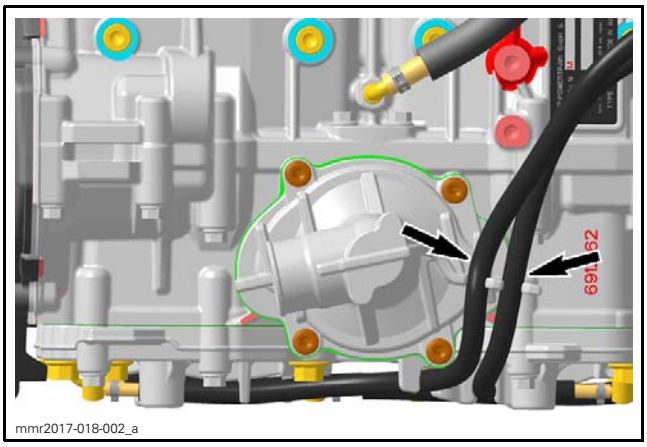
The water pump is located on the front of the engine, below the intake manifold.

Removing the Water Pump

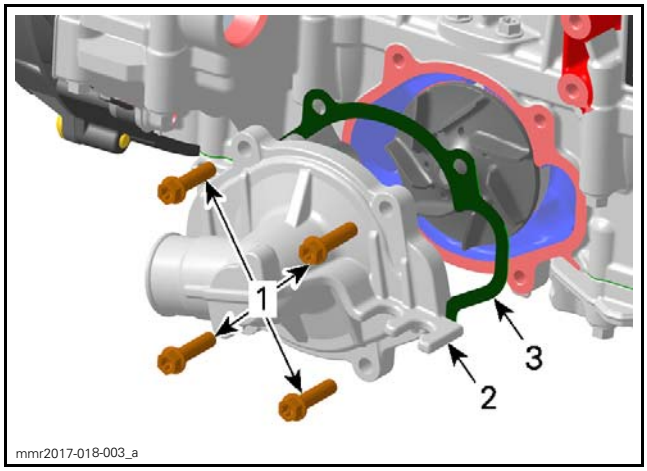
Drain cooling system, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Remove starter, refer to *MAGNETO AND STARTER* subsection.

Remove oil lines.



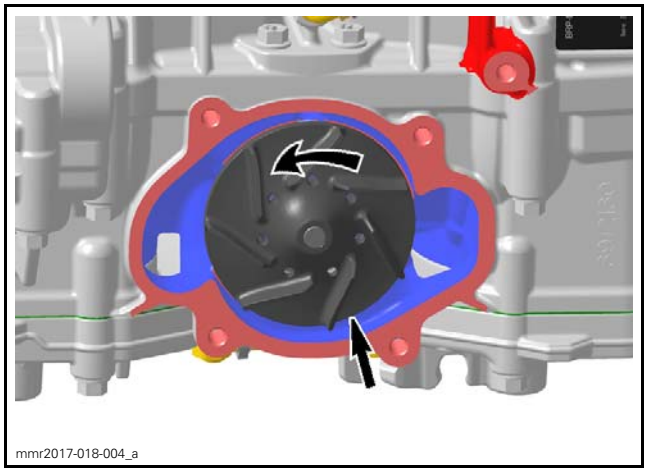
Remove the following parts.

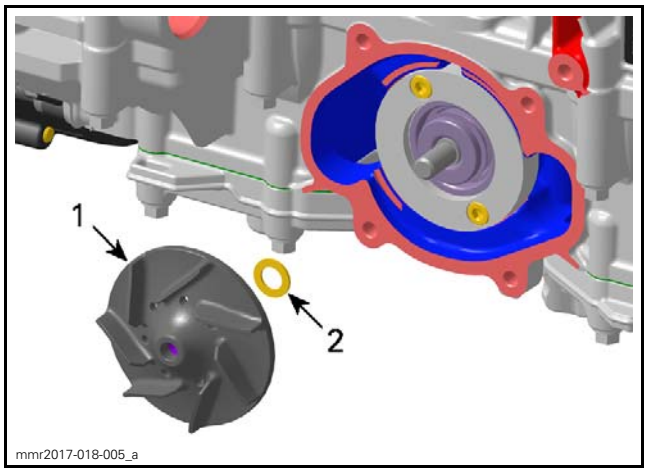


1. *Screws*
2. *Water pump cover*
3. *Gasket*

Remove impeller by turning it counterclockwise.

NOTICE Be careful not to damage impeller fins.





1. *Impeller*
2. *Washer, 1 mm (.039 in) thick*

Clean gasket surfaces of water pump cover and crankcase.

Installing the Water Pump

The installation is the reverse of removal procedure. However, pay attention to the following details.

Clean water pump shaft thread using a part cleaner and compressed air.

WATER PUMP SHAFT THREAD CLEANING	
Service product	PULLEY FLANGE CLEANER (P/N 413 711 809)

Ensure to install the 1 mm (.039 in) thick washer.

Apply thread locker on water pump shaft thread.

WATER PUMP SHAFT THREAD	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)

Tighten impeller to specification.

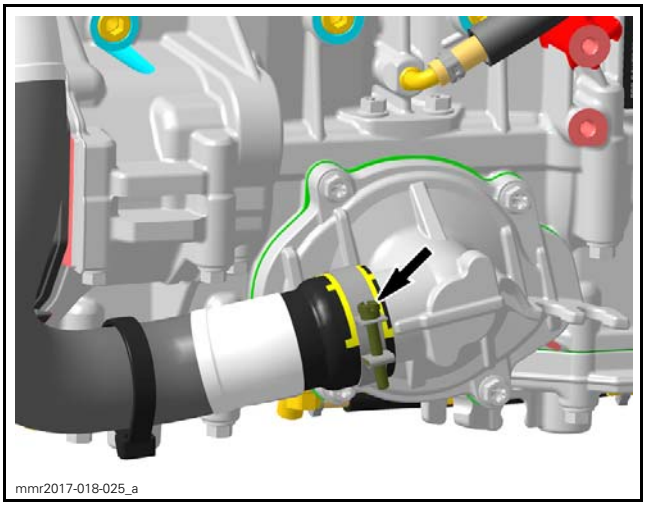
TIGHTENING TORQUE	
Impeller	15 N•m ± 1 N•m (133 lbf•**in** ± 9 lbf•**in**)

Install a NEW water pump cover gasket.

Tighten screws of water pump cover to specification in a crisscross sequence.

TIGHTENING TORQUE	
Water pump cover screws	11 N•m ± 0.8 N•m (97 lbf•**in** ± 7 lbf•**in**)

Install and tighten coolant hose clamp on water pump.

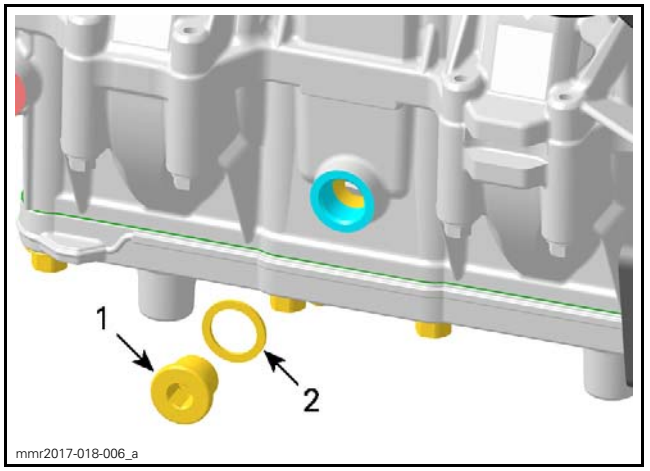


TIGHTENING TORQUE	
Coolant hose clamp	3 N•m ± 0.4 N•m (27 lbf•**in** ± 4 lbf•**in**)

BEARING CARRIER AND PUMP SHAFT

Removing the Bearing Carrier and Pump Shaft

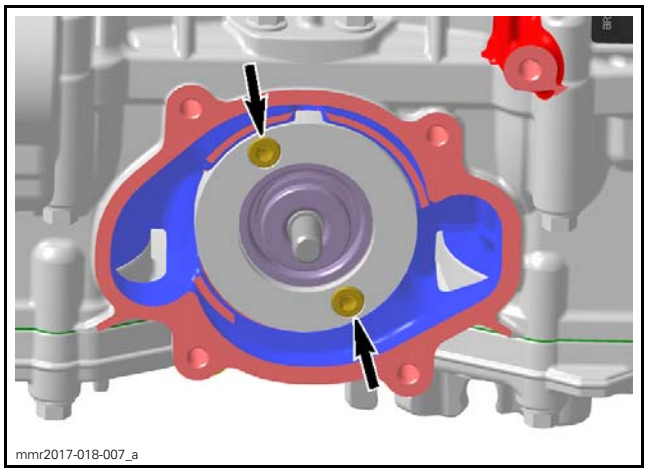
Remove plug screw and discard sealing ring.



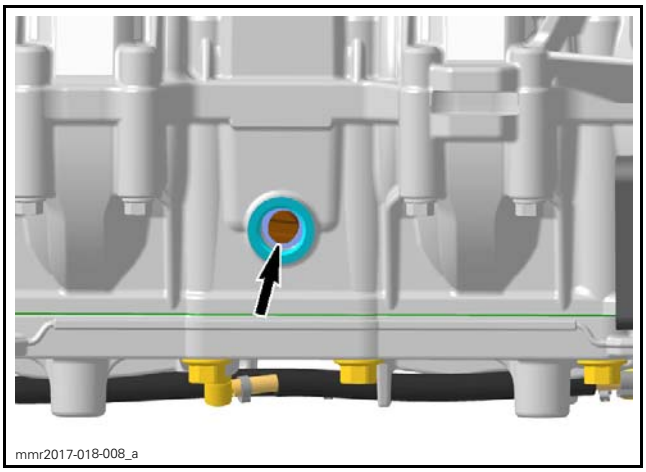
1. *Plug screw*
2. *Sealing ring*

Remove *WATER PUMP*. See procedure in this subsection.

Remove bearing carrier retaining screws.

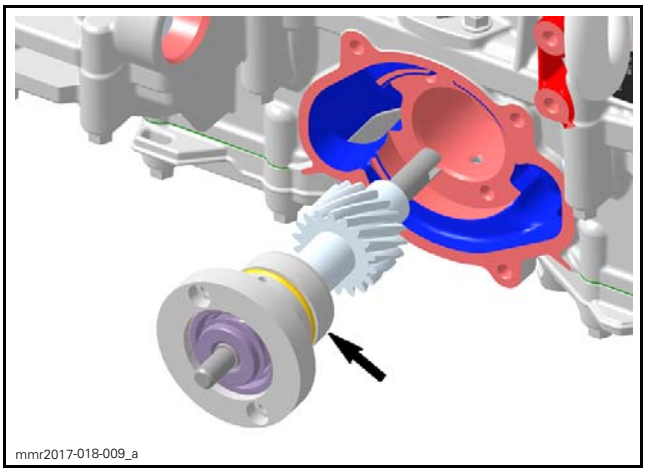


Push pump shaft out with a suitable drift punch and a hammer.

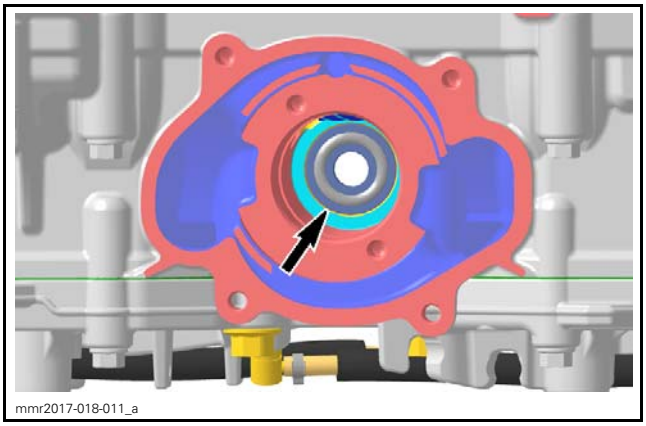


PUSH OUT SHAFT HERE

Extract bearing carrier and pump shaft.



For water pump shaft ball bearing replacement refer to *BOTTOM END* subsection.



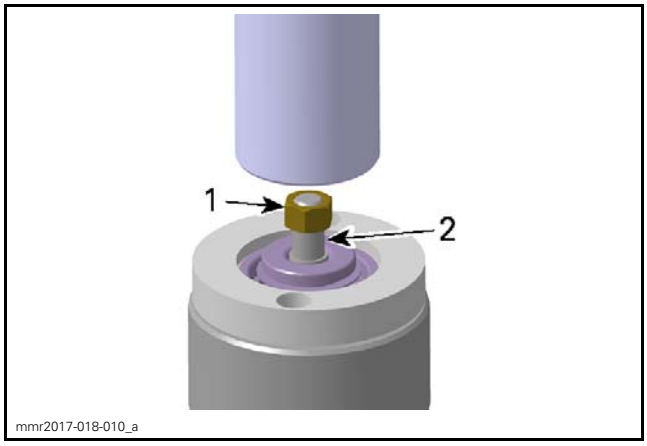
Disassembling the Bearing Carrier and Pump Shaft

NOTE: The pump shaft cannot be disassembled without damaging the ceramic seal and oil seal.

Protect the threads of shaft with a suitable M8 nut.

Properly support bearing carrier.

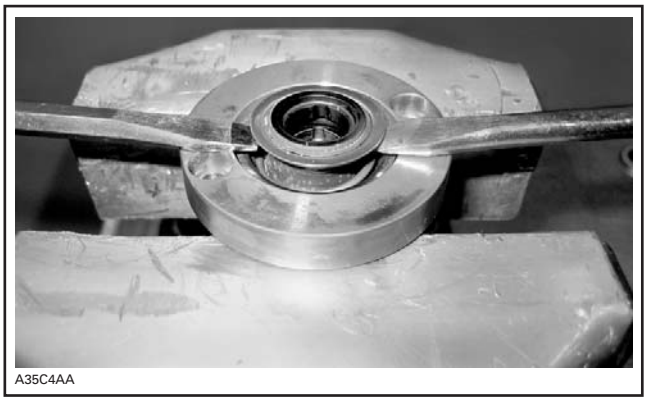
Push pump shaft out using a press.



1. *M8 nut*
2. *Shaft*

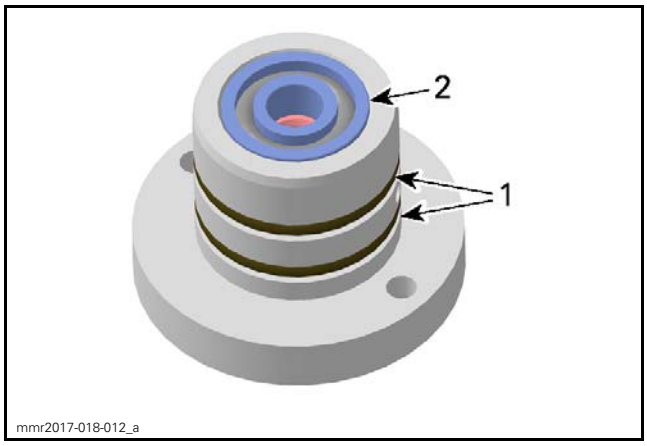
NOTICE Pay attention not to damage the bearing carrier during disassembly. Marks or other damages will lead to coolant or oil leakage.

Pry inner part of ceramic seal out.



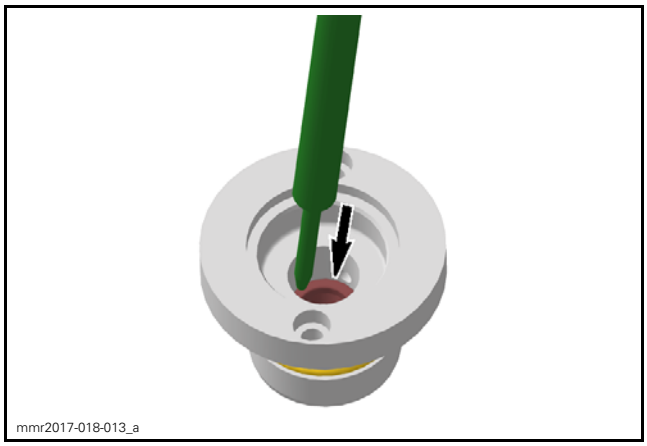
Remove O-rings and discard them.

Remove bearing using a blind hole bearing puller.



1. *O-rings*
2. *Ball bearing*

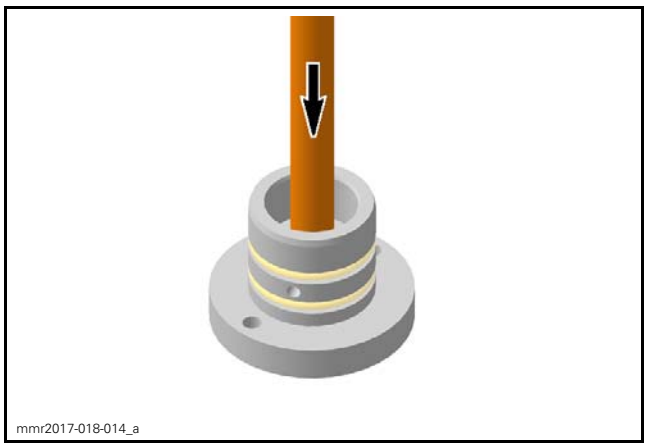
Remove oil seal using as appropriate punch.

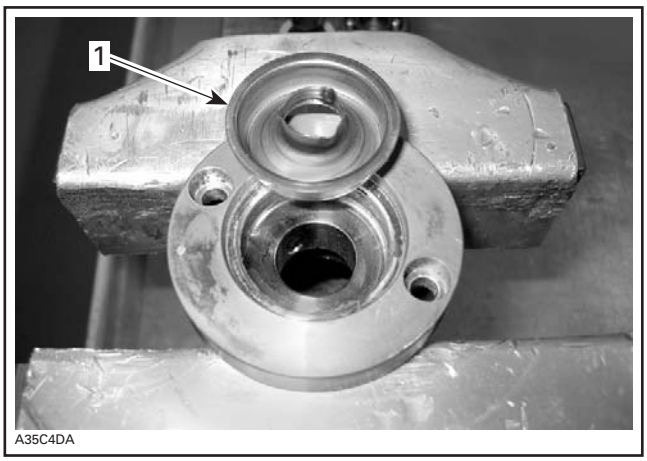


FOR CLARITY OUTER PART OF CERAMIC SEAL REMOVED

Carefully press the outer part of ceramic seal out.

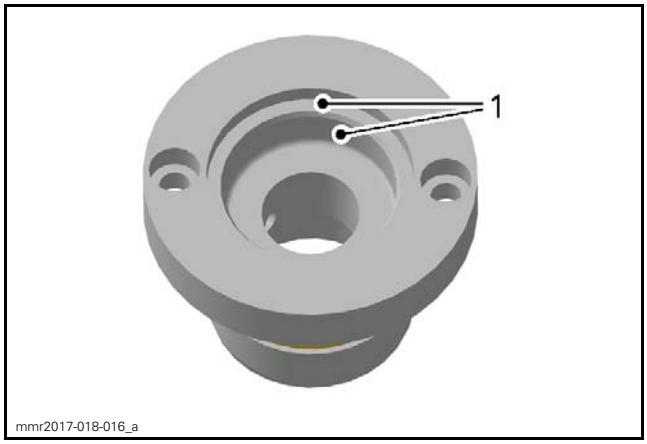
NOTE: Use a mandrel with a diameter of approximately 16 mm (.63 in).





1. *Outer part of ceramic seal*

Remove sealant from bearing carrier with sand paper no. 180.



1. *Remove sealant*

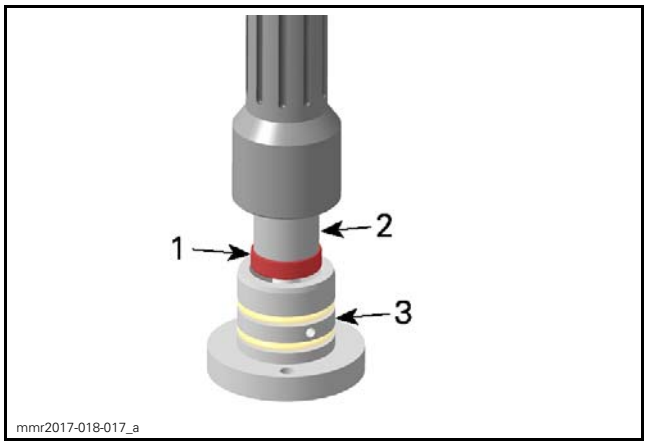
Reassembling the Bearing Carrier and Pump Shaft

Reverse disassembly procedure and pay attention to the following.

NOTE: Never put oil in the press fit area of the oil seal and ceramic seal.

Push the NEW oil seal in bearing carrier with the sealing lip facing to the ball bearing.

REQUIRED TOOL	
HANDLE (P/N 420 877 650)	
OIL SEAL PUSHER (P/N 529 035 757)	

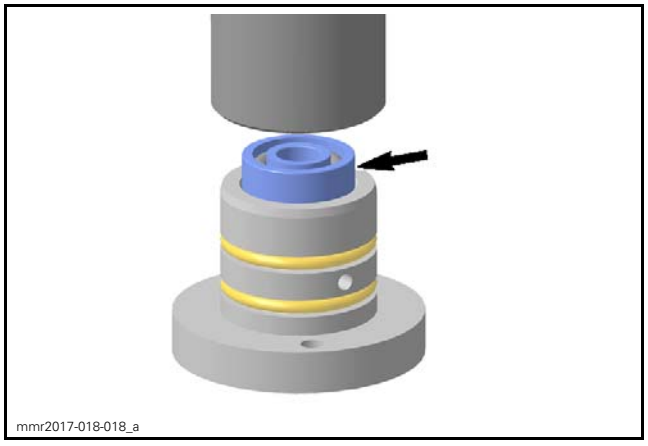


1. *Oil seal*
2. *Oil seal pusher*
3. *Bearing carrier*

Lubricate sealing lip of the oil seal.

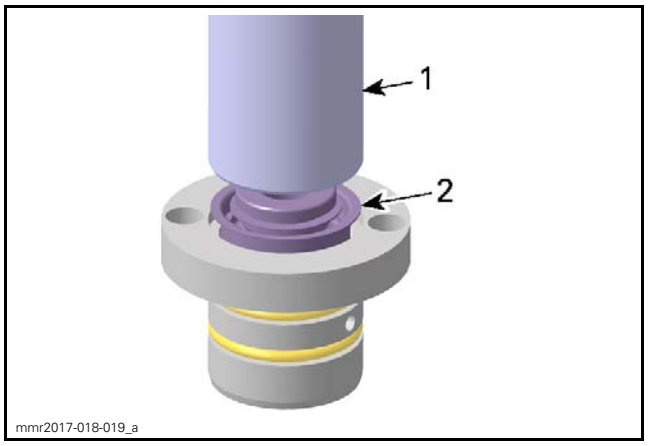
SEALING LIP OF OIL SEAL	
Service product	PETAMO GREASE GHY 133N (P/N 420 899 271)

Press bearing into bearing carrier.



Push the NEW ceramic seal in bearing carrier.

REQUIRED TOOL	
CERAMIC SEAL INSTALLER (P/N 529 036 014)	

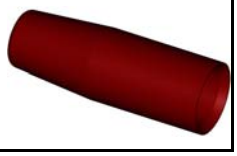


1. *Ceramic seal installer*
2. *Ceramic seal*

NOTICE **Never use a hammer for the ceramic seal installation. Only use a press to avoid damaging the ceramic component.**

Install protector sleeve on pump shaft.

NOTE: Apply some grease inside the protector sleeve to prevent the protector sleeve fall off the pump shaft during installation.

REQUIRED TOOL	
PROTECTOR SLEEVE (P/N 529 036 406)	

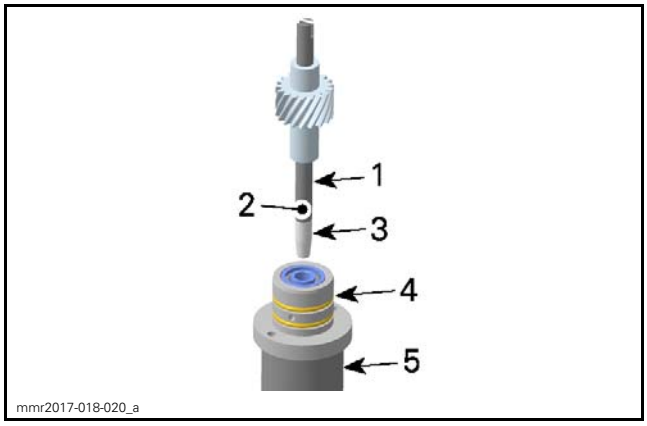
Apply injection oil on pump shaft.

Press pump shaft into the bearing carrier with the appropriate force.

NOTICE **Inadequate force will damage the oil seal and bearing.**

NOTE: During installation support the ceramic seal as shown on the following illustration.

REQUIRED TOOL	
CERAMIC SEAL INSTALLER (P/N 529 036 014)	



1. *Pump shaft*
2. *Apply injection oil*
3. *Potector sleeve*
4. *Bearing carrier*
5. *Ceramic seal installer*

Remove oil seal guide from pump shaft.

Clean water pump shaft thread using a part cleaner and compressed air.

WATER PUMP SHAFT THREAD CLEANING	
Service product	PULLEY FLANGE CLEANER (P/N 413 711 809)

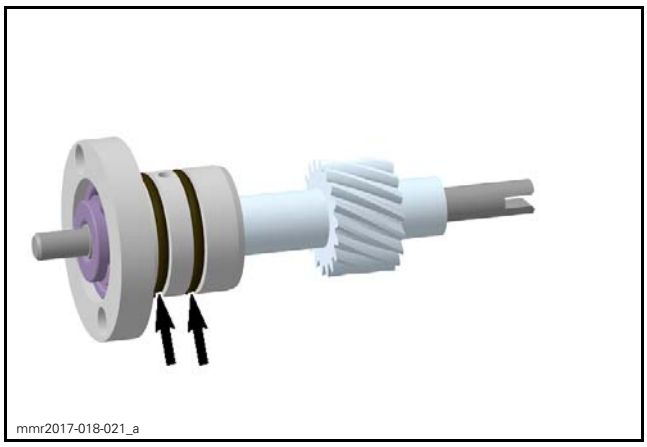
Installing the Bearing Carrier and Pump Shaft

The installation is the reverse of removal procedure, however pay attention to the following.

Pour injection oil in the pan under crankshaft worm gear.

CRANKSHAFT WORM GEAR LUBRICATION	
Service product	Injection oil
Quantity	50 ml (1.7 U.S. oz)

Install **NEW** O-rings on bearing carrier and apply injection oil.



Install pump shaft and bearing carrier in crankcase while turning shaft to mesh gears.

Tighten bearing carrier retaining screws to specification.

TIGHTENING TORQUE	
Bearing carrier screws	5 N•m ± 0.3 N•m (44 lbf•**in** ± 3 lbf•**in**)

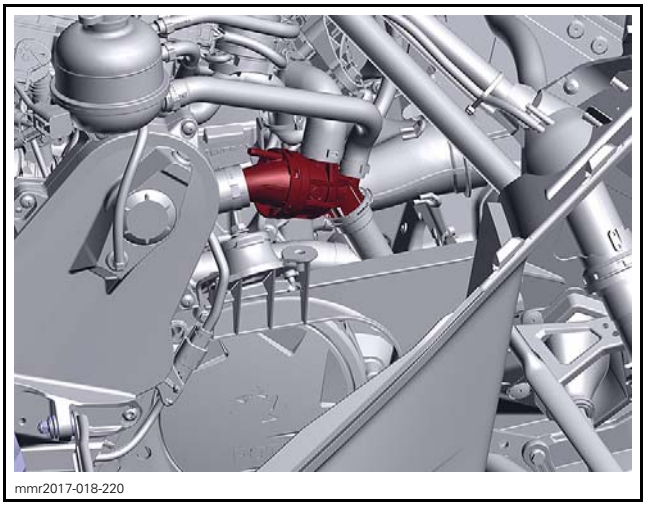
Install **NEW** sealing ring and tighten plug screw to specification.

TIGHTENING TORQUE	
Plug screw	30 N•m ± 2 N•m (22 lbf•ft ± 1 lbf•ft)

THERMOSTAT

Thermostat Location

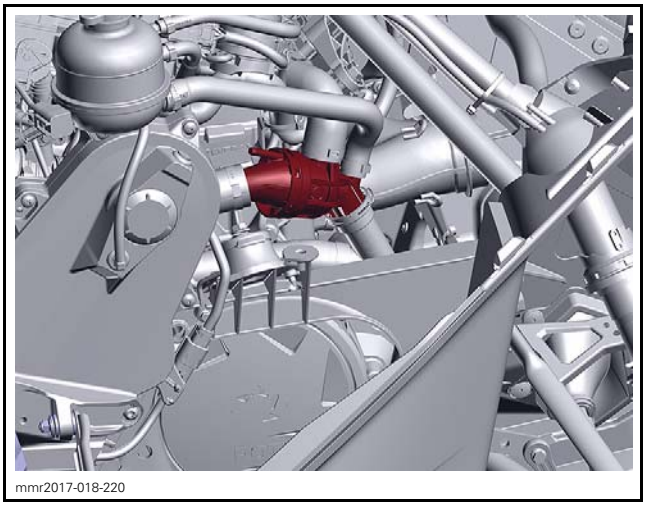
The thermostat is located on the RH side of the engine (PTO side), behind the muffler



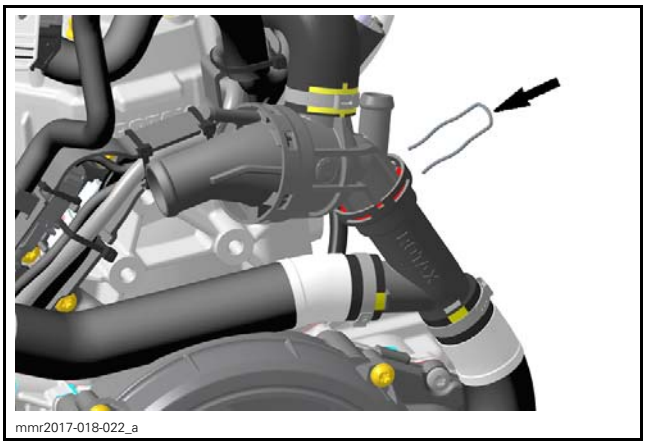
Removing the Thermostat

To remove thermostat:

– Block all four thermostat hoses with hose pinchers **or**
– Drain cooling system.

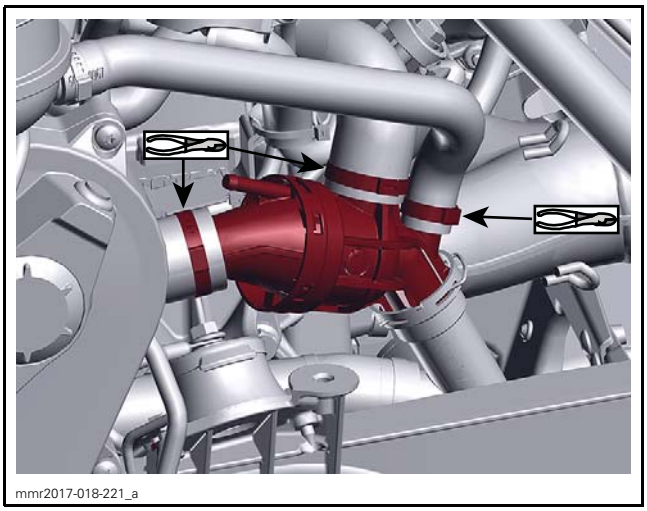

mmr2017-018-220

Remove spring clip from thermostat housing.

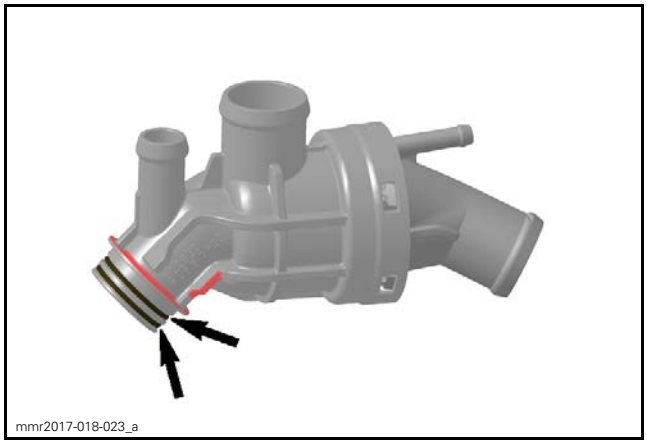

mmr2017-018-022_a

Cut Oetiker clamps (3x) then unplug hoses.

Remove thermostat housing from molded hose assembly.


mmr2017-018-221_a

Remove O-rings and discard them.


mmr2017-018-023_a

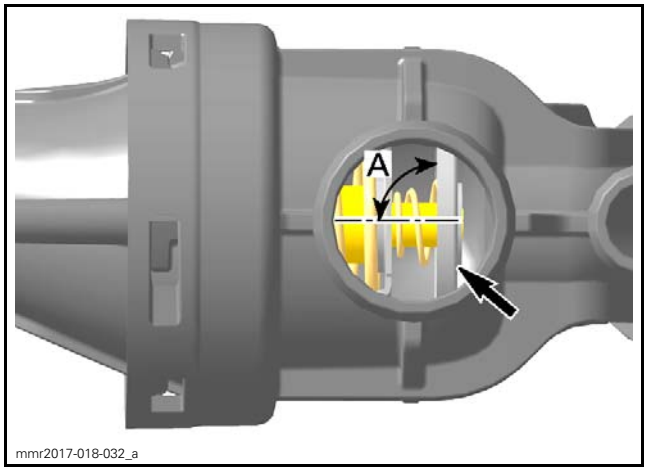
Testing the Thermostat

To check thermostat, put in water and heat water.

THERMOSTAT TEMPERATURE	
Starts to open	37°C (99°F)
Fully open	55°C (131°F)

Inspecting the Thermostat

Check for proper alignment of the thermostat plunger.



mmr2017-018-032_a

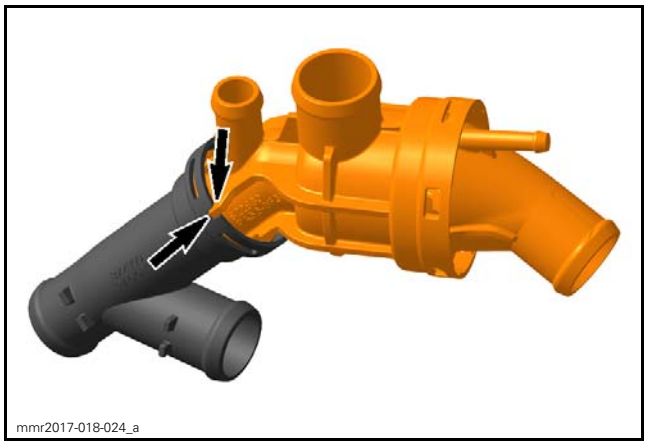
A. 90°

Installing the Thermostat

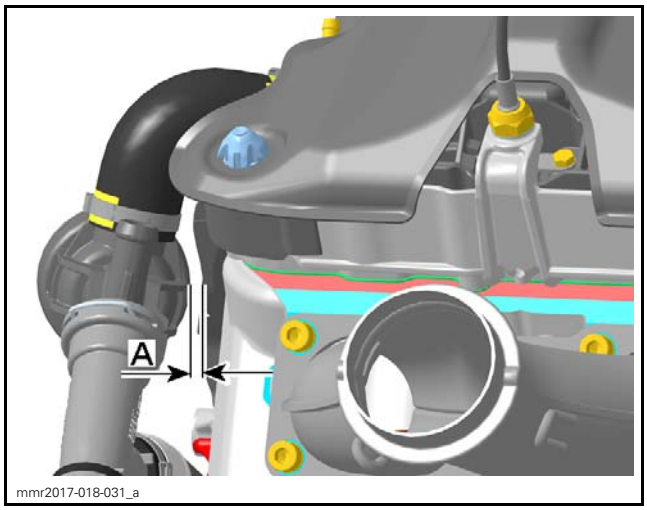
The installation is the reverse of the removal procedure. However, pay attention to the following.

Install **NEW** O-rings and apply coolant.

Take care that the nose of the thermostat housing is properly positioned in the recess of the molded hose assembly.


mmr2017-018-024_a

After installation ensure proper distance of thermostat housing to the cylinder block and exhaust manifold.



mmr2017-018-031_a

A. 5 mm ± 2 mm (.2 in ± .08 in)

Properly refill cooling system. Refer to *COOLING SYSTEM REFILL AND BLEEDING* in *PERIODIC MAINTENANCE PROCEDURES* subsection.

COOLANT TANK CAP

Using a pressure cap tester, check the relief pressure of coolant tank cap.

If the test failed, install a new 110 kPa (16 PSI) cap.

NOTICE **Do not install a tank cap exceeding the recommended pressure.**

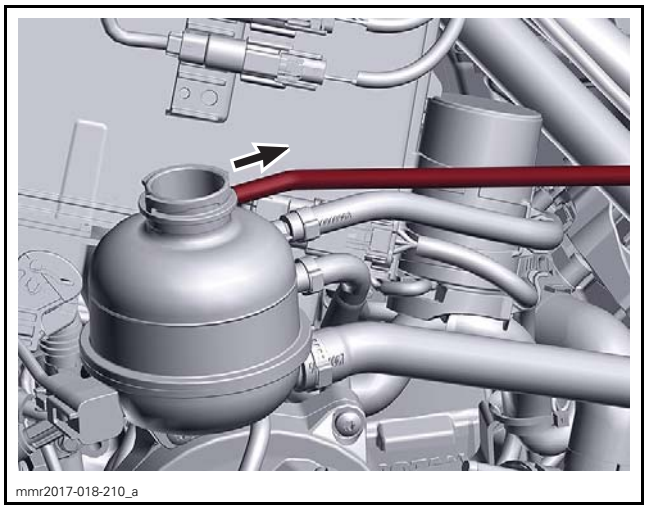
COOLANT TEMPERATURE SENSOR (CTS)

To test and replace the CTS, refer to *E-TEC DIRECT FUEL INJECTION* subsection.

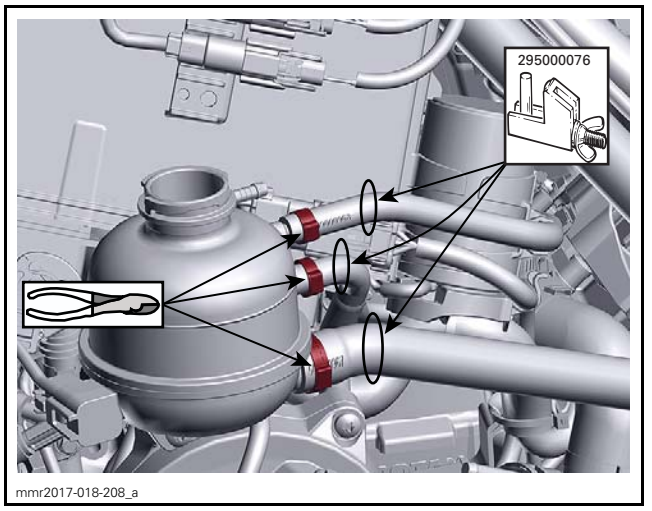
COOLANT TANK

Removing the Coolant Tank

1. Remove the RH side panel.
2. Siphon the coolant tank.
3. Unplug the upper vent hose.

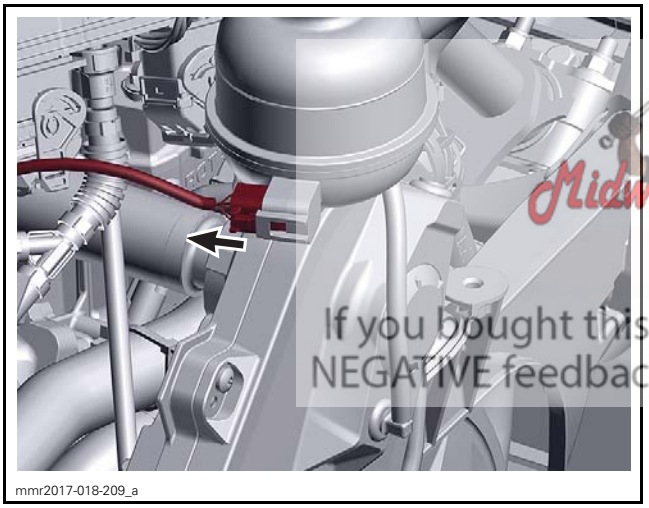

mmr2017-018-210_a

4. Block the three lower coolant hoses with pinchers.
5. Cut Oetiker clamps and remove coolant hoses from coolant tank.

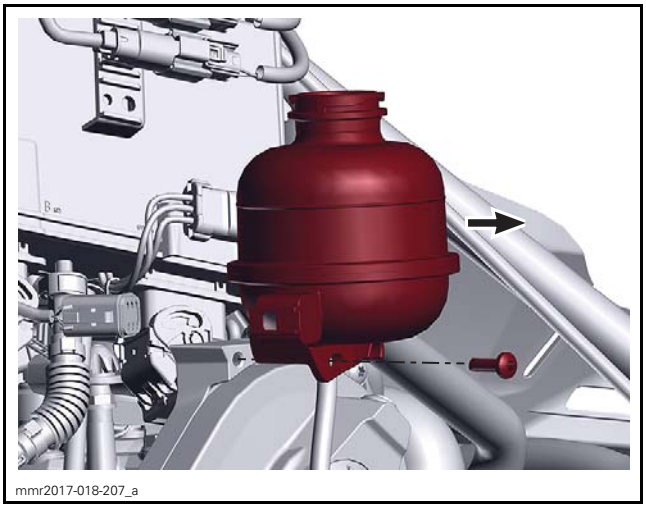


mmr2017-018-208_a

6. Disconnect the oil level sensor connector.


mmr2017-018-209_a

7. Detach the coolant tank from the top of the chaincase.


mmr2017-018-207_a

Inspecting the Coolant Tank

Check if the tank is cracked or melted. Replace if necessary.

Installing the Coolant Tank

The installation is the reverse of the removal procedure. However, pay attention to the following.

Properly refill cooling system. Refer to *COOLING SYSTEM REFILL AND BLEEDING* in *PERIODIC MAINTENANCE PROCEDURES* subsection.

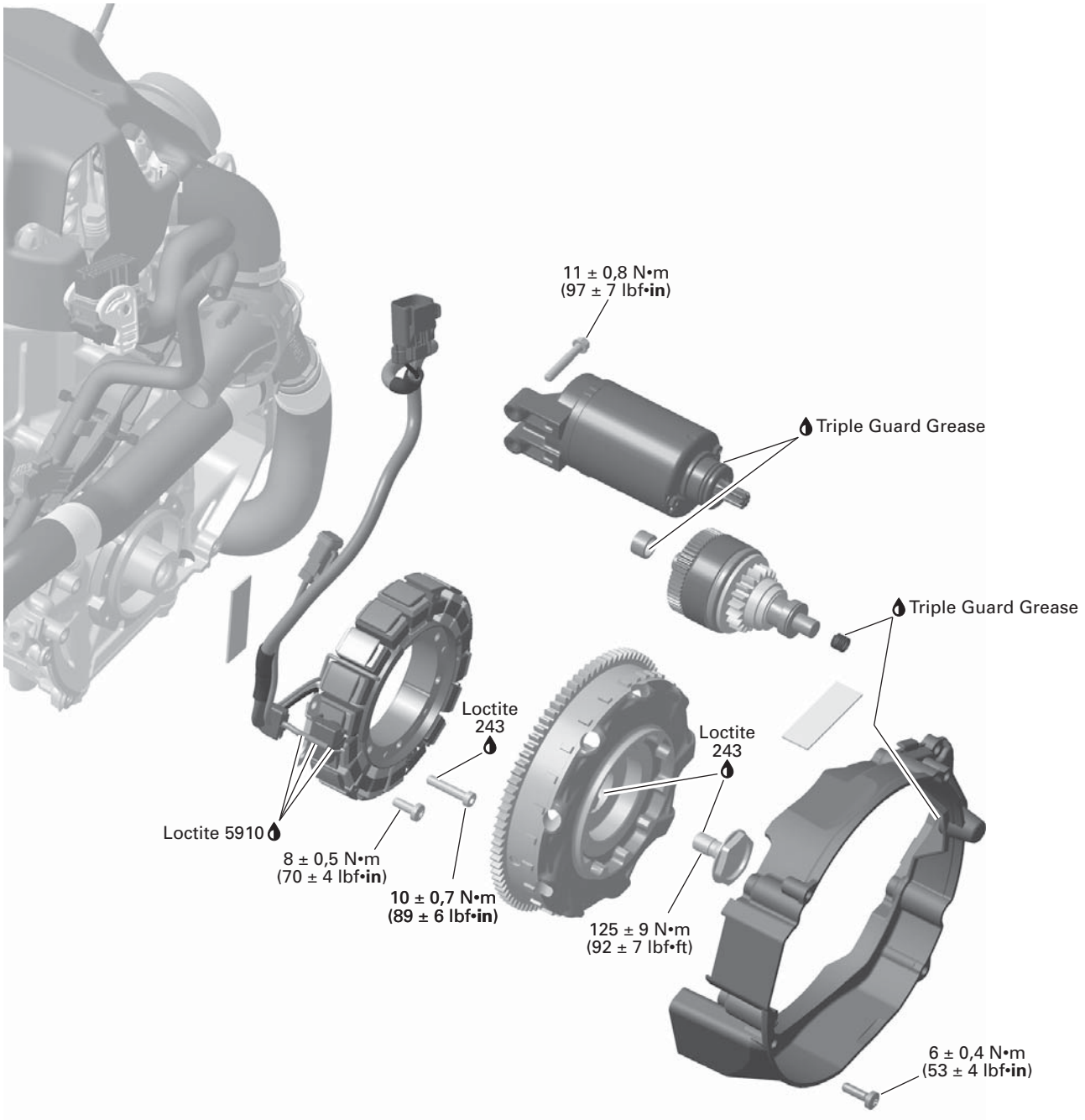
MAGNETO AND STARTER

SERVICE TOOLS

Description	Part Number	Page
ACG ADAPTER	529 036 410	10
CLUTCH HOLDER	529 036 369	3, 6
CRANKSHAFT PROTECTOR	529 036 434	4
FLUKE 115 MULTIMETER	529 035 868	9–10
HANDLE	420 877 650	14
MAGNETO HOLDER	529 036 404	3–4, 6
MAGNETO PULLER	529 036 403	4–5
STARTER DRIVE NEEDLE INSTALLER	529 035 934	14

SERVICE PRODUCTS

Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	13
LOCTITE 243 (BLUE)	293 800 060	5–6, 11
LOCTITE 5910	293 800 081	9
PULLEY FLANGE CLEANER	413 711 809	5
TRIPLE-GUARD GREASE	296 000 329	12, 15



NEW = Component must be replaced when removed.

mmr2017-019-001_a

GENERAL

NOTE: The following procedures can be carried out without removing the engine.

⚠ CAUTION Ensure tether cord is removed from D.E.S.S. post and engine shut-off switch is in the OFF position.

During assembly/installation, use the torque values and service products as shown in the exploded view.

Clean threads before applying a threadlocker. Refer to the *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* subsections at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, etc.).

PROCEDURES

MAGNETO FLYWHEEL

Magneto Flywheel Access

Remove the rewind starter, refer to *REWIND STARTER* subsection.

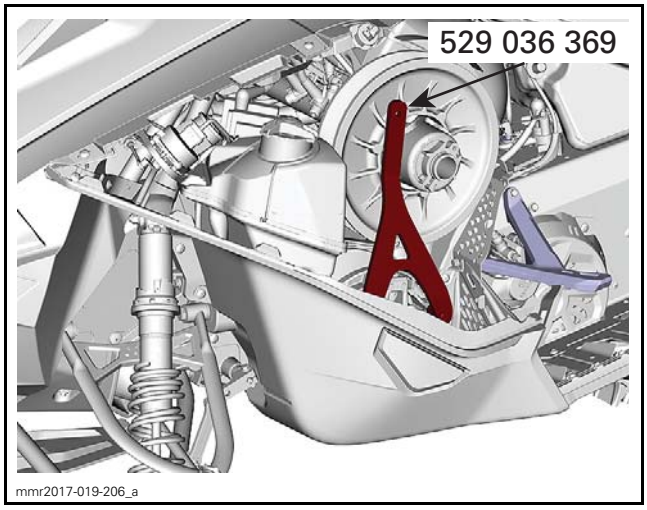
Removing the Magneto Flywheel

⚠ CAUTION Ensure tether cord is removed from D.E.S.S. post and engine shut-off switch is in the OFF position.

Engine In the Vehicle

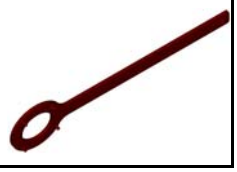
1. Block the drive pulley to avoid engine turning during the removal of the magneto retaining screw.

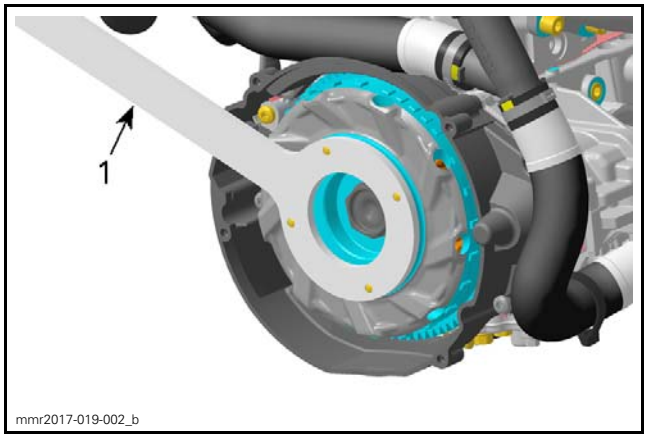
REQUIRED TOOL	
CLUTCH HOLDER (P/N 529 036 369)	



Engine Out of the Vehicle

2. Install the magneto holder.

REQUIRED TOOL	
MAGNETO HOLDER (P/N 529 036 404)	



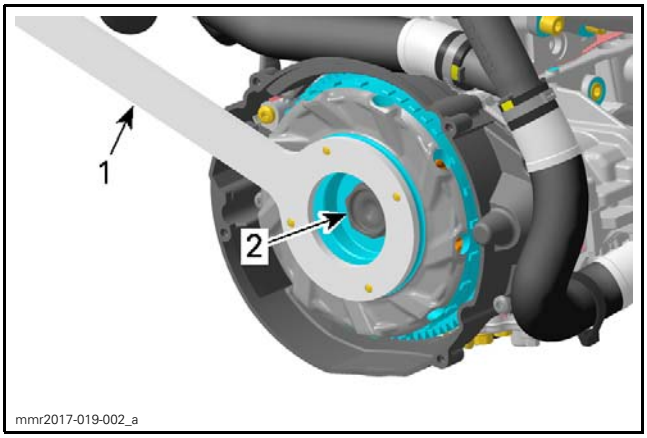
1. Magneto holder

Engine In or Out of the Vehicle

3. Remove magneto flywheel retaining screw.

NOTICE The hexagon head of the retaining screw is very flat. To avoid slipping off thoroughly hold socket against the screw head when loosening the retaining screw.

REQUIRED TOOL	
MAGNETO HOLDER (P/N 529 036 404)	
32 mm socket	



1. Magneto holder (engine out of vehicle)
2. Magneto flywheel retaining screw

Engine In the Vehicle

4. Remove the crankshaft position sensor (CPS). Refer to procedure in this subsection.

Engine Out of the Vehicle

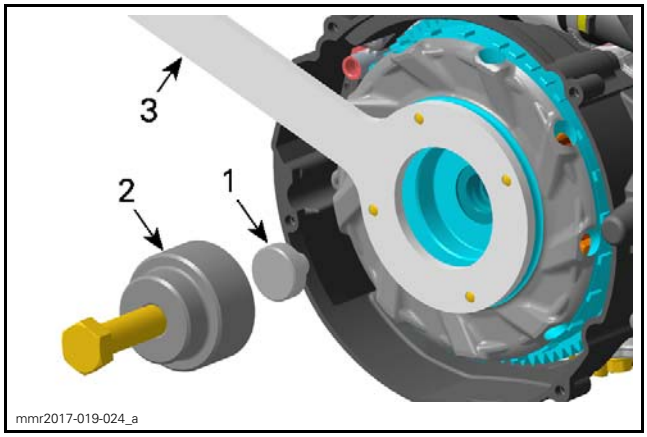
5. Unscrew crank position sensor (CPS). Refer to procedure in this subsection.
6. Slightly pull crank position sensor and cut silicone sealer between crank position sensor and crankcase.
7. Move CPS aside.

Engine In or Out of the Vehicle

8. Remove magneto flywheel.

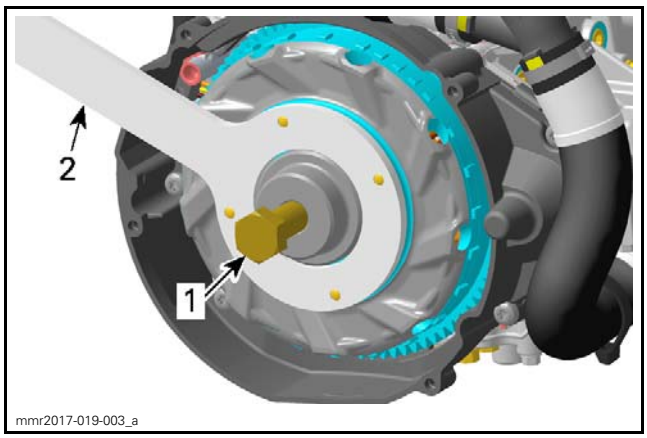
REQUIRED TOOL	
CRANKSHAFT PROTECTOR (P/N 529 036 434)	
MAGNETO PULLER (P/N 529 036 403)	
MAGNETO HOLDER (P/N 529 036 404)	
24mm socket	

Install service tools on engine.



1. Crankshaft protector
2. Magneto puller
3. Magneto holder (engine out of vehicle)

Tighten puller bolt, while holding the magneto flywheel in place until magneto flywheel releases from crankshaft.



1. Puller bolt
2. Magneto holder (engine out of vehicle)

Inspecting the Magneto Flywheel

Clean magneto flywheel using only a clean cloth.

Inspect magneto flywheel for abnormal coloration (brown or blue) that would indicate overheating condition.

If overheating condition is suspected, carry out the following:

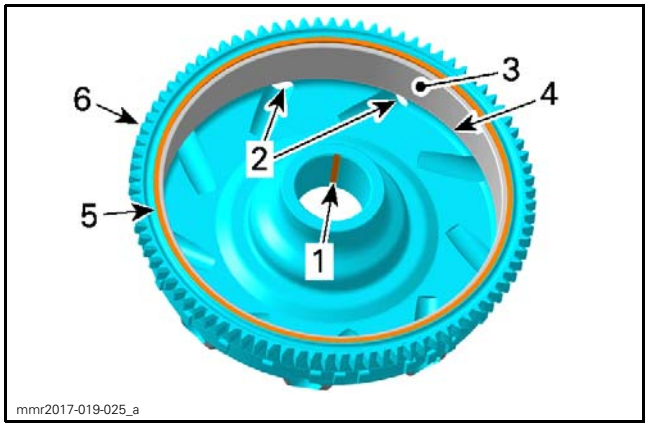
- Check flywheel magnetic field using a piece of metal. If magnetic field is not felt or weak, replace flywheel.
- Inspect flywheel for cracks, pay particular attention to the inside circumference (magnets), and the tapered center portion.
- Check if magneto flywheel ventilation holes are clean.
- Check if magneto housing ventilation holes are clean.
- Check stator for signs of overheating.
- Test stator, see procedures in this subsection.

Check INOX sheet metal ring on inside of magneto flywheel for proper position and fixation.

Check if bead of silicone is not damaged.

Check starter gear teeth for wear or any other damage.

Check keyway of the magneto flywheel for wear or damages.



1. *Keyway*
2. *Ventilation holes*
3. *INOX sheet metal ring (magnets underneath)*
4. *INOX sheet metal ring flush with flywheel (no gap)*
5. *Bead of silicone*
6. *Starter gear*

Installing the Magneto Flywheel

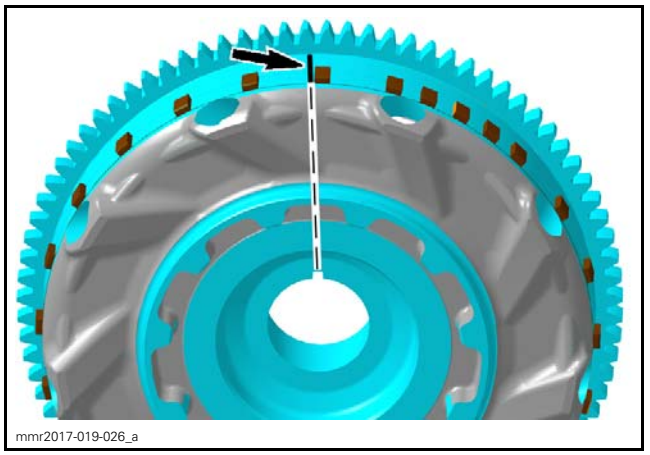
1. Clean:
   - Crankshaft taper
   - Thread in crankshaft
   - Magneto flywheel taper
   - Magneto flywheel retaining screw threads.

TAPER AND THREADS CLEANING	
Service product	PULLEY FLANGE CLEANER (P/N 413 711 809)

2. Apply thread locker on magneto flywheel taper.

MAGNETO FLYWHEEL TAPER	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)

3. Install woodruff key on crankshaft.
4. Turn crankshaft to position woodruff key in top position.
5. Mark keyway position on magneto flywheel.



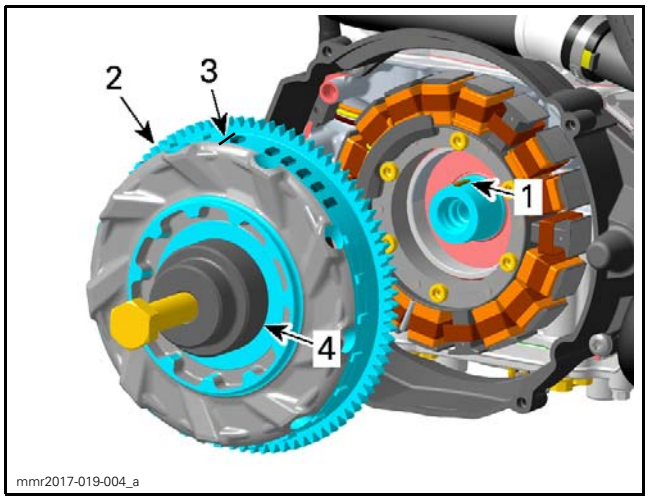
MARK KEYWAY POSITION

6. Install magneto flywheel.

⚠ CAUTION For installation use magneto puller to avoid injuries due to the high magnetic pull of the magneto flywheel.

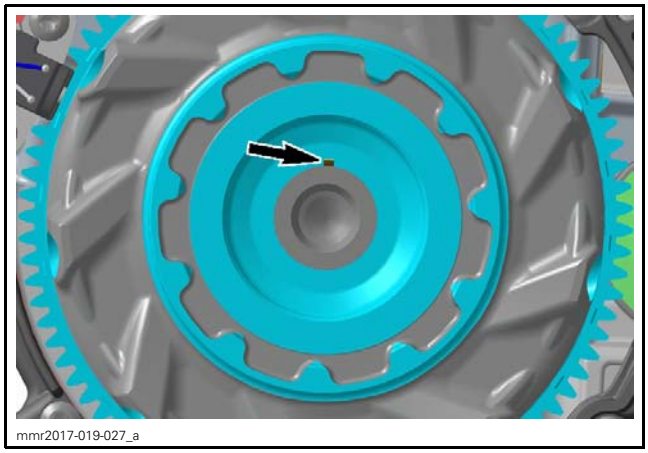
REQUIRED TOOL	
MAGNETO PULLER (P/N 529 036 403)	

Hold magneto flywheel with mark in top position.



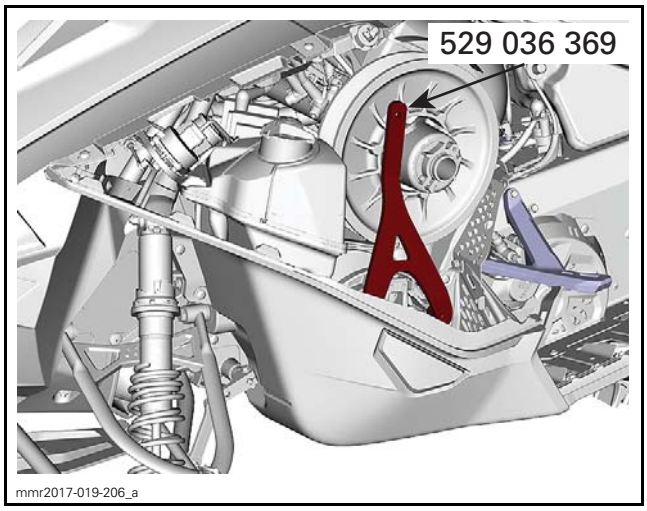
1. Woodruff key in top position
2. Magneto flywheel
3. Mark on magneto flywheel
4. Magneto puller

7. Check if woodruff key is in proper position.

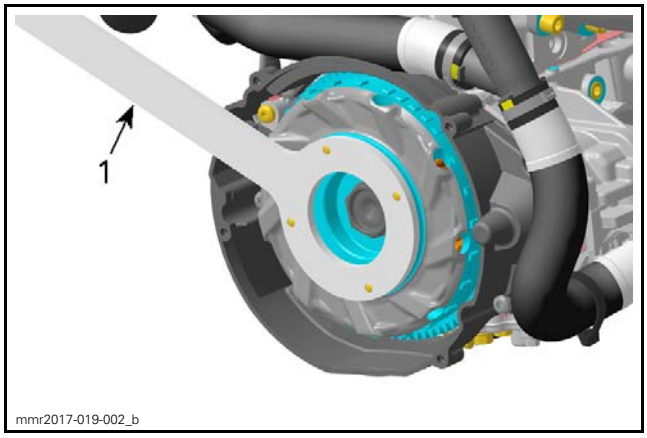


8. Block the drive pulley or the magneto flywheel using the appropriate tool.

REQUIRED TOOL	
CLUTCH HOLDER (P/N 529 036 369)	
MAGNETO HOLDER (P/N 529 036 404)	



IN VEHICLE

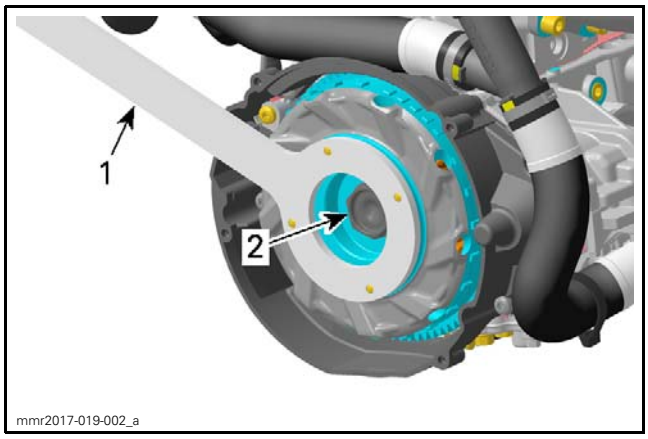


OUTSIDE VEHICLE
1. Magneto holder
2. Magneto flywheel screw

9. Install magneto flywheel retaining screw and tighten to specification.

NOTICE **The hexagon head of the retaining screw is very flat. To avoid slipping off thoroughly hold socket against the screw head when tightening the retaining screw.**

TIGHTENING TORQUE	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Magneto flywheel retaining screw	125 N•m ± 9 N•m (92 lbf•ft ± 7 lbf•ft)



1. *Magneto holder*
2. *Magneto flywheel retaining screw*

MAGNETO HOUSING

Inspecting the Magneto Housing

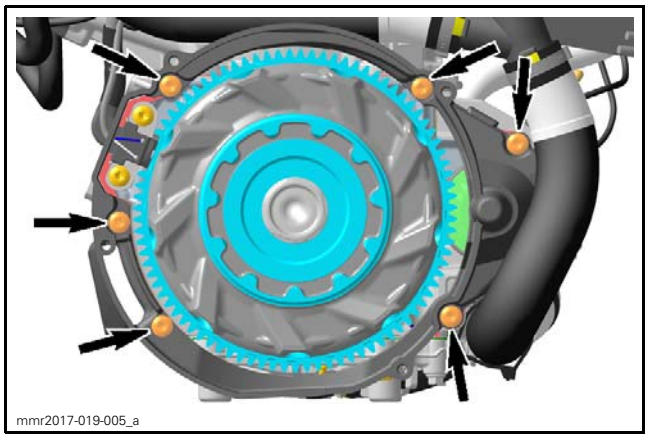
Inspect housing for cracks or other apparent damage. Replace if necessary.

Removing the Magneto Housing

NOTE: The engine removal is required to remove the magneto housing.

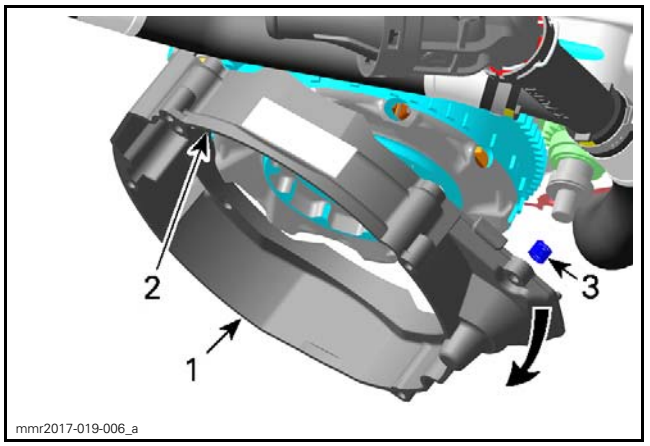
⚠ CAUTION Ensure tether cord is removed from D.E.S.S. post and engine shut-off switch is in the OFF position.

1. Remove magneto housing screws.



2. Slightly pull magneto housing and cut silicone sealer from between CPS and magneto housing.

NOTE: Do not lose starter drive spring during removal of magneto housing.



PULL MAGNETO COVER
1. *Magneto cover*
2. *CPS*
3. *Spring*

3. Remove magneto housing.

Installing the Magneto Housing

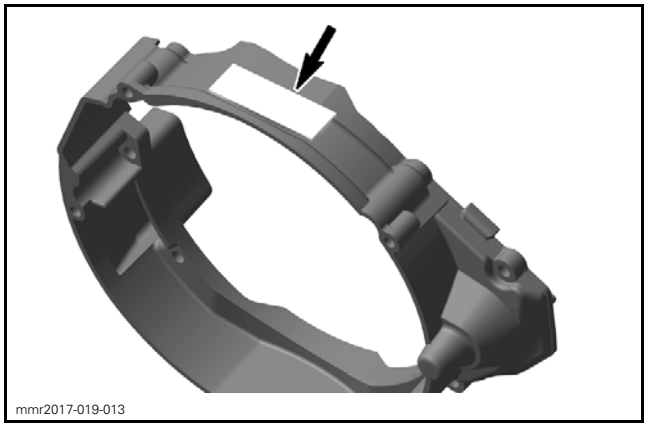
The installation is the reverse of the removal procedure, however pay attention to the following.

Remove the old silicon at CPS.

Tighten magneto housing screws to specification.

TIGHTENING TORQUE	
Magneto housing screws	6 N•m ± 0.4 N•m (53 lbf•**in** ± 4 lbf•**in**)

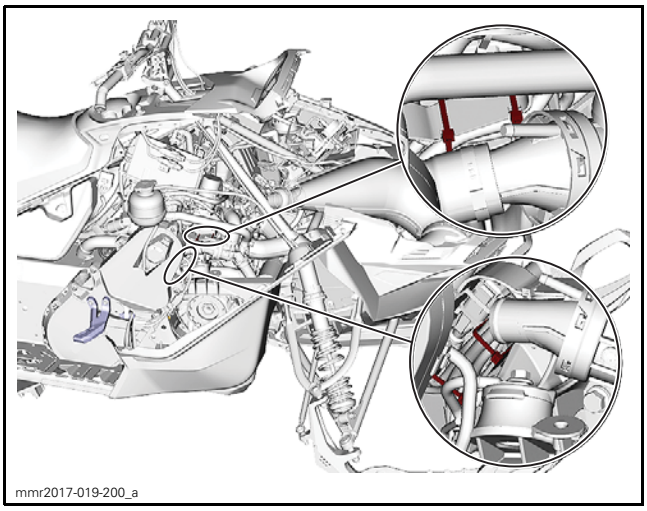
On a new magneto cover install adhesive pad.



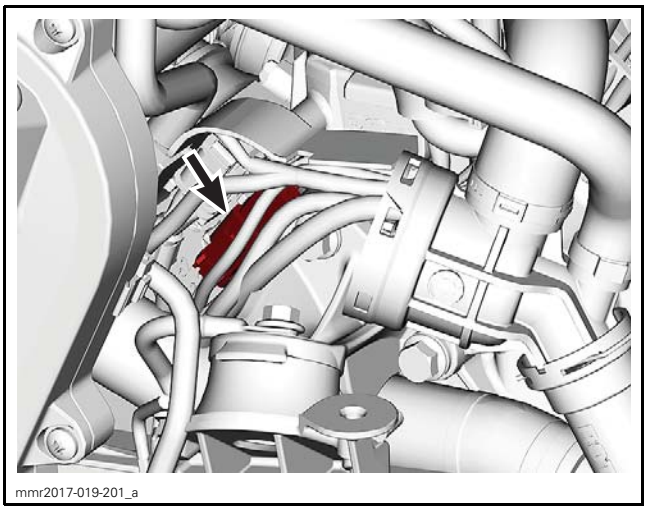
CRANKSHAFT POSITION SENSOR (CPS)

CPS Connector Access

1. Remove the muffler. Refer to *EXHAUST SYSTEM* subsection.
2. Cut locking ties securing the wiring harness to engine harness support.


mmr2017-019-200_a

3. Move wirings aside and disconnect the CPS connector.


mmr2017-019-201_a

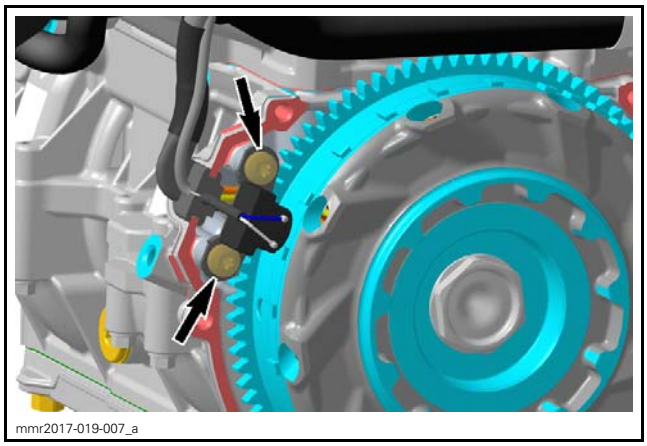
Testing the CPS

Refer to *E-TEC DIRECT INJECTION* subsection.

Removing the CPS

⚠ CAUTION **Ensure tether cord is removed from D.E.S.S. post and engine shut-off switch is in the OFF position.**

1. Remove magneto housing, refer to *MAGNETO HOUSING* in this subsection.
2. Remove CPS retaining screws.


mmr2017-019-007_a

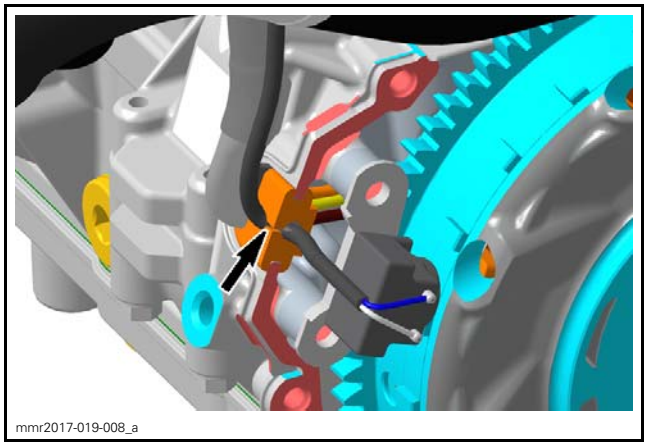
3. Disconnect CPS connector, refer to *CPS CONNECTOR ACCESS* in this subsection.
4. Remove CPS.
5. Remove the old silicon at CPS sensor location

Installing the CPS

NOTICE **Do not apply silicone dielectric grease or any other product on Deutsch waterproof housings as housing seal may be damaged.**

The installation is the reverse of the removal procedure, however pay attention to the following.

Insert CPS cable into stator cable grommet.


mmr2017-019-008_a

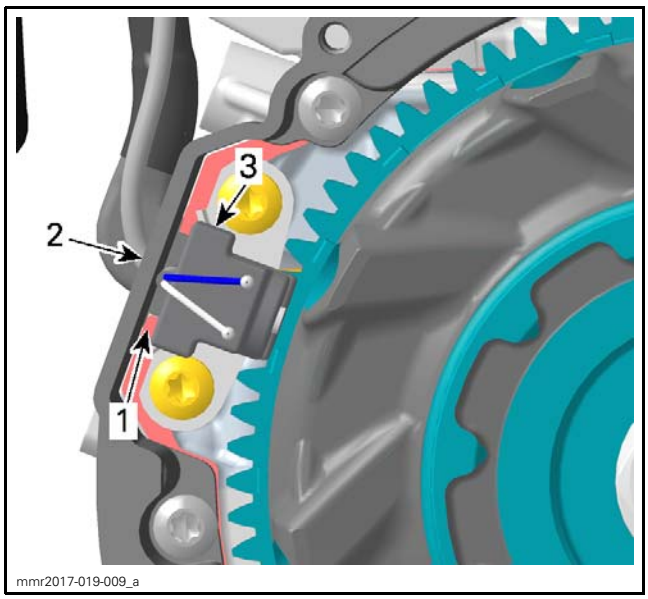
Tighten CPS retaining screws to specification.

TIGHTENING TORQUE	
CPS retaining screws	8 N•m ± 0.5 N•m (71 lbf•**in** ± 4 lbf•**in**)

NOTE: It is important to remove the old silicon at CPS location.

Fill out the gap between CPS and magneto housing with silicon.

CPS HARNESS	
Service product	LOCTITE 5910 (P/N 293 800 081)

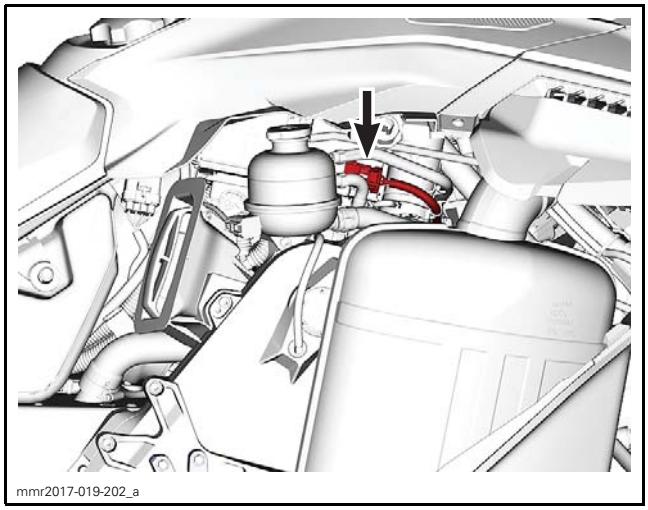


1. *Fill up with silicon.*
2. *Magneto housing*
3. *CPS*

STATOR

Stator Connector Access

1. Remove the RH side panel.
2. Disconnect stator connector (3-pin connector).



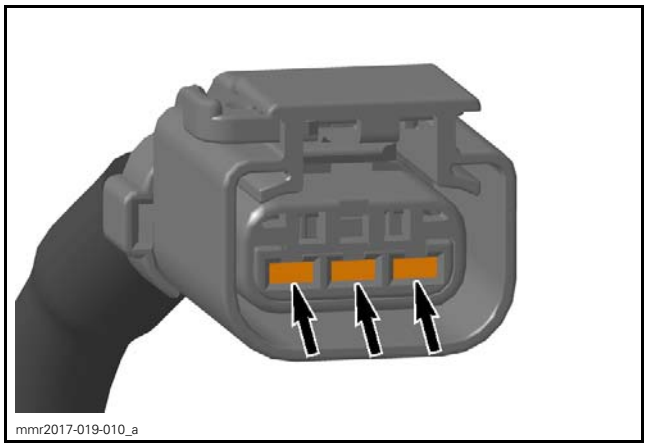
Testing the Stator Continuity

1. Disconnect stator connector.
2. Set multimeter to Ω.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

3. Measure resistance of each stator coil as follows.

STATOR CONTINUITY TEST		
TEST PROBES		RESISTANCE @ 20°C (68°F)
Pin 1	Pin 2	0.63 ± 0.03 Ω
Pin 1	Pin 3	
Pin 2	Pin 3	



STATOR CONNECTOR PIN-OUT

NOTE: The stator resistance values mentioned in the table are manufacturers specifications under ideal conditions. If stator coil resistance is less than 1 Ω, consider stator to be in good working condition.

If resistance is out of specification, replace stator.

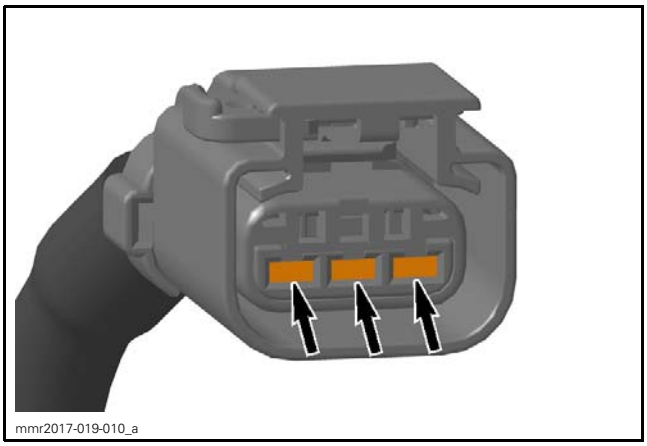
Testing the Stator Insulation

1. Disconnect stator connector.
2. Set multimeter to Ω.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

3. Measure resistance as follows.

STATOR INSULATION TEST		
TEST PROBES		RESISTANCE @ 20°C (68°F)
Pin 1	Engine ground	OL (open circuit)
Pin 2		
Pin 3		



STATOR CONNECTOR PIN-OUT

If results are out of specification, the stator and/or the wiring need to be repaired/replaced.

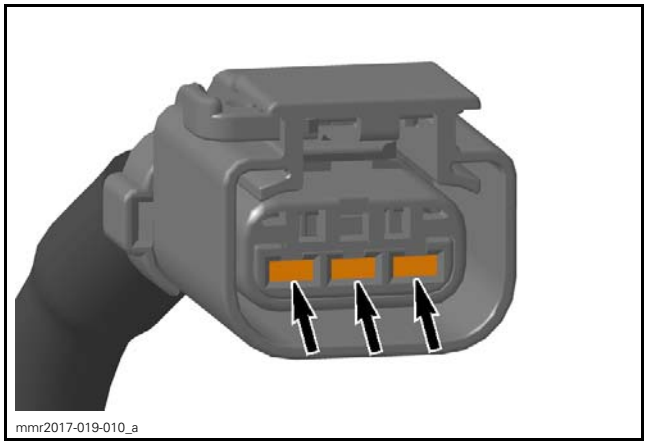
Testing the Stator Voltage Output

1. Disconnect stator connector.
2. Set multimeter to Vac and **manually set a scale** capable of reading at least 20 Vac.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	
ACG ADAPTER (P/N 529 036 410)	

3. Manually crank engine and read voltage from each winding as follows.
4. Repeat the test 3 times for each winding.

STATOR OUTPUT VOLTAGE TEST		
TEST PROBES		VOLTAGE
Pin 1	Pin 2	Approximately 15 - 20 Vac
Pin 1	Pin 3	
Pin 2	Pin 3	

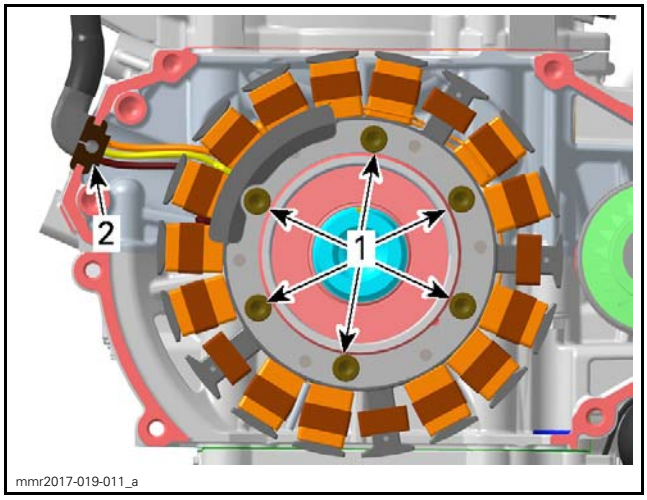


STATOR CONNECTOR PIN-OUT

5. If voltage is lower than specification, remove and inspect magneto flywheel and stator. Refer to *MAGNETO FLYWHEEL* in this subsection.
6. Replace magneto flywheel and/or stator if applicable.

Removing the Stator

1. Refer to procedures in this subsection and remove:
   - Magneto flywheel
   - Magneto housing
   - CPS.
2. Remove stator retaining screws.
3. Remove grommet from crankcase.



1. Stator retaining screws
2. Grommet

4. Disconnect stator connector. Refer to *STATOR CONNECTOR ACCESS* in this subsection.

NOTE: To ease harness routing at installation, tie a string on the connector and let the string follow through as you pull on the harnesses.

5. Remove stator.

Cleaning the Stator

NOTICE Clean stator using only a clean cloth.

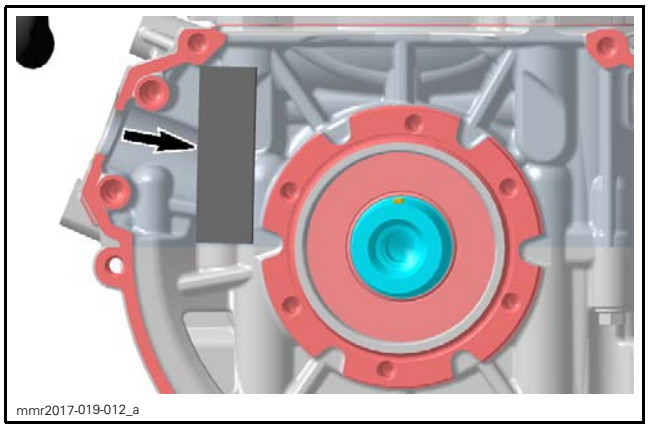
Inspecting the Stator

Refer to *MAGNETO FLYWHEEL INSPECTION* in this subsection.

Installing the Stator

NOTICE Do not apply silicone dielectric grease or any other product on Deutsch waterproof housings as housing seal may be damaged.

1. Install adhesive pad on crankcase.


mmr2017-019-012_a

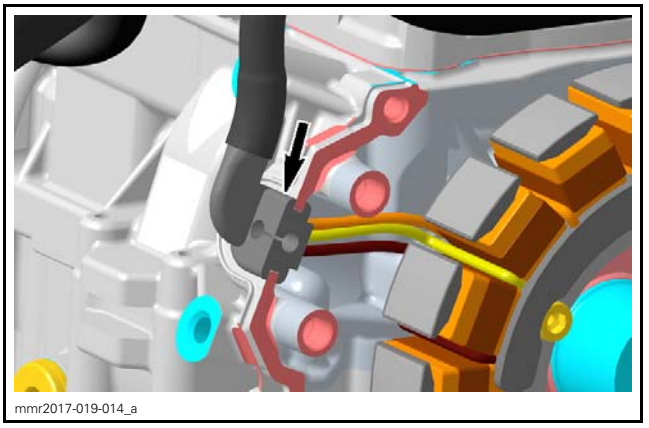
2. Install stator into crankcase.

NOTE: During installation, ensure stator harness is located on the left side.

3. Tighten stator retaining screws to specification.

TIGHTENING TORQUE	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Stator retaining screws	10 N•m ± 0.7 N•m (89 lbf•**in** ± 6 lbf•**in**)

4. Position grommet into crankcase recess.


mmr2017-019-014_a

5. Tie the string on the connector used during removal of the stator connector, then pull on him to route the harness up to his original locations.
6. Reinstall all other removed parts.

STARTER

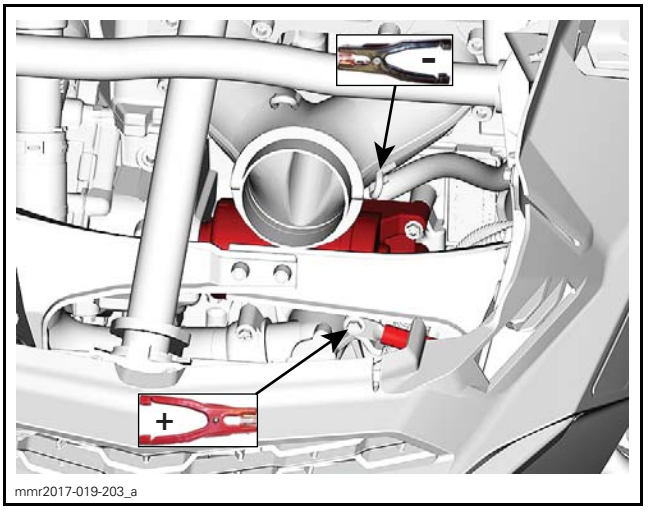
Starter Location

The starter is located at the front of the engine, below the exhaust manifold.

Testing the Starter Operation

Use booster cables and a booster battery to supply current directly to the starter.

1. Connect the RED jumper cable from the booster battery to the starter screw.
2. Momentarily connect the BLACK jumper cable to an ear of the exhaust manifold.



mmr2017-019-203_a

If the starter turns, test other starting system components. Refer to *STARTING SYSTEM* subsection.

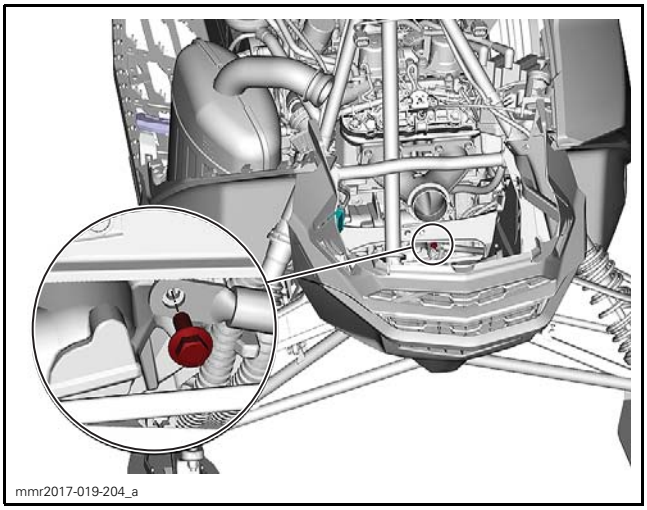
Removing the Starter

1. Disconnect the BLACK (-) battery cable from the battery.

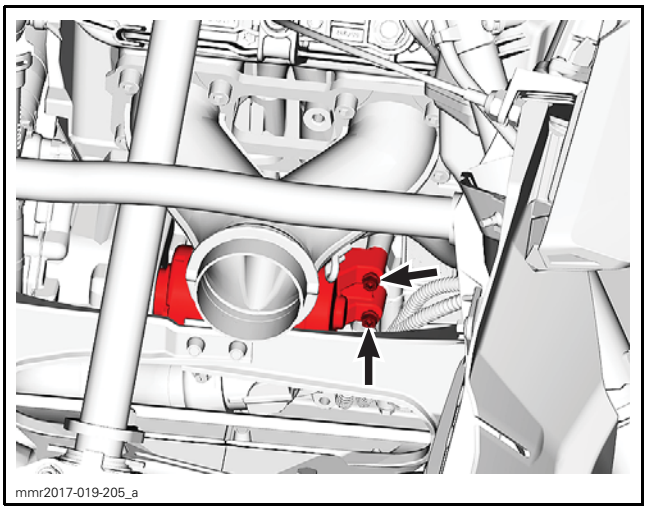
⚠ WARNING

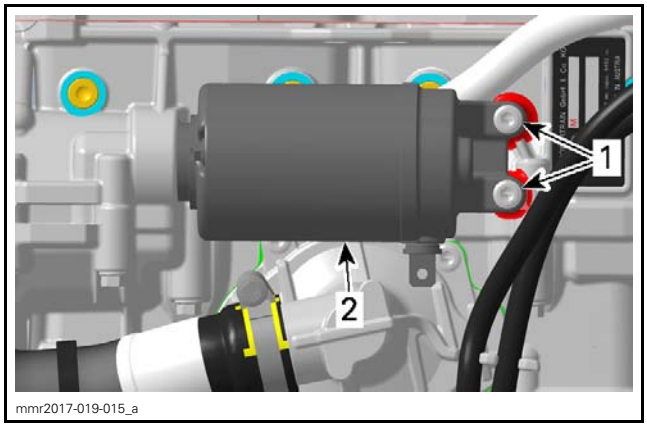
Always disconnect BLACK (-) battery cable first and reconnect last.

2. Remove the tuned pipe, refer to *EXHAUST SYSTEM* subsection.
3. Disconnect the RED (+) power cable from starter.


mmr2017-019-204_a

4. Clean starter and surrounding area.
5. Remove starter mounting screws.


mmr2017-019-205_a



mmr2017-019-015_a

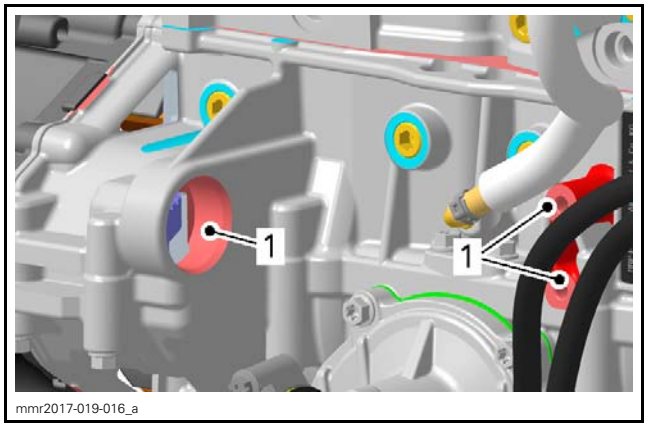
1. Starter mounting screws
2. Starter

6. Pull starter out of crankcase.

Installing the Starter

Reverse the removal procedure. However, pay particular attention to the following.

Make sure the starter and engine mating surfaces are free of debris. Serious problems may arise if the starter is not properly aligned.

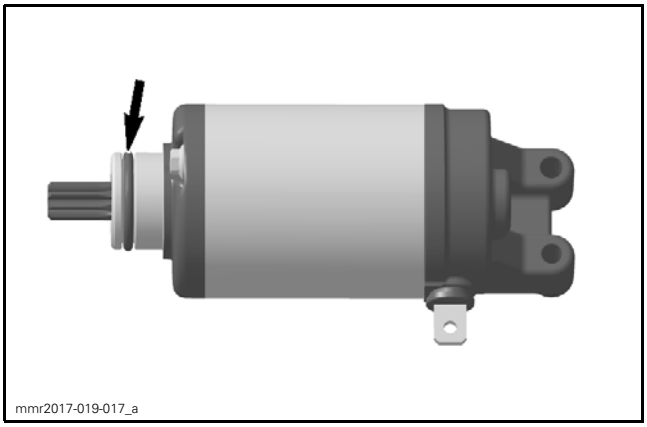


mmr2017-019-016_a

1. Clean starter mating surfaces

Lubricate starter O-ring.

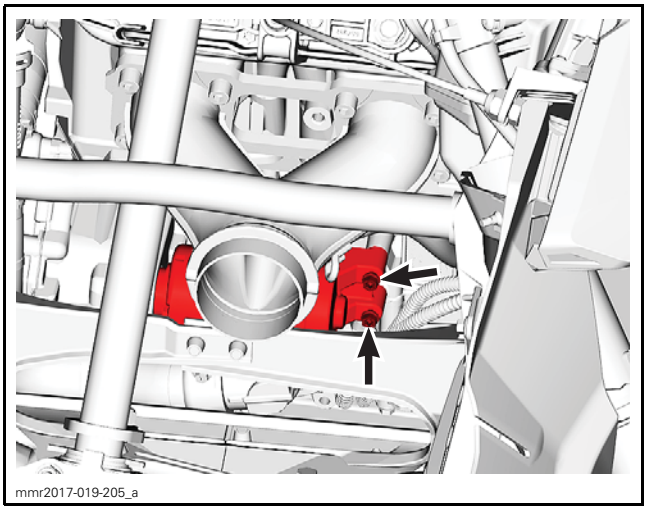
STARTER O-RING	
Service product	TRIPLE-GUARD GREASE (P/N 296 000 329)



LUBRICATE STARTER O-RING

Install starter and tighten mounting screws to specification

TIGHTENING TORQUE	
Starter mounting screws	11 N•m ± 0.8 N•m (97 lbf•**in** ± 7 lbf•**in**)



Connect the RED (+) cable to the starter and tighten screw to specification.

TIGHTENING TORQUE	
Service product	DIELECTRIC GREASE (P/N 293 550 004)
RED (+) power cable screw	2.7 N•m ± 0.7 N•m (24 lbf•**in** ± 6 lbf•**in**)

Connect the BLACK (-) battery cable last.

⚠ WARNING

Always connect the RED (+) starter cable first, then the BLACK (-) battery cable last. Whenever connecting the RED (+) cable to the starter motor, always make sure the BLACK (-) battery cable is disconnected to prevent electric shock.

Test starter operation.

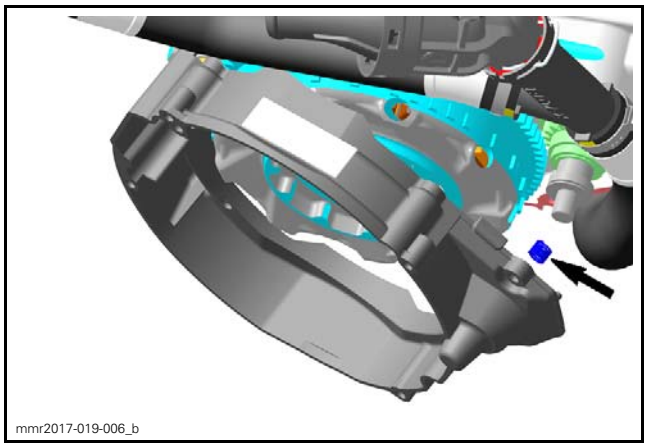
STARTER DRIVE

Removing the Starter Drive

Refer to procedures in this subsection to remove:

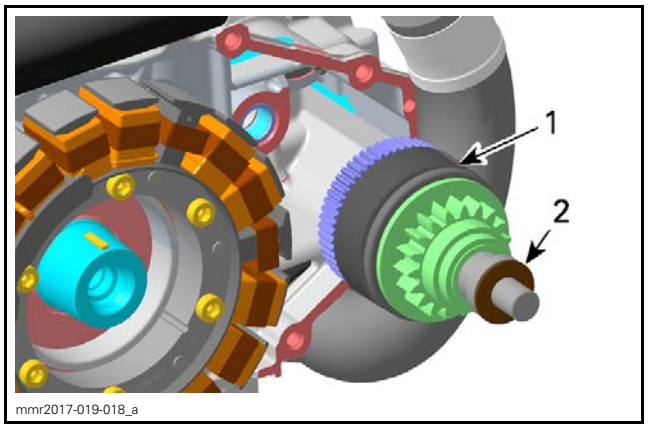
– Magneto flywheel
– Magneto housing.

NOTE: Do not lose starter drive spring during removal of magneto housing.



Pull out starter drive.

NOTE: Do not lose washer of starter drive gear during removal.



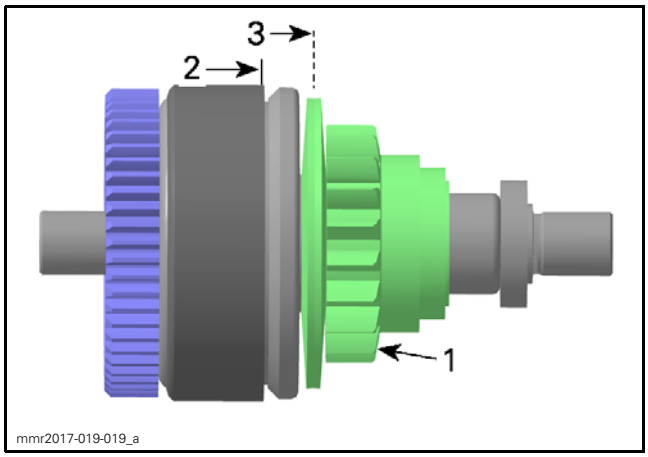
1. *Starter drive*
2. *Washer*

Inspecting the Starter Drive

Check if starter drive pinion is free of movement.

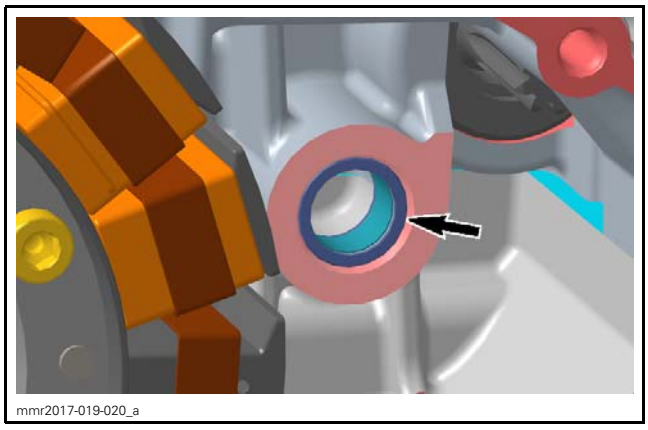
Ensure proper operation of the starter drive sprag clutch.

NOTE: Centrifugal weights avoid disengaging of the pinion while starting the engine.



1. *Starter drive pinion*
2. *Starting position (spring released)*
3. *Gear is engaged drive pulley fixed half (spring loaded)*

Check needle bearing excessive play and smooth operation. If damaged see *STARTER DRIVE NEEDLE BEARING REPLACEMENT* in this subsection.



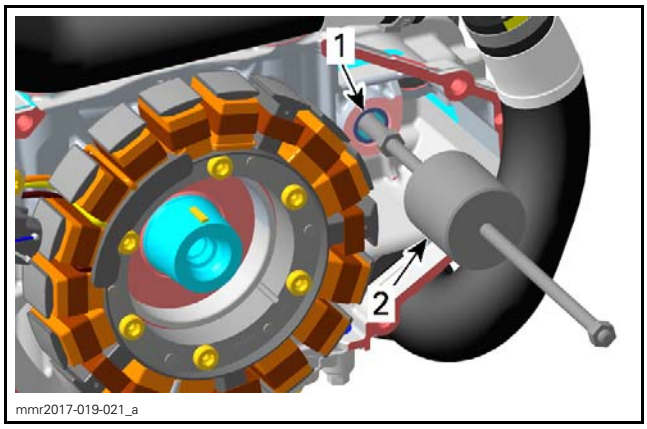
1. *Starter drive needle bearing*

Check magneto housing:
- for cracks at the starter drive bore location
- if starter drive bore is worn or otherwise damaged.

Replace magneto housing if necessary.

Starter Drive Needle Bearing Replacement

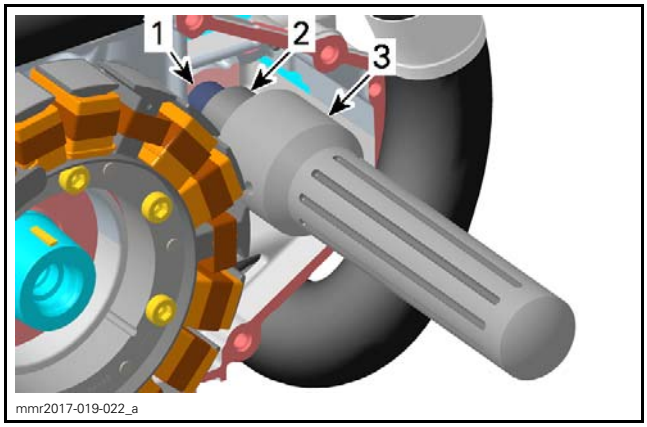
Remove needle bearing using a blind hole bearing puller.



1. *Needle bearing*
2. *Blind hole bearing puller*

Install needle bearing.

REQUIRED TOOL	
STARTER DRIVE NEEDLE INSTALLER (P/N 529 035 934)	
HANDLE (P/N 420 877 650)	



1. *Needle bearing*
2. *Starter drive needle bearing installer*
3. *Handle*

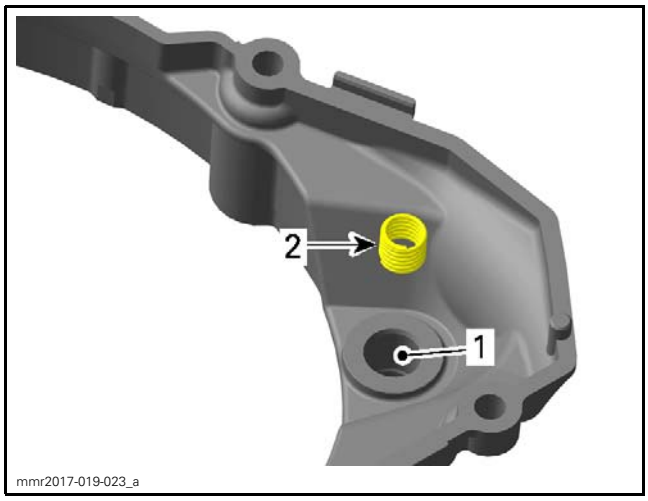
Installing the Starter Drive

For installation, reverse the removal procedure. However, pay attention to the following.

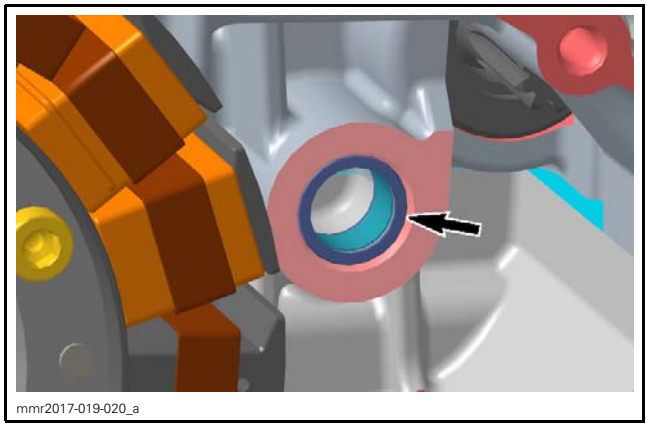
Clean out all residues of grease from:
- Needle bearing in the crankcase
- Starter drive journals
- Starter drive bore in magneto housing
- Spring.

Lubricate:
- Needle bearing in crankcase
- Starter drive bore in magneto housing
- Spring.

STARTER DRIVE LUBRICATION	
Service product	TRIPLE-GUARD GREASE (P/N 296 000 329)

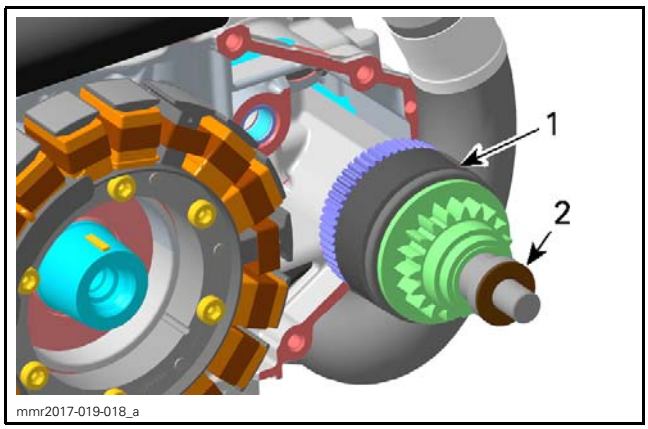


LUBRICATE
1. *Starter drive bore*
2. *Spring*



LUBRICATE NEEDLE BEARING IN CRANKCASE

Install starter drive with washer.



1. *Starter drive*
2. *Washer*

RAVE

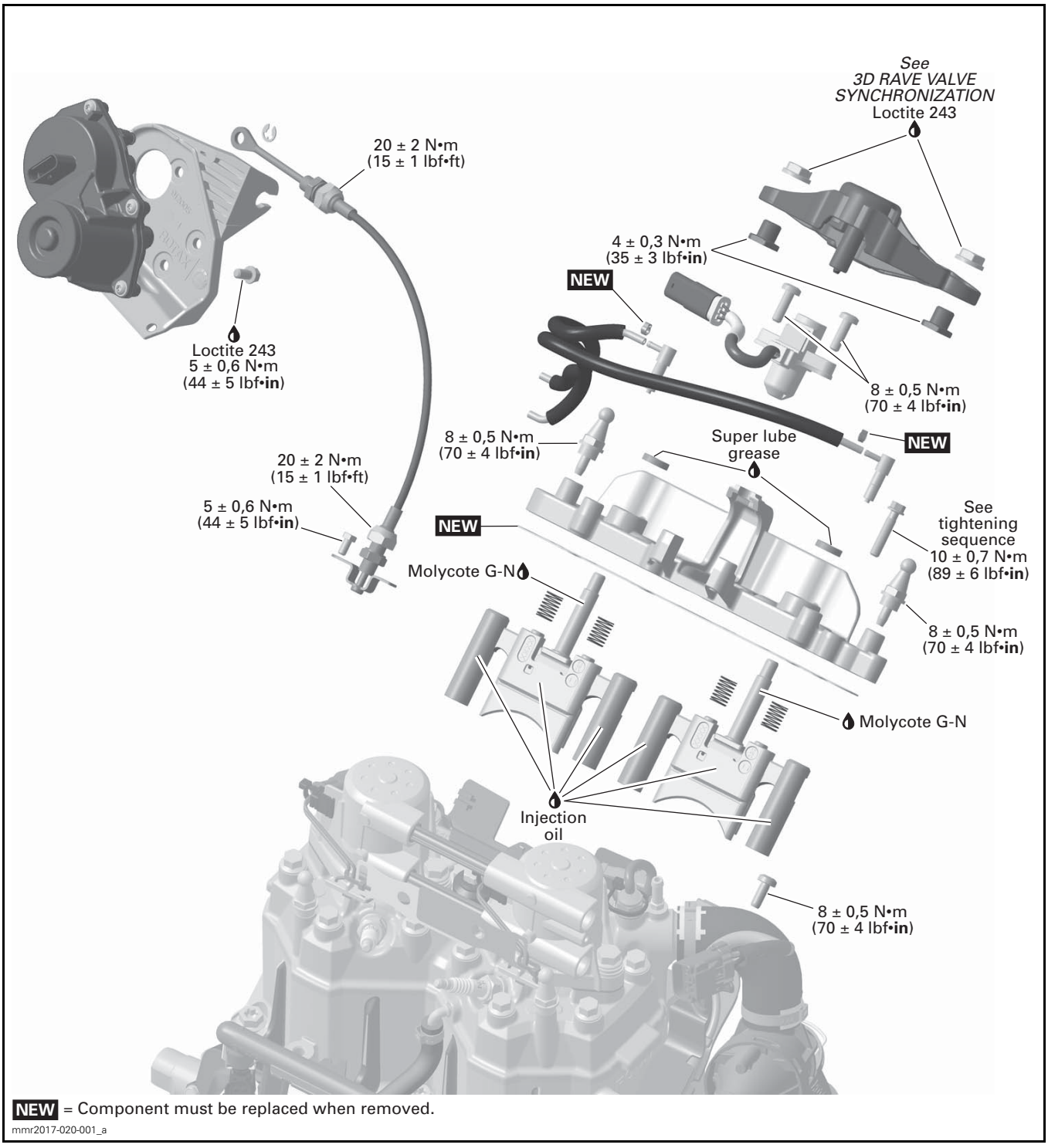
SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	7, 16
FLUKE 115 MULTIMETER	529 035 868	6–7, 15–17
PROTECTOR SLEEVE	529 036 406	12

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	8–9, 18
MOLYKOTE G-N	420 297 433	12

RAVE VALVE



NEW = Component must be replaced when removed.

mmr2017-020-001_a

GENERAL

During assembly/installation, use torque values and service products as shown in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS PROCEDURE* and *LOCTITE APPLICATION PROCEDURE* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

NOTICE **Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.**

SYSTEM DESCRIPTION

3D RAVE Basic Operation

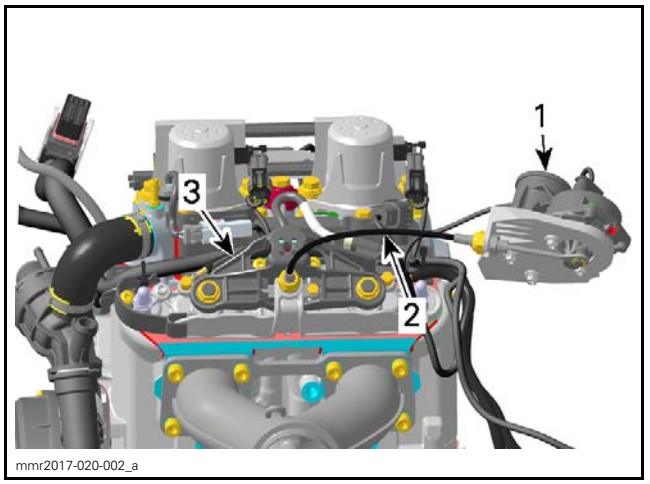
3-step RAVE valves are used. Their positions vary according to engine operating condition.

The RAVE valve steps are:
– Fully closed
– Partially opened
– Fully opened.

RAVE valves are moved to the desired position by a servomotor via a Rave cable that is controlled by the ECM through mappings.

Different mappings are used by the ECM to control the 3D RAVE valves. The mappings are based on current engine RPM and the following inputs: intake temperature, TPS, knock sensor, engine coolant temperature and APS.

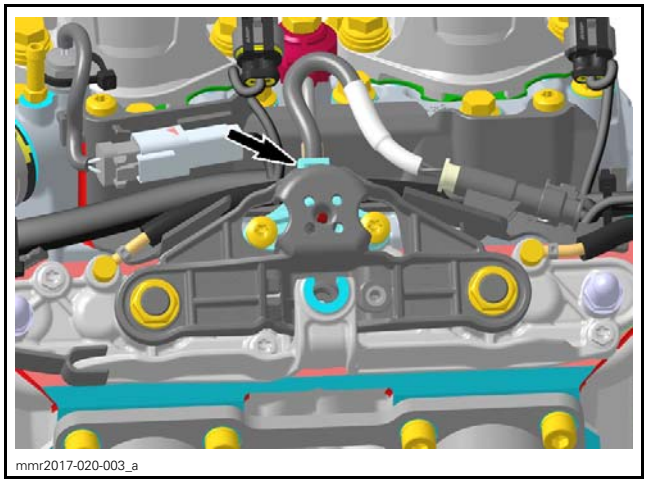
NOTE: 3D RAVE valves may go through all 3 positions or skip the partially opened position and go directly to either the fully opened or closed positions depending on present engine load and how quickly the throttle is depressed.



mmr2017-020-002_a

COVER REMOVED FOR CLARITY
1. *Servomotor*
2. *Rave cable*
3. *3D RAVE valve*

A hall-effect position sensor (RPS: RAVE position sensor) is used to provide RAVE valve position feedback to the ECM.

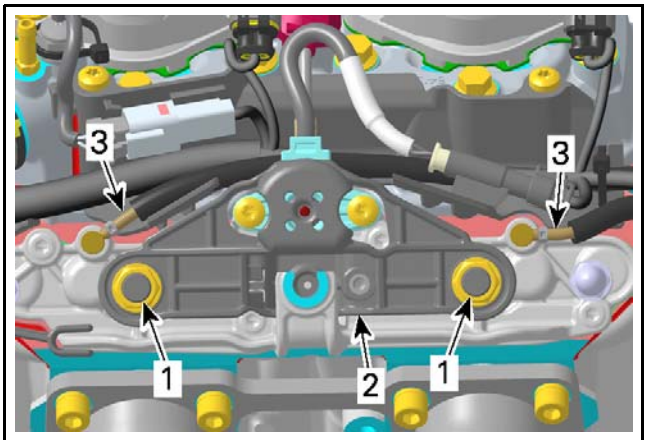

mmr2017-020-003_a

PARTS REMOVED FOR CLARITY

The RAVE position sensor (RPS) provides the ECM the actual position of the RAVE valves. Either closed, mid-position or opened. This informs the ECM that the RAVE valves are really at the expected position so that the proper amount of fuel is injected as well as other required operating parameters are applied.

RAVE valves are lubricated by the electronic oil injection pump.

RAVE valves are moved and monitored with a link bar.

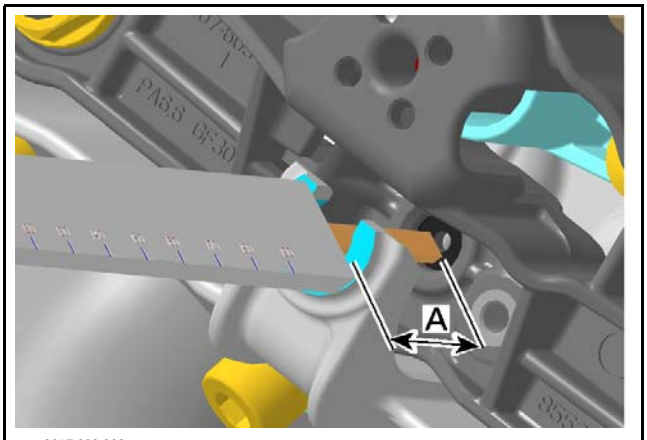


mmr2017-020-004_a

PARTS REMOVED FOR CLARITY
1. *Linked RAVE valves*
2. *Link bar*
3. *Oil lines to RAVE valves*

NOTICE It is very important to perform *3D RAVE VALVE SYNCHRONIZATION* and *RAVE VALVE POSITION SENSOR SETTING* whenever link bar is removed.

3D RAVE Position According to Engine Operation



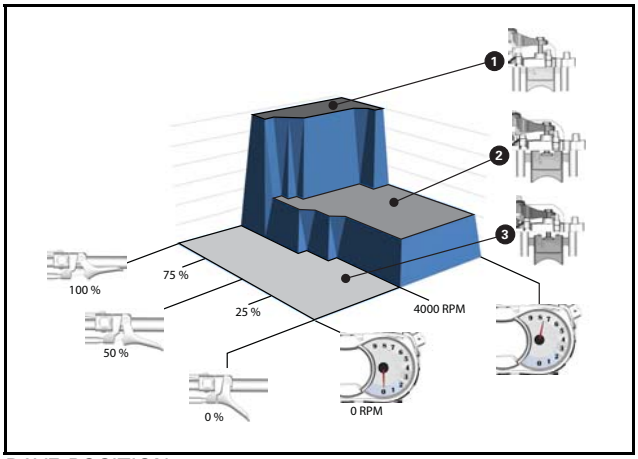
mmr2017-020-006_a

A. Measure from counter bearing to link bar

NOTICE For correct measurement the Rave cable must be removed.

Move both RAVE valves simultaneously to fully opened / mid / fully closed position by hand.

RAVE VALVE POSITION MEASURED FROM COUNTER BEARING OF THE RAVE CABLE TO THE LINK BAR	
Fully closed	1. Measure from counter bearing to link bar. 2. Set calliper to 0 mm (0 in).
Mid position	A: Approximately 6 mm (1/4 in) from 0 mm (0 in) (fully closed position)
Fully opened	A: Approximately17.5 mm (11/16 in) from 0 mm (0 in) (fully closed position)



RAVE POSITION
1. *Fully opened*
2. *Mid*
3. *Fully closed*

TROUBLESHOOTING

DIAGNOSTIC TIPS

As a first troubleshooting step, perform the following procedures to ensure RAVE system is properly adjusted.

1. *3D RAVE VALVE SYNCHRONIZATION*
2. *3D RAVE VALVES POSITION SENSOR SETTING*
3. *3D RAVE VALVES POSITION VALIDATION.*

TROUBLESHOOTING GUIDELINES

RAVE Valves Position Sensor Fault Code

The ECM may generate a **position sensor fault code** if the RAVE valve is not reaching the desired position.

If a position sensor fault code is generated by the ECM, check for the following:

Defective Position Sensor

– Test position sensor operation, perform *3D RAVE VALVES POSITION VALIDATION*, see procedure in this subsection.
– Check position sensor wiring, perform *INSPECTING THE 3D RAVE VALVES POSITION SENSOR*, see procedures in this subsection.
– Check movement of the RAVE manually.

Excessive Carbon Build-up in RAVE Valves

– Use the recommended oil quality, refer to *LUBRICATION SYSTEM* subsection.
– Check oil lines (installed incorrectly, air bubbles)
– Check for proper oil injection pump code in BUDS2, refer to *LUBRICATION SYSTEM* subsection.

NOTE: Insufficient oil delivery to RAVE valves may result in a carbon build-up.

PROCEDURES

3D RAVE VALVES POSITION SENSOR

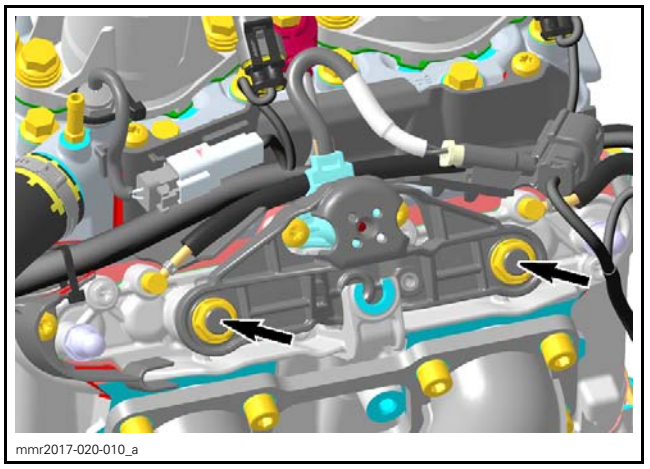
3D RAVE Valves Position Sensor Setting

1. Ensure RAVE valves are properly synchronized as per *3D RAVE VALVE SYNCHRONIZATION* procedure.

NOTICE It is very important to perform *3D RAVE VALVE SYNCHRONIZATION* and *RAVE VALVE POSITION SENSOR SETTING* whenever link bar is removed.

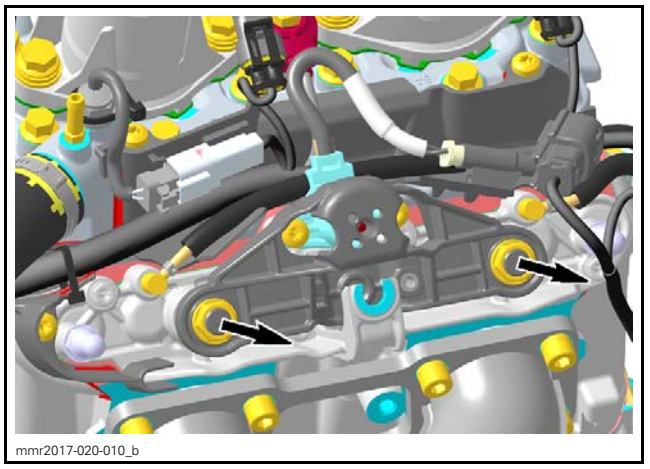
2. Remove upper body module. Refer to *BODY*.
3. Remove Rave cable from link bar. Refer to *REMOVING THE RAVE CABLE* in this subsection.
4. Connect vehicle to BUDS2, Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
5. Go to:
   – Settings / Initializations / RAVE Setting
6. Perform setting at **fully closed** position:
   6.1 Push both RAVE valves simultaneously to fully closed position by hand.

   NOTICE For a correct setting hold both RAVE stems simultaneously in its proper position. Never push or pull in the center of the link bar.


mmr2017-020-010_a

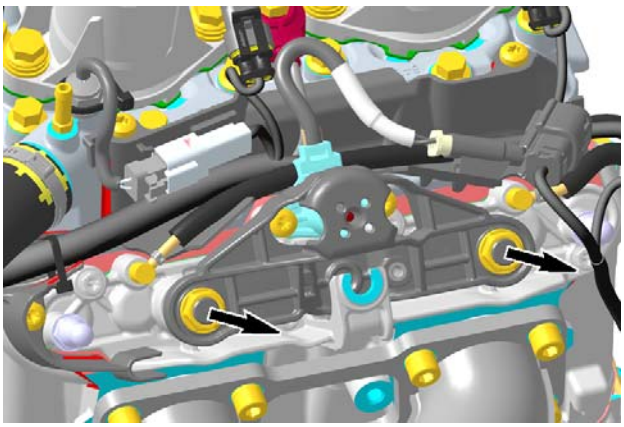
   6.2 Select "**Rave Closed Position Setting**" in the list.
   6.3 Confirm that **Rave Actual Position (V)** is within specification.
7. Perform setting at **fully opened** position:
   7.1 Pull both RAVE valves simultaneously to fully opened position by hand.

   NOTICE For a correct setting hold both RAVE stems simultaneously in its proper position. Never push or pull in the center of the link bar.


mmr2017-020-010_b

   7.2 Select "**Rave Fully Position Setting**" in the list.
   7.3 Confirm that **Rave Actual Position (V)** is within specification.
8. Perform setting at **middle** position:
   8.1 Move both RAVE valves simultaneously to mid position by hand.

   NOTICE For a correct setting hold both RAVE stems simultaneously in its proper position. Never push or pull in the center of the link bar.


mmr2017-020-010_b

8.2 Select "**Rave Middle Position Setting**" in the list.

8.3 Confirm that **Rave Actual Position (V)** is within specification.

9. Validate that position sensor is properly set. Refer to *3D RAVE VALVES POSITION VALIDATION* in this subsection.

10. Start engine.

At first engine start after RAVE position sensor setting is completed RAVE valves travel to fully opened position and than moving slowly to fully closed position

NOTICE **Do not push throttle lever during this initialization procedure, otherwise the ECM will discontinue the initialization and starts initialization from the beginning.**

Inspecting the 3D Rave Valves Position Sensor

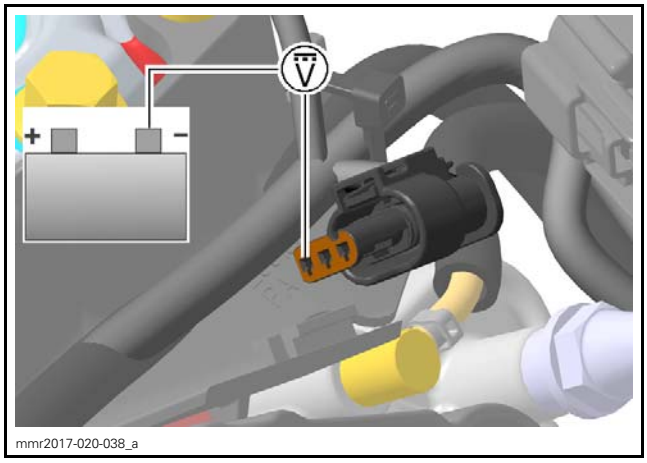
NOTE: As a first troubleshooting step, always check for applicable fault codes using BUDS2 software.

Testing the 3D Rave Valves Position Sensor Voltage Input

1. Disconnect position sensor connector.
2. Install D.E.S.S. key and press start/RER button to wake up ECM.
3. Set multimeter to Vdc and probe terminals as per following table.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

3D RAVE VALVES POSITION SENSOR INPUT VOLTAGE		
Position Sensor Connector (harness side)	Battery ground	Measurement
Pin 3		5 ± 0.25 Vdc



mmr2017-020-038_a

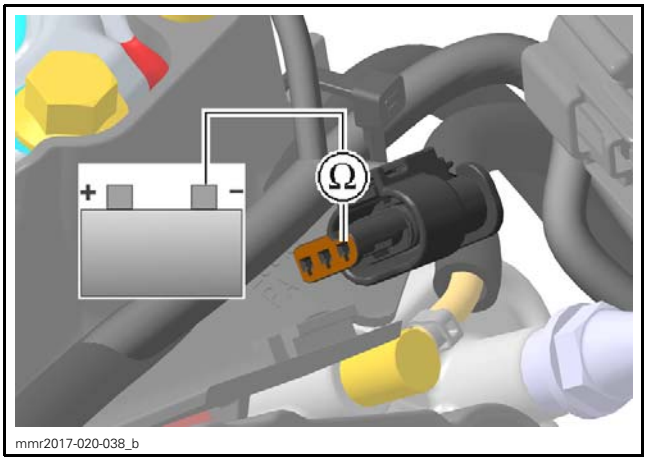
If voltage is exceeding the range check ECM power supply (fuses F1 and F3) and wiring harness.

Testing the Continuity of 3D Rave Valves Position Sensor Ground Circuit

1. Disconnect position sensor connector.
2. Set multimeter to Ω and probe terminals as per following table.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

3D RAVE VALVES POSITION SENSOR RESISTANCE		
Position Sensor Connector (harness side)	Battery ground	RESISTANCE @ 20°C (68°F)
Pin 1		Close to 0 Ω



mmr2017-020-038_b

If resistance is out of specifications check ECM grounding and wiring harness.

Testing the Continuity of 3D Rave Valves Position Sensor Circuit

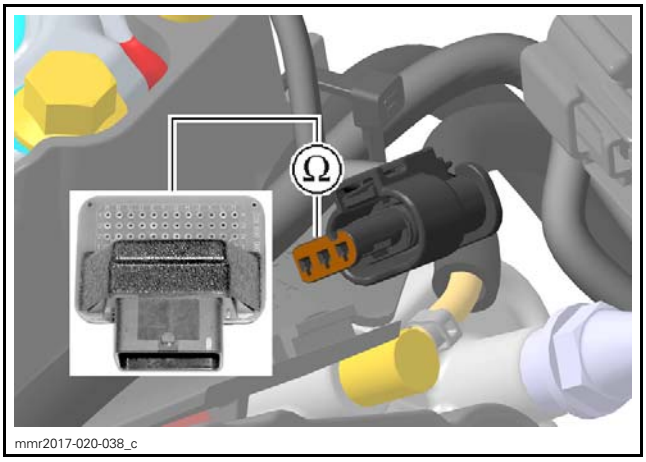
1. Disconnect:
   - ECM connector
   - Position sensor connector.
2. Connect ECM connector to ECM adapter tool.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

3. Set multimeter to Ω and probe terminals as per following table.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

3D RAVE VALVES POSITION SENSOR RESISTANCE		
Position Sensor Connector (harness side)	ECM-A	RESISTANCE @ 20°C (68°F)
Pin 1	E2	Close to 0 Ω
Pin 2	E3	
Pin 3	F3	

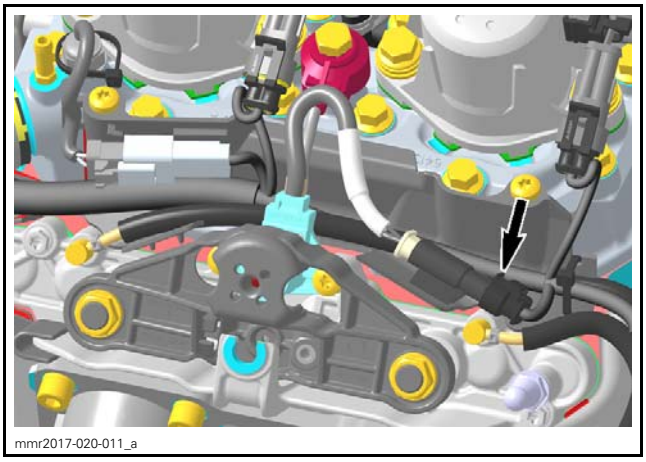


mmr2017-020-038_c

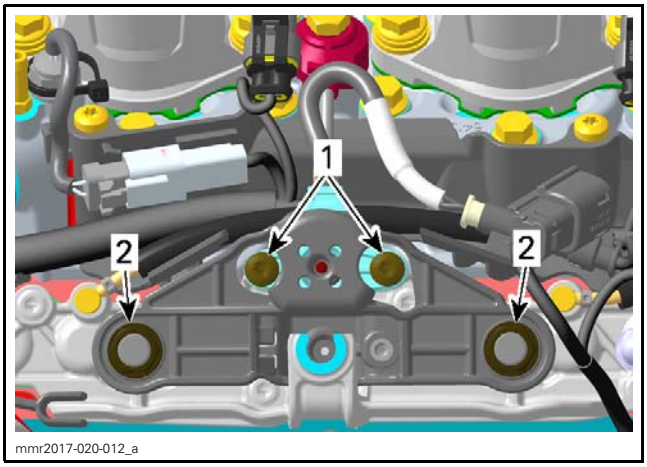
If resistance is not within specification, repair or replace the wiring harness.

Removing the 3D Rave Valves Position Sensor

1. Remove upper body module. Refer to *BODY*.
2. Remove cover, refer to *TOP END* subsection.
3. Remove Rave cable from link bar. Refer to *REMOVING THE RAVE CABLE* in this subsection.
4. Disconnect position sensor connector.


mmr2017-020-011_a

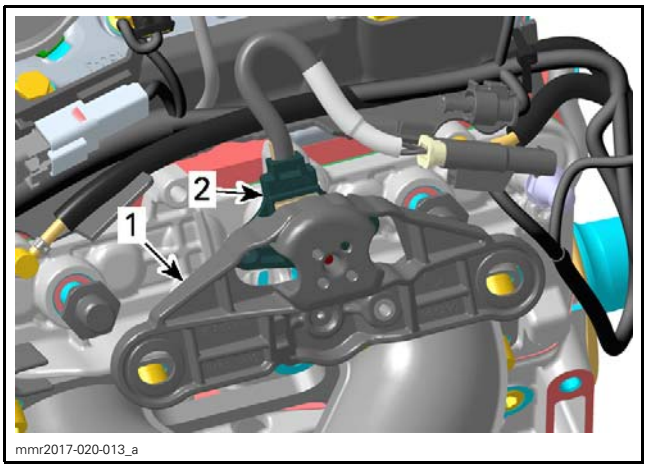
5. Unscrew:
   - RAVE valves position sensor retaining screws
   - Link bar retaining nuts.



mmr2017-020-012_a

1. *RAVE valves position sensor retaining screws*
2. *Link bar collar nuts*

6. Remove link bar with RAVE valves position sensor.



mmr2017-020-013_a

1. *Link bar*
2. *RAVE valves position sensor*

NOTICE It is very important to perform *3D RAVE VALVES SYNCHRONIZATION* whenever link bar is removed.

Installing the 3D Rave Valves Position Sensor

1. Position RAVE valves position sensor with link bar on RAVE valve housing.
2. Install position sensor retaining screws but do not tighten yet.
3. Perform *3D RAVE VALVE SYNCHRONIZATION* procedure in this subsection to complete link bar installation.

NOTICE It is very important to perform *3D RAVE VALVES SYNCHRONIZATION* and *RAVE VALVE POSITION SENSOR SETTING* whenever link bar is removed.

4. Install position sensor retaining screws.

TIGHTENING TORQUE	
Position sensor retaining screws	8 N•m ± 0.5 N•m (71 lbf•**in** ± 4 lbf•**in**)

5. Install connector.

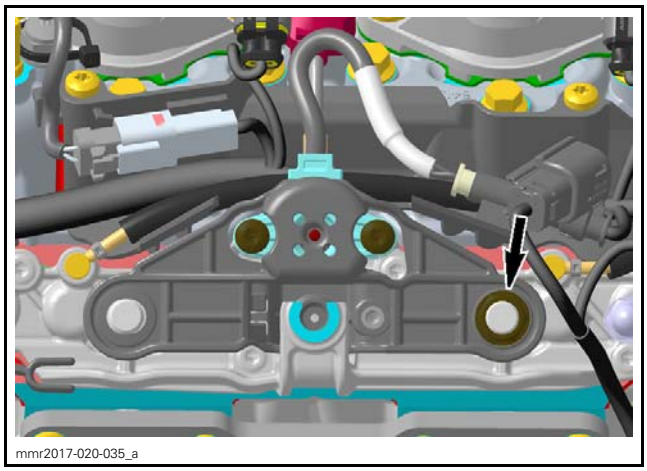
3D RAVE VALVES

3D RAVE Valve Synchronization

Synchronization Adjustment Procedure

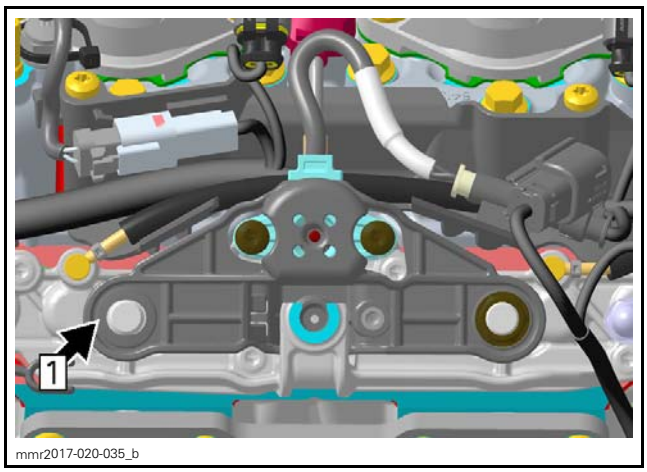
1. Remove link bar retaining nuts and clean threads.
2. Install PTO link bar retaining nut and tighten by hand.

LINK BAR RETAINING NUTS	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)


mmr2017-020-035_a

3. Check if the link bar rests flat on the retaining nut.

Tip on link bar at MAG side an listen if link bar rests on retaining nut.



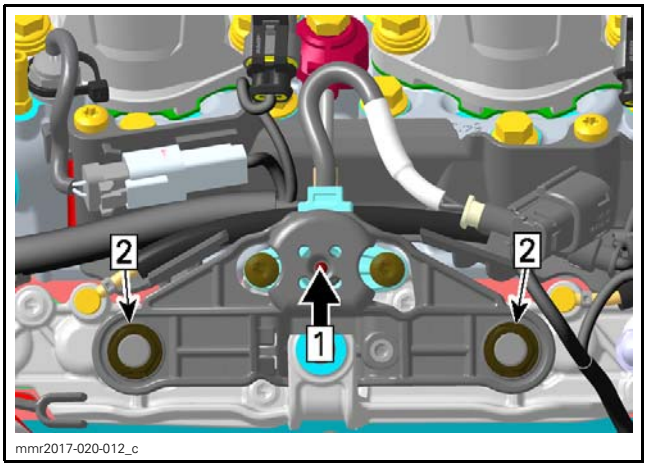
mmr2017-020-035_b

1. *Tip here*

4. If the link bar does not rest flat:
   4.1 Unscrew PTO nut then slightly move link bar.
   4.2 Tighten PTO nut by hand and recheck position.
   4.3 Repeat above sequence until the link bar rests flat.
5. Install MAG link bar retaining nut and tighten by hand.

LINK BAR RETAINING NUTS	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)

6. Push the center of link bar downwards in order to seat both RAVE valves on their fully closed position.
7. Firmly hold link bar downwards.
8. Tighten both retaining nuts.



Step 1: Push link bar
Step 2: Tighten retaining nuts

TIGHTENING TORQUE	
Link bar retaining nuts	4 N•m ± 0.3 N•m (35 lbf•**in** ± 3 lbf•**in**)

9. Adjust position sensor using BUDS2 Refer to *3D RAVE VALVES POSITION SENSOR SETTING*.
10. Push link bar down to fully closed position.
11. Install Rave cable, refer to *INSTALLING THE RAVE CABLE* in this subsection.

Synchronization Validation Procedure

1. Push and pull link bar to force RAVE valves to pass through their 3 positions.
   1.1 Ensure that only **one** step is felt at mid position.
   1.2 If out of specification, redo the *SYNCHRONIZATION ADJUSTMENT PROCEDURE*.

3D RAVE Valves Position Validation

1. Ensure RAVE valves are properly synchronized as per *3D RAVE VALVE SYNCHRONIZATION*.
2. Ensure position sensor is properly set as per *3D RAVE VALVES POSITION SENSOR SETTING*.
3. Remove upper body module. Refer to *BODY*.
4. Connect vehicle to BUDS2, Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
5. Go to:
   – Measurement/Custom/RAVE Actual Position (%)
   – Select the appropriate RAVE position in the list.

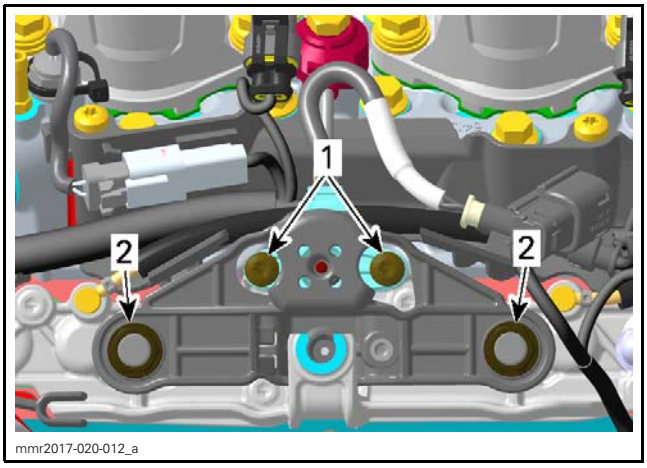
RAVE ACTUAL POSITION SPECIFICATION	
Closed	Below 2%
Middle	37 ± 2 %
Fully opened	Above 97%

TYPICAL

If RAVE valves actual position are out of specification, check the following:
– RAVE valve position sensor setting
– RAVE valve synchronization
– RAVE valves cleanliness.

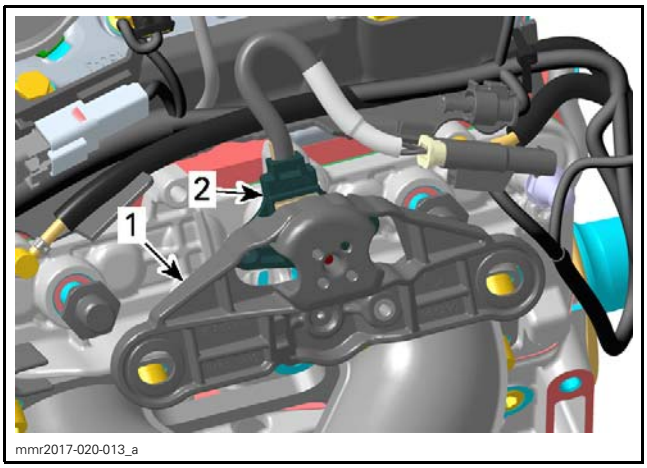
Removing the 3D RAVE Valves

1. Remove upper body module. Refer to *BODY*.
2. Remove cover, refer to *TOP END* subsection.
3. Remove Rave cable from link bar, refer to *REMOVING THE RAVE CABLE* in this subsection.
4. Disconnect Rave valve position sensor connector and put harness away.
5. Unscrew:
   – RAVE valves position sensor retaining screws
   – Link bar retaining nuts.



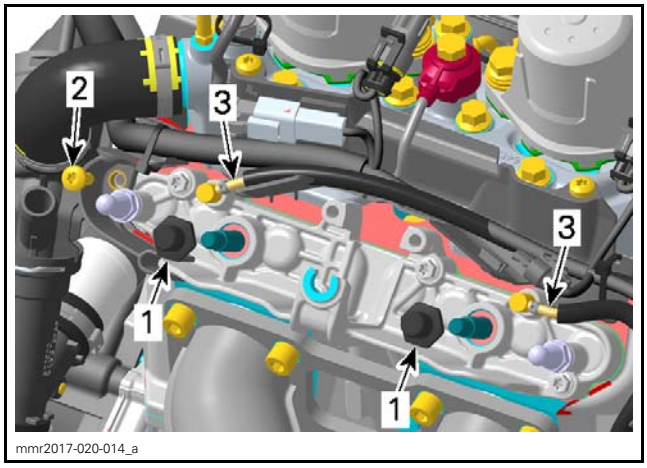
1. *RAVE valves position sensor retaining screws*
2. *Link bar retaining nuts*

6. Remove link bar with RAVE valves position sensor.



1. *Link bar*
2. *RAVE valves position sensor*

7. Remove:
   - Collar nuts
   - Screw from harness support
   - Disconnect lubrication hoses and discard Oetiker clamps.

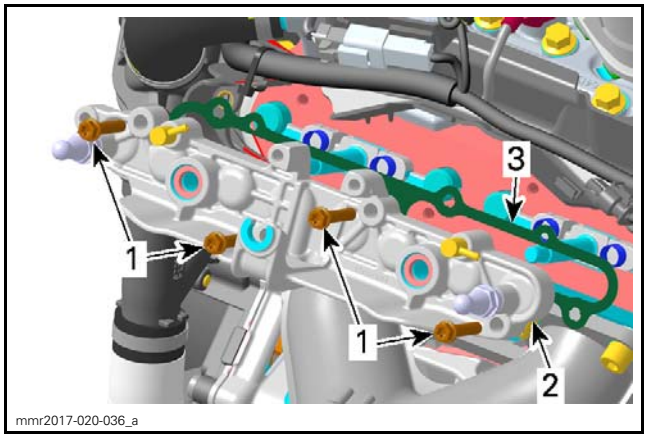


1. *Collar nuts*
2. *Harness support screw*
3. *Lubrication hoses*

8. Remove:
   - Retaining screws
   - RAVE valve housing
   - Gasket (discard it).

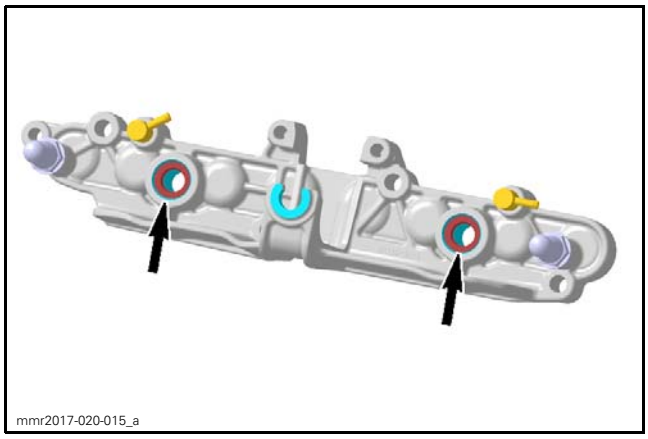
NOTE: Be careful not to loose springs underneath housing.

NOTICE **If signs of oil are found outside the housing, replace seals.**

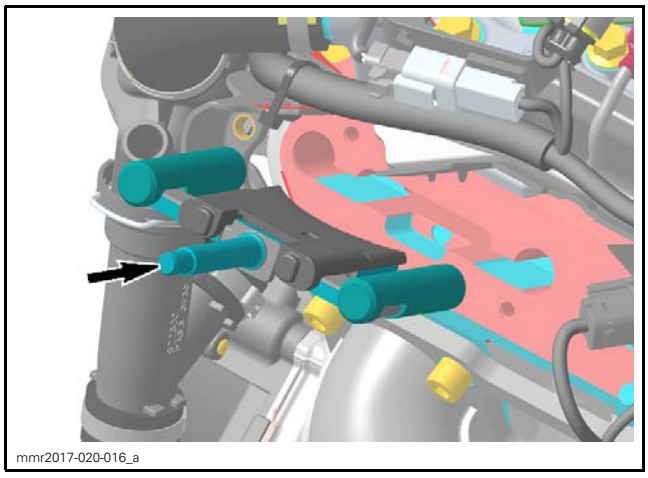


1. *Retaining screws*
2. *RAVE valve housing*
3. *Gasket (discard it)*

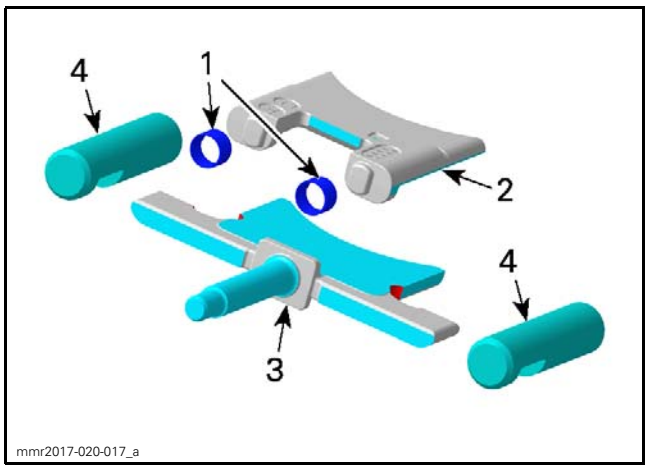
9. Take note of seals orientation and carefully pry them out using a screwdriver.


mmr2017-020-015_a

10. Pull RAVE valve assembly out.


mmr2017-020-016_a

11. If necessary separate RAVE valve assembly.



mmr2017-020-017_a

1. *Springs*
2. *Main valve upper part*
3. *Main valve lower part*
4. *Side valves*

Cleaning the 3D RAVE Valve

Thoroughly clean all RAVE VALVES components and cylinder slots.

No special solvents or cleaners are allowed when cleaning the valve.

RAVE Valves Frequently Gummed

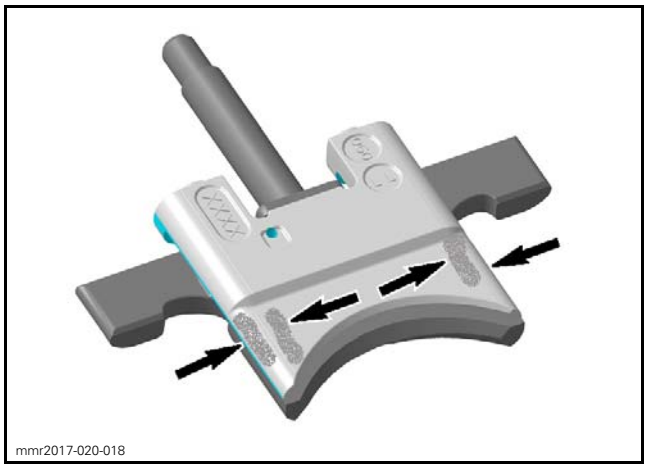
If the valves are getting gummed more frequently than usual, do the following:

– Check if the recommended injection oil is used.
– Check lubrication hoses for restriction.
– Check lubrication hoses for presence of air. Bleed system if needed.
– Check lubrication hose check valves as explained in this subsection.

Inspecting the 3D RAVE Valve

Check valves for:

– wear at sliding points
– straightness
– breakage.


mmr2017-020-018

SIGNS OF WEAR

Check spring condition and straightness.

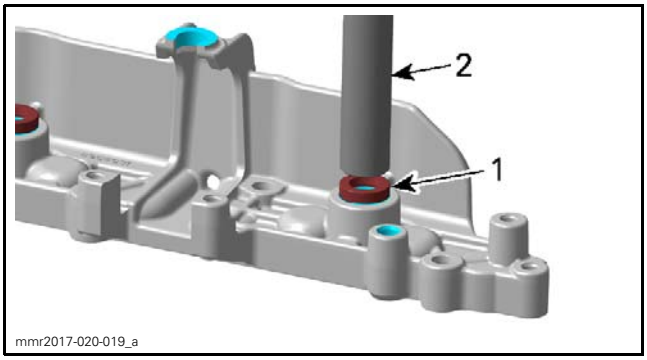
NOTE: Make sure hoses are not leaking, kinked or damaged.

Installing the 3D RAVE Valve

1. Use an appropriate pusher to reinstall seals.

Lubricate outer oil seal diameter.

OIL SEAL INSTALLATION	
Service product	Injection oil

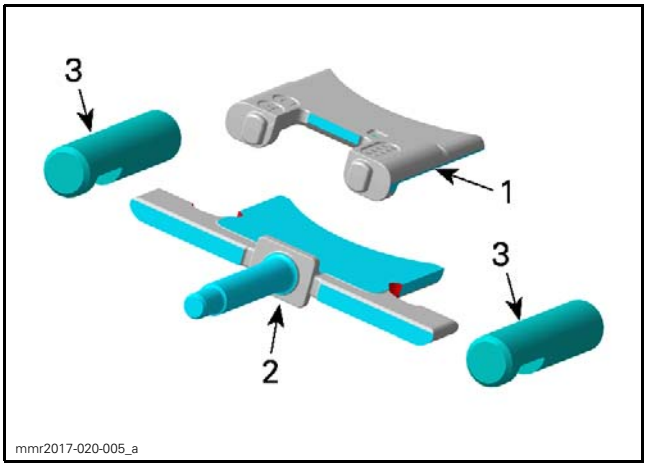


1. Oil seal
2. Pusher

2. Lubricate sealing lips of oil seals.

SEALING LIPS LUBRICATION	
Service product	Super lube grease

3. Preassemble the main and side valves.

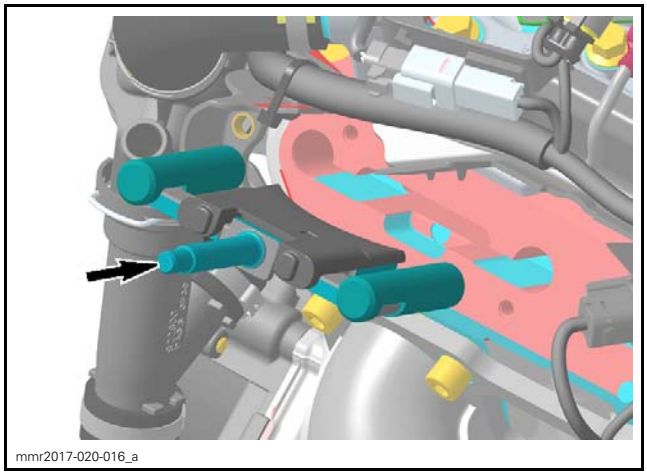


1. Main valve upper part
2. Main valve lower part
3. Side valves

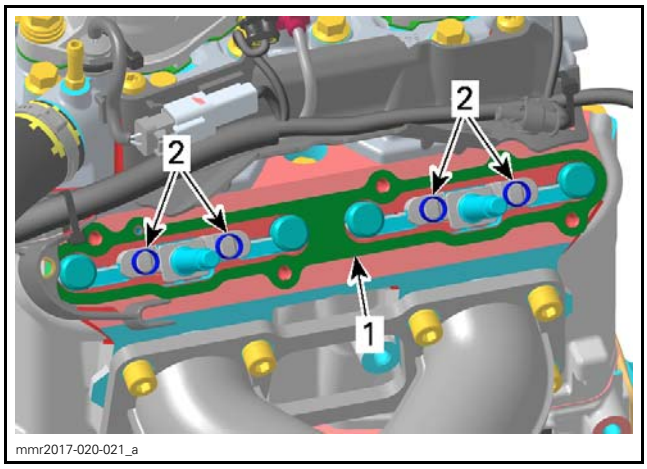
4. Lubricate:
   – RAVE chamber in cylinder block, main and side valves
   – Sliding surfaces of RAVE valves.

RAVE SLIDING SURFACES LUBRICATION	
Service product	Injection oil

5. Insert RAVE valves in cylinder.



6. Install NEW gasket.
7. Install springs on stud ends of valves.

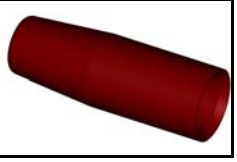


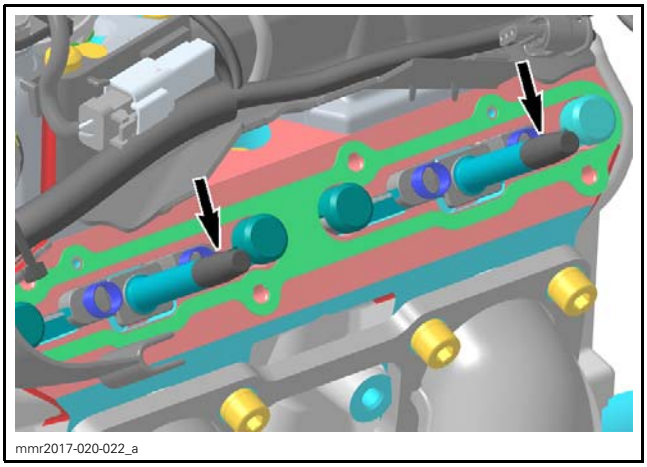
1. Gasket
2. Springs

8. Lubricate valve shaft.

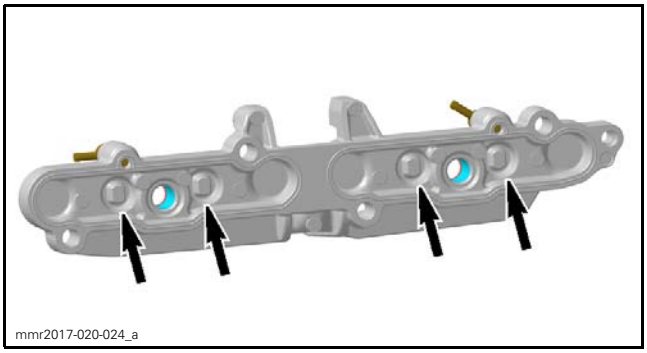
VALVE SHAFT	
Service product	MOLYKOTE G-N (P/N 420 297 433)

9. Place protector sleeves on RAVE valve threads.

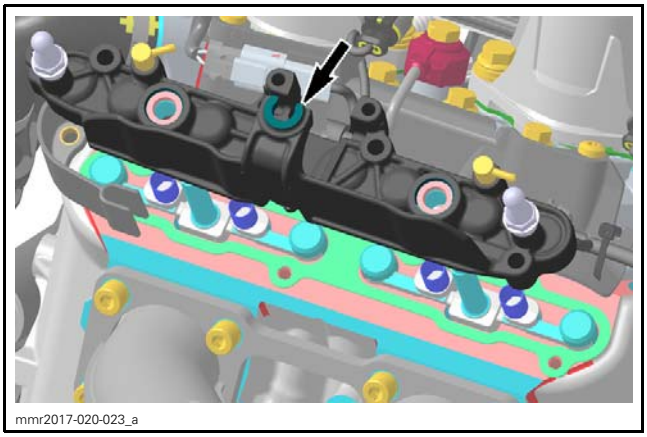
REQUIRED TOOL	
PROTECTOR SLEEVE (P/N 529 036 406)	


mmr2017-020-022_a

10. Install RAVE valve housing and carefully align springs in recess of RAVE valve housing.

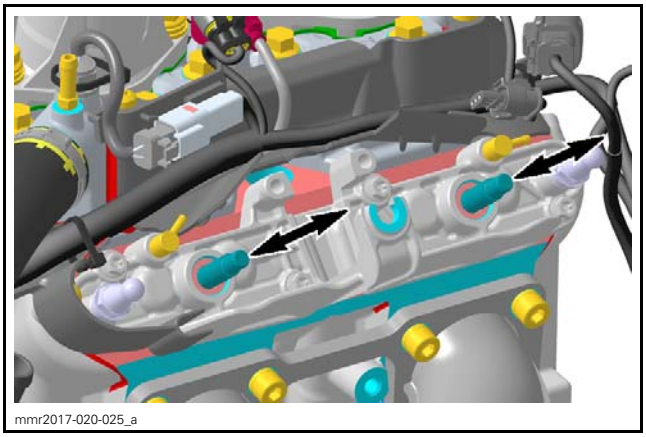

mmr2017-020-024_a

RECESS FOR RAVE SPRINGS


mmr2017-020-023_a

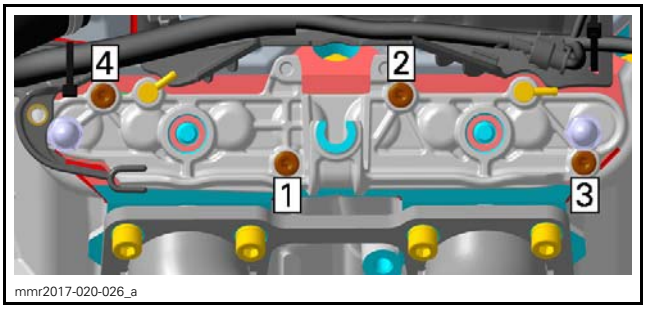
11. Remove protector sleeves.
12. Install and **hand tighten** screws.

Push and pull main valve stems to make sure they move freely.


mmr2017-020-025_a

13. Tighten RAVE valve housing screws and check valve stem for free movement again. If some friction is felt, slightly loosen screws and readjust housing then retighten screws.

TIGHTENING TORQUE	
RAVE valve housing screw	10 N•m ± 0.7 N•m (89 lbf•**in** ± 6 lbf•**in**)

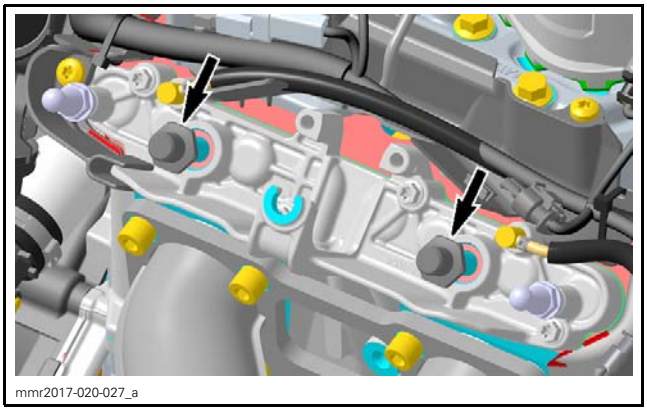


mmr2017-020-026_a

TIGHTENING SEQUENCE

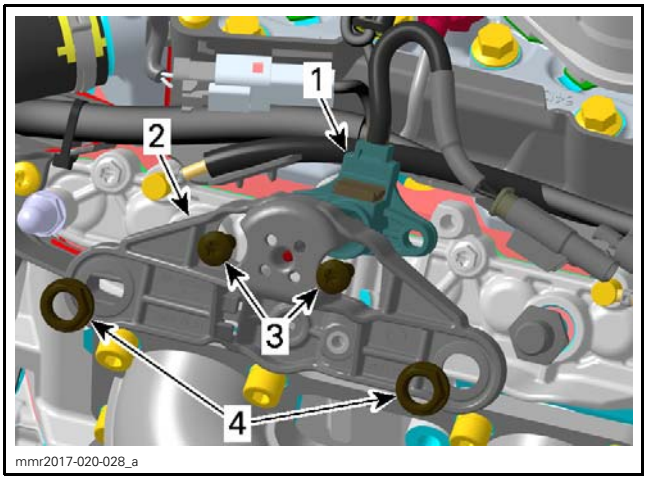
14. Repeat the process until a free movement is obtained.
15. Install lubrication hoses using **NEW** Oetiker clamps.
16. Tighten collar nuts to specification.

TIGHTENING TORQUE	
Collar nuts	4 N•m ± 0.3 N•m (35 lbf•**in** ± 3 lbf•**in**)


mmr2017-020-027_a

17. Position RAVE valves position sensor with link bar on RAVE valve housing.
18. Refer to *INSTALLING THE 3D RAVE VALVES POSITION SENSOR* in this subsection and install:
    – Position sensor retaining screws
    – Link bar retaining nuts.

NOTICE It is very important to perform *3D RAVE VALVES SYNCHRONIZATION* whenever link bar is removed.

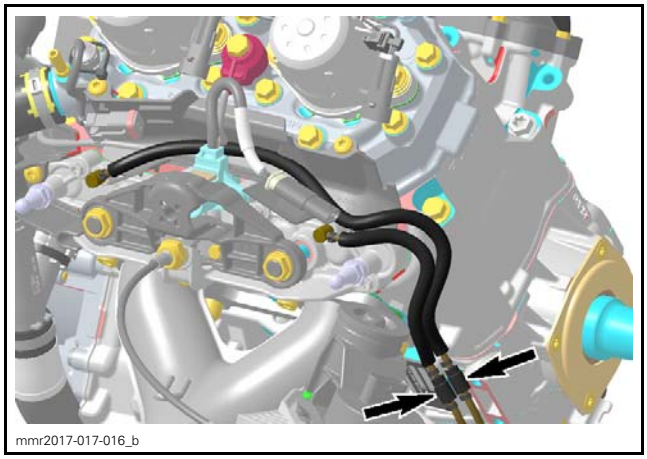


mmr2017-020-028_a

1. RAVE valves position sensor
2. Link bar
3. Position sensor retaining screws
4. Link bar retaining nuts

19. Connect the RAVE valves position sensor.
20. Install Rave cable. Refer to *INSTALLING THE RAVE CABLE* in this subsection
21. Bleed oil lines. Refer to *OIL INJECTION PUMP* in the *LUBRICATION SYSTEM* subsection.

CHECK VALVES


mmr2017-017-016_b

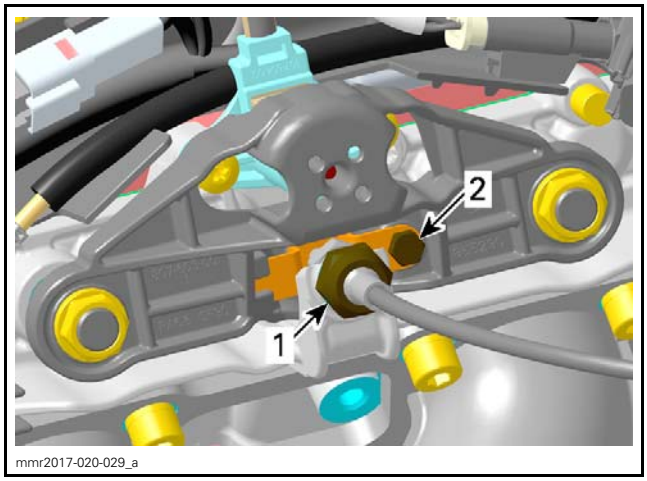
For testing and replacement refer to the *LUBRICATION SYSTEM* subsection.

RAVE CABLE

Removing the Rave Cable

NOTE: To avoid twisting the Rave cable, start with removal at the link bar.

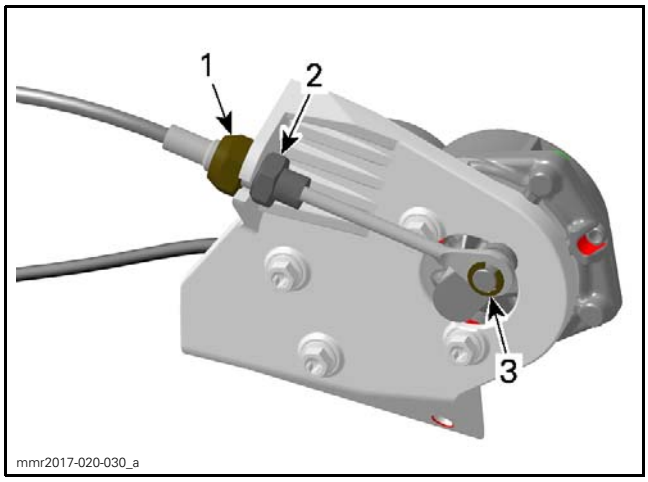
1. Push RAVE valves to closed position.
2. Loosen Rave cable lock nut. Hold counter nut.
3. Remove retaining plate screw.



mmr2017-020-029_a

1. Rave cable lock nut
2. Retaining plate screw

4. Remove Rave cable.
5. Remove Rave cable lock nut at servomotor bracket. Hold counter nut.
6. Remove snap ring from servomotor lever.



1. *Rave cable lock nut*
2. *Counter nut*
3. *Snap ring*

7. Remove Rave cable.

Inspecting the Rave Cable

Check Rave cable and retaining plate for wear or any other damage.

Check if cable moves freely.

If not, lubricate both ends of the Rave cable sleeve and check if the Rave cable is sliding without any resistance. Replace if necessary.

RAVE CABLE SLEEVE LUBRICATION	
Service product	O-ring chain lubricant

Installing the Rave Cable

1. Install Rave cable on the servomotor lever.
2. Install snap ring.
3. Install Rave cable lock nut at the Servomotor bracket.

TIGHTENING TORQUE	
Rave cable lock nut	20 N•m ± 2 N•m (15 lbf•ft ± 1 lbf•ft)

4. Install Rave cable on the link bar.
5. Install retaining plate screw but do not tighten yet.
6. Install Rave cable lock nut.

TIGHTENING TORQUE	
Rave cable lock nut	20 N•m ± 2 N•m (15 lbf•ft ± 1 lbf•ft)

7. Tighten retaining plate screw.

TIGHTENING TORQUE	
Retaining plate screw	5 N•m ± 0.6 N•m (44 lbf•**in** ± 5 lbf•**in**)

SERVOMOTOR

The servomotor consists of a brush DC motor (actuator) and a non-contacting angle sensor integrated in one housing.

Testing the Servomotor

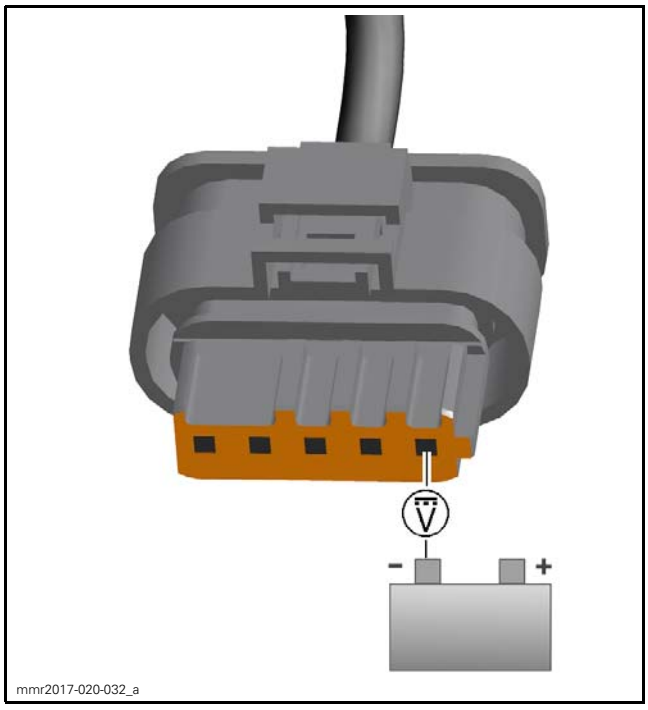
As a first troubleshooting step, always connect vehicle to the applicable BUDS2. software version to check for applicable fault codes. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

Testing the Sensor Input Voltage

1. Disconnect the servomotor connector.
2. Install D.E.S.S. key and press start/RER button to wake up ECM.
3. Set multimeter to Vdc and check voltage as per following table.

SENSOR INPUT VOLTAGE		
Servomotor connector (wiring harness side)	Battery ground	MEASUREMENT
Pin 1		5 ± 0.25 Vdc

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	



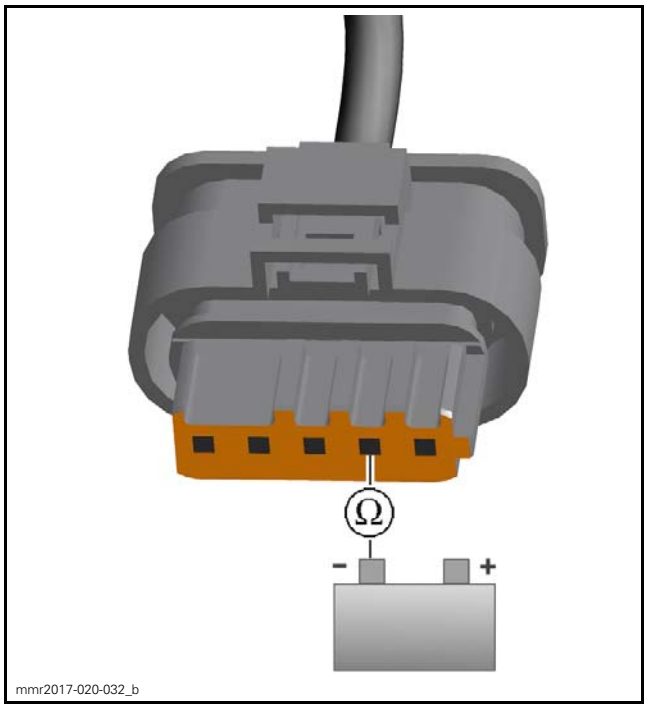
If voltage is exceeding the range check ECM power supply (Fuses F1 and F3) and servomotor wiring.

Testing the Sensor Ground

1. Disconnect the servomotor connector.
2. Set multimeter to Ω and probe terminals as per following table.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

SENSOR GROUND		
Servomotor connector (wiring harness side)	Battery ground	MEASUREMENT
Pin 2		Close to 0 Ω



If resistance is incorrect check ECM grounding and servomotor wiring.

Testing the Servomotor Wiring

1. Disconnect ECM connector.
2. Connect ECM connector to ECM adapter tool.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

3. Disconnect the servomotor connector.
4. Set multimeter to Ω and probe terminals as per following table.

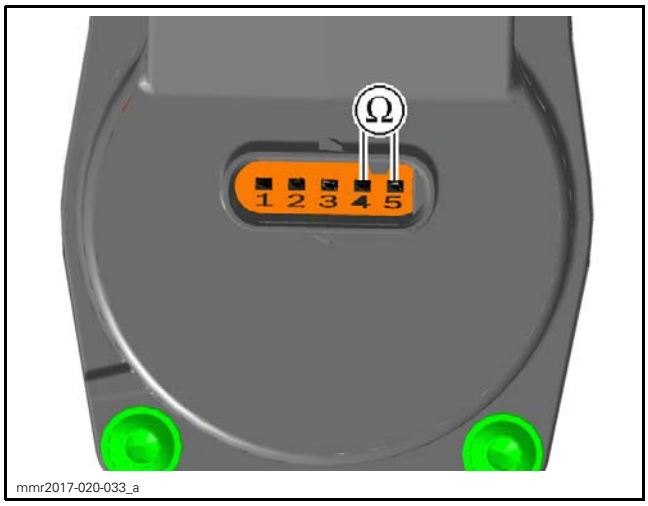
REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

ECM ADAPTER	SERVOMOTOR CONNECTOR (WIRING HARNESS SIDE)	RESISTANCE
E4	1	Close to 0 Ω
F4	2	
D4	3	
H4	4	
G4	4	
J4	5	
K4	5	

Testing the Servomotor Resistance

1. Disconnect the servomotor connector.
2. Set multimeter to Ω and probe terminals as per following table.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	



mmr2017-020-033_a

SERVOMOTOR RESISTANCE		
SERVOMOTOR CONNECTOR (SERVOMOTOR SIDE)	SERVOMOTOR CONNECTOR (SERVOMOTOR SIDE)	RESISTANCE @ 20°C (68°F)
4	5	Close to 0 Ω

Servomotor Location

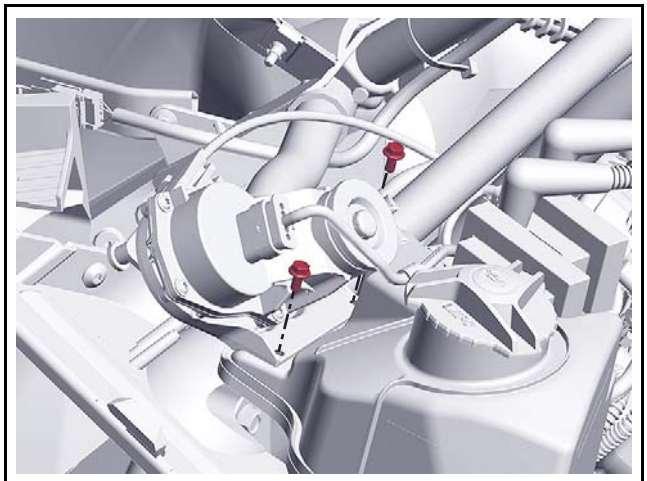
The servomotor is located on the top of the oil tank, on the LH side of the vehicle.

Remove the upper body module to work on the servomotor.

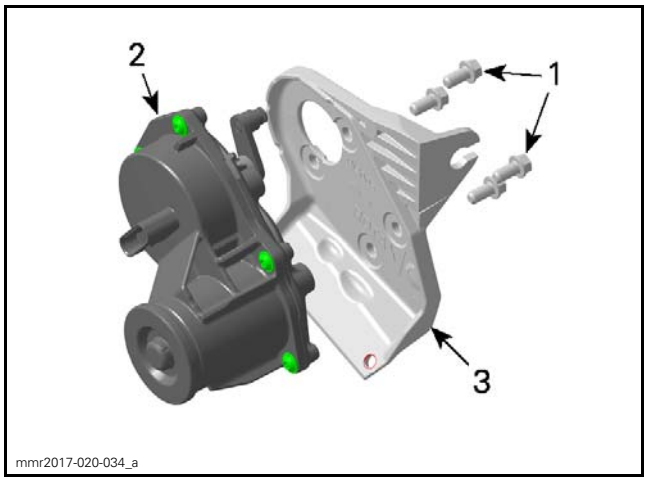
Removing the Servomotor

Remove Rave cable. Refer to *REMOVING THE RAVE CABLE* in this subsection.

Remove servomotor from the oil tank.


mmr2017-020-200_a

Remove:
- Bracket retaining screws
- Bracket.



mmr2017-020-034_a

1. Retaining screws
2. Servomotor
3. Servomotor bracket

Inspecting the Servomotor

Check ease of movement of the servomotor lever.

Check mechanical end stop of servomotor lever.

If necessary replace servomotor.

Installing the Servomotor

The installation is the reverse of the removal procedure. However pay attention to the following.

TIGHTENING TORQUE	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Bracket retaining screws	11 N•m ± 0.8 N•m (97 lbf•**in** ± 7 lbf•**in**)
Servomotor retaining screws	4 N•m ± 1 N•m (35 lbf•**in** ± 9 lbf•**in**)

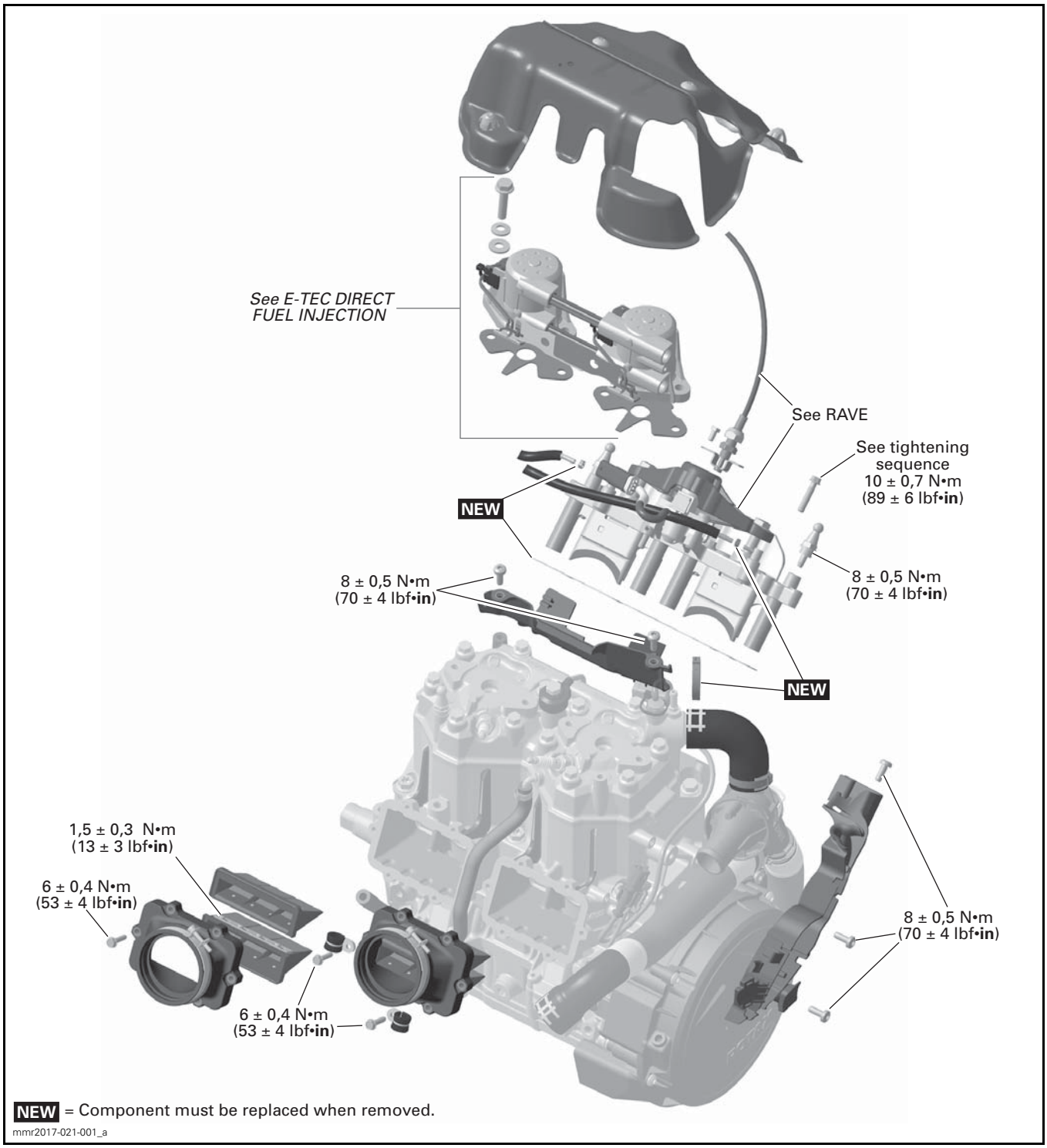
TOP END

SERVICE TOOLS

Description	Part Number	Page
PISTON CIRCLIP INSTALLER 21MM	529 036 138	16
PISTON PROJECTION	529 036 215	12
TDC DIAL INDICATOR	295 000 143	12

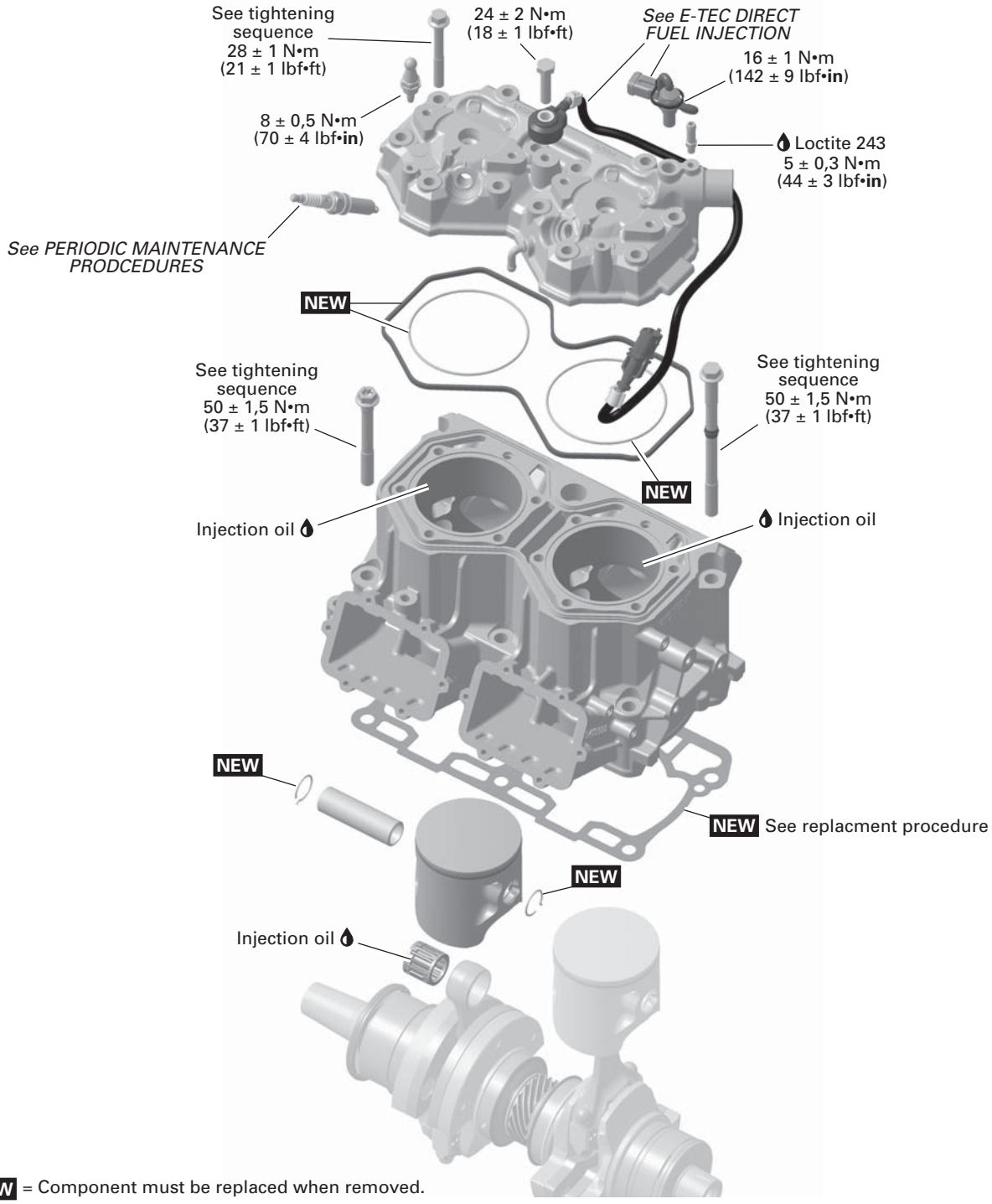
SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE CHISEL (GASKET REMOVER)	413 708 500	7, 10



NEW = Component must be replaced when removed.

mmr2017-021-001_a



NEW = Component must be replaced when removed.

mmr2017-021-002_a

GENERAL

Before completely disassembling the engine, check airtightness. Refer to *ENGINE LEAK TEST* subsection.

During assembly or installation:

– Use torque values and service products as shown in the exploded view.
– Clean threads before applying a threadlocker. Refer to the *INTRODUCTION* subsection.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

NOTICE **Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.**

⚠ WARNING

Always disconnect the magneto connector prior to:
– Disconnecting any fuel hose.
– Removing a fuel injector.
– Removing a spark plug cable or spark plug.
Otherwise, if the engine is cranked, fuel vapors may ignite in presence of a spark creating a fire hazard.

ENGINE BREAK-IN

NOTICE **After a repair involving major parts replacement, a break-in period must be observed. Follow *OPERATOR'S GUIDE* recommendation relating to break-in.**

To reactivate the break-in period, use the BUDS2 software.

Go to:

– Setting/Initialization/Restart Break-In

INSPECTION

ENGINE COMPRESSION TEST

1. Remove body parts as required to access to the spark plugs.
2. Lift rear of vehicle to clear track from the ground. Support it with a wide base stand.

⚠ WARNING

Prior to measuring engine compression, ensure vehicle is properly lifted with the track off the ground.

3. Safely warm up engine.
4. Remove a spark plug.
5. Install an appropriate ENGINE COMPRESSION TOOL on engine.

Place emergency engine stop switch to OFF position.

Crank engine several times:

– Pull rewind starter several times (if applicable) - or
– Press START/STOP button to crank engine.

Check if engine compression is according to specification.

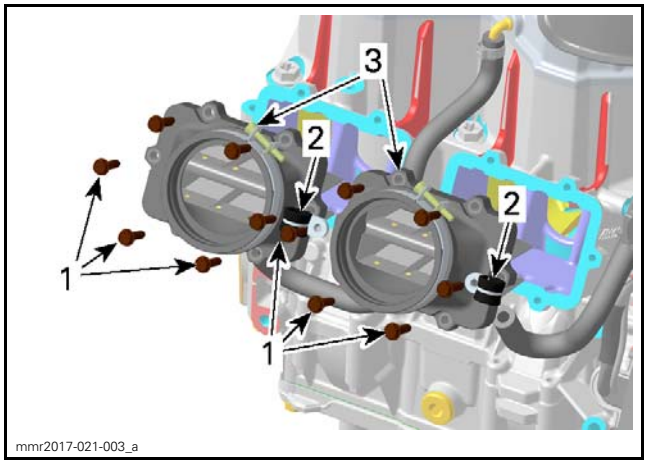
SERVICE LIMIT	
ENGINE COMPRESSION SPECIFICATION	7.5 bar (110 PSI)

PROCEDURES

REED VALVES

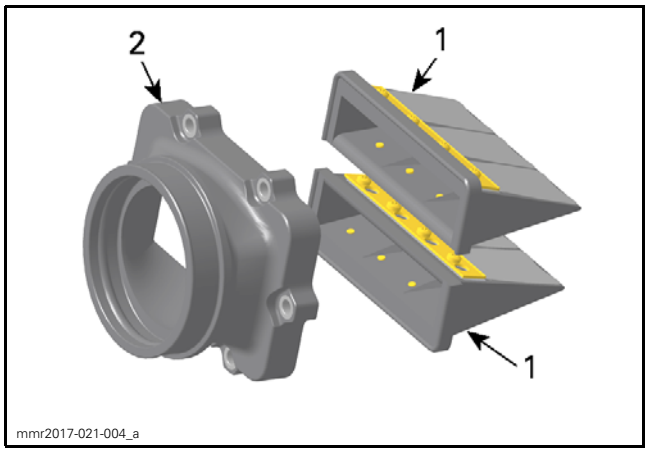
Removing the Reed Valve

1. Remove throttle body, refer to *E-TEC DIRECT FUEL INJECTION* subsection.
2. Remove the following parts.



1. Retaining screws (12x)
2. Clamps
3. Intake adapters with reed valves

3. Remove reed valves from intake adapter.



1. *Reed valves*
2. *Intake adapter*

Inspecting the Reed Valve

Check reed valve for proper tightness.

Check blades for breakouts at their end tips. In case of breakouts replace it.

There must not be any play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

In case of a play, turn blade upside down and recheck.

TIGHTENING TORQUE	
Reed valve blade screws	1.5 N•m ± 0.3 N•m (13 lbf•**in** ± 3 lbf•**in**)

If there is still a play, replace blade and/or reed valve assembly.

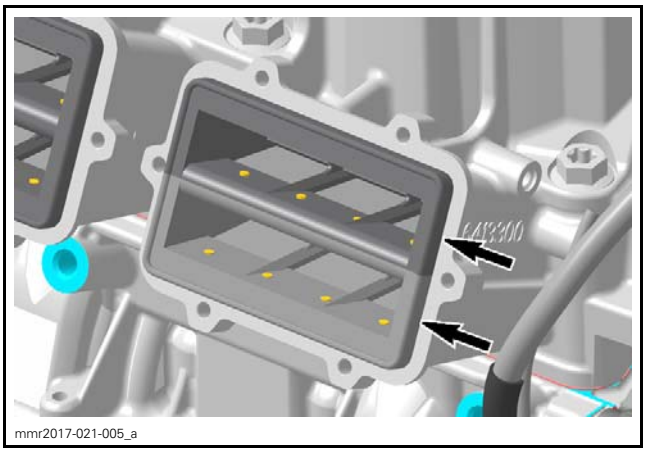
Installing the Reed Valve

The installation is the reverse of the removal procedure. However, pay attention to the following.

Blades have a curved shape. Install with their curve facing reed block.

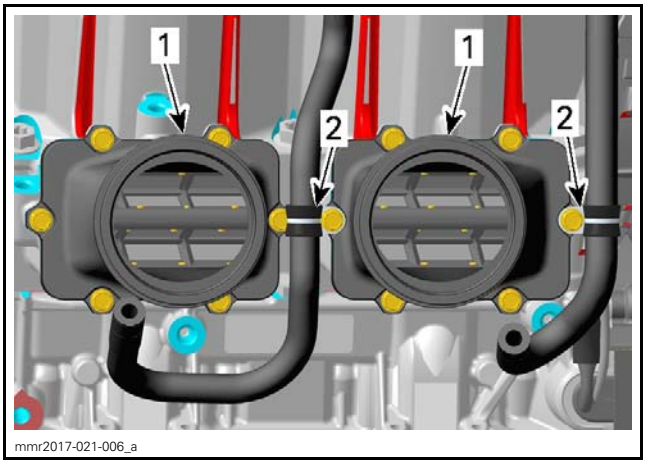
TIGHTENING TORQUE	
Reed valve blade screws	1.5 N•m ± 0.3 N•m (13 lbf•**in** ± 3 lbf•**in**)

Ensure to position reed valves so that they rest flat in intake opening.



Ensure to position intake adapter as shown.

Install clamps as shown in the illustration.



1. *Intake adapter*
2. *Clamps*

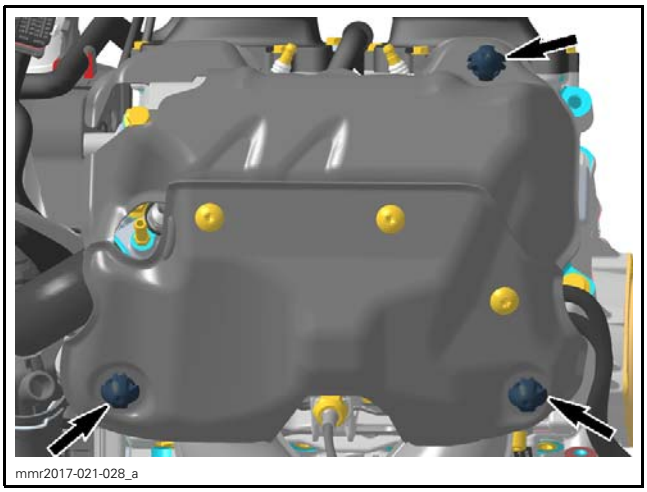
Tighten intake adapter retaining screws to specification.

TIGHTENING TORQUE	
Intake adapter retaining screws	6 N•m ± 0.4 N•m (53 lbf•**in** ± 4 lbf•**in**)

COVER

Removing the Cover

Carefully lift cover until rubber caps come off from distance screw.


mmr2017-021-028_a

Inspecting the Cover

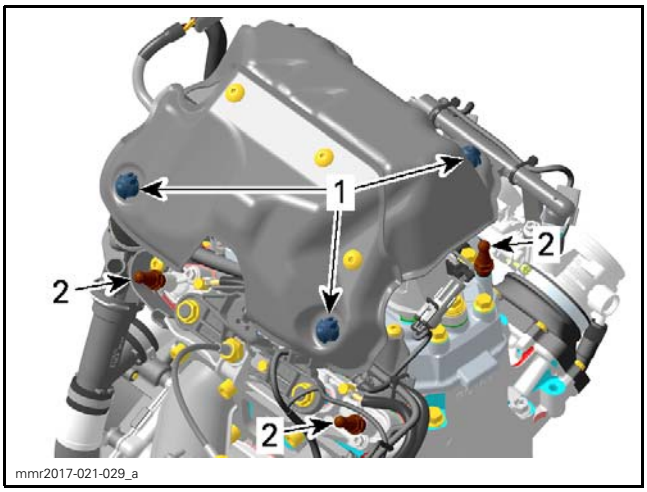
Check if heat protection mat inside cover is damaged. Replace cover if necessary.

Check rubber caps if they are brittle or otherwise damaged. Replace as required.

Installing the Cover

Position rubber caps onto the distance screw.

Push the cover until rubber caps snapping on the distance screw.



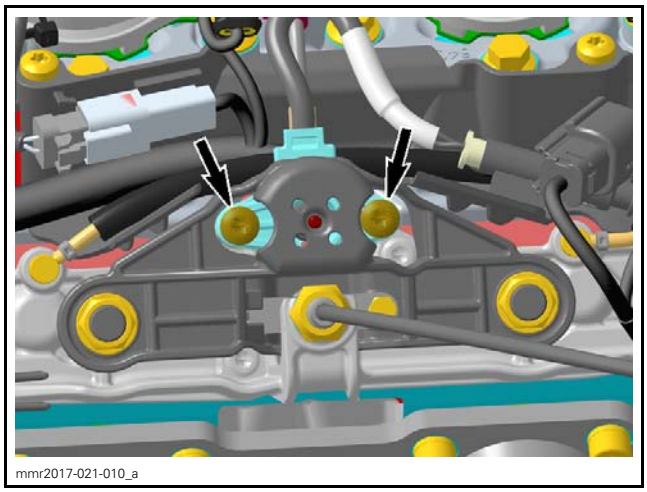
mmr2017-021-029_a

1. *Rubber caps*
2. *Distance screws*

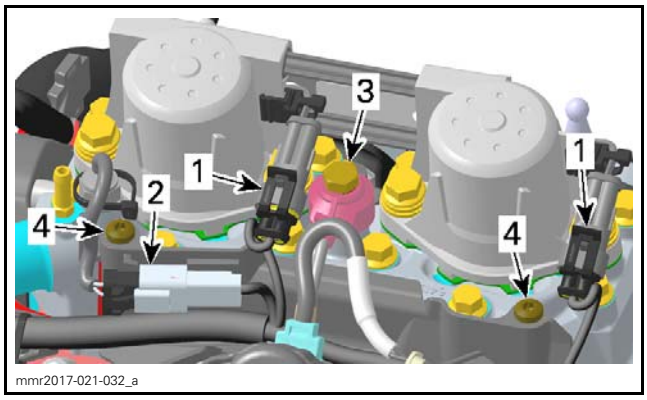
CYLINDER HEAD

Removing the Cylinder Head

1. Remove cover, refer to procedure in this subsection.
2. Drain coolant, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
3. Remove RAVE position sensor screws


mmr2017-021-010_a

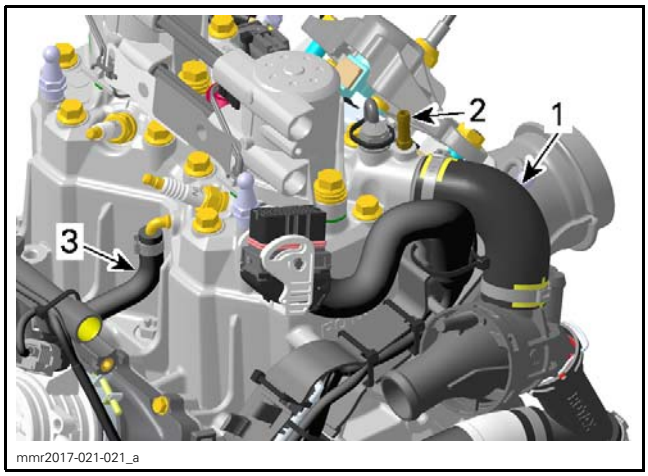
4. Pull RAVE valves to fully open position and lift RAVE position sensor.
5. Remove knock sensor retaining screw and move knock sensor aside.
6. Disconnect:
   - Fuel injector connectors
   - Coolant temperature sensor connector.
7. Remove retaining screws and move harness support towards RAVE valves.



mmr2017-021-032_a

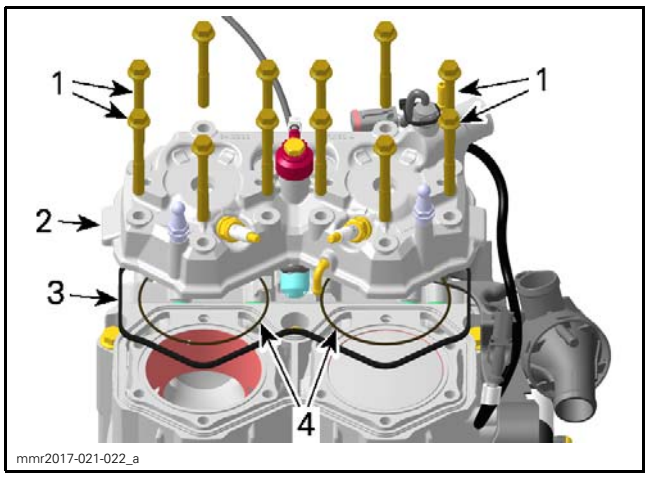
1. *Fuel injector connectors*
2. *Coolant temperature sensor connector*
3. *Knock sensor retaining screw*
4. *Harness support retaining screws*

8. Disconnect coolant hose at cylinder head.
9. Disconnect hose from bleeding nipple.
10. Disconnect throttle body heater inlet hose at cylinder head.



1. Coolant hose
2. Bleeder nipple
3. Throttle body heater inlet hose

11. Remove fuel injectors, refer to *E-TEC DIRECT FUEL INJECTION* subsection.
12. If necessary remove following parts from cylinder head:
    – Spark plugs
    – Knock sensor
    – Distance screws
    – Bleeder hose nipple.
13. Remove the following parts: .



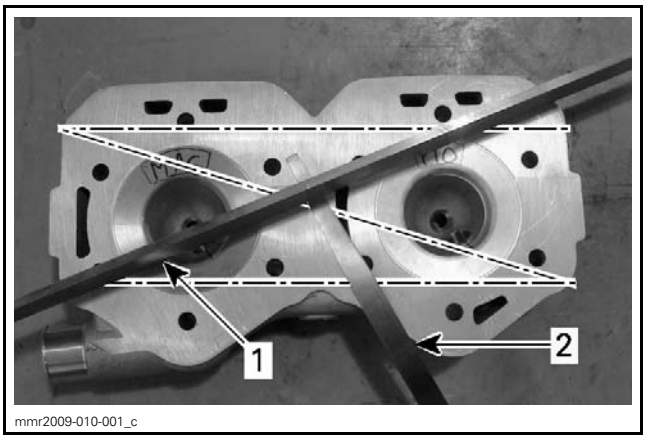
1. Cylinder head screws (12x)
2. Cylinder head
3. Cylinder rubber ring
4. O-rings

Inspecting the Cylinder Head

Check cylinder head for cracks or other damages. Replace if necessary.

Cylinder Head Warpage

1. Check gasket mating surface of the cylinder head with a straight edge and a feeler gauge. Make sure part is within the given specification.
2. If cylinder head is out of specification, replace it.



TYPICAL
1. Straight edge
2. Feeler gauge

SERVICE LIMIT	
CYLINDER HEAD WARPAGE	0.05 mm (.002 in) per 50 mm (2 in) of surface
	0.5 mm (.02 in) for total length of cylinder head

Cleaning the Cylinder Head

Scrape off any carbon deposits from cylinder head.

CYLINDER HEAD CLEANING	
Service product	LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500)

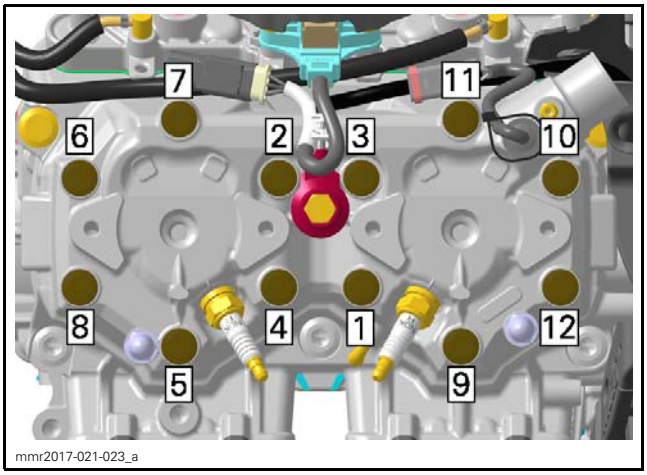
Installing the Cylinder Head

The installation is the reverse of removal procedure, however pay attention to the following.

Install **NEW** rubber ring and round O-rings on cylinder block.

Tighten cylinder head screws to specification as per the following sequence.

TIGHTENING TORQUE	
Cylinder head screws	28 N•m ± 1 N•m (21 lbf•ft ± 1 lbf•ft)



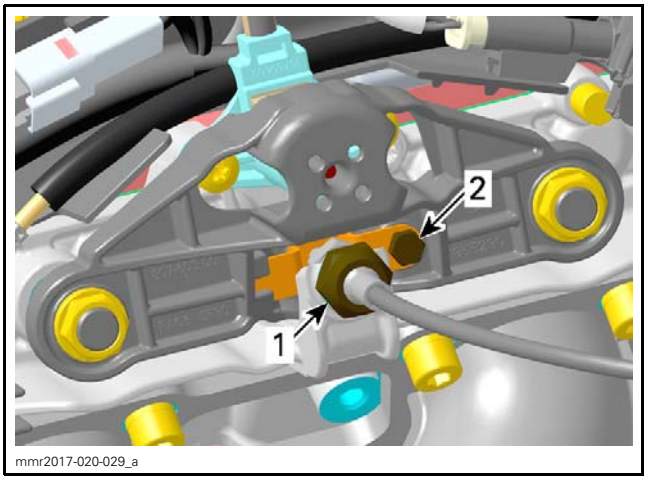
mmr2017-021-023_a

TIGHTENING SEQUENCE

CYLINDER BLOCK

Removing the Cylinder Block

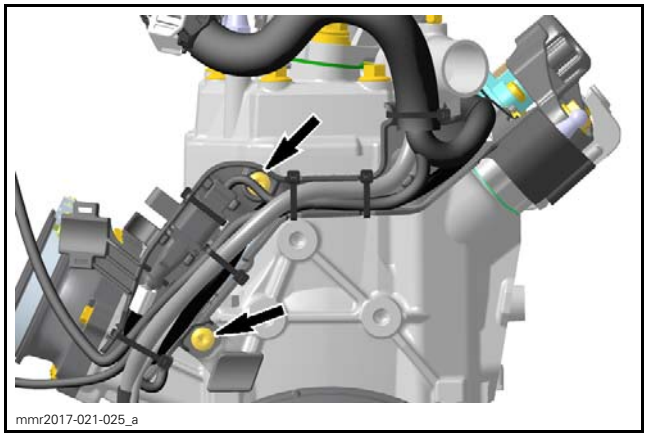
1. Remove *CYLINDER HEAD*, see procedure in this subsection.
2. Disconnect throttle bodies from intake adapters and set aside.
3. Loosen bowden cable lock nut and remove retaining plate screw and put cable aside.



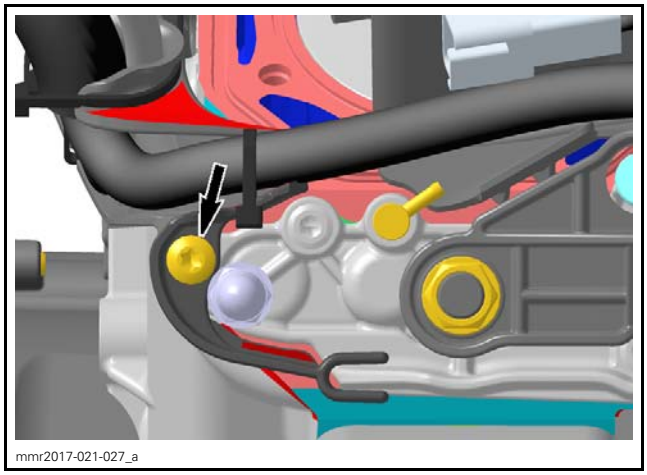
mmr2017-020-029_a

1. *Bowden cable lock nut*
2. *Retaining plate screw*

4. Disconnect RAVE valves oil lines.
5. Remove screws from harness support and put wiring harness with support aside.

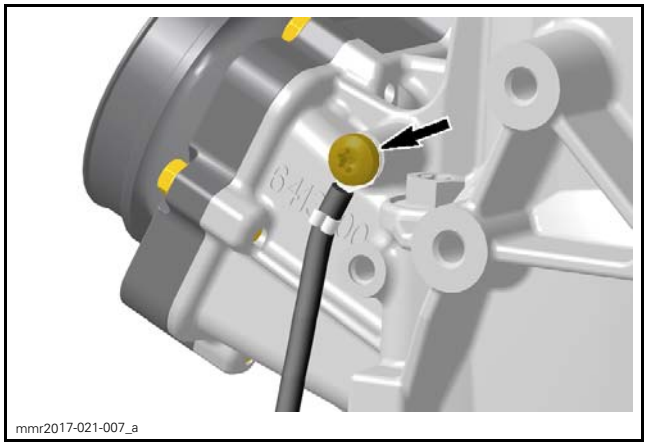

mmr2017-021-025_a

MAGNETO SIDE

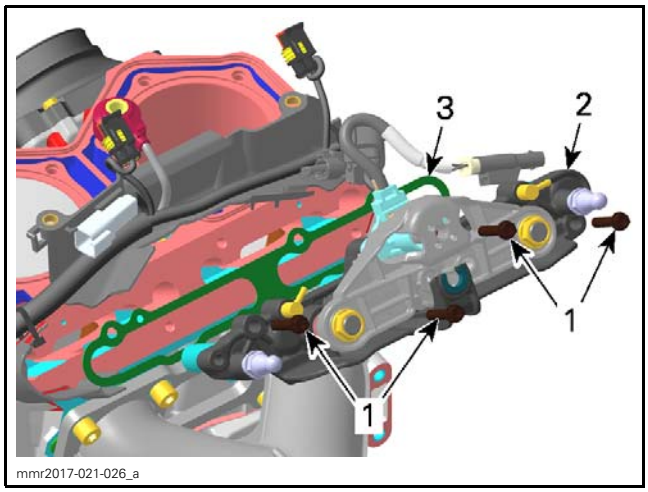

mmr2017-021-027_a

EXHAUST SIDE

6. Remove ground cable.

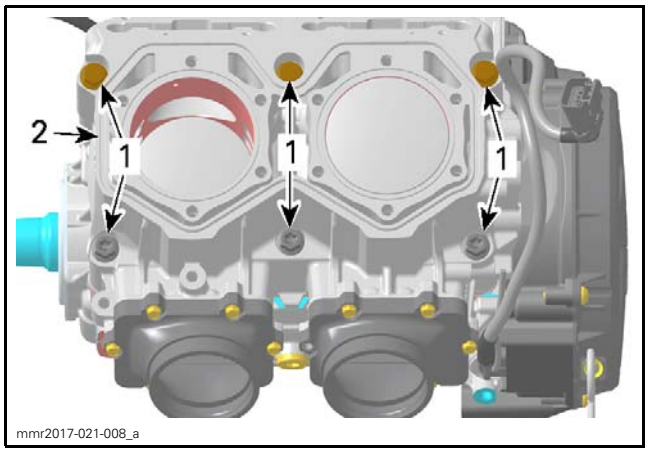

mmr2017-021-007_a

7. If necessary remove:
   - Retaining screws
   - RAVE assembly.



1. *Retaining screws*
2. *RAVE assembly*
3. *Gasket*

8. Remove:
   - Cylinder block screws
   - Cylinder block.



1. *Cylinder block screws*
2. *Cylinder block*

Inspecting the Cylinder Block

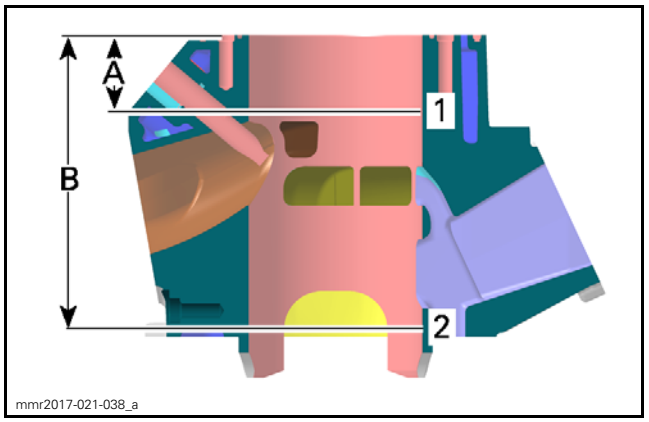
Remove RAVE valves, refer to *RAVE* subsection.

Remove reed valves, refer to *REMOVING THE REED VALVES* in this subsection.

Check cylinder bores for cracks and scoring on the top and bottom of cylinders. Replace if necessary.

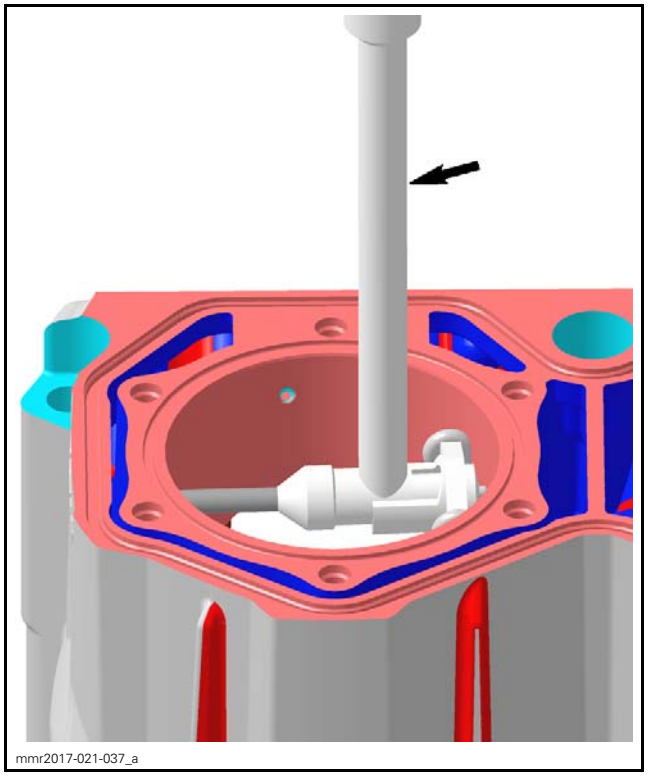
Cylinder Taper

1. Measure cylinder diameter at the following positions:
   - Above exhaust port
   - Below intake port.



CYLINDER TAPER MEASUREMENTS		
POSITION	MEASUREMENT	FROM TOP OF CYLINDER BLOCK
1	A	30 mm (1.18 in)
2	B	140 mm (5.51 in)

REQUIRED TOOL
Cylinder bore gauge



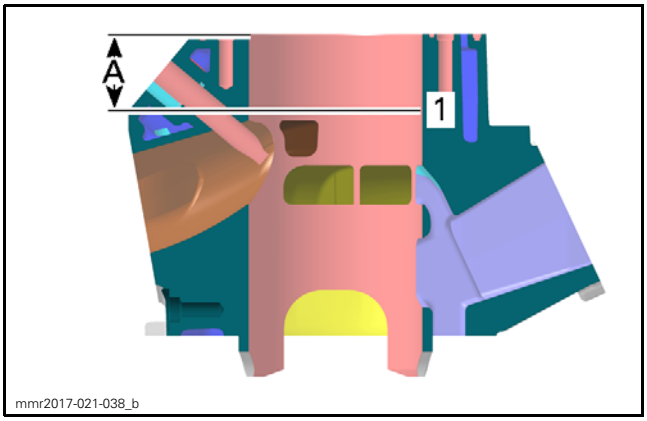
2. Compare cylinder diameters.
3. If the difference exceeds the specified dimension, replace the cylinder block.

CYLINDER BORE TAPER	
SERVICE LIMIT	0.10 mm (.0039 in)

Cylinder out of Round

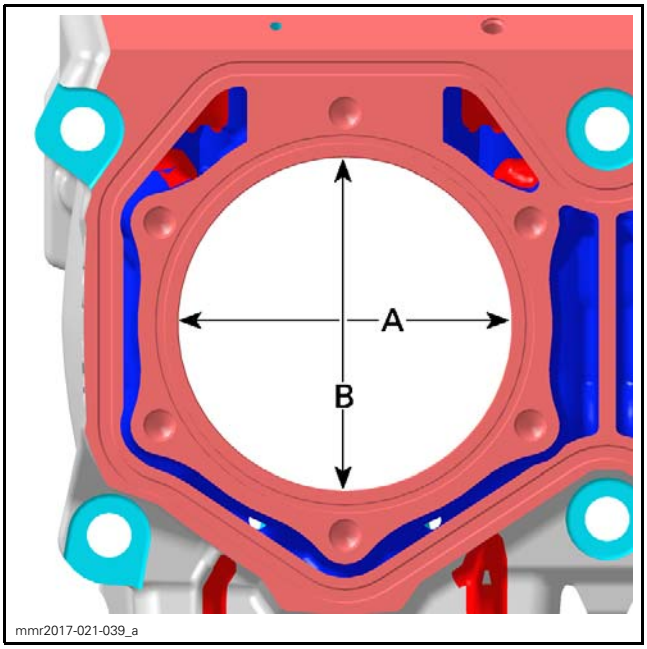
1. Check if the cylinder out of round is more than the specified dimension.

Measure above exhaust port:
– in piston pin axis
– perpendicular to piston pin axis.



mmr2017-021-038_b

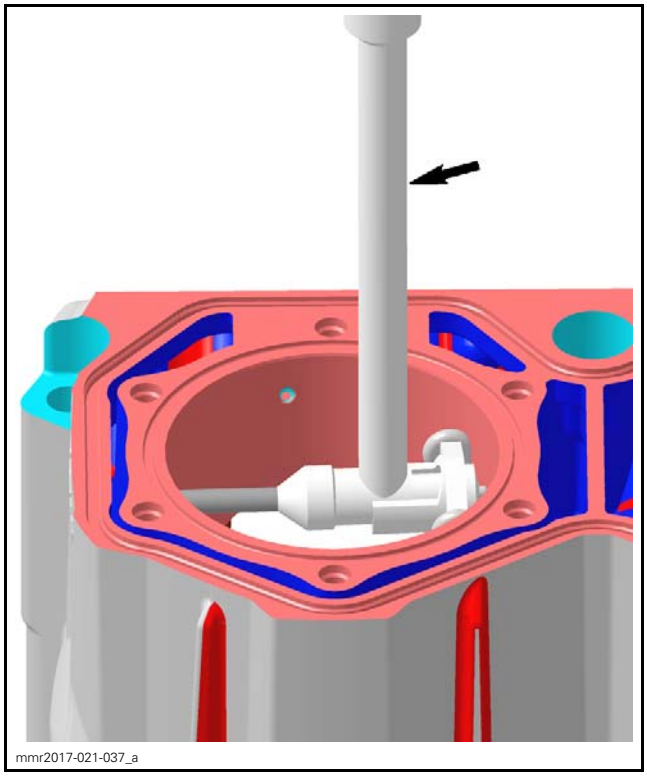
CYLINDER OUT OF ROUND MEASUREMENT		
POSITION	MEASUREMENT	FROM TOP OF CYLINDER BLOCK
1	A	30 mm (1.18 in)



mmr2017-021-039_a

A. Measure in piston pin axis
B. Measure perpendicular to piston pin axis

REQUIRED TOOL
Cylinder bore gauge


mmr2017-021-037_a

2. If the measurement exceeds the specifications, replace the cylinder block.

CYLINDER BORE OUT OF ROUND	
SERVICE LIMIT	0.08 mm (.0031 in)

Cleaning the Cylinder Block

Scrape off any carbon deposits from exhaust ports.

Carefully clean cylinder block screws, specifically under screw head.

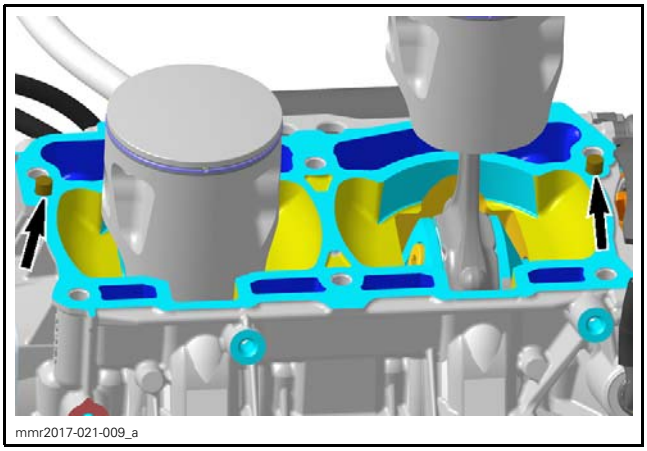
CYLINDER BLOCK AND SCREWS CLEANING	
Service product	LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500)

Installing the Cylinder Block

The installation is the reverse of removal procedure, however pay attention to the following.

Ensure top surface of crankcase is clean.

Check if dowel pins are in crankcase holes.


mmr2017-021-009_a

Install a NEW cylinder block base gasket of the same thickness as the old one. Refer to *PISTON PROJECTION MEASUREMENT* in this subsection.

NOTE: If thickness of the factory-installed gasket is unknown, install a 7-holes gasket (0.7 mm (.028 in)) as a base line.

Lubricate cylinder bores.

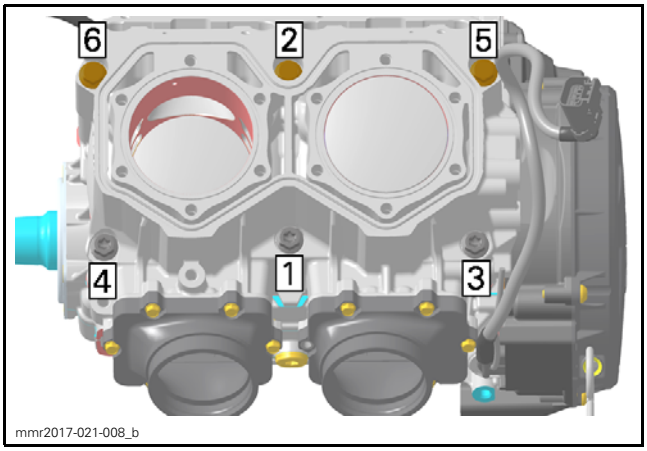
CYLINDER BORE LUBRICATION	
Service product	Injection oil

Carefully slide cylinder block down while squeezing piston rings to allow cylinder insertion.

Proceed one piston at a time, the help of an assistant may be required.

Tighten cylinder block screws to specification as per the following sequence.

TIGHTENING SEQUENCE	
Cylinder block screws	50 N•m ± 1.5 N•m (37 lbf•ft ± 1 lbf•ft)



mmr2017-021-008_b

TIGHTENING SEQUENCE

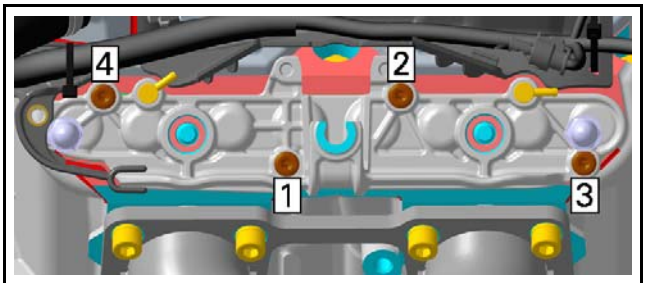
Measure piston projection as described in *PISTON PROJECTION MEASUREMENT* in this subsection.

NOTICE **Always install a cylinder block base gasket of the proper thickness. Failure to do so may cause detonation and severe engine damage.**

Install RAVE assembly with NEW gasket.

Tighten RAVE valve housing screws to specification following the illustrated sequence.

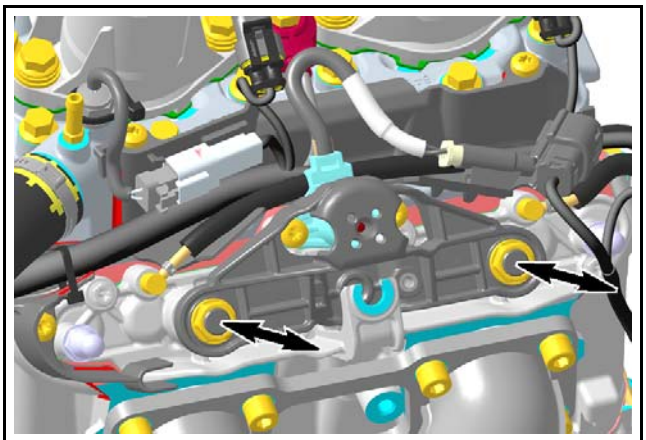
TIGHTENING TORQUE	
RAVE valve housing screws	10 N•m ± 0.7 N•m (89 lbf•**in** ± 6 lbf•**in**)



mmr2017-020-026_a

TIGHTENING SEQUENCE

Push and pull RAVE link bar to be sure that RAVE valves move freely.


mmr2017-020-010_c

PUSH AND PULL RAVE LINK BAR

Install bowden cable on the link bar, refer to *BOWDEN CABLE* in the *RAVE* subsection.

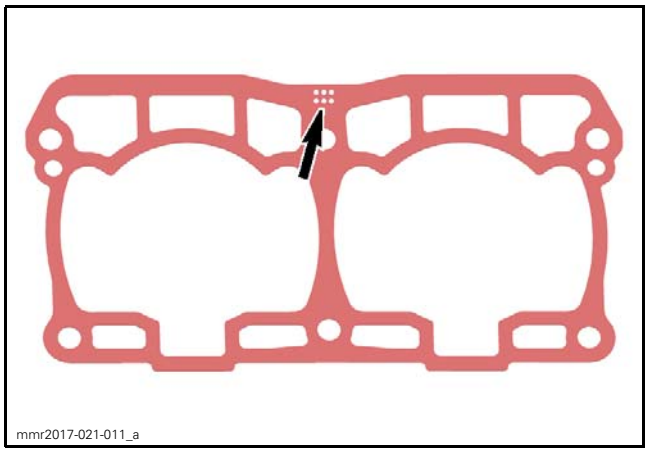
PISTON PROJECTION MEASUREMENT

NOTE: The piston projection measurement is used to determine the correct cylinder base gasket thickness when engine components are replaced.

Cylinder Block Base Gasket

The cylinder block base gasket is available in different thicknesses to adjust precisely the piston projection.

CYLINDER BLOCK BASE GASKET	
THICKNESS	HOLES QUANTITY
0.9	9
0.8	8
0.7	7
0.6	6
0.5	5



TYPICAL - GASKET THICKNESS IDENTIFICATION HOLES

NOTICE **Always install a cylinder block base gasket of the proper thickness. Failure to do so may cause detonation and severe engine damage.**

Engine Preparation

1. Bring PTO piston to TDC.

REQUIRED TOOL	
TDC DIAL INDICATOR (P/N 295 000 143)	

2. Remove cylinder head from engine. Refer to *CYLINDER HEAD* in this subsection.
3. Remove O-rings from cylinder block.
4. Clean top surface of cylinder block.
5. Ensure piston dome is clean and free of any carbon deposits.
6. Ensure cylinder block screws are properly tightened.

Piston Projection Measurement

1. Place piston projection tool on a flat steel surface.

REQUIRED TOOL	
PISTON PROJECTION (P/N 529 036 215)	
TDC DIAL INDICATOR (P/N 295 000 143)	

2. Rotate dial indicator face to position the **0** in line with needle.

SETTING THE ZERO

3. Install tool on PTO cylinder.
4. Center tool with cylinder to ensure that dial indicator reads piston dome.


mmr2011-010-003

TYPICAL - TOOL PROPERLY CENTERED

5. Ensure that PTO piston is set to TDC.
6. Read dial indicator then note measurement.


mmr2011-010-004

TYPICAL

NOTE: Convert dial indicator measurement to millimeter.

PISTON PROJECTION MEASUREMENT
1.75 mm to 1.82 mm (.069 in to .072 in)

7. If piston projection measurement is out of specification, change cylinder block base gasket thickness. Refer to *CYLINDER BLOCK* in this subsection.

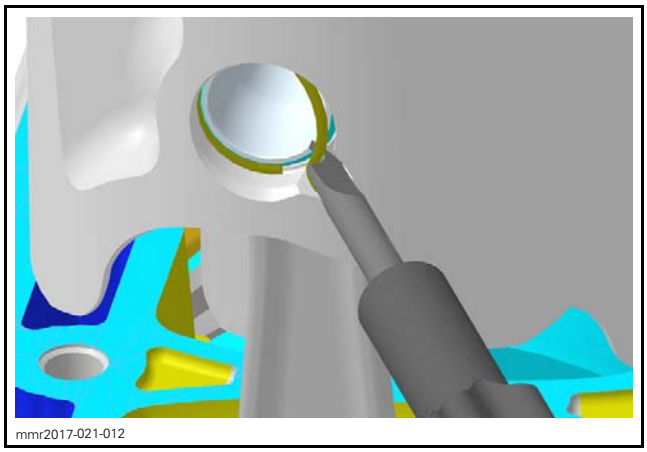
CYLINDER BLOCK BASE GASKET SELECTION GUIDELINE	
MEASURED PISTON PROJECTION	GASKET TO INSTALL
Below specification	Thinner
Above specification	Thicker

NOTICE Take care to use the proper specification according to the type of engine and the model of vehicle.

PISTONS

Removing the Piston

1. Remove *CYLINDER BLOCK*, see procedure in this subsection.
2. Place a clean cloth over crankcase.
3. Using a pointed tool inserted in piston notch, remove circlips from piston.


mmr2017-021-012

4. Push piston pin out of piston.
5. Remove piston.
6. Remove bearing.
7. Discard circlips.

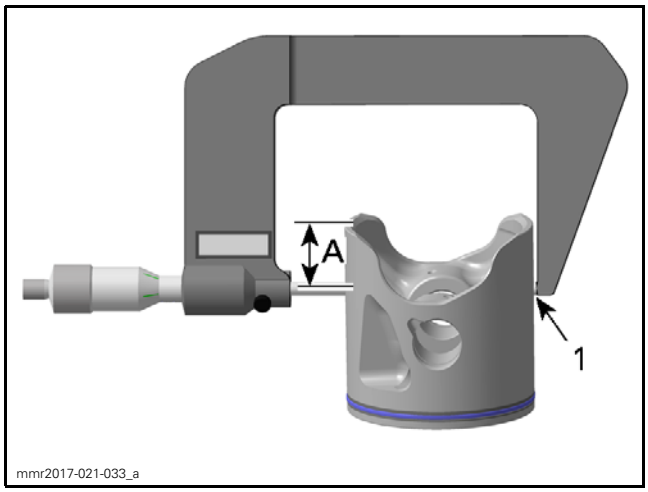
Inspecting the Piston

Inspect piston for scoring, cracking or other damage.

Cylinder/Piston Clearance

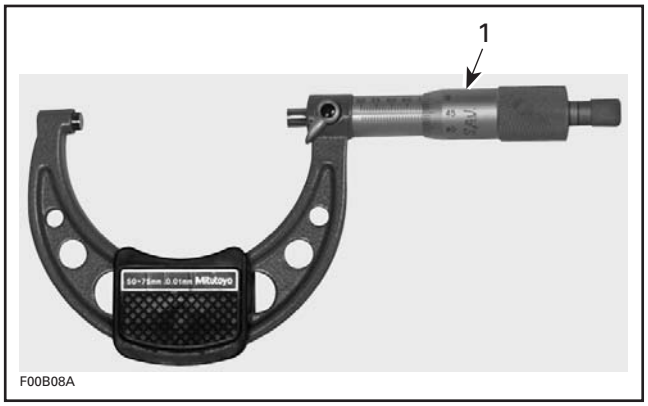
1. Measure piston diameter at "A" perpendicularly (90°) to piston pin.

REQUIRED TOOL
Micrometer



1. Measuring diameter perpendicularly (90°) to piston pin axis
A. 15 mm (.591 in)

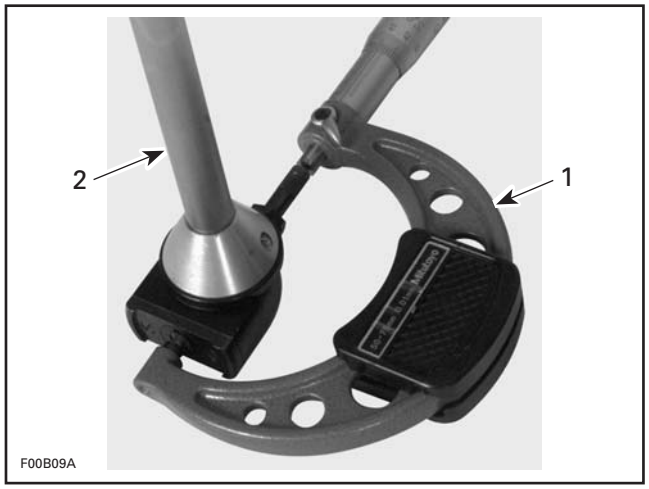
2. Adjust and **lock** a micrometer to the piston diameter.



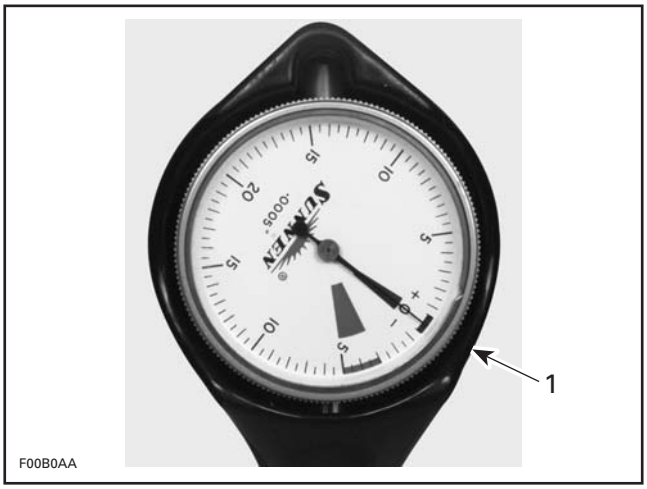
1. Micrometer set to the piston diameter

3. Adjust a cylinder bore gauge to the locked micrometer and set the indicator to 0.

REQUIRED TOOL
Cylinder bore gauge



1. Use the micrometer to set the cylinder bore gauge
2. Dial bore gauge

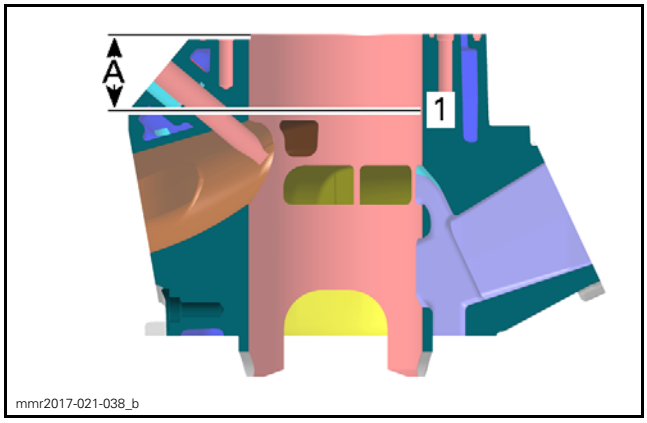


1. Indicator set to 0 (zero)

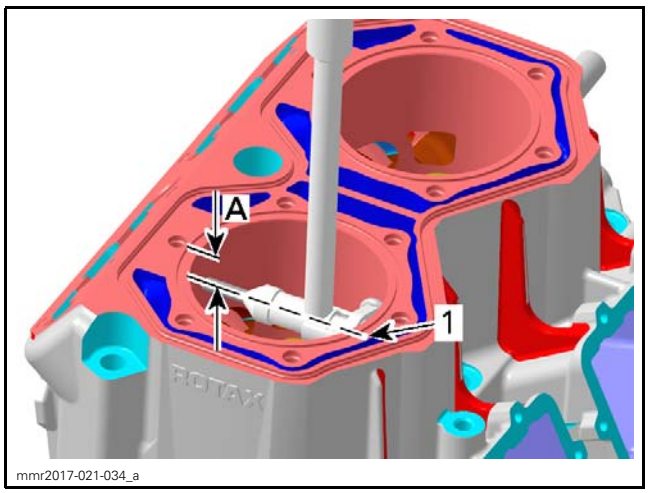
NOTE: Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

4. Position the dial bore gauge above the exhaust port.

NOTICE **Always remove cylinder-block from crankcase before measuring.**



CYLINDER OUT OF ROUND MEASUREMENT		
POSITION	MEASUREMENT	FROM TOP OF CYLINDER BLOCK
1	A	30 mm (1.18 in)



1. Measuring perpendicularly (90°) to piston pin axis
A. 30 mm (1.18 in)

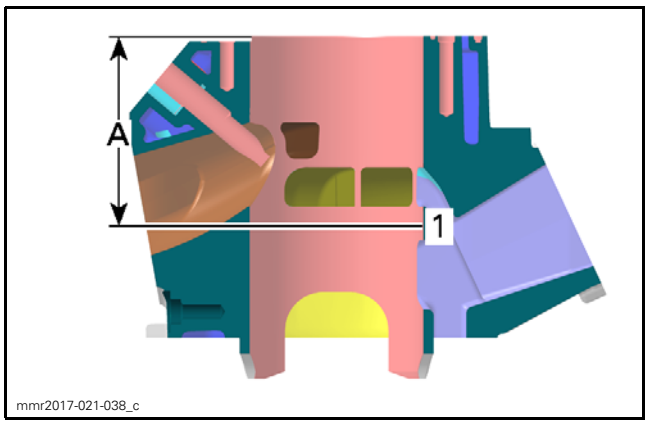
5. Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance.

CYLINDER/PISTON CLEARANCE	
NEW	0.136 mm to 0.160 mm (.0054 in to .0063 in)
SERVICE LIMIT	0.200 mm (.0079 in)

6. If clearance exceeds specified tolerance, replace cylinder and piston.

Ring End Gap

1. Position ring halfway between transfer ports and intake port.



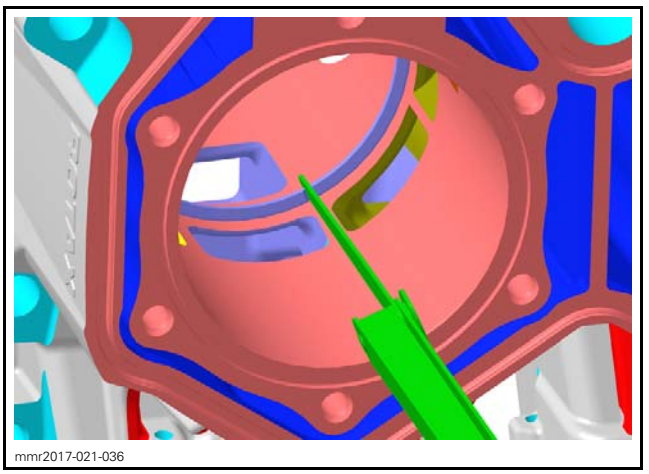
RING END GAP MEASUREMENT		
POSITION	MEASUREMENT	FROM TOP OF CYLINDER BLOCK
1	A	89 mm (3.5 in)

NOTE: In order to correctly position the ring in the cylinder, use piston as a pusher.

2. Check ring end gap. Replace ring if gap exceeds specified tolerance.

REQUIRED TOOL
Feeler gauge

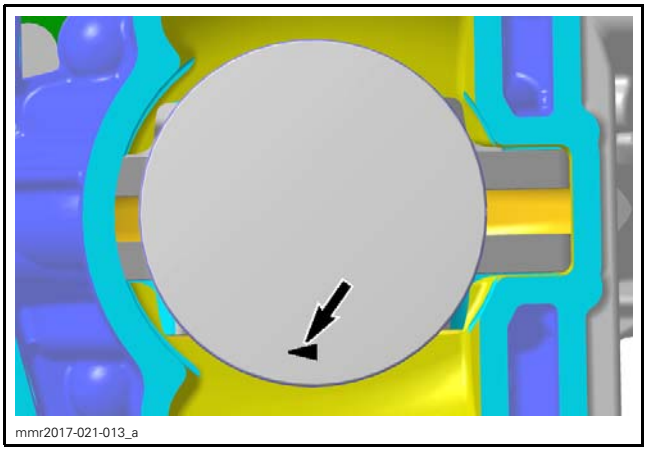
RING END GAP	
NEW	0.400 mm to 0.600 mm (.0157 in to .0236 in)
SERVICE LIMIT	1.000 mm (.0394 in)



Cleaning the Piston

1. Scrape off any carbon deposits from piston dome.

NOTE: The arrow on the piston dome must be visible after cleaning.



EXHAUST DIRECTION INDICATION

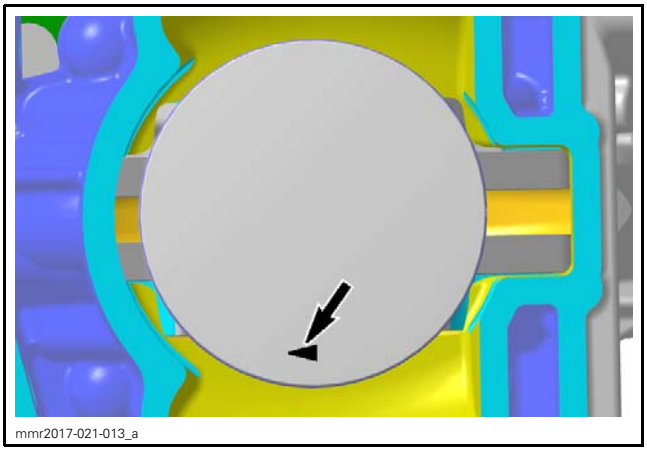
2. Clean the piston ring groove with a groove cleaner tool or with a piece of broken ring.

Installing the Piston

1. Lubricate needle bearing.

NEEDLE BEARING LUBRICATION	
Service product	Injection oil

2. Insert bearing into connecting rod.
3. Place pistons over connecting rods with the arrow on the piston dome facing towards exhaust port.



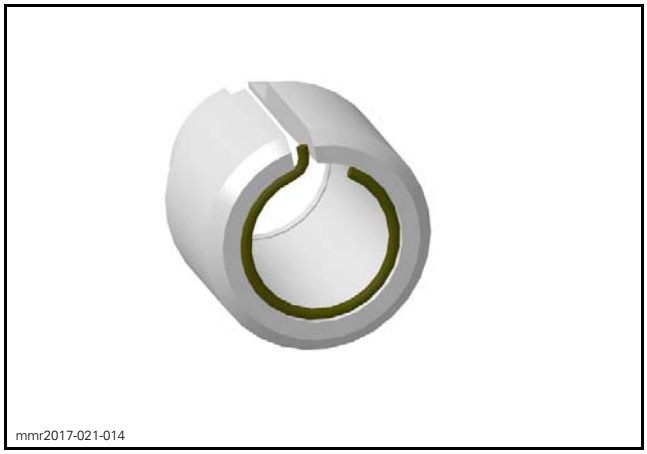
EXHAUST DIRECTION INDICATION

4. Install piston pin in piston.
5. Install **NEW** circlips.

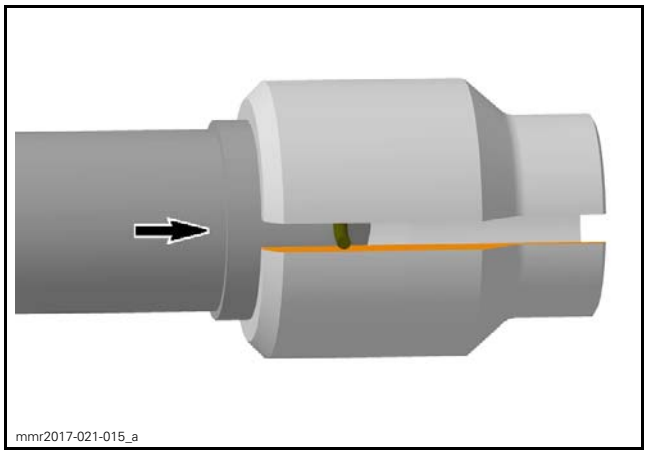
REQUIRED TOOL	
PISTON CIRCLIP INSTALLER 21MM (P/N 529 036 138)	

NOTICE **Always install NEW mono-hook circlips. If circlip installation fails at the first attempt, always retry with a new one.**

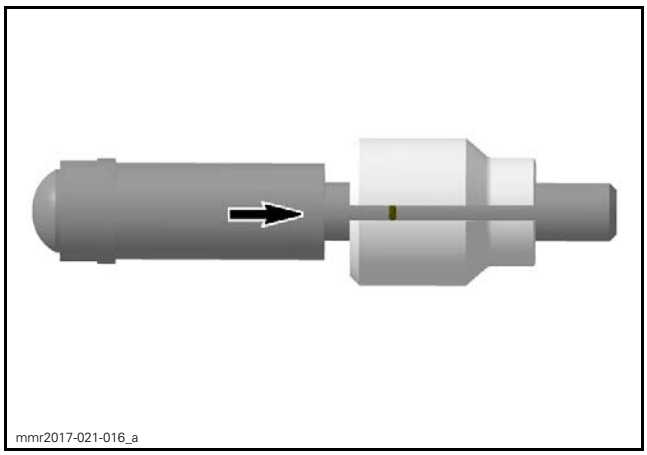
6. Use the following procedure to properly install circlip.
   6.1 Insert circlip into support so that, when installed in piston groove, the gap will be below the tab.

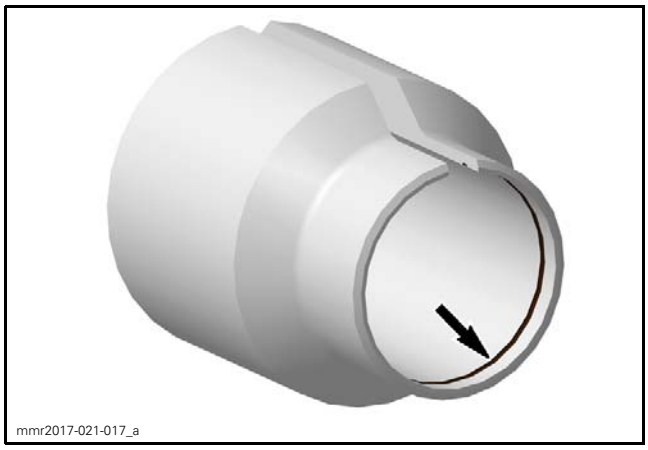


   6.2 With round end of pusher, position circlip perpendicularly to the support axis.

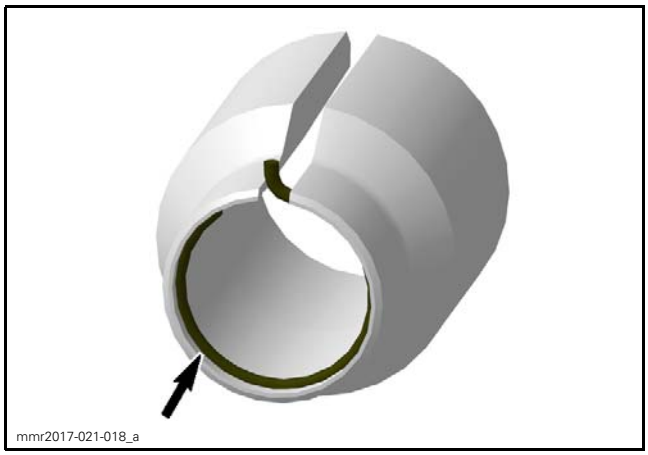


   6.3 With the other end of the pusher, push circlip into the support groove.

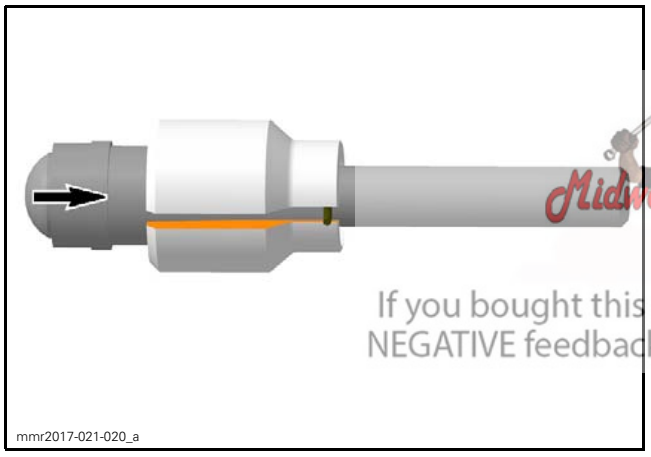




GROOVE

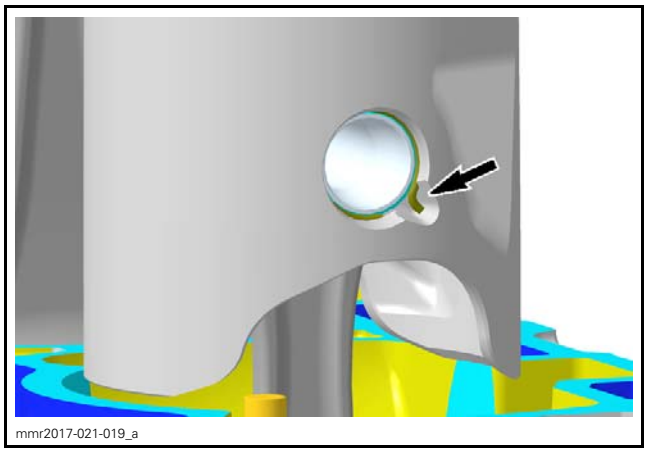


CIRCLIP READY TO BE INSTALLED ON PISTON



6.4 Using a plastic hammer, tap pusher to put the new circlip in place.

NOTE: Make sure to install new circlips with the gap below the tab exactly as shown on the following photo.



GAP BELOW THE TAB

NOTICE Circlips must not move freely after installation; if so, replace them.

7. Install all other removed parts as the reverse of removal procedure.

BOTTOM END

SERVICE TOOLS

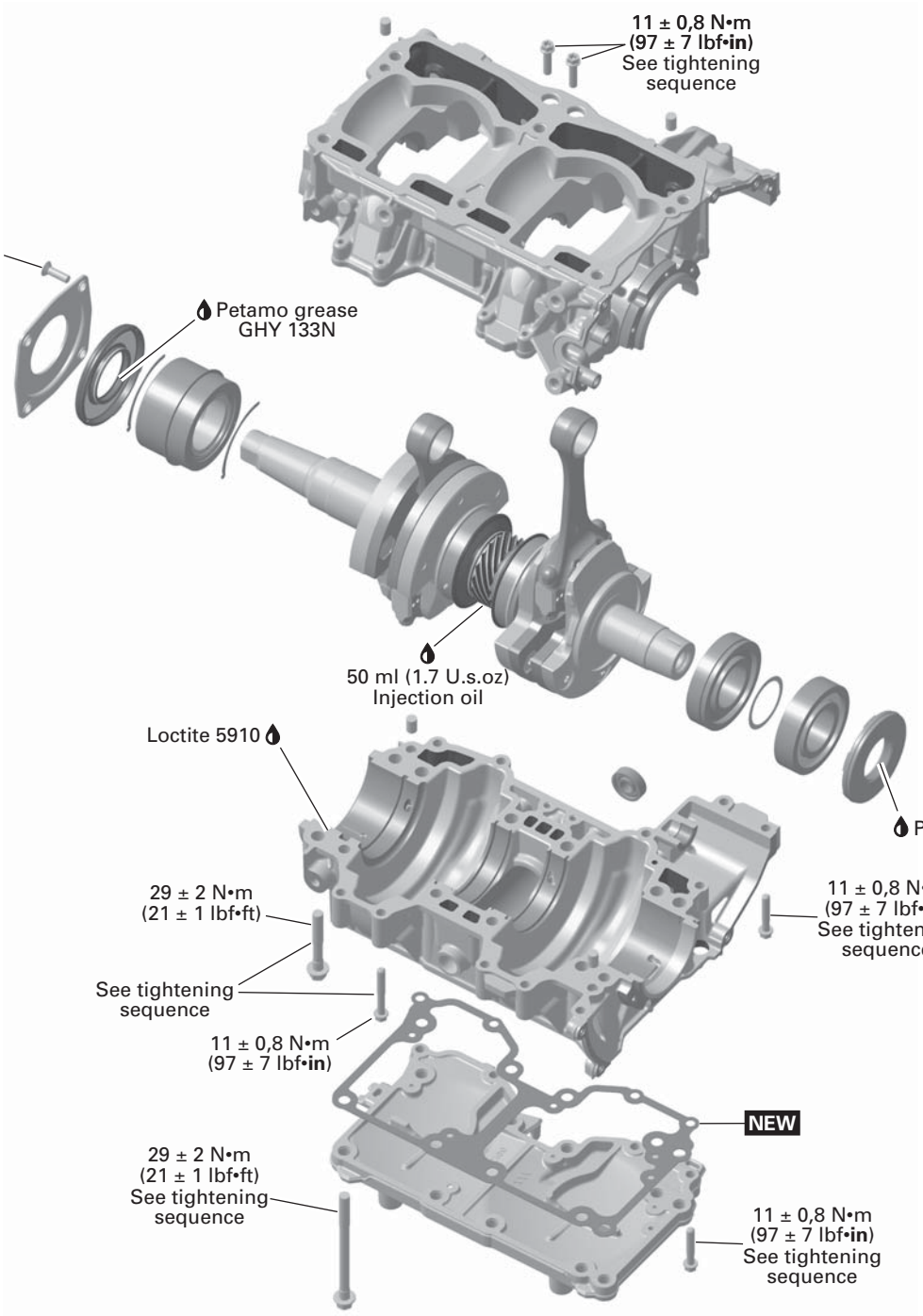
Description	Part Number	Page
BEARING HEATER	529 035 969	11
CRANKSHAFT BEARING PULLER	529 036 004	10
CRANKSHAFT PROTECTOR	529 036 434	10
DEGREE WHEEL	529 035 607	9
DISTANCE GAUGE	529 036 415	13
HALF-RING	529 036 414	10
PULLER RING	420 977 490	10
TEMPERATURE INDICATOR STICK	529 035 970	11
WATER PUMP BEARING PUNCH	529 036 417	6

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
SNAP-ON MANUAL IMPACT DRIVER	PIT120	3

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 5910	293 800 081	6
LOCTITE CHISEL (GASKET REMOVER)	413 708 500	5
PETAMO GREASE GHY 133N	420 899 271	12
PULLEY FLANGE CLEANER	413 711 809	11
XPS LUBE	293 600 016	10



NEW = Component must be replaced when removed.

mmr2017-022-001_a

GENERAL

Engine removal is required to repair bottom end.

All oil seals and gaskets must be discarded and replaced with new ones when crankcase is split.

Clean all metal components in a non-ferrous metal cleaner.

During assembly or installation:

– Use torque values and service products as shown in the exploded view.
– Clean threads before applying a threadlocker. Refer to the *INTRODUCTION* subsection.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

NOTICE **Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.**

⚠ WARNING

Always disconnect the magneto connector prior to:
– Disconnecting any fuel hose.
– Removing a fuel injector.
– Removing a spark plug cable or spark plug.
Otherwise, if the engine is cranked, fuel vapors may ignite in presence of a spark creating a fire hazard.

ENGINE BREAK-IN

NOTICE **After a repair involving major parts replacement, a break-in period must be observed. Follow *OPERATOR'S GUIDE* recommendation relating to break-in.**

To reactivate the break-in period, use the BUDS2 software.

Go to:

– Setting/Initialization/Restart Break-In

PROCEDURES

CRANKCASE

Disassembling the Crankcase

Remove engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.

Refer to *TOP END* subsection to remove:

– Cylinder head
– Cylinder block
– Pistons.

Refer to *MAGNETO AND STARTER* subsection to remove:

– Stator
– Magneto housing
– Starter drive
– Starter.

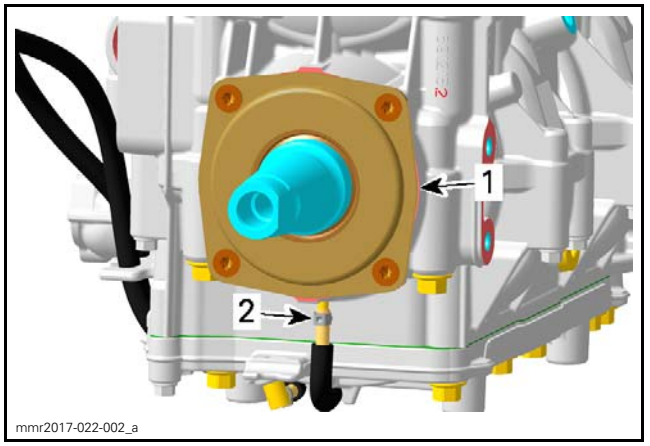
.

Remove drive pulley. Refer to *DRIVE PULLEY* subsection.

Remove PTO oil seal cover.

NOTE: Tap screw heads to break the Loctite bond or use a SNAP-ON MANUAL IMPACT DRIVER (P/N PIT120).

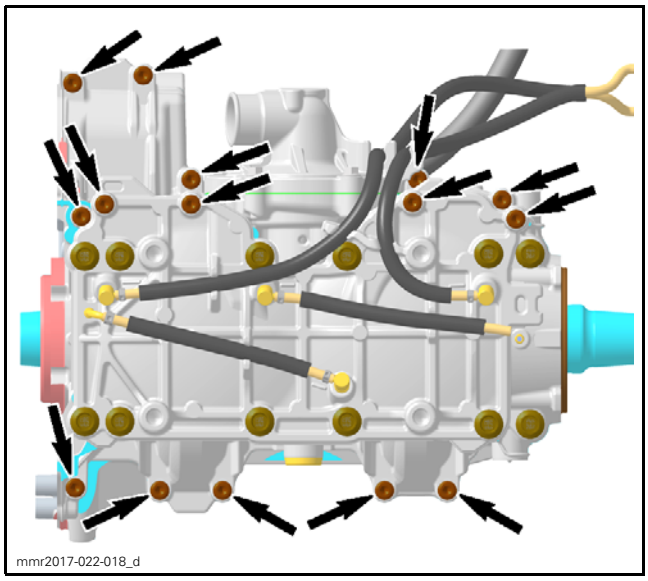
Remove oil line from crankcase. Discard 1-ear clamp.



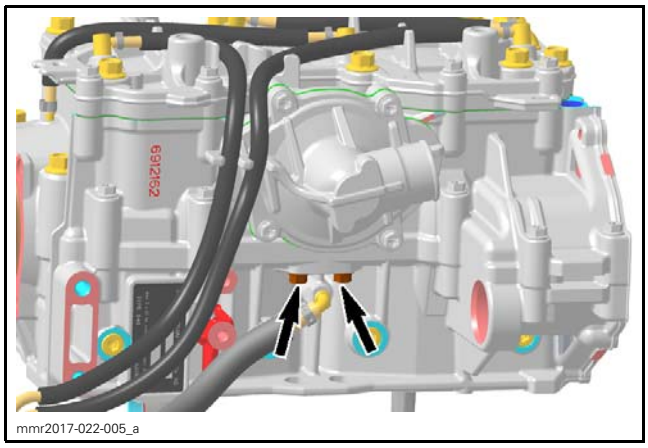
1. PTO oil seal cover
2. Oil line

Remove engine front supports.

Remove M6 crankcase screws.

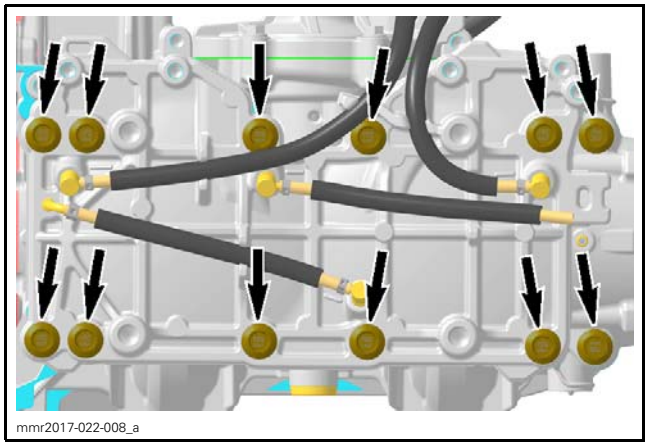


M6 CRANKCASE SCREWS - BOTTOM SIDE



M6 CRANKCASE SCREW - WATER PUMP SIDE

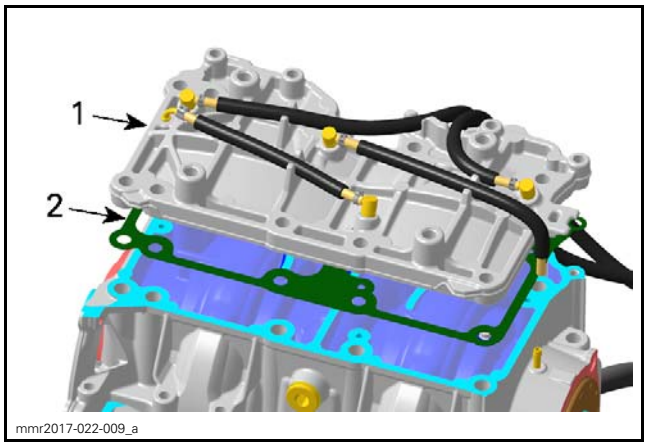
Remove M8 crankcase screws.



TYPICAL - BASE PLATE RETAINING SCREWS

Remove base plate and discard gasket.

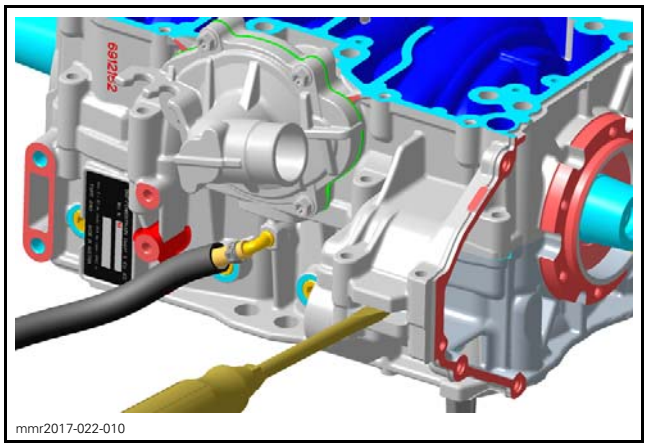
NOTICE **Whenever base plate is removed, crankcase must be opened, cleaned, and re-sealed.**



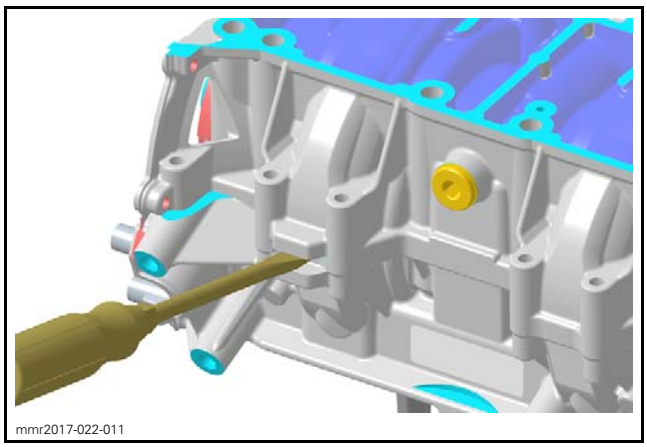
1. Base plate
2. Gasket (discard it)

Split crankcase.

NOTE: To prevent damage to crankcase mating surfaces, use prying lugs to "unstick" crankcase.

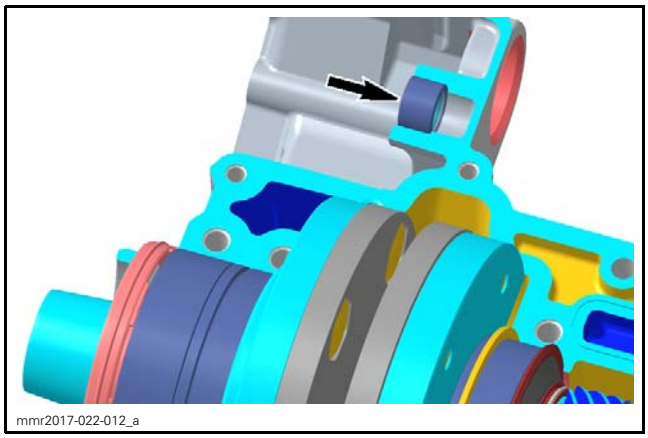


PRYING LUGS

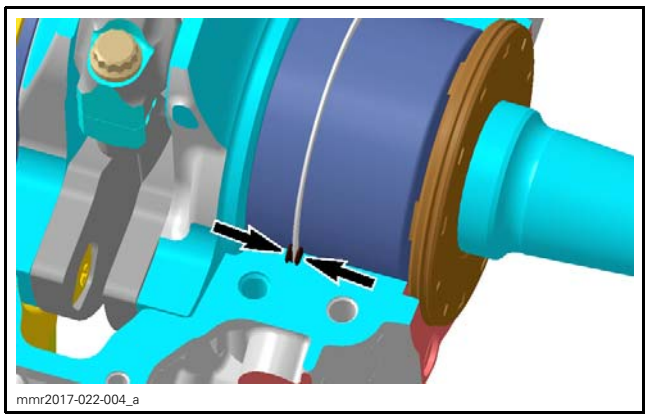


PRYING LUGS

Remove:
- Starter drive needle bearing
- Crankshaft assembly
- Shims.



STARTER DRIVE NEEDLE BEARING



SHIMS

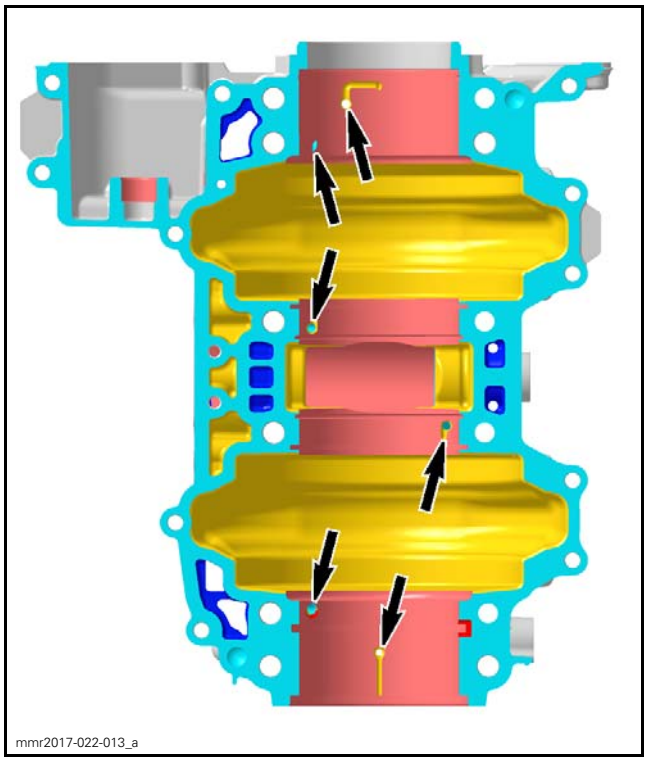
Cleaning the Crankcase and Base Plate

Clean all metal components in a non-ferrous metal cleaner.

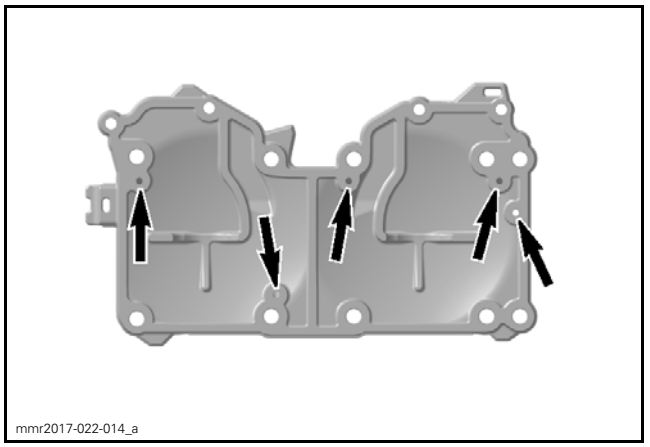
CRANKCASE CLEANING	
Service product	LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500)

NOTICE Never use a sharp object to remove sealant as score marks incurred are harmful to crankcase sealing.

Blow out the oil orifices using compressed air and make sure they are not clogged.



OIL BORES IN CRANKCASE LOWER PART



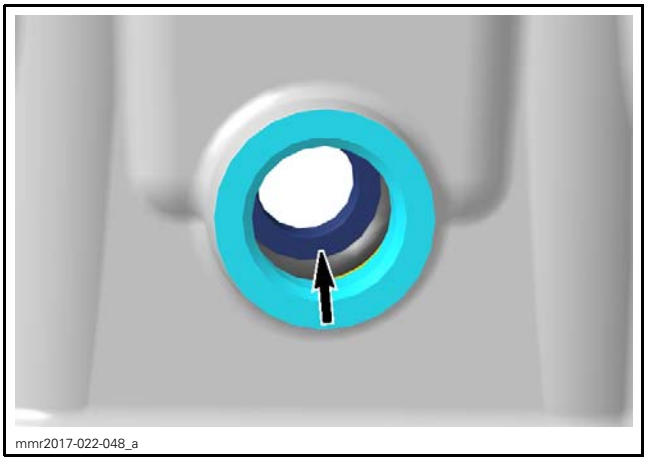
OIL BORES IN BASE PLATE

Inspecting the Crankcase and Base Plate

Check crankcase and base plate for cracks or other damages. Replace if necessary.

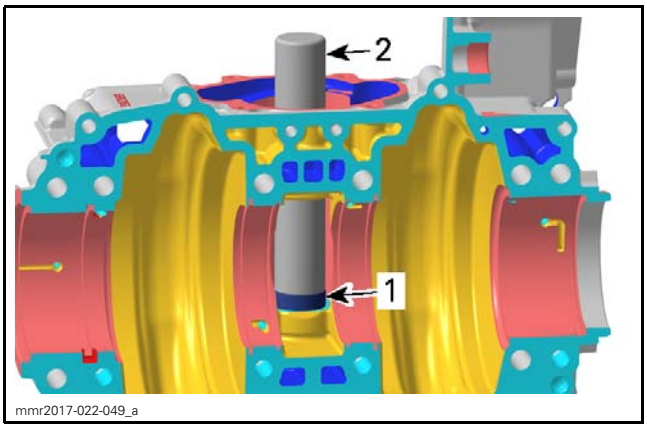
Water Pump Bearing Replacement

Use a suitable punch to push ball bearing out of crankcase.


mmr2017-022-048_a

Install **NEW** ball bearing.

REQUIRED TOOL	
WATER PUMP BEARING PUNCH (P/N 529 036 417)	



mmr2017-022-049_a

1. *Ball bearing*
2. *Water pump bearing punch*

Assembling the Crankcase

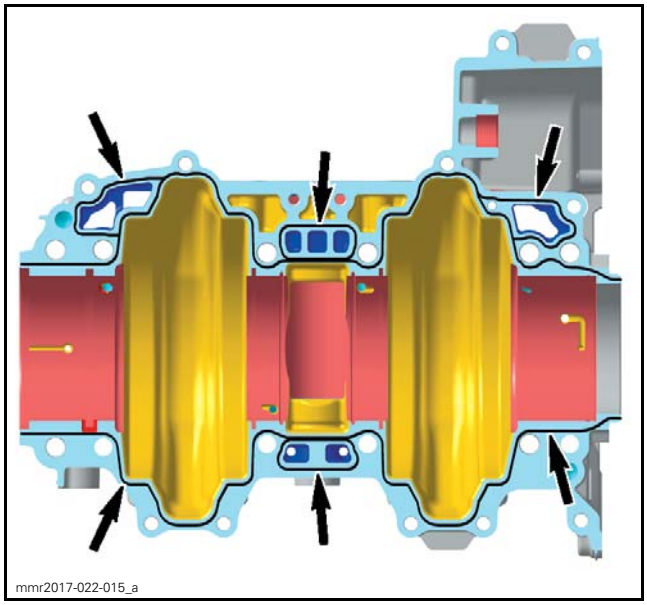
Install crankshaft in upper crankcase. See *CRANKSHAFT* for procedure.

Install needle bushing in crankcase upper with the writing showing to the outside.

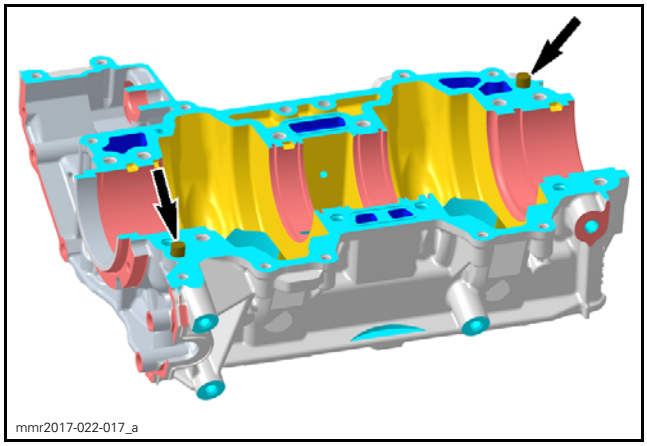
Apply sealant on lower crankcase as per following procedure.

CRANKCASE SEALANT	
Service product	LOCTITE 5910 (P/N 293 800 081)

NOTE: The total assembly sequence, including sealing compound application and crankcase torquing, must be performed within 10 minutes.


mmr2017-022-015_a

Ensure dowel pins are in their holes.


mmr2017-022-017_a

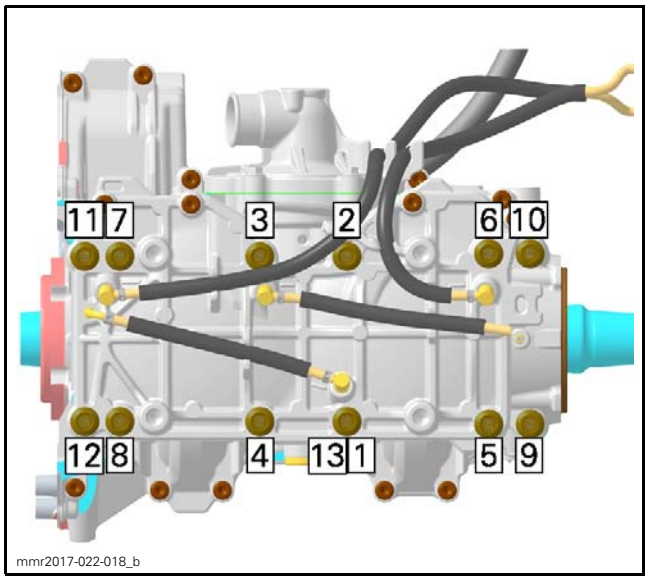
Assemble crankcase lower half.

Install base plate with **NEW** gasket.

Install crankcase screws.

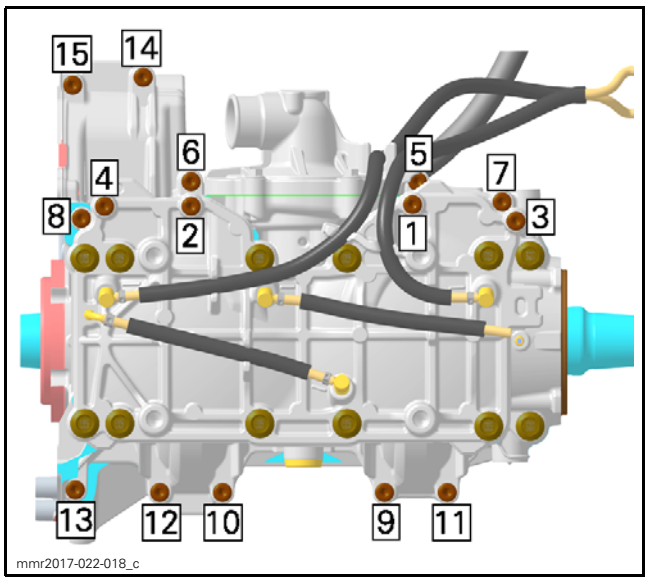
Tighten crankcase screws to specification as per illustrated sequence.

TIGHTENING TORQUE	
M8 Crankcase screws	29 N•m ± 2 N•m (21 lbf•ft ± 1 lbf•ft)

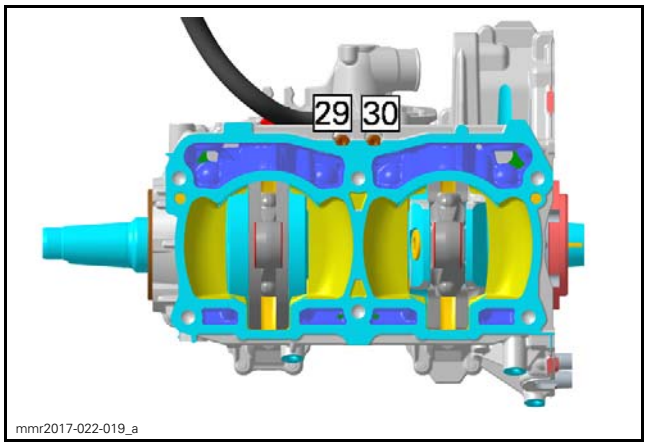


TIGHTENING SEQUENCE - M8 CRANKCASE SCREWS

TIGHTENING TORQUE	
M6 Crankcase screws	11 N•m ± 0.8 N•m (97 lbf•**in** ± 7 lbf•**in**)



TIGHTENING SEQUENCE - BOTTOM VIEW



TIGHTENING SEQUENCE- M6 CRANKCASE SCREWS - TOP VIEW

Install PTO oil seal cover.

Tighten oil seal cover to specification.

TIGHTENING TORQUE	
Oil seal cover screws	11 N•m ± 0.8 N•m (97 lbf•**in** ± 7 lbf•**in**)

NOTE: It is recommended to test engine cooling system for leaks after engine assembly, before installation in vehicle. Refer to *COOLING SYSTEM* subsection.

NOTE: It is recommended to always check the functionality of the check valves before installation in vehicle. Refer to *CHECK VALVES AND FITTINGS* in *LUBRICATION SYSTEM* subsection.

CRANKSHAFT

Removing the Crankshaft

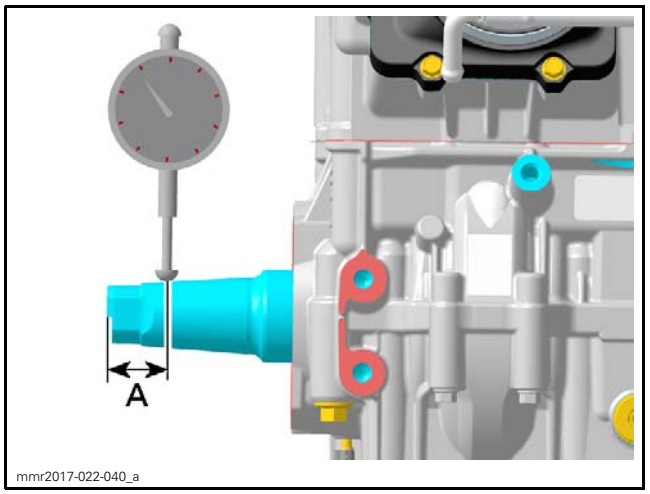
To remove crankshaft, use crankcase disassembly procedure.

Inspecting the Crankshaft

For crankshaft specifications refer to *TECHNICAL SPECIFICATIONS* subsection.

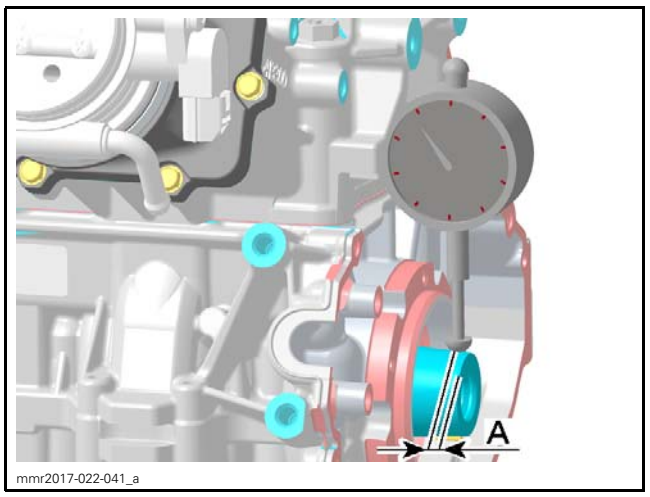
Crankshaft Deflection (Measuring in Crankcase)

1. Using a dial indicator, check deflection with crankshaft in crankcase.



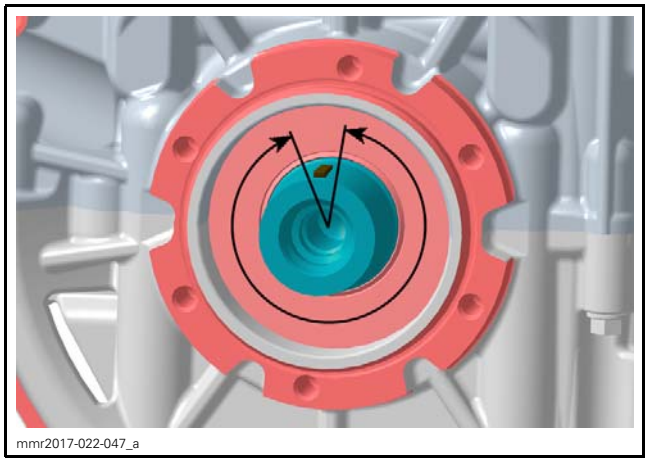
CRANKSHAFT PTO SIDE
A. 17 mm (.67 in)

CRANKSHAFT DEFLECTION PTO SIDE	
SERVICE LIMIT	0.060 mm (.0024 in)



CRANKSHAFT MAG SIDE
A. 3 mm (.12 in)

Measure deflection circumferential excluding the woodruff key.

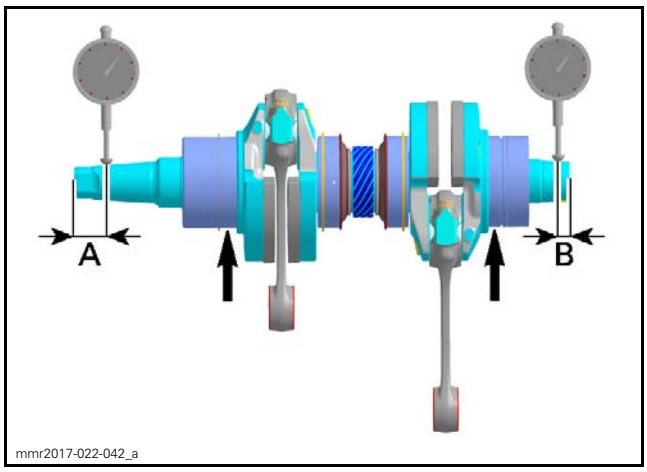


CRANKSHAFT DEFLECTION MAG SIDE	
SERVICE LIMIT	0.050 mm (.002 in)

2. If deflection exceeds the specified tolerance, recheck deflection using V-shaped blocks to determine the defective part(s). See *MEASURING ON BENCH*.

Crankshaft Deflection (Measuring on Bench)

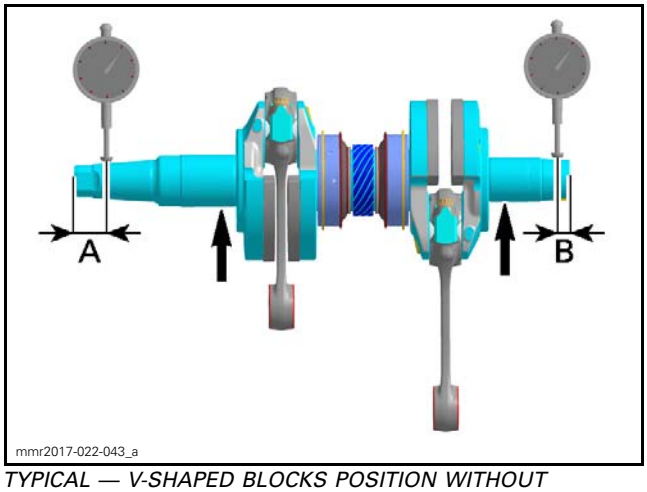
1. Once engine is disassembled, check crankshaft deflection on V-shaped blocks.



TYPICAL — V-SHAPED BLOCKS POSITION WITH BEARINGS
A. 17 mm (.67 in)
B. 3 mm (.12 in)

NOTE: Crankshaft deflection cannot be correctly measured between centers of a lathe.

2. If deflection exceeds the specified tolerance, it can be worn bearings or a bent crankshaft.
3. Remove crankshaft bearings and check deflection again on V-shaped blocks to determine the defective part(s).



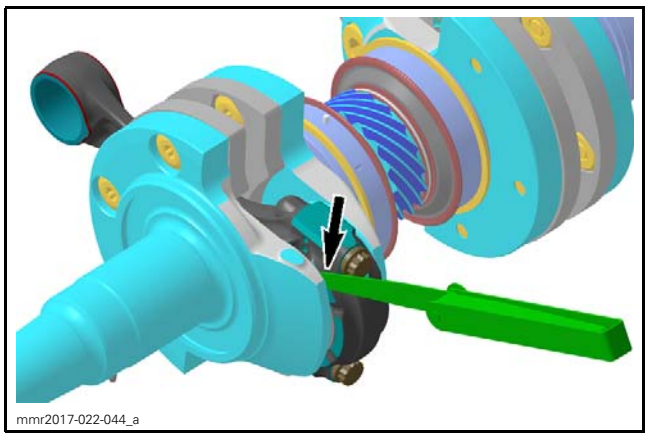
TYPICAL — V-SHAPED BLOCKS POSITION WITHOUT BEARINGS
A. 17 mm (.67 in)
B. 3 mm (.12 in)

4. If the deflection exceeds the specified tolerance, replace crankshaft.

Connecting Rod Big End Axial Play

1. Measure distance between connecting rod and crankshaft counterweight.

REQUIRED TOOL
Feeler gauge


mmr2017-022-044_a

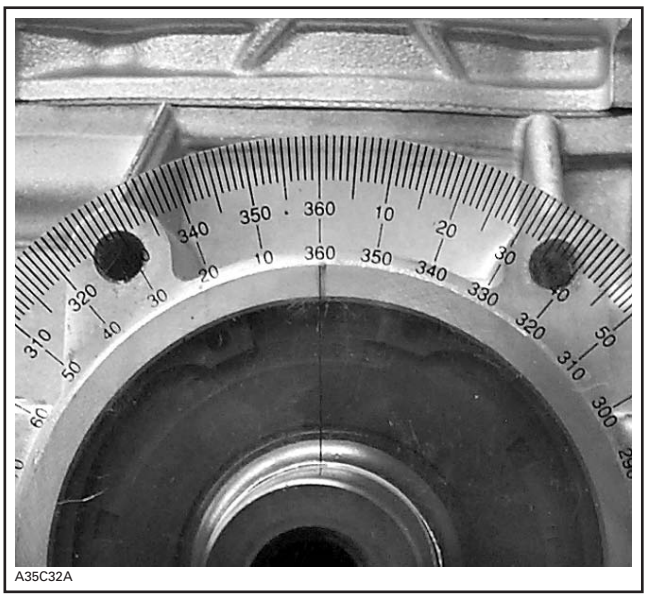
CONNECTING ROD BIG END AXIAL PLAY	
New	0.152 mm to 0.352 mm (.006 in to .0139 in)

2. If the distance exceeds specified tolerance, replace crankshaft.

Crankshaft Alignment

1. Remove injectors. Refer to *E-TEC DIRECT FUEL INJECTION* subsection.
2. Bring MAG piston at top dead center. Refer to *IGNITION SYSTEM* subsection.
3. Scribe a mark on crankcase (see illustration).
4. Install a degree wheel on crankshaft end so that 360° mark aligns with the mark on crankcase. Do not rotate crankshaft.

REQUIRED TOOL	
DEGREE WHEEL (P/N 529 035 607)	



A35C32A

5. Remove dial indicator and install it in spark plug hole on PTO side.
6. Bring PTO piston to top dead center. Degree wheel must rotate with crankshaft.
7. Interval between cylinders must be 180° ± 0.5.
8. Any other reading indicates a misaligned (twisted) crankshaft.

Removing the Crankshaft Bearing

NOTE: 10 minutes is required to heat up a new bearing for its installation, To save time, it is recommended to start the heating process prior to bearing removal operation. See procedure further.

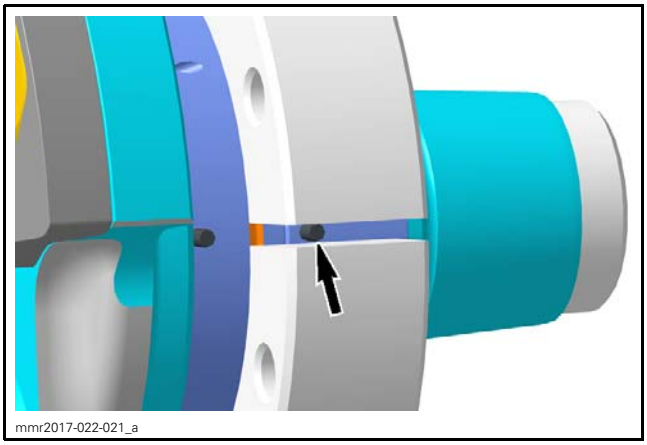
To remove MAG side bearings from crankshaft, install proper half rings and puller ring on the outer bearing race.

The roller bearing on PTO side has a sliding seat and can be removed without a tool.

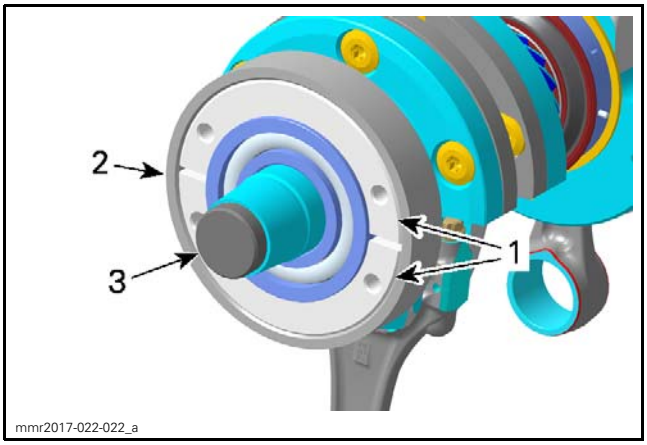
NOTE: Position tools in the groove of the inner bearing and pull out both bearings together.

REQUIRED TOOL	
HALF-RING (P/N 529 036 414)	
PULLER RING (P/N 420 977 490)	
CRANKSHAFT PROTECTOR (P/N 529 036 434)	

Ensure to position bearing pin between half ring gap.



MAG SIDE

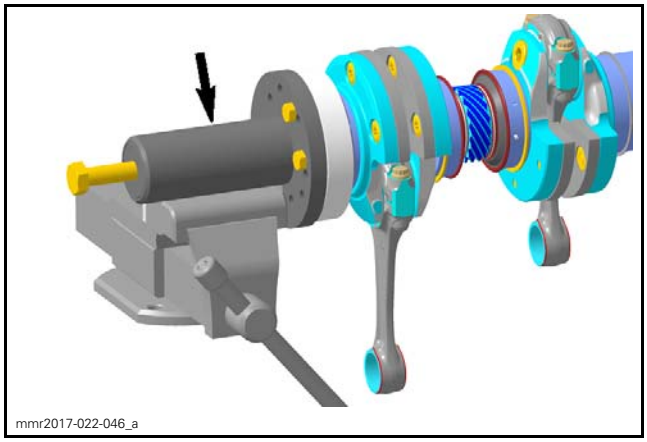


MAG SIDE
1. *Half rings*
2. *Puller ring*
3. *Crankshaft protector*

Install bearing puller on the half rings.

REQUIRED TOOL	
CRANKSHAFT BEARING PULLER (P/N 529 036 004)	

Secure the bearing puller in a vise at its rib.

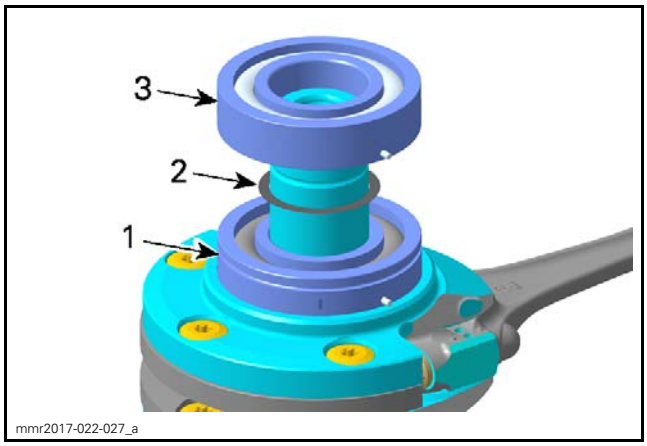


TYPICAL - BEARING PULLER SECURED IN THE VISE

NOTICE **Never use any air impact tool for tightening the puller bolt. Lubricate the bolt with XPS LUBE (P/N 293 600 016) to avoid damaging the threads.**

Screw in the puller bolt until the bearings come out.

During bearing removal take care not to lose the distane shim installed between inner and outer bearing.

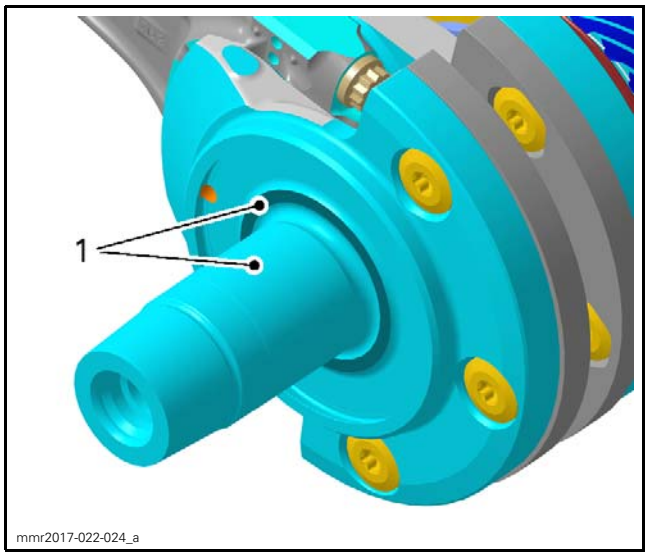


MAG SIDE
1. *Inner bearing*
2. *Distance shim*
3. *Outer bearing*

Installing the Crankshaft Bearing

Inspect crankshaft ends for damage.

Clean crankshaft ends with sand paper no. 400 to remove possible seal marks and debris.



Remove all residue.

CRANKSHAFT ENDS CLEANING	
Service product	PULLEY FLANGE CLEANER (P/N 413 711 809)

Heating the Bearing

Heat up the bearing(s) to ease installation.

REQUIRED TOOL	
BEARING HEATER (P/N 529 035 969)	

NOTICE Bearing(s) should not be heated to more than 80°C (176°F). Do not heat bearing(s) with direct flame, or with a heat gun or soaked in a heated oil bath. Inappropriate bearing(s) heating may result in cage failure.

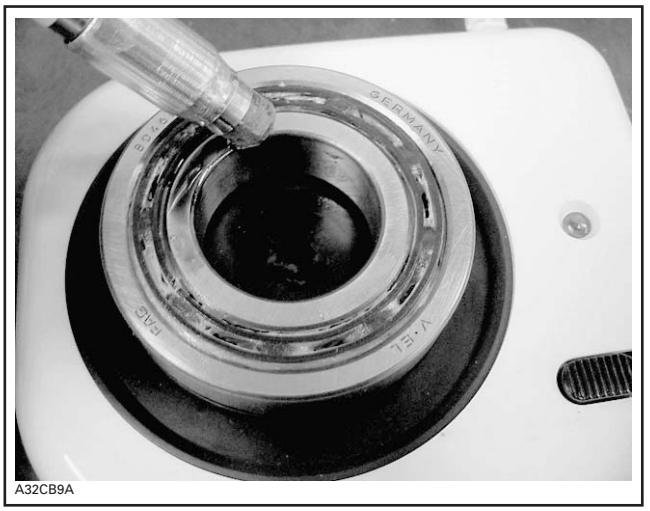
For even heat distribution, turn bearing several times during heating process.

NOTE: Two bearings can be heated at the same time on one bearing heater.

1. Bearings

Probe the side of the inner race of the bearing with a temperature indicator stick. Stick will liquefy when the bearing reaches the proper temperature.

REQUIRED TOOL	
TEMPERATURE INDICATOR STICK (P/N 529 035 970)	



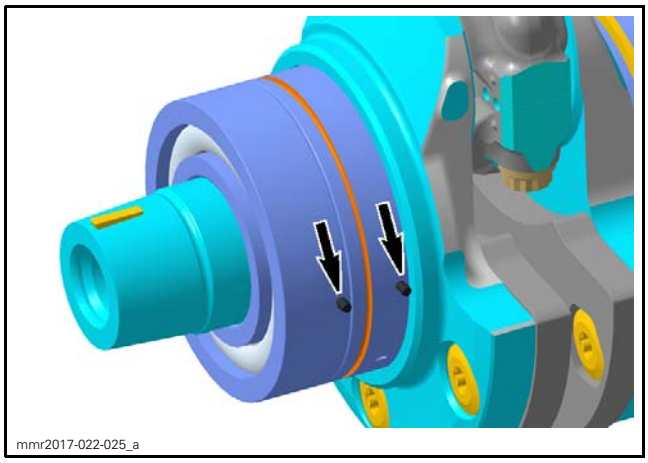
⚠ WARNING

Do not touch heated bearing with bare hands. Always wear heat resisting gloves before handling the heated bearing(s).

NOTICE Never reinstall a bearing that has been removed.

MAG Side Bearings

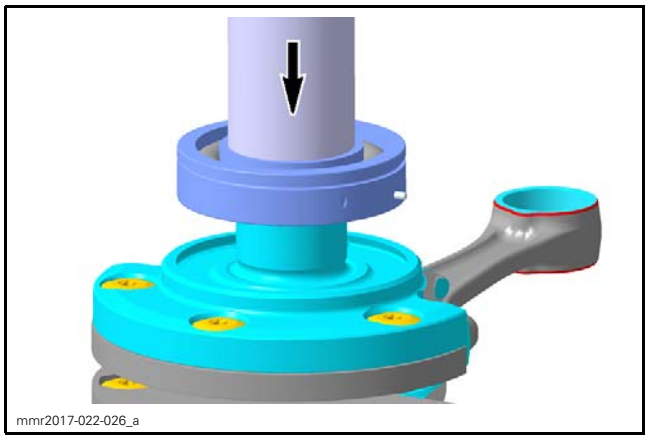
Install MAG bearings on crankshaft so that locating pins will be positioned as shown.



MAG SIDE

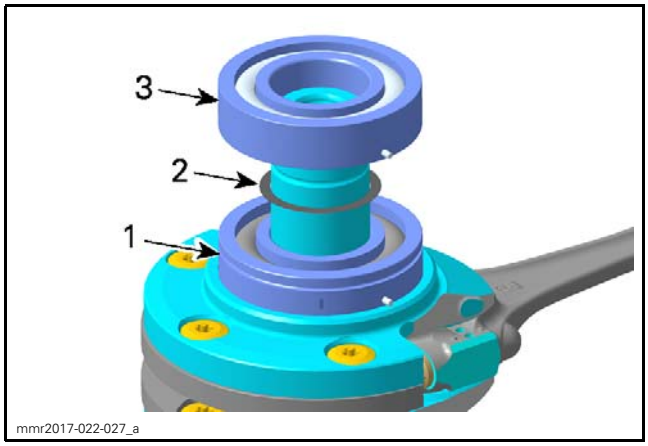
Slide the inner MAG bearing until it bottoms on crankshaft shoulder.

NOTE: Heated bearing should slide easily onto the crankshaft. If required, push with a steel tube on the inner race of the bearing.



Put distance shim on inner MAG bearing.

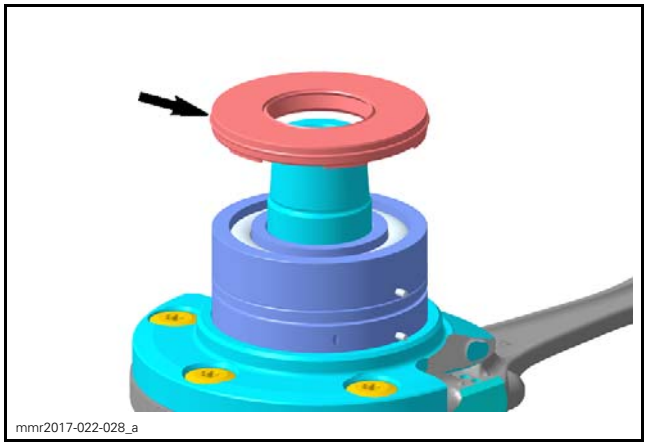
Slide the outer bearing until it sits on distance shim.



MAG SIDE
1. *Inner bearing*
2. *Distance shim*
3. *Outer bearing*

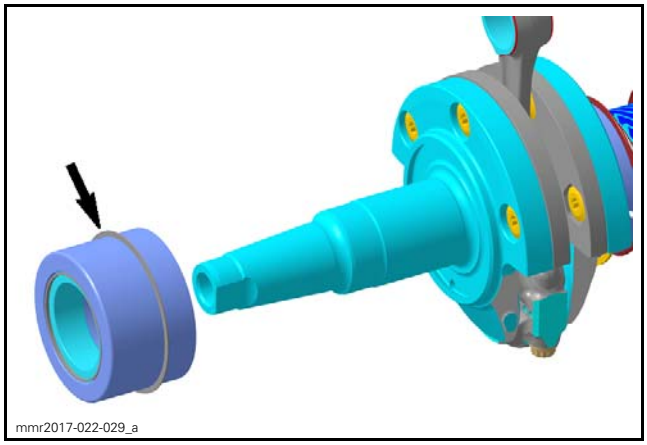
Lubricate oil seal sealing lip and slide it on crankshaft until it sits on outer bearing.

SEALING LIP LUBRICATION	
Service product	PETAMO GREASE GHY 133N (P/N 420 899 271)

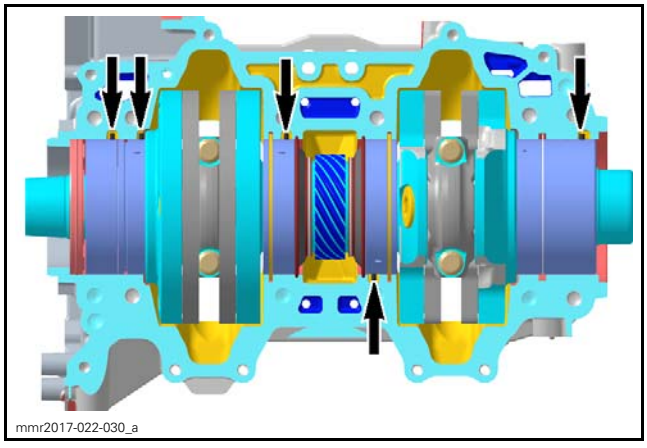


Installing the Crankshaft

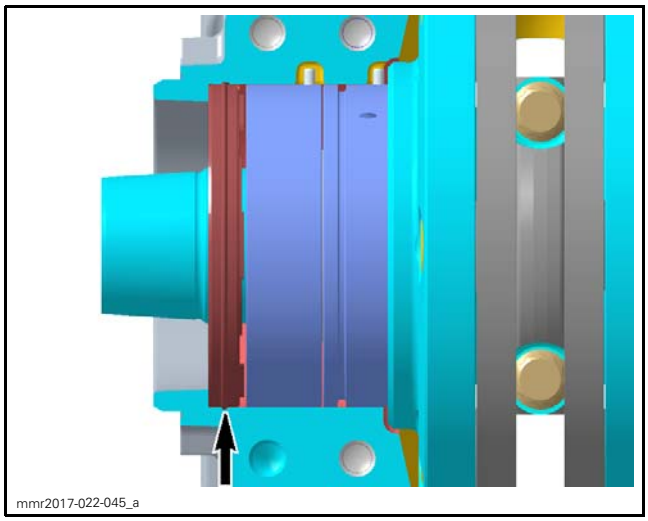
1. Slide cylinder roller bearing on crankshaft journal PTO side.



2. Position locating pins in their recess as illustrated.

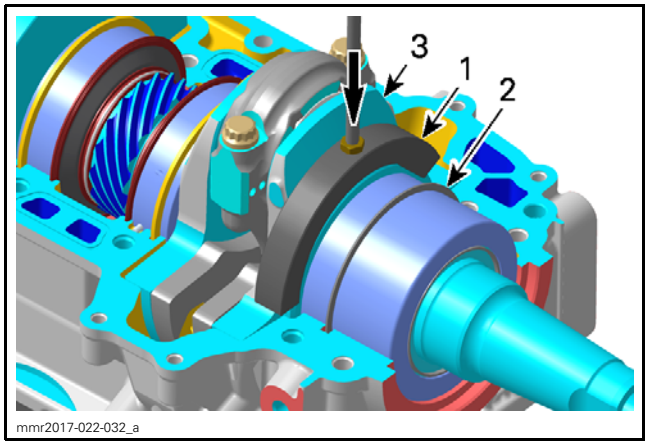


3. Pay attention to properly locate MAG seal in its groove.


mmr2017-022-045_a

4. Place distance gauge between distance ring and crank web PTO.

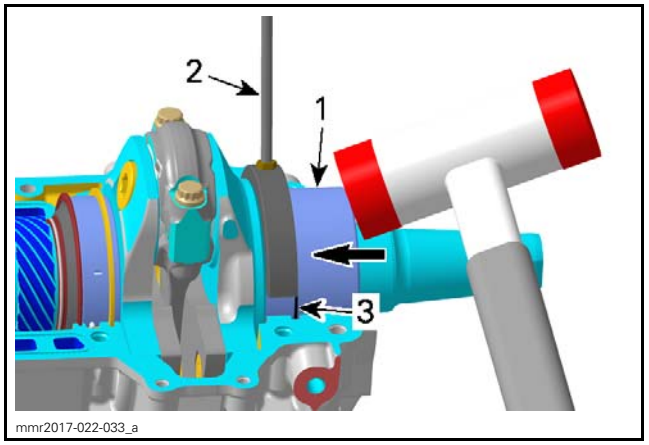
REQUIRED TOOL	
DISTANCE GAUGE (P/N 529 036 415)	



mmr2017-022-032_a

1. *Distance gauge*
2. *Distance ring*
3. *Crank web PTO*

5. Tap the cylinder roller bearing with a plastic hammer until the distance gauge is in contact with the distance ring and crank web.

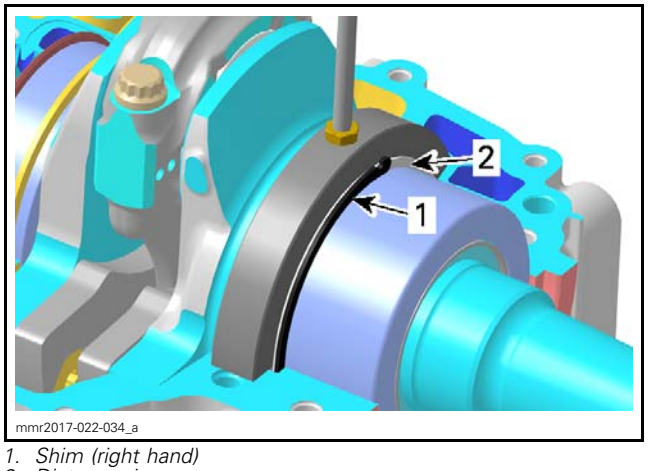


mmr2017-022-033_a

1. *Roller bearing*
2. *Distance gauge*
3. *Distance ring*

6. Put the biggest shim and try to install it in the groove right hand side of the distance ring

AVAILABLE SHIMS	
SHIM NUMBER	SHIM THICKNESS
50	0.50 mm (.02 in)
75	0.75 mm (.03 in)
100	1.00 mm (.039 in)
125	1.25 mm (.049 in)
150	1.50 mm (.059 in)
200	2.00 mm (.079 in)
250	2.50 mm (.098 in)



mmr2017-022-034_a

1. *Shim (right hand)*
2. *Distance ring*

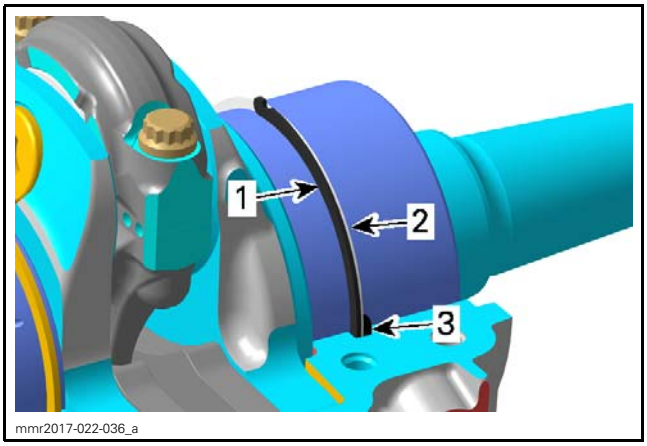
If the thickest shim does not fit, try to install the next thinner shim.

If the thickest shim fits, try to install a second shim until no gap is left.

NOTICE **Maximum 2 shims must be installed to achieve the proper adjustment.**

7. Remove the distance gauge carefully.
8. Put the biggest shim and try to install it in the groove left hand side of the distance ring

AVAILABLE SHIMS	
SHIM NUMBER	SHIM THICKNESS
50	0.50 mm (.02 in)
75	0.75 mm (.03 in)
100	1.00 mm (.039 in)
125	1.25 mm (.049 in)
150	1.50 mm (.059 in)
200	2.00 mm (.079 in)
250	2.50 mm (.098 in)



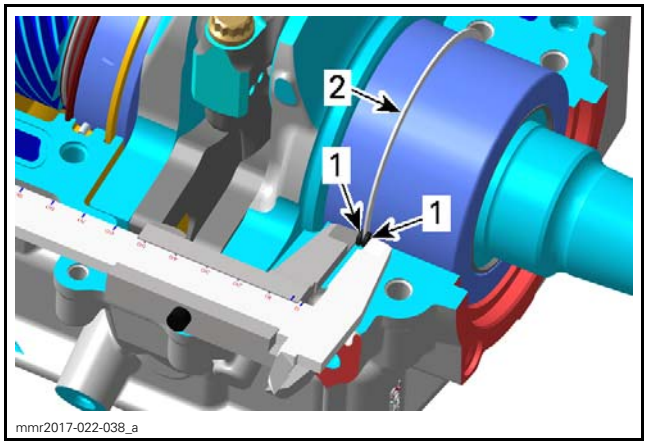
1. Shim (left hand)
2. Distance ring
3. Shim (right hand)

If the shim does not fit, try to install the next thinner shim.

If the shim fits, try to install another shim until no gap is left.

9. Measure the width of the complete package (shims + distance ring).

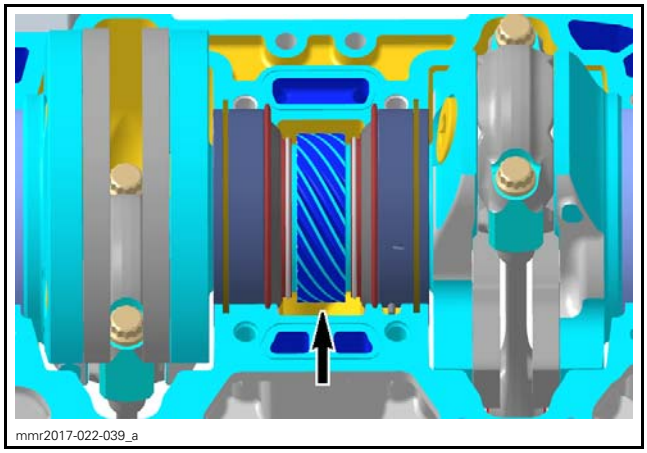
MINIMUM WIDTH OF THE PACKAGE (SHIMS + DISTANCE RING)
3.80 mm (.15 in)



1. Shims
2. Distance ring

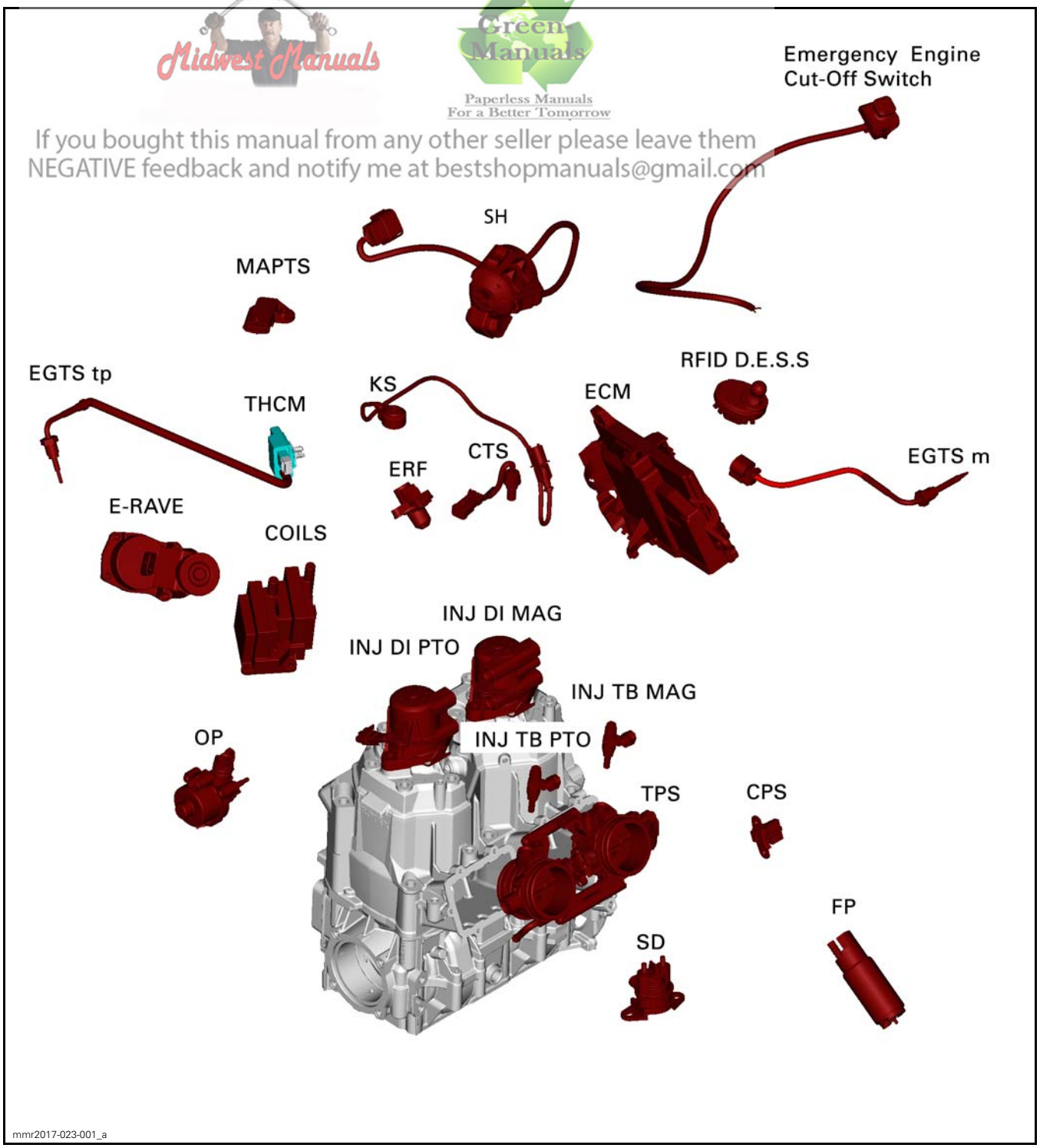
10. Pour injection oil in the oil bath under worm gear as shown.

CRANKSHAFT WORM GEAR LUBRICATION	
Service product	Injection oil
Quantity	50 ml (1.7 U.S. oz)



OIL BATH

ENGINE MANAGEMENT SYSTEM (EMS)



GENERAL

ACRONYM	DEFINITION
SH	Left hand multi-function switch
COILS	Ignition Coils
CPS	Crankshaft Position Sensor
CTS	Coolant Temperature Sensor
RFID DESS	Digitally Encoded Security System
ECM	Engine Control Module
EGTSm	Exhaust Gas Temperature Sensor muffler
EGTStp	Exhaust Gas Temperature Sensor tuned pipe
FP	Fuel Pump
INJ DI MAG	E-TEC Direct Injector (Mag Side)
INJ DI PTO	E-TEC Direct Injector (PTO Side)
INJ TB MAG	Throttle body Injector (Mag Side)
INJ TB PTO	Throttle body Injector (PTO Side)
KS	Knock Sensor
MAPTS	Manifold (intake) Air Pressure / Temperature Sensor
OP	Oil Pump
RER	Rotax Electronic Reverse
ERF	Rave Position Sensor
E-RAVE	Rave Actuator
SD	Starter Solenoid
TPS	Throttle Position Sensor
THCM	Thermocouple Module

SYSTEM DESCRIPTION

The Engine Control Module (ECM) ensures a high power output with a clean combustion with practically no exhaust smoke.

There are 8 main systems that are controlled by the ECM:

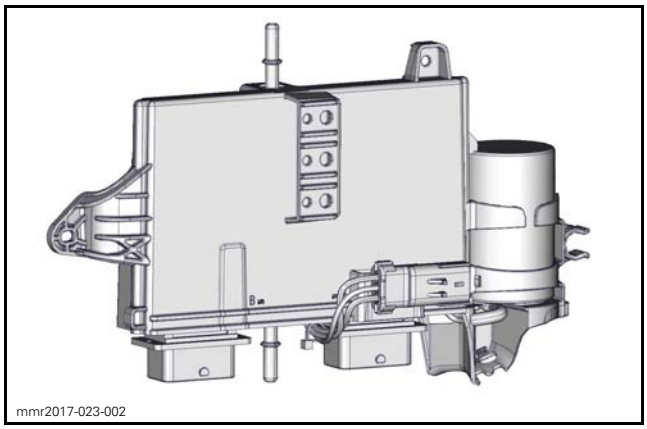
1. E-TEC Direct fuel injection
2. Throttle body injection
3. Ignition system
4. Starting system
5. Rotax electronic reverse (RER)
6. Digitally encoded security system (D.E.S.S.)
7. Lubrication system
8. 3D RAVE
9. Fuel pump
10. Electrical accessories.

The ECM features a monitoring system that self-diagnoses its electronic components. For more information, refer to *DIAGNOSTIC FAULT CODES* subsection.

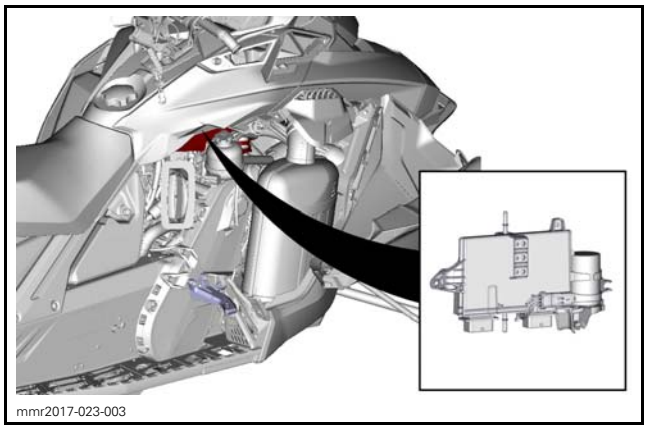
Electrical power distribution is also controlled by the ECM. Refer to *POWER DISTRIBUTION* subsection.

Engine Control Module (ECM)

The ECM reads the inputs and makes computations by comparing them to pre-determined parameters, and sends the required control signals to the outputs to ensure proper engine management.



ECM

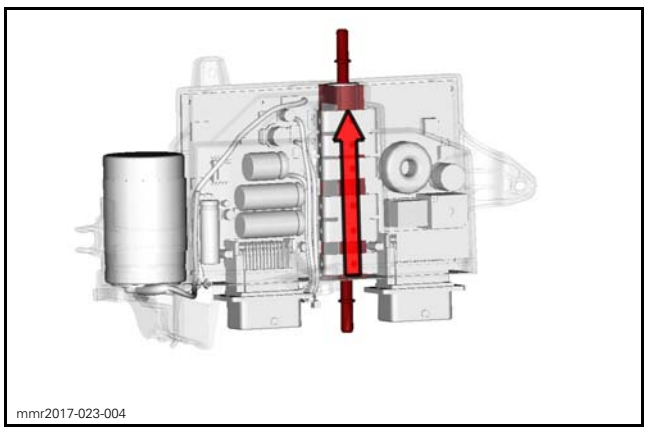


The ECM features a permanent memory that will store fault codes, customer information and other engine information when the engine is stopped.

ECM Cooling

Since the ECM manages all the vehicle's power needs as it incorporates the voltage regulator/ rectifier and other power components, a lot of heat needs to be dissipated.

To ensure adequate heat dissipation, a constant fresh fuel flow from the fuel pump is used to cool down the ECM.



ECM COOLING (FUEL FLOW DIRECTION)

SYSTEM FEATURES

Throttle Protection

If the throttle is not completely closed during engine startup, engine RPM will be limited to idle speed by the ECM.

To revert to normal operation, release the throttle completely and then depress it again.

Warm-Up Protection

The engine's RPM is limited until the desired engine and injection oil temperatures are obtained.

WARM-UP PROTECTION	ENGINE WARM-UP TEMPERATURE
850 E-TEC	20°C to 30°C (68°F to 86°F)

Engine Warm-Up

During the engine warm-up period, the RAVE valves will be limited to the MID position which, limits the engine to a maximum of 7500 ± 200 RPM.

Injection Oil Warm-Up

The injection oil warm-up period is based on oil viscosity.

This is accomplished by measuring the time it takes for the electric oil pump to complete a stroke (oil pump switch signal) from the time at which is was commanded. This provides an indication of the oil viscosity, and therefore temperature and flow capacity.

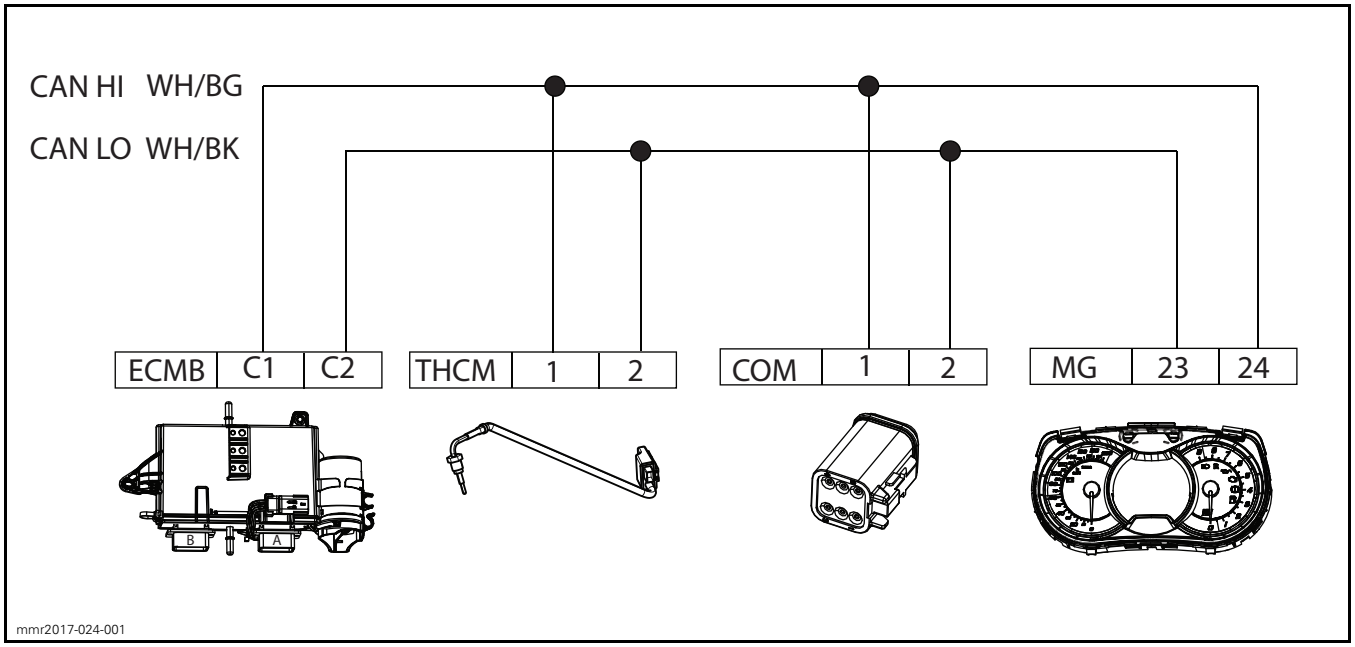
This function will limit engine speed to 5500 - 7500 RPM depending on detected oil viscosity.

This function may remain active for up to 10 - 15 minutes.

Automated Engine Oil Fogging (E-TEC)

An automated engine oil fogging has been implemented to automatically inject the required oil to protect the engine during vehicle storage. Refer to *STORAGE PROCEDURE* subsection for details.

COMMUNICATION PROTOCOLS



COM (Diagnostic connector)
ECM (Engine control module)
MG (Multifunction gauge)
THCM (Thermocouple module)
WH/BG (White/beige)
WH/BK (White/black)

GENERAL

CONTROLLER AREA NETWORK (CAN)

The CAN protocol is an ISO standard for serial data communication.

The ECM forms a network with other components linked with the CAN bus.

The CAN bus (or CAN lines) consist of a pair of wires (WHITE/BEIGE and WHITE/BLACK) that connect every component to each other. The electronic modules are in constant communication within the network.

There are resistors on the CAN lines in the ECM, multifunction gauge and the thermocouple module.

CAN network resistance can be measured from the COM connector pins.

TROUBLESHOOTING

CAN COMMUNICATION PROBLEMS

1. Measure CAN network resistance from the COM connector pins.
2. Disconnect modules one by one and observe change in network resistance to find network communication fault.

NOTE: Disconnect THCM last.

CAN NETWORK RESISTANCE	
CONDITION	SPECIFICATION ± 10%
Good network or THCM fault	60 Ω
ECM or MG network fault	120 Ω
ECM and MG network fault	above 1 MΩ
ECM, MG, and THCM network fault	O.L.
1 MΩ = 1,000,000Ω	

If the resistance does not vary when a module is unplugged ensure wiring harness and pins are in good condition before replacing a module.

NOTE: There is no resistor in the COM connector.

COMMUNICATION TOOLS AND B.U.D.S.

SERVICE TOOLS

Description	Part Number	Page
12 V BATTERY SUPPLY CABLE	529 035 997	2
DIAGNOSTIC CABLE	710 000 851	2
POWER INTERFACE	515 177 223	2

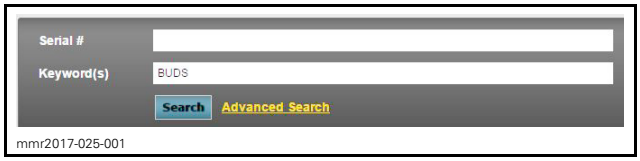
GENERAL

Use BUDS2.

Refer to the **B.U.D.S. directory** on *KNOWLEDGE CENTER* for all BUDS related information, including:

- Current version download link
- User manual (programming keys, reading fault codes, writing data to modules etc.)
- Installation instructions
- Navigation through menus
- BRP BUDS chart

Search keyword: "BUDS".



mmr2017-025-001

TROUBLESHOOTING

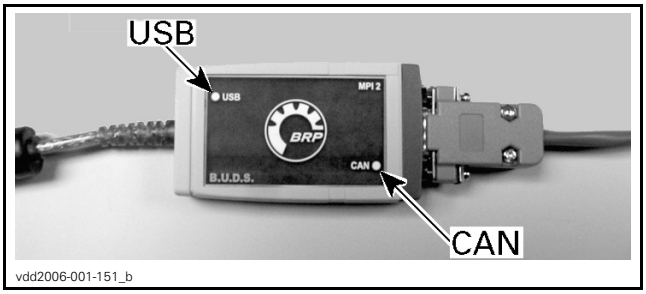
Refer to the BRP BUDS chart to ensure you are using the approriate hardware and tools.

COMMUNICATION PROBLEMS

MPI Connection Troubleshooting

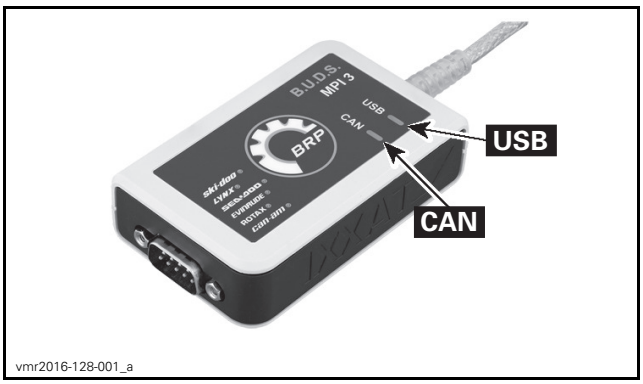
MPI Status Lights

The MPI includes 2 status lights to show the connection conditions: USB and CAN. **Both lights must be GREEN** for the MPI to function properly. Otherwise, refer to the following charts.



vdd2006-001-151_b

MPI-2 CARD



vmr2016-128-001_a

MPI-3 CARD

Prerequisite for USB Communication:

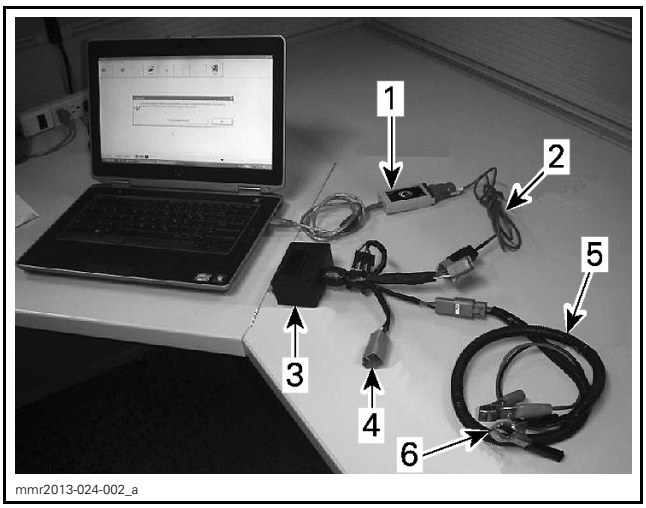
- PC Computer turned ON
- MPI connected to PC computer.

COMMUNICATION PROBLEM (USB)	
STATUS	WHAT TO DO
USB Light is OFF	– Check USB connection between MPI-2 and PC computer. – Check USB operation on PC computer (hardware or Windows drivers).
USB Light is GREEN	– Connections are GOOD. Communication can take place on USB side.

Prerequisite for CAN Communication:

1. MPI connected to diagnostic connector.

2. The tether cord cap (D.E.S.S. key) is installed on the engine cut-off switch and pull the emergency stop switch.
3. B.U.D.S. started and logged.
4. ECM is powered.



1. *MPI Interface carn*
2. *DIAGNOSTIC CABLE (P/N 710 000 851)*
3. *POWER INTERFACE (P/N 515 177 223)*
4. *To vehicle diagnostic connector*
5. *12 V BATTERY SUPPLY CABLE (P/N 529 035 997)*
6. *To 12 V battery*

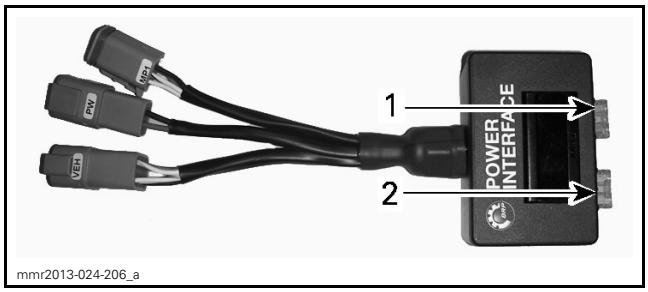
NOTE: The battery supply cable is only necessary on models without a battery.

COMMUNICATION PROBLEM (CAN)	
STATUS	WHAT TO DO
CAN Light is OFF	– B.U.D.S. does not communicate with the vehicle. – Check connections from computer to vehicle. – Check if B.U.D.S. is started. – Check if vehicle is powered: is cluster turned ON. If it is not ON, install the tether cord cap (D.E.S.S. key) on the engine cut-off switch and pull the emergency stop switch.
CAN Light is RED	This occurs when B.U.D.S. looses communication with vehicle. – Check connections from computer to vehicle. – Check if vehicle is powered: is cluster turned ON? If not, install the tether cord cap (D.E.S.S. key) on the engine cut-off switch and pull the emergency stop switch.
CAN Light is GREEN	– Connections are GOOD. B.U.D.S. communicates normally with the vehicle.

Power Interface Test

When the POWER INTERFACE (P/N 515 177 223) is connected to the vehicle diagnostic connector and the emergency stop switch is pulled, the multifunction gauge and the headlight should turn on. Otherwise, check the following and repair or replace Power interface if any test failed.

1. Set the emergency stop switch to run position.
2. Power interface fuses.



1. *Fuse 1*
2. *Fuse 2*

3. External battery voltage should be displayed on Power interface (primary voltage if engine running).

   3.1 Ensure battery charge is high enough to keep the vehicle ON for the duration of the maintenance.

   NOTE: This is especially IMPORTANT if you are updating vehicle software. In case of doubt, charge battery for at least 15 minutes; disconnect charger prior to updating software.

DIAGNOSTIC AND FAULT CODES

GENERAL

MONITORING SYSTEM

The ECM features a monitoring system that self-diagnose its electronic components.

When a predefined condition (engine overheat for example) or a fault occurs, the ECM sends a signal to the multifunction gauge and/or audible signals to a beeper to inform you of this particular condition.

The ECM monitors the following functions and components.

COMPONENT
ECM, TPS, CTS, CPS, KS, RAVE valve solenoids, MAPTS, RPS, ignition coils, fuel injectors and THCM (EGTSm and EGTStp)
12 volts under/over voltage 60 volts under/over voltage
D.E.S.S.
RER
Low oil level, electronic oil injection pump
Oil temperature (end of piston stroke feedback from electronic oil injection pump)
Engine RPM
CAN
Fuel pump

Limp Home Mode

The ECM may automatically set default parameters to ensure the adequate operation of the vehicle if a component of the engine management system is not operating properly.

NOTE: Sensor failures will not automatically result in limp home mode. The appropriate fault code will turn on and in some cases the beeper will sound.

The engine RPM may be limited if some critical components fail. In this case, releasing the throttle and letting the engine return to idle speed may allow normal operation to come back. If it does not, try removing and reinstalling the tether cord cap (D.E.S.S. key) on the engine cut-off switch.

These performance-reduced modes allow the rider to continue on to seek help, or return home, which would otherwise not be possible.

ECM ACTION	CAUSE
Engine is gradually stopped. Continuous fast short beeps and a shutdown message is displayed in multifunction gauge until shutdown.	Fuel pump wiring short circuit to ground or open circuit.
	Fuel pump current requirement is too high.
	Engine idle overheat protection: – Engine idled more than 5 seconds after engine temperature increased above 95°C (203°F). – Engine idled more than 5 minutes after engine temperature increased above 37°C (99°F).
Engine speed is limited to 2500 RPM.	D.E.S.S. key is not recognized by the ECM. The antitheft system is active. RAVE valves are kept at closed position.
Engine speed is limited to 5500 RPM (RAVE valves are kept closed).	Oil injection pump wiring shorted to ground or open circuit.
	Low voltage in the 55 Vdc system. Voltage dropped by 5 V.
	ECM overheat (85°C (185°F)). Engine overheat (100°C (212°F) and above).
	Exhaust gas temperature too high (800°C (1,472°F) and above).
	High engine detonation.
Engine speed is limited to 7000 RPM.	Max. RPM allowed to the engine in reverse. RAVE valves are kept closed.
Engine speed is limited (Variable limit)	Max. RPM allowed varies when engine is cold, according to oil viscosity
Engine speed is limited to 8600 RPM.	Maximum engine RPM allowed.

Pilot Lamps and Beep Codes

Warning lights in the multifunction gauge and/or a beeper provide signals as to a vehicle operation feedback, or to indicate a problem.

A pilot lamp can flash alone or in combination with another lamp.

Beeper codes will be heard and messages (depending on gauge model) will be displayed to attract your attention and inform you of the situation.

DIAGNOSTIC FAULT CODES (DTC)

A fault code is an indication that a glitch or malfunction is detected by the monitoring system of the vehicle.

When there is a problem, the ECM can provide fault codes to ease troubleshooting.

The faults registered in the ECM are stored in memory.

IMPORTANT: After a problem has been solved, be sure to clear the fault(s) in the ECM using the BUDS2 software. This will properly reset their states.

How to Read Fault Codes Using BUDS2 Software

Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

For more information pertaining to the faults code status and report, refer to B.U.D.S. online help.

How to Read Fault Codes on the Multifunction Gauge

Same gauges can display fault codes.. Refer to the applicable *GAUGE* subsection.

How to Find Fault Code Descriptions

Connect BUDS2 to the vehicle. Refer to *COMMUNICATION TOOLS AND BUDS* subsection.

Navigate to the faults page in BUDS2.

Browse lists of active/occurred and inactive fault codes.

DIAGNOSTIC AND FAULT CODES

GENERAL

FAULT CODE TABLES

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0106	ECM	Manifold air pressure sensor voltage not plausible.	Vacuum leakage between throttle body and plenum (ex: rubber hose disconnected, loose screws, missing gasket at cylinder head flange, missing injector o-rings, cracks) Air intake duct or filter severely clogged MAPTS sensor Defective Damaged circuit wires, damaged connector or damaged ECM pins, ECM voltage supply.	Make sure sensor connector is fully inserted. Measure voltage between harness connector MAPTS-1and MAPTS-3 (expected value: 4.8 to 5.1 volts).
P0107	ECM	Manifold air pressure sensor voltage too low.	Voltage on system circuit MAPTS-4 reached a low value. Sensor may be disconnected. Circuit wires MAPTS-3 or MAPTS-4 may be disconnected. MAPTS-4 is shorted to ground No 5 volts supply on MAPTS-3 circuit. Damaged sensor.	Make sure sensor's connector is fully inserted. Measure voltage between harness connector MAPTS-1 and MAPTS-3 with the vehicle turned on (expected value: 4.8 to 5.1 volts) Check continuity between ECMA-H2 and MAPTS-1. Check continuity between ECMA-B4 and MAPTS-3. Check continuity between ECMA-G4 and MAPTS-4.
P0108	ECM	Manifold air pressure sensor voltage too high.	Voltage on system circuit MAPTS-4 reached a high value. Circuit wire MAPTS-4 shorted to a supply Circuit wire MAPTS-1 is not connected. Damaged sensor.	Make sure sensor's connector is fully inserted. Measure voltage between harness connector MAPTS-1 and MAPTS-3 with the vehicle turned on (expected value: 4.8 to 5.1 volts) Check continuity between ECMA-H2 and MAPTS-1. Check continuity between ECMA-B4 and MAPTS-3. Check continuity between ECMA-G4 and MAPTS-4.

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0112	ECM	Manifold air temperature sensor voltage too high.	Voltage on system circuit MAPTS-2 reached a high value. Sensor may be disconnected. Circuit wires MAPTS-1 or MAPTS-2 may be disconnected. Damaged sensor.	Make sure sensor's connector is fully inserted. If it is correct then disconnect it and perform the following tests. Check MAPTS sensor pins 1 and 2 for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). If the sensor resistivity is out of range replace the sensor. Check system circuits ECMA-H3 for continuity to terminal 2 of the MAPTS sensor. Check system circuits ECMA-H2 for continuity to terminal 1 of the MAPTS sensor.
P0113	ECM	Manifold air temperature sensor voltage too low.	Voltage on system circuit MAPTS-2 reached a low value. System circuit MAPTS-2 shorted to ground. Damaged sensor.	Disconnect the sensor and check for a change in the fault code. If the fault code stays the same, look for a short circuit on the harness. If the fault code is different, replace the sensor. Check MAPTS sensor pins 1 and 2 for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). If the sensor resistivity is out of range replace the sensor. If the sensor resistivity is correct according to the specified temperature range then check circuit wire MAPTS-2 for a short to the ground.
P0117	ECM	Engine coolant temperature sensor voltage too high.	Voltage on system circuit CTS-2 reached a high value. Sensor may be disconnected. Circuit wires CTS-1 or CTS-2 may be disconnected. Circuit CTS-2 shorted to 5 or 12 volts. Damaged sensor.	Make sure sensor's connector is fully inserted. Check system circuit ECMA-1A for continuity to terminal 1 of the CTS connector and ECMA-J2 for continuity to terminal 2 of the CTS connector. Check CTS resistivity on the sensor pins for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). If the sensor resistivity is out of range replace the sensor.

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0118	ECM	Engine coolant temperature sensor voltage too low.	Voltage on system circuit CTS-2 reached a low value. Circuit wire CTS-2 shorted to ground. Damaged sensor.	Disconnect the sensor and check for a change in the fault code. If the fault code stays the same, look for a short circuit on the harness. If the fault code is different, replace the sensor. Check system circuit CTS-2 for resistivity to ground (Expected value = 1.2 Kohms when ECMA connector is still connected). Check system circuit ECMA-1A for continuity to terminal 1 of the CTS connector and ECMA-J2 for continuity to terminal 2 of the CTS connector. Check CTS sensor pins for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). If the sensor resistivity is out of range replace the sensor.
P0122	ECM	First Throttle Accelerator Sensor (TAS) Short circuit to GND	Damaged circuit wires, damaged throttle position sensor or damaged ECM pins.	Make sure sensor connector is fully inserted. Measure resistance from connector: ECMB-K1 to TAS-D (expected value: < 2 ohms). Measure resistance from connector: ECMB-K3 to TAS-E (expected value: < 2 ohms). Measure resistance from connector: ECMB-E1 to TAS-F (expected value: < 2 ohms).
P0123	ECM	First Throttle Accelerator Sensor (TAS) shorted to supply	Damaged circuit wires, damaged throttle position sensor or damaged ECM pins.	Make sure sensor connector is fully inserted. Measure resistance from connector: ECMB-K1 to TAS-D (expected value: < 2 ohms). Measure resistance from connector: ECMB-K3 to TAS-E (expected value: < 2 ohms). Measure resistance from connector: ECMB-E1 to TAS-F (expected value: < 2 ohms).

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0127	ECM	Torque reduction due to high manifold air temperature.	Temperature detected by the MAPTS sensor exceeded the maximum limit. Could happen during extended idling at high ambient temperatures or very low speed with load	
P0201	ECM	Injector Cyl. #1 (PTO) open circuit.	Circuit wires INJ1-1 or INJ1-2 open circuit. Blown fuse. Disconnected injector connector. Disconnected HIC connector. Injector coil open circuit,	Check fuel injector fuse. Make sure injector connector is fully inserted. Make sure HIC connector is connected. Check system circuit ECMA-B3 for continuity to pin 2 of INJ1 connector. Check system circuit INJ-1 for continuity to the fusebox. Check injector resistivity for approximately 14.5 ohms.
P0202	ECM	Injector Cyl. #2 (MAG) open circuit.	Circuit wires INJ2-1 or INJ2-2 open circuit. Blown fuse. Disconnected injector connector. Disconnected HIC connector. Injector coil open circuit.	Check fuel injector fuse. Make sure injector connector is fully inserted. Make sure HIC connector is connected. Check system circuit ECMA-K1 for continuity to pin 2 of INJ1 connector. Check system circuit INJ-1 for continuity to the fusebox. Check injector resistivity for approximately 14.5 ohms.
P0217	ECM	Torque reduction due to high engine coolant temperature.	Warm riding condition, lack of cooling.	Check coolant level. Check for air pocket in cooling system.
P0222	ECM	2nd Throttle Accelerator Sensor (TAS) shorted to GND	Damaged circuit wires, damaged throttle position sensor or damaged ECM pins.	Make sure sensor connector is fully inserted. Measure resistance from connector: ECMB-J3 to TAS-A (expected value: < 2 ohms). Measure resistance from connector: ECMB-B3 to TAS-B (expected value: < 2 ohms). Measure resistance from connector: ECMB-A3 to TAS-C (expected value: < 2 ohms).

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0223	ECM	2nd Throttle Accelerator Sensor (TAS) shorted to supply	Damaged circuit wires, damaged throttle position sensor, or damaged ECM pins.	Make sure sensor connector is fully inserted. Measure resistance from connector: ECMB-J3 to TAS-A (expected value: < 2 ohms). Measure resistance from connector: ECMB-B3 to TAS-B (expected value: < 2 ohms). Measure resistance from connector: ECMB-A3 to TAS-C (expected value: < 2 ohms).
P0231	ECM	Fuel pump open circuit or shorted to ground.	There is no load on circuit wire ECMB-M1 or it is shorted to ground. Blown fuse. Fuel pump connector is not connected. Fuel pump motor is open.	Check fuse. Make sure the fuel pump connector is fully inserted. Open ECM ACTIVATION page in B.U.D.S. Activate fuel pump and check if it reacts as expected. With vehicule power ON check voltage on FP-C connector (Expected value = battery voltage). Check system circuit ECMB-M1 for continuity to FP-A connector. Measure resistance between FP-C and FP-A (expected value: < 2 ohms)
P0232	ECM	Fuel pump shorted to battery.	Circuit wire ECMB-M1 is shorted to 12 volts. Fuel pump motor is stuck or shorted.	Disconnect the fuel pump and check if the fault disapears. If it does then replace the fuel pump. Ckeck if system circuits FP-A and FP-C are shorted together.
P0261	ECM	Injector Cyl. #1 (PTO) shorted to ground.	Circuit wire INJ1-1 is shorted to ground.	Disconnect injector 1. Measure resistance between injector pin 1 and 2 (Expected value = 10 to 15 ohms). With vehicule power ON and engine not running, check the voltage on pin 2 of the INJ2 connector (Expected value = around 3.3 volts). If the voltage is close to 12 volts check for a short to 12 volts on this circuit.

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0262	ECM	Injector Cyl. #1 (PTO) shorted to battery.	Circuit wire INJ1-1 is shorted to battery. Injector coil is shorted.	Disconnect injector 1. Measure resistance between injector pin 1 and 2 (Expected value = 10 to 15 ohms). With vehicule power ON and engine not running, check the voltage on pin 2 of the INJ2 connector (Expected value = around 3.3 volts). If the voltage is close to 12 volts check for a short to 12 volts on this circuit.
P0264	ECM	Injector Cyl. #2 (MAG) shorted to ground.	Circuit wire INJ2-1 is shorted to ground. Injector coil is open	Disconnect injector 2. Measure resistance between injector pin 1 and 2 (Expected value = 10 to 15 ohms). With vehicule power ON and engine not running, check the voltage on pin 2 of the INJ2 connector (Expected value = around 3.3 volts). If the voltage is close to 12 volts check for a short to 12 volts on this circuit.
P0265	ECM	Injector Cyl. #2 (MAG) shorted to battery.	Circuit wire INJ2-1 is shorted to battery. Injector coil is shorted.	Disconnect injector 2. Measure resistance between injector pin 1 and 2 (Expected value = 10 to 15 ohms). With vehicule power ON and engine not running, check the voltage on pin 2 of the INJ2 connector (Expected value = around 3.3 volts). If the voltage is close to 12 volts check for a short to 12 volts on this circuit.
P0335	ECM	Crankshaft signal fault.	Slow engine cranking due to low battery voltage Intermittent signal from crankshaft position sensor. Damaged circuit wires, damaged sensor. Sensor may not be properly secured.	Verify that the battery is properly charged Make sure sensor connector is fully inserted. Measure resistance from connector: ECMA-H1 to CPS-1 (Expected value: < 2 ohms). Measure resistance from connector: ECMA-K2 to CPS-2 (Expected value: < 2 ohms).

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0340	ECM	Engine phase determination error.	CAPS signal not plausible, damaged circuit wires, damaged connector or damaged tooth wheel.	Make sure sensor connector is fully inserted. Measure voltage between harness connector CAPS-3 and CAPS-1 (expected value: 11 to 13 volts). Measure resistance between connector ECMA-E2 to CAPS-2. (expected value : <2 ohms)
P0359	ECM	Ignition coil Cyl. #2 (MAG) shorted to battery.	Circuit wire IGN2-3 is shorted to battery. Ignition coil is damaged.	Disconnect ignition coil #2. With vehicule power ON and engine not running check voltage on pin 3 of IGN2 connector. (Expected value = 0 volt). If voltage is close to 12 volts, check for a short on this circuit.
P0360	ECM	Ignition coil Cyl. #1 (PTO) shorted to battery.	Circuit wire IGN1-3 is shorted to battery. Ignition coil is damaged.	Disconnect ignition coil #1. With vehicule power ON and engine not running check voltage on pin 3 of IGN1 connector. (Expected value = 0 volt). If voltage is close to 12 volts, check for a short on this circuit.
P0361	ECM	ECM ignition coil driver #2 (MAG) fault	Ignition coil or HIC connector not connected or damaged. Blown fuse. Broken wire or terminal.	Check if HIC connector connected. Check ignition fuse. Check circuit wire IGN2-3.
P0362	ECM	ECM ignition coil driver #1 (PTO) fault	Ignition coil or HIC connector not connected or damaged. Blown fuse. Broken wire or terminal.	Check if HIC connector connected. Check ignition fuse. Check circuit wire IGN1-3.
P0480	ECM	Fan relay circuit	Blown fuse, damaged or disconnected relay, damaged circuit wires, damaged connectors or damaged ECM output pins.	Check fuse. Disconnect Fan relay. Measure voltage between harness connector CFM-4 and ground (expected value: 11 to 13 volts). Measure resistance from harness connector: ECMB-J4 to CFM-2 (expected value: < 2 ohms). With the engine turned off measure voltage between CFM-2 and ground (expected value: 11 to 13 volts). Use BUDS to activate the fan and measure voltage between CFM-2 and ground (expected value: close to 0 volts). Check fuse F4

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0513	ECM	Invalid Access Key Detected	A non stored access key was detected when key switch was turned to ON. If no access key is available, program a new one and retry.	
P0520	ECM	Engine oil pressure switch functional problem.	Defective oil pressure switch, damaged circuit wires, damaged connector or loose terminals, damaged ECM pins.	Measure resistance between harness connector EOP and ground when engine stopped (expected value < 2 ohms). Measure resistance between harness connector EOP and ground when engine running (expected value = open). Measure resistance from harness connector: EOP to ECMA-E3 (expected value: < 2 ohms). Check if HIC connector is properly connected (engine harness to the vehicle harness).
P0523	ECM	Engine oil pressure switch sticking	Disconnected oil pressure switch Damaged oil pressure switch, damaged circuit wires, damaged connector, damaged ECM pins.	Measure resistance between harness connector EOP and ground when engine stopped (expected value < 2 ohms). Measure resistance between harness connector EOP and ground when engine running (expected value = open). Measure resistance from harness connector: EOP to ECMA-E3 (expected value: < 2 ohms). Check if HIC connector is properly connected (engine harness to the vehicle harness).
P0524	ECM	Low oil pressure.	Oil level too low Engine mechanical problem Defective oil pressure switch, damaged circuit wires, damaged connector, damaged ECM pins. Vehicle was turned upside down with the engine running	Check oil level. Check system circuit ECMA-E3 for continuity to the terminal of the OPS connector. Check oil pressure. If the vehicle was turned upside down while the engine was running, delete the fault
P0560	ECM	Non-plausibility error on system voltage	ECU internal failure in reading system voltage	Replace ECU if fault is persisting

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0562	ECM	Battery voltage too low.	Battery voltage dropped under 11 volts.	Check battery voltage for 11 to 13 volts with engine stopped. Check battery voltage for 13.5 to 14.5 volts with engine speed above 2500 RPM. Check connections on regulator. Check charging system.
P0563	ECM	Battery voltage too high.	Battery voltage exceeded 15.6 volts.	Check battery voltage for 11 to 13 volts with engine stopped. Check battery voltage for 13.5 to 14.5 volts with engine speed above 2500 RPM. Check connections on regulator. Check charging system.
P060D	ECM	Throttle Accelerator Sensor (TAS) signals not synchronized.	Throttle Accelerator Sensors (TAS) plausibility check error.	Make sure sensor connector is fully inserted. Check voltages on connector TAS-F and TAS-C. Voltage on pin TAS-F must be 2 times greater than voltage on pin TAS-C at any given position of the lever. Check for 5 volts on pin TAS-A and TAS-D.
P060E	ECM	Electrical Throttle Actuator (ETA) control fault	Damaged wiring harness Damaged TPS Damaged ECM	Disconnect throttle body Measure resistance between ETC pin 3 and 5 (expected value = 2 to 3 ohms). Disconnect ECMA. Measure resistance from harness connector: ETC-5 to ECMA-L1 (expected value: < 2 ohms). Measure resistance from harness connector: ETC-3 to ECMA-L2 (expected value: < 2 ohms).
P0610	ECM	Variant Coding error.	Faulty variant coding, faulty programming, wrong ECM after replacement	

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P062C	ECM	Loss of vehicle speed information from multifunction gauge.	ECM lost communication with the cluster. Multifunction gauge may be disconnected. Loss of power on the multidunction gauge. Loss of communication with the multidunction gauge via the CAN bus. CAN bus lines shorted together. CAN bus line shorted to ground.	Make sure the multidunction gauge connector is fully inserted. Check for bent pin on the cluster connector Measure voltage between harness connector MG-8 and ground with the vehicle turned on (expected value: 11 to 13 volts). Measure voltage between harness connector MG-9 and ground with the vehicle turned off (expected value: 11 to 13 volts). Measure resistivity between harness connector MG-11 for continuity to the ground (Expected value < 2 ohms). Check continuity between harness connector MG-24 and ECMB-C1 Check continuity between harness connector MG-23 and ECMB-C2 Resistance between harness connector MG-23 and MG-24 should be around 120 ohms Verify that harness connector MG-23 and MG-24 are not shorted to ground or anything else

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0685	ECM	Lighting relay circuit	Blown fuse, damaged or disconnected relay, damaged circuit wires, damaged connectors or damaged ECM output pins.	Check fuse. Disconnect lighting relay. Measure voltage between harness connector FB-D1 and ground (expected value: 11 to 13 volts). Measure voltage between harness connector FB-D2 and ground (expected value: 11 to 13 volts). Measure resistance from harness connector: ECMB-G1 to FB-C2 (expected value: < 2 ohms). With the engine turned off measure voltage between FB-C2 and ground (expected value: 11 to 13 volts). With the engine turned on measure voltage between FB-C2 and ground (expected value: close to 0 volts). Measure resistance between terminals 85 and 86 on the 2 relays (expected value: 70 to 90 ohms).
P0686	ECM	Lighting relay circuit shorted to ground or open circuit	Blown fuse, damaged or disconnected relay, damaged circuit wires, damaged connectors or damaged ECM output pins.	Check fuse. Disconnect lighting relay. Measure voltage between harness connector FB-D1 and ground (expected value: 11 to 13 volts). Measure voltage between harness connector FB-D2 and ground (expected value: 11 to 13 volts). Measure resistance from harness connector: ECMB-G1 to FB-C2 (expected value: < 2 ohms). With the engine turned off measure voltage between FB-C2 and ground (expected value: 11 to 13 volts). With the engine turned on measure voltage between FB-C2 and ground (expected value: close to 0 volts). Measure resistance between terminals 85 and 86 on the 2 relays (expected value: 70 to 90 ohms).

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0687	ECM	Lighting relay circuit shorted to battery +	Damaged relay, damaged circuit wires, damaged connector or damaged ECM output pins.	Check fuse. Disconnect lighting relay. Measure voltage between harness connector FB-D1 and ground (expected value: 11 to 13 volts). Measure voltage between harness connector FB-D2 and ground (expected value: 11 to 13 volts). Measure resistance from harness connector: ECMB-G1 to FB-C2 (expected value: < 2 ohms). With the engine turned off measure voltage between FB-C2 and ground (expected value: 11 to 13 volts). With the engine turned on measure voltage between FB-C2 and ground (expected value: close to 0 volts). Measure resistance between terminals 85 and 86 on the 2 relays (expected value: 70 to 90 ohms).
P0691	ECM	Fan relay circuit shorted to ground or open circuit	Blown fuse, damaged or disconnected relay, damaged circuit wires, damaged connectors or damaged ECM output pins.	Check fuse. Disconnect Fan relay. Measure voltage between harness connector CFM-4 and ground (expected value: 11 to 13 volts). Measure resistance from harness connector: ECMB-J4 to CFM-2 (expected value: < 2 ohms). With the engine turned off measure voltage between CFM-2 and ground (expected value: 11 to 13 volts). Use BUDS to activate the fan and measure voltage between CFM-2 and ground (expected value: close to 0 volts). Check fuse F4

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0692	ECM	Fan relay circuit shorted to battery +	Damaged relay, damaged circuit wires, damaged connector or damaged ECM output pins.	Check fuse. Disconnect Fan relay. Measure voltage between harness connector CFM-4 and ground (expected value: 11 to 13 volts). Measure resistance from harness connector: ECMB-J4 to CFM-2 (expected value: < 2 ohms). With the engine turned off measure voltage between CFM-2 and ground (expected value: 11 to 13 volts). Use BUDS to activate the fan and measure voltage between CFM-2 and ground (expected value: close to 0 volts). Check fuse F4
P1120	ECM	Wrong ratio between both throttle position sensor (TPS)	Damaged wiring harness Damaged TPS Damaged ECM	Make sure the TPS connector is fully inserted. Reset TPS postion. Measure voltage between harness connector ETC-6 and ETC-2 with the vehicle turned on (expected value: 3.3 volts) Check for short between ETC-1 or ETC-4 and a supply or a ground Check continuity between harness connector ETC-1 and ECMA-F3 Check continuity between harness connector ETC-4 and ECMA-K3 Check continuity between harness connector ETC-6 and ECMA-K4 Check continuity between harness connector ETC-2 and ECMA-A2
P160E	ECM	Electrical Throttle Actuator (ETA) control fault	Damaged wiring harness Damaged TPS Damaged ECM	Disconnect throttle body Measure resistance between ETC pin 3 and 5 (expected value = 2 to 3 ohms). Disconnect ECMA. Measure resistance from harness connector: ETC-5 to ECMA-L1 (expected value: < 2 ohms). Measure resistance from harness connector: ETC-3 to ECMA-L2 (expected value: < 2 ohms).

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P1610	ECM	Electrical Throttle Actuator (ETA) shorted to supply	Damaged ETC module, damaged circuit wires, damaged connector or damaged ECM output pins.	Disconnect ETC module. Check for a short between ECMA-L1 or ECMA-L2 and a supply Measure resistance from connector: ECMA-L1 to ETC-5 (expected value: < 2 ohms). Measure resistance from connector: ECMA-L2 to ETC-3 (expected value: < 2 ohms).
P1611	ECM	Electrical Throttle Actuator (ETA) shorted to ground	Damaged ETC module, damaged circuit wires, damaged connector or damaged ECM output pins.	Disconnect ETC module. Check for a short between ECMA-1L or ECMA-L2 and gnd Measure resistance from connector: ECMA-L1 to ETC-5 (expected value: < 2 ohms). Measure resistance from connector: ECMA-L2 to ETC-3 (expected value: < 2 ohms).
P1612	ECM	Electrical Throttle Actuator (ETA) signal not plausible	Damaged ETC module, damaged circuit wires, damaged connector or damaged ECM output pins.	Disconnect ETC module. Measure resistance from connector: ECMA-L1 to ETC-5 (expected value: < 2 ohms). Measure resistance from connector: ECMA-L2 to ETA-3 (expected value: < 2 ohms).
P1613	ECM	Electrical Throttle Actuator (ETA) open electrical load	Damaged ETC module, damaged circuit wires, damaged connector or damaged ECM output pins.	Disconnect ETC module. Measure resistance from connector: ECMA-L1 to ETC-5 (expected value: < 2 ohms). Measure resistance from connector: ECMA-L2 to ETA-3 (expected value: < 2 ohms). Measure resistance between ETC-5 and ETC-3 (expected value < 5 ohms)

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P1614	ECM	Electronic throttle control (ETC) return spring check not passed	Throttle mechanical adjustment. No TPS reset after throttle body/ECM replacement. Damaged throttle body	Check throttle plate movement. Check idle stop for wear. Check throttle position sensor angle at idle, expected value 1-4.5 degrees Perform THROTTLE POSITION SENSOR RESET in B.U.D.S. with throttle grip accelerator not activated since at least 30 seconds. Refer to the SERVICE MANUAL for more details.
P1615	ECM	Electronic throttle control (ETC) position deviation fault	Throttle mechanical adjustment. No TPS reset after throttle body/ECM replacement.	Check throttle plate movement. Check idle stop for wear. Check throttle position sensor angle at idle, expected value 1-4.5 degrees Perform THROTTLE POSITION SENSOR RESET in B.U.D.S. with throttle grip accelerator not activated since at least 30 seconds. Refer to the SERVICE MANUAL for more details.
P1616	ECM	Electronic throttle control (ETC) check of limp-home position failed	Throttle mechanical stop. No TPS reset after throttle body/ECM replacement.	Check throttle plate movement. Check idle stop for wear. Check throttle position sensor angle at idle, expected value 1-4.5 degrees Perform THROTTLE POSITION SENSOR RESET in B.U.D.S. with throttle grip accelerator not activated since at least 30 seconds. Refer to the SERVICE MANUAL for more details.
P1619	ECM	TPS adaptation failure	Wrong throttle body mechanical position during reset of closed TPS or no TPS reset after ECM replacement.	Check idle stop for wear. Perform THROTTLE POSITION SENSOR RESET in B.U.D.S. with throttle grip accelerator not activated since at least 30 seconds.
P1620	ECM	TPS adaptation failure	Wrong throttle body mechanical position during reset of closed TPS or no TPS reset after ECM replacement.	Check idle stop for wear. Perform THROTTLE POSITION SENSOR RESET in B.U.D.S. with throttle grip accelerator not activated since at least 30 seconds.

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P1621	ECM	TPS adaptation cancelled lower mechanical stop failed	Throttle mechanical stop. No TPS reset after throttle body/ECM replacement.	Check idle stop for wear. Ensure throttle plate is against throttle stop. Check throttle Position sensor angle at idle. Perform THROTTLE POSITION SENSOR RESET in B.U.D.S. with throttle grip accelerator not activated since at least 30 seconds. Refer to the SERVICE MANUAL for more details.
P1622	ECM	TPS adaptation failed	Throttle mechanical stop. No TPS reset after throttle body/ECM replacement.	Check idle stop for wear. Check throttle position sensor angle at idle. Perform THROTTLE POSITION SENSOR RESET in B.U.D.S. with throttle grip accelerator not activated since at least 30 seconds. Refer to the SERVICE MANUAL for more details.
P1672	ECM	Accessories relay circuit shorted to battery +	Damaged relay, damaged circuit wires, damaged connector or damaged ECM output pins.	Check fuse. Disconnect lighting relay. Measure voltage between harness connector FB-C6 and ground (expected value: 11 to 13 volts). Measure voltage between harness connector FB-C5 and ground (expected value: 11 to 13 volts). Measure resistance from harness connector: ECMB-J2 to FB-D5 (expected value: < 2 ohms). With the engine turned off measure voltage between FB-D5 and ground (expected value: 11 to 13 volts). With the engine turned on measure voltage between FB-D5 and ground (expected value: close to 0 volts). Measure resistance between terminals 85 and 86 on the 2 relays (expected value: 70 to 90 ohms).

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P1673	ECM	Accessories relay circuit shorted to ground or open circuit	Blown fuse, damaged or disconnected relay, damaged circuit wires, damaged connectors or damaged ECM output pins.	Check fuse. Disconnect lighting relay. Measure voltage between harness connector FB-C6 and ground (expected value: 11 to 13 volts). Measure voltage between harness connector FB-C5 and ground (expected value: 11 to 13 volts). Measure resistance from harness connector: ECMB-J2 to FB-D5 (expected value: < 2 ohms). With the engine turned off measure voltage between FB-D5 and ground (expected value: 11 to 13 volts). With the engine turned on measure voltage between FB-D5 and ground (expected value: close to 0 volts). Measure resistance between terminals 85 and 86 on the 2 relays (expected value: 70 to 90 ohms).
P1674	ECM	Accessories relay circuit	Blown fuse, damaged or disconnected relay, damaged circuit wires, damaged connectors or damaged ECM output pins.	Check fuse. Disconnect lighting relay. Measure voltage between harness connector FB-C6 and ground (expected value: 11 to 13 volts). Measure voltage between harness connector FB-C5 and ground (expected value: 11 to 13 volts). Measure resistance from harness connector: ECMB-J2 to FB-D5 (expected value: < 2 ohms). With the engine turned off measure voltage between FB-D5 and ground (expected value: 11 to 13 volts). With the engine turned on measure voltage between FB-D5 and ground (expected value: close to 0 volts). Measure resistance between terminals 85 and 86 on the 2 relays (expected value: 70 to 90 ohms).
P16C0	ECM	ECU ADC plausibility check	Monitoring plausibility check failed.	Check for ECM fault.
P16C1	ECM	ECU ADC test failed	Monitoring plausibility check failed.	Check for ECM fault.

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P16C2	ECM	ECU monitoring error	Monitoring plausibility check failed.	Check for ECM fault.
P16C3	ECM	Throttle Accelerator Sensors (TAS) monitoring check fault	Monitoring plausibility check failed.	Check for ECM fault.
P16C4	ECM	Engine speed monitoring check fault	Monitoring plausibility check failed.	Check for ECM fault.
P16C5	ECM	Safety fuel cut-off activated monitoring check level 1	Monitoring plausibility check failed.	Check for ECM fault.
P16C6	ECM	Safety fuel cut-off activated monitoring check level 2	Monitoring plausibility check failed.	Check for ECM fault.
P16C7	ECM	Throttle valve plausibility check failed	Monitoring plausibility check failed.	Check for ECM fault.
P16C8	ECM	Permitted throttle valve position monitoring check exceeded	Monitoring plausibility check failed.	Check for ECM fault.
P16C9	ECM	function monitoring: monitoring of the emergency switch in level 2 (DFC_MoFEmgcySwOff)	Monitoring plausibility check failed.	Check for ECM fault.
P1790	ECM	Driving mode selector switch	Driving mode selector switch has the up and down selection pressed at the same time	Check for a short between ECMB-D3 or ECO-A with ECM-A1 or ECO-B Check for a short between ECMB-E3 or ECO-C with ECM-A1 or ECO-B
P20EB	ECM	Main relay de-energized too late or sticking	Damaged circuit wires Damaged connectors Damaged ECM output pins Damaged main relay	Disconnect main relay. Measure resistance between terminals 85 and 86 on relay (expected value: 70 to 90 ohms). Measure resistance between terminals 30 and 87 on relay (expected value: open circuit). Disconnect relay and measure resistance between terminals FB-A4 and ground (expected value: open circuit).

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P212C	ECM	Throttle position sensor #2 voltage too low.	Low voltage or short to ground on circuit wire ETC-4. No 3.3 volts supply on ETC-6. ETC-1 is shorted to ground Damaged sensor.	Make sure the TPS connector is fully inserted. Reset TPS postion. Measure voltage between harness connector ETC-6 and ETC-2 with the vehicle turned on (expected value: 3.3 volts) Check continuity between harness connector ETC-4 and ECMA-K3 Check continuity between harness connector ETC-6 and ECMA-K4 Check continuity between harness connector ETC-2 and ECMA-A2 Check for a short between ETC-4 and a supply
P212D	ECM	Throttle position sensor #2 voltage too high.	Voltage on circuit wire ETC-4 too high. Circuit wire ETC-4 shorted to a supply. Circuit wire ETC-2 is open.	Make sure the TPS connector is fully inserted. Reset TPS postion. Measure voltage between harness connector ETC-6 and ETC-2 with the vehicle turned on (expected value: 3.3 volts) Check continuity between harness connector ETC-4 and ECMA-K3 Check continuity between harness connector ETC-6 and ECMA-K4 Check continuity between harness connector ETC-2 and ECMA-A2 Check for a short between ETC-4 and a supply
P2279	ECM	Air leak from intake plenum	Cracked plenum Leak in air intake system. TPS learning position not done correctly. MAP Sensor problem. Throttle body air leakage.	Reset TPS postion. Check for faulty Air Pressure Sensor. Check for faulty TPS. Check for cracked plenum. Check for leak on the throttle body
P2299	ECM	Throttle and break paddle are used at the same time		

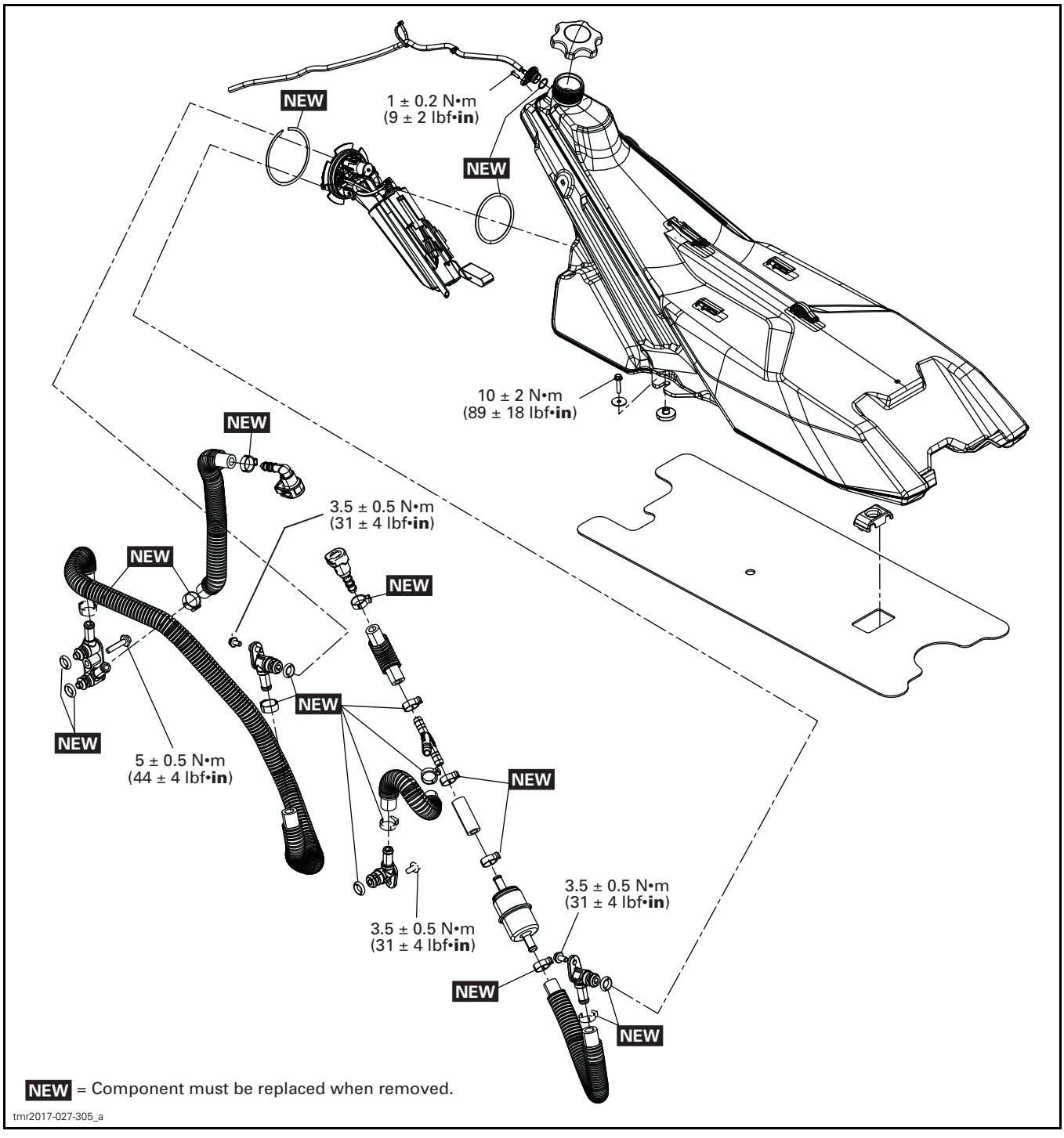
PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
P2621	ECM	Throttle position sensor #1 voltage too low.	Low voltage or short to ground on circuit wire ETC-1. No 3.3 volts supply on ETC-6. ETC-1 is shorted to ground Damaged sensor.	Make sure the TPS connector is fully inserted. Reset TPS postion. Measure voltage between harness connector ETC-6 and ETC-2 with the vehicle turned on (expected value: 3.3 volts) Check continuity between harness connector ETC-1 and ECMA-F3 Check continuity between harness connector ETC-6 and ECMA-K4 Check continuity between harness connector ETC-2 and ECMA-A2 Check for a short between ETC-1 and a supply
P2622	ECM	Throttle position sensor #1 voltage too high.	Voltage on circuit wire ETC-1 too high. Circuit wire ETC-1 shorted to a supply. Circuit wire ETC-2 is open.	Make sure the TPS connector is fully inserted. Reset TPS postion. Measure voltage between harness connector ETC-6 and ETC-2 with the vehicle turned on (expected value: 3.3 volts) Check continuity between harness connector ETC-1 and ECMA-F3 Check continuity between harness connector ETC-6 and ECMA-K4 Check continuity between harness connector ETC-2 and ECMA-A2 Check for a short between ETC-1 and a supply
U0167	ECM	No communication with DESS key.	Damaged circuit wires, damaged or disconnected DESS post, damaged DESS key.	Measure voltage between harness connector RFID-D and ground (expected value: 11 to 13 volts). Check continuity betweem hesness connector RFID-A and ECMB-F2 Check continuity betweem hesness connector RFID-B and ECMB-E4 Check continuity betweem hesness connector RFID-C and ECMB-B2

PCODE	MODULE	DESCRIPTION	CAUSE	ACTION
U0400	ECM	Variant coding failure software incompatibility	Faulty variant coding. Faulty programming.	Try updating the ECM. If the problem persists, make sure the ECM part number is correct for the model it is installed on.
U0426	ECM	DESS key communication error.	Damaged circuit wires, damaged or disconnected DESS post, damaged DESS key.	Measure voltage between harness connector RFID-D and ground (expected value: 11 to 13 volts). Check continuity betweem hesness connector RFID-A and ECMB-F2 Check continuity betweem hesness connector RFID-B and ECMB-E4 Check continuity betweem hesness connector RFID-C and ECMB-B2
U300A	ECM	State of the DESS key switch not plausible	Damaged wiring harness Damaged RFID module	Measure voltage between harness connector RFID-D and ground (expected value: 11 to 13 volts). Check continuity betweem hesness connector RFID-A and ECMB-F2 Check continuity betweem hesness connector RFID-B and ECMB-E4 Check continuity betweem hesness connector RFID-C and ECMB-B2

FUEL TANK AND FUEL PUMP

SERVICE TOOLS

Description	Part Number	Page
LEAK TEST KIT	529 033 100	6
OETIKER PLIER	295 000 070	9
PRESSURE GAUGE	529 036 395	7–8
SMALL HOSE PINCHER	295 000 076	6
VACUUM/PRESSURE PUMP	529 021 800	6–7


NEW
1 ± 0.2 N•m
(9 ± 2 lbf•in)
NEW
10 ± 2 N•m
(89 ± 18 lbf•in)
NEW
3.5 ± 0.5 N•m
(31 ± 4 lbf•in)
NEW
NEW
NEW
NEW
NEW
5 ± 0.5 N•m
(44 ± 4 lbf•in)
3.5 ± 0.5 N•m
(31 ± 4 lbf•in)
3.5 ± 0.5 N•m
(31 ± 4 lbf•in)
NEW
NEW
NEW = Component must be replaced when removed.
tmr2017-027-305_a

GENERAL

NOTE: It is a good practice to check for fault codes using the BRP diagnostic software BUDS2 as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES*.

⚠ WARNING

Always disconnect the magneto connector prior to:
– Disconnecting any fuel hose.
– Removing a fuel injector.
– Removing a spark plug cable or spark plug.
Otherwise, if the engine is cranked, fuel vapors may ignite in presence of a spark creating a fire hazard.

When disconnecting a fuel line, cover the connection with an absorbent shop rag and proceed slowly to minimize spilling.

⚠ WARNING

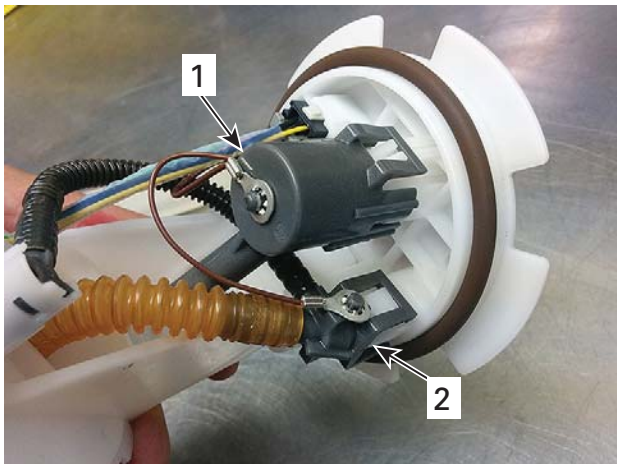
Do not allow fuel to spill on hot engine parts and/or on electrical connectors. Wipe off any fuel spillage in the engine compartment. Fuel is flammable and explosive under certain conditions.

⚠ WARNING

After working on the fuel system, always carry out a fuel system pressurization test to check for leaks.

⚠ WARNING

Never remove the eyelet connectors from the fuel pressure regulator and the fuel hose connector. A bad connection may create a static electricity discharge causing a fire hazard.

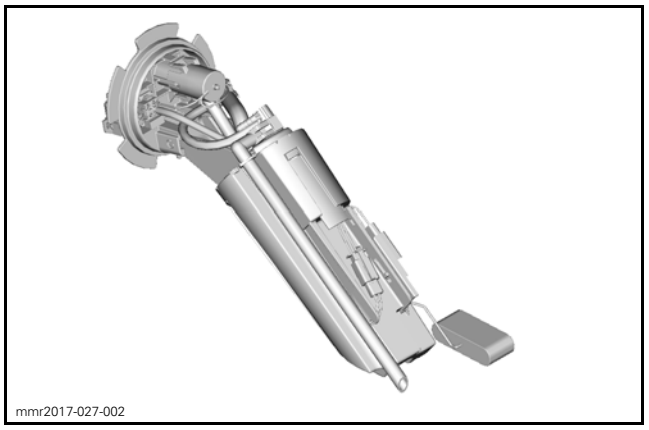


tmr2017-027-306_a

1. Fuel pressure regulator
2. Fuel hose connector

SYSTEM DESCRIPTION

Electric Fuel Pump


mmr2017-027-002

An electric fuel pump is mounted in the front center portion of the fuel tank.

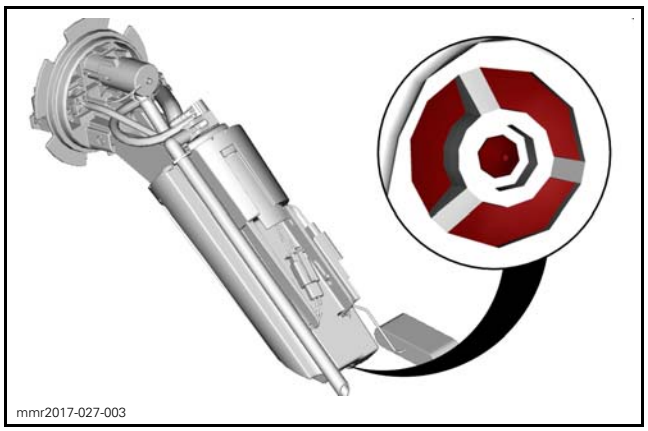
A 12 Vdc high pressure fuel pump with an integrated jet pump is used.

NOTE: Although the fuel pump is connected to the 55 Vdc system, the ECM modulates the voltage (Pulse Width Modulation) between 9 and 16 Vdc depending on the engine RPM. The fuel pump output will change as voltage changes.

As soon as the engine is cranking, the electric fuel pump turns on in preparation for the engine start. When the engine runs, the fuel pump is ON continuously to provide a constant fuel pressure to the injectors.

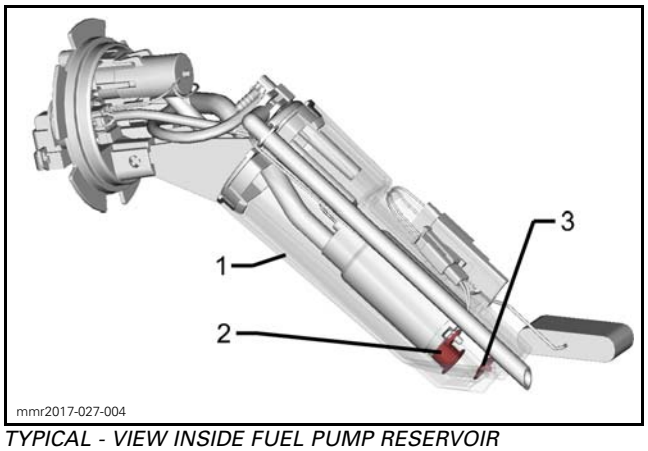
To ensure a constant delivery of fuel to the engine for all riding conditions when the fuel level is low, a rear pickup and a fuel pump reservoir is used.

The fuel pump reservoir is actually the housing of the fuel pump module in which the fuel pump is located. A check valve at the bottom of the housing allows the fuel in the tank to enter the fuel pump reservoir.



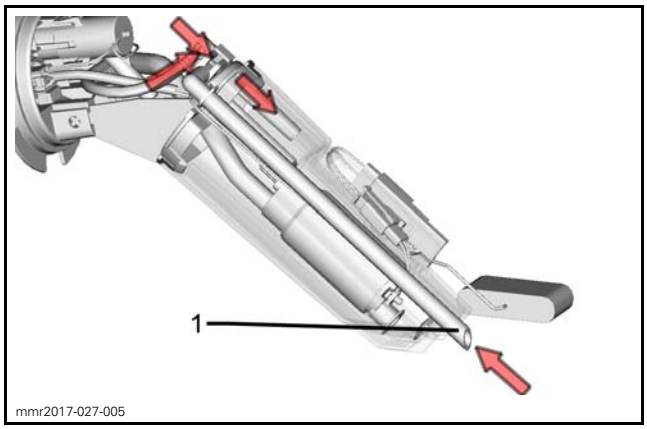
When the fuel pump runs, it draws the fuel from the fuel pump reservoir and feeds it to the injection system. This causes fuel in the tank to enter the fuel pump reservoir, by gravity, through its bottom inlet check valve.

At the same time, a portion of the fuel flow from the electric fuel pump flows through a jet pump that contains a venturi.



TYPICAL - VIEW INSIDE FUEL PUMP RESERVOIR
1. *Fuel pump reservoir*
2. *Bottom inlet*
3. *Check valve (open upwards)*

As the fuel accelerates through the venturi, it generates a low pressure area at a connection to the remote pickup, which draws fuel into the fuel pump reservoir from the remote pickup.



1. *Remote pickup*

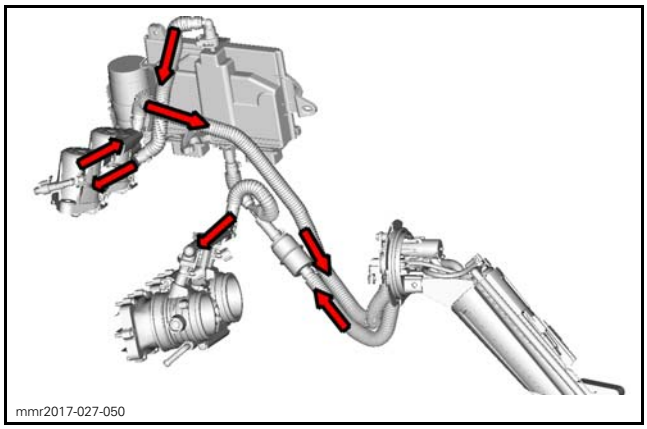
When riding the vehicle on a level surface, fuel enters into the fuel pump reservoir through its check valve and through the remote pickup simultaneously, as long as there is enough fuel in the tank to cover the remote pickup.

When riding downhill with a low amount of fuel in the tank, the fuel moves towards the front of fuel tank. The fuel enters the fuel pump reservoir through the check valve only as there is no fuel at the remote pickup.

When riding uphill with a low amount of fuel in the tank, the fuel moves towards the rear of the fuel tank. The check valve closes and traps the fuel in the pump reservoir. The fuel pump continues to draw fuel from the fuel pump reservoir, which is now only fed by the jet pump using the remote pickup. This prevents air from being drawn into the fuel lines from the fuel tank.

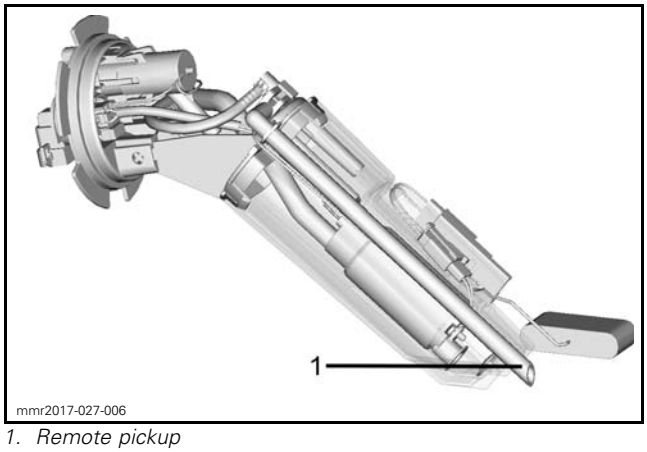
The continuous fuel flow cools down the fuel pump, the injectors and the ECM. To cool these components, the fuel circulates as follows:

– Out of fuel pump
– Through the ECM
– To the direct injectors (around the voice coils)
– Through the pressure regulator
– Back to fuel tank.



Fuel Pickup

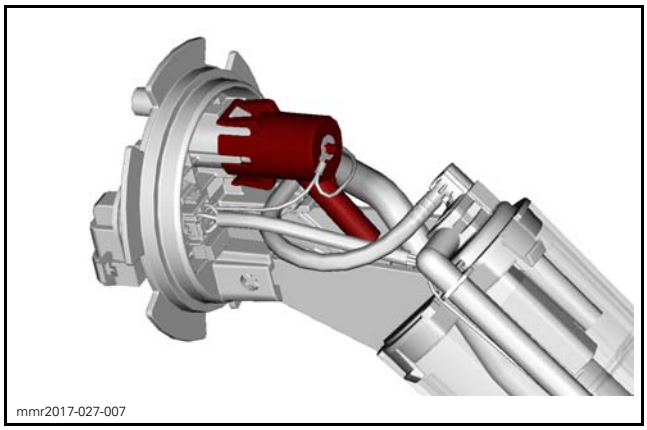
Fuel enters the fuel pump reservoir from either a check valve at the bottom of the fuel pump reservoir, or from a remote pickup in the rear portion of the fuel tank.



1. Remote pickup

Fuel Pressure Regulator

An integrated fuel pressure regulator is mounted on the fuel pump flange. It is basically a spring loaded valve that opens and closes the path of fuel returning to the tank, thus maintaining a constant fuel pressure in the system.



FUEL PRESSURE
Approximately 303 kPa (44 PSI) at 2000 RPM (will be lower at idle)

Fuel pressure should drop less than 35 kPa (5 PSI) when engine stops running.

If a leak is present, pressure will continue to drop within the first minute after engine stops running.

Fuel Tank Vent

The fuel tank is vented through a combination type check valve that allows ambient air pressure to enter fuel tank at all times.

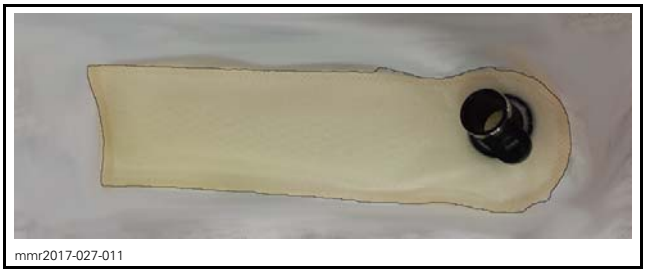
As fuel is consumed by the engine, a negative pressure would occur in the fuel tank. This could eventually prevent the fuel pump from drawing enough fuel. The **negative pressure relieve function** of the valve allows the higher outside air pressure in.

If pressure builds up and exceeds 2.0 kPa to 4.8 kPa (.3 PSI to .7 PSI) in the fuel tank, the check valve opens and lets the excess pressure vent out of the tank.

Fuel Filters

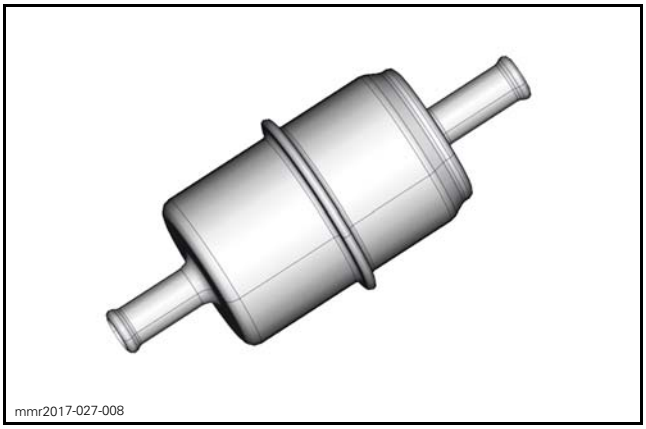
Fuel Pump Pre-Filter

A fuel pump pre-filter is used at the electric fuel pump inlet. It is a replaceable nylon mesh filter located within the fuel pump module housing (fuel pump reservoir).



The fuel pump pre-filter protects the fuel pump and prevents clogging of the fuel passages within the fuel pump module.

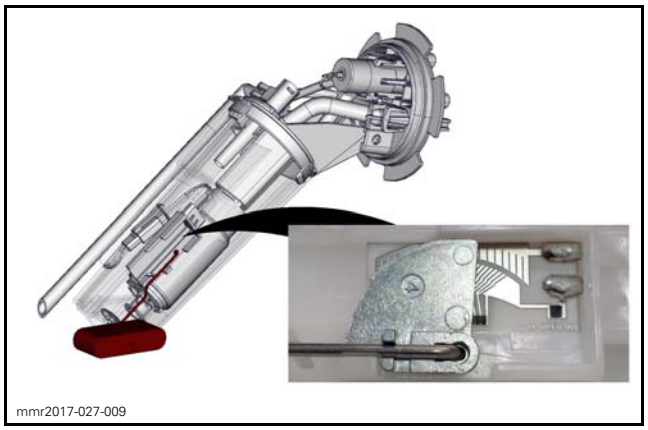
In-Line Fuel Filter



An in-line filter on the supply side is located between the fuel pump and the ECM.

It is a replaceable metallic canister type filter used to deliver dirt-free fuel to the injectors.

Fuel Level Indication


mmr2017-027-009

A float type fuel level sensor varies its resistance with fuel level thus providing a signal to the multifunction gauge for fuel level indication.

INSPECTION

TESTING FUEL SYSTEM FOR LEAKS

Activate the fuel pump from the **Functions** page in BUDS2.

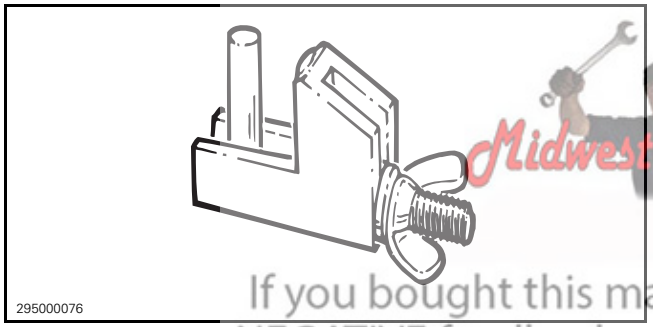
Check for fuel leaks.

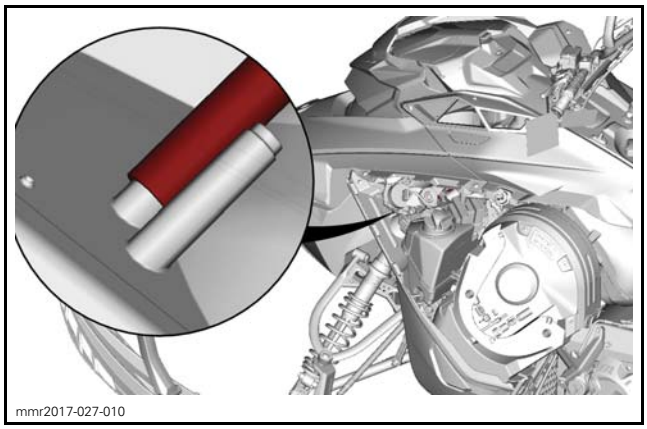
⚠ WARNING

After working on the fuel system, carry out a fuel system pressurization test to check for leaks. Failure to carry out a fuel system pressurization test could result in severe injury or a life threatening situation should a leak occur.

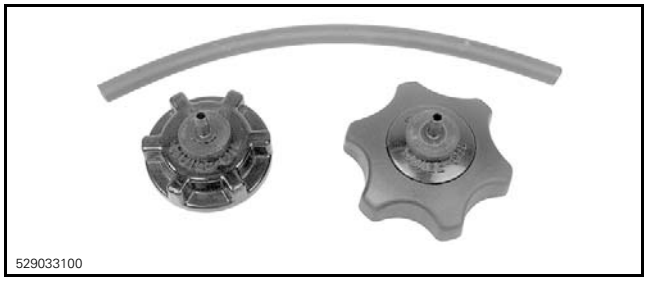
FUEL TANK LEAK TEST

1. Fill up fuel tank.
2. Open the left side panel to access the fuel vent tube.
3. Install a SMALL HOSE PINCHER (P/N 295 000 076) on the vent tube.


295000076

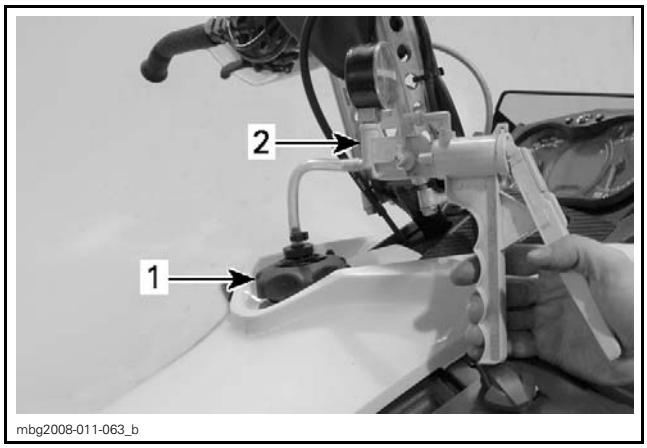

mmr2017-027-010

4. Install the appropriate test cap from the LEAK TEST KIT (P/N 529 033 100) on fuel tank inlet.


529033100

5. Install VACUUM/PRESSURE PUMP (P/N 529 021 800) on pressure test fuel cap.


529021800



TYPICAL
1. *Pressure test fuel cap*
2. *Vacuum/pressure pump*

6. Set pump selector to pressure.
7. Pressurize fuel tank as follows.

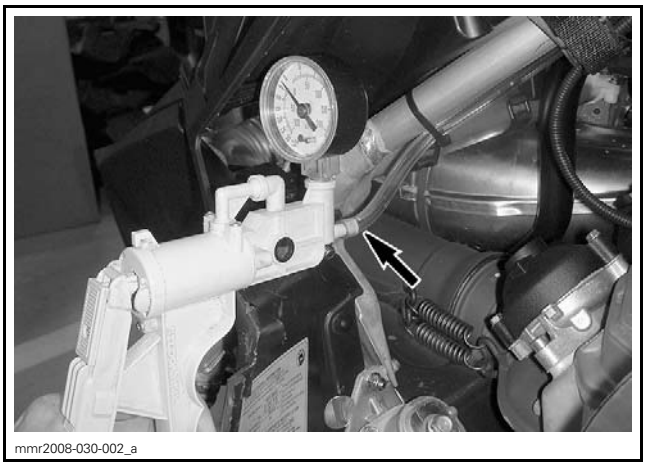
PRESSURE	TIME WITHOUT PRESSURE DROP
21 kPa (3 PSI)	3 minutes

If pressure drops, locate fuel leak(s) and repair or replace leaking component(s).

To ease locating leak(s), spray soapy water on components; bubbles will indicate leak location(s).

Fuel Tank Vent Valve Test

1. While the fuel tank is still pressurized as in the previous test, carry out the following:
2. Place a finger over the vent hose outlet.
3. When removing hose pincher, alternately touch and release vent hose outlet. You should feel pressurized air flowing out indicating the pressure relief valve function is working.
4. Release any remaining pressure in the fuel tank by slowly unscrewing fuel tank cap.
5. Remove the pressure test fuel cap.
6. Remove the fuel tank vent tube from its fitting on the lower left front body panel.
7. Install the VACUUM/PRESSURE PUMP (P/N 529 021 800) on the vent tube and apply air pressure through the vent valve. Air must flow freely towards the fuel tank neck.



TYPICAL - VACUUM/PRESSURE PUMP ON VENT TUBE

NOTE: If fuel vent check valve does not function as indicated in test, replace vent valve.

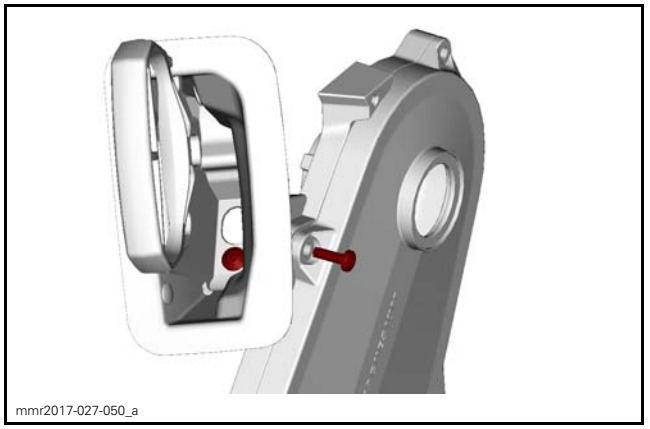
8. Remove vacuum/pressure pump.
9. Install vent tube on its fitting.
10. Install normal fuel tank cap.

TESTING FUEL PRESSURE

REQUIRED TOOLS	
PRESSURE GAUGE (P/N 529 036 395)	

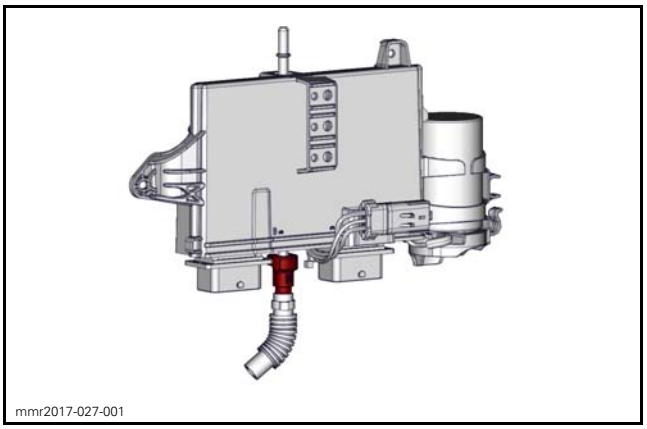
Open right hand side panel.

Move rewind starter handle assembly (applicable models).



The pressure test provides an indication of the available fuel pressure at the fuel pump outlet. It validates the pressure regulator and the fuel pump.

1. Ensure there is enough gas in fuel tank.
2. Install a rag under the ECM hose quick connect to catch fuel spillage.
3. Disconnect fuel pressure hose from ECM.


mmr2017-027-001

4. Install the PRESSURE GAUGE (P/N 529 036 395) between fuel pressure hose and ECM.

⚠ WARNING

When carrying out pressure test, ensure fuel is not leaking from test equipment onto hot exhaust system or electrical components. Ensure fuel hose do not come into contact with hot engine parts or hot exhaust system.

5. Start engine.
6. Run engine above 2000 RPM and observe the fuel pressure.

FUEL PRESSURE
303 kPa (44 PSI)

If pressure is lower than specified, momentarily block the return hose while monitoring the pressure gauge.

NOTICE **Do not block the fuel return for more than 2 seconds.**

If pressure rises to reach or exceed specification with the fuel return blocked, replace fuel regulator.

If pressure does not rise with the fuel return blocked, refer to *PRESSURE BELOW SPECIFICATIONS* in the following table.

FUEL PRESSURE TROUBLESHOOTING	
RESULT	POSSIBLE CAUSE
Pressure above specifications	Defective fuel regulator
Pressure below specifications	Clogged fuel filter
	Poor electrical connection
	Defective fuel regulator
	Defective fuel pump
	Leak in the fuel system circuit

7. Stop engine.

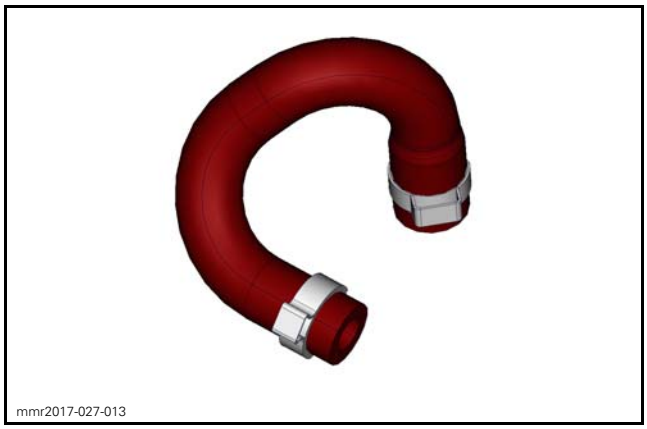
Fuel pressure should remain stable.

8. If fuel pressure drops, check the following for leaks:
   - Tools
   - Hoses
   - Fuel injectors
   - Fuel pressure regulator
   - Fuel pump.
9. Bleed away any remaining fuel in the pressure gauge and fuel hose adapter using the bleed valve on the fuel hose adapter.
10. Remove pressure gauge and fuel hose adapter.
11. Reinstall the fuel pressure hose on ECM and gently but firmly pull on hose to ensure quick disconnect fitting is properly locked and secure on the ECM.
12. Reinstall all remaining removed parts.

PROCEDURES

FUEL HOSE AND OETIKER CLAMPS

Replacing Fuel Hoses



TYPICAL PRE-FORMED FUEL HOSE

When replacing fuel hoses, be sure to use hoses as available from BRP parts department. This will ensure continued proper and safe operation.

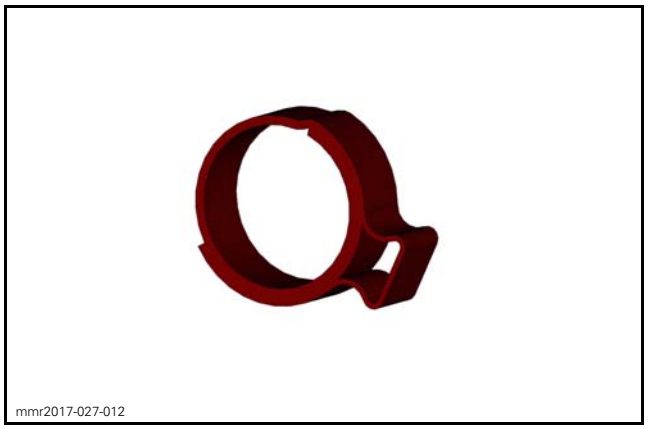
⚠ WARNING

Use of fuel lines other than those recommended by BRP may compromise fuel system integrity.

⚠ WARNING

- Never use a hose pincher on high pressure hoses.
- Never change the routing of a fuel hose.
- Always reinstall the corrugated protective tubing on fuel hoses.
- Secure fuel hoses using the appropriate locking tie or fastener to prevent contact with sharp edges or hot, rotating and moving parts.
- After connecting a hose or a quick connect fitting, pull on the hose near the fitting to make sure it is securely locked.
- Always validate fuel system tightness by performing a *FUEL SYSTEM PRESSURIZATION AND LEAK TEST*.

Replacing Oetiker Clamps



REQUIRED TOOL	
OETIKER PLIER (P/N 295 000 070)	

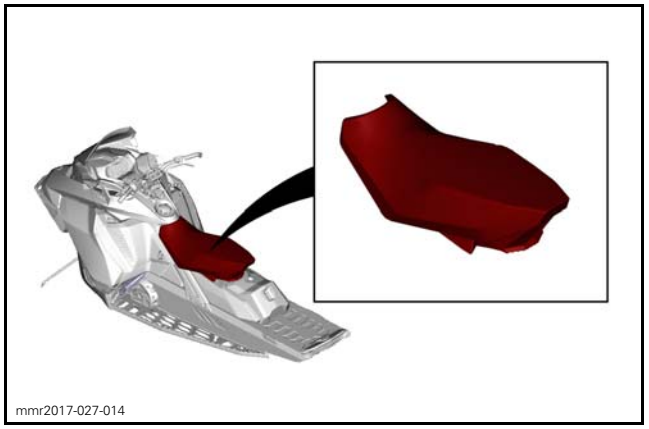
⚠ WARNING

Whenever removing a hose in the fuel system, always use new Oetiker clamps at assembly.

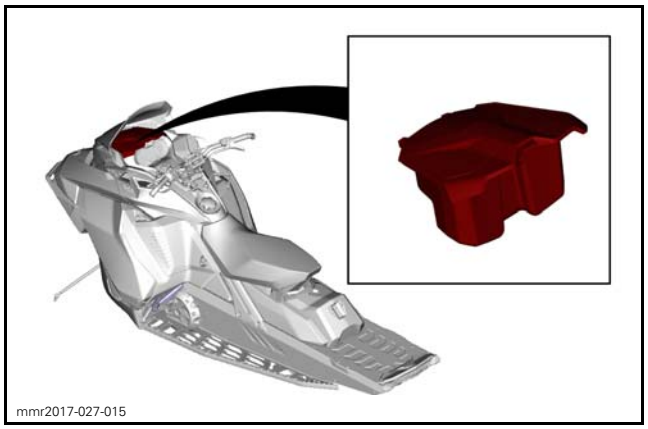
FUEL TANK

Removing the Fuel Tank

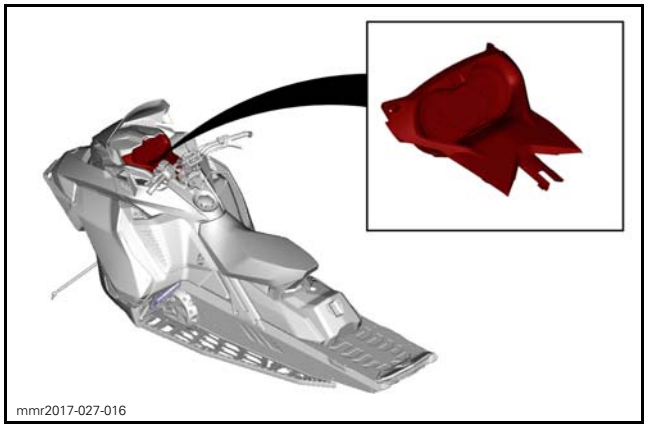
1. Remove seat.



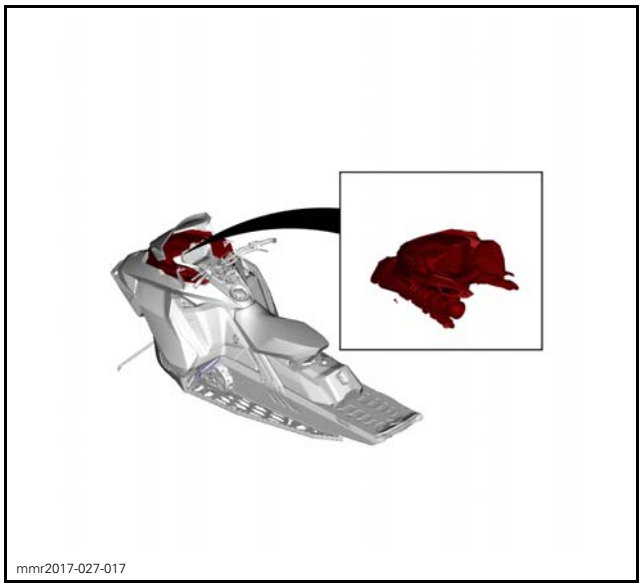
2. Remove glove box.



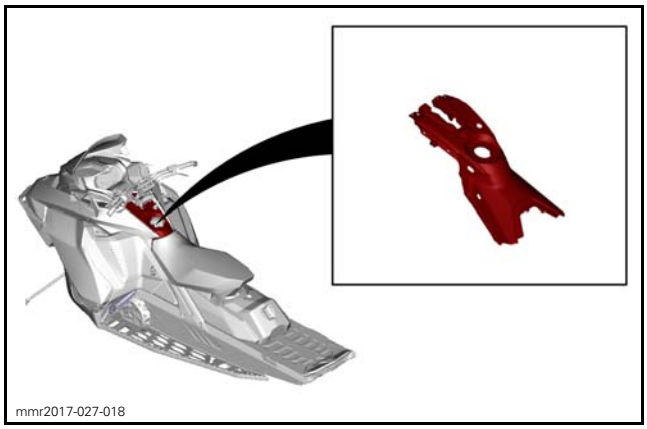
3. Remove cluster and trim.



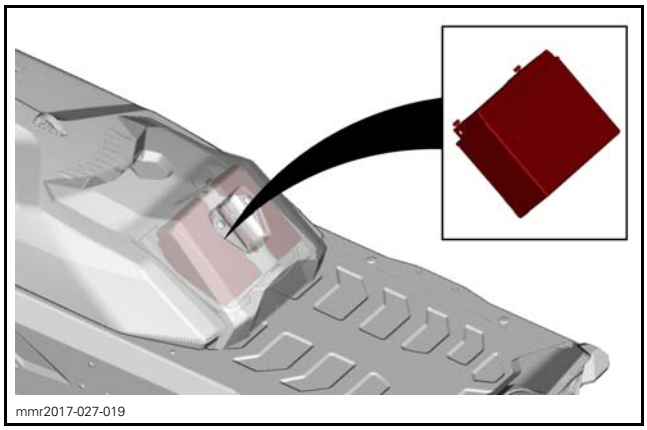
4. Remove console.



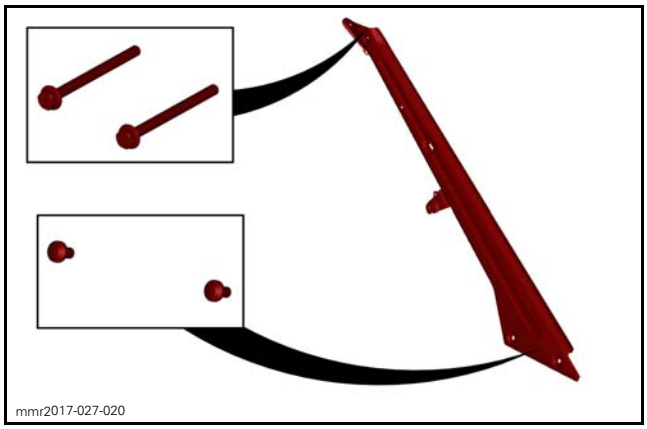
5. Remove tank cover.



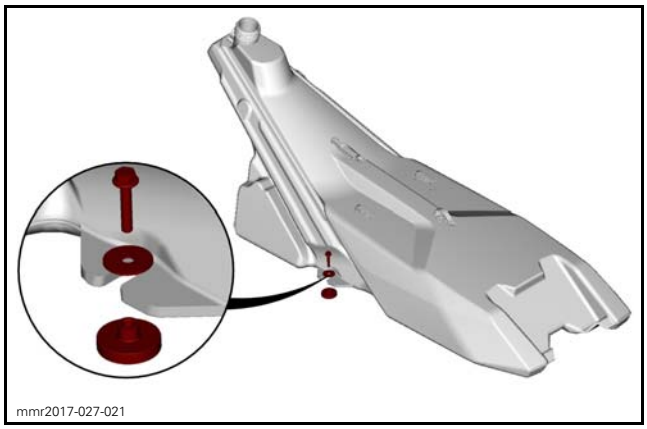
6. Remove battery cover and battery, if applicable.



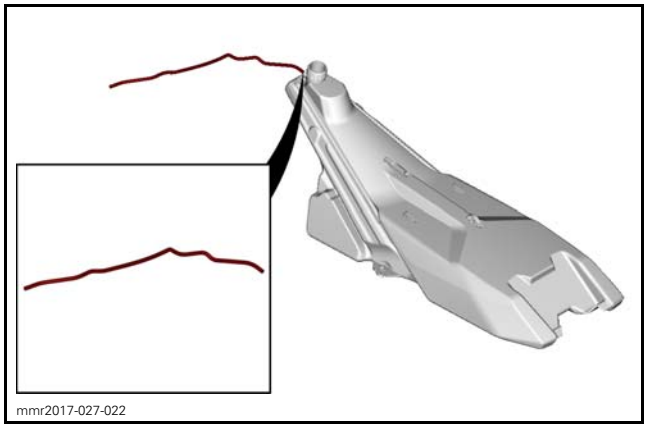
7. Remove pyramidal structure.



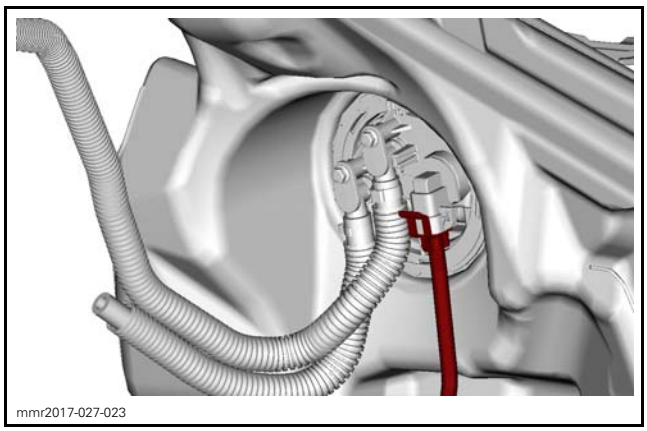
8. Remove fuel tank retaining screws.


mmr2017-027-021

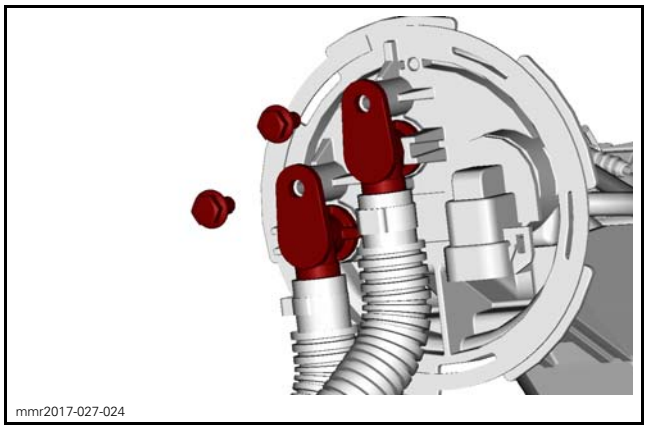
9. Remove fuel tank vent.


mmr2017-027-022

10. Remove fuel pump electrical connector.


mmr2017-027-023

11. Remove fuel hoses from pump.


mmr2017-027-024

12. Remove fuel tank.

Installing the Fuel Tank

Reverse removal procedure.

Pressurize and test fuel system for leaks.

FUEL PUMP

Relieving Fuel Pressure

1. Connect vehicle to BUDS2, refer to the *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. From the **Functions** page, relieve fuel pressure.

Activating the Fuel Pump with B.U.D.S.

NOTE: Activating the fuel pump as described in this procedure can be used for purging air from the fuel system whenever a fuel hose has been disconnected and reconnected. The pump should be activated for 15 seconds to ensure proper purging of the system.

1. Connect vehicle to BUDS2 software, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. From the **Functions** page, activate the fuel pump.
3. Listen for fuel pump operation.

If you do not hear the pump come ON, select the **Faults** tab in BUDS2 and check for fault codes.

If there is no fault code, connect a known good fuel pump to the vehicle harness (in parallel) and repeat the test.

NOTE: No voltage test can be done when the fuel pump is disconnected.

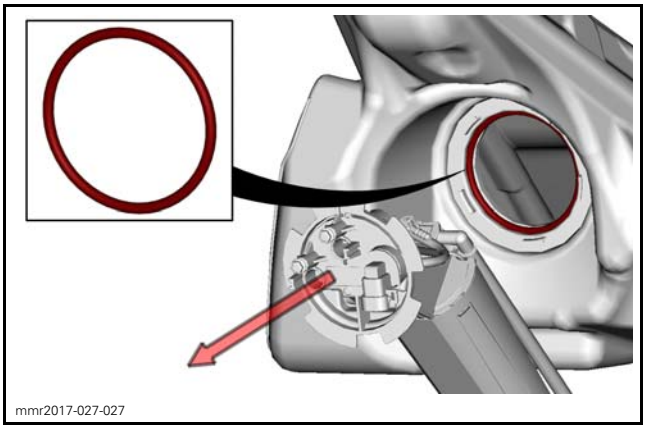
If the second fuel pump functions when connected to the vehicle harness, then replace the fuel pump installed in the vehicle.

Removing the Fuel Pump

1. Remove the fuel tank.
2. Remove fuel pump assembly snap ring from fuel tank.

mmr2017-027-026

3. Remove and discard fuel pump gasket.



mmr2017-027-027

4. Visually inspect for broken or damaged ground wires, if any issue are found, the module should be replaced.

Installing the Fuel Pump

For installation, reverse the removal procedure however, pay attention to the following.

Make sure the remote pick-up is inserted all the way to the rear of fuel tank and does not interfere with the fuel level sensor float.

Install a NEW gasket on the fuel pump prior to installing the pump in the tank.

Ensure the fuel pump snap ring is fully engaged with the gap on top. Refer to image in removal procedure.

NOTE: The gasket must be installed on the fuel tank side so it is located between the pump and the fuel tank.

Install fuel tank.

⚠ WARNING

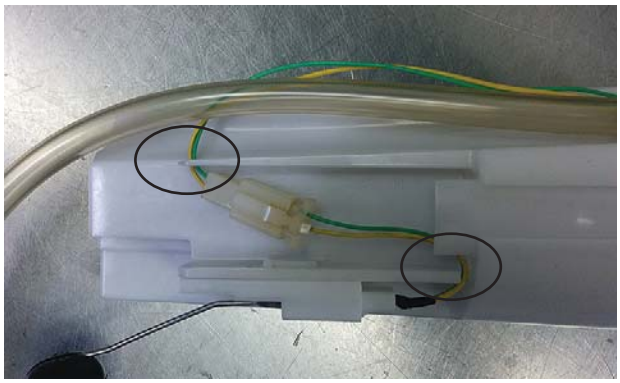
After working on the fuel system, carry out a fuel system pressurization test to check for leaks. Failure to carry out a fuel system leak test could result in severe injury or a life threatening situation should a leak occur.

FUEL PUMP INLET FILTER

Replacing the Fuel Pump Inlet Filter

1. Remove fuel pump assembly from fuel tank. Refer to procedure in this subsection.
2. Free the wires of the fuel level sensor of the fuel pump reservoir.

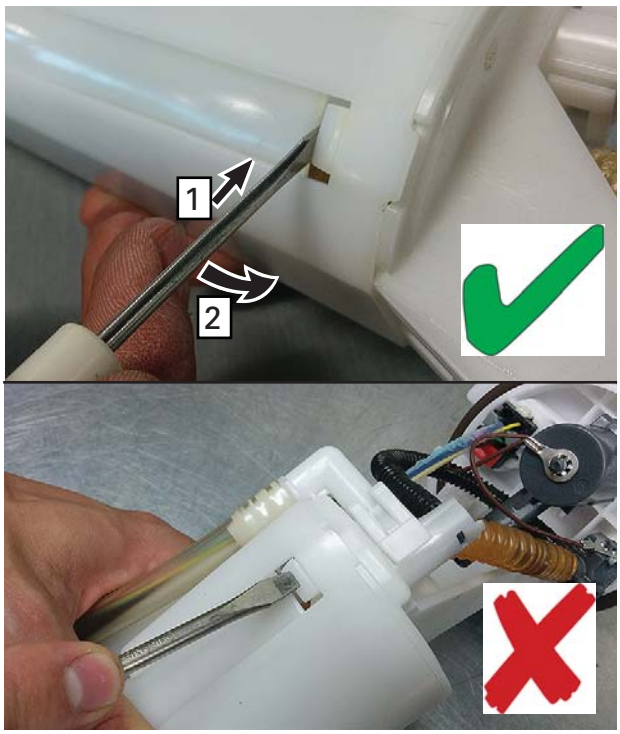
NOTICE **Do not pull / push on wires or metal terminals that connect the grounding wires to the plastic parts. Keep hands and tools away from this area.**



mmr2017-027-300_a

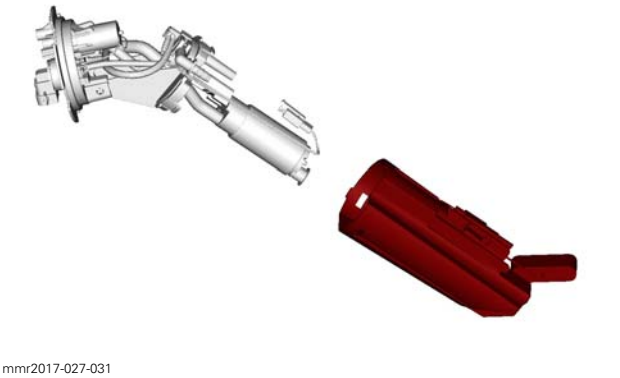
3. Unlock fuel pump reservoir by carefully inserting a small screwdriver between the tab and the fuel pump reservoir.

NOTICE **Do not push directly on tabs or twist the screwdriver.**



tmr2017-027-307_a

4. Completely remove fuel pump reservoir by pulling it carefully.


mmr2017-027-031

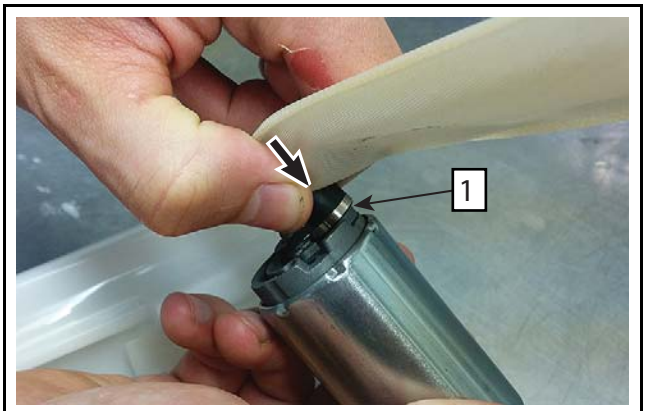
NOTICE To avoid damaging wires, Pull the reservoir carefully and do not let reservoir hang by wires.

5. Remove inlet fuel pump filter by pulling on it. If the filter is hard to remove, pry the filter gently using a small screwdriver.

NOTICE Be careful to avoid scratching the outside diameter of the pump inlet fitting where the filter fits.


mmr2017-027-302_a

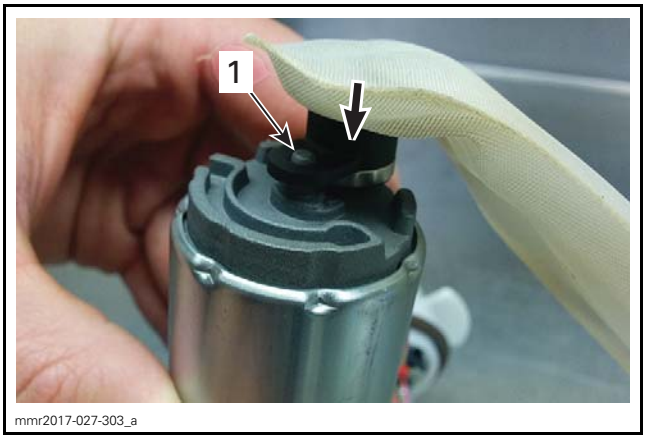
6. Discard inlet fuel pump filter and steel ring.
7. Install new fuel pump inlet filter.
   - 7.1 Insert inlet filter onto fuel pump by pressing it downward.
   - 7.2 Push the filter on until the fitting bottoms out on the pump inlet face, there should be no gap.



mmr2017-027-600_a

1. No gap here

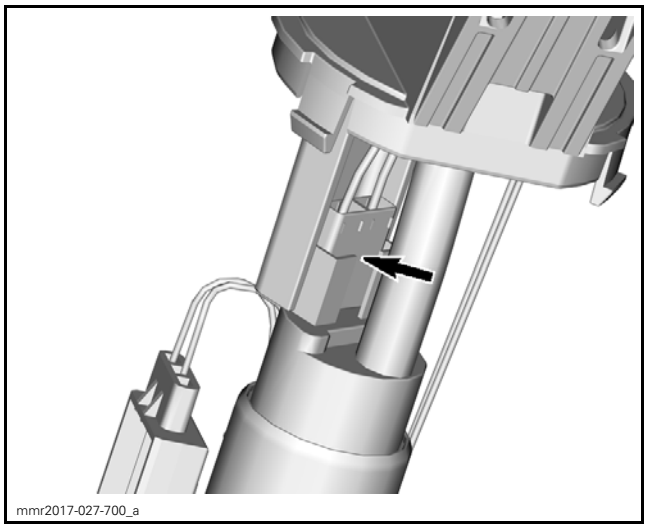
   - 7.3 Ensure that the filter hole is properly positioned into the pin.



mmr2017-027-303_a

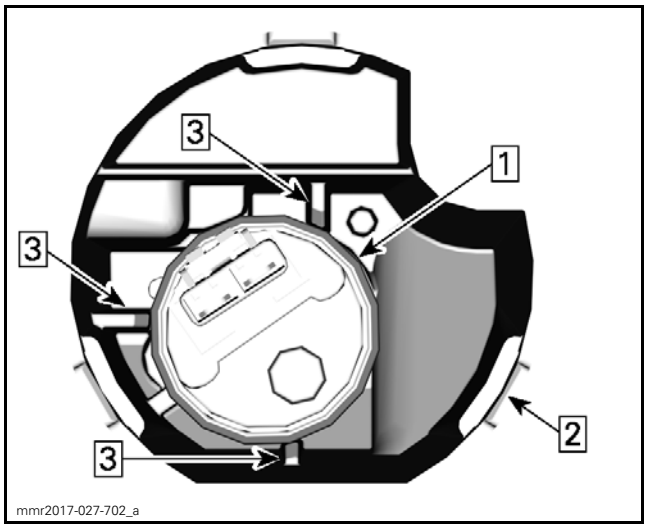
1. Pin

8. Install fuel pump reservoir carefully and ensure that all parts are properly positioned.


mmr2017-027-700_a

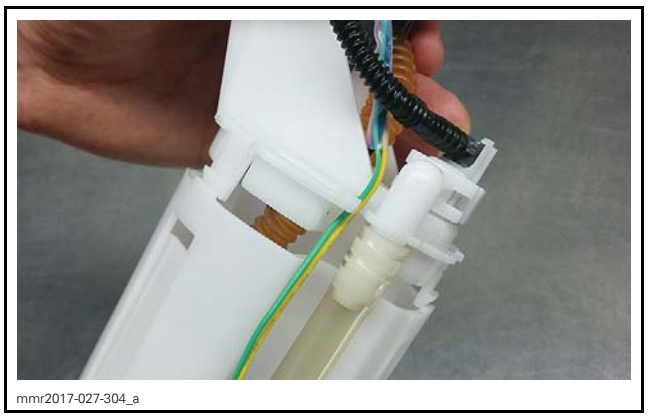
ELECTRICAL CONNECTOR MUST BE IN THIS POSITION

NOTE: Make sure the pump motor is positioned between the molded ribs in the reservoir.

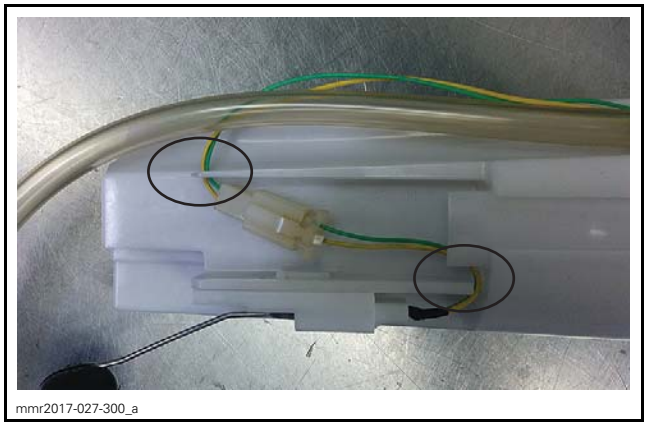


mmr2017-027-702_a

1. *Fuel pump motor*
2. *Reservoir*
3. *Ribs*


mmr2017-027-304_a

9. Ensure that fuel tank reservoir tabs are properly locked.
10. Route the fuel level sensor wires properly.


mmr2017-027-300_a

11. Reinstall fuel pump in fuel tank. Refer to procedure in this subsection.

FUEL LEVEL SENSOR

NOTE: Verify the gauge functions related to the fuel level sensor before testing the sensor. Refer to *GAUGE* subsection.

Measuring Fuel Level Sensor Resistance with BUDS2

1. Connect vehicle to BUDS2.
2. Select the **Measurements** page.
3. Monitor the fuel level sensor resistance under **Fuel Level** and compare to the table below.

FUEL LEVEL SENSOR RESISTANCE TABLE	
Full level resistance value	9 Ω ± 2 Ω
Empty level resistance value	95 Ω ± 5 Ω

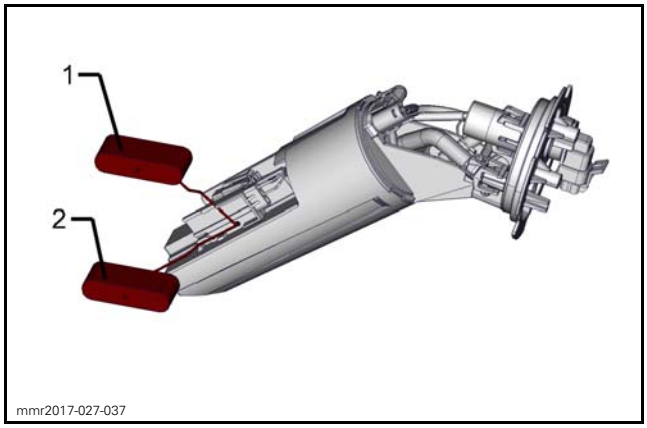
If resistance is within specifications, the fuel level sensor, and wiring are ok.

If resistance is not within specifications, measure resistance at the fuel pump connector **(FP)**. Refer to *TESTING FUEL LEVEL SENSOR RESISTANCE*

Testing Fuel Level Sensor Resistance

1. Remove fuel pump from fuel tank, refer to *FUEL PUMP* in this subsection.
2. Ensure the fuel level sensor is properly connected in the fuel pump module.
3. Measure the resistance at the fuel pump connector **(FP)**.

FUEL LEVEL SENSOR BENCH TEST		
PROBE	FLOAT POSITION	RESISTANCE
FP- B to FP-D	Empty	95 Ω ± 5 Ω
	Full	9 Ω ± 2 Ω



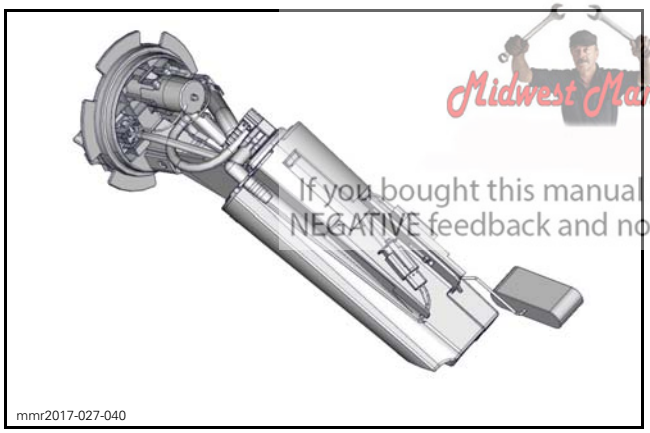
TYPICAL FUEL PUMP FLOAT
1. *Full position*
2. *Empty position*

4. When fuel level sensor travels from full to empty or vice-versa, there should be a constant linearity to the resistance readings. Any spike or drop of resistance indicates a "flat spot" in the fuel level sensor circuitry.

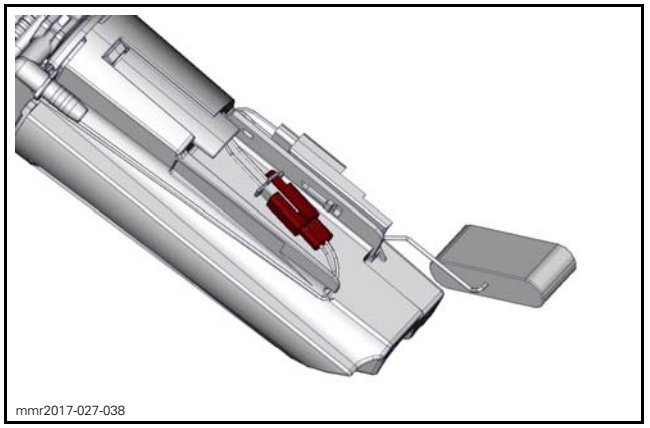
If fuel level sensor fails bench test, replace the fuel level sensor.

Replacing the Fuel Level Sensor

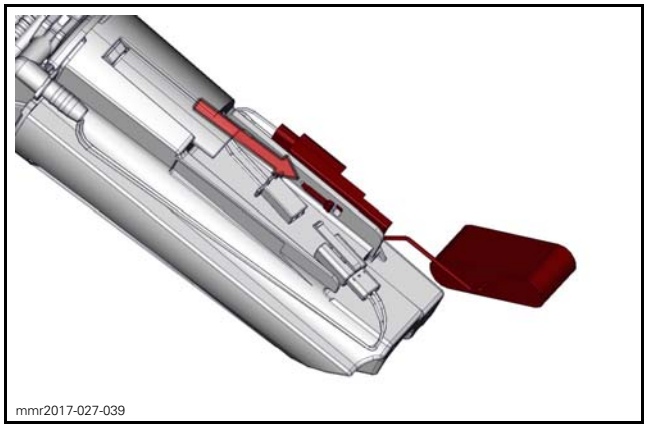
1. Remove the fuel pump.



2. Disconnect fuel level sensor connector.



3. Slide the potentiometer out of the fuel pump reservoir.



4. Remove fuel level sensor.
5. Replace the fuel level sensor with a new one and reverse steps.

E-TEC DIRECT FUEL INJECTION

SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	20, 30–33, 36–37
EXTRACTOR ADAPTOR	529 036 136	14
FLUKE 115 MULTIMETER	529 035 868	12, 20, 32–34, 36
OETIKER PLIER	295 000 070	6
SMALL HOSE PINCHER	295 000 076	27

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
SNAP-ON HAMMER	CJ125-6	14
SNAP-ON SCREW	CJ93-1	14

SERVICE PRODUCTS

Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	18, 34
PULLEY FLANGE CLEANER	413 711 809	28

GENERAL

When testing electrical systems, the emergency stop switch must always be in the RUN position unless otherwise mentioned, or test is performed while cranking engine.

⚠ WARNING

Always disconnect the magneto connector prior to:
- Disconnecting any fuel hose.
- Removing a fuel injector.
- Removing a spark plug cable or spark plug.

Otherwise, fuel vapors may ignite in presence of a spark creating a fire hazard.

⚠ WARNING

The fuel system is under high pressure. Proceed with care when working on the fuel system. Wear safety glasses and work in a well ventilated area.

Release fuel system pressure prior to removing fuel system components. Refer to *FUEL TANK REMOVAL* in *FUEL TANK AND FUEL PUMP* subsection.

⚠ WARNING

Perform a fuel pressure test each time a component from the fuel system is removed. Prior to starting the engine when a fuel hose was disconnected or a fuel injector removed:
- Ensure all fuel lines are properly connected.
- Inspect engine compartment to detect any fuel leakage or an abnormally strong fuel odor which may be an indication of a fuel leak that is not readily visible.

SYSTEM DESCRIPTION

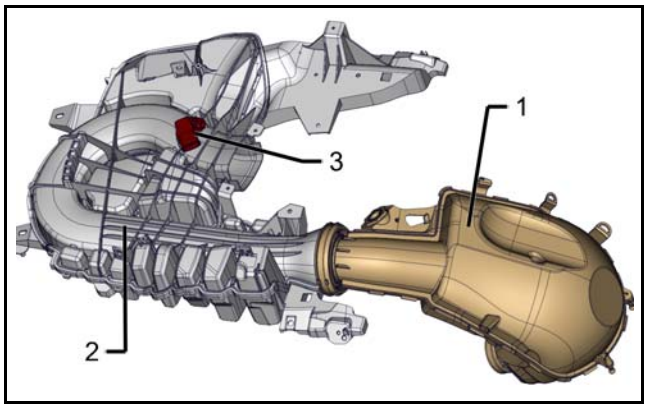
The ECM reads the input signals from different sensors which indicate engine operating conditions at micro-second intervals.

The ECM calculates the proper air/fuel ratio and activates the output to fuel injectors.

Signals from sensors are used by the ECM to determine the injection parameters (fuel maps required for optimum air-fuel ratio).

The crankshaft position sensor (CPS), the throttle position sensor (TPS) are the primary sensors used to control the injection. Other sensors (like temperature sensors, etc.) are used as secondary input.

Air Induction



1. *Primary air intake silencer*
2. *Secondary air intake silencer*
3. *MAPTS*

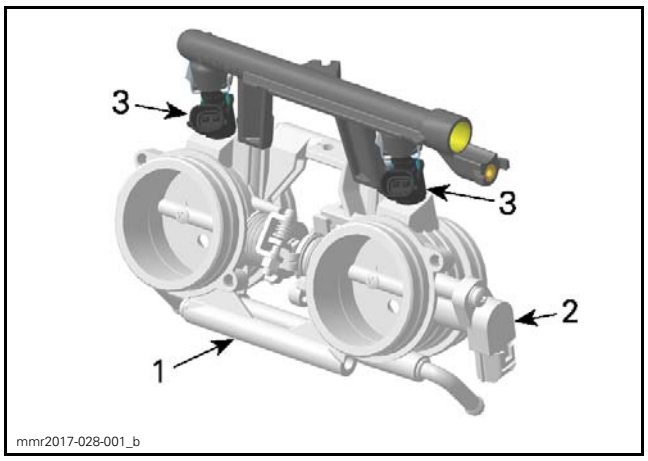
Air flows through a mesh filter in the secondary air intake silencer mounted on top of engine. The mesh filter prevents snow from being drawn into the engine.

Air pressure and temperature is measured in the secondary air intake silencer by the Manifold Absolute Air and Temperature Sensor (MAPTS).

Air then flows through the primary air intake silencer.

Air is then drawn in through a dual throttle body mounted on the engine intake side.

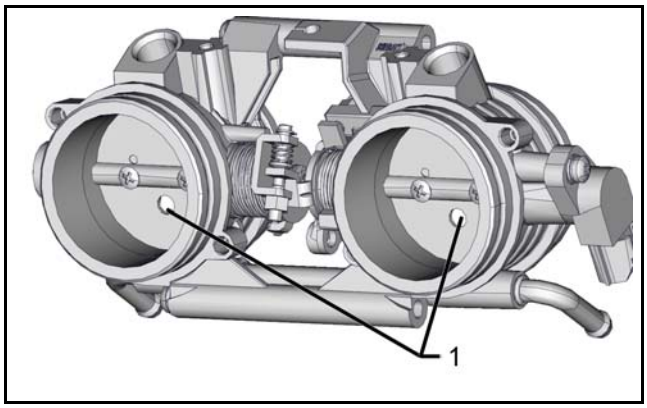
Throttle Body



1. *Throttle body*
2. *TPS (Throttle Position Sensor)*
3. *Throttle body injectors*

A dual throttle body assembly is directly mounted on the intake flange of each cylinder (52 mm (2.05 in)).

The air flow is controlled by two throttle plates. Each throttle plate has a 6.8 mm (.268 in) idle port in it.

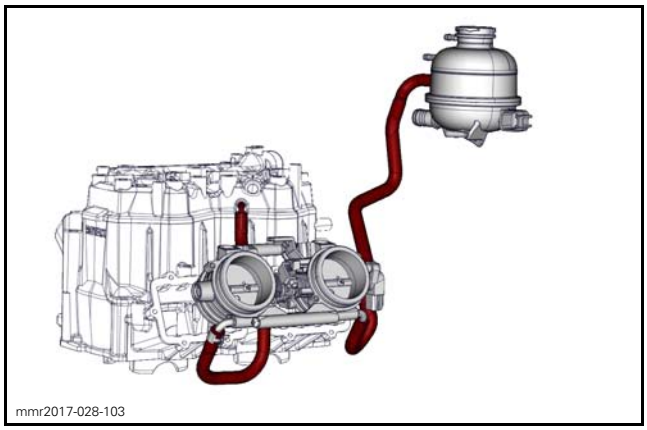


1. *Idle ports*

Since there is a constant airflow through the idle ports of the throttle plates, the idle speed is controlled by the ECM by varying the amount of fuel injected in the combustion chamber and by controlling the injection timing.

The TPS (Throttle Position Sensor) is fitted on the throttle body. The TPS sends throttle angle position to the ECM.

Engine coolant flows through the throttle body to prevent potential freezing of throttle plates due to the temperature drop naturally created by the venturi.

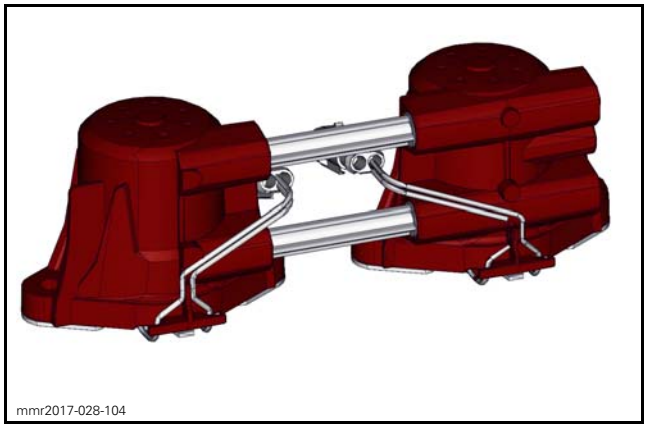


The air then continues through the reed valves into the cylinder base then into the crankcase.

Fuel Injectors

Each cylinder is supplied with fuel by a fuel injector on the top of the cylinder (high pressure direct ETEC injectors) and a fuel injector on the throttle body (throttle body injectors).

High Pressure Direct E-TEC Injectors

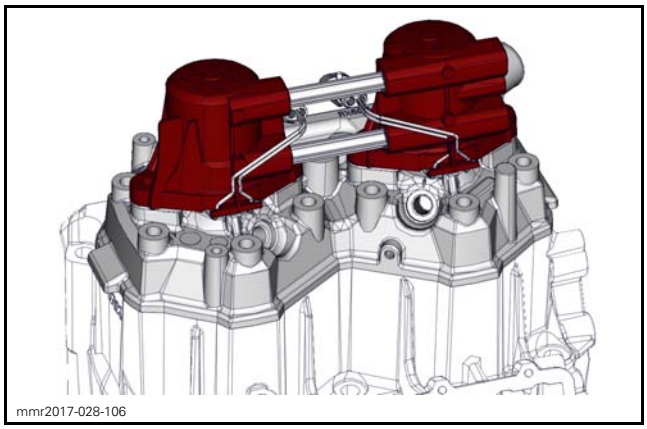


DIRECT INJECTORS

The fuel injectors are powered from the 55 Vdc system.

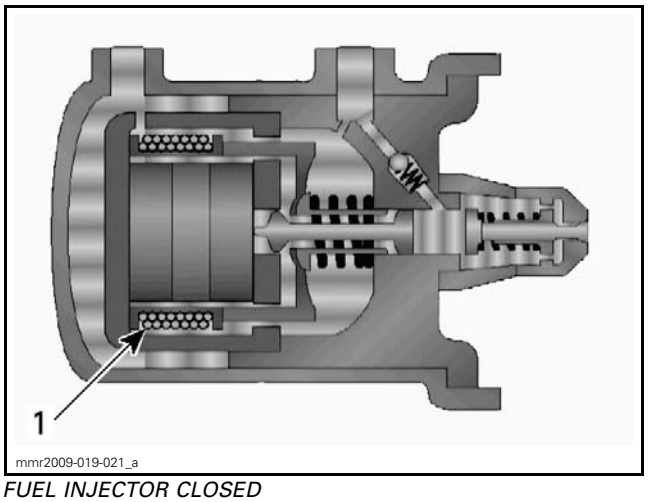
One fuel injector per cylinder is used.

The E-TEC fuel injector is mounted directly on top of the cylinder head.



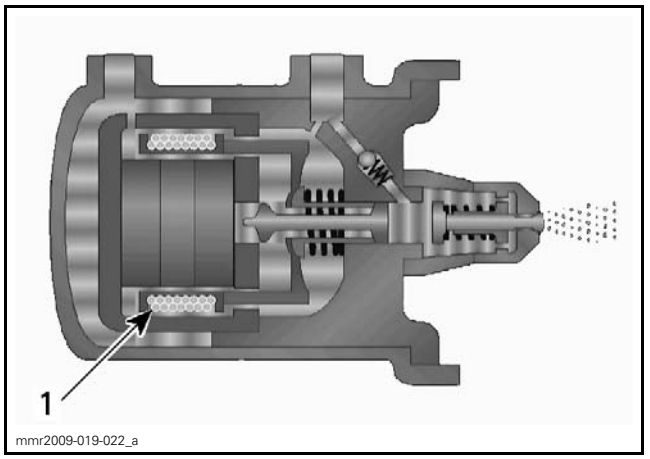
The fuel injector achieves a direct injection right into the combustion chamber. This keeps the piston cooler with less fuel.

A voice coil type is used to open and close the fuel injector nozzle. This allows for quick operation of the fuel injector; opening stage as well as the closing stage. This results in the ability to operate the engine at a higher RPM and lowers unburned fuel to the exhaust port.



FUEL INJECTOR CLOSED
1. Voice coil

When a positive current is supplied to the coil by the ECM, the fuel injector plunger moves towards the spring loaded injector needle. As the injector plunger moves, this builds up a pressure in the fuel injector chamber. When the pressure reaches approximately 1724 kPa (250 PSI), the injector needle spring is overcome and the needle opens. Fuel injection then takes place while the pressure peaks at 3103 kPa (450 PSI).



FUEL INJECTOR OPENED
1. Voice coil

Swirl channels are used in the fuel injector to better atomize the fuel charge.

The quantity of injected fuel is controlled by varying the injector plunger stroke.

To bring the injector plunger backward to its rest position, the current is reversed and the return springs close the injector needle and plunger. Near the end of the return stroke, a brief positive current is applied to "brake" the injector plunger. This results in a quieter operation of the fuel injectors.

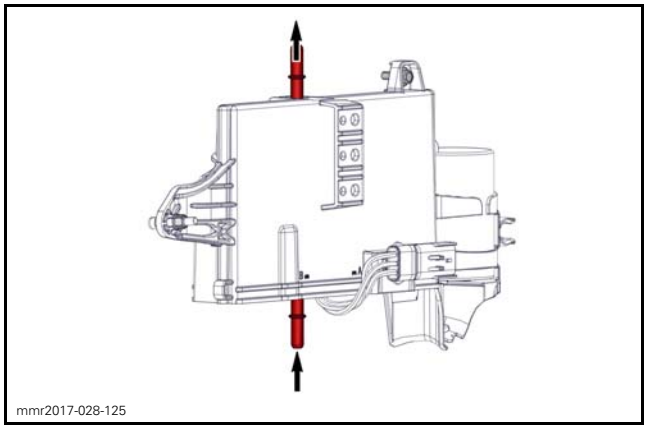
The fuel injectors provide a stratified fuel charge to the combustion chamber up to clutch engagement speed. Beyond this RPM, the fuel charge becomes homogeneous.

The stratified fuel charge provides a cleaner combustion, better idling and less smoke.

Fuel is used to maintain proper fuel injector operating temperature.

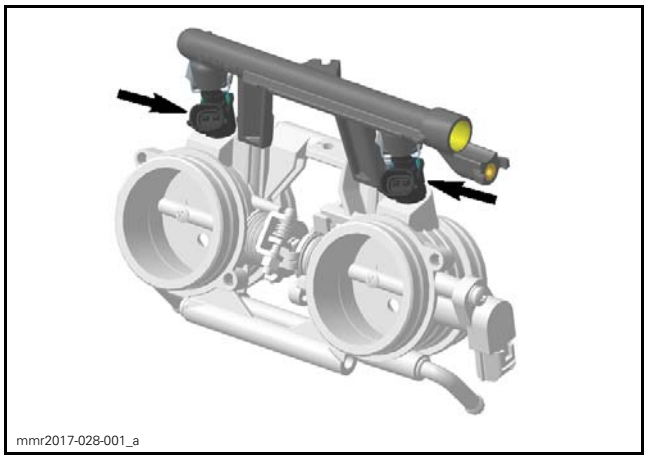
The flow starts from the fuel pump, through the ECM, then around the voice coil inside the fuel injector housings to cool down the fuel injector components.

Fuel enters the inlet port located at the bottom of the fuel injector housing and exits through the outlet port on top of the fuel injector.


mmr2017-028-125

Throttle Body Injectors

The fuel injectors are mounted directly on top of the throttle body.


mmr2017-028-001_a

Fuel injectors are used to inject fuel into the transfer port of the cylinder. One injector is used per cylinder.

The fuel injectors are supplied with fuel by the fuel rail. The fuel rail ensures all times that enough fuel at the right pressure can be delivered to the fuel injectors. The fuel rail is fed by the fuel pump module.

ADJUSTMENT

IDLE SPEED

Idle speed is controlled by the ECM and is not adjustable with an idle screw.

If idle speed is not as per specification (refer to *TECHNICAL SPECIFICATIONS*), perform the *CLOSED THROTTLE RESET (TPS)*.

RESETTING CLOSED THROTTLE VALUE (TPS)

General Information

This operation performs a reset of the TPS (throttle position sensor) values in the ECM when the throttle is closed. This reset is very important as the setting of the TPS will determine the basic parameters for all fuel mapping and several ECM calculations for idle speed control of the engine.

NOTICE **An improperly set TPS may lead to poor engine performance.**

Verifying TPS Closed Throttle Value

1. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2, navigate to the Measurements page.
3. Ensure throttle cable is properly adjusted, refer to *ADJUSTING THROTTLE CABLE* in this subsection.
4. Look for the throttle opening value .

NOTE: The Throttle Opening indication must be within the following specification.

THROTTLE OPENING SPECIFICATION	TEMPERATURE
(0 % ± 0.2)	Above 5°C (41°F)

If the throttle opening is within the % specification, DO NOT reset the closed throttle value unless the following parts were replaced:

– Engine control module (ECM)
– Throttle body
– Throttle position sensor (TPS).

If TPS is not within specification, reset the closed throttle value.

Resetting the Closed Throttle Value

NOTICE Proper throttle cable adjustment must be verified before proceeding.

1. In BUDS2, navigate to the Settings page.
2. Confirm the Actual TPS Voltage is within specification.

ACTUAL TPS VOLTAGE SPECIFICATION
0.3 to 0.7 Volts

NOTE: If the Actual TPS Voltage is out of specification, the TPS cannot be reset. The cause must be found. See *TROUBLESHOOTING ACTUAL TPS VOLTAGE OUT OF RANGE*.

3. Press on the Reset button.
4. Confirm Throttle Opening value indicates 0.0%.

NOTE: A throttle opening of 0.0% after reset indicates the operation is successful.

Troubleshooting Actual TPS Voltage Out of Range

If the Actual TPS Voltage is out of specification, check the following.
- Fault codes related to TPS
- Throttle cable adjustment
- TPS properly installed
- TPS connector and terminal condition.

TROUBLESHOOTING

DIAGNOSTIC TIPS

Engine problems are not necessarily related to the injection system.

It is important to ensure the mechanical integrity of the engine is present.

Spark Plugs

Improper spark plug indexing may lead to engine misfiring. Check if BRP spark plugs are installed or if spark plugs are properly indexed. Refer to *REPLACING SPARK PLUGS* in the *PERIODIC MAINTENANCE PROCEDURES* subsection.

3D RAVE Valves

Improper position of RAVE valves may lead to engine misfiring. Check RAVE valves. Refer to *RAVE* subsection.

Crankshaft Position Sensor (CPS)

Confirm that ECM receives the CPS signal. Refer to *CRANKSHAFT POSITION SENSOR (CPS)* in this subsection.

Electrical System

It is important to check that the electrical system is functioning properly:
- 55V system voltage
- Capacitor (refer to *CHARGING SYSTEM*)
- Ground connections
- Wiring and connectors.

Ensure that all electronic components are original BRP recommended components.

Any modification to the wiring harness may lead to fault codes or bad operation.

Always refer to the wiring diagram when diagnosing an electrical problem.

⚠ WARNING

The EMS operates on high voltage (55 Vdc), be careful to avoid electrical shocks.

⚠ WARNING

All electrical actuators (example: fuel injectors, fuel pump, ignition coils and electronic oil injection pump) are powered as soon as engine is cranked when the emergency engine stop switch is at the RUN position.

Electrical Connections

Pay particular attention to ensure that pins are not out of their connectors or out of shape.

Make sure that connections are very tight, make good contact, are corrosion-free, and show no signs of moisture. Particularly check ECM ground connections.

NOTE: Do not apply dielectric grease or other lubricant in the ECM connectors.

Check if wiring harness shows any signs of scoring.

Resistance Measurement

When measuring the resistance with an ohmmeter, all values are given for a temperature of 20°C (68°F). The value of a resistor varies with the temperature. The value for common resistor or windings (such as solenoid) increases as the temperature increases. However, our temperature sensors are NTC types (Negative Temperature Coefficient) except for the EGTS, which means

that the value decreases as the temperature increases. Use the provided tables for sensor resistive values at given temperature.

The resistive value of a temperature sensor may test good at a certain temperature but may be defective at other temperatures.

A good test is to put the sensor in a container filled with ice and water and measure resistance. Then, heat the water and read the resistance at different temperatures.

PROCEDURES

FUEL HOSES AND OETIKER CLAMPS

Removing and Installing Oetiker Clamps

REQUIRED TOOL	
OETIKER PLIER (P/N 295 000 070)	

Always use a shop rag when disconnecting a fuel hose.

⚠ CAUTION Fuel system is under high pressure.

⚠ WARNING

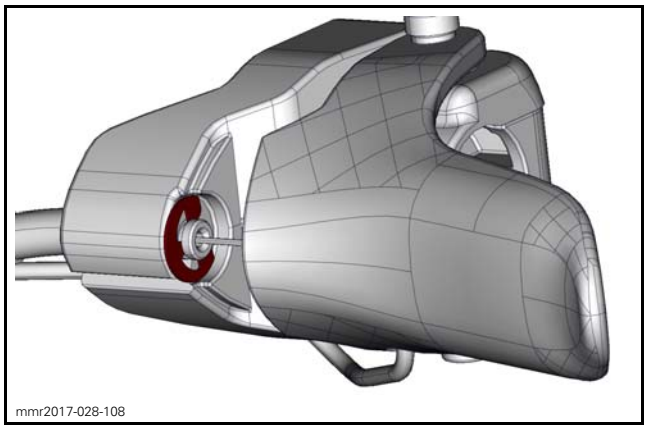
- Never use a hose pincher on high pressure hoses.
- Never change the routing of a fuel hose.
- Always reinstall the corrugated protective tubing on fuel hoses.
- Secure fuel hoses using the appropriate locking tie or fastener to prevent contact with sharp edges or hot, rotating and moving parts.
- After connecting a hose or a quick connect fitting, pull on the hose near the fitting to make sure it is securely locked.

Use of improper fuel lines could compromise fuel system integrity.

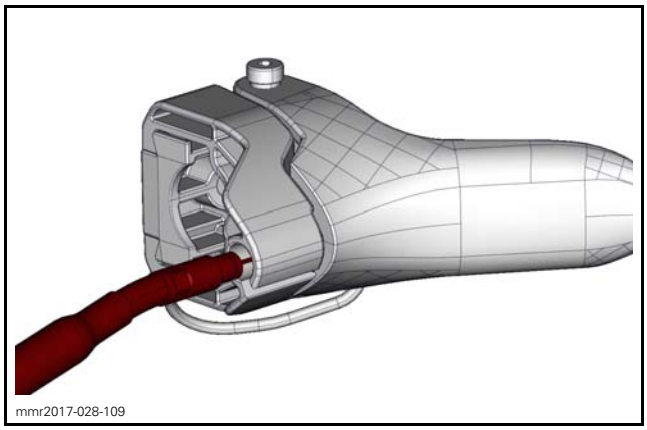
THROTTLE CABLE

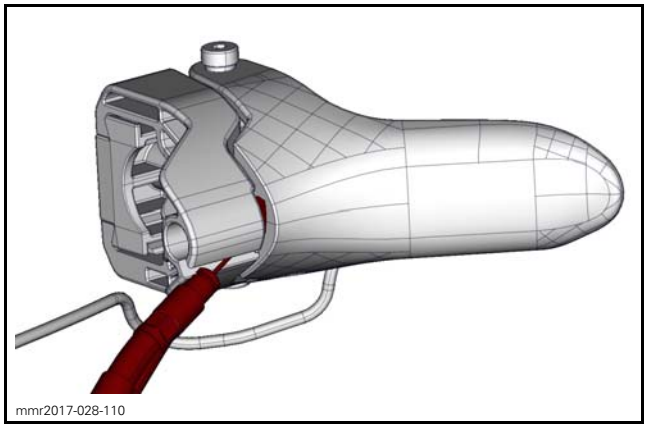
Removing the Throttle Cable

1. Depress and hold throttle lever.
2. Pull out circlip using long nose pliers. Keep circlip for re-use.

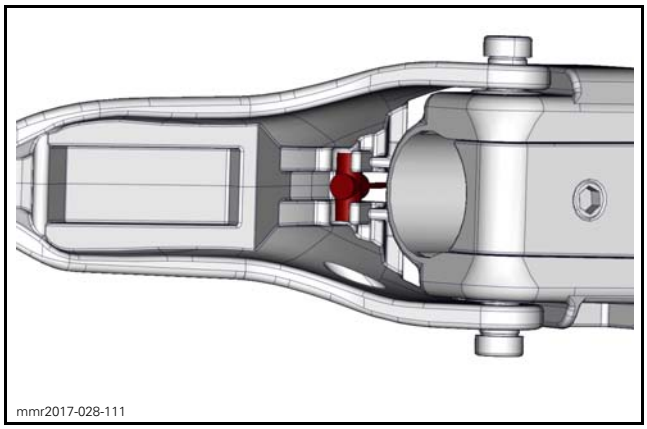


3. Pull throttle cable out of the throttle lever housing.



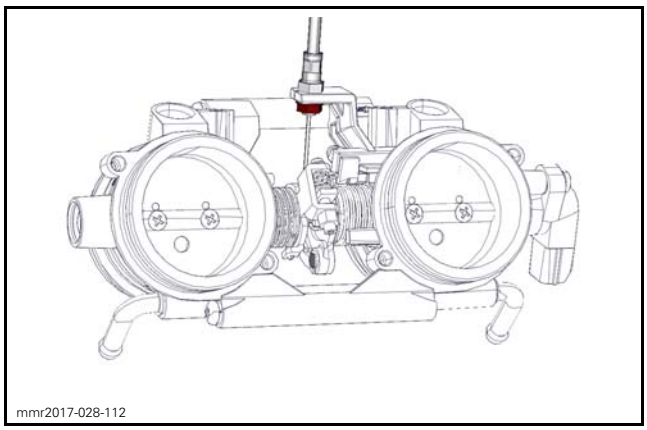


4. Unhook cable end barrel from throttle lever and remove cable.



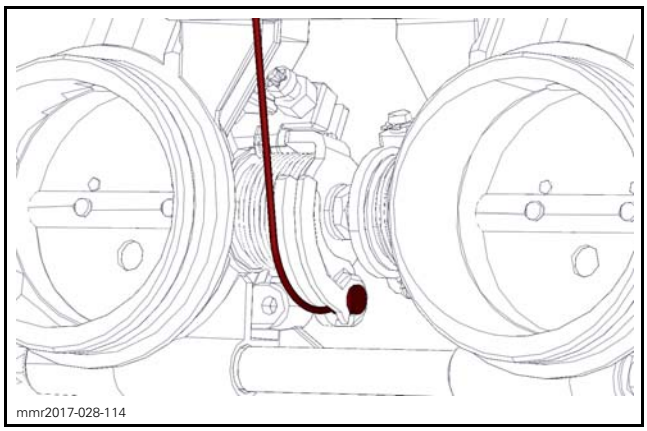
NOTE: Take note of cable routing before removal.

5. At throttle body, fully unscrew cable lock nut.



THROTTLE CABLE LOCK NUT

6. Unhook throttle cable end.



7. Remove throttle cable.

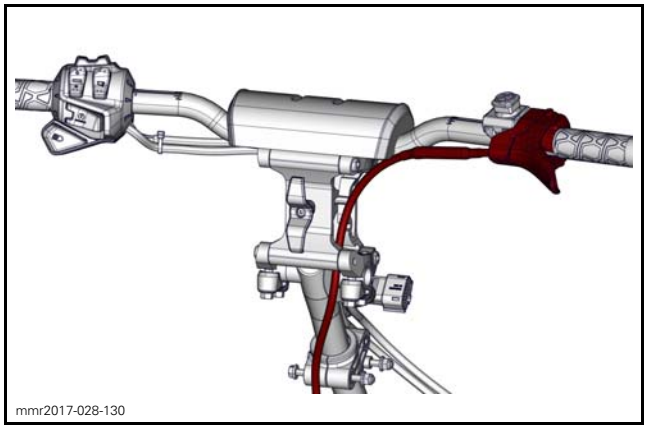
Installing the Throttle Cable

Reverse removal procedure however, pay attention to the following.

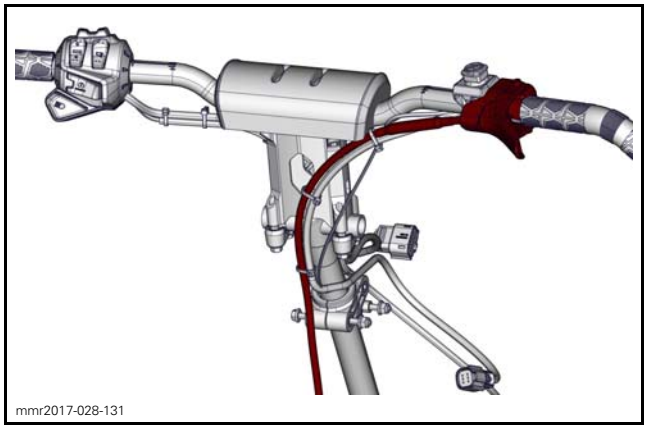
Route cable as noted prior to removal.

⚠ WARNING

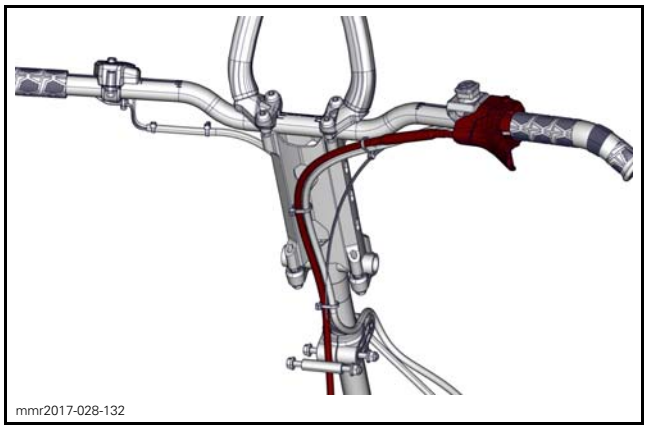
Ensure proper routing of throttle cable as per following illustrations.



CROSS-COUNTRY WITH ADJUSTABLE RISER



CROSS COUNTRY WITH FIXED RISER



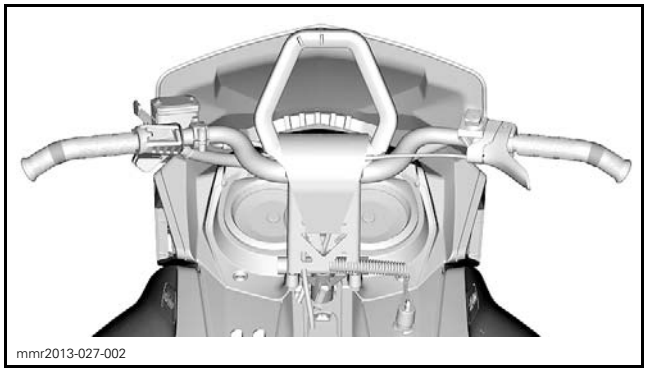
MOUNTAIN WITH FIXED RISER

Ensure that cable ends are properly secured in their levers.

Proceed with throttle cable adjustment.

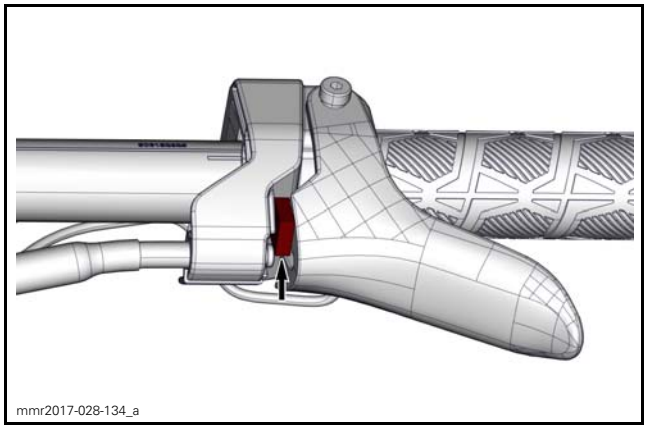
Adjusting the Throttle Cable

1. Connect BUDS2. Refer to *COMMUNICATION TOOLS AND BUDS* subsection.
2. Navigate to the measurements page and monitor TPS opening % in BUDS2.
3. Position handlebar straight and level.

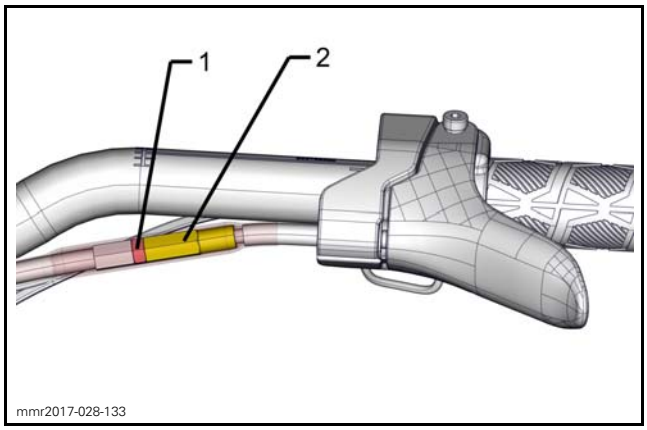


TYPICAL - HANDLEBAR IN STRAIGHT AHEAD POSITION

4. Insert a 4 mm (.157 in) spacer between throttle lever and throttle lever housing.



5. Unlock throttle cable adjuster lock nut.
6. Adjust throttle cable until the TPS value (%) is between 3 and 5% in BUDS2.

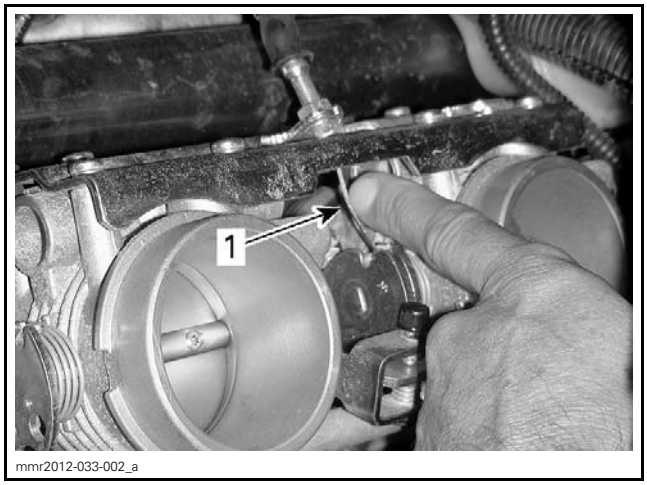


1. Throttle cable adjuster lock nut
2. Throttle cable adjuster

7. Lock throttle cable adjuster lock nut.
8. Remove the 4 mm (.157 in) spacer.
9. Fully depress the throttle lever and ensure the opening value is more than 95 % in BUDS2.
10. Ensure there is free play in the cable with the throttle lever at rest.

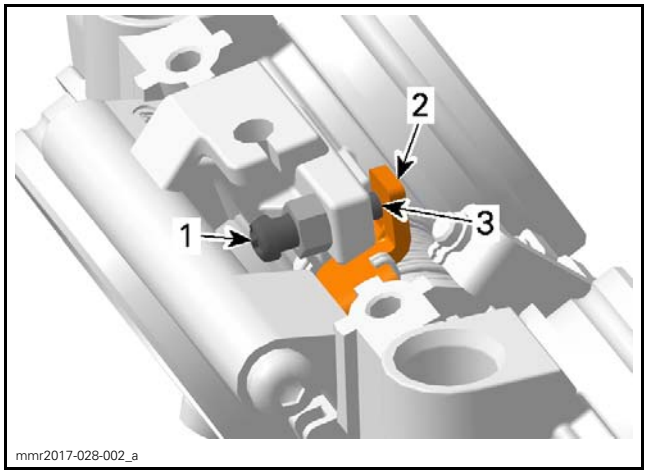
NOTICE **Do not tamper with any throttle body adjustment screws. Otherwise, throttle body must be replaced.**

NOTE: To ensure cable free play, lightly press on throttle cable as in following illustration.



THROTTLE CABLE FREE PLAY
1. Cable slightly loose here

11. Activate and release throttle lever 2 - 3 times to settle throttle plate.
12. Confirm throttle plate stopper is STILL in contact with master zero position screw.



THROTTLE BODY MASTER ZERO POSITION
1. Master zero position screw
2. Throttle plate stopper
3. Contact here

13. Readjust throttle cable if necessary.

14. Inspect the throttle cable operating range with BUDS2
15. Reset the Closed Throttle Value, refer to procedure in this subsection.

Inspecting the Throttle Cable Operating Range BUDS2

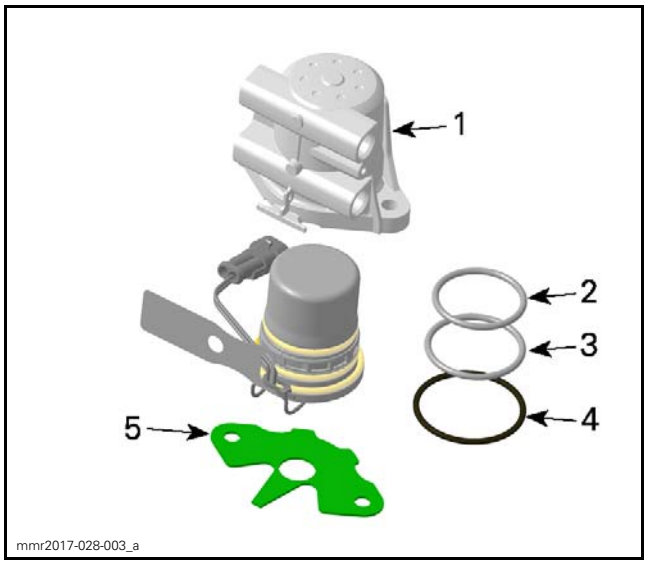
1. In BUDS2, navigate to the Measurements page.
2. Fully depress throttle lever and hold.
   2.1 Confirm throttle opening is within specification.

THROTTLE OPENING SPECIFICATION (WIDE OPEN THROTTLE)
More than 95%

3. If throttle opening is out of specification, readjust as follows.

THROTTLE OPENING OUT OF SPECIFICATION	
Above specification	Loosen throttle cable
Below specification	Tighten throttle cable

E-TEC DIRECT INJECTORS



1. *Fuel injector housing*
2. *Top O-ring*
3. *Bottom O-ring*
4. *Crush ring*
5. *Gasket*

Every fuel injector is bench tested. Its electrical and flow characteristics are registered throughout all its operating range in a calibration file.

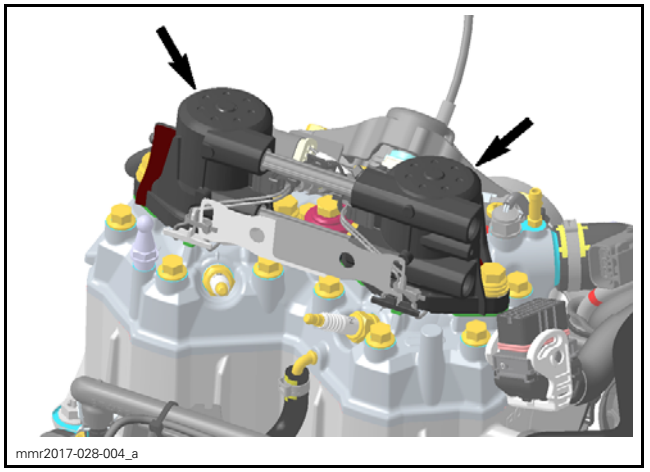
NOTICE When a fuel injector is replaced, the matching calibrated file must be loaded in the ECM using BUDS2 so that the ECM properly controls the fuel injector.

Fuel Injectors Access

1. Remove upper body module.
2. Remove engine cover.

Visually Inspecting Fuel Injectors

1. Visually inspect the fuel injector area.



FUEL INJECTORS

If a fuel leak is noticed in the hoses area, inspect hoses and connections.

If a fuel leak is noticed in fuel injector base area, it indicates a leak of the lower O-ring of fuel injector.

If a dark carbon sooted area is noticed in fuel injector base area, it indicates a leak between the fuel injector nozzle and the cylinder head. The fuel injector retaining screws may not be tight enough.

Fuel Injector Troubleshooting Tips

Usually, a faulty fuel injector will lead to poor engine idling and a low RPM (around 800 RPM and below). It may also lead to engine misfiring.

Ensure the correct fuel injector is installed on the proper cylinder. Refer to *FUEL INJECTOR POSITION VALIDATION*.

While engine is running, try disconnecting a fuel injector connector:

⚠ WARNING

Be careful while working close to rotating parts.

– If engine RPM does not change, the fuel injector could be faulty.
– If engine RPM decreases, the other fuel injector could be faulty.

If one injector is thought to be faulty, proceed with the injector tests.

Testing for Fuel Injector Leaks

Test Preparation

1. First make sure fuel pressure is within specifications. Refer to *FUEL TANK AND FUEL PUMP* subsection.

NOTE: Keep the pressure gauge installed for the leak test.

2. Disconnect magneto connector. Refer to *WIRING HARNESS AND CONNECTORS* subsection.

⚠ WARNING

The magneto connector must be disconnected to prevent any spark in the engine compartment should the engine be cranked. Fuel vapors may ignite in presence of a spark creating a fire hazard.

3. Using BUDS2, release fuel pressure. Refer to *FUEL TANK AND FUEL PUMP* subsection

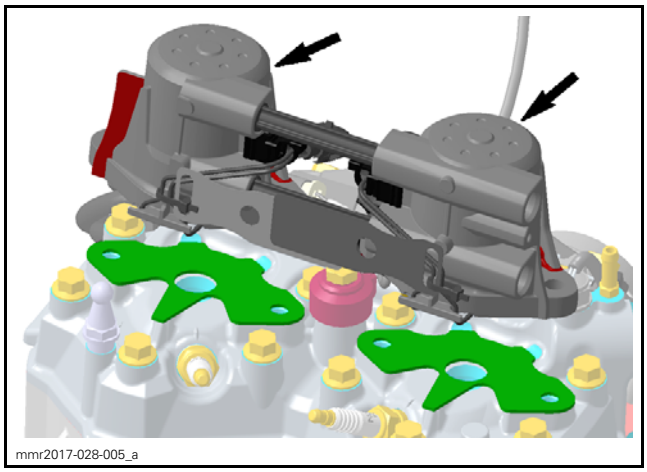
NOTICE **If the fuel pressure is not released, the pressure will push the fuel injector out of its housing when removing the fuel injector from the engine. This could damage the fuel injector and lead to an important fuel spill.**

4. Remove upper body module. Refer to *BODY* subsection.

NOTE: Fuel injector leak test can only be done on both injectors simultaneously.

5. Unscrew both E-TEC direct fuel injectors. Refer to *REMOVING THE FUEL INJECTOR* in this subsection.
6. Carefully lift both fuel injectors. Be careful not to pry hoses against their plastic fittings.

⚠ CAUTION **If both fuel injectors are not lifted carefully from the engine together, the strain on the injector fuel fittings may cause them to crack and leak fuel when pressurized, resulting in a fire hazard.**



mmr2017-028-005_a

NOTE: Do not install the gaskets against fuel injectors.

NOTE: Use a new crush ring. If a new crush ring is not installed, it will be difficult to determine if the E-TEC direct injector is leaking.

7. Secure the injectors on a cylinder head (either remove it from engine or order a spare one as a tool).

NOTICE **Test injectors when removed from the engine, while attached to the cylinder head.**

⚠ WARNING

Fuel injector must be secured during the leak test to avoid the fuel injector to be projected.

8. Place an appropriate container under the fuel injectors.
9. Ensure spark plug caps are installed on spark plugs.
10. Ensure there is enough fuel in fuel tank.
11. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

Leak Test

1. UsingBUDS2, activate the fuel pump.

NOTE: Fuel pump will operate until deactivated in BUDS2.

2. Check for fuel leakage from the fuel injector nozzle.

3. Monitor fuel pressure at fuel pressure gauge. If pressure drops below 275 kPa (40 PSI) during the test, re-activate fuel pump as necessary.

FUEL INJECTOR LEAKAGE	
TEST DURATION	SPECIFICATION
2 minutes	2 drops per minute maximum

4. If test is not within specification, replace the faulty fuel injector.
5. Properly reinstall fuel injectors. Refer to *INSTALLING FUEL INJECTORS* in this subsection.
6. Reinstall remaining removed components.
7. Connect magneto connector.

⚠ WARNING

Wipe up any spilled fuel.

Testing the Fuel Injector

1. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Activate each fuel injector.

With each activation a sound coming from the targeted injector should be heard.

If the fuel injector does not work, possible causes are:

– Injector
– Harness
– ECM.

If the fuel injector does not work, connect it to the opposite fuel injector connector, then test again.

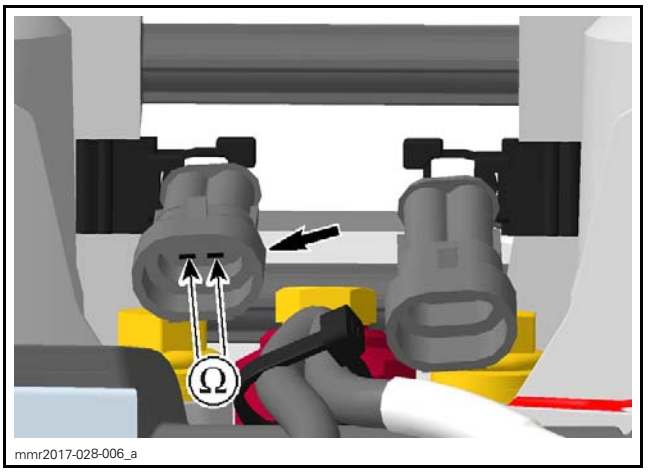
If the suspected fuel injector works normally with the opposite fuel injector connector, carry out the *TESTING THE FUEL INJECTOR INPUT VOLTAGE* in this subsection.

If the fuel injector still does not work, carry out the *TESTING THE FUEL INJECTOR RESISTANCE*.

Measuring E-TEC Direct Fuel Injector Resistance

1. Disconnect the fuel injector connector.
2. Measure fuel injector resistance directly on its terminals.

E-TEC DIRECT FUEL INJECTORS		MEASUREMENT @ 22°C (72°F)
Pin 1	Pin 2	Below 2.7 Ω



FUEL INJECTOR CONNECTOR

If measurement is out of specification, replace fuel injector.

Testing the Fuel Injector Input Voltage

1. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Read the voltage on the 55 V System Circuit meter in BUDS2.

55 V SYSTEM CIRCUIT VALUE
30 Vdc minimun

3. Measure voltage at E-TEC direct fuel injector connector with a multimeter.

PROBE		SPECIFICATION
INJ_DI_MAG-1	Chassis Ground	30 Vdc minimun
INJ_DI_PTO-1	Chassis Ground	30 Vdc minimun

If voltage test is as per specification, carry out *TESTING THE FUEL INJECTOR CONTROL CIRCUIT SIGNAL*.

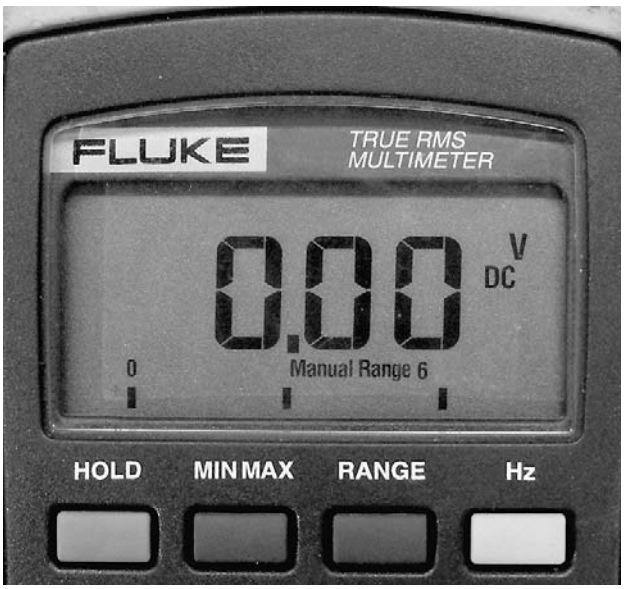
If voltage test is not as per specification, check wire continuity between ECM and fuel injector connector.

Testing the Fuel Injector Control Circuit Signal

1. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Backprobe injector connector, do not disconnect injector connector.
3. Set multimeter to Vdc (Hz).

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

4. Repeatedly press the RANGE button until the display shows Manual Range 6.



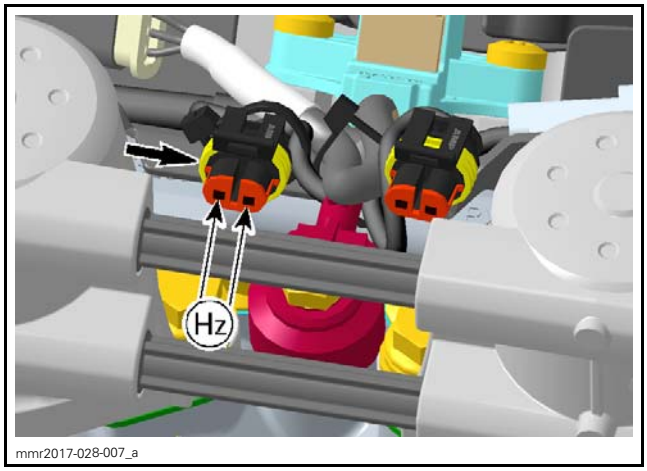
mmr2009-023-027_d

DC VOLTS AND MANUAL RANGE 6 SELECTED

5. Press the Hz button so that the display shows Hz.
6. Activate fuel injector and read the frequency on the multimeter.

NOTE: The multimeter counts the pulses per second (Hertz) of current the ECM sends to the fuel injector.

FUEL INJECTOR CONNECTOR		MEASUREMENT
Pin 1	Pin 2	Approximately 2 Hz



mmr2017-028-007_a

FUEL INJECTOR WIRING HARNESS CONNECTOR

If there is no reading, check continuity of wiring between ECM and fuel injector connector.

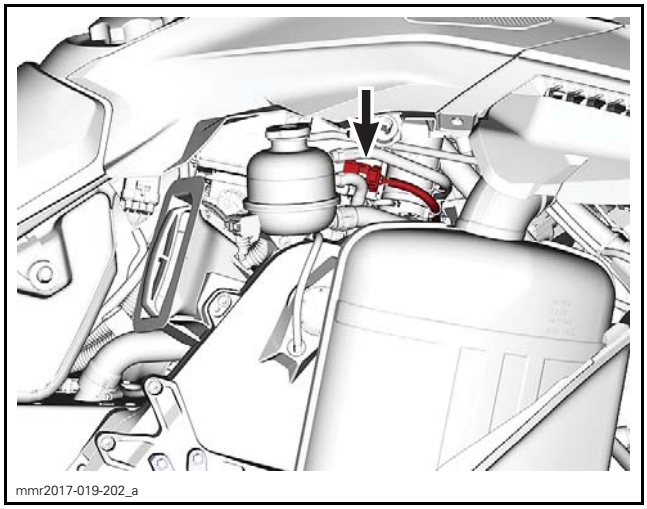
If you hear the injector click, control circuit is good.

If reading is good, the control circuit is functional.

Removing the Fuel Injector

IMPORTANT: NEW O-rings, retaining screws, and crush ring must be installed if fuel injector is removed (fuel injector disassembly required). Otherwise, leakage or damage to fuel injector/cylinder head might occur.

1. Release the fuel pressure in the system. Refer to *FUEL TANK AND FUEL PUMP* subsection.
2. Disconnect magneto connector (3-pin connector). Refer to *Stator Connector Access* in *MAGNETO AND STARTER* subsection.


mmr2017-019-202_a

3. Remove upper body module.
4. Remove engine cover.

⚠ WARNING

The magneto connector must be disconnected to prevent any spark in the engine compartment should the engine be cranked. Fuel vapors may ignite in presence of a spark creating a fire hazard.

5. Clean fuel injector area.

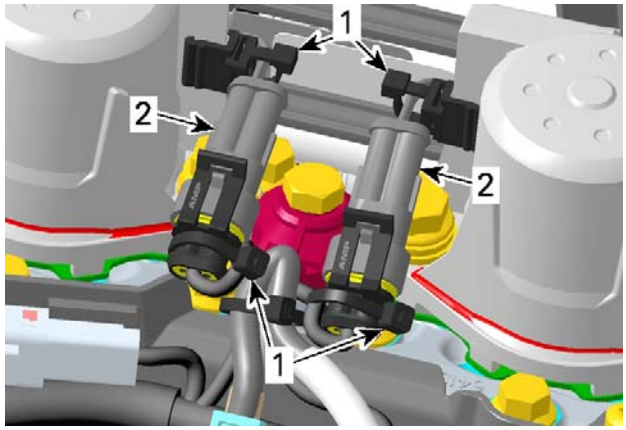
NOTICE If fuel pressure is not released, the pressure will push the fuel injector out of its housing when removing the fuel injector. This could damage the fuel injector and lead to an important fuel spill.

⚠ WARNING

Fuel vapors in the engine compartment could be lit by a spark. This might create a fire.

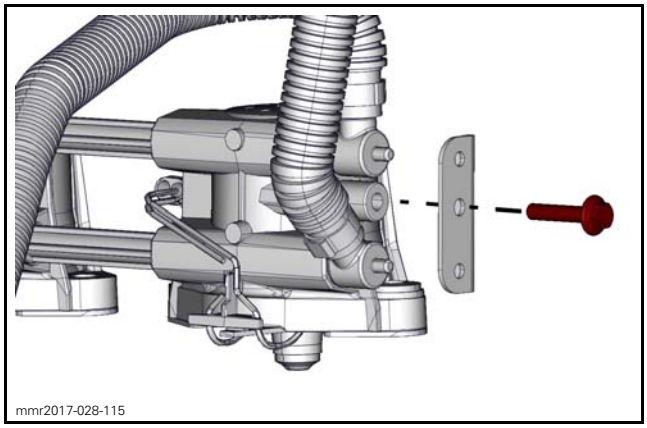
6. Disconnect fuel injector connectors.

NOTE: Locking ties must not be removed.

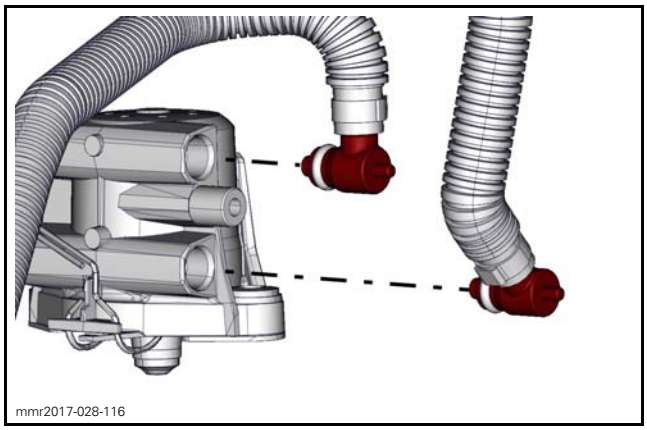


1. Locking ties
2. Fuel injector connectors

7. Install a rag under the hose ends to catch fuel spillage.
8. Remove fuel hose retainer screw and retainer.



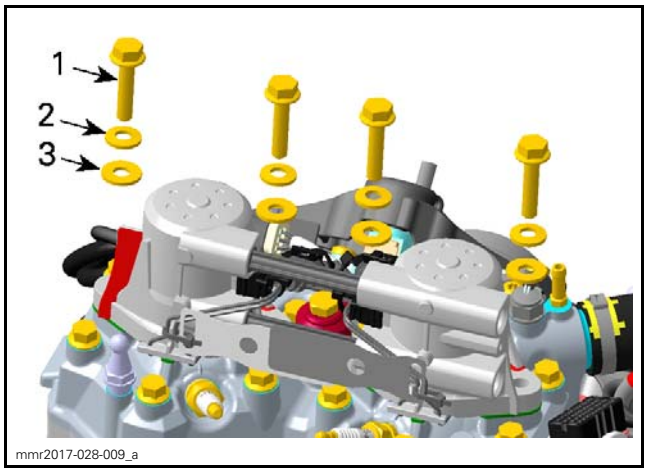
9. Disconnect fuel hoses from fuel injector.



⚠ WARNING

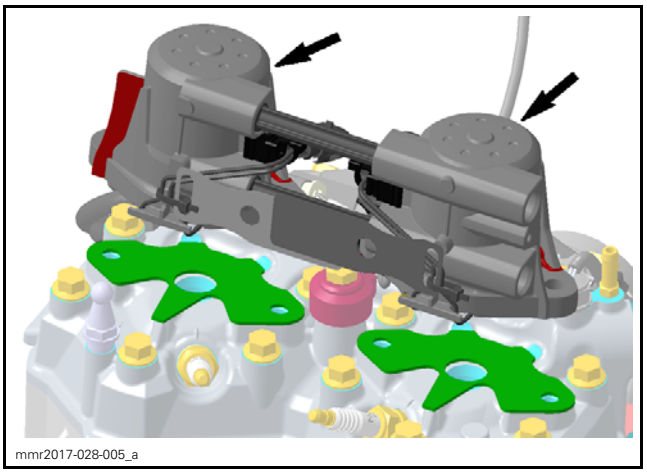
More fuel than usual will flow out of the fuel injectors. Work in a well ventilated area and wipe up spilled fuel.

10. Remove and discard:
    - Fuel injector screws
    - Spring washers
    - Washers.



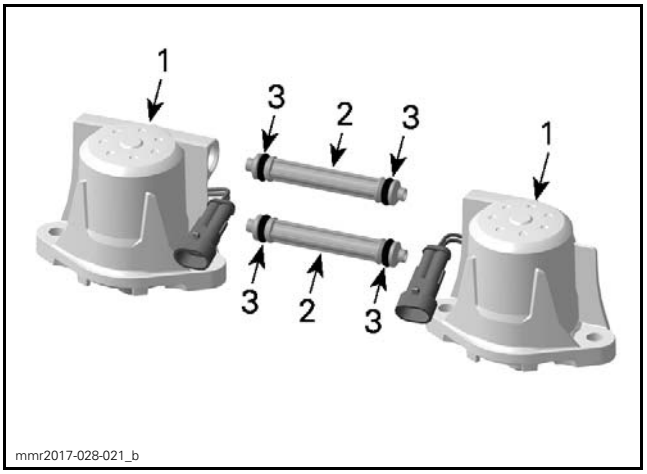
1. Fuel injector screw
2. Spring washer
3. Washer

11. Gently pull up on the fuel injectors to remove them.


mmr2017-028-005_a

NOTICE Use caution when handling fuel injector. Never hold injector by its electrical wires. Prevent dirt and debris from entering fuel inlet and outlet ports of fuel injectors or fuel hoses. Cover the fuel injector nozzle port in cylinder head to prevent contamination of combustion chamber.

12. Separate fuel injectors and connecting tubes. Remove and discard O-rings.



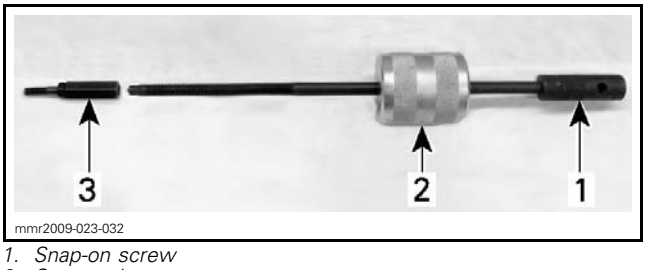
mmr2017-028-021_b

1. *Fuel injectors*
2. *Connecting tubes*
3. *O-rings*

Disassembling the Fuel Injector

REQUIRED TOOL	
SNAP-ON SCREW (P/N CJ93-1)	
SNAP-ON HAMMER (P/N CJ125-6)	
EXTRACTOR ADAPTOR (P/N 529 036 136)	

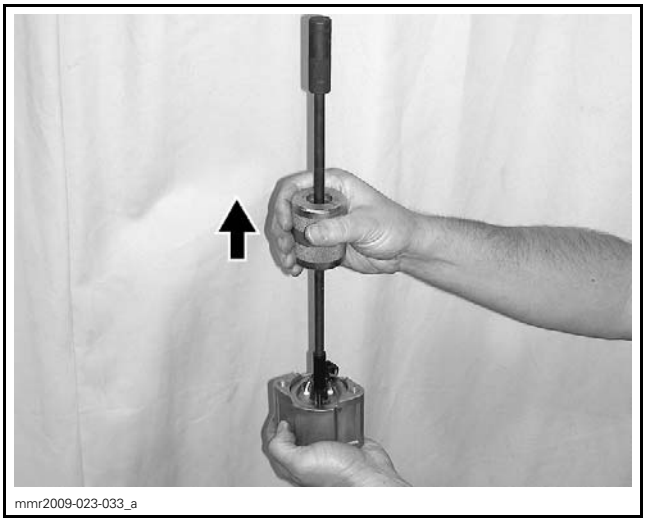
1. Install the extractor adapter on the Snap-on screw.



mmr2009-023-032

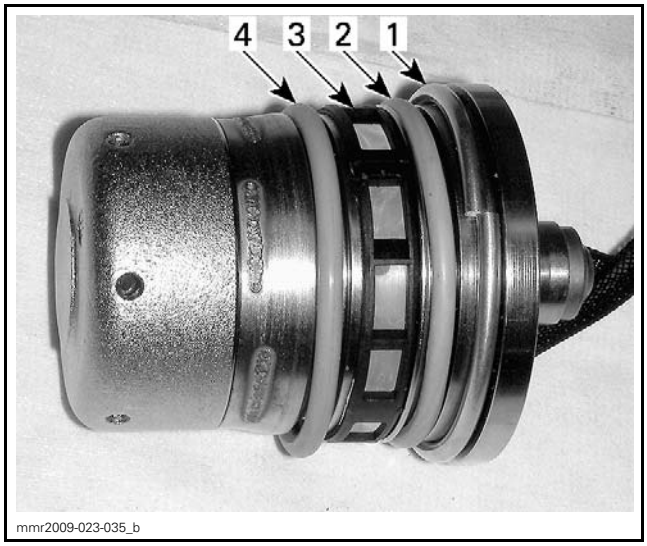
1. *Snap-on screw*
2. *Snap-on hammer*
3. *Extractor adapter (P/N 529 036 136)*

2. Thread the extractor adapter into the fuel injector.
3. Securely hold the fuel injector housing upside down to avoid dropping it.
4. Work slide hammer to pull the fuel injector out.


mmr2009-023-033_a


mmr2009-023-034

5. Remove the extractor adaptor from the fuel injector.
6. Remove O-rings, crush ring and filter from the fuel injector.



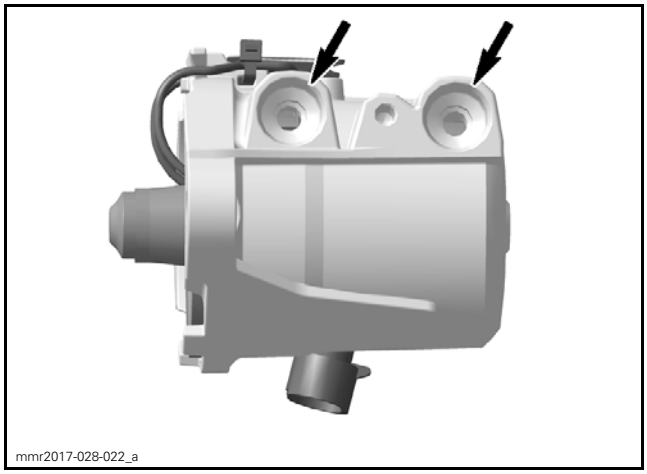
mmr2009-023-035_b

1. *Crush ring*
2. *ORANGE O-ring*
3. *Filter*
4. *BLUE O-ring*

7. Inspect and clean fuel injector filter.


mmr2009-023-036

8. Clean connecting tube bores in injector housing.


mmr2017-028-022_a

Assembling the Fuel Injector

The assembly procedure is the reverse of disassembly. However, pay attention to the following:

Lubricate O-rings.

O-RINGS LUBRICATION	
Service product	Injection oil

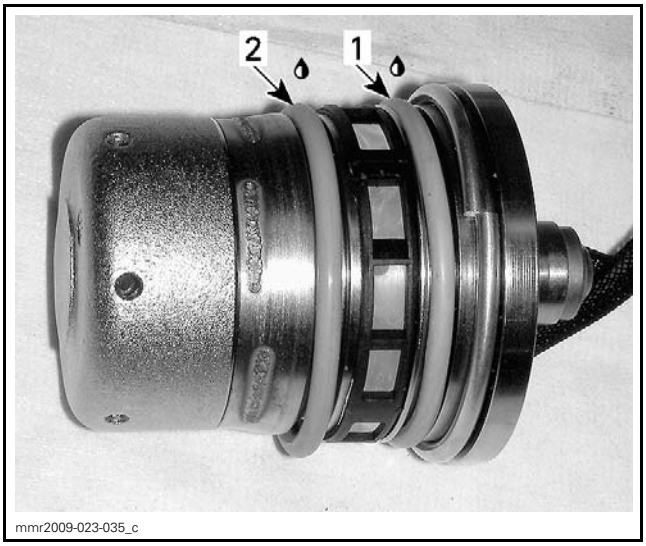
Install a NEW crush ring.

Install a NEW orange O-ring on top.

NOTICE **Always use the O-rings specifically designed for these fuel injectors.**

Install filter. Ensure filter is retained firmly on fuel injector. Otherwise, remove it, invert it half a turn, then reinstall. If it still not retained securely, install a new one.

Install a NEW blue O-ring at bottom.

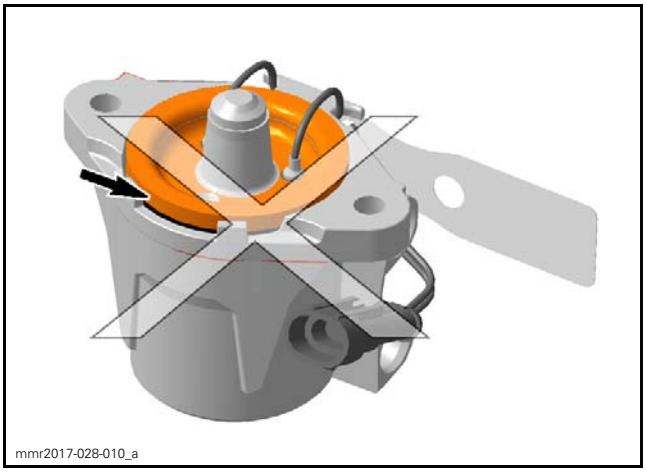


OIL INJECTION ON O-RINGS
1. *ORANGE*
2. *BLUE*

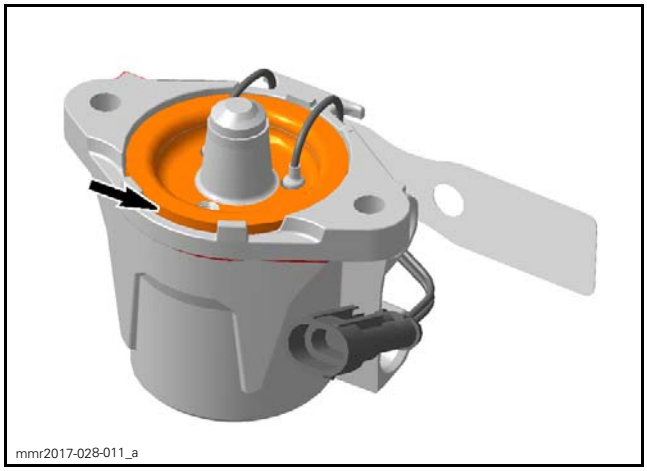
Reinstall fuel injector in its housing.

NOTE: Be sure to fully insert fuel injector in the housing with the wire outlets towards the fuel ports.

NOTICE Never press or tap the fuel injector tip.

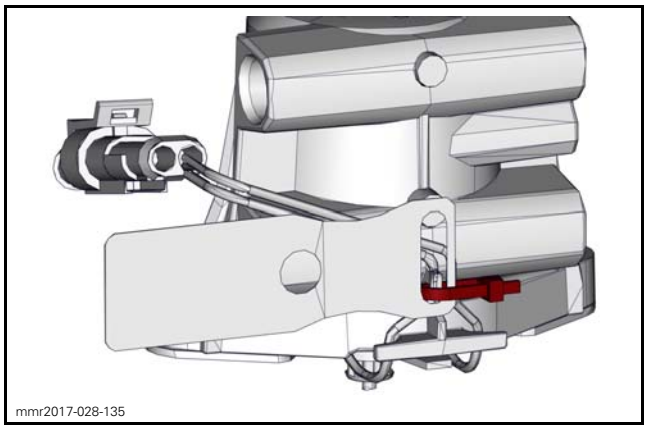


WRONG INSTALLATION



CORRECT INSTALLATION

Reinstall locking tie.



Installing the Fuel Injector

The following items and their mating surfaces must be cleaned and inspected prior to assembly:

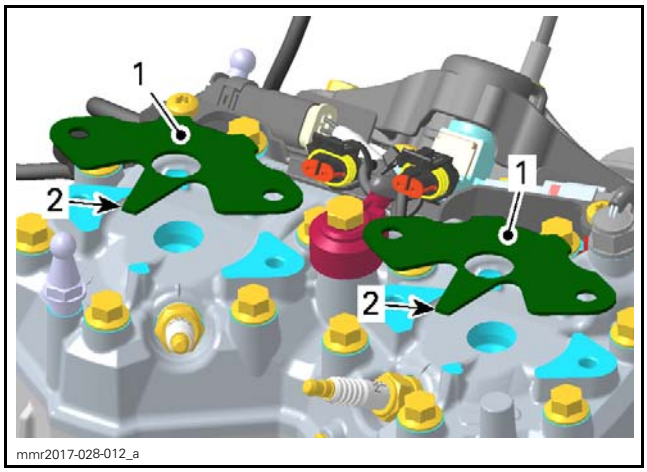
– Fuel Injector
– Cylinder head: fuel injector housing and fuel injector tip contact surfaces
– Fuel injector screw threads and cylinder head threads (must be dry).

NOTICE All fuel injector components must be clean to ensure correct torque tightening specifications and to avoid leakage. Carefully follow the installation instructions.

NOTE: When installing a used fuel injector, reinstall the fuel injector in the same location. If it was not marked at removal, verify the correct fuel injector-cylinder match using BUDS2 Refer to *FUEL INJECTOR POSITION VALIDATION*.

1. Position the NEW gaskets on cylinder head.

NOTICE Smooth surface of gasket must face toward injector housing.

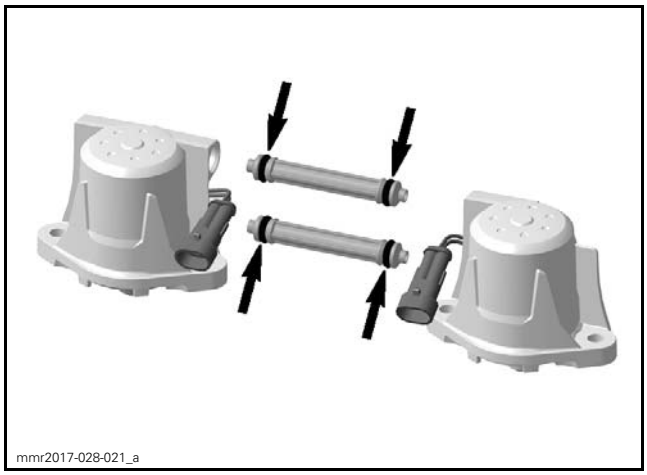


mmr2017-028-012_a

1. *Smooth surface of gasket*
2. *Tab facing towards intake side*

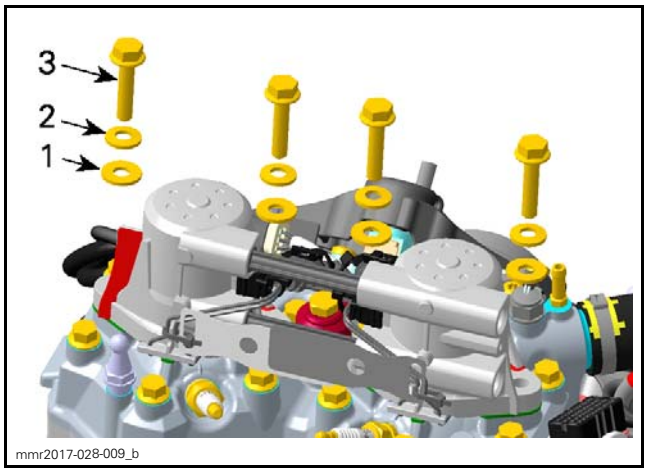
2. Install NEW O-rings on connecting tubes.
3. Lubricate O-rings and pre-assemble fuel injectors and connecting tubes.

O-RINGS LUBRICATION	
Service product	Injection oil


mmr2017-028-021_a

LUBRICATE O-RINGS

4. Place the fuel injectors on the cylinder head, then thread in NEW screws with NEW washers.



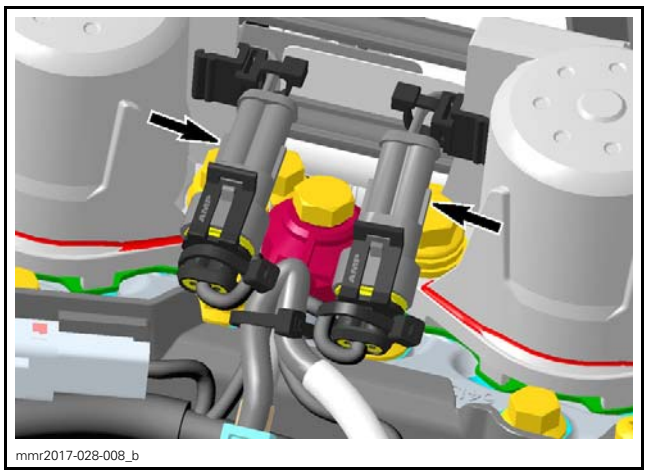
mmr2017-028-009_b

1. *Washer*
2. *Spring washer*
3. *Fuel injector screw*

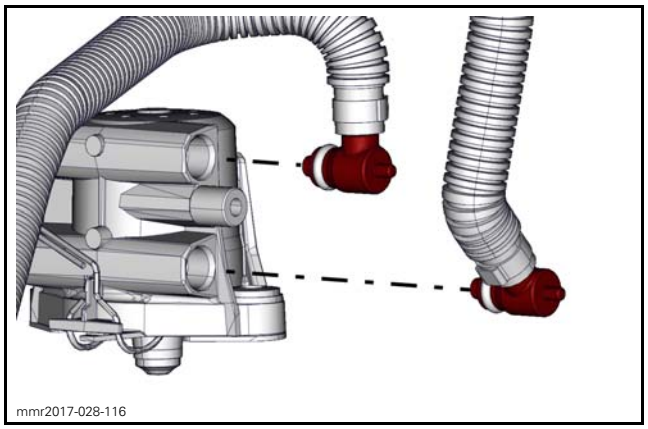
5. Tighten fuel injector retaining screws alternately in the following procedure:

TIGHTENING PROCEDURE		
Fuel injector retaining screws	Step A	7 N•m ± 0.5 N•m (62 lbf•**in** ± 4 lbf•**in**)
	Step B	20 N•m ± 0.6 N•m (15 lbf•ft ± 0 lbf•ft)
	Step C	35 N•m ± 1 N•m (26 lbf•ft ± 1 lbf•ft)

6. Install both fuel injector connectors between the fuel injectors.

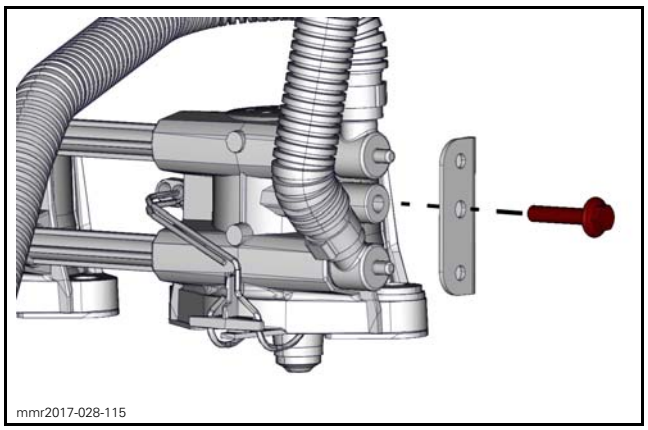

mmr2017-028-008_b

7. Check condition of fuel hose O-rings and plastic flange on hose fittings.
8. Apply injection oil on O-rings.
9. Insert fuel hoses in fuel injector housing.


mmr2017-028-116

NOTE: Both hose fittings must be fully seated in the fuel injector housing.

10. Insert the hose retainer so that it engages the groove in the fuel injector fittings.


mmr2017-028-115

NOTE: Ensure open end of retainer that locks in the fuel hoses faces inboard. The hole in the hose retainer used to secure the injector wiring must be on top for the PTO injector, and on the bottom for the MAG injector.

11. Install a NEW screw to secure hose retainer.

NOTICE **The screw features a scotch grip threadlocker coating that is destroyed when loosening screw. Always replace screw with a new one each time it is loosened.**

TIGHTENING TORQUE	
fuel hose retainer screw	5 N•m (44 lbf•**in**)

12. Secure fuel injector wiring using a NEW locking tie.
13. Grease fuel injector connector.

FUEL INJECTOR CONNECTOR LUBRICATION	
Service product	DIELECTRIC GREASE (P/N 293 550 004)

14. Reconnect fuel injector connector.

NOTICE **Never fasten the electrical connector to the fuel injector. The connector must be "free floating".**

15. If installing a NEW fuel injector, use BUDS2 to configure it in the ECM. Refer to *SETTING A FUEL INJECTOR TO A CYLINDER*.

NOTE: The engine will be able to run with an improperly matched fuel injector. However, the engine may misfire, run rough at idle, have poor fuel economy or run lean.

⚠ WARNING

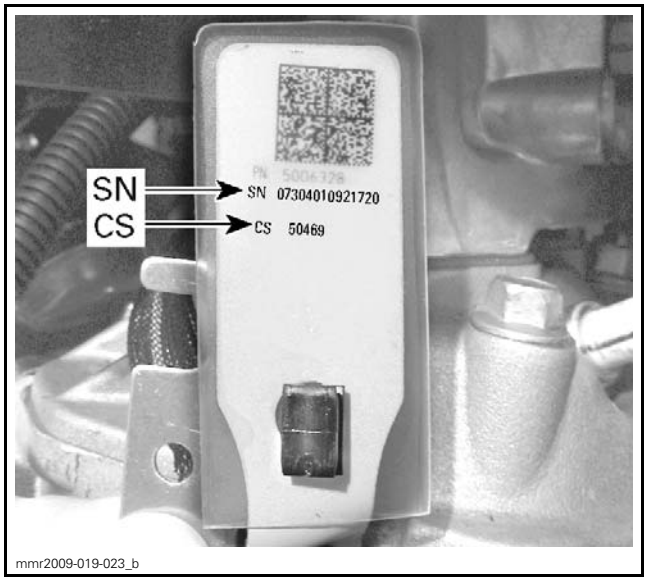
Perform a fuel pressure test and make sure there is no leak.

Fuel Injector Position Validation

When troubleshooting or reinstalling a fuel injector, the correct matching of the fuel injector and cylinder must be confirmed using BUDS2 An incorrect match between the fuel injector and cylinder may lead to engine misfiring, improper idling or poor fuel economy.

NOTE: To configure a new fuel injector at installation, refer to *SETTING A FUEL INJECTOR TO A CYLINDER.*

1. Look for the fuel injector identification tag.
2. Note the fuel injector serial number (SN) on the tag of the fuel injector you want to validate.



mmr2009-019-023_b

SN: Serial number
CS: Checksum number

3. In BUDS2, navigate to the Settings page.
4. In the Injector Coefficient box, look for the fuel injector serial numbers (S/N) that are registered in the ECM.

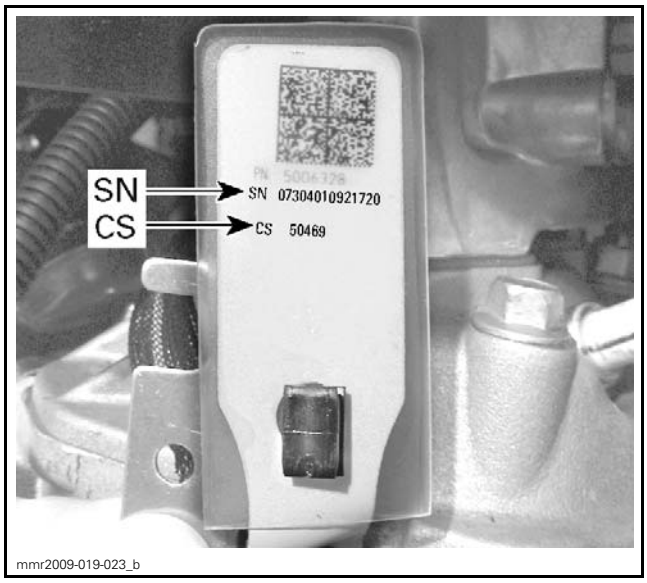
5. Compare the MAG or PTO Injector S/N that is configured in the ECM with the fuel injector SN installed on the engine.

NOTICE The actual fuel injector number (SN) must match the number in BUDS2 (Injector S/N).

If numbers do not match, configure the fuel injector in BUDS2 Refer to *SETTING A FUEL INJECTOR TO A CYLINDER.*

Setting a Fuel Injector to a Cylinder

1. Note the serial number (SN) and the checksum number (CS) on the fuel injector tag.



SN: Serial number
CS: Checksum number

2. Download the E-TEC injector coefficient file from the *COMCENTER* tab in *BOSSWEB.*.

DOWNLOAD INJECTOR COEFFICIENT FILE
Log in to BOSSWeb
Under the COMCENTER tab , click on E-TEC injector coefficient link

3. Start BUDS2 and click on the Scan button.
4. Navigate to the Settings page and Injector Coefficient tabs.
5. In the Injector Coefficient box, click on the New button of the fuel injector you want to replace (MAG or PTO).

NOTE: Every time the New button is clicked, BUDS2 will automatically open the Injector Coefficients folder.

6. Select and open the fuel injector serial number file that matches the fuel injector installed on the engine.
7. Enter the checksum number noted earlier and select Write.

NOTE: The file will be loaded in BUDS2

8. Click the OK button when the confirmation box appears.
9. Click on the Write Data button to save the changes to the ECM.

IMPORTANT: To ensure the proper file has been saved in the ECM, do the following:

10. Click on the Scan button again in BUDS2
11. Look in the Injector Coefficient area in the ECM Setting page.
12. Ensure the S/N in BUDS2 matches the SN of the fuel injector installed on the engine and the PTO/MAG numbers are not inverted.
13. If there is a mismatch, reload the proper configuration file. Write data and read it again to recheck.

FUEL RAIL AND THROTTLE BODY INJECTORS

Testing the Fuel Injector Operation Using BUDS2 (Dynamic)

NOTE: As a first troubleshooting step, always check for applicable fault codes using BUDS2

1. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Start engine.
3. Using the BUDS2, shut down fuel injection to each engine cylinder one at a time by clicking on the button under the applicable cylinder.

If the engine RPM drops momentarily when clicking on a cylinder, the injector on this cylinder is functioning normally.

If the engine RPM does not drop momentarily when clicking on a cylinder, this cylinder is not functioning properly. Check the following:

– Fuel injector operation. Refer to *TESTING THE FUEL INJECTOR BALANCE USING BUDS2*
– Spark plug and ignition coil. Refer to *IGNITION SYSTEM* subsection.
– Engine condition.

Testing the Fuel Injector Balance Using BUDS2

NOTICE After fuel injector activation using BUDS2, always crank engine in drowned mode to ventilate engine and prevent a potential backfire due to fuel accumulation in engine.

1. Set emergency stop switch to RUN.
2. Install a fuel pressure gauge as described in *FUEL TANK AND FUEL PUMP* subsection.
3. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
4. In BUDS2, activate fuel pump.
5. Fuel pressure must be within specification. Refer to *FUEL TANK AND FUEL PUMP* subsection. Re-activate fuel pump as necessary.
6. In BUDS2, energize fuel injector no. 1.
7. Record the fuel pressure drop for injector no. 1.
8. In BUDS2, ctivate fuel pump.
9. Repeat the procedure for fuel injector no. 2 and record the pressure drop.
10. The maximum fuel pressure drop between injectors should not exceed the following specification:

MAXIMUM FUEL PRESSURE DROP ALLOWED BETWEEN FUEL INJECTORS
10 kPa (1.5 PSI)

If pressure drop of any fuel injector is greater than the specification, replace that injector then repeat the test.

11. Using the valve on the fuel pressure gauge, release the pressure in the system (if so equipped).
12. Remove fuel pressure gauge and reinstall removed parts.

Testing for Fuel Injector Leaks

Carry out the *TESTING THE FUEL PUMP PRESSURE* as detailed in the *FUEL TANK AND FUEL PUMP* subsection.

Testing the Fuel Injector Activation Using BUDS2

Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

On the Functions page of BUDS2, energize the fuel injector to be tested.

You should hear or feel the injector functioning. This will validate the injector mechanical and electrical operation.

If the injector does not function, carry out the *TESTING THE FUEL INJECTOR RESISTANCE*.

Testing the Fuel Injector Resistance

Disconnect connector "A" from the ECM. Refer to *WIRING HARNESS AND CONNECTORS*

Check resistance value between terminals as follows.

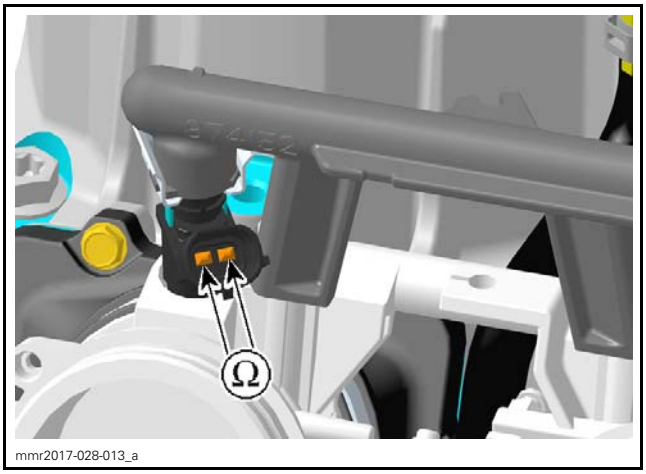
REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	
ECM ADAPTER TOOL (P/N 529 036 166)	

FUEL INJECTOR RESISTANCE TEST AT ECMA CONNECTOR			
INJECTOR	**ECM CONNECTOR "A"**		**RESISTANCE @ 20°C (68°F)**
MAG	ECMA-A3	ECMa_A4	11.4 - 12.6 Ω
PTO	ECMA-A2	ECMA-A1	

If resistance value is as specified, the injector and its circuits are good. Refer to *TESTING FOR FUEL INJECTOR INPUT VOLTAGE* in this subsection.

If resistance value is NOT as specified, remove injector connector and check resistance value between injector pins.

FUEL INJECTOR RESISTANCE TEST AT INJECTOR CONNECTOR			
INJECTOR	**INJECTOR PIN**		**RESISTANCE @ 20°C (68°F)**
MAG	1	2	11.4 - 12.6 Ω
PTO			



mmr2017-028-013_a

If readings are out of specifications, replace injector.

If readings are good, carry out *TESTING THE FUEL INJECTOR CIRCUIT RESISTANCE*.

Testing the Fuel Injector Input Voltage

Disconnect the fuel injector connector.

NOTE: If the connector is hard to unlock, gently use a screwdriver to release connector.

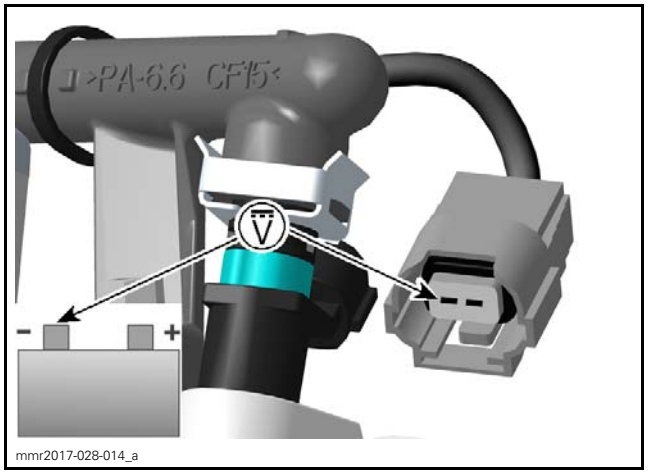

vmr2006-014-001_a

TYPICAL

NOTE: It is not necessary to activate the injector since it is continuously powered when the emergency stop switch is set to RUN and BUDS2 is connected.

Use a multimeter and set it to Vdc. Read voltage.

CYLINDER	INJECTOR CONNECTOR		MEASUREMENT
	INJECTOR PIN		
MAG	Pin 2	Battery ground	Battery voltage
PTO	Pin 2		



mmr2017-028-014_a

If supply voltage is good:

1. Check if ground circuit is faulty, repair/replace wiring and connectors. Refer to *TESTING THE FUEL INJECTOR CIRCUIT RESISTANCE*.
2. If the ground circuit is good, the injector problem may be mechanical. Replace injector.
3. If injector is good the problem may be in the power distribution system in the ECM (does not provide a ground signal) refer to *PROGRAMMING A NEW ECM*.

If the injector input voltage is good, the injector problem may be mechanical.

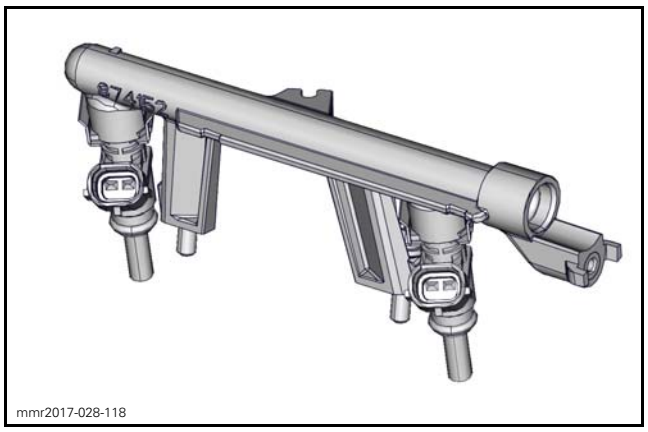
Fuel Rail with Fuel Injectors Access

Remove upper body module. Refer to *BODY* subsection.

Remove engine cover.

Remove primary air intake silencer.

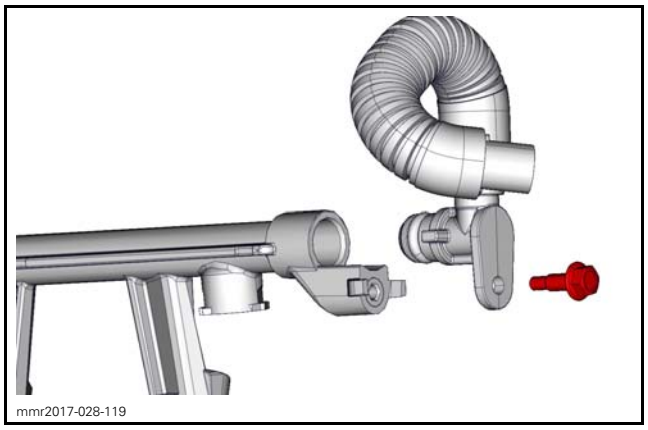
Removing the Fuel Rail with Fuel Injectors


mmr2017-028-118

Release fuel pressure from fuel system, refer to *FUEL TANK AND FUEL PUMP* subsection.

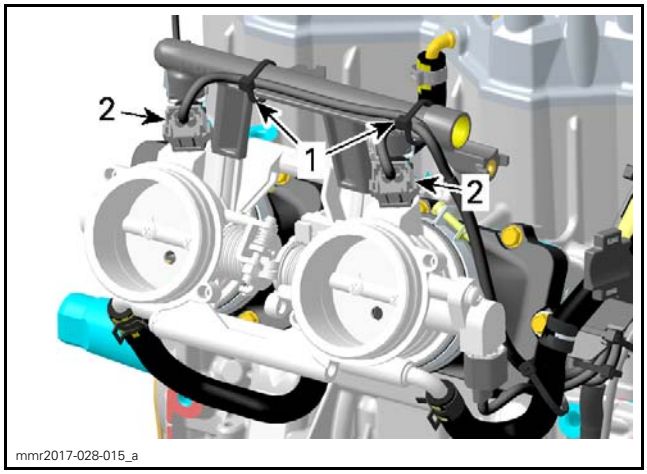
Place an absorbent shop rag around the fuel supply hose fitting at the fuel rail to catch any fuel leakage.

Disconnect fuel hose from fuel rail.


mmr2017-028-119

Cut locking ties securing engine harness to fuel rail.

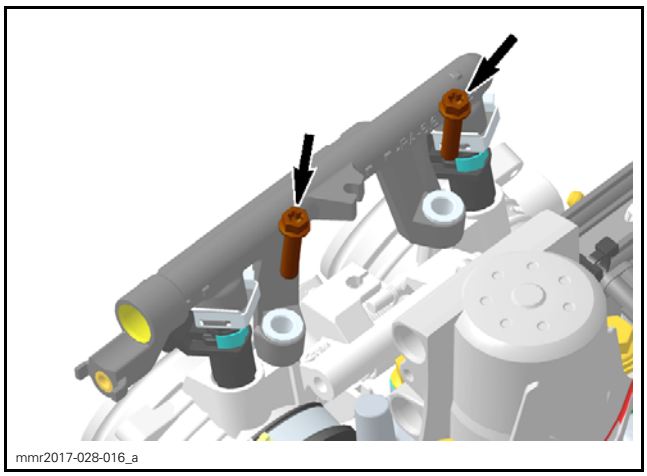
Disconnect fuel injector connectors.



mmr2017-028-015_a

1. *Locking ties*
2. *Injector connectors*

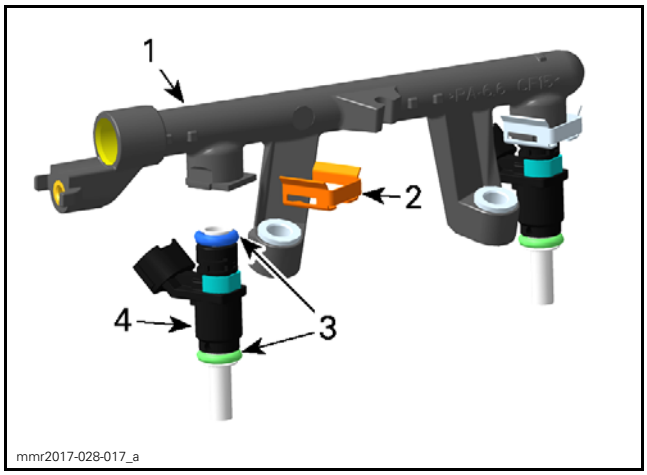
Remove fuel rail retaining screws .


mmr2017-028-016_a

Gently wiggle fuel rail side to side as you pull the fuel rail out with fuel injectors.

Remove the injector retaining clip.

Pull the fuel injector out of the fuel rail and discard the O-rings.



1. *Fuel rail*
2. *Retaining clip*
3. *Fuel injector*
4. *O-rings*

Installing the Fuel Rail and Fuel Injectors

For the installation, reverse the removal procedure. Pay attention to the following details.

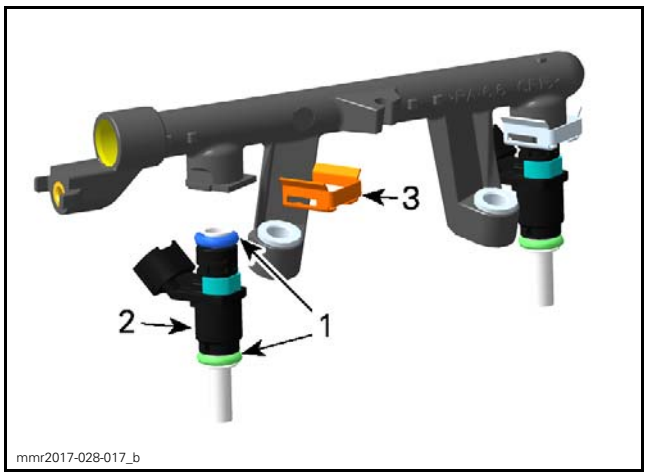
NOTICE **If installing the removed injector(s), always install NEW O-rings.**

Lubricate NEW O-rings to ease insertion in rail.

FUEL INJECTOR O-RINGS	
Service product	Injection oil

Install fuel injector with your hand. Do not use any tool.

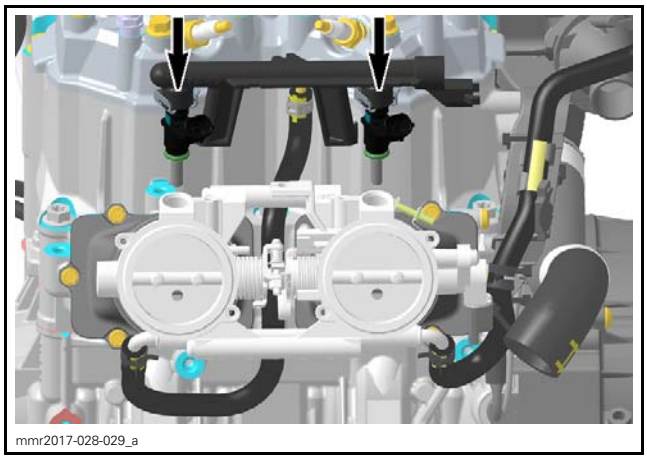
Carefully insert fuel injectors in fuel rail and install injector retaining clips..



1. *O-rings*
2. *Fuel injector*
3. *Retaining clip*

Gently push the fuel rail together with injectors in the throttle body.

NOTICE Pay attention to not damage the O-rings.



Tighten fuel rail retaining screws.

TIGHTENING TORQUE	
Fuel rail retaining screws	8 N•m ± 0.5 N•m (71 lbf•**in** ± 4 lbf•**in**)

Connect fuel pressure hose to fuel rail.

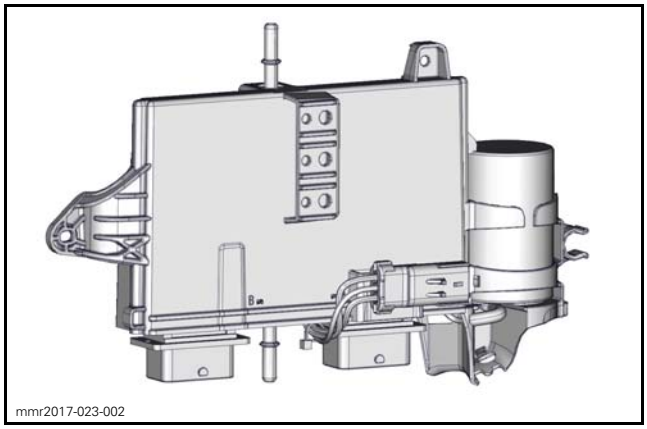
Pressurize the fuel system and check for fuel leaks. Refer to *FUEL TANK AND FUEL PUMP* subsection.

⚠ WARNING

Failure to pressurize the fuel system and checking for fuel leaks may result in severe injury or a life threatening situation should a leak occur.

Reinstall all remaining removed parts.

ECM (ENGINE CONTROL MODULE)



ECM

NOTE: Prior to replacing an ECM, carry out all testing procedures.

Troubleshooting ECM Power Supply

Verifying System Voltage

Set emergency stop switch to RUN.

Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

In BUDS2, navigate to the Measurements screen

View high voltage system circuit voltage.

Start or crank engine while viewing System Voltage.

TEST CONDITION	VOLTAGE
Manual crank speed	30 Vdc min.
Engine running	55 Vdc

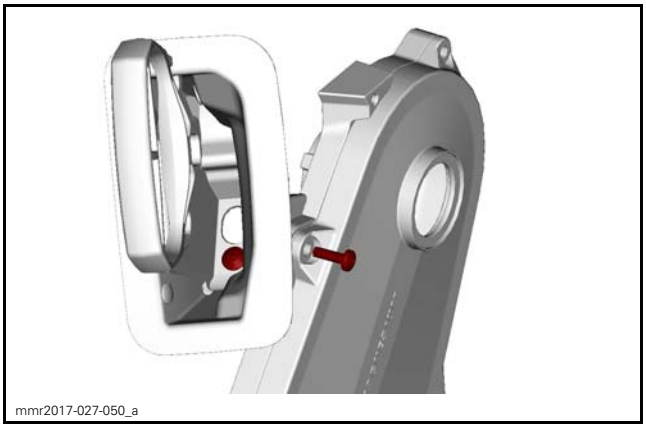
If voltage is as per specification, ECM is properly powered.

If voltage is out of specification, refer to *CHARGING SYSTEM*.

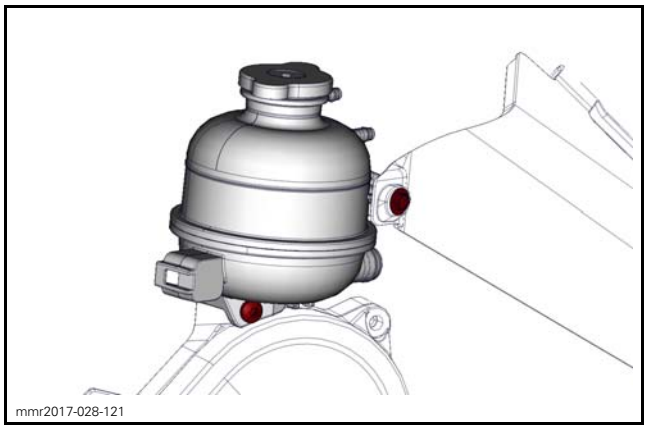
Removing the ECM

Save a BUDS2 File.

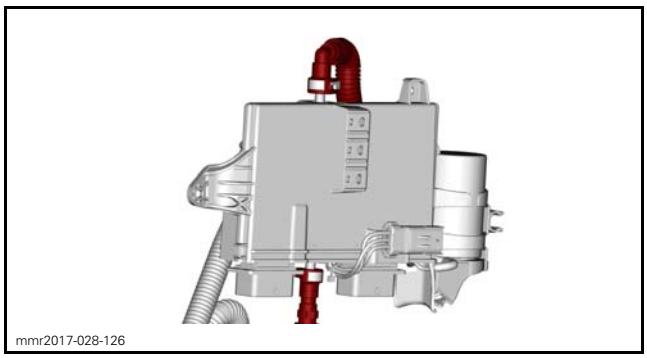
1. Set emergency engine stop switch to STOP.
2. Remove upper body module. Refer to *BODY* subsection.
3. Move rewind starter handle assembly (applicable models).


mmr2017-027-050_a

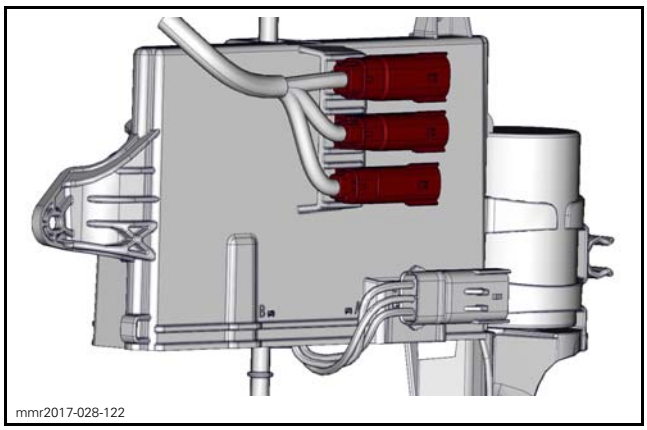
4. Detach coolant tank from its support.


mmr2017-028-121

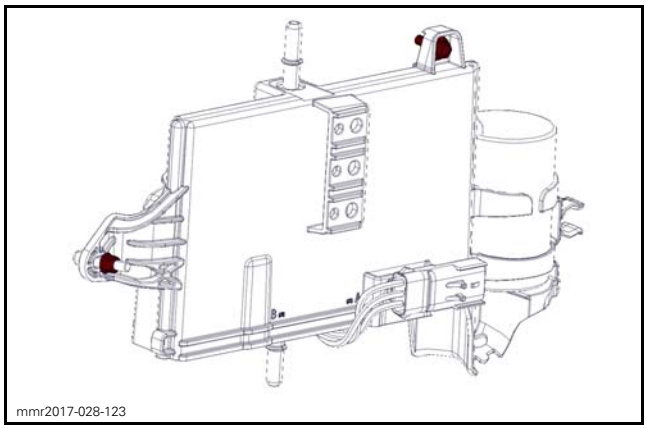
5. Install a rag under the ECM fuel hose quick connect to catch fuel spillage.
6. Place a container under the hose connector to recover fuel.
7. Slowly disconnect fuel both hoses from ECM and drain fuel.


mmr2017-028-126

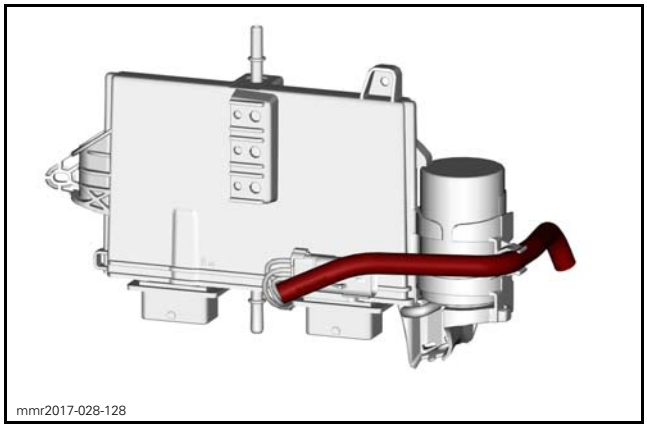
8. Disconnect magneto, ECMA, and ECMB connectors. Refer to *WIRING HARNESS AND CONNECTORS*.
9. Remove connectors from ECM housing.


mmr2017-028-122

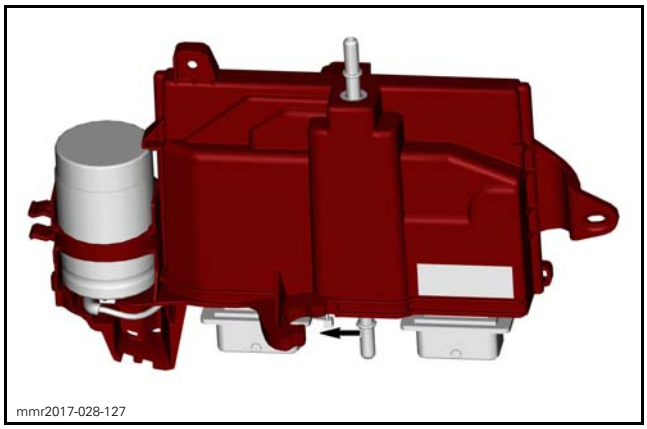
10. Remove ECM retaining screw and nut.


mmr2017-028-123

11. Move coolant hose.


mmr2017-028-128

12. Carefully slide ECM forwards to unhook clip behind ECM.


mmr2017-028-127

13.

14. Remove. Cut locking ties as applicable.

Installing ECM

Reverse removal procedure however, pay attention to the following.

⚠ WARNING

Wipe up all spilled fuel.

Set engine stop switch to RUN.

Install tether cord cap on engine cut-off switch.

Transfer or enter data in new ECM. Refer to *PROGRAMMING A NEW ECM* in this subsection.

Programming a New ECM

There are 2 possible methods to manually collect the required information. The 1st being the easiest.

– Use BUDS2 software and obtain the data from a saved file on your PC computer.
– Collect the information from the vehicle and obtain the fuel injector coefficient files from Knowledge Center.

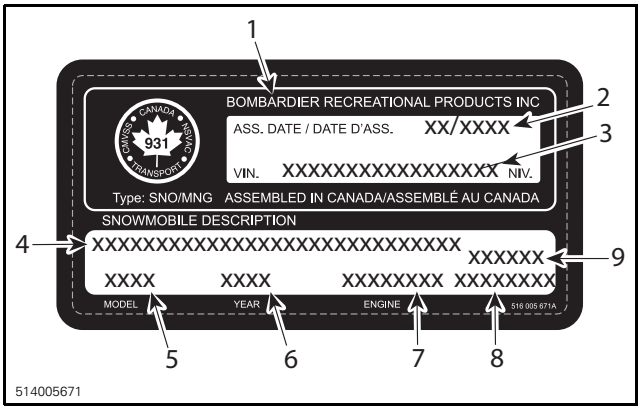
1. Remove the faulty ECM, refer to *REMOVING ECM* in this subsection.
2. Install and connect the new ECM, refer to *INSTALLING ECM* in this subsection.
3. Connect vehicle to BUDS2 version and log on. Refer to *COMMUNICATION TOOLS AND BUDS2* subsection.
4. Click on the Scan button.
5. Navigate to the Summary page and Healthtab.
6. Initiate the new ECM and perform any required updates
   6.1 Enter vehicle model number
   6.2 Follow instructions in BUDS2.

NOTE: If you were not able to save a BUDS2 file, refer to *COLLECT THE INFORMATION FROM THE VEHICLE* to get the required information.

7. Refer to the saved BUDS2 file and write the following information to the Settings page
   7.1 Keys
   7.2 Oil pump offset
   7.3 Ignition timing offset. Refer to *IGNITION SYSTEM*
   7.4 Injector coefficient. Refer to *SETTING A FUEL INJECTOR TO A CYLINDER*
   7.5 RAVE setting
   into the new ECM.
8. Check the Settings page and Options tab to ensure options and any accessories are entered.
9. Perform the *CLOSED THROTTLE RESET (TPS)* procedure in this subsection.

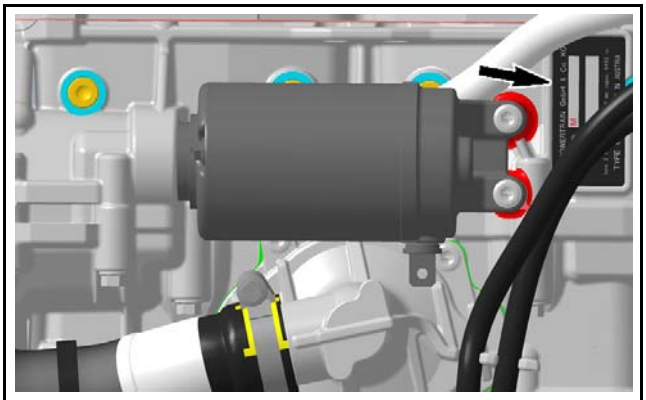
Collect the Information from the Vehicle

1. Record model number.



VEHICLE DESCRIPTION DECAL
1. *Manufacturer name*
2. *Manufacturing date*
3. *Vehicle identification number (VIN)*
4. *Model and package name*
5. *Model number*
6. *Model year*
7. *Engine type*
8. *Vehicle weight (European models)*
9. *Vehicle engine power (European models)*

NOTE: If prompted to enter engine serial number, it can be found on the cylinder block.



CYLINDER BLOCK, EXHAUST SIDE

2. Record oil injection pump code.

BACK OF OIL INJECTION PUMP
1. *Oil pump code (0 to 9)*

3. Record MAG/PTO injector S/N and Checksum numbers.

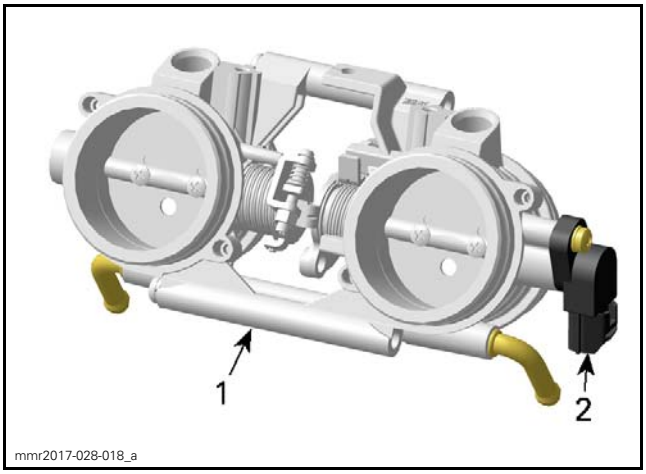
Record the serial number (SN) and the checksum (CS) on the fuel injector tag.

SN: Serial number
CS: Checksum number

Use the BOSSWeb Com Center tab to download the matching injector coefficient file.

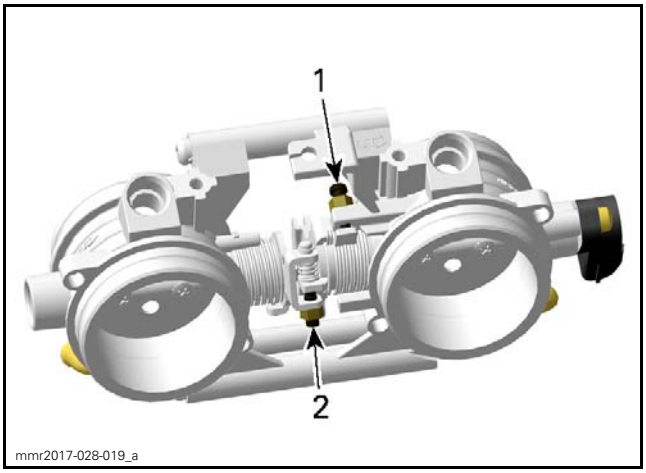
Save the calibration file to your PC computer in the folder:

THROTTLE BODY



1. *Throttle body*
2. *TPS (Throttle position sensor)*

Throttle Body Screw Identification



1. *Master zero position screw (capped)*
2. *Synchronizing screw (capped)*

NOTICE Do not tamper with any capped screw. Otherwise, throttle body may have to be replaced.

Inspecting the Throttle

- Ensure throttle plates move freely and smoothly when depressing throttle lever.
- Ensure throttle body master zero position screw is NOT loose. If so, replace throttle body.
- Ensure that the master zero position screw stops the throttle plate.
- Ensure TPS is NOT loose.
- Check for corroded or damaged wiring or connectors.

Throttle Body Access

⚠ WARNING

Always remove tether cord cap (D.E.S.S. key) before removing the throttle body.

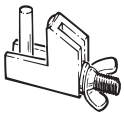
1. Remove upper body module. Refer to *BODY* subsection.
2. Remove engine cover.
3. Remove primary intake silencer. Refer to *AIR INTAKE SILENCER* subsection.

Removing the Throttle Body

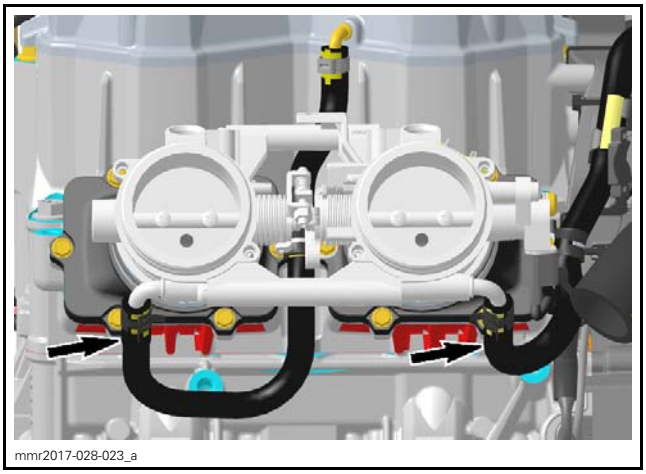
⚠ WARNING

Always remove tether cord cap (D.E.S.S. key) before removing the throttle body.

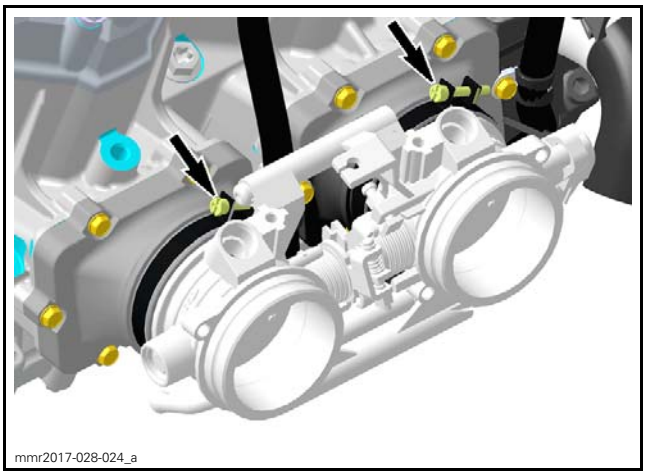
1. Remove fuel rail with fuel injectors and put it aside, refer to *FUEL RAIL AND THROTTLE BODY INJECTORS* in this subsection.
2. Block coolant hoses of throttle body heating.

REQUIRED TOOL	
SMALL HOSE PINCHER (P/N 295 000 076)	

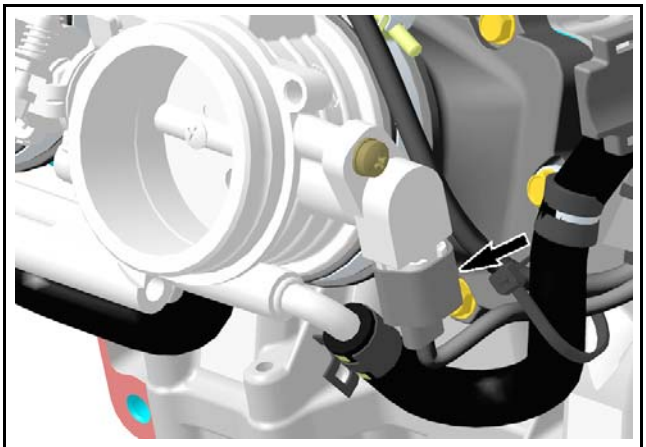
3. Remove coolant hoses from throttle body.



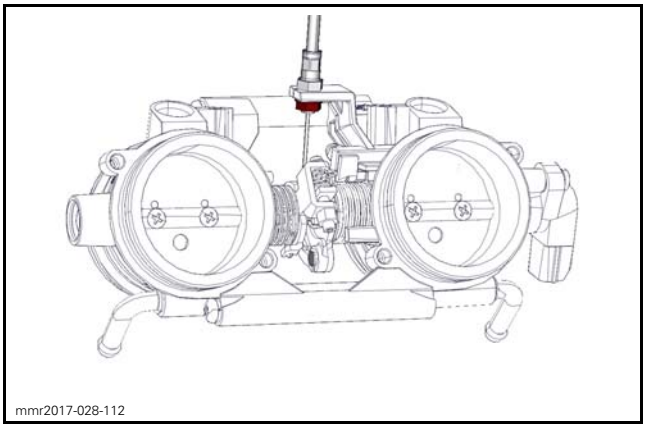
4. Loosen clamps retaining throttle body.



5. Disconnect TPS connector.

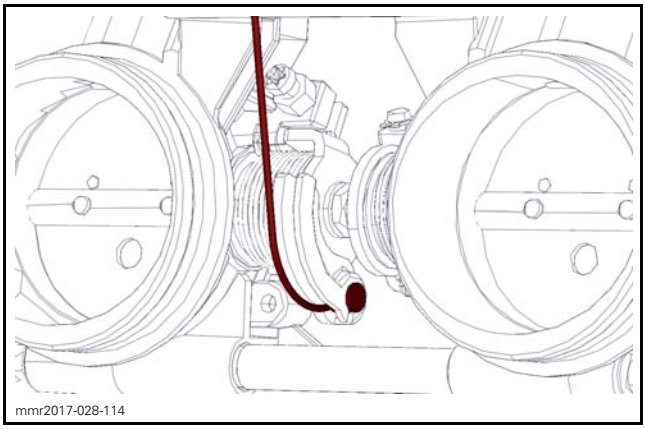

mmr2017-028-025_b

6. Disconnect throttle cable.
7. At throttle body, fully unscrew cable lock nut.


mmr2017-028-112

THROTTLE CABLE LOCK NUT

8. Unhook throttle cable end.


mmr2017-028-114

9. Remove throttle cable.
10. Remove throttle body from vehicle.

Installing the Throttle Body

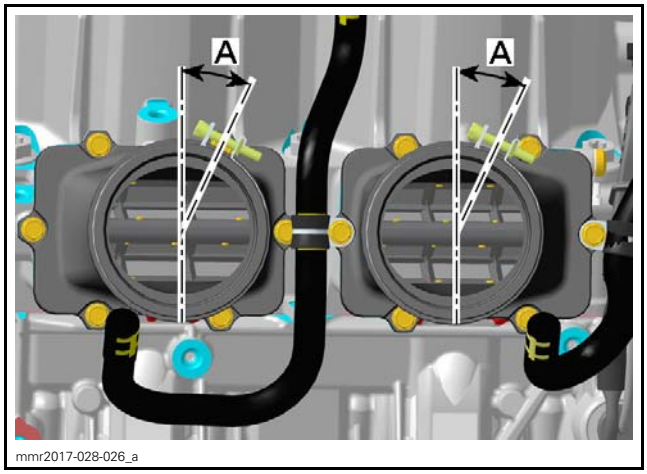
1. If installing the removed throttle body, clean throttle plates and bores before installation.

THROTTLE BODY CLEANING	
Service product	PULLEY FLANGE CLEANER (P/N 413 711 809)

2. Install cooling hoses on throttle body.
3. Remove hose pinchers.
4. Connect TPS connector.

NOTICE **Ensure TPS connector tab is properly locked.**

5. Install throttle body on intake adapters.
6. Position throttle body clamps and tighten to specification.



mmr2017-028-026_a

A. 25°

TIGHTENING TORQUE	
Throttle body clamps	1.5 N•m ± 0.2 N•m (13 lbf•**in** ± 2 lbf•**in**)

7. Install throttle cable loosely.
8. Carry out the *ADJUSTING THROTTLE CABLE* procedure as detailed in this subsection.
9. Install fuel rail with fuel injectors and put it aside, refer to *FUEL RAIL AND THROTTLE BODY INJECTORS* in this subsection.
10. If a new throttle body or TPS is installed, carry out the *CLOSED THROTTLE RESET (TPS)* as detailed in this subsection.
11. Refill and bleed cooling system, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
12. Install adapter plate (primary air intake silencer) on throttle body.

TIGHTENING TORQUE	
Adapter plate clamps	0.7 N•m ± 0.1 N•m (6 lbf•**in** ± 1 lbf•**in**)

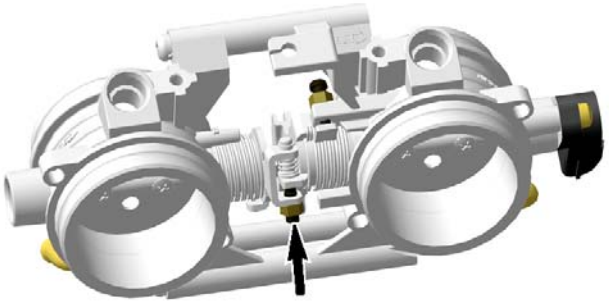
13. Install primary air intake silencer, refer to *AIR INTAKE SYSTEM* subsection.
14. Install all remaining removed parts.

NOTICE **Make sure the TPS wire does not touch the frame. Install locking tie as found from factory.**

Throttle Body Synchronization

No synchronization is required as it has already been done at the factory.

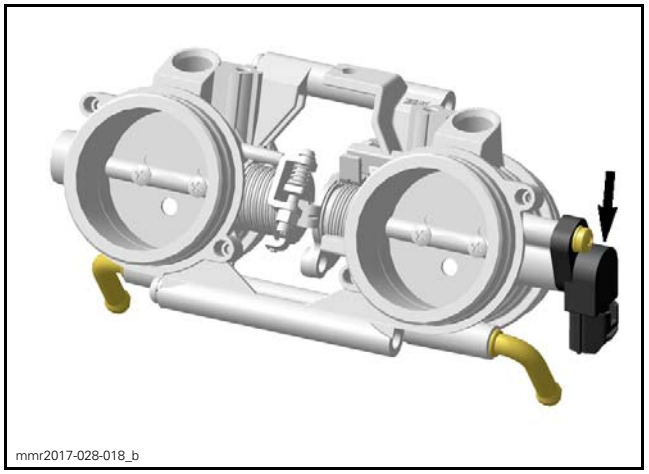
NOTICE **Do not alter synchronization screw setting. Otherwise throttle body must be replaced.**


mmr2017-028-019_b

TPS (THROTTLE POSITION SENSOR)

Description

The throttle position sensor (TPS) is a potentiometer that sends a signal to the ECM which is proportional to the throttle shaft angle.


mmr2017-028-018_b

THROTTLE POSITION SENSOR (TPS)

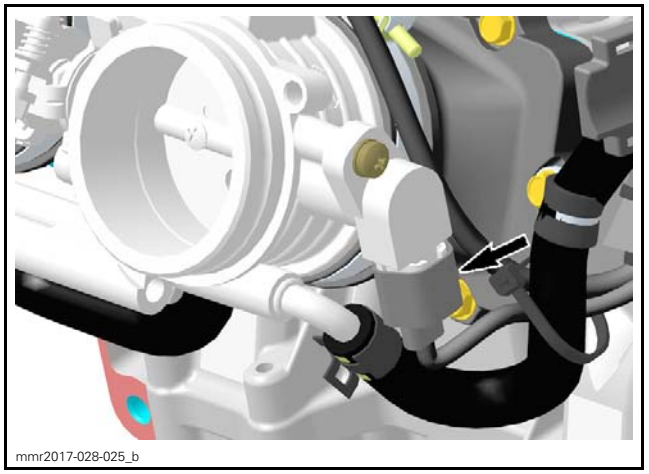
TPS Connector Access

1. Remove upper body module. Refer to *BODY* subsection.

⚠ WARNING

Always remove tether cord cap (D.E.S.S. key) before removing the throttle body.

2. Disconnect TPS connector.


mmr2017-028-025_b

Testing the TPS Wear using BUDS2

1. Ensure TPS connector is properly connected.
2. While engine is not running, activate throttle and pay attention for smooth operation without physical stops of the cable.
3. Use BUDS2 software.
4. Select the Measurements and ECM tabs. Monitor the TPS voltage.and percentage
5. Slowly and regularly depress the throttle.

The values must change gradually and regularly as the throttle is activated. If the values "stick", bounce, suddenly drops off or if any discrepancy

between the throttle movement and the needle movement is noticed, it indicates a worn TPS that needs to be replaced.

Reset TPS (Closed Throttle)

Refer to *RESETTING THE CLOSED THROTTLE VALUE* in the *ADJUSTMENT* topic of this subsection.

Testing the TPS Input Voltage

1. Remove parts required to access TPS connector, refer to *TPS CONNECTOR ACCESS* in this subsection.
2. Connect BUDS2 to power 12 Vdc and 5 Vdc system.
3. Disconnect TPS connector.
4. Read voltage at TPS harness connector as follows.

TPS HARNESS CONNECTOR		VOLTAGE
Pin 3	Pin 2	5.0 Vdc

If voltage is good, carry out *TESTING THE TPS SIGNAL WIRE*.

Testing the TPS Circuit Continuity

Disconnect connector A from ECM, refer to *CONNECTOR INFORMATION* subsection.

Check the wiring continuity as follows.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

TPS HARNESS CONNECTOR	ECMA CONNECTOR	RESISTANCE
Pin 1	D3	Close to 0 Ω (continuity)
Pin 2	C2	
Pin 3	D2	

If tests are good, replace the TPS.

If tests are not good, continue to check the resistance of the remainder of the TPS circuit.

Testing the TPS Resistance

1. Reconnect the TPS.
2. Disconnect ECMA connector .

ECMA CONNECTOR		THROTTLE IDLE POSITION	WIDE OPEN THROTTLE POSITION
PIN		RESISTANCE Ω	
D3	C2	1140±300	5140±1900
D3	D2	5140±1900	540±300
C2	D2	5000±2000	5000±2000

NOTE: The resistive value should change smoothly and proportionally to the throttle movement. Otherwise, replace TPS.

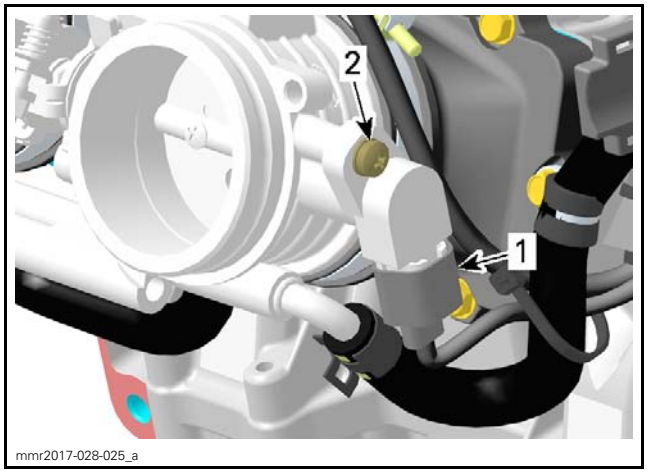
If resistive values are correct, try a new ECM. Refer to *ENGINE CONTROL MODULE (ECM)* elsewhere in this subsection.

If resistive values are incorrect:

– Repair/replace wiring/connectors.
– Replace TPS.

Replacing the TPS

1. Remove the throttle body, refer to *REMOVING THE THROTTLE BODY* in this subsection.
2. Disconnect TPS connector.
3. Remove TPS retaining screw.



1. TPS connector
2. Screw

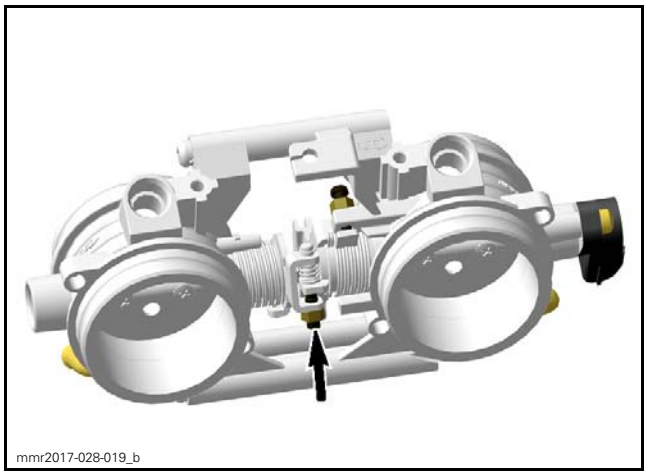
4. Remove TPS.
5. Install new TPS and secure wire with a locking tie.

NOTICE **Make sure the TPS wire does not touch the frame. Install locking tie as found from factory.**

6. Tighten TPS retaining screw to specification.

TIGHTENING TORQUE	
TPS retaining screw	4 N•m ± 0.5 N•m (35 lbf•**in** ± 4 lbf•**in**)

7. Open and quickly release throttle plates 6 times (throttle plates must snap shut).



PUSH TO OPEN THROTTLE PLATES

8. Reinstall remaining removed parts.
9. Reset TPS, refer to *CLOSED THROTTLE RESET (TPS)* in this subsection.

CRANKSHAFT POSITION SENSOR (CPS)

Testing the CPS with BUDS2

1. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2, navigate to the Measurements screen
3. Monitor the Engine Speed (RPM) indicator while cranking engine.

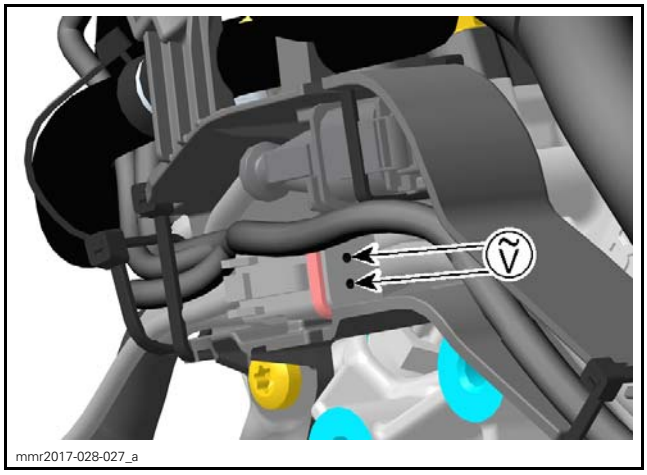
The value should move proportionally to the cranking RPM. If no value movement is observed, test the *CPS OUTPUT VOLTAGE*.

NOTE: A loose CPS or CPS connector can send an intermittent signal that can prevent the engine from starting.

Testing the CPS Output Voltage

1. Disconnect CPS connector (2-pin connector). Refer to *WIRING HARNESS AND CONNECTORS* for connector location.
2. Probe terminals coming from CPS while cranking engine.

CPS CONNECTOR		VOLTAGE
Pin 1	Pin 2	1 - 2 Vac min.



If voltage is out of specification, inspect wiring/connectors. Replace CPS if wiring is good.

Testing the CPS Resistance

1. Disconnect connector ECMA from ECM.
2. Measure the resistance of the sensor through its wiring.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

ECMA CONNECTOR		RESISTANCE @ 20°C (68°F)
K1	K2	190 - 290 Ω

If measurement is out of specification, check wiring continuity between ECM and CPS.

3. Also check for a shorted connection to ground as per table.

ECMA CONNECTOR		RESISTANCE @ 20°C (68°F)
K1	Engine ground	Open circuit (OL)
K2	Engine ground	

If the previous tests were good, replace CPS.

CPS Replacement

Refer to *MAGNETO AND STARTER* subsection.

3D RAVE VALVES POSITION SENSOR

Refer to *RAVE* subsection.

MANIFOLD ABSOLUTE PRESSURE AND TEMPERATURE SENSOR (MAPTS)

NOTE: This sensor is a multifunction device. It measures ambient absolute pressure and intake air temperature for air flow calculations.

MAPTS Location

The MAPTS is on the secondary air intake silencer.

MAPTS Pressure Function

The sensor measures the ambient atmospheric air pressure. The ambient air pressure is at that moment stored in the ECM.

The sensor must be correctly installed on the secondary air intake silencer. Otherwise, the MAPTS could generate a fault code for an unexpected sensor range at idle when it reads an erroneous pressure. If this is the case, remove sensor and check for oil or dirt on its end and if problem persists, check throttle plate condition/position and the wiring harness. Perform the following tests.

MAPTS Quick Test (Pressure Function)

1. Connect vehicle to BUDS2 Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Navigate to the Measurements page in BUDS2 to view the manifold pressure value.
3. Look for and take note of the MAPTS pressure reading while the engine is stopped.

NOTE: The indicated intake air pressure in BUDS2 must be within 3.4 kPa (.5 PSI) of local atmospheric pressure when the engine is stopped.

MAPTS PRESSURE FUNCTION QUICK TEST			
RESULT	Service action		
NO READING	Circuit Continuity Test of MAPTS Pressure Function	MAPTS Input Voltage Test	Repair or replace wiring
VALUE IS OUT OF RANGE	Replace MAPTS		

4. Perform the same test with a new MAPTS and compare both readings.

MAPTS Input Voltage Test

1. Connect BUDS2. Refer to *COMMUNICATION TOOLS AND BUDS*.
2. Remove electrical connector from MAPTS.
3. Install tether cord cap on engine shut-off switch.
4. Using a FLUKE 115 MULTIMETER (P/N 529 035 868) set to Vdc, measure for MAPTS input voltage as per following table.

MAPTS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
1	3	5 Vdc

If voltage test is good, replace the MAPTS.

If voltage test is not good, carry out the *MAPTS CIRCUIT CONTINUITY TEST (PRESSURE FUNCTION)*.

MAPTS Circuit Continuity Test (Pressure Function)

1. Remove parts required to access ECM connectors, refer to *ECM CONNECTOR ACCESS* in this subsection.
2. Disconnect the ECM-B connector from the ECM and connect it to the ECM adapter tool.

ECM ADAPTER TOOL (P/N 529 036 166)	

3. Using the FLUKE 115 MULTIMETER (P/N 529 035 868) set to Ω and check continuity of the following circuits.

MAPTS CIRCUIT CONTINUITY TEST (PRESSURE FUNCTION)		
ECM-B	MAPTS CONNECTOR	RESISTANCE VALUE
Pin E4	Pin 3	Close to 0 Ω
Pin F3	Pin 4	
Pin F4	Pin 1	

If resistance is not within specification, repair or replace the wiring harness between ECM connector and the MAPTS. Refer to *WIRING DIAGRAM.*

If value is not correct, try a new ECM.

MAPTS Temperature Function

The MAPTS also monitors the temperature of the air in the intake manifold.

MAPTS Quick Test (Temperature Function)

1. Connect vehicle to BUDS2 Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Navigate to the measurements page.
3. Look for the Intake Air temperature reading while the engine is stopped.

NOTE: If the complete vehicle is at room temperature, BUDS2 should display the ambient air temperature at the intake manifold.

4. Perform the same test with a new MAPTS and compare both readings.

If the engine's MAPTS temperature reading is significantly different than the new MAPTS, replace it.

NOTE: Both sensors must feel same ambient air temperature.

If there is no reading, carry out a *TESTING MAPTS RESISTANCE (TEMPERATURE FUNCTION).*

MAPTS Resistance Test (Temperature Function)

1. Disconnect the MAPTS connector.
2. Using the FLUKE 115 MULTIMETER (P/N 529 035 868) set to Ω, test MAPTS resistance at the sensor as per following tables.

MAPTS		MEASUREMENT
PIN		Refer to MAPTS TEMPERATURE SENSOR TABLE
1	2	

MAPTS TEMPERATURE SENSOR TABLE		
TEMPERATURE		RESISTANCE (ohms)
°C	°F	MAPTS
- 40	- 40	40528 TO 56935
- 10	- 14	8103 to 10919
20	68	2193 to 2863
80	176	294 to 368
120	248	98 to 122

If resistance is not within specification, replace the MAPTS.

If resistance tests good, reconnect the MAPTS and proceed with the following steps.

3. Disconnect the ECM-B connector.
4. Install ECM-B connector on the ECM adapter tool.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

5. Using a multimeter, recheck resistance value as per following table.

ECM ADAPTER		MEASUREMENT
PIN		Refer to MAPTS TEMPERATURE SENSOR TABLE
B2	F4	

MAPTS TEMPERATURE SENSOR TEST RESULTS			
RESULT	Service action		
NO READING	Circuit Continuity Test of MAPTS Temperature Function	MAPTS Input Voltage Test	Repair or replace wiring
INCORRECT RESISTANCE VALUE	Check condition of connector pins, replace MAPTS		
CORRECT RESISTANCE VALUE	Try a new ECM		

MAPTS Circuit Continuity Test (Temperature Function)

MAPTS CIRCUIT CONTINUITY TEST (TEMPERATURE FUNCTION)		
ECM ADAPTER	MAPTS CONNECTOR	RESISTANCE VALUE
Pin F4	Pin 1	Close to 0 Ω
Pin B2	Pin 2	
Pin E4	Pin 3	

Repair or replace wiring as required.

Replacing MAPTS

1. Disconnect MAPTS connector and remove the MAPTS from the intake manifold.
2. Install new MAPTS as per following table.

MAPTS INSTALLATION	
Retaining screw	TORQUE
	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**)
Connector	Service PRODUCT
	DIELECTRIC GREASE (P/N 293 550 004)

COOLANT TEMPERATURE SENSOR (CTS)

Testing the CTS with BUDS2

1. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2, navigate to the Measurements screen
3. Monitor the Engine temperature indicator. It should show the coolant temperature. Otherwise, perform *TESTING THE CTS RESISTANCE*.

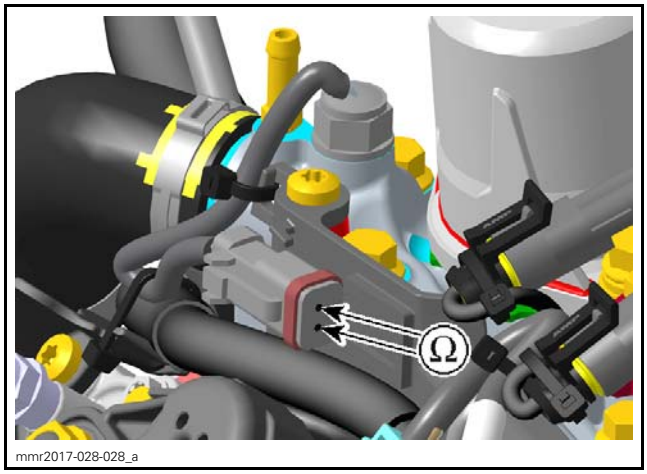
Testing the CTS Resistance

1. Disconnect CTS sensor connector. Refer to *WIRING HARNESS AND CONNECTORS* for connector location.
2. Set multimeter to Ω.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

3. Measure resistance between sensor terminals.

CTS		MEASUREMENT
Pin 1	Pin 2	Refer to *CTS SENSOR TEMPERATURE TABLE*
Pin 1 or 2	Engine ground	Open circuit (OL)



CTS RESISTANCE CHECK

CTS SENSOR TEMPERATURE TABLE	
TEMPERATURE	**RESISTANCE**
25°C (77°F)	2138 - 2570 Ω
38°C (100°F)	1284 - 1514 Ω
104°C (219°F)	156 - 174 Ω
121°C (250°F)	103 - 115 Ω

If resistance is out of specifications, replace CTS.

If resistance tests good, carry out the following steps.

4. Reconnect the CTS.
5. Disconnect the ECMA connector from ECM.
6. Measure CTS circuit resistance as follows.

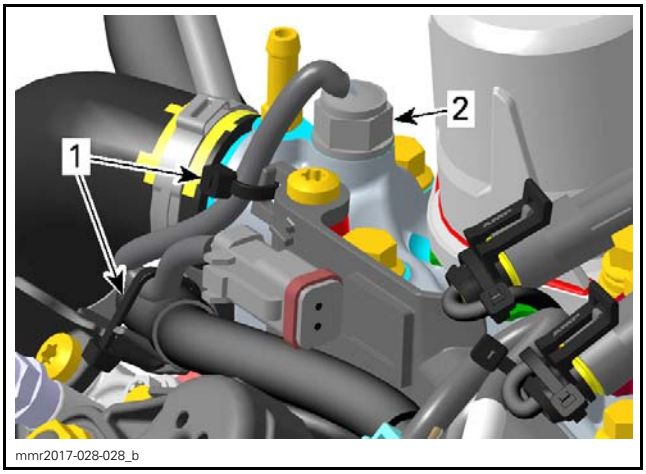
ECMA CONNECTOR		MEASUREMENT
B1	C1	Refer to *CTS SENSOR TEMPERATURE TABLE (E-TEC)*

If resistance value is correct, sensor and wiring/connectors are good.

If resistance value is incorrect, repair/replace wiring/connectors between ECM and CTS.

Replacing the CTS

1. Disconnect CTS connector.
2. Cut locking ties and remove CTS.



1. *Locking ties*
2. *CTS*

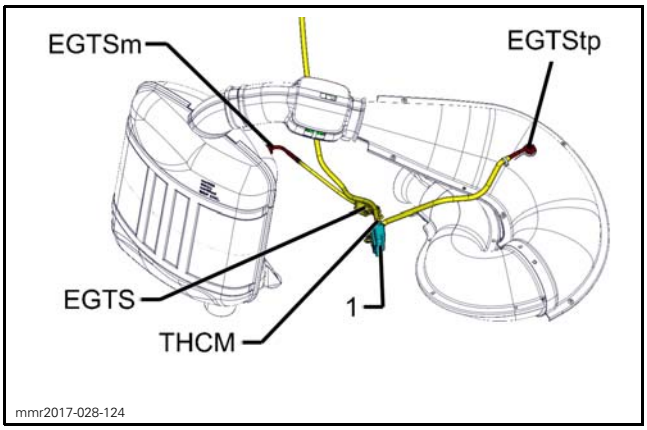
3. Install new CTS.

TIGHTENING TORQUE	
CTS	16 N•m ± 1 N•m (142 lbf•**in** ± 9 lbf•**in**)

4. Reinstall removed parts.
5. Refill engine coolant. If an important quantity of coolant spilled from the engine, bleed cooling system. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

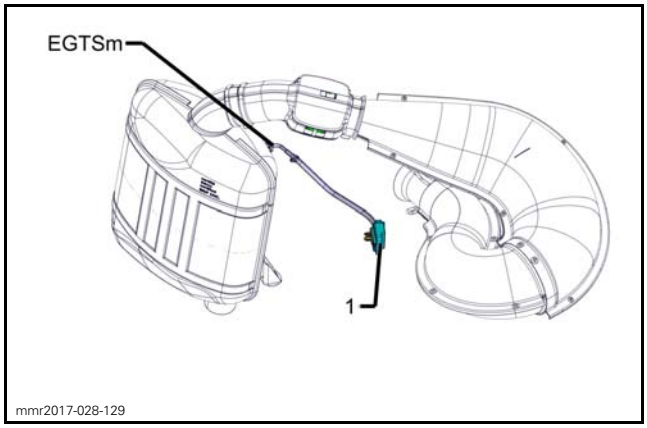
THCM (THERMOCOUPLE MODULE)

On models with an exhaust gas temperature sensor on the tuned pipe and the muffler, the THCM monitors the sensor on the tuned pipe.



MODELS WITH SENSOR ON TUNED PIPE AND MUFFLER
1. *THCM Module*

On models with an exhaust gas temperature sensor on the muffler only, the THCM monitors the sensor on the muffler.



MODELS WITH SENSOR ON MUFFLER
1. *THCM Module*

THCM Test with BUDS2

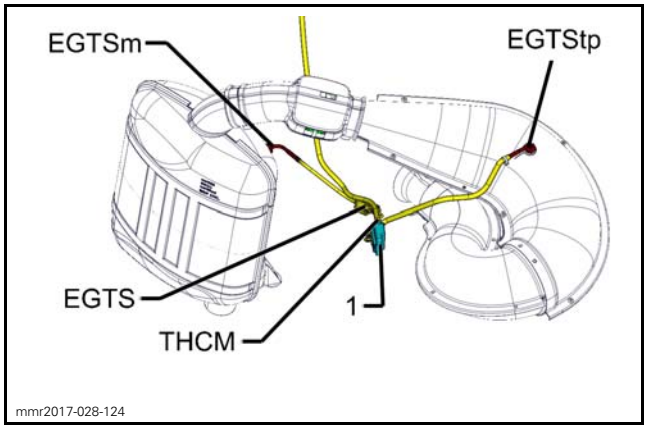
1. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2, navigate to the Measurements screen
3. In BUDS2, monitor the Exhaust (Muffler) and Tuned Pipe temperature indicators (as applicable).

If sensor temperature continuously read(s), 1 500°C (2,732°F) then the sensor is defective (open circuit). Replace THCM.

If sensor temperature is(are) read, THCM operates normally.

If BUDS2 cannot communicate with the THCM, check the power, ground, and CAN wires. Refer to *WIRING DIAGRAM*.

EXHAUST GAS TEMPERATURE SENSOR (EGTSM AND EGTSTP)



MODELS WITH SENSOR ON TUNED PIPE AND MUFFLER
1. *THCM Module*

EGTS Test with BUDS2

Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

In BUDS2, navigate to the Measurements screen

Monitor the Exhaust temperature indicators. They should show the exhaust temperature.

Use an infrared thermometer and measure the sensor's temperature.

The measured temperature should be close to the temperature displayed in BUDS2.

If temperature is not the same, replace EGTS.

NOTE: If engine runs with the EGTS connected but not installed in the muffler, the reading will be 710°C (1,310°F) steady.

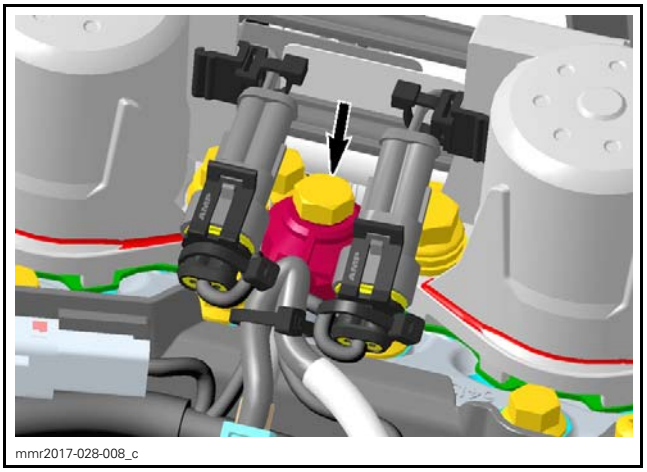
EGTS Replacement

Refer to *EXHAUST SYSTEM* subsection.

KNOCK SENSOR (KS)

Knock Sensor Location

The knock sensor is located on top of the cylinder head, between the fuel injectors.



mmr2017-028-008_c

Testing the KS with BUDS2

1. Lift rear of vehicle off the ground and support it with a wide-base mechanical stand.
2. Connect BUDS2 and navigate to the measurements page.
3. Use the latest applicable BUDS2 version.
4. Monitor the knock sensor value .
5. Start the engine.
6. Bring engine speed above 5200 RPM and vary engine RPM above 5200 RPM.

NOTE: Use the custom screen and graph the knock sensor signal.

The Knock Sensor Signal value should move between 0 and 100. The movement pattern is of no importance as long as it moves indicating the knock sensor senses the engine vibrations.

If the value changes as described, the knock sensor should be good.

If the value sticks either at 0 or 100, there is a problem.

NOTE: Ensure ignition coil cables are not close to knock sensor harness. If so, this might generate a false fault code.

Perform *TESTING THE KS RESISTANCE*.

Testing the KS Resistance

Disconnect ECMA connector and install it on the ECM adapter tool. Refer to *WIRING HARNESS AND CONNECTORS* subsection.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

Measure the knock sensor circuit resistance as per following table.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

ECMA CONNECTOR		RESISTANCE @ 20°C (68°F)
ECMA-H1	ECMA-G1	3.92 - 5.88 MΩ

If resistance measured at ECMA connector is not close to specification, measure resistance at KS connector.

If resistance measured at KS connector is not as specified, replace knock sensor.

If resistance test at KS connector is good perform *TESTING THE KS CIRCUIT CONTINUITY*.

NOTE: Although the knock sensor resistance is as specified, it may still be at fault as it may not be producing a signal within its design specification.

Testing the KS Circuit Continuity

1. Ensure sensor and cylinder head contact surfaces are clean and mounting bolt is properly torqued.

2. Disconnect knock sensor connector. Refer to *REPLACING THE KS*.
3. Disconnect ECMA connector from ECM.
4. Check wire continuity of circuit as per following table.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

ECMA CONNECTOR	KS CONNECTOR	MEASUREMENT
ECMA-H1	Pin 1	Close to 0 Ω (continuity)
ECMA-G1	Pin 2	

If test is not good, repair/replace wiring/connectors between ECM and knock sensor.

If test is good, try a new knock sensor.

Replacing the KS

1. Remove upper body module. Refer to *BODY* subsection
2. Remove engine cover.
3. Disconnect knock sensor connector. Refer to *WIRING HARNESS AND CONNECTORS* subsection for connector location.
4. Unscrew and remove knock sensor from cylinder head.
5. Clean contact surfaces on cylinder head, then install the new knock sensor.
6. Tighten knock sensor screw.

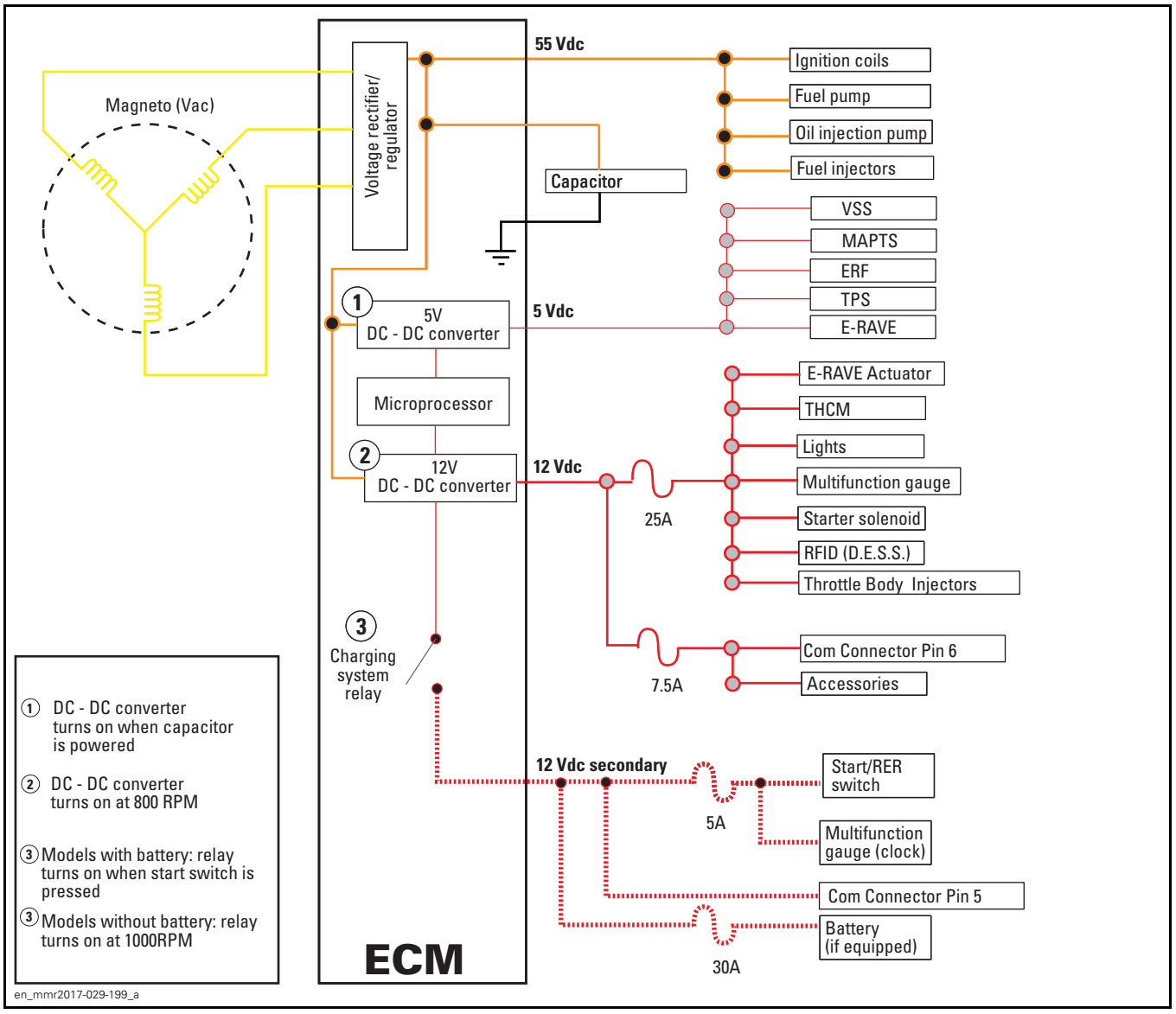
TIGHTENING TORQUE	
Knock sensor screw	24 N•m ± 1 N•m (18 lbf•ft ± 1 lbf•ft)

NOTICE **Improper torque may prevent sensor from functioning properly possibly leading to severe internal engine component damage.**

7. Reconnect connector.
8. Reinstall remaining parts.

POWER DISTRIBUTION

POWER DISTRIBUTION



GROUNDS

GENERAL

OVERVIEW

Power distribution is shown in red on the wiring diagram. Refer to *KNOWLEDGE CENTER*.

The magneto stator is wired with a 3 phase star configuration winding.

At high RPM if the magneto power is greater than the loads, the ECM will shunt the stator windings to regulate its power as necessary.

The voltage regulator/rectifier is part of the ECM.

The ECM receives the energy produced by the magneto, rectifies the alternating current (AC) to direct current (DC) and regulates the voltage.

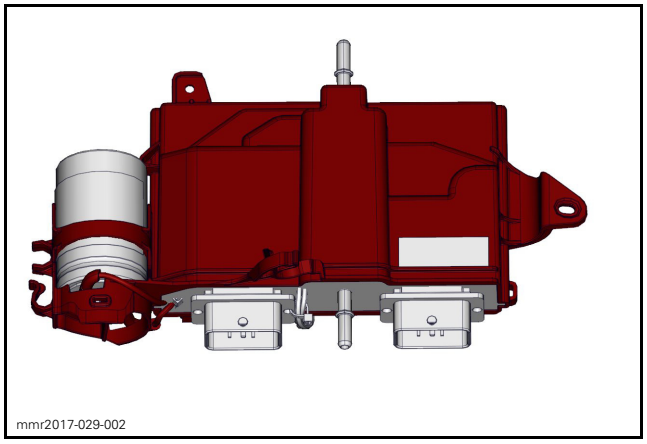
SYSTEM VOLTAGE (55 VDC)

Since the available power is low when cranking, the ECM first supplies 55 Vdc to the illustrated components that need voltage for the starting and the basic operation of the engine.

NOTE: When starting, voltage may be closer to 40Vdc until RPM increases.

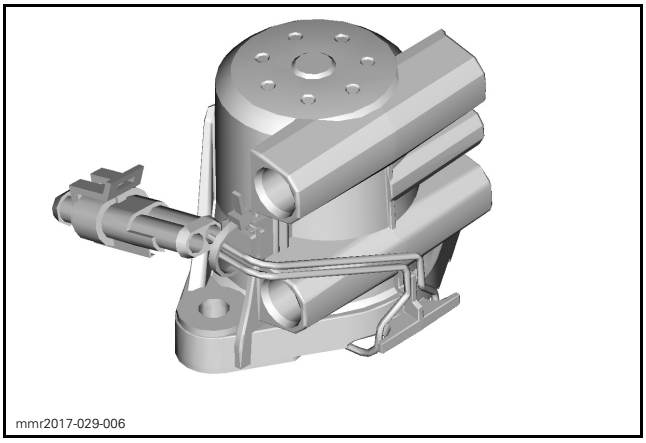
ECM

For more information, refer to *ENGINE MANAGEMENT SYSTEM* subsection.


mmr2017-029-002

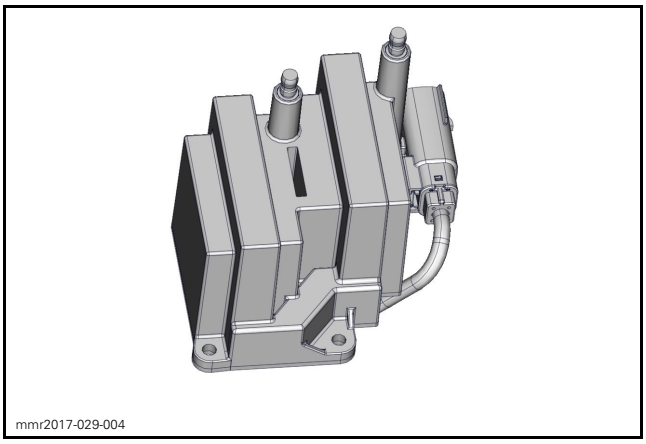
Fuel Injector

For more information, refer to *E-TEC DIRECT FUEL INJECTION* subsection.


mmr2017-029-006

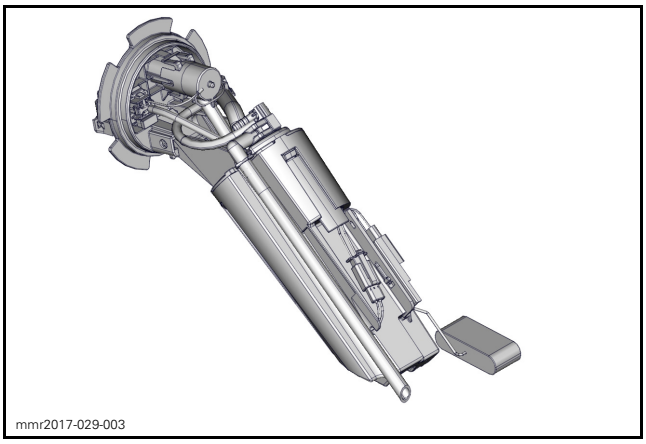
Ignition Coil

For more information, refer to *IGNITION SYSTEM* subsection.


mmr2017-029-004

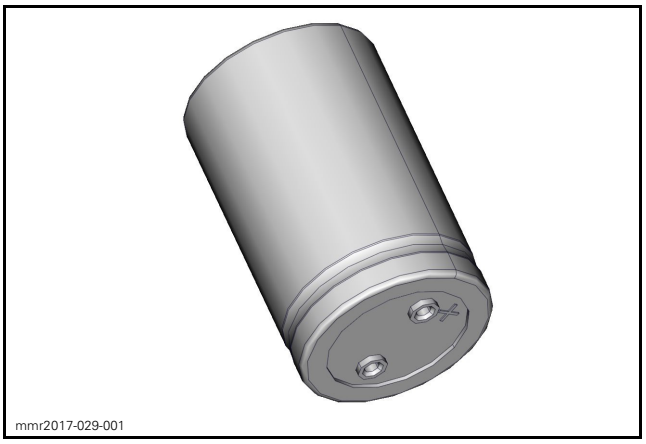
Fuel Pump

For more information, refer to *FUEL TANK AND FUEL PUMP* subsection.


mmr2017-029-003

Capacitor

For more information, refer to *CHARGING SYSTEM* subsection.


mmr2017-029-001

SYSTEM VOLTAGE (12 VDC)

A DC-DC converter, in the ECM, steps down the 55 DC voltage to 12 Vdc when the engine reaches 800 RPM.

Since the available power is not at its maximum at the early stage of engine starting, the ECM supplies 12 Vdc to the following components when engine reaches 800 RPM.

- THCM (thermocouple module)
- E-RAVE actuator
- Communication connector
- Lighting system
- Multifunction gauge
- Heaters
- Heated visor
- Auxiliary lights
- 12 V power outlet
- Other accessories.

Approximately 25 A are available at idle (1200 RPM). Refer to *CHARGING SYSTEM* for more information.

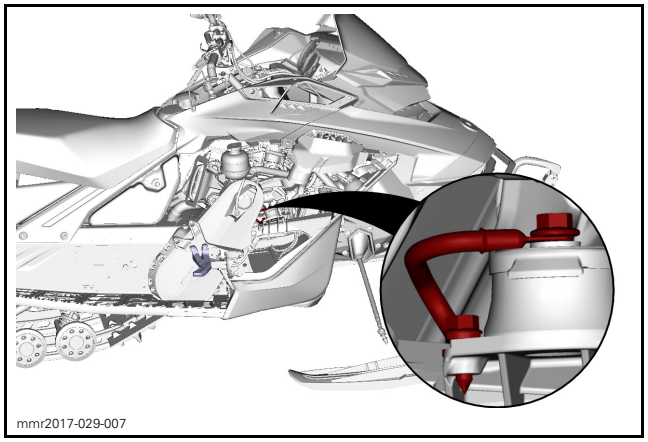
Below 2000 RPM, the total available current is limited to reduce the load on the system voltage.

Above 2000 RPM, the 12 Vdc system has a maximum of 30 A available.

If electrical system load is increased, or the RPM is decreased, the 12 Vdc system output is reduced in order to maintain 55 Vdc for engine operation.

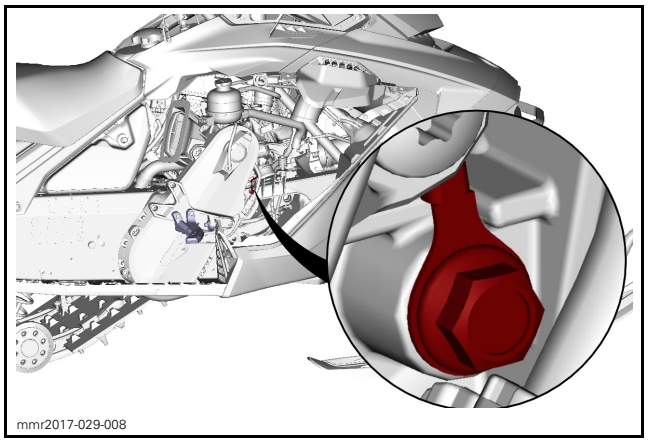
GROUNDS

Engine


mmr2017-029-007

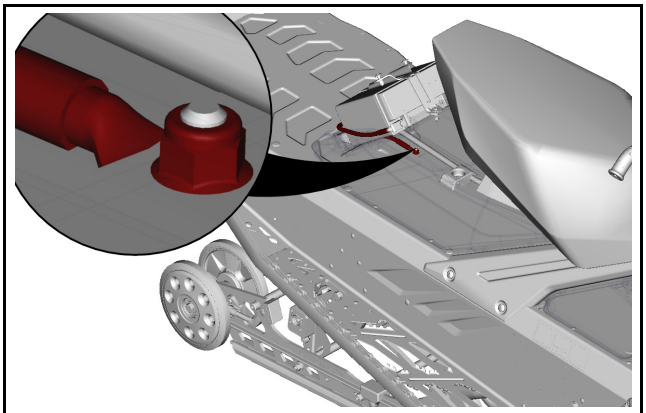
TIGHTENING TORQUE	
M6 screw on chassis	10 N•m ± 2 N•m (89 lbf•**in** ± 18 lbf•**in**)

Chassis


mmr2017-029-008

TIGHTENING TORQUE	
M5 screw on chassis	5 N•m ± 0.5 N•m (44 lbf•**in** ± 4 lbf•**in**)

Battery


mmr2017-029-005

TIGHTENING TORQUE	
M6 shoulder nut	10 N•m ± 2 N•m (89 lbf•**in** ± 18 lbf•**in**)

WIRING HARNESS AND CONNECTORS

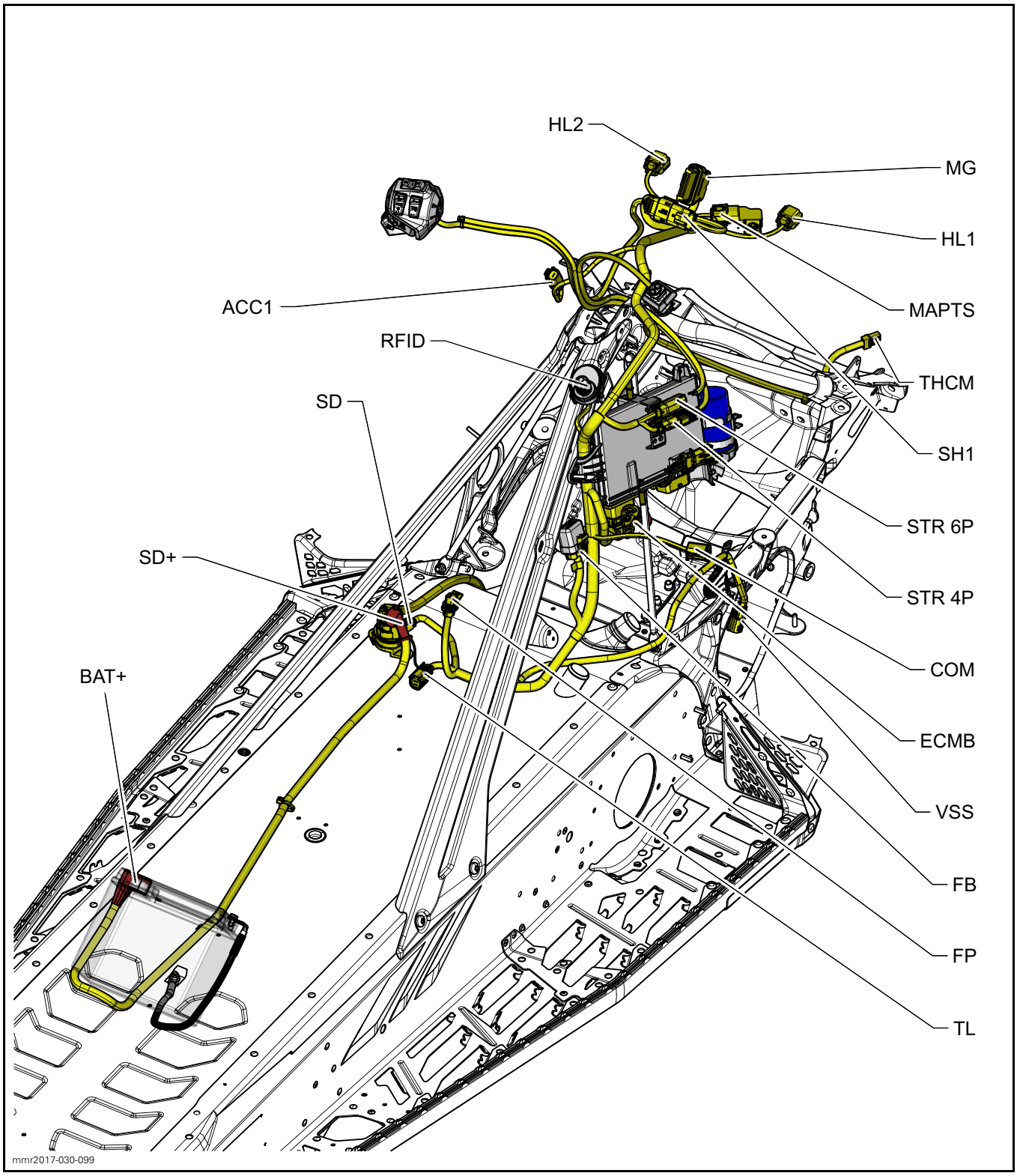
SERVICE TOOLS

Description	Part Number	Page
CRIMPING TOOL (HEAVY GAUGE WIRE)	529 035 730	13
ECM ADAPTER TOOL	529 036 166	9
ECM TERMINAL REMOVER 2.25	529 036 175	9
ECM TERMINAL REMOVER 3.36	529 036 174	9

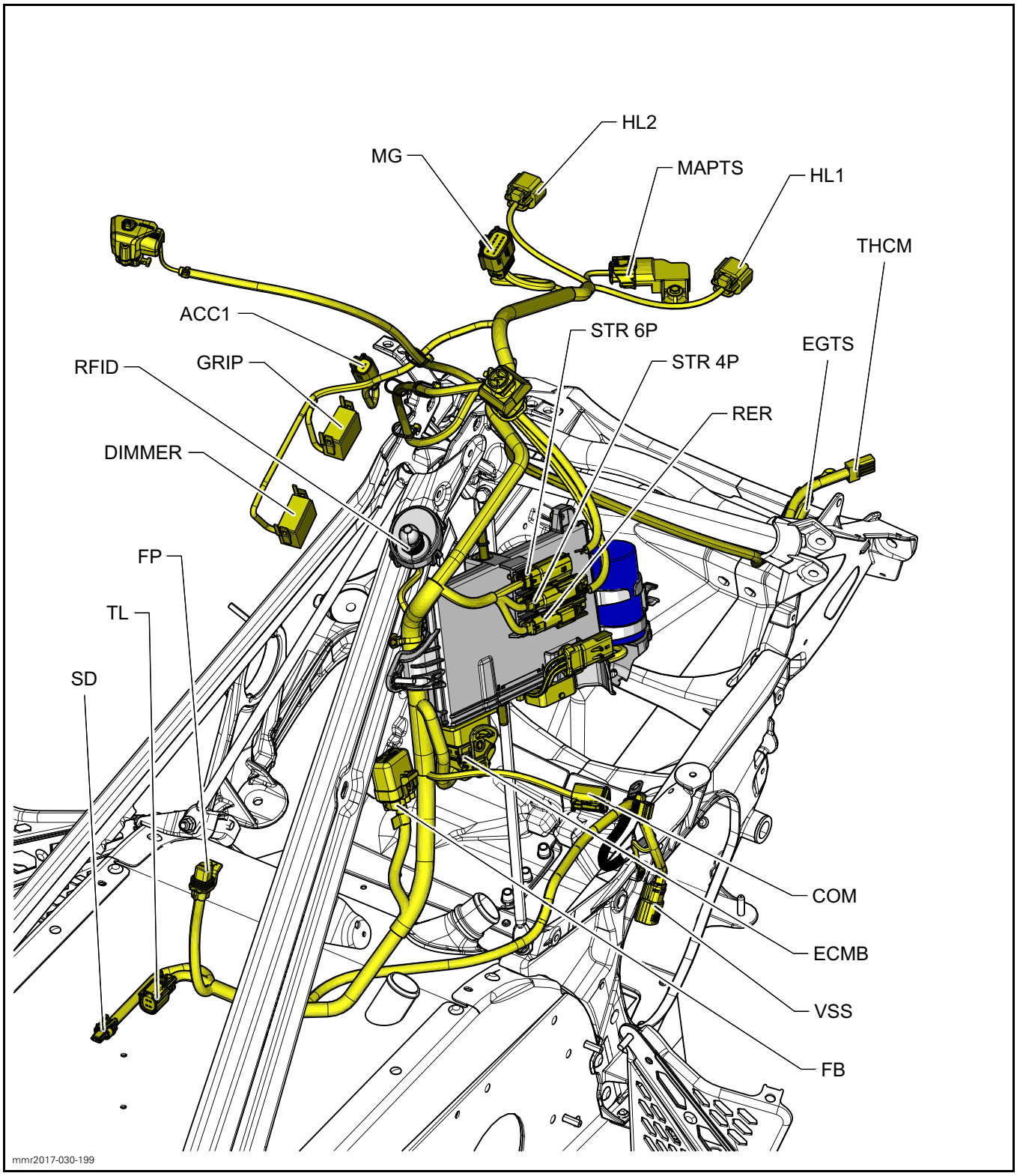
SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
DELPHI TERMINAL EXTRACTOR	12094429	11–12
FCI TERMINAL EXTRACTOR TOOL	54241678	10–11
MOLEX 150 TERMINAL EXTRACTOR TOOL	63813 - 1500	10–11

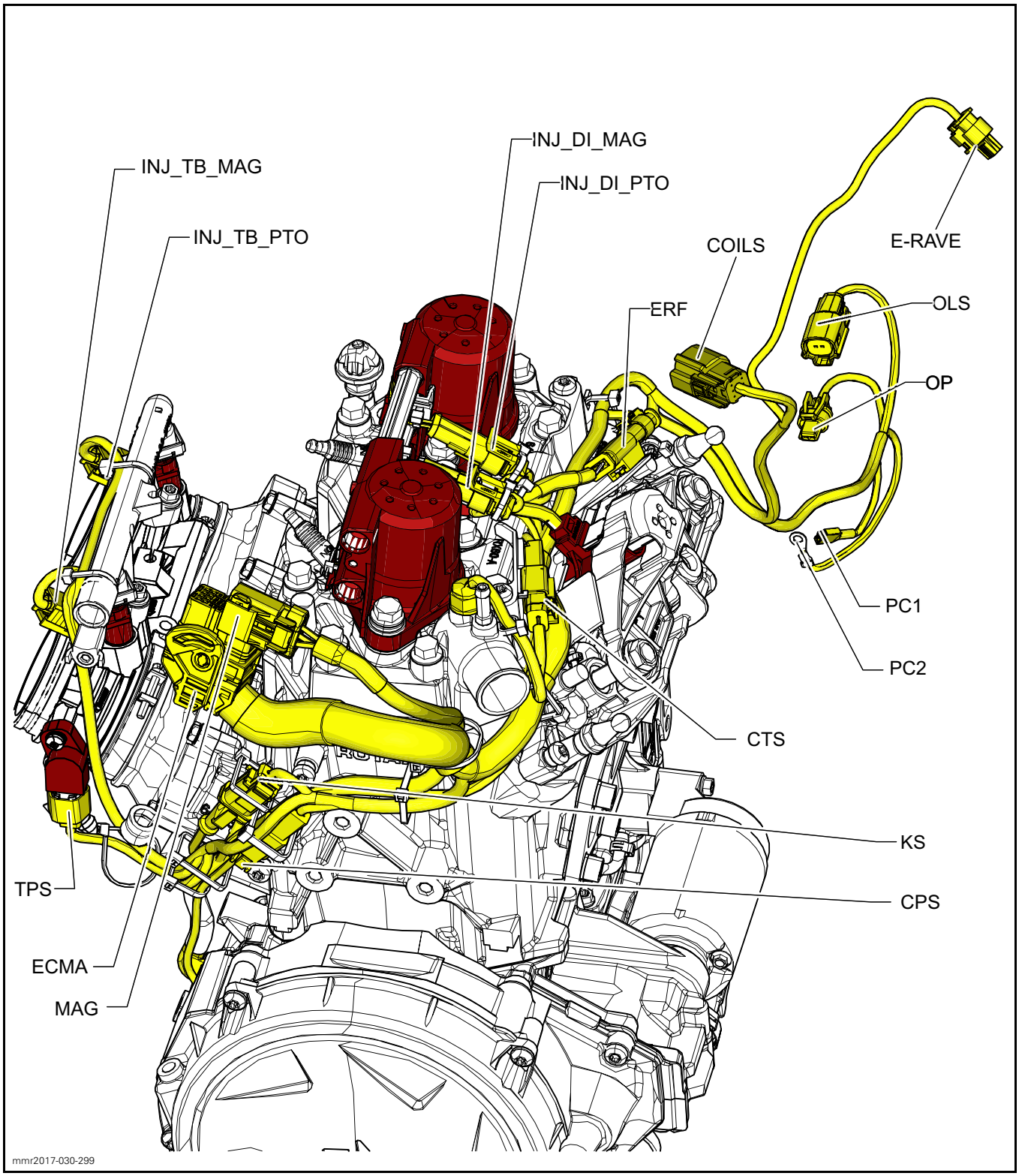
REV G4 CROSS-COUNTRY (WITH BATTERY) CHASSIS HARNESS



REV G4 MOUNTAIN (WITHOUT BATTERY) CHASSIS HARNESS



850 E-TEC ENGINE HARNESS



GENERAL

ACRONYMS

ACRONYM	DESCRIPTION
ACC	Accessory
BAT+	Battery +
CAN	Controller Area Network
CAPS	Camshaft Position Sensor
COM	Communication
CPS	Crankshaft Position Sensor
CTS	Coolant Temperature Sensor
CYL	Cylinder
DESS	Digitally Encoded Security System
ECMA	ECM connector A (Engine)
ECMB	ECM connector B (Chassis)
EGTS	Engine Gas Temperature Sensor
E-RAVE	E-Rave
ERF	E-Rave Feedback (position sensor)
ETC	Electronic Throttle Control
FB	Fusebox
FP	Fuel Pump
GND	Ground Engine
HL	HeadLamp
COILS	Ignition Coil Pack
INJ_DI_MAG	Direct Injector Magneto
INJ_DI_PTO	Direct Injector PTO
INJ_TB_MAG	Throttle Body Injector Magneto
INJ_TB_PTO	Throttle Body Injector PTO
KS	Knock Sensor
MAG	Magneto
MAPTS	Manifold Air Pressure & Temperature Sensor
MG	Multifunction Gauge
OLS	Oil Level Sensor
OP	Oil Pump
OLS	Oil Level Sensor
OPS	Oil Pressure Switch
RFID	Radio Frequency Identification
SD	Starter Solenoid
SH1	Switch Housing 1
THCM	Thermocouple Module
TL	Tail Light
TPS	Throttle Position Sensor
VSS	Vehicle Speed Sensor
DIMMER	Dimmer switch
GRIP	Heater switch
FLS	Fuel level sensor

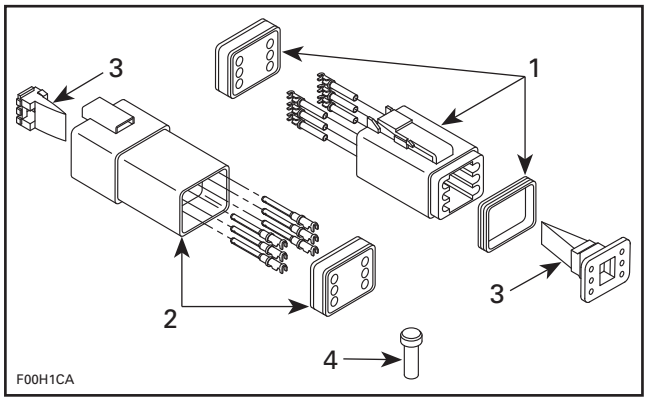
PROCEDURES

⚠ WARNING

When disassembling any connector for repair or replacement on the vehicle, always disconnect the battery to ensure all electrical power is removed and prevent any possibility of a short circuit. Refer to *CHARGING SYSTEM* subsection.

DIAGNOSTIC CONNECTOR (DEUTSCH)

Connector Disassembly and Reassembly

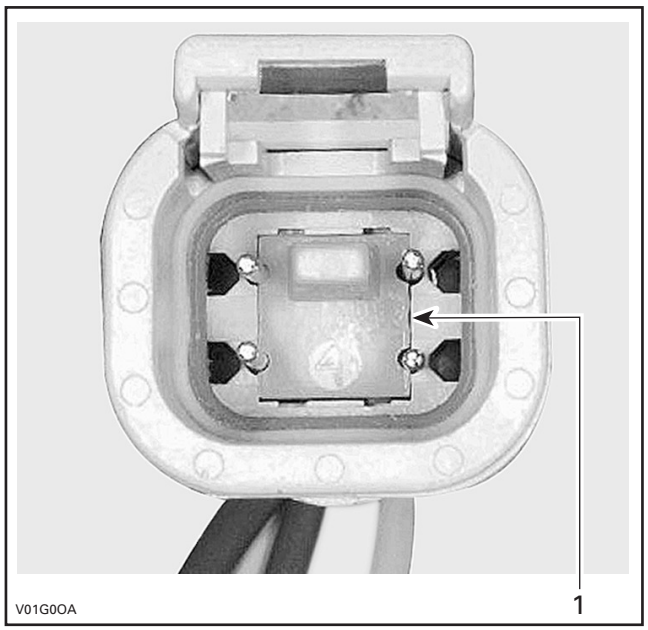


TYPICAL - DEUTSCH CONNECTOR
1. *Male connector*
2. *Female connector*
3. *Secondary lock*
4. *Sealing cap*

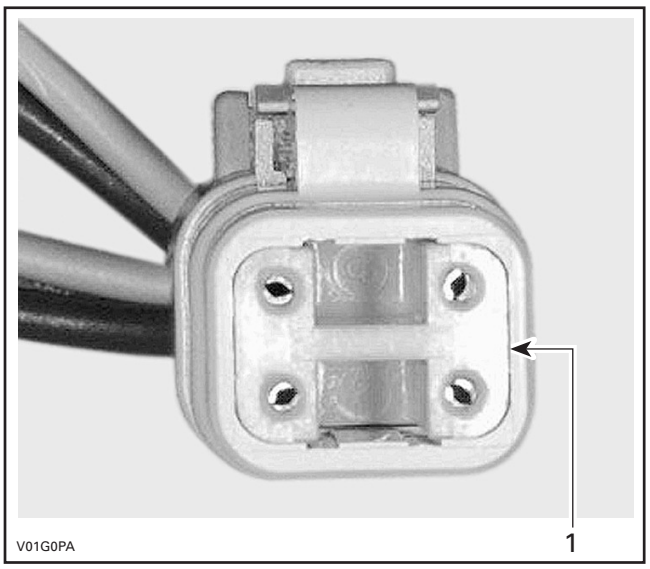
NOTICE Do not apply dielectric grease on terminal inside connector.

To remove terminals from connector, proceed as follows:

1. Using long nose pliers, pull out the plastic lock from between the terminals.



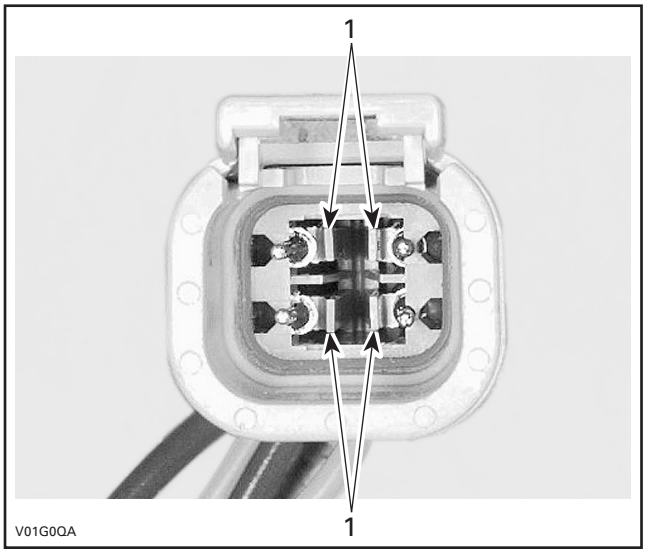
TYPICAL - FEMALE CONNECTOR
1. *Female lock*



TYPICAL - MALE CONNECTOR
1. *Male lock*

NOTE: Before pin extraction, push wire forward to relieve pressure on retaining tab.

2. Insert a 4.8 mm (.189 in) wide screwdriver blade inside the front of the terminal cavity.
3. Pry the retaining tab away from the terminal while gently pulling the wire and terminal out of the back of the connector.

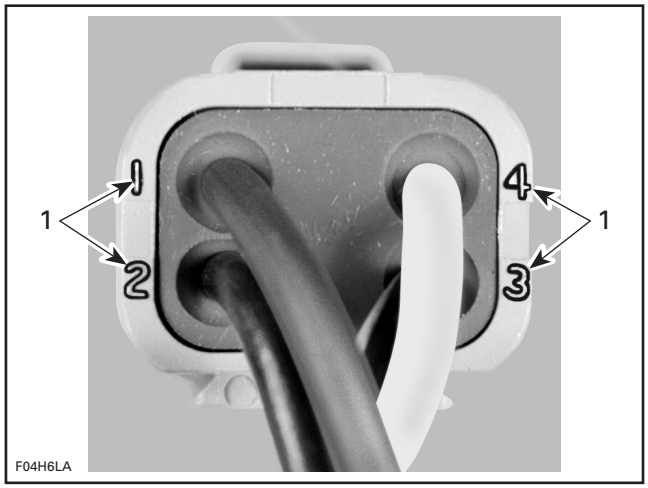


TYPICAL - FEMALE CONNECTOR
1. *Retaining tabs*

To install:

1. For insertion of a terminal, ensure the plastic lock is removed.
2. Insert terminal through the back of the connector in the appropriate position, and push it in as far as it will go. You should feel or hear the terminal lock engage.

3. Pull back on the terminal wire to ensure the retention fingers are holding the terminal.
4. After all required terminals have been inserted, the lock must be installed.



TYPICAL - CONNECTOR PIN-OUT
1. Terminal position identification numbers

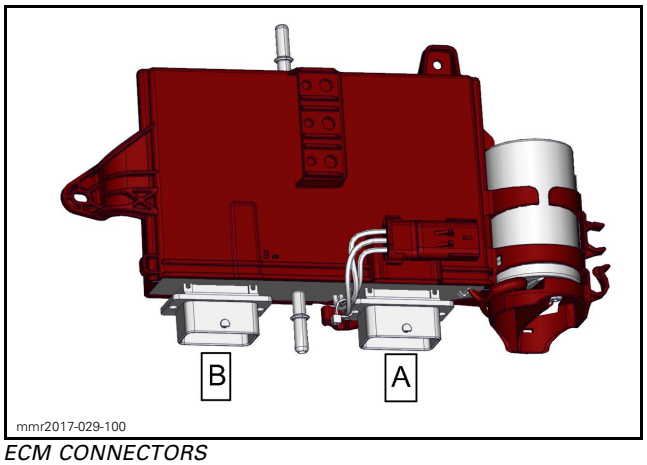
ECM CONNECTOR (MOLEX)

There are 2 connectors on the ECM.

The engine wiring harness connector is connected to ECM connector "A". The vehicle wiring harness connector is connected to ECM connector "B".

Each ECM connector has 48 pins however, connectors "A" and "B" are not interchangeable due to their specific keyways.

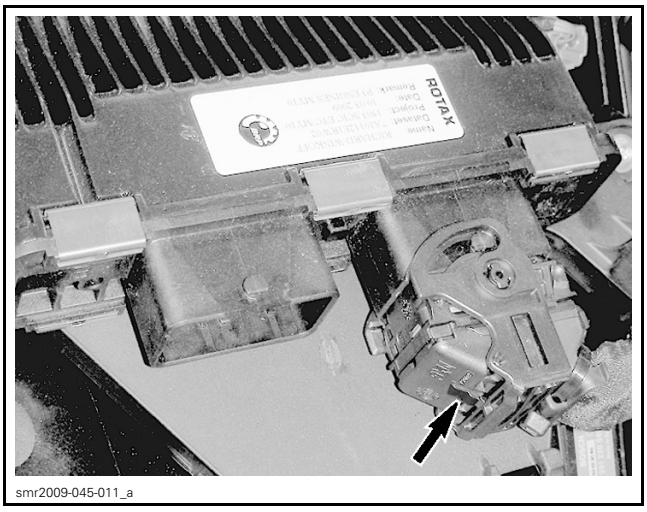
NOTE: If you need to remove the connector, be sure to not disconnect fuel quick-connector at ECM. If you need to remove the ECM or fuel quick connector, insure the ECM electrical connectors are securely in place and avoid fuel intrusion into connector/seal.



ECM CONNECTORS

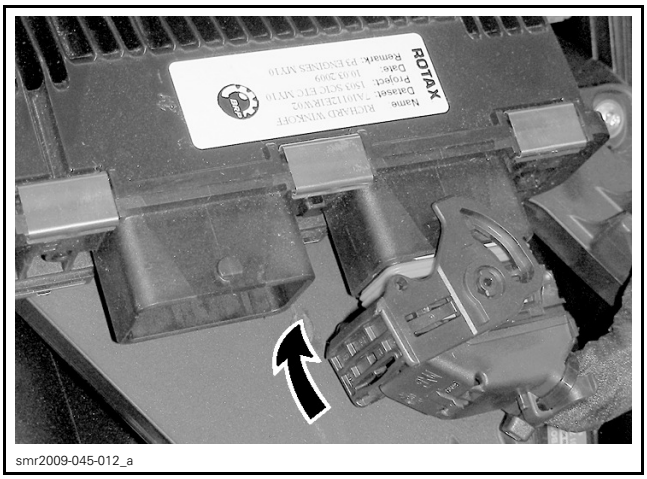
Connector Removal

1. To access the ECM, refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
2. Press **and hold** the locking tab on the connector to be disconnected.



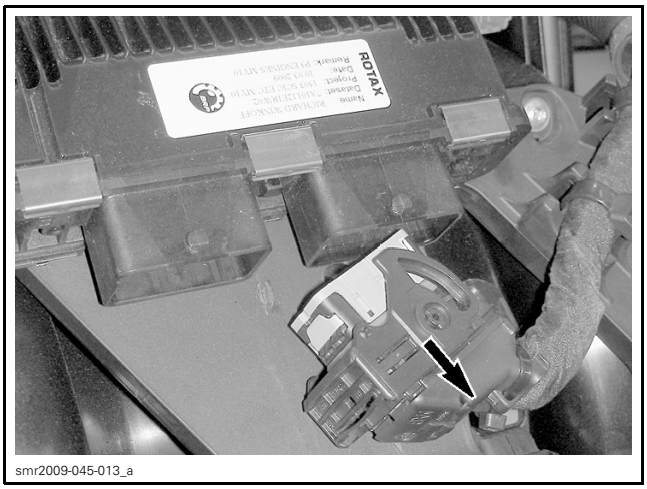
LOCKING TAB TO PRESS AND HOLD

3. As you hold the locking tab, rotate the connector locking cam until it stops.



CONNECTOR LOCKING CAM ROTATION TO RELEASE

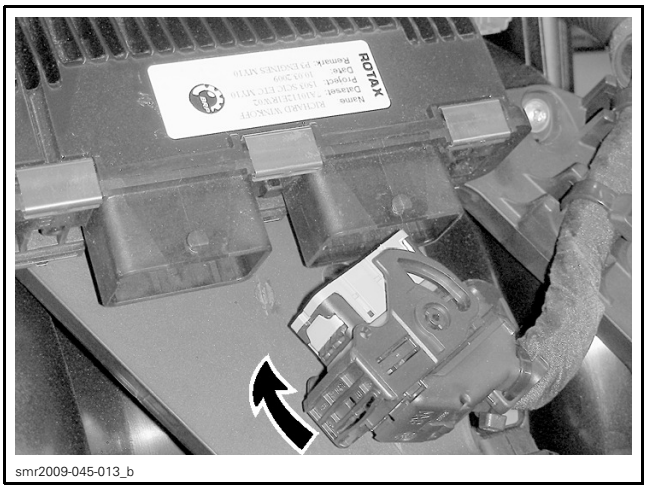
4. Pull connector off ECM.



smr2009-045-013_a

Connector Installation

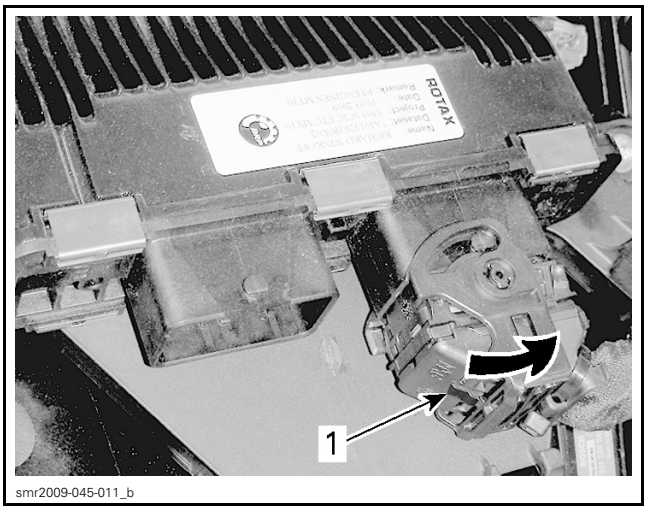
1. Fully open connector locking cam.



smr2009-045-013_b

CONNECTOR LOCKING CAM IN RELEASE POSITION

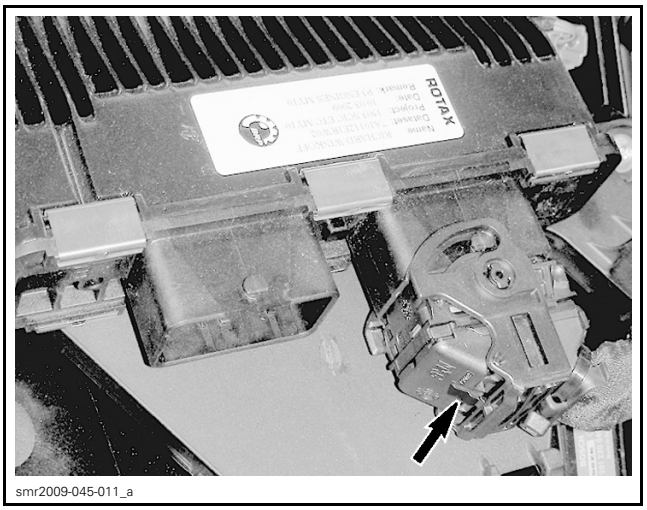
2. Insert connector on ECM.
3. As you push the connector onto the ECM, rotate the connector locking cam until it snaps locked.



smr2009-045-011_b

1. Locked here

4. Ensure the locking tab is fully out.



smr2009-045-011_a

LOCKING TAB FULLY OUT

Connector Inspection

Before replacing an ECM, always check electrical connections.

1. Ensure connector locking mechanism is functioning properly.
2. Ensure all wire terminals (pins) are properly locked in the connector.
3. Ensure they are very tight, make good contact with the pins in the ECM.
4. Ensure the pins in the harness connector and the ECM connector are clean, shiny and corrosion-free.

NOTE: A "defective ECM module" could possibly be repaired simply by disconnecting and reconnecting it.

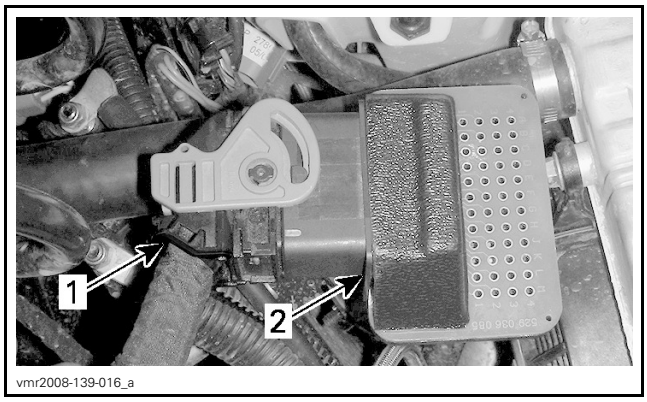
NOTICE **Do not apply any lubricant product to the pins of the ECM connector.**

Connector Probing

The most recommended and safest method to probe the MOLEX (ECM) connector terminals is to use the ECM ADAPTER TOOL (P/N 529 036 166). This tool will prevent deforming or enlarging of the terminals, which would lead to bad ECM terminal contact creating intermittent or permanent problems.


529036166

1. Disconnect the ECM connector to be probed, and reconnect it on the ECM adapter.
2. Probe wire terminals of the circuit to be tested directly in the adapter holes.



vmr2008-139-016_a

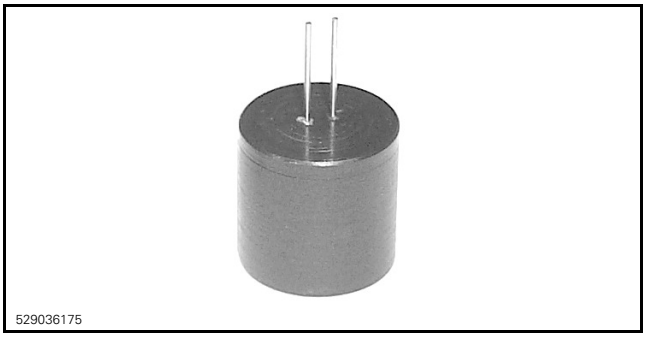
TYPICAL
1. ECM connector
2. ECM adapter

NOTICE **Never probe directly on the ECM harness connector. This could change the shape or enlarge the terminals and create intermittent or permanent contact problems.**

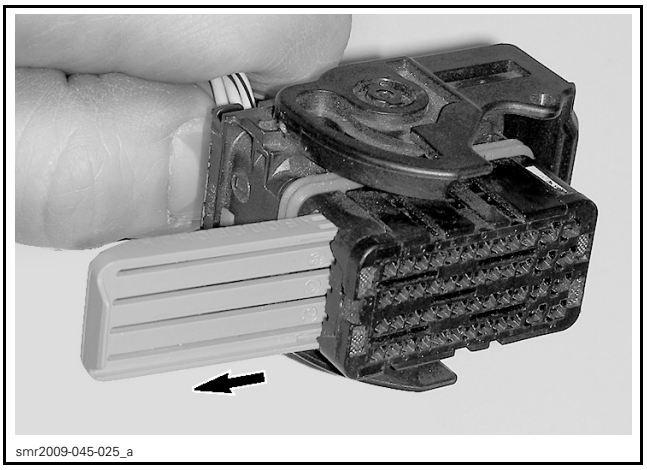
Connector Terminal Removal (Harness Connector)

To remove a signal terminal from the ECM harness connector, use the ECM TERMINAL REMOVER 2.25 (P/N 529 036 175).

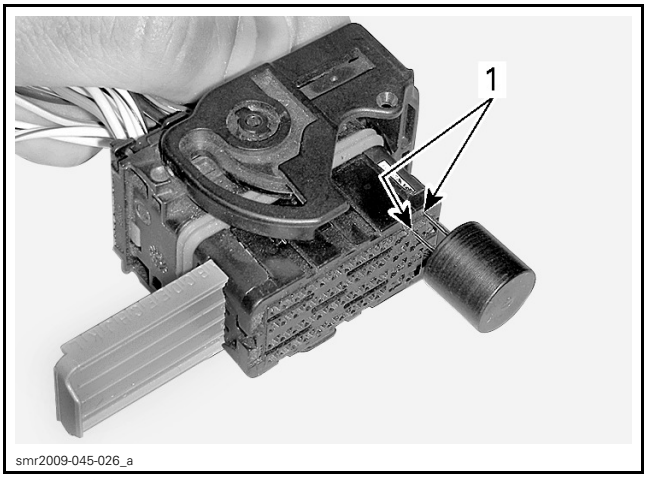
To remove a power terminal, use the ECM TERMINAL REMOVER 3.36 (P/N 529 036 174).


529036175

1. Remove rear protector from connector.
2. Pull out the connector lock.


smr2009-045-025_a

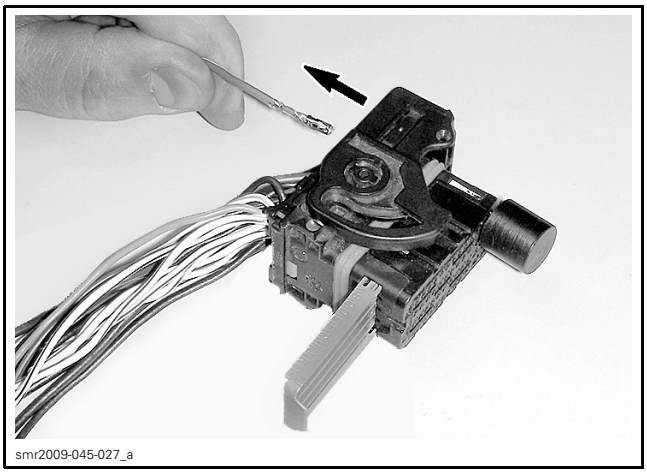
3. Insert tool to unlock terminal.



smr2009-045-026_a

1. Unlock here

4. Gently pull on the wire to extract the terminal out the back of the connector.


smr2009-045-027_a

NOTICE Before installing wire terminals in the connector, ensure all terminals are properly crimped on wires. After installation of wire terminals in the connectors, ensure they are properly locked by gently pulling on them as if to extract them.

MOLEX CONNECTORS (EXCEPT ECM)

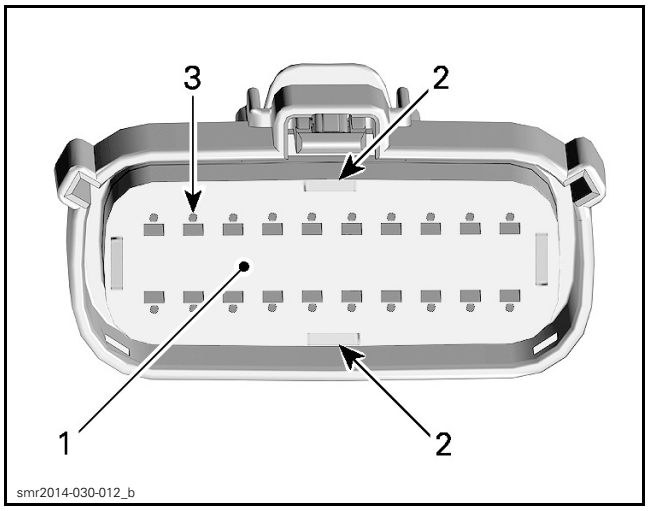
Connector Probing

1. Disconnect the steering connector in the vehicle and connect it to the Diagnostic Harness (P/N 284560054).
2. Probe the applicable circuit using the test connector on the diagnostic harness.

NOTICE Attempting to probe the connector without using the diagnostic connector may damage the connector pins, or even cause a short circuit if testing an energized circuit.

Socket Extraction (Female Connector)

1. Insert a small flat screwdriver in the pry holes of the socket locator, on the socket side of the connector.



smr2014-030-012_b

1. Socket locator
2. Pry holes
3. Holes for inserting terminal extractor tool

2. Carefully pull out the socket locator out to the detent position (approximately 5 mm).

NOTE: Do not remove the socket locator from the connector housing.

3. Insert the extractor tool in the small hole adjacent to the socket.

NOTE: Push the extractor tool in only as far as required to release the lock from the socket. The tool should slide along the socket and be inserted between the socket and the lock.

REQUIRED TOOL
FCI TERMINAL EXTRACTOR TOOL (P/N 54241678) or,
MOLEX 150 TERMINAL EXTRACTOR TOOL (P/N 63813 - 1500)

smr2010-052-002

FCI TERMINAL EXTRACTOR TOOL (P/N 54241678)

smr2014-045-001

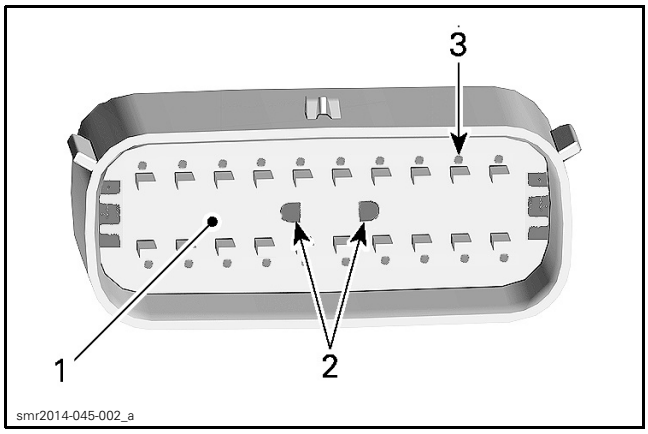
MOLEX 150 TERMINAL EXTRACTOR TOOL 6(P/N 3813 - 1500)

4. Gently pull on the wire to extract the socket out the back of the connector.

Pin Extraction (Male Connector)

1. Using a pair of thin long nose pliers, pull the pin locator out to the detent position (approximately 5 mm). This will allow unlocking of the pins.

NOTICE Do not attempt to remove the pin locator or damage will occur. Be careful not to bend the pins when using the pliers.



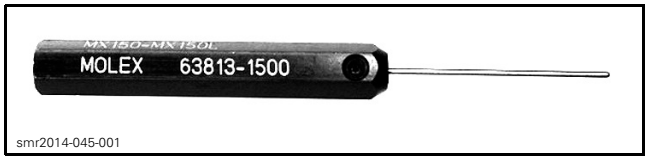
1. Pin locator
2. Insert long nose pliers here
3. Holes for inserting terminal extractor tool

2. Insert the extractor tool in the small hole adjacent to the pin.

NOTE: Push the extractor tool in only as far as required to release the lock from the pin. The tool should slide along the pin and be inserted between the pin and the lock.

REQUIRED TOOL
FCI TERMINAL EXTRACTOR TOOL (P/N 54241678) or,
MOLEX 150 TERMINAL EXTRACTOR TOOL (P/N 63813 - 1500)

FCI TERMINAL EXTRACTOR TOOL (P/N 54241678)



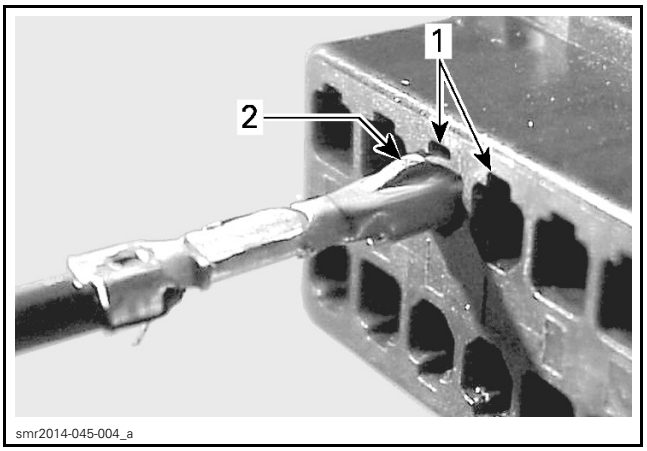
MOLEX 150 TERMINAL EXTRACTOR TOOL 6(P/N 3813 - 1500)

3. Gently pull on the wire to extract the pin out the back of the connector.

Pin Insertion

1. Ensure the terminal (pin) is properly crimped onto the wire.
2. Ensure the pin locator (the white plastic insert in the connector) is out in the detent position.
3. Insert the pin in through the back of the connector.

NOTE: When inserting the pin, insert the stepped portion facing the notch in the connector pin hole.



TYPICAL - PIN INSERTION
1. Notch
2. Stepped portion towards notch

4. Push the pin in until the pin lock engages the pin.
5. Gently pull on the pin to ensure it is properly locked.
6. Repeat previous steps for each pin to be inserted.
7. Push the pin locator into the connector to the locked position.

DELPHI/PACKARD CONNECTORS

Connector Terminal Removal

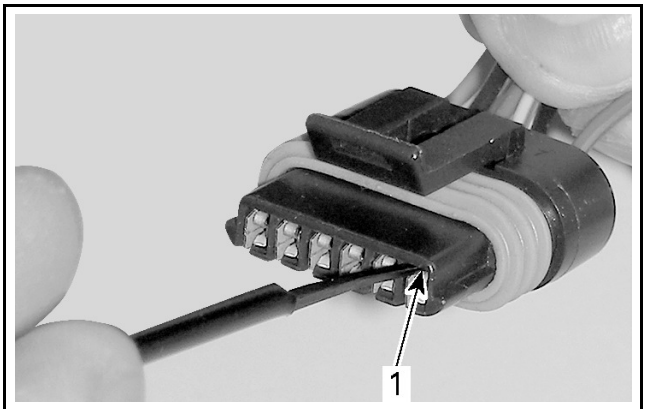
To remove a terminal (pin) from the connector, use a special tool such as the DELPHI TERMINAL EXTRACTOR (P/N 12094429).

DELPHI TERMINAL EXTRACTOR (P/N 12094429)

NOTE: Grinding the tool end to a taper is required.

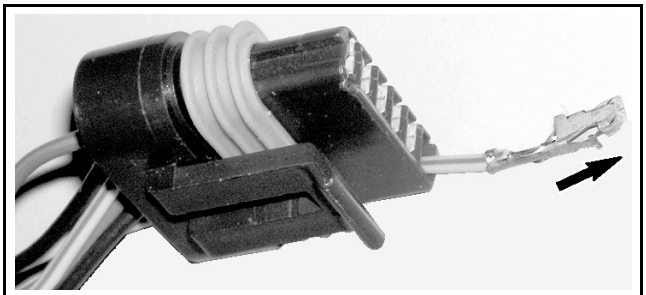
1. Carefully insert the tool in the space provided to release the pin lock.

2. Push the pin out the front of the connector by pushing on the wire.



smr2009-045-014_a

1. Unlock terminal here



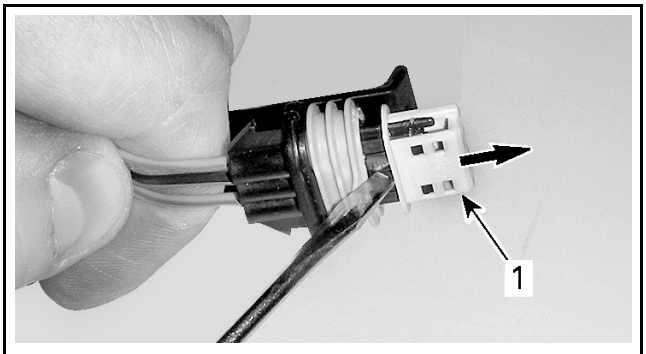
smr2009-045-015_a

NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.

DELPHI CONNECTORS

Terminal Removal

1. To remove a terminal from connector, first remove the locking cap.



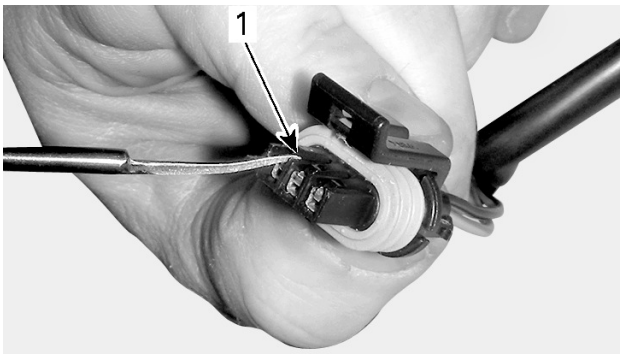
smr2009-045-023_a

1. Pry out locking cap

2. Carefully insert the DELPHI TERMINAL EXTRACTOR (P/N 12094429) in the space provided to release the pin lock.

smr2010-052-001

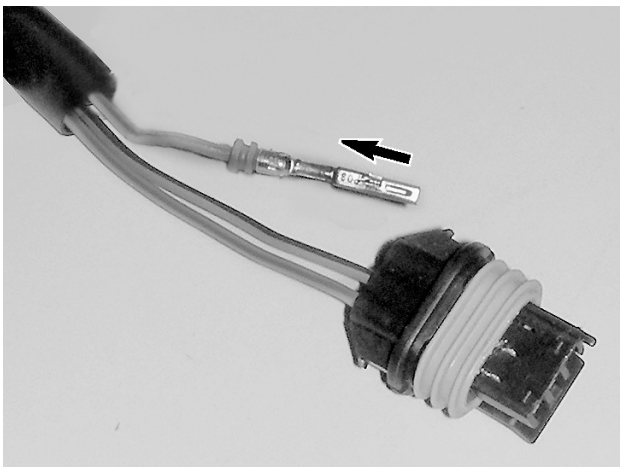
DELPHI TERMINAL EXTRACTOR (P/N 12094429)



smr2009-045-024_a

1. Unlock here

3. Gently pull on the wire to extract the pin out the back of the connector.



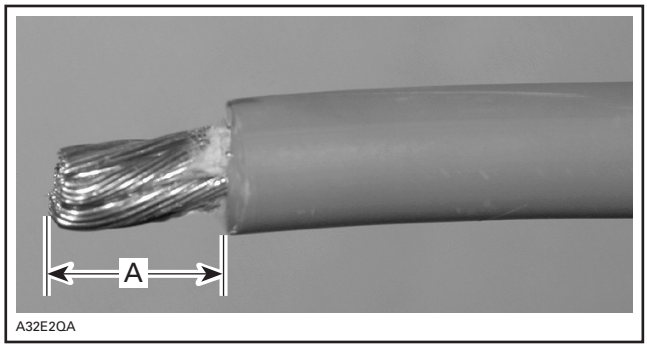
smr2009-045-028_a

NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.

BATTERY CABLES

Battery Cable Crimping

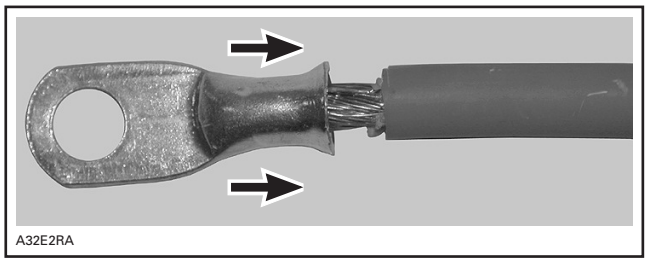
Carefully strip the wire approximately to 10 mm (3/8 in) in length, using a wire stripping tool or sharp blade/knife.



A. 10 mm (3/8 in)

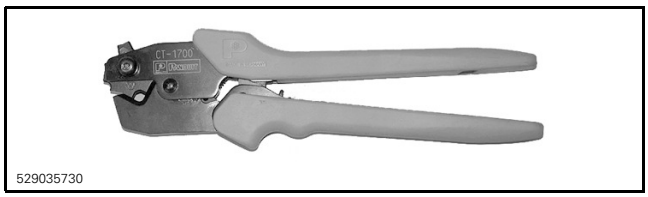
NOTE: Make sure not to cut wire strands while stripping the wire.

Install the appropriate terminal on the wire according to the requirement. Refer to appropriate *PARTS CATALOG*.

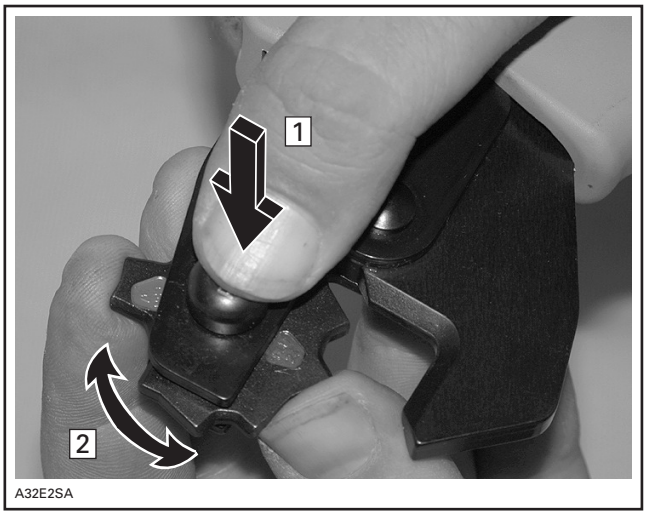


INSTALLATION OF TERMINAL

Follow the instructions provided with the CRIMPING TOOL (HEAVY GAUGE WIRE) (P/N 529 035 730) to select the proper position of the tool.

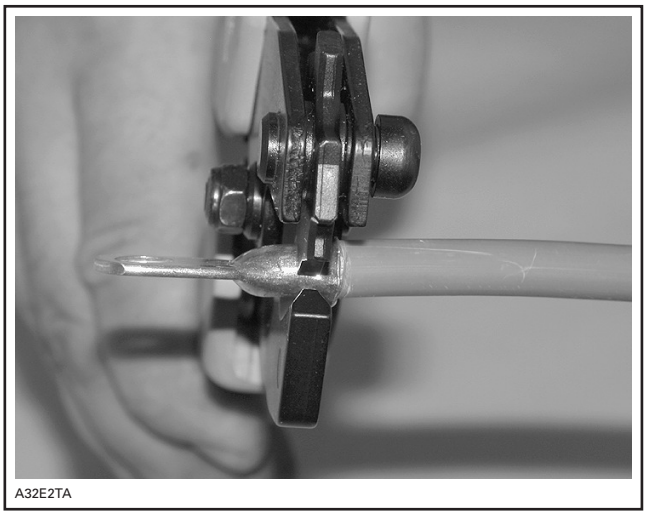


NOTE: Different wires require different crimping pliers settings, so make sure to follow the instruction supplied with the tool.

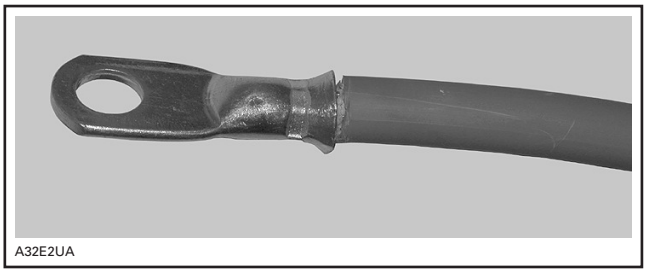


POSITIONING THE CRIMPING PLIERS
Step 1: Press
Step 2: Rotate

After positioning the crimping pliers, crimp the terminal already installed on wire.



CRIMPING OF WIRE



PROPERLY CRIMPED WIRE

To verify, if the wire is properly crimped, apply some pulling force on wire and the terminal at the same time from both directions.

NOTICE Never weld the wire to the terminal. Welding can change the property of the wire and it can become brittle and break.

Install the protective heat shrink rubber tube on the terminal. Heat the heat shrink rubber tube using the heat gun so that it grasps the wire and the terminal.

NOTICE Make sure that the protective heat shrink rubber tube has been properly installed and no part of wire is exposed.

IGNITION SYSTEM

SERVICE TOOLS

Description	Part Number	Page
DIAL INDICATOR ADAPTER	529 036 132	4
DIAL INDICATOR ADAPTER	529 036 418	4
IGNITION TIMING TOOL	529 036 419	4
TDC DIAL INDICATOR	295 000 143	4
TDC DIAL INDICATOR	414 104 700	4

GENERAL

⚠ WARNING

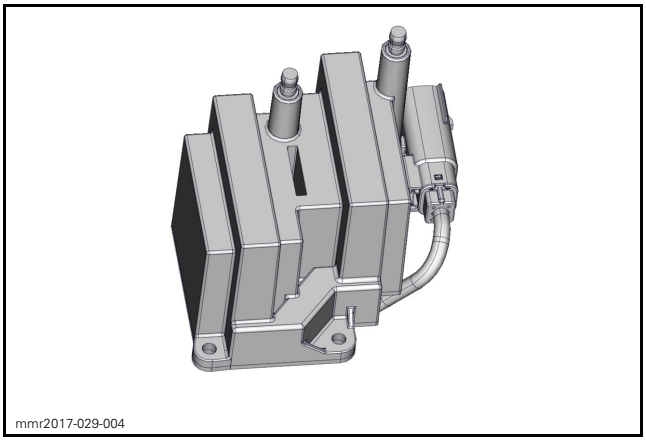
Always electrically disconnect both fuel injectors prior to testing for ignition spark. Otherwise, fuel vapors may ignite in presence of a spark creating a fire hazard.

SYSTEM DESCRIPTION

This ignition system is an inductive type specifically designed for the E-TEC engine with a rapid rise time to prevent spark plug fouling. It provides a quick spark with a long duration.

The ignition system is fully managed by the ECM which controls the ignition system parameters such as spark timing, dwell time, and firing order.

The system uses two separate ignition coils which induce high voltage in their secondary winding to produce a spark at each spark plug independently.



mmr2017-029-004

The ignition coils receive power from the 55 Vdc system. Their operating voltage varies from 20 to 55 Vdc.

Ignition System Basic Operation

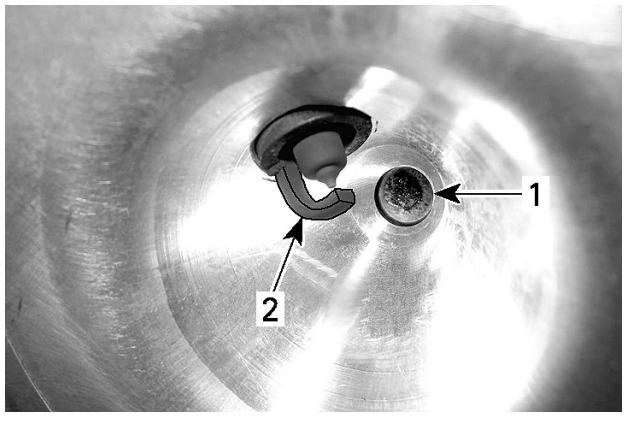
Each ignition coil uses an active circuitry to energize the primary winding when it receive a pulse from the ECM. The pulse has an amplitude of approximately 10 volts. At the end of the dwell time, the power is released from the primary winding which induces a current that produces a high voltage in the secondary winding. This high voltage is then fed to the spark plug.

A resistive core spark plug cable is used to prevent the RFI (Radio Frequency Interference). There is no resistor in the spark plug cap.

Spark Plugs

The OEM spark plug used is specially indexed for optimum engine operation and efficiency.

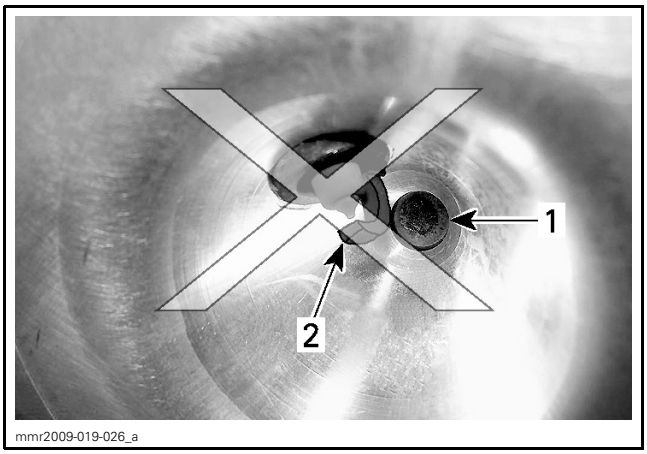
The threads on the spark plug and in the cylinder head are indexed so that when the plug is installed, the open end of the negative electrode will be facing the injection spray, within ± 90°. This ensures the negative electrode does not deviate the injection spray and ensures proper ignition.



mmr2009-019-027_a

CORRECTLY INDEXED
1. *Injector nozzle*
2. *Ground electrode*

NOTE: Using an incorrectly indexed spark plug will result in poor idle and increased emissions.



INCORRECTLY INDEXED
1. *Injector nozzle*
2. *Ground electrode*

If using a non OEM spark plug, a specific installation procedure must be followed. Refer to *PERIODIC MAINTENANCE PROCEDURE* subsection.

Ignition Timing

The crankshaft position sensor (CPS), the air pressure sensor (MAPTS) and the throttle position sensor (TPS) are the primary sensors used to control the ignition timing.

The ECM is programmed with data (ignition mappings). Using feedback provided by the sensors, the ECM controls the ignition timing for optimum engine operation under all operating conditions.

Ignition timing can be adjusted using BUDS2

Knock Detection

The knock sensor detects specific vibration that would be typically generated by engine detonation.

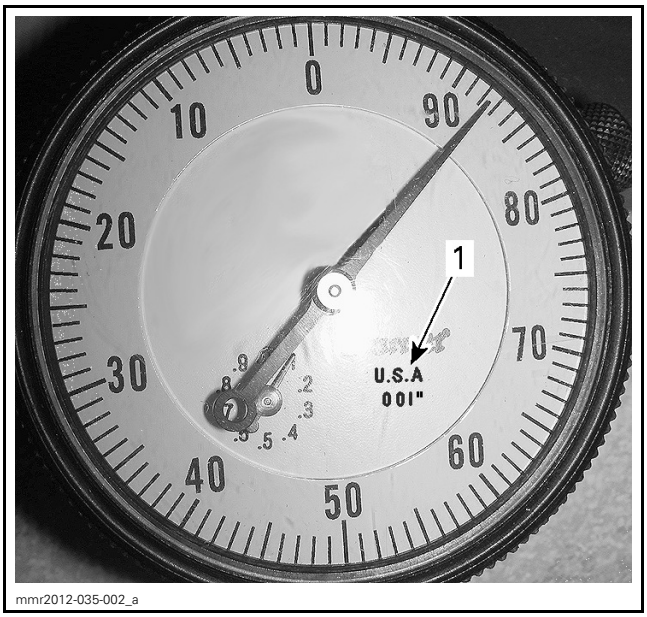
If detonation occurs, the ECMs retards the ignition and increases the fuel injected temporarily (it goes into a specific operating mode) until detonation stops.

ADJUSTMENT

UNDERSTANDING THE TDC GAUGE

Dial gauges can be either in imperial or metric units. It is crucial to identify gauge units and graduation.

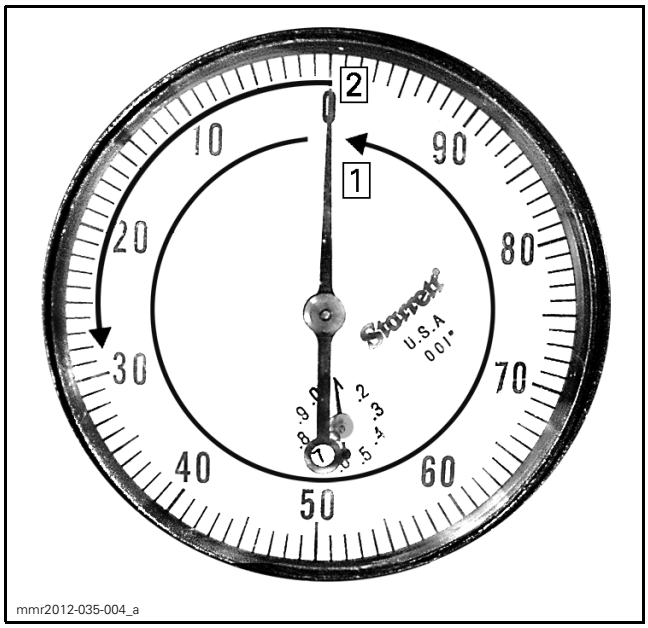
Imperial Dial Gauge



IMPERIAL GAUGE EXAMPLE
1. 001 inch means it is graduated each 1/1000 inch

TYPICAL IMPERIAL DIAL GAUGE		
GRADUATION	MEASURE PER NEEDLE TURN	MEASURE EXAMPLE: .128 INCH
1/1000 inch (.001) per graduation line	1 turn = .100 inch	1 complete turn + 28 graduation lines

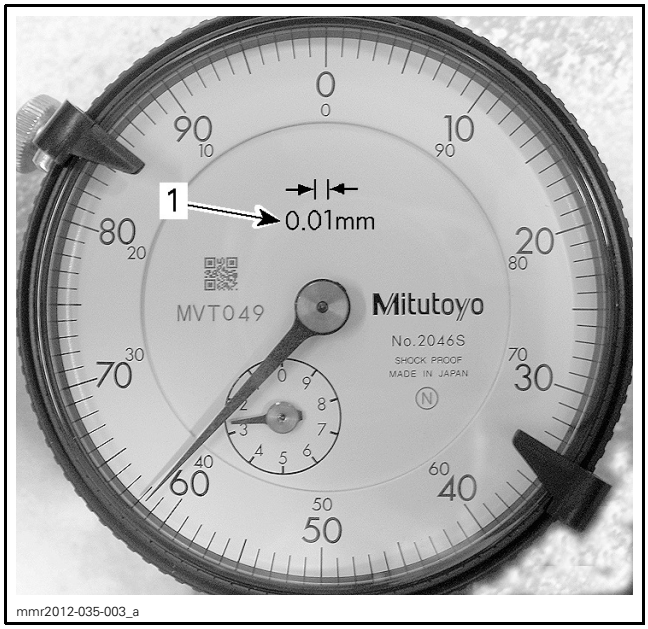
NOTE: The small dial indicates the number of turns the long needle traveled around the main dial.



mmr2012-035-004_a

.128 INCH AS AN EXAMPLE
Step 1: 1 complete turn
Step 2: 28 lines

Metric Dial Gauge

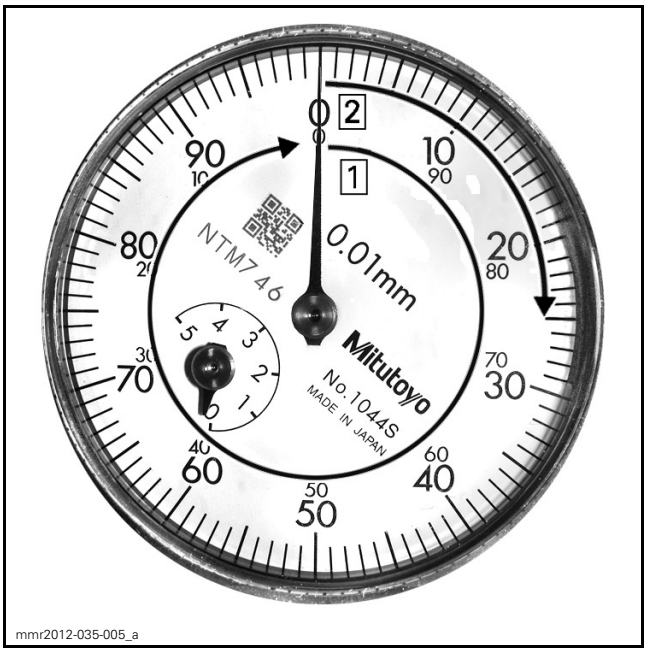


mmr2012-035-003_a

METRIC GAUGE EXAMPLE
1. 0.01mm means its graduated each 1/100 millimeter

METRIC DIAL GAUGE EXAMPLE		
GRADUATION	MEASURE PER NEEDLE TURN	MEASURE EXAMPLE: 3.25 mm
1/100 millimeter (.01) per graduation line	1 turn = 1 millimeter	3 complete turns + 25 graduation lines

NOTE: The small dial indicates the number of turns the long needle traveled around the main dial.



mmr2012-035-005_a

3.25 mm AS AN EXAMPLE
Step 1: Complete turns (3 X)
Step 2: 25 lines

IGNITION TIMING

Normally, ignition timing adjustments should not be required. It has been set at the factory and should remain correctly adjusted as every component is fixed and non adjustable.

The only time the ignition timing may require adjustment is when replacing the:
- Crankshaft
- Magneto flywheel
- CPS
- ECM.

Adjustment procedure summary:
- Ignition Timing Tool Installation
- TDC Gauge Installation
- Locating Piston TDC
- Scribing the Timing Mark
- Checking Ignition Timing
- Adjusting Timing.

If the ignition timing is incorrect, first check for proper crankshaft alignment. This might be an indication of a twisted crankshaft. Refer to *ENGINE MEASUREMENT* subsection.

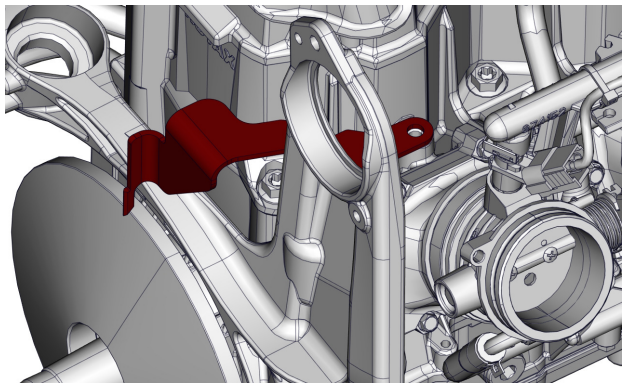
Installing the Ignition Timing Tool

REQUIRED TOOL	
IGNITION TIMING TOOL (P/N 529 036 419)	
Ignition timing tool retaining screw (diameter X thread pitch)	M8 X 1.25

⚠ WARNING

Ensure tether cord is removed from engine cut-off switch and emergency engine stop switch is in the STOP position.

1. Install the ignition timing tool on the engine.



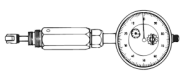
mmr2017-031-100

Installing the TDC Gauge

⚠ WARNING

Ensure tether cord is removed from engine cut-off switch and emergency engine stop switch is in the STOP position.

Two TDC gauges can be used:

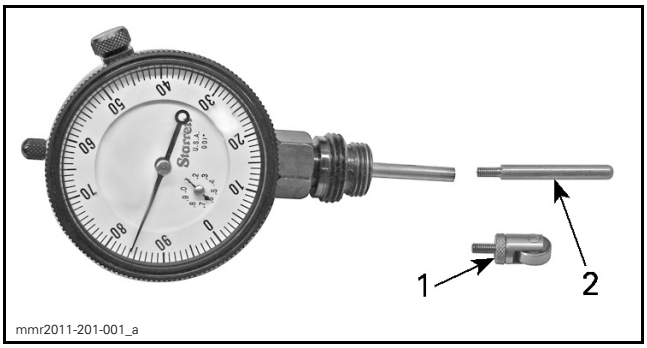
TDC GAUGES	
Preferred Gauge TDC DIAL INDICATOR (P/N 295 000 143) **(short reach)**	
TDC DIAL INDICATOR (P/N 414 104 700) **(long reach)**	

Preparing the Short Reach Gauge (Preferred Gauge)

1. Remove the roller tip from the gauge.

REQUIRED TOOL	
DIAL INDICATOR ADAPTER (P/N 529 036 418)	

2. Use the rounded tip from the DIAL INDICATOR ADAPTER (P/N 529 036 132).



mmr2011-201-001_a

1. Roller tip removed
2. Rounded tip to install

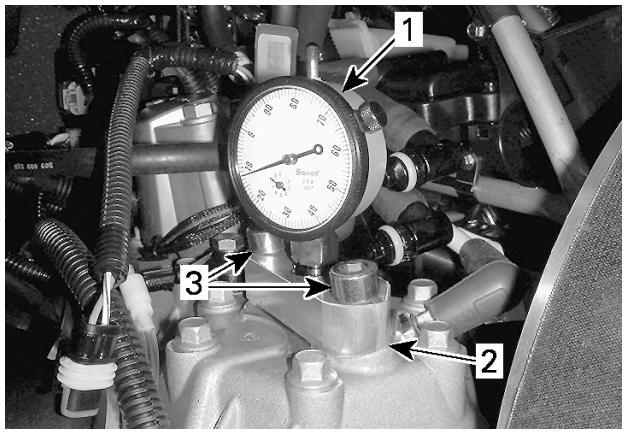
3. Install the rounded tip on the gauge.

Preparing the Long Reach Gauge

1. Replace the roller tip by the rounded tip as described in the *PREPARING THE SHORT REACH GAUGE*.

Installing Gauge (both gauges)

1. Remove the PTO injector, refer to *E-TEC DIRECT FUEL INJECTION* subsection.
2. Install the DIAL INDICATOR ADAPTER (P/N 529 036 418) over the PTO injector hole.
3. Use two screws M10 x 1.5 x 35 to secure the adaptor.
4. Carefully insert the TDC gauge through the dial indicator adapter hole.



mmr2009-024-001_a

TYPICAL
1. *TDC gauge*
2. *Dial indicator adaptor*
3. *Screws*

5. Screw the gauge into the adapter plate with the dial face towards the PTO and tighten it sufficiently to prevent movement.

Locating Piston TDC

NOTE: Normal engine rotation as seen from the PTO side is counterclockwise.

1. With a firm hold on the drive pulley, slowly rotate the drive pulley counterclockwise while observing the TDC gauge needle.

NOTE: Note that the needle stops moving only as the piston is changing direction at the top of its stroke.

2. Rotate the dial face so the "0" is in line with the needle when it stops moving.
3. Resume rotating the engine in the same direction (counterclockwise) until the gauge needle has rotated approximately 1/4 turn past TDC.
4. Then slowly rotate the engine in a clockwise direction until needle stops moving.

NOTE: The needle should stop on the "0". If not, reset the dial "0" to the needle.

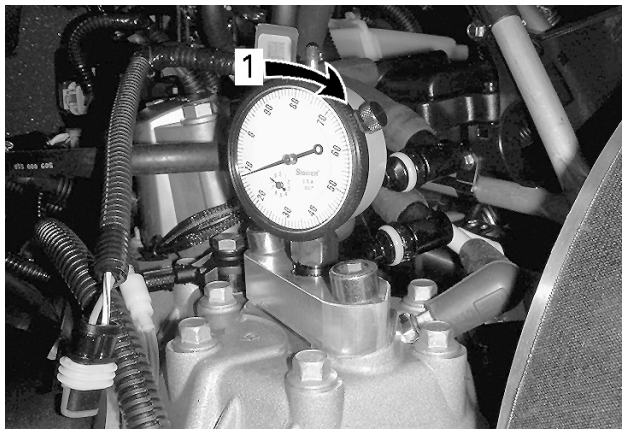
5. Again, slowly rotate the drive pulley back and forth across TDC and confirm the needle always stops exactly at "0" before changing direction. "0" now indicates exact TDC.
6. Lock the dial face with the dial lock screw.

NOTE: If a difference in "0" setting the dial in each direction of rotation is easily noticeable, the engine components may suffer from excessive wear. The engine may require further inspection and maintenance.

Scribing the Timing Mark

IMPORTANT: Make sure to understand the TDC gauge functioning. Refer to *UNDERSTANDING THE TDC GAUGE* in this subsection.

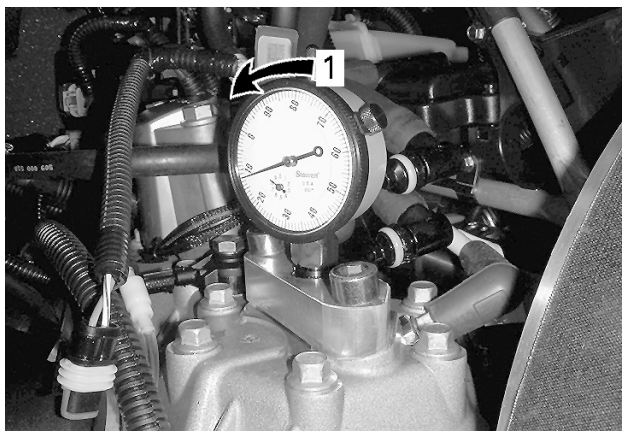
1. From the "0" (TDC), rotate the drive pulley clockwise (backwards engine rotation) until the dial needle rotates past the BTDC specification (see table below).



mmr2009-024-001_c

TYPICAL
1. *Pass the BTDC specification*

2. Then carefully rotate engine forward until needle precisely points the measurement specified in the table.



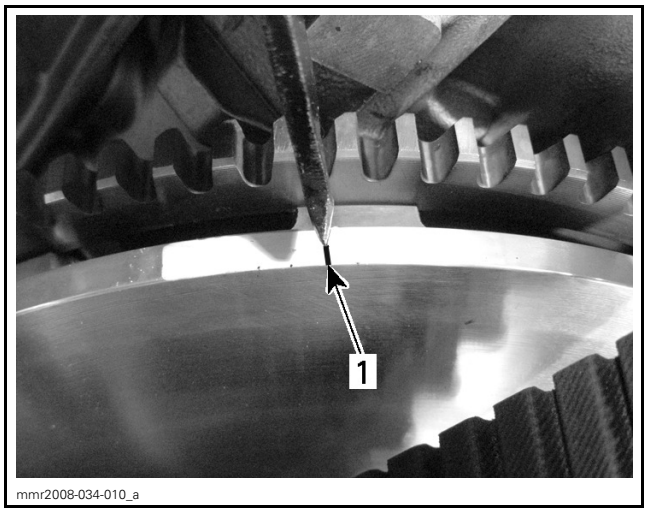
mmr2009-024-001_b

TYPICAL
1. *Bring dial needle to the BTDC specification*

NOTE: Final setting must always be made in the normal engine rotation.

IGNITION TIMING BTDC		
ENGINE	BTDC SPECIFICATION	DEGREE SETTING BTDC
850 E-TEC	6 mm (.236 in)	28°

3. With the TDC gauge indicating specified timing, use a permanent marker to draw a line on the drive pulley fixed sheave directly in line with pointer end.



TYPICAL
1. Timing mark in line with pointer end

4. Repeat the procedure to ascertain the mark is exactly in line with the pointer.
5. Remove the TDC gauge and dial indicator adapter.
6. Reinstall the fuel injector. Refer to *E-TEC DIRECT INJECTION* subsection.
7. Reconnect magneto connector.
8. Check ignition timing as per applicable procedure in this subsection.

Checking Ignition Timing

The ignition timing can be checked with either the engine hot or cold at the specified RPM.

ENGINE SPEED FOR IGNITION TIMING CHECK
ENGINE RPM
2500 to 4000 (1)
(1) In this range, the spark advance does not change during the procedure.

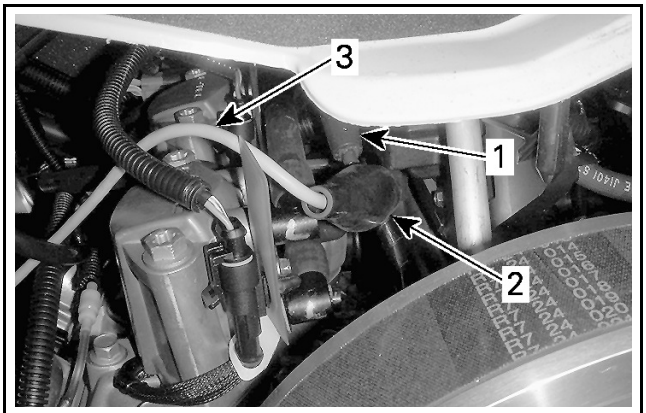
To check the ignition timing proceed as follows:

⚠ WARNING

Place ski tips against a wall, raise rear of vehicle on a stand, so that track does not contact the ground. Do not allow anyone in front of or behind the vehicle while engine is running. Keep clear of track and do not wear loose clothing which can get caught in moving parts.

1. Connect the timing light pick-up to the **PTO** spark plug cable.

NOTE: Be careful to route timing light cable away from drive belt and pulleys.



TYPICAL — TIMING LIGHT CONNECTION
1. PTO spark plug cable
2. Timing light connection to PTO plug cable
3. Timing light wire routing

2. Connect the vehicle to BUDS2, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
3. Start engine and let idle.
4. In BUDS2, navigate to the **Settings**page.
5. Select the **Ignition/Injection Timing** field.

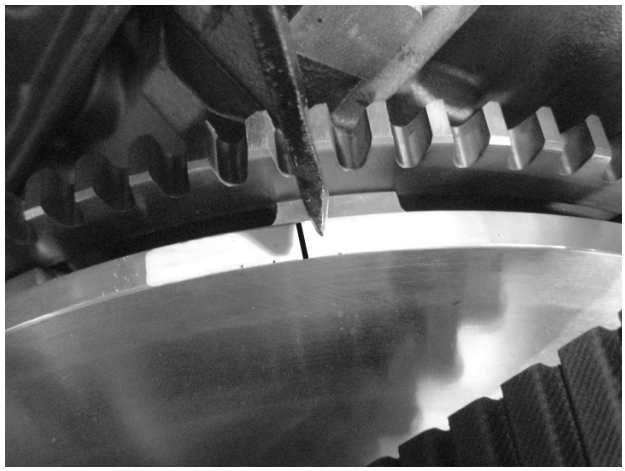
NOTE: Timing will be frozen on the PTO cylinder only for RPM stability. RPM will be limited to 4000 RPM.

6. Point the timing light on the timing mark and increase engine to **3500 RPM** for a brief instant.
7. The timing mark must be aligned with the pointer end within the specified tolerance.

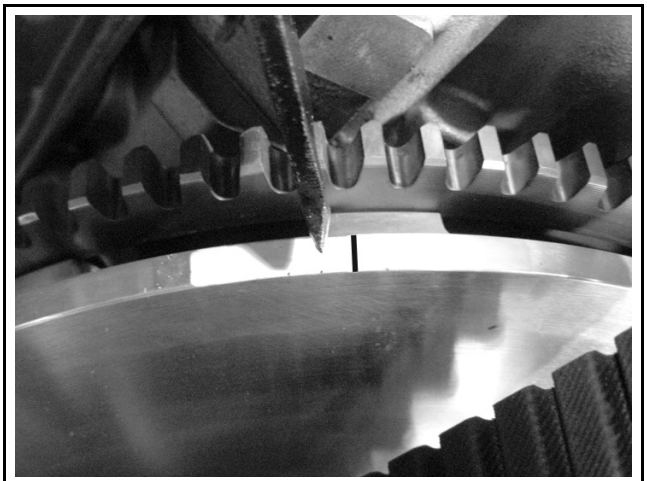
TOLERANCE
± 0.5°

If timing mark and pointer are aligned, no adjustment is required.

If they are not aligned, note if timing is retarded or advanced, see following illustrations. Then, adjust timing as described in *ADJUSTING TIMING* further in this subsection.



TYPICAL — TIMING RETARDED BY ABOUT 1°



TYPICAL — TIMING ADVANCED BY ABOUT 2°

Adjusting Timing

1. In the **Ignition/Injection Timing** area on the **Settings** page, select **Advance** or **Retard** to change the ignition timing.

NOTE: Timing will be changed in 0.5° increments.

2. Adjust the timing using the appropriate button until the timing mark is in line with the pointer, within 0.5°.
3. Unfreeze ignition timing.
4. Click **Close** button to store the ignition timing correction.
5. Shut down engine.
6. Restart engine and **Scan** in BUDS2.
7. Recheck timing to ensure ignition timing adjustment was properly stored in the ECM.
8. Increase engine RPM past 4000 RPM to ascertain the **Freeze Timing** function is no longer active.

NOTE: The **Freeze Timing** function automatically disengages when the engine is stopped.

9. Remove all tools.

MAINTENANCE

For maintenance, including replacing spark plugs, refer to *PERIODIC MAINTENANCE PROCEDURES*.

TROUBLESHOOTING

IGNITION SYSTEM TESTING SEQUENCE

NOTE: It is good practice to check for fault codes using the B.U.D.S. software as a first troubleshooting step. Refer to the *DIAGNOSTIC AND FAULT CODES* subsection.

In the case of ignition problems, check the following in the prescribed order until the problem can be solved:

1. Spark plugs
2. Spark plug cables
3. Wiring harness/electrical connectors
4. Emergency engine stop switch
5. Ignition cut-off switch
6. Ignition coil(s)
7. CPS
8. ECM (Engine Control Module).

If engine idles roughly or shows signs of increased emissions, the spark plugs may be incorrectly indexed. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

PROCEDURES

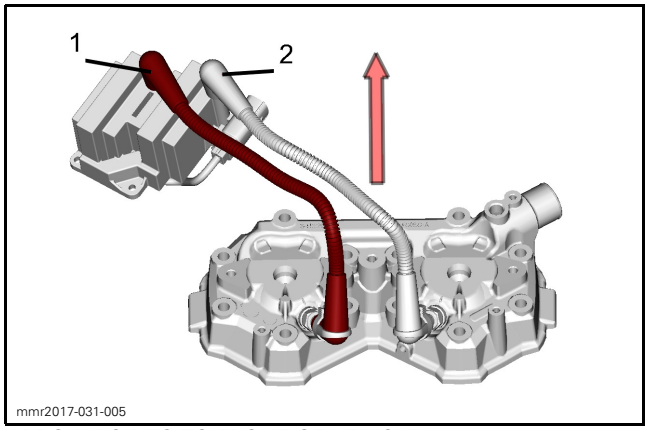
SPARK PLUGS

For spark plug type, refer to *TECHNICAL SPECIFICATIONS*.

For procedure to replace spark plugs, refer to *PERIODIC MAINTENANCE PROCEDURES.*

SPARK PLUG CABLES

NOTICE Do not interchange spark plug cables. The lower LH coil must be matched to the PTO spark plug.



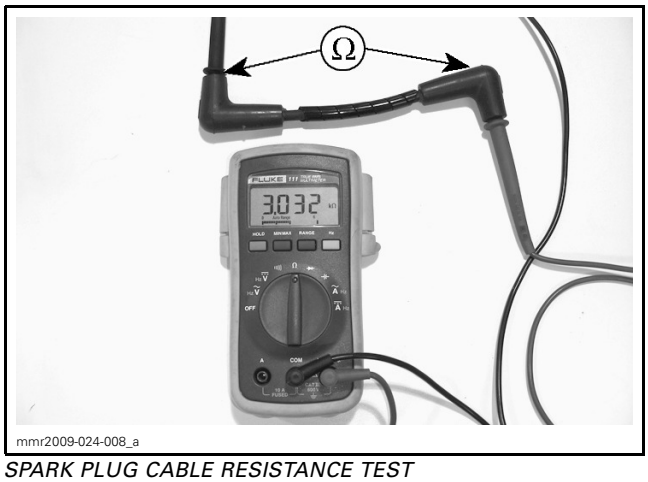
ARROW POINTS TO FRONT OF VEHICLE
1. *PTO side*
2. *MAG side*

Measuring Spark Plug Cable Resistance

If the spark plug cables are in good condition, carry out the following resistance test.

1. Remove each spark plug cable from its ignition coil and spark plug.
2. Insert a probe in each cable end and measure the resistance.

SPARK PLUG CABLE RESISTANCE
2160 – 6870 Ω



SPARK PLUG CABLE RESISTANCE TEST

If resistance is not as specified, replace spark plug cable.

EMERGENCY ENGINE STOP SWITCH

Emergency Engine Stop Switch Operation

The emergency engine stop switch provides a ground signal to the ECM when STOP is selected.

Refer to applicable *WIRING DIAGRAM* for details.

Testing Emergency Engine Stop Switch

1. Disconnect *STR 6P* connector. For connector location, refer to *WIRING HARNESS AND CONNECTORS*.
2. Measure resistance as per following table.

STR 6P CONNECTOR	EMERGENCY ENGINE STOP SWITCH POSITION	SPECIFICATION
Pin 3 to pin 6	RUN	O.L.
	STOP	Continuity

NOTE: If emergency engine stop switch is unplugged, engine will start and run. If emergency engine stop switch is jumped, engine will stop.

IGNITION COILS

Testing for Spark

NOTE: Ensure emergency stop switch is set to *RUN*.

NOTE: Use ONLY an approved inductive spark plug tester or a new spark plug to test for ignition spark. In-line (series connected) spark testers must not be used. Radio frequency interference (RFI) generated by the arcing current may cause erratic behavior in the ECM.

⚠ WARNING

Always electrically disconnect both fuel injectors prior to testing for ignition spark. Otherwise, fuel vapors may ignite in presence of a spark, creating a fire hazard.

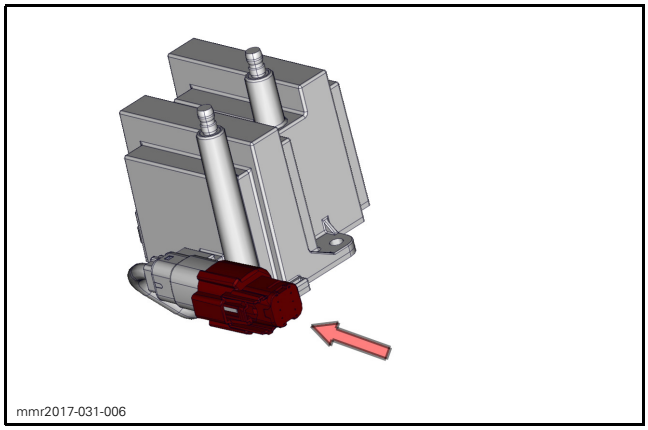
1. Install the inductive spark tester (or a new spark plug) on the spark plug cable **(Do not remove spark plugs installed on engine)**.
2. Activate ignition coil with BUDS2
3. If no spark is produced, test ignition coil.

4. If a spark is produced, install new spark plugs in the engine and repeat the test to assure the new spark plugs are in good condition and functioning correctly.

Testing Ignition Coils

NOTE: Ensure emergency stop switch is set to *RUN*.

1. Backprobe the ignition coil connector and measure voltage as per following table.


mmr2017-031-006

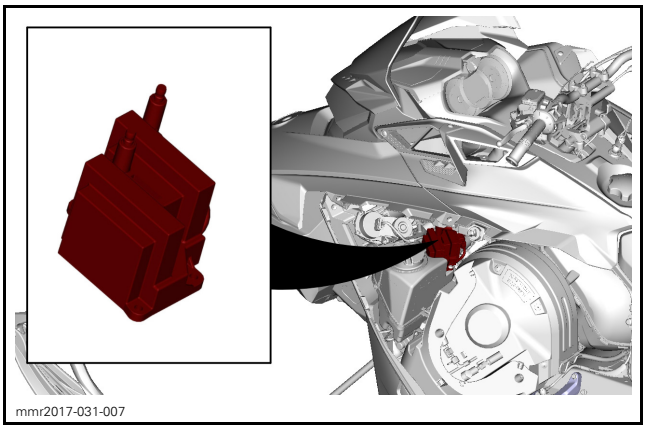
2. Use BUDS2 to activate ignition coil and measure the control signal.

IGNITION COIL CONNECTOR	DESCRIPTION	SPECIFICATION
Pin 1	Ground	Battery ground
Pin 2	Control MAG	Vary when activated 0.015V-0.222V[1]
Pin 3	55 Volts	40V engine off 55V engine running
Pin 4	Ground	Battery ground
Pin 5	Control PTO	Vary when activated 0.015V-0.222V[1]
Pin 6	55 Volts	40V engine off 55V engine running

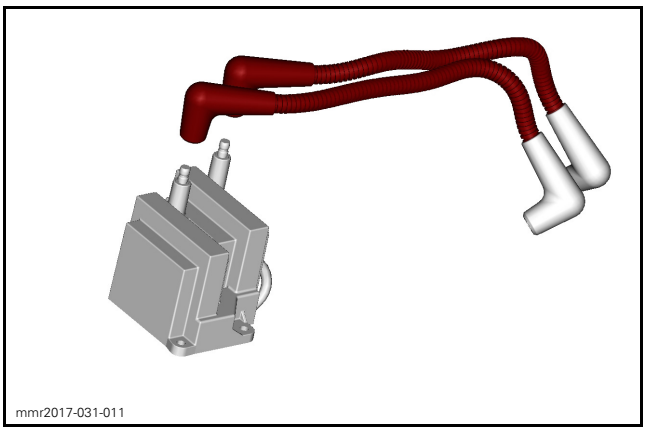
[1] Control signal actually varies between 13 - 15 volts for 800 micro-seconds (DWELL time) but most multimeters cannot read it, it happens so fast.

3. If all inputs are as per specifications and there is no spark, replace ignition coil.
4. If a pin does not test as per specification, troubleshoot the affected wire continuity to ground or ECM. Refer to *WIRING DIAGRAM*.

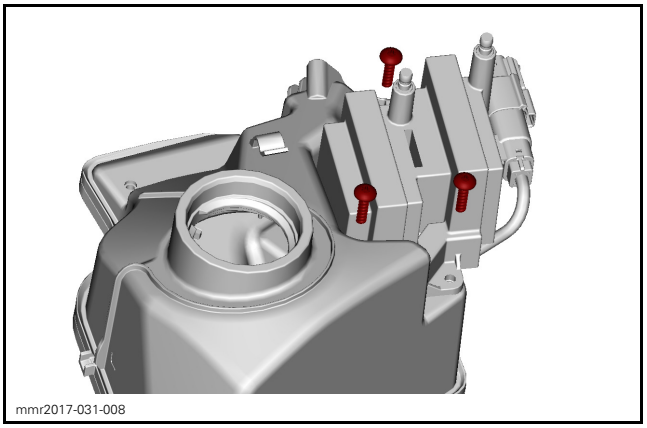
Removing Ignition Coil


mmr2017-031-007

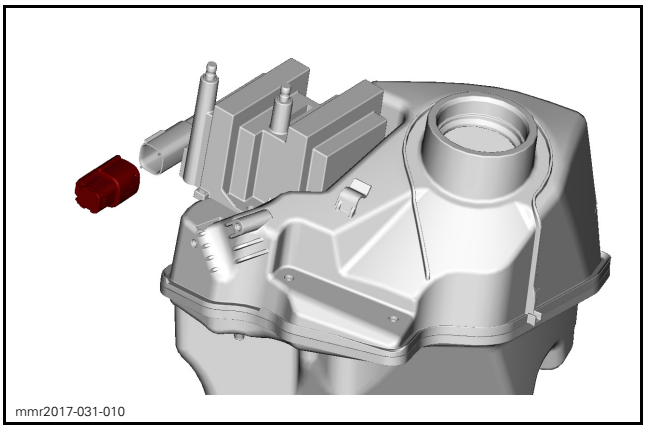
1. Remove the left hand side panel.
2. Note position of spark plug cables and remove them from the spark plugs.


mmr2017-031-011

3. Remove retaining screws.


mmr2017-031-008

4. Unplug ignition coil connector.


mmr2017-031-010

5. Remove ignition coil.

Installing Ignition Coil

Reverse the removal procedures but pay attention to the following:

TIGHTENING TORQUE	
Ignition coil retaining screws	2.4 N•m ± 0.2 N•m (21 lbf•**in** ± 2 lbf•**in**)

CHARGING SYSTEM

SERVICE TOOLS

Description	Part Number	Page
12 V BATTERY SUPPLY CABLE	529 035 997	4
FLUKE 115 MULTIMETER	529 035 868	5, 7
POWER INTERFACE	515 177 223	4

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
NAPA ULTRA PRO BATTERY LOAD TESTER	95260	3

GENERAL

⚠ WARNING

Unless otherwise specified, always disconnect the magneto connector and ensure spark plugs are installed on the engine before carrying out electrical system checks. Should the engine be made to rotate with magneto connected, a spark may occur resulting in electrical shock, a fire, or an explosion.

SYSTEM DESCRIPTION

12V System Capacity

12V SYSTEM CAPACITY	
Over 2000 RPM	30 A
1200 RPM (Idle)	25 A

Magneto

A magneto provides the primary source of electrical energy. It transforms a magnetic field into an alternating current (AC).

The magneto stator is wired with a 3 phase star configuration winding.

AC current is rectified and regulated by a voltage regulator/rectifier circuit within the ECM to provide 55 volts for engine component operation. It is then converted into 14.5 volts by a DC to DC converter for vehicle operation.

TROUBLESHOOTING

NOTE: It is good practice to check for fault codes using B.U.D.S. as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES*.

TROUBLESHOOTING GUIDELINES

Low or No System Voltage (Engine May Not Start)

The vehicle cannot start without having a minimum voltage to the 55 V power circuit. If the engine does not start, see *VOLTAGE REGULATOR/RECTIFIER* in this subsection and test the Vdc Output using BUDS2

If voltage is not as specified, check the following items in the recommended order until you find the fault:

– Stator (refer to *MAGNETO* subsection)
– Capacitor (see procedure in this subsection).

NOTE: The 55 Vdc may be unstable or unobtainable if the capacitor is faulty, not connected, or incorrectly connected.

If the above mentioned checks were good, isolate each of the following components by disconnecting them individually, and repeating the voltage test after each one.

– Each injector
– Each ignition coil
– Fuel pump
– Oil injection pump.

NOTE: When the 55 Vdc test good after a component is disconnected, replace that component and repeat the test.

PROCEDURES

Ensure battery is fully charged (if applicable).

Refer to *WIRING HARNESS AND CONNECTORS* subsection for harness layout and connector locations on vehicle.

Refer to appropriate *WIRING DIAGRAM* for additional information.

The magneto is covered in *MAGNETO AND STARTER* subsection.

⚠ WARNING

Ensure vehicle cannot move when performing charging system tests with the engine running.

BATTERY

Charging Battery

Initial Charging

Sealed VRLA batteries require an initial charge before being used in the vehicle.

NOTE: Since batteries state of charge need to be checked 3 months after their manufacturing date or their last charge, it is highly recommended to check the batteries of all newly arrived vehicles. Consult the "Identification of reminder sticker" section and battery chart on last page.

If you are using a constant current charger, refer to the standard (STD) charging method printed on the battery.

For YTX20HL batteries (18.9 AH), the initial charge must be 1.8 A for 5 - 10 hours.

YTX20HL CHARGING METHOD

If you are using an automatic type taper charger, check to make sure that the charger current (amps) is equal to or greater than the standard charging method listed on the battery.

If the battery gets very hot to the touch, cease charging and allow battery to cool down for 6 to 12 hours. Check voltage using a voltmeter. A fully charged, battery should be 12.8 volts or higher after the battery has been off the charger 1-2 hours. If less, it needs additional charge.

Routine Charging

NOTICE **Overcharging can harm the battery beyond recovery.**

The single most important thing to maintaining a VRLA battery is to not let it sit discharged: keep it fully charged for peak performance.

Use the following guidelines for charging. Always verify battery state of charge before charging, and 30 minutes after charging.

It is not recommended to overcharge sealed VRLA batteries. Because of their characteristics, too much charging will decrease the volume of electrolyte. The longer the overcharge time, the greater the drop in electrolyte – and starting power.

Refer to the following tables for charging routine.

Note that charging times can vary depending on type of charger. Follow the manufacturer's instructions for details.

STATE OF CHARGE : 100%		
VOLTAGE	ACTION	CHARGE TIME
12.8 – 13.0	Check in 3 months or when vehicle is sold***	None required
*** Identify battery as being checked on "date" or needs to be rechecked at "date"		

STATE OF CHARGE : 75% - 100%		
VOLTAGE	ACTION	CHARGE TIME *
12.5 – 12.8	May need slight charge. If no charge given, check in 3 months or when vehicle is sold***	3 – 6 hours
* Using a constant current charger at standard amps specified on the battery		
*** Identify battery as being checked on "date" or needs to be rechecked at "date"		

STATE OF CHARGE : 50% - 75%		
VOLTAGE	ACTION	CHARGE TIME *
12.0 – 12.5	Need charge. Check in 3 months or when vehicle is sold***	5 – 11 hours
* Using a constant current charger at standard amps specified on the battery		
*** Identify battery as being checked on "date" or needs to be rechecked at "date"		

STATE OF CHARGE : 25% - 50%		
VOLTAGE	ACTION	CHARGE TIME *
11.5 – 12.0	Need charge. Check in 3 months or when vehicle is sold***	At least 13 hours verify state of charge
* Using a constant current charger at standard amps specified on the battery		
*** Identify battery as being checked on "date" or needs to be rechecked at "date"		

STATE OF CHARGE : 0% - 25%		
VOLTAGE	ACTION	CHARGE TIME *
11.5 or less (see instructions below)	Need charge. Check in 3 months or when vehicle is sold***	20 hours
* Using a constant current charger at standard amps specified on the battery		
*** Identify battery as being checked on "date" or needs to be rechecked at "date"		

Charging for Voltage of 11.5 V or Less

Batteries with voltage below 11.5 V may require special equipment and procedures to recharge.

In charging an over discharged battery having a terminal voltage of 11.5 V or lower, its internal resistance may be too high to charge at a normal charge voltage.

Therefore, it may be necessary to raise the voltage of the battery initially (20 V as a maximum), and charge for approximately 5 minutes. If the ammeter shows no change in current after 5 minutes, you need a new battery.

Current flowing into the battery at high voltage can become excessive. Monitor amperage and adjust voltage as necessary to keep current at the battery's standard amp rating. Charge for approximately 20 hours.

Testing Battery

Battery Load Test

1. Connect a battery load tester such as the NAPA ULTRA PRO BATTERY LOAD TESTER (P/N 95260).
2. Ensure proper test conditions.

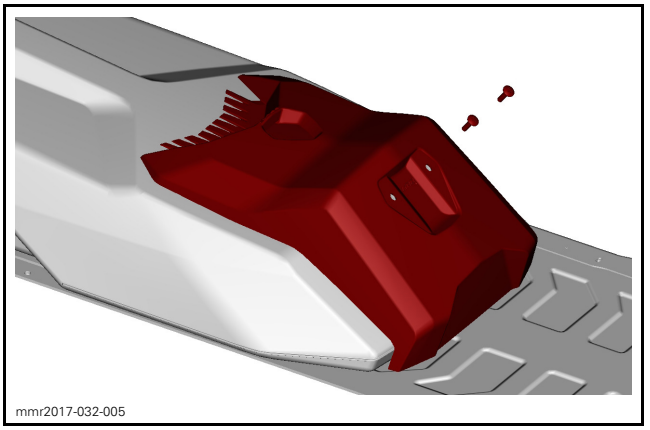
TEST CONDITIONS	
Initial battery voltage‡	Above 12.5 Vdc
Engine	OFF
Load	3 times the amp-hour (AH) rating
Time	15 seconds
‡ Required for accurate testing	

SPECIFICATION	
Battery	Above 9.6 Vdc

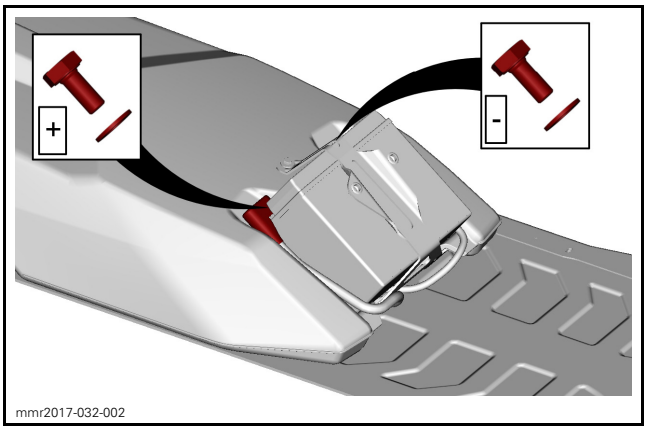
If battery voltage drops below specification during test, replace battery and test charging system.

Removing Battery

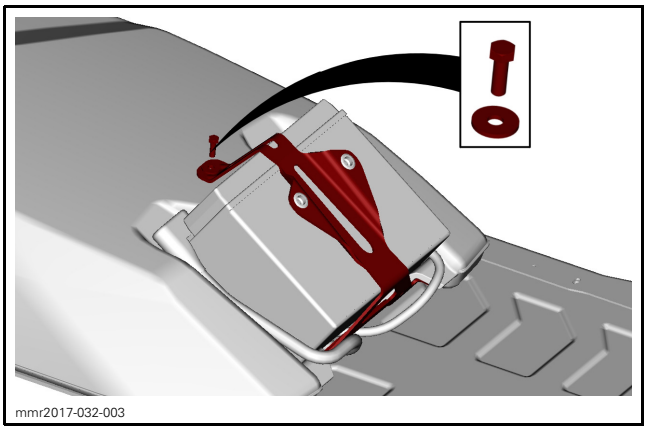
1. Remove seat.
2. Remove battery cover.



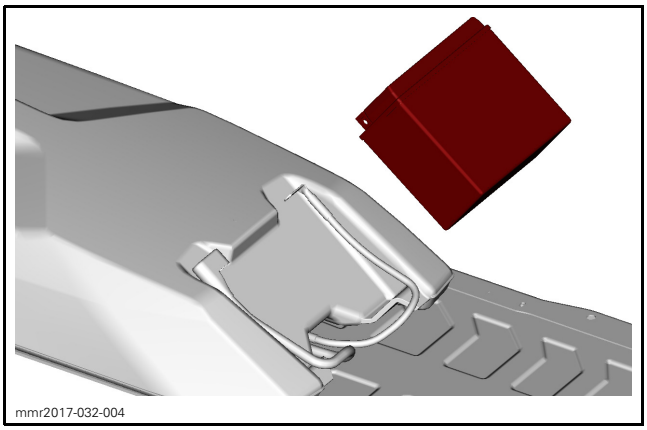
3. Disconnect negative before positive terminal.



4. Remove battery hold down bracket.


mmr2017-032-003

5. Remove battery.


mmr2017-032-004

Installing Battery

TIGHTENING TORQUE	
Battery terminals (positive and negative)	10 N•m ± 2 N•m (89 lbf•**in** ± 18 lbf•**in**)
Battery hold down bracket	5 N•m ± 0.5 N•m (44 lbf•**in** ± 4 lbf•**in**)
Battery cover retaining screws	7 N•m ± 1 N•m (62 lbf•**in** ± 9 lbf•**in**)

VOLTAGE REGULATOR/ RECTIFIER

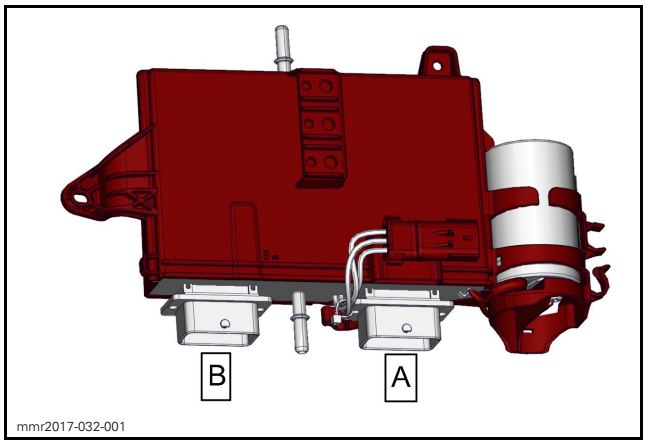
Description

The voltage regulator/rectifier is integrated within the ECM. It receives alternating current (AC) from the magneto which it rectifies and regulates to 55 Vdc.

On a single pull start with the engine between 250 and 500 RPM, the magneto, is capable of producing 30-40 Vdc.

55 Vdc Output

ECMB CONNECTOR
pins M1, M2, M4



mmr2017-032-001

Testing Continuity (Voltage Regulator/Rectifier)

Due to internal circuitry, there is no static test available to check continuity.

Testing 55 Vdc Voltage Output with B.U.D.S. (Voltage Regulator/Rectifier)

1. Raise vehicle so that the track is off the ground and can turn freely.

⚠ WARNING

Ensure vehicle track is completely raised off ground. If the track should come into contact with the ground when the engine is at 5000 RPM, equipment damage and severe injury may result.

2. Remove RH side panel, refer to *BODY* subsection.

Procedure When Engine Cannot be Started

1. Install the following tools to supply power to the 12 Vdc circuits for this test. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection for proper connections.
   - POWER INTERFACE (P/N 515 177 223)
   - 12 V BATTERY SUPPLY CABLE (P/N 529 035 997)
   - 12 volts battery.
2. Select the **Measurements** page.
3. Read the voltage on the **55V System Circuit** meter in B.U.D.S. as the engine is turning over.

55 VDC VOLTAGE OUTPUT TEST	
TEST ENGINE SPEED	VOLTAGE
Pull start (engine not running)	At least 30 Vdc

If you cannot obtain the specified voltage, refer to *TROUBLESHOOTING* in this subsection and carry out the required tests.

Also carry *TESTING VOLTAGE REGULATOR/RECTIFIER GROUND CIRCUIT* in this subsection.

Procedure with Engine Running

1. Connect vehicle to the applicable B.U.D.S. software version, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Start engine.
3. Select the **Measurements** page.
4. Read the voltage on the **55 V System Circuit** meter in B.U.D.S.

55 VDC VOLTAGE OUTPUT TEST (ENGINE RUNNING)	
TEST ENGINE SPEED	VOLTAGE
Any RPM from idle and above	55 Vdc ± 2

If voltage is below or above specification, refer to *TROUBLESHOOTING* in this subsection and carry out the required tests.

Also test the ECM ground circuit.

Testing ECM Ground Circuit

1. Disconnect the ECMA connector.
2. Test ground circuit continuity as follows.

ECM GROUND CIRCUIT		
Black wire of capacitor	ECMA Connector Pins L3, L4, M3, M4	Continuity
Black wire of capacitor	Chassis ground	Continuity

DC-DC CONVERTER

System voltage (12 Vdc) is explained in *POWER DISTRIBUTION AND GROUNDS* subsection.

12 Vdc Output Voltage Tests (DC-DC Converter)

12 VDC OUTPUT VOLTAGE	
OUTPUT	CONNECTOR - -PIN
Primary 12 Vdc	COM - 6
Secondary 12 Vdc	COM - 5

Testing Primary 12 Vdc Circuit with B.U.D.S.

1. Start engine.
2. Turn off any accessories.
3. Disconnect any external batteries.
4. Select the **Measurements** page.
5. Read the voltage on the **Primary 12 V Circuit** meter in B.U.D.S.

PRIMARY 12 VDC CIRCUIT TEST WITH B.U.D.S.	
TEST ENGINE SPEED	VOLTAGE
Any RPM from idle and above	14.5 ± 0.5 Vdc

If voltage is above specification, replace ECM.

If voltage is below specification, check the *PRIMARY 12 VDC CIRCUIT*

Also test the ECM ground circuit (voltage regulator/rectifier).

Install all removed parts and connectors.

Secondary 12 Vdc Circuit Test

The secondary 12 Vdc system is not monitored in B.U.D.S.

To test it, carry out the following procedure.

1. Remove RH side panel to expose the fuse(s). Refer to *BODY*.
2. Set FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc scale.
3. Start the engine.
4. Unplug battery (if applicable)
5. Probe the COM connector as follows.

12 VDC OUTPUT VOLTAGE	
OUTPUT	CONNECTOR - -PIN
Secondary 12 Vdc	COM - 5

SECONDARY 12 VDC CIRCUIT TEST	
TEST ENGINE SPEED	VOLTAGE
Any RPM from idle and above	14.5 ± 0.5 Vdc

If voltage cannot be measured, test continuity of wire from COM-5 to ECMB pins L1, L2, and L3.

If the wire continuity is good and other voltages from ECM tested good, ECM may not output secondary 12 Vdc.

Test the *VOLTAGE REGULATOR/RECTIFIER GROUND CIRCUIT*. If the ground circuit tests good, the ECM will need to be replaced.

NOTE: Before replacing ECM, all ECM grounds, power output circuits, and input circuits from the magneto must be tested.

Repair or replace as applicable.

CAPACITOR

The fuel injectors, which require a stable 55 Vdc for their operation, are particularly sensitive to voltage variations. A capacitor is connected to the 55 Vdc electrical system to stabilize the system voltage.

The capacitor is located next to the ECM on the RH side of the vehicle.

Quick Troubleshooting

A faulty capacitor will lead to the following symptoms:

– Unstable, low, or no system voltage (55 V).
– Engine will not start
– Engine hard to start
– Poor idling
– Engine misfiring.

NOTE: A defective capacitor is likely to give off a burning like odor.

Discharging Capacitor

⚠ WARNING

The capacitor remains charged approximately 10 seconds after engine is stopped. A high energy could suddenly be discharged if capacitor terminals were shorted. Always discharge capacitor before servicing.

To properly discharge capacitor, leave it connected for at least 5 minutes after engine has been stopped, or after engine was last cranked before carrying out any maintenance procedure on the capacitor or 55 volt electrical system.

Testing Capacitor Charge Hold

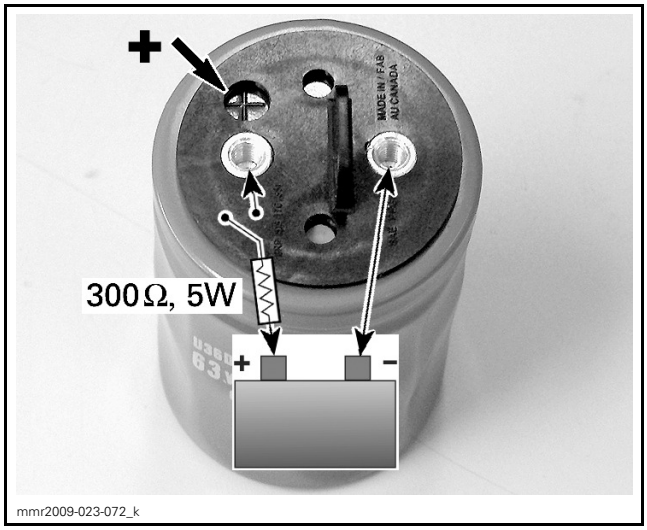
Procedure Setup

1. Remove capacitor from vehicle. Refer to *REMOVING CAPACITOR* in this subsection
2. Work on a non metallic workbench.
3. Connect the following items to the capacitor. See following illustration.
   – A switch
   – Resistor (300 Ω/5 W)
   – 12 V battery (fully charged).

NOTICE **Ensure the test switch is in the OFF position when connecting the battery to the capacitor to prevent sparking or electrical shock.**

⚠ WARNING

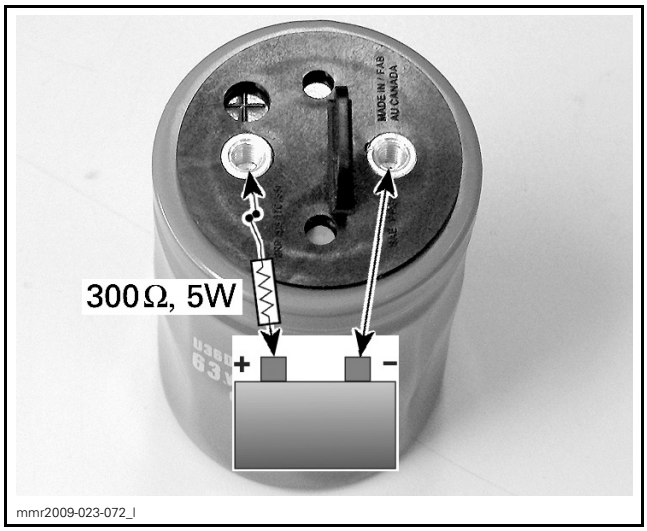
Connect the battery POSITIVE post to the capacitor POSITIVE terminal.



SWITCH AT OFF

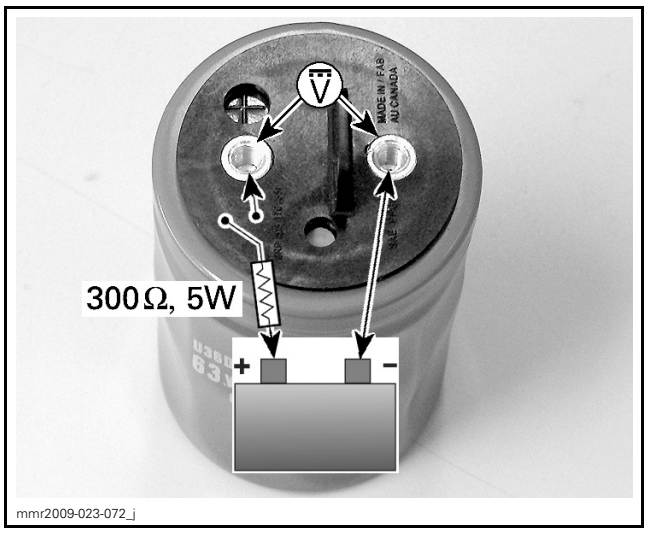
Test Procedure

1. Turn switch to **ON** and read capacitor voltage. Wait until voltage reaches 12 V.



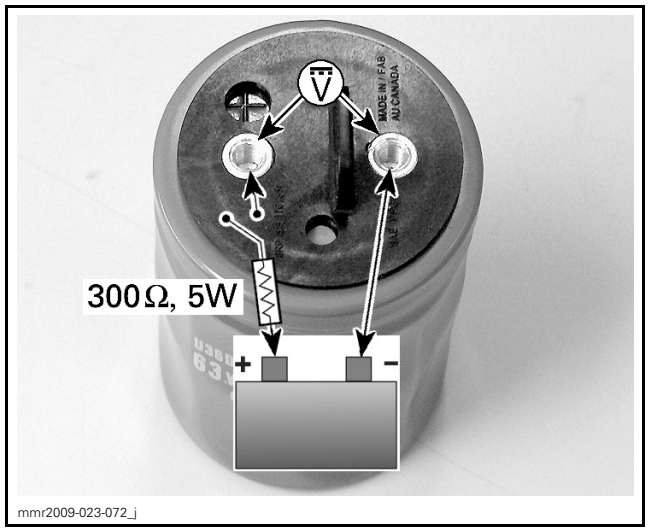
SWITCH AT ON

2. Turn test switch to **OFF**.
3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) set to Vdc.
4. Read capacitor voltage.



SWITCH AT OFF

5. Wait 5 minutes.
6. Read capacitor voltage again.



SWITCH AT OFF

7. The difference between the readings should not exceed the specification.

ALLOWED VOLTAGE DIFFERENCE BETWEEN READINGS
0.5 Vdc

If readings are out of specification, replace capacitor.

Reinstall capacitor. Refer to *INSTALLING CAPACITOR* in this subsection.

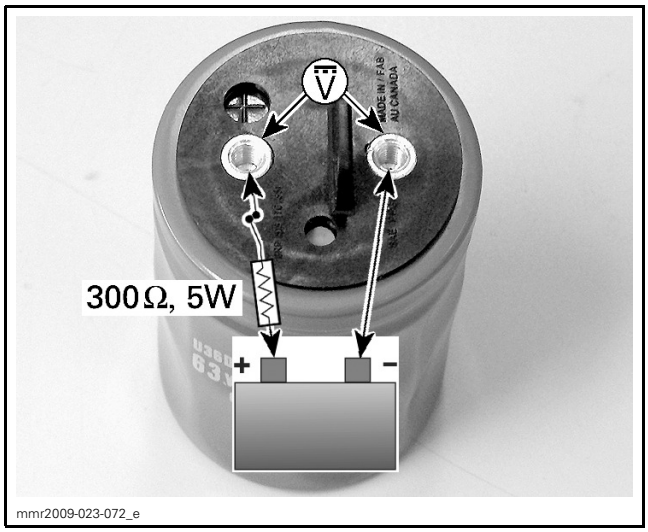
Testing Capacitor Residual Voltage

Procedure Setup

Follow the same steps as described in Procedure Setup of *TESTING CAPACITOR CHARGE HOLD*.

Test Procedure

1. Turn switch to **ON** and read capacitor voltage. Wait until voltage reaches 12 V to ensure the capacitor is fully charged.

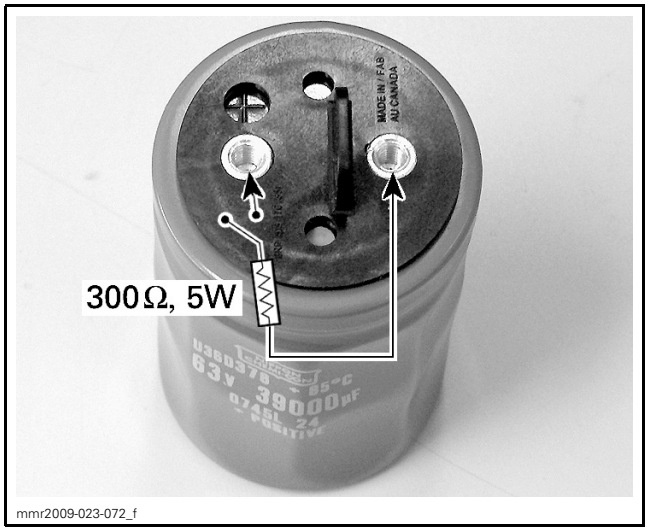


2. Turn test switch to OFF.

NOTE: Carry out the following steps **within one minute** to ensure the capacitor does not begin to discharge before the test.

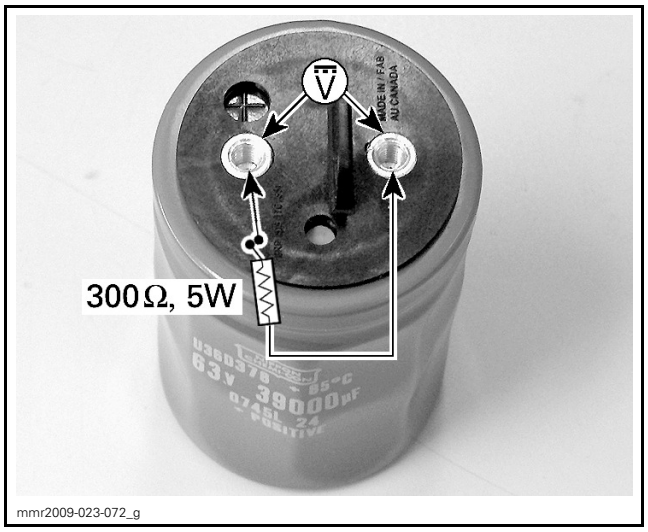
3. Remove battery from circuit and connect the resistor and switch across capacitor terminals.

NOTICE **Ensure test switch is in the OFF position during the circuit configuration change.**



SWITCH AT OFF

4. Turn test switch to the ON position for 12 seconds ± 1 second to slowly discharge capacitor.
5. Read capacitor voltage.



SWITCH AT ON

CAPACITOR RESIDUAL VOLTAGE
Must be above 2.6 Vdc

If voltage is out of specification, replace capacitor.

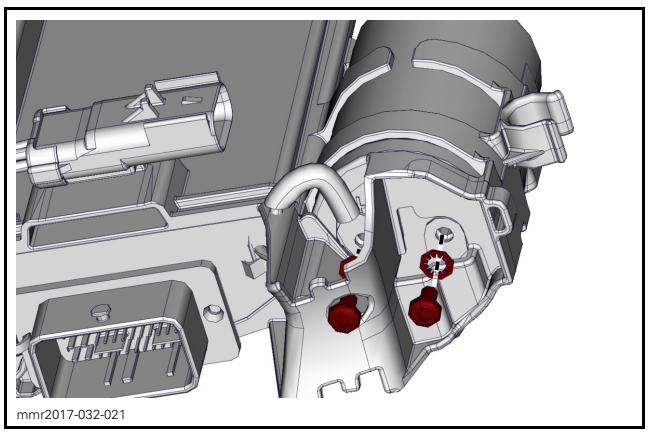
Removing Capacitor

1. Remove upper body module. Refer to *BODY* subsection.
2. Disconnect magneto connector.
3. Remove muffler.

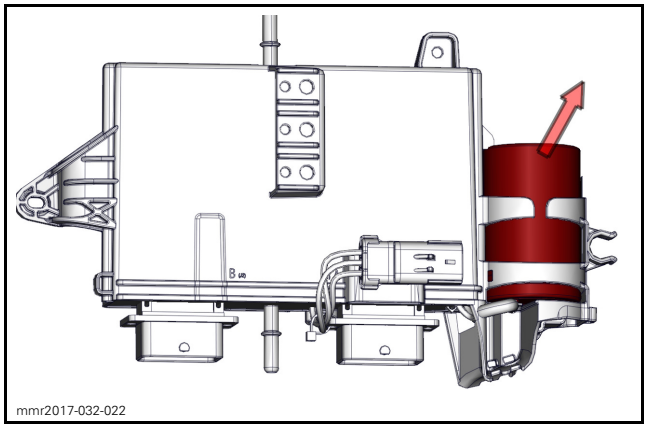
⚠ WARNING

Disconnect the magneto connector. Should the engine be made to rotate with magneto connected, a spark may occur resulting in electrical shock, a fire or an explosion.

4. Ensure capacitor remains connected for at least 1 minute after engine shut down, or after engine was last cranked. This ensures capacitor is fully discharged.
5. Disconnect wire terminals from capacitor.



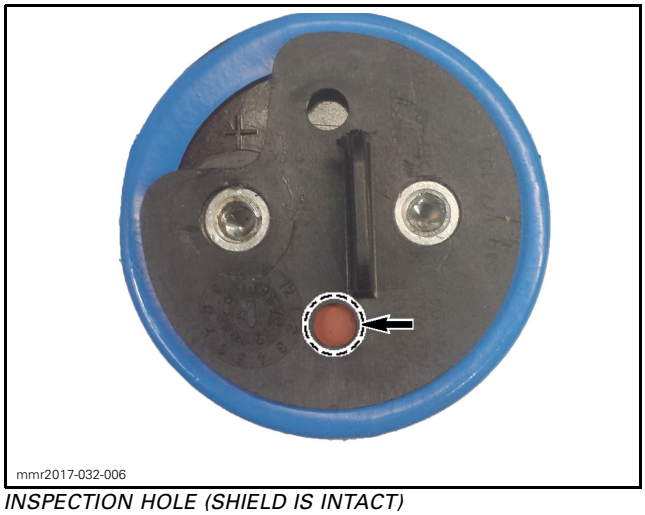
6. Remove capacitor from bracket.


mmr2017-032-022

⚠ WARNING

Do not remove plastic protector from top of capacitor unless the capacitor is to be replaced. The cover prevents the two capacitor contacts from being easily shorted together which may cause a spark, possibly resulting in a fire.

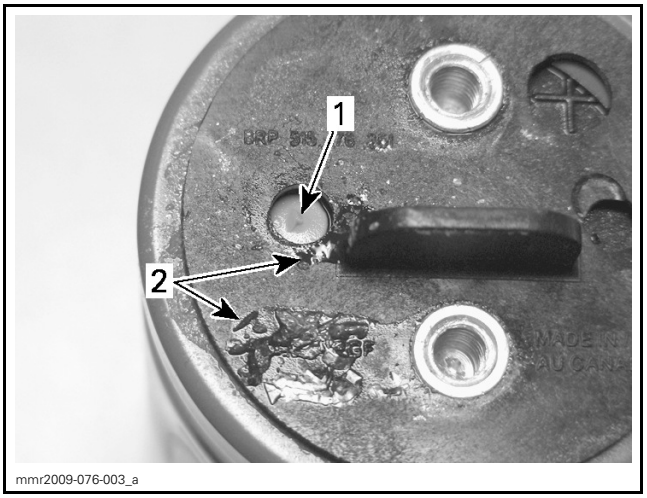
7. Check inspection hole on top of capacitor.


mmr2017-032-006

INSPECTION HOLE (SHIELD IS INTACT)

If the top shield is open (pierced), replace capacitor.

NOTE: The following illustration shows a perforated shield with capacitor fluid leakage. This capacitor was connected in reverse polarity.

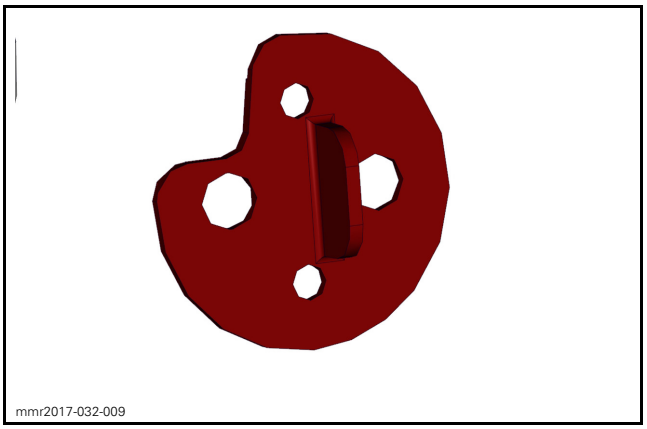


mmr2009-076-003_a

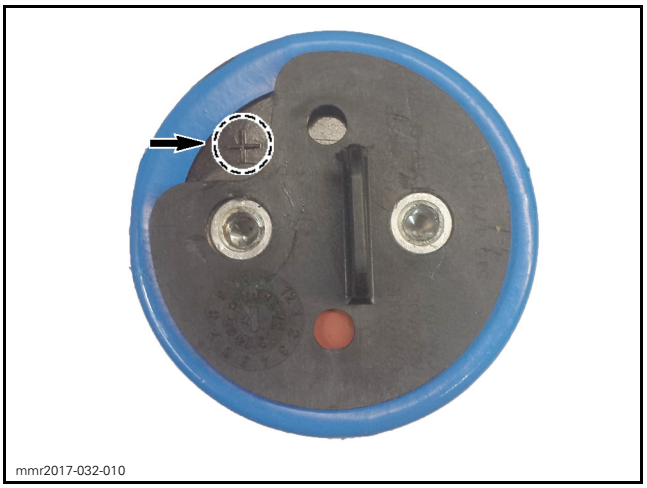
1. Perforated shield
2. Capacitor fluid leakage

Installing Capacitor

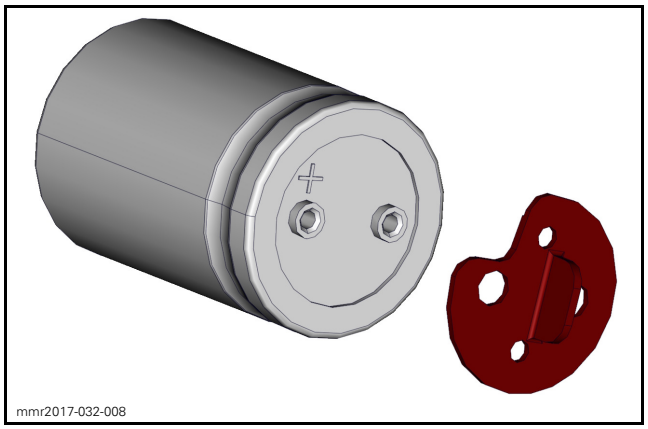
1. If capacitor was replaced, install a plastic protector cap on new capacitor.


mmr2017-032-009

NOTE: When reinstalling plastic protector, ensure the **+** sign on top of capacitor is visible through the hole in protector.

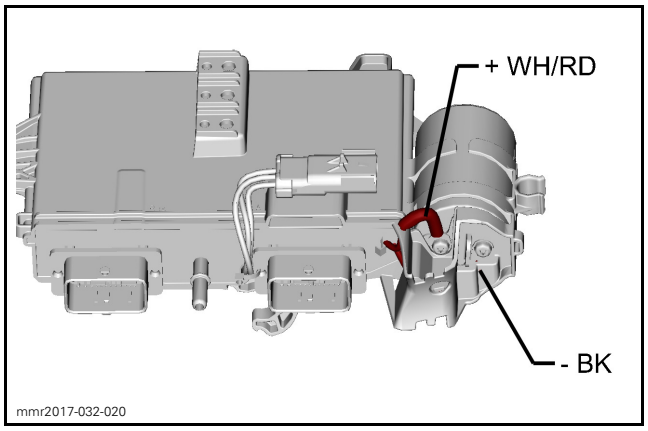

mmr2017-032-010

Otherwise, pull off protector, rotate it one half turn, then reinstall it.



2. Route capacitor wires as per illustration and connect wire terminals to capacitor. Connect the WH/RD wire to the **+** terminal.

NOTICE Improper polarity could destroy the capacitor while in operation.



NOTICE Be careful not to damage threads when tightening capacitor screws.

3. Torque screws to 2 N•m (18 lbf•**in**).
4. Complete assembly of remaining parts in the reverse order of removal.

STARTING SYSTEM

SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	3–4
FLUKE 115 MULTIMETER	529 035 868	3

SERVICE PRODUCTS

Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	5

GENERAL

STARTING SYSTEM BASICS (WITHOUT BATTERY)

Conditions for Engine Starting

– Emergency engine stop switch set to RUN;
– D.E.S.S. key on the D.E.S.S. post.

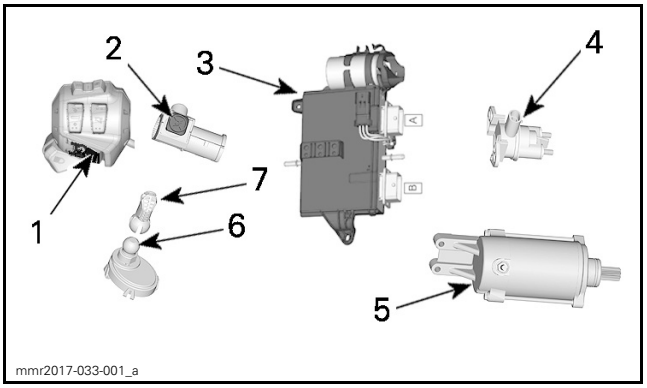
Starting System Operation

Refer to *REWIND STARTER* subsection for starting system operation.

STARTING SYSTEM BASICS (WITH BATTERY)

Basic Starting System Operation (With Battery)

When the START button is pressed, 12 Vdc is applied to the ECM. The ECM activates the internal ECM relay which provides 12 volts to one end of the coil of the starter solenoid. If the engine cranking conditions are met, the ECM completes the starter solenoid control circuit by providing a ground.



1. Start/RER button
2. Emergency engine stop switch
3. ECM
4. Starter solenoid
5. Starter
6. D.E.S.S. post
7. D.E.S.S. key

Engine Cranking Conditions

The following conditions must be met to allow engine cranking:

1. Emergency engine stop switch set to RUN.
2. D.E.S.S. key on the D.E.S.S. post.
3. START button pressed and held.

Starting System Logic

If the START button is activated while the throttle lever is depressed more than 60%, the engine will crank but will not start (engine drowned mode).

If the START button is held after engine has started, the ECM automatically stops the starter if engine speed reaches at least 1400 RPM.

TROUBLESHOOTING (WITH BATTERY)

DIAGNOSTIC TIPS

NOTE: It is a good practice to check for fault codes using B.U.D.S. as a first troubleshooting step. Refer to *DIAGNOSTIC SYSTEM AND FAULT CODES* subsection.

Starting system failures are not necessarily related to the starter but may be due to one the following:

– Crankshaft position sensor (CPS)
– Starter solenoid fuse and start fuse
– Battery, refer to *CHARGING SYSTEM*
– START/RER button
– Starter solenoid
– Emergency engine cut-off switch
– ECM
– Wiring/connections.

Check these components before removing the starter.

NOTE: This subsection assumes the problem is related to an electrical component of the starting system. If the starting system tests good, ensure engine is in good condition. Refer to applicable subsection.

DIAGNOSTIC GUIDELINES

NOTHING HAPPENS WHEN START/RER BUTTON PRESSED

1. Battery not connected
   - *Connect battery.*
2. Burnt fuse
   - *Check fuses*
3. Defective internal ECM relay or related circuits
   - *Test power and ground circuits to starter solenoid.*
4. Defective START/RER switch
   - *Test START/RER switch, wiring and connections.*

ENGINE DOES NOT CRANK

1. Discharged battery
   - *Recharge and test. Refer to CHARGING SYSTEM subsection.*
2. Battery connections
   - *Check/clean/tighten.*
3. Poor/bad or corroded ground contacts (engine, battery ground cable, starter etc.)
   - *Check/clean/repair, refer to POWER DISTRIBUTION AND GROUNDS subsection.*
4. Starter solenoid
   - *Test solenoid, wiring and connections.*
5. Damaged starter or ground cables
   - *Carry out SOLENOID DYNAMIC TEST.*
6. No ground provided by ECM to starter solenoid
   - *Refer to CONTINUITY TEST OF START/RER SWITCH CONTROL CIRCUIT in this subsection.*
7. Engine cannot be rotated (possibly seized)
   - *Refer to ENGINE subsection.*

ENGINE CRANKS SLOWLY

1. Loose, corroded or dirty battery cable connections
   - *Check/clean/tighten.*
2. Discharged/weak battery
   - *Recharge and test. Refer to CHARGING SYSTEM subsection.*
3. Low voltage from starter solenoid
   - *Carry out a SOLENOID DYNAMIC TEST.*
4. Damaged starter or ground cables
   - *Carry out SOLENOID DYNAMIC TEST.*

STARTER TURNS, BUT STARTER DRIVE DOES NOT MESH WITH RING GEAR

1. Worn starter drive gear/starter gear/ring gear
   - *Replace worn parts. Refer to MAGNETO AND STARTER subsection.*
2. Defective drive
   - *Replace starter drive. Refer to MAGNETO AND STARTER subsection.*

STARTER KEEPS RUNNING

1. Sticking solenoid contacts
   - *Replace solenoid.*
2. Sticking or defective starter drive
   - *Lubricate or replace. Refer to MAGNETO AND STARTER.*

PROCEDURES (WITH BATTERY)

REQUIRED TOOLS	
FLUKE 115 MULTIMETER (P/N 529 035 868)	
ECM ADAPTER TOOL (P/N 529 036 166)	

⚠ WARNING

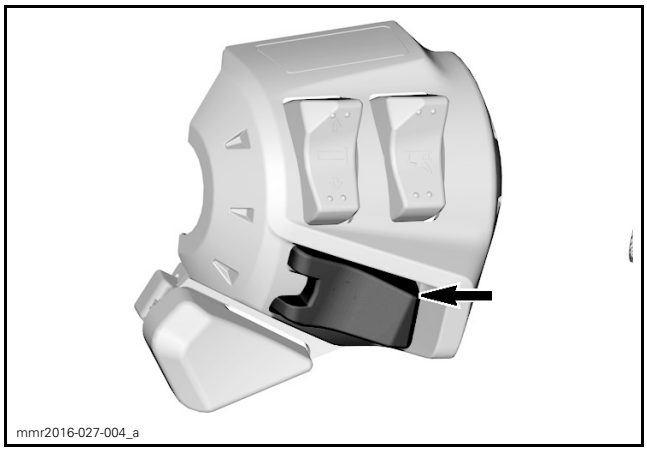
Ensure vehicle cannot move when performing starting system tests.

START/RER SWITCH

Pressing the start/RER switch sends a start signal (battery voltage) to the ECM. If the *ENGINE CRANKING CONDITIONS* are met, the ECM will ground the starter solenoid.

In B.U.D.S., select the **Measurements** page and press the start/RER button to see if the ECM receives the start signal.

START/RER Switch Continuity Test



1. Disconnect the steering connector SH2. Refer to *WIRING HARNESS AND CONNECTORS* subsection.
2. Measure resistance through switch as per following table.

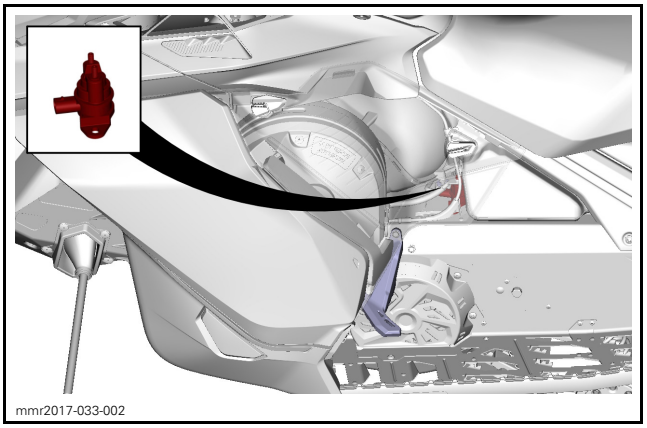
CONTINUITY TEST OF START/RER SWITCH CIRCUIT		
SWITCH POSITION	SH	RESISTANCE
Released	Pins 1 and 2	Close to 0 Ω
Pressed and held	Pins 2 and 8	Close to 0 Ω

If the switch does not test as specified, replace the START/RER switch.

If the switch tests as specified, check for an open circuit in harness.

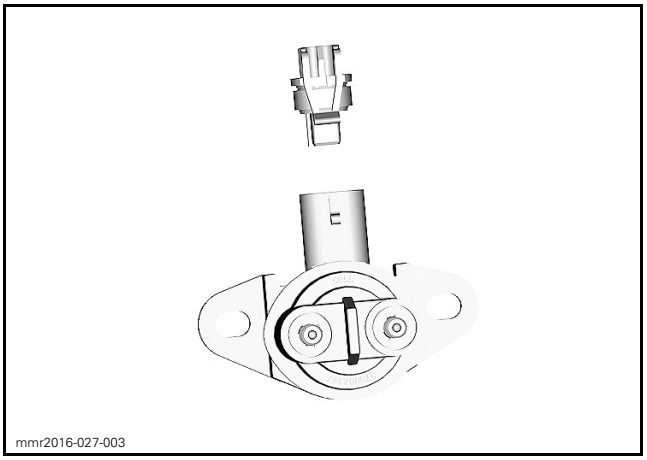
STARTER SOLENOID

Starter Solenoid Location



Testing Solenoid Input Voltage

1. Disconnect solenoid connector.



2. Set the multimeter to Vdc.
3. Install D.E.S.S. key on post.
4. Press the START/RER button to activate ECM.
5. Measure voltage.

SOLENOID INPUT VOLTAGE TEST (SOLENOID COIL)		
TEST PROBES		VOLTAGE READING
Pin A	Battery ground	Battery voltage

If test succeeded, carry out a *SOLENOID CONTROL CIRCUIT TEST*.

If test failed, carry out a *START/RER SWITCH CIRCUIT CONTINUITY TEST*.

Testing Solenoid Control Circuit

1. Set the multimeter to Ω.
2. Disconnect connector "B" from ECM, refer to *WIRING HARNESS AND CONNECTORS* subsection.
3. Install the ECM ADAPTER TOOL (P/N 529 036 166) on ECM harness connector.
4. Test continuity of wiring from solenoid to ECM as per following table.

SOLENOID CONTROL CIRCUIT TEST		
SOLENOID CONNECTOR	ECM CONNECTOR B	RESISTANCE
Pin B	ECMB-A1	Close to 0 Ω (continuity)

If test failed, repair or replace wiring/connectors.

If test succeeded, carry out a *SOLENOID COIL RESISTANCE TEST*.

Testing Solenoid Coil Resistance

1. Set multimeter to Ω.
2. Disconnect solenoid connector.
3. Measure solenoid coil resistance as per following table.

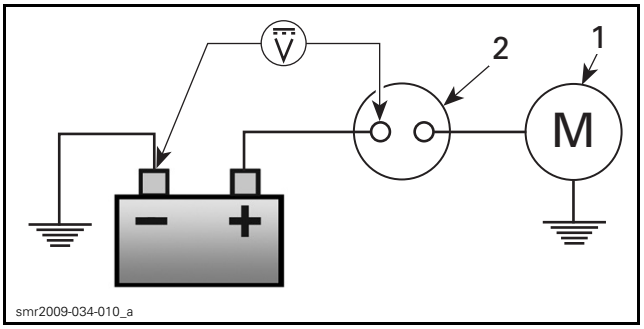
SOLENOID COIL RESISTANCE TEST		
SOLENOID CONNECTOR		RESISTANCE
Pin A	Pin B	4.5 to 5.5 Ω

If test fails, replace solenoid.

Testing Solenoid (Dynamic)

1. Depress the throttle lever to place the ECM in engine drowned mode. Hold throttle lever in place using a rubber band.
2. Set multimeter to Vdc.
3. Crank engine.
4. **As engine is cranking**, measure the voltage as per following tables.

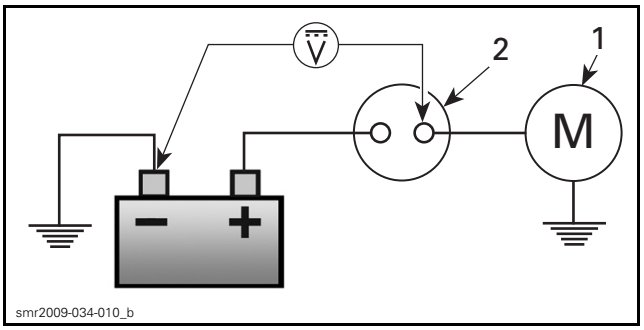
SOLENOID DYNAMIC TEST (ENGINE CRANKING)		
TEST PROBES		SPECIFICATION
Solenoid battery post	Battery ground	Battery voltage



1. Starter motor
2. Starter solenoid

5. If test failed, check battery positive cable (from battery to solenoid).
6. If test succeeded, continue with next step.

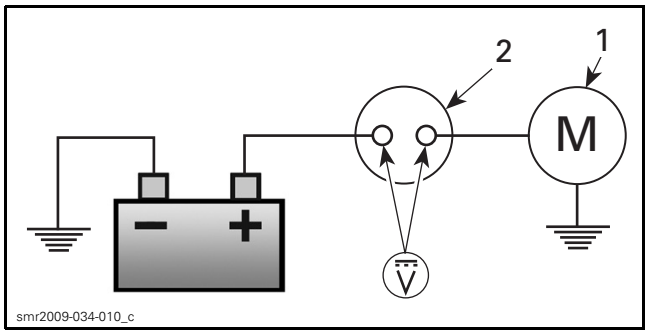
SOLENOID DYNAMIC TEST (ENGINE CRANKING)		
TEST PROBES		SPECIFICATION
Solenoid starter post	Battery ground	Battery voltage



1. Starter motor
2. Starter solenoid

7. If test failed, test *SOLENOID INPUT VOLTAGE*.
8. If test succeeded, continue with next step.

SOLENOID DYNAMIC TEST (ENGINE CRANKING)		
TEST PROBES		SPECIFICATION
Solenoid battery post	Solenoid starter post	0.2 Vdc max.



1. *Starter motor*
2. *Starter solenoid*

If test failed, replace solenoid.

If all solenoid dynamic tests are as specified, replace starter.

9. Remove rubber band from throttle lever.

10. Reinstall removed parts.

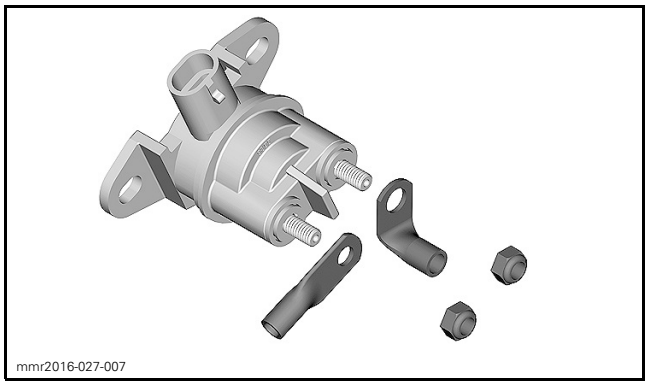
Removing Solenoid

1. Disconnect battery. Refer to *CHARGING SYSTEM* subsection.

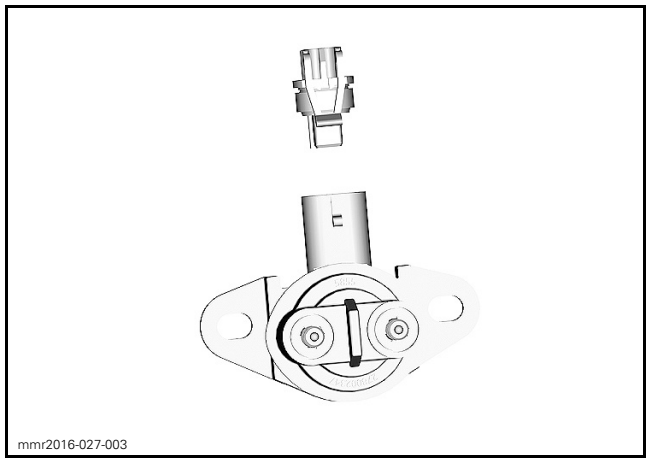
⚠ WARNING

Always disconnect the BLACK (-) battery cable first and reconnect last.

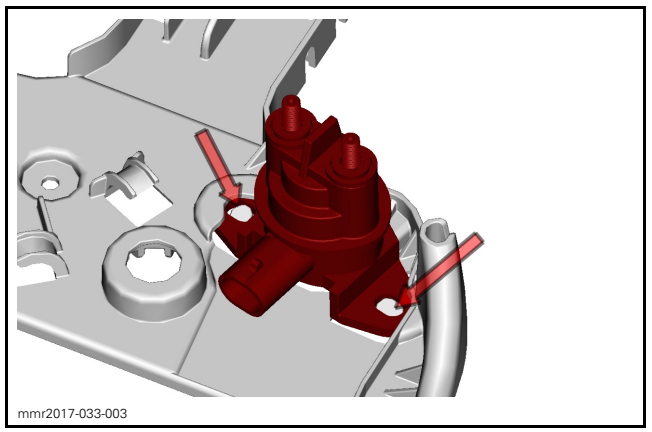
2. Disconnect solenoid cables.



3. Disconnect starter solenoid connector.



4. Press down on the tabs and release the solenoid.



Installing Solenoid

Reverse the removal procedure and pay attention to the following.

1. Secure solenoid on its support, ensure the tabs lock.

NOTE: Apply DIELECTRIC GREASE (P/N 293 550 004) under and over each connections and make sure each nut are well covered.

TIGHTENING TORQUE	
Solenoid cable retaining nuts	4 N•m ± 0.5 N•m (35 lbf•**in** ± 4 lbf•**in**)

2. Close or slide protective caps.

3. Reconnect battery and test starter solenoid operation.

STARTER

For starter information refer to *MAGNETO AND STARTER* subsection.

RF DIGITALLY ENCODED SECURITY SYSTEM (RF D.E.S.S.)

SERVICE TOOLS

Description	Part Number	Page
POWER INTERFACE	515 177 223	2

GENERAL

SYSTEM DESCRIPTION

The following components are specially designed for this system: ECM, D.E.S.S. key (inside tether cord cap) and engine cut-off switch.

This system allows the engine to reach pulley engagement speed only if a D.E.S.S. key is installed on engine cut-off switch and the key is recognized as valid by the ECM.

The D.E.S.S. key contains a magnet and a RFID chip.

– The magnet closes the hall effect switch inside the engine cut-off switch.
– The RFID chip contains a unique digital code. It is the equivalent of the tooth-pattern cut on a conventional ignition key.

Up to 8 D.E.S.S. keys may be programmed in the ECM memory using the B.U.D.S. The keys can also be erased individually.

NOTE: If desired, a D.E.S.S. key can be used on another vehicle equipped with the D.E.S.S. system. It only needs to be programmed for that vehicle.

D.E.S.S. Beeper Codes

When starting the engine with a D.E.S.S. key on the engine cut-off switch, the key is identified by the ECM and D.E.S.S. signals will be issued according to the key recognition. See table.

D.E.S.S. SIGNAL		DESCRIPTION	COMMENT
BEEPER	DISPLAYED MESSAGE		
2 shorts beeps	Compact digital gauge: "Good Key" Other gauges: DESS tell-tale light will flash	Valid key read	Working D.E.S.S. key.
Short beeps repeating slowly	CHECK KEY	Unable to read key	– Reinstall key – RPM limited to 2500 – Check D.E.S.S. status in B.U.D.S. – No voltage at RFID connector pin D
Shorts beeps repeating rapidly	BAD KEY	Invalid key or key not programmed	– Use the proper key for this vehicle or have the key programmed. – Vehicle can not be driven.

PROCEDURES

D.E.S.S. KEY

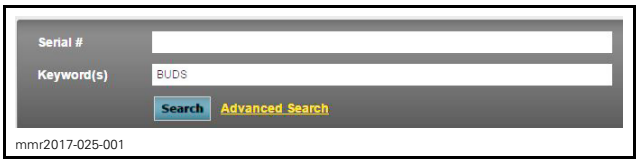
D.E.S.S. Key Programming

Use BUDS2.

Refer to the **B.U.D.S. directory** on *KNOWLEDGE CENTER* for all BUDS related information, including:

– Current version download link
– User manual (programming keys, reading fault codes, writing data to modules etc.)
– Installation instructions
– Navigation through menus
– BRP BUDS chart

Search keyword: "BUDS".



mmr2017-025-001

D.E.S.S. / ENGINE CUT-OFF OPERATION

Connect BUDS2, refer to *COMMUNICATION TOOLS AND BUDS*.

Navigate to the **keys** page.

Read key. Consult the sections below to troubleshoot a key problem.

Normal Operation (Good Key)

Refer to *WIRING DIAGRAM*.

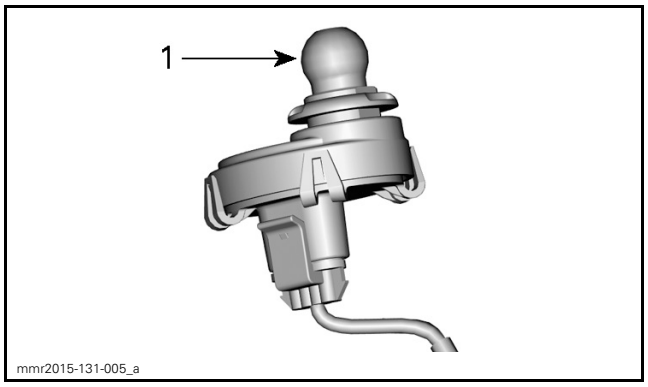
RFID CONNECTOR PIN	SPECIFICATIONS with POWER INTERFACE (P/N 515 177 223) installed
A	ECM ground
B	12 - 15 Vdc
C	5 Vdc
D	12 Vdc

Key Not Read

Possible causes:

– Damaged RFID chip
– No voltage at RFID-D connector
– No voltage at RFID-C connector

Condition can be duplicated with a magnet on the D.E.S.S. post.



mmr2015-131-005_a

1. D.E.S.S. post

Key Not Present

Possible causes:

– No key installed
– No voltage at RFID-B connector
– No ground at RFID-A connector

Condition can be duplicated by unplugging the RFID connector.

Invalid Key

Possible causes:

– Key not programmed to ECM

BEEPER

The beeper is integrated in the multifunction gauge and cannot be replaced alone.

If the beeper does not sound when starting the engine, check the beeper operation. Refer to *GAUGE* subsection.

ROTAX ELECTRONIC REVERSE (RER)

SERVICE TOOLS

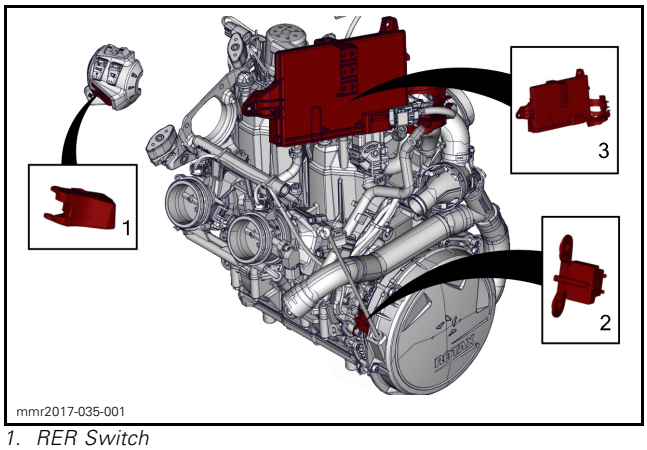
Description	Part Number	Page
12 V BATTERY SUPPLY CABLE	529 035 997	2
DIAGNOSTIC CABLE	710 000 851	2
ECM ADAPTER TOOL	529 036 166	2–3
FLUKE 115 MULTIMETER	529 035 868	2
MPI-2 INTERFACE CARD	529 036 018	2
MPI-3 INTERFACE CARD	529 036 353	2
POWER INTERFACE	515 177 223	2

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
OPTIONAL MALE-FEMALE EXTENSION SERIAL CABLE	(DB9)	2

GENERAL

The main components of the RER system are:



1. *RER Switch*
2. *Crankshaft position sensor (CPS)*
3. *ECM*

The ECM receives signals from the CPS for forward and reverse engine rotation.

The ECM recognizes a signal sent by the RER switch.

When the RER switch is activated and the engine is running at or near idle speed, the ECM cuts off ignition, therefore causing the engine RPM to drop off gradually.

When the engine reaches a predetermined low RPM (approximately 450 RPM), the ECM initiates an ignition spark that is greatly advanced in timing, creating a thrust which reverses engine rotation.

If the following condition are not meet, the RER function is disabled and nothing takes place when the RER button is pressed.

– RPM between 1000 and 4300 RPM
– Throttle lever released (TPS opening below 2%)
– Vehicle speed below 25 km/h (16 MPH).

NOTE: Refer to *E-TEC DIRECT FUEL INJECTION* subsection for crankshaft position sensor (CPS) testing.

TROUBLESHOOTING

DIAGNOSTIC TIPS

RER Does Not Respond When Depressing RER Button

Check the following:

– RER fuse condition
– Check if the vehicle is properly configured in B.U.D.S. (with Mechanical Reverse check box not selected)
– *TESTING RER SWITCH SIGNAL WITH B.U.D.S.*

Engine Stops after Pressing RER Button

This confirms that RER control circuits function normally. Check the following:

– CPS
– Engine compression, refer to *TOP END* subsection.
– Reed valves leaking, refer to applicable *TOP END* subsection

– RAVE valve adjustment or sticking, refer to *RAVE* subsection
– Drive belt adjustment, refer to *DRIVE SYSTEM AND BRAKE* subsection
– ECM
– Stator, refer to *MAGNETO SYSTEM* subsection
– Capacitor, refer to *CHARGING SYSTEM* subsection.

Ensure 55V system is in good condition at idle.

RER Functions Erratically

1. Check engine compression.

NOTE: A low compression resulting in loss of engine power may cause the RER to function erratically, leading you to believe the problem is in the electronic control system.

2. Low compression may be due to the following items:
   – REED valves leaking or broken
   – RAVE valves sticking
   – Worn engine parts.
3. Check piston condition through the intake and exhaust ports.

NOTE: Look for scoring on piston skirts. Scored piston skirts or other mechanical problems resulting in excessive friction which may cause the RER to function erratically.

4. Also check the following:
   – RER switch for intermittent operation, refer to *TESTING RER SWITCH CONTINUITY* in this subsection
   – Loose (intermittent) electrical connections
   – Drive belt adjustment, refer to *DRIVE SYSTEM AND BRAKE* subsection
   – ECM.

PROCEDURES

REQUIRED TOOLS	
FLUKE 115 MULTIMETER (P/N 529 035 868)	
ECM ADAPTER TOOL (P/N 529 036 166)	

RER SWITCH

Testing RER Switch Signal with BUDS2

1. Connect vehicle to BUSD2.Download from *KNOWLEDGE CENTER*. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection for proper connection instructions.

REQUIRED TOOLS	
MPI-2 INTERFACE CARD (P/N 529 036 018) or MPI-3 INTERFACE CARD (P/N 529 036 353)	
DIAGNOSTIC CABLE (P/N 710 000 851)	
POWER INTERFACE (P/N 515 177 223)	
12 V BATTERY SUPPLY CABLE (P/N 529 035 997)	
OPTIONAL MALE-FEMALE EXTENSION SERIAL CABLE (P/N (DB9))	

NOTE: A 12 volt battery is required to activate the electrical system.

2. In BUDS2, select the **Scan** button.
3. Select the **Measurements** tab.
4. Raise track and start the engine.
5. Press vehicle RER button and look for the **START/RER Button** status to change.

If the **START/RER Button** status changes, it indicates the RER switch, ECM and wiring are functioning properly. Test CPS. Refer to *E-TEC DIRECT FUEL INJECTION* subsection.

If the**START/RER Button** status does not change, carry out the RER switch tests that follow.

NOTE: When the B.U.D.S. RER test is carried out with engine running and reverse engages, the RER light on the **ECM Monitoring** page and the reverse light on the **Cluster Monitoring** page should both turn ON.

Testing RER Switch Continuity

1. Measure continuity of RER switch as per following table.

Models with multifunction switch on handlebar

2. Disconnect the RER switch (SH) connector.

SWITCH POSITION	SH CONNECTOR		RESISTANCE
Released	SH-1	SH-2	Continuity (0.4 Ω max.)
Press and held	SH-8	SH-2	Continuity (0.4 Ω max.)

Models with console switches

3. Disconnect the RER connector.

SWITCH POSITION	RER CONNECTOR		RESISTANCE
Release	RER-1	RER-2	O.L.
Press and hold	RER-1	RER-2	Continuity (0.4 Ω max.)

If continuity test fails, replace switch.

If continuity tests were good, measure voltage as per *TESTING RER SWITCH CIRCUIT*.

Testing RER Switch Circuit

Models with multifunction switch on handlebar

1. Backprobe SH2 connector pins as per table.
2. Lift track and idle vehicle.

(SH) CONNECTOR		SPECIFICATION
SH-1	Chassis ground	0Ω
SH-2	START / RER SIGNAL	Chassis ground when switch is released
		12 volts when switch is pressed and held
SH-8	Chassis ground	Unswitched 12 Vdc

If chassis ground SH-1 and 12 volts SH-8 measurements are good **but** START / RER SIGNAL SH-2 measurements are incorrect, replace switch.

If chassis ground is not measured, repair the wire between chassis ground and SH connector.

If 12 votls is not measured, repair the wire between RER fuse and SH connector.

Testing RER Switch Circuit

Models with console switches

1. Set multimeter to Vdc.
2. Backprobe RER connector pins as per table.
3. Lift track and idle vehicle.

(RER) CONNECTOR		SPECIFICATION
RER-2	Chassis ground	12 Vdc
RER-1	Chassis ground	No voltage when switch is released
		12 volts when switch is pressed and held

If no voltage is present at RER-1 when switch is pressed and held, replace switch.

If no voltage is present at RER-2, repair the wire between RER fuse and RER-2 connector.

Testing RER Switch Signal to ECM

Models with electric starter

1. If applicable, ensure the (SD) starter solenoid connector is disconnected.

All models

2. Disconnect ECMB connector and install the ECM ADAPTER TOOL (P/N 529 036 166).
3. Test wire continuity between the RER fuse and the ECMB connector as follows.

RER FUSE (F1)	ECMB CONNECTOR	RESISTANCE
FB-H	ECMB-A3	RER switch pressed and held Continuity (0.2 Ω max.)
FB-H	ECMB-A3	RER switch released Infinite (OL)

If continuity test is good, try a new ECM.

If test fails, repair or replace wiring.

BEEPER (REVERSE ALARM)

The reverse alarm (beeper) is integrated in the gauge cluster and is also used for emitting the vehicle beep codes. Refer to applicable *GAUGE* subsection for the testing procedure.

LIGHTS

SERVICE TOOLS

Description	Part Number	Page
12 V BATTERY SUPPLY CABLE	529 035 997	1
POWER INTERFACE	515 177 223	1

GENERAL

Refer to *WIRING HARNESS AND CONNECTORS* for electrical connector locations.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to. Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

SYSTEM TESTING

All vehicle lights are powered from the primary 12 Vdc circuit. This circuit is powered from and controlled by the ECM when the engine reaches 800 RPM. Refer to *POWER DISTRIBUTION AND GROUNDS* subsection for more information on how power is distributed to various systems.

For models without a battery, connect the following tools in order to provide electrical power to the vehicle.

REQUIRED TOOLS
– POWER INTERFACE (P/N 515 177 223) – 12 V BATTERY SUPPLY CABLE (P/N 529 035 997) – 12-volt battery

PROCEDURES

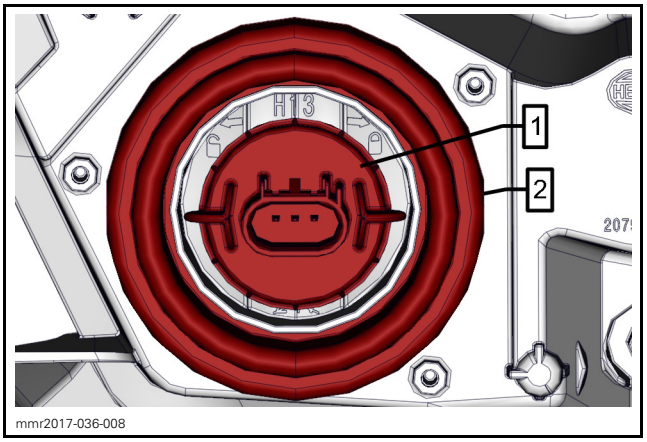
HEADLIGHTS

Removing Headlight Bulb

1. Remove gauge and trim. Refer to *BODY* subsection.
2. Remove front glove box. Refer to *BODY* subsection.
3. Unplug electrical connector.

4. Turn bulb socket to unlock and remove bulb.

NOTE: Ensure bulb seal stays in place.



1. Bulb socket
2. Bulb seal

Installing Headlight Bulb

NOTICE **Never touch glass portion of a halogen bulb with bare fingers, it shortens its operating life. If glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.**

Reverse removal procedure.

Measuring Headlight Input Voltage

1. Disconnect headlight connector(s).
2. Provide electrical power to the headlights for testing.

3. Read voltage at headlight connector as follows.

SWITCH POSITION	WIRE COLOR (HEADLIGHT CONNECTOR)		VOLTAGE
LO beam	GY/OG	BK	Battery voltage (Vdc)
HI beam	GY/WH	BK	

If voltage is inadequate, carry out the following to find the source of the problem:
- Test headlights dimmer switch.
- Test wiring harness and connectors.
- Test primary 12 Vdc system. Refer to *CHARGING SYSTEM*.

Testing Headlight Dimmer with BUDS2

The headlight dimmer switch status can be monitored using BUDS2.

Testing Headlight Dimmer Switch Continuity

1. Disconnect the applicable connector depending on gauge, refer to following tables.
2. Test switch circuits on applicable connector on switch side as per table.

MODELS WITH COMPACT DIGITAL GAUGE			
SWITCH POSITION	DIMMER PINS		SPECIFICATION
HIGH	2	4	Close to 0 Ω
	2	1	Infinite (OL)
LOW	2	4	Infinite (OL)
	2	1	Close to 0 Ω

MODELS WITH ANALOG/DIGITAL GAUGE			
SWITCH POSITION	SH PINS		SPECIFICATION
HIGH	12	7	Close to 0 Ω
	6	7	Infinite (OL)
LOW	12	7	Infinite (OL)
	6	7	Close to 0 Ω

If tests were good, switch is functioning properly.

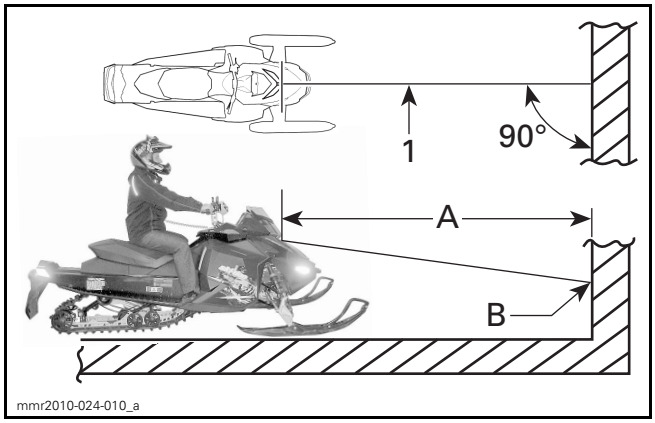
If any test failed, check wiring and connections going to switch.

If test of wiring and connections was good, replace switch.

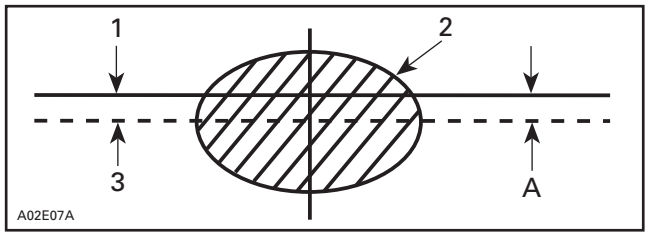
Aiming Headlight Beam

Beam aiming is correct when center of high beam is 25 mm (1 in) below the headlight horizontal center line, scribed on a test surface, 381 cm (12 ft 6 in) away.

1. Place the vehicle on a flat surface perpendicular to test surface (wall or screen) and 381 cm (12 ft 6 in) away from it.
2. Ask rider to sit on vehicle seat, or apply equivalent weight on the vehicle.
3. Select **high** beam.
4. Measure headlight center distance from ground. Scribe a line at this height on test surface (wall or screen). Light beam center should be 25 mm (1 in) below scribed line.



TYPICAL
1. Headlight center line
A. 381 cm (12 ft 6 in)
B. 25 mm (1 in) below center line



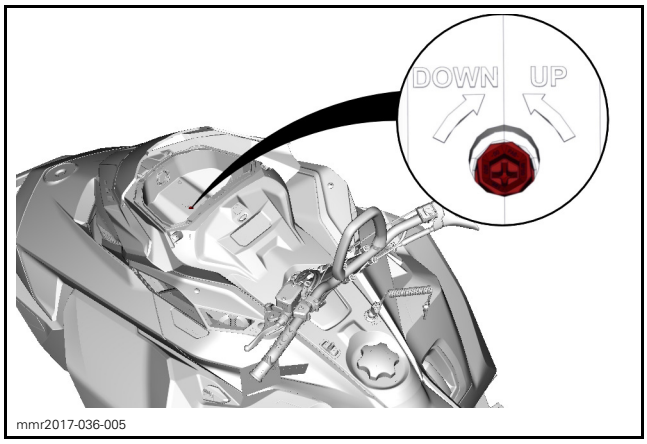
1. Headlight horizontal
2. Light beam (high beam) (projected on the wall)
3. Light beam center
A. 25 mm (1 in)

Adjusting Beam

Open the front storage compartment.

Turn knob to adjust the beam height.

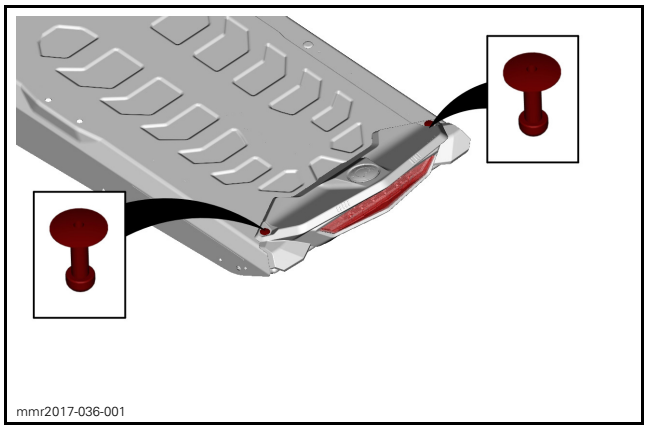
NOTE: Avoid reaching extreme adjustments as the headlight assembly might move out of position.

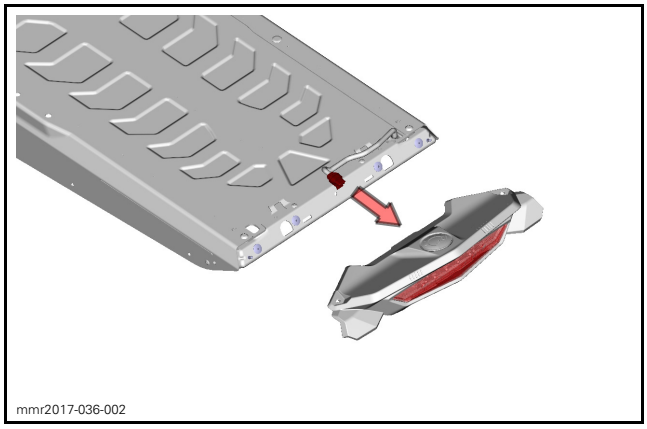


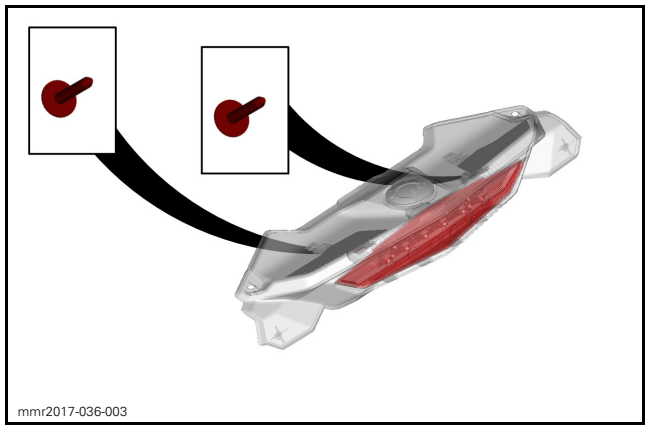
mmr2017-036-005

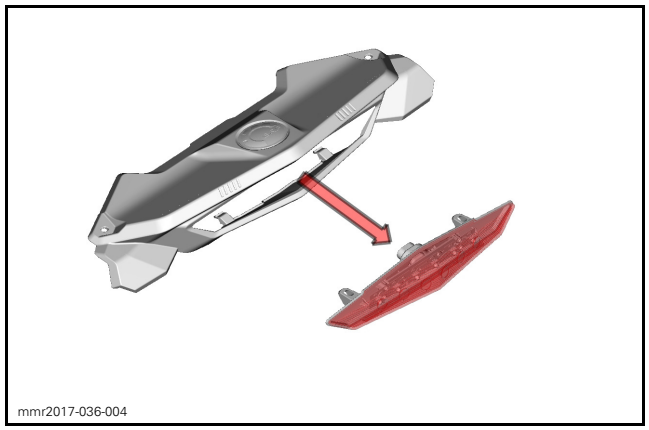
TAILLIGHT / BRAKE LIGHT

Replacing Taillight


mmr2017-036-001


mmr2017-036-002


mmr2017-036-003


mmr2017-036-004

Replace taillight.

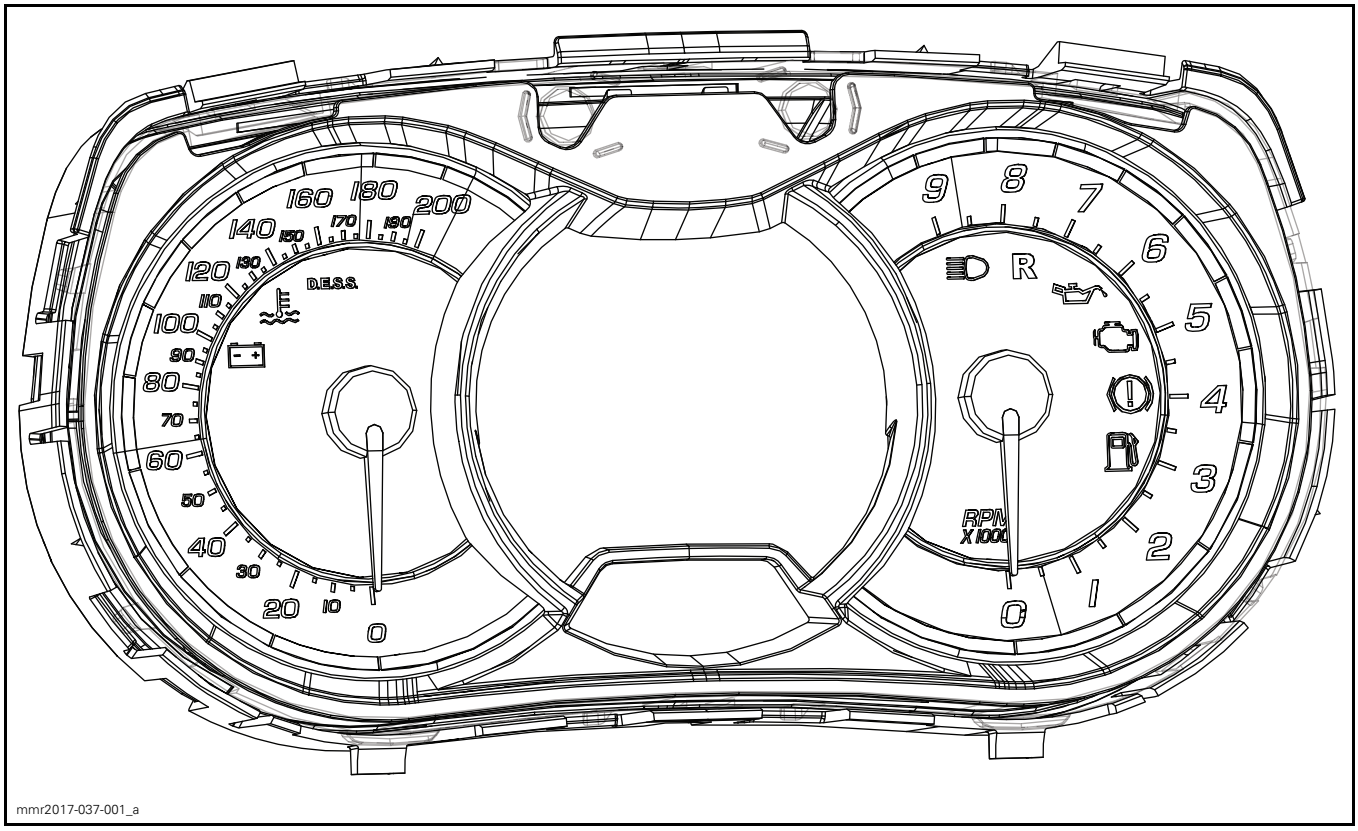
Installation is the reverse of removal. However pay attention to the following.

TIGHTENING TORQUE	
Taillight retaining screw	0.4 N•m (4 lbf•**in**)

GAUGE (ANALOG/DIGITAL)

SERVICE TOOLS

Description	Part Number	Page
12 V BATTERY SUPPLY CABLE	529 035 997	2, 4
POWER INTERFACE	515 177 223	2, 4



mmr2017-037-001_a

GENERAL

NOTE: It is a good practice to check for fault codes using BUDS2 software as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

⚠ WARNING

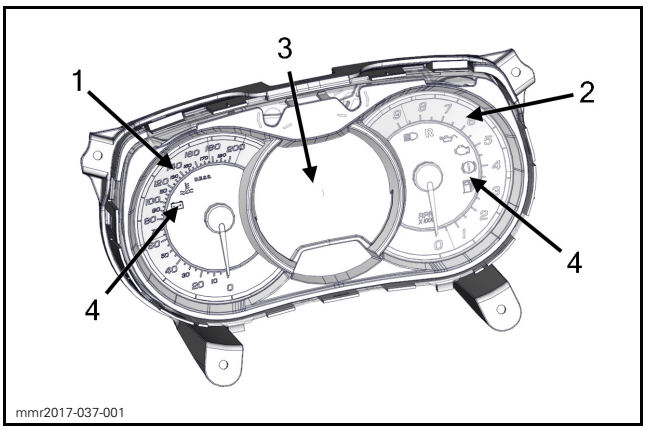
Torque wrench tightening specifications must be strictly adhered to. Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

SYSTEM TESTING

For models without a battery, connect the following tools in order to provide electrical power to the vehicle.

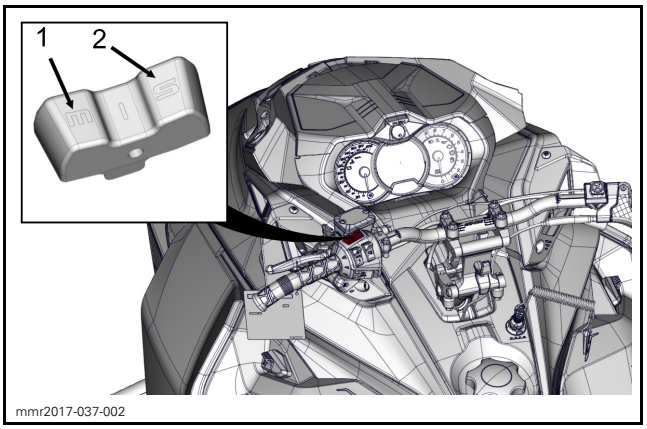
REQUIRED TOOLS
– POWER INTERFACE (P/N 515 177 223) – 12 V BATTERY SUPPLY CABLE (P/N 529 035 997) – 12-volt battery

GAUGE DESCRIPTION



MULTIFUNCTION ANALOG/DIGITAL GAUGE (PREMIUM)
1. *Speedometer*
2. *Tachometer (RPM)*
3. *Gauge Multifunction Digital Display*
4. *Gauge Pilot Lamps*

Mode and Set Buttons



1. *MODE button*
2. *SET button*

The mode and set buttons allow you to toggle through the different gauge functions and settings.

INDICATOR LAMPS

INDICATOR LAMP(S)	STATE	DESCRIPTION
All indicator lamps	On	All indicator lamps are activated during *WOW TEST*
	Steady on	Parking brake engaged.
	Blnking slowly	Unit in reverse position.
	On	Headlights in the HIGH beam position.

INDICATOR LAMP(S)	STATE	DESCRIPTION
	On	Charging system fault
	Blink 4 times then steady on	Engine management system fault
	Blink 4 times then steady on	Engine overheat 85°C (185°F)????
	Blinking	Major engine overheat100°C (212°F)????
	On	Engine temperature displayed
	On	Heated grip temperature displayed
	On	Heated throttle lever temperature displayed
	On	Fuel level displayed
	On (red indicator lamp)	Low fuel
	On	Low Engine Oil Pressure Indicator
D.E.S.S.	Blink 2 times	Good key
	Blinking slowly	Not able to read the key
	Blinking rapidly	Wrong key read / key not programmed to vehicle

INDICATOR LAMP DESCRIPTION

Charging System Fault

There is a charging system fault. Refer to *CHARGING SYSTEM* subsection.

Overheat Indicator Lamp

Overheat indicator lamp may come on for three different reasons: engine overheat, muffler overheat or ECM overheat. The multifunction gauge will display the active problem.

Engine Overheat

The indicator lamp comes on at 85°C (185°F) and power limitation will occur at 95°C (203°F). Major engine overheat condition occurs when engine temperature reaches 100°C (212°F), the overheat indicator light will begin to blink.

Muffler Overheat

The indicator lamp comes on at 750°C (1,382°F) and power limitation will happen at 800°C (1,472°F). Major muffler overheat condition occurs when the muffler temperature reaches 800°C (1,472°F).

ECM Overheat

The indicator lamp comes on at 80°C (176°F) and power limitation will occur at 85°C (185°F).

Fuel Level Indication

A bar gauge located in the RH side of the display indicates the amount of fuel in the fuel tank.

When there is approximately 12 L (3.2 U.S. gal.), the indicator lamp will come ON to advise you that a low fuel condition exists.

Check Engine Light

The check engine light comes ON when a fault is detected by the engine management system.

The check engine light may be accompanied by the applicable scrolling fault message in the multifunction display.

To scroll through active fault codes, refer to *DISPLAYING "P" CODES* in this subsection .

Low Injection Oil Level Indicator

When this indicator is ON, it indicates a low injection oil level condition. Look for a message in the multifunction display. Add oil to oil tank.

TROUBLESHOOTING

SYSTEM TESTING

For models without a battery, connect the following tools in order to provide electrical power to the vehicle.

REQUIRED TOOLS
– POWER INTERFACE (P/N 515 177 223) – 12 V BATTERY SUPPLY CABLE (P/N 529 035 997) – 12-volt battery

PROCEDURES

GAUGE

Gauge Self Test Function

Gauge self test only runs if the gauge has been off for more than 30 seconds.

On **ECM wake-up**, the gauge will perform a self-test. All indications should come ON and gauge pointers will cycle once. You will have a few seconds to ensure the indications (**LEDs** and **LCDs**) are functioning correctly.

NOTE: This test only validates the gauge operation of the **LEDs**, **LCDs** in the gauge digital display and the pointers. It does not test the actual circuit functions related to each indication.

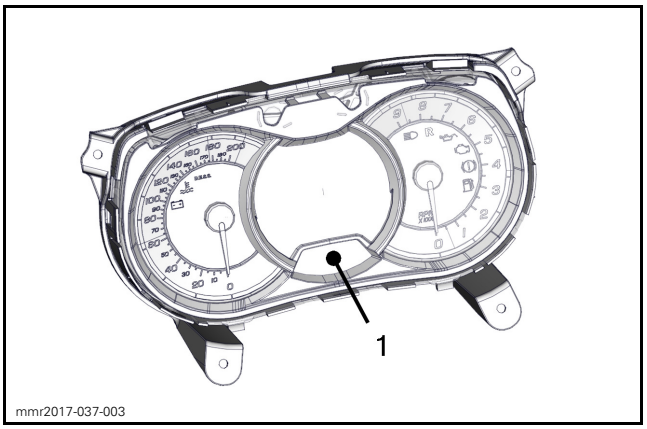
If the self test does not take place, test gauge input power.

Gauge Setup

Activating Clock

The gauge has an internal clock that can display the time of day in the lower digital display (when selected).

NOTE: The internal clock is only available if the vehicle is equipped with a battery, such as an electric starter kit.



1. Clock displayed

1. In BUDS2, select the **Settings** page.
2. Activate the clock (models with battery).

Changing Gauge Units of Measurement

The gauges are factory preset to indicate in imperial units and can be changed using the BUDS2 software.

To change the gauge units of measurement in BUDS2:

1. Provide electrical power to the gauge.
2. In BUDS2, select the **Setting** page.
3. Select **Imperial** or **Metric** in the **Cluster Units** field.

NOTE: Speedometer, odometer and trip meter will have their units (kilometer or miles) changed simultaneously.

Adjusting Speedometer and Tachometer Pointer

1. In BUDS2, select the **Settings** page.
2. Click on **Clockwise** or **Counterclockwise** button to align gauge pointer with the zero (0).

NOTE: Because of the fine tuning of the pointer, the button must be pressed several times before perceiving pointer movement.

Displaying "P" Codes

1. To activate **P CODE** mode, push and hold the "M" button for 2 seconds.
2. As you hold the "**M**" button, quickly turn ON and OFF the high beams a few times. The gauge will enter **P CODE** mode.
3. While in **P CODE** mode, use the "**M**" or "**S**" button to scroll over available failure codes.
4. Push and hold the "**M**" button to exit **P CODE** mode.

A NO ACTIVE P CODE message is displayed if there are no P CODES in memory.

Testing Gauge With BUDS2

The *GAUGE SELF TEST* can be duplicated using BUDS2

1. Connect vehicle to BUDS2 Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2,choose the **Functions** page.
3. Select **WOW Test**.

Testing Gauge Power(Main 12 Vdc)

If the gauge does not come on when the engine is started, carry out the following test.

1. Remove multifunction gauge.
2. Disconnect the gauge connector.
3. Set multimeter to Vdc.
4. Start engine.
5. Measure voltage with the chassis ground as per following table.

GAUGE CONNECTOR	VOLTAGE
Pin 8	Approximately 14.75 Vdc

6. If gauge main power input test was as specified, test the gauge ground circuit.
7. If no voltage was read, test wiring continuity. Refer to *WIRING DIAGRAM* for details.

Testing Gauge Ground

1. Set multimeter to Ω selection.
2. Measure for continuity of gauge ground wire to chassis ground as per following table.

GAUGE CONNECTOR	RESISTANCE
Pin 11	Close to 0 Ω

If ground test failed, check vehicle ground. Refer to *POWER DISTRIBUTION* subsection.

If gauge power input test and ground circuit continuity tests are good, replace gauge.

Testing Clock 12 Vdc Input (If electric starter kit is installed)

If the clock function in the premium gauge does not hold the proper time of day when the engine is not running, carry out the following test.

1. Remove multifunction gauge.
2. Disconnect the gauge connector.
3. Set multimeter to Vdc.
4. Measure voltage as per following table.

GAUGE CONNECTOR	VOLTAGE
Pin 9	Battery voltage

5. If there is no voltage read, test input wire continuity. Refer to *WIRING DIAGRAM* for circuit details.

Testing Gauge Beeper

To test beeper, perform the following test with BUDS2

1. Connect vehicle to BUDS2 Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. In BUDS2, choose the **Functions** page.
3. Activate the **Cluster Buzzer Test**.

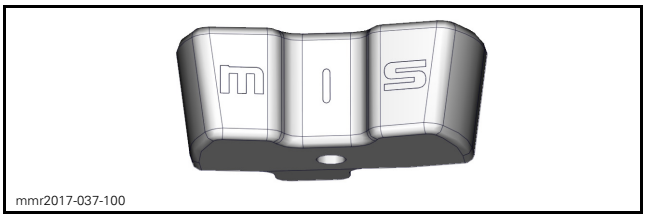
You should hear a few beeps.

– If you do not hear the beeper, replace gauge.

Testing Gauge Buttons with BUDS2

Using the BUDS2 software, select the **Measurements** page.

Press the **'m'** and **'s'** buttons on the left multifunction switch.



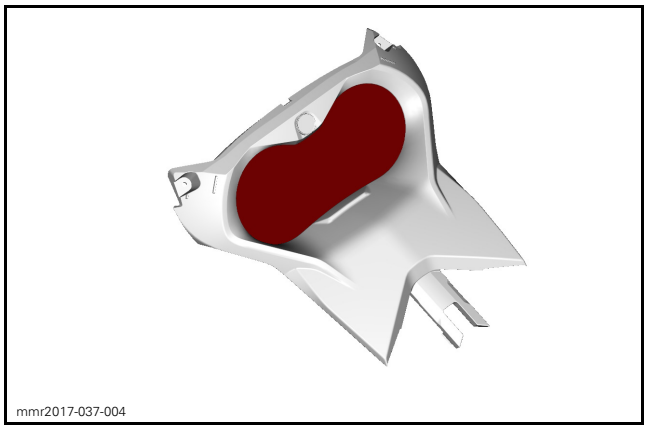
mmr2017-037-100

If the indicator light(s) come ON in BUDS2, the gauge button(s) is(are) functioning correctly.

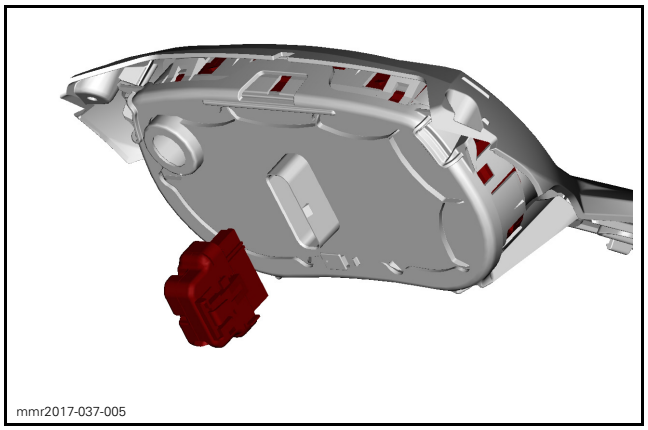
If the indicator light(s) do not come ON, check button(s) and wiring continuity, refer to *WIRING DIAGRAM*. If they are in good condition, replace gauge.

Removing Gauge

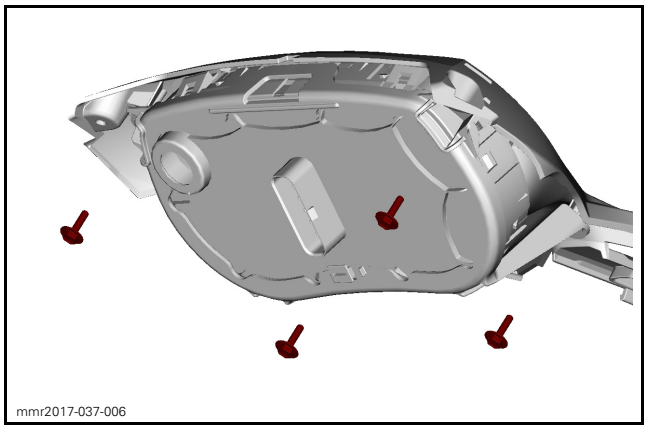
1. Remove glove box.
2. Remove gauge trim.



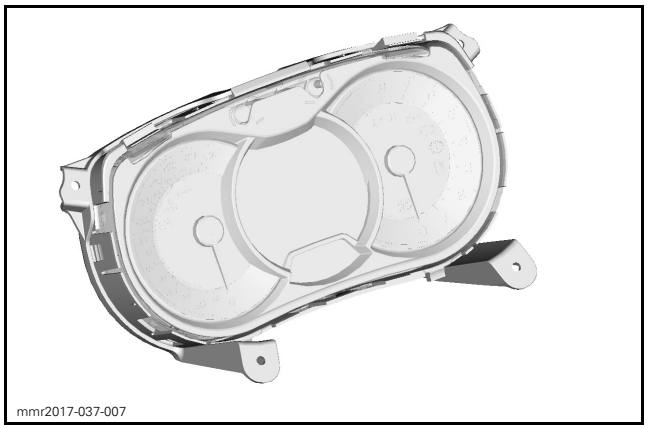
3. Unplug gauge connector.



4. Remove retaining screws.



5. Remove gauge.



Installing Gauge

Reverse removal procedure.

TIGHTENING TORQUE	
Gauge retaining screws	1 N•m ± 0.2 N•m (9 lbf•**in** ± 2 lbf•**in**)

Configuring Gauge

Using BUDS2, configure gauge options as per customer preferences

– Language
– Units

Summerization Function

Like other engines, the E-TEC has to be properly lubricated at storage for internal parts protection. The E-TEC system offers a built-in engine storage lubrication function (summerization) that can be initiated by the operator.

To engage procedure, do the following:

1. Place the vehicle in a well ventilated area.
2. Start the engine and let it run at idle speed until it reaches its operating temperature (watch the coolant temperature on the display or verify that the rear heat exchanger becomes warm).
3. Push the SET (S) button to select odometer mode.

NOTE: The storage mode does not function in other modes (trip A, trip B and hr trip).

4. Hold the **SET button** while repeatedly pressing the HI/LOW beam switch until **PRESS/HOLD _S_ FOR OIL INJECTION** appears on the display.
5. Release all buttons when gauge displays **PRESS/HOLD _S_ FOR OIL INJECTION** appears.
6. Again, press and hold the SET (S) button for 2 - 3 seconds.

NOTE: The gauge will display oil injection when the storage procedure is initiated.

mmr2017-037-101

7. When gauge displays **oil injection**, release button and wait for the lubrication function to end.

Do not touch anything during engine lubrication cycle.

The engine lubrication function takes approximately 1 minute. During this time, engine RPM may increase slightly and the oil pump will "oil flood" the engine.

At the end of engine lubrication function, the ECM will stop the engine.

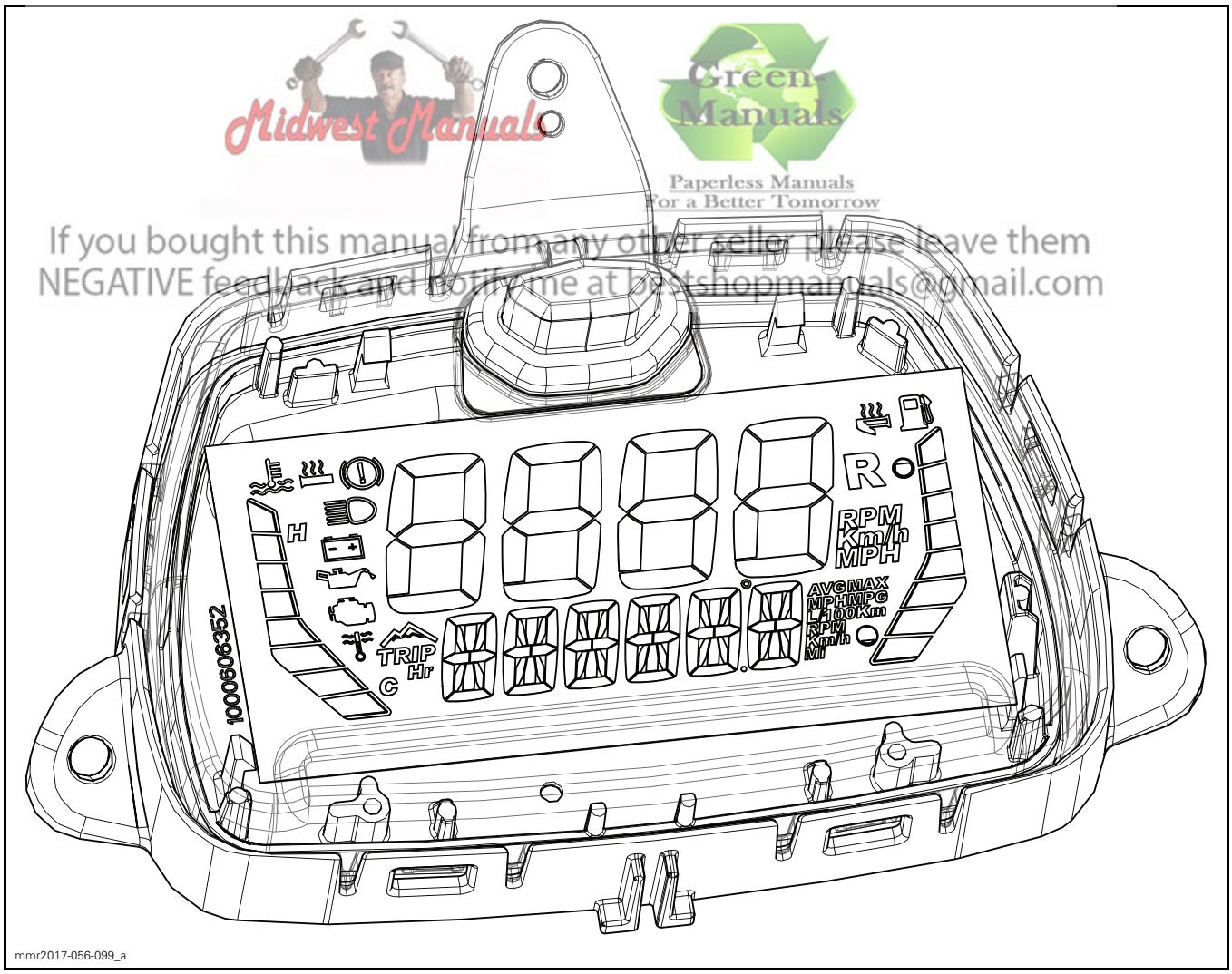
8. Remove tether cord cap from engine cut-off switch.

NOTICE **Do not start the engine during storage period.**

GAUGE COMPACT DIGITAL

SERVICE TOOLS

Description	Part Number	Page
12 V BATTERY SUPPLY CABLE	529 035 997	2
POWER INTERFACE	515 177 223	2



mmr2017-056-099_a

GENERAL

The compact digital gauges is a heated, backlit LCD gauge.

NOTE: It is a good practice to check for fault codes using BUDS2 software as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

⚠ WARNING

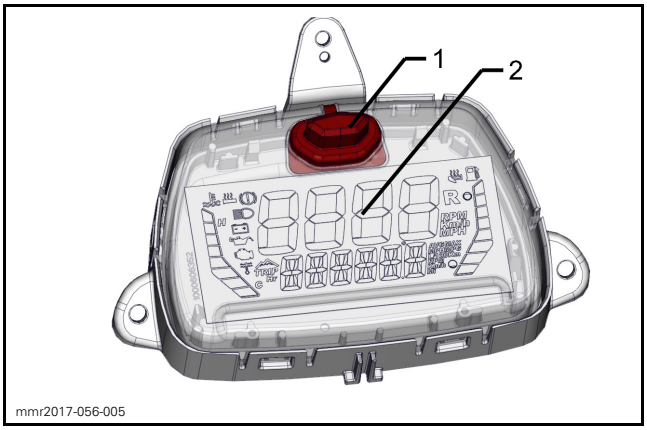
Torque wrench tightening specifications must be strictly adhered to. Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

SYSTEM TESTING

For models without a battery, connect the following tools in order to provide electrical power to the vehicle.

REQUIRED TOOLS
– POWER INTERFACE (P/N 515 177 223) – 12 V BATTERY SUPPLY CABLE (P/N 529 035 997) – 12-volt battery

GAUGE DESCRIPTION



COMPACT DIGITAL GAUGE
1. Gauge button
2. Gauge Digital Display

The button allow you to toggle through the different gauge functions and settings.

INDICATOR LAMPS

INDICATOR LAMP(S)	STATE	DESCRIPTION
All indicator lamps	On	All indicator lamps are activated during *WOW TEST*
	Flashing 4 Beeps	Parking brake engaged Brake applied while throttle lever depressed
	Flashing slowly Beeping slowly	Unit in reverse position.
	On 4 beeps	Headlights in the HIGH beam position.
	On 4 Beeps	Charging system fault
	On	Engine management system fault
	On	Temperature: cold
	On	Level: empty

INDICATOR LAMP(S)	STATE	DESCRIPTION
	On 4 Beeps	Overheat condition
	Flashing Beeping rapidly	Major overheat condition
	On	Engine temperature displayed
	On	Level: full
	On	Heated grip temperature displayed
	On	Heated throttle lever temperature displayed
	On	Temperature: hot
	On	Fuel level displayed
	Flashing Long beep	Low fuel
	On	Low oil indicator
Rev Limit	Scrolling	Limp home mode active

INDICATOR LAMP DESCRIPTION

Charging System Fault

There is a charging system fault. Refer to *CHARGING SYSTEM* subsection.

Overheat Indicator Lamp

Overheat indicator lamp may come on for three different reasons: engine overheat, muffler overheat or ECM overheat. The multifunction gauge will display the active problem.

Engine Overheat

The indicator lamp comes on at 85°C (185°F) and power limitation will occur at 95°C (203°F). Major engine overheat condition occurs when engine temperature reaches 100°C (212°F), the overheat indicator light will begin to blink.

Muffler Overheat

The indicator lamp comes on at 750°C (1,382°F) and power limitation will happen at 800°C (1,472°F). Major muffler overheat condition occurs when the muffler temperature reaches 800°C (1,472°F).

ECM Overheat

The indicator lamp comes on at 80°C (176°F) and power limitation will occur at 85°C (185°F).

Fuel Level Indication

A bar gauge located in the RH side of the display indicates the amount of fuel in the fuel tank.

When there is approximately 6 L (1.6 U.S. gal.), the indicator lamp will come ON to advise you that a low fuel condition exists.

Check Engine Light

The check engine light comes ON when a fault is detected by the engine management system.

The check engine light may be accompanied by the applicable scrolling fault message in the multifunction display.

To scroll through active fault codes, refer to *DISPLAYING "P" CODES* in this subsection .

Low Injection Oil Level Indicator

When this indicator is ON, it indicates a low injection oil level condition. Look for a message in the multifunction display. Add oil to oil tank.

PROCEDURES

GAUGE

Gauge Self Test Function

On **ECM wake-up**, the gauge will perform a self-test. All indications should come ON and cycle once. You will have a few seconds to ensure the indicator (lights are functioning correctly.

NOTE: This test only validates the gauge operation of the gauge digital display. It does not test the actual circuit functions related to each indication.

If the self test does not take place, proceed with the *TESTING GAUGE POWER*.

Gauge Setup

Changing Gauge Units of Measurement

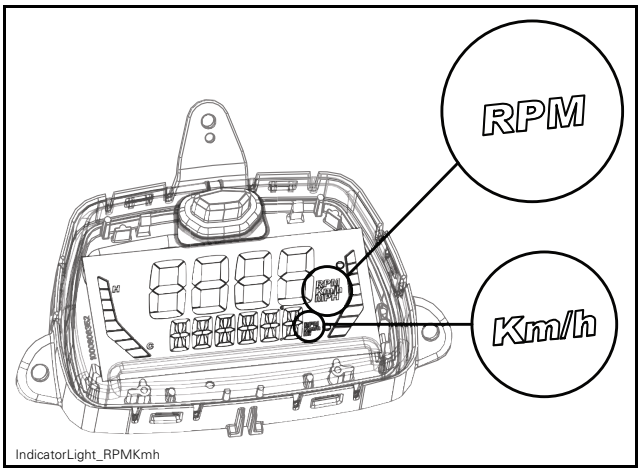
The gauges are factory preset to indicate in imperial units and can be changed using the BUDS2 software.

1. Provide electrical power to the gauge.
2. In BUDS2, navigate to the **Settings** page.
3. Change the units of measurement as per owner preferences.

NOTE: Speedometer, odometer and trip meter will have their units (kilometer or miles) changed simultaneously.

Displaying "P" Codes

1. Provide electrical power to the gauge.
2. Cycle through the gauge displays until both RPM and speed are displayed.



TYPICAL RPM AND SPEED DISPLAYED

3. Press and hold the button on the gauge while cycling high beams on and off 5 times.

Active fault codes will scroll across gauge display.

4. Press the button to scroll multiple fault codes.
5. Hold the button to exit the function.

Testing Gauge With BUDS2

The *GAUGE SELF TEST* can be duplicated using BUDS2

1. Connect vehicle to BUDS2 Refer to *COMMUNICATION TOOLS AND BUDS2* subsection.
2. In BUDS2,choose the **Functions** page.
3. Select **WOW Test**.

Testing Gauge Power (Main 12 Vdc)

If the gauge does not come on when the engine is started, carry out the following test.

1. Remove multifunction gauge.
2. Disconnect the gauge connector.
3. Set multimeter to Vdc.
4. Start engine.
5. Measure voltage with the chassis ground as per following table.

GAUGE CONNECTOR	VOLTAGE
Pin 2	Approximately 14.75 Vdc

6. If gauge main power input test was as specified, carry out the gauge *GROUND CIRCUIT CONTINUITY TEST*.
7. If no voltage was read, test wiring continuity. Refer to *WIRING DIAGRAM* for details.

Testing Gauge Ground

1. Set multimeter to Ω selection.
2. Measure for continuity of gauge ground wire to chassis ground as per following table.

GAUGE CONNECTOR	RESISTANCE
Pin 8	Close to 0 Ω

If ground test failed, check vehicle ground. Refer to *POWER DISTRIBUTION* subsection.

If gauge power input test and ground circuit continuity tests are good, replace gauge.

Testing Gauge Beeper

To test beeper, perform the following test with BUDS2

1. Connect vehicle to BUDS2 Refer to *COMMUNICATION TOOLS AND BUDS2*
2. In BUDS2, choose the **Functions** page.
3. Activate the **Cluster Buzzer Test**.

You should hear 4 short beeps.

– If you do not hear the beeper, replace gauge.

Testing Gauge Button

Using the BUDS2 software, select the **Measurements** page.

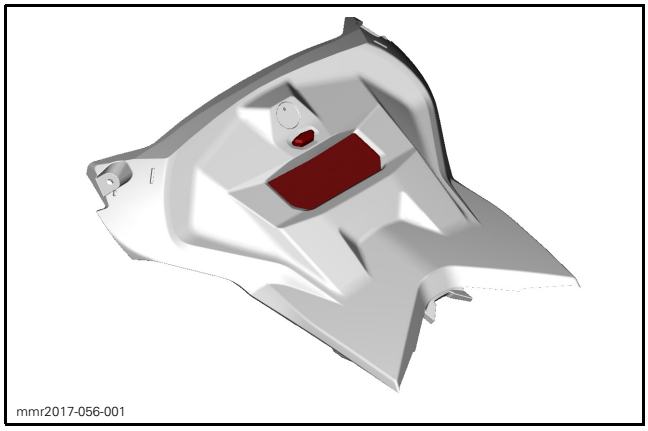
Press button on the gauge and activate the heater and hi/lo beam buttons on the console.

If the indicator light(s) come ON in BUDS2, the gauge button(s) is(are) functioning correctly.

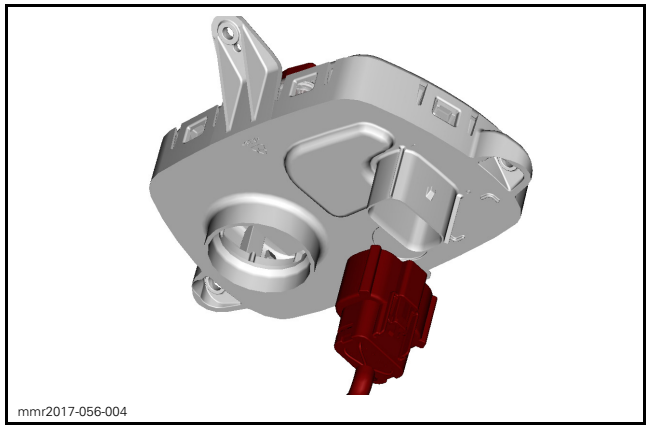
If the indicator light(s) do not come ON, check button(s) and wiring continuity. Refer to *WIRING DIAGRAM* for details. If they are in good condition, replace gauge.

Removing Gauge

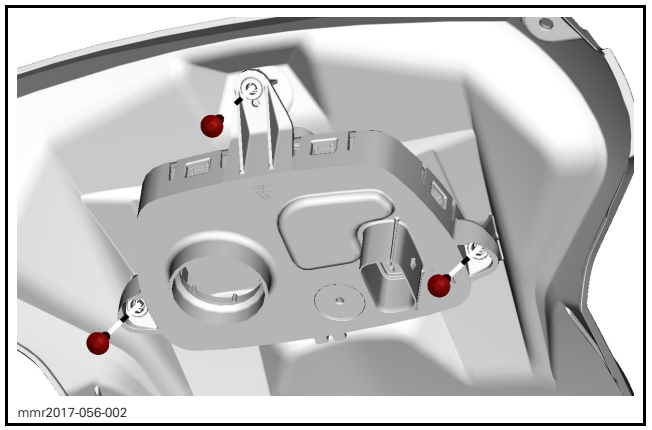
1. Remove glove box.
2. Remove gauge trim.


mmr2017-056-001

3. Unplug gauge connector.


mmr2017-056-004

4. Remove retaining screws.


mmr2017-056-002

5. Remove gauge.

mmr2017-056-003

Installing Gauge

Reverse removal procedure.

TIGHTENING TORQUE	
Gauge retaining screws	1 N•m ± 0.2 N•m (9 lbf•**in** ± 2 lbf•**in**)

Configuring Gauge

Using BUDS2, configure gauge options as per owner preferences

– Language
– Units
– Throttle lever heating ratio. Refer to *ACCESSORIES* subsection for more information.

Summerization Function

Like other engines, the E-TEC has to be properly lubricated at storage for internal parts protection. The E-TEC system offers a built-in engine storage lubrication function (summerization) that can be initiated by the operator.

To engage procedure, do the following:

1. Place the vehicle in a well ventilated area.
2. Start the engine and let it run at idle speed until it reaches its operating temperature (watch the coolant temperature on the display or verify that the rear heat exchanger becomes warm).
3. Push the gauge button to select odometer mode.

NOTE: The storage mode does not function in other modes (trip A, trip B and hr trip).

4. Hold the**gauge button** while repeatedly pressing the HI/LOW beam switch until PRESS/HOLD BUTTON FOR OIL INJECTION appears on the display.
5. Release all buttons when gauge displays PRESS/HOLD BUTTON FOR OIL INJECTION appears.
6. Again, press and hold the gauge button for 2 - 3 seconds.

NOTE: The gauge will display oil when the storage procedure is initiated.

7. When gauge displays OIL, release button and wait for the lubrication function to end.

Do not touch anything during engine lubrication cycle.

The engine lubrication function takes approximately 1 minute. During this time, engine RPM may increase slightly and the oil pump will "oil flood" the engine.

At the end of engine lubrication function, the ECM will stop the engine.

8. Remove tether cord cap from engine cut-off switch.

NOTICE **Do not start the engine during storage period.**

ACCESSORIES

SERVICE TOOLS

Description	Part Number	Page
12 V BATTERY SUPPLY CABLE	529 035 997	1
FLUKE 115 MULTIMETER	529 035 868	6
POWER INTERFACE	515 177 223	1

GENERAL

On multifunction analog/digital gauge, heated grips and heated throttle lever are limited at 50% output when idling.

NOTE: It is a good practice to check for fault codes using BUDS2 software as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to. Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

SYSTEM TESTING

For models without a battery, connect the following tools in order to provide electrical power to the vehicle.

REQUIRED TOOLS
– POWER INTERFACE (P/N 515 177 223) – 12 V BATTERY SUPPLY CABLE (P/N 529 035 997) – 12-volt battery

SYSTEM DESCRIPTION (HEATED THROTTLE LEVER)

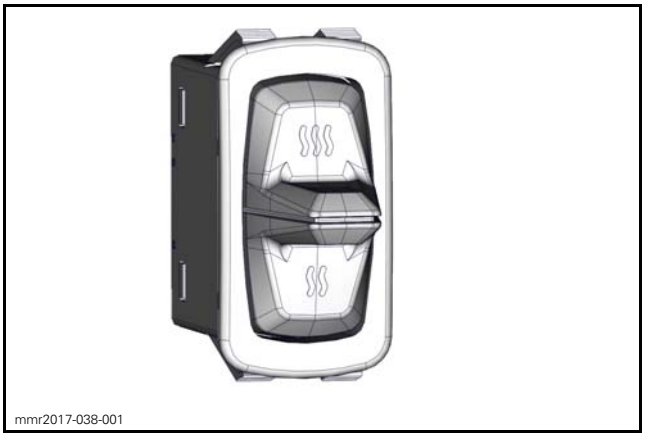
Power to the heated throttle lever is controlled through the gauge.

A three position switch allows the selection various heat levels, which are displayed in the gauge.

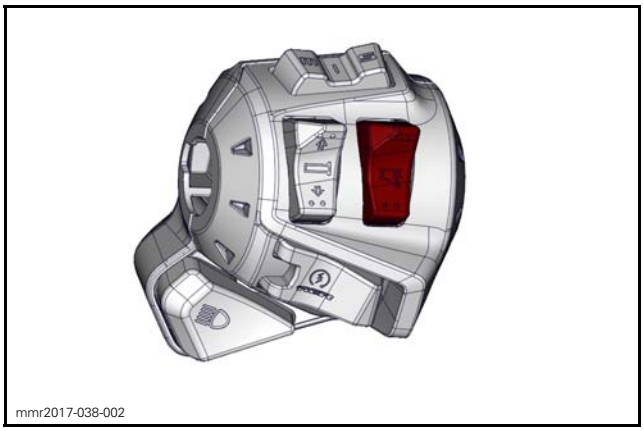
NOTE: The heated handlebar grips and the heated throttle lever are controlled by the same 3 position switch when used with the console switch. Refer to *SETTING THE HEATED THROTTLE LEVER RATIO*.

NOTE: The heating intensity is displayed via the gauge with the activation of the heated throttle lever switch.

The switch selection sends a signal to the gauge to increase or decrease heat.



HEATER SWITCH - MODELS WITH CONSOLE SWITCH



HEATER SWITCH - MODELS WITH MULTIFUNCTION SWITCH

The gauge then applies the appropriate amount of current to the heater according to the selection.

To turn OFF the heaters, select heat down until there is no more indication on the bar graph.

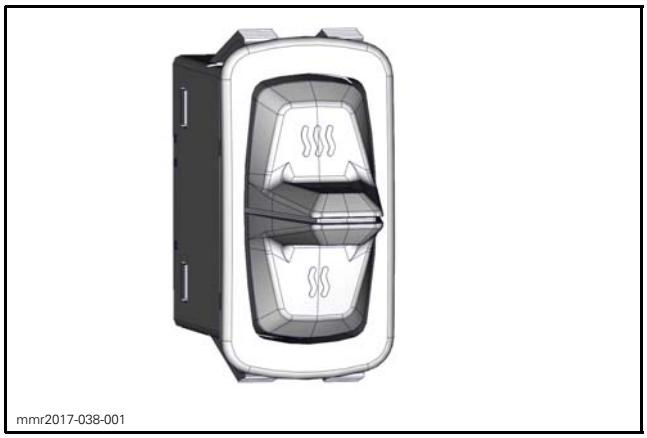
When released, the 3 position switch springs back to the center neutral position.

SYSTEM DESCRIPTION (HEATED HANDLEBAR GRIPS)

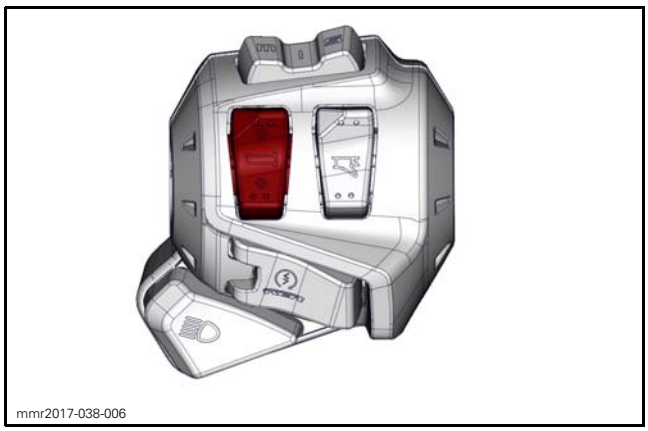
The grip heat is controlled through the gauge.

A three position switch allows the selection of various heat levels, which are displayed in the gauge.

NOTE: The heated handlebar grips and the heated throttle lever are controlled by the same 3 position switch when used with the console switch. Refer to *SETTING THE HEATED THROTTLE LEVER RATIO*.



HEATER SWITCH - MODELS WITH CONSOLE SWITCHES



HEATER SWITCH - MODELS WITH MULTIFUNCTION SWITCH

NOTE: The heating intensity is displayed via the gauge with the activation of the heated grips switch.

The gauge then applies the appropriate amount of current to the heater according to the selection.

To turn OFF the heaters, select heat down until there is no more indication on the bar graph.

When released, the switch springs back to the center neutral position.

SETTING THE HEATED THROTTLE LEVER RATIO

On models where one switch simultaneously controls the heated grip temperature and the throttle lever, use BUDS2 to set the heated throttle grip ratio.

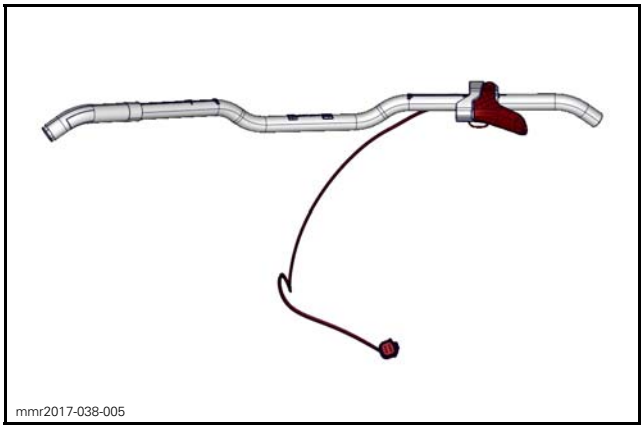
A higher ratio will increase the heated throttle temperature compared to the heated grips.

A lower ratio will lower the heated throttle temperature compared to the heated grips.

1. Connect BUDS2. Refer to *COMMUNICATION TOOLS AND BUDS* subsection.
2. Navigate to the settings page.
3. Change the **Heated Throttle Lever Ratio**.
4. Write the changes to the cluster.

PROCEDURES

HEATED THROTTLE LEVER



On multifunction analog/digital gauge heaters are limited to 50% under 2000 RPM.

For troubleshooting:

– Start engine and rev above 800 RPM for at least 2 seconds
– Use BUDS2 to activate the applicable heater.

NOTE: On models with console switches, there is only one switch that controls both the heated grips and heated throttle lever. Refer to *SYSTEM DESCRIPTION* and *SETTING THE HEATED THROTTLE LEVER RATIO*.

Testing Heated Throttle Lever Switch with BUDS2

Heating elements are permanently connected to ground. Positive voltages are supplied by gauges.

1. Provide electrical power to the gauge for testing.
2. Using BUDS2, select the **Measurements** page.
3. Alternately increase or decrease heat using heated throttle lever switch.
4. Look for the applicable value to change to confirm the gauge receives the signal.

If test is good, refer to *TESTING GAUGE HEATED THROTTLE LEVER POWER OUTPUT* in this subsection.

If test failed, refer to *TESTING THROTTLE LEVER HEAT SWITCH* in this subsection.

Testing Gauge Heated Throttle Lever Power Output

1. Provide electrical power to the gauge for testing.
2. Using BUDS2, select the **Functions** page..
3. In BUDS2, turn on the heated throttle grip.
4. Touch throttle lever to confirm it heats up.
5. Backprobe gauge **no. MG** connector as per following table.

MODELS WITH COMPACT DIGITAL GAUGE	
TERMINAL	SPECIFICATION
MG-7	2.7 to 14.5 Vdc depending on heated throttle lever ratio

MODELS WITH ANALOG/DIGITAL GAUGE	
TERMINAL	SPECIFICATION
MG-4	12 Vdc

6. If test is good, the gauge output to throttle lever heater is good. Proceed with *TESTING THROTTLE LEVER HEATING ELEMENT* in this subsection.
7. If the test failed, replace the gauge.

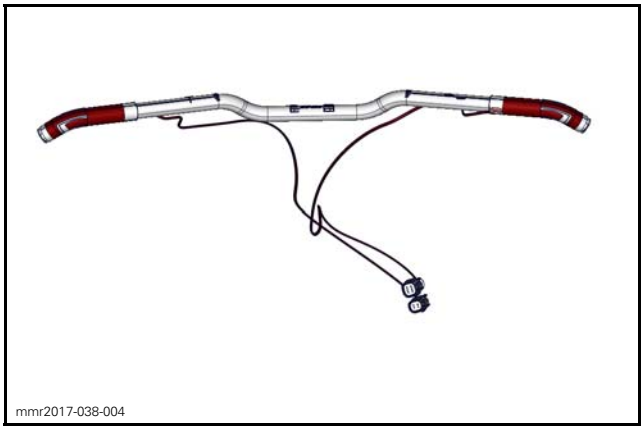
Testing Throttle Lever Heating Element

Refer to *WIRING HARNESS AND CONNECTORS* subsection for connector location.

STR 6P CONNECTOR		RESISTANCE @ 20°C (68°F)
STR 6P-5	STR 6P-2	1.73 - 4.22 Ω

1. If readings are out of specifications, replace throttle lever.
2. If heating element readings are within specifications, check wiring and connections to gauge.
3. Reconnect connectors.

HEATED HANDLEBAR GRIPS



Testing Handlebar Heated Grip Switch with BUDS2

Heating elements are permanently connected to ground. Positive voltages are supplied by gauges.

1. Provide electrical power to the gauge for testing.
2. Using the BUDS2, navigate to the **Measurements** page.
3. Press on the vehicle handle grip heat switch to alternately increase or decrease heat.
4. In BUDS2, look for the applicable to change.

If test is good, proceed with *TESTING GAUGE HEATER GRIPS POWER OUTPUT WITH BUDS2* in this subsection.

If test failed, proceed with *TESTING HANDLEBAR GRIP HEAT SWITCH* in this subsection.

Testing Gauge Heater Grips Power Output with BUDS2

1. Provide electrical power to the gauge for testing.
2. Using the BUDS2, navigate to the **Functions** page.
3. In BUDS2, turn the heated grips on.

MODELS WITH COMPACT DIGITAL GAUGE	
TERMINAL	SPECIFICATION
MG-1	12 Vdc

MODELS WITH ANALOG/DIGITAL GAUGE	
TERMINAL	SPECIFICATION
MG-5	12 Vdc

4. If test is good, the gauge heater to handlebar grip heater is good. Proceed with *TESTING HANDLEBAR GRIP HEATING ELEMENT* in this subsection.
5. If the test failed, replace the gauge.

Testing Handlebar Grip Heating Element

If you cannot feel the temperature increase of a hand grip heating element, carry out the following steps.

1. Disconnect heated grip connector.
2. Test heating elements on either side as per following specifications.

Refer to *WIRING HARNESS AND CONNECTORS* subsection for connector location.

RIGHT HEATED GRIP		RESISTANCE @ 20°C (68°F)
STR 6P-4	STR 6P-1	5.3 - 6.6 Ω

LEFT HEATED GRIP		RESISTANCE @ 20°C (68°F)
STR 6P-3	STR 6P-1	5.3 - 6.6 Ω

3. If readings are out of specifications, replace applicable handle grip heating element.
4. If heating element readings are within specifications, check wiring and connections.
5. Reconnect connectors.

Removing Heater Element

NOTICE Heater wire routing may vary significantly due to different type handlebars and vehicles. Its highly important to take note of exact positioning of grip heaters, locking ties, and wire routing before removing them from the handlebars. Failure to properly route wires may lead to equipment damage or failure.

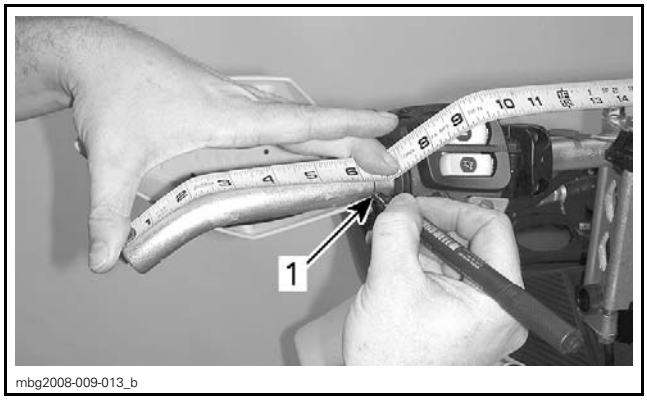
1. Disconnect the connector, Refer to *WIRING DIAGRAM AND CONNECTORS* subsection for connector location.
   1.1 STR 4P for left hand handlebar heater
   1.2 STR 6P for right hand handlebar heater

Use procedures for *MOLEX* connectors in the *WIRING DIAGRAM AND CONNECTORS* subsection.

2. Cut locking ties securing heater wires to handlebars.
3. Pull wires from harness protective sheath, multifunction switch housing or throttle lever housing.
4. Cut and remove black electrical tape from heater element and remove heater from cork insulator.
5. If damaged, remove cork insulator from handlebar and clean all adhesive residue from the handlebar.

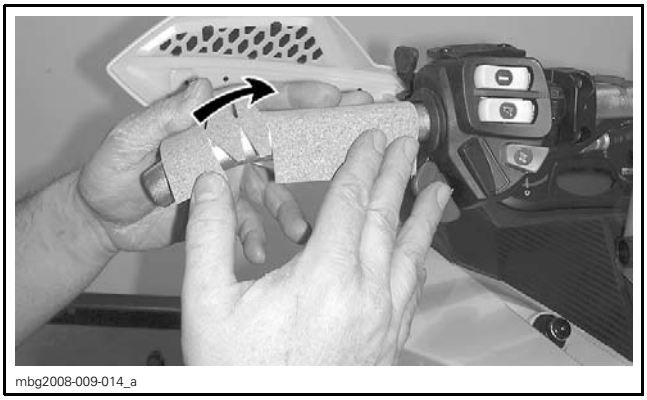
Installing Heated Grips Heater Element

1. Measure 159 mm (6.25 in) from the end of the handlebar, and across the top of the bend in the bar. Trace a reference line with a marker at that point on the handlebar.



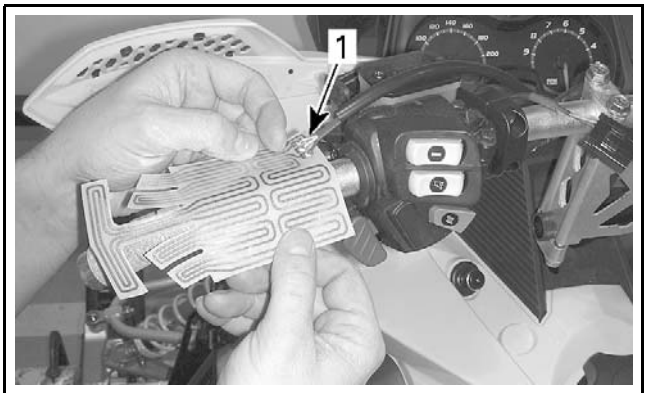
TYPICAL — MEASURING FOR HEATER POSITION
1. Trace reference line

2. Align the edge of the cork insulator with the reference line centered with the handlebar folding axis as illustrated.


mbg2008-009-014_a

TYPICAL — CORK INSULATOR ALIGNMENT

3. Apply firm pressure to cork insulator to assure proper adherence to handlebar.
4. Align the film heater element with the cork insulator and center of handlebar folding axis as illustrated.



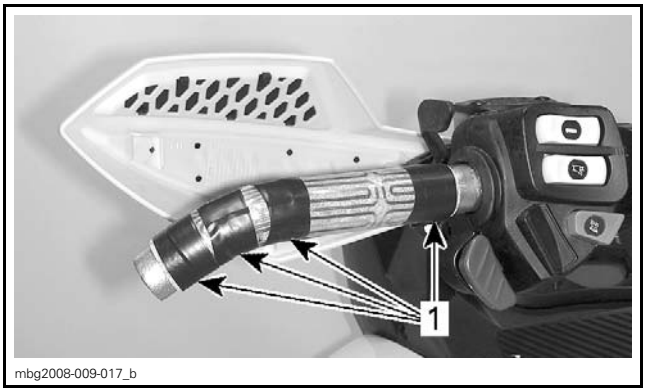
mbg2008-009-016_b

TYPICAL — HEATER ALIGNMENT
1. Heater wire position (LH front, RH rear)

5. Apply firm pressure to heater to assure proper adherence to cork insulator.

NOTE: The same heater element is used for both the LH and RH sides. Therefore, the electrical wiring will be in front of the handlebar on the LH side, and behind the handlebar (towards driver) on the RH side.

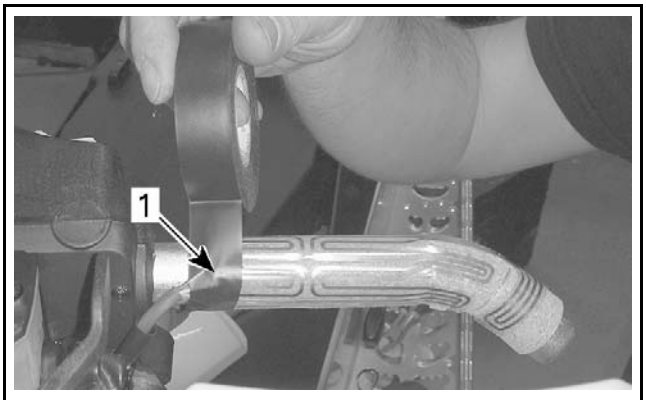
6. Apply two turns of black electrical tape at each of the four locations illustrated so that it covers the edges of the heater element and prevents snagging and damage to the element during rubber grip installation.



mbg2008-009-017_b

TYPICAL
1. Electrical tape application (4x)

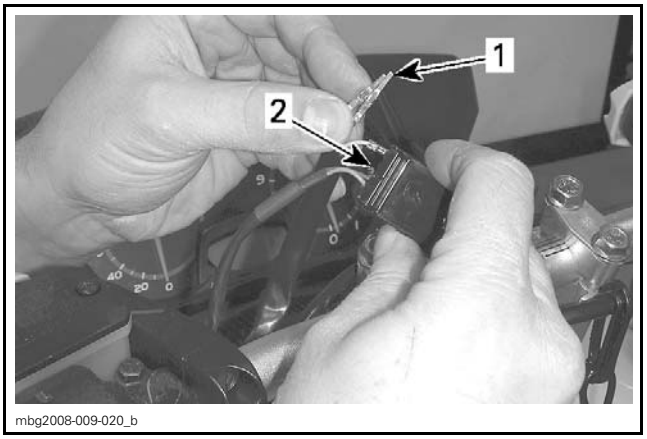
NOTE: It is highly important to apply tape so that it fully secures the electrical wire connections. This will ease installation of the rubber hand grip and prevent undue stress to the connections.



mbg2008-009-018_b

TYPICAL — IMPORTANT
1. Tape application over wire connections

7. Install rubber hand grip, refer to *STEERING SYSTEM* subsection for detail.
8. Route wiring as noted during the removal procedure.
9. Insert wire in housing, refer to *WIRING DIAGRAM* for wire color and pin number locations.

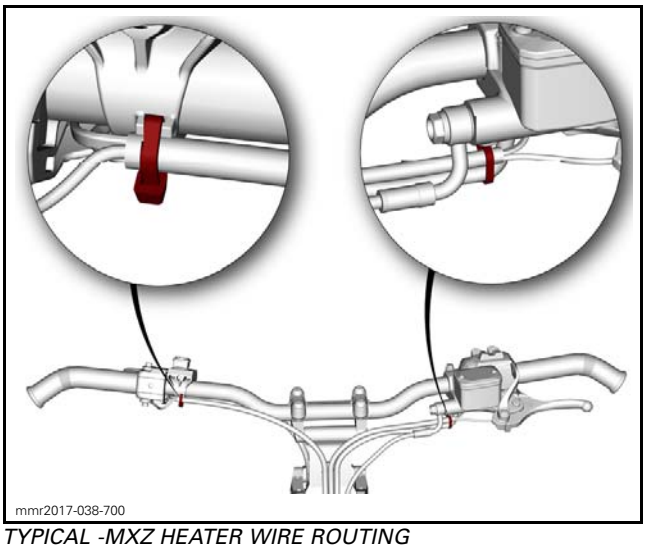


TYPICAL
1. *Heater wire terminals*
2. *Insertion through back of connector*

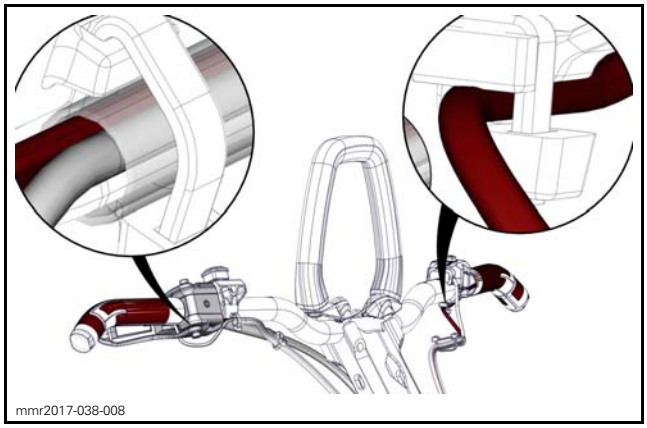
10. Install locking ties to secure the heater wire as it was routed originally..

⚠ WARNING

To ensure RH heater wires does not prevent smooth operation of throttle lever, it must be passed straight through the housing without any slack, and secured with a locking tie on the emergency engine cut-off switch housing.



TYPICAL -MXZ HEATER WIRE ROUTING



TYPICAL - SUMMIT HEATER WIRE ROUTING

NOTICE **Ensure LH heater wires are properly routed through multifunction switch housing to prevent them from being pinched when installing housing cover. Pinched or damaged wires may result in a short circuit.**

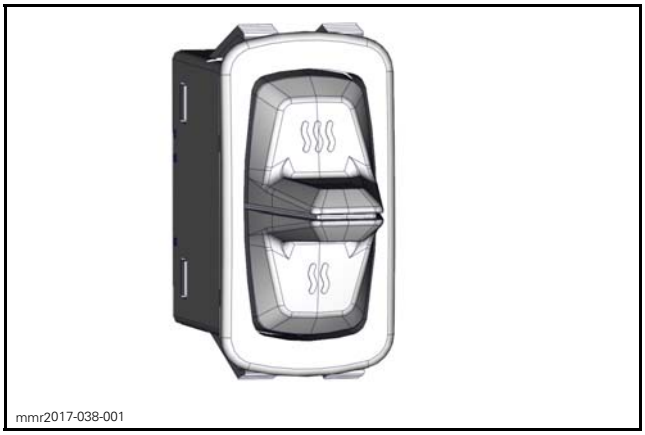
11. Provide electrical power to the heaters for testing.
12. Using the hand grip heat switch, turn on the hand grip heaters and ensure they are functioning correctly.

TESTING THROTTLE LEVER HEAT SWITCH

NOTE: On models with the compact digital gauge, there is only one switch that controls both the heated grips and heated throttle lever.

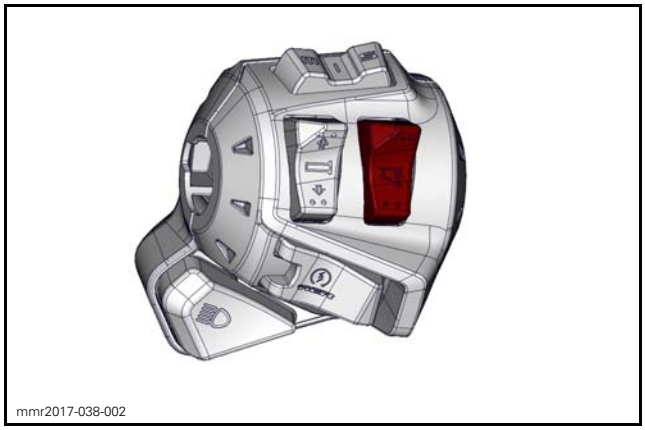
1. Using the FLUKE 115 MULTIMETER (P/N 529 035 868), select the Ω position.
2. Test throttle lever heat switch and circuits as per table.

Models with console switches



THROTTLE LEVER HEAT SWITCH TEST			
SWITCH SELECTION	TERMINAL		RESISTANCE
UP	GRIP-6	GRIP-8	Close to 0 Ω
	GRIP-6	GRIP-5	Infinite (OL)
DOWN	GRIP-6	GRIP-8	Infinite (OL)
	GRIP-6	GRIP-5	Close to 0 Ω

Models with multifunction switches



mmr2017-038-002

THROTTLE LEVER HEAT SWITCH TEST			
SWITCH SELECTION	TERMINAL		RESISTANCE
UP	SH-1	SH-9	Close to 0 Ω
	SH-1	SH-3	Infinite (OL)
DOWN	SH-1	SH-9	Infinite (OL)
	SH-1	SH-3	Close to 0 Ω

If continuity test is as per specification, check wiring to gauge connector.

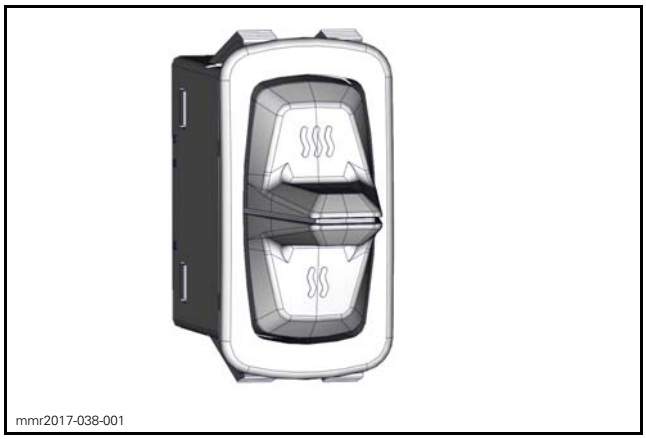
If continuity test is out of specification, check switch circuit as per wiring diagram. If good, replace switch.

TESTING HANDLEBAR HEATED GRIP SWITCH

NOTE: On models with the compact digital gauge, there is only one switch that controls both the heated grips and heated throttle lever.

1. Test throttle lever heat switch and circuits as per table.

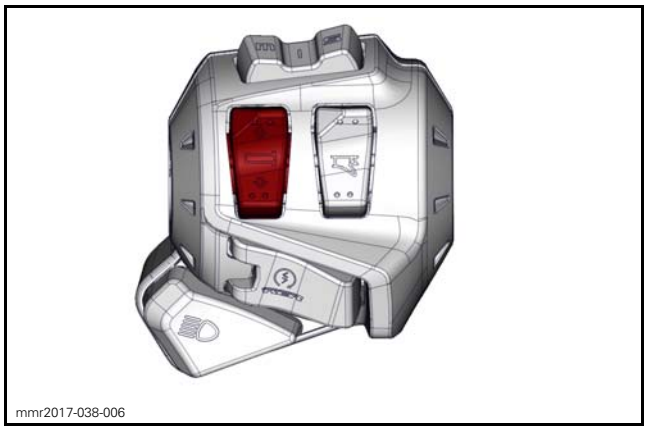
Models with console switches



mmr2017-038-001

HEATED GRIP HEAT SWITCH TEST			
SWITCH SELECTION	TERMINAL		RESISTANCE
UP	GRIP-6	GRIP-8	Close to 0 Ω
	GRIP-6	GRIP-5	Infinite (OL)
DOWN	GRIP-6	GRIP-8	Infinite (OL)
	GRIP-6	GRIP-5	Close to 0 Ω

Models with multifunction switches



mmr2017-038-006

HEATED GRIP HEAT SWITCH TEST			
SWITCH SELECTION	TERMINAL		RESISTANCE
UP	SH-1	SH-10	Close to 0 Ω
	SH-1	SH-4	Infinite (OL)
DOWN	SH-1	SH-10	Infinite (OL)
	SH-1	SH-4	Close to 0 Ω

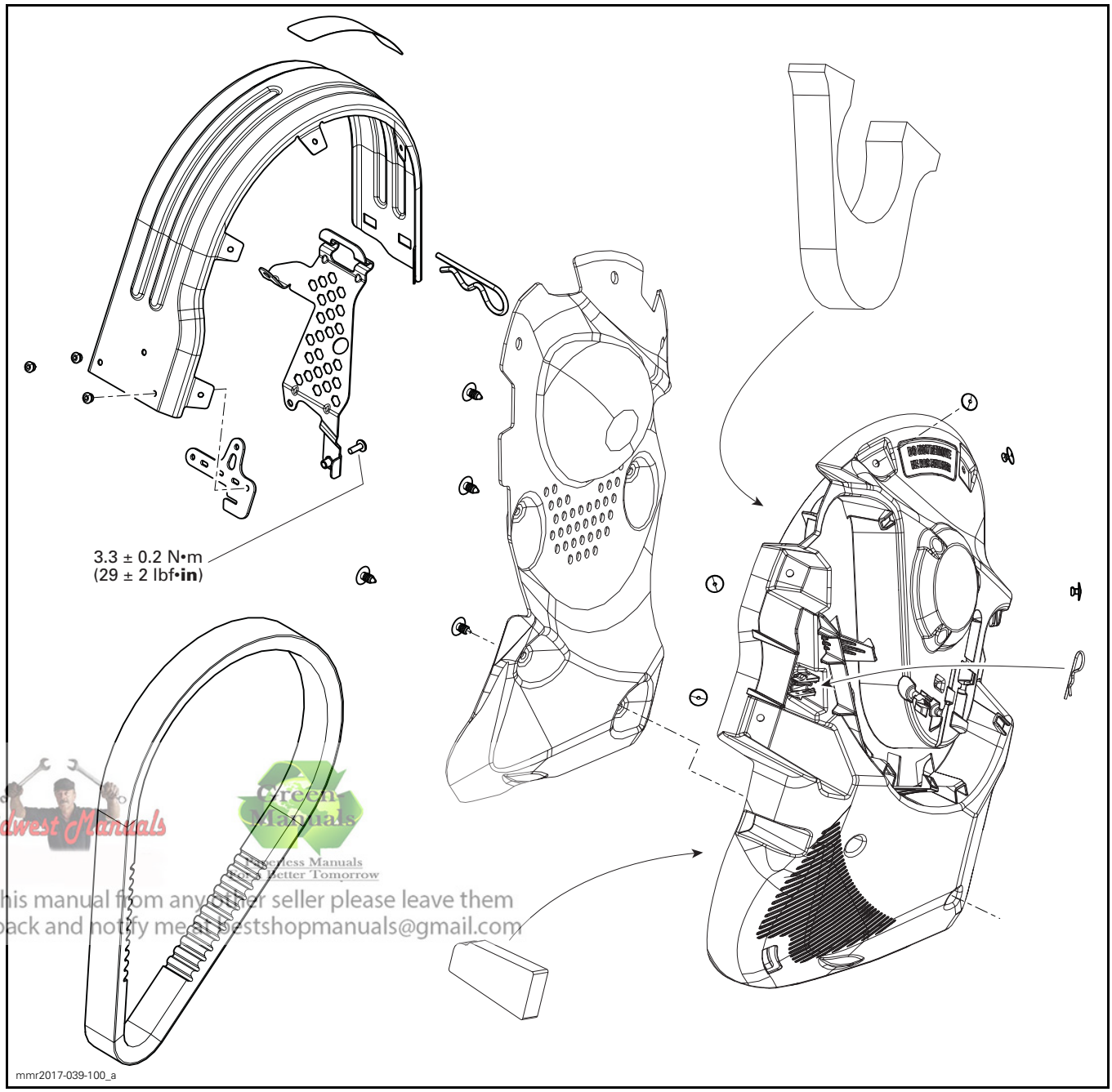
If continuity test is as per specification, check wiring to gauge connector.

If continuity test is out of specification, check switch circuit as per wiring diagram. If good, replace switch.

DRIVE BELT

SERVICE TOOLS

Description	Part Number	Page
TENSIOMETER	414 348 200	5



GENERAL

DRIVE BELT APPLICATION

Always use the drive belt specified in the BRP *PARTS CATALOG* as applicable to vehicle and engine model.

TROUBLESHOOTING

VEHICLE CREEPS FORWARD AT IDLE

1. Improper drive belt height (too high)
   - *Refer to ADJUSTING THE DRIVE BELT HEIGHT procedure in this subsection.*

ENGINE STALLS WHEN ENGAGING RER

1. Improper drive belt height (too high)
   - *Refer to ADJUSTING THE DRIVE BELT HEIGHT procedure in this subsection.*

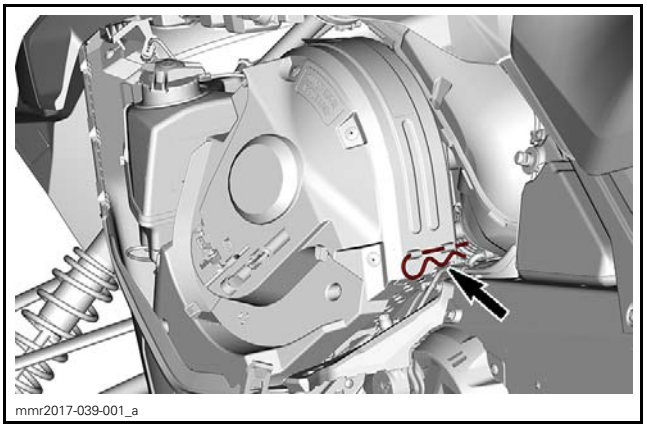
PROCEDURES

DRIVE BELT GUARD

NOTE: Belt guard is purposely made slightly oversize to maintain tension on its pins and retainers preventing undue noise and vibration.

Removing the Drive Belt Guard

1. Remove LH side panel.
2. Remove retaining pin.

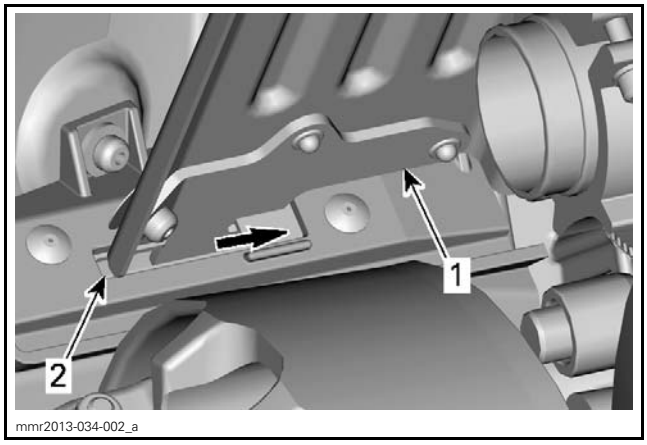


mmr2017-039-001_a

3. Lift rear portion of guard then release from front tabs.

Installing the Drive Belt Guard

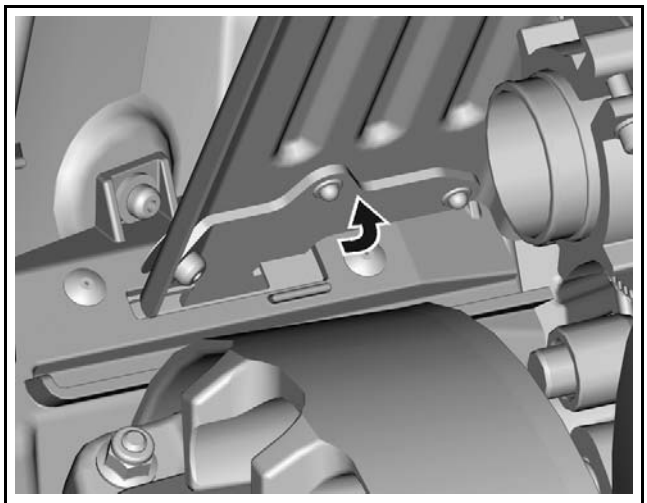
1. Insert belt guard tab in front support slot.



mmr2013-034-002_a

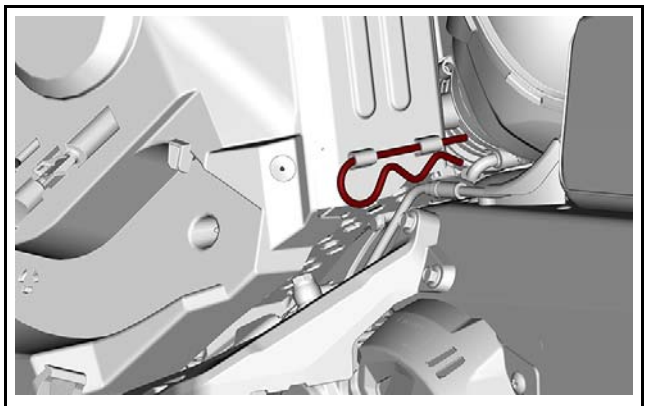
1. Belt guard tab
2. Front support slot

2. Push drive belt guard toward engine then toward front of vehicle.



mmr2013-034-006_a

3. Position rear portion of the drive belt guard over the retainer and secure it using the retaining pin.

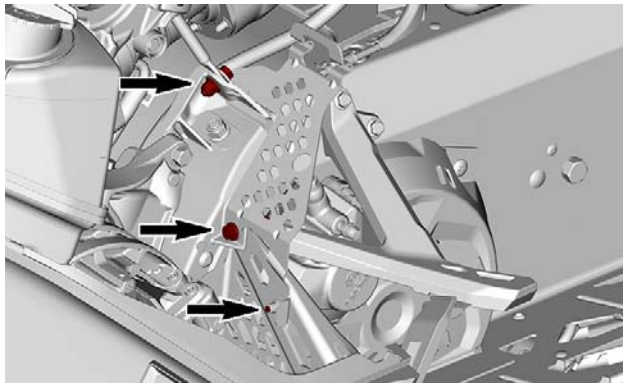


mmr2017-039-002

DRIVE BELT GUARD SUPPORT

Removing the Drive Belt Guard Support

1. Remove the drive belt guard.
2. Remove screws securing the support to vehicle.


mmr2017-039-003_a

Installing the Drive Belt Guard Support

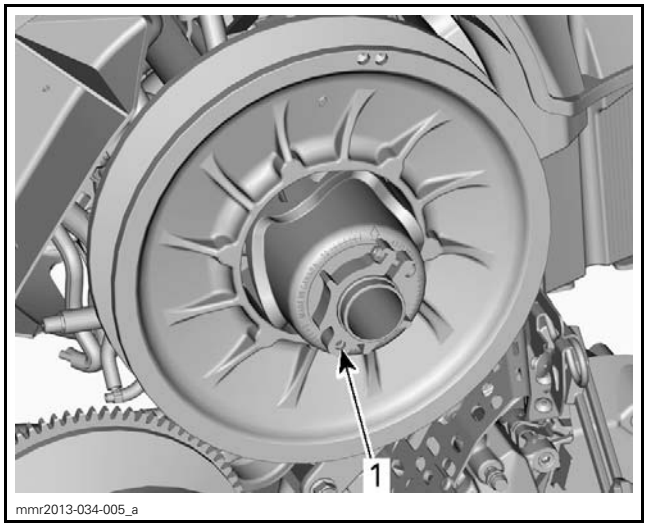
The installation is the reverse of the removal procedure. However pay attention to the following.

TIGHTENING TORQUE	
Drive belt guard support Torx screw	3.3 N•m ± 0.2 N•m (29 lbf•**in** ± 2 lbf•**in**)
Hexagonal flange elastic nut	10 N•m ± 2 N•m (89 lbf•**in** ± 18 lbf•**in**)

DRIVE BELT

Removing the Drive Belt

1. Remove tether cord cap from engine cut-off switch.
2. Remove LH side panel.
3. Remove drive belt guard, refer to *REMOVING THE DRIVE BELT GUARD*.
4. Insert the driven pulley expander provided in the tool kit in the threaded hole on the adjuster hub as illustrated.



mmr2013-034-005_a

1. PULLEY expander to be installed here - on Adjuster hub

5. Open the driven pulley by screwing the tool in.
6. Remove the belt by slipping it over the top of the driven pulley, then out of the drive pulley.

Inspecting the Drive Belt

Inspect belt for:
- Cracks
- Fraying
- Abnormal wear (uneven wear, wear on one side, missing cogs, torn fabric).

If abnormal wear is noted, the probable cause could be:
- Pulley misalignment
- Excessive RPM with frozen track
- Fast starts without warm-up period
- Scratched or rusty sheave
- Oil on belt
- Distorted spare belt.

Check drive belt width. Replace the drive belt if its width is under minimum recommended specification.

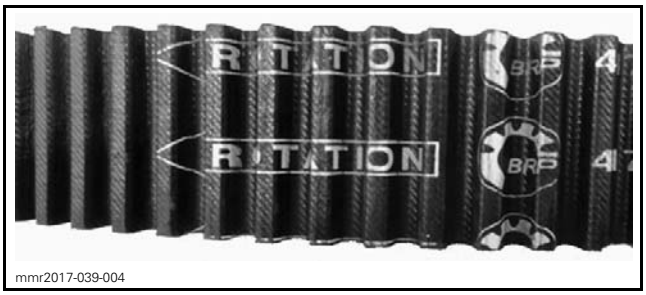
DRIVE BELT WIDTH	
NEW	WEAR LIMIT
38.3 mm (1.508 in)	35.9 mm (1.413 in)

Installing the Drive Belt

1. If necessary, open the driven pulley, refer to *REMOVING THE DRIVE BELT*.
2. Insert drive belt in the drive pulley, then pull it over the driven pulley.

NOTICE **Do not force or use tools to pry the belt into place, as this could cut or break the cords in the belt.**

NOTE: The maximum drive belt life span is obtained when the belt is installed with the arrows on the belt pointing in the direction of rotation.

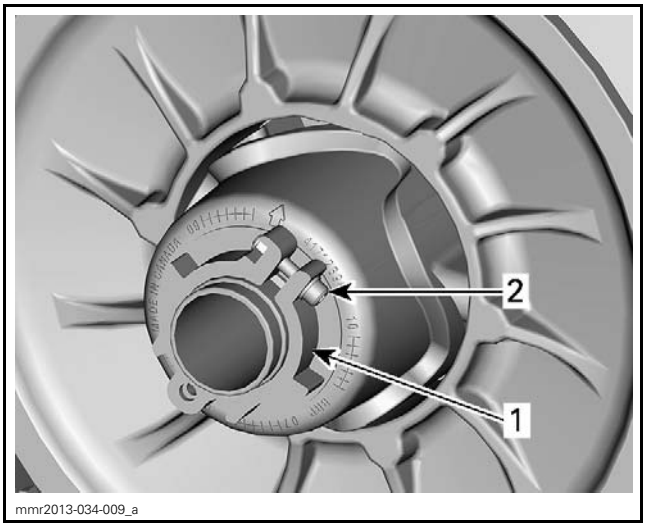


mmr2017-039-004

3. Unscrew and remove the driven pulley expander from the driven pulley.
4. Rotate the driven pulley several times to properly set the belt between the sheaves.
5. Adjust drive belt height. Refer to *ADJUSTING THE DRIVE BELT HEIGHT* procedure.
6. Install drive belt guard, refer to *INSTALLING THE DRIVE BELT GUARD*.
7. Install LH side panel.

Adjusting the Drive Belt Height

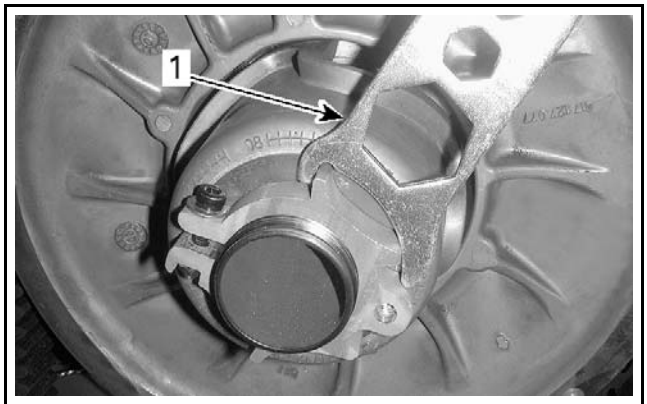
1. Remove tether cord cap from engine cutout switch.
2. Remove LH side panel.
3. Remove drive belt guard, refer to *REMOVING THE DRIVE BELT GUARD*.
4. Loosen the clamping screw.



mmr2013-034-009_a

1. Adjustment ring
2. Clamping screw

5. Using the suspension adjustment tool provided in the tool kit, turn the adjustment ring 1/4 turn at a time then rotate the driven pulley to properly set the belt between the pulley sheaves.

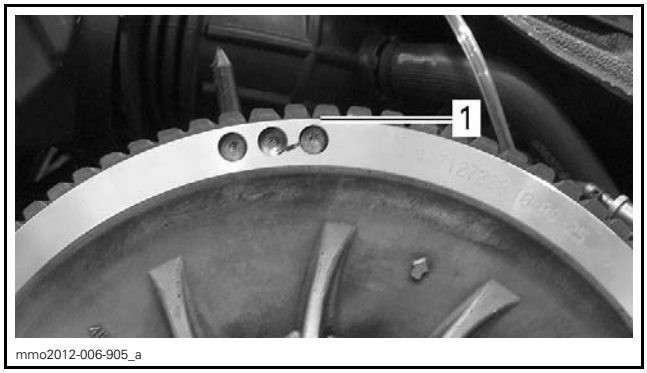


mmr2013-034-010_a

1. Suspension adjustment tool

NOTE: The adjustment ring has left hand treads.

Repeat step 5 until the lowest portion of the cogs on the external surface of drive belt is even with the driven pulley edge.



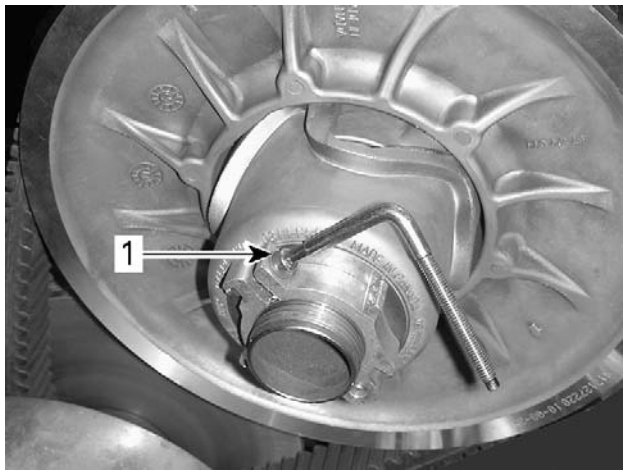
mmo2012-006-905_a

PRELIMINARY SETTING
1. Lowest portion of cogs even with external surface of drive belt

NOTE: Turning the adjustment ring counterclockwise lowers the belt in the pulley. Turning the ring clockwise raises the belt in the pulley.

6. Tighten the adjustment ring clamping screw.

TIGHTENING TORQUE	
Adjustment ring clamping screw	5.5 N•m ± 0.5 N•m (49 lbf•**in** ± 4 lbf•**in**)



1. Clamping screw

7. Install belt guard, refer to *INSTALLING THE DRIVE BELT GUARD*.
8. Install LH side panel.
9. Start engine and check if vehicle creeps.
   - 9.1 If vehicle does not creep, adjustment is complete.
   - 9.2 If vehicle creeps, check the drive belt deflection.

Reverse Activation

Reverse may not activate or may be harder to activate if the belt is positioned too high in the driven pulley. If reverse activation does not work properly, ensure the drive belt is properly adjusted.

Adjust the drive belt lower in the driven pulley if needed.

Verifying the Drive Belt Deflection

1. Make sure drive belt height is adjusted (preliminary setting).
2. Position a reference rule on drive belt.
3. Use the TENSIOMETER (P/N 414 348 200) as explained below.
4. Set deflection as per following table using bottom O-ring.

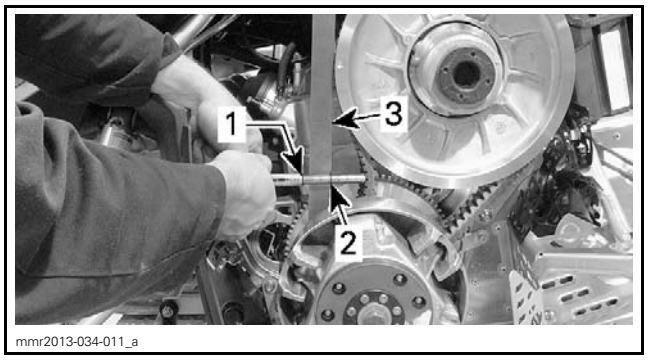
DRIVE BELT DEFLECTION	
DRIVE BELT DEFLECTION SETTING	32 mm ± 5 mm (1.26 in ± .2 in)

DEFLECTION SETTING
1. Bottom O-ring

5. Place upper O-ring to 0 kgf (0 lbf).

LOAD READING
1. Upper O-ring

6. Apply pressure until bottom O-ring (deflection) is flush with edge of rule.



TYPICAL
1. Upper O-ring — load
2. Bottom O-ring — deflection
3. Reference rule

7. Read drive belt load. Compare result with the following table.

DRIVE BELT DEFLECTION	
DRIVE BELT LOAD READING	11.30 kgf (25 lbf)

8. If deflection is within specification, drive belt is properly adjusted.
9. If deflection is out of specification, try the following:
   - Lower drive belt height from initial setting.
   - Try another drive belt.
10. If proper load still cannot be obtained, check the following:
    - Inspect engine supports.
    - Inspect countershaft and bearing.
    - Inspect chassis for damages.

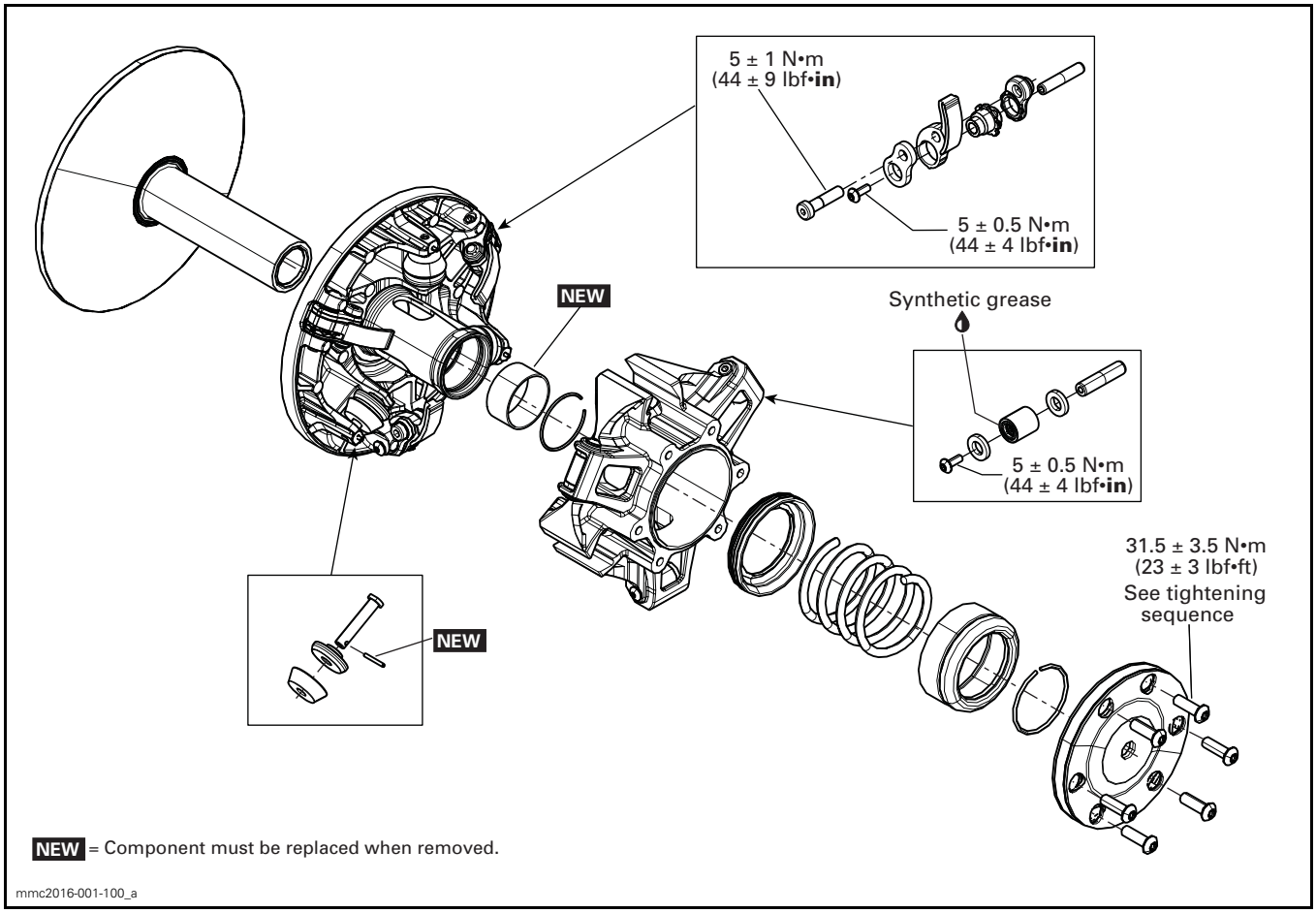
pDRIVE PULLEY WITH CLICKER

SERVICE TOOLS

Description	Part Number	Page
CIRCLIP INSTALLER/REMOVER	529 036 375	4–5
CLUTCH HOLDER	529 036 369	3, 12
DRIVE PULLEY OPENING TOOL	529 036 378	4, 8
DRIVE PULLEY SUPPORT	529 036 371	4–5, 7
GREASE INJECTOR	529 036 376	10
PDRIVE PULLER	529 036 370	3–4
PULLEY SPRING COMPRESSOR TOOL	529 036 373	4–5, 7–8
REMOVING AXLE TOOL	529 036 372	4, 6–8

SERVICE PRODUCTS

Description	Part Number	Page
ISOFLEX GREASE TOPAS NB 52	293 550 021	10
PULLEY FLANGE CLEANER	413 711 809	9



GENERAL

The pDrive pulleys are lubrication-free drive pulleys. Only the needle bearings inside the rollers need to be lubricated when replaced.

Always refer to appropriate *PARTS CATALOG* for replacement parts.

NOTICE Never use any type of impact wrench for drive pulley removal and installation. The use of impact wrench could damage the drive pulley and modify the calibration.

Some drive pulley components (like the spring and ramps) can be changed to improve vehicle performance in high altitude regions. A Service Bulletin provides information about calibration according to altitude.

NOTICE Such modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance. Verify spring specifications before installation. Do not only refer to the spring color code.

⚠ WARNING

Any drive pulley repairs must be performed by an authorized Ski-Doo dealer. Subcomponent installation and assembly tolerances require strict adherence to procedures detailed.

During assembly/installation, use torque values as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.).

ADJUSTMENT

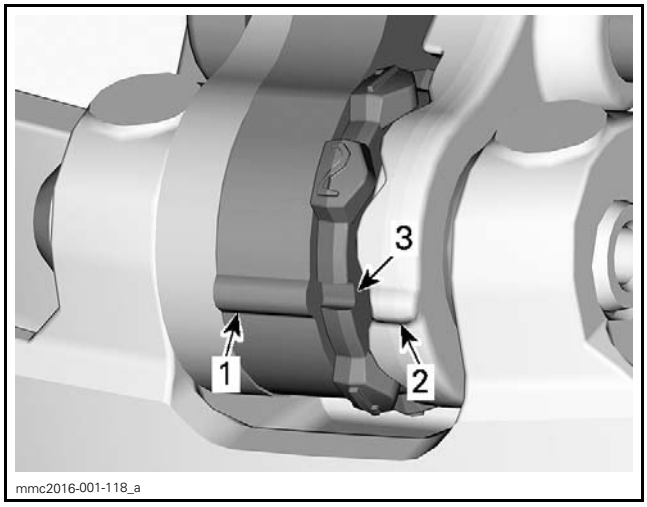
The drive pulley is factory calibrated to transmit maximum engine power at a predefined RPM. Factors such as ambient temperature, altitude or surface condition may vary this critical engine RPM thus affecting snowmobile efficiency.

This adjustable drive pulley allows setting maximum engine RPM in the vehicle to maintain maximum power. The adjustment has an effect on high RPM only.

Ramp cam should be adjusted so that actual maximum engine RPM in vehicle matches the maximum horsepower RPM given in *TECHNICAL SPECIFICATIONS*.

To adjust, modify ramp end position by turning ramp cams (3x).

The ramp and the right lever have a notch while ramp cam has 5 positions numbered 1 to 5.



mmc2016-001-118_a

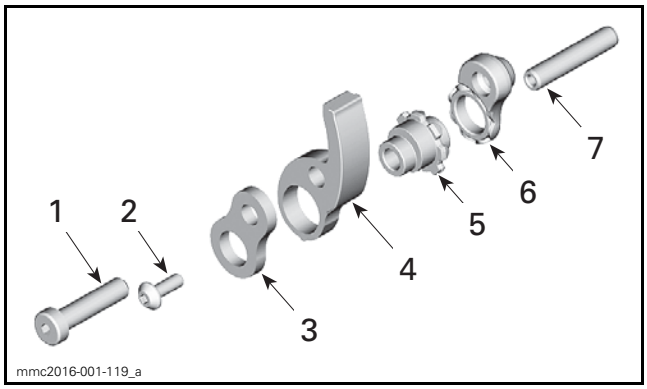
1. *Ramp notch*
2. *Right lever notch*
3. *Cam position (here #3 - factory setting, no number)*

Each number modifies maximum engine RPM by about 200 RPM.

Lower numbers decrease engine RPM in steps of 200 RPM and higher numbers increase it in steps of 200 RPM.

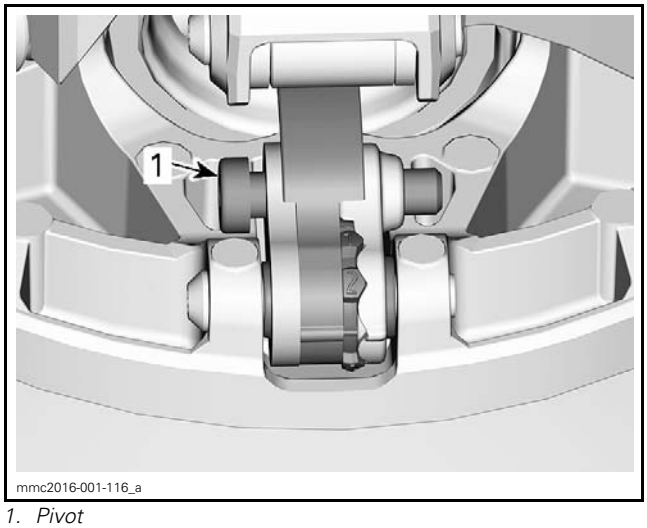
For example: Ramp cam is set at position 3 and is changed to position 5. So maximum engine RPM is increased by about 400 RPM.

MODIFYING THE RAMP CAM SETTING



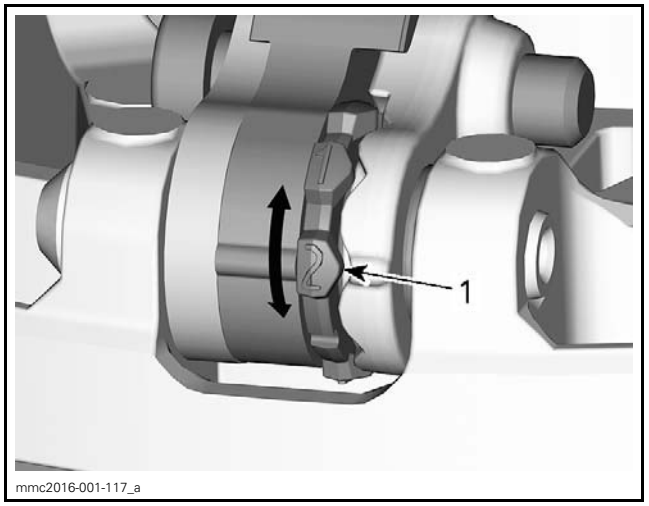
1. *Pivot*
2. *Axle retaining screw*
3. *Left lever*
4. *Ramp*
5. *Cam*
6. *Right lever*
7. *Axle*

1. Loosen the pivot.



1. *Pivot*

2. Move right lever aside to be able to turn the cam.
3. Turn cam to the desired position.



1. *Desired cam position (here #2)*

TIGHTENING TORQUE	
Pivot	5 N•m ± 1 N•m (44 lbf•**in** ± 18 lbf•**in**)

NOTICE Always adjust all 3 cams and make sure they are all set at the same number.

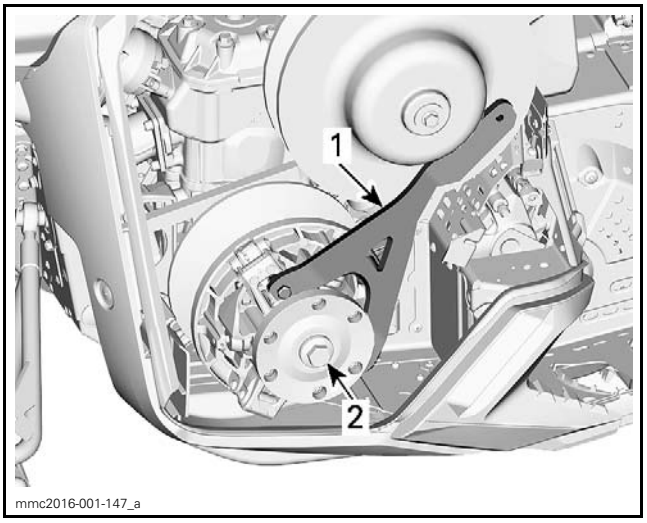
PROCEDURES

DRIVE PULLEY

Removing the Drive Pulley

REQUIRED TOOLS	
CLUTCH HOLDER (P/N 529 036 369)	
PDRIVE PULLER (P/N 529 036 370)	

1. Remove drive belt. Refer to *DRIVE BELT* subsection.
2. Remove the drive pulley bolt.
   2.1 Secure the drive pulley with the clutch holder.
   2.2 Using a breaker bar, remove the drive pulley bolt and its conical spring washer.



1. Clutches holder
2. Drive pulley bolt

3. Remove the drive pulley from engine.
   3.1 Make sure the clutches holder is properly installed.
   3.2 Screw the pDrive puller in place of the drive pulley bolt.
   3.3 Tighten the pDrive puller until pulley is disengaged from the crankshaft end.

NOTICE These pulleys have metric threads. Do not use a puller with ANS (American National Standard) or IS (International Standard) type threads. Always tighten puller by hand to ensure that the drive pulley has the same type of threads (metric vs ANS or IS) prior to fully tightening.

Disassembling the Drive Pulley

REQUIRED TOOLS	
PDRIVE PULLER (P/N 529 036 370)	
DRIVE PULLEY SUPPORT (P/N 529 036 371)	
PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)	

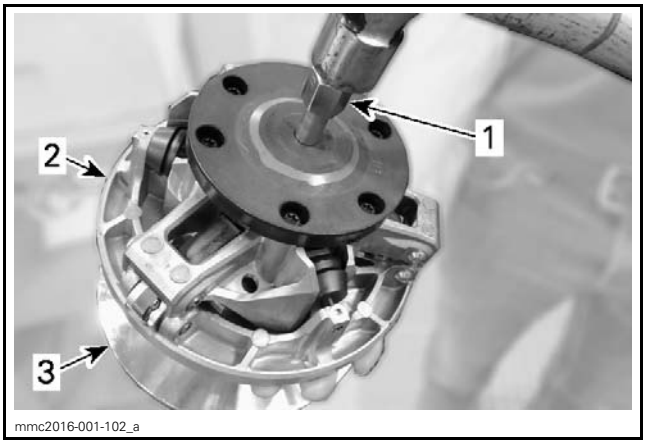
REQUIRED TOOLS	
CIRCLIP INSTALLER/REMOVER (P/N 529 036 375)	
REMOVING AXLE TOOL (P/N 529 036 372)	
DRIVE PULLEY OPENING TOOL (P/N 529 036 378)	

Separating Fixed and Sliding Sheaves

To separate fixed sheave from sliding sheave, screw puller into fixed sheave shaft about 13 mm (1/2 in).

Raise drive pulley and hold it by the sliding sheave while knocking on puller head to disengage fixed sheave.

NOTICE NEVER tap on spider.



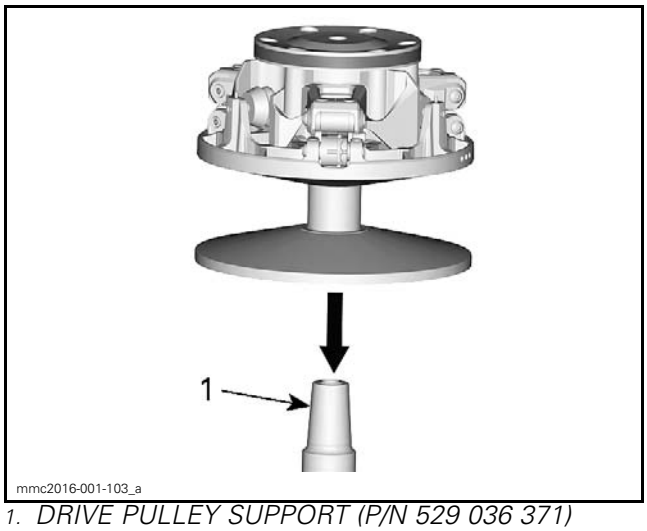
1. Puller screwed 13 mm (1/2 in) in fixed sheave
2. Sliding sheave
3. Fixed sheave

NOTE: No component marking is required before disassembly. This drive pulley features factory apposed index marks as references.

NOTICE Never use any type of torch to heat spider.

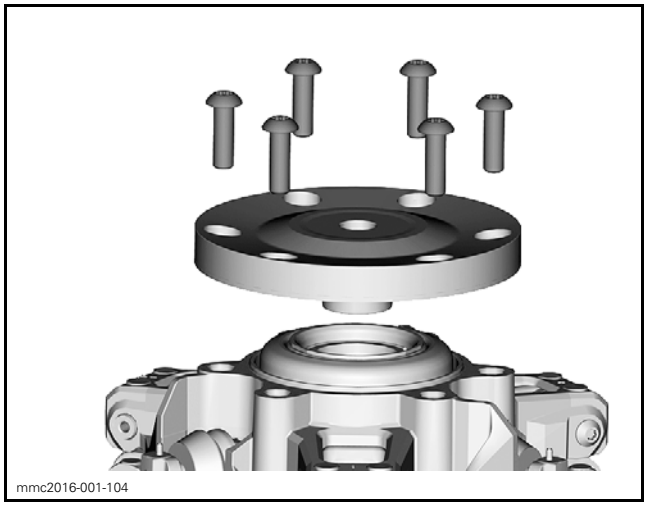
Removing the Damper

1. Secure the drive pulley support in a vice.
2. Install the drive pulley over the support.

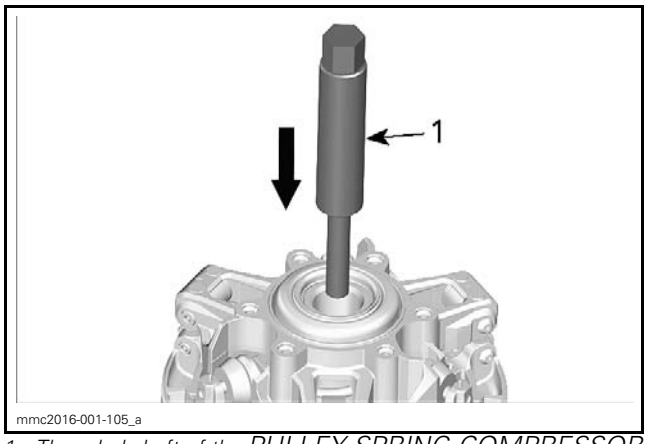


1. *DRIVE PULLEY SUPPORT (P/N 529 036 371)*

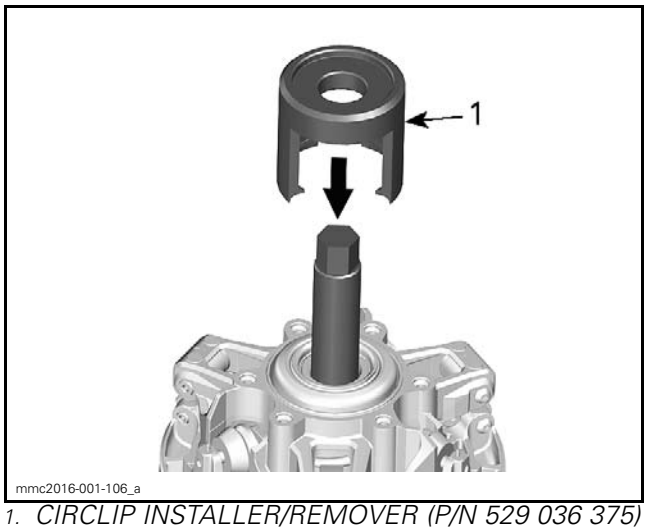
3. Remove the damper.



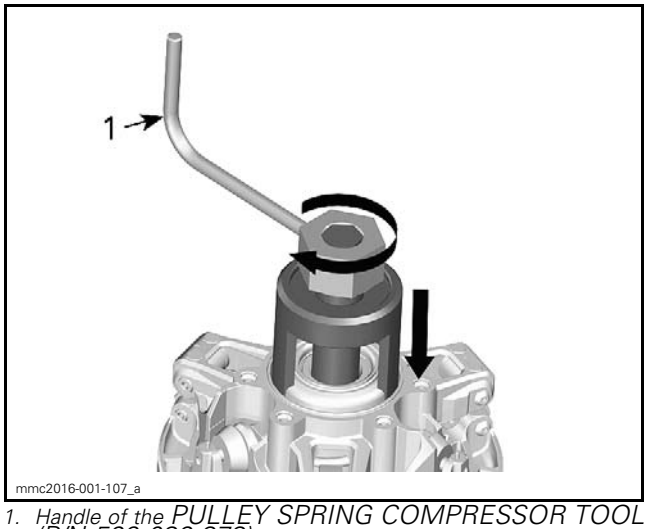
Removing the Spring



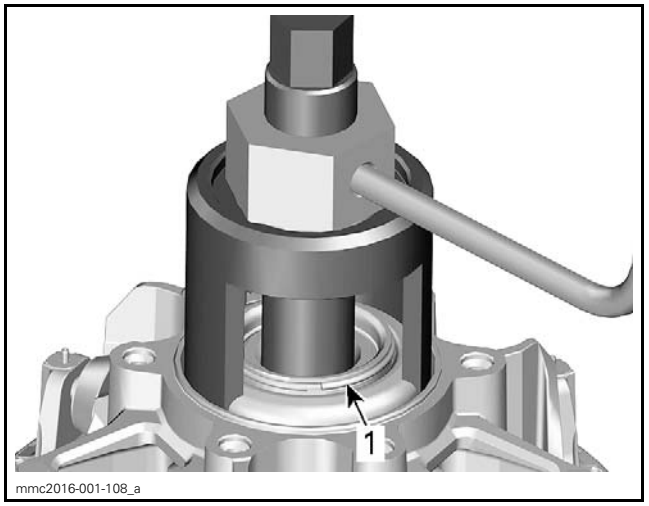
1. *Threaded shaft of the PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)*



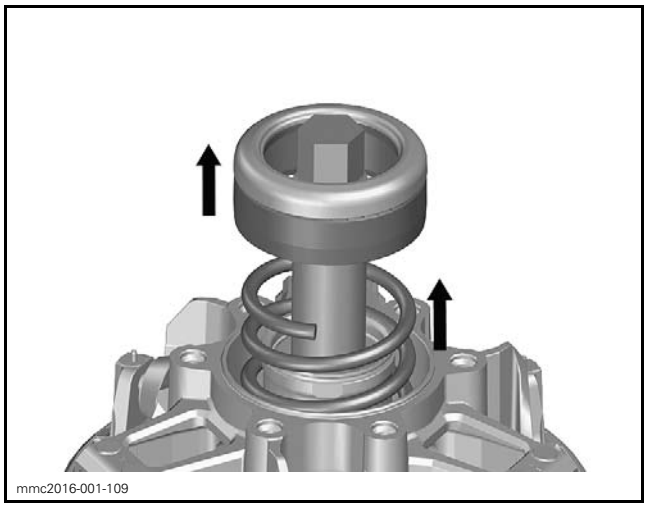
1. *CIRCLIP INSTALLER/REMOVER (P/N 529 036 375)*



1. *Handle of the PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)*

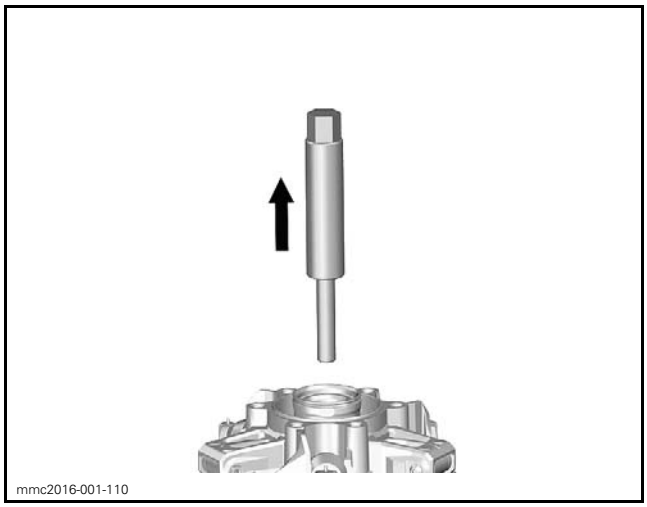


1. *Remove the circlip*


mmc2016-001-109

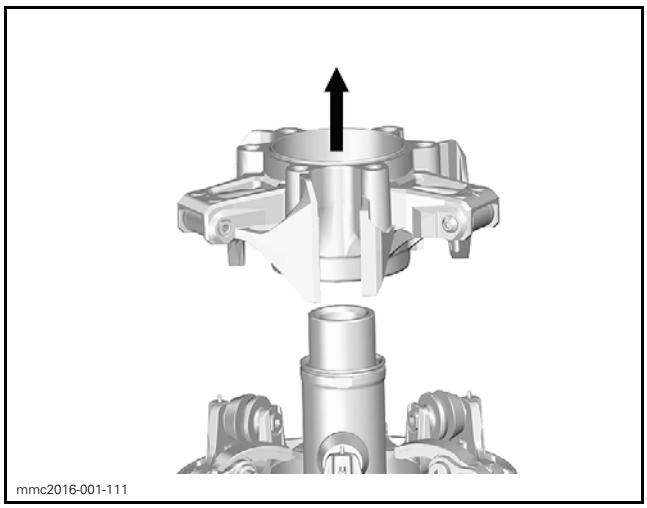
Removing the Spider

1. Remove the threaded shaft.


mmc2016-001-110

NOTICE Remove the threaded shaft to avoid damaging the bushings inside the spider.

2. Remove the spider.

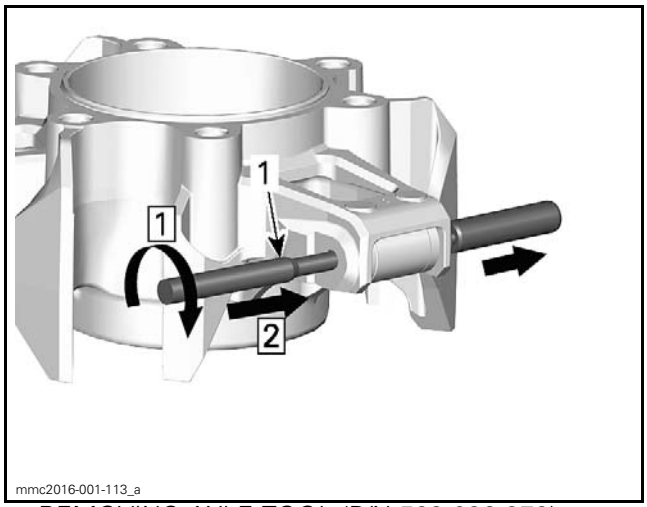

mmc2016-001-111

Removing the Roller

1. Remove axle retaining screw.


mmc2016-001-112

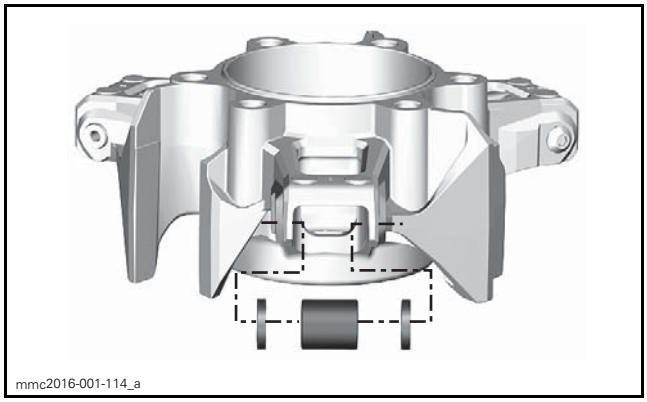
2. Remove the axle.



mmc2016-001-113_a

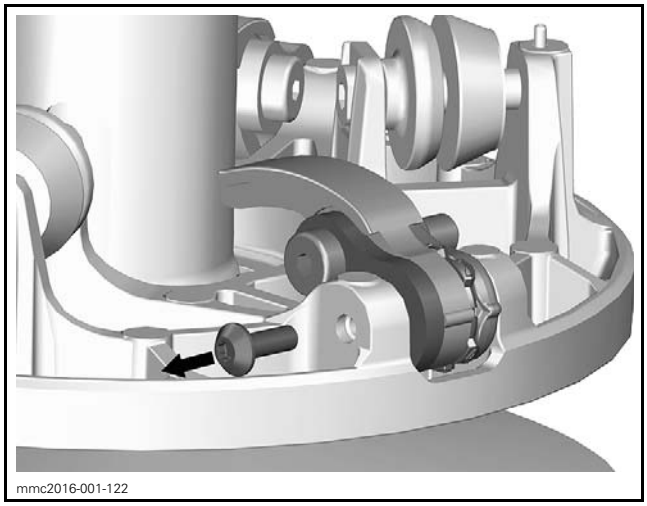
1. REMOVING AXLE TOOL (P/N 529 036 372)
Step 1: Screw the tool into the axle
Step 2: Push axle to the right side

3. Remove the roller and its thrust washers.

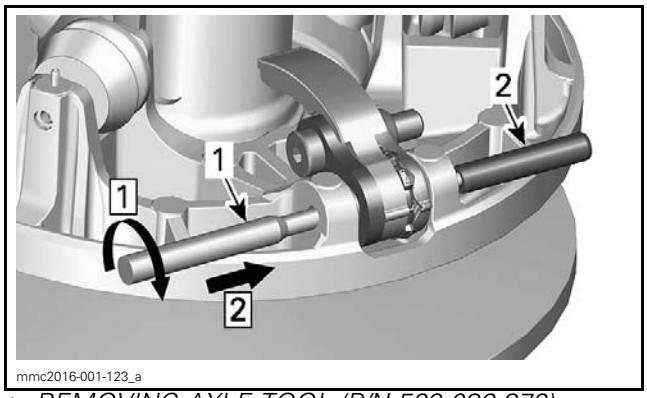

mmc2016-001-114_a

Removing the Ramp (without Spider)

1. Remove axle retaining screw.



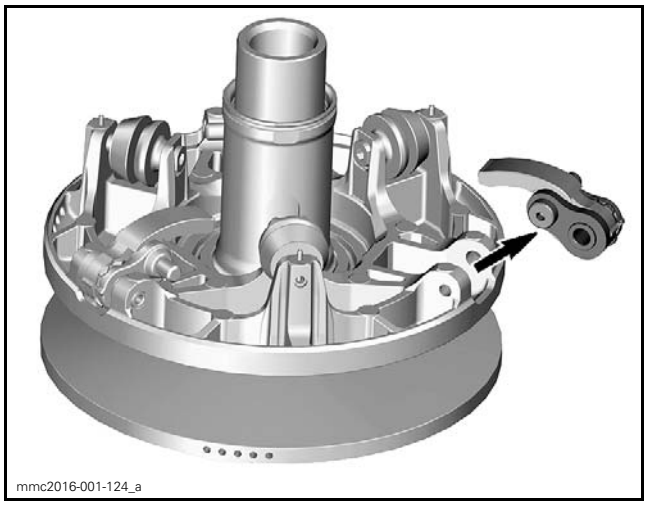
2. Remove the axle.



1. REMOVING AXLE TOOL (P/N 529 036 372)
2. Axle

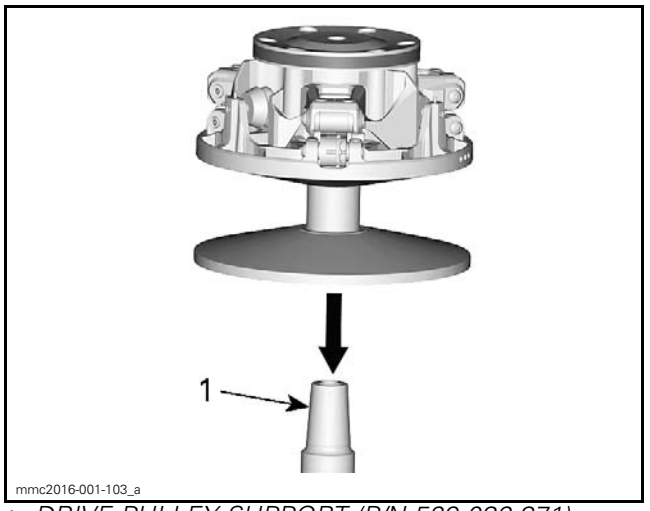
Step 1: Screw the tool into the axle
Step 2: Push axle to the right side

3. Remove ramp assembly.

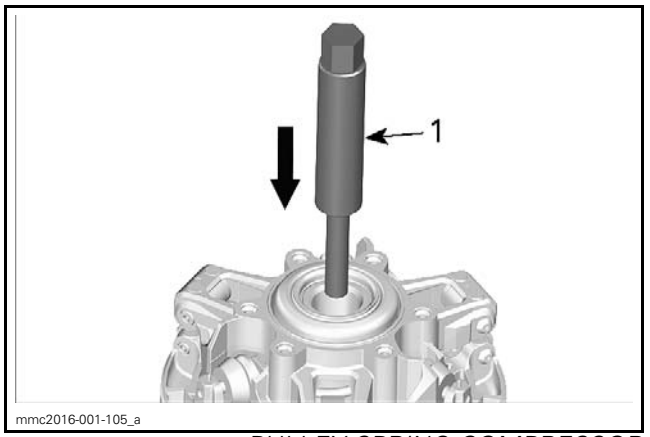


Removing the Ramp (Spider Installed)

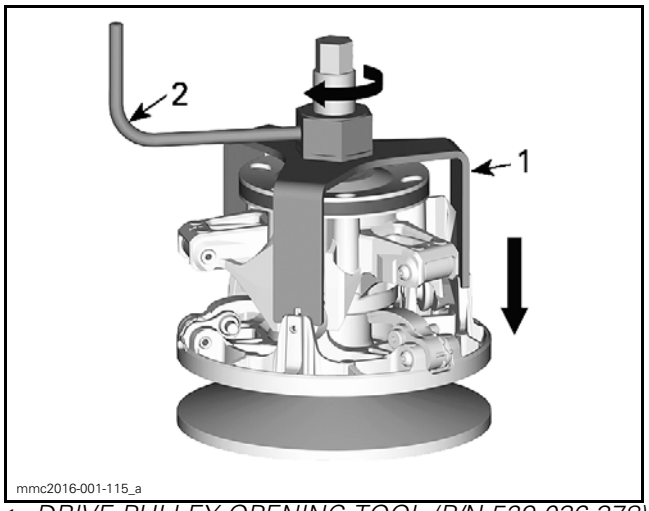
1. Lower the sliding sheave.
   1.1 Secure the drive pulley support in a vice.
   1.2 Install the drive pulley over the support.
   1.3 Install the drive pulley opening tool.



1. DRIVE PULLEY SUPPORT (P/N 529 036 371)

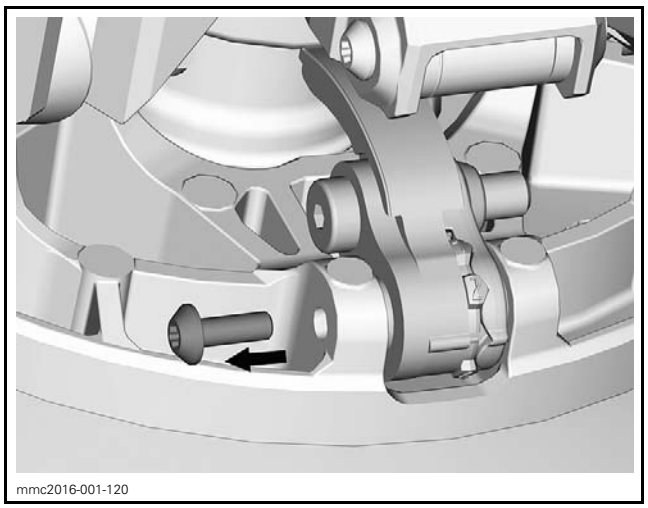


1. Threaded shaft of the PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)

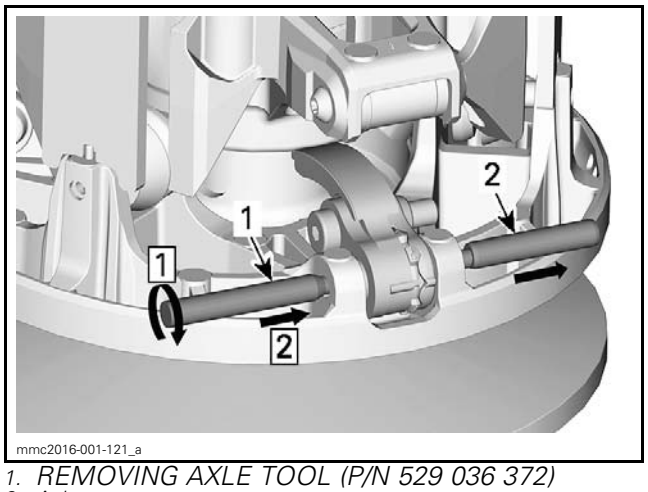


1. DRIVE PULLEY OPENING TOOL (P/N 529 036 378)
2. Handle of the PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)

2. Remove axle retaining screw.



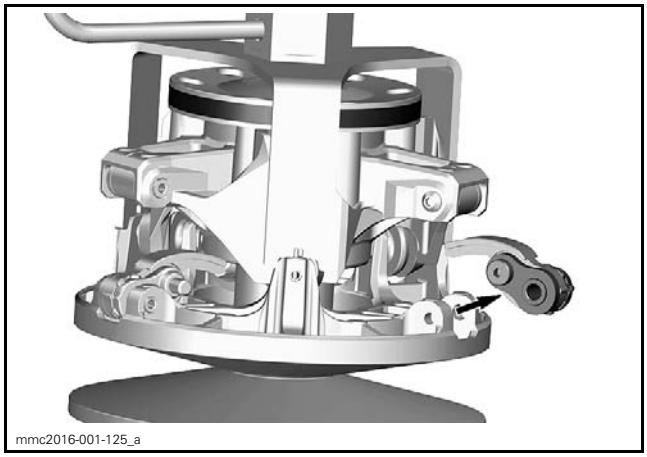
3. Remove the axle.



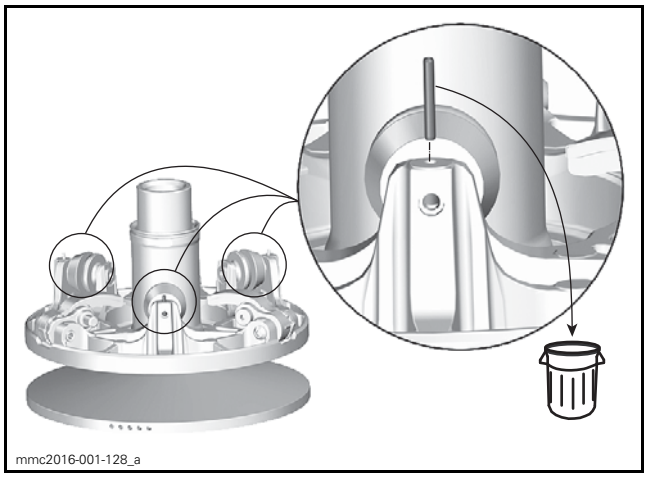
1. REMOVING AXLE TOOL (P/N 529 036 372)
2. Axle

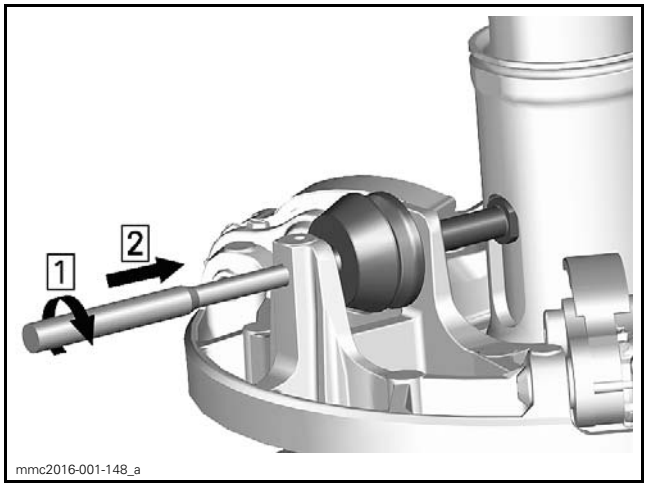
Step 1: Screw the tool into the axle
Step 2: Push axle to the right side

4. Remove ramp assembly.

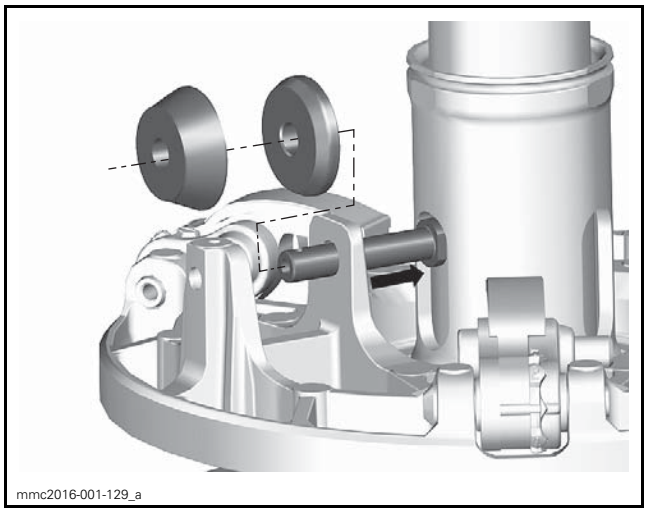


Removing the Torque Rollers





Step 1: Screw the tool into the axle
Step 2: Push axle towards the center of the pulley


mmc2016-001-129_a

Replacing the Sliding Sheave Bushing

In case of worn out bushing, it is advisable to replace whole sliding sheave assembly as replacing just the bushing may reduce drive pulley performance.

Cleaning the Drive Pulley

NOTE: Parts must be at room temperature before cleaning.

Clean pulley sheaves and shaft with fine steel wool and dry cloth.

Using a paper towel with PULLEY FLANGE CLEANER (P/N 413 711 809), clean the following components.

- Crankshaft tapered end
- Taper inside fixed sheave of drive pulley
- Crankshaft threads
- Retaining screw threads.

NOTICE Avoid contact between cleaner and crankshaft seal because damage may occur.

Remove all hardened oil deposits that are baked on crankshaft and pulley tapered surfaces with coarse or medium steel wool and/or sand paper no. 600.

NOTICE Do not use any other type of abrasive.

Reclean mounting surfaces with paper towel and cleaning solvent.

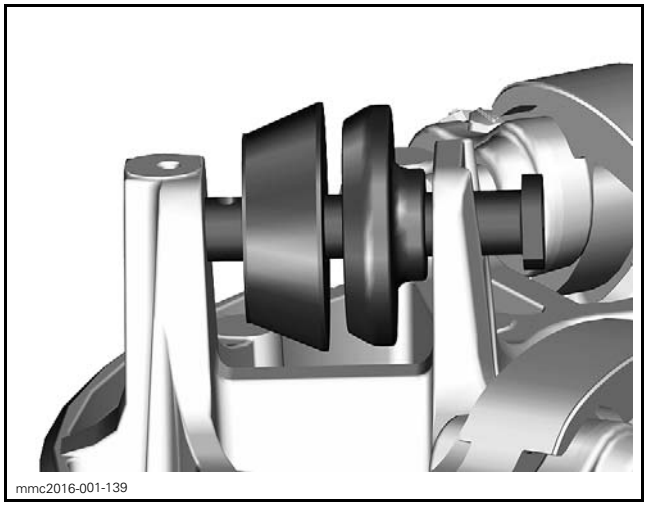
Wipe off the mounting surfaces with a clean, dry paper towel.

NOTICE Mounting surfaces must be free of any oil, cleaner or towel residue.

Assembling the Drive Pulley

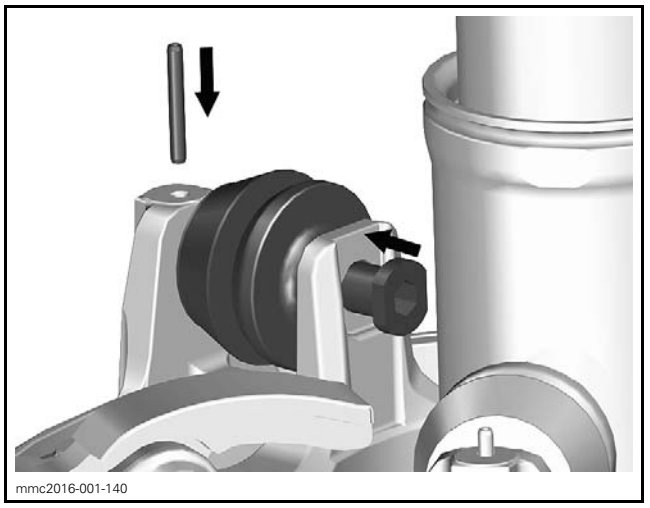
Torque Rollers

Position torque rollers as illustrated.


mmc2016-001-139

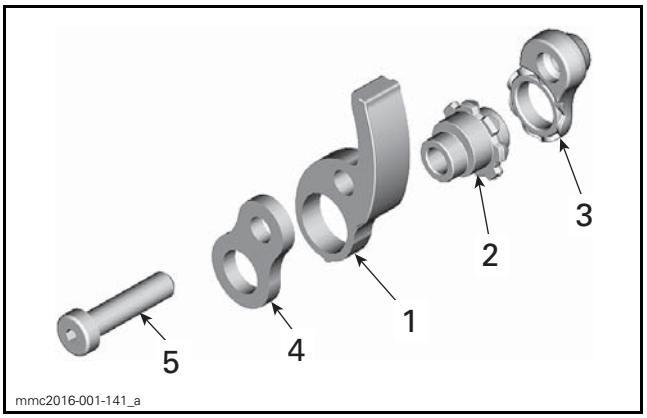
Position the flat sides of the axle head inside the slot of the mounting lug.

Install a new spring pin.


mmc2016-001-140

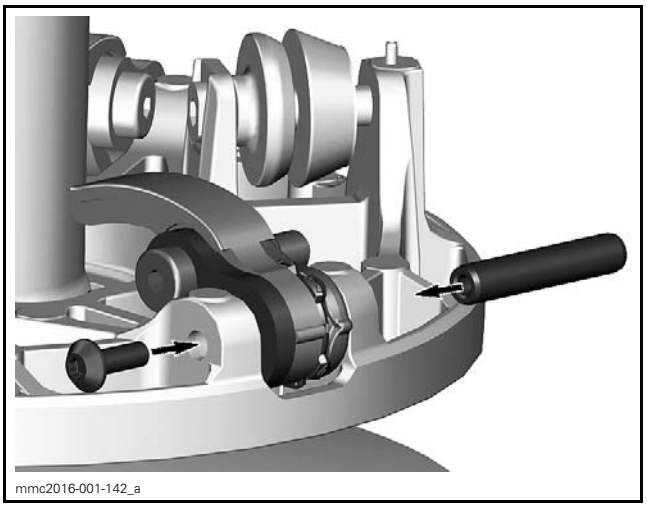
Ramp

Assemble the ramp as illustrated. Do not torque the pivot yet.



1. *Ramp*
2. *Cam*
3. *Right lever*
4. *Left lever*
5. *Pivot*

Install the ramp assembly on the sliding sheave.



TIGHTENING TORQUE	
Axle screw	5 N•m ± 0.5 N•m (44 lbf•**in** ± 4 lbf•**in**)

Position the cam to factory setting or to the desired position.

NOTICE **Make sure all cams are set at the same number.**

FACTORY SETTING	
Cam number	3 (position without number)

TIGHTENING TORQUE	
Pivot	8 N•m ± 2 N•m (71 lbf•**in** ± 18 lbf•**in**)

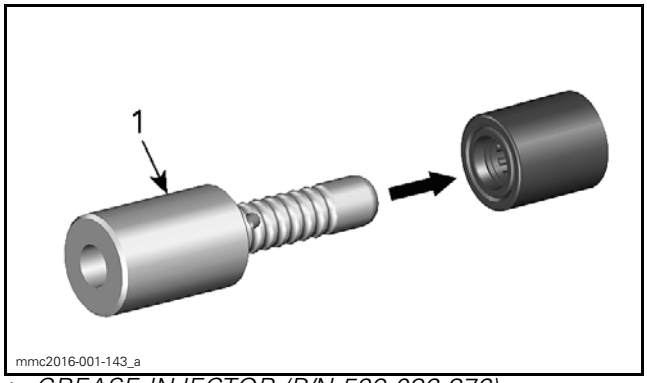
Roller

Lubricate the roller bearing.

REQUIRED SERVICE PRODUCT
ISOFLEX GREASE TOPAS NB 52 (P/N 293 550 021)

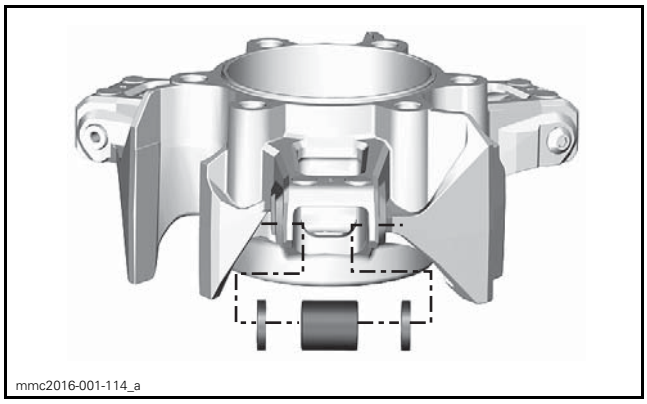
REQUIRED TOOL	
GREASE INJECTOR (P/N 529 036 376)	

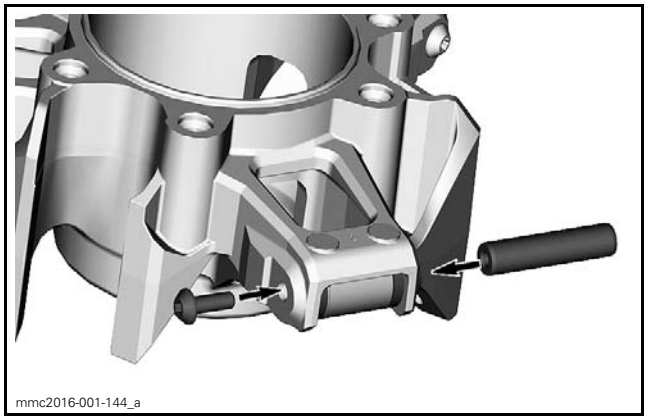
NOTE: A threaded end is required on the grease gun for using the grease injector.



1. *GREASE INJECTOR (P/N 529 036 376)*

Install roller.



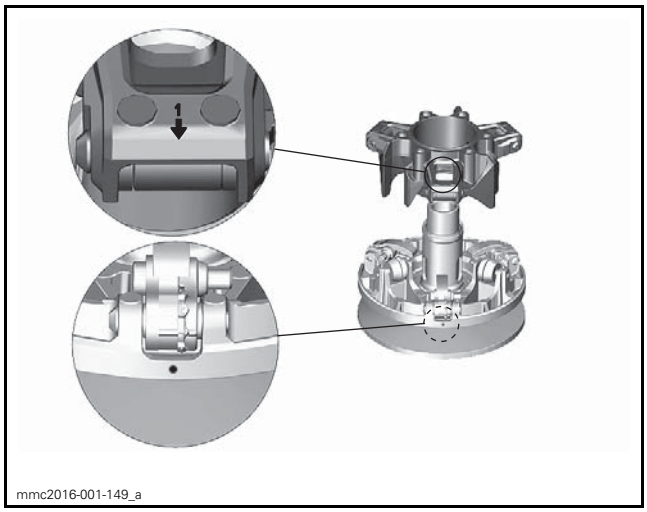


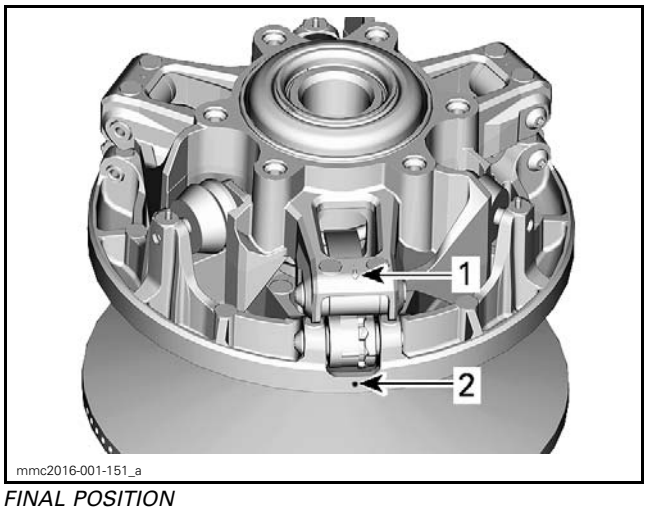
TIGHTENING TORQUE	
Roller axle screw	5 N•m ± 0.5 N•m (44 lbf•**in** ± 4 lbf•**in**)

Spider

Install the spider on the sliding sheave by aligning the indexing marks.

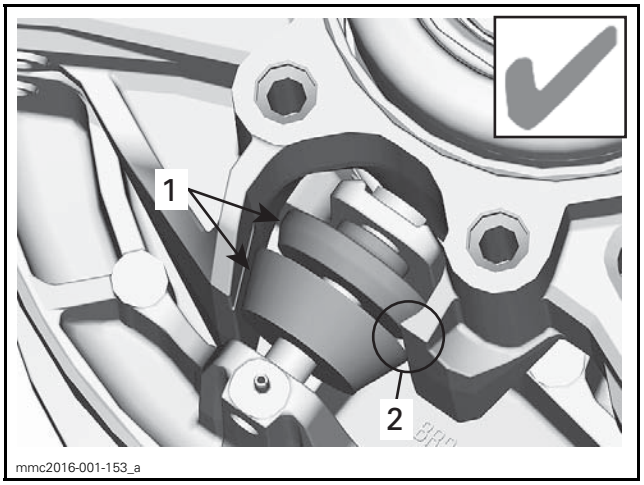
– Spider - the arrow on the arms #1, just above the roller.
– Sliding sheave - the dot on the external side of the sheave.



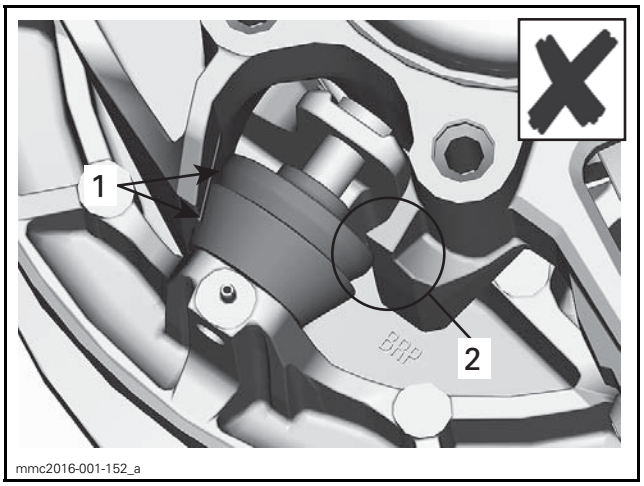


FINAL POSITION
1. Arrow - spider arm
2. Dot - sliding sheave

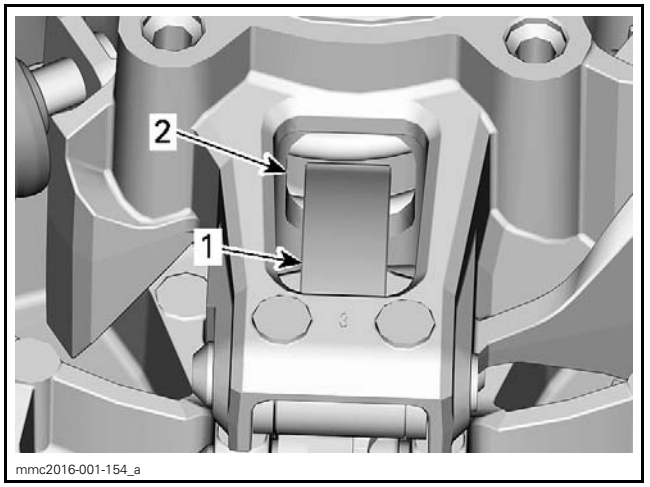
NOTICE During installation of the spider, make sure to position the three spurs of spider legs between torque rollers and ensure that ramps are positioned inside the openings of the spider.



ROLLER - GOOD INSTALLATION
1. Torque rollers
2. Spur of the spider leg



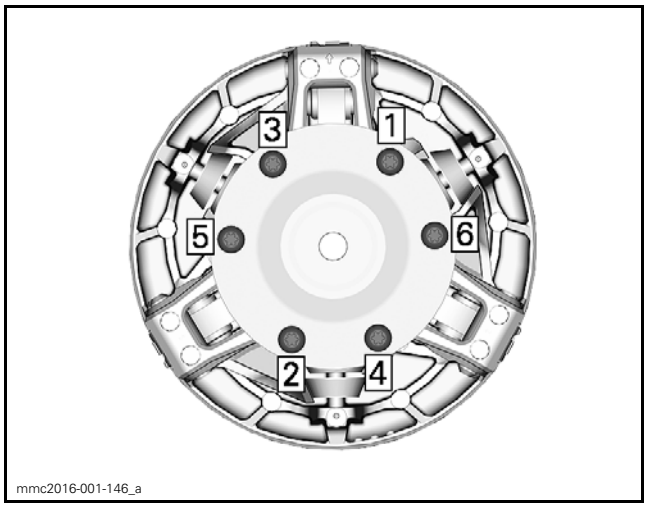
ROLLER - WRONG INSTALLATION
1. Torque rollers
2. Spur of the spider leg



RAMP POSITIONING

Damper

Install the damper using the following sequence.



TIGHTENING TORQUE	
Damper screws	31.5 N•m ± 3.5 N•m (23 lbf•ft ± 3 lbf•ft)

Sliding Sheave and Fixed Sheave Assembly

Index sliding sheave with fixed sheave by aligning index marks.

– Sliding sheave - the arrow on the spider arms #1, just above the roller.
– Fixed sheave- the dot on the external side of the sheave.

Drive Pulley Installation

REQUIRED TOOLS	
CLUTCH HOLDER (P/N 529 036 369)	

1. Clean mounting surfaces as described in *DRIVE PULLEY CLEANING* above.

NOTICE Do not apply antiseize or any lubricant on crankshaft and drive pulley tapers.

2. Install drive pulley on crankshaft end.

NOTE: The drive pulley can be installed in one position only. Drive pulley and crankshaft are indexed.

3. Install a NEW conical spring washer with its concave side towards drive pulley.
4. Install drive pulley bolt.

NOTICE Always use BRP genuine parts for conical spring washer and bolt.

5. Secure the drive pulley with the clutch holder.
6. Using a torque wrench, tighten the drive pulley bolt. Refer to *TIGHTENING THE DRIVE PULLEY* for the completed procedure.

Tightening the Drive Pulley

Tighten the drive pulley bolt.

TIGHTENING TORQUE		
Drive pulley bolt	First torque	120 N•m (89 lbf•ft)

Before starting engine, perform drive pulley adjustment. Refer to *ADJUSTMENT*, at the beginning of this subsection.

Install drive belt and guard.

Raise the rear of the vehicle and support it with a mechanical stand.

⚠ WARNING

Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at low speed (maximum 32 km/h (20 MPH) and apply the brake, repeat 5 times.

Tighten the drive pulley bolt again.

TIGHTENING TORQUE		
Drive pulley bolt	Final torque	120 N•m (89 lbf•ft)

⚠ WARNING

After 10 hours of operation the transmission system of the vehicle must be inspected to ensure drive pulley bolt is still properly torqued.

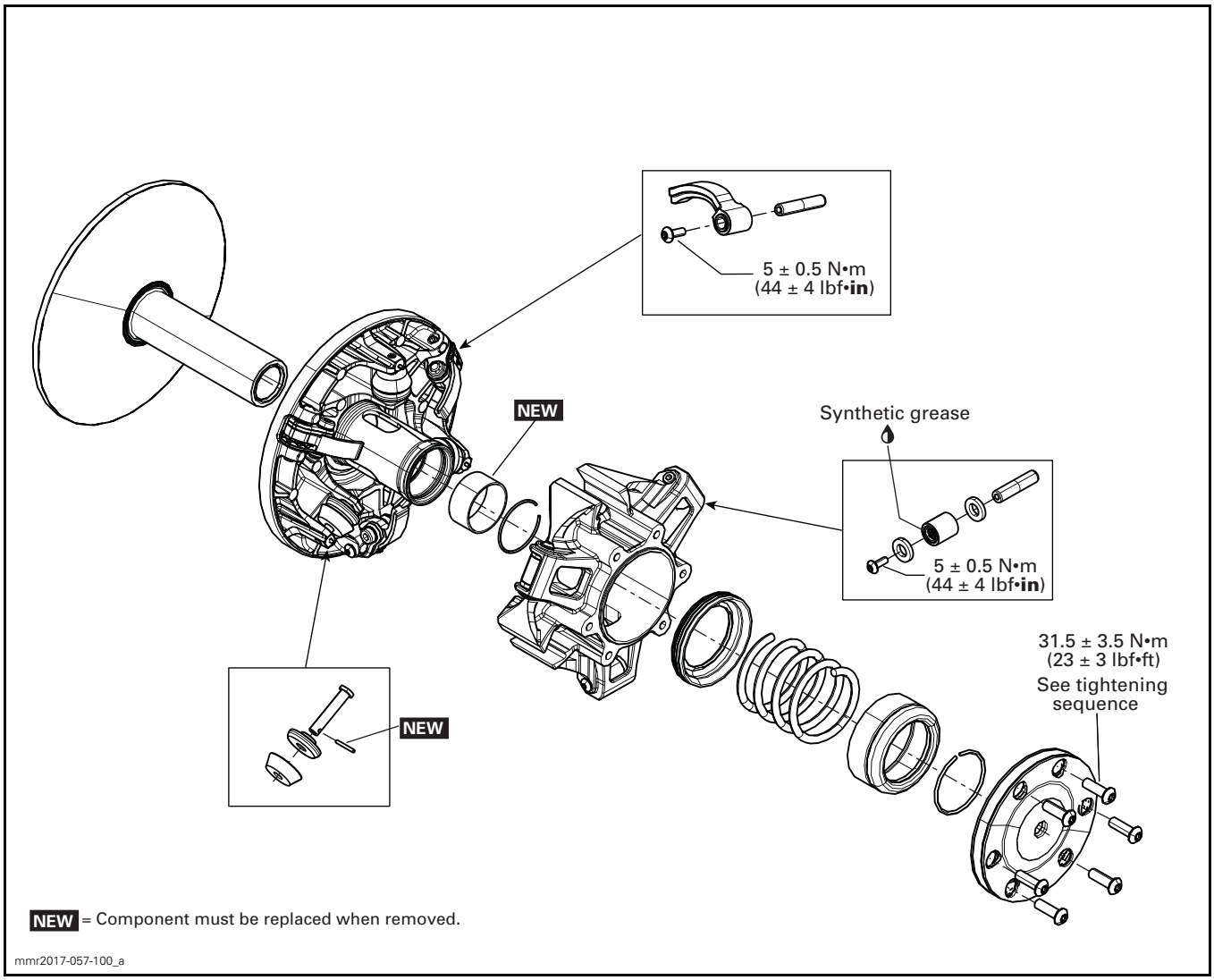
pDRIVE PULLEY WITHOUT CLICKER

SERVICE TOOLS

Description	Part Number	Page
CIRCLIP INSTALLER/REMOVER	529 036 375	4–5
CLUTCH HOLDER	529 036 369	3, 12
DRIVE PULLEY OPENING TOOL	529 036 378	4, 8
DRIVE PULLEY SUPPORT	529 036 371	4, 7
GREASE INJECTOR	529 036 376	10
PDRIVE PULLER	529 036 370	3–4
PULLEY SPRING COMPRESSOR TOOL	529 036 373	4–5, 7–8
REMOVING AXLE TOOL	529 036 372	4, 6–8

SERVICE PRODUCTS

Description	Part Number	Page
ISOFLEX GREASE TOPAS NB 52	293 550 021	10
PULLEY FLANGE CLEANER	413 711 809	9


5 ± 0.5 N•m
(44 ± 4 lbf•in)
NEW
Synthetic grease
5 ± 0.5 N•m
(44 ± 4 lbf•in)
31.5 ± 3.5 N•m
(23 ± 3 lbf•ft)
See tightening sequence
NEW
NEW = Component must be replaced when removed.
mmr2017-057-100_a

GENERAL

The pDrive pulleys are lubrication-free drive pulleys. Only the needle bearings inside the rollers need to be lubricated when replaced.

Always refer to appropriate *PARTS CATALOG* for replacement parts.

NOTICE Never use any type of impact wrench for drive pulley removal and installation. The use of impact wrench could damage the drive pulley and modify the calibration.

Some drive pulley components (like the spring and ramps) can be changed to improve vehicle performance in high altitude regions. A Service Bulletin provides information about calibration according to altitude.

NOTICE Such modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance. Verify spring specifications before installation. Do not only refer to the spring color code.

⚠ WARNING

Any drive pulley repairs must be performed by an authorized Ski-Doo dealer. Subcomponent installation and assembly tolerances require strict adherence to procedures detailed.

During assembly/installation, use torque values as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.).

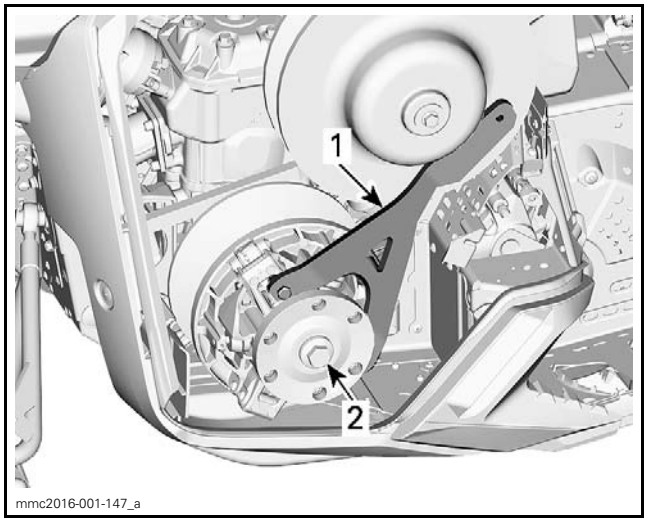
PROCEDURES

DRIVE PULLEY

Removing the Drive Pulley

REQUIRED TOOLS	
CLUTCH HOLDER (P/N 529 036 369)	
PDRIVE PULLER (P/N 529 036 370)	

1. Remove drive belt. Refer to *DRIVE BELT* subsection.
2. Remove the drive pulley bolt.
   2.1 Secure the drive pulley with the clutch holder.
   2.2 Using a breaker bar, remove the drive pulley bolt and its conical spring washer.



1. Clutches holder
2. Drive pulley bolt

3. Remove the drive pulley from engine.
   3.1 Make sure the clutches holder is properly installed.
   3.2 Screw the pDrive puller in place of the drive pulley bolt.
   3.3 Tighten the pDrive puller until pulley is disengaged from the crankshaft end.

NOTICE These pulleys have metric threads. Do not use a puller with ANS (American National Standard) or IS (International Standard) type threads. Always tighten puller by hand to ensure that the drive pulley has the same type of threads (metric vs ANS or IS) prior to fully tightening.

Disassembling the Drive Pulley

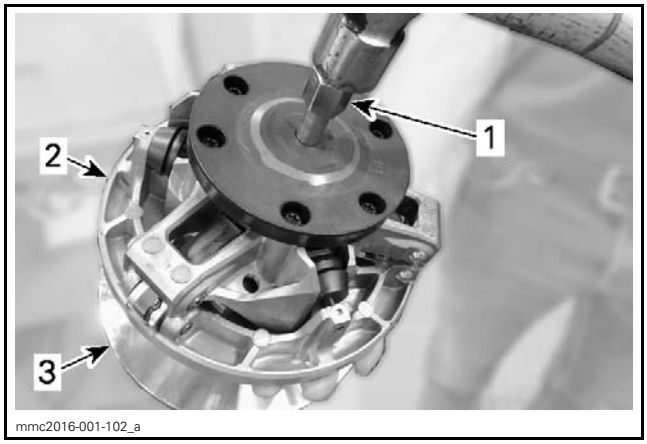
REQUIRED TOOLS	
PDRIVE PULLER (P/N 529 036 370)	
DRIVE PULLEY SUPPORT (P/N 529 036 371)	
PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)	
CIRCLIP INSTALLER/REMOVER (P/N 529 036 375)	
REMOVING AXLE TOOL (P/N 529 036 372)	
DRIVE PULLEY OPENING TOOL (P/N 529 036 378)	

Separating Fixed and Sliding Sheaves

To separate fixed sheave from sliding sheave, screw puller into fixed sheave shaft about 13 mm (1/2 in).

Raise drive pulley and hold it by the sliding sheave while knocking on puller head to disengage fixed sheave.

NOTICE NEVER tap on spider.



mmc2016-001-102_a

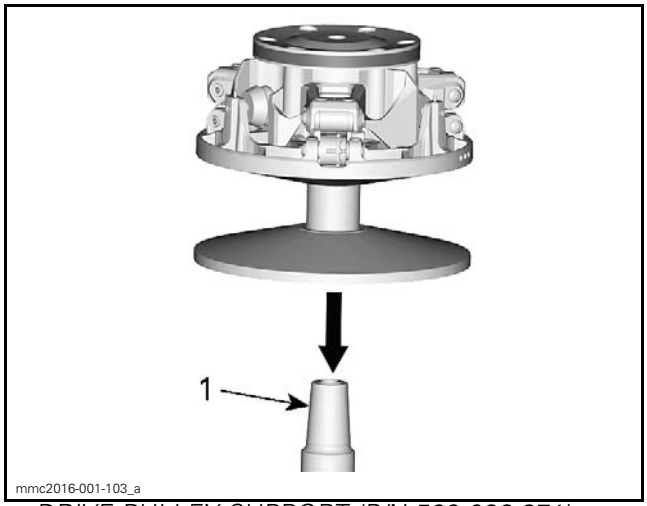
1. Puller screwed 13 mm (1/2 in) in fixed sheave
2. Sliding sheave
3. Fixed sheave

NOTE: No component marking is required before disassembly. This drive pulley features factory apposed index marks as references.

NOTICE Never use any type of torch to heat spider.

Removing the Damper

1. Secure the drive pulley support in a vice.
2. Install the drive pulley over the support.

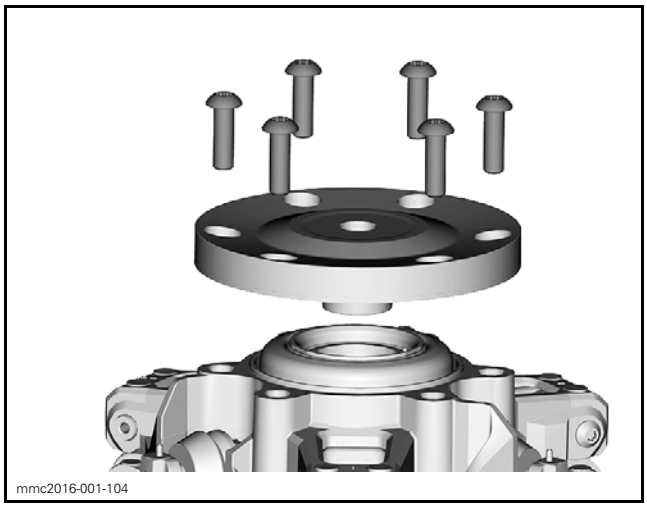


mmc2016-001-103_a

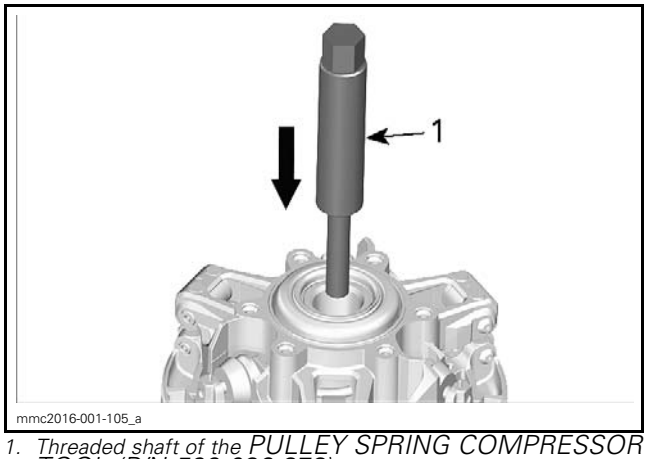
1. DRIVE PULLEY SUPPORT (P/N 529 036 371)

3. Remove the damper.

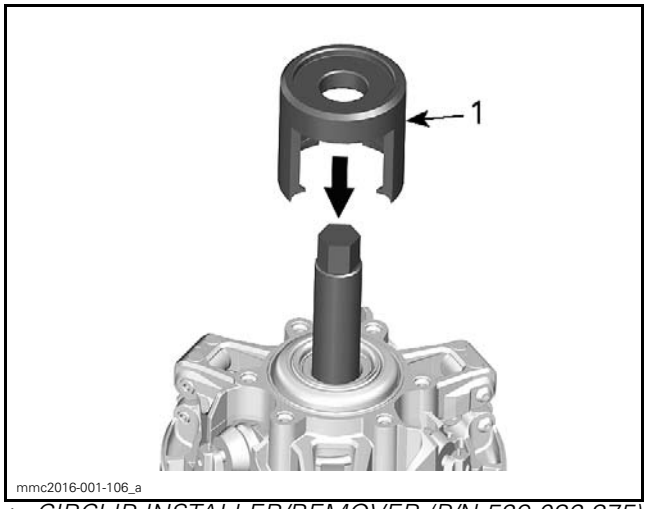
NOTE: To racing purpose only: Some dampers might be installed with shims for initial opening setup of the pulley.



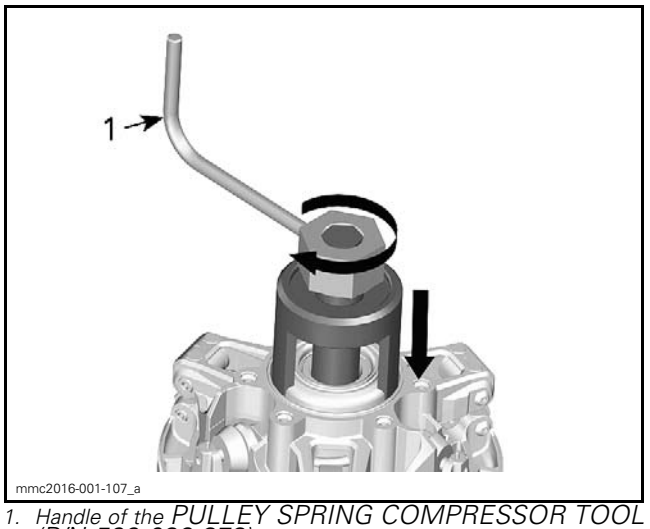
Removing the Spring



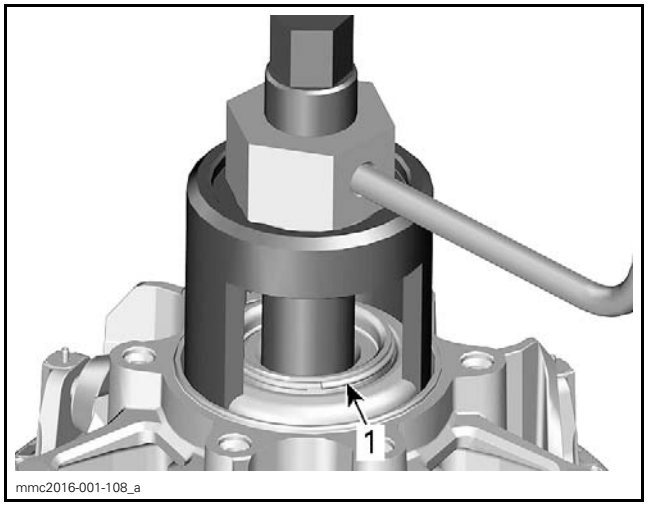
1. Threaded shaft of the PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)



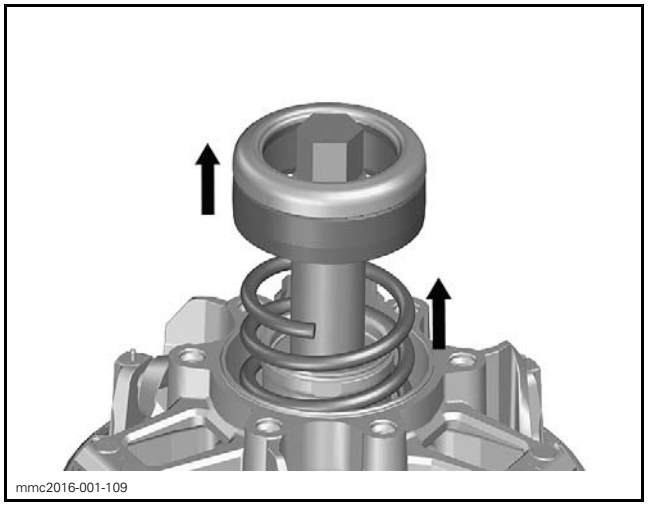
1. CIRCLIP INSTALLER/REMOVER (P/N 529 036 375)



1. Handle of the PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)



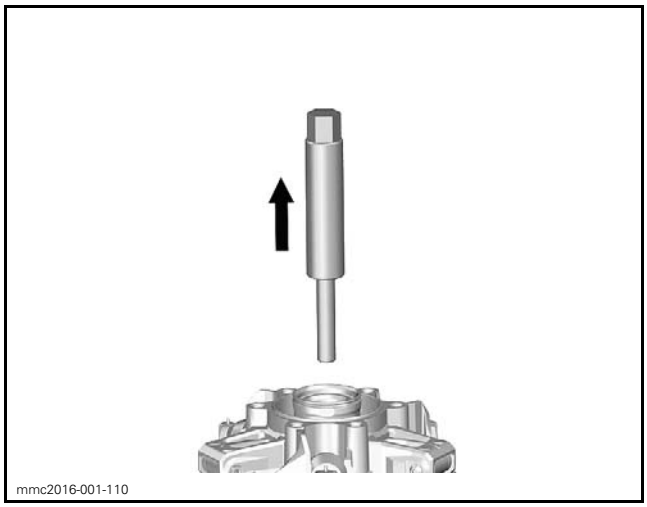
1. Remove the circlip



NOTE: To racing purpose only: A shim may be added between the spring and the cover to modify the compression of the spring. Refer to the chart in the *CALIBRATION SECTION*.

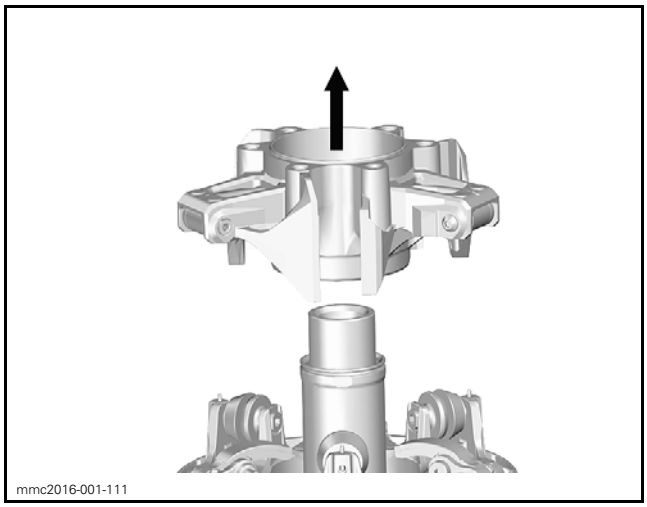
Removing the Spider

1. Remove the threaded shaft.



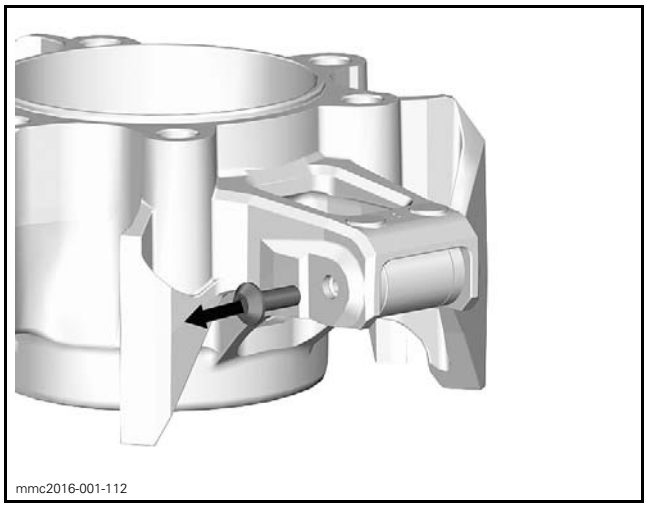
NOTICE Remove the threaded shaft to avoid damaging the bushings inside the spider.

2. Remove the spider.

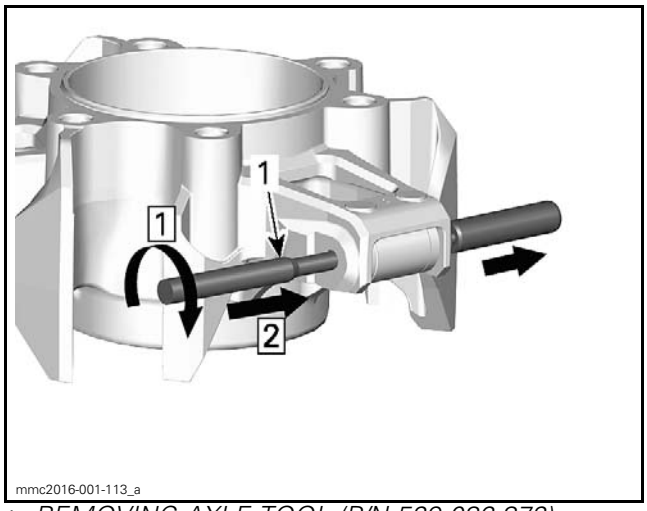


Removing the Roller

1. Remove axle retaining screw.

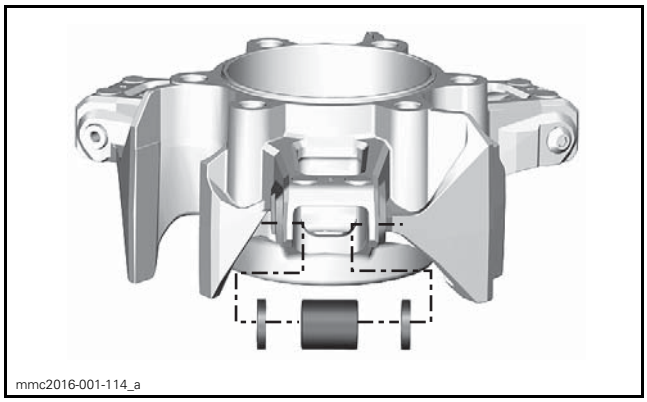


2. Remove the axle.



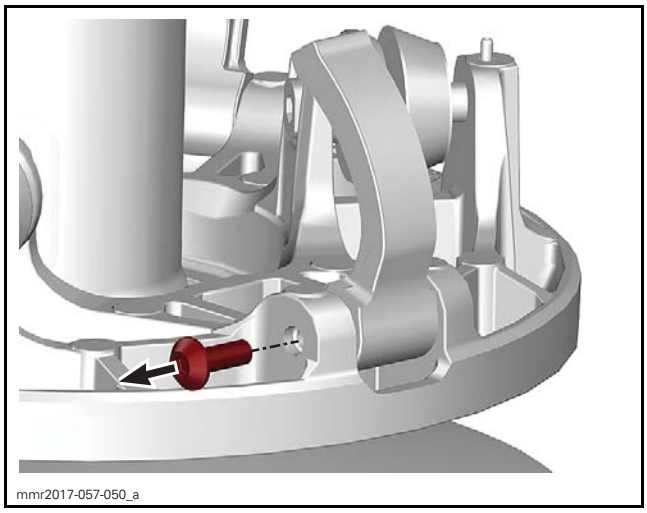
1. REMOVING AXLE TOOL (P/N 529 036 372)
Step 1: Screw the tool into the axle
Step 2: Push axle to the right side

3. Remove the roller and its thrust washers.

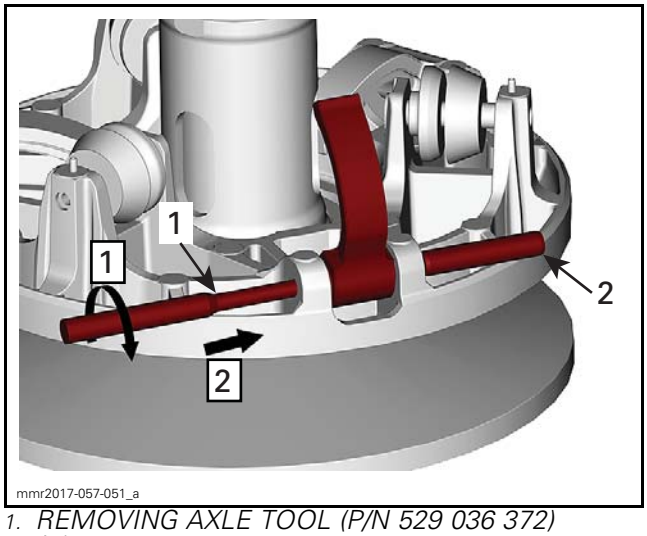


Removing the Ramp (without Spider)

1. Remove axle retaining screw.



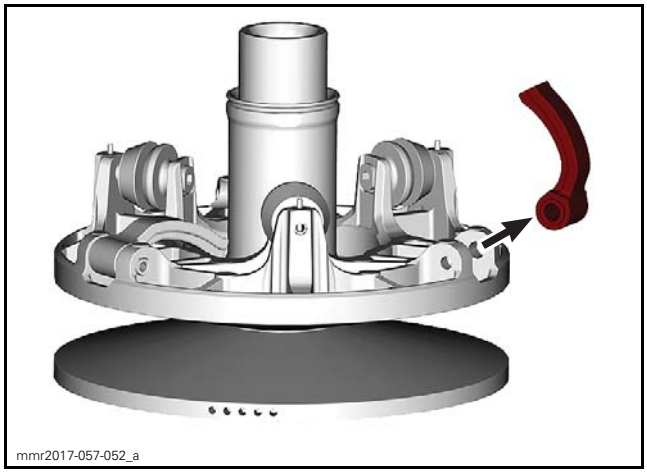
2. Remove the axle.



1. REMOVING AXLE TOOL (P/N 529 036 372)
2. Axle

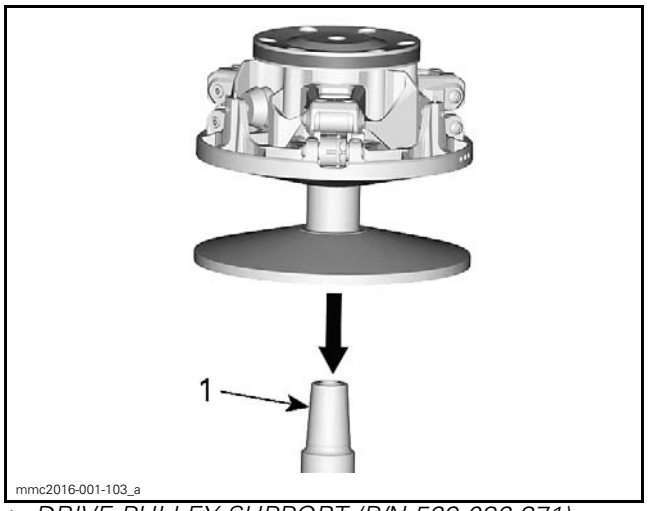
Step 1: Screw the tool into the axle
Step 2: Push axle to the right side

3. Remove ramp assembly.

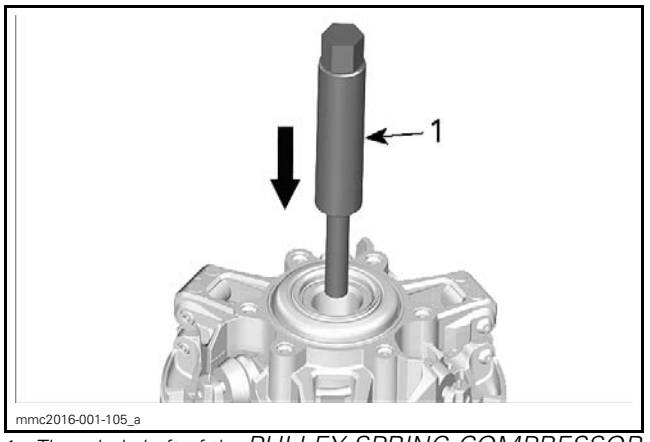


Removing the Ramp (Spider Installed)

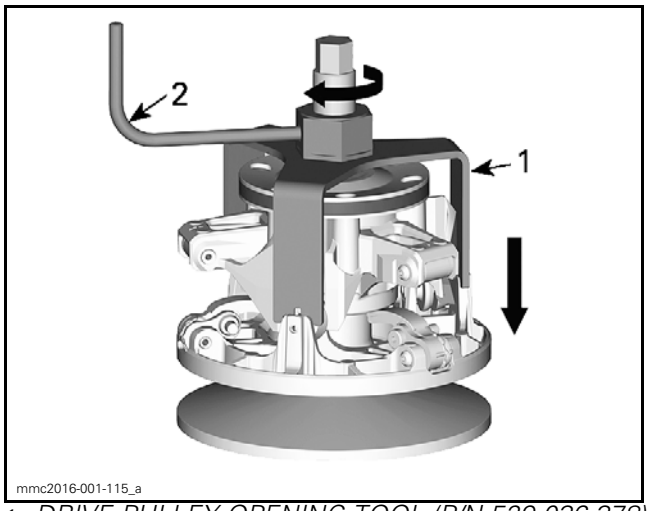
1. Lower the sliding sheave.
   1.1 Secure the drive pulley support in a vice.
   1.2 Install the drive pulley over the support.
   1.3 Install the drive pulley opening tool.



1. DRIVE PULLEY SUPPORT (P/N 529 036 371)

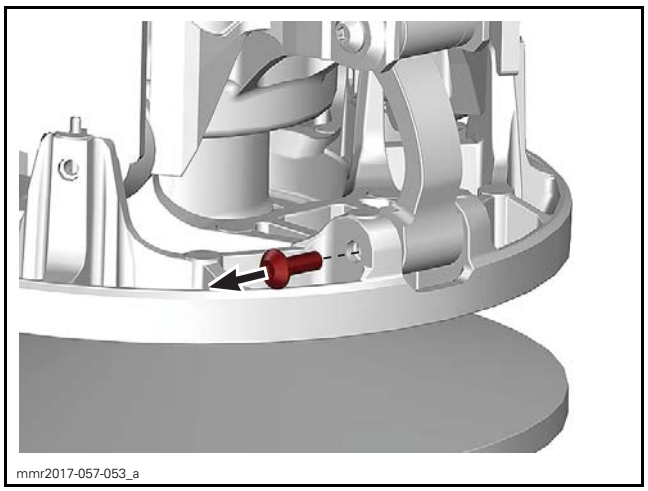


1. Threaded shaft of the PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)

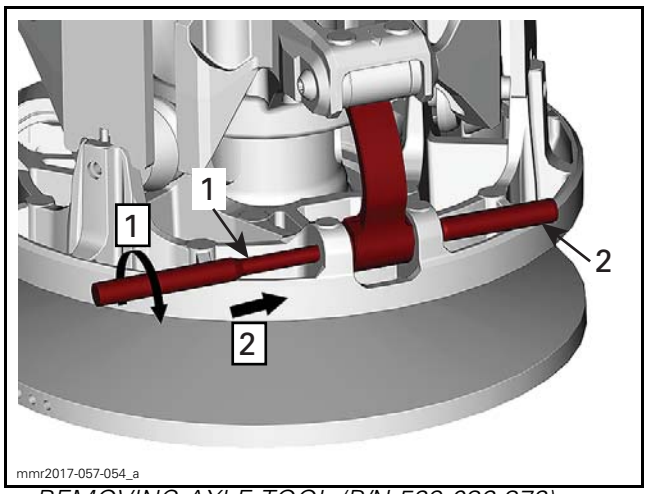


1. *DRIVE PULLEY OPENING TOOL (P/N 529 036 378)*
2. *Handle of the PULLEY SPRING COMPRESSOR TOOL (P/N 529 036 373)*

2. Remove axle retaining screw.



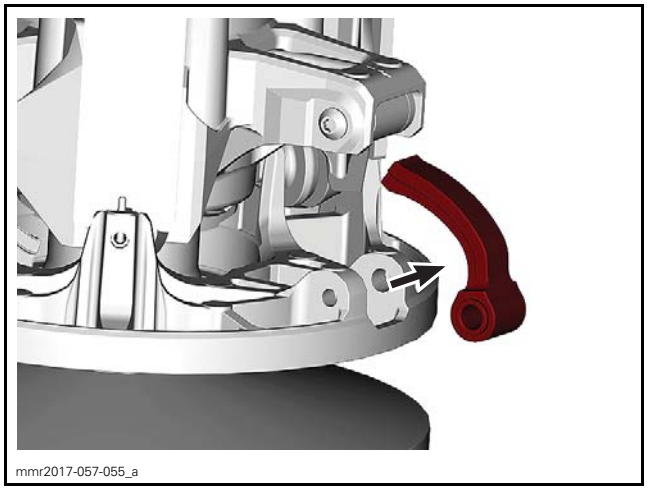
3. Remove the axle.



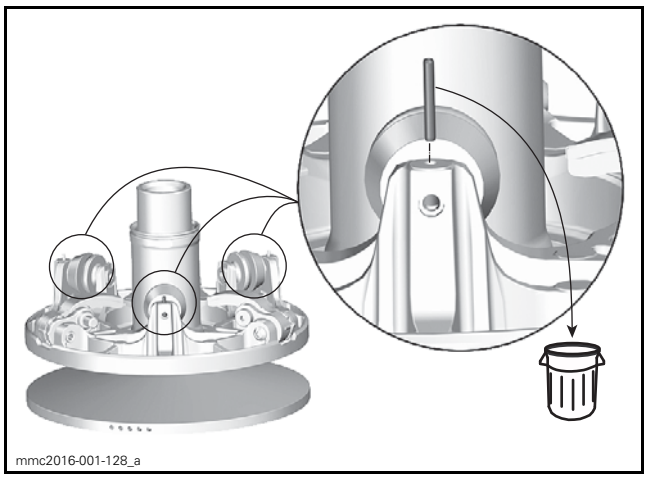
1. *REMOVING AXLE TOOL (P/N 529 036 372)*
2. *Axle*

Step 1: Screw the tool into the axle
Step 2: Push axle to the right side

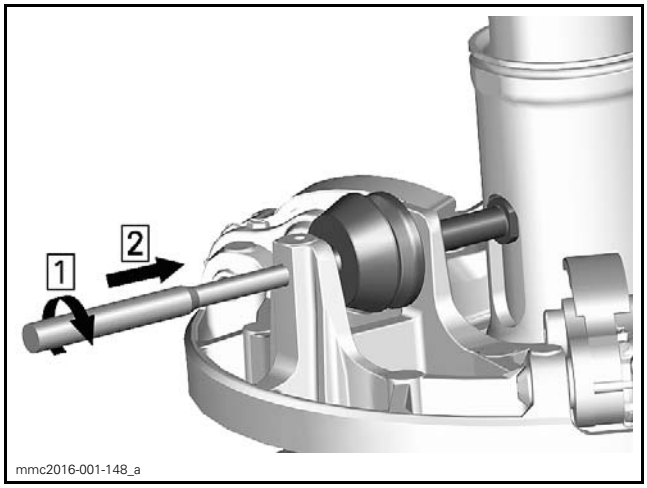
4. Remove ramp assembly.



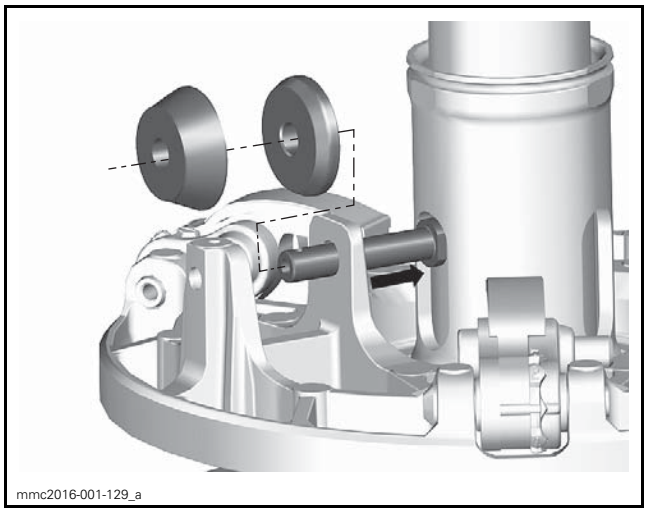
Removing the Torque Rollers



TYPICAL



TYPICAL
Step 1: Screw the tool into the axle
Step 2: Push axle towards the center of the pulley



TYPICAL

Replacing the Sliding Sheave Bushing

In case of worn out bushing, it is advisable to replace whole sliding sheave assembly as replacing just the bushing may reduce drive pulley performance.

Cleaning the Drive Pulley

NOTE: Parts must be at room temperature before cleaning.

Clean pulley sheaves and shaft with fine steel wool and dry cloth.

Using a paper towel with PULLEY FLANGE CLEANER (P/N 413 711 809), clean the following components.

- Crankshaft tapered end
- Taper inside fixed sheave of drive pulley
- Crankshaft threads
- Retaining screw threads.

NOTICE Avoid contact between cleaner and crankshaft seal because damage may occur.

Remove all hardened oil deposits that are baked on crankshaft and pulley tapered surfaces with coarse or medium steel wool and/or sand paper no. 600.

NOTICE Do not use any other type of abrasive.

Reclean mounting surfaces with paper towel and cleaning solvent.

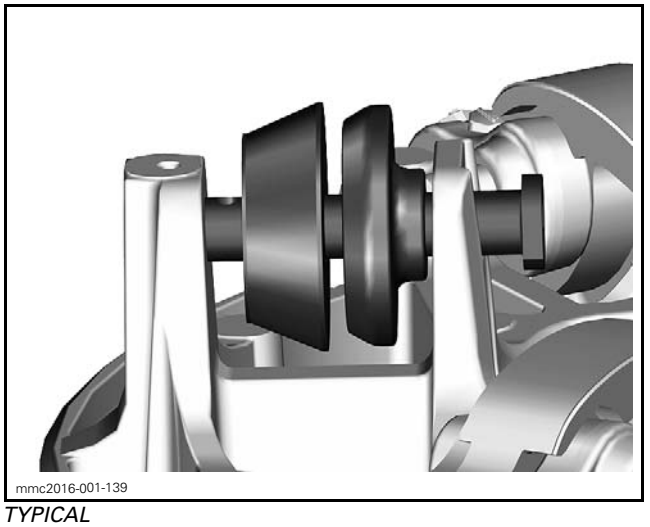
Wipe off the mounting surfaces with a clean, dry paper towel.

NOTICE Mounting surfaces must be free of any oil, cleaner or towel residue.

Assembling the Drive Pulley

Torque Rollers

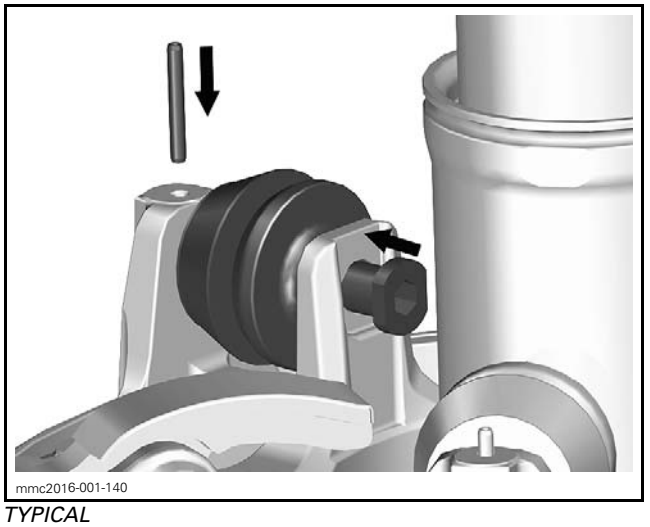
Position torque rollers as illustrated.



TYPICAL

Position the flat sides of the axle head inside the slot of the mounting lug.

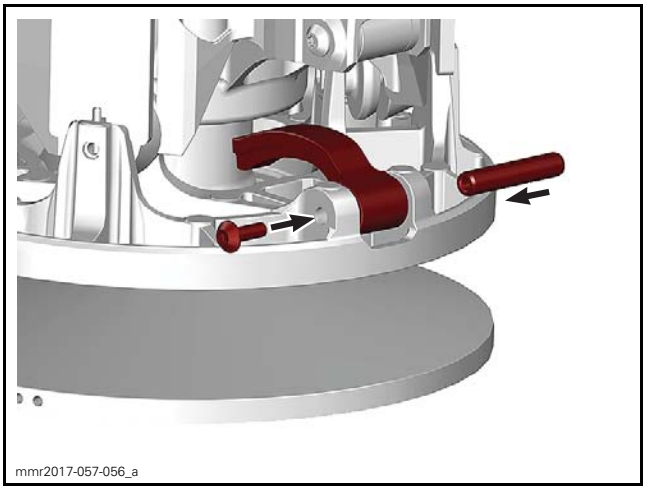
Install a new spring pin.



TYPICAL

Ramp

Install the ramp on the sliding sheave.


mmr2017-057-056_a

TIGHTENING TORQUE	
Axle screw	5 N•m ± 0.5 N•m (44 lbf•**in** ± 4 lbf•**in**)

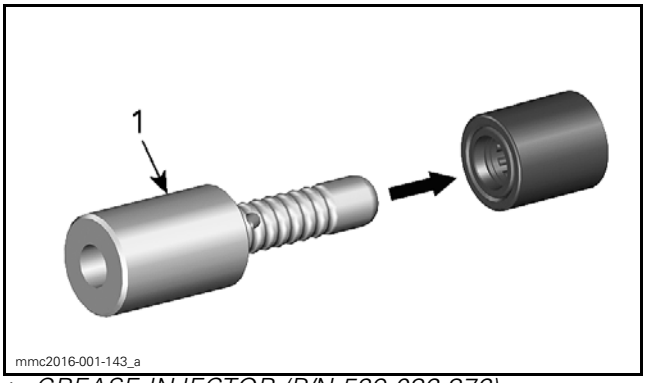
Roller

Lubricate the roller bearing.

REQUIRED SERVICE PRODUCT
ISOFLEX GREASE TOPAS NB 52 (P/N 293 550 021)

REQUIRED TOOL	
GREASE INJECTOR (P/N 529 036 376)	

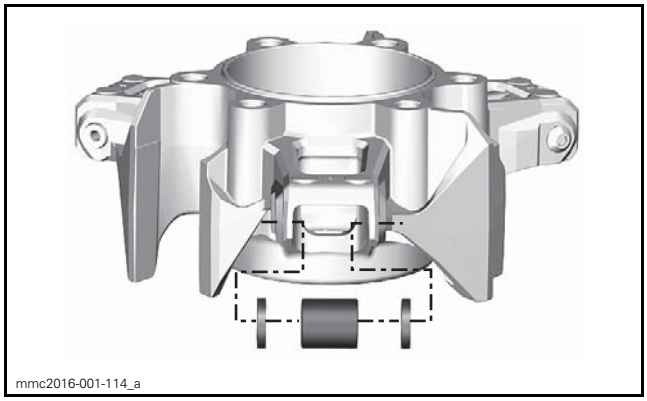
NOTE: A threaded end is required on the grease gun for using the grease injector.

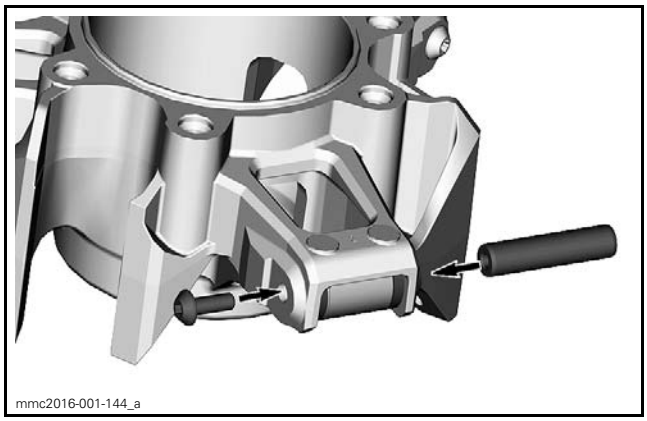


mmc2016-001-143_a

1. GREASE INJECTOR (P/N 529 036 376)

Install roller.


mmc2016-001-114_a

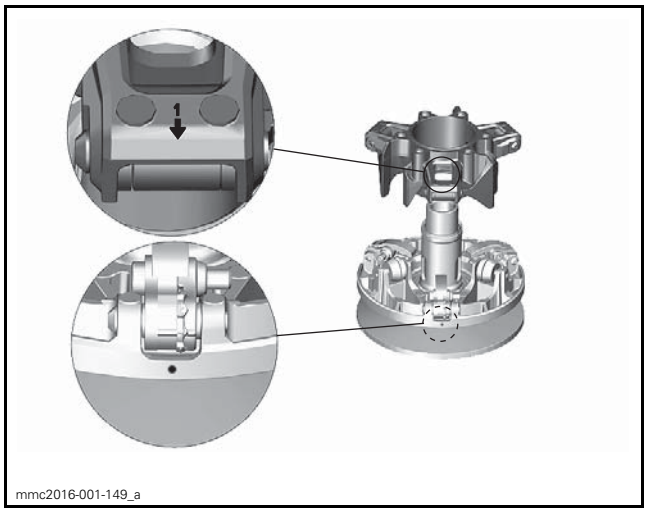

mmc2016-001-144_a

TIGHTENING TORQUE	
Roller axle screw	5 N•m ± 0.5 N•m (44 lbf•**in** ± 4 lbf•**in**)

Spider

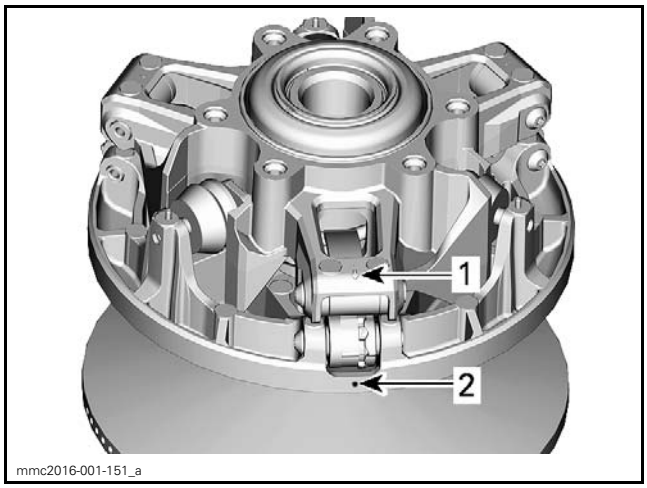
Install the spider on the sliding sheave by aligning the indexing marks.

– Spider - the arrow on the arms #1, just above the roller.
– Sliding sheave - the dot on the external side of the sheave.



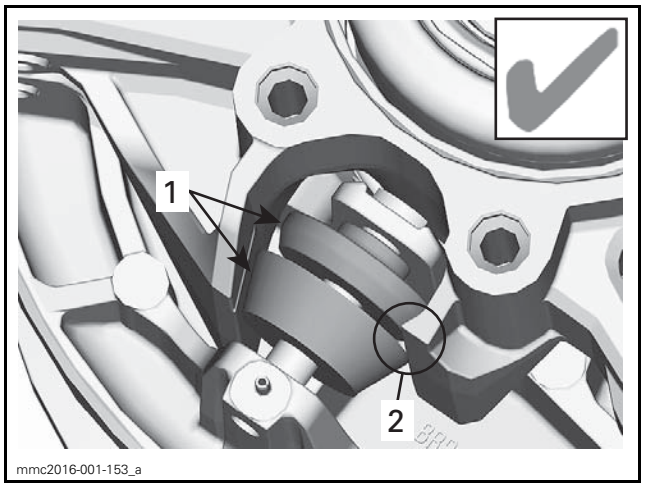
mmc2016-001-149_a

TYPICAL

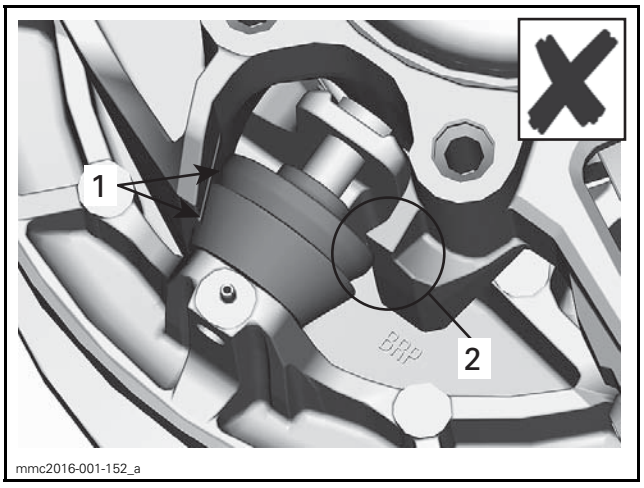


TYPICAL - FINAL POSITION
1. *Arrow - spider arm*
2. *Dot - sliding sheave*

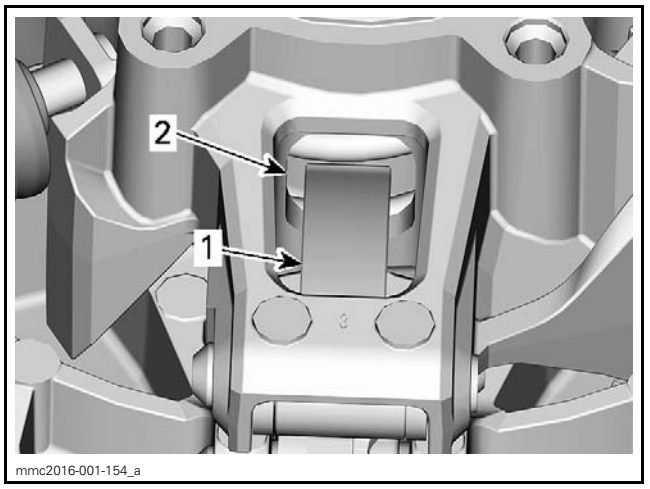
NOTICE During installation of the spider, make sure to position the three spurs of spider legs between torque rollers and ensure that ramps are positioned inside the openings of the spider.



ROLLER - GOOD INSTALLATION
1. *Torque rollers*
2. *Spur of the spider leg*



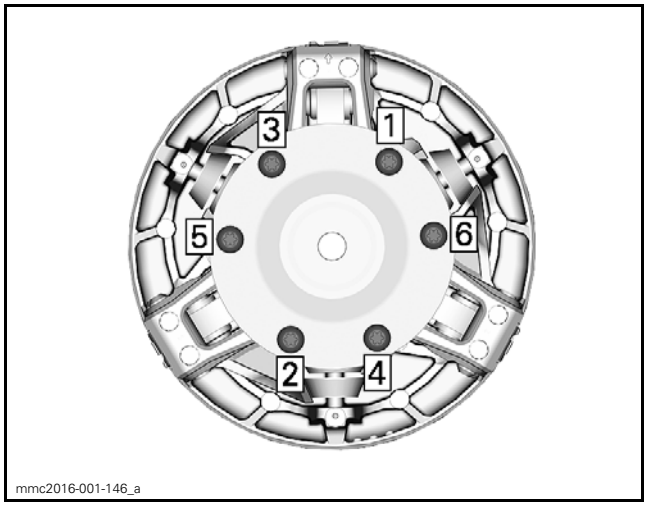
ROLLER - WRONG INSTALLATION
1. *Torque rollers*
2. *Spur of the spider leg*



RAMP POSITIONING

Damper

Install the damper using the following sequence.



TIGHTENING TORQUE	
Damper screws	31.5 N•m ± 3.5 N•m (23 lbf•ft ± 3 lbf•ft)

Sliding Sheave and Fixed Sheave Assembly

Index sliding sheave with fixed sheave by aligning index marks.

– Sliding sheave - the arrow on the spider arms #1, just above the roller.
– Fixed sheave- the dot on the external side of the sheave.

Drive Pulley Installation

REQUIRED TOOLS	
CLUTCH HOLDER (P/N 529 036 369)	

1. Clean mounting surfaces as described in *DRIVE PULLEY CLEANING* above.

NOTICE Do not apply antiseize or any lubricant on crankshaft and drive pulley tapers.

2. Install drive pulley on crankshaft end.

NOTE: The drive pulley can be installed in one position only. Drive pulley and crankshaft are indexed.

3. Install a NEW conical spring washer with its concave side towards drive pulley.
4. Install drive pulley bolt.

NOTICE Always use BRP genuine parts for conical spring washer and bolt.

5. Secure the drive pulley with the clutch holder.
6. Using a torque wrench, tighten the drive pulley bolt. Refer to *TIGHTENING THE DRIVE PULLEY* for the completed procedure.

Tightening the Drive Pulley

Tighten the drive pulley bolt.

TIGHTENING TORQUE		
Drive pulley bolt	First torque	120 N•m (89 lbf•ft)

Before starting engine, perform drive pulley adjustment. Refer to *ADJUSTMENT*, at the beginning of this subsection.

Install drive belt and guard.

Raise the rear of the vehicle and support it with a mechanical stand.

⚠ WARNING

Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at low speed (maximum 32 km/h (20 MPH) and apply the brake, repeat 5 times.

Tighten the drive pulley bolt again.

TIGHTENING TORQUE		
Drive pulley bolt	Final torque	120 N•m (89 lbf•ft)

⚠ WARNING

After 10 hours of operation the transmission system of the vehicle must be inspected to ensure drive pulley bolt is still properly torqued.

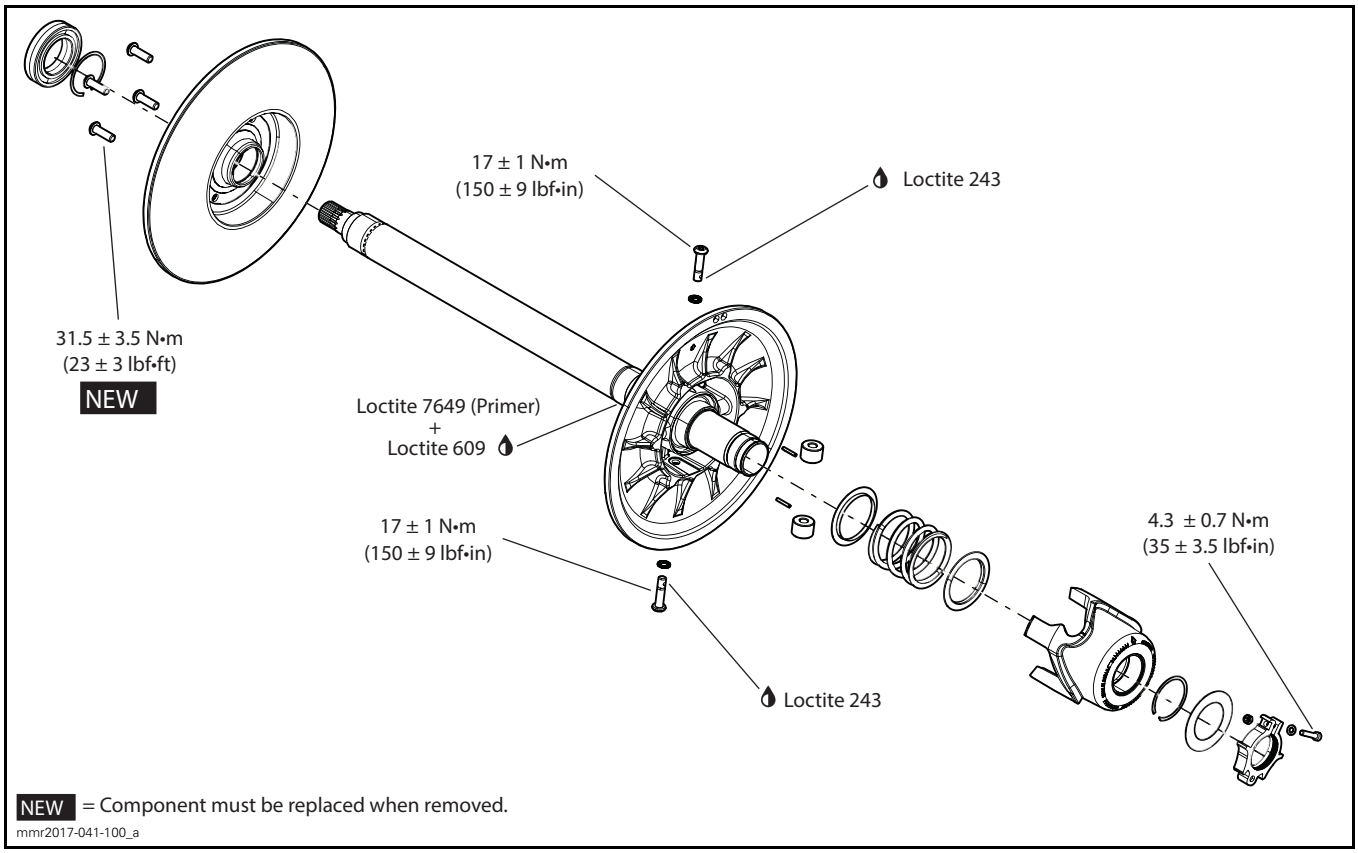
DRIVEN PULLEY AND COUNTERSHAFT

SERVICE TOOLS

Description	Part Number	Page
COUNTERSHAFT ADAPTER	529 036 424	9
COUNTERSHAFT BEARING INSTALLER	529 036 066	10
COUNTERSHAFT BEARING REMOVER	529 036 065	9
COUNTERSHAFT SUPPORT	529 036 067	9
DRIVEN PULLEY SPRING COMPRESSOR	529 036 182	3
UPPER GEAR RETAINING TOOL	529 036 110	2

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	7
LOCTITE 609	413 703 100	10
LOCTITE 7649 (PRIMER)	293 800 041	10
LOCTITE 767 (ANTISEIZE LUBRICANT)	293 800 070	8
PULLEY FLANGE CLEANER	413 711 809	6, 9



GENERAL

During assembly/installation, use the torque values and the service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.) must be replaced with new ones.

⚠ WARNING

Never start engine when the pulley guard is removed.

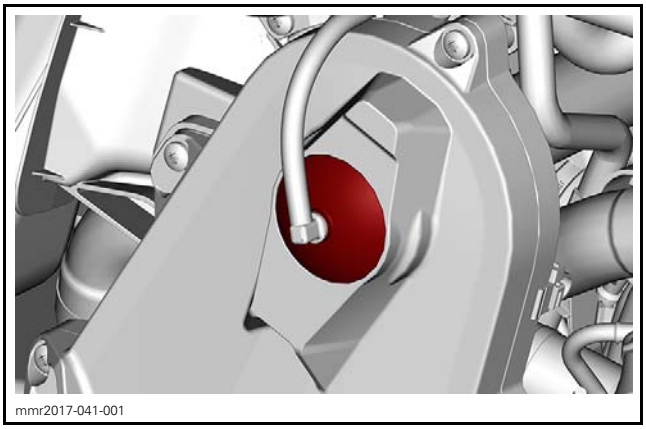
PROCEDURES

DRIVEN PULLEY

Removing the Driven Pulley

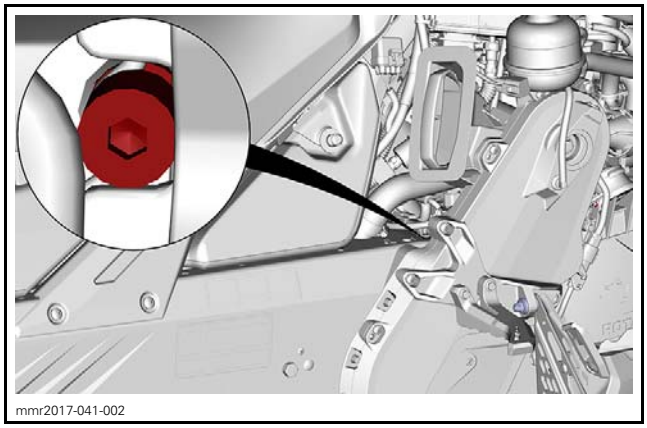
NOTE: The driven pulley is removed with the countershaft.

1. Remove the muffler. Refer to *EXHAUST SYSTEM* subsection.
2. Remove the filling plug on the chaincase cover.



mmr2017-041-001

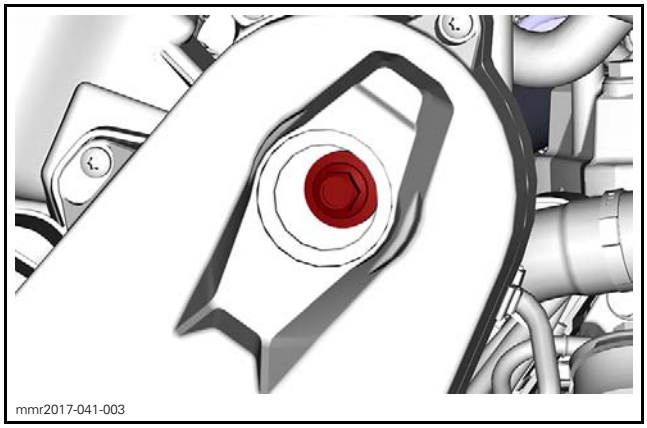
3. Release drive chain tension by unscrewing tensioner adjustment screw.



mmr2017-041-002

4. Remove the upper gear screw and the conical spring washer.

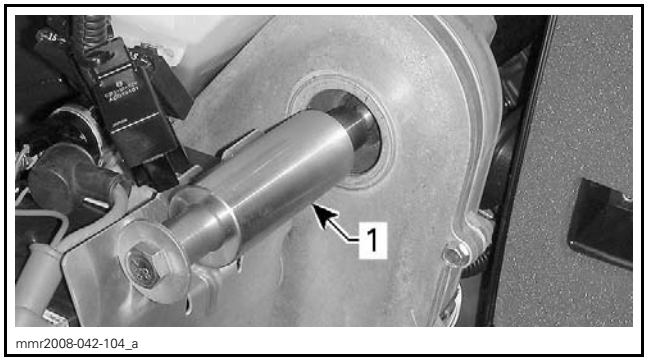
NOTE: Slightly tilt the bolt to avoid dropping washer inside chaincase.



mmr2017-041-003

5. Install the gear retaining tool on countershaft end.

REQUIRED TOOL	
UPPER GEAR RETAINING TOOL (P/N 529 036 110)	

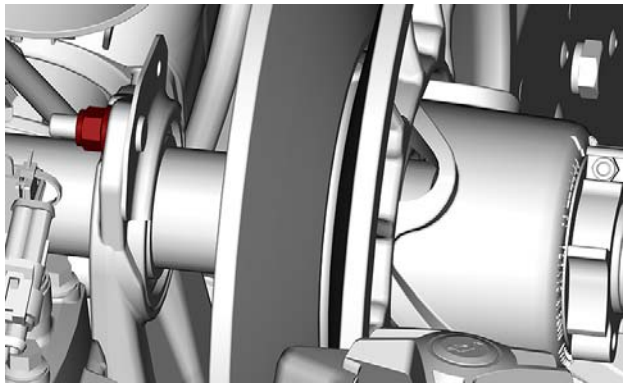


mmr2008-042-104_a

TYPICAL
1. Upper gear retaining tool

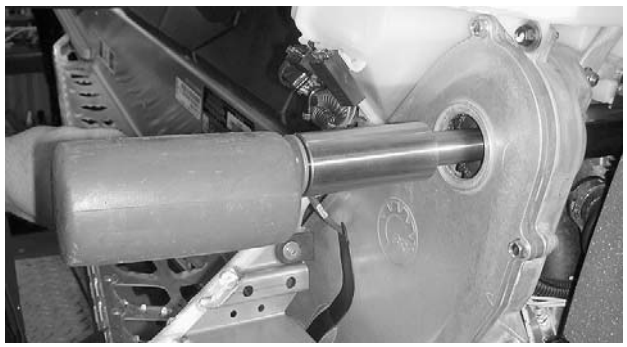
6. Remove the drive belt. Refer to *DRIVE BELT* subsection.

7. Behind driven pulley, remove nut securing the countershaft bearing flange.


mmr2017-041-004

8. Pull out bearing flange.
9. Pull the driven pulley to disengage countershaft and upper gear.

NOTE: If necessary, tap the upper gear retaining tool with a plastic hammer.


mmr2008-042-106

TYPICAL

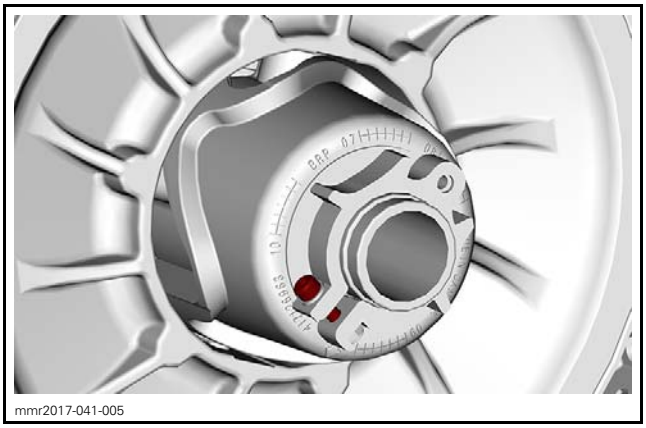
10. Unscrew countershaft from the upper gear retaining tool. **Do not** remove tool.

NOTE: While countershaft is removed from vehicle, the upper gear retaining tool maintains the drive chain and the upper gear in position inside chaincase.

Driven Pulley Disassembly

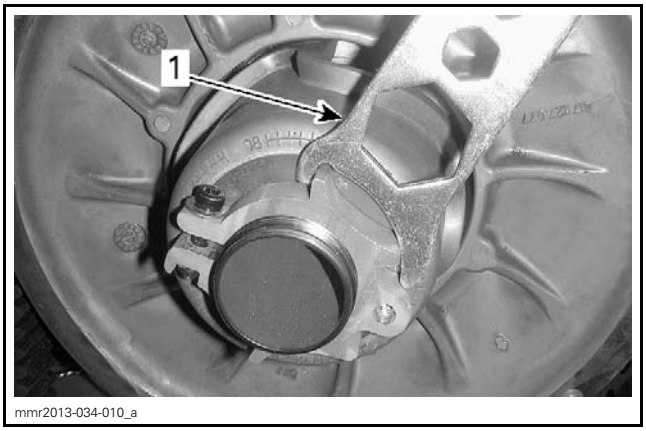
Removing Cam and Spring

1. Loosen the clamping screw.


mmr2017-041-005

2. Unscrew the adjuster hub **clockwise** using the suspension adjustment tool provided in the vehicle tool kit.

NOTE: The adjuster hub has LH treads.

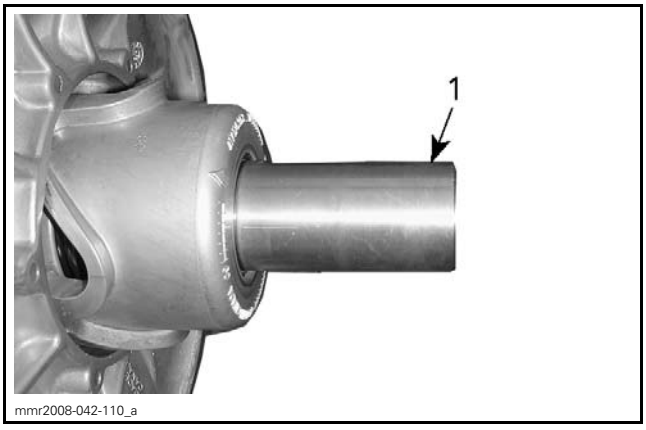


mmr2013-034-010_a

1. Suspension adjustment tool shown

REQUIRED TOOL	
DRIVEN PULLEY SPRING COMPRESSOR (P/N 529 036 182)	

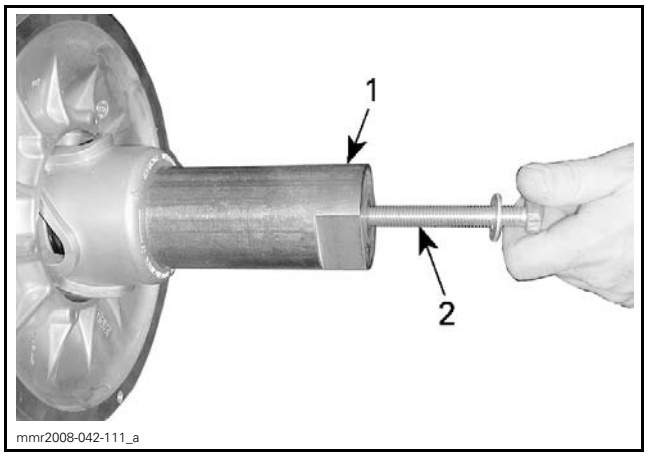
3. Install the threaded adapter of the spring compressor on the countershaft.



mmr2008-042-110_a

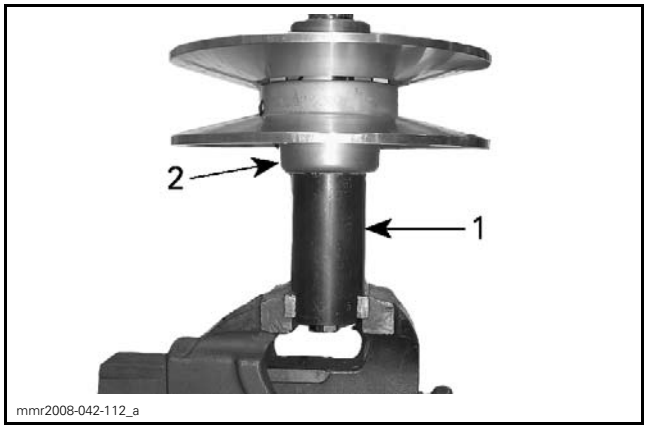
1. Threaded adapter

4. Install the external sleeve over the threaded adapter and secure sleeve with the tool screw.



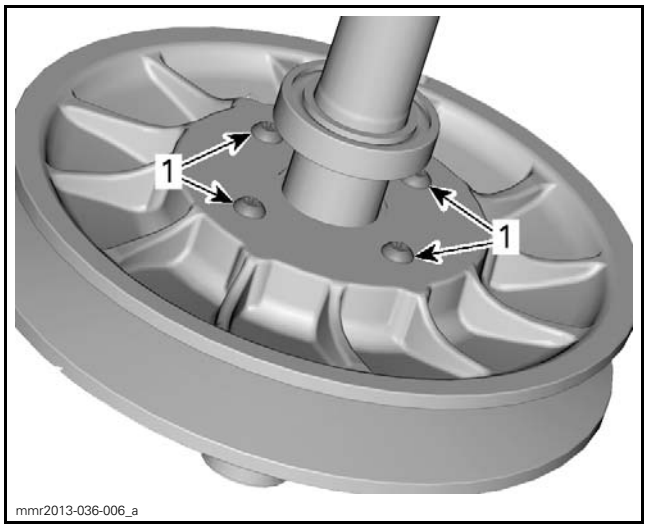
1. External sleeve
2. Driven pulley spring compressor screw

5. Tighten the tool screw to compress the cam.
6. Install the tool in a vice.



1. Driven pulley spring compressor
2. Driven pulley

7. Using a heat gun, heat cam screws to break the thread locker.

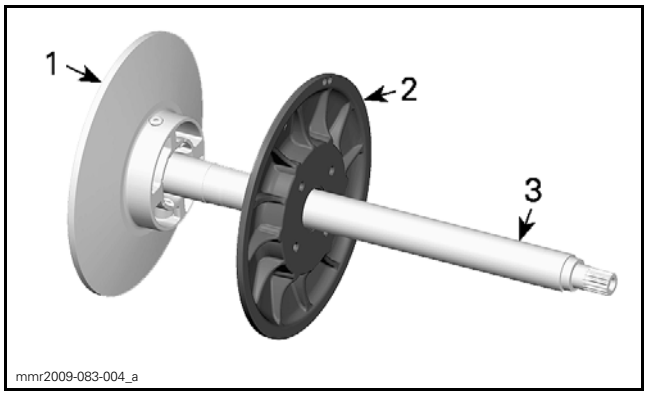


1. Heat cam screws

8. Remove and discard cam screws.
9. Unscrew the tool screw completely.
10. Remove cam, spring stoppers and spring.

Removing the Sliding Sheave

1. Remove the cam and spring. Refer to procedure in this subsection.
2. Remove the countershaft bearing. Refer to procedure in this subsection.
3. Remove sliding sheave.



1. Fixed sheave
2. Sliding sheave
3. Countershaft

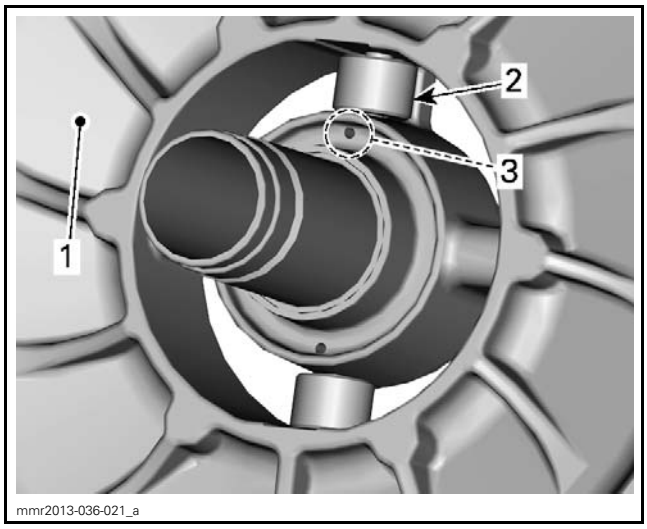
Removing the Fixed Sheave

The fixed sheave and countershaft are sold as an assembly. They are not available separately.

Removing the Driven Pulley Rollers

1. Move sliding and fixed sheaves apart.
2. Remove spring pins used to lock pivot screws.
   2.1 Use tap wrench to start removing spring pin.

2.2 Once spring pin is accessible to pliers, pull pin out using pliers.

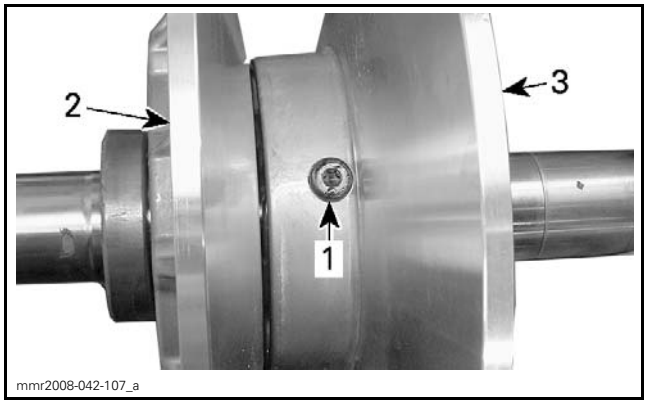


mmr2013-036-021_a

1. Fixed sheave outer face
2. Roller
3. Spring pin location

3. Identify pivot screws location before removal.
4. Remove pivot screw and ribbed lock washer; **keep both for reuse**.

NOTICE **Make sure not to damage or lose pivot screws. If screws need to be replaced, replace fixed sheave assembly.**

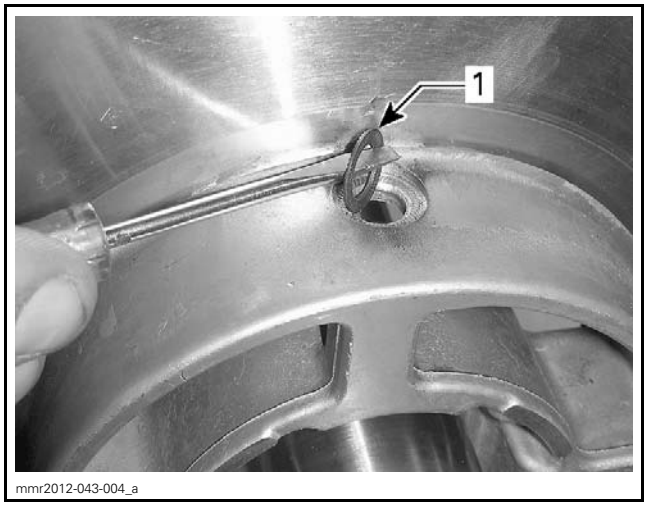


mmr2008-042-107_a

1. Pivot screw
2. Sliding sheave
3. Fixed sheave


mmr2012-043-003

PIVOT SCREW REMOVAL



mmr2012-043-004_a

1. Ribbed lock washer

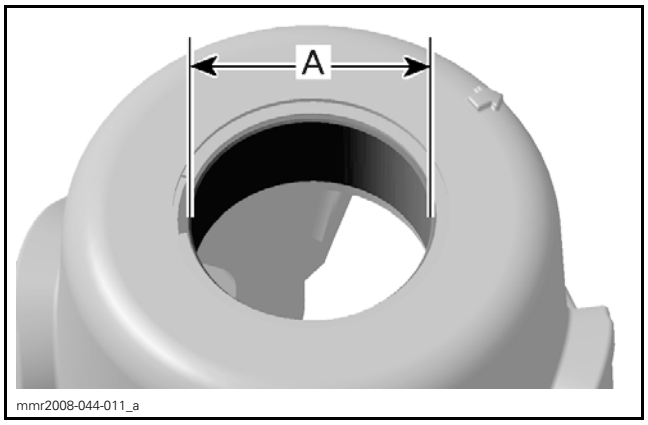
5. Remove roller.
6. Proceed with removal of other roller.

IMPORTANT: For proper fit, each pivot screw must be reinstalled where originally mounted in the fixed sheave.

Inspecting the Driven Pulley

Inspecting Cam and Spring

1. Verify contact surfaces of cam for visible damages. Ensure circlip properly locks the inner bushing. Replace part if necessary.
2. Using a dial bore gauge, measure the inner diameter of cam bushing. Measuring point must be at least 5 mm (1/4 in) from bushing edge.



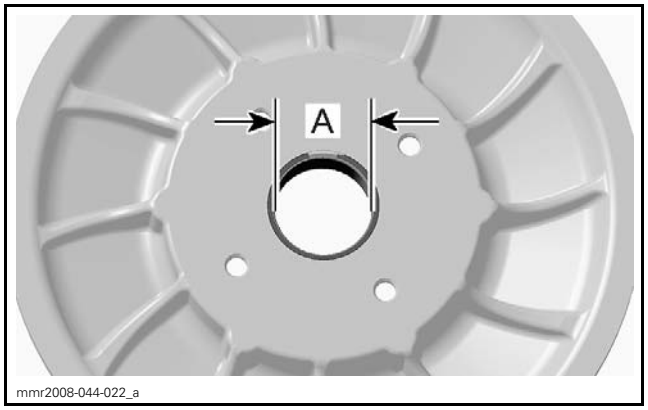
A. Inner diameter of cam bushing

CAM BUSHING	SERVICE LIMIT
Inner diameter	41.5 mm (1.634 in)

3. Replace the cam if the inner diameter of bushing is out of specification.

Inspecting the Sliding Sheave

1. Inspect pulley sheave for marks or scratches.
2. Ensure circlip properly locks the inner bushing. Replace part if necessary.
3. Using a dial bore gauge, measure the inner diameter of sliding sheave bushing. Measuring point must be at least 5 mm (1/4 in) from bushing edge.



A. Inner diameter of sliding sheave bushing

SLIDING SHEAVE BUSHING	SERVICE LIMIT
Inner diameter	41.5 mm (1.634 in)

4. Replace the sliding sheave if the inner diameter of bushing is out of specification.

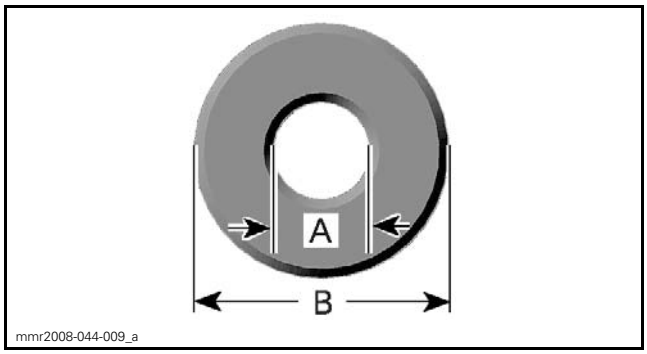
Inspecting the Fixed Sheave

Replace fixed sheave and countershaft if one of the following problem is detected:

– Marks or scratches on pulley sheave
– Bent, twisted or otherwise damaged countershaft
– Defective splines and threads at the end of countershaft.

Inspecting the Driven Pulley Roller

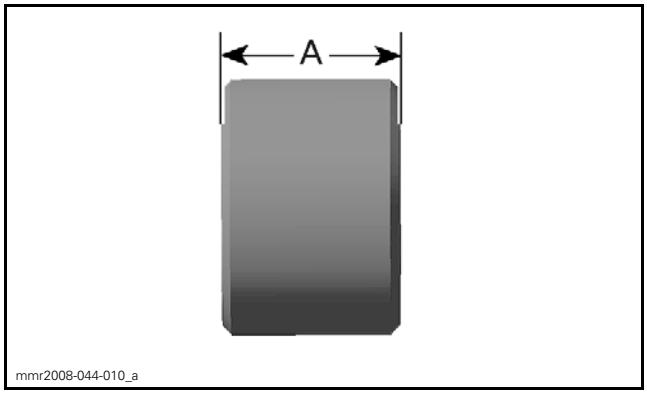
1. Check the rollers for flat spots, cracks or other visible damages. Replace if necessary (as a set).
2. Measure inner and outer diameter of rollers.



A. Inner diameter
B. Outer diameter

DRIVEN PULLEY ROLLER	SERVICE LIMIT
Inner diameter	8.5 mm (.335 in)
Outer diameter	21.5 mm (.846 in)

3. Measure the roller thickness.



A. Thickness of roller

DRIVEN PULLEY ROLLER	SERVICE LIMIT
Thickness	14.75 mm (.581 in)

4. If a roller is out of specifications, replace both rollers at the same time.

Cleaning the Driven Pulley

Use the PULLEY FLANGE CLEANER (P/N 413 711 809) and a clean rag to clean pulley sheaves.

Cleaning Cam and Spring

During break-in period, teflon from bushing moves to cam or countershaft surface. A teflon over teflon running condition occurs, leading to low friction. So it is normal to see gray teflon deposit on cam or countershaft. Do not remove this deposit.

When a dust deposit has to be removed from the cam or the countershaft, use dry cloth to avoid removing transferred teflon.

Driven Pulley Assembly

Installing the Driven Pulley Roller

NOTE: Exceptionally, do NOT clean threaded hole to avoid changing the screw position when torqued.

1. Using a hand wire brush, clean pivot screw threads.

IMPORTANT: Do not use a thread die to clean pivot screw of threadlocker as this may alter the screw threads.

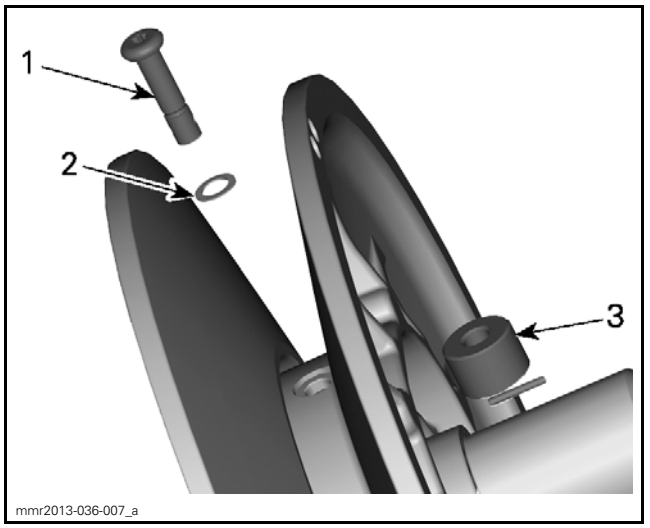
NOTE: Pivot screw and ribbed lock washer must be reused if in good condition. If damaged, replace fixed sheave assembly.

2. Apply the following threadlocker to the pivot screw threads.

SERVICE PRODUCT	
Pivot screw threads	LOCTITE 243 (BLUE) (P/N 293 800 060)

3. Insert roller in fixed sheave, thread in pivot screw with ribbed lock washer.

NOTE: The ribbed locked washer must be installed with the concave side towards the fixed sheave.



1. Pivot screw
2. Ribbed lock washer (concave side towards fixed sheave)
3. Roller

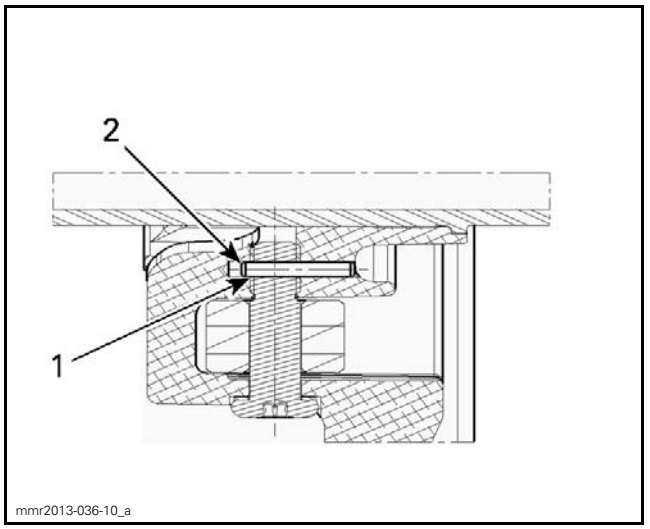
IMPORTANT: For proper fit, each pivot screw must be reinstalled where originally mounted in the fixed sheave.

4. Torque pivot screw as specified.

TIGHTENING TORQUE	
Pivot screws	17 N•m ± 1 N•m (150 lbf•**in** ± 9 lbf•**in**)

NOTE: Spring pin hole in the fixed sheave and pivot screw must perfectly line up when torque is applied.

NOTICE **If not properly aligned, spring pin will not insert in pivot screw hole and spring pin threads in fixed sheave will be damaged.**

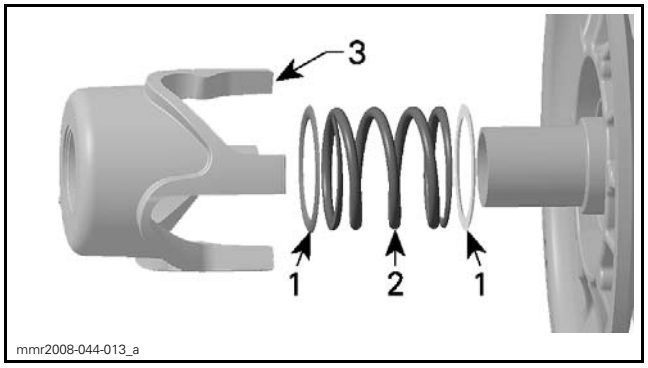


1. Hole in pivot screw
2. Spring pin

5. Install spring pin.

Installing Cam and Spring

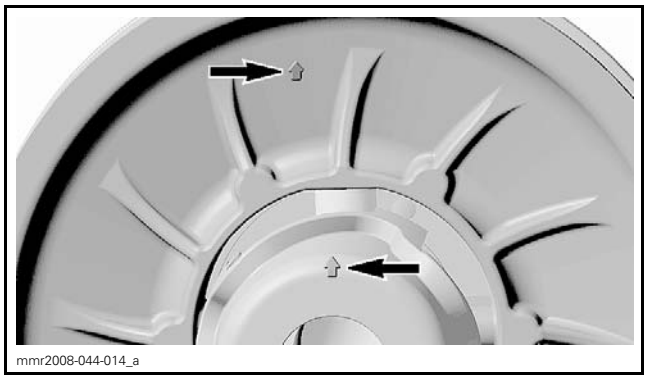
1. Install a spring stopper, the spring, the other spring stopper and the cam.



1. Spring stopper
2. Spring
3. Cam

2. Align the arrow on the cam with the arrow on the fixed sheave.

NOTE: On completion of cam installation, the arrow on the cam should have moved clockwise (approximately 30°).



3. Install the driven pulley spring compressor sleeve and tighten the tool screw until the cam is completely pressed against the sliding sheave.
4. From the back of the sliding sheave, install 4 new cam screws.
5. Torque cam screws as specified.

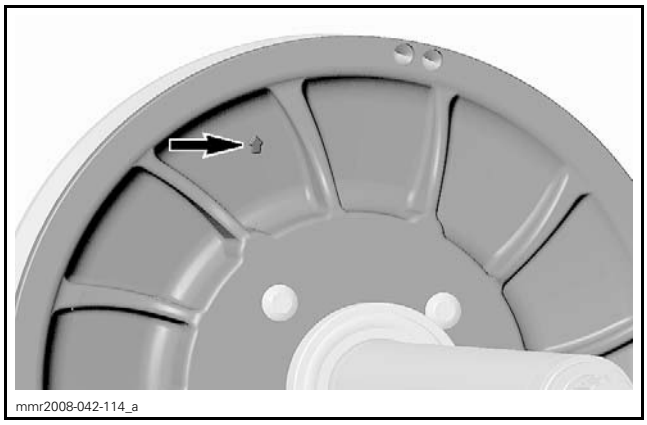
TIGHTENING TORQUE	
Cam screw	31.5 N•m ± 3.5 N•m (23 lbf•ft ± 3 lbf•ft)

6. Remove the tool.

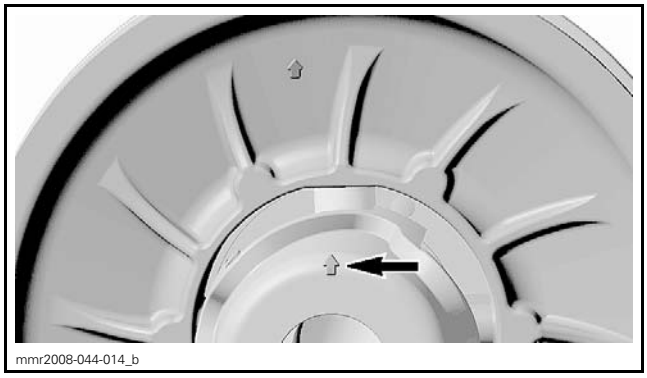
Installing the Sliding Sheave

The assembly of sliding sheave is the reverse of the disassembly. However, pay attention to the following.

When installing sliding sheave, make sure to align its arrow with the arrow on cam.



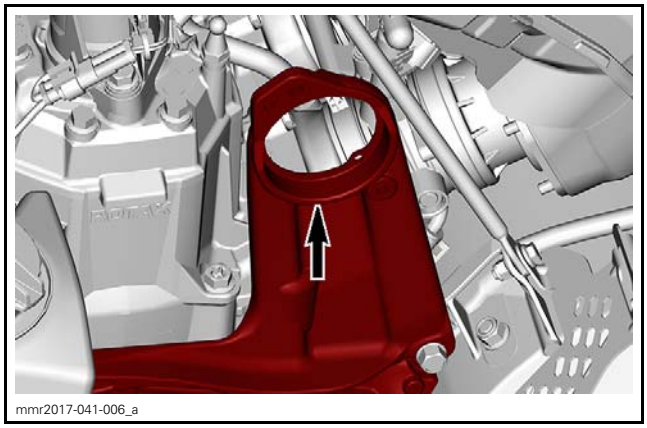
SLIDING SHEAVE ARROW



CAM ARROW

Installing the Driven Pulley

1. Using sand paper (600-grit or 1000-grit) or steel wool, remove any rust on bearing shoulder of countershaft bearing support.



BEARING SUPPORT SHOULDER

2. Apply a thin layer of LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070) on bearing shoulder.
3. Insert countershaft through countershaft bearing support.

4. Fasten the end of countershaft to upper gear retaining tool.
5. Align countershaft splines with upper gear splines.
6. Using the upper gear retaining tool as a puller, Engage countershaft splines in upper gear splines. Ensure countershaft bearing is installed properly in countershaft bearing support.
7. Remove the upper gear retaining tool.
8. Install the upper gear screw and the conical spring washer.

NOTE: The conical spring washer must be installed with its concave side towards upper gear.

9. Torque upper gear screw.
10. Install chaincase filler plug.
11. On LH side, install the bearing flange. Torque nut as specified.

TIGHTENING TORQUE	
Bearing flange nut	15.5 N•m ± 1.5 N•m (137 lbf•**in** ± 13 lbf•**in**)

12. Install the adjuster hub onto the countershaft end and temporarily tighten.
13. Install and adjust drive belt. Refer to *DRIVE BELT* subsection.
14. Install all other removed parts.

COUNTERSHAFT

The countershaft and the fixed sheave are sold as an assembly. They are not available separately.

Removing and Installing the Countershaft

Refer to *DRIVEN PULLEY* in this subsection for the procedures.

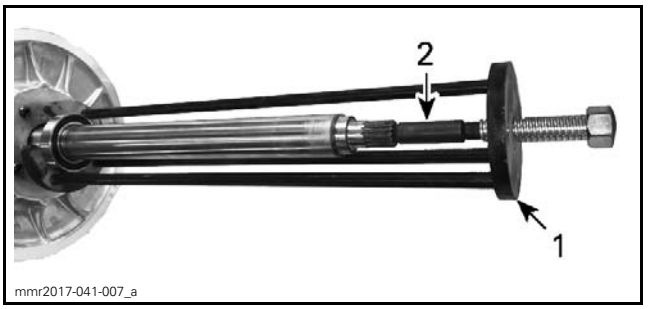
COUNTERSHAFT BEARING

Removing the Countershaft Bearing

Remove the driven pulley. Refer to procedure in this subsection.

Install the bearing remover on countershaft.

REQUIRED TOOL	
COUNTERSHAFT BEARING REMOVER (P/N 529 036 065)	
COUNTERSHAFT ADAPTER (P/N 529 036 424)	



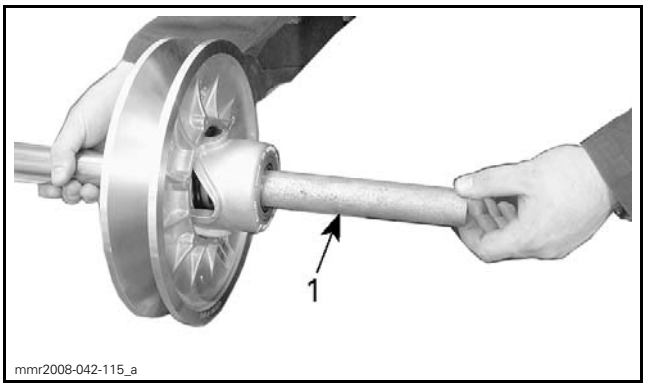
1. Countershaft adapter
2. Countershaft bearing remover

Tighten the screw at the end of tool to extract the bearing. Discard bearing.

Installing the Countershaft Bearing

1. Remove the adjuster hub from the cam.
2. Insert the countershaft support in the countershaft.

REQUIRED TOOL
COUNTERSHAFT SUPPORT (P/N 529 036 067)

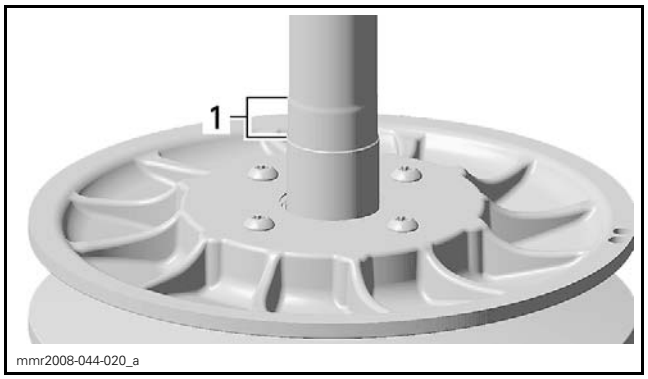


1. Countershaft support

NOTICE **The countershaft support is mandatory to avoid damaging the countershaft threaded end and the cam during bearing installation.**

3. Using PULLEY FLANGE CLEANER (P/N 413 711 809), clean residues on countershaft bearing surface.
4. Check countershaft bearing surface for wear.

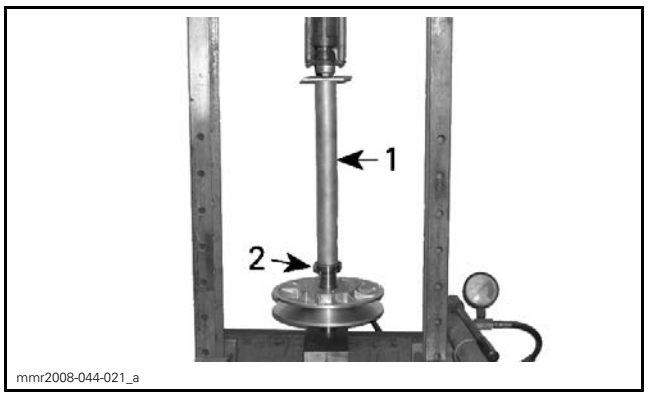
5. Apply LOCTITE 7649 (PRIMER) (P/N 293 800 041) on countershaft bearing surface and let dry 5 minutes.
6. Apply LOCTITE 609 (P/N 413 703 100) on primer.



1. Apply Loctite 7649 (Primer) before Loctite 609 in this region

7. Using a press and the bearing installer, install the new bearing on countershaft.

REQUIRED TOOL
COUNTERSHAFT BEARING INSTALLER (P/N 529 036 066)



1. Countershaft bearing installer
2. New bearing

NOTICE **Use a press only, never tap on countershaft bearing installer with an hammer to avoid damaging bearing and countershaft.**

8. Clean the surplus Loctite with a rag to avoid having Loctite on sliding sheave bushing.

COUNTERSHAFT BEARING SUPPORT

For countershaft bearing support removal and installation, refer to *COUNTERSHAFT BEARING SUPPORT* in *FRAME*.

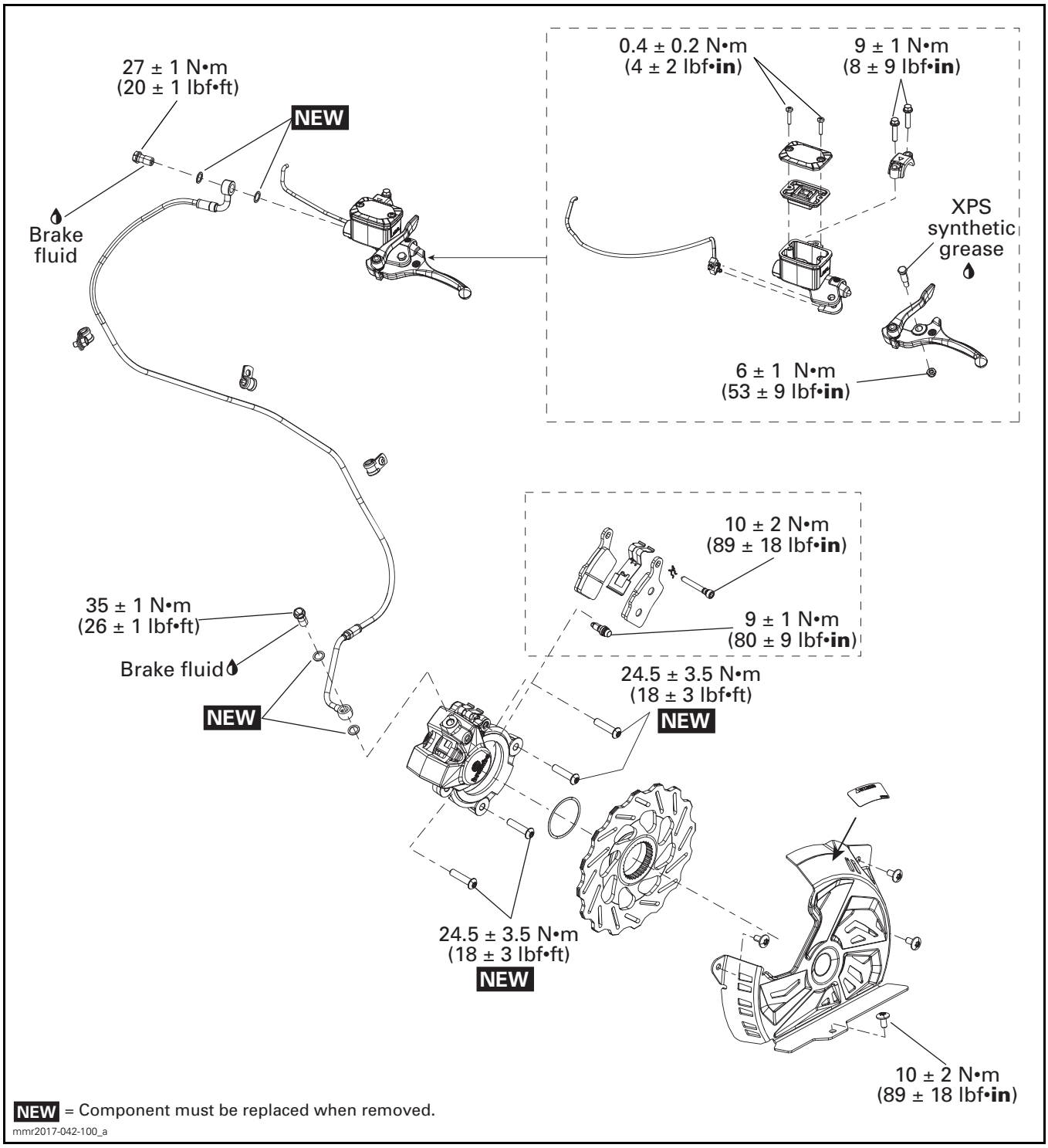
BRAKE

SERVICE TOOLS

Description	Part Number	Page
CALIPER PULLER	529 036 145	6
PROTECTIVE CAP	529 036 150	6

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 767 (ANTISEIZE LUBRICANT)	293 800 070	6
XPS SYNTHETIC GREASE	293 550 010	9


27 ± 1 N•m
(20 ± 1 lbf•ft)
NEW
Brake
fluid
0.4 ± 0.2 N•m
(4 ± 2 lbf•in)
9 ± 1 N•m
(8 ± 9 lbf•in)
XPS
synthetic
grease
6 ± 1 N•m
(53 ± 9 lbf•in)
10 ± 2 N•m
(89 ± 18 lbf•in)
9 ± 1 N•m
(80 ± 9 lbf•in)
35 ± 1 N•m
(26 ± 1 lbf•ft)
Brake fluid
NEW
24.5 ± 3.5 N•m
(18 ± 3 lbf•ft)
NEW
24.5 ± 3.5 N•m
(18 ± 3 lbf•ft)
NEW
10 ± 2 N•m
(89 ± 18 lbf•in)
NEW = Component must be replaced when removed.
mmr2017-042-100_a

GENERAL

During assembly/installation, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.).

Hoses or cables removed or disconnected must be installed and routed as per factory specifications.

NOTICE Locking ties removed must be replaced as per factory specifications.

⚠ WARNING

Never apply any product to brake fittings, The use of thread sealant or Teflon tape could cause brake system failure.

⚠ WARNING

A contaminated brake disc or pad reduces braking efficiency. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.

NOTICE Avoid spilling brake fluid on plastic, rubber or painted parts. Protect these parts with a rag when servicing the brake system.

NOTICE Wipe up any brake fluid spillage.

NOTICE To avoid serious damage to the brake system, use only DOT 4 brake fluid from a sealed container. Do not use brake fluid taken from an old or already opened containers, or mix different fluids for topping up the system.

NOTICE Sealing washers must be discarded and replaced with NEW ones every time a Banjo fitting is unscrewed.

Dispose of brake fluid as per your local environmental regulation.

PROCEDURES

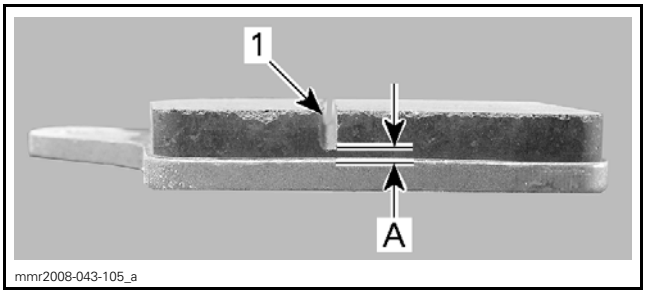
BRAKE PADS

Inspecting the Brake Pads

1. Measure brake pad lining thickness.

SERVICE LIMIT	
Brake pad thickness A	1 mm (1/32 in)

NOTICE Brake pads must always be replaced in pairs.



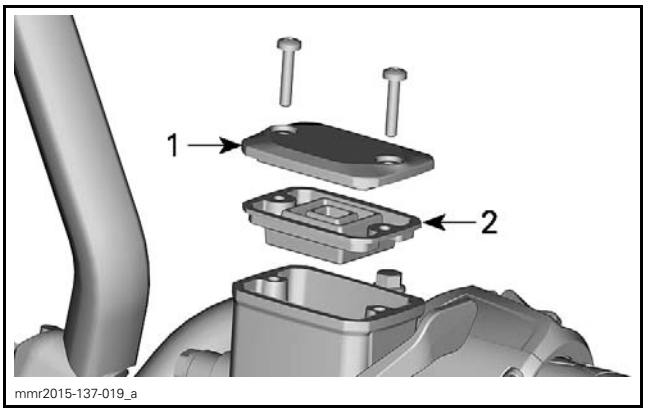
1. Groove on pad lining

2. Also inspect the brake disc, refer to *INSPECTING THE BRAKE DISC* in this subsection.

Replacing the Brake Pads

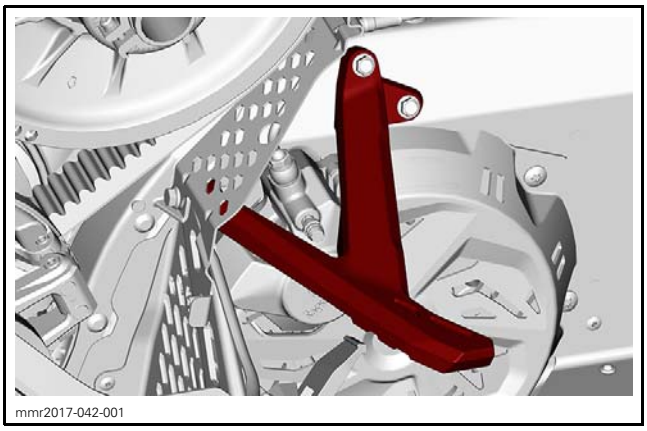
Removing the Brake Pads

1. Place the vehicle on a level surface.
2. Cover the plastic parts under and near master cylinder in the event that brake fluid would be spilled.
3. Remove reservoir cover with its diaphragm seal.

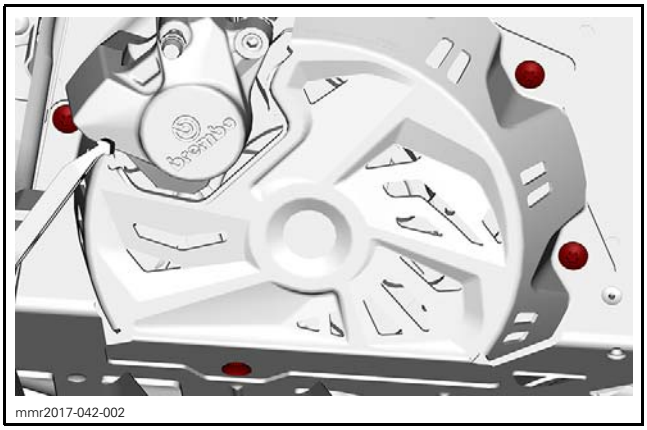


1. Reservoir cover
2. Diaphragm

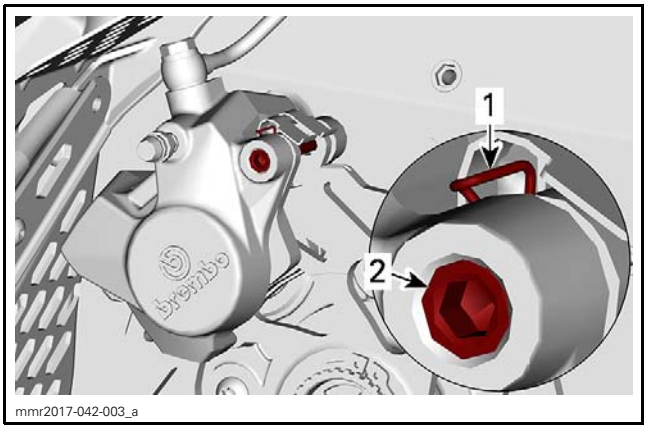
4. Open the LH side panel.
5. Remove the LH toe hook.


mmr2017-042-001

6. Remove the disc brake protective cover.


mmr2017-042-002

7. Remove the clip securing brake pad pin.
8. Unscrew and remove the brake pad pin.



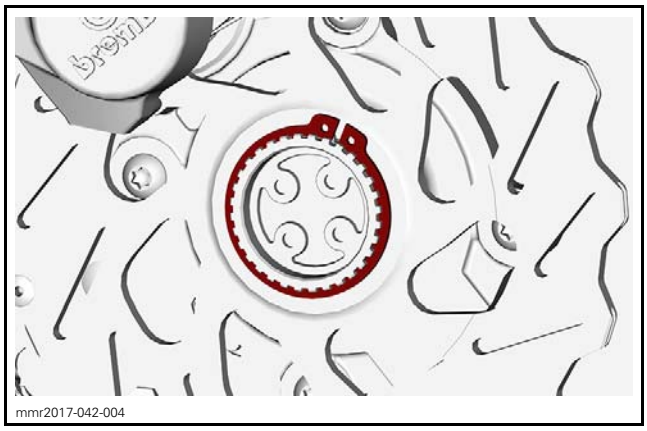
mmr2017-042-003_a

1. Clip
2. Brake pad pin

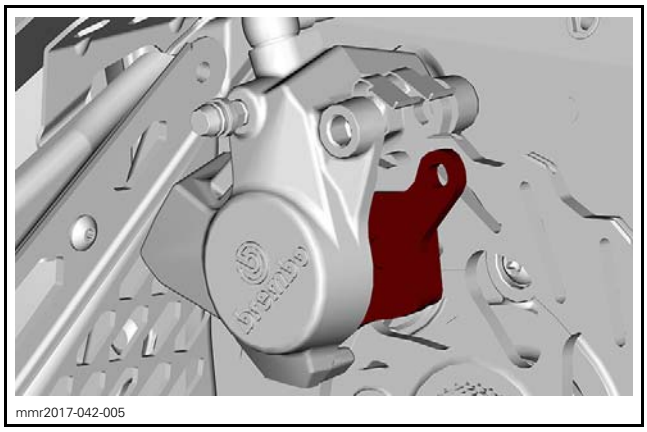
9. Using a flat screwdriver, depress caliper pistons into their bores.

NOTICE **Pay attention to avoid scratching brake disc.**

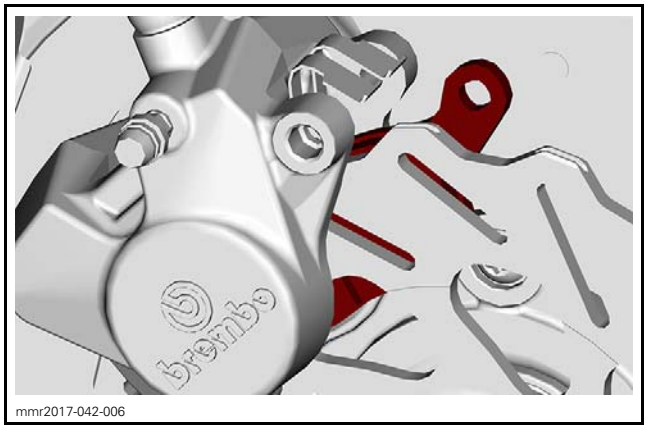
10. Remove the circlip securing brake disc to drive axle.


mmr2017-042-004

11. Remove brake pads.
    11.1 Remove the external pad first.


mmr2017-042-005

    11.2 Pull the brake disc outward and remove the internal pad.


mmr2017-042-006

Installing the Brake Pads

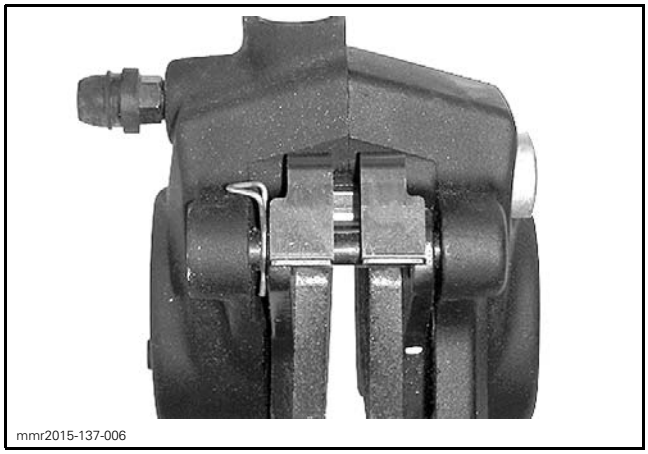
The installation is the reverse of the removal. However, pay attention to the following.

1. Install new brake pads with tabs facing upward.
2. Install brake pad pin and tighten to specification.

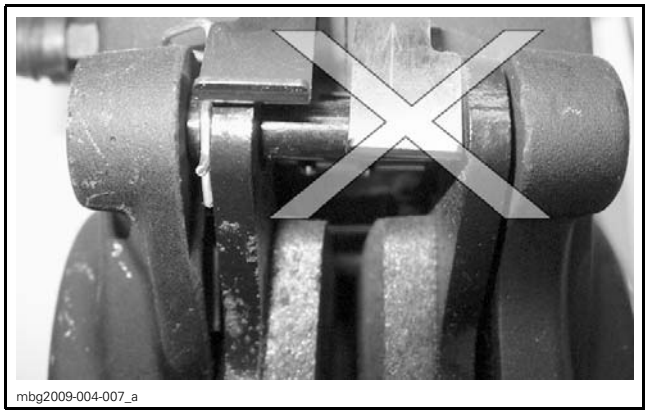
TIGHTENING TORQUE	
Brake pad pin	10 N•m ± 2 N•m (89 lbf•**in** ± 18 lbf•**in**)

3. Install spring clip on brake pad pin. If the clip seems loose, replace it with a new one.

NOTE: Make sure anti-rattle spring ends on brake pads tabs are correctly installed as per following pictures.


mmr2015-137-006

CORRECT


mbg2009-004-007_a

INCORRECT (RIGHT SIDE SPRING CLIP)

4. Operate the brake lever several times to bring the brake pads into contact with the disc brake.
5. Check brake fluid level in master cylinder and refill if necessary.
6. Reinstall the diaphragm and the cover.
7. Ride the vehicle a few minutes to make sure the repair is successful.

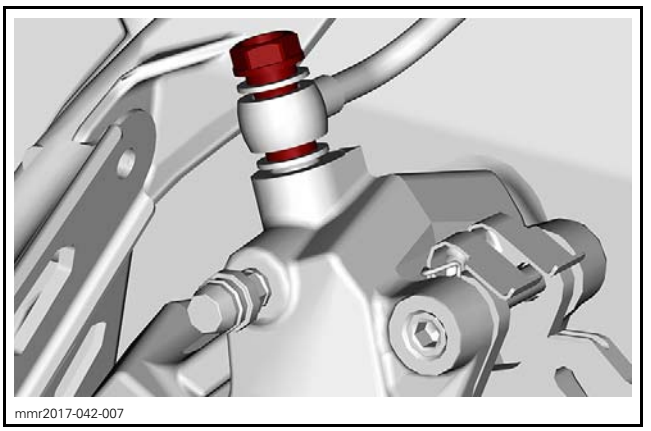
CALIPER

Removing the Caliper

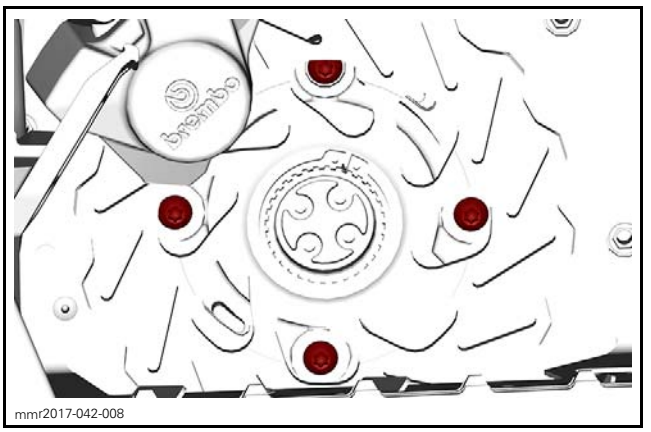
1. Open the RH side panel.
2. Refer to *CHAINCASE* subsection and carry the following steps.
   - 2.1 Remove chaincase cover.
   - 2.2 Loosen drive chain.
   - 2.3 Remove lower sprocket.
3. Open LH side panel.
4. Remove drive belt guard support. Refer to *DRIVE BELT* subsection.
5. Remove the LH toe hook.

NOTE: If the caliper is not replaced, omit steps 5 and 6 concerning the brake system draining and brake hose removal.

6. Drain the brake system, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
7. Remove the Banjo fitting and discard the sealing washers.

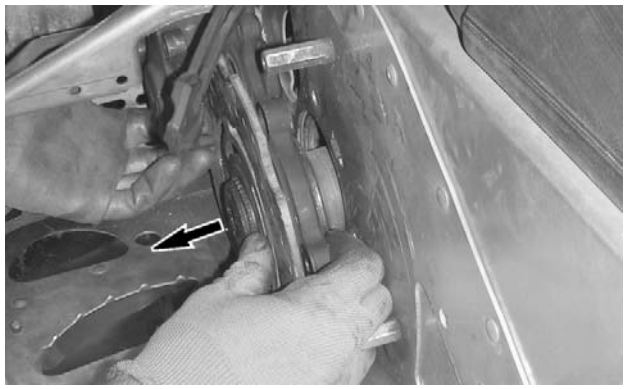

mmr2017-042-007

8. Remove the brake pads., Refer to procedure in this subsection.
9. Lift the rear of vehicle and release track tension completely.
10. Turn track to align brake disc slots with caliper bracket screws.
11. Remove caliper screws (4) behind brake disc.



mmr2017-042-008

12. Pull the assembly (brake disc, caliper, bearing, and drive axle) from LH side in order to make room for the caliper puller.



mbg2009-004-002_a

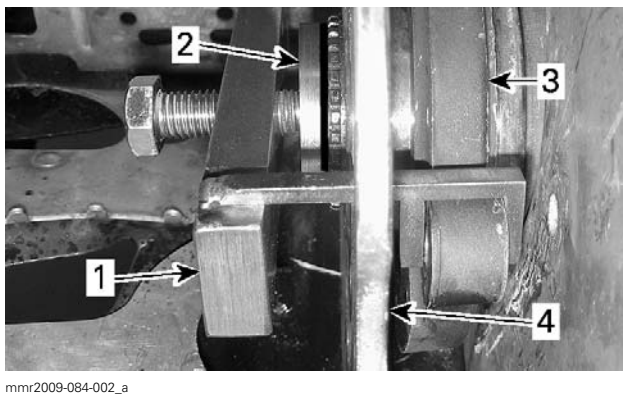
TYPICAL

REQUIRED TOOL	
CALIPER PULLER (P/N 529 036 145)	
PROTECTIVE CAP (P/N 529 036 150)	

13. Install the caliper puller on the brake caliper through brake disc slots.

NOTE: Make sure puller tabs are correctly engaged on caliper.

14. Install the protective cap between caliper puller bolt and plastic cap in drive axle end.



mmr2009-084-002_a

TYPICAL
1. *Caliper puller*
2. *Protective cap*
3. *Caliper bracket*
4. *Brake disc*

15. Tighten caliper puller bolt to separate caliper from drive axle bearing.

NOTICE Never use an impact tool to operate caliper puller. The caliper or the puller could break.

16. When brake disc is out of splines, remove it.
17. Remove caliper.

NOTICE Do not let caliper hang by the hose and do not stretch or twist the hose.

Inspecting the Caliper

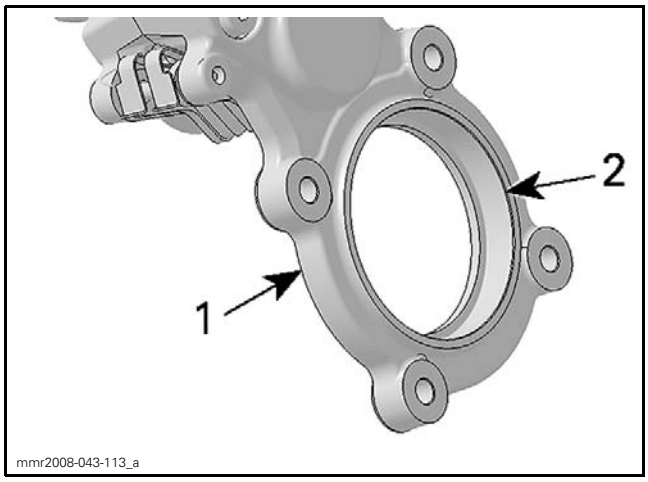
1. Check caliper pistons for:
   - Proper operation
   - Rust
   - Scratches
   - Leaks.
2. Check caliper bracket for:
   - Cracks
   - Rust on bearing shoulder (clean with a steel wood).
3. Replace caliper if required.

Installing the Caliper

1. Using your fingers or a small piece of wood, push both pistons into their bores.
2. Clean brake caliper bearing shoulder with fine steel wool.
3. Apply LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070) on drive axle splines and on bearing shoulder of caliper bracket.

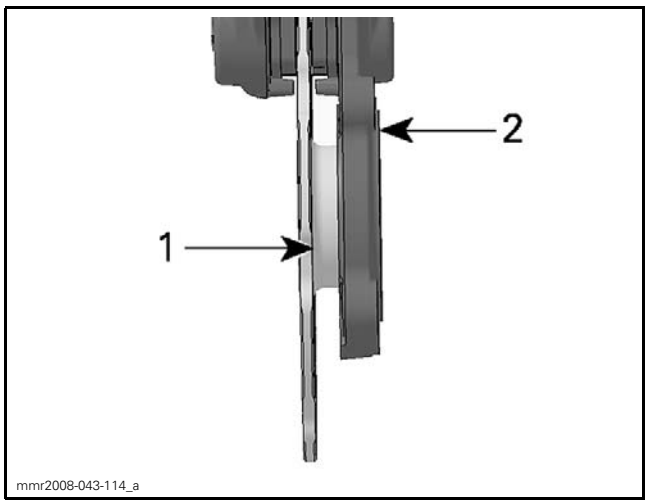
mmr2017-042-009

DRIVE AXLE SPLINES



1. Caliper bracket
2. Bearing shoulder

4. Insert brake disc in the caliper. The brake disc collar must be inserted in the caliper bracket.

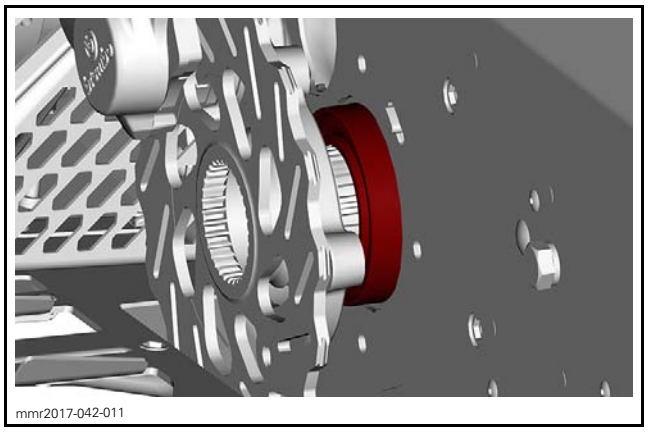


1. Brake disc collar
2. Caliper bracket

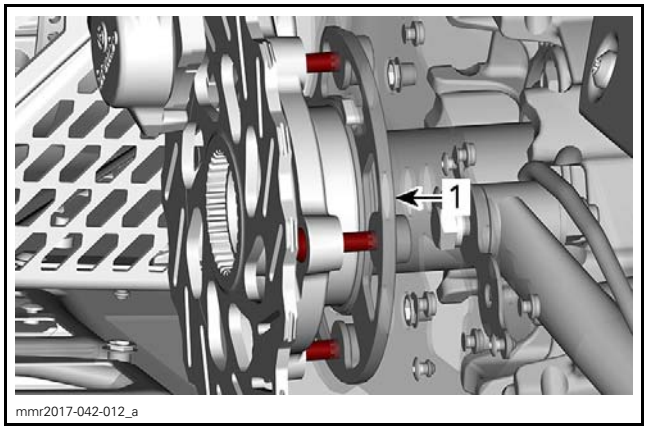
5. Ensure bearing flange is properly locked in the frame. Tabs must be properly inserted in frame slots.

VIEW FROM OUTSIDE FRAME

6. Align brake disc splines with drive axle splines and push brake disc onto drive axle.
7. Push the caliper bracket over the drive axle bearing.



8. Align caliper bracket holes with bearing flange holes and install caliper screws.



TUNNEL IS TRANSPARENT FOR CLARITY
1. Bearing flange (inside frame)

9. HAND TIGHTEN each caliper bracket screw evenly in a criss-cross pattern until bracket is correctly positioned against frame.

NOTICE **Never use an air tool to tighten caliper screws. The caliper bracket could crack.**

10. Install the brake pads. Refer to procedure in this subsection.
11. Install the brake disc circlip.
12. Tighten the brake caliper screws to specification.

TIGHTENING TORQUE	
Caliper screws	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

13. Apply brake fluid on Banjo fitting threads.
14. Install the Banjo fitting with two new sealing washers.
15. Tighten Banjo fitting to specification.

TIGHTENING TORQUE	
Banjo fitting	35 N•m ± 1 N•m (26 lbf•ft ± 1 lbf•ft)

16. Fill and bleed the brake system. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
17. Install all other removed parts.
18. Check the operation of the brake carefully before riding the snowmobile.

BRAKE DISC

Inspecting the Brake Disc (Not Removed)

1. Remove the disc brake protective cover.
2. Check for scoring, cracking or bending, replace as required.
3. Measure brake disc thickness. If the brake disc is out of specification, replace it with a new one.

NOTICE **Brake disc should never be machined.**

BRAKE DISC SPECIFICATION	
Minimum thickness	4.5 mm (.177 in)

Inspecting the Brake Disc (Removed)

1. Check brake disc splines and drive axle splines for wear or other damages. Replace defective parts.

Removing and Installing the Brake Disc

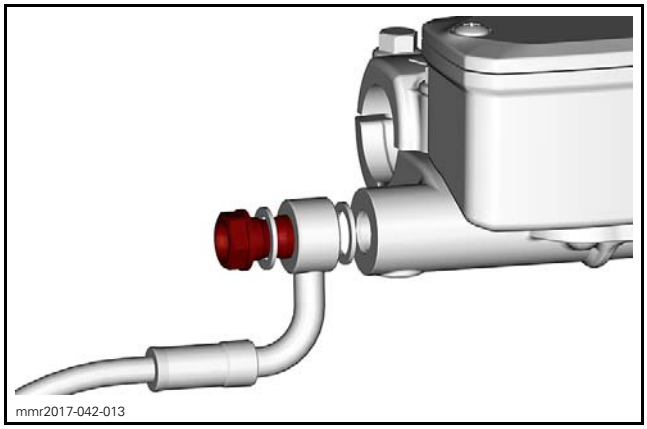
Follow procedures for caliper removal and installation.

MASTER CYLINDER

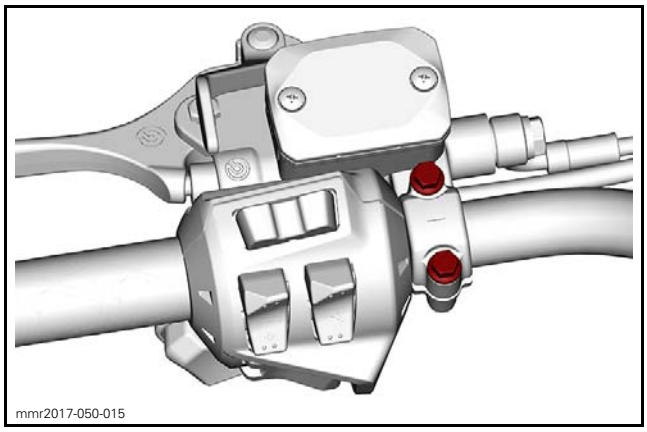
Removing the Master Cylinder

NOTE: If the master cylinder is not replaced, omit the steps concerning brake system draining and brake hose removal.

1. Drain brake system., Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
2. Remove the Banjo fitting and discard the sealing washers.


mmr2017-042-013

3. Remove screws and clamp securing master cylinder to handlebar.


mmr2017-050-015

4. Remove master cylinder.

NOTICE **Do not let master cylinder hang by the hose and do not stretch or twist the hose.**

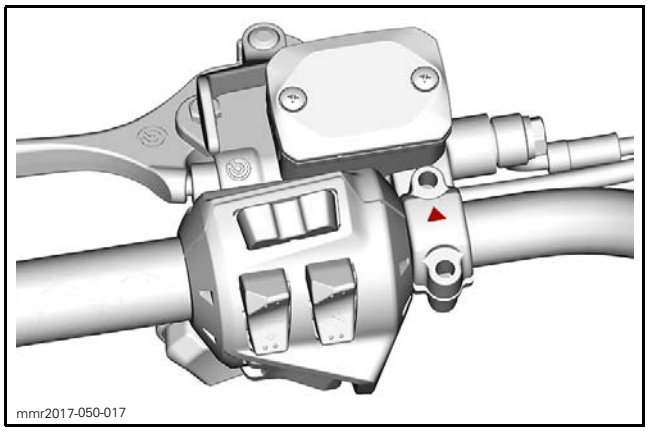
Inspecting the Master Cylinder

1. Discard all remaining fluid inside master cylinder reservoir.
2. Check if the reservoir cap seal is brittle, hard or damaged. Replace as necessary.
3. If the reservoir is damaged or leaking, replace master cylinder.

4. Check if brake lever is bent, cracked or otherwise damaged. Replace brake lever if required.

Installing the Master Cylinder

1. Place the master cylinder on the handlebar.
2. Install master cylinder retaining clamp with its arrow pointing toward the front of vehicle.



3. Install master cylinder clamp screws and tighten loosely.
4. With the handlebar in the straight ahead position, place the reservoir parallel to the ground.
5. Tighten master cylinder clamp screws to specification.

TIGHTENING TORQUE	
Master cylinder clamp screws	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

6. Install the Banjo fitting with two new sealing washers.
7. Tighten Banjo fitting to specification.

TIGHTENING TORQUE	
Banjo fitting	27 N•m ± 1 N•m (20 lbf•ft ± 1 lbf•ft)

8. Fill and bleed the brake system. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
9. Install brake light switch.
10. Install steering cover.

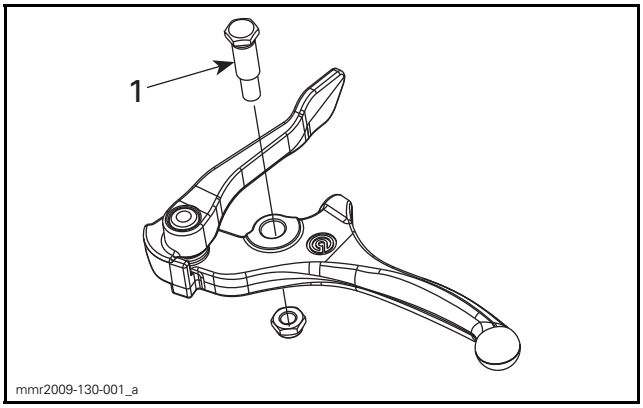
BRAKE LEVER

Lubricating the Brake Lever

After using brake cleaner in the brake lever area or after adding brake oil in reservoir, check brake lever pivot lubrication. Add XPS SYNTHETIC GREASE (P/N 293 550 010) on brake lever pivot as necessary.

Replacing the Brake Lever

Lubricate brake lever pivot using XPS SYNTHETIC GREASE (P/N 293 550 010).



TYPICAL
1. Lubricate brake lever pivot

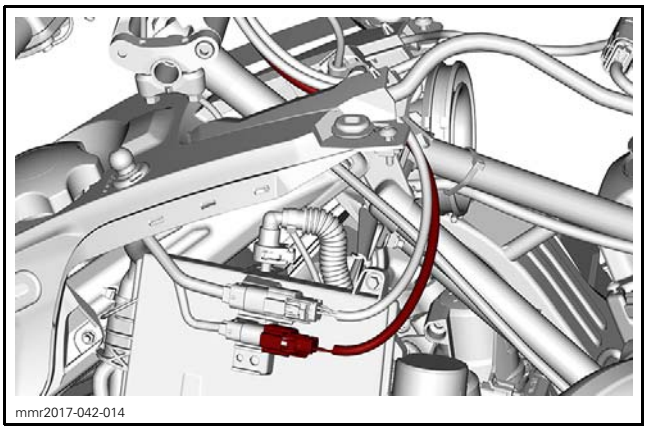
Tighten the pivot nut of brake lever to specification.

TIGHTENING TORQUE	
Brake lever pivot nut	6 N•m ± 1 N•m (53 lbf•**in** ± 9 lbf•**in**)

BRAKE LIGHT SWITCH

Testing the Brake Light Switch Resistance

1. Remove the upper body module. Refer to *BODY* subsection.
2. Disconnect the brake light switch connector located on the ECM.


mmr2017-042-014

3. Validate switch operation with an ohmmeter as follows.

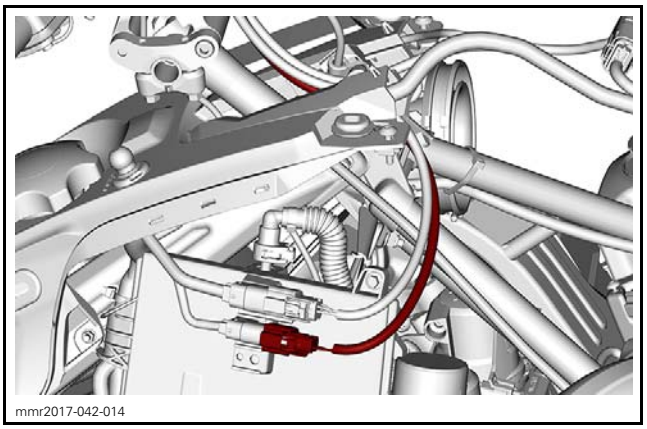
LH HANDLEBAR CONNECTOR (4-PIN)		
SWITCH	WIRE	RESISTANCE
Released	Pin 2 and pin 4	Infinite (OL)
Squeezed and held		Close to 0 Ω

If readings do not correspond to the above specifications, replace switch.

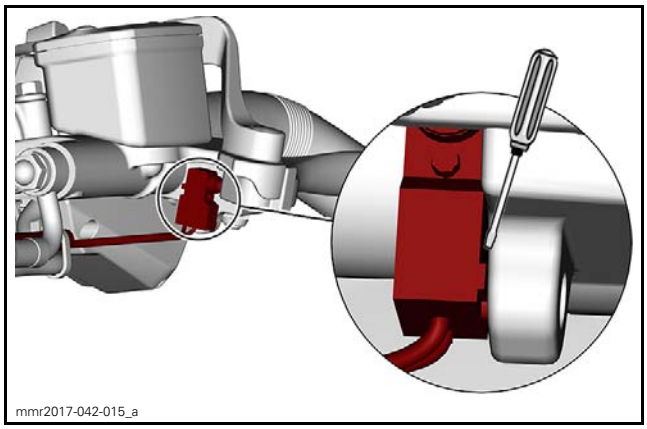
If readings correspond to the above specifications, check fuse, wiring and connectors going to switch. Repair or replace defective part(s).

Removing the Brake Light Switch

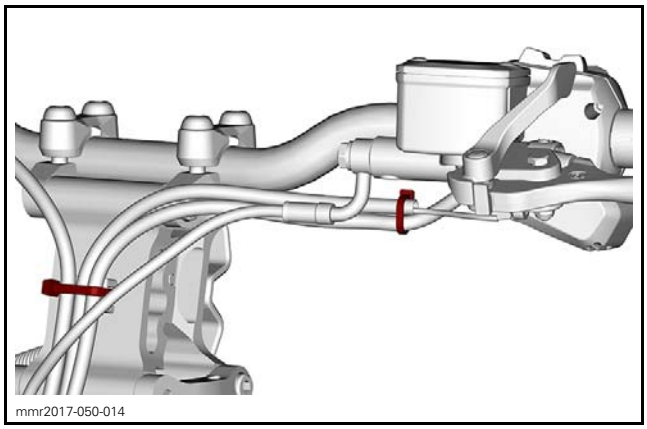
1. Remove the upper body module. Refer to *BODY* subsection.
2. Disconnect the brake light switch connector located on the ECM.


mmr2017-042-014

3. Slip a small screwdriver between brake light switch and master cylinder housing and separate them.


mmr2017-042-015_a

4. Cut all locking ties securing switch wires.


mmr2017-050-014

5. Remove switch wires from connector. Refer to *WIRING HARNESS AND CONNECTORS*.

NOTE: Check wires location for reinstallation.

Installing the Brake Light Switch

The installation is the reverse of the removal procedure. However, pay attention to the following.

Plug switch wires into connector as per following tables.

LH HANDLEBAR CONNECTOR (4-PIN)	
WIRE	CONNECTOR
GRAY	Pin 4
BROWN	Pin 2

Check if switch is working properly.

Install new locking ties.

BRAKE HOSE

Replacing the Brake Hose

1. Remove the console. Refer to *BODY* subsection.

2. Drain the brake system, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
3. Remove Banjo fittings at both ends of hose. Refer to *REMOVING THE MASTER CYLINDER* and *REMOVING THE CALIPER*.
4. Remove fasteners that secure the hose clamps to the frame.

NOTICE **Take care not to overdrill the lower clamp rivet. The fuel tank could be damaged.**

The installation is the reverse of the removal procedure. However, pay attention to the following.

Install new sealing washer.

TIGHTENING TORQUE	
Middle clamp nut	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)
Caliper Banjo fitting	35 N•m ± 1 N•m (26 lbf•ft ± 1 lbf•ft)
Master cylinder Banjo fitting	27 N•m ± 1 N•m (20 lbf•ft ± 1 lbf•ft)

CHAINCASE

SERVICE TOOLS

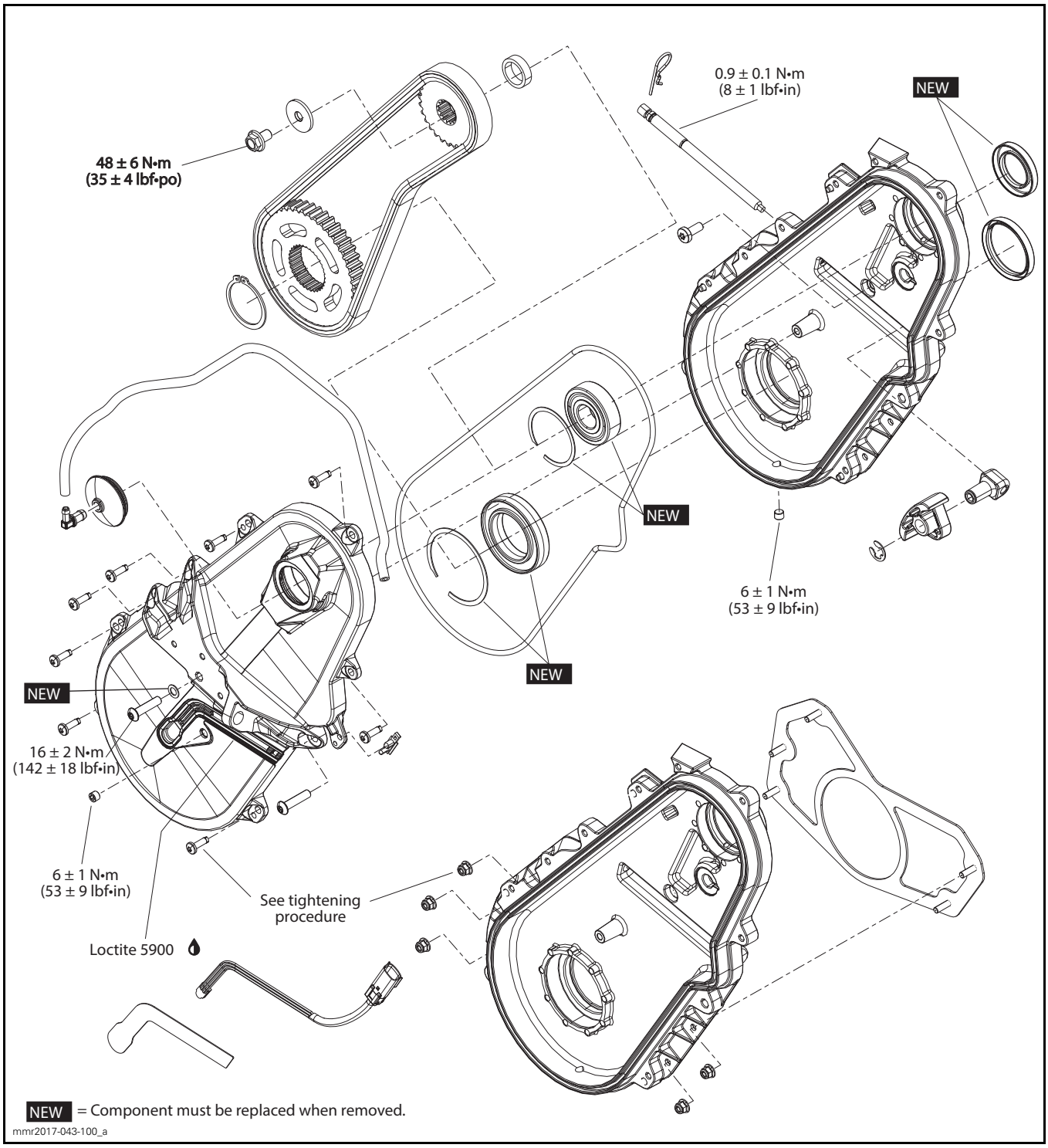
Description	Part Number	Page
BEARING PULLER/PUSHER	529 036 111	5
BEARING PULLER/PUSHER	529 036 112	5

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
SNAP-ON SEAL PULLER	YA105	6

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 5900	293 800 066	11


48 ± 6 N•m
(35 ± 4 lbf•po)
0.9 ± 0.1 N•m
(8 ± 1 lbf•in)
NEW
NEW
6 ± 1 N•m
(53 ± 9 lbf•in)
NEW
NEW
16 ± 2 N•m
(142 ± 18 lbf•in)
6 ± 1 N•m
(53 ± 9 lbf•in)
See tightening
procedure
Loctite 5900
NEW = Component must be replaced when removed.
mmr2017-043-100_a

GENERAL

During assembly/installation, use the torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, cotter pin, etc.).

NOTICE **Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.**

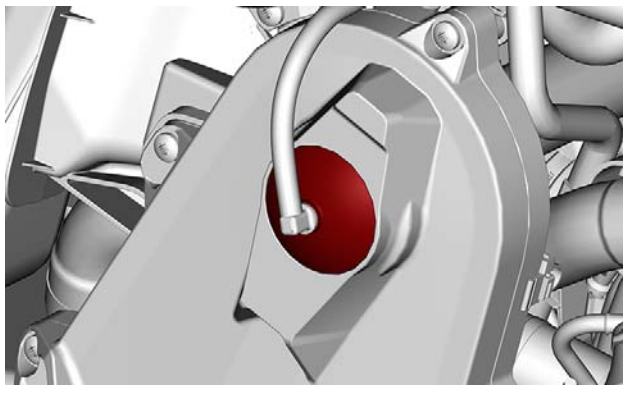
PROCEDURES

CHAINCASE

Chaincase Disassembly

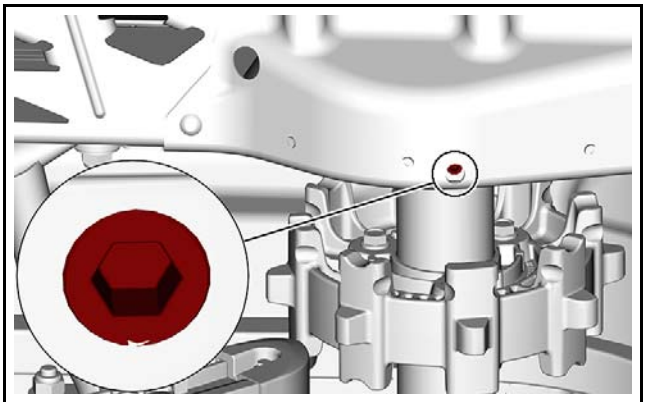
Removing the Chaincase Cover

1. Apply parking brake.
2. Remove the muffler. Refer to *EXHAUST SYSTEM* subsection.
3. Remove the filler plug on the chaincase cover.



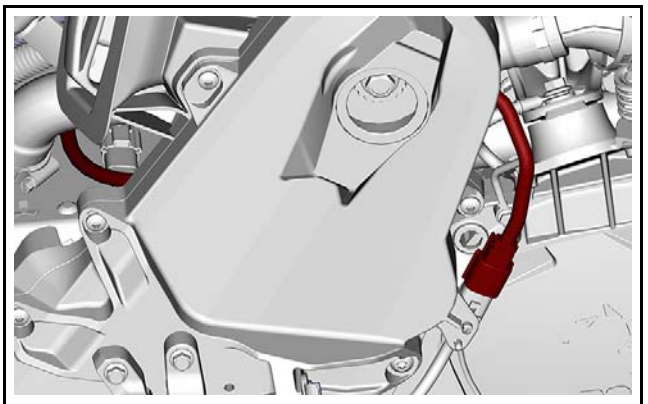
mmr2017-041-001

4. Place a container under vehicle in line with chaincase to catch chaincase oil.
5. Remove the drain plug on the bottom of the chaincase.



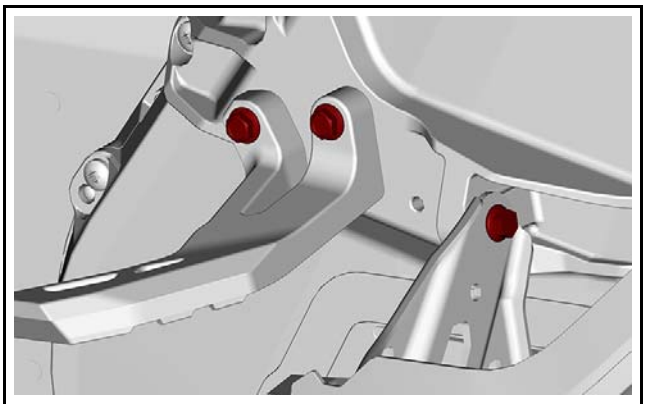
mmr2017-043-024_a

6. Disconnect speed sensor connector.



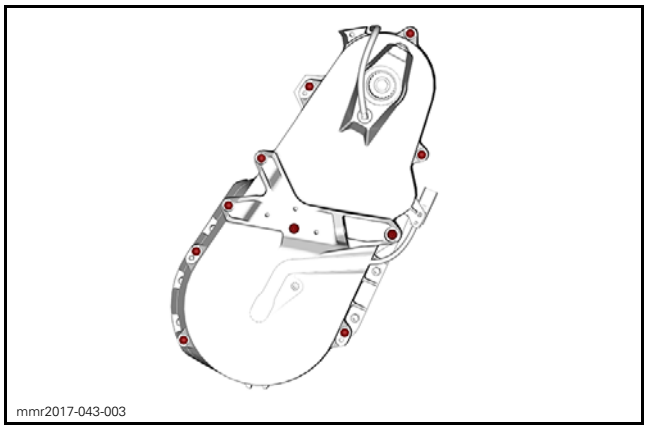
mmr2017-043-001

7. Remove the RH side toe hook and the screw securing the cover to the footrest.



mmr2017-043-002

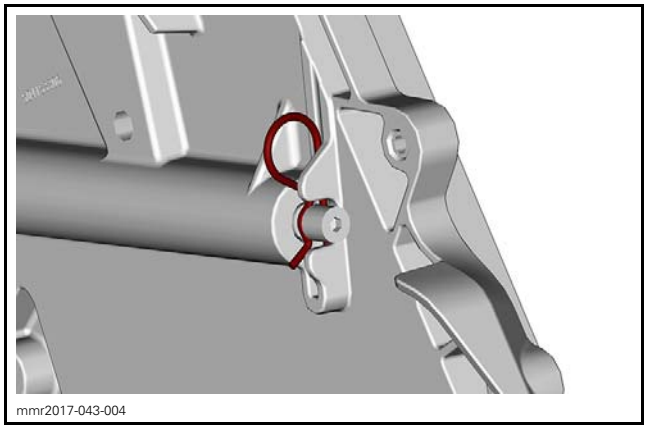
8. Remove chaincase cover screws.


mmr2017-043-003

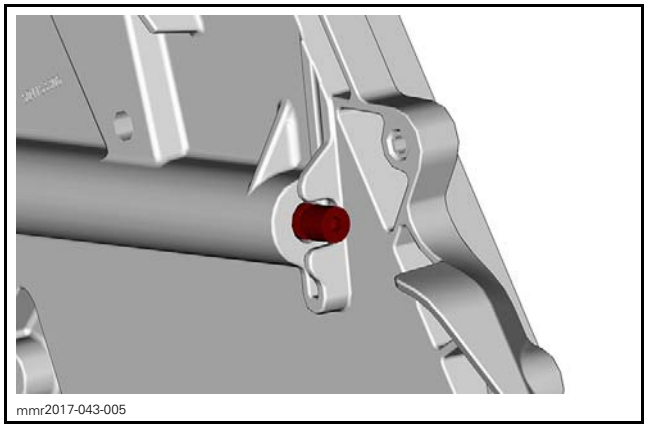
9. Pull on bottom of chaincase cover to drain oil.
10. Wait a moment then remove the cover completely.

Removing the Chain Tensioner

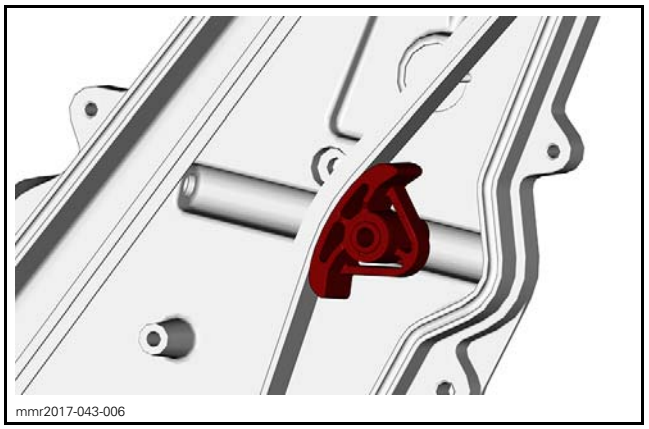
1. Remove the hair pin from behind the chaincase.


mmr2017-043-004

2. Remove the tensioner adjustment screw.

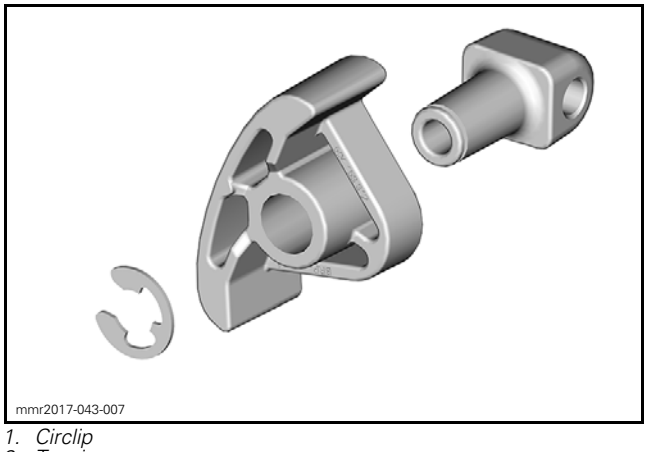

mmr2017-043-005

3. Remove tensioner.


mmr2017-043-006

NOTE: The following steps are required only if the tensioner or the slider is defective.

4. Remove the circlip securing the slider to tensioner.

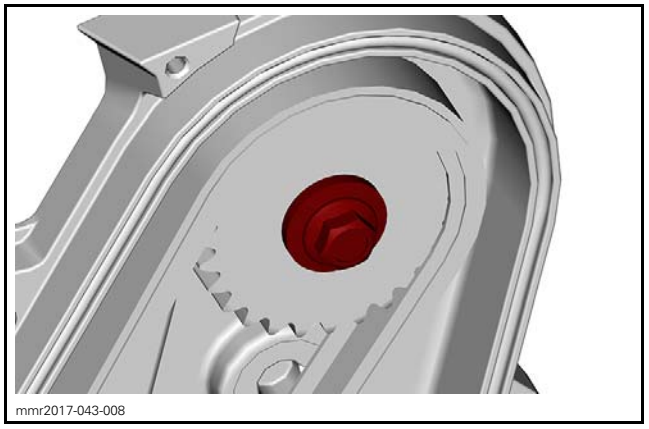

mmr2017-043-007

1. Circlip
2. Tensioner
3. Slider

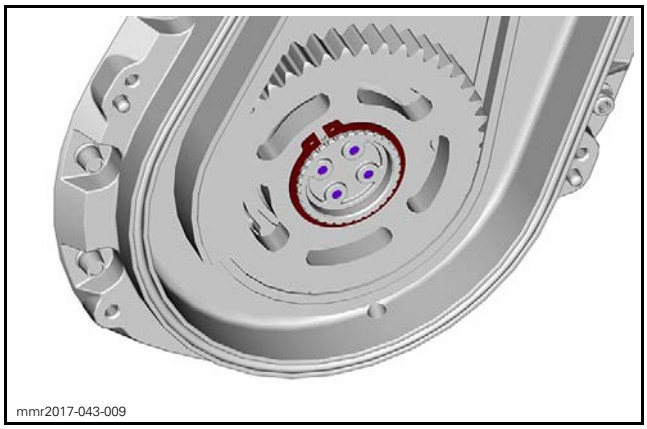
Removing the Drive Chain and Sprocket

NOTE: Prior to removing the drive chain, check the drive chain deflection.

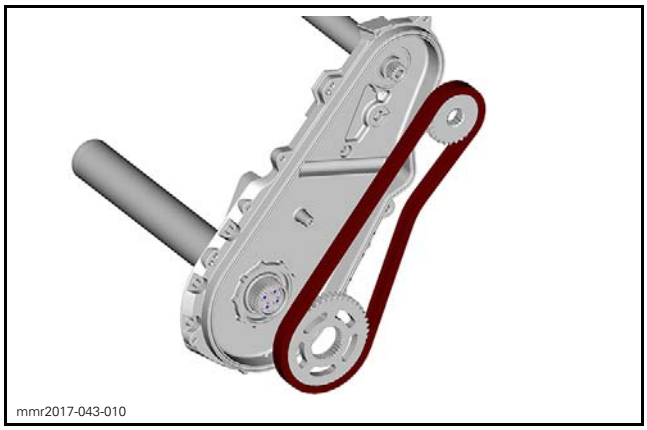
1. Remove the upper sprocket screw and its conical spring washer.


mmr2017-043-008

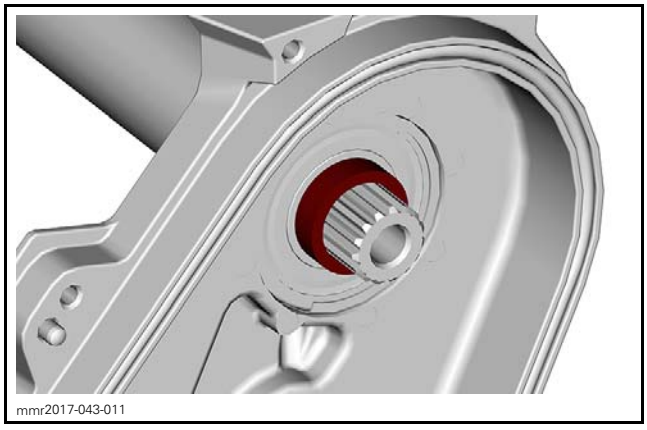
2. Remove the lower sprocket circlip.


mmr2017-043-009

3. Remove the upper sprocket, lower sprocket and drive chain simultaneously.

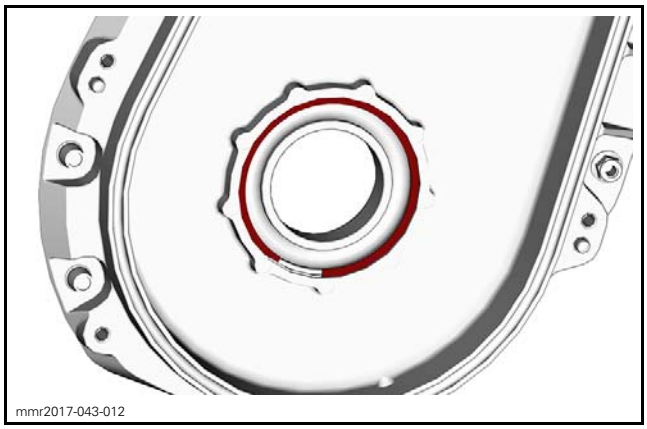

mmr2017-043-010

4. Remove the countershaft spacer.


mmr2017-043-011

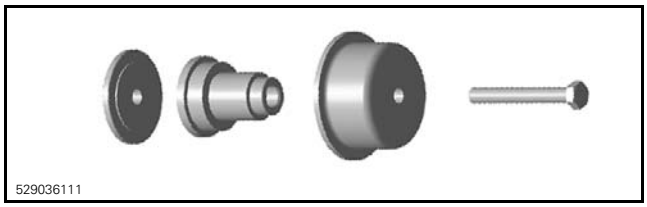
Removing the Chaincase Bearing

1. Remove countershaft or drive axle, depending which bearing is replaced. Refer to the appropriate subsection, *DRIVEN PULLEY AND COUNTERSHAFT* or *DRIVE AXLE*.
2. Remove snap ring securing bearing into chaincase.

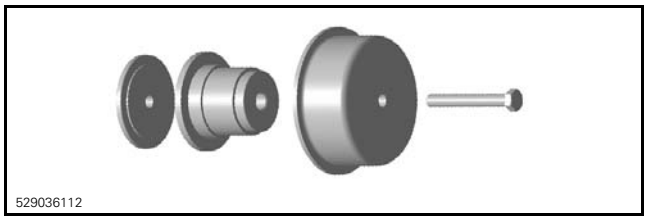

mmr2017-043-012

3. Install the appropriate bearing extractor:

BEARING	REQUIRED TOOL
Countershaft	BEARING PULLER/PUSHER (P/N 529 036 111)
Drive axle	BEARING PULLER/PUSHER (P/N 529 036 112)

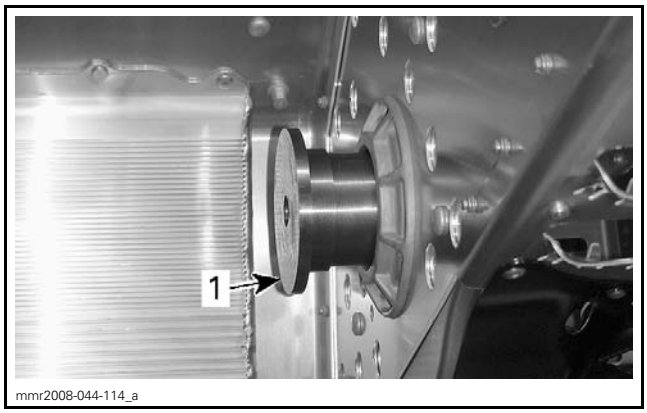

529036111

COUNTERSHAFT


529036112

DRIVE AXLE

4. Install the extractor/installer tool behind the bearing.

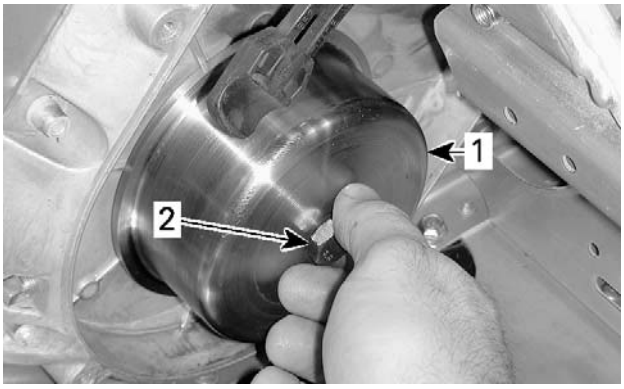


mmr2008-044-114_a

TYPICAL
1. Extractor/installer tool

5. Install the extractor cup over bearing.

6. Tighten the extractor/installer tool screw to remove the bearing.



mmr2008-044-115_a

TYPICAL
1. *Extractor cup*
2. *Tighten to remove bearing*

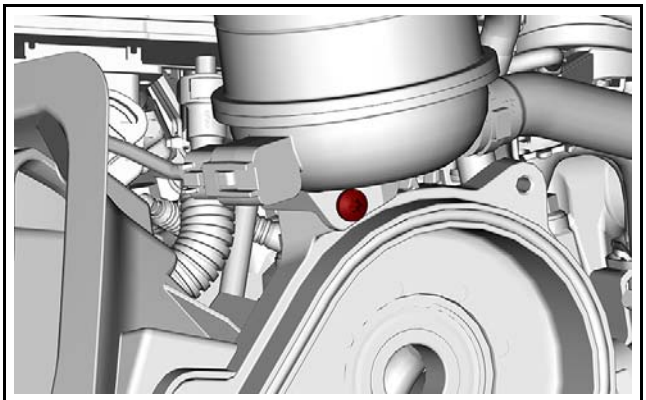
7. Using a seal puller such as the SNAP-ON SEAL PULLER (P/N YA105), remove and discard the oil seal.


mmr2008-044-116

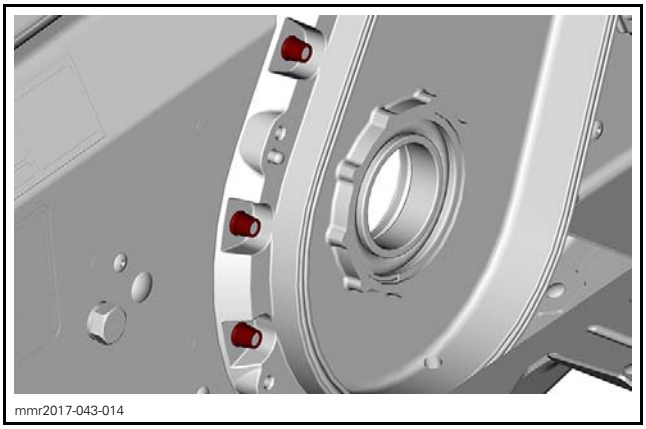
TYPICAL

Removing the Chaincase Housing

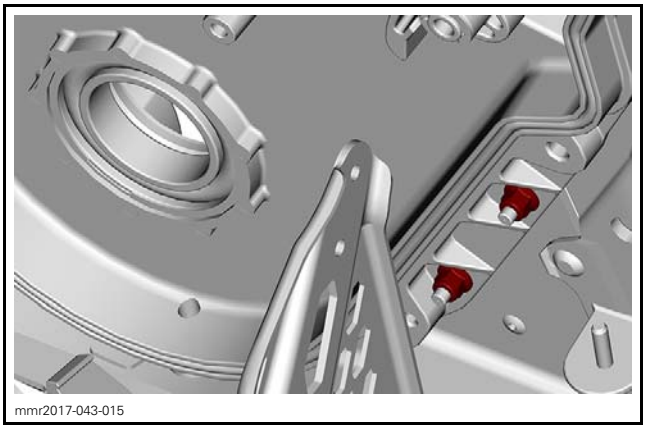
1. Remove the drive axle. Refer to *DRIVE AXLE* subsection.
2. Remove the countershaft. Refer to *DRIVEN PULLEY AND COUNTERSHAFT* subsection.
3. Remove the screw securing the coolant reservoir.


mmr2017-043-013

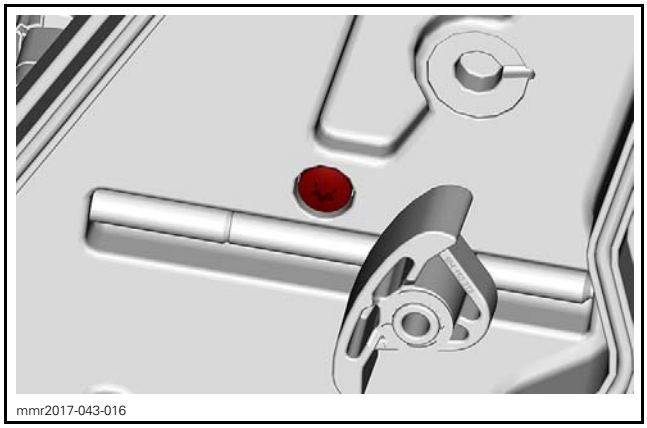
4. Remove the Huck rivets. Refer to *FRAME* subsection for proper removal procedure.


mmr2017-043-014

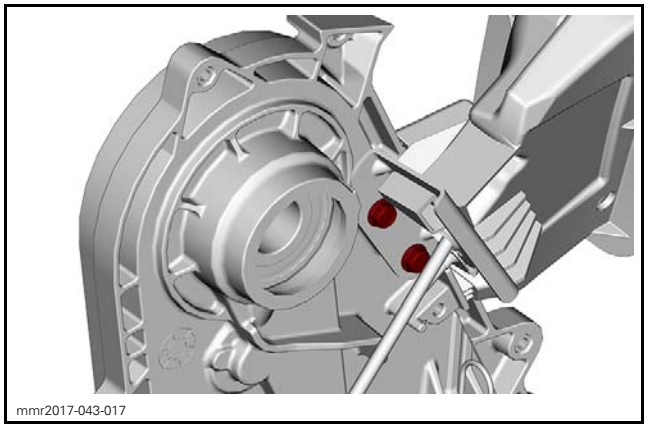
5. Remove nuts beside the footrest.


mmr2017-043-015

6. Remove the screw above the tensioner.


mmr2017-043-016

7. Using 2 large pry bars inserted between chaincase and frame, pry chaincase out of vehicle.
8. Remove the rewind starter rope guide screws.


mmr2017-043-017

Inspecting the Chaincase

Inspecting the Chaincase Cover

Check the cover for cracks or other damages. Replace it if necessary.

Check if O-ring inside cover is brittle, hard or damaged. Replace it if necessary.

Inspecting the Chain Tensioner

Check chain tensioner slider for wear or other damages. Replace if necessary.

Check threads of tensioner adjustment screw for damages or wear.

Replace screw if necessary and check chaincase for damages.

Inspecting the Drive Chain and Sprockets

Visually inspect the drive chain and sprockets for:
- Wear
- Cracks
- Damages teeth
- Missing links.

If a problem is detected, replace drive chain and sprockets as an assembly.

Check the drive chain deflection.

If the deflection is greater than 38 mm (1-1/2 in) without the chain tensioner, replace the drive chain.

Inspecting the Chaincase Bearing

Check for worn or defective bearings.

Chaincase Assembly

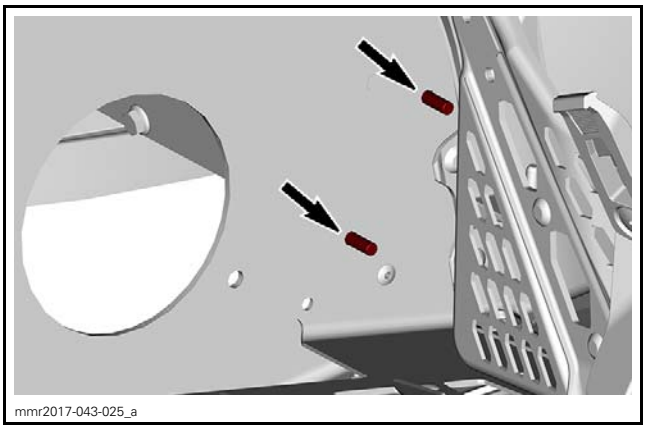
Installing the Chaincase Housing

The installation is the reverse of the removal procedure. However, pay attention to the following.

Have the following parts in hands:

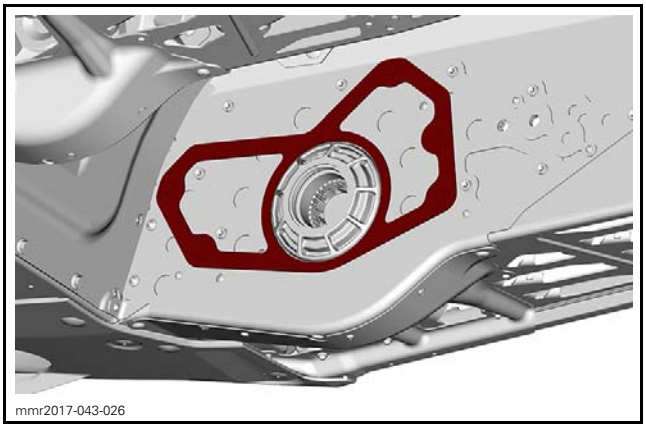
PARTS TO INSTALL CHAINCASE		
QTY	FASTENERS	PART NUMBER
1	Mounting plate kit	861805514
5	M6 elastic flanged nut	233261434

Remove the clinch studs from the frame.


mmr2017-043-025_a

Use a suitable box to support the frame around the stud head and hit the stud from the outside with a hammer.

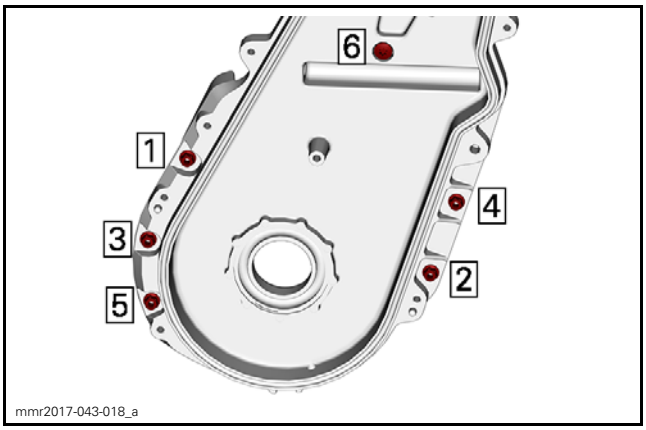
Install the mounting plate underneath the frame.


mmr2017-043-026

UNDERNEATH FRAME

Install 5 elastic flanged nuts to secure chaincase on mounting plate.

Tighten fasteners as per the following sequence.



mmr2017-043-018_a

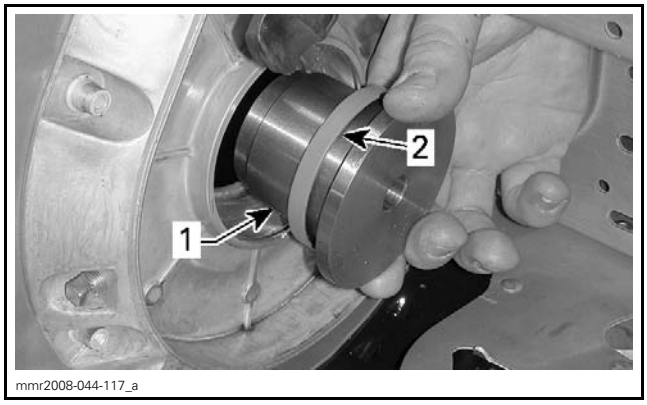
Proceed with drive chain adjustment. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Refill chaincase with recommended oil. Refer to *REPLACING THE CHAINCASE OIL* in *PERIODIC MAINTENANCE PROCEDURES* subsection.

Installing Chaincase Bearing

The installation is the reverse of the removal procedure. However, pay attention to the following.

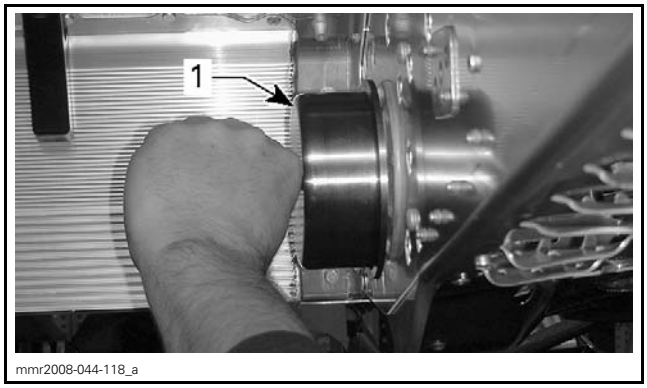
Install the new oil seal on the extractor/installer tool. Position the lips toward bearing.



mmr2008-044-117_a

TYPICAL
1. *Extractor/installer tool*
2. *Oil seal lips on this side*

Install the extractor cup inside frame.

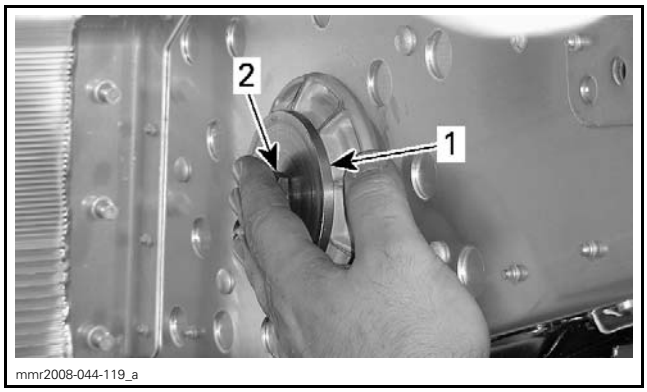


mmr2008-044-118_a

TYPICAL
1. *Extractor cup*

Tighten the extractor/installer tool screw to install the oil seal.

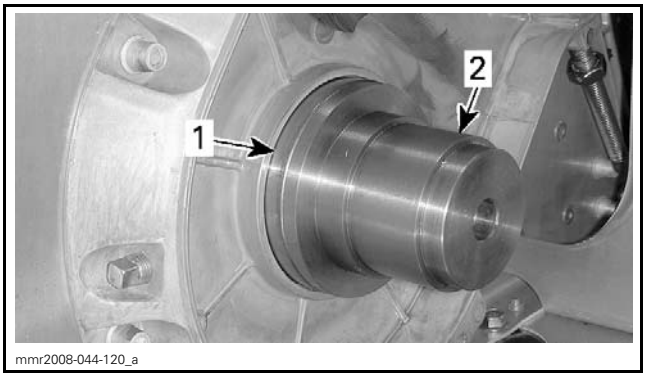
Install the large washer and the extractor/installer tool screw inside frame.



mmr2008-044-119_a

TYPICAL
1. *Large washer*
2. *Extractor/installer tool screw*

In chaincase, install new bearing and the extractor/installer tool.



TYPICAL
1. Bearing
2. Extractor/installer tool

Tighten the extractor/installer tool screw to install the bearing.

Install new snap ring.

Installing the Drive Chain and Sprockets

The installation is the reverse of the removal procedure. However, pay attention to the following.

Make sure to install sprockets with their inscriptions outward.

Install the conical spring washer on the upper sprocket with its concave side toward sprocket.

Installing the Chain Tensioner

The installation is the reverse of the removal procedure. However, pay attention to the following.

If the tensioner has been disassembled, make sure circlip turns freely and slider moves easily.

Proceed with drive chain adjustment. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

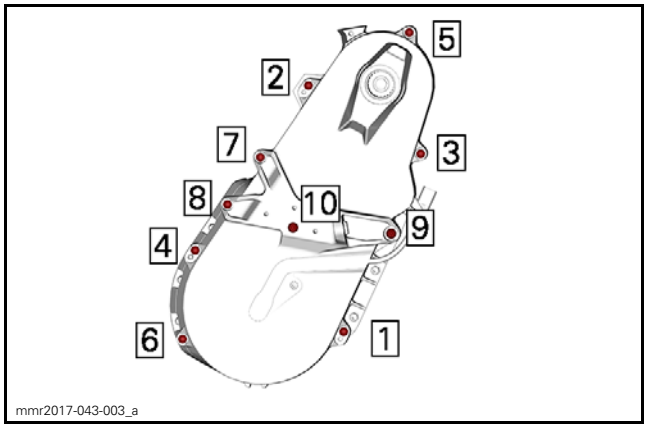
Installing the Chaincase Cover

The installation is the reverse of the removal procedure. However, pay attention to the following.

Ensure cover seal is positioned correctly in its groove.

Install new sealing washer with screw no.10. See next illustration.

Tighten chaincase cover screws in accordance with the following sequence.



TIGHTENING TORQUE		
Screws 1 to 8	Same chaincase	10 N•m ± 2 N•m (89 lbf•**in** ± 18 lbf•**in**)
	New chaincase	15 N•m ± 1 N•m (133 lbf•**in** ± 9 lbf•**in**)
Screw 9		24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)
Screw 10		16 N•m ± 2 N•m (142 lbf•**in** ± 18 lbf•**in**)

Refill chaincase with recommended oil. Refer to *CHAINCASE OIL REPLACEMENT* in *PERIODIC MAINTENANCE PROCEDURES* subsection.

Reinstall all other removed parts.

SPEED SENSOR (VSS)

The speed sensor is a hall effect sensor.

Speed Sensor Location

The speed sensor is mounted in the chaincase cover.

Testing the Speed Sensor Signal

1. Ensure speed sensor is properly connected.
2. Wake up ECM.
3. Back-probe VSS connector as per table and test for proper specification.

NOTICE **Be careful not to damage connector seals when back probing.**

SPEED SENSOR (VSS) CONNECTOR	SPECIFICATION
Pin 2	Ground
Pin 3	5 Vdc reference voltage

If test failed, check wiring harness going to ECM.

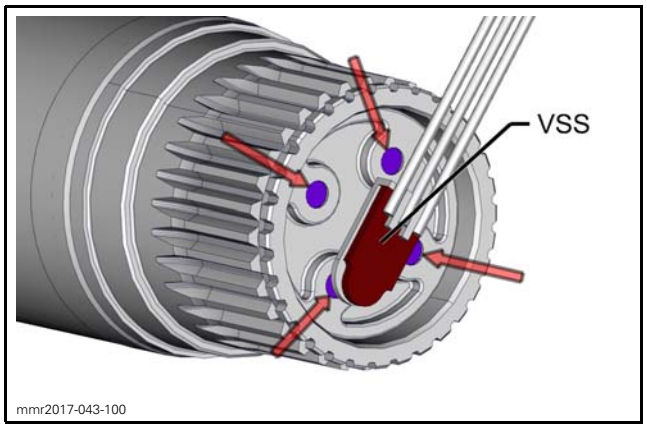
4. Lift and support rear of vehicle.

5. Back-probe VSS connector as per table and test for proper specification.
6. Rotate track/driven pulley.

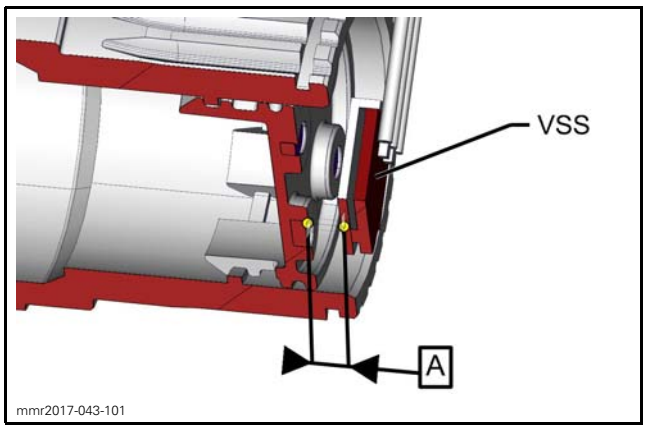
SPEED SENSOR SIGNAL TEST			
ROTATE DRIVEN PULLEY	SPEED SENSOR CONNECTOR (SENSOR SIDE)		VOLTAGE
	Pin 1	Pin 2	Alternate 7 Vdc and 0 Vdc

If reference voltage and ground are available at sensor, but no signal, replace sensor.

NOTE: During chaincase disassembly, ensure magnets are intact on shaft.



Air gap between magnets and sensor must be as specified.



A. VSS Air gap

AIR GAP SPECIFICATION	
no. A Measure between magnet and sensor	3 mm (.118 in)

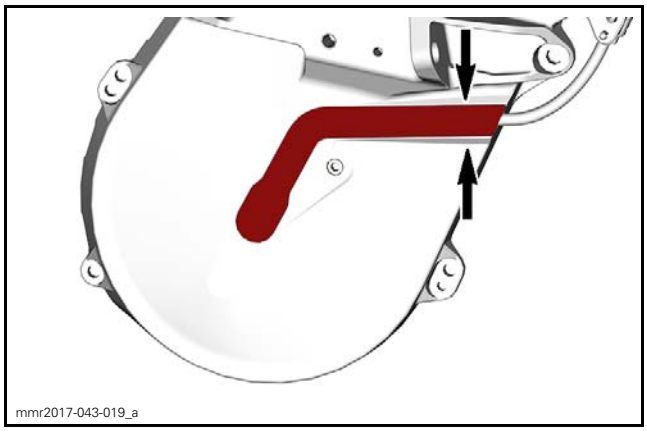
Replacing the Speed Sensor

The sensor can be replaced with the chaincase cover as an assembly. In such a case, refer to *CHAINCASE* subsection.

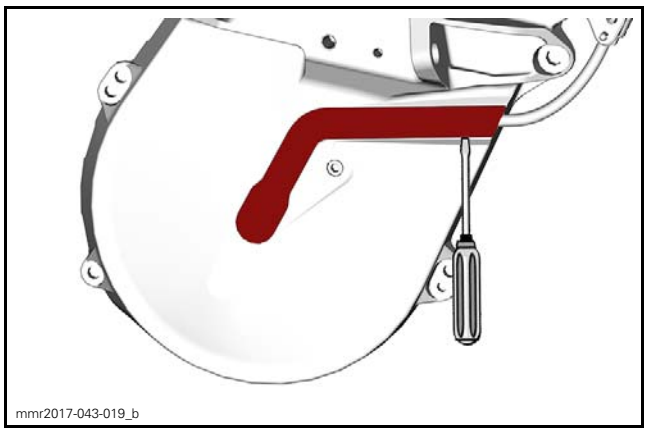
To replace sensor only, proceed as follows.

Removing the Speed Sensor

1. Remove chaincase cover. Refer to procedure in this subsection.
2. Heat the upper end of the speed sensor protective plate with a heat gun.



3. Use a flat screwdriver to pry out the end of the protective plate from chaincase cover.



NOTICE **Use care when prying out the plate not to damage the chaincase cover.**

4. Heat the next section of the plate.
5. Pry out the heated section using the flat screwdriver.
6. Repeat steps 4 and 5 until the protective plate is completely removed.
7. Remove the speed sensor.
8. Use the flat screwdriver to remove the remaining sealant from the chaincase cover.

NOTICE Do not apply excessive pressure when removing the remaining sealant not to damage the chaincase cover.

9. Rub the sealant using a scouring pad.

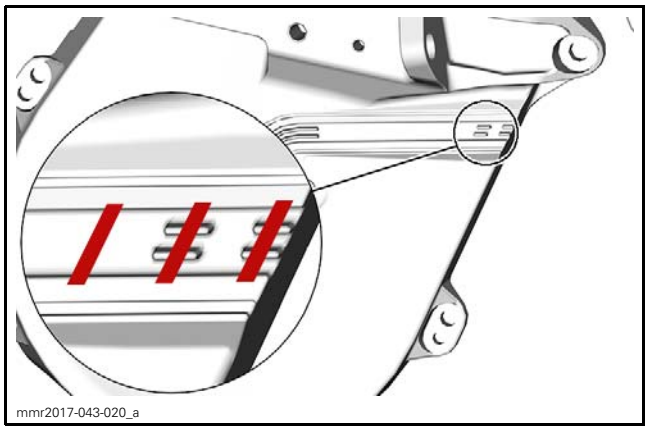
Installing the Speed Sensor

Make sure surface is clean and free of grease.

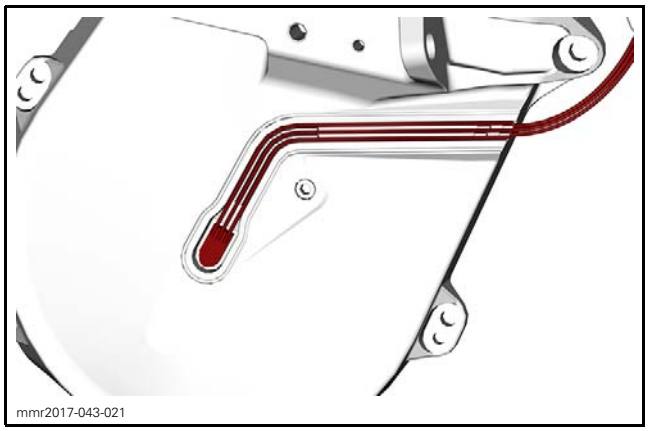
The assembly must be watertight.

PRODUCT REQUIRED
LOCTITE 5900 (P/N 293 800 066)

1. Apply 3 beads of sealant in the chaincase cover as per the following illustration.

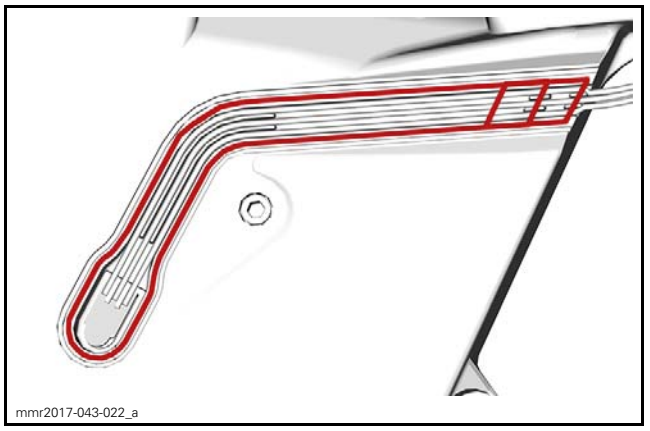

mmr2017-043-020_a

2. Install the speed sensor in the chaincase cover.


mmr2017-043-021

3. Apply sealant all around the protective plate bed on the chaincase cover.

Follow the pattern shown on the next picture.


mmr2017-043-022_a

4. Place the protective plate in position and firmly push in order to evacuate all the surplus sealant. Keep pressure for at least 1 minute.
5. Wipe off all the sealant surplus.
6. Once cleaned up, inspect all the circumference for sealant lacks.

NOTE: Sealant must be visible all around.

7. Place some adhesive tape on the protective plate to maintain a pressure for at least 24 hours.

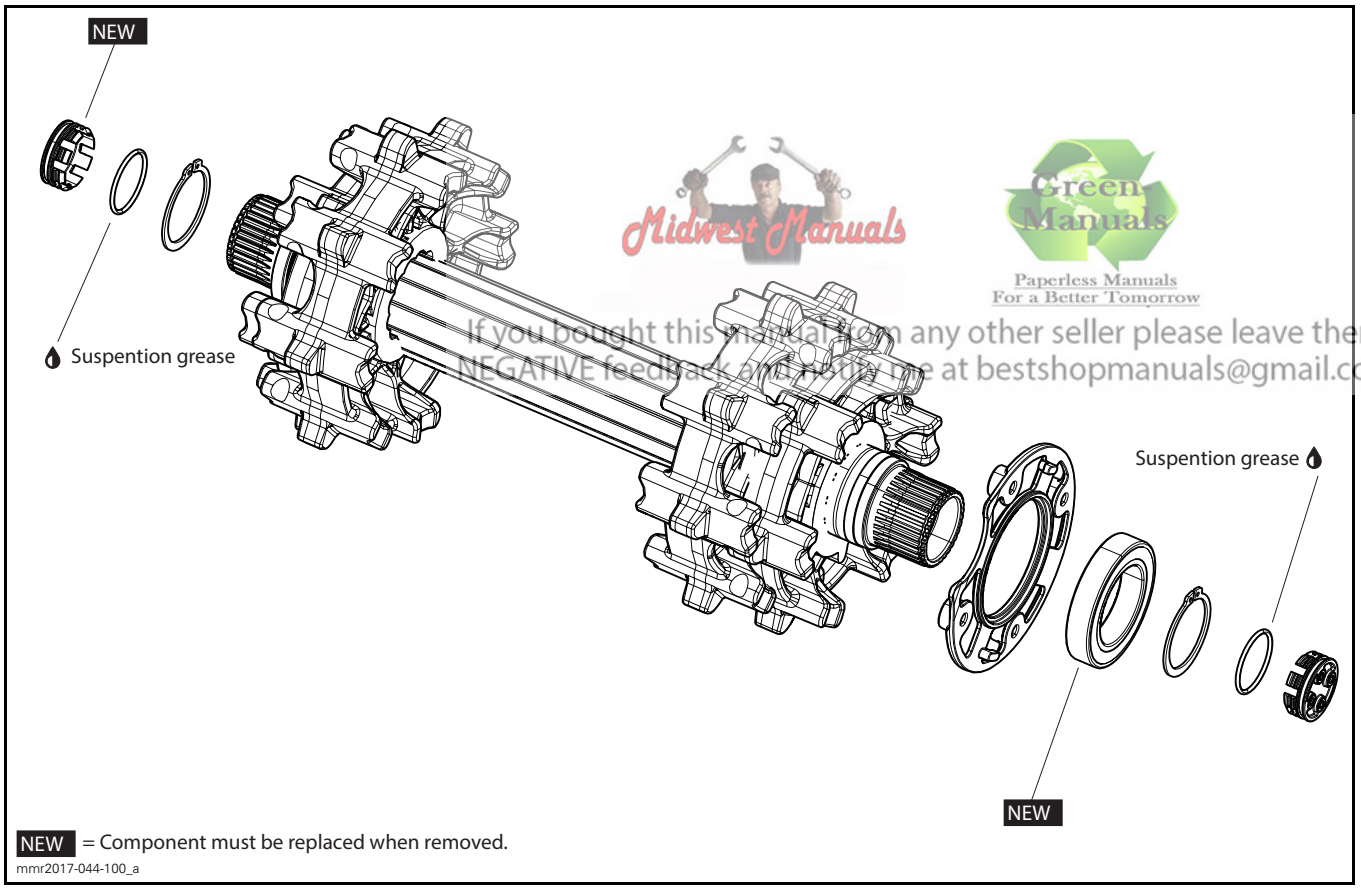
NOTE: Wait for at least 1 hour before exposing vehicle to cold temperature.

8. Reinstall chaincase cover. Refer to procedure in this subsection.

DRIVE AXLE

SERVICE PRODUCTS

Description	Part Number	Page
SUSPENSION GREASE	293 550 033	3



GENERAL

During assembly/installation, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

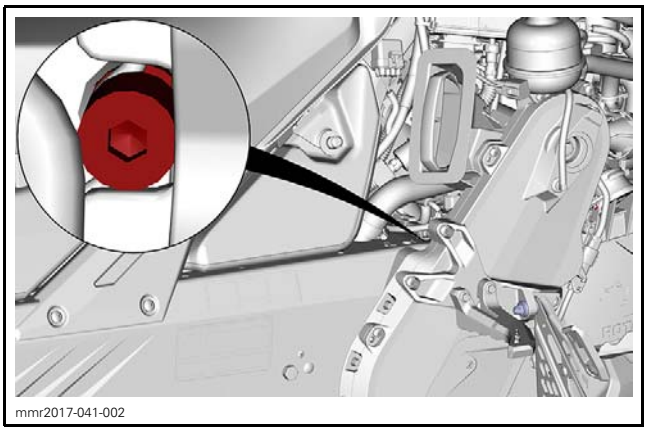
Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.).

PROCEDURES

DRIVE AXLE

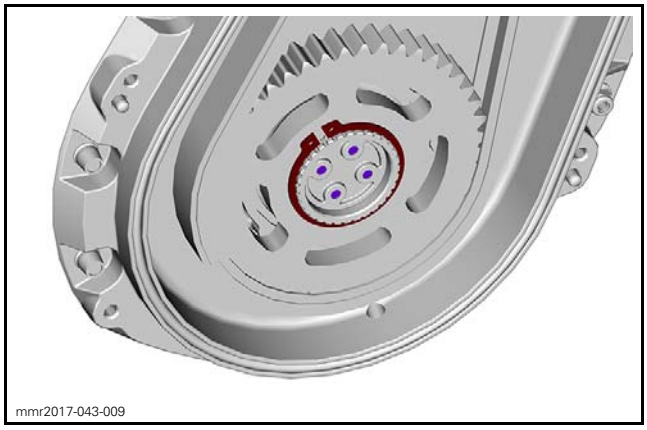
Removing the Drive Axle

1. Remove the rear suspension. Refer to *REAR SUSPENSION* subsection.
2. Remove the chaincase cover. Refer to *CHAINCASE* subsection.
3. Release tension from drive chain by unscrewing the tensioner adjustment screw.



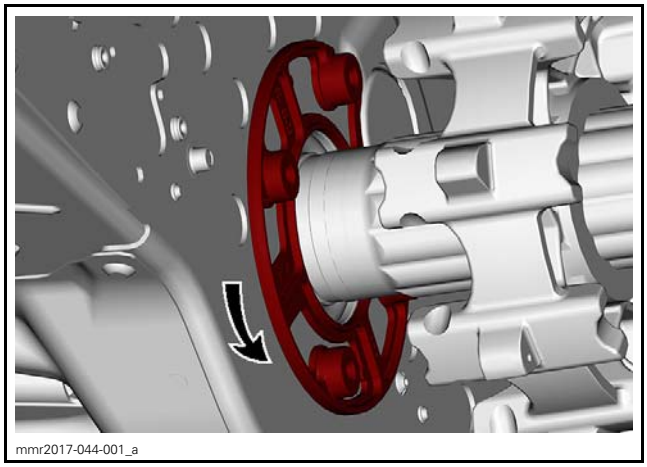
mmr2017-041-002

4. Remove the lower sprocket circlip.



mmr2017-043-009

5. Remove lower gear and drive chain.
6. Remove the caliper. Refer to *BRAKE* subsection.
7. From underneath of vehicle, turn the LH bearing flange counterclockwise to unlock it from frame.



mmr2017-044-001_a

8. Release drive axle sprockets from track and at the same time, push the drive axle towards left side until it comes out of the chaincase.
9. Move the drive axle towards the right side to remove it from vehicle.

Inspecting the Drive Axle

Check if bearing turns smoothly and freely. Replace bearing if necessary.

Check if bearing seals are damaged. Replace bearing if necessary.

Check if the bearing flange is cracked, bent or otherwise damaged. Replace if required.

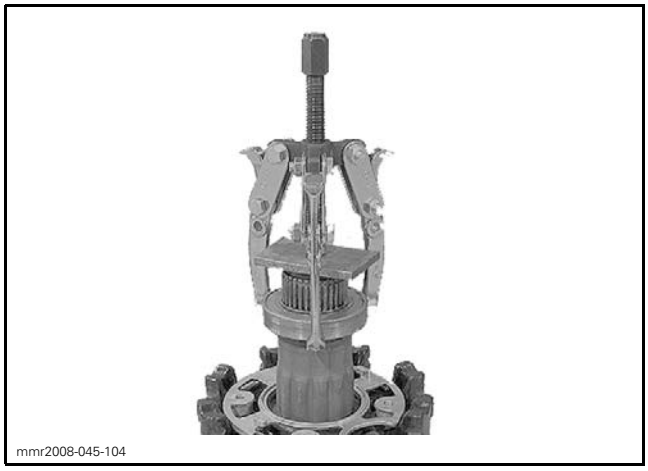
Replace drive axle if one of the following situations is detected:

– Cracked, worn or damaged drive axle
– Worn or damaged drive axle splines

– Worn or damaged sprockets
– Worn bearing journal.

Removing the Drive Axle Bearing

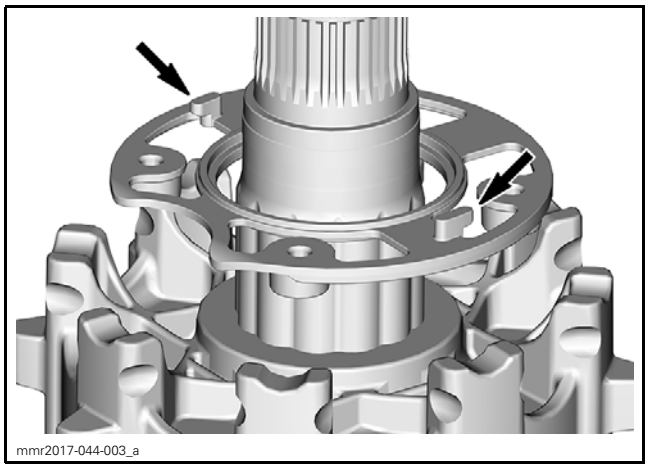
1. Use a 3-jaw pullerto remove the drive axle bearing.


mmr2008-045-104

2. Remove the bearing flange.

Installing the Drive Axle Bearing

1. Install bearing flange on drive axle with locking tabs outwards.


mmr2017-044-003_a

2. Using a press and a suitable pipe, push the bearing onto drive axel.

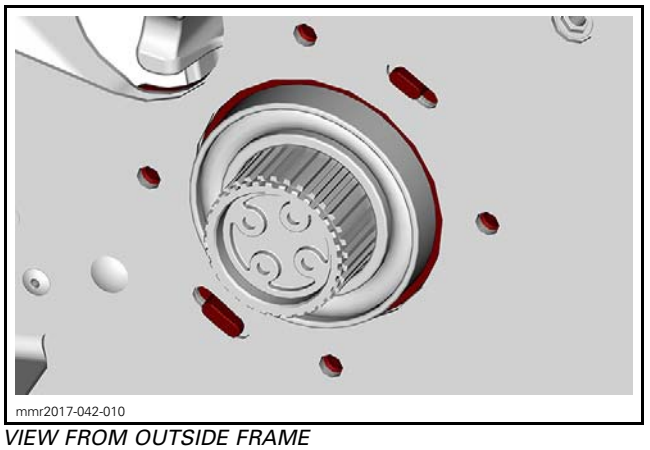
NOTICE **Always push the bearing by inner race.**

Installing the Drive Axle

The installation is the reverse of the removal procedure. However, pay attention to the following.

Insert drive axle and lock the bearing flange on frame.

NOTE: Ensure bearing flange is properly locked. Tabs must be properly inserted in frame slots.


mmr2017-042-010

VIEW FROM OUTSIDE FRAME

Install the caliper and the disc brake. Refer to *BRAKE* subsection for the specific procedure.

Install all other removed parts. Refer to appropriate subsections.

MAGNETIC CAPS

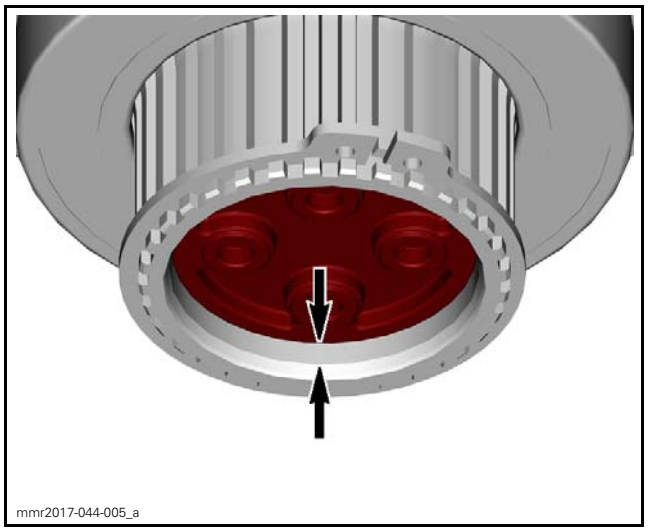
Removing the Magnetic Cap

1. For the LH cap, remove brake disc protective cover. Refer to *BRAKE* subsection.
2. For the RH cap, remove the chaincase cover. Refer to *CHAINCASE* subsection.
3. By screwing a large screw in the middle of the cap, pry or pull the magnetic cap out of drive axle end.
4. To remove the other cap, push through axle with a long metal bar or wood stick.
5. Discard the magnetic cap.

Installing the Magnetic Cap

1. Apply SUSPENSION GREASE (P/N 293 550 033) on O-ring.
2. Insert new magnetic cap in drive axle, Push until caps is secure into groove.

NOTE: Cap should have outside contour face 5 mm (.197 in) inwards.



5 MM (.197IN) INWARDS

3. Install all other removed parts.

TRACK

SERVICE TOOLS

Description	Part Number	Page
TRACK CLEAT INSTALLER	529 036 044	1

PROCEDURES

TRACK

Inspecting the Track

Visually inspect track for:
- Cuts and abnormal wear
- Broken rods
- Broken or missing track cleats
- Perforations in the track
- Tears in the track (particularly around traction product holes)
- Lugs that are broken or torn off, exposing portion of rods
- Delamination of the rubber
- Missing track guide(s).

If track is damaged or rods are broken, replace track. For damaged or missing cleats, replace by new ones.

⚠ WARNING

Do not operate a snowmobile with a cut, torn or damaged track.

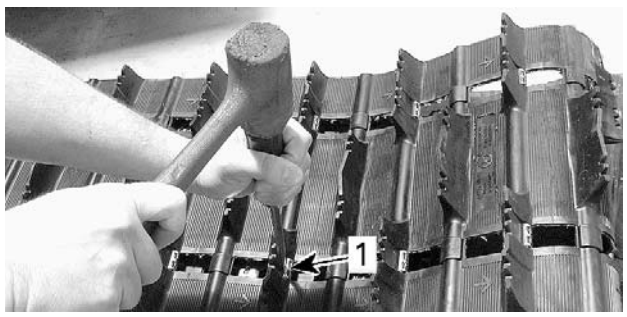
Replacing a Track Cleat

Raise rear of vehicle off the ground.

Lift snow guard.

Rotate track to expose a cleat to be replaced.

Remove cleat from track using plastic hammer and a big screwdriver.



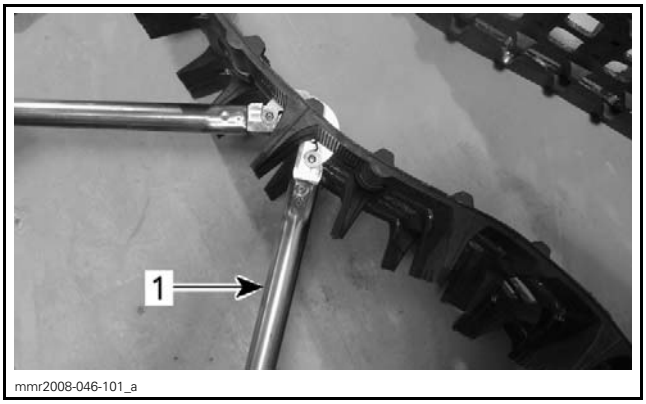
TYPICAL
1. Cleat

Place new cleat in position on the track.

Secure cleat with the cleat installer.

REQUIRED TOOL	
TRACK CLEAT INSTALLER (P/N 529 036 044)	

Bend cleat and push tabs into rubber.



TYPICAL
1. Narrow-cleat installer

Reopen narrow-cleat installer.

Position cleat tabs on open end of tool.

Squeeze tabs until they are indented in rubber.

Removing the Track

Remove rear suspension from vehicle. Refer to *REAR SUSPENSION*.

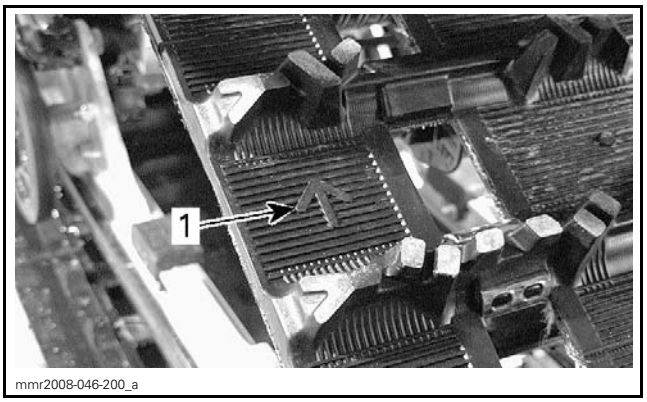
Remove drive axle. Refer to *DRIVE AXLE* subsection.

Remove track.

Installing the Track

Reverse the removal procedure.

NOTE: When installing the track, respect rotation direction indicated by an arrow on track thread.



1. Arrow pointing forwards

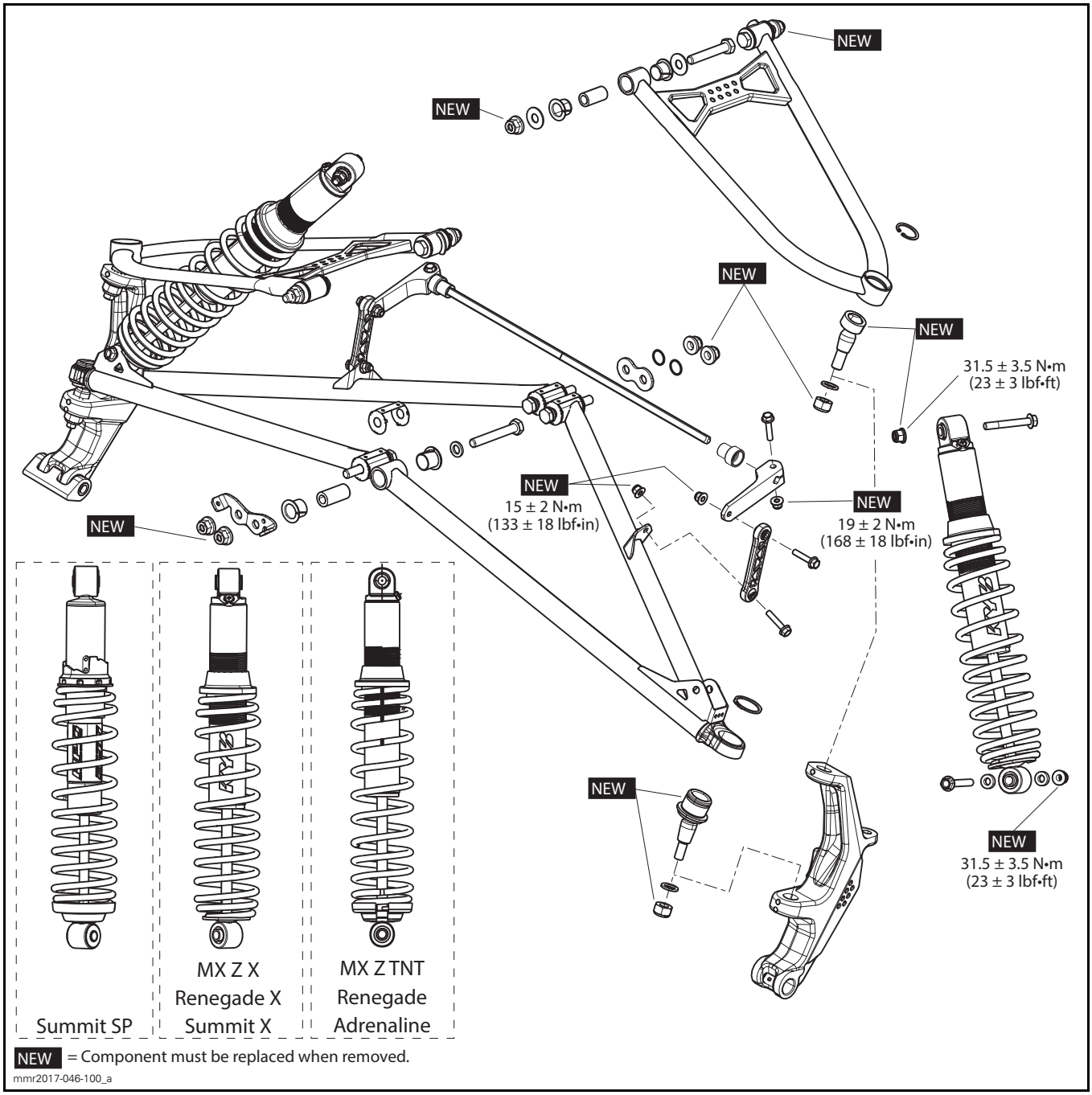
Adjusting and aligning the Track

Refer to *PERIODIC MAINTENANCE PROCEDURE* subsection to adjust and align the track.

FRONT SUSPENSION

SERVICE TOOLS

Description	Part Number	Page
BALL JOINT EXTRACTOR	529 035 827	4
BALL JOINT INSTALLER SUPPORT	529 036 398	7
BALL JOINT INSTALLER	529 036 399	7
BALL JOINT REMOVER SUPPORT	529 036 400	7
SPRING COMPRESSOR	529 036 184	3
SUSPENSION ARM SUPPORT	529 035 637	5



GENERAL

The procedure explained below is the same for the RH and LH sides unless otherwise noted.

During assembly/installation, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.) must be replaced with new ones.

Check for loose, bent, worn out, rusted or otherwise damaged components. Replace the faulty components.

ADJUSTMENT

SPRINGS

Front spring preload has an effect on front suspension firmness.

Front spring preload also has an effect on the steering behavior.

ACTION	RESULT
Increasing preload	Firmer front suspension
	Higher front end
	More precise steering
	More bump absorption capability
Decreasing preload	Softer front suspension
	Lower front end
	Lighter steering
	Less bump absorption capability

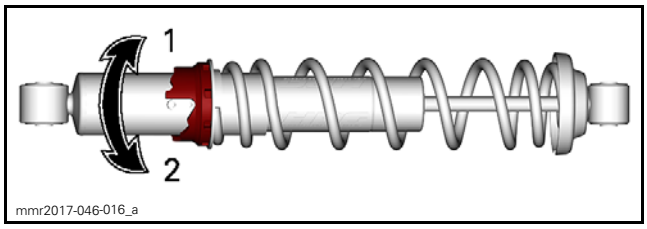
⚠ WARNING

Adjust both springs to the same preload. Uneven adjustment can cause poor handling and loss of stability, and/or control, and increase the risk of an accident.

Spring Preload Adjustment

Cam Type Adjustment

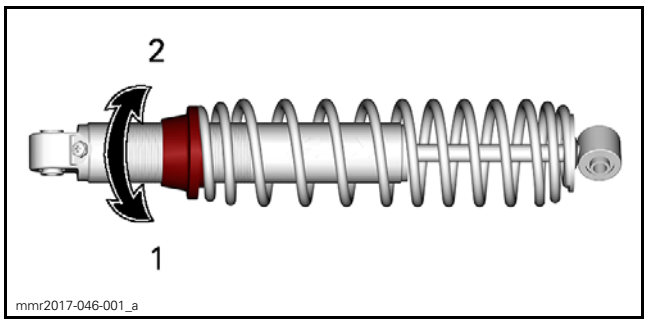
Using the suspension adjustment tool (included in the vehicle tool kit), turn the cam to increase or decrease spring preload.



1. Increase preload
2. Decrease preload

Ring Type Adjustment

Grab and turn the spring to increase or decrease spring preload.



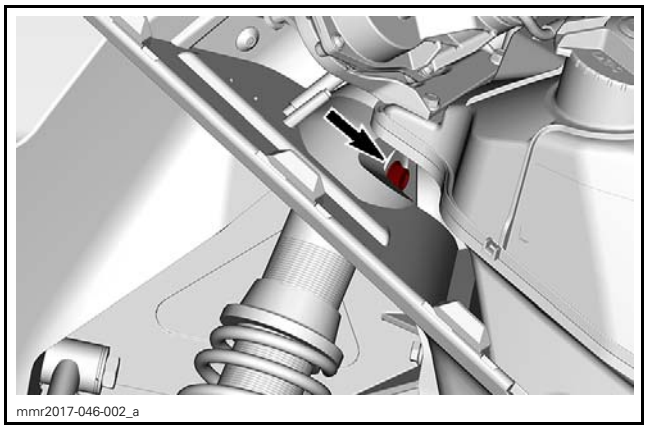
1. Increase preload
2. Decrease preload

PROCEDURES

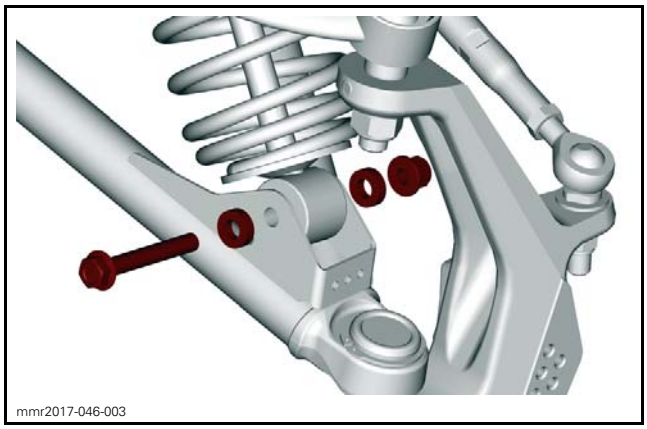
SHOCK ABSORBER

Removing the Shock Absorber

1. Remove the side panel. Refer to *BODY* subsection.
2. Lift the front of vehicle until skis are off the ground.
3. Remove the shock absorber upper bolt.


mmr2017-046-002_a

4. Remove the shock absorber lower bolt, nut, and spacers.


mmr2017-046-003

5. Remove the shock absorber.

Inspecting the Shock Absorber

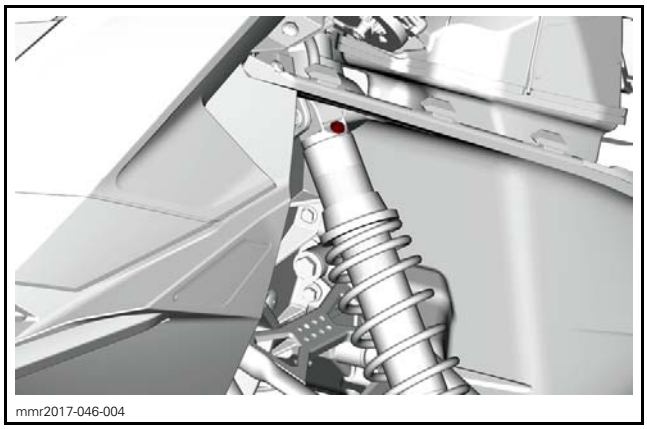
Refer to *REAR SUSPENSION (RMOTION)* subsection.

Installing the Shock Absorber

For installation, reverse the removal procedure, however, pay attention to the following.

Install upper bolt first while shock absorber lower mount is not engaged into the bracket.

Install shock absorber with body up and valve (if equipped) towards outside.

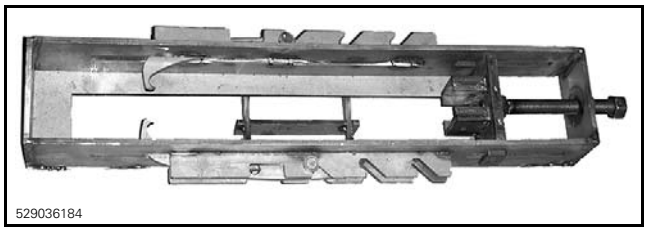

mmr2017-046-004

TIGHTENING TORQUE	
Front shock absorber retaining nuts	31.5 N•m ± 3.5 N•m (23 lbf•ft ± 3 lbf•ft)

SPRING

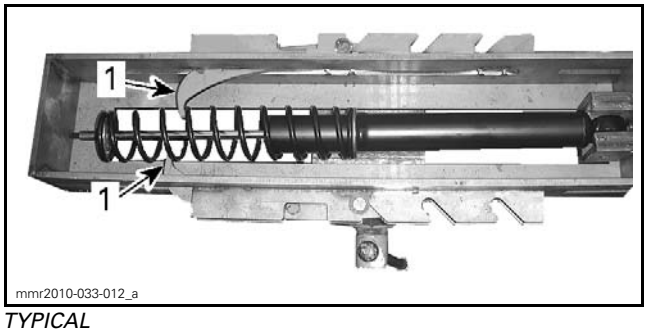
Removing the Spring

1. Secure the SPRING COMPRESSOR (P/N 529 036 184) in a vise.


529036184

SPRING COMPRESSOR

2. Position the shock absorber in the tool and install the spring compressor hooks.



mmr2010-033-012_a

TYPICAL
1. Spring compressor hooks

3. Tighten the spring compressor tool screw until the spring is sufficiently compressed to remove spring stopper.
4. Release the spring compressor tool screw.
5. Remove spring from shock absorber.

Inspecting the Spring

Inspect spring for apparent damage.

When the adjustment is at the lowest preload, ensure that adjustment cam and spring stopper are not loose. They must be under spring pressure. Otherwise, the spring stopper might fall off.

Installing the Spring

For installation, reverse the removal procedure.

UPPER SUSPENSION ARM

Inspecting the Upper Suspension Arm

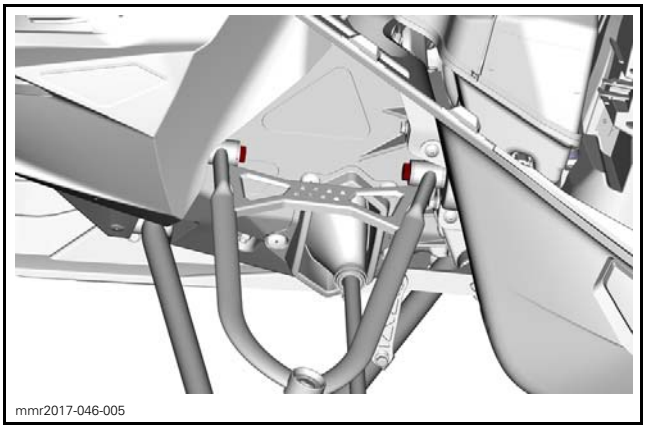
1. Check suspension arm for distortion or damage. Replace if necessary.
2. Lift the front of vehicle until skis are off the ground.
3. Move suspension arm from side to side.
4. Lower vehicle to the ground.
5. Move suspension up and down.
6. There should be no noticeable looseness. Replace bushings and/or sleeves if necessary.

NOTE: A play of 2 mm (.079 in) is acceptable when the suspension arm is moved forward and backward.

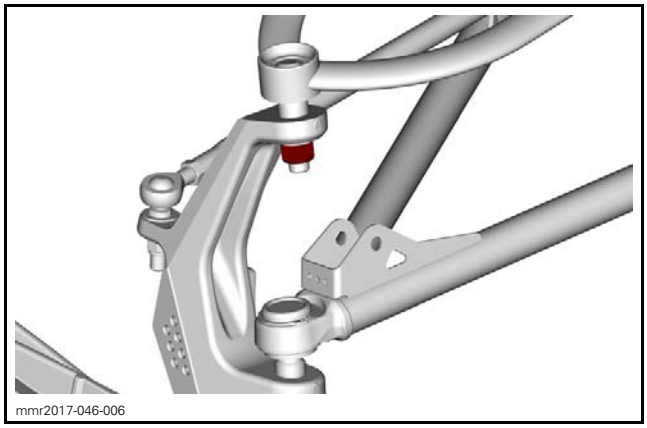
7. Check sleeves inside suspension arm attachments for wear or damage.

Removing the Upper Suspension Arm

1. Lift the front of vehicle until skis are off the ground.
2. Remove muffler and tuned pipe. Refer to *EXHAUST SYSTEM* subsection.
3. Remove shock absorber. See procedure in *REMOVING THE SHOCK ABSORBER* in this subsection.
4. Remove the upper suspension arm bolts.


mmr2017-046-005

5. Detach ball joint from ski leg as follows.
   5.1 Remove nut securing ball joint to ski leg.


mmr2017-046-006

   5.2 Use the extractor to detach ball joint from ski leg.

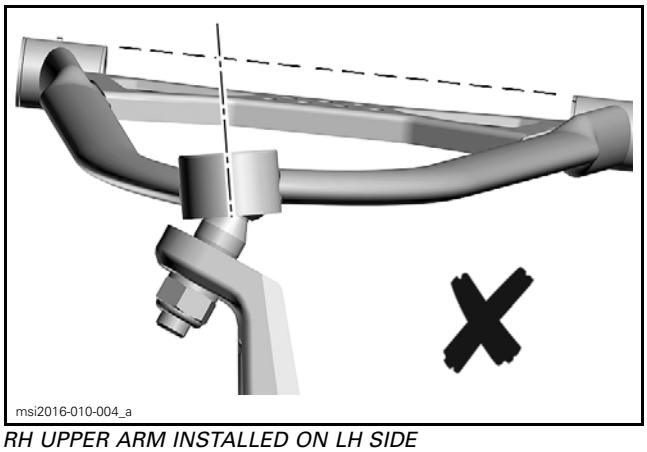
REQUIRED TOOL	
BALL JOINT EXTRACTOR (P/N 529 035 827)	

6. Remove upper suspension arm.

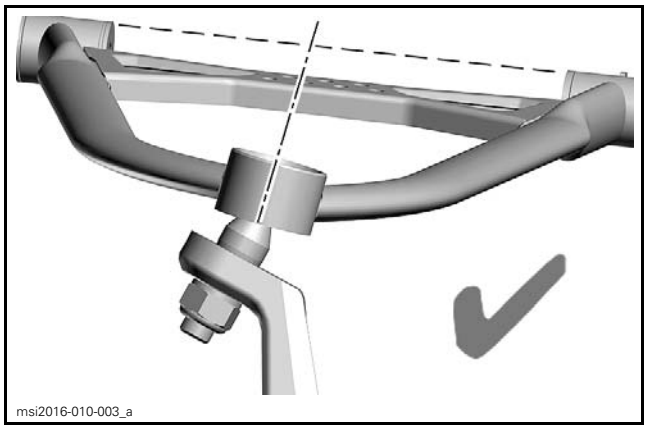
Installing the Upper Suspension Arm

The installation is the reverse of the removal procedure. However, pay attention to the following.

NOTICE Make sure not to invert LH and RH arm.


msi2016-010-004_a

RH UPPER ARM INSTALLED ON LH SIDE



LH UPPER ARM INSTALLED ON LH SIDE

UPPER BALL JOINT

Inspecting the Upper Ball Joint

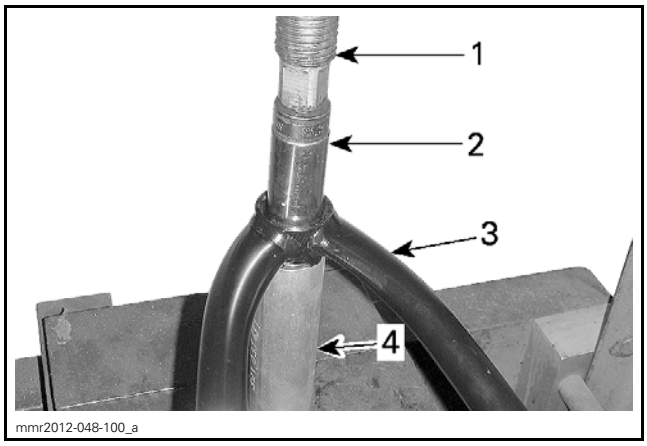
Check both upper ball joints for damage, pitting, looseness and roughness. If so, replace with a new one.

Removing the Upper Ball Joint

1. Remove the *UPPER SUSPENSION ARM*, see procedure in this subsection.
2. Remove circlip securing ball joint to suspension arm.

3. Press ball joint out of the suspension arm.

REQUIRED TOOLS	
Shop press	
SUSPENSION ARM SUPPORT (P/N 529 035 637)	
Suitable socket	



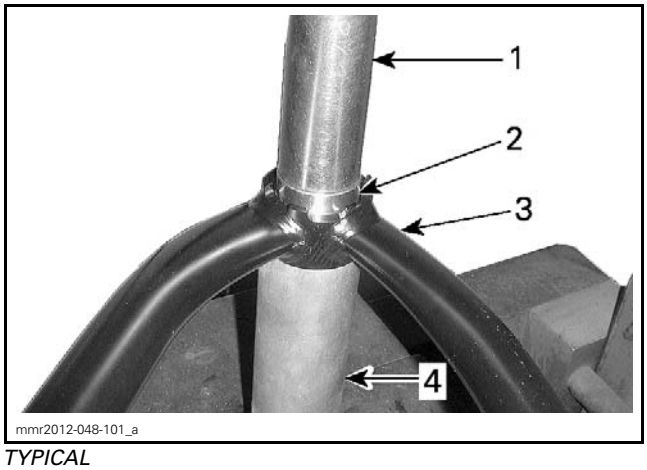
TYPICAL
1. *Press rod*
2. *Socket*
3. *Suspension arm*
4. *Suspension arm support*

Installing the Upper Ball Joint

The installation is the reverse of the removal procedure. However, pay attention to the following.

1. Press ball joint into the suspension arm.

REQUIRED TOOLS	
Shop press	
SUSPENSION ARM SUPPORT (P/N 529 035 637)	
Suitable socket	



TYPICAL
1. *Socket*
2. *Ball joint*
3. *Suspension arm*
4. *Suspension arm support (P/N 529 035 637)*

2. Reinstall the circlip. If it seems loose, replace it with a new one.

LOWER SUSPENSION ARM

Inspecting the Lower Suspension Arm

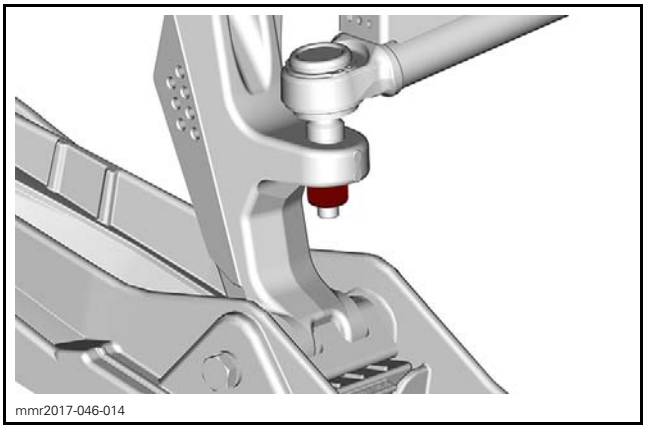
1. Check suspension arm for distortion or damage. Replace if necessary.
2. Lift the front of vehicle until skis are off the ground.
3. Detach shock absorber and stabilizer bar link from lower suspension arm.
4. Move suspension arm from side to side.
5. Lower vehicle to the ground.
6. Move suspension up and down.
7. There should be no noticeable loose. Replace bushings and/or sleeves if necessary.

NOTE: A play of 2 mm (.079 in) is acceptable when the suspension arm is moved forward and backward.

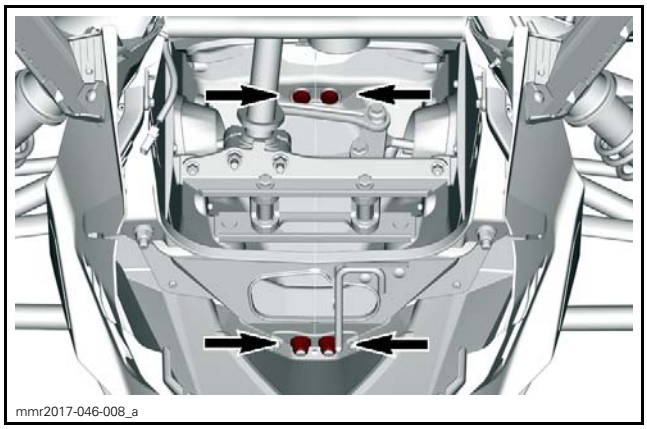
8. Check sleeves inside suspension arm attachments for wear or damage.

Removing the Lower Suspension Arm

1. Lift the front of vehicle until skis are off the ground.
2. Remove the tune pipe. Refer to *EXHAUST SYSTEM* subsection.
3. Remove shock absorber lower bolt.
4. Detach stabilizer bar link from lower suspension arm. Refer to *STABILIZER BAR* further in this subsection.
5. Remove lower ball joint nut.


mmr2017-046-014

6. Using a suitable ball joint remover, detach lower ball joint from ski leg.
7. Remove suspension arm screws from inside the vehicle.

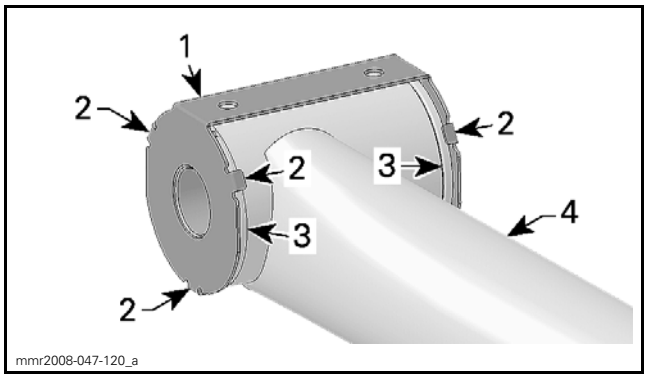

mmr2017-046-008_a

8. Remove lower suspension arm from vehicle.

Installing the Lower Suspension Arm

The installation is the reverse of the removal procedure. However, pay attention to the following.

1. Install a wear plate over bushings.
2. Position the wear plate on top.
3. Fold all tabs against bushings.



mmr2008-047-120_a

1. *Wear plate*
2. *Wear plate tabs*
3. *Bushings*
4. *Lower suspension arm*

Install all other removed parts.

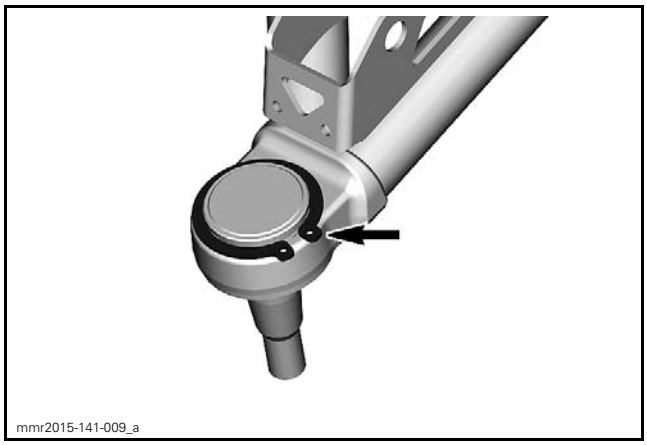
LOWER BALL JOINT

Inspecting the Lower Ball Joint

Inspect ball joint end for damage. Ensure it's moving freely, a 0.3 mm (.012 in) axial play is acceptable. Replace ball joints as required.

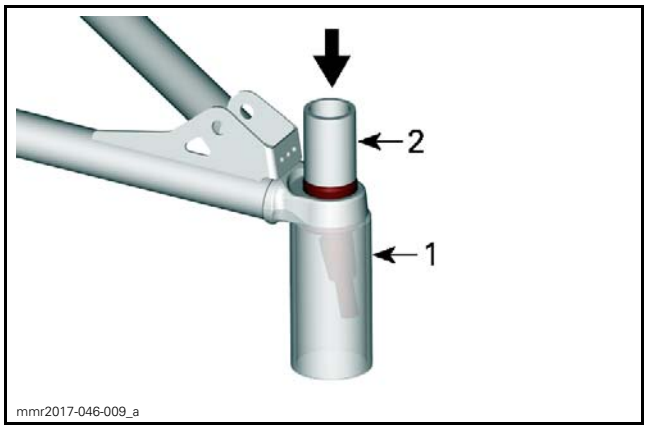
Removing the Lower Ball Joint

1. Remove the *LOWER SUSPENSION ARM*, see procedure in this subsection.
2. Remove circlip securing ball joint to suspension arm.


mmr2015-141-009_a

3. Use a shop press and the specified tools to press the ball joint out of the lower suspension arm.

REQUIRED TOOLS	
BALL JOINT REMOVER SUPPORT (P/N 529 036 400)	
Suitable box	



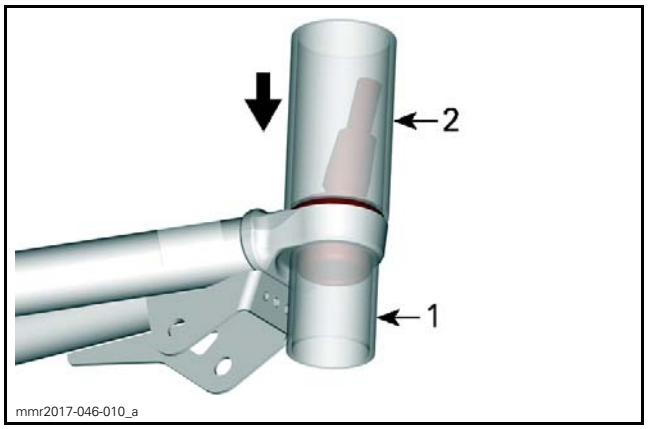
mmr2017-046-009_a

1. Ball joint remover support
2. Suitable box

Installing the Lower Ball Joint

1. Use a press and the specified tools to press the ball joint into the suspension arm end.

REQUIRED TOOLS	
BALL JOINT INSTALLER SUPPORT (P/N 529 036 398)	
BALL JOINT INSTALLER (P/N 529 036 399)	



mmr2017-046-010_a

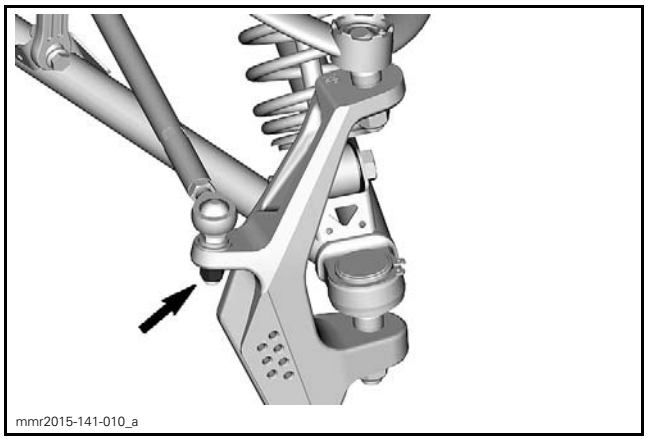
1. Ball joint installer support
2. Ball joint installer

2. Reinstall the circlip. If the circlip seems loose, replace it with a new one.
3. Install the *LOWER SUSPENSION ARM* on vehicle, see procedure in this subsection.

SKI LEG

Removing the Ski Leg

1. Remove ski from ski leg.
2. Detach tie-rod end from ski leg.


mmr2015-141-010_a

3. Remove upper and lower ball joints from ski leg. Refer to *UPPER BALL JOINT* and *LOWER BALL JOINT* in this subsection.

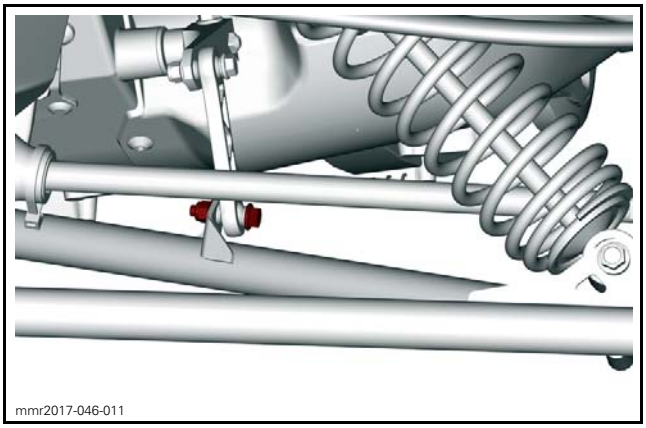
Installing the Ski Leg

The installation is the reverse of the removal procedure.

STABILIZER BAR

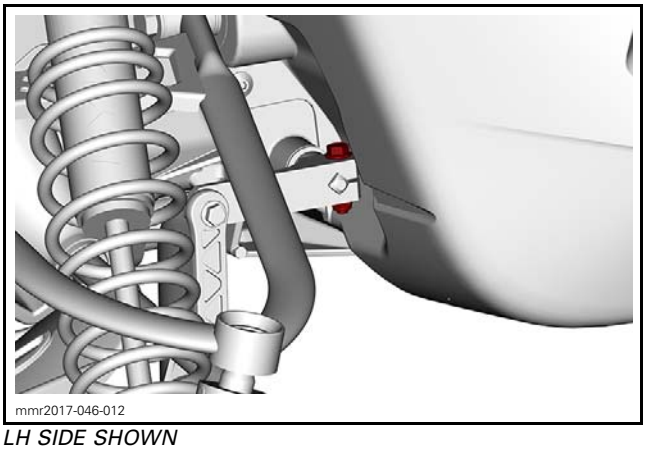
Removing the Stabilizer Bar

1. Remove bolts and nuts securing stabilizer links to lower suspension arms.


mmr2017-046-011

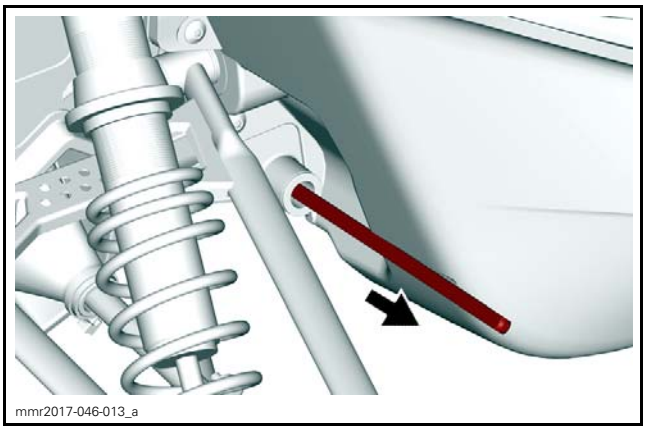
LH SIDE SHOWN

2. Remove stabilizer lever bolts and nuts.


mmr2017-046-012

LH SIDE SHOWN

3. Remove stabilizer levers and plastic bushings from stabilizer bar.
4. Slide stabilizer bar out of vehicle from the LH side.


mmr2017-046-013_a

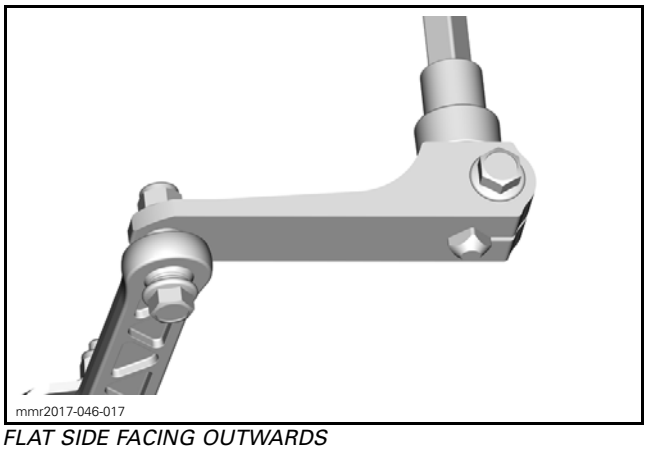
Installing the Stabilizer Bar

The installation is the reverse of the removal procedure. However, pay attention to the following.

Ensure to install the flat side outwards.

Install the screw with the head upwards.

TIGHTENING TORQUE	
Stabilizer bar link nut	19 N•m ± 2 N•m (168 lbf•**in** ± 18 lbf•**in**)


mmr2017-046-017

FLAT SIDE FACING OUTWARDS

REAR SUSPENSION (rMOTION)

SERVICE TOOLS

Description	Part Number	Page
RMOTION MASTER CYLINDER KEY	529 036 254	19
RMOTION SOCKET	529 036 255	19
RMOTION SUSPENSION TOOL	529 036 234	14, 27
SHOCK ABSORBER SUPPORTS	529 036 186	25

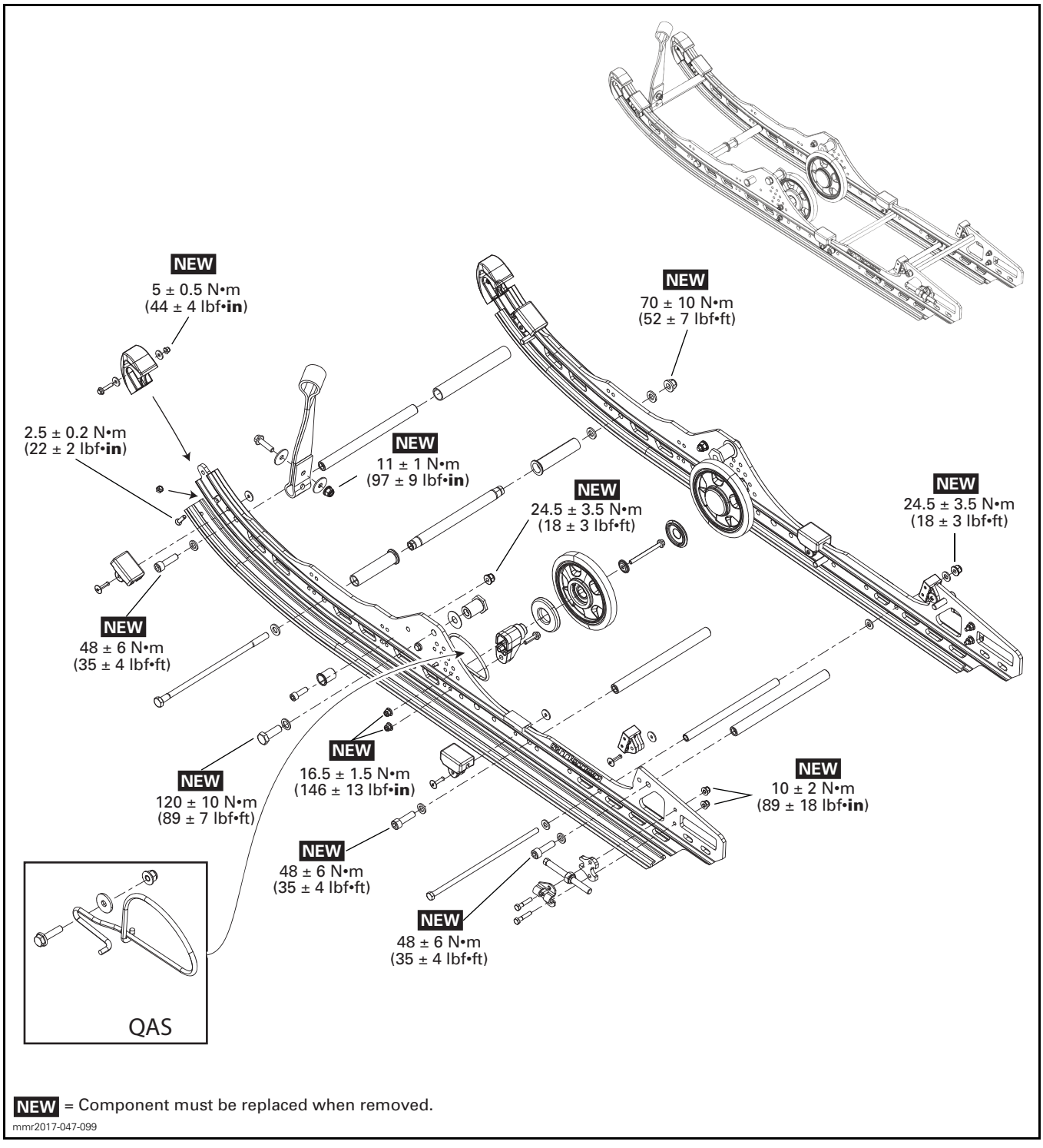
SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
BENCH SCALE	Salter Brecknell PS 400	25

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	17

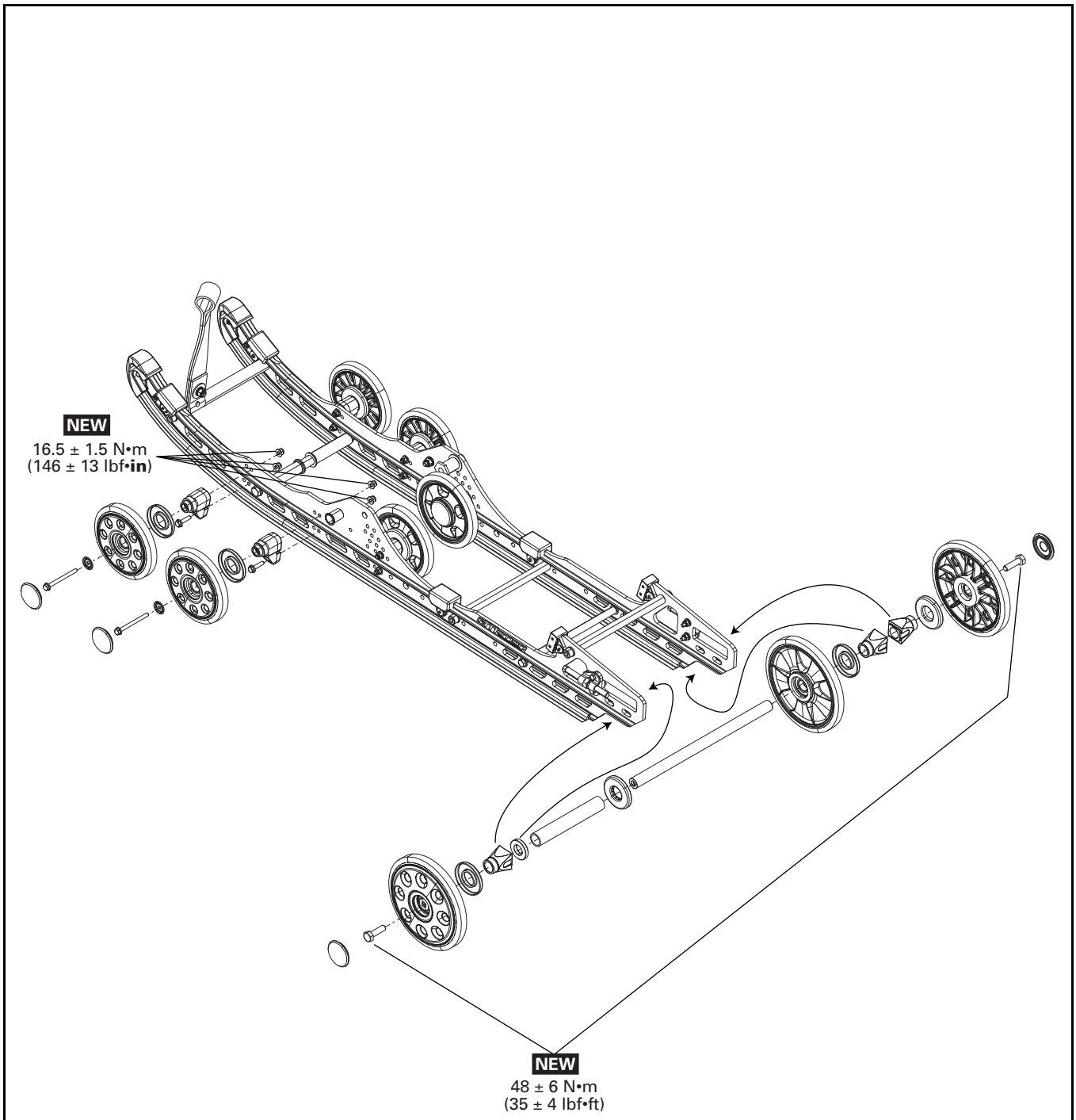
RAILS



NEW = Component must be replaced when removed.

mmr2017-047-099

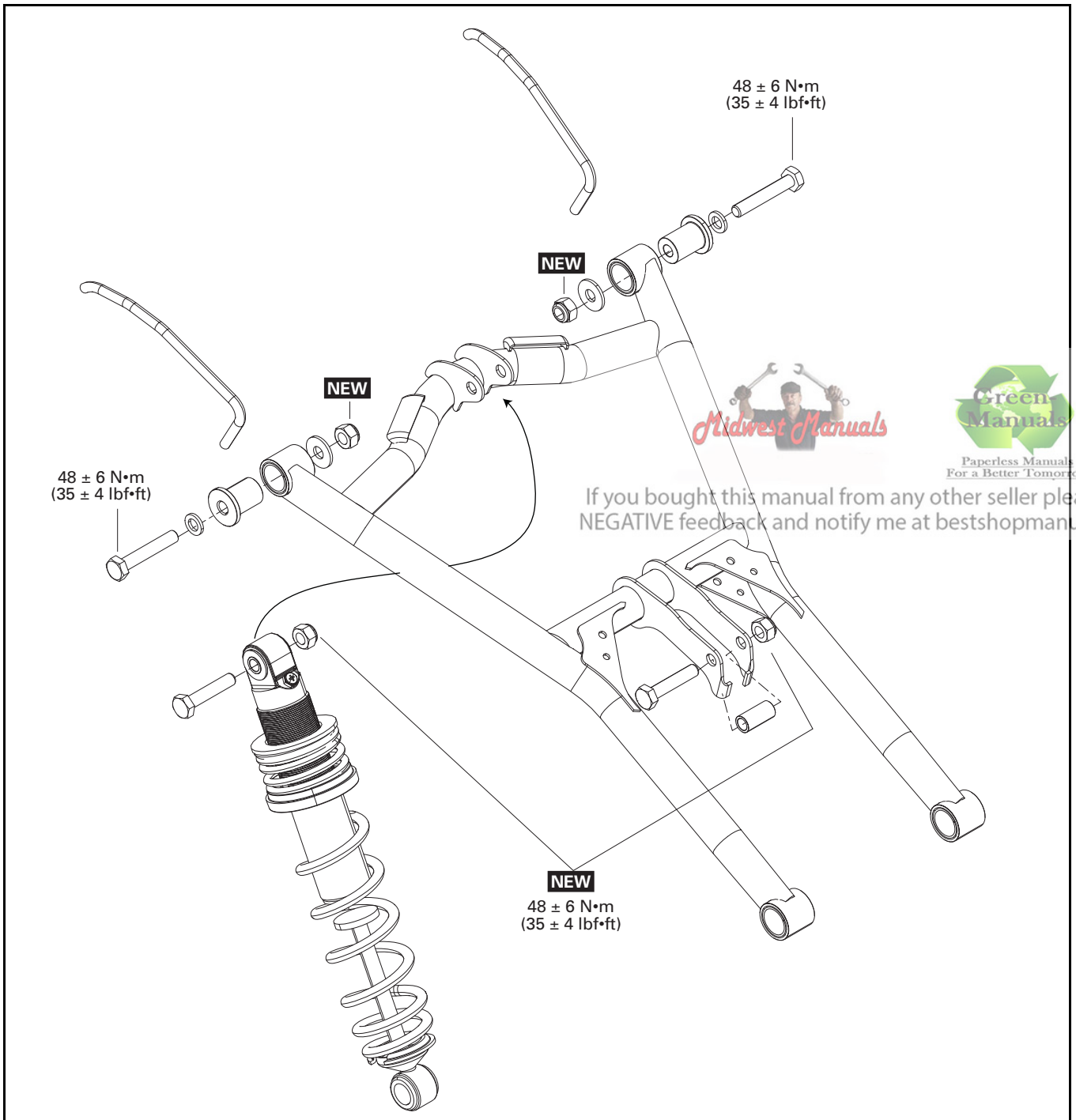
WHEELS (3 IDLER WHEELS LAYOUT)



NEW = Component must be replaced when removed.

en_mmr2017-047-199

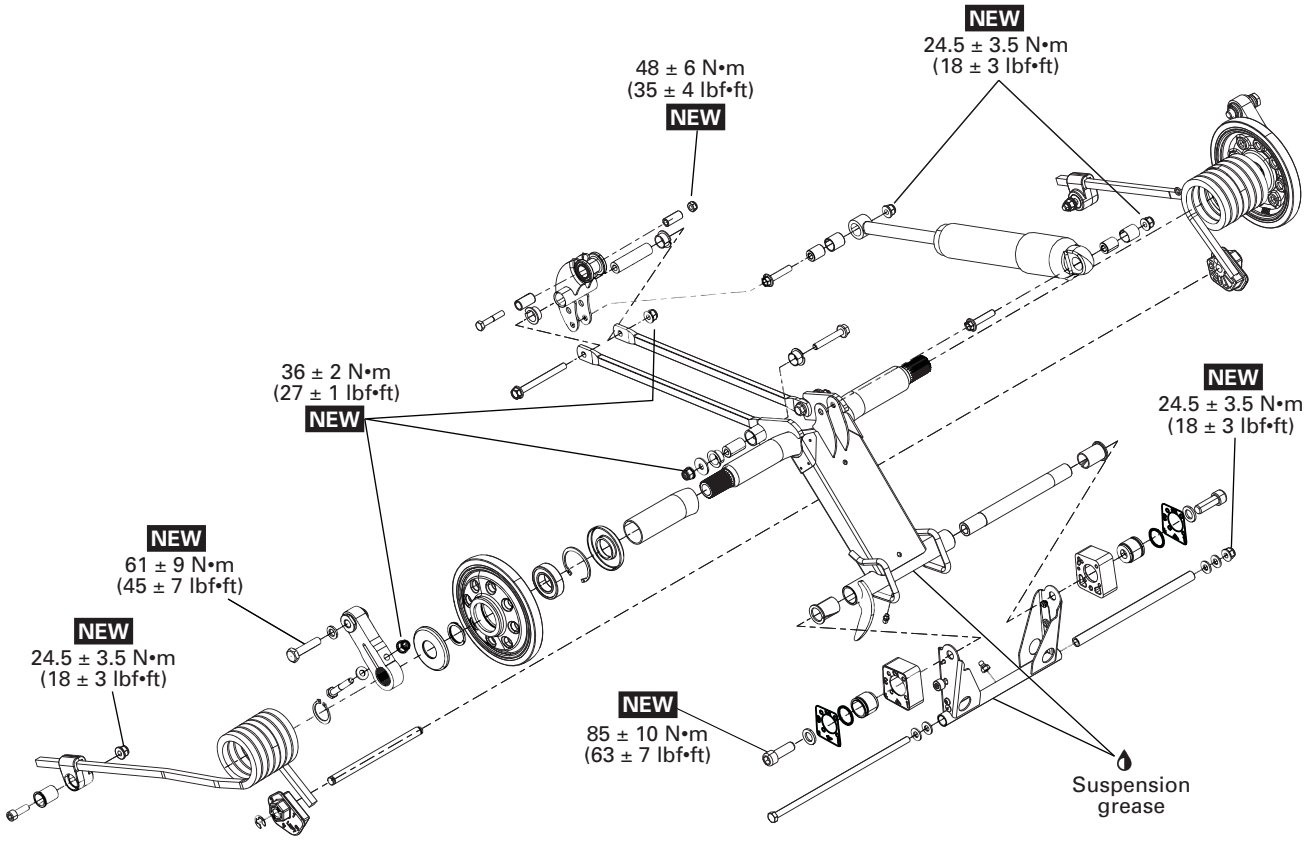
FRONT ARM



NEW = Component must be replaced when removed.

mmr2017-047-299

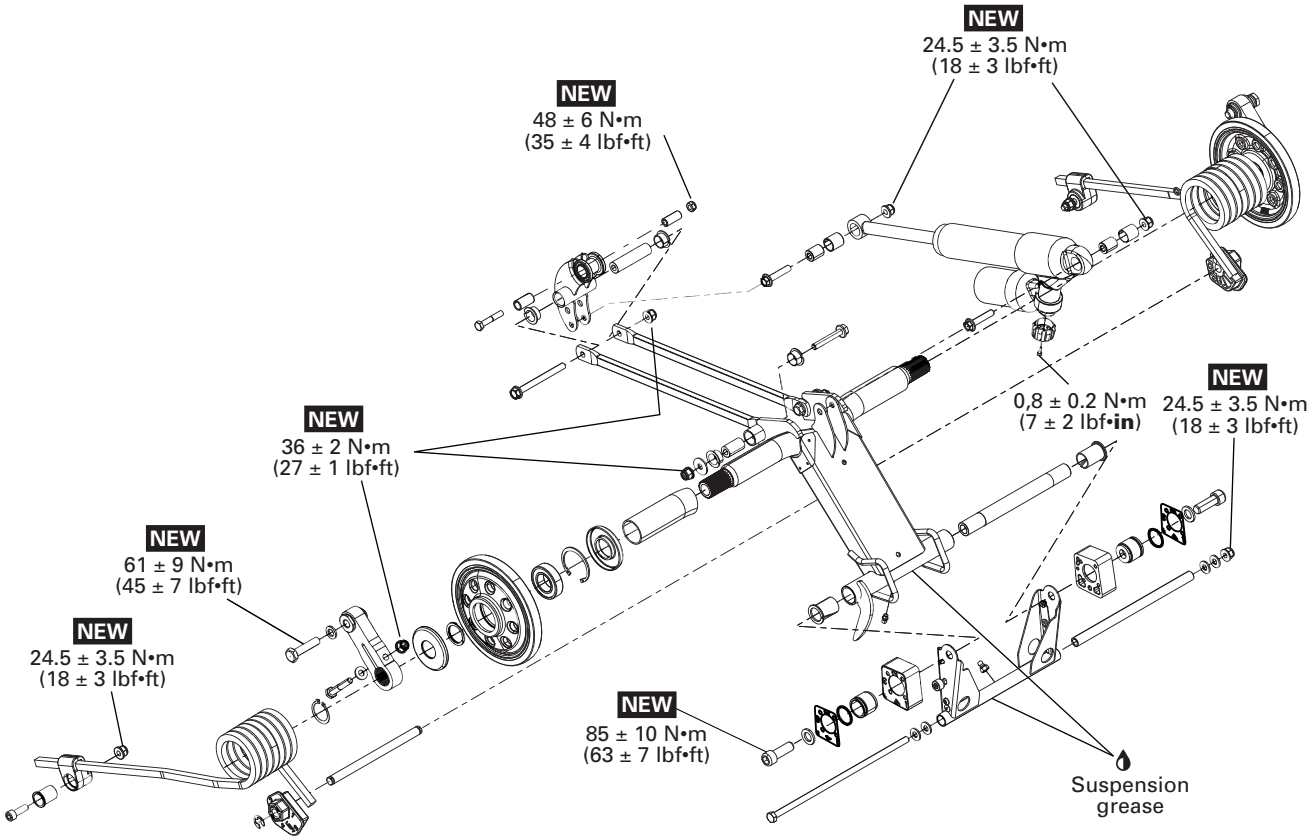
REAR ARM (MODELS WITHOUT ADJUSTABLE REAR SHOCK)



NEW = Component must be replaced when removed.

mmr2013-042-101_a

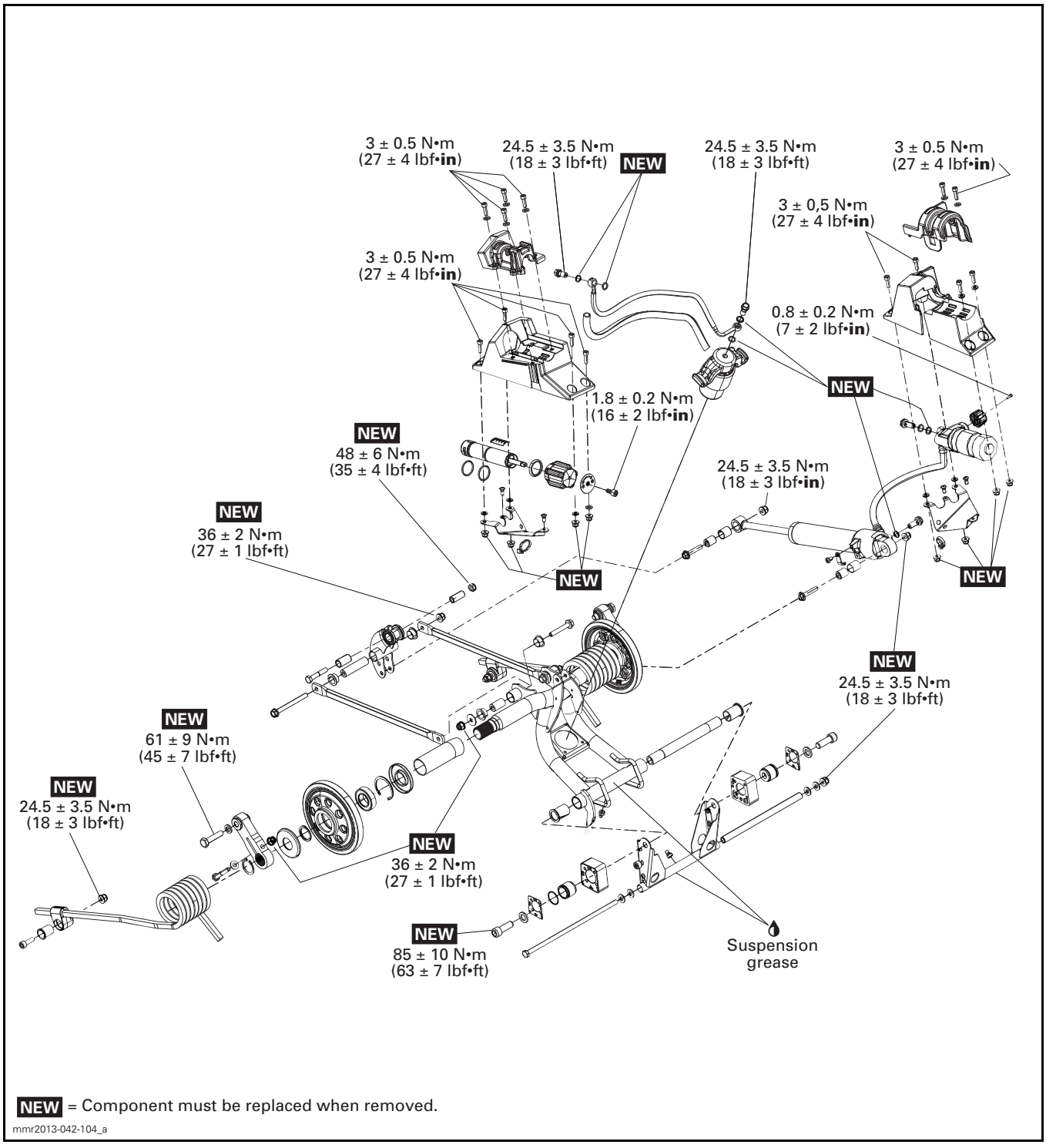
REAR ARM (MODELS WITHOUT QUICK ADJUST SYSTEM)



NEW = Component must be replaced when removed.

mmr2013-042-103_a

REAR ARM (MODELS WITH QUICK ADJUST SYSTEM)



NEW = Component must be replaced when removed.

mmr2013-042-104_a

GENERAL

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

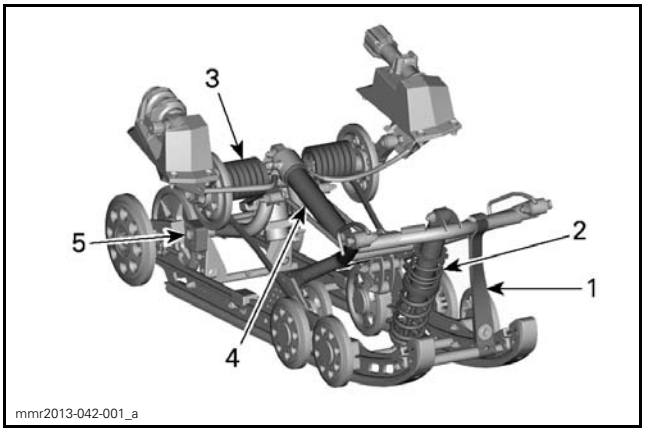
⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, cotter pins, etc.) must be replaced.

NOTICE **Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.**

ADJUSTMENT

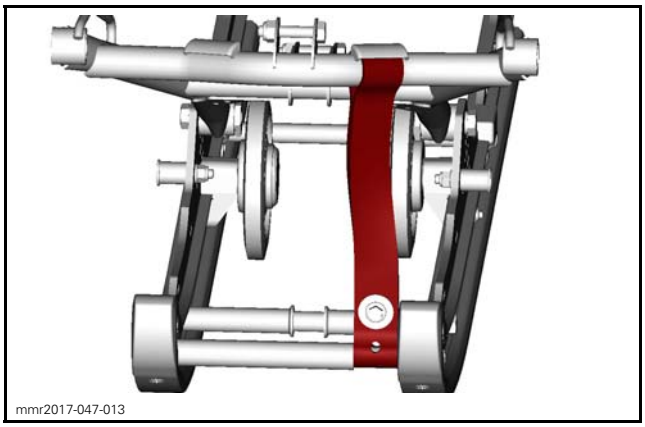
REAR SUSPENSION ADJUSTMENTS



ADJUSTABLE COMPONENTS
1. *Stopper strap*
2. *Center spring*
3. *Rear spring*
4. *Rear shock absorber*
5. *Coupling blocks (RH side shown)*

NOTICE **Whenever adjusting rear suspension, check track tension and adjust if necessary.**

Stopper Strap



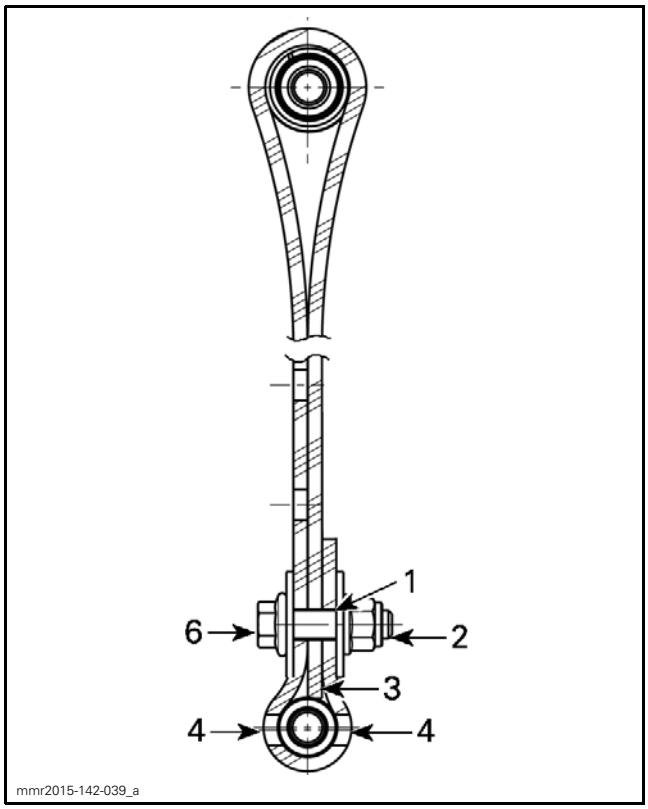
Stopper strap length has an effect on the amount of weight the center spring has to carry especially during acceleration, therefore on the front end uplift.

Stopper strap length also has an effect on center spring travel.

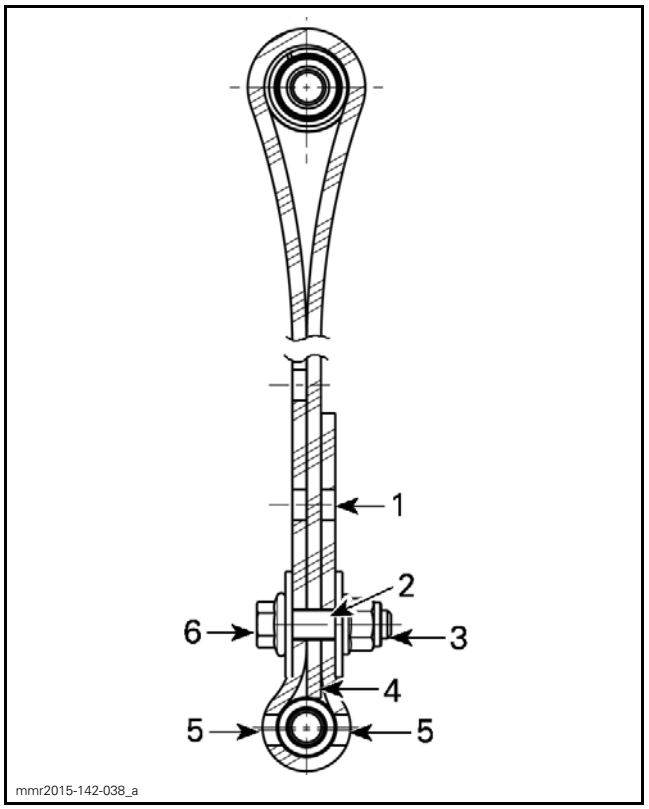
NOTICE **Whenever stopper strap length is changed, track tension must be checked.**

ACTION	RESULT
Increasing stopper strap length	Lighter ski pressure under acceleration
	More center spring travel
	More bump absorption capability
Decreasing stopper strap length	Heavier ski pressure under acceleration
	Less center spring travel
	Less bump absorption capability

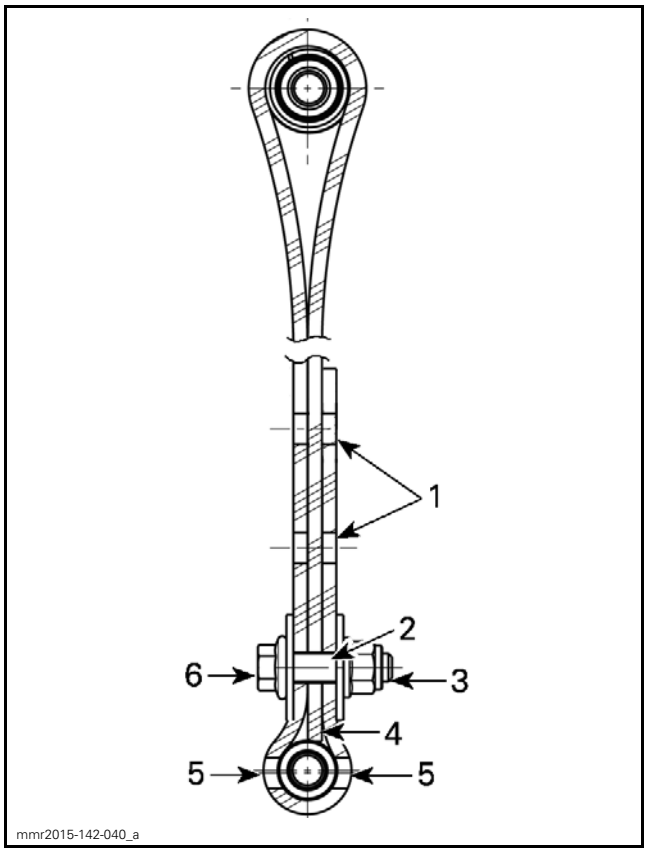
Stopper strap could be set to position 1, 2, 3, 4 and 5. Below are illustrations for position 1, 2, 3. Smaller numbers correspond to a longer strap setting.



STOPPER STRAP POSITION 1 (1ST HOLE, LONGEST)
1. *1st hole from end*
2. *Towards rear*
3. *Tip of strap touching strap axis*
4. *Two holes left open between screw head and nut*
5. *Towards front*



STOPPER STRAP POSITION 2 (2ND HOLE)
1. *Free hole*
2. *2nd hole from end*
3. *Towards rear*
4. *Tip of strap touching strap axis*
5. *Two holes left open between screw head and nut*
6. *Towards front*



STOPPER STRAP POSITION 3 (3RD HOLE)
1. *Free holes*
2. *3rd hole from end*
3. *Towards rear*
4. *Tip of strap touching strap axis*
5. *Two holes left open between screw head and nut*
6. *Towards front*

Always install stopper strap bolt as close as possible to the lower shaft.

Decreasing the stopper strap length may reduce comfort. If too much weight transfer is felt, try to correct it by adjusting the coupling blocks first. Always install stopper strap bolt as close as possible to the lower shaft.

When operating the snowmobile in deep snow, it may be necessary to vary stopper strap length and/or riding position, to change the angle at which the track rides on the snow. Operator's familiarity with the various adjustments as well as snow conditions will dictate the most efficient combination.

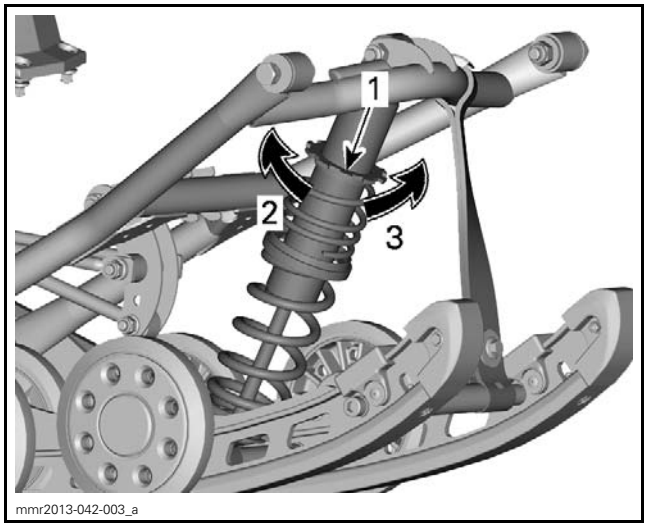
Generally, a longer stopper strap setting gives better performance in deep snow on a flat landscape.

Center Spring

Center spring preload has an effect on steering effort, handling and bump absorption.

Also, since center spring preload adjustment puts more or less pressure on the front of the track, it has an effect on the performance in deep snow.

ACTION	RESULT
Increasing preload	Lighter steering
	More bump absorption capability
	Better deep snow starts
	Better deep snow performance and handling
Decreasing preload	Heavier steering
	Less bump absorption capability
	Better trail handling



TYPICAL- RING TYPE SHOWN
1. *Spring preload adjustment ring*
2. *Increase preload*
3. *Decrease preload*

Rear Spring

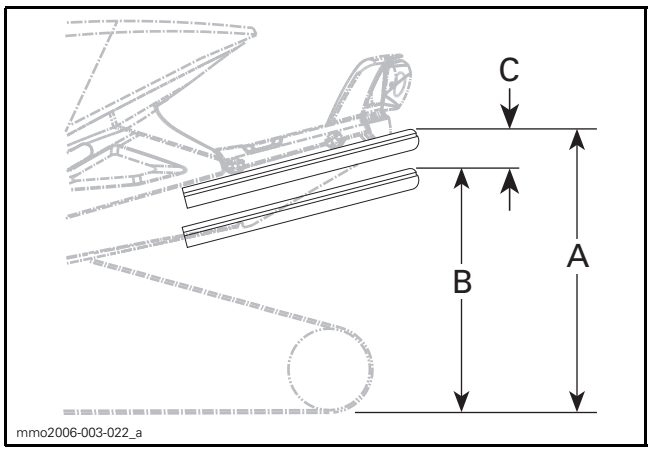
Rear spring preload has an effect on comfort, ride height and load compensation.

Also, adjusting rear spring preload shifts more or less weight to the snowmobile front end. As a result, more or less weight is applied to the skis. This has an effect on performance in deep snow, steering effort and handling.

Slight suspension bottoming occurring under the worst riding conditions indicates a good choice of spring preload.

ACTION	RESULT
Increasing preload	Firmer rear suspension
	Higher rear end
	More bump absorption capability
	Heavier steering
Decreasing preload	Softer rear suspension
	Lower rear end
	Less bump absorption capability
	Lighter steering
	Better performance and handling in deep snow

Refer to the following to determine if preload is correct.



TYPICAL — PROPER ADJUSTMENT
A. Suspension fully extended
B. Suspension has collapsed with operator, passenger(s) and load added
C. Distance between dimension "A" and "B", see table below

C	WHAT TO DO
50 mm to 75 mm (2 in to 3 in)	No adjustment required
More than 75 mm (3 in)	Adjusted too soft. Increase preload
Less than 50 mm (2 in)	Adjusted too firm. Decrease preload

If the specification is unattainable with the original springs, refer to the applicable *SPRING CHART* bulletin for other available springs.

rMotion Without Quick Adjust System

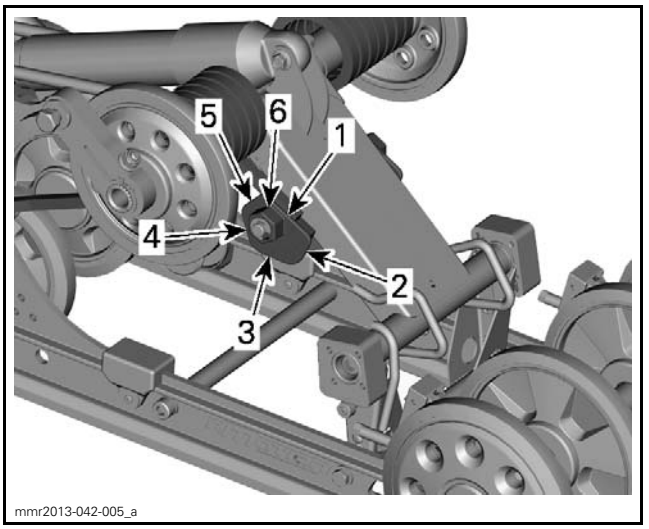
To increase spring preload using tool, always turn the left side adjustment cam in a clockwise direction, and the right side cam in a counterclockwise direction.

⚠ CAUTION Never set preload cams directly from position 5 to 1 or directly from position 1 to 5.

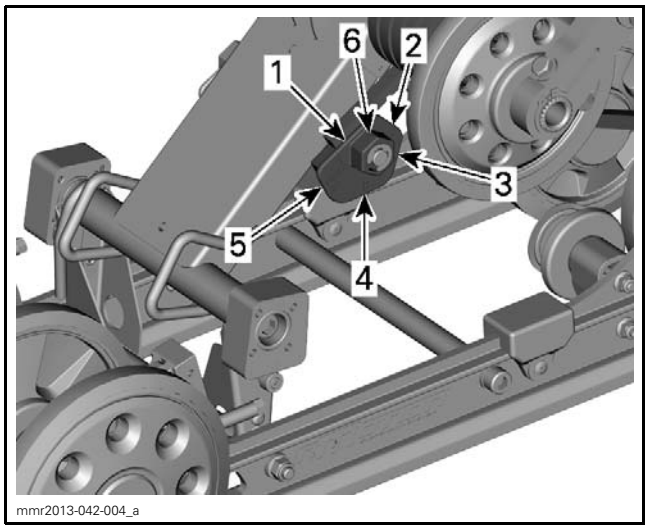
⚠ WARNING

Both rear spring preload must be set at the same position. Otherwise vehicle behavior may be unpredictable and suspension may become warped.

The adjustment cams have 5 different settings, 1 being the softest.



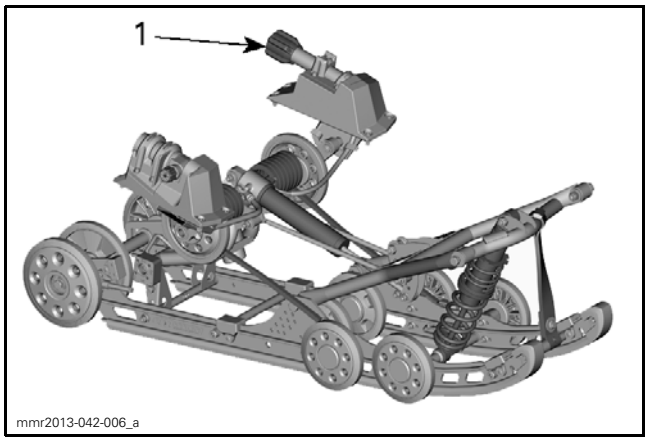
rMOTION WITHOUT QUICK ADJUST SYSTEM — LH SIDE
1. Position 1
2. Position 2
3. Position 3
4. Position 4
5. Position 5
6. Adjustment nut



rMOTION WITHOUT QUICK ADJUST SYSTEM— RH SIDE
1. *Position 1*
2. *Position 2*
3. *Position 3*
4. *Position 4*
5. *Position 5*
6. *Adjustment nut*

rMotion with Quick Adjust System

Turn the LH side knob to adjust preload accordingly.



TYPICAL — rMOTION WITH QUICK ADJUST SYSTEM
1. *LH side knob to adjust spring preload*

Rear Shock Absorber

Rear Shock Compression Damping

NOTE: Both low and high speed compression damping are adjusted simultaneously.

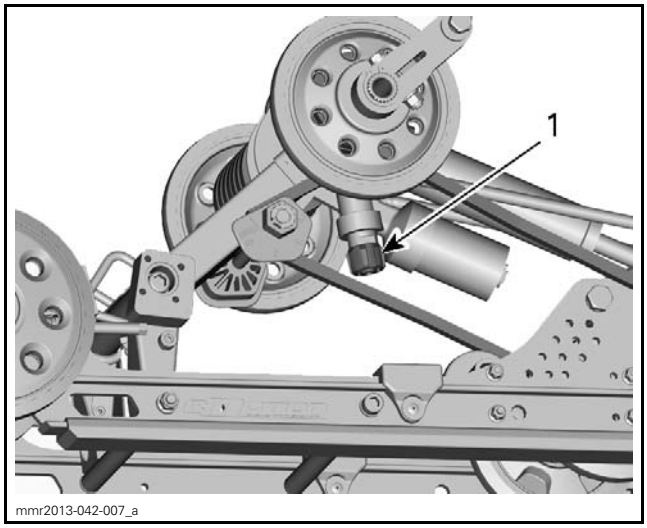
Low speed compression damping controls how the shock absorber reacts to a low suspension velocity (slow compression strokes, in most cases when riding at lower speeds).

High speed compression damping controls how the shock absorber reacts to a high suspension velocity (quick compression strokes, in most cases when riding at higher speeds).

TURNING	ACTION	RESULT ON BIG AND SMALL BUMPS
Clockwise	Increasing compression damping force	Firmer compression damping
Counter Clockwise	Decreasing compression damping force	Softer compression damping

rMotion Without Quick Adjust System

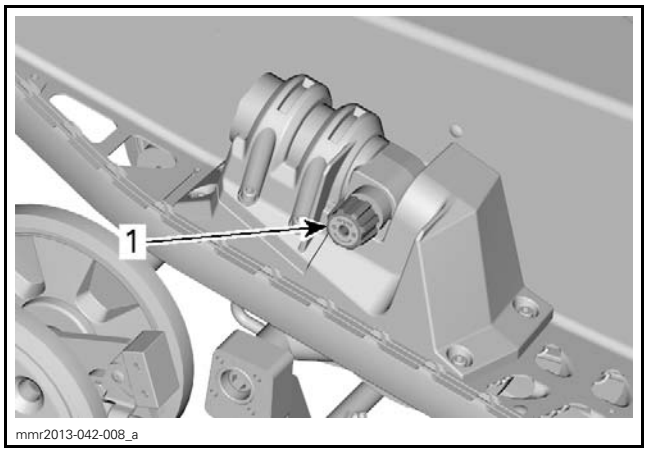
To adjust, turn the adjuster button located on the oil reservoir on shock clockwise to increase compression damping force and counterclockwise to decrease compression damping force.



TYPICAL — rMOTION WITHOUT QUICK ADJUST SYSTEM
1. *Compression damping adjustment button*

rMotion with Quick Adjust System

Turn the RH side knob to adjust the shock compression speed.

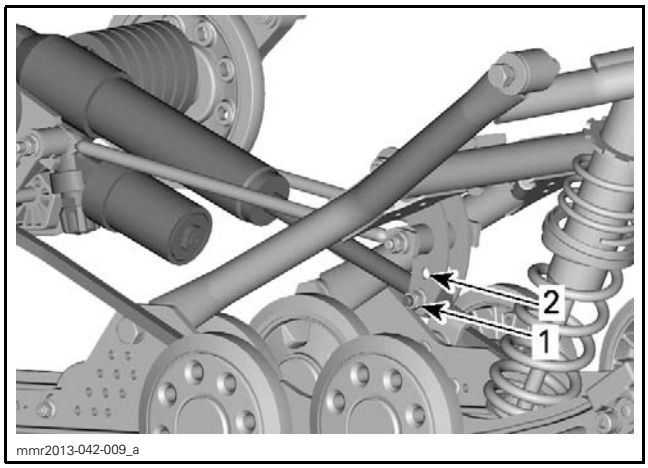


TYPICAL — rMOTION WITH QUICK ADJUST SYSTEM
1. *Knob to adjust low/high speed compression damping*

Rear Shock Mounting Position

Two rear shock mounting positions are available: high performance and sport.

Factory setting is set to lowest mounting position (high performance) which will suit most operators riding preferences. The sport mounting hole adjustment allows for another range of softer settings, but all other rear suspension adjustments should be performed before changing the rear shock mounting position.



REAR SHOCK MOUNTING POSITION
1. *High performance position*
2. *Sport position*

Coupling Blocks

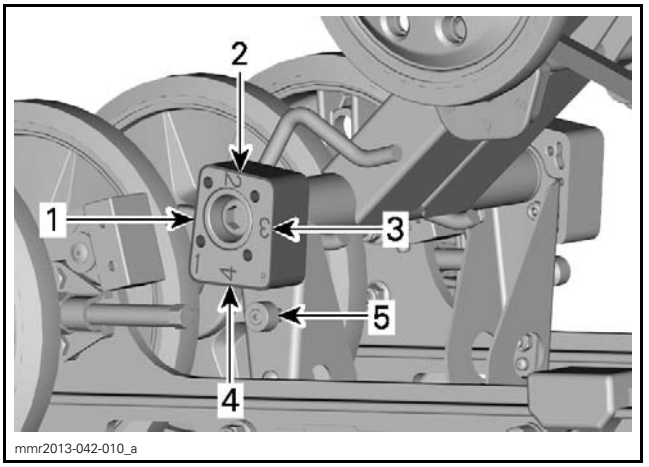
Coupling blocks adjustment has an effect on vehicle handling during acceleration only.

NOTE: A high coupling block setting will reduce both comfort and transfer under acceleration.

To adjust, push on release button under cam and turn coupling block to the desired setting.

⚠ WARNING

Both blocks must be set at the same position. Otherwise vehicle behavior may be unpredictable and suspension may become warped.



COUPLING BLOCK — RIGHT SIDE VIEW ("R" — RIGHT EMBOSSED ON BLOCK)
1. *Position 1 (minimum)*
2. *Position 2*
3. *Position 3*
4. *Position 4 (maximum)*
5. *Release button*

Coupling Blocks Setting

POSITION	USE
1	More ski lift during acceleration - and best comfort
2	Intermediate setting
3	Intermediate setting
4	Less ski lift during acceleration - and some comfort loss

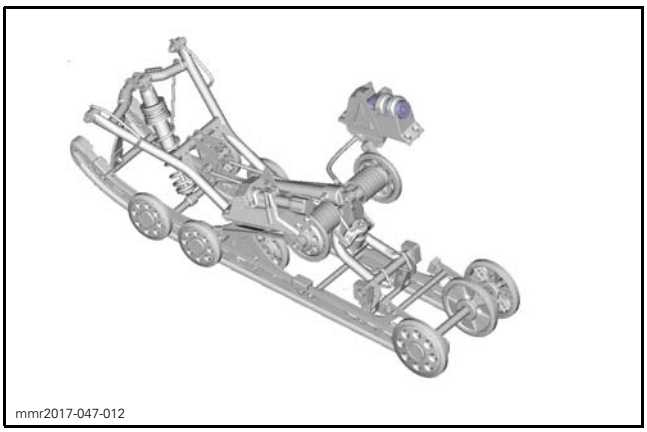
MAINTENANCE

For rear suspension lubrication, mechanism and stopper strap inspection, refer to *PERIODIC MAINTENANCE PROCEDURES*.

PROCEDURES

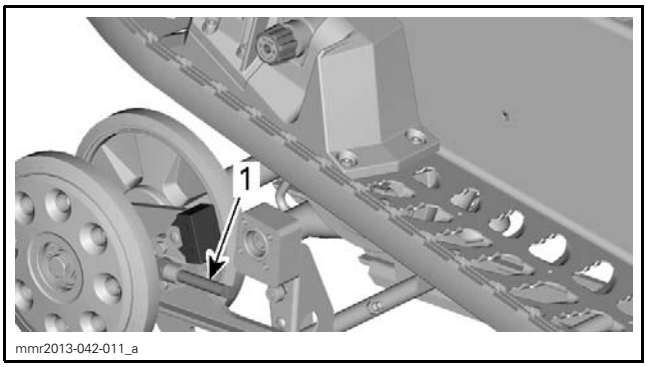
NOTE: Parts can be replaced without suspension removal, unless otherwise noted.

SUSPENSION ASSEMBLY


mmr2017-047-012

Removing Suspension Assembly

1. Lift rear of vehicle and support it off the ground.
2. Completely loosen track tension by unscrewing both adjustment screws.



mmr2013-042-011_a

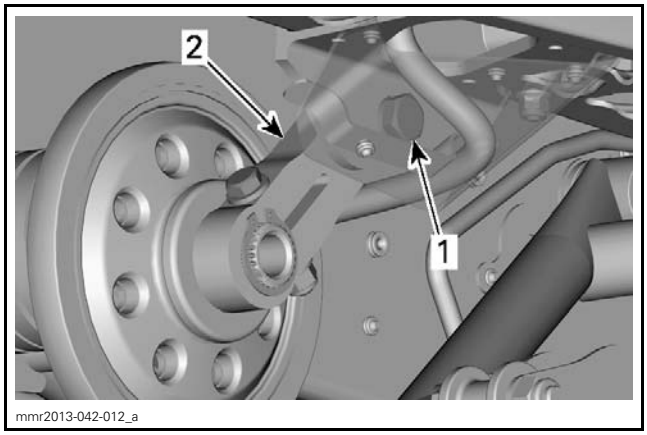
1. Adjustment screw

rMotion with Quick Adjust System

3. Remove quick adjuster control modules, refer to:
   - *SHOCK DAMPING QUICK ADJUSTER SYSTEM*
   - *SPRING PRELOAD QUICK ADJUSTER SYSTEM*.

All Models

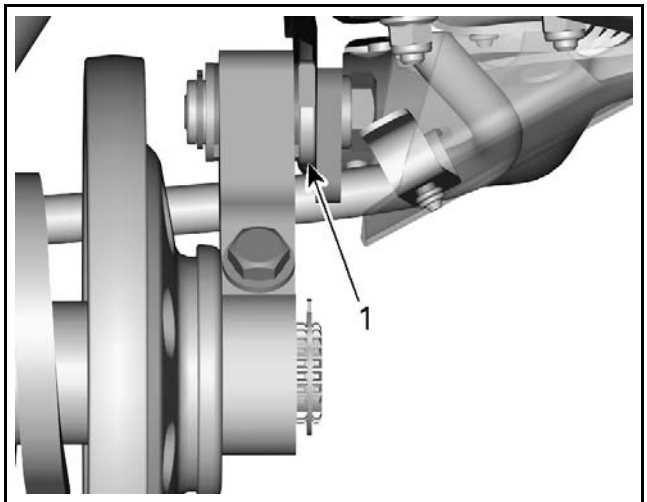
4. Lower the rear of vehicle just enough to support suspension.
5. Remove rear arm connecting rods retaining screws.



mmr2013-042-012_a

1. Retaining screw
2. Connecting rod

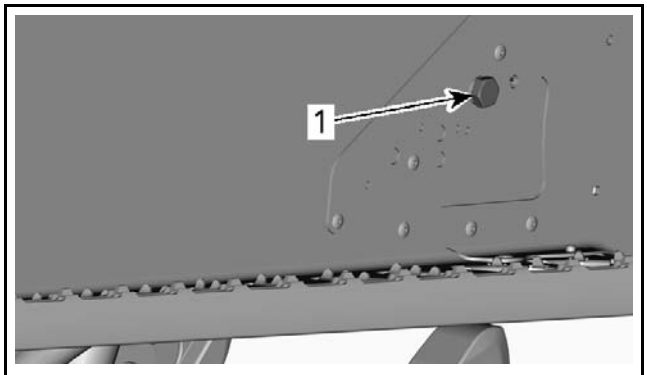
REQUIRED TOOL	
RMOTION SUSPENSION TOOL (P/N 529 036 234)	



mmr2013-042-013_a

1. rMotion suspension tool to be installed here

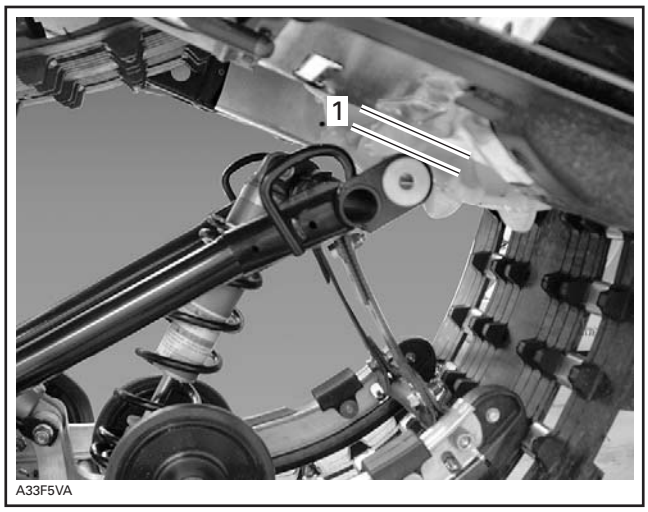
6. Remove front arm retaining bolts.



mmr2013-042-020_a

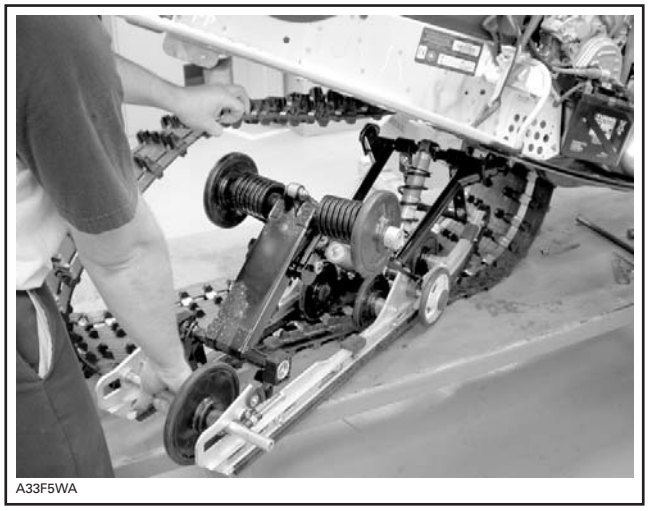
TYPICAL
1. Front arm bolt
2. Chaincase

7. Lift rear of vehicle until front arm as enough clearance to pass underneath tunnel.



TYPICAL
1. Enough clearance

8. Remove suspension assembly from vehicle.



TYPICAL — REMOVE SUSPENSION

Installing Suspension Assembly

Installation is the reverse of removal procedure. Pay attention to the following.

Install suspension into track with front portion first.

Tighten new screws to specification.

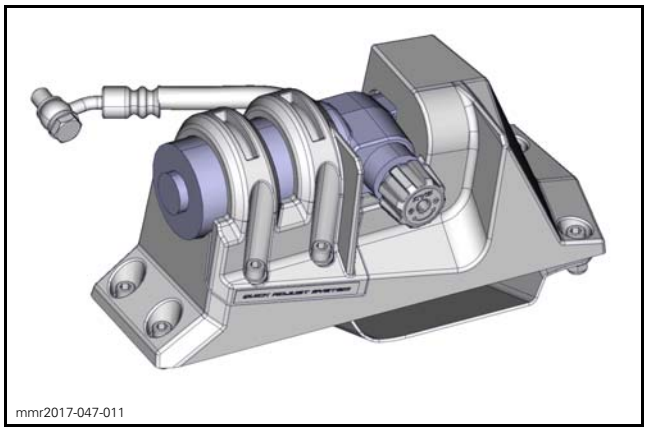
UPPER SUSPENSION ARM FASTENERS TIGHTENING TORQUE	
Front arm bolts	48 N•m ± 6 N•m (35 lbf•ft ± 4 lbf•ft)
Rear arm connecting rod screws	61 N•m ± 9 N•m (45 lbf•ft ± 7 lbf•ft)

Adjust track tension, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

rMotion with Quick Adjust System

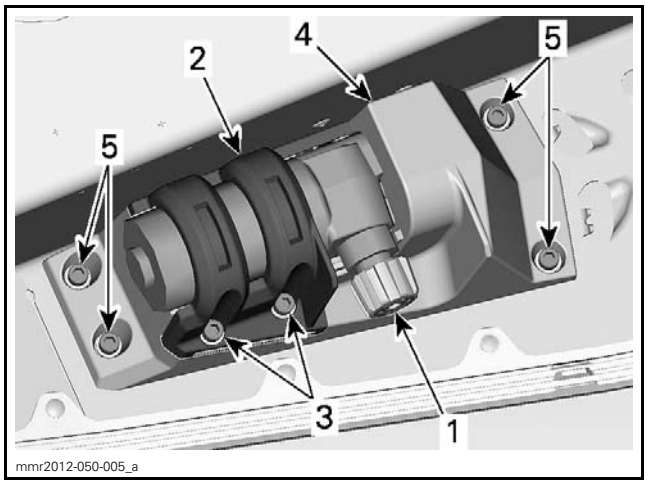
Install quick adjuster control modules, refer to:
– *SHOCK DAMPING QUICK ADJUSTER SYSTEM*
– *SPRING PRELOAD QUICK ADJUSTER SYSTEM*.

SHOCK DAMPING QUICK ADJUSTER SYSTEM



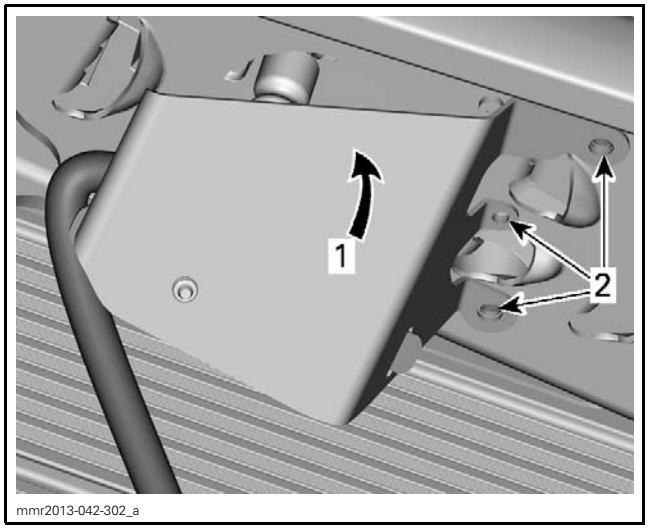
Removing Shock Damping Quick Adjuster Control Module

1. Remove the following parts:
   – Knob
   – Retaining clamp
   – Support.



CONTROL MODULE
1. Knob screw
2. Clamp
3. Clamp screws
4. Support
5. Support screws

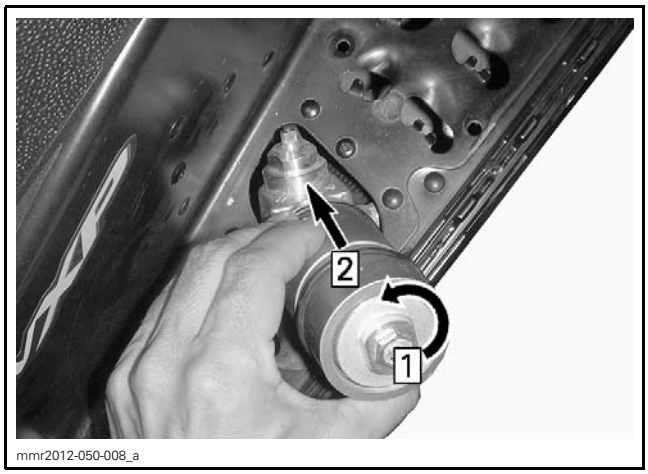
2. Remove front fasteners from hose guard.
3. Remove hose from its retainer tab and rotate hose guard outwards around rear rivet.



mmr2013-042-302_a

1. Pivot outwards
2. Front fasteners

4. Remove shock remote reservoir as follows:
   – Rotate.
   – Pass through tunnel opening.



mmr2012-050-008_a

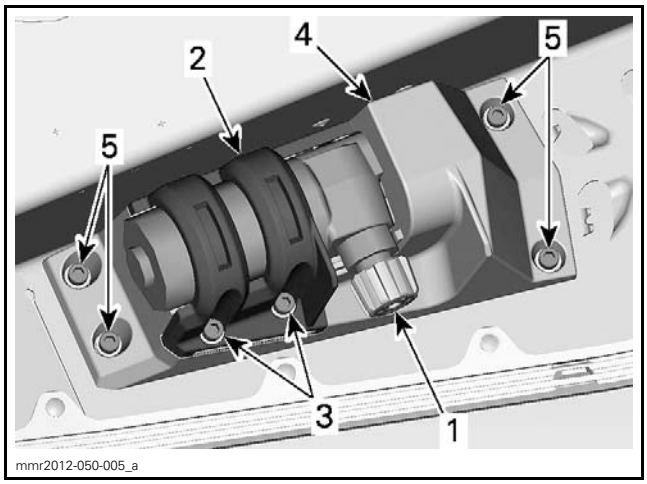
Step 1: Rotate
Step 2: Pass through tunnel opening

Installing Shock Damping Quick Adjuster Control Module

1. Align the hose guard front holes with the support front holes.

NOTE: No rivet needed at front of hose guard.

2. Install parts as follows:

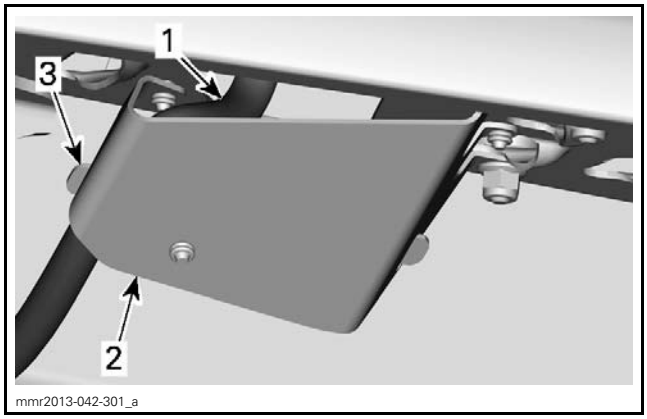


mmr2012-050-005_a

CONTROL MODULE
1. Knob screw
2. Clamp
3. Clamp screws
4. Support
5. Support screws

TIGHTENING TORQUE	
Support screws	5 N•m ± 1 N•m (44 lbf•**in** ± 9 lbf•**in**)
Clamp screws	2.5 N•m ± 0.5 N•m (22 lbf•**in** ± 4 lbf•**in**)
Knob screw	0.4 N•m ± 0.1 N•m (4 lbf•**in** ± 1 lbf•**in**)

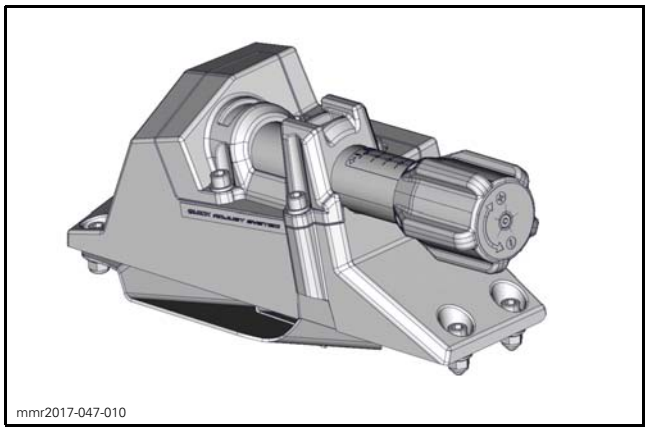
3. Secure rear shock hose to hose guard bracket.



mmr2013-042-301_a

1. Hose
2. Hose guard
3. Hose guard bracket

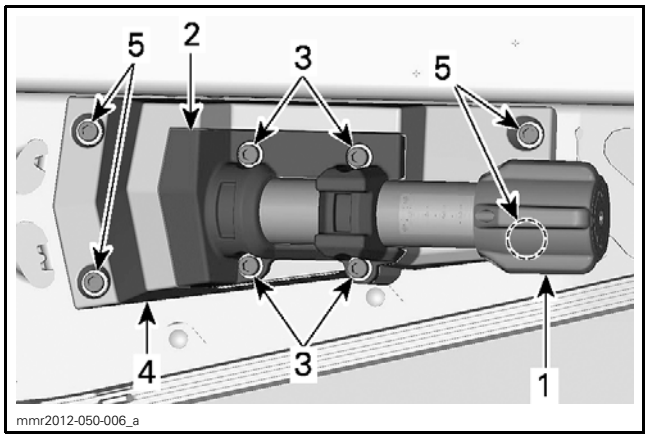
SPRING PRELOAD QUICK ADJUSTER SYSTEM


mmr2017-047-010

Removing Spring Preload Quick Adjuster Control Module

This procedure removes only the control module from the tunnel, without disconnecting the hose and will not necessitate bleeding the system.

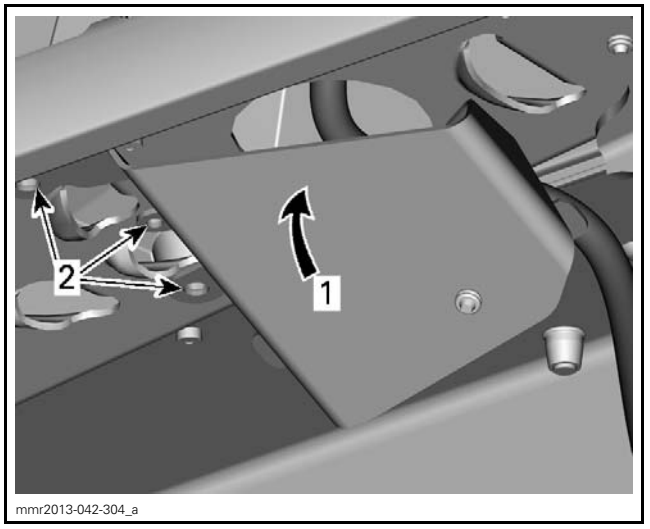
1. Remove the following parts:
   – Knob
   – Retaining clamp
   – Support.



mmr2012-050-006_a

SPRING PRELOAD QUICK ADJUSTER CONTROL MODULE
1. *Knob*
2. *Clamp*
3. *Clamp screws*
4. *Support*
5. *Support screws*

2. Remove front fasteners from hose guard.
3. Remove hose from its retainer tab and rotate hose guard outwards around rear rivet.



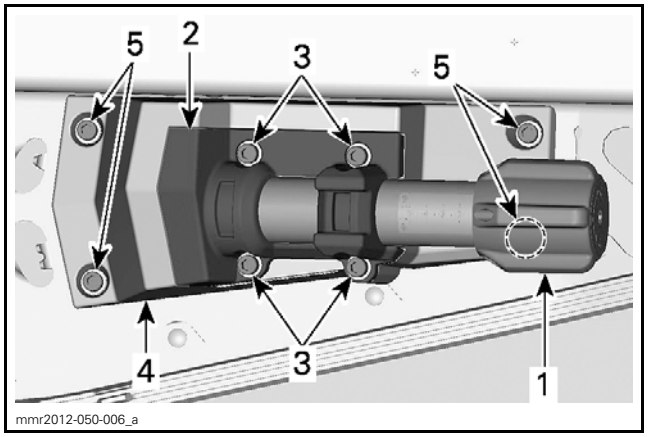
mmr2013-042-304_a

1. *Pivot outwards*
2. *Front fasteners*

4. Pass control cylinder through the opening in the tunnel.

Installing Spring Preload Quick Adjuster Control Module

1. Align the hose guard front holes with the support front holes.
2. Install parts as follows:

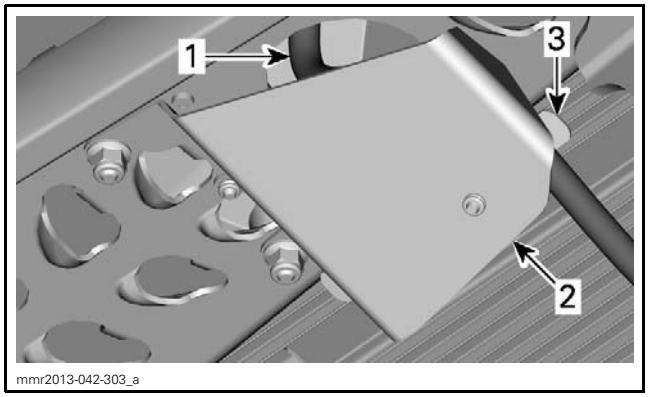


mmr2012-050-006_a

SPRING PRELOAD QUICK ADJUSTER CONTROL MODULE
1. *Knob*
2. *Clamp*
3. *Clamp screws*
4. *Support*
5. *Support screws*

TIGHTENING TORQUE	
Support screws	5 N•m ± 1 N•m (44 lbf•**in** ± 9 lbf•**in**)
Clamp screws	2.5 N•m ± 0.5 N•m (22 lbf•**in** ± 4 lbf•**in**)
Knob screw (apply LOCTITE 243 (BLUE) (P/N 293 800 060)	1.5 N•m ± 0.5 N•m (13 lbf•**in** ± 4 lbf•**in**)

3. Secure rear shock hose to hose guard bracket.



mmr2013-042-303_a

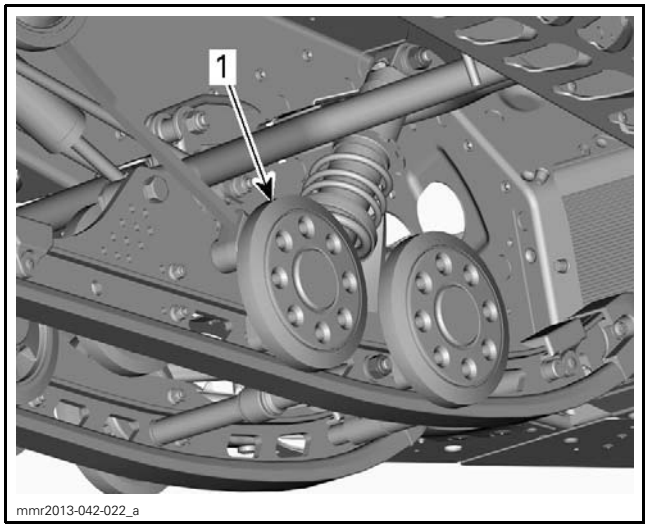
1. Hose
2. Hose guard
3. Hose guard bracket

Removing Spring Preload Quick Adjuster System

This procedure removes the following parts as an assembly and does not necessitate bleeding the system:

– Control module
– Hose
– Actuator.

1. Support the rear of vehicle just enough to remove load on the rear suspension.
2. Remove control module, refer to *SPRING PRELOAD QUICK ADJUSTER SYSTEM*.
3. Remove idler wheels to access spring support screws.

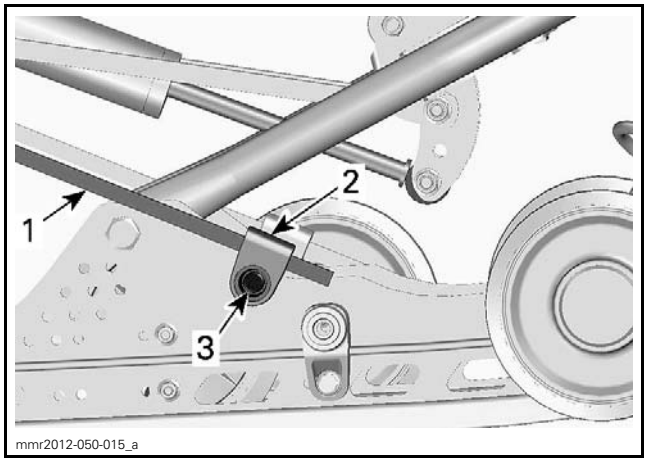


mmr2013-042-022_a

1. Idler wheel to be removed (on each side)

4. Firmly hold the spring supports and remove spring support bolts.

⚠ CAUTION Spring support are spring loaded.



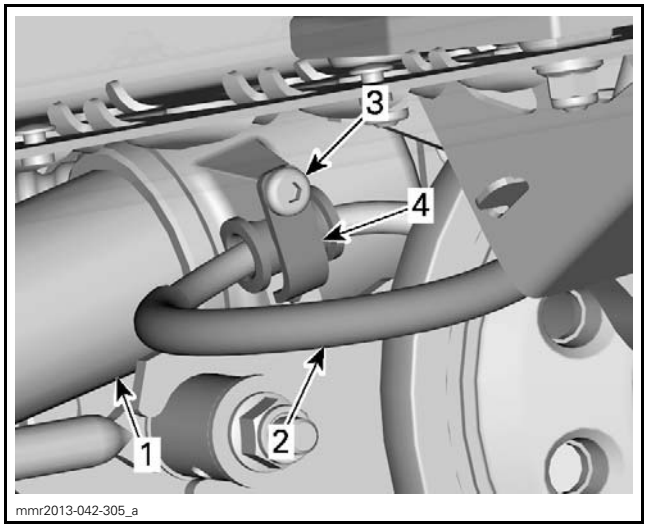
mmr2012-050-015_a

1. Spring
2. Spring support
3. Spring support bolt

5. Move spring supports with spring ends over the idler wheel supports and let them sit on the track.

NOTE: If the springs are still loaded, completely loosen track tension in order to make room to unload springs.

6. Move the other end of the springs off the spring adjuster actuator.
7. Remove hose retainer from shock assembly.



mmr2013-042-305_a

1. Shock
2. Hose
3. Retaining screw
4. Hose retainer

8. Remove actuator from rear arm.
9. Remove spring adjuster assembly.

Disassembling Spring Preload Quick Adjuster System

NOTE: System bleeding is required whenever the hose is disconnected.

NOTICE Thoroughly clean parts before disassembly. Work on a clean surface.

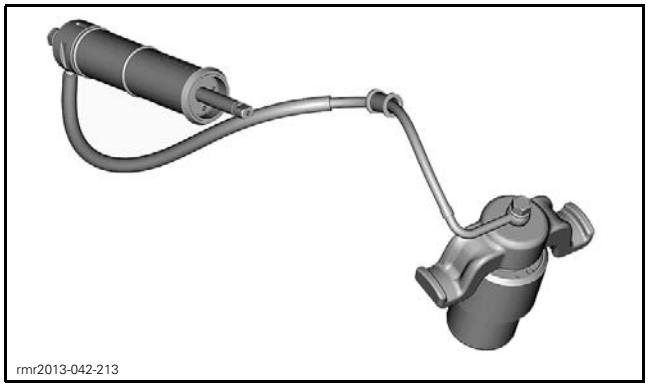
1. Set controller to the minimum preload.
2. Remove the banjo bolt(s) retaining the hose.
3. Drain fluid.

Replacing Spring Preload Quick Adjuster System Seals

NOTE: System bleeding is required whenever the hose is disconnected.

NOTICE Thoroughly clean parts before disassembly. Work on a clean surface.

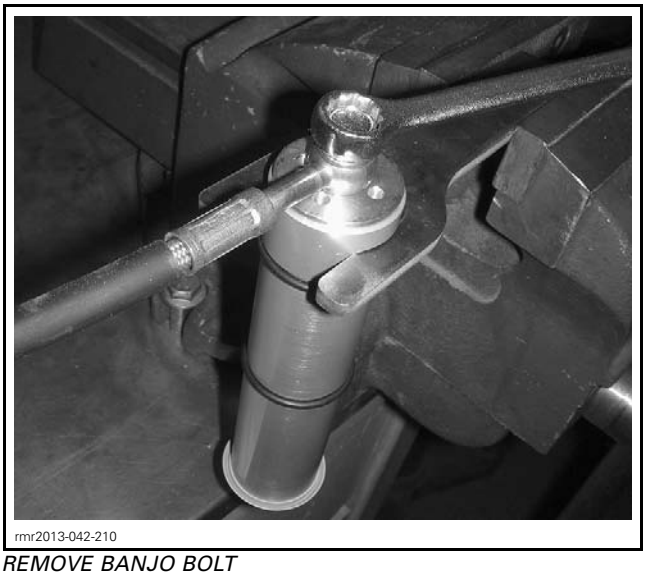
1. Remove quick adjuster assembly from vehicle. Refer to *REMOVING THE SPRING PRELOAD QUICK ADJUSTER CONTROL MODULE*.



QUICK ADJUSTER ASSEMBLY

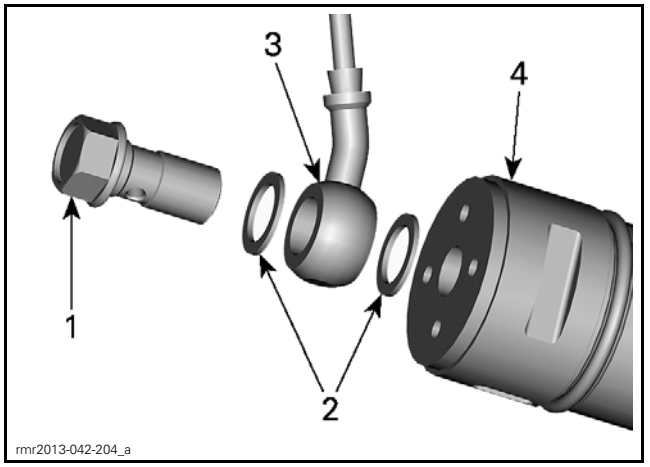
REQUIRED TOOL	
RMOTION MASTER CYLINDER KEY (P/N 529 036 254)	

2. Use retainer tool to hold cylinder while removing banjo bolt.



REMOVE BANJO BOLT

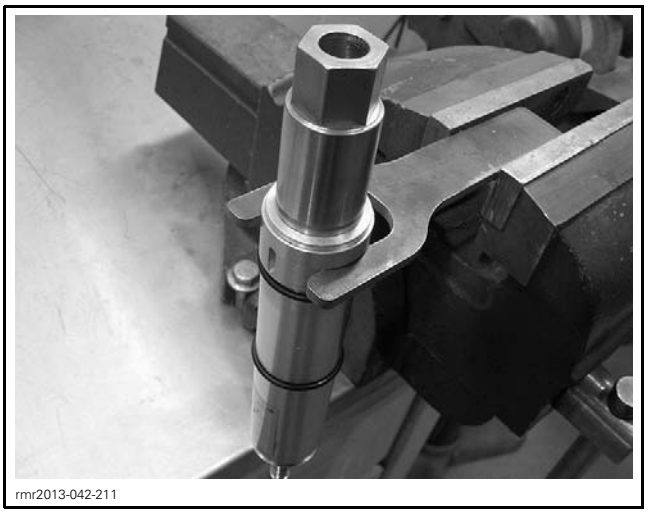
3. Remove banjo bolt, washers and hose from cylinder.



1. *Banjo bolt*
2. *Washer*
3. *Hose fitting*
4. *Cylinder body*

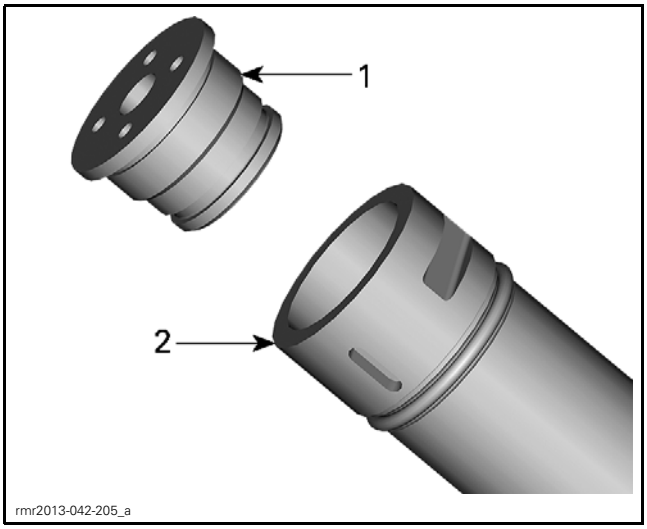
REQUIRED TOOL	
RMOTION MASTER CYLINDER KEY (P/N 529 036 254)	
RMOTION SOCKET (P/N 529 036 255)	

4. Hold cylinder body with tool and unscrew end cap using the rMotion socket.



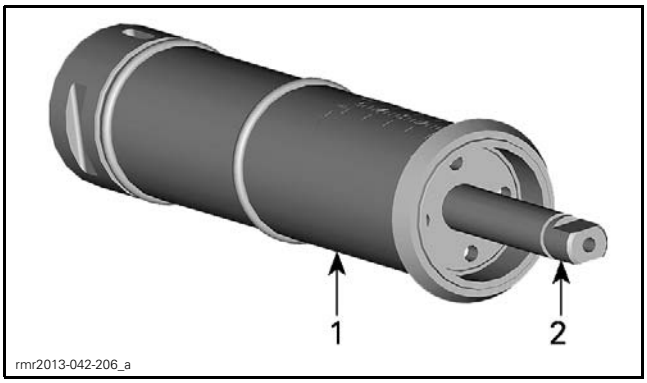
REMOVE END CAP

5. Remove end cap.



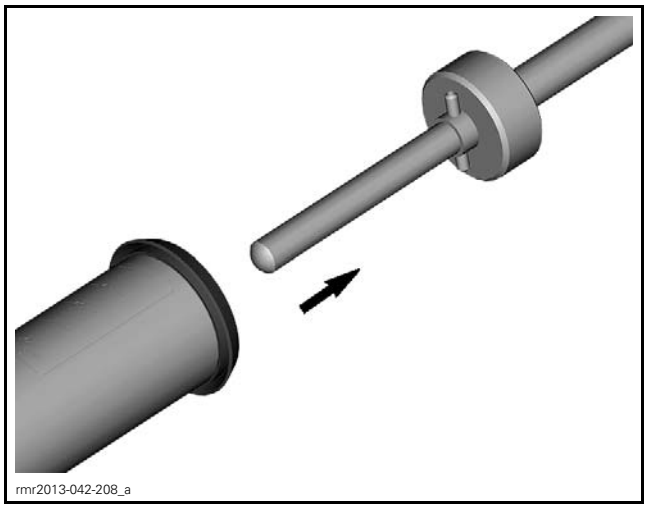
1. *End cap*
2. *Cylinder body*

6. At other end of cylinder, unscrew piston rod using same tools.



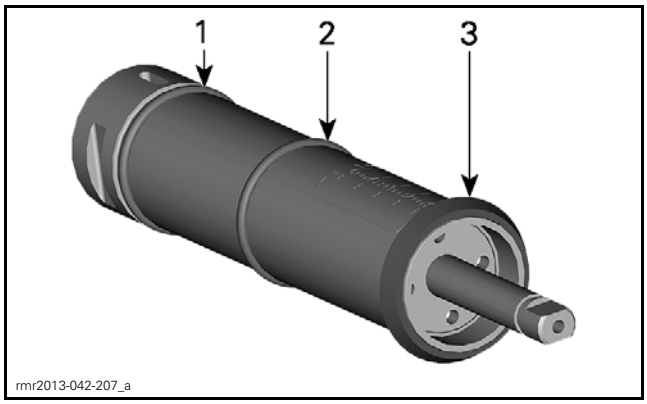
1. *Cylinder body*
2. *Piston rod*

7. Remove piston rod.



REMOVE PISTON ROD

8. Replace external seals if worn out or damaged.



1. *Cylinder Body front seal*
2. *Cylinder body rear seal*
3. *Knob seal*

9. Installation is the reverse of removal.

Bleeding and Reassembling Spring Preload Quick Adjuster System

NOTE: Actuator, control module and hose have to be separated from each other before carrying out bleeding procedure.

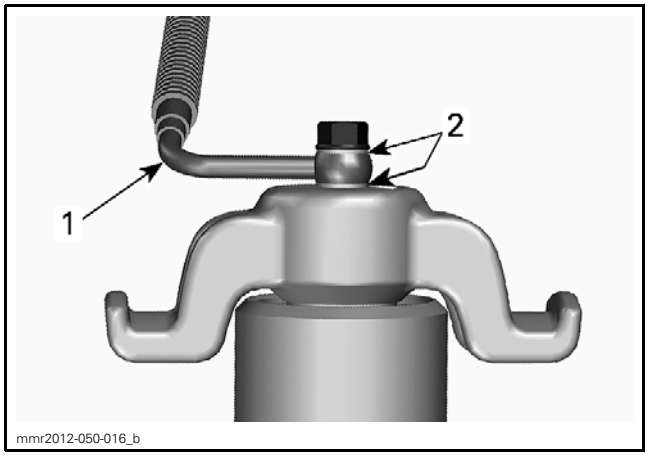
1. Fully extend the actuator by hand.
2. Add fluid in the actuator, see table.

ACTUATOR FILLING	
FLUID TYPE	QUANTITY
ATF Dexron III	Approximately 40 ml (1.35 U.S. oz)

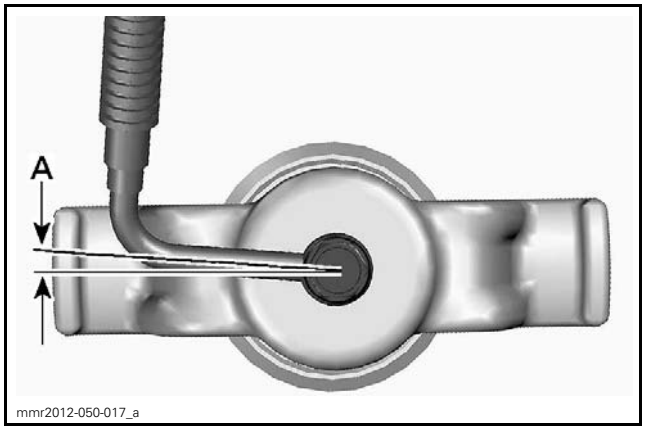
3. Maintain actuator with threaded hole upwards and:
   3.1 Compress the actuator by precisely 15 mm (19/32 in).

3.2 Fill until fluid reaches the top of the threads.

3.3 Install hose with new sealing washers as shown.



1. Hose
2. Sealing washers



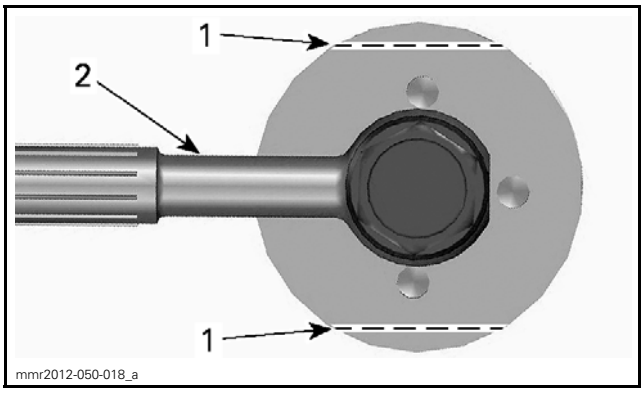
A. 5°

TIGHTENING TORQUE	
Banjo bolt	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

4. With the hose open end up, compress the actuator by precisely 8 mm (5/16 in).

NOTE: Fluid should reach the open end of the hose.

5. Unscrew the control cylinder adjustment rod until it stops.
6. Using a small diameter punch through the M10 threaded hole, push the control cylinder piston all the way back.
7. With the threaded hole up, fill control cylinder until fluid reaches the top of the threads.
8. Install the hose on the control cylinder as shown.



1. Notches
2. Hose

NOTE: The hose must on be the opposite side of the decal on the control cylinder.

TIGHTENING TORQUE	
Banjo bolt	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

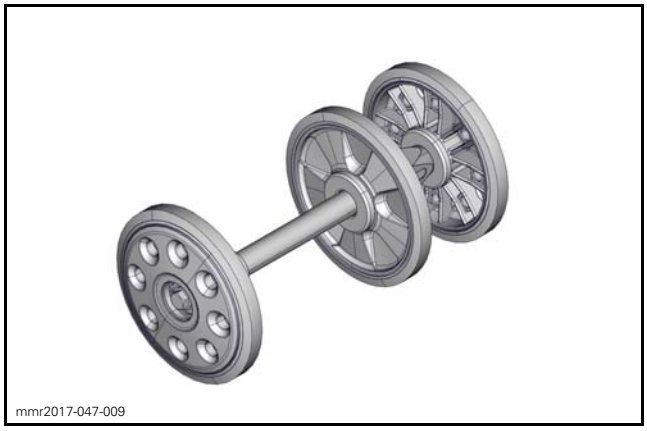
9. Verify system operation. The actuator full stroke should be 22 mm (7/8 in).

Installing Spring Preload Quick Adjuster System

Installation is the reverse of removal procedure, however, pay attention to the following:

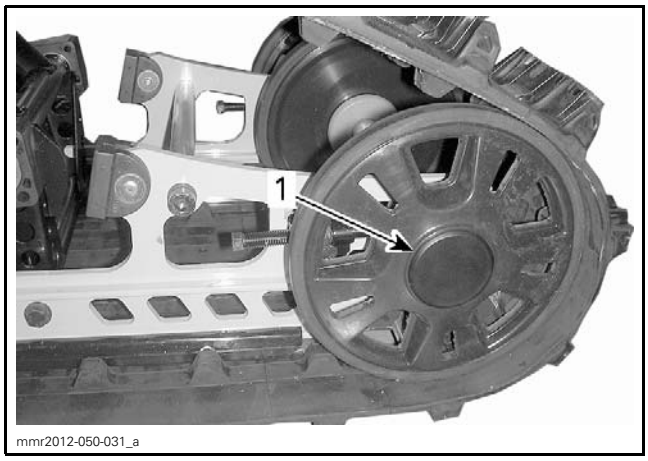
Set the preload to the minimum using the control cylinder adjustment rod first.

REAR AXLE



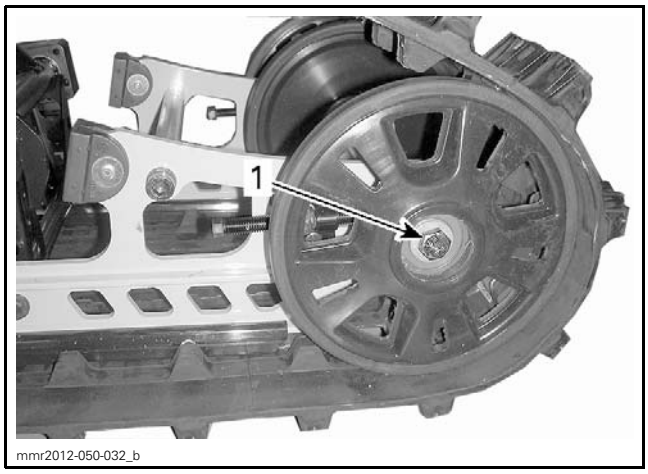
Removing Rear Axle

1. Lift rear of vehicle and support it off the ground.
2. Remove rear idler wheel caps.



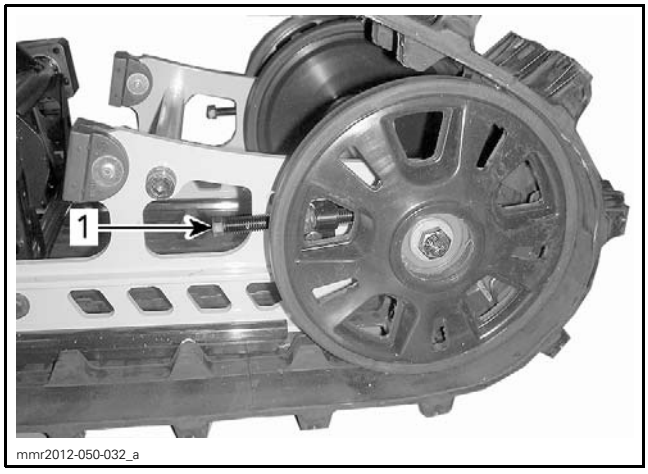
1. RH rear idler wheel cap

3. Loosen rear axle screws (one each side).



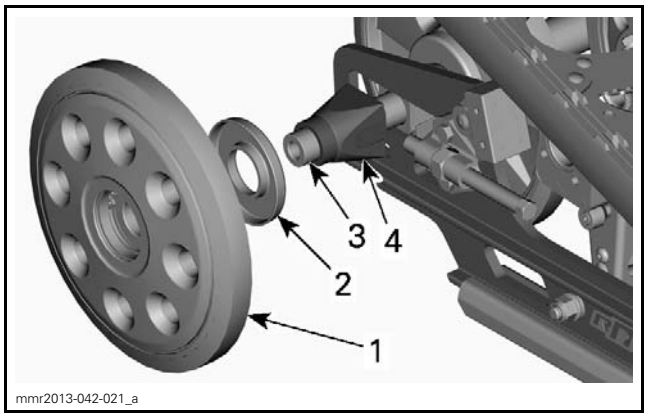
1. RH rear axle screw

4. Completely loosen track tension by unscrewing both adjustment screws.



1. RH adjustment screw

5. Remove both rear axle screws.
6. Remove rear idler wheels, seals and wheel spacers.



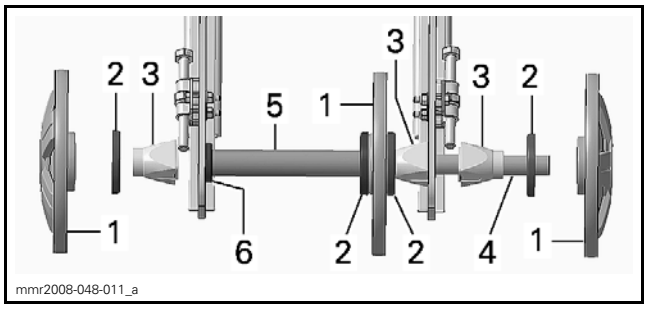
TYPICAL - RH SIDE SHOWN
1. Rear idler wheel
2. Seal
3. Rear axle
4. Wheel spacer

7. Pull out the rear axle.

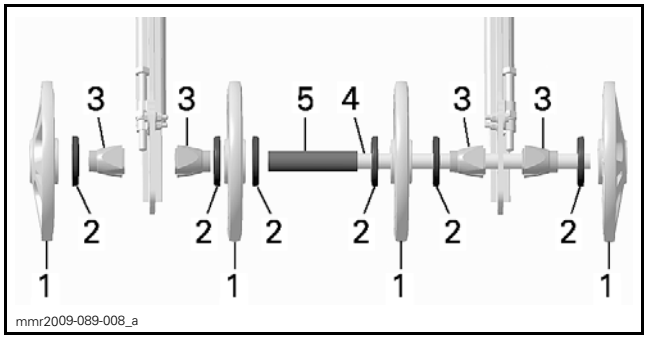
Installing Rear Axle

Installation is reverse of removal procedure. However, pay attention to the following.

Make sure to position all parts correctly.

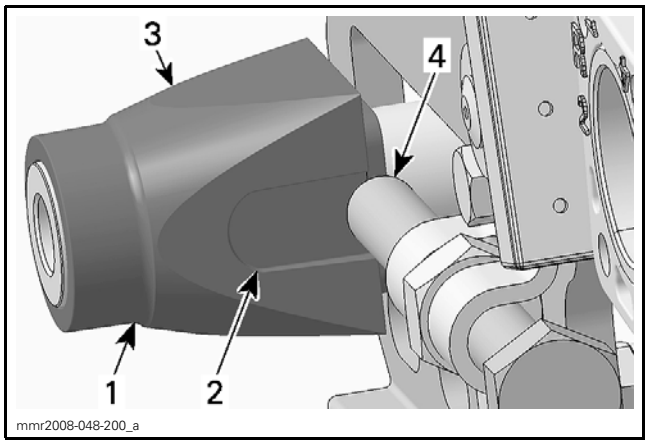


TYPICAL - 3 IDLER WHEELS LAYOUT
1. Idler wheels
2. Seals
3. Wheel spacers
4. Rear axle
5. Rear axle spacer
6. Washer



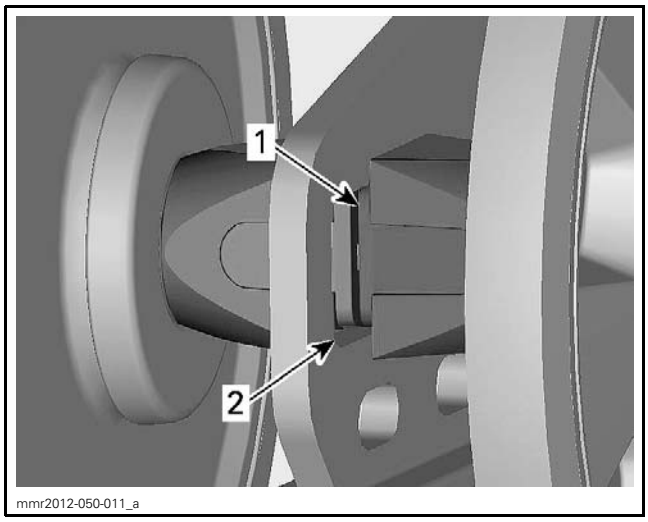
TYPICAL - 4 IDLER WHEELS LAYOUT
1. Idler wheels
2. Seals
3. Wheel spacers
4. Rear axle
5. Rear axle spacer

Position wheel spacers with a flat side up and a groove facing tensioner screw.



TYPICAL
1. *Wheel spacer*
2. *Groove*
3. *Flat side*
4. *Tensioner screw*

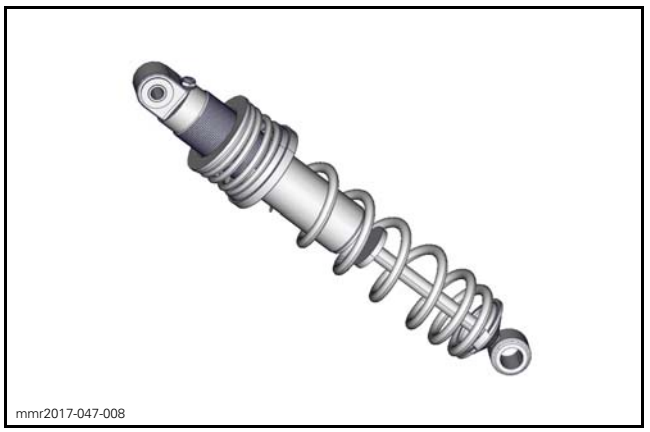
When tightening rear axle, make sure each wheel spacer protuberance is engaged into rail slot.



1. *Wheel spacer protuberance*
2. *Rail slot*

Adjust track tension. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

SHOCK ABSORBERS



Removing Rear Shock Absorber

1. Lift rear of vehicle and support it off the ground.

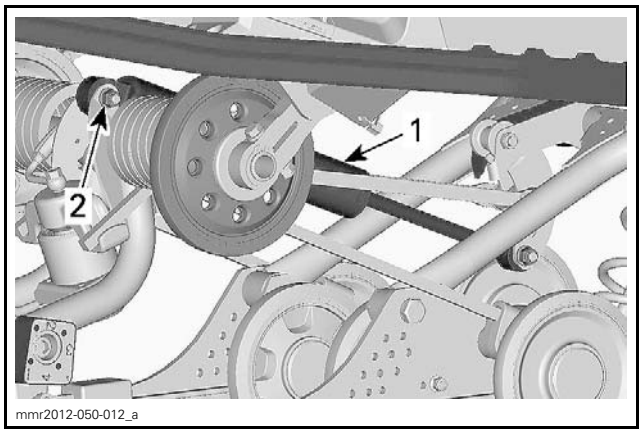
rMotion with Quick Adjust System

2. Carry out *REMOVING THE SHOCK DAMPING QUICK ADJUSTER CONTROL MODULE*, Refer to procedure in this subsection.

All Models

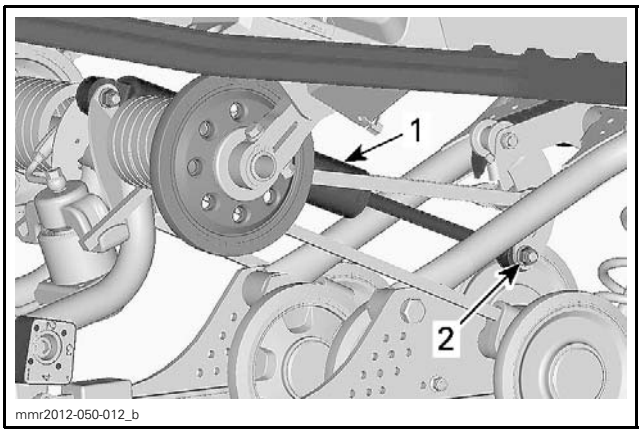
3. Remove the upper bolt.

NOTE: It may be necessary to lower the vehicle and slightly compress suspension to remove load.



TYPICAL
1. *Rear shock absorber*
2. *Upper bolt*

4. Remove the lower bolt.



TYPICAL
1. *Rear shock absorber*
2. *Lower bolt*

5. Remove rear shock absorber from the vehicle.

Installing Rear Shock Absorber

Installation is reverse of removal procedure. However, pay attention to the following.

REAR SHOCK ABSORBER POSITIONING	
rMotion quick with adjust system	Body up hose on RH side
rMotion quick without adjust system	Body up reservoir downwards

Install new shock absorber retaining nuts and tighten to specified torque.

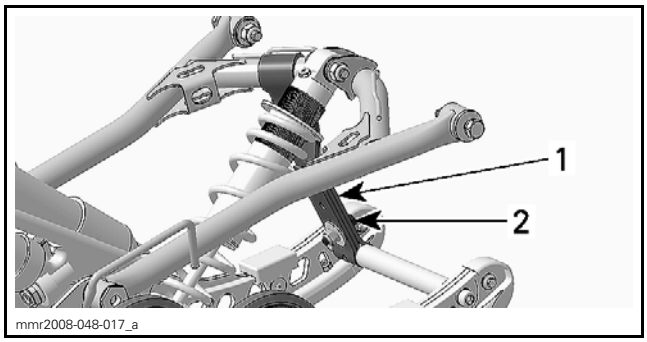
TIGHTENING TORQUE	
Shock absorber retaining bolts	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

rMotion with Quick Adjust System

Carry out *INSTALLING THE SHOCK DAMPING QUICK ADJUSTER CONTROL MODULE*.

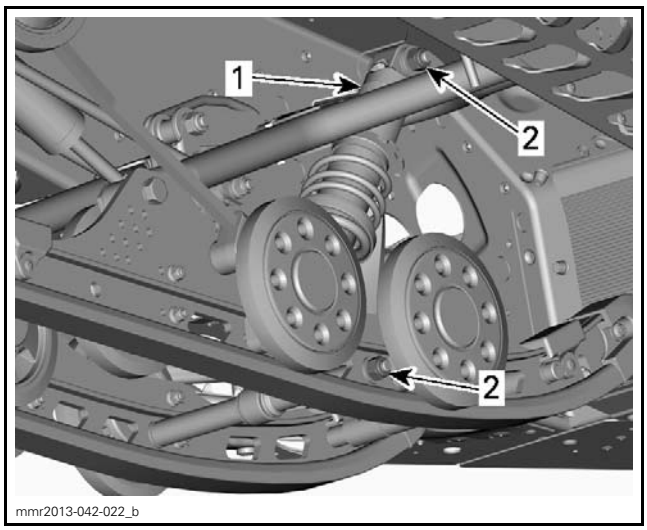
Removing Center Shock Absorber

1. Lift the rear of vehicle and support it off the ground.
2. Unfasten stopper strap.



TYPICAL
1. *Stopper strap*
2. *Stopper strap bolt*

3. Remove idler wheels to access lower retaining bolt.
4. Remove shock retaining bolts.



TYPICAL
1. *Center shock absorber*
2. *Retaining bolts*

5. Remove shock absorber from vehicle.

Inspecting Shock Absorber

NOTE: All types of shock absorbers are covered in this topic, refer to *TECHNICAL SPECIFICATIONS* to identify the shock absorber relating to the vehicle model.

NOTE: Unless otherwise noted, shock absorber must be at normal room temperature (21°C ± 2°C (70°F ± 36°F)) during inspection.

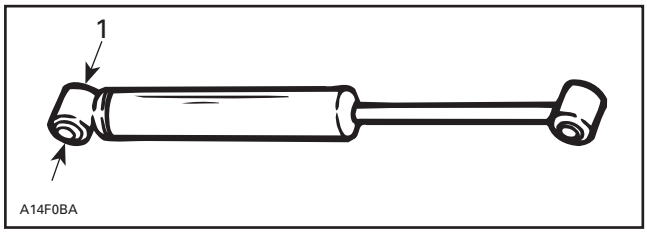
MC Hydraulic Shock

1. Perform a visual inspection of the shock:
   - The shock must be exempt of any dent or scratch, especially on the rod.
   - Small dent on the shock body may not affect any performance or reliability of this shock.

– Any defect on the rod, as small as it is, can lead to seal failure and oil leak.
– If such defect (on rod) is detected, the shock must be replaced, and this will not be cover under warranty.

2. Secure the shock body end in a vise, clamping on eyelet, with its rod upward.

NOTICE **Do not clamp directly on shock body.**



1. Shock body eyelet

3. Examine shock for leaks. Extend and compress the piston at least 5 complete strokes with its rod upward.
4. Check that shock moves smoothly and with uniform resistance over its entire stroke.

NOTE: For the first 5 complete strokes, it could be normal to note uneven resistance.

5. Check the following conditions that will denote a defective shock:
   – A skip or a hang back when reversing stroke at mid travel.
   – Seizing or binding condition except at extreme end of either stroke.
   – Oil leakage.
   – A gurgling noise, after completing one full compression and extension strokes.
6. If suspecting a shock is freezing, place shock in a freezer (temperature below 0°C (32°F)) for 4 hours.
7. Push down on rod and note its resistance. If shock is frozen it will be much more difficult to compress than one in normal condition.
8. If any faults are present, replace shock.

All HPG™ Shock (Including KYB PRO Series)

1. Perform a visual inspection of the shock:
   – The shock must be exempt of any dent or scratch, especially on the rod.
   – Any defect on the rod, as small as it is, can lead to seal failure and oil leak.
   – If such defect is detected, the shock must be replaced and this will not be covered under warranty.
2. Completely push down shock rod into the body and check result as per table.

HPG SHOCK	RESULT
All except 551 mm (21-11/16 in) rear shock	The rod should completely get in the shock body
551 mm (21-11/16 in) rear shock	The stroke must be at least 138 mm (5-7/16 in)

NOTE: For the **HPG Variable Rate Shock**, it should be stiff for approximately the first 25 mm (1 in), then softer for about 50 mm (2 in), and stiffer again. This stiff/soft/stiff phenomenon shows the normal operation of VR shock.

3. Release shock from completely collapsed position and check result as per table.

HPG SHOCK EXCEPT VARIABLE RATE
– The shock should extend unassisted. – The rod must come out at a steady speed.

HPG VARIABLE RATE SHOCK
– The shock should extend unassisted. – Rod must come out slowly first, than faster and finally slow again for the last 25 mm (1 in).

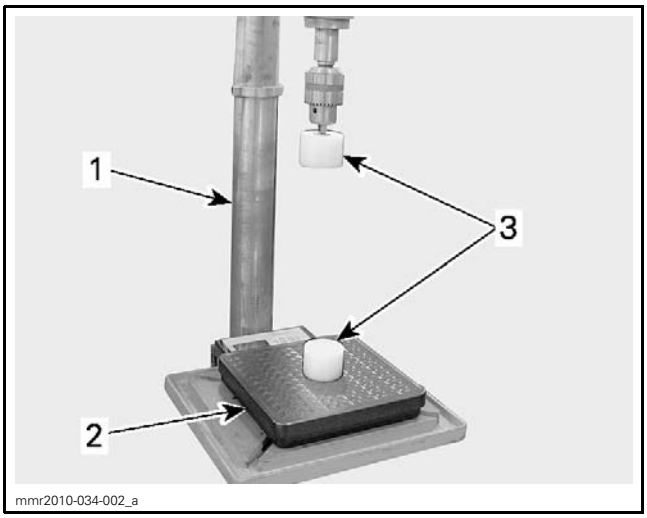
4. Proceed with *TESTING SHOCK ABSORBER COMPRESSION*. See procedure in this subsection.
5. If any faults are present, replace shock.

Testing Shock Absorber Compression

1. Ensure shock absorber is at normal room temperature (21°C ± 2°C (69.8°F ± 35.6°F).
2. Remove spring from shock absorber (if applicable).
3. Place a BENCH SCALE (P/N SALTER BRECKNELL PS 400) (or an equivalent) on a suitable drill press.

REQUIRED TOOL	
SHOCK ABSORBER SUPPORTS (P/N 529 036 186)	

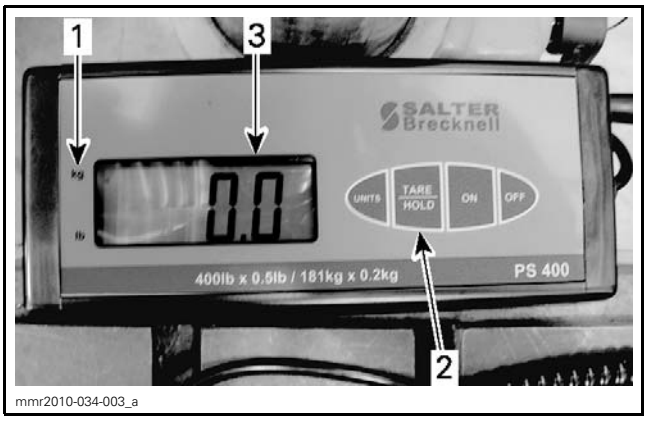
4. Install the shock absorber support onto drill press.
5. Set bench scale units to **kg**.



mmr2010-034-002_a

1. *Drill press*
2. *Bench scale*
3. *Shock absorber supports*

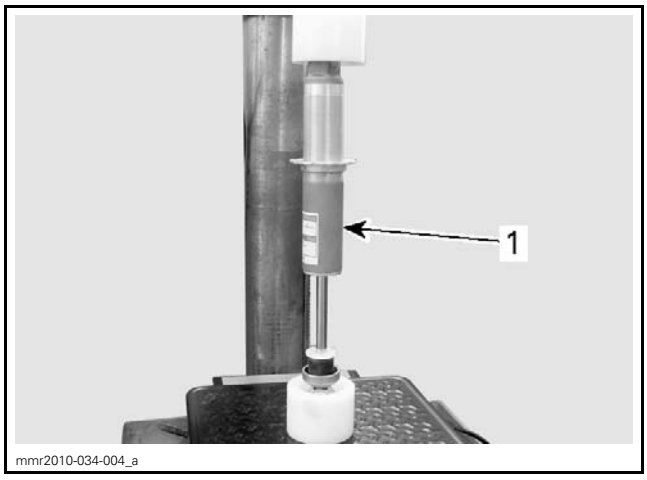
6. Press TARE to reset digits (must indicate zero).



mmr2010-034-003_a

1. *Units indicator lamp*
2. *TARE button*
3. *Digits*

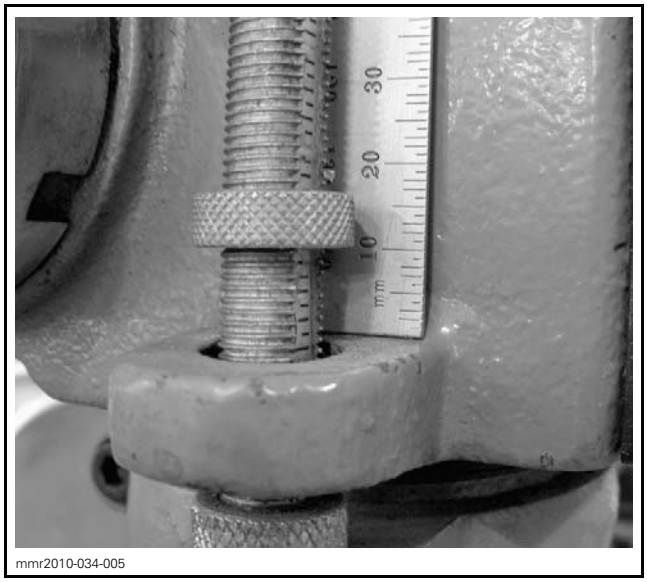
7. Install shock absorber into support with shock body upwards.
8. Adjust drill press table height in order to set the upper shock support flush with the shock body end.
9. Ensure shock absorber is aligned with drill press axis.



mmr2010-034-004_a

1. *Shock body upwards*

10. Set the drill press displacement to 10 mm (.394 in) using locking nut.



mmr2010-034-005

11. Compress shock absorber by 10 mm (.394 in) and hold it in position.
12. Read load recorded on the bench scale.

mmr2010-034-006

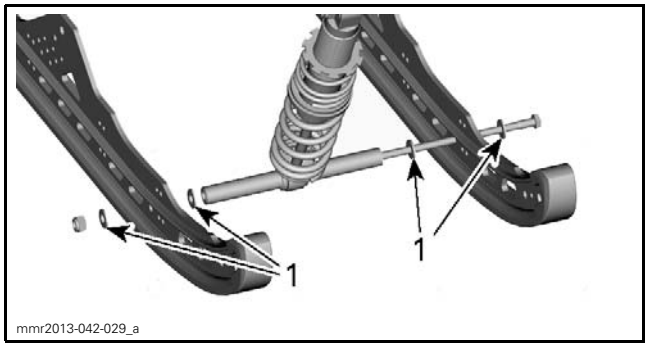
13. Load reading must be as per the following table.

MODEL	ROD DIAMETER	SERVICE RANGE
Every HPG (Plus/Plus R)	12.5 mm (1/2 in)	24 kgf ± 4 kgf (53 lbf ± 9 lbf)
All KYB PRO Series	16 mm (5/8 in)	39 kgf ± 5 kgf (86 lbf ± 11 lbf)

Installing Center Shock Absorbers

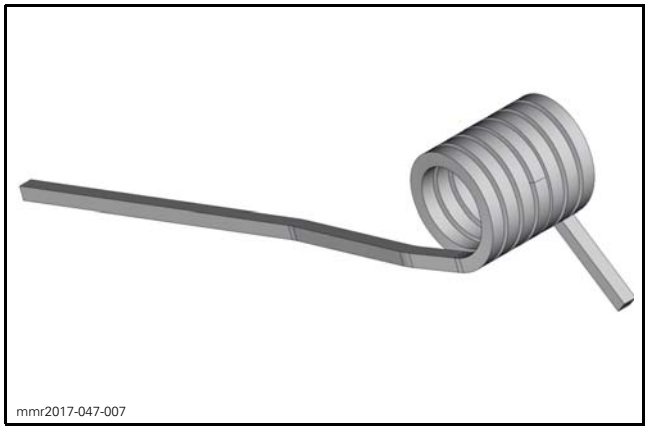
Installation is reverse of removal procedure. However, pay attention to the following.

CENTER SHOCK ABSORBER POSITIONING	
HPG Plus	Body up Valve upwards
KYB PRO	Body up Reservoir on the RH side



BOTTOM OF SHOCK ABSORBER
1. Washers location

REAR SPRINGS



Removing Rear Springs

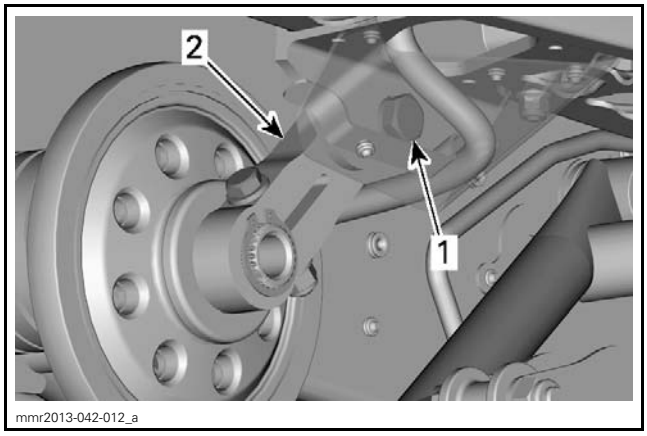
1. Support the rear of vehicle just enough to remove load on the rear suspension.
2. Set rear spring preload to the minimum.

rMotion with Quick Adjust System

3. Remove quick adjuster control modules, refer to:
   - *SHOCK DAMPING QUICK ADJUSTER SYSTEM*
   - *SPRING PRELOAD QUICK ADJUSTER SYSTEM*.

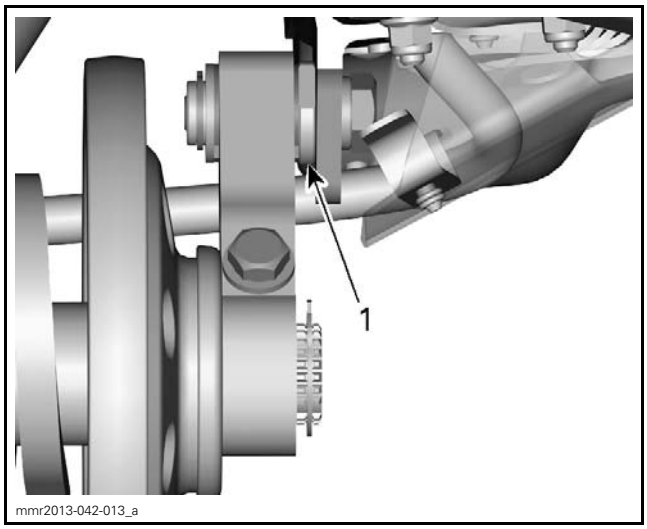
All Models

4. Remove rear arm connecting rod retaining screws.



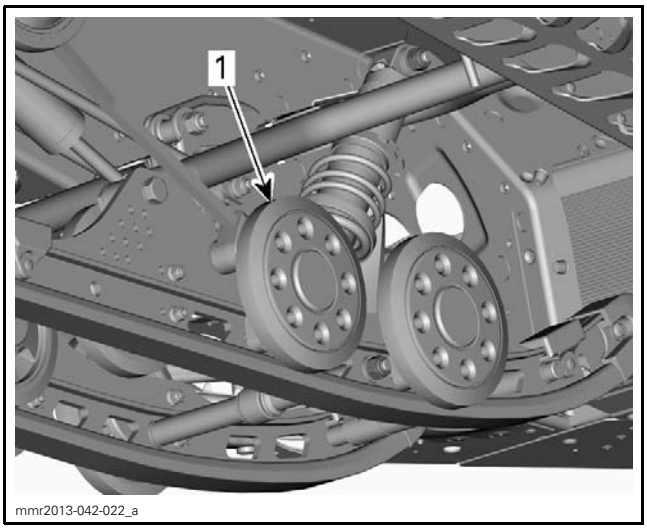
1. Connecting rod retaining screw
2. Connecting rod

REQUIRED TOOL	
RMOTION SUSPENSION TOOL (P/N 529 036 234)	



1. rMotion suspension tool to be installed here

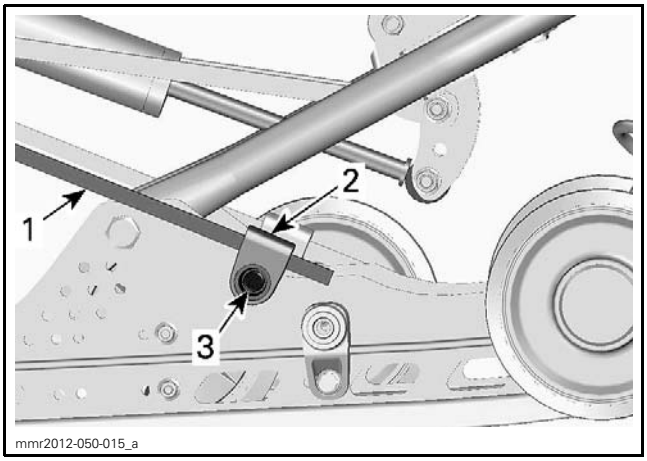
5. Remove idler wheels to have access to spring support screws.



1. Idler wheel to be removed (on each side)

6. Firmly hold the spring supports and remove spring support bolts.

⚠ CAUTION Spring support are spring loaded.



1. Spring
2. Spring support
3. Spring support bolt

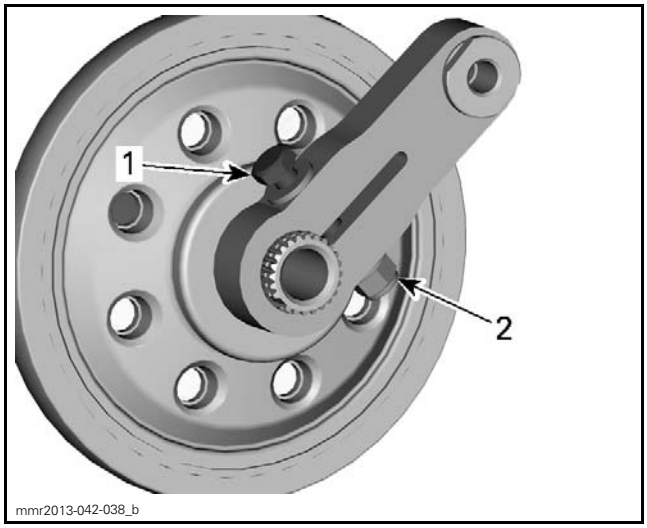
7. Move spring supports with spring ends over the idler wheel supports and let them sits on the track.

NOTE: If the springs are still loaded, completely loosen track tension in order to make room to unload springs.

8. Raise and support the rear of vehicle just enough to clear the rear arm connecting rods.

NOTICE rMotion with Quick Adjust system: Avoid stretching the hoses.

9. Remove connecting rods from the rear arm.
   9.1 Loosen bolt.
   9.2 Remove circlip.
   9.3 Pull connecting rod off the rear arm.



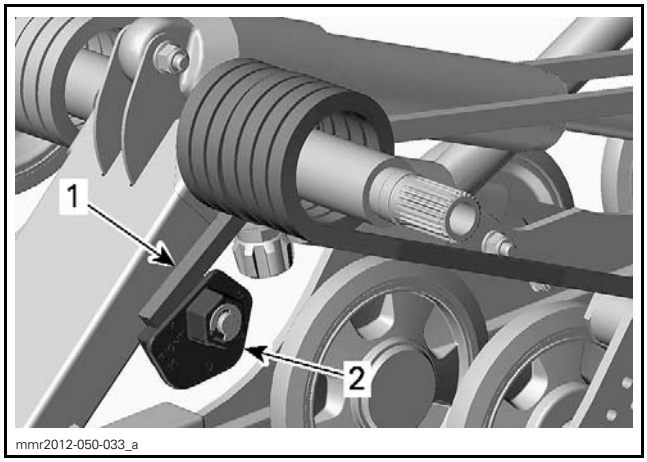
1. Retaining screw
2. Bolt

10. Remove upper idler wheels and hardware.
11. Remove rear spring from suspension.

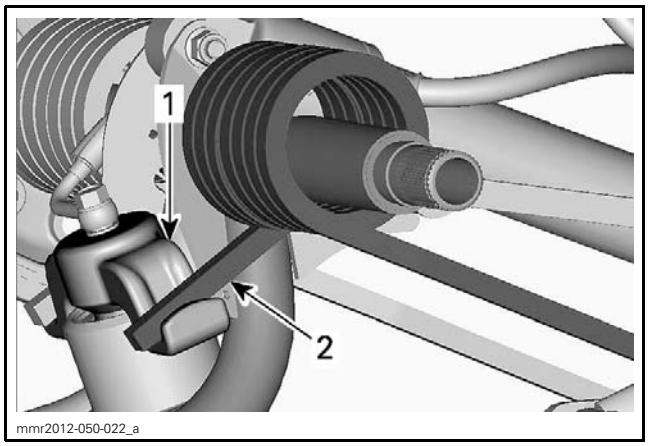
Installing Rear Springs

Installation is reverse of removal procedure. However, pay attention to the following.

Make sure that spring end is in cam adjuster or actuator spring support.



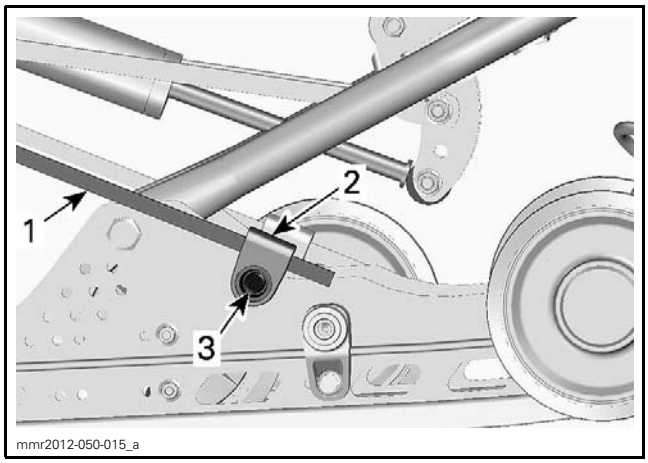
MODELS WITHOUT QUICK-ADJUST
1. Rear spring
2. Cams



mmr2012-050-022_a

QUICK-ADJUST MODELS
1. *Actuator spring support*
2. *Rear spring*

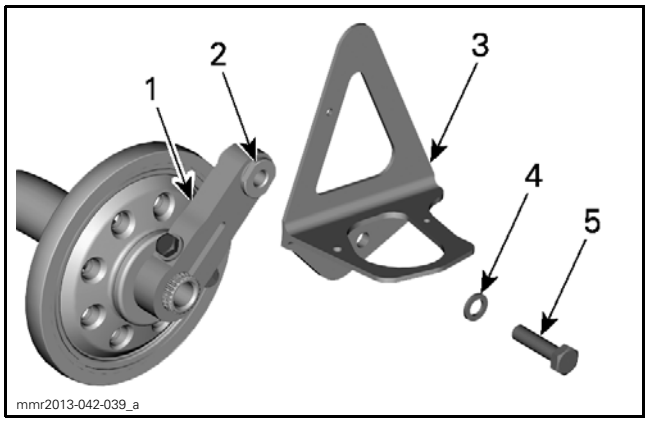
Install spring supports upwards.



mmr2012-050-015_a

1. *Spring*
2. *Spring support*
3. *Spring support bolt*

Install rear arm connecting rod inserts with the shoulder outwards.



mmr2013-042-039_a

1. *Connecting rod*
2. *Insert with the shoulder outwards*
3. *Support*
4. *Washer*
5. *Retaining screw*

rMotion with Quick Adjust System

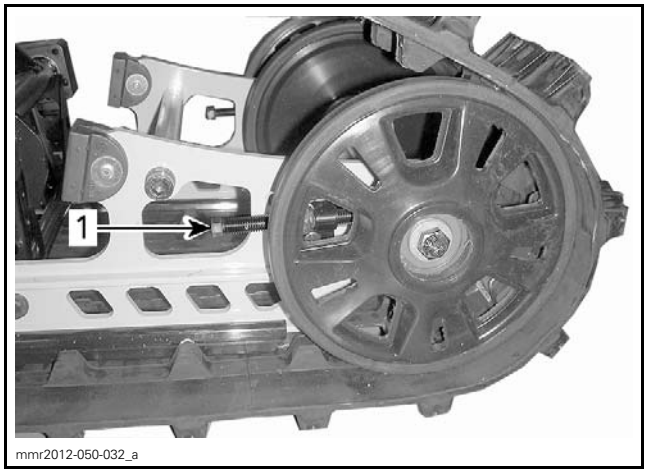
Install quick adjuster control modules, refer to:
– *SHOCK DAMPING QUICK ADJUSTER SYSTEM*
– *SPRING PRELOAD QUICK ADJUSTER SYSTEM*.

SLIDER SHOES


mmr2017-047-006

Removing Slider Shoes

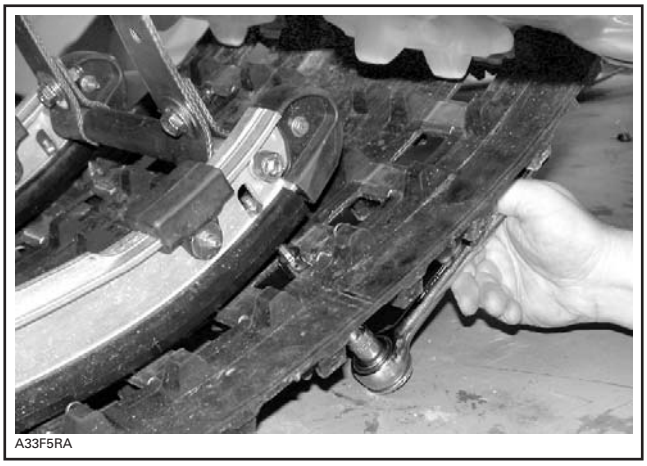
1. Lift rear of vehicle and support it off the ground.
2. Completely loosen track tension by unscrewing both adjustment screws.



mmr2012-050-032_a

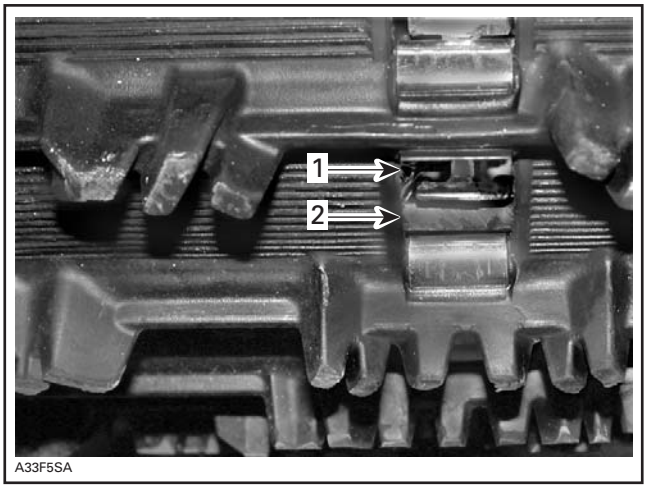
1. *RH adjustment screw*

3. Remove nut and screw of each runner.


A33F5RA

TYPICAL - REMOVE NUT AND SCREW OF EACH RUNNER

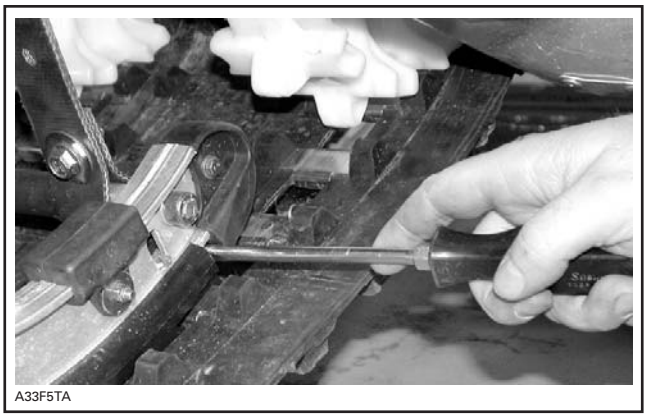
4. At the rear of vehicle, align a track window with slider shoe.



A33F5SA

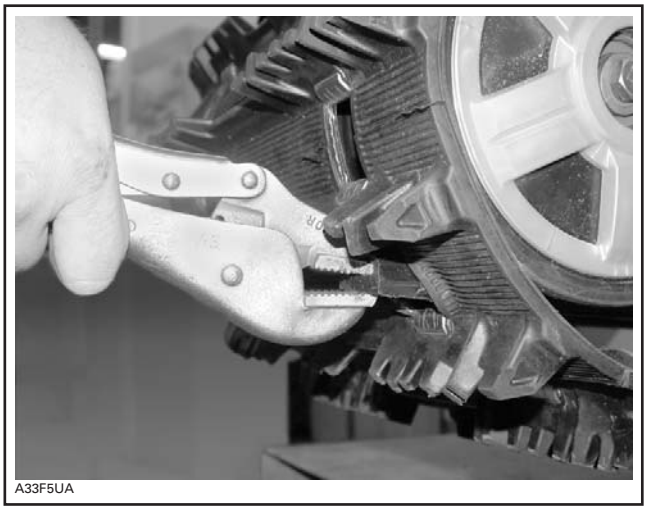
TYPICAL
1. Track window
2. Slider shoe

5. Lubricate widow edges.
6. Using a pry bar or a screwdriver, push slider shoe rearward until it comes in contact with track.


A33F5TA

TYPICAL - PUSH ON SLIDER SHOE

7. Using locking pliers, pull slider shoe through track window to remove.


A33F5UA

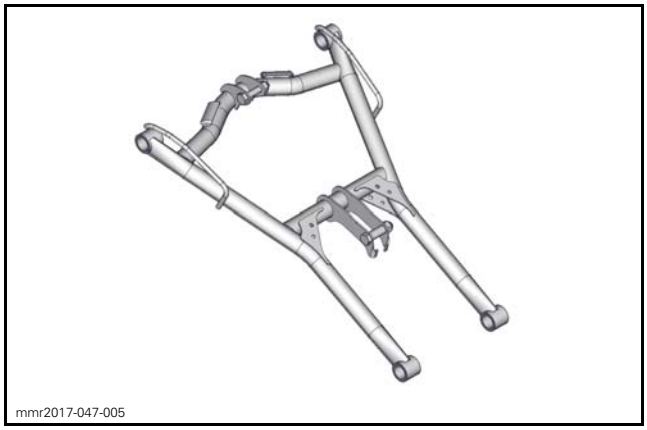
TYPICAL - PULL ON SLIDER SHOE TO REMOVE

Installing Slider Shoes

Installation is reverse of removal procedure. However, pay attention to the following.

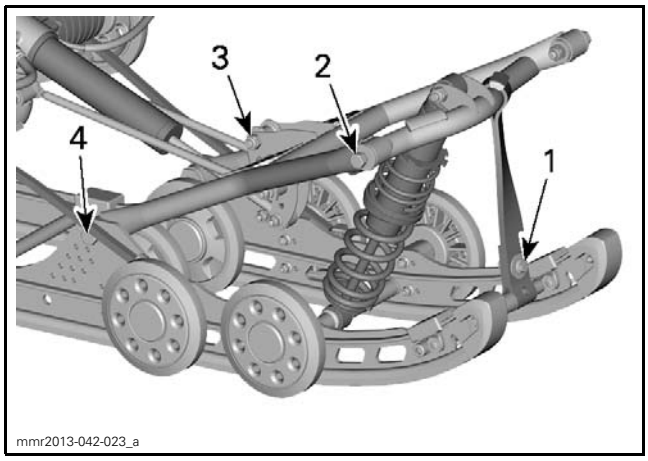
Make sure to insert slider shoe end with hole first.

FRONT ARM


mmr2017-047-005

Removing Front Arm

1. Proceed with *REMOVING THE SUSPENSION ASSEMBLY*. Refer to procedure in this subsection.
2. Unfasten stopper strap.
3. Remove the following fasteners:
   – Center shock to front arm
   – Front arm to rocker
   – Front arm to rail.



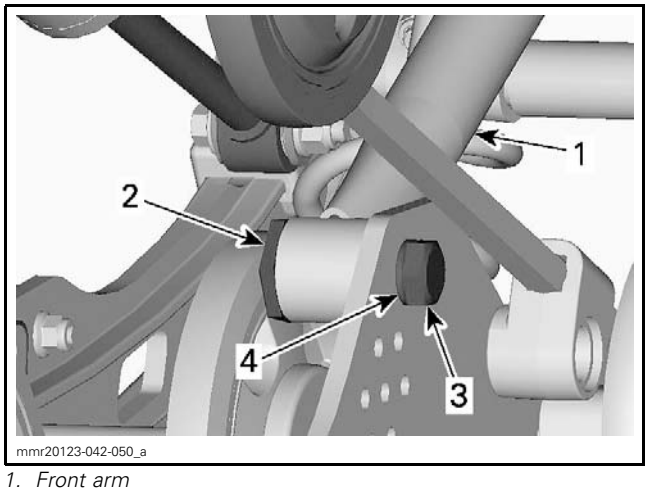
TYPICAL
1. *Stopper strap bolt*
2. *Center shock to front arm bolt*
3. *Front arm to rocker bolt*
4. *Front arm to rail screw*

4. Remove front arm from suspension assembly.

Installing Front Arm

Installation is reverse of removal procedure. However, pay attention to the following.

Install front arm to rail fasteners as shown.

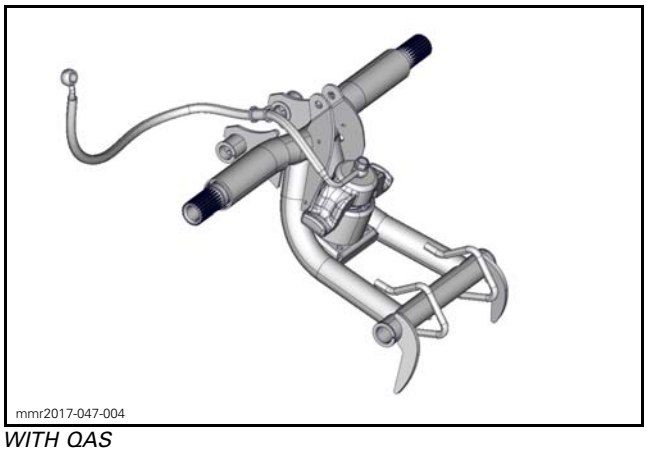


1. *Front arm*
2. *Insert (shoulder inward)*
3. *Front arm to rail screw*
4. *Washer*

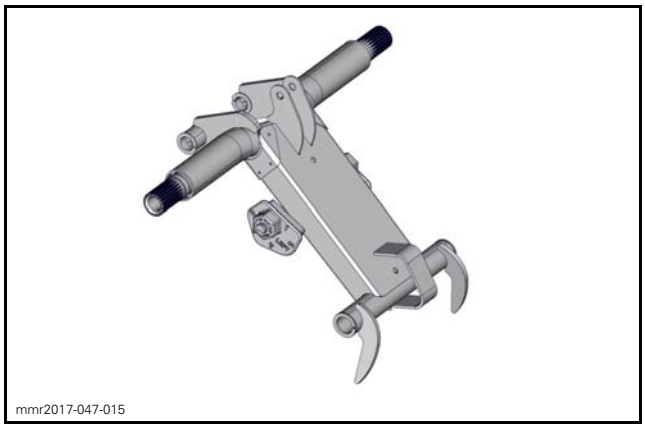
Install stopper strap on the LH side of the vehicle.

NOTICE Incorrect stopper strap installation would cause suspension parts interference.

REAR ARM



WITH QAS



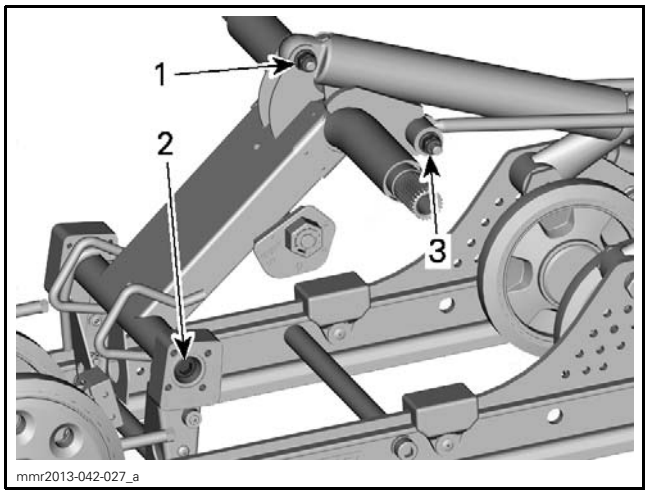
WITHOUT QAS

Removing Rear Arm

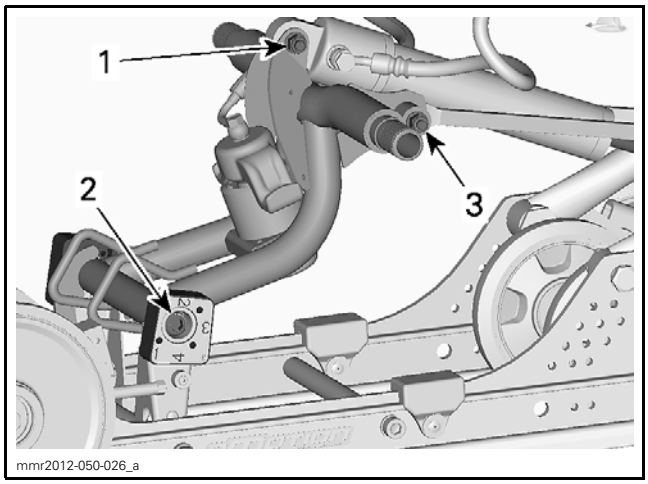
1. Remove rear springs, refer to *REMOVING REAR SPRINGS* in this subsection.

NOTE: On Quick Adjust models, set the spring preload actuator aside.

2. Remove the following fasteners:
   - Rear shock to rear arm
   - Rear arm to throttle rods
   - Coupling blocks retaining screws.



MODELS WITHOUT QUICK ADJUST SYSTEM
1. *Rear shock to rear arm bolt*
2. *Coupling blocks retaining screw*
3. *Rear arm to throttle rods bolt*



QUICK ADJUST SYSTEM
1. *Rear shock to rear arm bolt*
2. *Coupling blocks retaining screw*
3. *Rear arm to throttle rods bolt*

3. Remove rear arm from the vehicle.

Installing Rear Arm

Installation is the reverse of removal procedure. However, pay attention to the following.

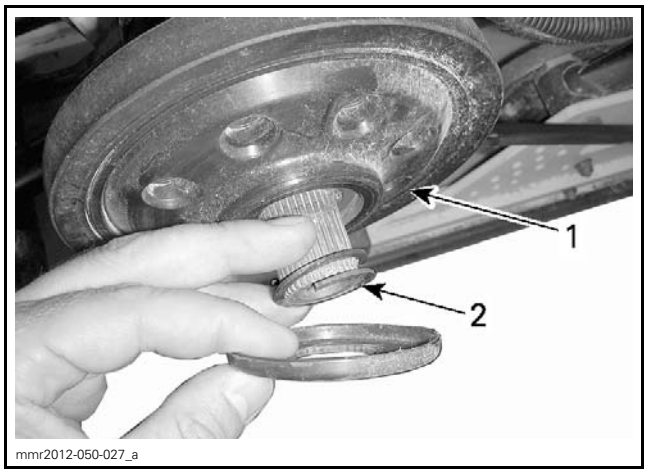
rMotion Without Quick Adjust System

Place rear arm grease fitting towards the front of the vehicle.

All Models

Install coupling block with new socket screws.

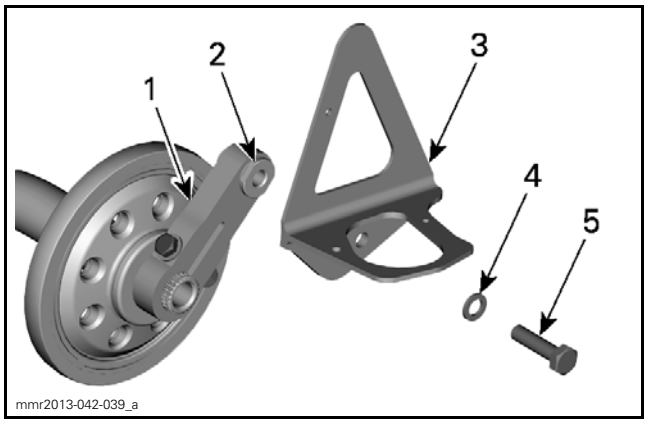
Install upper idler wheels as shown.



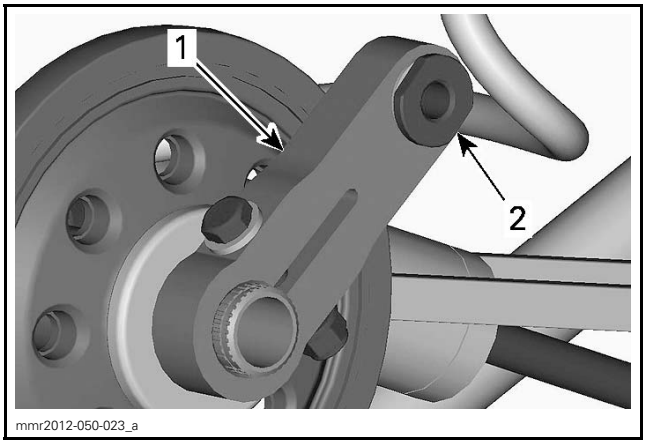
1. *Convex side out*
2. *Spring between wheel and plastic cover*

Install rear arm connecting rod inserts with the shoulder outwards.

Install circlip.



1. *Connecting rod*
2. *Shoulder outwards*
3. *Support*
4. *Washer*
5. *Retaining screw*

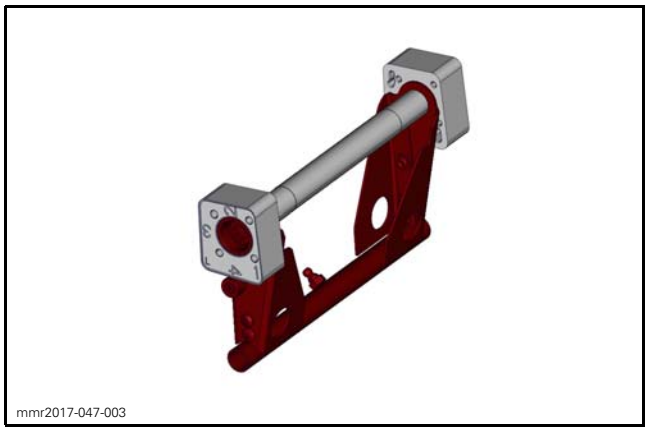


1. *Connecting rod*
2. *Shoulder outwards*

Install new connecting rod retaining screws.

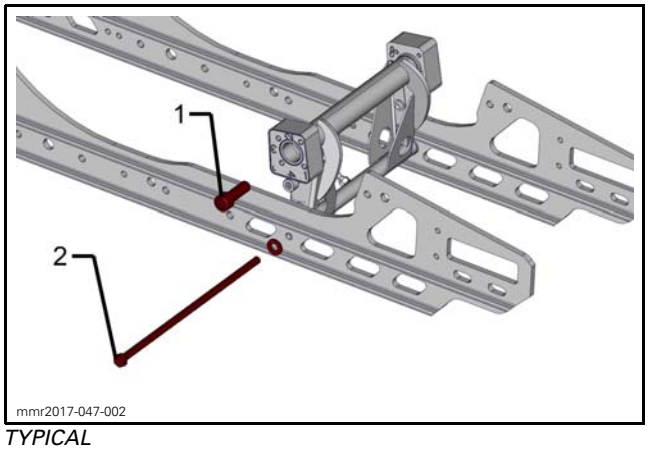
Lubricate rear arm pivot. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

PIVOT ARM



Removing Pivot Arm

1. Lift rear of vehicle and support it off the ground.
2. Completely loosen track tension by unscrewing both adjustment screws.
3. Set the rear springs preload to the minimum.
4. Remove rear spring supports.
5. Remove the following fasteners:
   – Coupling blocks retaining screws
   – Pivot arm to rails bolt.



TYPICAL
1. Coupling block screw
2. Pivot arm to rails bolt

6. Carefully remove pivot arm from rear arm.

Installing Pivot Arm

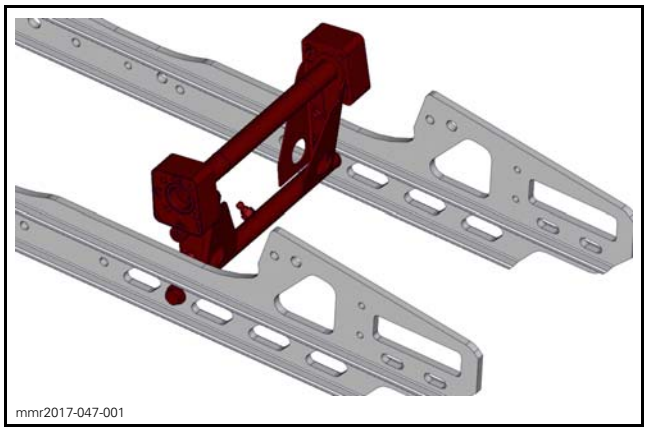
The installation is the reverse of the removal procedure. However, pay attention to the following.

Install new coupling block screws.

Install pivot arm with the grease fitting towards front of the vehicle.

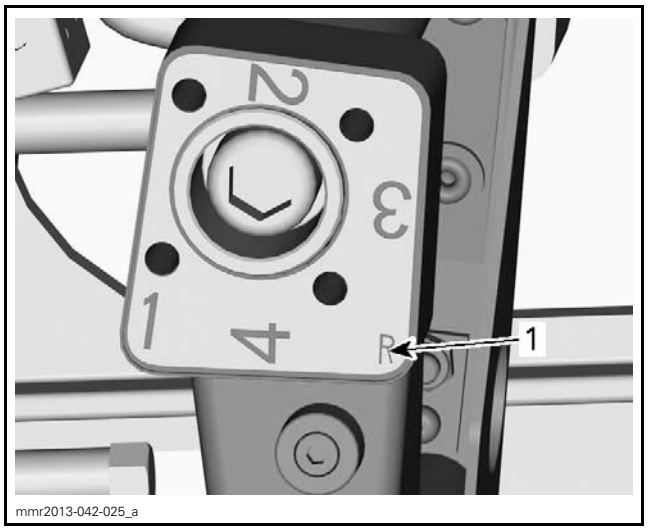
Lubricate pivot arm. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

COUPLING BLOCKS



Replacing Coupling Blocks

LH and RH coupling blocks are different. There is a molded "R" (RH side) or "L" (LH side) on the back face of the coupling blocks.



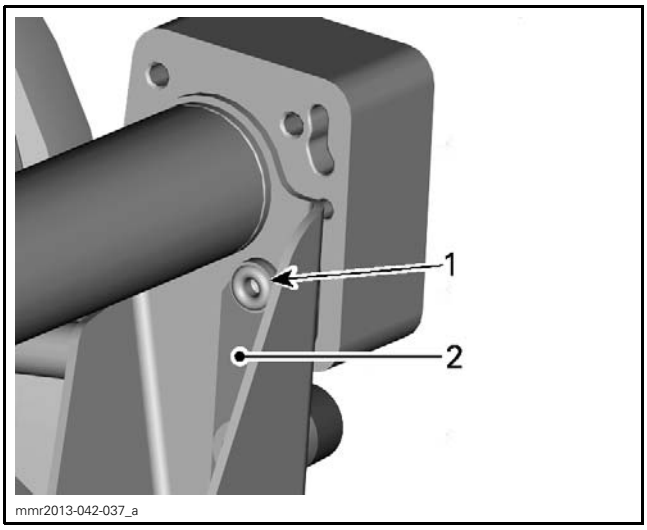
1. Side identification

Install new coupling block screws.

Set the coupling blocks to the same position on both sides.

MODELS	FACTORY BLOCK POSITION
All models	1

Fit riveted pin through coupling block.



TYPICAL
1. Riveted pin
2. Spring pin

IDLER WHEELS AND SUPPORTS

Replacing Idler Wheels

Refer to the exploded views at the beginning of this subsection for parts layout and fasteners tightening torque.

STOPPER STRAP

Refer to the exploded views at the beginning of this subsection for parts layout and fasteners tightening torque.

NOTICE **Incorrect stopper strap installation would cause suspension parts interference.**

REAR SUSPENSION (tMOTION)

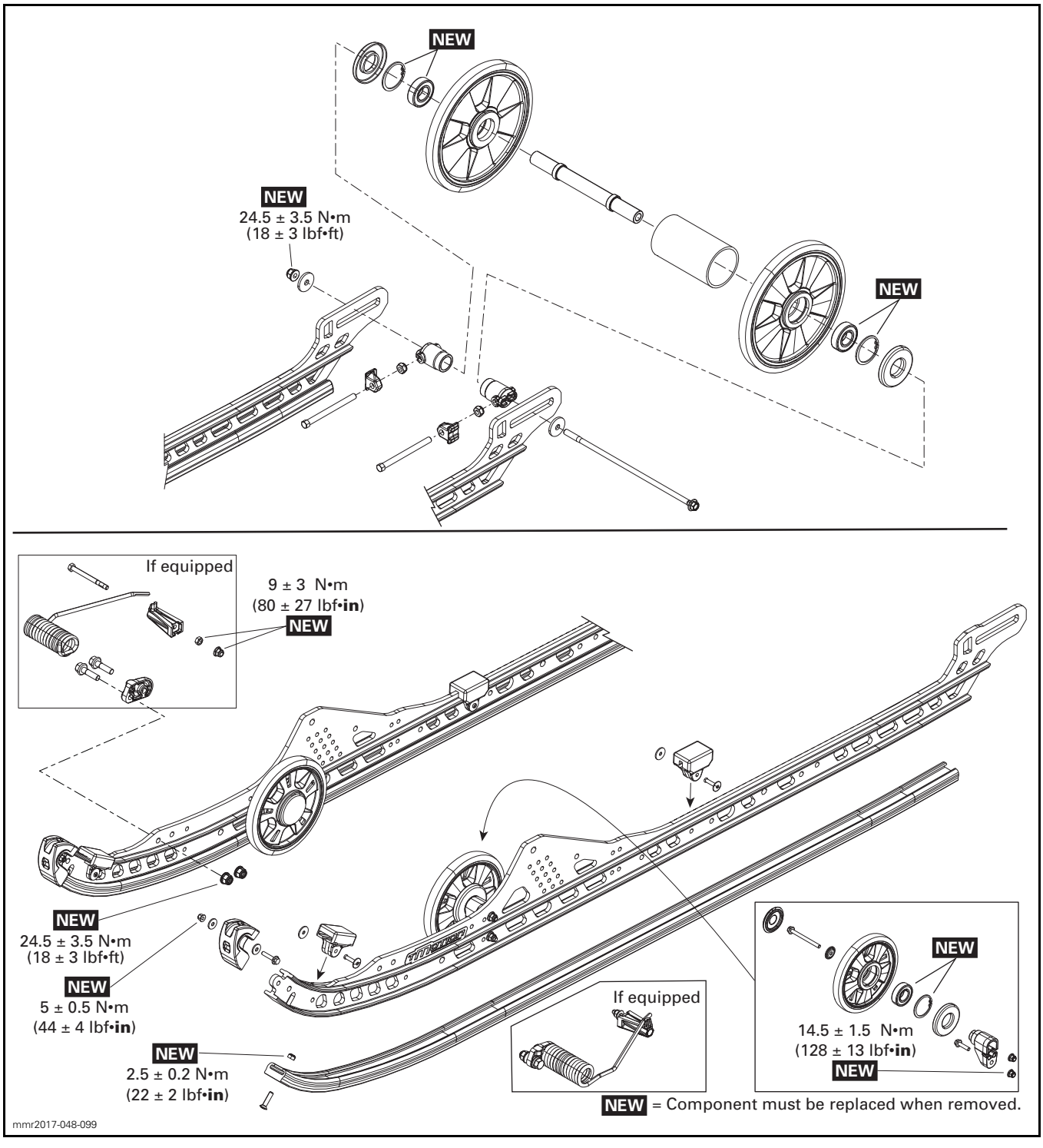
SERVICE TOOLS

Description	Part Number	Page
SHOCK ABSORBER SUPPORTS	529 036 186	12

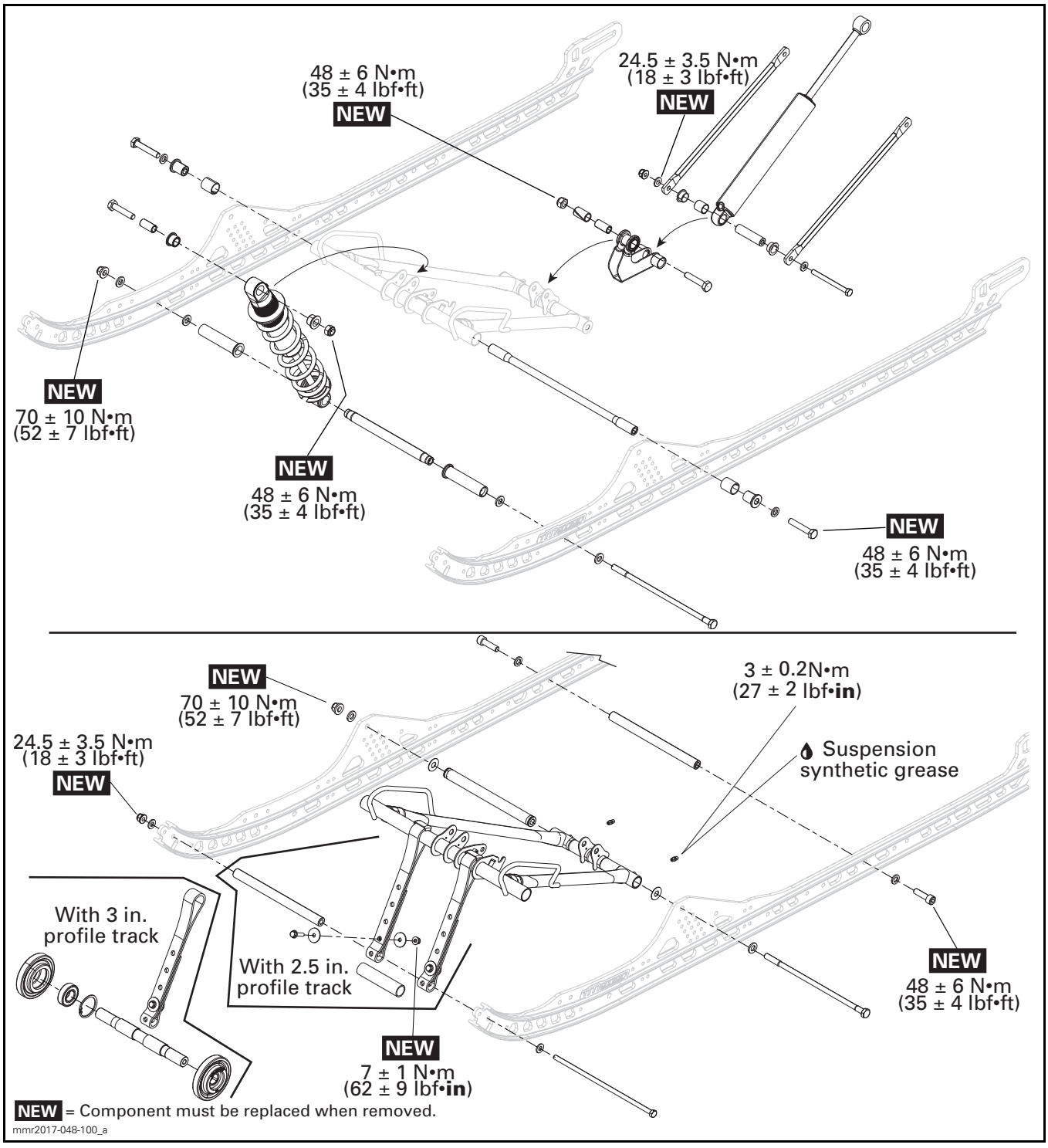
SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
BENCH SCALE SUCH AS SALTER BRECKNELL	PS 400	12

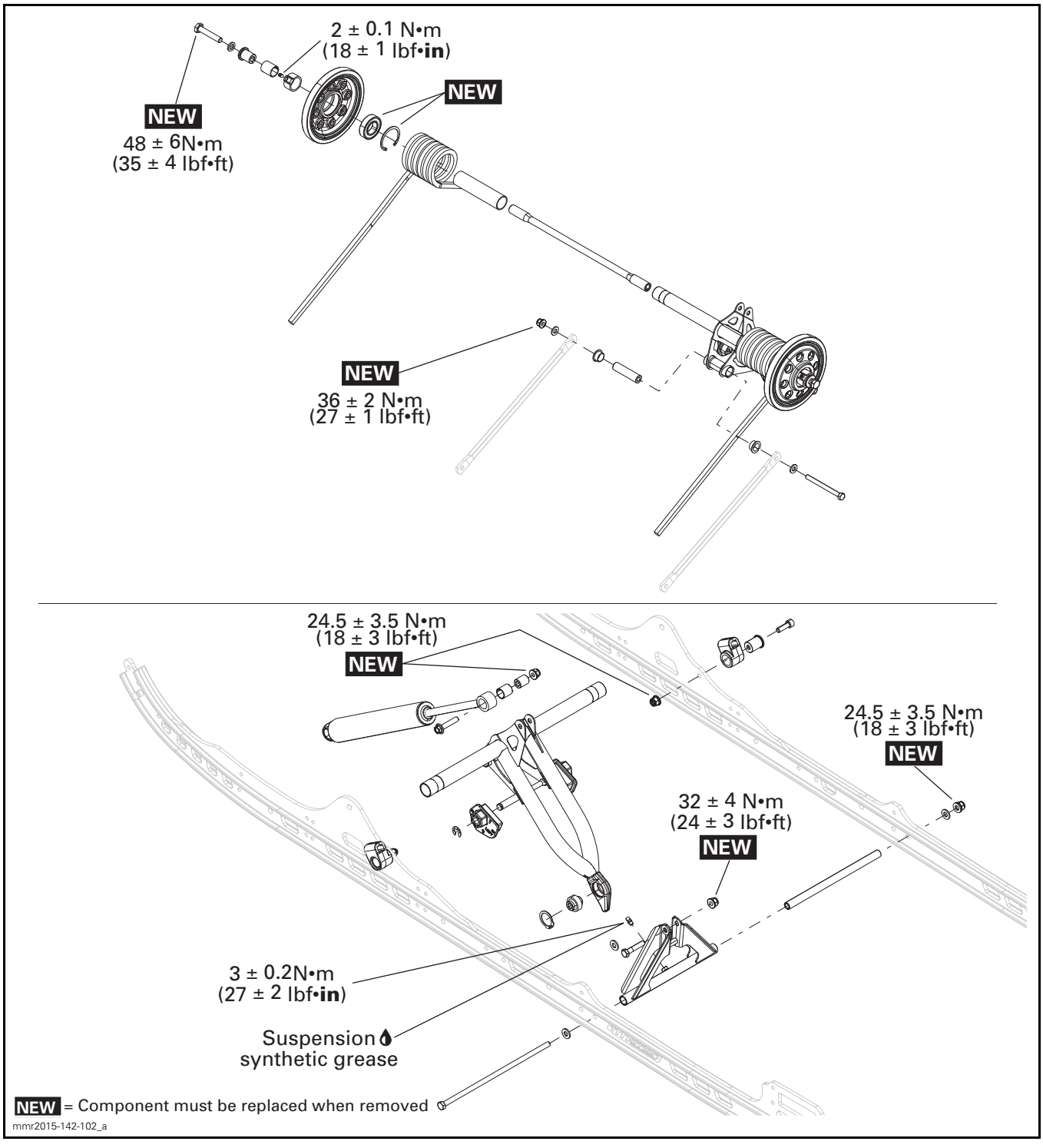
RAILS AND IDLER WHEELS



FRONT ARM


48 ± 6 N•m
(35 ± 4 lbf•ft)
NEW
24.5 ± 3.5 N•m
(18 ± 3 lbf•ft)
NEW
NEW
70 ± 10 N•m
(52 ± 7 lbf•ft)
NEW
48 ± 6 N•m
(35 ± 4 lbf•ft)
NEW
48 ± 6 N•m
(35 ± 4 lbf•ft)
NEW
70 ± 10 N•m
(52 ± 7 lbf•ft)
3 ± 0.2N•m
(27 ± 2 lbf•in)
24.5 ± 3.5 N•m
(18 ± 3 lbf•ft)
NEW
Suspension
synthetic grease
With 3 in.
profile track
With 2.5 in.
profile track
NEW
48 ± 6 N•m
(35 ± 4 lbf•ft)
NEW
7 ± 1 N•m
(62 ± 9 lbf•in)
NEW = Component must be replaced when removed.
mmr2017-048-100_a

REAR ARM


2 ± 0.1 N•m
(18 ± 1 lbf•**in**)
NEW
NEW
48 ± 6N•m
(35 ± 4 lbf•ft)
NEW
36 ± 2 N•m
(27 ± 1 lbf•ft)
24.5 ± 3.5 N•m
(18 ± 3 lbf•ft)
NEW
24.5 ± 3.5 N•m
(18 ± 3 lbf•ft)
NEW
32 ± 4 N•m
(24 ± 3 lbf•ft)
NEW
3 ± 0.2N•m
(27 ± 2 lbf•**in**)
Suspension
synthetic grease
NEW = Component must be replaced when removed
mmr2015-142-102_a

GENERAL

NOTE: Refer to *TECHNICAL SPECIFICATIONS* to identify the snowmobile suspension type.

During assembly/installation, use torque values and service products as in the exploded views.

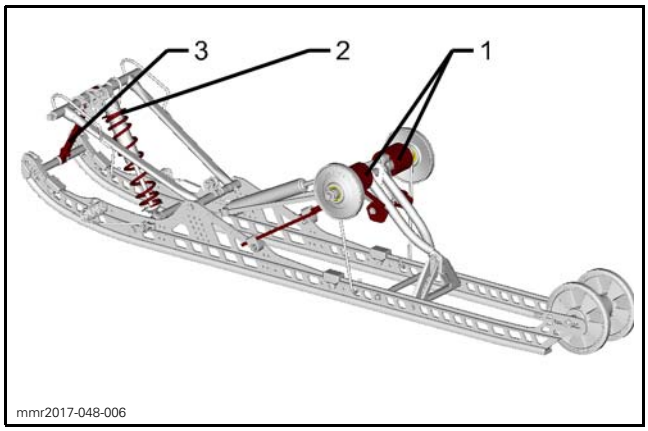
Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, cotter pins, etc.) must replaced.

ADJUSTMENT

REAR SUSPENSION ADJUSTMENTS



ADJUSTABLE COMPONENTS
1. *Rear springs*
2. *Center spring*
3. *Stopper strap*

NOTICE Whenever adjusting rear suspension, check track tension and adjust if necessary.

Stopper Strap

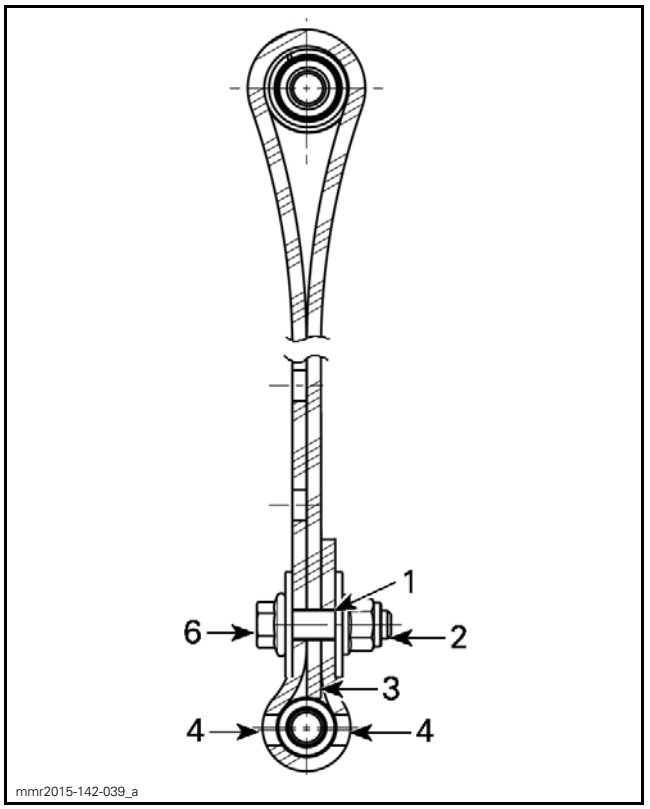
Stopper strap length has an effect on the amount of weight the center spring has to carry especially during acceleration, therefore on the front end uplift.

Stopper strap length also has an effect on center spring travel.

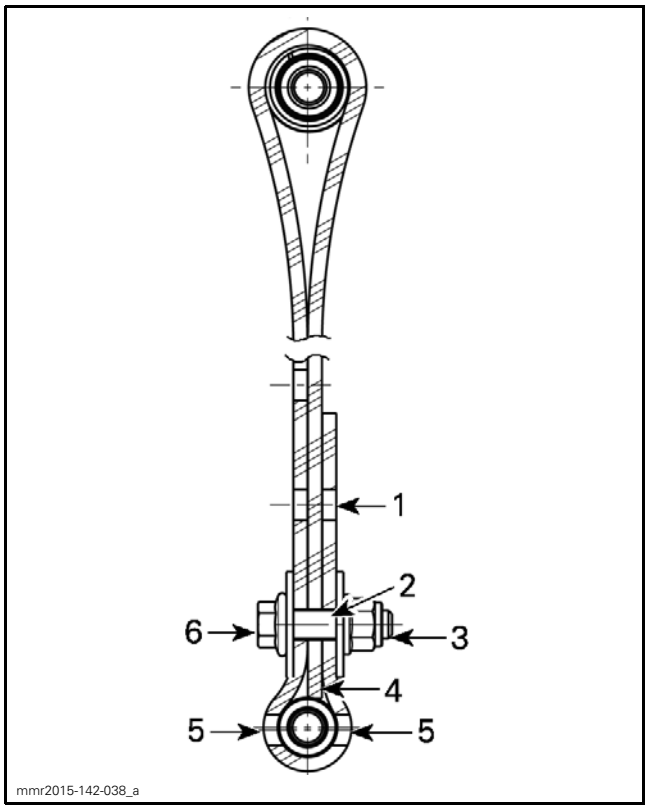
NOTICE Whenever stopper strap length is changed, track tension must be checked.

ACTION	RESULT
Increasing stopper strap length	Lighter ski pressure under acceleration
	More center spring travel
	More bump absorption capability
Decreasing stopper strap length	Heavier ski pressure under acceleration
	Less center spring travel
	Less bump absorption capability

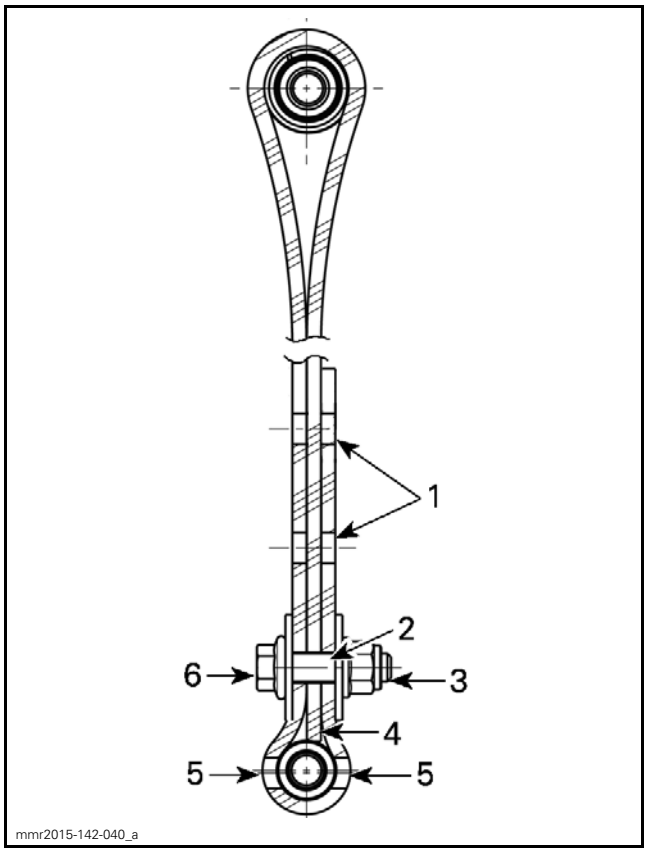
NOTE: Stopper strap could be set to position 1, 2, 3, 4 and 5. Below are illustrations for position 1, 2, 3. Smaller numbers correspond to a longer strap setting.



STOPPER STRAP POSITION 1 (1ST HOLE, LONGEST)
1. *1st hole from end*
2. *Towards rear*
3. *Tip of strap touching strap axis*
4. *Two holes left open between screw head and nut*
5. *Towards front*



STOPPER STRAP POSITION 2 (2ND HOLE)
1. *Free hole*
2. *2nd hole from end*
3. *Towards rear*
4. *Tip of strap touching strap axis*
5. *Two holes left open between screw head and nut*
6. *Towards front*



STOPPER STRAP POSITION 3 (3RD HOLE)
1. *Free holes*
2. *3rd hole from end*
3. *Towards rear*
4. *Tip of strap touching strap axis*
5. *Two holes left open between screw head and nut*
6. *Towards front*

NOTE: Always install stopper strap bolt as close as possible to the lower shaft.

When operating the snowmobile in deep snow or hill climbing, it may be necessary to vary stopper strap length and/or riding position, to change the angle at which the track rides on the snow. Operator's familiarity with the various adjustments as well as snow conditions will dictate the most efficient combination.

Generally, a longer stopper strap setting gives better performance on a flat landscape and a shorter setting will improve handling in steep hill climbing and deep snow conditions.

STOPPER STRAP SETTING	
POSITION	USE
1	Not used
2	Boon docking: – Better boon docking manoeuvrability – Better bump absorption – Better deep snow starts (forward and reverse)

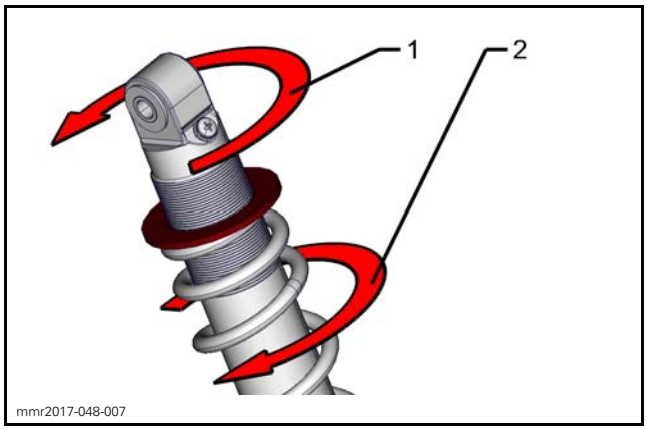
STOPPER STRAP SETTING	
POSITION	USE
3	Factory setting: Best overall setting (General use)
4	Hill climb: – Better track attack angle for hill climbing
5	Steep hill climb: – Better track attack angle for hill climbing – Less transfer – Lower ride height

Center Spring

Center spring preload has an effect on steering effort, handling and bump absorption.

Also, since center spring preload adjustment puts more or less pressure on the front of the track, it has an effect on the performance in deep snow.

ACTION	RESULT
Increasing preload	Lighter steering
	More bump absorption capability
	Better deep snow starts
	Better deep snow performance and handling
Decreasing preload	Heavier steering
	Less bump absorption capability
	Better trail handling



1. Decrease preload
2. Increase preload

Rear Springs

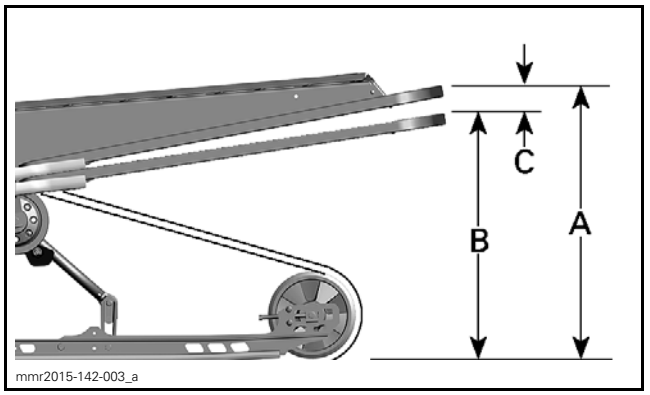
Rear spring preload has an effect on comfort, ride height and load compensation.

Also, adjusting rear spring preload shifts more or less weight to the snowmobile front end. As a result, more or less weight is applied to the skis. This has an effect on performance in deep snow, steering effort and handling.

Slight suspension bottoming occurring under the worst riding conditions indicates a good choice of spring preload.

ACTION	RESULT
Increasing preload	Firmer rear suspension
	Higher rear end
	More bump absorption capability
	Heavier steering
Decreasing preload	Softer rear suspension
	Lower rear end
	Less bump absorption capability
	Lighter steering
	Better deep snow performance and handling

Refer to the following to determine if preload is correct.



PROPER ADJUSTMENT
A. Suspension fully extended
B. Suspension has collapsed with operator, passenger and load added
C. Distance between dimension "A" and "B", see table below

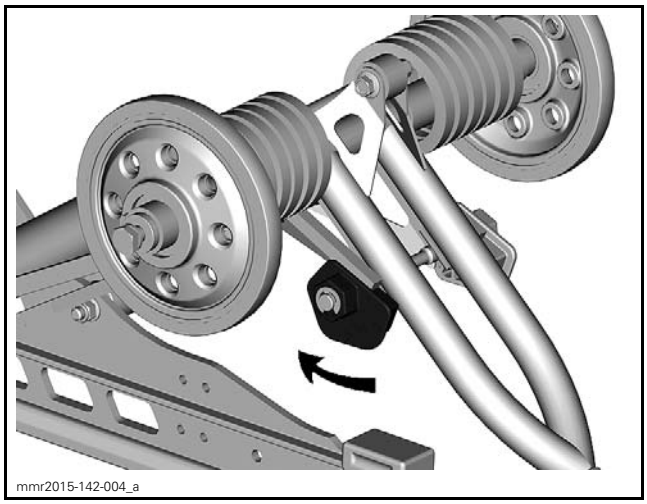
"C"	WHAT TO DO
65 mm to 100 mm (2.5 in to 4 in)	No adjustment required
More than 100 mm (4 in)	Adjusted too soft. Increase preload
Less than 65 mm (2.5 in)	Adjusted too firm. Decrease preload

If the specification is unattainable with the original springs, refer to the applicable *SPRING CHART* bulletin for other available springs.

NOTICE To increase spring preload, always turn the left side adjustment cam in a clockwise direction, and the right side cam in a counter-clockwise direction.

⚠ CAUTION Never set preload cams directly from position 5 to 1 or directly from position 1 to 5.

The adjustment cams have 5 different settings, 1 being the softest.


mmr2015-142-004_a

MAINTENANCE

For rear suspension lubrication, mechanism and stopper strap inspection, refer to *PERIODIC MAINTENANCE PROCEDURES*.

For shock absorbers inspection, refer to *SHOCK ABSORBERS* in this subsection.

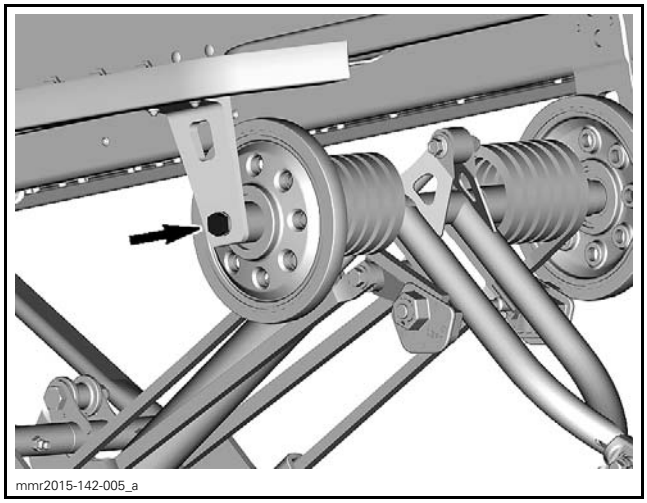
PROCEDURES

NOTE: Many parts can be changed with rear suspension in place. When specified, refer to *SUSPENSION ASSEMBLY* to remove rear suspension from vehicle.

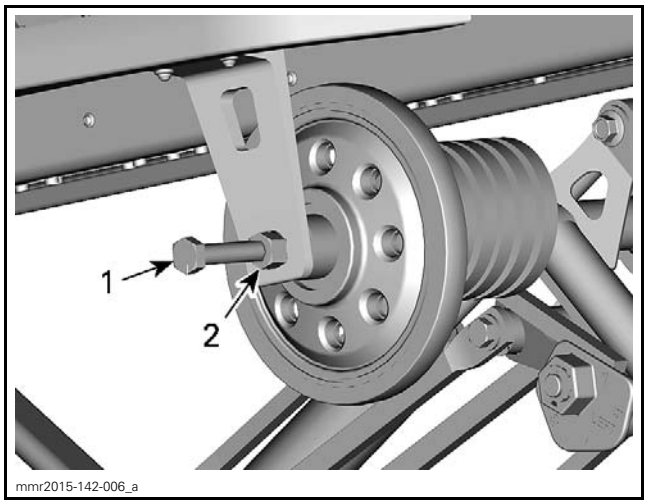
SUSPENSION ASSEMBLY

Removing Suspension Assembly

1. Lift rear of vehicle and support it off the ground.
2. Completely loosen track tension.
3. Remove and discard rear arm bolts from chassis. Use the following procedure to remove bolts easily.
   - 3.1 Remove one of the bolts securing the rear arm to frame.


mmr2015-142-005_a

   - 3.2 Replace this bolt with a longer one and a nut.
   - 3.3 Screw in by approximately 7 turns.
   - 3.4 Hold the bolt and tighten locking nut.

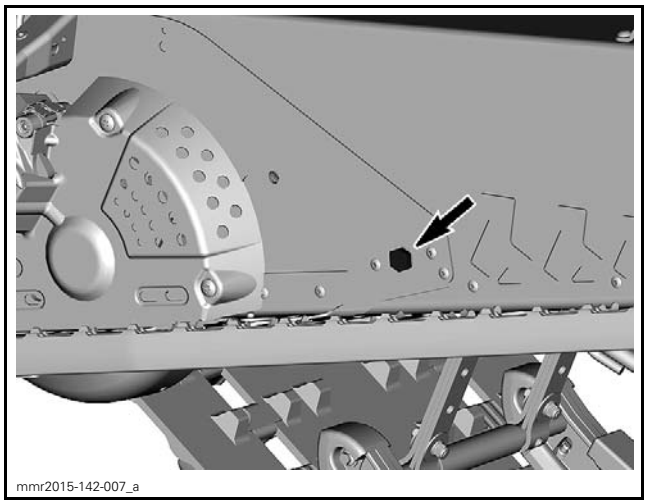


mmr2015-142-006_a

1. Long bolt
2. Locking nut

   - 3.5 Remove the bolt on the other side then unlock nut and remove the long bolt.
4. Remove bolts retaining front arm to tunnel the same way rear arm bolts have been removed.

NOTE: Discard the front arm bolts.


mmr2015-142-007_a

5. Lift rear of vehicle until front arm as enough clearance to pass underneath tunnel.
6. Remove suspension.

Installing Suspension Assembly

Installation is the reverse of removal procedure. Pay attention to the following.

Inspect track thoroughly before reinstalling suspension. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Install suspension into track with front portion first.

Install new front and rear arm bolts.

Tighten bolts to specified torque.

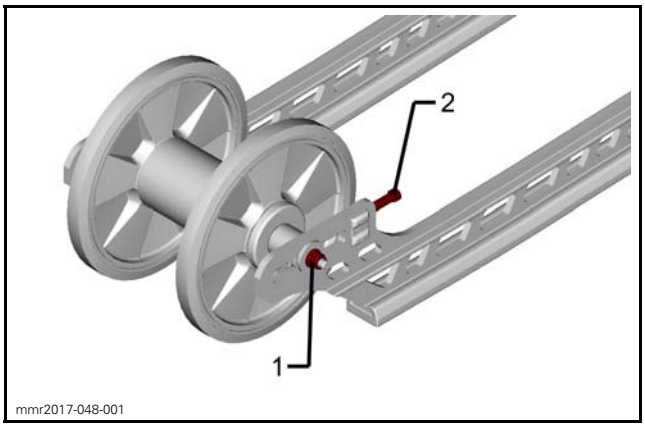
TIGHTENING TORQUE	
Front and rear arm upper bolts	48 N•m ± 6 N•m (35 lbf•ft ± 4 lbf•ft)

Adjust track tension, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

REAR AXLE

Removing Rear Axle

1. Lift rear of vehicle and support it off the ground.
2. Loosen rear axle nut.
3. Completely loosen track tension by unscrewing both adjustment screws.



mmr2017-048-001

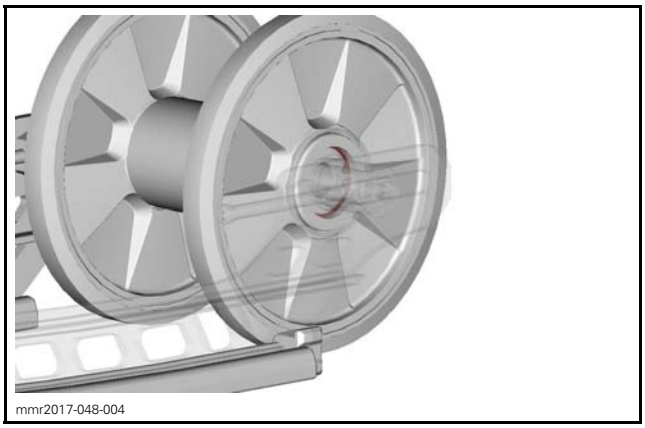
Step 1: Loosen axle nut
Step 2: Unscrew adjustment screws

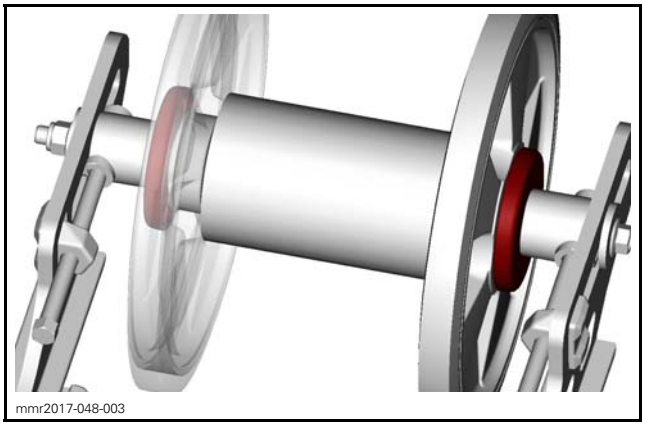
4. Remove rear axle nut, screw, washers and sliders.
5. Pull out the rear axle.

Installing Rear Axle

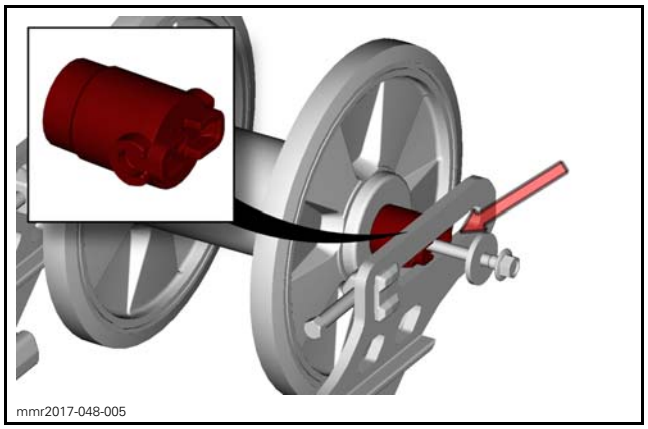
The installation is the reverse of the removal procedure. However, pay attention to the following.

Bearing circlip faces outward.


mmr2017-048-004


mmr2017-048-003

When tightening rear axle, make sure each wheel spacer protuberance is engaged into runner slot.

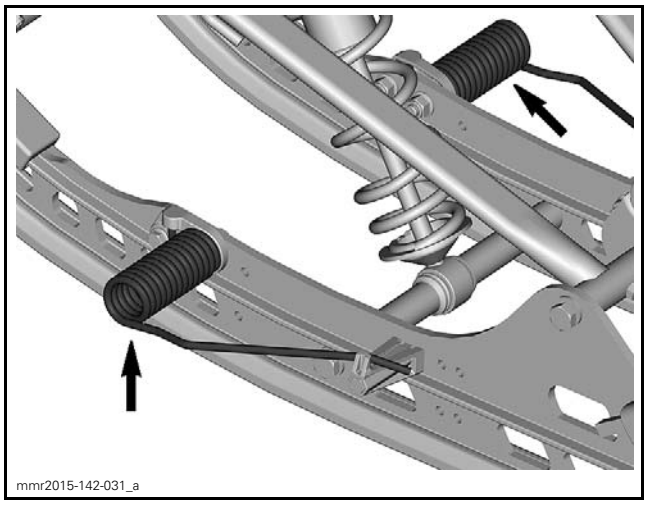


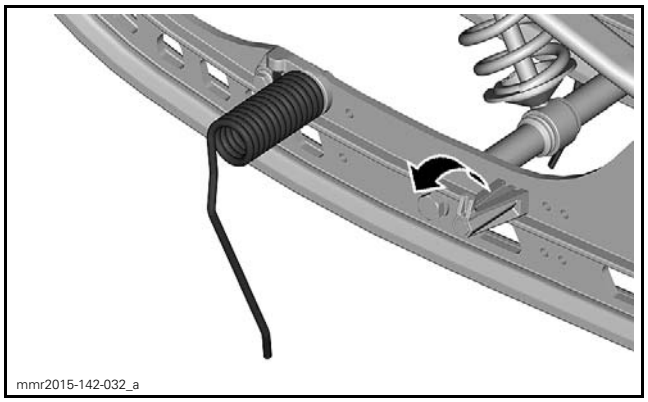
Adjust track tension. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

ICE SCRATCHERS

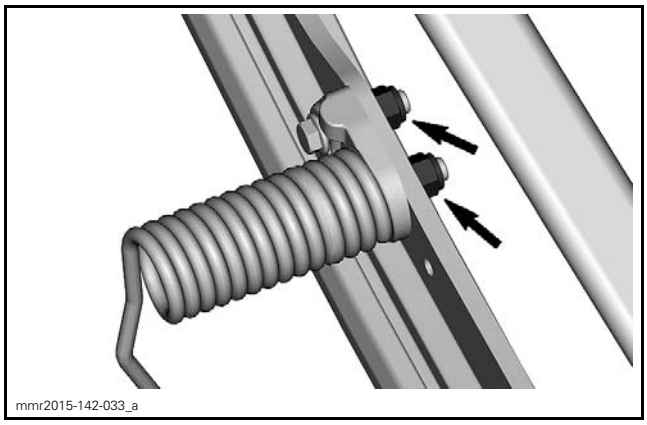
Removing Ice Scratchers

⚠ CAUTION Always remove ice scratchers from hooks before working on rear suspension.





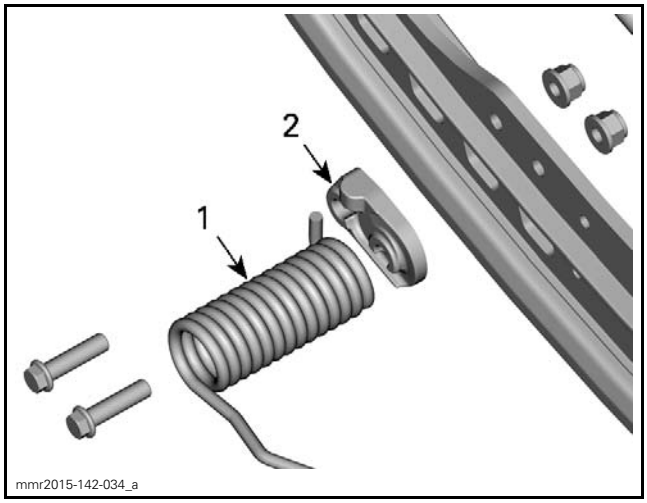
Remove spring holder nuts.



Installing Ice Scratchers

The installation is the reverse of the removal procedure. However, pay attention to the following.

Make sure spring end is well inserted in holder.



1. Ice scratcher spring
2. Spring holder

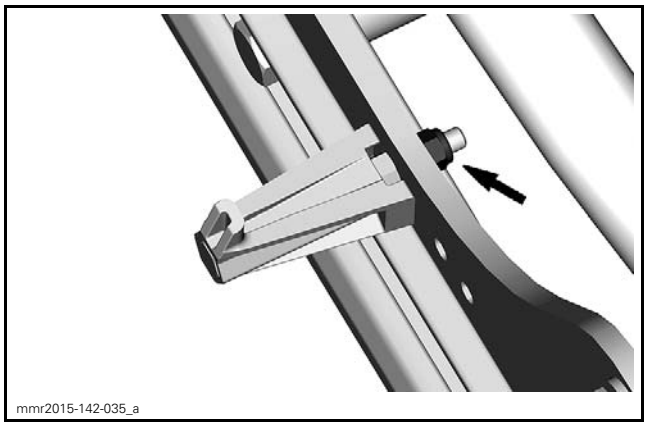
Tighten retaining nuts to specification.

TIGHTENING TORQUE	
Spring retaining nuts	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

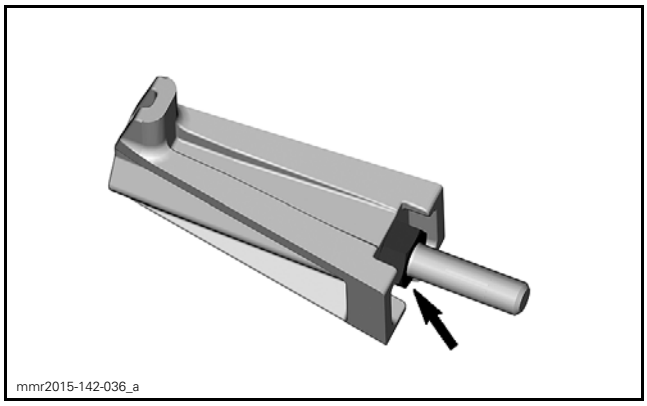
Removing Ice Scratcher Hooks

⚠ CAUTION Always remove ice scratchers from hooks before working on rear suspension.

1. Remove hook retaining nut.


mmr2015-142-035_a

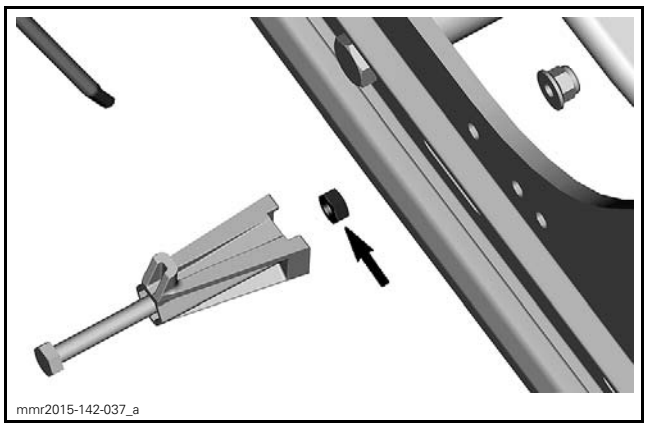
2. Remove hook counter nut.


mmr2015-142-036_a

Installing Ice Scratcher Hooks

The installation is the reverse of the removal procedure. However, pay attention to the following.

Hand tighten counter nut first.


mmr2015-142-037_a

Tighten hook retaining nut to specification.

TIGHTENING TORQUE	
Hook retaining nut	9 N•m ± 3 N•m (80 lbf•**in** ± 27 lbf•**in**)

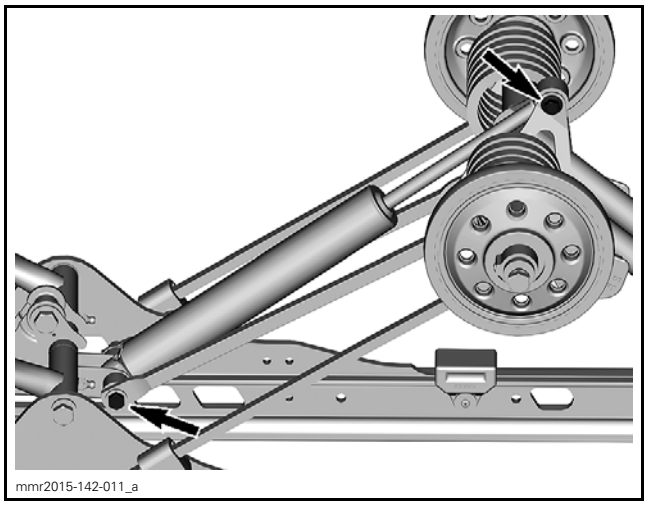
SHOCK ABSORBERS

Removing Rear Shock Absorber

1. Lift rear of vehicle and support it off the ground.

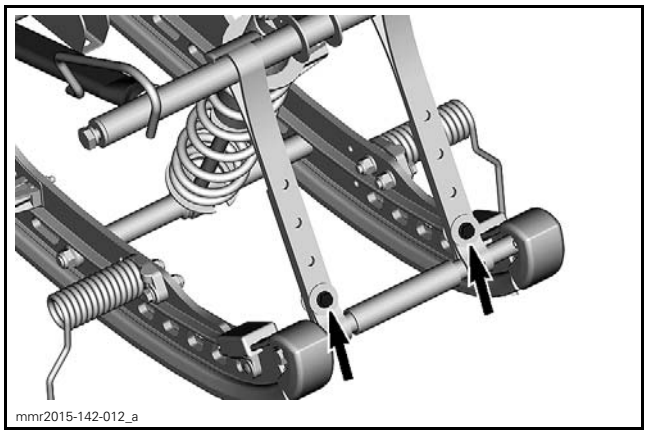
NOTE: If necessary, to ease shock removal, unfasten stopper strap to release shock pressure.

2. Remove bolts and nuts from shock.

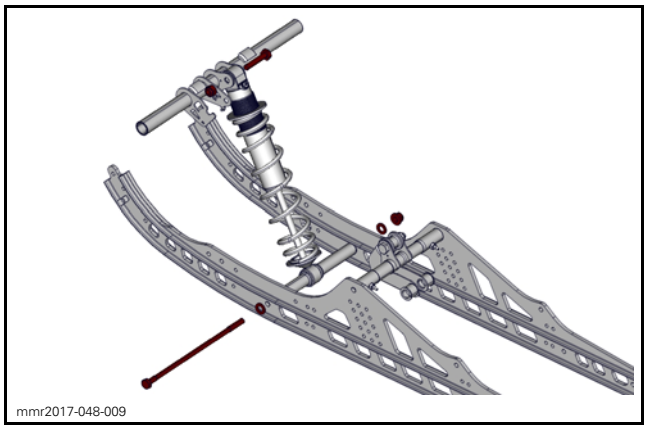

mmr2015-142-011_a

Removing Center Shock Absorber

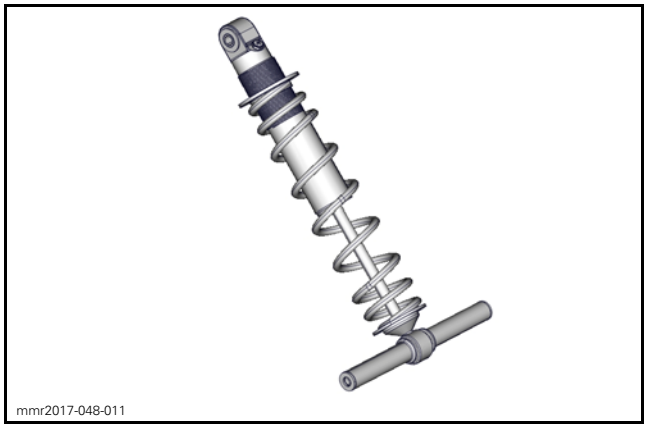
1. Lift the rear of vehicle and support it off the ground.
2. Unfasten stopper strap(s).


mmr2015-142-012_a

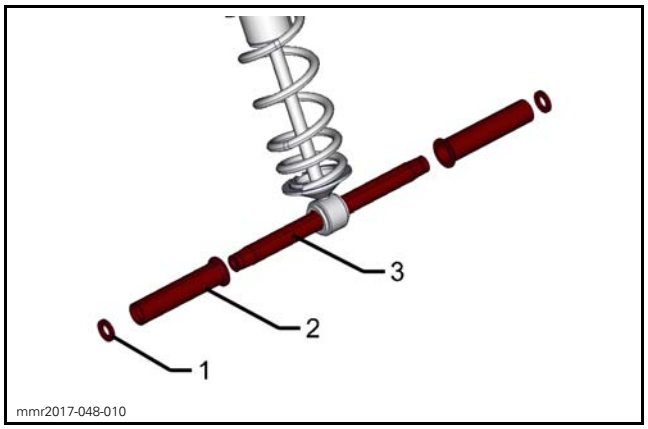
3. Remove lower and upper shock absorber nuts and bolts.


mmr2017-048-009

4. Remove shock absorber from vehicle.


mmr2017-048-011

5. Remove bushings and shock shaft from shock absorber.



mmr2017-048-010

Inspecting Shock Absorbers

NOTE: Unless otherwise noted, shock absorber must be at normal room temperature (21°C ± 2°C (70°F ± 36°F)) during inspection.

1. Perform a visual inspection of the shock:
   – The shock must be exempt of any dent or scratch, especially on the rod.
   – Any defect on the rod, as small as it is, can lead to seal failure and oil leak.
   – If such defect is detected, the shock must be replaced and this will not be covered under warranty.
2. Completely push down shock rod into the body and check result as per table.

HPG SHOCK	RESULT
All except 551 mm (21-11/16 in) rear shock	The rod should completely get in the shock body
551 mm (21-11/16 in) rear shock	The stroke must be at least 138 mm (5-7/16 in)

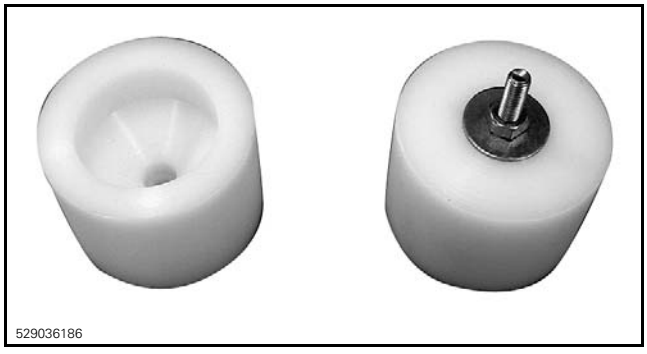
3. Release shock from completely collapsed position and check result as per table.

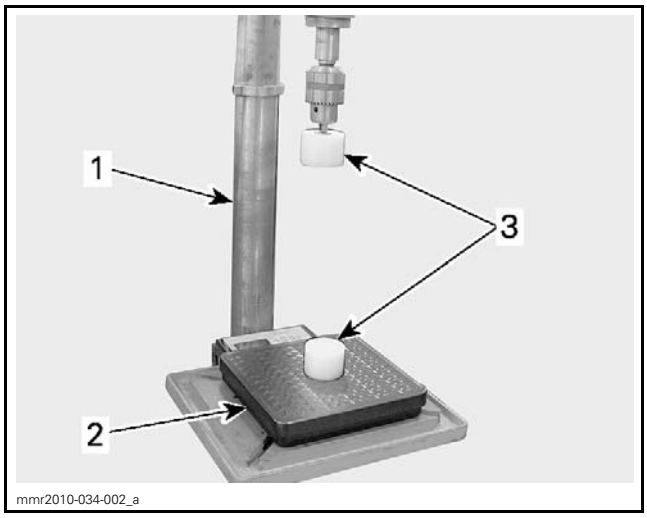
HPG SHOCK
– The shock should extend unassisted. – The rod must come out at a steady speed.

4. Proceed with *COMPRESSION TESTING SHOCK ABSORBERS*. See procedure in this subsection.
5. If any faults are present, replace shock.

Compression Testing Shock Absorbers

1. Ensure shock absorber is at normal room temperature (21°C ± 2°C (70°F ± 36°F)).
2. Remove spring from shock absorber (if applicable).
3. Place a BENCH SCALE SUCH AS SALTER BRECKNELL (P/N PS 400) (or an equivalent) on a suitable drill press.
4. Install SHOCK ABSORBER SUPPORTS (P/N 529 036 186) onto drill press.

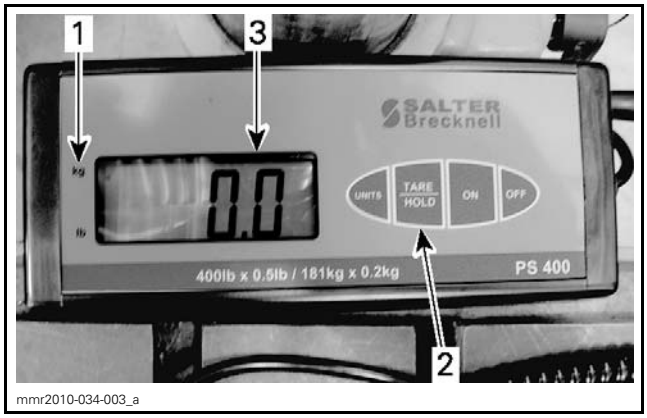

529036186



mmr2010-034-002_a

1. *Drill press*
2. *Bench scale*
3. *Shock absorber supports*

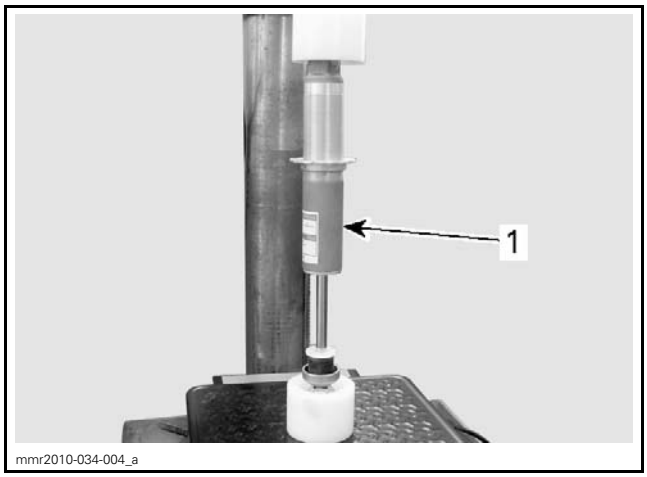
5. Set bench scale units to **kg** (or lb).
6. Press **TARE** to reset digits (must indicate (0) zero).



mmr2010-034-003_a

1. *Units indicator lamp*
2. *TARE button*
3. *Digits*

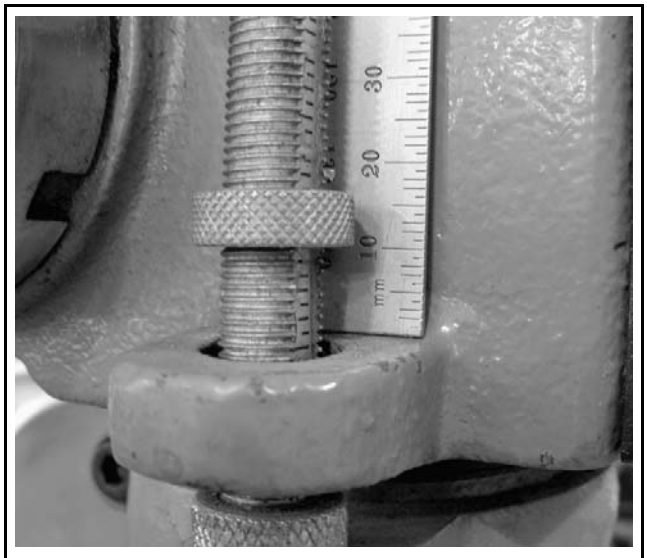
7. Install shock absorber into support with shock body upwards.
8. Adjust drill press table height in order to set the upper shock support flush with the shock body end.
9. Ensure shock absorber is aligned with drill press axis.



mmr2010-034-004_a

1. *Shock body upwards*

10. Set the drill press displacement to 10 mm (.394 in) using locking nut.



mmr2010-034-005

11. Compress shock absorber by 10 mm (.394 in) and hold it in position.
12. Read load recorded on the bench scale.

mmr2010-034-006

13. Load reading must be as per the following table.

ROD DIAMETER	SERVICE RANGE
12.5 mm (1/2 in)	24 kgf ± 4 kgf (53 lbf ± 9 lbf)

Installing Rear Shock Absorber

Installation is the reverse of removal procedure. Pay attention to the following.

To ease shock installation, secure upper side of shock first.

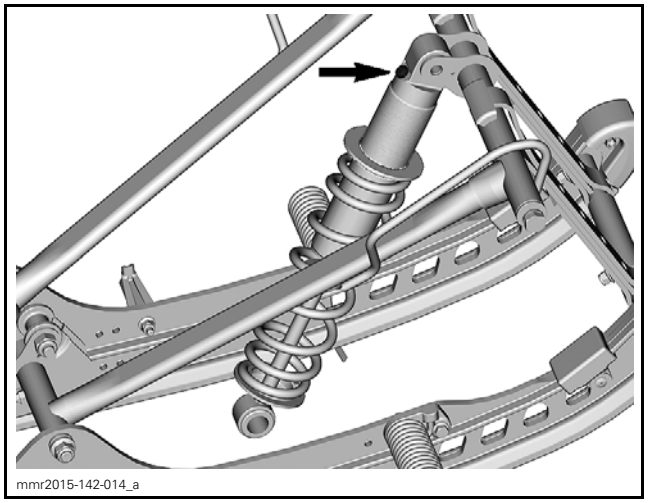
Install new shock absorber retaining nuts and tighten to specification.

TIGHTENING TORQUE	
Rear shock absorber fasteners	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

Installing Center Shock Absorber

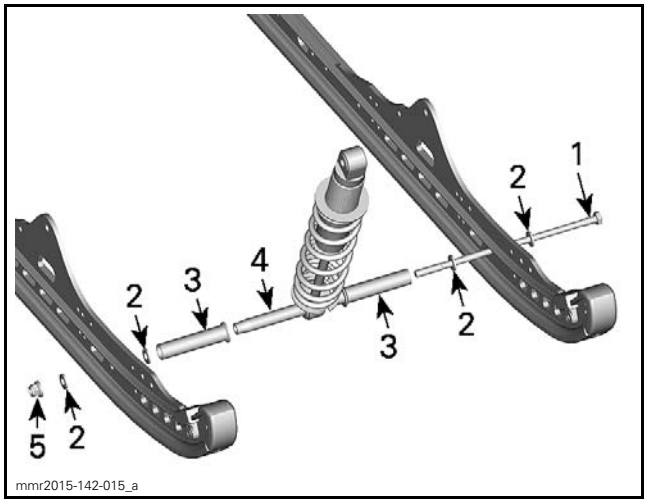
The installation is the reverse of the removal procedure. However, pay attention to the following.

1. Position the adjustment ring upwards and the valve towards the tunnel.



mmr2015-142-014_a

2. Using new nut, install shock shaft to runners.
3. Position washers in proper position.



mmr2015-142-015_a

BOTTOM OF SHOCK ABSORBER
1. *Lower screw*
2. *Washers location*
3. *Spacers*
4. *Shock shaft*
5. *Nut*

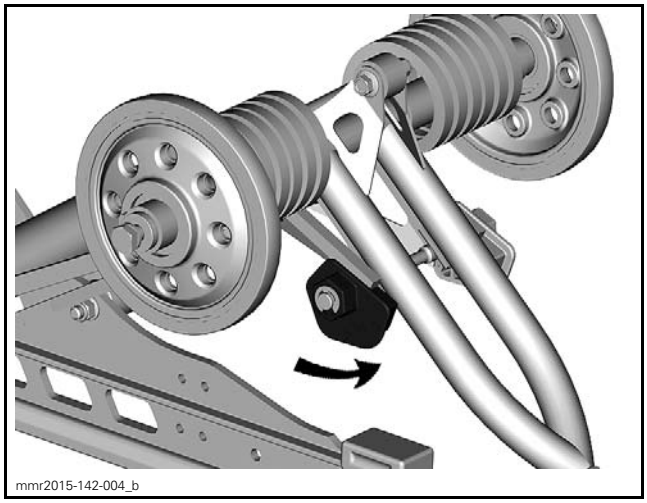
Tighten nut to the specification.

TIGHTENING TORQUE	
Center shock absorber lower nut	70 N•m ± 10 N•m (52 lbf•ft ± 7 lbf•ft)

REAR SPRINGS

Removing Rear Springs

1. Lift rear of vehicle and support it off the ground.
2. Completely loosen track tension by unscrewing both adjustment screws.
3. Decrease springs preload by turning cams accordingly.



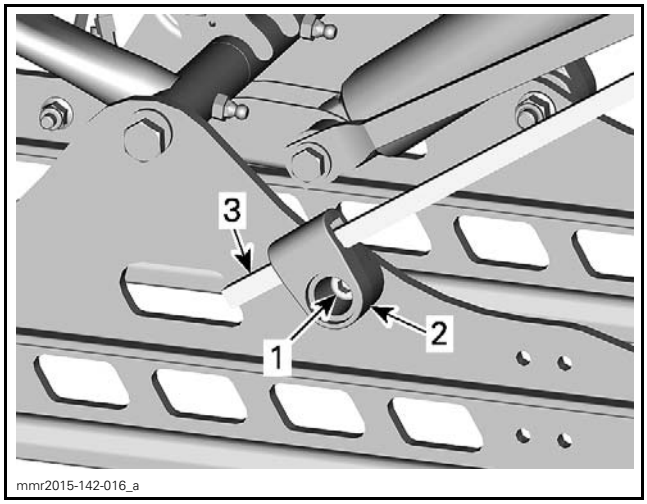
mmr2015-142-004_b

LH SIDE SHOWN

4. Firmly hold the spring support and unscrew its retaining bolt (one each side).

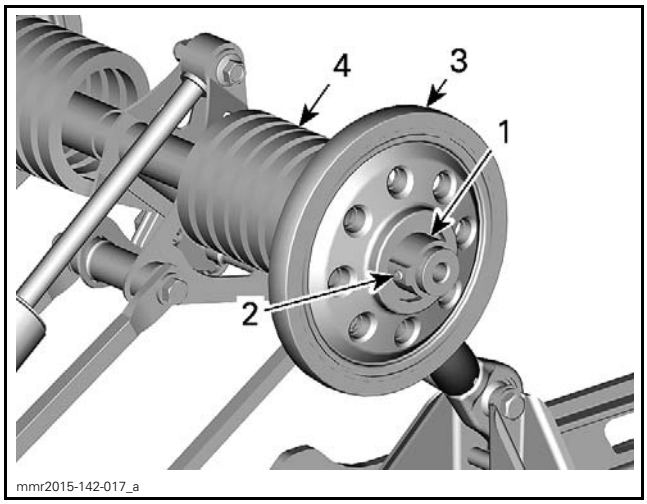
⚠ WARNING

Supports are spring loaded.



1. *Spring support bolt*
2. *Spring support*
3. *Spring*

5. Remove screws and washers from rear arm top axle. Refer to *REMOVING SUSPENSION ASSEMBLY* for procedure to remove the bolts.
6. Loosen set screw from locking rings.
7. Remove locking rings.
8. Remove upper idler wheels.
9. Remove springs.



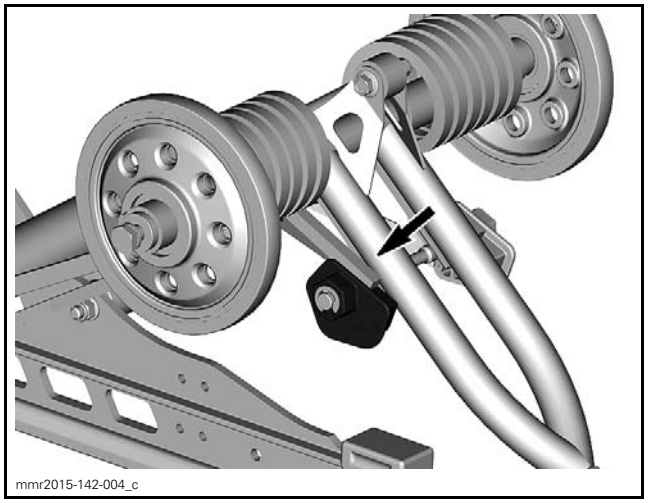
LH SIDE SHOWN

1. *Locking ring*
2. *Set screw*
3. *Upper idler wheel*
4. *Rear spring*

Installing Rear Springs

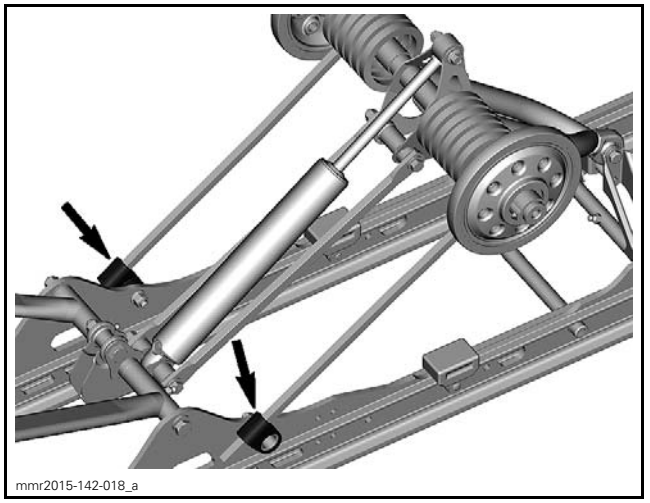
Installation is the reverse of removal procedure. Pay attention to the following.

1. Respect THIS SIDE OUT inscription on top idler wheels.
2. Make sure that spring end is in cam adjuster.



LH SIDE SHOWN

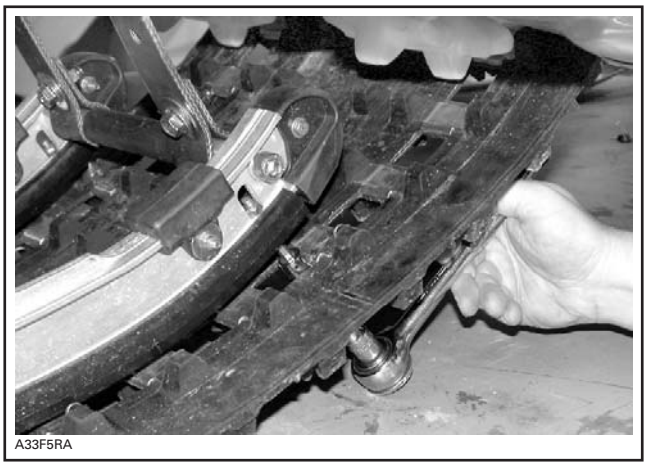
3. Install spring supports upwards.



SLIDER SHOES

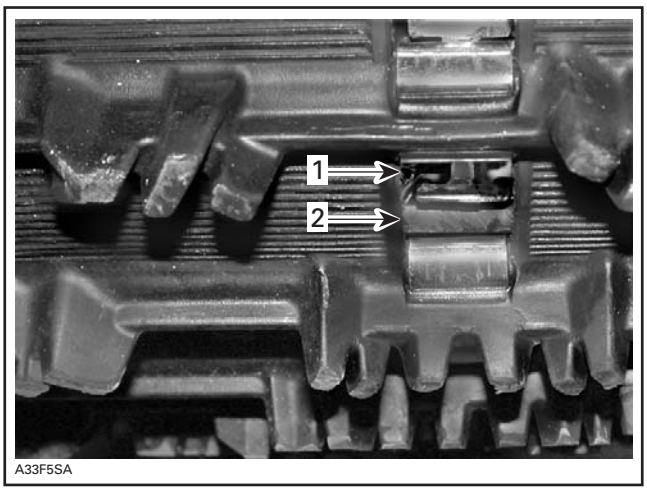
Removing Slider Shoes

1. Lift rear of vehicle and support it off the ground.
2. Completely loosen track tension.
3. Remove nut and screw of each runner.


A33F5RA

TYPICAL

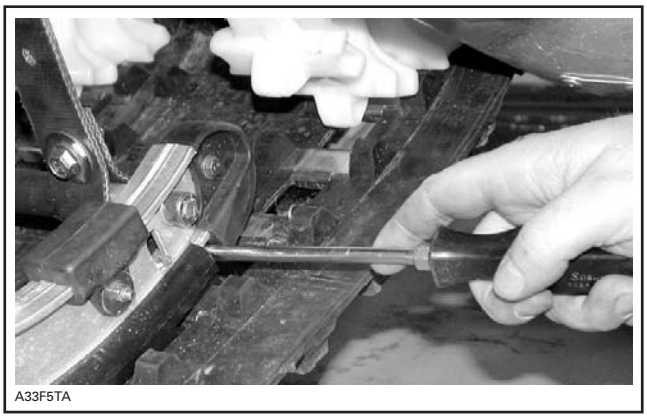
4. At the rear of vehicle, align a track window with slider shoe.



A33F5SA

TYPICAL
1. Track window
2. Slider shoe

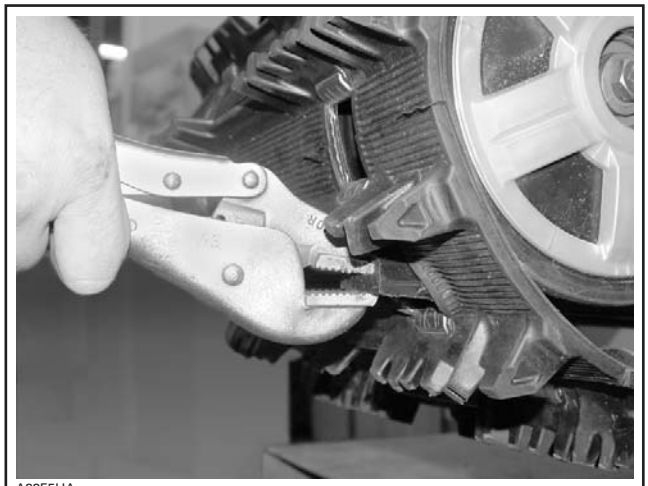
5. Using a pry bar or a screwdriver, push slider shoe rearward until it comes in contact with track.


A33F5TA

TYPICAL - PUSH ON SLIDER SHOE

6. Using locking pliers, pull slider shoe through track window to remove.

NOTE: If necessary, lubricate track window to facilitate slider shoe removal.


A33F5UA

TYPICAL - PULL ON SLIDER SHOE TO REMOVE

Installing Slider Shoes

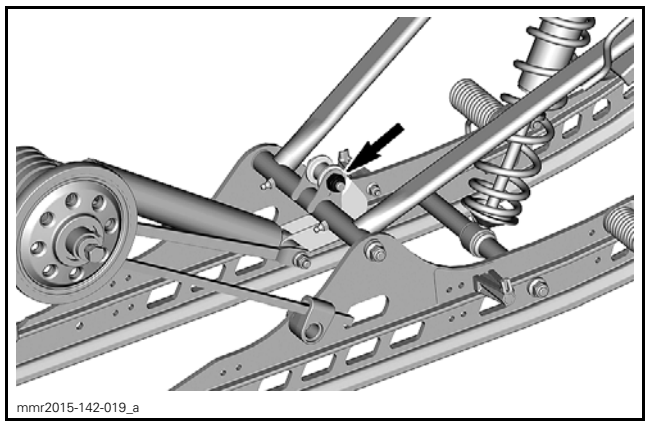
The installation is the reverse of the removal procedure. However, pay attention to the following.

Make sure to insert slider shoe end with hole first.

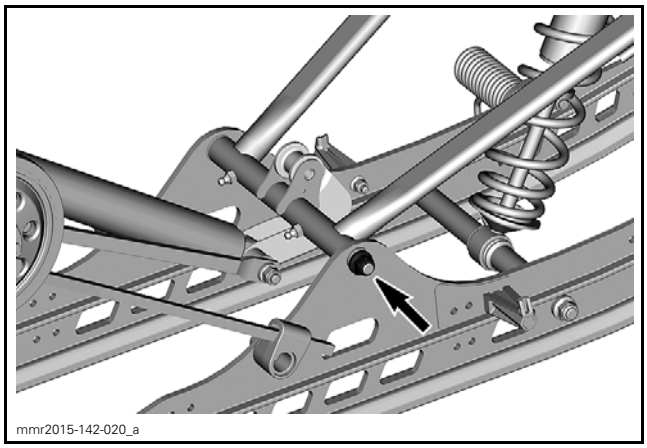
FRONT ARM

Removing Front Arm

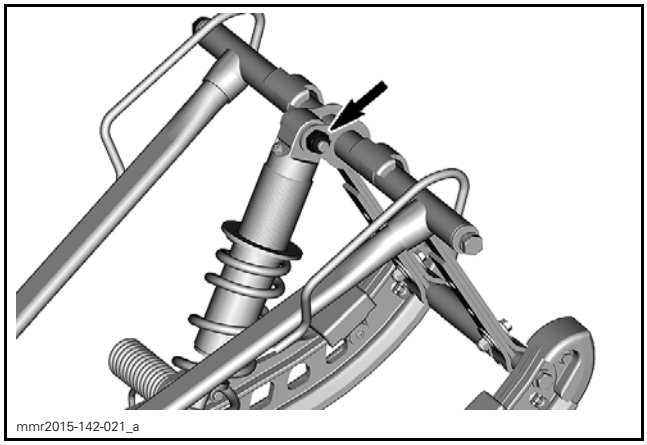
1. Proceed with *REMOVING SUSPENSION ASSEMBLY*, see procedure in this subsection.
2. Remove nut and bolt securing rocker to front arm.


mmr2015-142-019_a

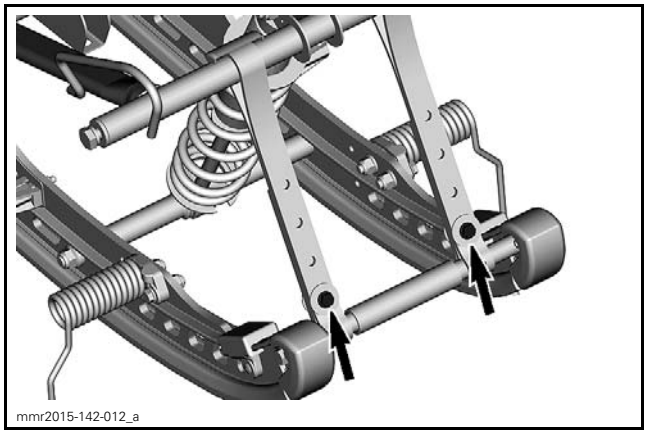
3. Remove the front arm lower bolt, nut and washers. Discard retaining nut.


mmr2015-142-020_a

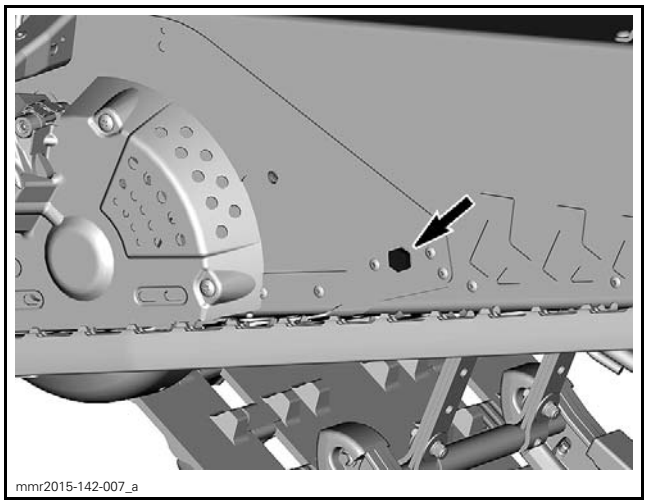
4. Remove the shock absorber upper nut and bolt.


mmr2015-142-021_a

5. Unfasten stopper strap(s).


mmr2015-142-012_a

6. Remove and discard front arm upper bolts.

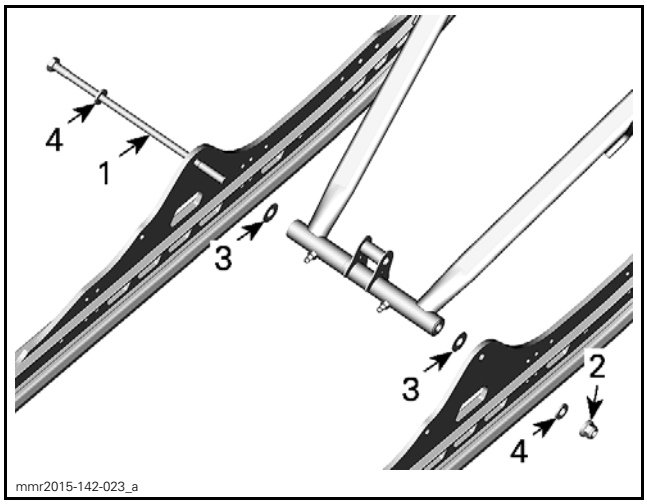

mmr2015-142-007_a

7. Remove front arm.

Installing Front Arm

The installation is the reverse of the removal procedure. However, pay attention to the following.

1. Install new nuts.
2. Install new front arm upper bolts.



mmr2015-142-023_a

1. *Front arm lower bolt*
2. *Nut*
3. *Spacer washers*
4. *Washers*

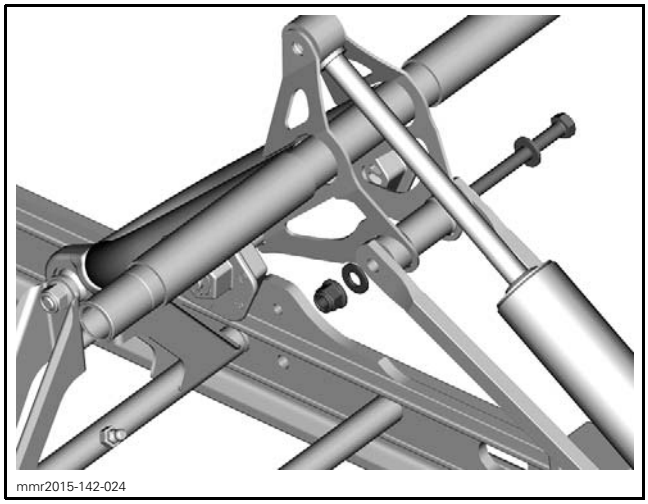
3. See front arm exploded view for proper tightening torque.

REAR ARM

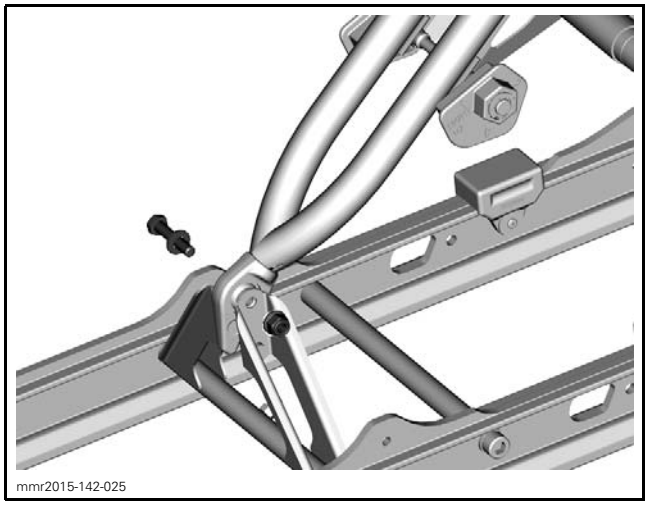
Removing Rear Arm

1. Lift rear of vehicle and support it off the ground.
2. Completely loosen track tension.
3. Proceed with *REMOVING REAR SPRINGS*, see procedure in this subsection.

4. Remove the rear shock absorber upper bolt and nut.
5. Remove nut and bolt securing throttle rods to rear arm.


mmr2015-142-024

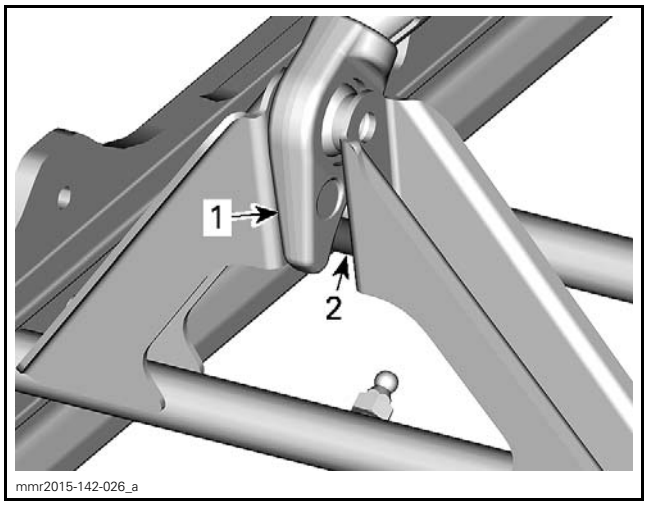
6. Remove bolt, nut and washer holding rear arm to pivot arm.


mmr2015-142-025

Installing Rear Arm

The installation is the reverse of the removal procedure. However, pay attention to the following.

1. At installation, rear arm stroke limiter must be at rear.

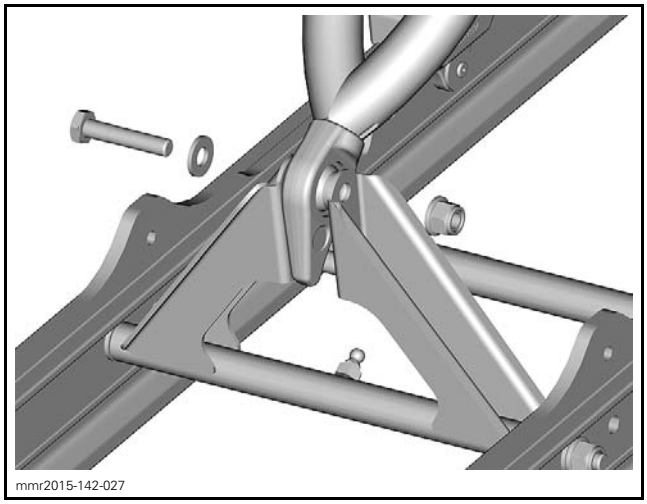


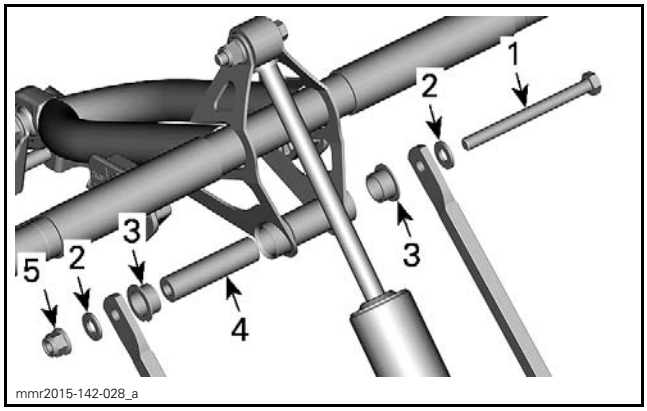
mmr2015-142-026_a

1. Rear arm stroke limiter
2. Pivot arm stroke limiter

2. Install new nuts and tighten to specification.

Assemble rear arm fasteners as per following illustrations.


mmr2015-142-027



mmr2015-142-028_a

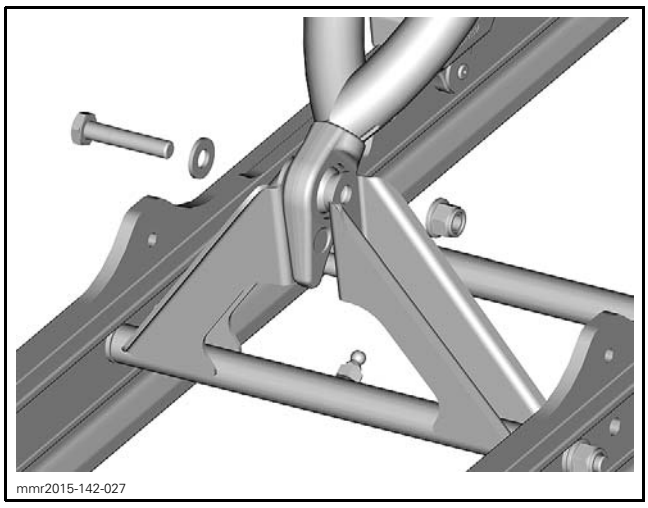
SOME PARTS REMOVED FOR CLARITY PURPOSES
1. Throttle rod upper bolt
2. Washers
3. Bushings
4. Axle
5. Throttle rod upper nut

TIGHTENING TORQUE	
Rear arm throttle rod nut	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)
Rear arm to pivot arm nut	32 N•m ± 4 N•m (24 lbf•ft ± 3 lbf•ft)

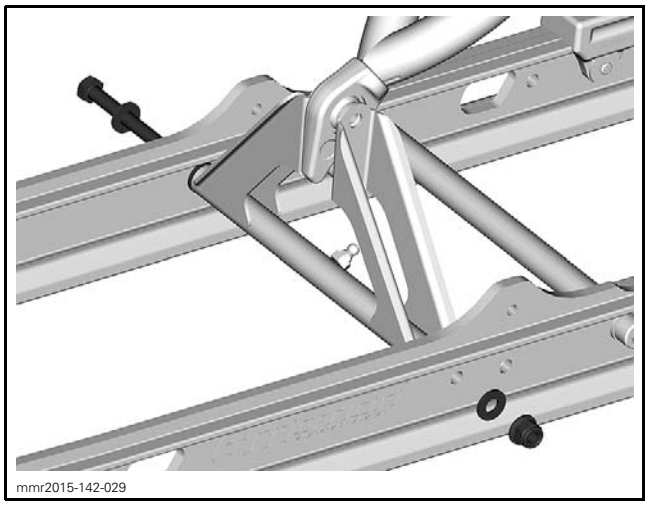
PIVOT ARM

Removing Pivot Arm

1. Lift rear of vehicle and support it off the ground.
2. Completely loosen track tension by unscrewing both adjustment screws.
3. Remove bolt, nut and washer retaining rear arm to pivot arm.


mmr2015-142-027

4. Remove bolt, nut and 4 washers retaining pivot arm to runners.


mmr2015-142-029

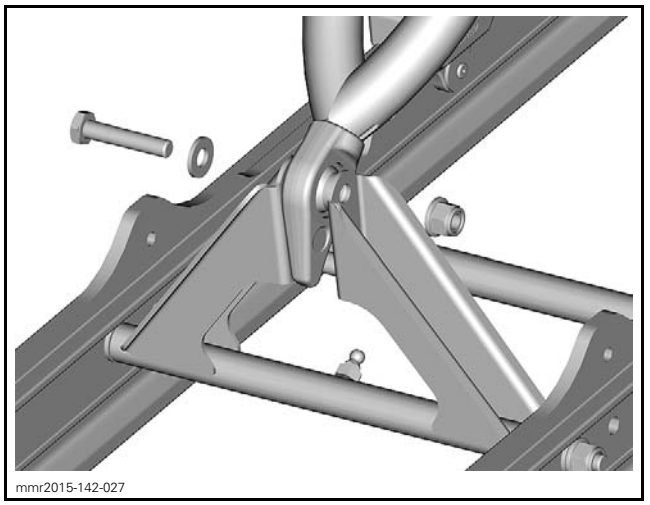
NOTE: Make sure inner washers are properly removed from assembly to avoid losing them.

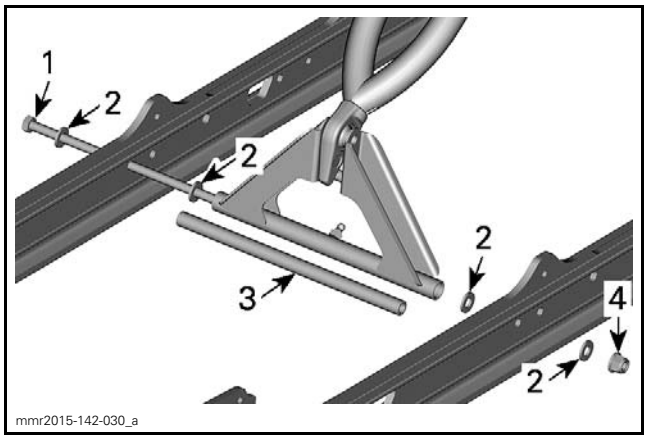
5. Carefully remove pivot arm from rear arm.

Installing Pivot Arm

The installation is the reverse of the removal procedure. However, pay attention to the following.

Assemble pivot arm fasteners as per following illustrations, with grease fitting towards front of vehicle.


mmr2015-142-027



mmr2015-142-030_a

PARTS REMOVED FOR CLARITY PURPOSE
1. *Pivot arm lower screw*
2. *Washers*
3. *Axle*
4. *Pivot arm nut*

Tighten pivot arm nuts to specification.

TIGHTENING TORQUE	
Pivot arm lower nut	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)
Pivot arm upper nut	32 N•m ± 4 N•m (24 lbf•ft ± 3 lbf•ft)

Lubricate pivot arm. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

STOPPER STRAP

Refer to the exploded views at the beginning of this subsection for parts layout and fasteners tightening torque.

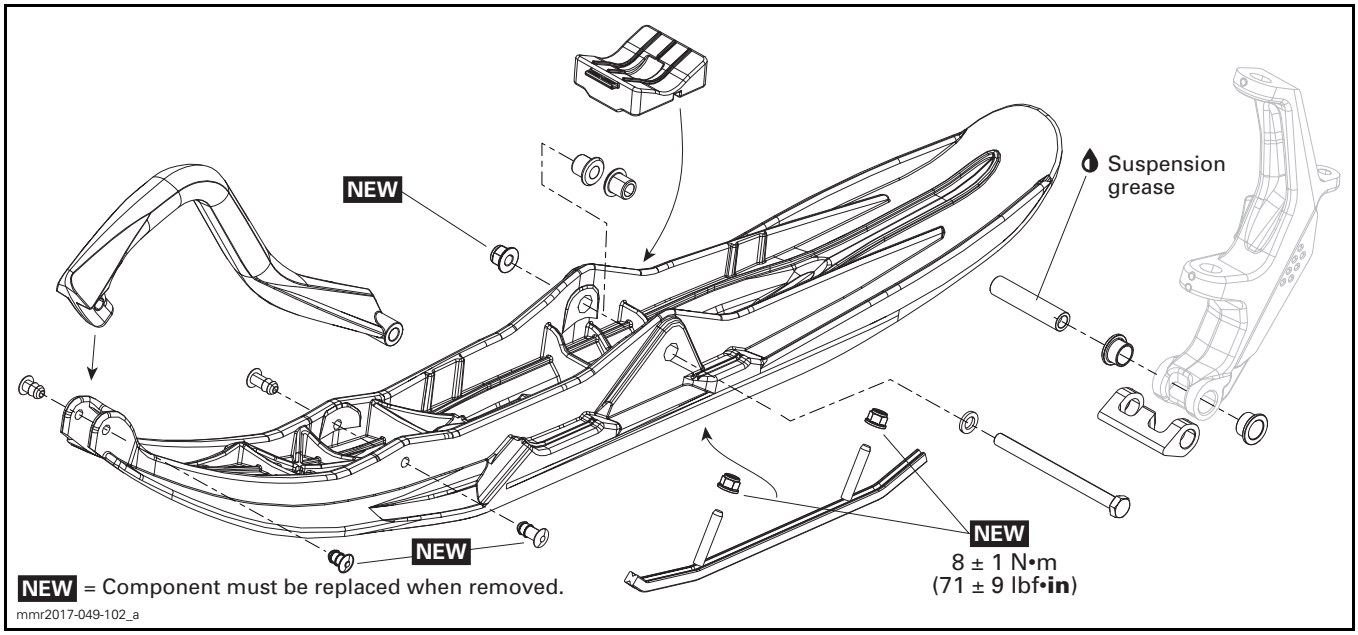
STEERING SYSTEM (PITMAN ARM)

SERVICE PRODUCTS

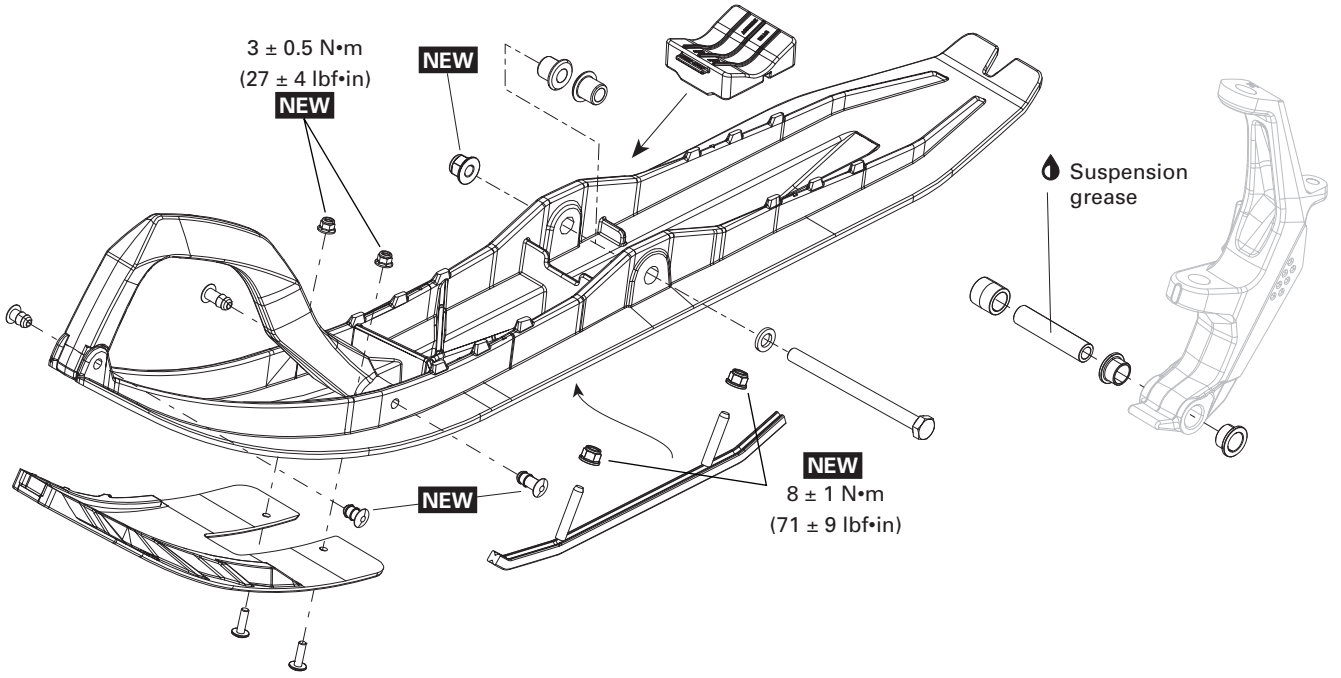
Description	Part Number	Page
SUSPENSION GREASE	293 550 033	18

SKIS

Trail and Crossover Models



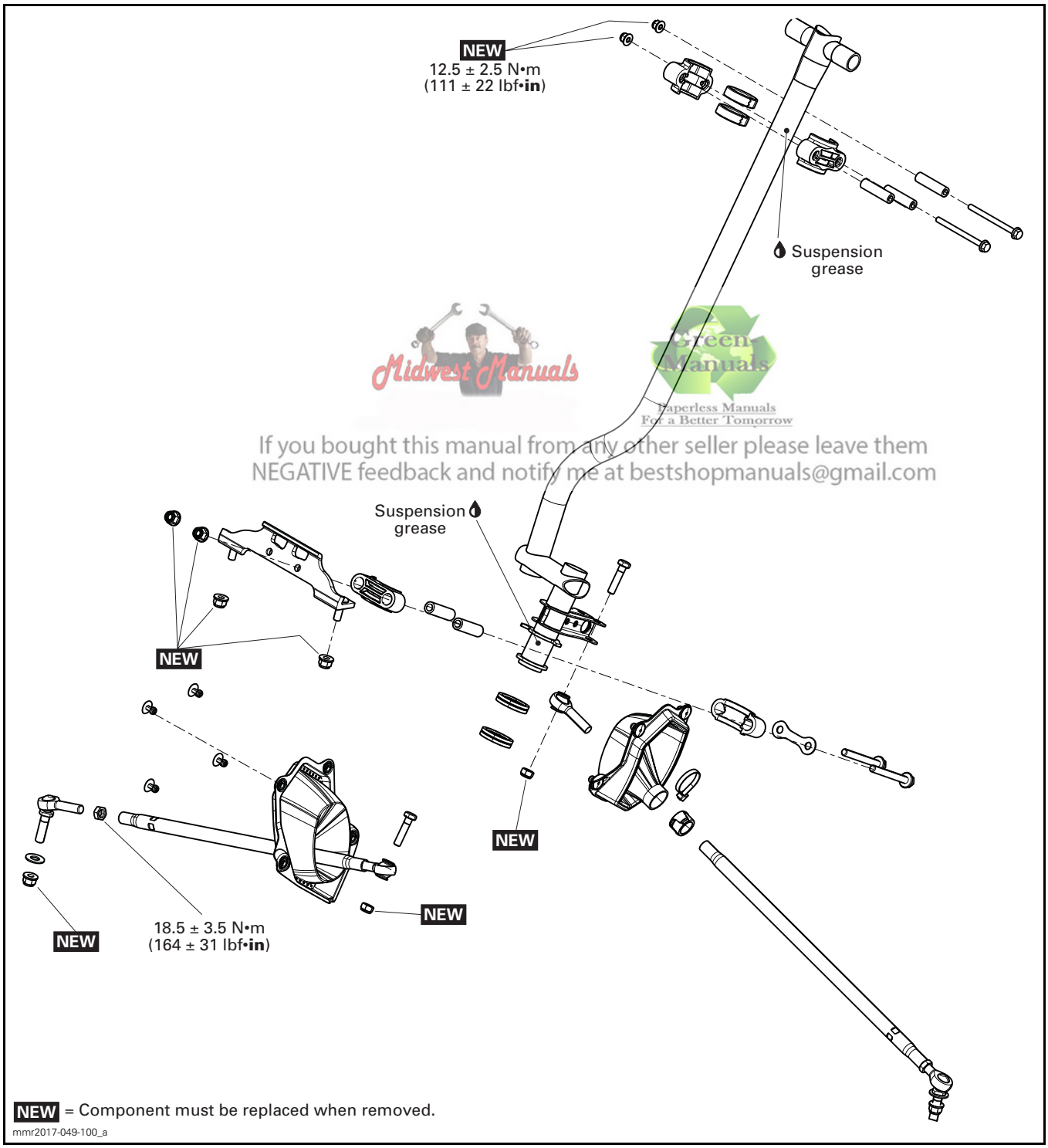
Mountain Models



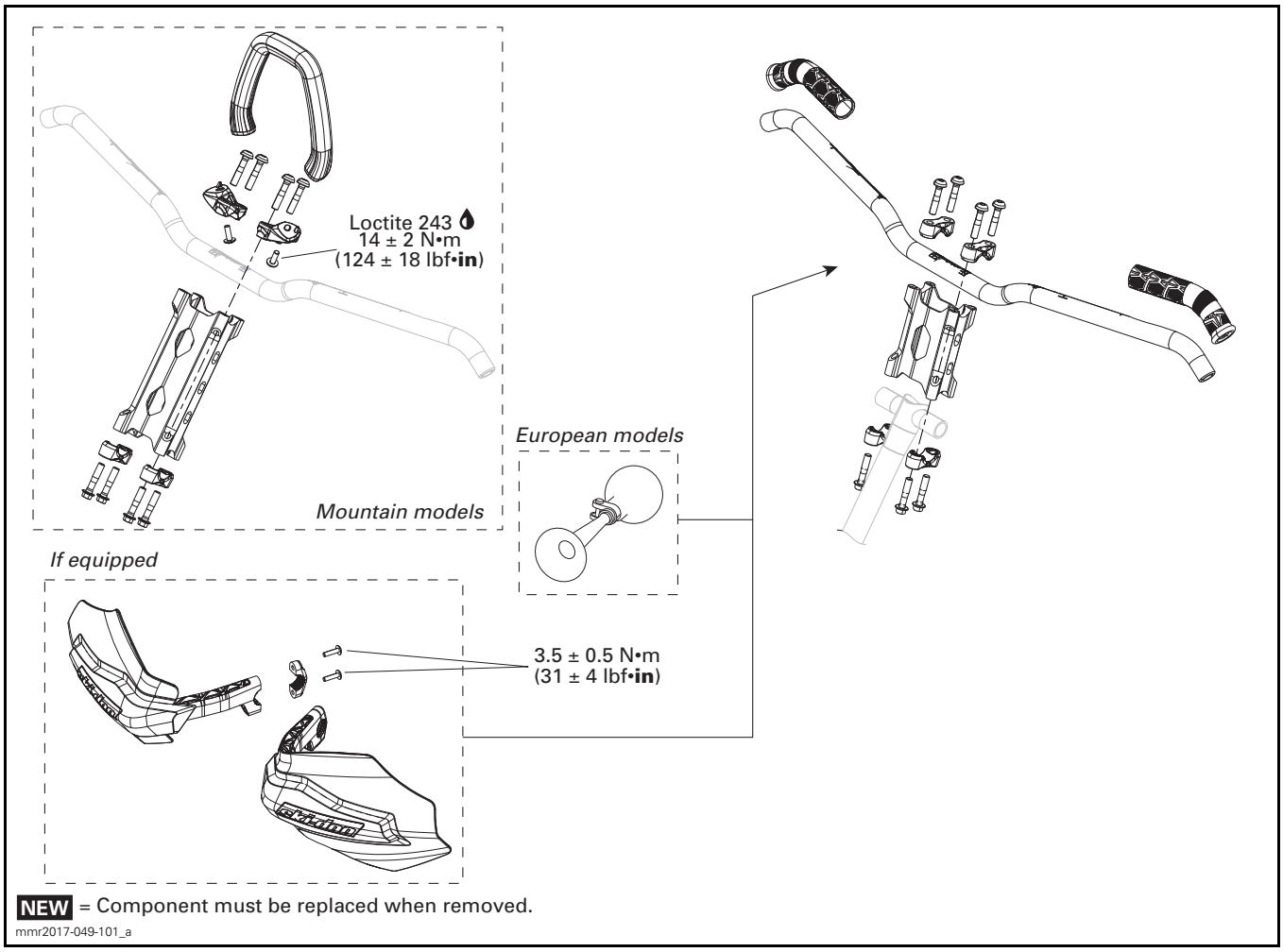
NEW = Component must be replaced when removed.

mmr2017-049-103_a

STEERING COLUMN AND TIE-RODS



HANDLEBAR



NEW = Component must be replaced when removed.

mmr2017-049-101_a

GENERAL

When removing or replacing a part of the steering mechanism, perform the steering alignment, refer to *ALIGNING THE STEERING* in this subsection.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.) must be replaced.

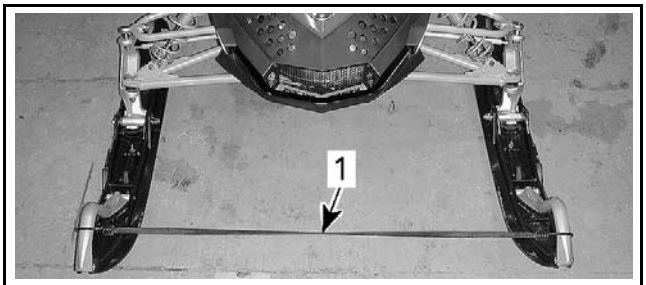
NOTICE **Hoses, cables and locking ties removed during a procedure must be reinstalled at the same location.**

ADJUSTMENT

ALIGNING THE STEERING

Ski alignment is performed by adjusting the length of left and right tie-rods.

1. Leave the vehicle on the ground on its own weight.
2. Attach ski handles together with a bungee cord.

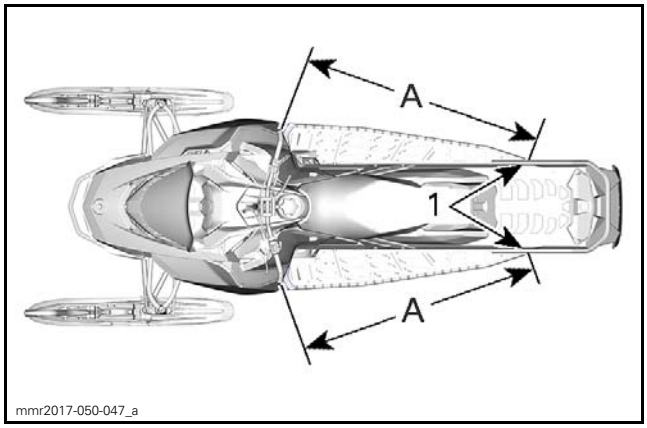


mmr2008-049-025_a

TYPICAL
1. Bungee cord

3. Position handlebar so that it is straight ahead position by measuring from the extremities of the grips to the rear most edge of the tunnel, as shown.

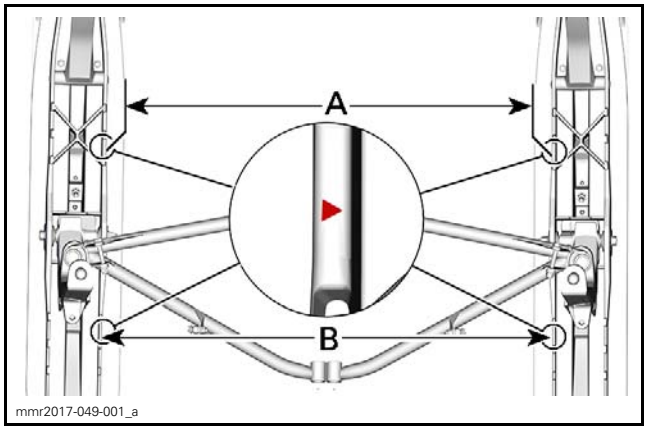
NOTE: The reference point must be the same to each side.



mmr2017-050-047_a

TYPICAL
1. Same reference point
A. Equal distance on each side

4. Ensure track is properly aligned.
5. Verify if skis are in straight-ahead position by placing a straight edge against track and measuring distance between front and rear ski bridges and straight edge.
6. With skis in straight ahead position, adjust the toe-out.
7. Measure the distance between front and rear ski bridges in line with arrows on skis.
8. Use the following illustration and this equation to determine the steering adjustment.



mmr2017-049-001_a

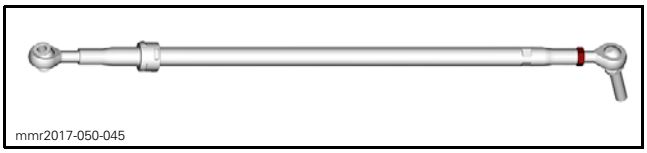
STEERING ALIGNMENT	
Toe-out	A – B = 5 mm (.197 in)

9. If adjustment is needed, loosen tie-rod jam nuts then turn tie-rods to change their length.

NOTE: There is no jam nut on the inner tie-rods.

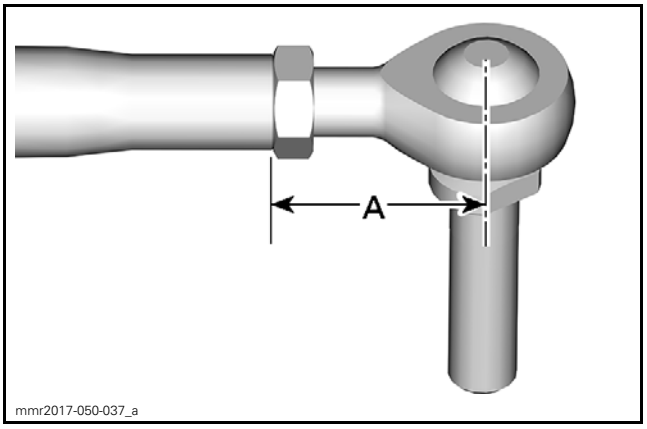
10. Tighten jam nuts to specification.

TIGHTENING TORQUE	
Jam nut	18.5 N•m ± 3.5 N•m (164 lbf•**in** ± 31 lbf•**in**)


mmr2017-050-045

⚠ WARNING

The maximum tie-rod end length (A) not engaged in the tie rod must not exceed 34 mm (1.339 in).



mmr2017-050-037_a

PROCEDURES

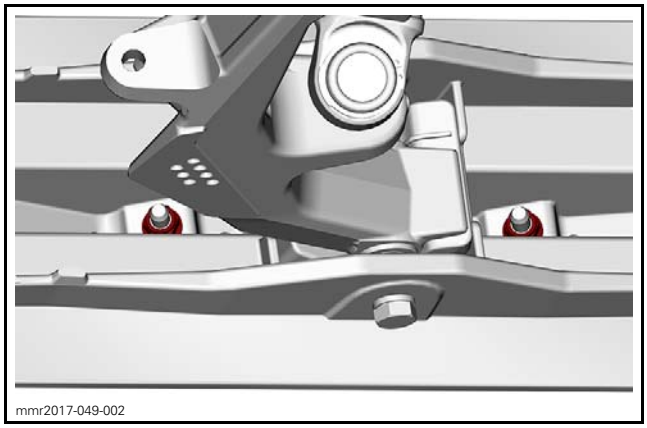
SKI RUNNER

Inspecting the Ski Runner

Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Removing the Ski Runner

1. Lift the front of vehicle and support it off the ground.
2. Unscrew the ski runner nuts then remove ski runners.


mmr2017-049-002

Installing the Ski Runner

The installation is the reverse of the removal procedure. Pay attention to the following.

tighten ski runner nuts to specification.

TIGHTENING TORQUE	
Runner nut	8 N•m ± 1 N•m (71 lbf•**in** ± 9 lbf•**in**)

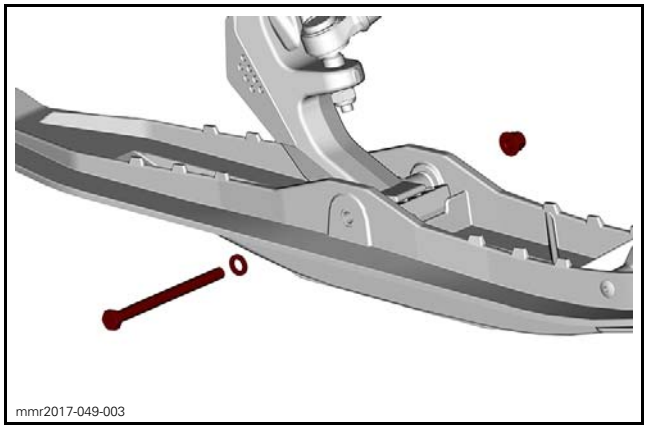
SKIS

Inspecting the Ski

Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Removing the Ski

1. Lift front of vehicle and support it off ground.
2. Unscrew nut then pull ski bolt out.

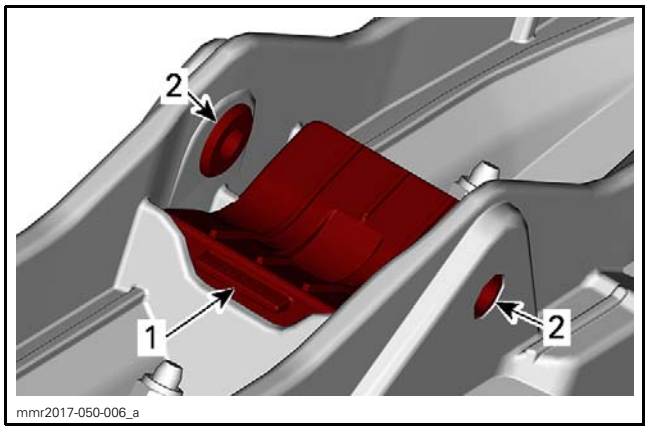

mmr2017-049-003

3. Remove ski from vehicle.

Installing the Ski

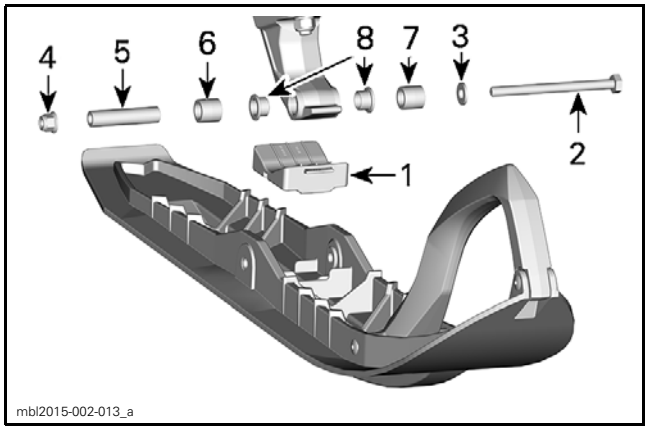
Make sure bushings are installed in ski holes.

Install the ski stopper. Position indicator in front and make sure the bump in the ski is in the groove of the ski stopper.



1. *Ski stopper*
2. *Bushings*

Mountain Models



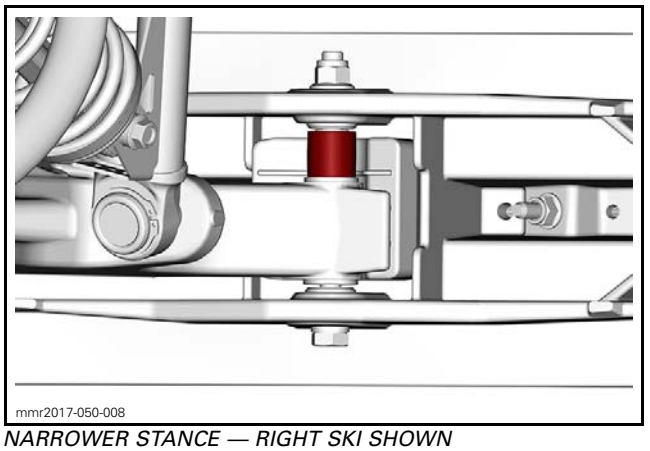
LH SIDE SHOWN

1. *Ski stopper*
2. *M10 x 130 screw*
3. *M10 flat washer*
4. *M10 flanged nut*
5. *Ski axel*
6. *Narrow adjustment*
7. *Wide adjustment*

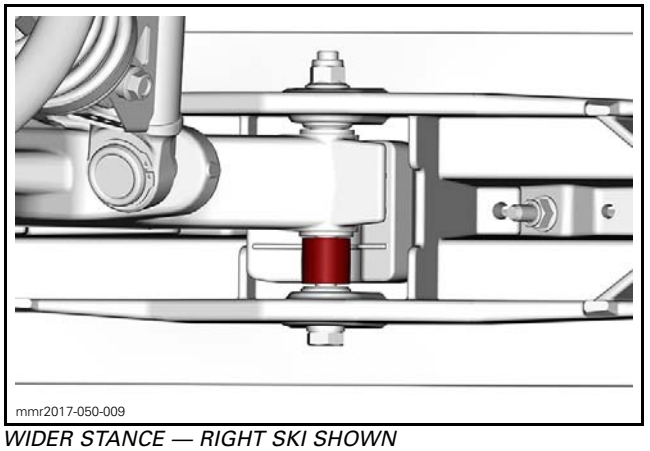
Install the spacer inside for the narrower stance and outside for the wider stance.

⚠ WARNING

Proceed to the same setting for both skis.



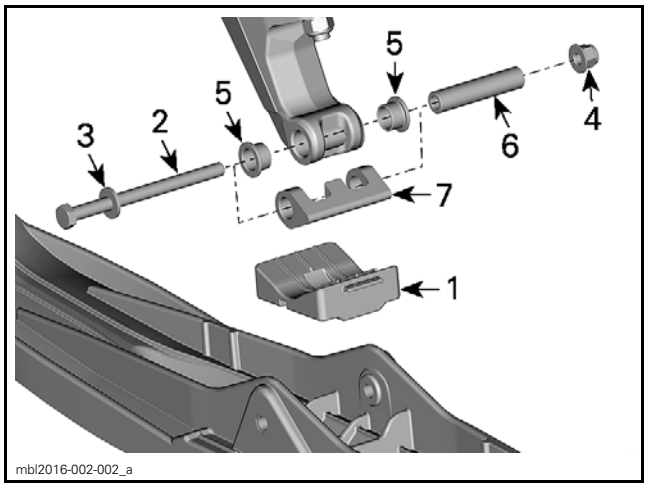
NARROWER STANCE — RIGHT SKI SHOWN



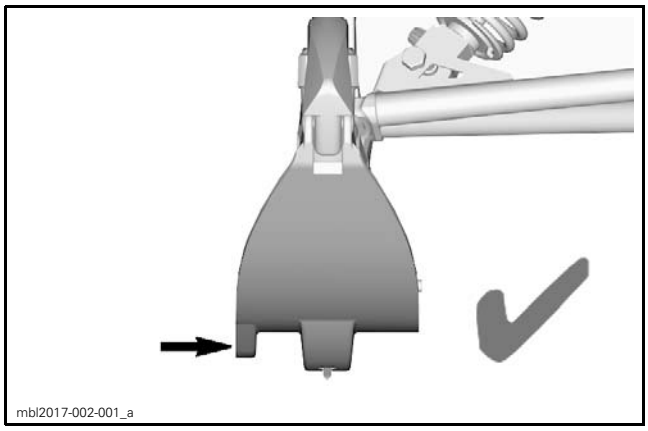
WIDER STANCE — RIGHT SKI SHOWN

Trail and Crossover Models

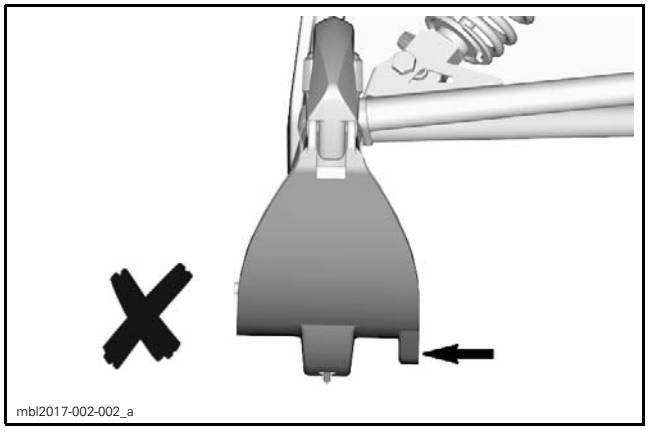
Install ski on ski leg as per the following illustrations.



1. *Ski stopper*
2. *M10 x 130 screw*
3. *M10 flat washer*
4. *M10 flanged nut*
5. *Ski leg bushings*
6. *Ski leg sleeve*
7. *Ski leg stopper*



LATERAL SKI KEEL TOWARDS OUTSIDE (IF EQUIPPED) - CORRECT



LATERAL SKI KEEL TOWARDS INSIDE (IF EQUIPPED) - NOT CORRECT

All Models

TIGHTENING TORQUE	
Ski nut	48 N•m ± 6 N•m (35 lbf•ft ± 4 lbf•ft)

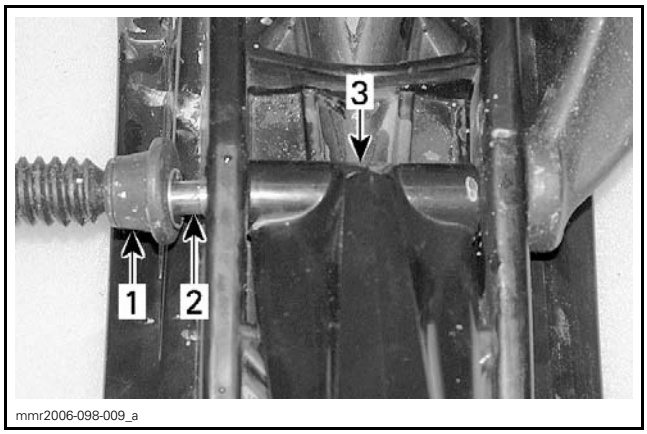
SKI HANDLES

Removing the Ski Handle

1. Remove ski from vehicle.
2. Using a 9 mm (3/8 in) drill bit, remove ski handle rivets. Only drill the head of rivet. Do not try to drill all the way through the rivet. Angle the drill bit to reduce the chance of spinning the rivet in the ski.
3. Remove handle from ski.
4. Place handle in hot water for 10 minutes then using a punch, drive the inner part of rivet out of handle.

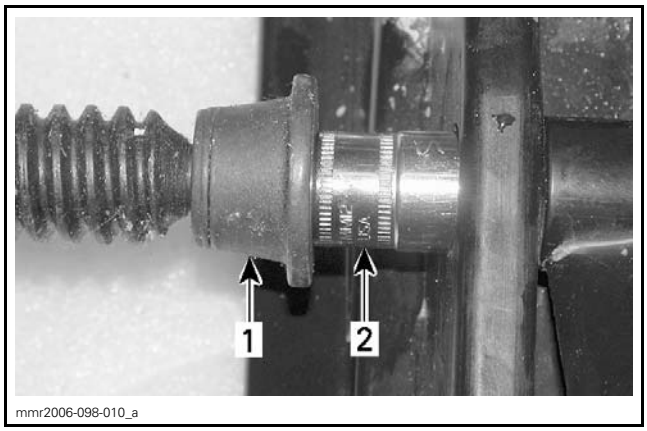
Installing the Ski Handle

1. To install rivets, use a C-clamp and a short 10 mm socket.
2. Place a rivet in position and insert it into ski and ski handle. Repeat the procedure for the other side.



1. *C-clamp*
2. *Rivet*
3. *Handle*

3. When both rivets are installed, use the short 10 mm socket to push rivet heads against the ski.



1. *C-clamp*
2. *10 mm socket*

SKI FLOTATION EXTENSION (MOUNTAIN MODELS)

Condition Utilization

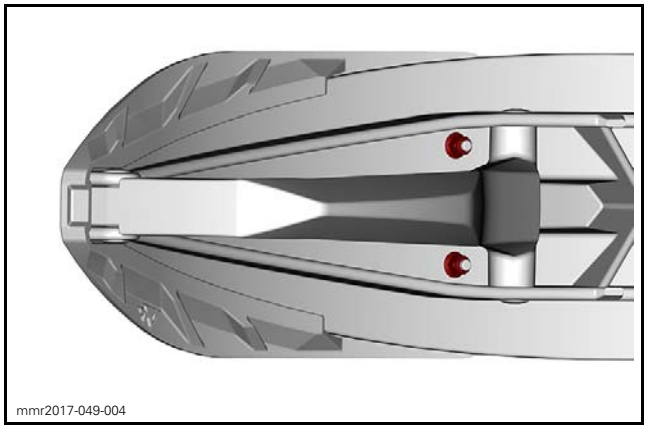
The key to the adjustable nose is to reduce the tip-hop that can slow down the vehicle.

In snow conditions with less than 41 cm (16 in) of fresh powder, specially when there is a crust, the narrow tip stays in the snow - which helps to maintain a carve. Also, when side hilling, and crossing a snowmobile rut, the narrow shape moves the impact point - where a change in snow density acts to tip-up the ski - more towards the spindle. This reduces kick back by 50% compared to the wider configuration, minimizing its impact on the attitude of the snowmobile holding a side hill.

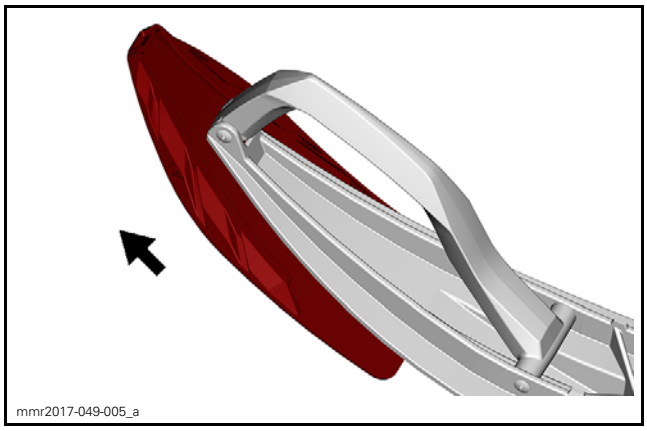
In snow conditions with more than 41 cm (16 in) of fresh powder, the wider tip configuration is desirable, as it increases flotation and will bring the nose of the snowmobile up.

Removing the Ski Flotation Extension

1. Remove nuts and screws securing the extension to ski.


mmr2017-049-004

2. Slide the extension off the ski.


mmr2017-049-005_a

Installing the Ski Flotation Extension

The installation is the reverse of the removal procedure. However, pay attention to the following.

1. Install extension nuts towards up and tighten to specification.

TIGHTENING TORQUE	
Extension nuts	3 N•m ± 0.5 N•m (27 lbf•**in** ± 4 lbf•**in**)

SKI LEG

To replace a ski leg, refer to *FRONT SUSPENSION* subsection.

HANDLEBAR GRIP

NOTE: To verify or replace heating elements, refer to *ACCESSORIES* subsection.

Removing the Handlebar Grip

Remove grips by pulling while using compressed air, which will inflate or loosen the fit between the grip and handlebar.


mmr2015-143-007

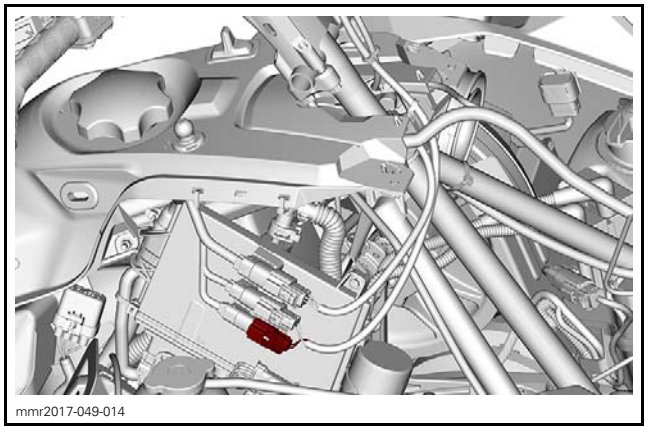
Installing the Handlebar Grip

Insert the handlebar grip on handlebar while blowing compressed air to inflate or loosen the fit between grip and handlebar.

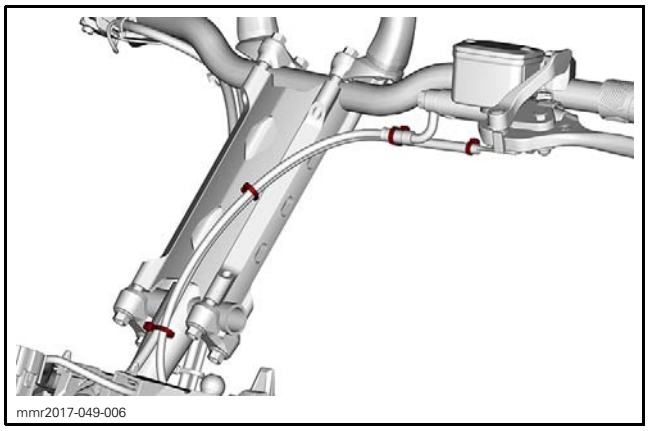
MULTIFUNCTION SWITCH

Removing the Multifunction Switch (Mountain models)

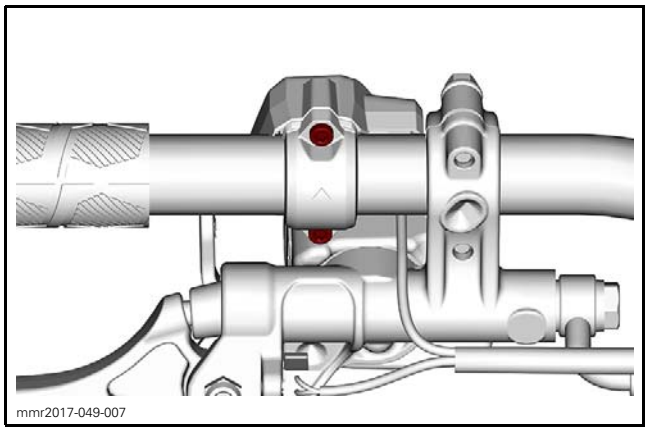
1. Remove the upper body module. Refer to *BODY* subsection.
2. Disconnect the multifunction switch connector (2-pin connector).


mmr2017-049-014

3. Cut locking ties securing multifunction switch harness.


mmr2017-049-006

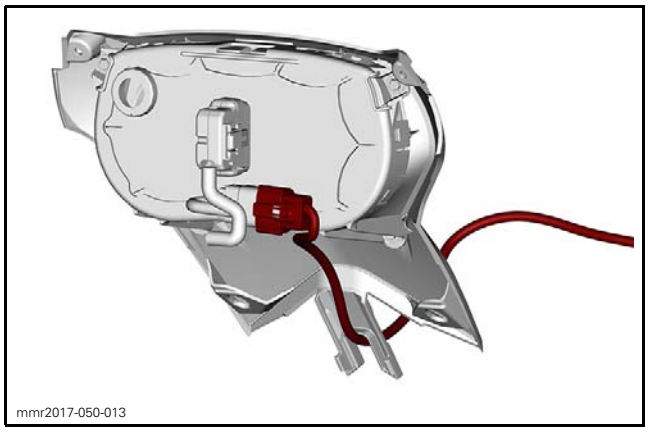
4. Remove multifunction switch screws.


mmr2017-049-007

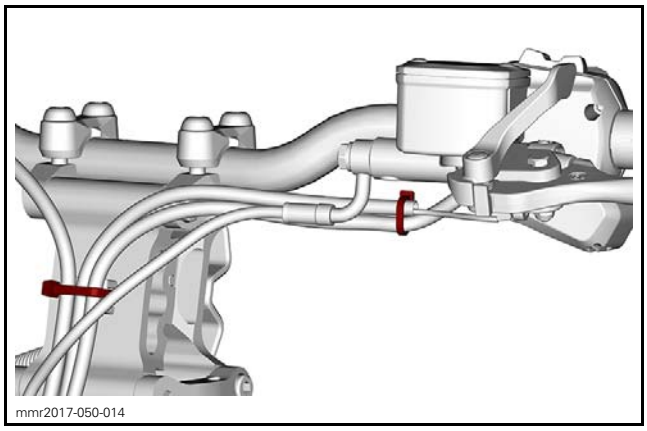
5. Remove multifunction switch from vehicle.

Removing the Multifunction Switch (Trail and Crossover models)

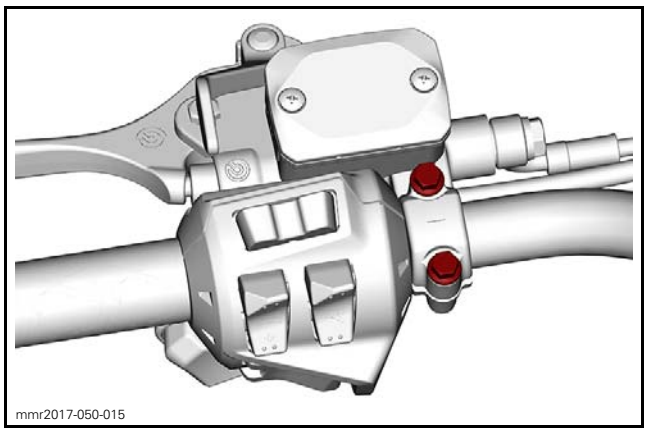
1. Remove the gauge support. Refer to *BODY* subsection.
2. Disconnect the multifunction switch connector.


mmr2017-050-013

3. Cut locking ties securing multifunction switch harness.


mmr2017-050-014

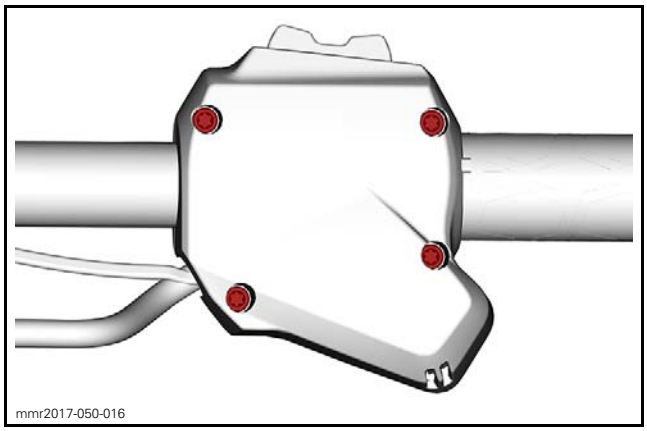
4. Unscrew master cylinder from handlebar.


mmr2017-050-015

5. Remove master cylinder.

NOTICE Do not let master cylinder hang by the hose and do not stretch or twist the hose.

6. Remove multifunction switch screws.


mmr2017-050-016

7. Remove multifunction switch from vehicle.

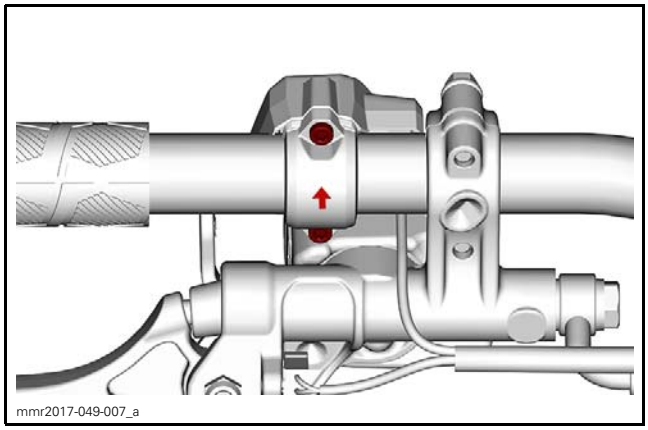
Installing the Multifunction Switch (Mountain models)

The installation is the reverse of the removal procedure. However, pay attention to the following.

Install the multifunction switch clamp with the arrow towards rear.

Tighten multifunction switch screws to specification as per the following sequence.

TIGHTENING TORQUE	
Multifunction switch screws	2.4 N•m ± 0.2 N•m (21 lbf•**in** ± 2 lbf•**in**)



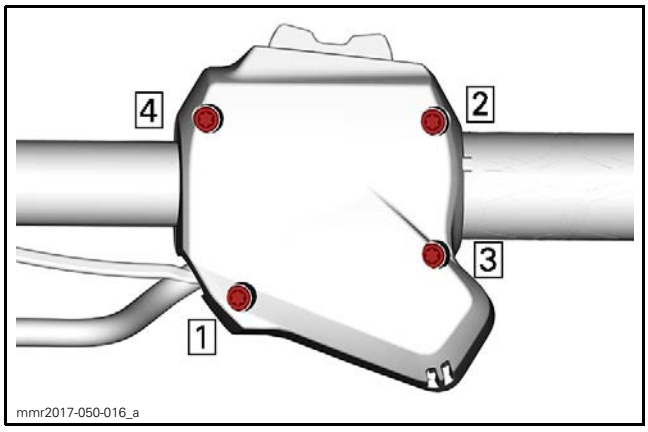
Turn handlebar completely from side to side making sure it does not exert unwanted tension on handlebar wires.

Installing the Multifunction Switch (Trail and Crossover Models)

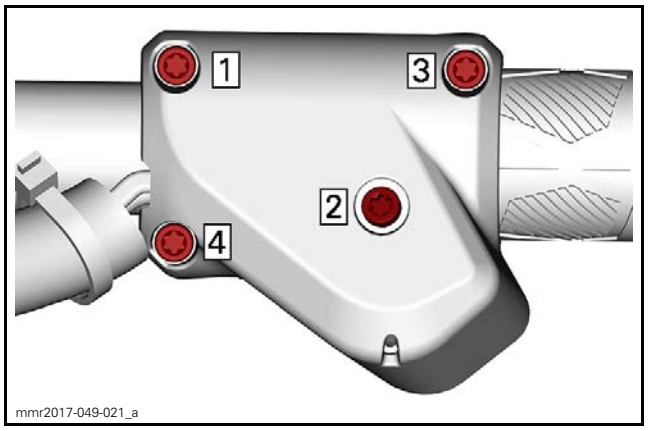
The installation is the reverse of the removal procedure. However, pay attention to the following.

Tighten the multifunction switch screws to specification, as per the following sequence.

TIGHTENING TORQUE	
Multifunction switch screw	2.4 N•m ± 0.2 N•m (21 lbf•**in** ± 2 lbf•**in**)



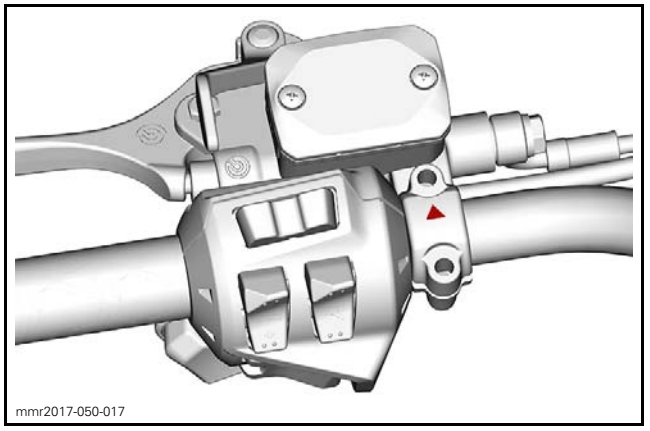
TRAIL AND CROSSOVER MODELS



MOUNTAIN MODELS

Place the master cylinder on the handlebar.

Install master cylinder retaining clamp with its arrow pointing toward the front of vehicle.



Install master cylinder clamp screws and tighten loosely.

With the handlebar in the straight ahead position, place the reservoir parallel to the ground.

Tighten master cylinder clamp screws to specification.

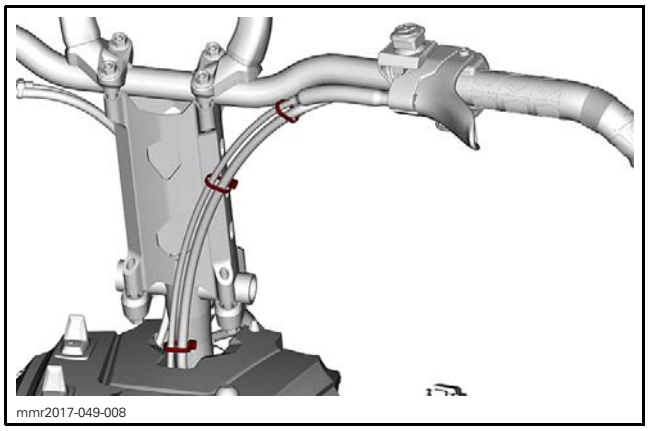
TIGHTENING TORQUE	
Master cylinder clamp screws	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

Turn handlebar completely from side to side making sure it does not exert unwanted tension on handlebar wires.

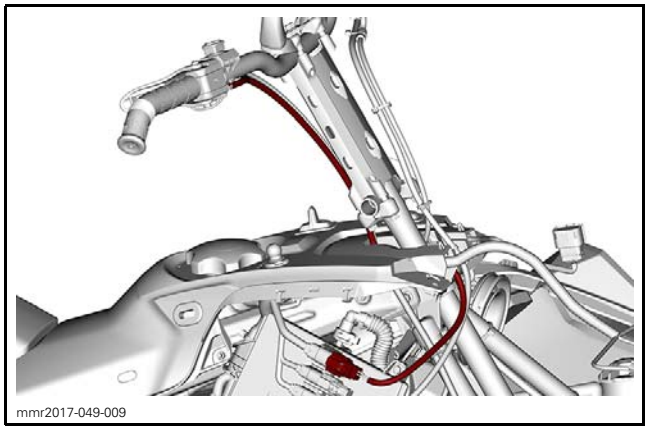
THROTTLE LEVER HOUSING

Removing the Throttle Lever Housing

1. Remove the upper body module. Refer to *BODY* subsection.
2. Cut the harness locking ties.


mmr2017-049-008

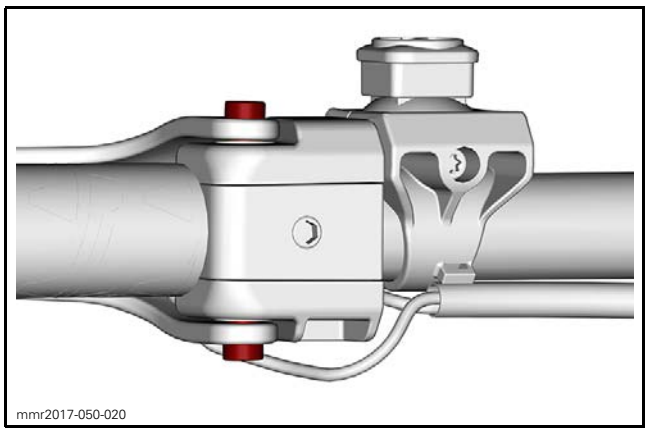
3. Disconnect the LH heater element connector (6-pin connector).


mmr2017-049-009

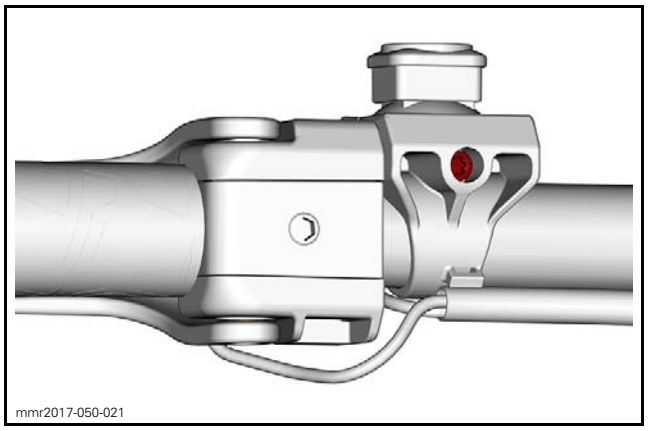
4. Remove the heater element wire terminals from connector. Refer to *WIRING HARNESS AND CONNECTORS* subsection.

NOTICE **Take note of exact positioning of multifunction wire before removing it from the connector.**

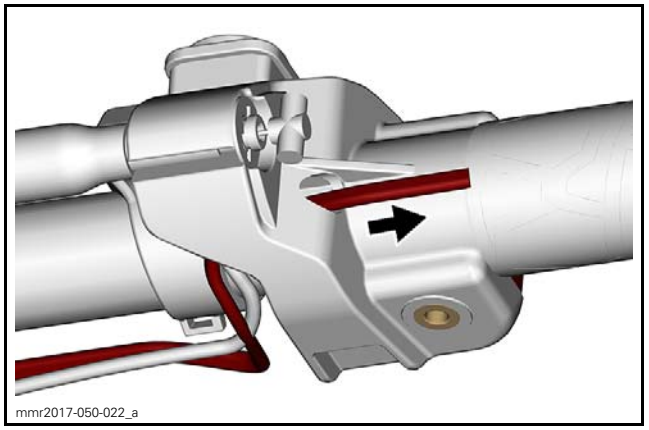
5. Disconnect throttle cable from throttle lever.
6. Remove both throttle lever pivot screws.


mmr2017-050-020

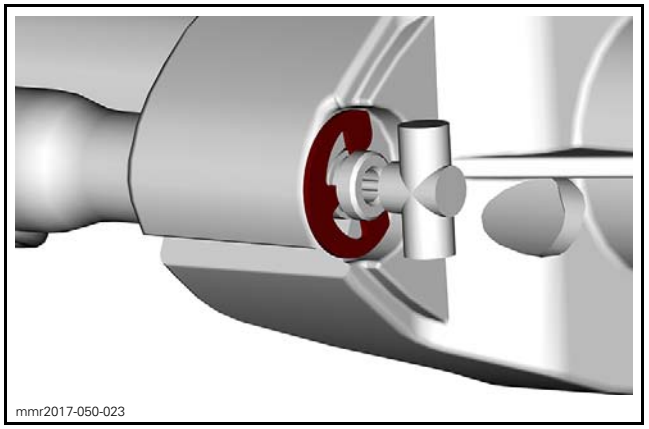
7. Loosen the emergency stop switch screw and slide the switch towards center of handlebar.


mmr2017-050-021

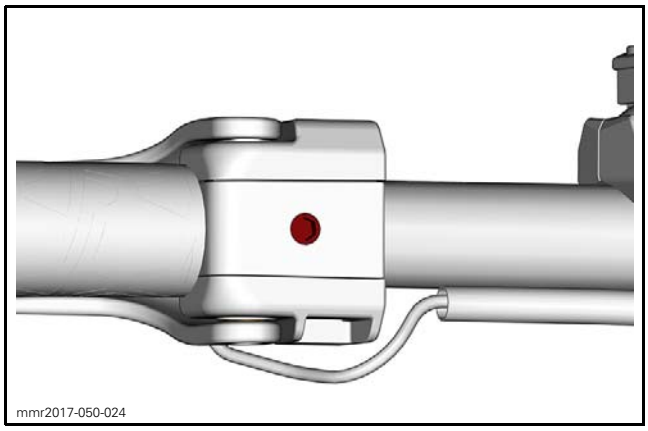
8. Pull the heater element wire out of the throttle lever housing.


mmr2017-050-022_a

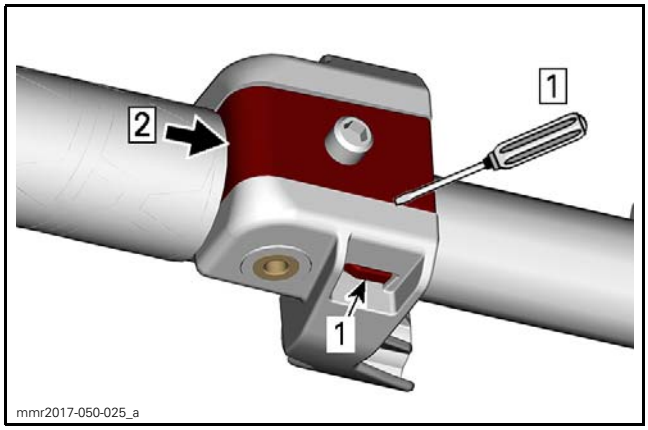
9. Remove throttle cable circlip.


mmr2017-050-023

10. Remove the throttle cable from the housing.
11. Loosen throttle lever housing retaining screw.

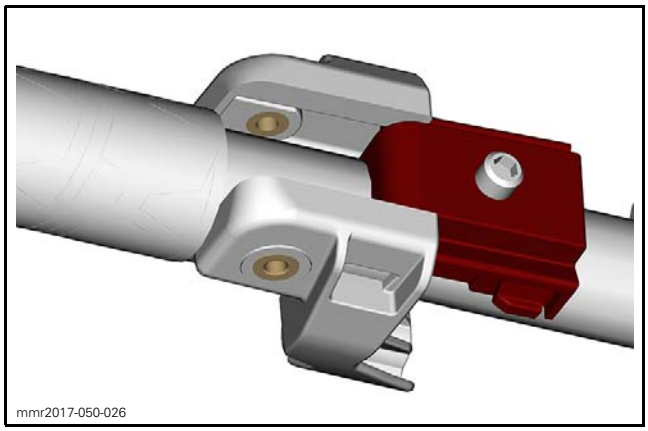


12. Insert a flat screwdriver between the housing and the clamp to release the tab.

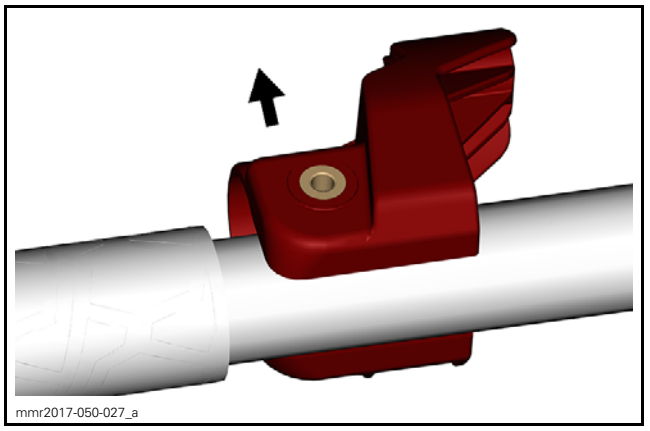


1. Tab

13. Slide the clamp out of the housing



14. Remove throttle lever housing from handlebar.



Installing the Throttle Lever Housing

The installation is the reverse of the removal procedure. However, pay attention to the following.

Tighten throttle lever pivot screws to specification.

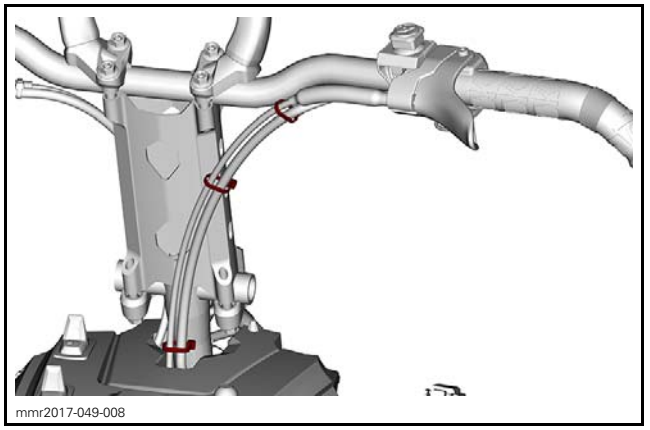
TIGHTENING TORQUE	
Throttle lever retaining screws	1.5 N•m ± 0.2 N•m (13 lbf•**in** ± 2 lbf•**in**)

Turn handlebar completely from side to side making sure it does not exert unwanted tension on handlebar wires.

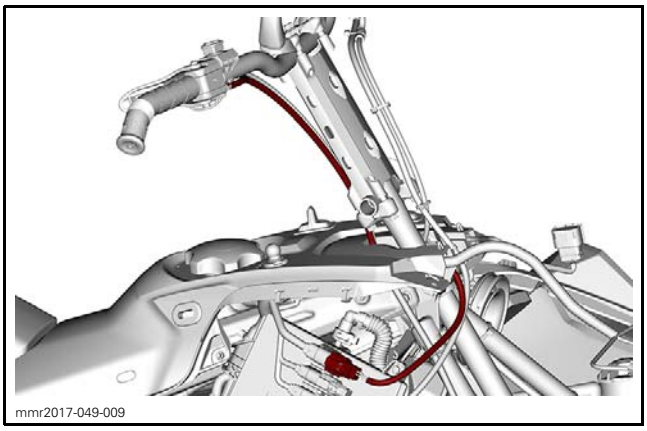
THROTTLE LEVER

Removing the Throttle Lever

1. Remove the upper body module. Refer to *BODY* subsection.
2. Cut the harness locking ties.



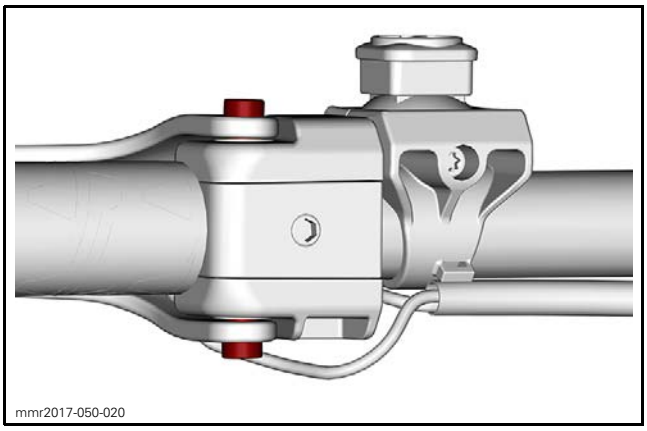
3. Disconnect the LH heater element connector.


mmr2017-049-009

4. Remove throttle lever heater wire terminals from connector. Refer to *CONNECTOR INFORMATION* subsection.

NOTICE **Take note of exact positioning of throttle lever heater before removing it from the connector.**

5. Disconnect throttle cable from throttle lever.
6. Remove throttle lever pivot screws.


mmr2017-050-020

7. Remove throttle lever and heater wires.

Installing the Throttle Lever

The installation is the reverse of the removal procedure. However, pay attention to the following.

Tighten throttle lever pivot screws to specification.

TIGHTENING TORQUE	
Throttle lever pivot screws	1.5 N•m ± 0.2 N•m (13 lbf•**in** ± 2 lbf•**in**)

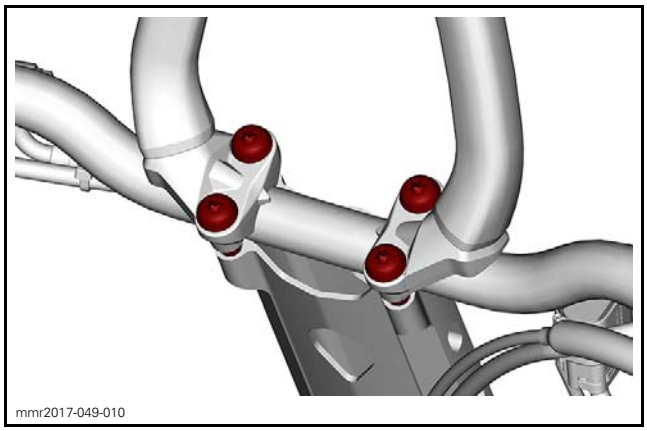
Turn handlebar completely from side to side making sure it does not exert unwanted tension on handlebar wires.

HANDLEBAR

Removing the Handlebar

NOTE: If the handlebar must be changed, remove all components (handlebar grip, throttle lever housing, etc.) before removing it from vehicle.

1. Remove handlebar retaining clamp screws.


mmr2017-049-010

2. Remove handlebar from handlebar extension.

Inspecting the Handlebar

1. Inspect the handlebar for:
   - Damages
   - Cracks
   - Bending.
2. Replace if any of these problems is detected.

⚠ WARNING

Do not try to repair a defective handlebar.

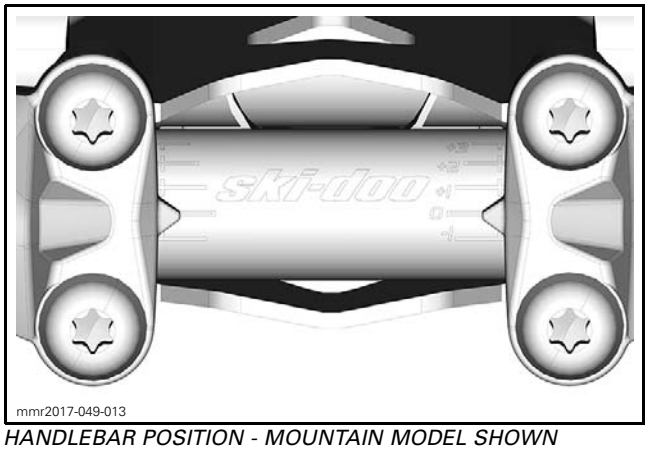
3. Check handlebar clamps for cracks or distortion, replace if necessary.

Installing the Handlebar

The installation is the reverse of the removal procedure. However, pay attention to the following.

Position the handlebar with clamps, as per the following table.

MODEL	HANDLEBAR POSITION
Mountain	0
Trail and crossover	+1

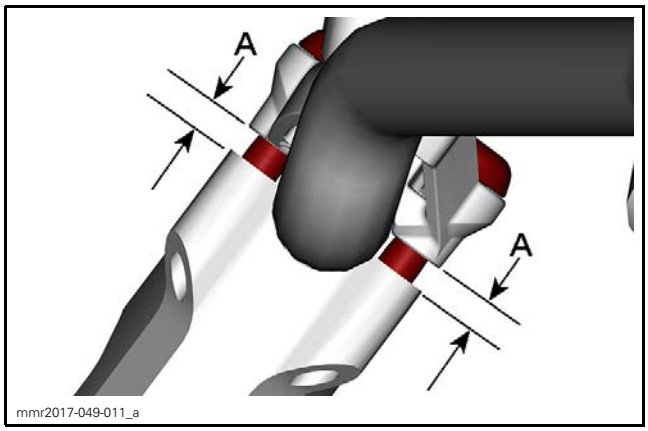


HANDLEBAR POSITION - MOUNTAIN MODEL SHOWN

Tighten handlebar clamps screws to specification.

TIGHTENING TORQUE	
Clamp screws	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

Ensure handlebar clamps are parallel with handlebar extension.



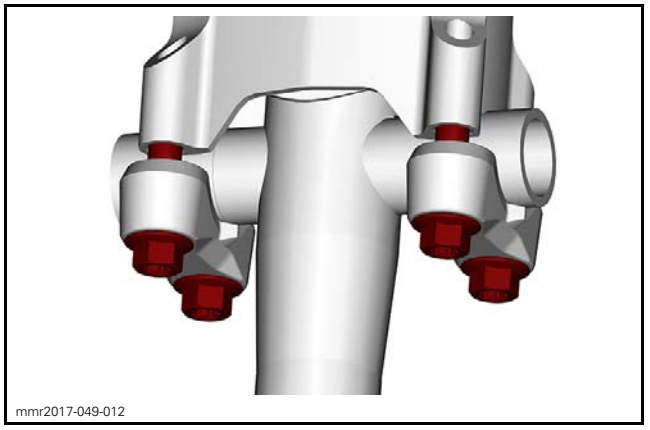
A. Must be equal on each side

Turn handlebar completely from side to side making sure it does not exert unwanted tension on handlebar wires.

HANDLEBAR EXTENSION

Removing the Handlebar Extension

1. Proceed with *REMOVING THE HANDLEBAR*, see procedure in this subsection.
2. Remove screws retaining the extension to steering column.



3. Remove handlebar extension from vehicle.

Inspecting the Handlebar Extension

1. Check handlebar extension for:
   - Cracks
   - Bending
   - Other damages.
2. Replace if any of these problems is detected.

⚠ WARNING

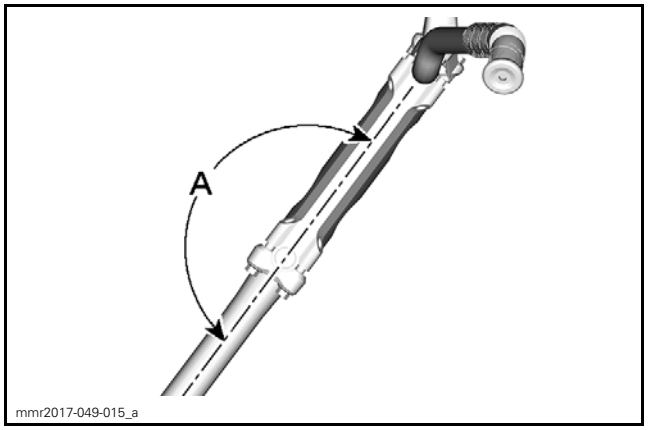
Do not try to repair a defective handlebar extension.

Installing the Handlebar Extension

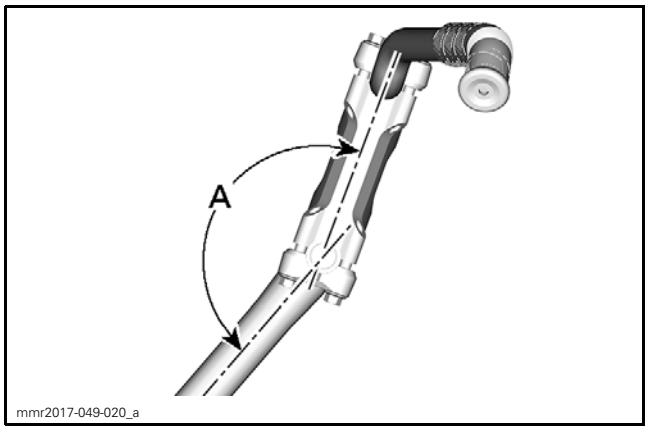
The installation is the reverse of the removal procedure. However, pay attention to the following.

Position the extension with the steering column, as per the following table.

MODEL	HANDLEBAR EXTENSION POSITION ANGLE
Mountain	180°
Trail and crossover	159°

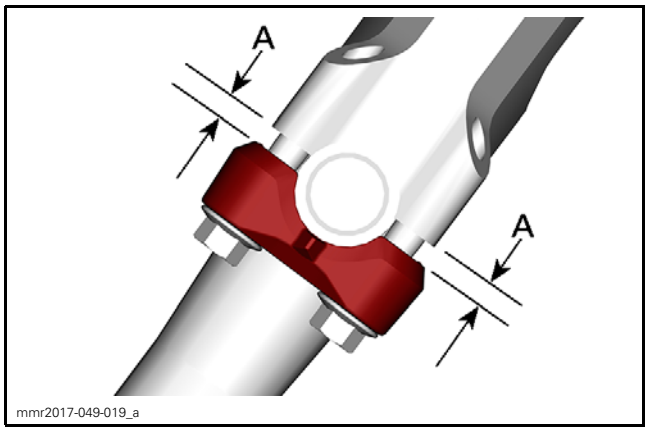


MOUNTAIN MODELS



TRAIL AND CROSSOVER MODELS

Ensure extension clamps are parallel with handlebar extension.



A. Must be equal on each side

⚠ WARNING

Handlebar and it's components must not get in contact with anything (windshield, fuel tank cap, etc.) when steering is turned.

TIE-RODS

NOTE: The same procedure is applied on RH and LH side.

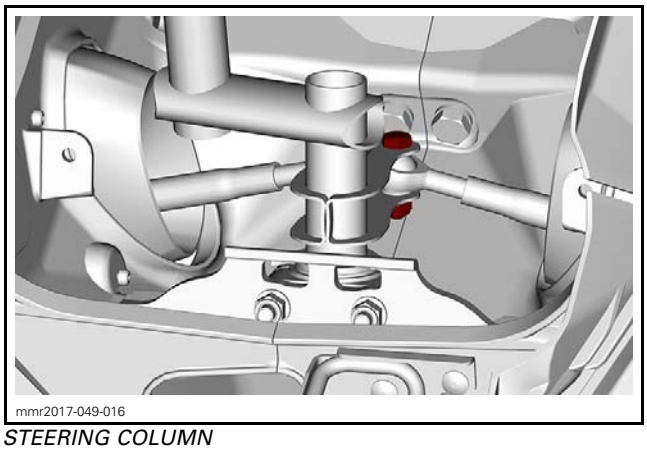
Inspecting the Tie-Rod

Check tie-rod ends for looseness. If play is excessive, replace tie-rod.

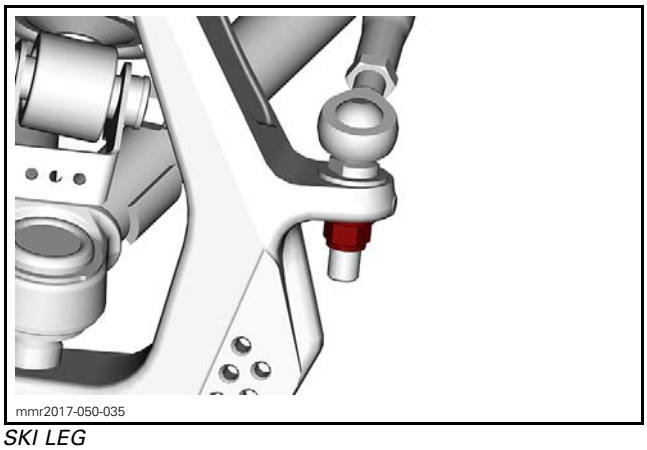
Check if the tie-rod is bent, cracked or otherwise damaged. Replace if necessary.

Removing the Tie-Rod

1. Remove the tuned pipe. Refer to *EXHAUST SYSTEM* subsection.
2. Remove the tie-rod end nuts and screws from the steering column and ski leg.

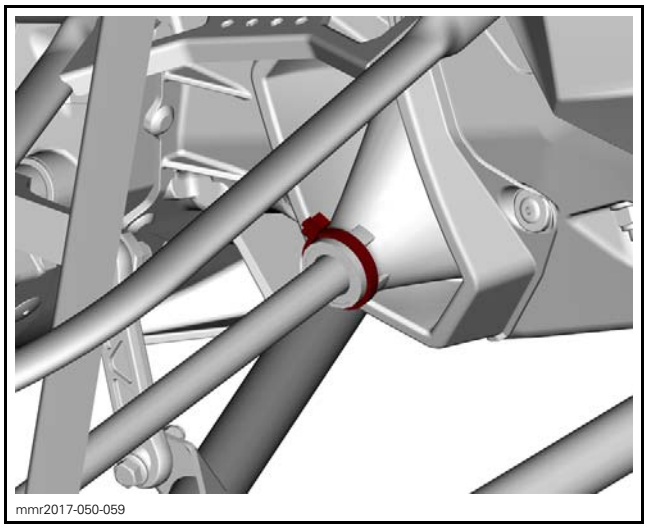


STEERING COLUMN

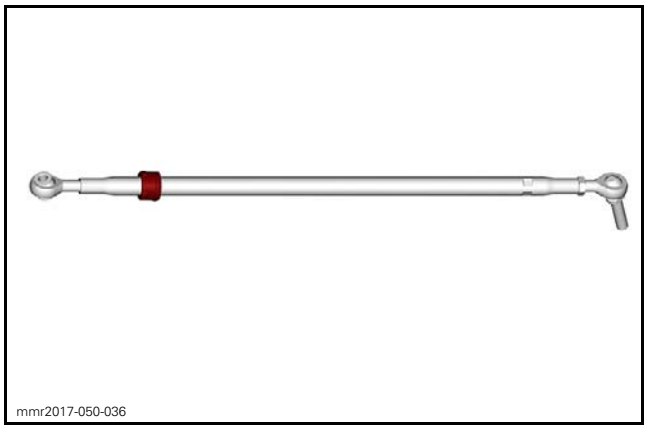


SKI LEG

3. Cut the locking tie on the steering boot.



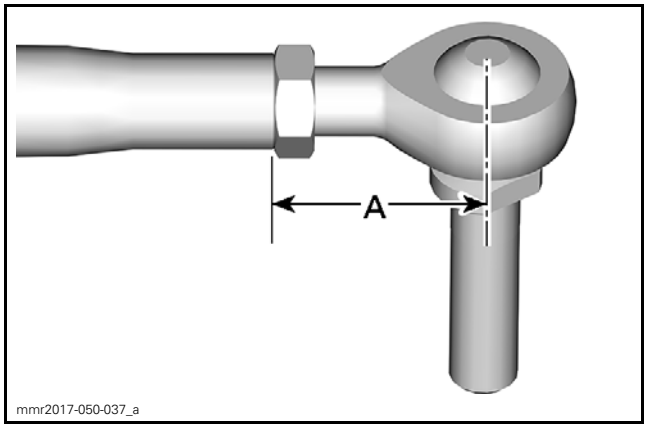
4. Remove tie-rod with ring from vehicle.


mmr2017-050-036

Installing the Tie-Rod

The installation is the reverse of the removal procedure. However, pay attention to the following.

Adjust the length of all tie-rod end to specification without tightening the jam nuts.



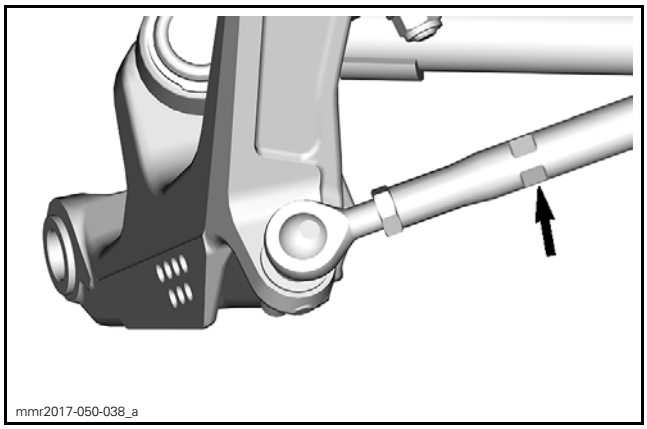
mmr2017-050-037_a

TIE-ROD LENGTH (A)
30 mm (1.181 in)

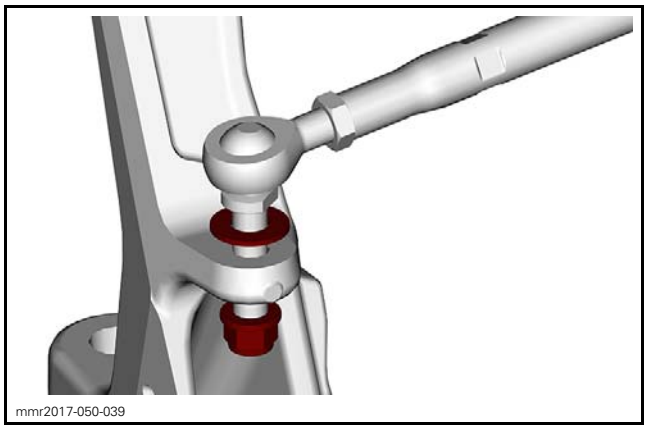
⚠ WARNING

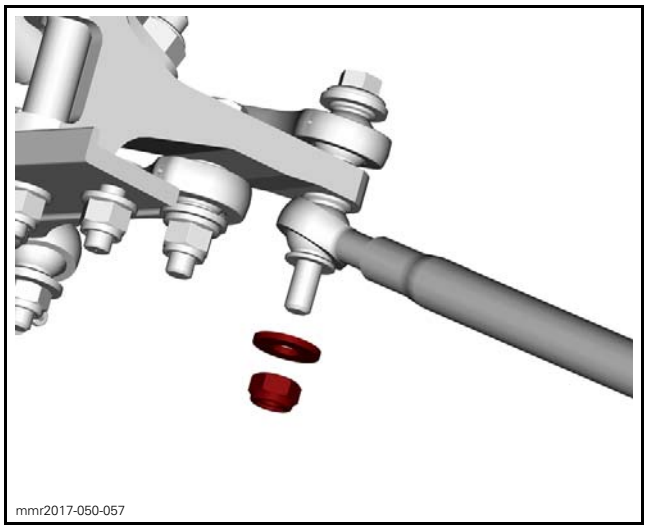
The maximum tie-rod end length (A) not engaged in the tie rod must not exceed 34 mm (1.339 in).

Install tie-rod with the groove on ski leg side.


mmr2017-050-038_a

Install the washer and the nut, and tighten to specification.

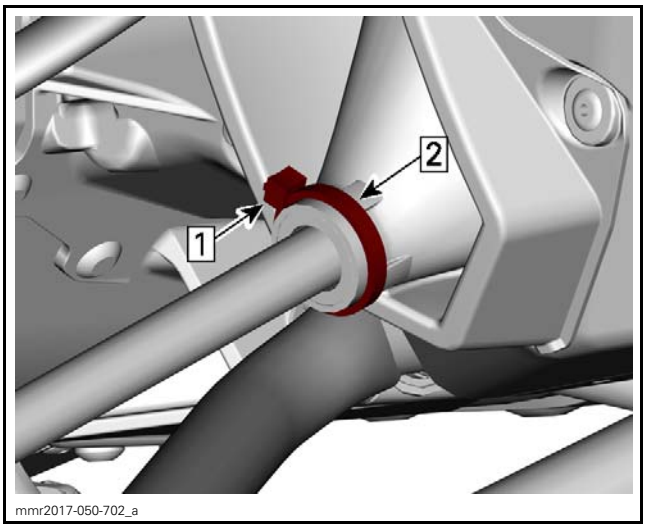

mmr2017-050-039


mmr2017-050-057

TIGHTENING TORQUE	
Outer tie-rod end nut	48 N•m ± 6 N•m (35 lbf•ft ± 4 lbf•ft)
Inner tie-rod end nut	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

Ensure the new locking tie is fully seated and the head is positioned upwards.

NOTICE To avoid bellows damage, make sure locking tie head is positioned upwards.



mmr2017-050-702_a

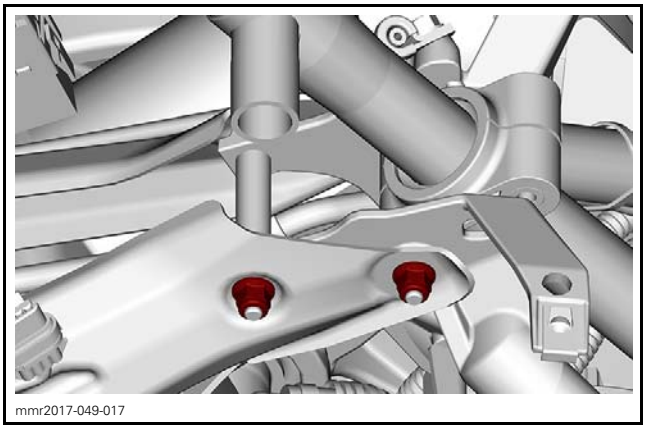
1. Head up
2. Fully seated

Perform the steering alignment, refer to *ALIGNING THE STEERING* in this section.

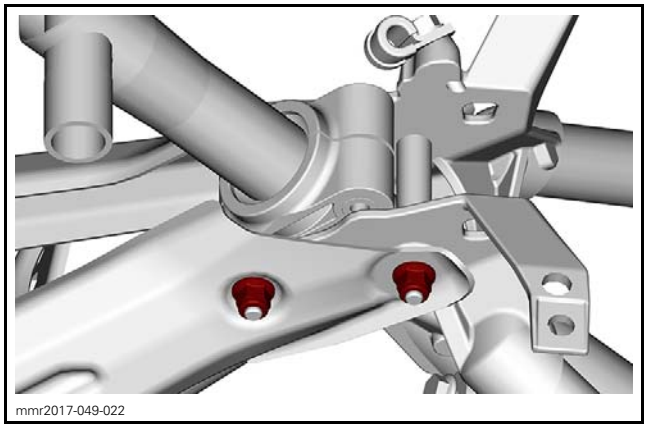
STEERING COLUMN

Removing the Steering Column

1. Remove the tuned pipe. Refer to *EXHAUST SYSTEM* subsection.
2. Remove the rear console. Refer to *BODY* subsection.
3. Remove *HANDLEBAR EXTENSION* from steering column. Refer to the procedure in this subsection.
4. Remove the inner tie-rod end nuts and screws. Refer to *TIE-RODS* in this subsection.
5. Remove nuts and screws securing steering column upper support.

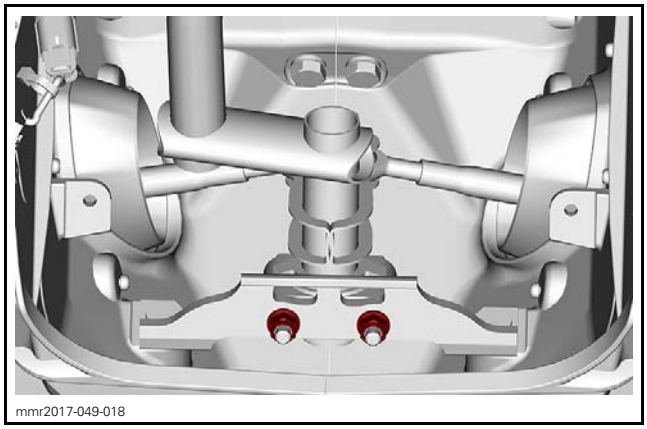

mmr2017-049-017

FRONTWARD POSITION COLUMN


mmr2017-049-022

REARWARD POSITION COLUMN

6. Remove nuts and screws securing the steering column lower support.


mmr2017-049-018

7. Pull steering column from top.

Inspecting the Steering Column

Check if steering column is:
– Cracked
– Bent
– Twisted
– Otherwise damaged.

Replace steering column if necessary.

⚠ WARNING

Do not try to repair a defective steering column.

Installing the Steering Column

The installation is the reverse of the removal procedure. However, pay attention to the followings.

1. Apply SUSPENSION GREASE (P/N 293 550 033) on vibration dampers before installing upper and lower supports.
2. Install new elastic nuts on the steering column retaining screws.

3. Tighten nuts to specification.

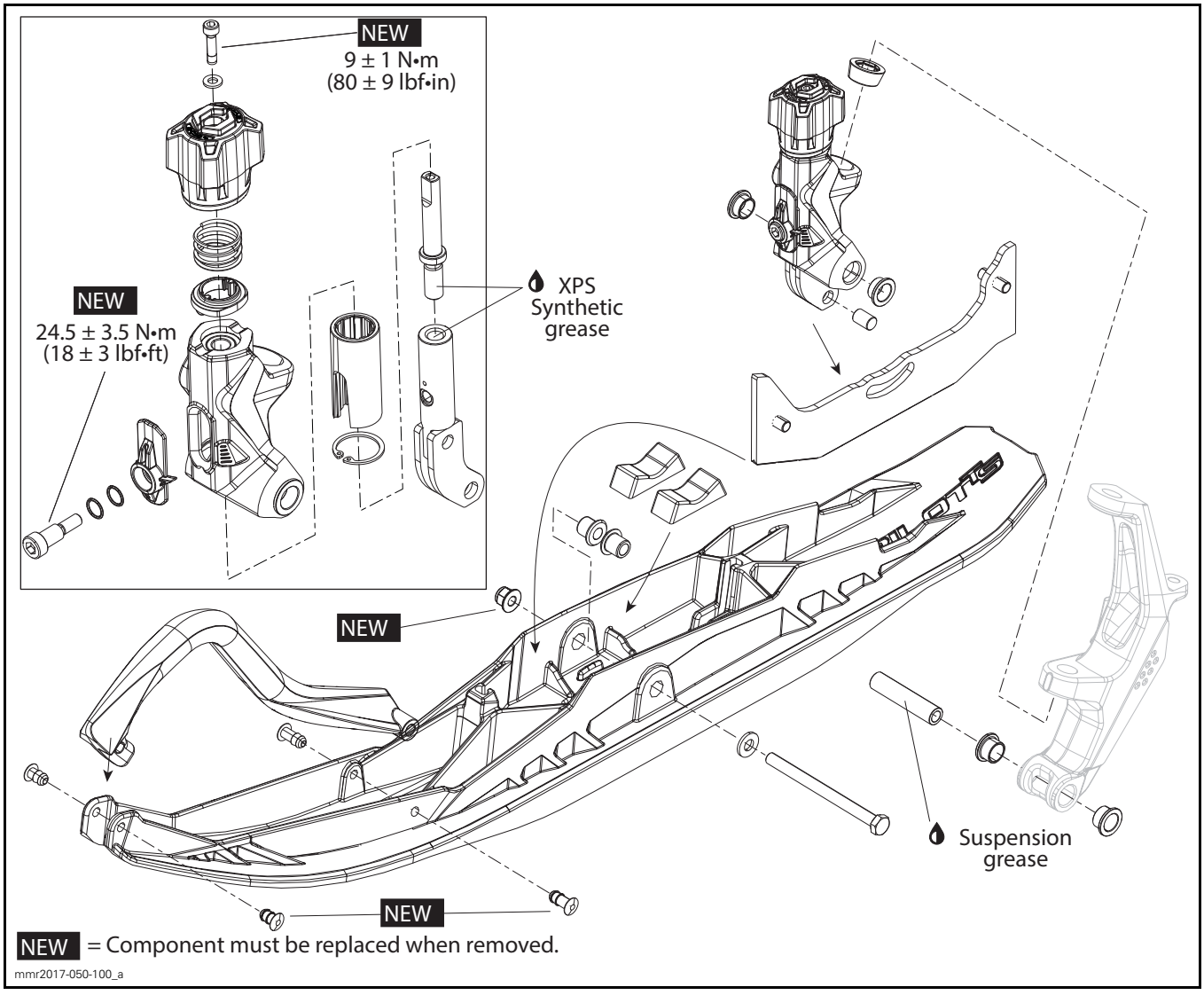
TIGHTENING TORQUE	
Upper steering column support nut	12.5 N•m ± 2.5 N•m (111 lbf•**in** ± 22 lbf•**in**)
Lower steering column support nut	23.5 N•m ± 3.5 N•m (17 lbf•ft ± 3 lbf•ft)

STEERING SYSTEM (RACK)

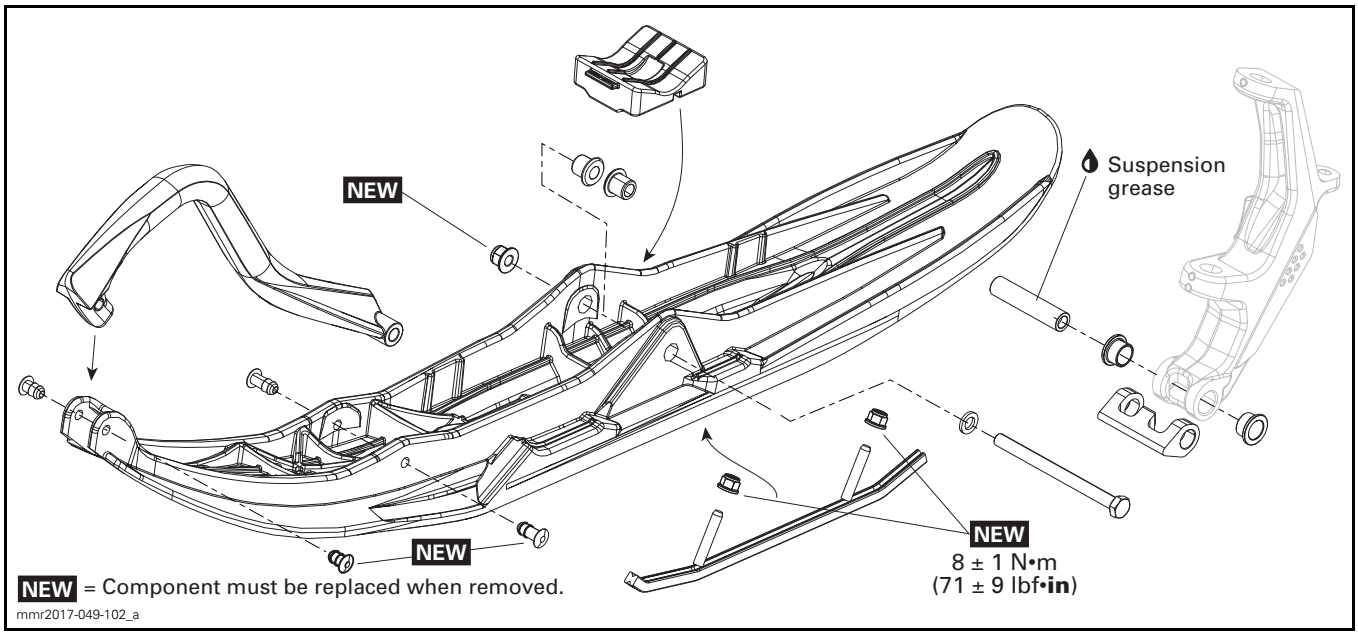
SERVICE PRODUCTS

Description	Part Number	Page
SUSPENSION GREASE	293 550 033	18
XPS BRAKES AND PARTS CLEANER (USA)	219 701 705	8
XPS BRAKES AND PARTS CLEANER	219 701 776	8
XPS SYNTHETIC GREASE	293 550 010	8

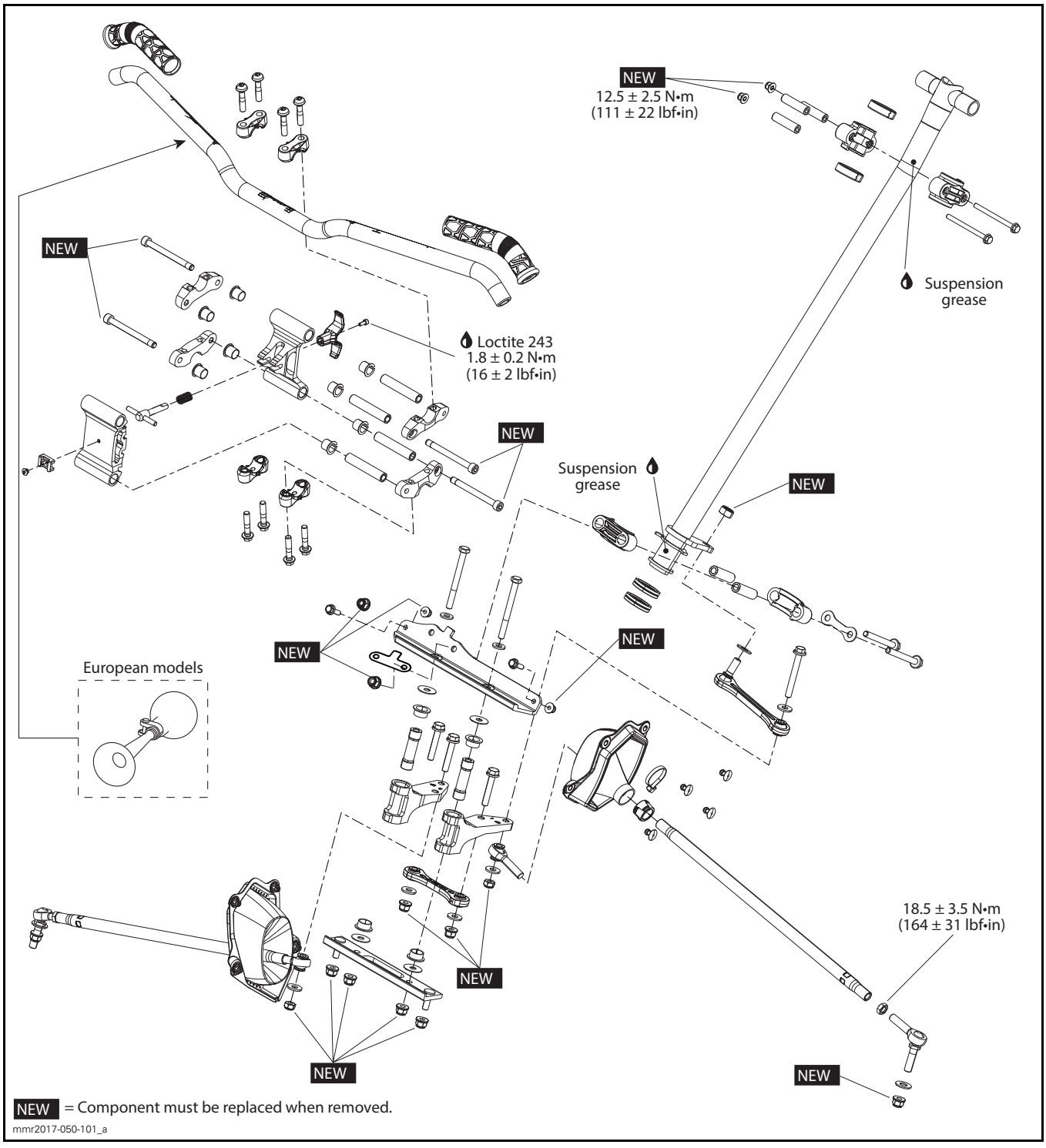
SKIS (WITH ADJUSTABLE RUNNER)



SKIS (WITHOUT ADJUSTABLE RUNNER)



STEERING COLUMN AND TIE-RODS



GENERAL

When removing or replacing a part of the steering mechanism, perform the steering alignment, refer to *STEERING ALIGNMENT* in this subsection.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.) must be replaced.

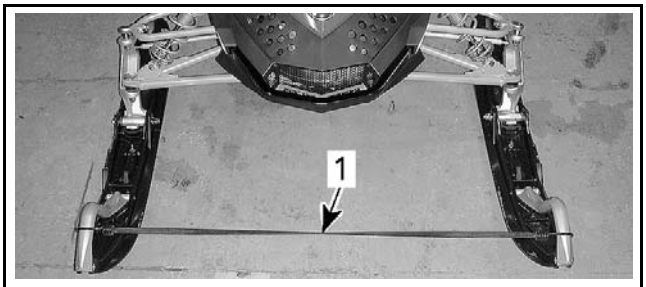
NOTICE **Hoses, cables and locking ties removed during a procedure must be reinstalled at the same location.**

ADJUSTMENT

ALIGNING THE STEERING

Ski alignment is performed by adjusting the length of left and right tie-rods.

1. Leave the vehicle on the ground on its own weight.
2. Attach ski handles together with a bungee cord.

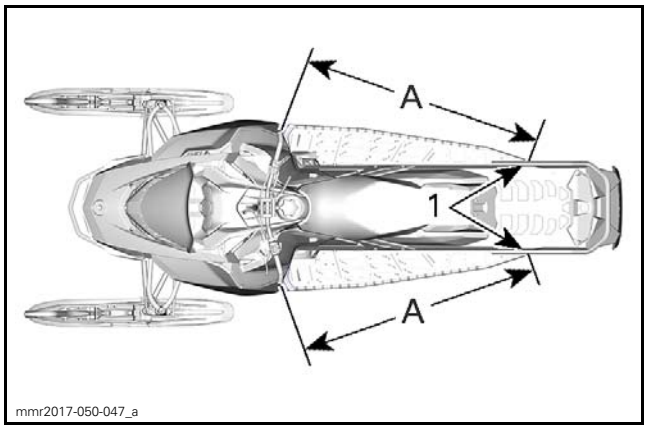


mmr2008-049-025_a

1. Bungee cord

3. Position handlebar so that it is straight ahead position by measuring from the extremities of the grips to the rear most edge of the tunnel, as shown.

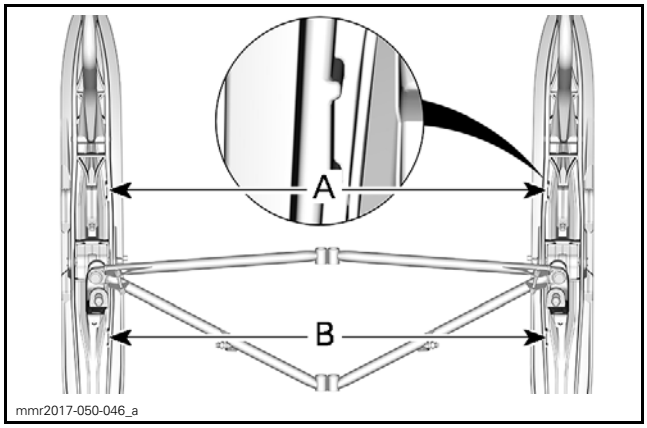
NOTE: The reference point must be the same to each side.



mmr2017-050-047_a

1. Same reference point
A. Equal distance on each side

4. Ensure track is properly aligned.
5. Verify if skis are in straight-ahead position by placing a straight edge against track and measuring distance between front and rear ski bridges and straight edge.
6. With skis in straight ahead position, adjust the toe-out.
7. Measure the distance between front and rear ski bridges in line with arrows on skis.
8. Adjust the steering alignment as per the following illustration and specification.



mmr2017-050-046_a

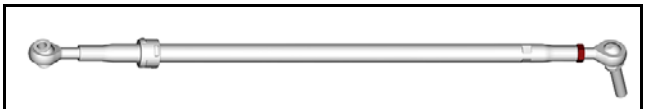
STEERING ALIGNMENT	
Toe-out	A - B = 5 mm (.197 in)

9. If adjustment is needed, loosen tie-rod jam nuts then turn tie-rods to change their length.

NOTE: There is no jam nut on the inner tie-rods.

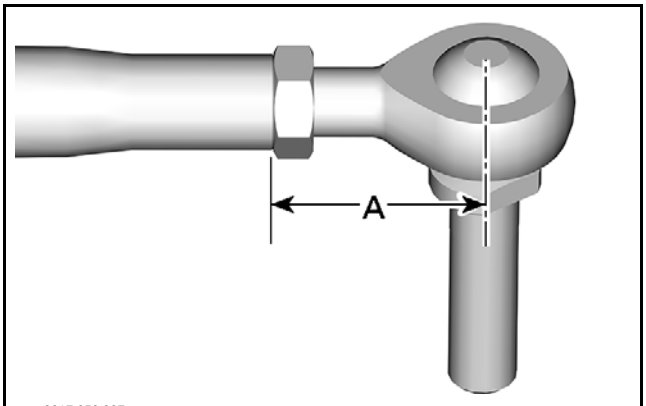
10. Tighten jam nuts to specification.

TIGHTENING TORQUE	
Jam nut	18.5 N•m ± 3.5 N•m (164 lbf•**in** ± 31 lbf•**in**)


mmr2017-050-045

⚠ WARNING

The maximum tie-rod end length (A) not engaged in the tie rod must not exceed 34 mm (1.339 in).



mmr2017-050-037_a

PROCEDURES

SKI RUNNER

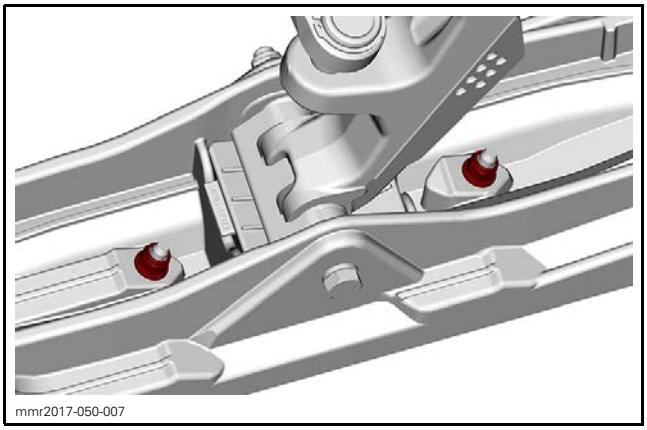
Inspecting the Ski Runner

Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Removing the Ski Runner

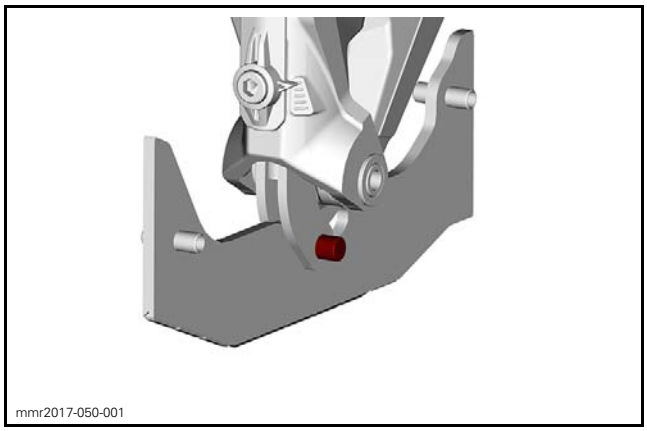
Without Adjustable Ski (Pilot TS)

1. Lift the front of vehicle and support it off the ground.
2. Unscrew the ski runner nuts, then remove the ski runner.


mmr2017-050-007

With Adjustable Ski (Pilot TS)

1. Remove the ski.
2. Remove the pin.


mmr2017-050-001

Installing the Ski Runner

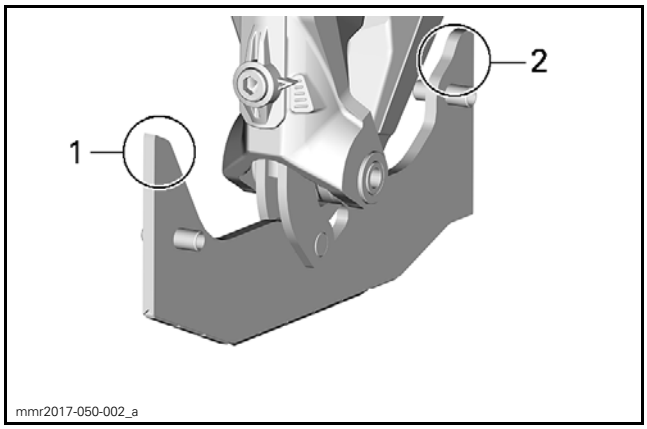
The installation is the reverse of the removal procedure. Pay attention to the following.

Without Adjustable Ski (Pilot TS)

Tighten ski runner nuts to specification.

TIGHTENING TORQUE	
Runner nut	8 N•m ± 1 N•m (71 lbf•**in** ± 9 lbf•**in**)

With Adjustable Ski (Pilot TS)



mmr2017-050-002_a

1. Towards front
2. Towards rear

SKIS

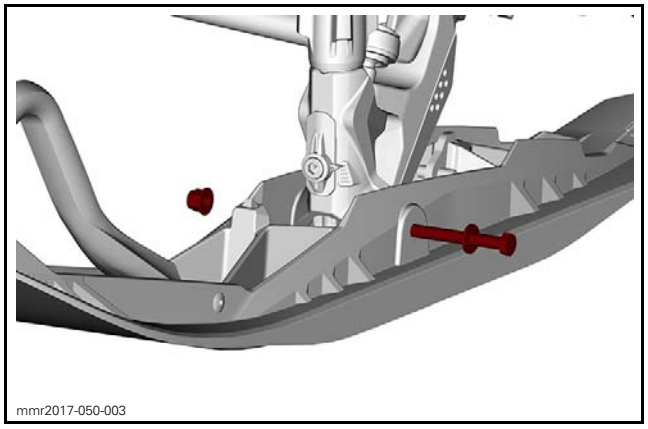
Inspecting the Ski

Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Removing the Ski

1. Lift front of vehicle and support it off ground.

2. Unscrew nut then pull ski bolt out.

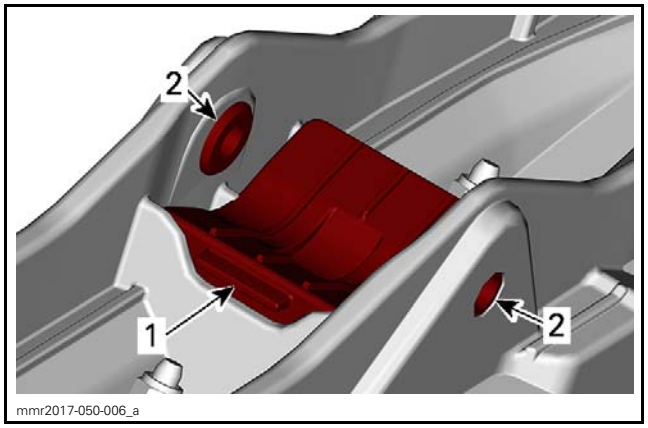


3. Remove ski from vehicle.

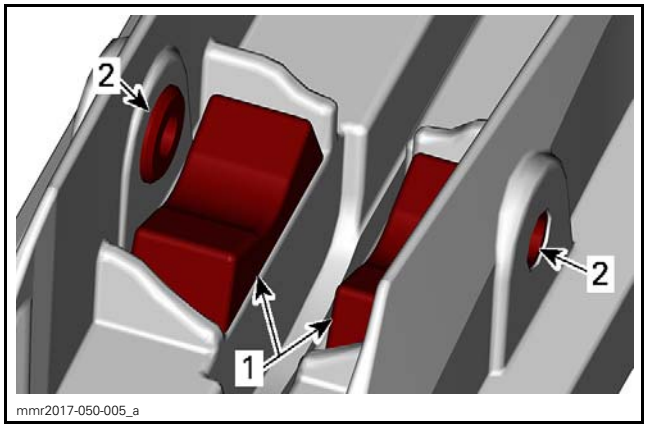
Installing the Ski

Make sure bushings are installed in ski holes.

Install the ski stopper. Position indicator in front and make sure the bump in the ski is in the groove of the ski stopper.

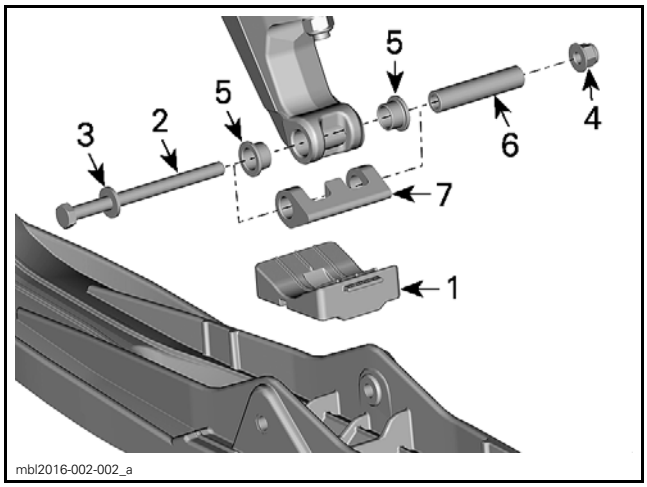


WITHOUT ADJUSTABLE SKI (PILOT TS)
1. *Ski stopper*
2. *Bushings*

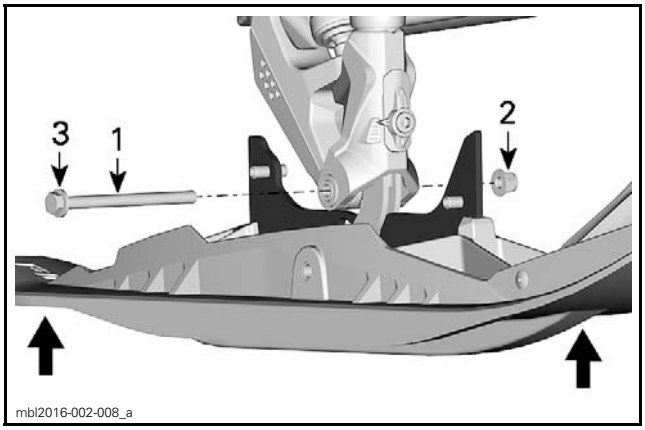


WITH ADJUSTABLE SKI (PILOT TS)
1. *Ski stopper*
2. *Bushings*

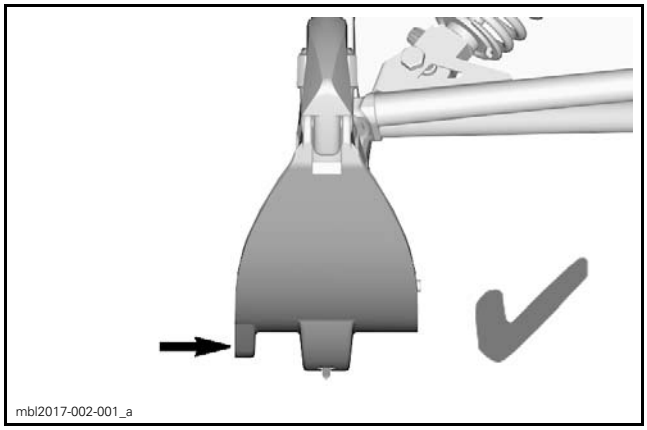
Install ski on ski leg as per the following illustrations.



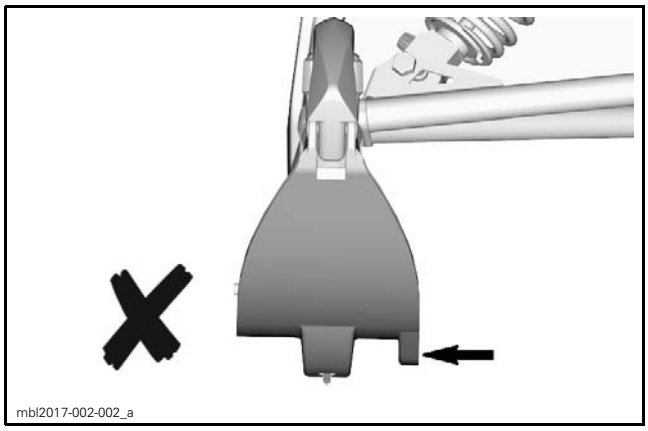
WITHOUT ADJUSTABLE SKI (PILOT TS)
1. *Ski stopper*
2. *M10 x 130 screw*
3. *M10 flat washer*
4. *M10 flanged nut*
5. *Ski leg bushings*
6. *Ski leg sleeve*
7. *Ski leg stopper*



WITH ADJUSTABLE SKI (PILOT TS)
1. *Ski screw*
2. *Nut*
3. *Washer*



LATERAL SKI KEEL TOWARDS OUTSIDE (IF EQUIPPED) - CORRECT



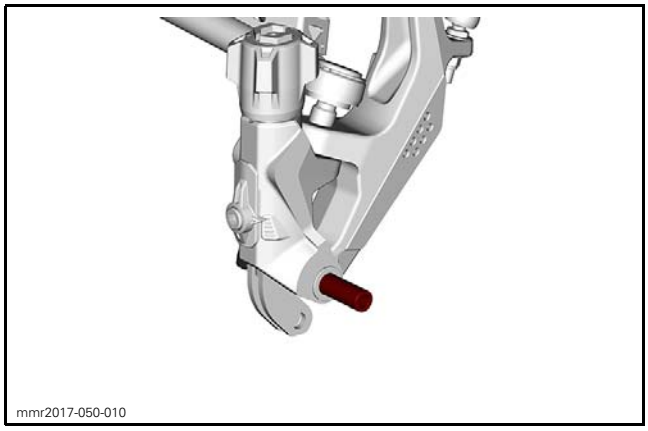
LATERAL SKI KEEL TOWARDS INSIDE (IF EQUIPPED) - NOT CORRECT

TIGHTENING TORQUE	
Ski nut	48 N•m ± 6 N•m (35 lbf•ft ± 4 lbf•ft)

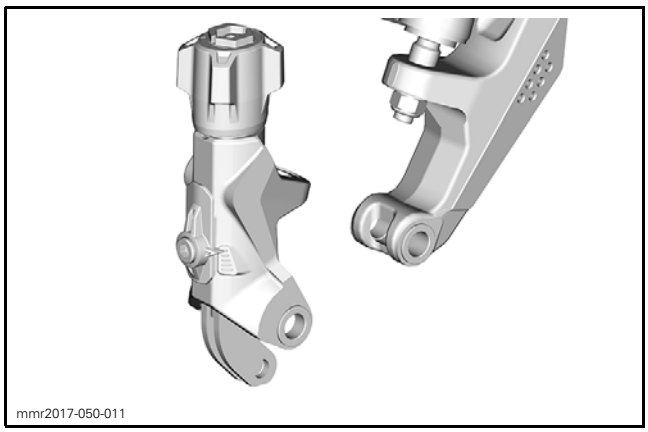
ADJUSTABLE SKI MECHANISM

Removing the Adjustable Ski Mechanism

1. Remove the ski and the runner.
2. Slide the sleeve out of the ski leg.



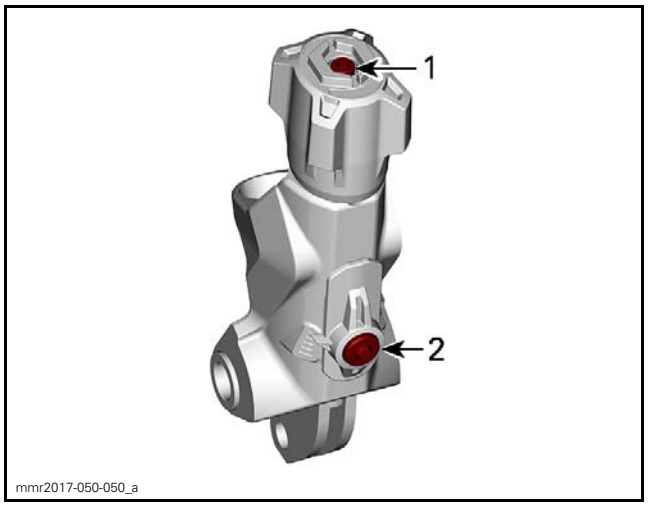
3. Remove the mechanism from the ski leg.



Disassembling the Adjustable Ski Mechanism

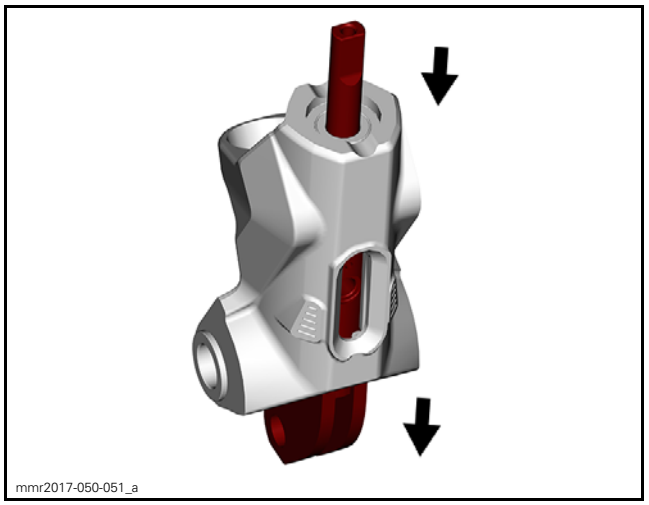
1. Remove the adjusting knob and the indicator screws.

NOTE: There are two O-rings on the indicator screw.

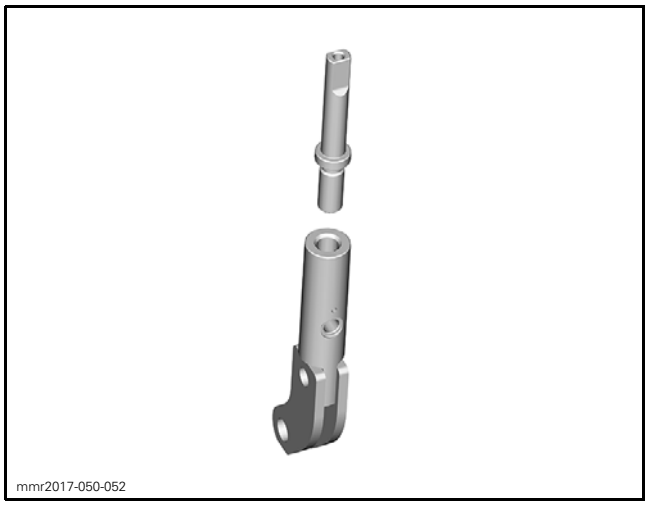


1. *Adjusting knob screw*
2. *Indicator screw*

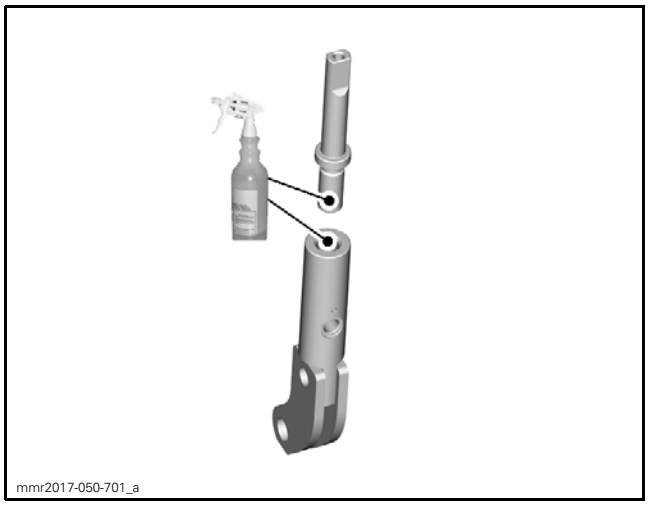
2. Slide the adjusting screw and the adjusting shaft out of the body.



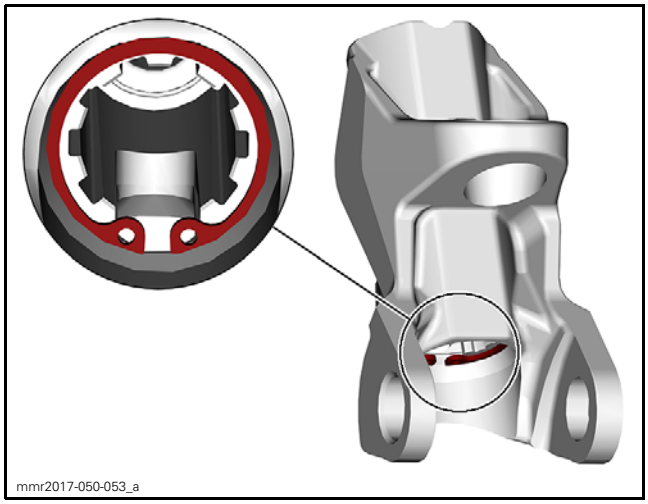
3. Remove the screw from the shaft.


mmr2017-050-052

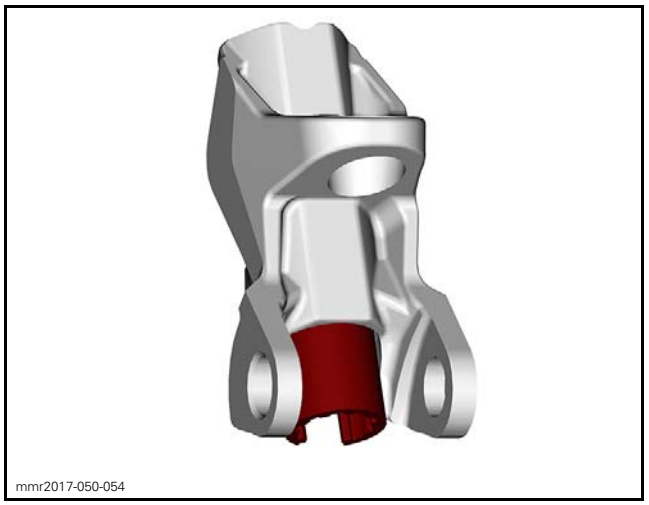
4. Clean the screw and the shaft inner threads with XPS BRAKES AND PARTS CLEANER (USA) (P/N 219 701 705) or XPS BRAKES AND PARTS CLEANER (P/N 219 701 776) and a small brush.


mmr2017-050-701_a

5. Remove the snap ring.


mmr2017-050-053_a

6. Slide the sleeve out of the body.


mmr2017-050-054

Inspecting the Adjustable Ski Mechanism

Inspect the mechanism body for cracks. Replace if required.

Inspect the adjusting screw and shaft for:

– Thread damages

– Bending.

Replace if required.

Inspect the sleeve for:

– Cracks

– Spline damages

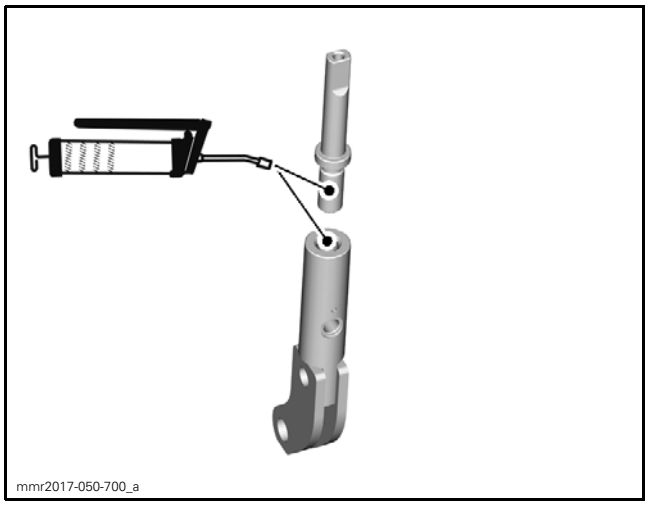
Replace if required.

Inspect the ball bearing. It should turn freely and smoothly. If bearing needs to be replaced, replace the mechanism assembly.

Assembling the Adjustable Ski Mechanism

The assembly is the reverse of the disassembly procedure. However, pay attention to the following.

Apply XPS SYNTHETIC GREASE (P/N 293 550 010) on screw thread and shaft inner thread.


mmr2017-050-700_a

Install a new knob screw.

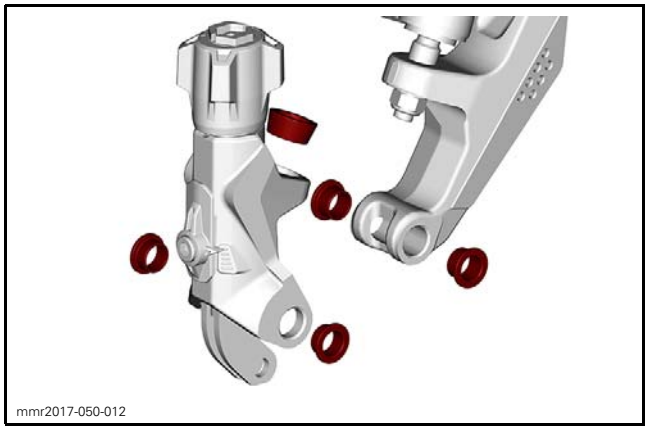
TIGHTENING TORQUE	
Adjusting knob screw	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)
Indicator screw	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

Installing the Adjustable Ski Mechanism

The installation is the reverse of the removing procedure. However, pay attention to the following.

Install rubber grommet on nut first. Align flat against flat.

Ensure all bushings, and the grommet are in place and fully seated.


mmr2017-050-012

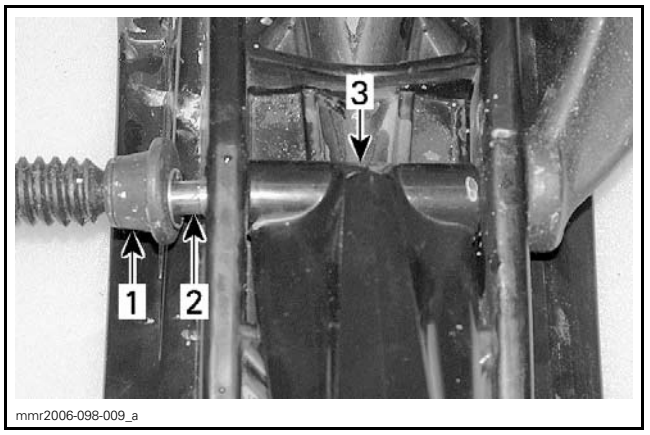
SKI HANDLES

Removing the Ski Handle

1. Remove ski from vehicle.
2. Using a 9 mm (3/8 in) drill bit, remove ski handle rivets. Only drill the head of rivet. Do not try to drill all the way through the rivet. Angle the drill bit to reduce the chance of spinning the rivet in the ski.
3. Remove handle from ski.
4. Place handle in hot water for 10 minutes then using a punch, drive the inner part of rivet out of handle.

Installing the Ski Handle

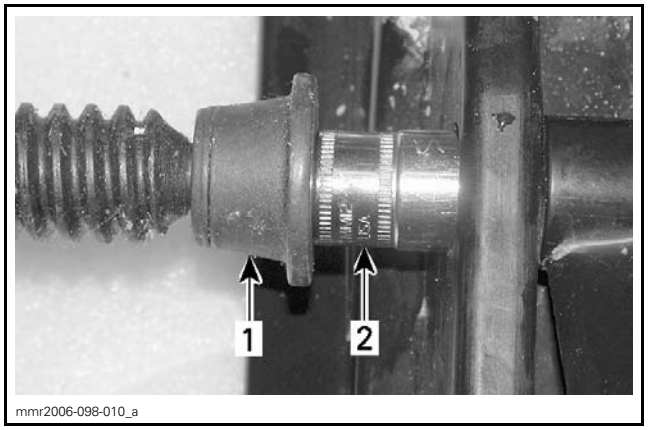
1. To install rivets, use a C-clamp and a short 10 mm socket.
2. Place a rivet in position and insert it into ski and ski handle. Repeat the procedure for the other side.



mmr2006-098-009_a

1. C-clamp
2. Rivet
3. Handle

3. When both rivets are installed, use the short 10 mm socket to push rivet heads against the ski.



mmr2006-098-010_a

1. C-clamp
2. 10 mm socket

SKI LEG

To replace a ski leg, refer to *FRONT SUSPENSION* subsection.

HANDLEBAR GRIP

NOTE: To verify or replace heating elements, refer to *LIGHTS, GAUGE AND ACCESSORIES* subsection.

Removing the Handlebar Grip

Remove grips by pulling while using compressed air, which will inflate or loosen the fit between the grip and handlebar.


mmr2015-143-007

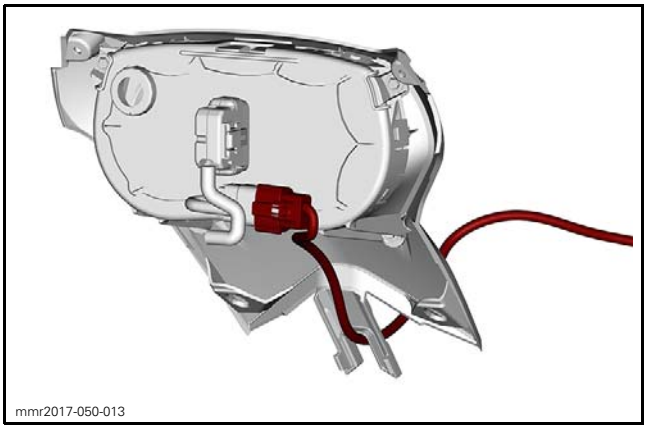
Installing the Handlebar Grip

Insert the handlebar grip on handlebar while blowing compressed air to inflate or loosen the fit between grip and handlebar.

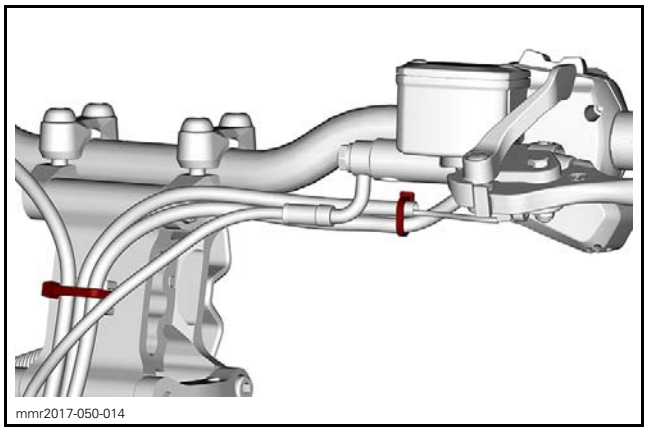
MULTIFUNCTION SWITCH

Removing the Multifunction Switch

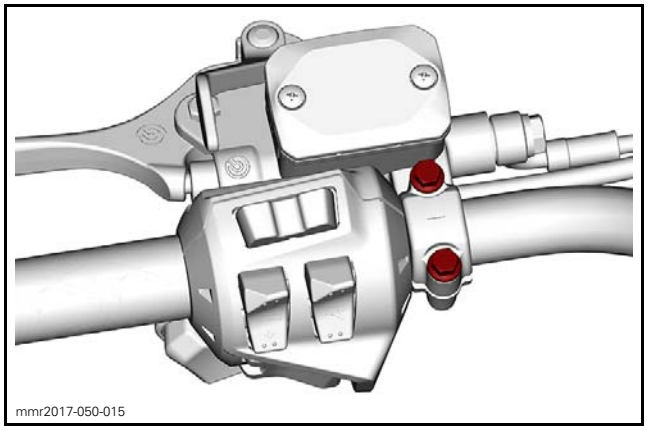
1. Remove the gauge support. Refer to *BODY* subsection.
2. Disconnect the multifunction switch connector.


mmr2017-050-013

3. Cut locking ties securing multifunction switch harness.


mmr2017-050-014

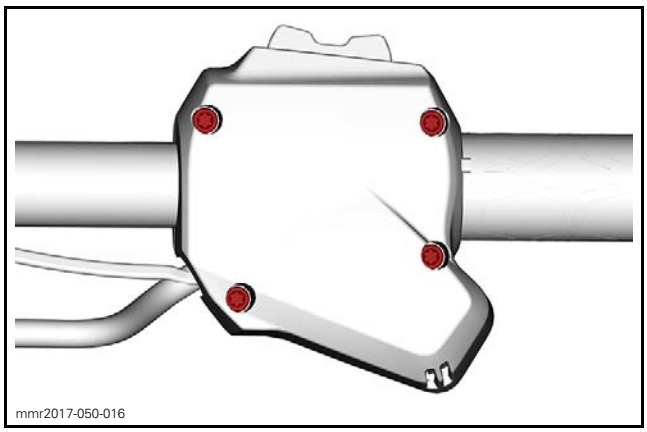
4. Unscrew master cylinder from handlebar.


mmr2017-050-015

5. Remove master cylinder.

NOTICE **Do not let master cylinder hang by the hose and do not stretch or twist the hose.**

6. Remove multifunction switch screws.


mmr2017-050-016

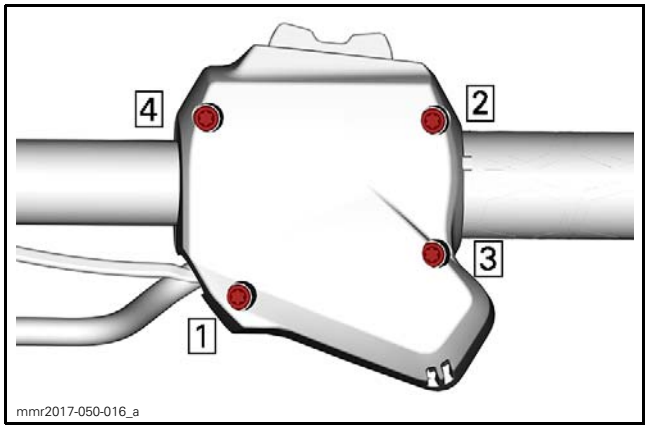
7. Remove multifunction switch from vehicle.

Installing the Multifunction Switch

The installation is the reverse of the removal procedure. However, pay attention to the following.

Tighten the multifunction switch screws to specification, as per the following sequence.

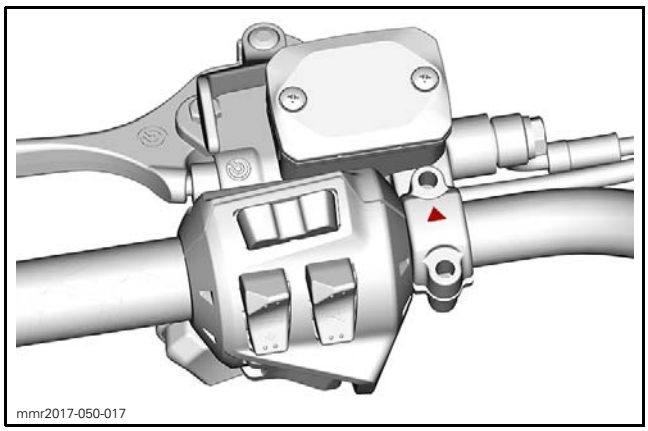
TIGHTENING TORQUE	
Multifunction switch screw	2.4 N•m ± 0.2 N•m (21 lbf•**in** ± 2 lbf•**in**)



mmr2017-050-016_a

Place the master cylinder on the handlebar.

Install master cylinder retaining clamp with its arrow pointing toward the front of vehicle.


mmr2017-050-017

Install master cylinder clamp screws and tighten loosely.

With the handlebar in the straight ahead position, place the reservoir parallel to the ground.

Tighten master cylinder clamp screws to specification.

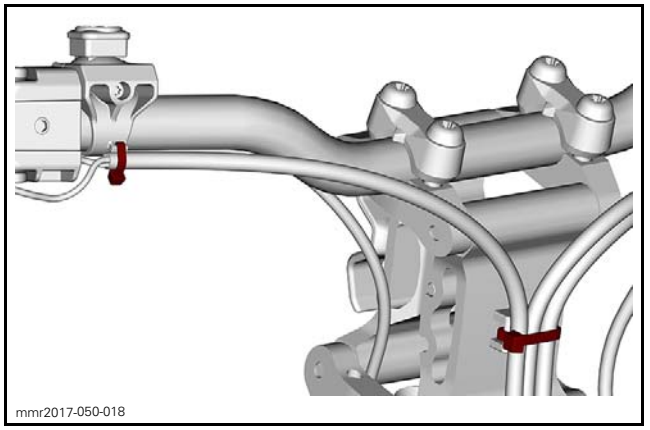
TIGHTENING TORQUE	
Master cylinder clamp screw	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

Turn handlebar completely from side to side making sure it does not exert unwanted tension on handlebar wires.

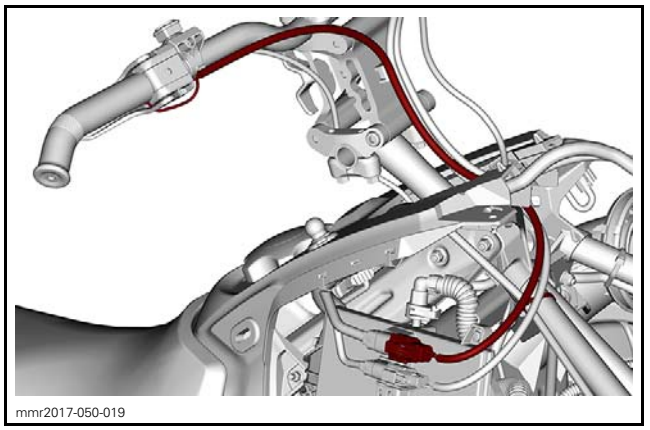
THROTTLE LEVER HOUSING

Removing the Throttle Lever Housing

1. Remove the upper body module. Refer to *BODY* subsection.
2. Cut the harness locking ties.


mmr2017-050-018

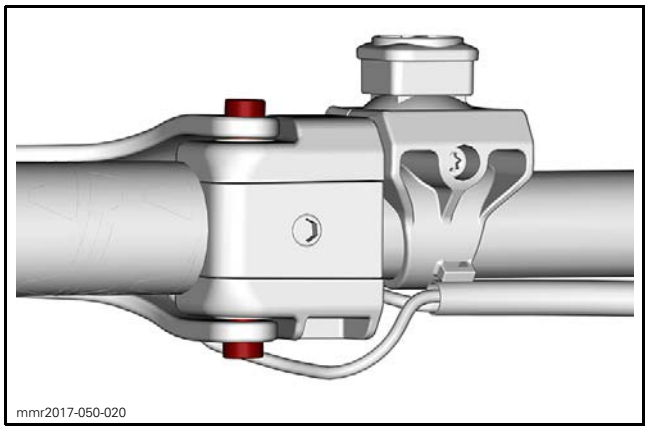
3. Disconnect the RH heater element connector.


mmr2017-050-019

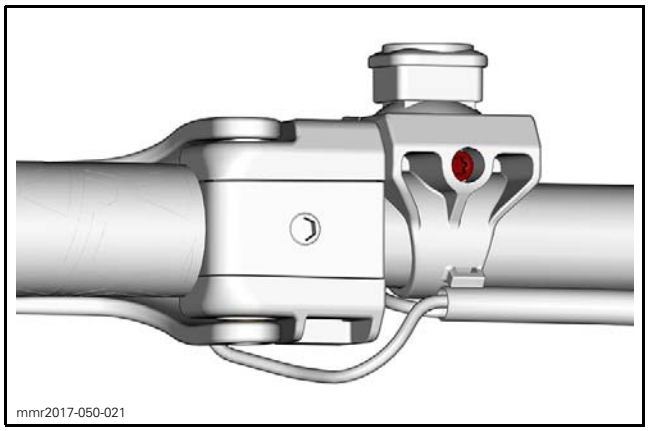
4. Remove the heater element wire terminals from connector. Refer to *WIRING HARNESS AND CONNECTORS* subsection.

NOTICE **Take note of exact positioning of multifunction wire before removing it from the connector.**

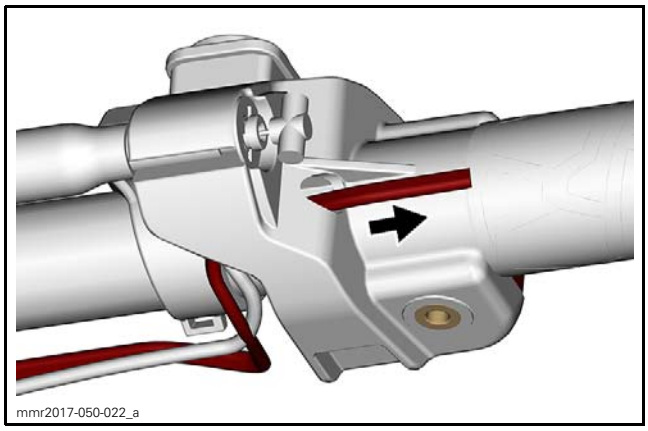
5. Disconnect throttle cable from throttle lever.
6. Remove both throttle lever pivot screws.



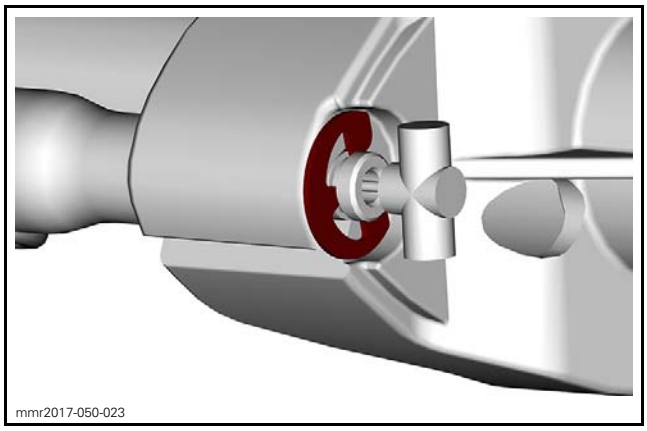
7. Loosen the emergency stop switch screw and slide the switch towards center of handlebar.



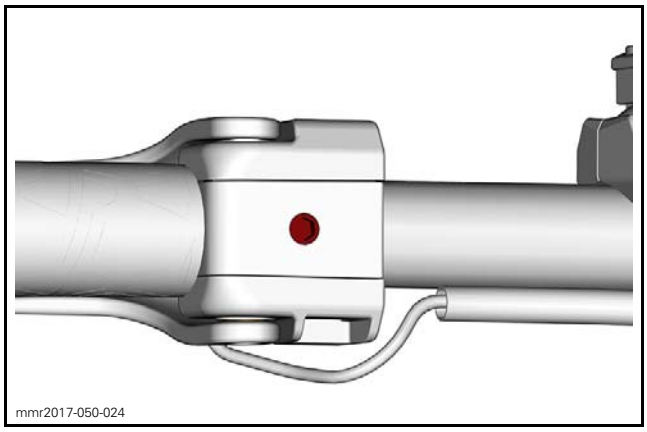
8. Pull the heater element wire out of the throttle lever housing.



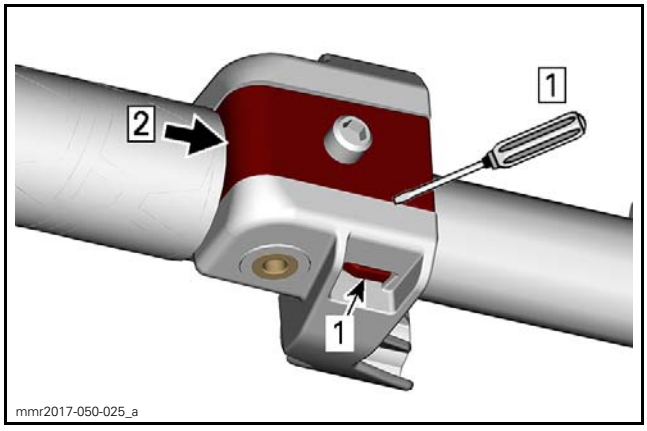
9. Remove throttle cable circlip.



10. Remove the throttle cable from the housing.
11. Loosen throttle lever housing retaining screw.

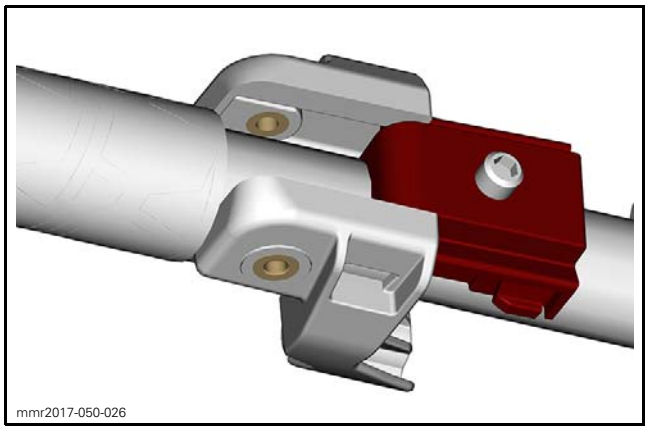


12. Insert a flat screwdriver between the housing and the clamp to release the tab.

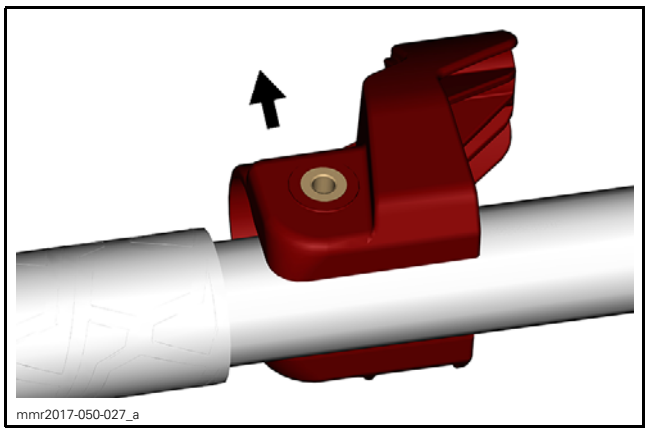


1. Tab

13. Slide the clamp out of the housing


mmr2017-050-026

14. Remove throttle lever housing from handlebar.


mmr2017-050-027_a

Installing the Throttle Lever Housing

The installation is the reverse of the removal procedure. However, pay attention to the following.

Tighten throttle lever pivot screws to specification.

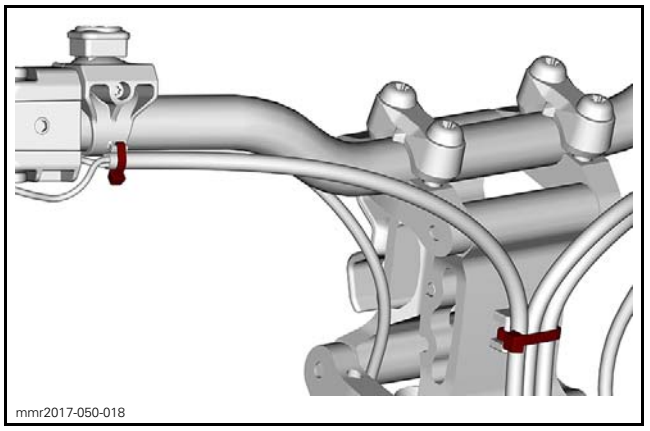
TIGHTENING TORQUE	
Throttle lever retaining screw	1.5 N•m ± 0.2 N•m (13 lbf•**in** ± 2 lbf•**in**)

Turn handlebar completely from side to side making sure it does not exert unwanted tension on handlebar wires.

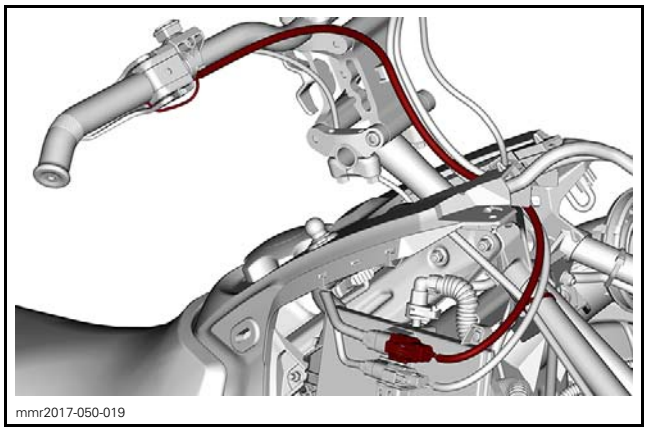
THROTTLE LEVER

Removing the Throttle Lever

1. Remove the upper body module. Refer to *BODY* subsection.
2. Cut the harness locking ties.


mmr2017-050-018

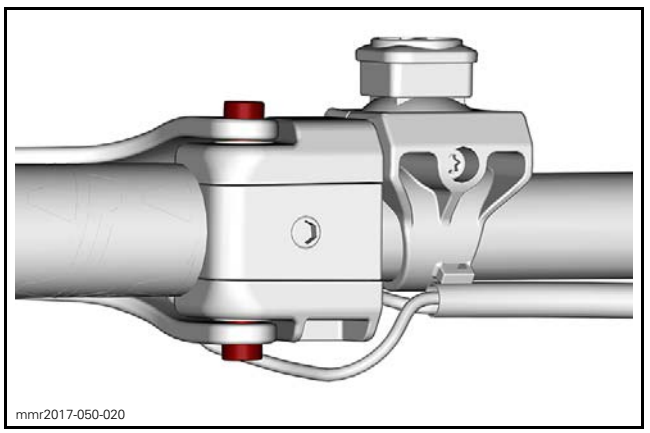
3. Disconnect the LH heater element connector.


mmr2017-050-019

4. Remove throttle lever heater wire terminals from connector. Refer to *CONNECTOR INFORMATION* subsection.

NOTICE **Take note of exact positioning of throttle lever heater before removing it from the connector.**

5. Disconnect throttle cable from throttle lever.
6. Remove throttle lever pivot screws.


mmr2017-050-020

7. Remove throttle lever and heater wires.

Installing the Throttle Lever

The installation is the reverse of the removal procedure. However, pay attention to the following.

Tighten throttle lever pivot screws to specification.

TIGHTENING TORQUE	
Throttle lever pivot screw	1.5 N•m ± 0.2 N•m (13 lbf•**in** ± 2 lbf•**in**)

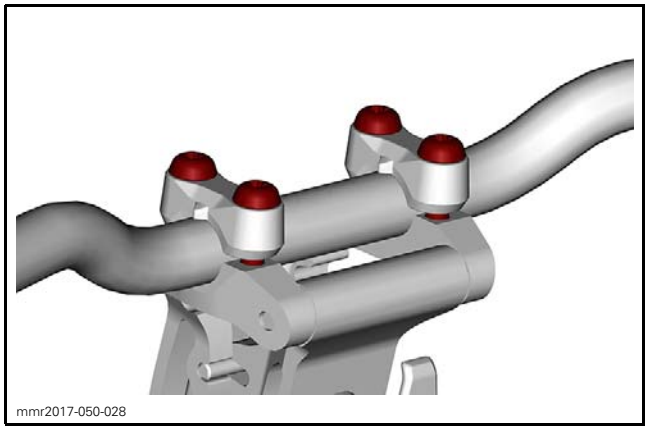
Turn handlebar completely from side to side making sure it does not exert unwanted tension on handlebar wires.

HANDLEBAR

Removing the Handlebar

NOTE: If the handlebar must be changed, remove all components (handlebar grip, throttle lever housing, etc.) before removing it from vehicle.

1. Remove handlebar retaining clamp screws.



2. Remove handlebar from handlebar extension.

Inspecting the Handlebar

1. Inspect the handlebar for:
   - Damages
   - Cracks
   - Bending.
2. Replace if any of these problems is detected.

⚠ WARNING

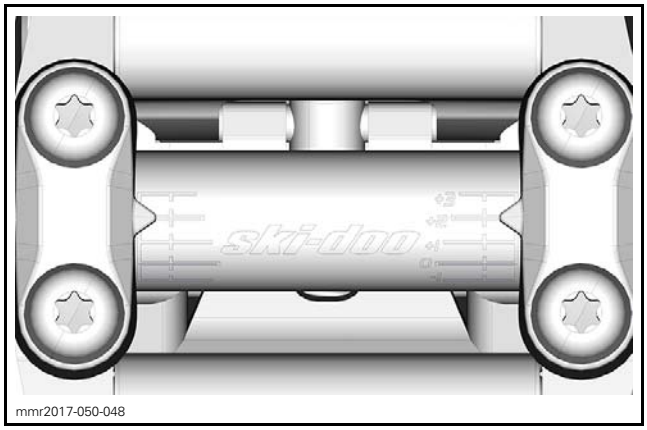
Do not try to repair a defective handlebar.

3. Check handlebar clamps for cracks or distortion, replace if necessary.

Installing the Handlebar

The installation is the reverse of the removal procedure. However, pay attention to the following.

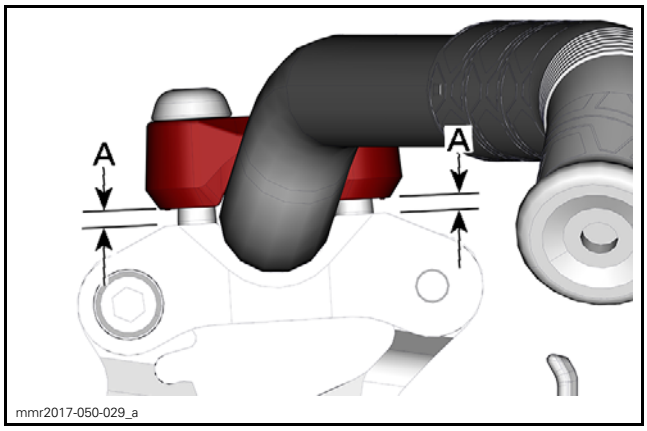
Position the handlebar at +2 with clamps.



Tighten handlebar clamps screws to specification.

TIGHTENING TORQUE	
Clamp screw	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

Ensure handlebar clamps are parallel with handlebar extension.



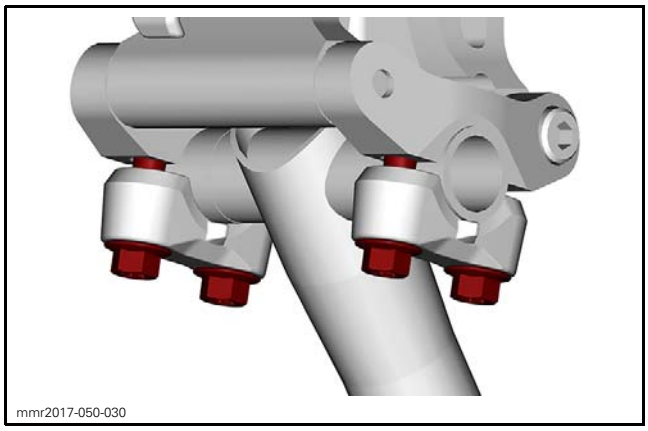
A. Must be equal on each side

Turn handlebar completely from side to side making sure it does not exert unwanted tension on handlebar wires.

HANDLEBAR EXTENSION

Removing the Handlebar Extension

1. Proceed with *REMOVING THE HANDLEBAR*, see procedure in this subsection.
2. Remove screws retaining the extension to steering column.


mmr2017-050-030

3. Remove handlebar extension from vehicle.

Inspecting the Handlebar Extension

1. Check handlebar extension for:
   – Cracks
   – Bending
   – Other damages.
2. Replace if any of these problems is detected.

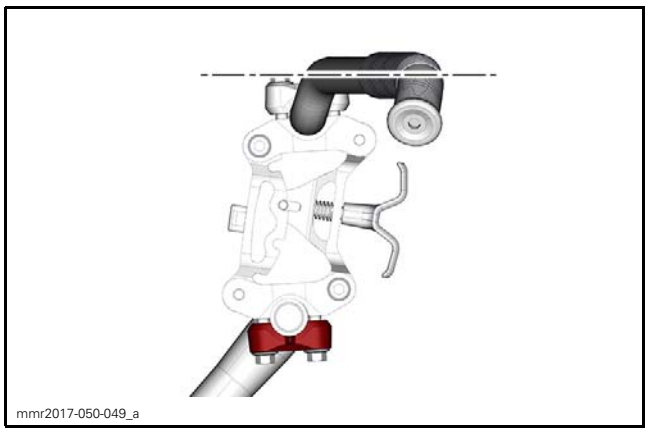
⚠ WARNING

Do not try to repair a defective handlebar extension.

Installing the Handlebar Extension

The installation is the reverse of the removal procedure. However, pay attention to the following.

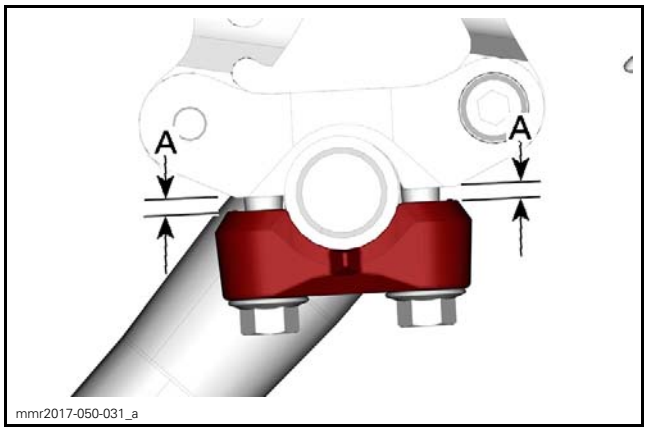
Position the extension in order to have the handlebar horizontal.


mmr2017-050-049_a

Torque handlebar extension retaining screws to specification.

TIGHTENING TORQUE	
Clamp screw	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

Ensure extension clamps are parallel with handlebar extension.



mmr2017-050-031_a

A. Must be equal on each side

⚠ WARNING

Handlebar and it's components must not get in contact with anything (windshield, fuel tank cap, etc.) when steering is turned.

TIE-RODS

NOTE: The same procedure is applied on RH and LH side.

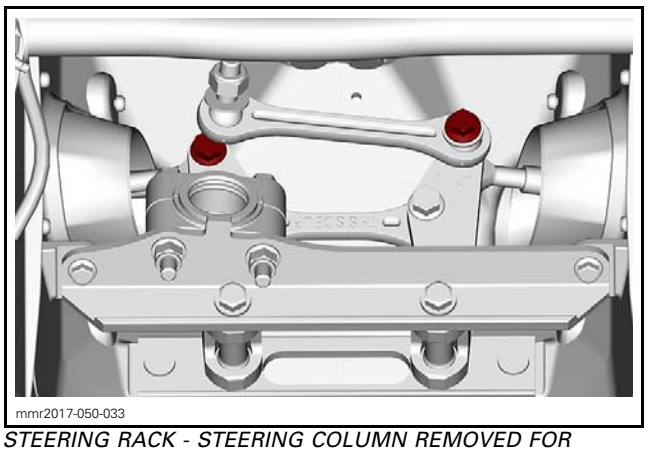
Inspecting the Tie-Rod

Check tie-rod ends for looseness. If play is excessive, replace tie-rod.

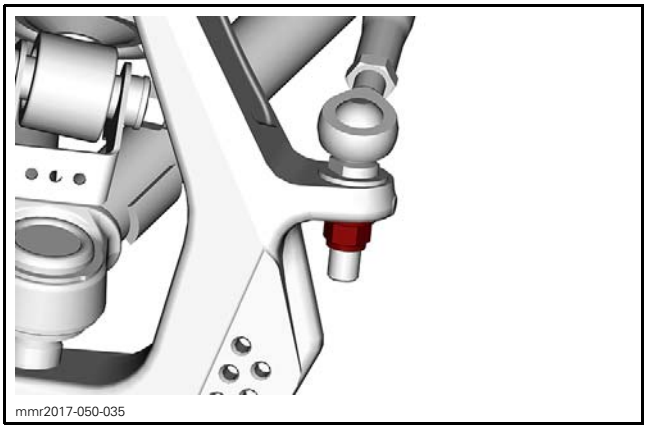
Check if the tie-rod is bent, cracked or otherwise damaged. Replace if necessary.

Removing the Tie-Rod

1. Remove the tuned pipe. Refer to *EXHAUST SYSTEM* subsection.
2. Remove the tie-rod end nuts and screws from the steering rack and ski leg.

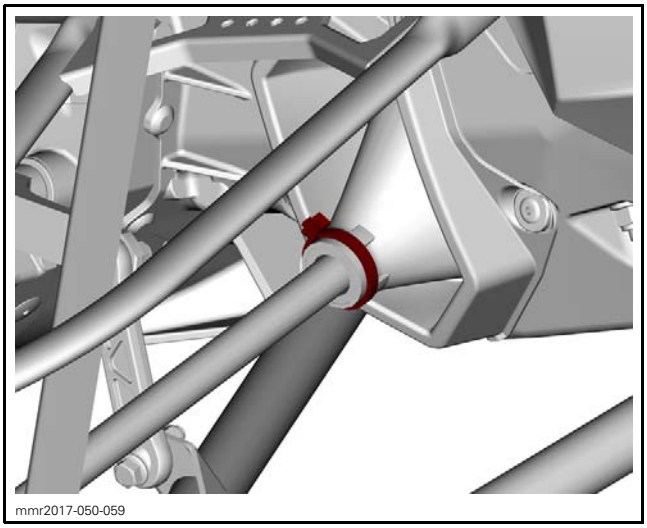

mmr2017-050-033

STEERING RACK - STEERING COLUMN REMOVED FOR CLARITY

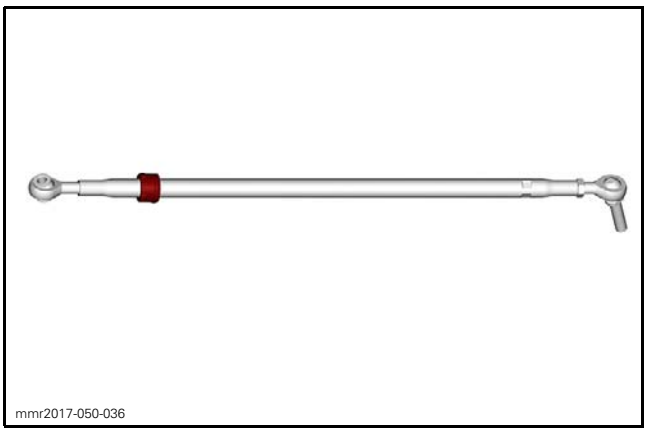

mmr2017-050-035

SKI LEG

3. Cut the locking tie on the steering boot.


mmr2017-050-059

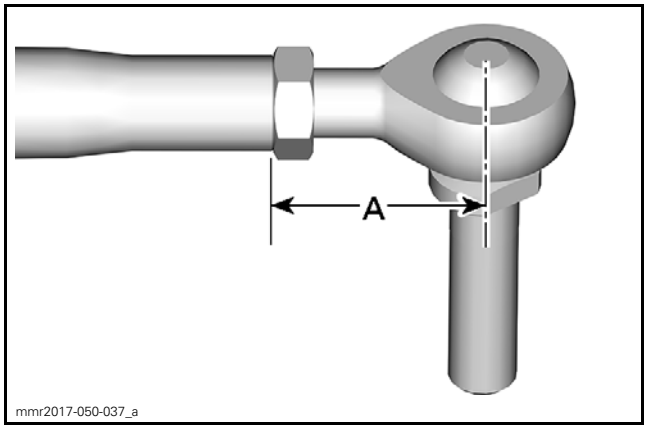
4. Remove tie-rod with ring from vehicle.


mmr2017-050-036

Installing the Tie-Rod

The installation is the reverse of the removal procedure. However, pay attention to the following.

Adjust the length of all tie-rod end to specification without tightening the jam nuts.



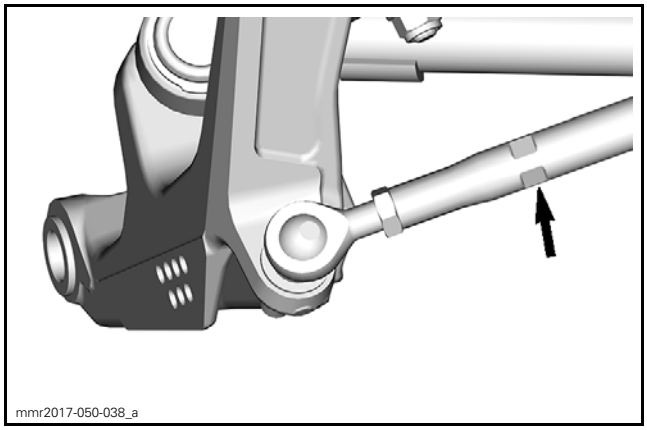
mmr2017-050-037_a

TIE-ROD LENGTH (A)
30 mm (1.181 in)

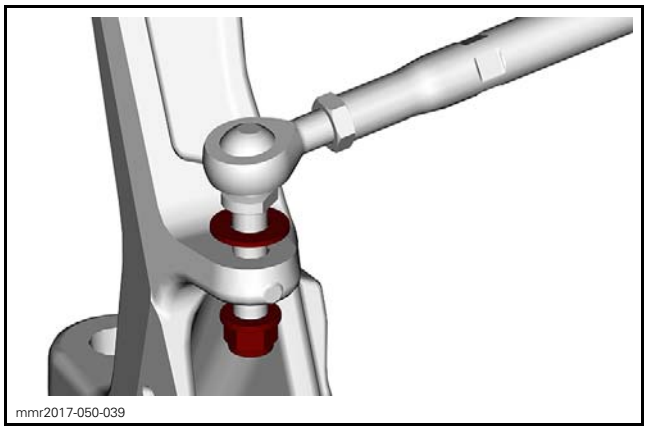
⚠ WARNING

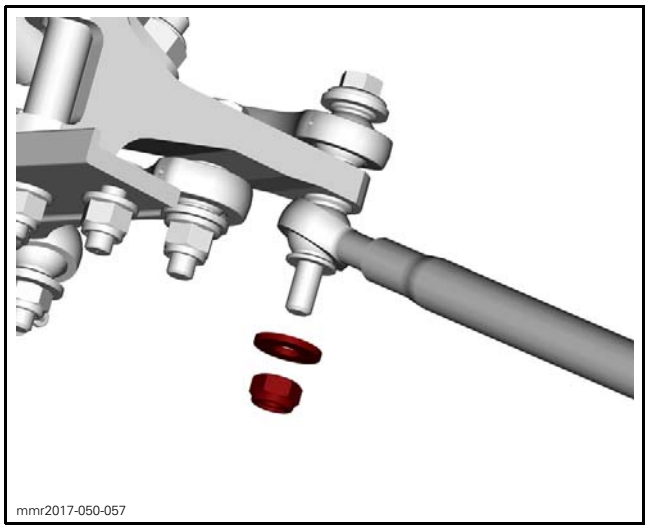
The maximum tie-rod end length (A) not engaged in the tie rod must not exceed 34 mm (1.339 in).

Install tie-rod with the groove on ski leg side.


mmr2017-050-038_a

Install the washer and the nut, and tighten to specification.

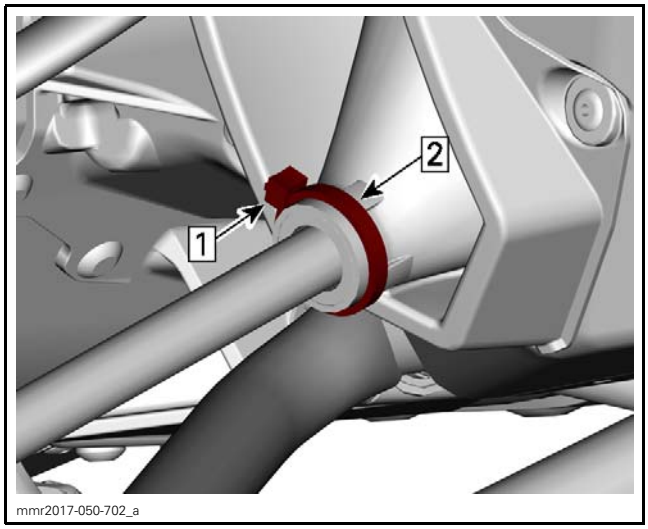

mmr2017-050-039


mmr2017-050-057

TIGHTENING TORQUE	
Outer tie-rod end nut	48 N•m ± 6 N•m (35 lbf•ft ± 4 lbf•ft)
Inner tie-rod end nut	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

Ensure the new locking tie is fully seated and the head is positioned upwards.

NOTICE To avoid bellows damage, make sure locking tie head is positioned upwards.



mmr2017-050-702_a

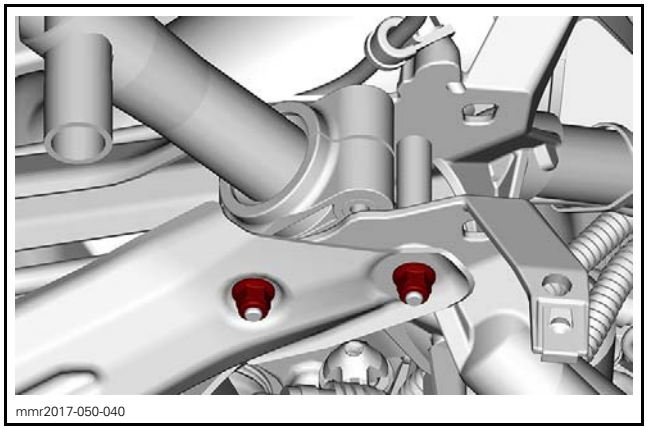
1. Head up
2. Fully seated

Perform the steering alignment, refer to *ALIGNING THE STEERING* in this section.

STEERING COLUMN

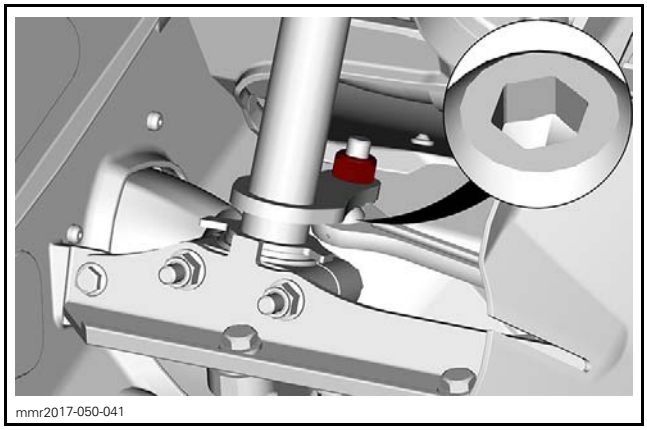
Removing the Steering Column

1. Remove the tuned pipe. Refer to *EXHAUST SYSTEM* subsection.
2. Remove the rear console. Refer to *BODY* subsection.
3. Remove *HANDLEBAR EXTENSION* from steering column. Refer to the procedure in this subsection.
4. Remove nuts and screws securing steering column upper support.

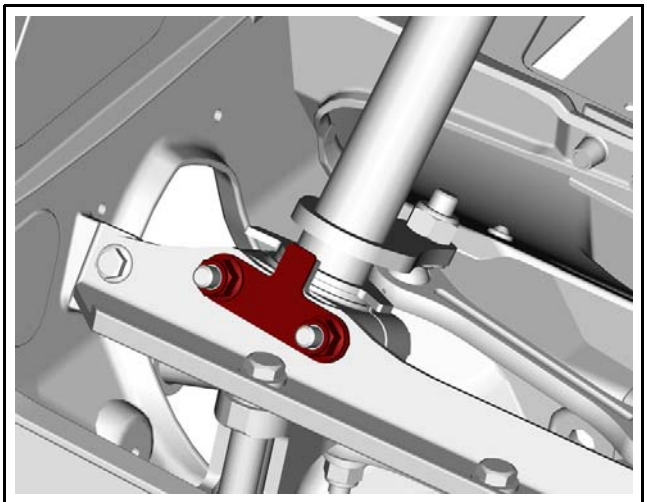

mmr2017-050-040

5. From inside engine compartment, remove the steering column pitman arm nut.

NOTE: Use an Allen key to lock the ball joint.


mmr2017-050-041

6. Remove nuts, stopper plate and screws securing the steering column lower support.


mmr2017-050-058

7. Pull steering column from top.

Inspecting the Steering Column

Check if steering column is:
– Cracked
– Bent
– Twisted
– Otherwise damaged.

Replace steering column if necessary.

⚠ WARNING

Do not try to repair a defective steering column.

Check if stopper plate is deformed or otherwise damaged.

Replace stopper plate as necessary.

Installing the Steering Column

The installation is the reverse of the removal procedure. However, pay attention to the followings.

1. Apply SUSPENSION GREASE (P/N 293 550 033) on vibration dampers before installing upper and lower supports.
2. Install new elastic nuts on the steering column retaining screws.
3. Tighten nuts to specification.

TIGHTENING TORQUE	
Upper steering column support nut	12.5 N•m ± 2.5 N•m (111 lbf•**in** ± 22 lbf•**in**)
Lower steering column support nut	23.5 N•m ± 3.5 N•m (17 lbf•ft ± 3 lbf•ft)

STEERING RACK

Inspecting the Steering Rack

Remove the tuned pipe. Refer to *EXHAUST SYSTEM* subsection.

Check if steering rack component are:
– Cracked
– Bent
– Twisted
– Otherwise damaged.

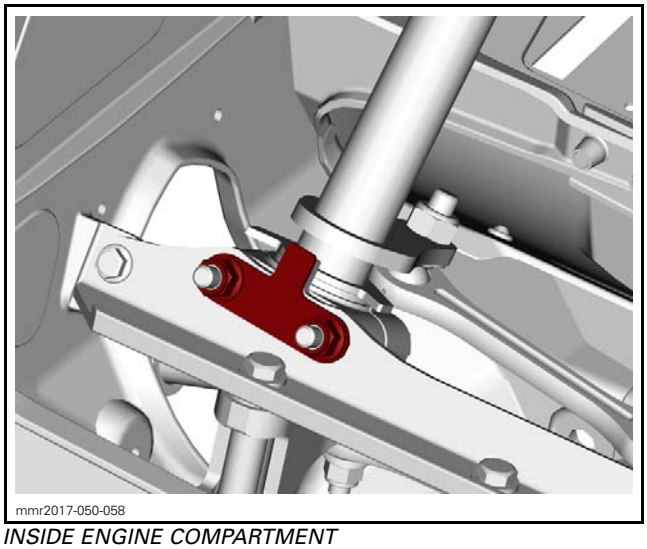
Check steering rack for looseness.

Check if stopper plate is deformed or otherwise damaged.

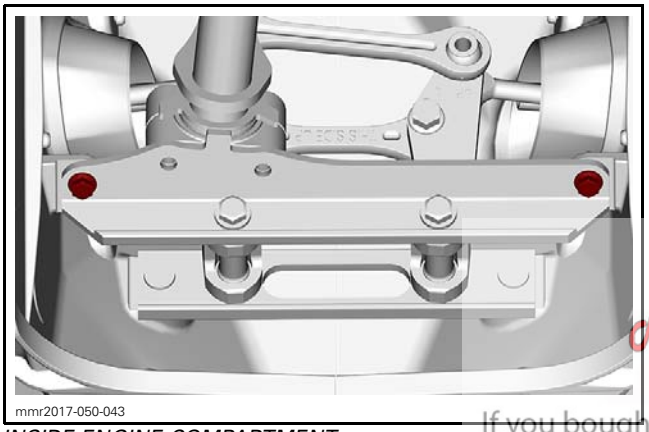
Replace component if necessary.

Removing the Steering Rack

1. Remove the tuned pipe. Refer to *EXHAUST SYSTEM* subsection.
2. Remove inner tie-rod end nuts and screws.
3. Remove the nuts, stopper plate and screws as per the following illustrations.

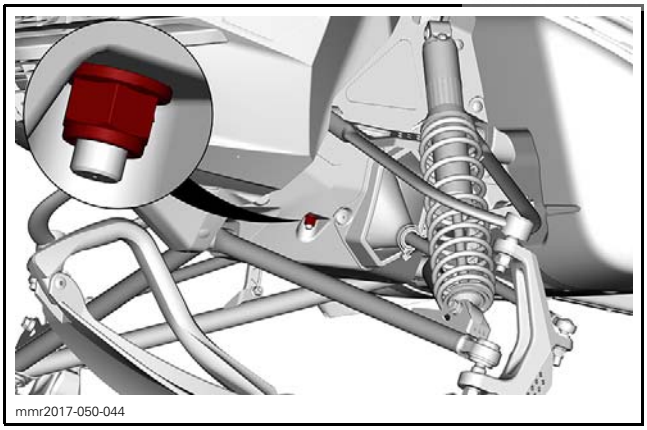

mmr2017-050-058

INSIDE ENGINE COMPARTMENT



mmr2017-050-043

INSIDE ENGINE COMPARTMENT



mmr2017-050-044

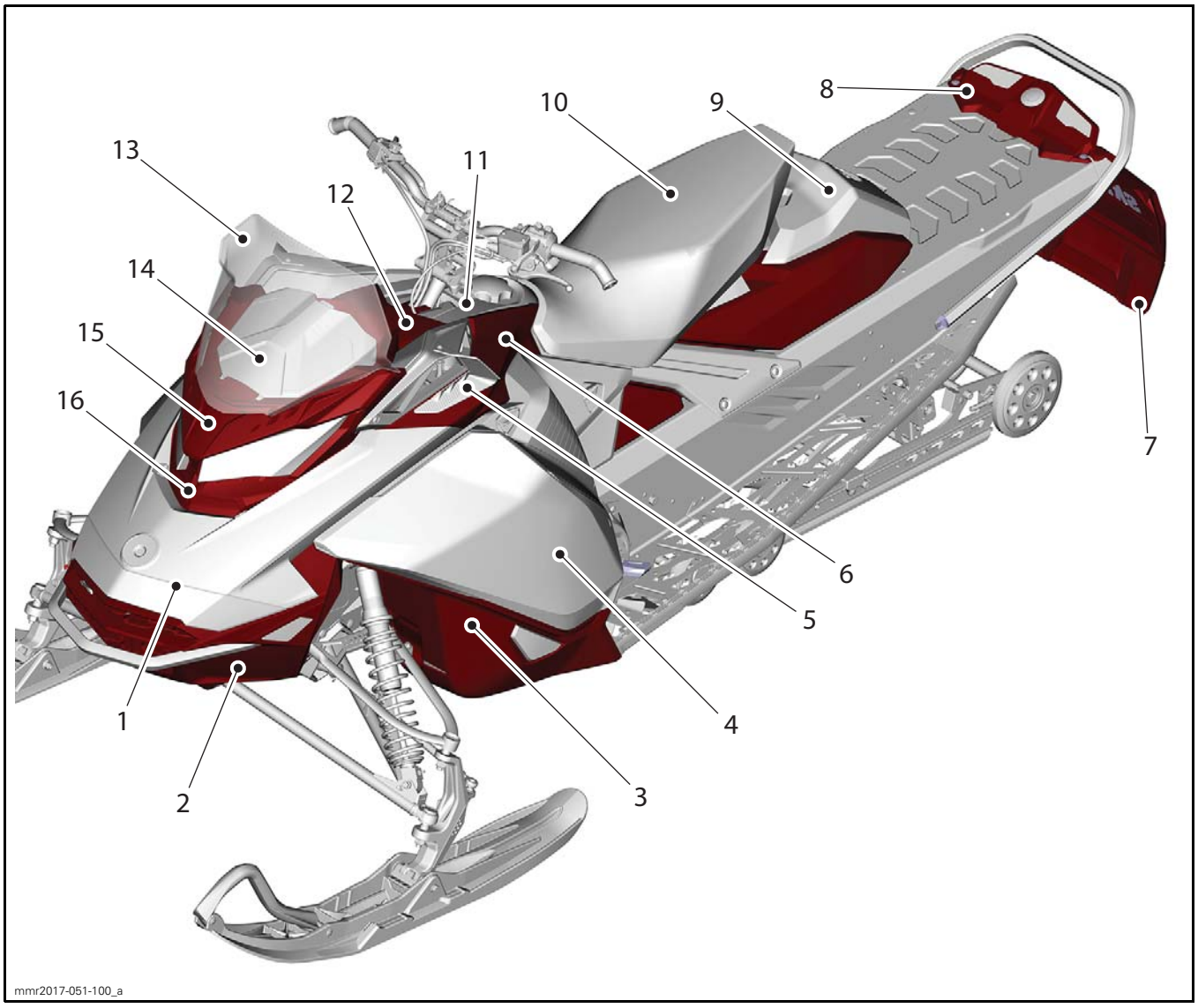
Installing the Steering Rack

The installation is the reverse of the removal procedure.

BODY

SERVICE TOOLS

Description	Part Number	Page
SUPERTANIUM DRILL BIT 3/16"	529 031 800	9



mmr2017-051-100_a

1. *Hood*
2. *Bottom pan*
3. *Side bottom pan*
4. *Side panel*
5. *Side wind deflector*
6. *Lateral hood*
7. *Snow guard*
8. *Taillight cover*
9. *Battery cover*
10. *Seat*
11. *Console*
12. *Gauge support*
13. *Windshield*
14. *Storage compartment cover*
15. *Windshield support*
16. *Headlight trim*

GENERAL

CLEANING

Cleaning the Seat

It is recommended to clean the seat with a solution of warm soapy water, using a soft clean cloth.

NOTICE Avoid use of harsh detergents such as strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc. that may cause damage to the seat cover.

Cleaning the Plastic

Clean the vehicle thoroughly, removing all dirt and grease accumulation.

To clean use a soft clean cloth and either soapy water or isopropyl alcohol.

To remove grease, oil or glue use isopropyl alcohol.

NOTICE Do not apply isopropyl alcohol or acetone directly on decals.

Follow these recommendations to protect the glossy finish of polypropylene parts.

Apply a non abrasive wax on glossy finish only.

Non Compatible Cleaning Products

NOTICE Polypropylene is not compatible with PETROLEUM BASE PRODUCTS. Contact with petroleum base products, such as cleaners or lubricants will permanently alter the glossy finish of polypropylene parts.

NOTICE The following products must not be applied on the plastic components used on the vehicles:

- Gasoline
- Brake fluid
- Kerosene
- Diesel fuel
- Lighter fluid
- Varsol
- Naphtha
- Acetone
- Strong detergents
- Abrasive cleaners
- Waxes containing an abrasive or a cleaning agent in their formula.

MATERIAL TYPE	NON-COMPATIBLE CLEANING PRODUCTS
Polypropylene	ANY PETROLEUM BASE CLEANING PRODUCTS
	XP-S ATV Finishing Spray (P/N 219 701 704)
	XP-S ATV Cleaning Kit (P/N 219 701 713) (it contains the above XP-S ATV Finishing Spray)

vbs2012-006-002_a

DO NOT USE ON POLYPROPYLENE

Compatible Cleaning Products

MATERIAL TYPE	COMPATIBLE CLEANING PRODUCT
Polypropylene	XPS ATV Wash (P/N 219 701 702)
	Soapy water

vbs2012-006-001

SAFE FOR POLYPROPYLENE

REPAIRING BODY PARTS

The very first step before repairing plastic materials is to find out exactly which type of material is involved.

On the inner surface of each part, the production date, part number, and material code are molded in.

PLASTIC PARTS	
CODE	MATERIAL
PP	Polypropylene
EMA+PA	Surlyn

NOTICE Some repair products are not compatible with certain plastics.

⚠ WARNING

Polycarbonate windshields must never be repaired by welding or otherwise.

The following company provides a complete line of products to repair plastic materials:

CREST INDUSTRIES, INC.
Trenton, MI 48183
Phone: 734 479-4141
Toll Free: 1 800 822-4100
Fax: 734 479-4040
E-Mail: info@crestauto.com
www.crestauto.com

PROCEDURES

NOTE: The same procedure applies for RH and LH side. Most of the time, only one side is described in this subsection.

DECAL

Replacing the Decal

1. To remove a decal; heat old decal with a heat gun (low temperature) and peel off slowly.
2. Using isopropyl alcohol, clean the surface and dry thoroughly.

NOTICE Do not apply isopropyl alcohol or solvent directly on decals. Use only in a well ventilated area.

3. Just before beginning to affix the new decals, wipe the surface with a clean damp cloth and allow to dry.
4. Use a pallet to affix the decal. Always work from the center towards the edges.

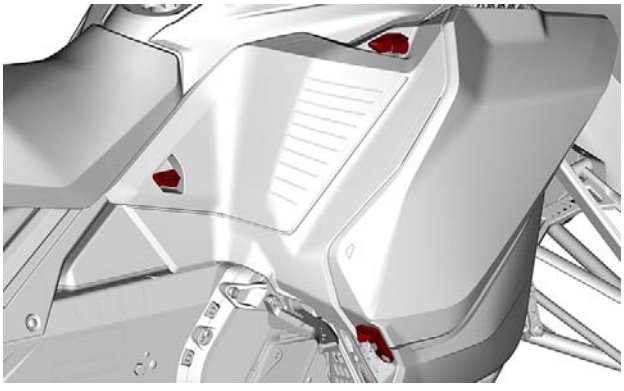
NOTICE Do not remove the pre-mask yet.

5. Once the decal is correctly affixed, carefully make a final pass with the pallet. Apply enough pressure to make sure the glue sticks well on the surface.
6. Remove the pre-mask.

SIDE PANEL

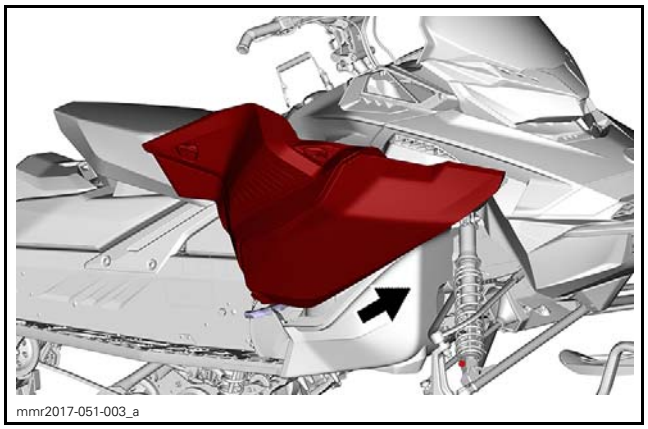
Removing the Side Panel

1. Release all lock devices.



mmr2017-051-002

2. Open side panel.
3. Lift the side panel up and towards front.


mmr2017-051-003_a

NOTICE Make sure to place panels in a safe place to avoid scratching.

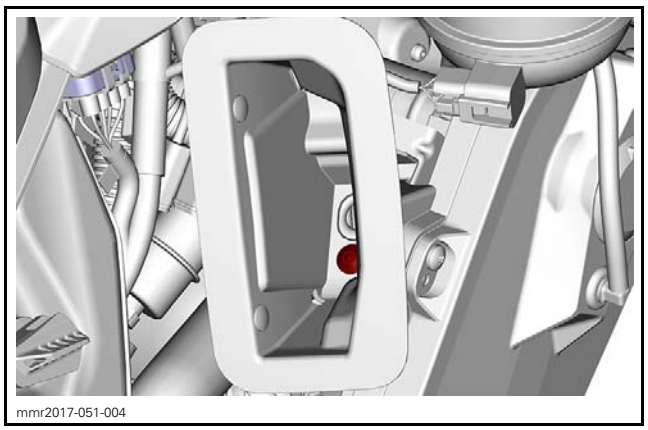
Installing the Side Panel

The installation is the reverse of the removal procedure.

REWIND STARTER HANDLE HOUSING

Removing the Rewind Starter Handle Housing

1. Open RH side panel.
2. Remove screw retaining housing to bracket.


mmr2017-051-004

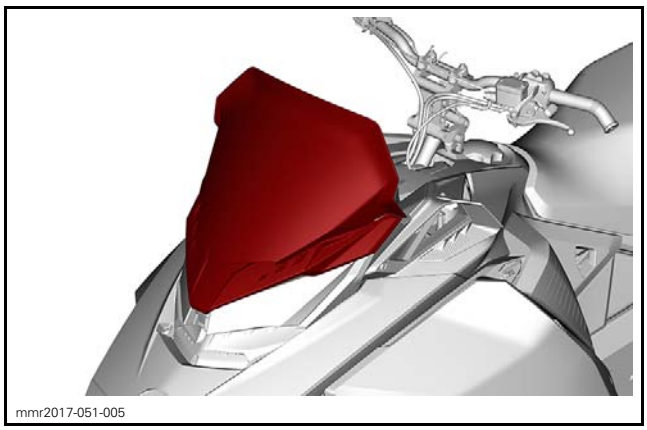
3. Remove rewind starter handle. Refer to *REWIND STARTER* subsection.

Installing the Rewind Starter Handle Housing

Installation is the reverse of removal procedure. Pay attention to the following.

TIGHTENING TORQUE	
Rewind starter handle housing screw	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

WINDSHIELD


mmr2017-051-005

Removing the Windshield

Place your hands on each side of windshield.

Pull the windshield until its pins come out of rubber grommets then pull in the center to remove center pin from grommet.

Installing the Windshield

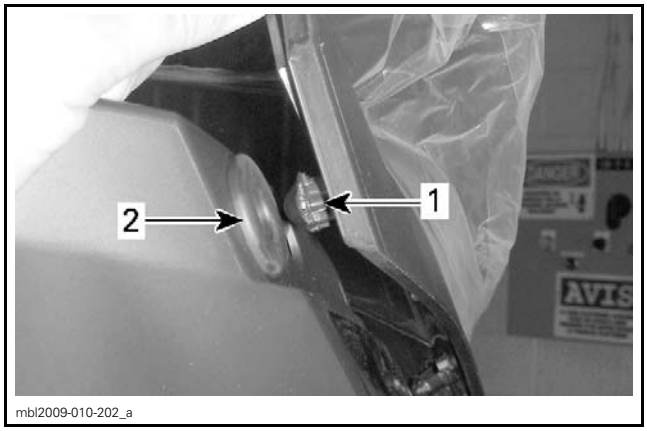
The installation is the reverse of removal procedure.

Lubricate the grommets using soapsuds.

NOTICE Do not lubricate grommets with any type of grease.

Secure windshield by inserting the windshield pins into the grommets.

NOTE: Make sure not to push grommets through gauge support holes.



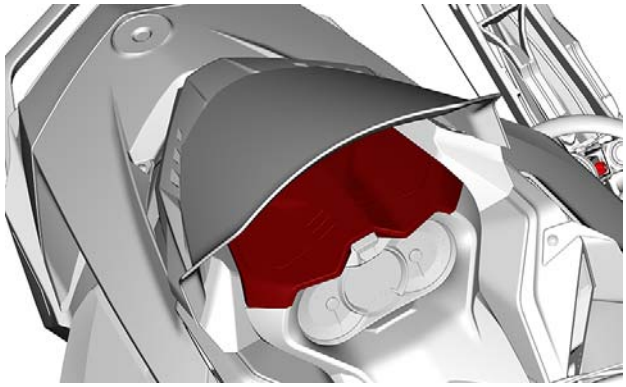
mbl2009-010-202_a

TYPICAL
1. Windshield tab
2. Gauge support front grommet

⚠ WARNING

Make sure that handlebar turns freely in both directions. Make sure that there is no contact at any time between handlebar wind deflectors (if so equipped) and windshield.

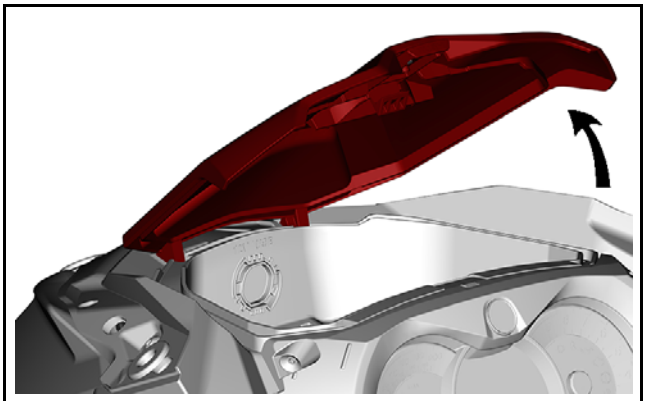
STORAGE COMPARTMENT COVER



mmr2017-051-006

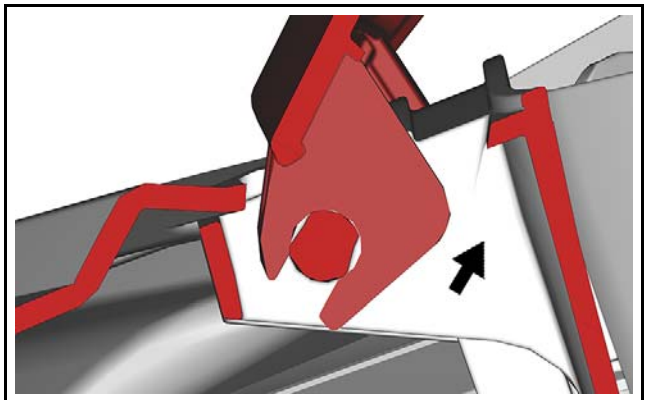
Removing the Storage Compartment Cover

1. Remove windshield.
2. Open storage cover until it is almost vertical.



mmr2017-051-007_a

3. Pull out storage cover.



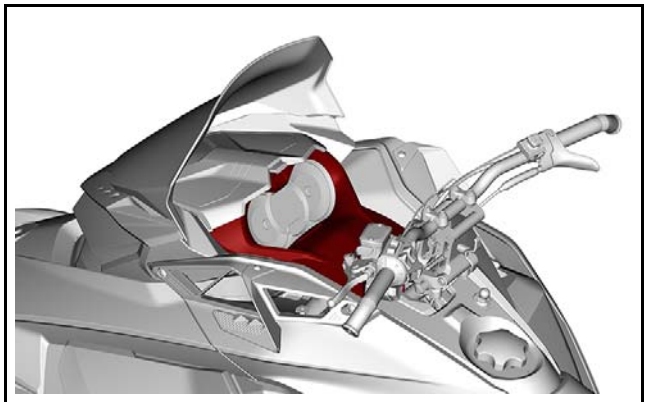
mmr2017-051-008_a

Installing the Storage Compartment Cover

The installation is the reverse of the removal procedure.

NOTICE **Ensure windshield is NOT installed. Otherwise, the storage cover could be damaged during installation.**

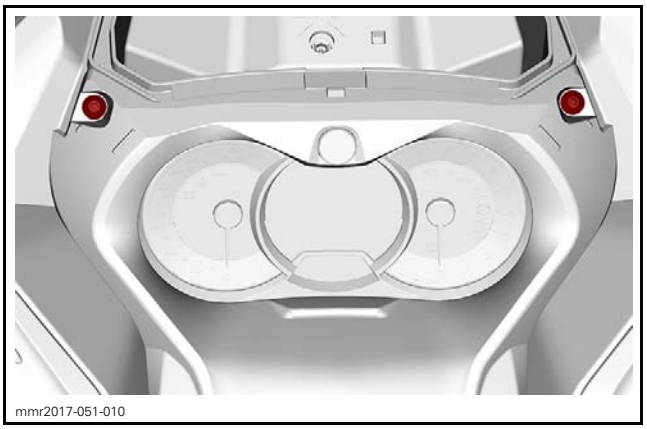
GAUGE SUPPORT



mmr2017-051-009

Removing the Gauge Support

1. Remove the windshield. Refer to procedure in this subsection.
2. Open the storage compartment cover
3. Remove the gauge support screws.


mmr2017-051-010

TRAIL AND CROSSOVER MODELS SHOWN

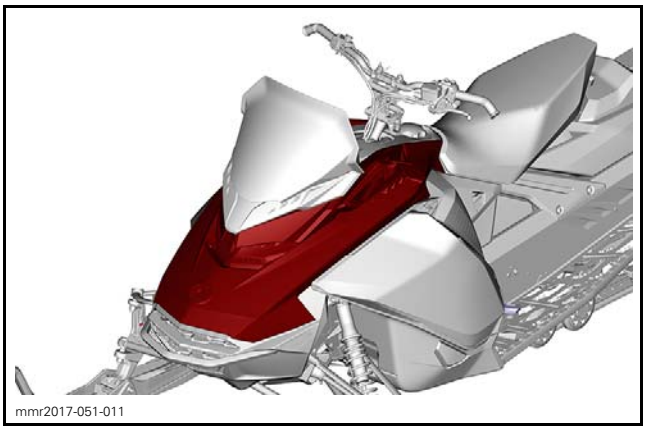
4. Pull out gauge support from bottom grommets.
5. Remove the multifunction gauge from support. Refer to *GAUGE* subsection.

Installing the Gauge Support

The installation is the reverse of removal procedure.

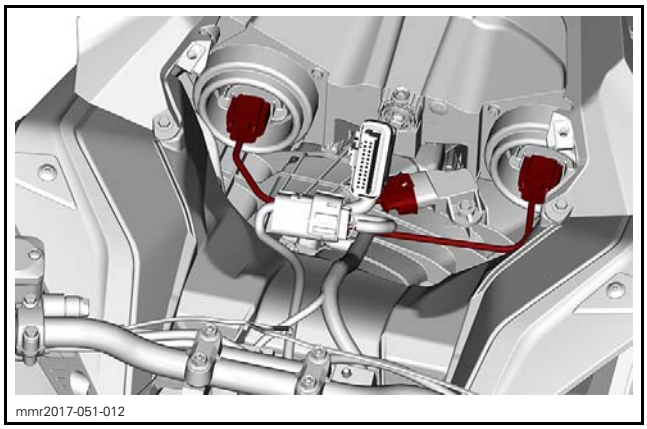
TIGHTENING TORQUE	
Gauge support screw	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

UPPER BODY MODULE

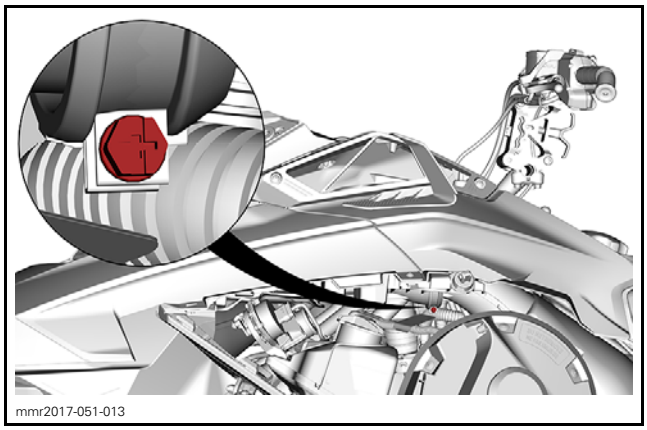

mmr2017-051-011

Removing the Upper Body Module

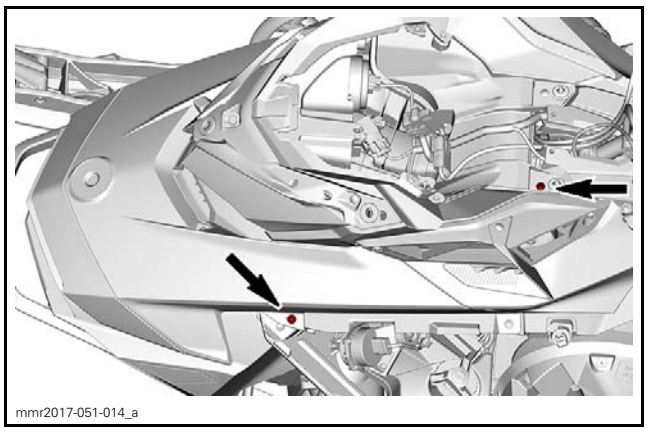
1. Refer to procedures in this subsection and remove:
   - Side panels
   - Gauge support
   - Storage compartment and its cover.
2. Disconnect the MAPTS and headlight connectors.


mmr2017-051-012

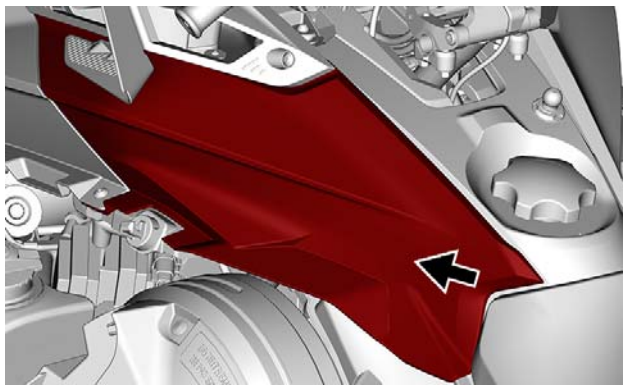
3. Loosen the air intake hose clamp.


mmr2017-051-013

4. Remove the upper body module retaining screws.


mmr2017-051-014_a

5. Pull on the rear end of both lateral hood until their tabs come out of the rear console.


mmr2017-051-015_a

6. Remove the upper body module.
   6.1 Grab the upper body module in the gauge support section.
   6.2 Pull the module forward.
   6.3 Remove the module from the vehicle.

Installing the Upper Body Module

The installation is the reverse of the removal procedure. However, pay attention to the following.

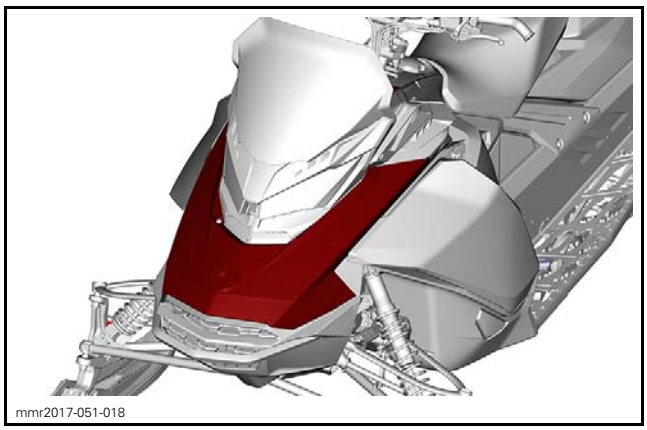
Ensure to engage rear hood tabs in rear console.


mmr2017-051-016

Ensure to connect the air intake hose.

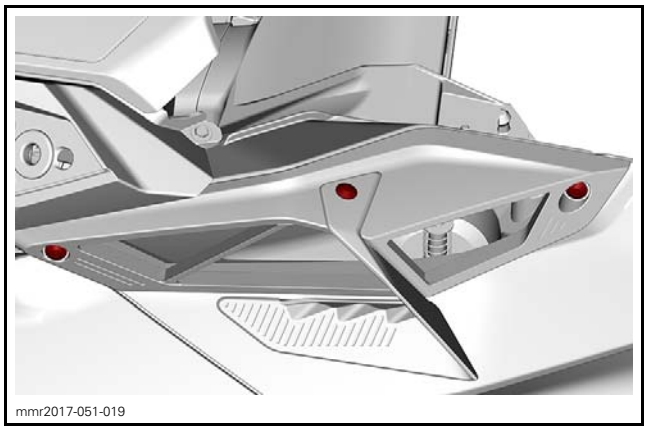
TIGHTENING TORQUE	
Upper body module screw	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

HOOD

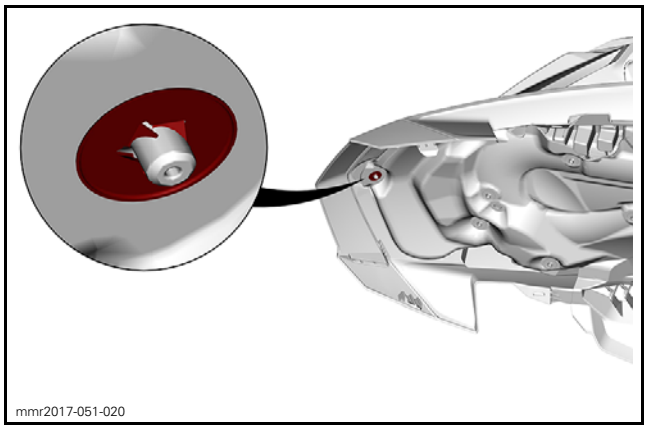

mmr2017-051-018

Removing the Hood

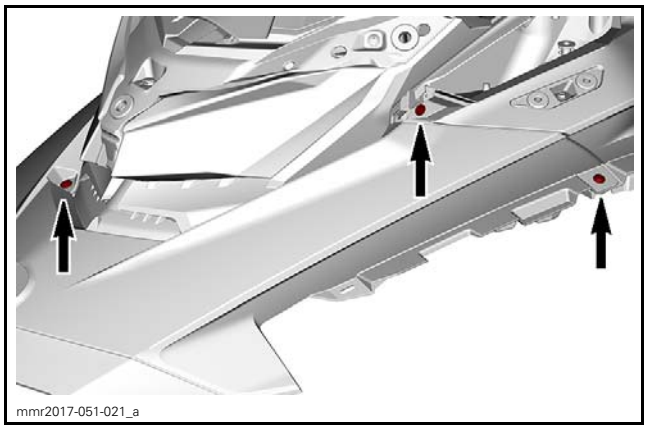
1. Remove the upper body module. Refer to procedure in this subsection.
2. Remove both sides air deflector and air intake filter.


mmr2017-051-019

3. Remove the front push nut under the hood.


mmr2017-051-020

4. Remove hood screws.


mmr2017-051-021_a

5. Pull out hood.

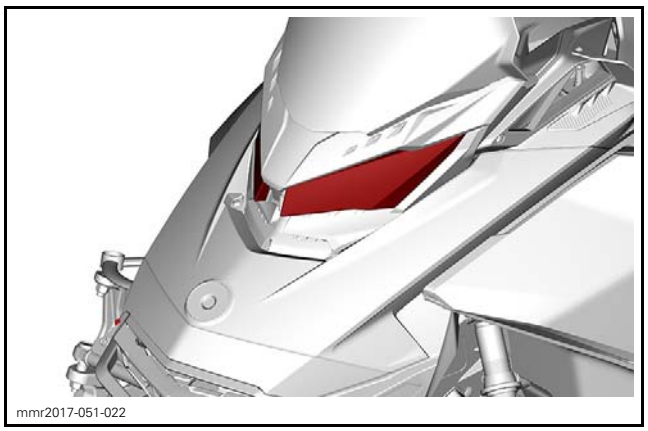
Installing the Hood

The installation is the reverse of removal procedure.

Install a new push nut.

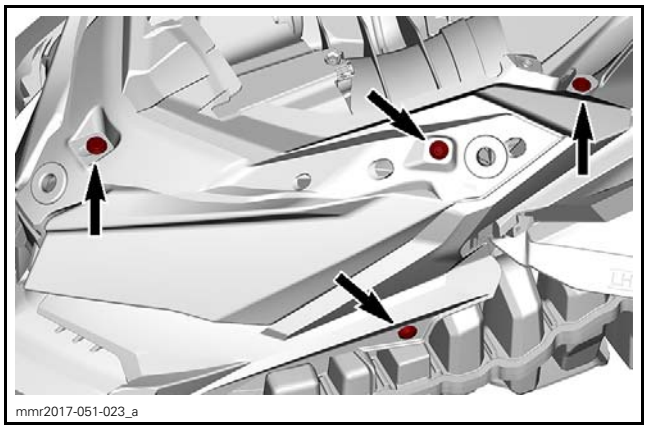
TIGHTENING TORQUE	
Hood hexagonal screw	1.8 N•m ± 0.2 N•m (16 lbf•**in** ± 2 lbf•**in**)
Hood Torx screw	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

HEADLIGHT MODULE


mmr2017-051-022

Removing the Headlight Module

1. Remove the hood. Refer to procedure in this subsection.
2. Remove the headlight trim fasteners.


mmr2017-051-023_a

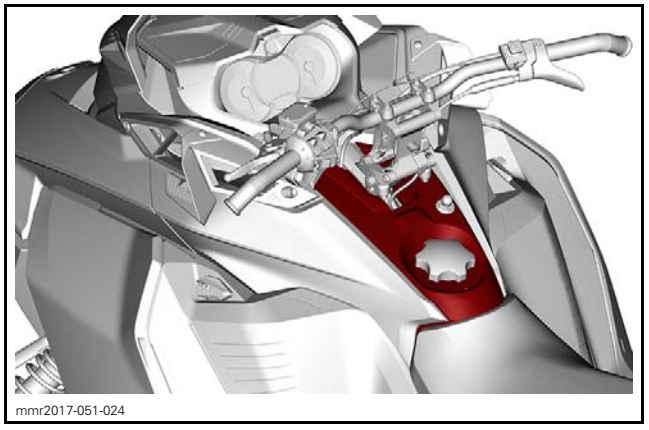
3. Pull out headlight housing and trim.

Installing the Headlight Module

The installation is the reverse of removal procedure.

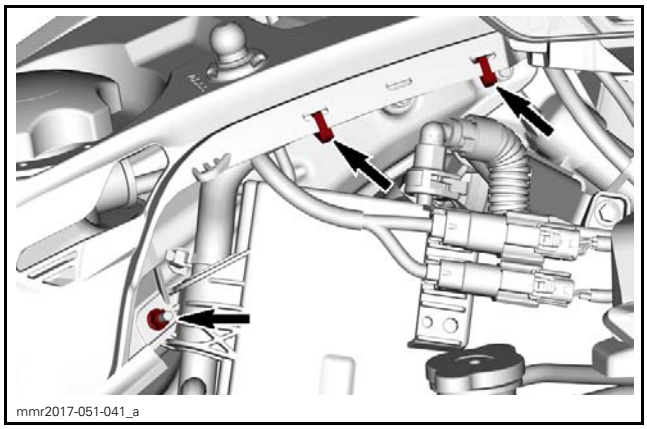
TIGHTENING TORQUE	
Headlight hexagonal screw	1.8 N•m ± 0.2 N•m (16 lbf•**in** ± 2 lbf•**in**)
Headlight Torx screw	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

CONSOLE


mmr2017-051-024

Removing the Console

1. Remove *UPPER BODY MODULE*. Refer to procedure in this subsection.
2. Remove the seat. Refer to *SEAT* subsection.
3. Cut harness locking ties.
4. Remove console nuts.


mmr2017-051-041_a

5. Remove fuel tank cap.
6. Lift up the console and unplug all connectors.
7. Install fuel tank cap.

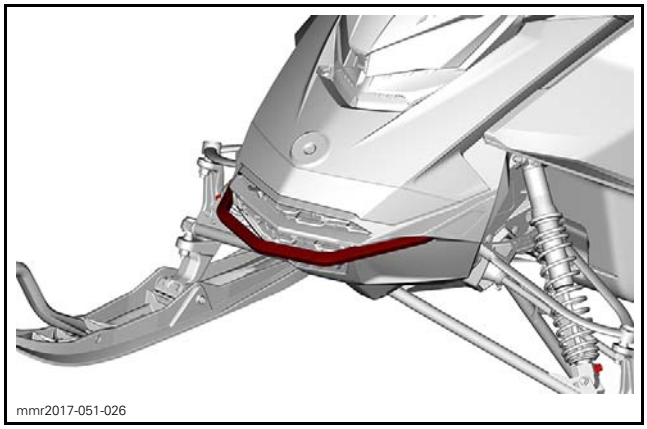
Installing the Console

The installation is the reverse of the removal procedure.

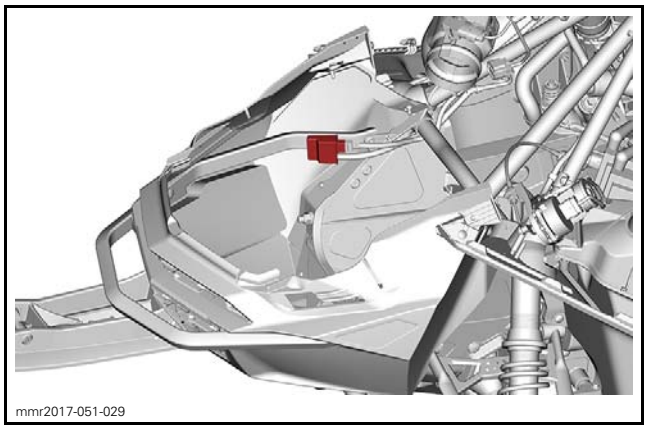
TIGHTENING TORQUE	
Console nut	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

FRONT BUMPER

Removing the Front Bumper


mmr2017-051-026

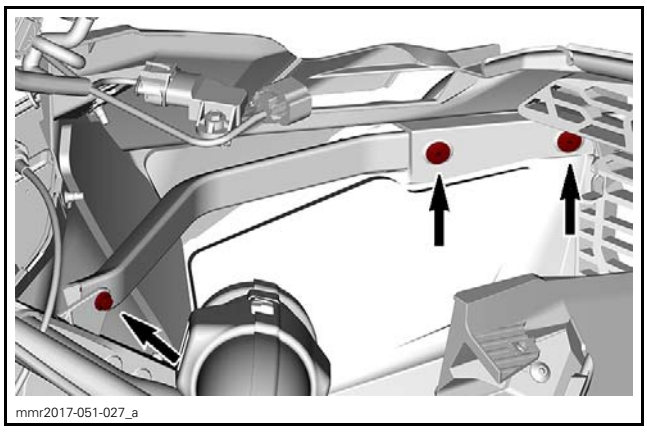
1. Remove tuned pipe. Refer to *EXHAUST SYSTEM* subsection.
2. Detach TCM from bumper.


mmr2017-051-029

3. Drill out rivets from front bumper.

REQUIRED TOOL
SUPERTANIUM DRILL BIT 3/16" (P/N 529 031 800)

4. Remove front bumper screws.

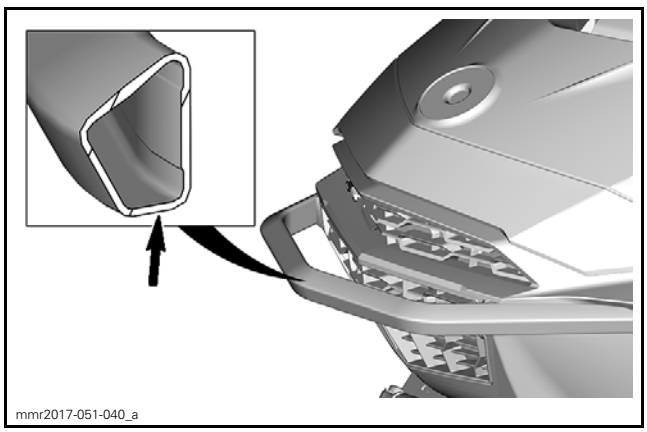

mmr2017-051-027_a

5. Pull out bumper towards front.

Installing the Front Bumper

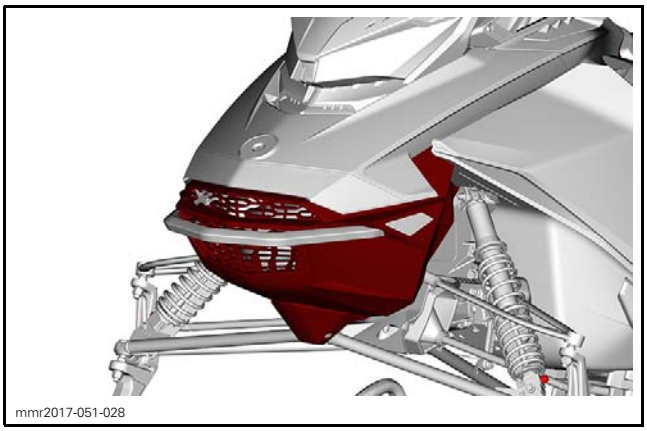
The installation is the reverse of the removal procedure.

Ensure the small surface of the bumper extrusion is facing downwards.


mmr2017-051-040_a

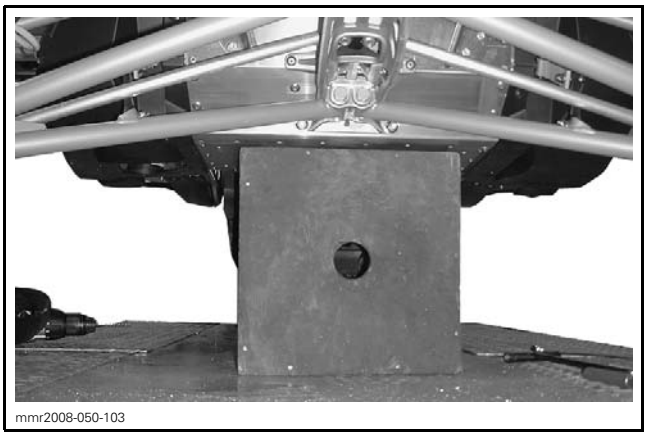
TIGHTENING TORQUE	
Front bumper nut	5 N•m ± 0.5 N•m (44 lbf•**in** ± 4 lbf•**in**)

FRONT BOTTOM PAN

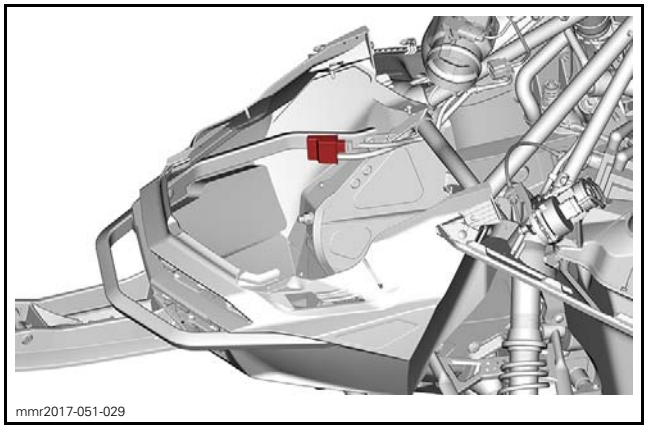

mmr2017-051-028

Removing the Front Bottom Pan

1. Lift front of vehicle until skis are off the ground.
2. Place the front portion of frame on a wooden box to support it securely.


mmr2008-050-103

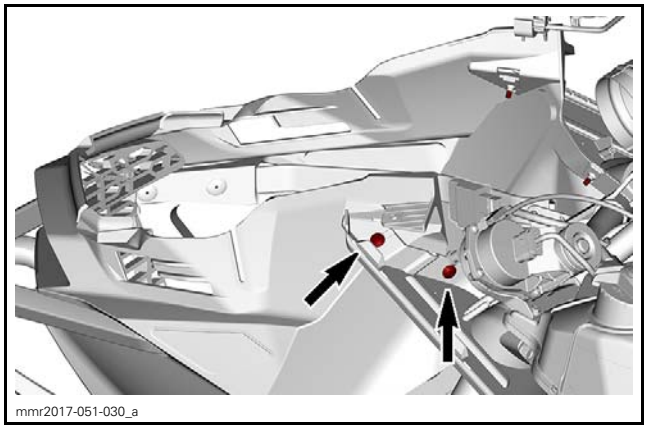
3. Remove the upper body module. Refer to procedure in this subsection.
4. Remove tuned pipe. Refer to *EXHAUST SYSTEM* subsection.
5. Detach TCM from bumper.


mmr2017-051-029

6. Remove *FRONT BUMPER*. See procedure in this subsection.

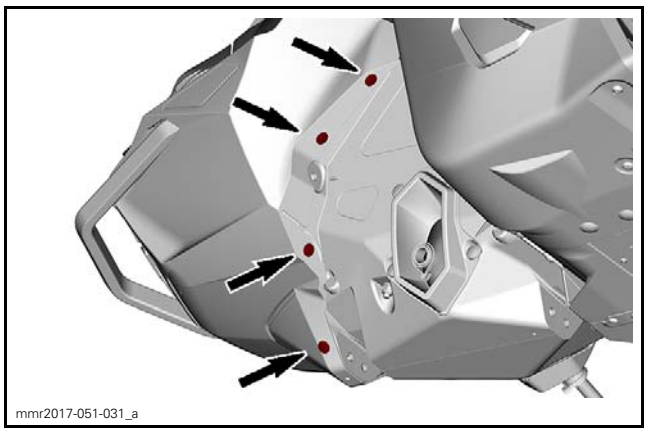
If the front bottom pan does not need to be replaced, the bumper may remain attached to bottom pan.

7. Remove bottom pan screws.


mmr2017-051-030_a

8. Remove front shock absorbers. Refer to *FRONT SUSPENSION* subsection.
9. Drill out all rivets retaining bottom pan.

NOTE: Refer to *FRAME* for proper procedure when drilling rivets retaining plastic parts.


mmr2017-051-031_a

LH SIDE SHOWN — SOME PARTS REMOVED FOR CLARITY PURPOSE

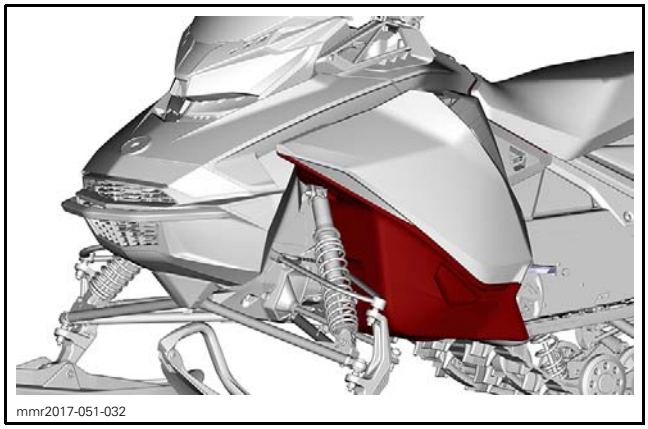
10. Remove bottom pan.

Installing the Front Bottom Pan

The installation is the reverse of the removal procedure.

TIGHTENING TORQUE	
Bottom pan screw	1.8 N•m ± 0.2 N•m (16 lbf•**in** ± 2 lbf•**in**)

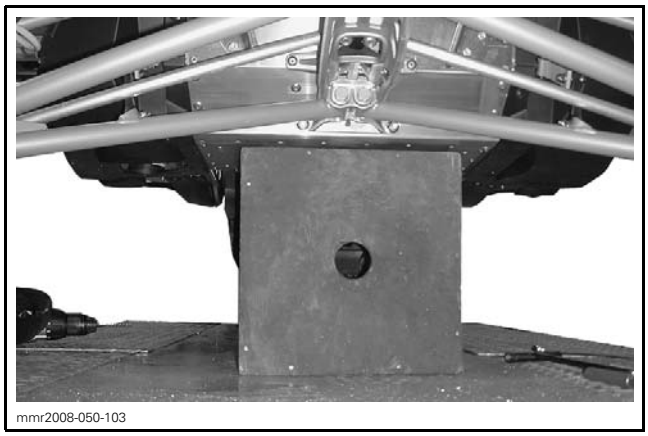
SIDE BOTTOM PAN


mmr2017-051-032

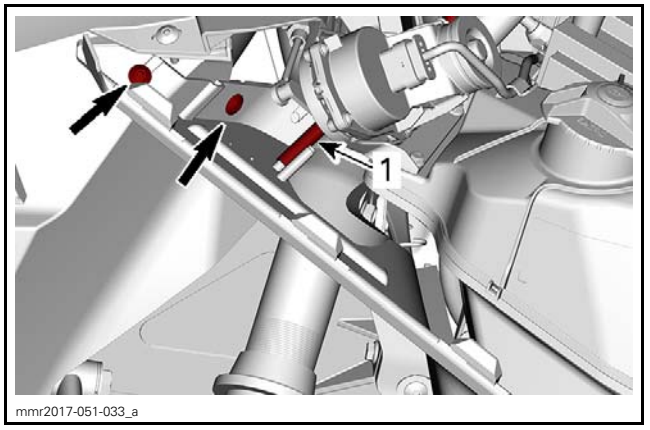
Removing the Side Bottom Pan

1. Remove the side panel. Refer to procedure in this subsection.
2. Lift front of vehicle until skis are off the ground.
3. Place the front portion of frame on a wooden box to support it securely.

NOTE: Ensure to clear side bottom pans so they can move freely.

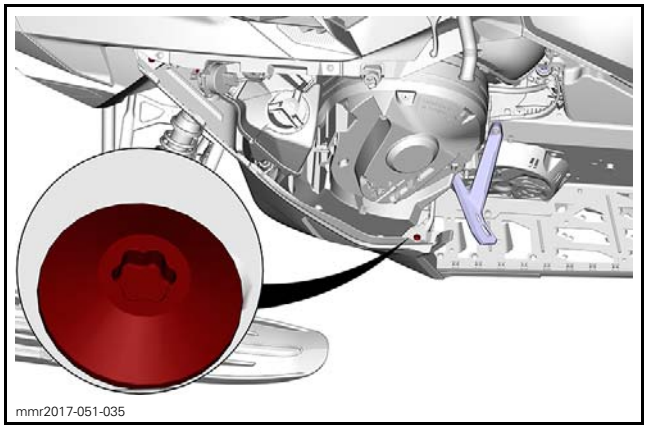

mmr2008-050-103

4. Disconnect vent tube from side bottom pan, and remove the screws.

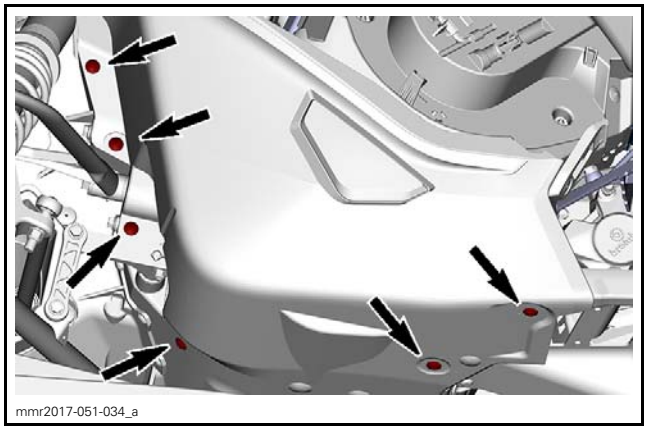


mmr2017-051-033_a

1. Vent tube


mmr2017-051-035

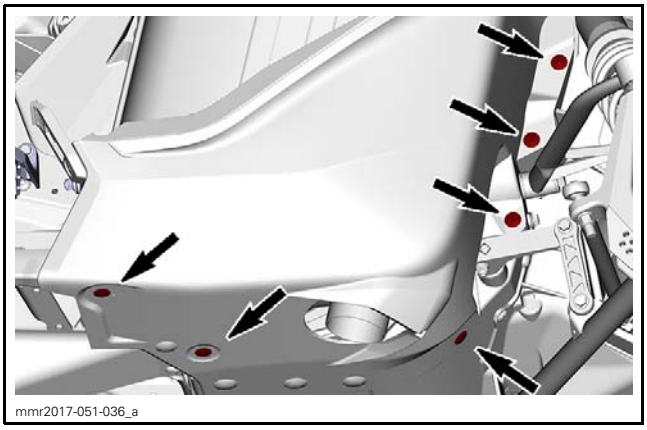
5. To remove the LH side bottom pan, remove the screws.


mmr2017-051-034_a

6. To remove the RH side bottom pan, drill out all rivets

NOTE: Refer to *FRAME* for proper procedure when drilling rivets retaining plastic parts.

NOTICE **Be careful not to drill through muffler.**


mmr2017-051-036_a

RH SIDE SHOWN

Installing the Side Bottom Pan

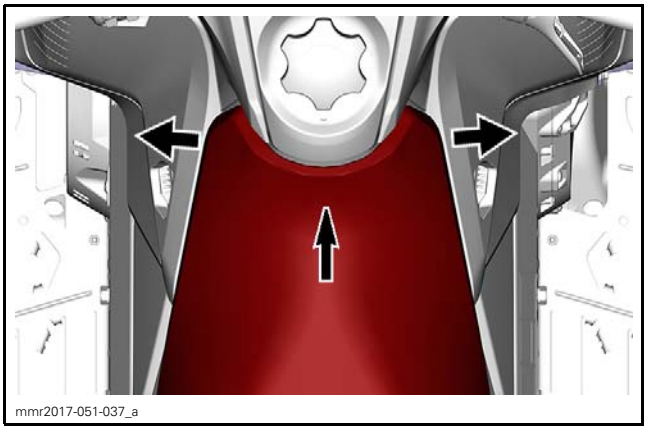
The installation is the reverse of the removal procedure.

TIGHTENING TORQUE	
Side bottom pan screw	2.8 N•m ± 0.2 N•m (25 lbf•**in** ± 2 lbf•**in**)

SEAT

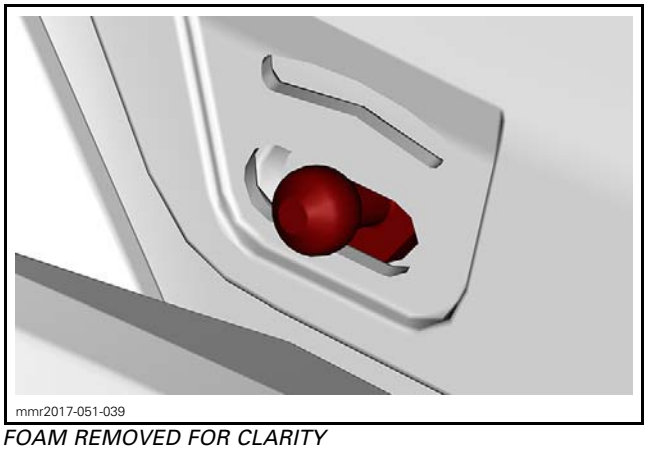
Removing and Installing the Seat

1. While pushing in the center of the seat towards front, pull on both sides, to unlock, and slide rearwards.


mmr2017-051-037_a

The Installation is the reverse of the removal procedure.

Ensure the seat is locked.


mmr2017-051-039

FOAM REMOVED FOR CLARITY

Replacing the Seat Cover

Remove seat.

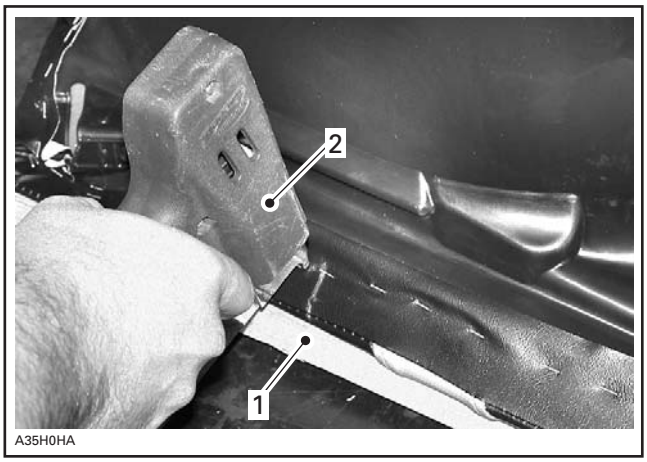
Remove the old seat cover. Check the foam and replace it if necessary.

Install the new seat cover with staples.

NOTICE **Ensure to use the proper length staples. Extra long staples would pierce the exposed side of the leatherette.**

NOTE: For an easier installation, it is highly recommended to use an electric tacker.

Ensure that the seat rest firmly against a hard surface such as a piece of wood. This is done to get the staples completely pushed in place.



A35H0HA

TYPICAL
1. Piece of wood
2. Tacker

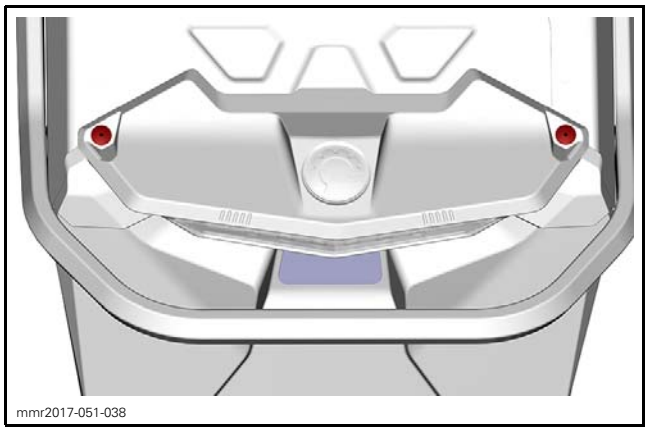
After seat cover installation, cut all around the excess of material.

REAR BUMPER

TIGHTENING TORQUE	
Rear bumper screws	16 N•m ± 2 N•m (142 lbf•**in** ± 18 lbf•**in**)

TAIL LIGHT HOUSING

Drill out the rivets.


mmr2017-051-038

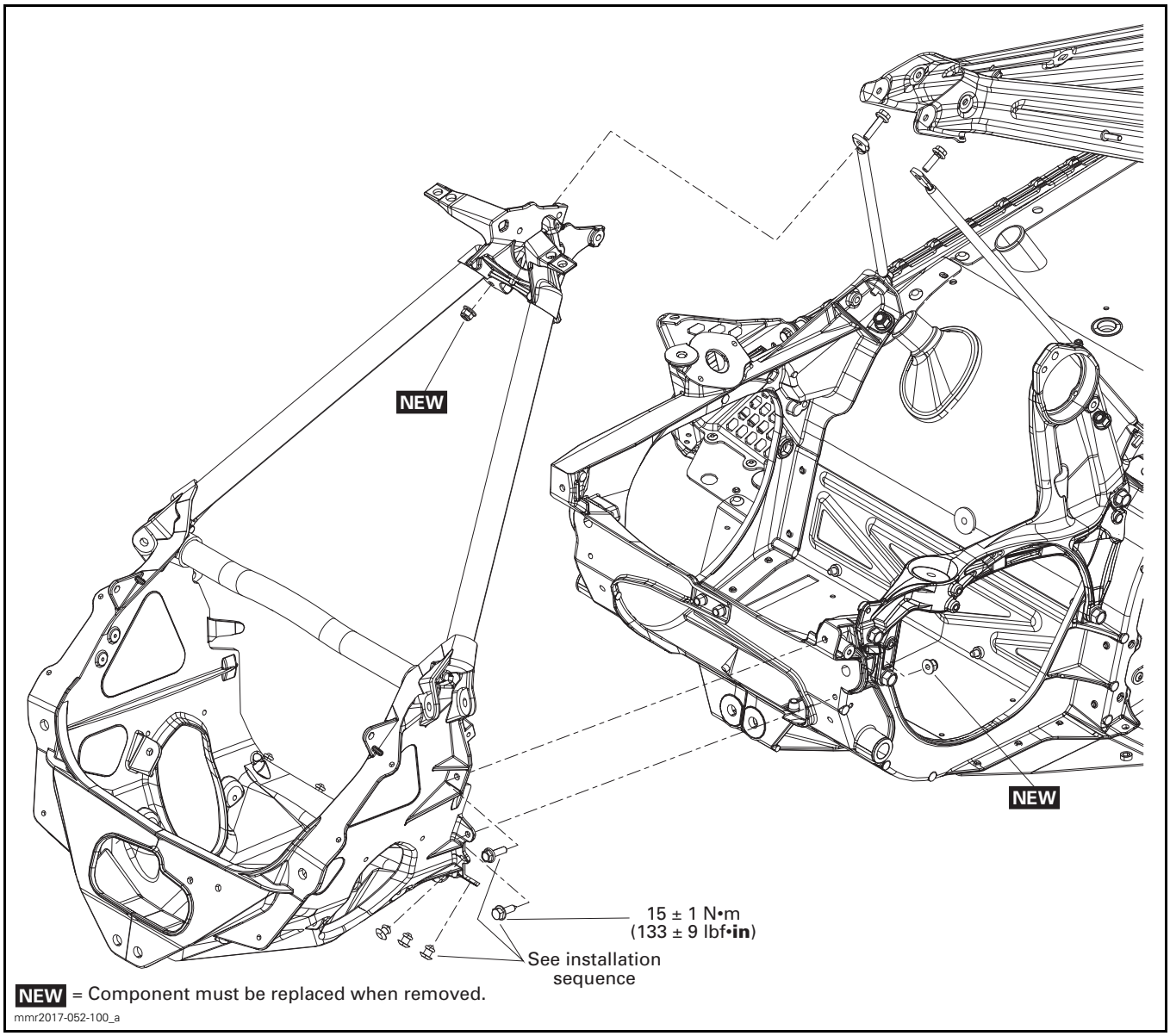
Pull housing towards rear.

FRAME

SERVICE TOOLS

Description	Part Number	Page
RADIATOR INSTALLATION GAUGES	529 036 422	13
SUPERTANIUM DRILL BIT 3/16"	529 031 800	4

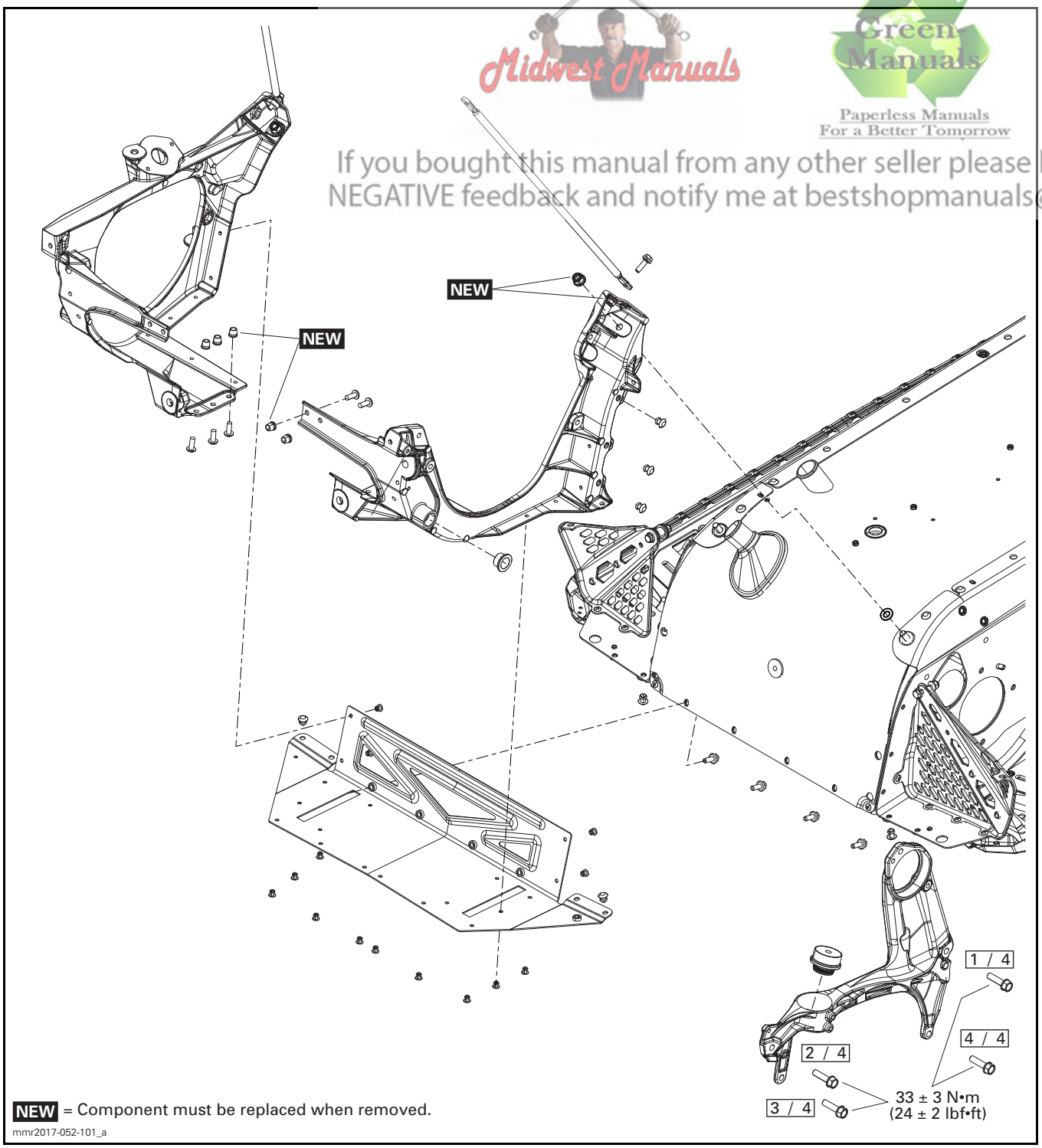
SUSPENSION MODULE



NEW = Component must be replaced when removed.

mmr2017-052-100_a

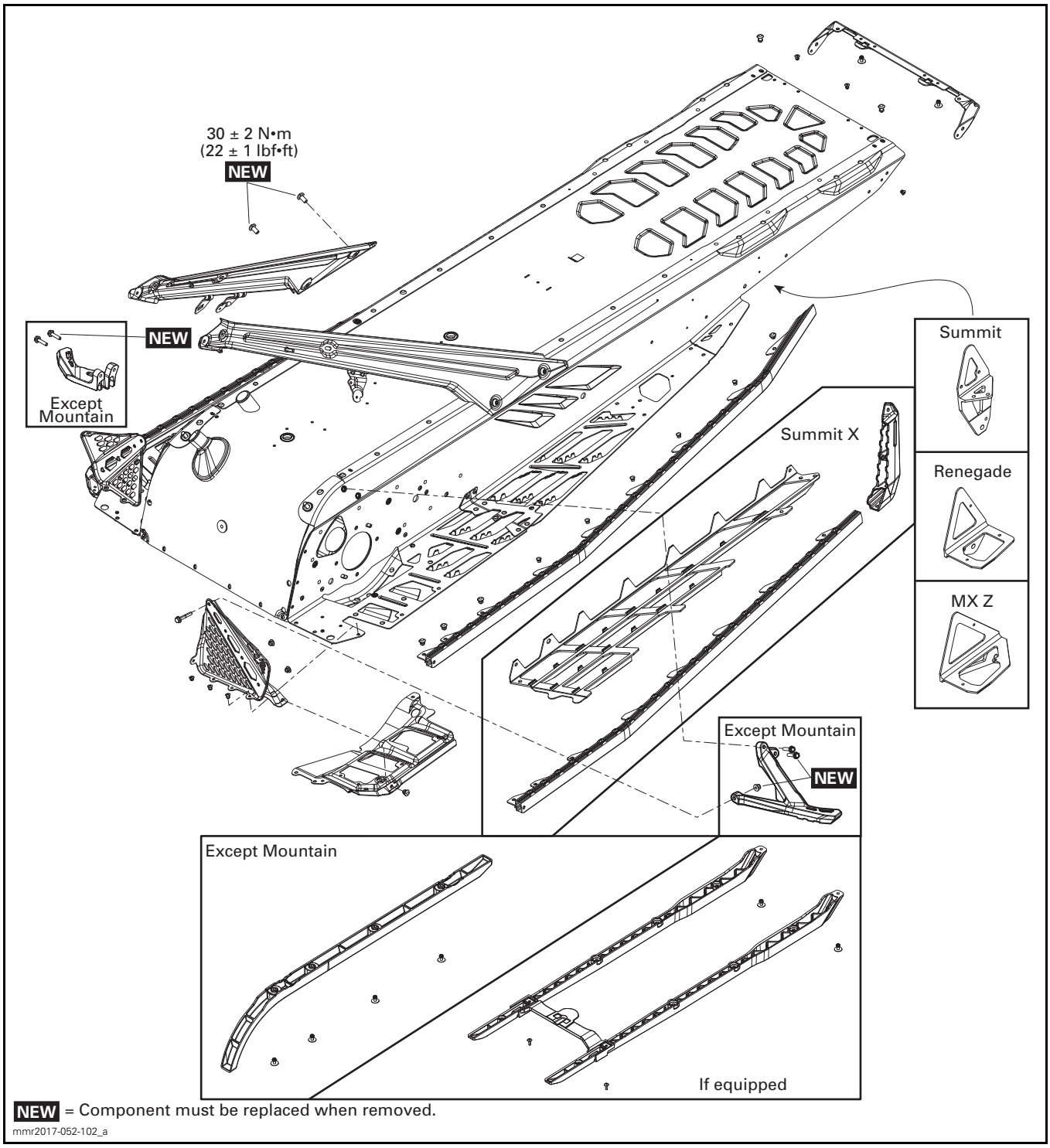
ENGINE MODULE



NEW = Component must be replaced when removed.

mmr2017-052-101_a

TUNNEL MODULE



NEW = Component must be replaced when removed.

mmr2017-052-102_a

GENERAL

During assembly/installation, use the torque values and the service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.) must be replaced with new ones.

Check for loose, bent, worn out, rusted or otherwise damaged components. Replace the faulty components.

PROCEDURES

RIVETS

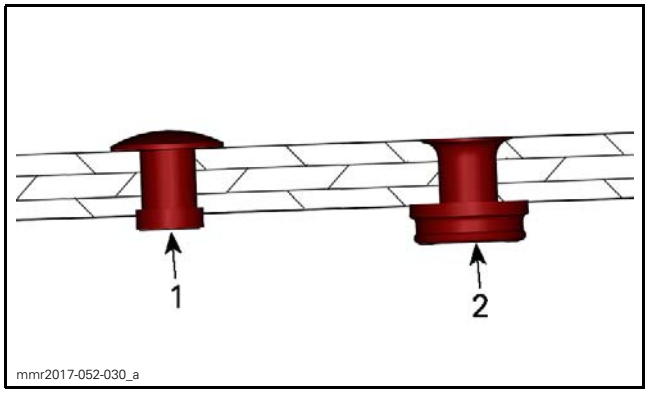
For proper drilling instructions and to prevent premature wear, follow the procedures as detailed.

NOTICE **When removing rivets, do not enlarge or deform the rivet holes in the frame.**

Removing a Self-Percing Rivet

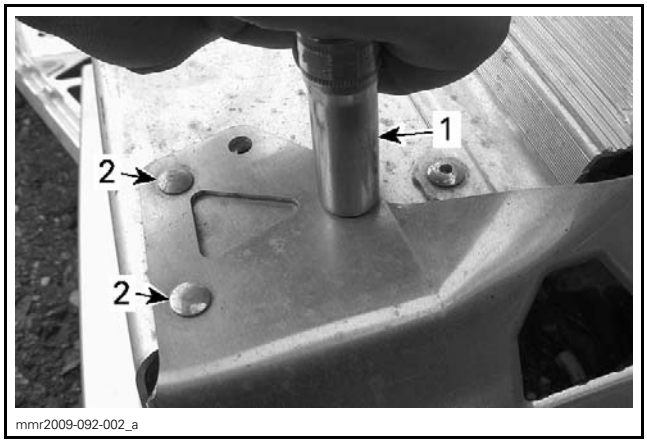
Henrob and Thomson rivets are self-piercing rivets. They are installed with specific robotized equipment.

1. Using a grinding disk, grind the rivet end.



1. Thomson rivet
2. Henrob rivet

2. Support the frame around the rivet head with a socket on the opposite side to avoid warpage.



TYPICAL
1. 11 mm socket over a rivet head
2. Rivet heads

3. Drive out remaining rivet using a punch.

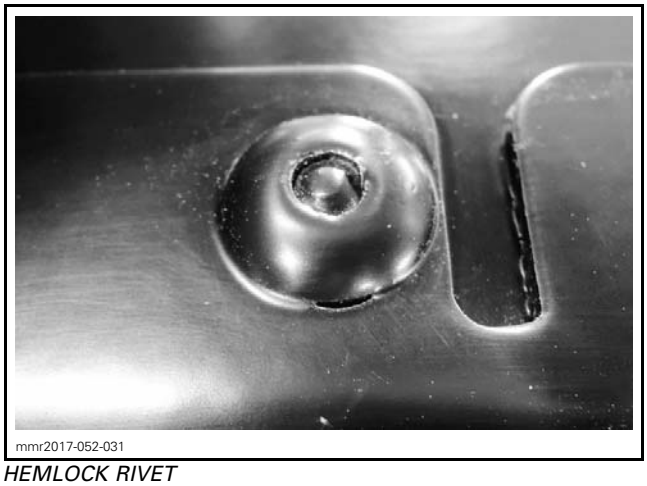
Removing a Pop Rivet

Stavex, Avibulb, and Hemlock rivets are standard pop rivets. They are installed with standard manual or pneumatic tool.

1. Drill rivet head sufficiently to cut through it.

NOTE: To drill a Hemlock rivet, remove the riveting nail using a punch first.

Important: It is highly recommended to support the frame locally around a Hemlock rivet when punching its nail out.



HEMLOCK RIVET

RECOMMENDED TOOL
SUPERTANIUM DRILL BIT 3/16" (P/N 529 031 800)

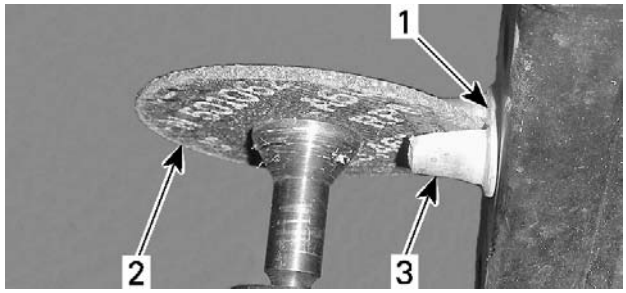
NOTICE **Drill only sufficiently to cut rivet head. Do not drill into frame material, or part secured using the rivet. When rivet is used to secure a plastic part, use pliers to avoid rotation of rivet with drill bit and heating or melting of the plastic part.**

2. Using a small punch, drive out the remaining rivet end.

Removing a HUCK Rivet

Huck rivet is a 2 parts type rivet. It is installed with a specific pneumatic tool.

1. Using a cut-off tool, cut the rivet retainer without touching the retainer's shoulder.



mmr2008-051-125_a

1. Rivet retainer's shoulder
2. Cutter wheel
3. Rivet retainer

NOTE: Apply a thin layer of grease on cutter wheel to increase its durability.

2. Break the rivet retainer's shoulder using a chisel.
3. Use a small punch to drive out the rivet stem.

FRAME

Cleaning the Frame

Clean frame and tunnel with appropriate cleaners and rinse with high pressure hose.

NOTE: For bare aluminum frames use only aluminum cleaner and follow instructions on container.

NOTICE **Never direct high-pressure water jet towards decals. They will peel off.**

Welding the Frame

No welding is permitted unless it is specified on a BRP bulletin.

Repairing the Frame

NOTE: The following is specific information for aluminum chassis painting. Use common painting techniques.

1. Sand the area to be painted.
2. Clean and dry the area.
3. Apply a thin layer of paint of the appropriate color.
4. Allow paint to dry before re-coating.

NOTE: Paint takes approximately 15 minutes to dry following application.

5. Apply a thin coat of clear.

NOTE: Immediately after the clear coat application, apply a thin coat of HR50 blending solvent **around** the painted area.

6. Allow clear coat to dry.

NOTE: Clear coat takes approximately 2 hours to dry following application.

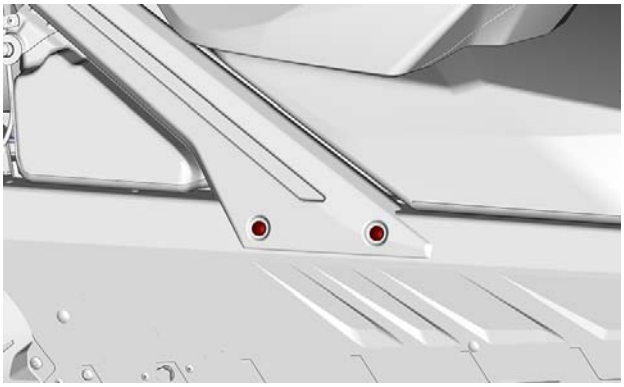
REAR BUMPER

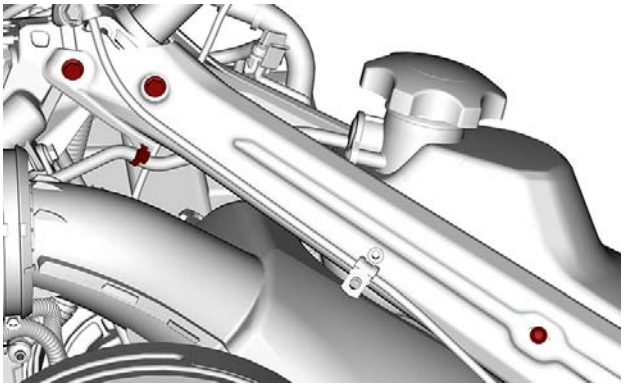
Refer to *BODY* subsection for rear bumper removal and installation procedure.

REAR FRAME MEMBER

Removing the Rear Frame Member

1. Refer to *BODY* subsection to remove the following:
   – Seat
   – Upper body module
   – Rear console.
2. Remove fasteners as per the following illustrations.


mmr2017-052-001


mmr2017-052-002

3. Remove rear frame member.

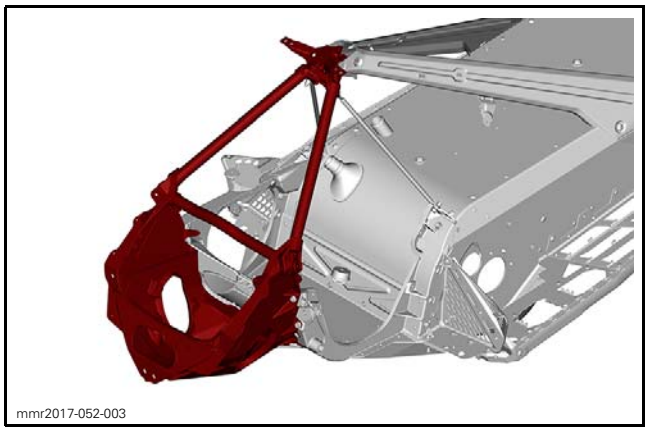
Installing the Rear Frame Member

The installation is the reverse of the removal procedure. However, pay attention to the following.

NOTE: Install all screws and nuts before tightening them.

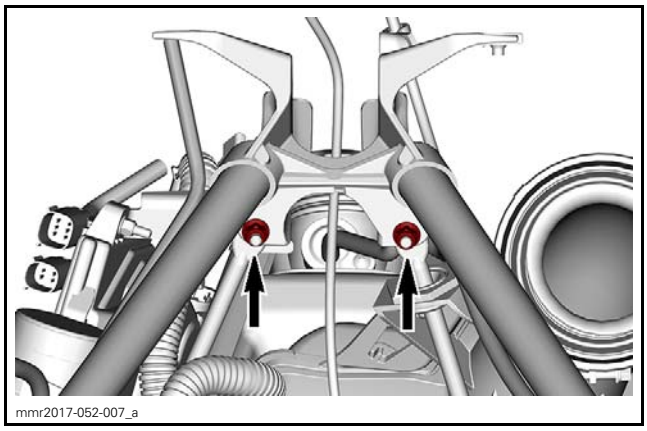
Refer to exploded view for proper tightening torque.

FRONT SUSPENSION MODULE

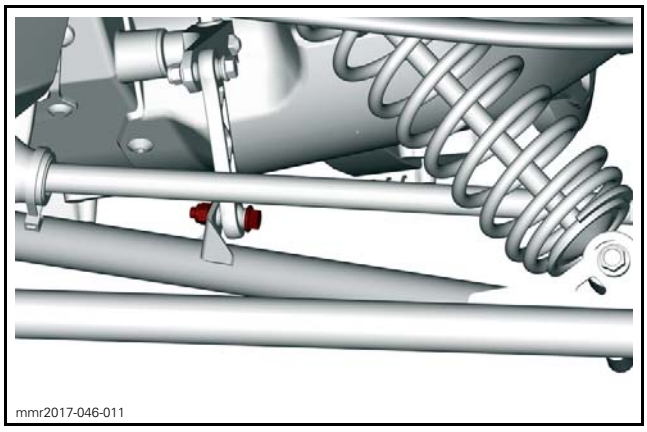

mmr2017-052-003

Removing the Front Suspension Module

1. Lift front of vehicle until skis are off the ground.
2. Place a wooden box under the engine module to support the frame securely.
3. Refer to the appropriate subsection and remove:
   – Engine
   – Steering column.
4. Detach the brake hose clamp next of the upper steering column support.
5. Detach side frame members from upper steering column support.


mmr2017-052-007_a

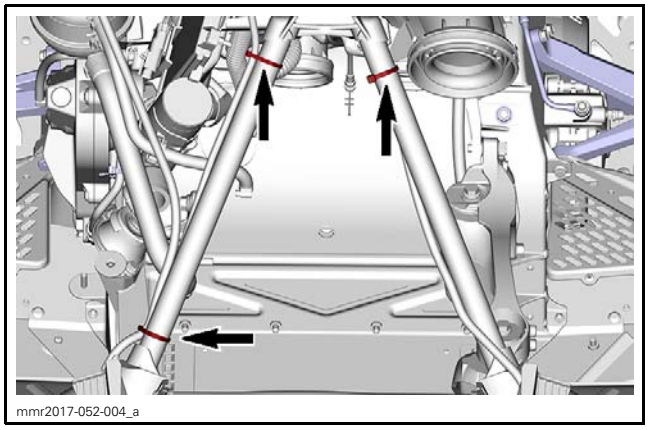
6. Remove the front suspension assembly in the following manner:
   6.1 Detach tie-rod ends from steering column.
   6.2 Remove upper shock absorber screws.
   6.3 Remove screw that secures stabilizer link to lower arm.


mmr2017-046-011

   6.4 Remove upper and lower suspension arms screws and nuts. Refer to *FRONT SUSPENSION* subsection.
   6.5 Remove front suspension assembly from vehicle.
7. Remove the stabilizer bar. Refer to *FRONT SUSPENSION* subsection.
8. Remove the front bottom pan. Refer to *BODY* subsection.

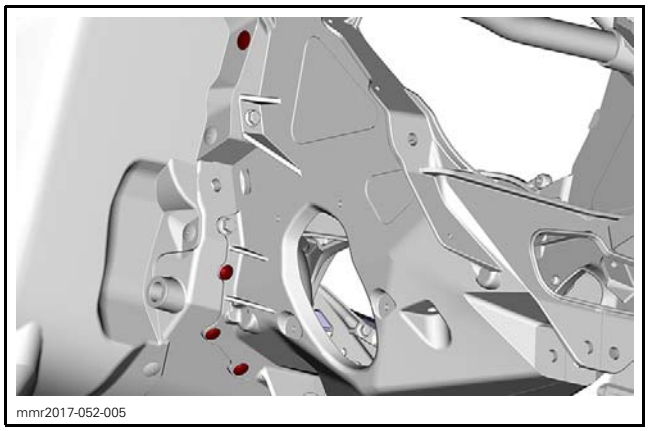
NOTE: Keep the front bumper installed on front bottom pan.

9. Cut locking ties that secure vents and electrical harness to module tubes.


mmr2017-052-004_a

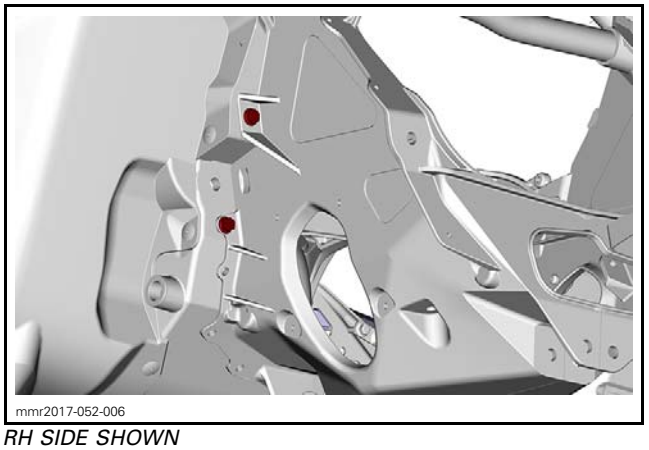
10. If the suspension module needs to be replaced, remove:
    – Steering rack / lower steering column support
    – Tie rod boots.
    Refer to *STEERING SYSTEM* subsection.
11. Remove the following pop rivets. Refer to *REMOVING A POP RIVET* at the beginning of this subsection.

Important: It is highly recommended to support the frame locally around a Hemlock rivet when punching its nail out.


mmr2017-052-005

RH SIDE SHOWN

12. Remove screws securing front suspension module to frame.


mmr2017-052-006

RH SIDE SHOWN

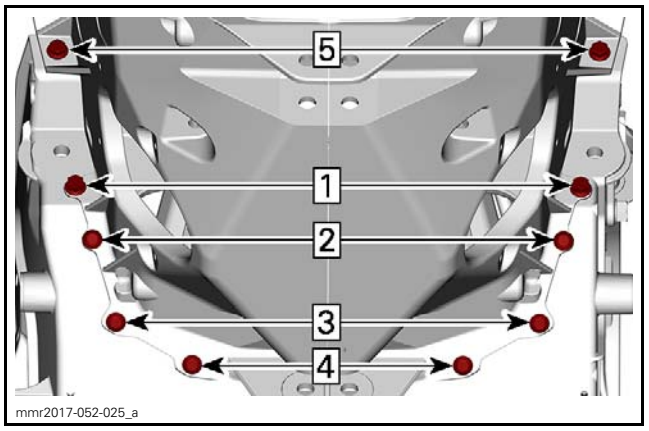
13. Remove the front suspension module.

Installing the Front Suspension Module

The installation is the reverse of the removal procedure. However, pay attention to the following.

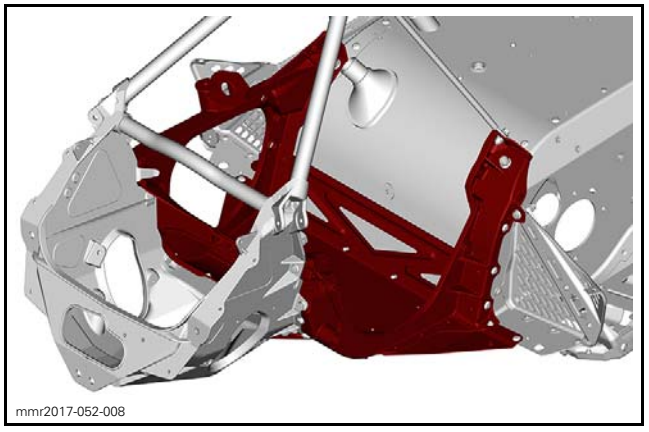
Refer to exploded view for proper tightening torque.

Install fasteners as per the following sequence.



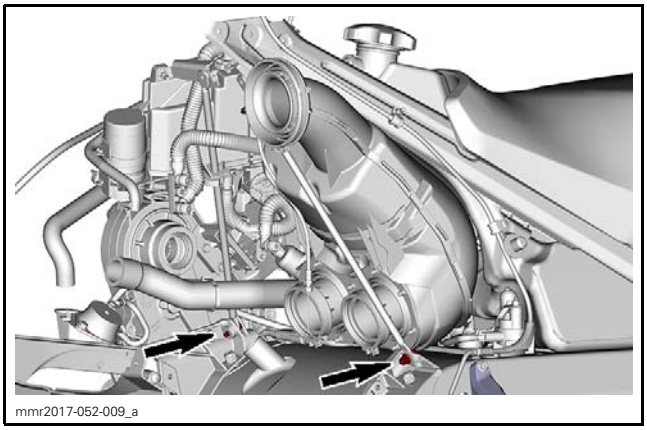
mmr2017-052-025_a

ENGINE MODULE

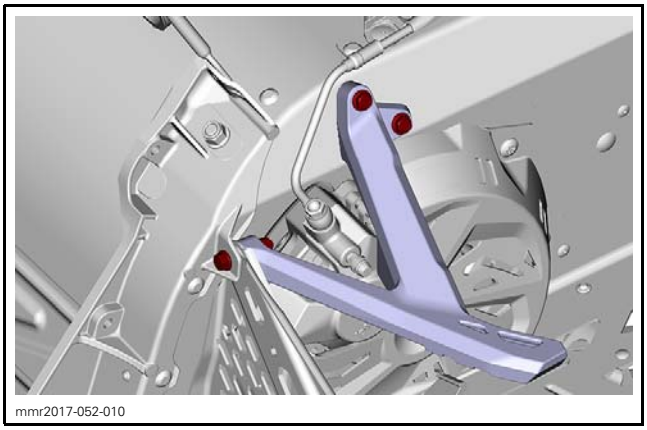

mmr2017-052-008

Removing the Engine Module

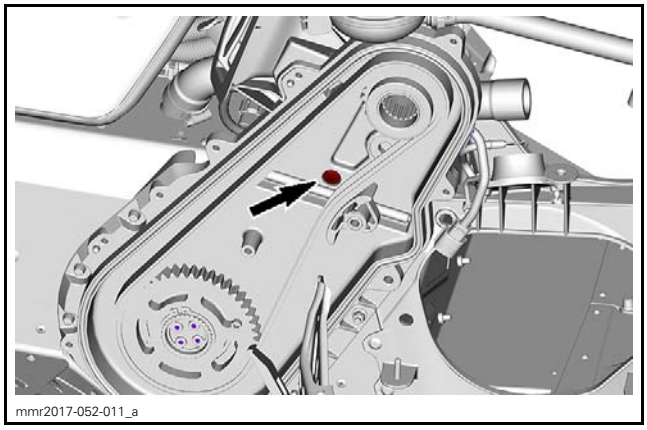
1. Remove the *FRONT SUSPENSION MODULE*, see procedure in this subsection.
2. Remove RH side bottom pan. Refer to *BODY* subsection.
3. Remove the RH side engine rubber mount. Refer to *ENGINE*.subsection.
4. Detach side frame members from engine module.


mmr2017-052-009_a

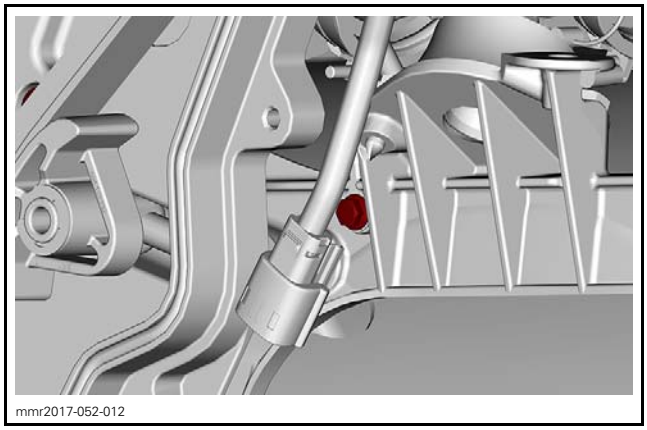
5. Remove toe hook fasteners, if equipped.


mmr2017-052-010

6. Remove the chaincase cover. Refer to *CHAINCASE* subsection.
7. Remove the screw that secure the chaincase to the engine module.

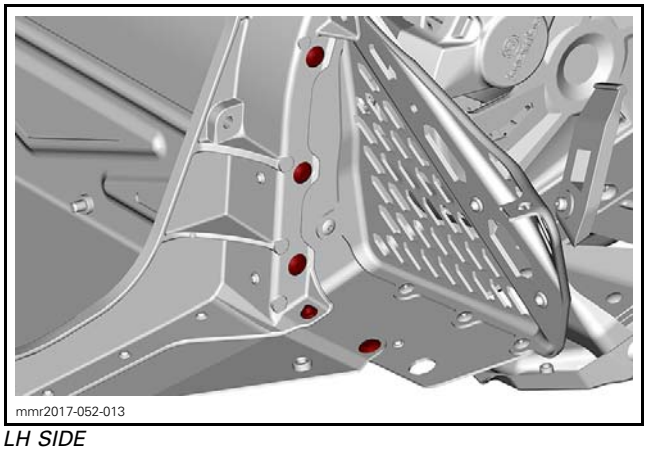

mmr2017-052-011_a

8. Remove the electrical ground screw located between the chaincase and the engine mount.

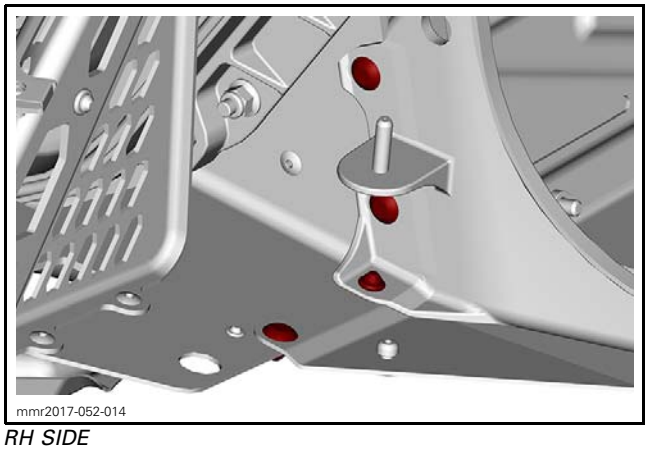

mmr2017-052-012

9. Remove rivets as per the following illustrations. Refer to *REMOVING A POP RIVET* in this subsection.

Important: It is highly recommended to support the frame locally around a Hemlock rivet when punching its nail out.

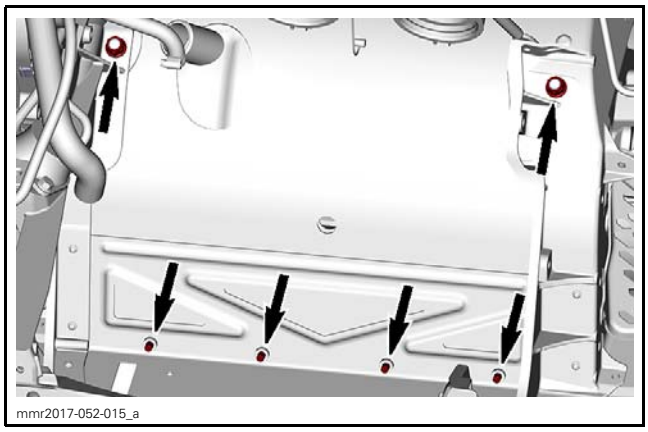

mmr2017-052-013

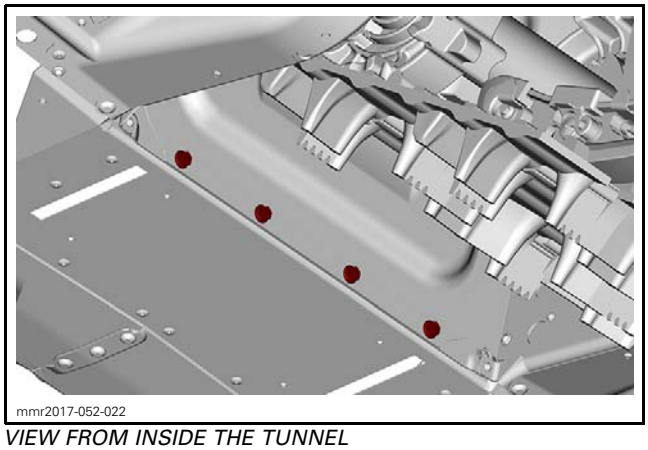
LH SIDE



RH SIDE

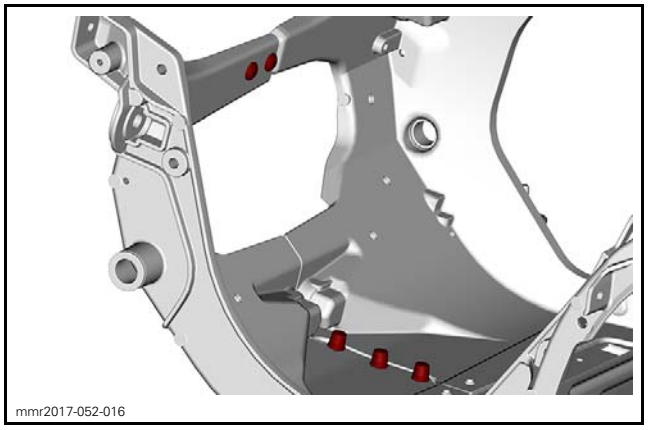
10. Remove nuts and screws securing the engine module to the tunnel.





VIEW FROM INSIDE THE TUNNEL

11. Remove the engine module.
12. If only one of the two side members is replaced, remove HUCK rivets as per the procedure in this subsection.



Engine Module Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Assemble LH and RH side frame member before to fix on the tunnel module.

If the HUCK rivets were removed, replace with the following parts.

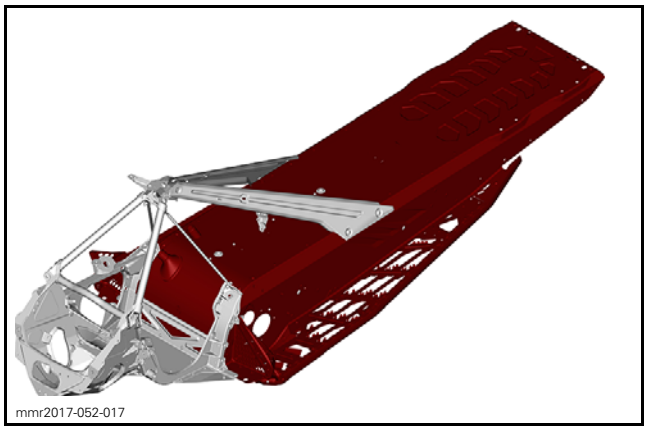
NEW FASTENERS	
Torx screw M6 x 20	(P/N 250000712)
Hexagonal flanged elastic stop nut M6	(P/N 233261414)

NOTE: Install the 3 bottom screws with heads downwards and the 2 upper screws with heads towards the engine.

Install all screws and rivets in there hole before tightening and riveting.

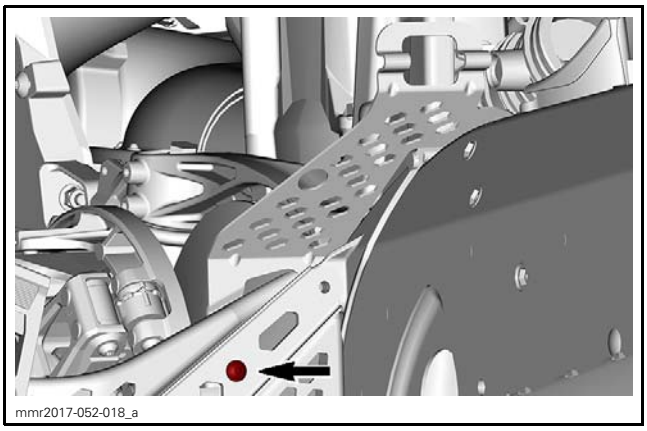
Refer to exploded view for proper tightening torque. Use standard tightening torque when not specified.

TUNNEL MODULE

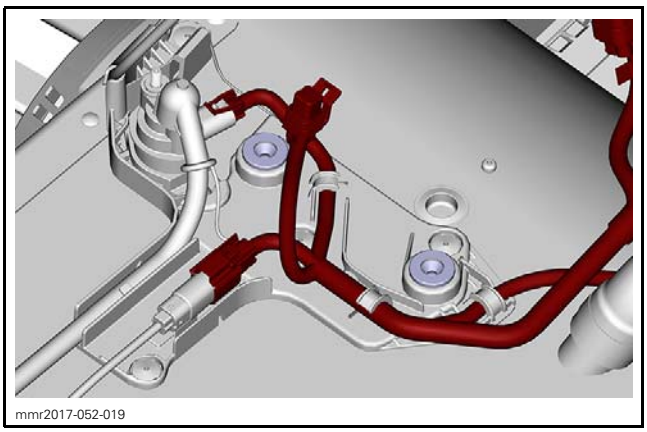


Removing the Tunnel Module

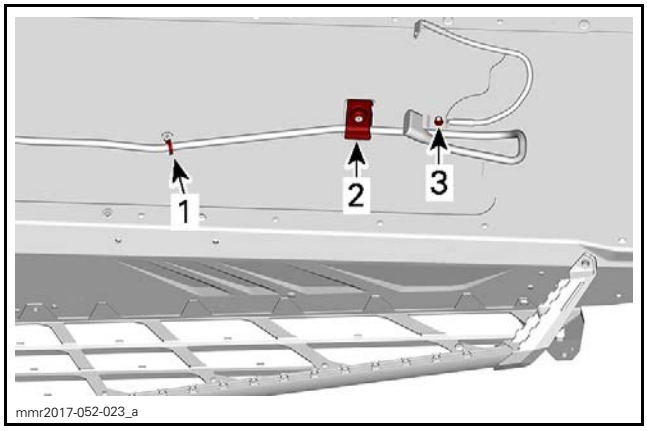
1. Drain cooling system, Refer to *COOLING SYSTEM DRAINING* in *PERIODIC MAINTENANCE PROCEDURES* subsection.
2. Place a wooden box under the engine module to support the frame.
3. Refer to the appropriate subsection and remove:
   - Driven pulley and countershaft
   - Fuel tank
   - Primary air intake silencer
   - LH bottom pan
   - Track
4. Remove the remaining drive belt guard bracket screw.


mmr2017-052-018_a

5. Disconnect the starter cable from the solenoid, if equipped.
6. Disconnect and remove the electric harness from the plastic bracket.

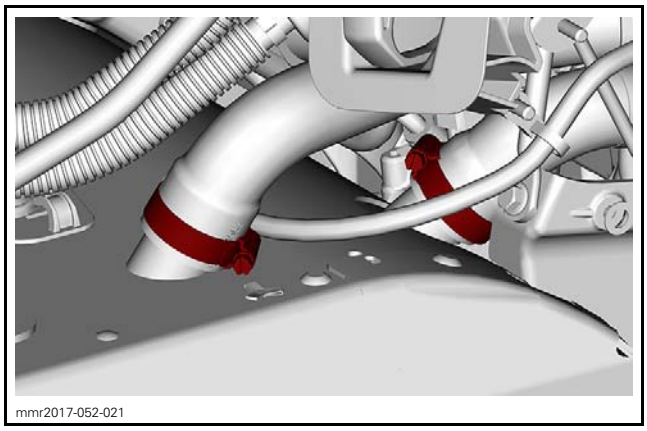

mmr2017-052-019

7. If the tunnel is replaced, remove:
   - Chaincase
   - The plastic bracket
   - Devices that retain the battery cable, if equipped
   - Rear bumper
   - Taillight
   - Snowguard.



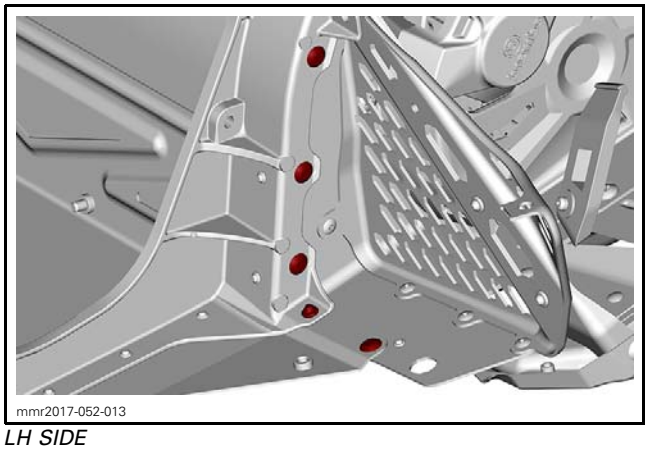
mmr2017-052-023_a

8. Move the plastic bracket, electrical harness, and fuel hoses aside to clear the tunnel.
9. Loosen the coolant hose clamps and disconnect hoses.

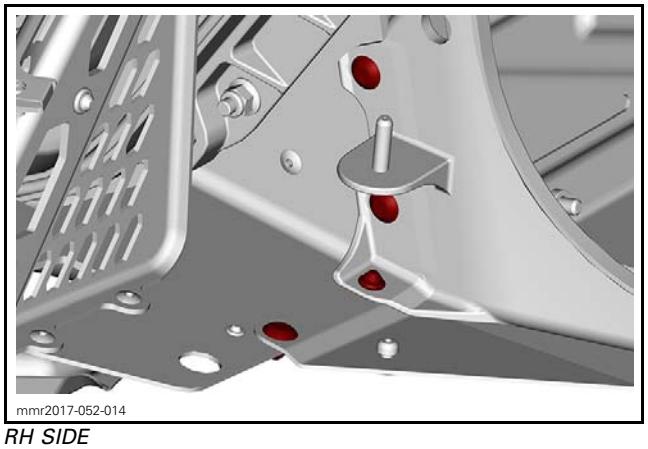

mmr2017-052-021

10. Remove rivets as per the following illustrations. Refer to *REMOVING A POP RIVET* in this subsection.

Important: It is highly recommended to support the frame locally around a Hemlock rivet when punching its nail out.

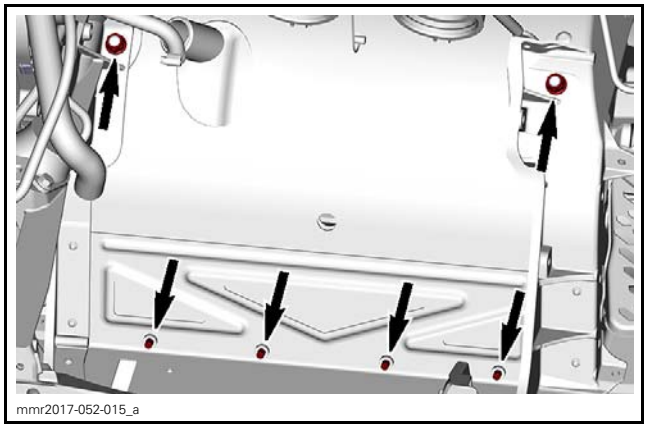


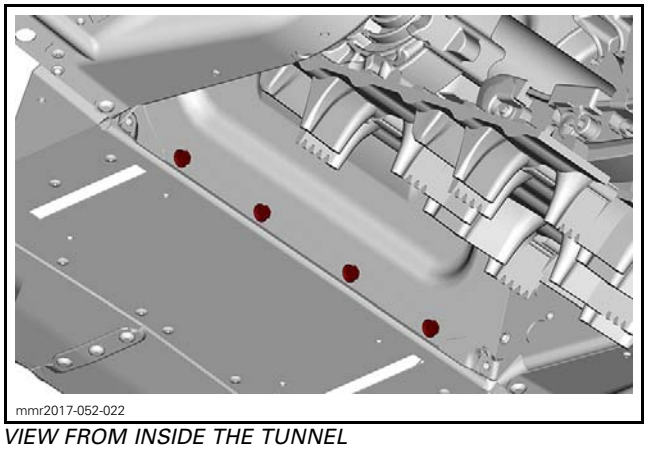
LH SIDE



RH SIDE

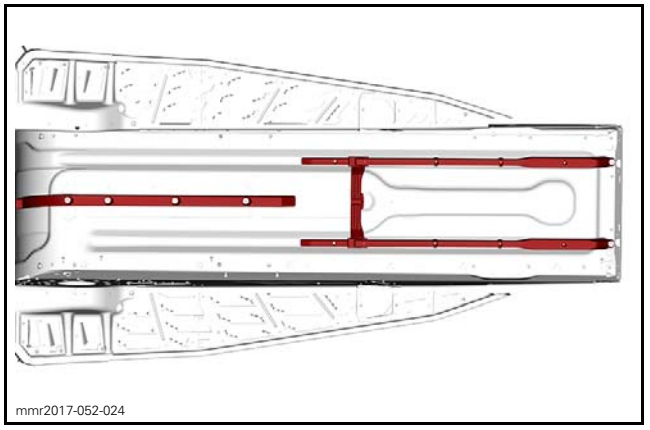
11. Remove nuts and screws securing the engine module to the tunnel.





VIEW FROM INSIDE THE TUNNEL

12. Separate the tunnel module from the rest of the frame.
13. Remove the tunnel protectors under the tunnel, if equipped.



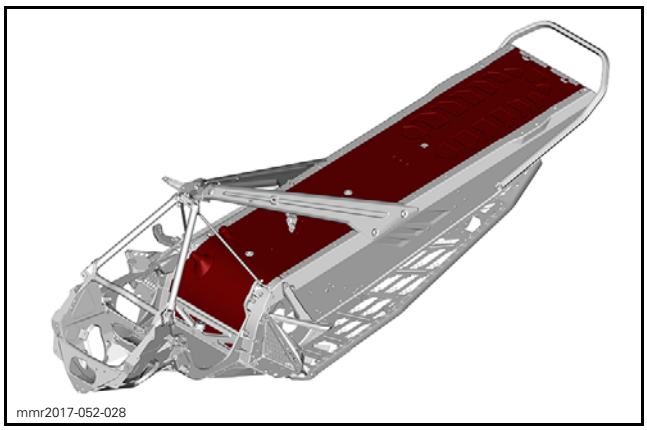
Installing the Tunnel Module

The installation is the reverse of the removal procedure. However, pay attention to the following.

Refer to exploded views or appropriate subsections for proper tightening torque.

Properly refill cooling system. Refer to *COOLING SYSTEM REFILL AND BLEEDING* in *PERIODIC MAINTENANCE PROCEDURES* subsection.

HEAT EXCHANGER


mmr2017-052-028

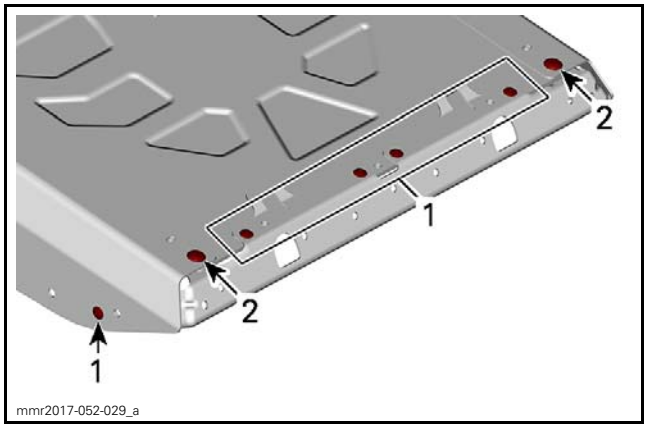
Replacing the Heat Exchanger

1. Remove the tunnel. Refer to the procedure in this subsection.

Do not remove the chaincase.

2. Remove the tunnel rear cap. Refer to *RIVETS* in this subsection.

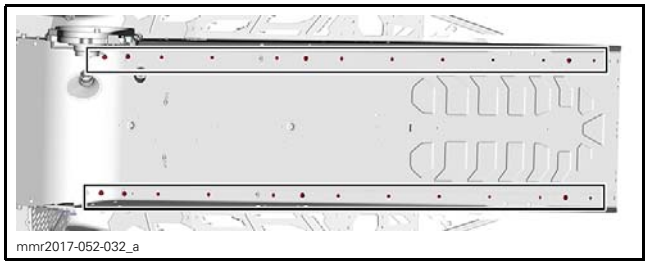
Important: It is highly recommended to support the frame locally around a Hemlock rivet when punching its nail out.

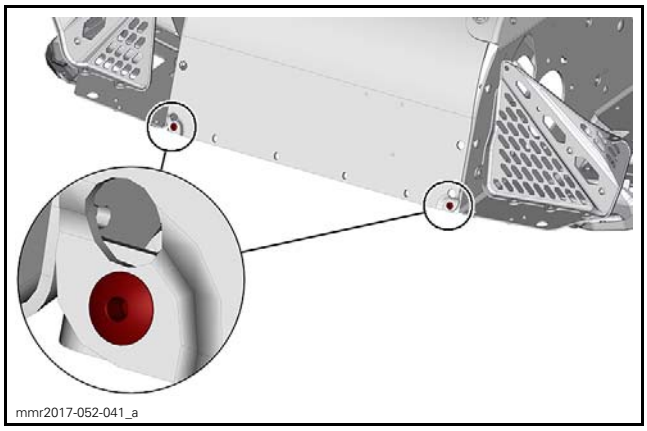


mmr2017-052-029_a

1. Avibulb rivets (pop rivets)
2. Hemlock rivets (pop rivets)

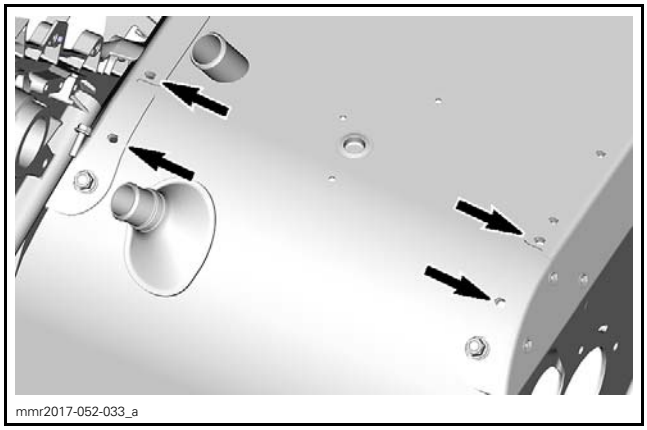
3. Remove the following rivets.


mmr2017-052-032_a

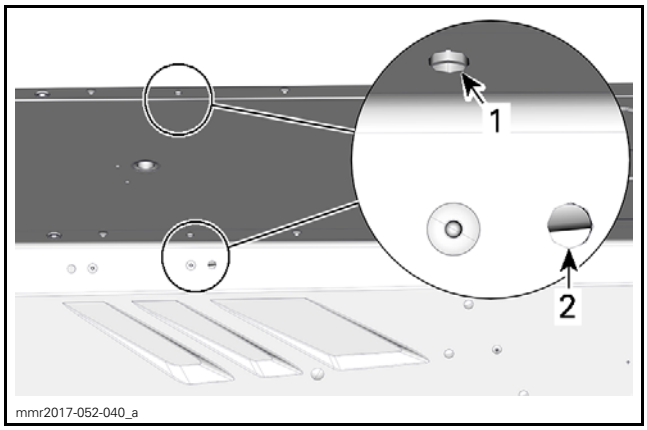

mmr2017-052-041_a

4. Position the new heat exchanger.
5. Install M6 screws and nuts loosely in the Hemlock rivet holes.

NOTE: M6 screws will not fit in self-piercing rivet holes.

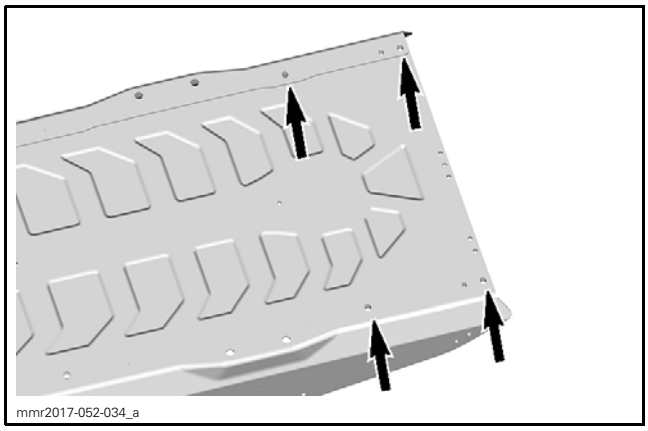

mmr2017-052-033_a

FRONT RIVET HOLES



mmr2017-052-040_a

MID-LENTGH RIVET HOLES
1. Install M6 screws and nuts here
2. Rear mounting hole for rear frame member



REAR RIVET HOLES

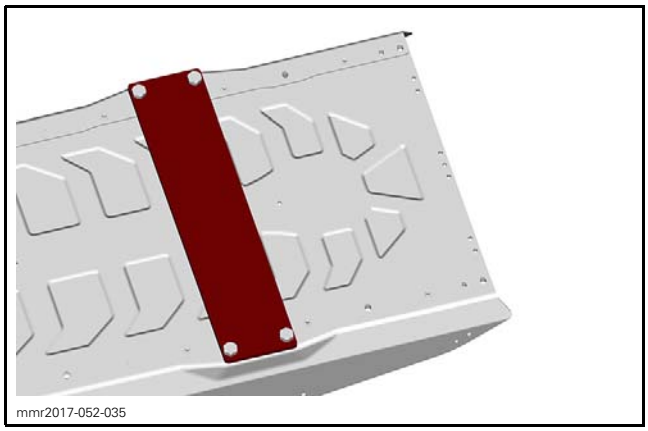
6. Install the gauge kit loosely with the appropriate screws, as per the following illustrations.

NOTICE **It is imperative to use the gauge kit and to follow each steps of this procedure to avoid drive axle misalignment.**

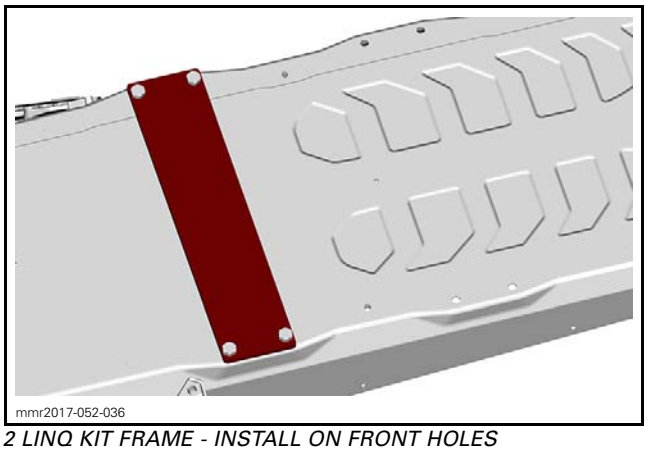
REQUIRED TOOL	
RADIATOR INSTALLATION GAUGES (P/N 529 036 422)	

CYLINDRICAL GAUGES LENGHT	
Rear suspension hole gauges	419.2 mm (16-1/2 in)
Tail gauge	426.4 mm (16-25/32 in)

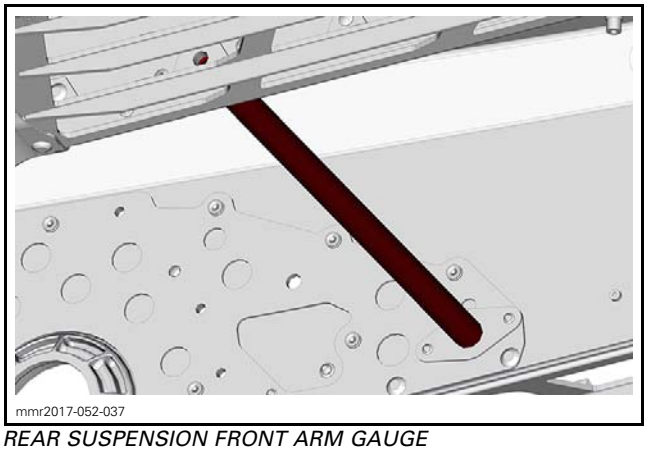
The gauge kit fits all tunnel sizes.



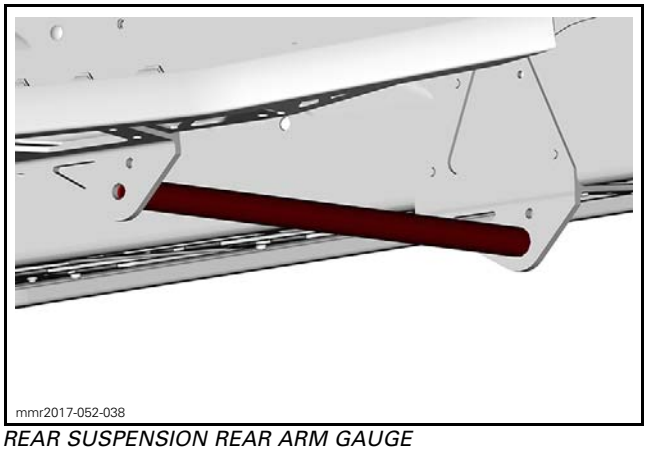
1 LINQ KIT FRAME



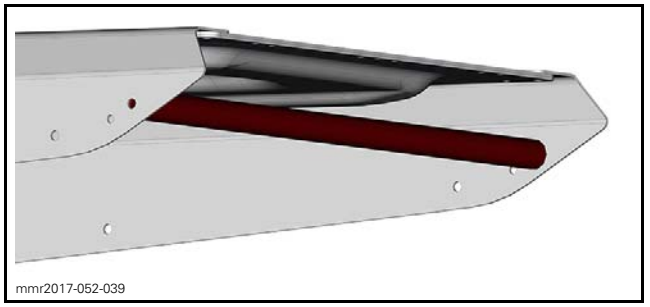
2 LINQ KIT FRAME - INSTALL ON FRONT HOLES



REAR SUSPENSION FRONT ARM GAUGE



REAR SUSPENSION REAR ARM GAUGE



TAIL GAUGE

7. Install the drive axle. Refer to *DRIVE AXLE* subsection.

NOTE: It is not required to install the chain and the brake disc.

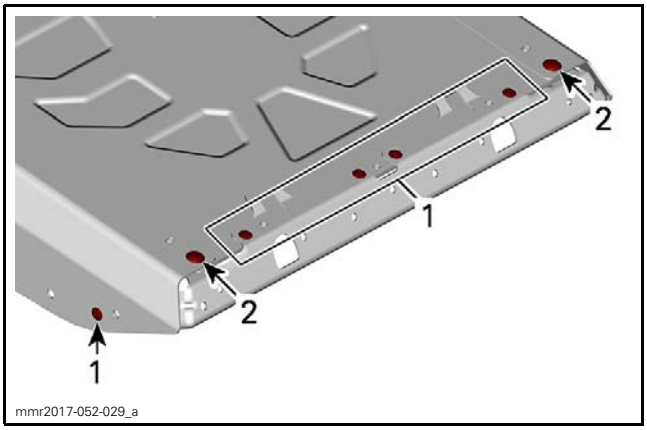
8. Tighten gauges and M6 screws with standard torque.
9. Enlarge self-piercing rivet holes.

REQUIRED TOOL
Drill bit6.35 mm (1/4 in)

10. Install Hemlock rivets in enlarged holes.

REQUIRED PARTS	
Hemlock rivets	293150119

11. Install the tunnel rear cap.



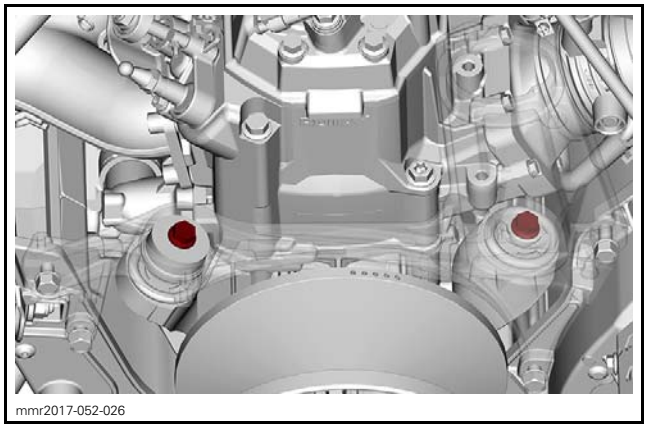
1. Avibulb 4.76 mm (3/16 in) rivets
2. Hemlock 6.4 mm (1/4 in) rivets

12. Remove the M6 screws and nuts, and install Hemlocks rivets.
13. Remove all gauges and the drive axle.
14. Reassemble the vehicle.

COUNTERSHAFT BEARING SUPPORT

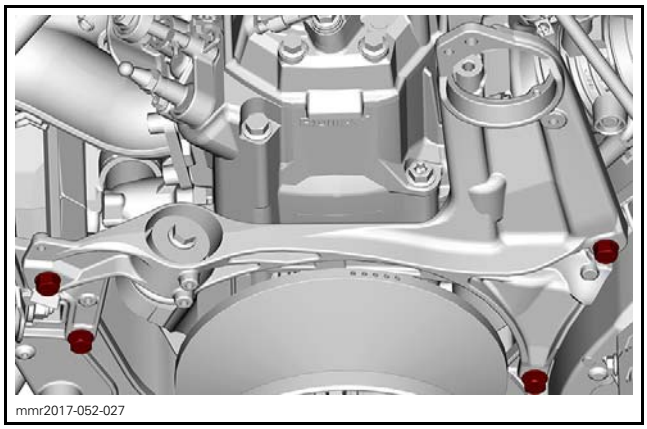
Removing the Countershaft Bearing Support

1. Refer to the appropriate subsection and remove:
   – Driven pulley and countershaft
   – LH side bottom pan.
2. Disconnect the Rave valve cable. Refer to *RAVE* subsection in *ENGINE*.
3. Install a shim between the engine bottom end and the engine module.
4. Remove both engine mount screws.



FRAME MEMBER IS TRANSPARENT FOR CLARITY

5. Remove countershaft bearing support screws.



6. Remove the countershaft bearing support.

Installing the Countershaft Bearing Support

The installation is the reverse of the removal procedure. However, pay attention to the following.

IF INSTALLED ON THE SAME FRAME MEMBER	
M8 Hexagonal flange screw	207683044
IF INSTALLED ON A NEW FRAME MEMBER	
M8 Hexagonal flange self-tapping screw	210283040

Refer to exploded view for tightening torque and sequence.

ENGINE

ENGINE			
Engine type			Rotax 850 E-TEC
Number of cylinder			2
Bore			82 mm (3.228 in)
Stroke			80.4 mm (3.165 in)
Displacement			849 cm^3 (51.81 in^3)
Compression ratio			12.50 ± 0.3
Combustion chamber volume			37.00 cc ± 0.93
Maximum power engine speed			7900 ± 100 RPM
3D RAVE spring	Valve springs	Color	Yellow
		Wire diameter	0.7 mm (.0276 in)
		Minimum free length	35 mm (1.378 in)
Piston ring type			Semi-trapezoidal
Ring end gap		New	0.4 mm to 0.6 mm (.016 in to .024 in)
		Service limit	1 mm (.039 in)
Engine compression specification		Service limit	7.5 bar (109 PSI)
Piston/cylinder wall clearance		New	0.135 mm to 0.161 mm (.0053 in to .0063 in)
		Service limit	0.200 mm (.0079 in)
Piston projection			1.75 mm to 1.82 mm (.069 in to .072 in)
Cylinder head warpage		Service limit	0.5 mm (.0197 in)
Cylinder taper		New (max.)	0.03 mm (.0012 in)
		Service limit	0.1 mm (.0039 in)
Cylinder out of round		New (max.)	0.010 mm (.0004 in)
		Service limit	0.080 mm (.0031 in)
Crankshaft deflection		Max.	MAG: 0.05 mm (.002 in) PTO: 0.06 mm (.0024 in)
Connecting rod big end axial play		New	0.152 mm to 0.352 mm (.006 in to .0139 in)

COOLING SYSTEM		
Coolant	Type	Ethyl glycol and distilled water (50%/50%). Use BRP LONG LIFE ANTIFREEZE (P/N 219 702 685) or coolant specifically formulated for aluminum engines
Thermostat opening temperature		37°C (99°F)

FUEL SYSTEM		
Fuel delivery		E-TEC direct injection with integrated auxiliary injection system
Throttle body		2x 52 mm
Idle speed (not adjustable)		1200 ± 200 RPM

ELECTRICAL SYSTEM		
Lighting system output		1340 W @ 6000 RPM
Ignition type		Inductive
Spark plug	Make and type	NGK ILKR8Q7 (engine and spark plug threads are indexed)
	Gap	Not adjustable 0.6 mm to 0.7 mm (.024 in to .028 in)
Ignition timing BTDC @ 3500 RPM		28°
		5.98 mm (.235 in)

VEHICLES

COOLING SYSTEM			
Coolant	Type		Ethyl glycol and distilled water (50%/50%). Use BRP LONG LIFE ANTIFREEZE or coolant specifically formulated for aluminum engines
	Quantity	MX Z	6.8 L (7.2 qt (U.S. liq.))
		Renegade	7.1 L (7.5 qt (U.S. liq.))
		Summit	7.5 L (7.9 qt (U.S. liq.))
Radiator cap opening pressure			110 kPa (16 PSI)

LUBRICATION SYSTEM		
Oil injection pump type		Electronic oil injection pump
Injection oil	Type	XPS synthetic 2-stroke oil
	Quantity	3.4 L (3.6 qt (U.S. liq.))

FUEL SYSTEM			
Fuel pump			In-tank electrical fuel pump
Fuel	Type		Premium unleaded gasoline (fuel which may contain up to 10% MAX ethanol
	Octane rating	Inside North America	91 Pump Posted AKI (R+M)/2)
		Outside North America	95 (RON)
Fuel tank capacity			36 L (9.5 U.S. gal.)

ELECTRICAL SYSTEM		
Battery		12 V, 18 A•h
Headlamp		2 x 60/55 W (H-13)
Taillight and stoplight		2.6 W / 139m W LED
Fuses	START/RER/CLOCK (F1)	5 A
	LOADS (F2)	25 A
	BATTERY (F3)	30 A
	ACCESSORIES (F4)	7.5 A

DRIVE SYSTEM		
Chaincase oil	Type	XPS synthetic chaincase oil
	Quantity	350 ml (12 U.S. oz)

DRIVE SYSTEM			
Chain drive ratio		MX Z	27/45
		Renegade	25/45
		Summit (154")	19/45
		Summit (165")	21/51
Chain	Pitch		9.530 mm (.375 in)
	Type		Silent
	Links qty/ plate qty	MX Z	110/13
		Renegade	108/13
		Summit (154")	112/13
		Summit (165")	116/13
Drive pulley type			pDrive
Drive pulley calibration	Clutch engagement	MX Z Renegade	3600 ± 100 RPM
		Summit (High Altitude Calibration)	3800 ± 100 RPM
		Summit (Sea Level Calibration)	3600 ± 100 RPM
	Spring color code	MX Z	Blue/Violet
		Renegade	Blue/Blue
		Summit (High Altitude Calibration)	Violet/Violet
		Summit (Sea Level Calibration)	Blue/Yellow
	Spring length	Blue/Blue	108 mm (4.252 in)
		Blue/Violet	100.3 mm (3.949 in)
		Blue/Yellow	123 mm (4.843 in)
		Violet/Violet	106.7 mm (4.201 in)
Drive pulley calibration	Screw length		14 mm (.551 in)
	Ramp	MX Z Renegade	868
		Summit	967 adjustable
Drive pulley calibration	Clicker position	Summit	3

DRIVE SYSTEM			
Driven pulley type	Type		QRS
	Spring color code	MX Z Renegade	Green/Green
		Summit (High Altitude Calibration)	Blue/Blue
		Summit (Sea Level Calibration)	Not applicable
	Spring length	Blue/Blue	124.3 mm (4.894 in)
		Green/Green	98.5 mm (3.878 in)
		Summit (Sea Level Calibration)	88.8 mm (3.496 in)
	Spring preload		0
	Cam angle	MX Z	47°/44°
		Renegade	44°/42°
		Summit	40° - XTIs
Pulley distance	Z		Not adjustable 20.9 mm (.823 in)
	X		Not adjustable 41.1 mm ± 1.8 mm (1.618 in ± .071 in)
Offset	Y - X	New	Not adjustable 3 mm (.118 in)
		After break-in	Not adjustable 2 mm ± .5 mm (.079 in ± .02 in)
Drive belt	Width		38.3 mm (1.508 in)
	Wear limit		35.9 mm (1.413 in)
Drive sprocket number of teeth		MX Z Renegade	8
		Summit	6
Drive sprocket diameter		MX Z Renegade	183 mm (7.2 in)
		Summit	166 mm (6.5 in)

DRIVE SYSTEM			
Track	Width	MX Z Renegade	381 mm (15 in)
		Summit	406.4 mm (16 in)
	Length	MX Z	326.9 cm (129 in)
		Renegade	348.7 cm (137 in)
		Summit	3 923 mm (154 in)
			4 178 mm (165 in)
	Profile height	MX Z Renegade	31.75 mm (1.25 in)
		Summit	63.5 mm (2.5 in) or 76.2 mm (3 in)
Track adjustment	Deflection		3.2 cm (1.26 in)
	Force		6.0 kgf to 8.5 kgf (13 lbf to 19 lbf)

BRAKE SYSTEM		
Brake lining minimum thickness		1 mm (.039 in)
Brake disk minimum thickness		4.5 mm (.177 in)
Brake fluid	Type	DOT 4
	Quantity	65 ml (2.2 U.S. oz)

SUSPENSION		
FRONT		
Suspension type		RAS 3
Suspension maximum travel	MX Z Renegade	233 mm (9.17 in)
	Summit	214 mm (8.4 in)
Shock absorber type	Summit SP	HPG
	All other	HPG Plus
Stabilizer bar type		Link
REAR		
Suspension type	MX Z Renegade	rMotion
	Summit	tMotion
Suspension maximum travel	MX Z TNT MX Z X	27.2 cm (10.7 in)
	Renegade	27 cm (10.6 in)
	Summit	239 mm (9.4 in)

SUSPENSION			
Shock absorber type	Center	MX Z TNT MX Z X Renegade X Summit X	HPG Plus
		Renegade Adrenaline Summit SP	HPG
	Rear	MX Z TNT Summit X	HPG Plus
		MX Z X Renegade X	KYB PRO 36 EA
		Renegade Adrenaline Summit SP	HPG
Stroke limiter standard position			3

STEERING SYSTEM		
Handlebar	MX Z Renegade	Aluminum with J-Hooks
	Summit	Aluminum with J-Hooks and Grab handle
Riser block height	MX Z TNT Renegade Adrenaline	120 mm (4.7 in)
	MX Z X Renegade X	Adjustable - 120 mm (4.7 in)
	Summit	190 mm (7.5 in)
Ski type	MX Z TNT Renegade Adrenaline	Pilot 5.7
	MX Z X Renegade X	Pilot 5.7 Pilot TS (optional)
	Summit	Pilot DS3
Toe-out		5 mm (.197 in)

WEIGHT AND DIMENSIONS		
Mass (dry)	MX Z TNT	214 kg (471 lb)
	MX Z X	215 kg (475 lb)
	Renegade	220 kg (486 lb)
	Summit SP (154")	200 kg (441 lb)
	Summit SP (165")	203 kg (448 lb)
	Summit X (154")	197 kg (434 lb)
	Summit X (165")	200 kg (441 lb)
Overall length	MX Z	301 cm (118.5 in)
	Renegade	311 cm (122.4 in)
	Summit (154")	3 422 mm (134.7 in)
	Summit (165")	3 555 mm (140 in)

WEIGHT AND DIMENSIONS		
Overall width	MX Z Renegade	121.7 cm (47.9 in)
	Summit	1 057 mm (41.6 in)
Overall height	MX Z Renegade	122.2 cm (48.1 in)
	Summit	1 379 mm (54.3 in)
Ski stance	MX Z Renegade	106 cm (41.7 in)
	Summit	89.5 cm (35.2 in)

MATERIAL	
Frame	Aluminum
Side bottom pan, Front bottom pan, gauge support, gauge support cover, side panel, rear console, windshield support, glove box cover and headlamp surrounding	Polypropylene
Rear lateral hood, front hood and top side panel	Surlyn

WIRING DIAGRAM INFORMATION

GENERAL

WIRING DIAGRAM LOCATION

Wiring diagrams are found in the *WIRING DIAGRAM BOOKLET*.

WIRING DIAGRAM WITH COLORED LINES

The wiring diagram on the *KNOWLEDGE CENTER* is in color.

Color Definition

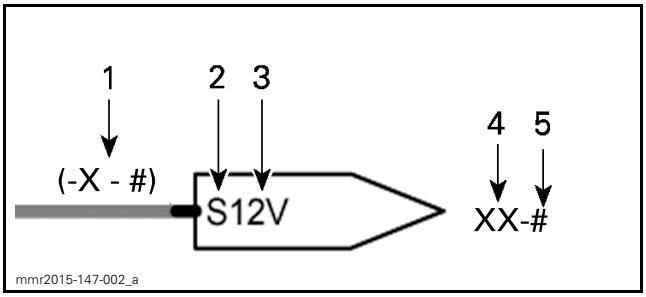
NOTE: To find the color of the wire on the vehicle skip to *WIRE COLORS AND SIZES* in this subsection.

The following colors refer to the color of the line drawn in the wiring diagram.

LINE COLOR	LINE TYPE	FUNCTION	DEFINITION
Red	Thick	Unswitched 12 V	Hot at all times
	Thin	3.3 and 5 V	Sensor reference voltage
Orange	Thick	55 - 60 V	High voltage
Blue	Thin	Analog signal	Variable voltage
Cyan	Thin	Digital signal	Pulsed or constant digital (on/off)
Pink	Thick	12V switched	Condition must be met to activate circuit
Green	Thin dotted	Communication	Data communication between modules using a protocol (CAN, LIN, & other)
Brown	Thick	Power control	Controls a circuit by providing an on/off control to activate the circuit
Yellow	Thick	AC Volts	Alternative current exiting the magneto
Black	Thick	Permanent ground	A ground that is in permanent contact
	Thin	Module (analog/digital) ground	A ground that is controlled by a module

WIRING DIAGRAM CODES

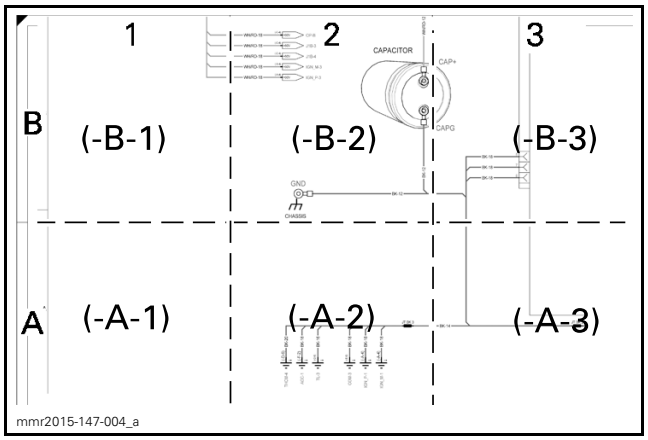
The wiring diagrams use the following codes.



1. *Wiring diagram index*
2. *Power condition*
3. *Voltage of a powered circuit*
4. *Connector code*
5. *Connector pin*

Wiring Diagram Index

The wiring diagram is separated by rows (letters) and columns (numbers).



WIRING DIAGRAM INDEX

Power Condition (12V Circuits Only)

The wiring diagram indicates when a circuit is powered:

– S: Switched. Certain conditions must be met;
– U: Unswitched (hot at all times).

Voltage of Powered Circuit

Voltage references are approximate for a powered circuit in good condition.

INDICATED VOLTAGE	APPROXIMATION
12V	Battery voltage
5V	Regulated 4.95 - 5V
60V	Regulated 55 - 60V

Connector Code

The wire connects to the indicated connector. See image at the beginning of this subsection.

Connector Pin

The wire is the indicated pin in the connector.

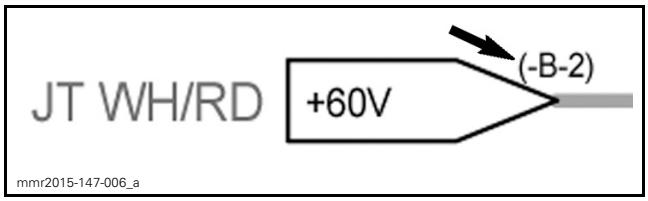
NOTE: Could be identified by either a number or by a letter depending on the type of connector used.

FOLLOWING A CIRCUIT

To follow a circuit, search the in section of the wiring diagram shown in the wiring diagram index.

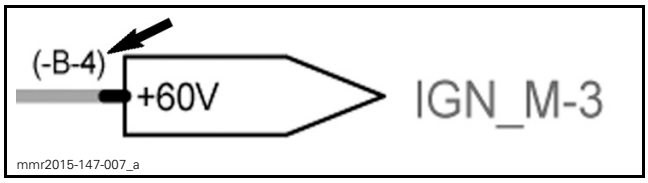
In this example, the 60V comes **from** JT WH/RD in section (-B-2).

NOTE: The arrow indicates the direction of the power in the circuit.



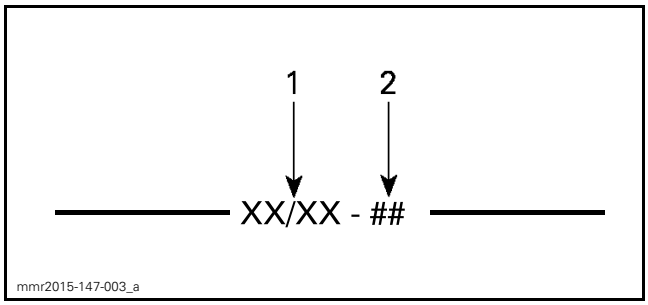
FROM JT WH/RD (-B-2)

In following example, the 60V goes **to** the IGN_M connector pin 3 in section (-B-4).



TO ING_M-3 (-B-4)

WIRE COLORS AND SIZES



1. *Wire color*
2. *Wire gauge (AWG)*

The first color of a wire is the main color, second color is the stripe.

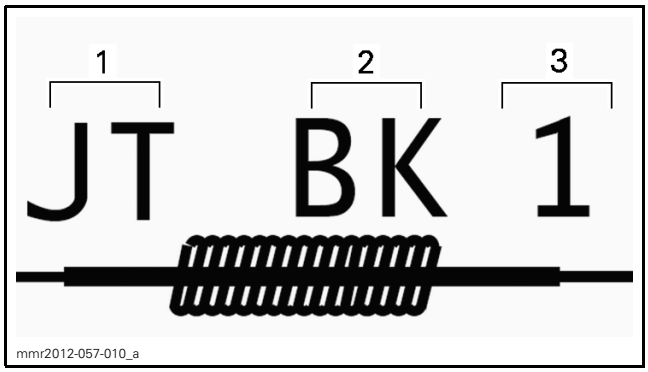
Example: YE/BK is a YELLOW wire with a BLACK stripe.

COLOR CODE					
BG	—	BEIGE	OG	—	ORANGE
BK	—	BLACK	RD	—	RED
BU	—	BLUE	VT	—	VIOLET
BN	—	BROWN	WH	—	WHITE
GN	—	GREEN	YE	—	YELLOW
GY	—	GRAY	PK	—	PINK

LT prefix means a "light" color. E.g: LT GN = Light green.

SPLICES IN WIRING HARNESS

Splices in wiring harness are indicated on the wiring diagram as follows.



1. JT: Splice indication
2. Spliced wire color
3. Splice number on the wire

Refer to *SPLICE INFORMATION* subsection for more details.

2017 SUMMIT 850 E-TEC

LINE TYPES
55 / 60 VOLTS
12 VOLTS SWITCHED
12 VOLTS UNSWITCHED
5 OR 3.3 VOLTS
DIGITAL SIGNAL
POWER CONTROL
ANALOG SIGNAL
COMMUNICATION
A-D GROUND
POWER GROUND
AC VOLTAGE

Link

ENGINE CONTROL MODULE
ECMB

FUSEBOX
FB
RER F1: 5A
BATTERY F2: 30A
ACCESSORY F4: 7.5A
LOADS F3: 25A

BAT+
CHASSIS
SD+
STARTER SOLENOID
CHASSIS
ENGINE
SD
CONTROL
12 VOLTS

BATTERY CHARGING
VEHICLE LOADS
RER CONTROL
ECM POWER INPUT
ENGINE CUT OFF SIGNAL INPUT
FUEL PUMP PWM CONTROL
55 V FOR FUEL PUMP
BRAKE SIGNAL INPUT
CAN LO
CAN HI
DATA
CONTACT
GROUND

RF IDENTIFICATION KEY
RFID
12 VOLTS
DATA
CONTACT
GROUND

FUEL PUMP
FP
PWM CONTROL
FUEL LEVEL SIGNAL
55 VOLTS
FUEL LEVEL GROUND

COMMUNICATION CONNECTOR
COM
+12V
+12V
ECM POWER IN
GROUND
CAN LO
CAN HI

THCM
CAN HI
CAN LO
S12V
GND

REVERSE BUTTON
RER
12 VOLTS

ACC 1
12 VOLTS
GROUND

TL
12 VOLTS
BRAKE
GROUND

STR 4P
BRAKE SWITCH
LEFT GRIP WARMER

STR 6P
EMERGENCY ENGINE CUT OFF SWITCH
THROTTLE LEVER WARMER
RIGHT GRIP WARMER

GAUGE SUMMIT
MG
12 VOLTS
FUEL LEVEL SIGNAL
CAN LO
CAN HI
GROUND
HEATED LEVER OUTPUT
HEATED GRIPS OUTPUT
HEATER UP
HEATER DOWN
HIGH BEAM

GRIP
GRIP AND LEVER HEATER CONTROL SWITCH
UP
DOWN

DIMMER
HEADLAMP DIMMER SWITCH
HI
LO

HEADLAMP 1
HL1
HIGH BEAM
GROUND
LOW BEAM

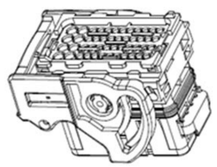
HEADLAMP 2
HL2
HIGH BEAM
GROUND
LOW BEAM

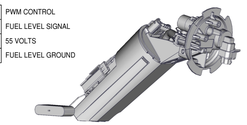
MUFFLER TEMP. SENSOR
EGTS
EGTS SIGNAL
GROUND
SIGNAL
GROUND

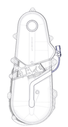
VEHICLE SPEED SENSOR
VSS
5 VOLTS
GROUND
SPEED SIGNAL
5 VOLTS
GROUND
SPEED SIGNAL

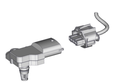
MANIFOLD AIR PRESSURE TEMP SENSOR
MAPTS
INTAKE MANIFOLD PRESSURE SIGNAL
5 VOLTS
INTAKE MANIFOLD TEMP. SIGNAL
GROUND
PRESSURE SIGNAL
5 VOLTS
TEMPERATURE SIGNAL
GROUND

GND
CHASSIS









REF: 515178206 REV: 1

2017 MXZ, RENEGADE 850 E-TEC

LINE TYPES
55 / 60 VOLTS
12 VOLTS SWITCHED
12 VOLTS UNSWITCHED
5 OR 3.3 VOLTS
DIGITAL SIGNAL
POWER CONTROL
ANALOG SIGNAL
COMMUNICATION
A-D GROUND
POWER GROUND
AC VOLTAGE

ECMB
BATTERY CHARGING
STARTER SOLENOID
VEHICULE LOADS
DIAGNOSTIC POWER
DATA
CONTACT
GROUND
BRAKE SIGNAL INPUT
FUEL PUMP PWM CONTROL
55 V FOR FUEL PUMP
ENGINE CUT OFF CONTROL INPUT
ENGINE CUT OFF CONTROL GROUND
CAN LO
CAN HI
START/RER CONTROL
5 VOLTS
GROUND
SPEED SIGNAL INPUT
INTAKE MANIFOLD PRESSURE SIGNAL
5 VOLTS
INTAKE MANIFOLD TEMP. SIGNAL
GROUND

FUSEBOX FB
IGNITION CLOCK F1 5A
BATTERY F3 30A
ACCESSORY F4 7.5A
LOADS F2 20A

BAT+
CHASSIS
SD+
STARTER SOLENOID SD
CONTROL
12 VOLTS
CHASSIS
ENGINE

RF IDENTIFICATION KEY RFID
12 VOLTS
DATA
CONTACT
GROUND

FUEL PUMP FP
PWM CONTROL
FUEL LEVEL SIGNAL
55 VOLTS
FUEL LEVEL GROUND

VEHICLE SPEED SENSOR VSS
5 VOLTS
GROUND
SPEED SIGNAL

MANIFOLD AIR PRESSURE TEMP SENSOR MAPTS
PRESSURE SIGNAL
5 VOLTS
TEMPERATURE SIGNAL
GROUND

GAUGE MG
FUEL LEVEL GROUND
FUEL LEVEL SIGNAL
CAN LO
CAN HI
S12V
CLOCK (U12V)
GROUND
HEATED LEVER OUTPUT
HEATED GRIPS OUTPUT
LEVER DOWN
GRIP DOWN
SET
LEVER UP
GRIP UP
MODE
HIGH BEAM

COMMUNICATION CONNECTOR COM
12 VOLTS
12 VOLTS
ECM POWER IN
GROUND
CAN LO
CAN HI

THCM
CAN HI
CAN LO
12 VOLTS
GROUND

ACC 1
12 VOLTS
GROUND

TL
ACC2
12 VOLTS
GROUND
TAIL LIGHT
12 VOLTS
BRAKE
GROUND

STR 4P
BRAKE SWITCH
LEFT GRIP WARMER

STR 6P
EMERGENCY ENGINE CUT OFF SWITCH
THROTTLE LEVER WARMER
RIGHT GRIP WARMER

SH
START / RER SWITCH
LEVER DOWN
GRIP DOWN
SET
LEVER UP
GRIP UP
MODE
DIMMER SWITCH

HEADLAMP 1 HL1
HIGH BEAM
GROUND
LOW BEAM

HEADLAMP 2 HL2
HIGH BEAM
GROUND
LOW BEAM

GND
CHASSIS

REF: 515178205 REV:

2017 ENGINE HARNESS 850 E-TEC

RAVE POSITION SENSOR
ERF
5 VOLTS 3 PK/VT-18 F3
SIGNAL 2 WH/VT-18 E3
GROUND 1 BK/VT-18 E2

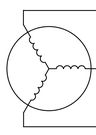
THROTTLE POSITION SENSOR
TPS
5 VOLTS 3 PK/BR-18 D2
GROUND 2 BK/BN-18 C2
SIGNAL 1 WH/BN-18 D3

KNOCK SENSOR
KS
SIGNAL 2 YE/BU-18 G1
GROUND 1 BG/BU-18 H1

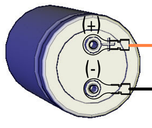
COOLANT TEMPERATURE SENSOR
CTS
SIGNAL 2 BK/OG-18 B1
GROUND 1 BG/OG-18 C1

CRANKSHAFT POSITION SENSOR
CPS
SIGNAL 1 BU/YE-18 K2
GROUND 2 WH/YE-18 K1

OIL LEVEL SENSOR
OLS
SIGNAL 1 LT BU-18 F2
GROUND 2 BK/BU-18 G3

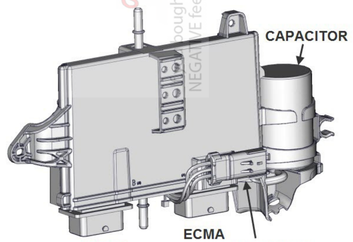


MAGNETO
MAG
YE-12
YE-12
YE-12

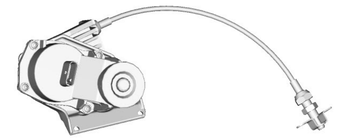


CAPACITOR
WH/RD-12
BK-12

ECMA
ECMA



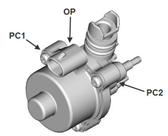
RAVE ACTUATOR
E-RAVE
E4 PK/BG-18 1 SENSOR 5 VOLTS
F4 BK/BG-18 2 SENSOR GROUND
D4 WH/BG-18 3 SENSOR SIGNAL
G4 BG/RD-18 JT BG/RD BG/RD-18 4 ACTUATOR (+/-)
H4 BG/RD-18 JT BG/BN BG/BN-18 5 ACTUATOR (-/+)
J4 BG/BN-18
K4 BG/BN-18



THROTTLE BODY INJECTOR MAG
INJ TB MAG
A3 BN/BU-18 1 CONTROL
A4 VT/BU-18 2 12 VOLTS

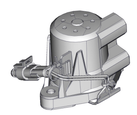
THROTTLE BODY INJECTOR PTO
INJ TB PTO
A2 BN/GN-18 1 CONTROL
A1 VT/GN-18 2 12 VOLTS

OIL PUMP FEEDBACK SWITCH
E1 BK/WH-18 PC1
F1 BG/BK-18 PC2

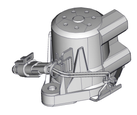


OIL PUMP
OP
B4 GN/YE-18 1 CONTROL
WH/RD-18 2 55 VOLTS

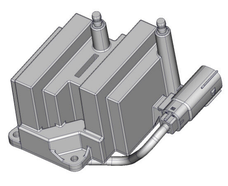
DIRECT INJECTOR MAG.
INJ DI MAG
L1 WH/RD-14 JT WH/RD
M1 BU-16 2 CONTROL
WH/RD-16 1 55 VOLTS



DIRECT INJECTOR PTO
INJ DI PTO
M2 GN-16 2 CONTROL
WH/RD-16 1 55 VOLTS



IGNITION COILS
COILS
L3 BK-16 JT B K 1 BK-16 1 GROUND
J3 OG/BU-18 2 CONTROL MAG
WH/RD-16 3 55 VOLTS
M3 BK-16 JR BK 2 BK-16 4 GROUND
K3 OR/GN-18 5 CONTROL PTO
WH/RD-16 6 55 VOLTS



BK-16
BK-16
GROUND
L4 BK-16
M4 BK-16
ENGINE

LINE TYPES

55 / 60 VOLTS	
12 VOLTS SWITCHED	
12 VOLTS UNSWITCHED	
5 OR 3.3 VOLTS	
DIGITAL SIGNAL	
POWER CONTROL	
ANALOG SIGNAL	
COMMUNICATION	
A-D GROUND	
POWER GROUND	
AC VOLTAGE	

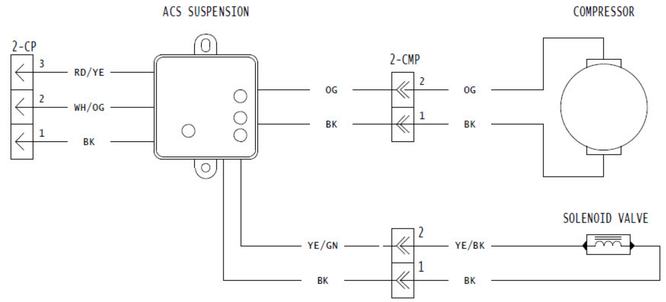
Link

219100863-019

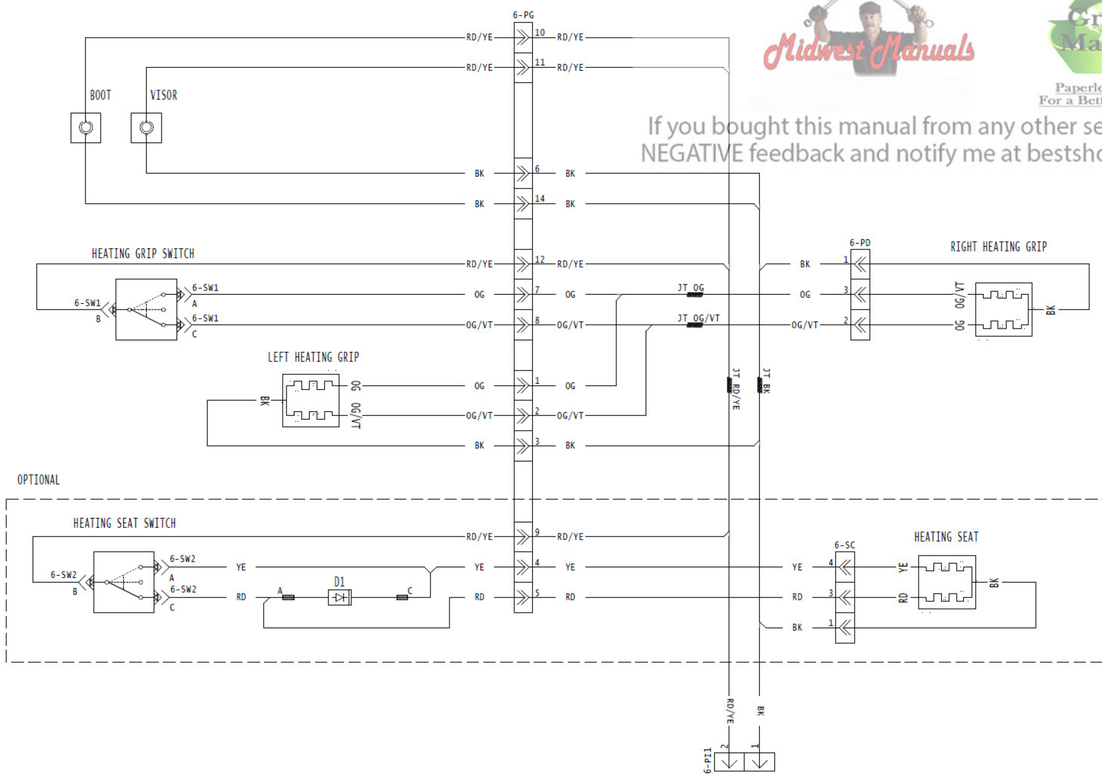
REF 864 440 REV 1

2017 SECONDARY HARNESSES

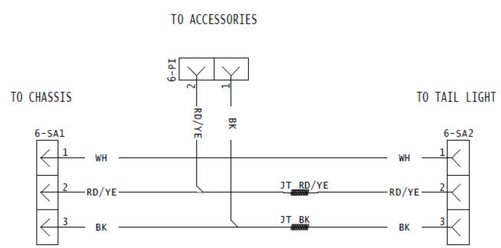
ACS SUSPENSION



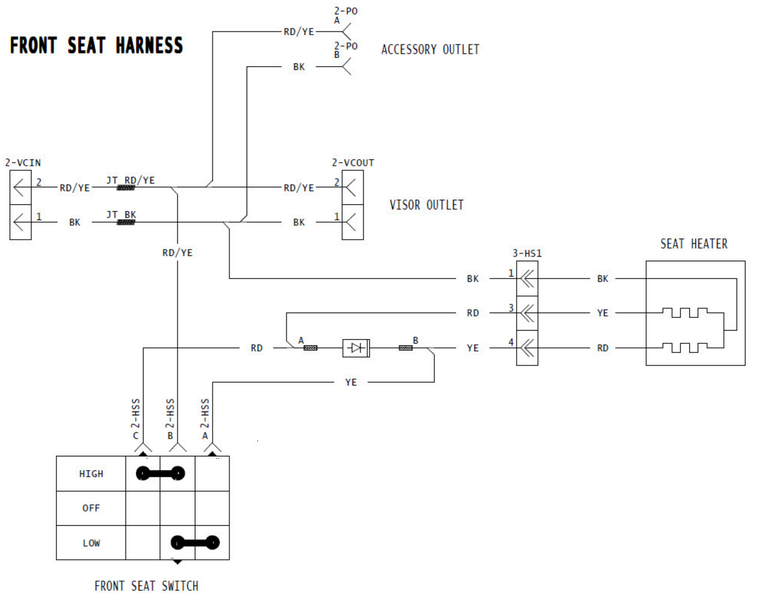
REAR SEAT HARNESS



REAR ACCESORIES T HARNESS



FRONT SEAT HARNESS



WHAT MATTERS IS WHAT'S NEXT

ENTER NOW TO
WIN
YOUR DREAM ACCESSORIZED SKI-DOO SLED

ski-doo.com/skidoo-contest.html

RIDING GEAR
ACCESSORIES
GENUINE PARTS

ski-doo | BRP 2017

WELCOME TO WHAT'S NEXT

Welcome to the 2017 Ski-Doo Riding Gear and Accessories Catalog. The biggest news for Ski-Doo in 2017 is the debut of our next 4th generation REV platform. There's a lot of amazing stuff about it, but at its heart, it is about you. It's totally designed around the rider so you can get the most out of its technology and have the best snowmobile experience you've ever had.

That's also what we do with our Riding Gear and Accessories. We design our items around you and how you ride so you can have your best time on your sled. That's evident in many of the new items for 2017...

When the 4th generation REV platform based sleds hit the snow, there will be 70 new accessories available. Like all our accessories, they were designed right along with the new platform, so they fit perfectly, look great and are easy to install. And we were sure to cover the most sought-after items, including Auxiliary LED Light, 1 + 1 seat system, skid plates, windshields and more.

We've used your comments to improve items, too. Like a new LinQ Fuel Caddy you can latch a LinQ bag on top of. And the new LinQ bags are more stylish. We redesigned many of our outerwear items to better fit how you ride and new Helium jackets are even more specialized for mountain riding.

We took this designed-around-riders approach in developing this catalog too. We want to make it easy to find the items you're looking for and understand their design and technology. You'll find:

Riding Gear Performance Ratings: An industry exclusive, we tell you the level of waterproofness, windproofness, warmth and breathability of our outerwear. This makes it easy to create the right combination of garments to keep you warm.

Comparison Charts: See all the items in a category in one chart, with technologies, features, benefits, performance ratings, colors, sizes and prices. It's easy to compare and choose the right one for you.

Video Links: Short videos tell the complete story of some of our most full-featured items and bring them to life. You'll find links to them throughout the catalog.

Tech Zones: Just like with our sleds, we use the latest technology to get the best performance. These pages will help you understand how they work and how they make your rides better.

And we didn't forget the fun stuff either. You'll find tips from our backcountry experts (and others), product development stories, profiles of inspiring riders and a look inside some race sleds. There's also a more international flavor as Ski-Doo grows around the world.

We are always looking for the next way to make your snowmobile experience great. You'll find that on nearly every one of the next 176 pages.

Enjoy this catalog and think snow!

Your Riding Gear, Accessories and Genuine Parts Team

2017 RIDING GEAR, ACCESSORIES & GENUINE PARTS

RIDING GEAR

14 Mountain
27 Crossover
28 Trail Performance
34 Touring
44 Recreational / Utility
45 Technical Wear
50 Helmets
61 Balaclavas
62 Goggles
64 Gloves & Mitts
69 Headwear
70 Boots & Socks
72 Bags & TEK Vest
74 Sportswear
85 Sizing Chart
86 Teenwear
88 Kidswear

TECH ZONE

10 Technology guide
12 Sympatex
13 PrimaLoft & RPM
45 Technical Wear
54 Modular 3 Helmet
55 BV2S Helmet

PARTS & ACCESSORIES

92 Platform/Accessories fit guide

CUSTOMIZED SLEDS

97 Summit SP 850 E-TEC
98 MXZ X 850 E-TEC
99 Renegade Backcountry
100 Renegade Adrenaline

ACCESSORIES

102 LinQ™ System
107 Windshields / Wind Protection
113 Mirrors
114 Handlebar Air Deflectors & Handlebars
115 LED Lights
116 Adjustable Risers & Extension Kits
118 Protection / Reinforcement
125 Toe-Holds / Reinforcement
126 Winch & Accessories
127 Vent & Grille Kits
128 Exclusive Sled Wrap Kits
129 Seats, Backrests / Footrests
132 Storage / Cargo
142 Traction & Control
154 Parts & Performance
161 Electronics / Electrical
164 Installation Parts
165 Garage / Stickers
166 Trailering / Covers
168 XPS

SPECIAL FEATURES

2 Ski-Doo Store
3 Riding Gear, Parts & Accessories Warranty
4 Summit REV (G4) Accessories & Riding Gear Proposal
6 MXZ REV (G4) Accessories & Riding Gear Proposal
8 BRP Peformance Rating System
22 Good habits for avalanche terrain
23 Multi day ride on trails
26 The Crossover boom
33 Ski-Doo backcountry expert profile
43 Cornerstone of riding experience
54 Know your helmet safety ratings
54 What backcountry experts wear under the lid
81 Growing passion for freeriding to the XX power
96 At the peak of performance
101 Quick swap your windshield for comfort
104 Ski-Doo LinQ System
105 Two sleds in one: Renegade with accessories
106 Build your dream sled
123 Freedom for your feet
142 Traction made easier
148 Tech focus - Skis & Carbides
153 Why you should use Genuine BRP Parts
159 Tech focus - Drive belts
160 BRP engine rebuilt center
170 Choosing the best for the harshest conditions
173 Maintenance tips to help keep your Ski-Doo snowmobile like new
174 Using the right oil matters
175 Maintenance chart

GET THE RIGHT GEAR

Wearing gear for the type of riding you do will maximize your snowmobiling experience. Look for the icon that best matches your riding style:

MOUNTAIN
CROSSOVER
TRAIL PERFORMANCE
TOURING
RECREATIONAL / UTILITY

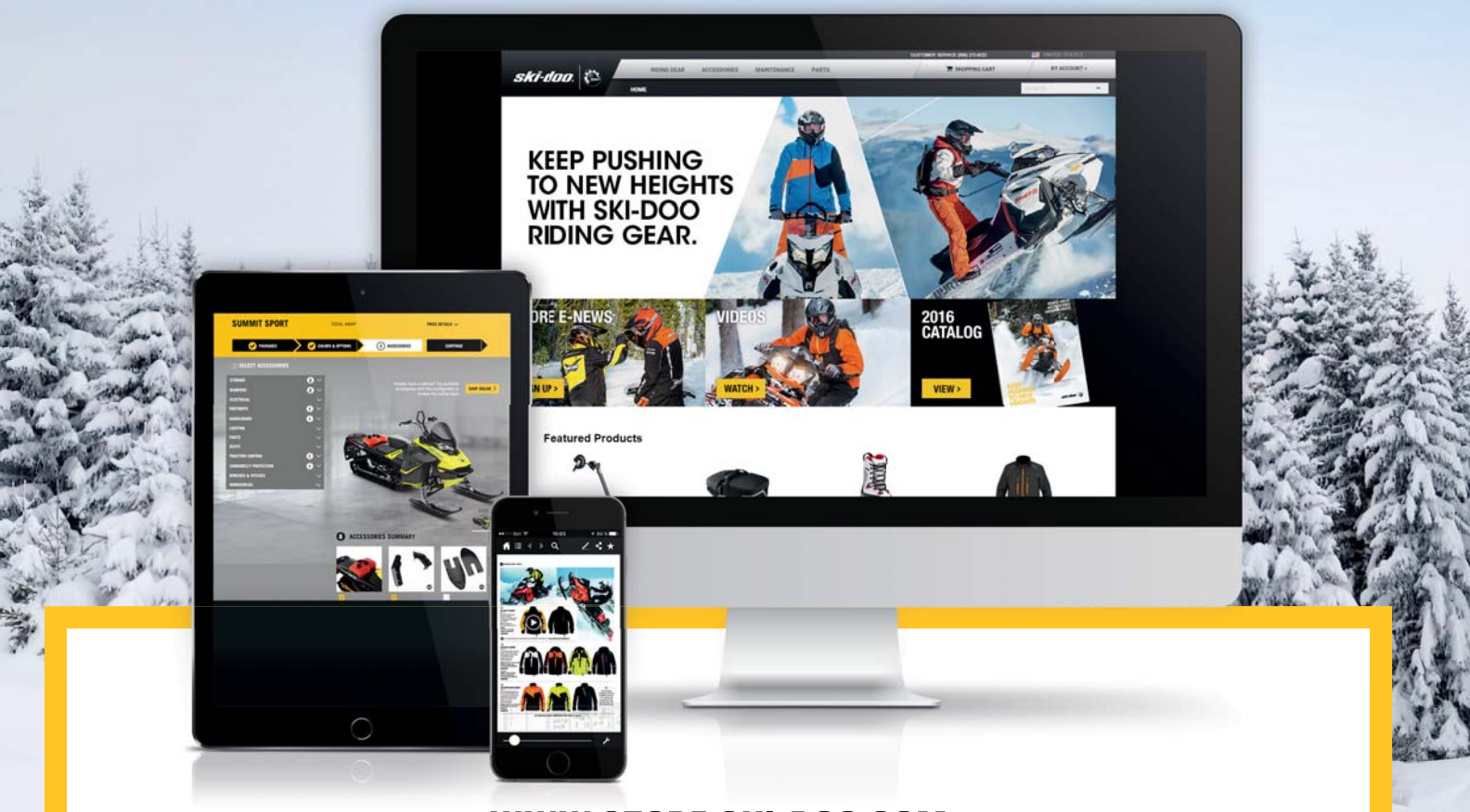
LEARN MORE AT A GLANCE

Look for these icons throughout the catalog to learn a bit more about key products.

NEW — New item for 2017.

DID YOU KNOW
An interesting tidbit about an item beyond the product description.

INNOVATION
An item BRP pioneered that takes your ride to the next level.



WWW.STORE.SKI-DOO.COM

Shop online store for parts, accessories and riding gear.

Sign up for Ski-Doo eNews and get free shipping the next time you buy online.
*Valid with order of $150 and more.

XPS Get your oils and lubricants online.

Explore all our products in the interactive online catalog. Jump directly to products with the interactive table of contents, watch videos, large format images and share your favorite items via social media.

Download the free BRP magazine app on the App Store or Google Play to access all BRP's catalogs. Browse through the publication and enjoy add-ons like social media and annotation features, bookmarking and video streaming.

GET IT ON Google Play Download on the App Store

Instantly view your dream Ski-Doo snowmobile as you build it.
www.ski-doo.com/build-and-price.html

Check out our videos to learn more about our new and innovative Riding Gear & Accessories.
http://www.ski-doo.com/shopping-tools/brochures.html

Access the sled wrap online store.
www.scsskidoowraps.com

The 2017 Ski-Doo lineup will be available at your authorized Ski-Doo dealer and online to purchase in September 2016.

IF WE SELL IT, WE STAND BY IT.

BRP LIMITED WARRANTY*

FOR NEW PARTS, ACCESSORIES AND RIDING GEAR

GENUINE BRP PARTS AND ACCESSORIES
installed by you or your authorized BRP dealer

1 YEAR LIMITED WARRANTY**

RIDING GEAR
except SympaTex gear

1 YEAR LIMITED WARRANTY**

SYMPATEX RIDING GEAR

LIFETIME† WARRANTY**

HELMETS

4 YEAR LIMITED WARRANTY**

GET ALL THE DETAILS FROM YOUR SKI-DOO DEALER

† Use other than which the product is designed for will void the product lifetime warranty.
* Purchased at an authorized BRP dealership / distributor or on a BRP-authorized online store. Other exclusions may apply, see complete limited warranty or contact your Ski-Doo authorized dealer.
** Unless otherwise stipulated or required by law.
This limited warranty does not apply to factory installed accessories. This limited warranty does not apply on Evinrude parts and accessories.
This limited warranty is effective as of March 1st 2016.

OUR NEW SUMMIT. YOUR NEXT CLIMB

WHAT MATTERS IS WHAT'S NEXT.

The next generation of Ski-Doo mountain sled accessories. Developed with the new generation REV platform to match perfectly, install easily and last for years.

1 FOX FLOAT SHOCKS P. 156
2 FULL BODY SKID PLATE P. 118
3 HEAVY-DUTY BUMPER P. 120
4 ERGO ADJUSTABLE TOE-HOLDS P. 125
5 STACKABLE LinQ FUEL CADDY - 15 L P. 133
6 LinQ SNOWBOARD/SKI RACK P. 134
7 TRANSPARENT HANDLEBAR AIR DEFLECTORS P. 114
8 HELIUM 30 JACKET & HIGHPANTS P. 18
9 SKI-DOO XP-3 PRO CROSS SCARP HELMET P. 59
10 SKI-DOO HELIUM GOGGLES BY SCOTT P. 62
11 SKI-DOO TEC+ BOOTS P. 70
12 OUTDRY HIGHMARK GLOVES P. 64


OUR NEXT MXZ. YOUR NEXT WASHBOARD TRAIL.
WHAT MATTERS IS WHAT'S NEXT.
The next generation of Ski-Doo accessories. Make your next ride truly your own with accessories built just for the new generation REV platform.
10
7
8
14
6

1 AUXILIARY LED LIGHT P. 115
2 SIGNATURE LED LIGHT FOR HANDLEBAR AIR DEFLECTORS P. 115
3 FULL BODY SKID PLATE P. 118
4 XC 356T6 CAST BUMPER P. 120
5 ERGO 2 STEP KNEE PADS P. 124
6 ERGO LATERAL FOOTPLATES P. 125
7 SR 21 L LinQ TUNNEL BAG P.132
8 STACKABLE LinQ FUEL CADDY - 15 L P. 133
9 GLOVEBOX EXTENSION / GPS SUPPORT P. 138
10 X-TEAM JACKET & HIGHPANTS P. 30
11 SKI-DOO XP-3 PRO CROSS X-TEAM HELMET P. 59
12 SKI-DOO HOLESHOT GOGGLES BY SCOTT P. 63
13 OUTDRY TRAIL PERFORMANCE GLOVES P. 66
14 SKI-DOO TEC+ BOOTS P. 70

CREATE YOUR CLIMATE WITH THE BRP PERFORMANCE RATING

We designed this Performance Rating System so you can easily choose and compare riding gear to find the ideal combination of performance and value for how you ride. Each riding gear garment has 3 performance ratings.

Look for these in the item descriptions throughout the catalog. On a 1 to 5 scale, 5 is the highest.

WARMTH

This rating considers all aspects of the garment, including insulation, waterproofness, windproofness, breathability and fabric construction. Use it as your main criteria.

WATERPROOF/WINDPROOF

This rating reflects the technology used, sealed seams, zipper types and more.

BREATHABILITY

This rating indicates how effectively perspiration is moved away from your body and out of the garment.

HOW TO CREATE YOUR CLIMATE

Mix outer layers (jackets and pants), mid layers and base layers to create a level of warmth that matches your riding style and natural body temperature. **Add up the WARMTH rating of each garment in each layer to get your system warmth total — the higher the number, the warmer the system.** Make sure you also consider your waterproof/windproof and breathability needs.

When building your system, be sure to consider your:

RIDING STYLE (active vs. relaxed)
RIDING ENVIRONMENT (mild vs. extreme cold)
BODY TEMPERATURE (do you run hot or chill easily?)

Examples of riding styles	Base Layer		Mid Layer		Outer Layer		Total WARMTH Rating
VERY ACTIVE MOUNTAIN RIDER	 Active Base Layer ●	+	 Tech Mid Layer Fleece ●●	+	 Helium 30 Jacket ●●	=	5
TOURING RIDER IN COLDER CONDITIONS	 Thermal Base Layer ●●	+	 Thermal Pants ●●	+	 Absolute Trail Highpants ●●●●	=	8

ADD FLEXIBILITY WITH LAYERING

No matter which outer layer you choose, the mid layer is where you can really adapt your climate to the conditions — even as they change throughout the day.

For an extreme cold snap, consider adding a Packable Down Jacket, you could even also add the Heated Vest Liner.

When it's mild and you're using a lot of energy, you might go with no mid layer at all, just a good base layer.

EXTREME COMBINATIONS

So, what are our warmest and coolest combinations for 2017?

Warmest	Coolest
Thermal Base Layer ●●	Ultralight Base Layer ●
+ Arctic Fleece ●●●	(NO Mid Layer)
+ Heated Vest Liner ●●●●● (on highest setting)	+ Helium Pullover Jacket ●●
+ Absolute 0 Jacket ●●●●●	
= 15 Rating	= 3 Rating

2017 RIDING GEAR PERFORMANCE RATINGS

		Garment	Page	Warmth	Water/Windproof	Breathability
STEP 1 BASE LAYERS	Tops & Bottoms	Active Base Layer (Men's/Ladies')	p.46-48	●	●	●●●●●
		Ultralight Base Layer (Men's/Ladies')	p.46-48	●	●	●●●●●
		Thermal Base Layer (Men's/Ladies')	p.47-49	●●	●	●●●●
		Thermal Pants	p.47	●●	●	●●●●
STEP 2 MID LAYERS	Tops & Bottoms	Packable Down Jacket (Men's/Ladies')	p.19-20	●●●●●	●●●	●●●●
		Tech Windproof Fleece Jacket	p.46	●●●●	●●●●	●●●
		Tech Mid Layer Fleece (Men's/Ladies')	p.46-48	●●	●●	●●●●
		MCode Mid Layer	p.46	●●	●	●●●●
		Ski-Doo Zip Up Mid Layer	p.46	●●●	●●	●●●●
		Arctic Fleece	p.47	●●●	●●	●●●●
		Cozy Fleece Jacket	p.47	●●	●	●●●●
		X-Team Microfleece (Men's/Ladies')	p.47-48	●●	●	●●●●
		Sno-X Fleece	p.47	●●●	●●	●●●●
		Ladies' Muskoka Fleece	p.48	●●●	●●	●●●●
		Ladies' Supreme Fleece	p.49	●●●	●●	●●●●
		Ladies' Weekender Zip Up Sweater	p.48	●●	●	●●●●
		Ladies' Polar Hoodie	p.49	●●	●	●●●●
STEP 3 OUTER LAYERS	Jackets	Helium 50 Jacket	p.18	●●●	●●●●●	●●●●●
		Helium 30 Jacket	p.18	●●	●●●●●	●●●●●
		Helium Pullover Jacket	p.19	●●	●●●●●	●●●●●
		Packable Down Jacket (Men's/Ladies')	p.19-20	●●●●●	●●●	●●●●
		Ladies' Helium 30 Jacket	p.20	●●	●●●●●	●●●●●
		Ladies' Helium Jacket	p.20	●●●	●●●●●	●●●●●
		Revy One-Piece Suit	p.24	●●	●●●	●●●
		MCode Jacket with Insulation (Men's/Ladies')	p.24-25	●●●●	●●●	●●●
		Helium Enduro Jacket	p.27	●●●	●●●●●	●●●●●
		X-Team Winter Jacket	p.30	●●●	●●●	●●●
		Ski-Doo Warnert Makita Race Edition Jacket	p.30	●●●	●●●	●●●
		Ladies' X-Team Jacket	p.31	●●●	●●●	●●●
		Sno-X Race Edition Shell	p.32	●●	●●●●●	●●●●●
		Warm-up Coat	p.32	●●●	●●	●●
		Absolute 0 Jacket (Men's/Ladies')	p.38	●●●●●	●●●●●	●●●●
		Absolute Trail Jacket	p.39	●●●●	●●●●●	●●●●
		Glide Jacket	p.40	●●●●	●●●	●●●
		Glide LED Jacket	p.40	●●●●	●●●	●●●
		Heated Vest Liner	p.40	●●●●●	●●	●●
		Ladies' Muskoka Jacket	p.41	●●●●	●●●	●●●
		Expedition Jacket	p.44	●●●	●●●	●●●
		Holeshot Jacket	p.44	●●●	●●	●●●
		Track & Trail Jacket (Men's/Ladies')	p.44	●●●	●●	●●●
	Pants	Helium 50 Highpants	p.19	●●●	●●●●●	●●●●●
		Helium 30 Highpants	p.19	●●	●●●●●	●●●●●
		Ladies' Helium Highpants	p.20	●●●	●●●●●	●●●●●
		MCode Pants (Men's/Ladies')	p.24-25	●●●●	●●●	●●●
		Helium Enduro Highpants	p.27	●●●	●●●●●	●●●●●
		X-Team Winter Highpants	p.30	●●●	●●●	●●●
		Ladies' X-Team Highpants	p.31	●●●	●●●	●●●
		Sno-X Race Edition Pants	p.32	●●	●●●●●	●●●●●
		Absolute 0 Highpants (Men's/Ladies')	p.38	●●●●●	●●●●●	●●●●
		Absolute Trail Highpants	p.39	●●●●	●●●●●	●●●●
		Voyager Highpants (Men's/Ladies')	p.40-41	●●●●	●●●	●●●
		Expedition Highpants	p.44	●●●	●●●	●●●
		Trail Highpants (Men's/Ladies')	p.44	●●●	●●	●●●

TECHNOLOGY GUIDE

THE MOST ADVANCED TECHNOLOGIES AND MATERIALS SO YOU'RE READY FOR WHAT'S NEXT.

Learn everything about Riding Gear for Mountain Riders
http://www.ski-doo.com/shopping-tools/brochures.html

HELIUM 50 P.18

LIGHTWEIGHT AND TOUGH, YET HEAVY ON TECHNOLOGY.

1. Neoprene inner collar and microfleece inner ply
2. Underarm and bicep venting
3. Water-resistant zippers at front opening, pockets and vents
4. 100% seams and logos sealed
5. Sympatex† waterproof, windproof and breathable membrane
6. Cordura† fabric for extra abrasion resistance
7. Velcro† wrist adjustment
8. Powder skirt
9. Mid layer: Tech Mid Layer Fleece p.46

Features not shown:
• Velcro adjusments at waist and hem

Sympatex membrane
Waterproof/windproof/ ultrabreathable membrane actually gets more breathable the harder you ride.

Ski-Doo Riding Gear with Sympatex Lifetime Warranty

RPM
Provides maximum waterproofness, windproofness and breathability no matter how tough the ride or how cold the environment. Critical seams and logos sealed.

Laminated Polyester Cordura

PrimaLoft
A high-performance insulation with the full spectrum of benefits to brave the elements.

RPM MAX
Provides maximum waterproofness, windproofness and breathability no matter how tough the ride or how cold the environment. All seams and logos sealed.

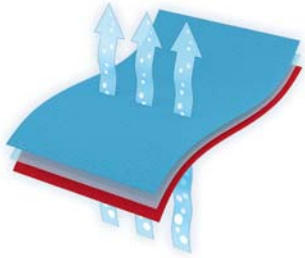
ABSOLUTE 0 P.38

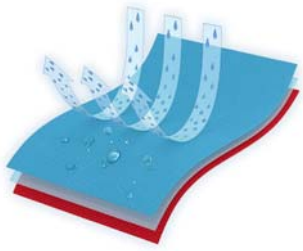
THE WARMEST JACKET
WE'VE EVER PRODUCED. PERIOD.

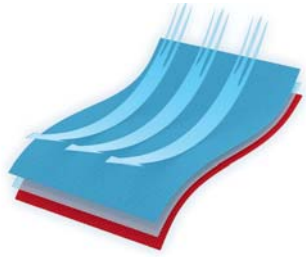
1. Removable and adjustable synthetic down collar
2. PrimaLoft Gold insulation
3. 100% seams and logos sealed
4. Center front quadruple flaps with 2 offset zippers
5. Sympatex waterproof, windproof and breathable membrane
6. Shaped sleeves
7. Underarm venting
8. Removable liner
9. Powder skirt
10. Mid layer: Ski-Doo Zip up Mid Layer p.46

Features not shown:
- Removable hood
- Reflective detailing

SYMPATEX WATERPROOF/WINDPROOF/ OPTIMALLY BREATHABLE MEMBRANE ACTUALLY GETS MORE BREATHABLE THE HARDER YOU RIDE.







OPTIMALLY BREATHABLE

Breathability will increase with heat and humidity

100% WATERPROOF

Non porous membrane will never quit

100% WINDPROOF

Non porous, meaning that wind has no way of entering

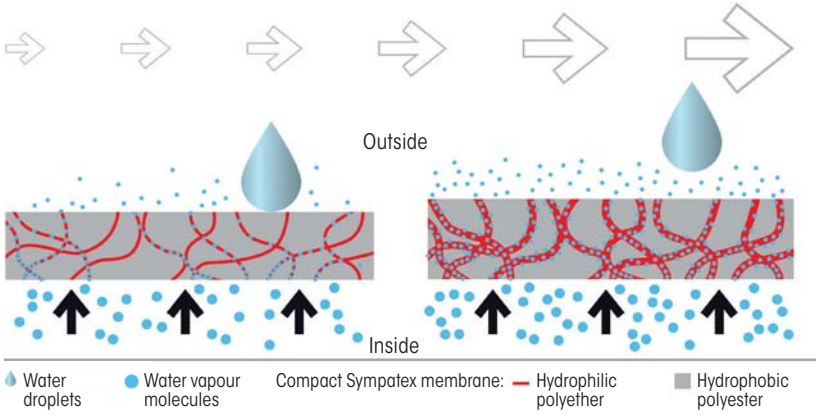
Stretches to 300% of its size

Extremely durable and tough

DID YOU KNOW Gear with Sympatex doesn't have pores like other membranes and can be washed over and over without clogging or loss of performance.

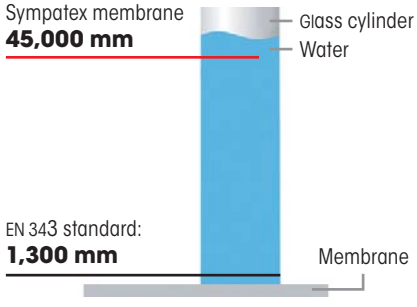
COMPARISON OF WATER VAPOUR TRANSPORT

Function during increasing physical activity / sweating



MEMBRANE RESISTANCE

A membrane is waterproof if it can resist a pressure of **1,300 mm**. The Sympatex membrane is extremely waterproof since it can resist over **45,000 mm**.



BRP LIFETIME WARRANTY

We believe so strongly in our Sympatex gear that we back it with a lifetime warranty. Go to **www.store.ski-doo.com/warranty** for details.

WARRANTY COVERAGE PERIOD

Bombardier Recreational Products Inc. (BRP) warrants that all its 2017 Sympatex Riding Gear sold as New and Unused by an authorized North American BRP dealer will be free from any defect in material and / or workmanship for the lifetime of the product*.

* The lifetime of a product does not mean your lifetime. The intensity under which the product is used determines this factor. Rips, tears, punctures, holes and burns will void the product lifetime warranty even if the warranty issue is not related to these damages.

PRIMALOFT
Feel the Performance

A HIGH-PERFORMANCE INSULATION WITH THE FULL SPECTRUM OF BENEFITS TO BRAVE THE ELEMENTS.

WARMER, DRIER, SOFTER AND MORE COMPRESSIBLE THAN ANY OTHER SYNTHETIC INSULATION

- **Warmth without bulk**
- **Water resistant**
- **Breathable**
- **Packable**
- **Lightweight**
- **Superior softness**

COMMITTED TO DELIVERING FEEL-GOOD PRODUCTS THAT EMPOWER YOU TO STAY IN THE MOMENT.

GOLD INSULATION

Absolute O Jacket and Highpants are insulated with PrimaLoft Gold for extreme warmth while staying soft and flexible. Our absolute warmest gear.
p. 38

SILVER INSULATION

Gilde Jacket is insulated with PrimaLoft Silver for very good warmth and added flexibility.
p. 40

BLACK INSULATION

Absolute Trail Jacket and **Highpants** use PrimaLoft Black insulation to give you the right amount of warmth and extra reathability.
p. 39

BLACK INSULATION DOWN BLEND

Packable Down Jackets use the PrimaLoft Black Insulation Down Blend. A unique hybrid of water-repellent down and PrimaLoft superfine fibers. It combines the lightweight warmth, loft, packability and comfort of standard down, but with outstanding wet-weather thermal performance that even dries 4X faster, plus it's machine-washable.
p. 19-20

RPM
RESPIRACTIVE PERFORMANCE MATRIX

RPM MAX
RESPIRACTIVE PERFORMANCE MATRIX MAX

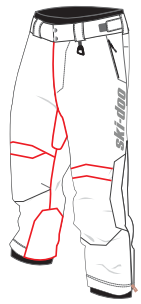
HIGH PERFORMANCE GEAR WITH RPM TECHNOLOGY

Developed by BRP for snowmobilers like you, the RPM coating provides maximum protection no matter how tough the ride or how cold the environment.

RPM

Holeshot Jacket with RPM coating
p. 44

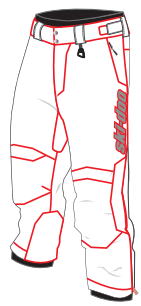
Critical seams and logos sealed



RPM MAX

MCode Jacket with RPM MAX coating
p. 24

All seams and logos sealed



OUR MOUNTAIN RIDING GEAR. YOUR DRY, WARM ADRENALINE RUSH.

MOUNTAIN

LIGHTWEIGHT, WATERPROOF, BREATHABLE GEAR DESIGNED FOR MOUNTAIN RIDING.

		FEATURES
HELIUM 50 JACKET 440699	 P. 18	SHELL Sympatex 3-Ply Laminated Polyester SympaTex · BRP LIFETIME WARRANTY · CORDURA FABRIC	• 100% seams and logos sealed. • Waterproof, windproof and breathable membrane. • Water-resistant zippers at front opening, pockets and vents. • Powder skirt. • Underarm and bicep venting. • Neoprene inner collar and microfleece inner ply. • Velcro wrist adjustment and adjustment at waist and hem. • Durable Cordura fabric.
HELIUM 50 HIGHPANTS 441549	 P. 19	SHELL Sympatex 3-Ply Laminated Polyester SympaTex · BRP LIFETIME WARRANTY · CORDURA FABRIC	• 100% seams and logos sealed. • Waterproof, windproof and breathable membrane. • Stretch fabric at waist and storm gaiters. • High front and back bib panels. • Lightweight fleece and mesh inner liner at front and seat. • Removable knee and shin pads. • 2-way front and full-length water-resistant side curved zippers. • Zippered hip and front pockets.
HELIUM 30 JACKET 440693 • 440700	 P. 18	SHELL Sympatex 2-Ply Laminated Polyester SympaTex · BRP LIFETIME WARRANTY	• 100% seams and logos sealed. • Waterproof, windproof and breathable membrane. • Water-resistant zippers at front opening, pockets and vents. • Powder skirt. • Underarm and bicep venting. • Removable hood.
HELIUM 30 HIGHPANTS 441548 • 441561	 P. 19	SHELL Sympatex 2-Ply Laminated Polyester SympaTex · BRP LIFETIME WARRANTY · CORDURA FABRIC	• 100% seams and logos sealed. • Waterproof, windproof and breathable membrane. • High front and back bib panels. • Stretch fabric at waist. • Storm gaiters. • Lightweight fleece and mesh inner liner at front and seat. • Removable knee and shin pads. • 2-way front and full-length water-resistant side curved zippers. • Zippered hip and front pockets.
HELIUM PULLOVER JACKET 440666	 P. 19	SHELL Sympatex 2-Ply Laminated Polyester SympaTex · BRP LIFETIME WARRANTY	• 100% seams and logos sealed. • Waterproof, windproof and breathable membrane. • Water-resistant zippers. • Underarm venting. • Tough polyester shell with mesh lining.

BENEFITS	PERFORMANCE RATINGS	SIZES	PRICE
• Keeps you dry and warm all day. • Keeps snow out in even the deepest powder. • Becomes more breathable the harder you ride, for comfort. • Backpack friendly vents. • Tough and durable.		XS, S, M, L, XL, 2XL, 3XL	**$499.99**
• Keeps you dry and warm all day. • Become more breathable the harder you ride, for comfort. • Keeps snow out in even the deepest powder. • Lightweight, comfortable and easy to get into and out of. • Curved zipper will prevent bunching.		XS, S, M, L, XL, 2XL, 3XL	**$439.99**
• Keeps you dry and warm all day. • Becomes more breathable the harder you ride, for comfort. • Backpack friendly vents. • Lightweight offering max rider mobility.		XS, S, M, L, XL, 2XL, 3XL Tall sizes MT, LT, XLT, 2XLT	**$379.99** Tall sizes **$399.99**
• Keeps you dry and warm all day. • Become more breathable the harder you ride, for comfort. • Keeps snow out in even the deepest powder. • Easy to get into and out of.		XS, S, M, L, XL, 2XL, 3XL Tall sizes MT, LT, XLT, 2XLT	**$369.99** Tall sizes **$389.99**
• Keeps you dry and warm all day. • Becomes more breathable the harder you ride, for comfort. • Super profiled.		XS, S, M, L, XL, 2XL, 3XL	**$289.99**

FEATURES

PACKABLE DOWN JACKET
440749 • 440750

P. 19-20

SHELL
Nylon, Polyester

- Use as a light jacket for cool dry weather or as a mid layer.
- Water-repellent treatment on down feathers.
- Drawcord hem adjustment in pockets.
- Microfleece underarm vents.
- Shaped sleeves.

LADIES' HELIUM 30 JACKET
440695

P. 20

SHELL
Sympatex 2-Ply
Laminated Polyester

- 100% seams and logos sealed.
- Waterproof, windproof and breathable membrane.
- Water-resistant zippers at front opening and pockets.
- Powder skirt.
- Underarm venting.
- Removable hood.
- Added reflective detailing for optimal visibility.

LADIES' HELIUM JACKET
440583

P. 20

SHELL
Sympatex 3-Ply
Laminated Polyester

- 100% seams and logos sealed.
- Waterproof, windproof and breathable membrane.
- Water-resistant zippers at front opening and pockets.
- Powder skirt.
- Side venting.
- Stretch fabric inserts for ease of movement.

LADIES' HELIUM HIGHPANTS
441493

P. 20

SHELL
Sympatex 3-Ply
Laminated Polyester

- 100% seams and logos sealed.
- Waterproof, windproof and breathable membrane.
- Stretch fabric at waist, crotch and upper knees.
- Designed with high front and back bib panels.
- 2-way full-length water-resistant side zippers.
- Integrated removable knee pads.
- Storm gaiters.
- Water-resistant front zipper.

MCODE JACKET WITH INSULATION
440724 • 440723

P. 24-25

SHELL
Polyester, Nylon

- 3-in-1 jacket that can be worn as shell, shell + insulated liner, liner alone.
- 100% seams and logos sealed.
- Waterproof, windproof and breathable.
- Water-resistant zippered pockets.
- Powder skirt.
- Shaped sleeves with adjustable hem and wrists.
- Underarm venting.
- Removable hood and inner removable quilted jacket.

Ladies'

- Integrated inner Lycra† wrist with thumb.

MCODE PANTS
441575 • 441576

P. 24-25

SHELL
Polyester, Nylon

- 100% seams and logos sealed.
- Waterproof, windproof and breathable.
- Water-resistant waist and thigh pockets.
- Lightly insulated and full-length side zippers.
- Storm gaiters.
- Back suspender divider to avoid slipping off.
- Removable suspender system.
- Adjustable waist.
- Shaped knees.
- Fleece lined seat.

Ladies'

- Jacket-to-pants attachment system.

REVY ONE-PIECE SUIT
440667

P. 24

SHELL
Nylon, Polyester

- 100% seams and logos sealed.
- Waterproof, windproof and breathable.
- Water-resistant zippers.
- Removable hood.
- Shaped sleeves and knees.
- Adjustable wrists, waist and inner suspender system.
- Storm gaiters.
- Oversized thigh pockets.

BENEFITS	PERFORMANCE RATINGS	SIZES	PRICE
• Lightweight and packable. • Warm even when wet. • Breathable to keep you dry. • Temperature regulation.		Men's S, M, L, XL, 2XL, 3XL Ladies' XS, S, M, L, XL, 2XL, 3XL	Men's **$184.99** Ladies' **$184.99**
• Women's cut and fit. • Lightweight and flexible. • Keeps you dry and warm all day. • Becomes more breathable the harder you ride, for comfort. • Keeps snow out even in the deepest powder.		XS, S, M, L, XL, 2XL, 3XL	**$359.99**
• Women's cut and fit. • Lightweight and flexible. • Keeps you dry and warm all day. • Becomes more breathable the harder you ride, for comfort. • Keeps snow out even in the deepest powder.		XS, S, M, L, XL, 2XL, 3XL	**$399.99**
• Keeps you dry and warm all day. • Keeps snow out even in the deepest powder. • Women's cut for a comfortable fit, easy to get into and out of. • Become more breathable the harder you ride, for comfort.		XS, S, M, L, XL, 2XL, 3XL	**$389.99**
• Keeps you dry and warm all day. • Keeps snow out even in the deepest powder. • 3-in-1 design to adapt to conditions.		Men's XS, S, M, L, XL, 2XL, 3XL Ladies' XS, S, M, L, XL, 2XL, 3XL	Men's **$309.99** Ladies' **$309.99**
• Keeps you dry and warm all day. • Light insulation keeps you warm. • Easy to get into and out of.		Men's XS, S, M, L, XL, 2XL, 3XL Ladies' XS, S, M, L, XL, 2XL, 3XL	Men's **$229.99** Ladies' **$229.99**
• Rad look that gives you freedom of movement and no snow intrusion. • Keeps you dry and warm all day. • Adjustments enable you to get just the right fit.		XS, S, M, L, XL, 2XL, 3XL	**$499.99**

2 5 5

HELIUM 30 JACKET

A radically lightweight and flexible jacket for the most active riders. Keeps you warm and dry thanks to Sympatex technology.

Shell: Sympatex 2-Ply Laminated Polyester

440693 • XS, S, M, L, XL, 2XL, 3XL
Orange (12), Hi-Vis Yellow (26), Blue (80), Black (90)

$379.99

Tall sizes

440700 • MT, LT, XLT, 2XLT
Black (90)

$399.99

3 5 5

HELIUM 50 JACKET

Built with the best and most innovative materials, the Helium 50 is our thoughest and highest performing jacket for the most active riders.

Shell: Sympatex 3-Ply Laminated Polyester

440699 • XS, S, M, L, XL, 2XL, 3XL
Hi-Vis Yellow (26), Black (90)

$499.99

SEE MOUNTAIN OUTER LAYER FEATURES & BENEFITS P. 14-17

EXPLORE MOUNTAIN LinQ ACCESSORIES STARTING ON P.103

5 3 4

PACKABLE DOWN JACKET

An ideal mid layer for maximum warmth. Down insulation compresses to take very little room in your pack or storage compartment.

Shell: 90% Nylon, 10% Polyester
Insulation: 50% PrimaLoft Ultrafine Fibers, 50% PrimaLoft Black Insulation Down Blend

440749 • S, M, L, XL, 2XL, 3XL
Orange (12), Black (90)

$184.99

See the features of the Packable Down Jacket.
http://www.ski-doo.com/shopping-tools/brochures.html

3 5 5

HELIUM 50 HIGHPANTS

Robust Cordura fabric and Sympatex technology combine for tough yet flexible and comfortable highpants. Jointly designed with top mountain riders for just the right fit.

Shell: Sympatex 3-Ply Laminated Polyester

441549 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$439.99

Learn everything about the technology built into the Helium 50 Highpants.
http://www.ski-doo.com/shopping-tools/brochures.html

Our Helium Highpants feature curved zippers on outer leg to prevent bunching of the material.

2 5 5

HELIUM 30 HIGHPANTS

Riding pants for active riders with Sympatex technology to protect you from wet and cold conditions. Our lightest, most flexible highpants.

Shell: Sympatex 2-Ply Laminated Polyester

441548 • XS, S, M, L, XL, 2XL, 3XL
Orange (12), Black (90)

$369.99

Tall sizes
441561 • MT, LT, XLT, 2XLT
Black (90)

$389.99

2 5 5

HELIUM PULLOVER JACKET

The most lightweight shell in our lineup, feels like wearing no shell at all. Innovative materials deliver breathability, performance and durability for mountain riding.

Shell: Sympatex 2-Ply Laminated Polyester

440666 • XS, S, M, L, XL, 2XL, 3XL
Orange (12), Hi-Vis Yellow (26), Black (90)

$289.99

The Sympatex membrane stretches to 300% of its size, so it maintains its properties in high bending areas, like elbows and knees.

SEE MOUNTAIN OUTER LAYER FEATURES & BENEFITS P. 14-17

MATCH YOUR INSULATION TO THE CONDITIONS: SEE MID-LAYERS ON P.46

5 3 4

LADIES' PACKABLE DOWN JACKET

An ideal mid layer for maximum warmth, styled with a women's cut. Down insulation compresses to take very little room in your pack or storage compartment.

Shell: 90% Nylon, 10% Polyester
Insulation: 50% PrimaLoft Ultrafine Fibers, 50% PrimaLoft Black Insulation Down Blend

440750 • XS, S, M, L, XL, 2XL, 3XL
Grey (09), Black (90)

$184.99

See the features of the Packable Down Jacket.
http://www.ski-doo.com/shopping-tools/brochures.html

2 5 5

HELIUM 30 JACKET

Advanced technology and performance in a lightweight shell designed for women riders.

Shell: Sympatex 2-Ply Laminated Polyester

440695 • XS, S, M, L, XL, 2XL, 3XL
Charcoal Grey (07)

$359.99

3 5 5

HELIUM HIGHPANTS

Designed specifically for women. Feminine fit and super lightweight fabric. Waterproof, windproof and ultra breathable thanks to Sympatex technology.

Shell: Sympatex 3-Ply Laminated Polyester

441493 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$389.99

3 5 5

HELIUM JACKET

Advanced technology and performance in a lightweight shell designed for women riders.

Shell: Sympatex 3-Ply Laminated Polyester

440583 • XS, S, M, L, XL, 2XL, 3XL
White (01)

$399.99

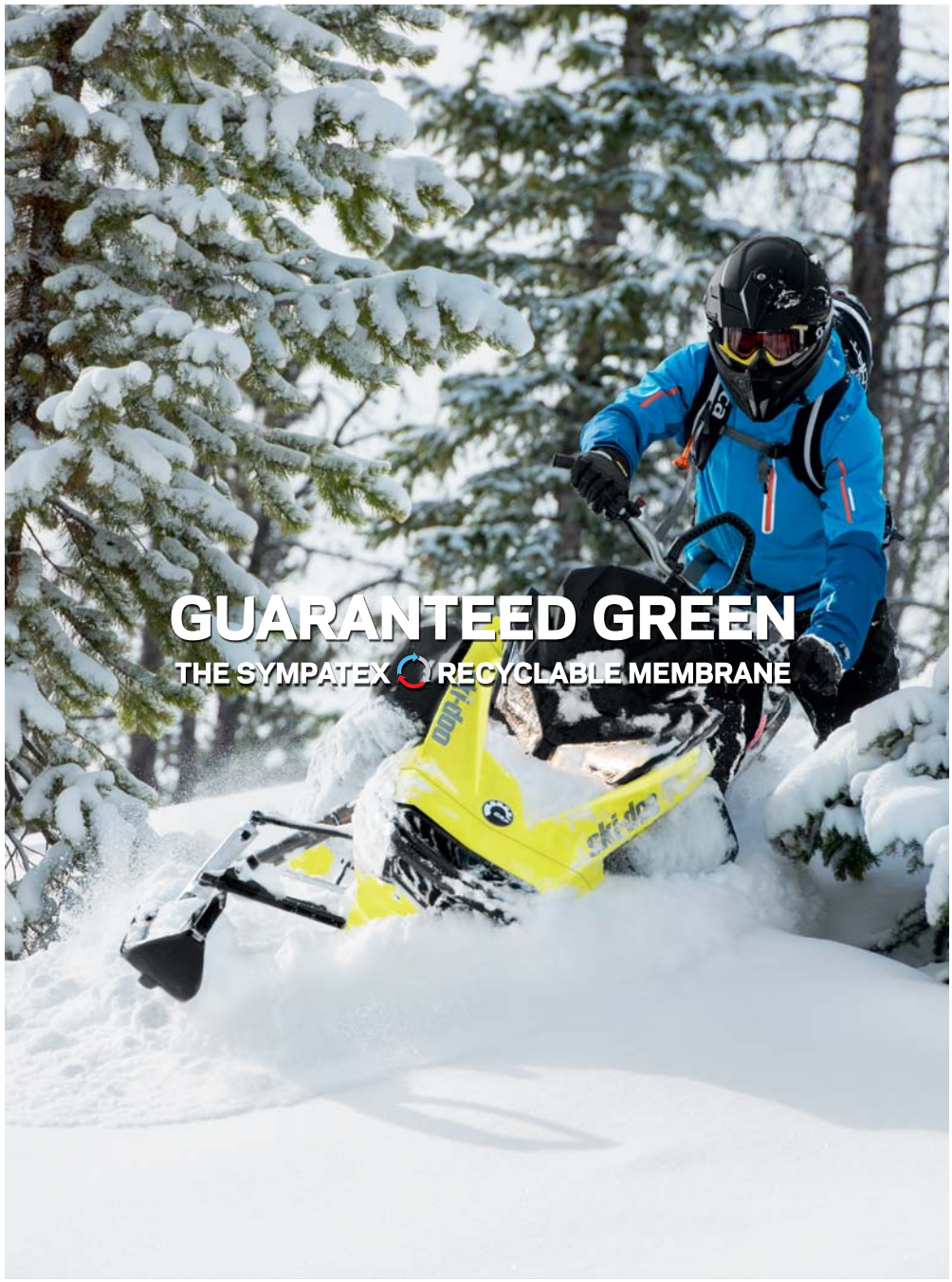
SEE MOUNTAIN OUTER LAYER FEATURES & BENEFITS P. 14-17

READ ABOUT WOMEN RIDERS SHREDDING THEIR OWN LINES ON P.81

SympaTex®

THE MOST RESPONSIVE RIDING GEAR

SYMPATEX.COM



DYNAMIC PERFORMANCE

WATERPROOF BREATHABLE WINDPROOF

GOOD HABITS FOR AVALANCHE TERRAIN

So your group has taken some sort of avalanche training... maybe attended one of the seminars at a Ski-Doo dealer that BRP puts on. Awesome. Now it's time to get in the habit of practicing what you learned every time you head out into the backcountry.

by Jeremy Mercier, Ski-Doo Backcountry Expert

Here are habits I've ingrained to ride as safely as I can:

Check the weather forecast. Rapid rises in temperature, heavy snowfalls and wind can have drastic impacts on the snowpack. You're considering: which slope got loaded by wind last night? What was the temperature? How much snow fell?

Check the backcountry avalanche forecast. Go to the top website in your country – www.avalanche.org in the US and www.avalanche.ca in Canada. This information is especially important if you haven't seen the conditions in person lately. Don't be afraid to ask locals as well.

Do a transceiver check. Before we leave the parking lot, everyone makes sure their transceiver is working and has enough battery life. This is a MUST DO. You also need to practice transceiver searches with your group a few times a year. Have a party.

Do a radio check. I started using FRS radios with my riding buddies and I won't ride without them again. You can quickly get a hold of people if something happens. Plus, you don't waste riding time tracking down your buddy who took off over that ridge.

Come up with a plan and stick to it. Discuss what type of terrain you're heading into and what is safe to ride for that particular zone. Evaluate the snowpack when you get out there and decide if you're going to continue. And don't succumb to peer pressure. There's no need to risk an avalanche just to get that great shot or footage for your social media page.

Start on low angle terrain. Then migrate towards steeper terrain if the snowpack allows.

Never lose contact with the group. Either keep your eye on your group or maintain radio contact.

I know this sounds like a lot of stuff. But if you commit to doing these, they'll just become a habit and you won't even think about them after a while. Finally, keep up the education. Organizations like the Canadian Avalanche Centre, American Avalanche Association and Avalanche 1 keep adding to our knowledge of avalanches. And the increased educational opportunities – like BRP's free Avalanche Awareness Seminars – have been reducing snowmobile fatalities significantly.

BRP AVALANCHE AWARENESS SEMINARS

For the past three years, more than 12,000 snowmobilers have attended free avalanche safety seminars sponsored by BRP and hosted by Ski-Doo dealers across North America. Open to snowmobilers of all brands, these cover the basics of avy safety in an effort to keep backcountry snowmobilers safe. For the schedule of 2016-2017 seminars, go to www.ski-doo.com.

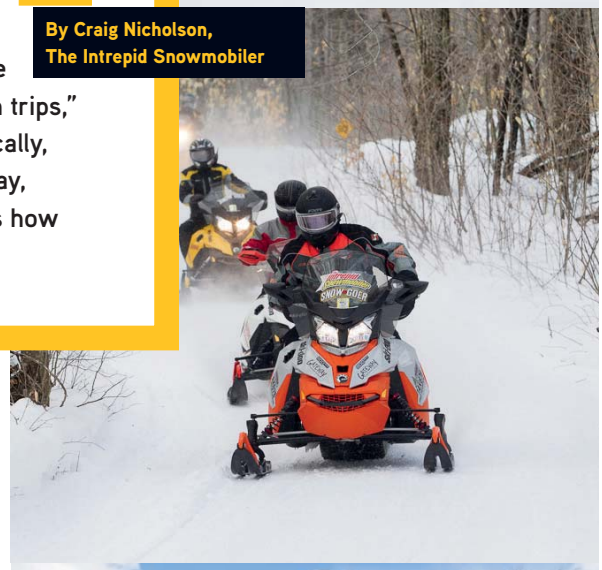
Jeremy Mercier is a Ski-Doo Backcountry Expert riding out of Colorado. He's been playing in the mountains for more than 20 years (including operating a snowmobile and snowboard riding camp) and has a Level 2 Avalanche Certification from Silverton Avalanche School, the longest running school in the country.

Follow Jeremy:
jeremy.mercier.7
mercier4colorado

PREPPING A 3-DAY BLITZ RIDE

By Craig Nicholson,
The Intrepid Snowmobiler

Some of the best snowmobiling happens during three day blitz rides. These are sometimes known as "toothbrush trips," because that's all you really need to take with you? Typically, you would depart Thursday night and return late Sunday, after doing as much sledding as your group wants. Here's how I get ready for a blitz ride.



Choose your destination

Start with a location that's close enough to reach that first night after work. Then consider truck and trailer parking, nearby services and direct trail access. In locations with lots of trail options, you can use one home base and not carry your overnight items on your rides. Other times, you'll ride one large point-to-point loop with overnight stops. Backcountry riding along the way is always a great bonus. Obtain the applicable trail maps several weeks ahead to familiarize yourself with your destination and routes...and to make advance reservations for lodging on busy weekends.

Prep the sleds

Before leaving, make sure all sleds, tow vehicles and trailers are in good shape and ready. Fuel them up and fill the oil reservoirs on the 2-stroke sleds. The night before departure, pack extra oil for top-ups, the owner's manual, toolkit, spare BRP belt, spark plugs, fuses and emergency kit. Then load them on the trailer.

Pack your bags

There's one rule for what else to pack for a blitz ride: not much. You can wear the same clothes for trailering there and back, leaving them in your truck while you're riding. That means just carrying one set of sportswear for two nights, dressing in the same attire twice. Along with a change of underwear or two and minimal toiletries (the toothbrush!), you can easily fit your necessities into a LinQ Medium Tunnel Bag and Saddlebags. There's even room for a lightweight Racing Storage Cover to protect your sled from snow and frost each night.

Don't forget cash, credit cards and whatever license, registration, trail permits and proof of insurance you may need. You can also gather your smartphone, charger and other personal items like sunglasses.

Make a list, check it twice

Print a checklist and pack everything – including your riding gear, technical base and mid layers – mark each item off the list. Set your bag by the door with your helmet in its helmet bag, so you pretty much have to trip over them when leaving. This way, no critical riding gear gets left behind.

Before leaving, email your riding companions so everyone (especially spouses staying at home) know exactly when you're departing, where you're staying, what days you intend to ride and when your return is planned.

NOW LET YOUR BLITZ RIDE BEGIN!

The Intrepid Snowmobiler **Craig Nicholson** is a freelance journalist specializing in motorized recreational activities, including snowmobiling. As an avid snowmobiler, he logs up to 10,000 miles (15,000 km) on the snow each winter and has snowmobiled in every region of Canada. He has published a one-of-a-kind tour book, "Canada's Best Snowmobiling – The Ultimate Ride Guide," has a syndicated column and radio show and is a regular contributor to SnowGoer Canada and Snowmobiler TV. His current sled is a Ski-Doo Renegade.

4 3 3

MCODE JACKET WITH INSULATION

A versatile 3-in-1 jacket with modern styling and colors. Mix and match with MCode Pants.

Shell: 65% Polyester, 35% Nylon
Insulation: PrimaLoft Black

440724 • XS, S, M, L, XL, 2XL, 3XL
Camo (37), Green (70)

$309.99

DID YOU KNOW

Helium and M-Code gear is developed with feedback from mountain freeriders

4 3 3

MCODE PANTS

Fresh modern design in lightly insulated pants. Pair perfectly with MCode Jackets, especially when you mix and match for your own look.

Shell: 75% Polyester, 25% Nylon
Insulation: PrimaLoft Black

441575
XS, S, M, L, XL, 2XL, 3XL
Camo (37), Black (90)

$229.99

2 3 3

REVY ONE-PIECE SUIT

You'll never feel so free and ready to take on any amount of powder with this roomy, high performing and high style suit.

Shell: 84% Nylon, 16% Polyester

440667
XS, S, M, L, XL, 2XL, 3XL
Blue (80), Sunburst Yellow (96)

$499.99

SEE MOUNTAIN OUTER LAYER FEATURES & BENEFITS P. 14-17

SHOP ALL MOUNTAIN GEAR & MORE AT YOUR SKI-DOO DEALER AND STORE.SKI-DOO.COM.

4 3 3

MCODE JACKET WITH INSULATION

A versatile 3-in-1 jacket with modern styling and colors. Unique fit, style and colors for women riders.

Shell: 60% Polyester, 40% Nylon
Insulation: PrimaLoft Black

440723 • XS, S, M, L, XL, 2XL, 3XL
Pink (36), Teal (74)

$309.99

4 3 3

MCODE PANTS

Fresh modern design in lightly insulated pants. Pair perfectly with MCode Jackets, especially when you mix and match for your own look. Women-specific fit and colors.

Shell: 95% Polyester, 5% Nylon
Insulation: PrimaLoft Black

441576 • XS, S, M, L, XL, 2XL, 3XL
Camo (37), Black (90)

$229.99

SEE MOUNTAIN OUTER LAYER FEATURES & BENEFITS P. 14-17

PACK FOR AN ACTIVE RIDE: SKI-DOO ELEVATION BACKPACK P. 72

THE CROSSOVER BOOM

If you've been snowmobiling the past few years, you've surely noticed more and more crossover sleds out there. Crossover is currently the fastest growing segment in snowmobiling. What's behind this trend?

We see two main reasons. First, there are **benefits to a longer suspension on trail**. When we first launched the Renegade, we envisioned midwesterners buying it for riding trails at home and then trailering it out West for their trips to ride deep snow. In fact, the first one was the Summit Renegade.

"I switched to a Renegade from an MXZ to be able to enjoy backcountry riding as well as have a comfortable ride on the trail," said Corey Haas on Facebook. "It makes each trip an adventure when you don't have to limit yourself to just one type of riding. I ride in the U.P. of Michigan as well as West Yellowstone."

Like Corey, while riders appreciated the added off-trail capability, they really liked the improved performance and comfort on trail. The longer suspension bridged bumps for comfort, added traction and for larger riders, felt more planted.

Second, **snowmobile innovation and technology** have made riding off-trail so much easier. Sleds are lighter, the riding position makes it easier to boondock, the tracks are so much better. The suspensions are just so good there's little to no compromise in trail cornering. Fuel efficiency is good so you can stay out and play longer.

So now, you can get a crossover sled with the capability to carve up trails and carve up fresh snow in a meadow, to confidently break trail after a dump and have a blast freeriding – even head out for a multi-day tour. You can do a lot with just one sled.

This versatility is the key to the crossover boom.

"But the growing appeal of the Renegade has created a new challenge," says Jimmy Coté, Ski-Doo product manager. "When you have a sled that can be used so many ways, riders now want that sled a bit more specialized for how they ride. Some will ride only once or twice a season off-trail. Others want a hot trail ride and then freeride for a few hours."

BRP has this covered with three types of 2017 Renegade sleds:

The **Renegade X-RS**, **Renegade X**, **Renegade Adrenaline** and **Renegade Sport** are primarily equipped for trail riding – maybe breaking trail and playing in deeper snow once in awhile.

The **Renegade Backcountry** sleds are more like the original Summit Renegade, about a 60%-40% bias towards off-trail riding. For those that want the freedom and exploration of western deep snow riding in lower altitude areas and still have a fun time on the trails.

The **Renegade Enduro** is the class of the growing premium adventure sub-segment. You get the versatility of a trail-oriented Renegade but with features for more capability and more comfort, such as the Air Ride suspension, Pilot TS adjustable skis and a heated seat. It's as much at home on a multi-day vacation as a weekend bash through single-track.

As Renegade buyers want to customize their sled even further, we offer a huge range of accessories enabling you to do just that. Think LinQ system bags, the unrivalled 1+1 seat system, skid plates, adjustable risers, Garmin GPS system, LED Auxiliary lights and ice scratchers to name a few.

And we even have taken this versatility to a clothing line for Renegade riders. Helium Enduro gear is ultra flexible and breathable while totally waterproof and windproof for comfort in active off-trail riding. But unlike our mountain gear, it has a light insulation for warmth in colder temperatures and more relaxed trail riding.

Crossover sleds go way back to the early days of snowmobiling where you could ride almost anywhere in any way on your Olympic and have fun. This freedom drove snowmobiling to incredible heights then and is driving excitement today with the Renegade sleds.

YOUR NEXT CRUISE THROUGH RUGGED TERRAIN.

CROSSOVER

GEAR THAT'S A CROSS BETWEEN OUR TOP MOUNTAIN AND TRAIL TECHNOLOGIES.

HELIUM ENDURO JACKET

Ultra high performance jacket with mid-weight insulation to keep you warm and dry, whether you're carving up trails, exploring the woods or in open space.

- Waterproof, windproof, breathable membrane.
- 100% seams and logos sealed.
- Water-resistant zippers at front, pockets and vents.
- Microfleece inner collar.
- Easy-to-reach bicep vents.
- Powder skirt.
- Hem, collar and wrist adjustments.
- Inner microfleece cuffs.
- Silicone grips at shoulder to stabilize a backpack.
- Wide reflective features for better visibility.
- Reinforced elbows and back hem for durability.

Shell: Sympatex 2-Ply Laminated Polyester
Insulation: PrimaLoft Black

440744 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$399.99

HELIUM ENDURO HIGHPANTS

For the rider who wants to do it all, on and off trail. Mid-weight insulation, Sympatex technology and lots of features to keep you comfortable.

- Full-length 2-way waterproof side zippers.
- Front 2-way zipper.
- Shaped knees.
- Padded and reinforced inner legs.
- Storm gaiters.
- Adjustable suspenders.
- Waterproof hip pockets.
- Chest and cargo pockets.

Shell: Sympatex 2-Ply Laminated Polyester
Insulation: PrimaLoft Black

441593 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$379.99

OUR TRAIL PERFORMANCE GEAR. YOUR NEXT HEAT RACE.

TRAIL PERFORMANCE

FEATURES

X-TEAM WINTER JACKET
440720 • 442428 • 442432 • 440721

P. 30-31

Men's | Ladies' | Ski-Doo Warnert Makita† Race Edition Jacket 440728

SHELL
Men's: Polyester/Nylon
Ladies': Polyester/Nylon

PRIMALOFT | RPM

- 100% seams and logos sealed.
- Adjustable collar, hem and wrists.
- Reflective detailing.
- Shaped sleeves and articulated shoulders.
- Triple front flaps construction.
- Powder skirt.

Men's
- Underarm and back venting.
- Integrated inner Lycra wrist and reinforced fabric at elbows and back hem.

Ladies'
- Underarm venting.
- Removable hood.

X-TEAM WINTER HIGHPANTS
441573 • 441577 • 441574

P. 30-31

Men's | Ladies'

SHELL
Polyester/Nylon

PRIMALOFT | RPM

- Fully-insulated highpants.
- Waterproof, windproof and breathable.
- 100% seams and logos sealed.
- Adjustable waist.
- Storm gaiters.

Ladies'
- Flapped side zippers.

Men's
- Full-length water-resistant side zippers.
- Articulated, padded, shaped knees and adjustable suspenders.
- Water-resistant zippers at pockets and vents and reinforced crotch.

WARM-UP COAT
440703

P. 32

SHELL
Polyester/Nylon

RPM

- Insulated pre-race overcoat.
- Waterproof and windproof.
- Removable hood fits over Ski-Doo snocross helmet.
- Large pockets.

SNO-X RACE EDITION SHELL
440722

P. 32

SHELL
Sympatex 2-Ply Laminated Polyester

SympaTex | BRP LIFETIME WARRANTY

- 100% seams and logos sealed.
- Waterproof, windproof and breathable membrane.
- Water-resistant zippers at back and underarm vents.
- Removable collar with neoprene replacement panel to accomodate neck brace.
- Race-approved blaze orange.
- Mesh inner lining.
- Underarm and back venting.
- Front offset opening with flap.
- Oversized front pocket.
- Articulated shoulders and shaped sleeves.
- Adjustable collar, hem and wrists.
- Reflective detailing.

SNO-X RACE EDITION PANTS
441571

P. 32

SHELL
Sympatex 2-Ply Laminated Polyester

SympaTex | BRP LIFETIME WARRANTY

- Waterproof, windproof and breathable membrane.
- 100% seams and logos sealed.
- Hip pockets and thigh venting with water-resistant zippers.
- Articulated, shaped knees and knee padding.
- Reinforced inner leg and crotch.
- Mesh lining.
- Full-length water-resistant side zippers.
- Adjustable waist.
- Removable suspenders.

BENEFITS	PERFORMANCE RATINGS	SIZES	PRICE
• Warm jacket for trail riding. • Keeps you dry and warm all day. • Designed to move with you when riding. • Highly visible.		Men's XS, S, M, MT, L, LT, XL, XLT, 2XL Tall sizes: 2XLT, 3XL, 3XLT, 4XL, 5XL Ladies' XS, S, M, L, XL, 2XL, 3XL	Men's **$319.99** Tall sizes **$339.99** Ladies' **$309.99** Ski-Doo Warnert Makita Race Edition **$369.99**
• Warm for trail riding. • Race-team styling. • Easy to get into and out of. • Keeps you dry and warm all day. • Designed to move with you when riding.		Men's XS, S, M, L, XL, 2XL Tall sizes: MT, LT, XLT, 2XLT, 3XL, 3XLT, 4XL, 4XLT, 5XL Ladies' XS, S, M, L, XL, 2XL, 3XL	Men's **$279.99** Tall sizes **$289.99** Ladies' **$249.99**
• Full overcoat-style coverage to keep wind and cold out. • Keeps you dry and warm all day. • Versatility for racers or spectators.		One size	**$279.99**
• Easy to get into and out of, even with helmet or safety vest on. • Keeps you dry and warm all day. • Racing-specific features, such as added visibility. • Becomes more breathable the harder you ride for comfort. • Enables you to match warmth to conditions and riding style. • Customizable fit.		XS, S, M, L, XL, 2XL, 3XL	**$379.99**
• Keeps you dry and warm all day. • Become more breathable the harder you ride, for comfort. • Racing-specific features, such as protection. • Easy to get into and out of.		XS, S, M, L, XL, 2XL, 3XL	**$349.99**

3 3 3

X-TEAM WINTER JACKET

Insulation and features for performance trail riding with race team style.

Shell: 60% Polyester, 40% Nylon
Insulation: PrimaLoft Black

440720 • XS, S, M, MT, L, LT, XL, XLT, 2XL
Grey (09), Red (30), Black (90), Sunburst Yellow (96)

$319.99

Tall sizes
Shell: 60% Polyester, 40% Nylon
442428 • 2XLT, 3XL, 3XLT, 4XL
Black (90), Sunburst Yellow (96)

442432 • 5XL
Black (90)

$339.99

NEW 3 3 3

SKI-DOO WARNERT MAKITA† RACE EDITION JACKET

Straight from the race track with insulation and features for performance trail riding.

Shell: 60% Polyester, 40% Nylon
Insulation: PrimaLoft Black

440728 • S, M, L, XL, 2XL
Sunburst Yellow (96)

$369.99

3 3 3

X-TEAM WINTER HIGHPANTS

Designed for performance trail riding with full insulation and style.

Shell: 99% Polyester, 1% Nylon
Insulation: PrimaLoft Black

441573 • XS, S, M, L, XL, 2XL
Black (90)

$279.99

Tall sizes
441577 • MT, LT, XLT, 2XLT, 3XL, 3XLT, 4XL, 4XLT, 5XL
Black (90)

$289.99

SEE TRAIL PERFORMANCE OUTER LAYER FEATURES & BENEFITS P. 28-29

CHECK OUT NEW REV (G4) MXZ ACCESSORIES ON P.6-7

3 3 3

X-TEAM JACKET

Women's fit, style and colors in an insulated performance jacket with race team style.

Shell: 70% Polyester, 30% Nylon
Insulation: PrimaLoft Black

440721 • XS, S, M, L, XL, 2XL, 3XL
Grey (09), Pink (36), Black (90)

$309.99

3 3 3

X-TEAM HIGHPANTS

Cold temperature performance highpants with a feminine cut.

Shell: 99% Polyester, 1% Nylon
Insulation: PrimaLoft Black

441574 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$249.99

SEE TRAIL PERFORMANCE OUTER LAYER FEATURES & BENEFITS P. 28-29

FAST, EASY & SECURE: NEW LinQ TUNNEL BAG P.132

The more you perspire the more breathable the Sno-X Race Edition Shell and Pants get, thanks to the Sympatex windproof, waterproof and breathable membrane.

2 5 5

SNO-X RACE EDITION SHELL

Designed with professional racers.

Shell: Sympatex 2-Ply Laminated Polyester

440722 • XS, S, M, L, XL, 2XL, 3XL
Orange (12)

$379.99

2 5 5

SNO-X RACE EDITION PANTS

Lightweight non-insulated pants.

Shell: Sympatex 2-Ply Laminated Polyester

441571
XS, S, M, L, XL, 2XL, 3XL
Orange (12)

$349.99

3 2 2

WARM-UP COAT

The ultimate racer's overcoat is here for all racers and fans. Stay warm at the races and show your colors.

Shell: 95% Polyester, 5% Nylon
Insulation: Thermal Loft

440703 • One size
Sunburst Yellow (96)

$279.99

SEE TRAIL PERFORMANCE OUTER LAYER FEATURES & BENEFITS P. 28-29

BEST PERFORMANCE. BEST RELIABILITY. LONGEST LIFE. XPS OILS P.171

SKI-DOO BACKCOUNTRY EXPERT PROFILE

TONY JENKINS

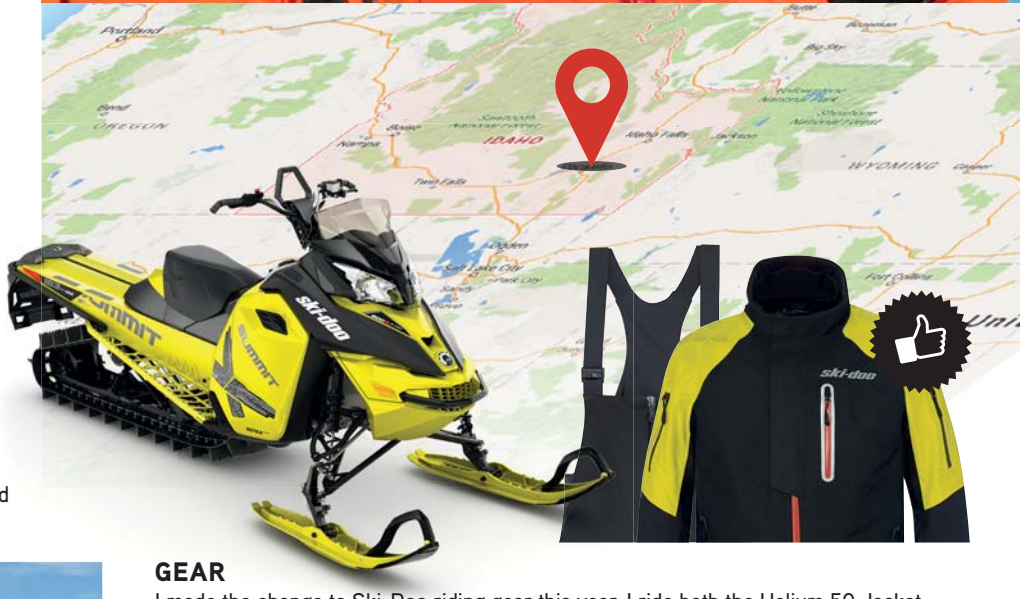
CURRENT SLED
Summit X 163 with 3 in. track

PASSION
Anything that has to do with being in the outdoors... camping, dirt biking, fishing, hunting, mountain biking. I also love spending a lot of time with my wife and children. My family and friends will tell you I'm always finding adventures and never getting home before dark.

Riding snowmobiles has driven me to keep pushing the sport and to share my passion for riding. From teaching backcountry clinics to weekend adventures with friends, I have always had a passion to ride. I'm fortunate enough to live in Southeast Idaho, where in a good snow year I'll ride from November to June. Riding 8 months out of the year only leaves me 4 months to prepare for the next season – you know how that is.

RIDING
My favorite area is in Southeast Idaho, mainly because I know the areas so well and we always have good snow coverage being so close to the continental divide. Even on a bad snow year I will head for the North-facing slopes that are filled with trees and go exploring. I've been fortunate enough to ride a lot of different and unique areas in North America from Washington, Oregon, Montana, Wyoming, Utah, Colorado to British Columbia and have found that being on the Idaho/ Wyoming border offers some of the best riding around – especially if you like technical riding like I do.

FOLLOW TONY ON INSTAGRAM: @tony_jenkins



GEAR
I made the change to Ski-Doo riding gear this year. I ride both the Helium 50 Jacket and Highpants. I have the Helium 50 because I'm extremely hard on gear and it has the tougher shell. The MCode Gloves are very good... but the Highmark Gloves are really something else. Just great feel and they stay so dry. Great fit, too.

NORMAL JOB
Well... this is hard one for me to answer! It's not a "normal job." What I can tell you is that it involves a lot of fun and challenging training, and I have the flexibility to ride my Ski-Doo on my days off. But let's be real – I'd last about two days in a "normal job!"

MOST FUN ON A SLED EVER
When you're out riding with your buddy and you look down and you need your headlights to see where you're heading is a good day. I've had a couple encounters where I had dropped off some mountain top and found myself in the bottom of a canyon with running water and darkness and an empty fuel tank (Hey, I thought it was a short cut!). I ended up spending the night and getting out in the early morning (that's why I always take the right survival gear). For some reason, these are my most memorable rides! (The funny thing is my wife knows not to call search and rescue for at least 2 days because they will never find me and I would have to go rescue them after I got myself out – no joke!)

OUR TOURING GEAR. YOUR NEXT EPIC RIDE.

TOURING

TECHNOLOGY AND SMART DESIGN FOR ALL-DAY COMFORT WITH MODERN STYLE.

FEATURES

ABSOLUTE 0 JACKET
440748 • 440698

P. 38

Men's Ladies'

SHELL
Sympatex 2-Ply
Laminated Polyester

- 100% seams and logos sealed.
- Waterproof, windproof and breathable membrane.
- Underarm venting.
- Removable liner and hood.
- Center front quadruple flaps with 2 offset zippers.
- Removable and adjustable synthetic down collar to seal air entry.
- Shaped sleeves.
- Powder skirt.
- Action back pleat.
- Reflective detailing.
- Water-resistant zippers at front opening, pockets and vents.

ABSOLUTE 0 HIGHPANTS
441494 • 441495

P. 38

Men's Ladies'

SHELL
Sympatex 2-Ply
Laminated Polyester

- 100% seams and logos sealed.
- Waterproof, windproof and breathable membrane.
- Full-length 2-way water-resistant side zippers with double flaps.
- Polar fleece-lined seat.
- Shaped, padded and reinforced knees and adjustable waist.
- Reinforced crotch and seat.
- Storm gaiters.

ABSOLUTE TRAIL JACKET
440702

P. 39

SHELL
Sympatex 2-Ply
Laminated Polyester

- 100% seams and logos sealed.
- Waterproof, windproof and breathable membrane.
- Underarm and back venting.
- Powder skirt.
- Shaped sleeves and triple front flaps with microfleece polyester.

ABSOLUTE TRAIL HIGHPANTS
441570

P. 39

SHELL
Sympatex 2-Ply
Laminated Polyester

- 100% seams and logos sealed.
- Waterproof, windproof and breathable membrane.
- Full-length side zippers.
- Shaped and padded knees for protection and adjustable waist and removable suspenders.
- Storm gaiters.
- Hip pockets.
- Cordura insert at knees.

BENEFITS	PERFORMANCE RATINGS	SIZES	PRICE
• Keeps you dry and warm all day, but not bulky. • Lightweight and flexible for comfort. • Many features to match warmth to conditions and riding style. • Seals out wind and elements. • Ultra warm: extremely popular in the coldest regions.		Men's S, M, L, XL, 2XL, 3XL Ladies' XS, S, M, L, XL, 2XL, 3XL	Men's **$499.99** Ladies' **$499.99**
• Keeps you dry and warm all day, but not bulky. • Lightweight and flexible for comfort. • Added insulation at point of contact with sled for extra warmth. • Easy to get into and out of.		Men's XS, S, M, L, XL, 2XL, 3XL Ladies' XS, S, M, L, XL, 2XL, 3XL	Men's **$399.99** Ladies' **$399.99**
• Keeps you dry and warm all day. • Becomes more breathable the harder you ride, for comfort. • Seals out wind and elements. • Enable you to match warmth to conditions and riding style. • Good coverage and comfort while riding all day.		S, M, L, XL, 2XL, 3XL	**$429.99**
• Keeps you dry and warm all day. • Become more breathable the harder you ride, for comfort. • Seal out wind and elements. • Enable you to match warmth to conditions and riding style.		S, M, L, XL, 2XL, 3XL	**$389.99**

FEATURES

HEATED VEST LINER
440645

P. 40

- Insulated, stretchable and water-resistant shell.
- Durable wind-blocking layer.
- Xtreme Comfort Technology: hair-thin, micro alloy fibers and modules.
- Two flexible heating panels at chest and two at lower back.
- Built-in control panel at chest.
- IC protection and UL certification.
- Rechargeable lithium battery, up to 5 hours of heating time.
- Easy access battery pocket.
- 1 wall charger included and vehicle charger sold separately (4880600090).

GLIDE LED JACKET
440605

P. 40

SHELL
100% Nylon

- 100% seams and logos sealed.
- Underarm and back venting.
- LED lighting, requires 2 AA batteries. (not included)
- Removable insulated lining.
- Shaped sleeves and stretch fabric at elbows and adjustable collar, waist and wrists.
- Handwarmer pockets.
- Double front flaps.
- Articulated shoulders.
- Includes removable battery pack.

GLIDE JACKET
440661

P. 40

SHELL
100% Nylon

- 100% seams and logos sealed.
- Underarm and back venting.
- Removable insulated lining.
- Double front flaps.
- Adjustable collar, waist and wrists.
- Articulated shoulders, shaped sleeves and stretch fabric at elbows.
- Handwarmer pockets.

VOYAGER HIGHPANTS
441554 • 441478

P. 40-41

Men's Ladies'

SHELL
Men's: 80% Nylon, 20% Polyester
Ladies': Nylon

- 100% seams and logos sealed.
- Waterproof, windproof and breathable.
- Polar fleece-lined seat and knees.
- Storm gaiters.
- Shaped knees.
- Adjustable waist.
- 2-way full-length side zippers.

Men's
- 1000 denier nylon-lined seat, knees and inner legs and padded knees.
- Composite insulation construction.

Ladies'
- Adjustable waist, stretch fleece bib and drop seat design.

MUSKOKA JACKET
440704

P. 41

SHELL
100% Polyester

- 100% seams and logos sealed.
- Waterproof, windproof and breathable.
- Powder skirt.
- Handwarmer pockets.
- Underarm venting.
- Removable synthetic fur around detachable insulated hood.
- Adjustable collar, hem and wrists.
- Front flap and additional inner flap.
- Inner fleece cuffs.
- Reflective detailing.

BENEFITS	PERFORMANCE RATINGS	SIZES	PRICE
• Electronic heating modules keep you warm and enable you to easily adjust the temperature. • Provides extra warmth by blocking wind. • Safe and sophisticated. • Runs on rechargeable battery for up to 5 hours.		XS, S, M, L, XL, 2XL, 3XL	**$159.99**
• Great performance with LED lighting for visibility at night or in snow dust. • Enables you to match warmth to conditions and riding style. • Good coverage and comfort while riding all day. • Customizable fit.		XS, S, M, L, XL, 2XL	**$399.99**
• Keeps you dry and warm all day. • Enables you to match warmth to conditions and riding style. • Good coverage and comfort while riding all day. • Customizable fit.		XS, S, M, L, XL, 2XL, 3XL	**$339.99**
• Keeps you dry and warm all day. • Lightweight and flexible for comfort. • Added insulation at point of contact with sled for extra warmth. • Seal out wind and elements. • Easy to get into and out of.		Men's XS, S, M, MT, L, LT, XL, XLT, 2XL Ladies' XS, S, M, MT, L, LT, XL, XLT, 2XL, 3XL	Men's **$269.99** Ladies' **$269.99**
• Women's cut and fit for comfort and flair. • Keeps you dry and warm all day. • Enables you to match warmth to conditions and riding style.		XS, S, M, L, XL, 2XL, 3XL	**$279.99**

Sympatex membrane is 100% recyclable like a PET bottle Sympatex is Oeko-Tex† standard 100, guaranteeing the membrane causes no harm to health Sympatex contains no PTFE or PFC to be environmentally friendly.

DID YOU KNOW The fibers in the PrimaLoft Gold insulation used in Absolute 0 gear are modeled after actual goose down fibers.

5 5 4

ABSOLUTE 0 JACKET

You'll have a hard time finding a warmer jacket in any sport. Tailormade for extreme temperatures and conditions.

Shell: Sympatex 2-Ply Laminated Polyester
Insulation: PrimaLoft Gold

440748 • S, M, L, XL, 2XL, 3XL
Black (90)

$499.99

5 5 4

ABSOLUTE 0 HIGHPANTS

The best materials and designs are used to make the warmest pants we've ever offered. Totally windproof, waterproof and breathable.

Shell: Sympatex 2-Ply Laminated Polyester
Insulation: PrimaLoft Gold

441494 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$399.99

5 5 4

LADIES' ABSOLUTE 0 JACKET

Our warmest women's jacket ever. Built with the best materials on the market, including Sympatex and PrimaLoft for maximum comfort.

Shell: Sympatex 2-Ply Laminated Polyester
Insulation: PrimaLoft Gold

440698 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$499.99

5 5 4

LADIES' ABSOLUTE 0 HIGHPANTS

The best materials and practices are used in these no-compromise pants. Highly windproof, waterproof and breathable. Protect against the elements for maximum performance in all conditions.

Shell: Sympatex 2-Ply Laminated Polyester
Insulation: PrimaLoft Gold

441495 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$399.99

TOURING OUTER LAYER FEATURES & BENEFITS P. 34-37

OFTEN COPIED, NEVER DUPLICATED: LinQ 1+1 COMPLETE SEAT SYSTEM P. 130

4 5 4

ABSOLUTE TRAIL JACKET

Sharp styling, leading technology combined in a high performance jacket for active to moderate riders.

Shell: Sympatex 2-Ply Laminated Polyester
Insulation: PrimaLoft Black

440702 • S, M, L, XL, 2XL, 3XL
Orange (12), Black (90)

$429.99

Sympatex is the modern membrane for moisture control.

4 5 4

ABSOLUTE TRAIL HIGHPANTS

The complementary pants to our advanced technology Absolute Trail Jacket.

Shell: Sympatex 2-Ply Laminated Polyester
Insulation: PrimaLoft Black

441570 • S, M, L, XL, 2XL, 3XL
Black (90)

$389.99

TOURING OUTER LAYER FEATURES & BENEFITS P. 34-37

ESCAPE 9-TO-5 WITHOUT COMPROMISE. 2-UP RIDING ACCESSORIES P.130-131

4 3 3

GLIDE JACKET

Classic lines and refined cut deliver great fit and style on the trails. Removable liner helps keep you comfortable in all conditions.

Shell: 100% Nylon
Insulation: PrimaLoft Silver

440661
XS, S, M, L, XL, 2XL, 3XL
Yellow (10),
Orange (12), Black (90)

$339.99

5 2 2

HEATED VEST LINER

The ultimate in riding warmth and temperature regulation, as you control this vest's electronic heating modules.

440645
XS, S, M, L, XL, 2XL, 3XL
Black (90)

$159.99

LITHIUM-ION BATTERY

(Not illustrated)

4880590001

$39.99

LITHIUM-ION BATTERY VEHICLE CHARGER

(Not illustrated)

- Allows to recharge the Heated Vest Liner while riding.

4880600090

$29.99

4 3 3

GLIDE LED JACKET

Unmatched visibility with LED lighting integrated into our full-featured Glide Jacket.

Shell: 100% Nylon
Insulation: PrimaLoft Silver

440605
XS, S, M, L, XL, 2XL
Black (90)

$399.99

4 3 3

VOYAGER HIGHPANTS

One of our warmest and full-featured trail-riding pants.

Shell: 80% Nylon, 20% Polyester
Insulation: PrimaLoft Silver

441554
XS, S, M, MT, L, LT, XL, XLT, 2XL
Black (90)

$269.99

TOURING OUTER LAYER FEATURES & BENEFITS P. 34-37

NEVER GET LOST. NEW GARMIN ZUMO 590 GPS AND SUPPORT KIT P.137

4 3 3

MUSKOKA JACKET

A classy, high style look for the ladies out on the trails.

Shell: 100% Nylon (Black and Teal), 100% Polyester (Violet)
Insulation: PrimaLoft Silver

440704 • XS, S, M, L, XL, 2XL, 3XL
Violet (41), Teal (74), Black (90)

$279.99

4 3 3

VOYAGER HIGHPANTS

Women's fit and all the features you'd expect in one of our warmest pants.

Shell: Nylon
Insulation: PrimaLoft Silver

441478 • XS, S, M, MT, L, LT, XL, XLT, 2XL, 3XL
Black (90)

$269.99

TOURING OUTER LAYER FEATURES & BENEFITS P. 34-37

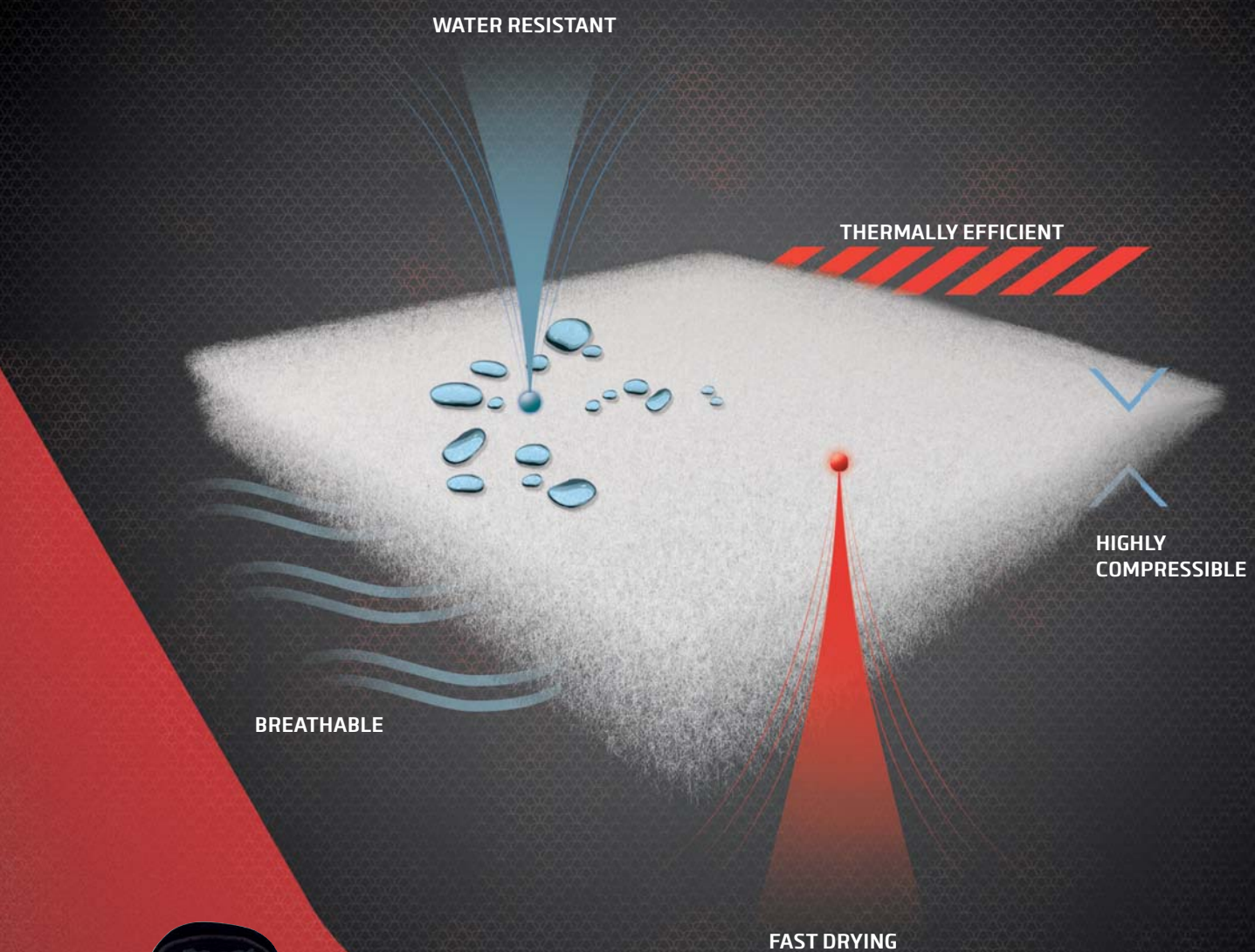
SHOP ALL TOURING GEAR AT YOUR SKI-DOO DEALER AND STORE.SKI-DOO.COM.

FEEL THE PERFORMANCE WITH PRIMALOFT® INSULATION.

IT'S MORE THAN A JACKET

PRIMALOFT®

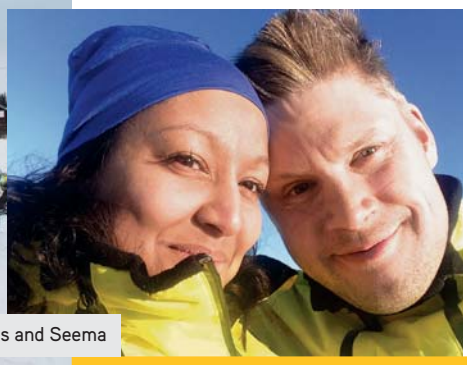
Feel the Performance™



The Absolute 0 Jacket features superior PrimaLoft® insulation, delivering ultimate warmth and comfort without bulk – even when wet. With a high warmth-to-weight ratio, exceptional water-resistance and breathability, you'll stay warm, dry and comfortable in the harshest weather.

REDISCOVER COMFORT AT THE NEW PRIMALOFT.COM

Thomas and his crew take out riders of many different ages and experience levels. And he has Ski-Doo gear to help keep them all comfortable and safe.



Thomas and Seema

SKI-DOO SLEDS AND RIDING GEAR

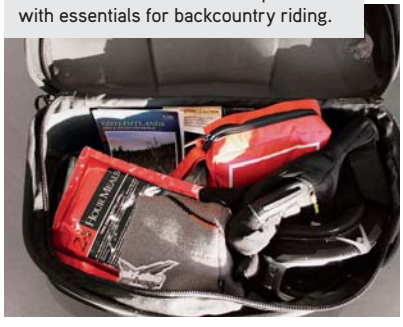
CORNERSTONE OF RIDING EXPERIENCE

Thomas Wärdell and his fiance Seema Edström have turned their passion for the outdoors and snowmobiling into a career. A world-class snowmobiler who has been in many European sled films, Wärdell started Terrain Events Thomas Wärdell Riding Experience to teach snowmobile riding technique, technology, proper clothing and safety to individuals and companies, especially skiers and snowboarders. Snowmobilers in Sweden must have a sled driver's license, and Thomas and his team offer programs enabling guests to earn one.

"Making a good impression and ensuring our guests have a fun, first-class experience are critical to the success of our business," says Wärdell. "That's why we choose Ski-Doo snowmobiles and accessories. The ability to customize the sleds and easily add and remove accessories makes our jobs easier and our guests have more fun."

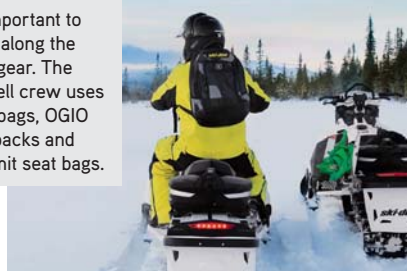
Wärdell, his guiding/instructor crew and one of the Summit Burton sleds from their fleet. Many guests mix skiing and snowboarding with their sledding classes, so the Summit Burton sled is ideal.

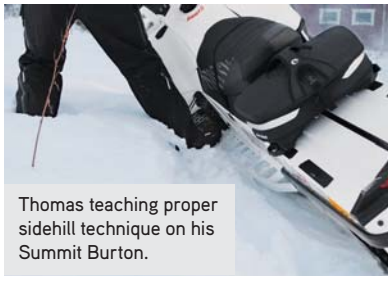
A LinQ Premium Tunnel BAG packed with essentials for backcountry riding.



The Adjustable Handlebar Riser allows for machines to be fitted for different size riders quickly and effectively.

It's important to bring along the right gear. The Wärdell crew uses LinQ bags, OGIO backpacks and Summit seat bags.





Thomas teaching proper sidehill technique on his Summit Burton.

Wärdell's organization uses Superclamps, available from BRP dealers, to secure their sleds when trailering between riding areas.

OUR RECREATIONAL / UTILITY GEAR. YOUR NEXT JOB WELL DONE.

RECREATIONAL / UTILITY

WORK OR PLAY HARD – AT A GREAT VALUE – WITH GEAR FEATURING FUNCTIONAL DESIGNS FROM OUR UNMATCHED EXPERIENCE IN SNOWMOBILING.

RPM 3 2 3

HOLESHOT JACKET

For decades, our Holeshot Jacket has bundled more affordable value than any other jacket on the market.

- All critical seams sealed.
- Shaped sleeves and adjustable hem and wrists.
- Handwarmer pockets.
- Added reflective detailing for optimal visibility.

Shell: Orange/Sunburst Yellow: 73% Nylon, 27% Polyester. Black: 100% Nylon
Insulation: Thermal Loft

440701 • XS, S, M, MT, L, LT, XL, XLT, 2XL
Orange (12), Black (90), Sunburst Yellow (96)

$189.99

RPM 3 2 3

TRAIL HIGHPANTS

Classic look for anytime winter wear warmth.

- All critical seams sealed.
- Waterproof 1000 denier nylon at seat and knees.
- Articulated knees.
- Storm gaiters.
- 2-way full-length side zippers.

Shell: Nylon
Insulation: Thermal Loft

Men's	Ladies'
441584	441583
XS, S, M, MT, L, LT, XL, XLT, 2XL	XS, S, M, L, XL, 2XL, 3XL
Black (90)	Black (90)
$179.99	**$179.99**

RPM 3 2 3

TRACK & TRAIL JACKET

A perfect all around jacket that is packed with technical features at an affordable price.

- All critical seams sealed.
- Shaped sleeves.
- Handwarmer pockets.
- Adjustable collar, hem and wrists.

Shell: Polyester
Insulation: Thermal Loft

$199.99

Other available colors
12
10

Men's 440619 • S, M, MT, L, LT, XL, XLT, 2XL
Yellow (10), Orange (12)

Ladies' 440620 • XS, S, M, L, XL
White (01), Yellow (10)

DID YOU KNOW RPM technology was developed by BRP to provide excellent waterproofness and breathability.

RPM PRIMALOFT 3 3 3

EXPEDITION JACKET

A full-featured jacket that's ready to work - or play - as hard as you do. Parka lenght for warmth with 9 pockets and reflective webbing.

- Parka length.
- Side slits.
- Teflon HT coating.
- Two insulated front zipper flaps.
- Powder skirt.
- Detachable hood.
- Reinforced elbows and forearms.
- Easy-to-reach bicep vents.
- Adjustable collar and wrists.
- Microfleece inner neck and sleeve cuffs.
- All critical seams sealed.

Shell: 95% Nylon, 5% Polyester
Insulation: PrimaLoft Black

440718 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$249.99

RPM PRIMALOFT 3 3 3

EXPEDITION HIGHPANTS

Ready to work and play with features delivering durability, safety and warmth.

- Teflon HT coating repels dirt.
- Reinforcements at seat and inside knees, legs and hems.
- Fleece-lined seat.
- Full-length side zippers.
- 2 large cargo pockets.
- Adjustable suspenders.
- Storm gaiters.
- Wide reflective webbing.

Shell: 90% Nylon, 10% Polyester
Insulation: PrimaLoft Black

441594 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$249.99

TECHNICAL WEAR

STAYING WARM MEANS STAYING DRY. MATCH YOUR COMFORT TO YOUR RIDING STYLE WITH OUR SNOWMOBILE-SPECIFIC TECHNICAL BASE AND MID LAYERS.

HOW IT WORKS

Each layer has a function. You get the best performance and versatility when you dress in a system with base layer, mid layer and outer layer.

OUTER LAYER

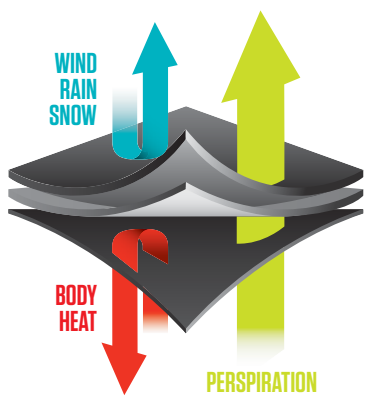
Keeps wind and water out and breathes. Adds insulation for warmth.

MID LAYER

Dials in your warmth level. Add or remove during the day as conditions change.

BASE LAYER

Close to the body to wick perspiration and prevent chills. Adds warmth and keeps you dry. Avoid cotton — it gets wet and stays wet.



We've made it easy to choose just the right gear. Look for these ratings with each layer. You can even add the warmth ratings of different layers together for an overall system rating. **Learn more about our climate rating system on pages 8-9.**

- WARMTH
- WATERPROOF / WINDPROOF
- BREATHABILITY

CREATE YOUR OWN CLIMATE

The combination of base layer, mid layer and outer layer works together to keep you warm and comfortable. Select and combine each to create your own climate for how you ride. For instance:

ACTIVE MOUNTAIN RIDER

Needs highly breathable gear to let perspiration escape.

ACTIVE TRAIL RIDER

Needs breathability with a bit more insulation, especially in colder climates.

LONG DISTANCE CRUISER

Needs more thermal gear with added insulation.

BASE LAYERS

1 1 5

ULTRALIGHT BASE LAYER

- Coconut fibers actively promote evaporative cooling and odor absorption, and to filter moisture out while trapping warmth in.
- Mesh paneled in specific areas for better ventilation and accelerated drying.
- Spandexed for ease of movement.

68% Polyester, 32% Coconut Fiber

Top
453544 • S, M, L, XL, 2XL, 3XL
Charcoal Grey (07)
$44.99

Bottom
453545 • S, M, L, XL, 2XL, 3XL
Charcoal Grey (07)
$34.99

1 1 5

ACTIVE BASE LAYER

- X-STATIC† enhanced through to the fiber to thermodynamically regulate your temperature by reflecting body heat back to the skin in cold weather.
- Permanently treated for long-lasting antibacterial performance even after 250 washes.
- Silver woven into fiber immediately binds with odor-causing agents such as ammonia and denatured proteins to instantly reduce odor.
- Panels in specific areas for better ventilation and accelerated drying.
- Compressed for added comfort.

92% Polyester, 6% Spandex, 2% X-STATIC

Top
453554 • S, M, L, XL, 2XL, 3XL
Black (90)
$59.99

Bottom
453555 • S, M, L, XL, 2XL, 3XL
Black (90)
$54.99

MID LAYERS

NEW 4 4 3

TECH WINDPROOF FLEECE JACKET

High tech windproof and water-resistant jacket can be used as a mid layer or cool weather light jacket.

- Textured polyester fleece shell.
- Windproof, water-resistant membrane.
- Zippered, countoured pockets.
- Embroidered logo.

453816 • S, M, L, XL, 2XL
Black (90)
$119.99

2 2 4

TECH MID LAYER FLEECE

- Textured polyester fleece with brushed interior for softness.
- Zippered pocket.
- Reflective silver accents for visibility.
- Shaped sleeves.
- Placket behind collar zipper prevents wind intrusion.

100% Polyester

453799 • XS, S, M, L, XL, 2XL
Black (90)
$99.99

2 1 4

MCODE MID LAYER

Great mid layer choice with MCode attitude.

- Mid layer thermal fleece.
- Brushed interior for softness and non-pilling.
- Moisture-wicking.
- Antibacterial to reduce odors.
- Handwarmer pockets.

95% Polyester, 5% Spandex

453777 • S, M, L, XL, 2XL, 3XL
Green (70), Blue (80)
$99.99

3 2 4

SKI-DOO ZIP UP MID LAYER

- Moisture wicking.

100% Polyester Mesh

453766 • S, M, L, XL, 2XL, 3XL
Charcoal Grey (07), Black (90)
$89.99

CREATE YOUR CLIMATE WITH THE BRP PERFORMANCE RATINGS P.8-9

USE THE TUNNEL BACKPACK WITH LinQ SOFT STRAP TO BRING AN EXTRA LAYER DURING LONG RIDES P.135

2 1 4

THERMAL PANTS

- Made of high-filament polyester enhanced by slight brushing to provide softness and warmth.
- Spandexed for ease of movement.

95% Polyester, 5% Spandex

453592 • XS, S, M, L, XL, 2XL
Charcoal Grey (07)

$59.99

2 1 4

THERMAL BASE LAYER

- Made of high-filament polyester enhanced by slight brushing to provide softness and warmth.
- Spandexed for ease of movement.

95% Polyester, 5% Spandex

<u>Top</u>
453569 • S, M, L, XL, 2XL, 3XL
Charcoal Grey (07), Yellow (10), Red (30)

$64.99

<u>Bottom</u>
453553 • S, M, L, XL, 2XL, 3XL
Charcoal Grey (07)

$49.99

3 2 4

SNO-X FLEECE

- Full zip with 2 front hip pockets.
- X-Team embroidered logo.
- Bonded fleece heavy mid layer.

100% Polyester

453769 • XS, S, M, L, XL, 2XL, 3XL
Orange (12), Black (90)

$89.99

2 1 4

COZY FLEECE JACKET

A semi-fitted fleece jacket for use under a riding jacket or for relaxing around the house.

- Technical moisture-wicking stretch fabric.
- Antibacterial to reduce odors.
- Zip mesh pocket.
- Semi-fitted.
- Ski-Doo logo at front.

95% Polyester, 5% Spandex

453791 • S, M, L, XL, 2XL, 3XL
Black (90)

$74.99

2 1 4

X-TEAM MICROFLEECE

- Zippered handwarmer pockets.
- Welded pocket outline.
- X-Team embroidered logo on sleeve.

100% Polyester

453762 • S, M, L, XL, 2XL, 3XL
Grey (09), Black (90)

$69.99

BASE LAYERS

1 1 5

ULTRALIGHT BASE LAYER

- Coconut fibers actively promote evaporative cooling and odor absorption, and to filter moisture out while trapping warmth in.
- Mesh paneled in specific areas for better ventilation and accelerated drying.
- Spandexed for ease of movement.

68% Polyester, 32% Coconut Fiber

Top
453546 • XS, S, M, L, XL, 2XL
Charcoal Grey (07)
$44.99

Bottom
453547 • XS, S, M, L, XL, 2XL
Charcoal Grey (07)
$34.99

1 1 5

ACTIVE BASE LAYER

- X-STATIC enhanced through to the fiber to thermodynamically regulate your temperature by reflecting body heat back to the skin in cold weather.
- Permanently treated for long-lasting antibacterial performance even after 250 washes.
- Silver woven into fiber immediately binds with odor-causing agents such as ammonia and denatured proteins to instantly reduce odor.
- Panels in specific areas for better ventilation and accelerated drying.
- Compressed for added comfort.

92% Polyester, 6% Spandex, 2% X-STATIC

Top
453548 • XS, S, M, L, XL, 2XL
Black (90)
$59.99

Bottom
453549 • XS, S, M, L, XL, 2XL
Black (90)
$54.99

MID LAYERS

2 2 4

TECH MID LAYER FLEECE

- Women's cut with shaped sleeves.
- Textured polyester fleece with brushed interior for softness.
- Rhinestone and embroidered accents.
- Zippered pocket.
- Reflective silver accents for visibility.
- Placket behind collar zipper to keep cold out.

100% Polyester

453800 • XS, S, M, L, XL, 2XL, 3XL
Black (90)
$99.99

3 2 4

MUSKOKA FLEECE

- Full zip with 2 front hip pockets.
- Ski-Doo rubberized logo.
- Bonded fleece heavy mid layer.

100% Polyester

453773 • XS, S, M, L, XL, 2XL
Heather Grey (27)
$69.99

2 1 4

X-TEAM MICROFLEECE

- Zippered handwarmer pockets.
- Outline X-Team embroidery on back.
- Embroidered Ski-Doo logo on left sleeve.

100% Polyester

453768 • XS, S, M, L, XL, 2XL
Grey (09), Pink (36), Black (90)
$69.99

2 1 4

WEEKENDER ZIP UP SWEATER

- Textured polyester fleece with brushed interior for softness.
- Handwarmer pockets.
- Ski-Doo logo on bottom.

100% Polyester

453729 • XS, S, M, L, XL, 2XL
Grey (09)
$69.99

CREATE YOUR CLIMATE WITH THE BRP PERFORMANCE RATINGS P.8-9

NEW DESIGNS FOR THE RACY X-TEAM JACKETS ON P.30-31

2 1 4

THERMAL BASE LAYER

- Made of high-filament polyester enhanced by slight brushing to provide softness and warmth.
- Spandexed for ease of movement.

95% Polyester, 5% Spandex

Top
453568 • XS, S, M, L, XL, 2XL
White (01), Charcoal Grey (07)
$64.99

Bottom
453551 • XS, S, M, L, XL, 2XL
Charcoal Grey (07)
$49.99

2 1 4

POLAR HOODIE

- Fleece pullover hoodie.

100% Polyester

453675 • XS, S, M, L, XL, 2XL
Ice (38)
$69.99

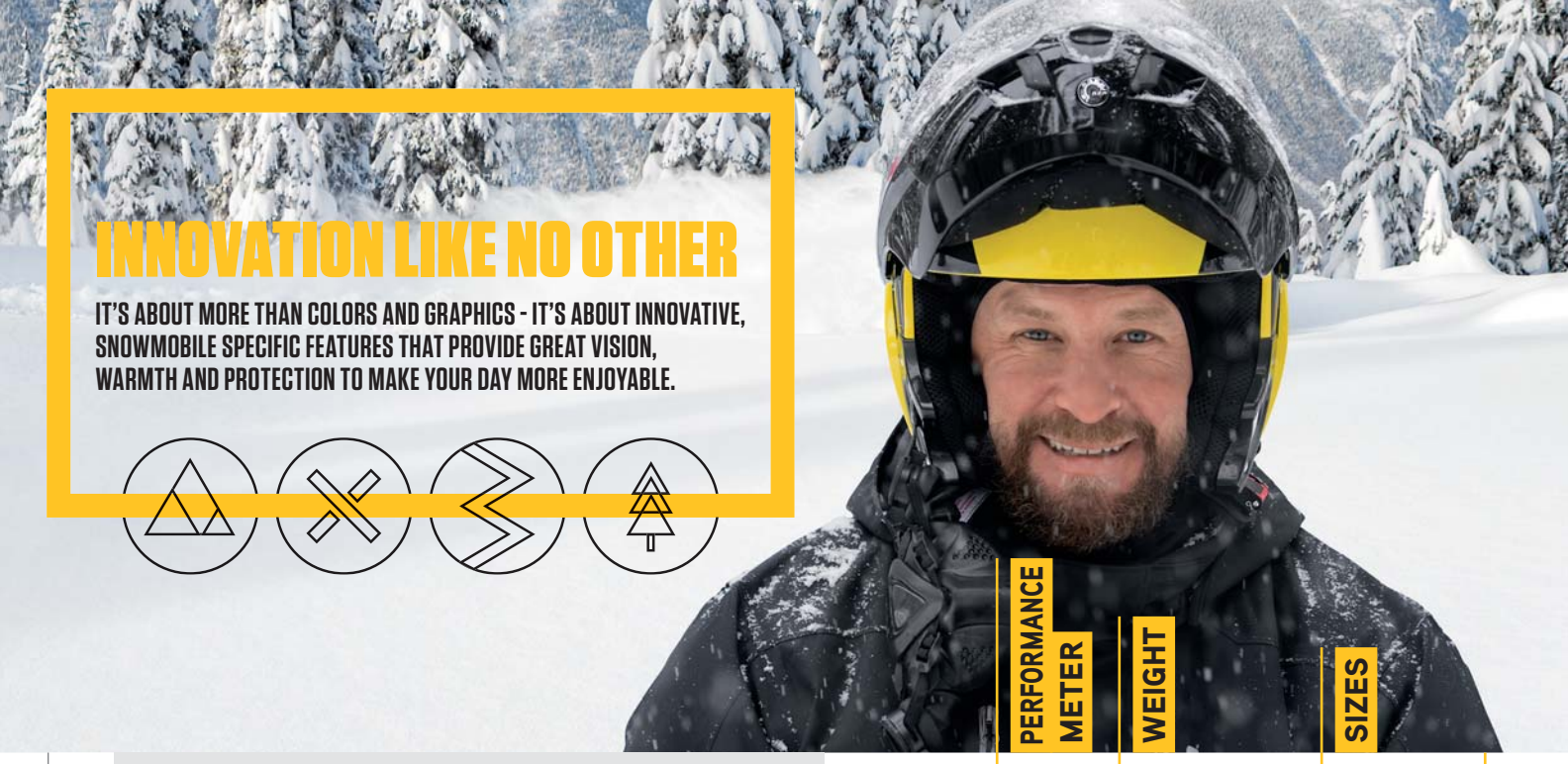
3 2 4

SUPREME FLEECE

- Slim cut to flatter your figure.
- Stand-up collar helps keep neck cozy.
- Zippered handwarmer pockets and one zip-pocket on left chest.

100% Polyester

453631 • XS, S, M, L, XL, 2XL
Ice (38), Raspberry (39), Black (90)
$69.99



INNOVATION LIKE NO OTHER

IT'S ABOUT MORE THAN COLORS AND GRAPHICS - IT'S ABOUT INNOVATIVE, SNOWMOBILE SPECIFIC FEATURES THAT PROVIDE GREAT VISION, WARMTH AND PROTECTION TO MAKE YOUR DAY MORE ENJOYABLE.

		PERFORMANCE METER	WEIGHT	SIZES
BV2S	P. 56  BV2S 447404  BV2S Electric SE 447468	SHELL Polycarbonate Composite	Light Very light Ultra light	S, M, L, XL, 2XL, 3XL
MODULAR 3	P. 57  Modular 3 X-Team Swift 448403  Ladies' Modular 3 Swift 448404  Modular 3 447963  Modular 3 Electric SE 447964	SHELL Polycarbonate Composite	Light Very light Ultra light	S, M, L, XL, 2XL, 3XL

YOU CAN GET MANY REPLACEMENT PARTS FOR BRP HELMETS — LIKE VISORS, MASKS AND PIVOT KITS.

Learn everything about the Ski-Doo Helmets in action. Go to: http://www.ski-doo.com/shopping-tools/videos.html

FEATURES	BENEFITS	PRICE
• Dual lens visor featuring Clear Vision Technology.	▸ Delivers fog-free 180° peripherial vision.	**BV2S $449.99** **BV2S Electric SE $529.99**
• Lever activated sunshield.	▸ Easy to adjust to light conditions.	
• Front push-buttons release for jaw piece.	▸ Easy operation with gloves on.	
• BV2S fog-resistant mask system with soft surgical rubber seal and easy adjust knob.	▸ Adapts to all faces.	
• Removable and washable inner liner.	▸ Keeps helmet fresh.	
• Integrated backlight (batteries included).	▸ Added visibility.	
• Quick-release chin strap.	▸ Easy to secure and release.	
• D.O.T. certified.		
• Electric heated shield (electric model only).		
• Clear Vision Technology with optically-correct dual lens visor.	▸ Distortion - and fog-free vision.	**Modular 3 $299.99** **Modular 3 X-Team Swift $339.99** **Ladies' Modular 3 Swift $339.99** **Modular 3 Electric SE $369.99**
• Adjustable sunshield lowers or raises at the touch of a button.	▸ Easily adapts to conditions.	
• Front push-buttons release integrated into jaw section.	▸ Allows easy movement when wearing gloves.	
• BREATH EVAC fog-resistant mask system with increased vent diameter.	▸ Controlled breathing airflow in and out of helmet.	
• Quick-release chin strap.	▸ Easy to secure and release.	
• Graphics applied with ink transfer process.	▸ High quality finish with increased scratch resistance.	
• D.O.T. certified.		
• Electric heated shield (electric model only).		

VISIT YOUR DEALER OR STORE.SKI-DOO.COM FOR COMPLETE LIST OF ITEMS AVAILABLE SPECIFICALLY FOR YOUR HELMET MODEL.

		PERFORMANCE METER	WEIGHT	SIZES
XP-R2	P. 58  XP-R2 Carbon Light Original 447826  XP-R2 Carbon Light Blaze 447657  XP-R2 Carbon Light 447656	SHELL Carbon Fiber Composite	Light Very light Ultra light	XS, S, M, L, XL, 2XL, 3XL
XP-3	P. 59  Ski-Doo XP-3 Pro Cross Scarp 448257  XP-3 Pro Cross 448258  Ski-Doo XP-3 Pro Cross X-Team 448412	SHELL Fiberglass	Light Very light Ultra light	XS, S, M, L, XL, 2XL
XC-4	P. 60  NEW Ladies' XC-4 Cross 448397  XC-4 Cross 448250  XC-4 Cross Drift 448252	SHELL Polycarbonate Composite	Light Very light Ultra light	XS, S, M, L, XL, 2XL
X-1	P. 60  X-1 Cross 448338  X-1 Cross Triad 448226	SHELL ABS	Light Very light Ultra light	XS, S, M, L, XL, 2XL

FEATURES	BENEFITS	PRICE
• ±1200 grams for size Large.	▸ Less stress on neck and shoulder muscles.	**XP-R2 Carbon Light $399.99**
• Tool-less multi-adjustable front peak with anti-reflecting underside.	▸ Allows quick visor adjustment and reduces glare.	
• Flexible face trim design with a large nose protector area.	▸ Protects from wind and snow.	**XP-R2 Carbon Light Blaze $424.99**
• F.A.S. (Full Air System) with 10 ventilation points and double rear extractor.	▸ Allows you to control airflow for cooling.	
• Integrated rear fin and goggle anti-slip design.	▸ Added stability and aerodynamic performance.	**XP-R2 Carbon Light Original $424.99**
• Multi density EPS foam inner shell.	▸ Superior protection over single-density foams.	
• Removable, washable inner liner and cheek pads and liner features sanitized treatment.	▸ Keeps your helmet fresh and promotes wicking of moisture.	
• Front top pocket for sweat absorbing pads.		
• Morpho System Plus - Ergonomic 3D cheek pads.	▸ Allows for a better fit.	
• Double D racing buckle.	▸ Most secure fastening method.	
• Aluminum screws, protective coated parts.	▸ Assures lasting appearance.	
• D.O.T. and E.C.E. certified.		
• ±1470 grams for size large.		**Ski-Doo XP-3 Pro Cross Scarp $249.99**
• Superlight premium fiberglass shell.	▸ Less stress on neck and shoulder muscles.	
• EPS inner liner.	▸ Impact absorbing protection.	**XP-3 Pro Cross $239.99**
• Front stainless steel and rear vent system.	▸ Allows control of airflow for cooling or for warmth on cold days.	
• Aero-tuned, fully adjustable visor system.	▸ Added stability and aerodynamic performance.	**Ski-Doo XP-3 Pro Cross X-Team $249.99**
• Removable, washable, and replaceable CoolMax† moisture-wicking liner and cheek pads.	▸ Keeps helmet fresh.	
• Winter breath deflector.		
• Lightweight double D ring chin strap.	▸ Most secure fastening method.	
• Triple certified: D.O.T., E.C.E. and Snell M2015.		
• ±1470 grams for size Large.		**Ladies' XC-4 Cross Helmet $159.99**
• Polycarbonate composite shell.	▸ Less stress on neck and shoulder muscles.	
• EPS inner shell.	▸ Impact absorbing protection.	**XC-4 Cross $149.99**
• Front stainless steel and rear vent system.	▸ Allows control of airflow for cooling or for warmth on cold days.	
• Aero-tuned and fully adjustable visor system.	▸ Added stability and aerodynamic performance.	**XC-4 Cross Drift $159.99**
• Removable, washable, and replaceable CoolMax moisture-wicking liner and cheek pads.	▸ Keeps your helmet fresh.	
• Winter breath deflector.		
• Lightweight double D chin strap.	▸ Most secure fastening method.	
• D.O.T. and Snell M2015.		
• Lightweight and tough.		**X-1 Cross $119.99**
• Adjustable, aero-tuned visor.	▸ Added stability and aerodynamic performance.	
• Ventilation system.	▸ Airflow for cooling.	**X-1 Cross Triad $129.99**
• Moisture-wicking and breathable chin strap, liner and cheek pads.	▸ Keeps your helmet fresh.	
• Easily removable and washable liner and cheek pads.		
• Strap grip keeps goggle strap in place.	▸ Keeps goggles in place.	
• D.O.T. certified.		

KNOW YOUR HELMET

SAFETY RATINGS

Ever wonder what those certification labels on your helmet mean? They are safety standards based on street motorcycling.

DOT (Department of Transportation - FMVSS 218)
This is a test that all road-going motorcycle helmets have to pass. Has been the same standard for more than 20 years.

SNELL M2015
SNELL is an independent testing organization, and certification is voluntary. SNELL is more rigorous than DOT, and its standards are updated every 5 years – the M2015 standards are the most recent. Continuous tests of production helmets are conducted to ensure compliance.

ECE (Economic Commission for Europe) **22.05**
The safety standard most used worldwide, recognized in more than 50 countries and every race organization. Considered very up-to-date. 50 production helmets must pass testing before being certified and continuous tests of production helmets are conducted to ensure compliance.

WHICH IS BEST? They are all adequate for snowmobiling. SNELL and ECE are more rigorous, but typically reject features like modular designs. Meeting SNELL and ECE standards generally cost more, so expect to pay more for a helmet certified at that level.

HOW LONG DOES A HELMET LAST?

Assuming your helmet hasn't taken any hard hits, it should last 5-6 years before the interior foam loses its ability to cushion impacts. Of course, if you have had a hard impact, you should replace your helmet immediately.

TECH FOCUS

WHAT BACKCOUNTRY EXPERTS WEAR UNDER THE LID.

"On really cold days I use the Mountain Balaclava. As soon as I start to warm up I remove it to prevent fogging. I use the nose piece that comes with my XP-R2 Helmet to reduce fogging because it does a really good job of deflecting my breath down from my goggles."

JEREMY MERCIER

ROB ALFORD

"I wear a balaclava. For drying my goggles, I put them on my clutch cover during breaks when the sled is shut off. It's important to take off your helmet and goggles when helping dig sleds out to prevent fogging."

"For those deep powder days, I'll wear a balaclava to keep the snow from hitting my neck and going down my jacket and will even add a strip of duct tape on my nose to prevent frostbite on frigid days. I've found the the only way to keep your goggles from fogging up is to keep your head dry with as much airflow as possible, so I ride without the breath deflector."

TONY JENKINS

MODULAR 3

Clear Vision Technology with optically-correct dual lens visor **offers distortion and fog-free vision.**

Front push-button release integrated into jaw section **allows easy movement when wearing gloves.**

BREATH EVAC fog-resistant mask system with increased vent diameter **controls breathing airflow in and out of helmet.**

BV2S

Dual lens widest visor featuring Clear Vision Technology **delivers fog-free 180˚ peripherial vision.**

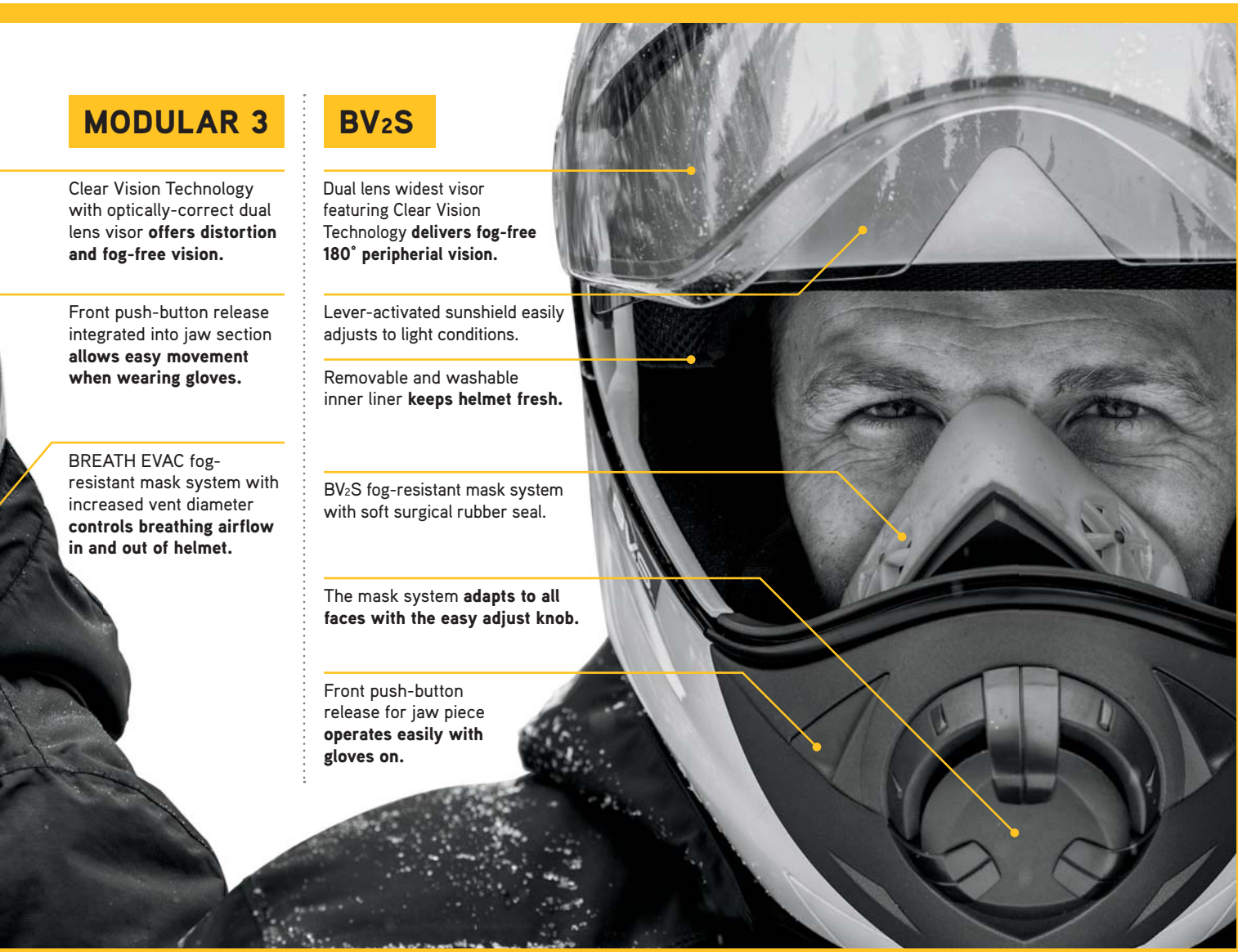
Lever-activated sunshield easily adjusts to light conditions.

Removable and washable inner liner **keeps helmet fresh.**

BV2S fog-resistant mask system with soft surgical rubber seal.

The mask system **adapts to all faces with the easy adjust knob.**

Front push-button release for jaw piece **operates easily with gloves on.**



ASHLEY CHAFFIN

"My everyday favorite under my helmet is the technical neck gator with my hair tied back in a tight braid. If the riding gets really technical and I'm breathing heavily I can fold the gator down from my face and keep my neck warm. On really cold days, I'll use a Ski-Doo Balaclava. The opening size is key, because I need it to keep my hair out of my eyes and my mouth and nose inside the mask. If my nose is exposed I start to get winded and breathe directly into my goggles – fogging them."

"I don't wear anything under my helmet unless it is colder than 14˚F / -10˚C. Then I wear a Ski-Doo thin balaclava. I find a great way to combat fogging is to stow an extra pair in the Ski-Doo Goggle Bag on the clutch cover."

DAVE NORONA

"I wear a balaclava on the trail ride in and out, but once I start riding aggressively I take it off. If it's an absolute blower pow day then I sometimes leave it on and pull it down under my chin to keep the white gold from getting down my neck."

JAY MENTABERRY

When using a **BV2S** or **Modular 3 Helmet** we recommend the Mask System Balaclava (447630). This is designed to work with the fog resistant mask and BREATH EVAC systems on these high tech helmets.

BV2S

Simply the highest tech helmet available. Designed for unmatched vision and comfort in even the harshest conditions.

BV2S HELMET

Shell: Polycarbonate Composite

447404
S, M, L, XL, 2XL, 3XL
White (01),
Yellow (10),
Black (90),
Matte Black (93)

$449.99

DOT

BV2S ELECTRIC SE HELMET

Shell: Polycarbonate Composite

447468
S, M, L, XL, 2XL, 3XL
Black (90)

$529.99

DOT

ELECTRIC VISOR

448240 • One size
Clear (00)

$169.99

ABSORBENT MASKS

• Pack of 5.

929013 • One size
White (01)

$7.99

HELMET LIGHTING SYSTEM KIT

• Batteries are not included.

447465 • One size
Black (90)

$39.99

SEE BV2S HELMET FEATURES & BENEFITS P. 50-51

PERFECT MATCH TO SNOWMOBILING'S WARMEST GEAR ON P38

MODULAR 3

Outstanding vision with crystal clear visor and BREATH EVAC system to prevent fogging.

MODULAR 3 X-TEAM SWIFT HELMET

High performance design and features of the Modular 3 helmet, with a look to match.

Shell: Polycarbonate Composite

448403
S, M, L, XL, 2XL, 3XL
Yellow (10)

$339.99

DOT

LADIES' MODULAR 3 SWIFT HELMET

Shell: Polycarbonate Composite

448404
S, M, L, XL, 2XL, 3XL
Ice (38)

$339.99

DOT

MODULAR 3 HELMET

Shell: Polycarbonate Composite

447963 • S, M, L, XL, 2XL, 3XL
White (01), Grey (09),
Hi-Vis Yellow (26), Black (90)

$299.99

DOT

MODULAR 3 ELECTRIC SE HELMET

All the great features of the standard Modular 3 helmet, plus an electric shield for extra protection against fogging.

Shell: Polycarbonate Composite

447964
S, M, L, XL, 2XL, 3XL
Black (90)

$369.99

DOT

ELECTRIC VISOR

- Cord included.
- Sun visor not included.

448239 • One size
Clear (00)

$149.99

ABSORBENT MASKS

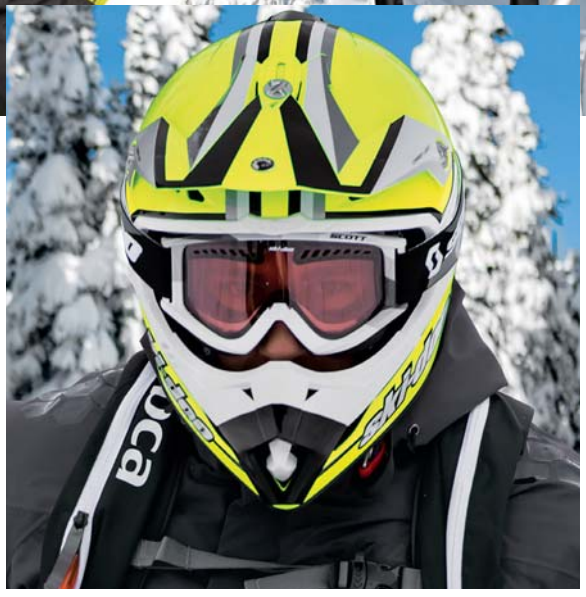
- Pack of 10.

929014 • One size
White (01)

$7.99

SEE MODULAR 3 HELMET FEATURES & BENEFITS P. 50-51

SEE MORE HELMET DETAILS IN ACTION AT HTTP://WWW.SKI-DOO.COM/SHOPPING-TOOLS/BROCHURES.HTML



XP-R2

Ultra lightweight and strong multi-directional carbon fiber construction with premium style and details.

XP-R2 CARBON LIGHT HELMET

Shell: Carbon Fiber Composite

447656
XS, S, M, L, XL, 2XL, 3XL
Black (90)

$399.99

DOT ECE22.05

XP-R2 CARBON LIGHT ORIGINAL HELMET

Shell: Carbon Fiber Composite

447826
XS, S, M, L, XL, 2XL, 3XL
Hi-Vis Yellow (26)

$424.99

DOT ECE22.05

XP-R2 CARBON LIGHT BLAZE HELMET

Shell: Carbon Fiber Composite

447657
XS, S, M, L, XL, 2XL, 3XL
Orange (12)

$424.99

DOT ECE22.05

SWEAT ABSORBENT PADS

• Pack of 10.

929015 • One size
White (01)

$7.99

MORPHO KIT

• For a perfect custom fit.
• Extra cheek pads, for a better fit inside the helmet.
• Left and right pads included.

447754 • XS, S, M, L, XL, 2XL, 3XL
Clear (00)

$14.99

SEE XP-R2 HELMET FEATURES & BENEFITS P. 52-53

GET PERFECT FIT AND SWEET STYLE WITH SKI-DOO GOGGLES BY SCOTT P.62-63

XP-3

Feature-packed superlight snocross-style helmet for exceptional performance, protection and comfort.

NEW

SKI-DOO XP-3 PRO CROSS SCARP HELMET

Shell: Fiberglass

448257
XS, S, M, L, XL, 2XL
Yellow (10), Blue (80)

$249.99

DOT ECE22.05 Snell

NEW

SKI-DOO XP-3 PRO CROSS X-TEAM HELMET

Shell: Fiberglass

448412
XS, S, M, L, XL, 2XL
Silver (08), Orange (12), Black (90)

$249.99

DOT ECE22.05 Snell

XP-3 PRO CROSS HELMET

Shell: Fiberglass

448258
XS, S, M, L, XL, 2XL
Matte Black (93)

$239.99

DOT Snell

SEE XP-3 HELMET FEATURES & BENEFITS P. 52-53

SEE MORE ABOUT THESE HELMETS AT STORE.SKI-DOO.COM/VIDEOS

XC-4

Fresh look and style with features you expect in more expensive helmets.

XC-4 CROSS HELMET

Shell: Polycarbonate Composite

448250
XS, S, M, L, XL, 2XL
Black (90)

$149.99

DOT Snell

XC-4 CROSS DRIFT HELMET

Shell: Polycarbonate Composite

448252 • XS, S, M, L, XL, 2XL
Yellow (10), Black (90)

$159.99

DOT Snell

NEW

LADIES' XC-4 CROSS HELMET

Shell: Polycarbonate Composite

448397
XS, S, M, L, XL, 2XL
Pink (36)

$159.99

DOT ECE22.05

X-1

Packed with features at an unbeatable price.

X-1 CROSS HELMET

Shell: ABS

448338
XS, S, M, L, XL, 2XL
Matte Black (93)

$119.99

DOT

X-1 CROSS TRIAD HELMET

Shell: ABS

448226 • XS, S, M, L, XL, 2XL
White (01), Yellow (10)

$129.99

DOT

SEE XC-4 AND X-1 HELMETS' FEATURES & BENEFITS P. 52-53

SEE THESE HELMETS IN ACTION AT: STORE.SKI-DOO.COM/VIDEOS

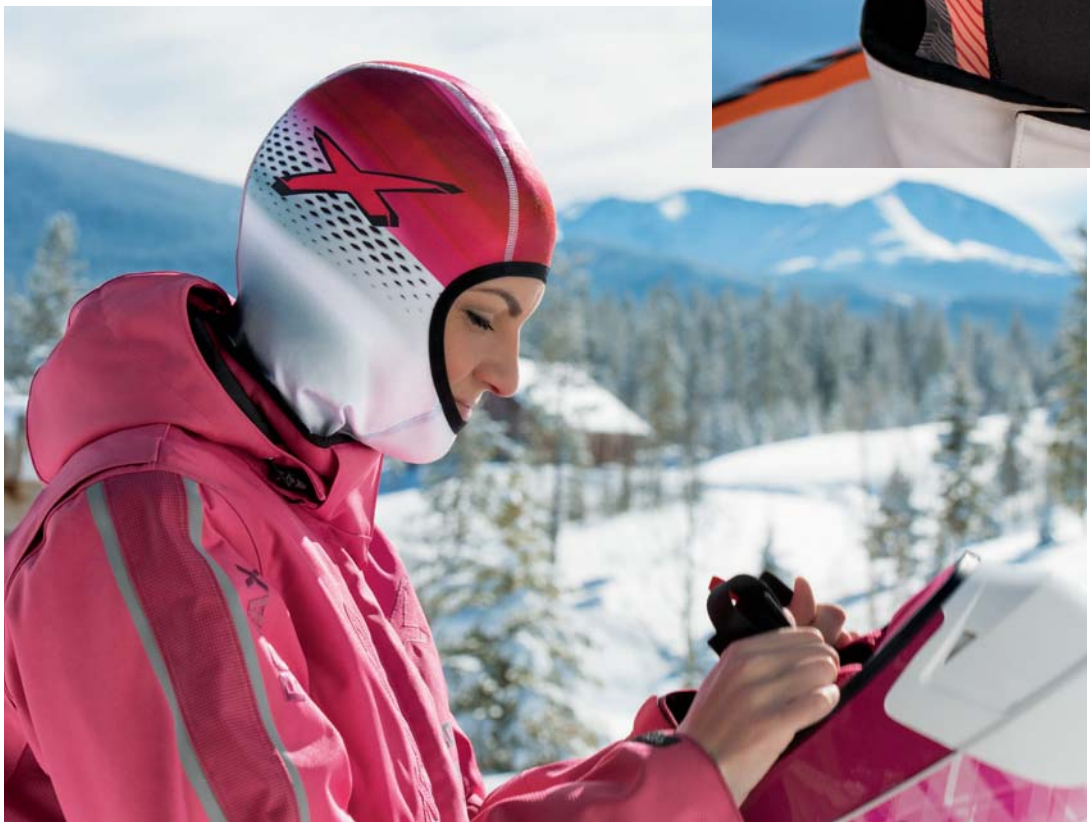
SUBLIMATED BALACLAVA

- Stretch, antibacterial fabric with brushed inner surface.
- Moisture-wicking anti-odor treatment.
- Flatlocked seams prevent skin chafing.

91% Polyester, 9% Spandex

Ladies'
448381 • One size
Pink (36)
$24.99

Men's
448384 • One size
Orange (12)
$24.99



X-TEAM TUBE

- Multi-purpose, stretch and comfortable tubular headwear.
- 12 different configurations: bandana, headband, balaclava and more.
- Protects from sun, wind, or cold.
- Keeps hair out of face.
- Flatlocked seams to prevent skin chafing.

94% Cotton, 6% Spandex

454013 • One size • Pink (36), Black (90)
$14.99

MOUNTAIN BALACLAVA

- Stretch, quick-dry fabric with brushed inner surface.
- Neoprene face guard for effective moisture exchange to promote breathing in extreme cold with removable rubber part in pocket.
- Flatlocked seams prevent skin chafing.
- Good fit with open face helmets.

65% Nylon, 20% Polyester, 10% Spandex, 5% Synthetic Rubber

448234 • One size • Black (90)
$34.99

TECHNICAL NECK GAITOR

- Keeps you warm while providing breathable, windproof and waterproof performance.
- Moisture-wicking fabric.
- Laser-cut breather holes.
- Ergonomic patterning with microfleece at side and back panel for more stretchability.
- Elastic adjustment at back.

89% Polyester, 8% Spandex, 3% Synthetic Rubber

447636 • One size • Black (90)
$29.99

TECHNICAL BALACLAVA

- Strategically placed mesh for breathability, microfleece for warmth.
- Windproof neck bib.
- Higher at back of neck for increased motion range.
- Flatlocked seams prevent skin chafing.

92% Polyester, 8% Spandex

445950 • One size • Black (90)
$29.99

BASIC BALACLAVA

- Designed for warmth, dryness and comfort.
- Flatlocked seams prevent skin chafing.

80% Nylon, 20% Spandex

447449 • One size
Black (90)
$19.99

MICROFLEECE BALACLAVA

- Stretch, antibacterial warming fleece fabric with brushed inner surface.
- Flatlocked seams prevent skin chafing.

92% Polyester, 8% Spandex

447565 • One size
Black (90)
$24.99

MASK SYSTEM BALACLAVA

- Perfect to use with BV2S or Modular 3 helmets.
- Keeps you warm while providing breathable and windproof performance.
- Moisture-wicking and waterproof fabric.
- Elastic adjustment at sides.

60% Polyester, 30% Nylon, 10% Spandex

447630 • S/M, L/XL • Black (90)
$29.99

NECK GAITOR

- Spandex binding and elastic at back for a better fit.
- Anti-pilling fleece.

100% Polyester

447634 • One size
Black (90)
$19.99

SKI-DOO HELIUM GOGGLES BY SCOTT

- Custom painted frame and strap graphics.
- Thermal dual lens.
- No Fog† anti-fog lens treatment.
- 100% UV protected pink Lexan† lens.
- Polar shield/face guard.
- Multi-layer face foam.
- Durable anti-slip strap.
- Tear-off and roll-off compatible.
- Ski-Doo by Scott branded.
- Storing pouch included.

SKI-DOO HELIUM GOGGLES BY SCOTT

448408 • One size • Grey (09), Yellow (10)

$89.99

SKI-DOO HELIUM SPEED STRAP GOGGLES BY SCOTT

- Speed strap helmet attachment system.

448409 • One size • Grey (09), Yellow (10)

$94.99

DID YOU KNOW
Matching your goggles to your helmet and your face delivers the best vision and warmth.

The Helium and Adrenaline goggles pioneered the heated goggle technology. The dual lens electric heating element eliminates fogging for clear vision.

ADRENALINE ELECTRIC WIRED GOGGLES

- Electric dual lens system for ultimate sub-zero anti-fog and optical performance.
- Large molded urethane frame for strength, flexibility and style.
- Oversized, hypoallergenic dual density face foam for comfort and shock absorption.
- Anti-fog, scratch-resistant amber dual maxflow lens for long lasting clear vision.
- Premium silicone backed strap system for long lasting slip-free performance.
- Hinged strap system for better fit on any facial geometry.
- Clip-on nose guard shield included.
- Storing pouch included.

447867 • One size • Yellow (10)

$159.99

HELIUM ELECTRIC WIRELESS GOGGLES

- Wireless electric dual lens system for maximum anti-fog performance and rider mobility.
- Anti-fog, scratch-resistant dual maxflow lens for good visibility in varied light conditions.
- Large, flexible, assembled urethane frame with integrated vents for strength, flexibility and comfort-flow ventilation.
- Oversized, hypoallergenic triple density face foam for comfort and increased shock and sweat absorption.
- Premium silicone backed strap system for long lasting slip-free performance.
- Dual hinged strap system for optimum fit on any facial geometry.
- Clip-on nose guard shield included.
- 110V battery charger.

447827 • One size • Silver (08)

$229.99

SKI-DOO HOLESHOT GOGGLES BY SCOTT

- Custom painted frame and strap graphics.
- Thermal dual lens.
- No Fog anti-fog lens treatment.
- 100% UV protected pink Lexan lens.
- Multi-layer face foam.
- Durable anti-slip strap.
- Tear-off and roll-off compatible.
- Polar shield/face guard.
- Ski-Doo by Scott branded.

SKI-DOO HOLESHOT GOGGLES BY SCOTT

447947 • One size • White (01), Yellow (10), Black (90)

$74.99

SKI-DOO TRAIL GOGGLES BY SCOTT

- Thermal dual lens.
- 100% UV protected pink Lexan lens.
- Hypoallergenic super-soft face foam.
- Durable anti-slip strap.
- Tear-off and roll-off compatible.
- Polar shield/face guard.
- Ski-Doo by Scott branded.

SKI-DOO TRAIL GOGGLES BY SCOTT

447946 • One size • White (01), Yellow (10), Black (90)

$54.99

SKI-DOO HOLESHOT SPEED STRAP GOGGLES BY SCOTT

- Speed strap helmet attachment system.

447956 • One size • White (01), Yellow (10), Black (90)

$79.99

SKI-DOO HOLESHOT OVER THE GLASSES GOGGLES BY SCOTT

447948 • One size • Black (90)

$84.99

Learn everything about the Ski-Doo gloves in action. http://www.ski-doo.com/shopping-tools/brochures.html

DID YOU KNOW OutDry Backcountry and OutDry Highmark gloves are so waterproof you can submerse your hands in water and they will be dry.

The OutDry membrane is waterproof, windproof, extremely breathable and designed specifically for gloves. It is uniquely bonded to the outer fabric, preventing water and wind from constantly cooling your hands.

OUTDRY† HIGHMARK GLOVES

Short-cuff gloves specifically designed for mountain riding.

1. Maximal Abrasion Resistance Super Fabric
2. 7mm Padding
3. Reflective Material
4. Woven Nylon with Teflon Protection Fabric
5. Neoprene Cuff for Maximal Adjustment
6. Texturized Indogoat Leather
7. Goggle Wiper
8. Kevlar† Thread Reinforcement
9. Ax Suede Connect Fabric for Touchscreen Sensitivity
10. 0.75 mm Ultra Strong Synthetic Suede

OutDry PrimaLoft

OUTDRY HIGHMARK GLOVES

The OutDry waterproof membrane delivers bar feel you've never experienced before.

- OutDry membrane technology is waterproof and windproof.
- Fingers are shaped and articulated with stretch fabric at knuckles.
- Extra tacky leather palm with Kevlar stitching.
- Nylon Cordura knuckles with padding.
- Short wrist with adjustable gauntlet.
- X-STATIC mesh antibacterial lining.
- PrimaLoft Gold insulation on back of hand.

Shell: Nylon, Neoprene, Cordura
Palm: Leather, Nash
Insulation: PrimaLoft Gold

446279 • S, M, L, XL, 2XL, 3XL • Black (90)

$189.99

ALWAYS BE PREPARED – SEE OUR TIPS FOR AVALANCHE TERRAIN PREPAREDNESS ON P.22

OUTDRY BACKCOUNTRY GLOVES

This moderate temperature glove uses an OutDry membrane for maximum breathable waterproofness with superior feel and grip.

- Antibacterial X-STATIC mesh inner liner.
- Articulated fingers and padded knuckles.
- Leather on palm and thumb for secure grip and control.
- Adjustable gauntlet and wrist.

Shell: Leather, Nylon, Cordura
Palm: Leather, Perforated Leather
Insulation: PrimaLoft Gold

446256 • S, M, L, XL, 2XL, 3XL
Black (90)

$189.99

DID YOU KNOW
mcFit manufacturing technology bonds, rather than sews, the inner layers of the gloves together, so that you get the best feel, grip and performance.

GRIP GLOVES

High performance insulated glove with great grip, feel.

- mcTEX† waterproof, windproof and breathable glove insert.
- mcFIT† technology for a better grip.
- Insulated backhand only, for warmth without compromising feel.
- Print design on backhand to minimise snow accumulation.
- Rubber finger print for improved grip.
- Shaped fingers.
- Box fingertips to avoid air infiltration.
- Neoprene wrist with adjustment.
- Padded and reinforced palm.
- Visor wiper.

Shell: Leather, Nylon, Chloroprene Rubber, Polyester
Insulation: PrimaLoft Gold

446234 • S, M, L, XL, 2XL, 3XL
Blue (80), Black (90)

$74.99

MOUNTAIN GLOVES

Uninsulated glove for bar feel in mild weather.

- mcFIT technology for a better grip.
- Mild-weather glove with lining.
- Hipora† waterproof, windproof and breathable glove insert.
- Shaped fingers.
- Velcro adjustment for easy sleeve fit.

Shell: Nylon, Leather

446222 • S, M, L, XL, 2XL, 3XL
Black (90)

$59.99

KEEP YOUR FEET DRY AND WARM, TOO!

SEE OUR TOP BOOTS IN ACTION AT
HTTP://WWW.SKI-DOO.COM/SHOPPING-TOOLS/BROCHURES.HTML

The OutDry membrane is waterproof, windproof, extremely breathable and designed specifically for gloves. It is uniquely bonded to the outer fabric, preventing water and wind from constantly cooling your hands.

OUTDRY TRAIL PERFORMANCE GLOVES

Cold weather glove with superior handlebar feel and the OutDry advantages of being waterproof, windproof and breathable.

1. Ax Suede Connect Fabric works on touchscreens
2. Ax Suede provides maximum abrasion resistance for secure grip and control
3. PrimaLoft Gold insulation on back hand
4. PrimaLoft Gold with Grip Control in palm
5. Goggle wiper
6. Kevlar thread reinforcement
7. Internal mid cinch system
8. Wraparound construction blocks wind at fingertips
9. Antibacterial X-STATIC mesh liner

NEW OutDry

OUTDRY TRAIL PERFORMANCE GLOVES

- Cold weather design.
- OutDry membrane for maximum waterproofness, windproofness, breathability, superior grip and feel.
- Articulated fingers.

Shell: Nylon, Leather, Polyester
Insulation: Primaloft Gold

446265 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$219.99

mcFIT

X-TEAM LEATHER GLOVES

Rugged, proven leather construction in a warm insulated glove.

- mcFIT technology for a better grip.
- Hipora waterproof, windproof and breathable glove insert.
- Antibacterial, stay-dry moisture management lining.
- Padded knuckles.
- Shaped, articulated fingers.
- Box fingertips to avoid air infiltration.
- Reinforced rubberized non-slip grip.
- Visor wiper.
- Wide opening gauntlet with adjustable wrist.

Shell: Leather, Nylon, Polyester
Insulation: PrimaLoft Gold

446219 • S, M, L, XL, 2XL, 3XL
Black (90), Sunburst Yellow (96)

$114.99

mcFIT

X-TEAM NYLON GLOVES

- Hipora waterproof, windproof and breathable membrane glove insert.
- mcFIT technology for a better grip.
- Antibacterial, stay-dry moisture management lining.
- Rubber palm and fingertips for improved grip.
- Padded knuckles.
- Shaped, articulated knuckles and fingers.
- Box fingertips to avoid cold air infiltration.
- Added backhand insulation for maximum protection.
- Wrist adjustment strap system.
- Visor wiper.

Shell: Nylon
Insulation: PrimaLoft Gold

446220 • XS, S, M, L, XL, 2XL, 3XL
Black (90), Sunburst Yellow (96)

$84.99

SNO-X GLOVES

A favorite among riders for good reason. An excellent glove for comfort in all riding conditions.

- Stay-dry moisture management lining.
- Hipora waterproof, windproof and breathable glove insert.
- Stretch texturized fabric to facilitate movement.
- Padded knuckles.
- Rubber palm and fingertips for improved grip.
- Adjustable wrists.

Shell: Spandex, Neoprene, Nylon
Palm: Synthetic Nash Suede
Insulation: Thermolite

446202 • S, M, L, XL, 2XL, 3XL
Black (90), Sunburst Yellow (96)

$64.99

X-TEAM CREW GLOVES

A lightweight glove without insulation for warm weather riding or for hand protection during short stops.

- Soft, durable, flexible and breathable.
- Backhand lined with 2-way stretch texturized Spandex for maximum flexibility and fit.
- Neoprene wrists for easy sleeve fit.
- Durable rubber finger patches.

Shell: Soft shell, Perforated Leather, Leather, Neoprene
Palm: Synthetic Leather

446278 • S, M, L, XL, 2XL, 3XL
Black (90)

$49.99

NEW

ABSOLUTE 0 GLOVES

Gloves that earn the Absolute 0 name. Built for extreme cold using proven high quality materials.

- Nylon outer shell with leather reinforced palm.
- Antibacterial, stay-dry moisture management lining.
- Visor wiper.
- Waterguard† membrane.

Shell: Nylon, Leather, Polyester
Insulation: PrimaLoft Gold

446282 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$114.99

ABSOLUTE 0 MITTS

A mitt built for extreme cold.

- Nylon outer construction with leather reinforced palm.
- Inner glove design.
- Antibacterial, stay-dry moisture management lining.
- Visor wiper.
- Waterguard membrane.

Shell: Nylon, Leather, Polyester
Insulation: Down, PrimaLoft Gold

446283 • XS, S, M, L, XL, 2XL
Black (90)

$109.99

UTILITY GLOVES

Snowmobile gloves with tough leather palm and knuckles specifically designed for getting the job done.

- Leather palm with split cow leather reinforcement and cushion.
- Leather with logo at knuckles.
- Shaped and articulated fingers for maximum grip.
- Extra tacky leather on palm and thumb for grip.
- PrimaLoft Gold insulation on back of hand.

Shell: Nylon, Leather, Cordura
Palm: Leather
Insulation: PrimaLoft Gold

446287 • XS, S, M, L, XL, 2XL, 3XL
Black (90)

$84.99

Watch the Expedition Jacket & Highpants and Utility Gloves' work features.
http://www.ski-doo.com/shopping-tools/brochures.html

HOLESHOT GLOVES

A great glove for comfort in all riding conditions.

- High wrist cuff to keep wind out.
- Hipora waterproof, windproof and breathable glove insert.
- Added backhand insulation for maximum protection.
- Thinner-insulated palm for increased dexterity.
- Articulated, shaped fingers.
- PVC padded knuckles.
- Extra-grip rubberized palm and thumb.
- Adjustable gauntlet and wrist.

Shell: Nylon
Insulation: Thermal Loft

446206 • S, M, L, XL, 2XL, 3XL
Red (30), Black (90)

$64.99

LADIES' MUSKOKA GLOVES

Extra warm nylon gloves with leather palm and fingers.

- Hipora waterproof, windproof and breathable glove insert.
- Ultra comfortable synthethic fur lining.
- Added backhand insulation for maximum protection.
- Thinner-insualted palm for increased dexterity.
- Box fingertips to avoid cold air infiltration.
- Shaped fingers.
- Silicone fingertips for better grip.
- Wide opening gauntlet with adjustable wrist.

Shell: Nylon
Insulation: PrimaLoft Gold

446238 • S, M, L, XL, 2XL
Raspberry (39), Black (90)

$79.99

LADIES' MUSKOKA MITTS

Extra warm nylon mitts with leather palm.

- Inner glove design for cozy feeling.
- Antibacterial, stay-dry moisture management lining.
- Articulated finger area for easy hand movement.
- Long 14" (35 cm) gauntlet with adjustable wrist.

Shell: Nylon
Palm: Leather
Insulation: PrimaLoft Gold

446257 • S, M, L, XL, 2XL
Pink (36), Black (90)

$79.99

REVERSIBLE BEANIE

• 2 in 1 reversible hat. • Band micro-fleece lining. 50% Wool, 50% Acrylic

448380 • One size • Orange (12), Red (30), Black (90), Sunburst Yellow (96)

$24.99

RETRO BEANIE

• Microfleece lining. 85% Acrylic, 15% Wool

447939 • One size • Grey (09), Sunburst Yellow (96)

$19.99

Men's Ladies'

VINTAGE RABBIT FUR HAT

• Soft leather-lined with real rabbit fur. • Attachment on side.
100% Genuine Leather

Men's

445897 • One size • Black (90)

$79.99

Ladies'

447580 • One size • White (01), Black (90)

$79.99

LADIES' KNITTED HAT

• Microfleece band lining. 85% Acrylic, 15% Wool

448383 • One size • Grey (09), Pink (36), Sunburst Yellow (96)

$24.99

LADIES' MUSKOKA HAT

• Microfleece lining. 59% Acrylic, 26% Nylon, 15% Wool

447929 • One size • White (01), Charcoal Grey (07), Teal (74)

$24.99

SKI-DOO TEC+ BOOTS

Designed for active riders who demand performance and comfort.

- Features the best materials and construction for superior fit and comfort while keeping feet dry and warm.
- Moisture-wicking inner liner material.
- Half sizes available with insole inserts.
- Use of a technical sock is recommended for best performance.

444217 • 7, 8, 9, 10, 11, 12, 13 • Black (90)

$234.99

LADIES' SKI-DOO TEC+ BOOTS

All the same features of the Ski-Doo TEC + Boots, with feminine look.

444212 • 7, 8, 9, 10, 11
White (01)

$234.99

SKI-DOO TEC+ BOOTS UNIQUE FEATURES

1. Leather outer layer incorporates COSMO† HydroGuard† waterproof membrane.
2. 600 g PrimaLoft ECO FOOTWEAR insulation for maximum comfort.
3. PoRon† XRD† extreme impact protection in tongue for lower shin.
4. Tapered rear shape for better achilles and ankle support.
5. Rear upper cut away for improved walking.
6. Aggressive, durable anti-slip outsole for running board traction.
7. Abrasion and impact resistant ice breaker toe piece.
8. Kevlar reinforced laces.

ULTRALIGHT SOCKS

- Warm and comfortable moisture-wicking for dry feet at all times.
- Extreme resistance to cold and active management of perspiration moisture.
- Dri-release† wool combines latest-generation ease of care of synthetic fabric and look of natural fiber.
- Elastic ankle and arch support.

42% Polyester, 34% Polyamide Nylon, 16% Polypropylene, 6% Merino Wool, 2% Elastane

444136 • S/M, L/XL
Black (90)

$9.99

Men's

ACTIVE / RACE SOCKS

- Moisture-wicking for dry feet at all times.
- Engineer-knitted with Isolfil† yarn designed to keep skin dry, with built-in polypropylene fibers that trap warm air and slow the dispersion of body heat.
- Elastic ankle and arch support.
- Reinforced toe and heel, plus added protection above the boot line thanks to over-the-calf length.
- Special padding for pressure reduction and buffered protection.

45% Polyamide Nylon, 35% Merino Wool, 18% Polypropylene, 2% Elastane

Men's
444138 • S/M, L/XL
Yellow (10), Red (30)

Ladies'
444153 • S/M, L/XL
Black (90)

$24.99

Men's Ladies'

Learn more about Ski-Doo boots and see them in action.
http://www.ski-doo.com/shopping-tools/brochures.html

SKI-DOO REBEL BOOTS

- Designed for all-purpose trail riding.
- Waterproof membrane.
- Synthetic leather upper.
- Thinsulate insulation.
- Removable insole.
- Ultra grip outsole design.
- Waterproof rubber bottom.
- Comfort-rated to -49 °F (-45 °C).

444160 • 7, 8, 9, 10, 11, 12, 13
Black (90)

$154.99

LADIES' SKI-DOO REBEL BOOTS

- Same features as Ski-Doo Rebel Boots with feminine styling

444168 • 6, 7, 8, 9, 10
Charcoal Grey (07)

$154.99

NEW

NEOPRENE SUPREME BOOTS

Multi-purpose boots deliver warmth, comfort and are 100% waterproof.

- Built in handles.
- Rugged outsole.
- Aggressive tread design.
- Multi purpose boots.
- Neoprene construction.
- 400 g PrimaLoft insulation.
- Dri-Lex liner.
- 100% waterproof.
- Vulcanized seamless outer shell.
- Comfort-rated to -58°F (-50°C).

Note: Use of moisture-wicking technical socks is recommended.

444219 • 7, 8, 9, 10, 11, 12, 13
Black (90)

$159.99

THERMAL SOCKS

- Socks for extreme cold.
- Same thickness as competing thermal socks, but lighter, warmer and better moisture-wicking performance.
- Thermolite† hollow-core fibers deliver new generation of warmth-comfort fusion.
- Elastic ankle and arch support.
- Fully cushioned shin segment.

50% Polyester Thermolite, 32% Polyamide Nylon, 13% Merino Wool, 3% Acrylic, 2% Elastane

Men's
444140 • S/M, L/XL
Black (90)

Ladies'
444150 • S/M, L/XL
Black (90)

$19.99

Men's Ladies'

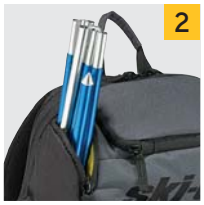
SKI-DOO ELEVATION BACKPACK

- Lightweight and clever backpack specially designed for active riding.
- 8-liter main storage compartment.
- Ski-Doo branded.

100% Polyester

469266 • One size • Black (90)

$109.99



SKI-DOO ELEVATION BACKPACK FEATURES

1. Velvety top pocket for extra goggles or small electronics.
2. Closed probe pocket.
3. Tool pocket with removable tool pouch.
4. Side attach accessory holder for snow shovel.
5. 2-point shoulder strap settings with torso adjustment.
6. Circulation back channels.
7. Ergonomic waist strap with two easy-access pockets.

SKI-DOO CARRIER 9800 GEAR BAG BY OGIO

- Premium carry bag for all your gear.
- Structural Load Equalization Deck (SLED) wheeled chassis system.
- Wide mouth lid opening for easy access to all compartments and specialty pockets.
- iFom† integrated foam panel construction throughout entire bag for added protection.
- Adjustable main compartment dividers.
- Multiple zippered mesh organization pockets.
- Front accessory pocket and secure hold compression straps.
- Oversized heavy-duty treaded wheels.
- Telescoping pull handle.
- 16″ H x 17″ W x 36″ D (40 cm x 43 cm x 91 cm).

75% Polyester, 25% Plastic

447837 • One size • Black (90)

$274.99

SKI-DOO CARRIER DRY BACKPACK BY OGIO

- Completely waterproof rolltop design.
- Constructed of 420-denier nylon for durability.
- Dual-density shoulder straps and adjustable sternum strap.
- Quick-access front pocket.
- Organization panel with 2 zip pockets on inside.
- Laptop and tablet sleeves.
- 360-degree reflective print.
- Removable high visibility liner.
- 20.5″ H (rolled) x 10.5″ W x 6.75″ D (52 cm x 27 cm x 17 cm).
- 1600 Cu. In./26 L, capacity.

100% Polyester

447958 • One size • Black (90)

$139.99

SKI-DOO ALTITUDE BACKPACK BY OGIO

- 2-point shoulder strap adjustment with torso adjustment.
- Ergonomic waist strap.
- Dual exit points.
- Removable tool pouch.
- Side attach accessory holder (e.g. snow shovel and probe).
- 1 expandable storage compartment, 1 main compartment and 1 easy-access pocket.
- Circulation back channels.

100% Polyester

447339 • One size • Black (90)

$89.99

SKI-DOO CARRIER BACKPACK BY OGIO

- Padded interior laptop compartment fits most 17″ laptops.
- iFom integrated panels keep your electronics and other valuables protected.
- Padded iPad† / tablet / e-reader sleeve.
- Large main compartment.
- Comfortable padded back panel.
- Adjustable ergonomic shoulder straps.
- Zippered fleece lined top valuables pocket.
- Dual side beverage / accessory holders.
- 19″ H x 13″ W x 7.5″ D (48 cm x 83 cm x 19 cm).

100% Polyester

447836 • One size • Black (90)

$79.99

SKI-DOO CARRIER 8800 GEAR BAG BY OGIO

- Heavy-duty chassis with oversized treaded wheels.
- Wide mouth U-shaped opening for easy access to all gear.
- Large main ventilated compartment and multi-use dual end pockets.
- Secondary end pocket with accessory organization sleeves.
- iFom integrated foam panel construction throughout for added gear protection.
- Telescoping pull handle and padded adjustable shoulder strap.
- Easy grab end handles for transport.
- 15″ H x 18″ W x 32″ D (38 cm x 46 cm x 81 cm).

90% Polyester, 10% Plastic

447851 • One size • Black (90)

$164.99

SKI-DOO HELMET CASE

- Easy-carry ergonomic handle.
- Helmet accessory outer pocket (helmet not included).

100% Polyester

447640 • One size • Black (90)

$29.99

SKI-DOO CARRIER DUFFLE BAG BY OGIO

- High-tensile strength, durable, lightweight construction.
- Ventilated shoe compartment (holds two pairs).
- Zippered front accessory pocket.
- Large main compartment with additional end storage pocket.
- Padded, ventilated and adjustable shoulder strap.
- Molded carry handle.
- Durable abrasion-resistant base.
- High visibility liner.
- 11″ H x 9.75″ W x 25″ D (28 cm x 25 cm x 64 cm).

100% Polyester

447838 • One size • Black (90)

$69.99

SUPER SPORT TEK VEST

The ultimate upper-body protector for all trail riders regardless of age, gender or experience level.

- Zip-off fleece collar comes standard.
- Convenient front zipper access.
- Reverse-entry, 2-stage pocket design.
- Works best with 3-in-1 jackets with a zip-out lining.
- Ski-Doo logos.

469267 • S, M, L, XL
Black (90)

$339.99

469270 • 2XL
Black (90)

$369.99

SKI-DOO CARRIER HEAD CASE BY OGIO

- Oversized helmet bag fits all helmet brands and sizes with fins and without.
- iFom integrated foam panels and fleece interior provide the ultimate in protection.
- Protective zipper closure prevents scratches from zippers.
- Easy-access oversized external pocket for goggles, lenses and tear-offs.
- Exterior zippered accessory pocket.
- Durable reinforced bottom.
- 11″ H x 13″ W x 19″ D (28 cm x 33 cm x 48 cm).

100% Polyester

447707 • One size • Black (90)

$49.99


SPORTSWEAR
Shop on store.ski-doo.com or visit your Ski-Doo dealer


ski-doo
ski-doo


#skidoo


ski-doo
HUSKY
CRAFTSMAN

X-TEAM HOODIE

- Semi-fitted hooded sweatshirt.
- Center front opening.
- Hidden handwarmer pockets.
- Asymmetrical yoke with embroidered Ski-Doo logo at back.

60% Cotton, 40% Polyester

453761 • S, M, L, XL, 2XL, 3XL
Grey (09), Black (90)

$74.99

SKI-DOO GENERIC HOODIE

- One side brushed fleece.
- Hidden handwarmer pockets.

80% Cotton, 20% Polyester

453767 • S, M, L, XL, 2XL, 3XL • Black (90)

$69.99

OVERSHIRT

- Fleece overshirt with light quilted insulating lining for warmth.

60% Cotton, 40% Polyester Fleece

453763 • XS, S, M, L, XL, 2XL • Black (90)

$79.99

SKI-DOO WINTERBREAK HOODIE

- Semi-fitted hooded sweatshirt with water-repellent performance.
- Hidden handwarmer pockets.

80% Cotton,
20% Polyester

453722
S, M, L, XL, 2XL, 3XL
Black (90),
Sunburst Yellow (96)

$74.99

WEEKENDER HOODIE

- Textured polyester fleece with brushed interior for softness.
- Hidden pockets.

100% Polyester

453727
S, M, L, XL, 2XL
Black (90)

$89.99

OVERSHIRT

- Plaid flannel overshirt.
- Front opening with press buttons.
- Two chest pockets.
- Warm plush interior.

100% Cotton /
100% Polyester lining

453795
XS, S, M, L, XL, 2XL
Red (30)

$69.99

SNO-X FLEECE

- Full zip with 2 front hip pockets.
- X-Team embroidered logo.
- Bonded fleece heavy mid layer.

100% Polyester

453769 • XS, S, M, L, XL, 2XL, 3XL • Orange (12), Black (90)

$89.99

MCODE MID LAYER

Great mid layer choice with MCode attitude.

- Mid layer thermal fleece.
- Brushed interior for softness and non-pilling.
- Moisture-wicking.
- Antibacterial to reduce odors.
- Handwarmer pockets.

95% Polyester, 5% Spandex

453777 • S, M, L, XL, 2XL, 3XL • Green (70), Blue (80)

$99.99

X-TEAM MICROFLEECE

- Zippered handwarmer pockets.
- Welded pocket outline.
- X-Team embroidered logo on sleeve.

100% Polyester

453762 • S, M, L, XL, 2XL, 3XL • Grey (09), Black (90)

$69.99

SKI-DOO ZIP UP MID LAYER

- Brush effect fabric inside.

100% Polyester Mesh

453766 • S, M, L, XL, 2XL, 3XL • Charcoal Grey (07), Black (90)

$89.99

JERSEYS

Jerseys that look good and function as a base or mid layer for warmer days.

- V-neck design.
- Antibacterial, moisture-wicking fabric.
- Underarm mesh.
- Sublimated print.

100% Polyester

NEW

SKI-DOO WARNERT MAKITA TEAM RACE EDITION JERSEY

453825
S, M, L, XL, 2XL
Teal (74)

$49.99

NEW

HIGHMARK JERSEY

453815
S, M, L, XL, 2XL
Blue (80)

$49.99

X-TEAM JERSEY

453788
S, M, L, XL, 2XL

Grey (09), Orange (12)

$49.99

SKI-DOO LONG SLEEVE T-SHIRT

• Ski-Doo logo on front.

100% Cotton

453790
S, M, L, XL, 2XL, 3XL
Khaki (05), Black (90)

$34.99

NEW

RIDE T-SHIRT

• Ski-Doo Logo on front.

100% Cotton

453812
S, M, L, XL, 2XL, 3XL
Khaki (05), Whiskey (28)

$24.99

X-TEAM TURTLENECK

• Stretch fabric.
• Collar rib and cuff rib.

95% Cotton, 5% Spandex

453610
M, L, XL, 2XL
Black (90)

$34.99

X-TEAM T-SHIRT

100% Cotton

453813
S, M, L, XL, 2XL, 3XL
Khaki (05), Charcoal Grey (07),
Blue (80), Black (90)

$24.99

SKI-DOO T-SHIRT

100% Cotton

453699
S, M, L, XL, 2XL, 3XL
Heather Grey (27), Whiskey (28),
Black (90), Sunburst Yellow (96),

$21.99

VINTAGE T-SHIRT

• Semi-fitted t-shirt.
• 1979 vintage look.

Ice: 98% Cotton, 2% Polyester
Black: 60% Polyester, 40% Cotton

453798
S, M, L, XL, 2XL, 3XL
Ice (38), Black (90)

$24.99

SKI-DOO MCODE T-SHIRT

100% Cotton

453785
S, M, L, XL, 2XL, 3XL
Black (90)

$24.99

X-TEAM FLAT CAP

- Fitted stretch twill cap.
- Flat peak.

97% Cotton, 3% Spandex

447978
S/M, L/XL, 2XL
Black (90)

$24.99

NEW

SKI-DOO WARNERT MAKITA TEAM RACE EDITION CAP

- Metal adjuster with BRP logo.
- Embroidered race team logos on front.
- X-Team 3D logo on right side.

100% Cotton

447234 • One size • Teal (74)

$24.99

FREESTYLE CAP

- Fitted stretch twill cap.
- Flat peak.
- Striped print on the peak and front left panel.

97% Cotton, 3% Spandex

447924
S/M, L/XL
Black (90), Sunburst Yellow (96)

$24.99

X-TEAM CAP

- Metal adjuster with BRP logo.
- Embroidered X-Team logo on right side.
- Embroidered Ski-Doo signature on left side.

100% Cotton

448379 • One size • Red (30), Black (90), Sunburst Yellow (96)

$19.99

SKI-DOO CLASSIC CAP

- Metal adjuster with BRP logo.
- 3D Ski-Doo logo on the front.
- Print on left side.

100% Cotton

447926 • One size • Yellow (10), Black (90)

$24.99

GROWING PASSION FOR FREERIDING

TO THE XX POWER

Meet Erika Lindblad and Caroline Ohlsson, backcountry riders from Sweden. These ladies could not keep their passion for backcountry riding to themselves and created the women-only XX Freeride Camp. Now in its third year, the camp brings more than 60 riders together to progress their freeriding skills and share their passion for shredding.

CAROLINE OHLSSON

SLED
Summit X 163

FAVORITE RIDING LOCATION
Hemavan, Saxnas, and Riksgransen in Sweden

PASSION
Erika and I share a passion to increase interest in sledding among female riders, and we are happy to see more women enjoying the sport. We organize the XX Freeride Camp, where we get four days on sleds with 60 other girls!

I also feel passionate about developing my snowmobiling. I like the challenge and adrenaline that a day on the sled gives me. Every ride I get more courage – and that is a must to keep on progressing.

My interest in freeriding has had another big benefit – the chance to meet many new friends. As Erika says, "During winter, all the friends out in the snow become family." And that is really how I feel. I am lucky to have such a big and wonderful family!

GEAR
XP-R2 Helmet lets me ride long days without feeling heavy or my neck getting tired. Revy One-Piece suit gives me great mobility while keeping snow from getting between a jacket and pants. The Ladies' MCode Jacket and Pants' 3-in-1 design means I can wear the shell most of the time and then put on the insulated liner jacket for the ride home when it's colder.

MOST FUN ON A SLED EVER
I can't say because that changes so often. Year after year, it keeps getting better and better. But days when I get to be out riding with friends, having fun in the powder are moments I will cherish forever!

ERIKA LINDBLAD

SLED
Summit X 154

FAVORITE RIDING LOCATION
Bangnas and Riksgransen in Sweden

PASSION
Inspiring others to try new things and explore the world. When I think of how far we have come boosting female riders both locally and internationally with the XX Freeriders project, it makes me so thrilled. I can't stop smiling every time I see another girl out sledding, as it was not that common a couple of years ago. I am also passionate about learning new skills on the sled; it is a challenge to grasp all the technical parts of freeriding but great achievements comes from practice. Finally, I love to travel and explore new places.

GEAR
The Revy One-Piece suit is definitely my favorite. It keeps me dry no matter what weather conditions we have. Since my heart is all yellow, the color works perfect for me. As an alternative, I often use the MCode Jacket and Helium Pants. Whichever set of clothing, I always use the new Ski-Doo TEC+ Boots, which work for active riders and is designed with a great female look that suits me. Love them!

MOST FUN ON A SLED EVER
The XX Freeride Camp and XX Spring Ride events, for sure. I love sledding with other people with the same interests and spending time with both new and existing sled buddies. During the winter season, all the friends out in the snow becomes family.

X-TEAM HOODIE

Stylish and refined X-Team look that's proud, but not too loud.
- Semi fitted hooded sweatshirt.
- Full zipper.
- Hidden handwarmer pockets.

72% Cotton, 23% Polyester, 5% Spandex

453759 • XS, S, M, L, XL, 2XL • Grey (09), Black (90)

$74.99

RIDER T-SHIRT

- Feminine fit.
- Raglan sleeve with burnout fabric effect.
- V-neck.
- Vintage logo at front.

95% Cotton, 5% Spandex

453783 • XS, S, M, L, XL, 2XL • Charcoal Grey (07)

$34.99

MUSKOKA LONG SLEEVE TEE

- Extra wide hood / collar all in one.
- Long bracelet sleeve with shirring effect.
- Feminine fit.
- Ski-Doo signature at front and back.
- Lace drawcord for collar adjustment.

100% Cotton

453726 • XS, S, M, L, XL, 2XL • Heather Grey (27)

$44.99

SUPREME FLEECE

- Slim cut to flatter your figure.
- Stand-up collar helps keep neck cozy.
- Zippered handwarmer pockets and one zip-pocket on left chest.

100% Polyester

453631 • XS, S, M, L, XL, 2XL • Ice (38), Raspberry (39), Black (90)

$69.99

X-TEAM MICROFLEECE

- 2 zippered hand pockets.
- Embroidered Ski-Doo logo.
- Large embossed X logo at back.

100% Polyester

453768 • XS, S, M, L, XL, 2XL • Grey (09), Pink (36), Black (90)

$69.99

MUSKOKA FLEECE

- Full zip with 2 front hip pockets.
- Ski-Doo rubberized logo.
- Bonded fleece heavy mid layer.

100% Polyester

453773 • XS, S, M, L, XL, 2XL • Heather Grey (27)

$69.99

WEEKENDER ZIP UP SWEATER

- Textured polyester fleece with brushed interior for softness.
- Comfortable fit.
- Handwarmer pockets.
- Ski-Doo logo on bottom.

100% Polyester

453729 • XS, S, M, L, XL, 2XL • Grey (09)

$69.99

LOUNGE JACKET

- One side brushed.
- Handwarmer pockets.

95% Polyester, 5% Spandex

453666 • XS, S, M, L, XL, 2XL • Black (90)

$59.99

LOUNGE PANTS

- One side brushed.
- Comfortable fit.

95% Polyester, 5% Spandex

453667 • XS, S, M, L, XL, 2XL • Black (90)

$54.99

X-TEAM JERSEY

Jersey that looks good and function as a base or mid layer for warmer days.

- Semi-fitted V-neck made from quick-dry, antibacterial, moisture-wicking fabric.
- Underarm mesh.
- Sublimated print.

100% Polyester

453787 • XS, S, M, L, XL, 2XL • Yellow (10), Pink (36)

$49.99

MUSKOKA T-SHIRT

• Fitted style. • Stretch fabric.

95% Cotton, 5% Spandex

453786 • XS, S, M, L, XL, 2XL • Pink (36), Black (90)

$24.99

X-TEAM T-SHIRT

• Fitted style. • Stretch fabric.

95% Cotton, 5% Spandex

453801 • XS, S, M, L, XL, 2XL • Pink (36), Blue (80), Black (90)

$24.99

MUSKOKA CAP

• Adjustable cap.
• Metal badge Ski-Doo logo on right side.
• Print on left side and on the peak.

100% Cotton Twill

448378 • One size • Black (90)

$19.99

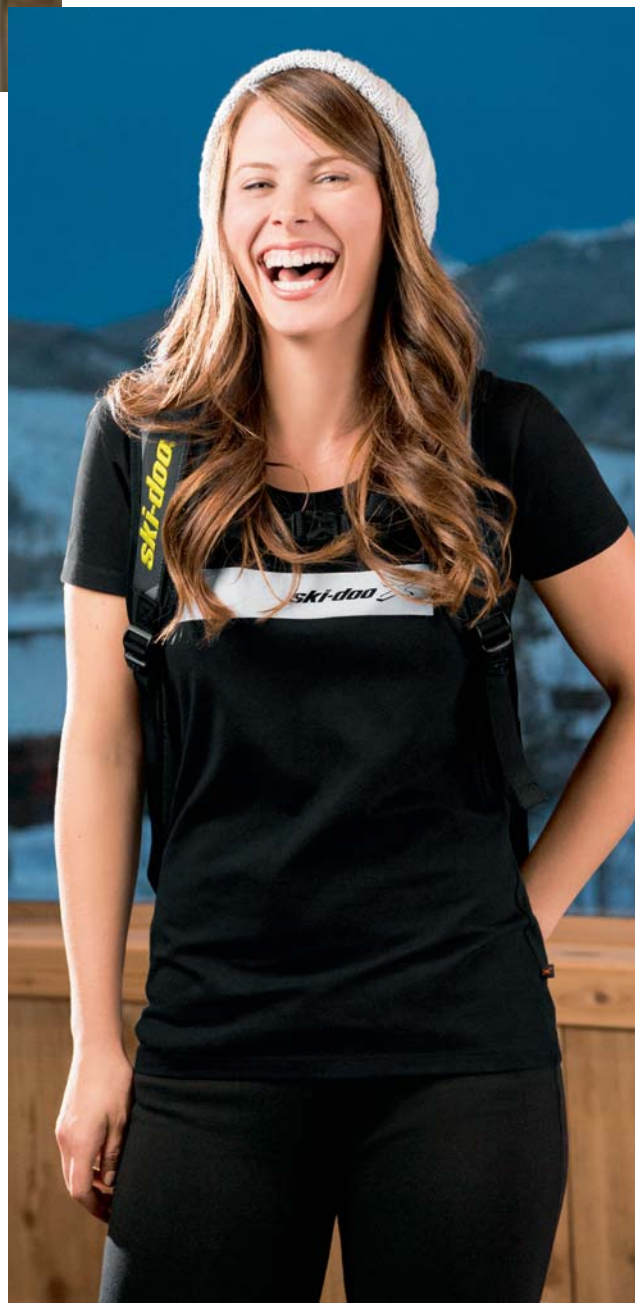
OVERSHIRT

• Plaid flannel overshirt.
• Front opening with press buttons.
• Two chest pockets.
• Plush silky fabric lining.

100% Cotton / 100 % Polyester lining

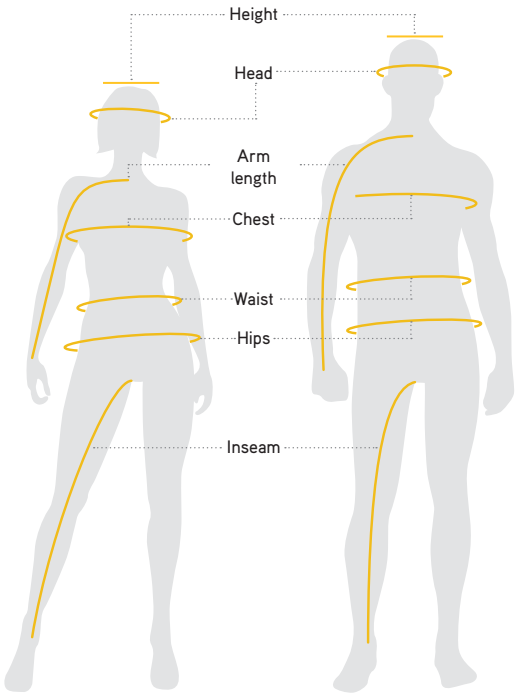
453728 • XS, S, M, L, XL, 2XL • Mixed Color (18)

$69.99



HOW TO MEASURE

- For best results, have someone else take measurements.
- Measure body in underwear.
- Tape must be snug but not tight.
- If measurements fall between two sizes, order the larger size.



Height: without shoes, standing with heels and back against a wall.

Head: around your head, from the center of the forehead, above the ears and over the natural bump at the back of the head.

Arm length: let the hands hang down on the side in a slightly bent position. Measure from the center of the back of your neck, along the length of your arm, to the wrist.

Chest: measure under your arm, around the fullest part of your chest.

Waist: immediately below the lowest rib.

Hips: across the fullest part of the seat.

Inseam: without shoes, from crotch to the floor.

WHAT CODE REPRESENTS YOUR SIZE?

1 Find your size.

2 The corresponding code is THE CODE you use to complete the part number on your order.
Example: 440 227 90
Size: M = code "**06**",
Therefore 440 227 **06** 90

SIZE	CODE	SIZE	CODE	SIZE	CODE
One Size	00	4XLT	19	13	33
XS	02	5XL	88	14	34
S	04	1	20	16	35
M	06	2	21	3-4	79
MT	07	3	22	5-6	52
L	09	4	23	6-8	48
LT	10	5	24	7-8	54
XL	12	6	25	10-12	49
XLT	13	7	27	14-16	50
2XL	14	8	28	S/M	72
2XLT	15	9	29	M/L	91
3XL	16	10	30	L/XL	73
3XLT	17	11	31		
4XL	18	12	32		

MEN'S - REGULAR 5'8" - 6'0"

	XS	S	M	L	XL	2XL	3XL	4XL	5XL
Chest	33-35	35-37	37-40	40-44	44-48	48-52	52-56	56-59	59-63
Waist	27-29	29-31	31-34	34-38	38-42	42-46	46-50	50-53	53-62
Hips (Seat)	33-35	35-37	37-40	40-44	44-48	48-52	52-56	56-59	59-68
Arm Length	30	31	32	33	34	35	35	36	36
Inseam	31	31 1/2	32	32	32	32	32 1/2	32 1/2	33

MEN'S - TALL 6'1" - 6'4" Arm length + 1.5" Inseam + 2.0"

	MT	LT	XLT	2XLT	3XLT	4XLT
Chest	37-40	40-44	44-48	48-52	52-56	56-59
Waist	31-34	34-38	38-42	42-46	46-50	50-53
Hips (Seat)	37-40	40-44	44-48	48-52	52-56	56-59
Arm Length	33 1/2	34 1/2	35 1/2	36 1/2	36 1/2	37 1/2
Inseam	34	34	34	34	34 1/2	34 1/2

LADIES' - REGULAR 5'4" - 5'8"

	XS	S	M	L	XL	2XL	3XL
Chest	32-34	34-36	36-39	39-42	42-45	45-49	49-53
Waist	24-26	26-28	28-30	30-34	34-37	37-41	41-45
Hips (Seat)	34-36	36-38	38-40	40-44	44-47	47-51	51-55
Arm Length	31	31	32	32	33	33	34
Inseam	30	30	30	30	30	30 1/2	30 1/2

LADIES' - TALL 5'9" - 6'0"

	MT	LT	XLT
Chest	36-39	39-42	42-45
Waist	28-30	30-34	34-37
Hips (Seat)	38-40	40-44	44-47
Arm Length	33	33 1/2	34
Inseam	32	32	32

KIDS & TEEN

	2	3	4	5	6	7	8	10	12	14	16
Height	2'11"	3'2"	3'5"	3'8"	3'11"	4'2"	4'5"	4'8"	4'11"	5'2"	5'5"
Chest	21	22	23	24	25	26	27	28 1/2	30	31 1/2	33
Waist	20	20 1/2	21	21 1/2	22	22 1/2	23	24	25	26	27
Hips (Seat)	21	22	23	24	25	26	27	28 1/2	30	31 1/2	33
Arm Length	15 1/2	17	18 1/2	20	21 1/2	23	24 1/2	28 1/2	30	31 1/2	33
Inseam	13 1/2	15 1/2	17 1/2	19 1/2	21	22 3/4	24 1/2	26 1/2	28	29 1/2	31

SOCKS

	S/M	L/XL	One Size
Men	6 1/2 - 9	9 1/2 - 12 1/2	--
Ladies	5 1/2 - 7 1/2	8 - 10 1/2	--
Kids	9 1/2 - 12 1/2	13 - 3	--
Teen	--	--	3 1/2 - 6

GLOVES & MITTS Measure Palm Width

	XS	S	M	L	XL	2XL	3XL
Men							
Inches	3	3 1/4	3 1/2	4	4 1/2	5	5 1/2
cm	7 1/2	8	9	10	11 1/2	13	14
Ladies							
Inches	2 1/2	2 3/4	3	3 1/2	4	4 1/2	-
cm	6	7	8	9	10	11 1/2	-

HELMETS

	XS	S	M	L	XL	2XL	3XL
Head (cm)	53 - 54	55 - 56	57 - 58	59 - 60	61 - 62	63 - 64	65 - 66
Head (Inches)	20 7/8 - 21 1/4	21 5/8 - 22	22 3/8 - 22 3/4	23 1/8 - 23 5/8	24 - 24 3/8	24 3/4 - 25 1/8	25 1/2 - 25 7/8

JUNIOR HELMET

	S	M	L
Head (cm)	49 - 50	51 - 52	53 - 54
Head (Inches)	19 1/4 - 19 3/4	20 - 20 1/2	20 7/8 - 21 1/4

OUR TEEN RIDING GEAR. YOUR NEXT RIDING BUDDY.

TEENWEAR

RPM

X-TEAM JACKET

- Stylish jacket for teens.
- Includes all the features required for cold temperatures.
- Critical seams sealed.
- Adjustable hem and wrists.
- Microfleece wrists.
- Shaped sleeves.
- Removable insulated hood.
- Powder skirt.
- 2 pockets.

Shell: 100% Polyester
Insulation: Thermal Loft

440725 • 7, 8, 10, 12, 14, 16
Whiskey (28), Pink (36)

$179.99

RPM

X-TEAM HIGHPANTS

- Rugged design and construction for active teens.
- 100% waterproof.
- Growing-leg system with zipper for lengthening legs by 4" as child gets taller.
- Critical seams sealed.
- Full front and back bib.
- Shaped and reinforced knees.
- Side zipper opening.
- Elastic waist.
- Storm gaiters.

Shell: 71% Nylon, 29% Polyester
Insulation: Thermal Loft

441579 • 7, 8, 10, 12, 14, 16
Whiskey (28), Black (90)

$119.99

RPM

TEEN PANTS

- Growing-leg system for lengthening legs by 4" as child gets taller.
- Critical seams sealed.
- Adjustable waist.
- Shaped and reinforced knees.
- Reinforced seat.
- Fleece at seat for more comfort.
- Side zipper opening at bottom.
- Storm gaiters.

Shell: 80% Nylon, 20% Polyester
Insulation: Thermal Loft

441524 • 7, 8, 10, 12, 14, 16
Black (90)

$109.99

X-1 HELMETS

- High-tech, lightweight and tough.
- Fully-adjustable, aero-tuned peak.
- Ventilation system.
- Moisture-wicking and breathable chin strap, liner and cheek pads.
- Easily removable and washable liner and cheek pads.
- Provides maximum visibility.
- Fits all goggles.
- Breath deflector mask included.
- Strap grip keeps goggle strap in place.
- Available with clear-coated bold waterslide graphics.
- D.O.T. certified.

Shell: ABS

X-1 BLAZE HELMET

447673 • S, M, L • Orange (12)

$109.99

X-1 DOODLE HELMET

447966 • S, M, L • Silver (08)

$119.99

BASIC BALACLAVA

- Designed for warmth, dryness and comfort.
- Flatlocked seams to prevent skin chafing.

80% Nylon, 20% Spandex

445685 • S/M, L/XL
Black (90)

$15.99

SKI-DOO TRAIL GOGGLES BY SCOTT

- Integrated custom painted frame and strap graphics.
- Pink dual lens.
- No Fog anti-fog lens treatment.
- Durable anti-slip strap.
- 100% UV protected clear Lexan lens.
- Multi-layer hypoallergenic face foam.
- Ski-Doo by Scott branded.

447944 • One size
Black with graphics (94)

$54.99

LONG KNITTED HAT

- 2 in 1 reversible hat.

100% Acrylic

448235 • One size
Whiskey (28), Raspberry (39)

$19.99

X-TEAM GLOVES

- Waterproof and breathable membrane.
- 4-way stretch fleece cuff.
- Drawstring closure.
- Adjustable hook and loop web strap.
- Brushed polyester lining with Microban† anti-microbial product protection.

Shell: 65% Nylon, 20% Polyurethane, 15% Stretch Polyester
Insulation: Thermal Loft

446289 • 6-8, 10-12, 14-16
Black (90)

$39.99

X-TEAM MITTS

- Waterproof and breathable membrane.
- Drawstring closure.
- Adjustable hook and loop web strap with slip keep.
- Micro-polyester lining with Microban anti-microbial product protection.
- Heat pack pocket built into inner mitt lining.

Shell: Nylon
Insulation: Thermal Loft

446245 • 6-8, 10-12, 14-16
Black (90)

$34.99

X-TEAM BOOTS

- Unisex boots.
- Waterproof.
- Rubber outline.
- 6 mm thick removable liner.
- Height: 12" (30.5 cm).
- Comfort-rated to -61°F (-52 °C).

100% Polyester

444194 • 1, 2, 3, 4, 5, 6
Black (90)

$109.99

X-TEAM FLEECE

- Handwarmer pockets.
- X-Team embroidery at back.

100% Polyester

453772
7-8, 10-12, 14-16
Pink (36), Sunburst Yellow (96)

$59.99

OUR KIDS CLOTHING. YOUR NEXT SNOWMOBILER.

KIDSWEAR

RPM

X-TEAM JACKET

- X-Team style in a smaller-size jacket.
- Critical seams sealed.
- Adjustable hem and wrists.
- Lycra wrists.
- New shaped sleeves.
- Removable insulated hood.
- New double collar seals.
- Powder skirt.

Shell: 82% Nylon, 18% Polyester
Insulation: Thermal Loft

440717 • 2, 3, 4, 5, 6
Red (30),
Sunburst Yellow (96)

$129.99

RPM

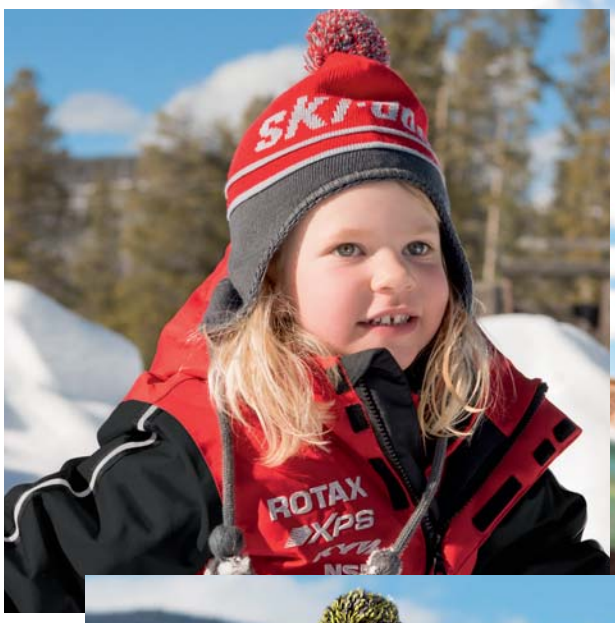
X-TEAM HIGHPANTS

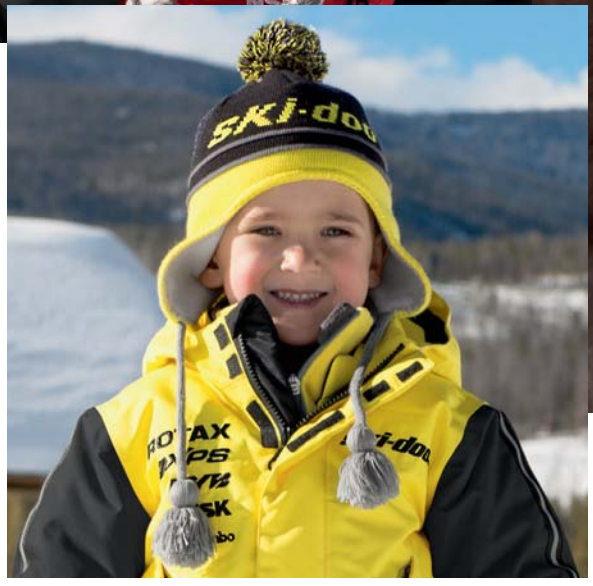
- Rugged design and construction for active kids.
- 100% waterproof.
- Growing-leg system with zipper for lengthening legs by 4" as child gets taller.
- Critical seams sealed.
- Full front and back bib.
- Shaped and reinforced knees.
- Side zipper opening.
- Elastic waist.
- Storm gaiters.

Shell: 68% Nylon, 32% Polyester
Insulation: Thermal Loft

441581 • 2, 3, 4, 5, 6
Black (90)

$109.99





SKI-DOO

X-TEAM MITTS

- Waterproof and breathable membrane.
- Drawstring closure.
- Adjustable hook and loop web strap with slip keep.
- Micro-polyester lining with Microban anti-microbial product protection.
- Heat pack pocket built into inner mitt lining.

Shell: Nylon
Insulation: Thermal Loft

446281 • 2, 4, 6
Black (90)

$34.99

RACING PERUVIAN HAT

- Knitted hat with microfleece lining.

100% Acrylic

447937 • One size
Red (30), Sunburst Yellow (96)

$19.99

X-TEAM FLEECE

- Mid weight polar fleece.
- Handwarmer pockets.
- X-Team embroidery at back.

100% Polyester

453778 • 2, 3-4, 5-6
Sunburst Yellow (96)

$44.99

THERMAL SOCKS

- Dependable comfort sourced from the durability of Polyamide Nylon and the warmth of Merino Wool.
- Stay-up comfort top keeps socks up.
- Itch-free and shrink treated to retain their size and shape for years.
- Elastic ankle and arch support.
- Fully cushioned shin segment.

35% Merino Wool, 35% Acrylic, 28% Polyamide Nylon, 2% Elastane

444151 • S/M, L/XL
Charcoal Grey (07), Yellow (10)

$14.99

WHAT MATTERS IS MAKING IT YOURS

SKI-DOO ACCESSORIES

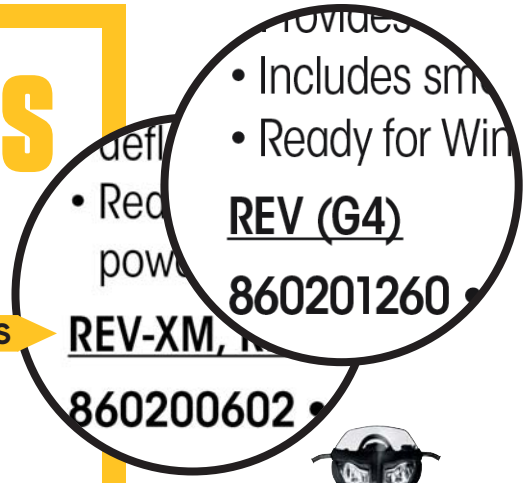
Connect with us: Share your ideas for accessories, get new product releases, enter contests on our online community.

More than 70 items are available for the REV platform 4th generation.

WHICH ACCESSORIES FIT YOUR RIDE?

Descriptions in this catalog are followed by a list of **PLATFORMS** such as REV, REV-XP, REV-XR, REV-XS, REV-XM, REV-XU and REV (G4) which tell what accessories fit which models.

Use this chart to determine which platform you have.



	MODEL	ENGINE	PLATFORM
2011	MXZ	800R E-TEC, 800R PowerT.E.K., 600RS, 600 E-TEC, 600 ACE, 600, 550 FAN	REV-XP
	MXZ	1200	REV-XR
	Renegade	800R E-TEC, 800R PowerT.E.K., 600 E-TEC, 600 ACE, 550 FAN	REV-XP
	Renegade	1200	REV-XR
	GSX	600 E-TEC	REV-XP
	GSX	1200	REV-XR
	Grand Touring	1200, 600 E-TEC	REV-XR
	Grand Touring	600, 600 ACE, 550 FAN	REV-XP
	Summit	800R E-TEC, 800R PowerT.E.K., 600 E-TEC, 600 ACE, 550 FAN	REV-XP
	Freeride™	800R E-TEC	REV-XP
	Expedition	1200, 600 E-TEC	REV-XU
	Expedition	600 ACE, 550 FAN	REV-XP
	Tundra	600 E-TEC, 600 ACE, 550 FAN	REV-XU
	Skandic® WT	600 E-TEC, 600 ACE, 550 FAN	REV-XU
2012	MXZ	800R E-TEC, 600RS, 600 E-TEC, 600 ACE, 550 FAN	REV-XP
	MXZ	1200	REV-XR
	Renegade	800R E-TEC, 600 E-TEC, 600 ACE, 550 FAN	REV-XP
	Renegade	1200	REV-XR
	GSX LE	600 E-TEC	REV-XP
	GSX SE	1200, 800R E-TEC, 600 E-TEC	REV-XR
	Grand Touring	1200, 600 E-TEC	REV-XR
	Grand Touring	600, 600 ACE, 550 FAN	REV-XP
	Summit	800R E-TEC, 800R PowerT.E.K., 600 E-TEC, 600	REV-XP
	Freeride	800R E-TEC	REV-XP
	Expedition	1200, 600 E-TEC	REV-XU
	Expedition	600 ACE, 550 FAN	REV-XP
	Tundra	600 E-TEC, 600 ACE, 550 FAN	REV-XU
	Skandic	600 E-TEC, 600 ACE, 550 FAN	REV-XU


REV-XU Tundra


REV-XP


REV-XU Expedition


REV-XM


REV-XS

You can also visit the Ski-Doo Owners Center: www.ski-doo.com/owners/previous-model-years.html

	MODEL	ENGINE	PLATFORM
2013	MXZ X-RS™	800R E-TEC, 600RS, 600 E-TEC	**REV-XP**
	MXZ X®	800R E-TEC, 600 E-TEC	**REV-XS™**
	MXZ X	1200	**REV-XR**
	MXZ TNT™	800R E-TEC	**REV-XS**
	MXZ TNT	600 E-TEC	**REV-XP**
	MXZ TNT	1200	**REV-XR**
	MXZ Sport	600, 600 ACE, 550 FAN	**REV-XP**
	Renegade X®	800R E-TEC, 600 E-TEC	**REV-XS**
	Renegade X	1200	**REV-XR**
	Renegade Backcountry™ X®	800R E-TEC, 600 E-TEC	**REV-XS**
	Renegade Adrenaline	800R E-TEC, 600 E-TEC	**REV-XP**
	Renegade Adrenaline	1200	**REV-XR**
	Renegade Backcountry	800R E-TEC, 600 E-TEC	**REV-XP**
	Renegade Sport	600 ACE, 550 FAN	**REV-XP**
	GSX LE	600 E-TEC	**REV-XP**
	GSX SE	1200, 800R E-TEC, 600 E-TEC	**REV-XR**
	Grand Touring	1200, 600 E-TEC	**REV-XR**
	Grand Touring	600 ACE, 550 FAN	**REV-XP**
	Summit	800R E-TEC	**REV-XM™**
	Summit	800R PowerT.E.K., 600 E-TEC, 600	**REV-XP**
	Freeride	800R E-TEC	**REV-XP**
	Expedition	1200, 600 E-TEC	**REV-XU**
	Expedition	600, 550 FAN	**REV-XP**
	Tundra	600 E-TEC, 600 ACE, 550 FAN	**REV-XU**
	Skandic	600 E-TEC, 600 ACE, 550 FAN	**REV-XU**
2014	MXZ X-RS, X	800R E-TEC, 600 E-TEC	**REV-XS**
	MXZ X	1200	**REV-XR**
	MXZ TNT	800R E-TEC, 600 E-TEC, 900 ACE	**REV-XS**
	MXZ TNT	1200	**REV-XR**
	MXZ Sport	600, 600 ACE, 550 FAN	**REV-XP**
	Renegade X, Adrenaline	800R E-TEC, 600 E-TEC, 900 ACE	**REV-XS**
	Renegade X, Adrenaline	1200	**REV-XR**
	Renegade Backcountry X	800R E-TEC, 600 E-TEC	**REV-XS**
	Renegade Backcountry	800R E-TEC, 600 E-TEC	**REV-XS**
	Renegade Sport	600 ACE, 550 FAN	**REV-XP**
	GSX LE	600 E-TEC, 900 ACE	**REV-XS**
	GSX SE	1200, 800R E-TEC, 600 E-TEC	**REV-XR**
	Grand Touring	1200, 600 E-TEC	**REV-XR**
	Grand Touring	600, 600 ACE, 550 FAN	**REV-XP**
	Summit X, SP	800R E-TEC, 600 H.O. E-TEC	**REV-XM**
	Summit Sport	800R PowerT.E.K., 600	**REV-XP**

REV-XS

REV-XS

REV-XS

REV-XS

REV-XU Expedition

REV-XM

You can also visit the Ski-Doo Owners Center: www.ski-doo.com/owners/previous-model-years.html

	MODEL	ENGINE	PLATFORM
2014	Freeride	800R E-TEC	REV-XM
	Expedition	1200, 600 E-TEC	REV-XU
	Expedition	600 ACE, 550 FAN	REV-XP
	Expedition	900 ACE	REV-XS
	Tundra	600 E-TEC, 600 ACE, 550 FAN	REV-XU
	Skandic	600 E-TEC, 600 ACE, 550 FAN	REV-XU
2015	MXZ X-RS, X	800R E-TEC, 600 H.O. E-TEC	REV-XS
	MXZ X	1200 4-TEC	REV-XR
	MXZ TNT	800R E-TEC, 600 H.O. E-TEC, 900 ACE	REV-XS
	MXZ TNT	1200 4-TEC	REV-XR
	MXZ Sport	600 ACE	REV-XS
	MXZ Sport	600	REV-XP
	Renegade® X-RS®, X, Adrenaline	800R E-TEC, 600 H.O. E-TEC, 900 ACE	REV-XS
	Renegade X, Adrenaline	1200 4-TEC	REV-XR
	Renegade Backcountry X	800R E-TEC	REV-XS
	Renegade Backcountry	800R E-TEC, 600 H.O. E-TEC	REV-XS
	Renegade Sport	600 ACE	REV-XS
	Renegade Sport	600	REV-XP
	GSX LE	600 H.O. E-TEC, 900 ACE	REV-XS
	GSX LE	1200 4-TEC	REV-XR
	GSX SE	800R E-TEC, 600 H.O. E-TEC, 1200 4-TEC	REV-XR
	Grand Touring	1200 4-TEC, 900 ACE, 600 H.O. E-TEC	REV-XR
	Grand Touring Sport	550 Fan	REV-XP
	Grand Touring Sport	600 ACE	REV-XS
	Summit X W/T3, X, SP	800R E-TEC, 600 H.O. E-TEC	REV-XM
	Summit Sport	800 PowerT.E.K., 600	REV-XP
	Freeride	800R E-TEC	REV-XM
	Expedition Sport	900 ACE, 600 ACE	REV-XS
	Expedition Sport	550 Fan	REV-XP
	Expedition LE, SE	All	REV-XU
	Tundra	All	REV-XU
	Skandic	All	REV-XU
2016	MXZ X-RS, X,	800R E-TEC, 600 H.O. E-TEC, 1200 4-TEC	REV-XS
	MXZ Blizzard, TNT	800R E-TEC, 600 H.O. E-TEC, 1200 4-TEC, 900 ACE	REV-XS
	MXZ Sport	600 ACE	REV-XS
	MXZ Sport	600	REV-XP

REV-XS

REV-XS

REV-XP

REV-XU Expedition

REV-XU

REV-XS

You can also visit the Ski-Doo Owners Center: www.ski-doo.com/owners/previous-model-years.html

	MODEL	ENGINE	PLATFORM
2016	Renegade® X-RS®, X, Adrenaline	800R E-TEC, 600 H.O. E-TEC, 1200 4-TEC, 900 ACE	**REV-XS**
	Renegade Enduro	800R E-TEC, 600 H.O. E-TEC, 1200 4-TEC, 900 ACE	**REV-XS**
	Renegade Backcountry X	800R E-TEC	**REV-XM**
	Renegade Backcountry	800R E-TEC, 600 H.O. E-TEC	**REV-XM**
	Renegade Sport	600 ACE	**REV-XS**
	Renegade Sport	600	**REV-XP**
	Grand Touring	1200 4-TEC, 900 ACE, 600 H.O. E-TEC	**REV-XS**
	Grand Touring Sport	600 ACE	**REV-XS**
	Summit X W/T3, X, SP	800R E-TEC, 600 H.O. E-TEC	**REV-XM**
	Summit Sport	800 PowerT.E.K., 600	**REV-XP**
	Freeride	800R E-TEC	**REV-XM**
	Expedition Sport	900 ACE, 600 ACE	**REV-XS**
	Expedition Sport	550 Fan	**REV-XP**
	Expedition LE, SE, Xtreme	All	**REV-XU**
	Tundra	All	**REV-XU**
	Skandic	All	**REV-XU**
2017	MXZ X-RS, X,	800R E-TEC, 600 H.O. E-TEC, 1200 4-TEC	**REV-XS**
	MXZ X, TNT	850 E-TEC	**REV (G4)**
	MXZ Blizzard, TNT	800R E-TEC, 600 H.O. E-TEC, 1200 4-TEC, 900 ACE	**REV-XS**
	MXZ Sport	600 ACE	**REV-XS**
	MXZ Sport	600	**REV-XP**
	Renegade X-RS, X, Adrenaline	800R E-TEC, 600 H.O. E-TEC, 1200 4-TEC, 900 ACE	**REV-XS**
	Renegade X, Adrenaline	850 E-TEC	**REV (G4)**
	Renegade Enduro	800R E-TEC, 600 H.O. E-TEC, 1200 4-TEC, 900 ACE	**REV-XS**
	Renegade Backcountry X	800R E-TEC	**REV-XM**
	Renegade Backcountry	800R E-TEC, 600 H.O. E-TEC	**REV-XM**
	Renegade Sport	600 ACE	**REV-XS**
	Renegade Sport	600	**REV-XP**
	Grand Touring SE, LE	1200 4-TEC, 900 ACE, 600 H.O. E-TEC	**REV-XS**
	Grand Touring Sport	600 ACE	**REV-XS**
	Summit X, SP 165, 154	850 E-TEC	**REV (G4)**
	Summit X W/T3, X, SP	800R E-TEC, 600 H.O. E-TEC	**REV-XM**
	Summit Sport	600	**REV-XP**
	Freeride	800R E-TEC	**REV-XM**
	Expedition Sport	900 ACE, 600 ACE	**REV-XS**
	Expedition Sport	550 Fan	**REV-XP**
	Expedition LE, SE, Xtreme	All	**REV-XU**
	Tundra	All	**REV-XU**
	Skandic	All	**REV-XU**

REV-XS

REV-XM

REV-XS

REV-XM

REV-XP

REV (G4)

You can also visit the Ski-Doo Owners Center: www.ski-doo.com/owners/previous-model-years.html

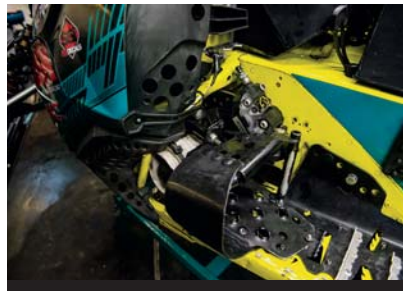
AT THE PEAK OF PERFORMANCE

The very pinnacle of snowmobile performance is in the Pro classes of the ISOC Snocross National Circuit. We shadowed one of our long time partners, Warnert Racing for the first few races of the 2015-2016 season to show you what it's like. The team runs MXZx 600RS race sleds and has been using XPS oils and wearing Ski-Doo gear for over 15 years. Its racers come all the way from Europe to compete at the highest level: John Stenberg, from Sweden, races in the premier Pro Open class; Elias Ishoel hails from Norway and competes in Pro Lite.

Ishoel landing on the front straight at Canterbury Park in Minnesota.

Before every race weekend and between heats the sleds are checked and maintained by the mechanics. Working in a 53 foot heated semi trailer makes things a little easier. The Makita tools used by the team are proven performers in any weather and they're also used by BRP on our production lines.

Stenberg flies the finish at Canterbury.



Every rider and team has their own take on footrests and grip. Some are fully enclosed for protection and leverage; others run virtually nothing except a little added grip. Notice the fan to cool the oversize brake on Stenberg's Open sled.

The rules in Open class allow some weight saving tricks. You can see many parts have been removed, drilled, cut up and replaced, all in the name of saving a few grams. This sled runs a small custom aluminum fuel tank with pre-mix 112 octane gas.

The team relies on KYB shocks, like on our top consumer sleds, with fine tuning and maintenance by KYB/Enzo professional technicians. In Snocross the track is constantly changing, so shock calibration changes are frequent throughout the race weekend. Racing isn't possible without sponsors and GMC, NSK Bearings and Kicker Speakers help with quality products and support.

Ishoel's Pro-Lite sled (200) is a stock MXZx 600RS with some customizations for his preferences. Stenberg's Pro Open sled (259) starts with a stock chassis and engine, then adds twin tuned pipes and high compression heads, different airbox, lightweight hood and more. You can also see some of the weight saving ideas the team uses.

Strategy is important - especially at the starting line – so Stenberg talks with his mechanic before the Canterbury race, which featured a radical raised starting line.

SUMMIT SP 850 E-TEC

OUR PERFECTLY-INTEGRATED ACCESSORIES. YOUR NEXT SUPER TECHNICAL LINE.

See the video of this accessorized sled. Go to: http://www.ski-doo.com/shopping-tools/brochures.html

GET 1 YEAR FACTORY WARRANTY* ON BRP ACCESSORIES. INSTALLED BY YOU OR YOUR DEALER.

1	**FULL BODY SKID PLATE** 860201441	**$129.99**
2	**STACKABLE LinQ FUEL CADDY - 15 L** 860201265	**$169.99**
3	**TRANSPARENT HANDLEBAR AIR DEFLECTORS** 860201254	**$89.99**
4	**ADJUSTABLE RISER FOR STRAIGHT HANDLEBAR** 860201276	**$164.99**
5	**ERGO ADJUSTABLE TOE-HOLDS** 860201370	**$229.99**
6	**LinQ SNOWBOARD / SKI RACK** 860201255	**$399.99**
7	**LinQ PREMIUM TUNNEL BAG - SHORT 10 + 3 L** 860200622	**$144.99**
8	**HEAVY-DUTY REAR BUMPER** 860201431	**$249.99**
9	**LinQ ERGO SUMMIT BAG** 860201355	**$109.99**

LEVEL 1	**ACCESSORIES COST**	**$784.95**
	MONTHLY PAYMENT FOR 60 MONTHS†	$15.51

LEVEL 2	**ACCESSORIES COST**	**$1,689.91**
	MONTHLY PAYMENT FOR 60 MONTHS†	$33.38

*Certain conditions may apply.

MXZ X 850 E-TEC

OUR PERFECT-FIT ACCESSORIES. YOUR NEXT PERFECT CORNER.

See the video of this accessorized sled. Go to: http://www.ski-doo.com/shopping-tools/brochures.html

GET 1 YEAR FACTORY WARRANTY* ON BRP ACCESSORIES. INSTALLED BY YOU OR YOUR DEALER.

1	**FULL BODY SKID PLATE** 860201441	**$129.99**
2	**STACKABLE LinQ FUEL CADDY - 15 L** 860201265	**$169.99**
3	**GLOVEBOX EXTENSION / GPS SUPPORT** 860201249	**$99.99**
4	**ERGO 2 STEP KNEE PADS** 860201251	**$89.99**
5	**FORWARD ADJUSTABLE RISER (FAR) EXTENSION** 860201316	**$99.99**
6	**SR 21 L LinQ TUNNEL BAG** 860201273	**$179.99**
7	**SIGNATURE LED LIGHT FOR HANDLEBAR AIR DEFLECTORS** 860201406	**$124.99**
8	**AUXILIARY LED LIGHT** 860201229	**$339.99**
9	**XC 356T6 CAST BUMPER** 860201228	**$289.99**

LEVEL 1	**ACCESSORIES COST**	**$589.95**
	MONTHLY PAYMENT FOR 60 MONTHS†	$11.65

LEVEL 2	**ACCESSORIES COST**	**$1,524.91**
	MONTHLY PAYMENT FOR 60 MONTHS†	$30.12

*Certain conditions may apply.

RENEGADE BACKCOUNTRY

OUR PROVEN ACCESSORIES. YOUR NEXT OFF-TRAIL ADVENTURE.

GET 1 YEAR FACTORY WARRANTY* ON BRP ACCESSORIES. INSTALLED BY YOU OR YOUR DEALER.

1	**EXTREME SKID PLATE** 860200741	**$119.99**
2	**TRANSPARENT HANDLEBAR AIR DEFLECTORS** 860200789	**$74.99**
3	**ULTRA LOW WINDSHIELD** 860200901	**$94.99**
4	**WINDSHIELD BASE** 860200956	**$19.99**
5	**LinQ PREMIUM TUNNEL BAG - SHORT 10 + 3 L** 860200622	**$144.99**
6	**PILOT DS-2 SKIS (2X)** 505073278	**$239.98**
7	**GLOVEBOX EXTENSION** 860200707	**$79.99**
8	**PREFILTER GRILLE KIT** 860200610	**$104.99**
9	**SNOWFLAP** 860200688	**$94.99**

LEVEL 1	**ACCESSORIES COST**	**$454.95**
	MONTHLY PAYMENT FOR 60 MONTHS†	$8.99

LEVEL 2	**ACCESSORIES COST**	**$974.90**
	MONTHLY PAYMENT FOR 60 MONTHS†	$19.26

*Certain conditions may apply.

RENEGADE ADRENALINE

OUR PERFECTLY INTEGRATED ACCESSORIES. YOUR NEXT AWESOME LONG WEEKEND.

GET 1 YEAR FACTORY WARRANTY* ON BRP ACCESSORIES. INSTALLED BY YOU OR YOUR DEALER.

1	**AUXILIARY LED LIGHT** 860201235	**$339.99**
2	**SPORT PERFORMANCE FLARED WINDSHIELD - HIGH** 860200602	**$134.99**
3	**LinQ FUEL CADDY - 11 L** 860200585	**$129.99**
4	**LinQ PREMIUM TUNNEL BAG - MEDIUM 19 + 3L** 860200620	**$154.99**
5	**FULL BODY SKID PLATE** 860201035	**$129.99**
6	**FRONT BUMPER** 860201170	**$79.99**
7	**REAR BUMPER** 518326356	**$79.99**
8	**ADJUSTABLE RISER FOR STRAIGHT HANDLEBAR** 860201116	**$159.99**
9	**CHASSIS REINFORCEMENT KIT** 860200816	**$69.99**

LEVEL 1		
	ACCESSORIES COST	**$889.95**
	MONTHLY PAYMENT FOR 60 MONTHS†	$17.58

LEVEL 2		
	ACCESSORIES COST	**$1,279.91**
	MONTHLY PAYMENT FOR 60 MONTHS†	$25.28

*Certain conditions may apply.

MATCHING YOUR WINDSHIELD TO CONDITIONS MADE EASY

QUICK SWAP YOUR WINDSHIELD FOR COMFORT

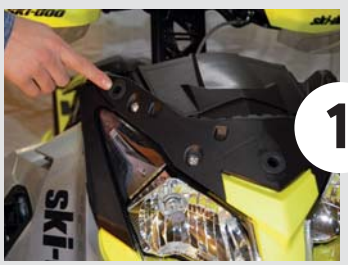
Your sled's windshield contributes to the look and personality of your sled – but it's also the most important factor in your warmth and comfort. With today's riding gear technology and layering, we change our riding gear to match the variety of weather conditions we encounter snowmobiling. We've made it extremely easy to do the same thing with your sled's windshield.

In addition to the no-tool attachment system, where you merely plug the windshield into the rubber mounts, we offer a huge variety of windshield sizes, shapes and prices, so you'll find the ones that fit the riding conditions, your height and the look you want on your sled.

This medium injected windshield with side deflector kit is a popular choice. Once you've attached the side deflectors to the windshield support, changing from one windshield to another takes just a minute*.

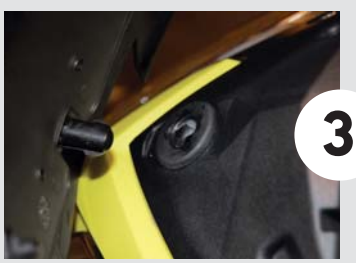
*When using Medium and higher windshields, handguards must be removed.

HERE'S HOW TO EASILY CHANGE FROM ONE WINDSHIELD TO ANOTHER:



1. Gently remove the current windshield, pulling at the base. Place and store it in an area where it won't get scratched.

2. Most larger windshields attach to the side of the hood for additional support. For those, remove the trim cover from each side of the hood. Be sure to keep these.



3. To install the new windshield, position it with these posts at each rubber mount and press with the heel of your hand until you hear and feel each attach securely. A light coating of grease or petroleum jelly makes this even easier. Attach the side deflectors or flares to the sides of the hood in the same fashion. That's it!

Stock Windshield MXZ X-RS

Low Windshield with Side Deflectors

Medium Windshield and Side Deflector Kit

LinQ SYSTEM™

FAST. EASY. SECURE. UNIQUE.

This is the only accessory system that adapts quickly, easily and can easily transfer from sled-to-sled. It has become the most respected system for snowmobilers.

NEW

STACKABLE - 15 L LinQ FUEL CADDY
P. 133

NEW

SR 21 L LinQ TUNNEL BAG
P. 132

NEW

LinQ ERGO SUMMIT SEAT BAG
P. 136

LinQ 1 + 1 COMPLETE SEAT SYSTEMS
P. 129-130

LinQ 1 + 1 BACKREST
P. 130

LinQ CARGO BOX - 40 L
P. 132

LinQ SNOWBOARD/SKI RACK
P. 134

LinQ FUEL CADDY - 11 L
P. 133

Note: For LinQ parts see p. 164

LinQ PREMIUM TUNNEL BAG - MEDIUM 19 + 3 L

P. 132

LinQ PREMIUM TUNNEL BAG - SHORT 10 + 3 L

P. 132

SLIM TUNNEL BAG WITH LinQ SOFT STRAP

P. 135

TUNNEL ROLL TOP BAG - MEDIUM 25 L WITH LinQ SOFT STRAP

P. 139

LinQ SADDLEBAGS

P. 132

LinQ REAR CARGO RACK

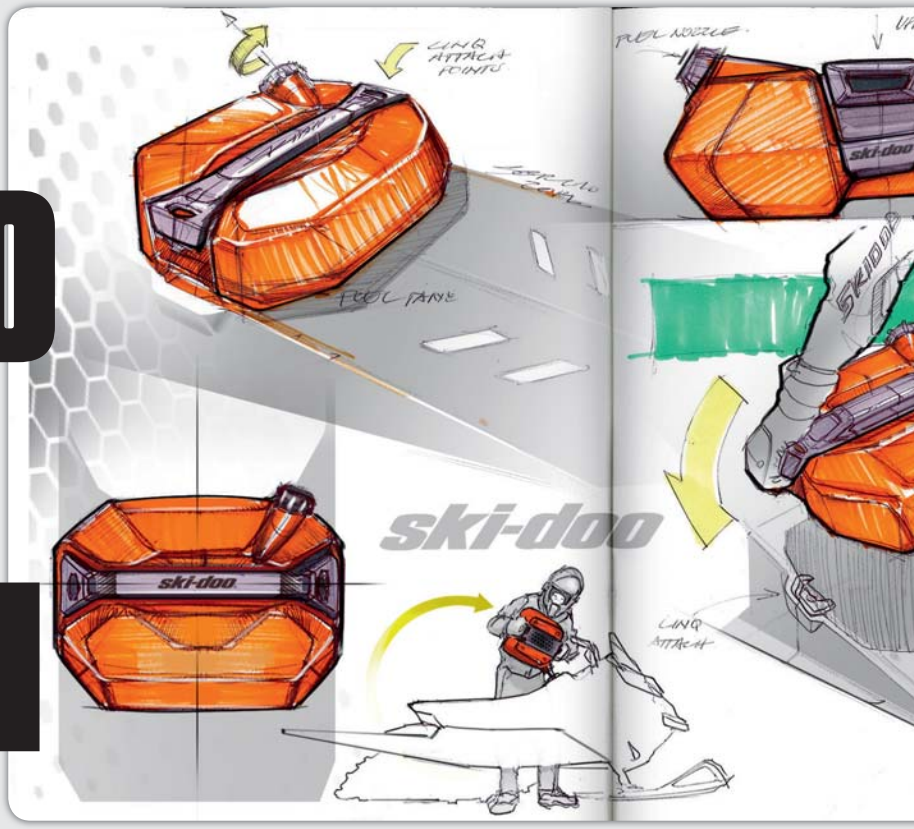
P. 141

TUNNEL BACKPACK WITH LinQ SOFT STRAP

P. 135

DESIGN BRIEF:

SKI-DOO LinQ SYSTEM



In 2009, as the BRP team was developing the Can-Am ATV G2 platform, the design team turned their attention to the racking and cargo. As they observed riders using their ATVs in the real world, they saw all those bungee cords holding down cargo. And they saw the bungees stretch, the cargo bounce around, the bungees break and the hooks rust and fail. They decided there had to be a better way.

"We wanted a new attachment system that could attach accessories really quickly and solidly, and was versatile enough to be used with many different types of items, like racks, bags and fuel cans," said François Duval, design director of BRP's Lifestyle Studio. "We also understood owners would need to tie down odd-shaped items and even still use bungees. Our solution was the LinQ system, including special openings in the rack and LinQ clamps."

The LinQ clamp drops into the hex-shaped opening and a quarter-turn of its latch pulls the clamp tight and locks it in place. [Fun fact: LinQ stands for "Lock Integrated Quarter turn."] For added security, a tiny allen bolt can be screwed in to lock the latch in place.

With the design concept and architecture developed, the team turned to the implementation for snowmobiles.

"We had the openings molded into the composite racks on the Outlanders and SSVs and we considered something like that for sleds," recalls Duval. "But we have a very strong tunnel in the back, so we looked for a way to make the tunnel the base for the LinQ receivers. That's when we came up with the cleat and the bridges."

"It looks very simple, but that cleat does a lot of things," says Frederic Cossette, BRP Project Manager for Sea-Doo / Ski-Doo / Special Projects Accessories. "It's the base for the LinQ clamps. But it also receives the end of the bridge that goes over the heat exchanger [as a base for bags, boxes and fuel caddies] and holds the tabs for saddlebags and the snowboard / ski rack. And just like with the ATVs, you can use the cleats to strap your own things to the sled or our low profile tunnel bags. It's an amazing design."

Of course, the devil was in the details and there were challenges getting the system just right.

"While testing the devices in certain conditions we identified scenarios where the LinQ actually 'unLinQed,'" said Duval. "There were a few times in testing where we hit bumps and our LinQ bags went flying all over the trail. The force that faces an item at the end of a sled tunnel can be up to 20 *g* when it hits a bump! So we kept refining how the latch and the bridge end connect, lock, how much pressure there is and the materials we used. And we did a lot of testing."

At BRP, accessories are part of the development process and with the REV-X platform, the tunnel was standardized to accomodate a 16" (40 cm) wide track

and the mounting holes for the LinQ cleats were drilled into nearly every sled tunnel at the factory. This made installation take just minutes and ensured the cleats would be placed perfectly for every owner. An available base enables sleds with wide tracks to enjoy the benefits of any available Ski-Doo LinQ accessories.

New for 2017 is a new fuel caddy and tunnel bag, heavily influenced by snowmobiler feedback. The bag has a sleeker shape and roll top to keep snow dust out. The fuel caddy is easier to pour and has bigger capacity (15 L). But the most exciting aspect is that the bag can be mounted on top of the Fuel Caddy, meaning a rider can now take extra fuel AND a LinQ bag on a short track sled.

LinQ
lock integrated quarter turn

LinQ SYSTEM

The original LinQ logo, and the final one. The Q in the logo is designed to look like the LinQ latch.

TWO SLEDS IN ONE :

RENEGADE WITH ACCESSORIES

When we talk about offering accessories that take your snowmobile experience to the next level, this sled below is exactly what we mean. It's a sporty one-up mogul eating monster at heart... but **add just a few key accessories** and it's ready to take a passenger to enjoy winter with you. Everything's easy to install the first time. And it's super easy to go from one personality to another.

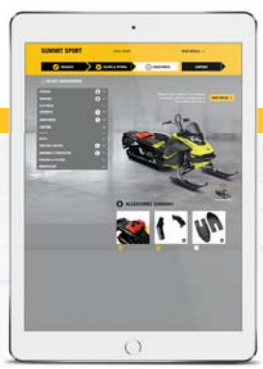
NEW
WWW.SKI-DOO.COM

BUILD YOUR DREAM SLED

ON THE NEW SKI-DOO.COM, WE'VE MADE IT EASIER THAN EVER TO CHOOSE THE ACCESSORIES THAT WILL MAKE YOUR 2017 SKI-DOO THE SNOWMOBILE YOU'VE ALWAYS DREAMED OF.

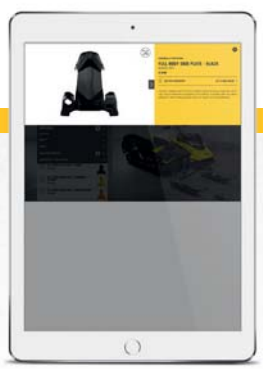
Build your snowmobile

Like always, **choose** your model, feature package, engine, color and other factory options.



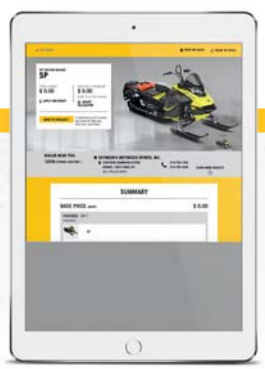
Browse accessories

Browse the accessories you're interested in. You'll see larger images, item descriptions and prices.



Add it

Click to add this accessory to your built sled – it now appears on the snowmobile and in your accessories summary, so you can see just what it will look like. **Add or remove** accessories, change colors, at any time.



Finish it

Complete your build. The vehicle summary includes your accessories in the price and monthly payment estimate. You can send this to your dealer and have them contact you, or print it and take with you for final negotiations and ordering.

REV (G4)

NEW

MEDIUM WINDSHIELD KIT

- 17" (43 cm) in length.
- Offers a generous amount of protection with integrated style.
- Includes side deflectors and support.
- Ready for Windshield-Mount Mirrors (860200694).

<u>REV (G4)</u>

860201559 • Smoke

$139.99

NEW

LOW WINDSHIELD

- 14" (36 cm) in length.
- High quality, best durability.
- Includes low windshield support.
- Standard on REV platform 4th generation MXZ X & Renegade.

<u>REV (G4)</u>

860201448 • Smoke

$119.99

WINDSHIELD SIDE DEFLECTOR KIT - LOW

- Increases wind deflection for windshields.

<u>REV (G4)</u>

<u>For low and ultra low windshields</u>

860201449 • Smoke

$29.99

NEW

CENTRAL DEFLECTOR

<u>REV (G4)</u>

<u>For low windshields</u>

517305749 • Black

$19.99

<u>For Summit</u>

517305875 • Black

$24.99

517305749

517305875

Note: When installing the windshield and/or windshield side deflectors on your vehicle, please make sure it does not - in any position - interfere with the operation of the steering and controls.

REV-XS & REV-XM

Without side deflectors

Shown with side deflectors (860201221), sold separately

EXTRA HIGH WINDSHIELD*

- 20" (51 cm) in length for extra protection.
- Standard on 2016-2017 Grand Touring.
- Side deflectors not included.

REV-XM, REV-XS

860201182 • Smoke

$164.99

SPORT PERFORMANCE FLARED WINDSHIELD - HIGH*

- 16" (41 cm) in length.
- One-piece with integrated deflectors.
- Redirects snow in deep powder conditions.

REV-XM, REV-XS

860200602 • Smoke

$134.99

DID YOU KNOW All of the popular REV-XS accessories now work with 2016 and 2017 models equipped with the 1200 4-TEC engine.

WINDSHIELD SIDE DEFLECTOR KIT

- Adds lower body wind protection.
- Ready for Windshield Mirrors (860200694).
- Standard on 2016-2017 Grand Touring.

REV-XM, REV-XS

For medium and higher windshields

860201221 • Smoke

$49.99

WINDSHIELD SIDE DEFLECTOR KIT

- Increases wind deflection for windshields.
- Ready for Windshield Mirrors (860200694).

REV-XM, REV-XS

For medium and higher windshields

860200912 • Smoke

$49.99

For low and ultra low windshields

860201012 • Smoke

$29.99

*Depending on your vehicle configuration, you may need corresponding windshield base kit and side deflectors to install this windshield. Ask your dealer for details.
Note: When installing the windshield and/or windshield side deflectors on your vehicle, please make sure it does not - in any position - interfere with the operation of the steering and controls.

REV-XS & REV-XM

LOW WINDSHIELD WITH GRAPHICS*

- 9″ (23 cm) in length.
- Injected windshield with embedded graphics.
- High quality, best durability.

REV-XM, REV-XS

860201087 • Black - Yellow Ski-Doo‡

$119.99

ULTRA LOW WINDSHIELD*

- 6″ (15 cm) in length.

REV-XM, REV-XS

860200901 • Smoke

$94.99

MEDIUM INJECTED WINDSHIELD AND SIDE DEFLECTOR KIT

- 13.5″ (34 cm) in length.
- Offers a generous amount of protection with integrated style.
- Medium side deflectors ready to receive Windshield Mirrors (860200694).
- Includes medium windshield support.

REV-XM, REV-XS

860200759 • Smoke

$139.99

SPORT PERFORMANCE FLARED WINDSHIELD - MEDIUM*

- 12″ (31 cm) in length.
- One-piece with integrated deflectors.

REV-XM, REV-XS

860200696 • Smoke

$124.99

HIGH WINDSHIELD*

- 18″ (46 cm) in length.
- Side deflectors not included.

REV-XM, REV-XS

860200928 • Smoke

$154.99

ULTRA HIGH WINDSHIELD

- Our largest sport windshield ever.
- 24″ (60 cm) in length.
- One-piece with integrated deflectors.
- Maximum wind protection, for extreme cold conditions.
- Ready to receive Windshield-Mount Mirrors (860200103).

REV-XM, REV-XS

860201185 • Clear

$184.99

‡While supplies last.

*Depending on your vehicle configuration, you may need corresponding windshield base kit and side deflectors to install this windshield. Ask your dealer for details.

Note: When installing the windshield and/or windshield side deflectors on your vehicle, please make sure it does not - in any position - interfere with the operation of the steering and controls.

REV-XS & REV-XM

POWDER PLOW®* FOR WINDSHIELD

- Specifically designed for deep snow powder deflection.
- Deflects snow to sides instead of towards driver's face.
- Easily attaches underneath windshield support.
- Can be installed with or without REV-XM, REV-XS low, and ultra low windshield.

The Powder Plow diverts the snow away from the center of the vehicle, keeping the rider drier and increasing overall visibility.

REV-XM & REV-XS with low, extra low or without windshield

860200603 • Black‡

$124.99

WINDSHIELD BASE

- Colored plastic trim.
- Hardware not included.

REV-XM, REV-XS
Ultra low, low and one-piece windshields

517305403 • Grey
517305617 • Manta Green
517305808 • Sunburst Yellow
517305948 • Lava Red
517305952 • White

$24.99

860200937 • Black
860200956 • Yellow

$19.99

Medium and high windshields

860200944 • Black
860200957 • Yellow

$24.99

REV-XP

ULTRA LOW FIXED WINDSHIELD*

- 6" (15 cm) in length.

REV-XP

860200646 • Smoke with X graphic

$104.99

LOW WINDSHIELD AND SIDE DEFLECTOR KIT

- 12" (30 cm) in length.
- Same complete kit as found on the 2011-2012 X package models.
- Retrofittable on earlier REV-XP snowmobile models.
- Includes low windshield, side deflector and base kit.

REV-XP

860200545 • Smoke

$104.99

MEDIUM WINDSHIELD KIT

- Includes medium injected windshield, dark smoke side deflector kit and base kit.

REV-XP

860200478 • Smoke

$139.99

WINDSHIELD SIDE DEFLECTOR KIT

- Increased wind deflection for windshields.

REV-XP - Medium & High

860200084 • Dark Smoke

$39.99

SPORT PERFORMANCE FLARED WINDSHIELD

- 17 ½" (44.5 cm) in length.
- One piece with integrated side deflectors.
- Complete with base mounting kit.

REV-XP

860200547 • Smoke

$124.99

ULTRA HIGH WINDSHIELD*

- 23" (58 cm) in length.
- Note: J-hooks need to be removed to install windshield.

REV-XP

860200225 • Clear with fading

$124.99

Medium, High & Ultra High

Ultra Low & Low

WINDSHIELD BASE KIT

- Plastic trim for windshields.

REV-XP - Medium, High & Ultra High

860200091 • Black

$24.99

REV-XP - Ultra Low & Low

860200089 • Black

$19.99

‡While supplies last.
*Depending on your vehicle configuration, you may need corresponding windshield base kit to install this windshield. Ask your dealer for details.
Note: When installing the windshield and/or windshield side deflectors on your vehicle, please make sure it does not - in any position - interfere with the operation of the steering and controls.

REV-XR & REV-XU

860200438

860200453

SPORT PERFORMANCE FLARED WINDSHIELD

- One-piece with integrated side deflectors.
- Top flare maximizes wind protection and redirects snow in deep powder conditions.
- Complete with base mounting kit.

REV-XR, REV-XU - High 17 ½" (44.5 cm)

860200438 • Smoke

$124.99

REV-XR, REV-XU - Medium 14" (35.6 cm)

860200453 • Smoke

$124.99

EXTRA HIGH ONE-PIECE WINDSHIELD

- 23" (58 cm) in length.
- One-piece with integrated deflectors.
- Maximum wind protection.
- For extreme cold conditions.
- Ready to receive Windshield-Mount Mirrors (517305787).
- No windshield base required.

REV-XR, REV-XU

860201000 • Clear

$154.99

ULTRA HIGH WINDSHIELD*

- 27 ½" (70 cm) in length.

REV-XR, REV-XU, except MXZ and Renegade with J-hooks

860200227 • Clear with fading

$124.99

WINDSHIELD SIDE DEFLECTOR KIT

- Increased wind deflection for windshields.

REV-XR, REV-XU
Fits extra high and ultra high windshields using base kit (860200230)

860200235 • Smoke

$49.99

REV-XR, REV-XU
Fits medium and high windshields using base kits (860200229)

860200234 • Smoke

$39.99

LATERAL AIR DEFLECTOR KIT

- Added wind protection.

REV-XU WT, SWT, Expedition SE, LE, Xtreme

860201039 • Black

$64.99

KNEE AIR DEFLECTORS

- Redirect the wind away from your knees while adding a finishing touch to your sled.
- Sold in pairs.

REV-XP

860200087 • Black

$23.99

Low

Medium & High

Extra High & Ultra High

WINDSHIELD BASE KIT

- Colored plastic trim.

REV-XR, REV-XU

Low
860200228 • Black
$19.99

Medium & High
860200229 • Black
$24.99

Extra High & Ultra High
860200230 • Black
$24.99

*Depending on your vehicle configuration, you may need corresponding windshield base kit to install this windshield. Ask your dealer for details.
Note: When installing the windshield and/or windshield side deflectors on your vehicle, please make sure it does not - in any position - interfere with the operation of the steering and controls.

PIVOTING MIRROR KIT FOR HANDLEBAR AIR DEFLECTORS

- Perfectly integrated design and style.
- Mirrors fold away when not in use for easy storage or when covering vehicle.
- Sold in pairs.

Vehicles with Transparent Handlebar Air Deflectors

860200893 • Black

$34.99

WINDSHIELD-MOUNT MIRRORS

- Windshield mount design.
- 3" round reflector with adjustable angle.

REV-XU, REV-XR (with extra high one-piece windshield)

517305787 • Black

$39.99

HANDLEBAR AIR DEFLECTOR MIRROR KIT

- Handlebar mount air deflector.
- Sold in pairs.

Vehicles with 2011 and up Handlebar Air Deflectors

860200674 • Black

$24.99

Our Handlebar Air Deflector Mirrors pivot out of the way when you want a sleek look or are covering your sled.

MIRROR KITS

- Side panel mount design.
- Sold in pairs.
- Premarked side panels make installation easier.

REV-XM, REV-XS (except 1200)

860200607

$79.99

- Side panel body mount design.
- Sold in pairs.

REV-XP, REV-XR, REV-XU Tundra

860200693

$69.99

- Windshield extension mount design.
- Sold in pairs.

REV-XM, REV-XS, REV-XP, REV-XR, REV-XU (with medium and higher windshield side deflectors), REV (G4) with medium windshield (860201559)

860200694

$59.99

- Windshield mount design.
- Sold in pairs.

REV-XS, REV-XM (with ultra high windshield)

860200103

$39.99

- Handlebar wind deflector mount design.
- Sold in pairs.

Vehicles with 2010 & prior Handlebar Air Deflectors

860200080

$24.99

TRANSPARENT HANDLEBAR AIR DEFLECTORS

- Design delivers better protection and great style.
- Comes with black/grey colored interchangeable caps.
- Use with low and ultra low windshield - for all handlebars.
- Sold in pairs.

REV (G4), REV-XS, REV-XM, REV-XP, REV-XR, REV-XU

860200789 • Grey/Black

$74.99

NEW

- Featuring new more flexible mounts for extreme conditions.

860201254 • Grey/Black

$89.99

HANDLEBAR AIR DEFLECTORS EXTENSION KIT

- Semi-rigid, won't collapse at high speed.
- Delivers additional hand protection from the elements.
- Can be installed and removed in seconds.

Vehicles with Transparent Handlebar Air Deflectors

860200781 • Black

$74.99

HANDLEBAR AIR DEFLECTORS CAPS

- Colored caps let you customize your look.
- Sold in pairs.

Vehicle with Transparent Handlebar Air Deflectors

860201344 • Sunburst Yellow/Black
860201345 • Race Orange/Black
860201347 • White/Black
860201346 • Black/Grey

$39.99

NEW

860201457 • Orange Crush/Black

$39.99

HANDLEBAR MUFFS

- Ultra warm handlebar muffs with fleece liner.
- Designed for extreme cold conditions.
- Easy to remove in warmer weather.
- Can be used on handlebars with or without handguards and mirrors.

Does not fit vehicles with large handlebar pad. Fits with Handlebar Air Deflectors 2015 and up

860201144 • Black

$59.99

- Inner skeleton allows muff to keep its shape and gives more space for hand movement.
- Transparent section allows visibility and easy manipulation of control switches.
- Note: Never use handlebar muffs with finger throttle lever.

Note: When installing steering / handlebar accessories, make sure windshield and deflectors do not interfere - in any position - with the operation of the steering and brake lever.

NEW

AUXILIARY LED LIGHT

- New dynamic scoop design integrates perfectly with 4th generation REV platform.
- 8 LED lamps provide more than 2,500 additional lumens for an intense super-wide foglight-type pattern.
- Say goodbye to sacrificing close range lighting when switching to high beams.
- Easily installs on hood with a simple plug-and-play hook-up.

REV (G4)

860201229

$339.99

AUXILIARY LED LIGHT

- 10 LED lamps provide more than 2100 additional lumens in an intense, super-wide foglight-type pattern.
- Three-position OFF-ON-HI switch gives you the option of riding with these lights off, always on or only when switching to your high beams.
- Say goodbye to sacrificing close range lighting when switching to high beams.
- Easily installs below stock headlight with a simple plug-and-play hook-up.

REV-XM, REV-XS, except Expedition Sport

860201235

$339.99

See the dramatic effect this Auxiliary LED Light generate. http://www.ski-doo.com/shopping-tools/brochures.html

These signature handlebar air deflectors lights create a nighttime look unlike anything on the market.

A first in snowmobiling, creates a signature look at night.

SIGNATURE LED LIGHT FOR HANDLEBAR AIR DEFLECTORS

- Delivers a unique look at night.
- Replaces stock handguard cap with LED light.
- Includes wiring harness.
- Sold in pairs.

REV-XM, REV-XS with Transparent Handlebar Air Deflectors. Can be installed on REV-XP, REV-XR, REV-XU with Adaptor for Signature LED Light for Handlebar Air Deflectors (860201114)

860200981 • Black

$119.99

NEW

REV (G4) with Transparent Handlebar Air Deflectors

860201406 • Black

$124.99

See the dramatic effect these Handlebar Air Deflector generate. http://www.ski-doo.com/shopping-tools/brochures.html

ADAPTOR FOR SIGNATURE LED LIGHT FOR HANDLEBAR AIR DEFLECTORS

REV-XP, REV-XR, REV-XU, except fan-cooled engines

860201114

$39.99

All listed sleds' stock** cables and wiring are long enough to accommodate the adjustable risers.

ADJUSTABLE RISERS

- Instantly modify your handlebar height to adapt to changing riding conditions.
- Utilize the lower position for trail / sit down riding: extend to maximum height in seconds for stand up riding.
- No tools required to make the adjustment, just flip the lever.
- Patent pending US20150360713A1.

860201429

860201276

NEW

ADJUSTABLE RISER FOR STRAIGHT HANDLEBAR (REV (G4))

- Adjustable length: 4.9" to 6.3" (125 mm to 160 mm) high.

MXZ and Renegade with 4.7" (120 mm) riser block

860201429
Black/Aluminum
$159.99

- Adjustable length: 6.9" to 9.3" (175 mm to 235 mm) high.
- Works with all stock cables and wiring.

Summit with 7.5" (190 mm) riser block

860201276
Black/Aluminum
$164.99

ADJUSTABLE RISER FOR STRAIGHT HANDLEBAR (XS-XM-XP)

- Adjustable length: 5.1" to 8" (130 mm to 205 mm) high.
- Works with all stock cables and wiring.

Fits Renegade Backcountry (2011 and up) with 6.3" (160 mm) riser block

860200634 • Black/Aluminum

- Adjustable length: 4.7" to 6.3" (120 mm to 160 mm) high.
- Works with all stock cables and wiring.

Fits MXZ and Renegade with 4.5" (115 mm) or 5.1" (130 mm) stock riser 2013 and up. Requires steering pad (506152541) for MXZ and Renegade X-RS

860201116 • Black/Aluminum

- Adjustable length: 7.3" to 9.8" (185 mm to 250 mm) high.
- Works with all stock cables and wiring.

Fits Summit SP, REV-XU Skandic - Vehicles with 8" (205 mm) riser block

860200972 • Black/Aluminum

$159.99

860201116

860200972

Adjusting riser height is easy as flipping a lever. Check it out.
http://www.ski-doo.com/shopping-tools/brochures.html

ADJUSTABLE RISER FOR TAPERED HANDLEBAR (XM-XP)

(Not illustrated)

- Adjustable length: 4.5" to 6.9" (115 mm to 175 mm) high.
- Works with all stock cables and wiring.
- For REV-XP platform; requires steering pad (506152717) (not included).

Summit X & Freeride* - Vehicles with 5.1" (130 mm) riser block

860200973 • Black/Aluminum

$164.99

*Brake line (507032535) required for Freeride 2011 only. To be ordered separately.
**Except MXZ models

NEW

FORWARD ADJUSTABLE RISER (FAR) EXTENSION

- Raises by 1.8" (45 mm) the height of the forward adjustable riser on the REV platform 4th generation.

REV (G4)

860201316

$99.99

NEW

FORWARD ADJUSTABLE RISER (FAR)

- Tool-less customization of the riding position in seconds.
- 4 positions over 4" (10 cm) of fore-aft adjustment.
- Standard on REV platform 4th generation X packages.

REV (G4) MXZ and Renegade

860201320

$99.99

NEW

EXTENSION KIT FOR STRAIGHT HANDLEBAR

- Handlebar extension kit to fit all riding styles.

Fits REV (G4) MXZ and Renegade with 4.7" (120 mm) riser block

860201393 • 6.5" (165 mm)
- Cable included

$69.99

860201427 • 4.7" (120 mm)
- Work with all stock wiring and cables

$59.99

Fits REV (G4) Summit with 7.5" (190 mm) riser block
- Works with all stock wiring and cables.

860201392 • 9.3" (235 mm)

$99.99

860201428 • 7.5" (190 mm)

$79.99

860201393 860201427 860201392 860201428

EXTENSION KIT FOR STRAIGHT HANDLEBAR

- Handlebar extension kit to fit all riding styles.
- Works with all stock wiring and cables.

REV-XS, REV-XR, REV-XP, REV-XU Tundra

860200819 • MXZ 4.5" (115 mm)

$54.99

Fits Renegade Backcountry (2011 and up) with 6.3" (160 mm) riser block

860200821 • 8" (205 mm)

Fits Summit SP, REV-XU Skandic - Vehicles with 8" (205 mm) riser block

860200822 • 9.8" (250 mm)

REV-XS, REV-XR, REV-XP, REV-XU Tundra

860200820 • MXZ 6.3" (160 mm)

$64.99

EXTENSION KIT FOR TAPERED HANDLEBAR

- 6.9" (175 mm) extension.
- 1.8" (45 mm) higher than stock extension.
- Works with all stock wiring and cables (except Freeride 2011*).

Summit X & Freeride - Vehicles with 5.1" (130 mm) riser block

860200758 • Black

$74.99

*Brake line (507032535) required for Freeride 2011 only. To be ordered separately.

REV (G4)

NEW

FULL BODY SKID PLATE

- Injection molded process provides smooth surface, better definition, a perfect fit and easier installation.
- For assertive riders who demand the utmost protection.
- 4 mm thick high impact resistance polypropylene for durability.
- Extra wide, covers vital primary clutch, chaincase and front heat exchanger components to provide maximum underbelly protection.
- Chassis is premarked for easy installation.
- Attachment kit included.

REV (G4)

860201227 • Black
860201441 • Sunburst Yellow
860201442 • Orange Crush
860201443 • White

$129.99

REV-XM & REV-XS

HIGH PERFORMANCE SKID PLATES

- Injection molded process provides smooth surface, better definition, a perfect fit and easier installation.
- For assertive riders who demand the utmost protection.
- Smooth bottom surface to reduce drag.
- 4 mm thick high impact resistance polypropylene for durability.
- Extra wide, covers vital primary clutch, chaincase and front heat exchanger components to provide maximum underbelly protection.
- Attachment kit included.
- Chassis is premarked for easy installation.
- Includes marking for 4-stroke oil change cut-out.

DID YOU KNOW These injection molded skid plates fit precisely and their smooth bottom surface slides easily through snow.

FULL BODY SKID PLATE

- Wide shape for full protection and maximum flotation.

REV-XM, REV XS

860201034 • Lava Red
860201035 • White
860200605 • Black
860200739 • Yellow
860200740 • Orange Crush
860201147 • Manta Green
860201148 • Sunburst Yellow

$129.99

EXTREME SKID PLATE

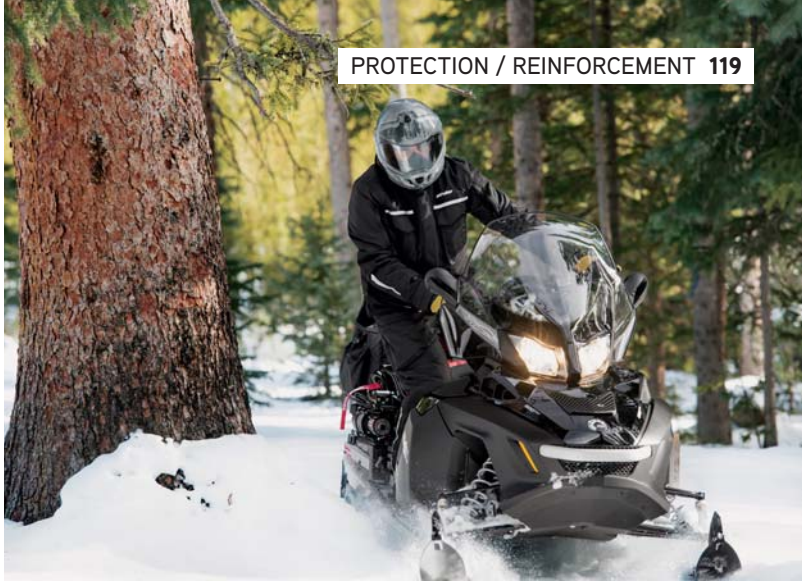
- Relieved A-arm area that reduces chance of snow buildup.

REV-XM, REV XS

860201032 • Lava Red
860201033 • White
860200606 • Black
860200741 • Yellow
860200742 • Orange Crush
860201145 • Manta Green
860201146 • Sunburst Yellow

$124.99

$119.99



REV-XU EXPEDITION

FULL BODY SKID PLATE

- Provides additional underbelly protection in off trail conditions.
- Made of high molecular weight polyethylene.
- Helps glide on snow and prevents snow from sticking to the frame.
- Works with A-arm protectors.
- Standard on REV-XU Expedition SE.

REV-XU Expedition SE, Xtreme, LE 2009 and up

860200563 • Black

$159.99

REAR SKID PLATE

- Extra underbelly protection.
- Protects components such as brakes and gearbox from impacts.
- High molecular weight polyethylene.
- Can be combined with Full Body Skid Plate (860200563) for maximum protection.

REV-XU Expedition SE, Xtreme, LE

860201361 • Black

$139.99

REV-XP/REV-XR

FULL BODY SKID PLATE

- High molecular weight polyethylene embossed with Ski-Doo logo.
- For assertive riders who demand the utmost protection.
- Attachment kit included.
- Chassis is premarked for easy installation.

REV-XP

860200203 • White‡
860200287 • Black

REV-XR

860200167 • Black

$109.99

REV-XU SKANDIC

FULL BODY SKID PLATE

- High molecular weight polyethylene.
- Provides maximum underbelly protection in off trail conditions.
- Helps glide on snow and prevents snow from sticking to the frame.

REV-XU WT 2015 and prior

860200702 • Black

REV-XU WT 2016 and up

860201342 • Black

$204.99

REV-XU SWT 2015 and prior

860200713 • Black

REV-XU SWT 2016 and up

860201343 • Black

$234.99

REV-XU TUNDRA

FULL BODY SKID PLATE

- High molecular weight polyethylene.
- Provides maximum underbelly protection in off trail conditions.
- Helps glide on snow and prevents snow from sticking to the frame.

REV-XU Tundra

860200601 • Black

$169.99

SNOWFLAPS

- Customize your sled.
- Hardware included.

REV-XM

860200689 • White/Black
860201038 • Lava Red/White

REV-XS 129" & 137"

860200765 • White/Black

$94.99

860200689

860201038

REV-XP, REV-XR except GTX, Grand Touring, REV-XU Expedition 2009 and up

860200106 • Black/Yellow
860200467 • Black/Grey

$74.99

860200106

‡While supplies last.

NEW

HEAVY-DUTY REAR BUMPER

- Premium finish heavy-duty aluminum bumper for REV platform 4th generation.
- Doesn't detract from deep snow performance.
- Required for LinQ Snowboard / Ski Rack (860201255).

REV (G4)

860201369 • Black 154"
$249.99

860201431 • Black 165"
$249.99

NEW

HITCH REAR BUMPER

- Premium finish heavy-duty bumper for hitch applications for REV platform 4th generation.
- Required for hitch use.
- Easy attachment with no cutting or drilling.

REV (G4)

860201433 • Black 129"
860201471 • Black 137"
$89.99

860201250 • Black 154"
$94.99

860201424 • Black 165"
$99.99

NEW

FRONT BUMPER

- Easy-install bumper changes the appearance of your sled in minutes.

REV (G4)

502007460 • Black
860201445 • White
$79.99

NEW

REAR BUMPER

- Easy-install bumper changes the appearance of your sled in minutes.

REV (G4)

129"	137"	154"	165"
518329151 • White 518328745 • Black	518329479 • White 518328746 • Black	518329152 • White 518328501 • Black	518329153 • White 518328697 • Black
$79.99	**$79.99**	**$89.99**	**$89.99**

‡While supplies last.

NEW

XC 356T6 CAST BUMPER

- Add extra protection and attitude with this bumper.
- Perfect integration with or without a skid plate.
- Lightweight cast aluminum heat treated construction.

REV (G4)

860201228
$289.99

FRONT BUMPER

• Easy-install bumper changes the appearance of your sled in minutes.

REV-XM, REV-XS

860201167 • Black
860201168 • Orange Crush
860201170 • White
860201171 • Lava Red
860201172 • Fusion Red
860201173 • Manta Green
860201174 • Race Orange
860201175 • Sunburst Yellow

REV XP

502007116 • Black

$79.99

REAR BUMPER

• Easy-install bumper changes the appearance of your sled in minutes.

REV-XP, REV-XR, REV-XS (120" - 137")

518325481 • Black
518328678 • Sunburst Yellow

$79.99

EXTRA BUMPER

• Heavy-duty front bumper.

REV-XU Expedition

860200350 • Black

$209.99

HITCH REAR BUMPER

• Heavy-duty aluminum bumper for hitch applications.
• Easy attachement with no cutting or drilling.
• Does not fit Grand Touring SE, LE.

REV-XP, REV-XM

860200953 • Black 146"
860200954 • Black 154"
860200955 • Black 163"

$89.99

860201135 • Black 174"

$134.99

860200952 • Black 120" - 137"

$79.99

REV-XU Tundra, REV-XS, REV-XP, REV-XR - 120" - 137" Does not fit on Freeride 137"

860200803 • Aluminium 120" - 137"

$69.99

REV-XS MXZ 129"

860201306 • Black 129"

Renegade X-RS, Freeride

860201307 • Black 137"

$79.99

XC BUMPER

• The ultimate front protection for your sled, providing additional front and lateral protection.
• Large center grab area for additional leverage.
• Heavy-duty performance with lightweight aluminum construction.

REV-XM, REV-XS

860201099 • Aluminum
860201318 • Black

$229.99

FULL WRAP-AROUND BUMPER

• Full 1.25" (3.8 cm) diameter heavy-duty steel wrap-around model.
• Delivers added protection to front of sled and side panels.
• Attaches to existing bumper and footrests.

REV-XU Tundra

860200572 • Black

$229.99

HITCH TONGUE

• Easily transforms the C-type Hitch (860200829) into a tongue-type hitch.

511000521 • Black

$11.99

C-TYPE HITCH

• Heavy-duty C-type hitch works in conjunction with Hitch Rear Bumper.

REV-XP, REV-XR, REV-XU Tundra, REV-XS, REV-XM, REV (G4)

860200829 • Black

$49.99

TONGUE TYPE HITCH

• Heavy-duty tongue type hitch works in conjunction with Hitch Rear Bumper.

REV-XP, REV-XR, REV-XU Tundra, REV-XS, REV-XM, REV (G4)

860200902 • Black

$49.99

XU REAR HEAVY-DUTY BUMPER

- Ready to accept 2'' Receiver (860201062).
- Essential for modular towing options.
- Provides complete rear protection.
- Works hard during intense use.
- Features convenient hand-gripping area.

Skandic SWT

860201106 • Black

$309.99

Skandic WT, Expedition SE, LE

860200991 • Black

$289.99

HEAVY-DUTY TONGUE HITCH

- Cast stainless steel construction.
- Mounting pattern for Heavy-duty bumpers and Multi-Mount Drawbar (860201117).

Fits directly on: Skandic WT, SWT, Expedition SE, LE).
Fits on XU Rear Heavy-Duty Bumpers WT (860200991) or SWT (860201106).
Fits on Multi-Mount Drawbar (860201117)

860201023 • Stainless Steel

$59.99

HEAVY-DUTY FRONT BUMPER WITH 2'' RECEIVER

- Increases front protection.
- Integrated 2'' Multi-Mount Receiver.
- Works with 2'' Multi-Mount Drawbar (860201117) and Multi-Mount Winch (860200992).
- Note: Not compatible with Prefilter Grille Kit (860201152).

Skandic WT, SWT

860200987 • Black

$309.99

See the Utility Accessories.
http://www.ski-doo.com/shopping-tools/brochures.html

2" RECEIVER FOR HEAVY-DUTY REAR BUMPER

- Easy installation.
- Standard 2'' size for wide compatibility.
- Allows quick switching of towing hook-ups or winch use.
- Note: Does not fit with stock tongue hitch 2016-2017.

Fits on XU Rear Heavy-Duty Bumpers WT (860200991) or SWT (860201106)

860201062 • Black

$79.99

EXTRA FRONT BUMPER

- Made of heavy duty high-strength steel to protect front and side of body.

REV-XU WT, SWT

860200561 • Black

$279.99

MULTI-MOUNT DRAWBAR

- Allows quick installation and removal of different towing platforms.
- Compatible with J-Hitch (860201142) and Heavy-Duty Tongue Hitch (860201023).

Fits on XU Rear 2'' Receiver for Heavy-Duty Bumper (860201062) and XU Front Bumper with 2'' Receiver (860200987)

860201117 • Black

$104.99

FRONT & REAR HITCH DRAWBAR

- Fits 2" receiver hitch.
- Hitch ball not included.

Fits on XU Rear 2'' Receiver for Heavy-Duty Bumper (860201062) and XU Front Bumper with 2'' Receiver (860200987).

715000972 • Black

$79.99

J-HITCH

- Spring-loaded latch system for quick, secure hook up.

Fits directly on: Skandic WT, SWT, Expedition SE, LE, Xtreme. Fits on XU Rear Heavy-Duty Bumpers WT (860200991) or SWT (860201106). Fits on Multi-Mount Drawbar (860201117)

860201142 • Black

$69.99

FREEDOM FOR YOUR FEET

The new 4th Generation REV platform sets your feet free — free to work with the sled how YOU want. MXZ, Renegade and Summit sleds each come with foot areas specialized for the riding style — MXZ and Renegade sleds with open toe-holds, Summit sleds with a mountain toe hook.

WITH NEW ACCESSORIES, YOU CAN CUSTOMIZE YOUR FOOT AREA FOR HOW YOU RIDE:

DO YOU PUSH OUTWARD WITH YOUR FEET WHEN CORNERING?

1 Add the **Lateral Footplates** for added leverage and comfort.

LIKE THE FREEDOM TO PIVOT YOUR FEET WITH THE OPEN TOE-HOLDS, BUT WANT A TIGHTER FIT FOR THE TOP OF YOUR BOOT?

2 Install the **Shim Kit** (both 10 mm and 20 mm shims are included).

WANT A FULLY LOCKED-IN IN FEEL AND FIT?

1 + 2 Use the **Lateral Footplates** and the **Shim Kit** to keep those boots snug.

The Adjustable Toe-Holds are a totally new experience for mountain riders. They add leverage when you want it and they easily adjust up, down, forward and back for a custom fit. They're also spring-loaded folding — they fold downward when weight is applied from the top — to stay out of the way when shifting from side to side.

FINALLY. CUSTOM FIT FOR HOW YOU RIDE WITH ERGO COMPONENTS

1 2 Step Knee Pads

2 Shim Kit for Toe-Hold

NEW

2 STEP KNEE PADS

- Designed for a perfect fit on the REV platform 4th generation MXZ Ergo-Step side panels to allow easy transition to both stages of the panel.
- Provide comfort and impact absorption.
- Provide extra knee grip.
- Injected molded soft material.
- Easy install with peel-off adhesive.

REV (G4) MXZ and Renegade

860201251

$89.99

NEW

KNEE PADS

- Designed for a perfect fit on the REV platform 4th generation Summit side panels.
- Provide comfort and impact absorption especially on steep descents.
- Provide extra knee grip.
- Injected molded soft material.
- Easy install with peel-off adhesive.

REV (G4) Summit (with electric start)

860201363

$69.99

NEW

ADJUSTABLE TOE-HOLDS

- Die-cast aluminum part.
- Allow user to adjust toe-hold position for different riding styles and control.
- Foldable to ease floorboard access.
- Adjustable 3" (7.6 cm) rearward and 1.5" (3.8 cm) upward.
- Forward/backward and top/down adjustments.

REV (G4) Summit

860201370

$229.99

NEW

FIXED TOE-HOLDS

- Fixed toe-holds for control and leverage when boondocking.

REV (G4) Summit

860201510 • Aluminum

$79.99

NEW

LATERAL FOOTPLATES

- Cast aluminum outer support for riders that use their feet to push in corners, or desire a more locked in feel.

REV (G4)

860201402

$99.99

NEW

SHIM KIT FOR TOE-HOLDS

- Fit your REV platform 4th generation MXZ and Renegade to your size or style.
- Spacers in two heights (10 & 20 mm) let you determine how tight your boots fit the toe-holds.

REV (G4) MXZ & Renegade

860201408

$49.99

TUNNEL GRIP PLATES

- Lightweight plastic grip plates for extra side boot grip in rough riding conditions.
- Developed for the 600 Race sled.
- Sold in pairs with complete hardware.

REV-XP, REV-XR, REV-XS, REV-XM, REV-XU Tundra

860200164

$34.99

SUMMIT RAIL REINFORCEMENT

- Increases rail strength and longevity.

REV-XM 174"

860201218 • Black

$74.99

REV-XP & REV-XM 2013 and up (except Summit 174")

860201005 • Black

$59.99

CHASSIS REINFORCEMENT KIT

- Provides additional reinforcement to your tunnel along with improved grip.
- Easy installation.
- Does not fit Grand Touring.

REV-XS (except Renegade Backcountry/Backcountry X), REV-XP, REV-XR, REV-XU Tundra (except 2015 and up)

860200521 • Viper Red
860200814 • Black
860200815 • Yellow
860200816 • White
860201030 • Lava Red
860201031 • Orange Crush
860201150 • Fusion Red
860201151 • Sunburst Yellow

$69.99

860200813 • Aluminum

$59.99

MULTI-MOUNT 2500 WINCH

- 2,500 lb (1,134 kg) capacity steel-cabled winch with Roller Fairlead.
- Standard 2" receiver-style mount.
- Includes: sidemount carry bracket, 6' (1.83 m) wired remote control, wiring harness and hardware.
- Fits on XU Front Bumper with 2" Receiver (860200987) and XU Rear 2" Receiver for Heavy-Duty Bumper (860201062).

860200992 • Black

$869.99

DID YOU KNOW The front and rear bumpers – and the cargo rack – are designed to hold the multi-mount winch. so you can easily pull from where you need to.

SYNTHETIC WINCH CABLE

- Easier to manipulate than steel cable.
- Replaces the original cable on any factory installed Warn† winch or sold as an accessory by BRP.
- Kit includes synthetic rope and rock guard sleeve.
- Always use with Hawse Guide (860201143) to prevent premature wear.
- 50' (15 m) long, 3,000 lb (1,361 kg) of strength.
- Fits on Multi-Mount Winch (860200992).
- Hawse Guide (860201143) must be installed.

715000539

$114.99

WINCH ACCESSORIES KIT

- Get the most out of your winch.
- Double your pulling power, change your pulling direction and keep your winch in proper working order.
- Includes tree straps, snatch block and shackle.
- To be used with Multi-Mount Winch (860200992).

715002409

$104.99

HAWSE GUIDE

- Replaces Roller Fairlead for longer cable life.
- For use with synthetic cable only.
- Replaces Roller Fairlead when synthetic cable (715000539) is installed.

860201143 • Black

$49.99

NEW

PREFILTER GRILLE KIT

- Prevents water and snow intrusion with a clean, integrated look.
- Easily removable bottom grille.
- Snap-in top grille.
- Airbox pop-off valve filter.

REV (G4)

860201224

$104.99

NEW

HEAVY-DUTY AIR INTAKE FILTERS

- Filter prevents water intrusion and snow buildup.
- Reinforced intake filters, preventing damage in heavy use.
- Replacement for stock filters.

REV (G4)

860201399

$99.99

VENT KIT FOR SIDE PANELS

- Fast air-evacuating overmolded prefilter vents.
- Easy do-it-yourself installation onto premarked production side panels.
- 1¾" holesaw required.
- Use in conjunction with your stock vehicle panels.
- For racing applications only.

DID YOU KNOW The inside of all REV-XM and REV-XS side panels is pre-marked for optimal placement of the vents.

REV-XM

- Kit includes vents for both side panels (24x).
- Foam with foil included.

REV-XM

860200609 • Black

$179.99

REV-XS

- Kit includes vents for both side panels (13x).
- Foam with foil included.

REV-XS

860200750 • Black

$109.99

VENT KIT

- Assortment of replacement or additional vents (7x) with hardware.
- Can be installed on most body panels with relatively flat surface and 2.5 to 3.2 mm thickness.

All models

860200684

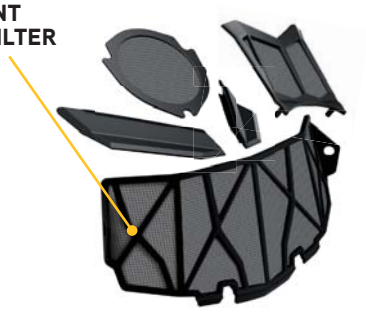
$54.99

REPLACEMENT FRONT PREFILTER

REV-XM, REV-XS

517305029 • Black

$79.99



PREFILTER GRILLE KIT

- Fully integrated overmolded prefilter snap-in grilles.
- Repel and prevent snow from entering bottom pan and hood openings.
- Kit includes easily removable bottom pan grille, lower pan cover plugs, hood grille, and air-box pop-off valve prefilter.

REV-XM, REV-XS

860200610 • Black

$104.99

PREFILTER GRILLE KIT

- Keeps snow and moisture out, lets air in.
- Plastic frame molded over mesh for strength.
- Installs easily.
- Totally integrated design.
- Kit includes filters for bottom pan and hood openings.
- Note: Not compatible with Heavy-Duty Front Bumper with 2" Receiver (860200987).

REV-XU Expedition SE, LE, Skandic WT, SWT

860201152 • Black

$99.99

SHOCK PROTECTORS

- Protect your shocks against tough weather conditions.
- Color-matched nylon protectors.
- Easy installation.
- Sold in pairs.

280000327 • Bee

$24.99

860201128 • Black
860201129 • White
860201130 • Yellow

$19.99

BRING YOUR STYLE TO THE SNOW WITH THE ONLY SLED WRAPS ENDORSED BY BRP

SCS has led the industry with fresh looks that complement both sleds and riders. With designs from wild to mild, they can give your new – or older – sled a look all its own. Especially when you consider how they can customize an existing design with colors and logos, and even create a design you come up with.

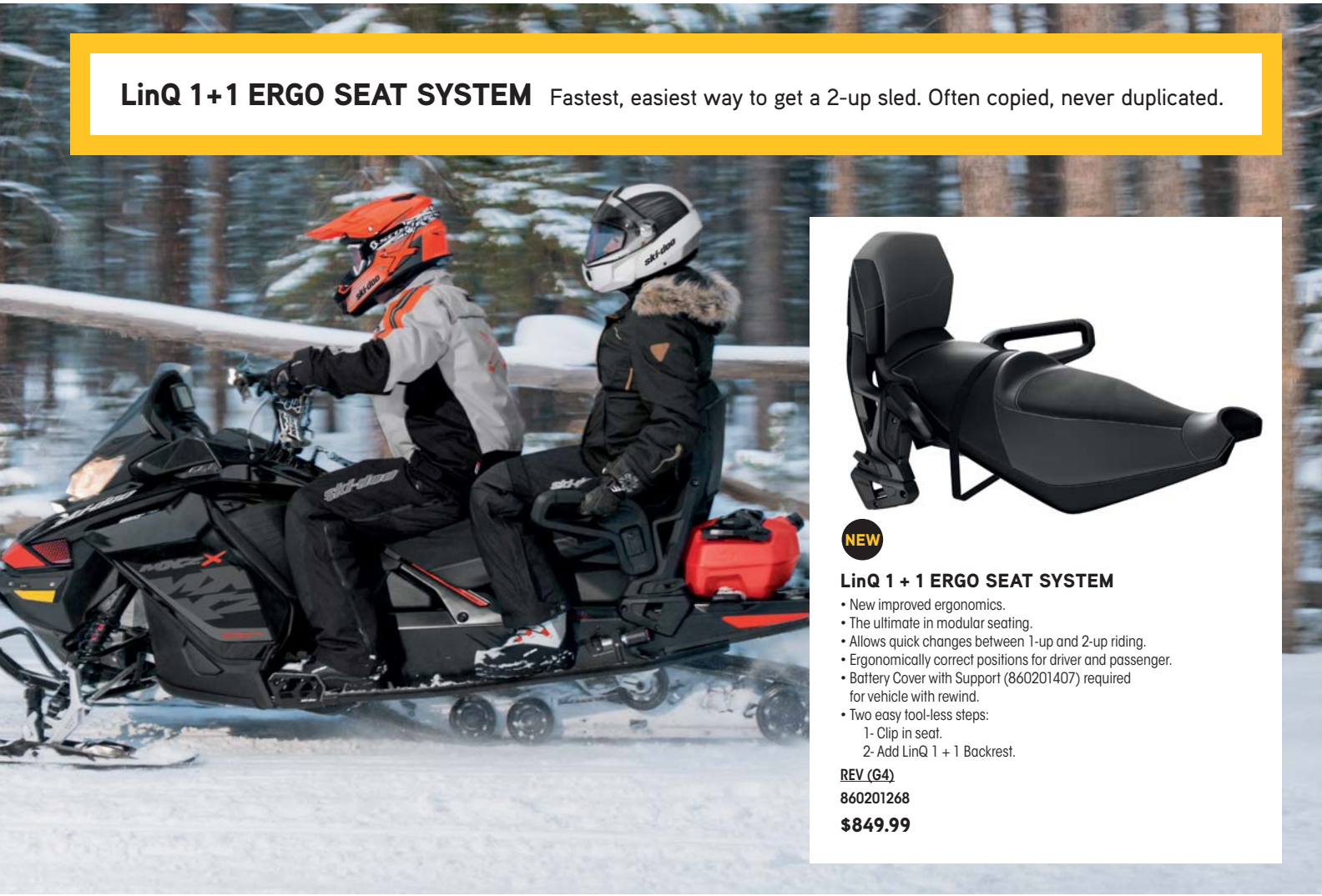
The wraps are of the highest quality – 4 mil vinyl overlaid with an 8 mil UV protective laminate. You get bright vibrant colors that hold up to both the rigors of snowmobiling and harsh weather conditions.

Note: These new graphics are also offered on XM and XS platforms.

Produit Autorisé
Licensed Product

Available at participating Ski-Doo dealers and www.scsskidoowraps.com

LinQ 1+1 ERGO SEAT SYSTEM Fastest, easiest way to get a 2-up sled. Often copied, never duplicated.



NEW

LinQ 1 + 1 ERGO SEAT SYSTEM

- New improved ergonomics.
- The ultimate in modular seating.
- Allows quick changes between 1-up and 2-up riding.
- Ergonomically correct positions for driver and passenger.
- Battery Cover with Support (860201407) required for vehicle with rewind.
- Two easy tool-less steps:
  1- Clip in seat.
  2- Add LinQ 1 + 1 Backrest.

REV (G4)

860201268

$849.99

NEW

1 + 1 SEAT

- Quick, easy installation and ideal ergonomics for driver and passenger.
- Full tunnel capacity is maintained and allows additional accessories to be added.
- Battery Cover with Support (860201407) required for vehicle with rewind.

REV (G4)

860201267 • Black

$399.99

NEW

HEATED SEAT

- Add warmth with this heated seat.

REV-XS, REV-XM

860201458 • Black

$499.99

NEW

HEATED 1 + 1 GRIPS

- Allow your passenger to ride in comfort in all conditions.
- Easy unplug.

REV (G4)

860201456

$159.99

NEW

LinQ 1 + 1 BACKREST ANCHOR BASE KIT

- Allows installation of LinQ 1 + 1 Backrest on more than one vehicle.

REV (G4)

860201321 • Black

$174.99

LinQ 1 + 1 COMPLETE SEAT SYSTEM

- The ultimate in modular seating.
- Allows quick changes between 1-up and 2-up riding.
- Ergonomically correct positions for driver and passenger.
- Two easy tool-less steps:
  1- Clip in seat.
  2- Add LinQ 1 + 1 Backrest.

REV-XM, REV-XS, REV-XP & REV-XR (except GTX, Grand Touring), REV-XU Tundra

860200575

$824.99

Watch the video of the LinQ 1 + 1 Complete Seat System in action. http://www.ski-doo.com/shopping-tools/brochures.html

1 + 1 SEAT

- Quick, easy installation and ideal ergonomics for driver and passenger.
- Full tunnel capacity is maintained and allows additional accessories to be added.

REV-XM, REV-XS, REV-XP & REV-XR (except GTX, Grand Touring), REV-XU Tundra

860200665

$484.99

LinQ 1 + 1 BACKREST

- Option for 1 + 1 Seat (860200665) when not sold as a kit.
- Can be locked using a padlock (not included).

REV-XM, REV-XS, REV-XP & REV-XR (except GTX, Grand Touring), REV-XU Tundra

860200595

$434.99

Note: See p.164 for LinQ 1 + 1 Backrest Rubber Latch and Anchor Base Kit.

1 + 1 PASSENGER MUFFS

- Muffs fit snugly around the passenger handles and provide total warmth even on the coldest days.
- Easy to install and remove.

Fits seat with handles and air deflectors

860200831 • Black

$49.99

Fits seat with handles only

860201028 • Black

$29.99

HEATED 1 + 1 GRIPS WITH GUARDS

- Allow your passenger to ride in comfort in all conditions.
- Self disconnect.

2016-2017 XS-XM models

860201322

Fits on 1 + 1 LinQ Backrest (860200595). 2015 models and prior

860200584

$159.99

2-UP SEAT

- Extended seat providing convenient 2-up riding.
- Complete seat assembly with passenger strap.
- Replaces existing seat in seconds.
- Ideal use with LinQ Snowboard/Ski Rack (860201222).

REV-XP, REV-XR, REV-XU Tundra, REV-XM, REV-XS

860201314 • Black

$339.99

ADJUSTABLE BACKREST

- Adjustable, and works in conjunction with 2-up Seat (860201314).
- Positionable for passenger or driver use.
- Rigid steel frame and integrated foam pad.
- Easy, tool-less removal when not needed.

REV-XP, REV-XR, REV-XU Tundra, REV-XM, REV-XS

860200823 • Black

$289.99

2-UP SEAT / BACKREST COMBO

- Extended seat with backrest providing convenient 2-up riding.
- Complete seat assembly with passenger strap.
- Replaces existing seat in seconds.
- Adjustable backrest enhances comfort level.
- Positionable for passenger or driver use.
- Easy, tool-less removal when not needed.

REV-XP, REV-XR, REV-XU Tundra, REV-XM, REV-XS

860200571

$629.99

2 + 1 SEAT

- 2 + 1 seat specifically designed for REV-XR GTX, Grand Touring platforms, allowing you to ride 3-up.
- Enables you to enjoy all the same benefits you have been accustomed to with previous models.

REV-XR GTX, Grand Touring, REV-XS Grand Touring (except Sport)

860200170‡

$349.99

SEAT BACKREST

- Enhances the comfort level of your seat by adding this backrest option.

REV-XU Skandic

860200060

$329.99

PASSENGER SEAT / BACKREST FOR XU

REV-XU WT, SWT, Expedition SE, LE, Xtreme

619400068

$729.99

ADJUSTABLE TOE-HOLD KIT

- Kit provides easy adjustment to the toe-hold to match your riding style.

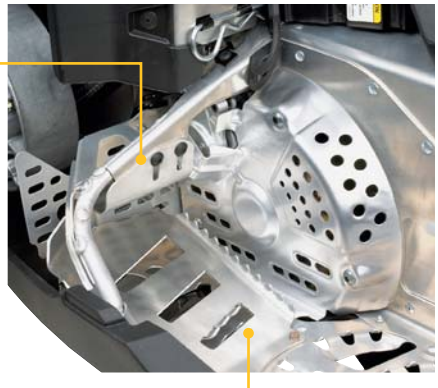
REV-XP, REV-XR, REV-XU Tundra, REV-XS, REV-XM (except 600 ACE & 900 ACE)

860200743 • Aluminum

$34.99

860200744 • Black

$39.99



FRONT FOOTREST

- A must for aggressive riders.
- Sloped plate provides a relaxed ankle position during long rides.

REV-XS, REV-XM

860200906 • Black

$84.99

‡While supplies last.

REAR FOOTREST KIT

- Provides additional boot grip at the rear of the tunnel when climbing.

REV-XM

860200889 • Black

$74.99

PASSENGER FOOTREST KIT

- Fits 137" and up.
- Does not fit with rMotion adjusters.

REV-XP, REV-XR, REV-XU Tundra, REV-XS

860200810 • Aluminum

$44.99

LinQ. FAST. EASY. SECURE. AND NOW EVEN MORE VERSATILE.

NEW

SR 21 L LinQ TUNNEL BAG

- Semi-rigid expandable LinQ tunnel bag.
- 21-liter (5.5 US gallons) capacity.
- Can be installed on top of Stackable LinQ Fuel Caddy - 15 L (860201265) or behind seat.
- All the benefits of LinQ - simple, fast, secure with an integrated look.
- Utilizes LinQ mounting system (Patent US 8777531 & US 8875830).
- Easy one-second on/off tool-less system.
- LinQ Cargo Base Kit included (860200583).

REV (G4)

860201273

$179.99

DID YOU KNOW Now you can take both extra fuel and a LinQ cargo bag on your short track sled – the NEW SR 21 L LinQ Tunnel Bag locks on top of the new Stackable LinQ Fuel Caddy - 15 L.

Short 10 + 3 L

Medium 19 + 3 L

LinQ PREMIUM TUNNEL BAG

- All the benefits of LinQ - simple, fast, secure with an integrated look.
- Semi-rigid expandable tunnel bag.
- Easy one-second on/off tool-less system.
- Utilizes LinQ mounting system (Patent US 8777531 & US 8875830).
- LinQ Cargo Base Kit included (860200583).

REV (G4), REV-XM, REV-XS, REV-XP & REV-XR (except GTX, Grand Touring). Does not fit on REV-XU Tundra. 2008-2012: Drilling holes and LinQ Protective Decal (860200767) required. 2013 and up: Tunnel ready with decal and preperforated holes.

860200622 • Short 10 + 3 L

$144.99

860200620 • Medium 19 + 3 L

$154.99

LinQ CARGO BOX - 40 L

- Rigid molded plastic construction with integrated design.
- Provides dry, safe storage.
- Attaches using 2 sets of LinQ mounts (included).

Fits 137" and longer with 1-up seat or 1 + 1 seat

860201100 • Black

$359.99

LinQ SADDLEBAGS

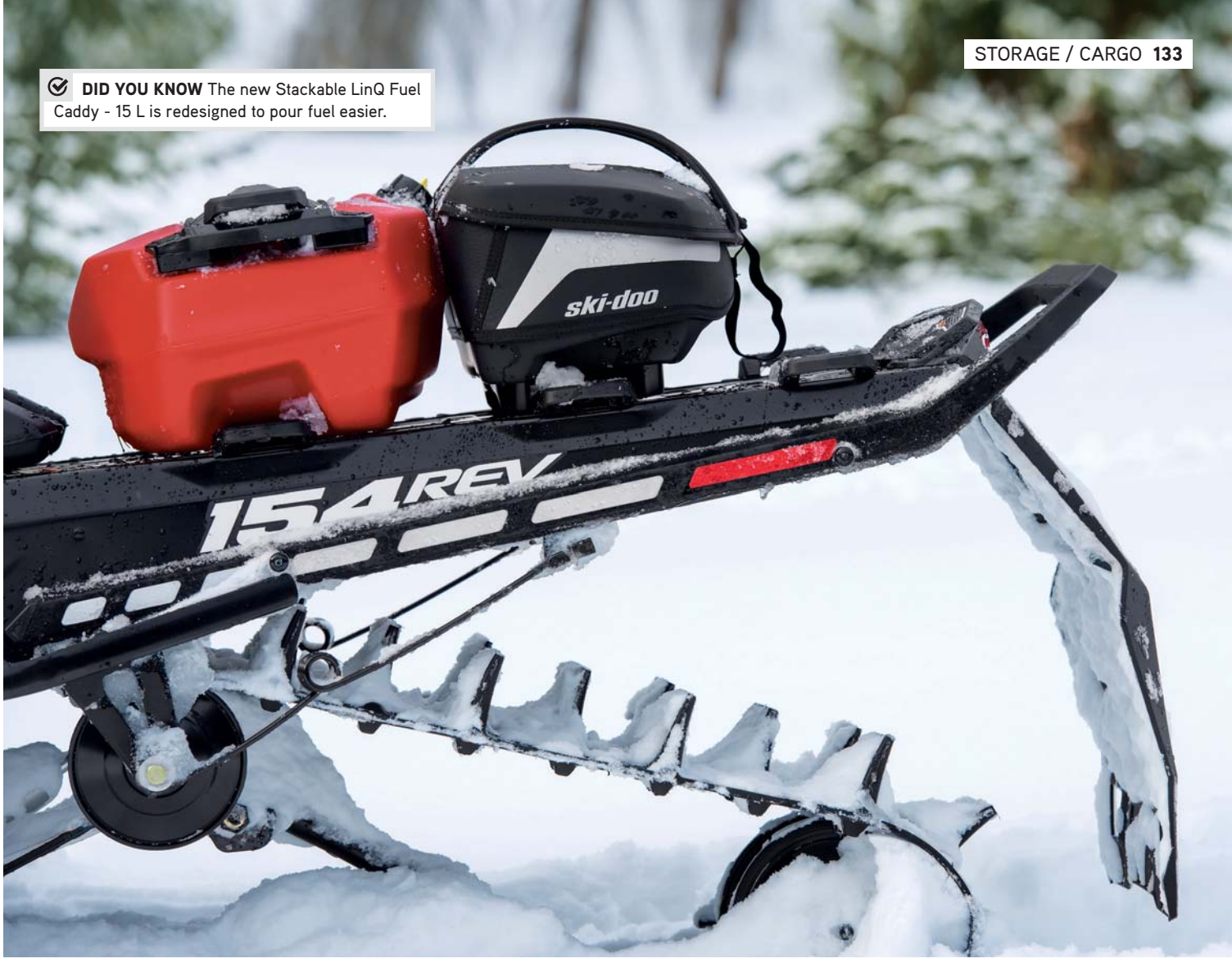
- Premium semi-rigid saddlebags, utilizing the LinQ mounting system (Patent US 8777531 & US 8875830).
- Easy attach and remove.
- Can be used in conjunction with additional LinQ mounted accessories at the same time.
- 26-liter capacity (2 x 13 L) (6.9 US gallons) (2 x 3.45 US gallons).
- LinQ Cargo Base Kit not included (860200583).
- LinQ Fastner included (715001707).

REV (G4), REV-XP, REV-XR, REV-XS, REV-XM (except Grand Touring, GTX & MXZ X-RS)

860200624 • Black

$249.99

DID YOU KNOW The new Stackable LinQ Fuel Caddy - 15 L is redesigned to pour fuel easier.



NEW

STACKABLE LinQ FUEL CADDY - 15 L

- New design for easier pouring.
- 15-liter (4 US gallons) capacity.
- Allows a LinQ tunnel bag to stack on top for more storage.

Note: Fuel caddies cannot be stacked.

REV (G4), REV-XU with LinQ Adaptor Plate (860200945)

860201265

$169.99

NEW

SHIMS FOR STACKABLE LinQ FUEL CADDY - 15 L

- Required to fit stackable fuel caddy on REV-XS, REV-XM, REV-XP.

REV-XS, REV-XM, REV-XP

860201432

$49.99

LinQ FUEL CADDY - 11 L

- On/Off in a few seconds.
- 11-liter (3 US gallons) capacity.
- LinQ Cargo Base Kit included (860200583).
- Cannot be installed with the Luggage Rack Reinforcement Plates (860200798).

860200585

$129.99

LinQ FUEL CADDY REPLACEMENT CAP AND NOZZLE

860201109

$10.99

REV (G4), REV-XM, REV-XS, REV-XP, REV-XR, REV-XU Tundra. Does not fit Grand Touring.
2008-2012: Drilling holes and Protective LinQ Decal (860200767) required.
2013 and up: Tunnel ready with decal and preperforated holes.

The low profile design of the LinQ Fuel Caddy keeps the sled's center of gravity low to maintain its excellent handling.

Get a closer look at the LinQ Premium Tunnel Bag and LinQ Fuel Caddy. Go to: http://www.ski-doo.com/shopping-tools/brochures.html

This rack attaches and removes in seconds, so you mount it strictly when you need it. Also, you can use it with other LinQ accessories, like a bag or fuel caddy.

LinQ SNOWBOARD/SKI RACK

- The ultimate solution for carrying skis or snowboard equipment.
- Lightweight rack uses patented LinQ system for quick, easy mounting.
- Easy to convert from snowboard to skis in minutes - fits all sizes.
- Kit includes all necessary LinQ hardware.
- Requires appropriate heavy-duty rear bumper.

REV-XP, REV-XM 154" and longer

860201222 • Black/Aluminum

$339.99

NEW

REV (G4)

860201255 • Black/Aluminum

$399.99

Watch how easy the LinQ Snowboard/Ski Rack is. Go to: http://www.ski-doo.com/shopping-tools/brochures.html

STRAP KIT FOR LinQ SNOWBOARD/SKI RACK

- Replacement parts for Snowboard/Ski Rack (1 strap per kit).
- Can also be used for switching rack from snowboard to skis easily (2 kits required for conversion).
- Hardware included.

860201304 • Black

$20.99

INTERIOR PLASTIC SUPPORT FOR LinQ SNOWBOARD/SKI RACK

511001061

$10.99

EXTERIOR PLASTIC SUPPORT FOR LinQ SNOWBOARD/SKI RACK

511001059

$10.99

PROTECTIVE DECAL FOR LinQ SNOWBOARD/SKI RACK

(Not illustrated)

- To protect your tunnel from ski tip scratches when using the LinQ Snowboard/Ski Rack.

516006982 • Clear

$6.99

SLIM TUNNEL BAG WITH LinQ SOFT STRAP

- Utilizes LinQ Cargo Base Kit (860200583) and soft strap for mounting.
- Low profile, positioned flat on tunnel, for convenient out of the way storage.
- Easy access full wrap around zipper.
- Top mount shovel pocket.
- Utilizes LinQ mount with lightweight strap and buckle (included).
- LinQ Cargo Base Kit included (860200583).
- 15-liter (4 US gallons) capacity.

137" and longer with 1-up seat

860200935 • Black

$139.99

TUNNEL BACKPACK WITH LinQ SOFT STRAP

- Utilizes LinQ Cargo Base Kit (860200583) and soft strap for mounting.
- Includes a compartment for the Ski-Doo Shovel (860200574) and 2.8 m Avalanche Probe (520000408) (not included).
- Quick-disconnect system instantly transforms the bag into a backpack.
- LinQ Cargo Base Kit (2x) (860200583) not included but required to mount the bag on the tunnel.
- 28-liter (7.4 US gallons) capacity.

137" and longer with 1-up seat

860200939 • Black
860200940 • Orange

$149.99

SHOVEL WITH SAW HANDLE

- Lightweight shovel with retractable saw handle.
- Can be disassembled and easily stored on your sled.

860200574

$89.99

SAW & HANDLE REPLACEMENT FOR SHOVEL

- Replacement saw blade and handle for Ski-Doo Shovel.

860200794

$44.99

2.8 M AVALANCHE PROBE

- Lightweight, durable and strong 1/2" (12 mm) aluminum tubing construction.
- 7-16" (40 cm) color-coded sections.
- Weight: 13 oz. (370 g).

520000408

$104.99

RISER BLOCK BAG

- Innovative 2-pocket carry bag for secure storage around the steering riser block.
- 3W heated insulated pocket design reduces the chance of water bottles freezing and increases the battery life of small electronic equipment.
- Includes RCA adaptor kit.
- Requires Heated Visor Kit (860201234) sold separately.

Long

REV-XP Summit, REV-XU Tundra, REV-XM (for Risers 175 mm and up)

860200677 • 5-liter (1.32 US gallons)

$99.99

Short

REV-XM, REV-XS, REV-XP, REV-XR, REV-XU Tundra, except Grand Touring & GSX

860200676 • 3-liter (0.8 US gallon)

$89.99

NEW

LinQ ERGO SUMMIT SEAT BAG

- LinQ seat bag for REV platform 4th generation Summit.
- Integrated storage that stays out of the way.
- 4-liter (1 US gallon) capacity.
- Easy on/off.
- Can be used with tunnel bags or fuel caddy.
- Vehicles with pull start require the Battery Cover and Support (860201407).

REV (G4) Summit

860201355 • Black

$109.99

OIL SUPPORT CADDY/ GOGGLE BAG

- Multi purpose bag.
- Allows you to easily access and carry an extra liter of XPS oil or a spare set of goggles.
- Installs conveniently on top of the CVT cooling system.
- Models without E-TEC engine need the Acoustic Plate (512060847).

REV-XM, REV-XS

860200614 • Black

$49.99

EXTREME SUMMIT SEAT BAG

- A must for extreme mountain riding.
- Low profile bag lets you add storage without getting in the way of your riding needs.
- Fully integrated and allows for the REV-XM seat to easily clip on/off in seconds without taking away any tunnel space.
- Works in conjunction with REV-XM seat.
- 5-liter (1.2 US gallons) capacity.
- Inner zipper to access underseat compartment.

REV-XM

860200745 • Black

$79.99

TUNNEL BAG

- Includes a compartment for the Ski-Doo Shovel (860200574) (not included).
- Chassis premarked for easier installation of bags on tunnel.
- 40-liter (10.6 US gallons) capacity.
- Extension provides more cargo space when required.

REV-XP, REV-XR, REV-XU Tundra, REV-XS, REV-XM

860200824 • Black/White

$139.99

MXZ TUNNEL BAG

- Utilizes our cleat and bag retaining system (Patent USD607,313).
- Innovative thermo-formed tunnel bag, designed for a slick look and rigid structure.
- Chassis premarked for easier installation of bags on tunnel.
- 25-liter (6.6 US gallons) capacity.

REV-XP, REV-XR, XF, REV-XU Tundra, REV-XM, REV-XS

860200826 • Soft

$99.99

NEW

BATTERY COVER AND SUPPORT

- Use in conjunction with LinQ Ergo Summit Seat Bag (860201355) or 1 + 1 Ergo Seat System (860201268) on models without a battery standard.

REV (G4)

860201407

$44.99

NEW

CGX2 CAMERA

- 4K HD and 1080p at 60fps.
- 2" LCD display screen.
- Waterproof housing of up to 50 m underwater and the 2.4gh waterproof remote.
- Comes with 32GB micro SD card class 10 and 9 mounts.
- Wi-Fi available to control your camera from your smart phone or tablet with the free i-Cyclops App for iOs and Android.
- *Exclusive to Ski-Doo dealers.

2866860090

$299.99

MONTANA† GPS AND SUPPORT KIT

- One of the best GPS systems available, designed to fit your sled perfectly with plug-and-play hook-up.
- Glovebox Extension required (860200707) for REV-XS, REV-XM.
- Universal GPS Mount (860201018) required for REV-XU, REV-XR.

REV-XM, REV-XS, REV-XU, REV-XR

860201417

$659.99

DID YOU KNOW The Montana GPS has a screen lock feature so you can see where you're headed even during the roughest rides.

NEW

GARMIN ZUMO† 590 GPS

- The latest from GPS expert Garmin.
- 5" sunlight-readable, glove-friendly screen.
- Bluetooth† technology can pair with cell phones.
- US topo maps included, trail maps can be downloaded.
- Mounting cradle and harness included.
- Glovebox Extension / GPS Support (860201249) required for mounting.

REV (G4)

860201263

$899.99

UNIVERSAL GPS MOUNT

- Kit includes mount, wiring harness and all hardware.
- GPS sold separately.
- Requires Montana GPS and Support Kit (860201417).

REV-XR, REV-XU

860201018 • Black

$74.99

NEW

GARMIN ZUMO 590 GPS MOUNT SUPPORT KIT

- Mount for Garmin Zumo 590 GPS allows use on more than one vehicle.
- Plug-and-play wire harness.
- Included in Garmin Zumo 590 GPS (860201263)

REV (G4)

860201262

$184.99

GLOVEBOX LINER

- Padded liner provides an inner bag within your glovebox storage.
- Provides a finished interior and additional protection to your items.
- Includes an organizer pocket for small items.
- Can be used with 3W Heater for Bags (515176786) (not included).

REV-XM, REV-XS 2013

860200678 • Black‡

$54.99

GLOVEBOX LINER

- Padded inner liner protects items.
- Design seals against snow intrusion.
- Glovebox Extension compatible.
- Can be used with 3W Heater for Bags (515176786) (not included).

REV- XM, REV-XS 2014 and up

860201084 • Black

$49.99

NEW

GLOVEBOX LINER

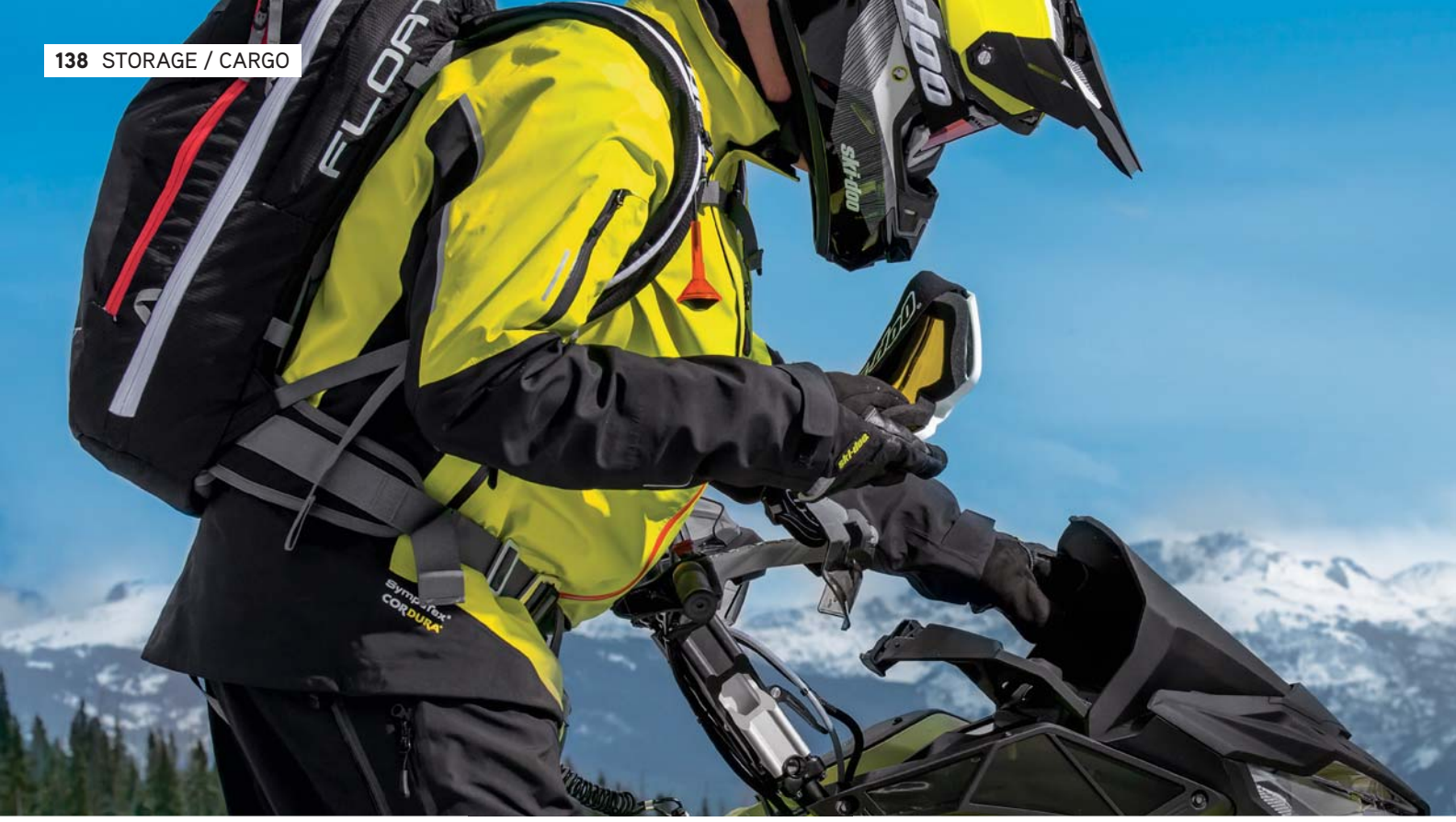
- Thermoformed liner has a soft finish interior.
- Features one pocket to separate items.

REV (G4)

860201270

$49.99

‡While supplies last.



NEW

GLOVEBOX EXTENSION / GPS SUPPORT

- New design for REV platform 4th generation models doubles the storage with 4-liter (1 US gallon) capacity.
- Can be used with or without windshield.
- Door provides perfect mount for GPS (sold separately).
- Replaces stock storage compartment cover.

REV (G4)

860201249 • Black

$99.99

GLOVEBOX EXTENSION

- Increases storage capacity by 50%.
- Replaces stock storage compartment cover.
- Face door allows for perfect positioning and mounting of GPS.
- GPS sold separately.
- 2-liter (0.5 US gallon) capacity.

REV-XM, REV-XS

860200707 • Black

$79.99

DASHBOARD BAG

- Easy-access bag designed to provide extra storage.
- 2-liter (0.5 US gallon) capacity.

REV-XP

860201176 • Black

REV-XR, REV-XU Tundra

860201177 • Black

$49.99

TANK BAG

- Easy-access bag with full-length zipper.
- Access fuel cap without removing bag.
- 11-liter (2.9 US gallons) capacity.

REV-XP

860200297 • Black

$94.99

TANK BAG 5 L

- Low profile bag.
- Easy-to-view map pocket.
- Access fuel cap without removal.
- Ready for 3W Heater for Bags (515176786) (not included).

REV-XM, REV-XS

860200974 • Black

$94.99

HEATED TANK BAG

- Easy-access bag with full-length zipper.
- Map pocket.
- Access gas cap without removing bag.
- 3W heated, insulated pocket for battery-powered electronics, e.g. cell, GPS.
- Access to the 12V plug-in port.
- 2.4-liter (0.6 US gallon) capacity.
- Includes RCA adaptor plug kit.
- Requires Heated Visor Kit (860201234) (not included but required for installation).

REV-XR, REV-XU Tundra

860201127 • Black

$94.99

CARGO BAG

- Rugged all-purpose utility design.
- Sealed PVC construction.
- Large capacity (approx. 80 liters, 21 US gallons).
- Integrated attachment system.
- Includes rain cover for added resistance to the elements.
- Can also double as travel/duffle bag.

REV-XU Tundra 137", 154" & Summit

860200801

$164.99

Rain Cover

LinQ RETROFIT KIT FOR CARGO BAG

(Not illustrated)

- 4 straps to adapt the Cargo Bag to LinQ system.
- LinQ Cargo Base Kit (2x) (860200583) not included but required to mount the bag on the tunnel.

860200941 • Black

$19.99

TUNNEL ROLL TOP BAG - MEDIUM 25 L WITH LinQ SOFT STRAP

- Utilizes LinQ Cargo Base Kit (860200583) and soft strap for mounting (included).
- Compact roll-up polyester bag.
- Expandable to 25-liter (6.6 US gallons) capacity.
- Convenient, lightweight storage.

REV (G4) REV-XP, REV-XR, REV-XS, REV-XM (except Grand Touring and GTX)

860200787 • Black

$89.99

COMBO BAG

- Utilizes easy on/off clip system.
- No need to remove seat.
- Multiple pockets.
- 45-liter (11.9 US gallons) capacity.

REV-XP, REV-XR, REV-XS, REV-XU

860200623

$129.99

LinQ 1 + 1 BACKREST BAG

- Attaches itself on the LinQ 1 + 1 Backrest (860200595) and easily on/off.
- Expandable 14-liter + 3-liter (3.7 US gallons + 0.8 US gallon) capacity.
- Can be used in conjunction with the Fuel Caddy or Medium/Short Premium Tunnel Bag.

1 + 1 & Grand Touring Backrest

860200621 • Black‡

$164.99

‡While supplies last.

SEMI-RIGID TUNNEL BAG

- Versatile multi-configuration bag.
- High-quality hard topped for better protection.
- Use alone or with Modular Tunnel Bag Extension (860200173).
- Attaches to backrest when combined with Fuel Caddy.
- 31.3-liter (7.1 US gallons) capacity.

REV-XR GTX & Grand Touring, REV-XS Grand Touring

860200174 • Black

$154.99

MODULAR TUNNEL BAG EXTENSION

- Versatile multi-configuration bag.
- Use alone, with or without Fuel Caddy, or with Semi-Rigid Tunnel Bag (860200174).
- Installs and removes easily, horizontally or vertically.
- 38-liter (10 US gallons) capacity.

REV-XR GTX & Grand Touring, REV-XS Grand Touring

860200173 • Black

$144.99

EXTRA LARGE XU BAG

- Extra large 150-liter (40 US gallons) capacity shaped to fit utility model racks.
- Weather-resistant polyester, includes compartment organizer.

REV-XU Skandic WT, SWT, REV-XU Expedition SE, LE, Xtreme

860201179 • Black

$309.99

UNDER SEAT STORAGE BAG

- Padded bag protects your items.
- Makes them easy to transport.

REV-XU Skandic WT, SWT, REV-XU Expedition SE, LE & Xtreme

860201063 • Black

$69.99

CARGO BOX

- 45-liter (11.88 US gallons) capacity.
- Made of durable polyethylene.
- Provides additional secure storage.
- Convenient flip top provides easy access to stored goods.
- Standard on SE models.

REV-XU Skandic WT, SWT, REV-XU Expedition SE, LE & Xtreme

860200395 • Black

$249.99

RACK AND NET KIT FOR CARGO BOX

- Rack to carry additional items on top of Cargo Box (860200395).
- Net to better secure items inside Cargo Box cover.

860201025 • Black

$129.99

CARGO CENTER BOX

- 20-liter (5.28 US gallons) capacity.
- Easily interchangeable with passenger seat.
- Provides additional storage space.
- Can be padlocked.
- Can be installed in conjunction with Cargo Box (860200395).

REV-XU Skandic WT, SWT, REV-XU Expedition SE, LE, Xtreme

860200732 • Black

$269.99

BRING IT ALL, OR ONLY WHAT YOU NEED

1. Gun Boot 6.0 Impact by KOLPIN
2. Gun Boot Rack
3. XU Rear Heavy-Duty Bumper / p. 122

GUN BOOT 6.0 IMPACT† BY KOLPIN†

- Features largest interior room of all Kolpin Gun Boot cases.
- Extra room for pistol-grip-type weapons and small bipods.
- Easily fits firearms up to 51" (130 cm) in total length.
- Provides ample room for 60 mm scopes.
- Hatchback design allows easy access.
- Snap-close cover with locking capability.
- Ergonomically designed handle and molded attachment points for sling.
- Designed to accommodate left and right hand bolt-action rifles and shotguns.
- Includes removable, shock absorbing foam and nylon impact liner for superior interior protection.
- Requires appropriate mounting kit for installation.

715001419

$79.99

GUN BOOT RACK

- Required for Gun Boot use on vehicle.
- Can be installed on either side of the sled, facing forward or rearward and at any angle.

REV-XU Skandic WT & SWT, REV-XU Expedition SE, LE, Xtreme

860200984 • Black

$164.99

There's extra room for pistol-grip-type weapons and small bipods, left and right hand bolt-action rifles and shotguns.

LinQ REAR CARGO RACK

- Provides mounting point for LinQ Cargo Base Kit (860200583).
- Compatible with LinQ fuel caddy and tunnel bags.
- Easily interchangeable with passenger seat.
- Provides additional cargo space.

REV-XU Skandic WT, SWT, Expedition SE, LE, Xtreme

860200914 • Black

$189.99

REAR RACK EXTENSION

- Delivers increased cargo space.
- Does not fit with XU Rear Heavy-Duty Bumper (860201106).

REV-XU Skandic WT, SWT, REV-XU Expedition SE, LE, Xtreme

860200700 • Black

$79.99

LUGGAGE RACK REINFORCEMENT PLATES

- Additional reinforcement for your long and short rear rack.
- Made of high strength steel.
- Sold in pairs.

REV-XM, REV-XP, REV-XR, REV-XU Tundra, REV-XS

860200798 • Black

$44.99

TRACTION MADE EASIER.

At BRP we make our snowmobiles to be easy, including adding traction for riding in icy conditions. So we've gone to great lengths to engineer and test parts that install easier and integrate with your sled – things like tracks pre-marked for stud installation, carbide runners of different sizes and new snap-in tunnel protectors for the 4th Generation REV sleds. So if you've made the decision to add more traction, be confident we have you covered with the right parts. Here is some advice on choosing and installing them.

286 PHANTOM SERIES STUDS & SUPPORT PLATES BY WOODY'S

- A complete line of traction products developed specifically for Ski-Doo's REV-XP, REV-XR, REV-XS & REV (G4) tracks.
- Due to the unique track design, this is the only traction product available to maintain track warranty and track life.
- Kit complete with stud, nut and support plate.
- The only traction product approved by BRP.

REV-XS, REV-XP, REV-XR, REV (G4)

860200718 • 5/16 - 1.075"
Pack of 84 (for 120" track)
$259.99

860200720 • 5/16 - 1.075"
Pack of 500
$1,414.99

860200722 • 5/16 - 1.325"
Pack of 96 (for 137" track)
$334.99

860200719 • 5/16 - 1.075"
Pack of 96 (for 129" & 137" track)
$304.99

860200721 • 5/16 - 1.325"
Pack of 84 (for 120" track)
$284.99

860200723 • 5/16 - 1.325"
Pack of 500
$1,553.99

NEW

860201281 • 5/16 - 1.325"
Pack of 90 (for 129" track)
$299.99

PHANTOM SHARP STUDS & SUPPORT PLATES BY WOODY'S

- All the benefits of 286 Phantom Series studs.
- Unique track design makes it the only traction product available to maintain track warranty and track life.
- Kit complete with stud, nut and support plate.
- The only traction product approved by BRP.

REV-XS, REV-XP, REV-XR, REV (G4)

860200729 • 5/16 - 1.325"
Pack of 84 (for 120" track)
$334.99

860200731 • 5/16 - 1.325"
Pack of 500
$1,934.99

860200730 • 5/16 - 1.325"
Pack of 96 (for 129" & 137" track)
$374.99

TUNNEL PROTECTOR KIT

- New design, installs in seconds.
- Provides proper protection for stud installation or pre-studded track.
- So unique it's patent pending.
- Pattent pending US20160152304.

NEW

REV (G4)

860201280

- Protects your bulkhead and heat exchangers in all conditions.

REV-XP (except fan-cooled), REV-XR, REV-XS 120", 129" & 137"

860200802

REV-XP fan-cooled 120" & 137", REV-XU Tundra 137"

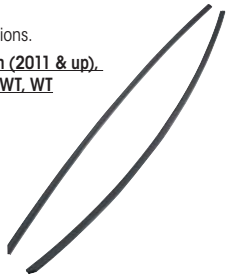
860200381

$54.99

REV-XU Expedition (2011 & up), REV-XU Skandic SWT, WT

860200757

$99.99



Balance your traction

Be sure to consider both front and rear traction to balance your sled's handling. Too much front bite allows the rear or track to be loose and too much rear traction pushes the front through corners.

Start with the front carbides

Choose how much bite you want up front first. If you want really positive turning, Executive Carbides with 8" (20 cm) of 60˚ turning carbide are a good choice. Options for more or less turning carbide are available, too. Pilot TS adjustable skis have four types available with both different amount of carbide and depth. Some experimenting with different types might be useful for you to find just the right combination for your riding style and predominant conditions.

Stud Your Track

Using studs in your track provides you with better control and confidence in slippery spots and balances ski-runner carbides. Your Ski-Doo snowmobile's track is pre-marked with the right number and location for studs that would balance nicely with the Executive Carbides for most riders
84 studs for a 120" (305 cm) track;
90 studs for a 129" (327 cm) track;
96 studs for a 137" (348 cm) track.

Does it matter which studs you use on your Ski-Doo snowmobile?

Yes. Most new Ski-Doo trail sleds built on the REV-XS and REV (G4) platforms use the RipSaw Lite track, which is a single-ply design to make it lighter and more responsive. This unique construction means the studs and backer plates need to be specially designed to grip the track effectively. The Woody's 286 Phantom stud and backer kits available through BRP are the only studs that have been tested by BRP and proven to provide the performance and durability required for use with this track design.

Just install the studs, is that all there is to it?

You need to make sure that the proper tunnel protectors are installed on your snowmobile, also. On most Ski-Doo sleds it's a very simple operation to slide the original short protectors out, and slide the new taller protectors back into the channels of your heat exchangers. The new REV (G4) is even easier with a patent-pending snap-in protector design that takes just minutes to install. Be sure to consult your dealer for the proper protector height for your track and stud height to prevent damage.

Is my track still warrantied if studs are installed?

Because the 286 Phantom studs and backer plates grip the track in a unique way and hold the assembly solidly, your warranty is maintained if the studs are installed properly on the pre-marked locations. These are the only traction products that maintain the warranty.

We recommend you have your authorized BRP dealer install your studs and on pre-patterned tracks only. If you do choose to do it yourself, be sure to always use the proper installation tools, procedures and torque specified in the instructions. Proper installation provides maximum product longevity and helps prevent track damage.

To install the studs, always use the installation tools, procedures and torque specified in the instructions. Proper installation provides maximum product longevity and helps prevent track damage. BRP recommends that studs be installed by authorized BRP dealers, and on approved pre-patterned tracks only. These tracks come standard on most 2017 Ski-Doo snowmobiles. Look for this symbol on your track. Woody's products are designed to fit and interact with each other. The stud nut and support plate form a complete unit. The use of aggressive skis, ski carbide runners or studs will alter the handling of your snowmobile, particularly in terms of manoeuvrability, acceleration and braking. Please refer to your Operators Guide for more details.

YOUR CONNECTION TO THE SNOW.

ICE COBRA 1.6

ICE RIPPER XT

POWDER MAX 3

POWDER MAX / FLEXEDGE

- The track edges bend, making roll-up easy and predictable.
- Exclusive FlexEdge technology available in Powder Max, Powder Max 2 & 3 and Cobra 1.6 profiles.
- From 137" to 174".

PITCH	WIDTH	LENGTH	LUG HEIGHT	PROFILE	CLIP	SKU	PRICE	
3.50"	16"	154"	2.50"	PowderMax Light	1 clip every 2 profiles	504153569	$979.99	NEW
	16"	154"	3.00"	PowderMax Light	1 clip every 2 profiles	504153571	$1,359.99	NEW
	16"	165"	2.50"	PowderMax Light	1 clip every 2 profiles	504153570	$1,019.99	NEW
	16"	165"	3.00"	PowderMax Light	1 clip every 2 profiles	504153572	$1,359.99	NEW
3.00"	16"	154"	3.00"	Powder Max 3 / FlexEdge	1 clip every 2 profiles	504153349	$1,359.99	
	16"	163"	3.00"	Powder Max 3 / FlexEdge	1 clip every 2 profiles	504153224	$1,359.99	
	16"	174"	3.00"	Powder Max 3 / FlexEdge	1 clip every 2 profiles	504153234	$1,599.99	
2.86"	15"	120"	1.25"	ICE Ripper XT	Full clip	504153100	$849.99	
	15"	120"	1.00"	RipSaw	Full clip	504152760	$549.99	
	15"	120"	1.25"	RipSaw	Full clip	504152606	$599.99	
	15"	120"	1.50"	RipSaw	Full clip	504153205	$689.99	
	15"	129"	1.25"	ICE Ripper XT	Full clip	504153345	$869.99	
	15"	129"	1.25"	RipSaw	Full clip	504153344	$669.99	
	15"	129"	1.25"	RipSaw 2 PLY	Full clip	504153346	$669.99	
	15"	129"	1.50"	RipSaw 2 PLY	Full clip	504153347	$789.99	
	15"	137"	1.25"	Cobra	1 clip every 2 profiles	504152838	$719.99	
	15"	137"	1.60"	ICE Cobra 1.6	Full clip	504153399	$859.99	
	15"	137"	1.25"	ICE Ripper XT	Full clip	504153101	$859.99	
	15"	137"	1.25"	RipSaw	Full clip	504152905	$699.99	
	15"	137"	1.25"	RipSaw (SilentDrive System)	Full clip	504153480	$699.99	NEW
	15"	137"	1.25"	ICE Ripper XT (SilentDrive System)	Full clip	415130062	$859.99	
	15"	137"	1.50"	RipSaw	Full clip	504153237	$819.99	
	16"	137"	1.25"	Cobra	1 clip every 2 profiles	504152907	$749.99	
	16"	137"	1.75"	Powder Max	1 clip every 2 profiles	504152803	$779.99	
	16"	137"	1.75"	Powder Max / FlexEdge	Full clip	504153294	$779.99	
	16"	137"	2.25"	Powder Max	Full clip	504153103	$909.99	
	16"	137"	2.25"	Powder Max / FlexEdge	Full clip	504153293	$909.99	
	16"	137"	1.25"	RipSaw	1 clip every 2 profiles	504152734	$699.99	
	16"	137"	1.50"	WT Lite	1 clip every 2 profiles	504153102	$819.99	
	16"	146"	1.60"	Cobra 1.6 / FlexEdge	Full clip	504153400	$899.99	
	16"	146"	2.00"	Powder Max / FlexEdge	1 clip every 2 profiles	504153348	$879.99	
	16"	146"	2.25"	Powder Max	1 clip every 2 profiles	504153014	$829.99	
	16"	146"	2.25"	Powder Max / FlexEdge	1 clip every 2 profiles	504153222	$829.99	
	16"	146"	2.50"	Powder Max 2	1 clip every 2 profiles	504153008	$929.99	
	16"	146"	2.50"	PowderMax 2 / FlexEdge	1 clip every 2 profiles	504153198	$929.99	
	16"	154"	1.50"	Charger	1 clip every 2 profiles	504152761	$889.99	
	16"	154"	2.25"	Powder Max	1 clip every 2 profiles	504153015	$919.99	
	16"	154"	2.25"	Powder Max / FlexEdge	1 clip every 2 profiles	504153223	$919.99	
	16"	154"	2.50"	Powder Max 2	1 clip every 2 profiles	504153009	$979.99	
	16"	154"	2.50"	PowderMax 2 / FlexEdge	1 clip every 2 profiles	504153199	$979.99	
	16"	154"	2.50"	ProLite		504153396	$1,039.99	
	20"	154"	1.25"	Utility	1 clip every 3 profiles	504152817	$919.99	
	20"	154"	1.50"	Extreme Utility	1 clip every 3 profiles	605613004	$919.99	
	20"	154"	1.25"	ICE Ripper	Full clip	504153036	$1,149.99	
	20"	154"	1.50"	ICE Ripper	Full clip	504153037	$1,299.99	
	16"	163"	2.25"	Powder Max	1 clip every 2 profiles	504153016	$969.99	
	16"	163"	2.50"	Powder Max 2	1 clip every 2 profiles	504153010	$1,019.99	
	16"	163"	2.50"	PowderMax 2 / FlexEdge	1 clip every 2 profiles	504153200	$1,019.99	
2.52"	15"	121"	1.25"	ICE Ripper	Full clip	504152654	$799.99	
	15"	121"	1.25"	RipSaw	Full clip	504152558	$649.99	
	16"	136"	1.25"	Track	1 clip every 3 profiles	504152456	$699.99	
	24"	156"	1.25"	ICE Ripper for SWT	Full clip	504153171	$919.99	

COBRA WT

ICE ATTAK XT

RIPSAW II 1.5

BACKCOUNTRY X

CAMSO ROAD FREE COMPANY

PITCH	WIDTH	LENGTH	LUG HEIGHT	PROFILE	CLIP	SKU	PRICE
2.52"	15"	121"	1,063"	ICE Attak	Full clip	C9028H	$729.99
	15"	121"	1,35"	Cobra	Full clip	C9052H	$639.99
	15"	136"	1,35"	Cobra	Full clip	C9061H	$699.99
	15"	121"	1,22"	ICE Attak XT	Full clip	C9200H	$789.99
	15"	121"	1,25"	RipSaw II	Full clip	C9214H	$619.99
	15"	121"	1,25"	RipSaw	Full clip	C9968H	$649.99
	15"	121"	1,25"	RipSaw	Full clip	C9968H144	$669.99
	15"	136"	1,25"	RipSaw	Full clip	C9969H	$699.99
	15"	121"	1,5"	Intense	Full clip	C9930C	$669.99
	15"	121"	1"	Energy	1 clip every 3 profiles	C9793T	$489.99
	24"	156"	1,75"	Cobra SWT	Full clip	C9260U	$1,169.99
2.86"	16"	137"	2,31"	Challenger	Full clip	C9204M	$909.99
	15"	137"	1,35"	Cobra	Full clip	C9093H	$719.99
	16"	137"	1,38"	ICE Attak	Full clip	C9134H*	$889.99
	15"	120"	1,25"	ICE Ripper XT	Full clip	C9164H	$849.99
	15"	120"	1,22"	ICE Attak XT	Full clip	C9190H*	$799.99
	15"	137"	1,22"	ICE Attak XT	Full clip	C9191H*	$859.99
	15"	120"	1,25"	RipSaw II	Full clip	C9209H	$649.99
	15"	137"	1,25"	RipSaw II	Full clip	C9223H	$699.99
	15"	129"	1,22"	ICE Attak XT	Full clip	C9236H*	$869.99
	15"	120"	1,35"	Cobra	Full clip	C9284H	$649.99
	15"	120"	1,6"	ICE Cobra 1.6	Full clip	C9244C*	$779.99
	16"	137"	1,6"	ICE Cobra 1.6	Full clip	C9249C*	$869.99
	15"	120"	1,75"	Back Country X	Full clip	C9287C	$699.99
	15"	137"	1,75"	Back Country X	Full clip	C9289C	$779.99
	15"	120"	1,6"	Cobra 1.6	Full clip	C9291C	$739.99
	15"	129"	1,6"	Cobra 1.6	Full clip	C9292C	$789.99
	15"	120"	1,5"	RipSaw II 1.5	Full clip	C9304C	$749.99
	15"	129"	1,5"	RipSaw II 1.5	Full clip	C9305C	$789.99
	15"	137"	1,5"	RipSaw II 1.5	Full clip	C9306C	$819.99
	20"	154"	1,5"	Cobra WT	Full clip	C9196U	$919.99
3.00"	16"	162"	3"	Challenger X3	Full clip	C9219M	$1,359.99

*ICE Attak, ICE Attak XT, ICE Cobra 1.6 not compatible with REV (G4).

SLIDER SHOES

- Custom color-matched slider shoes with built-in wear marker.
- Long-lasting, impact-resistant.
- For all slide rail lengths.
- Easy-cut to desired length.

146" SC-5 Mountain & tMotion

503191499 • Black
503191695 • Yellow
503191947 • White

154" SC-5 Mountain & tMotion

503191198 • Black
503191696 • Yellow
503191948 • White

163" SC-5 Mountain & tMotion

503191501 • Black
503191697 • Yellow
503191949 • White

$24.99

137" rMotion Grand Touring 900 ACE

503193449 • Black

120" SC-5 & rMotion

503191301 • Black
503191693 • Yellow
503191945 • White
503192562 • Red

137" SC-5 & rMotion

503191306 • Black
503191694 • Yellow
503191946 • White
503192563 • Red

$19.99

174" tMotion

503193819 • Black
503194506 • Sunburst Yellow
503194505 • White

$29.99

NEW

REV (G4) 154"

503194251 • Black

NEW

REV (G4) 165"

503194254 • Black
503194520 • Orange

$24.99

LIGHTWEIGHT WHEEL

- Color-matched lightweight snowmobile wheels.

REV (G4), REV-XM, REV-XS, REV-XP, REV-XR

141 mm

503191621 • Yellow
503191622 • Full Moon
503191942 • White
503192794 • Black

141 mm - rMotion

503193477 • Black

147 mm - rMotion

503193376 • Black

152 mm

503191755 • Black

180 mm

503191626 • Yellow
503191627 • Full Moon
503191742 • Black
503191943 • White

180 mm - rMotion

503192766 • Black

200 mm

503191450 • Yellow
503191625 • Full Moon
503191741 • Black
503191944 • White

200 mm - T3

503194055 • Black

$39.99

EXTRA IDLER WHEEL KIT

- Reduces drag and rolling resistance.
- Includes 2 wheels, brackets and hardware.

REV (G4), REV-XM, REV-XM Summit X with T3 package

860201183 • 152 mm

REV-XP, REV-XR, except rMotion

860201230 • 141 mm

$69.99

4th REAR WHEEL KIT

- 4th rear idler design reduces drag and rolling resistance.
- Works in conjunction with stock 3 wheel setup.

REV-XS, REV-XP, REV-XR 120" & 137"

860200358 • 180 mm

$49.99

DS-3 SKI TIP KIT

- Easy-install custom color tips changes the appearance of your sled in minutes.
- Adds flotation on the front of the DS-3 ski.
- Sold in pairs with mounting hardware.

Fits vehicles with DS-3 skis

860201214 • Black

NEW

860201501 • Sunburst Yellow

$69.99

PILOT 5.7 SL SKIS
TOURING

PILOT 5.7 SKIS
TRAIL SPORT / PERFORMANCE

PILOT 5.7R SKIS
PERFORMANCE

PILOT DS SKIS
MOUNTAIN PERFORMANCE

PILOT DS-2
MOUNTAIN PERFORMANCE

PILOT DS-3
MOUNTAIN PERFORMANCE

SKIS

PLATFORMS

REV (G4) • REV-XP • REV-XR • REV-XU • REV-XS • REV-XM • REV

RIDING STYLE	TOURING	TRAIL SPORT / PERFORMANCE		PERFORMANCE	MOUNTAIN PERFORMANCE			
PILOT	**PILOT 5.7 SL** 2 carbides/ski	**PILOT 5.7** 1 or 2 carbides/ski***	**PILOT TS ADJUSTABLE** 1 carbide/ski	**PILOT 5.7R** 1 carbide/ski	**PILOT DS*** 1 carbide/ski	**PILOT DS-2*** 1 carbide/ski	**PILOT DS-3*** 1 carbide/ski	**PILOT DS-3 REV (G4)**** 1 carbide/ski
DESCRIPTION	• Reduces steering effort and darting. • Specifically designed for Touring applications. • Skis sold individually.	• Lightweight single runner skis provide virtually effortless steering at low speeds, and constant grip without compromise at higher speeds.	• The industry's first and only adjustable ski: the Pilot TS Skis are the critical factor in steering precision and effort, yet their performance is dependent on snow conditions, which can change in hours. • With the Pilot TS ski, you can dial-in ski bite for conditions or your riding style by turning a knob on the ski leg. • It raises or lowers the ski runner over a range of 1/2" (12.5 mm). • This thin runner and new square keel design work together to make darting a thing of the past. • Easy-install custom color ski changes the appearance of your sled in minutes. • Patent pending US20150314799A1	• Same single keel ski equipped on the RS race sled. • Designed for aggressive riders.	• Designed specifically for mountain riding. • Vertical outer edge dramatically improves sidehilling bite. • Narrower and thinner, yet stiffer for dependable steering and carving. • Boot grips more effective than ever. • Carbides sold separately. • Skis sold individually.	• New keel design offers unmatched steering performance when used in conjunction with new ski leg. • Lower steering effort, increased agility and predictability. • Color options available to customize your sled. • Sold individually.	• Designed to work with deeper and longer tracks. • 12 mm deeper keel than DS-2. • Redesigned top-side bracing reduces weight of each ski by 0.28 lb (125 g). • Sold individually.	• Designed to work with deeper and longer tracks. • 12 mm deeper keel than DS-2. • Redesigned top-side bracing reduces weight of each ski by 0.28 lb (125 g). • Sold individually.

COLORS

Black	Left	505072548	505072854	505073786	505072205	505073100	505073227	505073568	505074135
	Right	505072548	505072855	505073796	505072205	505073100	505073227	505073568	505074135
Yellow	Left	N/A	505073028	N/A	N/A	N/A	505073278	N/A	N/A
	Right		505073029				505073278		
Sunburst Yellow	Left	N/A	505073575	505073851	N/A	N/A	505073658	505073627	505074195
	Right		505073576	505073852			505073658	505073627	505074195
Black/ Yellow	Left	N/A	505073021	N/A	N/A	N/A	N/A	N/A	N/A
	Right		505073022						
Black/ White	Left	N/A	505073023	N/A	N/A	N/A	505073279	N/A	N/A
	Right		505073024			N/A	505073279		
Viper Red	Left	N/A	505073005	N/A	N/A	N/A	N/A	N/A	N/A
	Right		505073006						
Lava Red	Left	N/A	N/A	N/A	N/A	N/A	505073510	N/A	N/A
	Right						505073510		
Orange Crush	Left	N/A	505074071	505074067	N/A	N/A	505073511	505074023	505074137
	Right		505074072	505074068			505073511	505074023	505074137
Race Orange	Left	N/A	505073645	N/A	N/A	N/A	505073654	N/A	N/A
	Right		505073646				505073654		
Manta Green	Left	N/A	N/A	N/A	N/A	N/A	505073354	505073990	N/A
	Right						505073354	505073990	
PRICE		**$119.99**	**$119.99**	**$119.99**	**$119.99**	**$119.99**	**$119.99**	**$119.99**	**$119.99**

*Do not fit REV (G4)
**fits only REV (G4)
***Second carbide can be added to ski by drilling marked additional holes.
Note: The use of aggressive skis, ski carbide runners or studs will alter the handling of your snowmobile, particularly in terms of manoeuvrability, acceleration and braking. Please refer to your Operators Guide for more details.

TECH FOCUS

SKIS & CARBIDES

Skis make all the difference in getting your sled to handle just how you like. We offer seven different styles of skis for you to choose from. Which one is right for you? Here's some tips on choosing the right one:

Pilot 5.7
Standard on many models. Lightweight dual-keel design offers great balance between steering effort. A runner is standard on the center keel and a second runner can be added to the outside keel to reduce darting. For most trail riders, this is a great choice.

Pilot 5.7 SL
Straight Line delivers light steering effort with less darting. Perfect for touring applications or smaller riders.

Pilot 5.7R
Standard on the MXZ X 600RS race sled. Very aggressive single keel design with dual outer keels provides very positive steering - for aggressive riders only.

Pilot DS
Designed specifically for deep snow riding. Works well in many off trail applications from utility sleds to mountain sleds for all types of riders. Thin edge grabs sidehills well.

Pilot DS-2
An evolution of the Pilot DS with a deeper and shorter center keel for deep snow applications. This version offers increased agility and less turning effort than the original. Standard on mountain sleds with 2.5". lug tracks and utility sleds, this ski is great for all around use for all types of deep snow riders.

Pilot DS-3
Deep snow ski designed to match the latest 3" lug and longer tracks. Matches up well with aggressive riders using the biggest tracks.

Pilot TS Adjustable
The ultimate trail solution offering adjustment with the turn of a knob. Fits all riding styles except deep snow. Revolutionary design enables you to dial in ski bite instantly for changing conditions or your riding style. The thin runner adjusts ½" (12.5 mm) up and down to find your sweet spot. Square shape of keel aids in preventing darting.

CHOOSING CARBIDE SKI RUNNERS

When choosing carbide runners you need to know your end game: is it more grip on icy surfaces, longer wear before replacing, or balancing the traction you added with studs?

Carbide runners generally have three shapes of sharp carbide inserts brazed into a host bar, and the host bar can be different diameters (7/16", ½") and/or shapes.

- **Flat carbide inserts are for long life. They preserve the host runner but don't add grip.**
- **90° turning carbide inserts are the most common trail carbide inserts.**
- **60° turning carbide inserts are much sharper. These are more aggressive - many choose these for trails.**
- **Other options include specialty carbides for things like ice racing.**

The next variable is the amount/length of carbide used. The most common lengths are 4, 6, 8 and 10 inches.

You're looking to balance the bite of the skis with the amount of steering effort required for your sled and how you ride. Let's take a look at an example.

For a Renegade with 800R E-TEC without studs, 6" of 90° turning carbide would be a good choice. If the rider wants more bite, the next option would be 6" with 60° angle.

If that same Renegade has studs, you would want more carbide to balance the added push of the track, so 8" of 60° turning carbide would work well.

Running 10" of 60° turning carbide would deliver much more steering bite, but the steering effort goes up and your arms might feel it at the end of a long ride.

There are no hard and fast rules for carbide choice - it's individual taste and you might have to experiment to get the handling just right.

SKI SKIN
- Provides additional flotation and reduces ski wear.
- Made of durable polyethylene.
- Sold in pairs.

Pilot 6.9 skis

860200422 • Black

$134.99

PILOT DS SKI LINER
- Provides additional flotation and reduces ski wear.
- Same durable material as DS Ski.
- Sold in pairs.

Pilot DS

860200636

Pilot DS-2 skis

860201040 • Black

$154.99

SKI HANDLE
- High-density colored polyethylene loops.

Pilot 5.7, 6.9, Precision, Flex, Mountain, Pilot TS

505070917 • Yellow
505070963 • Black
505071032 • Blue
505071038 • Scarlet Red
505071048 • Orange Saturn
505071059 • Viper Red
505071556 • Full Moon
505072102 • White
505073642 • Sunburst Yellow
505073649 • Race Orange

Pilot DS, DS-2, DS-3

505072976 • Black
505073107 • Yellow
505073108 • White
505073388 • Lava Red
505073513 • Orange Crush
505073651 • Race Orange
505073665 • Sunburst Yellow

Pilot R
- ISR legal race ski loop.

505071674 • Yellow
505073138 • Black

$24.99

Pilot 5.7 & 6.9

Pilot DS, DS-2 & DS-3

Pilot R

SKI HANDLE RIVET KIT
- Includes 2 long and 2 short aluminum rivets for repairing the handle on Pilot Skis.

860200525

$10.99

PILOT TS CONVERSION KIT

• Upgrade to the revolutionary adjustable Pilot TS skis.

For vehicles with 2016 RAS 2 spindle

• For 2016 and up REV-XS models with RAS 2 or previous vehicles with 42" RAS 2 upgrade kit and 2016 spindle (860201241).
• REV-XS 2016 and up with RAS 2, REV-XP, REV-XR, REV-XS with 42" RAS 2 and 2016 spindle (860201241 or 860201353).

860201237 • Black

$559.99

NEW

REV (G4)

860201484 • Black

$559.99

PILOT TS CONVERSION KIT WITH SPINDLES

• Pilot TS adjustable ski kit for 2015 and prior sleds equipped with RAS 2 front suspensions.
• Includes new spindles, both skis and necessary hardware.
• REV-XS 2015 with RAS 2 front suspension.
• REV-XS, REV-XP, REV-XR equiped with RAS 2 suspension and 2015 spindle (860201154).

For vehicles with 2015 RAS 2 spindle

860200692 • Black

$649.99

PILOT TS CARBIDE RUNNER

• For Pilot TS adjustable ski.
• Sold in pairs.
• Patent pending US20150314800A1.

Pilot TS (stock replacement)

860201178 • Black • 5" 90° carbides

$104.99

Pilot TS

860201240 • Black • 7" 60° carbides

$129.99

NEW

PILOT TS CARBIDE RUNNER

• Increase front end bite with an extra 1/4" (6 mm) of runner depth, plus 7" of 60° carbide.

Pilot TS

860201364 • Black • 7" 60° carbides

$129.99

ADJUST HANDLING FOR CONDITIONS INSTANTLY

Pilot TS skis change steering bite fast and easy. It's like having 5 different size carbides to choose with the twist of a knob. (Patent Pending US20150314800A1)

SKI-DOO PILOT*

Skis and carbides to suit all riding styles.

PILOT 5.7 SKI UPGRADE KIT

- Complete kit for upgrading earlier snowmobile models.
- Includes 2 skis, 2 handles with rivet kit, 2 Expedition carbides and all required hardware.

REV, ZX, RF

860200524 • Black

$254.99

NEW

PILOT DS-2 SKI KIT

- Complete kit includes 2 ski assemblies with pre-installed handles, 2 Expedition carbides and all required hardware.

860201487 • Black

$289.99

PILOT EXPEDITION CARBIDES

REV-XP, REV-XR, REV-XU Tundra, REV-XS, REV-XM

860201044 • Square - Pack of 2

$64.99

860511900 • Round 7/16" - Pack of 2

$69.99

PILOT EXTREME CARBIDES

REV-XP, REV-XR, REV-XU Tundra, REV-XS, REV-XM

860201043 • Round 1/2" - Pack of 2

$69.99

860201045 • Pack of 4

$139.99

Note: The use of aggressive skis, ski carbide runners or studs will alter the handling of your snowmobile, particularly in terms of manoeuvrability, acceleration and braking. Please refer to your Operators Guide for more details.

*Protected under patent numbers US 7,413,198, US 7,389,995 and CA2535565.

CARBIDES Replacement for XP, XR, XU Tundra, XS, XM and (G4).		EXPEDITION	EXTREME
TOURING	**PILOT 5.7 SL** (2 carbides/ski)	N/A	860201045 (pack of 4)
TRAIL SPORT / PERFORMANCE	**PILOT 5.7** (1 or 2 carbides/ski)	860201044 (pack of 2)	N/A
PERFORMANCE	**PILOT 5.7R** (1 carbide/ski)	N/A	860201043 (pack of 2)
MOUNTAIN PERFORMANCE	**PILOT DS, PILOT DS-2, PILOT DS-3** (1 carbide/ski)	860201044 (pack of 2)	N/A

SKI-DOO BY woody's Carbides

DID YOU KNOW Ski-Doo invented and patented the ski carbide in 1973.

CARBIDE RUNNER

- The Dooly† by Woodys has two 7/16" Flat-top† runners mounted on a plate for each ski.
- Four contact lines on snow surface help decrease darting of sled as it makes own groove in a trail.
- When in a turn, only one of the Dooly bars is in contact with the snow or ice.
- A Dooly with 4", 6" or 8" of carbide on both runners provides the same turning power as a single runner with 4", 6" or 8" of turning carbide.
- Sold individually.

Pilot Skis, except DS & DS-2

860200443 • Preformed 4" 60°	860200513 • Preformed 6" 60°	860200514 • Preformed 8" 60°
$59.99	**$69.99**	**$94.99**

TRAIL BLAZER IV† CARBIDES

- 1/2" round preformed material swedged at each end to best fit ski contour.
- With 6" of 60° turning carbide, this runner is designed for trail riders looking for performance in cornering power and control.
- Pack of 2.

REV (G4), REV-XP, REV-XR, REV-XU Tundra, REV-XS, REV-XM

860200579

$79.99

EXTENDER TRAIL III† CARBIDES

- ½" round preformed material swedged at each end to best fit ski contour.
- 4" of 60° turning carbide provides positive cornering control.
- Pack of 2.

REV (G4), REV-XS, REV-XM, REV-XP, REV-XR, REV-XU Tundra

860200578

$69.99

EXECUTIVE† CARBIDES

- 1/2" round preformed material swedged at each end to best fit ski contour fitted with 8" of 60° turning carbide.
- Performance trail riders are known to use this runner.
- Provides proper balance with a studded track.
- Pack of 2.

REV (G4), REV-XP, REV-XR, REV-XU Tundra, REV-XS, REV-XM

860200580

$99.99

YOUR SLED IS THE SUM OF ITS PARTS.

MAKE EVERY ONE COUNT BY USING ONLY GENUINE BRP PARTS.

WHY YOU SHOULD USE GENUINE BRP PARTS

Don't take a chance with your valuable Ski-Doo snowmobiles – when replacing parts, use only genuine BRP parts.

BRP parts take into account the complete vehicle and its performance - protecting our reputation and your valuable investment.

BRP parts are manufactured to our original equipment standards for materials, finish and fit.

BRP PARTS UNDERGO RIGOROUS TESTING, INCLUDING:

- Physical field testing
- Extended wear testing
- Laboratory testing
- Harsh environment and element testing
- UV and exposure testing

With BRP parts, you get the peace-of-mind of a **FULL ONE YEAR WARRANTY**. That's whether they're installed by you or your authorized BRP dealer.

And if they're installed by your dealer, labor is covered, too.

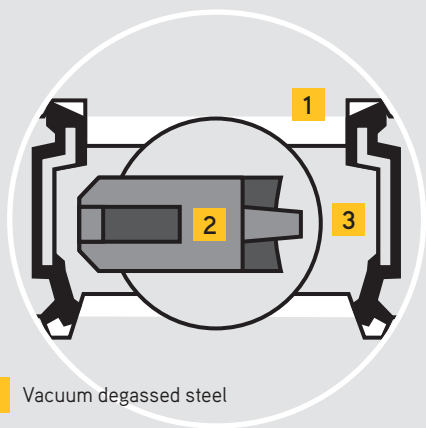
BRP rebuilt components are cost-effective and time-saving solutions. BRP rebuilt parts carry the same one year warranty for major assemblies like short blocks, cylinders and crankshafts.

THE NSK ADVANTAGE

Designed, developed, validated and manufactured to the highest standard in conjunction with BRP, NSK bearings feature technologies to ensure extended bearing life and uncompromising performance in extreme conditions.

Proven results:

- Double contact seal design provides winter-grade, trouble-free environmental protection.
- Non-metallic cage reduces the risk of internal corrosion due to moisture ingress.
- Grease retains optimum performance with high water resistance in extreme temperatures.
- Increased capacity, speed and bearing life derived from real winter-grade internal design.



1 Vacuum degassed steel

2 TX1 polyamide cage

3 Double contact seal

NEW

TUNNEL ICE SCRATCHERS WITH REPLACEABLE TIPS

- New more efficient design featuring replaceable carbide tips.
- Provide additional cooling in hard and icy conditions.
- Coil design allows reverse operation without damage.

REV (G4) 129", REV-XS, REV-XP, REV-XR 120", 129" & 137"

- Bracket (860201503) required for MXZ with quick-adjusters.

860201430

REV (G4) Summit, REV-XM

860201279

Renegade REV (G4)

860201516

$104.99

NEW

ICE SCRATCHERS TIPS

- Ice scratcher replaceable carbide tips.

REV (G4)

860201447 • Flat shape
860201446 • Delta shape

$34.99

RAIL ICE SCRATCHERS

- Provides additional lubrication in hard and icy conditions.
- Rail mounted, small, light.
- Design expands on coil concept to allow reversing without damage.
- Easily stored when not in use.

REV (G4) Summit, REV-XM, REV-XP Summit

860201140

$84.99

TUNNEL ICE SCRATCHERS

- Provide additional cooling in hard and icy conditions.
- Double coil allows use in reverse.
- Can be stored along the tunnel when not in use.

REV-XM, REV-XP Summit

860200444

REV-XS, REV-XP, REV-XR with rMotion suspension 120", 129" & 137"

- Bracket (860201503) required for MXZ with quick-ajusters.

860201107

$84.99

See how these unique ice scratchers work.
http://www.ski-doo.com/shopping-tools/brochures.html

The compact design reduces weight while delivering superior performance, and works in reverse.

tMOTION ADJUSTABLE LIMITER

- Quickly change limiter strap length by flipping a lever, to tune ride and handling to snow conditions and terrain.
- Shortening keeps the front end lower and improves track approach angle.
- Longer increases transfer and lifts the front end higher.
- Adjustment is equivalent to 2 holes on a conventional strap (1.3"/34 mm).
- Slim, non-intrusive design.
- 2 initial settings to choose from: holes 3 to 5 or 2 to 4 (compared to conventional strap hole positions).
- US patent 9022156.

NEW

REV (G4)

860201492 • Black

REV-XM 2016 & up

860201105 • Black

$149.99

REV-XM 2015 & prior

- Includes new front arm and all the parts and features of the 860201105 kit.

860201349

$169.99

See how the t-Motion Adjustable Limiter change handling in seconds.
http://www.ski-doo.com/shopping-tools/brochures.html

tMOTION ADJUSTABLE LIMITER REPLACEMENT PARTS KIT

(Not illustrated)

REV-XM & REV (G4)

860201426

$44.99

You can have it all. The Adjustable Limiter Strap offers mountain riders the opportunity to easily perform handling adjustments simply by flipping a lever. Measurably change weight transfer and ski pressure quickly and effortlessly.

ARTICULATED REAR SUSPENSION (REV-XM)

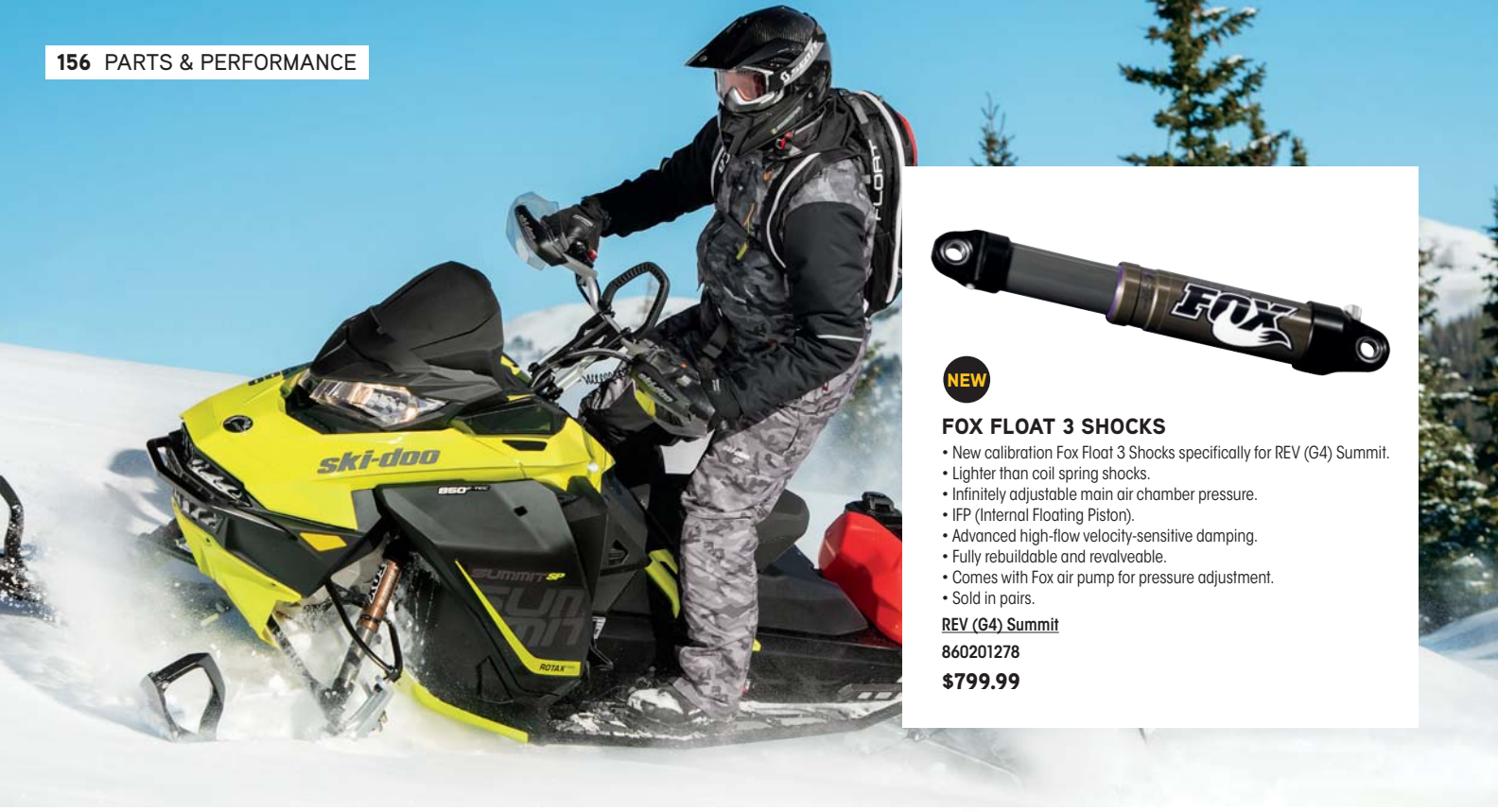
- Two modes: Articulation, locked down.
- Improves reverse performance in soft snow conditions.
- Includes new rails and all hardware.

Fits both tMotion and SC-5M

860201223 • 154"	860201163 • 163"	860201236 • 174"
Black/Aluminum	Black/Aluminum	Black/Aluminum
$499.99	**$599.99**	**$599.99**

DID YOU KNOW The Articulated Rear Suspension is inspired by the go-anywhere performance of the SC-5U on Skandic, Tundra and Expedition sleds.

Watch the new Articulated Rear Suspension in action.
http://www.ski-doo.com/shopping-tools/brochures.html



NEW

FOX FLOAT 3 SHOCKS

- New calibration Fox Float 3 Shocks specifically for REV (G4) Summit.
- Lighter than coil spring shocks.
- Infinitely adjustable main air chamber pressure.
- IFP (Internal Floating Piston).
- Advanced high-flow velocity-sensitive damping.
- Fully rebuildable and revalveable.
- Comes with Fox air pump for pressure adjustment.
- Sold in pairs.

REV (G4) Summit

860201278

$799.99

SWAY BAR QUICK DISCONNECT LINK KIT

- Kit allows you to utilize the benefits of a sway bar on rough trails, and quickly disconnect it for sidehilling the mountains.
- Sold individually.

REV-XM, REV-XP Summit 2013 and up

860200811

REV-XP Summit 2012 and prior

860200667

$69.99

FOX FLOAT SHOCK GUARDS

- Protection for Fox Float 3 shocks.
- Protect shock body from root and brush damage.
- Sold in pairs with mounting hardware.

Fox Float 3 shocks

860201011 • Black

$24.99

Kit 36"

42" with shocks

42" without shocks

FRONT SUSPENSION KIT

36"

- To update your sled to the REV-XM Summit X with T3 package.
- Delivers the agility of the original S-36 handling package, plus the benefits of the RAS 2.
- Lighter weight.
- Better straightline tracking on big bumps.
- Great styling.
- HPG shocks.
- Ski stance adjustable from 35.7" (90 cm) to 37.4" (95 cm).

REV-XM, REV-XS, REV-XP

860201153 • Black

$799.99

42" with shocks

- To update your sled to the RAS 2, X-package configuration.
- 42" (107 cm) RAS 2 front suspension kit.
- Updates sleds to latest REV-XS trail front end.
- Better straightline tracking on big bumps.
- Lighter weight.
- Great styling.
- HPG Plus R shocks with rebound adjustment.
- Includes spindle compatible with Pilot TS ski.

REV-XM, REV-XS, REV-XP without 42" front suspension

860201353 • Black

$799.99

42" without shocks

- Includes spindle compatible with Pilot TS ski.

REV-XS, REV-XP, REV-XR with 42" front suspension

860201241 • Black

$539.99

MAINTENANCE KIT FOR DRIVE PULLEY

• Includes: 1 Spring Cover Ass'y, 3 Rollers Ass'y, 1 Bushing (Siding Flange),
• 6 Slider Shoes, 6 O-Rings, 1 Circlip, 3 Cotter Pins & 3 Lever Axles.

REV-XM, REV-XU

415129625 • 2012 (1200)
2012 to 2017 (600 E-TEC high altitude)
2013 to 2017 Tundra Xtreme

$119.99

REV-XP, REV-XS, REV-XM, REV-XU

415129626 • 2011 to 2017
(800R P-TEK & 800R E-TEC)

415129627 • 2008 to 2010
(800R P-TEK & 800R E-TEC)

415129708 • 2011 and prior (1200),
2011 and prior (600 E-TEC high altitude)

$119.99

REV-XP, REV-XR, REV-XS, REV-XM, REV-XU

415129624 • 2011 (550F)
2011 to 2017
(600 & 600 E-TEC Sea-Level)

$119.99

eDRIVE 2 CLUTCH

• With double the number of rollers and arms compared to TRA designs, this clutch is designed for low maintenance and long life with 4-stroke powertrains.

4-TEC 1200 only (2010 and up)

415129789

$499.99

MAINTENANCE KIT FOR DRIVE PULLEY

(Not illustrated)
• Includes: 6 rollers ass'y, 2 slider shoes, 3 O Rings.

All models with eDrive 2 Clutch

415130055

$104.99

FLOATING QRS SHORT SHAFT CONVERSION KIT

• Conversion kit allows installation of a removable floating secondary pulley.
• Also provides ability to remove driven pulley without removing countershaft.
• Includes gun-drilled lightweight shaft and all necessary parts and hardware for conversion.

Fits 600 CARB, 600 E-TEC, 800 P-TEK and 800 E-TEC engines

860200832

$449.99

QRS TECH LINK

• Designed for extreme use, this lightweight fully adjustable carbon fiber support helps maintain the driven pulley position through the most extreme loads.
• Mounts conveniently between the front bulkhead and secondary tower.

REV-XM, REV-XS, REV-XP except 550 Fan and 4 stroke engines

860200783

$214.99

DRIVEN PULLEY CAM FOR QRS ROLLER SECONDARY CAM

• Specially designed for the QRS driven pulley.
• For optimal smooth performance and durability.

REV-XP

417126956 • 40°
417126962 • 38°
417126974 • 44-40°
417126975 • 44-33°
417127325 • 44-42°
417127367 • 44°
417127372 • 42°
417127426 • 46-42°

$109.99

SEA LEVEL CALIBRATION CLUTCH KIT

Please refer to high altitude / sea-level specification bulletin to find the appropriate clutch kit and components for your vehicle.

CVT COOLING SYSTEM

• Ensures superior air flow to reduce belt temperature by 45 °F / 25 °C.
• Note: For 2008; part 417300448 is required for installation.

REV-XP, except 2008

860200883

$54.99

NEW OWNER START-UP KIT

- Includes 1 drive belt, 2 spark plugs, 1 gallon of XPS 2-stroke oil and 1 quick fix detailing kit (XPS spray cleaner and polish with two XPS microfiber towels) in a convenient box ready to go.

600 E-TEC	800 E-TEC
415129543	415129547
$199.99	**$244.99**

PISTON KIT

- Kit includes: piston, rings, piston pin, needle bearing and circlips.

415129406 • 593 HO including SDI

$189.99

415129405 • 793 HO
415129854 • 800 E-TEC 2011 and prior
415129855 • 800 E-TEC 2012 and up
415129858 • 800R P-TEK and 800R E-TEC 2010

$229.99

415129542 • Ski 552
415129541 • Ski 593

$199.99

FUEL TANK CONVERSION KIT

- 10-gallon (38-liter) full size fuel tank kit for converting vehicles with 5-gallon racing fuel tank.
- All necessary hardware for installation included.

REV-XP & REV-XS with racing fuel tank (5-gallon)

860200936

$394.99

OIL FILTER

- Use on all Ski-Doo engines.
- See your dealer for details.

NGK† SPARK PLUG

- You'll see a difference with genuine NGK spark plugs.
- Solid steel terminal reduces the chance of arcing in the plug cap, which may interfere with electric component.
- A necessity in today's ignition systems.

415129429 • 1200 4-TEC - CR8EKB

$9.99

512059552 • 550F, 600RS - BR9ECS (Gap 0.5 mm)

$6.99

512060029 • 600 CARB, 800R P-TEK - BR8ECS (Gap 0.8 mm)

$8.99

415129375 • 600 H.O. E-TEC - PZFR6F

$19.99

415129670 • 600 ACE - MR7BI8

$21.99

415129484 • 800R E-TEC - PFR7AB

$19.99

415129944 • 900 ACE - MR8BI8

$21.99

415128524 • 600 CARB & 800 P-TEK - BR9-ECS (Gap 0.8 mm)

$8.99

414961100 • BR9-ES

$2.99

DID YOU KNOW It's always good to carry a spare OEM belt and spark plugs on every ride.

PERFORMANCE DRIVE BELTS

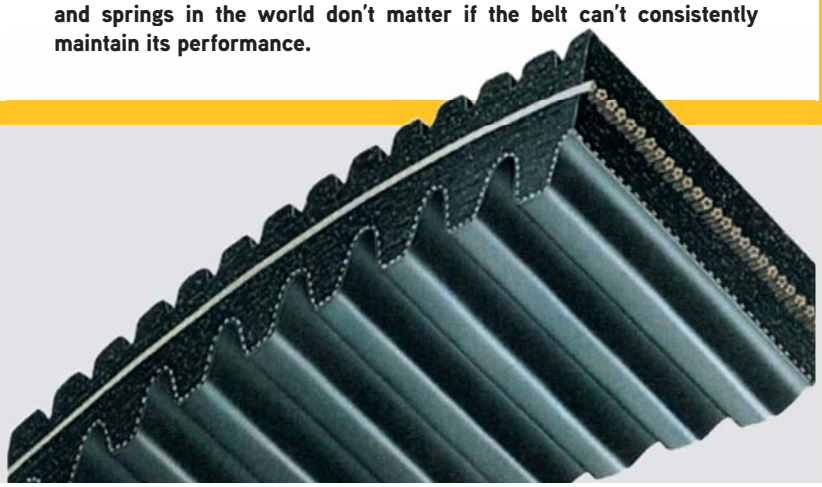
- High performance drive belts calibrated to maximize your sled's performance.
- Aramid tensile cords used in construction for extra long life and dependability, also delivers a consistent length with minimal belt shrinkage and minimal length adjustments.
- High tensile reinforced fiber elastomer undercords provide minimal dusting and long term flex life.
- Flexweave overcord for superior adhesion and crack resistance.
- Consistent performance during life of belt.
- Quality you can count on for optimum performance.
- Built with distinctive durability features for mountain, trail or fast tracks.

SKU	DESCRIPTION	PRICE
REV-XP, REV-XR, REV-XU, REV, REV-XM, REV-XS, REV (G4)		
417300383	600 E-TEC, 800R PowerT.E.K except Summit, 1200 4-TEC and 900 ACE	**$129.99**
417300391	850 E-TEC, 800 E-TEC and Summit 800R PowerT.E.K	**$184.99**
417300197	600 CARB, 600, 600 H.O SDI	**$104.99**
417300367	550 Fan (2010-2011)	**$59.99**
415060600	Fan (2009 and prior)	**$59.99**
414860700	550 Fan (2012, 2014)	**$59.99**
417300127	600 ACE	**$104.99**
RT		
417300189	1000	**$174.99**
ZX		
414860700	500, 600 LC	**$59.99**
417300127	700, 800 LC	**$104.99**
417300067	700 (1999, 2000)	**$104.99**
415060600	Fan	**$59.99**
417300197	V-1000, 600 SDI (2004), V-800	**$104.99**
417300383	800 SDI (2004)	**$129.99**
SKANDIC		
605348425	All 2008 models, 2007 TUV and SWT V-800	**$119.99**
414633800	All Fan Skandic except Tundra	**$59.99**
417300326	Tundra RF 300	**$79.99**
415060600	Tundra RF 500	**$59.99**
417300197	Tundra RF V-800	**$104.99**
414827600	Old Tundra 280 Fan	**$59.99**
S-CHASSIS		
417300067	Semi-cogged	**$104.99**
414860700	Not cogged	**$59.99**

TECH FOCUS

DRIVE BELTS

The drive belt is an integral part of your snowmobile's transmission and its importance for achieving its maximum performance can't be overstated. All the tuning or changes made in gearing, weights, ramps and springs in the world don't matter if the belt can't consistently maintain its performance.



SO, WHAT MAKES A BELT A BELT?

You see that several elements include "Aramid." Aramid is a man-made fiber resistant to heat and abrasion and is used to add strength and long life to the rubber belt. Aramid fibers and fabrics are common in belts.

Top Cog with Special Aramid Fiber

Adhesion Rubber

Specialized High Modulus Aramid Cord

Compressive Rubber with High Modulus PBO Fiber

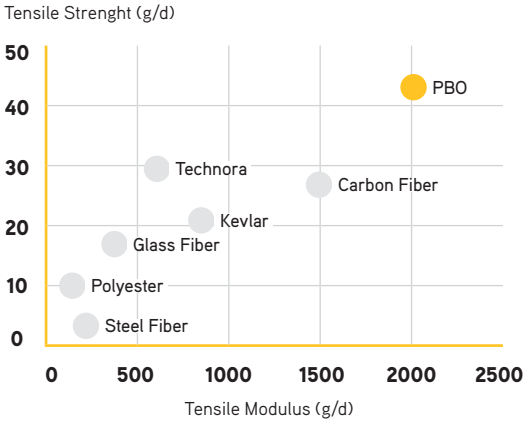
Bottom Cog with Aramid Fabric

BRP BELT CONSTRUCTION VS. COMPETITORS

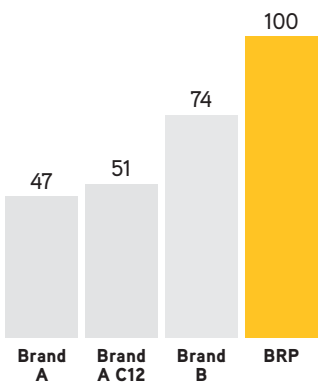
	Brand A	Brand A C12	Brand B	BRP
Top Rubber Chopped Fiber	CR Aramid	CR Aramid	H-NBR Aramid/Cotton	CR Aramid
Upper Adhesion Rubber Chopped Fiber	CR	CR	H-NBR	CR
Cord	Aramid	Carbon	Aramid	Aramid
Lower Adhesion Rubber Chopped Fiber	CR	CR	H-NBR	CR
Bottom Rubber Chopped Fiber	CR Aramid	CR Aramid	H-NBR Aramid/Cotton	CR PBO Aramid
Bottom Fabric	Acrylic 1 ply	Acrylic 1 ply	CR Aramid/Cotton	Aramid/PET 1 ply

CR: Chloroprene Rubber

MODULUS & TENSILE STRENGHT
(Based on BRP Dynamometer Testing)



DURABILITY COMPARISON



USE THE RIGHT BELT

Just as we calibrate our clutches and gearing to deliver the best possible performance for how a sled is ridden, we specialize the belt for the application, too.

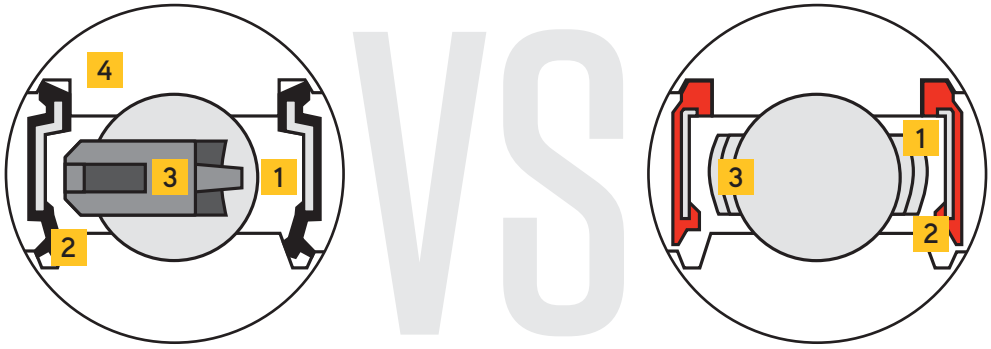
Different types of riding create different heat and load conditions our engineers must account for. For instance, higher drivetrain loads, like on a Summit sled churning 3 in. paddles on the throttle hard for extended periods of time, generally require belts with a stiff construction and high heat resistance. A utility sled pulling equipment or heavily loaded sees high drivetrain loads too, but the clutch calibrations, engine RPM, vehicle speed and environment differ significantly – so will the required belt.

This is why it's best to match the exact model and year of your snowmobile to replacement belt. And even though BRP belts might have the same width and length dimensions, the difference in the materials delivers the best performance and longevity for your sled's application and calibrations.

REAR SUSPENSION NSK WHEEL BEARING

- High performance grease developed for extreme temperatures, water resistance and high speeds with low start torque.
- Advanced Winter Grade DUL1 double-contact seal design for optimum protection from moisture and contamination.
- Polyamide resin ball-guide cage facilitates smooth rolling contact and lubricant distribution.
- Ultra-clean steel for extended bearing life - High-grade balls for quiet and smooth operation even at high speed.
- Super finished raceways to minimize noise and improve lubricant distribution and life.

NSK 6004	NSK 6205	NSK 6005	NSK 6006
503190396	293350115	503191982	503191778
$7.99	**$7.99**	**$9.99**	**$9.99**



GENUINE BRP BEARING

EXCLUSIVE TO BRP

1. **HIGH PERFORMANCE SYNTHETIC GREASE**
   High performance grease developed for extreme temperatures, water resistance and high speeds with low start torque.
2. **DUL1 DOUBLE-CONTACT SEAL DESIGN**
   Advanced Winter Grade DUL1 double-seal design for optimum protection from moisture and contamination.
3. **T1X CAGE**
   Polyamide resin ball-guide cage facilitates smooth rolling contact and lubricant distribution.
4. **PREMIUM CONSTRUCTION**
   - Ultra-clean steel for extended bearing life.
   - High-grade balls for quiet and smooth operation even at high speed.
   - Super finished raceways to minimize noise and improve lubricant distribution and life.

GENERIC BEARING

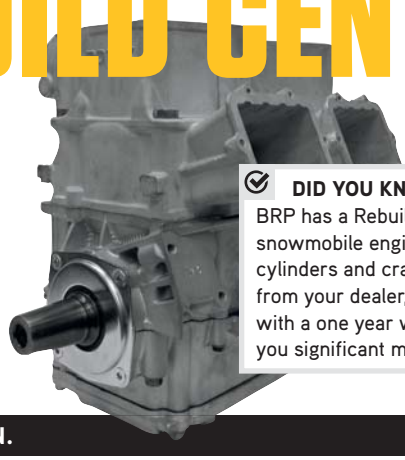
1. **GENERIC INDUSTRIAL GREASE**
   - Grease optimized for industrial use.
   - Rarely suitable for snowmobiles.
2. **GENERIC SINGLE LIP SEAL DESIGN**
   - Lip design not optimized to prevent water from entering.
   - Poor water resistance when loading.
3. **INDUSTRIAL STEEL RIVETED CAGE**
   - Standard industrial style not optimized for snowmobiles.
   - Metallic cage presents higher risk of corrosion when used in harsh environments.

BRP ENGINE REBUILD CENTER

Experienced BRP technicians use only new, original Rotax parts — there's no cutting corners and reusing parts that "look good." For instance, when rebuilding a crankshaft, ALL bearings, rods, pins and seals are replaced, regardless of condition.

Rebuilt short blocks get new pistons, rings, gaskets, crankshaft rods, pins, bearings and seals - every wear item is replaced with new genuine Rotax parts.

The BRP Rebuild Center has been providing this service to dealers and consumers for more than 30 years.



DID YOU KNOW

BRP has a Rebuild Center for snowmobile engines, short blocks, cylinders and crankshafts. Available from your dealer, rebuilt parts come with a one year warranty and save you significant money.

TALK TO YOUR AUTHORIZED SKI-DOO DEALER FOR MORE INFORMATION.

NEW

USB POWER OUTLET KIT

- Provides clean, stable power to recharge your electronics while riding.
- Dual USB ports.
- Plug-and-play installation.
- Includes wiring harness.

REV (G4)

860201261

$44.99

12-VOLT POWER OUTLET KITS

- Power up all your electronics with easy to mount 12V plug.
- Install inside storage compartment.
- Wiring harness included.

NEW

REV (G4)

860201423

$39.99

REV-XM, REV-XS

860200632

REV-XP, REV-XR, REV-XU Tundra (except standard 2011-2012)

860200196

$29.99

All models with battery (except REV-XM, REV-XS, REV-XP, REV-XR, REV-XU Tundra)

861507200

$24.99

861507200

- Wiring harness not included.

$24.99

REAR 12-VOLT POWER OUTLET

(Not illustrated)

- Mounts inside rear seat storage compartment.
- Wiring harness included.

Fits REV-XU Skandic & Expedition models without E-TEC engine

860200979

$34.99

DID YOU KNOW All Ski-Doo 4-stroke engines use Learning Key technology, with two dealer-programmed top speeds and 5 acceleration rates.

LEARNING KEY (PROGRAMMABLE)

- Ask your dealer to program you a spare key.

2015 and up vehicles with 600, 900 ACE or 1200 engine

860201162 • Green

2014 vehicles with 900 ACE engine

860200907 • Green

$49.99

RF DESS™ CORD

- Ask your dealer to program you a spare key.

515177457

$54.99

DESS CORD

- Ask your dealer to program you a spare key.

515177057

$39.99

HEATED VISOR KIT

- Easy install plug-in for visor kit or heated bags.
- Wiring harness included.

NEW

REV (G4)

860201283

REV-XP, REV-XR, REV-XU Tundra, REV-XM, REV-XS

860201234

$34.99

3W HEATER FOR BAGS

- Replacement or additional heater for heated bags.

515176786

$19.99

HEATED PASSENGER VISOR KIT

- Enjoy fog-free riding with this visor kit option for your 1 + 1 Seat.
- To be used in conjunction with Heated 1 + 1 Grip with Guard (860200584).

860200882

$39.99

RCA ADAPTOR PLUG KIT

- Y plug power splitter lets you connect 2 heating components or 1 heater and 1 electrical visor.

515176794

$10.99

ELECTRIC ACCESSORIES Y-ADAPTOR

- Harness enables use of more than one plug-and-play accessory.
- Required when using more than one of either of these accessories: Signature LED Light for Handguards, GPS, Ambient Air & Engine Temperature Module.

REV-XP, REV-XR, REV-XU

860201141

$39.99

ELECTRIC ACCESSORIES WIRING HARNESS

- Electrical kit required when combining multiple accessories.

REV-XS, REV-XM, REV-XP, REV-XR, REV-XU Tundra (except Tundra Standard 2011-2012)

860200817

$39.99

DID YOU KNOW Like most BRP accessories, the Ambient Air & Engine Temperature Module is truly plug-and-play for no-hassle installation.

AMBIENT AIR & ENGINE TEMPERATURE MODULE

- Get both outside air and engine temps on your cluster.
- Fits both analog and digital multifunction gauge.
- Bonus feature: Lap record mode on multifunction gauge.
- Plug-and-play in vehicle harness.

2015 and up for all platforms
(except fan-cooled engines and 2015 P-TEK)

860201021

$144.99

NEW

REV (G4)

860201362

$154.99

Know the temperature outside and in your engine. Perfectly integrated within the gauge this module delivers both.

Analog engine temperature

Engine temperature

ENGINE TEMPERATURE MODULE

- Easy plug-and-play into existing gauge cluster.
- Module plugs into the wire harness and activates the function on the gauge.
- Fits on REV-XP, REV-XR, REV-XS, REV-XM, analog and multifunction gauges.
- Activates engine temperature display.
- Activates engine temperature display and lap record mode on 2013-2014 REV-XM, REV-XS multifunction gauges.

2014 & prior REV-XP & REV-XU Tundra (except 550), REV-XR, REV-XM, REV-XS

860200629

$104.99

YUASA† BATTERIES

- Maintenance free.
- No need to add water but periodic charging required when not in use.
- Absorbed Glass Mat (AGM) Separators – an advanced battery technology that eliminates the need to ever add water.
- Advanced lead-calcium technology – holds its specific gravity more than 3 times longer than conventional lead antimony batteries.

42215 • 14 Amps. Dry (12N14-3A)

$49.99

410301203 • 18 Amps. Wet (YTX20L-BS)

$115.99

410922962 • 21 Amps. Wet (YTX24HL-BS)

$142.99

515176151 • 30 Amps. Wet (YIX30L)

$161.99

296600295 • 18 Amps. Wet (YTX20HL-PW)

$128.99

410301201 • 20 Amps. Dry (Y50N18L-A)

$83.99

410301204 • 3 Amps. Wet (YTX4L-BS)

$51.99

YUASA SMART SHOT AUTOMATIC BATTERY CHARGER

- The Yuasa Smart Shot automatic battery charger is available in 1 Amp charge capacity and ensures that optimum power is available from your battery when you need it.
- Charger is supplied with a fused-ring connector, in addition to the alligator clips that can be attached permanently to your battery, making charging and maintaining your battery a snap.

Automatic 1 Amp (1000 MA) 3 stage charge cycle

529036307

$41.99

ELECTRIC STARTER KIT

- Start your sled with the simple push of a button.
- Kit components vary per model.

NEW

REV (G4)

860201282

REV-XP 500SS, 600 Sport 2009 and up, REV-XP Fan, REV-XU Tundra

860201085

REV-XP, REV-XM, REV-XS 600 E-TEC 2009 and up, 800R, 800R E-TEC

860200627

$559.99

START YOUR SLED WITH THE SIMPLE PUSH OF A BUTTON.

AIR RADIATOR KIT

- Provides addition cooling in extreme conditions.
- Note: Not compatible with Auxiliary LED Light.

REV-XR 1200 4-TEC (2015 and prior)

860200448

$504.99

REV-XS & REV-XR with 600 & 900 ACE (2014 and prior & 2016 and up)

860201350

REV-XS & REV-XR with 600 & 900 ACE (2015 only)

860201186

$429.99

REV-XS 1200 4-TEC (2016 and up)

860201401

$519.99

PRIMER KIT

- Provides hassle-free starting in extreme cold temperatures.

REV-XU Tundra, 500 SS

860200416

$37.99

REWIND STARTER KIT

- Complete rewind kit.
- Note: Rewind handle locates behind panel; instant handle access requires different side panel.

600 HO E-TEC, 800R E-TEC engines, except REV-XU Expedition, WT, SWT

860201053

$174.99

NEW

REV (G4)

860201410

$164.99

ENGINE HEATER KIT

- Improve starting in extreme cold temperatures.

600 ACE, 900 ACE

860201315

$169.99

PROTECTION / REINFORCEMENT

FRAME UNDERBELLY BRACE KIT / S-MODULE REINFORCEMENT KIT

- S module reinforcement, standard on 600 RS racing sled.
- Compatible with Ski-Doo skid plates.

REV-XM, REV-XS, REV-XP, REV-XR, REV-XU Expedition

860200905 • Black

$39.99

SKID PLATE FASTENER KIT

(Not illustrated)

- Made to fit and hold your skid plate securely in place.

REV-XP, REV-XR, REV, RT, REV-XS, REV-XM

860200808 • Skid rivet

$9.99

SEATS, BACKRESTS / FOOTRESTS

LinQ 1 + 1 BACKREST ANCHOR BASE KIT

- Allows installation of LinQ 1 + 1 Backrest on more than 1 vehicle.

REV-XM, REV-XS, REV-XP & REV-XR (except GTX, Grand Touring), REV-XU Tundra

860201024 • Black

$174.99

RUBBER LATCH FOR LinQ 1 + 1 BACKREST

(Not illustrated)

510005617 • Left Side
510005618 • Right Side

$11.99

TRACTION & CONTROL

DRILL BIT

415128884

$13.99

STORAGE / CARGO

LinQ PROTECTIVE DECAL KIT

- Durable Lexan decals to protect your tunnel.

REV-XS, REV-XM, REV-XP

- Replacement item on model year 2013, but required for utilizing the LinQ accessories on model years 2012 and prior.

860200767 • Black - 2 decals included

$9.99

NEW

REV (G4)

516007627 • Black - 1 decal included

$4.99

LinQ CARGO BASE KIT

- Unique mounting fastener usable on any LinQ System accessory.
- Tool-less installation and removal.
- Included: 2 Cargo LinQ bases and hardware.

860200583 • Black

$29.99

LinQ ADAPTOR PLATE

- Allows installation of LinQ Cargo Base on embossed REV-XU tunnels.

REV-XU Skandic WT, SWT, REV-XU Expedition SE, LE, Xtreme

860200945 • Black

$59.99

LinQ REPAIR KIT

(Not illustrated)

- Replaces LinQ mechanism.
- Included: Lever, T-lock and hardware.

860201137 • Left Side
860201138 • Right Side

$13.99

RUBBER LATCH SERVICE KIT FOR TUNNEL LinQ ACCESSORIES

(Not illustrated)

LinQ Tunnel Bags and LinQ Fuel Caddy

860201057

$16.99

MONTANA GPS MOUNT KIT

(Not illustrated)

- Mounting kit and hardware for Garmin Montana GPS.
- To be able to use GPS on more than 1 vehicle.

REV-XS, REV-XM

860201029

$104.99

GARAGE

RATCHET TIE-DOWNS

- 400 lb (181 kg) safe working load.
- 1" x 10' (2.5 cm x 3 m) strap with Sea-Doo, Ski-Doo and Can-Am logos.
- Deluxe ratchet with rubber handle.
- Coated S hooks.
- Pack of 2.

860200447 • Black/Grey

$16.99

SLED SHOP WHEELS

- Non-slip rubber grips allow this steel 3-dolly system to move your sled easily throughout the garage.
- Works with both dual and single runner skis.

861002600

$69.99

SKI-DOO 2" RUBBER HITCH CAP

520001498 • Black

$13.99

LOCKABLE VEHICLE FUEL CAP

- Lockable to protect your fuel.
- Meets latest EPA requirements.

860200387 • Black

$39.99

COUNTER STOOL

- Stool has classic chrome legs and seat with BRP or Ski-Doo X-Team logo.

415129015 • BRP
415129292 • Ski-Doo X-Team

$124.99

STICKERS

SKI-DOO PERFORMANCE

516006297 • Set of 20 decals on two 10" X 8" (25 cm X 20 cm) sheets

$23.99

SKI-DOO X-TEAM BEE

516006301 • Set of 2 decals: 11" X 6" (28 cm X 15 cm)

$23.99

SKI-DOO X-TEAM CAMO

516006304 • Set of 6 decals on two 10" X 8" (25 cm X 20 cm) sheets

$23.99

SKI-DOO POP STICKER SERIES

516006292 • Set of 2 decals: 10" X 8" (25 cm X 20 cm)

$19.99

SKI-DOO TECHNO X

516006299 • Set of 2 decals: 10" X 8" (25 cm X 20 cm)

$14.99

SKI-DOO X-TEAM KIT

516006300 • Set of 6 decals on two 10" X 8" (25 cm X 20 cm) sheets

$23.99

SKI-DOO FREERIDE SKULLS

516006307 • Set of 3 decals 10" X 8" (25 cm X 20 cm) sheet

$16.99

SKI-DOO BEE

516006302 • Set of 3 decals 20" X 8" (50 cm X 20 cm) sheet

$23.99

RAP-CLIP TRAILERING COVER

The strap-less snowmobile trailering cover that clips on to the tunnel intuitively.

- No more kneeling in the snow.
- Easy installation. Installs in seconds.
- 600-denier solution-dyed, water repellent polyester construction.

PLATFORM	STOCK MODEL (2017)	EQUIVALENT CONFIGURATION AND POSSIBLE OPTIONS																						
		1 UP Seat	1+1 Seat 2-up	2 UP Seat	Backrest	Passenger Handgrips	Passenger Wind Deflectors	Extra Low Windshield	Low Windshield	Medium Windshield	High Windshield	Extra High Windshield	Ultra High Windshield	Mirrors on Windshield Side Deflectors	Handlebar Air Deflectors	Mirrors on Handlebar Air Deflectors	Mirrors on Side Panel	MXZ Hi-Riser Kit	Summit Hi-Riser Kit	Extra Front Bumper	Luggage Box		
REV (G4)	SUMMIT (SP, X)	■						■	■						■	■			■	■		860201440	$239.99
	SUMMIT WITH MEDIUM WINDSHIELD	■								■				■					■	■		860201486	$239.99
	MXZ (X, TNT), RENEGADE (X, ADRENALINE)	■						■	■						■			■		■		860201437	$239.99
	MXZ OR RENEGADE WITH MEDIUM WINDSHIELD	■								■				■				■		■		860201438	$239.99
	MXZ OR RENEGADE WITH 1 +1 AND BACKREST		■		■	■	■		■	■				■	■	■		■		■		860201439	$289.99
REV-XM	SUMMIT (SP, X, BURTON), FREERIDE	■						■	■						■	■			■	■		860201375	$239.99
	RENEGADE (BACKCOUNTRY X)	■						■	■						■	■		■	■	■		860201373	$239.99
	RENEGADE (BACKCOUNTRY)	■								■	■			■				■		■		860201374	$239.99
	REV-XM WITH MED-HIGH WINDSHIELD	■								■	■			■					■	■		280000625	$239.99
	REV-XM WITH 1+1 (NO BACKREST), WITH SIDE PANEL MIRRORS AND LOW-MEDIUM-HIGH WINDSHIELD	■	■						■	■	■				■	■	■		■	■		280000611	$279.99
REV-XS	MXZ (X, X-RS), RENEGADE (X, X-RS)	■						■	■						■	■		■		■		860201373	$239.99
	MXZ (SPORT, TNT, BLIZZARD), RENEGADE (SPORT, ADRENALINE, ENDURO)	■								■	■			■				■		■		860201374	$239.99
	REV-XS 1-UP WITH ULTRA HIGH WINDSHIELD	■										■	■	■				■		■		280000627	$239.99
	REV-XS WITH 1 + 1 AND BACKREST		■		■	■	■			■	■			■				■		■		280000626	$289.99
	REV-XS WITH SIDE PANEL MIRRORS	■							■	■	■				■	■	■					280000609‡	$279.99
	GRAND TOURING (LE)			■	■	■	■				■	■	■									860201371	$289.99
	GRAND TOURING (SE)			■	■	■	■				■	■	■								■	860201372	$289.99
	EXPEDITION (SPORT), GRAND TOURING (SPORT)			■	■	■	■				■	■	■	■				■				280000630	$289.99
REV-XP	REV-XP WITH ULTRA LOW / LOW WINDSHIELD	■						■	■						■	■	■	■	■			860201387	$259.99
	MXZ (SPORT), RENEGADE (SPORT), SUMMIT (SPORT)	■								■	■			■	■	■	■	■	■			860201388	$239.99
	EXPEDITION (SPORT)			■	■	■	■				■	■		■			■					280000566	$239.99
	REV-XP WITH 1 + 1 AND BACKREST		■		■	■	■			■	■			■	■		■	■				280000590‡	$289.99
REV-XU	TUNDRA (SPORT, LT, XTREME)	■		■				■	■	■				■					■	■		280000650	$239.99
	TUNDRA WITH EXTRA HIGH WINDSHIELD	■		■								■		■								280000673	$279.99
	EXPEDITION (LE, SE), SKANDIC (WT, SWT)			■	■	■	■					■	■	■								280000649	$239.99
	EXPEDITION XTREME	■						■	■	■								■				860201377	$239.99

RAP CLIP COVER

‡While supplies last.

RACING STORAGE COVER (UNIVERSAL)

- Provides protection for any snowmobile model.

<u>All models</u>

280000529 • Black with graphics

$114.99

SUPERGLIDE EDGE RAIL TRIM

- To secure Superglides on ramps or decks leaving an encapsulated finished edge.

860201217 • Aluminum

$69.99

SUPERGLIDE 2 PRO

- No more ripping up the plywood on your trailer.
- Allows skis to glide with ease.
- Traction knobs incorporated for better traction.
- Moisture minimizing venting.
- Accomodates all sleds with single or dual runner skis.
- Total length of 20 feet.

860201216

$114.99

SUPERTRAC KIT

- Comes with stainless steel hardware.

860201413 • 12"

$34.99

860201414 • 24"

$42.99

860201415 • 48"

$59.99

T-STYLE DECK HOOK

- For trailers with a channel in the floor.

860200995

$17.99

SCREW STYLE DECK HOOK

- Most common.
- Comes standard with all Superclamps.
- Screws into the existing hole where you would screw the old style bar and crank into.

860200994

$17.99

SUPERTRAC DECK HOOK

860201416

$19.99

SUPERCLAMP

- Secure your sled with a simple pull of the handle.
- Durable composite construction.
- According to certain state or provincial laws, the use of both Superclamps may be required.

DID YOU KNOW

Superclamps are the fastest way to secure your sled to your deck.

SUPERCLAMP II

- Innovative trailer tie-down system.
- Silicone rubber pads to protect your skis.
- Front and middle handles allowing easy manoeuverability.
- Pad lock compatible, becomes a theft deterrent.
- Tension adjustment knob, fits all snowmobiles.

860200950

$209.99

SUPERCLAMP REAR WITH SUPERTRAC

- Snowmobile tie-down system for rail.
- Silicone rubber pads to protect snowmobile suspension skid.
- Tension adjustment knob – fits all snowmobiles.
- Screw style deck hook comes standard with all Superclamps.
- Pad lock compatible, becomes a theft deterrent.

860201425

$139.99

MAKE THE RIGHT CHOICE

BRP's commitment to quality means that every snowmobile is engineered to the highest industry leading standards. Nevertheless, a lack of proper maintenance may cause even the best components to eventually fail.

BY USING ORIGINAL BRP MAINTENANCE PARTS, YOU ARE TAKING CARE OF YOUR INVESTMENT.

7 ESSENTIAL BRP PRODUCTS TO ENSURE A PROPER TUNE-UP

DRIVE BELTS
P. 158

BEARINGS
P. 160

XPS 4-STROKE OIL CHANGE KITS
P. 171

CLUTCH MAINTENANCE KITS
P. 157

XPS SYNTHETIC CHAINCASE OIL
P. 172

CARBIDES
P. 150

TRACKS
P. 143

MORE THAN JUST OIL.

The XPS brand has a complete family of performance products to expertly protect, enhance, and extend the life of your BRP vehicle. Every XPS product has been tested and approved for complete peace of mind. No second guesses, no assumptions. The exact product to use, every time.

AFTER ALL, YOU ONLY GET OUT WHAT YOU PUT IN... SO IF YOU'RE CHOOSING ANYTHING OTHER THAN XPS, THEN YOU'RE NOT GIVING YOUR SKI-DOO SNOWMOBILE THE ABSOLUTE BEST.

FIND OUT WHY OIL MATTERS AT WWW.XPSLUBRICANTS.COM

CHOOSING THE BEST FOR THE HARSHEST CONDITIONS

THE ULTIMATE PROVING GROUNDS

The challenges facing racers competing in the ultra long-distance races, Iron Dog and Cain's Quest, are very different from the snocross and cross-country races we are all familiar with. The races are long – 2,031 miles (3,200 km) for the Iron Dog in Alaska and about 2,174 miles (3,500 km). for Cain's Quest in Newfoundland. They are multi-day affairs and your route is basically up to you. Some of the race is on established trails, but you're also riding over ocean ice, fjords, bogs, forest and even evil suspension-eating humps called tussocks. Two-man teams are required for safety reasons.

To compete – just finish, even – your sled needs to be incredibly tough and capable, plus be able to carry extra fuel, gear and survival items. You might think that competitors custom fabricate their sleds and gear, like desert-racing trophy trucks. Sure, there are some custom alterations, but more race teams are just lightly modifying their Ski-Doo sleds and equipping them with the same accessories you can buy at your dealer.

"In the past we have had to spend a lot of time and money creating or finding the right items to successfully compete in this race," said Paul Sindorf, a veteran of eight Iron Dogs. "BRP now offers many of these items, so the work and engineering is already done. Now it is almost plug-and-play, so the time we usually would spend fabricating, sourcing and installing we can spend practicing and testing."

We asked two privateer teams to share with us the BRP accessories they use on their race sleds.

ACADEMY MORTGAGE TEAM #23 IRON DOG

2016 RACERS
Paul Sindorf, Hatcher's Pass, Alaska
Kristofer Sindorf, Palmer, Alaska

2016 RACE SLEDS
Renegade X 600 H.O. E-TEC

- 16" (41 cm) Sport Performance Flared Windshield
- LED Accessory Light
- Montana GPS + Glovebox Extension + Mount Kit
- Tank Bag
- LinQ Tunnel Bag (Large)
- LinQ Tunnel Bag (Medium)
- Heavy-Duty Rear Bumper
- XC Front Bumper
- Extreme Skid Plate
- BRP clutching and gearing
- KYB PRO-40 Race Shocks
- XPS Oil
- Extra Belts
- Handlebar Riser
- 4th Axle Wheel Kit and Auxiliary Idler Wheels
- Heavy-Duty Springs
- 6" (15 cm) Extreme Carbides (2 carbides per ski)
- Woody's Phantom Sharp Studs
- Tunnel Protectors
- Customized Wraps from SCS Unlimited

MONTANA GPS

"One of the best integrated items is the extended glovebox with the powered GPS mount and Montana GPS from BRP," said Paul Sindorf of Academy Mortgage Team #23. "The ability to have the GPS screen easily readable right from the seat is mandatory. It was a lifesaver when we encountered severe blizzard conditions on the way back down the coast in 2015 [Iron Dog]. Visibility deteriorated to near zero and we had to navigate across the ice pack using only the Montana GPS. Had we gone the wrong direction, we could have headed out to sea."

TEAM MAINE CAIN'S QUEST FOR MANY YEARS, IRON DOG 2014

2016 RACERS
Andrew Milley, Labrador City, Newfoundland.
Robert Gardner, Mercer, Maine

2016 RACE SLEDS
Renegade X-RS 600 H.O. E-TEC

- Extreme Skid Plate
- LED Auxiliary Light
- LinQ Fuel Caddy
- Glovebox Extension and Liner
- Handlebar Bag
- Summit Seat Bag
- Ski-Doo Saddlebags
- High Windshield
- XPS Oil
- BRP Belts
- QRS Brace and Floating Secondary Kit
- Heated Visor Kit
- Handlebar Muffs
- Prefilter Vent Kit
- Google Caddy
- Ski-Doo Shovel

LinQ TUNNEL BAGS

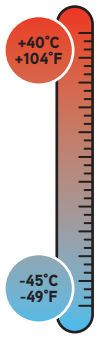
"Year after year we searched for the best way to attach our survival gear to the back of our race sleds," said Paul Sindorf of Academy Mortage Team #23. "After the LinQ system was created, our problems were solved. We have been using the LinQ tunnel bags since 2009 and have never had any problems with them coming off or falling apart. We trust them to carry all of our mandatory survival gear."

DID YOU KNOW XPS oils are developed specifically for Rotax engines.

XPS 2-STROKE FULL SYNTHETIC OIL

- Uniquely engineered for specialized lubrication and wear protection for E-TEC applications where less oil is used, and also formulated for low-smoke, low-odor performance.
- BRP-engineer-certified for use in Ski-Doo snowmobiles equipped with E-TEC engines.
- Extra detergency for optimum engine cleanliness, plus proprietary anti-wear additives for longer engine life.

293600132 • 1 quart / 946 ml
293600133 • 1 US gallon / 3.785 L



XPS 4-STROKE SYNTHETIC OIL

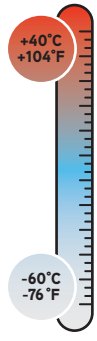
- Specifically formulated and BRP engineer-certified for use in Ski-Doo snowmobiles equipped with Rotax 4-stroke engines.
- Premium synthetic base with custom additives package provides unmatched lubrication and enhanced corrosion protection.
- Provides easier starting in cold temperature and enhanced cold start protection.
- Cold weather pour point/flow temperature = -49°F/-45°C

293600112 • 1 quart / 946 ml
293600115 • 1 US gallon / 3.785 L

XPS 2-STROKE MINERAL OIL

- BRP engineer-certified to provide optimal lubrication at all running temperatures for carbureted, oil injected engines.
- Superior, high-detergency formula.
- Flows at -40°F/-40°C and also usable as a pre-mix.

293600117 • 1 quart / 946 ml
293600118 • 1 US gallon / 3.785 L



XPS 4-STROKE SYNTHETIC OIL EXTREME COLD GRADE

- Engineered from premium high-quality base stocks and esters for superior cold weather oil flow in harsh winter climates.
- Provides quick and easy engine starting and superior cold weather protection at temperatures below -40°F/-40°C.
- Cold weather pour point/flow temperature = -76°F/-60°C

293600154 • 1 quart / 946 ml
293600155 • 1 US gallon / 3.785 L

XPS 4-STROKE OIL CHANGE KIT

- Ski-Doo Oil Change Kit contains:
  - 1 Gallon of XPS 4-Stroke Full Synthetic Oil
  - 1 Rotax High-Quality Oil Filter: Synthetic Media supported by Metal Mesh
- All required O-rings.

415130168 • 1200 4-TEC
415130166 • 600 ACE
415130167 • 900 ACE

XPS PREMIX OIL

- Superior performance 2-stroke oil developed especially for Rotax 2-stroke engines.
- Formulated for fast and easy mixing at very cold temperatures.

293600120 • 500 ml

Note: Please contact your nearest dealer for suggested retail prices of oil based products.

XPS CARBON FREE FUEL TREATMENT

- Prevents problems inherent in Ethanol-blended fuels.
- Extends storage life of fuel up to 12 months.
- Cleans fuel system while preventing corrosion and oxidation.
- Helps keep piston rings, valves and combustion chamber carbon-free to prevent difficult starting and restore peak performance.

219702533 • 355 ml

$8.99

XPS FUEL STABILIZER

- Extends fuel life by preventing fuel breakdown during storage.
- Helps prevent difficult starting, throttle hesitation and poor performance.
- Anti-corrosive, anti-oxidant formula protects fuel system and engine.
- Prevents problems inherent in Ethanol-blended fuels.

413408601 • 8 oz.

$9.99

XPS PRE-MIXED ANTIFREEZE/COOLANT

- Pre-mixed, ready-to-use.
- Exceptional 5-year extended service life.
- Provides superior heat transfer, protection against corrosion and cavitation.
- Specifically formulated for use in your Ski-Doo snowmobile.
- Ideal as a replacement coolant in vehicles that usually use 2-year antifreeze/coolant (green).

219702685
5 years (orange) - 1 quart / 946 ml

$9.99

Watch 2-stroke & 4-stroke oil videos. www.xpslubricants.com

XPS STORAGE OIL

- This specialty oil is a must when putting your Ski-Doo snowmobile away in the spring.
- Specially formulated to protect the engine's internal parts from the hazards of rust and corrosion due to condensation during storage or prolonged periods of non-use.

413711900 • 350 g

$9.99

XPS LUBE

- A multipurpose lubricant that prevents rust, corrosion and moisture intrusion.
- Contains active extreme-pressure additives that provide excellent lubrication and anti-wear properties.
- Comes in a spray can that works upside down.

293600016 • 14 oz.

$11.99

XPS DOT 4 BRAKE FLUID

- Exceeds DOT 3 and 4 requirements.
- Low-moisture formulation providing maximum protection against vapor lock.
- Recommended in Ski-Doo snowmobiles.

293600131

$9.99

XPS HPG SHOCK OIL

- High-quality shock oil for performance shocks used in severe conditions.
- Impedes foaming to reduce fade.

293600035 • 1 L

$73.99

XPS MINERAL CHAINCASE OIL

- Dependable mineral-based chaincase protection.

415129500 • 250 ml

$7.99

XPS SYNTHETIC CHAINCASE OIL

- The best in multigrade chain lubrication, specifically developed for our high performance models.
- Offers wide operating range of temperatures.

293600138 • 355 ml

$11.99

XPS SUSPENSION GREASE

- Provides optimal lubrication at extremes temperature.
- Protects against external contamination.
- Specifically formulated for use in Ski-Doo snowmobiles.
- Allows suspensions to perform egardless of conditions.

293550033 • 400 g

$8.99

XPS PULLEY FLANGE CLEANER

- Easy-to-use cleaner specifically developed to quickly remove gunk and grime from primary and secondary pulley flanges.
- No rinsing required.

413711809 • 320 g

$20.99

XPS HEAVY-DUTY CLEANER

- Strong citrus-based engine cleaner for jobs such as removing grease, oil and grime.

Not available in the US.

293110001 • 400 g

$13.99

XPS BRAKES & PARTS CLEANER

- A concentrated blend of solvents with a powerful blasting spray that effectively removes grease, grime, brake fluid and other contaminants from brake components and metal parts.
- Evaporates instantly and completely, leaving no residue to hinder performance.
- Contains no ozone depleters.

219701705 • 14 oz. / 397 g

$7.99

XPS SPRAY CLEANER & POLISH

- Removes dirt, grease, and water marks easily and quickly.
- Non-petroleum-based formula will not harm plastic finishes.

219702844 • 340 g

$9.99

XPS MICROFIBER TOWELS

- Made of extremely fine fibers, their soft surfaces have been perfected for polishing painted, gelcoated and hard shiny surfaces.
- They are so absorbent they hold up to 7 times their weight in water.
- Machine washable means they can be used over and over again.

219701759 • Pack of 2

$8.99

MAINTENANCE TIPS TO HELP KEEP YOUR SKI-DOO SNOWMOBILE LIKE NEW

MAINTENANCE TIPS

1
TRACK AND REAR SUSPENSION

Visually inspect all suspension components including slider shoes, wheels and bearings. Lubricate any grease fittings using XPS Suspension Grease. While checking the rear suspension, inspect the track for damage or excessive wear. Check your studs to ensure they're tight and they're not excessively worn. Check the tension and alignment, and adjust as needed.

Studs **P. 142**
Tracks **P. 143**
Slider Shoes **P. 145**
Bearings **P. 160**

2
DRIVE SYSTEM

Clean the drive and driven pulley flange surface using BRP Pulley Flange cleaner that leaves no residue that can cause belt slippage. Inspect belt for cracks, fraying or abnormal wear. Replace if needed.

Drive Belt Height Adjustment:
In order to ensure the best performance, the drive belt height must be checked every time a new drive belt is installed or as the belt wears.

Drive Belts **P. 158**
XPS Pulley Flange Cleaner **P. 172**

3
FLUID LEVELS

Check engine or injection oil, brake fluids and coolant levels. Adjust or top off when necessary. Change chaincase or transmission oil annually during preseason preparation.

XPS 4-stroke Synthetic Oil, **P. 171**
XPS 2-stroke Synthetic Oil **P. 171**
XPS DOT 4 Brake Fluid **P. 172**
XPS Pre-Mixed Antifreeze/Coolant **P. 171**
XPS Chaincase Oil **P. 172**

4
FUEL SYSTEM

Control the inherent moisture problems today's ethanol-blended fuels can cause by periodically adding fuel treatments. XPS Fuel Stabilizer will protect against corrosion, stabilize the fuel to fight oxidation and fuel system deposits. XPS Carbon Free adds fuel system and engine intake cleaning.

XPS Carbon Free Fuel Treatment **P. 171**
XPS Fuel Stabilizer **P. 171**

5
CLEANING

Post ride care and cleaning: Remove snow and ice from rear suspension, track, front suspension, steering mechanism and skis. Cover your snowmobile when leaving it outside overnight or during extended periods of inactivity. Wash your vehicle with a microfiber cloth and surface compatible cleaner.

XPS Microfiber Towel **P. 172**
XPS Spray Cleaner and Polish **P. 172**

EXTENDED STORAGE TIPS*

DID YOU KNOW
Planning to store your Ski-Doo snowmobile for 3 months or more? Here are a few things you can do to ensure it comes out of storage running as smoothly as the day you put it in.

- After cleaning and drying your snowmobile, use XPS Lube on all metallic parts to minimize corrosion.
- Use a Yuasa Charger to keep your battery completely charged over months of non-use.
- Top-off the gas tank, and add XPS Carbon Free Fuel Treatment or XPS Fuel Stabilizer.
- Lubricate the engine's internal parts using XPS Storage Oil. On E-Tec engines, activate the Engine Storage Mode.

*Note: Please refer to your operator's guide for complete storage procedure.

CONSULT YOUR AUTHORIZED SKI-DOO SNOWMOBILE DEALER: YOUR PARTNER FOR VEHICLE MAINTENANCE EXCELLENCE.

USING THE RIGHT OIL MATTERS

The right oil delivers:

THE BEST PERFORMANCE
THE BEST RELIABILITY
THE LONGEST LIFE

It's a balancing act to deliver all three attributes – and only XPS, with its custom blend formulations and carefully matched additives, is specifically designed to do just that in a Rotax engine.

> "The best oil is the oil that was specifically designed for the engine, without compromising the engine."

Mischa Zimmermann
Project Leader Engine Development, BRP

Find out why oil matters at www.xpslubricants.com

DOES ONE OIL FIT ALL?

Our efficient, high-output engines place strong demands on engine oil. At BRP, we treat oil like an actual mechanical part that needs to be developed alongside the engine it is intended for, throughout its entire design, testing and validation process. XPS is the best choice for our Rotax engines because the oil is engineered at the same time as our existing and emerging new engine technology. Each engine type has its own specific needs and characteristics that the oil must match. Not all oil manufacturers do.

2-STROKE OIL

Fact: XPS synthetic 2-stroke oil is subjected to extensive research and validation to allow the unique properties of E-TEC technology to reach their full potential. It's the kind of chemistry you won't find in any other oil.

4-STROKE OIL

Fact: XPS 4-stroke oil is BRP engineer-certified for unmatched lubrication, quick and easy cold starting, and oil flow in harsh winter conditions and extreme cold temperatures that delivers cold start protection against engine wear.

WHY NOT CHOOSE A LOW-COST ALTERNATIVE INSTEAD OF XPS ENGINE OILS?

BRP engineers and experts like Mischa Zimmerman have proven repeatedly that other brands of oil behave differently in Rotax engines.

- Each vehicle manufacturer establishes their own internal matching and compatibility standards and criterias for their OEM oil manufacturer.
- Aftermarket oil suppliers mostly follow existing industry standards for compliance purposes, but this is a common practice for general applications, and nowhere near the synergetic and concurrent engine-engine oil design and validation procedure we adhere to.
- Even oil that is more expensive than XPS will not have the same custom-matched results.
- Only XPS is designed exclusively in synch with Rotax engine technology, including its high-demand E-TEC direct fuel injection.
- Our oil is tested on the whole line-up of vehicles we manufacture and their engines – not just one or two models – and despite what other oil suppliers claim, we actually validate and revalidate the life span of both the engine and vehicle, meaning we put in thousands of dynamometer hours and hundreds of thousands of miles of hard real world test riding, as opposed to relying only on the equivalent of one season of usage other oil suppliers advertise.

AREN'T THERE OTHER HIGH QUALITY OILS ON THE MARKET?

Yes. But no other oil is designed as an actual mechanical part during engine development like XPS. The best oil is the oil engineered with carefully matched additives matrixed to meet exactly what the engine needs. Your satisfaction matters. We want you to have the best experience with your BRP vehicle, so we set extremely high standards for XPS oil.

YOU BOUGHT THE BEST VEHICLE AVAILABLE ON THE MARKET. IT DESERVES THE BEST MAINTENANCE PRODUCTS IN THE WORLD.

Going to your BRP dealership for regular maintenance servicing can prevent bigger and more expensive repairs in the long run. Just follow the recommended maintenance schedule. It was designed by experts who understand your Ski-Doo and know how to keep it in top form. Take care of your vehicle by maintaining it using strictly BRP and Rotax OEM or 100% Ski-Doo approved parts and products.

RECOMMENDED PERIODIC MAINTENANCE SCHEDULE FOR E-TEC, ACE & 1200 4-TEC POWERED VEHICLES

SYSTEM	COMPONENT	ACTION	First Inspection 300 mi. (500 km)	Every 1,000 mi. (1,500 km)	Every 2,000 mi. (3,000 km) or 1 year	Every 4,000 mi. (6,000 km) or 2 years	Every 6,000 mi. (10,000 km) or 3 years	Every 5 years
ENGINE	Oil System 4-Stroke	Replace oil and oil filter			After the first 2,000 mi. (3,000 km) ACE and 1200 4-TEC	or once a year		
	Seals and Gaskets (ACE and 1200 4-TEC)	Inspect	■					
	Spark Plugs	Replace					■	
	Rewind Starter	Clean and lubricate				■		
	3D-RAVE Valves (E-TEC)	Clean					■	
FUEL	In Line Fuel Filter (E-TEC)	Replace						■
	Fuel Lines & Connections	Inspect	■					
	Fuel Pump Strainer (E-TEC)	Inspect or replace			■			
	Fuel Pump Outlet Filter (ACE and 1200 4-TEC)	Replace			■			
OIL SYSTEM (E-TEC)	Pump Strainer	Inspect/clean					■	
COOLING	Coolant	Check level	■					
		Replace						■
EXHAUST	System	Inspect and check for leaks	■		■			
REAR SUSPENSION	Idler Wheels	Check bearings, inspect rubber			■			
	Slider Shoes & Stopper Straps, Bolts	Inspect	■		■			
	Axles & Pivots	Grease/lubricate			■			
TRACK	Track	Adjust and align	■		■			
FRONT SUSPENSION	Shocks, Springs, A-Arms, Bolts	Inspect	■		■			
SKIS	Skis & Runners	Inspect skis and runners	■					
PULLEY SYSTEM	Drive Pulley	Visually inspect/clean	■		■			
		Tighten retainer screw	■		■			
	Slider Shoes, O-Rings, Sliding Sheave Bushing (E-TEC)	Replace				■		
	Spring Cover Bushing & Ramps (E-TEC)	Replace					■	
	Drive Belt	Inspect	■					
	Driven Pulley	Inspect	■					
		Check preload (ACE)	■					
		Clean			■			
DRIVE SYSTEM	Drive Chain	Adjust	■	■				
	Chaincase Oil	Change	■					
		Check oil level		■				
BRAKING SYSTEM	Brake Fluid	Check level	■					
		Replace				■		
	Brake Pads, Hose & Disc	Inspect	■		■			
BODY	Engine Rubber Mounts	Inspect			■			
	Engine Stopper (E-TEC)	Adjust			■			
CONTROLS	Throttle Cable (E-TEC)	Inspect	■			■		
	Steering Mechanism	Inspect	■		■			

MORE THAN JUST OIL.

XPS OILS AND ROTAX ENGINES. CREATED, DEVELOPED, AND CONSTANTLY EVOLVING TOGETHER TO WORK BEST TOGETHER.

It's all about reaching optimum performance and protection, ensuring XPS oils have no equals when used in Rotax engines, and Rotax engines have no equals when they use XPS oils.

QUALITY, INNOVATION, RELIABILITY AND PERFORMANCE GO INTO EVERY BRP VEHICLE AND INTO EVERY DROP OF XPS OIL.

Our performance requirements exceed oil certification standards, so we set our own: Testing, and retesting our oils in every Rotax engine type under a wide range of rigorous operating conditions to make sure they work the best under all conditions.

XPS IS THE ONLY OIL SPECIFICALLY ENGINEERED FOR ROTAX ENGINES.

BRP's Rotax engines are the perfect embodiment of power and technology, and only highly specialized, specially engineered XPS oils can ensure they always operate at their maximum efficiency and potential.

XPS OILS & ROTAX ENGINES. PARTNERS IN PERFORMANCE.

BRP

ski-doo LYNX SEA-DOO EVINRUDE ROTAX can-am

484801408

ski-doo®

2017

OPERATOR'S GUIDE

Includes Safety, Vehicle and Maintenance Information

REV™ G4

Mountain Series

⚠ WARNING

Read this guide thoroughly.
It contains important safety information.
Minimum recommended operator's age: 16 years old.
Keep this Operator's Guide in the vehicle.

5 2 0 0 0 1 4 9 6

Original Instructions

⚠ WARNING

Disregarding any of the safety precautions and instructions contained in this Operator's Guide, *SAFETY VIDEO* and on-product safety labels could cause injury including the possibility of death!

⚠ WARNING

This vehicle may exceed the performance of other vehicles you may have ridden. Take time to familiarize yourself with your new vehicle.

CALIFORNIA PROPOSITION 65 WARNING

⚠ WARNING

This vehicle contains or emits chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.

In USA, products are distributed by BRP US Inc.

In Canada, products are distributed by Bombardier Recreational Products Inc.

FOREWORD

Deutsch	Dieses Handbuch ist möglicherweise in Ihrer Landessprache verfügbar. Bitte wenden Sie sich an Ihren Händler oder besuchen Sie: **www.operatorsguides.brp.com**
English	This guide may be available in your language. Check with your dealer or go to: **www.operatorsguides.brp.com**
Español	Es posible que este manual esté disponible en su idioma. Consulte a su distribuidor o visite: **www.operatorsguides.brp.com**
Français	Ce guide peut être disponible dans votre langue. Vérifier avec votre concessionnaire ou aller à: **www.operatorsguides.brp.com**
日本語	このガイドは、言語によって翻訳版が用意されています。. ディーラーに問い合わせるか、次のアドレスでご確認ください： **www.operatorsguides.brp.com**
Nederlands	Deze handleiding kan beschikbaar zijn in uw taal. Vraag het aan uw dealer of ga naar: **www.operatorsguides.brp.com**
Norsk	Denne boken kan finnes tilgjengelig på ditt eget språk. Kontakt din forhandler eller gå til: **www.operatorsguides.brp.com**
Português	Este manual pode estar disponível em seu idioma. Fale com sua concessionária ou visite o site: **www.operatorsguides.brp.com**
Suomi	Käyttöohjekirja voi olla saatavissa omalla kielelläsi. Tarkista jälleenmyyjältä tai käy osoitteessa: **www.operatorsguides.brp.com**
Svenska	Denna bok kan finnas tillgänglig på ditt språk. Kontakta din återförsäljare eller gå till: **www.operatorsguides.brp.com**

Congratulations on your purchase of a new Ski-Doo® snowmobile. Whatever model you have chosen, it is backed by the Bombardier Recreational Products Inc. (BRP) warranty and a network of authorized Ski-Doo snowmobile dealers ready to provide the parts, service or accessories you may require.

Your dealer is committed to your satisfaction. He has taken training to perform the initial set-up and inspection of your snowmobile as well as completed the final adjustment required to suit your specific weight and riding environment before you took possession.

At delivery, you were informed of the warranty coverage and signed the *PREDELIVERY CHECK LIST* to ensure your new vehicle was prepared to your entire satisfaction.

Know Before you Go

To learn how to reduce the risk for you, your passenger or bystanders being injured or killed, read the following sections before you operate the vehicle:

– *SAFETY INFORMATION*
– *VEHICLE INFORMATION*.

Also read all safety labels on your snowmobile and watch attentively your *SAFETY VIDEO*.

We highly recommend that you take a safety riding course. Please check with your dealer or local authorities for availability in your area.

Failure to follow the warnings contained in this Operator's Guide can result in SERIOUS INJURY or DEATH.

Safety Messages

The types of safety messages, what they look like and how they are used in this guide are explained as follows:

The safety alert symbol ⚠ indicates a potential injury hazard.

⚠ WARNING

Indicates a potential hazard, if not avoided, could result in serious injury or death.

⚠ CAUTION Indicates a hazard situation which, if not avoided, could result in minor or moderate injury.

NOTICE Indicates an instruction which, if not followed, could severely damage vehicle components or other property.

About this Operator's Guide

This Operator's Guide has been prepared to acquaint the owner/operator and passenger with this snowmobile and its various controls, safe riding and maintenance instructions.

The following terminology in regards to operator, passenger and vehicle configuration is used as follows throughout this guide:

- Operator: refers to the person being behind the controls and driving the snowmobile.
- Passenger: refers to a person sitting behind the operator.
- 1-UP: refers to a model designed for an operator only.
- 2-UP: refers to a model designed to accommodate one passenger.

Keep this Operator's Guide in the vehicle as you can refer to it for things such as maintenance, troubleshooting and instructing others.

Note that this guide is available in several languages. In the event of any discrepancy, the English version shall prevail.

If you want to view and/or print an extra copy of your Operator's Guide, simply visit the following website **www.operatorsguides.brp.com**.

The informations contained in this document are correct at the time of publication. BRP, however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured. Due to late changes, some differences between the manufactured product and the descriptions and/or specifications in this guide may occur. BRP reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring any obligation upon itself.

This Operator's Guide and the *SAFETY DVD* should remain with the vehicle when it's sold.

TABLE OF CONTENTS

FOREWORD **1**
Know Before you Go 1
Safety Messages 2
About this Operator's Guide 2

SAFETY INFORMATION

GENERAL PRECAUTIONS **10**
Avoid Carbon Monoxide Poisoning 10
Avoid Gasoline Fires and Other Hazards 10
Avoid Burns from Hot Parts 11
Accessories and Modifications 11

SPECIAL SAFETY MESSAGES **12**

RIDING THE VEHICLE **17**
Pre-Ride Inspection 17
How to Ride 20
Carrying a Passenger 23
Terrain/Riding Variations 25
Environment 32

TRACTION ENHANCING PRODUCTS **35**
Manoeuvrability 35
Acceleration 38
Braking 38
Important Safety Rules 38
Effects of Having a Studded Track on the Life of the Snowmobile 39
Installation of Studs on BRP Approved Tracks 39
Maintenance/Replacement 42

IMPORTANT ON-PRODUCT LABELS **43**
Hang Tag(s) 43
Vehicle Safety Labels 46
Compliance Labels 54
Technical Information Labels 56

VEHICLE INFORMATION

CONTROLS, INSTRUMENTS AND EQUIPMENT **60**
1) Handlebar 61
2) Throttle Lever 61
3) Brake Lever 62

CONTROLS, INSTRUMENTS AND EQUIPMENT (cont'd)
4) Parking Brake Lever 63
5) Engine Cut-off Switch 64
6) Emergency Engine Stop Switch 65
7) Start/Electronic Reverse (RER) Button 68
8) Headlights Dimmer Switch 68
9) Heated Grips and Throttle Lever Switch 69
10) Seat 70
11) Tools 71
12) Front and Rear Bumpers 73
13) Multifunction Digital Gauge 74
14) Storage Compartment 82
15) Drive Belt Guard 82
16) Spare Drive Belt Holder 85
17) Upper Body Module (Hood) 86
18) Side Panels 92
19) Rewind Starter Handle (If Applicable) 93
20) Ice Scratchers 93
21) Operator's Guide 94

FUEL 95
Fuel Requirements 95
Vehicle Fueling Procedure 96

INJECTION OIL 98
Recommended Injection Oil 98
Injection Oil Level Verification 98

BREAK-IN PERIOD 100
Operation During Break-In 100

BASIC PROCEDURES 101
Engine Starting Procedure 101
Emergency Starting 101
Vehicle Warm-Up 104
Reverse (RER) 105
Shutting Off the Engine 106

RIDING CONDITIONS AND YOUR SNOWMOBILE 107
Altitude 107
Temperature 107

SPECIAL OPERATION 108
Towing an Accessory 108

SPECIAL OPERATION (cont'd)
Towing Another Snowmobile 108
TUNE YOUR RIDE **109**
Rear Suspension Adjustments 110
Front Suspension Adjustments 119
Adjustment Tips According to Vehicle Behavior 121
VEHICLE TRANSPORTATION **123**

MAINTENANCE

MAINTENANCE SCHEDULE **126**
MAINTENANCE PROCEDURES **129**
Engine Coolant 129
Exhaust System 130
Spark Plugs 131
Brake Fluid 131
Chaincase Oil 133
Drive Chain 136
Drive Belt 137
Drive Pulley 142
Track 146
Suspension 154
Skis 155
Fuses 156
Headlights 157
VEHICLE CARE **163**
Post-Operation Care 163
Vehicle Cleaning and Protection 163
STORAGE **164**
Engine Storage Mode 164

TECHNICAL INFORMATION

VEHICLE IDENTIFICATION **168**
Vehicle Description Decal 168
Identification Numbers 169

NOISE EMISSION AND VIBRATION VALUES (ALL COUNTRIES EXCEPT CANADA/UNITED STATES) 171

EC DECLARATION OF CONFORMITY 172

EPA CERTIFIED ENGINES 173
Engine Emissions Information 173

RADIO FREQUENCY DIGITALLY ENCODED SECURITY SYSTEM (RF D.E.S.S. KEY) 175

SPECIFICATIONS 176

TROUBLE-SHOOTING

TROUBLESHOOTING GUIDELINES 182

MONITORING SYSTEM 185
Icons, Messages and Beeper Codes 185
Fault Codes 189

WARRANTY

BRP LIMITED WARRANTY USA AND CANADA: 2017 SKI-DOO® SNOWMOBILES 192

US EPA EMISSION-RELATED WARRANTY 196

BRP INTERNATIONAL LIMITED WARRANTY: 2017 SKI-DOO® SNOWMOBILES 199

BRP LIMITED WARRANTY FOR THE EUROPEAN AND THE COMMONWEALTH OF THE INDEPENDENT STATES (CIS) AREAS AND TURKEY: 2017 SKI-DOO® SNOWMOBILES 204

CUSTOMER INFORMATION

PRIVACY INFORMATION 212

CONTACT US 213
North America 213
Europe 213
Oceania 214
South America 214
Asia 214

CHANGE OF ADDRESS/OWNERSHIP 215

SAFETY INFORMATION

GENERAL PRECAUTIONS

Avoid Carbon Monoxide Poisoning

All engine exhaust contains carbon monoxide, a deadly gas. Breathing carbon monoxide can cause headaches, dizziness, drowsiness, nausea, confusion and eventually death.

Carbon monoxide is a colorless, odorless, tasteless gas that may be present even if you do not see or smell any engine exhaust. Deadly levels of carbon monoxide can collect rapidly, and you can quickly be overcome and unable to save yourself. Also, deadly levels of carbon monoxide can linger for hours or days in enclosed or poorly ventilated areas. If you experience any symptoms of carbon monoxide poisoning, leave the area immediately, get fresh air and seek medical treatment.

To prevent serious injury or death from carbon monoxide:

– Never run the vehicle in poorly ventilated or partially enclosed areas such as garages, carports or barns. Even if you try to ventilate engine exhaust with fans or open windows and doors, carbon monoxide can rapidly reach dangerous levels.
– Never run the vehicle outdoors where engine exhaust can be drawn into a building through openings such as windows and doors.

Avoid Gasoline Fires and Other Hazards

Gasoline is extremely flammable and highly explosive. Fuel vapors can spread and be ignited by a spark or flame many feet away from the engine. To reduce the risk of fire or explosion, follow these instructions:

– Use only an approved gasoline container to store fuel.
– Strictly adhere to instructions in *FUELING PROCEDURE*.
– Never start or operate the engine if the fuel cap is not properly installed.

Gasoline is poisonous and can cause injury or death.

– Never siphon gasoline by mouth.
– If you swallow gasoline, get any in your eye or inhale gasoline vapor, see your doctor immediately.

If gasoline spills on you, wash with soap and water and change your clothes.

Avoid Burns from Hot Parts

The exhaust system and engine become hot during operation. Avoid contact during and shortly after operation to avoid burns.

Accessories and Modifications

Do not make unauthorized modifications, or use attachments or accessories that are not approved by BRP. Since these changes have not been tested by BRP, they may increase the risk of crashes or injuries, and they can make the vehicle illegal.

Tunnel accessories must be loaded onto vehicle as per instructions provided for each accessories.

Accessory passenger seats approved by BRP and conforming to SSCC standards may be available for certain models. If such a seat is used, you must follow the guidelines and recommendations in regards to a passenger in this guide.

⚠ WARNING

Passenger seat must have a strap or handholds and must meet SSCC standards.

See your authorized Ski-Doo dealer for available accessories for your vehicle.

SPECIAL SAFETY MESSAGES

SEVERE INJURY OR DEATH can result if you do not follow these instructions:

- Always make a pre-ride inspection BEFORE you start the engine.
- Throttle mechanism should be checked for free movement and return to idle position before starting engine.
- Always attach tether cord eyelet to clothing before starting the engine.
- Never operate the engine without belt guard and brake disk guard securely installed or, with hood or side panels opened or removed. Never run the engine without drive belt installed. Running an unloaded engine such as without drive belt or with track raised, can be dangerous.
- Always engage parking brake before starting the engine.
- Everyone is a beginner the first time he sits behind the controls of a snowmobile regardless of previous experience in driving any other type of vehicle. The safe use of your snowmobile depends on many conditions such as visibility, speed, weather, environment, traffic, vehicle condition and the condition of the operator.
- Basic training is required for the safe operation of any snowmobile. Study your operator's guide paying particular attention to cautions and warnings. Join your local snowmobile club: its social activities and trail systems are planned for both fun and safety. Obtain basic instructions from your snowmobile dealer, friend, fellow club member or enroll in your state or provincial safety training program.
- Any new operator must read and understand all safety labels on the snowmobile, the Operator's Guide and watch the *SAFETY VIDEO* before operating the snowmobile. Only allow a new operator to operate the snowmobile in a restricted flat area, at least until he is completely familiar with its operation. If snowmobile operator's training course is offered in your area, have him enroll.
- The performance of some snowmobiles may significantly exceed that of other snowmobiles you have operated. Therefore, use by novice or inexperienced operators is not recommended.
- Snowmobiles are used in many areas and in many snow conditions. Not all models perform the same in similar conditions. Always consult your snowmobile dealer when selecting the snowmobile model for your particular needs and uses.
- Injury or death may result to the snowmobile operator, passenger or bystander if the snowmobile is used in risky conditions which are beyond the operator's, passenger's or snowmobile's capabilities or intended use.

- BRP recommends the operator has at least 16 years old of age. Verify also your local laws for age and training requirements.
- It is very important to inform any operator, regardless of his experience, of the handling characteristics of this snowmobile. The snowmobile configuration, such as ski stance, ski type, suspension type, track length, width and type vary from a model to another. The snowmobile handling is greatly influenced by these characteristics.
- The novice operator should become familiar with the snowmobile through practice on a level area at slow speeds before venturing far afield.
- Know your local laws. Federal, state, provincial and local government agencies have enacted laws and regulations pertaining to the safe use and operation of snowmobiles. It is your responsibility as a snowmobiler to learn and obey these laws and regulations. Respect and observance will result in safer snowmobiling for all. Be aware of the liability property damages and insurance laws regarding your equipment.
- Speeding can be fatal. In many cases, you cannot react or respond quickly enough to the unexpected. Always ride at a speed which is suitable to the trail, weather conditions and your own ability. Know your local rules. Speed limit may be in effect and meant to be observed.
- Always keep right hand side of the trail.
- Always keep a safe distance from other snowmobiles and bystanders.
- Remember, promotional material may show risky maneuvers performed by professional riders under ideal and/or controlled conditions. You should never attempt any such risky maneuvers if they are beyond your level of riding ability.
- Never use this vehicle with drugs or alcohol. They slow reaction time and impair judgement.
- Your snowmobile is not designed to be operated on public streets, roads or highways.
- Avoid road traveling. If you must do so, and it is permitted, reduce speed. The snowmobile is not designed to operate or turn on paving. When crossing a road, make a full stop, then look carefully in both directions before crossing at a 90° angle. Be wary of parked vehicles.

- Snowmobiling at night can be a delightful experience but because of reduced visibility, be extra cautious. Avoid unfamiliar terrain and be sure your lights are working. Always carry a flashlight and spare light bulbs.
- Never remove any original equipment from your snowmobile. Each vehicle has many built in safety features. Such features include various guards and consoles, plus reflective materials and safety labels.
- Nature is wonderful but don't let it distract your attention from driving. If you want to truly appreciate winter's scenery, stop your snowmobile on the side of the trail so that you don't become a hazard to others.
- Fences represent a very serious threat for both you and your snowmobile. Give a wide berth to telephone poles or posts.
- Hidden wires unseen from a distance can cause serious accidents.
- Always wear an approved safety helmet, eye protection and a face shield. This also applies to your passenger.
- Be aware of inherent risks associated with riding off trails, such as avalanche and other natural or man made hazards or obstacles.
- Tailgating another snowmobile should be avoided. If the snowmobile in front of you slows for any reason, its operator and passenger could be harmed through your neglect. Maintain a safe stopping distance between you and the snowmobile in front of you. Depending on the terrain condition, stopping may require a little more space than you think. Play it safe. Be prepared to use evasive driving.
- Venturing out alone with your snowmobile could also be hazardous. You could run out of fuel, have an accident, or damage your snowmobile. Remember, your snowmobile is capable of traveling further in half an hour than you may be able to walk in a day. Use the "buddy system". Always ride with a friend or member of your snowmobile club. Even then, tell someone where you are going and the approximate time you plan to return.
- Meadows sometimes have low areas where water accumulate and freezes over in winter. This ice is usually glare ice. Attempting to turn or brake on this surface could cause your vehicle to spin out of control. Never brake or attempt speeding or turning on glare ice. If you do happen to travel over such a condition, reduce speed by carefully releasing the throttle.
- Never "jump" with your snowmobile.

- While on safari, do not "gun" the throttle. Snow and ice can be thrown back into the path of a following snowmobile. In addition, when "gunning" the throttle, the vehicle digs into and leaves an irregular snow surface for others.
- Safaris are both fun and enjoyable but don't show off or overtake others in the group. A less experienced operator might try to do the same as you and fail. When riding with others, limit your abilities to the experience of others.
- In an emergency, the snowmobile engine can be stopped by pressing down on the emergency engine stop switch or by pulling the tether cord cap from the engine cut-off switch, while applying brake.
- Always engage parking brake when vehicle is not in use.
- Never run the engine in a non-ventilated area and/or if vehicle is left unattended.
- Electric start models only: Never charge or boost a battery while installed on snowmobile.
- E-TEC engines: Never attempt any fuel system or electrical system maintenance or repair. Any maintenance or repair of these systems must be performed by an authorized Ski-Doo dealer.
- Never attempt any fuel system or electrical system maintenance or repair. Any maintenance or repair of these systems must be performed by an authorized Ski-Doo dealer.
- Ensure the path behind is clear of obstacles or bystanders before proceeding in reverse.
- Always remove the tether cord cap from engine cut-off switch when vehicle is not in operation in order to prevent accidental engine starting, to avoid unauthorized use by children or others or theft.
- NEVER stand behind or near a rotating track. Debris could be projected causing severe injuries. To remove packed snow or ice, stop engine, tilt and hold vehicle on its side and use wrench tool on the belt guard.
- Do not stud the track unless it has been approved for studs. At speed, a studded track that has not been approved for studs could tear and separate from vehicle. See an authorized Ski-Doo dealer for current specific studding availability and applications.

– You may stud the track on this vehicle model. However, you MUST only use the BRP approved type stud for use on Ski-Doo snowmobiles. DO NOT EVER use conventional studs because the track thickness is thinner then our standard tracks. The stud could tear off of track and separate from vehicle.
– Always wear an approved helmet and follow the same dressing guidelines as those recommended for the operator and described in this guide.
– Make sure that you are able to achieve a stable stance, both feet resting positively on the footboards of footrests with good grip, and that you are able to hold on firmly to the handholds.
– Do not forget, with 2-UP models, the operator is responsible for the safety of the passenger. Always remember that the snowmobile handling, stability and braking distance may be affected when riding with a passenger.
– Before riding the vehicle, ask your passenger to inform you to slowdown or stop immediately if he feels uncomfortable or insecure during the ride. Keep a watchful eye on your passenger while riding.

RIDING THE VEHICLE

Each operator has a responsibility to ensure the safety of other recreationists or bystanders.

You are responsible for proper operation of your vehicle as well as training those whom you allow to ride or drive. There may be noticeable handling and performance differences from one snowmobile to the other.

A snowmobile is relatively simple to operate but like any other vehicle or mechanical equipment, it can be hazardous if you or a passenger are reckless, thoughtless or inattentive. We encourage you to have an Annual Safety Inspection of your snowmobile. Please contact an authorized Ski-Doo dealer for further details. Though not required, it is recommended that an authorized Ski-Doo dealer performs the preseason preparation of your snowmobile. Each visit to your authorized Ski-Doo dealer is a great opportunity for your dealer to verifiy if your snowmobile is included in any safety campaign. We also urge you to visit your authorized Ski-Doo dealer in a timely manner if you become aware of any safety related campaigns.

See an authorized Ski-Doo dealer for available accessories you may require.

Before venturing on the trails, operate the snowmobile in a restricted flat area until you are completely familiar with its operation and feel comfortable that you can safely tackle a more demanding task. Have an enjoyable and safe ride.

Pre-Ride Inspection

⚠ WARNING

The pre-operation check is very important prior to operating the vehicle. Always check the proper operation of critical controls, safety features and mechanical components before starting.

Before Starting the Engine

1. Remove snow and ice from body including lights, seat, footrests, controls and instruments.
2. Verify that air silencer prefilter is free of snow.
3. Verify that skis and steering operate freely. Check corresponding action of skis versus handlebar.

4. Check fuel and injection oil (if applicable) for levels and leaks. Replenish if necessary and in case of any leaks; you should seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA EMISSION-RELATED WARRANTY* contained herein for information about warranty claims.
5. All storage compartments must be properly latched and they must not contain any heavy or breakable objects. Hood and side panels must be also properly latched.
6. Activate the throttle control lever several times to check that it operates easily and smoothly. It must return to idle position when released.
7. Activate the brake lever and make sure the brake fully applies before the brake control lever touches the handlebar grip. It must fully return when released.
8. Apply parking brake and check if it operates properly. Leave parking brake applied.

After Engine is Started

For proper engine starting procedure, refer to the appropriate *ENGINE STARTING PROCEDURE* section.

1. Check headlights high beam and low beam, taillight, stop light and pilot lamps operation.

NOTE: You may need to detach tether cord from your clothes to check lights. In such a case, attach cord as soon as you get back at the controls of the snowmobile.

2. Check the engine cut-off switch (by pulling tether cord cap) and emergency engine stop switch operation.
3. Release parking brake.
4. Refer to the *WARM UP* section and follow instructions.

Pre-Ride Check List

ITEM	OPERATION	✔
BODY INCLUDING SEAT, FOOTRESTS, LIGHTS, AIR FILTER, CONTROLS AND INSTRUMENTS	Check condition and remove snow or ice.	
SKIS AND STEERING ACTION	Check for free movement and proper operation.	
FUEL AND INJECTION OIL (IF APPLICABLE)	Check for proper level and no leaks.	
COOLANT	Check for proper level and no leaks.	
BRAKE FLUID	Check for proper level and no leaks.	
STORAGE COMPARTMENT	Check for proper latching and no heavy or breakable objects.	
TRACK	Check condition and remove snow or ice. For studded tracks, see *INSPECTION* in the *TRACTION ENHANCING PRODUCTS* subsection.	
THROTTLE LEVER	Check for proper operation.	
BRAKE LEVER	Check for proper operation.	
PARKING BRAKE, BRAKE	Check for proper operation.	
EMERGENCY ENGINE STOP SWITCH AND ENGINE CUT-OFF SWITCH (TETHER CORD CAP)	Check for proper action. Tether cord must be attached to operator clothing eyelet.	
LIGHTS	Check for proper operation.	
SKI RUNNERS	Check for proper operation.	
SLIDER SHOES	Check for proper operation.	
DRIVE BELT	Check for cracks, fraying or abnormal wear.	

How to Ride

Riding Gear

Proper snowmobile clothing should be worn. It should be comfortable and not too tight. Always check the weather forecast before going on a ride. Dress for the coldest weather expected. Thermal underwear next to the skin also provides a good insulation.

Wear an approved helmet at all times for safety and comfort. They provide both warmth and reduce injury. A stocking type cap, balaclava and face mask should always be carried or worn. Goggles or a face shield that attach to the helmet are indispensable.

Hands should be protected by a pair of snowmobile gloves or mitts which have sufficient insulation and allow use of thumbs and fingers for operation of controls.

Rubber bottom boots with either a nylon or a leather top, with removable felt liners are best suited for snowmobiling.

You should keep yourself as dry as possible when snowmobiling. When you come indoors, take your snowmobile suit and boots off and make certain they dry properly.

Do not wear a long scarf or loose apparels that could get caught in moving parts.

Carry colored lens goggles.

What to Bring

First aid kit	Provided tool kit
Mobile phone	Knife
Spare spark plugs	Flashlight
Friction tape	Trail map
Spare drive belt	Snack

Rider Position (Forward Operation)

Your riding position and balance are the two basic principles of making your snowmobile go where you want it to. When turning on the side of a hill, you and your passenger must be ready to shift body weight to help it turn in the desired direction. Operator and passenger must never attempt this maneuvering by placing feet

outside of the vehicle. Experience will teach you how much lean to put into turns at different speeds and how much you will have to lean into a slope to maintain proper balance.

Generally, the riding position for best balance and control is sitting. However, the posting, kneeling or standing positions are also used under certain conditions.

⚠ WARNING

Do not attempt any maneuvers if they are beyond your abilities.

Sitting

Feet on the running boards, body midway back on seat is an ideal position when operating the snowmobile over familiar, smooth terrain. Knees and hips should remain flexible to absorb shocks.

mmo2008-003-001

Posting

A semi-sitting position with the body off the seat and the feet under the body in a sort of squatting posture, thus allowing the legs to absorb the shocks when traveling over uneven terrain. Avoid abrupt stops.

mmo2008-003-002

Kneeling

This position is achieved by placing one foot firmly on the running board and the opposite knee on the seat. Avoid abrupt stops.

mmo2008-003-003

Standing

Place both feet on the running boards. Knees should be flexed to absorb the shock from surface bumps. This is an effective position to see better and to shift weight as conditions dictate. Avoid abrupt stop.

mmo2008-003-004

Rider Position (Reverse Operation)

We recommend sitting on your snowmobile when operating in reverse.

Avoid standing up. Your weight could shift forward against throttle lever while operating in reverse, causing an unexpected acceleration.

⚠ WARNING

Unexpected acceleration when snowmobile operates in reverse can cause a loss of control.

Carrying a Passenger

Certain snowmobiles are designed for an operator only (1-UP), and others can allow one passenger (2-UP). Make sure to identify and respect the warnings according to your specific models.

Even when a passenger is allowed, this person must be physically fit for snowmobiling.

⚠ WARNING

Any passenger must be able to firmly lay his feet on the footrests and keep his hands on the handholds or seat strap at all times when seated. Respecting those physical criteria is important to ensure that the passenger is stable and to reduce the risks of ejection.

The operator has a responsibility to ensure the safety of his passenger and should inform the passenger about snowmobiling basics.

⚠ WARNING

- **Passenger must only sit on designated passenger seat. Never allow anyone to sit between the handlebar and the operator.**
- **Passenger and operator must always wear an approved helmet and warm clothing appropriate for snowmobiling. Make sure that no skin is exposed.**
- **If the passenger feels uncomfortable or insecure for any reason, he must right away inform the operator to slow-down or stop.**

Riding with a passenger on board is different than riding alone. The operator has the benefit of knowing what will be the next maneuver and is able to prepare himself accordingly. The operator also benefits from the support of his grip on the handlebar. In contrast, the passenger has to rely on the operator's careful and safe operation of the vehicle. In addition, "body english" is limited with a passenger, and the operator can sometimes see more of the trail ahead than the passenger. Therefore, smooth starting and stopping are required with a passenger, and the operator must slow down. The operator must also warn the passenger about side hills, bumps, branches, etc. An unforeseen bump can leave you passenger-less. Remind your passenger to lean into the turn with you, without causing the vehicle to topple. Be extremely careful, go more slowly and check the passenger frequently.

⚠ WARNING

When riding with a passenger:

- Braking ability and steering control are reduced. Decrease speed and allow extra space to maneuver.
- Adjust suspension according to weight.

For complete information on how to adjust the suspension, please refer to the *TUNE YOUR RIDE* subsection.

Riding with a Child

On snowmobiles allowing two passengers (with optional seat), if you have an adult and a child for passenger, BRP recommends that the child sits in the center location. This allows an adult sitting in the rear seat to keep a visual contact with the child and hold him if necessary. In addition, the child is best protected against the wind and cold temperature if seated in the center location.

Use extra caution and go even more slowly with a young passenger. Check frequently to make certain the child has a firm grip and is properly positioned with his feet on the running boards.

Terrain/Riding Variations

Groomed Trail

On a maintained trail, sitting is the most preferred riding position. Do not race and, above all, keep to the right hand side of the trail. Be prepared for the unexpected. Observe all trail signs. Do not zigzag from one side of the trail to the other.

Ungroomed Trail

Unless there has been a fresh snowfall you can expect "washboard" and snowdrift conditions. Taken at excessive speeds, such conditions can be physically harmful. Slow down. Hold on the handlebar and assume a posting position. Feet should be under the body assuming a crouched position to absorb any jarring effect. On longer stretches of "washboard" trails, the kneeling position of one knee on the seat can be adopted. This provides a certain amount of comfort, while at the same time keeps the body loose and capable of vehicle control. Beware of hidden rocks or tree stumps partially hidden by a recent snowfall.

Deep Snow

In deep "powder" snow, your vehicle could begin to "bog" down. If this occurs, turn in as wide an arc as possible and look for a firmer base. If you do get "bogged", and it happens to everyone, do not spin your track as this makes the vehicle sink deeper. Instead, turn the engine off, get off and move the back of the vehicle onto new snow. Then tramp a clear path ahead of the vehicle. A few feet will generally suffice. Restart the engine. Assume the standing position and rock the vehicle gently as you steadily and slowly apply the throttle. Depending on whether the front or rear end of the vehicle is sinking, your feet should be placed on the opposing end of the running boards. Never place foreign material beneath the track for support. Do not allow anyone to stand in front of, or to the rear of, the snowmobile with the engine running. Stay away from the track. Personal injury will result if contact is made with the revolving track.

Frozen Water

Traveling frozen lakes and rivers can be fatal. Avoid waterways. If you are in an unfamiliar area, ask the local authorities or residents about the ice condition, inlets, outlets, springs, fast moving currents or other hazards. Never attempt to operate your snowmobile on ice that may be too weak to support you and the vehicle. Operating a snowmobile on ice or icy surfaces can be very dangerous if you do not observe certain precautions. The very nature of ice is foreign to good control of a snowmobile or any vehicle. Traction for starting, turning or stopping is much less than that on snow. Thus, these distances can be multiplied manyfold. Steering is minimal, and uncontrolled spins are an ever present danger. When operating on ice, drive slowly with caution. Allow yourself plenty of room for stopping and turning. This is especially true at night.

Hard Packed Snow

Don't underestimate hard packed snow. It can be difficult to negotiate as both skis and track do not have as much traction. Best advice is to slow down and avoid rapid acceleration, turning or braking.

Uphill

There are two types of hills you can encounter — the open hill on which there are few trees, cliffs or other obstacles, and a hill that can only be climbed directly. On an open hill, the approach is to climb it by side hilling or slaloming. Approach at an angle. Adopt a kneeling

position. Keep your weight on the uphill side at all times. Maintain a steady, safe speed. Continue as far as you can in this direction, then switch to an opposite hill angle and riding position.

A direct climb could present problems. Choose the standing position, accelerate before you start the climb and then reduce throttle pressure to prevent track slippage.

In either case, vehicle speed should be as fast as the incline demands. Always slow down as you reach the crest. If you cannot proceed further, don't spin your track. Turn the engine off, free the skis by pulling them out and downhill, place the rear of the snowmobile uphill restart the engine and ease it out with slow even throttle pressure. Position yourself to avoid tipping over, then descend.

Downhill

Downhill driving requires that you have full control of your vehicle at all times. On steeper hills, keep your center of gravity low and both hands on the handlebar. Maintain slight throttle pressure and allow the machine to run downhill with the engine operating. If a higher than safe speed is reached, slow down by braking but apply the brake with frequent light pressure. Never jam the brake and lock the track.

Side Hill

When crossing a side hill or traversing up or downhill, certain procedures must be followed. All riders should lean towards the slope as required for stability. The preferred operating positions are the kneeling position, with the knee of the down hill leg on the seat and the foot of the uphill leg on the running board, or the posting position. Be prepared to shift your weight quickly as needed. Side hills and steep slopes are not recommended for a beginner or a novice snowmobiler.

Avalanche Hazard

When riding on mountainous terrain, you should be aware of the risk of avalanches. Avalanches vary in size and shapes and generally occur in steep terrain and on unstable snow.

New snow, animals, people, wind and snowmobiles can all trigger an avalanche. Avoid high marking or traversing steep terrain when avalanche conditions are possible. When in unstable snow conditions, travel should be restricted to lower angle slopes. Wind formed cornices should be avoided. Staying off unstable conditions is the key to safe mountain riding. Probably most important is to be

aware of the conditions and dangers on a daily basis when in the mountains. Check local avalanche forecasts and threats each day before heading out to ride and heed forecasters advice.

You should always carry a snow shovel, probe and avalanche beacon while riding on mountains. We recommend that all mountain riders take a local avalanche safety training course to become more familiar with snow conditions and learn how to properly use their equipment.

Here are some web sites that can help you finding important information:

- US: www.avalanche.org
- Europe: www.avalanches.org
- Canada: www.avalanche.ca

Slush

Slush should be avoided at all times. Always check for slush before starting across any lake or river. If dark spots appear in your tracks, get off the ice immediately. Ice and water can be thrown rearward into the path of a following snowmobile. Getting a vehicle out of a slush area is strenuous and in some cases, impossible.

Fog or Whiteout Conditions

On land or water, fog or visibility-limiting snow can form. If you have to proceed into the fog or heavy snow, do so slowly with your lights on and watch intently for hazards. If you are not sure of your way, do not proceed. Keep a safe distance behind other snowmobilers to improve visibility and reaction time.

Unfamiliar Territory

Whenever you enter an area that is new to you, drive with extreme caution. Go slow enough to recognize potential hazards such as fences or fence posts, brooks crossing your path, rocks, sudden dips, guy wires and countless other obstacles which could result in a termination of your snowmobile ride. Even when following existing tracks, be cautious. Travel at a speed so you can see what is around the next bend or over the top of the hill.

Bright Sunshine

Bright sunny days can considerably reduce your vision. The glare from sun and snow may blind you to the extent that you cannot easily distinguish ravines, ditches or other obstacles. Goggles with colored lenses should always be worn under these conditions.

Unseen Obstruction

There may be obstructions hidden beneath the snow. Driving off established trails and in the woods requires reduced speed and increased vigilance. Driving too fast in an area can make even minor obstacles very hazardous. Even hitting a small rock or stump could throw your snowmobile out of control and cause injury to its riders. Stay on established trails to reduce your exposure to hazards. Be safe, slow down and enjoy the scenery.

Hidden Wires

Always be on the lookout for hidden wires, especially in areas that may have been farmed at one time or another. Too many accidents have been caused by running into wires in the fields, guy wires next to poles and roads, and into chains and wires used as road closures. Slow speeds are a must.

Obstacles and Jumping

Unplanned jumps of snowdrifts, snowplow ridges, culverts or indistinguishable objects can be dangerous. You can avoid them by wearing the proper color lenses or face shields and by operating at a lower speed.

Jumping can be a hazardous situation. Be prepared before landing to absorb the shock and brace yourself for the impact. Knees must be flexed to act as shock absorbers. If the trail does suddenly drop away from you, crouch (stand) towards the rear of the vehicle and keep the skis up and straight ahead. Apply partial throttle and brace yourself for the impact. Knees must be flexed to act as shock absorbers.

Turning

Depending on terrain conditions, there are two preferred ways to turn or corner a snowmobile. For most snow surfaces, "body english" is the key to turning. Leaning towards the inside of the turn and positioning body weight on the inside foot will create a

"banking" condition beneath the track. By adopting this position and positioning yourself as far forward as possible, weight will be transferred to the inside ski.

On occasion, you will find that the only way to turn the vehicle about in deep snow is to pull the snowmobile around. Do not over-exert yourself. Get assistance. Remember to always lift using your legs as opposed to your back.

mmo2008-003-005

Road Crossing

In some cases, you will be approaching the road from a ditch or snowbank. Choose a place where you know you can climb without difficulty. Use the standing position and proceed with only as much speed needed to crest the bank. Stop completely at the top of the bank and wait for all traffic to clear. Judge the drop to the roadway. Cross the road at a 90° angle. If you encounter another snowbank on the opposite side, position your feet near the rear of the vehicle. Remember, your snowmobile is not designed to operate on bare pavement and steering on this type of surface is more difficult.

Railroad Crossing

Never ride on railroad tracks. It is illegal. Railroad tracks and railroad rights-of-way are private property. A snowmobile is no match for a train. Before crossing a railroad track, stop, look and listen.

Night Rides

The amount of natural and artificial light at a given time can effect your ability to see or to be seen. Nighttime snowmobiling is delightful. It can be a unique experience if you acknowledge your reduced visibility. Before you start, make certain your lights are clean and work properly. Drive at speeds that will allow you to stop in time when you see an unknown or dangerous object ahead. Stay on established trails and never operate in unfamiliar territory. Avoid rivers and lakes. Guy wires, barbed wire fences, cabled road entrances and other objects such as tree limbs are difficult to see at night. Never drive alone. Always carry a flashlight. Keep away from residential areas and respect the right of others to sleep.

Riding in a Group

Before starting out, designate a "trail boss" to lead the party and another person to follow-up at the end of the party. Ensure that all members of the party are aware of the proposed route and destination. Make certain that you are carrying all necessary tools and equipment and that you have sufficient fuel to complete the trip. Never overtake the trail boss or, for that matter, any other snowmobile. Use down-the-line hand signals to indicate hazards or intent of direction change. Assist others whenever necessary.

It is always IMPORTANT to keep a safe distance between each snowmobile. Always maintain a safe interval and allow sufficient stopping distance. Don't be a tailgater. Know the position of the machine ahead.

Signals

If you intend to stop, raise either hand straight above your head. A left turn is indicated by extending your left hand straight out in the proper direction. For right turns, extend the left arm and raise the hand to a vertical position so it forms a right angle at the elbow. Every snowmobiler should relay any signal to the ones behind.

Trail Stops

Whenever possible, pull off the trail when you stop. This will reduce the hazard to other snowmobilers using the trail.

Trails and Signs

Trail signs are used to control, direct or regulate the use of snowmobiles on trails. Become familiar with all signs used in the area where you are snowmobiling.

Environment

Wildlife compliments your snowmobiling day. Snowmobile tracks provide firm ground over which animals can travel from area to area. Do not violate this privilege by chasing or harassing wildlife. Fatigue and exhaustion can lead to animal's death. Avoid areas posted for the protection or feeding of wildlife.

If you happen to be fortunate enough to see an animal, stop your snowmobile and observe quietly.

The guidelines that we support are not designed to limit your snowmobiling fun, but to preserve the beautiful freedom that you can experience only on a snowmobile! These guidelines will keep snowmobilers healthy, happy and able to introduce others to what they know and enjoy about their favorite winter pastime. So, the next time you hit the trails on a cool, crisp and clear winter day, we ask you to remember that you are paving the way for the future of our sport. Help us lead it down the right path! From all of us at BRP, thank you for doing your share.

There is nothing more exhilarating than snowmobiling. Venturing onto snowmobile trails that cross wild areas is an exciting and healthy winter sport. However, as the number of people using these recreational parks increases, so does the potential for damage to the environment. Abuse of land, facilities and resources inevitably leads to restrictions and closures of both private and public land.

In essence, the greatest threat to our sport, is all around us. Which leaves us with one logical choice. When we snowmobile, we must always ride responsibly.

The vast majority respect the law and the environment. Each of us must set an example for those who are new to the sport, young and old alike.

It is in every one's best interest to tread lightly into our recreational areas. Because, in the long run, to protect the sport we must preserve the environment.

Recognizing the importance of this issue and the need for snowmobilers to do their share in preserving areas that make it possible to enjoy our sport, BRP has developed the "Light Treading Is Smart Sledding" campaign for snowmobilers.

Light Treading refers to more than the thread of our tracks. It's a statement of concern, respect and willingness to take the lead and take action. It applies to the environment in general, its proper care and maintenance, its natural inhabitants and all enthusiasts and the public at large who enjoy the great outdoors. With this theme, we invite all snowmobilers to remember that respecting the environment is not only critical to the future of our industry but to future generations.

Light Treading in no way suggests you should curb your appetite for snowmobiling fun! It simply means tread with respect!

The fundamental objective of Light Treading is one of respect for where and how you ride a snowmobile. You're a light treader when you follow the principles below.

Become informed. Obtain maps, regulations and other information from the Forest Service or from other public land agencies. Learn the rules and follow them and that goes for speed limits, too!

Avoid running over young trees, shrubs, and grasses and don't cut wood. On flatlands or areas where trail riding is popular, it's important to ride only where authorized. Remember, there is a link between protecting your environment and your own safety.

Respect wildlife and be particularly sensitive of animals that are rearing young or suffering from food shortage. Stress can sap scarce energy reserves. Refrain from riding in areas where only animals are intended to tread!

Obey gate closures and regulatory signs and remember, light treaders don't litter!

Stay out of wilderness areas. They're closed to all vehicles. Know where the boundaries are.

Obtain permission to travel across private land. Respect the rights of landowners and other people's privacy. Remember, snowmobile technology has lowered the noise factor considerably, but you still shouldn't rev your engines where quiet "is the order of the day".

Snowmobilers know all too well the efforts that have been made throughout the sport's history to enjoy access to areas where people can snowmobile safely and responsibly. This effort continues today, as strong as ever.

Respecting the areas where we ride... wherever they may be... is the only way to ensure their future enjoyment. That's one major reason why we know you'll agree that Light Treading is smart sledding! And there are more.

Enjoying the opportunity to see winter and all its natural majestic wonders, is an experience cherished by snowmobilers. Light Treading will preserve this opportunity and will make it possible for us to expose others to the beauty of winter and the unique thrill of our sport! Light Treading will help our sport to grow!

Finally, Light Treading is the sign of a smart snowmobiler. You don't have to leave big tracks or careen through a virgin forest to show you can ride. So whether you're driving a high performance Ski-Doo, a sporty MX Z™ snowmobile or any other make or model, show you know what you're doing. Show you know how to send snow flying and make tracks with a light touch!

TRACTION ENHANCING PRODUCTS

NOTE: This section is applicable to snowmobiles equipped with a factory installed track that has been approved by BRP for special studs installation.

⚠ WARNING

Never stud a track that has not been approved for studs. Installing studs on an unapproved track could increase the risk of the track tearing or severing.

⚠ WARNING

You may stud the track on this vehicle model. However, you MUST only use the BRP approved type stud for use on these Ski-Doo snowmobiles. DO NOT EVER use conventional studs as the track thickness is thinner then other standard tracks. The stud could tear off of track and separate from vehicle. See an authorized Ski-Doo dealer for current specific studding availability and applications.

Using traction enhancing products such as, adjustable or more aggressive ski carbide runners and/or studs on your snowmobile will change its behavior, particularly in terms of manoeuvrability, acceleration, and braking.

Using traction enhancing products gives a better grip on packed snow and ice, but has no noticeable effect on soft snow. For this reason, driving a snowmobile equipped with traction enhancing products requires a certain adaptation period. If your snowmobile is equipped with traction enhancing products, be sure to take plenty of time to get used to the way it handles when turning, accelerating, and braking.

Also, always check local regulations concerning the use of traction enhancing products on snowmobiles. Always drive your snowmobile in a responsible manner, respecting the environment and other people's property.

Manoeuvrability

Using traction enhancing products such as, more aggressive ski carbide runners and/or studs makes the snowmobile grip the ground better at both the front and at the rear. The use of carbide runners is therefore required to give the skis a better grip, so that the front and rear of the snowmobile are in balance. While off-the-shelf carbide

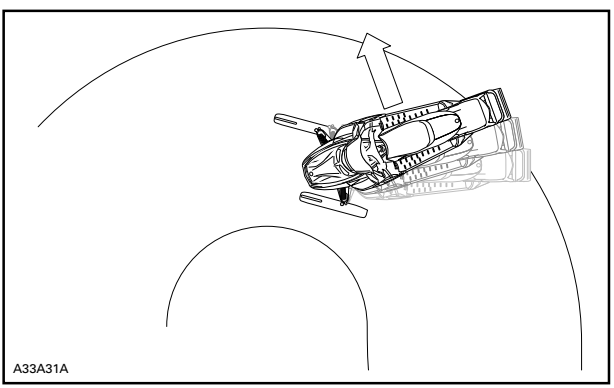
ski runners are adequate, they don't necessarily give you optimal control, since that depends on your personal preferences, your riding style, and how your suspension is adjusted.

⚠ WARNING

If the front and rear of the snowmobile are out of balance due to an incorrect combination of traction enhancing products, the snowmobile may tend to oversteer or understeer, which could lead to a loss of control.

Oversteering

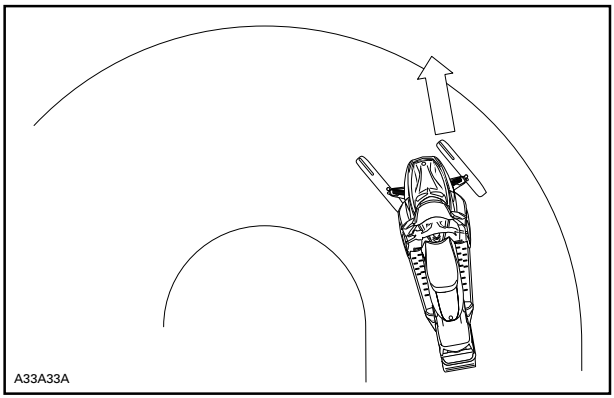
In certain conditions, using more aggressive ski carbide runners without studs on the rear track could make the snowmobile prone to oversteering, see illustration.



OVERSTEERING

Understeering

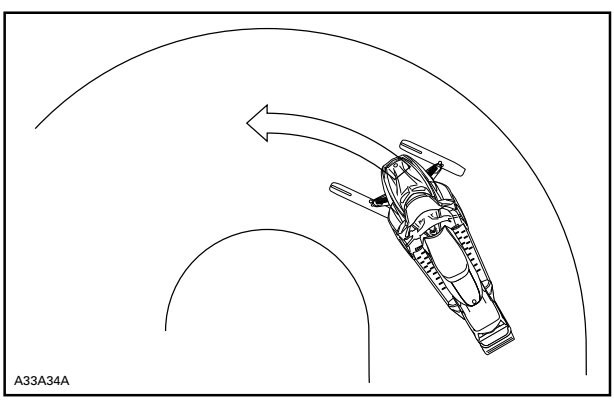
In certain conditions, the use of studs on the track could make the snowmobile prone to understeering if the skis are not equipped with more aggressive ski carbide runners, see illustration.



UNDERSTEERING

Controlled Driving

A balanced combination of carbide ski runners and studs on the track ensures adequate control and better handling, see illustration.



CONTROLLED DRIVING

Acceleration

Using studs on the track will allow your sled to accelerate better on packed snow and ice but will have no noticeable effect on soft snow. This can cause sudden variations in traction under certain conditions.

⚠ WARNING

To prevent surprises that could lead to a loss of control of the snowmobile:

- Always go easy on the throttle.
- NEVER try to spin the track to make the rear of the snowmobile skid.

This could cause debris or ice to be thrown violently backwards, possibly injuring others nearby or on snowmobiles behind you.

Braking

As in the case of acceleration, using studs on the track will give you better braking capacity on packed snow or ice but will have no noticeable effect on soft snow. Braking may thus vary suddenly under certain conditions. Be sure to use restraint in braking to keep from blocking the track in order to avoid surprises that could lead to a loss of control.

Important Safety Rules

⚠ WARNING

To prevent serious injury to individuals near the snowmobile:

- NEVER stand behind or near a moving track.
- Always use a wide-base snowmobile stand with a rear deflector panel if it is necessary to rotate track.
- When the track is raised off the ground, only run it at the lowest possible speed.

Centrifugal force could cause debris, damaged or loose studs, pieces of torn track, or an entire severed track to be violently thrown backwards out of the tunnel with tremendous force.

Effects of Having a Studded Track on the Life of the Snowmobile

The use of traction enhancing products can increase the load and the stress on certain snowmobile components, as well as the vibration level. This can cause premature wear on parts such as belts, brake linings, bearings, chain, chaincase sprocket, and on approved studded tracks, shorten track life. Always proceed with a visual inspection of your track before each use. For more information, refer to the *TRACK* section in *MAINTENANCE*.

Studs on the track can also cause serious damage to your snowmobile if it is not equipped with the tunnel protectors designed for your particular model. Damage to the electrical wiring or perforation of the heat exchangers are potential hazards, that could cause the engine to overheat and be severely damaged.

⚠ WARNING

If tunnel protectors are excessively worn or not installed, the gas tank could be punctured, causing a fire.

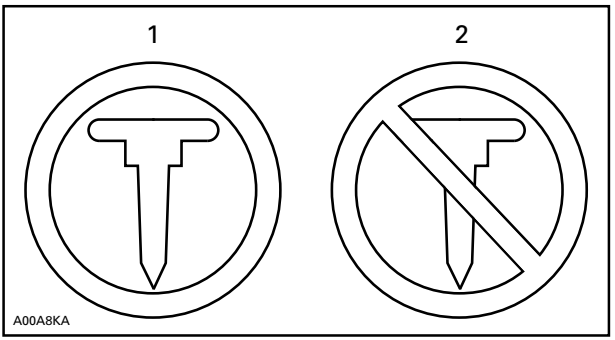
NOTICE Ask your dealer for the appropriate tunnel protectors model and kit number required for your snowmobile.

NOTE: Consult the BRP limited warranty to find out what warranty limitations are related to the use of studs.

Installation of Studs on BRP Approved Tracks

⚠ WARNING

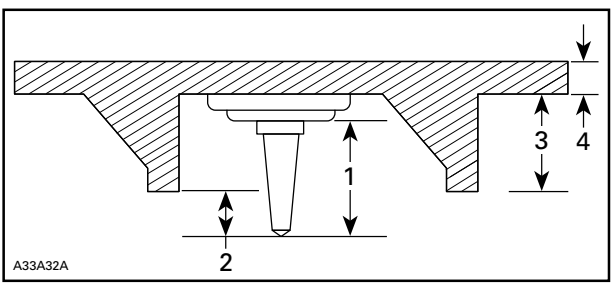
Never stud a track that has not been approved for studs. Approved tracks can be identified by a stud symbol (see illustration below) molded into the track surface. Installing studs on an unapproved track could increase the risk of the track tearing or severing.



TRACK SYMBOLS
1. *Approved*
2. *NOT Approved*

To ensure safe and proper installation, BRP recommends to have the studs installed by your dealer.

– Use only the BRP approved special studs.
– Never use studs that exceed the height of your snowmobile's track profile by more than 9.5 mm (3/8 in).



INSTALLATION OF STUDS
1. *Stud size*
2. *Penetration range 6.4 mm to 9.5 mm (1/4 in to 3/8 in)*
3. *Track lug height*
4. *Track belt thickness*

⚠ WARNING

- See an authorized Ski-Doo dealer for current specific studding availability and applications.
- DO NOT EVER use conventional stud because, the track thickness is thinner then our standard tracks and the stud could tear off of track and separate from vehicle.
- Studs should only be installed in the locations indicated by molded bulges in the track surface. Some track models have two types of molded bulges; triangles and circles. See the warning molded into the track surface to know which one to use.
- Never stud a track with a profile of 35 mm (1-3/8 in) or more.
- The number of studs installed must always perfectly match the pattern of molded bulges in the track.
- Always consult the traction product manufacturer's installation instructions and recommendations before having your dealer install studs and runners. It is very important to follow the torque specifications for the stud bolts.

INSTALLING AN INCORRECT NUMBER OF STUDS OR AN IMPROPER INSTALLATION CAN INCREASE THE RISK OF THE TRACK TEARING OR SEVERING.

Maintenance/Replacement

PROCEED WITH A VISUAL INSPECTION OF YOUR TRACK BEFORE EACH USE.

Look for any defects, such as:

- Perforations in the track
- Tears in the track (particularly around traction holes on studded tracks)
- Lugs that are broken or torn off, exposing portions of rods
- Delamination of the rubber
- Broken rods
- Broken studs (studded tracks)
- Bent studs (studded tracks)
- Missing studs
- Studs that are torn off the track
- Missing track guide(s)
- Also, ensure that studs nut are tighten to the recommended torque.

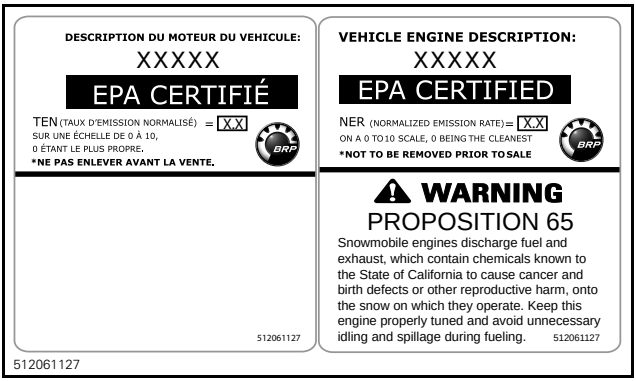
On approved studded tracks, replace broken or damaged studs immediately. If your track shows signs of deterioration, it must be replaced immediately. When in doubt, ask your dealer. Always proceed with a visual inspection of your track before each use.

⚠ WARNING

Riding with a damaged track or studs could lead to loss of control.

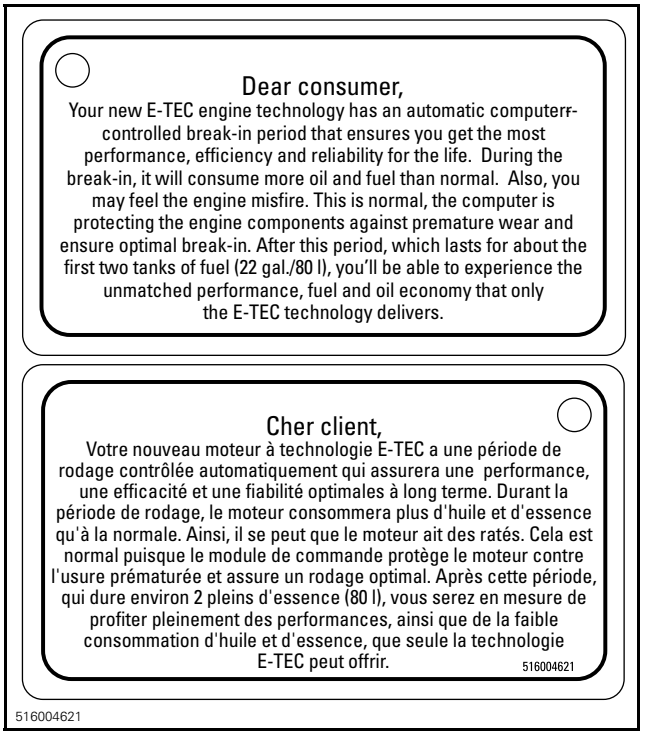
IMPORTANT ON-PRODUCT LABELS

Hang Tag(s)



512061127

TYPICAL


Dear consumer,
Your new E-TEC engine technology has an automatic computer-controlled break-in period that ensures you get the most performance, efficiency and reliability for the life. During the break-in, it will consume more oil and fuel than normal. Also, you may feel the engine misfire. This is normal, the computer is protecting the engine components against premature wear and ensure optimal break-in. After this period, which lasts for about the first two tanks of fuel (22 gal./80 l), you'll be able to experience the unmatched performance, fuel and oil economy that only the E-TEC technology delivers.
Cher client,
Votre nouveau moteur à technologie E-TEC a une période de rodage contrôlée automatiquement qui assurera une performance, une efficacité et une fiabilité optimales à long terme. Durant la période de rodage, le moteur consommera plus d'huile et d'essence qu'à la normale. Ainsi, il se peut que le moteur ait des ratés. Cela est normal puisque le module de commande protège le moteur contre l'usure prématurée et assure un rodage optimal. Après cette période, qui dure environ 2 pleins d'essence (80 l), vous serez en mesure de profiter pleinement des performances, ainsi que de la faible consommation d'huile et d'essence, que seule la technologie E-TEC peut offrir.
516004621
516004621

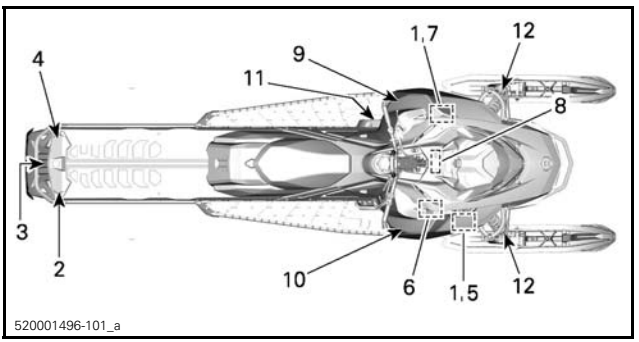

Have you asked your dealer to adjust your suspension to **YOUR** riding style?
·Limiter strap length
·Spring preload
for more details.
See the operator's guide
-Tune your ride section
*This hangtag may ONLY be removed by the customer.
BRP
516004302
mmo2010-003-100_en

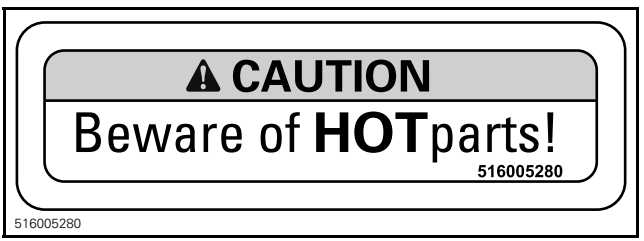
Vehicle Safety Labels

These labels are affixed to the vehicle for the safety of the operator, passenger or bystanders.

The following labels are on your vehicle and they should be considered permanent parts of the vehicle. If missing or damaged, the decals can be replaced free of charge. See an authorized Ski-Doo dealer.

NOTE: In the event of any discrepancy between this guide and the vehicle, the safety labels on the vehicle have precedence over the labels in this guide.



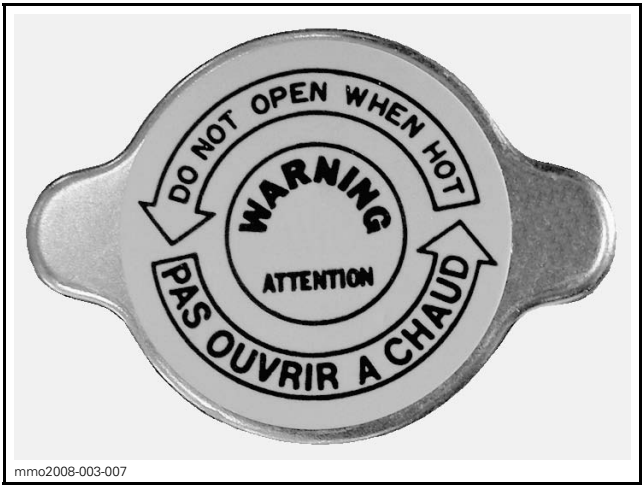


LABEL 1

LABEL 2

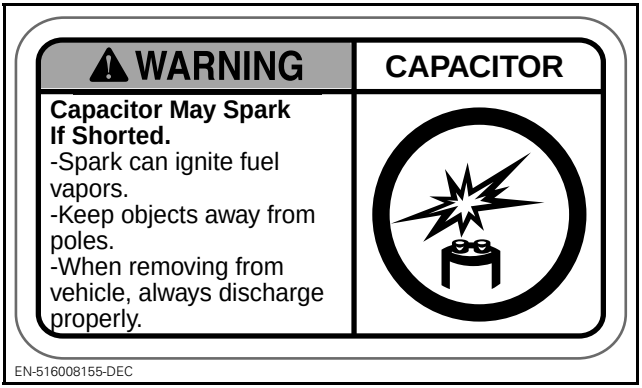
LABEL 3 - APPLICABLE MODELS

LABEL 4



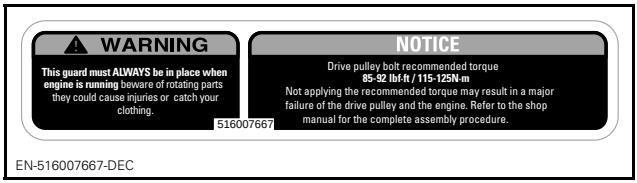
mmo2008-003-007

LABEL 5

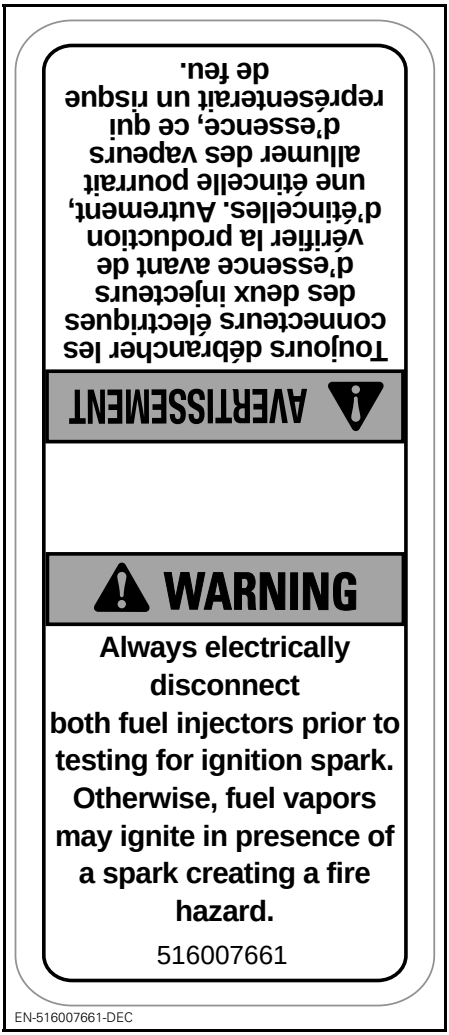


EN-516008155-DEC

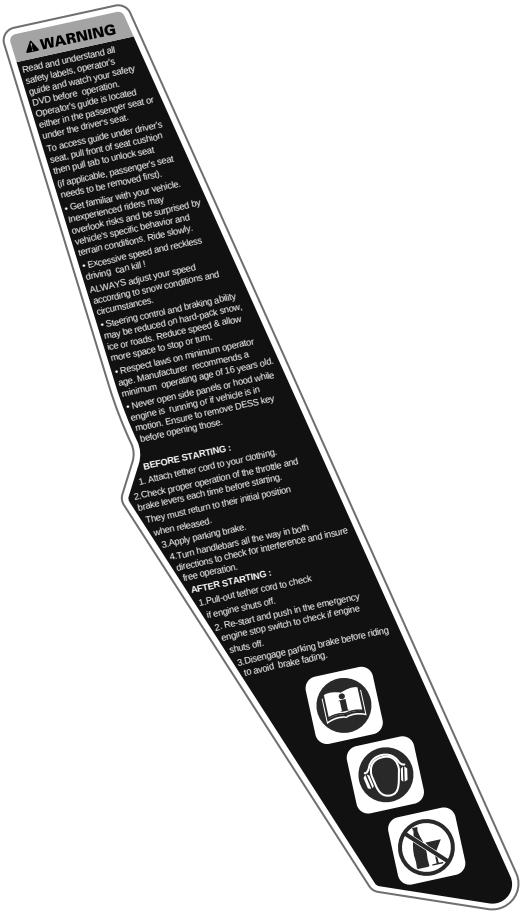
LABEL 6


WARNING
This guard must ALWAYS be in place when engine is running beware of rotating parts they could cause injuries or catch your clothing.
516007667
NOTICE
Drive pulley bolt recommended torque
85-92 lbf-ft / 115-125N-m
Not applying the recommended torque may result in a major failure of the drive pulley and the engine. Refer to the shop manual for the complete assembly procedure.
EN-516007667-DEC

LABEL 7

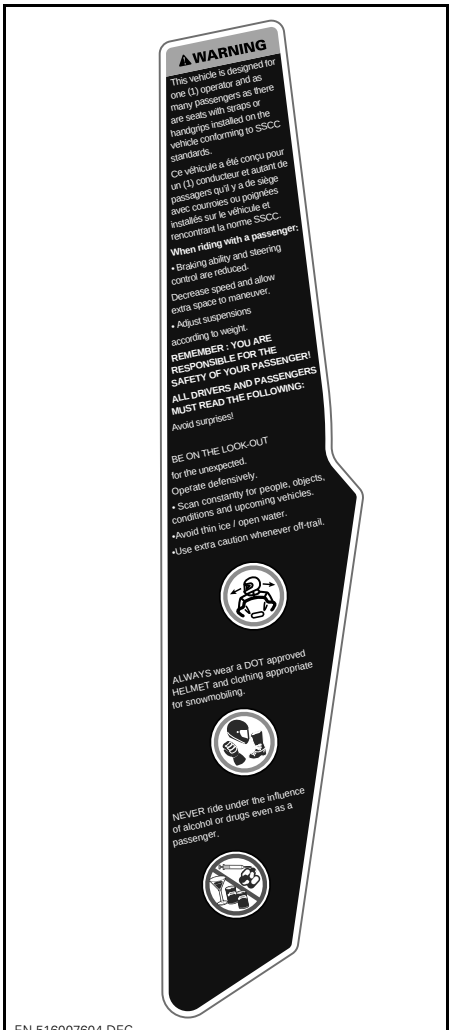

Toujours débrancher les connecteurs électriques des deux injecteurs d'essence avant de vérifier la production d'étincelles. Autrement, une étincelle pourrait allumer des vapeurs d'essence, ce qui représenterait un risque de feu.
AVERTISSEMENT
WARNING
Always electrically disconnect both fuel injectors prior to testing for ignition spark. Otherwise, fuel vapors may ignite in presence of a spark creating a fire hazard.
516007661
EN-516007661-DEC

LABEL 8



EN-516007603-DEC

LABEL 9

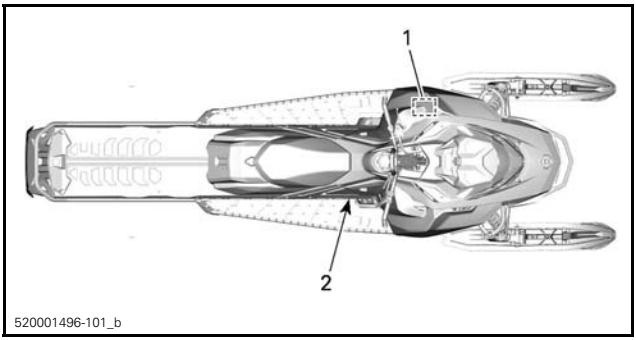

⚠WARNING
This vehicle is designed for one (1) operator and as many passengers as there are seats with straps or handgrips installed on the vehicle conforming to SSCC standards.
Ce véhicule a été conçu pour un (1) conducteur et autant de passagers qu'il y a de siège avec courroies ou poignées installés sur le véhicule et rencontrant la norme SSCC.
When riding with a passenger:
• Braking ability and steering control are reduced.
Decrease speed and allow extra space to maneuver.
• Adjust suspensions according to weight.
REMEMBER : YOU ARE RESPONSIBLE FOR THE SAFETY OF YOUR PASSENGER!
ALL DRIVERS AND PASSENGERS MUST READ THE FOLLOWING:
Avoid surprises!
BE ON THE LOOK-OUT for the unexpected.
Operate defensively.
• Scan constantly for people, objects, conditions and upcoming vehicles.
•Avoid thin ice / open water.
•Use extra caution whenever off-trail.
ALWAYS wear a DOT approved HELMET and clothing appropriate for snowmobiling.
NEVER ride under the influence of alcohol or drugs even as a passenger.
EN-516007604-DEC

LABEL 10

LABEL 11

LABEL 12 - ON SHOCK GAS CHARGED ABSORBERS

Compliance Labels



EPA Compliance Label

EMISSION CONTROL INFORMATION

THIS VEHICLE IS CERTIFIED TO OPERATE ON UNLEADED GASOLINE AND MEETS XXXX U.S. EPA REGULATIONS FOR SNOWMOBILE SI ENGINES.

EC 121

ENGINE FAMILY	XXXXXXXXXXXX	FAMILLE DE MOTEUR
PERMEATION FAMILY	XXXXXXXXXXXX	FAMILLE DE PERMÉATION
FEL	XX g/kW-hr HC XXX g/kW-hr CO X.X g/ m2 / day	LIMITE DES ÉMISSIONS DES FAMILLES
ENGINE DISPLACEMENT	XXX cm^3	CYLINDRÉE
EXHAUST EMISSION CONTROL SYSTEM	XXXX	SYSTÈME DE CONTRÔLE DES ÉMISSIONS

RENSEIGNEMENTS SUR LE DISPOSITIF ANTIPOLLUTION

CE VÉHICULE EST CERTIFIÉ POUR FONCTIONNER À L'ESSENCE SANS PLOMB ET IL RÉPOND AUX NORMES XXXX DE L'EPA DES É.-U. POUR LES MOTONEIGES À MOTEUR SI.

SEE OPERATOR'S GUIDE FOR MAINTENANCE SPECIFICATIONS
VOIR GUIDE DU CONDUCTEUR POUR LES SPÉCIFICATIONS D'ENTRETIENS

BOMBARDIER RECREATIONAL PRODUCTS INC. 6865

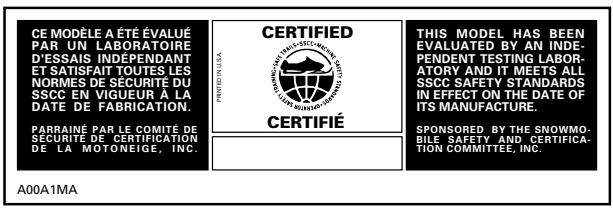
516006865

TYPICAL: COMPLIANCE LABEL 1 - IN ENGINE COMPARTMENT

SSCC Label

Safety standards for snowmobiles have been adopted by the Snowmobile Safety and Certification Committee (SSCC) of which BRP is a proud participating member. Assurance that your snowmobile meets these standards is easily checked by locating the Certification Label on a right vertical portion of the vehicle.

The following label shows that an independent testing laboratory has verified compliance with the SSCC safety standards.



LABEL 2

Technical Information Labels

NOTICE

The engine of this snowmobile has been developed and validated using the BRP XPS™ approved lubricant. BRP recommends the use of its XPS™ approved lubricant or equivalent.
Damages caused by oil which is not suitable for this engine may not be covered by the BRP limited warranty.
See the operator's guide.

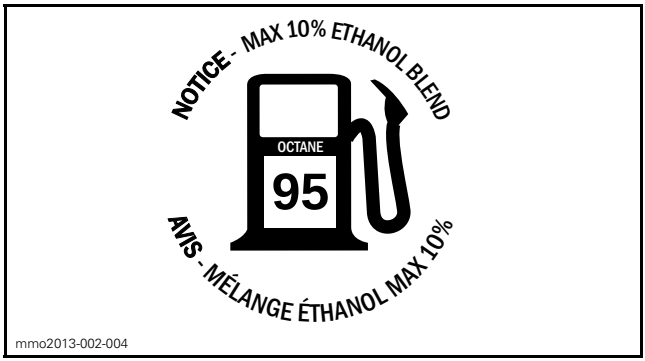
516007443

516007443

ON OIL RESERVOIR

mmo2013-002-002

ON FUEL CAP - IN COUNTRIES USING PUMP POSTED AKI (RON+MON)/2 OCTANE RATINGS



ON FUEL CAP - IN COUNTRIES USING RON OCTANE RATINGS

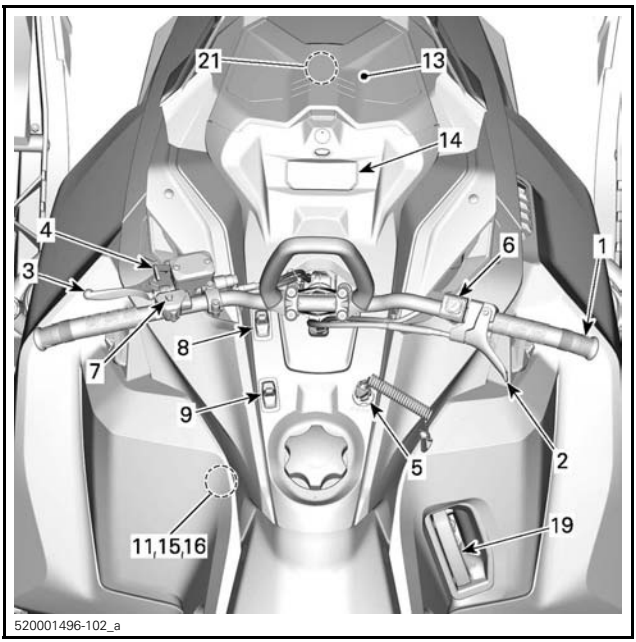
This page is intentionally blank

VEHICLE INFORMATION

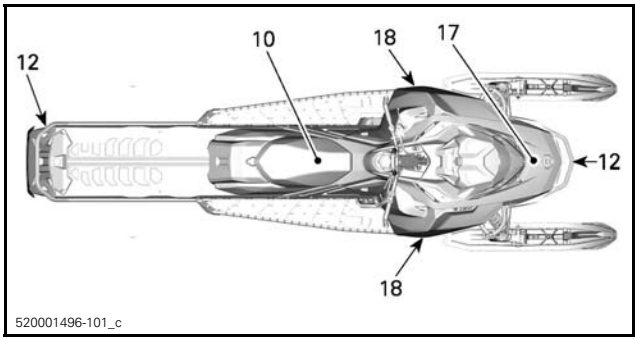
CONTROLS, INSTRUMENTS AND EQUIPMENT

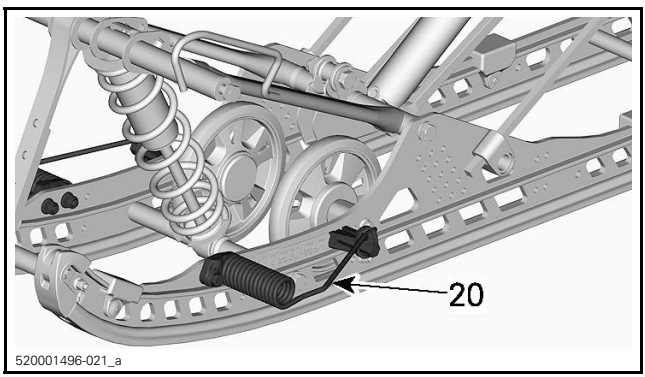
NOTE: Some features may not apply to your model or could be optional.

NOTE: Some vehicle safety labels are not shown on illustrations. For information on vehicle safety labels, refer to *VEHICLE SAFETY LABELS* subsection.



520001496-102_a





1) Handlebar

The handlebar controls the steering of the snowmobile. As the handlebar is rotated to right or left, the skis are turned right or left to steer the snowmobile.

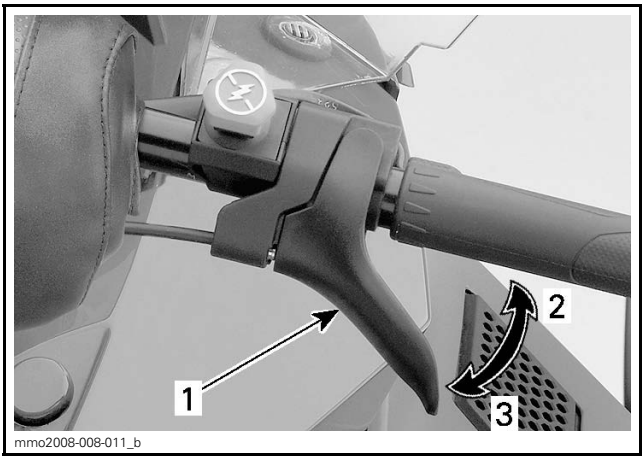
⚠ WARNING

Fast reverse while turning, could result in loss of stability and control.

2) Throttle Lever

Throttle lever is located on the RH side of handlebar.

Designed to be thumb activated. When squeezed, it increases the engine speed. When released, engine speed returns automatically to idle.



mmo2008-008-011_b

TYPICAL
1. *Throttle lever*
2. *To accelerate*
3. *To decelerate*

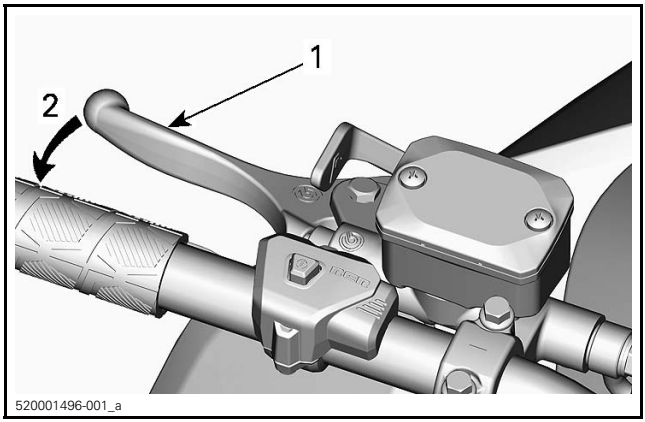
⚠ WARNING

Test the throttle lever operation each time before starting the engine. The lever must return to the rest position once released. Otherwise, do not start engine.

3) Brake Lever

Brake lever is located on the LH side of handlebar.

When squeezed, brake is applied. When released, it automatically returns to the rest. Braking effect is proportional to the pressure applied on the lever and to the type of terrain and its snow coverage.

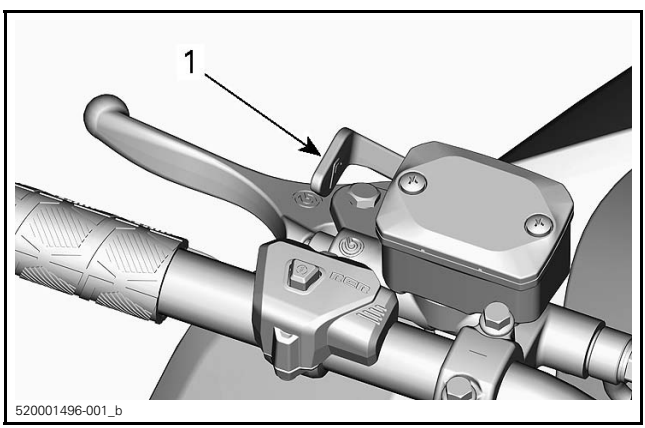


1. Brake lever
2. Apply brake

4) Parking Brake Lever

Parking brake lever is located on the LH side of handlebar.

Parking brake should be used whenever snowmobile is parked.



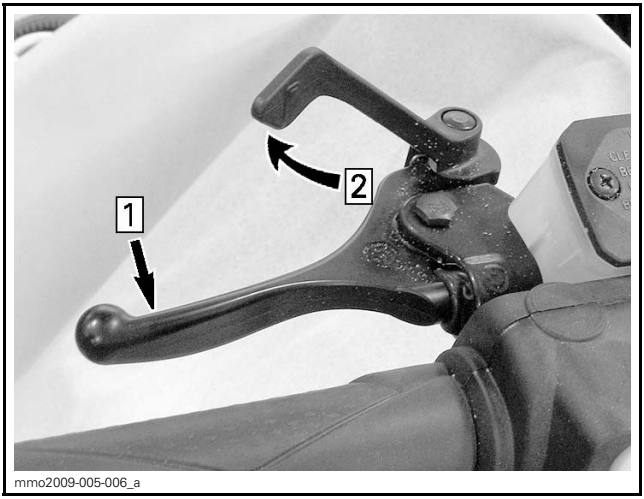
1. Parking brake lever

⚠ WARNING

Make sure parking brake is fully disengaged before operating the snowmobile. When you ride the vehicle, brake pads that are caused to drag by a continuous pressure on the lever may cause damage to the brake system and cause loss of braking capacity and/or fire.

To Engage Parking Brake

Apply and hold brake, then lock brake lever using the parking brake lever as shown.



TYPICAL — ENGAGE MECHANISM
Step 1: Apply and hold brake
Step 2: Lock brake lever using parking brake lever

To Release Parking Brake

Squeeze brake lever. Parking brake lever will automatically return to its original position. Always release parking brake before riding.

5) Engine Cut-off Switch

The engine cut-off switch (tether cord) is located on the console.

The tether cord cap must be securely snapped on the engine cut-off switch to allow vehicle operation.

NOTE: After engine starting, 2 short beeps should be heard if a programmed D.E.S.S. key (tether cord cap) is correctly snapped on engine cut-off switch. If another beep code is heard, refer to *MONITORING SYSTEM* for D.E.S.S. malfunction codes information.

Pulling the tether cord cap from the switch shuts the engine off.

⚠ WARNING

Always attach the tether cord eyelet to clothing before starting the engine.

D.E.S.S. (Digitally Encoded Security System)

The tether cord cap has an integrated D.E.S.S. key to provide you and your snowmobile with the equivalent security of a conventional lock key.

The D.E.S.S. key contains an electronic chip which features a unique permanently memorized digital code.

Your authorized Ski-Doo dealer has programed the D.E.S.S. of your snowmobile to recognize the D.E.S.S. key in the tether cord cap to allow vehicle operation.

If another tether cord is used without programming the D.E.S.S., the engine will start but will not reach drive pulley engagement speed to move vehicle.

Make sure the tether cord cap is free of dirt or snow.

D.E.S.S. Flexibility

The D.E.S.S. of your snowmobile can be programmed by your authorized Ski-Doo dealer to accept up to 8 different keys.

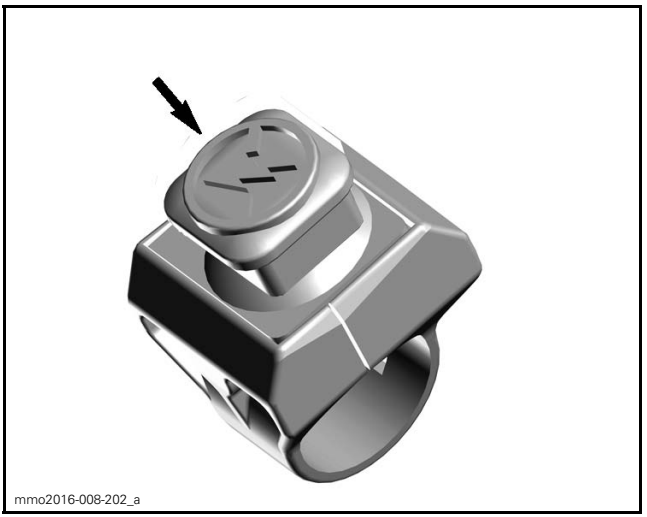
We recommend the purchase of additional tether cords from your authorized Ski-Doo dealer. If you have more than one D.E.S.S. equipped Ski-Doo snowmobile, each can be programmed by your authorized Ski-Doo dealer to accept the other vehicles D.E.S.S. keys.

6) Emergency Engine Stop Switch

The emergency engine stop switch is located on the RH side of handlebar.

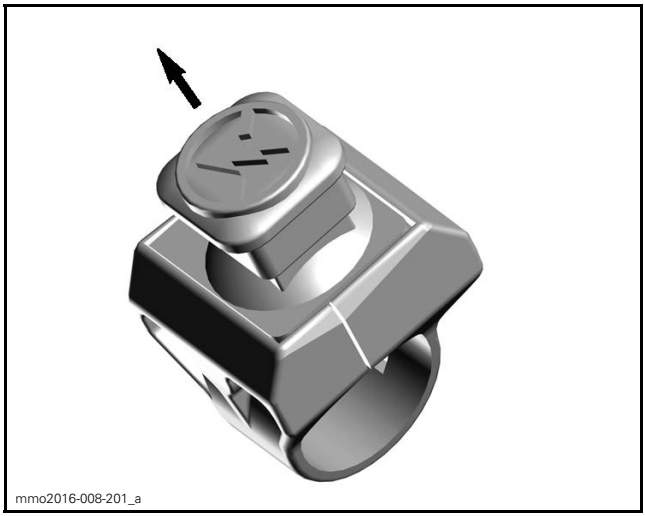
Push-pull type switch.

To stop the engine in an emergency, select OFF position (down) and simultaneously apply the brake. To restart, button must be at the ON position (up).



OFF POSITION

To allow engine starting, the switch must be in the ON position (UP).



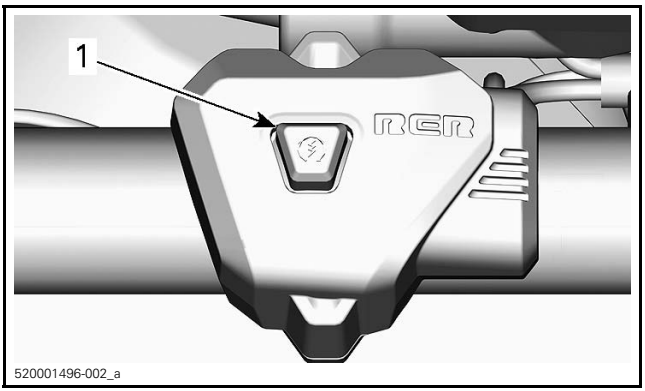
ON POSITION

All operators of the snowmobile should familiarize themselves with the function of the emergency engine stop switch by using it several times on first outing and whenever stopping the engine thereafter. This engine stopping procedure will become a reflex and will prepare operators for emergency situations requiring its use.

⚠ WARNING

If the switch has been used in an emergency caused by a suspected malfunction, the source of the malfunction should be determined and corrected before restarting engine. See an authorized Ski-Doo dealer for servicing.

7) Start/Electronic Reverse (RER) Button



1. Start / RER button

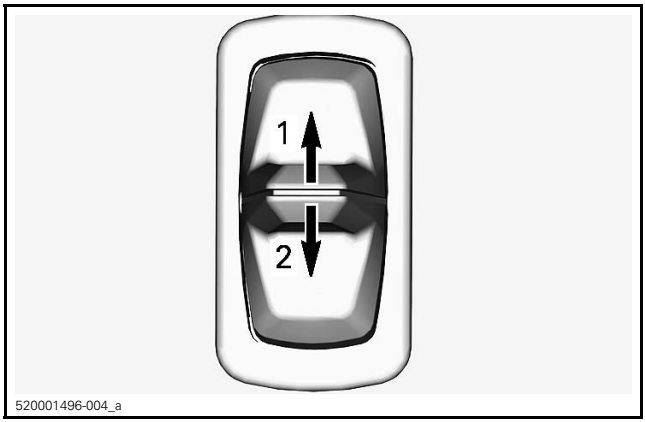
On electric start models, press to start engine. Refer to *ENGINE STARTING PROCEDURE* in the *BASIC PROCEDURES* subsection.

Once engine is started, press to engage the electronic reverse. Refer to *REVERSE (RER)* in *BASIC PROCEDURES* section for procedure.

8) Headlights Dimmer Switch

Push the switch forward to select high beam.

Push the switch backwards to select low beam.

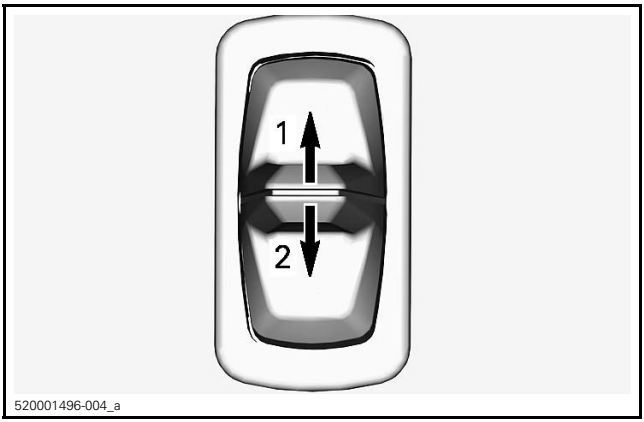


1. High beam
2. Low beam

9) Heated Grips and Throttle Lever Switch

The heated throttle lever **and** heated grips are adjusted simultaneously using the switch.

There are 4 intensity settings. To set, press and release the switch repeatedly until the desired setting is obtained.



1. *Increase heat*
2. *Decrease heat*

The setting is displayed on the bar gauges of the multifunction digital gauge. See *MULTIFUNCTION DIGITAL GAUGE* in this section.

To shut off, press the button down until the bar gauge is empty.

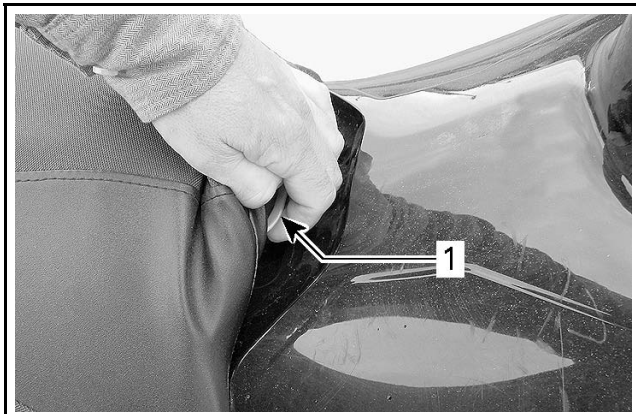
NOTE: If the balance between the temperature of the throttle lever and the grips does not suit you, it is possible to adjust it. Contact an authorized Ski-Doo dealer.

10) Seat

Seat Removal

Roll up the front of the foam.

While pushing seat forward, pull up the latch.



1. Seat latch

Slide seat rearwards to remove it.

Seat Installation

NOTICE Riding the vehicle with any objects between the seat and the fuel tank could damage the fuel tank. NEVER place any objects between seat and fuel tank.

Place seat over the hooks, then slide it forward.

Securely engage latch.

⚠ WARNING

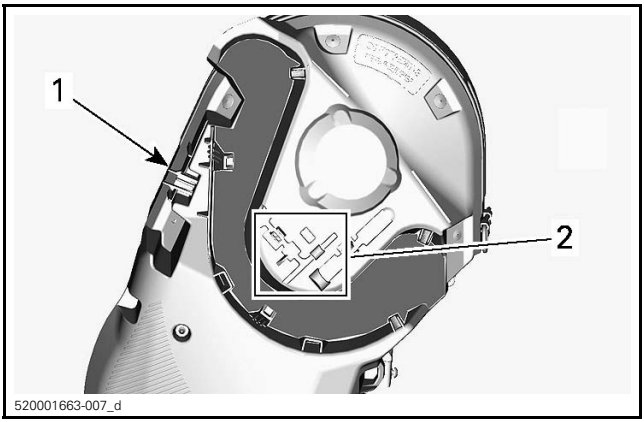
Make sure seat is securely latched before riding.

11) Tools

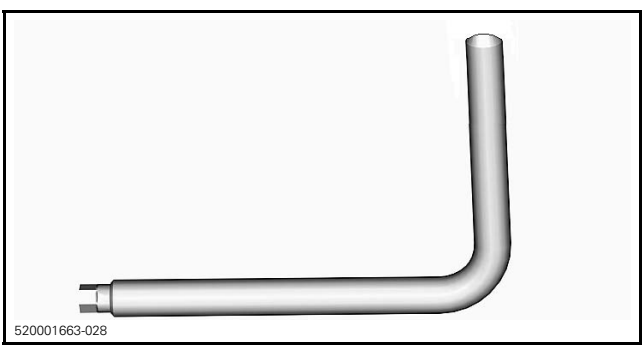
A part of the drive belt guard is designed to hold the tools allowing for basic maintenance.

The tools are supplied with the vehicle.

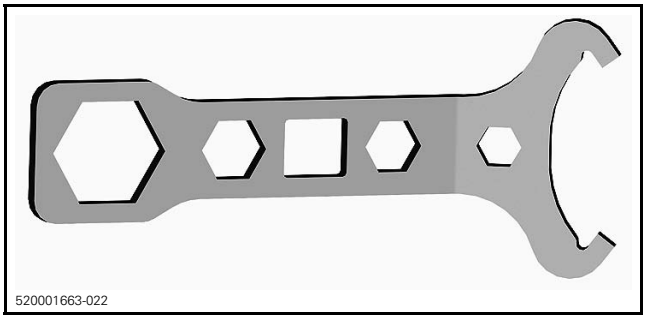
NOTICE Make sure tools are secured properly.



DRIVE BELT GUARD
1. *Suspension adjustment tool location*
2. *Pulley expander location*



PULLEY EXPANDER

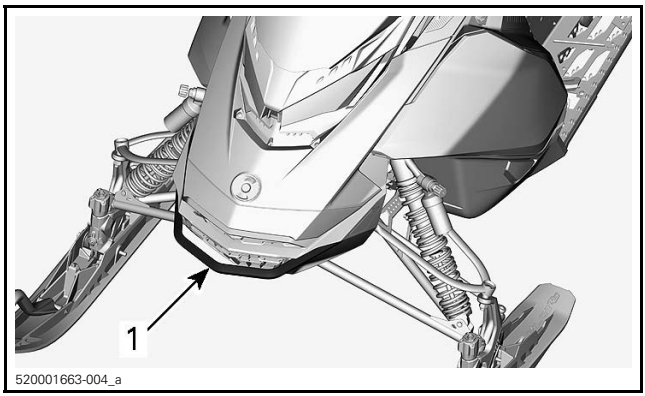


SUSPENSION ADJUSTMENT TOOL

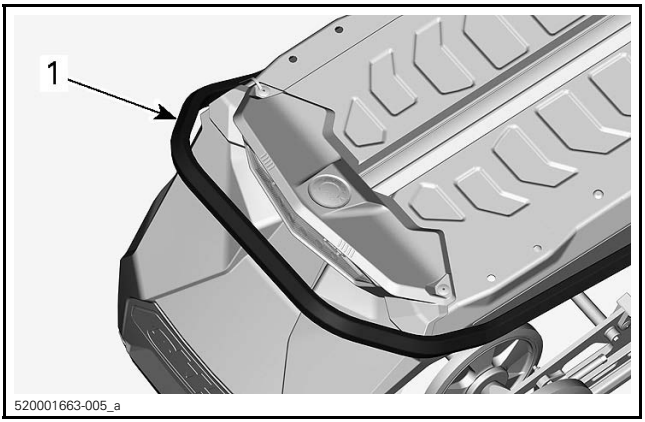
12) Front and Rear Bumpers

To be used whenever snowmobile requires manual lifting.

⚠ **CAUTION** Beware of injuries by using proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits. Use appropriate lifting device or have assistance to share lifting stress if possible.



1. Front bumper



1. Rear bumper

NOTICE Do not use skis to pull or lift snowmobile.

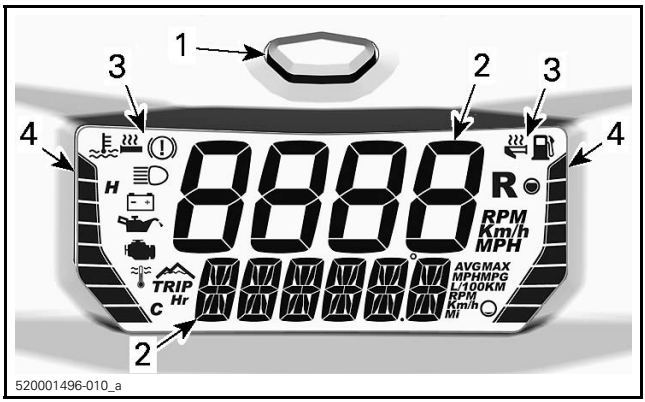
13) Multifunction Digital Gauge

⚠ WARNING

Reading the gauge digital display can distract from the operation of the vehicle, particularly from constantly scanning the environment.

NOTE: The gauge is factory preset in Imperial units and in English. To change units or language, contact an authorized Ski-Doo dealer.

Gauge Features



MULTIFUNCTION DIGITAL GAUGE
1. *Mode button*
2. *Digital displays*
3. *Icons*
4. *Bar gauges*

The gauge also has a built-in beeper.

Digital Display

⚠ WARNING

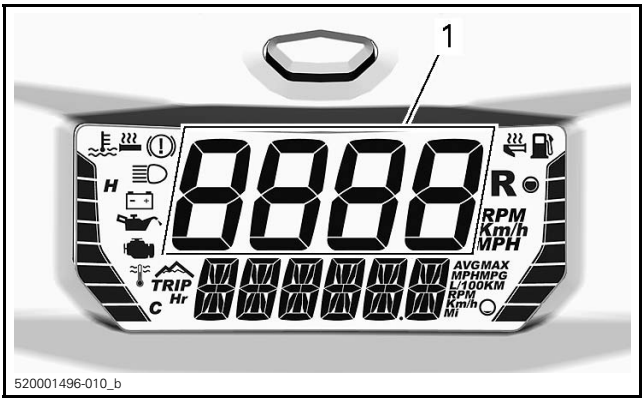
Never adjust or set functions on the multifunction gauge while riding the vehicle.

To set the displays to your preference, see *DISPLAY COMBINATION SELECTION*.

Upper Display

The upper display is used to display:

– Vehicle speed.
– Engine RPM.

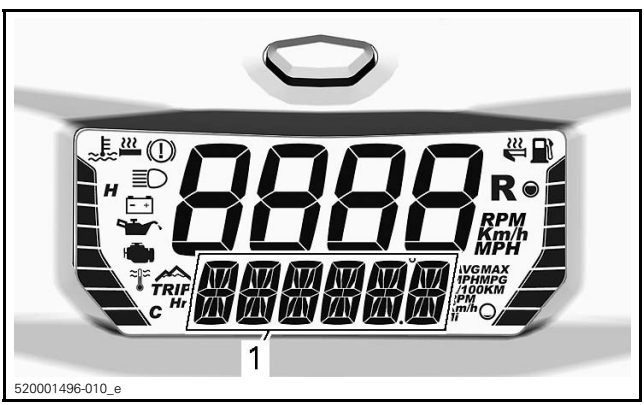


1. Upper Display

Lower Display

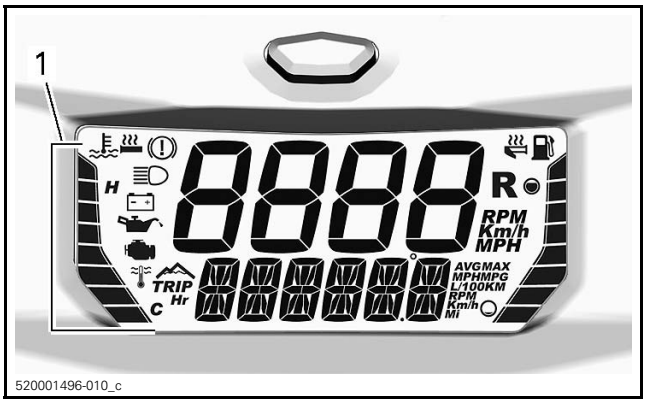
The lower display is used to display

- Various information (in combination with the upper display)
- Messages, see *ICONS AND MESSAGES* and *MONITORING SYSTEM* for details.
- Fault codes, see *MONITORING SYSTEM* for details.



1. Lower display

LH side Bar Gauge



1. LH bar gauge

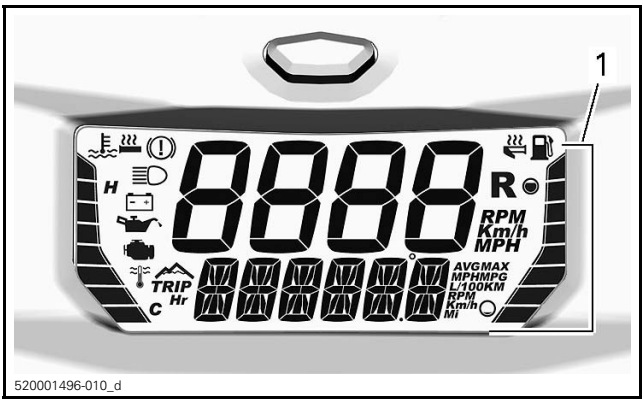
LH BAR GAUGE INFORMATION
Engine coolant temperature
Heated grips level

The LH side bar gauge displays the engine coolant temperature except while adjusting the heated grips.

NOTICE **If engine overheats, stop vehicle in a safe place. Refer to TROUBLESHOOTING section.**

For details on heated grips operation, see *HEATED GRIPS AND THROTTLE LEVER SWITCH* in this section.

RH side Bar Gauge



1. RH bar gauge

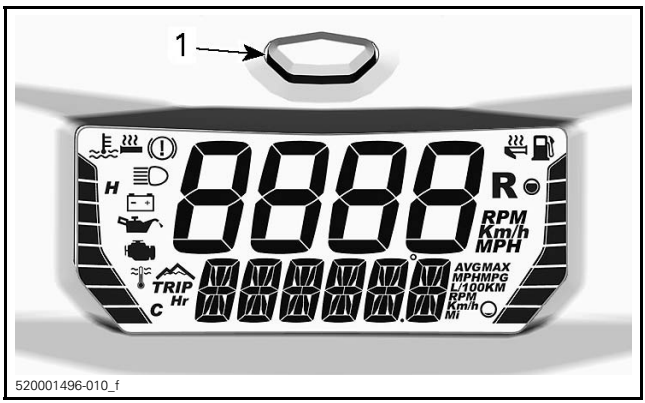
LH BAR GAUGE INFORMATION
Fuel level
Heated throttle lever level

The RH side bar gauge displays the fuel level except while adjusting the heated throttle lever.

For details on heated throttle lever operation, see *HEATED AND THROTTLE LEVER SWITCH* in this section.

Display Combination Selection

To scroll through the information options, press and release the mode button repeatedly until the desired information is displayed.



1. Gauge mode button

The upper and lower displays can be set as combinations only. They cannot be set separately.

See the following table for available combinations.

AVAILABLE DISPLAY COMBINATIONS			
	UPPER DISPLAY	LOWER DISPLAY	ICON/ SPECIFIC INFORMATION
1	Engine RPM	Vehicle speed	—
2	Vehicle speed	Engine RPM	—
3	Engine RPM	Altitude	

AVAILABLE DISPLAY COMBINATIONS			
	UPPER DISPLAY	LOWER DISPLAY	ICON/ SPECIFIC INFORMATION
4	Vehicle speed	Altitude	
5		Odometer	—
6		Trip odometer A (1)	TRIP
7		Trip odometer B (1)	TRIP
8		Trip hour (1)	TRIP Hr
9		Top speed (1) (2)	MAX
10		Average speed (1) (2)	AVG
11		Top RPM (1)	MAX
12		Average fuel consumption (4)	AVG
13		Engine coolant temperature	—
(1) Press and hold the mode button to reset (2) Resetting the trip odometer B also resets the average fuel consumption			

NOTE: Make sure to display the vehicle speed whenever this information is necessary.

Icons and Messages

See table below for usual icons and messages.

For details on malfunction pilot lamps and messages, refer to *MONITORING SYSTEM*.

ICON	BEEPER	MESSAGE LOWER DISPLAY	DESCRIPTION
—	2 short beeps	GOOD KEY	At power up, with a good key. Vehicle ready for use.
—	—	BREAK-IN	Displayed during break-in period. See *BREAK-IN PERIOD*
	4 short beeps every 5 minutes	LOW OIL	Injection oil level is low. Stop vehicle in a safe place then, replenish injection oil reservoir.
	—	—	Low fuel level. One (1) bar left in fuel level display. Replenish fuel tank as soon as possible.
	Long beeps repeating slowly	REVERSE	Reverse is selected.
	3 short beeps	REV. FAIL	Reverse did not engage, try again.
	—	—	High beam headlights are selected.
—	—	WARM UP	Engine and/or injection oil need to warm-up before normal operation. The engine's RPM is limited until desired temperature is reached (up to 10 minutes when driving). Warm-up period may occur after a restart in very cold weather.

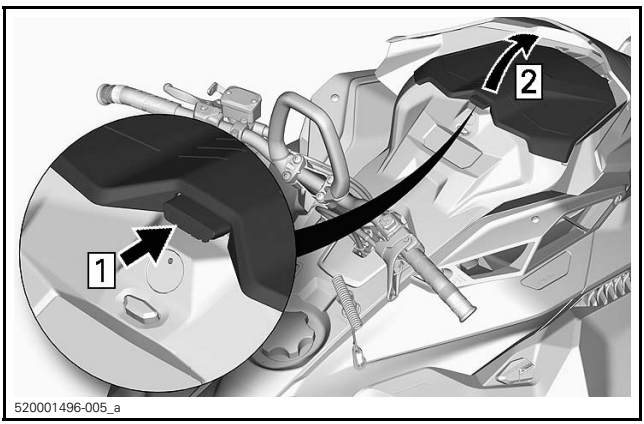
NOTE: Additional function may be available for your vehicle, see the appropriate Ski-Doo accessory catalog.

14) Storage Compartment

A storage compartment is located at the front of the vehicle, above the gauge.

The Operator's Guide and the emergency starter rope are in the front storage compartment.

To open, push the button and lift the cover.



NOTE: When closing, make sure cover is secured properly. You will hear a "clic".

15) Drive Belt Guard

Drive Belt Guard Removal

⚠ WARNING

NEVER operate engine:

- Without shields and belt guard securely installed.
- With hood and/or side panels opened or removed.

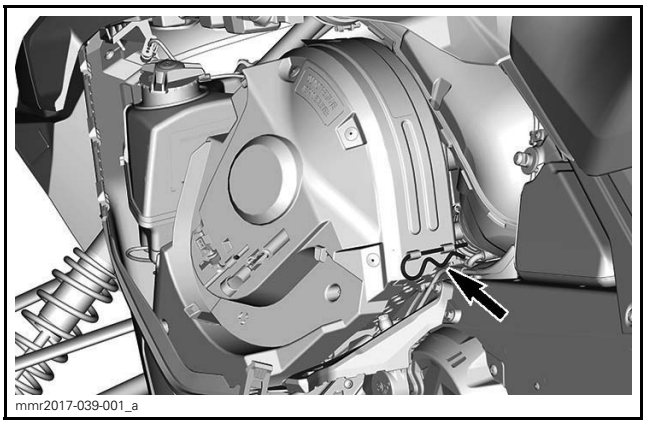
NEVER attempt to make adjustments to moving parts while engine is running.

NOTE: Belt guard is purposely made slightly oversize to maintain tension on its pins and retainers preventing undue noise and vibration. It is important that this tension be maintained when reinstalling.

Remove tether cord cap from engine cut-off switch.

Open the LH side panel. See procedure in this section.

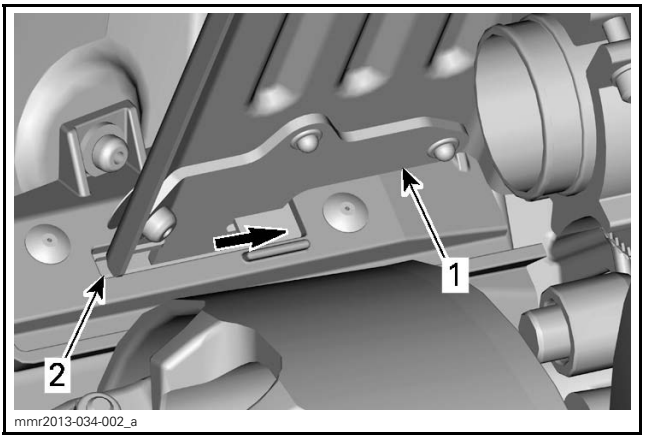
Remove retaining pin.


mmr2017-039-001_a

Lift rear portion of guard then release from front tab.

Drive Belt Guard Installation

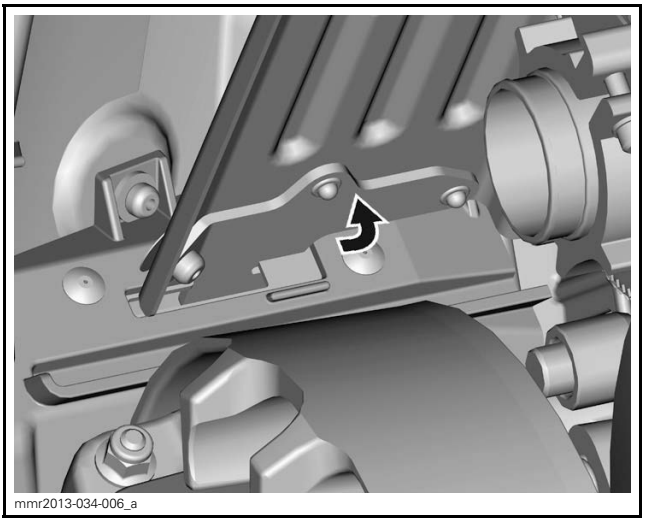
Insert the tab into the slot and push it into place



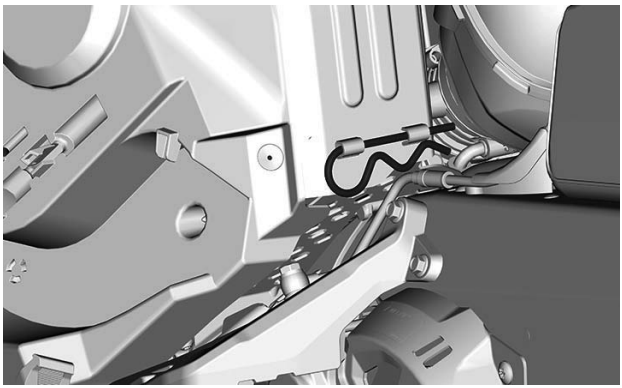
mmr2013-034-002_a

1. *Belt guard tab*
2. *Front support slot*

Push drive belt guard toward engine then toward front of vehicle.


mmr2013-034-006_a

Position the rear portion of the belt guard over the retainer and secure it using the retaining pin.



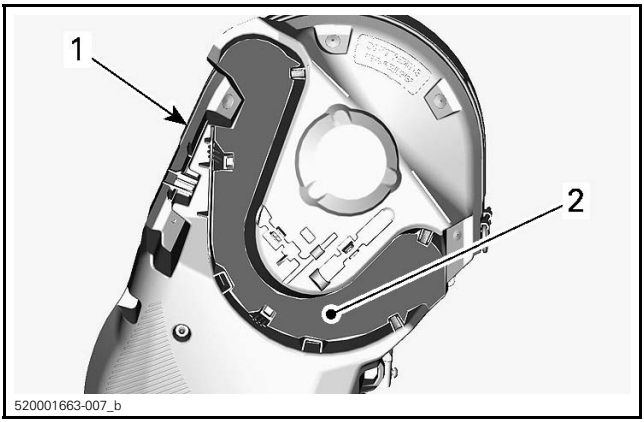
mmr2017-039-002

16) Spare Drive Belt Holder

A spare drive belt can be stored in a holder located on the drive belt guard.

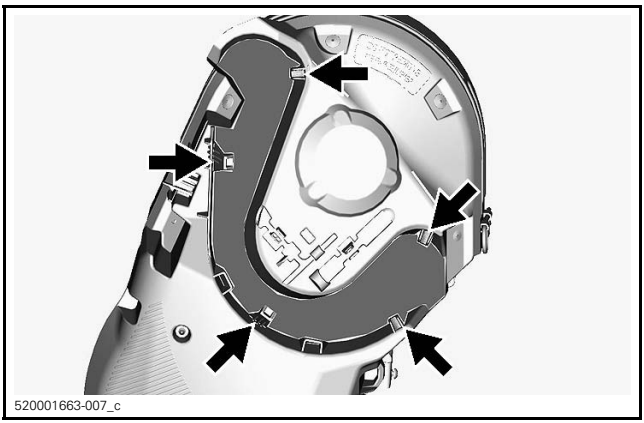
NOTE: The spare drive belt is not supplied with the snowmobile.

Position spare drive belt into drive belt guard slot.



1. Drive belt guard
2. Slot

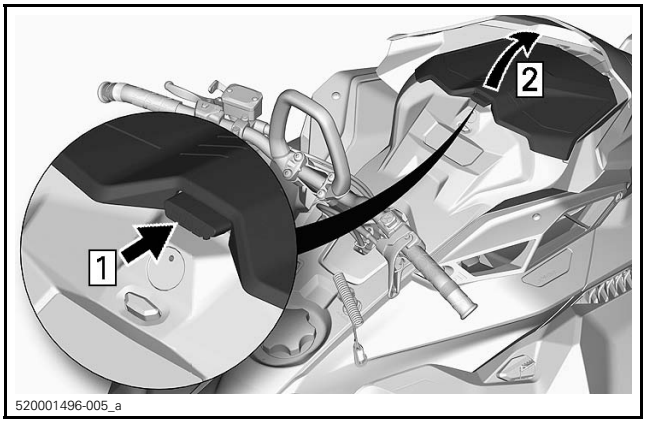
Secure in place by sliding it behind the tabs.



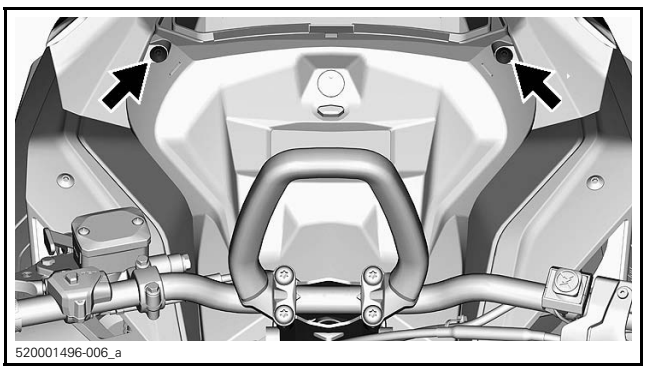
17) Upper Body Module (Hood)

Upper Body Module Removal

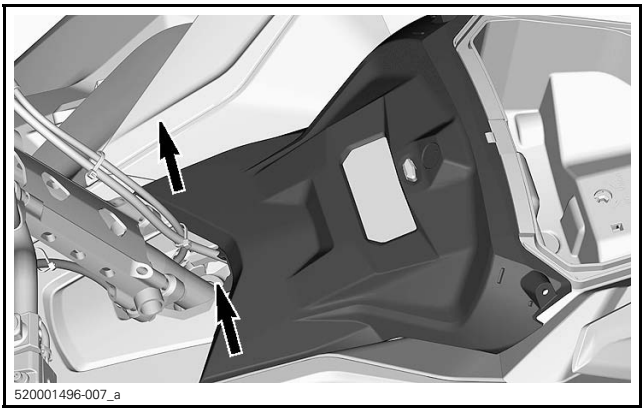
1. Open the storage compartment.



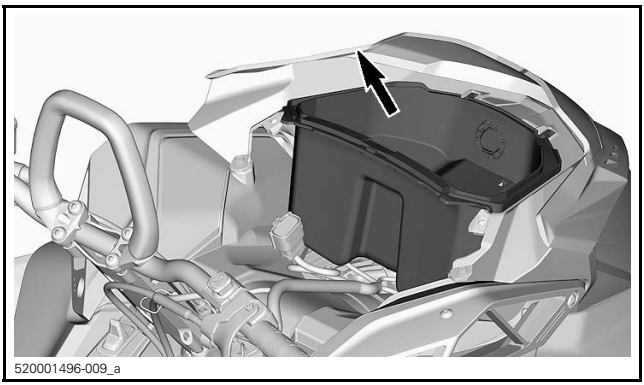
2. Remove the gauge retaining screws.



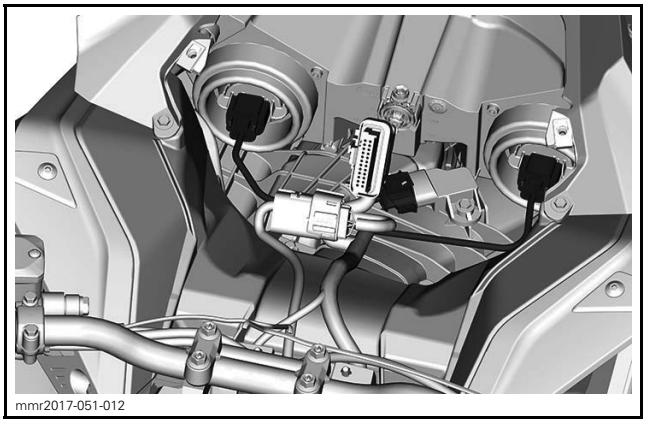
3. Free the rear of the gauge from its grommets.


520001496-007_a

4. Slide the gauge forward to remove it.
5. Set gauge aside.
6. Remove the storage compartment.

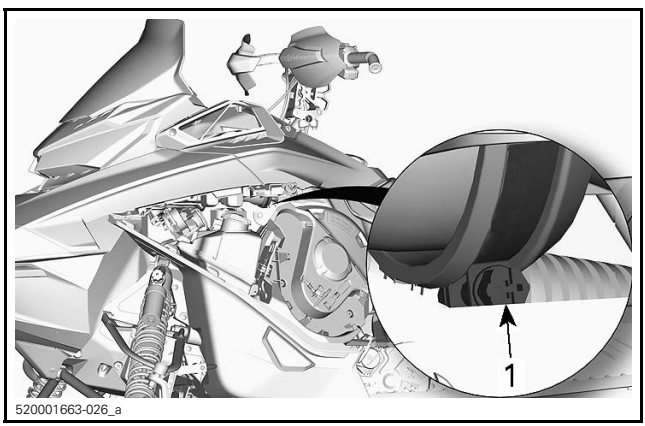

520001496-009_a

7. Disconnect the MAPTS and headlight connectors.


mmr2017-051-012

TYPICAL

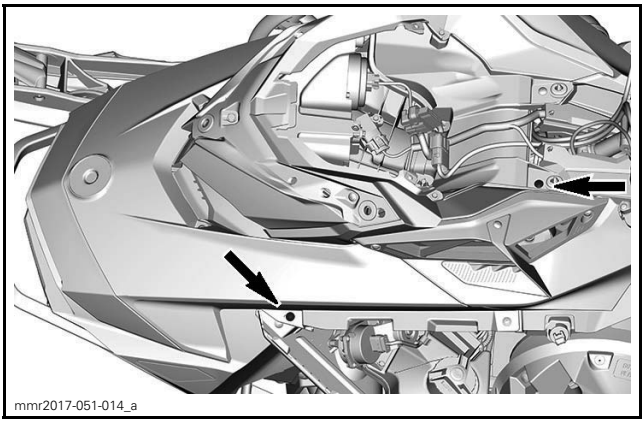
8. Loosen the air intake duct clamp.



520001663-026_a

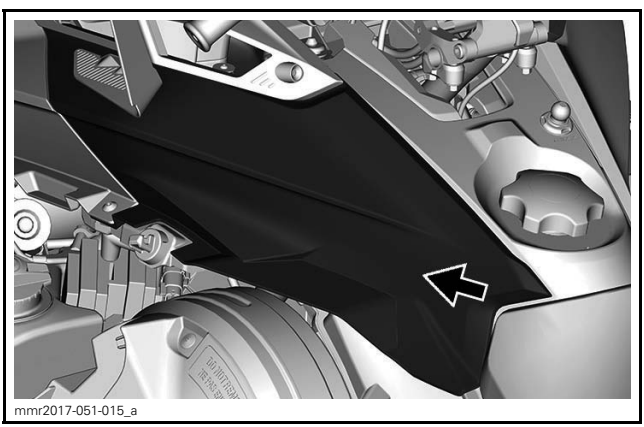
TYPICAL
1. Clamp

9. Remove the upper body module retaining screws on both sides.



TYPICAL

10. Free the rear end hooks of the upper body module from the slots in the console.



TYPICAL

11. Remove the upper body module.
    11.1 Grab the upper body module in the section.
    11.2 Pull the module forward.

11.3 Remove the module from the vehicle.

Upper Body Module Installation

1. At front, insert the upper body module tabs into the upper bottom pan openings.
2. Lower the rear end of the upper body module.
3. Insert the rear end hooks of the upper body module into the slots in the console.

mmr2017-051-016

NOTE: Make sure the air intake duct is positioned correctly in the boot.

4. Tighten air intake duct clamp.
5. On both sides, install the upper body module retaining screws.

TIGHTENING TORQUE	
Upper body screws	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

6. Connect the manifold air pressure and temperature sensor (MAPTS) connector.
7. Connect the headlight connectors.
8. Install the storage compartment but leave the cover open.

9. Install gauge, secure with the screws.

TIGHTENING TORQUE	
Gauge screws	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

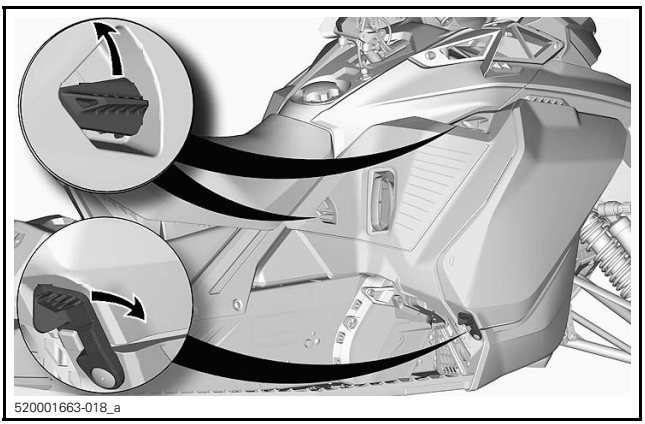
18) Side Panels

⚠ WARNING

Never operate engine with side panels opened or removed from vehicle.

Side Panels Opening and Closing

Unlock all three latches, then open panel.



520001663-018_a

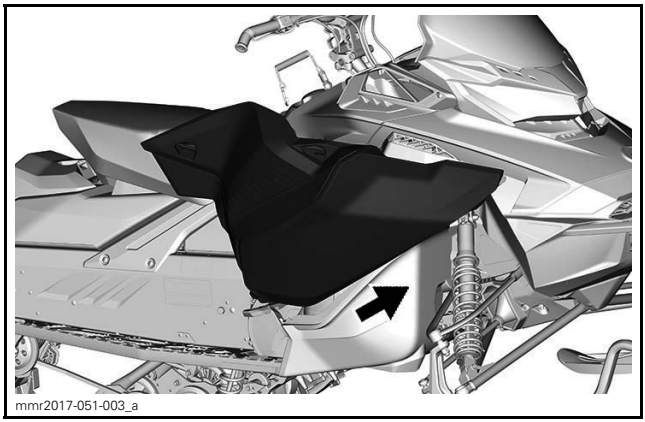
TYPICAL

When closing panel, make sure latches are locked securely.

Side Panels Removal

Open side panel.

Pull the hinges off the bottom pan.



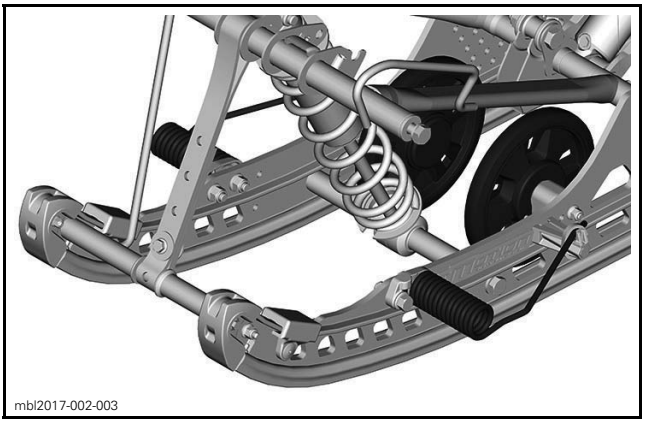
TYPICAL

19) Rewind Starter Handle (If Applicable)

Auto-rewind type located on right hand side of snowmobile. To engage mechanism, pull handle slowly until a resistance is felt then pull vigorously. Slowly release handle.

20) Ice Scratchers

Summit models are factory equipped with 2 idler wheels, and 2 ice scratchers which provide lubrication and cooling to slides and track guides for **short rides** on ice and hard packed trails.



Ice scratchers must be used whenever the vehicle is operated on a trail, hard snow or ice.

BRP ice scratchers are designed to be used in forward or reverse.

21) Operator's Guide

The Operator's Guide should be stored in the *STORAGE COMPARTMENT*.

FUEL

Fuel Requirements

NOTICE Always use fresh gasoline. Gasoline will oxidize; the result is loss of octane, volatile compounds, and the production of gum and varnish deposits which can damage the fuel system.

Alcohol fuel blending varies by country and region. Your vehicle has been designed to operate using the recommended fuels, however, be aware of the following:

- Use of fuel containing alcohol above the percentage specified by government regulations is not recommended and can result in the following problems in the fuel system components:
  - Starting and operating difficulties.
  - Deterioration of rubber or plastic parts.
  - Corrosion of metal parts.
  - Damage to internal engine parts.
- Inspect frequently for the presence of fuel leaks or other fuel system abnormalities if you suspect the presence of alcohol in gasoline exceeds the current government regulations.
- Alcohol blended fuels attract and hold moisture which may lead to fuel phase separation and can result in engine performance problems or engine damage.

Recommended Fuel

Use unleaded gasoline containing MAXIMUM 10% ethanol. The gasoline must have the following minimum octane requirements.

FUEL TYPE	ENGINE	MIN. OCTANE RATING
Fuel with NO ethanol	850 E-TEC	91 AKI (RON+MON)/2 95 RON
Fuel which may contain up to 10% MAX ethanol	850 E-TEC	91 AKI (RON+MON)/2 95 RON

NOTICE Never experiment with other fuels. Engine or fuel system damages may occur with the use of an inadequate fuel.

NOTICE Do NOT use fuel from fuel pumps labeled E85.

Use of fuel labeled E15 is prohibited by U.S. EPA Regulations.

Fuel Antifreeze Additives

When using oxygenated fuel, additional gas line antifreeze or water absorbing additives are not required and should be not used.

When using non-oxygenated fuel, isopropyl base gas line antifreeze can be used in a proportion of 150 ml (5 U.S. oz) of gas line antifreeze added to 40 L (10.6 U.S. gal.) of gas.

This precaution is in order to reduce the risk of frost buildup in fuel system components which may lead, in certain cases, to severe damage to engine.

NOTE: Use only methyl hydrate free gas line antifreeze.

Vehicle Fueling Procedure

⚠ WARNING

- Fuel is flammable and explosive under certain conditions.
- Never use an open flame to check fuel level.
- Never smoke or allow flame or spark in vicinity.
- Always work in a well-ventilated area.

1. Stop engine.

⚠ WARNING

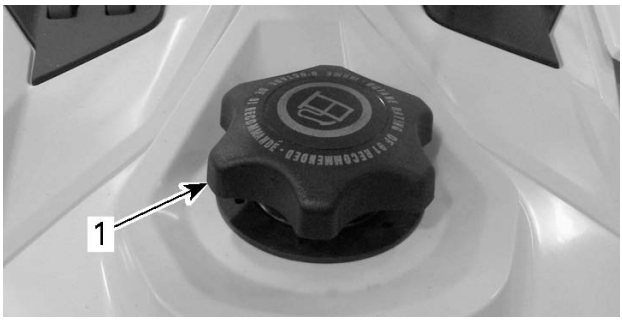
Always stop engine before refueling.

2. Have operator and passenger get off vehicle.

⚠ WARNING

Do not allow anyone seated on the vehicle while fueling.

3. Unscrew slowly the fuel reservoir cap counterclockwise to remove it.



TYPICAL
1. Fuel tank cap

⚠ WARNING

If a differential pressure condition is noticed (whistling sound heard when loosening fuel reservoir cap) have vehicle inspected and/or repaired before further operation.

4. Insert the spout into the filler neck.
5. Pour fuel slowly so that air can escape from the tank and prevent fuel flow back. Be careful not to spill fuel.
6. Stop filling when the fuel reaches the bottom of filler neck. Do not overfill.

⚠ WARNING

Never top up the fuel tank before placing the vehicle in a warm area. As temperature increases, fuel expands and may overflow.

7. Fully tighten fuel reservoir cap clockwise.

⚠ WARNING

Always wipe off any fuel spillage from the vehicle.

NOTE: Do not sit or lean on seat when fuel tank cap is not properly installed.

INJECTION OIL

Recommended Injection Oil

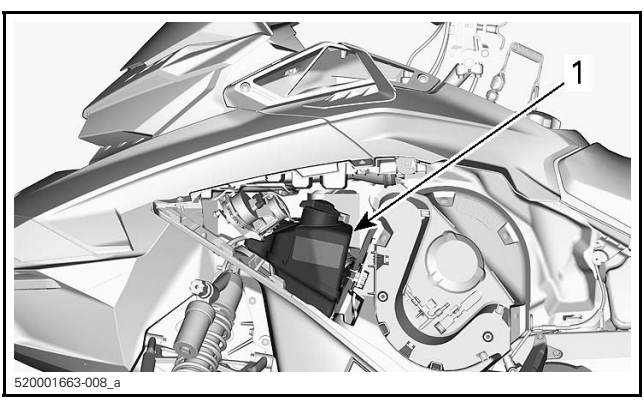
RECOMMENDED INJECTION OIL	
ENGINES	XPS SYNTHETIC 2-STROKE OIL (P/N 293 600 132)
850 E-TEC	✓

NOTICE The engine of this snowmobile has been developed and validated using the recommended BRP XPS™ oil. BRP recommends the use of its recommended XPS oil or equivalent. Damages caused by oil which is not suitable for this oil injected 2-stroke direct fuel injection engine may not be covered by the BRP limited warranty.

Injection Oil Level Verification

The injection oil reservoir is located behind the LH side panel. See *CONTROLS, INSTRUMENTS AND EQUIPMENT* for opening procedure.

Always maintain a sufficient amount of recommended injection oil in the injection oil reservoir.



1. Oil reservoir

Marks on the tank indicates "3/8" and "1/2" of the total amount of oil.

NOTICE Check level and refill every time you refuel.

To Add Injection Oil

Remove injection oil reservoir cap.

Add injection oil.

NOTE: Do not overfill.

Reinstall cap.

NOTICE Do not overtighten.

⚠ WARNING

Wipe off any oil spills. Oil is highly flammable when heated.

BREAK-IN PERIOD

Operation During Break-In

Engine

During the break-in period:

- Avoid prolonged full throttle operation.
- Avoid sustained accelerations.
- Avoid prolonged cruising speeds.
- Avoid engine overheating.

However, brief accelerations and speed variations contribute to a good break-in.

During a predetermined period, the engine management system controls some engine parameters.

The duration is based on fuel volume. It will take approximately two fuel tanks to complete the break-in.

During this period:

- The engine performance and behavior will not be optimal.
- The fuel and oil consumption will be higher.

Drive Belt

A new drive belt requires a break in period of 50 km (30 mi).

During the break-in period:

- Avoid strong acceleration and deceleration.
- Avoid pulling a load.
- Avoid high speed cruising.

BASIC PROCEDURES

Engine Starting Procedure

Procedure

1. Apply parking brake.
2. Recheck throttle control lever operation.
3. Put your helmet on.
4. Ensure that the tether cord cap is installed on the engine cut-off switch and that the cord is attached to your clothing eyelet.
5. Ensure that the emergency engine stop switch is in the ON position (up).

⚠ WARNING

Never depress throttle while starting engine.

6. Release parking brake.

NOTE: For an initial cold start, do not release parking brake. Perform the *VEHICLE WARM-UP* procedure as explained below.

Manual Start Models

Grab rewind starter handle, pull handle slowly until a resistance is felt, then hold handle firmly and pull vigorously to start engine.

Electric Start Models

Depress the START/RER button to engage the electric starter and start the engine. Release button immediately when engine has started.

NOTICE Do not engage electric starter for more than 10 seconds at a time. A rest period should be observed between the cranking cycles to allow electric starter to cool down.

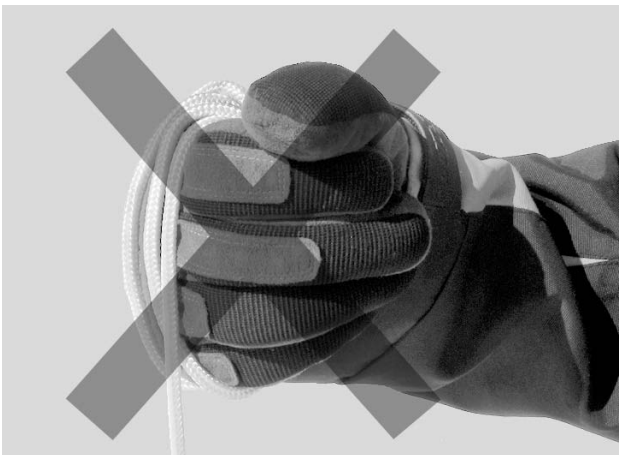
Emergency Starting

The engine can be started with the emergency starter rope supplied in the storage compartment, see *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Remove the drive belt guard, see *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

⚠ WARNING

Do not wind starting rope around your hand. Hold rope by the handle only. Do not start the engine by the drive pulley unless it is a true emergency situation. Have the snowmobile repaired as soon as possible.

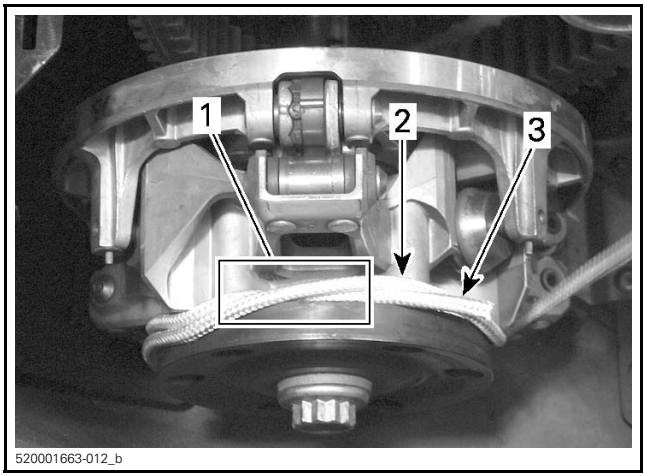


mmo2008-005-008_a

Attach one end of emergency rope to the rewind handle.

NOTE: The suspension adjustment tool can be used as an emergency handle.

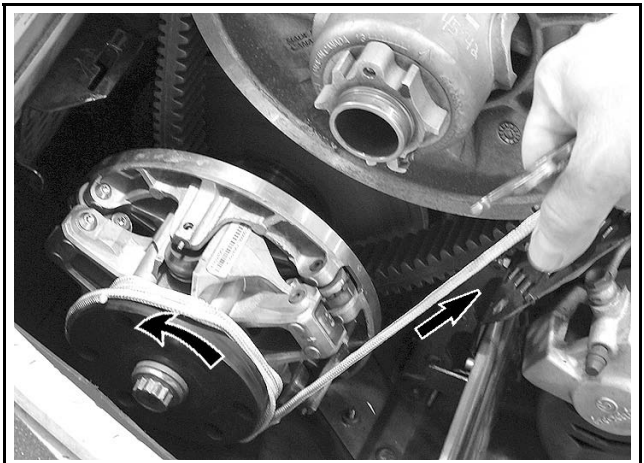
Cross the rope on the first turn as shown.



1. *Rope crossed*
2. *Rope to be winded*
3. *Rope end*

Wind rope two turns counterclockwise tightly around the drive pulley where shown.

Pull the rope using a sharp, crisp pull so the rope comes free of the drive pulley.


520001663-013_b

Start engine as per usual manual starting.

⚠ WARNING

When starting the snowmobile in an emergency situation, using drive pulley, do not reinstall the belt guard and return slowly to have snowmobile repaired.

Vehicle Warm-Up

Before every ride, vehicle has to be warmed up as follows.

1. Start engine as explained in *ENGINE STARTING PROCEDURE* above.
2. Allow engine to warm up one or two minutes at idle speed.

NOTE: Engine will shut down after approximately 12 minutes of idling.

3. Disengage parking brake.
4. Apply throttle until drive pulley engages. Drive at low speed the first two or three minutes.

NOTICE If vehicle does not move when throttle is applied, stop engine, remove tether cord cap from the engine cut-off switch, then do the following.

- Check if skis are stuck on the ground. Lift one ski at a time by the handle, then put it down.
- Check if track is stuck on the ground. Lift rear of snowmobile enough to clear track from the ground, then drop.
- Check rear suspension for hard snow or ice accumulation that could interfere with track rotation. Clean the area.

⚠ **CAUTION** Beware of injuries by using proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.

⚠ WARNING

Make sure tether cord cap is removed before standing in front the vehicle, getting close to the track or rear suspension components.

NOTE: Warm-up is electronically controlled. During this period (up to 10 minutes depending on ambient temperature), engine RPM is limited.

Reverse (RER)

When the engine is running, depressing the RER button will slow down engine RPM to almost a stop and advance the ignition timing to invert crankshaft rotation.

- Engine will automatically shift into forward when restarting after stopping or stalling.
- Shifting procedure will take place only when the engine is running.
- If engine is running at a speed above 4300 RPM, the function of the RER button is disabled.
- It is recommended to warm up the engine to its normal operating temperature before shifting.

Shifting in Reverse

1. Bring vehicle to a complete stop.
2. Apply and hold brake. Remain seated, refer to *RIDER POSITION (REVERSE OPERATION)* for posture information.

3. With engine at idle speed, press and release the RER button.
4. Wait until reverse beeper sounds, then gently depress throttle lever.

⚠ WARNING

Engaging the reverse mode is done by depressing the RER button when the engine is running. Wait until the reverse alarm sounds and the RER pilot lamp comes on in the digital gauge before operating throttle to proceed in reverse. The reverse speed is not limited. Always proceed with caution as fast reverse could result in loss of vehicle stability. Come to complete stop before depressing RER button. Always remain seated and apply the brake before shifting. Ensure the path behind is clear of obstacles or bystanders before proceeding.

Shifting in Forward

1. Bring vehicle to a complete stop.
2. Apply and hold brake.
3. Press and release the RER button.
4. RER pilot lamp will stop.
5. Apply throttle slowly and evenly. Allow drive pulley to engage then accelerate carefully.

Shutting Off the Engine

Release throttle lever and wait until engine has returned to idle speed.

Shut off the engine using either the emergency engine stop switch or by pulling off the tether cord cap from the engine cut-off switch.

⚠ WARNING

Always remove the tether cord cap from engine cut-off switch when vehicle is not in operation in order to prevent accidental engine starting or to avoid unauthorized use by children or others or theft.

RIDING CONDITIONS AND YOUR SNOWMOBILE

Altitude

At factory, your snowmobile was calibrated to be used within an altitude range (relative to sea level).

A new snowmobile has a tag attached to the handlebar indicating its calibration. See *IMPORTANT ON-PRODUCT LABELS*.

If for any reason you don't know your snowmobile calibration, contact an authorized Ski-Doo dealer.

If your snowmobile is to be used at an altitude outside the specified range, have it calibrated accordingly by an authorized Ski-Doo dealer.

NOTICE An inappropriate altitude calibration would decrease performance and may cause serious damage to the snowmobile.

Temperature

The engine management of these engines provides the optimum air/fuel ratio for all temperatures.

SPECIAL OPERATION

Towing an Accessory

Always use a rigid tow bar to tow an accessory. Any towed accessory should have reflectors on both sides and at the rear. Check local laws for brake light(s) requirements.

⚠ WARNING

Never tow an accessory with a rope. Always use a rigid tow bar. Using a rope would result in a collision between the object and the snowmobile and possibly in a tip over in case of a rapid deceleration or on a downward slope.

Towing Another Snowmobile

If a snowmobile is disabled and must be towed use a rigid tow bar. Remove the drive belt from disabled snowmobile, refer to *DRIVE BELT* in the *MAINTENANCE PROCEDURES* subsection and tow at moderate speed.

NOTICE **Always remove the drive belt of the snowmobile that is to be towed to prevent damage to its belt and drive system.**

In an emergency situation only, if a rigid tow bar is not available, a rope can be used. Proceed with extra caution. In some areas, it may be illegal to do so. Check with state or local authorities.

Remove the drive belt, attach the rope to the ski legs (spindles), have someone sit on the towed snowmobile to activate the brake, and tow at low speed.

NOTICE **In order to prevent damage to the steering system, never attach the tow rope to the ski loops (handles).**

⚠ WARNING

Never ride at high speed when towing a disabled snowmobile. Proceed slowly with extra caution.

TUNE YOUR RIDE

Snowmobile handling and comfort depend upon multiple adjustments.

⚠ WARNING

Suspension adjustment could affect vehicle handling. Always take time to familiarize yourself with the vehicle's behavior after any suspension adjustment have been made. Always adjust LH and RH suspension components to the same setting.

Choice of suspension adjustments vary with carrying load, operator's weight, personal preference, riding speed and field condition.

NOTE: Some adjustments may not apply to your snowmobile.

⚠ WARNING

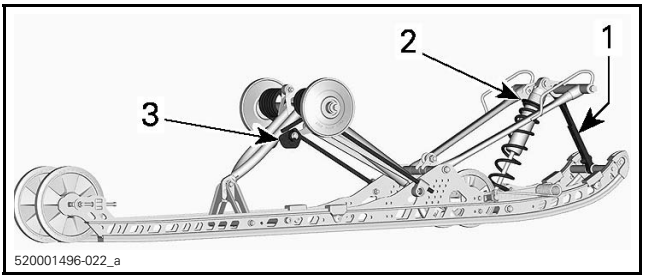
Before proceeding with any suspension adjustment, remember:

- Park in a safe place.
- Remove the tether cord cap from the engine cut-off switch.
- Use appropriate lifting device or have assistance to share lifting stress. If a lifting device is not used, use proper lifting techniques, notably using your legs force.
- Do not attempt to lift the front or rear of vehicle if it is above your limits.
- Support front of vehicle off the ground with a suitable device before adjusting suspension.
- Support rear of vehicle off the ground with a wide-base snowmobile stand with a rear deflector panel.
- Make sure support device is stable and secure.

The best way to set up the suspension is to customize each adjustment one at a time. Various adjustments are interrelated. It may be necessary to readjust center spring after adjusting front springs for instance. Test run the snowmobile under the same conditions; trail, speed, snow, operator riding position, etc. Proceed methodically until you are satisfied.

Following are guidelines to fine-tune suspension. Use suspension adjustment tool provided in the tool kit.

Rear Suspension Adjustments



ADJUSTABLE COMPONENTS
1. *Stopper strap*
2. *Center spring*
3. *Rear spring*

NOTICE Whenever adjusting rear suspension, check track tension and adjust if necessary.

Stopper Strap

Stopper strap length has an effect on the amount of weight the center spring has to carry especially during acceleration, therefore on the front end uplift.

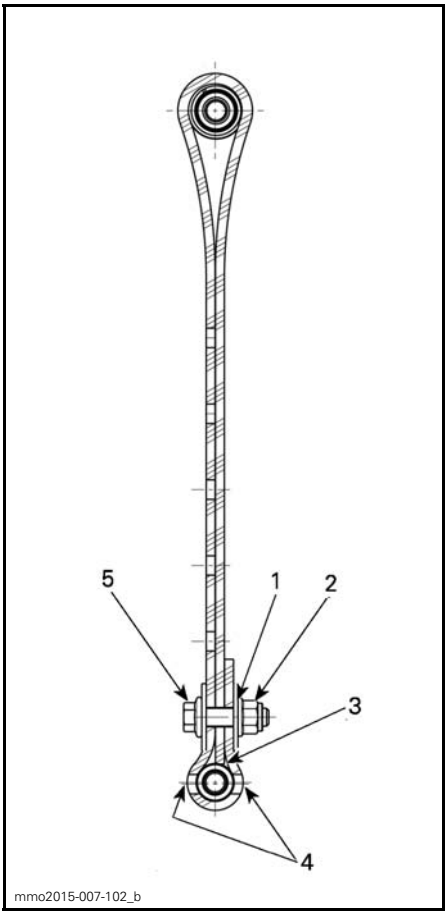
Stopper strap length also has an effect on center spring travel.

When operating the snowmobile in deep snow or hill climbing, it may be necessary to vary stopper strap length and/or riding position, to change the angle at which the track rides on the snow. Operator's familiarity with the various adjustments as well as snow conditions will dictate the most efficient combination.

Generally, a longer stopper strap setting gives better performance in deep snow on a flat landscape and a shorter setting will improve handling in steep hill climbing conditions.

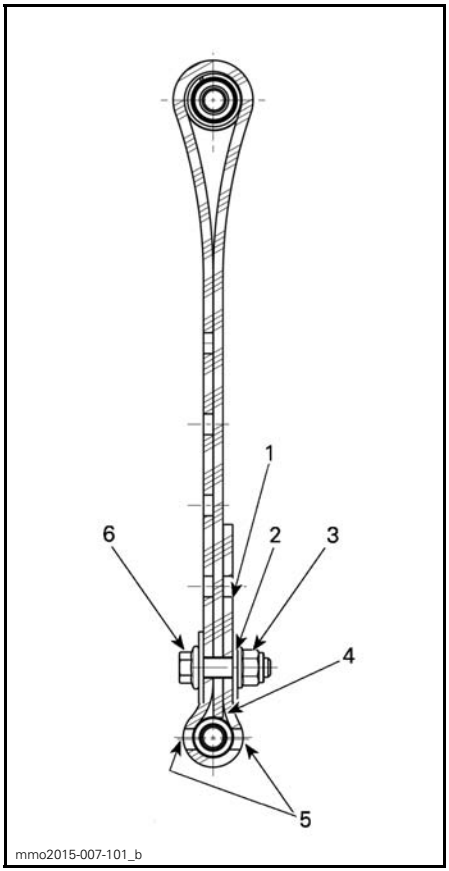
STOPPER STRAP SETTING	
POSITION	USE
1	Longest strap position for optimal bump absorption
2	Boon docking: – Better boon docking manoeuvrability – Better bump absorption – Better deep snow starts (forward and reverse)
3	Factory setting: Best overall setting (general use)
4	Hill climb: – Better track attack angle for hill climbing
5	Steep hill climb: – Better track attack angle for hill climbing – Less transfer – Lower ride height

NOTE: Illustrations below are for position 1, 2 and 3.



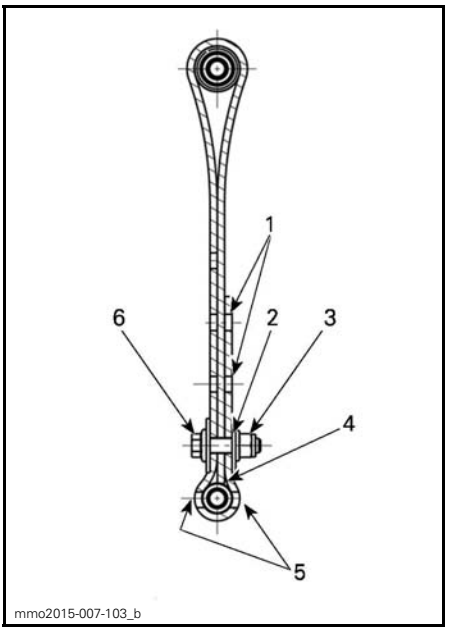
STOPPER STRAP POSITION 1 (LONGEST, 1ST HOLE)

1. *1st hole from end*
2. *Towards rear*
3. *Tip of strap touching strap axis*
4. *Two holes left open between screw head and nut*
5. *Towards front*



STOPPER STRAP POSITION 2 (2ND HOLE)

1. *Free hole*
2. *2nd hole from end*
3. *Towards rear*
4. *Tip of strap touching strap axis*
5. *Two holes left open between screw head and nut*
6. *Towards front*



STOPPER STRAP IN POSITION 3 (3RD HOLE)
1. *Free holes*
2. *3rd hole from end*
3. *Towards rear*
4. *Tip of strap touching strap axis*
5. *Two holes left open between screw head and nut*
6. *Towards front*

NOTE: Smaller numbers correspond to a longer strap setting.

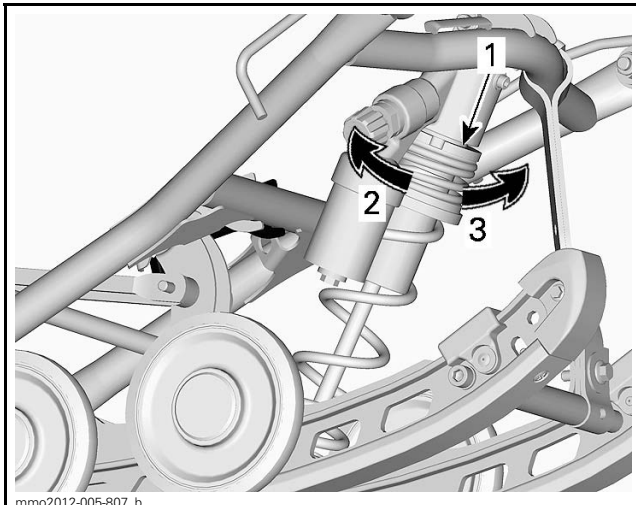
NOTE: Decreasing the stopper strap length may reduce comfort. Always install stopper strap bolt as close as possible to the lower shaft (two holes left open between screw head and nut).

Center Spring

Center spring preload has an effect on steering effort, handling and bump absorption.

Also, since center spring preload adjustment puts more or less pressure on the front of the track, it has an effect on the performance in deep snow.

ACTION	RESULT
Increasing preload	Lighter steering
	More bump absorption capability
	Better deep snow starts
	Better deep snow performance and handling
Decreasing preload	Heavier steering
	Less bump absorption capability
	Better trail handling



TYPICAL - RING TYPE
1. *Spring preload adjustment ring*
2. *Increase preload*
3. *Decrease preload*

NOTE: For cam type or ring type preload adjuster, use the suspension adjustment tool provided in the tool kit.

Rear Springs

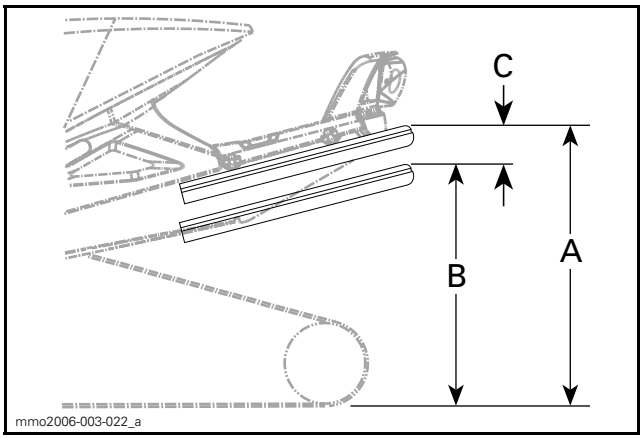
Rear spring preload has an effect on comfort, ride height and load compensation.

Also, adjusting rear spring preload shifts more or less weight to the snowmobile front end. As a result, more or less weight is applied to the skis. This has an effect on performance in deep snow, steering effort and handling.

Slight suspension bottoming occurring under the worst riding conditions indicates a good choice of spring preload.

ACTION	RESULT
Increasing preload	Firmer rear suspension
	Higher rear end
	More bump absorption capability
	Heavier steering
Decreasing preload	Softer rear suspension
	Lower rear end
	Less bump absorption capability
	Lighter steering
	Better deep snow performance and handling

Refer to the following to determine if preload is correct.



TYPICAL - PROPER ADJUSTMENT
A. Suspension fully extended
B. Suspension has collapsed with operator, passenger and load added
C. Distance between dimension "A" and "B", see table below

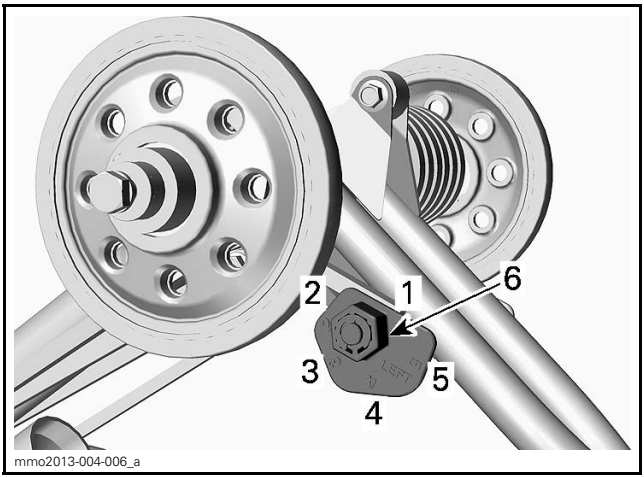
"C"	WHAT TO DO
65 mm to 100 mm (2.5 in to 4 in)	No adjustment required
More than 100 mm (4 in)	Adjusted too soft. Increase preload
Less than 65 mm (2.5 in)	Adjusted too firm. Decrease preload

NOTE: If the specification is unattainable with the original springs, see an authorized Ski-Doo dealer for other available springs.

To increase spring preload, using tool, always turn the left side adjustment cam in a clockwise direction, and the right side cam in a counterclockwise direction.

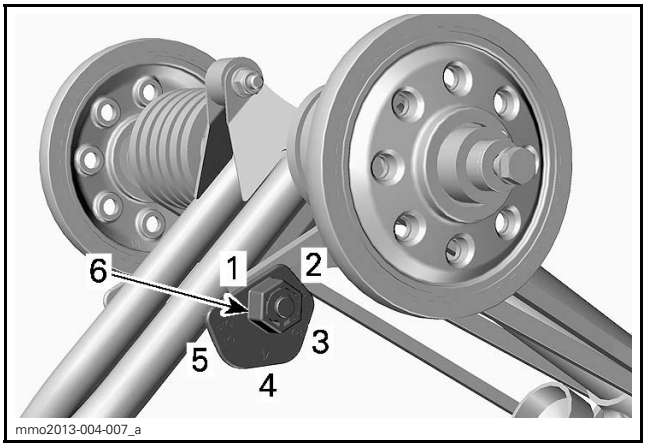
⚠ CAUTION **Never set preload cams directly from position 5 to 1 or directly from position 1 to 5.**

The adjustment cams have 5 different settings, 1 being the softest.



LH SIDE

1. *Position 1*
2. *Position 2*
3. *Position 3*
4. *Position 4*
5. *Position 5*
6. *Adjustment nut*



RH SIDE
1. *Position 1*
2. *Position 2*
3. *Position 3*
4. *Position 4*
5. *Position 5*
6. *Adjustment nut*

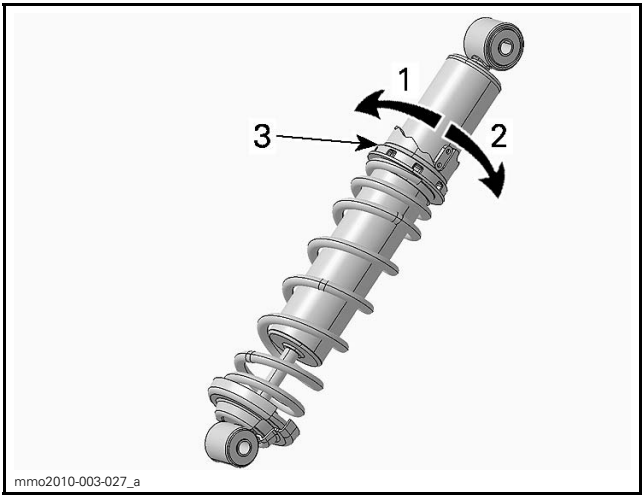
Front Suspension Adjustments

Front Springs

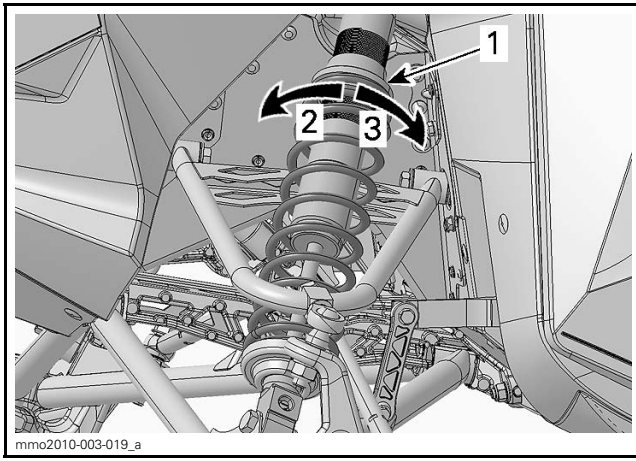
Front spring preload has an effect on front suspension firmness.

Front spring preload also has an effect on the steering behavior.

ACTION	RESULT
Increasing preload	Firmer front suspension
	Higher front end
	More precise steering
	More bump absorption capability
Decreasing preload	Softer front suspension
	Lower front end
	Lighter steering
	Less bump absorption capability



CAM TYPE - HPG SHOCK ABSORBER
1. *Decrease preload*
2. *Increase preload*
3. *Spring preload adjustment cam*



TYPICAL - RING TYPE
1. *Spring preload adjustment ring*
2. *Increase preload*
3. *Decrease preload*

Adjustment Tips According to Vehicle Behavior

PROBLEM	CORRECTIVE MEASURES
Front suspension darting	Check ski alignment. – Reduce front suspension spring preload. – Increase center spring preload. – Reduce rear spring preload.
Steering feels too heavy at steady speeds	– Reduce front suspension spring preload. – Increase center spring preload.
Steering feels too heavy during acceleration	– Reduce rear spring preload. – Lengthen limiter strap.
Too much ski lift during cornering or acceleration	– Shorten limiter strap. – Increase rear spring preload.

PROBLEM	CORRECTIVE MEASURES
Rear of snowmobile seems too stiff	– Reduce rear spring preload. – Reduce compression damping adjustment if equipped
Rear of snowmobile seems too soft	– Increase rear spring preload.
Rear suspension is frequently bottoming	– Increase compression damping adjustment if equipped. – Increase rear spring preload. – Increase center spring preload. – Lengthen limiter strap. – Increase compression damping adjustment if equipped.
Snowmobile seems to pivot around its center	– Reduce center spring preload. – Increase rear spring preload. – Increase front suspension spring preload. – Shorten limiter strap.
Track spins too much at start	– Lengthen limiter strap.
Ski diving in deep snow	– Install ski tip enlarger.

VEHICLE TRANSPORTATION

Make sure that oil reservoir and fuel tank caps are properly installed.

Tilt bed trailers can easily be equipped with a winch mechanism to afford maximum safety in loading. Simple as it may seem, never drive your snowmobile onto a tilt bed trailer or any other kind of trailer or vehicle. Many serious accidents have resulted from driving up and over a trailer. Anchor your vehicle securely, front and rear, even on short hauls. Be certain all equipment is securely fastened. Cover your snowmobile when trailering to prevent road grime from causing damage.

Be certain your trailer meets state or provincial requirements. Ensure the hitch and safety chains are secure and the brake, turn indicators and clearance lights all function.

⚠ WARNING

Do not tow the vehicle facing backwards. If the vehicle is towed facing backwards, the wind may cause damage to the windshield or even loss of the windshield.

This page is intentionally blank

MAINTENANCE

MAINTENANCE SCHEDULE

Maintenance is very important for keeping your vehicle in safe operating condition. A repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems. These instructions do not require components or service by BRP or authorized Ski-Doo dealers. Although an authorized Ski-Doo dealer has an in-depth technical knowledge and tools to service the Ski-Doo snowmobile, the emission-related warranty is not conditioned on the use of an authorized Ski-Doo dealer or any other establishment with which BRP has a commercial relationship. For emission-related warranty claims, BRP is limiting the diagnosis and repair of emission-related parts to the authorized Ski-Doo dealers. For more information, please refer to the *US EPA EMISSION-RELATED WARRANTY* contained herein. Proper maintenance is the owner's responsibility. A warranty claim may be denied if, among other things, the owner or operator caused the problem through improper maintenance or use. You must follow the instructions for fuel requirements in the fuel section of this manual. Even if gasoline containing greater than ten volume percent ethanol is readily available, the US EPA issued a prohibition against the use of gasoline containing greater than 10 vol% ethanol that applies to this vehicle. The use of gasoline containing greater than 10 vol% ethanol with this engine may harm the emission control system. The vehicle should be serviced as per the maintenance schedule.

The maintenance schedule does not exempt the pre-ride inspection.

⚠ WARNING

Failure to properly maintain the vehicle according to the maintenance schedule and procedures can make it unsafe to operate.

DURING THE FIRST 1 500 KM (1,000 MI)
Adjust and align track **after the first 75 km (50 mi)**
Verify track tension and alignment **every 500 km (300 mi)** adjust if required

EVERY 1 500 KM (1,000 MI)
Adjust drive chain
Verify track tension and alignment. Adjust if required

EVERY YEAR AT PRESEASON OR 3 000 KM (2,000 MI) (WHICHEVER COMES FIRST)
Perform pre-ride inspection
Check fault codes
Charge battery (electric start models)
Adjust drive chain
Verify track tension. Adjust and align if required
Inspect brake hose, pads and disk
Check coolant density
Inspect drive belt
Visually inspect and clean drive pulley
Inspect and clean driven pulley
Lubricate rear suspension. Lubricate whenever the vehicle is used in wet conditions (rain, puddles)
Inspect exhaust system and check for leaks
Tighten exhaust manifold screws to specified torque
Inspect fuel lines and connections
Inspect front suspension
Inspect rear suspension (including stopper straps and slider shoes)
Inspect tie-rod ends and alignment
Adjust headlight beam aiming

EVERY 2 YEARS OR 6 000 KM (4,000 MI) (WHICHEVER COMES FIRST)
Replace brake fluid
Inspect throttle cable

EVERY 2 YEARS OR 6 000 KM (4,000 MI) (WHICHEVER COMES FIRST)
Clean and lubricate rewind starter (manual start models)
Replace chaincase oil
Inspect engine rubber mounts

EVERY 3 YEARS OR 10 000 KM (6,000 MI) (WHICHEVER COMES FIRST)
Inspect oil injection pump strainer and clean if needed
Clean Rave valves

EVERY 5 YEARS OR 20 000 KM (12,500 MI) (WHICHEVER COMES FIRST)
Replace spark plugs

EVERY 5 YEARS
Replace engine coolant
Replace in-line fuel filter

MAINTENANCE PROCEDURES

This section includes instructions for basic maintenance procedures.

⚠ WARNING

Turn off the engine, remove tether cord cap and follow these maintenance procedures when performing maintenance. If you do not follow proper maintenance procedures you can be injured by hot parts, moving parts, electricity, chemicals or other hazards.

⚠ WARNING

Should removal of a locking device be required (e.g. lock tabs, self-locking fasteners, etc.) when undergoing disassembly/assembly, always replace with a new one.

Engine Coolant

⚠ WARNING

Never open coolant tank cap when engine is hot.

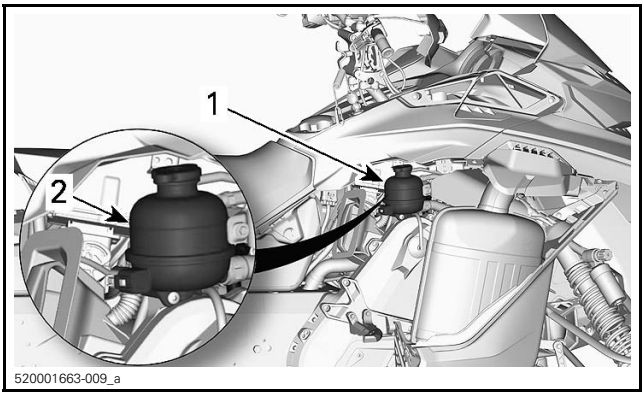
Engine Coolant level Verification

Open the RH side panel, see *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Check coolant level at room temperature with the cap removed. Liquid should be at cold level line of coolant tank.

NOTE: When checking level at low temperature it may be slightly lower then the mark.

If additional coolant is necessary or if entire system has to be refilled, refer to an authorized Ski-Doo dealer, repair shop or person of your own choosing.



1. *Coolant reservoir*
2. *COLD line*

Recommended Engine Coolant

BRP RECOMMENDED PRODUCT	COOLANT
Finland, Norway and Sweden	LONG LIFE ANTIFREEZE(F) (P/N 619 590 204)
All other countries	LONG LIFE ANTIFREEZE (P/N 219 702 685)
Alternative, or if not available	Distilled water and antifreeze solution (50% distilled water, 50% antifreeze)

NOTICE Always use ethylene-glycol antifreeze containing corrosion inhibitors specifically for internal combustion aluminum engines.

Exhaust System

Exhaust System Verification

The muffler tail pipe should be centered with the exit hole in the bottom pan. Exhaust system must be free of rust or leaks. Make sure that all parts are securely in place.

Check retaining springs condition and replace if necessary.

The exhaust system is designed to reduce noise and to improve the total performance of the engine. Modification may be in violation of local laws.

NOTICE If any exhaust system component is removed, modified or damaged, severe engine damage may result.

Spark Plugs

Spark plugs inspection or replacement may be performed by an authorized Ski-Doo dealer, repair shop, or person of your own choosing. Spark plugs inspection or replacement requires an in-depth technical knowledge. Though not required, it is recommended that an authorized Ski-Doo dealer performs spark plugs inspection or replacement.

Brake Fluid

Recommended Fluid

Use only DOT 4 brake fluid from a sealed container. An opened container may be contaminated or may have absorbed moisture from the air.

⚠ WARNING

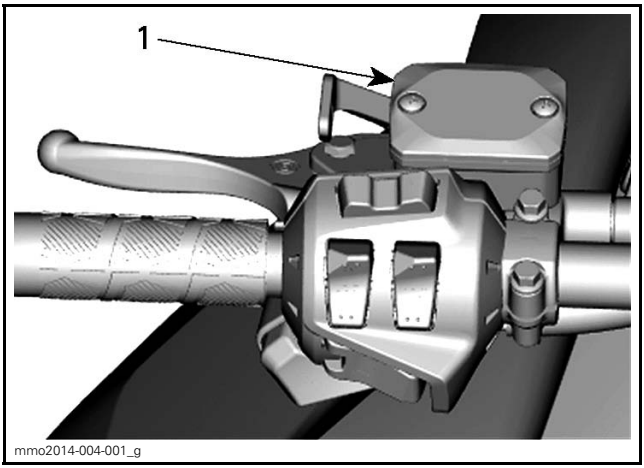
Use only DOT 4 brake fluid from a sealed container. To avoid serious damage to the braking system, do not use fluids other than the recommended one, nor mix different fluids for topping up.

NOTICE Brake fluid can damage painted and plastic parts. Handle with care. Rinse thoroughly in case of spillage.

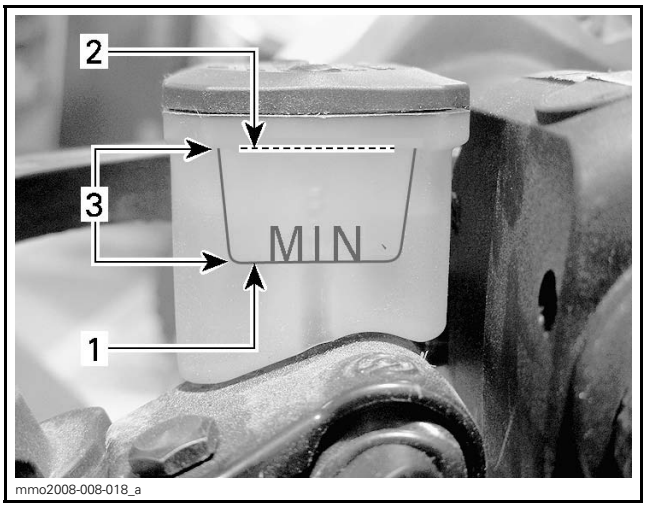
Brake Fluid Level Verification

NOTICE Vehicle must be on a level surface before checking any fluid levels.

Check brake fluid (DOT 4) in reservoir for proper level. Add fluid (DOT 4) as required.



TYPICAL
1. Brake fluid reservoir



TYPICAL
1. *Minimum*
2. *Maximum*
3. *Operating range*

⚠ CAUTION Avoid getting brake fluid on skin or eyes - it may cause severe burns. In case of contact skin, wash thoroughly. In case of contact with the eyes, immediately rinse with plenty of water for at least 10 minutes and then consult a doctor immediately.

Chaincase Oil

Recommended Chaincase Oil

RECOMMENDED CHAINCASE OIL
XPS SYNTHETIC CHAINCASE OIL (P/N 413 803 300)

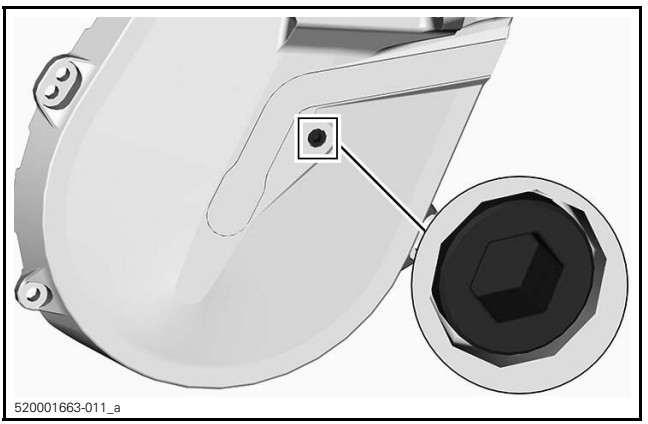
NOTICE The chaincase of this snowmobile has been developed and validated using the XPS™ Synthetic chaincase oil. BRP strongly recommends the use of its XPS Synthetic chaincase oil at all times. Damages caused by oil which is not suitable for the chaincase will not be covered by the BRP limited warranty.

Access to Chaincase

Open RH side panel, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Chaincase Oil Level Verification

With the vehicle on a level surface, check the oil level by removing the check plug.



CHECK PLUG

NOTE: The Allen end of the driven pulley expander can be used.

Oil level must reach the threaded hole.

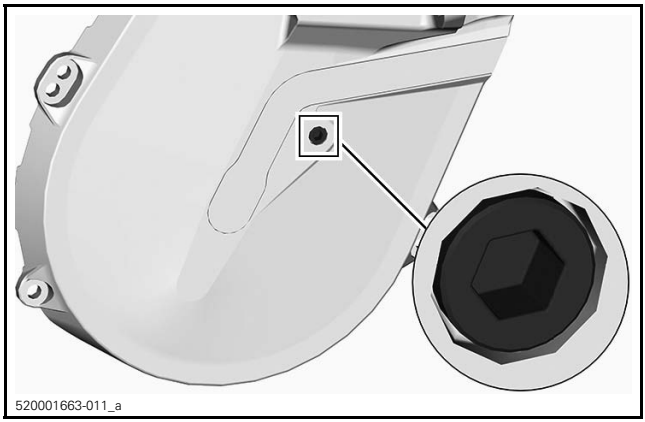
If level is correct, reinstall check plug and tighten to the specified torque.

TIGHTENING TORQUE	
Check plug	6 N•m ± 1 N•m (53 lbf•**in** ± 9 lbf•**in**)

If level is insufficient, See *CHAINCASE FILLING PROCEDURE*.

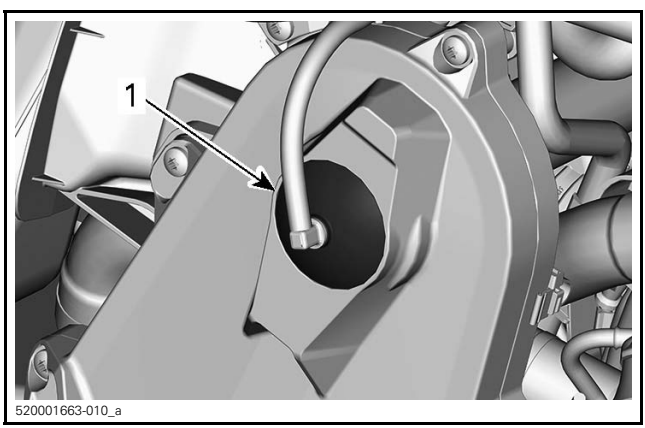
Chaincase Filling Procedure

Remove the check plug.



CHECK PLUG

Remove the filler cap.



TOP OF CHAINCASE
1. Filler cap

Pour recommended oil in the filler hole until oil comes out by the check plug hole.

Reinstall check plug and tighten to the specified torque.

TIGHTENING TORQUE	
Check plug	6 N•m ± 1 N•m (53 lbf•**in** ± 9 lbf•**in**)

Reinstall the filler cap.

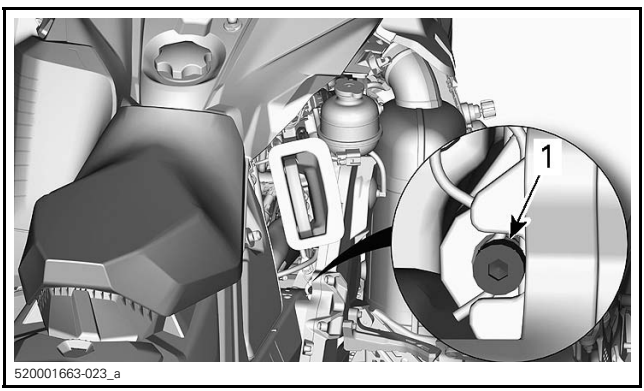
Drive Chain

Access to Chaincase

Open RH side panel, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Drive Chain Adjustment

Using the Allen end of the driven pulley expander, GENTLY turn tensioner clockwise to eliminate the play.



520001663-023_a

TYPICAL

Do not force the tensioner in.

NOTE: Do not remove the hair cotter pin.

NOTICE Overtightening the drive chain could result in severe damage to the chaincase components.

Drive Belt

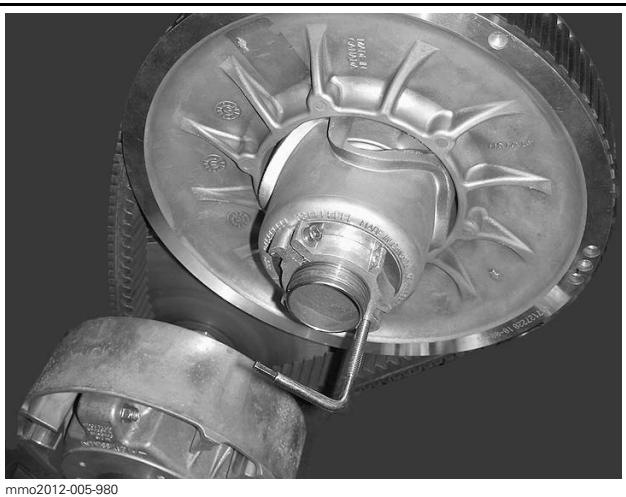
Drive Belt Inspection

Inspect belt for cracks, fraying or abnormal wear (uneven wear, wear on one side, missing cogs, cracked fabric). If abnormal wear is noted, probable cause could be pulley misalignment, excessive RPM with frozen track, fast starts without warm-up period, burred or rusty sheave, oil on belt or distorted spare belt. Contact an authorized Ski-Doo dealer.

Drive Belt Replacement

Drive Belt Removal

1. Remove tether cord cap from engine cut-off switch.
2. Remove drive belt guard, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.
3. Insert the driven pulley expander provided in the threaded hole on the adjuster hub as shown.



mmo2012-005-980

TYPICAL - PULLEY EXPANDER INSTALLED ON ADJUSTER HUB

4. Open the driven pulley by screwing the tool in.

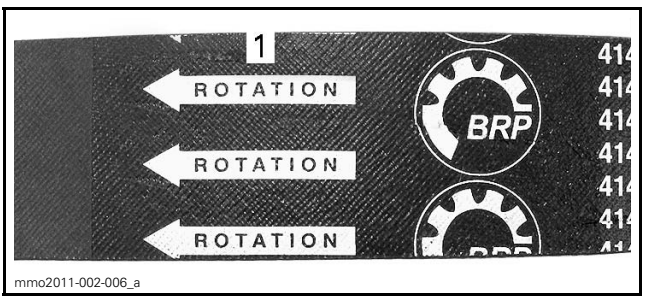
5. Remove the drive belt by slipping it over the top of the driven pulley, then over the drive pulley.

Drive Belt Installation

1. If necessary, open the driven pulley, refer to *DRIVE BELT REMOVAL* above.
2. Slip the belt over the drive pulley, then over the driven pulley.

NOTICE Do not force or use tools to pry the belt into place, as this could cut or break the cords in the belt.

NOTE: The maximum drive belt life span is obtained when belt is installed with arrows in the direction of rotation.



1. To be pointed in the direction of rotation

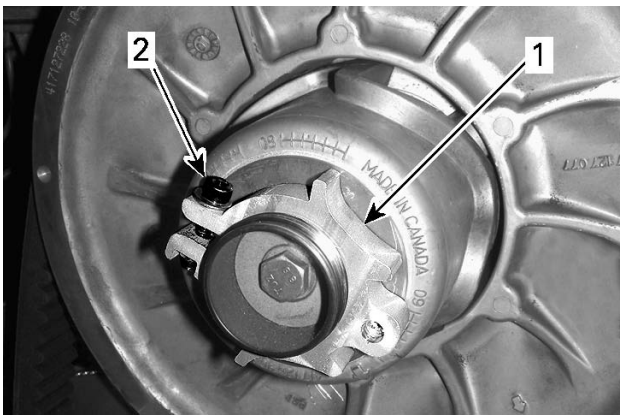
3. Unscrew and remove the driven pulley expander from the pulley.
4. Rotate the driven pulley several times to properly set the belt between the sheaves.
5. If a new belt was installed, adjust the belt height. Refer to *DRIVE BELT HEIGHT ADJUSTMENT* below.
6. Install belt guard, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.
7. Close side panel, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Drive Belt Height Adjustment

The drive belt height must be checked every time a new drive belt is installed.

To adjust the drive belt height, proceed as follows:

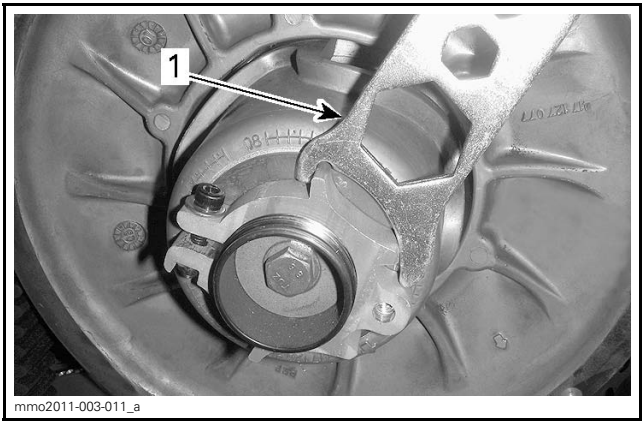
1. Remove tether cord cap from engine cut-off switch.
2. Remove drive belt guard.
3. Loosen the clamping bolt.



mmo2011-003-010_a

1. Adjuster hub
2. Clamping bolt

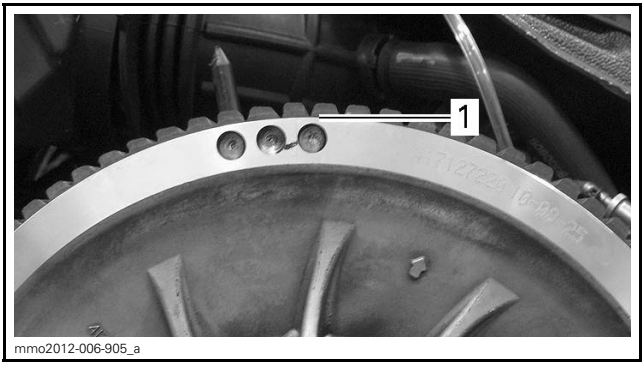
4. Using the suspension adjustment tool provided, turn the ring 1/4 turn at a time then rotate the driven pulley to properly set the drive belt between the pulley sheaves.



1. Suspension adjustment tool

NOTE: The adjustment ring has left hand treads.

Repeat step 4 until the lowest portion of the cogs on the external surface of drive belt is even with the driven pulley edge.

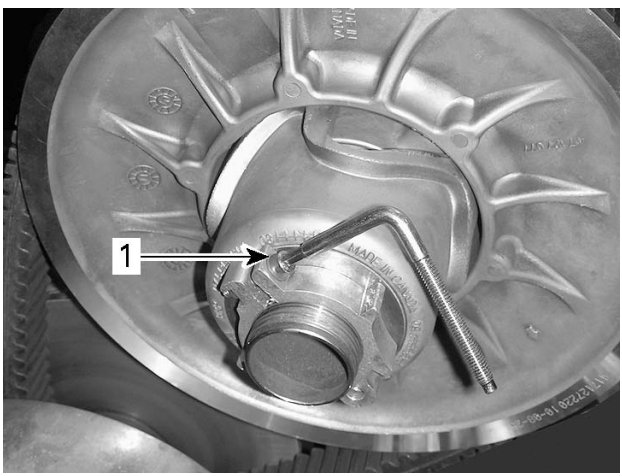


TYPICAL - PRELIMINARY SETTING
1. Lowest portion of cogs even with external surface of drive belt

NOTE: Turning the ring counterclockwise lowers the drive belt in the pulley. Turning the ring clockwise raises the drive belt in the pulley.

5. Firmly tighten the clamping bolt. If possible, tighten to specified torque using a torque wrench.

TIGHTENING TORQUE	
Clamping bolt	5.5 N•m ± 0.5 N•m (49 lbf•**in** ± 4 lbf•**in**)



mmo2012-004-903_a

TYPICAL
1. Clamping bolt

6. Install drive belt guard.
7. Install side panel.

NOTE: These settings are correct as a preliminary adjustment for most models. In some cases, when starting the engine, the vehicle could creep, indicating that the drive belt is too tight.

If the vehicle creeps, lower the drive belt height from the preliminary setting. Repeat procedure until creeping stops.

Reverse Activation

NOTE: The reverse may not activate if the belt is positioned too high in the driven pulley. If reverse activation does not work properly, ensure the drive belt is properly adjusted. Adjust the drive belt lower in the driven pulley if needed.

Drive Pulley

Drive Pulley Adjustment

⚠ WARNING

Remove tether cord cap from engine cut-off switch before performing any adjustment. Vehicle must be parked in a safe place, away from the trail.

⚠ WARNING

NEVER disassemble or modify the drive pulley.
Improper assembly or modifications could cause the pulley to explode violently under the stress generated by the high rotational speed.
See your Ski-Doo dealer to maintain or service the drive pulley. Improper servicing or maintenance may affect performance and reduce belt life. Always respect maintenance schedules.

The drive pulley is factory calibrated to transmit maximum engine power at a predefined RPM. Factors such as ambient temperature, altitude or surface condition may vary this critical engine RPM thus affecting snowmobile efficiency.

This adjustable drive pulley allows setting maximum engine RPM to maintain maximum power.

Ramp cams should be adjusted so that actual maximum engine RPM matches the maximum horsepower RPM. Refer to *SPECIFICATIONS*.

NOTE: Use a precision digital tachometer for engine RPM adjustment.

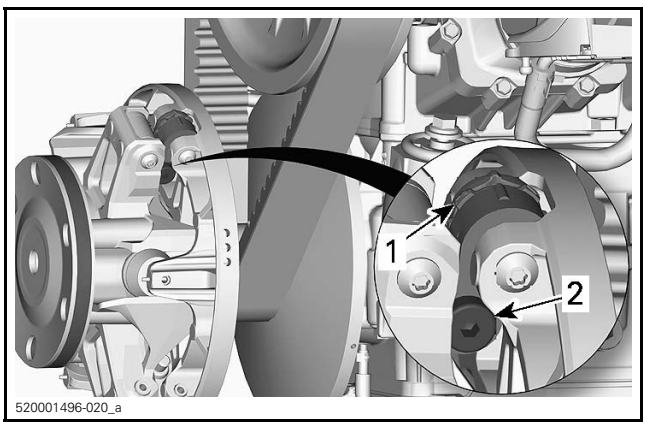
There are 5 positions in which the ramp cam can be set.

Each position modifies the maximum engine RPM by about 200 RPM.

Lower position numbers decrease engine RPM in steps of 200 RPM and higher position numbers increase it in steps of 200 RPM.

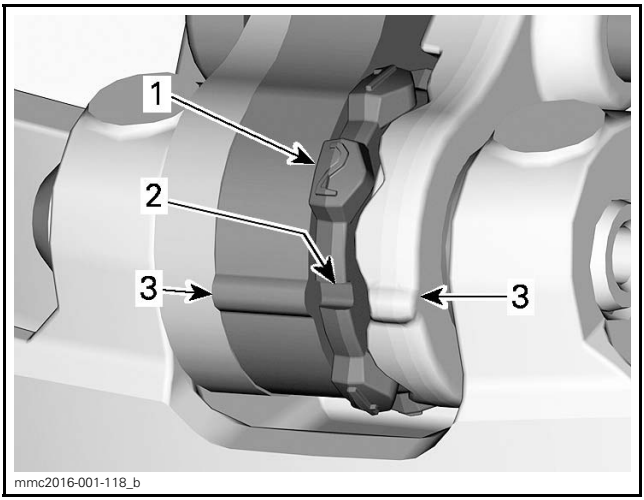
Procedure

1. Refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT* and remove:
   - LH side panel
   - Drive pulley guard
2. Locate the cam and the pivot screw on the drive pulley.



1. Cam
2. Pivot screw

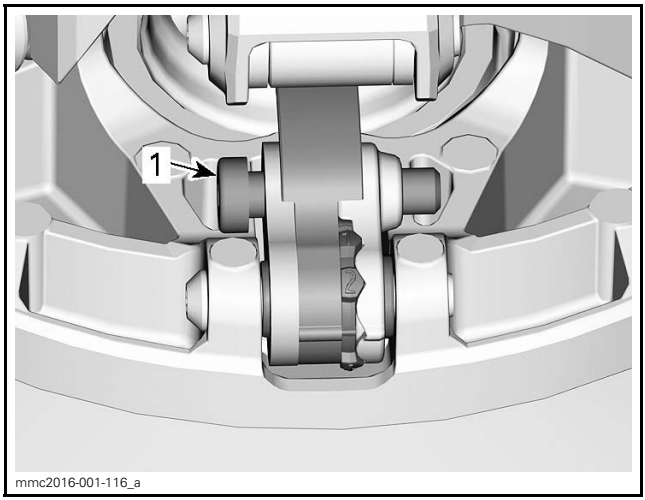
The cam position is identified as follows:
- Positions 1, 2, 4 and 5 are numbered.
- Position 3 (middle) is identified by a notch.
- There are notches on each side of the cam used as pointers.



1. Numbered position
2. Position 3 - Notch
3. Pointers

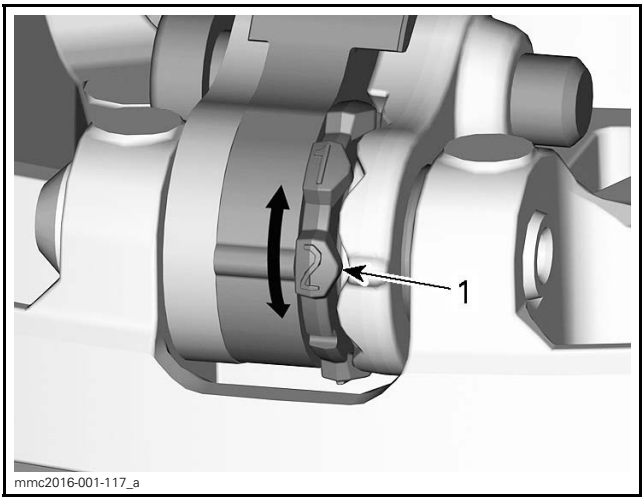
To adjust, proceed as follows for all 3 cams:

3. Using the Allen end of the driven pulley expander, loosen the pivot screw.



1. Pivot screw

4. Move the right lever aside to be able to turn the cam.
5. Turn cam to the desired position.



1. Desired cam position (here #2)

6. Tighten the pivot screw.

TIGHTENING TORQUE	
Pivot	5 N•m ± 1 N•m (44 lbf•**in** ± 18 lbf•**in**)

NOTICE Always adjust all 3 cams to the same setting.

Track

Track Condition

⚠ WARNING

Remove tether cord cap from engine cut-off switch before performing any maintenance or adjustment, unless otherwise specified. Vehicle must be parked in a safe place, away from the trail.

Remove tether cord cap from engine cut-off switch.

Lift the rear of the snowmobile and support it with a wide-base snowmobile mechanical stand with a rear deflector panel. With the engine off, rotate the track by hand, and inspect condition. If worn or cut, or if track fibers are exposed, or if missing or defective inserts or guides are noted; contact an authorized Ski-Doo dealer.

Snowmobiles Equipped with Traction Enhancing Products

If your snowmobile is equipped with a BRP approved studded track, PROCEED WITH A VISUAL INSPECTION OF YOUR TRACK BEFORE EACH USE.

Look for any defects, such as:

- Perforations in the track
- Tears in the track (particularly around traction holes on studded tracks)
- Lugs that are broken or torn off, exposing portions of rods
- Delamination of the rubber
- Broken rods
- Broken studs (studded tracks)
- Bent studs (studded tracks)
- Missing studs
- Studs that are torn off the track
- Missing track guide(s)
- Also, ensure that studs nut are tighten to the recommended torque.

On approved studded tracks, replace broken or damaged studs immediately. If your track shows signs of deterioration, it must be replaced immediately. When in doubt, ask your dealer.

⚠ WARNING

Riding with a damaged track or studs could lead to a loss of control.

For complete information on traction enhancing products, refer to the section entitled *TRACTION ENHANCING PRODUCTS* in the *SAFETY INFORMATION* section at the beginning of this Operator's Guide.

Track Tension and Alignment

NOTE: Track tension and alignment are interrelated. Do not adjust one without the other.

⚠ WARNING

To prevent serious injury to individuals near the snowmobile:

- NEVER stand behind or near a moving track.
- Always use a wide-base snowmobile stand with a rear deflector panel if it is necessary to rotate track.
- When the track is raised off the ground, only run it at the lowest possible speed.

Centrifugal force could cause debris, damaged or loose studs, pieces of torn track, or an entire severed track to be violently thrown backwards out of the tunnel with tremendous force, possibly resulting in the loss of a leg or other serious injury.

Track Tension Verification

NOTE: Ride the snowmobile in snow about 15 to 20 minutes prior to adjusting track tension.

1. Remove tether cord cap from engine cut-off switch.
2. Lift rear of vehicle and support it off the ground.

⚠ **CAUTION** Use proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.

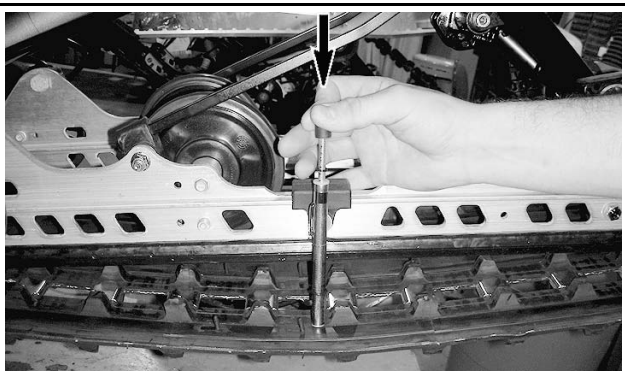
3. Allow rear suspension to fully extend.
4. Use the TENSIOMETER (P/N 414 348 200).

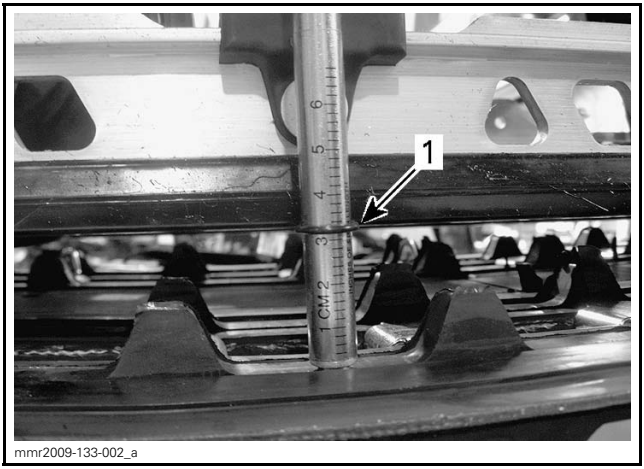
5. Set deflection between 30 mm and 35 mm (1-3/16 in and 1-3/8 in) using bottom O-ring.

mmr2009-133-003_b

DEFLECTION SETTING
1. Bottom O-ring set to specification

6. Place upper O-ring to 0 kgf (0 lbf).
7. Position the tensiometer on track, halfway between front and rear idler wheels.
8. Push the tensiometer downwards until bottom O-ring (deflection set earlier) be aligned with the bottom of slider shoe.


mmr2009-133-001_a



1. Deflection O-ring aligned with slider shoe

9. Read load recorded by the upper O-ring on the tensiometer.

LOAD READING
1. Upper O-ring

10. Load reading must be as per the following table.

TRACK ADJUSTMENT SPECIFICATION	
Track deflection setting	3.2 cm (1.26 in)
Track load reading	6 kgf to 8.5 kgf (13 lbf to 19 lbf)

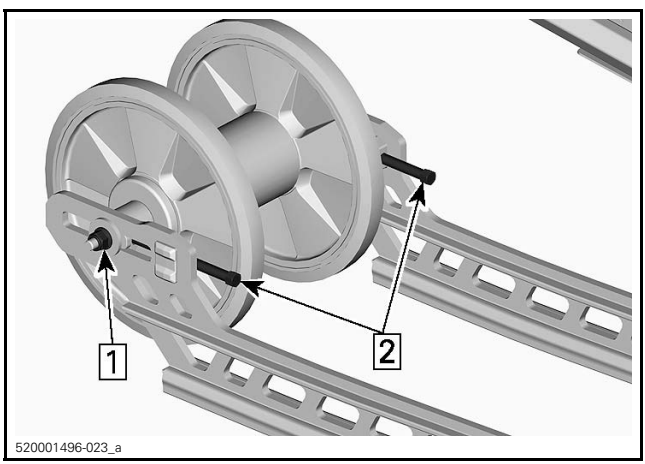
11. If load reading is not in accordance with the specification, adjust track tension. Refer to *TRACK TENSION ADJUSTMENT*.

Track Tension Adjustment

1. Remove tether cord cap from engine cut-off switch.
2. Lift rear of vehicle and support it off the ground.

⚠ CAUTION Use proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.

3. Loosen the rear axle nut.
4. Tighten or loosen both adjustment screws (equally) to increase or decrease track tension.



Step 1: Loosen the axle nut
Step 2: Tighten or loosen the adjustment screws

5. If correct tension is unattainable, contact an authorized Ski-Doo dealer.
6. Retighten the rear axle nut to specification.

TIGHTENING TORQUE	
Rear idler wheel retaining nut and screw **(2 idler wheels system)**	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

7. Check track alignment as described below.

Track Alignment

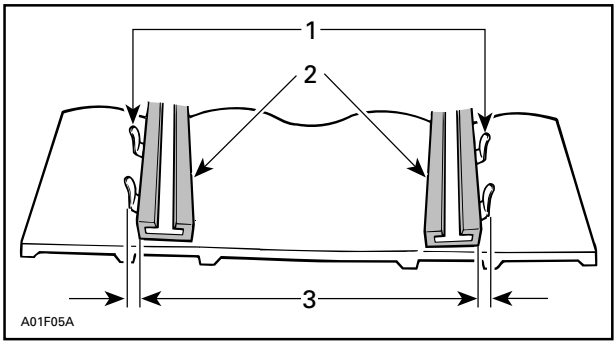
⚠ WARNING

Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Always lift the snowmobile on a wide-base stand with a rear deflector panel. Ensure no one is standing in close proximity to the snowmobile, especially at the rear of the track. Never rotate track at high speed.
Centrifugal force could cause debris, damaged or loose studs, pieces of torn track, or an entire severed track to be violently thrown backwards out of the tunnel with tremendous force.

1. Lift rear of vehicle and support it off the ground.

⚠ CAUTION **Use proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.**

2. Start engine and accelerate slightly so that track slowly turns. This must be done in a short period of time (15 to 20 seconds).
3. Check that the track is well centered; equal distance on both sides between edges of track guides and slider shoes.



1. Guides
2. Slider shoes
3. Equal distance

4. To correct track alignment:

   4.1 Stop engine.

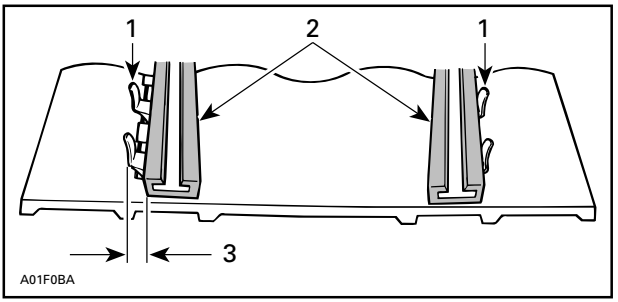
   4.2 Remove tether cord cap from engine cut-off switch.

⚠ WARNING

Remove tether cord cap from engine cut-off switch before performing any maintenance or adjustment, unless otherwise specified. Vehicle must be parked in a safe place, away from the trail.

   4.3 Loosen the rear axle nut.

   4.4 Tighten adjustment screw on side where the slider shoe is the farthest from the track insert guides.



1. Guides
2. Slider shoes
3. Tighten on this side

5. Tighten the rear axle nut.

⚠ WARNING

Properly tighten wheel retaining bolt, otherwise wheel may come off and cause track to "lock".

6. Restart engine and rotate track slowly to recheck alignment.
7. Tighten the rear axle nut to specified torque.

TIGHTENING TORQUE	
Rear idler wheel retaining nut and screw **(2 idler wheels system)**	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

8. Reposition snowmobile on the ground.

Suspension

Rear Suspension Condition

Visually inspect all suspension components including slider shoes, springs, wheels, etc.

NOTE: During normal driving, snow will act as a lubricant and coolant for the slider shoes. Extensive riding on ice or sanded snow, will create excessive heat build-up and cause premature slider shoe wear.

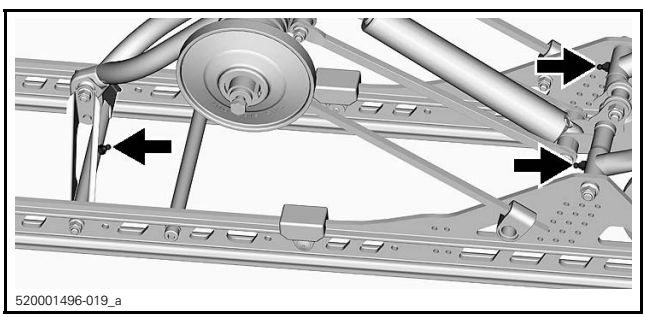
Suspension Stopper Strap Condition

Inspect stopper strap for wear and cracks, bolt and nut for tightness. If loose inspect holes for deformation. Replace as required. Torque nut to specification.

TIGHTENING TORQUE
10 N•m ± 1 N•m (89 lbf•**in** ± 9 lbf•**in**)

Suspension Lubrication

Lubricate the following suspension pivots at grease fittings using SUSPENSION GREASE (P/N 293 550 033). Refer to *MAINTENANCE SCHEDULE* for maintenance frequency.



GREASE FITTINGS

Steering and Front Suspension Condition

Visually inspect steering and front suspension for tightness of components (steering arms, control arms and links, tie rods, ball joints, ski bolts, ski legs, etc.). If necessary, contact an authorized Ski-Doo dealer.

Skis

Wear and Condition of Skis and Runners

Check the condition of the skis and ski runner carbides. If worn, contact an authorized Ski-Doo dealer.

⚠ WARNING

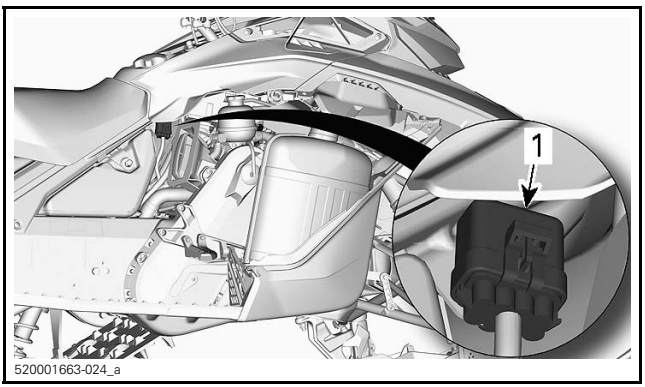
Excessively worn skis and/or ski runners will adversely affect snowmobile control.

Fuses

Access to Fuse Block

Open RH side panel, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Fuses Location



1. Fuse block

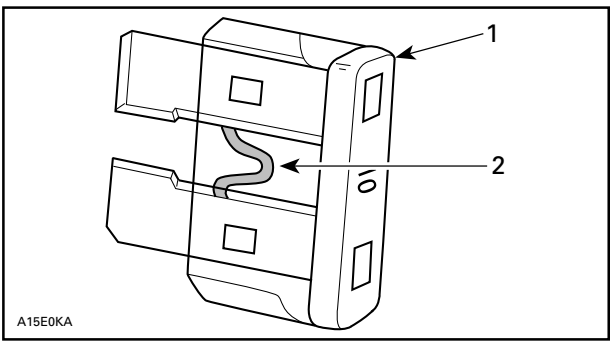
Unlock fuse block from its cover.

FUSE IDENTIFICATION	AMPERAGE RATING
Start/RER	5 A
Battery	30 A
Accessories	7.5 A
Loads	25 A

Fuse Inspection

Check fuse condition and replace it if necessary.

To remove fuse from holder, pull fuse out. Check if filament is melted.



1. Fuse
2. Check if melted

⚠ WARNING

Do not use a higher rated fuse.

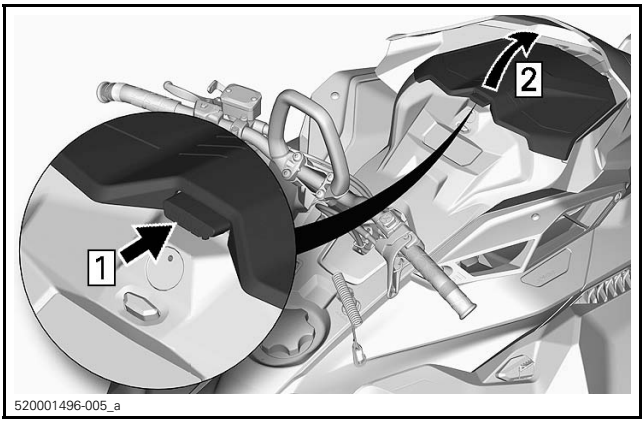
⚠ WARNING

If fuse has burnt out, source of malfunction should be determined and corrected before restarting. See an authorized Ski-Doo dealer for servicing.

Headlights

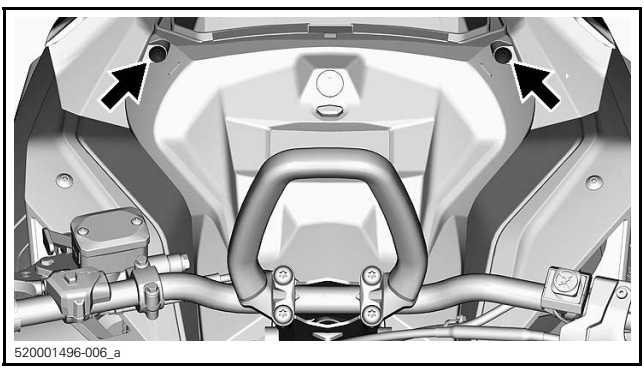
Headlights Bulb Replacement

1. Open the storage compartment.

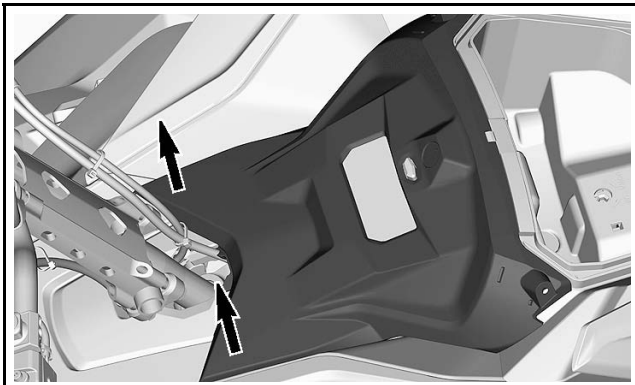


520001496-005_a

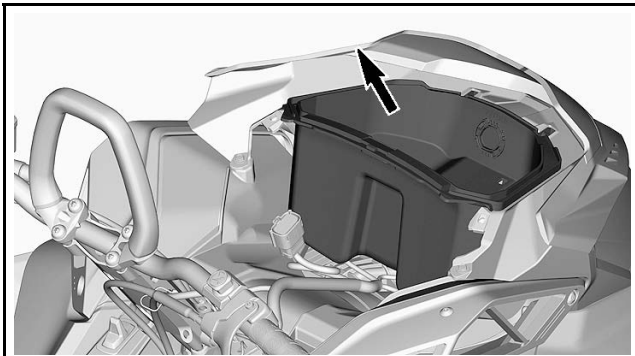
2. Remove the gauge retaining screws.


520001496-006_a

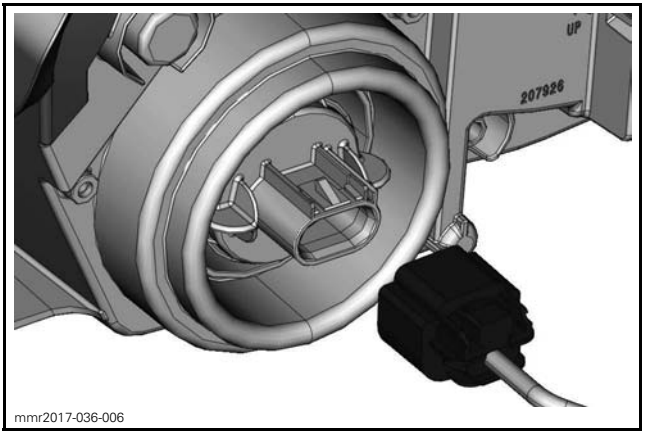
3. Free the rear of the gauge from its grommets.


520001496-007_a

4. Slide the gauge forward to remove it.
5. Set gauge aside.
6. Remove the storage compartment.


520001496-009_a

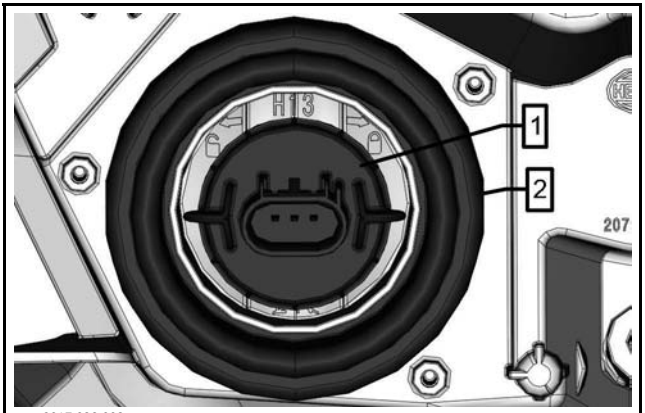
7. Disconnect bulb connector.



mmr2017-036-006

8. Unlock bulb by turning it counterclockwise.
9. Pull bulb out.

NOTE: Ensure bulb seal stays in place.



mmr2017-036-008

1. Bulb
2. Bulb seal

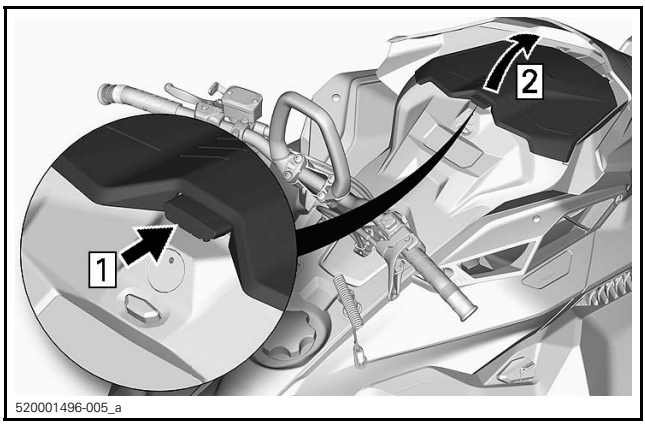
Install a new bulb using the reverse of the removal procedure.

NOTICE Never touch glass portion of an halogen bulb with bare fingers, it shortens its operating life. If glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.

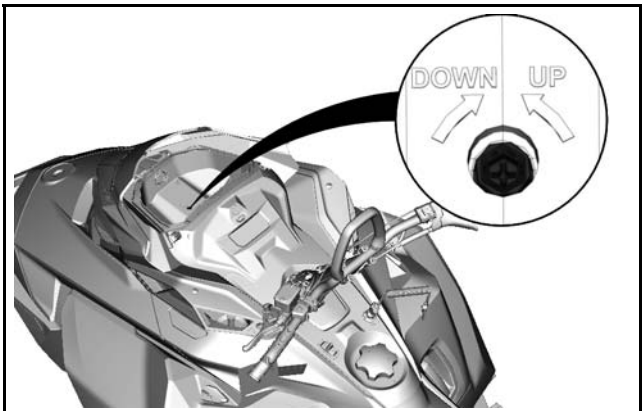
Check headlights operation.

Headlights Beam Aiming

Open the storage compartment.



Turn the adjustment screw to reach desired beam height.



mmr2017-036-005

Post-Operation Care

Remove snow and ice from rear suspension, track, front suspension, steering mechanism and skis.

⚠ WARNING

Make sure tether cord cap is away from engine cut-off switch before standing in front the vehicle, getting close to the track or rear suspension components.

Always cover your snowmobile when leaving it outside overnight or during extended periods of inactivity. This will protect it from frost and snow as well as help retain its appearance.

Vehicle Cleaning and Protection

Wash snowmobile with water mixed with a mild detergent. Use only microfiber cloths or an equivalent.

NOTICE **It is necessary to use microfiber cloths or equivalent on windshield and hood to avoid damaging further surfaces to clean.**

To remove grease, oil and grime, use BRP HEAVY DUTY CLEANER (P/N 293 110 001).

NOTICE **Do not use Heavy duty cleaner on decals or vinyl.**

To remove stubborn dirt from all plastic and vinyl surfaces, use XPS ALL PURPOSE CLEANER (P/N 219 701 709).

NOTICE **Never clean plastic parts or hood with strong detergent, degreasing agent, paint thinner, acetone, products containing chlorine, etc.**

Wax painted portion of the vehicle for better protection.

NOTE: Apply wax on glossy finish only.

STORAGE

During summer, or when a snowmobile is not in use for more than three months, proper storage is necessary.

STORAGE
Clean the vehicle
Add fuel stabilizer to fuel following the product manufacturer recommendations. Run the engine after adding the product to the fuel
Lubricate engine
Lubricate brake lever pivot
Lubricate rear suspension
Charge battery monthly to keep it fully charged during storage (on models with electric starter)
Block muffler outlet with rags
Lift rear of vehicle until track is clear of the ground. Do not release track tension

⚠ **CAUTION** Use appropriate lifting device or have assistance to share lifting stress. If a lifting device is not used, use proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.

NOTICE The snowmobile has to be stored in a cool and dry place and covered with an opaque but ventilated tarpaulin. This will prevent sun rays and grime from affecting plastic components and vehicle finish.

NOTICE Fuel stabilizer should be added prior to engine lubrication to ensure carburetor protection against varnish deposits.

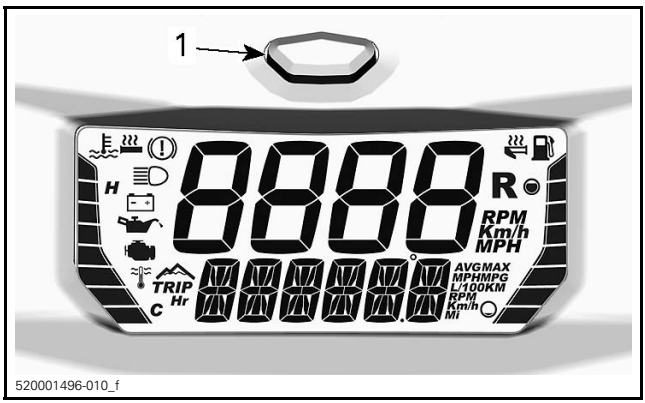
Engine Storage Mode

Like other engines, the E-TEC has to be properly lubricated at storage for internal parts protection. The E-TEC system offers a built-in engine storage lubrication function (summerization) that can be initiated by the operator.

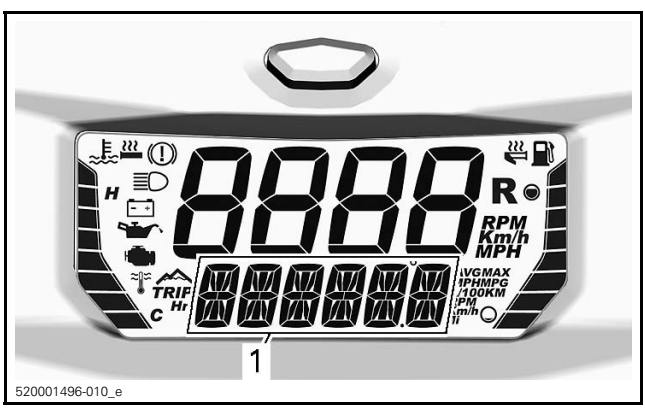
To engage procedure, do the following:

1. Place the vehicle in a well ventilated area.

2. Start the engine and let it run at idle speed until it reaches its operating temperature (watch the coolant temperature on the display or verify the rear heat exchanger becomes warm).
3. Press and release the mode button on the gauge until the odometer is displayed on the lower display.



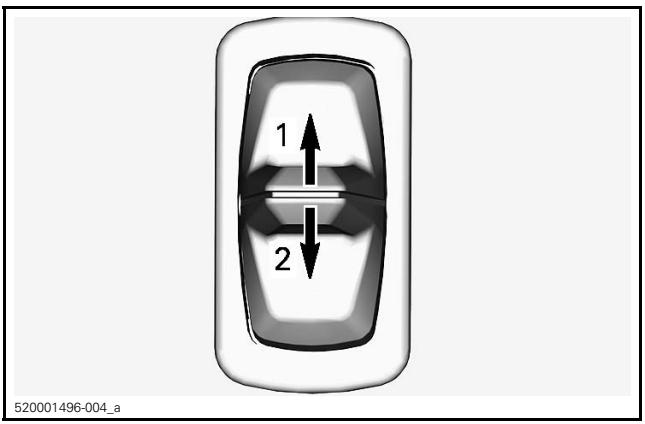
1. Gauge mode button



1. Lower display

NOTE: The storage mode does not function in other modes (trip A, trip B and hr trip).

4. While holding the mode button on the gauge, rapidly switch from HIGH to LOW beam until the gauge displays PRESS/HOLD BUTTON FOR OIL INJECTION.



1. High beam
2. Low beam

5. Release all buttons.
6. Again, press and hold the mode button for 2 - 3 seconds.
7. When gauge displays OIL, release button and wait for the lubrication function to end.

Do not touch anything during engine lubrication cycle.

The engine lubrication function takes approximately 1 minute. During this time the engine RPM will increase slightly to approximately 1600 RPM and the oil pump will "oil flood" the engine.

At the end of engine lubrication procedure, the ECM will turn the engine off.

Remove tether cord cap from engine cut-off switch.

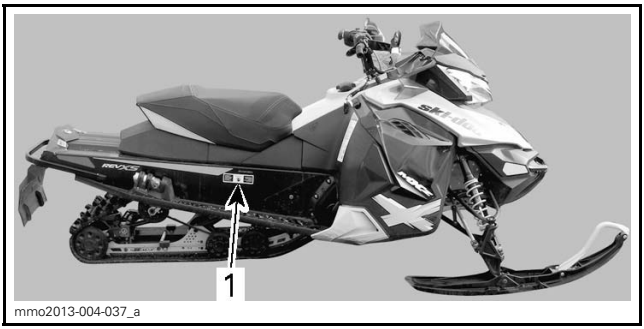
NOTICE **Do not start the engine during storage period.**

TECHNICAL INFORMATION

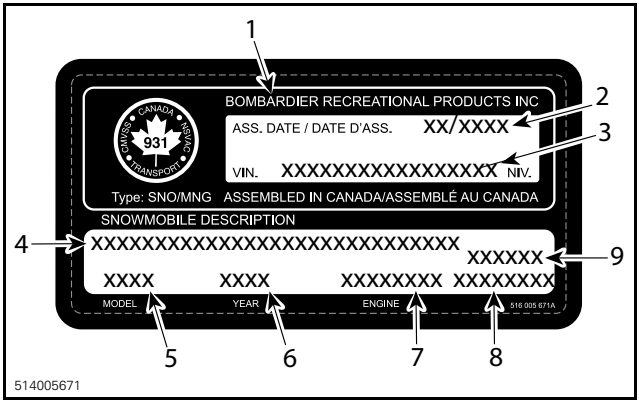
VEHICLE IDENTIFICATION

Vehicle Description Decal

Vehicle description decal is located on right hand side of tunnel.



TYPICAL
1. *Vehicle description decal*



VEHICLE DESCRIPTION DECAL
1. *Manufacturer name*
2. *Manufacturing date*
3. *Vehicle identification number (VIN)*
4. *Model and package name*
5. *Model number*
6. *Model year*
7. *Engine type*
8. *Vehicle weight (European models)*
9. *Vehicle engine power (European models)*

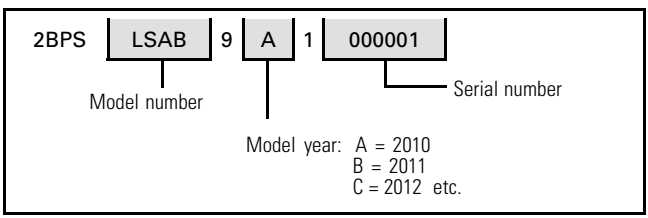
Identification Numbers

The main components of your snowmobile (engine and frame) are identified by different identification numbers. It may sometimes become necessary to locate these numbers for warranty purposes or to trace your snowmobile in the event of loss. These numbers are required by the authorized Ski-Doo dealer to complete warranty claims properly. We strongly recommend that you take note of all the identification numbers on your snowmobile and supply them to your insurance company.

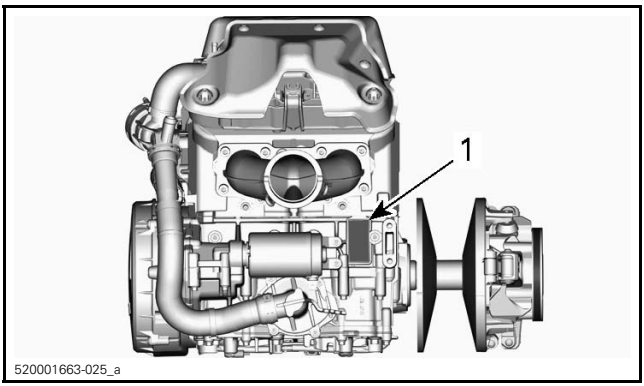
Vehicle Identification Number (VIN)

VIN is scribed on vehicle description decal. See above. It is also engraved on tunnel near vehicle description decal.

Model number and model year are part of the information found in the VIN. See illustration.



Engine Identification Number Location



1. Engine identification number

NOISE EMISSION AND VIBRATION VALUES (ALL COUNTRIES EXCEPT CANADA/UNITED STATES)

MODEL		850 E-TEC
NOISE EMISSION AND VIBRATION VALUES[1]		
Noise	Sound power level (L_{WA})	100 dB (Uncertainty (K_{wa}) 3 dB)
	Sound pressure (L_{pA})	86 dB (Uncertainty (K_{pA}) 3 dB)
Vibration	Hand-arm system	<2.5 m/s^2
	Whole body at seat	<0.5 m/s^2
[1]: Noise emission and Vibration values are measured in accordance with Standard EN 15997:2011 on a paved surface, at neutral or without belt.		

La déclaration de conformité CE n'apparaît pas dans cette version du guide du conducteur.

Veuillez vous reporter à la version imprimée qui accompagnait votre véhicule.

EPA CERTIFIED ENGINES

Engine Emissions Information

Manufacturer's Responsibility

Beginning with 2007 model year engines, snowmobile manufacturers of snowmobile engines need to determine the exhaust emission levels for each engine horsepower family and certify these engines with the United States of America Environmental Protection Agency (EPA). An emissions control information label, showing emission levels and engine specifications, must be placed on each vehicle at the time of manufacture.

Dealer's Responsibility

When performing service on a certified Ski-Doo snowmobiles that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the engine in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturer's prescribed changes, such as altitude adjustments for example.

Owner Responsibility

The owner/operator is required to have engine maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

EPA Emission Regulations

All Ski-Doo snowmobiles manufactured by BRP are certified to the EPA as conforming to the requirements of the regulations for the control of air pollution from new snowmobile engines. This certification is contingent on certain adjustments being set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, whenever practicable, returned to the original intent of the design.

The responsibilities listed above are general and in no way a complete listing of the rules and regulations pertaining to the EPA requirements on exhaust emissions for snowmobile products. For more detailed information on this subject, you may contact the following locations:

MAIL:

U.S. Environmental Protection Agency
Certification Division
Gasoline Engine Compliance Center
2000 Traverwood Drive
Ann Arbor MI 48105
USA

INTERNET WEB SITE:

www.epa.gov/otaq/

RADIO FREQUENCY DIGITALLY ENCODED SECURITY SYSTEM (RF D.E.S.S. KEY)

This device complies with FCC Part 15 and Industry Canada license exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC Registration Number: 12006A-M01456

FCC ID: 2ACERM01456

We, the party responsible for compliance, declare under our sole responsibility that the device is in conformity with the provisions of the following Council Directive: 2014/53/EU. To which this declaration relates is in conformity with the essential requirements and other relevant requirements. The product is in conformity with the following directives, harmonized standards and regulations:

Radio Equipment Directive (RED) 2014/53/EU and Harmonized Standards:

EN 300 330-2, EN 60950-1

SPECIFICATIONS

MODEL	850 E-TEC
ENGINE	
Engine type	Rotax, liquid cooled w/Reed valve, electronic RAVE
Cylinders	2
Displacement	849 cm³ (51.9 in³)
Bore	82 mm (3.2 in)
Stroke	80.4 mm (3.2 in)
Maximum horsepower RPM	7900 ± 100 RPM
Fuel injection system	E-TEC Direct injection with additional booster injectors
Exhaust system	Single tuned pipe, baffle muffler
Engine oil	XPS SYNTHETIC 2-STROKE OIL (P/N 293 600 132) [1] or equivalent
Engine oil tank capacity	3.4 L (3.6 qt (U.S. liq.))
Coolant	Ethyl glycol/water mix (50% coolant, 50% distilled water). Use LONG LIFE ANTIFREEZE (P/N 219 702 685) or (P/N 619 590 204) (Finland, Norway and Sweden) or coolant specifically designed for aluminum engines
Recommended fuel	Premium unleaded (fuel which may contain up to 10% MAX ethanol)
Minimum octane rating. Refer to *FUEL REQUIREMENTS*	91 Pump Posted AKI (RON+MON)/2
	95 RON
Fuel tank capacity	36 L (9.5 U.S. gal.)
DRIVE SYSTEM	
Drive pulley type	pDrive
Driven pulley type	QRS

MODEL		850 E-TEC
DRIVE SYSTEM (cont'd)		
Engagement	Sea level calibration	3600 ± 100 RPM
	High altitude calibration	3800 ± 100 RPM
Chaincase oil		XPS SYNTHETIC CHAINCASE OIL (P/N 413 803 300)
Small sprocket number of teeth	154 in track	19
	165 in track	21
Large sprocket number of teeth	154 in track	45
	165 in track	51
Drive sprocket number of teeth		6
Track nominal width		40.6 cm (16 in)
Track nominal length		392 cm (154 in) OR 419 cm (165 in)
Track profile height		63.5 mm (2.5 in) OR 76.2 mm (3 in)
Track tension	Deflection	3.2 cm (1.26 in)
	Force [2]	6 kgf to 8.5 kgf (13 lbf to 19 lbf)
Track alignment		Equal distance between edges of track guides and slider shoes
BRAKE SYSTEM		
Brake system type		Brembo racing brake with stainless-steel braided brake line
Brake fluid		DOT 4

MODEL		850 E-TEC
SUSPENSION		
Front suspension		RAS 3
Front shock	Summit SP	HPG
	Summit X	HPG Plus
Front suspension max. travel		214 mm (8.4 in)
Rear suspension		tMotion
Center shock	Summit SP	HPG
	Summit X	HPG Plus
Rear shock	Summit SP	HPG
	Summit X	HPG Plus
Rear suspension max. travel		24 cm (9.4 in)
ELECTRICAL SYSTEM		
Lighting system output		30 A @ 14.5 V Max output 1300 W
Headlights bulb HI/LOW beam		2 x 60/55 Watts (H-13)
Taillight bulb		2.6 W / 139m W LED
Spark plug	Type	NGK ILKR8Q7 [3] or equivalent
	Gap	0.7 mm ± 0.05 mm (.028 in ± .002 in) (not adjustable)
Fuse		Refer to *FUSES* in *MAINTENANCE*

MODEL		850 E-TEC
DIMENSIONS AND WEIGHT		
Vehicle overall length	154 in track	342.2 cm (134.7 in)
	165 in track	355.5 cm (140 in)
Vehicle overall width		105.7 cm (41.6 in)
Vehicle overall height		137.9 cm (54.3 in)
Dry weight	Summit SP 154 in track	200 kg (440 lb)
	Summit SP 165 in track	203 kg (447 lb)
	Summit X 154 in track	197 kg (434 lb)
	Summit X 165 in track	200 kg (440 lb)
Ski stance		89.5 cm (35.2 in)
Ski overall length		104 cm (41 in)
Ski width		165 mm (6.5 in)

(1) Refer to *INJECTION OIL* subsection for detailed information.

(2) Measure gap between slider shoe and bottom inside track when exerting a downward pull to the track.

(3) **NOTIC** Do not attempt to adjust gap on this spark plug.

This page is intentionally blank

TROUBLE-SHOOTING

TROUBLESHOOTING GUIDELINES

ELECTRIC STARTER DOES NOT WORK

1. **Emergency engine stop switch in OFF position or tether cord cap not installed on engine cut-off switch.**
   – *Place the emergency engine stop switch in the ON position and install tether cord cap (on engine cut-off switch.*
2. **Throttle applied while attempting an engine start.**
   – *Release throttle while cranking.*

ENGINE IS CRANKED BUT FAILS TO START

1. **No fuel to the engine.**
   – *Check fuel tank level, add fuel if necessary.*
2. **System voltage too low.**
   – *Contact an authorized Ski-Doo dealer.*

ENGINE RPM DOES NOT REACH CLUTCH ENGAGEMENT POINT

1. **D.E.S.S. did not read D.E.S.S. key code in the tether cord cap. D.E.S.S. pilot lamp blinks (slow short beeps/repetitive).**
   – *Properly install tether cord cap.*
2. **D.E.S.S. has read a different code than the one programmed. D.E.S.S. pilot lamp blinks rapidly (fast short beeps/repetitive).**
   – *Install a tether cord cap for which this snowmobile was programmed.*
3. **ECM does not recognize the D.E.S.S. key.**
   – *Refer to an authorized Ski-Doo dealer.*

ENGINE LACKS ACCELERATION OR POWER

1. **Engine warm-up in progress.**
   – *Drive vehicle at low speeds for a few minutes.*
2. **Engine break-in period not completed.**
   – *Complete break-in period.*
3. **Drive and driven pulleys require servicing.**
   – *Contact an authorized SKI-DOO dealer.*

ENGINE LACKS ACCELERATION OR POWER (cont'd)

4. **Engine overheats.**
   - *Check coolant level, see MAINTENANCE PROCEDURES.*
   - *Check heat exchangers cleanliness. Clean if necessary.*
5. **Drive belt worn too thin.**
   - *If the drive belt has lost more than 3 mm (1/8 in) of its original width, it will affect vehicle performance.*
   - *Replace drive belt.*
6. **Incorrect track adjustment.**
   - *See MAINTENANCE and/or an authorized SKI-DOO dealer for proper alignment and tension adjustments.*
7. **R.A.V.E. valves problem.**
   - *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*
8. **Fuel pressure too low.**
   - *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

ENGINE BACKFIRES

1. **Engine is running too hot.**
   - *See item 4 of ENGINE LACKS POWER.*
2. **Ignition timing is incorrect or there is an ignition system failure.**
   - *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

ENGINE BACKFIRES (cont'd)

3. Exhaust system leak.

– *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

4. Fuel pressure too low.

– *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

ENGINE MISFIRES

1. Water in fuel.

– *Drain fuel system and refill with fresh fuel.*

2. RAVE valves malfunction.

– *Have RAVE valves system inspected. Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

HEATED GRIPS/THUMB WARMERS ARE NOT WORKING

1. Engine RPM is too low.

– *Make sure engine RPM is above 2000.*

ENGINE HAS SHUT DOWN

1. The engine shuts down after long periods of idling.

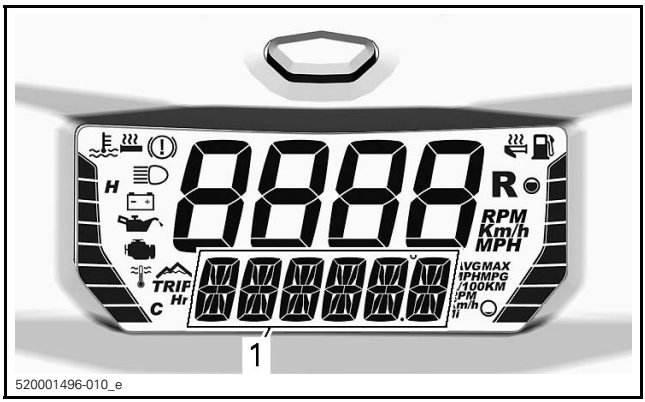
– *Do not let engine idle too long. Refer to VEHICLE WARM-UP in OPERATING INSTRUCTION.*

MONITORING SYSTEM

Icons, Messages and Beeper Codes

The gauge icons inform you of an anomaly or a particular condition.

Icons can come on or blink alone or in combination with others.



1. Lower display

In addition to the icons, messages are displayed along with a beep code.

See table below for details.

ICON ON	BEEPER	MESSAGE	DESCRIPTION
	4 short beeps every 30 seconds	ENGINE OVERHEAT	Engine is overheating, reduce snowmobile speed and run in loose snow or stop engine immediately and let engine cool down. Check coolant level, refer to *MAINTENANCE*. If coolant level is correct and overheating persists, contact an authorized Ski-Doo dealer. Do not run the engine if condition persists.
		MUFFLER	Reduce speed or stop engine. Let engine cool down and restart. If overheating persists, contact an authorized Ski-Doo dealer. Do not run the engine if condition persists.
		ECM	
	Short beeps repeating rapidly	OVERHEAT In combination with "ENGINE OVERHEAT" above	Critical overheat. Stop engine immediately and let engine cool down. Check coolant level, refer to *MAINTENANCE*. If coolant level is correct and overheating persists, contact an authorized Ski-Doo dealer. Do not run the engine if condition persists.
		OVERHEAT In combination with "MUFFLER" OR "ECM"	Critical overheat. Stop engine immediately and let engine cool down. If overheating persists, contact an authorized Ski-Doo dealer. Do not run the engine if condition persists.

ICON ON	BEEPER	MESSAGE	DESCRIPTION
	4 short beeps every 5 minutes	LOW BAT HIGH BAT	Indicate a low or high battery voltage condition. See an authorized Ski-Doo dealer as soon as possible.
	4 short beeps	CHECK ENGINE	Engine fault, see an authorized Ski-Doo dealer, repair shop or person of your own choosing as soon as possible.
 (blinking)	4 short beeps		Displayed when brake is applied for more than 15 seconds while throttle lever is squeezed and vehicle is moving at more than 5 km/h (3 MPH).
—	4 short beeps every 8 seconds	KNOCK	Engine detonation (RPM is limited when this condition occurs). – Ensure recommended fuel is used. – Check fuel quality, replace if necessary. – If fault still occurs, contact an authorized Ski-Doo dealer, repair shop, or person of your own choosing.
—	4 short beeps every 5 minutes	REV LIMIT	Engine RPM limited for protection when certain faults occur.
—	—	OVER REV	Indicates that maximum engine RPM is reached. Check clutch calibration.

ICON ON	BEEPER	MESSAGE	DESCRIPTION
—	Short beeps repeating rapidly	SHUT DOWN	Shutdown procedure in force due to engine overheating or fuel pump problem.
—	—	COMMUNI-CATION	Communication problem between ECM and gauge. Stop engine, remove tether cord cap. Wait a few minutes, then start engine. If problem persists, contact an authorized Ski-Doo dealer.
—	Short beeps, repeating slowly	CHECK KEY	Unable to read key (bad connection). Make sure the key is clean and correctly snapped on post.
	Short beeps repeating rapidly	BAD KEY	Invalid key or key not programmed. Use the proper key for the vehicle or have the programmed.
   (All blinking)	—	—	Fuel level sensor problem.

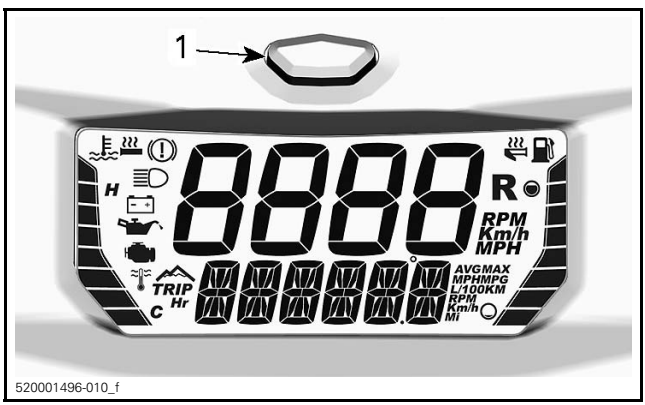
Fault Codes

If the check engine icon is ON, it is possible to read fault code(s) on the gauge.

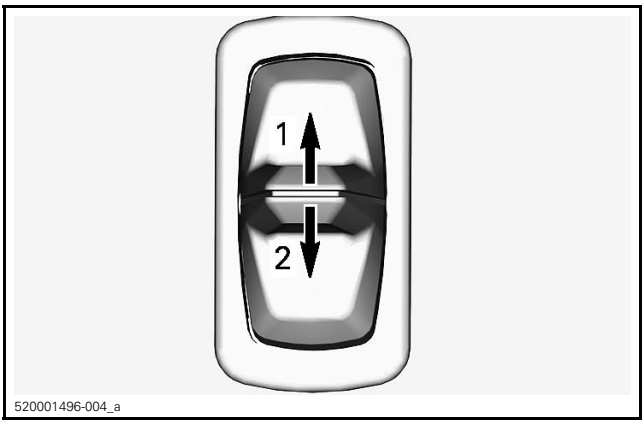
To read active fault code(s), select the vehicle speed and engine RPM display combination, see *MULTIFUNCTION DIGITAL GAUGE*.

NOTE: Make sure to select actual vehicle speed and actual engine RPM (not "top" or "average" values.

Press and hold the gauge mode button and simultaneously switch from HIGH to LOW beam repeatedly several times until a code is displayed.



1. Gauge mode button



1. High beam
2. Low beam

If two or more codes are registered, use the gauge mode button to scroll.

To exit the fault codes mode, press and hold the gauge mode button.

Contact an authorized Ski-Doo dealer for code signification.

WARRANTY

BRP LIMITED WARRANTY USA AND CANADA: 2017 SKI-DOO® SNOWMOBILES

1) SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products Inc. ("BRP")* warrants its 2017 Ski-Doo snowmobiles sold by authorized BRP dealers (as defined below) in the United States of America ("USA") and in Canada from defects in material or workmanship for the period and under the conditions described below. This limited warranty will become null and void if: (1) the snowmobile was used for racing or any other competitive activity, at any point, even by a previous owner; or (2) the snowmobile has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or has been altered or modified to change its intended use.

Non-factory installed parts and accessories are not covered under this limited warranty. Please refer to the applicable parts and accessories limited warranty text.

2) LIMITATIONS OF LIABILITY

THIS WARRANTY IS EXPRESSLY GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME STATES/PROVINCES DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM STATE TO STATE, OR PROVINCE TO PROVINCE.

Neither the distributor, any BRP dealer nor any other person has been authorized to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against BRP. BRP reserves the right to modify this limited warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the products sold while this warranty is in effect.

3) EXCLUSIONS – ARE NOT WARRANTED

The following are not warranted under any circumstances:

- Normal wear and tear;
- Routine maintenance items, tune ups, adjustments;
- Damage caused by failure to provide proper maintenance and/or storage, as described in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, modifications or use of parts or accessories not manufactured or approved by BRP or resulting from repairs done by a person that is not an authorized servicing BRP dealer;
- Damage caused by abuse, abnormal use, neglect, use of the product on surfaces other than snow, or operation of the product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from accident, submersion, fire, theft, vandalism or any act of God;
- Operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operator's Guide);
- Snow or water ingestion;
- Incidental or consequential damages, or damages of any kind including without limitation towing, storage, telephone, rental, taxi, inconvenience, insurance coverage, loan payments, loss of time, loss of income; and
- Damage resulting from studs installed on tracks if the installation does not conform to BRP's instructions.

4) WARRANTY COVERAGE PERIOD

This limited warranty will be in effect from the date of delivery to the first retail consumer or the date the product is first put into use, whichever occurs first and for the following period:

TWELVE (12) CONSECUTIVE MONTHS, for private or commercial use owners. However, the warranty coverage period on a snowmobile delivered between June 1st and December 1st of a given year will expire November 30th of the following year.

For emission-related components; please also refer to the *US EPA EMISSION-RELATED WARRANTY* contained herein.

The repair or replacement of parts or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

5) CONDITIONS REQUIRED FOR WARRANTY COVERAGE

This warranty coverage is available **only** if each of the following conditions has been fulfilled:

- The 2017 Ski-Doo snowmobile must be purchased as new and unused by its first owner from a BRP dealer authorized to distribute Ski-Doo snowmobiles in the country in which the sale occurred ("**BRP dealer**");
- The BRP specified pre-delivery inspection process must be completed and documented and signed by the purchaser;
- The 2017 Ski-Doo snowmobile must have undergone proper registration by an authorized BRP dealer;
- The 2017 Ski-Doo snowmobile must be purchased in the country in which the purchaser resides; and
- Routine maintenance outlined in the Operator's Guide must be timely performed in order to maintain warranty coverage. BRP reserves the right to make warranty coverage contingent upon proof of proper maintenance.

BRP will not honor this limited warranty to any private use owner or commercial use owner if one of the preceding conditions has not been met. Such limitations are necessary in order to allow BRP to preserve both the safety of its products, and also that of its consumers and the general public.

6) WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The customer must cease using the snowmobile upon the appearance of an anomaly. The customer must notify a servicing BRP dealer within three (3) days of the appearance of a defect, and provide it with reasonable access to the product and reasonable opportunity to repair it. The customer must also present to the authorized BRP dealer, proof of purchase of the product and must sign the repair/work order prior to starting the repair in order to validate the warranty repair. All parts replaced under this limited warranty become the property of BRP.

7) WHAT BRP WILL DO

BRP's obligations under this warranty are limited to, at its sole discretion, repairing parts found defective under normal use, maintenance and service, or replacing such parts with new genuine Ski-Doo parts without charge for parts and labor , at any authorized BRP dealer during the warranty coverage period under the conditions described herein. No claim of breach of warranty shall be cause for cancellation or rescission of the sale of the snowmobile to the owner.

In the event that service is required outside of the country of original sale, the owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve or modify products from time to time without assuming any obligation to modify products previously manufactured.

8) TRANSFER

If the ownership of a product is transferred during the warranty coverage period, this limited warranty, subject to its terms and conditions, shall also be transferred and be valid for the remaining coverage period provided BRP or an authorized Ski-Doo Distributor/Dealer receives a proof that the former owner agreed to the transfer of ownership, in addition to the co-ordinates of the new owner.

9) CONSUMER ASSISTANCE

If the matter still remains unresolved, contact BRP by filling out the customer contact form at www.brp.com or contact BRP by mail at one of the addresses listed under the *CONTACT US* section of this guide.

* In the USA, products are distributed and serviced by BRP US Inc.

US EPA EMISSION-RELATED WARRANTY

Bombardier Recreational Products Inc. ("BRP")* warrants to the ultimate purchaser and each subsequent purchaser that this new engine, including all parts of its exhaust emission-control system and its evaporative emission-control system, meets two conditions:

1. It is designed, built, and equipped so it conforms at the time of sale to the ultimate purchaser with the requirements of 40 CFR 1051 and 40 CFR 1060.
2. It is free from defects in materials and workmanship that may keep it from meeting the requirements of 40 CFR 1051 and 40 CFR 1060.

Where a warrantable condition exists, BRP will repair or replace, as it elects, any part or component with a defect in materials or workmanship that would increase the engine's emissions of any regulated pollutant within the stated warranty period at no cost to the owner, including expenses related to diagnosing and repairing or replacing emission-related parts. All defective parts replaced under this warranty become the property of BRP.

For all emission-related warranty claims, BRP is limiting the diagnosis and repair of emission-related parts to the authorized Ski-Doo dealers, unless for emergency repairs as required by item 2 of the following list.

As a certifying manufacturer, BRP will not deny emission-related warranty claims based on any of the following:

1. Maintenance or other service BRP or BRP's authorized facilities performed.
2. Engine/equipment repair work that an operator performed to correct an unsafe, emergency condition attributable to BRP as long as the operator tries to restore the engine/equipment to its proper configuration as soon as possible.
3. Any action or inaction by the operator unrelated to the warranty claim.
4. Maintenance that was performed more frequently than BRP specify.
5. Anything that is BRP fault or responsibility.
6. The use of any fuel that is commonly available where the equipment operates unless BRP written maintenance instructions state that this fuel would harm the equipment's emission control system and operators can readily find the proper fuel. See maintenance information section and fuel requirements of fueling section.

Emission-Related Warranty Period

The emission-related warranty is valid for the following period whichever comes first:

	HOURS	MONTHS	KILOMETERS
Exhaust emission-related components	200	30	4000
Evaporative emission-related components	N/A	24	N/A

Components Covered

The emission-related warranty covers all components whose failure would increase an engine's emissions of any regulated pollutant, including the following listed components:

1. For exhaust emissions, emission-related components include any engine parts related to the following systems:
   - Air-induction system
   - Fuel system
   - Ignition system
   - Exhaust gas recirculation systems
2. The following parts are also considered emission-related components for exhaust emissions:
   - Aftertreatment devices
   - Crankcase ventilation valves
   - Sensors
   - Electronic control units
3. The following parts are considered emission-related components for evaporative emissions:
   - Fuel tank
   - Fuel cap
   - Fuel line
   - Fuel line fittings
   - Clamps*
   - Pressure relief valves*
   - Control valves*

- Control solenoids*
- Electronic controls*
- Vacuum control diaphragms*
- Control cables*
- Control linkages*
- Purge valves
- Vapor hoses
- Liquid/vapor separator
- Carbon canister
- Canister mounting brackets
- Carburetor purge port connector

4. Emission-related components also include any other part whose only purpose is to reduce emissions or whose failure will increase emissions without significantly degrading engine/equipment performance.

Limited Applicability

As a certifying manufacturer, BRP may deny emission-related warranty claims for failures that have been caused by the owner's or operator's improper maintenance or use, by accidents for which the manufacturer has no responsibility, or by acts of God. For example, an emission-related warranty claim need not be honored for failures that have been directly caused by the operator's abuse of the engine/equipment or the operator's use of the engine/equipment in a manner for which it was not designed and are not attributable to the manufacturer in any way.

*As related to the evaporative emission control system
* In the USA, products are distributed and serviced by BRP US Inc.

BRP INTERNATIONAL LIMITED WARRANTY: 2017 SKI-DOO® SNOWMOBILES

1) SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products Inc. ("BRP")* warrants its 2017 Ski-Doo snowmobiles sold by distributors or dealers authorized by BRP to distribute SKI-Doo snowmobiles ("Ski-Doo Distributor/Dealer") outside of the fifty United States, Canada, members of the European Economic Area (which is comprised of the member states of the European Union plus Norway, Iceland and Liechtenstein) ("EEA"), members states of the Commonwealth of the Independent States (including Ukraine and Turkmenistan) (''CIS'') and Turkey, from defects in material or workmanship for the period and under the conditions described below.

Non-factory installed parts and accessories are not covered under this limited warranty. Please refer to the applicable parts and accessories limited warranty text.

This limited warranty will become null and void if: (1) the snowmobile was used for racing or any other competitive activity, at any point, even by a previous owner; or (2) the snowmobile has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or has been altered or modified to change its intended use.

2) LIMITATIONS OF LIABILITY

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY IS EXPRESSLY GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME JURISDICTIONS DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM COUNTRY TO COUNTRY. (FOR PRODUCTS PURCHASED IN AUSTRALIA SEE CLAUSE 4 BELOW).

Neither the Ski-Doo Distributor/Dealer nor any other person has been authorized to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against BRP.

BRP reserves the right to modify this warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the products sold while this warranty is in effect.

3) EXCLUSIONS – ARE NOT WARRANTED

The following are not warranted under this limited warranty under any circumstances:

- Normal wear and tear;
- Routine maintenance items, tune ups, adjustments;
- Damage caused by negligence or failure to provide proper maintenance and/or storage, as described in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, modifications or use of parts or accessories not manufactured or approved by BRP which in its reasonable judgement are either incompatible with the product or adversely affect its operation, performance and durability, or resulting from repairs done by a person that is not an authorized servicing Ski-Doo Distributor/Dealer;
- Damage caused by abuse, abnormal use, neglect, racing or operation of the product on surfaces other than snow, or operation of the product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from accident, submersion, fire, snow or water ingestion, theft, vandalism or any act of God;
- Operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operator's Guide);
- Damage resulting from rust, corrosion or exposure to the elements;
- Incidental or consequential damages, or damages of any kind including without limitation towing, storage, transportation expenses, telephone, rental, taxi, inconvenience, insurance coverage, loan payments, loss of time, loss of income; or time missed for downtime experience due to service work.
- And damage resulting from studs installed on tracks if the installation does not conform to BRP's instructions.

4) WARRANTY COVERAGE PERIOD

This warranty will be in effect from (1) the date of delivery to the first retail consumer or (2) the date the product is first put into use, whichever occurs first and for a period of:

TWELVE (12) CONSECUTIVE MONTHS, for private or commercial use owners. However, the warranty coverage period on a snowmobile delivered between June 1st and December 1st of a given year will expire November 30th of the following year.

The repair or replacement of parts or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

Note that the duration and any other modalities of the warranty coverage are subject to the applicable national or local legislation in the customer's country.

FOR PRODUCTS SOLD IN AUSTRALIA ONLY

Nothing in these Warranty terms and conditions should be taken to exclude, restrict or modify the application of any condition, warranty, guarantee, right or remedy conferred or implied under the Competition and Consumer Act 2010 (Cth), including the Australian Consumer Law or any other law, where to do so would contravene that law, or cause any part of these terms and conditions to be void. The benefits given to you under this limited warranty are in addition to other rights and remedies that you have under Australian law.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

5) CONDITIONS TO HAVE WARRANTY COVERAGE

This warranty coverage is available **only** if each of the following conditions has been fulfilled:

– The 2017 Ski-Doo snowmobile must be purchased as new and unused by its first owner from a Ski-Doo Distributor/Dealer authorized to distribute Ski-Doo snowmobiles in the country in which the sale occurred;

– The BRP specified pre-delivery inspection process must be completed and documented;
– The product must have undergone proper registration by an authorized Ski-Doo Distributor/Dealer;
– The 2017 Ski-Doo snowmobile must be purchased in the country or union of countries in which the purchaser resides.
– Routine maintenance outlined in the Operator's Guide must be timely performed in order to maintain warranty coverage. BRP reserves the right to make warranty coverage contingent upon proof of proper maintenance.

BRP will not honour this limited warranty to any private use owner or commercial use owner if one of the preceding conditions has not been met. Such limitations are necessary in order to allow BRP to preserve both the safety of its products, and also that of its consumers and the general public.

6) WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The customer must cease using the snowmobile upon the appearance of an anomaly. The customer must notify a servicing Ski-Doo Distributor/Dealer within two (2) days of the appearance of a defect, and provide it with reasonable access to the product and reasonable opportunity to repair it. The customer must also present to the authorized Ski-Doo Distributor/Dealer, proof of purchase of the product and must sign the repair/work order prior to starting the repair in order to validate the warranty repair. All parts replaced under this limited warranty become the property of BRP.

Note that the notification period is subject to the applicable national or local legislation in customer's country.

7) WHAT BRP WILL DO

To the extent permitted by law, BRP's obligations under this warranty are limited to, at its sole discretion, repairing parts found defective under normal use, maintenance and service, or replacing such parts with new genuine Ski-Doo parts without charge for parts and labour, at any authorized Ski-Doo Distributor/Dealer during the warranty coverage period under the conditions described herein. BRP's responsibility is limited to making the required repairs or replacements of parts. No claim of breach of warranty shall be cause

for cancellation or rescission of the sale of the snowmobile to the owner. You may have other legal rights which may vary from country to country.

In the event that service is required outside of the country of original sale, the owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve or modify products from time to time without assuming any obligation to modify products previously manufactured.

8) TRANSFER

If the ownership of a product is transferred during the warranty coverage period, this limited warranty, subject to its terms and conditions, shall also be transferred and be valid for the remaining coverage period provided BRP or an authorized Ski-Doo Distributor/Dealer receives a proof that the former owner agreed to the transfer of ownership, in addition to the co-ordinates of the new owner.

9) CONSUMER ASSISTANCE

In the event of a controversy or a dispute in connection with this limited warranty, BRP suggests that you try to resolve the issue at the Ski-Doo Distributor/Dealer level. We recommend discussing the issue with the authorized Ski-Doo Distributor/Dealer's service manager or owner.

If the matter still remains unresolved, contact BRP by filling out the customer contact form at www.brp.com or contact BRP by mail at one of the addresses listed under the *CONTACT US* section of this guide.

* For the territory covered by this limited warranty, products are distributed and serviced by Bombardier Recreational Products Inc. or its affiliates.

BRP LIMITED WARRANTY FOR THE EUROPEAN AND THE COMMONWEALTH OF THE INDEPENDENT STATES (CIS) AREAS AND TURKEY: 2017 SKI-DOO® SNOWMOBILES

1) SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products Inc. ("**BRP**")* warrants its 2017 Ski-Doo snowmobiles sold by distributors or dealers authorized by BRP to distribute Ski-Doo snowmobiles ("Ski-Doo Distributor/Dealer") in member states of the European Economic Area (which is comprised of the member states of the European Union plus Norway, Iceland and Liechtenstein) ("EEA"), in member states of the Commonwealth of the Independent States (including Ukraine and Turkmenistan) (''CIS'') and Turkey from defects in material or workmanship for the period and under the conditions described below.

Non-factory installed parts and accessories are not covered under this limited warranty. Please refer to the applicable parts and accessories limited warranty text.

This limited warranty will become null and void if: (1) the snowmobile was used for racing or any other competitive activity, at any point, even by a previous owner; or (2) the snowmobile has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or has been altered or modified to change its intended use.

2) LIMITATIONS OF LIABILITY

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY IS EXPRESSLY GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTIES. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME JURISDICTIONS DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS

WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM COUNTRY TO COUNTRY.

Neither the Ski-Doo Distributor/Dealer nor any other person has been authorized to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against BRP.

BRP reserves the right to modify this warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the products sold while this warranty is in effect.

3) EXCLUSIONS – ARE NOT WARRANTED

The following are not warranted under this limited warranty under any circumstances:

- Normal wear and tear;
- Routine maintenance items, tune ups, adjustments;
- Damage caused by negligence or failure to provide proper maintenance and/or storage, as described in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, modifications or use of parts or accessories not manufactured or approved by BRP which in its reasonable judgement are either incompatible with the product or adversely affect its operation, performance and durability, or resulting from repairs done by a person that is not an authorized servicing Ski-Doo Distributor/Dealer;
- Damage caused by abuse, abnormal use, neglect, racing or operation of the product on surfaces other than snow, or operation of the product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from accident, submersion, fire, snow or water ingestion, theft, vandalism or any act of God;
- Operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operator's Guide);
- Damage resulting from rust, corrosion or exposure to the elements;

– Incidental or consequential damages, or damages of any kind including without limitation towing, transportation expenses, storage, telephone, rental, taxi, inconvenience, insurance coverage, loan payments, loss of time, loss of income or time missed for downtime experience due to service work;
– and damage resulting from studs installed on tracks if the installation does not conform to BRP's instructions.

4) WARRANTY COVERAGE PERIOD

This warranty will be in effect from (1) the date of delivery to the first retail consumer or (2) the date the product is first put into use, whichever occurs first and for a period of:

TWENTY-FOUR (24) CONSECUTIVE MONTHS, for private use owners and TWELVE (12) CONSECUTIVE MONTHS for commercial use owners. However, the warranty coverage period on a snowmobile delivered between June 1st and December 1st of a given year will expire November 30th of the applicable year. A snowmobile is used commercially when it is used in connection with generating income or any work or employment during any part of the warranty period. A snowmobile is also used commercially when, at any point during the warranty period, it has commercial tags or is licensed for commercial use.

The repair or replacement of parts or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

Note that the duration and any other modalities of the warranty coverage are subject to the applicable national or local legislation in the customer's country.

5) CONDITIONS TO HAVE WARRANTY COVERAGE

This warranty coverage is available **only** if each of the following conditions has been fulfilled:

– The 2017 Ski-Doo snowmobile must be purchased as new and unused by its first owner from a Ski-Doo Distributor/Dealer authorized to distribute Ski-Doo products in the country in which the sale occurred;
– The BRP specified pre-delivery inspection process must be completed and documented;

– The product must have undergone proper registration by an authorized Ski-Doo Distributor/Dealer;
– The 2017 Ski-Doo snowmobile must be purchased within the EEA by an EEA resident, in the CIS for residents of the countries comprised in such area and in Turkey for residents of Turkey; and
– Routine maintenance outlined in the Operator's Guide must be timely performed in order to maintain warranty coverage. BRP reserves the right to make warranty coverage contingent upon proof of proper maintenance.

BRP will not honour this limited warranty to any private use owner or commercial use owner if one of the preceding conditions has not been met. Such limitations are necessary in order to allow BRP to preserve both the safety of its products, and also that of its consumers and the general public.

6) WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The customer must cease using the snowmobile upon the appearance of an anomaly. The customer must notify a servicing Ski-Doo Distributor/Dealer within two (2) months of the appearance of a defect, and provide it with reasonable access to the product and reasonable opportunity to repair it. The customer must also present to the authorized Ski-Doo Distributor/Dealer, proof of purchase of the product and must sign the repair/work order prior to starting the repair in order to validate the warranty repair. All parts replaced under this limited warranty become the property of BRP.

Note that the notification period is subject to the applicable national or local legislation in customer's country.

7) WHAT BRP WILL DO

To the extent permitted by law, BRP's obligations under this warranty are limited to, at its sole discretion, repairing parts found defective under normal use, maintenance and service, or replacing such parts with new genuine Ski-Doo parts without charge for parts and labour, at any authorized Ski-Doo Distributor/Dealer during the warranty coverage period under the conditions described herein. BRP's responsibility is limited to making the required repairs or replacements of parts. No claim of breach of warranty shall be cause for cancellation or rescission of the sale of the snowmobile to the owner. You may have other legal rights which may vary from country to country.

In the event that service is required outside of the EEA, CIS or Turkey, the owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve or modify products from time to time without assuming any obligation to modify products previously manufactured.

8) TRANSFER

If the ownership of a product is transferred during the warranty coverage period, this limited warranty, subject to its terms and conditions, shall also be transferred and be valid for the remaining coverage period provided BRP or an authorized Ski-Doo Distributor/Dealer receives a proof that the former owner agreed to the transfer of ownership, in addition to the co-ordinates of the new owner.

9) CONSUMER ASSISTANCE

In the event of a controversy or a dispute in connection with this limited warranty, BRP suggests that you try to resolve the issue at the Ski-Doo Distributor/Dealer level. We recommend discussing the issue with the authorized Ski-Doo Distributor/Dealer's service manager or owner.

If the matter still remains unresolved, contact BRP by filling out the customer contact form at www.brp.com or contact BRP by mail at one of the addresses listed under the *CONTACT US* section of this guide.

* In the EEA, products are distributed and serviced by BRP European Distribution S.A. and other affiliates or subsidiaries of BRP.

ADDITIONAL TERMS AND CONDITIONS FOR FRANCE ONLY

The following terms and conditions are applicable to products sold in France only:

The seller shall deliver goods that are complying with the contract and shall be responsible for defects existing upon delivery. The seller shall also be responsible for defects resulting from packaging, assembling instructions or the installation when it is its responsibility per the contract or if accomplished under its responsibility. To be compliant with the contract, the good shall:

1. Be fit for normal use for goods similar thereto and, if applicable:
   - Correspond to the description provided by the seller and have the qualities presented to the buyer though sample or model;
   - Have the qualities that a buyer may legitimately expect considering the public declarations of the seller, the manufacturer of its representative, including in advertising or labeling; or
2. Have the characteristics mutually agreed upon as between the parties or be fit for the specific use intended by the buyer and brought to the attention of the seller and which accepted

The action for failure to comply is prescribed after two years after delivery of the goods. The seller is responsible for the warranty for hidden defects of the good sold if such hidden defects are rendering the good unfit for the intended use, or if they diminish its use in such a way that the buyer would not have acquired the good or would have given a lesser price, had he known. The action for such hidden defects shall be taken by the buyer within 2 years of the discovery of the defect.

This page is intentionally blank

CUSTOMER INFORMATION

520 001 496
GUIDE DU CONDUCTEUR, REV G4 Mountain Series / FRANÇAIS
OPERATOR'S GUIDE, REV G4 Mountain Series / FRENCH

FAIT AU / MADE IN CANADA U/M:P.C.

ski-doo®

BRP

2017

OPERATOR'S GUIDE

Includes Safety, Vehicle and Maintenance Information

REV™ G4™

Trail / Crossover Series

⚠ WARNING

Read this guide thoroughly.
It contains important safety information.
Minimum recommended operator's age: 16 years old.
Keep this Operator's Guide in the vehicle.

5 2 0 0 0 1 6 6 3

Original Instructions

FOREWORD

Deutsch	Dieses Handbuch ist möglicherweise in Ihrer Landessprache verfügbar. Bitte wenden Sie sich an Ihren Händler oder besuchen Sie: **www.operatorsguides.brp.com**
English	This guide may be available in your language. Check with your dealer or go to: **www.operatorsguides.brp.com**
Español	Es posible que este manual esté disponible en su idioma. Consulte a su distribuidor o visite: **www.operatorsguides.brp.com**
Français	Ce guide peut être disponible dans votre langue. Vérifier avec votre concessionnaire ou aller à: **www.operatorsguides.brp.com**
日本語	このガイドは、言語によって翻訳版が用意されています。. ディーラーに問い合わせるか、次のアドレスでご確認ください： **www.operatorsguides.brp.com**
Nederlands	Deze handleiding kan beschikbaar zijn in uw taal. Vraag het aan uw dealer of ga naar: **www.operatorsguides.brp.com**
Norsk	Denne boken kan finnes tilgjengelig på ditt eget språk. Kontakt din forhandler eller gå til: **www.operatorsguides.brp.com**
Português	Este manual pode estar disponível em seu idioma. Fale com sua concessionária ou visite o site: **www.operatorsguides.brp.com**
Suomi	Käyttöohjekirja voi olla saatavissa omalla kielelläsi. Tarkista jälleenmyyjältä tai käy osoitteessa: **www.operatorsguides.brp.com**
Svenska	Denna bok kan finnas tillgänglig på ditt språk. Kontakta din återförsäljare eller gå till: **www.operatorsguides.brp.com**

Congratulations on your purchase of a new Ski-Doo® snowmobile. Whatever model you have chosen, it is backed by the Bombardier Recreational Products Inc. (BRP) warranty and a network of authorized Ski-Doo snowmobile dealers ready to provide the parts, service or accessories you may require.

Your dealer is committed to your satisfaction. He has taken training to perform the initial set-up and inspection of your snowmobile as well as completed the final adjustment required to suit your specific weight and riding environment before you took possession.

At delivery, you were informed of the warranty coverage and signed the *PREDELIVERY CHECK LIST* to ensure your new vehicle was prepared to your entire satisfaction.

Know Before you Go

To learn how to reduce the risk for you, your passenger or bystanders being injured or killed, read the following sections before you operate the vehicle:

– *SAFETY INFORMATION*
– *VEHICLE INFORMATION*.

Also read all safety labels on your snowmobile and watch attentively your *SAFETY VIDEO*.

We highly recommend that you take a safety riding course. Please check with your dealer or local authorities for availability in your area.

Failure to follow the warnings contained in this Operator's Guide can result in SERIOUS INJURY or DEATH.

Safety Messages

The types of safety messages, what they look like and how they are used in this guide are explained as follows:

The safety alert symbol ⚠ indicates a potential injury hazard.

⚠ WARNING

Indicates a potential hazard, if not avoided, could result in serious injury or death.

⚠ CAUTION Indicates a hazard situation which, if not avoided, could result in minor or moderate injury.

NOTICE Indicates an instruction which, if not followed, could severely damage vehicle components or other property.

About this Operator's Guide

This Operator's Guide has been prepared to acquaint the owner/operator and passenger with this snowmobile and its various controls, safe riding and maintenance instructions.

The following terminology in regards to operator, passenger and vehicle configuration is used as follows throughout this guide:

- Operator: refers to the person being behind the controls and driving the snowmobile.
- Passenger: refers to a person sitting behind the operator.
- 1-UP: refers to a model designed for an operator only.
- 2-UP: refers to a model designed to accommodate one passenger.

Keep this Operator's Guide in the vehicle as you can refer to it for things such as maintenance, troubleshooting and instructing others.

Note that this guide is available in several languages. In the event of any discrepancy, the English version shall prevail.

If you want to view and/or print an extra copy of your Operator's Guide, simply visit the following website **www.operatorsguides.brp.com**.

The informations contained in this document are correct at the time of publication. BRP, however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured. Due to late changes, some differences between the manufactured product and the descriptions and/or specifications in this guide may occur. BRP reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring any obligation upon itself.

This Operator's Guide and the *SAFETY DVD* should remain with the vehicle when it's sold.

TABLE OF CONTENTS

FOREWORD **1**
Know Before you Go 1
Safety Messages 2
About this Operator's Guide 2

SAFETY INFORMATION

GENERAL PRECAUTIONS **10**
Avoid Carbon Monoxide Poisoning 10
Avoid Gasoline Fires and Other Hazards 10
Avoid Burns from Hot Parts 11
Accessories and Modifications 11

SPECIAL SAFETY MESSAGES **12**

RIDING THE VEHICLE **17**
Pre-Ride Inspection 17
How to Ride 20
Carrying a Passenger 23
Terrain/Riding Variations 25
Environment 32

TRACTION ENHANCING PRODUCTS **35**
Manoeuvrability 35
Acceleration 38
Braking 38
Important Safety Rules 38
Effects of Having a Studded Track on the Life of the Snowmobile 39
Installation of Studs on BRP Approved Tracks 39
Maintenance/Replacement 42

IMPORTANT ON-PRODUCT LABELS **43**
Hang Tag(s) 43
Vehicle Safety Labels 44
Compliance Labels 52
Technical Information Labels 54

VEHICLE INFORMATION

CONTROLS, INSTRUMENTS AND EQUIPMENT **58**
1) Handlebar 59
2) Throttle Lever 59
3) Brake Lever 60

CONTROLS, INSTRUMENTS AND EQUIPMENT (cont'd)
4) Parking Brake Lever 61
5) Engine Cut-off Switch 63
6) Emergency Engine Stop Switch 64
7) Adjustable Handlebar Riser (MX Z X and Renegade X) 66
8) Multifunction Switch 67
9) Seat 73
10) Tools 75
11) Front and Rear Bumpers 77
12) Multifunction Analog/Digital Gauge 79
13) Storage Compartment 94
14) Drive Belt Guard 95
15) Spare Drive Belt Holder 98
16) Upper Body Module (Hood) 99
17) Side Panels 105
18) Rewind Starter Handle (If Applicable) 106
19) Operator's Guide 106

FUEL 107
Fuel Requirements 107
Vehicle Fueling Procedure 108

INJECTION OIL 110
Recommended Injection Oil 110
Injection Oil Level Verification 110

BREAK-IN PERIOD 112
Operation During Break-In 112

BASIC PROCEDURES 113
Engine Starting Procedure 113
Emergency Starting 113
Vehicle Warm-Up 116
Reverse (RER) 117
Shutting Off the Engine 118

RIDING CONDITIONS AND YOUR SNOWMOBILE 119
Altitude 119
Temperature 119

SPECIAL OPERATION 120
Towing an Accessory 120
Towing Another Snowmobile 120

TUNE YOUR RIDE **121**
Pilot TS Skis (If Applicable) 122
Rear Suspension Adjustments 123
Front Suspension Adjustments 140
Adjustment Tips According to Vehicle Behavior 142
VEHICLE TRANSPORTATION **144**

MAINTENANCE

MAINTENANCE SCHEDULE **146**
MAINTENANCE PROCEDURES **149**
Engine Coolant 149
Exhaust System 150
Spark Plugs 151
Brake Fluid 151
Chaincase Oil 153
Drive Chain 156
Drive Belt 157
Drive Pulley 162
Track 166
Suspension 174
Skis 176
Fuses 176
Headlights 178
VEHICLE CARE **182**
Post-Operation Care 182
Vehicle Cleaning and Protection 182
STORAGE **183**
Engine Storage Mode 183

TECHNICAL INFORMATION

VEHICLE IDENTIFICATION **188**
Vehicle Description Decal 188
Identification Numbers 189
NOISE EMISSION AND VIBRATION VALUES (ALL COUNTRIES EXCEPT CANADA/UNITED STATES) **191**
EC DECLARATION OF CONFORMITY **192**

EPA CERTIFIED ENGINES 193
Engine Emissions Information 193
RADIO FREQUENCY DIGITALLY ENCODED SECURITY SYSTEM (RF D.E.S.S. KEY) 195
SPECIFICATIONS 196

TROUBLE-SHOOTING

TROUBLESHOOTING GUIDELINES 202
MONITORING SYSTEM 205
Pilot Lamps, Messages and Beeper Codes 205
Fault Codes 209

WARRANTY

BRP LIMITED WARRANTY USA AND CANADA: 2017 SKI-DOO® SNOWMOBILES 212
US EPA EMISSION-RELATED WARRANTY 216
BRP INTERNATIONAL LIMITED WARRANTY: 2017 SKI-DOO® SNOWMOBILES 219
BRP LIMITED WARRANTY FOR THE EUROPEAN AND THE COMMONWEALTH OF THE INDEPENDENT STATES (CIS) AREAS AND TURKEY: 2017 SKI-DOO® SNOWMOBILES 224

CUSTOMER INFORMATION

PRIVACY INFORMATION 232
CONTACT US 233
North America 233
Europe 233
Oceania 234
South America 234
Asia 234
CHANGE OF ADDRESS/OWNERSHIP 235

SAFETY INFORMATION

GENERAL PRECAUTIONS

Avoid Carbon Monoxide Poisoning

All engine exhaust contains carbon monoxide, a deadly gas. Breathing carbon monoxide can cause headaches, dizziness, drowsiness, nausea, confusion and eventually death.

Carbon monoxide is a colorless, odorless, tasteless gas that may be present even if you do not see or smell any engine exhaust. Deadly levels of carbon monoxide can collect rapidly, and you can quickly be overcome and unable to save yourself. Also, deadly levels of carbon monoxide can linger for hours or days in enclosed or poorly ventilated areas. If you experience any symptoms of carbon monoxide poisoning, leave the area immediately, get fresh air and seek medical treatment.

To prevent serious injury or death from carbon monoxide:

– Never run the vehicle in poorly ventilated or partially enclosed areas such as garages, carports or barns. Even if you try to ventilate engine exhaust with fans or open windows and doors, carbon monoxide can rapidly reach dangerous levels.
– Never run the vehicle outdoors where engine exhaust can be drawn into a building through openings such as windows and doors.

Avoid Gasoline Fires and Other Hazards

Gasoline is extremely flammable and highly explosive. Fuel vapors can spread and be ignited by a spark or flame many feet away from the engine. To reduce the risk of fire or explosion, follow these instructions:

– Use only an approved gasoline container to store fuel.
– Strictly adhere to instructions in *FUELING PROCEDURE*.
– Never start or operate the engine if the fuel cap is not properly installed.

Gasoline is poisonous and can cause injury or death.

– Never siphon gasoline by mouth.
– If you swallow gasoline, get any in your eye or inhale gasoline vapor, see your doctor immediately.

If gasoline spills on you, wash with soap and water and change your clothes.

Avoid Burns from Hot Parts

The exhaust system and engine become hot during operation. Avoid contact during and shortly after operation to avoid burns.

Accessories and Modifications

Do not make unauthorized modifications, or use attachments or accessories that are not approved by BRP. Since these changes have not been tested by BRP, they may increase the risk of crashes or injuries, and they can make the vehicle illegal.

Tunnel accessories must be loaded onto vehicle as per instructions provided for each accessories.

Accessory passenger seats approved by BRP and conforming to SSCC standards may be available for certain models. If such a seat is used, you must follow the guidelines and recommendations in regards to a passenger in this guide.

⚠ WARNING

Passenger seat must have a strap or handholds and must meet SSCC standards.

See your authorized Ski-Doo dealer for available accessories for your vehicle.

SPECIAL SAFETY MESSAGES

SEVERE INJURY OR DEATH can result if you do not follow these instructions:

- Always make a pre-ride inspection BEFORE you start the engine.
- Throttle mechanism should be checked for free movement and return to idle position before starting engine.
- Always attach tether cord eyelet to clothing before starting the engine.
- Never operate the engine without belt guard and brake disk guard securely installed or, with hood or side panels opened or removed. Never run the engine without drive belt installed. Running an unloaded engine such as without drive belt or with track raised, can be dangerous.
- Always engage parking brake before starting the engine.
- Everyone is a beginner the first time he sits behind the controls of a snowmobile regardless of previous experience in driving any other type of vehicle. The safe use of your snowmobile depends on many conditions such as visibility, speed, weather, environment, traffic, vehicle condition and the condition of the operator.
- Basic training is required for the safe operation of any snowmobile. Study your operator's guide paying particular attention to cautions and warnings. Join your local snowmobile club: its social activities and trail systems are planned for both fun and safety. Obtain basic instructions from your snowmobile dealer, friend, fellow club member or enroll in your state or provincial safety training program.
- Any new operator must read and understand all safety labels on the snowmobile, the Operator's Guide and watch the *SAFETY VIDEO* before operating the snowmobile. Only allow a new operator to operate the snowmobile in a restricted flat area, at least until he is completely familiar with its operation. If snowmobile operator's training course is offered in your area, have him enroll.
- The performance of some snowmobiles may significantly exceed that of other snowmobiles you have operated. Therefore, use by novice or inexperienced operators is not recommended.
- Snowmobiles are used in many areas and in many snow conditions. Not all models perform the same in similar conditions. Always consult your snowmobile dealer when selecting the snowmobile model for your particular needs and uses.
- Injury or death may result to the snowmobile operator, passenger or bystander if the snowmobile is used in risky conditions which are beyond the operator's, passenger's or snowmobile's capabilities or intended use.

- BRP recommends the operator has at least 16 years old of age. Verify also your local laws for age and training requirements.
- It is very important to inform any operator, regardless of his experience, of the handling characteristics of this snowmobile. The snowmobile configuration, such as ski stance, ski type, suspension type, track length, width and type vary from a model to another. The snowmobile handling is greatly influenced by these characteristics.
- The novice operator should become familiar with the snowmobile through practice on a level area at slow speeds before venturing far afield.
- Know your local laws. Federal, state, provincial and local government agencies have enacted laws and regulations pertaining to the safe use and operation of snowmobiles. It is your responsibility as a snowmobiler to learn and obey these laws and regulations. Respect and observance will result in safer snowmobiling for all. Be aware of the liability property damages and insurance laws regarding your equipment.
- Speeding can be fatal. In many cases, you cannot react or respond quickly enough to the unexpected. Always ride at a speed which is suitable to the trail, weather conditions and your own ability. Know your local rules. Speed limit may be in effect and meant to be observed.
- Always keep right hand side of the trail.
- Always keep a safe distance from other snowmobiles and bystanders.
- Remember, promotional material may show risky maneuvers performed by professional riders under ideal and/or controlled conditions. You should never attempt any such risky maneuvers if they are beyond your level of riding ability.
- Never use this vehicle with drugs or alcohol. They slow reaction time and impair judgement.
- Your snowmobile is not designed to be operated on public streets, roads or highways.
- Avoid road traveling. If you must do so, and it is permitted, reduce speed. The snowmobile is not designed to operate or turn on paving. When crossing a road, make a full stop, then look carefully in both directions before crossing at a 90° angle. Be wary of parked vehicles.

- Snowmobiling at night can be a delightful experience but because of reduced visibility, be extra cautious. Avoid unfamiliar terrain and be sure your lights are working. Always carry a flashlight and spare light bulbs.
- Never remove any original equipment from your snowmobile. Each vehicle has many built in safety features. Such features include various guards and consoles, plus reflective materials and safety labels.
- Nature is wonderful but don't let it distract your attention from driving. If you want to truly appreciate winter's scenery, stop your snowmobile on the side of the trail so that you don't become a hazard to others.
- Fences represent a very serious threat for both you and your snowmobile. Give a wide berth to telephone poles or posts.
- Hidden wires unseen from a distance can cause serious accidents.
- Always wear an approved safety helmet, eye protection and a face shield. This also applies to your passenger.
- Be aware of inherent risks associated with riding off trails, such as avalanche and other natural or man made hazards or obstacles.
- Tailgating another snowmobile should be avoided. If the snowmobile in front of you slows for any reason, its operator and passenger could be harmed through your neglect. Maintain a safe stopping distance between you and the snowmobile in front of you. Depending on the terrain condition, stopping may require a little more space than you think. Play it safe. Be prepared to use evasive driving.
- Venturing out alone with your snowmobile could also be hazardous. You could run out of fuel, have an accident, or damage your snowmobile. Remember, your snowmobile is capable of traveling further in half an hour than you may be able to walk in a day. Use the "buddy system". Always ride with a friend or member of your snowmobile club. Even then, tell someone where you are going and the approximate time you plan to return.
- Meadows sometimes have low areas where water accumulate and freezes over in winter. This ice is usually glare ice. Attempting to turn or brake on this surface could cause your vehicle to spin out of control. Never brake or attempt speeding or turning on glare ice. If you do happen to travel over such a condition, reduce speed by carefully releasing the throttle.
- Never "jump" with your snowmobile.

- While on safari, do not "gun" the throttle. Snow and ice can be thrown back into the path of a following snowmobile. In addition, when "gunning" the throttle, the vehicle digs into and leaves an irregular snow surface for others.
- Safaris are both fun and enjoyable but don't show off or overtake others in the group. A less experienced operator might try to do the same as you and fail. When riding with others, limit your abilities to the experience of others.
- In an emergency, the snowmobile engine can be stopped by pressing down on the emergency engine stop switch or by pulling the tether cord cap from the engine cut-off switch, while applying brake.
- Always engage parking brake when vehicle is not in use.
- Never run the engine in a non-ventilated area and/or if vehicle is left unattended.
- Electric start models only: Never charge or boost a battery while installed on snowmobile.
- E-TEC engines: Never attempt any fuel system or electrical system maintenance or repair. Any maintenance or repair of these systems must be performed by an authorized Ski-Doo dealer.
- Never attempt any fuel system or electrical system maintenance or repair. Any maintenance or repair of these systems must be performed by an authorized Ski-Doo dealer.
- Ensure the path behind is clear of obstacles or bystanders before proceeding in reverse.
- Always remove the tether cord cap from engine cut-off switch when vehicle is not in operation in order to prevent accidental engine starting, to avoid unauthorized use by children or others or theft.
- NEVER stand behind or near a rotating track. Debris could be projected causing severe injuries. To remove packed snow or ice, stop engine, tilt and hold vehicle on its side and use wrench tool on the belt guard.
- Do not stud the track unless it has been approved for studs. At speed, a studded track that has not been approved for studs could tear and separate from vehicle. See an authorized Ski-Doo dealer for current specific studding availability and applications.

– You may stud the track on this vehicle model. However, you MUST only use the BRP approved type stud for use on Ski-Doo snowmobiles. DO NOT EVER use conventional studs because the track thickness is thinner then our standard tracks. The stud could tear off of track and separate from vehicle.
– Always wear an approved helmet and follow the same dressing guidelines as those recommended for the operator and described in this guide.
– Make sure that you are able to achieve a stable stance, both feet resting positively on the footboards of footrests with good grip, and that you are able to hold on firmly to the handholds.
– Do not forget, with 2-UP models, the operator is responsible for the safety of the passenger. Always remember that the snowmobile handling, stability and braking distance may be affected when riding with a passenger.
– Before riding the vehicle, ask your passenger to inform you to slowdown or stop immediately if he feels uncomfortable or insecure during the ride. Keep a watchful eye on your passenger while riding.

RIDING THE VEHICLE

Each operator has a responsibility to ensure the safety of other recreationists or bystanders.

You are responsible for proper operation of your vehicle as well as training those whom you allow to ride or drive. There may be noticeable handling and performance differences from one snowmobile to the other.

A snowmobile is relatively simple to operate but like any other vehicle or mechanical equipment, it can be hazardous if you or a passenger are reckless, thoughtless or inattentive. We encourage you to have an Annual Safety Inspection of your snowmobile. Please contact an authorized Ski-Doo dealer for further details. Though not required, it is recommended that an authorized Ski-Doo dealer performs the preseason preparation of your snowmobile. Each visit to your authorized Ski-Doo dealer is a great opportunity for your dealer to verifiy if your snowmobile is included in any safety campaign. We also urge you to visit your authorized Ski-Doo dealer in a timely manner if you become aware of any safety related campaigns.

See an authorized Ski-Doo dealer for available accessories you may require.

Before venturing on the trails, operate the snowmobile in a restricted flat area until you are completely familiar with its operation and feel comfortable that you can safely tackle a more demanding task. Have an enjoyable and safe ride.

Pre-Ride Inspection

⚠ WARNING

The pre-operation check is very important prior to operating the vehicle. Always check the proper operation of critical controls, safety features and mechanical components before starting.

Before Starting the Engine

1. Remove snow and ice from body including lights, seat, footrests, controls and instruments.
2. Verify that air silencer prefilter is free of snow.
3. Verify that skis and steering operate freely. Check corresponding action of skis versus handlebar.

4. Check fuel and injection oil (if applicable) for levels and leaks. Replenish if necessary and in case of any leaks; you should seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA EMISSION-RELATED WARRANTY* contained herein for information about warranty claims.
5. All storage compartments must be properly latched and they must not contain any heavy or breakable objects. Hood and side panels must be also properly latched.
6. Activate the throttle control lever several times to check that it operates easily and smoothly. It must return to idle position when released.
7. Activate the brake lever and make sure the brake fully applies before the brake control lever touches the handlebar grip. It must fully return when released.
8. Apply parking brake and check if it operates properly. Leave parking brake applied.

After Engine is Started

For proper engine starting procedure, refer to the appropriate *ENGINE STARTING PROCEDURE* section.

1. Check headlights high beam and low beam, taillight, stop light and pilot lamps operation.

NOTE: You may need to detach tether cord from your clothes to check lights. In such a case, attach cord as soon as you get back at the controls of the snowmobile.

2. Check the engine cut-off switch (by pulling tether cord cap) and emergency engine stop switch operation.
3. Release parking brake.
4. Refer to the *WARM UP* section and follow instructions.

Pre-Ride Check List

ITEM	OPERATION	✔
BODY INCLUDING SEAT, FOOTRESTS, LIGHTS, AIR FILTER, CONTROLS AND INSTRUMENTS	Check condition and remove snow or ice.	
SKIS AND STEERING ACTION	Check for free movement and proper operation.	
FUEL AND INJECTION OIL (IF APPLICABLE)	Check for proper level and no leaks.	
COOLANT	Check for proper level and no leaks.	
BRAKE FLUID	Check for proper level and no leaks.	
STORAGE COMPARTMENT	Check for proper latching and no heavy or breakable objects.	
TRACK	Check condition and remove snow or ice. For studded tracks, see *INSPECTION* in the *TRACTION ENHANCING PRODUCTS* subsection.	
THROTTLE LEVER	Check for proper operation.	
BRAKE LEVER	Check for proper operation.	
PARKING BRAKE, BRAKE	Check for proper operation.	
EMERGENCY ENGINE STOP SWITCH AND ENGINE CUT-OFF SWITCH (TETHER CORD CAP)	Check for proper action. Tether cord must be attached to operator clothing eyelet.	
LIGHTS	Check for proper operation.	
SKI RUNNERS	Check for proper operation.	
SLIDER SHOES	Check for proper operation.	
DRIVE BELT	Check for cracks, fraying or abnormal wear.	

How to Ride

Riding Gear

Proper snowmobile clothing should be worn. It should be comfortable and not too tight. Always check the weather forecast before going on a ride. Dress for the coldest weather expected. Thermal underwear next to the skin also provides a good insulation.

Wear an approved helmet at all times for safety and comfort. They provide both warmth and reduce injury. A stocking type cap, balaclava and face mask should always be carried or worn. Goggles or a face shield that attach to the helmet are indispensable.

Hands should be protected by a pair of snowmobile gloves or mitts which have sufficient insulation and allow use of thumbs and fingers for operation of controls.

Rubber bottom boots with either a nylon or a leather top, with removable felt liners are best suited for snowmobiling.

You should keep yourself as dry as possible when snowmobiling. When you come indoors, take your snowmobile suit and boots off and make certain they dry properly.

Do not wear a long scarf or loose apparels that could get caught in moving parts.

Carry colored lens goggles.

What to Bring

First aid kit	Provided tool kit
Mobile phone	Knife
Spare spark plugs	Flashlight
Friction tape	Trail map
Spare drive belt	Snack

Rider Position (Forward Operation)

Your riding position and balance are the two basic principles of making your snowmobile go where you want it to. When turning on the side of a hill, you and your passenger must be ready to shift body weight to help it turn in the desired direction. Operator and passenger must never attempt this maneuvering by placing feet

outside of the vehicle. Experience will teach you how much lean to put into turns at different speeds and how much you will have to lean into a slope to maintain proper balance.

Generally, the riding position for best balance and control is sitting. However, the posting, kneeling or standing positions are also used under certain conditions.

⚠ WARNING

Do not attempt any maneuvers if they are beyond your abilities.

Sitting

Feet on the running boards, body midway back on seat is an ideal position when operating the snowmobile over familiar, smooth terrain. Knees and hips should remain flexible to absorb shocks.

mmo2008-003-001

Posting

A semi-sitting position with the body off the seat and the feet under the body in a sort of squatting posture, thus allowing the legs to absorb the shocks when traveling over uneven terrain. Avoid abrupt stops.

mmo2008-003-002

Kneeling

This position is achieved by placing one foot firmly on the running board and the opposite knee on the seat. Avoid abrupt stops.

mmo2008-003-003

Standing

Place both feet on the running boards. Knees should be flexed to absorb the shock from surface bumps. This is an effective position to see better and to shift weight as conditions dictate. Avoid abrupt stop.

mmo2008-003-004

Rider Position (Reverse Operation)

We recommend sitting on your snowmobile when operating in reverse.

Avoid standing up. Your weight could shift forward against throttle lever while operating in reverse, causing an unexpected acceleration.

⚠ WARNING

Unexpected acceleration when snowmobile operates in reverse can cause a loss of control.

Carrying a Passenger

Certain snowmobiles are designed for an operator only (1-UP), and others can allow one passenger (2-UP). Make sure to identify and respect the warnings according to your specific models.

Even when a passenger is allowed, this person must be physically fit for snowmobiling.

⚠ WARNING

Any passenger must be able to firmly lay his feet on the footrests and keep his hands on the handholds or seat strap at all times when seated. Respecting those physical criteria is important to ensure that the passenger is stable and to reduce the risks of ejection.

The operator has a responsibility to ensure the safety of his passenger and should inform the passenger about snowmobiling basics.

⚠ WARNING

- **Passenger must only sit on designated passenger seat. Never allow anyone to sit between the handlebar and the operator.**
- **Passenger and operator must always wear an approved helmet and warm clothing appropriate for snowmobiling. Make sure that no skin is exposed.**
- **If the passenger feels uncomfortable or insecure for any reason, he must right away inform the operator to slow-down or stop.**

Riding with a passenger on board is different than riding alone. The operator has the benefit of knowing what will be the next maneuver and is able to prepare himself accordingly. The operator also benefits from the support of his grip on the handlebar. In contrast, the passenger has to rely on the operator's careful and safe operation of the vehicle. In addition, "body english" is limited with a passenger, and the operator can sometimes see more of the trail ahead than the passenger. Therefore, smooth starting and stopping are required with a passenger, and the operator must slow down. The operator must also warn the passenger about side hills, bumps, branches, etc. An unforeseen bump can leave you passenger-less. Remind your passenger to lean into the turn with you, without causing the vehicle to topple. Be extremely careful, go more slowly and check the passenger frequently.

⚠ WARNING

When riding with a passenger:

- Braking ability and steering control are reduced. Decrease speed and allow extra space to maneuver.
- Adjust suspension according to weight.

For complete information on how to adjust the suspension, please refer to the *TUNE YOUR RIDE* subsection.

Riding with a Child

On snowmobiles allowing two passengers (with optional seat), if you have an adult and a child for passenger, BRP recommends that the child sits in the center location. This allows an adult sitting in the rear seat to keep a visual contact with the child and hold him if necessary. In addition, the child is best protected against the wind and cold temperature if seated in the center location.

Use extra caution and go even more slowly with a young passenger. Check frequently to make certain the child has a firm grip and is properly positioned with his feet on the running boards.

Terrain/Riding Variations

Groomed Trail

On a maintained trail, sitting is the most preferred riding position. Do not race and, above all, keep to the right hand side of the trail. Be prepared for the unexpected. Observe all trail signs. Do not zigzag from one side of the trail to the other.

Ungroomed Trail

Unless there has been a fresh snowfall you can expect "washboard" and snowdrift conditions. Taken at excessive speeds, such conditions can be physically harmful. Slow down. Hold on the handlebar and assume a posting position. Feet should be under the body assuming a crouched position to absorb any jarring effect. On longer stretches of "washboard" trails, the kneeling position of one knee on the seat can be adopted. This provides a certain amount of comfort, while at the same time keeps the body loose and capable of vehicle control. Beware of hidden rocks or tree stumps partially hidden by a recent snowfall.

Deep Snow

In deep "powder" snow, your vehicle could begin to "bog" down. If this occurs, turn in as wide an arc as possible and look for a firmer base. If you do get "bogged", and it happens to everyone, do not spin your track as this makes the vehicle sink deeper. Instead, turn the engine off, get off and move the back of the vehicle onto new snow. Then tramp a clear path ahead of the vehicle. A few feet will generally suffice. Restart the engine. Assume the standing position and rock the vehicle gently as you steadily and slowly apply the throttle. Depending on whether the front or rear end of the vehicle is sinking, your feet should be placed on the opposing end of the running boards. Never place foreign material beneath the track for support. Do not allow anyone to stand in front of, or to the rear of, the snowmobile with the engine running. Stay away from the track. Personal injury will result if contact is made with the revolving track.

Frozen Water

Traveling frozen lakes and rivers can be fatal. Avoid waterways. If you are in an unfamiliar area, ask the local authorities or residents about the ice condition, inlets, outlets, springs, fast moving currents or other hazards. Never attempt to operate your snowmobile on ice that may be too weak to support you and the vehicle. Operating a snowmobile on ice or icy surfaces can be very dangerous if you do not observe certain precautions. The very nature of ice is foreign to good control of a snowmobile or any vehicle. Traction for starting, turning or stopping is much less than that on snow. Thus, these distances can be multiplied manyfold. Steering is minimal, and uncontrolled spins are an ever present danger. When operating on ice, drive slowly with caution. Allow yourself plenty of room for stopping and turning. This is especially true at night.

Hard Packed Snow

Don't underestimate hard packed snow. It can be difficult to negotiate as both skis and track do not have as much traction. Best advice is to slow down and avoid rapid acceleration, turning or braking.

Uphill

There are two types of hills you can encounter — the open hill on which there are few trees, cliffs or other obstacles, and a hill that can only be climbed directly. On an open hill, the approach is to climb it by side hilling or slaloming. Approach at an angle. Adopt a kneeling

position. Keep your weight on the uphill side at all times. Maintain a steady, safe speed. Continue as far as you can in this direction, then switch to an opposite hill angle and riding position.

A direct climb could present problems. Choose the standing position, accelerate before you start the climb and then reduce throttle pressure to prevent track slippage.

In either case, vehicle speed should be as fast as the incline demands. Always slow down as you reach the crest. If you cannot proceed further, don't spin your track. Turn the engine off, free the skis by pulling them out and downhill, place the rear of the snowmobile uphill restart the engine and ease it out with slow even throttle pressure. Position yourself to avoid tipping over, then descend.

Downhill

Downhill driving requires that you have full control of your vehicle at all times. On steeper hills, keep your center of gravity low and both hands on the handlebar. Maintain slight throttle pressure and allow the machine to run downhill with the engine operating. If a higher than safe speed is reached, slow down by braking but apply the brake with frequent light pressure. Never jam the brake and lock the track.

Side Hill

When crossing a side hill or traversing up or downhill, certain procedures must be followed. All riders should lean towards the slope as required for stability. The preferred operating positions are the kneeling position, with the knee of the down hill leg on the seat and the foot of the uphill leg on the running board, or the posting position. Be prepared to shift your weight quickly as needed. Side hills and steep slopes are not recommended for a beginner or a novice snowmobiler.

Avalanche Hazard

When riding on mountainous terrain, you should be aware of the risk of avalanches. Avalanches vary in size and shapes and generally occur in steep terrain and on unstable snow.

New snow, animals, people, wind and snowmobiles can all trigger an avalanche. Avoid high marking or traversing steep terrain when avalanche conditions are possible. When in unstable snow conditions, travel should be restricted to lower angle slopes. Wind formed cornices should be avoided. Staying off unstable conditions is the key to safe mountain riding. Probably most important is to be

aware of the conditions and dangers on a daily basis when in the mountains. Check local avalanche forecasts and threats each day before heading out to ride and heed forecasters advice.

You should always carry a snow shovel, probe and avalanche beacon while riding on mountains. We recommend that all mountain riders take a local avalanche safety training course to become more familiar with snow conditions and learn how to properly use their equipment.

Here are some web sites that can help you finding important information:

- US: www.avalanche.org
- Europe: www.avalanches.org
- Canada: www.avalanche.ca

Slush

Slush should be avoided at all times. Always check for slush before starting across any lake or river. If dark spots appear in your tracks, get off the ice immediately. Ice and water can be thrown rearward into the path of a following snowmobile. Getting a vehicle out of a slush area is strenuous and in some cases, impossible.

Fog or Whiteout Conditions

On land or water, fog or visibility-limiting snow can form. If you have to proceed into the fog or heavy snow, do so slowly with your lights on and watch intently for hazards. If you are not sure of your way, do not proceed. Keep a safe distance behind other snowmobilers to improve visibility and reaction time.

Unfamiliar Territory

Whenever you enter an area that is new to you, drive with extreme caution. Go slow enough to recognize potential hazards such as fences or fence posts, brooks crossing your path, rocks, sudden dips, guy wires and countless other obstacles which could result in a termination of your snowmobile ride. Even when following existing tracks, be cautious. Travel at a speed so you can see what is around the next bend or over the top of the hill.

Bright Sunshine

Bright sunny days can considerably reduce your vision. The glare from sun and snow may blind you to the extent that you cannot easily distinguish ravines, ditches or other obstacles. Goggles with colored lenses should always be worn under these conditions.

Unseen Obstruction

There may be obstructions hidden beneath the snow. Driving off established trails and in the woods requires reduced speed and increased vigilance. Driving too fast in an area can make even minor obstacles very hazardous. Even hitting a small rock or stump could throw your snowmobile out of control and cause injury to its riders. Stay on established trails to reduce your exposure to hazards. Be safe, slow down and enjoy the scenery.

Hidden Wires

Always be on the lookout for hidden wires, especially in areas that may have been farmed at one time or another. Too many accidents have been caused by running into wires in the fields, guy wires next to poles and roads, and into chains and wires used as road closures. Slow speeds are a must.

Obstacles and Jumping

Unplanned jumps of snowdrifts, snowplow ridges, culverts or indistinguishable objects can be dangerous. You can avoid them by wearing the proper color lenses or face shields and by operating at a lower speed.

Jumping can be a hazardous situation. Be prepared before landing to absorb the shock and brace yourself for the impact. Knees must be flexed to act as shock absorbers. If the trail does suddenly drop away from you, crouch (stand) towards the rear of the vehicle and keep the skis up and straight ahead. Apply partial throttle and brace yourself for the impact. Knees must be flexed to act as shock absorbers.

Turning

Depending on terrain conditions, there are two preferred ways to turn or corner a snowmobile. For most snow surfaces, "body english" is the key to turning. Leaning towards the inside of the turn and positioning body weight on the inside foot will create a

"banking" condition beneath the track. By adopting this position and positioning yourself as far forward as possible, weight will be transferred to the inside ski.

On occasion, you will find that the only way to turn the vehicle about in deep snow is to pull the snowmobile around. Do not over-exert yourself. Get assistance. Remember to always lift using your legs as opposed to your back.

mmo2008-003-005

Road Crossing

In some cases, you will be approaching the road from a ditch or snowbank. Choose a place where you know you can climb without difficulty. Use the standing position and proceed with only as much speed needed to crest the bank. Stop completely at the top of the bank and wait for all traffic to clear. Judge the drop to the roadway. Cross the road at a 90° angle. If you encounter another snowbank on the opposite side, position your feet near the rear of the vehicle. Remember, your snowmobile is not designed to operate on bare pavement and steering on this type of surface is more difficult.

Railroad Crossing

Never ride on railroad tracks. It is illegal. Railroad tracks and railroad rights-of-way are private property. A snowmobile is no match for a train. Before crossing a railroad track, stop, look and listen.

Night Rides

The amount of natural and artificial light at a given time can effect your ability to see or to be seen. Nighttime snowmobiling is delightful. It can be a unique experience if you acknowledge your reduced visibility. Before you start, make certain your lights are clean and work properly. Drive at speeds that will allow you to stop in time when you see an unknown or dangerous object ahead. Stay on established trails and never operate in unfamiliar territory. Avoid rivers and lakes. Guy wires, barbed wire fences, cabled road entrances and other objects such as tree limbs are difficult to see at night. Never drive alone. Always carry a flashlight. Keep away from residential areas and respect the right of others to sleep.

Riding in a Group

Before starting out, designate a "trail boss" to lead the party and another person to follow-up at the end of the party. Ensure that all members of the party are aware of the proposed route and destination. Make certain that you are carrying all necessary tools and equipment and that you have sufficient fuel to complete the trip. Never overtake the trail boss or, for that matter, any other snowmobile. Use down-the-line hand signals to indicate hazards or intent of direction change. Assist others whenever necessary.

It is always IMPORTANT to keep a safe distance between each snowmobile. Always maintain a safe interval and allow sufficient stopping distance. Don't be a tailgater. Know the position of the machine ahead.

Signals

If you intend to stop, raise either hand straight above your head. A left turn is indicated by extending your left hand straight out in the proper direction. For right turns, extend the left arm and raise the hand to a vertical position so it forms a right angle at the elbow. Every snowmobiler should relay any signal to the ones behind.

Trail Stops

Whenever possible, pull off the trail when you stop. This will reduce the hazard to other snowmobilers using the trail.

Trails and Signs

Trail signs are used to control, direct or regulate the use of snowmobiles on trails. Become familiar with all signs used in the area where you are snowmobiling.

Environment

Wildlife compliments your snowmobiling day. Snowmobile tracks provide firm ground over which animals can travel from area to area. Do not violate this privilege by chasing or harassing wildlife. Fatigue and exhaustion can lead to animal's death. Avoid areas posted for the protection or feeding of wildlife.

If you happen to be fortunate enough to see an animal, stop your snowmobile and observe quietly.

The guidelines that we support are not designed to limit your snowmobiling fun, but to preserve the beautiful freedom that you can experience only on a snowmobile! These guidelines will keep snowmobilers healthy, happy and able to introduce others to what they know and enjoy about their favorite winter pastime. So, the next time you hit the trails on a cool, crisp and clear winter day, we ask you to remember that you are paving the way for the future of our sport. Help us lead it down the right path! From all of us at BRP, thank you for doing your share.

There is nothing more exhilarating than snowmobiling. Venturing onto snowmobile trails that cross wild areas is an exciting and healthy winter sport. However, as the number of people using these recreational parks increases, so does the potential for damage to the environment. Abuse of land, facilities and resources inevitably leads to restrictions and closures of both private and public land.

In essence, the greatest threat to our sport, is all around us. Which leaves us with one logical choice. When we snowmobile, we must always ride responsibly.

The vast majority respect the law and the environment. Each of us must set an example for those who are new to the sport, young and old alike.

It is in every one's best interest to tread lightly into our recreational areas. Because, in the long run, to protect the sport we must preserve the environment.

Recognizing the importance of this issue and the need for snowmobilers to do their share in preserving areas that make it possible to enjoy our sport, BRP has developed the "Light Treading Is Smart Sledding" campaign for snowmobilers.

Light Treading refers to more than the thread of our tracks. It's a statement of concern, respect and willingness to take the lead and take action. It applies to the environment in general, its proper care and maintenance, its natural inhabitants and all enthusiasts and the public at large who enjoy the great outdoors. With this theme, we invite all snowmobilers to remember that respecting the environment is not only critical to the future of our industry but to future generations.

Light Treading in no way suggests you should curb your appetite for snowmobiling fun! It simply means tread with respect!

The fundamental objective of Light Treading is one of respect for where and how you ride a snowmobile. You're a light treader when you follow the principles below.

Become informed. Obtain maps, regulations and other information from the Forest Service or from other public land agencies. Learn the rules and follow them and that goes for speed limits, too!

Avoid running over young trees, shrubs, and grasses and don't cut wood. On flatlands or areas where trail riding is popular, it's important to ride only where authorized. Remember, there is a link between protecting your environment and your own safety.

Respect wildlife and be particularly sensitive of animals that are rearing young or suffering from food shortage. Stress can sap scarce energy reserves. Refrain from riding in areas where only animals are intended to tread!

Obey gate closures and regulatory signs and remember, light treaders don't litter!

Stay out of wilderness areas. They're closed to all vehicles. Know where the boundaries are.

Obtain permission to travel across private land. Respect the rights of landowners and other people's privacy. Remember, snowmobile technology has lowered the noise factor considerably, but you still shouldn't rev your engines where quiet "is the order of the day".

Snowmobilers know all too well the efforts that have been made throughout the sport's history to enjoy access to areas where people can snowmobile safely and responsibly. This effort continues today, as strong as ever.

Respecting the areas where we ride... wherever they may be... is the only way to ensure their future enjoyment. That's one major reason why we know you'll agree that Light Treading is smart sledding! And there are more.

Enjoying the opportunity to see winter and all its natural majestic wonders, is an experience cherished by snowmobilers. Light Treading will preserve this opportunity and will make it possible for us to expose others to the beauty of winter and the unique thrill of our sport! Light Treading will help our sport to grow!

Finally, Light Treading is the sign of a smart snowmobiler. You don't have to leave big tracks or careen through a virgin forest to show you can ride. So whether you're driving a high performance Ski-Doo, a sporty MX Z™ snowmobile or any other make or model, show you know what you're doing. Show you know how to send snow flying and make tracks with a light touch!

TRACTION ENHANCING PRODUCTS

NOTE: This section is applicable to snowmobiles equipped with a factory installed track that has been approved by BRP for special studs installation.

⚠ WARNING

Never stud a track that has not been approved for studs. Installing studs on an unapproved track could increase the risk of the track tearing or severing.

⚠ WARNING

You may stud the track on this vehicle model. However, you MUST only use the BRP approved type stud for use on these Ski-Doo snowmobiles. DO NOT EVER use conventional studs as the track thickness is thinner then other standard tracks. The stud could tear off of track and separate from vehicle. See an authorized Ski-Doo dealer for current specific studding availability and applications.

Using traction enhancing products such as, adjustable or more aggressive ski carbide runners and/or studs on your snowmobile will change its behavior, particularly in terms of manoeuvrability, acceleration, and braking.

Using traction enhancing products gives a better grip on packed snow and ice, but has no noticeable effect on soft snow. For this reason, driving a snowmobile equipped with traction enhancing products requires a certain adaptation period. If your snowmobile is equipped with traction enhancing products, be sure to take plenty of time to get used to the way it handles when turning, accelerating, and braking.

Also, always check local regulations concerning the use of traction enhancing products on snowmobiles. Always drive your snowmobile in a responsible manner, respecting the environment and other people's property.

Manoeuvrability

Using traction enhancing products such as, more aggressive ski carbide runners and/or studs makes the snowmobile grip the ground better at both the front and at the rear. The use of carbide runners is therefore required to give the skis a better grip, so that the front and rear of the snowmobile are in balance. While off-the-shelf carbide

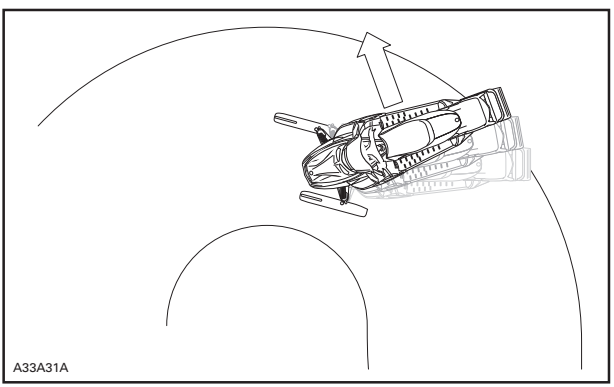
ski runners are adequate, they don't necessarily give you optimal control, since that depends on your personal preferences, your riding style, and how your suspension is adjusted.

⚠ WARNING

If the front and rear of the snowmobile are out of balance due to an incorrect combination of traction enhancing products, the snowmobile may tend to oversteer or understeer, which could lead to a loss of control.

Oversteering

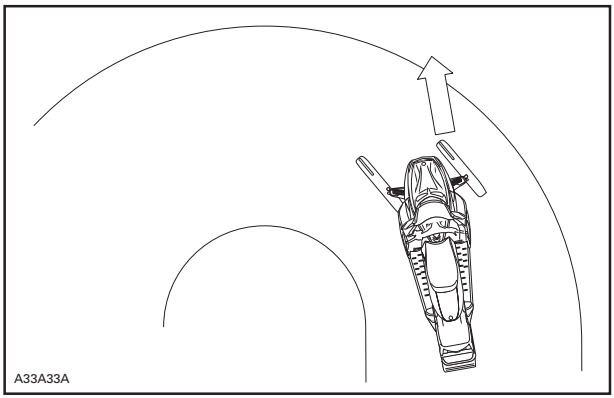
In certain conditions, using more aggressive ski carbide runners without studs on the rear track could make the snowmobile prone to oversteering, see illustration.



OVERSTEERING

Understeering

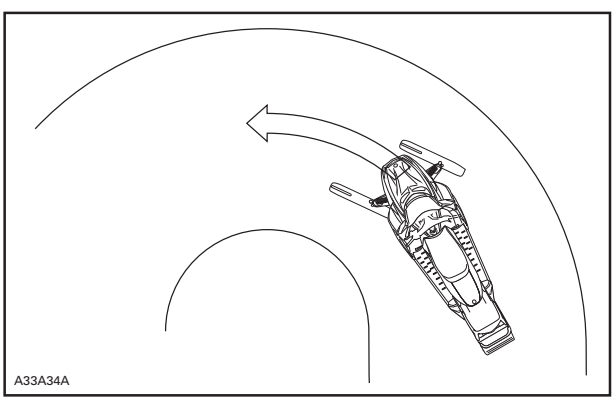
In certain conditions, the use of studs on the track could make the snowmobile prone to understeering if the skis are not equipped with more aggressive ski carbide runners, see illustration.



UNDERSTEERING

Controlled Driving

A balanced combination of carbide ski runners and studs on the track ensures adequate control and better handling, see illustration.



CONTROLLED DRIVING

Acceleration

Using studs on the track will allow your sled to accelerate better on packed snow and ice but will have no noticeable effect on soft snow. This can cause sudden variations in traction under certain conditions.

⚠ WARNING

To prevent surprises that could lead to a loss of control of the snowmobile:

- Always go easy on the throttle.
- NEVER try to spin the track to make the rear of the snowmobile skid.

This could cause debris or ice to be thrown violently backwards, possibly injuring others nearby or on snowmobiles behind you.

Braking

As in the case of acceleration, using studs on the track will give you better braking capacity on packed snow or ice but will have no noticeable effect on soft snow. Braking may thus vary suddenly under certain conditions. Be sure to use restraint in braking to keep from blocking the track in order to avoid surprises that could lead to a loss of control.

Important Safety Rules

⚠ WARNING

To prevent serious injury to individuals near the snowmobile:

- NEVER stand behind or near a moving track.
- Always use a wide-base snowmobile stand with a rear deflector panel if it is necessary to rotate track.
- When the track is raised off the ground, only run it at the lowest possible speed.

Centrifugal force could cause debris, damaged or loose studs, pieces of torn track, or an entire severed track to be violently thrown backwards out of the tunnel with tremendous force.

Effects of Having a Studded Track on the Life of the Snowmobile

The use of traction enhancing products can increase the load and the stress on certain snowmobile components, as well as the vibration level. This can cause premature wear on parts such as belts, brake linings, bearings, chain, chaincase sprocket, and on approved studded tracks, shorten track life. Always proceed with a visual inspection of your track before each use. For more information, refer to the *TRACK* section in *MAINTENANCE*.

Studs on the track can also cause serious damage to your snowmobile if it is not equipped with the tunnel protectors designed for your particular model. Damage to the electrical wiring or perforation of the heat exchangers are potential hazards, that could cause the engine to overheat and be severely damaged.

⚠ WARNING

If tunnel protectors are excessively worn or not installed, the gas tank could be punctured, causing a fire.

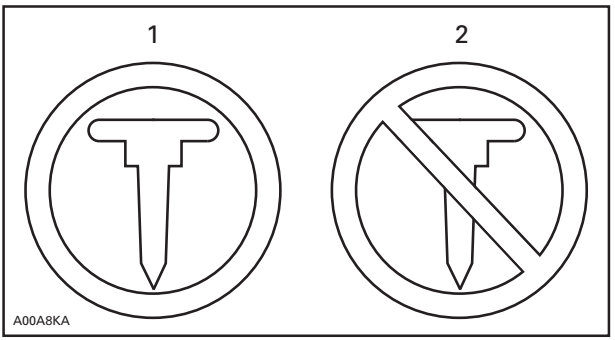
NOTICE Ask your dealer for the appropriate tunnel protectors model and kit number required for your snowmobile.

NOTE: Consult the BRP limited warranty to find out what warranty limitations are related to the use of studs.

Installation of Studs on BRP Approved Tracks

⚠ WARNING

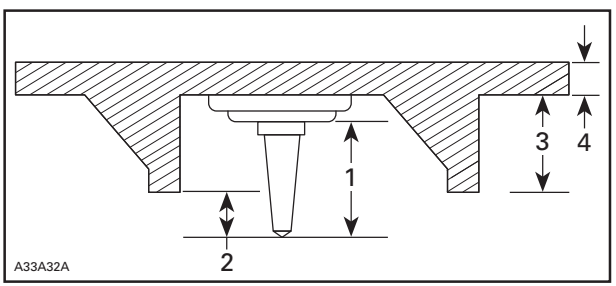
Never stud a track that has not been approved for studs. Approved tracks can be identified by a stud symbol (see illustration below) molded into the track surface. Installing studs on an unapproved track could increase the risk of the track tearing or severing.



TRACK SYMBOLS
1. *Approved*
2. *NOT Approved*

To ensure safe and proper installation, BRP recommends to have the studs installed by your dealer.

– Use only the BRP approved special studs.
– Never use studs that exceed the height of your snowmobile's track profile by more than 9.5 mm (3/8 in).



INSTALLATION OF STUDS
1. *Stud size*
2. *Penetration range 6.4 mm to 9.5 mm (1/4 in to 3/8 in)*
3. *Track lug height*
4. *Track belt thickness*

⚠ WARNING

- See an authorized Ski-Doo dealer for current specific studding availability and applications.
- DO NOT EVER use conventional stud because, the track thickness is thinner then our standard tracks and the stud could tear off of track and separate from vehicle.
- Studs should only be installed in the locations indicated by molded bulges in the track surface. Some track models have two types of molded bulges; triangles and circles. See the warning molded into the track surface to know which one to use.
- Never stud a track with a profile of 35 mm (1-3/8 in) or more.
- The number of studs installed must always perfectly match the pattern of molded bulges in the track.
- Always consult the traction product manufacturer's installation instructions and recommendations before having your dealer install studs and runners. It is very important to follow the torque specifications for the stud bolts.

INSTALLING AN INCORRECT NUMBER OF STUDS OR AN IMPROPER INSTALLATION CAN INCREASE THE RISK OF THE TRACK TEARING OR SEVERING.

Maintenance/Replacement

PROCEED WITH A VISUAL INSPECTION OF YOUR TRACK BEFORE EACH USE.

Look for any defects, such as:

- Perforations in the track
- Tears in the track (particularly around traction holes on studded tracks)
- Lugs that are broken or torn off, exposing portions of rods
- Delamination of the rubber
- Broken rods
- Broken studs (studded tracks)
- Bent studs (studded tracks)
- Missing studs
- Studs that are torn off the track
- Missing track guide(s)
- Also, ensure that studs nut are tighten to the recommended torque.

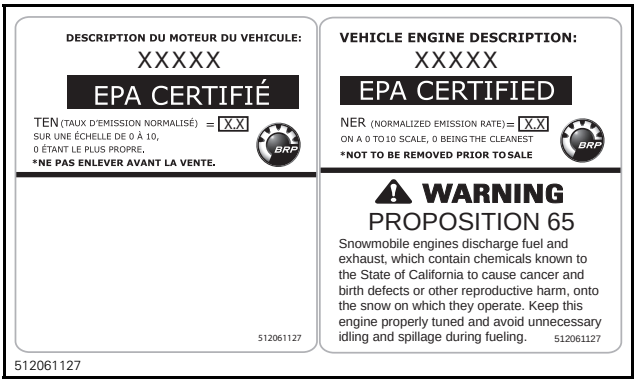
On approved studded tracks, replace broken or damaged studs immediately. If your track shows signs of deterioration, it must be replaced immediately. When in doubt, ask your dealer. Always proceed with a visual inspection of your track before each use.

⚠ WARNING

Riding with a damaged track or studs could lead to loss of control.

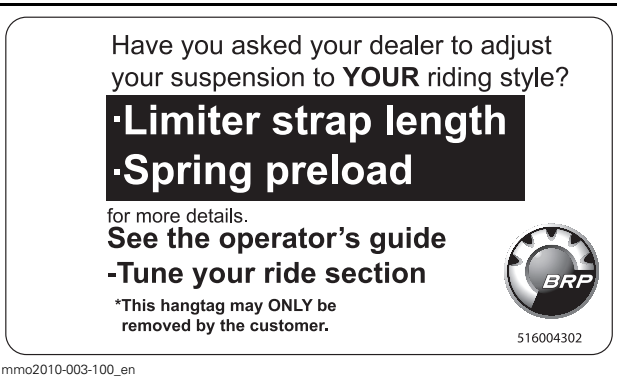
IMPORTANT ON-PRODUCT LABELS

Hang Tag(s)



512061127

TYPICAL



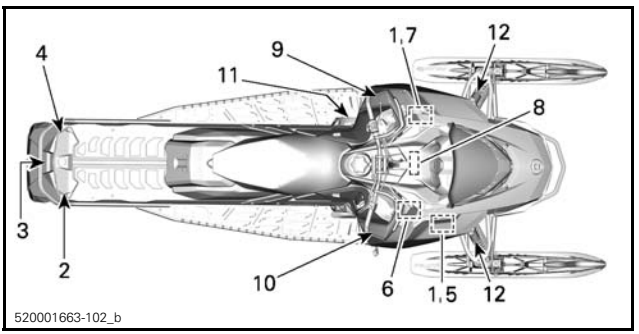
mmo2010-003-100_en

Vehicle Safety Labels

These labels are affixed to the vehicle for the safety of the operator, passenger or bystanders.

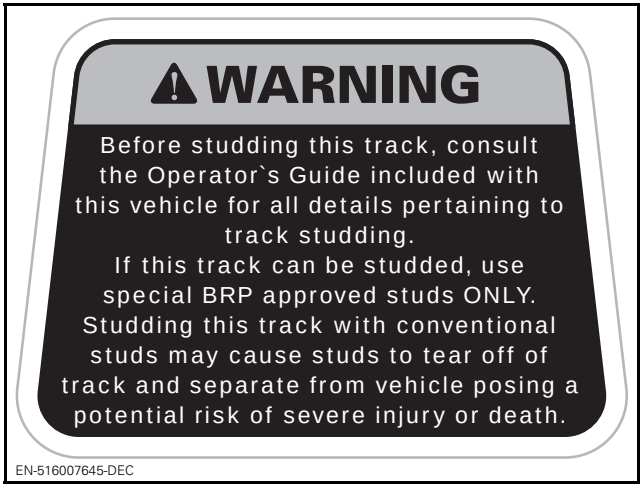
The following labels are on your vehicle and they should be considered permanent parts of the vehicle. If missing or damaged, the decals can be replaced free of charge. See an authorized Ski-Doo dealer.

NOTE: In the event of any discrepancy between this guide and the vehicle, the safety labels on the vehicle have precedence over the labels in this guide.



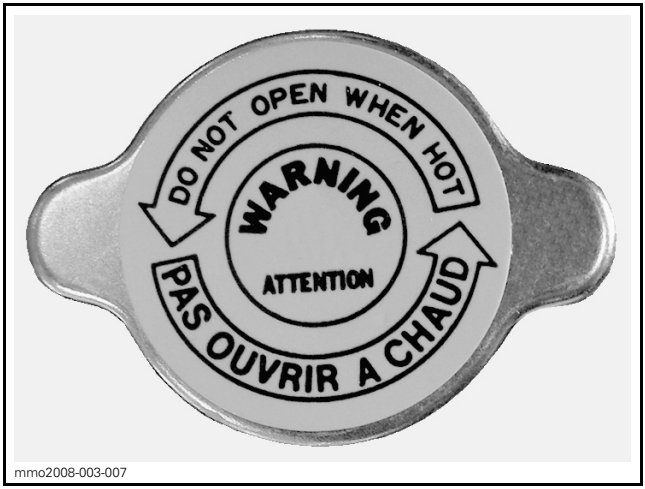
LABEL 1

LABEL 2

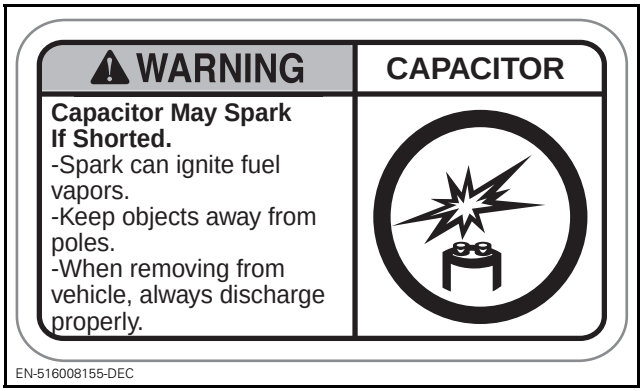


LABEL 3 - APPLICABLE MODELS

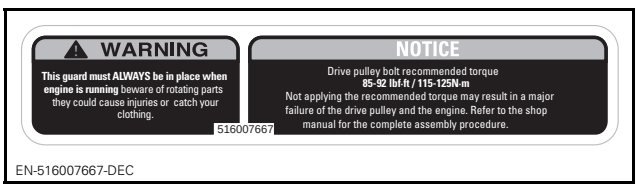
LABEL 4



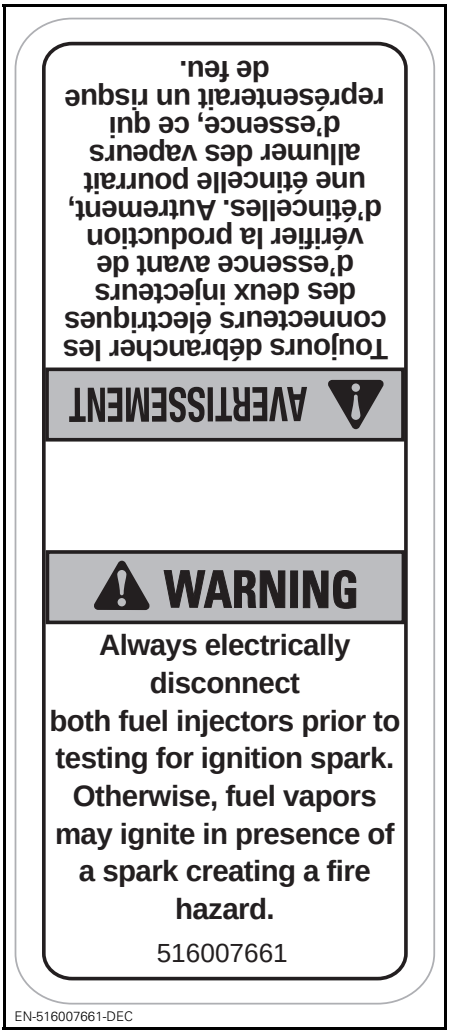
LABEL 5



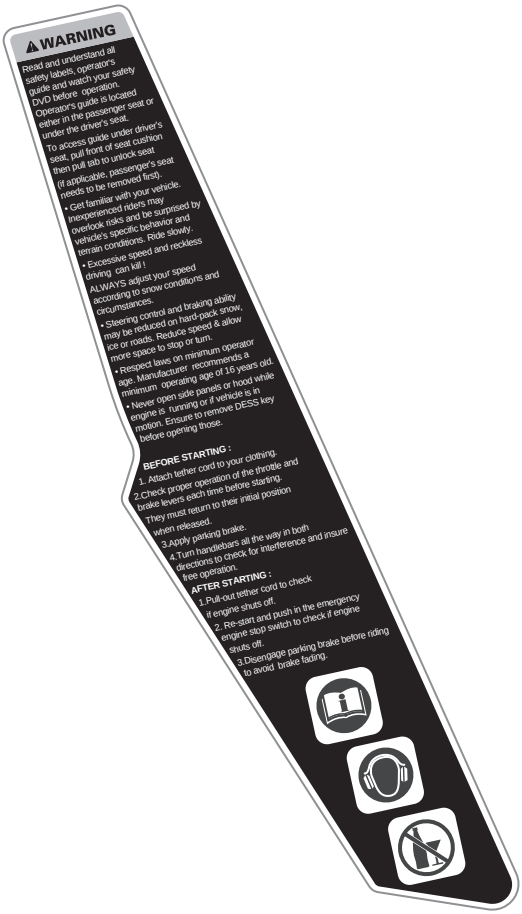
LABEL 6



LABEL 7


Toujours débrancher les connecteurs électriques des deux injecteurs d'essence avant de vérifier la production d'étincelles. Autrement, une étincelle pourrait allumer des vapeurs d'essence, ce qui représenterait un risque de feu.
AVERTISSEMENT
WARNING
Always electrically disconnect
both fuel injectors prior to testing for ignition spark. Otherwise, fuel vapors may ignite in presence of a spark creating a fire hazard.
516007661
EN-516007661-DEC

LABEL 8


⚠WARNING
Read and understand all safety labels, operator's guide and watch your safety DVD before operation.
Operator's guide is located either in the passenger seat or under the driver's seat.
To access guide under driver's seat, pull front of seat cushion then pull tab to unlock seat (if applicable, passenger's seat needs to be removed first).
• Get familiar with your vehicle.
Inexperienced riders may overlook risks and be surprised by vehicle's specific behavior and terrain conditions. Ride slowly.
• Excessive speed and reckless driving can kill !
ALWAYS adjust your speed according to snow conditions and circumstances.
• Steering control and braking ability may be reduced on hard-pack snow, ice or roads. Reduce speed & allow more space to stop or turn.
• Respect laws on minimum operator age. Manufacturer recommends a minimum operating age of 16 years old.
• Never open side panels or hood while engine is running or if vehicle is in motion. Ensure to remove DESS key before opening those.
BEFORE STARTING :
1. Attach tether cord to your clothing.
2.Check proper operation of the throttle and brake levers each time before starting. They must return to their initial position when released.
3.Apply parking brake.
4.Turn handlebars all the way in both directions to check for interference and insure free operation.
AFTER STARTING :
1.Pull-out tether cord to check if engine shuts off.
2. Re-start and push in the emergency engine stop switch to check if engine shuts off.
3.Disengage parking brake before riding to avoid brake fading.
EN-516007603-DEC

LABEL 9

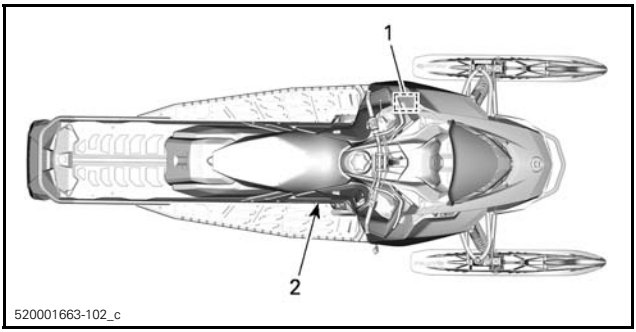

⚠WARNING
This vehicle is designed for one (1) operator and as many passengers as there are seats with straps or handgrips installed on the vehicle conforming to SSCC standards.
Ce véhicule a été conçu pour un (1) conducteur et autant de passagers qu'il y a de siège avec courroles ou poignées installés sur le véhicule et rencontrant la norme SSCC.
When riding with a passenger:
• Braking ability and steering control are reduced.
Decrease speed and allow extra space to maneuver.
• Adjust suspensions according to weight.
REMEMBER : YOU ARE RESPONSIBLE FOR THE SAFETY OF YOUR PASSENGER!
ALL DRIVERS AND PASSENGERS MUST READ THE FOLLOWING:
Avoid surprises!
BE ON THE LOOK-OUT for the unexpected.
Operate defensively.
• Scan constantly for people, objects, conditions and upcoming vehicles.
•Avoid thin ice / open water.
•Use extra caution whenever off-trail.
ALWAYS wear a DOT approved HELMET and clothing appropriate for snowmobiling.
NEVER ride under the influence of alcohol or drugs even as a passenger.
EN-516007604-DEC

LABEL 10

LABEL 11

LABEL 12 - ON SHOCK GAS CHARGED ABSORBERS

Compliance Labels



EPA Compliance Label

EMISSION CONTROL INFORMATION

THIS VEHICLE IS CERTIFIED TO OPERATE ON UNLEADED GASOLINE AND MEETS XXXX U.S. EPA REGULATIONS FOR SNOWMOBILE SI ENGINES.

EC 121

ENGINE FAMILY	XXXXXXXXXXXX	FAMILLE DE MOTEUR
PERMEATION FAMILY	XXXXXXXXXXXX	FAMILLE DE PERMÉATION
FEL	XX g/kW-hr HC XXX g/kW-hr CO X.X g/ m2 / day	LIMITE DES ÉMISSIONS DES FAMILLES
ENGINE DISPLACEMENT	XXX cm³	CYLINDRÉE
EXHAUST EMISSION CONTROL SYSTEM	XXXX	SYSTÈME DE CONTRÔLE DES ÉMISSIONS

RENSEIGNEMENTS SUR LE DISPOSITIF ANTIPOLLUTION

CE VÉHICULE EST CERTIFIÉ POUR FONCTIONNER À L'ESSENCE SANS PLOMB ET IL RÉPOND AUX NORMES XXXX DE L'EPA DES É.-U. POUR LES MOTONEIGES À MOTEUR SI.

SEE OPERATOR'S GUIDE FOR MAINTENANCE SPECIFICATIONS
VOIR GUIDE DU CONDUCTEUR POUR LES SPÉCIFICATIONS D'ENTRETIENS

BOMBARDIER RECREATIONAL PRODUCTS INC. 6865

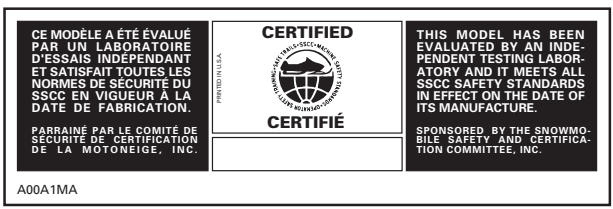
516006865

TYPICAL: COMPLIANCE LABEL 1 - IN ENGINE COMPARTMENT

SSCC Label

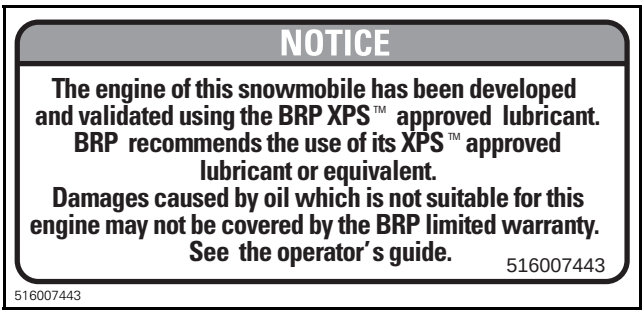
Safety standards for snowmobiles have been adopted by the Snowmobile Safety and Certification Committee (SSCC) of which BRP is a proud participating member. Assurance that your snowmobile meets these standards is easily checked by locating the Certification Label on a right vertical portion of the vehicle.

The following label shows that an independent testing laboratory has verified compliance with the SSCC safety standards.

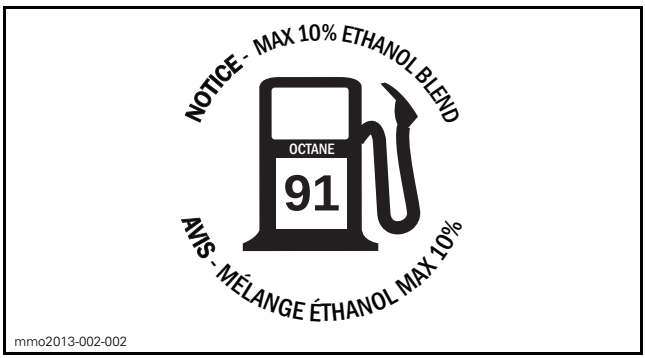


LABEL 2

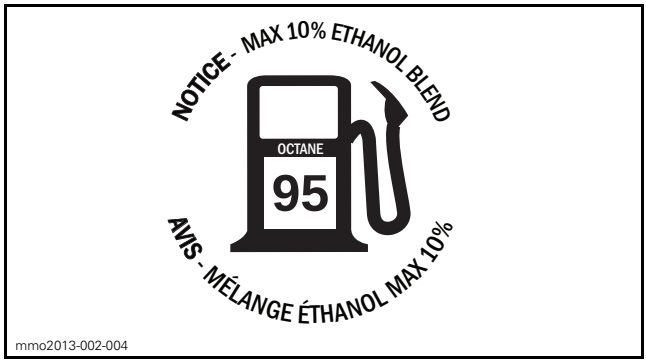
Technical Information Labels



ON OIL RESERVOIR



ON FUEL CAP - IN COUNTRIES USING PUMP POSTED AKI (RON+MON)/2 OCTANE RATINGS



ON FUEL CAP - IN COUNTRIES USING RON OCTANE RATINGS

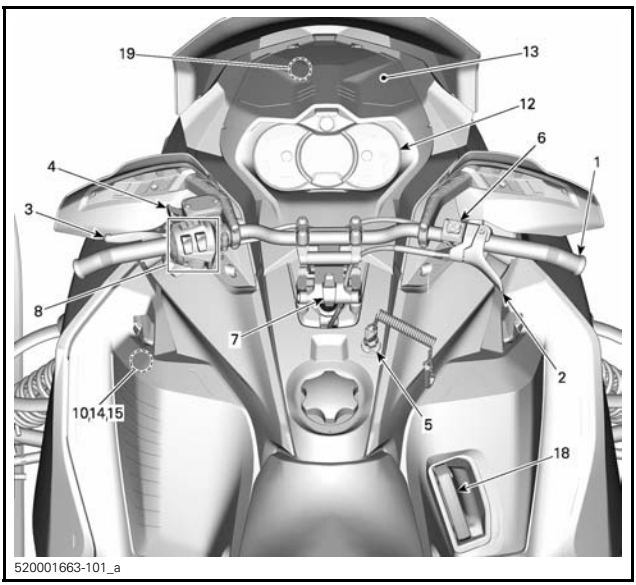
This page is intentionally blank

VEHICLE INFORMATION

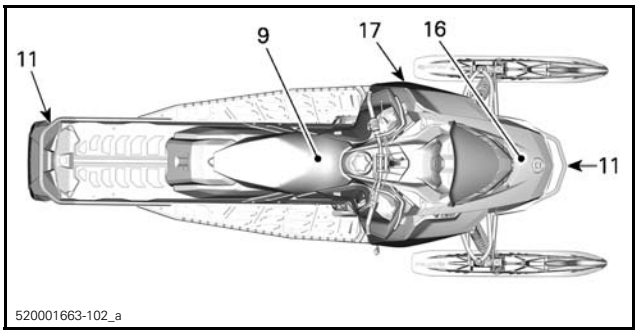
CONTROLS, INSTRUMENTS AND EQUIPMENT

NOTE: Some features may not apply to your model or could be optional.

NOTE: Some vehicle safety labels are not shown on illustrations. For information on vehicle safety labels, refer to *VEHICLE SAFETY LABELS* subsection.



520001663-101_a



1) Handlebar

The handlebar controls the steering of the snowmobile. As the handlebar is rotated to right or left, the skis are turned right or left to steer the snowmobile.

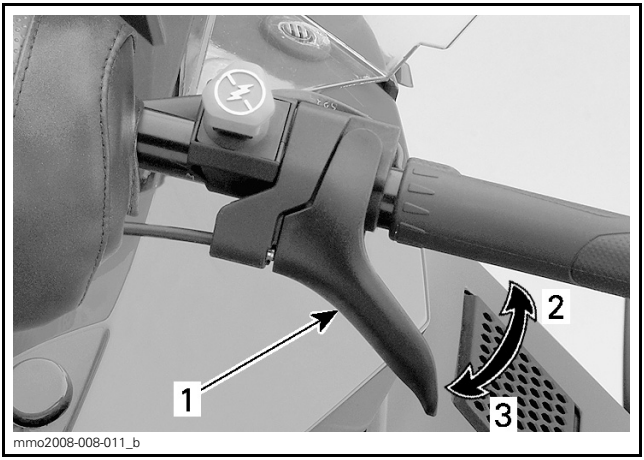
⚠ WARNING

Fast reverse while turning, could result in loss of stability and control.

2) Throttle Lever

Throttle lever is located on the RH side of handlebar.

Designed to be thumb activated. When squeezed, it increases the engine speed. When released, engine speed returns automatically to idle.



mmo2008-008-011_b

TYPICAL
1. *Throttle lever*
2. *To accelerate*
3. *To decelerate*

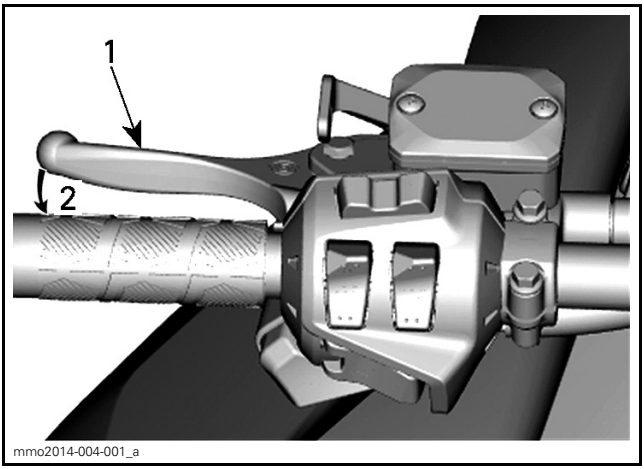
⚠ WARNING

Test the throttle lever operation each time before starting the engine. The lever must return to the rest position once released. Otherwise, do not start engine.

3) Brake Lever

Brake lever is located on the LH side of handlebar.

When squeezed, brake is applied. When released, it automatically returns to the rest. Braking effect is proportional to the pressure applied on the lever and to the type of terrain and its snow coverage.

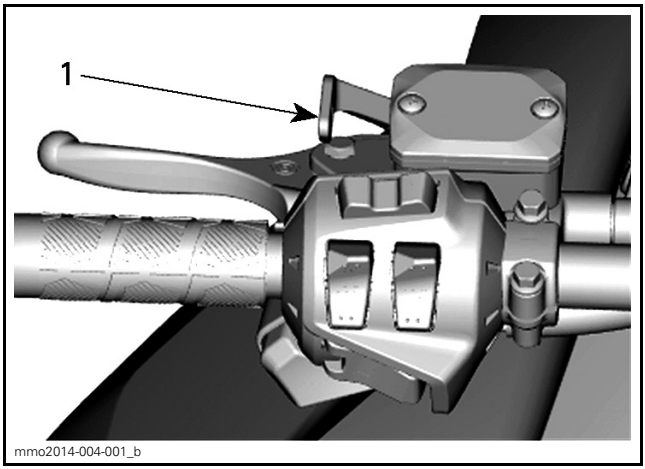


TYPICAL
1. Brake lever
2. To apply brake

4) Parking Brake Lever

Parking brake lever is located on the LH side of handlebar.

Parking brake should be used whenever snowmobile is parked.



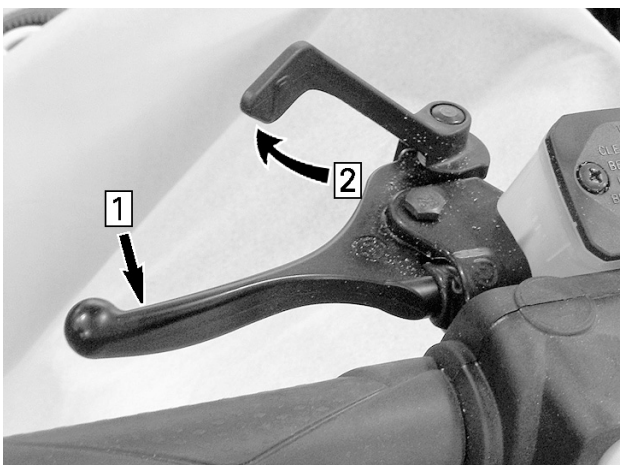
TYPICAL
1. Parking brake lever

⚠ WARNING

Make sure parking brake is fully disengaged before operating the snowmobile. When you ride the vehicle, brake pads that are caused to drag by a continuous pressure on the lever may cause damage to the brake system and cause loss of braking capacity and/or fire.

To Engage Parking Brake

Apply and hold brake, then lock brake lever using the parking brake lever as shown.



mmo2009-005-006_a

TYPICAL — ENGAGE MECHANISM
Step 1: Apply and hold brake
Step 2: Lock brake lever using parking brake lever

To Release Parking Brake

Squeeze brake lever. Parking brake lever will automatically return to its original position. Always release parking brake before riding.

5) Engine Cut-off Switch

The engine cut-off switch (tether cord) is located on the console.

The tether cord cap must be securely snapped on the engine cut-off switch to allow vehicle operation.

NOTE: After engine starting, 2 short beeps should be heard if a programmed D.E.S.S. key (tether cord cap) is correctly snapped on engine cut-off switch. If another beep code is heard, refer to *MONITORING SYSTEM* for D.E.S.S. malfunction codes information.

Pulling the tether cord cap from the switch shuts the engine off.

⚠ WARNING

Always attach the tether cord eyelet to clothing before starting the engine.

D.E.S.S. (Digitally Encoded Security System)

The tether cord cap has an integrated D.E.S.S. key to provide you and your snowmobile with the equivalent security of a conventional lock key.

The D.E.S.S. key contains an electronic chip which features a unique permanently memorized digital code.

Your authorized Ski-Doo dealer has programed the D.E.S.S. of your snowmobile to recognize the D.E.S.S. key in the tether cord cap to allow vehicle operation.

If another tether cord is used without programming the D.E.S.S., the engine will start but will not reach drive pulley engagement speed to move vehicle.

Make sure the tether cord cap is free of dirt or snow.

D.E.S.S. Flexibility

The D.E.S.S. of your snowmobile can be programmed by your authorized Ski-Doo dealer to accept up to 8 different keys.

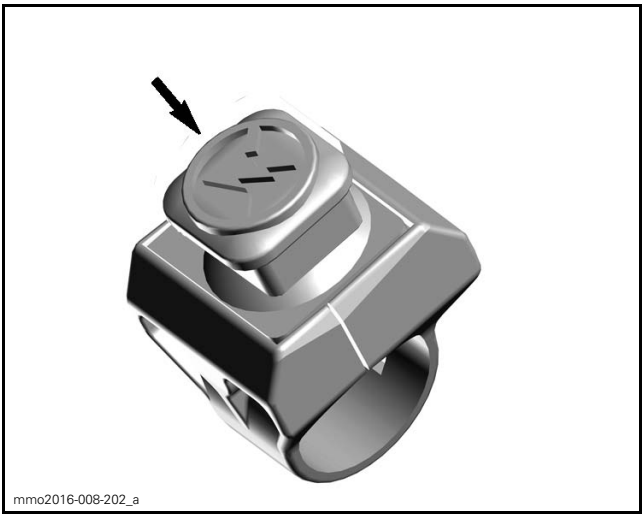
We recommend the purchase of additional tether cords from your authorized Ski-Doo dealer. If you have more than one D.E.S.S. equipped Ski-Doo snowmobile, each can be programmed by your authorized Ski-Doo dealer to accept the other vehicles D.E.S.S. keys.

6) Emergency Engine Stop Switch

The emergency engine stop switch is located on the RH side of handlebar.

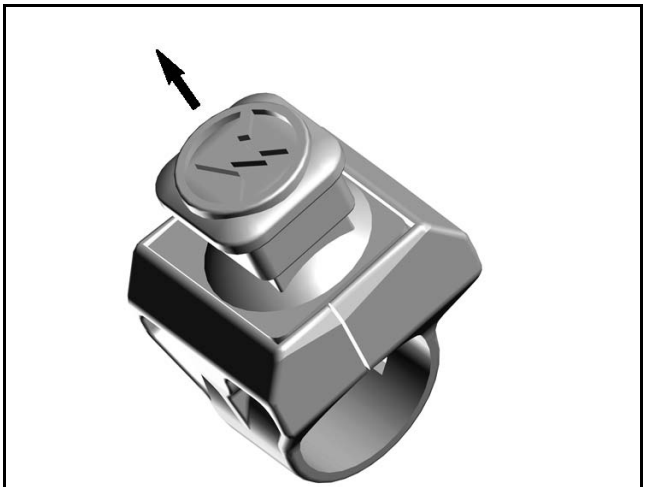
Push-pull type switch.

To stop the engine in an emergency, select OFF position (down) and simultaneously apply the brake. To restart, button must be at the ON position (up).



OFF POSITION

To allow engine starting, the switch must be in the ON position (UP).



ON POSITION

All operators of the snowmobile should familiarize themselves with the function of the emergency engine stop switch by using it several times on first outing and whenever stopping the engine thereafter. This engine stopping procedure will become a reflex and will prepare operators for emergency situations requiring its use.

⚠ WARNING

If the switch has been used in an emergency caused by a suspected malfunction, the source of the malfunction should be determined and corrected before restarting engine. See an authorized Ski-Doo dealer for servicing.

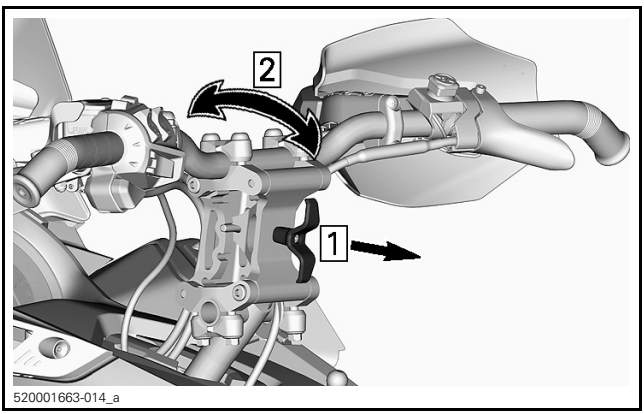
7) Adjustable Handlebar Riser (MX Z X and Renegade X)

⚠ WARNING

Always stop engine before adjusting handlebar.

The handlebar can be set in four different positions.

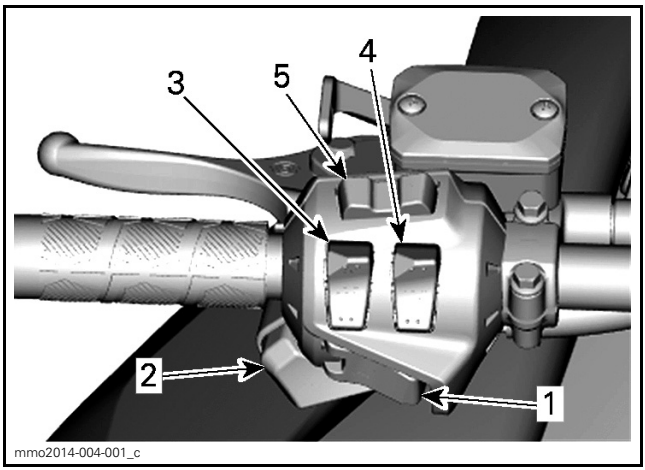
To change handlebar position, pull lever and position handlebar as desired.



Move the handlebar back and forth to make sure mechanism is securely engaged.

8) Multifunction Switch

Multifunction switch is located on the LH side of handlebar.



TYPICAL
1. *Start/Electronic Reverse button*
2. *Headlights dimmer switch*
3. *Heated grips switch*
4. *Heated throttle lever switch*
5. *Mode/set button*

Start/Electronic Reverse Button

On electric start models, press to start engine. Refer to *ENGINE STARTING PROCEDURE* in the *BASIC PROCEDURES* subsection.

Once engine is started, press to engage the electronic reverse. Refer to *REVERSE (RER)* in *BASIC PROCEDURES* section for procedure.

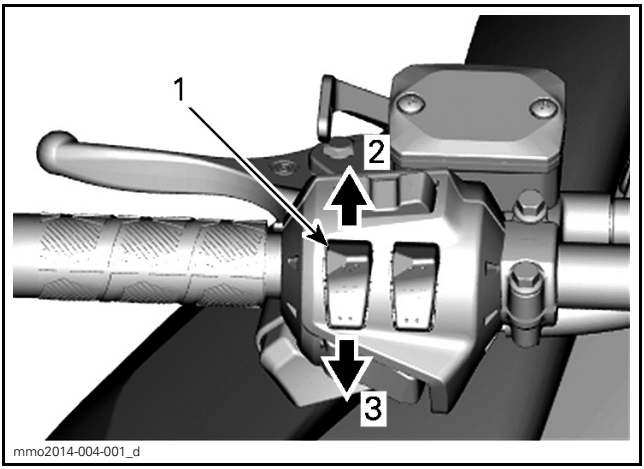
Headlights Dimmer Switch

Press to select HI or LOW beam. Lights are automatically ON when the engine is running.

Heated Grips Switch

NOTE: Under 2000 RPM, heated grips will be limited at 50%.

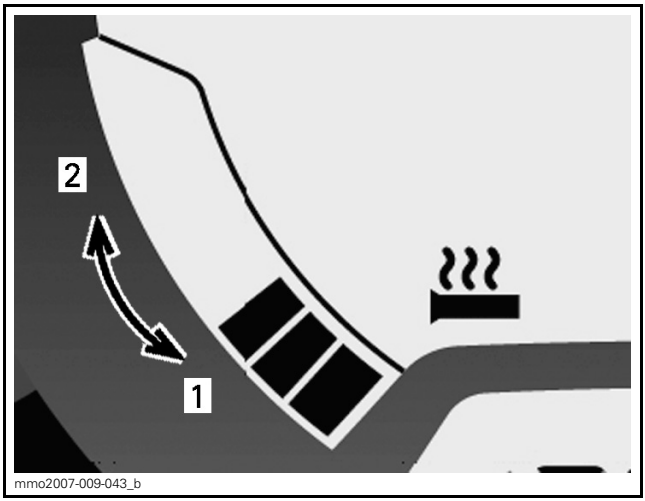
Depress switch as required to select heating intensity to keep your hands at a comfortable temperature.



VARIABLE INTENSITY
1. *Heated grip switch*
2. *Increase heat*
3. *Decrease heat*

The heating intensity is displayed via the digital display.

NOTE: There are nine intensity settings. When released, display will return to engine coolant temperature (if equipped).



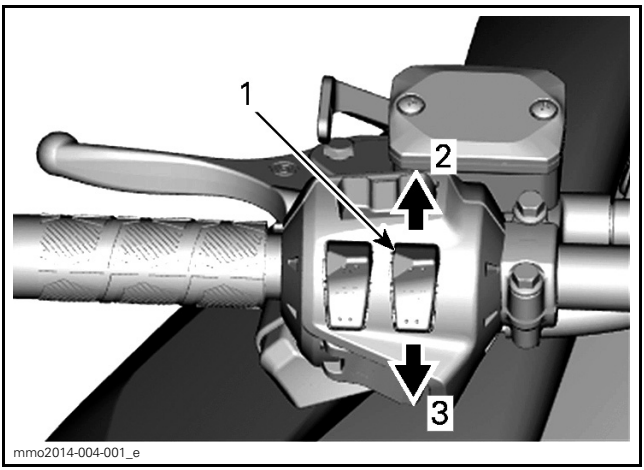
HEATING INTENSITY DISPLAY
1. *Less heat*
2. *More heat*

Heated grips will be in OFF position when there are no bars displayed on the gauge.

Heated Throttle Lever Switch

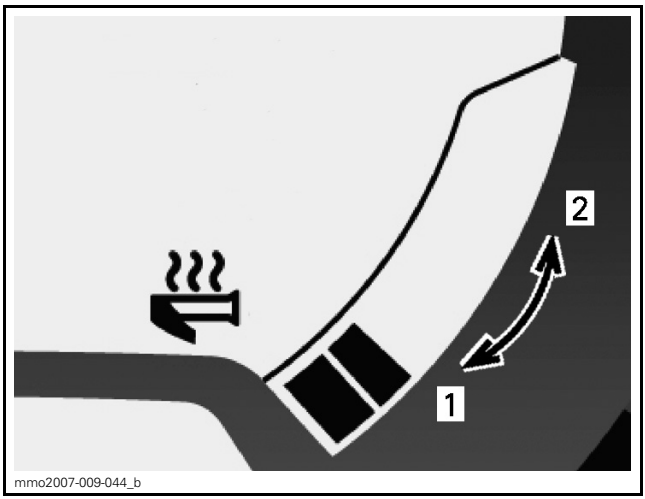
NOTE: Under 2000 RPM, heated throttle lever will be limited at 50%.

Depress switch as required to select heating intensity to keep your thumb at a comfortable temperature.



VARIABLE INTENSITY
1. *Heated throttle lever switch*
2. *Increase heat*
3. *Decrease heat*

NOTE: The heating intensity is displayed via the multifunction display with the activation of the throttle lever switch. There are nine intensity settings. When released, display will return to fuel tank level.

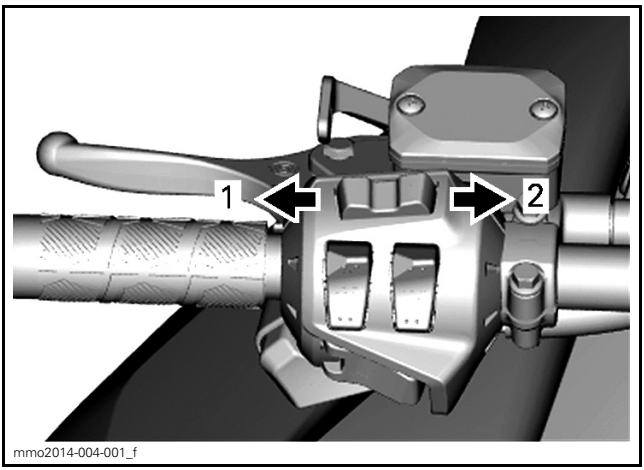


HEATING INTENSITY DISPLAY
1. *Less heat*
2. *More heat*

Heated throttle lever will be in OFF position when there are no bars displayed on the gauge.

Mode/Set Button

This button is used to manage the information displayed on the multifunction analog/digital gauge.

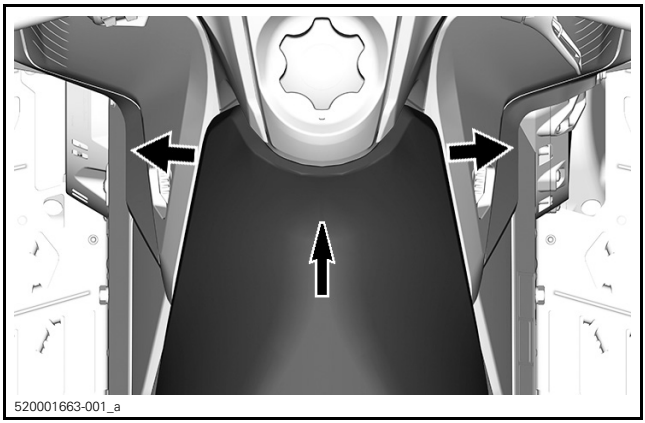


MULTIFUNCTION GAUGE
1. MODE function
2. SET function

9) Seat

Seat Removal

While pushing in the center of the seat towards front, pull on both sides, to unlock.



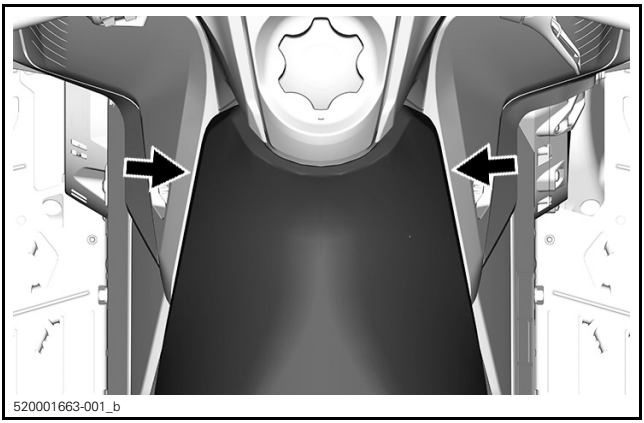
Slide seat rearwards to remove it.

Seat Installation

NOTICE Riding the vehicle with any objects between the seat and the fuel tank could damage the fuel tank. NEVER place any objects between seat and fuel tank.

Place seat over the hooks, then slide it forward.

Securely engage both ball studs at front.



⚠ WARNING

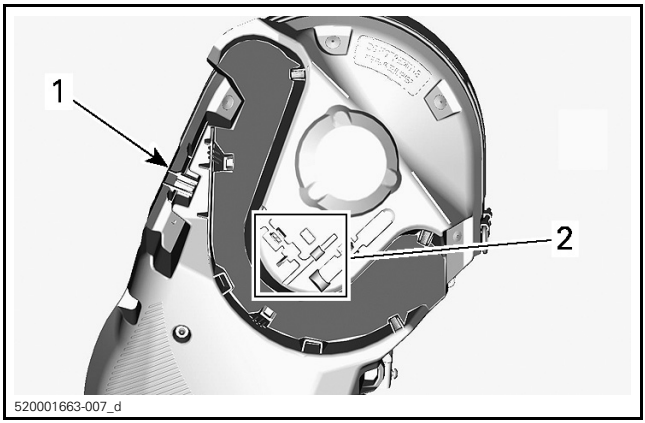
Make sure seat is securely latched before riding.

10) Tools

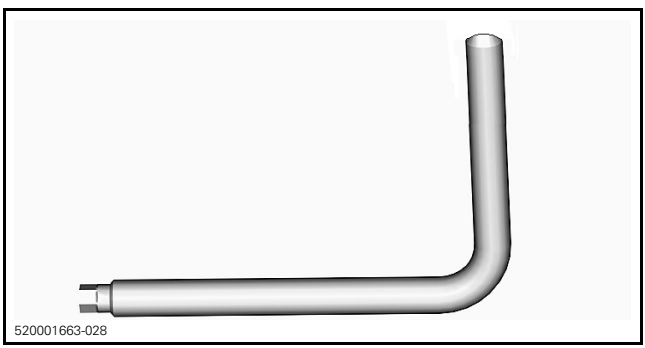
A part of the drive belt guard is designed to hold the tools allowing for basic maintenance.

The tools are supplied with the vehicle.

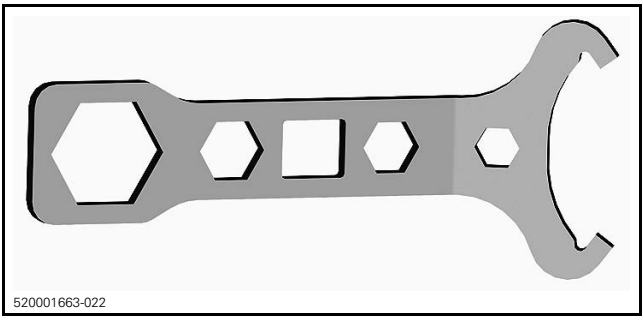
NOTICE Make sure tools are secured properly.



DRIVE BELT GUARD
1. *Suspension adjustment tool location*
2. *Pulley expander location*



PULLEY EXPANDER

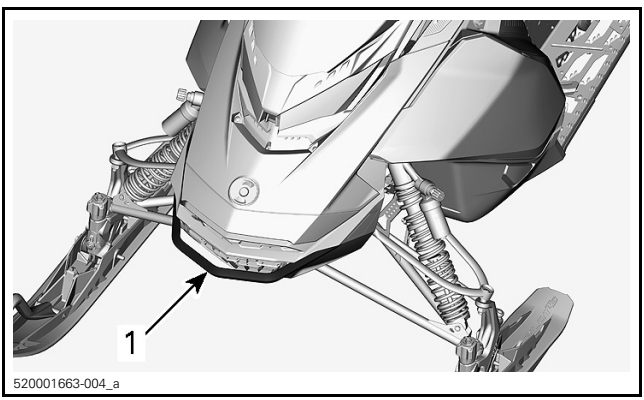


SUSPENSION ADJUSTMENT TOOL

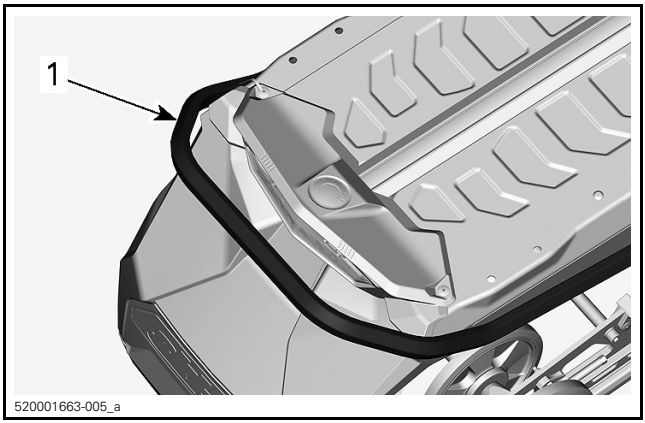
11) Front and Rear Bumpers

To be used whenever snowmobile requires manual lifting.

⚠ **CAUTION** Beware of injuries by using proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits. Use appropriate lifting device or have assistance to share lifting stress if possible.



1. Front bumper



1. Rear bumper

NOTICE Do not use skis to pull or lift snowmobile.

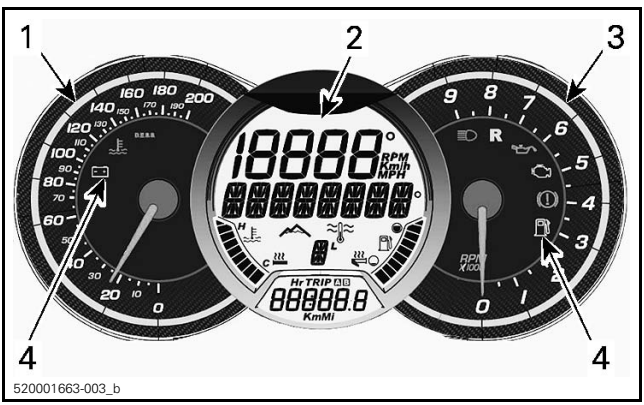
12) Multifunction Analog/Digital Gauge

⚠ WARNING

Reading the gauge digital display can distract from the operation of the vehicle, particularly from constantly scanning the environment.

NOTE: The gauge is factory preset in Imperial units and in English. To change units or language, contact an authorized Ski-Doo dealer.

Gauge Features



MULTIFUNCTION ANALOG/DIGITAL GAUGE
1. *Analog speedometer*
2. *Multifunction digital display*
3. *Analog tachometer*
4. *Pilot lamps*

1) Analog Speedometer

Indicates vehicle speed.

mmo2008-007-017

TYPICAL - LH PORTION OF GAUGE

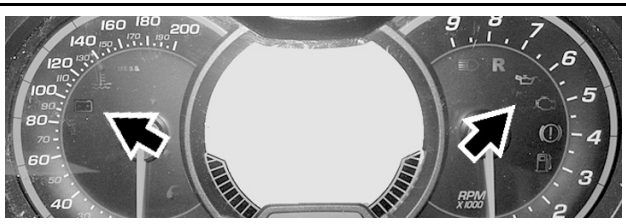
2) Analog Tachometer (RPM)

Indicates engine revolution per minute (RPM). Multiply by 1000 to obtain the actual revolutions.

mmo2008-007-018

TYPICAL - RH PORTION OF GAUGE

3) Pilot Lamps and Messages



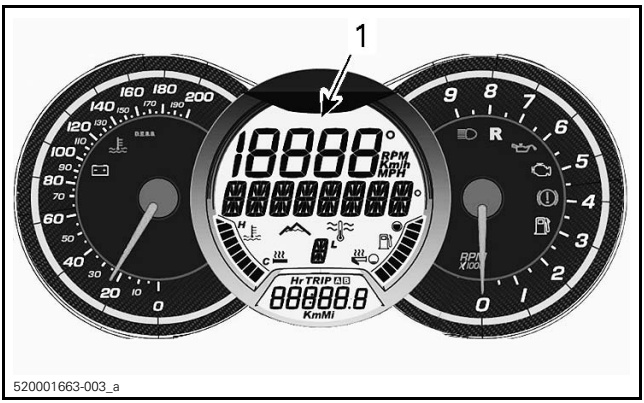
mmo2013-004-045_b

TYPICAL — PILOT LAMPS

See table below for usual pilot lamps information. Refer to *MONITORING SYSTEM* for details on malfunction pilot lamps and messages.

PILOT LAMP ON	BEEPER	MESSAGE DISPLAY	DESCRIPTION
	4 short beeps every 5 minutes	LOW OIL	Injection oil level is low. Stop vehicle in a safe place then, replenish injection oil reservoir.
	—	—	Low fuel level. One (1) bar left in fuel level display. Replenish fuel tank as soon as possible.
	Long beeps repeating slowly	REVERSE	Reverse is selected.
	3 short beeps	REV. FAIL	Reverse did not engage, try again.
	—	—	High beam headlights are selected.
—	—	WARM UP	Engine and/or injection oil need to warm-up before normal operation. The engine's RPM is limited until desired temperature is reached (up to 10 minutes when driving). Warm-up period may occur after a restart in very cold weather.

4) Multifunction Digital Display



1. Multifunction display

The multifunction display is used to:

- Display the WELCOME message on power up
- Display the KEY recognition message
- Provide various indications as selected by the operator
- Display scrolling messages of function activation or system faults
- Display fault codes.

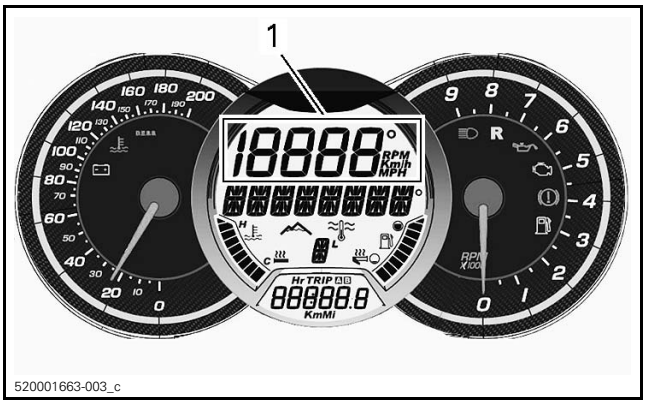
There are five digital displays where various information can be displayed.

- Upper display
- Center display
- Lower display
- LH side bar gauge
- RH side bar gauge

⚠ WARNING

Never adjust or set functions on the multifunction gauge while riding the vehicle.

Upper Display



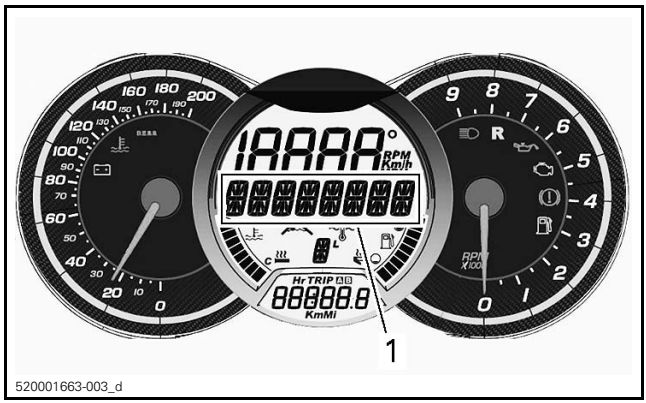
1. Upper Display

The following information can be selected on the upper diplay:

UPPER DISPLAY INFORMATION
Vehicle speed
Top speed (Since the last reset)
Average speed (Since the last reset)
Engine RPM
Top RPM (Since the last reset)
Instant fuel consumption
Total fuel consumption (Since the last reset)

To set the display to your preference, see *UPPER DISPLAY AND CENTER DISPLAY SET-UP*

Center Display



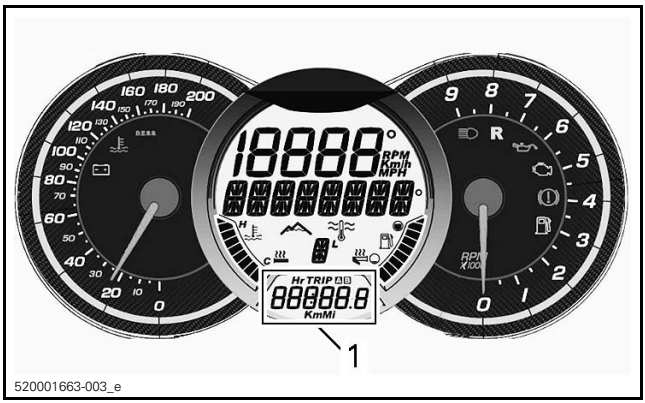
1. Center Display

The following information can be selected on the center display:

CENTER DISPLAY INFORMATION
Vehicle speed
Engine RPM
Engine coolant temperature
Altitude
System messages See *PILOT LAMPS AND MESSAGES* and *MONITORING SYSTEM* for details

To set the display to your preference, see *UPPER DISPLAY AND CENTER DISPLAY SET-UP*

Lower display



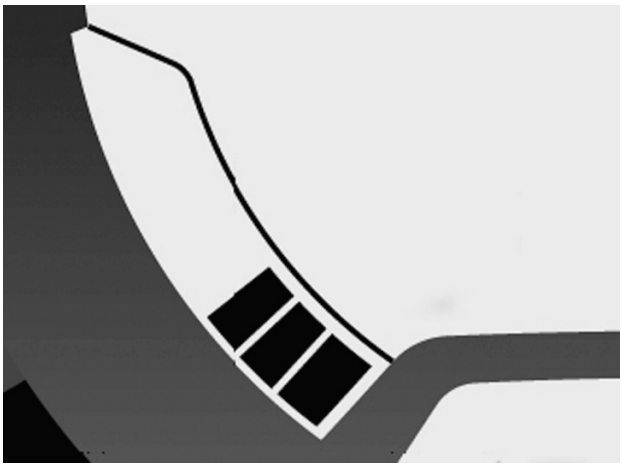
1. Lower display

The following information can be selected on the lower display:

LOWER DISPLAY INFORMATION
Odometer
Trip odometer
Trip hour
Clock

To set the display to your preference, see *LOWER DISPLAY SET-UP*

LH side Bar Gauge



520001663-019

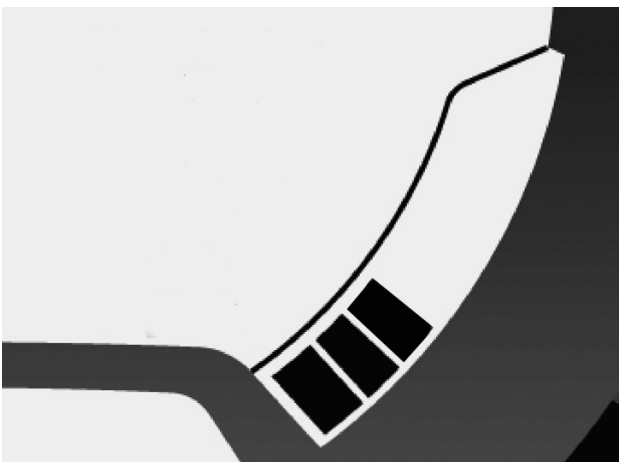
LH BAR GAUGE INFORMATION
Engine coolant temperature
Heated grips level

The LH side bar gauge displays the engine coolant temperature except while adjusting the heated grips.

NOTICE If engine overheats, stop vehicle in a safe place. Refer to TROUBLESHOOTING section.

For details on heated grips operation, see *HEATED GRIPS SWITCH* in this section.

RH side Bar Gauge



520001663-020

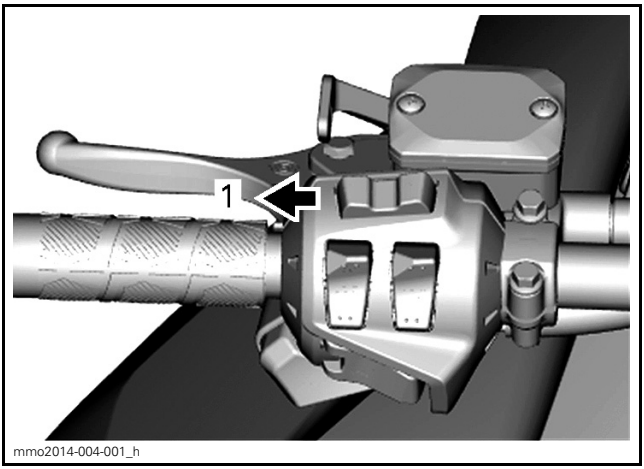
RH BAR GAUGE INFORMATION
Fuel level
Heated throttle lever level

The RH side bar gauge displays the fuel level except while adjusting the heated throttle lever.

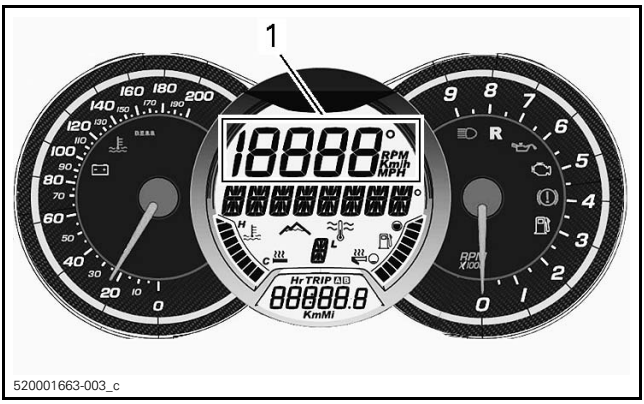
For details on heated throttle lever operation, see *HEATED THROTTLE LEVER SWITCH* in this section.

Upper Display and Center Display Set-Up

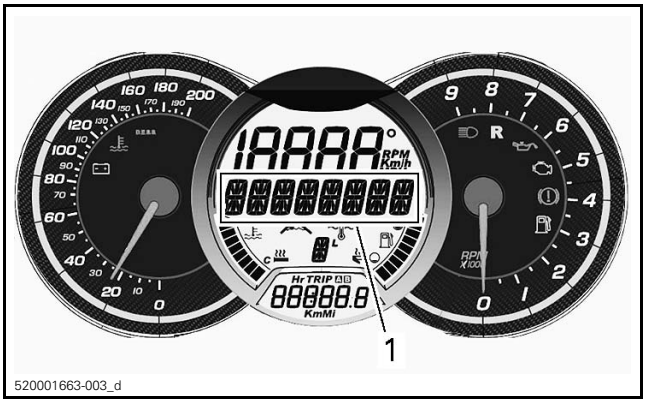
1. Select the upper or center display by using the MODE (M) button on the multifunction switch.



1. MODE (M) button

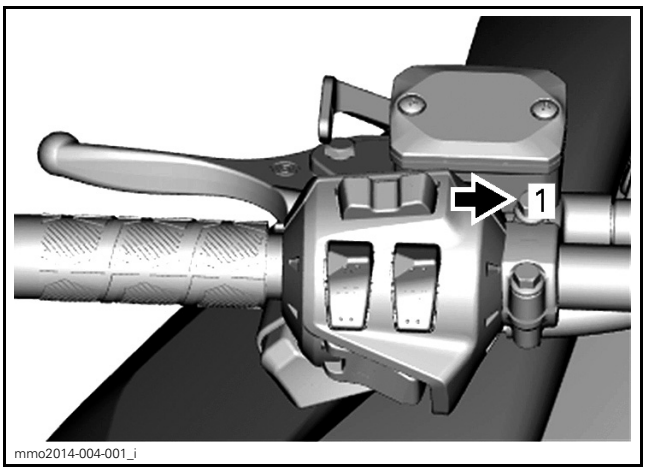


1. Upper display



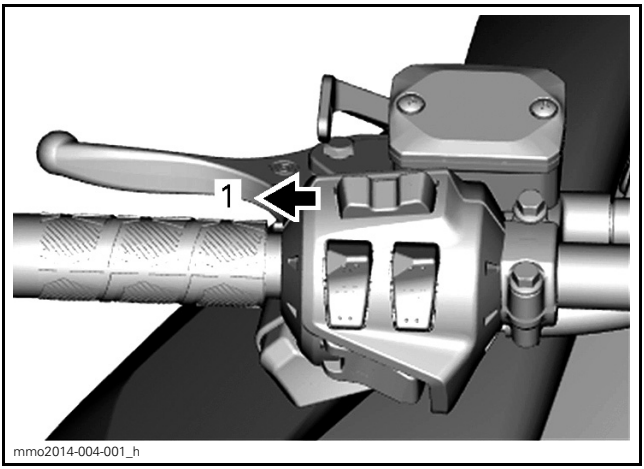
1. Center display

2. While the desired display is flashing, navigate through the display, by using the SET (S) button on the multifunction switch.



1. SET (S) button

Once the desired information is displayed, press the MODE (M) button or wait 5 seconds to confirm.



1. MODE (M) button

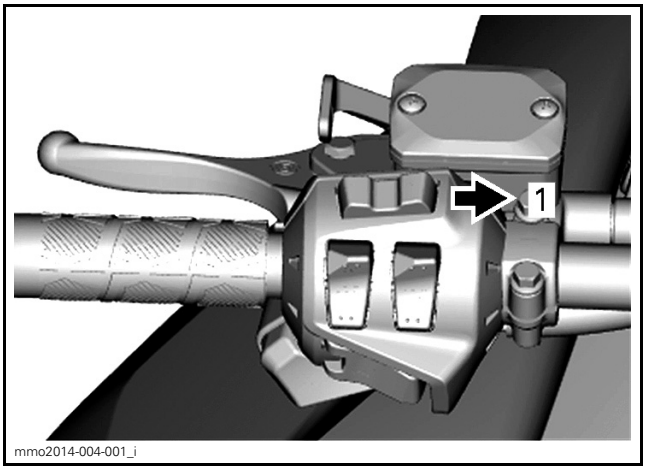
To reset
- Average speed
- Top speed
- Total fuel consumption
- Top RPM

Press and hold the SET (S) button while display is flashing.

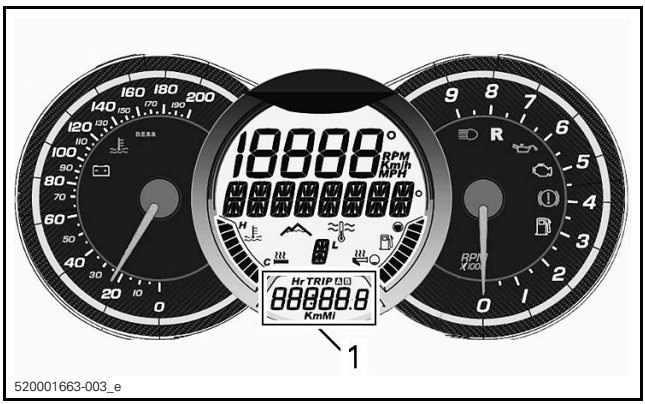
Lower Display Set-Up

Odometer and Hour Meter

Select the desired information by using the SET (S) button on the multifunction switch.



1. SET (S) button



1. Lower display

To reset

– Trip odometer A or B

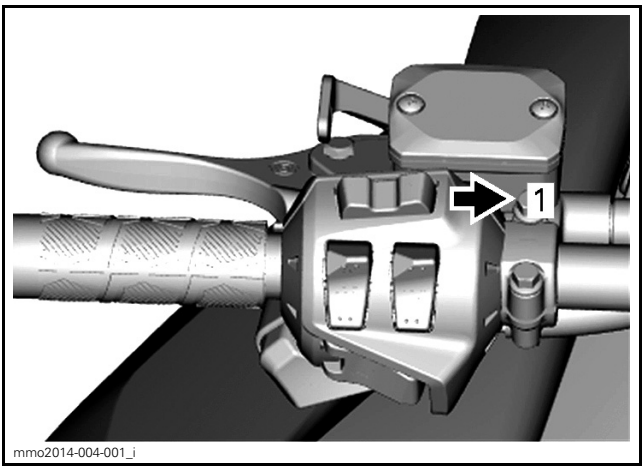
– Trip hour Meter

Press and hold the SET (S) button.

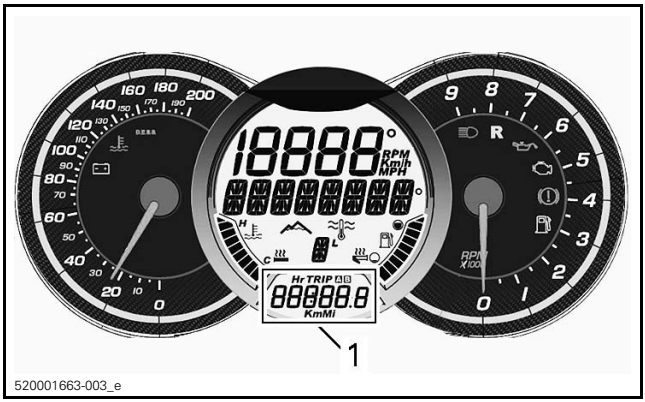
Clock

NOTE: This clock displays hour in the 24-hour format only.

Press the SET (S) button to select the clock mode on the lower display.



1. SET (S) button



1. Lower display

To set time:

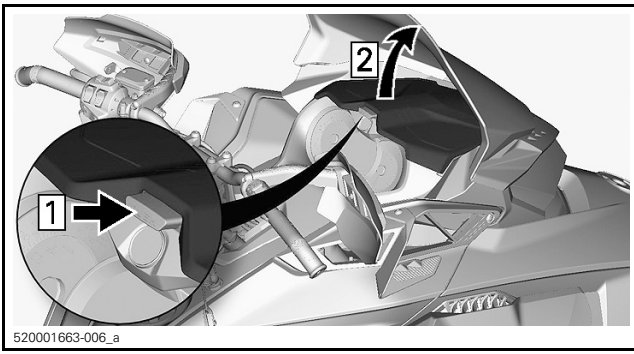
– Press and hold the SET (S) button
– While the hour digits are flashing, use the SET (S) button to set
– Use the MODE (M) button to switch to the minutes digits
– While the minutes digits are flashing, use the SET (S) button to set
– Press the MODE (M) button to save clock set-up and exit.

13) Storage Compartment

A storage compartment is located at the front of the vehicle, above the gauge.

The Operator's Guide and the emergency starter rope are in the front storage compartment.

To open, push the button and lift the cover.



NOTE: When closing, make sure cover is secured properly. You will hear a "clic".

14) Drive Belt Guard

Drive Belt Guard Removal

⚠ WARNING

NEVER operate engine:

– Without shields and belt guard securely installed.

– With hood and/or side panels opened or removed.

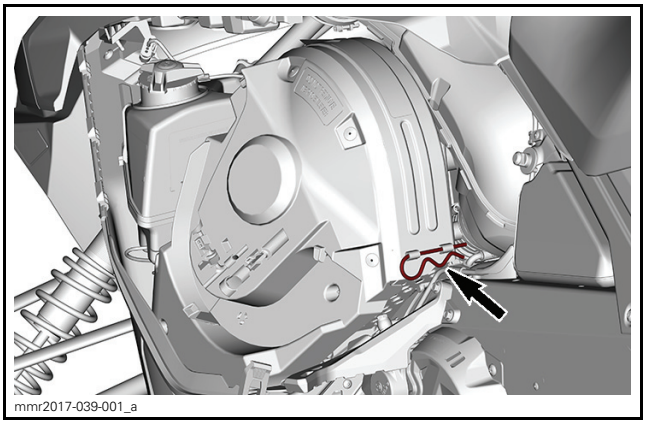
NEVER attempt to make adjustments to moving parts while engine is running.

NOTE: Belt guard is purposely made slightly oversize to maintain tension on its pins and retainers preventing undue noise and vibration. It is important that this tension be maintained when reinstalling.

Remove tether cord cap from engine cut-off switch.

Open the LH side panel. See procedure in this section.

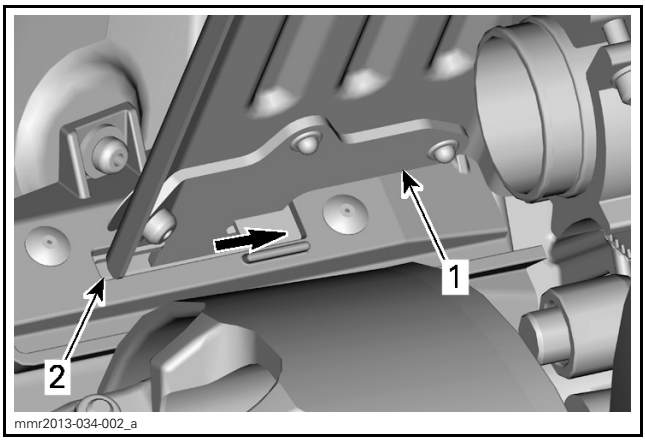
Remove retaining pin.


mmr2017-039-001_a

Lift rear portion of guard then release from front tab.

Drive Belt Guard Installation

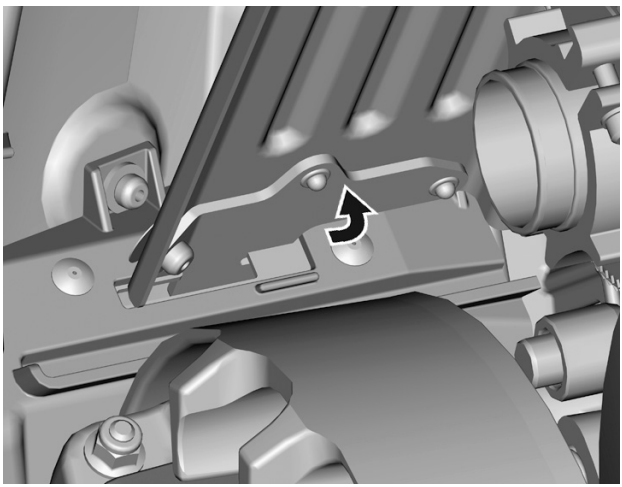
Insert the tab into the slot and push it into place



mmr2013-034-002_a

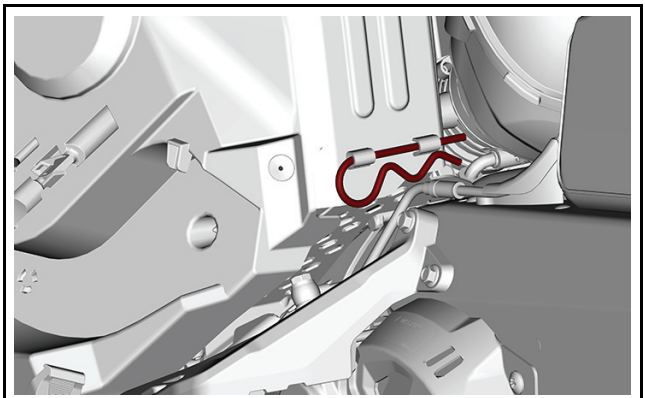
1. *Belt guard tab*
2. *Front support slot*

Push drive belt guard toward engine then toward front of vehicle.



mmr2013-034-006_a

Position the rear portion of the belt guard over the retainer and secure it using the retaining pin.

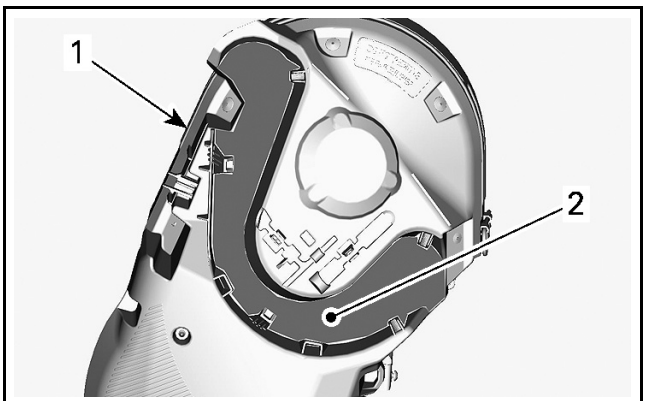

mmr2017-039-002

15) Spare Drive Belt Holder

A spare drive belt can be stored in a holder located on the drive belt guard.

NOTE: The spare drive belt is not supplied with the snowmobile.

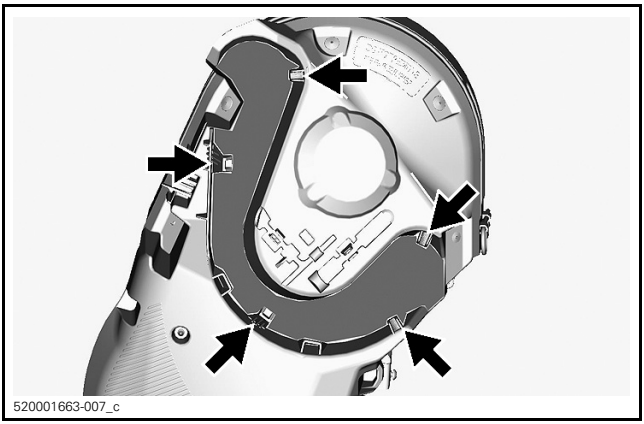
Position spare drive belt into drive belt guard slot.



520001663-007_b

1. *Drive belt guard*
2. *Slot*

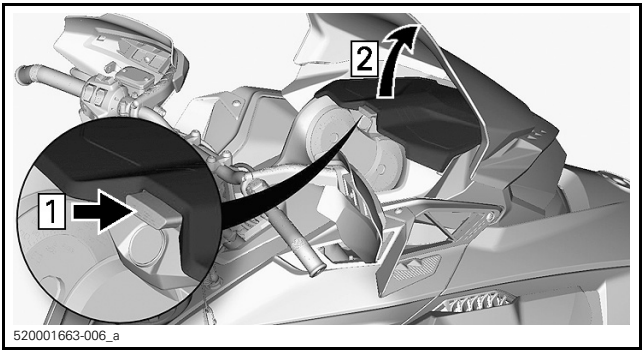
Secure in place by sliding it behind the tabs.


520001663-007_c

16) Upper Body Module (Hood)

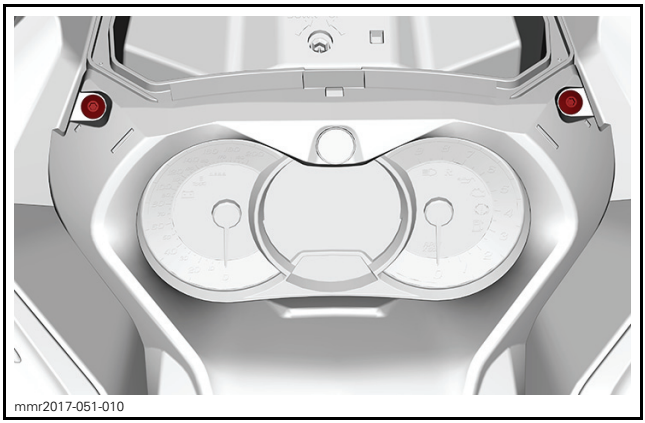
Upper Body Module Removal

1. Open the storage compartment.

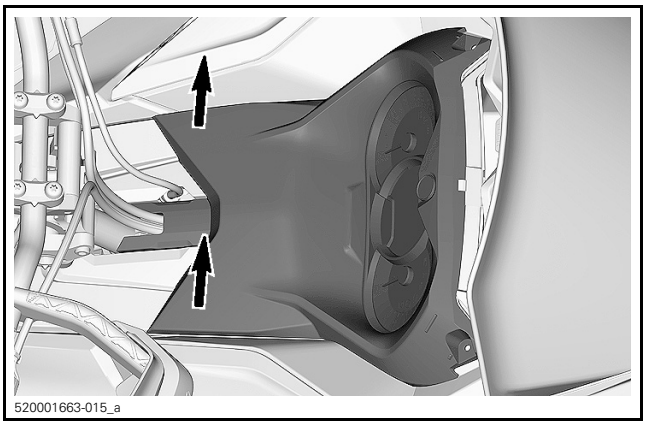


520001663-006_a

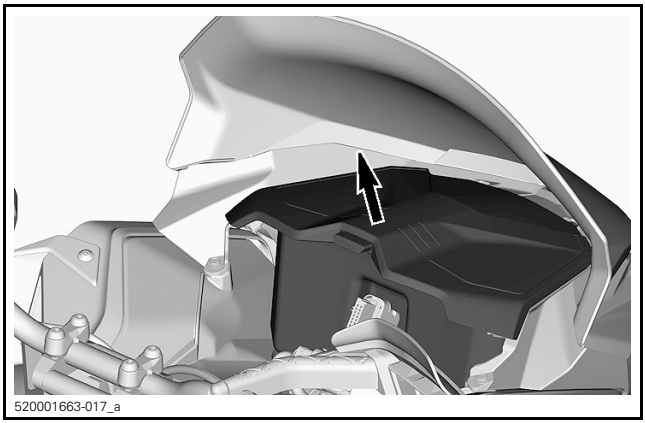
2. Remove the gauge retaining screws.


mmr2017-051-010

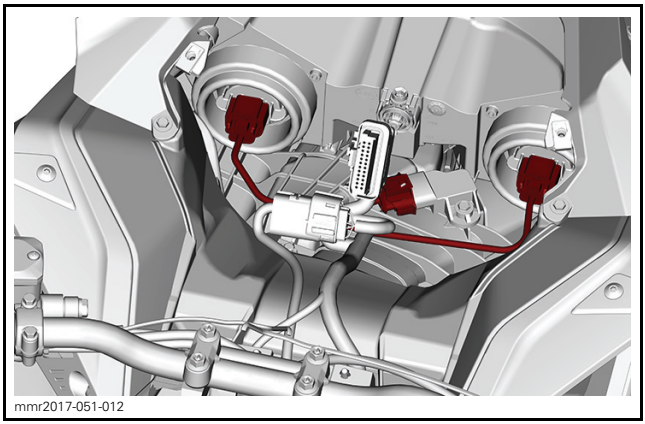
3. Free the rear of the gauge from its grommets.


520001663-015_a

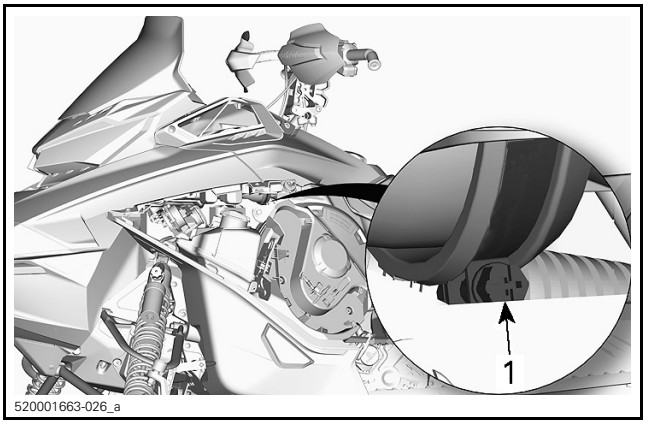
4. Slide the gauge forward to remove it.
5. Set gauge aside.
6. Remove the storage compartment.


520001663-017_a

7. Disconnect the MAPTS and headlight connectors.

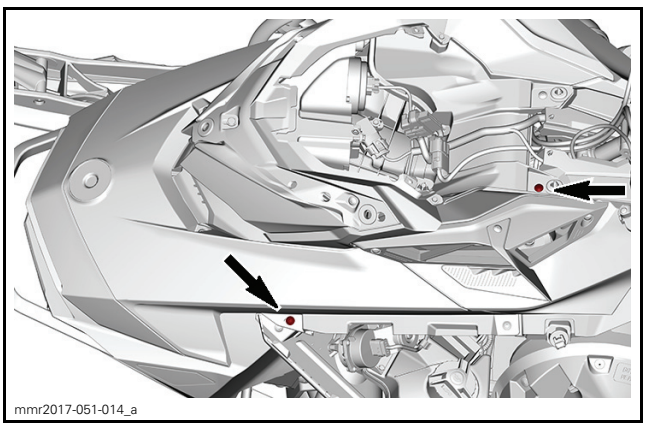

mmr2017-051-012

8. Loosen the air intake duct clamp.

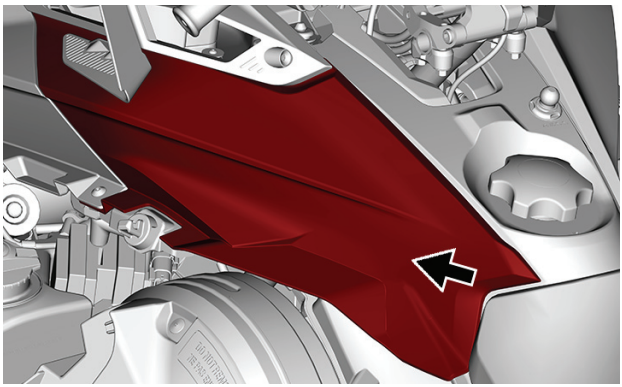


1. Clamp

9. Remove the upper body module retaining screws on both sides.



10. Free the rear end hooks of the upper body module from the slots in the console.



mmr2017-051-015_a

11. Remove the upper body module.
    - 11.1 Grab the upper body module in the section.
    - 11.2 Pull the module forward.
    - 11.3 Remove the module from the vehicle.

Upper Body Module Installation

1. At front, insert the upper body module tabs into the upper bottom pan openings.
2. Lower the rear end of the upper body module.
3. Insert the rear end hooks of the upper body module into the slots in the console.


mmr2017-051-016

NOTE: Make sure the air intake duct is positioned correctly in the boot.

4. Tighten air intake duct clamp.
5. On both sides, install the upper body module retaining screws.

TIGHTENING TORQUE	
Upper body screws	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

6. Connect the manifold air pressure and temperature sensor (MAPTS) connector.
7. Connect the headlight connectors.
8. Install the storage compartment but leave the cover open.
9. Install gauge, secure with the screws.

TIGHTENING TORQUE	
Gauge screws	2.3 N•m ± 0.2 N•m (20 lbf•**in** ± 2 lbf•**in**)

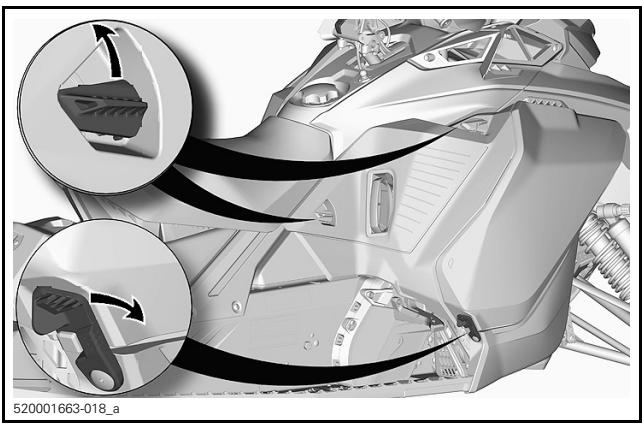
17) Side Panels

⚠ WARNING

Never operate engine with side panels opened or removed from vehicle.

Side Panels Opening and Closing

Unlock all three latches, then open panel.



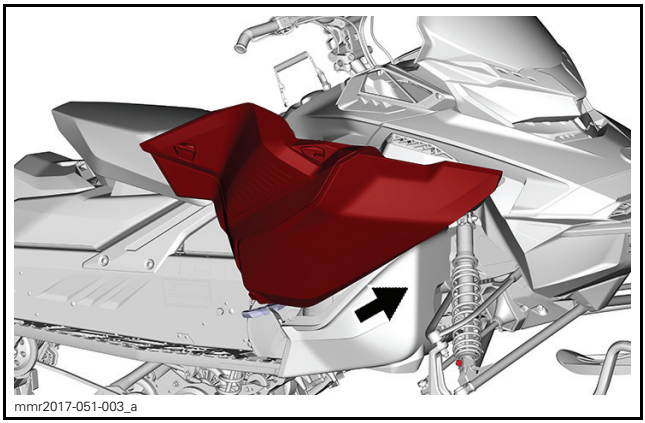
520001663-018_a

When closing panel, make sure latches are locked securely.

Side Panels Removal

Open side panel.

Pull the hinges off the bottom pan.


mmr2017-051-003_a

18) Rewind Starter Handle (If Applicable)

Auto-rewind type located on right hand side of snowmobile. To engage mechanism, pull handle slowly until a resistance is felt then pull vigorously. Slowly release handle.

19) Operator's Guide

The Operator's Guide should be stored in the *STORAGE COMPARTMENT*.

FUEL

Fuel Requirements

NOTICE Always use fresh gasoline. Gasoline will oxidize; the result is loss of octane, volatile compounds, and the production of gum and varnish deposits which can damage the fuel system.

Alcohol fuel blending varies by country and region. Your vehicle has been designed to operate using the recommended fuels, however, be aware of the following:

- Use of fuel containing alcohol above the percentage specified by government regulations is not recommended and can result in the following problems in the fuel system components:
  - Starting and operating difficulties.
  - Deterioration of rubber or plastic parts.
  - Corrosion of metal parts.
  - Damage to internal engine parts.
- Inspect frequently for the presence of fuel leaks or other fuel system abnormalities if you suspect the presence of alcohol in gasoline exceeds the current government regulations.
- Alcohol blended fuels attract and hold moisture which may lead to fuel phase separation and can result in engine performance problems or engine damage.

Recommended Fuel

Use unleaded gasoline containing MAXIMUM 10% ethanol. The gasoline must have the following minimum octane requirements.

FUEL TYPE	ENGINE	MIN. OCTANE RATING
Fuel with NO ethanol	850 E-TEC	91 AKI (RON+MON)/2 95 RON
Fuel which may contain up to 10% MAX ethanol	850 E-TEC	91 AKI (RON+MON)/2 95 RON

NOTICE Never experiment with other fuels. Engine or fuel system damages may occur with the use of an inadequate fuel.

NOTICE Do NOT use fuel from fuel pumps labeled E85.

Use of fuel labeled E15 is prohibited by U.S. EPA Regulations.

Fuel Antifreeze Additives

When using oxygenated fuel, additional gas line antifreeze or water absorbing additives are not required and should be not used.

When using non-oxygenated fuel, isopropyl base gas line antifreeze can be used in a proportion of 150 ml (5 U.S. oz) of gas line antifreeze added to 40 L (10.6 U.S. gal.) of gas.

This precaution is in order to reduce the risk of frost buildup in fuel system components which may lead, in certain cases, to severe damage to engine.

NOTE: Use only methyl hydrate free gas line antifreeze.

Vehicle Fueling Procedure

⚠ WARNING

- Fuel is flammable and explosive under certain conditions.
- Never use an open flame to check fuel level.
- Never smoke or allow flame or spark in vicinity.
- Always work in a well-ventilated area.

1. Stop engine.

⚠ WARNING

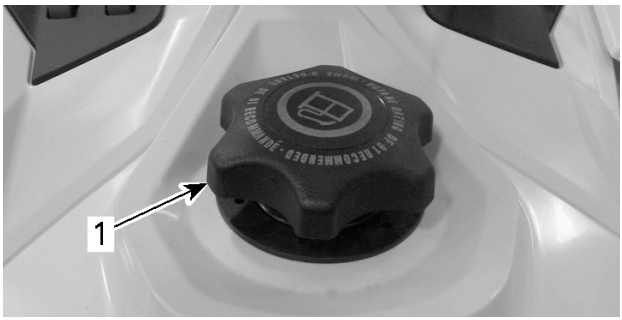
Always stop engine before refueling.

2. Have operator and passenger get off vehicle.

⚠ WARNING

Do not allow anyone seated on the vehicle while fueling.

3. Unscrew slowly the fuel reservoir cap counterclockwise to remove it.



TYPICAL
1. Fuel tank cap

⚠ WARNING

If a differential pressure condition is noticed (whistling sound heard when loosening fuel reservoir cap) have vehicle inspected and/or repaired before further operation.

4. Insert the spout into the filler neck.
5. Pour fuel slowly so that air can escape from the tank and prevent fuel flow back. Be careful not to spill fuel.
6. Stop filling when the fuel reaches the bottom of filler neck. Do not overfill.

⚠ WARNING

Never top up the fuel tank before placing the vehicle in a warm area. As temperature increases, fuel expands and may overflow.

7. Fully tighten fuel reservoir cap clockwise.

⚠ WARNING

Always wipe off any fuel spillage from the vehicle.

NOTE: Do not sit or lean on seat when fuel tank cap is not properly installed.

INJECTION OIL

Recommended Injection Oil

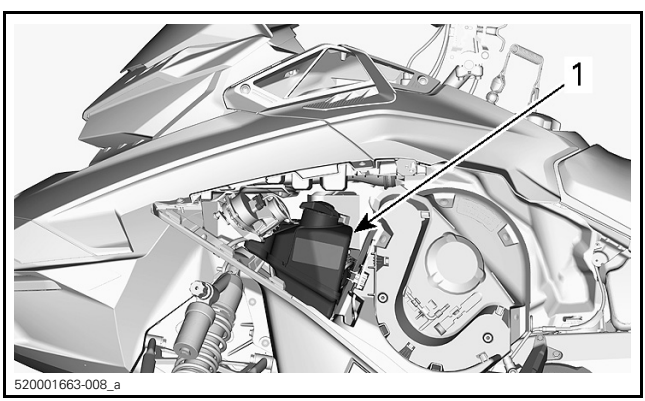
RECOMMENDED INJECTION OIL	
ENGINES	XPS SYNTHETIC 2-STROKE OIL (P/N 293 600 132)
850 E-TEC	✓

NOTICE The engine of this snowmobile has been developed and validated using the recommended BRP XPS™ oil. BRP recommends the use of its recommended XPS oil or equivalent. Damages caused by oil which is not suitable for this oil injected 2-stroke direct fuel injection engine may not be covered by the BRP limited warranty.

Injection Oil Level Verification

The injection oil reservoir is located behind the LH side panel. See *CONTROLS, INSTRUMENTS AND EQUIPMENT* for opening procedure.

Always maintain a sufficient amount of recommended injection oil in the injection oil reservoir.



1. Oil reservoir

Marks on the tank indicates "3/8" and "1/2" of the total amount of oil.

NOTICE Check level and refill every time you refuel.

To Add Injection Oil

Remove injection oil reservoir cap.

Add injection oil.

NOTE: Do not overfill.

Reinstall cap.

NOTICE Do not overtighten.

⚠ WARNING

Wipe off any oil spills. Oil is highly flammable when heated.

BREAK-IN PERIOD

Operation During Break-In

Engine

During the break-in period:

- Avoid prolonged full throttle operation.
- Avoid sustained accelerations.
- Avoid prolonged cruising speeds.
- Avoid engine overheating.

However, brief accelerations and speed variations contribute to a good break-in.

During a predetermined period, the engine management system controls some engine parameters.

The duration is based on fuel volume. It will take approximately two fuel tanks to complete the break-in.

During this period:

- The engine performance and behavior will not be optimal.
- The fuel and oil consumption will be higher.

Drive Belt

A new drive belt requires a break in period of 50 km (30 mi).

During the break-in period:

- Avoid strong acceleration and deceleration.
- Avoid pulling a load.
- Avoid high speed cruising.

BASIC PROCEDURES

Engine Starting Procedure

Procedure

1. Apply parking brake.
2. Recheck throttle control lever operation.
3. Put your helmet on.
4. Ensure that the tether cord cap is installed on the engine cut-off switch and that the cord is attached to your clothing eyelet.
5. Ensure that the emergency engine stop switch is in the ON position (up).

⚠ WARNING

Never depress throttle while starting engine.

6. Release parking brake.

NOTE: For an initial cold start, do not release parking brake. Perform the *VEHICLE WARM-UP* procedure as explained below.

Manual Start Models

Grab rewind starter handle, pull handle slowly until a resistance is felt, then hold handle firmly and pull vigorously to start engine.

Electric Start Models

Depress the START/RER button to engage the electric starter and start the engine. Release button immediately when engine has started.

NOTICE Do not engage electric starter for more than 10 seconds at a time. A rest period should be observed between the cranking cycles to allow electric starter to cool down.

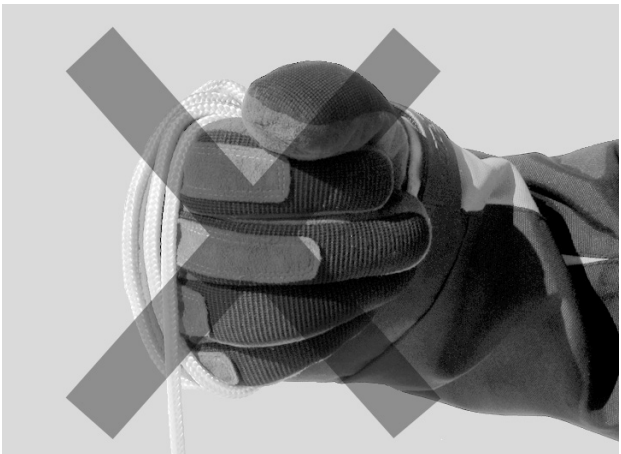
Emergency Starting

The engine can be started with the emergency starter rope supplied in the storage compartment, see *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Remove the drive belt guard, see *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

⚠ WARNING

Do not wind starting rope around your hand. Hold rope by the handle only. Do not start the engine by the drive pulley unless it is a true emergency situation. Have the snowmobile repaired as soon as possible.

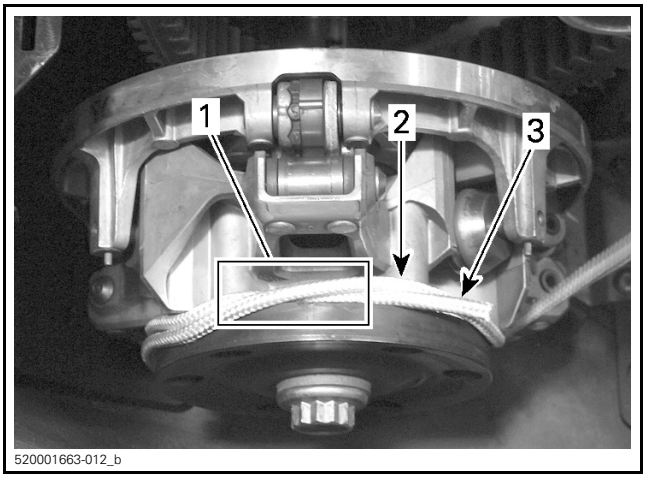


mmo2008-005-008_a

Attach one end of emergency rope to the rewind handle.

NOTE: The suspension adjustment tool can be used as an emergency handle.

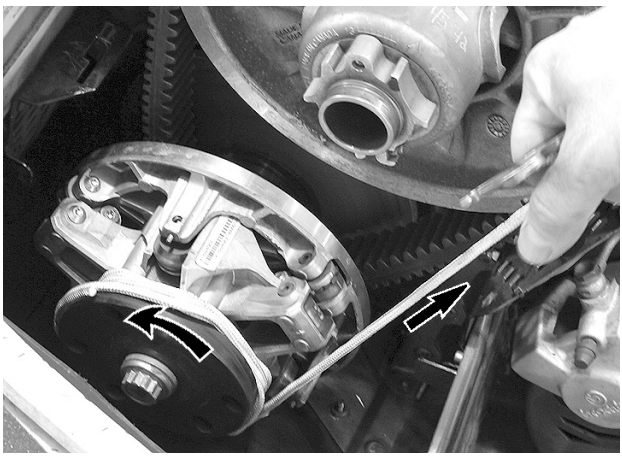
Cross the rope on the first turn as shown.



1. *Rope crossed*
2. *Rope to be winded*
3. *Rope end*

Wind rope two turns counterclockwise tightly around the drive pulley where shown.

Pull the rope using a sharp, crisp pull so the rope comes free of the drive pulley.


520001663-013_b

Start engine as per usual manual starting.

⚠ WARNING

When starting the snowmobile in an emergency situation, using drive pulley, do not reinstall the belt guard and return slowly to have snowmobile repaired.

Vehicle Warm-Up

Before every ride, vehicle has to be warmed up as follows.

1. Start engine as explained in *ENGINE STARTING PROCEDURE* above.
2. Allow engine to warm up one or two minutes at idle speed.

NOTE: Engine will shut down after approximately 12 minutes of idling.

3. Disengage parking brake.
4. Apply throttle until drive pulley engages. Drive at low speed the first two or three minutes.

NOTICE If vehicle does not move when throttle is applied, stop engine, remove tether cord cap from the engine cut-off switch, then do the following.

- Check if skis are stuck on the ground. Lift one ski at a time by the handle, then put it down.
- Check if track is stuck on the ground. Lift rear of snowmobile enough to clear track from the ground, then drop.
- Check rear suspension for hard snow or ice accumulation that could interfere with track rotation. Clean the area.

⚠ CAUTION Beware of injuries by using proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.

⚠ WARNING

Make sure tether cord cap is removed before standing in front the vehicle, getting close to the track or rear suspension components.

NOTE: Warm-up is electronically controlled. During this period (up to 10 minutes depending on ambient temperature), engine RPM is limited.

Reverse (RER)

When the engine is running, depressing the RER button will slow down engine RPM to almost a stop and advance the ignition timing to invert crankshaft rotation.

- Engine will automatically shift into forward when restarting after stopping or stalling.
- Shifting procedure will take place only when the engine is running.
- If engine is running at a speed above 4300 RPM, the function of the RER button is disabled.
- It is recommended to warm up the engine to its normal operating temperature before shifting.

Shifting in Reverse

1. Bring vehicle to a complete stop.
2. Apply and hold brake. Remain seated, refer to *RIDER POSITION (REVERSE OPERATION)* for posture information.

3. With engine at idle speed, press and release the RER button.
4. Wait until reverse beeper sounds, then gently depress throttle lever.

⚠ WARNING

Engaging the reverse mode is done by depressing the RER button when the engine is running. Wait until the reverse alarm sounds and the RER pilot lamp comes on in the analog/digital gauge before operating throttle to proceed in reverse. The reverse speed is not limited. Always proceed with caution as fast reverse could result in loss of vehicle stability. Come to complete stop before depressing RER button. Always remain seated and apply the brake before shifting. Ensure the path behind is clear of obstacles or bystanders before proceeding.

Shifting in Forward

1. Bring vehicle to a complete stop.
2. Apply and hold brake.
3. Press and release the RER button.
4. RER pilot lamp will stop.
5. Apply throttle slowly and evenly. Allow drive pulley to engage then accelerate carefully.

Shutting Off the Engine

Release throttle lever and wait until engine has returned to idle speed.

Shut off the engine using either the emergency engine stop switch or by pulling off the tether cord cap from the engine cut-off switch.

⚠ WARNING

Always remove the tether cord cap from engine cut-off switch when vehicle is not in operation in order to prevent accidental engine starting or to avoid unauthorized use by children or others or theft.

RIDING CONDITIONS AND YOUR SNOWMOBILE

Altitude

At factory, your snowmobile was calibrated to be used within an altitude range (height above the sea level). For your model's factory calibration, refer to the following table.

MODELS	FACTORY CALIBRATION
All models (North America)	Sea level up to 600 m (2,000 ft)

MODELS	FACTORY CALIBRATION
All models (Europe)	Sea level up to 600 m (2,000 ft)

If your snowmobile is to be used at an altitude outside the specified range, have it calibrated accordingly by an authorized Ski-Doo dealer.

NOTICE An inappropriate altitude calibration would decrease performance and may cause serious damage to the snowmobile.

Temperature

The engine management of these engines provides the optimum air/fuel ratio for all temperatures.

SPECIAL OPERATION

Towing an Accessory

Always use a rigid tow bar to tow an accessory. Any towed accessory should have reflectors on both sides and at the rear. Check local laws for brake light(s) requirements.

⚠ WARNING

Never tow an accessory with a rope. Always use a rigid tow bar. Using a rope would result in a collision between the object and the snowmobile and possibly in a tip over in case of a rapid deceleration or on a downward slope.

Towing Another Snowmobile

If a snowmobile is disabled and must be towed use a rigid tow bar. Remove the drive belt from disabled snowmobile, refer to *DRIVE BELT* in the *MAINTENANCE PROCEDURES* subsection and tow at moderate speed.

NOTICE **Always remove the drive belt of the snowmobile that is to be towed to prevent damage to its belt and drive system.**

In an emergency situation only, if a rigid tow bar is not available, a rope can be used. Proceed with extra caution. In some areas, it may be illegal to do so. Check with state or local authorities.

Remove the drive belt, attach the rope to the ski legs (spindles), have someone sit on the towed snowmobile to activate the brake, and tow at low speed.

NOTICE **In order to prevent damage to the steering system, never attach the tow rope to the ski lhandles.**

⚠ WARNING

Never ride at high speed when towing a disabled snowmobile. Proceed slowly with extra caution.

TUNE YOUR RIDE

Snowmobile handling and comfort depend upon multiple adjustments.

⚠ WARNING

Suspension adjustment could affect vehicle handling. Always take time to familiarize yourself with the vehicle's behavior after any suspension adjustment have been made. Always adjust LH and RH suspension components to the same setting.

Choice of suspension adjustments vary with carrying load, operator's weight, personal preference, riding speed and field condition.

NOTE: Some adjustments may not apply to your snowmobile.

⚠ WARNING

Before proceeding with any suspension adjustment, remember:

- Park in a safe place.
- Remove the tether cord cap from the engine cut-off switch.
- Use appropriate lifting device or have assistance to share lifting stress. If a lifting device is not used, use proper lifting techniques, notably using your legs force.
- Do not attempt to lift the front or rear of vehicle if it is above your limits.
- Support front of vehicle off the ground with a suitable device before adjusting suspension.
- Support rear of vehicle off the ground with a wide-base snowmobile stand with a rear deflector panel.
- Make sure support device is stable and secure.

The best way to set up the suspension is to customize each adjustment one at a time. Various adjustments are interrelated. It may be necessary to readjust center spring after adjusting front springs for instance. Test run the snowmobile under the same conditions; trail, speed, snow, operator riding position, etc. Proceed methodically until you are satisfied.

Following are guidelines to fine-tune suspension. Use suspension adjustment tool provided in the tool kit.

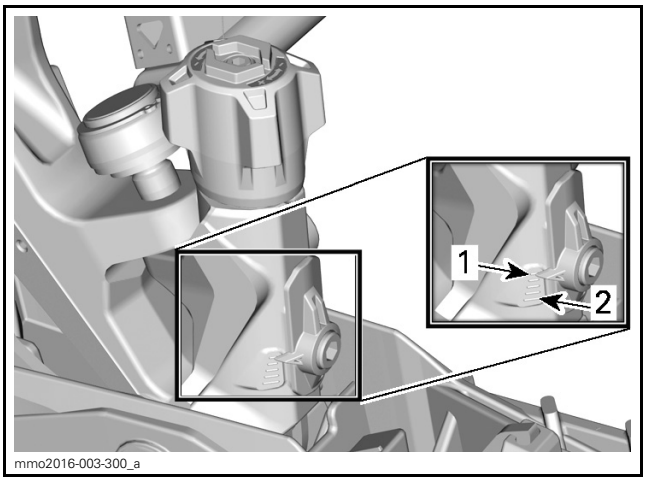
Pilot TS Skis (If Applicable)

Pilot TS skis enables the rider to dial in the amount of ski bite for conditions and riding style.

A knob adjacent to the ski leg raises or lowers the ski runner.

Ski behavior depends largely on trail conditions but also on ski runner adjustment. Same as drivers behavior adapts to trail condition change.

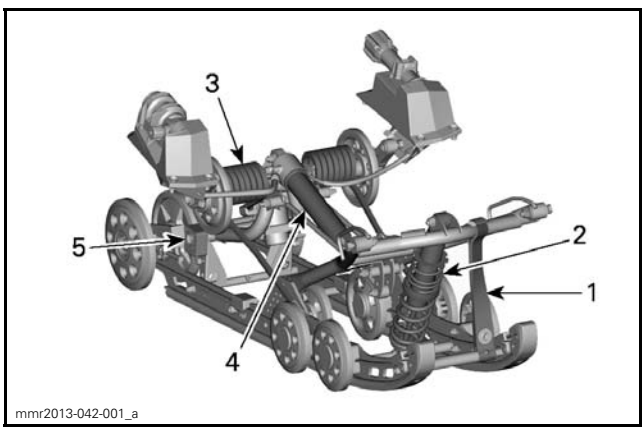
Ski runner bottom face conditions must be regularly checked especially if the snow condition is marginal such as a lack of snow, presence of rocks or sand. Snowmobile must be driven slowly when on paved surfaces in order to prevent overheating of the ski runner bottoms and as such, damage to carbide inserts. Ski runners must be replaced as soon as any of the carbide inserts are worn out or missing. Worn out runner usage may lead to damage of ski sole.



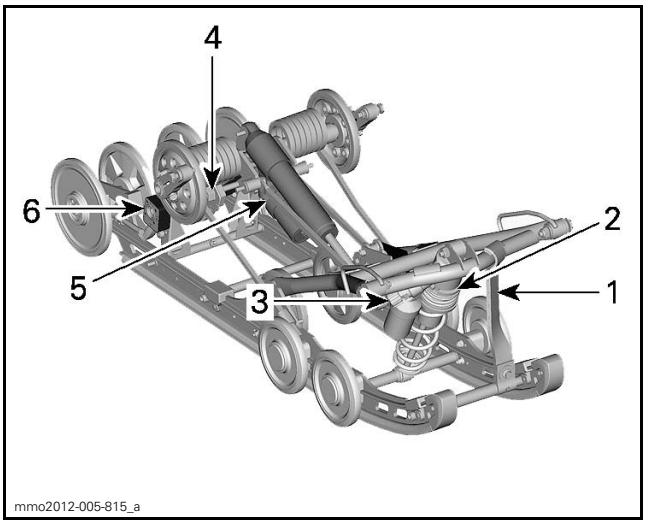
PILOT TS SKIS ADJUSTMENT KNOB
1. *Position 1*
2. *Position 5*

PILOT TS SKI ADJUSTABILITY				
Position	Lateral grip	Handling	Possible understeering	Possible oversteering
1	*	*	***	
2	**	**	**	
3	***	***	*	*
4	****	****		**
5	*****	*****		***

Rear Suspension Adjustments



rMOTION WITH QUICK ADJUST- ADJUSTABLE COMPONENTS
1. *Stopper strap*
2. *Center spring*
3. *Rear spring*
4. *Rear shock absorber*
5. *Coupling blocks (RH side shown)*



rMOTION WITHOUT QUICK ADJUST- ADJUSTABLE COMPONENTS
1. *Stopper strap*
2. *Center spring*
3. *Center shock absorber*
4. *Rear spring*
5. *Rear shock absorber*
6. *Coupling blocks (RH side shown)*

NOTICE Whenever adjusting rear suspension, check track tension and adjust if necessary.

Stopper Strap

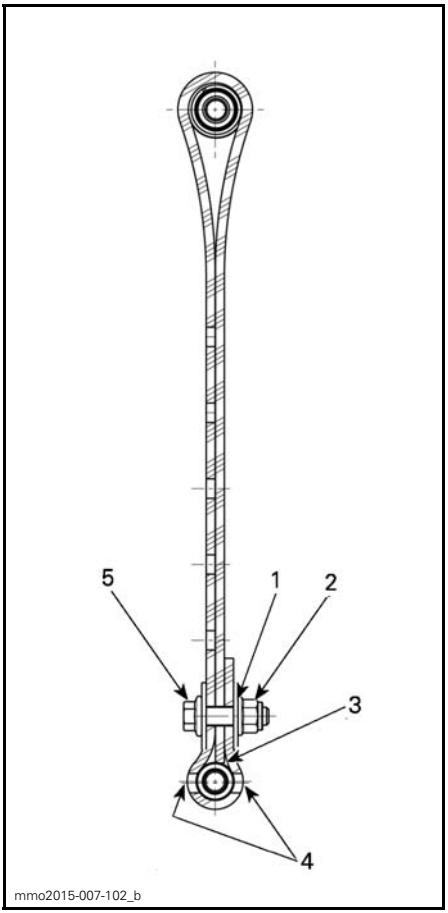
Stopper strap length has an effect on the amount of weight the center spring has to carry especially during acceleration, therefore on the front end uplift.

Stopper strap length also has an effect on center spring travel.

NOTICE Whenever stopper strap length is changed, track tension must be checked.

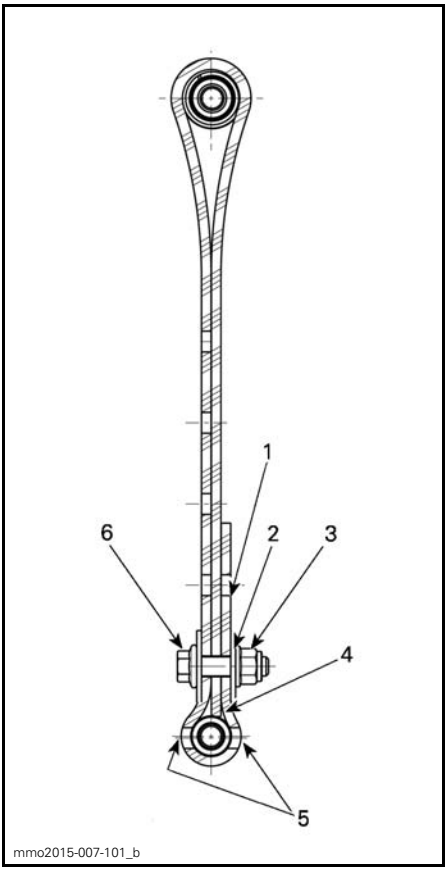
ACTION	RESULT
Increasing stopper strap length	Lighter ski pressure under acceleration
	More center spring travel
	More bump absorption capability
Decreasing stopper strap length	Heavier ski pressure under acceleration
	Less center spring travel
	Less bump absorption capability

NOTE: Stopper strap could be set to position 1, 2, 3, 4 and 5. Below are illustrations for position 1, 2, 3. Smaller numbers correspond to a longer strap setting.



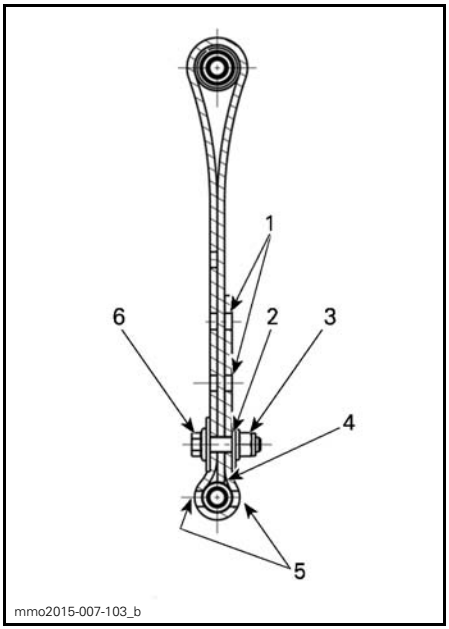
STOPPER STRAP POSITION 1 (1ST HOLE, LONGEST)

1. *1st hole from end*
2. *Towards rear*
3. *Tip of strap touching strap axis*
4. *Two holes left open between screw head and nut*
5. *Towards front*



STOPPER STRAP POSITION 2 (2ND HOLE)

1. *Free hole*
2. *2nd hole from end*
3. *Towards rear*
4. *Tip of strap touching strap axis*
5. *Two holes left open between screw head and nut*
6. *Towards front*



STOPPER STRAP POSITION 3 (3RD HOLE)
1. *Free holes*
2. *3rd hole from end*
3. *Towards rear*
4. *Tip of strap touching strap axis*
5. *Two holes left open between screw head and nut*
6. *Towards front*

NOTE: Decreasing the stopper strap length may reduce comfort. If too much weight transfer is felt, try to correct it by adjusting the coupling blocks first. Always install stopper strap bolt as close as possible to the lower shaft.

When operating the snowmobile in deep snow, it may be necessary to vary stopper strap length and/or riding position, to change the angle at which the track rides on the snow. Operator's familiarity with the various adjustments as well as snow conditions will dictate the most efficient combination.

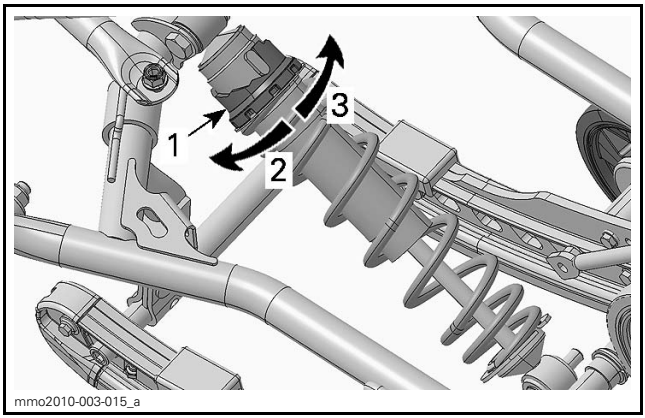
Generally, a longer stopper strap setting gives better performance in deep snow on a flat landscape.

Center Spring

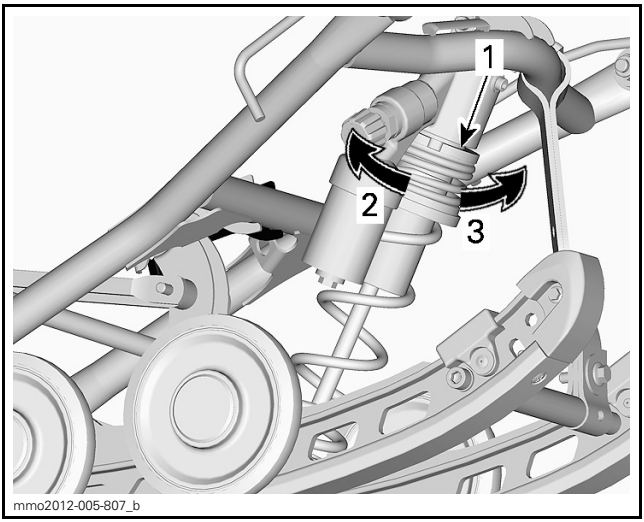
Center spring preload has an effect on steering effort, handling and bump absorption.

Also, since center spring preload adjustment puts more or less pressure on the front of the track, it has an effect on the performance in deep snow.

ACTION	RESULT
Increasing preload	Lighter steering
	More bump absorption capability
	Better deep snow starts
	Better deep snow performance and handling
Decreasing preload	Heavier steering
	Less bump absorption capability
	Better trail handling



CAM TYPE - HPG™ SHOCK ABSORBER
1. *Spring preload adjustment cam*
2. *Decrease preload*
3. *Increase preload*



TYPICAL- RING TYPE
1. *Spring preload adjustment ring*
2. *Increase preload*
3. *Decrease preload*

NOTE: Use the suspension adjustment tool provided with the vehicle.

Rear Spring

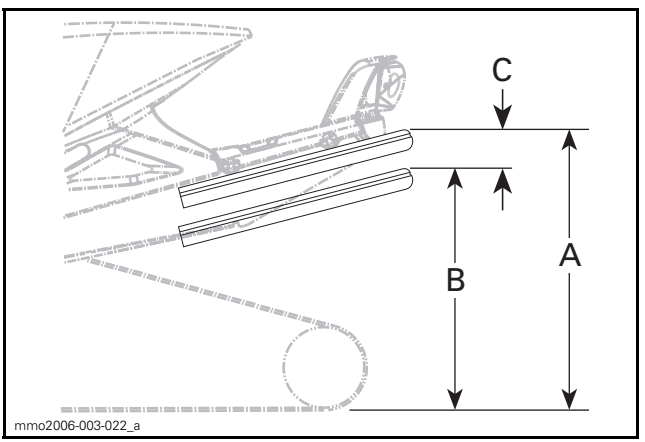
Rear spring preload has an effect on comfort, ride height and load compensation.

Also, adjusting rear spring preload shifts more or less weight to the snowmobile front end. As a result, more or less weight is applied to the skis. This has an effect on performance in deep snow, steering effort and handling.

Slight suspension bottoming occurring under the worst riding conditions indicates a good choice of spring preload.

ACTION	RESULT
Increasing preload	Firmer rear suspension
	Higher rear end
	More bump absorption capability
	Heavier steering
Decreasing preload	Softer rear suspension
	Lower rear end
	Less bump absorption capability
	Lighter steering
	Better performance and handling in deep snow

Refer to the following to determine if preload is correct.



TYPICAL - PROPER ADJUSTMENT
A. Suspension fully extended
B. Suspension has collapsed with operator, passenger(s) and load added
C. Distance between dimension "A" and "B", see table below

C	WHAT TO DO
50 mm to 75 mm (2 in to 3 in)	No adjustment required
More than 75 mm (3 in)	Adjusted too soft. Increase preload
Less than 50 mm (2 in)	Adjusted too firm. Decrease preload

NOTE: If the specification is unattainable with the original springs, see an authorized Ski-Doo dealer for other available springs.

rMotion Without Quick Adjust

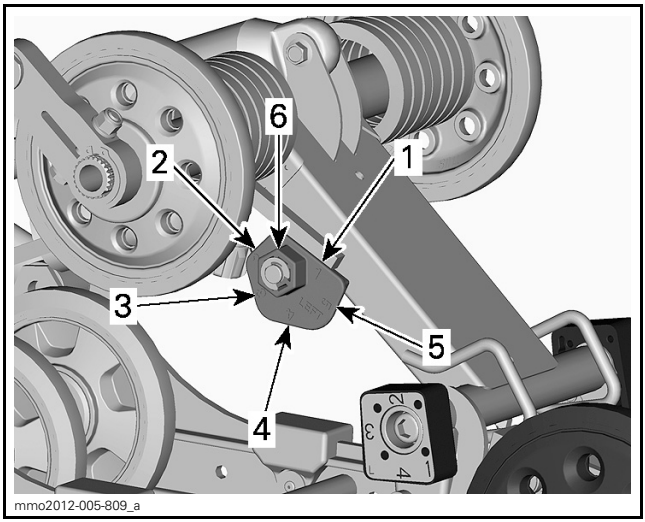
To increase spring preload using tool, always turn the left side adjustment cam in a clockwise direction, and the right side cam in a counterclockwise direction.

⚠ CAUTION Never set preload cams directly from position 5 to 1 or directly from position 1 to 5.

⚠ WARNING

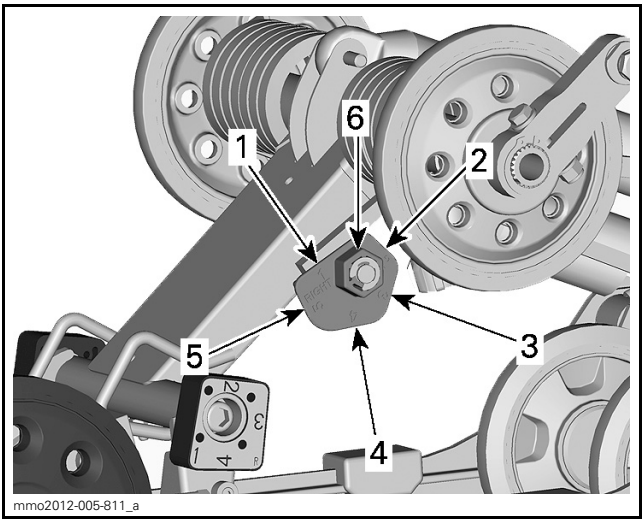
Both rear spring preload must be set at the same position. Otherwise vehicle behavior may be unpredictable and suspension may become warped.

The adjustment cams have 5 different settings, 1 being the softest.



rMOTION WITHOUT QUICK ADJUST - LH SIDE

1. *Position 1*
2. *Position 2*
3. *Position 3*
4. *Position 4*
5. *Position 5*
6. *Adjustment nut*

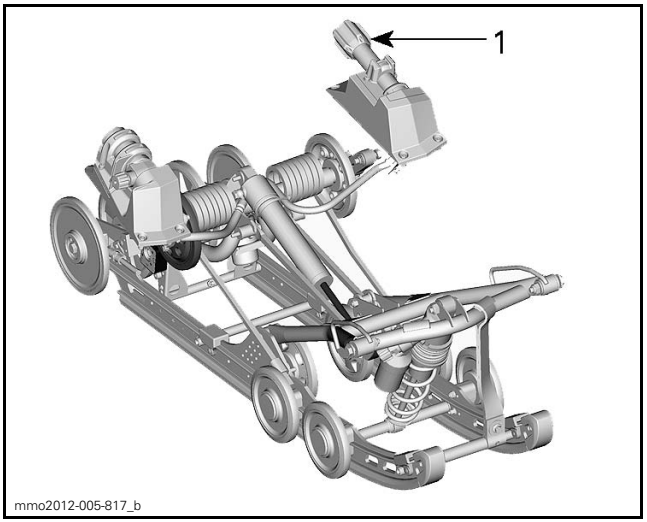


rMOTION WITHOUT QUICK ADJUST - RH SIDE

1. *Position 1*
2. *Position 2*
3. *Position 3*
4. *Position 4*
5. *Position 5*
6. *Adjustment nut*

rMotion - With Quick Adjust

Turn the left side knob to adjust the spring preload.



rMOTION WITH QUICK ADJUST
1. LH side knob to adjust spring preload

ACTION	RESULT
Increasing preload	Firmer rear suspension
	Higher rear end
	More bump absorption capability
	Heavier steering
Decreasing preload	Softer rear suspension
	Lower rear end
	Less bump absorption capability
	Lighter steering
	Better performance and handling in deep snow

Rear Shock Absorber

Rear Shock Compression Damping

MX Z X and Renegade X

NOTE: Both low and high speed compression damping are adjusted simultaneously.

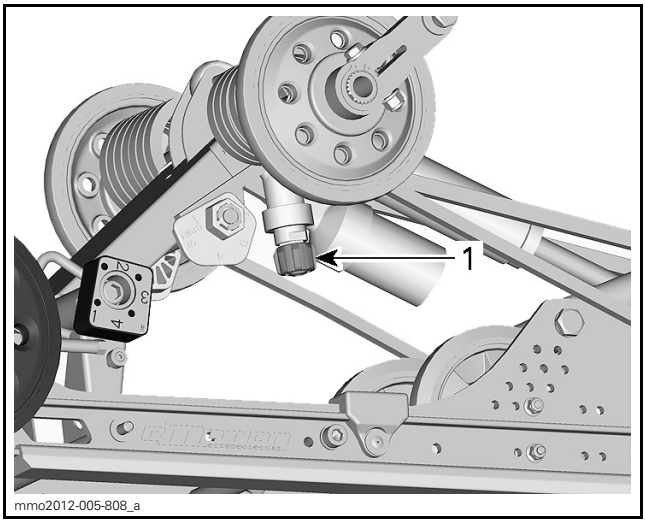
Low speed compression damping controls how the shock absorber reacts to a low suspension velocity (slow compression strokes, in most cases when riding at lower speeds).

High speed compression damping controls how the shock absorber reacts to a high suspension velocity (quick compression strokes, in most cases when riding at higher speeds).

TURNING	ACTION	RESULT ON BIG AND SMALL BUMPS
Clockwise	Increasing compression damping force	Firmer compression damping
Counter Clockwise	Decreasing compression damping force	Softer compression damping

rMotion Without Quick Adjust

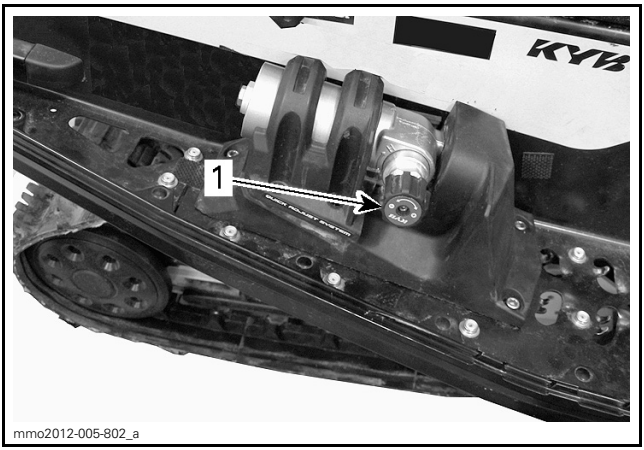
To adjust, turn the adjuster button located on the oil reservoir on shock clockwise to increase compression damping force and counterclockwise to decrease compression damping force.



1. Compression damping adjustment button

rMotion With Quick Adjust

Turn the right side knob to adjust the shock compression speed.



TYPICAL - rMOTION WITH QUICK ADJUST - RH SIDE
1. Knob to adjust low/high speed compression damping

Coupling Blocks

Coupling blocks adjustment has an effect on vehicle handling during acceleration only.

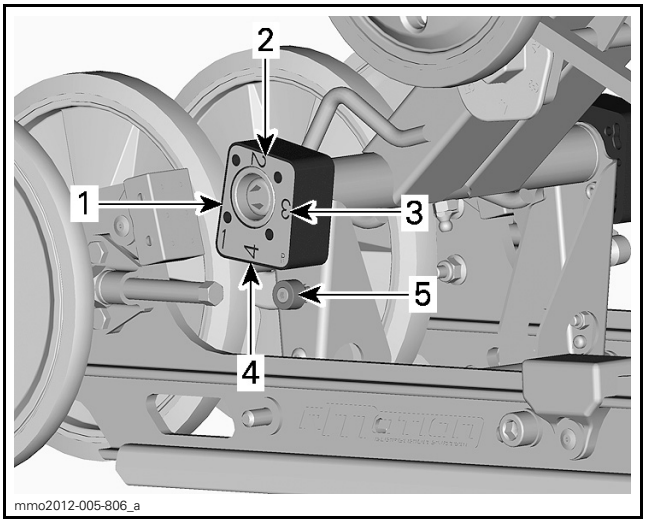
NOTE: A high coupling block setting will reduce both comfort and transfer under acceleration.

To adjust, push on release button under cam and turn coupling block to the desired setting.

Place the desired setting number towards rubber stopper. No tools required.

⚠ WARNING

Both blocks must be set at the same position. Otherwise vehicle behavior may be unpredictable and suspension may become warped.



COUPLING BLOCK - RIGHT SIDE VIEW
(R - RIGHT EMBOSSED ON BLOCK)
1. *Position 1 (minimum)*
2. *Position 2*
3. *Position 3*
4. *Position 4 (maximum)*
5. *Release button*

Coupling Blocks Setting

POSITION	USE
1	More ski lift during acceleration - and best comfort
2	Intermediate setting
3	Intermediate setting
4	Less ski lift during acceleration - and some comfort loss

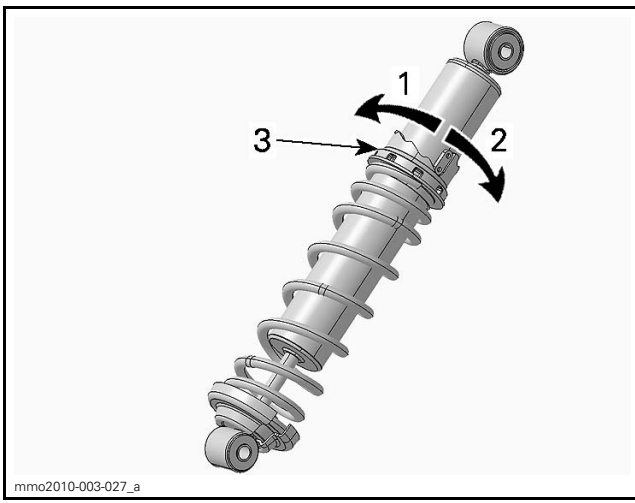
Front Suspension Adjustments

Front Springs

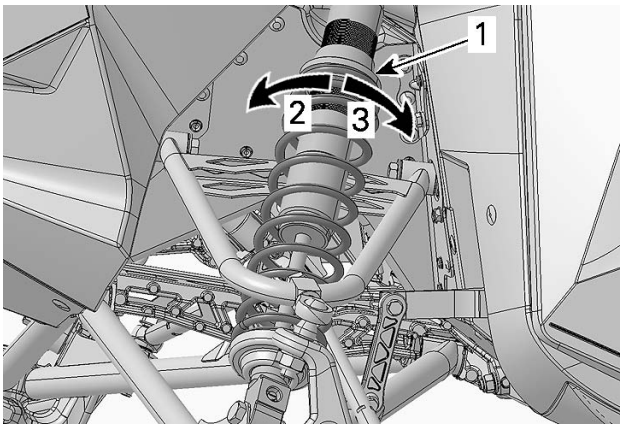
Front spring preload has an effect on front suspension firmness.

Front spring preload also has an effect on the steering behavior.

ACTION	RESULT
Increasing preload	Firmer front suspension
	Higher front end
	More precise steering
	More bump absorption capability
Decreasing preload	Softer front suspension
	Lower front end
	Lighter steering
	Less bump absorption capability



CAM TYPE - HPG SHOCK ABSORBER
1. *Decrease preload*
2. *Increase preload*
3. *Spring preload adjustment cam*



mmo2010-003-019_a

TYPICAL - RING TYPE
1. *Spring preload adjustment ring*
2. *Increase preload*
3. *Decrease preload*

Adjustment Tips According to Vehicle Behavior

PROBLEM	CORRECTIVE MEASURES
Front suspension darting	Check ski alignment. – Reduce front suspension spring preload. – Increase center spring preload. – Reduce rear spring preload.
Steering feels too heavy at steady speeds	– Reduce front suspension spring preload. – Increase center spring preload.
Steering feels too heavy during acceleration	– Set coupling blocks to a lower position. – Reduce rear spring preload. – Lengthen limiter strap.

PROBLEM	CORRECTIVE MEASURES
Too much ski lift during cornering or acceleration	– Set coupling blocks to a higher position. – Shorten limiter strap. – Increase rear spring preload.
Rear of snowmobile seems too stiff	– Reduce rear spring preload. – Reduce compression damping adjustment if equipped
Rear of snowmobile seems too soft	– Increase rear spring preload.
Rear suspension is frequently bottoming	– Increase compression damping adjustment if equipped. – Increase rear spring preload. – Increase center spring preload. – Lengthen limiter strap. – Increase compression damping adjustment if equipped.
Snowmobile seems to pivot around its center	– Reduce center spring preload. – Increase rear spring preload. – Increase front suspension spring preload. – Shorten limiter strap.
Track spins too much at start	– Set coupling blocks to a lower position. – Lengthen limiter strap.
Ski diving in deep snow	– Install ski tip enlarger.

VEHICLE TRANSPORTATION

Make sure that oil reservoir and fuel tank caps are properly installed.

Tilt bed trailers can easily be equipped with a winch mechanism to afford maximum safety in loading. Simple as it may seem, never drive your snowmobile onto a tilt bed trailer or any other kind of trailer or vehicle. Many serious accidents have resulted from driving up and over a trailer. Anchor your vehicle securely, front and rear, even on short hauls. Be certain all equipment is securely fastened. Cover your snowmobile when trailering to prevent road grime from causing damage.

Be certain your trailer meets state or provincial requirements. Ensure the hitch and safety chains are secure and the brake, turn indicators and clearance lights all function.

⚠ WARNING

Do not tow the vehicle facing backwards. If the vehicle is towed facing backwards, the wind may cause damage to the windshield or even loss of the windshield.

MAINTENANCE

MAINTENANCE SCHEDULE

Maintenance is very important for keeping your vehicle in safe operating condition. A repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems. These instructions do not require components or service by BRP or authorized Ski-Doo dealers. Although an authorized Ski-Doo dealer has an in-depth technical knowledge and tools to service the Ski-Doo snowmobile, the emission-related warranty is not conditioned on the use of an authorized Ski-Doo dealer or any other establishment with which BRP has a commercial relationship. For emission-related warranty claims, BRP is limiting the diagnosis and repair of emission-related parts to the authorized Ski-Doo dealers. For more information, please refer to the *US EPA EMISSION-RELATED WARRANTY* contained herein. Proper maintenance is the owner's responsibility. A warranty claim may be denied if, among other things, the owner or operator caused the problem through improper maintenance or use. You must follow the instructions for fuel requirements in the fuel section of this manual. Even if gasoline containing greater than ten volume percent ethanol is readily available, the US EPA issued a prohibition against the use of gasoline containing greater than 10 vol% ethanol that applies to this vehicle. The use of gasoline containing greater than 10 vol% ethanol with this engine may harm the emission control system. The vehicle should be serviced as per the maintenance schedule.

The maintenance schedule does not exempt the pre-ride inspection.

⚠ WARNING

Failure to properly maintain the vehicle according to the maintenance schedule and procedures can make it unsafe to operate.

EVERY YEAR AT PRESEASON OR 3 000 KM (2,000 MI) (WHICHEVER COMES FIRST)
Perform pre-ride inspection
Check fault codes
Charge battery
Adjust drive chain
Adjust and align track
Inspect brake hose, pads and disk

EVERY YEAR AT PRESEASON OR 3 000 KM (2,000 MI) (WHICHEVER COMES FIRST)
Check coolant density
Inspect drive belt
Visually inspect and clean drive pulley
Inspect and clean driven pulley
Lubricate rear suspension. Lubricate whenever the vehicle is used in wet conditions (rain, puddles)
Inspect exhaust system and check for leaks
Tighten exhaust manifold screws to specified torque
Inspect fuel lines and connections
Inspect front suspension
Inspect rear suspension (including stopper straps and slider shoes)
Inspect tie-rod ends and alignment
Adjust headlight beam aiming

EVERY 2 YEARS OR 6 000 KM (4,000 MI) (WHICHEVER COMES FIRST)
Replace brake fluid
Inspect throttle cable
Clean and lubricate rewind starter
Replace chaincase oil
Inspect engine rubber mounts

EVERY 3 YEARS OR 10 000 KM (6,000 MI) (WHICHEVER COMES FIRST)
Inspect oil injection pump strainer and clean if needed
Clean RAVE valves

EVERY 5 YEARS OR 20 000 KM (12,500 MI) (WHICHEVER COMES FIRST)
Replace spark plugs

EVERY 5 YEARS
Replace engine coolant
Replace in-line fuel filter

MAINTENANCE PROCEDURES

This section includes instructions for basic maintenance procedures.

⚠ WARNING

Turn off the engine, remove tether cord cap and follow these maintenance procedures when performing maintenance. If you do not follow proper maintenance procedures you can be injured by hot parts, moving parts, electricity, chemicals or other hazards.

⚠ WARNING

Should removal of a locking device be required (e.g. lock tabs, self-locking fasteners, etc.) when undergoing disassembly/assembly, always replace with a new one.

Engine Coolant

⚠ WARNING

Never open coolant tank cap when engine is hot.

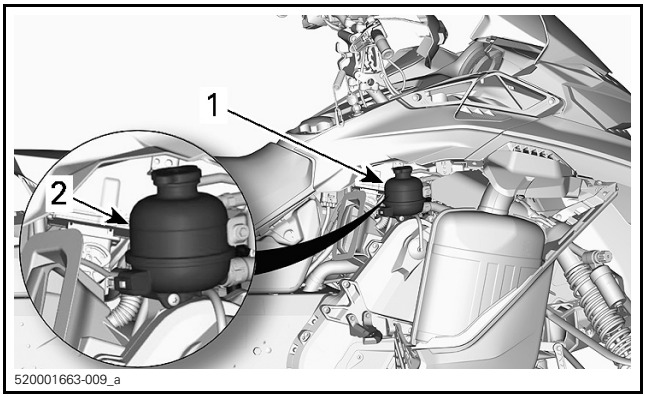
Engine Coolant level Verification

Open the RH side panel, see *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Check coolant level at room temperature with the cap removed. Liquid should be at cold level line of coolant tank.

NOTE: When checking level at low temperature it may be slightly lower then the mark.

If additional coolant is necessary or if entire system has to be refilled, refer to an authorized Ski-Doo dealer, repair shop or person of your own choosing.



1. *Coolant reservoir*
2. *COLD line*

Recommended Engine Coolant

BRP RECOMMENDED PRODUCT	COOLANT
Finland, Norway and Sweden	LONG LIFE ANTIFREEZE(F) (P/N 619 590 204)
All other countries	LONG LIFE ANTIFREEZE (P/N 219 702 685)
Alternative, or if not available	Distilled water and antifreeze solution (50% distilled water, 50% antifreeze)

NOTICE Always use ethylene-glycol antifreeze containing corrosion inhibitors specifically for internal combustion aluminum engines.

Exhaust System

Exhaust System Verification

The muffler tail pipe should be centered with the exit hole in the bottom pan. Exhaust system must be free of rust or leaks. Make sure that all parts are securely in place.

Check retaining springs condition and replace if necessary.

The exhaust system is designed to reduce noise and to improve the total performance of the engine. Modification may be in violation of local laws.

NOTICE If any exhaust system component is removed, modified or damaged, severe engine damage may result.

Spark Plugs

Spark plugs inspection or replacement may be performed by an authorized Ski-Doo dealer, repair shop, or person of your own choosing. Spark plugs inspection or replacement requires an in-depth technical knowledge. Though not required, it is recommended that an authorized Ski-Doo dealer performs spark plugs inspection or replacement.

Brake Fluid

Recommended Fluid

Use only DOT 4 brake fluid from a sealed container. An opened container may be contaminated or may have absorbed moisture from the air.

⚠ WARNING

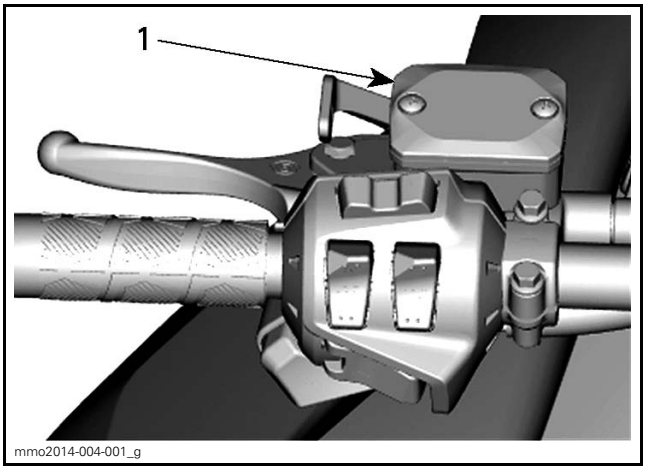
Use only DOT 4 brake fluid from a sealed container. To avoid serious damage to the braking system, do not use fluids other than the recommended one, nor mix different fluids for topping up.

NOTICE Brake fluid can damage painted and plastic parts. Handle with care. Rinse thoroughly in case of spillage.

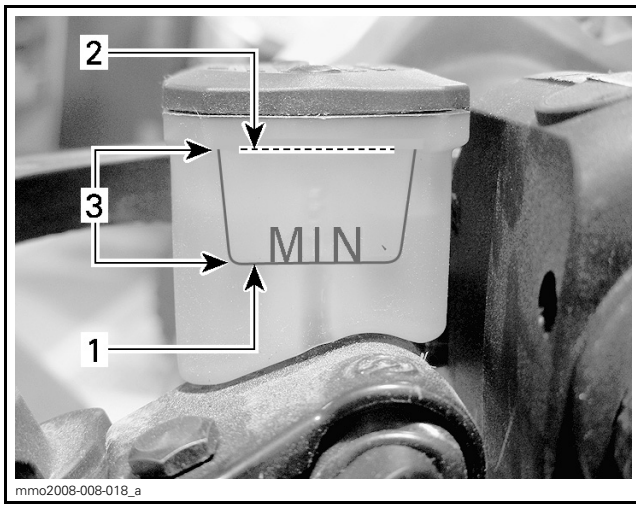
Brake Fluid Level Verification

NOTICE Vehicle must be on a level surface before checking any fluid levels.

Check brake fluid (DOT 4) in reservoir for proper level. Add fluid (DOT 4) as required.



TYPICAL
1. Brake fluid reservoir



TYPICAL
1. *Minimum*
2. *Maximum*
3. *Operating range*

⚠ CAUTION Avoid getting brake fluid on skin or eyes - it may cause severe burns. In case of contact skin, wash thoroughly. In case of contact with the eyes, immediately rinse with plenty of water for at least 10 minutes and then consult a doctor immediately.

Chaincase Oil

Recommended Chaincase Oil

RECOMMENDED CHAINCASE OIL
XPS SYNTHETIC CHAINCASE OIL (P/N 413 803 300)

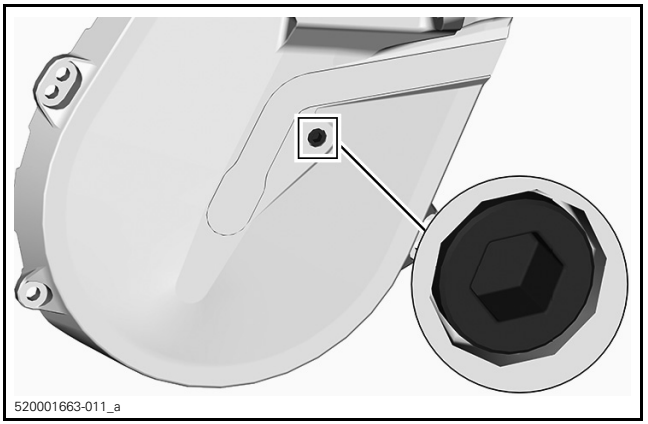
NOTICE The chaincase of this snowmobile has been developed and validated using the XPS™ Synthetic chaincase oil. BRP strongly recommends the use of its XPS Synthetic chaincase oil at all times. Damages caused by oil which is not suitable for the chaincase will not be covered by the BRP limited warranty.

Access to Chaincase

Open RH side panel, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Chaincase Oil Level Verification

With the vehicle on a level surface, check the oil level by removing the check plug.



CHECK PLUG

NOTE: The Allen end of the driven pulley expander can be used.

Oil level must reach the threaded hole.

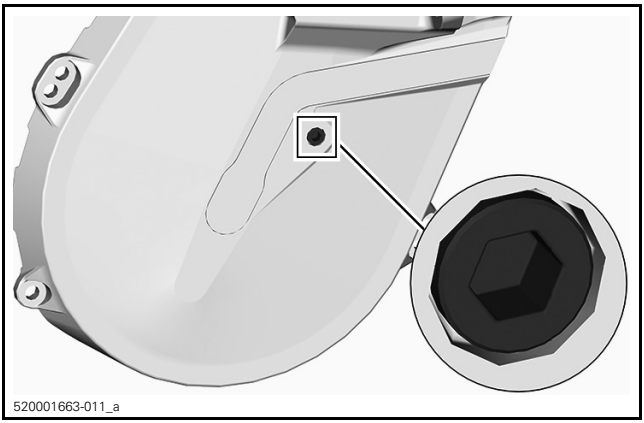
If level is correct, reinstall check plug and tighten to the specified torque.

TIGHTENING TORQUE	
Check plug	6 N•m ± 1 N•m (53 lbf•**in** ± 9 lbf•**in**)

If level is insufficient, See *CHAINCASE FILLING PROCEDURE*.

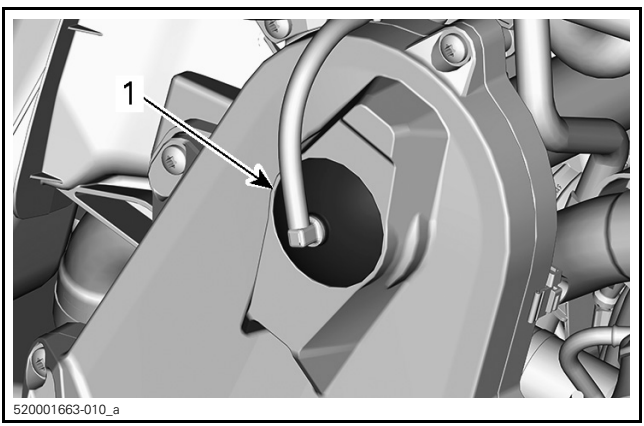
Chaincase Filling Procedure

Remove the check plug.



CHECK PLUG

Remove the filler cap.



TOP OF CHAINCASE
1. Filler cap

Pour recommended oil in the filler hole until oil comes out by the check plug hole.

Reinstall check plug and tighten to the specified torque.

TIGHTENING TORQUE	
Check plug	6 N•m ± 1 N•m (53 lbf•**in** ± 9 lbf•**in**)

Reinstall the filler cap.

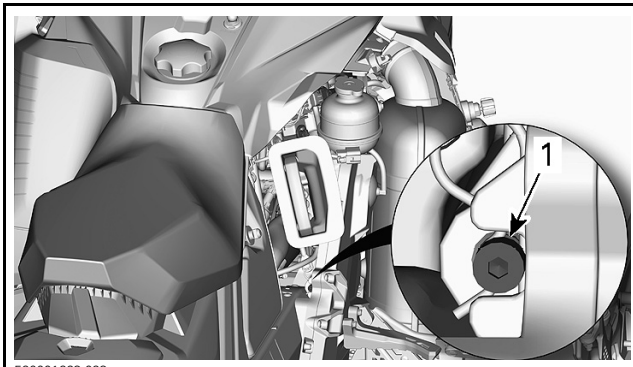
Drive Chain

Access to Chaincase

Open RH side panel, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Drive Chain Adjustment

Using the Allen end of the driven pulley expander, GENTLY turn tensioner clockwise to eliminate the play.



520001663-023_a

Do not force the tensioner in.

NOTE: Do not remove the hair cotter pin.

NOTICE Overtightening the drive chain could result in severe damage to the chaincase components.

Drive Belt

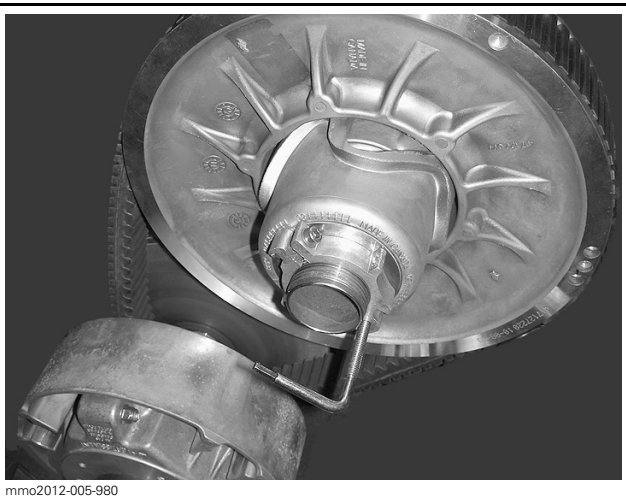
Drive Belt Inspection

Inspect belt for cracks, fraying or abnormal wear (uneven wear, wear on one side, missing cogs, cracked fabric). If abnormal wear is noted, probable cause could be pulley misalignment, excessive RPM with frozen track, fast starts without warm-up period, burred or rusty sheave, oil on belt or distorted spare belt. Contact an authorized Ski-Doo dealer.

Drive Belt Replacement

Drive Belt Removal

1. Remove tether cord cap from engine cut-off switch.
2. Remove drive belt guard, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.
3. Insert the driven pulley expander provided in the threaded hole on the adjuster hub as shown.



mmo2012-005-980

TYPICAL - PULLEY EXPANDER INSTALLED ON ADJUSTER HUB

4. Open the driven pulley by screwing the tool in.

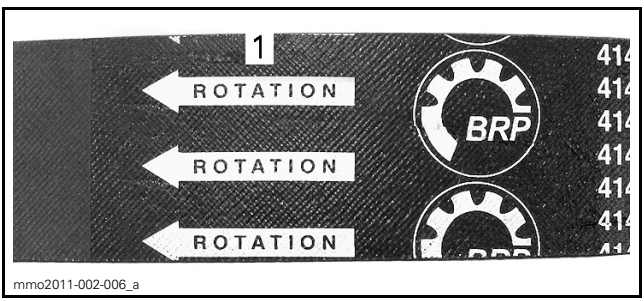
5. Remove the drive belt by slipping it over the top of the driven pulley, then over the drive pulley.

Drive Belt Installation

1. If necessary, open the driven pulley, refer to *DRIVE BELT REMOVAL* above.
2. Slip the belt over the drive pulley, then over the driven pulley.

NOTICE Do not force or use tools to pry the belt into place, as this could cut or break the cords in the belt.

NOTE: The maximum drive belt life span is obtained when belt is installed with arrows in the direction of rotation.



1. To be pointed in the direction of rotation

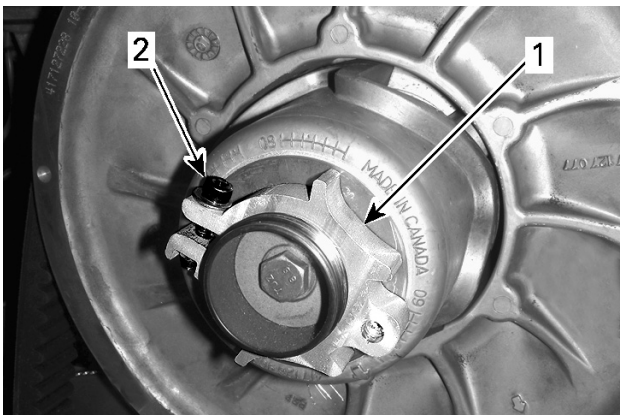
3. Unscrew and remove the driven pulley expander from the pulley.
4. Rotate the driven pulley several times to properly set the belt between the sheaves.
5. If a new belt was installed, adjust the belt height. Refer to *DRIVE BELT HEIGHT ADJUSTMENT* below.
6. Install belt guard, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.
7. Close side panel, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Drive Belt Height Adjustment

The drive belt height must be checked every time a new drive belt is installed.

To adjust the drive belt height, proceed as follows:

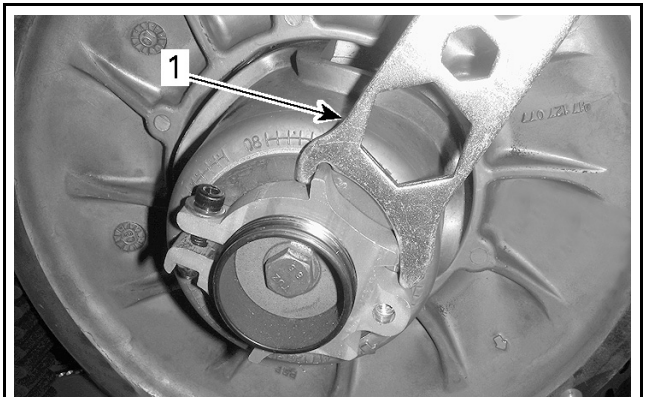
1. Remove tether cord cap from engine cut-off switch.
2. Remove drive belt guard.
3. Loosen the clamping bolt.



mmo2011-003-010_a

1. Adjuster hub
2. Clamping bolt

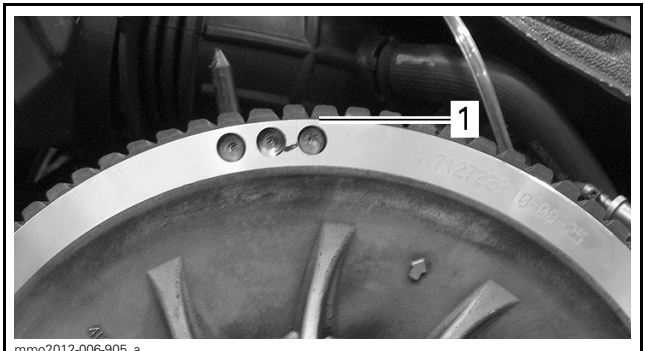
4. Using the suspension adjustment tool provided, turn the ring 1/4 turn at a time then rotate the driven pulley to properly set the drive belt between the pulley sheaves.



1. Suspension adjustment tool

NOTE: The adjustment ring has left hand treads.

Repeat step 4 until the lowest portion of the cogs on the external surface of drive belt is even with the driven pulley edge.

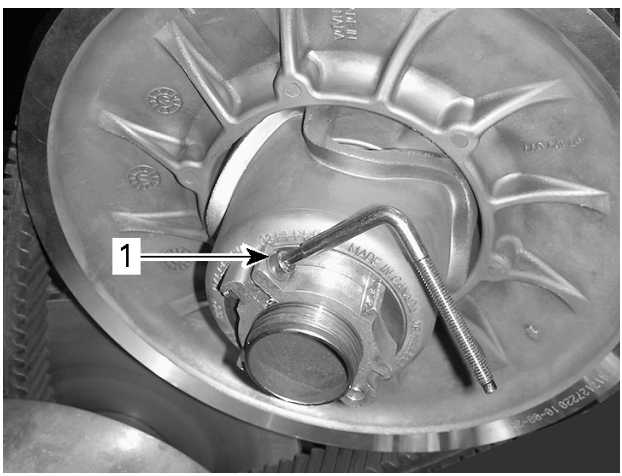


TYPICAL - PRELIMINARY SETTING
1. Lowest portion of cogs even with external surface of drive belt

NOTE: Turning the ring counterclockwise lowers the drive belt in the pulley. Turning the ring clockwise raises the drive belt in the pulley.

5. Firmly tighten the clamping bolt. If possible, tighten to specified torque using a torque wrench.

TIGHTENING TORQUE	
Clamping bolt	5.5 N•m ± 0.5 N•m (49 lbf•**in** ± 4 lbf•**in**)



TYPICAL
1. Clamping bolt

6. Install drive belt guard.
7. Install side panel.

NOTE: These settings are correct as a preliminary adjustment for most models. In some cases, when starting the engine, the vehicle could creep, indicating that the drive belt is too tight.

If the vehicle creeps, lower the drive belt height from the preliminary setting. Repeat procedure until creeping stops.

Reverse Activation

NOTE: The reverse may not activate if the belt is positioned too high in the driven pulley. If reverse activation does not work properly, ensure the drive belt is properly adjusted. Adjust the drive belt lower in the driven pulley if needed.

Drive Pulley

Drive Pulley Adjustment

⚠ WARNING

Remove tether cord cap from engine cut-off switch before performing any adjustment. Vehicle must be parked in a safe place, away from the trail.

⚠ WARNING

NEVER disassemble or modify the drive pulley.
Improper assembly or modifications could cause the pulley to explode violently under the stress generated by the high rotational speed.
See your Ski-Doo dealer to maintain or service the drive pulley. Improper servicing or maintenance may affect performance and reduce belt life. Always respect maintenance schedules.

The drive pulley is factory calibrated to transmit maximum engine power at a predefined RPM. Factors such as ambient temperature, altitude or surface condition may vary this critical engine RPM thus affecting snowmobile efficiency.

This adjustable drive pulley allows setting maximum engine RPM to maintain maximum power.

Ramp cams should be adjusted so that actual maximum engine RPM matches the maximum horsepower RPM. Refer to *SPECIFICATIONS*.

NOTE: Use a precision digital tachometer for engine RPM adjustment.

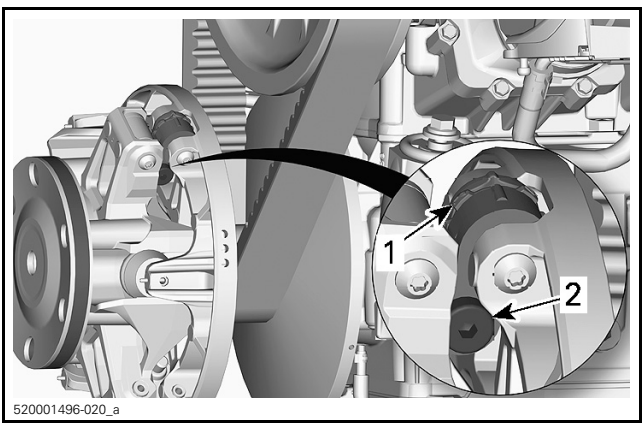
There are 5 positions in which the ramp cam can be set.

Each position modifies the maximum engine RPM by about 200 RPM.

Lower position numbers decrease engine RPM in steps of 200 RPM and higher position numbers increase it in steps of 200 RPM.

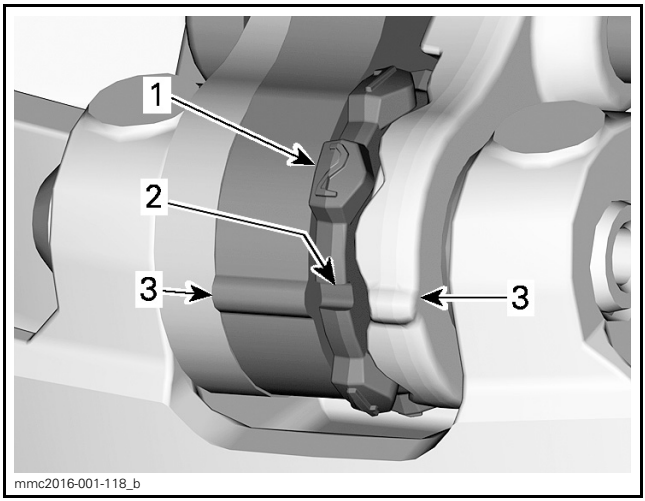
Procedure

1. Refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT* and remove:
   - LH side panel
   - Drive pulley guard
2. Locate the cam and the pivot screw on the drive pulley.



1. Cam
2. Pivot screw

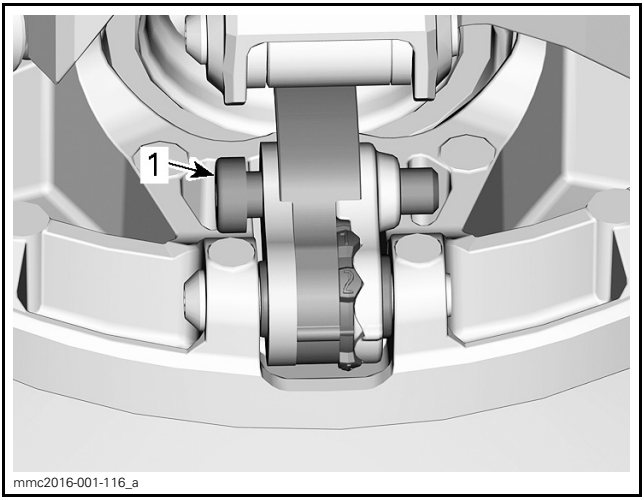
The cam position is identified as follows:
- Positions 1, 2, 4 and 5 are numbered.
- Position 3 (middle) is identified by a notch.
- There are notches on each side of the cam used as pointers.



1. Numbered position
2. Position 3 - Notch
3. Pointers

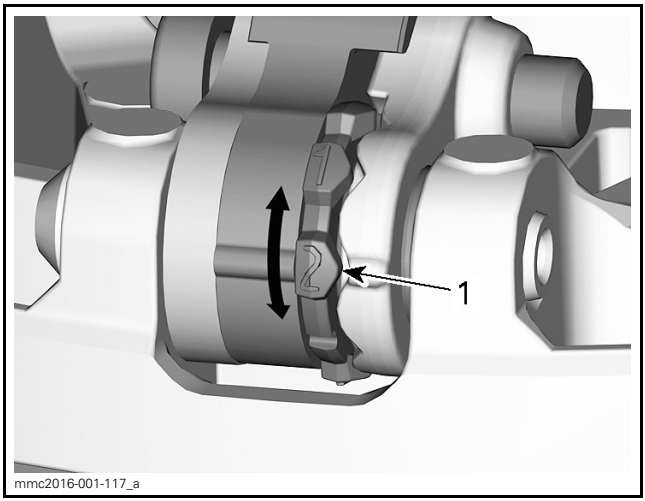
To adjust, proceed as follows for all 3 cams:

3. Using the Allen end of the driven pulley expander, loosen the pivot screw.



1. Pivot screw

4. Move the right lever aside to be able to turn the cam.
5. Turn cam to the desired position.



1. Desired cam position (here #2)

6. Tighten the pivot screw.

TIGHTENING TORQUE	
Pivot	5 N•m ± 1 N•m (44 lbf•**in** ± 18 lbf•**in**)

NOTICE Always adjust all 3 cams to the same setting.

Track

Track Condition

⚠ WARNING

Remove tether cord cap from engine cut-off switch before performing any maintenance or adjustment, unless otherwise specified. Vehicle must be parked in a safe place, away from the trail.

Remove tether cord cap from engine cut-off switch.

Lift the rear of the snowmobile and support it with a wide-base snowmobile mechanical stand with a rear deflector panel. With the engine off, rotate the track by hand, and inspect condition. If worn or cut, or if track fibers are exposed, or if missing or defective inserts or guides are noted; contact an authorized Ski-Doo dealer.

Snowmobiles Equipped with Traction Enhancing Products

If your snowmobile is equipped with a BRP approved studded track, PROCEED WITH A VISUAL INSPECTION OF YOUR TRACK BEFORE EACH USE.

Look for any defects, such as:

- Perforations in the track
- Tears in the track (particularly around traction holes on studded tracks)
- Lugs that are broken or torn off, exposing portions of rods
- Delamination of the rubber
- Broken rods
- Broken studs (studded tracks)
- Bent studs (studded tracks)
- Missing studs
- Studs that are torn off the track
- Missing track guide(s)
- Also, ensure that studs nut are tighten to the recommended torque.

On approved studded tracks, replace broken or damaged studs immediately. If your track shows signs of deterioration, it must be replaced immediately. When in doubt, ask your dealer.

⚠ WARNING

Riding with a damaged track or studs could lead to a loss of control.

For complete information on traction enhancing products, refer to the section entitled *TRACTION ENHANCING PRODUCTS* in the *SAFETY INFORMATION* section at the beginning of this Operator's Guide.

Track Tension and Alignment

NOTE: Track tension and alignment are interrelated. Do not adjust one without the other.

⚠ WARNING

To prevent serious injury to individuals near the snowmobile:

- NEVER stand behind or near a moving track.
- Always use a wide-base snowmobile stand with a rear deflector panel if it is necessary to rotate track.
- When the track is raised off the ground, only run it at the lowest possible speed.

Centrifugal force could cause debris, damaged or loose studs, pieces of torn track, or an entire severed track to be violently thrown backwards out of the tunnel with tremendous force, possibly resulting in the loss of a leg or other serious injury.

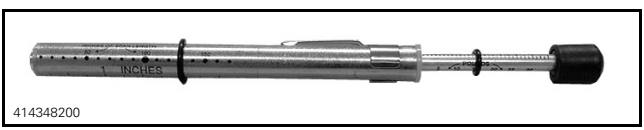
Track Tension Verification

NOTE: Ride the snowmobile in snow about 15 to 20 minutes prior to adjusting track tension.

1. Remove tether cord cap from engine cut-off switch.
2. Lift rear of vehicle and support it off the ground.

⚠ **CAUTION** Use proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.

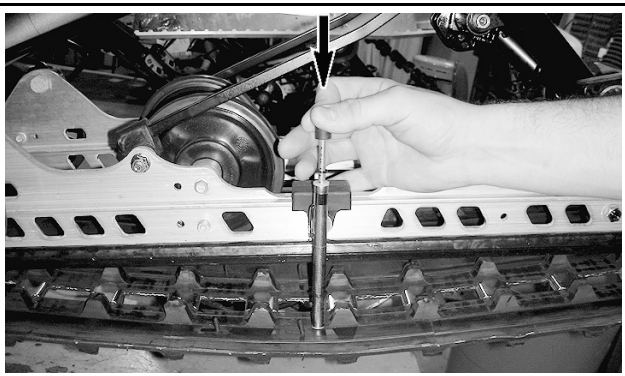
3. Allow rear suspension to fully extend.
4. Use the TENSIOMETER (P/N 414 348 200).

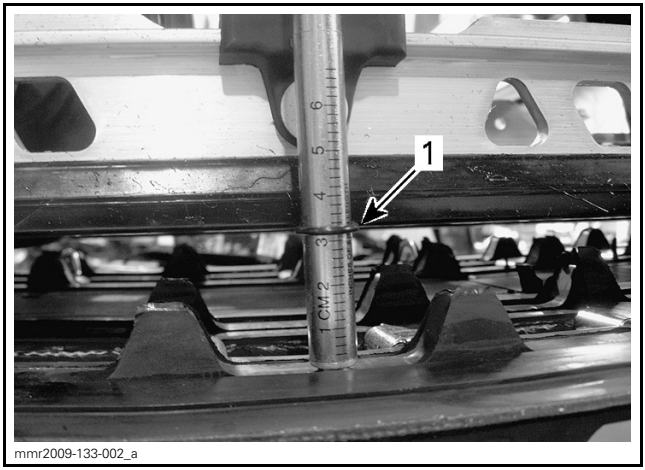


5. Set deflection between 30 mm and 35 mm (1-3/16 in and 1-3/8 in) using bottom O-ring.

DEFLECTION SETTING
1. Bottom O-ring set to specification

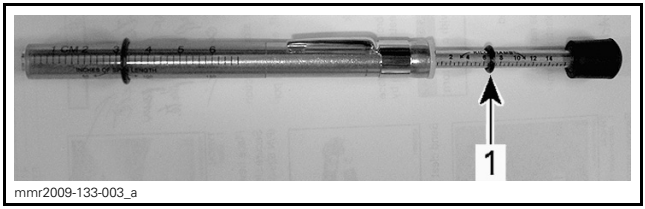
6. Place upper O-ring to 0 kgf (0 lbf).
7. Position the tensiometer on track, halfway between front and rear idler wheels.
8. Push the tensiometer downwards until bottom O-ring (deflection set earlier) be aligned with the bottom of slider shoe.





1. Deflection O-ring aligned with slider shoe

9. Read load recorded by the upper O-ring on the tensiometer.



LOAD READING
1. Upper O-ring

10. Load reading must be as per the following table.

TRACK ADJUSTMENT SPECIFICATION	
Track deflection setting	3.2 cm (1.26 in)
Track load reading	6 kgf to 8.5 kgf (13 lbf to 19 lbf)

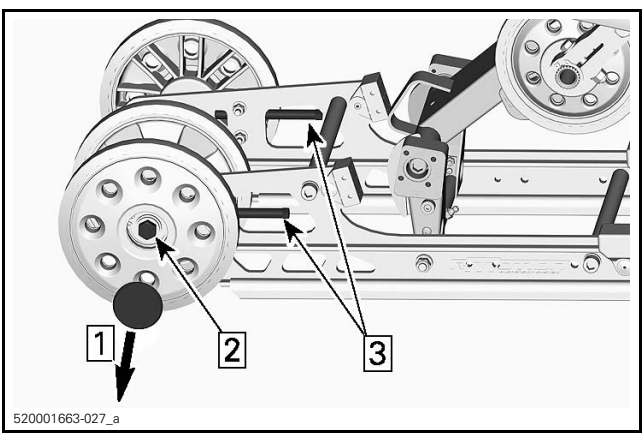
11. If load reading is not in accordance with the specification, adjust track tension. Refer to *TRACK TENSION ADJUSTMENT*.

Track Tension Adjustment

1. Remove tether cord cap from engine cut-off switch.

⚠ CAUTION Use proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.

2. Remove wheel caps.
3. Loosen the rear axle screws on both sides.
4. Tighten or loosen both adjustment screws (equally) to increase or decrease track tension.



Step 1: Remove cap
Step 2: Loosen the axle screw
Step 3: Tighten or loosen adjustment screws

5. If correct tension is unattainable, contact an authorized Ski-Doo dealer.
6. Retighten the rear axle fasteners to specification.

TIGHTENING TORQUE	
Rear idler wheel retaining screws (3 wheels and 4 wheels models)	48 N•m ± 6 N•m (35 lbf•ft ± 4 lbf•ft)
Rear idler wheel retaining nut and screw (2 idler wheels models)	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

7. Check track alignment as described below.

Track Alignment

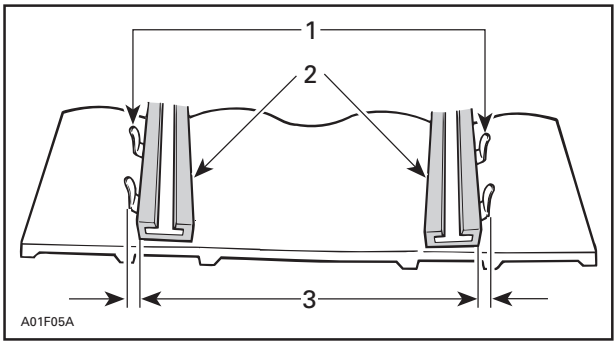
⚠ WARNING

Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Always lift the snowmobile on a wide-base stand with a rear deflector panel. Ensure no one is standing in close proximity to the snowmobile, especially at the rear of the track. Never rotate track at high speed.
Centrifugal force could cause debris, damaged or loose studs, pieces of torn track, or an entire severed track to be violently thrown backwards out of the tunnel with tremendous force.

1. Lift rear of vehicle and support it off the ground.

⚠ CAUTION **Use proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.**

2. Start engine and accelerate slightly so that track slowly turns. This must be done in a short period of time (15 to 20 seconds).
3. Check that the track is well centered; equal distance on both sides between edges of track guides and slider shoes.



1. Guides
2. Slider shoes
3. Equal distance

4. To correct track alignment:

   4.1 Stop engine.

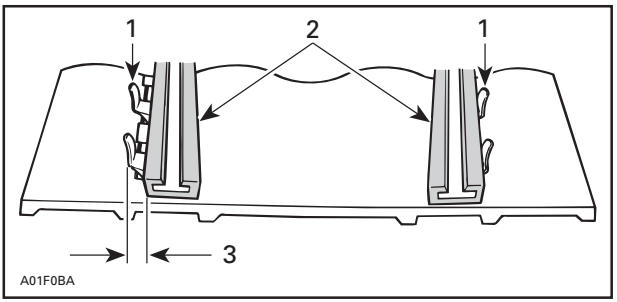
   4.2 Remove tether cord cap from engine cut-off switch.

⚠ WARNING

Remove tether cord cap from engine cut-off switch before performing any maintenance or adjustment, unless otherwise specified. Vehicle must be parked in a safe place, away from the trail.

   4.3 Loosen the rear axle nut.

   4.4 Tighten adjustment screw on side where the slider shoe is the farthest from the track insert guides.



1. Guides
2. Slider shoes
3. Tighten on this side

5. Tighten the rear axle nut.

⚠ WARNING

Properly tighten wheel retaining bolt, otherwise wheel may come off and cause track to "lock".

6. Restart engine and rotate track slowly to recheck alignment.
7. Tighten the rear axle nut to specified torque.

TIGHTENING TORQUE	
Rear idler wheel retaining screws **(3 and 4 idler wheels system)**	48 N•m ± 6 N•m (35 lbf•ft ± 4 lbf•ft)
Rear idler wheel retaining nut and screw **(2 idler wheels system)**	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

8. Reposition snowmobile on the ground.

Suspension

Rear Suspension Condition

Visually inspect all suspension components including slider shoes, springs, wheels, etc.

NOTE: During normal driving, snow will act as a lubricant and coolant for the slider shoes. Extensive riding on ice or sanded snow, will create excessive heat build-up and cause premature slider shoe wear.

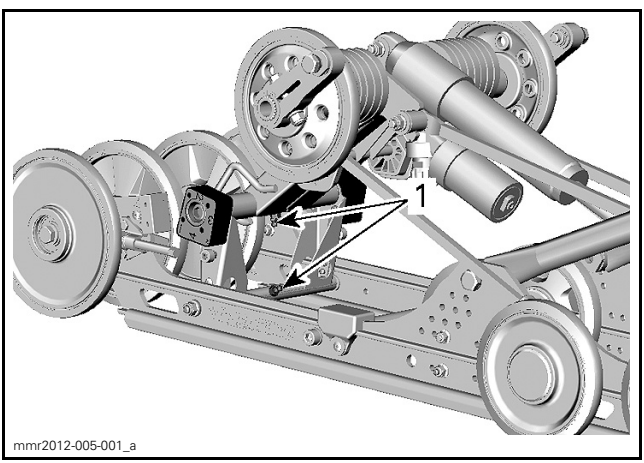
Suspension Stopper Strap Condition

Inspect stopper straps for wear and cracks, bolt and nut for tightness. If loose inspect holes for deformation. Replace as required. Torque nut to specification.

TIGHTENING TORQUE
10 N•m ± 1 N•m (89 lbf•**in** ± 9 lbf•**in**)

Suspension Lubrication

Lubricate the following suspension pivots at grease fittings using SUSPENSION GREASE (P/N 293 550 033). Refer to *MAINTENANCE SCHEDULE* for maintenance frequency.



rMOTION
1. Grease fitting

Steering and Front Suspension Condition

Visually inspect steering and front suspension for tightness of components (steering arms, control arms and links, tie rods, ball joints, ski bolts, ski legs, etc.). If necessary, contact an authorized Ski-Doo dealer.

Skis

Wear and Condition of Skis and Runners

Check the condition of the skis and ski runner carbides. If worn, contact an authorized Ski-Doo dealer.

⚠ WARNING

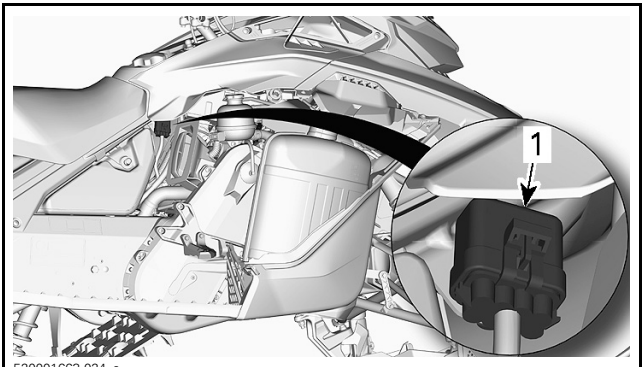
Excessively worn skis and/or ski runners will adversely affect snowmobile control.

Fuses

Access to Fuse Block

Open RH side panel, refer to *CONTROLS, INSTRUMENTS AND EQUIPMENT*.

Fuses Location



520001663-024_a

1. Fuse block

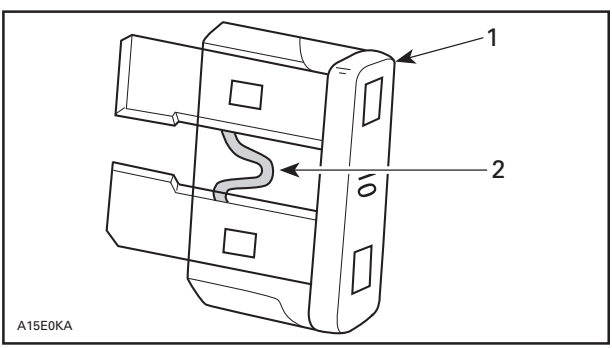
Unlock fuse block from its cover.

FUSE IDENTIFICATION	AMPERAGE RATING
Start/RER	5 A
Battery	30 A
Accessories	7.5 A
Loads	25 A

Fuse Inspection

Check fuse condition and replace it if necessary.

To remove fuse from holder, pull fuse out. Check if filament is melted.



1. Fuse
2. Check if melted

⚠ WARNING

Do not use a higher rated fuse.

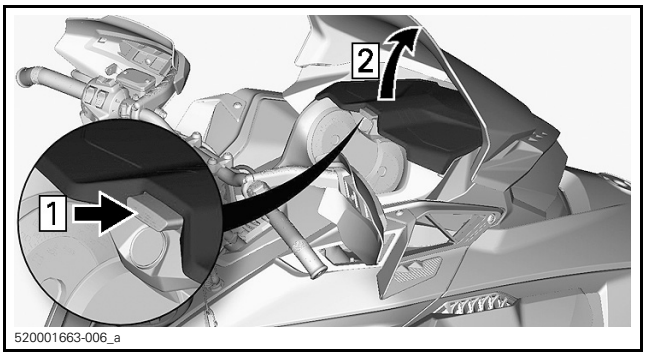
⚠ WARNING

If fuse has burnt out, source of malfunction should be determined and corrected before restarting. See an authorized Ski-Doo dealer for servicing.

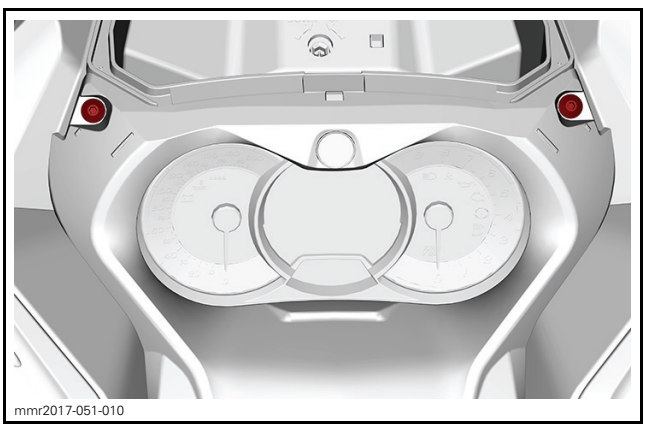
Headlights

Headlights Bulb Replacement

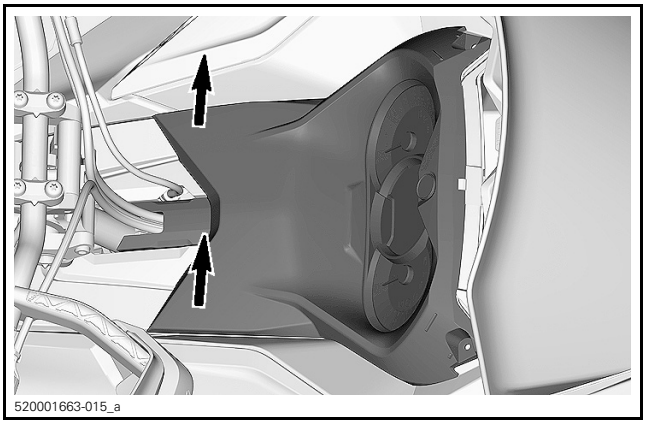
1. Open the storage compartment.



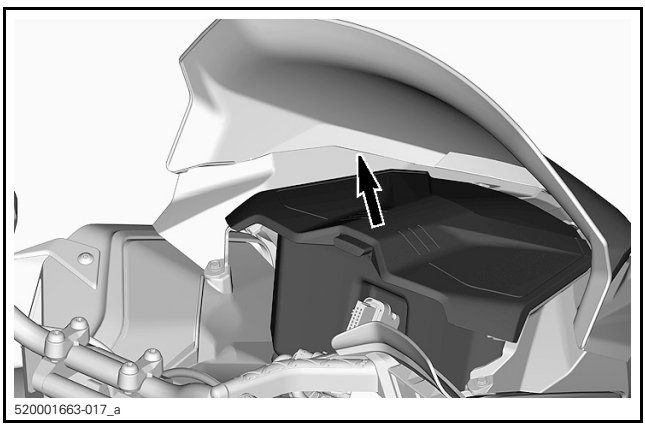
2. Remove the gauge retaining screws.



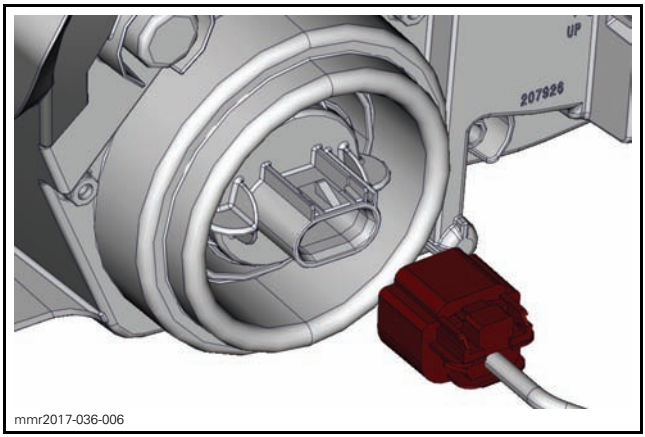
3. Free the rear of the gauge from its grommets.


520001663-015_a

4. Slide the gauge forward to remove it.
5. Set gauge aside.
6. Remove the storage compartment.


520001663-017_a

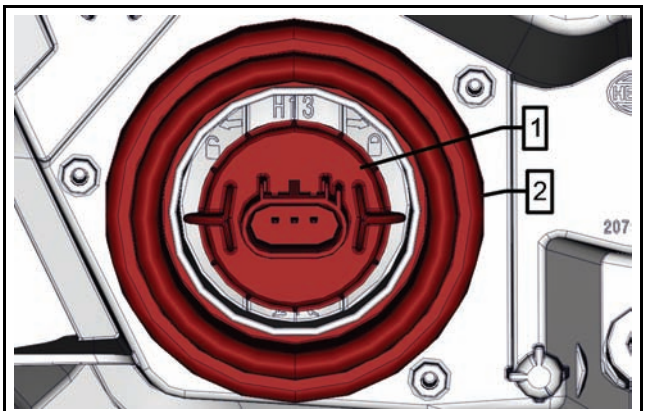
7. Disconnect bulb connector.



mmr2017-036-006

8. Unlock bulb by turning it counterclockwise.
9. Pull bulb out.

NOTE: Ensure bulb seal stays in place.



mmr2017-036-008

1. Bulb
2. Bulb seal

Install a new bulb using the reverse of the removal procedure.

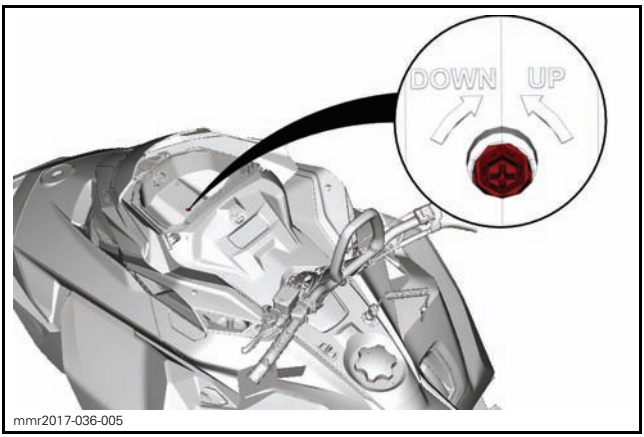
NOTICE Never touch glass portion of an halogen bulb with bare fingers, it shortens its operating life. If glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.

Check headlights operation.

Headlights Beam Aiming

Open the storage compartment, see *FRONT STORAGE COMPARTMENT*.

Turn the adjustment screw to reach desired beam height.



mmr2017-036-005

Post-Operation Care

Remove snow and ice from rear suspension, track, front suspension, steering mechanism and skis.

⚠ WARNING

Make sure tether cord cap is away from engine cut-off switch before standing in front the vehicle, getting close to the track or rear suspension components.

Always cover your snowmobile when leaving it outside overnight or during extended periods of inactivity. This will protect it from frost and snow as well as help retain its appearance.

Vehicle Cleaning and Protection

Wash snowmobile with water mixed with a mild detergent. Use only microfiber cloths or an equivalent.

NOTICE **It is necessary to use microfiber cloths or equivalent on windshield and hood to avoid damaging further surfaces to clean.**

To remove grease, oil and grime, use BRP HEAVY DUTY CLEANER (P/N 293 110 001).

NOTICE **Do not use Heavy duty cleaner on decals or vinyl.**

To remove stubborn dirt from all plastic and vinyl surfaces, use XPS ALL PURPOSE CLEANER (P/N 219 701 709).

NOTICE **Never clean plastic parts or hood with strong detergent, degreasing agent, paint thinner, acetone, products containing chlorine, etc.**

Wax painted portion of the vehicle for better protection.

NOTE: Apply wax on glossy finish only.

STORAGE

During summer, or when a snowmobile is not in use for more than three months, proper storage is necessary.

STORAGE
Clean the vehicle
Add fuel stabilizer to fuel following the product manufacturer recommendations. Run the engine after adding the product to the fuel
Lubricate engine
Lubricate brake lever pivot
Lubricate rear suspension
Charge battery monthly to keep it fully charged during storage (on models with electric starter)
Block muffler outlet with rags
Lift rear of vehicle until track is clear of the ground. Do not release track tension

⚠ **CAUTION** Use appropriate lifting device or have assistance to share lifting stress. If a lifting device is not used, use proper lifting techniques, notably using your legs force. Do not attempt to lift the rear of vehicle if it is above your limits.

NOTICE The snowmobile has to be stored in a cool and dry place and covered with an opaque but ventilated tarpaulin. This will prevent sun rays and grime from affecting plastic components and vehicle finish.

NOTICE Fuel stabilizer should be added prior to engine lubrication to ensure carburetor protection against varnish deposits.

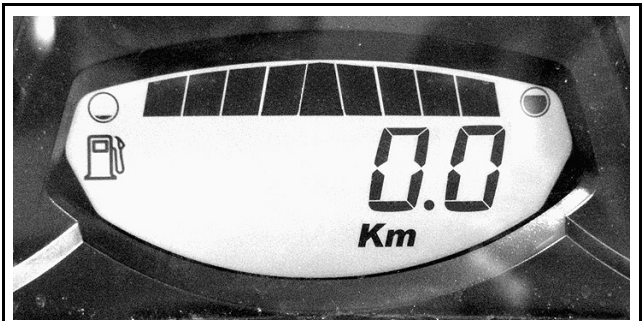
Engine Storage Mode

Like other engines, the E-TEC has to be properly lubricated at storage for internal parts protection. The E-TEC system offers a built-in engine storage lubrication function (summerization) that can be initiated by the operator.

To engage procedure, do the following:

1. Place the vehicle in a well ventilated area.

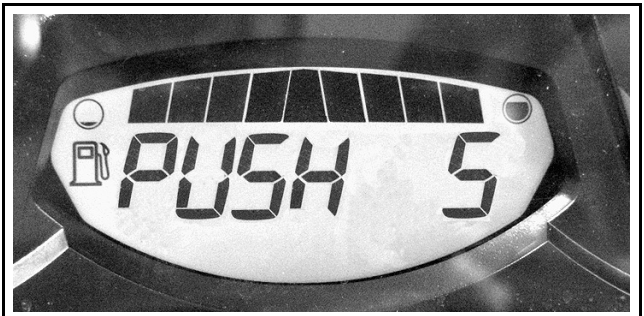
2. Start the engine and let it run at idle speed until it reaches its operating temperature (watch the coolant temperature on the display or verify the rear heat exchanger becomes warm).
3. Push the SET (S) button to select odometer mode.



mmr2009-004-002

NOTE: The storage mode does not function in other modes (trip A, trip B and hr trip).

4. Repeatedly depress the HI/LOW beam switch rapidly, then, **while doing this**, press and hold the **SET button** until PUSH "S" appears on the display.

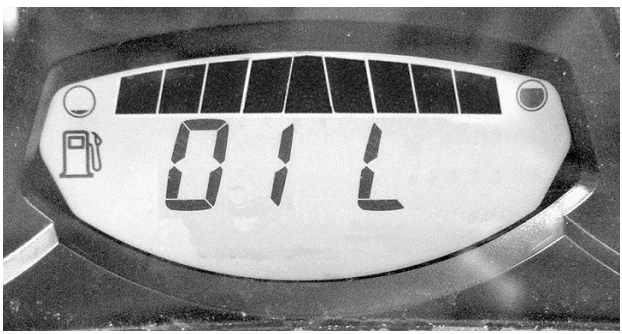


mmr2009-004-003

5. Release all buttons when gauge displays **PUSH (S)** appears.
6. Again, press and hold the SET (S) button for 2 - 3 seconds.

NOTE: The gauge will display OIL when the storage procedure is initiated.

7. When gauge displays **OIL**, release button and wait for the lubrication function to end.



mmr2009-004-004

Do not touch anything during engine lubrication cycle.

The engine lubrication function takes approximately 1 minute. During this time the engine RPM will increase slightly to approximately 1600 RPM and the oil pump will "oil flood" the engine.

At the end of engine lubrication procedure, the ECM will turn the engine off.

Remove tether cord cap from engine cut-off switch.

NOTICE **Do not start the engine during storage period.**

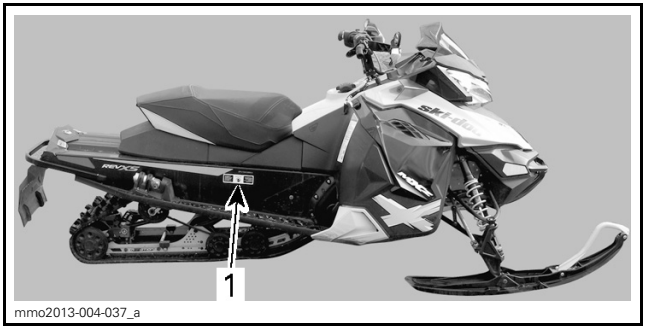
This page is intentionally blank

TECHNICAL INFORMATION

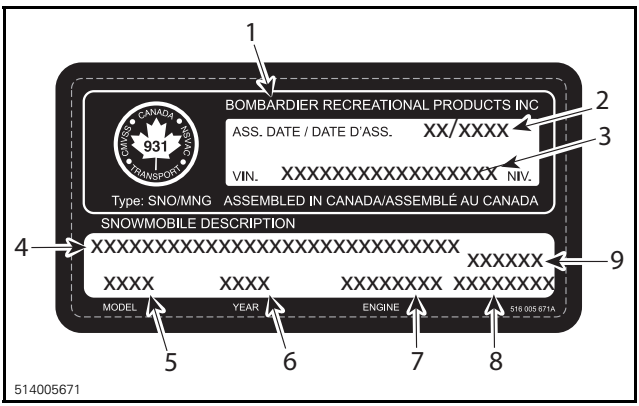
VEHICLE IDENTIFICATION

Vehicle Description Decal

Vehicle description decal is located on right hand side of tunnel.



TYPICAL
1. *Vehicle description decal*



VEHICLE DESCRIPTION DECAL
1. *Manufacturer name*
2. *Manufacturing date*
3. *Vehicle identification number (VIN)*
4. *Model and package name*
5. *Model number*
6. *Model year*
7. *Engine type*
8. *Vehicle weight (European models)*
9. *Vehicle engine power (European models)*

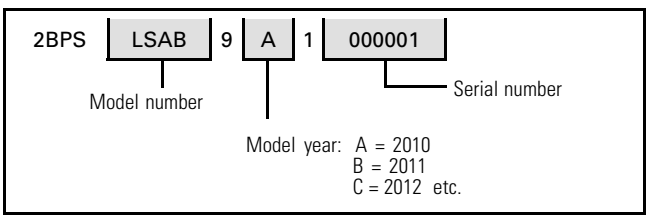
Identification Numbers

The main components of your snowmobile (engine and frame) are identified by different identification numbers. It may sometimes become necessary to locate these numbers for warranty purposes or to trace your snowmobile in the event of loss. These numbers are required by the authorized Ski-Doo dealer to complete warranty claims properly. We strongly recommend that you take note of all the identification numbers on your snowmobile and supply them to your insurance company.

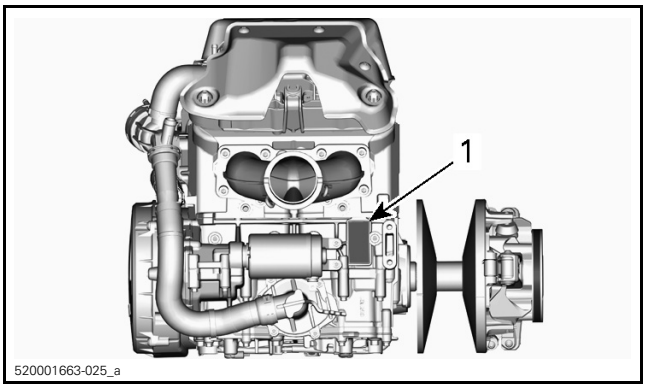
Vehicle Identification Number (VIN)

VIN is scribed on vehicle description decal. See above. It is also engraved on tunnel near vehicle description decal.

Model number and model year are part of the information found in the VIN. See illustration.



Engine Identification Number Location

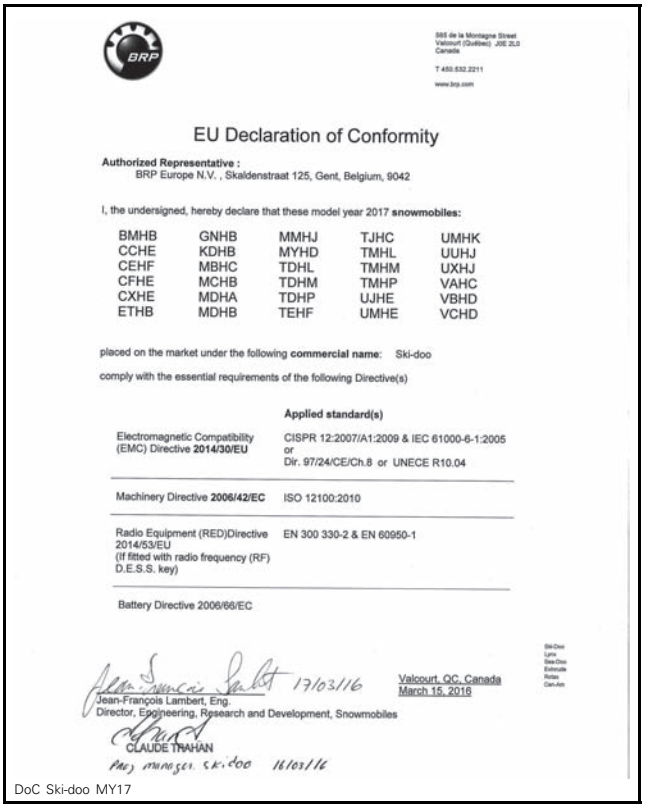


1. Engine identification number

NOISE EMISSION AND VIBRATION VALUES (ALL COUNTRIES EXCEPT CANADA/UNITED STATES)

MODEL		850 E-TEC
NOISE EMISSION AND VIBRATION VALUES[1]		
Noise	Sound power level (L_{WA})	100 dB (Uncertainty (K_{wa}) 3 dB)
	Sound pressure (L_{pA})	86 dB (Uncertainty (K_{pA}) 3 dB)
Vibration	Hand-arm system	<2.5 m/s^2
	Whole body at seat	<0.5 m/s^2
[1]: Noise emission and Vibration values are measured in accordance with Standard EN 15997:2011 on a paved surface, at neutral or without belt.		

EC DECLARATION OF CONFORMITY



565 de la Montagne Street
Valcourt (Québec) J0E 2L0
Canada

T 450.532.2211

www.brp.com

EU Declaration of Conformity

Authorized Representative :
BRP Europe N.V. , Skaldenstraat 125, Gent, Belgium, 9042

I, the undersigned, hereby declare that these model year 2017 **snowmobiles:**

BMHB	GNHB	MMHJ	TJHC	UMHK
CCHE	KDHB	MYHD	TMHL	UUHJ
CEHF	MBHC	TDHL	TMHM	UXHJ
CFHE	MCHB	TDHM	TMHP	VAHC
CXHE	MDHA	TDHP	UJHE	VBHD
ETHB	MDHB	TEHF	UMHE	VCHD

placed on the market under the following **commercial name**: Ski-doo

comply with the essential requirements of the following Directive(s)

	Applied standard(s)
Electromagnetic Compatibility (EMC) Directive **2014/30/EU**	CISPR 12:2007/A1:2009 & IEC 61000-6-1:2005 or Dir. 97/24/CE/Ch.8 or UNECE R10.04
Machinery Directive **2006/42/EC**	ISO 12100:2010
Radio Equipment (RED)Directive 2014/53/EU (If fitted with radio frequency (RF) D.E.S.S. key)	EN 300 330-2 & EN 60950-1
Battery Directive 2006/66/EC	

Ski-Doo
Lynx
Sea-Doo
Evinrude
Rotax
Can-Am

17/03/16

Valcourt, QC, Canada
March 15, 2016

Jean-François Lambert, Eng.
Director, Engineering, Research and Development, Snowmobiles

CLAUDE TRAHAN
Proj manager, Ski-doo 16/03/16

DoC Ski-doo MY17

EPA CERTIFIED ENGINES

Engine Emissions Information

Manufacturer's Responsibility

Beginning with 2007 model year engines, snowmobile manufacturers of snowmobile engines need to determine the exhaust emission levels for each engine horsepower family and certify these engines with the United States of America Environmental Protection Agency (EPA). An emissions control information label, showing emission levels and engine specifications, must be placed on each vehicle at the time of manufacture.

Dealer's Responsibility

When performing service on a certified Ski-Doo snowmobiles that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the engine in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturer's prescribed changes, such as altitude adjustments for example.

Owner Responsibility

The owner/operator is required to have engine maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

EPA Emission Regulations

All Ski-Doo snowmobiles manufactured by BRP are certified to the EPA as conforming to the requirements of the regulations for the control of air pollution from new snowmobile engines. This certification is contingent on certain adjustments being set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, whenever practicable, returned to the original intent of the design.

The responsibilities listed above are general and in no way a complete listing of the rules and regulations pertaining to the EPA requirements on exhaust emissions for snowmobile products. For more detailed information on this subject, you may contact the following locations:

MAIL:

U.S. Environmental Protection Agency
Certification Division
Gasoline Engine Compliance Center
2000 Traverwood Drive
Ann Arbor MI 48105
USA

INTERNET WEB SITE:

www.epa.gov/otaq/

RADIO FREQUENCY DIGITALLY ENCODED SECURITY SYSTEM (RF D.E.S.S. KEY)

This device complies with FCC Part 15 and Industry Canada license exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC Registration Number: 12006A-M01456

FCC ID: 2ACERM01456

We, the party responsible for compliance, declare under our sole responsibility that the device is in conformity with the provisions of the following Council Directive: 2014/53/EU. To which this declaration relates is in conformity with the essential requirements and other relevant requirements. The product is in conformity with the following directives, harmonized standards and regulations:

Radio Equipment Directive (RED) 2014/53/EU and Harmonized Standards:

EN 300 330-2, EN 60950-1

SPECIFICATIONS

MODEL	850 E-TEC
ENGINE	
Engine type	Rotax, liquid cooled w/Reed valve, electronic RAVE
Cylinders	2
Displacement	849 cm³ (51.9 in³)
Bore	82 mm (3.2 in)
Stroke	80.4 mm (3.2 in)
Maximum horsepower RPM	7900 ± 100 RPM
Fuel injection system	E-TEC Direct injection with additional booster injectors
Exhaust system	Single tuned pipe, baffle muffler
Engine oil	XPS SYNTHETIC 2-STROKE OIL (P/N 293 600 132) [1] or equivalent
Engine oil tank capacity	3.4 L (3.6 qt (U.S. liq.))
Coolant	Ethyl glycol/water mix (50% coolant, 50% distilled water). Use LONG LIFE ANTIFREEZE (P/N 219 702 685) or (P/N 619 590 204) (Finland, Norway and Sweden) or coolant specifically designed for aluminum engines
Recommended fuel	Premium unleaded (fuel which may contain up to 10% MAX ethanol)
Minimum octane rating. Refer to *FUEL REQUIREMENTS*	91 Pump Posted AKI (RON+MON)/2
	95 RON
Fuel tank capacity	36 L (9.5 U.S. gal.)
DRIVE SYSTEM	
Drive pulley type	pDrive
Driven pulley type	QRS
Engagement	3600 ± 100 RPM
Chaincase oil	XPS SYNTHETIC CHAINCASE OIL (P/N 413 803 300)

MODEL		850 E-TEC
DRIVE SYSTEM (cont'd)		
Small sprocket number of teeth	MX Z	27
	Renegade	25
Large sprocket number of teeth		45
Drive sprocket number of teeth		8
Track nominal width		38 cm (15 in)
Track nominal length	Renegade	348.7 cm (137 in)
	MX Z	326.9 cm (129 in)
Track profile height		31.8 mm (1.25 in)
Track tension	Deflection	3.2 cm (1.26 in)
	Force (2)	6 kgf to 8.5 kgf (13 lbf to 19 lbf)
Track alignment		Equal distance between edges of track guides and slider shoes
BRAKE SYSTEM		
Brake system type		Brembo racing brake with stainless-steel braided brake line
Brake fluid		DOT 4

MODEL		850 E-TEC
SUSPENSION		
Front suspension		RAS 3
Front shock		HPG Plus
Front suspension max. travel		233 mm (9.17 in)
Rear suspension		rMotion
Center shock	Renegade Adrenaline	HPG
	MX Z TNT MX Z X Renegade X	HPG Plus
Rear shock	Renegade Adrenaline	HPG
	MX Z TNT	HPG Plus
	MX Z X Renegade X	KYB PRO 36 Easy-adjust
Rear suspension max. travel	Renegade	27 cm (10.6 in)
	MX Z	27.2 cm (10.7 in)
ELECTRICAL SYSTEM		
Lighting system output		30 A @ 14.5 V Max output 1300 W
Headlights bulb HI/LOW beam		2 x 60/55 Watts (H-13)
Taillight bulb		2.6 W / 139m W LED

MODEL		850 E-TEC
ELECTRICAL SYSTEM (cont'd)		
Spark plug	Type	NGK ILKR8Q7 [3] or equivalent
	Gap	0.7 mm ± 0.05 mm (.028 in ± .002 in) (not adjustable)
Fuse		Refer to *FUSES* in *MAINTENANCE*
DIMENSIONS AND WEIGHT		
Vehicle overall length	MX Z	301 cm (118.5 in)
	Renegade	311 cm (122.4 in)
Vehicle overall width		121.7 cm (47.9 in)
Vehicle overall height		122.2 cm (48.1 in)
Dry weight	Renegade Adrenaline Renegade X	220 kg (486 lb)
	MX Z X	215 kg (475 lb)
	MX Z TNT	214 kg (471 lb)
Ski stance		106 cm (41.7 in)
Ski overall length		106.6 cm (42 in)
Ski width		145 mm (5.7 in)

[1] Refer to *INJECTION OIL* subsection for detailed information.

[2] Measure gap between slider shoe and bottom inside track when exerting a downward pull to the track.

[3] **NOTIC** Do not attempt to adjust gap on this spark plug.

This page is intentionally blank

TROUBLE-SHOOTING

TROUBLESHOOTING GUIDELINES

ELECTRIC STARTER DOES NOT WORK

1. **Emergency engine stop switch in OFF position or tether cord cap not installed on engine cut-off switch.**
   – *Place the emergency engine stop switch in the ON position and install tether cord cap (on engine cut-off switch.*
2. **Throttle applied while attempting an engine start.**
   – *Release throttle while cranking.*

ENGINE IS CRANKED BUT FAILS TO START

1. **No fuel to the engine.**
   – *Check fuel tank level, add fuel if necessary.*
2. **System voltage too low.**
   – *Contact an authorized Ski-Doo dealer.*

ENGINE RPM DOES NOT REACH CLUTCH ENGAGEMENT POINT

1. **D.E.S.S. did not read D.E.S.S. key code in the tether cord cap. D.E.S.S. pilot lamp blinks (slow short beeps/repetitive).**
   – *Properly install tether cord cap.*
2. **D.E.S.S. has read a different code than the one programmed. D.E.S.S. pilot lamp blinks rapidly (fast short beeps/repetitive).**
   – *Install a tether cord cap for which this snowmobile was programmed.*
3. **ECM does not recognize the D.E.S.S. key.**
   – *Refer to an authorized Ski-Doo dealer.*

ENGINE LACKS ACCELERATION OR POWER

1. **Engine warm-up in progress.**
   – *Drive vehicle at low speeds for a few minutes.*
2. **Engine break-in period not completed.**
   – *Complete break-in period.*
3. **Drive and driven pulleys require servicing.**
   – *Contact an authorized SKI-DOO dealer.*

ENGINE LACKS ACCELERATION OR POWER (cont'd)

4. **Engine overheats.**
   - *Check coolant level, see MAINTENANCE PROCEDURES.*
   - *Check heat exchangers cleanliness. Clean if necessary.*
5. **Drive belt worn too thin.**
   - *If the drive belt has lost more than 3 mm (1/8 in) of its original width, it will affect vehicle performance.*
   - *Replace drive belt.*
6. **Incorrect track adjustment.**
   - *See MAINTENANCE and/or an authorized SKI-DOO dealer for proper alignment and tension adjustments.*
7. **R.A.V.E. valves problem.**
   - *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*
8. **Fuel pressure too low.**
   - *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

ENGINE BACKFIRES

1. **Engine is running too hot.**
   - *See item 4 of ENGINE LACKS POWER.*
2. **Ignition timing is incorrect or there is an ignition system failure.**
   - *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

ENGINE BACKFIRES (cont'd)

3. Exhaust system leak.

– *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

4. Fuel pressure too low.

– *Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

ENGINE MISFIRES

1. Water in fuel.

– *Drain fuel system and refill with fresh fuel.*

2. RAVE valves malfunction.

– *Have RAVE valves system inspected. Seek service from an authorized Ski-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA EMISSIONS-RELATED WARRANTY contained herein for information about warranty claims.*

HEATED GRIPS/THUMB WARMERS ARE NOT WORKING

1. Engine RPM is too low.

– *Make sure engine RPM is above 2000.*

ENGINE HAS SHUT DOWN

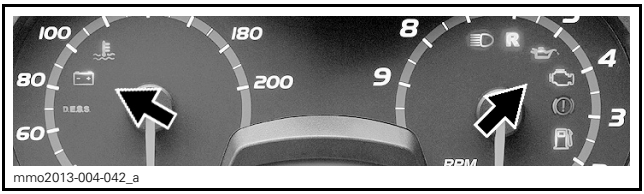
1. The engine shuts down after long periods of idling.

– *Do not let engine idle too long. Refer to VEHICLE WARM-UP in OPERATING INSTRUCTION.*

MONITORING SYSTEM

Pilot Lamps, Messages and Beeper Codes

Gauge pilot lamp(s) will inform you if an anomaly occurs or to inform you of a particular condition.

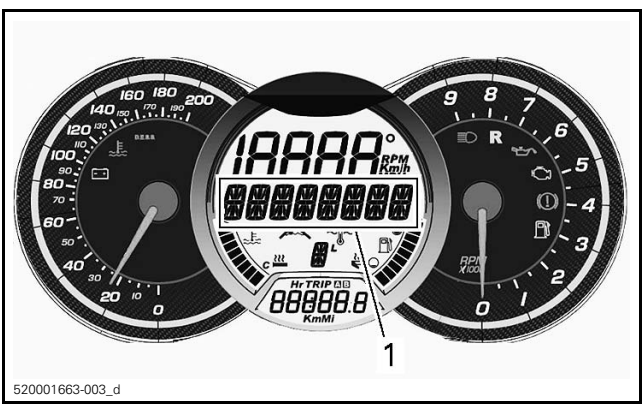


mmo2013-004-042_a

TYPICAL — PILOT LAMPS

Pilot lamp can flash alone or in combination with another lamp.

The center display is used as a complement of the pilot lamps to give you a brief description if an anomaly occurs or to inform you of a particular condition.



520001663-003_d

1. Center Display

Messages will be displayed with a beep code and pilot lamp(s).

Beeper codes will be heard and messages will be displayed to catch your attention.

See table below for details.

NOTE: Some of the listed pilot lamps and messages do not apply to all models. The message display is available only on the multifunction analog/digital gauge.

PILOT LAMP ON	BEEPER	MESSAGE DISPLAY	DESCRIPTION
	4 short beeps every 30 seconds	ENGINE OVERHEAT	Engine is overheating, reduce snowmobile speed and run in loose snow or stop engine immediately and let engine cool down. Check coolant level, refer to *MAINTENANCE*. If coolant level is correct and overheating persists, contact an authorized Ski-Doo dealer. Do not run the engine if condition persists.
		MUFFLER	Reduce speed or stop engine. Let engine cool down and restart. If overheating persists, contact an authorized Ski-Doo dealer. Do not run the engine if condition persists.

PILOT LAMP ON	BEEPER	MESSAGE DISPLAY	DESCRIPTION
	Short beeps repeating rapidly	ENGINE OVERHEAT	Critical overheat. Stop engine immediately and let engine cool down. Check coolant level, refer to *MAINTENANCE*. If coolant level is correct and overheating persists, contact an authorized Ski-Doo dealer. Do not run the engine if condition persists.
		MUFFLER OVERHEAT	Critical overheat. Stop engine immediately and let engine cool down. If overheating persists, contact an authorized Ski-Doo dealer. Do not run the engine if condition persists.
		ECM OVERHEAT	
	4 short beeps every 5 minutes	LOW BAT	Indicate a low or high battery voltage condition. See an authorized Ski-Doo dealer as soon as possible.
		HIGH BAT	
	4 short beeps	CHECK ENGINE	Engine fault, see an authorized Ski-Doo dealer, repair shop or person of your own choosing as soon as possible.
	—		Displayed when brake is applied for more than 15 seconds while throttle lever is squeezed and vehicle is moving at more than 5 km/h (3 MPH).

PILOT LAMP ON	BEEPER	MESSAGE DISPLAY	DESCRIPTION
—	4 short beeps every 5 minutes	KNOCK	Engine detonation (RPM is limited when this condition occurs). – Ensure recommended fuel is used. – Check fuel quality, replace if necessary. – If fault still occurs, contact an authorized Ski-Doo dealer, repair shop, or person of your own choosing.
—	4 short beeps every 5 minutes	REV LIMIT	Engine RPM limited for protection when certain faults occur.
—	—	OVER REV	Indicates that maximum engine RPM is reached. Check clutch calibration.
—	Short beeps repeating rapidly	SHUTDOWN	Shutdown procedure in force due to engine overheating or fuel pump problem.
—	—	COMMUNICA-TION	Communication problem between ECM and gauge. Stop engine, remove tether cord cap. Wait a few minutes, then start engine. If problem persists, contact an authorized Ski-Doo dealer.

PILOT LAMP ON	BEEPER	MESSAGE DISPLAY	DESCRIPTION
DESS	2 short beeps	—	Good key, vehicle ready to operate.
	Short beeps, repeating slowly	CHECK KEY	Unable to read key (bad connection). Make sure the key is clean and correctly snapped on post.
	Short beeps repeating rapidly	BAD KEY	Invalid key or key not programmed. Use the proper key for the vehicle or have the programmed.
—	—	 (blinking)	Fuel level sensor problem.

Fault Codes

To read any active fault code, press and hold MODE (M) Button and simultaneously depress the HI/LOW beam switch repeatedly several times.

If two or more codes are registered, use SET (S) or MODE (M) to scroll.

To exit the fault codes mode, press and hold MODE (M) button.

Contact an authorized Ski-Doo dealer for code signification.

This page is intentionally blank

WARRANTY

BRP LIMITED WARRANTY USA AND CANADA: 2017 SKI-DOO® SNOWMOBILES

1) SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products Inc. ("BRP")* warrants its 2017 Ski-Doo snowmobiles sold by authorized BRP dealers (as defined below) in the United States of America ("USA") and in Canada from defects in material or workmanship for the period and under the conditions described below. This limited warranty will become null and void if: (1) the snowmobile was used for racing or any other competitive activity, at any point, even by a previous owner; or (2) the snowmobile has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or has been altered or modified to change its intended use.

Non-factory installed parts and accessories are not covered under this limited warranty. Please refer to the applicable parts and accessories limited warranty text.

2) LIMITATIONS OF LIABILITY

THIS WARRANTY IS EXPRESSLY GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME STATES/PROVINCES DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM STATE TO STATE, OR PROVINCE TO PROVINCE.

Neither the distributor, any BRP dealer nor any other person has been authorized to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against BRP. BRP reserves the right to modify this limited warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the products sold while this warranty is in effect.

3) EXCLUSIONS – ARE NOT WARRANTED

The following are not warranted under any circumstances:

- Normal wear and tear;
- Routine maintenance items, tune ups, adjustments;
- Damage caused by failure to provide proper maintenance and/or storage, as described in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, modifications or use of parts or accessories not manufactured or approved by BRP or resulting from repairs done by a person that is not an authorized servicing BRP dealer;
- Damage caused by abuse, abnormal use, neglect, use of the product on surfaces other than snow, or operation of the product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from accident, submersion, fire, theft, vandalism or any act of God;
- Operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operator's Guide);
- Snow or water ingestion;
- Incidental or consequential damages, or damages of any kind including without limitation towing, storage, telephone, rental, taxi, inconvenience, insurance coverage, loan payments, loss of time, loss of income; and
- Damage resulting from studs installed on tracks if the installation does not conform to BRP's instructions.

4) WARRANTY COVERAGE PERIOD

This limited warranty will be in effect from the date of delivery to the first retail consumer or the date the product is first put into use, whichever occurs first and for the following period:

TWELVE (12) CONSECUTIVE MONTHS, for private or commercial use owners. However, the warranty coverage period on a snowmobile delivered between June 1st and December 1st of a given year will expire November 30th of the following year.

For emission-related components; please also refer to the *US EPA EMISSION-RELATED WARRANTY* contained herein.

The repair or replacement of parts or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

5) CONDITIONS REQUIRED FOR WARRANTY COVERAGE

This warranty coverage is available **only** if each of the following conditions has been fulfilled:

- The 2017 Ski-Doo snowmobile must be purchased as new and unused by its first owner from a BRP dealer authorized to distribute Ski-Doo snowmobiles in the country in which the sale occurred ("**BRP dealer**");
- The BRP specified pre-delivery inspection process must be completed and documented and signed by the purchaser;
- The 2017 Ski-Doo snowmobile must have undergone proper registration by an authorized BRP dealer;
- The 2017 Ski-Doo snowmobile must be purchased in the country in which the purchaser resides; and
- Routine maintenance outlined in the Operator's Guide must be timely performed in order to maintain warranty coverage. BRP reserves the right to make warranty coverage contingent upon proof of proper maintenance.

BRP will not honor this limited warranty to any private use owner or commercial use owner if one of the preceding conditions has not been met. Such limitations are necessary in order to allow BRP to preserve both the safety of its products, and also that of its consumers and the general public.

6) WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The customer must cease using the snowmobile upon the appearance of an anomaly. The customer must notify a servicing BRP dealer within three (3) days of the appearance of a defect, and provide it with reasonable access to the product and reasonable opportunity to repair it. The customer must also present to the authorized BRP dealer, proof of purchase of the product and must sign the repair/work order prior to starting the repair in order to validate the warranty repair. All parts replaced under this limited warranty become the property of BRP.

7) WHAT BRP WILL DO

BRP's obligations under this warranty are limited to, at its sole discretion, repairing parts found defective under normal use, maintenance and service, or replacing such parts with new genuine Ski-Doo parts without charge for parts and labor , at any authorized BRP dealer during the warranty coverage period under the conditions described herein. No claim of breach of warranty shall be cause for cancellation or rescission of the sale of the snowmobile to the owner.

In the event that service is required outside of the country of original sale, the owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve or modify products from time to time without assuming any obligation to modify products previously manufactured.

8) TRANSFER

If the ownership of a product is transferred during the warranty coverage period, this limited warranty, subject to its terms and conditions, shall also be transferred and be valid for the remaining coverage period provided BRP or an authorized Ski-Doo Distributor/Dealer receives a proof that the former owner agreed to the transfer of ownership, in addition to the co-ordinates of the new owner.

9) CONSUMER ASSISTANCE

If the matter still remains unresolved, contact BRP by filling out the customer contact form at www.brp.com or contact BRP by mail at one of the addresses listed under the *CONTACT US* section of this guide.

* In the USA, products are distributed and serviced by BRP US Inc.

US EPA EMISSION-RELATED WARRANTY

Bombardier Recreational Products Inc. ("BRP")* warrants to the ultimate purchaser and each subsequent purchaser that this new engine, including all parts of its exhaust emission-control system and its evaporative emission-control system, meets two conditions:

1. It is designed, built, and equipped so it conforms at the time of sale to the ultimate purchaser with the requirements of 40 CFR 1051 and 40 CFR 1060.
2. It is free from defects in materials and workmanship that may keep it from meeting the requirements of 40 CFR 1051 and 40 CFR 1060.

Where a warrantable condition exists, BRP will repair or replace, as it elects, any part or component with a defect in materials or workmanship that would increase the engine's emissions of any regulated pollutant within the stated warranty period at no cost to the owner, including expenses related to diagnosing and repairing or replacing emission-related parts. All defective parts replaced under this warranty become the property of BRP.

For all emission-related warranty claims, BRP is limiting the diagnosis and repair of emission-related parts to the authorized Ski-Doo dealers, unless for emergency repairs as required by item 2 of the following list.

As a certifying manufacturer, BRP will not deny emission-related warranty claims based on any of the following:

1. Maintenance or other service BRP or BRP's authorized facilities performed.
2. Engine/equipment repair work that an operator performed to correct an unsafe, emergency condition attributable to BRP as long as the operator tries to restore the engine/equipment to its proper configuration as soon as possible.
3. Any action or inaction by the operator unrelated to the warranty claim.
4. Maintenance that was performed more frequently than BRP specify.
5. Anything that is BRP fault or responsibility.
6. The use of any fuel that is commonly available where the equipment operates unless BRP written maintenance instructions state that this fuel would harm the equipment's emission control system and operators can readily find the proper fuel. See maintenance information section and fuel requirements of fueling section.

Emission-Related Warranty Period

The emission-related warranty is valid for the following period whichever comes first:

	HOURS	MONTHS	KILOMETERS
Exhaust emission-related components	200	30	4000
Evaporative emission-related components	N/A	24	N/A

Components Covered

The emission-related warranty covers all components whose failure would increase an engine's emissions of any regulated pollutant, including the following listed components:

1. For exhaust emissions, emission-related components include any engine parts related to the following systems:
   - Air-induction system
   - Fuel system
   - Ignition system
   - Exhaust gas recirculation systems
2. The following parts are also considered emission-related components for exhaust emissions:
   - Aftertreatment devices
   - Crankcase ventilation valves
   - Sensors
   - Electronic control units
3. The following parts are considered emission-related components for evaporative emissions:
   - Fuel tank
   - Fuel cap
   - Fuel line
   - Fuel line fittings
   - Clamps*
   - Pressure relief valves*
   - Control valves*

- Control solenoids*
- Electronic controls*
- Vacuum control diaphragms*
- Control cables*
- Control linkages*
- Purge valves
- Vapor hoses
- Liquid/vapor separator
- Carbon canister
- Canister mounting brackets
- Carburetor purge port connector

4. Emission-related components also include any other part whose only purpose is to reduce emissions or whose failure will increase emissions without significantly degrading engine/equipment performance.

Limited Applicability

As a certifying manufacturer, BRP may deny emission-related warranty claims for failures that have been caused by the owner's or operator's improper maintenance or use, by accidents for which the manufacturer has no responsibility, or by acts of God. For example, an emission-related warranty claim need not be honored for failures that have been directly caused by the operator's abuse of the engine/equipment or the operator's use of the engine/equipment in a manner for which it was not designed and are not attributable to the manufacturer in any way.

*As related to the evaporative emission control system
* In the USA, products are distributed and serviced by BRP US Inc.

BRP INTERNATIONAL LIMITED WARRANTY: 2017 SKI-DOO® SNOWMOBILES

1) SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products Inc. ("BRP")* warrants its 2017 Ski-Doo snowmobiles sold by distributors or dealers authorized by BRP to distribute SKI-Doo snowmobiles ("Ski-Doo Distributor/Dealer") outside of the fifty United States, Canada, members of the European Economic Area (which is comprised of the member states of the European Union plus Norway, Iceland and Liechtenstein) ("EEA"), members states of the Commonwealth of the Independent States (including Ukraine and Turkmenistan) (''CIS'') and Turkey, from defects in material or workmanship for the period and under the conditions described below.

Non-factory installed parts and accessories are not covered under this limited warranty. Please refer to the applicable parts and accessories limited warranty text.

This limited warranty will become null and void if: (1) the snowmobile was used for racing or any other competitive activity, at any point, even by a previous owner; or (2) the snowmobile has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or has been altered or modified to change its intended use.

2) LIMITATIONS OF LIABILITY

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY IS EXPRESSLY GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME JURISDICTIONS DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM COUNTRY TO COUNTRY. (FOR PRODUCTS PURCHASED IN AUSTRALIA SEE CLAUSE 4 BELOW).

Neither the Ski-Doo Distributor/Dealer nor any other person has been authorized to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against BRP.

BRP reserves the right to modify this warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the products sold while this warranty is in effect.

3) EXCLUSIONS – ARE NOT WARRANTED

The following are not warranted under this limited warranty under any circumstances:

- Normal wear and tear;
- Routine maintenance items, tune ups, adjustments;
- Damage caused by negligence or failure to provide proper maintenance and/or storage, as described in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, modifications or use of parts or accessories not manufactured or approved by BRP which in its reasonable judgement are either incompatible with the product or adversely affect its operation, performance and durability, or resulting from repairs done by a person that is not an authorized servicing Ski-Doo Distributor/Dealer;
- Damage caused by abuse, abnormal use, neglect, racing or operation of the product on surfaces other than snow, or operation of the product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from accident, submersion, fire, snow or water ingestion, theft, vandalism or any act of God;
- Operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operator's Guide);
- Damage resulting from rust, corrosion or exposure to the elements;
- Incidental or consequential damages, or damages of any kind including without limitation towing, storage, transportation expenses, telephone, rental, taxi, inconvenience, insurance coverage, loan payments, loss of time, loss of income; or time missed for downtime experience due to service work.
- And damage resulting from studs installed on tracks if the installation does not conform to BRP's instructions.

4) WARRANTY COVERAGE PERIOD

This warranty will be in effect from (1) the date of delivery to the first retail consumer or (2) the date the product is first put into use, whichever occurs first and for a period of:

TWELVE (12) CONSECUTIVE MONTHS, for private or commercial use owners. However, the warranty coverage period on a snowmobile delivered between June 1st and December 1st of a given year will expire November 30th of the following year.

The repair or replacement of parts or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

Note that the duration and any other modalities of the warranty coverage are subject to the applicable national or local legislation in the customer's country.

FOR PRODUCTS SOLD IN AUSTRALIA ONLY

Nothing in these Warranty terms and conditions should be taken to exclude, restrict or modify the application of any condition, warranty, guarantee, right or remedy conferred or implied under the Competition and Consumer Act 2010 (Cth), including the Australian Consumer Law or any other law, where to do so would contravene that law, or cause any part of these terms and conditions to be void. The benefits given to you under this limited warranty are in addition to other rights and remedies that you have under Australian law.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

5) CONDITIONS TO HAVE WARRANTY COVERAGE

This warranty coverage is available **only** if each of the following conditions has been fulfilled:

– The 2017 Ski-Doo snowmobile must be purchased as new and unused by its first owner from a Ski-Doo Distributor/Dealer authorized to distribute Ski-Doo snowmobiles in the country in which the sale occurred;

– The BRP specified pre-delivery inspection process must be completed and documented;
– The product must have undergone proper registration by an authorized Ski-Doo Distributor/Dealer;
– The 2017 Ski-Doo snowmobile must be purchased in the country or union of countries in which the purchaser resides.
– Routine maintenance outlined in the Operator's Guide must be timely performed in order to maintain warranty coverage. BRP reserves the right to make warranty coverage contingent upon proof of proper maintenance.

BRP will not honour this limited warranty to any private use owner or commercial use owner if one of the preceding conditions has not been met. Such limitations are necessary in order to allow BRP to preserve both the safety of its products, and also that of its consumers and the general public.

6) WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The customer must cease using the snowmobile upon the appearance of an anomaly. The customer must notify a servicing Ski-Doo Distributor/Dealer within two (2) days of the appearance of a defect, and provide it with reasonable access to the product and reasonable opportunity to repair it. The customer must also present to the authorized Ski-Doo Distributor/Dealer, proof of purchase of the product and must sign the repair/work order prior to starting the repair in order to validate the warranty repair. All parts replaced under this limited warranty become the property of BRP.

Note that the notification period is subject to the applicable national or local legislation in customer's country.

7) WHAT BRP WILL DO

To the extent permitted by law, BRP's obligations under this warranty are limited to, at its sole discretion, repairing parts found defective under normal use, maintenance and service, or replacing such parts with new genuine Ski-Doo parts without charge for parts and labour, at any authorized Ski-Doo Distributor/Dealer during the warranty coverage period under the conditions described herein. BRP's responsibility is limited to making the required repairs or replacements of parts. No claim of breach of warranty shall be cause

for cancellation or rescission of the sale of the snowmobile to the owner. You may have other legal rights which may vary from country to country.

In the event that service is required outside of the country of original sale, the owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve or modify products from time to time without assuming any obligation to modify products previously manufactured.

8) TRANSFER

If the ownership of a product is transferred during the warranty coverage period, this limited warranty, subject to its terms and conditions, shall also be transferred and be valid for the remaining coverage period provided BRP or an authorized Ski-Doo Distributor/Dealer receives a proof that the former owner agreed to the transfer of ownership, in addition to the co-ordinates of the new owner.

9) CONSUMER ASSISTANCE

In the event of a controversy or a dispute in connection with this limited warranty, BRP suggests that you try to resolve the issue at the Ski-Doo Distributor/Dealer level. We recommend discussing the issue with the authorized Ski-Doo Distributor/Dealer's service manager or owner.

If the matter still remains unresolved, contact BRP by filling out the customer contact form at www.brp.com or contact BRP by mail at one of the addresses listed under the *CONTACT US* section of this guide.

* For the territory covered by this limited warranty, products are distributed and serviced by Bombardier Recreational Products Inc. or its affiliates.

BRP LIMITED WARRANTY FOR THE EUROPEAN AND THE COMMONWEALTH OF THE INDEPENDENT STATES (CIS) AREAS AND TURKEY: 2017 SKI-DOO® SNOWMOBILES

1) SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products Inc. ("**BRP**")* warrants its 2017 Ski-Doo snowmobiles sold by distributors or dealers authorized by BRP to distribute Ski-Doo snowmobiles ("Ski-Doo Distributor/Dealer") in member states of the European Economic Area (which is comprised of the member states of the European Union plus Norway, Iceland and Liechtenstein) ("EEA"), in member states of the Commonwealth of the Independent States (including Ukraine and Turkmenistan) (''CIS'') and Turkey from defects in material or workmanship for the period and under the conditions described below.

Non-factory installed parts and accessories are not covered under this limited warranty. Please refer to the applicable parts and accessories limited warranty text.

This limited warranty will become null and void if: (1) the snowmobile was used for racing or any other competitive activity, at any point, even by a previous owner; or (2) the snowmobile has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or has been altered or modified to change its intended use.

2) LIMITATIONS OF LIABILITY

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY IS EXPRESSLY GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTIES. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME JURISDICTIONS DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS

WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM COUNTRY TO COUNTRY.

Neither the Ski-Doo Distributor/Dealer nor any other person has been authorized to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against BRP.

BRP reserves the right to modify this warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the products sold while this warranty is in effect.

3) EXCLUSIONS – ARE NOT WARRANTED

The following are not warranted under this limited warranty under any circumstances:

- Normal wear and tear;
- Routine maintenance items, tune ups, adjustments;
- Damage caused by negligence or failure to provide proper maintenance and/or storage, as described in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, modifications or use of parts or accessories not manufactured or approved by BRP which in its reasonable judgement are either incompatible with the product or adversely affect its operation, performance and durability, or resulting from repairs done by a person that is not an authorized servicing Ski-Doo Distributor/Dealer;
- Damage caused by abuse, abnormal use, neglect, racing or operation of the product on surfaces other than snow, or operation of the product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from accident, submersion, fire, snow or water ingestion, theft, vandalism or any act of God;
- Operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operator's Guide);
- Damage resulting from rust, corrosion or exposure to the elements;

– Incidental or consequential damages, or damages of any kind including without limitation towing, transportation expenses, storage, telephone, rental, taxi, inconvenience, insurance coverage, loan payments, loss of time, loss of income or time missed for downtime experience due to service work;
– and damage resulting from studs installed on tracks if the installation does not conform to BRP's instructions.

4) WARRANTY COVERAGE PERIOD

This warranty will be in effect from (1) the date of delivery to the first retail consumer or (2) the date the product is first put into use, whichever occurs first and for a period of:

TWENTY-FOUR (24) CONSECUTIVE MONTHS, for private use owners and TWELVE (12) CONSECUTIVE MONTHS for commercial use owners. However, the warranty coverage period on a snowmobile delivered between June 1st and December 1st of a given year will expire November 30th of the applicable year. A snowmobile is used commercially when it is used in connection with generating income or any work or employment during any part of the warranty period. A snowmobile is also used commercially when, at any point during the warranty period, it has commercial tags or is licensed for commercial use.

The repair or replacement of parts or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

Note that the duration and any other modalities of the warranty coverage are subject to the applicable national or local legislation in the customer's country.

5) CONDITIONS TO HAVE WARRANTY COVERAGE

This warranty coverage is available **only** if each of the following conditions has been fulfilled:

– The 2017 Ski-Doo snowmobile must be purchased as new and unused by its first owner from a Ski-Doo Distributor/Dealer authorized to distribute Ski-Doo products in the country in which the sale occurred;
– The BRP specified pre-delivery inspection process must be completed and documented;

– The product must have undergone proper registration by an authorized Ski-Doo Distributor/Dealer;
– The 2017 Ski-Doo snowmobile must be purchased within the EEA by an EEA resident, in the CIS for residents of the countries comprised in such area and in Turkey for residents of Turkey; and
– Routine maintenance outlined in the Operator's Guide must be timely performed in order to maintain warranty coverage. BRP reserves the right to make warranty coverage contingent upon proof of proper maintenance.

BRP will not honour this limited warranty to any private use owner or commercial use owner if one of the preceding conditions has not been met. Such limitations are necessary in order to allow BRP to preserve both the safety of its products, and also that of its consumers and the general public.

6) WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The customer must cease using the snowmobile upon the appearance of an anomaly. The customer must notify a servicing Ski-Doo Distributor/Dealer within two (2) months of the appearance of a defect, and provide it with reasonable access to the product and reasonable opportunity to repair it. The customer must also present to the authorized Ski-Doo Distributor/Dealer, proof of purchase of the product and must sign the repair/work order prior to starting the repair in order to validate the warranty repair. All parts replaced under this limited warranty become the property of BRP.

Note that the notification period is subject to the applicable national or local legislation in customer's country.

7) WHAT BRP WILL DO

To the extent permitted by law, BRP's obligations under this warranty are limited to, at its sole discretion, repairing parts found defective under normal use, maintenance and service, or replacing such parts with new genuine Ski-Doo parts without charge for parts and labour, at any authorized Ski-Doo Distributor/Dealer during the warranty coverage period under the conditions described herein. BRP's responsibility is limited to making the required repairs or replacements of parts. No claim of breach of warranty shall be cause for cancellation or rescission of the sale of the snowmobile to the owner. You may have other legal rights which may vary from country to country.

In the event that service is required outside of the EEA, CIS or Turkey, the owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve or modify products from time to time without assuming any obligation to modify products previously manufactured.

8) TRANSFER

If the ownership of a product is transferred during the warranty coverage period, this limited warranty, subject to its terms and conditions, shall also be transferred and be valid for the remaining coverage period provided BRP or an authorized Ski-Doo Distributor/Dealer receives a proof that the former owner agreed to the transfer of ownership, in addition to the co-ordinates of the new owner.

9) CONSUMER ASSISTANCE

In the event of a controversy or a dispute in connection with this limited warranty, BRP suggests that you try to resolve the issue at the Ski-Doo Distributor/Dealer level. We recommend discussing the issue with the authorized Ski-Doo Distributor/Dealer's service manager or owner.

If the matter still remains unresolved, contact BRP by filling out the customer contact form at www.brp.com or contact BRP by mail at one of the addresses listed under the *CONTACT US* section of this guide.

* In the EEA, products are distributed and serviced by BRP European Distribution S.A. and other affiliates or subsidiaries of BRP.

ADDITIONAL TERMS AND CONDITIONS FOR FRANCE ONLY

The following terms and conditions are applicable to products sold in France only:

The seller shall deliver goods that are complying with the contract and shall be responsible for defects existing upon delivery. The seller shall also be responsible for defects resulting from packaging, assembling instructions or the installation when it is its responsibility per the contract or if accomplished under its responsibility. To be compliant with the contract, the good shall:

1. Be fit for normal use for goods similar thereto and, if applicable:
   - Correspond to the description provided by the seller and have the qualities presented to the buyer though sample or model;
   - Have the qualities that a buyer may legitimately expect considering the public declarations of the seller, the manufacturer of its representative, including in advertising or labeling; or
2. Have the characteristics mutually agreed upon as between the parties or be fit for the specific use intended by the buyer and brought to the attention of the seller and which accepted

The action for failure to comply is prescribed after two years after delivery of the goods. The seller is responsible for the warranty for hidden defects of the good sold if such hidden defects are rendering the good unfit for the intended use, or if they diminish its use in such a way that the buyer would not have acquired the good or would have given a lesser price, had he known. The action for such hidden defects shall be taken by the buyer within 2 years of the discovery of the defect.

This page is intentionally blank

CUSTOMER INFORMATION

520 001 663
GUIDE DU CONDUCTEUR, REV G4 Trail /Crossover Series / FRANÇAIS
OPERATOR'S GUIDE, REV G4 Trail/Crossover Series / FRENCH

FAIT AU / MADE IN CANADA U/M:P.C.