INTRODUCTION

This Shop Manual covers the following BRP made 2013 snowmobiles:

CHASSIS	ENGINE
REV-XS	600 HO E-TEC
	800R E-TEC
REV-XM	600 HO E-TEC
	800R E-TEC

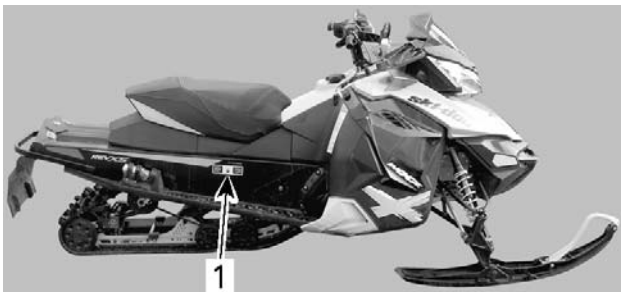
The information and component/system descriptions contained in this manual are correct at time of writing. BRP however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured.

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.

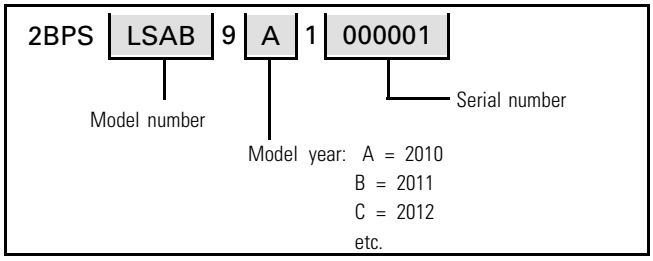
VEHICLE INFORMATION

VEHICLE IDENTIFICATION NUMBER (VIN)

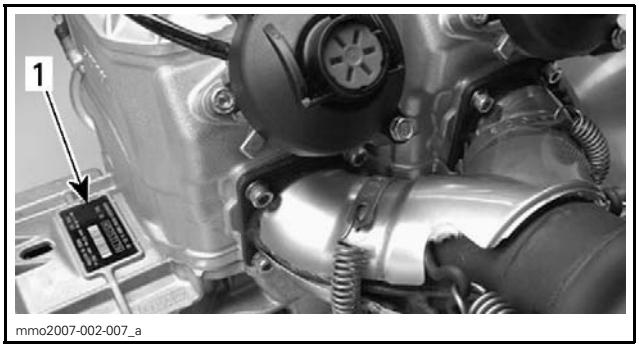


TYPICAL
1. Vehicle identification number

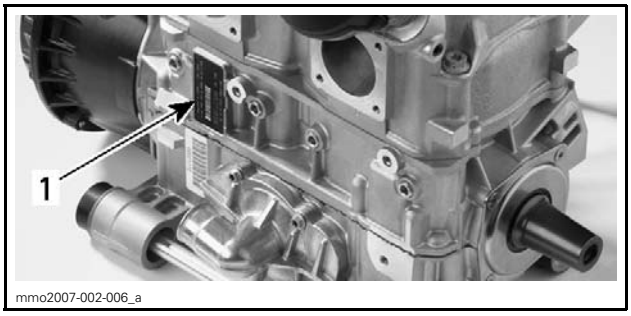
Identification Number Description



ENGINE SERIAL NUMBER



TYPICAL — 600 HO E-TEC
1. Engine serial number



TYPICAL — 800R E-TEC
1. Engine serial number

SNOWMOBILE LIFTING

To lift the snowmobile securely, it is important to use the reinforced footrest holes.

1. Reinforced holes in footrest

Install lifting tool hooks in holes as shown.

SERVICE TOOLS INDEX

COUNTERSHAFT BEARING REMOVER
(P/N 529 036 065)

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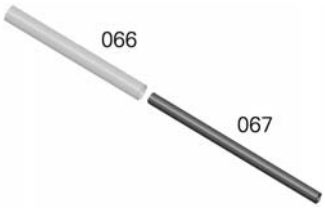
COUNTERSHAFT SUPPORT
(P/N 529 036 067)



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CRANKSHAFT BEARING PULLER
(P/N 529 036 004)

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CRANKSHAFT DISTANCE GAUGE
(P/N 529 035 968)

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CRANKSHAFT PROTECTOR (MAG)
(P/N 420 876 557)

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CRANKSHAFT PROTECTOR (PTO)
(P/N 420 876 552)

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CRIMPING TOOL (HEAVY GAUGE WIRE)
(P/N 529 035 730)

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CRIMPING TOOL (KOSTAL)
(P/N 529 035 909)

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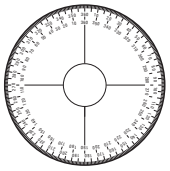
DEGREE WHEEL
(P/N 529 035 607)



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DIAL INDICATOR ADAPTER
(P/N 529 036 132)

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DISTANCE GAUGE
(P/N 529 036 060)

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DRIVE PULLEY HOLDER
(P/N 529 035 674)

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DRIVE PULLEY PULLER
(P/N 529 000 064)

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DRIVEN PULLEY SPRING COMPRESSOR
(P/N 529 036 182)

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ENGINE LIFTING HOOK
(P/N 529 035 829)

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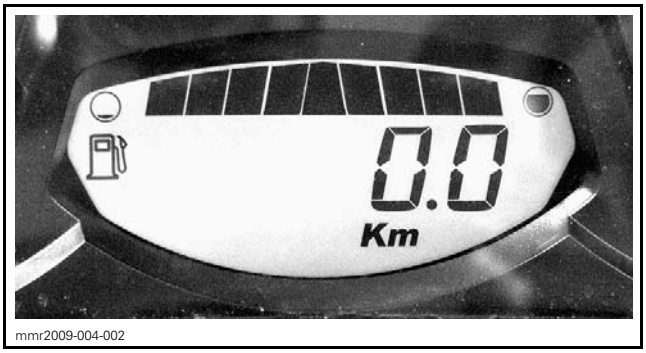

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NOTE: The storage mode does not function in other modes (trip A, trip B and hr trip).

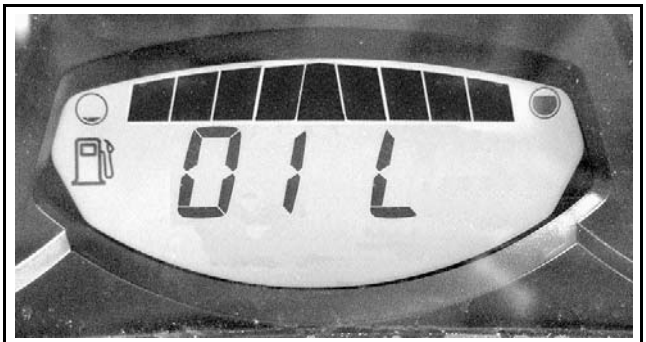
4. Repeatedly depress the HI/LOW beam switch rapidly, then, **while doing this**, press and hold the **SET button** until PUSH S appears on the display.

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.



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Do not touch anything during engine lubrication cycle.

The engine lubrication function takes approximately 1 minute. During this time, engine RPM will increase slightly to approximately 1600 RPM 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.**

ENGINE (COOLING SYSTEM)

⚠ WARNING

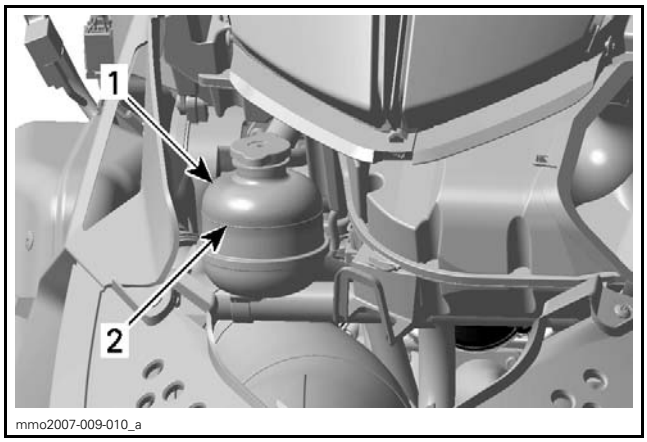
Never open coolant tank cap when engine is hot.

Engine Coolant Level Verification

Break-In	Scheduled Maintenance	Storage	Preseason
✔			

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.



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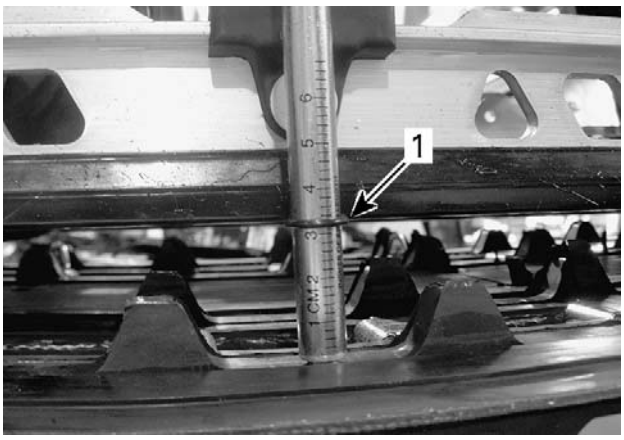
TYPICAL
1. Coolant tank
2. COLD LEVEL line

Engine Coolant Strength Verification

Break-In	Scheduled Maintenance	Storage	Preseason
			✔

Remove pressure cap.

Use an antifreeze tester to test coolant strength.



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1. Deflection O-ring aligned with slider shoe

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

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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)

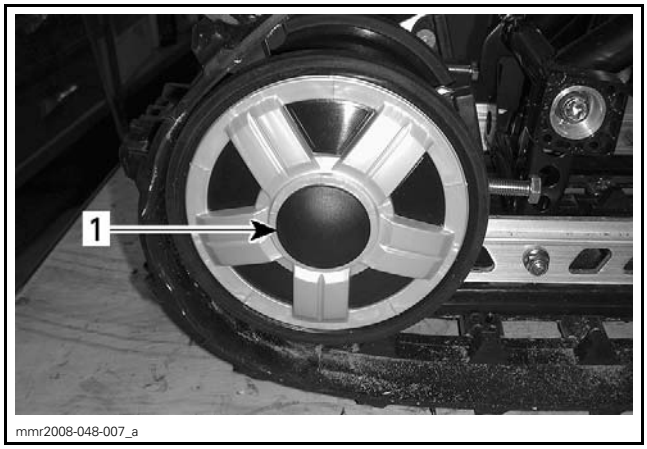
9. If load reading is not in accordance with the specification, adjust track tension. Refer to *TRACK TENSION ADJUSTMENT*.

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

Track Tension Adjustment

NOTE: After track tension adjustment, ride the snowmobile in snow about 15 to 20 minutes and recheck track tension.

1. Lift rear of vehicle and support it off the ground.
2. Remove rear idler wheel caps.



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1. RH rear idler wheel cap

3. Loosen rear axle screws (one each side).

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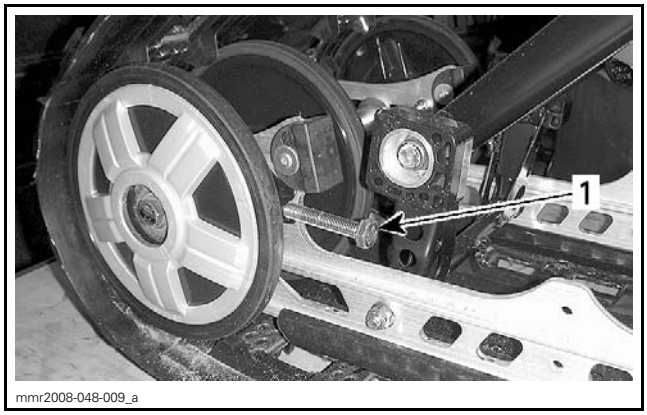
1. RH rear axle screw

4. Tighten or loosen both adjustment screws to increase or decrease track tension.



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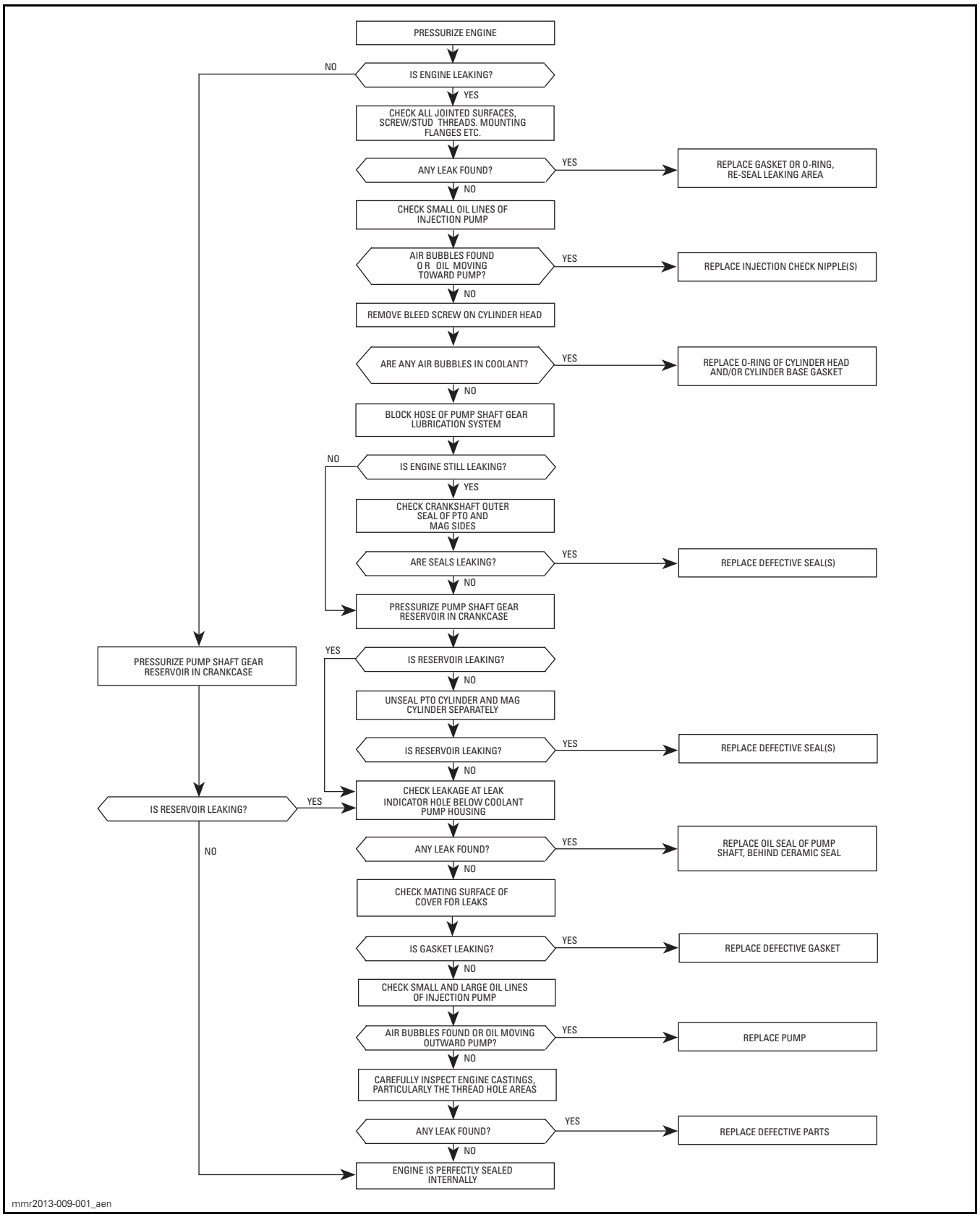
1. RH adjustment screw

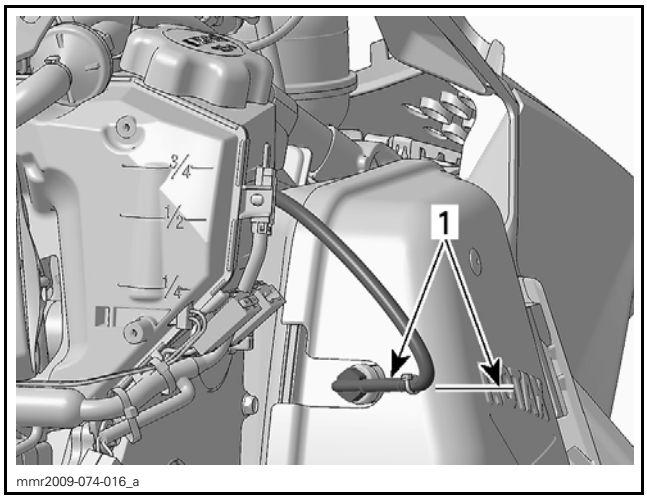
5. Verify track tension, refer to *TRACK TENSION VERIFICATION*.
6. Ensure track is properly aligned, refer to *TRACK ALIGNMENT*.

PROCEDURES

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



NOTICE Do not use the sensor if it was dropped and never use an impact wrench to install it.



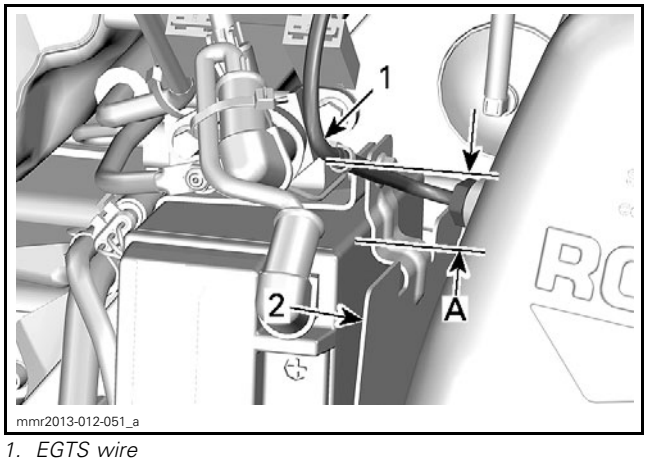
1. EGTS sensor positioned horizontally

6. Tighten EGTS sensor to specification while holding sensor to prevent turning.

EGTS SENSOR TORQUE
45 N•m (33 lbf•ft)

7. Install muffler as the reverse of removal.

NOTICE Make sure the positive battery cable is not in contact with the EGTS wire.



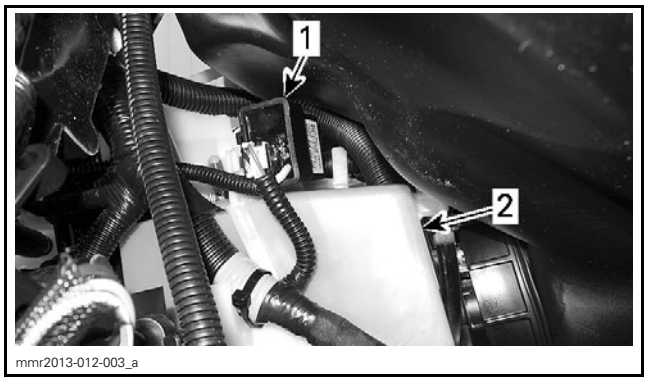
1. EGTS wire
2. Battery support
A. 30 mm (1-3/16 in)

8. Connect EGTS sensor connector.
9. Install RH side panel.

800R E-TEC

NOTE: EGTS sensor, tuned pipe temperature sensor (if so equipped) and THCM module must be replaced as an assembly.

1. Remove the primary air intake silencer, refer to *AIR INTAKE SYSTEM*.
2. Unclip THCM module from oil injection tank.



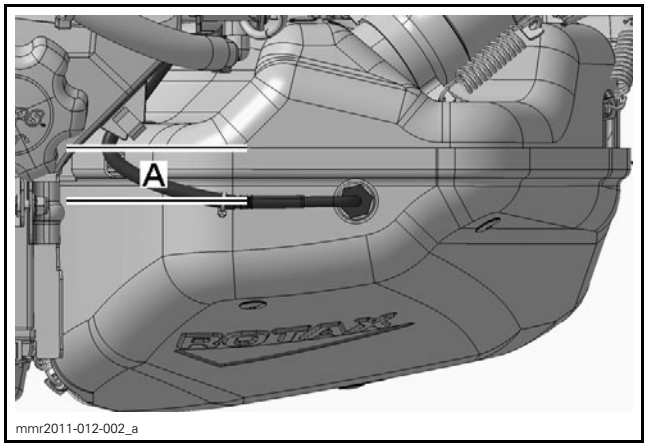
1. THCM module
2. Oil injection tank

3. Remove EGTS sensor from muffler.

NOTE: On **Renegade Back Country X and Summit**, unscrew the tuned pipe temperature sensor from the tuned pipe. Both sensors must be replaced at the same time with the THCM module.

4. Install **NEW** EGTS sensor in the following specific position for optimum efficiency.

NOTICE Do not use an impact wrench for installation or if it was dropped.

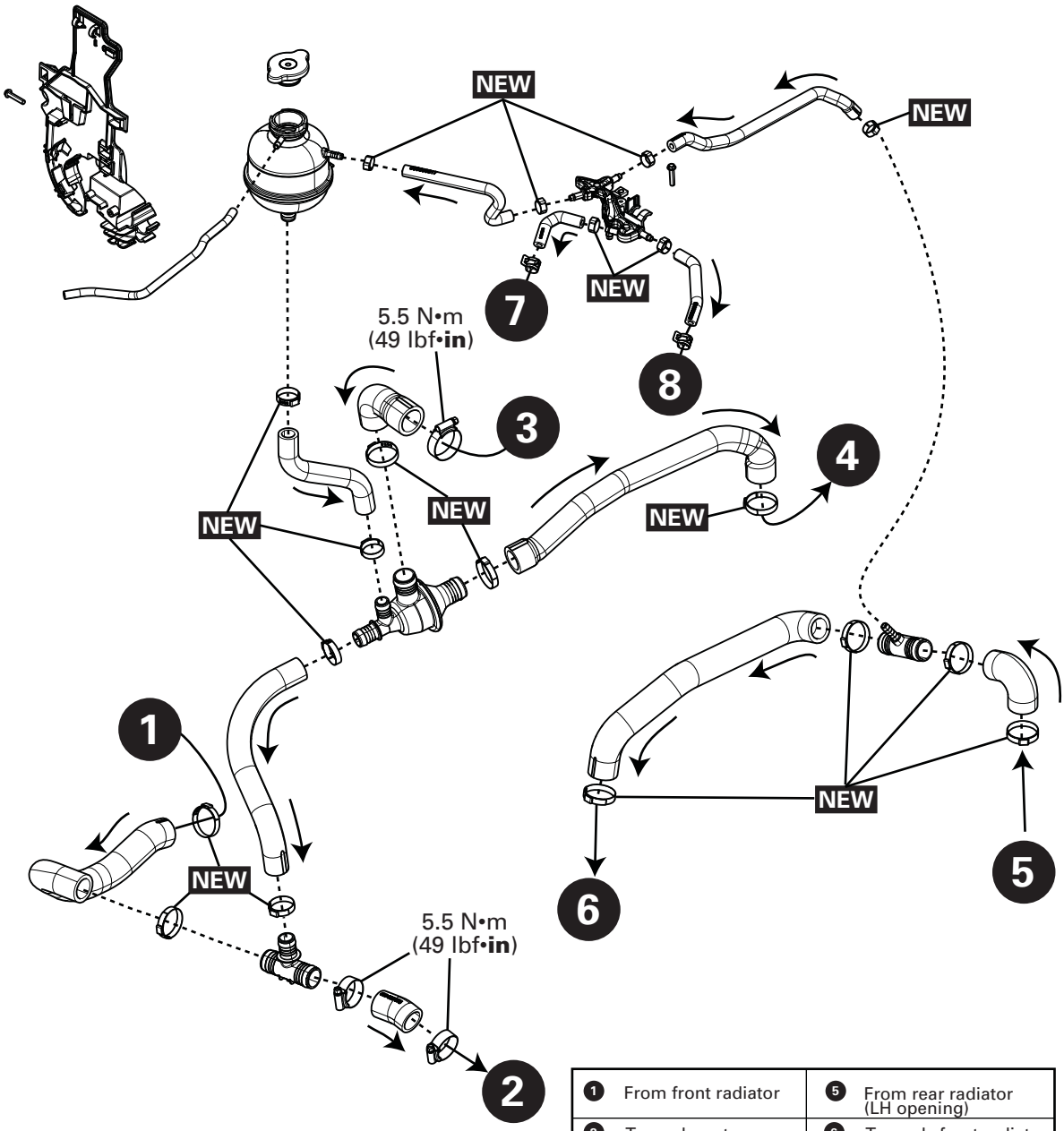


A. EGTS sensor positioned parallel with muffler seam

5. Tighten EGTS sensor to specification while holding sensor to prevent turning.

TIGHTENING TORQUE	
EGTS sensor	45 N•m (33 lbf•ft)

6. Install muffler as the reverse of removal.



1	From front radiator	5	From rear radiator (LH opening)
2	Towards water pump	6	Towards front radiator
3	From cylinder head	7	Towards cylinder head (MAG side)
4	Towards rear radiator (RH opening)	8	Towards cylinder head (PTO side)

NEW = Component must be replaced when removed.

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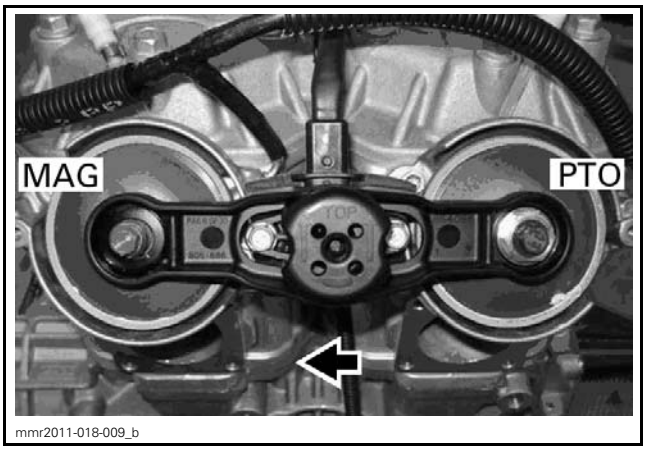

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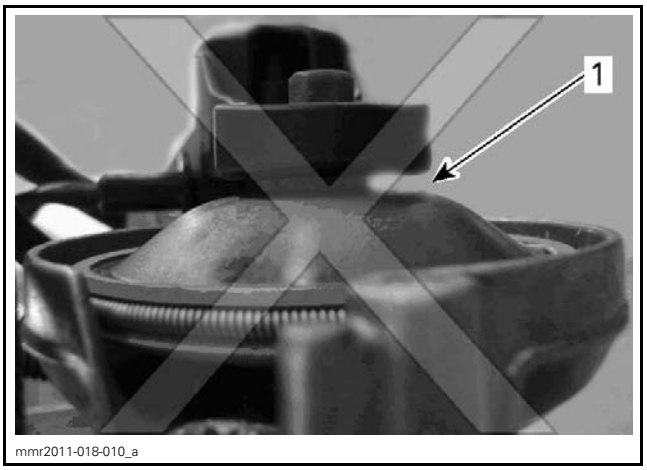
5. Check if a gap is visible between MAG valve piston and link bar.



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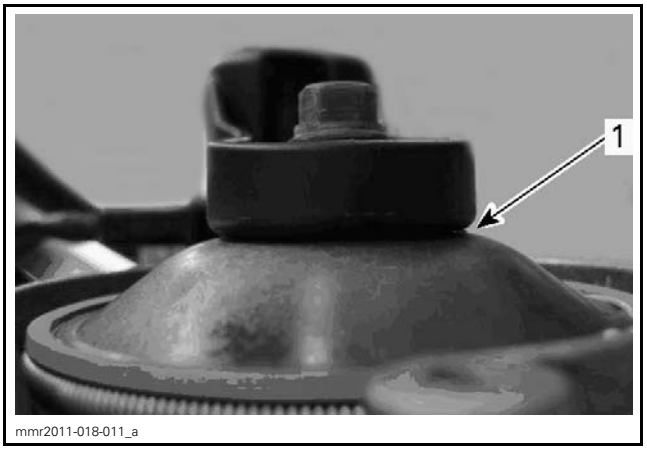
WRONG ADJUSTMENT
1. Gap on MAG side



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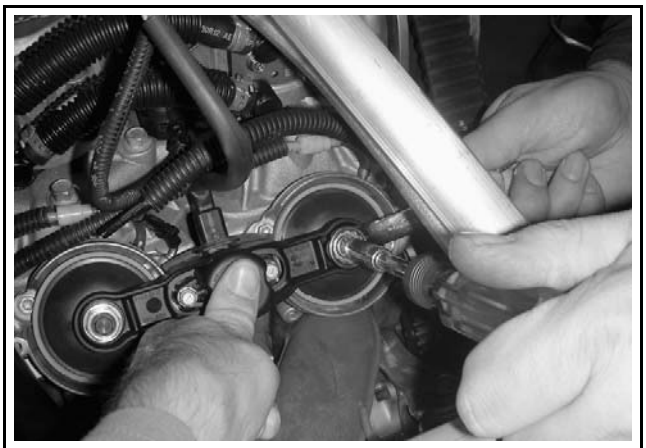
CORRECT ADJUSTMENT
1. No gap on MAG side

6. If a gap is visible:
   - 6.1 Unscrew PTO nut then slightly move link bar toward PTO side.
   - 6.2 Tighten PTO nut by hand and recheck gap.
   - 6.3 Repeat above sequence until no gap is visible.
7. Push the center of link bar downwards in order to seat both RAVE valves on their fully closed position.
8. Firmly hold link bar downwards.
9. Tighten both retaining nuts while holding RAVE valve pistons with a wrench.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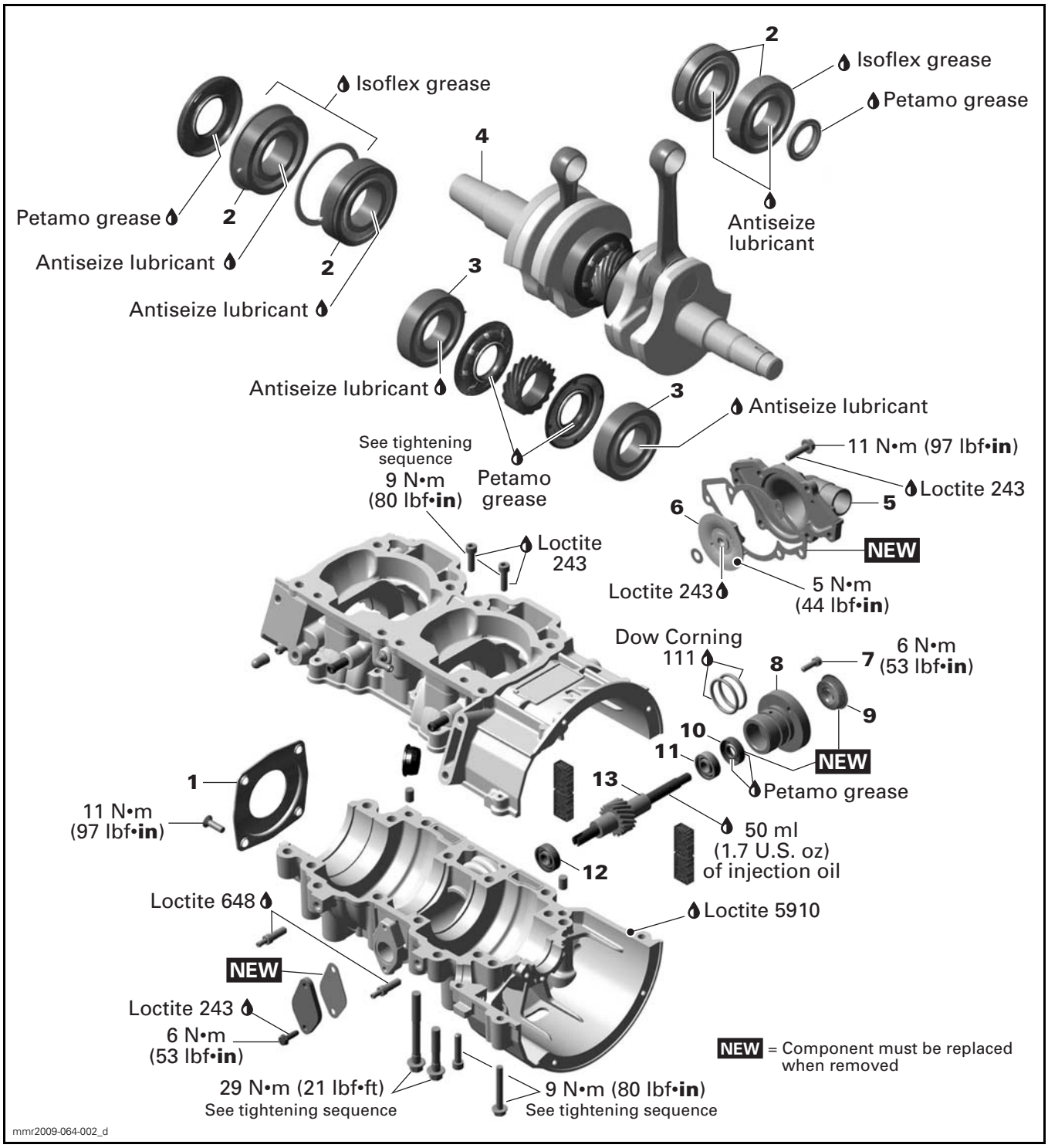
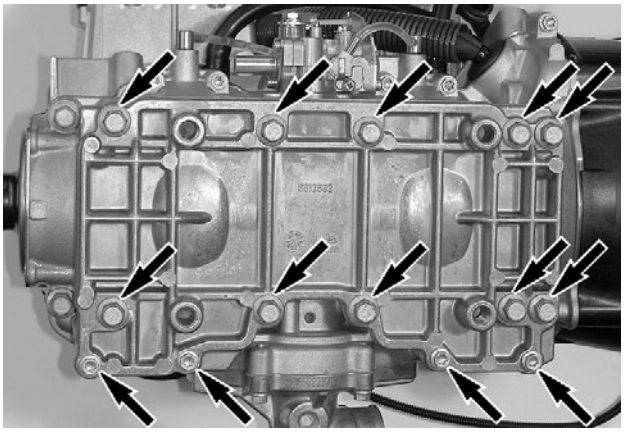
NOTICE To prevent RAVE valve piston breakage, proceed with care and make sure piston does not turn to avoid inducing torsional force to piston rods.

10. Adjust position sensor using B.U.D.S. Refer to *3D RAVE VALVES POSITION SENSOR SETTING*.

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, repeat the *ADJUSTMENT PROCEDURE*.
2. With B.U.D.S., check position sensor voltage as follows:
   - 2.1 Difference from fully opened to mid position.
   - 2.2 Difference from closed to mid position.
   - 2.3 Confirm that voltage is within **0.15 volts**.
   - 2.4 If out of specification, repeat the *ADJUSTMENT PROCEDURE*.


2
Isoflex grease
Petamo grease
Isoflex grease
4
Petamo grease
2
Antiseize lubricant
Antiseize lubricant
2
Antiseize lubricant
3
Antiseize lubricant
3
Antiseize lubricant
See tightening sequence
9 N•m (80 lbf•in)
Petamo grease
11 N•m (97 lbf•in)
Loctite 243
5
6
NEW
Loctite 243
Loctite 243
5 N•m (44 lbf•in)
Dow Corning 111
8
7
6 N•m (53 lbf•in)
9
10
11
NEW
Petamo grease
1
13
11 N•m (97 lbf•in)
50 ml (1.7 U.S. oz) of injection oil
12
Loctite 648
Loctite 5910
NEW
Loctite 243
6 N•m (53 lbf•in)
NEW = Component must be replaced when removed
29 N•m (21 lbf•ft)
See tightening sequence
9 N•m (80 lbf•in)
See tightening sequence
mmr2009-064-002_d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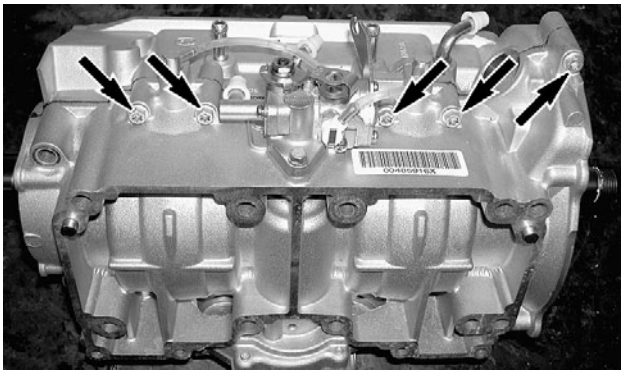
TYPICAL - BASE PLATE RETAINING SCREWS

NOTICE Whenever base plate is removed, crankcase must be opened, cleaned, and re-sealed.

Remove engine front supports.

Remove crankcase screws.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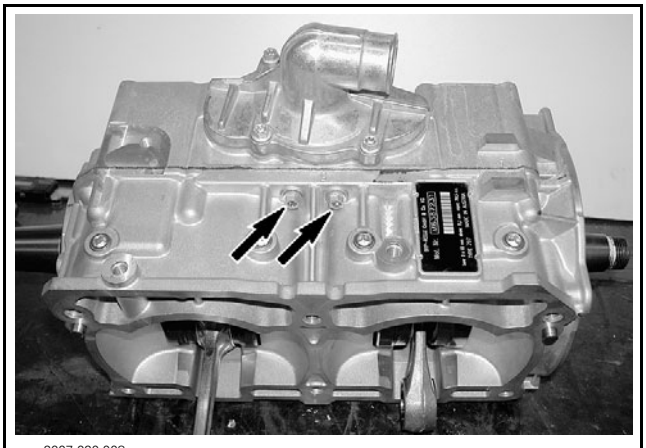
CRANKCASE SCREWS - OIL INJECTION PUMP SIDE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TYPICAL - CRANKCASE SCREWS - WATER PUMP SIDE

Split crankcase.

NOTE: To prevent damage to crankcase mating surfaces, use prying lugs to "unstick" crankcase.


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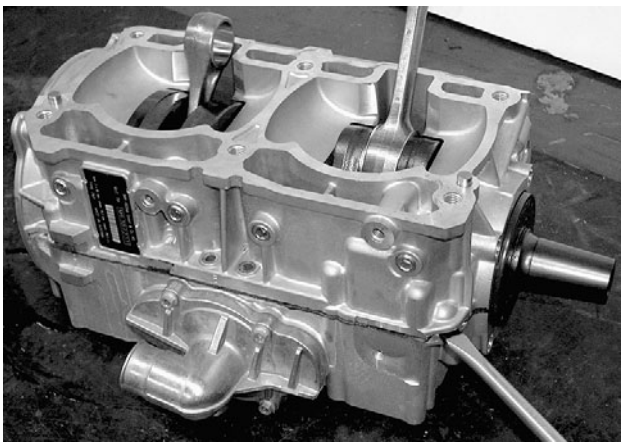
PRYING LUGS


mmr2007-020-005

PRYING LUGS

Remove crankshaft assembly.

Crankcase Cleaning

Clean all metal components in a non-ferrous metal cleaner. Use LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500) accordingly.

NOTICE Never use a sharp object to remove sealant as score marks incurred are harmful to crankcase sealing.

Crankcase Inspection

Check crankcase for cracks or other damages. Replace if necessary.

Crankcase Assembly

Install crankshaft in lower crankcase. See *CRANKSHAFT* for procedure.

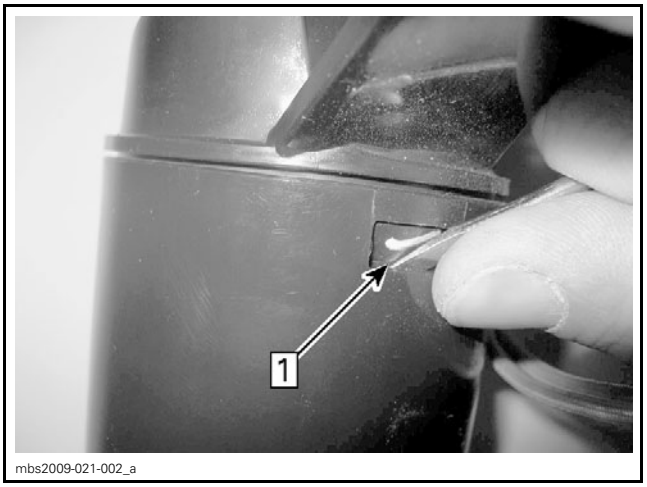
Apply LOCTITE 5910 (P/N 293 800 081) on crankcase halves as per following procedure.

NOTE: The total assembly sequence, including sealing compound application and crankcase torquing, must be performed within 10 minutes.

1. Rear pickup hose

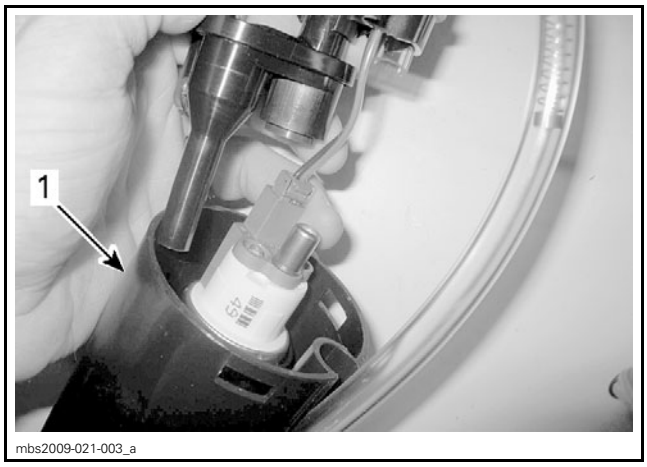
3. Unlock sump tank by carefully inserting a small screwdriver between the tab and the sump tank.

NOTICE Be careful not to damage tabs while pushing them.

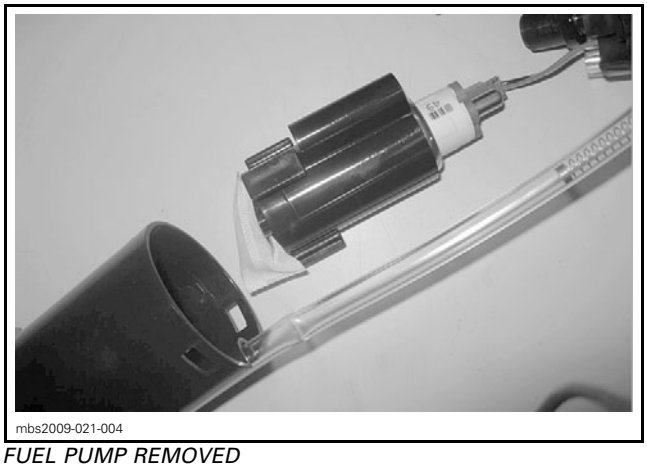


Step 1: Insert screwdriver between tab and sump tank

4. Completely remove sump tank from pump by pulling it carefully.

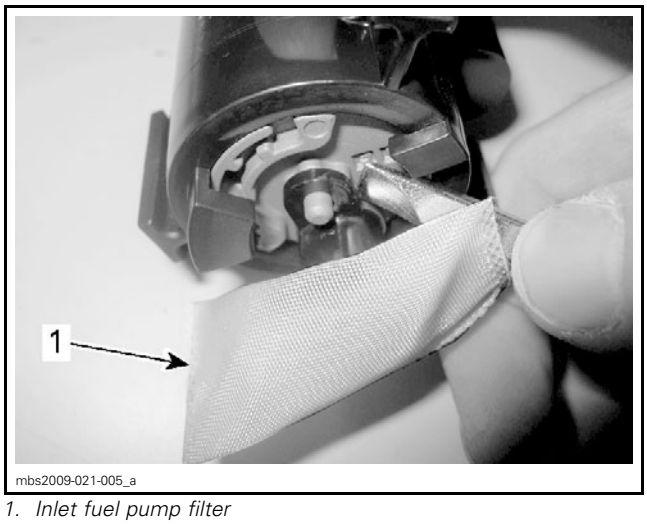


1. Sump tank



FUEL PUMP REMOVED

5. Remove inlet fuel pump filter using a small screwdriver.



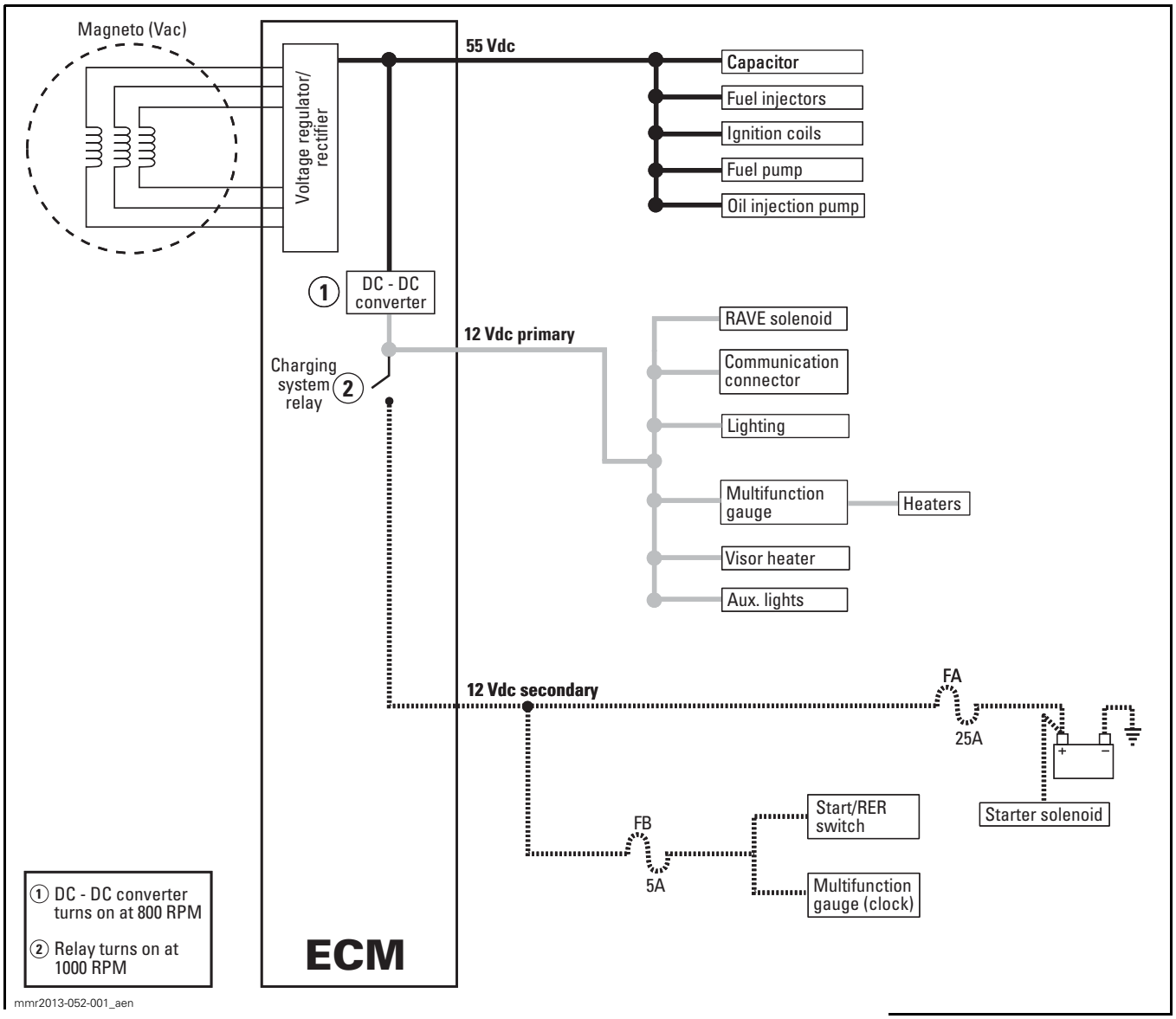
1. Inlet fuel pump filter

6. Discard inlet fuel pump filter and steel ring.
7. Install NEW steel ring on NEW inlet filter.

POWER DISTRIBUTION

GENERAL

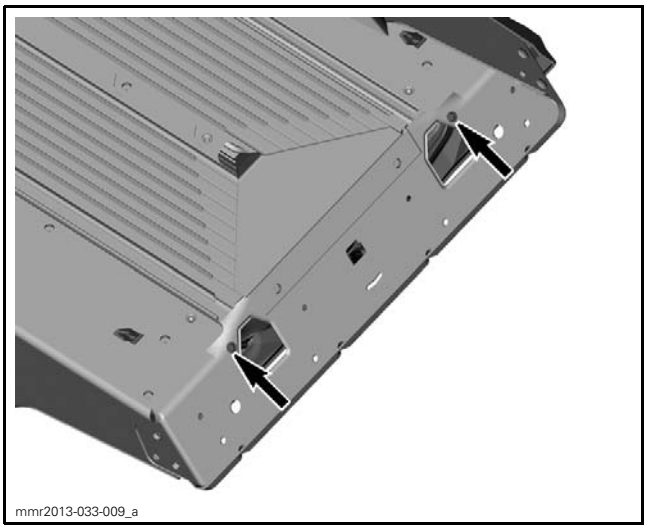
OVERVIEW



TAILLIGHT

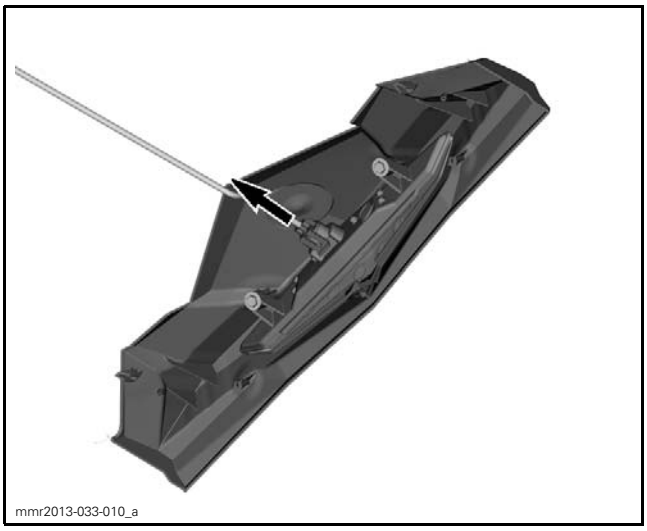
Taillight Replacement

Remove both retaining bolts securing rear taillight to frame.



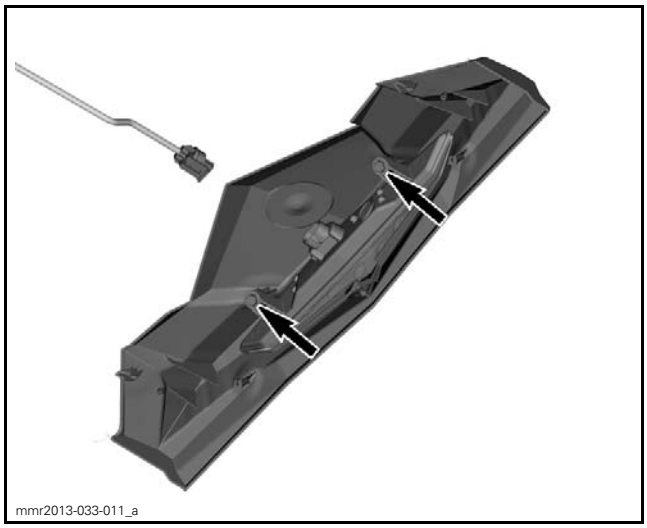
RETAINING BOLTS LOCATION - VIEWED FROM UNDER

Pull rear taillight support out of location and disconnect taillight connector.



TAILLIGHT CONNECTOR DISCONNECTION

Remove both retaining screws securing taillight to taillight support.



RETAINING BOLTS SECURING TAILLIGHT TO TAILLIGHT SUPPORT

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

Gauge Self Test Function

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, proceed with the *GAUGE POWER INPUT TEST*.

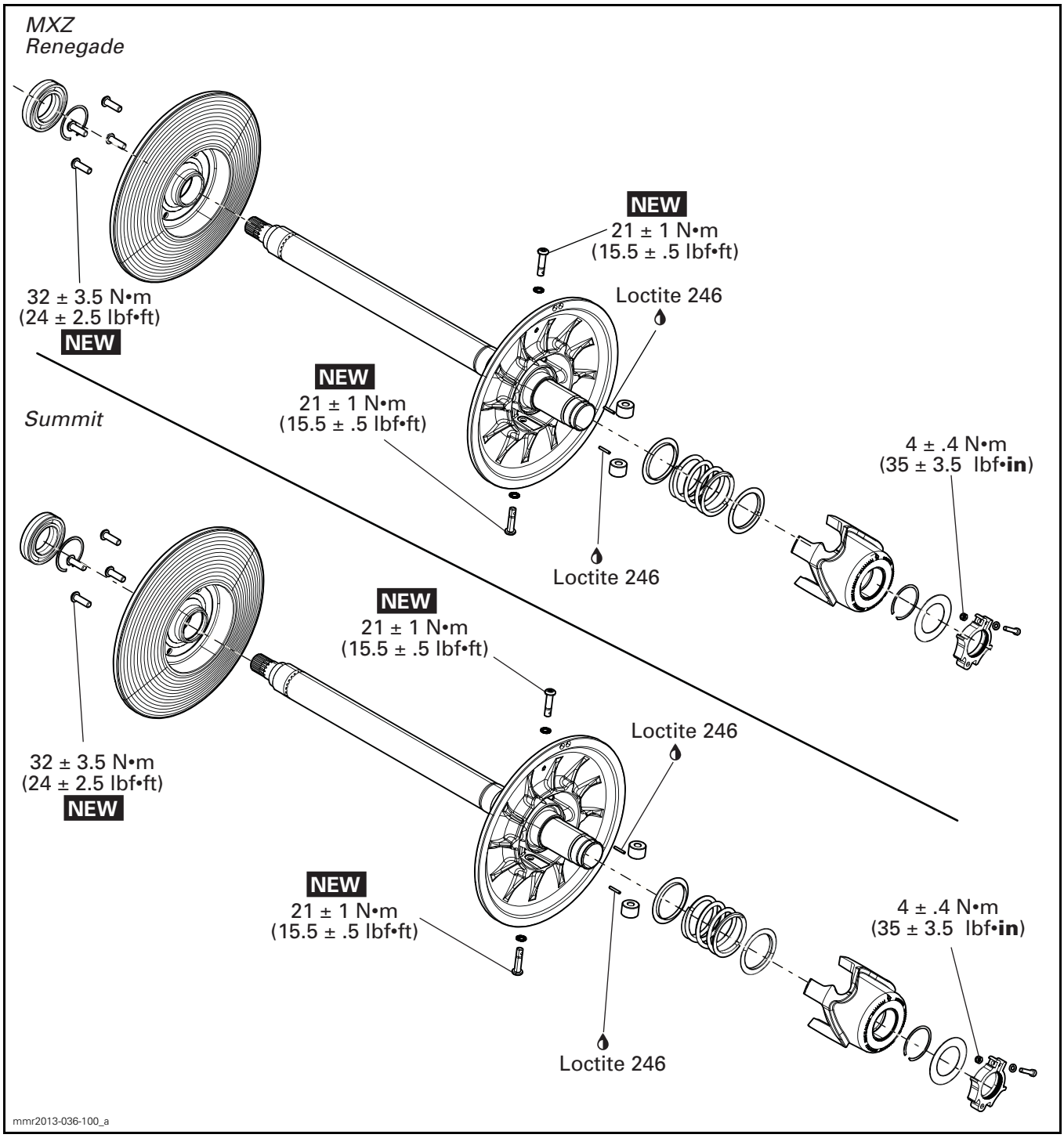
Gauge Setup

Clock Activation (Premium Gauge)

The gauge has an internal clock that can display the time of day in the lower digital display (when selected).

This clock requires power from the vehicle battery to maintain the proper time of day.

DRIVEN PULLEY



Track Removal

Remove rear suspension from vehicle. Refer to *REAR SUSPENSION*.

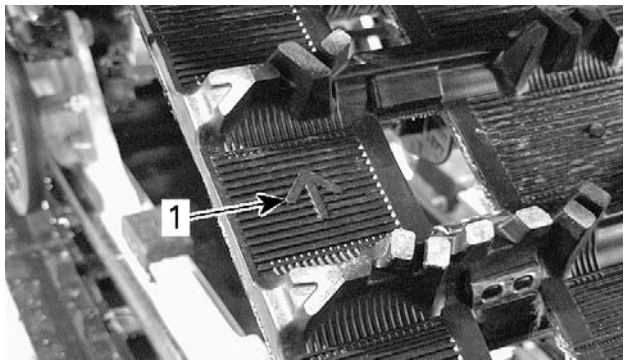
Remove drive axle, refer to *DRIVE AXLE* subsection.

Remove track.

Track Installation

Reverse the removal procedure.

NOTE: When installing the track, respect rotation direction indicated by an arrow on track thread.



1. Arrow pointing forwards

Track Adjustment and Alignment

Refer to *PERIODIC MAINTENANCE PROCEDURE* subsection to adjust and align the track.

TRACTION ENHANCING PRODUCTS (STUDS)

Important Safety Rules

All REV-XS tracks use special single ply of fabric track to reduce weight and rolling resistance. The conventional track design is a 2 layers of fabric and one layer of high strength tensile cord. These new tracks design is a single layer of fabric and one layer of tensile cord. This results in a thinner track and if studded, absolutely requires the use of the 286 Phantom series designed studs.

⚠ WARNING

REV-XS require special studs. Use only the 286 Phantom series studs and support plates on these tracks. The use of other kinds of studs on these tracks may cause risks of injuries.

⚠ WARNING

Installing an incorrect number of studs or an improper installation could reduce the track life and possibly resulting in serious injury or death.

⚠ 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, possibly resulting in serious injury or death. Approved tracks can be identified by a stud symbol molded into the track surface.**
- **Studs should only be installed in the locations indicated by molded bulges in the track surface.**
- **Never stud a track with a profile of 35 mm (1.378 in) or more.**
- **The maximum allowable stud penetration range is 6.4 mm to 9.5 mm (1/4 in to 3/8 in).**
- **The number of studs installed must match the number of molded bulges in the track.**
- **Strictly adhere to the specified tightening torque.**

⚠ 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.**
- **When the track is raised off the ground, only run it at 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.

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 lining, bearings, chain, and chaincase sprockets, and on approved studded tracks, shorten track life. For this reason, it is even more