SEA-DOO®

BRP

2008
SHOP MANUAL

4-TEC™
SERIES

219 100 313

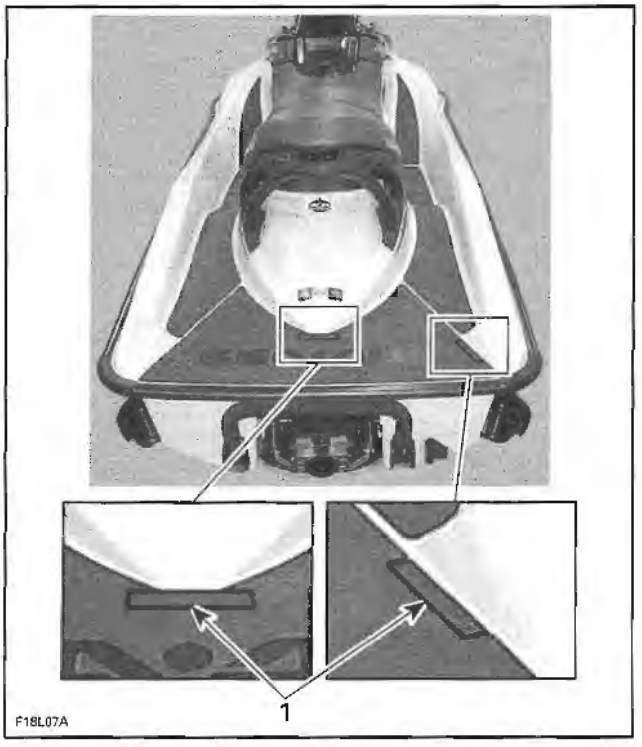
VEHICLE INFORMATION

Hull Identification Number (H.I.N.)

The hull identification number is composed of 12 digits:

YDV	12345	L	4	95
				Model year
				Year of production
				Month of production
				Serial number (a letter may also be used as a digit)
				Manufacturer

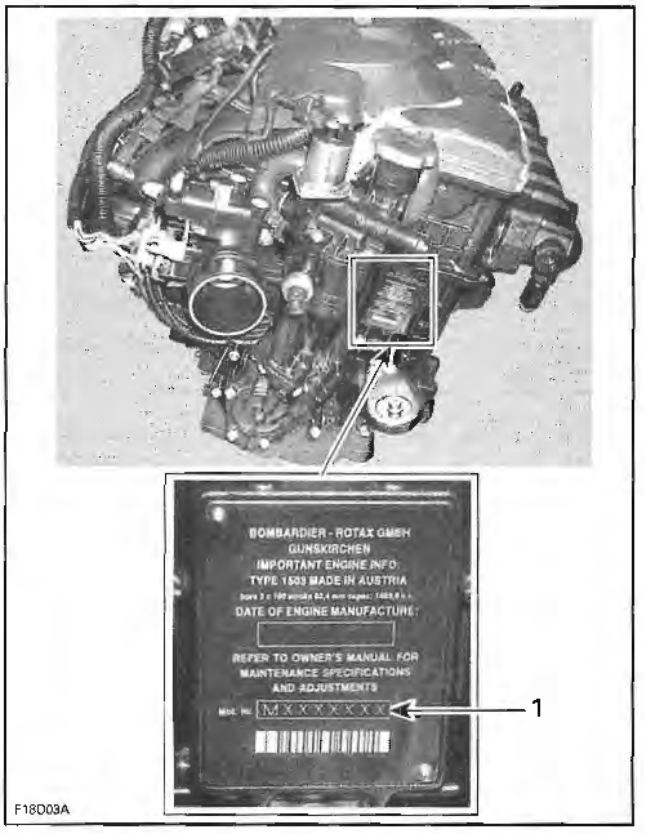
It is located on footboard at the rear of watercraft.



TYPICAL
1. Hull Identification Number (H.I.N.)

Engine Identification Number (E.I.N.)

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

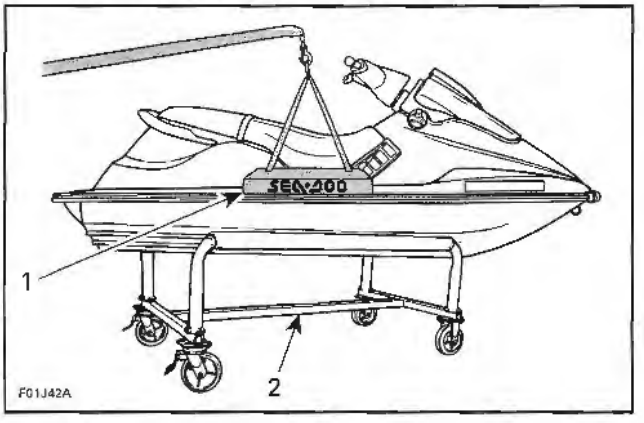


1. Engine Identification Number (E.I.N.)

WORKING ON WATERCRAFT

To work on watercraft, securely install it on a stand. Thus, if access is needed to water inlet area, it will be easy to slide underneath watercraft.

The lift kit (P/N 295 100 205) can be used to install watercraft on a stand.



TYPICAL
1. Lift kit
2. Work stand

4-TEC MODELS						
A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE	FIRST 10 HOURS	EVERY 25 HOURS OR 3 MONTHS	EVERY 50 HOURS OR 6 MONTHS	EVERY 100 HOURS OR 1 YEAR	EVERY 200 HOURS OR 2 YEAR	
PART/TASK						REFER TO
STEERING SYSTEM						
Steering cable and connections	I			I		*STEERING SYSTEM*
Steering nozzle bushings	I			I		
Off-power assisted steering (O.P.A.S.)	I			I		*OFF-POWER ASSISTED STEERING SYSTEM (O.P.A.S.)*
PROPULSION SYSTEM						
Drive shaft				L (1)		*DRIVE SYSTEM*
Carbon ring and rubber boot (drive shaft)	I			I		
Reverse system, cable and connections	I			I		*REVERSE SYSTEM*
VTS (Variable Trim System) (if so equipped)	I			I		*VARIABLE TRIM SYSTEM (VTS)*
Drive shaft/impeller splines				I, L		*JET PUMP and DRIVE SYSTEM*
Impeller boot	I			I		*JET PUMP*
Impeller shaft seal, sleeve and O-ring				I (1)		
Impeller and wear ring clearance	I			I		
Sacrificial anode	(6)					
HULL/BODY						
Ride plate and water intake grate	I			I		*BODY/HULL*
Drain plugs (inside bilge), check for obstructions	I			I		
Hull	I			I		
Ski/wakeboard post and fasteners	I					

(1) In fresh water, perform for storage period or after 100 hours of use whichever comes first. In salt water use, lubricate drive shaft as indicated to protect it from corrosion.

(2) Including intercooler on supercharged models.

(3) Daily flushing in salt water or foul water use.

(4) The supercharger requires replacement when the MAINTENANCE SUPERCHARGER message is displayed on the information center every 100 hours of operation or earlier depending on the riding style (speed, engine RPM's, water conditions). This is determined by the engine management system. The supercharger will need to be replaced within 5 hours of the message display by an authorized Sea-doo dealer.

(5) IMPORTANT: When use in salt water, the throttle body lubrication is highly recommended after every 10 hours of use. Failure to perform lubrication will result in damage to the throttle body.

6) In salt water use.

CAUTION: Never clean fiberglass and plastic parts with strong detergent, degreasing agent, paint thinner, acetone, etc.

- If the watercraft is to be stored outside, cover it with an opaque tarpaulin to prevent sun rays and grime from affecting the plastic components, watercraft finish as well as preventing dust accumulation.

CAUTION: The watercraft must never be left in water for storage. Never leave the watercraft stored in direct sunlight.

ANTICORROSION TREATMENT

- Wipe off any residual water in the engine compartment.
- Spray BOMBARDIER LUBE lubricant over all metallic components in engine compartment.
- Lubricate the throttle cable with BOMBARDIER LUBE lubricant.
- Apply an anticorrosion product (P/N 219 700 304) on drive shaft. Refer to PROPULSION is appropriate *SHOP MANUAL*.

NOTE: The seat should be partially left opened during storage. This will avoid engine compartment condensation and possible corrosion.

CHECK LIST

OPERATION	✔
Propulsion System	
Fuel System	
Engine Oil and Filter Change	
Exhaust Cooling System Flushing	
Close Loop Cooling System (engine)	
Engine Lubrication	
Throttle Body Lubrication	
Intercooler and Exhaust Manifold Antifreeze Protection	
Battery	
Watercraft Cleaning	
Anticorrosion Treatment	

Symptom: ENGINE SMOKE IN THE EXHAUST (BLUE SMOKE AT ENGINE STARTING) (cont'd)

2. **Oil rings worn out**
   - *Replace rings, refer to CYLINDER BLOCK.*

Symptom: ENGINE SMOKE IN THE EXHAUST (BLUE SMOKE WITH ENGINE UNDER LOAD)

1. **Oil rings**
   - *Replace oil rings, refer to CYLINDER BLOCK.*

Symptom: LOW OR NO ENGINE OIL PRESSURE

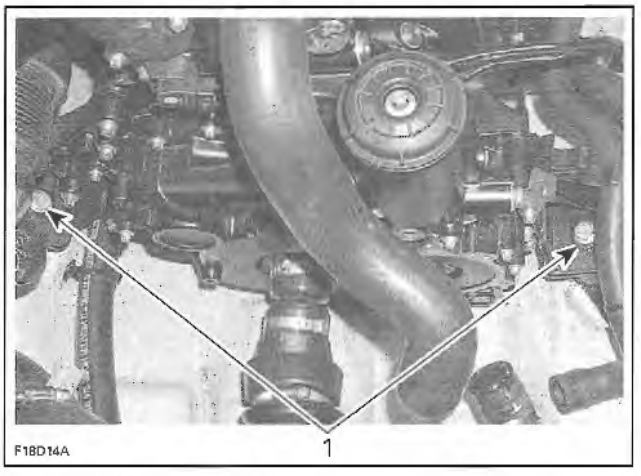
1. **Oil level too low**
   - *Refill. See LUBRICATION SYSTEM.*
2. **Leaking gasket**
   - *Replace.*
3. **Oil leaking out of leak indicator hole (PTO housing)**
   - *Replace oil seal on pump shaft.*
4. **Oil pressure sensor defective**
   - *Check/replace.*
5. **Oil pump malfunctioning**
   - *Clean rotor and check wear limits.*
6. **Oil regulator valve sticks open, or spring load too small**
   - *Clean/replace.*
7. **Heavy wear on plain bearings**
   - *Replace.*

Symptom: ENGINE OIL CONTAMINATION (MILKY)

1. **Oil seal and rotary seal on water pump shaft leaking**
   - *Replace both seals. Refer to PTO HOUSING AND MAGNETO. Change oil.*
2. **Cylinder head gasket leaking**
   - *Replace gasket. Refer to CYLINDER HEAD. Change oil.*
3. **Loose screws on cylinder head, PTO housing or oil separator**
   - *Retorque. Change oil.*
4. **Oil contamination due to metal or plastic particles**
   - *Replace possibly damaged parts. Change oil.*
5. **Water ingestion**
   - *Refer to SPECIAL PROCEDURES.*
6. **Leak indicator hole plugged**
   - *Check/clean leak indicator hole.*

Symptom: UNUSUAL ENGINE NOISE AND/OR VIBRATION

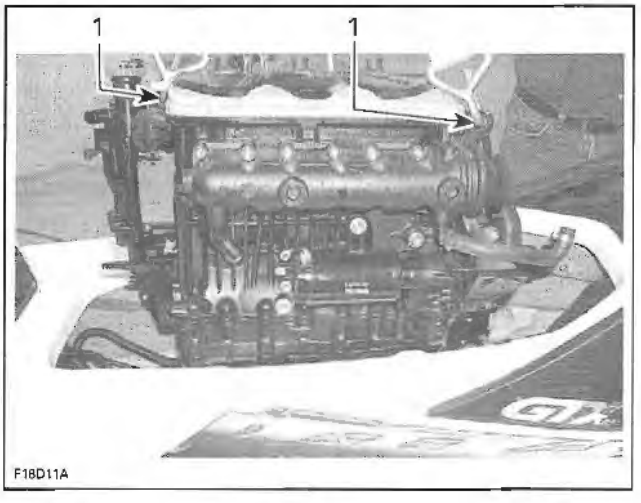
1. **Worn chain tensioner**
   - *Replace.*
2. **Worn chain guide**
   - *Replace.*



REAR SUPPORT
1. Remove screws

Using a chain block, a hoist or other suitable equipment, slightly lift engine to ease the remaining component removal.

CAUTION: Take care not to damage cables.

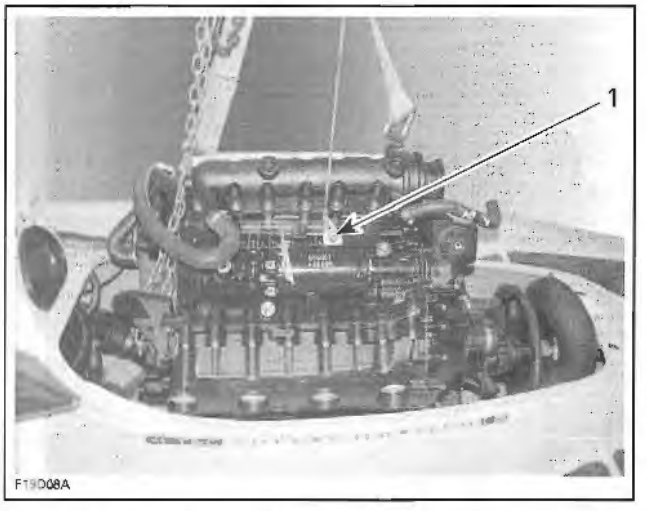


TYPICAL
1. Lifting brackets

RXP Models

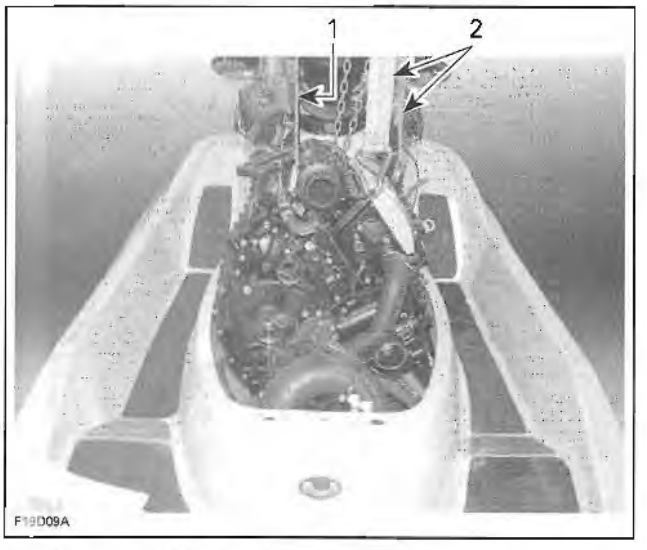
Slightly move engine rearward to take advantage of the larger opening.

The engine have to be hooked-up at an additional location. See illustration.



1. Hook-up a steel rope/chain here

Carefully lift engine by the side with the steel rope/chain and rotate engine so that it can be pulled out of vehicle.



1. Lift steel rope/chain here to rotate engine
2. Usual lifting brackets

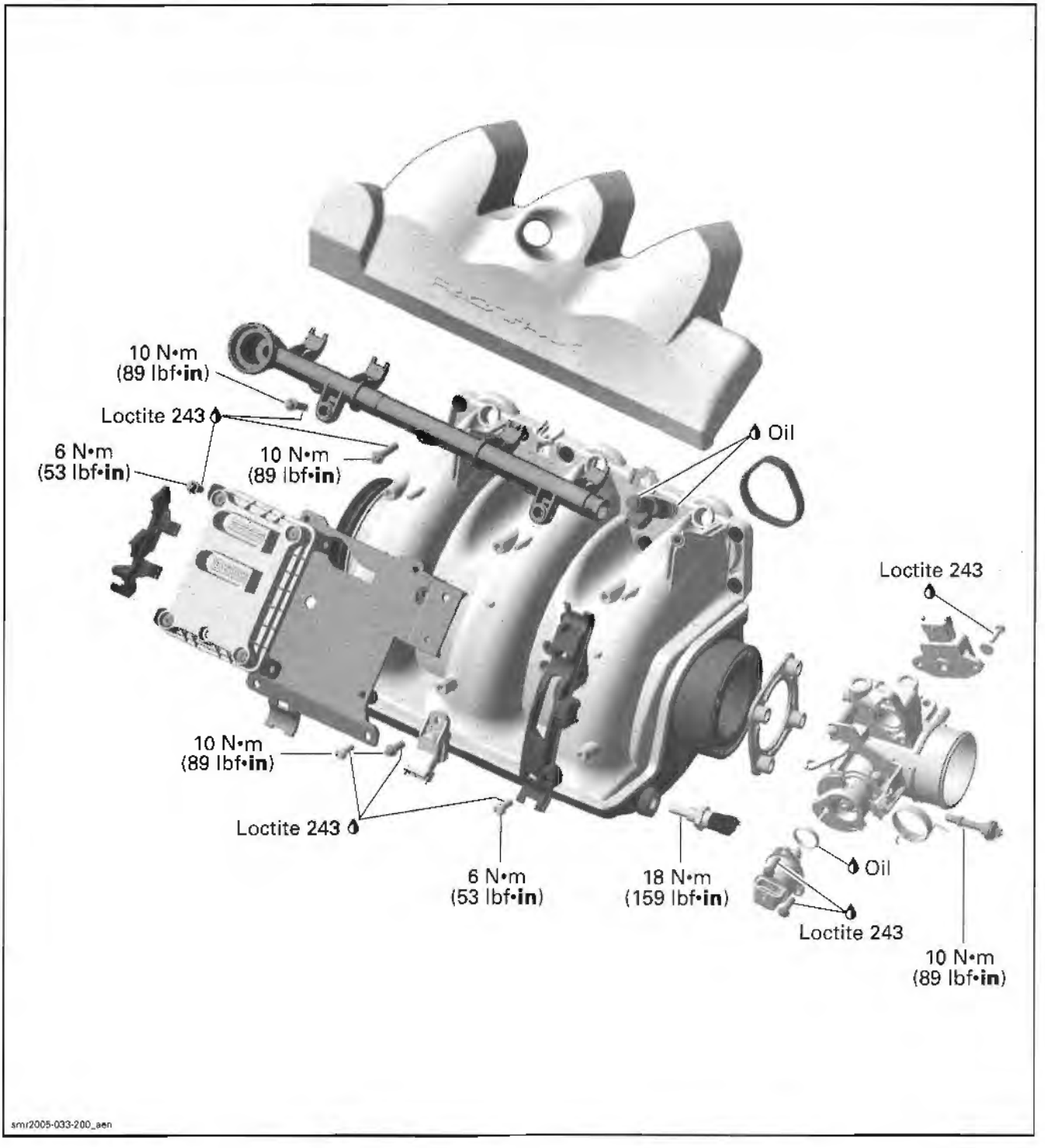
All Models

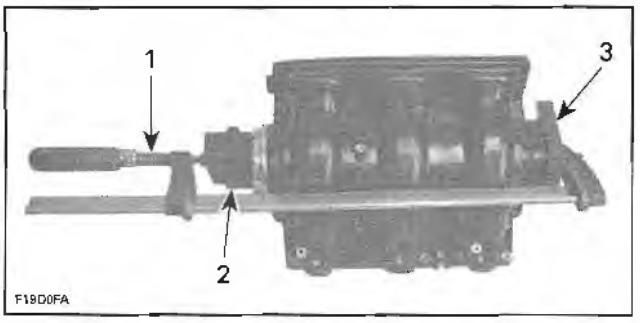
Carry on engine lifting to remove from the body opening.

CAUTION: Be careful not to scratch body or to hit any component.

Disconnect RED (+) cable from starter post.

130/155 Naturally Aspirated Engines

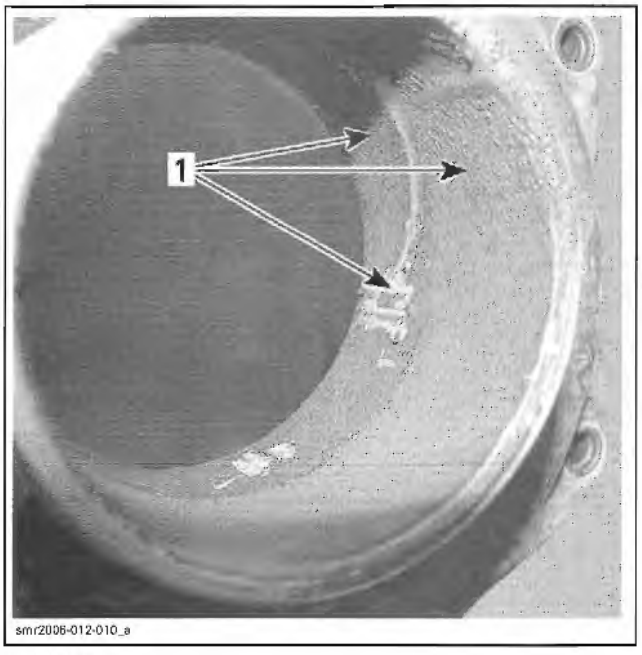




1. Clamp
2. Plastic block between nipples
3. Plastic block

Reinstall collar.

Reinstall intake manifold.



1. Dirt here

If dirt is found, proceed as follows.

Remove supercharger and perform the clutch slipping moment test. Inspect bearings and friction clutch. Replace bearings/clutch components as necessary.

Separate supercharger housing.

NOTE: Since supercharger is disassembled, it is recommended to completely inspect it.

Clean internal housing and turbine using a brush and cleaning solvent to get rid of oil deposits.

Blow dry with compressed air.

CAUTION: Do not let turbine spin when using compressed air.

Complete usual assembly procedures as described in this section.

SUPERCHARGER CLUTCH SLIPPING MOMENT (ON ENGINE)

All RXP Supercharged Models

Remove the engine cover. Refer to *BODY* section.

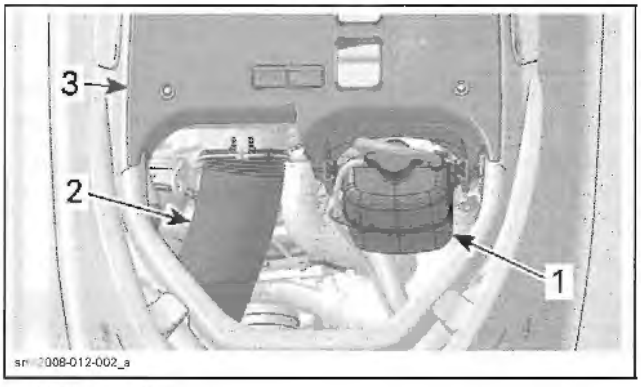
Move the coolant tank aside.

All Supercharged Models (except RXP)

Detach the vent tube.

Move the coolant tank aside.

Remove the vent tube support.

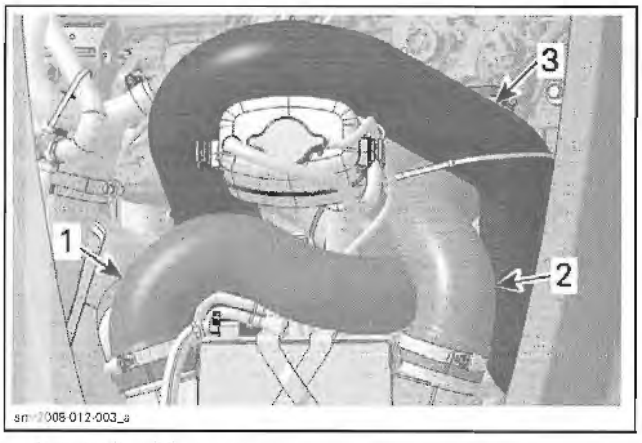


1. Coolant tank
2. Vent tube
3. Vent tube support

All RXP Supercharged Models

Disconnect intercooler air hoses.

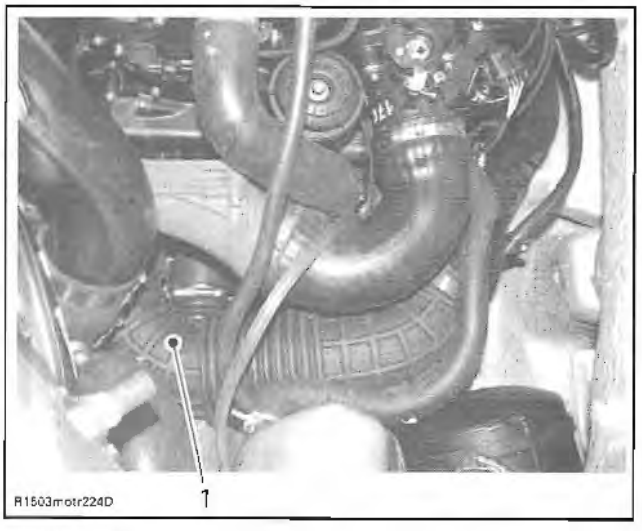
Remove the exhaust inlet hose.



1. Intercooler air inlet hose
2. Intercooler air outlet hose
3. Exhaust inlet hose

All Supercharged Models

Remove air inlet hose from supercharger.



1. Inlet hose

CAUTION: No other grease can be used, otherwise damage to bearings will occur.

Install the 40 needle bearings on the compressor shaft.

NOTE: The 40 needle bearings comes in a wax strip with an adhesive backing.

Remove the adhesive backing.

Install the drive gear over the needle bearings.

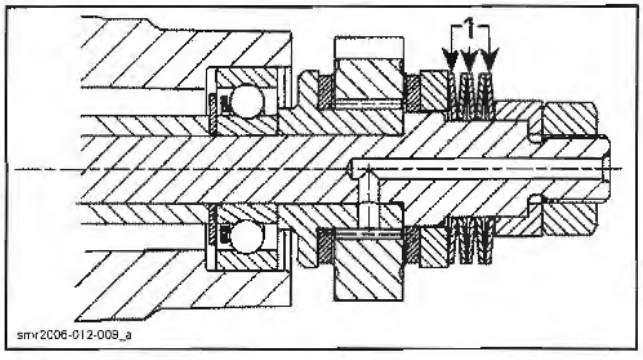
Install the second titanium shim.

Install the lock washer.

Apply engine oil to the spring washers.

Position the spring washers as per illustration.

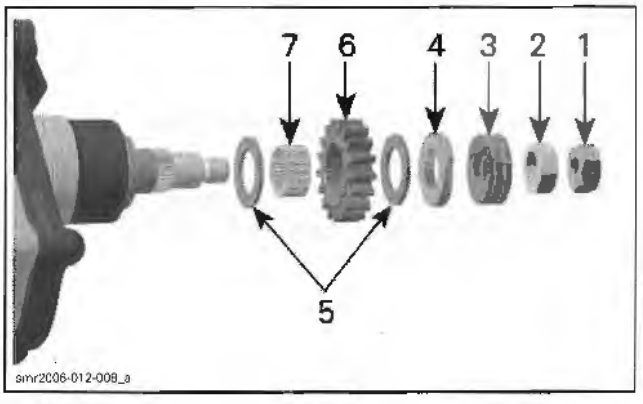
CAUTION: When installing the spring washers, take care of the exact installation direction of the washers.



1. Spring washers

Install the L-ring on the compressor shaft.

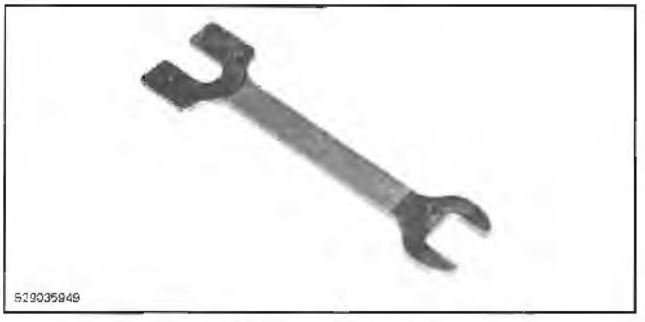
Apply Loctite 243 (blue) (P/N 293 800 060) on the hexagonal nut threads. Torque to 30 N•m (22 lbf•ft).



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

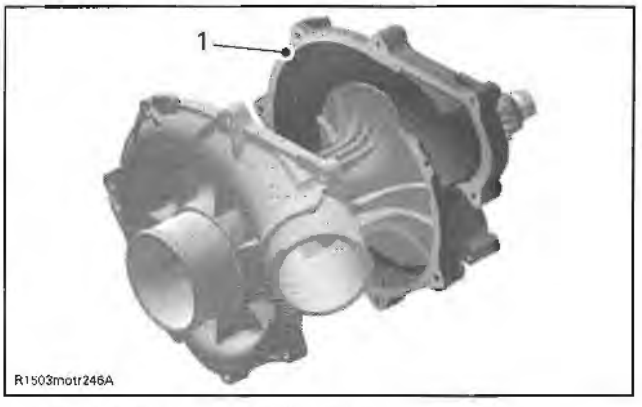
NOTE: The L-ring will preload the spring washers.

Hold the lock washer of the supercharger shaft (engine side) using the retaining key (P/N 529 036 027).



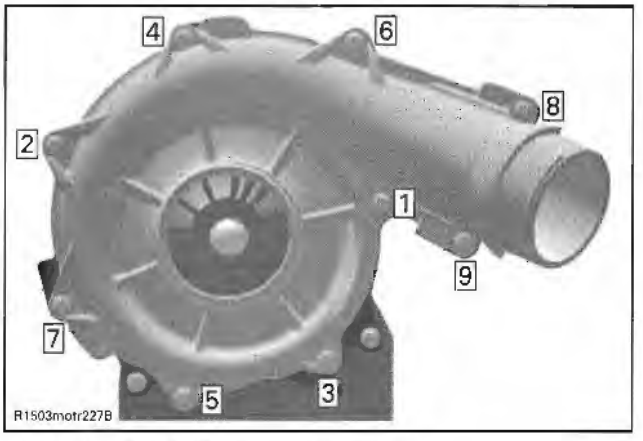
Tighten the cap nut to 30 N•m (22 lbf•ft).

Apply Loctite 5910 (P/N 293 800 081) on supercharger housing sealing surface.



1. Apply Loctite 5910 on sealing surface

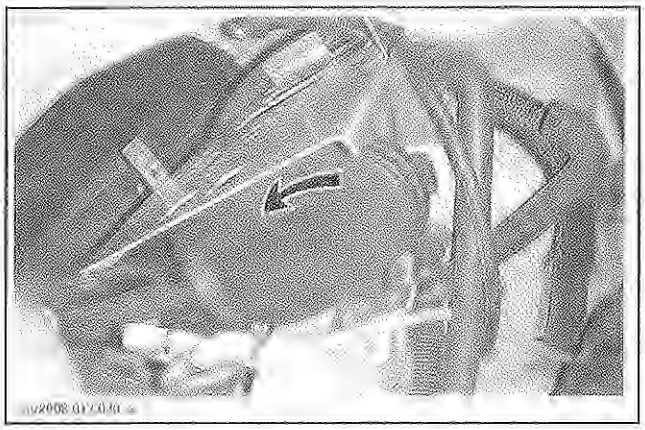
Assemble supercharger housing halves. Apply Loctite 243 (blue) (P/N 293 800 060) on retaining screws and torque to 11 N•m (97 lbf•**in**) according to the following sequence.



SUPERCHARGER TIGHTENING SEQUENCE

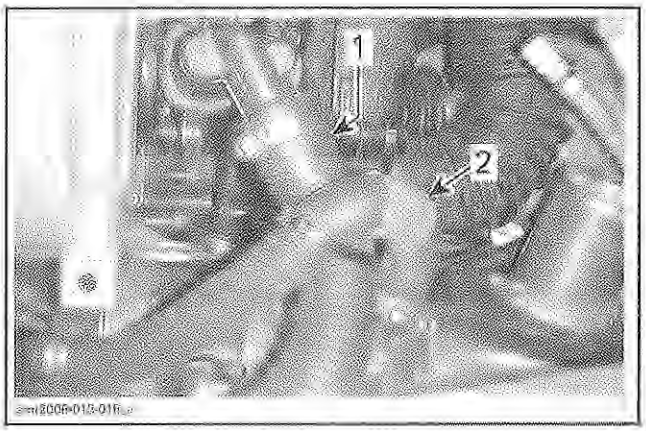
Perform the clutch slipping moment test. Refer to *SUPERCHARGER CLUTCH SLIPPING MOMENT (BENCH TEST)* in this section.

Turn intercooler support and VTS toward the RH side to make room.



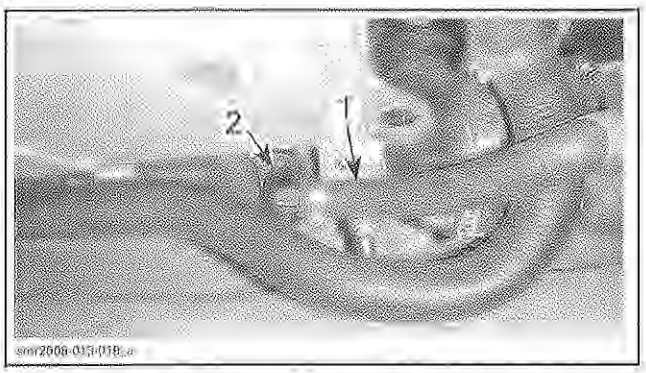
All Models

Cut locking tie securing TOPS valve hose and exhaust manifold water outlet hose.



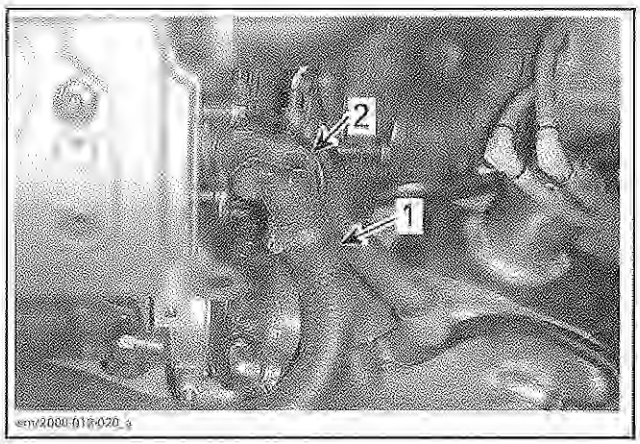
1. *TOPS valve hose*
2. *Exhaust manifold water outlet hose*

Disconnect the upper water outlet hose from the exhaust manifold.



1. *Exhaust manifold water outlet hose*
2. *Exhaust manifold fitting*

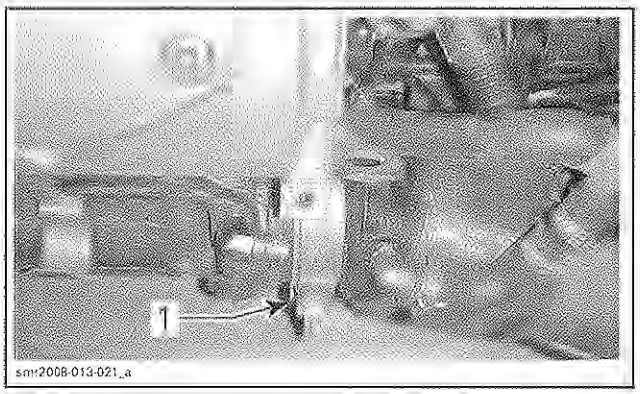
Gently disconnect the TOPS valve hose from TOPS valve.



1. *TOPS valve hose*
2. *TOPS valve*

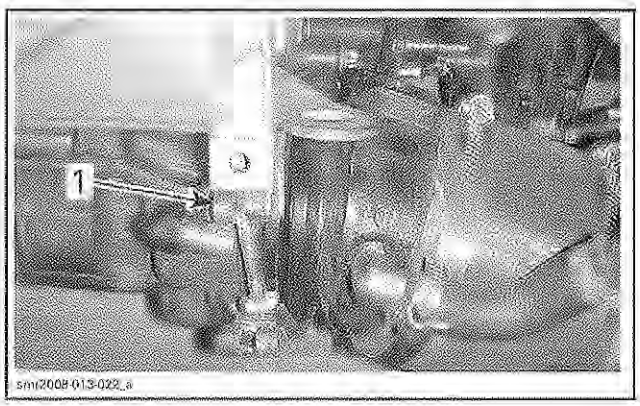
Unscrew exhaust clamp.

CAUTION: Do not use pneumatic or electric tools as seizure may occurs.



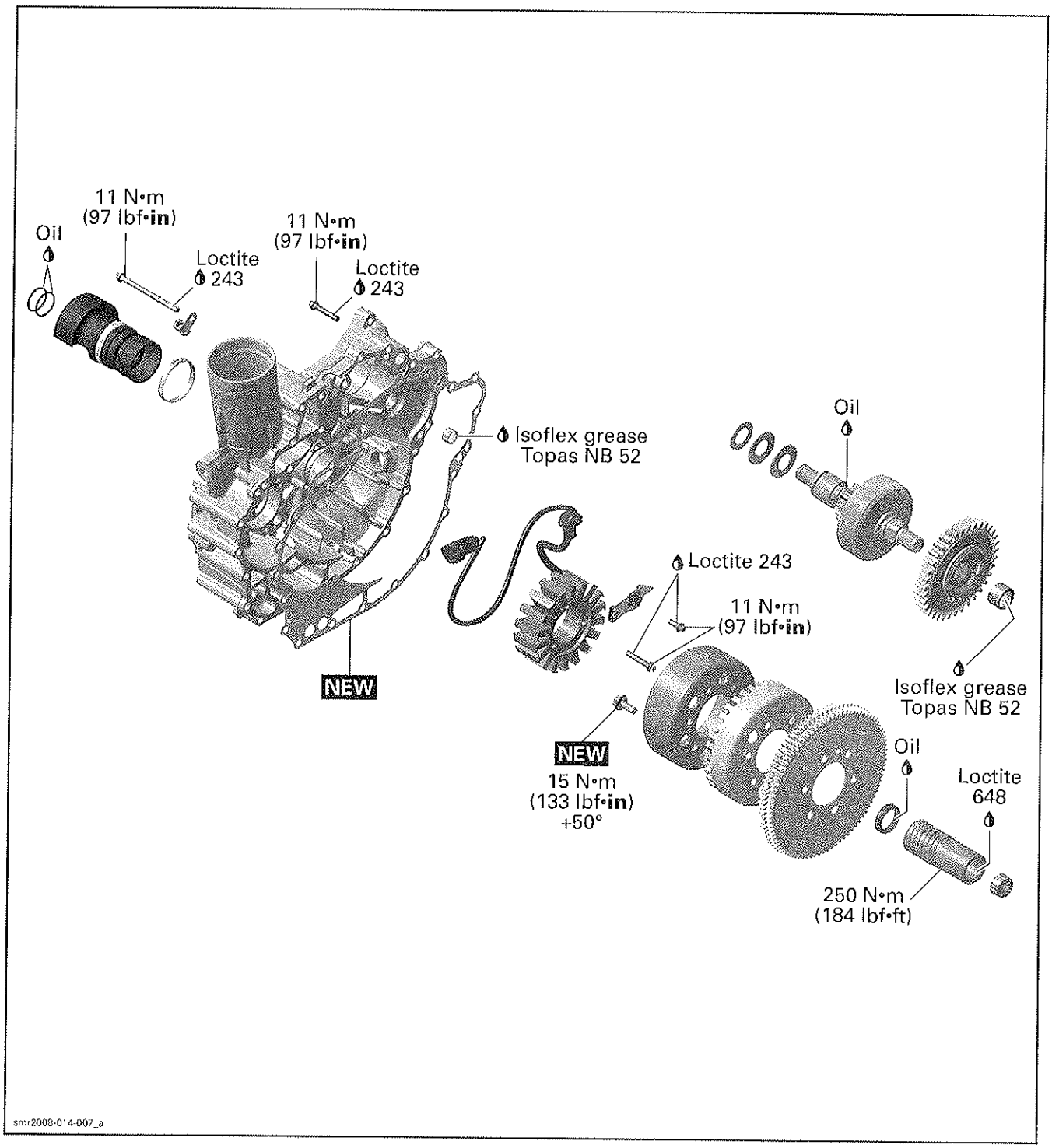
1. *Exhaust clamp*

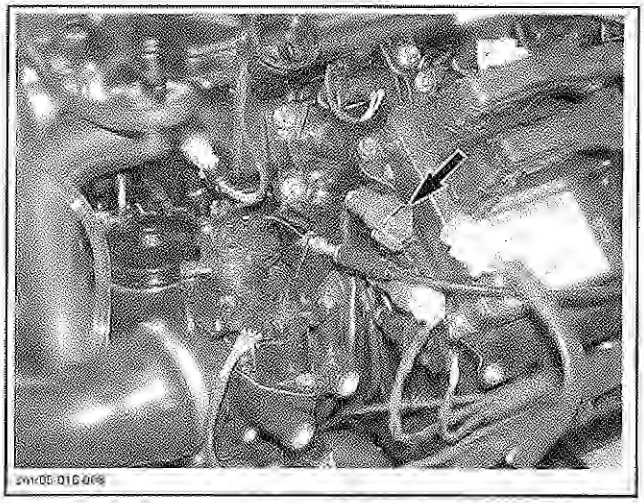
Move exhaust clamp on exhaust manifold.



1. *Opened exhaust clamp on exhaust manifold*

Unplug the exhaust gas temperature sensor (EGTS) from muffler.


11 N•m
(97 lbf•in)
Oil
Loctite
243
11 N•m
(97 lbf•in)
Loctite
243
Isoflex grease
Topas NB 52
Oil
Loctite 243
11 N•m
(97 lbf•in)
NEW
NEW
15 N•m
(133 lbf•in)
+50°
Isoflex grease
Topas NB 52
Oil
Loctite
648
250 N•m
(184 lbf•ft)
smr2008-014-007_a



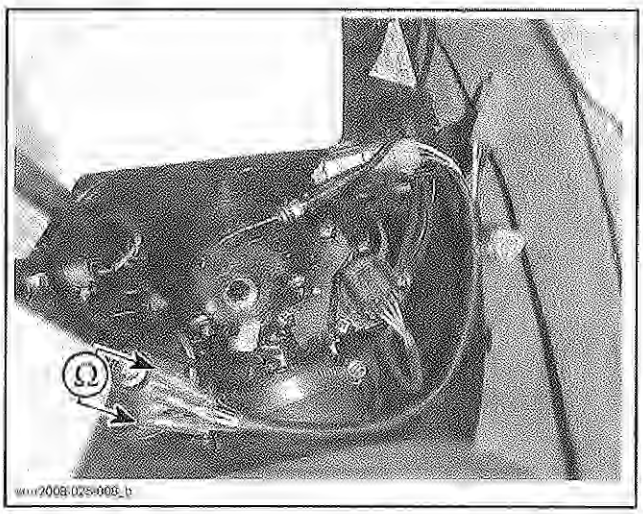
TYPICAL – ENGINE COVER REMOVED FOR CLARITY OF ILLUSTRATION

Install the 3-pin magneto harness adapter (P/N 529 036 016) onto the magneto connector.

NOTE: Do not connect the magneto harness adapter to the vehicle harness connector.

Set multimeter to Ω.

Connect multimeter between each pair of YELLOW wires.



STATOR CONTINUITY TEST (ENGINE COVER INSTALLED)

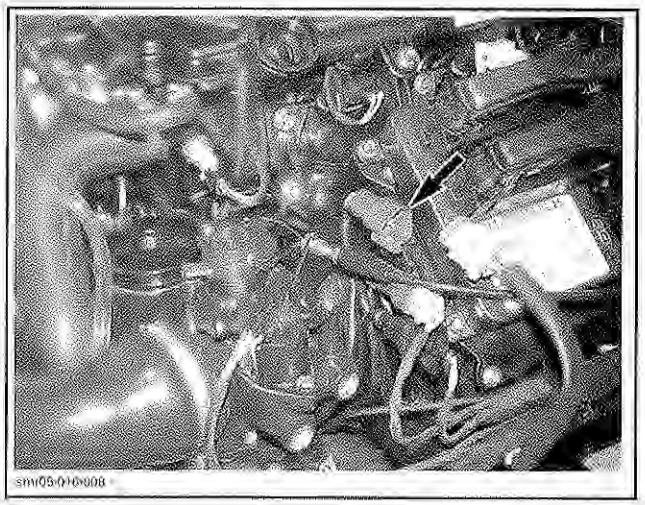
Read resistance.

STATOR CONTINUITY TEST	
TERMINAL	RESISTANCE @ 20°C (69°F)
1 and 2	0.1 - 1 Ω
1 and 3	
2 and 3	

If any result is out of specification, replace stator.

Stator Insulation Test

Disconnect the magneto wiring harness connector.



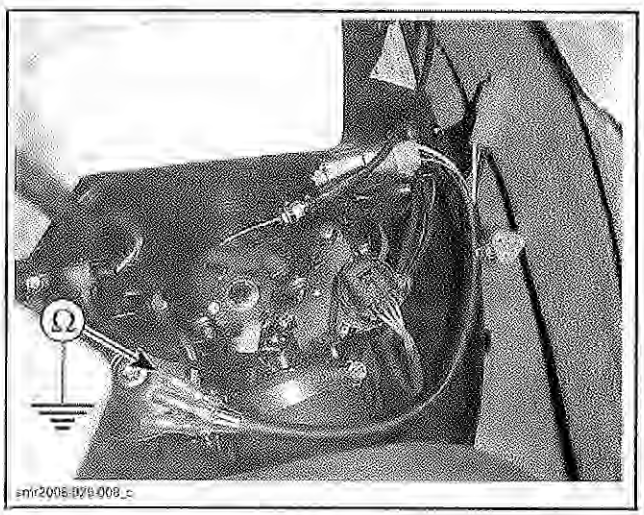
TYPICAL – ENGINE COVER REMOVED FOR CLARITY OF ILLUSTRATION

Install the 3-pin magneto harness adapter (P/N 529 036 016) onto the magneto connector.

NOTE: Do not connect the magneto harness adapter to the vehicle harness connector.

Set multimeter to Ω.

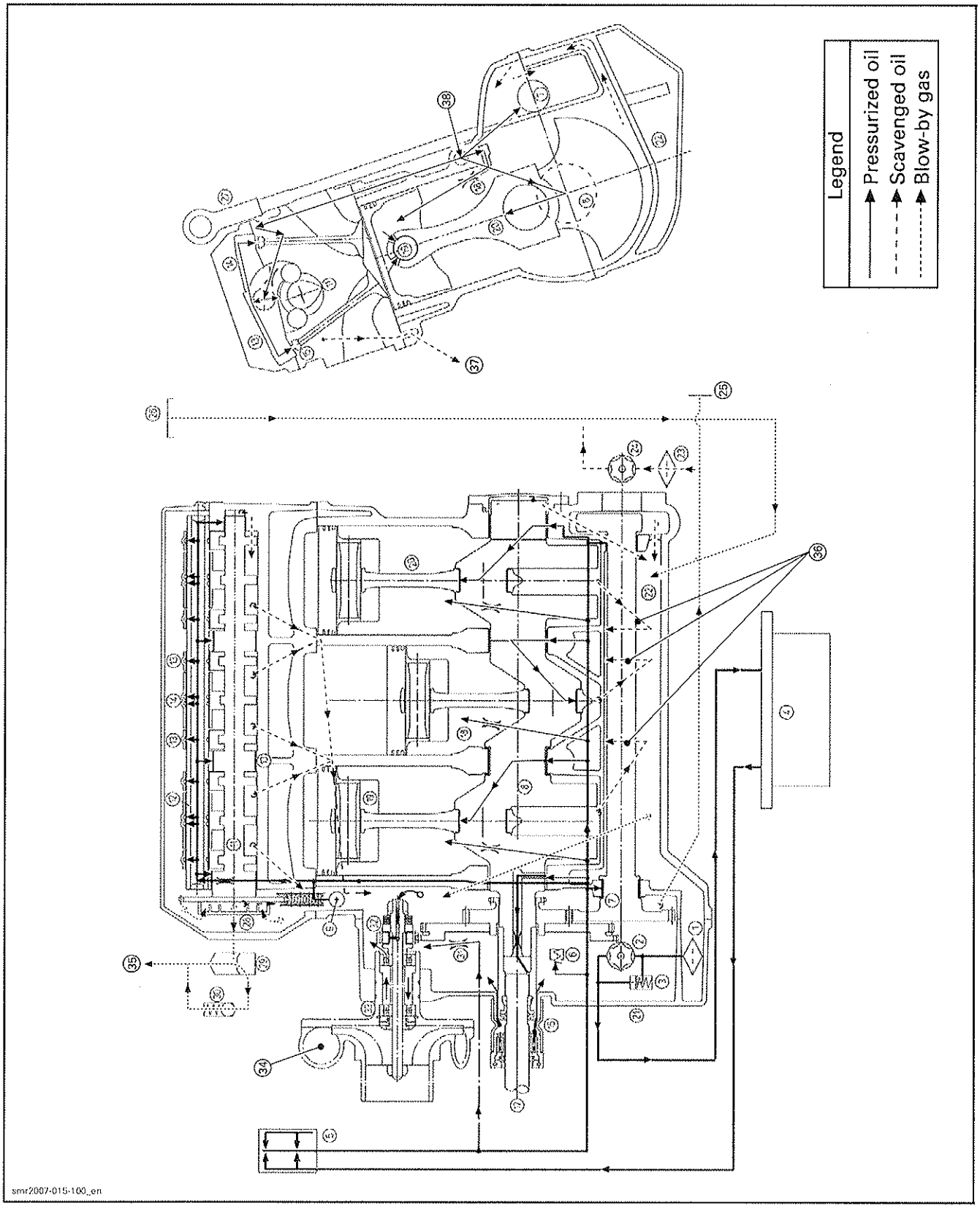
Connect multimeter between any YELLOW wire and engine ground.

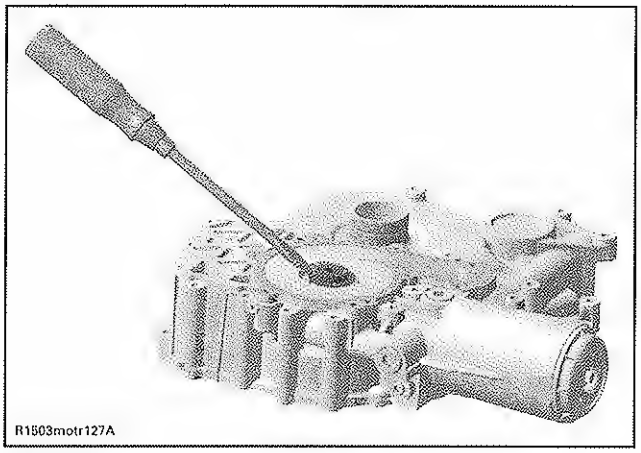


STATOR INSULATION TEST (ENGINE COVER INSTALLED)

Read resistance.

ENGINE OIL FLOW

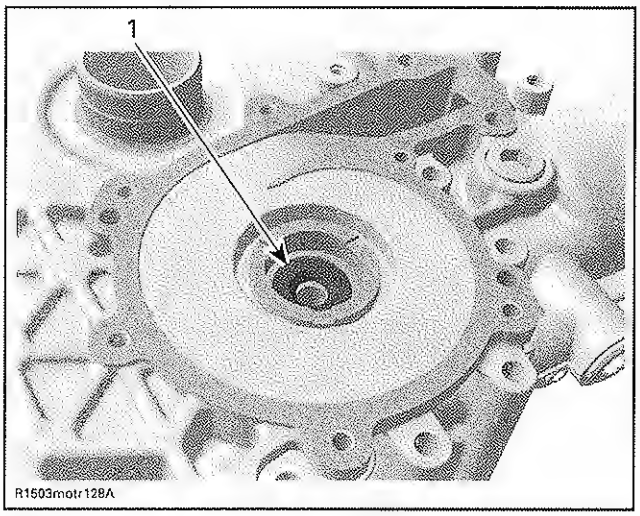




TYPICAL

CAUTION: Be careful not to damage the surface of the rotary seal bore in PTO housing cover.

- Remove and discard the oil seal behind rotary seal.

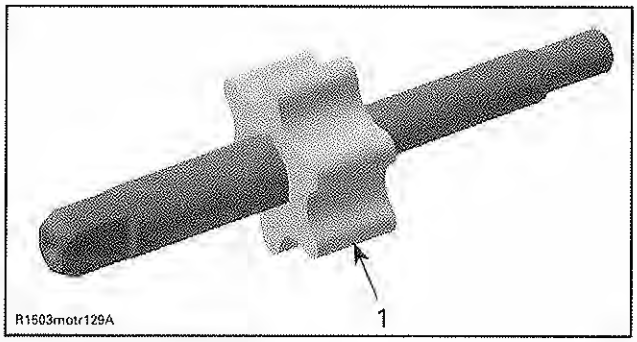


1. Oil seal

Oil Pressure Pump Inspection

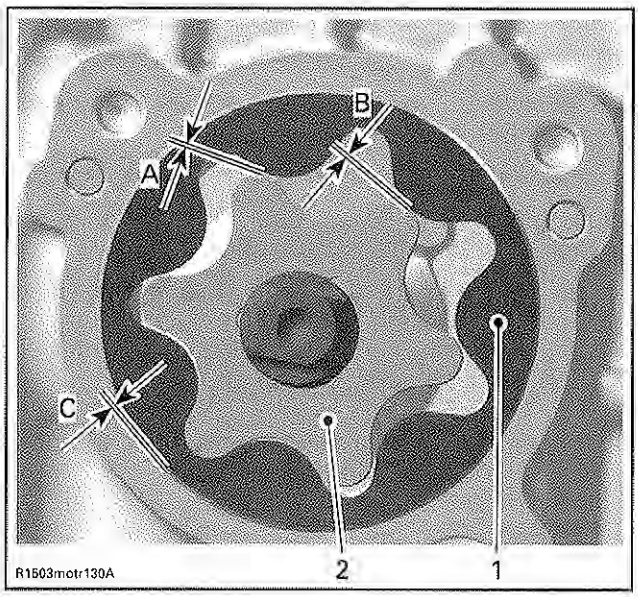
Inspect oil pump shaft, housing and cover for marks or other damages.

Check inner rotor for corrosion pin-holes or other damages. If so, replace oil pump shaft. Ensure to also check oil pump housing and cover and replace if damaged.



1. Pittings on the teeth

Using a feeler gauge, measure the clearance between inner and outer rotors.



1. Outer rotor
2. Inner rotor

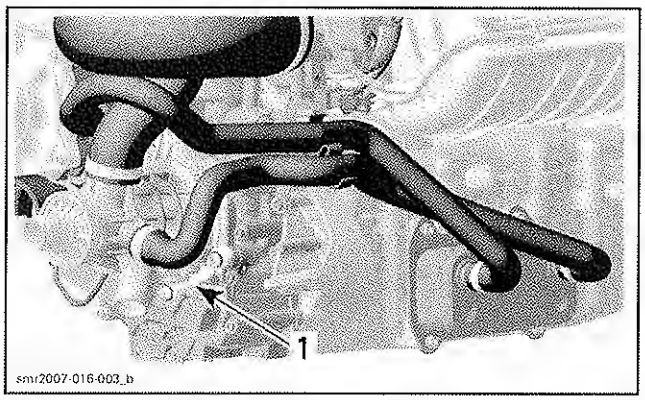
OUTER AND INNER ROTOR CLEARANCE	
SERVICE LIMIT	
A	0.25 mm (.009 in)
B	
C	

If clearance between inner and outer rotors exceeds the tolerance, replace water/oil pump shaft. Ensure to also check oil pump housing and cover and replace if damaged.

If clearance between outer rotor and its bore in oil pump exceeds the tolerance, replace the complete oil pump and the PTO housing.

Using a vernier depth gauge, measure side wear as shown.

WATER PUMP HOUSING



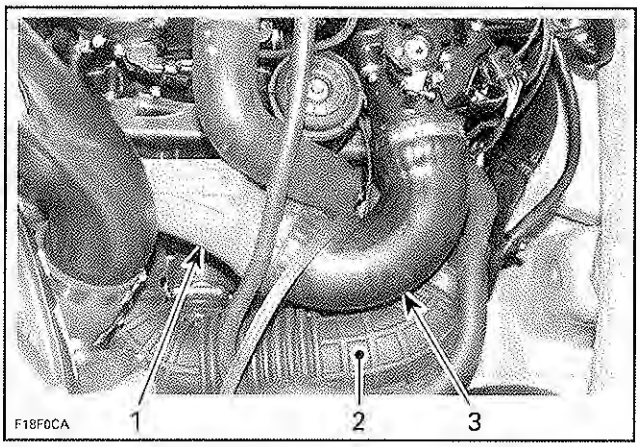
1. *Water pump housing*

Water Pump Housing Removal

215 and 255 Engines

On **255 engine models**, remove both air hoses from intercooler to reach supercharger.

Remove supercharger inlet and outlet hoses to make room.



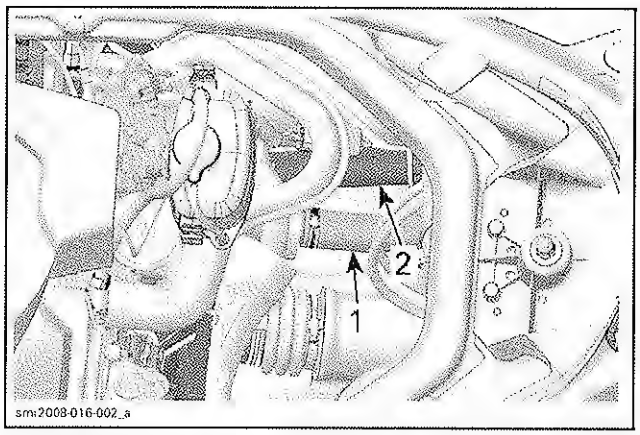
1. *Supercharger*
2. *Inlet hose*
3. *Outlet hose*

All Engines

Drain cooling system and engine oil.

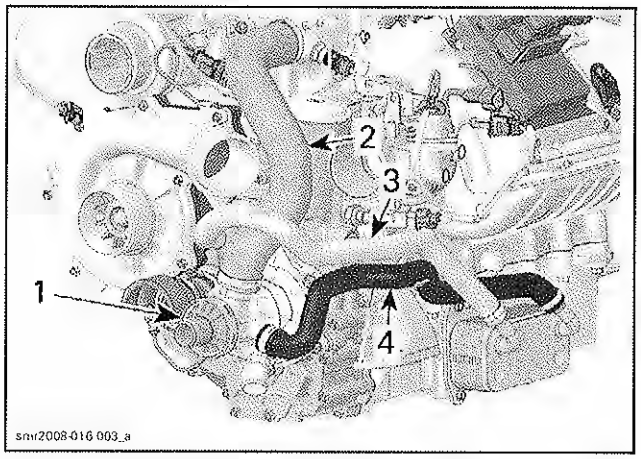
Disconnect the coolant expansion tank hose from water pump housing.

Disconnect ride plate hoses from water pump housing.



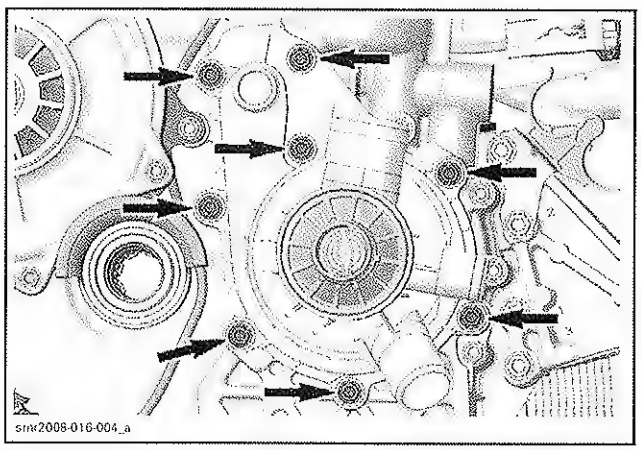
1. *Ride plate inlet hose*
2. *Ride plate outlet hose*

Disconnect the cylinder head outlet hose and oil cooler hoses.



1. *Water pump housing*
2. *Cylinder head hose*
3. *Oil cooler inlet hose*
4. *Oil cooler outlet hose*

Remove water pump housing screws.



Pull the water pump housing to remove it.

Measure rocker arm inside diameter. If diameter is out of specification, change the rocker arm assembly.

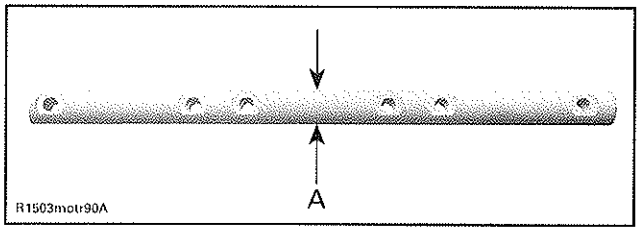
ROCKER ARM INSIDE DIAMETER	
NEW	20.007 - 20.020 mm (.7877 - .7881 in)
SERVICE LIMIT	20.035 mm (.7887 in)

Press the hydraulic lifter with your thumb. If the hydraulic lifter can be fully pressed in, replace rocker arm. Lifter must turn freely in rocker arm bore. Otherwise, replace.

Rocker Arm Shaft

Check for scored friction surfaces, if so, replace parts.

Measure rocker arm shaft diameter.

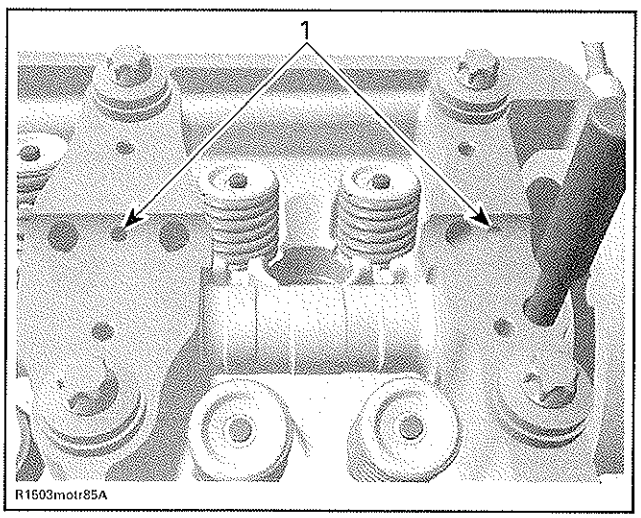


A. Measure rocker arm shaft diameter here

ROCKER ARM SHAFT DIAMETER	
NEW	19.980 - 19.993 mm (.7866 - .7871 in)
SERVICE LIMIT	19.965 mm (.7860 in)

Any area worn excessively will require parts replacement.

Verify and clean oil passages to ensure a good rocker arm shaft lubrication.



1. Oil supply from the camshaft to the rocker arm shaft, then to the rocker arms and finally to the valve adjustment

Rocker Arms Installation

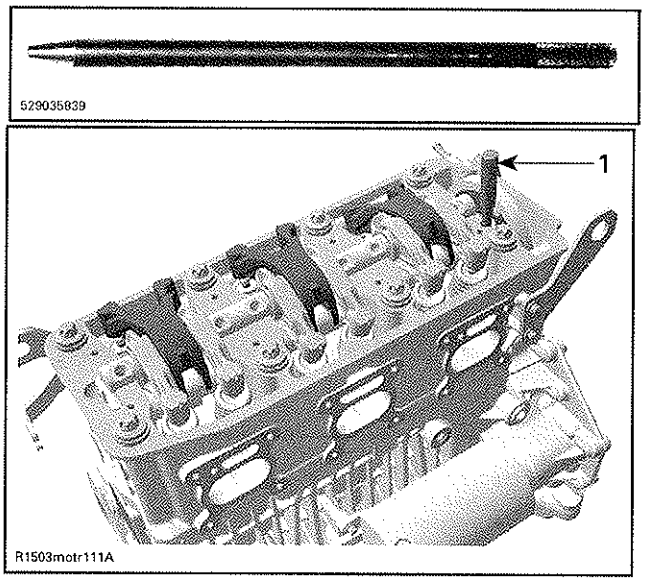
For installation, reverse the removal procedure. Pay attention to the following details.

Apply engine oil on rocker arm shaft.

IMPORTANT: The rocker arm shaft can only be installed in one specific position. Therefore crankshaft as well as camshaft has to be positioned with their locking pins when the piston of cylinder no. 3 is on ignition TDC. Refer to *CYLINDER BLOCK* section for crankshaft and the following for the camshaft locking.

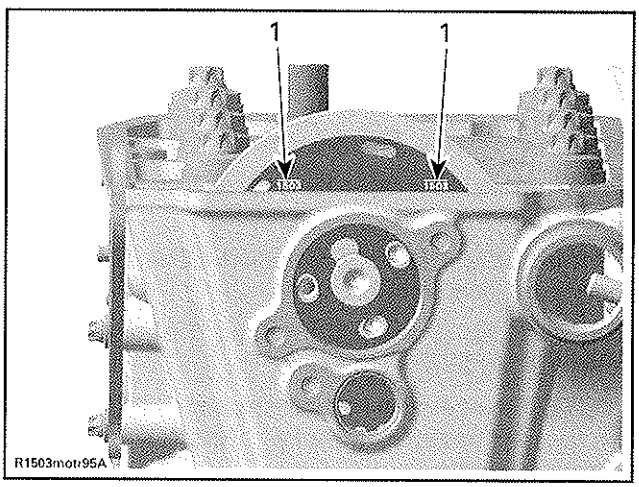
NOTE: Cylinder no. 3 is next to the oil filler tube.

Rotate camshaft so that the camshaft locking tool (P/N 529 035 839) can be pushed in camshaft hole and lock camshaft in place.

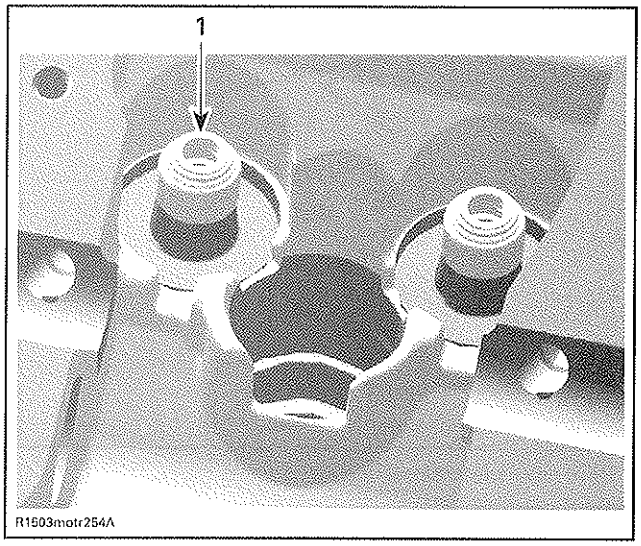


1. Camshaft locking tool

Then, the camshaft sprocket lines should be lined up as shown in the following illustration.



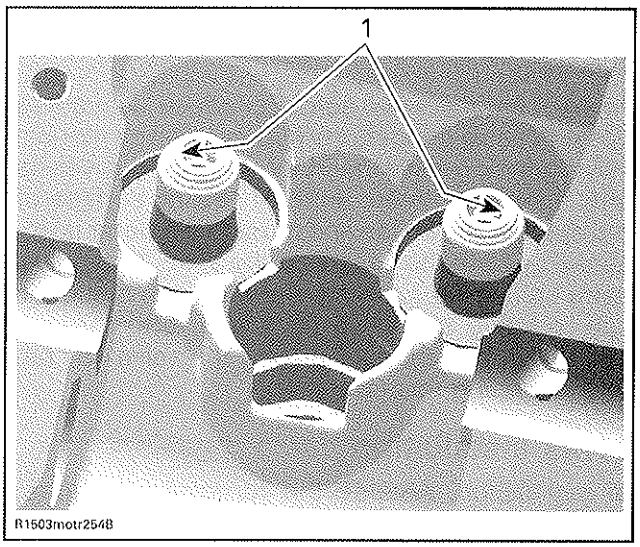
1. Position lines



1. Valve stem seal

Apply engine oil on valve stem and install valve.

CAUTION: Be careful when valve stem is passed through sealing lips of valve stem seal.



1. Sealing lips of valve stem seal

To ease installation of cotters, apply oil or grease on them so that they remain in place while releasing the spring.

After springs are installed, ensure valve springs and valve spring retainer are properly locked by tapping on valve stem end with a soft hammer so that valve opens and closes a few times.

CAUTION: An improperly locked valve spring will cause engine damage.

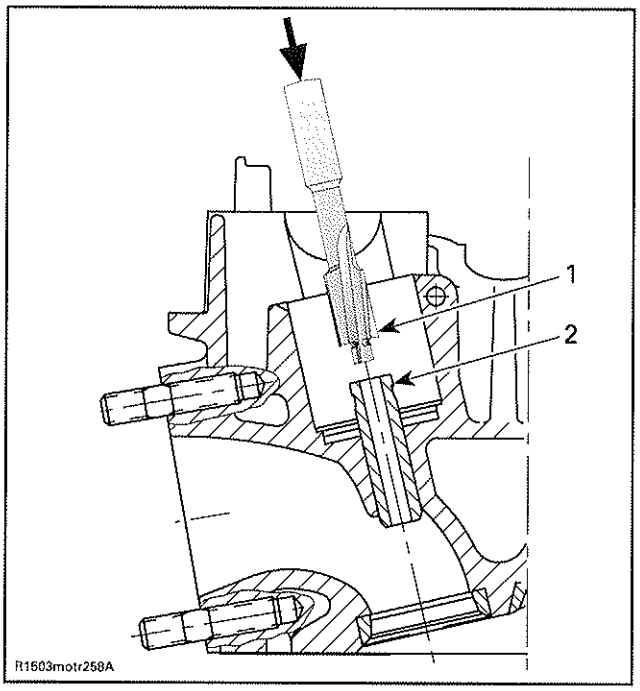
VALVE GUIDES

Valve Guide Replacement

CAUTION: Do not heat cylinder head for this procedure.

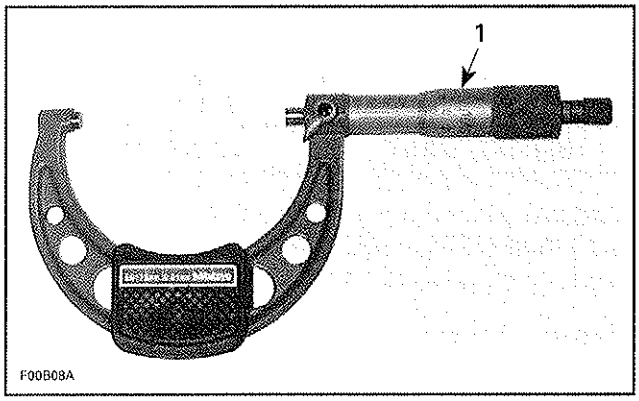
CAUTION: The sharp edge near the top of the valve guide must be machined away. Otherwise it will foul the valve guide hole in the cylinder head and destroy the cylinder head, as the valve guide is removed.

Use a special reamer as far as the top of the notch.



TYPICAL
1. Special reamer
2. Notch

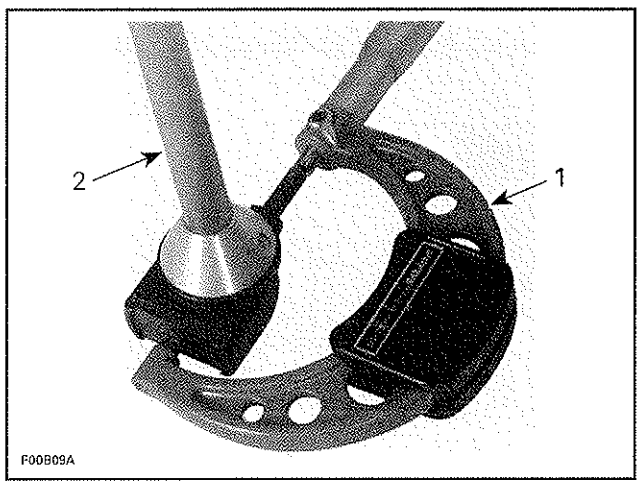
Chase valve guide out of the cylinder head towards combustion chamber by using valve guide remover (P/N 529 036 086).



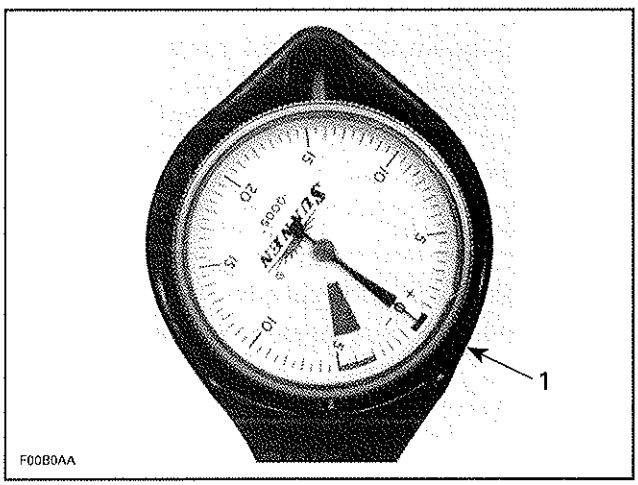
1. Micrometer set to the piston dimension

NOTE: Make sure used piston is not worn.

With the micrometer set to the dimension, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0 (zero).



1. Use the micrometer to set the cylinder bore gauge
2. Dial bore gauge



TYPICAL
1. Indicator set to 0 (zero)

NOTE: Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

Position the dial bore gauge 62 mm (2.44 in) above cylinder base, measuring perpendicularly (90°) to piston pin axis.

Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance.

PISTON/CYLINDER CLEARANCE mm (in)	
NEW NOMINAL	0.024 - 0.056 (.0009 - .0022)
SERVICE LIMIT	0.090 (.004)

If clearance exceeds specified tolerance, re-hone cylinder sleeve and replace piston by an oversize one.

NOTE: It is not necessary to have all pistons replaced with an oversize if they are not all out of specification. Mixed standard size and oversize piston are allowed.

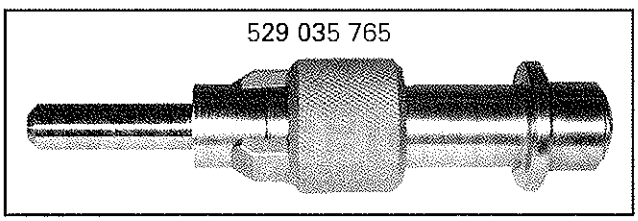
Pistons/Connecting Rods Assembly

For installation, reverse the removal procedure. Pay attention to the following details.

Apply engine oil on the piston pin.

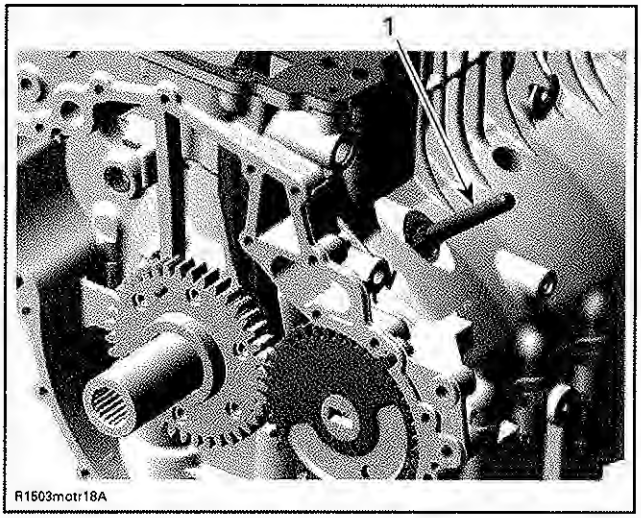
Insert piston pin into piston and connecting rod.

Use the piston circlip installer (P/N 529 035 765) to assemble the piston circlip.



CAUTION: Secure piston pin with new piston circlips.

NOTE: Take care that the hook of the piston circlip is positioned properly.



1. Crankshaft locking tool

CYLINDER BLOCK

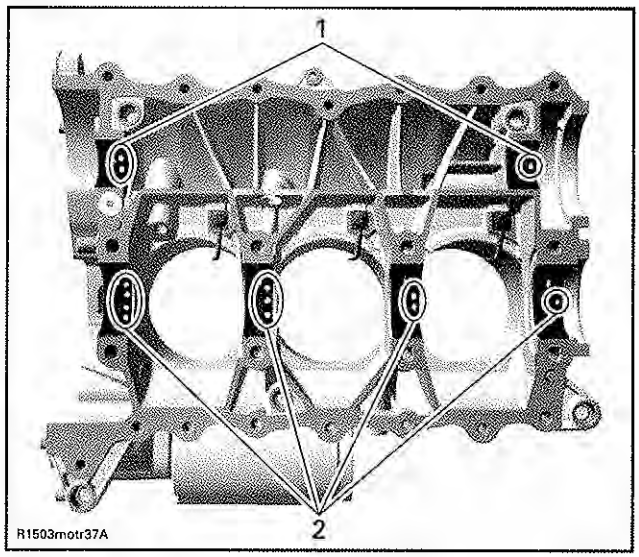
Cylinder Block Disassembly

Remove:

- Engine oil (refer to *LUBRICATION SYSTEM* section)
- Engine from vehicle (refer to *ENGINE REMOVAL/INSTALLATION* section)
- Cylinder head (refer to *CYLINDER HEAD* section)
- PTO housing (refer to *PTO HOUSING AND MAGNETO* section)
- Starter gear (refer to *PTO HOUSING AND MAGNETO* section)
- Starter drive
- Oil suction pump (refer to *LUBRICATION SYSTEM* section)
- Balancer shaft (refer to *BALANCER SHAFT* elsewhere in this section)
- Crankshaft (refer to *CRANKSHAFT* elsewhere in this section)
- Piston with connecting rod (refer to *PISTONS/CONNECTING RODS* elsewhere in this section).

Bearings

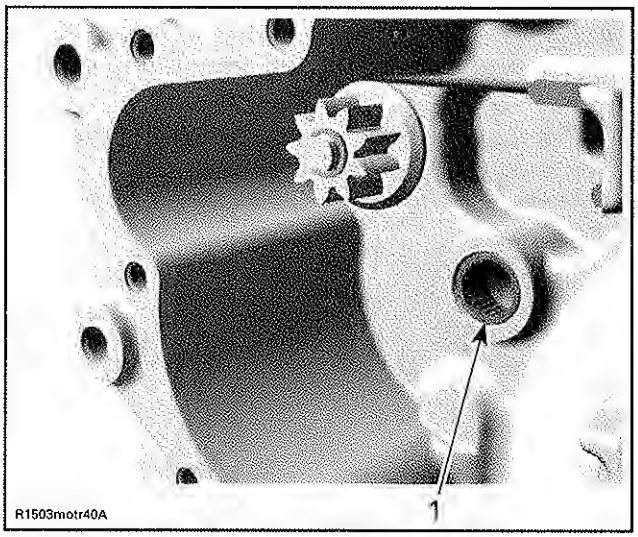
When bearings need to be removed from the cylinder block, mark them to identify the correct position at installation. See the following illustration for an example:



1. Mark on balancer shaft bearings
2. Mark on crankshaft bearings

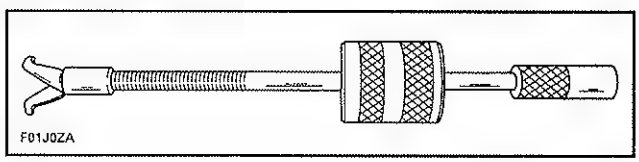
Starter Drive Bearing

Check bearing no. **21** of starter drive assembly no. **22** in cylinder block and replace it if damaged.



TYPICAL
1. Bearing of starter drive assembly

Starter drive bearing can be easily removed from crankcase lower half using the a small slide hammer such as the Snap-on small slide hammer (P/N CJ93B).



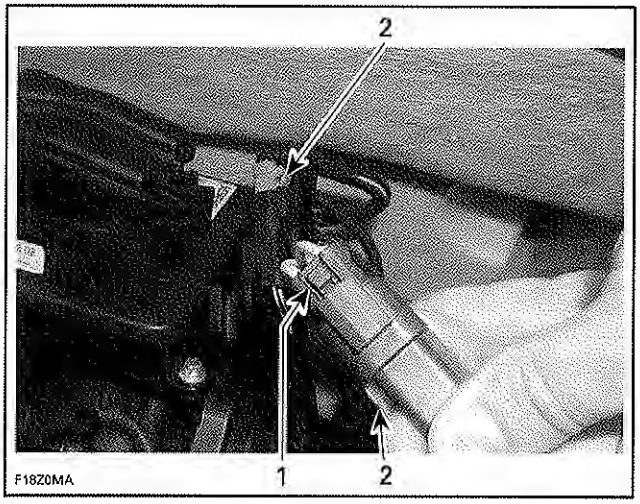
Close puller claws so that they can be inserted in end bearing. Holding claws, turn puller shaft clockwise so that claws open and become firmly tight against bearing.

Beeper Signals

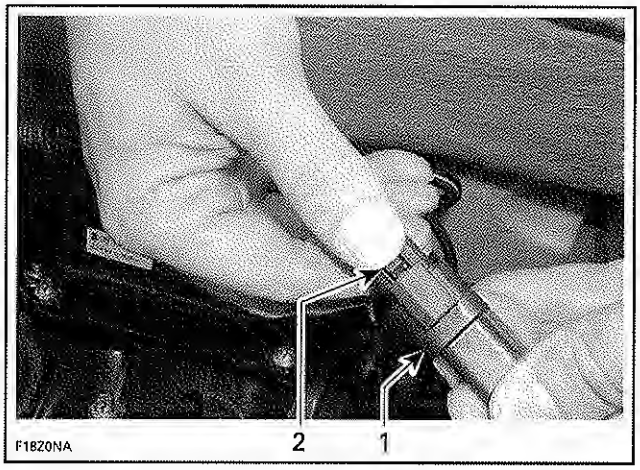
When one of the below conditions occurs, the monitoring system emits the following beep signals.

CODED SIGNALS	POSSIBLE CAUSE	REMEDY
2 short beeps (while installing DESS key on post).	– Confirms key signal operation. – Key is recognized by the ECM. – Good contact between key and DESS post.	– Engine can be started.
1 long beep (while installing key on post).	– Bad DESS system connection. – Wrong key. – Defective key. – Dried salt water or dirt in key. – Defective DESS post. – Improper operation of ECM or defective wiring harness.	– Reinstall key correctly over post. – Use a key that has been programmed for the watercraft. If it does not work, check key with B.U.D.S. Replace key if defective. – Use another programmed key. – Clean key to remove salt water. – Refer to *DESS* section. – Refer to *ELECTRONIC FUEL INJECTION* section.
4 very short beeps will sound every 5 minutes for 2 cycles. Then, 4 very short beeps will sound every 3 second interval.	– DESS key has been installed on its post without starting engine within 10 seconds or left connected 10 seconds after engine was stopped.	– To prevent battery discharge, remove the key from its post.
2 seconds beep every 15 minutes interval.	– VTS, compass, bilge pump, lake temperature sensor, exterior temperature sensor or circuit malfunction. – Watercraft is upside down or TOPS switch or circuit malfunction. – Wrong ECM or information center installed. – Battery voltage too high or too low. – CAN communication, ECM, MAPS, MATS, CTS, OPS, EGTS, CPS, CAPS, TPS, knock sensor, IACV or circuit malfunction. – Fuel injector or circuit malfunction. – Ignition coil or circuit malfunction. – Fuel pump/fuel level or circuit malfunction. – Starter solenoid or circuit malfunction.	– Refer to *GAUGE/FUSES.* – Turn watercraft upright. If it does not work, check the TOPS switch. Refer to *ELECTRONIC FUEL INJECTION* section. – Refer to *ELECTRONIC FUEL INJECTION* or *GAUGE/FUSES.* – Refer to *CHARGING SYSTEM* section. – Refer to *ELECTRONIC FUEL INJECTION* section. – Refer to *ELECTRONIC FUEL INJECTION* section. – Refer to *IGNITION SYSTEM* section. – Refer to *FUEL SYSTEM* section. – Refer to *STARTING SYSTEM* section.
A 2 seconds beep every 5 minutes interval.	– Low fuel level. – Fuel tank level sensor or circuit malfunction.	– Refer to *GAUGE/FUSES* section. – Refer to *GAUGE/FUSES* section.
A 2 seconds beep every minute interval.	– High air intake temperature detected.	– Refer to *INTAKE MANIFOLD* or *INTERCOOLER (255 ENGINE)* section.

FAULT CODE	DESCRIPTION	POSSIBLE FAULT	ACTION	BEEPER PATTERN	CHECK ENGINE LIGHT
P0600	Communication problem detected by ECM.	Damaged circuit wires, damaged connector, damaged ECM output pins. Diagnostic connector cap not connected. Fault detected when the engine is stopped.	Connect diagnostic connector cap.	2 second beep every 15 minutes	On
P0600	Communication problem – ECM message missing.	Damaged circuit wires, damaged connector or damaged ECM output pins. Fault detected when the engine is stopped.	Check system circuits B-10 and B-11.	2 second beep every 15 minutes	On
P0601	TPS learns unlikely or checksum fault.	ECM not coded, damaged ECM or TPS not initialized.	Check cable adjustment. Check idle stop for wear. Check throttle angle at idle. Reset closed TPS.	2 second beep every 15 minutes	On
P0601	Module call monitoring.	Damaged ECM.	Key on and off. Reset closed TPS. Check battery voltage. Replace TPS.	2 second beep every 15 minutes	On
P0602	ECM not coded.	ECM not coded or damaged ECM.	No service action available for fault P0602, symptom 142.	2 second beep every 15 minutes	On
P0604	RAM fault.	Damaged ECM.	No service action available for fault P0604, symptom 136.	2 second beep every 15 minutes	On
P0605	EEPROM fault.	Damaged ECM.	No service action available for fault P0605, symptom 137.	2 second beep every 15 minutes	On
P0605	EEPROM checksum fault.	Damaged ECM.	No service action available for fault P0605, symptom 143.	2 second beep every 15 minutes	On
P0605	Coding ID checksum fault.	Damaged ECM.	No service action available for fault P0605, symptom 144.	2 second beep every 15 minutes	On
P0605	Coding checksum fault.	Damaged ECM.	No service action available for fault P0605, symptom 145.	2 second beep every 15 minutes	On
P0605	Programming checksum fault.	Damaged ECM.	No service action available for fault P0605, symptom 146.	2 second beep every 15 minutes	On
P0608	Sensor's power supply voltage too low.	Intake pressure sensor or TPS failure. Sensors power line shorted to ground. Fault detected when the engine is stopped.	Check for MAPS or TPS failure. Check for MAPS or TPS circuit failure.	2 second beep every 15 minutes	On

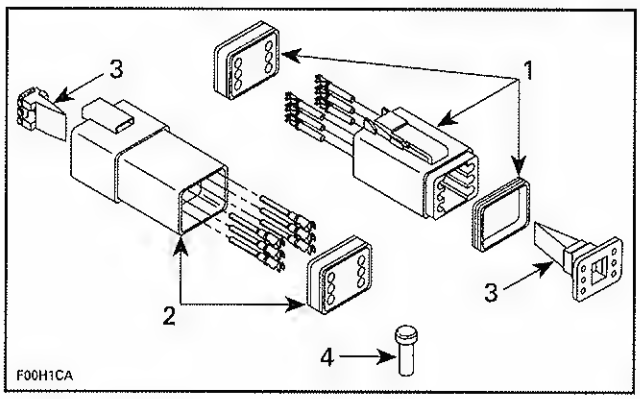


1. *Release button*
2. *Deutsch connectors*



1. *Deutsch connectors*
2. *Press release button*

Connector Disassembly

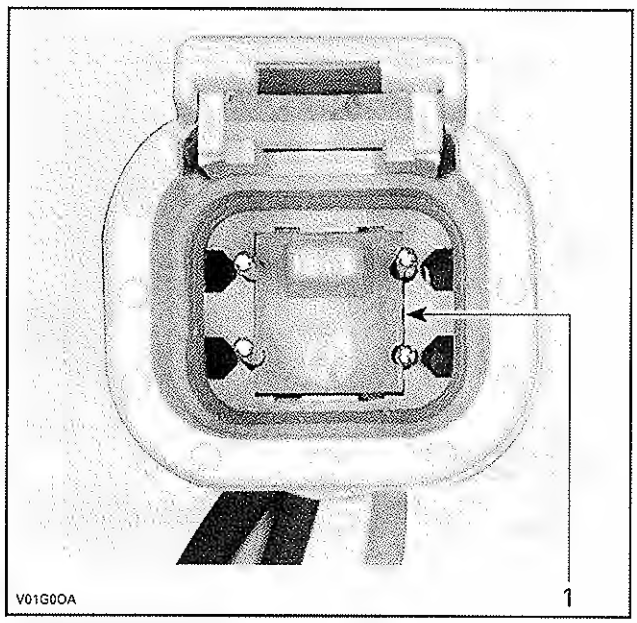


1. *Male connector*
2. *Female connector*
3. *Secondary lock*
4. *Sealing cap*

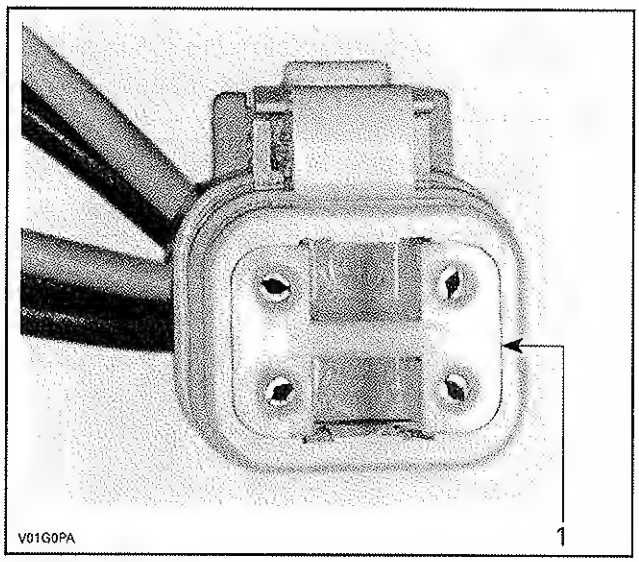
CAUTION: Do not apply dielectric grease on terminal inside connector.

To remove terminals from connector, proceed as follows:

– Using a long nose pliers, pull out the lock.



FEMALE CONNECTOR
1. *Female lock*



MALE CONNECTOR
1. *Male lock*

NOTE: Before extraction, push wire forward to relieve pressure on retaining tab.

– Insert a 4.8 mm (.189 in) wide screwdriver blade inside the front of the terminal cavity.

– Pry back the retaining tab while gently pulling wire back until terminal is removed.

Ensure the throttle body plate stop lever rest against its stopper. Open throttle approximately one quarter then quickly release. Repeat 2 - 3 times to settle throttle plate. If stopper does not rest against its stop lever, perform throttle cable adjustment.

To properly reset idle air control valve, first install DESS key then remove it and then wait 5 seconds. Repeat this cycle 2 - 3 times.

Push the **Reset** button in the **Setting** tab of B.U.D.S.

NOTE: If TPS is not within the allowed range while resetting the **Closed Throttle and Idle Actuator**, the ECM will generate a fault code and will not accept the setting. In this case, the fault must be cleared to allow the reset operation.

Start engine and make sure it operates normally through its full engine RPM range. If fault codes appear, refer to *MONITORING SYSTEM AND FAULT CODES* section for more information.

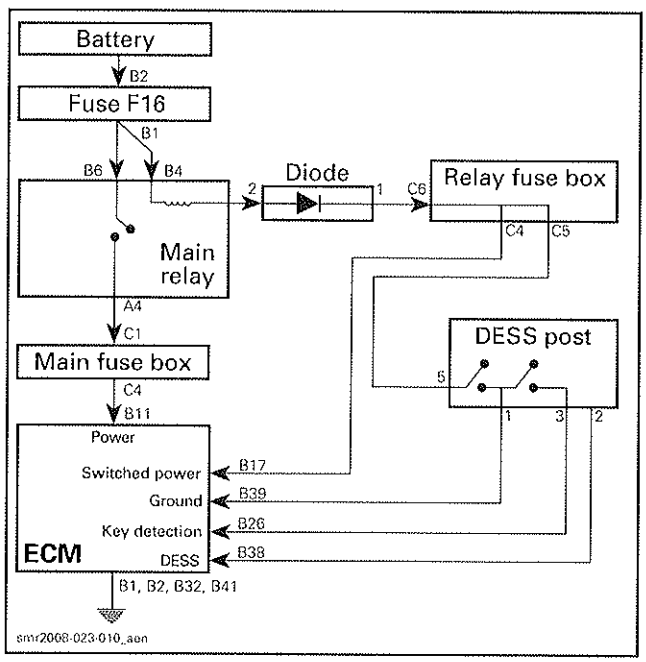
IGNITION TIMING

The ECM is able to determine the exact position of camshaft and crankshaft. That means that no ignition timing setting has to be performed.

REPAIR PROCEDURES

ENGINE CONTROL MODULE (ECM)

Power Supply to ECM



NOTES
When DESS key has been removed for a while, no power goes to the ECM.
When DESS key is installed on its post: – The magnet in the DESS key closes the reed switches in the DESS post. – ECM pin B39 provides a ground through the reed switch. This closes the main relay contacts. – ECM pin B11 receives its main power from battery. ECM operation is started. – ECM pin B17 receives power from battery. – ECM pin B26 monitors if a key is present. – ECM pin B38 reads the DESS key and determines if it is valid.
When DESS key is just removed from its post: – ECM pin B26 senses the key has been removed. – Reed switches open but ECM pin B17 keeps main relay contacts temporarily closed. – ECM stops the engine. – ECM completes its tasks. – ECM pin B17 releases the main relay contacts. – Main relay contacts open and power to the ECM is cut.

Troubleshooting ECM

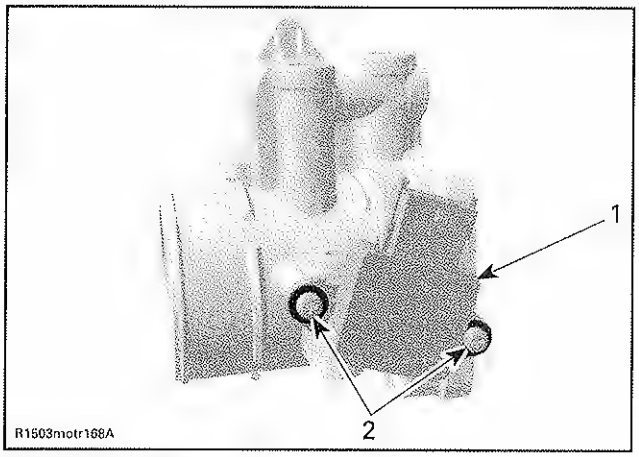
Install key on DESS post.

This should wake up the ECM and continuously activate the main relay.

QUICK INDICATION THAT ECM IS NOT POWERED (assuming the observed component is working)
Beeper does not sound.
Information center does not turn on.
Fuel pump does not turn on for approx. 5 seconds.
Engine cranking does not occur when pressing START button.

If ECM does not turn on, check the following:
- Fuse F16
- Battery voltage, refer to *CHARGING SYSTEM*
- Diode 1
- DESS key and post, refer to *DESS SYSTEM*
- Main relay, refer to *GAUGE AND FUSES*

Remove TPS.



THROTTLE BODY
1. *Throttle position sensor (TPS)*
2. *Screws*

Install the new TPS

Apply Loctite 243 on screw threads and secure screws.

Reinstall remaining removed parts.

Proceed with the Closed Throttle and Idle Actuator reset as described in *BASIC ADJUSTMENTS*.

IDLE AIR CONTROL VALVE (IACV)

An idle air control valve with good resistance measurement can still be faulty. It is also possible that a mechanical failure occurs which is not detectable without measuring the air flow. Replacing the idle air control valve may be necessary as a test.

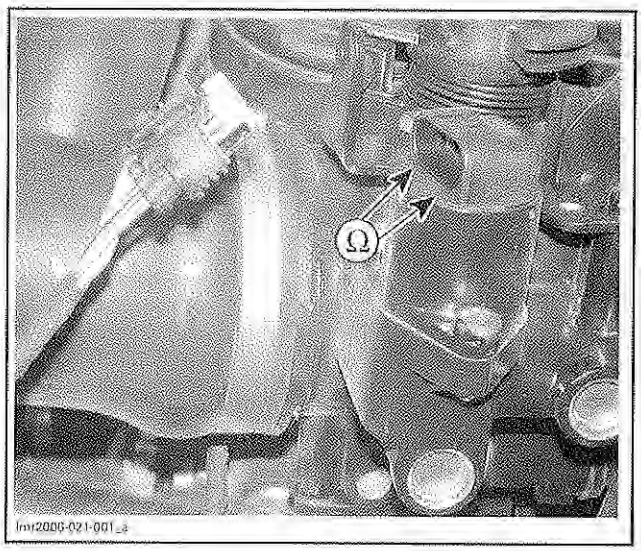
If an erratic engine idle is experienced, clean the idle air bypass in throttle body.

IACV Resistance Test (at Component)

Disconnect idle air control valve connector.

Check the resistance between pins as follows.

IDLE AIR CONTROL VALVE		MEASUREMENT
PIN		RESISTANCE @ 20°C (68°F)
A	D	Approximately 50 Ω
B	C	



If the resistance of any winding is inadequate, replace the idle air control valve.

If resistance test of valve windings is good, check continuity of circuits A-35, A-36, A-37, A-38.

IACV Resistance Test (at ECM Connector)

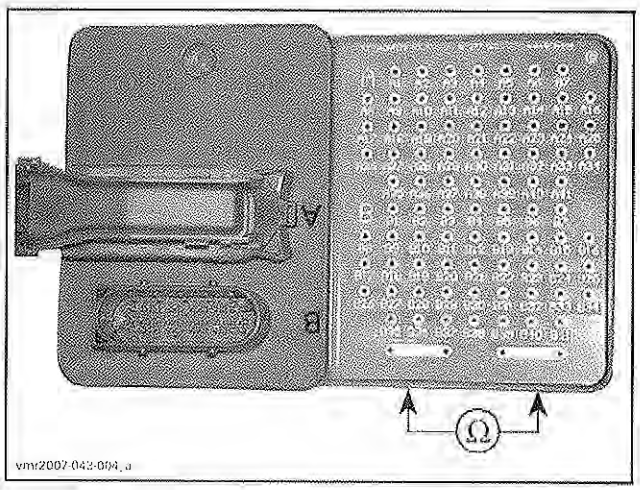
Reconnect IACV connector.

Disconnect ECM A connector.

Use ECM adapter (P/N 420 277 010) and a multimeter.

Set multimeter to Ω and read resistance as follows.

ECM CONNECTOR		MEASUREMENT
PIN		RESISTANCE @ 20°C (68°F)
A-35	A-36	See above.
A-37	A-38	



KS Replacement

Remove the intake manifold. Refer to *INTAKE MANIFOLD AND INTERCOOLER* in the *ENGINE* section.

Unscrew and remove knock sensor.

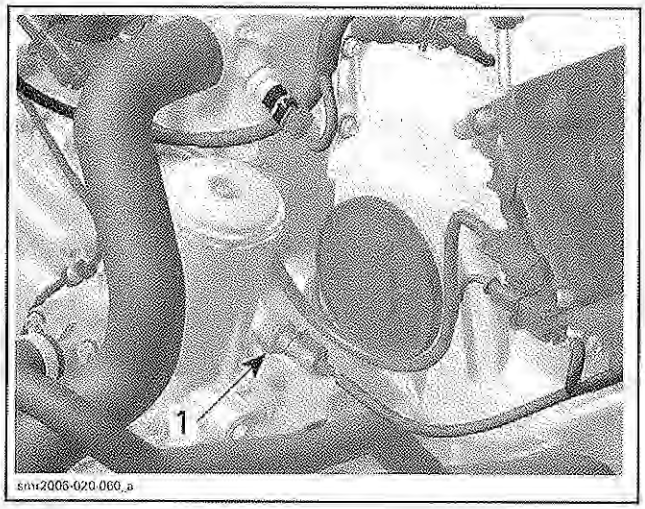
Clean contact surface, apply Loctite 243 in threaded hole then install the new knock sensor.

Torque screw to 24 N•m (18 lbf•ft).

CAUTION: Improper torque might prevent sensor to work properly and lead engine to severe damage of internal components.

Replug connector.

OIL PRESSURE SENSOR (OPS)



TYPICAL
1. OPS

Oil Pressure Test

First, carefully check the condition of the connector terminals. Clean to remove dirt and corrosion that coud affect proper operation of the sensor.

IMPORTANT: Do not apply dielectric grease on terminal.

Before checking the function of the oil pressure sensor, an oil pressure test has to be performed to be sure the oil pressure is not in fault. Refer to *LUBRICATION SYSTEM* in the *ENGINE* section.

When the engine oil pressure tests good but the OIL message in the information center is present and the beeper sounds:

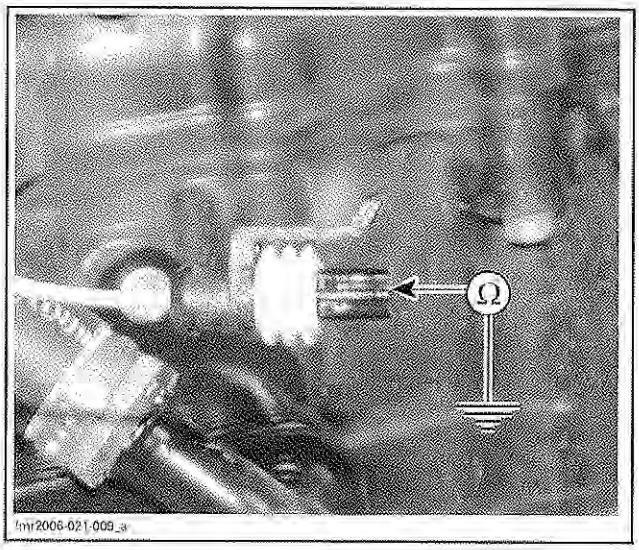
- Ensure OPS connector is plugged to the sensor.
- Check the resistance of the OPS while engine is off and while engine is running.

OPS Resistance Test

Disconnect the connector from the OPS.

Use a multimeter to check the resistance as shown.

OPS CONNECTOR		ENGINE NOT RUNNING	ENGINE RUNNING
PIN		RESISTANCE (Ω)	
1	Engine ground	Close to 0 Ω (normally closed switch)	Infinitely high (OL) when pressure reaches 180 - 220 kPa (26 - 32 PSI)



If resistance values are incorrect, replace OPS.

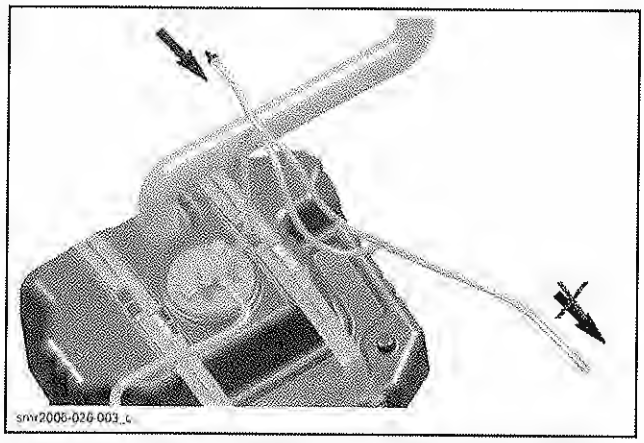
If the values are correct, check the continuity of the wiring harness.

Wiring Harness Continuity Test

Disconnect the ECM connector A from the ECM

Use the ECM adapter (P/N 420 277 010) and a multimeter. Check continuity of OPS circuit as per following table.

OPS CONNECTOR	ECM	RESISTANCE
Pin 1	Pin A-6	Close to 0 Ω (continuity)



TYPICAL – PRESSURE RELIEF VALVE OPENS AT MAXIMUM OPERATING PRESSURE

If the pressure in the fuel tank builds up and exceeds 3.5 kPa (.5 PSI), the **pressure relief valve** opens and lets the excess pressure evacuate through the vent system OUTLET.

⚠ WARNING

If the pressure relief valve is stuck, the pressure in the fuel system will build up and may cause fuel to leak in the engine compartment.

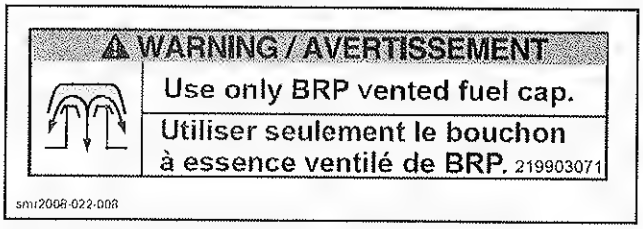
NOTE: If the fuel tank cap is replaced on a fuel tank with separate vent system components, the vented cap may be installed instead of the non-vented type. This will only double the vent protection of the fuel tank.

Models with a Vented Fuel Tank Cap

On later 2008 models, the vent system composed of separate valves and hoses, has been replaced by a vented fuel tank cap which replaces the more complex vent system of earlier models.

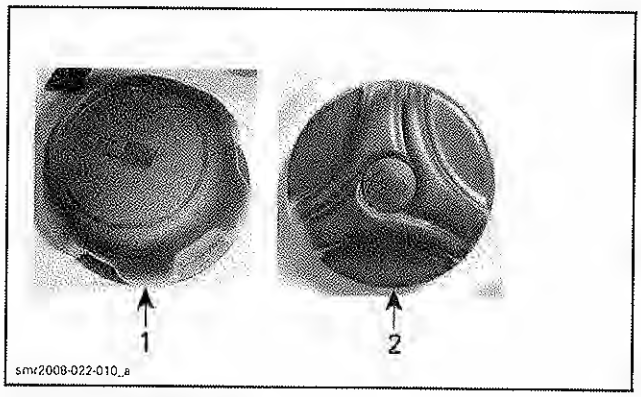
It can be identified by the following items:

- Decal identifying use of a vented fuel tank cap next to filler neck.



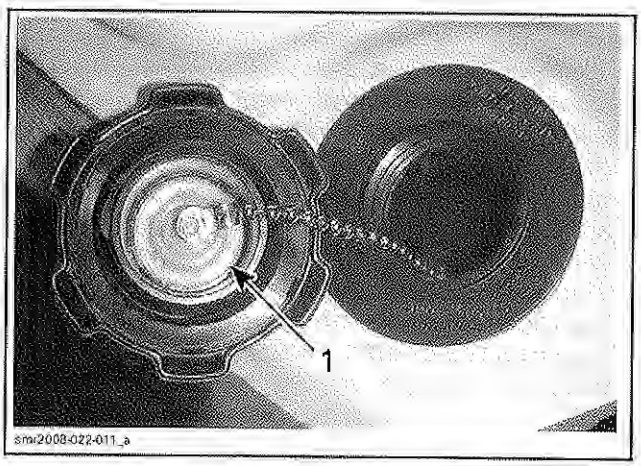
DECAL FOR FUEL TANK WITH VENTED CAP

- The vented cap has a different look



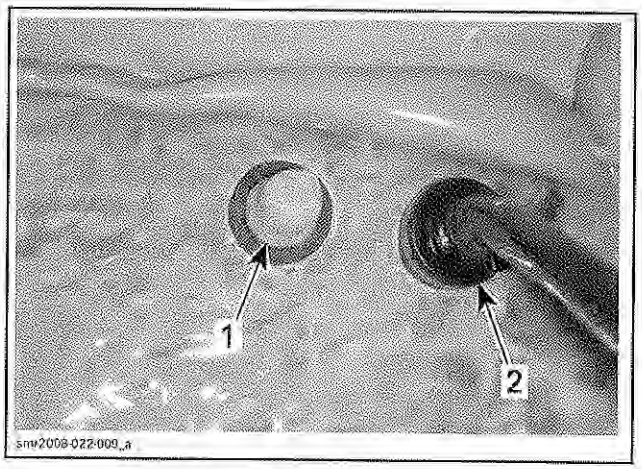
1. *Vented fuel tank cap*
2. *Non-vented fuel tank cap*

- Entire vent system is incorporated within the fuel tank cap.



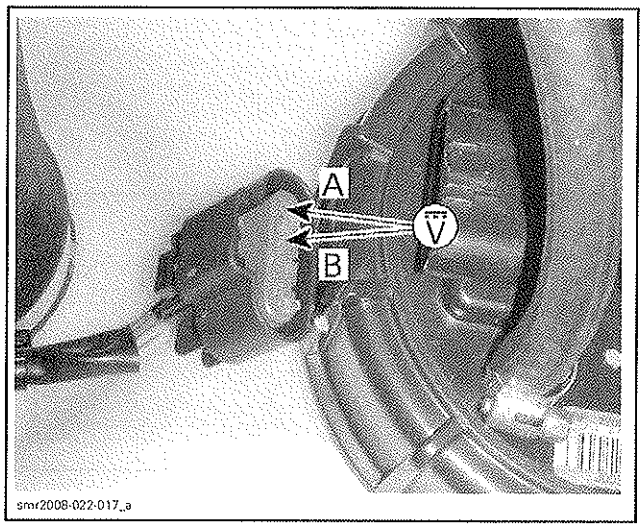
1. *Inlet check valve/pressure relief valve*

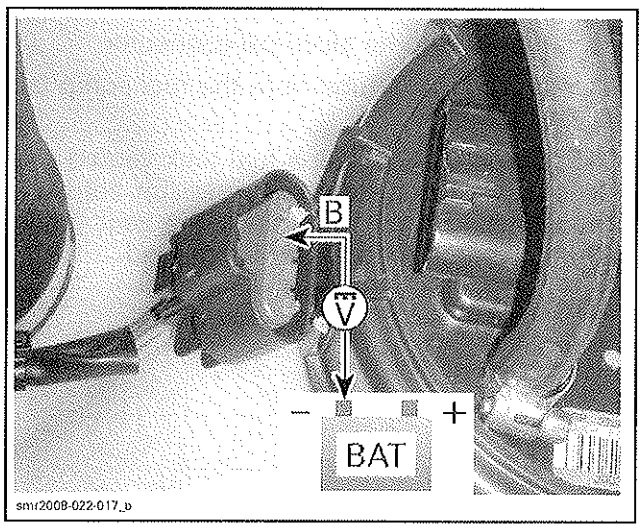
- Vent inlet and outlet ports on the hull are blanked off.



1. *Fuel system outlet vent blanked off*
2. *Battery vent*

- Fuel tank vent outlet fitting on the fuel pump module is capped.





When installing safety lanyard, you should read battery voltage for approximately 2 seconds (then voltage will drop to approximately 11 V).

If battery voltage is read, the problem can be in the fuel pump or in the harness connector. Repair or replace as required.

If battery voltage is read to battery ground but not to pin A, test continuity of fuel pump ground wire to ECM. See *FUEL PUMP HARNESS CONTINUITY TEST* in this section.

If battery voltage is not read, test continuity of pump input voltage wire to relay fuse box. See *FUEL PUMP HARNESS CONTINUITY TEST* in this section.

Fuel Pump Harness Continuity Test

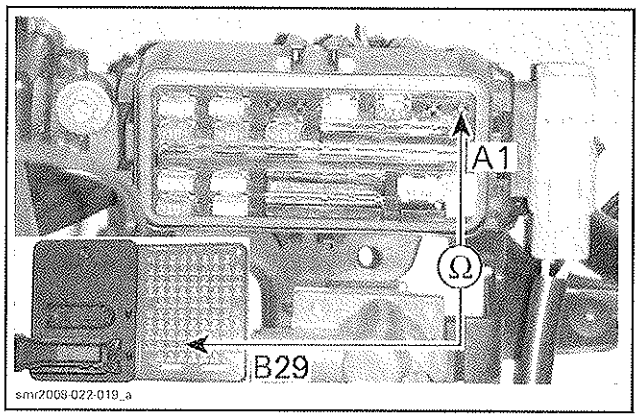
Reconnect the fuel pump harness connector.

Remove fuse 6 in main fuse box.

Remove ECM connector B and install it on the ECM adapter (P/N 420 277 010).

Set multimeter to Ω setting and test pump wiring continuity as per following tables.

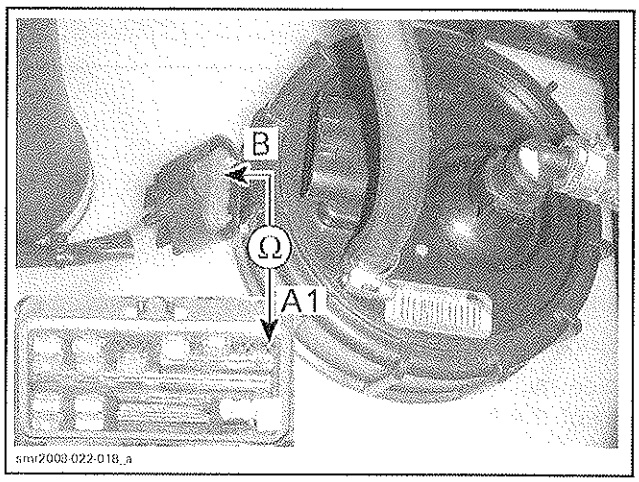
HARNESS CONTINUITY TEST THROUGH FUEL PUMP		
PROBE		RESISTANCE @ 20°C (68°F)
Main fuse box pin A 1	ECM connector B pin B 29	Approx. 12 Ω



HARNESS CONTINUITY TEST THROUGH FUEL PUMP

If you obtained approximately 12 ohms, the fuel pump and its wiring harness are good.

FUEL PUMP HARNESS CONTINUITY TEST (WIRING ONLY)		
PROBE		RESISTANCE @ 20°C (68°F)
Pump harness connector pin B	Main fuse box pin A 1	Close to 0 Ω (continuity)
Pump harness connector pin A	ECM connector B pin B 29	



You should hear the spark occurring. If in doubt, use a sealed **vapor proof** spark tester – available from tool suppliers, to prevent a spark from occurring in the bilge. If there is no spark, carry out the following checks.

NOTE: Keep in mind that even if the tester indicates that there is a spark during this static test, the voltage required to produce a spark in the combustion chamber is higher when the engine is running. The ignition coil or spark plug may not be functioning properly during actual engine operation. Replacing the ignition coil or spark plug may be necessary as a test.

If there is no ignition at one or more coils, carry out a *PRIMARY WINDING INPUT VOLTAGE TEST.*

Ignition Coil Input Voltage Test (Primary Winding)

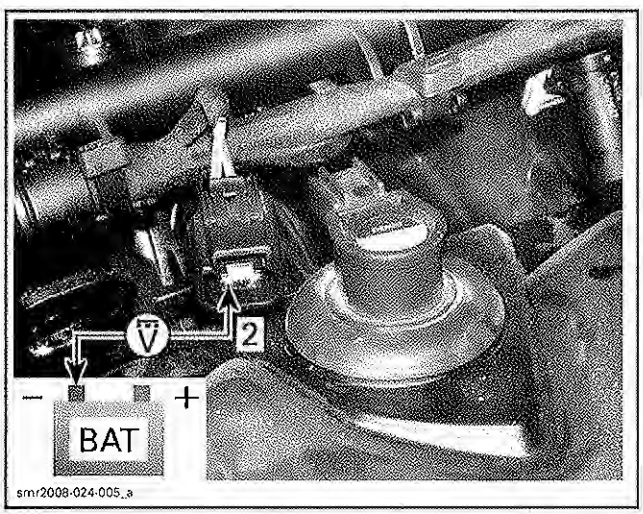
Disconnect the ignition coil connector.

Install safety lanyard on the DESS post.

Use a Fluke 115 multimeter (P/N 529 035 868) set to Vdc.

Test for the primary winding input voltage at the ignition coil connector as per following table.

IGNITION COIL INPUT VOLTAGE TEST		
TEST PROBES		VOLTAGE
Coil 1 connector pin 2 (PURPLE/BLUE)	Battery ground	Battery voltage
Coil 2 connector pin 2 (PURPLE/GREEN)		
Coil 3 connector pin 2 (PURPLE/ORANGE)		



IGNITION COIL INPUT VOLTAGE TEST (PIN 2)

If battery voltage is read, test coil ground wire continuity to ECM. Refer to *IGNITION COIL CIRCUIT CONTINUITY TEST* below.

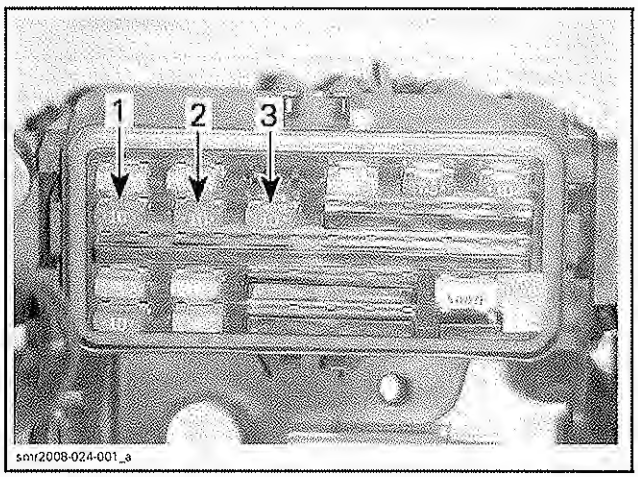
If battery voltage is NOT read, test ignition coil power input wire continuity. Refer to *IGNITION COIL CIRCUIT CONTINUITY TEST* below.

Remove safety lanyard from DESS post.

Ignition Coil Circuit Continuity Test

Power Input Wire Continuity Test (Coil)

Remove the applicable ignition/injector fuse located in main fuse box.



1. *Fuse 7 (# 1 CYL)*
2. *Fuse 8 (# 2 CYL)*
3. *Fuse 9 (# 3 CYL)*

Disconnect ignition coil connector.

Test for continuity of circuit as per following table.

POWER INPUT WIRE CONTINUITY TEST (COIL)			
COIL	COIL CONNECTOR	RELAY FUSE BOX CONTACT	RESISTANCE
Cylinder 1 (rear)	Pin 2 (PURPLE/BLUE)	B11	Close to 0 Ω (continuity)
Cylinder 2	Pin 2 (PURPLE/GREEN)	B9	
Cylinder 3	Pin 2 (PURPLE/ORANGE)	B7	

Read current.

CAUTION: Charging current may rise over multimeter current reading capacity (10 A) possibly causing testing equipment damage. It is preferable to use an inductive ammeter to test the charging system current.

CHARGING SYSTEM CURRENT TEST	
TEST ENGINE SPEED	CURRENT (DC)
6000 RPM	5 A min.

If current is below specification, carry out a magneto stator output voltage test prior to concluding that rectifier is faulty.

BATTERY

Troubleshooting

SYMPTOM: DISCHARGED OR WEAK BATTERY	
CAUSE	REMEDY
Battery posts and/or cable terminal oxidized.	Clean battery terminals, posts, and coat with dielectric grease.
Loose or bad connections.	Check for wiring and connector tightness, frayed or broken wires. Repair or replace cables or connectors.
Faulty battery (sulfated, fretting, shorted plates or cell, damaged casing, loose post).	Replace battery.
Burnt fuse(s) or faulty rectifier.	First check fuse(s). If in good condition, check rectifier/regulator.
Faulty battery charging coil (or stator).	Test stator and replace as required.
Parasitic or "Key Off" current loads.	Isolate, reduce or eliminate such loads, recharge battery as recommended if vehicle is not used for extended periods of time.

NOTE: "Key Off" or parasitic loads may be loads due to installed accessories. Parasitic loads may also be due to water ingress in connectors, or partial short circuits that slowly drain a battery without causing a fuse to burn.

NOTE: A battery that continually necessitates the addition of distilled water indicates an over voltage situation. Carry out a *CHARGING SYSTEM VOLTAGE TEST*.

Battery Removal

⚠ WARNING

The BLACK negative battery cable must always be disconnected first and reconnected last. Never charge or boost battery while installed in watercraft.

Proceed as follows:
- Disconnect the BLACK negative cable first.
- Disconnect the RED positive cable last.
- Remove the vent line from the battery.
- Remove the upper battery support.
- Withdraw battery from watercraft being careful not to lean it so that electrolyte flows out of battery vent fitting.

⚠ WARNING

Electrolyte is poisonous and corrosive. Avoid contact with eyes, skin and clothing. Wear a suitable pair of non-absorbent gloves when removing the battery by hand. Rinse any affected area with clear running water for at least 15 minutes, then seek professional medical attention.

CAUTION: Should any electrolyte spillage occur, immediately wash off area with a solution of baking soda and water, then rinse thoroughly.

Battery Cleaning

Clean the battery casing, caps, cables and battery posts using a solution of baking soda and water.

CAUTION: Do not allow cleaning solution to enter battery.

Remove corrosion from battery cable terminals and battery posts using a firm wire brush. Rinse with clear water then dry well.

Battery Inspection

Visually inspect battery casing for cracks or other possible damages. If casing is damaged or shows signs of acid leaking, replace battery and thoroughly clean battery tray and surrounding area with a solution of water and baking soda.

Inspect battery posts for corrosion and security of mounting.

Press the vehicle start button and look for the **Start Button** LED to come "ON" in the lower center portion of the page.

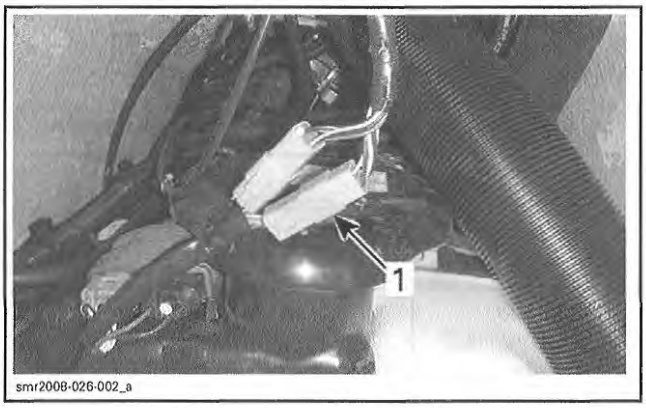
The start button LED should turn ON, indicating the starting system control circuits are functioning normally on the input side (start button, ECM and wiring). Test for a problem on the output side of the starting system (ECM ground signal to the starter solenoid, starter solenoid, wiring harness to the solenoid and the starter motor).

If the start button LED did not come ON, test the Start/Stop switch and its wiring circuits.

Start/Stop Switch Continuity Test

Open the front storage cover and remove the storage bin.

Disconnect the start/stop switch connector.

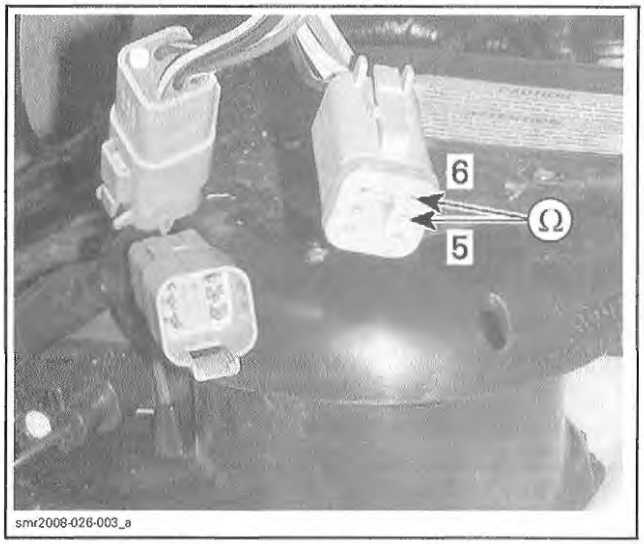


1. Start/stop switch connector

Set a Fluke 115 multimeter (P/N 529 035 868) to Ω setting.

Measure resistance through switch as per following table.

START/STOP SWITCH CONTINUITY TEST		
SWITCH POSITION	TEST PROBES	RESISTANCE
Released	Pin 6 (YELLOW/RED) and Pin 5 (PURPLE)	Infinite (OL)
Pressed and held		Close to 0 Ω



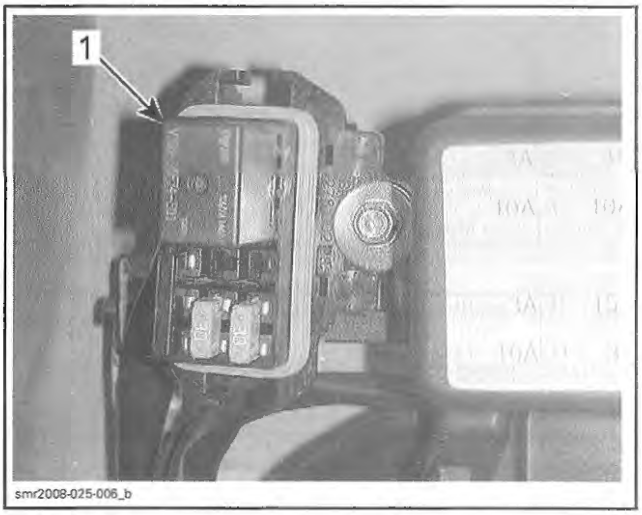
START/STOP SWITCH CONTINUITY TEST (PINS 5 AND 6)

If switch does not test as specified, replace the engine start/stop switch.

If switch tests as specified, reconnect switch connector and carry out a *START/STOP SWITCH CIRCUIT CONTINUITY TEST* as follows.

Start/Stop Switch Circuit Continuity Test

Remove main relay in relay fuse box.



1. Main relay

Disconnect ECM connector B and install it on the ECM adapter (P/N 420 277 010).

DIGITALLY ENCODED SECURITY SYSTEM (DESS)

SERVICE TOOLS

Description	Part Number	Page
ECM adapter	420 277 010	314
Fluke 115 multimeter	529 035 868	311

GENERAL

NOTE: It is a good practice to check for fault codes using B.U.D.S. software as a first troubleshooting step. Refer to *COMMUNICATION TOOLS/B.U.D.S. SOFTWARE*.

This system allows starting the engine only with safety lanyard(s) that has been programmed to operate a specific watercraft. This functionality is the DESS system.

NOTE: If desired, a DESS key can be used on other watercraft equipped with the DESS. It only needs to be programmed for that watercraft.

The following components are specially designed for this system: ECM, DESS key and DESS post.

The DESS key cap contains a magnet and a ROM chip. The magnet actually closes the reed switches inside the post which is the equivalent of a mechanical ON/OFF switch. The chip has a unique digital code which is the equivalent of the notch pattern on a conventional key.

The system is quite flexible. Up to 8 different keys may be programmed in the memory of the ECM. They can also be erased individually.

The memory of the ECM is programmed to recognize the digital code of the DESS key. This is achieved with the B.U.D.S. software.

DESS Key Types

In addition to the standard DESS key, the ECM also offers special keys that can be programmed so that the vehicle can be run only at a limited speed. Such feature is ideal for first time riders or renters.

The following table indicates the approximate maximum engine rpm's given the type of key used.

DESS KEY TYPE	COLOR	MAXIMUM ENGINE RPM
Standard key	YELLOW	Approximately 8220 to prevent engine overspeed
Learning key	WHITE	Approximately 5500
R key	ORANGE	Approximately 6500

⚠ WARNING

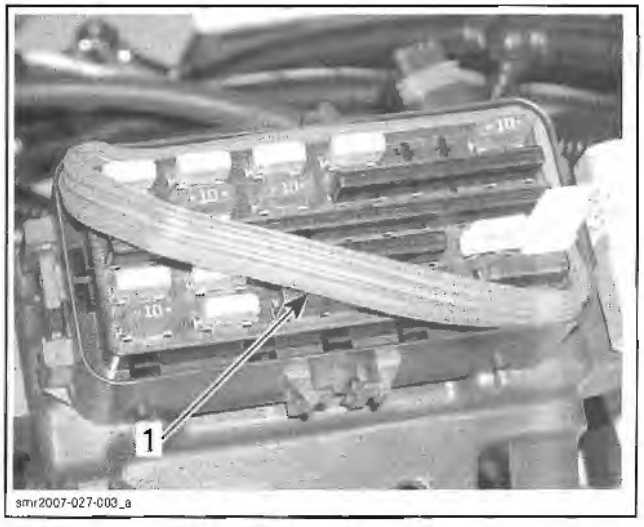
The 3 key types differ only in color and can be programmed to any of the 3 options proposed in B.U.D.S. It is important to program each key type to the adequate engine RPM restriction. Only program WHITE key for learning mode, ORANGE key for rental or reduced speed mode and YELLOW key for no restriction mode. Failure to do so can result in severe injury or death for the operator of the vehicle.

NOTE: Depending on riding and environment conditions, the given values can vary of at least ± 500 RPM's. At high altitude, variations could be greater if impeller is not replaced.

The restrictor plate for the air intake system is an option to use solely on GTI Rental models when using the R key, it does not apply to any other models. The restrictor plate does not affect the RPM restriction.

Beeps

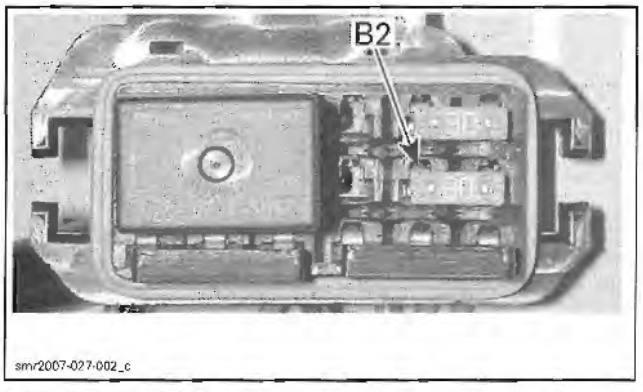
When connecting a key on the post, the DESS is activated and will emit audible signals:



TYPICAL
1. Wider lip here

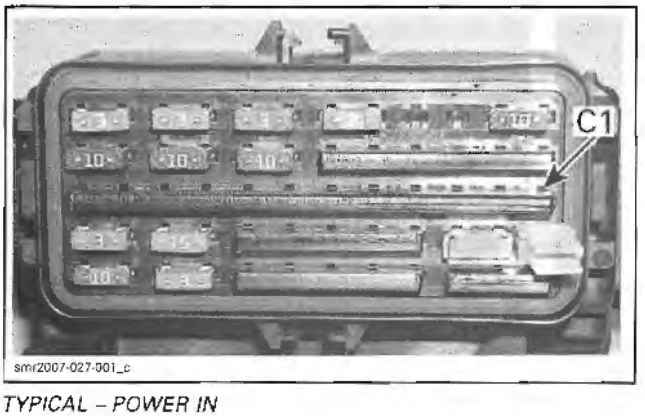
Fuse Box Power Input

The relay fuse box receives power at pin B2 from the battery. Refer to *FUSE BOX PIN-OUT IDENTIFICATION* further in this section.

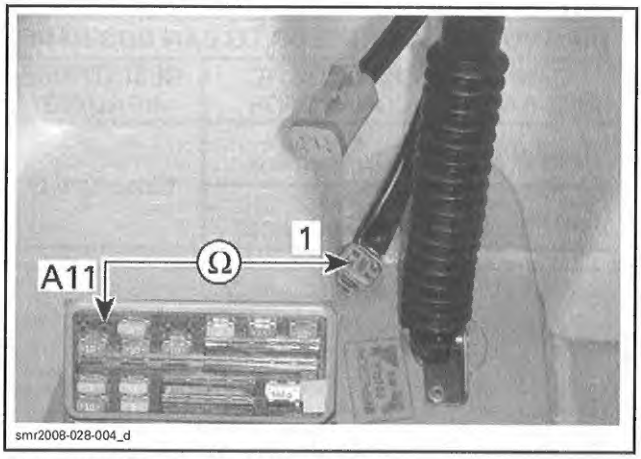


TYPICAL – POWER IN

Main fuse box receives its power at pin C1 from the main relay. It then distributes power through plug-in bus bars (seen in illustration) and jumper wires to the system fuses (connected in back of fuse box).



TYPICAL – POWER IN



INPUT VOLTAGE WIRE CONTINUITY

If battery voltage is measured between pin 1 and pin 2, refer to *INFORMATION CENTER INPUT VOLTAGE TEST.*

Information Center Input Voltage Test (at Gauge Connector)

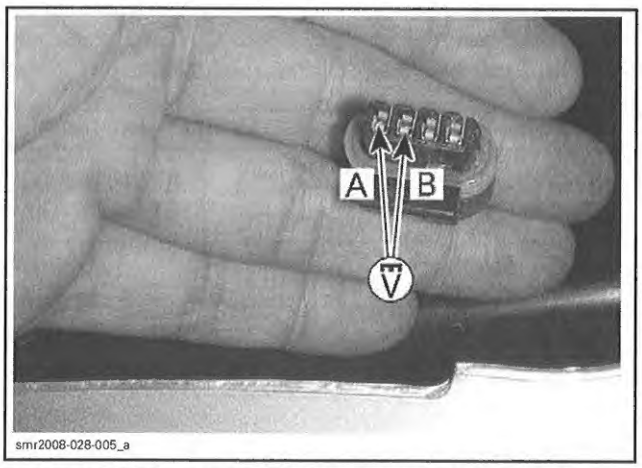
All Models

Remove the information center, refer to *INFORMATION CENTER REMOVAL* in this section.

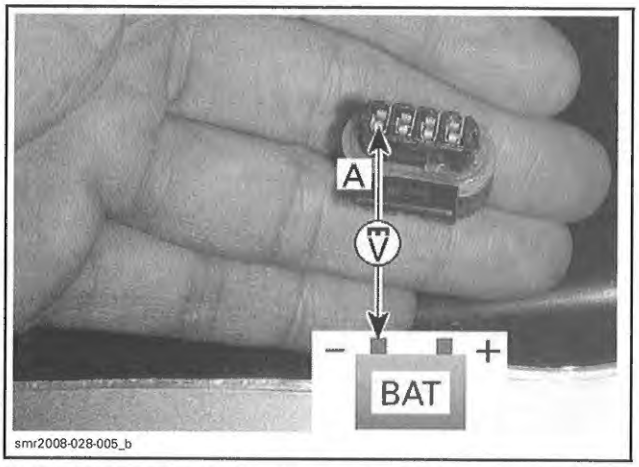
Install the safety lanyard on the DESS post.

Measure the information center input voltage as per following table.

INFORMATION CENTER INPUT VOLTAGE TEST		
INFORMATION CENTER CONNECTOR		VOLTAGE
Pin A	Pin B	Battery voltage
Pin A	Battery ground	



INPUT VOLTAGE TEST AT GAUGE CONNECTOR (A TO B)

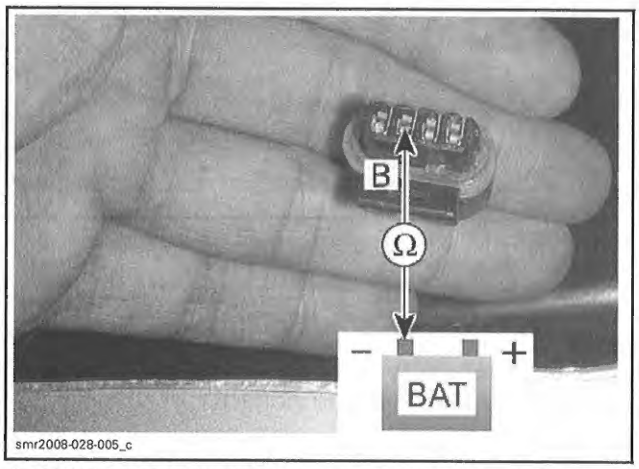


INPUT VOLTAGE TEST AT GAUGE CONNECTOR (A TO BATTERY GROUND)

If battery voltage is measured to pin B, replace information center.

If battery voltage is measured to battery ground but not to pin B, carry out the following continuity test:

- Remove lanyard.
- Set multimeter to Ω setting.
- Test ground wire continuity, pin B information center connector to battery ground.
- Repair or replace wiring/connectors as required.



GROUND WIRE CONTINUITY (PIN B TO BATTERY GROUND)

If no voltage is measured, test input voltage wire continuity, pin A to contact A 11 in main fuse box.

- Remove lanyard.
- Set multimeter to Ω setting.
- Test input voltage wire continuity, pin A information center connector to contact A 11 in main fuse box.
- Repair or replace wiring/connectors as required.

Connect vehicle to the latest applicable B.U.D.S. software, refer to the *COMMUNICATION TOOLS/B.U.D.S. SOFTWARE* section.

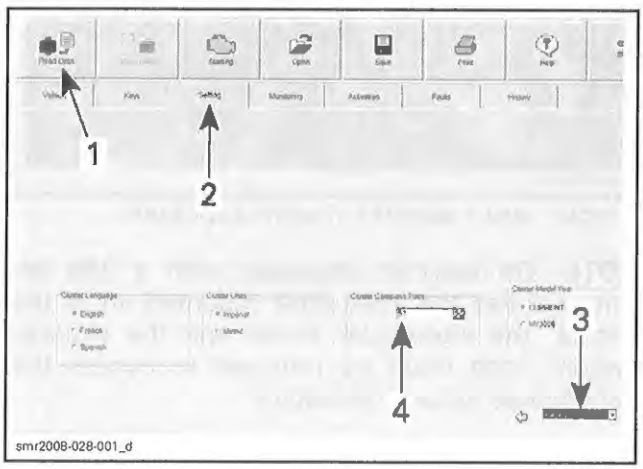
Install safety lanyard on DESS post.

Select the **Read Data** button.

Choose the **Setting** tab at the top of the page.

At the bottom R/H side of the **Setting Page**, choose **page 2**.

In the **Cluster Compass Pitch** field, ensure the proper pitch setting is selected.

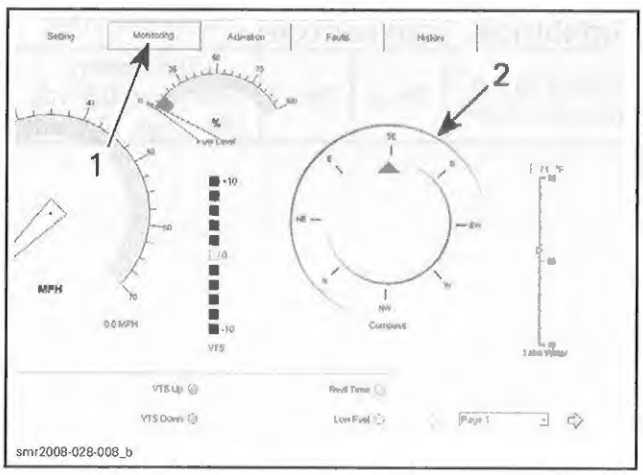


1. *Read Data button*
2. *Setting page tab*
3. *Setting Page 2*
4. *Cluster Compass Pitch*

COMPASS PITCH SETTINGS IN B.U.D.S.	
MODELS	COMPASS PITCH
GTX and RXT	51
RXP	41

Choose the **Monitoring** tab at the top of the page.

A **Compass** is visible on the R/H side of the page.



1. *Monitoring page tab*
2. *Compass indication*

Change the direction of the vehicle. There should be a change of direction on the Information Center and in B.U.D.S. Otherwise, try a new information center.

NOTE: To check the accuracy of the compass, you can use a portable compass and point it in the same direction. Compare the given directions, they should be the same. Otherwise, try a new information center.

SPEED SENSOR

All Models (except GTI)

Speed Sensor Operation

As the vehicle moves forward, water flows through the speed sensor which turns a magnetic paddle wheel that triggers an electronic pick-up. This generates a speed signal that is sent to the ECM. The ECM interprets this signal and sends a signal through the CAN bus to the information center which produces a speedometer indication.

SPEED SENSOR

B.U.D.S. can be used to test the speed sensor operation.

Speed Sensor Activation and Testing Using B.U.D.S.

Connect vehicle to the latest applicable B.U.D.S. software, refer to the *COMMUNICATION TOOLS/B.U.D.S. SOFTWARE* section.

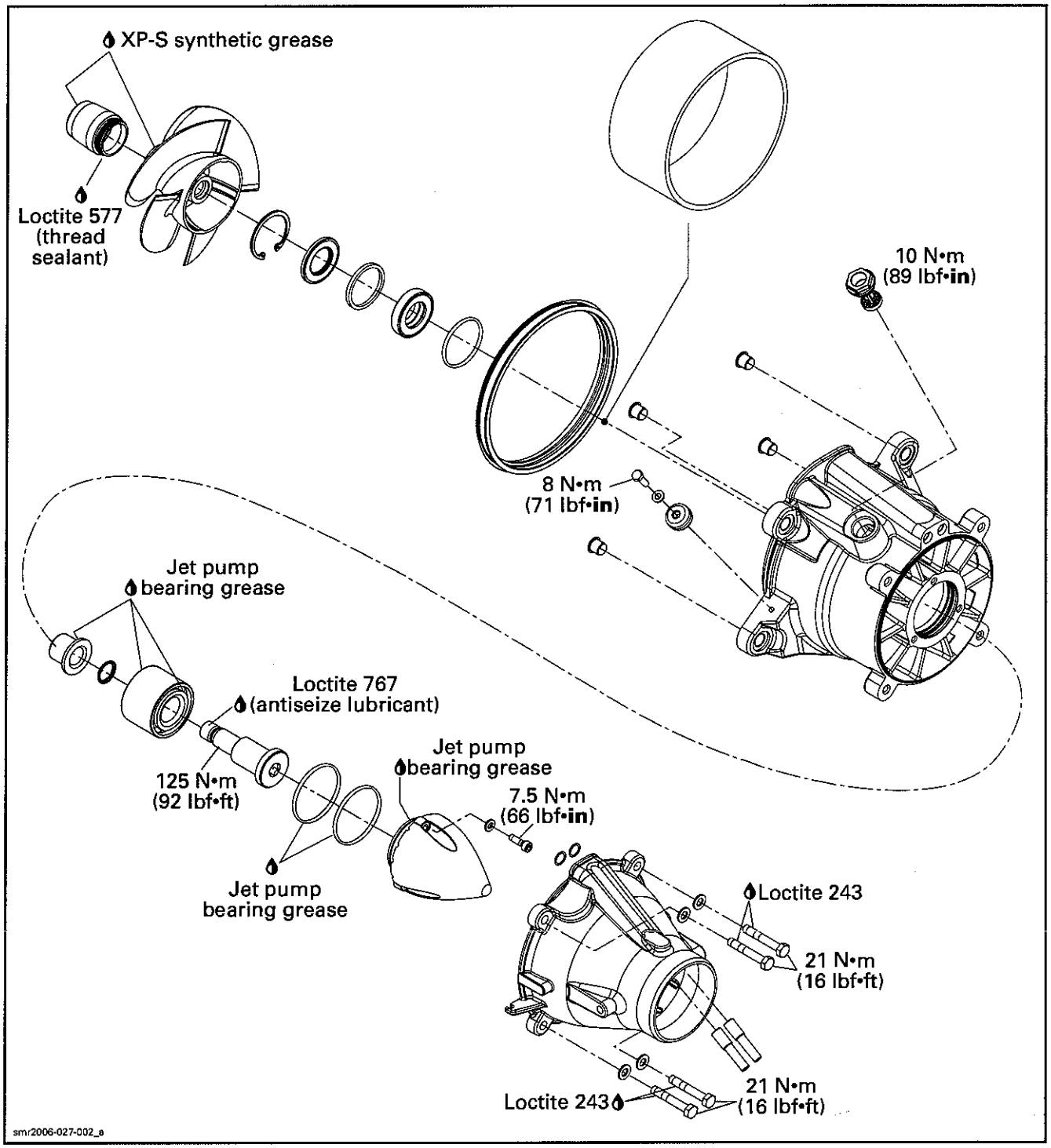
Install safety lanyard on DESS post.

Select the **Read Data** button.

Choose the **Setting** tab at the top of the page.

In the **Options** field, ensure the **Lake Water Temp/Speed Sensor** box is selected.

ALUMINUM HOUSING



WEAR RING

Wear Ring Inspection

Check wear ring for:
- Deep scratches
- Irregular surface
- Any apparent damage.

Check *IMPELLER/WEAR RING CLEARANCE*, see procedure at the beginning of this section.

Wear Ring Removal

Remove jet pump housing and impeller. See procedures above.

On plastic pump housing, remove the screws retaining wear ring in the jet pump housing.

Place jet pump housing in a vise with soft jaws. It is best to clamp housing using a lower ear.

Cut wear ring at two places.

CAUTION: When cutting ring, be careful not to damage jet pump housing.

NOTE: Wear ring can be cut using a jigsaw, a small grinder or a low clearance hacksaw.

After cutting ring, insert a screwdriver blade between jet pump housing and ring outside diameter.

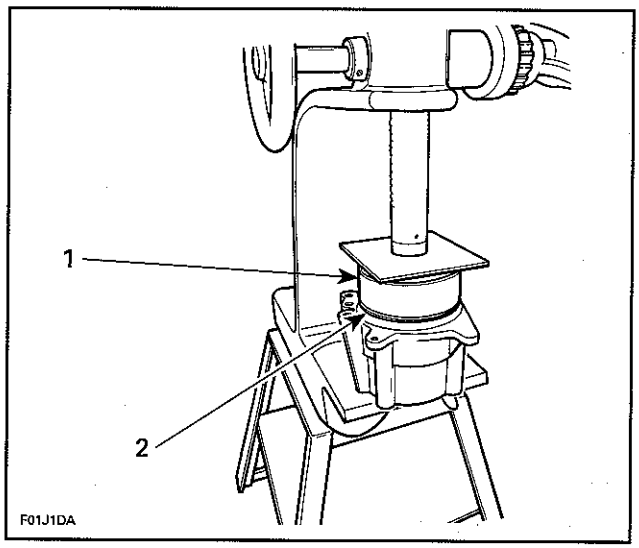
Push ring so that it can collapse internally.

Pull ring out.

Wear ring Installation

To install ring in housing, use a square steel plate of approximately 180 x 180 mm x 6 mm thick (7 x 7 in x 1/4 in) and a press.

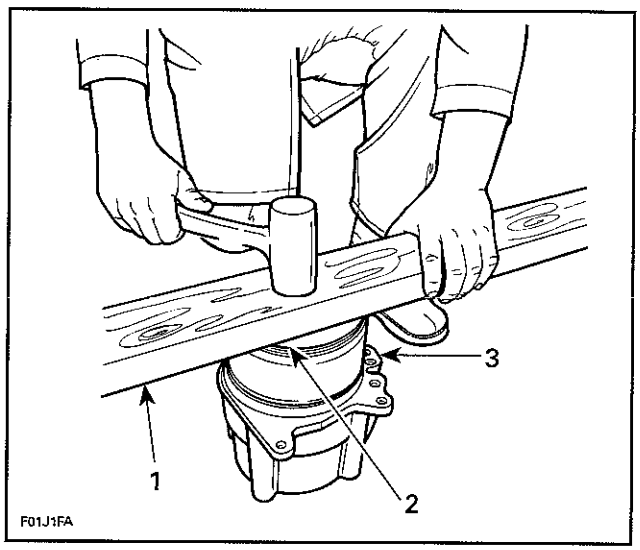
Manually engage ring in housing making sure it is equally inserted all around. Press ring until it seats into bottom of housing.



1. Rounded edge
2. Press wear ring

If a press is not readily available, a piece of wood such as a 2 x 4 in x 12 in long, can be used.

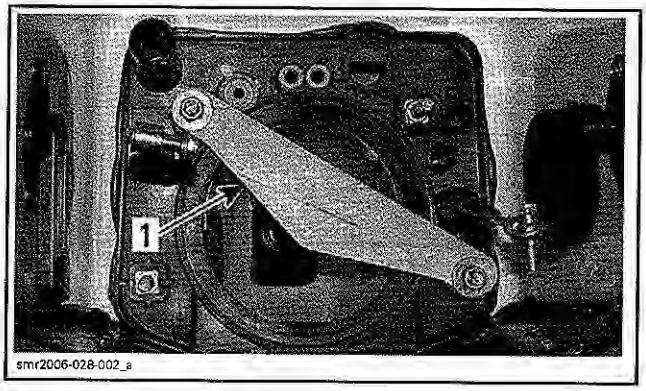
Manually engage ring in housing making sure it is equally inserted all around. Place wood piece over ring. Using a hammer, strike on wood to push ring. Strike one side then rotate wood piece about 90° and strike again. Frequently rotate wood piece so that ring slides in evenly until it seats into bottom of housing.



1. Piece of wood
2. Rounded edge
3. Wear ring

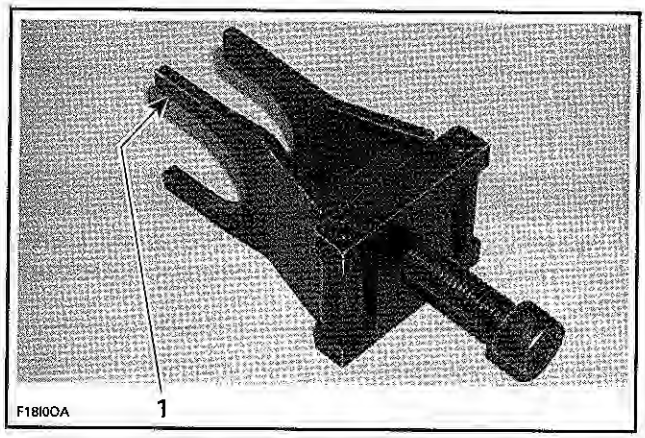
Models with a Plastic Pump Housing

After wear ring installation, install wear ring screws. Using their holes in jet pump housing as a drilling guide, drill 4 mm (5/32 in) diameter holes in wear ring. The depth of holes does not exceed 5 mm (3/16 in).



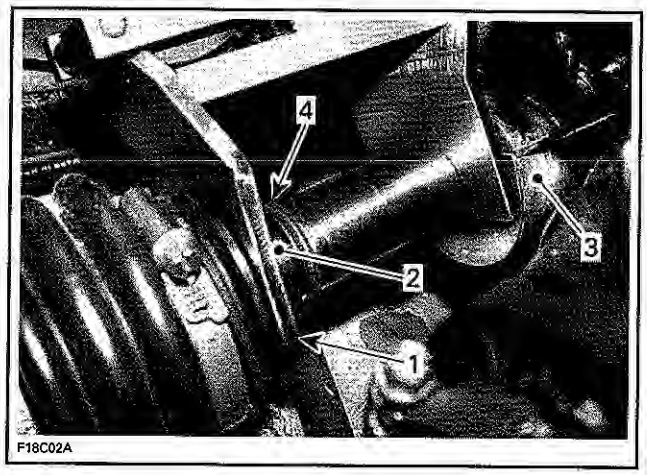
TYPICAL
1. Drive shaft holder

Reinstall the floating ring tool as shown.



TYPICAL
1. Largest opening on PTO seal side

Push floating ring rearwards to expose circlip and remove it. Discard circlip.



TYPICAL
1. Largest opening here
2. Floating ring
3. PTO seal support tool
4. Remove circlip

Remove drive shaft holder tool then the floating ring tool.

Place rags under PTO housing to prevent spillage. If spillage occurs, clean immediately with the pulley flange cleaner (P/N 413 711 809) to prevent oil stains.

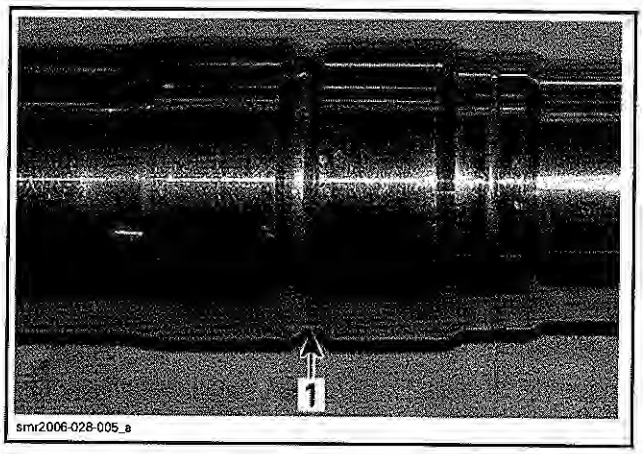
Remove drive shaft.

NOTE: A slight jerk to the rear may be required to remove the drive shaft from the PTO seal assembly.

Drive Shaft Inspection

Drive Shaft

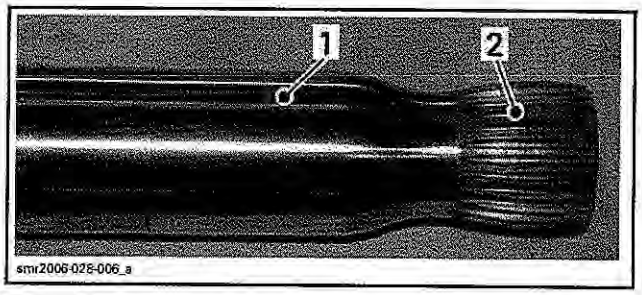
Inspect condition of circlip groove. If there is any damage or severe wear, replace drive shaft.



1. Circlip groove

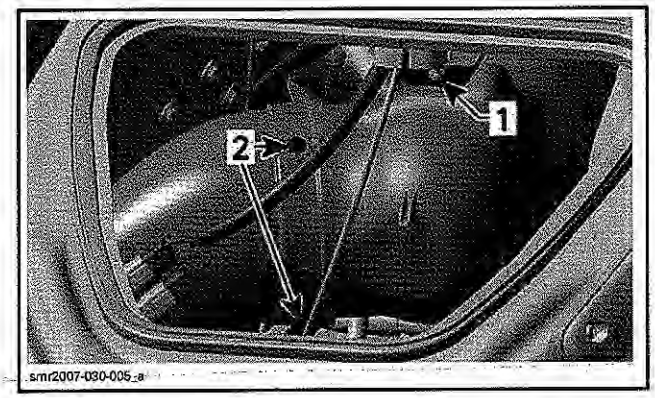
Inspect condition of drive shaft splines. If splines are damaged, replace drive shaft.

With your finger nail, feel machined surface of drive shaft. If any irregular surface is found, renew drive shaft.



TYPICAL
1. Surface condition
2. Splines condition

Excessive deflection could cause vibration and damage to drive shaft splines, impeller or floating ring.



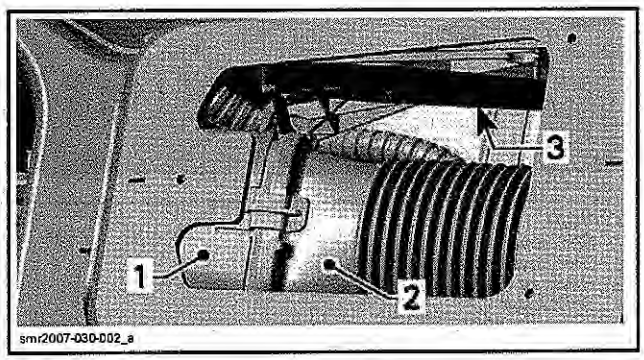
1. *Remove nut*
2. *Remove darts*

Pull out bottom part first then top part.

GTX and RXT Series

Remove the seat(s) and the glove box. Refer to *BODY* section.

Disconnect the flexible vent tube from the air collector by lifting the locking tabs then move tube toward the front of vehicle. DO NOT REMOVE the flexible vent tube completely.



TYPICAL
1. *Air collector*
2. *Flexible vent tube*
3. *Reverse cable lever*

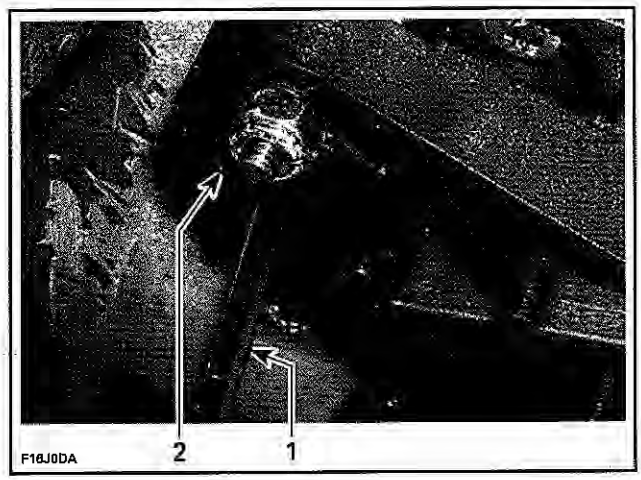
NOTE: There are two locking tabs, one above and one underneath flexible vent tube.

GTI Series

Remove glove box. Refer to *BODY* section.

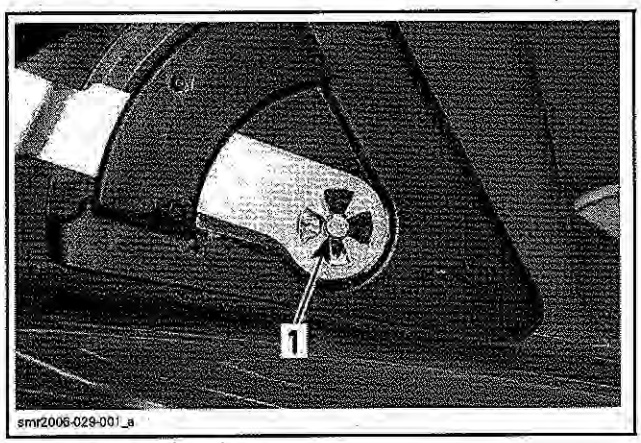
All Models

Detach the reverse cable from reverse cable lever.



TYPICAL
1. *Reverse cable*
2. *Reverse cable lever*

Unscrew the shift lever retaining bolt, washer and nut, then remove reverse cable lever.



1. *Shift lever retaining bolt*

Cable Lever Inspection

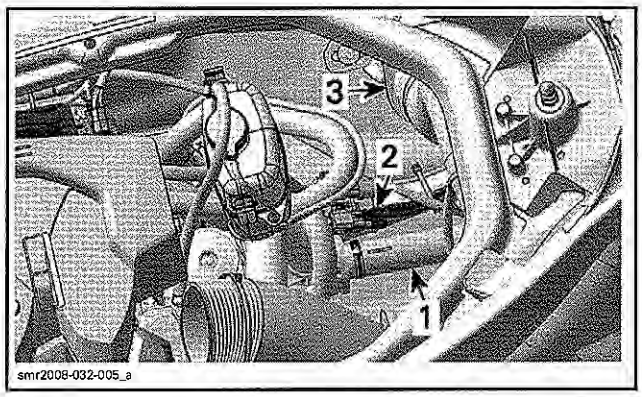
Check reverse cable lever for cracks or wear. Replace as required.

Cable Lever Installation

Apply XP-S synthetic grease (P/N 293 550 010) on the reverse cable lever pivot and in the reverse cable support hole.

Install the reverse cable lever in a rotating movement. Engage properly the reverse cable lever tabs in the shift lever slots.

Insert reverse cable lever into reverse cable support slider and make sure that the lever slides freely in the support.



1. *Drive shaft*
2. *VTS connectors*
3. *Resonator*

Pull and remove VTS unit from vehicle.

RXP 215/255

Refer to *BODY* section to remove the following parts:
- Seat
- Engine cover.

Remove muffler hose.

On **RXP 255**, remove the air inlet hose and air outlet hose from the intercooler. Refer to *INTERCOOLER 255* section.

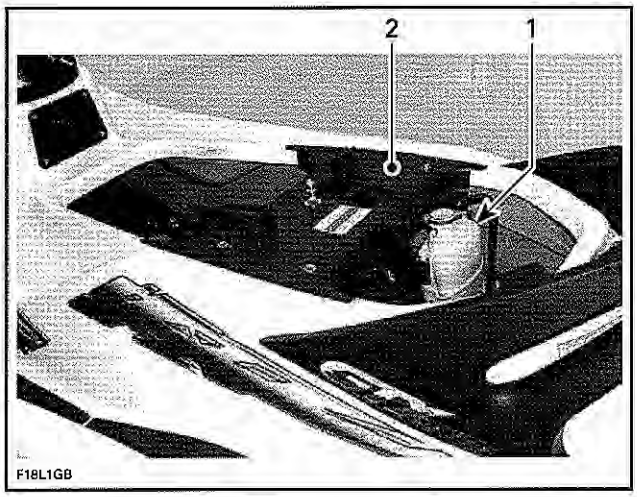
Unplug VTS connectors. The connector is located to the right of drive shaft, in front of resonator.

Pull and remove VTS unit from vehicle.

RXT 255

Refer to *BODY* section to remove the following parts:
- Seats
- Seat support
- Air vent tube.

Detach coolant expansion reservoir from vent tube support then move away.



TYPICAL
1. *Detach expansion reservoir*
2. *Remove vent tube support*

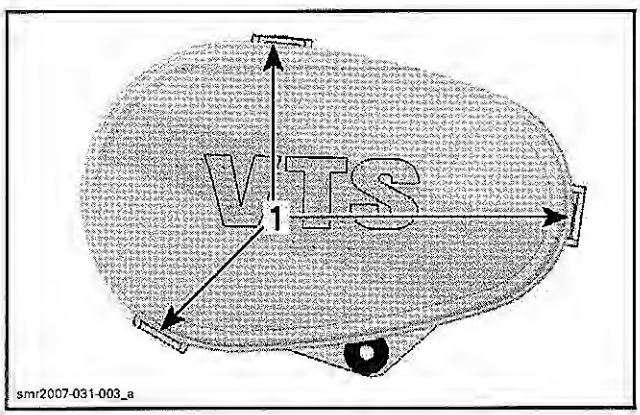
Unplug VTS connectors. The connector is located to the right of drive shaft, in front of resonator.

Pull and remove VTS unit from vehicle.

VTS Unit Disassembly

Cover

Remove VTS cover by pressing on tabs.

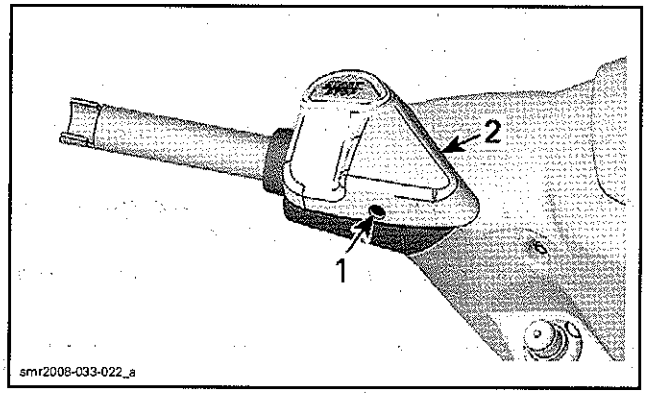


1. *Press tabs to remove cover*

Motor

Disconnect wires from motor noting their location for reinstallation.

Remove motor retaining nuts.



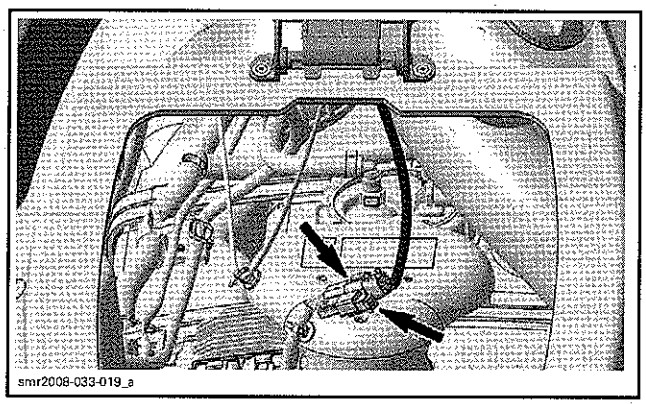
1. *Tapping screw*
2. *Multifunction switch cover*

Remove cover on multifunction switch housing.

Push housing away from steering cover.

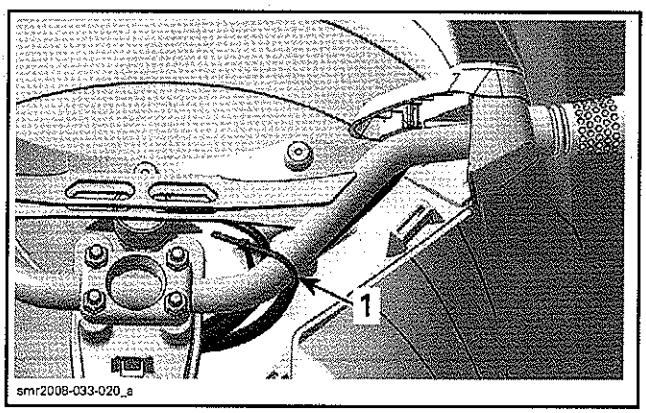
Open front storage cover and remove basket.

Unplug multifunction switch connectors.



Remove the upper steering cover, see *STEERING COVER* further in this section for the proper procedure.

Cut locking tie securing multifunction switch harness to handlebar.

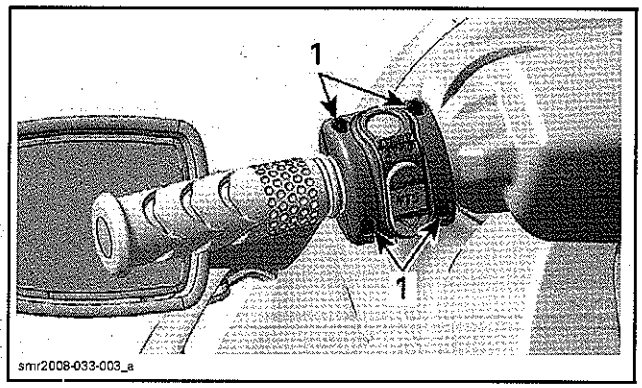


1. *Cut this locking tie*

Remove multifunction switch.

X Packages

Remove screws securing the multifunction switch.



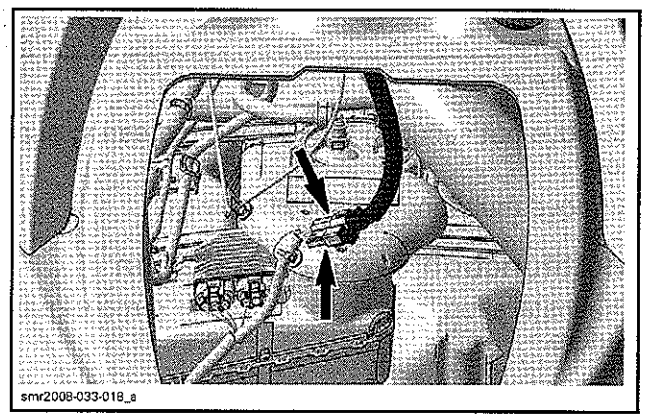
1. *Multifunction switch housing screws*

Separate multifunction switch contacts from housing.

Remove the *STEERING COVER*, see procedure further in this section.

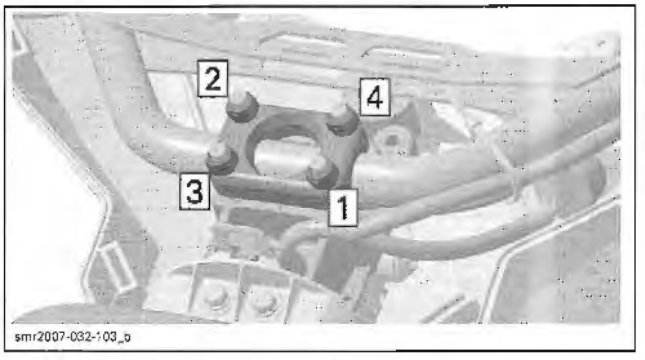
Open front storage cover and remove basket.

Unplug multifunction switch connectors.



Cut locking tie retaining multifunction switch harness to handlebar.

Unscrew DESS switch nut using the DESS post remover (P/N 529 035 943).



STEERING CABLE SUPPORT

Cable Support Removal

All Models except GTI Series and X Packages

Open front storage cover and remove basket.

Remove glove box. Refer to *BODY* section.

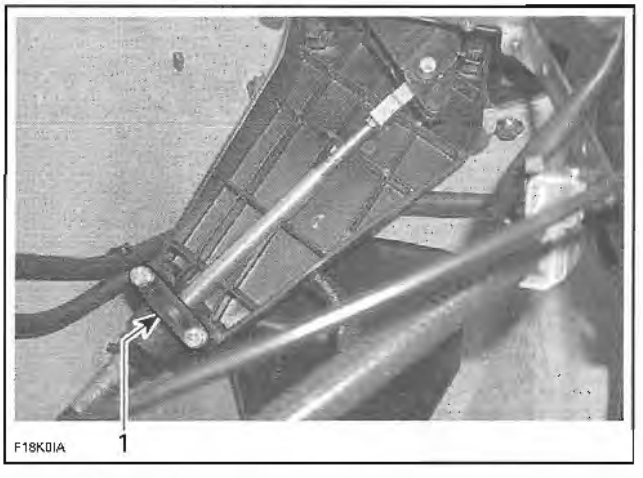
On **RXP models**, remove front vent tube.

GTI Series

Remove glove box and console. Refer to *BODY* section.

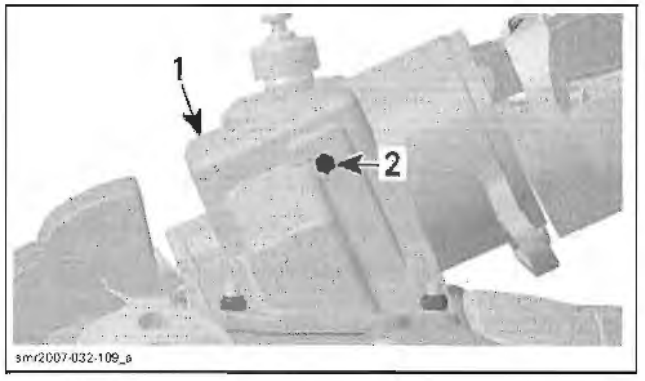
All Models except 255 HP

Unscrew bolts securing retaining block then remove it from steering cable support.

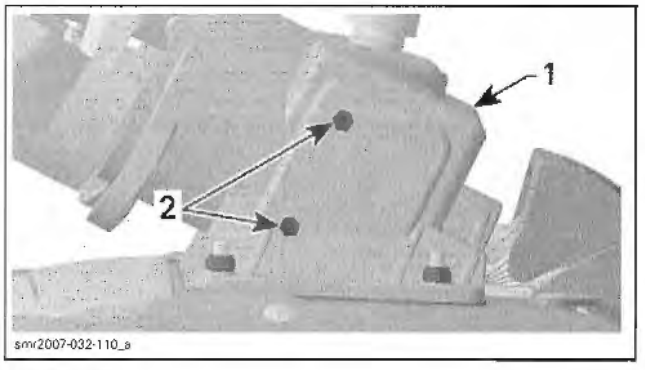


1. Retaining block

Loosen screws each side of steering support.

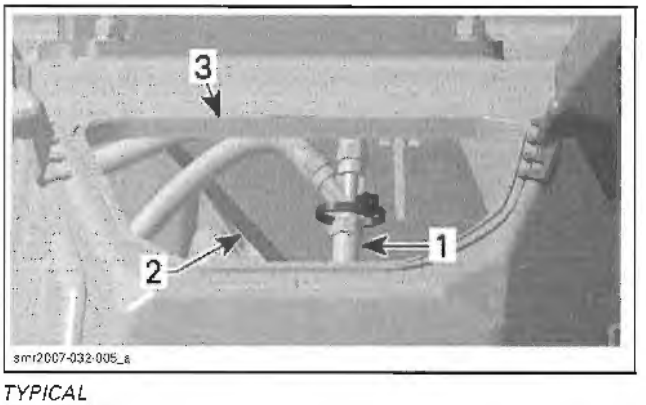


RIGHT SIDE
1. Steering support
2. Screw



LEFT SIDE
1. Steering support
2. Screws

Detach fuel lines from steering cable support.



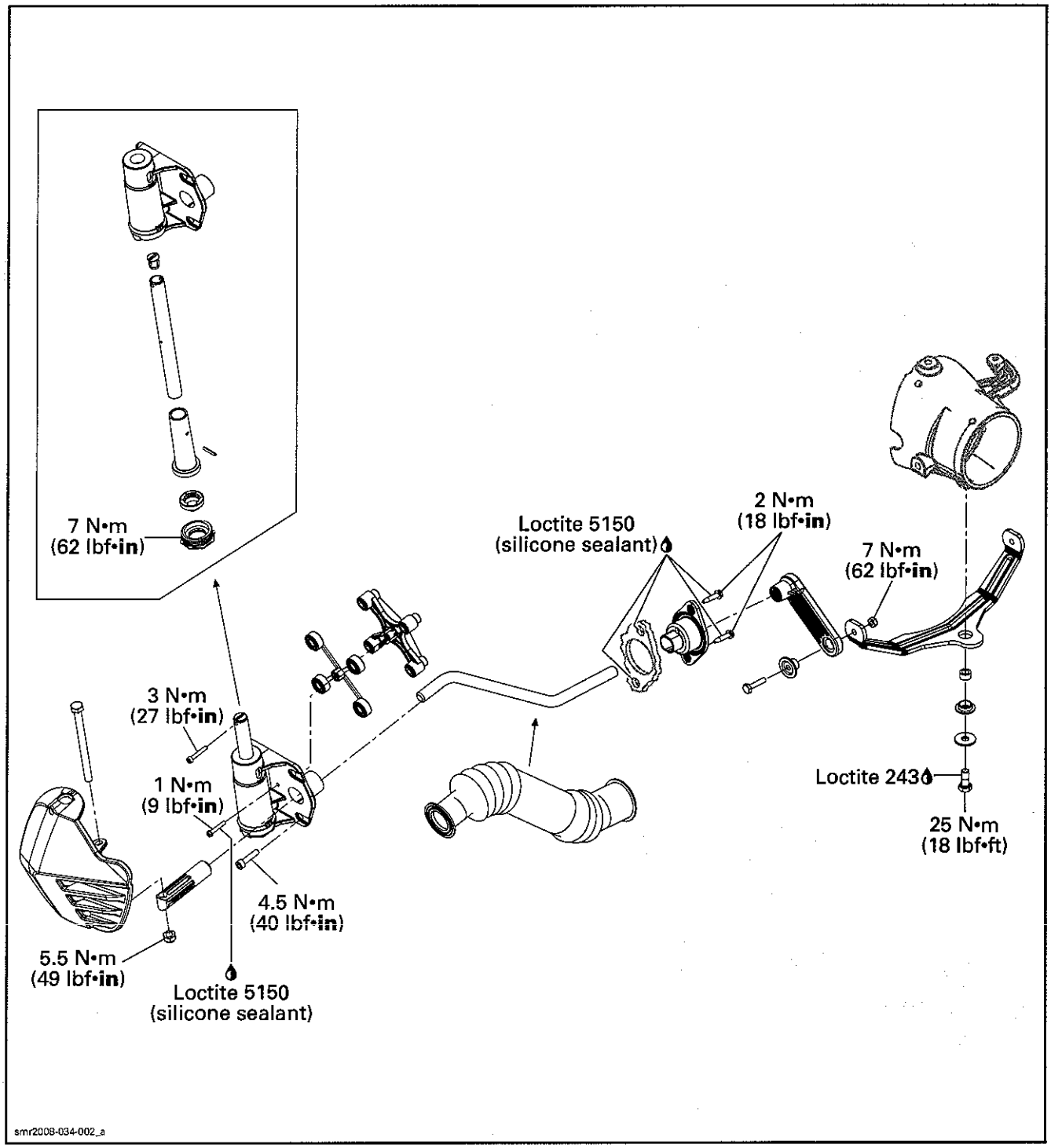
TYPICAL
1. Fuel line
2. Steering cable support
3. Glove box location

Remove steering cable support.

Cable Support Installation

For installation, reverse the removal procedure.

GTI and RXP Series



BODY

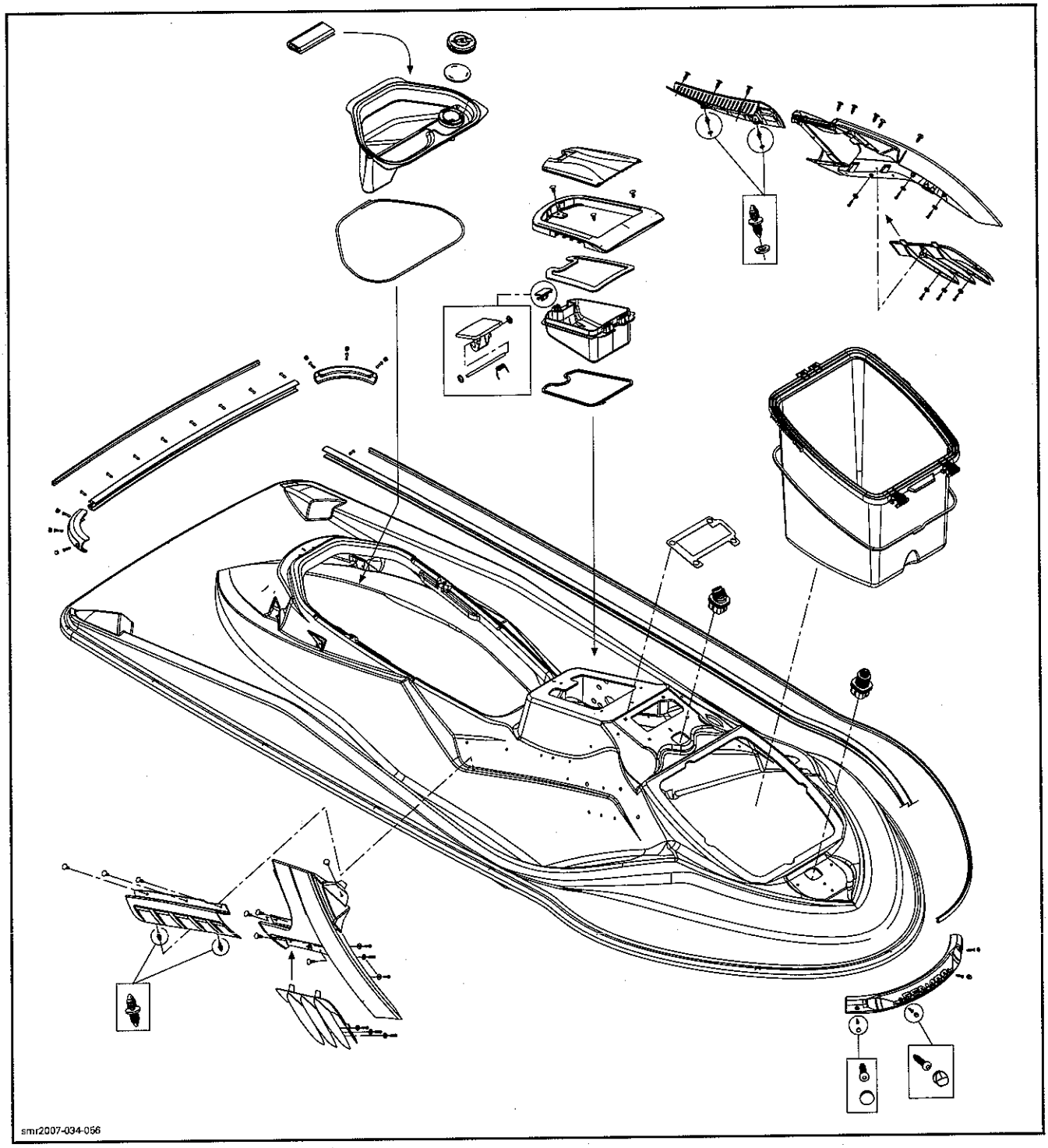
SERVICE TOOLS

Description	Part Number	Page
Supertanium™ drill bit	529 031 800	451, 464

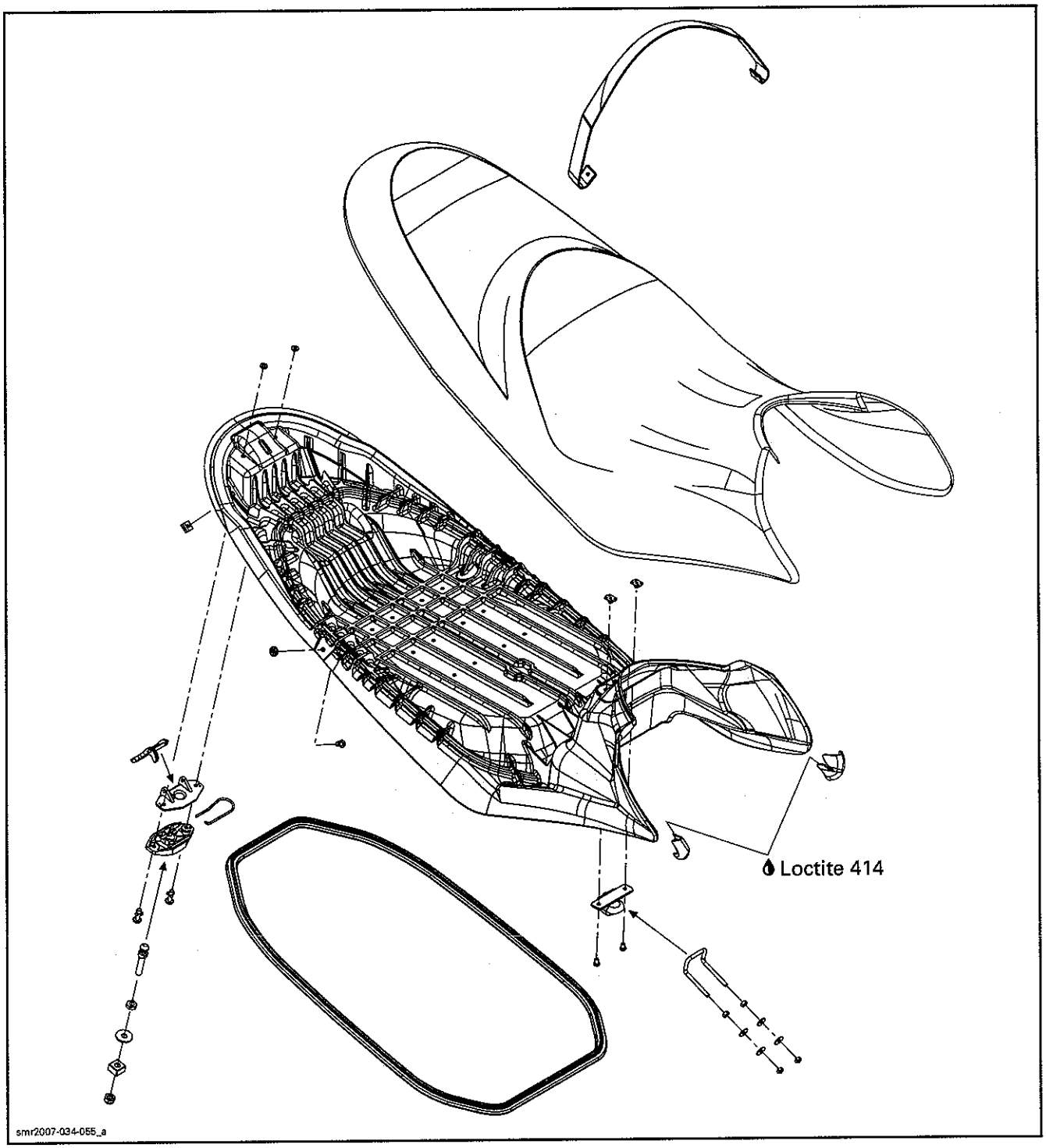
SERVICE PRODUCTS

Description	Part Number	Page
XP-S synthetic grease	293 550 010	468–469
Loctite 243 (blue)	293 800 060	454
BRP Plastic & Vinyl Cleaner	413 711 200	453

RXT Models (Body Front View)



RXP Models (Seat)

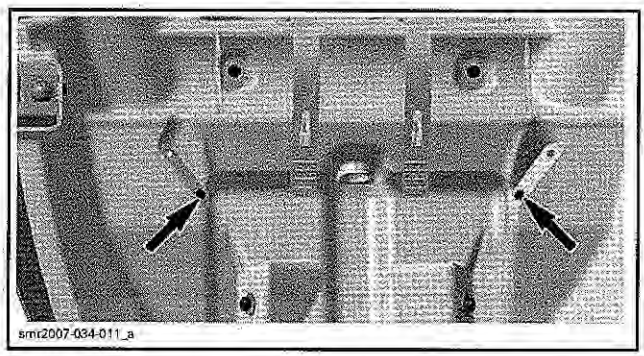


Lower Inner Shell

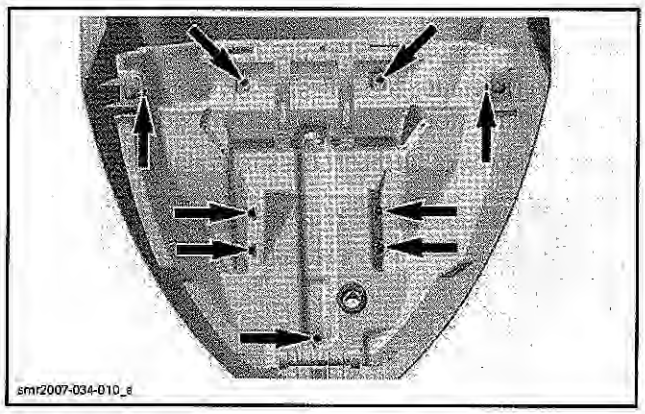
Remove the storage compartment cover from vehicle. Refer to *STORAGE COMPARTMENT COVER* above.

Remove the upper inner shell.

Remove screws holding front grills.



Remove all screws (9) securing lower inner shell to storage compartment cover.



Cut locking ties retaining wiring harness to shell.

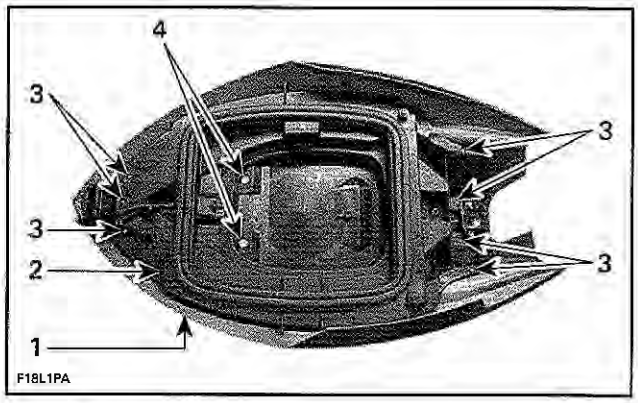
RXT Models

Remove the *STORAGE COMPARTMENT COVER*, see procedure above in this section.

CAUTION: Failure to follow this order may lead to damaging inner plastic studs.

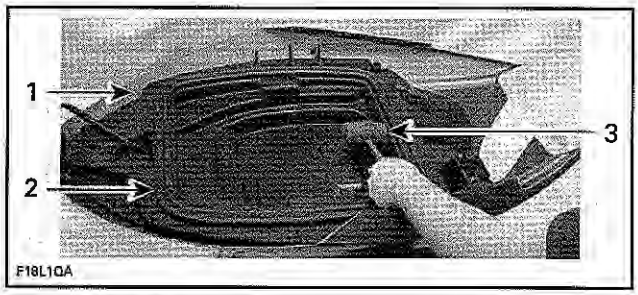
Remove seven inner shell short screws (flanged screws).

Remove two long inner shell screws (hexagonal screws).



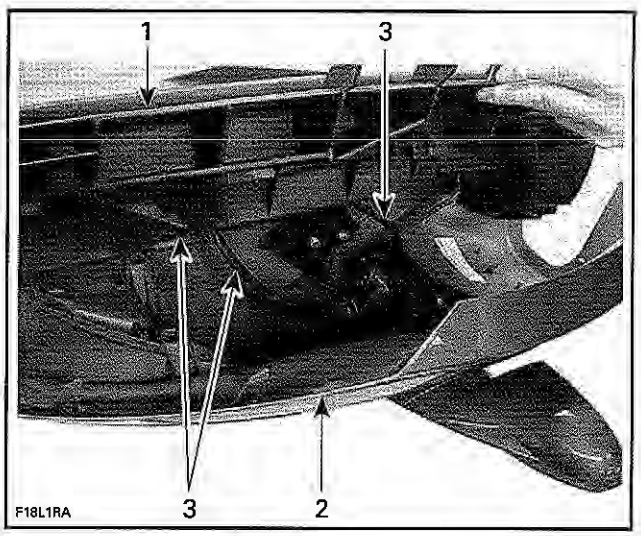
1. *Storage cover*
2. *Inner shell*
3. *Inner shell short screws (x 7)*
4. *Inner shell long screws (x 2)*

Use a rubber hammer to remove the inner shell from the cover. If the inner shell is too stiff, install a piece of 2 x 4 against the inner shell and hit it with the rubber hammer.



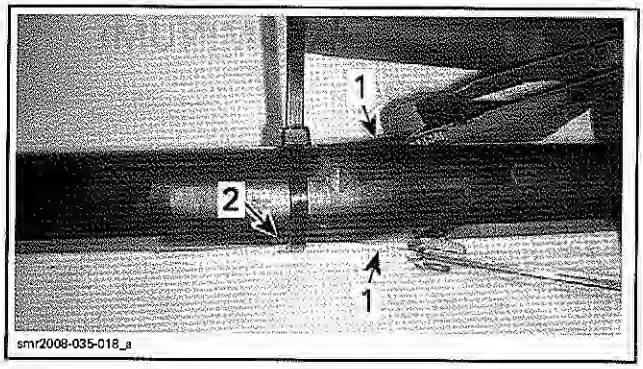
1. *Storage cover*
2. *Inner shell*
3. *Rubber hammer*

Remove connector harness from the inner shell by cutting tie raps.



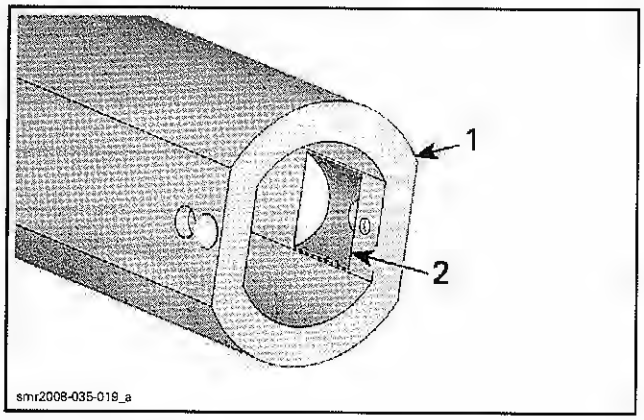
1. *Inner shell*
2. *Storage cover*
3. *Connector harness*

Remove inner shell.



1. *Feeler gauges*
2. *Ball*

Apply XP-S synthetic grease (P/N 293 550 010) in both recesses of the extension tube.



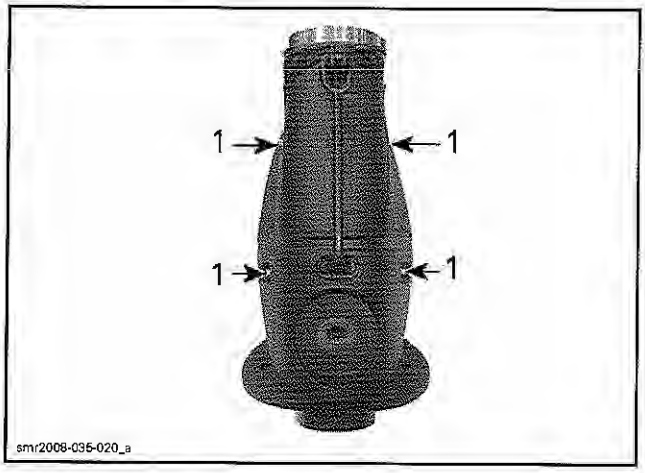
1. *Extension tube*
2. *Recesses*

Slide the handle stem into the extension tube.

Remove feeler gauges and locking tie.

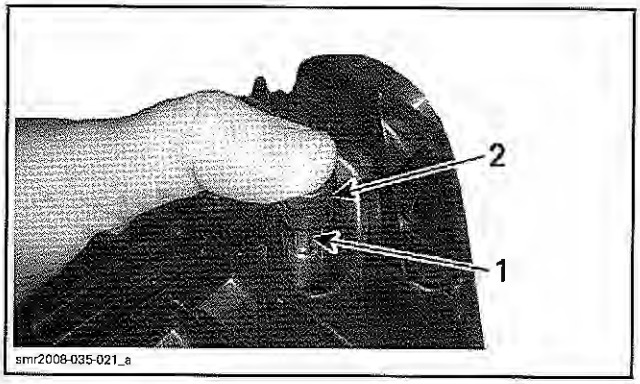
Locking Strap

Remove the wake pylon trim.



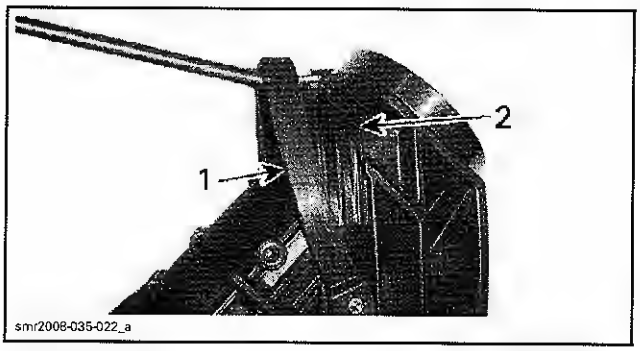
1. *Wake pylon trim screws*

Install lock and insert the end of the locking strap over the retaining pin.



1. *Retaining pin*
2. *Locking strap*

Using a suitable tool, position the locking strap in its groove.



1. *Locking strap*
2. *Locking strap groove*

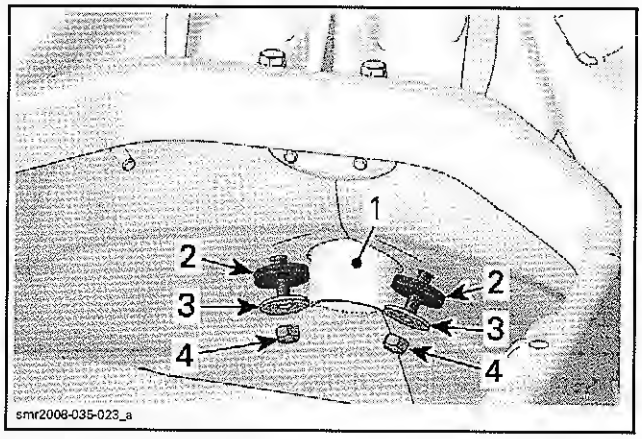
Reinstall the wake pylon trim.

Do not install the handle into wake pylon yet.

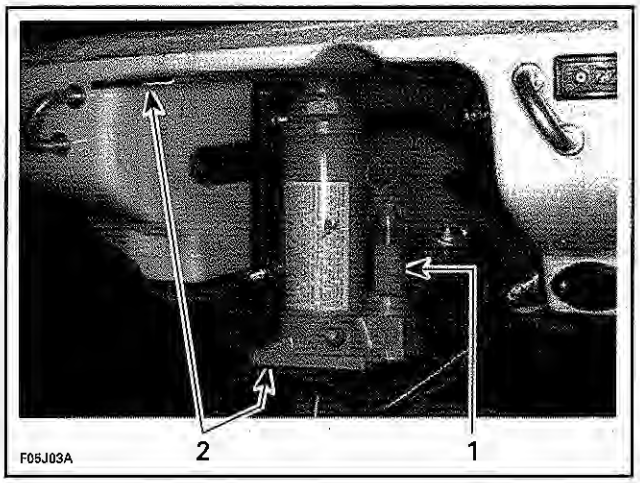
Wake Pylon Installation

Position the wake pylon on vehicle.

Install all bolts securing wake pylon and lateral arms.



1. *Bottom of wake pylon*
2. *Rubber washers*
3. *Flat washers*
4. *Nuts*



TYPICAL
1. *Hydraulic bottle jack*
2. *Steel plates*

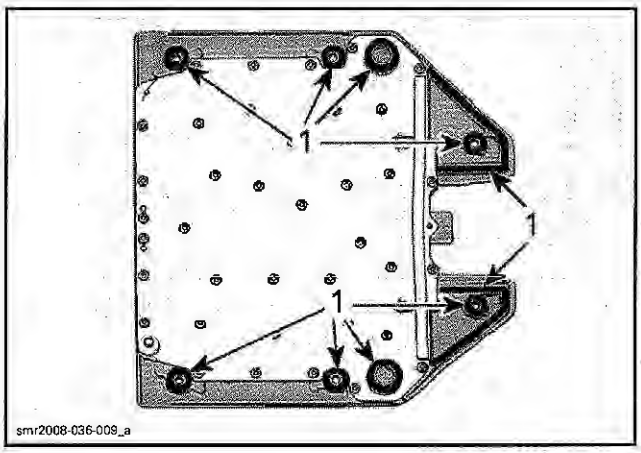
Riding Plate Cleaning

Scrape off all excess of sealant from riding plate and hull.

Clean hull surface with BRP heavy duty cleaner (P/N 293 110 001) to eliminate grease, dust and any residue of sealant. Clean fitting threads.

Riding Plate Installation

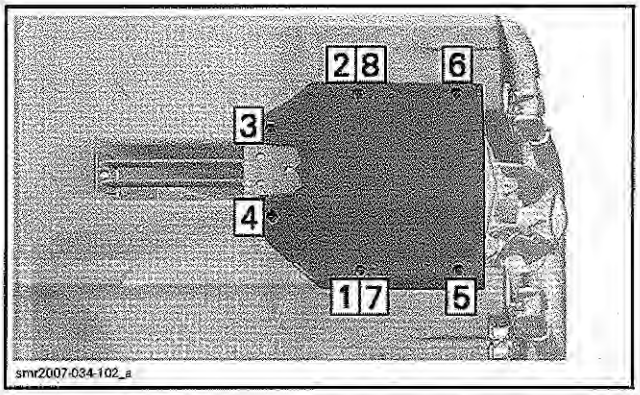
Apply Loctite 5900 (P/N 293 800 066) as indicated by the shaded areas in the next illustration.



1. *Apply Loctite 5900 here*

Apply Loctite 243 (blue) (P/N 293 800 060) on threads of M8 screws or use new M8 screws with Scotch grip.

Torque screws to 25 N•m (18 lbf•ft) as per following sequence.



Properly reinstall hose fittings to ride plate.

Reinstall hoses to ride plate and refill cooling system. Refer to *COOLING SYSTEM* section.

Install jet pump and inlet grate.

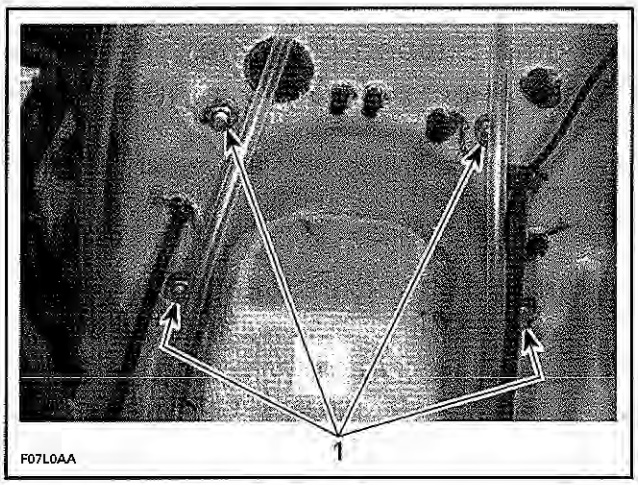
JET PUMP SUPPORT

Jet Pump Support Removal

Inside Hull

Disconnect water supply hose, water return hose and bailer hoses from jet pump support.

Remove elastic stop nuts or screws as well as flat washers securing jet pump support.



TYPICAL
1. *Elastic stop nuts*

Outside Hull

Remove jet pump.

Remove inlet grate and riding plate.

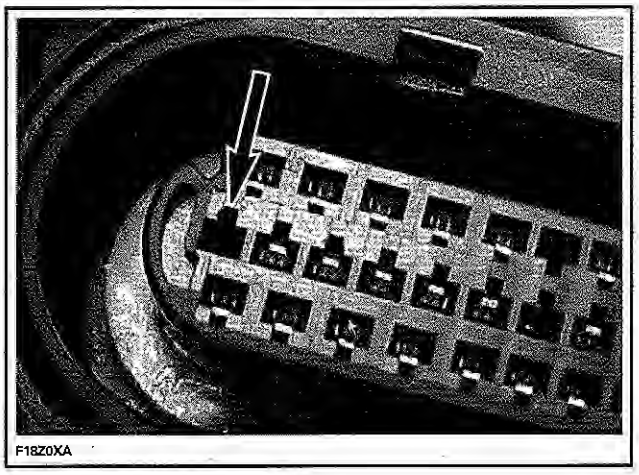
Remove ball joint, boot, nut, half rings and O-rings from steering cable.

1503 ENGINE (130 HP)

MODEL				GTI	GTI SE	GTI RENTAL
ENGINE						
Engine type				ROTAX 1503 4-TEC, 4-stroke, Single Over Head Camshaft (SOHC)		
Induction				Naturally aspirated		
Number of cylinders				3		
Number of valves				12 valves with hydraulic lifters (no adjustment)		
Bore		Standard	mm (in)	100 (3.9)		
		1st Oversize	mm (in)	100.25 (3.95)		
Stroke			mm (in)	63.4 (2.49)		
Displacement			cm^3 (in^3)	1493.8 (91)		
Compression ratio				10.6:1		
Maximum HP			RPM	7300 ± 50		
Lubrication		Type		Dry sump (2 oil pumps). Replaceable oil filter. Water-cooled oil cooler		
		Oil type		10W40 4-stroke oil API service classification SM, SL or SJ		
		Capacity	L (U.S. qt)	3 (2.7) oil change w/filter 4.5 (4.1) total		
Intake valve opening				10° BTDC		
Intake valve closing				50° ABDC		
Exhaust valve opening				50° BBDC		
Exhaust valve closing				10° ATDC		
Valve stem diameter	Intake	New	mm (in)	5.961 to 5.975 (.2347 to .2352)		
		Wear limit	mm (in)	5.930 (.2330)		
	Exhaust	New	mm (in)	5.946 to 5.960 (.2341 to .2346)		
		Wear limit	mm (in)	5.930 (.2330)		
Valve guide diameter		New	mm (in)	5.990 to 6.010 (.2358 to .2366)		
		Wear limit	mm (in)	6.060 (.2386)		
Valve spring free length	Inner	New	mm (in)	41.02 (1.615)		
		Wear limit	mm (in)	38.80 (1.499)		
	Outer	New	mm (in)	45.45 (1.789)		
		Wear limit	mm (in)	43.00 (1.693)		
Valve seat contact width	Intake	New	mm (in)	1.10 to 1.30 (.043 to .051)		
		Wear limit	mm (in)	1.60 (.063)		
	Exhaust	New	mm (in)	1.25 to 1.55 (.049 to .061)		
		Wear limit	mm (in)	1.80 (.071)		
Rocker arm inner diameter		New	mm (in)	20.000 to 20.020 (.7874 to .7882)		
		Wear limit	mm (in)	20.030 (.7886)		
Rocker arm shaft diameter		New	mm (in)	19.980 to 19.990 (.7866 to .7870)		
		Wear limit	mm (in)	19.960 (.7858)		
Cylinder head maximum warpage		Service limit	mm (in)	0.15 (.006)		

MODEL		GTI SE	GTX	WAKE	RXP
MATERIALS (cont'd)					
Fuel tank		Polyethylene			
Seat		Polyurethane/foam			
PERFORMANCE					
Estimated pump power	kW (HP)	52.6 (70.5)			
Maximum fuel consumption at wide open throttle	L/h (U.S. gal/h)	43.1 (11.4)			
Cruising time at full throttle	Fuel tank without reserve	± 63 minutes			
	Fuel tank reserve (from low level signal)	± 20 minutes			

MODEL			RXT	RXP
ENGINE (cont'd)				
Piston pin diameter	New	mm (in)	22.996 to 23.000 (.9053 to .9055)	
	Wear limit	mm (in)	22.990 (.9051)	
Balance shaft journal diameter	New	mm (in)	31.980 to 32.000 (1.2591 to 1.2598)	
	Wear limit	mm (in)	31.950 (1.2579)	
Balance shaft radial clearance	Wear limit	mm (in)	0.070 (.0028)	
Balance shaft axial clearance	New	mm (in)	0.020 to 0.250 (.0008 to .0098)	
Supercharger shaft driven plate journal depth	New	mm (in)	14.460 to 14.500 (.5692 to .5709)	
	Wear limit	mm (in)	14.600 (.5748)	
Supercharger drive gear thickness	New	mm (in)	11.000 to 11.050 (.4331 to .4350)	
	Wear limit	mm (in)	10.900 (.4291)	
Supercharger lock washer thickness	New	mm (in)	4.050 to 4.150 (.1594 to .1634)	
	Wear limit	mm (in)	3.950 (.1555)	
Supercharger spring washer package height (uncompressed)	New	mm (in)	10.900 to 10.700 (.4291 to .4213)	
	Wear limit	mm (in)	10.200 (.4016)	
ENGINE COOLING SYSTEM				
Type			Closed loop cooling system	
Coolant			Ethylene-glycol and distilled water (50%/50%). Use premix coolant from BRP or a coolant specially formulated for aluminum engines	
Cooling system capacity		L (U.S. qt)	5.5 (4.8) total	
Thermostat		°C (°F)	87 (188)	
Monitoring beeper setting		°C (°F)	100 (212)	
EXHAUST SYSTEM				
Type			Water cooled/water injected (opened loop). Direct flow from jet pump	
Intake spark arrester			Tubular, wire screen	
Water injection in muffler		mm (in)	3 x 3.5 (.138) on exhaust pipe 1 x 3.5 (.138) on muffler	
ELECTRICAL SYSTEM				
Magneto generator output			360 W @ 6000 RPM	
Stator		Ω	0.1 to 1.0	
Battery			12 V, 30 A•h	
Ignition system type			DI (Digital Induction)	
Ignition timing			Not adjustable	
Spark plug	Make and type		NGK DCPR8E	
	Gap	mm (in)	0.7 to 0.8 (.028 to .031)	
Ignition coil	Primary	Ω	0.85 to 1.15	
	Secondary	KΩ	9.5 to 13.5	
Engine RPM limiter setting		RPM	8300	

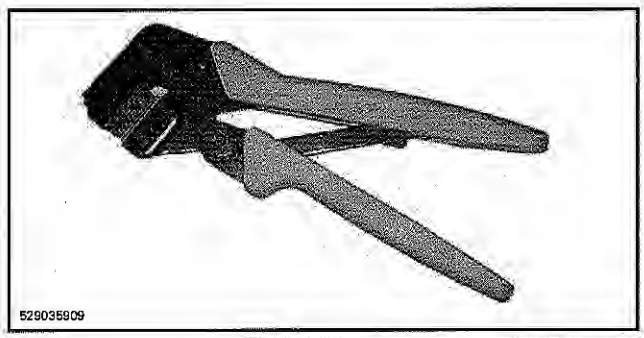

F18Z0XA

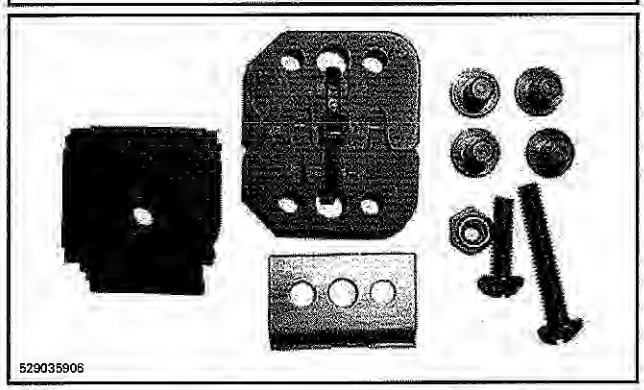
Insert the terminal, ensuring the locking tab snaps into its cavity.

Re-install the orange locking tab, attach the 2 tie raps, and close the connector cover.

Terminal Crimping

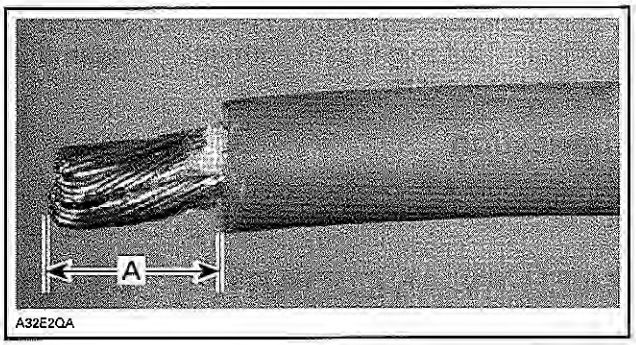
To crimp a new connector terminal, use the crimping tool (P/N 529 035 909) and the crimper die (P/N 529 035 906).


529035909


529035906

To properly crimp the wires, strictly follow this procedure.

Strip the wire to a maximum of 3 mm (1/8 in).

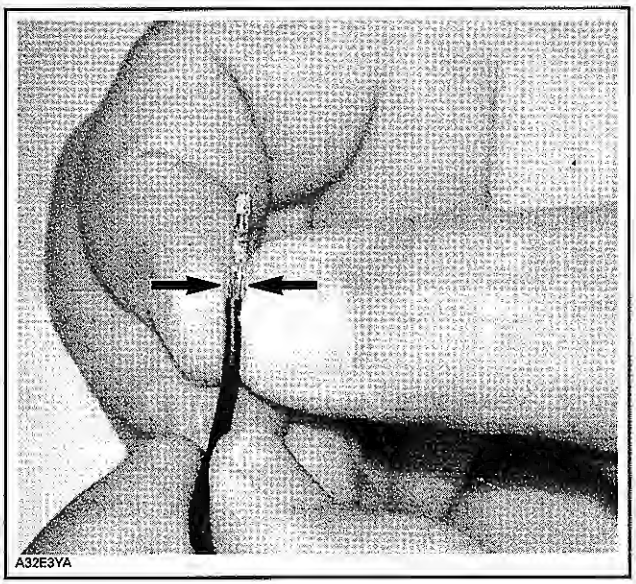


A32E2QA

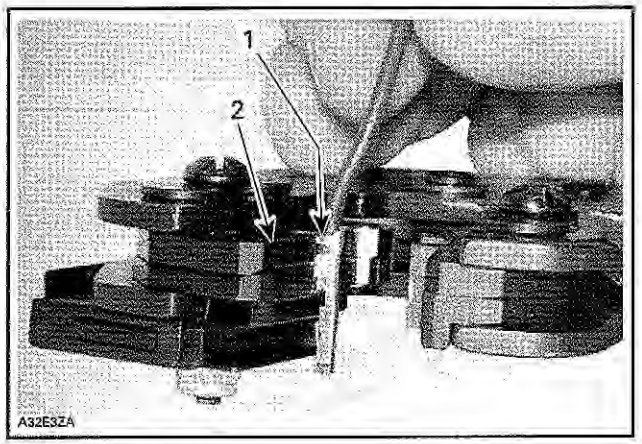
TYPICAL
A. 3 mm (1/8 in) max.

Position wire in terminal.

Squeeze the terminal tabs with your fingers to temporarily retain terminal in place.


A32E3YA

Insert terminal with wire in crimping pliers and position so that top of terminal tabs are flush with pliers edge or a little bit lower as shown.



A32E3ZA

1. *Top of terminal tabs*
2. *Align tabs with pliers edge*

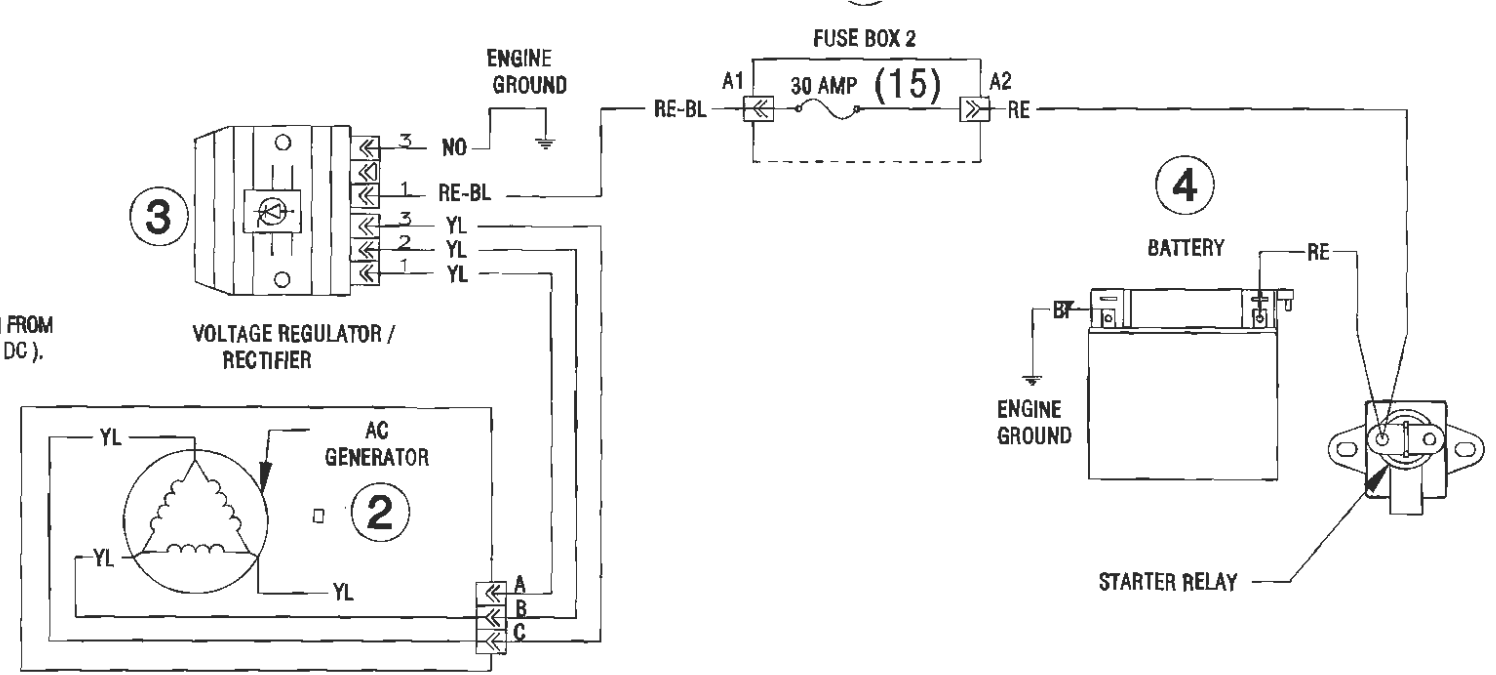
OPERATION:

1- FUSE (15) IS GOOD.

2- ACG SENDS CURRENT TO VOLTAGE REGULATOR / RECTIFIER

3- VOLTAGE REGULATION AND CURRENT RECTIFICATION FROM ALTERNATIVE CURRENT (AC) TO DIRECT CURRENT (DC).

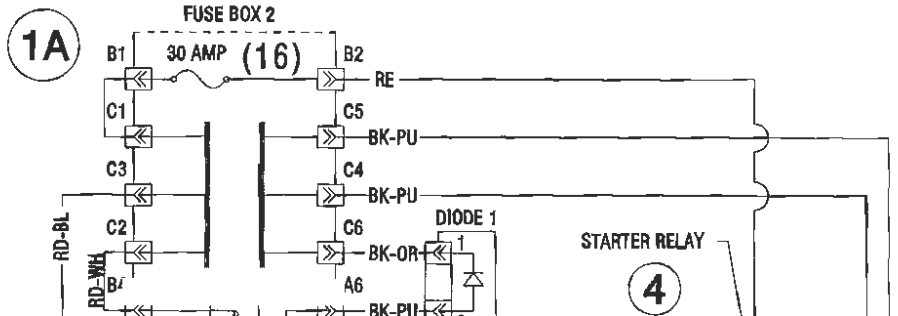
4- DIRECT CURRENT CHARGES BATTERY.



STARTING SYSTEM

OPERATION:

1- FUSES (2), (13) AND (16) ARE GOOD.



4-TEC MODELS						
A: Adjust C: Clean I: Inspect L: Lubricate R: Replace	FIRST 10 HOURS	EVERY 25 HOURS OR 3 MONTHS	EVERY 50 HOURS OR 6 MONTHS	EVERY 100 HOURS OR 1 YEAR	EVERY 200 HOURS OR 2 YEAR	
PART/TASK						REFER TO
ENGINE MANAGEMENT SYSTEM						
EMS sensors				I		*ENGINE MANAGEMENT SYSTEM*
EMS fault codes	I			I		
STEERING SYSTEM						
Steering cable and connections	I			I		*STEERING SYSTEM*
Steering nozzle bushings	I			I		
Off-power assisted steering (O.P.A.S.)	I			I		*OFF-POWER ASSISTED STEERING SYSTEM (O.P.A.S.)*
PROPULSION SYSTEM						
Carbon ring and rubber boot (drive shaft)	I			I		*DRIVE SYSTEM*
Reverse system, cable and connections	I			I		*REVERSE SYSTEM*
VTS (Variable Trim System) (if so equipped)	I			I		*VARIABLE TRIM SYSTEM (VTS)*
Drive shaft/impeller splines				I, L		*JET PUMP and DRIVE SYSTEM*
Impeller boot	I			I		*JET PUMP*
Impeller shaft seal and O-ring				I (1)		
Impeller and wear ring clearance	I			I		
Sacrificial anode	(6)					
HULL/BODY						
Ride plate and water intake grate	I			I		*BODY/HULL*
Drain plugs (inside bilge), check for obstructions	I			I		
Hull	I			I		
Ski/wakeboard post and fasteners	I					

(1) In fresh water, perform for storage period or after 100 hours of use whichever comes first. In salt water use, lubricate drive shaft as indicated to protect it from corrosion.

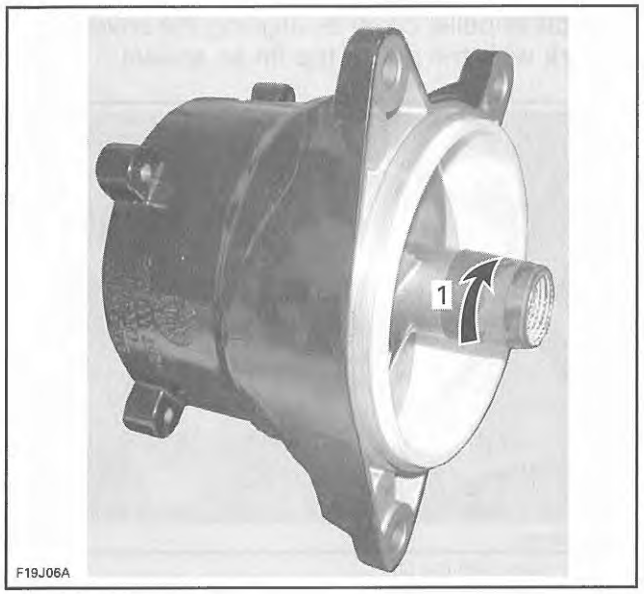
(2) Including intercooler on supercharged models.

(3) Daily flushing in salt water or foul water use.

(4) The supercharger requires replacement when the MAINTENANCE SUPERCHARGER message is displayed on the information center, at every 100 hours of operation or earlier depending on the riding style (speed, engine RPM's, water conditions). This is determined by the engine management system. The supercharger will need to be replaced within 5 hours of the message display by an authorized Sea-doo dealer.

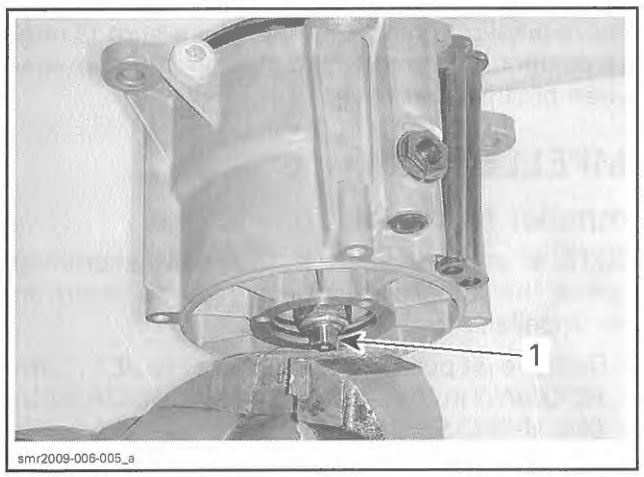
(5) IMPORTANT: When used in salt water, the throttle body lubrication is highly recommended after every 10 hours of use. Failure to perform lubrication will result in damage to the throttle body.

6) In salt water use.



1. Unscrew clockwise

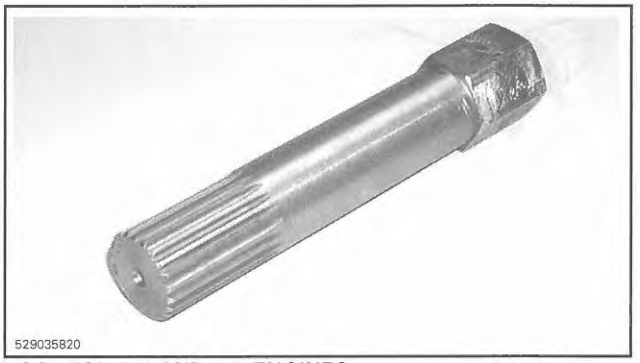
4. Mount the flat sides of impeller shaft in a vise.



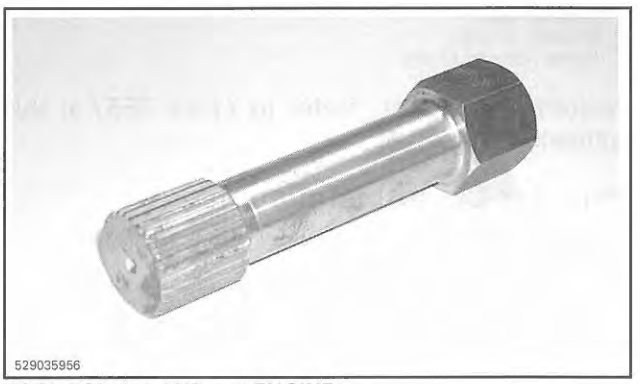
1. Flat side

5. Mount the proper impeller remover/installer in impeller.

MODEL	TOOL
130 and 155 engines	IMPELLER REMOVER/INSTALLER (P/N 529 035 820)
215 and 255 engines	IMPELLER REMOVER/INSTALLER (P/N 529 035 956)



TOOL FOR 130 AND 155 ENGINES

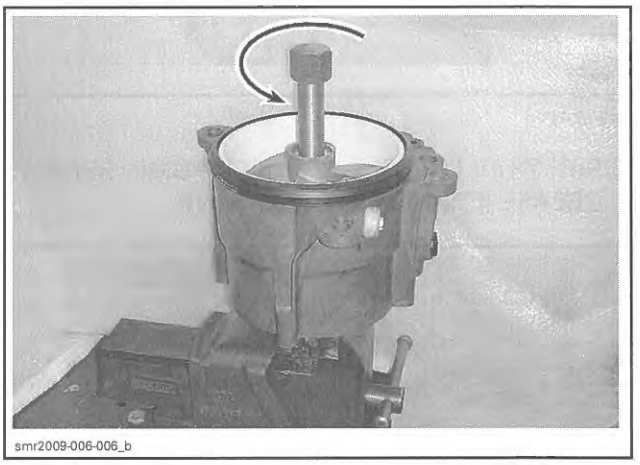


TOOL FOR 215 AND 255 ENGINE

6. Unscrew the impeller counterclockwise.

NOTE: It may be necessary to heat the impeller to ease removal.

⚠ **CAUTION** Never use any impact wrench to loosen impeller.



7. To pull out impeller from pump, apply a rotating movement and pull at the same time.

Impeller Installation

1. Mount the flat sides of impeller shaft in a vise.

GENERAL

Jet pump must be removed to replace any components of the drive system. Refer to *JET PUMP* for removal procedure.

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

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

⚠ WARNING

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

MAINTENANCE

CORROSION PROTECTION

No protection against corrosion is required since the drive shaft is rubber-coated.

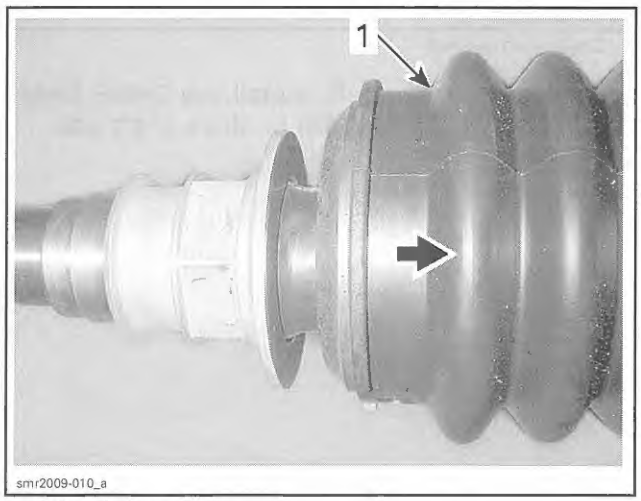
TROUBLESHOOTING

DIAGNOSTIC TIPS

Leaks at PTO Seal

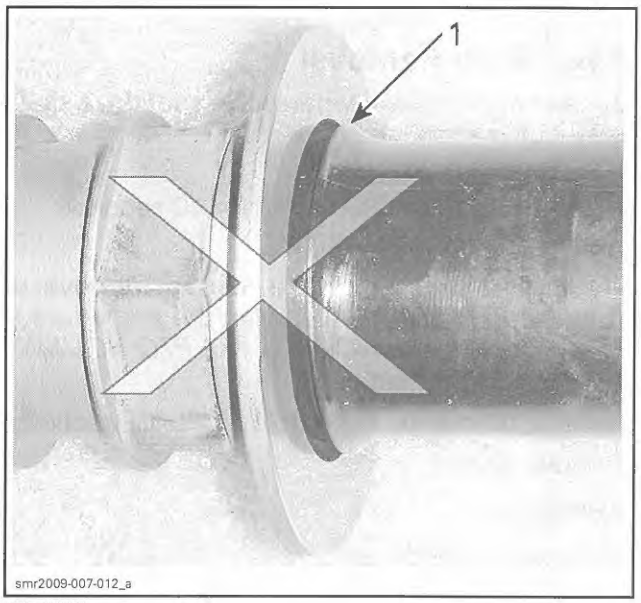
If water enters engine or oil leaks from engine at PTO seal, check if drive shaft is fully engaged in sealing ring.

Compress the drive shaft boot to visually check for proper contact.

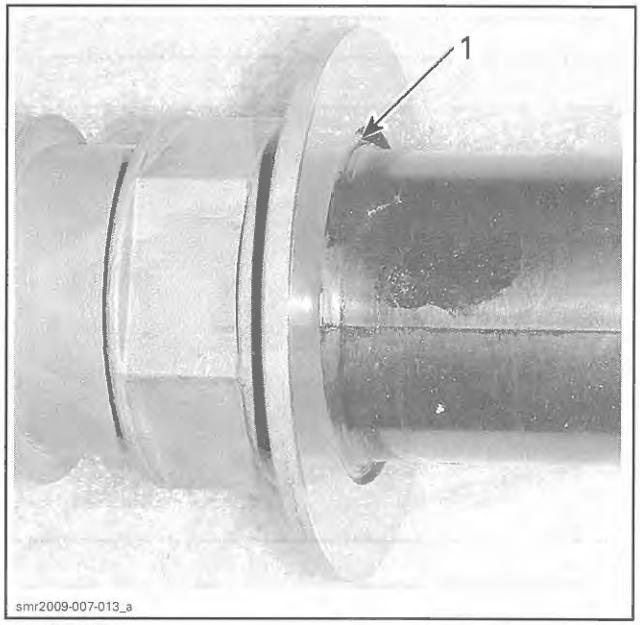


1. Drive shaft boot

Rubber sealing lip of drive shaft must be fully engaged into flange of sealing ring.



WRONG
1. Rubber sealing lip NOT fully engaged



CORRECT
1. Rubber sealing lip fully engaged

NOTE: If drive shaft boot cannot be compressed enough for the inspection, remove jet pump and torque drive shaft. If it does not work, remove drive shaft and inspect drive shaft threads. Refer to *DRIVE SHAFT* in this subsection.

MODEL				GTI	GTI SE	GTI (RENTAL)
ENGINE (cont'd)						
Balance shaft journal diameter	New		mm (in)	31.980 to 32.000 (1.2591 to 1.2598)		
	Wear limit		mm (in)	31.950 (1.2579)		
Balance shaft radial clearance	Wear limit		mm (in)	0.070 (.0028)		
Balance shaft axial clearance	New		mm (in)	0.020 to 0.250 (.0008 to .0098)		
ENGINE COOLING SYSTEM						
Type				Closed loop cooling system		
Coolant				Ethylene-glycol and distilled water (50%/50%). Use premix coolant from BRP or a coolant specially formulated for aluminum engines		
Cooling system capacity			L (U.S. qt)	5.5 (5.8) total		
Thermostat			°C (°F)	87 (188)		
Monitoring beeper setting			°C (°F)	100 (212)		
EXHAUST SYSTEM						
Type				Water cooled/water injected (opened loop). Direct flow from jet pump		
Intake spark arrester				Tubular, wire screen		
Water injection in muffler			mm (in)	3 x 3.5 (.138) on exhaust pipe 1 x 3.5 (.138) on muffler		
ELECTRICAL SYSTEM						
Magneto generator output				360 W @ 6000 RPM		
Stator			Ω	0.1 to 1.0		
Battery				12 V, 30 A•h		
Ignition system type				IDI (inductive discharge ignition)		
Ignition timing				Variable (electronically controlled)		
Spark plug	Make and type			NGK DCPR8E		
	Gap		mm (in)	0.7 to 0.8 (.028 to .031)		
Ignition coil	Primary		Ω	0.85 to 1.15		
	Secondary		KΩ	9.5 to 13.5		
Engine RPM limiter setting			RPM	7650		
Fuse	Information center		A	3		
	Beeper		A	3		
	Depth sounder		A	3 (installed but not in use)		
	Fuel level		A	3		
	VTS		A	7.5 (installed but not in use)		
	Fuel pump		A	10		
	Ignition coil and injection		A	3 x 10		
	TOPS		A	3		
	Diagnostic tool		A	15		
	Starter solenoid		A	10		
	CAPS		A	3		
	Charging system		A	30		
	Battery		A	30		

1503 ENGINE (215 HP)

MODEL				GTX	WAKE PRO	RXT	RXP
ENGINE							
Engine type				ROTAX 1503 4-TEC, 4-stroke, Single Over Head Camshaft (SOHC)			
Induction				Supercharged intercooled			
Number of cylinders				3			
Number of valves				12 valves with hydraulic lifters (no adjustment)			
Bore		Standard	mm (in)	100 (3.9)			
		1st Oversize	mm (in)	100.25 (3.95)			
Stroke			mm (in)	63.4 (2.49)			
Displacement			cm^3 (in^3)	1493.8 (91)			
Compression ratio				8.4:1			
Maximum HP RPM			RPM	8000			
Lubrication		Type		Dry sump (2 oil pumps). Replaceable oil filter. Water-cooled oil cooler			
		Oil type		XPS summer grade oil (P/N 293 600 121) or use a 5W 40 engine oil compatible with wet clutches			
		Capacity	L (U.S. qt)	3 (3.2) oil change w/filter 4.5 (4.8) total			
Intake valve opening				0° BTDC			
Intake valve closing				50 ABDC			
Exhaust valve opening				50° BBDC			
Exhaust valve closing				0° ATDC			
Valve stem diameter	Intake	New	mm (in)	5.961 to 5.975 (.2347 to .2352)			
		Wear limit	mm (in)	5.930 (.2330)			
	Exhaust	New	mm (in)	5.946 to 5.960 (.2341 to .2346)			
		Wear limit	mm (in)	5.930 (.2330)			
Valve guide diameter		New	mm (in)	5.990 to 6.010 (.2358 to .2366)			
		Wear limit	mm (in)	6.060 (.2386)			
Valve spring free length	Inner	New	mm (in)	41.02 (1.615)			
		Wear limit	mm (in)	38.80 (1.499)			
	Outer	New	mm (in)	45.45 (1.789)			
		Wear limit	mm (in)	43.00 (1.693)			
Valve seat contact width	Intake	New	mm (in)	1.10 to 1.30 (.043 to .051)			
		Wear limit	mm (in)	1.60 (.063)			
	Exhaust	New	mm (in)	1.25 to 1.55 (.049 to .061)			
		Wear limit	mm (in)	1.80 (.071)			
Rocker arm inner diameter		New	mm (in)	20.000 to 20.020 (.7874 to .7882)			
		Wear limit	mm (in)	20.030 (.7886)			
Rocker arm shaft diameter		New	mm (in)	19.980 to 19.990 (.7866 to .7870)			
		Wear limit	mm (in)	19.960 (.7858)			
Cylinder head maximum warpage		Service limit	mm (in)	0.15 (.006)			

219 100 369 CA

2009 4-TEC SERIES SHOP MANUAL SUPPLEMENT / ENGLISH
SUPPLÉMENT MANUEL DE RÉP. SÉRIE 4-TEC 2009 / ANGLAIS

FAIT AU / MADE IN CANADA U/M:P.C.

DEALER TECHNICAL SUPPORT

CANADA AND USA

Call the Service Representatives to get technical assistance and to get a Warranty authorization number. Remember these are for DEALER USE ONLY.			
	Phone	Fax	E-mail
Rich Klein Coordinator	715 842-8886	715 847-6879	richard.klein@brp.com
Service Representatives			
USA	800 366-6992	715 847-6879	—
Canada	800 361-9980	819 566-3062	
Alain Doucet (English and French)			service@brp.com
Bill Phare (English)			
Claude Beaudoin (English and French)			
Dany Davey (English and French)			
Dennis Sawyer (English and French)			
Jeff Downs (English)			
John Lofy (English)			
Ken Gauthier (English and French)			
Mike Carter (English)			
Paul Literski (English)			
Perry Redeker (English)			
Richard Cossette (English and French)			
Robert Wegmueller (English)			
Tom Lawrence (English)			

OUTBOARD

	PHONE	FAX	E-MAIL
Brian Hanover International Coordinator	+1 847 689 7099	+1 847 689 7277	brian.hanover@brp.com

BRP AUSTRALIA

	PHONE	FAX	E-MAIL
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BRPED DISTRIBUTORS EUROPE, MIDDLE EAST AND AFRICA

	PHONE	FAX	E-MAIL
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Effort Returns!

ASA electronics
THE MOBILE ELECTRONICS COMPANY SINCE 1977

Flat Rate Schedule

Time in Hours	Product Description
0.3	Antennas
0.3	CD Changer
0.4	Outside Entertainment Centers (OEC)
0.5	Radios (Dash or Wallmount)
0.5	Navigation Systems
0.2	Speakers
0.5	Observation Camera or Monitor
0.2	Headphones/ Vacuums/ Flashlights
0.3	Surround Sound Systems
1.0	System Harnesses
0.5	CRT Televisions
0.5	LCD Flipdown Televisions
0.5	LCD Flat Panel Televisions

An additional 0.20 of an hour will be added to cover time for troubleshooting.

Labor reimbursement will not be provided if:

- the unit is physically damaged
- the defective unit is not returned
- the unit is not returned within the 30 days

ASA Electronics Troubleshooting Hotline:
1-877-845-8750

BRP

AUDIOVOX Voyager JENSEN DESIGNED TO MOVE [YOU]

sdd2008-002-120_en_2

Was the PDI checklist reviewed with the customer? Was the "OWNER'S SECTION" of the PDI Check list read and signed by the customer?

Legal Protection

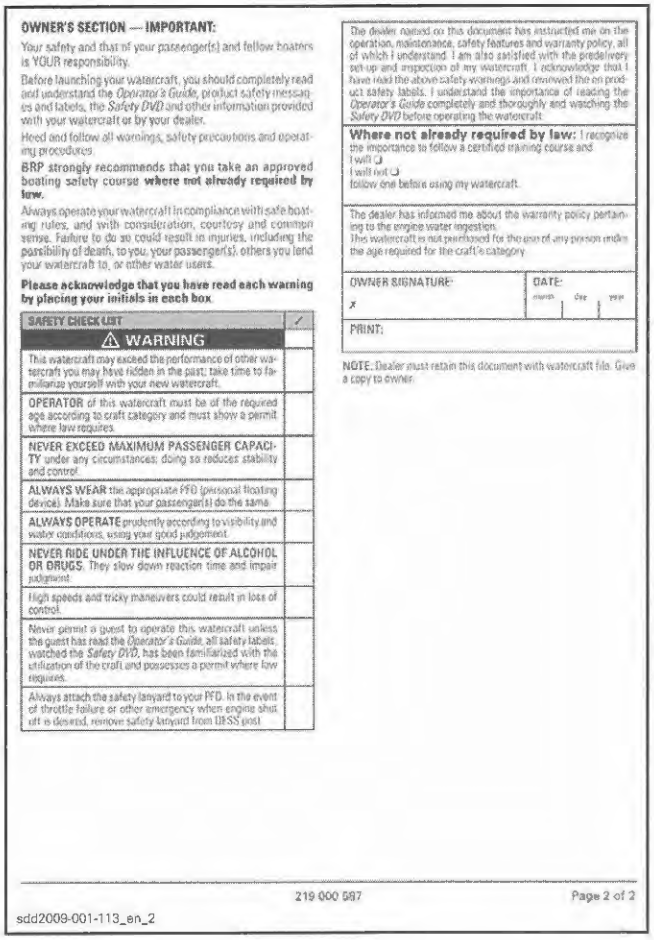
Documented proof that you have reviewed with the customer the operation and maintenance procedures for the vehicle.

Where Do I Find these Documents?

They are shipped with every BRP recreational vehicle or can be found in **BOSSWeb** (www.bossweb.brp.com), **ComCenter** tab, **Document Type** (Technical Publications), **Category** (Checklist).

How Do I Learn More About It!

An easy way to learn more about the delivery process is to view the DVD: Introduction to Dealer Development Training DVD Volume 1; (P/N 219 700 256) from the BRPTI (Bombardier Recreational Products Training Institute) DVD series.



OWNER'S SECTION — IMPORTANT:

Your safety and that of your passenger(s) and fellow boaters is YOUR responsibility.

Before launching your watercraft, you should completely read and understand the *Operator's Guide*, product safety messages and labels, the *Safety DVD* and other information provided with your watercraft or by your dealer.

Heed and follow all warnings, safety precautions and operating procedures.

BRP strongly recommends that you take an approved boating safety course where not already required by law.

Always operate your watercraft in compliance with safe boating rules, and with consideration, courtesy and common sense. Failure to do so could result in injuries, including the possibility of death, to you, your passenger(s), others you land your watercraft to, or other water users.

Please acknowledge that you have read each warning by placing your initials in each box.

SAFETY CHECK LIST	✓
⚠ WARNING	
This watercraft may exceed the performance of other watercraft you may have ridden in the past; take time to familiarize yourself with your new watercraft.	
OPERATOR of this watercraft must be of the required age according to craft category and must show a permit where law requires.	
NEVER EXCEED MAXIMUM PASSENGER CAPACITY under any circumstances; doing so reduces stability and control.	
ALWAYS WEAR the appropriate PFD (personal floating device). Make sure that your passenger(s) do the same.	
ALWAYS OPERATE prudently according to visibility and water conditions, using your good judgement.	
NEVER RIDE UNDER THE INFLUENCE OF ALCOHOL OR DRUGS. They slow down reaction time and impair judgment.	
High speeds and tricky maneuvers could result in loss of control.	
Never permit a guest to operate this watercraft unless the guest has read the *Operator's Guide*, all safety labels, watched the *Safety DVD*, has been familiarized with the utilization of the craft and possesses a permit where law requires.	
Always attach the safety lanyard to your PFD. In the event of throttle failure or other emergency when engine shut off is desired, remove safety lanyard from DESS post.	

The dealer named on this document has instructed me on the operation, maintenance, safety features and warranty policy, all of which I understand. I am also satisfied with the predelivery set-up and inspection of my watercraft. I acknowledge that I have read the above safety warnings and reviewed the on product safety labels. I understand the importance of reading the *Operator's Guide* completely and thoroughly and watching the *Safety DVD* before operating the watercraft.

Where not already required by law: I recognize the importance to follow a certified training course and
I will ❍
I will not ❍
follow one before using my watercraft.

The dealer has informed me about the warranty policy pertaining to the engine water ingestion.
This watercraft is not purchased for the use of any person under the age required for the craft's category.

OWNER SIGNATURE: X

DATE: month day year

PRINT:

NOTE: Dealer must retain this document with watercraft file. Give a copy to owner.

219 000 597 Page 2 of 2

sdd2009-001-113_en_2

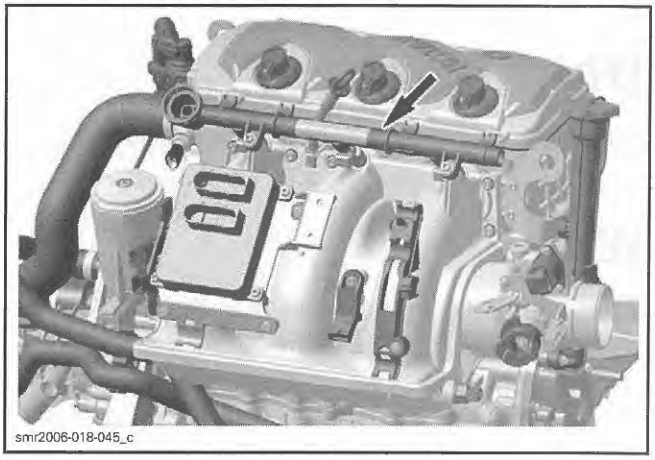
ALL 1503 ENGINES

What's New:

New fuel rail assembly.

Why:

Quality improvement. Can retrofit previous MYs.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ALL 1503 ENGINES EXCEPT ETC (ELECTRONIC THROTTLE CONTROL)

What's New:

Oil filter cover.

Why:

Quality improvement. Can retrofit previous MYs.


sdd2009-001-047_a

1503 ETC ENGINES

What's New:

Oil filter cover.

Basically same as previously mentioned cover however, it is designed so that it will be pushed out of the filter housing when the oil filter bolt is unscrewed.

The oil filter bolt is the same, but a sleeve and a nut threaded onto the oil filter bolt is used to push the new cover out of the housing when unscrewing the bolt.

Will retrofit on all previous 1503 executions.

Why:

Ease of removal.

WAKE 155, WAKE PRO 215

What's New:

New plastic ski-pole.

Why:

Ski Pole standardization.


sdd2009-001-010_a

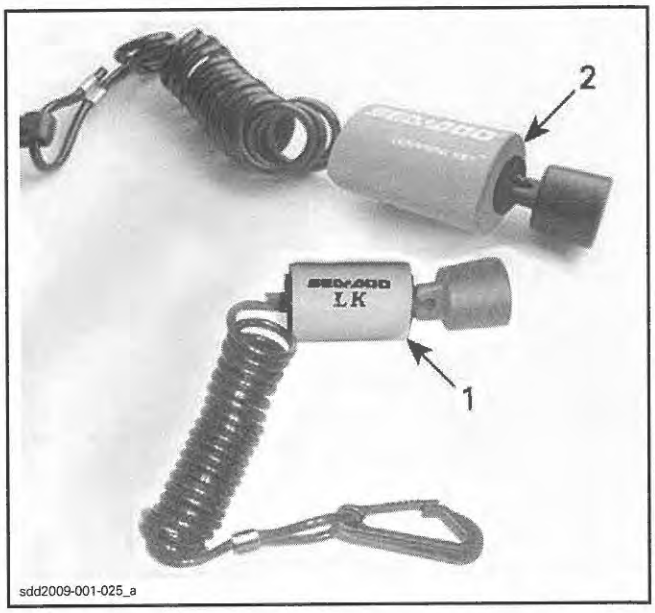
What's New:

GREEN learning key (Lanyard) instead of WHITE.

All model Sea-Doo's except iS models use lanyard with floats that have a round cross-section **[1]**. All iS models use lanyards floats that have an oblong (egg shape) cross-section **[2]**.

Why:

Standardization with new models.



sdd2009-001-025_a

230 CHALLENGER, 230 CHALLENGER SP AND 230 WAKE

What's New:

Bow seat cushions hinged to deck.

Why:

Increased convenience and cushion retention.


sdd2009-001-140

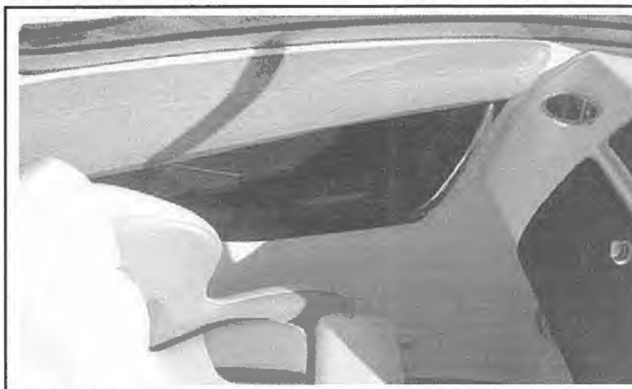
230 CHALLENGER, 230 CHALLENGER SP AND 230 WAKE

What's New:

Combing box added to port gunwale.

Why:

Increased convenience.


sdd2009-001-137

SEA-DOO BRP WATERCRAFT SERVICE Bulletin

October 31, 2008 Subject: **Supercharger Service Part Update** No. **2008-12**

YEAR	MODEL	MODEL NUMBER	SERIAL NUMBER
All	All Supercharged Models	All	All

This bulletin is concerning all supercharger retaining nuts found in the Supercharger Repair Kits.

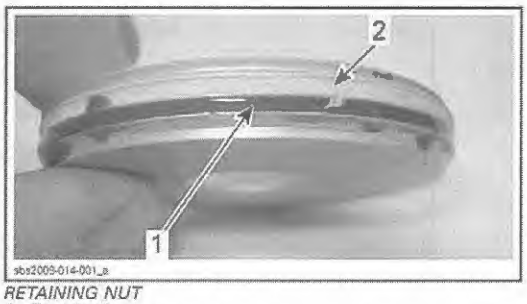
Dealers should perform the following procedure explained in this bulletin each time this part is used for a supercharger repair.

PROBLEM

As a running change at Rotax facilities during MY2008 supercharger production, the amount of scotch grip was reduced on retaining nut.

SOLUTION

LOCTITE 243 (BLUE) (P/N 293 800 060)† should be applied around (360°) of the first thread turn, as shown by the picture, prior to installation.



RETAINING NUT
1. Scotch grip
2. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) here

NOTICE Care must be taken not to put too much Loctite on to prevent getting it on the bearing.

† Loctite is a registered trademark of Loctite Corp.

sdd2009-001-115_en

To activate SLOW SPEED mode:

1. Position the iBR in the neutral position.
2. PRESS and HOLD the cruise button **[1]** for more than 1 second.
3. The information center toggles to a scrolling display that indicates SLOW SPEED mode active.

NOTE: The iBR is in neutral position on engine start up as long as the throttle is not depressed to move the iBR into forward thrust position. Once the iBR has been operated in forward thrust position, to position the iBR in neutral position without shutting down and restarting the engine, you must activate the brake function using the Brake/Reverse lever, and then releasing it. The iBR will automatically move to the neutral position after the brake function is terminated.

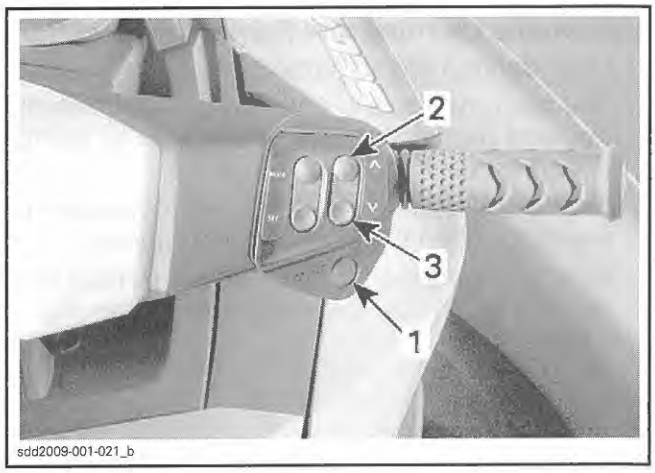
SLOW SPEED can be adjusted by pressing the UP **[2]** or DOWN **[3]** arrow buttons on the RH handlebar. By holding the UP or DOWN buttons, the speed can be adjusted accordingly, 1.6 thru 8 km/h (1 - 5 MPH), or 8 thru 1.6 km/h (5 - 1 MPH).

From 1.6 - 5 km/h (1 - 3 MPH), the angle of the reverse gate is modulated between neutral and forward.

To achieve between 6.5 and 8 km/h (4 and 5 MPH), the reverse gate is at the full forward position and the engine RPM is increased.

Slow Speed Mode is deactivated by:

- Depressing the brake lever, or
- Pressing the cruise button again, or
- Accelerating above the threshold maximum slow speed, or
- Shutting off the engine.



sdd2009-001-021_b

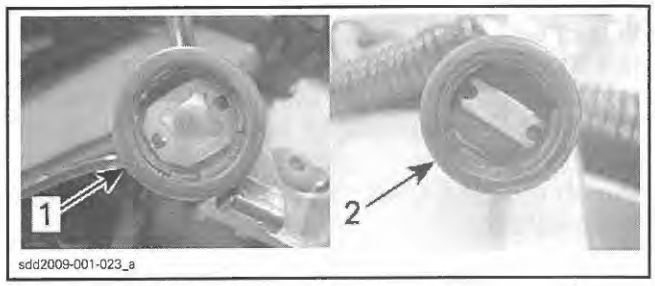
Lanyards (Also referred to as Keys).

The iS model Sea-Doo will now use the same execution lanyards as snowmobiles **[1]** in that they have an internal plate for better contact.

The floats have a new shape, and the color identifies the type key.

- YELLOW (normal) all iS models except LTD
- BLACK (normal for LTD models)
- ORANGE (rental)
- GREEN (learning)

NOTE: The learning key is now green on iS models instead of white. All other models will use the old execution lanyards **[2]** with the round float.



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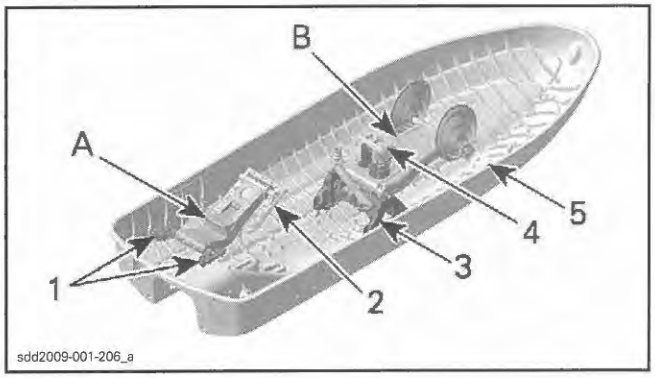
Suspension Control Arms

The Moving Deck is supported by two control arms.

The Rear Control Arm **[A]** is attached to the fixed deck **[1]** and to the rear of the moving deck **[2]**, just behind the seat.

The Front Control Arm **[B]** is attached to a base support mounted to the hull **[3]** and to the moving deck, by a mounting plate atop the spring and shock absorber **[4]**, and by two lateral supports under the foot wells **[5]**.



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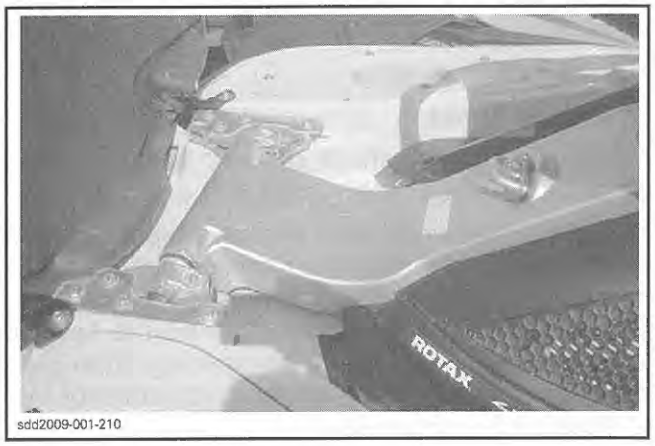
Rear Suspension Control Arm

The rear suspension control arm has a pivot point at each end. It basically acts as a hinge that moves with and secures the aft end of the moving deck to the fixed deck.

It also provides for the ski eye attachment point.



sdd2009-001-210

Front Suspension Control Arm

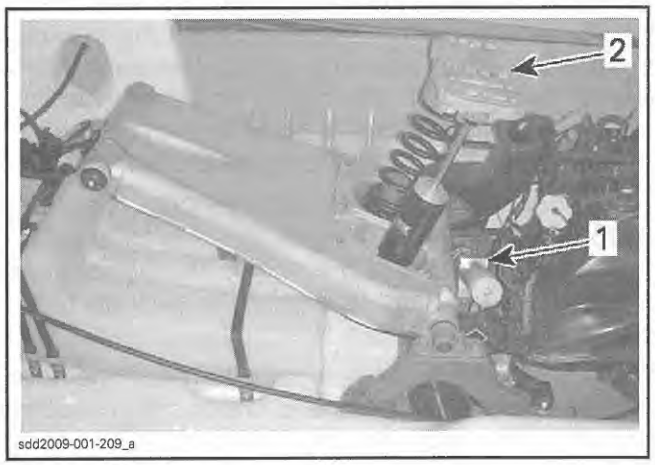
The front suspension control arm has a pivot point at each end. It also basically acts as a hinge that moves with and secures the forward end of the moving deck to a support mounted on the hull.

It also serves as the lower attachment points for the shock absorber and spring assemblies.

The hydraulic system **[1]** used for raising or lowering the moving deck is attached to the base support.

The upper end of the shock and spring assemblies are attached to a mounting plate **[2]** that attaches the moving deck, just ahead of the center position.

Note how the shock and spring assemblies are mounted side by side.



sdd2009-001-209_a

Engine Accessibility

Engine accessibility will vary depending on what exterior coverings are removed. These coverings are the:

1. Vent box
2. Deck extension
3. Moving deck.

The vent box is the covering for the deck extension which doubles as a fresh air inlet.

The deck extension is an extension panel that is fastened to the deck (similar to the RXPs, but hidden from sight by the moving deck.

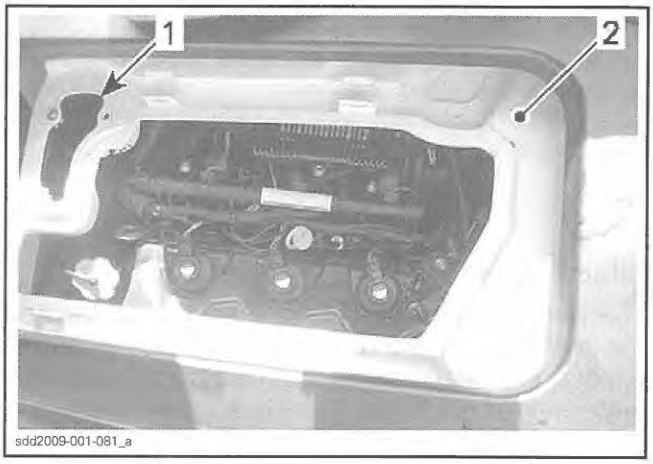
The moving deck is the suspended portion of the boat which moves with the suspension, and among other things, includes the seat and the steering pod.

Removing the vent box provides access to the spark plugs, dip stick, oil filter, oil filler neck and coolant bottle. The rear fresh air inlet to engine compartment **[1]** which, is fixed to the deck extension **[2]**, is clearly visible with the vent cover removed.

To provide access to the rear engine components and drive shaft, the deck extension must be removed. Unbolting the rear swing arm and lifting the aft end of the moving deck will provide access to the deck extension fasteners.

For further access, the moving deck must be completely removed. To accomplish this, the rear swing arm, front swing arm, and suspension mount must be unbolted from the moving deck. The steering cable must also be taken off and several connectors must be undone.

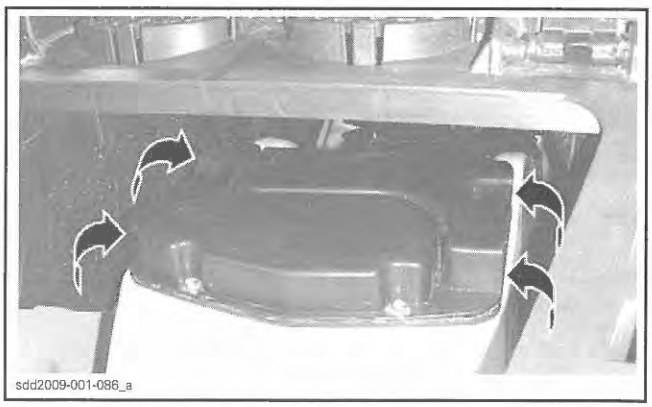
Once disconnected, the moving deck can be lifted off the deck by hand but, it is highly recommended that some sort of a lifting device such as a hoist be used. This is especially important when reinstalling the moving deck as all fasteners should be started before torquing them.



Fresh Air Inlets to Engine Compartment

Air enters the engine compartment through two separate inlets.

One such inlet is located at the front of the boat under the moving deck. It can be accessed by opening the front cover and looking towards the stern of the boat. Air enters the engine compartment through openings on either side of the inlet.



Standard Features

GTI 130 RECREATION | 2009

HULL AND COMPONENTS

Progressive-V, composite	Wider, flatter, more stable and provides a drier ride.
FRP construction	Strong, light and easy to maintain.
3-up seat	Comfortable room for three – permits rear-facing spotter for watersports.
Elevated fuel filler	Easy access and prevents water intrusion while refueling.
Multifunction Digital Information Center	Reports 15 key operating functions: Fuel Level, Low Fuel Level, Low Voltage, Tachometer, Overheat, Hour Meter, Maintenance Info, Check Engine, Low Oil Pressure, Sensor Check, Hi Voltage, Key (battery protection), Key (wrong key), L-Key, P codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Power Assisted Steering (O.P.A.S.)	Assists steering during off-power, as well as off-throttle situations.

Sponsons
Bumpers
Temporary docking loops
Double density comfort hand grips
Reboarding platform
Non-slip hand grips
Tow hook
Floating safety lanyard
Seat strap
Grab handle
Large glove compartment
Watertight, removable storage bin
Dual drain plugs
External exhaust cooling flush attachment
Operator's guide, instructional video and booklet

OPTIONS

Fold-down reboarding step
Retractable ski pylon
Removable wakeboard rack
Speedometer
Lake temperature
Depth finder
Removable dry bag for front storage
Safety kit
Mooring rope
Sandbag anchor
Protective cover

WARRANTY

BRP limited warranty covers the watercraft for one year.

ENGINE

1,494 cc four-stroke, Rotax SOHC with four valves per cylinder	130 hp Rotax 4-TEC engine provides reliable performance in fresh or salt water, increased torque at low RPM, optimized power at all RPM levels and throttle positions.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
Sea-Doo Learning Key	LK1 – Limits engine RPM and top speed to about 35 mph. LK2 – Limits engine RPM and top speed to about 45 mph. Options are programmable by dealer.
D-Sea-Bel™ system	Sound reduction system for a quieter ride.
Closed-loop cooling system	Ensures the proper operating temperature at all speeds and improves corrosion durability.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Forward/neutral/reverse	Improves maneuverability especially around docks and trailer ramps.
Aluminum stator vanes	Handle the high-performance engine without erosion.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Replaceable urethane wear ring	Provides long impeller life, less maintenance and maximum thrust.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

sdd2009-001-101_en_2

SEA-DOO. THE GOOD LIFE JUST GOT BETTER™

Standard Features

RXP-X 255 MUSCLECRAFT | 2009

HULL AND COMPONENTS

Semi-V, composite	Ensures a smooth and comfortable ride in a variety of conditions, and greater maneuverability.
FRP construction	Strong, light and easy to maintain.
Bow and stern eyes	Designed for towing or securing the craft to a trailer or dock.
Carpeted footwells and deck pads	Offer extra comfort, non-skid surface and an aggressive diamond-plate pattern for additional traction.
X-Handlebars	Allows rider to fine tune positioning when launching off large waves.
X-Racing seat	Low-profile seat allows rider to adjust body position for maximum leverage.
Removable engine hatch	Easily removed to allow expanded access during routine engine maintenance.
Multifunction Digital Information Center	Reports 20 key operating functions: Fuel Level, Low Fuel Level, Low Voltage, Tachometer, Overheat, Hour Meter, Maintenance Info, Speedometer, Compass, VTS, Lake Temperature, Check Engine, Low Oil Pressure, Sensor Check, Hi Voltage, Key (battery protection), Key (wrong key), L-Key, P codes, VTS Preset.
High performance electric Variable Trim System (VTS)	Provides pre-set positions for quick settings when adjusting boat trim, maximizes acceleration and high-speed stability.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Power Assisted Steering (O.P.A.S.™)	Assists steering during off-power, as well as off-throttle situations.

Sponsons
Bumpers
Adjustable mirrors
Knee pads
Reboarding platform
Billet finger throttle with braided steel cable
Double density comfort hand grips
Floating safety lanyard
Seat strap
Grab handle
Extra-large storage compartment(s)
Glove compartment
Extended range fuel tank (15.9 US gal)
Elevated fuel filler
Dual drain plugs
External exhaust cooling flush attachment
Operator's guide, Instructional video and booklet

OPTIONS

Fold-down reboarding step
Removable dry bag for front storage
Safety kit
Mooring rope
Sandbag anchor
Protective cover

WARRANTY

BRP limited warranty covers the watercraft for one year.

ENGINE

Supercharged intercooled 1,494 cc four-stroke, Rotax SOHC with four valves per cylinder	255 hp Supercharged Intercooled Rotax 4-TEC engine provides reliable ultra-high performance in fresh or salt water, increased torque at low RPM, optimized power at all RPM levels and throttle positions.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
Sea-Doo Learning Key™	LK1 – Limits engine RPM and top speed to about 35 mph. LK2 – Limits engine RPM and top speed to about 50 mph. Options are programmable by dealer.
D-Sea-Bel™ system	Sound reduction system for a quieter ride.
Water cooled exhaust pipe	Regulates exhaust temperature.
Closed-loop cooling system	Ensures the proper operating temperature at all speeds and improves corrosion durability.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Racing pump with high performance intake grate	Ensures that the inlet stays hooked up and fills the pump for maximum thrust even in the roughest conditions.
Forward/neutral/reverse	Improves maneuverability especially around docks and trailer ramps.
Aluminum stator vanes	Handle the high-performance engine without erosion.
Replaceable urethane wear ring	Provides long impeller life, less maintenance and maximum thrust.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

SEA-DOO. THE GOOD LIFE JUST GOT BETTER™

sdd2009-001-106_en_2

Standard Features

WAKE PRO 215 SPORT | 2009

HULL AND COMPONENTS

Modified-V, composite	Ensures a smooth and comfortable ride in a variety of conditions, and greater maneuverability.
FRP construction	Strong, light and easy to maintain.
Bow and stern eyes	Designed for towing or securing the craft to a trailer or dock.
Carpeted footwells and deck pads	Offer extra comfort, non-skid surface and great looks.
3-up seat	Comfortable room for three – permits spotter for watersports.
Elevated fuel filler	Easy access and prevents water intrusion while refueling.
Multifunction Digital Information Center	Reports 20 key operating functions: Fuel Level, Low Fuel Level, Low Voltage, Tachometer, Overheat, Hour Meter, Maintenance Info, Speedometer, Compass, VTS, Lake Temperature, Check Engine, Low Oil Pressure, Sensor Check, Hi Voltage, Key (battery protection), Key (wrong key), L-Key, P codes, VTS Preset.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Power Assisted Steering (O.P.A.S.™)	Assists steering during off-power, as well as off-throttle situations.

Sponsons
Bumpers
Temporary docking loops
Double density comfort hand grips
Wide handlebars
Reboarding platform
Fold-down reboarding step
Floating safety lanyard
Seat strap
Grab handle
Watertight, removable storage bin
Extra-large storage compartment(s)
Glove compartment
Extended range fuel tank (15.9 US gal)
Dual drain plugs
External exhaust cooling flush attachment
Operator's guide, instructional video and booklet

WAKE PRO PACKAGE

Removable WakeBoost system	Adds weight to reboarding platform to fine-tune wake size and shape (200 lbs / 90.7kg).
High performance electric Variable Trim System (VTS)	Enables rider to alter the watercraft's trim to fine-tune wake and improve acceleration.
Retractable ski pylon	Allows for high, secure attachment of a ski rope.
Removable wakeboard rack	Provides easy transport of a wakeboard to the ride site.
Removable storage tray	Provides portable access to front storage items.
Wide-angle convex mirrors	Increases field of view by 32% over standard mirrors.

WARRANTY

BRP limited warranty covers the watercraft for one year.

ENGINE

Supercharged intercooled 1,494 cc four-stroke, Rotax SOHC with four valves per cylinder	215 hp Supercharged Intercooled Rotax 4-TEC engine provides reliable ultra-high performance in fresh or salt water, increased torque at low RPM, optimized power at all RPM levels and throttle positions.
Sea-Doo Learning Key™	LK1 – Limits engine RPM and top speed to about 35 mph. LK2 – Limits engine RPM and top speed to about 50 mph. Options are programmable by dealer.
D-Sea-Bel™ system	Sound reduction system for a quieter ride.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
Closed-loop cooling system	Ensures the proper operating temperature at all speeds and improves corrosion durability.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Forward/neutral/reverse	Improves maneuverability especially around docks and trailer ramps.
Aluminum stator vanes	Handle the high-performance engine without erosion.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Replaceable urethane wear ring	Provides long impeller life, less maintenance and maximum thrust.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

OPTIONS

Special GTX® Limited glove compartment with GPS
Depth finder
Removable dry bag for front storage
Safety kit
Additional wakeboard rack
Mooring rope
Sandbag anchor
Protective cover

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THE GOOD LIFE JUST GOT BETTER™

Overall Specifications

180 Challenger SE

RECREATION | 2009

Riviera Blue

DIMENSIONS

Length	17' 7" / 5.36 m
Beam	8' 2" / 2.49 m
Draft	12" / 30.5 cm
Dry weight: No tower	1,913 lbs / 868 kg
With tower	1,948 lbs / 884 kg
Storage capacity	23 cu ft / .65 cu m
Seating capacity	8
Weight capacity	1,383 lbs / 627 kg
Fuel capacity	32 US gal / 121 L

DIMENSIONS (ON TRAILER)

Length [tongue folded]	19' 4" / 5.9 m [18' 3" / 5.56 m]
Width	8'2" / 2.49 m
Height: No tower	6' 1" / 1.85 m
Tower down	6' 7" / 2.00m
Tower up	8' 5" / 2.57 m
Gross weight	2,843 lbs / 1,290 kg

ENGINE

Model	Fuel injected, Rotax 1503 4-TEC
Displacement	1,494 cc
Horsepower: Std	215 hp SCIC
Opt 1	255 hp SCIC
Cylinders (/engine)	3
Max RPM (/engine): Std & Opt 1	8,000
Octane no: Std & Opt 1	91
Emission level	CARB 3-Star
Cooling system	Closed-Loop Cooling System

ELECTRICAL

Generator	30 amp / 380 W
Battery	12 V

HULL & DECK

Material	Composite FRP
Vinylester barrier stringer	Std
Full fiberglass liner	Std
Graphics	Std
Deadrise	20°
Colors: Opt 1 gel-coat	Scarlet Red
Opt 2 gel-coat	Riviera Blue

PROPULSION

Jet pump type:	
Axial flow	Single stage
Pump diameter: Std & Opt 1	6 1/4" / 15.63 cm
Impeller:	
Material	Stainless steel
Outside diameter (mm)	159 ± .07
Reverse system	Std

Equipment

HULL & DECK

- Stringer system – composite FRP, foam filled
- Cleats – stainless steel pull-up (6)
- Cup holders – stainless steel (8)
- Rub rail (Black)
- Grab handles (10)
- Non-skid decking
- Navigation light
- Courtesy lights (3)
- Tow eyes – stainless steel bow & stern
- Ski eye – stern
- Walk-Through – rear
- Swim platform
- Reboarding ladder – rear (2-step)
- Engine access
- Engine blower
- Auto bilge pump

STORAGE

- Ski locker, lockable
- Under seat
- Glovebox, lockable
- Dual access rear

CONTROL STATION

HELM

- Steering – custom
- Horn
- Separated shift & throttle lever
- Battery switch – rear storage
- Fuse box
- DESS magnetic lanyard key

CONTROL STATION (Cont'd)

DIGITAL INFOCENTER

- Fuel level
- Low fuel level
- Low oil level
- Low voltage
- Tachometer
- Overheat
- Hour meter
- Maintenance info
- Speedometer
- Compass
- Water temperature
- Check engine
- Low oil pressure
- Depth finder
- Sensor check
- Hi voltage
- Battery protection
- Key (Wrong Key)
- L- Key

COCKPIT

- Carpet – snap-in
- Dash finish – Vinyl covered Gray
- Outlet – 12 volt accessory (1)
- Cooler – removable

SEATING

Driver Seat

- Track & swivel

Passenger Seat

- Track & swivel

STEREO & SOUND

- Stereo system – satellite-ready
- AM/FM/CD
- Speakers – bow (2)
- Speakers – cockpit (2)
- MP3 port
- Stereo remote – helm

CANVAS & MISCELLANEOUS

- Cockpit cover
- Tonneau cover
- Bimini top
- Bow filler cushion
- Windshield – fixed
- Warranty (1 yr)

CERTIFICATIONS

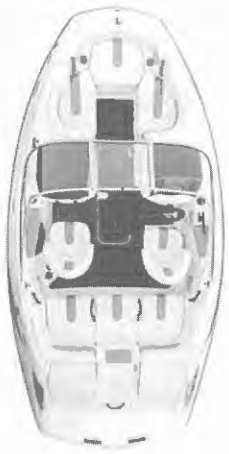
- NMMA

TRAILER

- Single axle
- Swing-away tongue
- Painted trailer

Options

- Wakeboard tower
- Mooring cover
- Custom trailer
- Galvanized trailer
- Warranty – B.E.S.T. (3 years)



SEA-DOO. THE GOOD LIFE JUST GOT BETTER™

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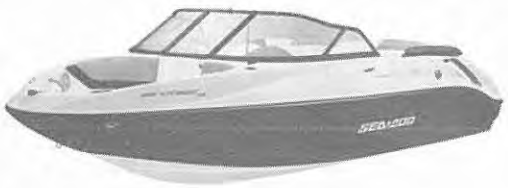
Overall Specifications

205 Utopia SE

LUXURY PERFORMANCE | 2009



DIMENSIONS

Length	19'10" / 6.05 m
Beam	8' / 2.44 m
Draft	12" / 30.5 cm
Dry weight: No tower	2,570 lbs / 1,166 kg
With tower	2,630 lbs / 1,193 kg
Storage capacity	43 cu ft / 1.22 cu m
Seating capacity	8
Weight capacity	1,320 lbs / 599 kg
Fuel capacity	44 US gal / 166.5 L

DIMENSIONS (ON TRAILER)

Length (tongue folded)	20' 9" / 6.32 m (18' 6" / 5.64) m
Width	8' / 2.44 m
Height: No tower	6' 7" / 2.01 m
Tower down	7' 1" / 2.16 m
Tower up	9' 11" / 3.02 m
Gross weight: No tower	3,690 lbs / 1,674 kg
With tower	3,750 lbs / 1,701 kg

ENGINE

Model	Fuel injected, Rotax 1503 4-TEC (2)
Displacement	1,494 cc
Horsepower Std	310 hp NA
Opt	430 hp SCIC
Cylinders (/engine)	3
Max RPM (/engine) Std	7,300
Opt	8,000
Octane no Std	87
Opt	91
Emission level	CARB 3-Star
Cooling system	Closed-Loop Cooling System

ELECTRICAL

Generator	30 amp / 380 W
Battery	12 V

HULL & DECK

Material	Composite FRP
Vinylester barrier layer	Std
Full fiberglass stringer	Std
Graphics	Std
Deadrise	20°
Color gel-coat	Seashell Beige

PROPULSION

Jet pump type:	
Axial flow	Single stage
Pump diameter	6 1/8" / 15.56 cm
Opt	6 1/4" / 15.63 cm
Impeller:	
Material	Stainless steel
Outside diameter (mm)	159 ± .07
Reverse system	Std

Equipment

HULL & DECK

- Stringer system – composite FRP, foam filled
- Cleats – stainless steel, pull-up (6)
- Cup holders – stainless steel (7)
- Rub rail – stainless steel
- Grab handles (10)
- Non-skid decking
- Navigation light
- Courtesy lights (3)
- Tow eyes – stainless steel bow & stern
- Ski eye – stern
- Swim platform
- Reboarding ladder – rear (2-step)
- Engine access
- Engine blower (2)
- Auto bilge pump

STORAGE

- Ski locker, lockable
- Under seat
- Side compartment storage
- Sunpad, lockable
- Glovebox

CONTROL STATION

HELM

- Steering – Burlwood
- Horn (chrome)
- Combined shift & throttle lever
- Battery switch – rear storage
- Fuse box
- DESS magnetic lanyard key

INSTRUMENTATION

- Gauges – backlight & anti-fog
- Fuel level
- Overheat engine warning
- Speedometer – 88 mm
- Tachometer – 88 mm (2)
- Analog fuel – 47 mm
- Depth finder

COCKPIT

- Carpet – snap-in
- Dash finish – Vinyl covered Black / Burlwood
- Outlet – 12 volt accessory (1)
- Table
- Table mount – rear

SEATING

Driver Seat
- Track & swivel

Passenger Seat
- Buddy swivel

STEREO & SOUND

- Stereo system – satellite-ready
- AM/FM/CD
- Speakers – bow (2)
- Speakers – cockpit (2)
- Stereo remote
- MP3 port

CANVAS & MISCELLANEOUS

- Cockpit cover
- Tonneau cover
- Bimini top
- Windshield – fixed
- Warranty (1 yr)

CERTIFICATIONS

- NMMA

TRAILER

- Single axle
- Disc brakes
- Swing-away tongue
- Painted trailer

Options

- Wakeboard tower
- Mirror
- Mooring cover
- Galvanized trailer
- Warranty – B.E.S.T. (3 years)

SEA-DOO THE GOOD LIFE JUST GOT BETTER™

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BRP Oils and Lubricants

BRP 2-STROKE ENGINE OILS						
NEW PRODUCT				OLD PRODUCT		
MINERAL OIL GROUP						
293 600 117	Quart/946 ml	2-Stroke engine oil	Approved for all **carbureted** 2-stroke Sea-Doo and Ski-Doo engines	413 802 900	Quart	XPS chaincase oil
293 600 118	Gallon/3.785 L			413 803 000	Gallon	XPS 2-stroke mineral injection oil
293 600 119	55 GDrum/205 L			413 803 200	Drum	XPS 2-stroke mineral injection oil
293 600 120	Pre-Mix/500 ml			413 803 100	Pre-Mix	XPS premix oil 500 ml (17 oz)
SEMI-SYNTHETIC OIL GROUP						
293 600 100	Quart/946 ml	2-Stroke engine oil	Approved for all Sea-Doo and Ski-Doo 2-stroke engines, **except Sea-Doo DFI Note: Only Oil Approved for Ski-Doo E-Tec engines**	293 600 071	Quart	XPS Semi-Synthetic 2-stroke oil
293 600 101	Gallon/3.785 L			293 600 072	Gallon	XPS Semi-Synthetic 2-stroke oil
293 600 102	55 GDrum/205 L			293 600 073	Drum	XPS Semi-Synthetic 2-stroke oil
SYNTHETIC OIL GROUP						
293 600 045	Quart/946 ml	XPS Synthetic 2-stroke engine oil	New product to come in 2009	293 600 045	Quart	XPS Synthetic 2-stroke oil
293 600 046	Gallon/3.785 L			293 600 046	Gallon	
293 600 047	55 G Drum/205 L			293 600 047	Drum	