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No. **99-8**

Date: December 29, 1998

**SUBJECT: Shop Manual Supplement for
MX Z 600/700, MX Zx 440 LC
and Summit 600/700**

YEAR	MODEL	MODEL NUMBER	SERIAL NUMBER
1999	MX Z 600	1336/1337/1338	All
1999	MX Z 700	1339/1340/1341	All
1999	MX Zx 440 LC	1342/1343/1344	All
1999	Summit 600	1345/1346/1361	All
1999	Summit 700	1467/1468	All

Maintenance and repair procedures on models above are very like those covered in *Ski-Doo 1999 Shop Manual*, volume 2. However, the following points are specific to ZX series snowmobiles and supersede information found in volume 2 of *Shop Manual*.

For exploded views, refer to *Parts and Accessories Catalogs* featuring the models above.

01 — LUBRICATION AND MAINTENANCE CHART

Refer to *Ski-Doo 1999 Shop Manual*, volume 2.

02 — TROUBLESHOOTING

Refer to *Ski-Doo 1999 Shop Manual*, volume 2.

03 — ENGINE

Refer to *Ski-Doo 1999 Shop Manual*, volume 2 for most of procedures except the followings.

Shut-Off Valve

These vehicles have no manual shut-off valve. Fuel pump automatically performs fuel shut-off.

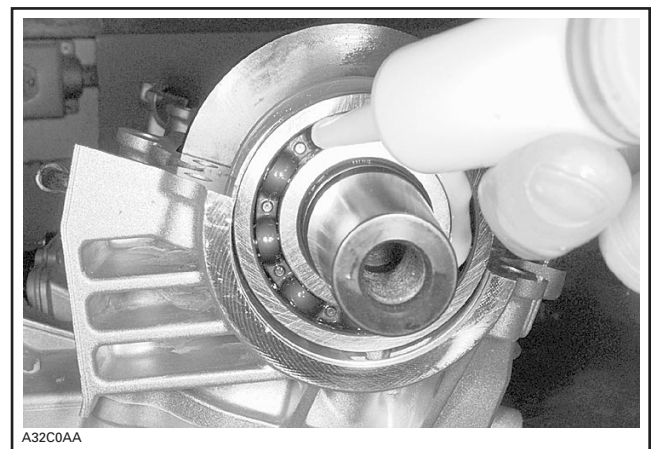
453, 593 and 693 Engine Lubrication and Assembly

Before assembling engine bottom end, ball bearings on PTO must be lubricated with grease (P/N 293 550 021) (the grease tube contains 50 g, which is similar to 50 mL or 50 cc).

Crankcase Lubrication

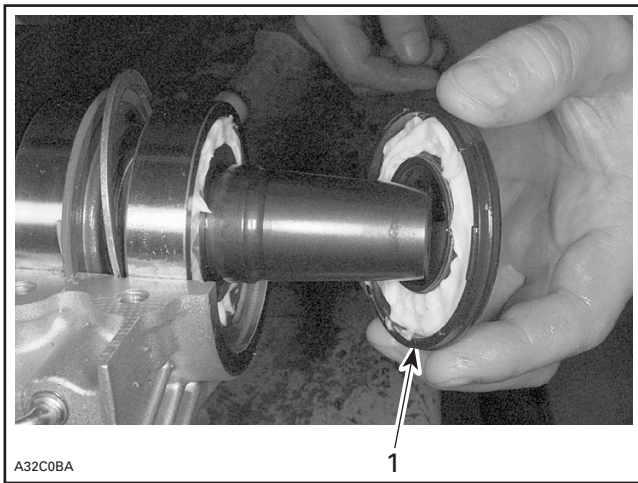
Put 35 to 40 mL of grease in a syringe.

With the syringe, fill the outer ball bearing with grease.



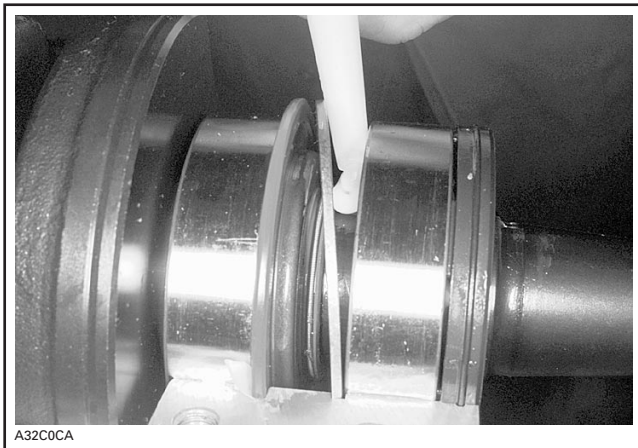
BALLS COATED WITH A SEAM OF GREASE

Coat inner side of seal and set it in place.

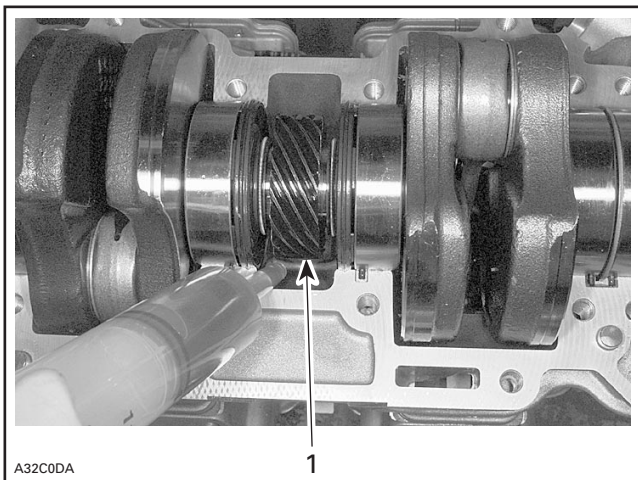


1. Fill with grease and set in place

Use the remaining grease to coat the inner side of the ball bearing.



Drop 50 mL of injection oil in the pan under central gear to lubricate pump gearing as per photo.

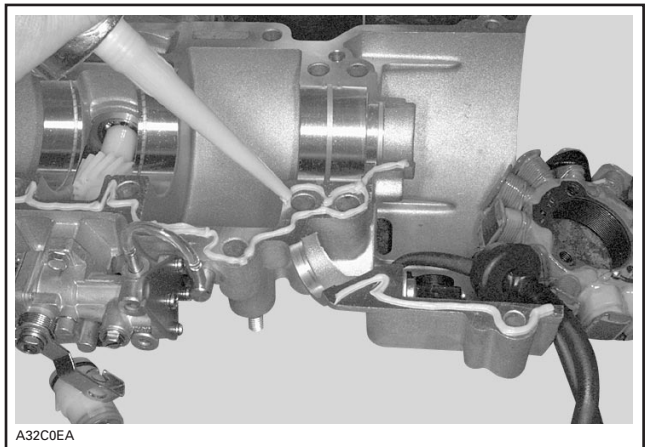


1. Oil bath

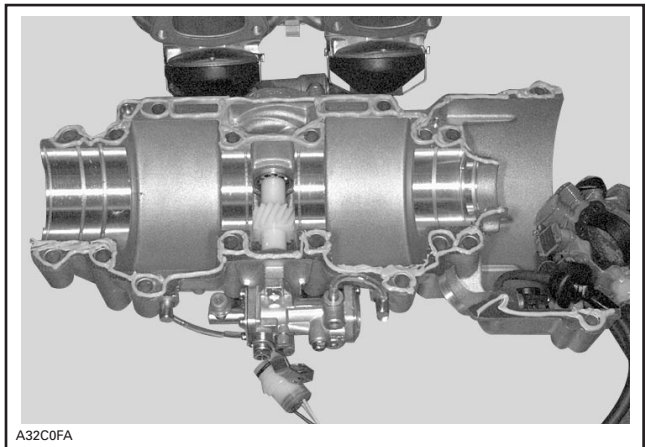
Crankcase Assembly

Before screwing both parts of crankcase, seal it with a silicon sealing compound (P/N 420 297 905). Make sure surfaces are clean and degreased before applying silicon sealing compound.

Spread a seam of 1.2 mm (1/16 in) maximum in diameter on the surface of the crankcase.



As far as possible, silicon compound must be applied in one run to avoid any risks of leaking through the crankcase.

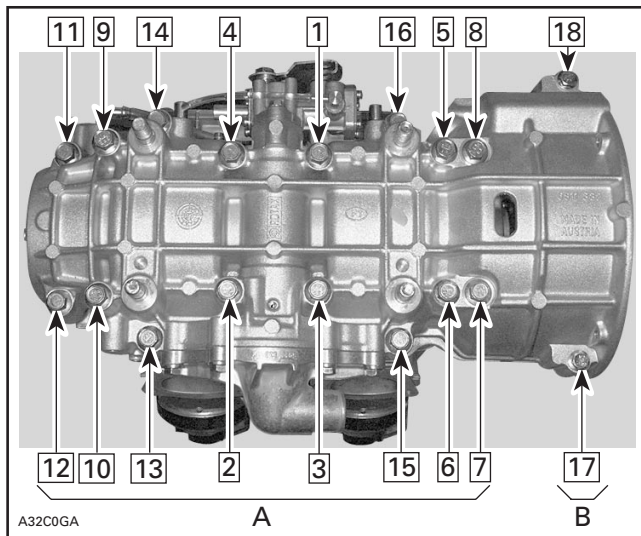


SEAMING COMPLETED — CONTACT SURFACES COVERED AND SCREW HOLES SURROUNDED

Screw the 4 central bolts to squeeze compound between crankcase halves before it starts to dry.

NOTE: Sealing compound spreading plus screwing of engine central four bolts must be performed within 2 minutes to ensure a good sealing and avoid linking.

Screw all crankcase bolts in place in the following sequence and to the appropriate torque through a two steps torquing: first, screw bolts up to 60% of the final torque (18 N•m (13.5 lbf•ft) for most of the bolts), then, secure to the required torque (i.e. between 28 and 30 N•m (21 and 22 lbf•ft).



A. Torque bolts 1 through 16 to 28-30 N•m (21-22 lbf•ft)
 B. Torque bolts 17 and 18 to 8-10 N•m (6-8 lbf•ft)

NOTE: The total assembly sequence, including sealing compound spreading, screwing and torquing of bolts according to the proper sequence must be performed within 10 minutes.

Oil Pump

Identification

Different engines use different pumps. See identification on lever.

▼ CAUTION	
Always mount proper pump on engine.	

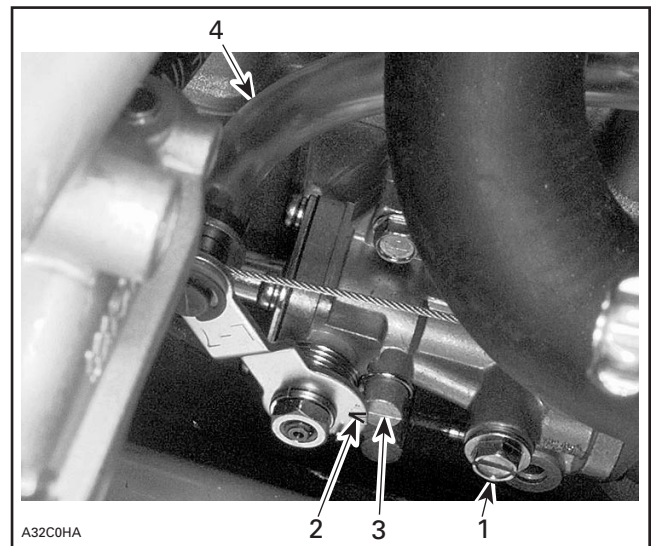
ENGINE TYPE	OIL PUMP IDENTIFICATION
693	L-8
593	L-7
453	No oil pump

Bleeding and Adjustment

All Models Except MX Zx 440 LC

Remove air silencer and move carburetors aside. Bleed main oil line (between tank and pump) by loosening the bleeder screw until air has escaped from the line. Add injection oil as required.

Check also for proper oil lever adjustment. Mark on pump body must be set from 0 to 1 mm (0 to 1/32 in) farther than second mark on lever. **Do not take cable play by pressing throttle lever.**



TYPICAL (FUEL PUMP IS REMOVED)

1. Bleeder screw
2. Marks on pump lever
3. Mark on pump body
4. Main line

Reinstall all parts.

Bleed the small oil line by running engine at idle while holding the pump lever in fully open position.

NOTE: Make a J hook out of mechanical wire to reach the lever from magneto side and pull it in open position.

Oil System Leak Test

All Models Except MX Zx 440 LC

Install a hose pincher on hose going to crankcase for lubrication of coolant and oil shaft gears.

When performing leak test, pressurize oil system to 20 kPa (2.9 PSI). Pressure must not drop within 3 minutes.

Never use a hammer to install oil seals. These pieces must be installed on shaft using a press and appropriate pushers.

Rave System

MX Z 600 Only

There is a O-ring under red adjustment screw.

All Models

Remove spring clip, cover and spring and unscrew valve piston. Remove cylindrical screws then valve rod housing. Remove bellows and spring. Pull out exhaust valve.

Check valve rod housing and cylinder for clogged passages.

NOTE: Oil dripping from draining hole indicates a loosen spring or damaged bellows.

Check for cracked, dried or perforated bellows.

Spring

ENGINE TYPE	SPRING P/N	WIRE DIA. mm (in)	FREE LENGTH mm (in)	PRELOAD IN N (LBF) AT COMPRESSED LENGTH OF 14.7 mm (.579 in)
693 on MX Z 700	420 239 947	1.1 (.043)	42.0 (1.65)	30.0 (6.7)
693 on Summit 700	420 239 944	0.9 (.031)	48.5 (1.91)	16.9 (3.8)
593	420 239 946	1.00 (.039)	42.0 (1.65)	16.4 (3.7)
453	420 239 945	1.00 (.039)	48.5 (1.91)	20.3 (4.5)

Digital Performance Management (DPM)

Summit 600/700 and MX Z 700

These models are equipped of a DPM to manage air/fuel mixture according to temperature and atmospheric pressure. However, this DPM features only a compensation mode. Only one solenoid is mounted on DPM manifold. There is no air pump nor DPM engine coolant sensor because no enrichment mode exists on this DPM version. See *Ski-Doo 1999 Shop Manual*, volume 2 for further details.

Carburetor

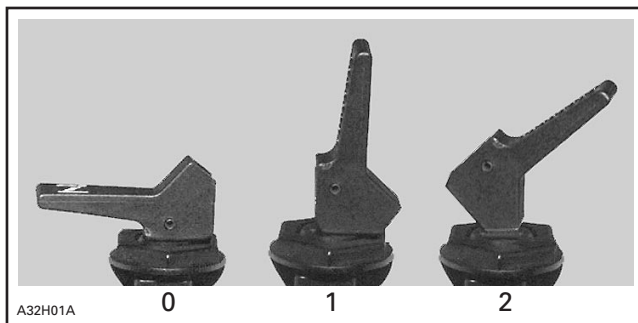
All Models Except MX Zx 440 LC

These models are equipped with a new three-position choke.

Cold Engine Starting

When temperature is below -10°C (+15°F), set the choke lever to the second position.

When temperature is -10°C or over (+15°F or over), set the choke lever to the first position.



0. OFF
1. Position 1
2. Position 2

After the engine is started, close off choke to ensure proper air-fuel mix when speed drops below 2000 RPM.

Warm Engine Starting

Start the engine without any choke.

◆ WARNING

Do not apply throttle while starting.

Choke Plunger Adjustment

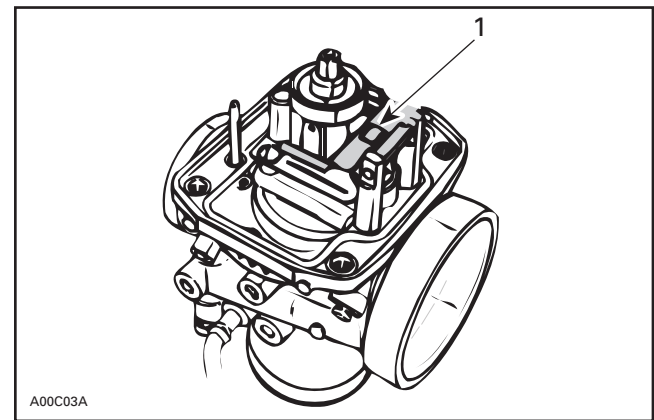
A new tool is developed for choke adjustment (P/N is not available at time of printing).

Float Level Adjustment

CARBURETOR MODEL	FLOAT HEIGHT H	
	± 1 mm	(± .040 in)
MX Zx 440 LC	N.A.	N.A.
MX Z 600/700	22.9	(.902)
Summit 600/700	22.9	(.902)

To Adjust Height H

- Bend the contact tab of float arm until the specified height is reached.



1. Contact tab

Throttle Slide Height

Adjust throttle slide height (see following table) by turning idle speed screw. Throttle slide height is measured on outlet side of carburetor (engine side).

NOTE: Make sure that throttle cable does not hold throttle slide. Loosen cable adjuster accordingly. Throttle cable adjustment will be done during adjustment of throttle-slide-to-cover free play.

Final idle speed adjustment (engine running at idle speed) should be within 1/2 turn of idle speed screw from preliminary adjustment.

MODELS	THROTTLE SLIDE HEIGHT mm (in)
MX Zx 440 LC	1.8 (0.071)
MX Z 600	1.3 (0.051)
MX Z 700	1.5 (0.059)
Summit 600	1.7 (0.067)
Summit 700	1.9 (0.075)

MX Zx 440 LC

Primer

This model is equipped with a primer instead of a choke.

Jet Needle

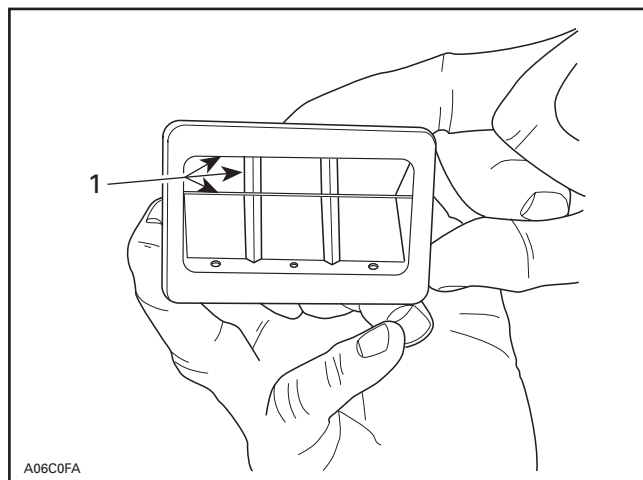
MX Zx 440 LC features a new TMX-34 carburetor. On this model, needle jets are press fit mounted and cannot be sold separately. Otherwise, servicing is similar to other Mikuni carburetors.

Reed Valve

Engines concerned with this bulletin are equipped with reed valves. Perform reed valves inspection as per following.

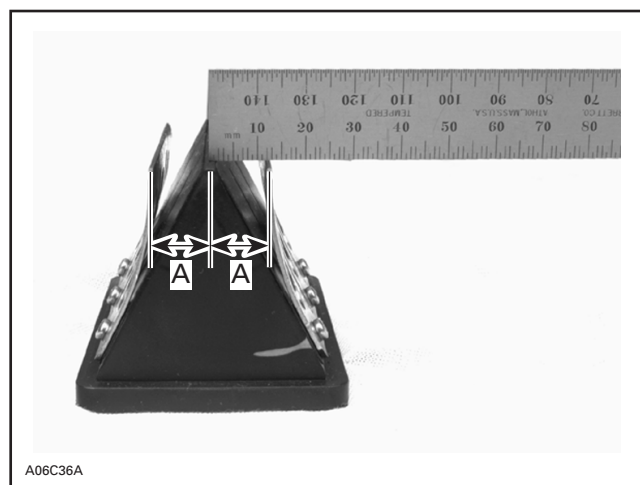
With blade stopper removed, check reed valve for proper tightness. There must be no play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

In case of a play, turn blade upside down and re-check. If there is still a play, replace blade and/or valve body.



1. No play

Check blade stopper distance from center of reed valve block.



TYPICAL

- A. 693 Engine: 13 ± 0.25 mm (.512 \pm .010 in)
- 593 Engine: 14 ± 0.25 mm (.551 \pm .010 in)
- 453 Engine: 12 ± 0.25 mm (.472 \pm .010 in)

Bent blade stopper as required to obtain the proper distance.

Cooling System

The new ZX platform features a new cooling system. As S-series, a cold engine circuitry stands beside a hot engine circuitry. Cooling liquid routing is managed through a thermostat.

The difference consists in a new hot engine circuitry with a front radiator on firewall and only one rear radiator.

For inspection and servicing, refer to *Ski-Doo 1999 Shop Manual*, volume 2 (Liquid Cooling system and Coolant pump).

Recommended Fuel

All Models Except MX Zx 440 LC

Use regular unleaded fuel with minimum octane number of 87.

MX Zx 440 LC

Use regular unleaded fuel with minimum octane number of 87 premixed 40:1 with Bombardier synthetic injection oil (P/N 413 710 500, 12 x 1 liter).

Racers who will install high compression cylinder inserts provided with this vehicle **must** use racing fuel with a minimum octane of 112. Refer to instruction sheet for further details.

04 — TRANSMISSION

Refer to *Ski-Doo 1999 Shop Manual*, volume 2 for inspection and servicing procedures on transmission and brake systems.

Drive Belt

MODEL	PART NUMBER	WIDTH (NEW) ± 0.25 mm (.010 in)	MINIMUM WIDTH (WEAR LIMIT)
Summit 600, MX Z 600 and MX Zx 440 LC	414 860 700	35.30 mm (1.390 in)	32.30 mm (1.272 in)
Summit 700, MX Z 700	417 300 067	35.10 mm (1.382 in)	32.10 mm (1.264 in)

05 — ELECTRICAL SYSTEM

Refer to *Ski-Doo 1999 Shop Manual*, volume 2 for inspection and servicing.

Models involved with this bulletin feature no battery and no electric starter.

Changing Timing

Timing can only be changed using the programmer (P/N 529 035 589).

Start engine. Turn on programmer then enter password.

Increase engine speed to 2500 RPM.

From main menu select INFO VEHICLE.

Engine will misfire during vehicle information is transferred from MPEM to programmer. If engine stalls, restart it, keep engine speed at 2500 RPM and select VEHICLE INFO again.

NOTE: In fact the programmer takes a **copy** of all vehicle parameters scribed in MPEM. This copy will be modified within the programmer then transferred to the MPEM.

Select ENGINE PARAMETER.

Select TIMING ADJUSTMENT.

Press ENTER.

Now the display shows the engine timing correction factor that is programmed in the MPEM. In the following example timing correction factor is 4.

Press any key.

Select YES using the key **↔**.

Press ENTER.

Select a timing correction factor corresponding to correction needed.

Example: Timing mark as verified with a timing light at 3500 RPM was too early by 2°. The correction factor programmed is no. 4.

Select correction factor no. 5. This will retard the timing by 2° because the difference between correction factor no. 4 and no. 5 is - 2° (passing from 1° to - 1°).

IGNITION CORRECTION FACTOR	
CORRECTION FACTOR PROGRAMMED IN MPEM	IGNITION TIMING CORRECTION
2	3°
3	2°
4	1°
1	0°
5	- 1°
6	- 2°
7	- 3°
8	- 4°

Press ENTER twice.

The display confirms that correction factor has been changed to no. 5.

Press any key.

If the new correction factor selected above is the good one select NO. Otherwise select YES to choose an other correction factor.

Press MENU.

Scroll to SAVE AND QUIT.

Press ENTER.

Increase engine speed to 2500 RPM.

Press ENTER.

Engine will misfire during vehicle information is transferred from programmer to MPEM. If engine stalls, restart it, keep engine speed at 2500 RPM and select SAVE AND QUIT again.

Digital Encoded Security System (DESS)

MX Zx 440 LC only

This model is equipped with a mechanical tether switch. Its function is similar to the emergency cut-off switch. To allow snowmobile to start, tether cap must be installed on post.

NOTE: Never allows transmission to be engaged (and even snowmobile to be started) if tether cord is not tied to yourself.

A cap covers a hole designed to allow electronic DESS to be installed. DESS switch is already installed under console and may be drawn out from console, if needed.

DESS is active as input terminal for programming but cut-off function is disabled.

06 — REAR SUSPENSION

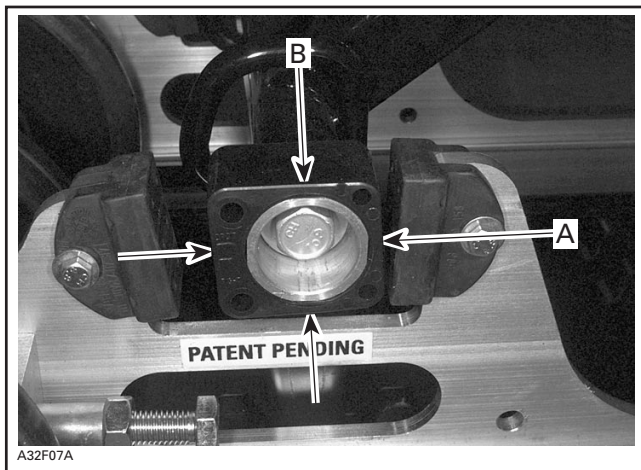
All Models Except MX Zx 440 LC

Refer to *Ski-Doo 1999 Shop Manual*, volume 2 for most of inspection and servicing procedures.

MX Zx 440 LC

Suspension Adjustment

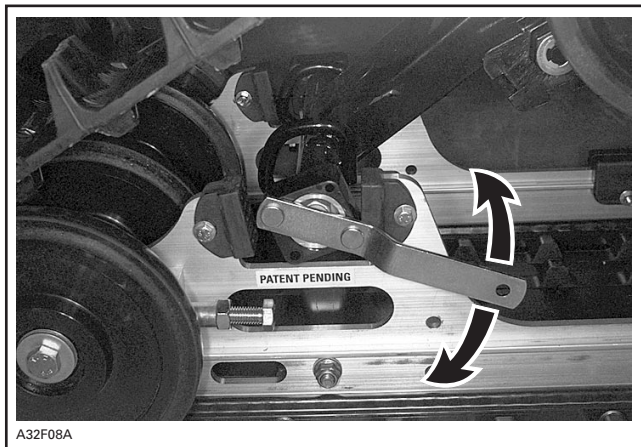
This model is equipped with a new two-position anti-transfer system. To adjust to the preferred position, turn both left and right blocks by steps of 90°.



ANTI-TRANSFER BLOCK — RIGHT SIDE VIEW
("R" — RIGHT — EMBOSSED ON BLOCK)

- A. Wider side — less track grip and more skis steering
- B. Narrower side — more track grip and less skis steering

Use tool provided in tool bag to adjust anti-transfer blocks.



TURN BOTH BLOCKS BY STEPS OF 90°

▼ CAUTION

Both blocks must be set at the same position. Otherwise, vehicle behavior will be impaired and suspension may be warped.

Track Tension Adjustment

Refer to *Ski-Doo 1999 shop Manual*, volume 2 for track tension adjustment except for the following:

Loosen lock nuts on adjustment screws before proceeding to adjustment and secure when track adjustment is done.

07 — FRONT SUSPENSION AND STEERING SYSTEM

Models concerned with this bulletin are equipped with an Advanced Direct Shock Action suspension system. For most of the servicing and inspections procedures, refer to *Ski-Doo 1999 Shop Manual*, volume 2. The following items only state the differences between the snowmobiles listed in heading and the ones described in volume 2.

Shock Absorber Servicing

MX Zx 440 LC only

Reservoir Disassembly and Reassembly

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



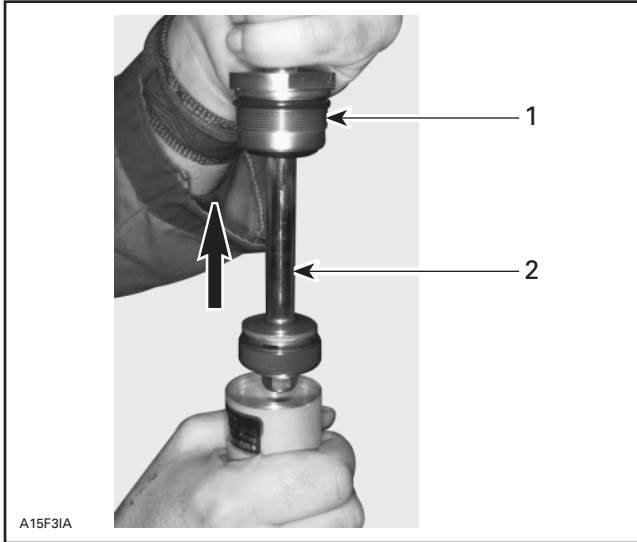
RELEASING PRESSURE FROM RESERVOIR

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 used oil into storage container. Never re-use old oil during damper rework.

Reservoir Disassembly

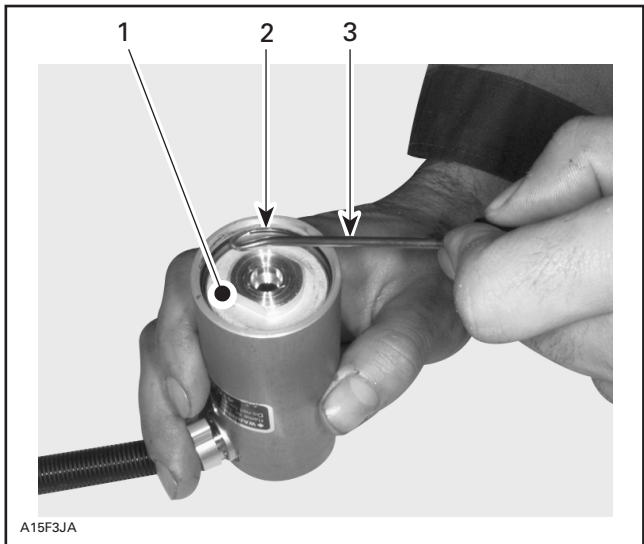
Remove air valve from reservoir cap assembly on the remote reservoir.

Using both thumbs, press on the reservoir cap assembly.

Remove circlip with Snap-on 3ASH special tool.

▼ CAUTION

Ensure not to scratch any inner parts of the cylinder.



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

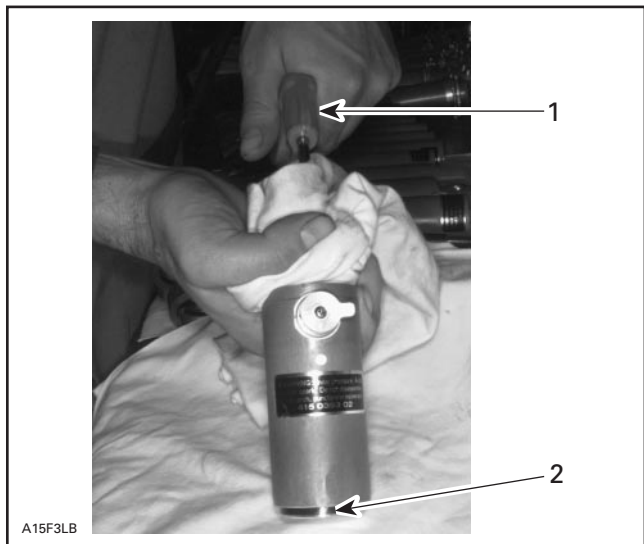
Using a M8 (pitch 1.0 mm) bolt, pull out reservoir cap assembly.

Hold reservoir in hand, 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.



TYPICAL

1. Compressed air
2. Floating piston

Reservoir Assembly

Fill reservoir with 150 mL of Bombardier HPG shock oil (P/N 413 709 400).

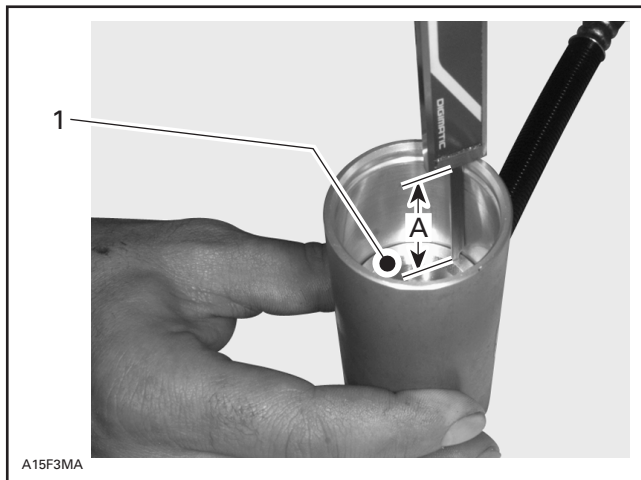
Reinstall floating piston into reservoir body. Concave side of piston must be facing outside. Use oil to ease O-ring pass reservoir body groove.

Invert reservoir. Using both thumbs apply pressure on floating piston to position floating piston to a depth of 44.5 ± 1 mm ($1\text{-}3/4 \pm 1/32$ in). Measure from the top edge of reservoir body.

▼ CAUTION

When positioning floating piston turn damper with reservoir facing down. 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.

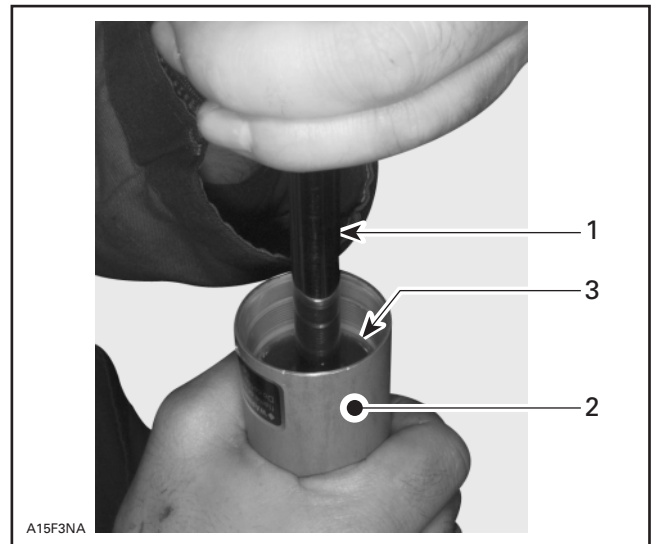


RESERVOIR TURNED UPSIDE DOWN TO SHOW HOW TO MEASURE

1. Concave side of piston facing upward
- A. 44.5 ± 1 mm ($1\text{-}3/4 \pm 1/32$ in)

Damper Assembly

Refill damper with Bombardier HPG shock oil (P/N 413 709 400) up to lowest threads of damper seal carrier.



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.

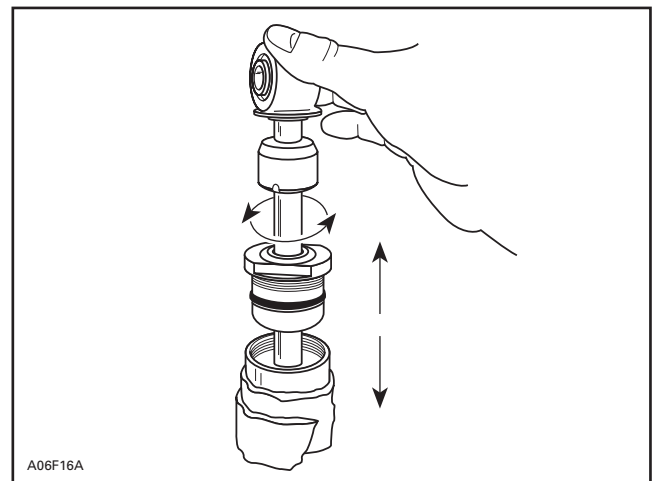
NOTE: Some shock oil may overflow when installing damper rod assembly. Wrap damper with shop cloth to catch possible oil overflow.

▼ 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 (44.5 ± 1 mm ($1\text{-}3/4 \pm 1/32$ in)):

- If floating piston is positioned 43 mm and less, apply pressure on floating piston to position floating piston to a depth of 44.5 mm ($1\text{-}3/4$ 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.

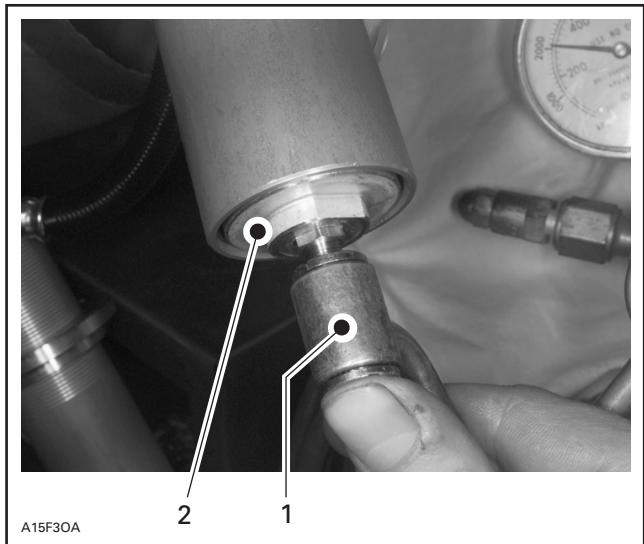
Reservoir Final Assembly

NOTE: If all previous procedures have been properly performed, **final floating piston position must be 41 ± 2 mm ($1\text{-}5/8 \pm 5/64$ 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), this gas pressure will restore the correct pressure for the damper.



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

▼ CAUTION

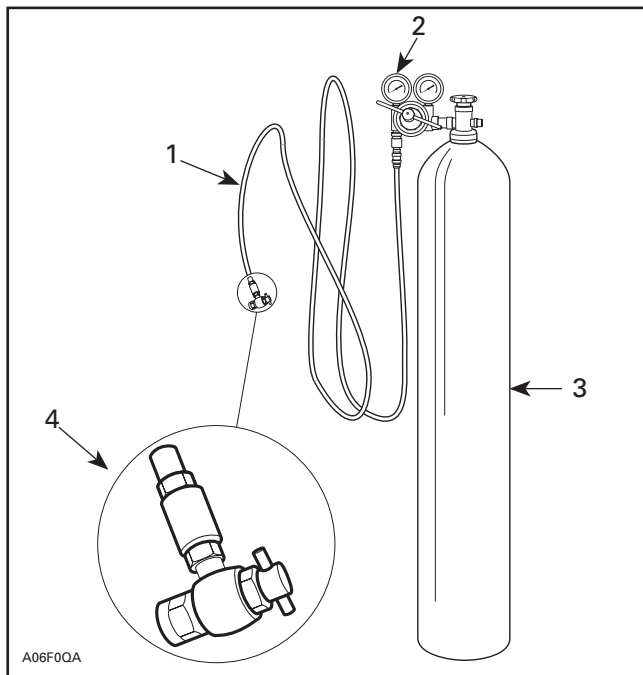
Do not exceed the recommended pressure value.

◆ 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

Front Suspension Springs Preload Adjustment

Lift snowmobile to remove tension from front springs.

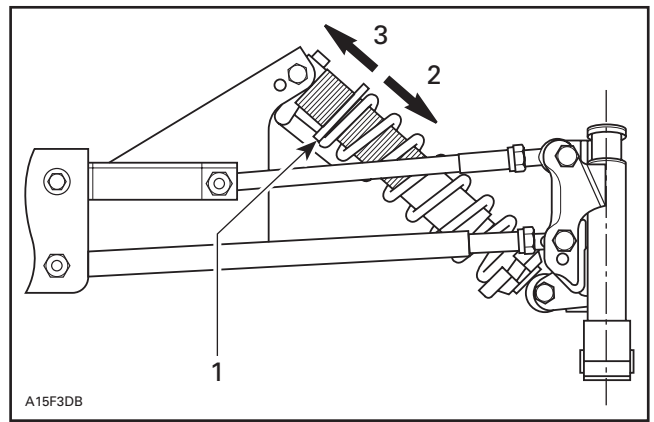
NOTE: Always set preload to the same value (or the same number of turns) on both shocks.

MX Z 600/700 and MX Zx 440 LC

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

▼ 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

Summit 600/700

Perform preload adjustment on Motion Control shock absorber by setting adjusting cam upward (add preload) or downward (remove preload). Use provided tool to set preload.

Steering Adjustments

Steering adjustment must be performed in the following sequence:

- Center pivot arm.
- Set camber angle.
- Check for a handlebar perpendicular to skis.
- Set toe-out.

For most of procedures (i.e. handlebar levelling and adjustments and lubrication), refer to *Ski-Doo 1999 Shop Manual*, volume 2. Following are items which differ.

Pivot Arm Centering

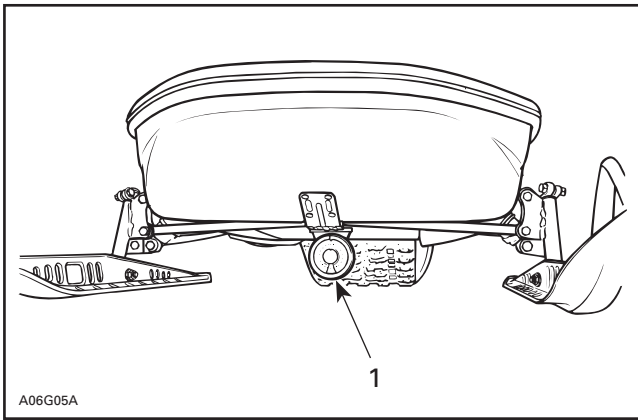
Pivot arm should be midstroke when handlebar and skis are straight ahead.

NOTE: If servicing is needed, torque pivot arm bolt between 37 and 45 N•m (28 and 33 lbf•ft) when reassembling.

Camber Angle Setting

NOTE: Identical adjustments are required on both sides of the vehicle.

- Make sure the vehicle is leveled by placing an angle finder under the main frame member as shown on the following illustration.



TYPICAL

1. Angle finder

Using special tool (P/N 529 021 600) mounted to the ski leg, position the angle finder on the tool as shown in the following illustration. An alternative location for the angle finder, if the special tool is not available, is the outside of the ski leg housing.

Camber should be set as follows (with shock completely stretched):

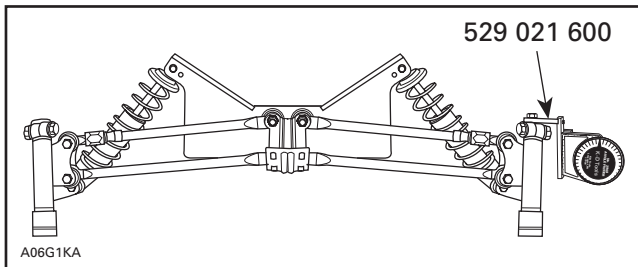
MX Z 600/700: $1^\circ \pm 1^\circ$

MX Zx 440 LC: $2^\circ \pm 1^\circ$

Summit 600/700: (no adjustment on these models).

▼ CAUTION

Angle finder must sit square against swing arm. Positioning angle finder against weld bead or decal may result in false reading.



TYPICAL — ADSA CAMBER ADJUSTMENT SET-UP

Adjusting

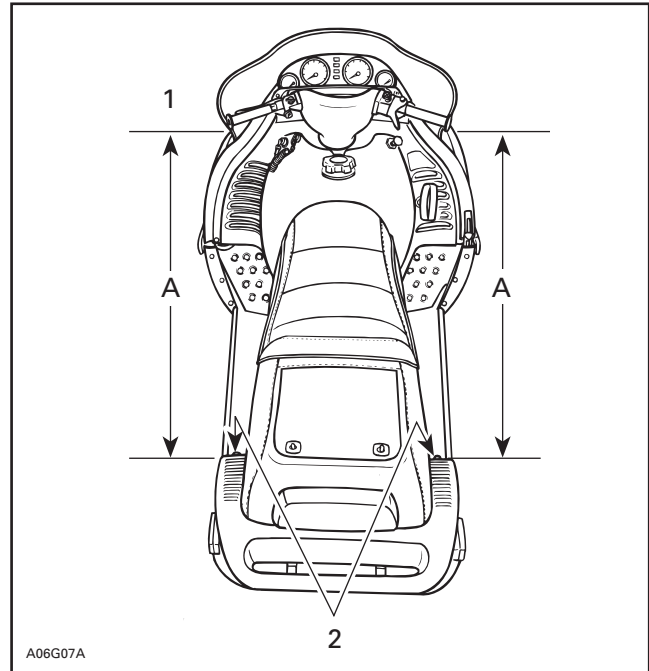
- Loosen lock nut on both upper control arms.
- Unbolt both upper control arms at ski leg housing. Turn ball joint of tie rod half a turn at a time to obtain right camber value. Bolt upper control arms.

NOTE: Always use new elastic nuts when retightening control arms.

HANDLEBAR AND SKI TOE-OUT

Check that handlebar is horizontal when skis are in straight-ahead position by measuring from the extremities of the grips to the rearmost edge of the tunnel, as shown.

NOTE: The reference point must be the same relative to each side.



TYPICAL

1. Equal distance A on each side
2. Same reference point (rivet)

Adjustment is performed by adjusting length of left and right tie rods.

◆ WARNING

Do not attempt to adjust skis straight-ahead position by turning ball joint on tie rod between steering column and pivot arm.

Procedure:

- Apply a slight tension to close skis using an rubber cord.
- Lift snowmobile high enough to stretch completely front suspension and unload skis.
- Lay a straight edge alongside track (make sure track is perfectly aligned).
- Check for snowmobile toe-out
 - Measure distance between edge and runner rearmost stud.
 - Measure distance between edge and runner frontmost stud.
 - Difference between both measures must be **half** of the following specifications:

MX Z 600/700: 8 ± 3 mm ($5/16 \pm 1/8$ in);

MX Zx 440 LC: 0 ± 3 mm ($0 \pm 1/8$ in);

Summit 600/700: 8 ± 3 mm ($5/16 \pm 1/8$ in).

Perform toe-out check on the other ski. If measures are out of specifications:

- Loosen jam nuts of both ends of tie rods.
- Turn the tie rod to adjust its length.
- Tighten jam nuts to $18 \text{ N}\cdot\text{m}$ ($159 \text{ lbf}\cdot\text{in}$).
- Measure distance between both runners rear-most studs.
- Measure distance between both runners front-most studs.
- Difference between both measures must be according to the previous specifications. If not, adjust tie rod length as described high above.

◆ WARNING

Never lengthen tie rod making threaded portion of ball joint exceed 20 mm ($25/32$ in).

Handlebar Levelling

Handlebar can be adjusted for the driver's comfort and driving preferences.

Remove steering pad and foam padding.

Unscrew the four bolts and adjust handlebar height. Lock the handlebar in place by tightening the 4 nuts to $25 \text{ N}\cdot\text{m}$ ($19 \text{ lbf}\cdot\text{ft}$).

NOTE: When levelling handlebar, make sure brake oil reservoir is level too.

◆ WARNING

Avoid contact between the brake handle and the windshield by NOT adjusting the handlebar too high.

◆ WARNING

Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.

Reinstall foam padding and steering pad.

Skis Installation and Torquing

On ZX platform, ski stoppers must be installed with higher side in front and ski bolts must be torqued to $32 \text{ N}\cdot\text{m}$ ($24 \text{ lbf}\cdot\text{ft}$).

08 — BODY/FRAME

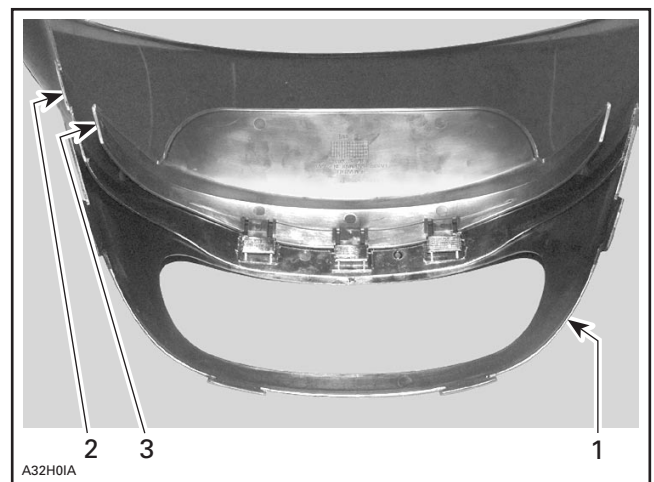
Refer to *Ski-Doo 1999 Shop Manual*, volume 2 for inspection and servicing. Body and frame materials on ZX platform and S-series are the same.

Windshield Installation

Insert tabs of headlamp protector in windshield square holes.

Clip inner protector in place.

Secure windshield assembly on hood using latches.



1. Headlamp Protector
2. Windshield
3. Inner Protector

09 — TECHNICAL DATA

See following pages.






10 — WIRING DIAGRAMS

See last pages.

IMPORTANT: Use the MX Z 600 and Summit 600 wiring diagram for MX Z 700 and Summit 700.





ENGINE SPECIFICATIONS

VEHICLE MODEL		MX Zx 440 LC	MX Z 600	MX Z 700	
ENGINE TYPE		453	593	693	
Number of Cylinders		2	2	2	
Bore mm (in)		65.00 (2.57)	76.00 (2.99)	78.00 (3.0709)	
Stroke mm (in)		65.80 (2.59)	65.80 (2.59)	73.00 (2.874)	
Displacement cm ³ (in ³)		436.7 (26.65)	597.00 (36.43)	697.64 (42.573)	
Compression Ratio (corrected)		7.2	6.7	6.7	
Maximum Power Engine Speed ① ± 100 RPM		8500	8000	8000	
Piston Ring Type		Semi-trapez	Semi-trapez	Semi-trapez	
Ring End Gap	(new) mm (in)	0.200 (0.008)	0.400 (0.016)	0.400 (0.016)	
	(wear limit) mm (in)	1.0 (.039)	1.0 (.039)	1.0 (.039)	
Ring/Piston Groove Clearance	(new) mm (in)	0.040 (0.002)	0.040 (0.002)	0.040 (0.002)	
	(wear limit) mm (in)	0.2 (.008)	0.2 (.008)	0.2 (.008)	
Piston/Cylinder Wall Clearance	(new) mm (in)	0.113 (0.004)	0.110 (.0043)	0.070 (.0028)	
	(wear limit) mm (in)	0.15 (0.006)	0.2 (.008)	0.150 (.0059)	
Connecting Rod Big End Axial Play	(new) mm (in)	0.390 (0.015)	0.390 (0.015)	0.390 (0.015)	
	(wear limit) mm (in)	1.2 (0.047)	1.2 (0.047)	1.2 (0.047)	
Maximum Crankshaft End-Play ② mm (in)		0.3 (.0118)	0.3 (.0118)	0.3 (.0118)	
Maximum Crankshaft Deflection Measured at Center mm (in)		0.08 (.0031)	0.08 (.0031)	0.08 (.0031)	
Rotary Valve Timing					
		Opening			
		Closing			
Magneto Generator Output W		290	290	290	
Ignition Type		CDI	CDI	CDI	
Spark Plug Make and Type		NGK BR9ES	NGK BR9ES	NGK BR9ES	
Spark Plug Gap ± 0.05 mm (± 0.002 in)		0.45 (.018)	0.45 (.018)	0.45 (.018)	
Ignition Timing BTDC ③ mm (in)		3.14 (0.124)	3.0 (0.118)	3.36 (0.132)	
Trigger Coil Air Gap mm (in)		0.55 - 1.45 (0.22 - 0.57)	0.55 - 1.45 (0.22 - 0.57)	0.55 - 1.45 (0.22 - 0.57)	
Trigger Coil ④ Ω		190 - 300	190 - 300	190 - 300	
Generating Coil ④ Ω		11.6 - 21.6	11.6 - 21.6	11.6 - 21.6	
Lighting Coil ④ Ω		0.1 - 0.4	0.1 - 0.4	0.1 - 0.4	
High Tension Coil ④		Primary Ω			
		Secondary kΩ			
Carburetor Type PTO/MAG		TMX-34 1/1	VM 40-107/107	VM 40-117/117	
Main Jet PTO/MAG		290/290	280/280	310/310	
Needle Jet		Q-6	224 Z-9	224 Z-5	
Pilot Jet		25	37.5	40	
Needle Identification — Clip Position		6FIY5-58 - 3	7DFY1-3	7DHY6-4	
Slide Cut-Away		4.0	2.5	2.5	
Float Adjustment ± 1 mm (± .04 in)		N.A.	22.9 (.90)	22.9 (.90)	
Air Screw Adjustment ± 1/16 turn		1	1/2	1	
Idle Speed RPM ± 200 RPM		1600	1600	1600	
Gas Type/Pump Octane Number		Unleaded/87	Unleaded/87	Unleaded/87	
Gas/Oil Ratio		40:1	Injection	Injection	
Type		Liquid cooled	Liquid cooled	Liquid cooled	
Axial Fan Belt Adjustment		Deflection mm (in)	N.A.	N.A.	
		Force ⑤ kg (lbf)	N.A.	N.A.	
Thermostat Opening Temperature °C (°F)		42 (108)	42 (108)	42 (108)	
Radiator Cap Opening Pressure kPa (PSI)		90 (13)	90 (13)	90 (13)	
ENGINE COLD N·m (lb·ft)		Drive Pulley Retaining Screw ⑥	95 (70)	95 (70)	95 (70)
		Exhaust Manifold Nuts or Bolts	23 (17)	23 (17)	23 (17)
		Magneto Ring Nut	125 (92)	125 (92)	125 (92)
		Crankcase Nuts or Screws M6	9 (6.5)	9 (6.5)	9 (6.5)
		Crankcase Nuts or Screws M8	29 (21)	29 (21)	29 (21)
		Crankcase/Engine Support Nuts or Screws	40 (29.5)	40 (29.5)	40 (29.5)
		Cylinder Head Nuts	29 (21)	29 (21)	29 (21)
Crankcase/Cylinder Nuts or Screws		29 (21)	29 (21)	29 (21)	
Axial Fan Shaft Nut		N.A.	N.A.	N.A.	

VEHICLE MODEL		SUMMIT 600	SUMMIT 700
ENGINE TYPE		593	693
	Number of Cylinders	2	2
	Bore	mm (in) 76.00 (2.9921)	78.00 (3.0709)
	Stroke	mm (in) 65.80 (2.59)	73.00 (2.874)
	Displacement	cm ³ (in ³) 597.00 (36.43)	697.64 (42.573)
	Compression Ratio (corrected)	6.7	6.7
	Maximum Power Engine Speed ①	± 100 RPM 8000	8000
	Piston Ring Type	Semi-trapez	Semi-trapez
	Ring End Gap	(new) mm (in) 0.400 (0.016) (wear limit) mm (in) 1.0 (.039)	0.400 (0.016) 1.0 (.039)
	Ring/Piston Groove Clearance	(new) mm (in) 0.040 (0.002) (wear limit) mm (in) 0.2 (.008)	0.040 (0.002) 0.2 (.008)
	Piston/Cylinder Wall Clearance	(new) mm (in) 0.110 (.0043) (wear limit) mm (in) 0.2 (.008)	0.070 (.0028) 0.150 (.0059)
	Connecting Rod Big End Axial Play	(new) mm (in) 0.390 (0.015) (wear limit) mm (in) 1.2 (0.047)	0.390 (0.015) 1.2 (0.047)
	Maximum Crankshaft End-Play ②	mm (in) 0.3 (.0118)	0.3 (.0118)
	Maximum Crankshaft Deflection Measured at Center	mm (in) 0.08 (.0031)	0.08 (.0031)
	Rotary Valve Timing	Opening Closing N.A.	N.A.
	Magneto Generator Output	W 290	290
	Ignition Type	CDI	CDI
	Spark Plug Make and Type	NGK BR9ES	NGK BR9ES
	Spark Plug Gap	± 0.05 mm (± 0.002 in) 0.45 (.018)	0.45 (.018)
	Ignition Timing BTDC ③	mm (in) 3.0 (0.118)	3.36 (0.132)
	Trigger Coil Air Gap	mm (in) 0.55 - 1.45 (0.22 - 0.57)	0.55 - 1.45 (0.22 - 0.57)
	Trigger Coil ④	Ω 190 - 300	190 - 300
	Generating Coil ④	Ω 11.6 - 21.6	11.6 - 21.6
	Lighting Coil ④	Ω 0.1 - 0.4	0.1 - 0.4
	High Tension Coil ④	Primary Ω Secondary kΩ	
	Carburetor Type	PTO/MAG VM 40 113/113	VM 40 121/121
	Main Jet	PTO/MAG 280/280	310/310
	Needle Jet	224 Z-9	224 Z-5
	Pilot Jet	37.5	40
	Needle Identification — Clip Position	7DFY1-3	7DHY6-4
	Slide Cut-Away	2.5	2.5
	Float Adjustment	± 1 mm (± .04 in) 22.9 (.90)	22.9 (.90)
	Air Screw Adjustment	± 1/16 turn 1/2	1
	Idle Speed RPM	± 200 RPM 1600	1600
	Gas Type/Pump Octane Number	Unleaded/87	Unleaded/87
Gas/Oil Ratio	Injection	Injection	
	Type	Liquid cooled	Liquid cooled
	Axial Fan Belt Adjustment	Deflection mm (in) N.A. Force ⑤ kg (lbf) N.A.	N.A. N.A.
	Thermostat Opening Temperature	°C (°F) 42 (108)	42 (108)
	Radiator Cap Opening Pressure	kPa (PSI) 90 (13)	90 (13)
	ENGINE COLD N _{om} (lb•ft)	Drive Pulley Retaining Screw ⑥	95 (70)
		Exhaust Manifold Nuts or Bolts	23 (17)
		Magneto Ring Nut	125 (92)
		Crankcase Nuts or Screws	M6 9 (6.5) M8 29 (21)
		Crankcase/Engine Support Nuts or Screws	40 (29.5)
		Cylinder Head Nuts	29 (21)
		Crankcase/Cylinder Nuts or Screws	29 (21)
Axial Fan Shaft Nut	N.A.		

VEHICLE SPECIFICATIONS

VEHICLE MODEL		MX Zx 440 LC	MX Z 600	MX Z 700	
ENGINE TYPE		453	593	693	
Chain Drive Ratio		21/43	24/43	25/43	
Chain	Pitch in	3/8	3/8	3/8	
	Type/Links Qty/Plates Qty	Silent/74/13	Silent/74/13	Silent/76/13	
Drive Pulley	Type of Drive Pulley	TRA	TRA	TRA	
	Ramp Identification	296 ③	281 ①	297 ①	
	Calibration Screw Position or Calibration Part	3	3	3	
	Spring Color	White/Silver	Violet/Yellow	Violet/Yellow	
	Spring Length ± 1.5 mm (± .060 in)	127.6 (5.0)	157.9 (6.22)	157.9 (6.22)	
	Clutch Engagement ± 100 RPM	5300	3800	3800	
Driven Pulley	Type of Driven Pulley	Formula	Formula	Formula	
	Spring Preload ± 0.7 kg (± 1.5 lb)	7.0 (15.4)	7.0 (15.4)	7.0 (15.4)	
	Cam Angle degree	44	50	47	
Pulley Distance Z mm (in)		16.5 ± 0.5 (.650 ± .020)	16.5 ± 0.5 (.650 ± .020)	16.5 ± 0.5 (.650 ± .020)	
Offset	X mm (in)	35.5 ± 0.5 (1.398 ± .020)	35.5 ± 0.5 (1.398 ± .020)	35.5 ± 0.5 (1.398 ± .020)	
	Y - X MIN. MAX.	+ 1 (+ .040) + 2 (+ .080)	+ 1 (+ .040) + 2 (+ .080)	+ 1 (+ .040) + 2 (+ .080)	
Drive Belt Part Number (P/N)		414 860 700	414 860 700	417 300 067	
Drive Belt Width (new) ④ mm (in)		35.3 (1.398)	35.3 (1.398)	35.1 (1.382)	
Drive Belt Adjustment	Deflection ± 5 mm (± 13/64 in)	38 (1-1/2)	38 (1-1/2)	38 (1-1/2)	
	Force ⑤ kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)	
Track	Width cm (in)	38.1 (15)	38.1 (15)	38.1 (15)	
	Length cm (in)	307.4 (121)	307.4 (121)	307.4 (121)	
	Profile Height mm (in)	31.8 (1.25)	22.3 (.878)	22.3 (.878)	
	Adjustment	Deflection mm (in)	30 - 35 (1-3/16 - 1-3/8)	30 - 35 (1-3/16 - 1-3/8)	30 - 35 (1-3/16 - 1-3/8)
		Force ⑥ kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
Suspension Type	Track	SC-10 Cross-Country	SC-10 Cross-Country	SC-10 Cross-Country	
	Ski	ADSA	ADSA	ADSA	
Length cm (in)		275 (108.3)	275 (108.3)	275 (108.3)	
Width cm (in)		117.4 (46.2)	121.25 (47.75)	121.25 (47.75)	
Height cm (in)		95.0 (37.4)	100 (39.4)	100 (39.4)	
Ski Stance cm (in)		104.1 (41)	108 (42.5)	108 (42.5)	
Mass (dry) kg (lb)		210 (463)	216 (475)	221 (487)	
Ground Contact Area cm ² (in ²)		6671 (1034)	6671 (1034)	6671 (1034)	
Ground Contact Pressure kPa (PSI)		3.09 (.448)	3.18 (.461)	3.25 (.471)	
Frame Material		Aluminum	Aluminum	Aluminum	
Bottom Pan Material		Impact Copolymer	Impact Copolymer	Impact Copolymer	
Hood Material		RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane	
Battery V (A•h)		N.A.	N.A.	N.A.	
Headlight W		H4 60/55	H4 60/55	H4 60/55	
Taillight and Stoplight W		8/27	8/27	8/27	
Tachometer and Speedometer Bulb W		2 x 3	2 x 3	2 x 3	
Fuel and Temperature Gauge Bulb W		N.A.	N.A.	N.A.	
Fuse	Starter Solenoid A	N.A.	N.A.	N.A.	
	Tachometer A	N.A.	N.A.	N.A.	
Fuel Tank L (U.S. gal)		40 (10.6)	40 (10.6)	40 (10.6)	
Chaincase Gearbox mL (U.S. oz)		250 (8.5)	250 (8.5)	250 (8.5)	
Cooling System ⑦ L (U.S. oz)		3.3 (111.6)	3.8 (128.5)	3.8 (128.5)	
Injection Oil Reservoir L (U.S. oz)		N.A.	3.5 (118)	3.5 (118)	

VEHICLE MODEL		SUMMIT 600	SUMMIT 700	
ENGINE TYPE		593	693	
	Chain Drive Ratio	21/43	23/43	
	Chain	Pitch in	3/8	3/8
		Type/Links Qty/Plates Qty	Silent/74/13	Silent/74/13
	Drive Pulley	Type of Drive Pulley	TRA	TRA
		Ramp Identification	294 ②	297 ②
		Calibration Screw Position or Calibration Part	5	4
		Spring Color	Green/Blue	Violet/Yellow
		Spring Length ± 1.5 mm (± .060 in)	147.4 (5.80)	157.9 (6.22)
		Clutch Engagement ± 100 RPM	4200	4100
	Driven Pulley	Type of Driven Pulley	Formula	Formula
		Spring Preload ± 0.7 kg (± 1.5 lb)	7.0 (15.4)	7.0 (15.4)
		Cam Angle degree	47	47
	Pulley Distance Z mm (in)		16.5 ± 0.5 (1.65 ± .020)	16.5 ± 0.5 (1.65 ± .020)
	Offset	X mm (in)	35.5 ± 0.5 (1.398 ± .020)	35.5 ± 0.5 (1.398 ± .020)
		Y - X MIN. MAX.	+ 1 (+ .040) + 2 (+ .080)	+ 1 (+ .040) + 2 (+ .080)
	Drive Belt Part Number (P/N)		414 860 700	417 300 067
	Drive Belt Width (new) ④ mm (in)		35.3 (1.398)	35.1 (1.382)
	Drive Belt Adjustment	Deflection ± 5 mm (± 13/64 in)	38 (1-1/2)	38 (1-1/2)
		Force ⑤ kg (lbf)	11.3 (25)	11.3 (25)
	Track	Width cm (in)		38.1 (15)
		Length cm (in)		345 (136)
		Profile Height mm (in)		44.5 (1.752)
		Adjustment	Deflection mm (in)	30 - 35 (1-3/16 - 1-3/8)
Force ⑥ kg (lbf)			7.3 (16)	
Suspension Type	Track	SC-10 Mountain	SC-10 Mountain	
	Ski	ADSA	ADSA	
	Length cm (in)	294 (115.7)	294 (115.7)	
	Width cm (in)	107.3 (42.25)	107.3 (42.25)	
	Height cm (in)	113 (44.5)	113 (44.5)	
	Ski Stance cm (in)	94.0 (37.0)	94.0 (37.0)	
	Mass (dry) kg (lb)	226 (497)	226 (497)	
	Ground Contact Area cm² (in²)	7357 (1140)	7357 (1140)	
	Ground Contact Pressure kPa (PSI)	3.01 (0.436)	3.01 (.436)	
	Frame Material	Aluminum	Aluminum	
	Bottom Pan Material	Impact Copolymer	Impact Copolymer	
	Hood Material	RRIM Polyurethane	RRIM Polyurethane	
	Battery V (A•h)	N.A.	N.A.	
	Headlight W	H4 60/55	H4 60/55	
	Taillight and Stoplight W	8/27	8/27	
	Tachometer and Speedometer Bulb W	2 x 3	2 x 3	
	Fuel and Temperature Gauge Bulb W	N.A.	N.A.	
	Fuse	Starter Solenoid A	N.A.	N.A.
		Tachometer A	N.A.	N.A.
	Fuel Tank L (U.S. gal)	40 (10.6)	40 (10.6)	
	Chaincase Gearbox mL (U.S. oz)	250 (8.5)	250 (8.5)	
	Cooling System ⑦ L (U.S. oz)	4.0 (135)	4.0 (135)	
	Injection Oil Reservoir L (U.S. oz)	3.5 (118)	3.5 (118)	

ENGINE LEGEND

BTDC: Before Top Dead Center

CDI: Capacitor Discharge Ignition

CTR: Center

K: Kilo (× 1000)

MAG: Magneto Side

N.A.: Not Applicable

PTO: Power Take Off Side

- ① The maximum horsepower RPM applicable on the vehicle. It may be different under certain circumstances and **BOMBARDIER INC.** reserves the right to modify it without obligation.
- ② Crankshaft end-play is not adjustable on these models. Specification is given for verification purposes only.
- ③ At 3500 RPM with headlamp turned on.
- ④ All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.
- ⑤ Drive pulley retaining screw: torque to 90 to 100 N•m (66 to 74 lbf•ft), install drive belt, accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake; repeat 5 times. Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

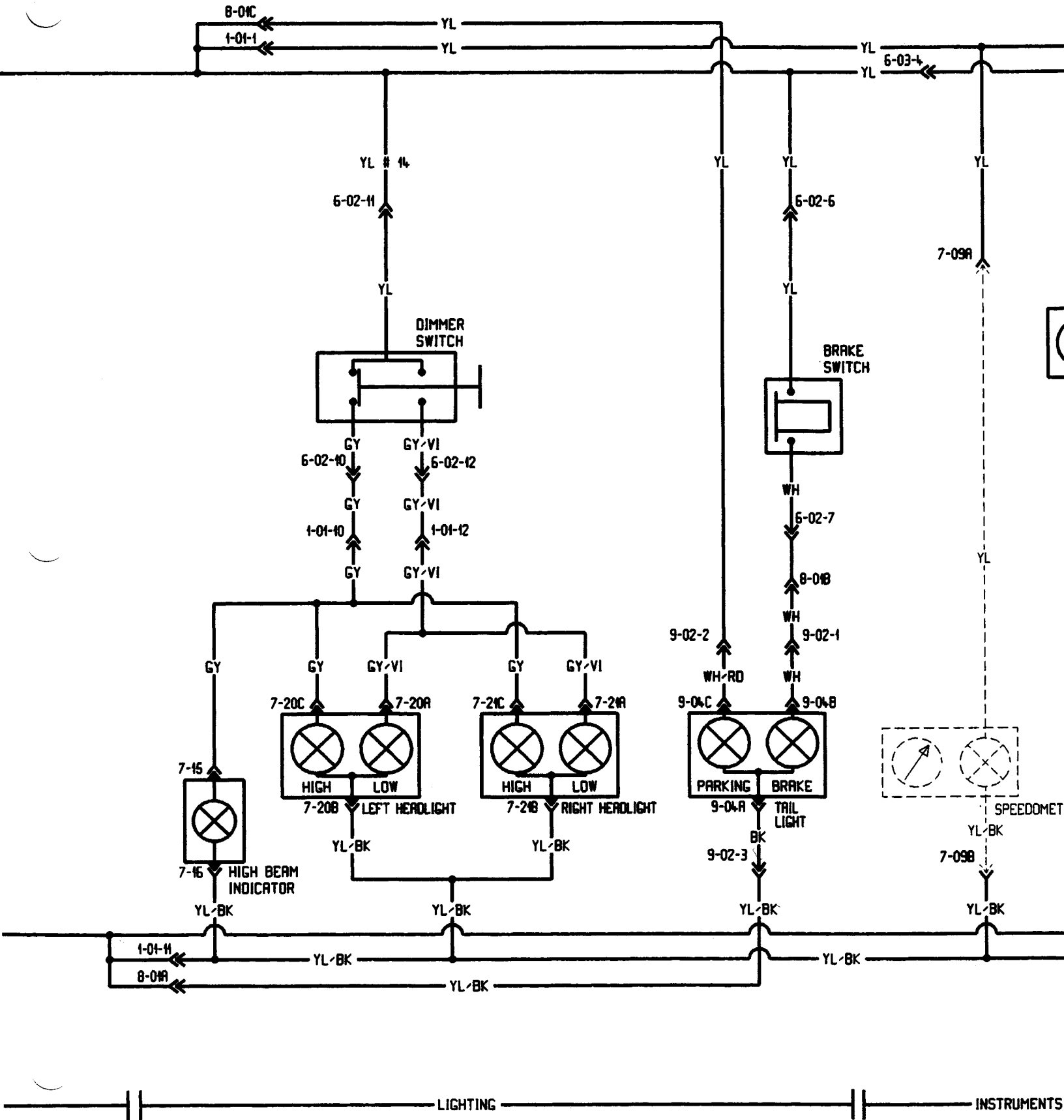
VEHICLE LEGEND

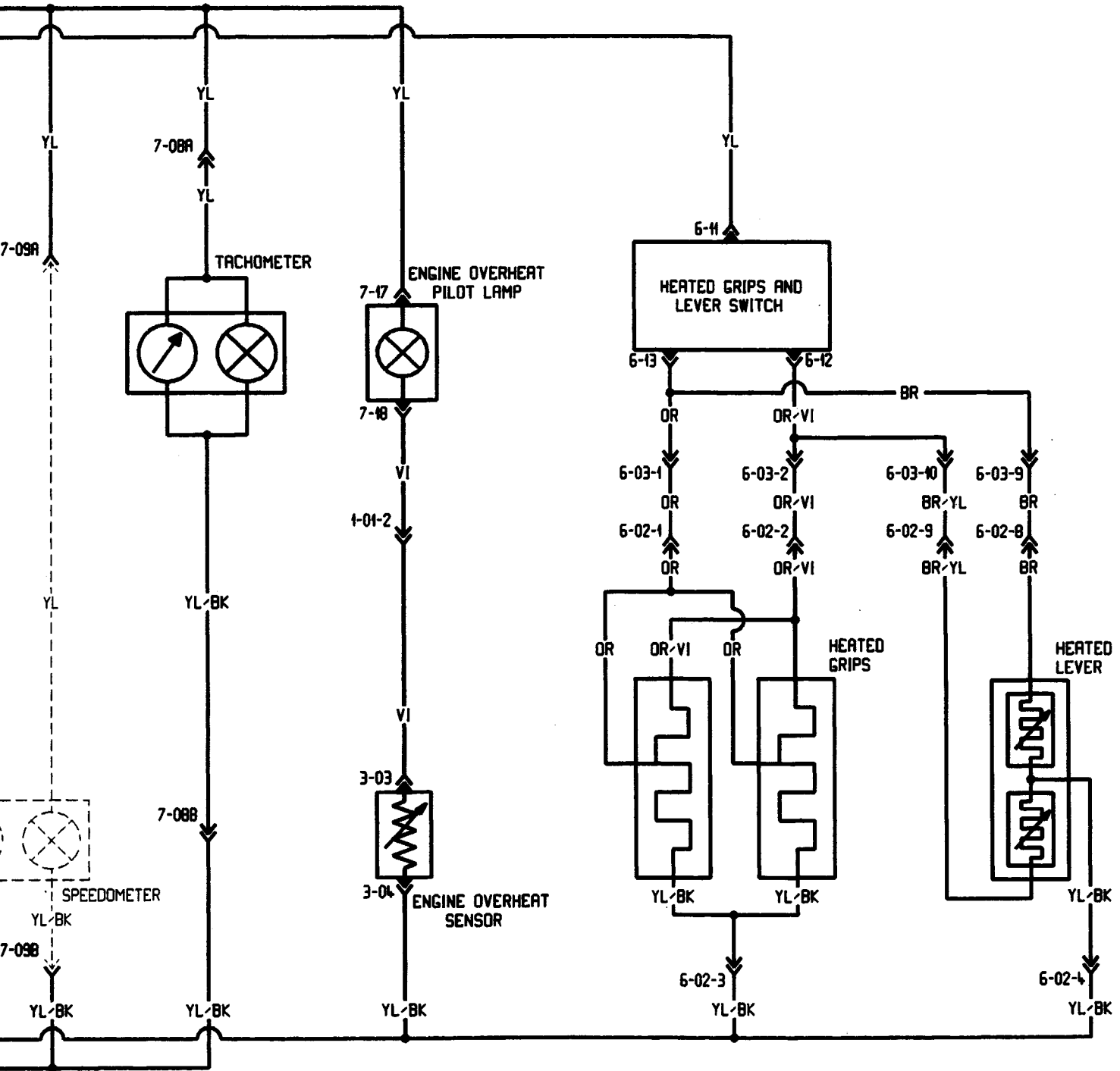
ADSA: Advanced Direct Shock Action

TRA: Total Range Adjustable

N.A.: Not Applicable

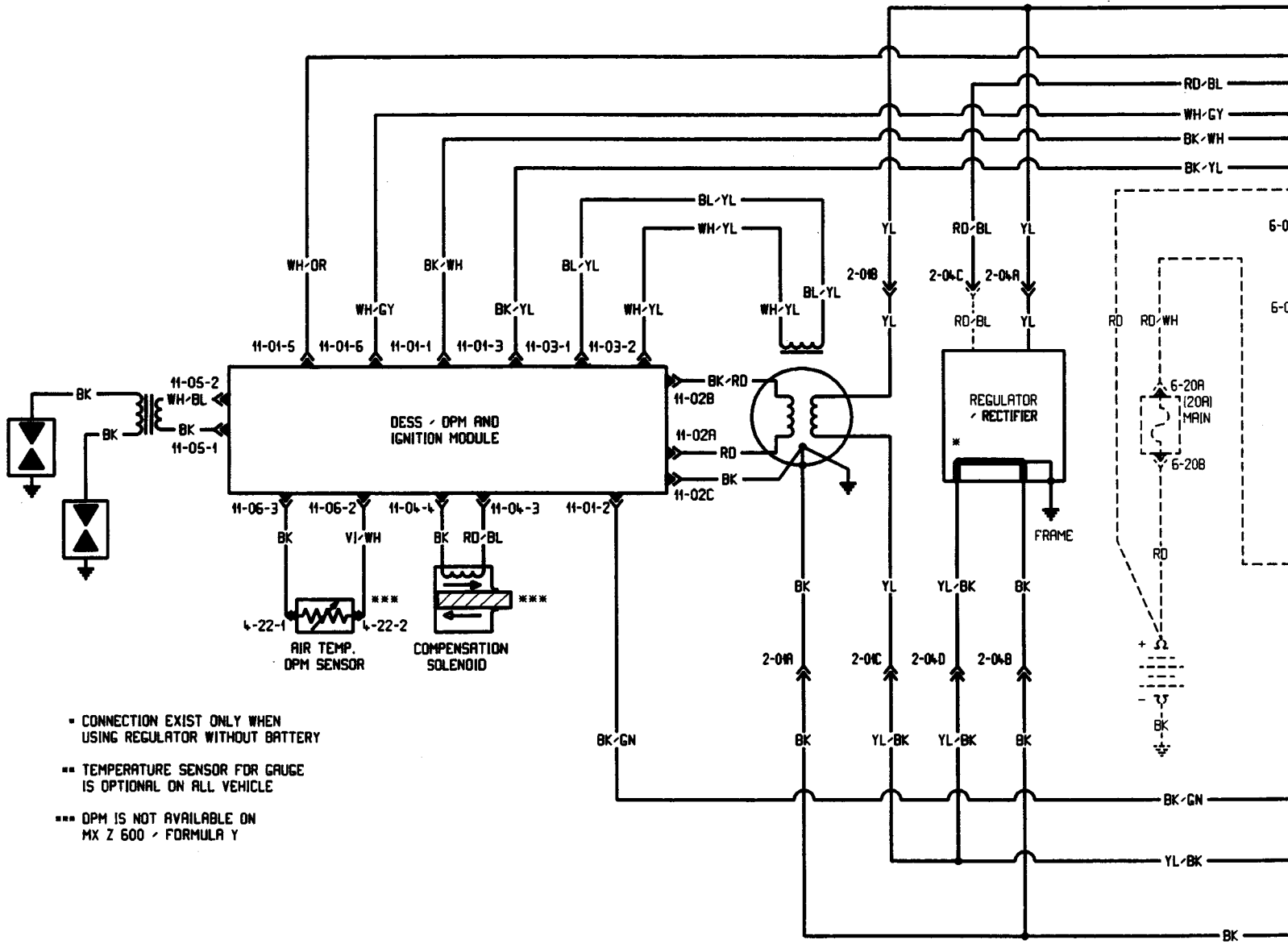
- ① Lever with solid roller pin (P/N 417 004 308).
- ② Lever with hollow roller pin (P/N 417 004 309).
- ③ Lever with threaded hollow roller pin (P/N 504 151 700) with 10.3 g.
- ④ Minimum allowable width may not be less than 3.0 mm (1/8 in) of new drive belt.
- ⑤ Force applied midway between pulleys to obtain specified tension deflection.
- ⑥ Force or downward pull applied to track to obtain specified tension deflection.
- ⑦ Coolant mixture: 60% antifreeze/40% water.





INSTRUMENTS

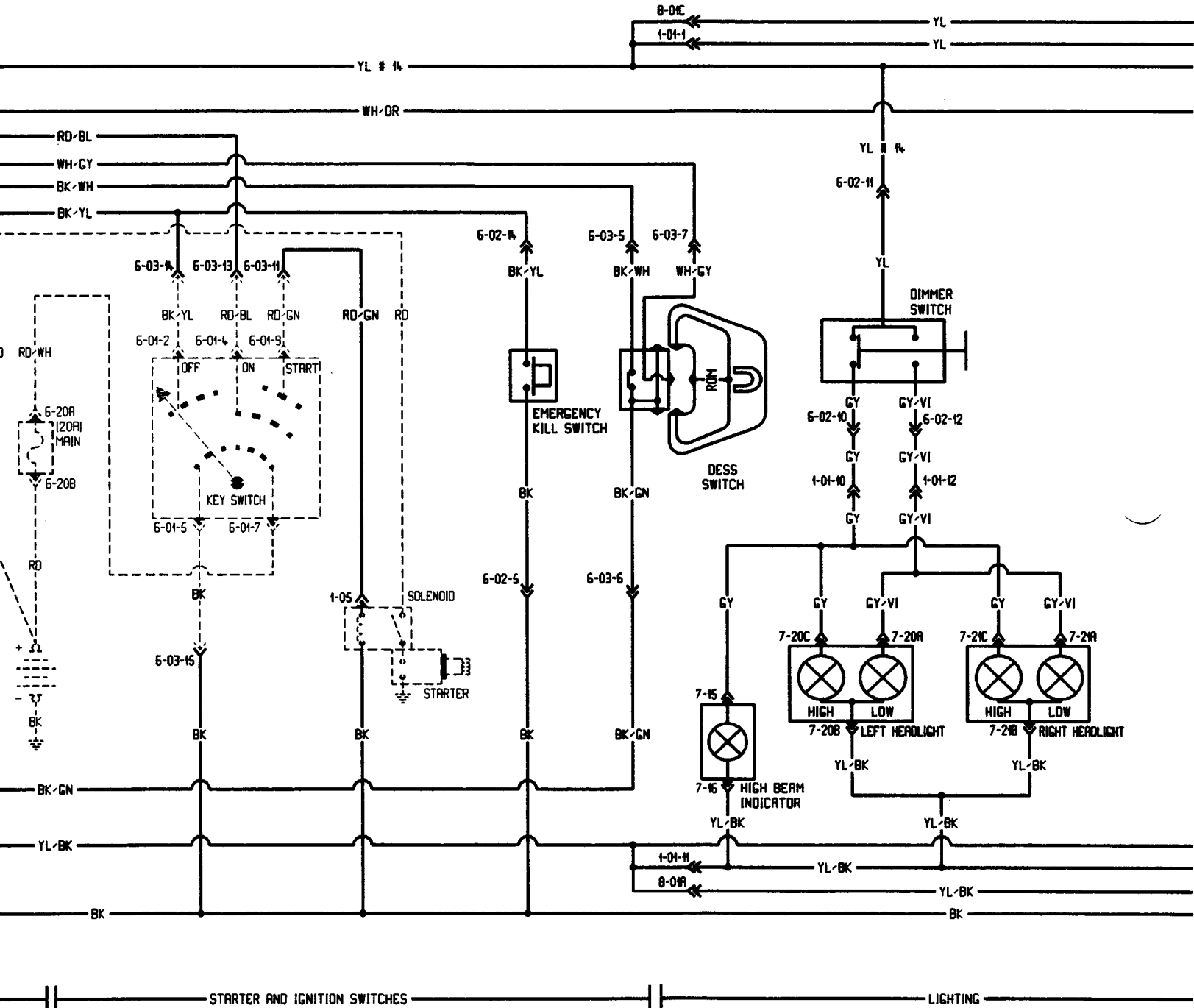
HEATING ELEMENTS

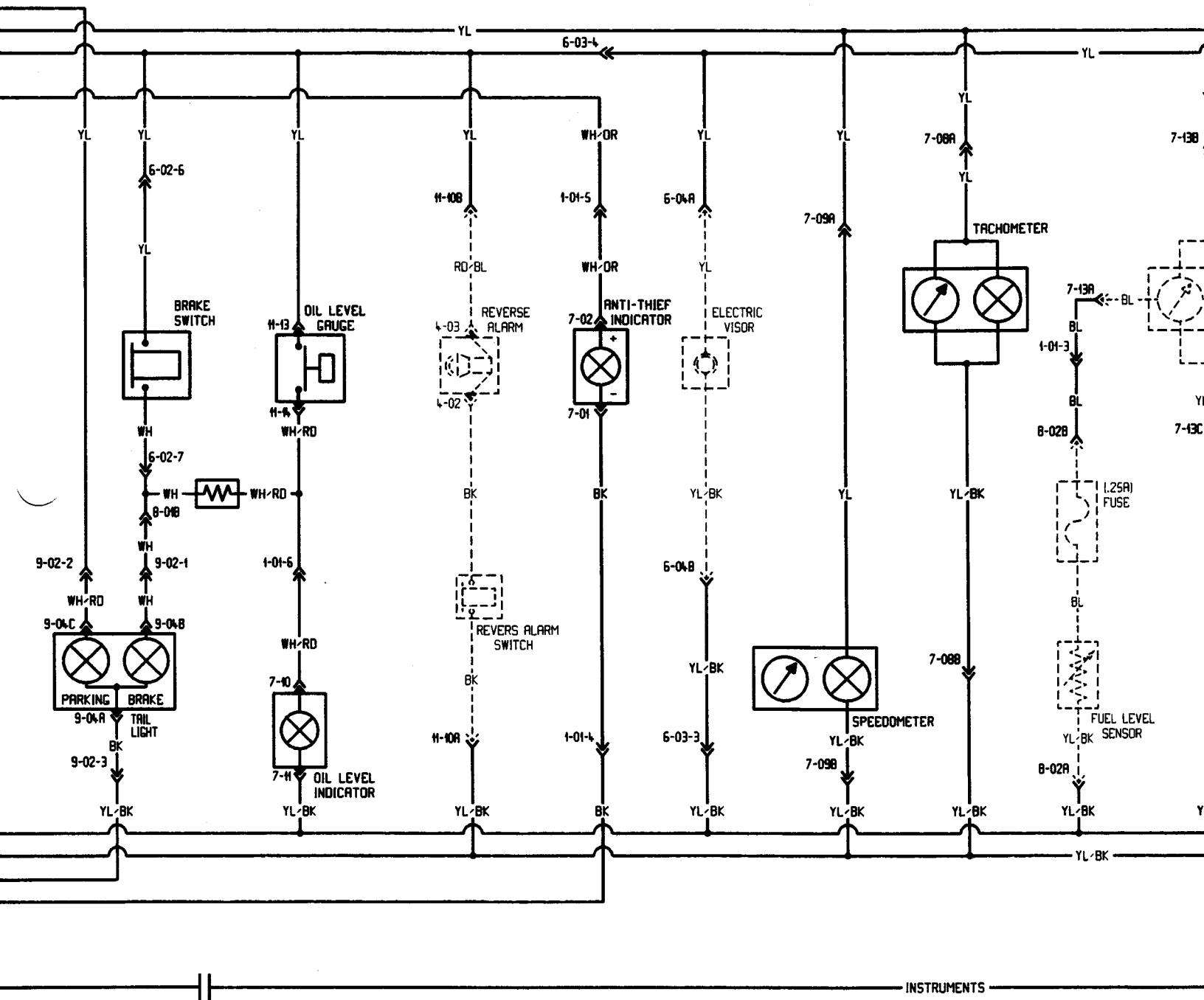


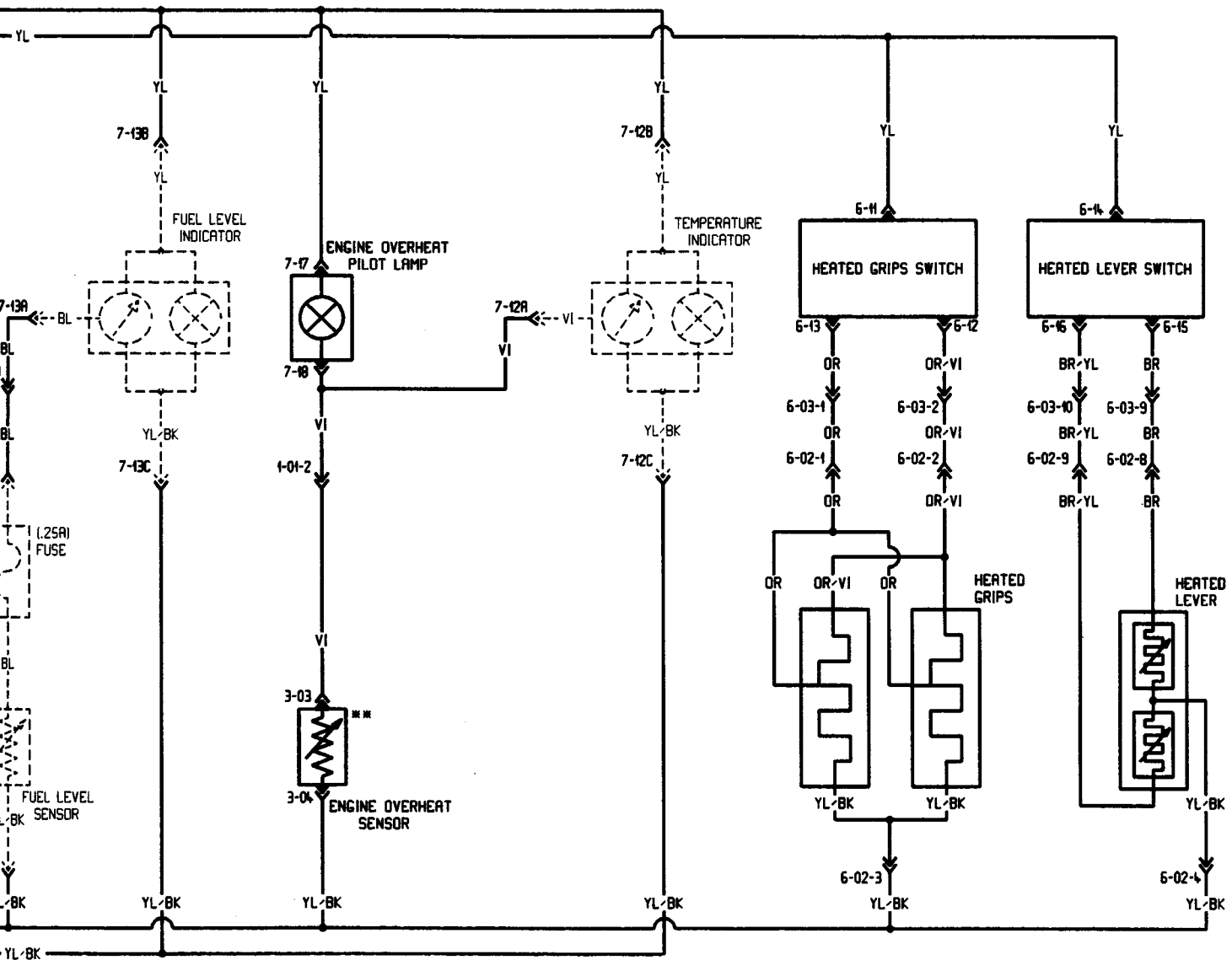
- CONNECTION EXIST ONLY WHEN USING REGULATOR WITHOUT BATTERY
- TEMPERATURE SENSOR FOR GAUGE IS OPTIONAL ON ALL VEHICLE
- OPM IS NOT AVAILABLE ON MX Z 600 / FORMULA Y

DESS / OPM AND IGNITION MODULE

POWER SUPPLY SYSTEM







HEATING ELEMENTS