



SEA-DOO®



ENGINE Shop Manual

Watercraft and
Sport Boats

2005 **ROTAX®**
1503 4-TEC™
Engines



2005
Engine Shop Manual

ROTAX® 1503 4-TEC
ENGINES

SEA-DOO®



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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair the Rotax® 1503 4-TEC engines. This edition was primarily published to be used by technicians who are already familiar with all service procedures relating to BRP products. Mechanical technicians should attend training courses given by BRP Training Dept.

Please note that the instructions will apply only if proper hand tools and special service tools are used. This *ENGINE SHOP MANUAL* uses technical terms which may be slightly different from the ones used in the *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 time of writing. Service and Warranty Bulletins may be published to update the content of this manual. Make sure to read and understand these.

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

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

The engine identified in this document should not be utilized on product(s) other than those for which it was designed.

WARNING

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

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 engine 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.

BRP 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 engine illegal under existing federal, provincial and state regulations.

INTRODUCTION

INTRODUCTION

GENERAL INFORMATION

This *ENGINE SHOP MANUAL* covers the Rotax 1503 4-TEC engine. It should be used in conjunction with the appropriate *VEHICLE SHOP MANUAL*.

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.

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

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

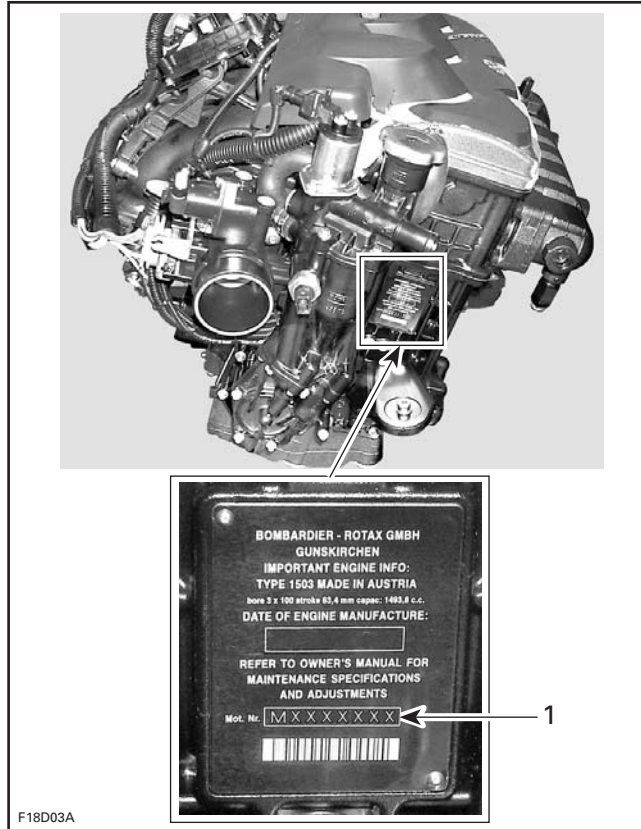
When ordering parts always refer to the specific model *PARTS CATALOGS*.

ENGINE EMISSIONS INFORMATION

Refer to the appropriate *VEHICLE SHOP MANUAL*.

ENGINE IDENTIFICATION NUMBER (E.I.N.)

The Engine Identification Number is located on front end of the engine.



1. Engine Identification Number (E.I.N.)

TIGHTENING TORQUES

Tighten fasteners to torque mentioned in exploded views and/or text.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to. Locking devices (ex.: locking tabs, elastic stop nuts, self-locking fasteners, etc.) must be installed or replaced with new ones, where specified. If the efficiency of a locking device is impaired, it must be renewed.

ARRANGEMENT OF THIS MANUAL, ILLUSTRATIONS AND PROCEDURES

The manual is divided into many major sections as you can see in the main table of contents at the beginning of the manual.

Several sections are divided in various subsections. There is a table of contents at the beginning of many sections.

The illustrations show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown, however, they represent parts which have the same or a similar function.

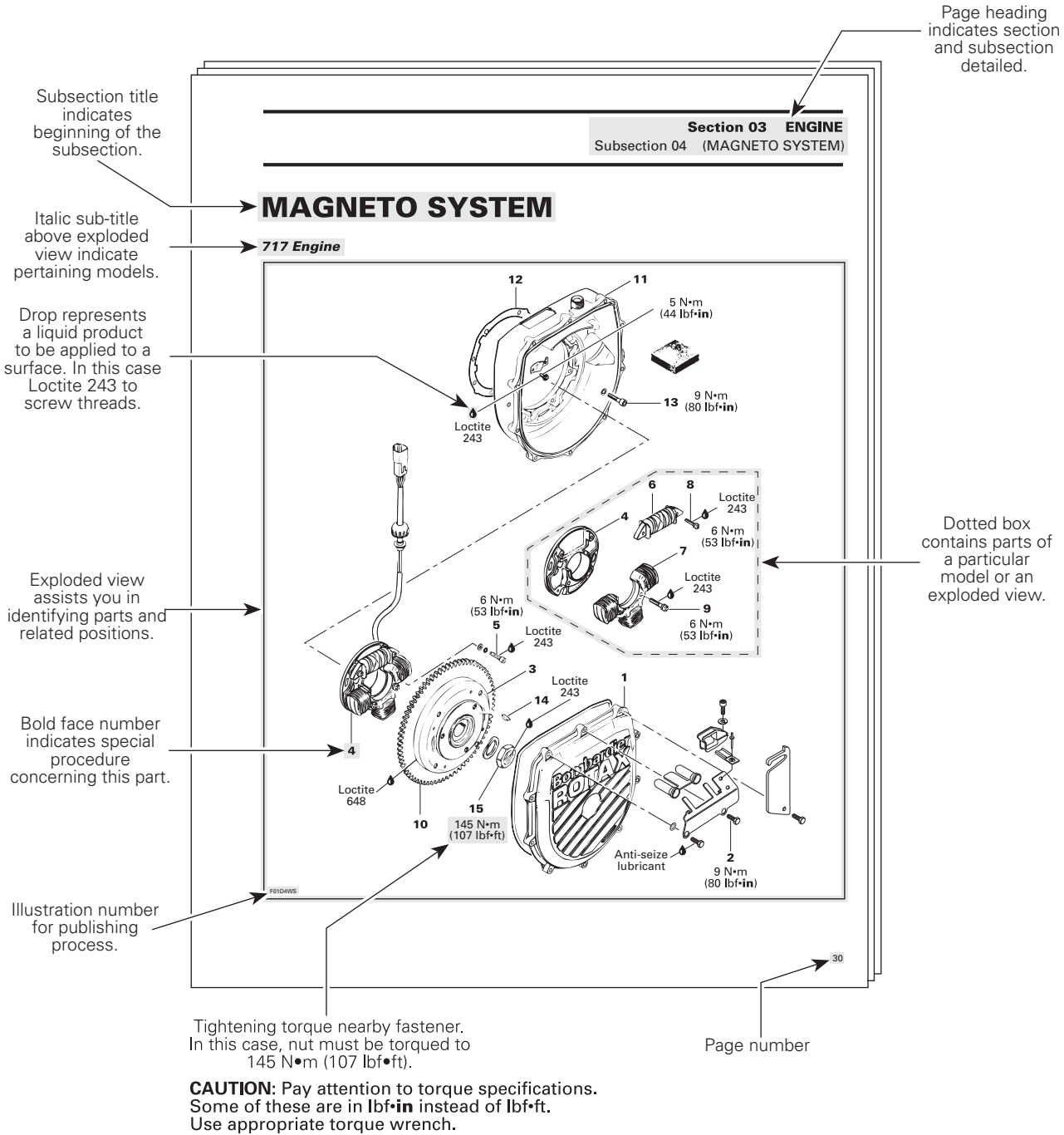
CAUTION: These watercraft are designed with parts dimensioned mostly in the metric system. However some components may be from the imperial system. When replacing fasteners, make sure to use only those recommended by BRP.

As many of the procedures in this manual are inter-related, we suggest, that before undertaking any task, you read and thoroughly understand the entire section or subsection in which the procedure is contained.

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

INTRODUCTION

TYPICAL PAGE



TYPICAL PAGE

Sub-title with part name(s) from exploded view.

Section 06 FUEL SYSTEM
Subsection 03 (CARBURETORS)

CARBURETOR REMOVAL

To remove carburetors from engine, proceed as follows:

- Remove air vent tube support.
- Unlock retaining slides holding air intake silencer base.
- Remove air intake silencer base from watercraft.
- Remove screws holding flame arrester base support to cylinder head cover.
- Unscrew base retaining screws then remove base from carburetors and move to front of watercraft.
- Turn the valve to OFF position.

NOTE: For fuel line removal, use pliers (P/N 295 000 054).

- Disconnect pulse line from fuel pump.
- Disconnect fuel supply line from fuel pump.
- Disconnect fuel return line.
- Disconnect oil injection pump cable, throttle cable and choke cable.

XP Model Only

- Remove screws no. 6 and lock washers no. 7 retaining carburetors.

All Others Models

- Remove 4 bolts no. 8 and lock washers no. 12 from rotary valve cover then move carburetors and rotary valve cover on top of engine.

NOTE: When removing rotary valve cover, pay attention that the rotary valve stay in place, otherwise it must be timed.

- Remove carburetors from intake manifold.
- Disconnect fuel bypass line between carburetors (twin carburetors).
- Remove carburetor(s) from rotary valve cover.

DISASSEMBLY AND INSPECTION

Inspect parts for corrosion damage (shaft, butterfly, spring, etc., check valve housing, etc.).

Diaphragm

PUMP DIAPHRAGM LEAK TEST

Using a suitable pump gauge tester, perform the following test proceeding as follows:

- Install pump gauge tester (P/N 295 000 083) on pulse nipple.
- Pump tester until it reaches 28 kPa (4 PSI).

TYPICAL

Step 1: Install pump gauge tester to pulse nipple
Step 2: Pump tester until it reaches the desired pressure

1: Fuel outlet nipple
2: Fuel inlet nipple
A: 28 kPa (4 PSI)

Diaphragm must stand pressure for 10 seconds. If pressure drops, replace diaphragm.

31

Title indicates main procedure to be carried-out.

Service tool to be used to perform a certain procedure.

Title in italic indicates a particular procedure concerning a model.

Sub-sub-title in this case indicates that particular procedure for XP is finished, so from this point, all others models are concerned.

Bold numbers in the text refer to the parts shown in the exploded view at the beginning of the subsection.

Numbers are used for description of components.

Sub-sub-title in capital indicates a particular testing, adjustment or repair procedure.

Illustration always follows text it is pertained to.

"TYPICAL" mention indicates a general view which does not represent full detail.

Numbered step are used to give a sequence to be performed.

Letters are used for any measures.

LEAK TEST

SERVICE TOOLS

Description	Part Number	Page
Drive shaft adapter	529 035 892	2
Drive shaft adapter	529 035 985	2

SERVICE PRODUCTS

Description	Part Number	Page
Molykote 111.....	413 707 000	4

PROCEDURES

PREPARATION

The procedure has to be done when engine operating temperature of approx. 70°C (158°F) is reached.

⚠ WARNING
 Prevent burning yourself due to handling on the hot engine.

Remove:

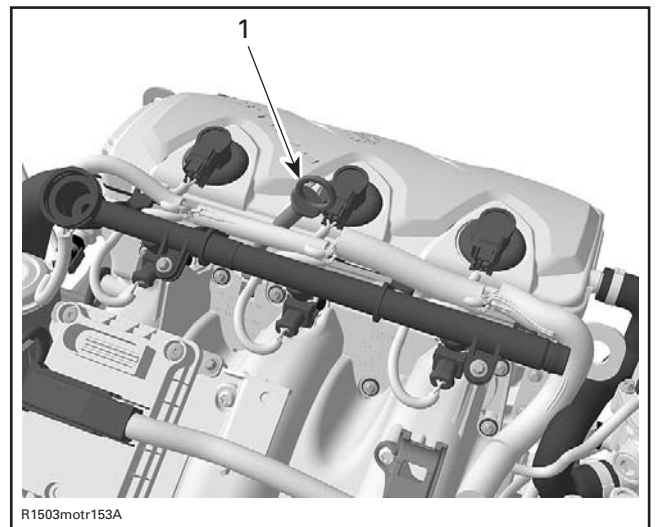
- any parts to have access to engine
- safety lanyard

⚠ WARNING
 Safety lanyard must be removed to prevent engine to be cranked while fuel rail is removed to prevent fuel to be sprayed out. Fuel is flammable.

- jet pump (refer to JET PUMP in the appropriate *VEHICLE SHOP MANUAL*)
- coolant tank cap

⚠ WARNING
 To prevent burning yourself only remove the coolant tank cap by wearing the appropriate safety equipment.

- oil dipstick



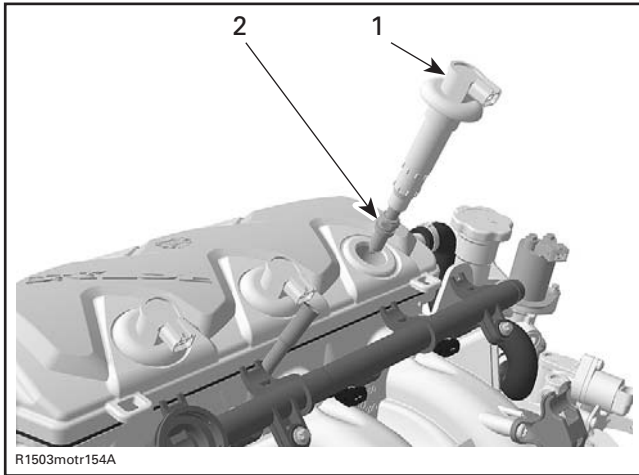
1. Oil dipstick

- Unplug ignition coil and pull it out
- spark plug.

NOTE: Ignition coil may be used as an extractor.

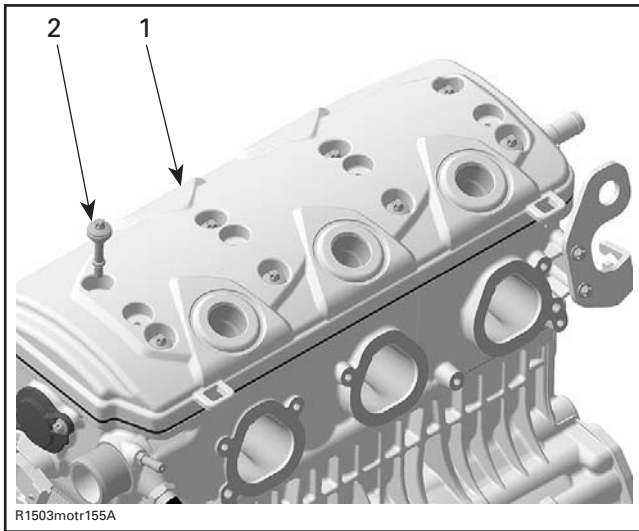
Section 01 ENGINES (1503 4-TEC)

Subsection 01 (LEAK TEST)



1. Ignition coil
2. Spark plug

- Remove valve cover cowl.
- Unscrew and remove valve cover.



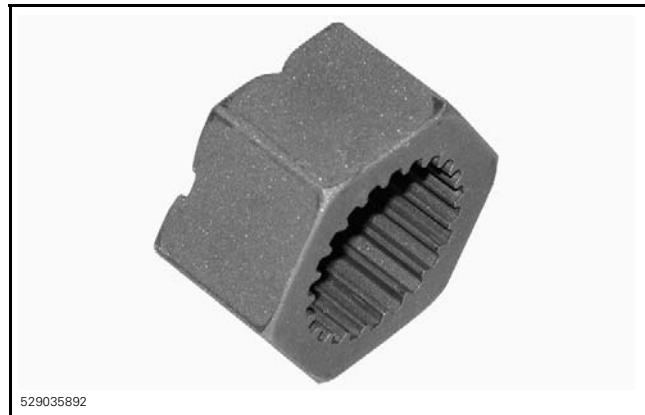
1. Valve cover
2. Valve cover screw

PROCEDURE

The following procedure has to be performed for each cylinder separately.

With an appropriate wrench lever, engine is rotated using the drive shaft adapter. Refer to the following table.

ENGINE	TOOL
1503 4-TEC Naturally Aspirated 1503 4-TEC Supercharged	Drive shaft adapter (P/N 529 035 892)
1503 4-TEC Supercharged Intercooled	Drive shaft adapter (P/N 529 035 985)



DRIVE SHAFT ADAPTER

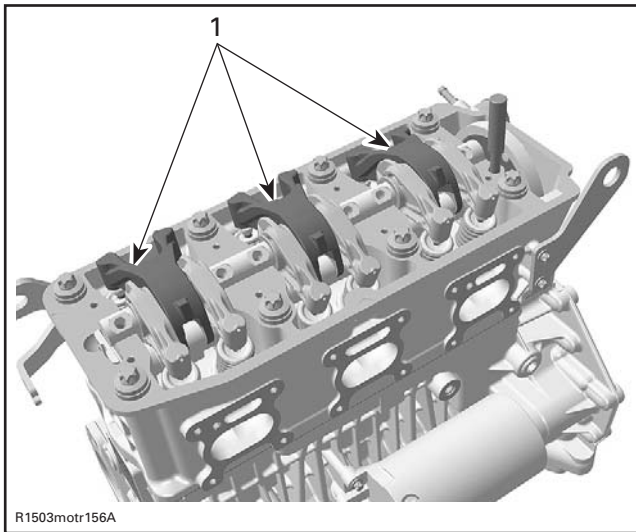
Rotate engine counterclockwise until the cylinder no. 1 is at Top Dead Center (TDC) compression stroke.

NOTE: Cylinder numbers are molded on valve cover.

As the engine is turned over, observe the movement of intake rocker arm of the cylinder to be checked. After it completes the cycle and the intake valve closes, observe the piston. When it reaches its uppermost position that is TDC compression stroke.

Section 01 ENGINES (1503 4-TEC)

Subsection 01 (LEAK TEST)



1. Intake rocker arms

Protect the hull area then position the wrench lever so that it rest against hull to prevent further crankshaft rotation.

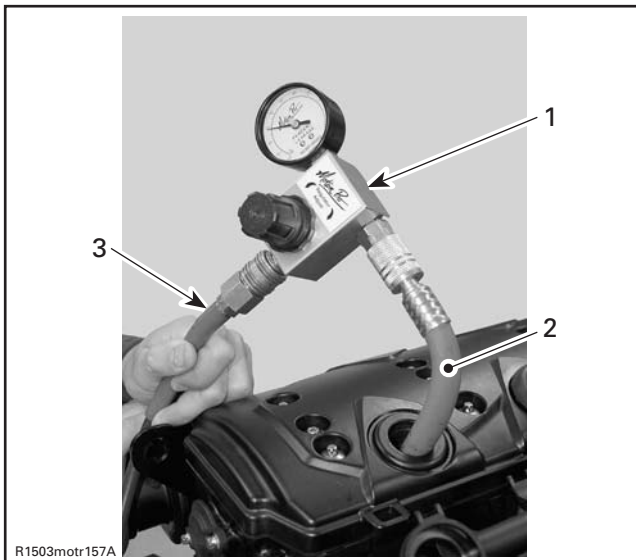
Install gauge adapter into previously cleaned spark plug hole.

Connect to adequate air supply.

NOTE: Each tester will have specific instruction on the gauge operation and required pressure.

Set needle of measuring gauge to zero.

Supply combustion chamber with air.



1. Measuring gauge
2. Adequate adapter for spark plug hole
3. Air supply

Note the amount of leaking or percentage (depending on tester).

LEAKAGE PERCENTAGE	ENGINE CONDITION
0% to 15%	Excellent condition.
16% to 25%	Good condition
26% to 40%	Fair condition; engine will run and performance might be down in some cases.
41% and higher	Poor condition, diagnose and repair engine.

Proceed the same way with remaining cylinders.

DIAGNOSIS

Pressurize area to be tested, spray soap/water solution at the indicated location and look and/or listen for air bubbles.

- air escaping on intake port means leaking intake valve(s)
- air escaping on exhaust port means leaking exhaust valve(s)
- air bubbles out of coolant tank means leaking cylinder head gasket
- air escaping into crankcase area means excessively worn and/or broken piston rings.

POSSIBLE ENGINE LEAKAGE AREA

Spray soap/water solution at the indicated location and look and/or listen for air bubbles.

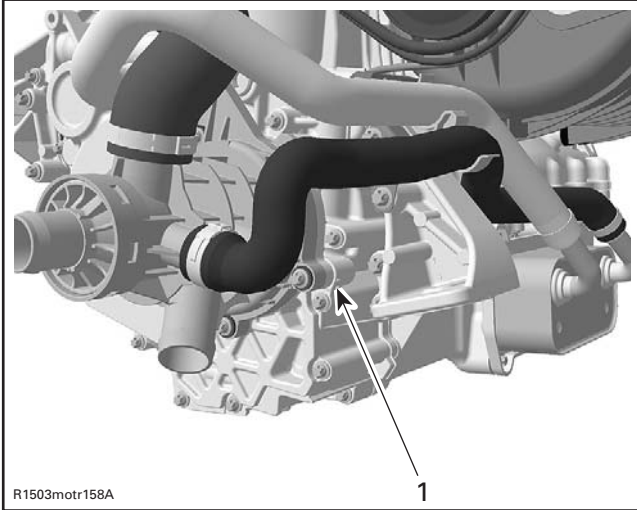
Paying attention to the following checkpoints:

- clamp(s) tightened
- coolant hoses
- air/oil escaping from crankcase means damaged gasket(s) and/or loosened screws (refer to ENGINE BLOCK)
- air/water escaping from cylinder/head means damaged gasket(s) and/or loosened screws (refer to CYLINDER HEAD)
- oily contamination on weep hole (speed sensor area) means a damaged oil seal on coolant pump shaft

Section 01 ENGINES (1503 4-TEC)

Subsection 01 (LEAK TEST)

- coolant escaping from weep hole means a damaged rotary seal on coolant pump shaft (refer to COOLING SYSTEM)



1. Weep hole

- coolant escaping from coolant pump housing means damaged gasket(s) and/or loosened screws (refer to COOLING SYSTEM).

NOTE: For all the checkpoints mentioned above see the appropriate engine section to diagnose and repair the engine.

ASSEMBLY

NOTE: For assembly, use the torque values and Loctite products from the exploded views (refer to proper engine section).

For assembly, reverse the preparation procedure.

NOTE: Prior to inserting the ignition coil in its location, apply some Molykote 111 (P/N 413 707 000) around the seal area that touches the spark plug hole. After installation, ensure the seal seats properly with the engine top surface.

INTAKE MANIFOLD AND SUPERCHARGER

SERVICE TOOLS

Description	Part Number	Page
4-pin socket	529 035 948	20, 23
camshaft locking tool.....	529 035 839	11
leak test pump.....	529 021 800	10
retaining key	529 035 949	18–19, 25
support plate.....	529 035 947	22–23
support/pusher	529 035 950	23
support/pusher	529 035 950	22
Torx adapter.....	529 035 938	17, 27

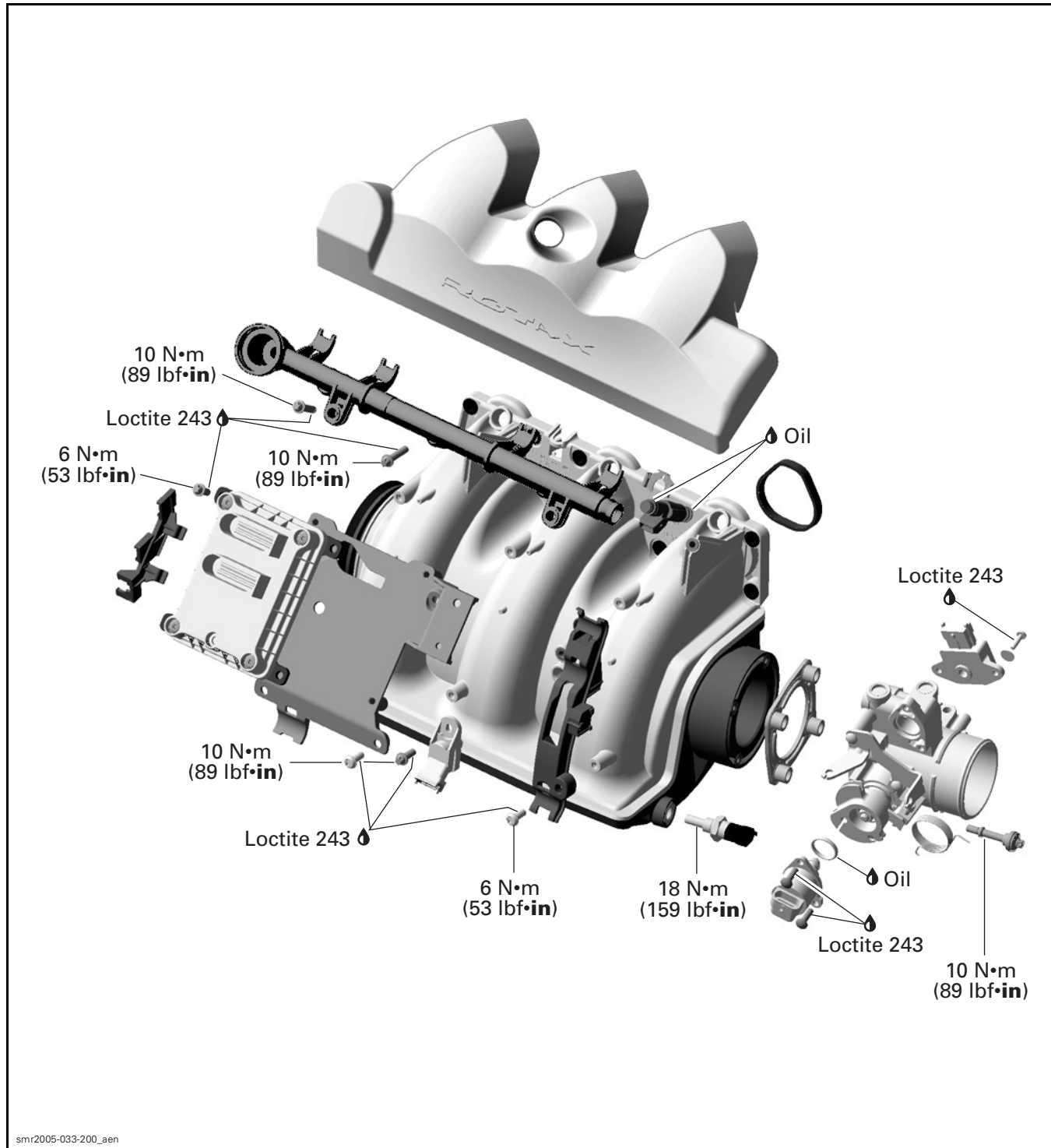
SERVICE PRODUCTS

Description	Part Number	Page
Kluber Isoflex grease	293 550 021	24
Loctite 243.....	293 800 060	23–27
Loctite 5910.....	293 800 081	25
Super Lube grease	293 550 030	27

Section 01 ENGINES (1503 4-TEC)

Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)

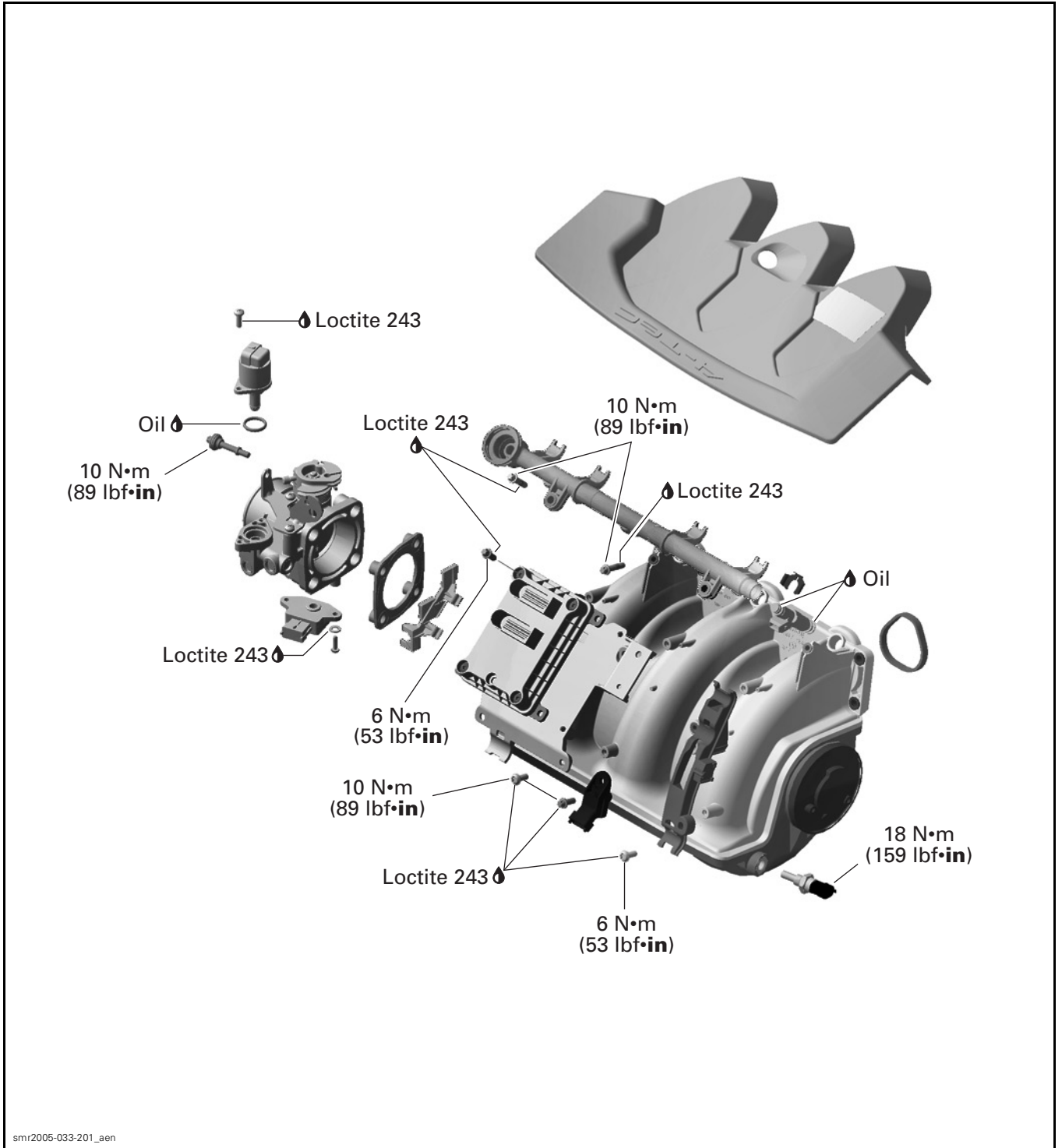
Naturally Aspirated Engine — Intake Manifold and Throttle Body



TYPICAL

Section 01 ENGINES (1503 4-TEC)
Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)

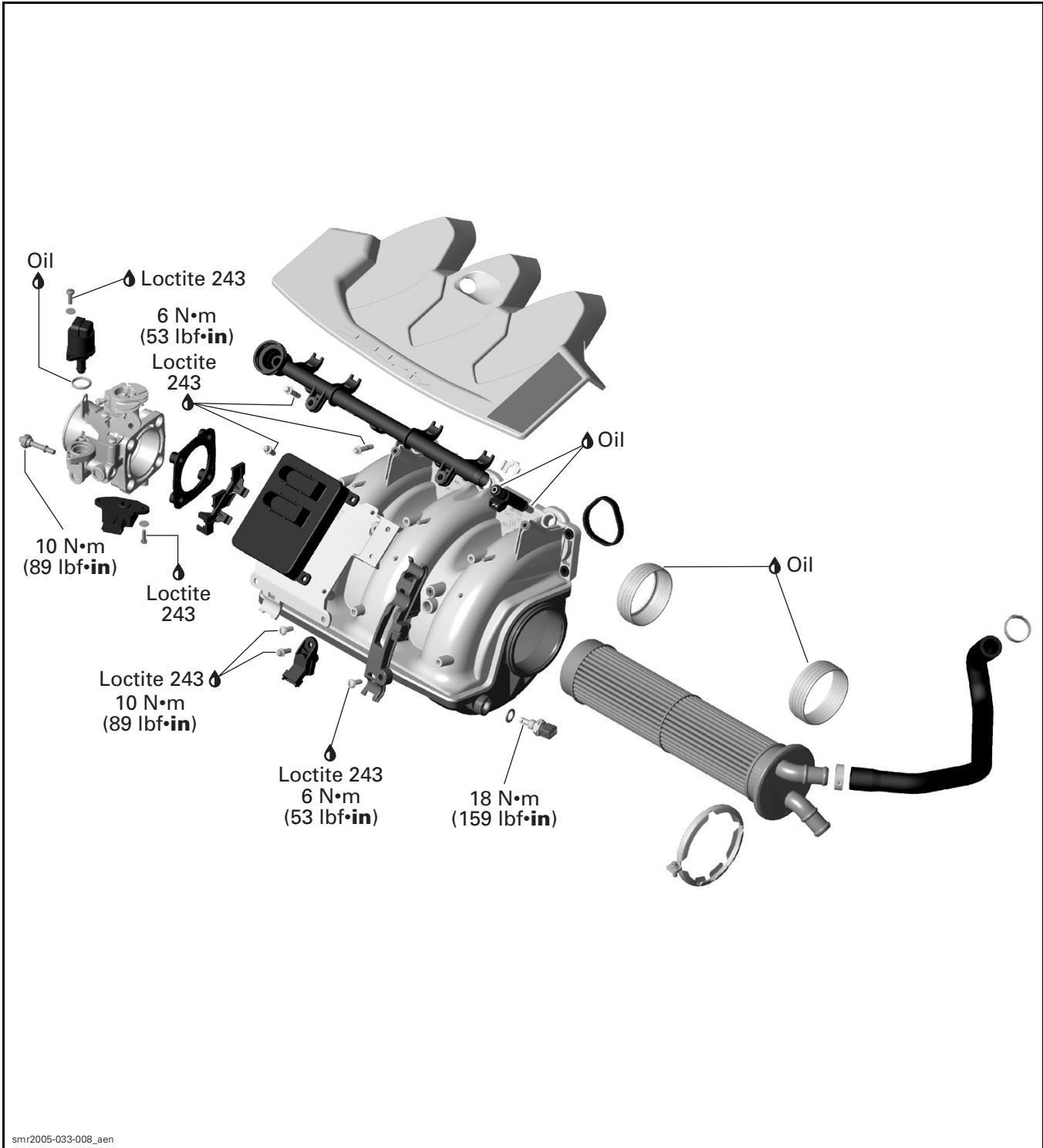
Supercharged Engine — Intake Manifold and Throttle Body



Section 01 ENGINES (1503 4-TEC)

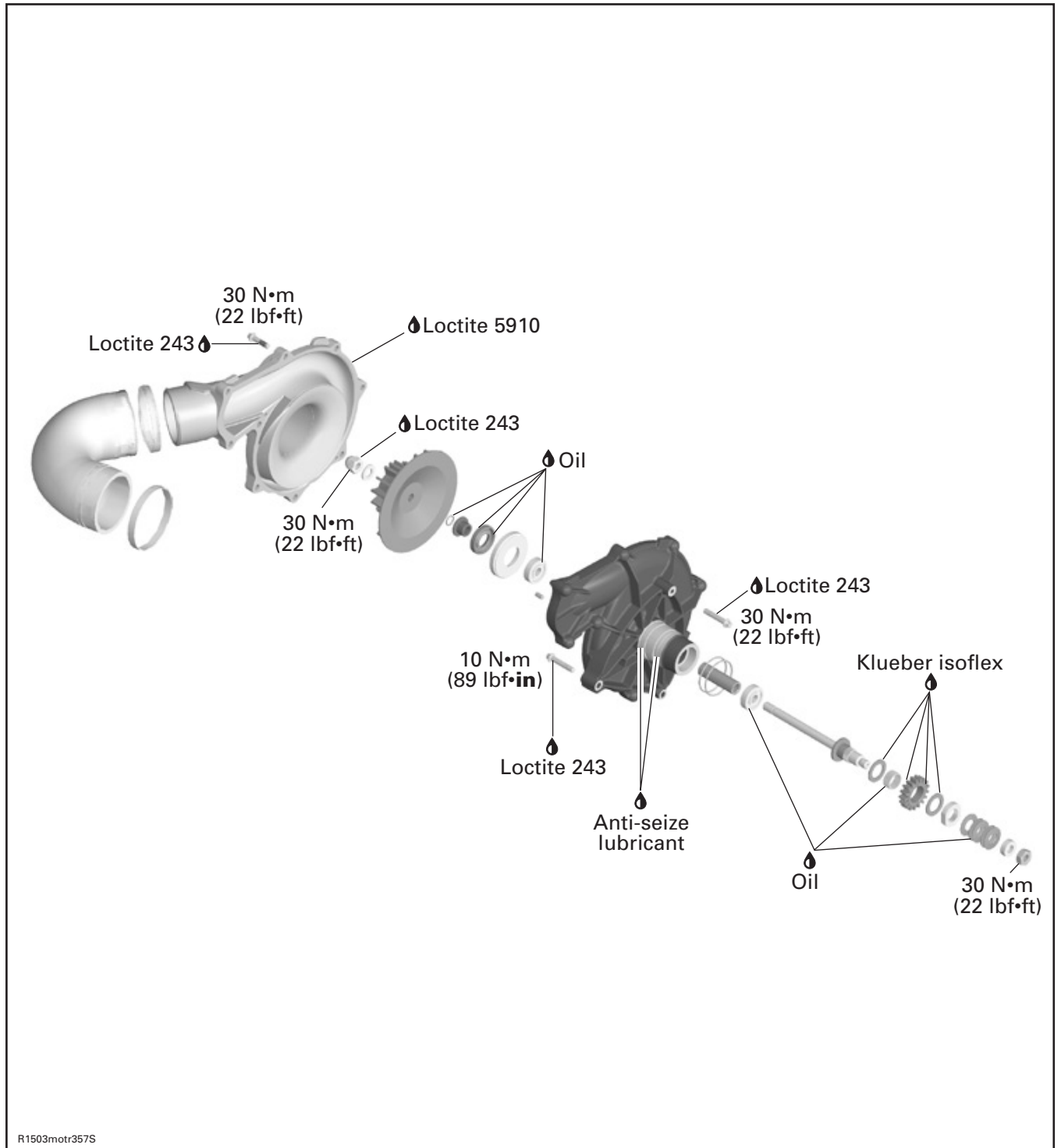
Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)

Supercharged Intercooled Engine — Intake Manifold and Throttle Body



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Supercharged Engines — Supercharger



Section 01 ENGINES (1503 4-TEC)

Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)

INSPECTION (PARTS ASSEMBLED)

Intercooler Leak Test

Supercharged Intercooled Engine

Perform intercooler leak test when engine loses performance, when there is white exhaust smoke or when temperature in exhaust system is too high.

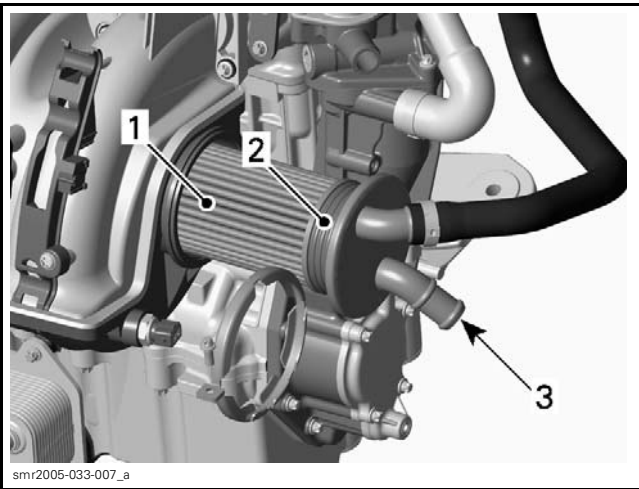
⚠ WARNING

Let engine cool down prior to perform leak test. Direct contact with hot engine may result in skin burn.

NOTE: The inspection can be done while intercooler remains installed in intake manifold.

Remove:

- outlet hose from exhaust manifold
- inlet hose from intercooler.



1. Intercooler
2. Outlet hose
3. Inlet nipple

Plug intercooler inlet nipple.

Install an adapter on the outlet hose to connect the leak test pump (P/N 529 021 800).



529 021 800

Pressurize the intercooler as follows:

PRESSURE TEST

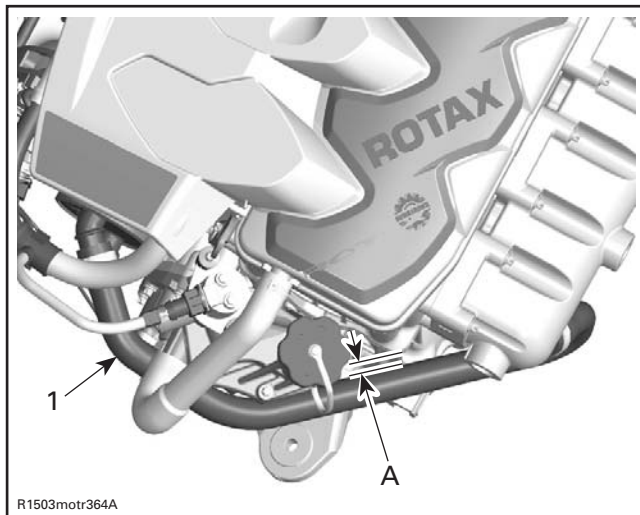
69 kPa (10 PSI) for 10 minutes min

If there is a pressure drop, first spray hoses and adapters with a soapy solution to ensure they are not leaking.

Otherwise, remove intercooler from manifold to spray soapy water on it. If air bubbles are present, replace the intercooler. Refer to procedures farther in this section.

Properly reinstall removed parts.

The distance between engine block and intercooler outlet hose must be 3 - 7 mm (0.12 - 0.27 in) otherwise the hose would scuff on the engine block.



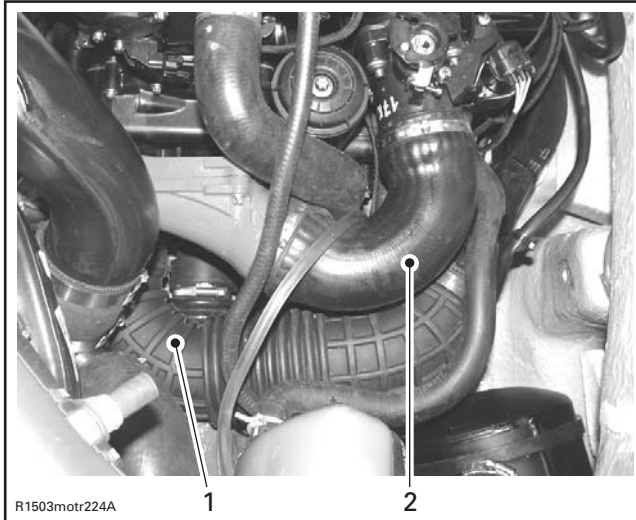
1. Outlet hose distance
- A. 3 - 7 mm (0.12 - 0.27 in)

Section 01 ENGINES (1503 4-TEC)
Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)

Supercharger Clutch Slipping Moment
Supercharged Engines

NOTE: Remove required parts to access supercharger. Refer to appropriate *VEHICLE SHOP MANUAL*.

Remove air intake hose from supercharger.

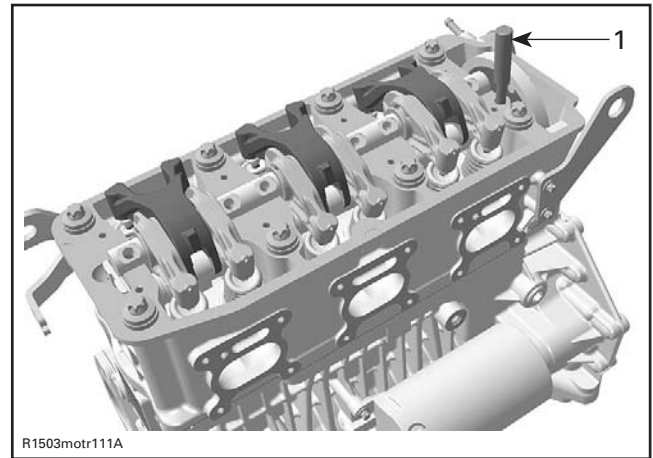


1. Supercharger ass'y
2. Air intake hose

Remove valve cover and install camshaft locking tool (P/N 529 035 839) to prevent camshaft rotation while checking slipping moment of supercharger. Refer to *CYLINDER HEAD*.

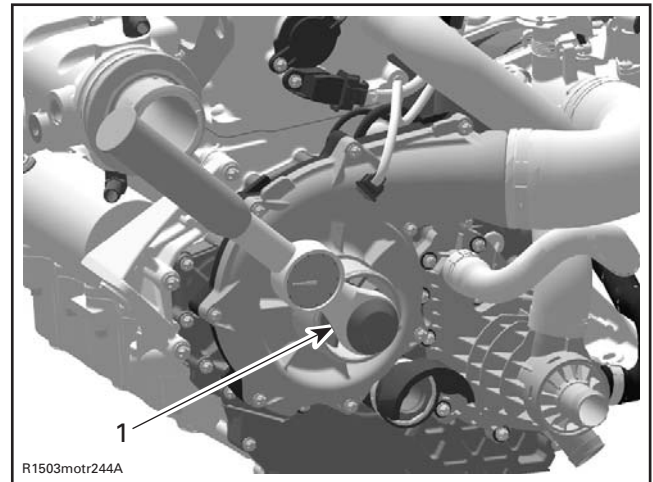


NOTE: Rotate supercharger nut to align camshaft holes and to allow insertion of the locking tool.



1. Camshaft locking tool

Check slipping moment counterclockwise by using a torque wrench with actual torque viewer. A mirror is useful to see the viewer.



1. Torque wrench

NOTE: Before checking the supercharger slipping moment it is recommended to turn the clutch a full revolution. This way the parts can mate together and you will get a more accurate reading.

Supercharger should start to turn at a torque within the specified values.

SLIPPING MOMENT	NEW SUPERCHARGER	BREAK-IN SUPERCHARGER
Torque value applied	7 - 12 N•m (62 - 106 lbf•in)	5 - 10 N•m (44 - 88 lbf•in)

NOTE: After supercharger ran for a few hours, the parts break-in and this brings a reduced slipping moment.

Section 01 ENGINES (1503 4-TEC)

Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)

If the torque is not within specifications, repair supercharger clutch. Verify supercharger clutch components as per INSPECTION (PARTS DISASSEMBLED) further in this section.

REMOVAL

Intake Manifold

NOTE: Remove required parts to access intake manifold. Refer to appropriate *VEHICLE SHOP MANUAL*.

Remove oil dipstick.

Pull fuel rail cover out.

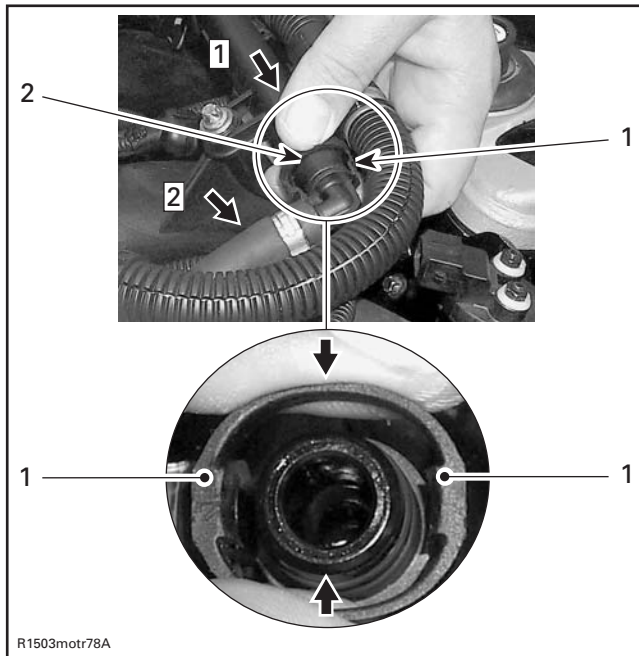
Release the fuel pressure in the system, refer to ENGINE MANAGEMENT section of the appropriate *VEHICLE SHOP MANUAL*.

Disconnect battery cables from battery.

WARNING

Always disconnect battery cables exactly in the specified order, **BLACK** negative cable first then the **RED** positive battery cable last.

Disconnect fuel hose connector at fuel rail.



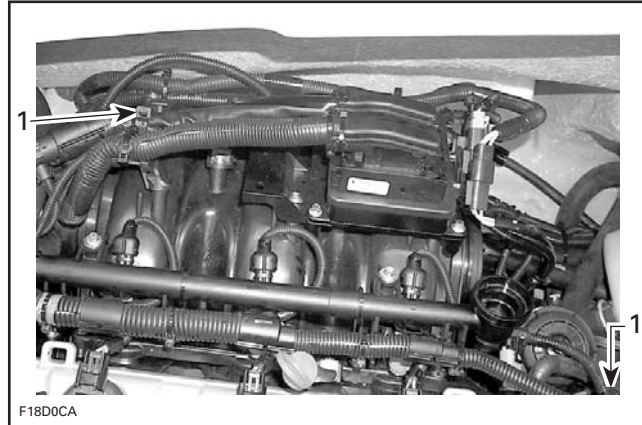
Step 1: Squeeze

Step 2: Pull out

1. Supporting tabs

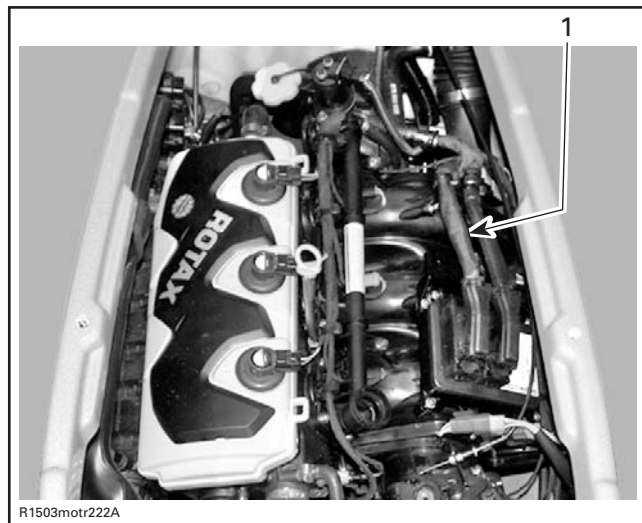
2. Squeeze in middle of supporting tabs, hold and pull out

Cut locking ties where shown.



NATURALLY ASPIRATED ENGINE

1. Cut locking ties to release harness



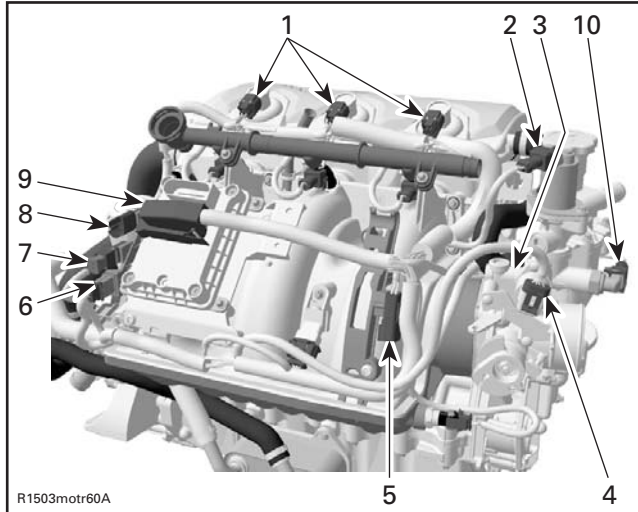
SUPERCHARGED ENGINE

1. Cut locking ties to release harness

Section 01 ENGINES (1503 4-TEC)
Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)

Unplug electrical connectors.

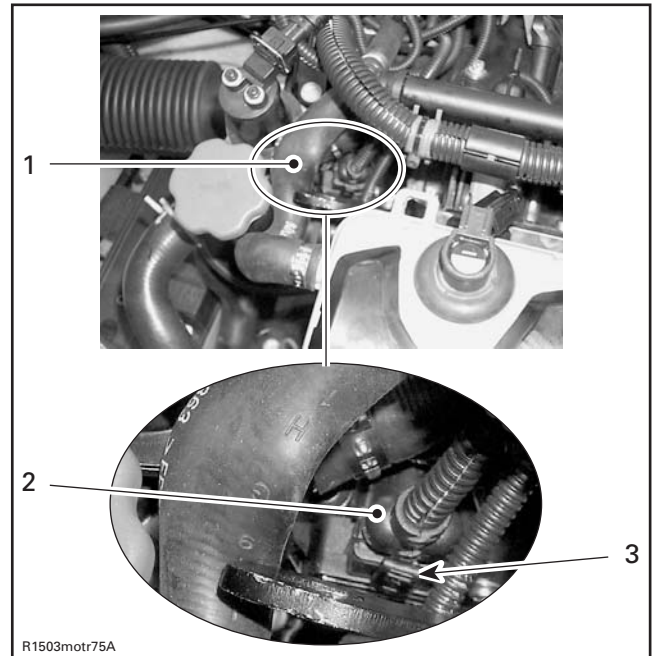
Naturally Aspirated Engine



NATURALLY ASPIRATED ENGINE

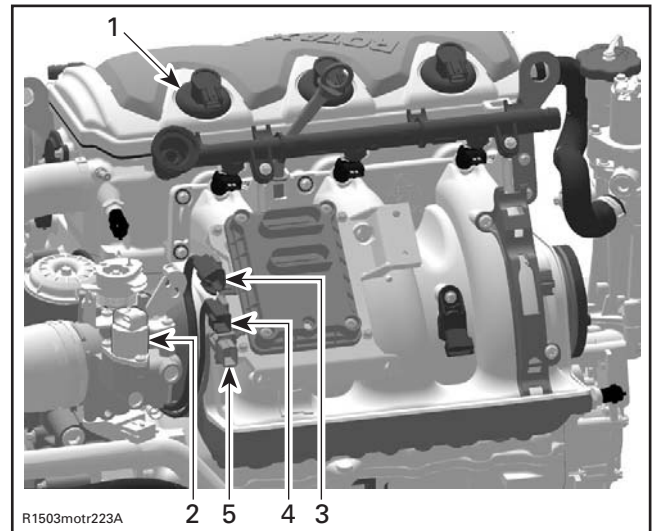
1. Ignition coils
2. TOPS
3. TPS (hidden behind throttle body)
4. Idle bypass valve
5. Engine connector
6. KS
7. CPS
8. Magneto
9. "B" Kostal connector
10. OSPS

NOTE: The TPS connector is hidden behind the TOPS hose. Disconnect hose from TOPS valve then move away to access the TPS connector. Slightly pry locking tab of connector to unlock.



1. TOPS hose disconnected and moved away
2. TPS connector
3. Slightly pry tab to unlock

Supercharged Engines



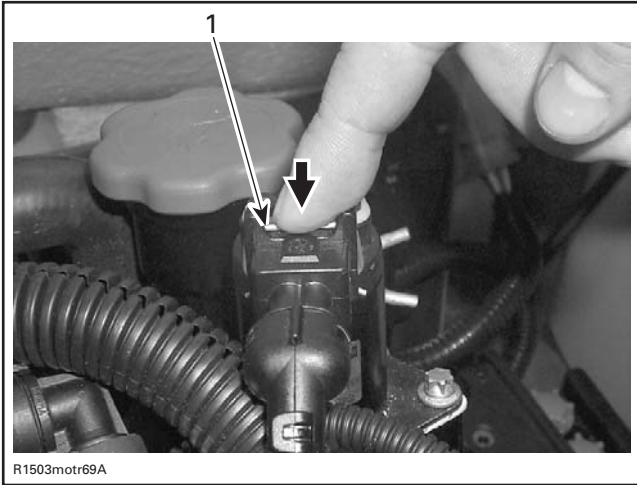
SUPERCHARGED ENGINES

1. Ignition coils
2. Idle bypass valve
3. KS
4. CPS
5. Magneto

Section 01 ENGINES (1503 4-TEC)

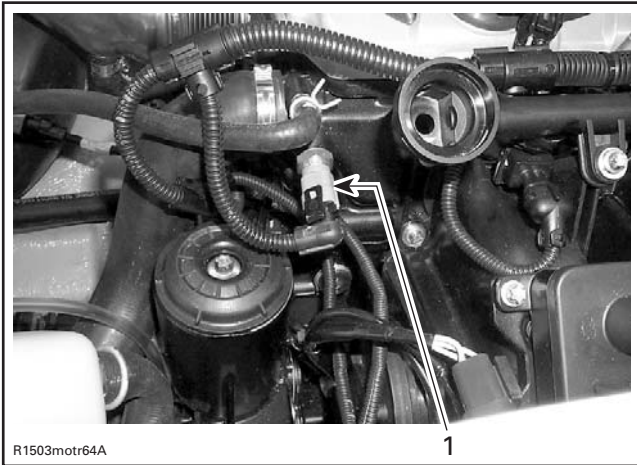
Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)

All Engines



TOPS VALVE

1. Push here and hold while pulling connector out



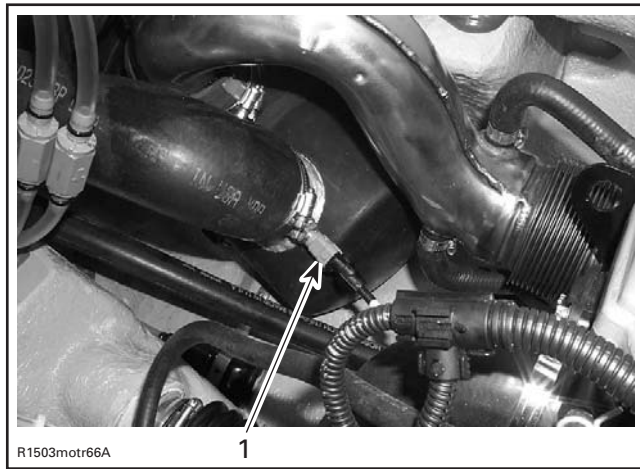
TYPICAL

1. CTS connector



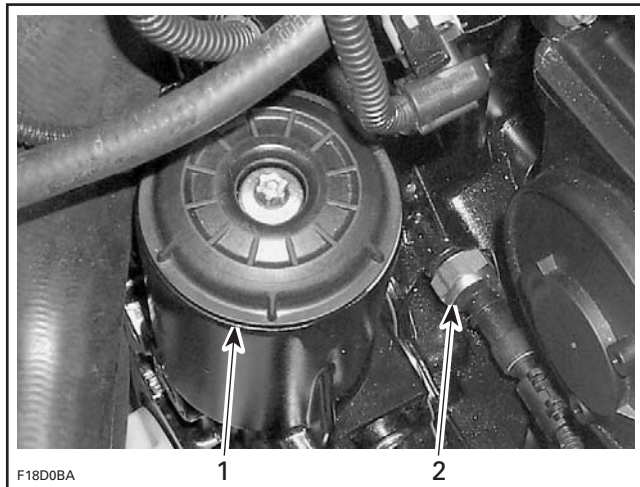
TYPICAL

1. CAPS connector



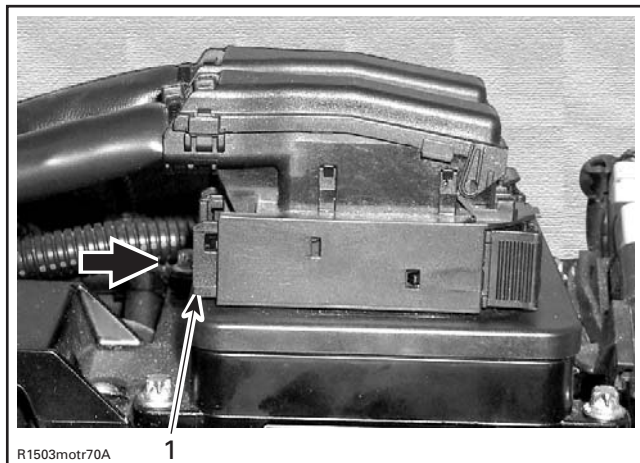
TYPICAL

1. EGTS connector



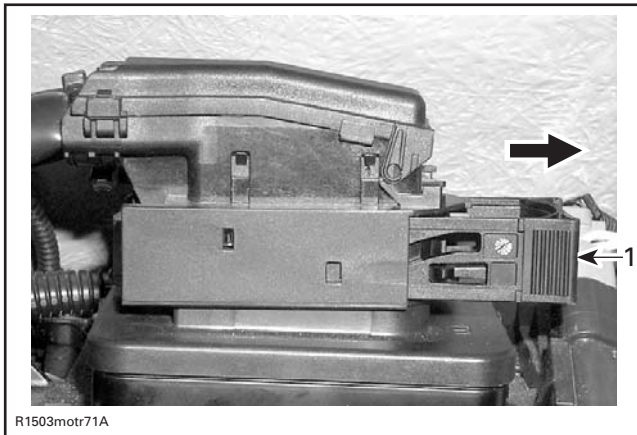
1. Oil filter housing
2. OPS

Unplug the "B" connector from the ECM.



1. Push this end to unlock

Section 01 ENGINES (1503 4-TEC) Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)



1. Pull here to release

Pull the connectors for the knock sensor (KS), crankshaft position sensor (CPS) and magneto out of the ECM support. For more details, refer to ELECTRICAL CONNECTORS section of the appropriate *VEHICLE SHOP MANUAL*.

Disconnect knock sensor (KS) and crankshaft position sensor (CPS) connectors.

Cut locking ties as necessary and pull wiring harness away from intake manifold.

Naturally Aspirated Engine

Loosen air intake silencer collar.

Unlock throttle cable housing from throttle body. Cable is to be detached later on.

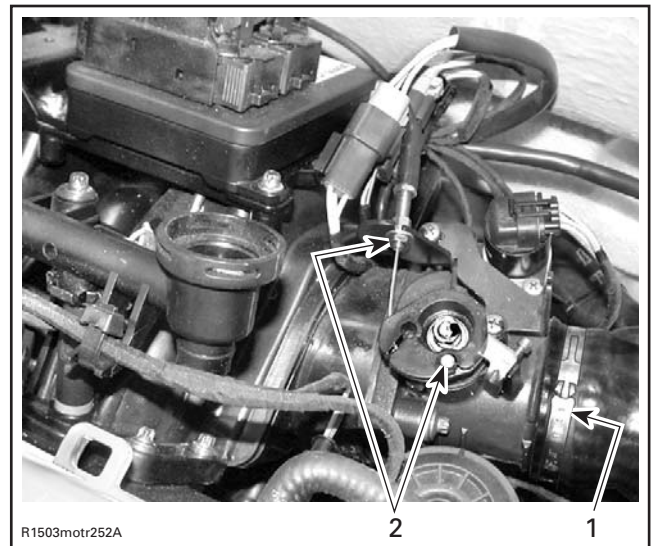


1. Air intake silencer collar
2. Unlock throttle cable housing

Supercharged Engines

Remove inlet hose from throttle body.

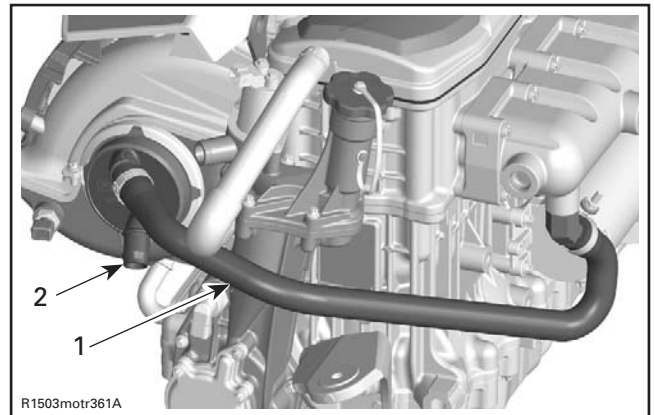
Disconnect throttle cable from throttle body.



1. Detach hose
2. Disconnect cable

Supercharged Intercooled Engine

Remove the hoses connected to the intercooler.



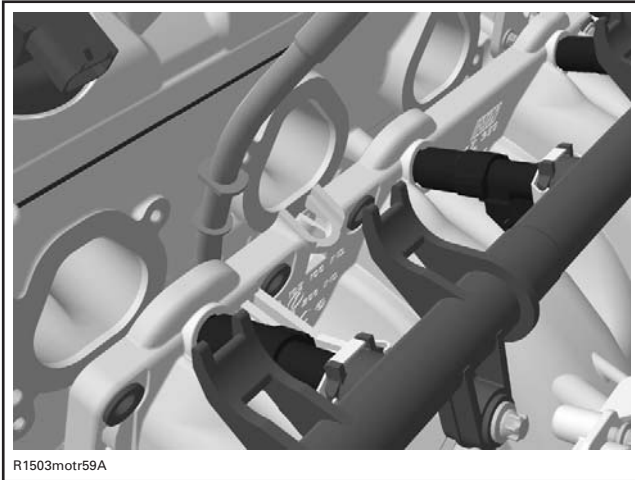
1. Hose from intercooler to exhaust manifold (outlet nipple)
2. Hose from jet pump

All Engines

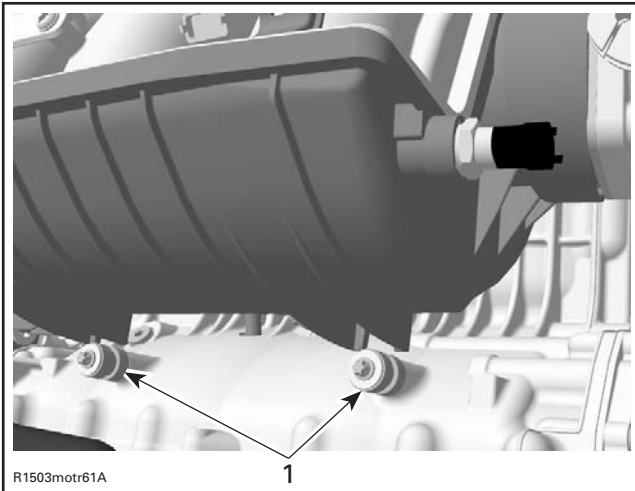
Remove manifold retaining screws and push the oil dipstick tube out of the manifold slot.

Section 01 ENGINES (1503 4-TEC)

Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)



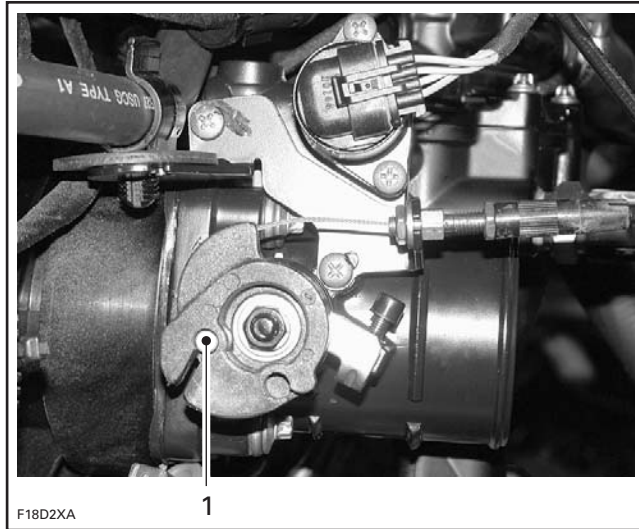
Lift intake manifold up to pull it out of the mounting brackets just enough to reach throttle cable end.



1. Mounting brackets

Naturally Aspirated Engine

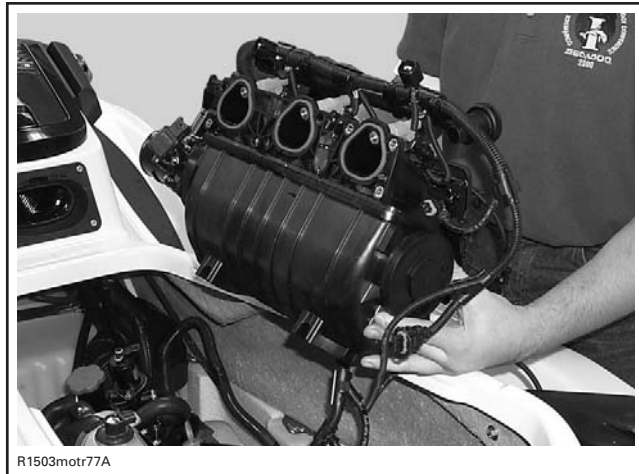
Detach throttle cable end from throttle body.



1. Detach cable end from throttle body

All Engines

Pull intake manifold out.



TYPICAL

NOTE: The flame arrester and the intercooler (if so equipped) in the intake manifold are maintenance free.

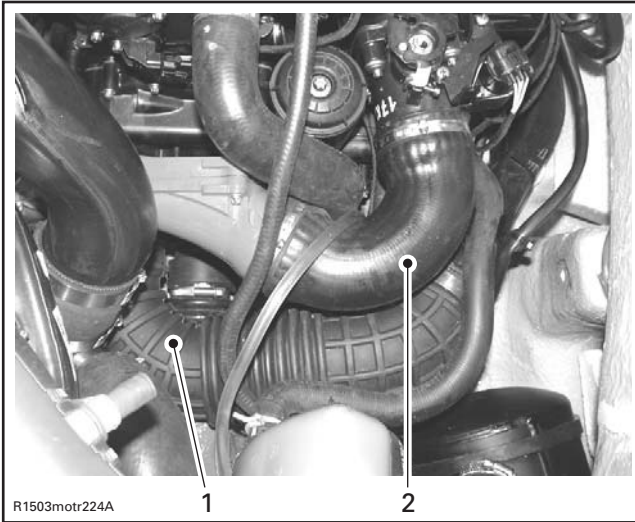
Supercharger

Supercharged Engines

NOTE: Remove required parts to access supercharger. Refer to appropriate *VEHICLE SHOP MANUAL*.

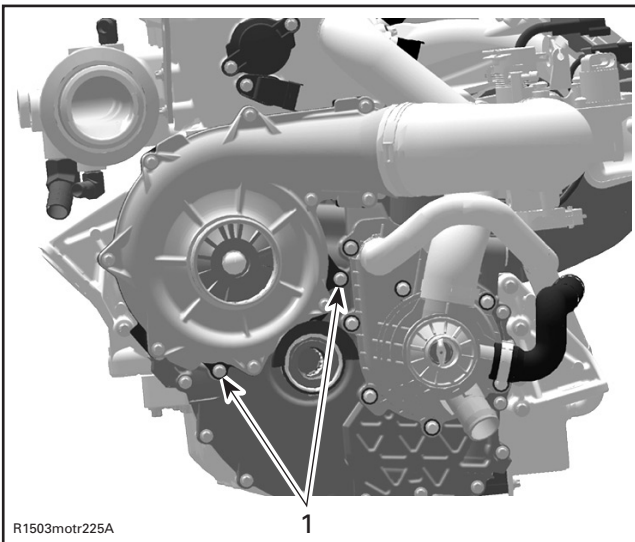
Remove hoses from supercharger ports.

Section 01 ENGINES (1503 4-TEC)
Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)



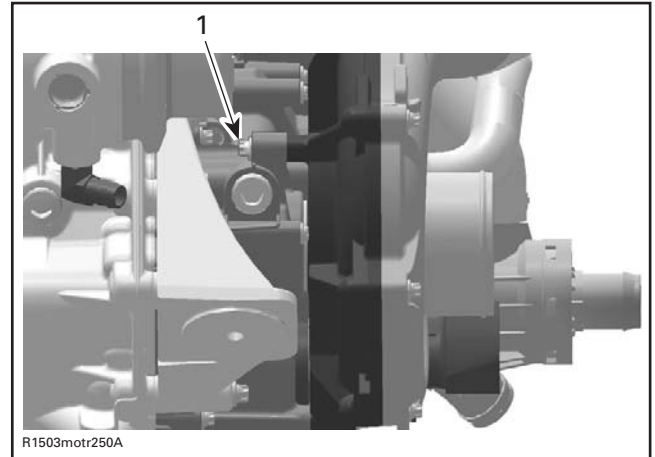
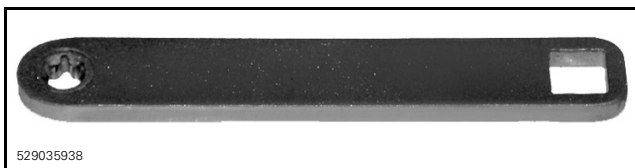
1. Inlet hose
2. Outlet hose

Remove retaining screws and pull out the super-charger ass'y.



1. Retaining screws

To remove the upper screw (not shown on the picture above), use the Torx adapter (P/N 529 035 938).

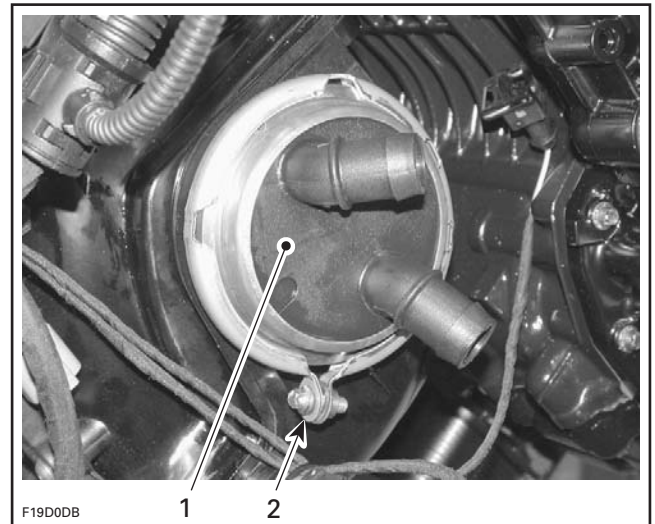


1. Upper retaining screws

DISASSEMBLY

Intake Manifold and Intercooler **Supercharged Intercooled Engines**

Remove collar from intercooler.

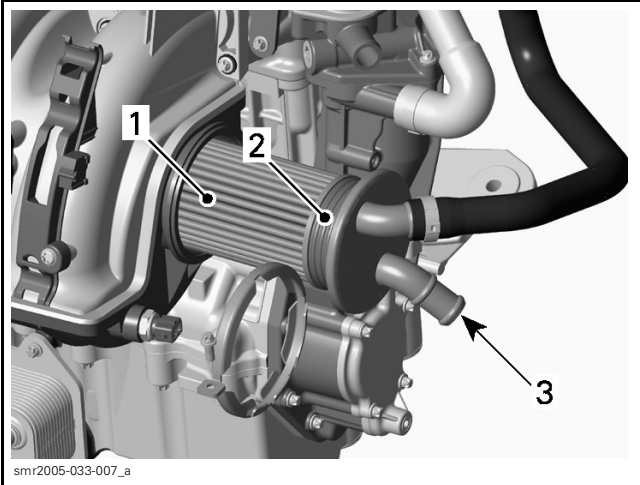


1. Intercooler
2. Collar

Carefully pull intercooler out of intake manifold.

Section 01 ENGINES (1503 4-TEC)

Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)



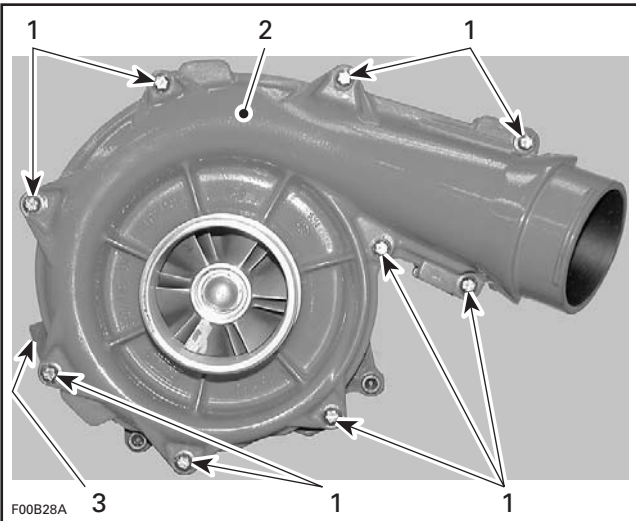
1. Intercooler
2. Profile Ring
3. Collar

Supercharger

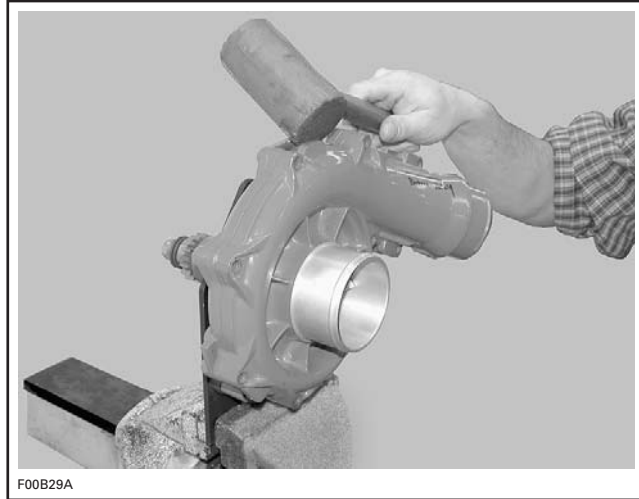
Supercharged Engines

CAUTION: Be scrupulous when working on supercharger parts. Supercharger rotation reaches 40 000 RPM. Any modification, improper repair/assembly or damage on the parts, may result in damage of the supercharger. Strictly follow the described procedures.

Take apart supercharger housing.



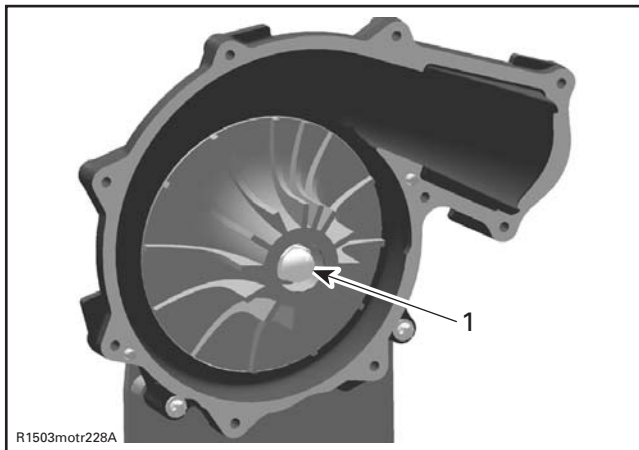
1. Retaining screws
2. Housing half (intake side)
3. Housing half (engine side)



PLASTIC HAMMER

NOTE: The cap nut on the supercharger shaft has LH threads.

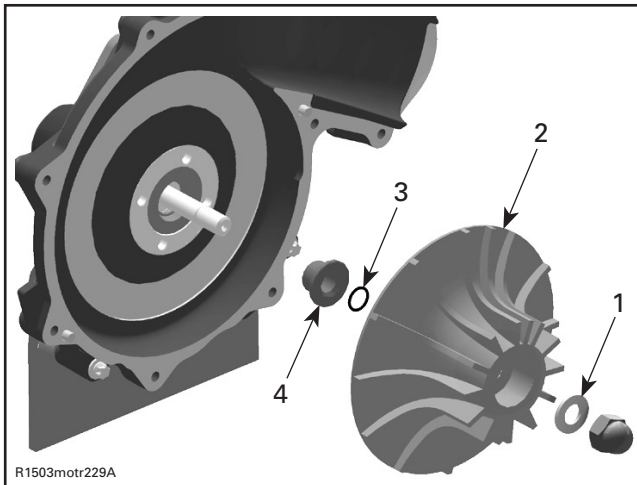
Loosen cap nut (turn clockwise) on supercharger shaft turbine side while holding shaft with a retaining key (P/N 529 035 949).



1. Cap nut

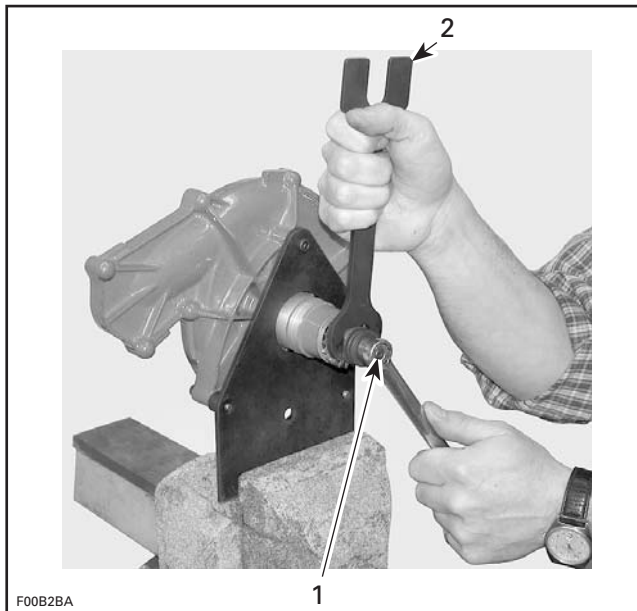
Remove washer, turbine, O-ring and step collar from supercharger shaft.

Section 01 ENGINES (1503 4-TEC)
Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)



1. Washer
2. Turbine
3. O-ring
4. Step collar

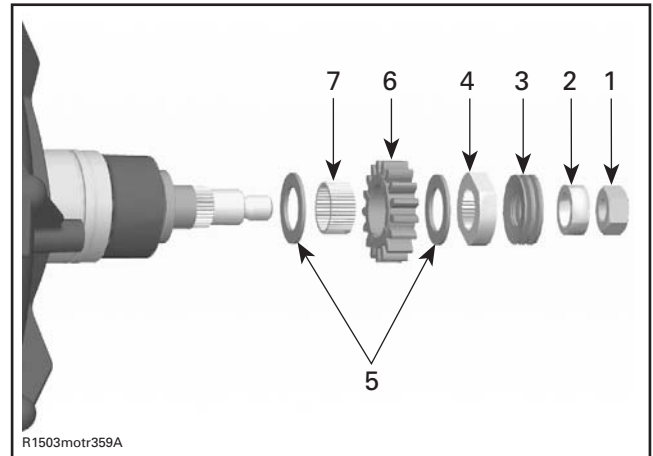
Loosen nut on supercharger shaft engine side while holding shaft with a retaining key (P/N 529 035 949).



1. Nut
2. Retaining key

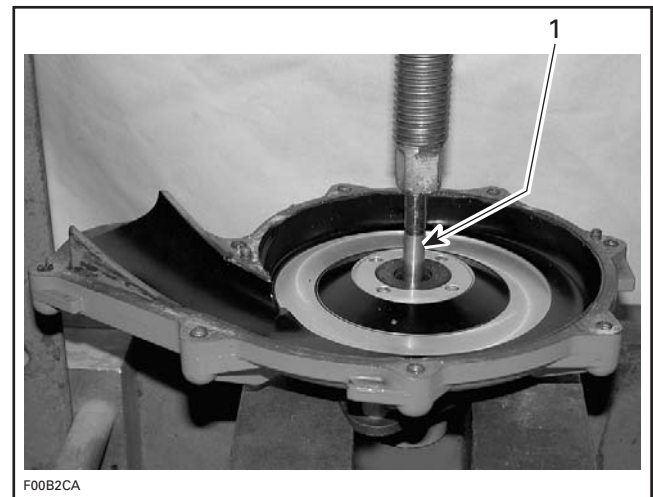
NOTE: There are 40 loose needle bearings under the gear. Do not reuse.

Remove L-ring, spring washers, lock washer, drive gear and needle pins by turning the supercharger ass'y upside down.



1. Nut
2. L-ring
3. Spring washers
4. Lock washer
5. Ceramic washers
6. Drive gear
7. Needle bearings

Carefully push out supercharger shaft towards engine side by using a press.



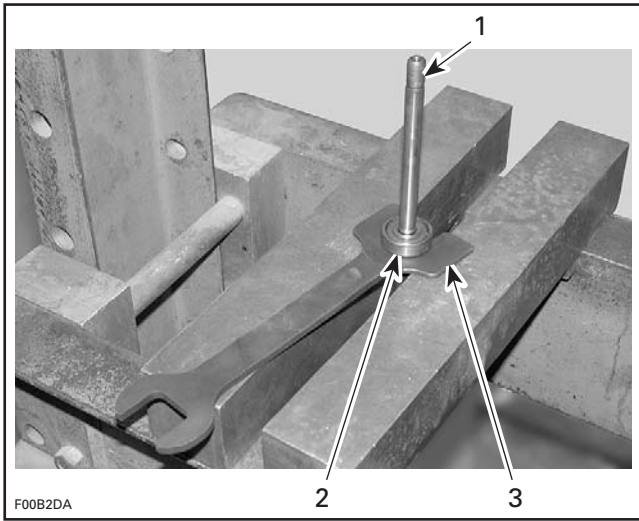
1. Supercharger shaft

CAUTION: Every time when removing the supercharger shaft, both ball bearings have to be replaced.

Remove ball bearing from supercharger shaft by using a press and retaining key (P/N 529 035 949).

Section 01 ENGINES (1503 4-TEC)

Subsection 02 (INTAKE MANIFOLD AND SUPERCHARGER)

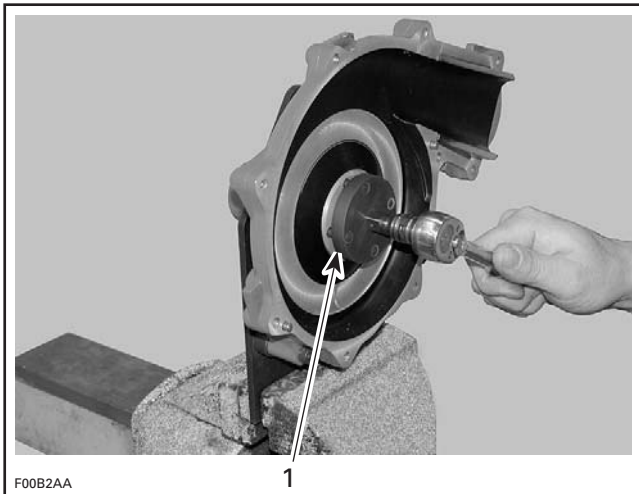


1. Supercharger shaft
2. Ball bearing
3. Retaining key

Screw out retaining disc with seal from housing half (engine side) by using the 4-pin socket (P/N 529 035 948).

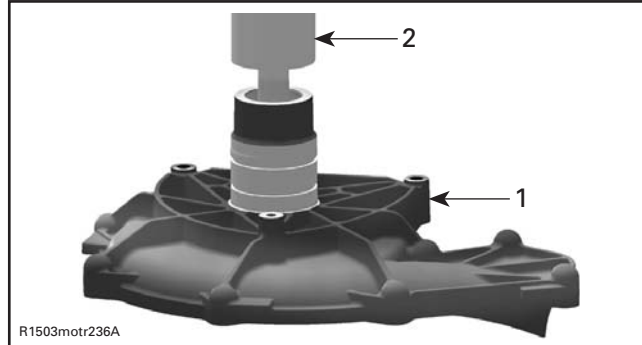


NOTE: It may be necessary to heat the housing with a heat gun to release the retaining disc.



1. 4-pin socket

Remove ball bearing from supercharger housing half (engine side) by using a press and a suitable bearing pusher.



1. Supercharger housing half (engine side)
2. Bearing pusher

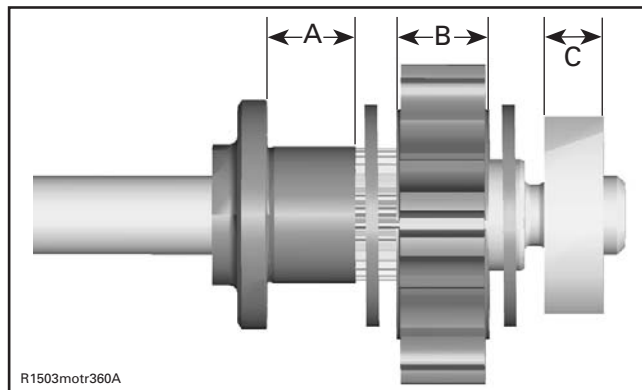
INSPECTION (PARTS DISASSEMBLED)

Supercharged Clutch Components and Gear

Replace worn parts by new ones. A clutch repair kit is available. If all parts are within specifications, replace the 40 needle bearings and spring washer package on supercharger shaft.

NOTE: Ceramic washers are not affected by wear.

Check the wear limit on drive gear, lock washer and driven plate on supercharger shaft. Check drive gear for cracks.



- A. Driven plate thickness
- B. Drive gear thickness
- C. Lock washer thickness



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