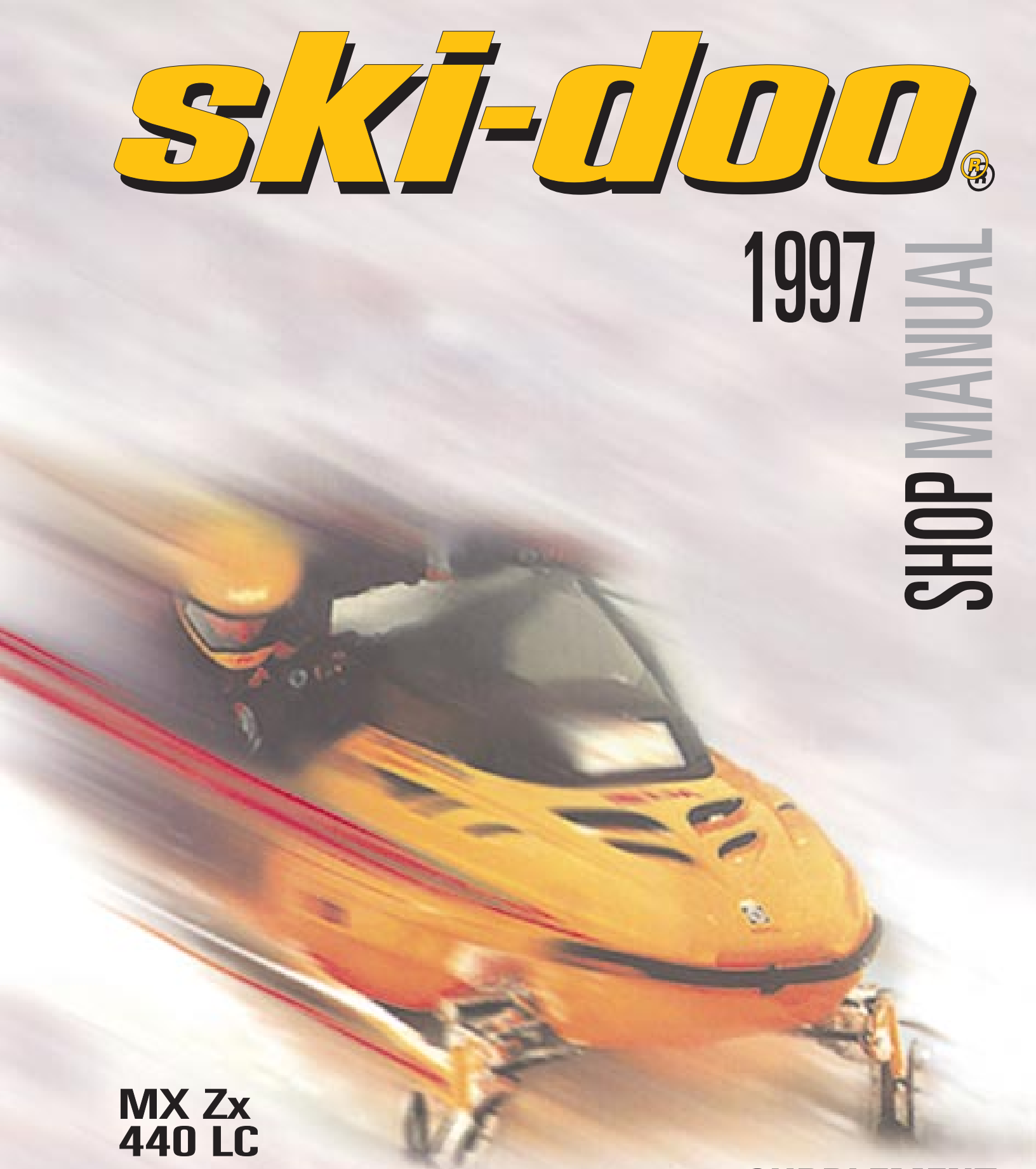
ski-doo®

1997 SHOP MANUAL



MX Zx 440 LC

SUPPLEMENT

USE IN CONJUNCTION WITH THE SKI-DOO SHOP MANUAL P/N 484 0647 01

484 0647 03

TABLE OF CONTENTS

SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair MX Zx 440 LC snowmobiles.

This edition was primarily published to be used by snowmobile mechanics who are already familiar with all service procedures relating to Bombardier made snowmobiles.

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

This manual uses technical terms which may be slightly different from the ones used in *Parts Catalog*.

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

The content depicts parts and/or procedures applicable to the particular product at its time of manufacture. It does not include dealer modifications, whether authorized or not by Bombardier, after manufacturing the product.

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 Bombardier 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.

Torque wrench tightening specifications must be strictly adhered to. Locking devices (ex.: locking tab, elastic stop nut, etc.) must be installed or replaced with new ones, when damaged. If the efficiency of a locking device is impaired, it must be renewed.

This manual emphasizes particular information denoted by the wording and symbols;

◆ WARNING

Identifies an instruction which, if not followed, could cause serious personal injury including possibility of death.

▼ CAUTION

Denotes an instruction which, if not followed, could severely damage vehicle components.

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

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use. Always use common shop safety practice.

This information relates to the preparation and use of Bombardier snowmobiles and has been utilized safely and effectively by Bombardier Inc. However, Bombardier Inc. disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic. It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

01 — LUBRICATION

Refer to *1997 ski-doo Shop Manual*, volume 2.

02 — TROUBLESHOOTING

Refer to *1997 ski-doo Shop Manual*, volume 2.

03 — ENGINE

Refer to *1997 ski-doo Shop Manual*, volume 2.

GENERAL

Engine is basically the same to MX Z 440 LC. Maintenance procedure remains the same except for engine lubrication and cooling system. Refer to section ENGINE from *Shop Manual*.

LUBRICATION

Oil injection pump has been removed. Premix fuel/oil system is now being used.

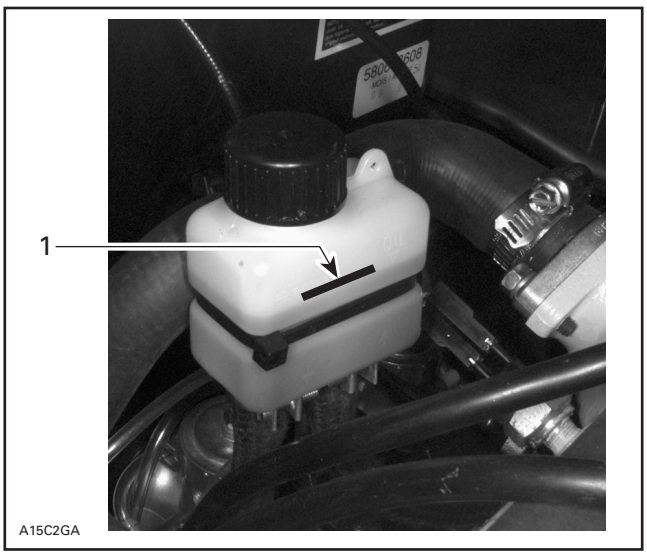
▼ CAUTION

When fuelling snowmobile, always premix fuel with Bombardier-Rotax synthetic injection oil using a ratio of 40:1 (40 parts of fuel for 1 part of oil).

FUEL RESERVOIR CAP

Check rotary valve oil reservoir level. Use Bombardier-Rotax synthetic injection oil (P/N 413 7105 00) (12 x 1 L).

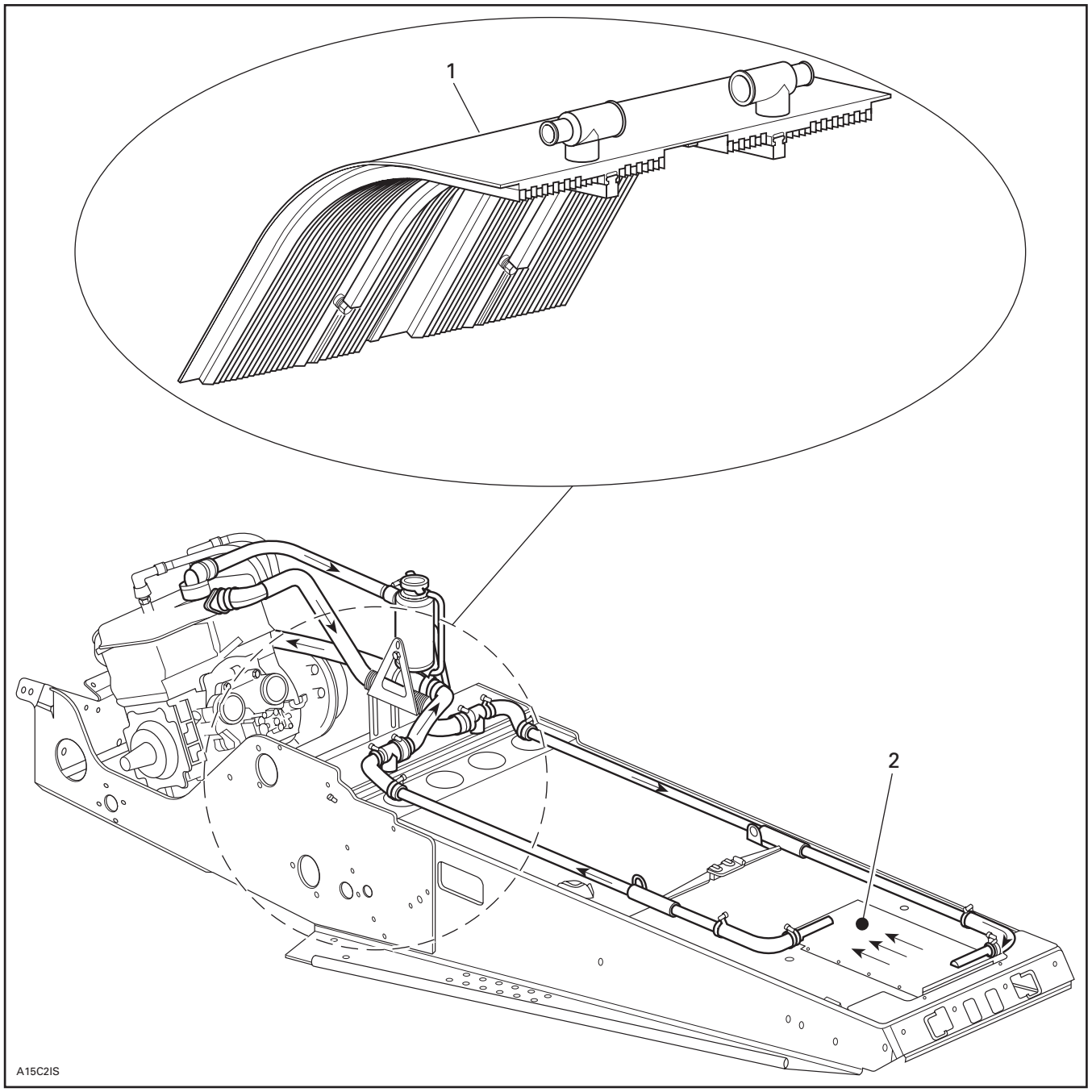
Fill up to mark.



ROTARY VALVE OIL RESERVOIR

1. Rotary valve oil filling mark

LIQUID COOLING SYSTEM



Three radiators parallel cooling system.

The two main radiators no. 1 are located in front of the drive axle. These radiators are welded to the frame.

The third radiator no. 2 is located inside tunnel and secured with rivets.

Recommended Coolant

Use a blend of 55% antifreeze with 45% water.

▼ CAUTION

To prevent rust formation or freezing condition, always fill up the system with 55% antifreeze and 45% water. Pure antifreeze without water freezes. Always use ethyl-glycol antifreeze containing corrosion inhibitors specially recommended for aluminum engines.

04 — TRANSMISSION

Refer to *1997 ski-doo Shop Manual,* volume 2.

DRIVE PULLEY

Newly designed lighter TRA drive pulley is used. Disassembly, assembly and adjustment procedures are identical to MX Z 440 LC.

A15D2XA

NEW DESIGNED LIGHTER TRA DRIVE PULLEY

DRIVEN PULLEY

1-position driven pulley mounted on a spline axle. Perform fine tune alignment by adjusting engine position.

BRAKE

Fixed brake disc with racing type brake pad. Brake hoses are reinforced.

05 — ELECTRICAL

Refer to wiring diagram at the end of this *Supplement*.

The electrical system is a Nippondenso CDI type with 12 V/220 W magneto generator.

Ignition switch has been removed.

A unique parallel circuit activates both heating throttle lever and handle grip.

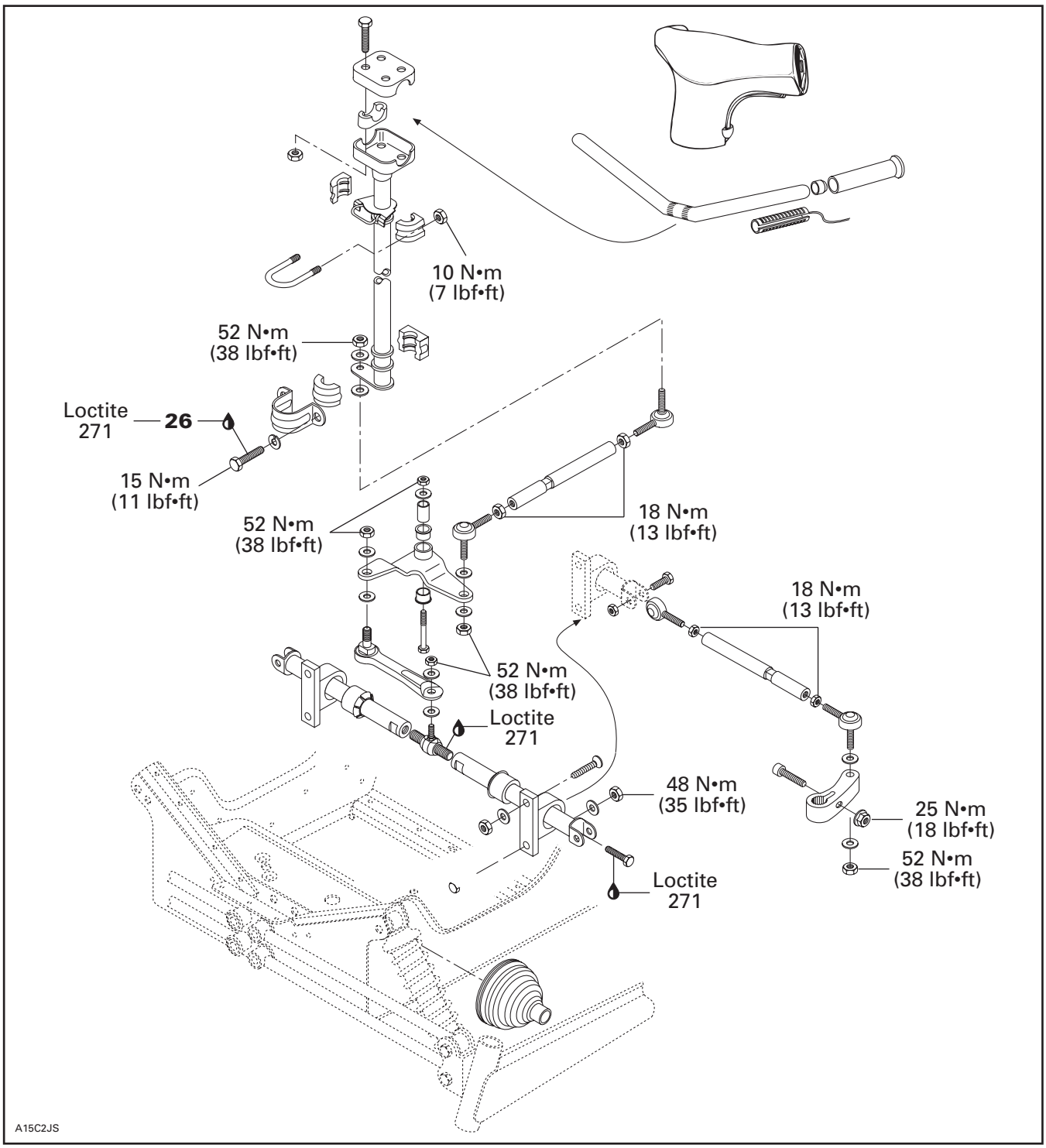
06 — REAR SUSPENSION

Refer to *1997 ski-doo Shop Manual*, volume 2.

07 — STEERING/FRONT SUSPENSION

Refer to *1997 ski-doo Shop Manual*, volume 2.

STEERING ADJUSTMENT (SKIS)



CAMBER:

Specific inward or outward tilt angle of ski leg compared to a vertical line when viewing the snowmobile from front.

Lower Control Arms Adjusting

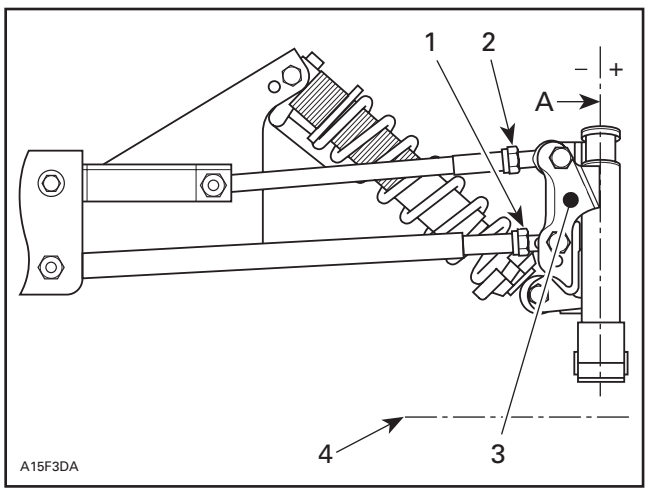
– Lift and level front of snowmobile (skis must not touch ground).
– Loosen lock nut on both lower control arms.
– Unbolt both lower control arms at ski leg housings.
– Turn tie rod end and adjust lower control arms length to **461 mm (18 in)**.
– Tighten lock nut and reinstall both lower control arms into ski leg housing.

Upper Control Arms Adjusting

– Loosen lock nut on both upper control arms.
– Unbolt both upper control arms at ski leg housings.

Turn tie rod end to adjust camber angle to **-2 ± 0.5°** (Negative camber).

– Tighten lock nuts and reinstall both upper control arms into ski leg housings.



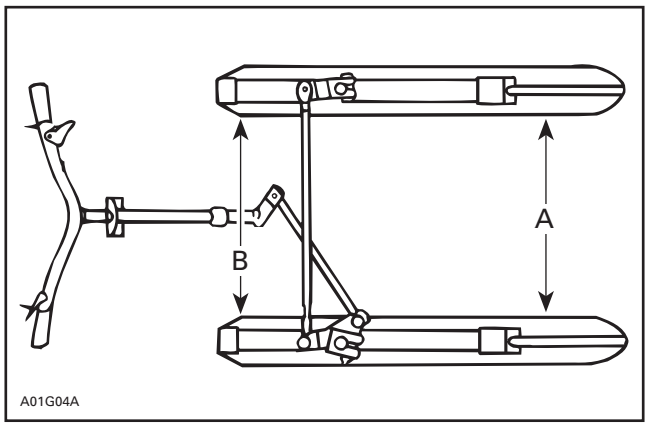
1. Lock nut of lower control arm
2. Lock nut of upper control arm
3. Ski leg housing
4. level line
A. -2 ± 0.5° (negative camber)

NOTE: Adjust camber with front of snowmobile lifted and level.

Refer to section STEERING/FRONT SUSPENSION (STEERING SYSTEM) from *Shop Manual.*

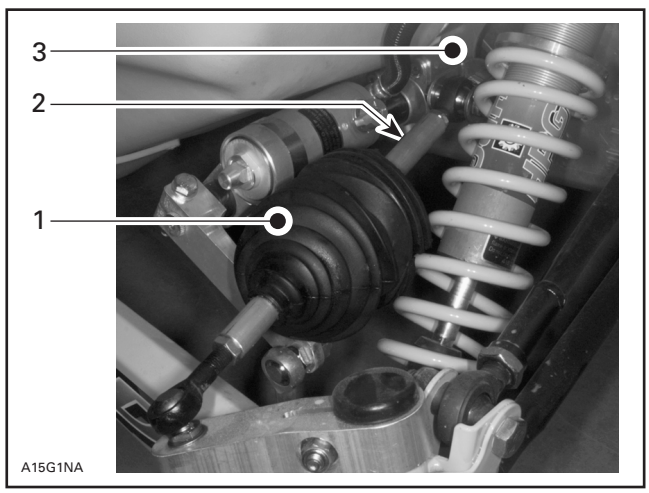
TOE-OUT:

Difference measured between the front edge of the skis "A" and rear edge "B" as viewed from the top. It is adjustable.



A. Equal distance with "B"
B. Equal distance with "A"

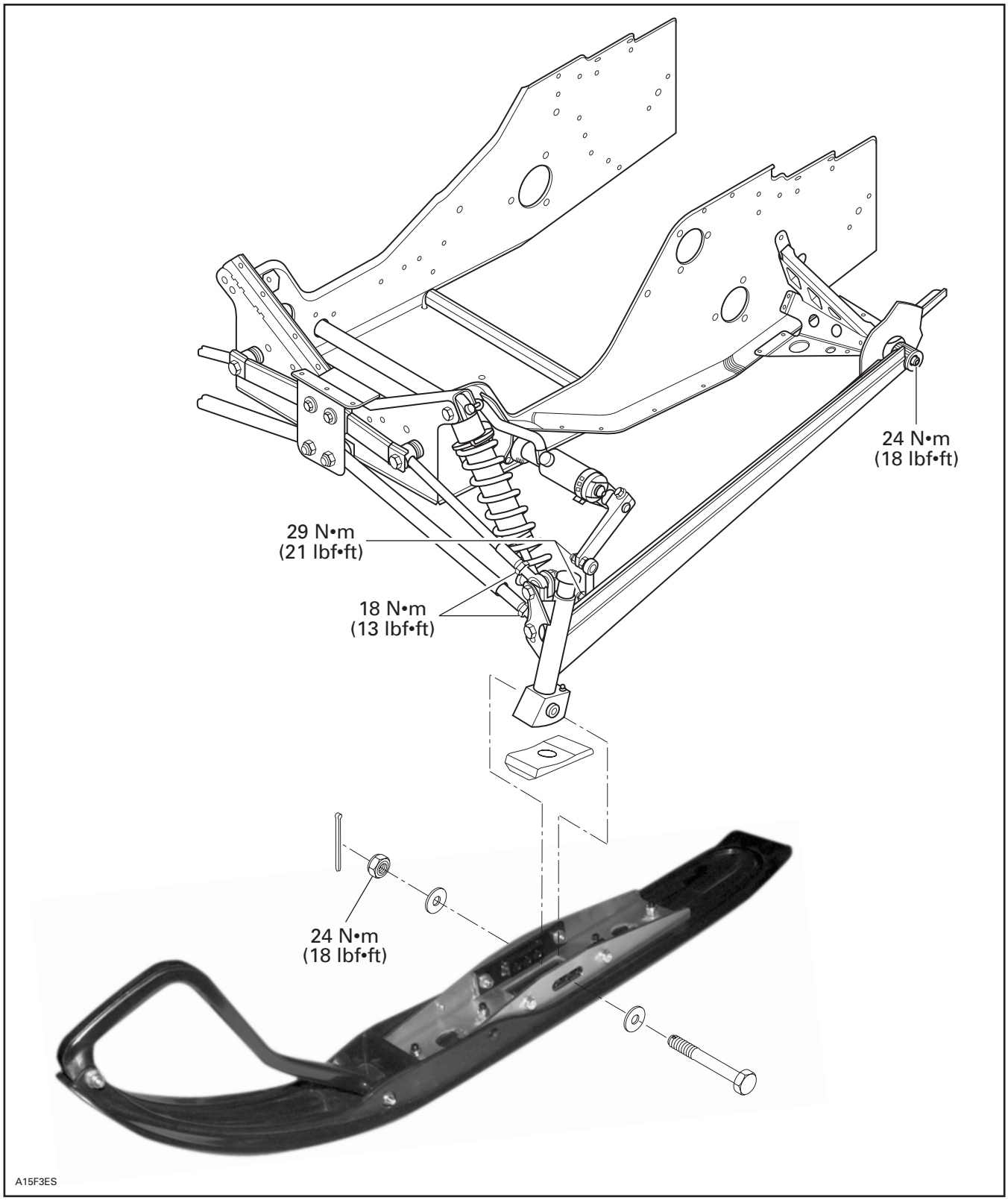
In order to ease steering tie rod loosening, detach rubber boot from snowmobile frame. Refer to the following photo.



1. Rubber boot
2. Steering tie rod
3. Snowmobile frame

Refer to section STEERING/FRONT SUSPENSION (STEERING SYSTEM) from *Shop Manual* for adjusting procedure.

FRONT SUSPENSION AND SKIS



TYPICAL — LEFT SIDE SHOWN

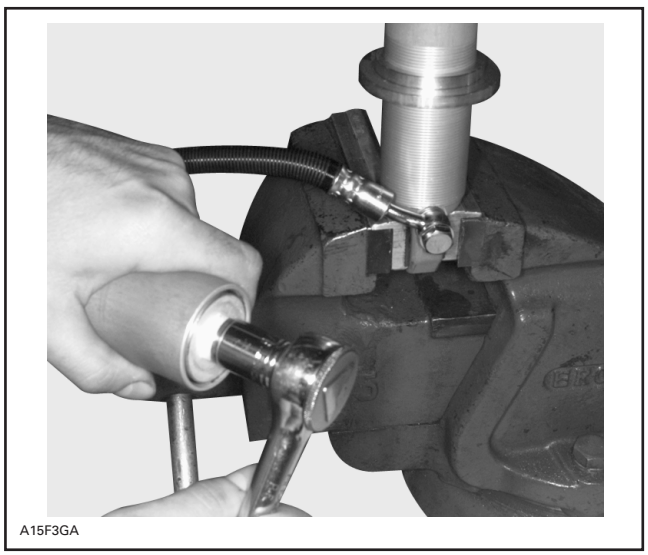
SHOCK ABSORBER SERVICING

HPG Racing remote reservoir shocks with 4-positions adjustment knob. Refer to *Shop Manual* and *Racing Handbook* for damper disassembly and assembly procedures.

Reservoir Disassembly and Assembly

Gas Pressure Release

In a bench vise with shock body downward, hold reservoir in hand then remove air valve cap from air valve on reservoir.



REMOVE AIR VALVE CAP FROM RESERVOIR

Using air valve cap, release pressure from reservoir as shown on the next photo.

RELEASE PRESSURE FROM RESERVOIR

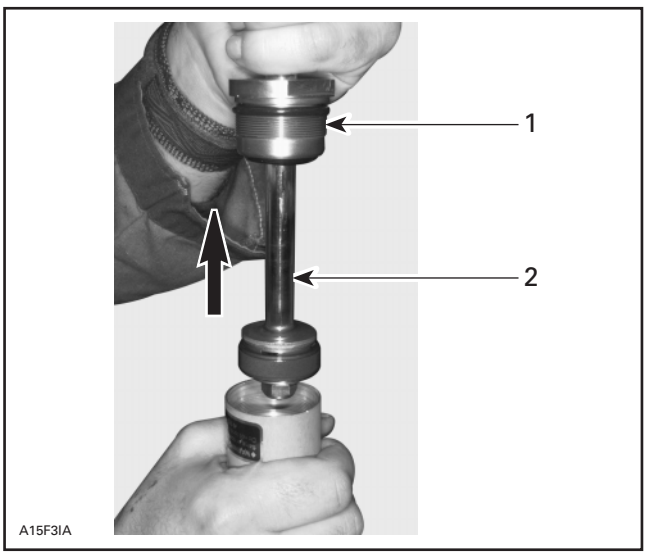
Damper Disassembly

◆ WARNING

Never perform any maintenance onto damper and reservoir assemblies until pressure is completely released from reservoir.

Remove seal carrier assembly from damper body.

Slide out the damper rod assembly. Refer to *Shop Manual* or *Racing Handbook* to change damper valving.



1. Seal carrier assembly
2. Damper rod assembly

Discard old oil into storage container. Never reuse old oil during damper rebuild.

Reservoir Disassembly

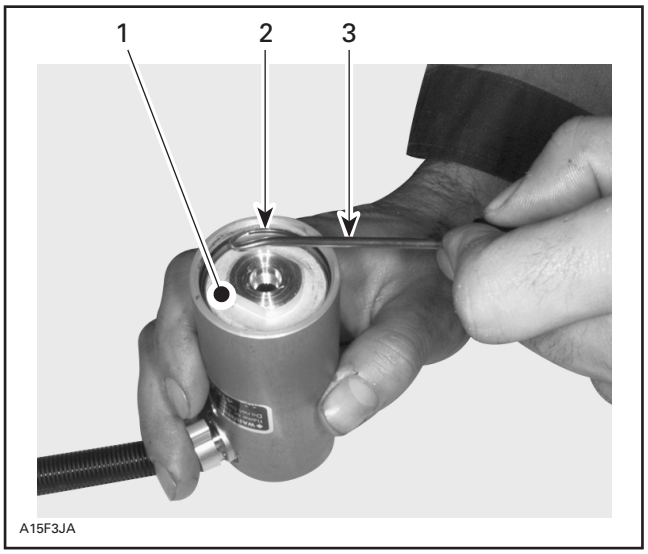
Remove air valve from reservoir cap assembly on the remote reservoir.

Using both thumbs, press on the reservoir cap assembly.

Remove circlip with special tool Snap-on 3ASH.

▼ CAUTION

Ensure not to scratch any inner parts of the cylinder.



1. Reservoir cap assembly
2. Circlip
3. Special tool Snap-on 3ASH

Using a M8 (pitch 1.0mm) bolt, pull out reservoir cap assembly.

Disconnect oil hose from reservoir.

NOTE: Note oil hose positioning for proper reassembling, as shown on the next photo.

HOSE POSITIONING

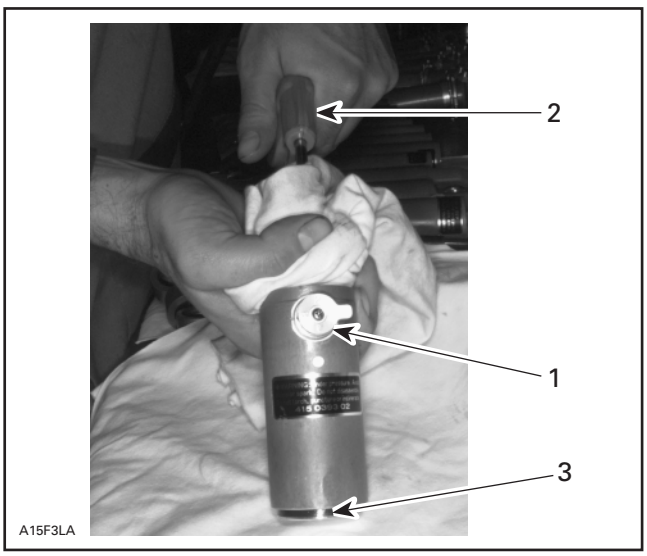
Set reservoir adjustment knob to position 4.

Hold reservoir in hand, 1 inch above table then use compressed air pressure and carefully remove floating piston from reservoir body.

NOTE: Shock oil will leak from reservoir. Use shop cloth to catch excess oil.

◆ WARNING

Use extreme caution when removing piston with compressed air. Protective eye wear should be used.



1. Adjustment knob set to position 4
2. Compressed air
3. Floating piston

Reservoir Assembly

Reinstall oil hose on both reservoir and damper. Torque bolts to 30 N•m (22 lbf•ft). Refer to the HOSE POSITIONING photo of the reservoir disassembly section for proper hose positioning.

NOTE: When reinstalling oil hose always use new washers (P/N 415 0387 00).

Fill reservoir with 50 mL of Bombardier HPG shock oil (P/N 413 7094 00).

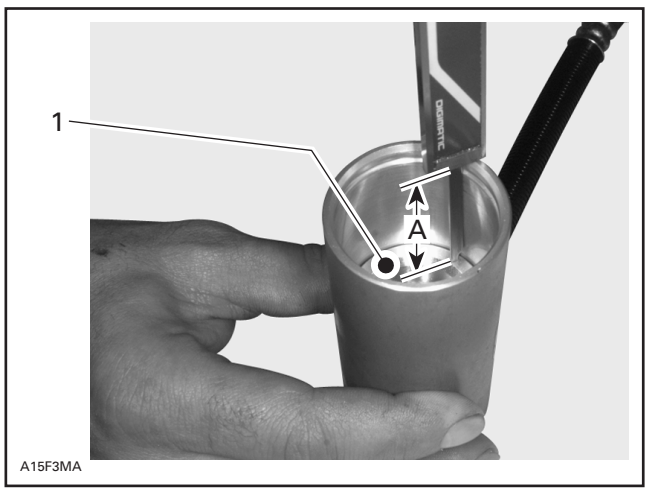
Reinstall floating piston into reservoir body. Concave side of piston must be facing upward. Use oil to ease O-ring pass reservoir body groove.

Invert reservoir (hose connector upward). Using the two thumbs apply pressure on floating piston to position floating piston to depth of 43 ± 2 mm (1-11/16 ± 5/64 in). Measure from the top edge of reservoir body.

▼ CAUTION

When positioning floating piston ensure that reservoir is in vertical position (hose connector facing upward). This will allow air to exit from reservoir. Oil transferring from reservoir to damper body indicates that no more air remains in reservoir.

NOTE: If the floating piston is installed too far into reservoir body, wait for damper rod assembly installation to adjust floating piston position.

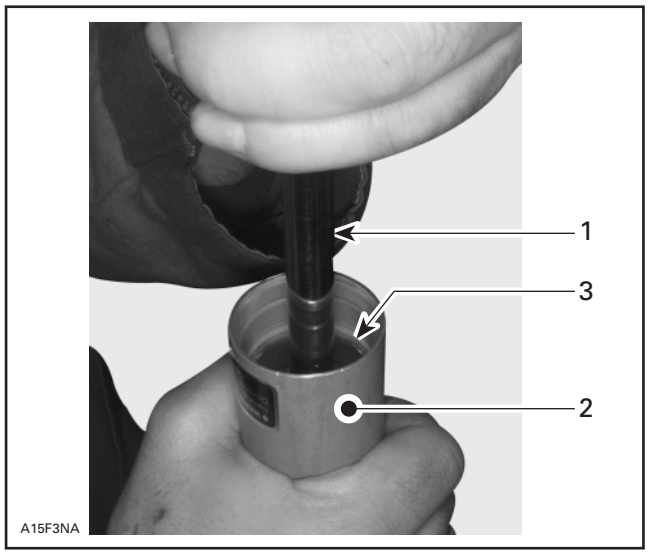


RESERVOIR HAS BEEN REVERSE TO SHOW HOW TO MEASURE

1. Concave side of piston facing upward
A. 43 ± 2 mm (1-11/16 ± 5/64 in)

Damper Assembly

Replace damper oil with Bombardier HPG shock oil (P/N 413 7094 00) to the base of damper seal carrier threads.



1. Damper rod assembly
2. Damper body
3. Oil level

Install damper rod assembly into the damper body. Lightly oil damper piston seal ring with shock oil to ease installation.

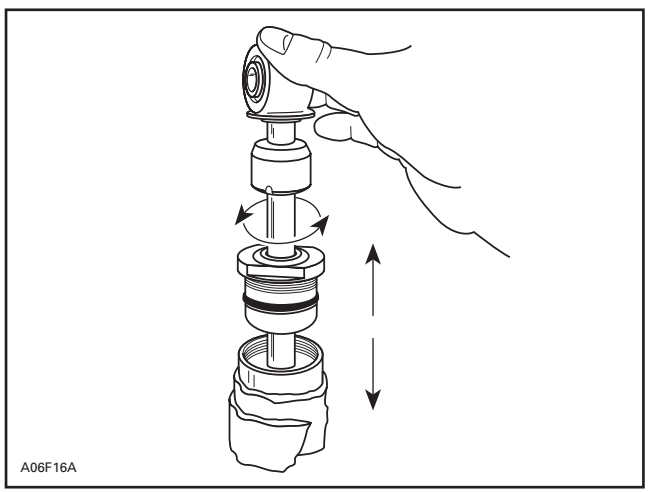
NOTE: Some shock oil may overflow when installing damper rod assembly. Wrap damper with shop cloth to catch possible oil overflow.

▼ CAUTION

Use care when passing piston into damper body at damper body threads.

Slight oscillation of damper rod may be required to allow piston to enter damper body bore.

Slowly push piston into damper body. Slight up and down movement may be required to allow all air to pass through piston assembly.



NOTE: Fast installation of the damper rod may displace the floating piston from its original position. Do not allow this to occur.

Reservoir Floating Piston Final Check (before damper seal carrier installation)

Perform a final check of the floating piston position (43 ± 2 mm (1-11/16 ± 5/64 in)):

– If floating piston is positioned 41 mm and less. Apply pressure on floating piston to position floating piston to a depth of 43 mm (1-11/16 in).
– If floating piston is too far (45 mm and more). Move damper rod with fast movement to allow oil to transfer from damper body to reservoir. Floating piston will move back.

Damper Final Assembly

With damper rod piston into oil volume, re-top damper oil volume. Oil level should be to damper body thread base.

Seal carrier assembly can now be threaded into damper body. This should be done slowly to allow weepage of shock oil from body while installing.

NOTE: When reinstalling seal carrier, oil must overflow. This overflow indicates that damper is full of oil.

Reservoir Final Assembly

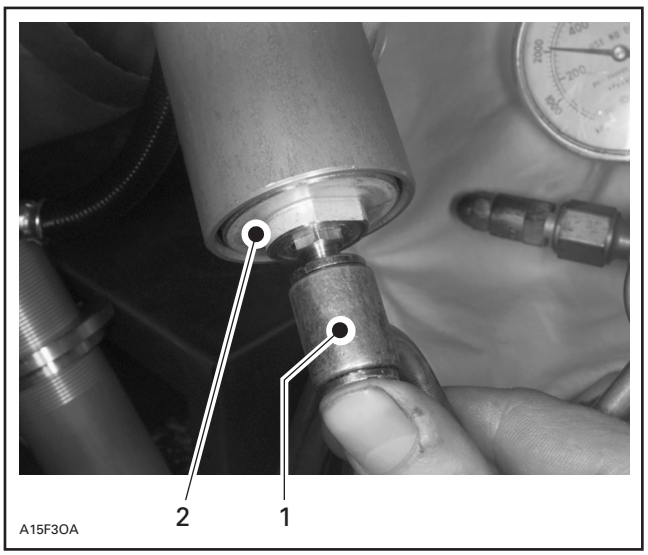
NOTE: If all previous procedures have been properly performed, **final floating piston position must be 40 ± 2 mm (1-9/16 ± 5/64 in)**. Final floating piston position must be measured after damper seal carrier assembly has been completely threaded.

Reinstall reservoir cap assembly with circlip then install air valve.

Gas Pressure Adjustment

Nitrogen (N_2) can now be added to reservoir body.

Preset pressure regulator to 2070 kPa (300 PSI) nitrogen (N_2), this gas pressure will restore the correct pressure for the damper.



1. Valve tip (Nitrogen)
2. Reservoir cap assembly

▼ CAUTION

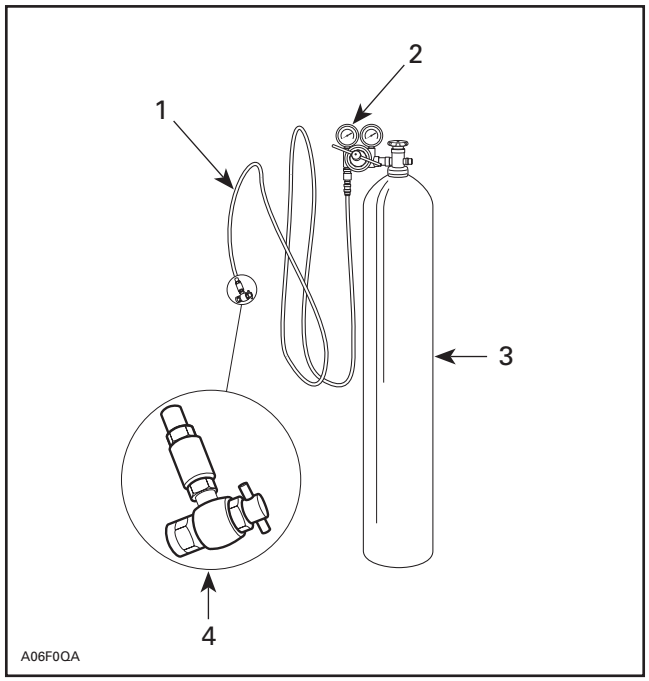
Do not exceed the recommended pressure value.

◆ WARNING

Whenever working with high pressure gas, use eyewear protection. Never direct gas pressure toward anybody.

NOTE: Carefully inspect damper for gas or oil leaks. Any leaks must be corrected before continuing.

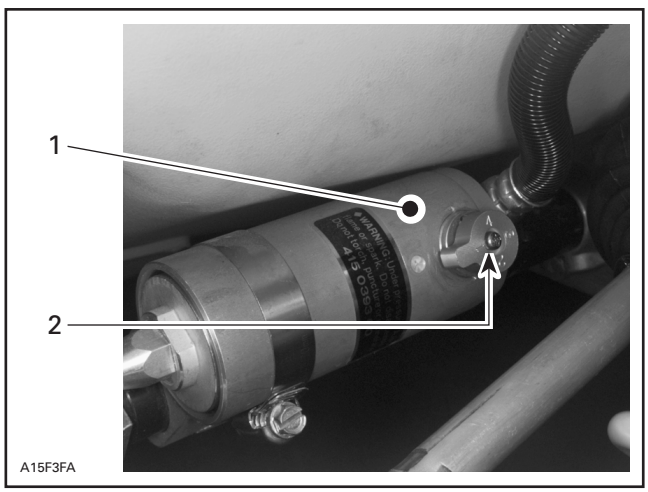
Damper gas pressure can be confirmed by using a pressure gauge available through your local industrial gas supplier.



1. *Automotive type air pressure hose*
2. *Two stage regulator, delivery pressure range 2070 KPa (300 PSI)*
3. *High pressure cylinder filled with industrial grade nitrogen*
4. *Valve tip*

4-Positions Quick Adjustment

Perform front suspension adjustment with adjusting knob located on remote reservoir.



1. *Remote reservoir*
2. *Adjusting knob ("1" softer — "4" stiffer)*

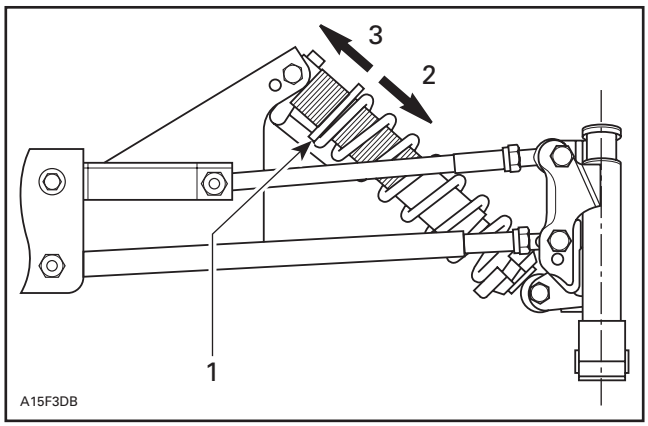
Preload Adjustment

Lift snowmobile to remove tension from shock absorber.

Perform preload adjustment on HPG shock absorbers by setting adjusting nut upward (remove preload) or downward (add preload).

▼ CAUTION

Ensure that shock absorber is extended when adjusting preload and make sure that tension remains on spring when removing preload.



TYPICAL — FRONT HPG SHOCK ABSORBER

1. *Adjusting nut*
2. *Add preload*
3. *Remove preload*

08 — BODY/FRAME

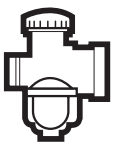
Refer to *1997 ski-doo Shop Manual*, volume 2.

Newly designed **waterproof** seat.

WATERPROOF SEAT

09 — TECHNICAL DATA

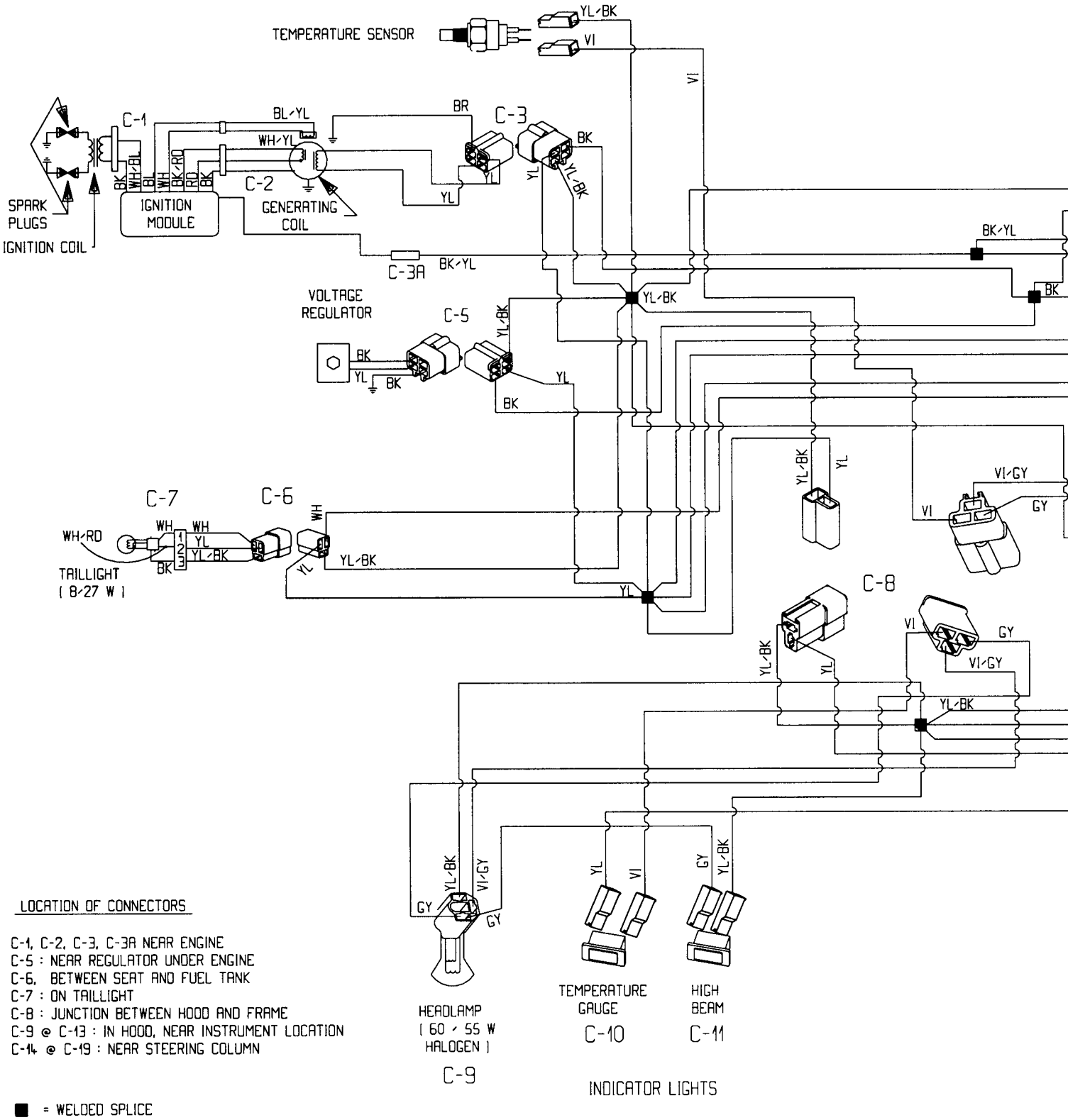
Refer to *1997 ski-doo Shop Manual*, volume 2.

	VEHICLE MODEL			**MX Zx 440 LC**
	ENGINE TYPE			**454**
	Number of Cylinders			2
	Bore		mm (in)	67.5 (2.6575)
	Stroke		mm (in)	61.0 (2.402)
	Displacement		cm^3 (in^3)	436.6 (26.6)
	Compression Ratio (corrected)			6.6
	Maximum Power Engine Speed ①		± 100 RPM	8450
	Piston Ring Type		1st/2nd	ST/R
	Ring End Gap	new wear limit	mm (in) mm (in)	0.25 (.010) 1.0 (.040)
	Ring/Piston Groove Clearance	new wear limit	mm (in) mm (in)	0.04 (.0016) 0.2 (.0079)
	Piston/Cylinder Wall Clearance	new wear limit	mm (in) mm (in)	0.1 (.0039) 0.15 (.0059)
	Connecting Rod Big End Axial Play	new wear limit	mm (in) mm (in)	0.39 (.0154) 1.2 (.0472)
	Maximum Crankshaft End-play ②		mm (in)	0.3 (.0118)
	Maximum Crankshaft Deflection		mm (in)	0.08 (.0031)
	Rotary Valve Timing ③ and P/N 420 924 XXX		Opening Closing	146° – 65° 502
	Magneto Generator Output		W	220
	Ignition Type			CDI
	Spark Plug Make and Type			NGK BR9ES
	Spark Plug Gap		mm (in)	0.45 (.018)
	Ignition Timing BTDC ④		mm (in)	1.48 (.058)
	Trigger Coil ⑤		Ω	190 – 300
	Generating Coil ⑤		Ω	10 – 17
	Lighting Coil ⑤		Ω	0.2 – 0.35
	High Tension Coil ⑤	Primary Secondary	Ω kΩ	0.3 – 0.7 8 – 16
	Carburetor Type		PTO/MAG	VM 34-498/499
	Main Jet		PTO/MAG	260/250
	Needle Jet			159 P-8
	Pilot Jet			45
	Needle Identification — Clip Position			6FJ43
	Slide Cutaway			2.5
	Float Adjustment		± 1 mm (± .040 in)	23.9 (.94)
	Air Screw Adjustment		± 1/16 Turn	1
	Idle Speed RPM		± 200 RPM	1700
	Gas Type/Pump Octane Number			Unleaded/87
	Gas/Oil Ratio Mixing Oil			Premix 40: 1 Bombardier-Rotax Synthetic
	Type			Liquid
	Axial Fan Belt Adjustment	Deflection ⑥ Force	mm (in) kg (lbf)	N.A. N.A.
	Thermostat Opening Temperature		°C (°F)	42 (108)
	Radiator Cap Opening Pressure		kPa (PSI)	90 (13)
	**ENGINE COLD N•m (lb•ft)**	Drive Pulley Retaining Screw		⑦
		Exhaust Manifold Nuts or Bolts		23 (17)
		Magneto Ring Nut		125 (92)
		Crankcase Nuts or Screws	M6 M8	9 (6.5) 29 (21)
		Crankcase/Engine Support Nuts or Screws		40 (29)
		Cylinder Head Nuts		29 (21)
		Crankcase/Cylinder Nuts or Screws		29 (21)
		Axial Fan Shaft Nut		N.A.

	VEHICLE MODEL				**MX Zx 440 LC**
	ENGINE TYPE				**454**
	Chain Drive Ratio				23/43
	Chain	Pitch		in	3/8
		Type/Links Qty/Plates Qty			Silent 72 – 13
	Drive Pulley	Type of Drive Pulley			TRAC
		Ramp Identification			285 ⑤
		Calibration Screw Position or Calibration Disc Quantity ⑤			3
		Spring Color			Pink/Pink
		Spring Length		± 1.5 mm (± 0.060 in)	137.2 (5.4)
		Clutch Engagement		± 200 RPM	4900
	Driven Pulley Spring Preload Cam Angle			± 0.7 kg (±1.5 lb) degree	7.0 (15.4) 40° – 44°
	Pulley Distance Z			(+ 0, –1) mm ((+ 0, –1/32) in)	16.5 (21/32)
	Offset	X		± 0.4 mm (± 1/64 in)	35.0 (1-3/8)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (0.039 – 0.079)
	Drive Belt Part Number (P/N)				414 8607 00
	Drive Belt Width (new) ①			mm (in)	34.9 (1-3/8)
	Drive Belt Adjustment		Deflection	± 5 mm (± 13/64 in)	32 (1-1/4)
			Force ②	kg (lbf)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)
		Length		cm (in)	307 (121)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)
	Suspension Type		Track		SC10 XC
			Ski		DSA
	Length			cm (in)	272.5 (107.3)
	Width			cm (in)	114.9 (45.3)
	Height			cm (in)	108 (42.5)
	Ski Stance			cm (in)	101.6 (40.0)
	Mass (dry)			kg (lb)	210 (462)
	Ground Contact Area			cm^2 (in^2)	6745 (1045)
	Ground Contact Pressure			kPa (PSI)	3.05 (0.442)
	Frame Material				Aluminum
	Bottom Pan Material				Impact Copolymer
	Cab Material				RRIM Polyurethane
	Battery			V (A•h)	N.A.
	Headlight			W	H4 60/55
	Taillight and Stoplight			W	8/27
	Tachometer and Speedometer Bulb			W	2 x 3
	Fuel and Temperature Gauge Bulb			W	N.A.
	Fuse	Starter Solenoid		A	N.A.
		Tachometer		A	N.A.
	Fuel Tank			L (U.S. gal)	37.0 (9.8)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)
	Cooling System			L (U.S. oz)	3.5 (118.4)
	Rotary Valve Reservoir			mL (U.S. oz)	50 (1.7)

ANNEX 1 MX Zx 440 LC

MX-ZX 440 LC'97



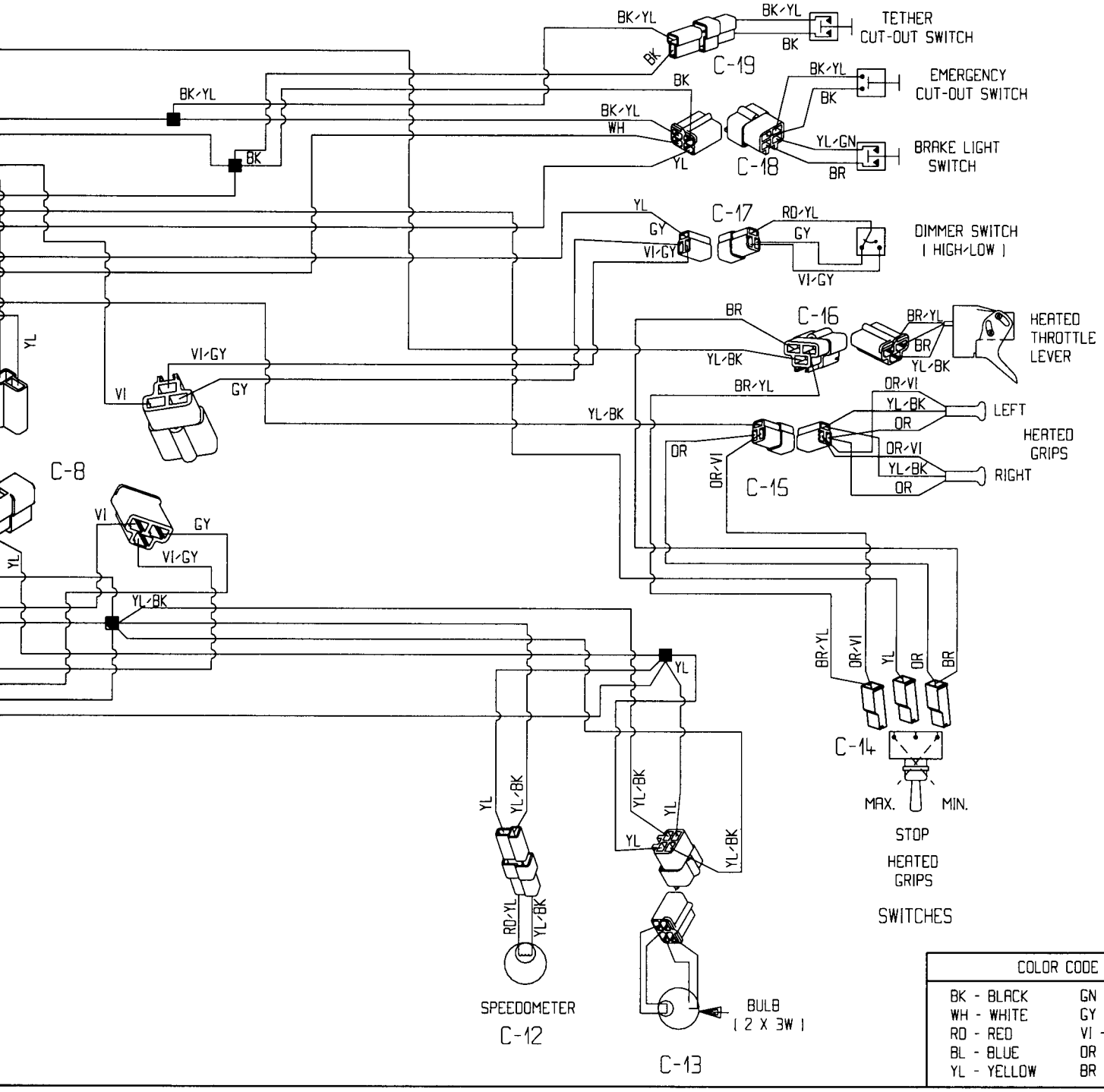
LOCATION OF CONNECTORS

C-1, C-2, C-3, C-3A NEAR ENGINE
C-5 : NEAR REGULATOR UNDER ENGINE
C-6, BETWEEN SEAT AND FUEL TANK
C-7 : ON TAILLIGHT
C-8 : JUNCTION BETWEEN HOOD AND FRAME
C-9 @ C-13 : IN HOOD, NEAR INSTRUMENT LOCATION
C-14 @ C-19 : NEAR STEERING COLUMN

■ = WELDED SPLICE

◆ WARNING

- ENSURE ALL TERMINALS ARE PROPERLY CRIMPED ON THE WIRES AND ALL CONNECTOR HOUSINGS ARE PROPERLY FASTENED



COLOR CODE	
BK - BLACK	GN - GREEN
WH - WHITE	GY - GREY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN