2022 Sea-Doo 900 ACE GTI Series (No 1630 ACE)

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900 ACE GTI™ Series

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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair GTI Series (except Rental), GTR and WAKE 170 Sea-Doo® watercraft.

This edition was primarily published to be used by technicians who are already familiar with all service procedures relating to BRP products. Mechanical technicians should attend training courses given by BRPTI.

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

The contents of this manual depicts parts and procedures applicable to the particular product at the time of writing. Service and Warranty Bulletins may be published to update the content of this manual. Dealer modifications that were carried out after manufacturing of the product, whether or not authorized by BRP, are not included.

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

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

The engines and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

It is understood that certain modifications may render use of the watercraft illegal under existing federal, provincial and state regulations.

This manual emphasizes particular information denoted by the following wording and symbols:

⚠ WARNING

Indicates a potential hazard that, if not avoided, could result in serious injury or death.

⚠ CAUTION Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE Indicates an instruction which, if not followed, could result in severe damage to vehicle components or other property.

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

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

Always observe common shop safety practice.

Unless otherwise noted, the engine must be stopped and the tether cord must be removed prior to perform any services.

Before carrying out any inspection or maintenance procedure on the watercraft, wait until the engine and exhaust have cooled down to avoid potential burns.

Torque wrench tightening specifications must be strictly adhered to. Use the torque values and service products as in the exploded views or in the procedures when noted.

Locking devices when removed must be replaced (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.

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

We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic.

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

BRP disclaims liability for all damages and/or injuries resulting from the improper use of the contents of this publication.

IMPORTANT SAFETY PRECAUTIONS

We do not provide warnings about many basic shop safety practices (e.g.: Use Grinding Wheel – wear safety glasses). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practices, we recommend that you do not attempt to perform the procedures described in BRP shop manuals.

You should have a clear understanding of all basic shop safety practices. You should be wearing the appropriate clothing, using appropriate safety

equipment and taking all necessary safety precautions. Please be especially careful of the following:

- Read and understand all instructions before you begin a procedure or repair.
- Ensure you have the proper tools, any necessary replacement parts and the skills to perform the tasks safely and completely.
- Protect your eyes by using approved and properly fitted safety glasses.
- Use other protective wear when necessary, for example safety shoes and gloves.
- Unless the service procedure requires that the engine remain running, make sure the engine is off **before** beginning service.
- Be sure there is adequate ventilation whenever you run the engine, to avoid the risk of Carbon Monoxide poisoning.
- To avoid injury from moving parts, make sure your hands, fingers and clothing are out of the way when the engine is running.
- Gasoline vapors and hydrogen gases from batteries are explosive. Keep all cigarettes, sparks and flames away from the battery, fuel-related components and other enclosed compartments.
- Never use gasoline to clean parts, always use an approved nonflammable solvent.
- Never drain or store gasoline in an open container.

⚠ WARNING

The foregoing list represents general safety practices. For details on workplace health and safety requirements in your area, consult your local workplace health and safety agency or association.

We have provided you with some of the most important general service safety precautions, above. We cannot, however, warn you of every conceivable hazard that can arise in performing the service and repair procedures depicted in BRP manuals. Only you can decide whether or not you should perform a given task.

INTRODUCTION

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

Due to late changes, there may be some differences between the manufactured product and the description and/or specifications in this document.

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

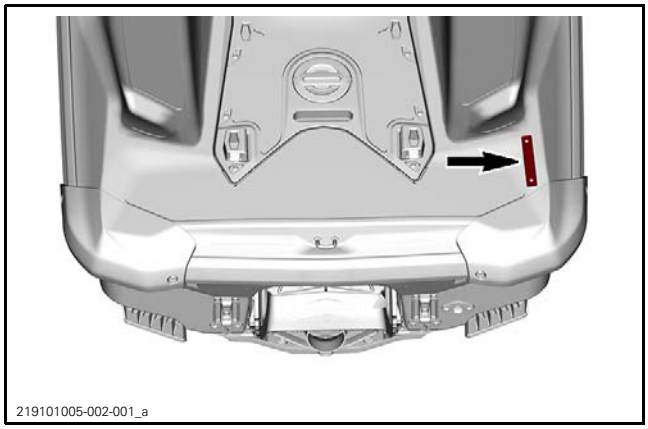
VEHICLE INFORMATION

HULL IDENTIFICATION NUMBER (HIN)

The hull identification number is composed of 12 digits:

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

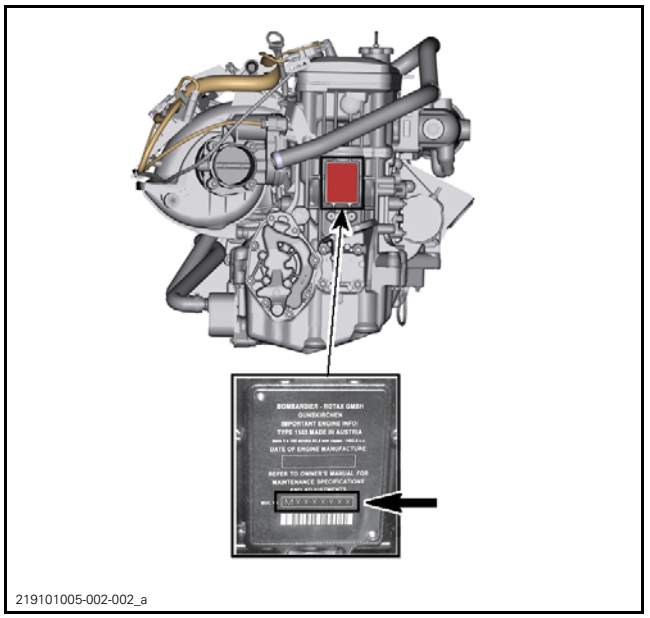
It is located on the deck at the rear of watercraft.



219101005-002-001_a

ENGINE IDENTIFICATION NUMBER (EIN)

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



219101005-002-002_a

HOISTING A WATERCRAFT

To work on a watercraft, you should mount it securely on a stand.

The lifting strap MUST be used to hoist and mount the watercraft on a stand.

REQUIRED TOOL	
LIFTING STRAP (P/N 295 100 758)	

NOTICE Using any other lifting strap kit than the one recommended may cause damage to the vehicle. Bumpers could be torn off.



sbl2009-004-003

TYPICAL

ENGINE EMISSIONS INFORMATION

Manufacturer's Responsibility

Manufacturers of engines must determine the exhaust emission levels for each engine horsepower family and certify these engines with the United States of America Environmental Protection Agency (EPA). An emissions control information label, showing emission levels and engine specifications, must be placed on each vehicle at the time of manufacture.

Dealer Responsibility

When servicing any vehicle that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the engine in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturers' prescribed changes, such as altitude adjustments.

Owner Responsibility

The owner/operator is required to have engine maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone else to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

Emission Regulations

The vehicle you are servicing may have been certified to applicable emission regulations in your country or state. Not as an exhaustive list; this may include standards for engine exhaust emissions, crankcase emissions, permeation emissions and evaporative emissions. Servicing procedures in this manual must be strictly followed in order to keep the vehicle within the factory specifications. Failure to follow servicing procedures in this manual may lead a vehicle to be out of compliance with applicable emission regulations.

When servicing any vehicle; adjustments must be kept within published factory specifications. Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the applicable certification standards. Nobody is allowed to modify the engine in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications. Exceptions include manufacturer’s prescribed changes.

The owner/operator is required to have engine maintenance performed to maintain emission levels within the prescribed certification standards. The owner/operator is allowed and should not allow anyone else to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

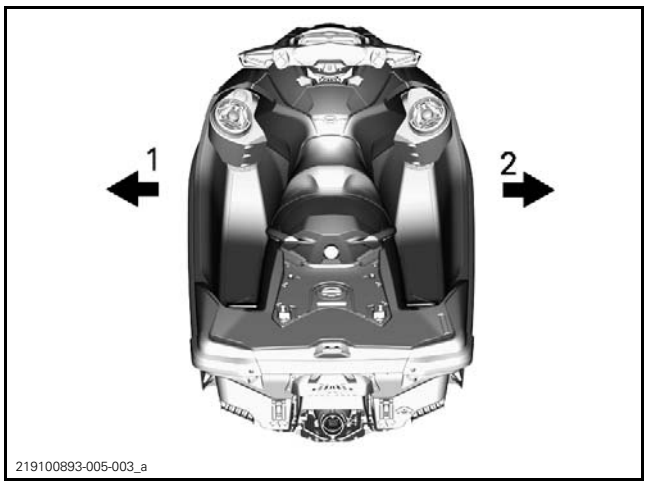
MANUAL INFORMATION

MANUAL PROCEDURES

Many of the procedures in this manual are interrelated. Before undertaking any task, you should read and thoroughly understand the entire section or subsection in which the procedure is contained.

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

The use of RIGHT (starboard) and LEFT (port) indications in the text are always referenced to the driving position (when sitting on the watercraft).



1. Left (port)
2. Right (starboard)

Other common terms used in the marine industry are the BOW (front of the watercraft), and the STERN (rear of the watercraft).

This manual uses technical terms which may be different from the ones in the *PARTS CATALOGS*.

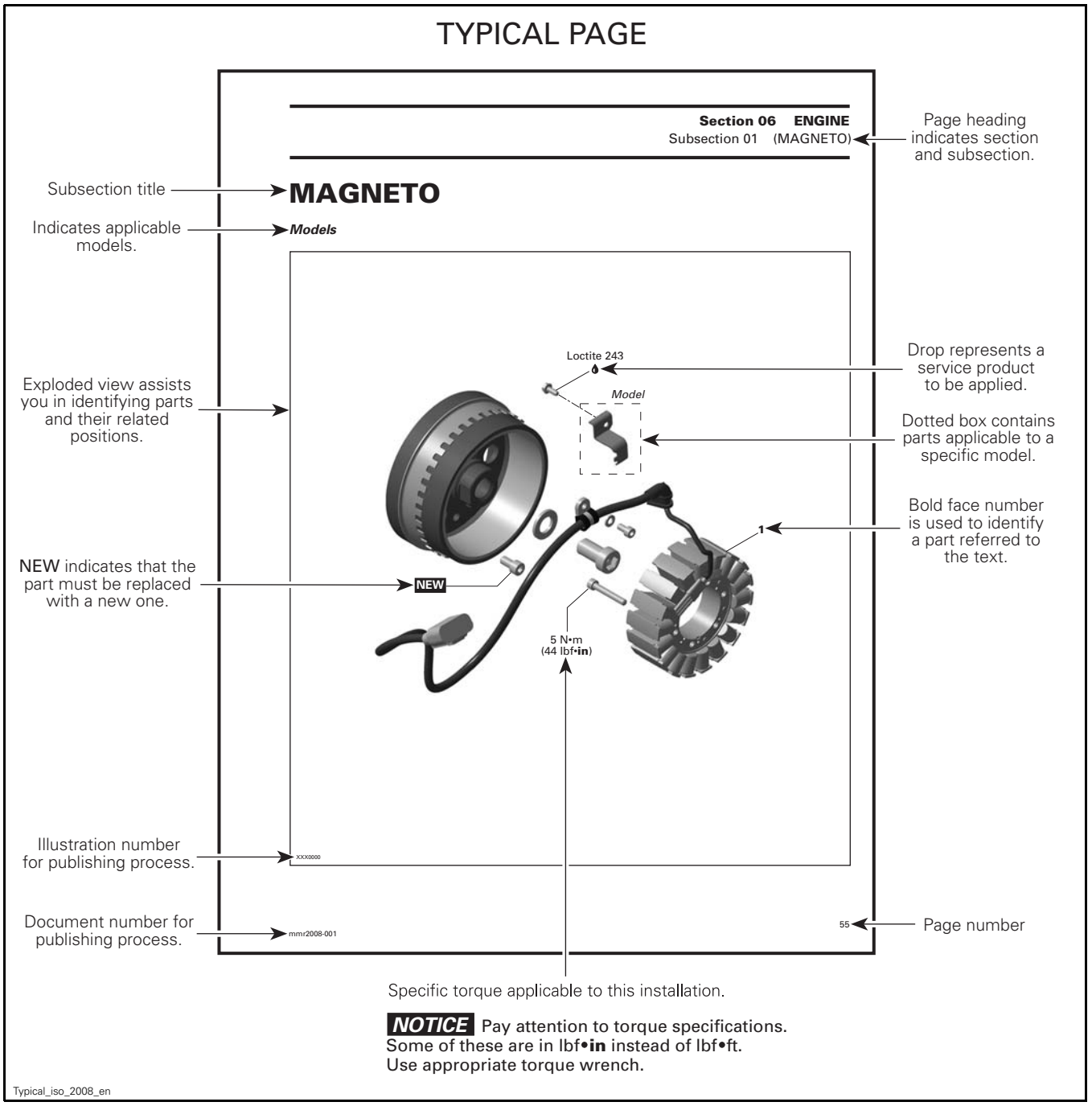
MANUAL LAYOUT

This manual is divided into many major sections as can be seen in the main table of contents at the beginning of the manual.

Each section is divided into various subsections, and again, each subsection has one or more divisions.

Illustrations and photos show the typical construction of various assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts used in a particular model vehicle. However, they represent parts which have the same or a similar function.

TYPICAL PAGE



TYPICAL PAGE

Tittle in bold indicates category of information to be carried out.

GENERAL

NOTE: The following procedures can be done without removing the engine.

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

Reference to a specific section or subsection.

Clean threads before applying a threadlocker. Refer to the *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* sections 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, etc.) must be replaced with new ones.

PROCEDURES

Indicates component procedures apply to.

MAGNETO FLYWHEEL

Magneto Flywheel Cleaning

Clean all metal components in a non-ferrous metal cleaner.

CAUTION: Clean magneto flywheel using only a clean cloth.

Indicates specific procedure to be carried out.

Magneto Flywheel Removal

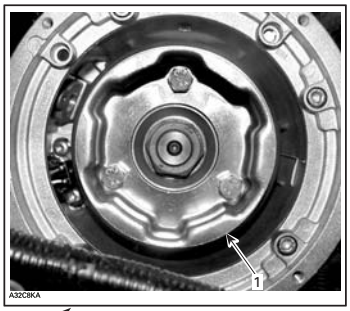
Remove muffler, refer to the *EXHAUST SYSTEM* section.

Remove acoustic panel.

Remove rewind starter.

Remove starting pulley **no. 2**.

Bold face number following part name refers to exploded view at beginning of subsection.



TYPICAL
1. Starting pulley

"TYPICAL" indicates a general view which may not represent exact details.

Call-outs pertaining to above illustration.

NOTE: To remove starting pulley bolts, hold magneto flywheel with a socket as shown.



TYPICAL

Illustration always follows text to which it applies.

Models

Remove the connecting flange retaining the rewind starter to the engine housing.

Italic bold face typesetting indicates a procedure applicable to a specific model(s).

typical_txt_2008_en

TIGHTENING TORQUE

Tighten fasteners to the torque specified in the exploded view(s) and/or in the written procedure. When a torque is not specified, the torque normally recommended for a specific fastener should be used. Refer to the following table.

⚠ WARNING

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

In order to avoid a poor assembly, tighten screws, bolts, or nuts in accordance with the following procedure:

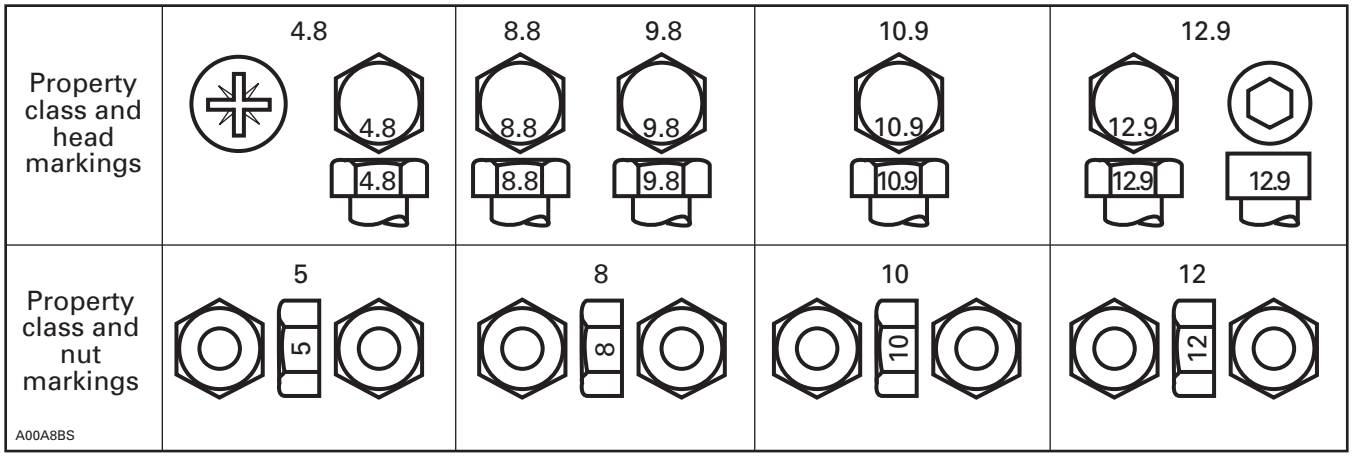
1. Manually screw all screws, bolts and/or nuts.
2. Apply half the recommended torque value.

NOTICE Be sure to use the recommended tightening torque for the specified fastener used.

NOTE: Whenever possible, always apply torque on the nut.

3. Tighten fastener to the recommended torque value.

NOTE: Always torque screws, bolts and/or nuts using a crisscross pattern when multiple fasteners are used to secure a part (e.g. a cylinder head). Some parts must be torqued according to a specific sequence and torque pattern as detailed in the installation procedure.



FASTENER SIZE	FASTENER GRADE/TORQUE			
	5.8 Grade	8.8 Grade	10.9 Grade	12.9 Grade
M4	1.5 N•m - 2 N•m (13 lbf•**in** - 18 lbf•**in**)	2.5 N•m - 3 N•m (22 lbf•**in** - 27 lbf•**in**)	3.5 N•m - 4 N•m (31 lbf•**in** - 35 lbf•**in**)	4 N•m - 5 N•m (35 lbf•**in** - 44 lbf•**in**)
M5	3 N•m - 3.5 N•m (27 lbf•**in** - 31 lbf•**in**)	4.5 N•m - 5.5 N•m (40 lbf•**in** - 49 lbf•**in**)	7 N•m - 8.5 N•m (62 lbf•**in** - 75 lbf•**in**)	8 N•m - 10 N•m (71 lbf•**in** - 89 lbf•**in**)
M6	6.5 N•m - 8.5 N•m (58 lbf•**in** - 75 lbf•**in**)	8 N•m - 12 N•m (71 lbf•**in** - 106 lbf•**in**)	10.5 N•m - 15 N•m (93 lbf•**in** - 133 lbf•**in**)	16 N•m (142 lbf•**in**)
M8	15 N•m (133 lbf•**in**)	25 N•m (18 lbf•ft)	32 N•m (24 lbf•ft)	40 N•m (30 lbf•ft)
M10	29 N•m (21 lbf•ft)	48 N•m (35 lbf•ft)	61 N•m (45 lbf•ft)	73 N•m (54 lbf•ft)
M12	52 N•m (38 lbf•ft)	85 N•m (63 lbf•ft)	105 N•m (77 lbf•ft)	128 N•m (94 lbf•ft)
M14	85 N•m (63 lbf•ft)	135 N•m (100 lbf•ft)	170 N•m (125 lbf•ft)	200 N•m (148 lbf•ft)

FASTENER INFORMATION

NOTICE Most fasteners are metric. Mismatched or incorrect fasteners could cause damage to the vehicle.

SELF-LOCKING FASTENER PROCEDURE



TYPICAL — SELF-LOCKING FASTENER

The following describes common procedures used when working with self-locking fasteners.

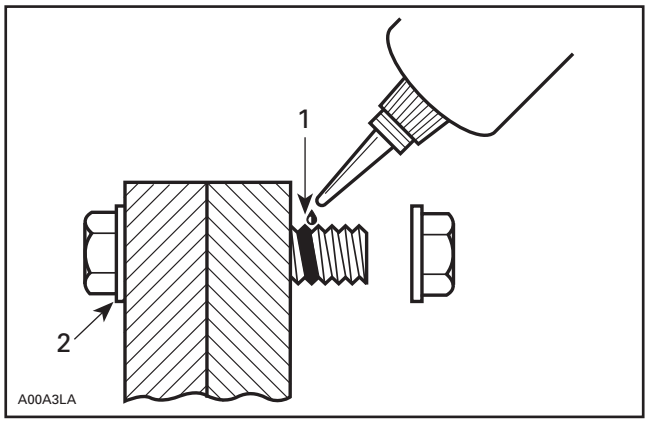
Use a metal brush or a tap to clean the hole properly, then use a solvent. Allow the solvent time to act, approximately 30 minutes, then wipe off. Solvent utilization is to ensure proper adhesion of the product used for locking the fastener.

LOCTITE® APPLICATION PROCEDURE

The following describes common procedures used when working with Loctite products.

NOTE: Always use proper strength Loctite product as recommended in this Shop Manual.

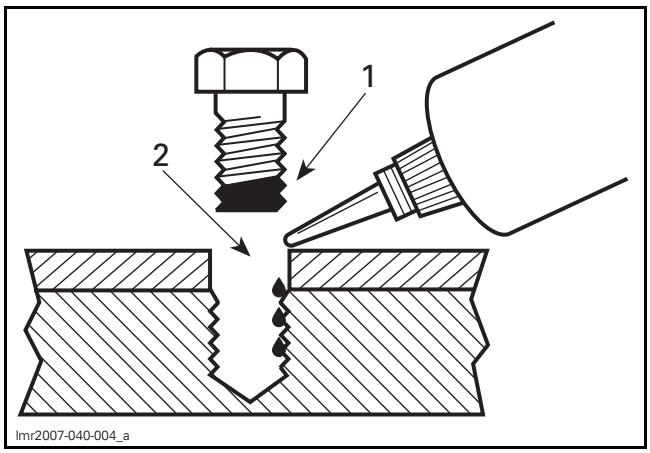
Threadlocker Application for Uncovered Holes (Bolts and Nuts)



1. Apply here
2. Do not apply

1. Clean threads (bolt and nut) with solvent.
2. Apply *LOCTITE 7649 (PRIMER)* on threads and allow to dry.
3. Choose proper strength Loctite threadlocker.
4. Fit bolt in the hole.
5. Apply a few drops of threadlocker at proposed tightened nut engagement area.
6. Position nut and tighten as required.

Threadlocker Application for Blind Holes

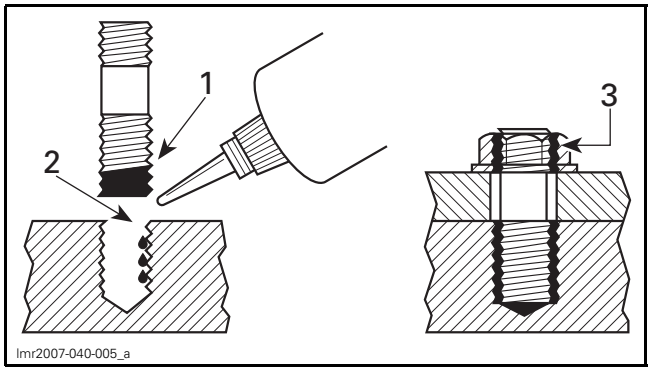


1. On fastener threads
2. On threads and at the bottom of hole

1. Clean threads (bolt and hole) with solvent.
2. Apply *LOCTITE 7649 (PRIMER)* on threads (bolt and nut) and allow to dry for 30 seconds.
3. Choose proper strength Loctite threadlocker.
4. Apply several drops along the threaded hole and at the bottom of the hole.

5. Apply several drops on bolt threads.
6. Tighten as required.

Threadlocker Application for Stud Installation in Blind Holes



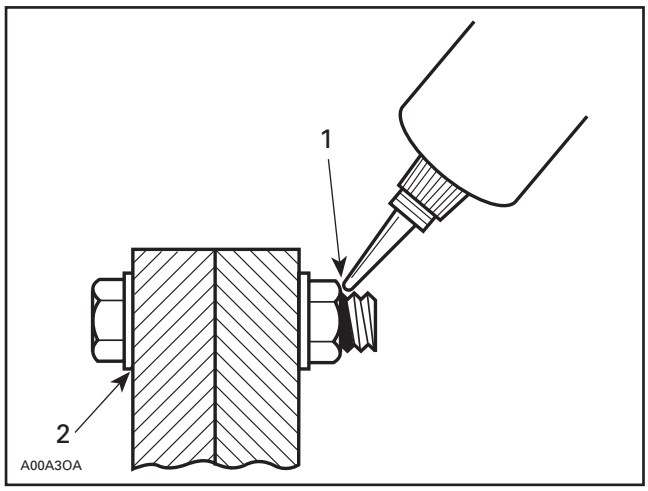
1. On stud threads
2. On threads and in the hole
3. On retaining nut threads

1. Clean threads (stud and hole) with solvent.
2. Apply *LOCTITE 7649 (PRIMER)* on threads and allow to dry.
3. Put 2 or 3 drops of proper strength Loctite threadlocker on female threads and in hole.

NOTE: To avoid a hydro lock situation, do not apply too much Loctite.

4. Apply several drops of proper strength Loctite on stud threads.
5. Install stud.
6. Install cover, part, etc.
7. Apply a few drops of proper strength Loctite on uncovered stud threads.
8. Install and tighten retaining nut(s) as required.

Threadlocker Application for Pre-Assembled Parts

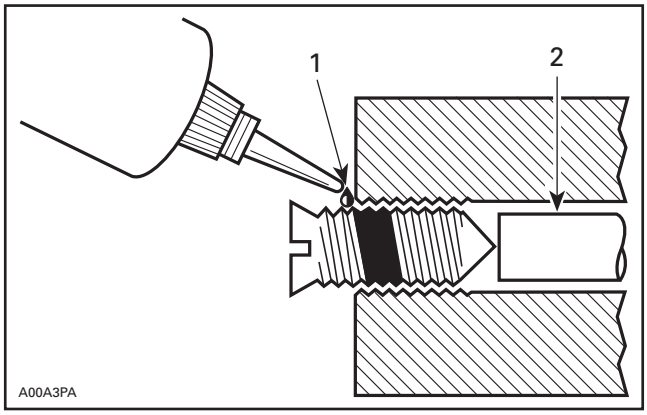


1. Apply here
2. Do not apply

1. Clean bolts and nuts with solvent.
2. Assemble components.
3. Tighten nuts.
4. Apply a few drops of proper strength Loctite on bolt/nut contact surfaces.
5. Avoid touching metal with tip of flask.

NOTE: For preventive maintenance on existing equipment, retighten nuts and apply proper strength Loctite on bolt/nut contact surfaces.

Threadlocker Application for an Adjustment Screw

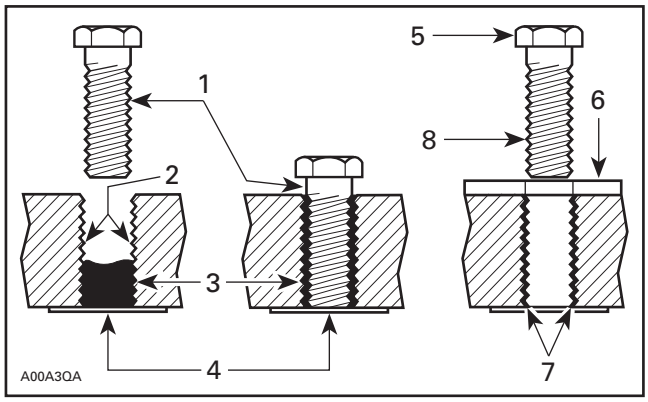


1. Apply here
2. Plunger

1. Adjust screw to proper setting.
2. Apply a few drops of proper strength Loctite threadlocker on screw/body contact surfaces.
3. Avoid touching metal with tip of flask.

NOTE: If it is difficult to readjust, heat screw with a soldering iron (232°C (450°F)).

Application for Stripped Thread Repair



1. Release agent
2. Stripped threads
3. Form-A-Thread
4. Tapes
5. Cleaned bolt
6. Plate
7. New threads
8. Threadlocker

Standard Thread Repair

Follow instructions on Loctite FORM-A-THREAD 81668 package.

If a plate is used to align bolt:

1. Apply release agent on mating surfaces.
2. Put waxed paper or similar film on the surfaces.
3. Twist bolt when inserting it to improve thread conformation.

NOTE: NOT intended for engine stud repairs.

Repair of Small Holes/Fine Threads

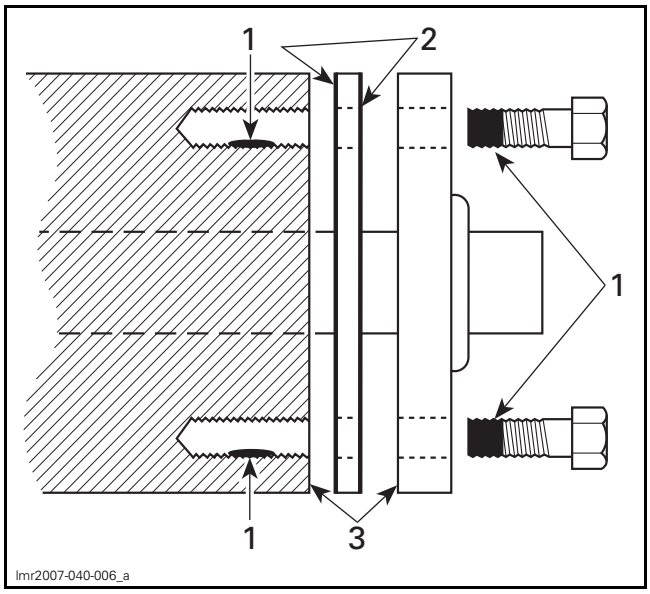
Option 1: Enlarge damaged hole, then follow *STANDARD THREAD REPAIR* procedure.

Option 2: Apply FORM-A-THREAD on the screw and insert in damaged hole.

Permanent Stud Installation (Light Duty)

1. Use a stud of the desired thread length.
2. DO NOT apply release agent on stud.
3. Follow Standard Thread Repair procedure.
4. Allow 30 minutes for Loctite FORM-A-THREAD to cure.
5. Complete part assembly.

Gasket Compound Application



1. Proper strength Loctite
2. Loctite Primer N and Gasket Eliminator 518 on both sides of gasket
3. Loctite Primer N only

1. Remove old gasket and other contaminants using *LOCTITE CHISEL (GASKET REMOVER)*. Use a mechanical means only if necessary.

NOTE: Avoid grinding.

2. Clean both mating surfaces with solvent.
3. Spray Loctite Primer N on both mating surfaces and on both sides of gasket and allow to dry 1 or 2 minutes.
4. Apply *LOCTITE 518* on both sides of gasket, using a clean applicator.
5. Place gasket on mating surfaces and assemble parts immediately.

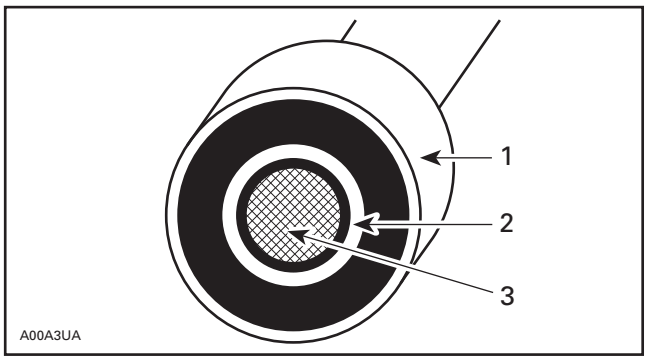
NOTE: If the cover is bolted to blind holes, apply proper strength Loctite in the hole and on threads. Tighten fastener.

If holes are sunken, apply proper strength Loctite on bolt threads.

6. Tighten as usual.

Threadlocker Application for Mounting on a Shaft

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

1. Clean shaft external contact surface.
2. Clean internal contact surface of part to be installed on shaft.
3. Apply a strip of proper strength Loctite on circumference of shaft contact surface at insertion or engagement point.

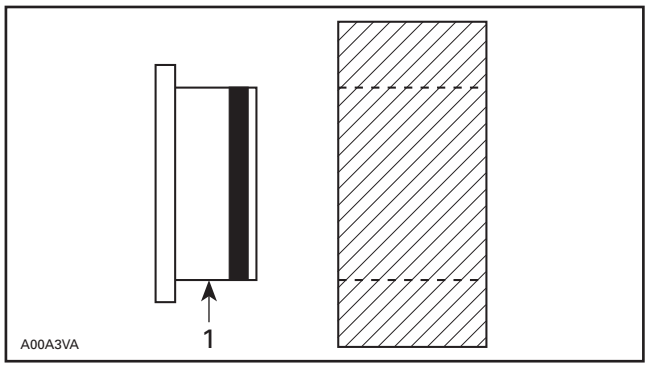
NOTE: Retaining compound is always forced out when applied on shaft.

4. DO NOT use antiseize Loctite or any similar product.
5. No curing period is required.

Mounting in Tandem

1. Apply retaining compound on internal contact surface (bore) of parts to be installed.
2. Continue parts assembly as per previous illustration.

Threadlocker Application for Case-In Components (Metallic Gaskets)



1. Proper strength Loctite

1. Clean inner housing diameter and outer gasket diameter.
2. Spray housing and gasket with *LOCTITE 7649 (PRIMER)*.
3. Apply a strip of proper strength Loctite on leading edge of outer metallic gasket diameter.

NOTE: Any Loctite product can be used here. A low strength liquid is recommended as normal strength and gap are required.

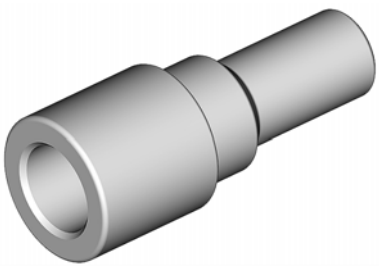
4. Install according to standard procedure.
5. Wipe off excess product.
6. Allow 30 minutes for product to cure.

NOTE: Normally used on worn-out housings to prevent leaking or sliding.

It is generally not necessary to remove gasket compound applied on outer gasket diameter.

SERVICE TOOLS INDEX

ALIGNMENT SHAFT ADAPTER (900 ACE)
(P/N 529 036 454)



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ALIGNMENT SHAFT ADAPTER
(P/N 529 035 719)



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ALIGNMENT SHAFT SUPPORT
(P/N 529 035 506)



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ALIGNMENT SHAFT
(P/N 295 000 141)

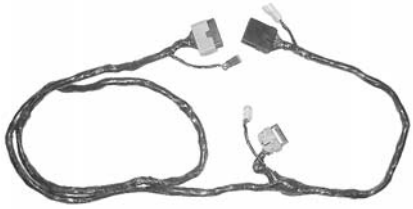
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D.E.S.S. POST REMOVER
(P/N 529 035 943)



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DIAGNOSTIC HARNESS
(P/N 529 036 188)



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DIAGNOSTIC HARNESS
(P/N 529 036 384)



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DRIVE SHAFT C-CLIP REMOVER
(P/N 529 036 026)



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ECM ADAPTER TOOL
(P/N 529 036 166)



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ECM TERMINAL REMOVER 2.25
(P/N 529 036 175)



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ECM TERMINAL REMOVER 3.36
(P/N 529 036 174)



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ENGINE LIFTING TOOL
(P/N 529 036 217)



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FLOATING RING TOOL (TYPE II)
(P/N 529 036 116)



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SERVICE TOOLS INDEX

FLUKE 115 MULTIMETER
(P/N 529 035 868)



Page: 35, 114, 118, 167, 175, 177

FLUSHING CONNECTOR ADAPTER
(P/N 295 500 473)



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FUEL HOSE ADAPTER
(P/N 529 036 396)



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FUEL HOSE DISCONNECT TOOL
(P/N 529 036 037)



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FUEL PUMP MODULE SOCKET
(P/N 529 036 125)



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FUEL TANK TEST CAP
(P/N 529 036 242)



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IBR NUT SOCKET
(P/N 529 036 379)



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IMPELLER REMOVER/INSTALLER
(P/N 529 035 956)



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IMPELLER SHAFT BEARING TOOL
(P/N 529 036 168)



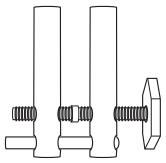
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IMPELLER SHAFT PUSHER
(P/N 529 035 955)



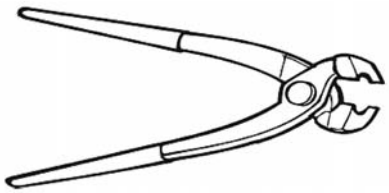
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LARGE HOSE PINCHER
(P/N 529 032 500)



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OETIKER PLIER
(P/N 295 000 070)



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PRESSURE CAP
(P/N 529 036 283)



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PRESSURE GAUGE
(P/N 529 036 395)



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SERVICE TOOLS INDEX

PTO SHAFT ADAPTER
(P/N 529 036 401)



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PTO SUPPORT TOOL
(P/N 529 035 842)



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PUMP PLATE
(P/N 529 036 224)



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SPRING INSTALLER/REMOVER
(P/N 529 035 983)



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SUCTION PUMP
(P/N 529 035 880)



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TEST CAP
(P/N 529 035 991)



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VACUUM/PRESSURE PUMP
(P/N 529 021 800)



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VENTED CAP TEST ADAPTER
(THREADED)
(P/N 529 036 243)



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PERIODIC MAINTENANCE SCHEDULE

Maintenance is very important for keeping the watercraft in a safe operating condition. The watercraft should be serviced as per the maintenance schedule.

Proper maintenance is the owner's responsibility. A warranty claim may be denied if, among other things, the owner or operator caused the problem through improper maintenance or use.

Perform periodic checks and follow the maintenance schedule. **The maintenance schedule does not exempt the pre-ride inspection**.

Verifying fault codes, as first maintenance step, is a good practice and is highly recommended.

⚠ WARNING

Failure to properly maintain the vehicle according to the maintenance schedule and procedures can make it unsafe to operate.

EPA Regulation - Canadian and USA Vehicles

A repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems. These instructions do not require components or service by BRP or authorized Sea-Doo dealers.

Although an authorized Sea-Doo dealer has an in-depth technical knowledge and tools to service your vehicle, the emission-related warranty is not conditioned on the use of an authorized Sea-Doo dealer or any other establishment with which BRP has a commercial relationship.

Proper maintenance is the owner's responsibility. A warranty claim may be denied if, among other things, the owner or operator caused the problem through improper maintenance or use.

The maintenance schedule does not exempt the pre-ride inspection. Refer to *OPERATOR'S GUIDE*.

AFTER EACH RIDE IN SALT, OR DIRTY WATER
Rinse engine compartment with fresh water and drain salt water
Flush the exhaust system

EVERY MONTH IN SALT, OR DIRTY WATER
Spray an anticorrosion lubricant to metallic components in engine compartment (every 10 hours in salt water use)
Inspect sacrificial anodes

AFTER FIRST 6 MONTHS OR 50 HOURS (WHICHEVER COMES FIRST)
Replace engine oil and filter (Rotax 1630 ACE - 300 engines)

EVERY YEAR AT PRESEASON OR 100 HOURS OF OPERATION (WHICHEVER COMES FIRST)
Inspect sacrificial anodes
Check for fault codes
Perform all items indicated in the Pre-Ride Inspection and Post-Operation Care
Replace engine oil and filter
Inspect engine rubber mounts
Inspect the cooling system (coolant level, hoses and fasteners for leaks)
Visually inspect connection between throttle body and intake manifold
Inspect the air intake for damage on hoses and clamps.
Inspect electrical connections and fastening (ignition system, starting system, fuel injectors, fuse boxes etc.)

EVERY YEAR AT PRESEASON OR 100 HOURS OF OPERATION (WHICHEVER COMES FIRST)
Visually inspect area around carbon ring and drive shaft rubber boot for the following signs of failure: black carbon dust and water sprays (more frequently when using PWC in dirty water)
Inspect impeller and boot
Visually inspect impeller and wear ring for deep scratches, nicks and grooves
Remove impeller cover and inspect for signs of water intrusion
Visually inspect reverse gate bushing for excessive play
Inspect fuel cap, filler neck, fuel tank, straps, fuel lines and connections
Visually inspect coolant level in transducer support, top-off if necessary.

EVERY 2 YEARS OR 200 HOURS OF OPERATION (WHICHEVER COMES FIRST)
Replace spark plugs
Validate condition of bearing by manually spinning impeller checking for radial shaft play or noise
Verify and lubricate splines of the drive shaft and impeller

MAINTENANCE FREE
230 engines and 300 engines: The supercharger is **maintenance free***. *Inspect supercharger **every 200 hours** (irrespective of the number of years) when vehicle is used in intense conditions such as off-shore riding, continuous operation at wide open throttle, etc.

NOTICE Do not attempt to replace components of the supercharger assembly as the unit is factory- balanced to precise specifications. Failure to follow this recommendation may lead to supercharger and / or engine damage.

EVERY 5 YEARS OR 300 HOURS OF OPERATION (WHICHEVER COMES FIRST)
Replace the coolant

STORAGE PROCEDURE

SERVICE PRODUCTS

Description	Part Number	Page
ANTICORROSION SPRAY	219 700 304	8–9
FUEL STABILIZER (EUR)	779183	7
FUEL STABILIZER	779171	7
LUBRICANT AND ANTI-CORROSIVE (EUR)	779224	7–9
LUBRICANT AND ANTI-CORROSIVE	779168	7–9

PROCEDURES

PROPULSION SYSTEM

⚠ WARNING

Always remove tether cord from the engine cut-off switch to prevent unexpected engine starting before cleaning or servicing the propulsion system components.

Cleaning and Protecting the Propulsion System

Clean jet pump by spraying water in its inlet and outlet and then apply a coating of anticorrosion spray or equivalent.

SERVICE PRODUCT	
Scandinavia	LUBRICANT AND ANTI-CORROSIVE (EUR) (P/N 779224)
All other countries	LUBRICANT AND ANTI-CORROSIVE (P/N 779168)

Inspecting the Jet Pump

Remove impeller cover and check if jet pump is water contaminated; if so, refer to *JET PUMP* subsection for the repair procedure.

FUEL SYSTEM

Inspecting the Fuel System

Verify fuel system. Check fuel hoses for leaks. Replace damaged hoses or clamps if necessary.

Protecting the Fuel System

With the new fuel additives, it is critical to use a fuel stabilizer to prevent fuel deterioration and fuel system gumming. Follow the manufacturer's instructions for proper use.

Fuel stabilizer should be added in the fuel tank to prevent fuel deterioration and fuel system gumming. Follow manufacturer's instructions for proper use.

NOTICE **Fuel stabilizer should be added prior to engine lubrication to ensure fuel system component protection against varnish deposits.**

SERVICE PRODUCT	
Scandinavia	FUEL STABILIZER (EUR) (P/N 779183)
All other countries	FUEL STABILIZER (P/N 779171)

Fill up fuel tank completely. Ensure there is no water inside fuel tank.

NOTICE **Should any water be trapped inside fuel tank, severe internal damage will occur to the fuel injection system.**

ENGINE

Replacing the Engine Oil and Filter

Change engine oil and filter. Refer to *LUBRICATION SYSTEM* subsection.

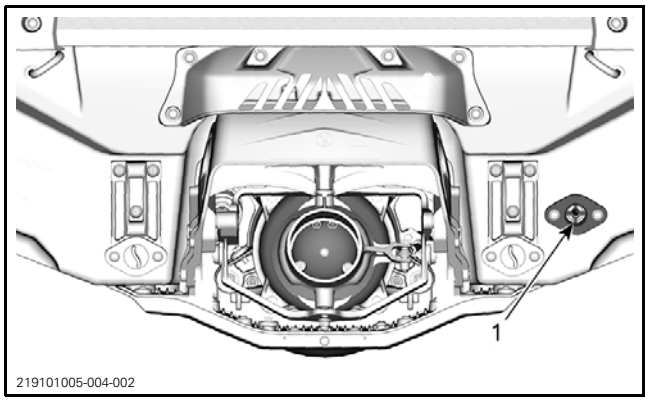
Flushing the Exhaust System

Flush the exhaust system. Refer to *EXHAUST SYSTEM* subsection.

Draining the Exhaust System

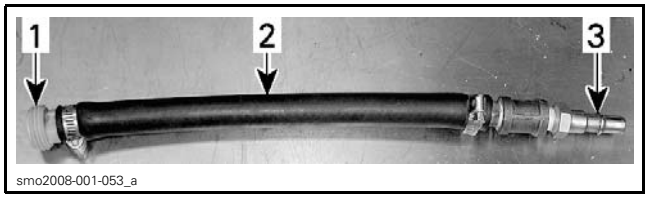
The exhaust system is self draining, but the exhaust manifold needs to be drained to avoid damages should the watercraft be stored in an area where the temperature attains the freezing point of water.

Using the flushing connector located at the rear of vehicle, inject pressurized air (at 380 kPa (55 PSI)) in the system until there is no more water flowing from jet pump.



1. Flushing connector

The following hose can be fabricated to ease draining procedure.



TYPICAL
1. Flushing adaptor (P/N 295500473)
2. Hose 13 mm (1/2 in)
3. Air hose male adapter

NOTICE **Failure to drain the exhaust manifold may cause severe damage to the intercooler (supercharged models) and exhaust manifold.**

Remove special tools.

Replacing the Engine Coolant

Antifreeze should be replaced every 300 hours or every 5 years (whichever comes first) to prevent antifreeze deterioration.

NOTICE **Failure to replace the antifreeze as recommended may allow its degradation that could result in poor engine cooling.**

Replace coolant if necessary. For the coolant replacement procedure, refer to *COOLING SYSTEM - VEHICLE COMPONENTS* subsection.

Lubricating the Engine Internals

Engine must be lubricated to prevent corrosion on internal parts.

Lubrication of the engine is recommended at the end of the season and before any extended storage period to provide additional corrosion protection. This will lubricate the engine intake valves, the cylinders and the exhaust valves.

To lubricate the engine, proceed as follows:

1. Open the seat.
2. Remove ignition coils and spark plugs. Refer to *IGNITION SYSTEM* subsection for details on removing the spark plugs and ignition coils.
3. Spray anti-corrosive lubricant or an equivalent product into each spark plug hole.

SERVICE PRODUCT	
Scandinavia	LUBRICANT AND ANTI-CORROSIVE (EUR) (P/N 779224)
All other countries	LUBRICANT AND ANTI-CORROSIVE (P/N 779168)
All countries	ANTICORROSION SPRAY (P/N 219 700 304)

4. Crank the engine a few turns to distribute the oil on cylinder walls.

NOTE: To crank engine, use the drowned mode to avoid injecting fuel. Fully depress throttle lever and hold for cranking engine.

5. Refer to *IGNITION SYSTEM* subsection for details on installing the spark plugs and ignition coils.
6. Install all other removed parts.

ELECTRICAL SYSTEM

Removing the Battery

For battery removal, cleaning and storage, refer to *CHARGING SYSTEM* subsection.

ENGINE COMPARTMENT

Cleaning the Engine Compartment

1. Clean the bilge with hot water and a mild detergent, or using bilge cleaner.
2. Rinse thoroughly.
3. Lift front end of watercraft to completely drain bilge. Refer to *HULL* subsection for bilge drain plug removal.

Applying an Anticorrosion Treatment

Wipe off any residual water in the engine compartment.

Spray anti-corrosive lubricant or an equivalent product over all metallic components in engine compartment while minimizing overspray.

SERVICE PRODUCT	
Scandinavia	LUBRICANT AND ANTI-CORROSIVE (EUR) (P/N 779224)
All other countries	LUBRICANT AND ANTI-CORROSIVE (P/N 779168)
All countries	ANTICORROSION SPRAY (P/N 219 700 304)

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

BODY AND HULL

Cleaning the Body and Hull

Refer to appropriate *CARE AND REPAIR ONLINE BOOKLET* on www.operatorsguides.brp.com.

Replace damaged labels/decals.

Repairing the Body or Hull

If any repair are required, refer to appropriate *CARE AND REPAIR ONLINE BOOKLET* on www.operatorsguides.brp.com.

Protecting the Body and Hull

Refer to appropriate *CARE AND REPAIR ONLINE BOOKLET* on www.operatorsguides.brp.com.

PRESEASON PREPARATION

Proper vehicle preparation is necessary after the winter months or when a watercraft has not been used during 4 months.

Any worn, broken or damaged parts found must be replaced.

Using the *MAINTENANCE SCHEDULE*, perform the items titled *EVERY 100 HOURS OR 1 YEAR*.

EVERY YEAR AT PRESEASON OR 100 HOURS OF OPERATION (WHICHEVER COMES FIRST)
Check for fault codes
Perform all items indicated in the Pre-Ride Inspection and Post Care Inspection
Replace engine oil and filter
Inspect engine rubber mounts
Inspect the cooling system (coolant level, hoses and fasteners for leaks)
Test the fuel system for leaks
Inspect and lubricate throttle body
Inspect the air intake for damage on hoses and clamps.
Inspect electrical connections and fastening (ignition system, starting system, fuel injectors, fuse boxes etc.)

219100893-008-001_a

Furthermore, proceed with the following:

Watercraft Prepared as per Storage Procedure

– Ensure battery is fully charged.
– Reinstall the battery.
– Test ride watercraft to confirm proper operation.

Watercraft Not Prepared as per Storage Procedure

– Ensure battery is fully charged.
– Replace engine oil and filter.
– Drain fuel tank and fill with fresh fuel.
– Reinstall the battery.
– Test ride watercraft to confirm proper operation.

SPECIAL PROCEDURES

SERVICE TOOLS

Description	Part Number	Page
SUCTION PUMP	529 035 880	15

Midwest Manuals
Green Manuals
Paperless Manuals
For a Better Tomorrow
www.green-manuals.com
If you bought this manual from any other seller please leave them
NEGATIVE feedback and notify us at bestshopmanuals@gmail.com

SERVICE PRODUCTS

Description	Part Number	Page
ANTICORROSION SPRAY	219 700 304	14–15
DIELECTRIC GREASE	293 550 004	14
LUBRICANT AND ANTI-CORROSIVE (EUR)	779224	14–15
LUBRICANT AND ANTI-CORROSIVE	779168	14–15

GENERAL

Refer to the following special procedures according to the specific event. Procedures described may not be applicable to every watercraft model.

PROCEDURES

TOWING THE WATERCRAFT IN WATER

Special precautions should be taken when towing a Sea-Doo watercraft in water.

1630 Engines

The maximum recommended towing speed is 32 km/h (20 MPH).

NOTE: Clamping the water supply hose is not required.

900 Engines

The maximum recommended towing speed is 21 km/h (13 MPH).

If you have to tow the watercraft, clamp the water supply hose in the engine compartment.

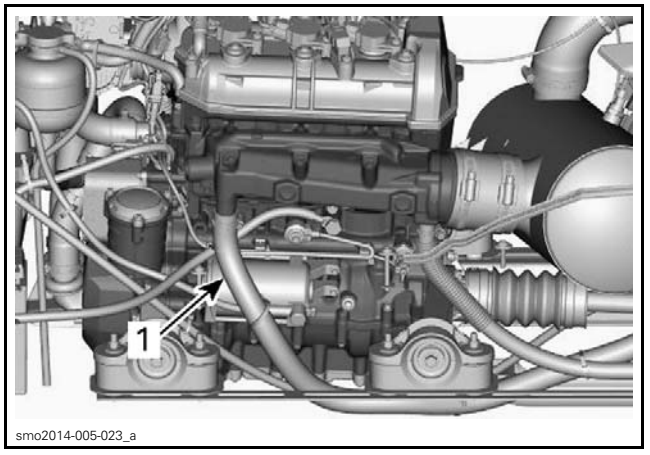
To access the water supply hose, pull out the LH access cover below the LH side of the seat and slide rearward to remove.

⚠ WARNING

Some components in the engine compartment may be hot. To avoid injury, wait for engine to cool down.

⚠ CAUTION Make sure the hose is properly clamped before towing the watercraft. If hose is not properly clamped when engine is not running, water will accumulate in the exhaust system, will enter the engine and cause damages.

NOTICE Failure to follow these instructions may result in damage to the engine. If you must tow a stranded watercraft in water, be sure not to exceed the maximum towing speed.



1. Water supply hose

Reinstall the LH access cover.

SUBMERGED WATERCRAFT

NOTICE Never try to crank or start engine. Water trapped in the intake manifold or inside air intake silencer would flow towards the engine and possibly cause severe engine damage.

1. Drain bilge.
2. Remove the central body. Refer to *BODY* subsection.
3. If the watercraft was submerged in salt water, rinse the bilge and all components thoroughly with fresh water using a garden hose to stop the salt corroding effect.
4. Check for water inside:
   - Air intake system
   - Exhaust system
   - Combustion chambers.

If water is found, refer to *WATER-FLOODED ENGINE* in this subsection.

5. Inspect all electrical connectors (harness and part side) for trace of corrosion.
   - If any corrosion is found, repair terminals and connectors.
   - Reapply dielectric grease if needed in all connectors except the ECM and starter relay.

SERVICE PRODUCT
DIELECTRIC GREASE (P/N 293 550 004)

If terminals and connectors are not corroded, reinstall the central body, as per procedure done in the *BODY* subsection.

Lubricating the Engine

Refer to *WATER-FLOODED ENGINE* in this subsection.

Inspecting the Fuel

Check fuel tank for water contamination. If necessary, siphon and refill with fresh fuel.

WATER-FLOODED ENGINE

If the engine is flooded with water, it must be serviced within a few hours after the event. Otherwise, the engine will have to be overhauled.

NOTICE

- Never try to crank or start the engine. Water trapped in the intake manifold or inside air intake silencer would enter the combustion chamber through the intake valves and may cause damage to the engine.
- An engine flooded with water must be properly drained, lubricant replaced (oil change), operated (cranking of engine), then lubricant replaced again, otherwise parts will be seriously damaged.

Draining the Exhaust System

If water is suspected to be in the exhaust system, remove and drain the resonator, muffler and exhaust manifold. Refer to *EXHAUST SYSTEM* subsection.

Draining the Intake System

1. If water is present in the air intake silencer, empty it and check for water in the inlet hose. Refer to *AIR INTAKE SYSTEM* subsection.
2. Remove the water from blow-by hose.
3. If water is suspected in the intake manifold, remove the intake manifold and drain it. Then siphon the water out from the intake valve ports. Refer to *AIR INTAKE SYSTEM* subsection.

Draining and Lubricating the Combustion Chamber

Remove spark plugs.

Drain any water from combustion chambers and spray lub. & anti-corrosive in each spark plug hole. Do not crank engine yet.

SERVICE PRODUCT	
Scandinavia	LUBRICANT AND ANTI-CORROSIVE (EUR) (P/N 779224)
All other countries	LUBRICANT AND ANTI-CORROSIVE (P/N 779168)
All countries	ANTICORROSION SPRAY (P/N 219 700 304)

Replacing the Engine Oil and Filter

If the engine oil is contaminated with water (oil will be milky), change the engine oil and filter as per following procedure.

1. Using the suction pump, siphon the contaminated oil from the engine reservoir through the dipstick tube.

REQUIRED TOOL	
SUCTION PUMP (P/N 529 035 880)	

2. Remove the suction pump tube from the dipstick tube.
3. Remove the oil filter. Refer to *LUBRICATION SYSTEM* subsection.
4. Siphon the contaminated oil from the oil filter reservoir.
5. Fully depress throttle lever and HOLD it for cranking. Crank the engine for 10 seconds.
6. Again, siphon the contaminated oil from the oil filter reservoir and dipstick tube.
7. Continue cranking and siphoning oil until no more oil coming into the oil filter reservoir.
8. Install a NEW oil filter and reinstall the oil filter cap.
9. Fill the engine with appropriate amount of the recommended engine oil. Refer to *LUBRICATION SYSTEM* subsection.
10. Reinstall spark plugs and ignition coils. Refer to *IGNITION SYSTEM* subsection.

NOTE: The installation of new spark plugs should be necessary.

11. Proceed with the *BOIL OUT PROCEDURE* that follows.

Boil Out Procedure in Water

NOTICE **This procedure may be performed in water only. Performing this procedure out of water, using a garden hose, may seriously damaged the PTO sealing system and the cooling system.**

NOTE: The boil out procedure is intended to evaporate a small quantity of water contained in the oil system.

1. Run the engine for 20 minutes at 4500 RPM.
2. Shut the engine off.
3. Change the oil and filter again.

Anticorrosion Treatment

NOTICE **It is important to apply an anticorrosion treatment, especially if the vehicle was submerged in salt waters.**

Wipe off any residual water in the engine compartment.

Spray lub. & anti-corrosive or anticorrosion spray over all metallic components in engine compartment.

SERVICE PRODUCT	
Scandinavia	LUBRICANT AND ANTI-CORROSIVE (EUR) (P/N 779224)
All other countries	LUBRICANT AND ANTI-CORROSIVE (P/N 779168)
All countries	ANTICORROSION SPRAY (P/N 219 700 304)

NOTICE **Never spray lub. & anti-corrosive on any plastic parts or any electrical connector. For these parts always use ANTICORROSION SPRAY (P/N 219 700 304).**

DROWNED MODE

If the engine is flooded with fuel and does not start, this special mode can be activated to prevent fuel injection and ignition while cranking in order to ventilate the engine to dry the cylinder walls.

To activate DROWNED MODE, proceed as per following steps.

1. Install the tether cord cap on the engine cut out switch.
2. While the engine is stopped, fully pull and HOLD the throttle lever.
3. Press the START/STOP button. DROWNED MODE is now on.

Releasing the throttle lever will allow the ECM to revert back to normal mode.

If the engine does not start, it may be necessary to remove the spark plugs and crank the engine with rags over the spark plug holes. Refer to *IGNITION SYSTEM* subsection.

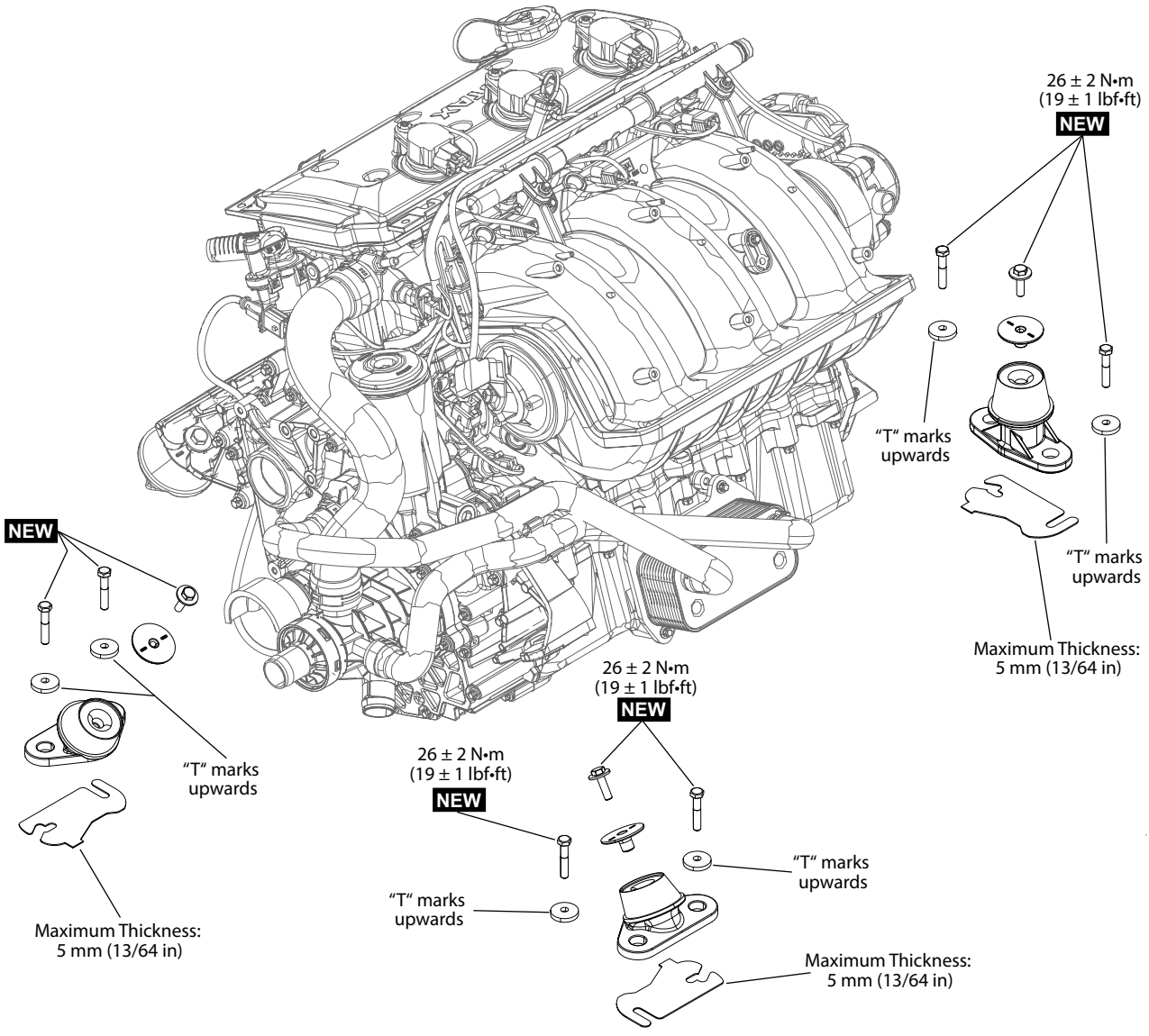
CAPSIZED WATERCRAFT

Capsized for More than 5 Minutes

Refer to *SUBMERGED WATERCRAFT* in this subsection.

Engine Removal and Installation

Figure 1. Engine Supports



■ = Component must be replaced when removed.

ENGINE SUPPORTS

170 models shown

General

⚠ WARNING

When electrically disconnecting or removing the throttle body from the intake manifold, always remove the tether cord from the engine cut-off switch and disconnect the battery.

⚠ WARNING

Always disconnect battery prior to working on the fuel system. Always disconnect battery exactly in the specified order, BLACK (-) cable first. Electrical connections should be disconnected prior to disconnecting fuel lines.

⚠ WARNING

Fuel is flammable and explosive under certain conditions. Work in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity.

⚠ WARNING

Fuel lines remain under pressure at all times. Always proceed with care and use appropriate safety equipment when working on a pressurized fuel system. Wear safety glasses. Do not allow fuel to spill on hot engine parts and/or on electrical connectors. Proceed with care when removing or installing high pressure test equipment, or disconnecting fuel line connections. Wipe off any fuel spillage in the bilge. Never use a hose pincher on high pressure hoses.

Cover the fuel line connection with an absorbent shop rag before disconnecting them. Slowly disconnect the fuel hose to minimize spilling.

When the repair is completed, ensure the hose from the fuel rail to the fuel pump is properly connected and secured in its support.

⚠ WARNING

After working on the fuel system, always pressurize the fuel system and check for fuel leaks. Refer to *FUEL SYSTEM PRESSURIZATION* in *FUEL TANK AND FUEL PUMP* subsection.

⚠ WARNING

If a gasoline leak and/or odor is present, do not start the engine. Repair the leak.

Procedures

Removing the Engine

Required Tool	
Suction pump (P/N 529035880)	
Fuel hose disconnect tool (P/N 529036037)	

Required Tool	
Large hose pincher (P/N 529032500)	
Engine lifting tool (P/N 529036217)	

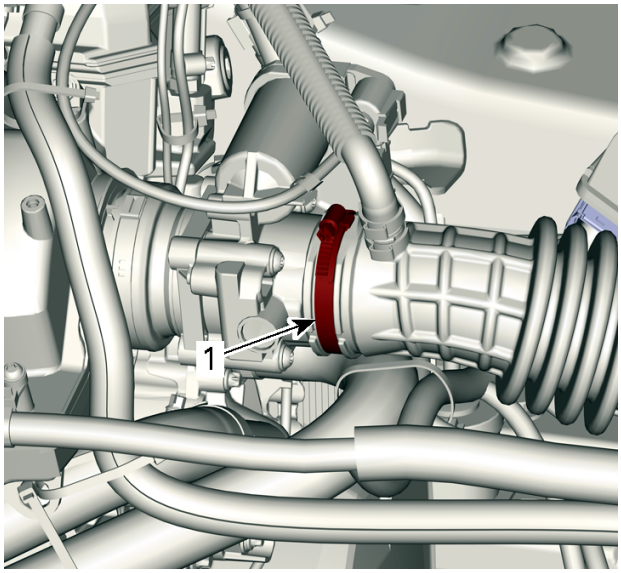
1. Place vehicle on a workstation equipped with an engine-lifting hoist.
2. Remove the following components:
   - Engine Service Cover (refer *Body* subsection)
   - Jet pump housing (refer to *Jet Pump* subsection)
   - Drive shaft (refer to *Drive Shaft* subsection)
   - Muffler (refer to *Exhaust System* subsection).
3. Disconnect the battery cables.

NOTICE

Always disconnect the BLACK (-) cable first, then the RED (+) cable.

4. Drain engine coolant. Refer to *Cooling System* subsection.
5. Detach air intake silencer hose from throttle body.
   1. Loosen air intake silencer hose clamp.

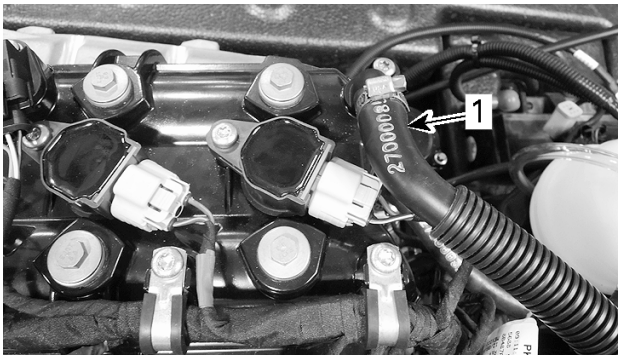
Figure 2.



i. Loosen this clamp

   2. Detach blow-by hose from cylinder valve cover.

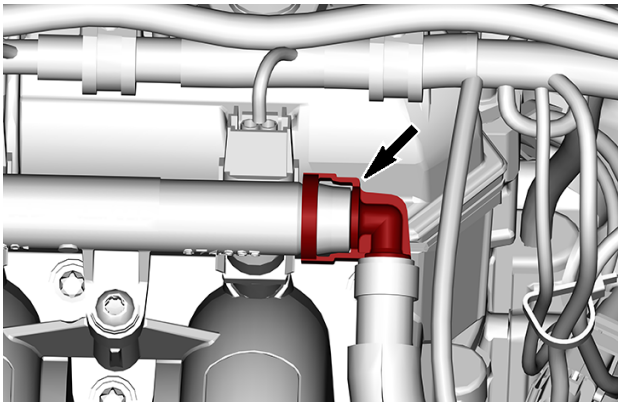
Figure 3.



i. Blow-by hose

6. Disconnect fuel inlet hose from fuel rail.

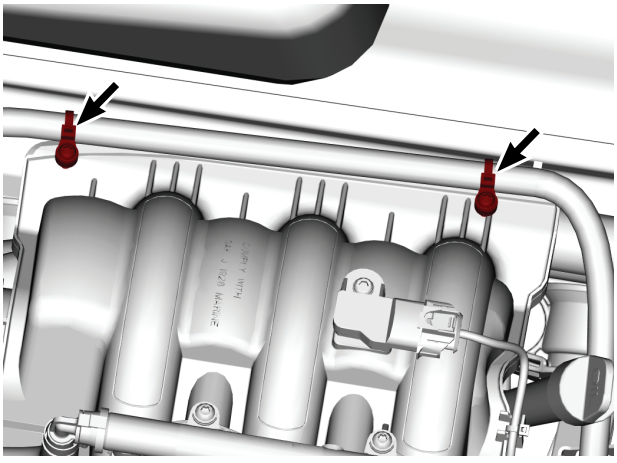
Figure 4.



1. Place a rag around fuel hose fitting.
2. Disconnect fuel hose from fuel rail using the fuel hose disconnect tool.

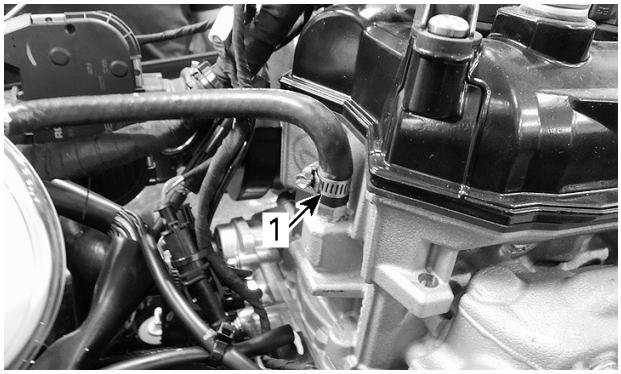
7. Detach the wiring harness from intake manifold.

Figure 5.



8. Loosen clamp on cylinder head and disconnect coolant return hose.

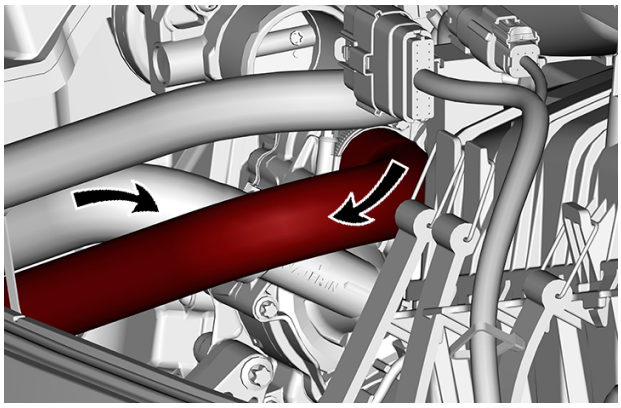
Figure 6.



1. Coolant return hose clamp

9. Disconnect inlet and outlet radiator hoses.

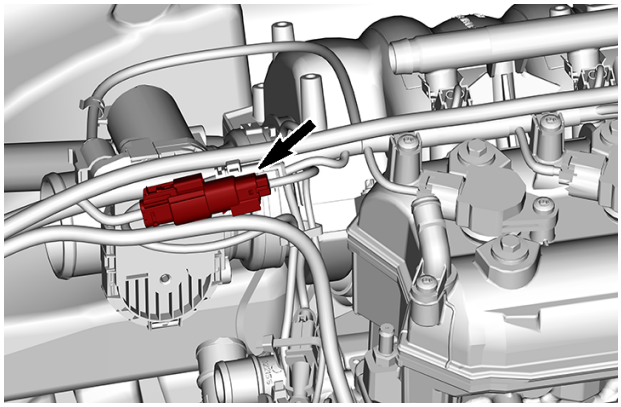
Figure 7.



1. Install a large hose pincher on each hose.
2. Loosen hoses clamps and disconnect hoses from thermostat housing.

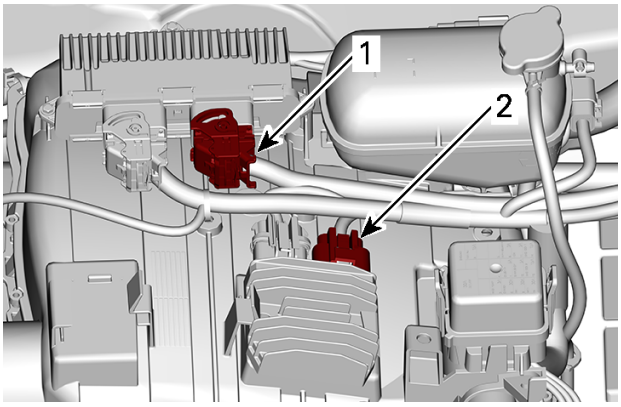
10. Unplug HIC connector.

Figure 8.



11. Unplug the "A" connector from the ECM.
12. Cut locking ties securing engine harness to vehicle harness.
13. Unplug magneto connector from voltage regulator/rectifier.

Figure 9.



1. *ECM "A" connector*
2. *Regulator/rectifier connector*

14. Disconnect inlet and outlet hoses from exhaust manifold.

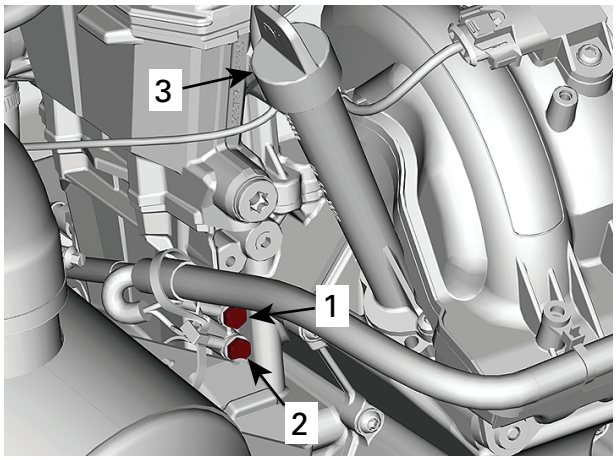
Figure 10.



1. *Exhaust manifold inlet hose*
2. *Exhaust manifold outlet hose*

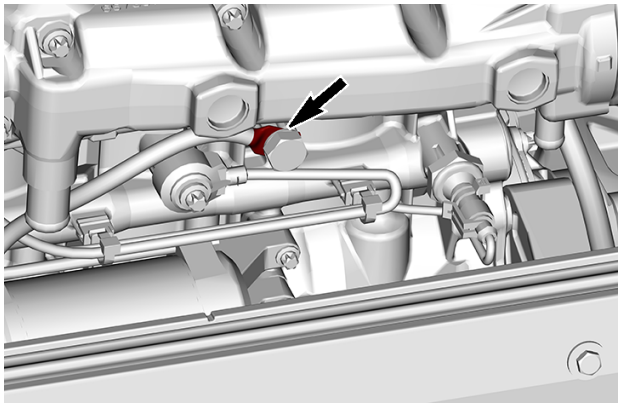
15. Unscrew ground wires from engine.

Figure 11.



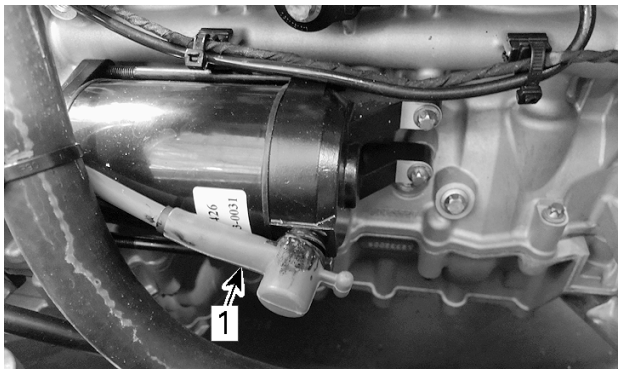
1. *Engine/vehicle grounds*
2. *Battery ground*
3. *Dipstick*

Figure 12.



16. Detach starter cable from starter.

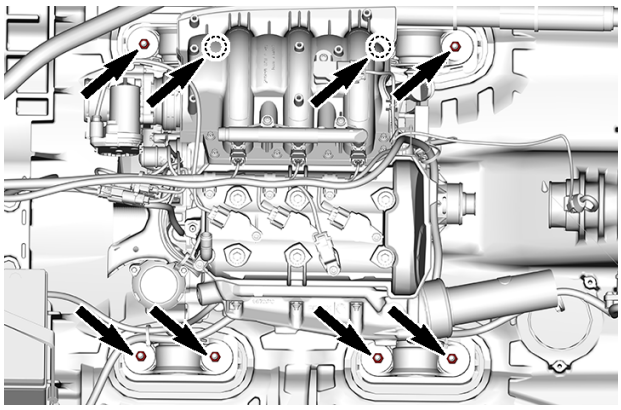
Figure 13.



1. Starter cable

17. Remove and discard elastic nuts retaining engine mount clamps.

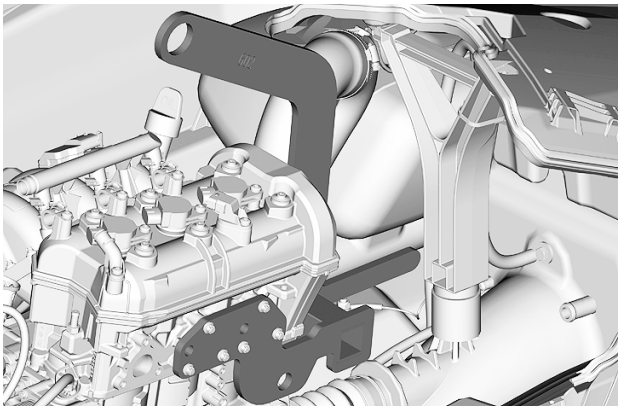
Figure 14. Parts Removed For Clarity



PARTS REMOVED FOR CLARITY

18. Remove exhaust manifold and install the engine lifting tool.

Figure 15.



19. Slowly lift the engine out of hull.

Installing the Engine

1. The installation is the reverse of the removal procedures. However pay attention to the following.
2. Wipe off any spillage in bilge.

Service Product
PRO C1 Cleaner and Degreaser

3. Place engine into vehicle.
4. Install all engine mount clamps and secure them loosely using new M8 elastic stop nuts.
5. Perform the engine alignment.

NOTICE
The engine alignment must be completed before finalizing the engine installation.

6. Install and properly align muffler. Refer to *Exhaust System* subsection.
7. Reinstall all other removed parts.
8. Check fuel hose condition and pressure test the fuel system, refer to *Fuel Tank and Fuel Pump* subsection.

⚠ WARNING
Whenever doing any type of repair on watercraft or if any components of the fuel system are disconnected, a pressure test must be done before starting engine.

9. To avoid potential corrosion of ground and starter cable, apply neoprene paint on bolt and eyelet connector.

Service Product
Neoprene paint

10. Verify all electrical connections (ground wires and battery).
11. Fill and bleed the engine cooling system. Refer to *Cooling System* subsection
12. Run engine and ensure there is no leakage.

NOTICE
If watercraft is out of water, exhaust system must be cooled using the flush kit. Never run engine more than 2 minutes.

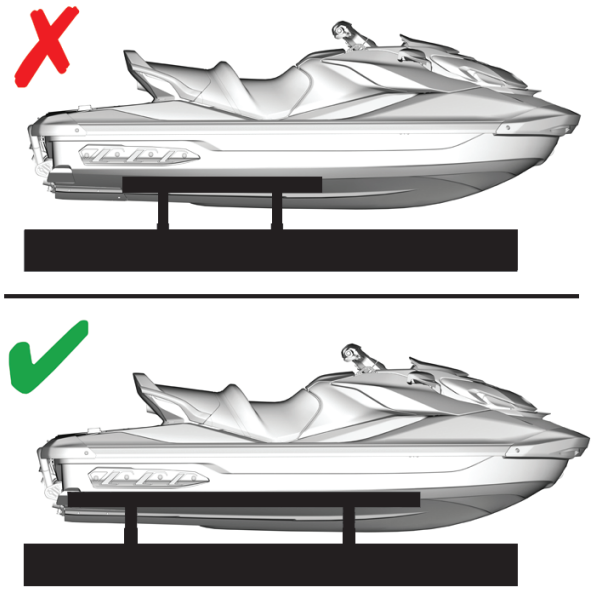
Performing the Engine Alignment

Engine alignment is required only when one of the following parts is removed and/or replaced with new one.

- Engine supports (from cylinder block)
- Engine mount base (more than one)
- Jet pump support
- Hull.

The vehicle must be supported practically on its complete length to avoid hull deformation. It is important to support from the edge of the rear end up to at least the front of the engine.

Figure 16. Typical



TYPICAL

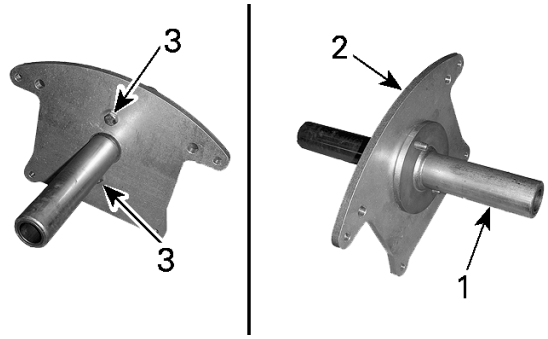
To verify alignment of engine proceed as follows:

1. Remove the jet pump, drive shaft and drive shaft boot. Refer to *Steering and Propulsion* section.
2. Remove the drive shaft boot.
3. Assemble the alignment tool.

Engine alignment plate (P/N 529036224)	
Alignment shaft support (P/N 529035506)	

1. Install the alignment shaft support on the pump plate.
2. Secure using M8 x 25 x 1.25 hexagonal screws.

Figure 17.

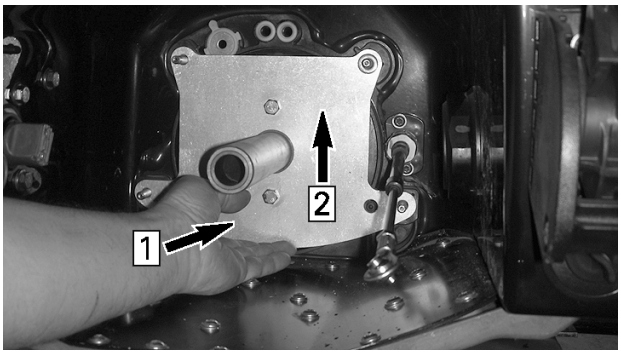


i. Alignment shaft support
ii. Engine alignment plate
iii. M8 x 25 x 1.25 hexagonal screws

Tightening Torque	
Alignment tool screws	24.5 ± 3.5 Nm (18 ± 3 lbf-ft)

4. Install the alignment tool as follows.
   1. Position the alignment tool against the pump support.
   2. Push the alignment tool upward and hold it in this position.

Figure 18.



i. Place alignment tool against pump support
ii. Push alignment tool upward

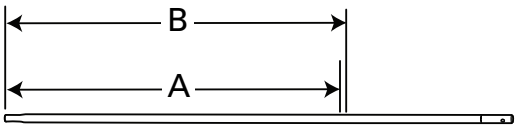
   3. Secure the tool using the pump retaining nuts.

Tightening Torque	
Pump retaining nut	24.5 ± 3.5 Nm (18 ± 3 lbf-ft)

5. Starting from the smaller end, trace two thin lines on alignment shaft.

Alignment shaft (P/N 295 000 141)	

Figure 19.

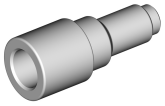


Lines	Distance
Line A	at 631 mm (24.843 in)
Line B	at 634 mm (24.961 in)

6. Insert alignment shaft end into crankshaft PTO coupler.

NOTE: A small resistance during shaft insertion is normal.

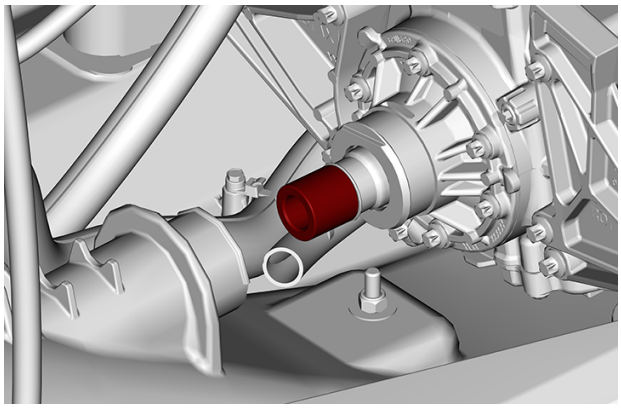
7. Install the alignment shaft adapter in the engine PTO housing.

Alignment shaft adapter (P/N 529036561)	

NOTICE

Ensure alignment shaft adapter is fully inserted into the engine PTO housing.

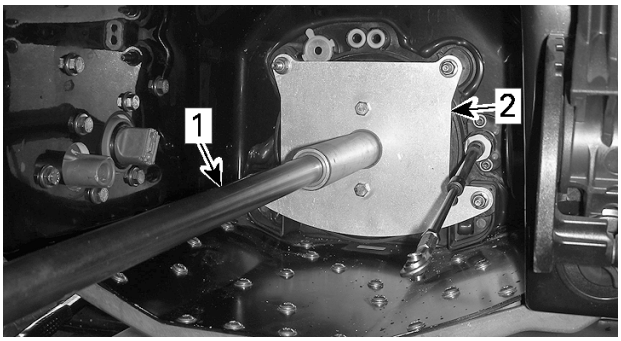
Figure 20. Typical



TYPICAL

8. Carefully slide the alignment shaft through the engine alignment tool.

Figure 21.

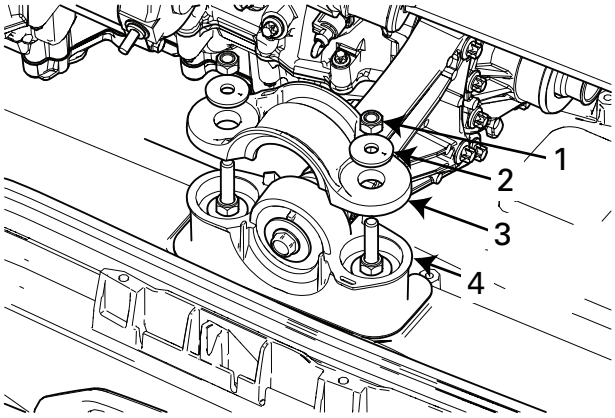


1. Alignment shaft
2. Alignment tool

9. Insert alignment shaft end into alignment shaft adapter. If the alignment is correct, the alignment shaft end should slide through the adapter.

NOTE: A small resistance during shaft insertion is normal.

10. If the alignment is incorrect, remove all engine mount clamps.
11. Loosen nuts securing engine mount base.



1. Engine mount clamp nut
2. Flat washer
3. Engine mount clamp
4. Engine mount base

12. Add or remove shims as required.

NOTE: Shims location is between engine mount and hull.

NOTICE
Whenever shims are used to correct alignment, never install more than 5 mm (13/64 in) of shims.

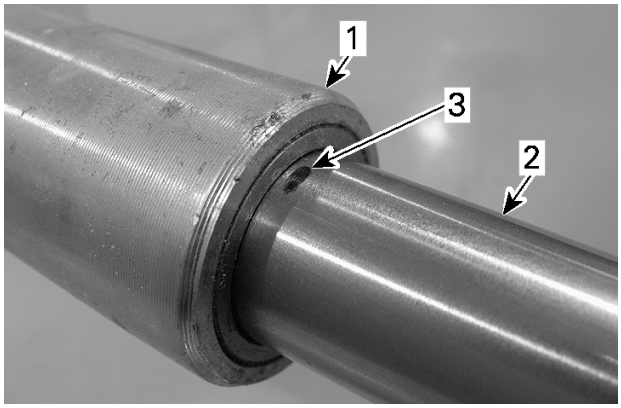
13. When engine alignment is correct, check the longitudinal position of engine.

Verifying the Engine Longitudinal Position

1. With alignment shaft installed, check the location of the lines (previously drawn at the beginning of the engine alignment procedure).
2. Engine is properly positioned longitudinally when the engine alignment tool is between both lines.
   – If **one** line is visible, the engine is properly positioned.

– If **both** lines are visible, the engine must be moved forward.
– If **no** line is visible, the engine must be moved rearward.

Figure 22. Proper Position



PROPER POSITION
1. Engine alignment tool
2. Alignment shaft
3. Line B

3. When alignment and longitudinal position of engine are correct, tighten engine mount fasteners. Refer to *Engine Mounts* in this subsection.
4. Recheck engine alignment.

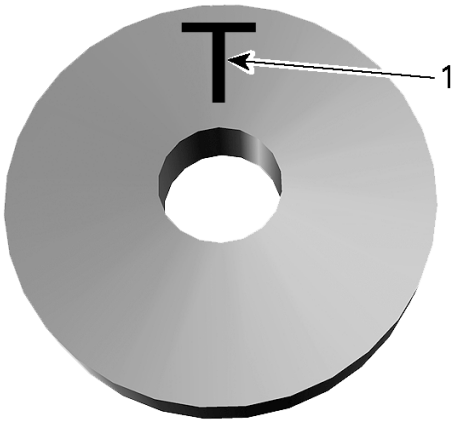
Engine Mounts

If engine mount clamps or bases have been removed, replace retaining nuts with **NEW** ones.

Tightening Torque	
Engine mount base nuts	12 ± 2 Nm (106 ± 18 lbf-in)
Engine mount clamp nuts	26 ± 2 Nm (19 ± 1 lbf-ft)

NOTE: Position conical spring washer with the "T" mark upwards.

Figure 23.

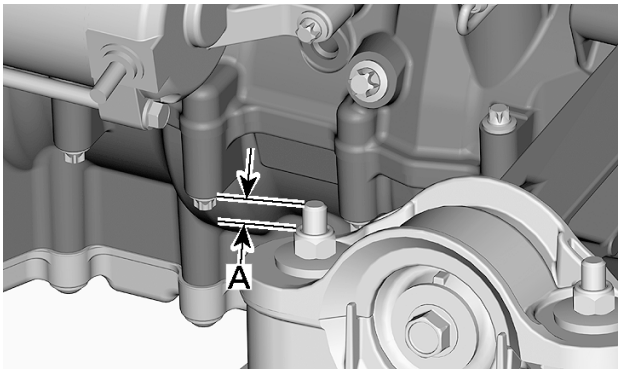


1. T mark

NOTICE

When the tightening is completed, make sure to leave a minimum of 3 mm (1/8 in) of free threads over the engine mount clamp nuts.

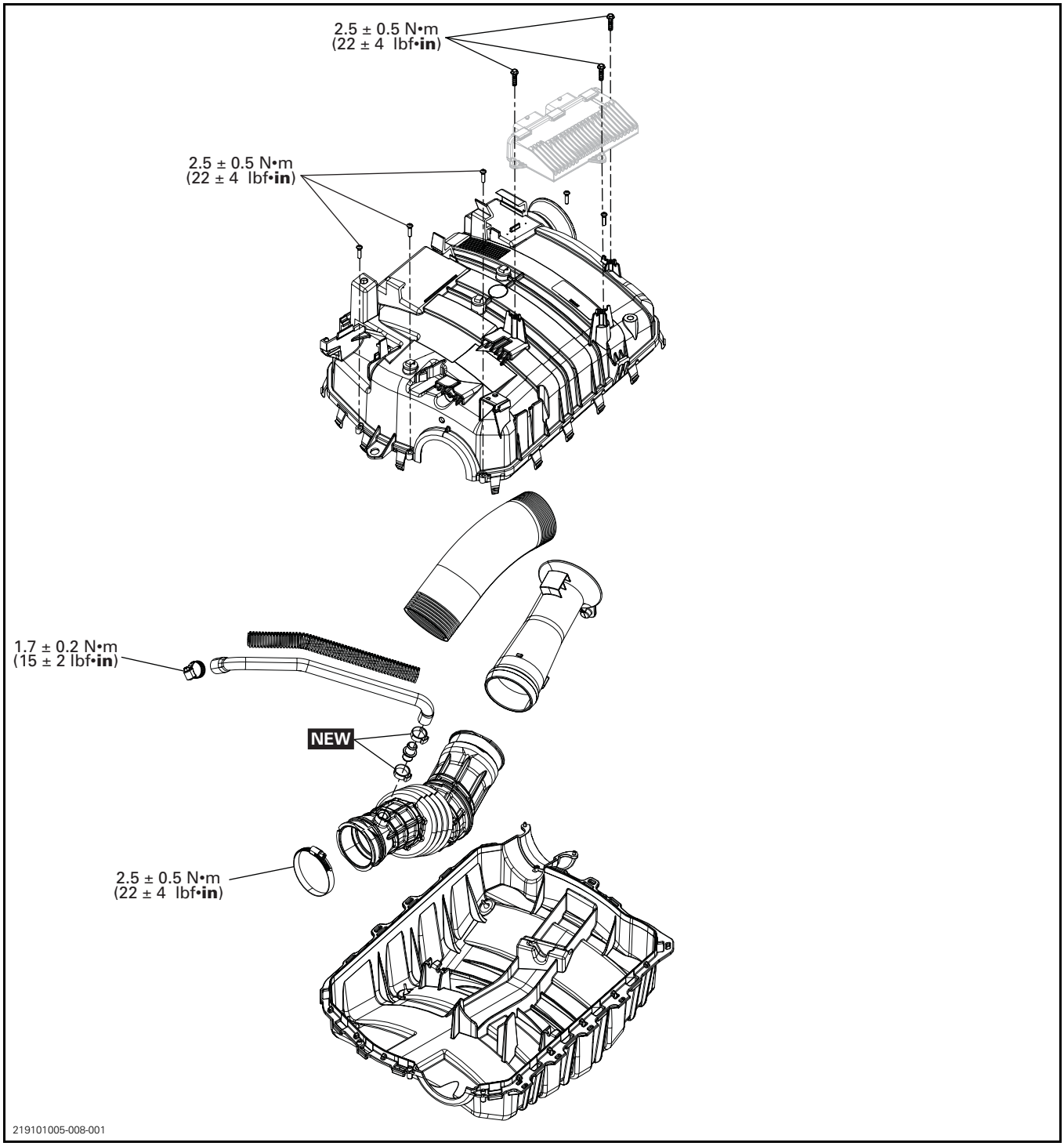
Figure 24.



A. 3 mm (1/8 in) minimum

AIR INTAKE SYSTEM

AIR INTAKE SILENCER

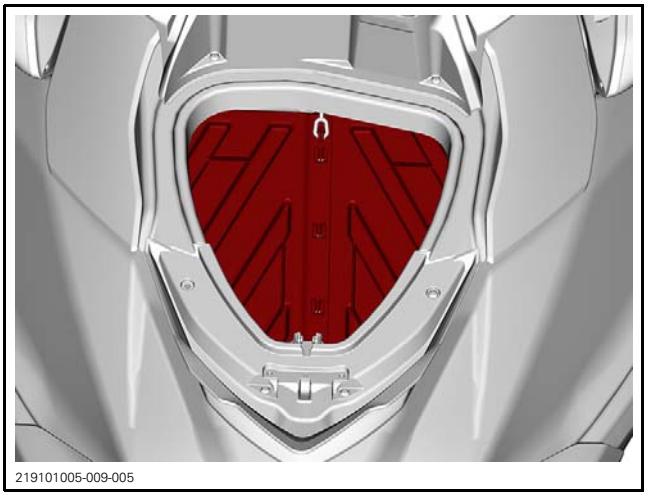


PROCEDURES

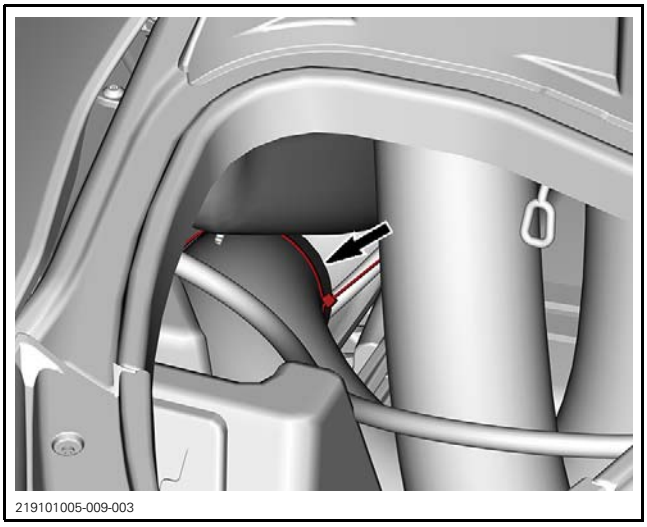
AIR INTAKE SILENCER

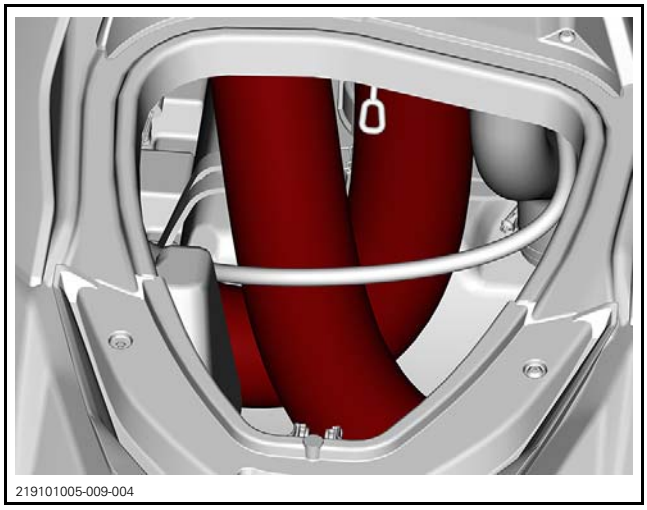
Removing the Air Intake Silencer

1. Remove the seats, storage compartment cover and engine service cover. Refer to *BODY* subsection.
2. Remove partitions.


219101005-009-005

3. Cut locking tie and unplug the top of ventilations tubes and place them lower in hull.

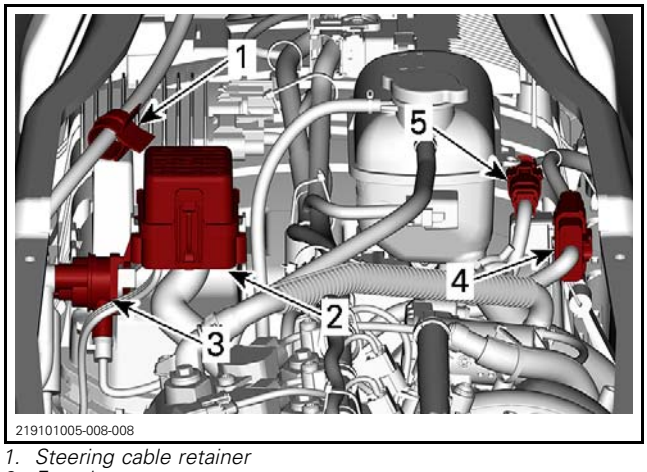

219101005-009-003


219101005-009-004

4. Disconnect the battery.

NOTICE **Always disconnect the BLACK (-) cable first and reconnect last.**

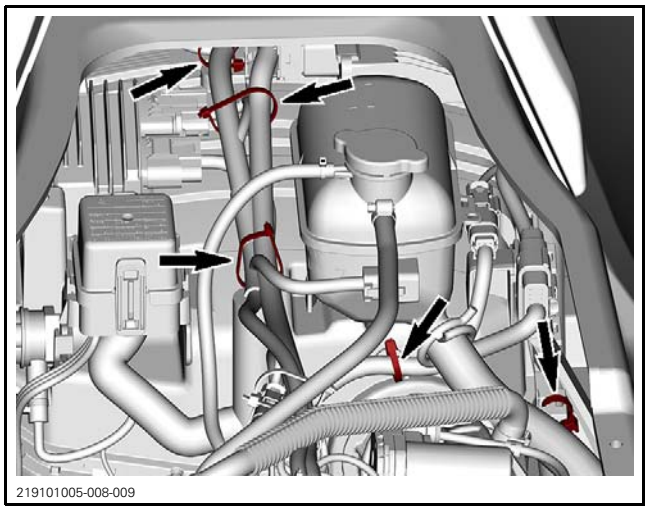
5. Separate from air intake silencer and set aside the following components.

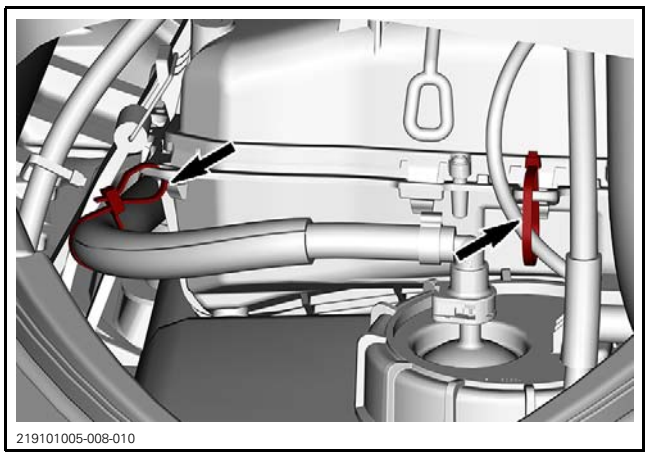


219101005-008-008

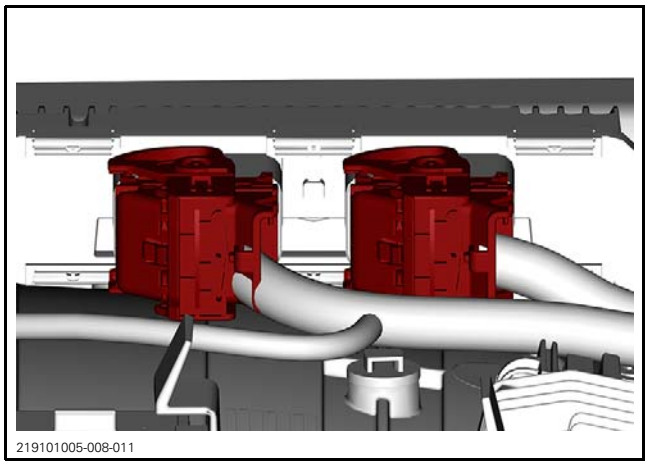
1. *Steering cable retainer*
2. *Fuse box*
3. *Starter solenoid*
4. *HIC1 connector*
5. *HIC2 connector*

6. Cut locking ties securing wiring harness and fuel hose to the air intake silencer.

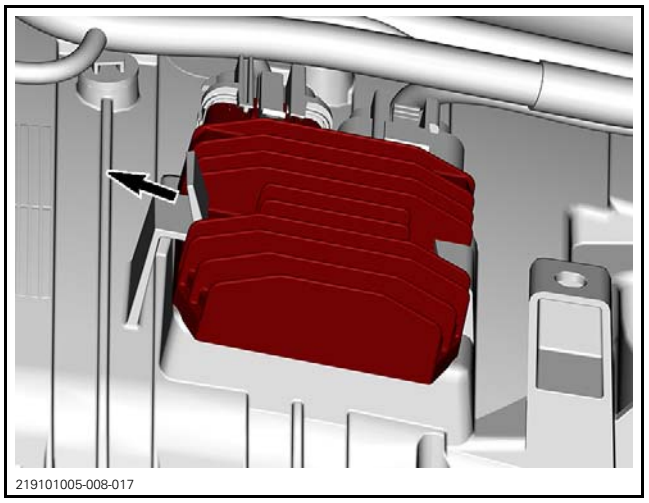

219101005-008-009


219101005-008-010

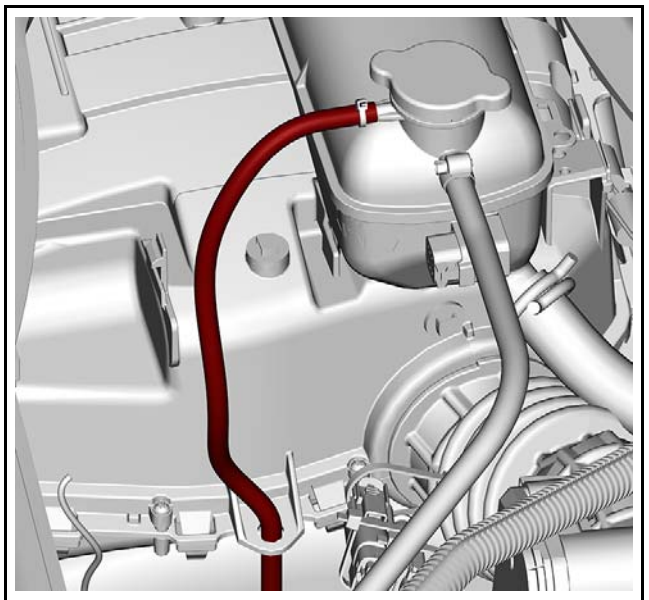
7. Disconnect both ECM connectors.


219101005-008-011

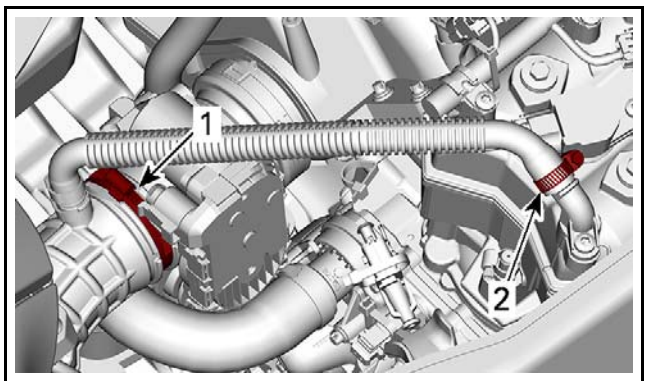
8. Unclip rectifier from air intake silencer and set aside.


219101005-008-017

9. Remove coolant hose from coolant reservoir.


219101005-008-012

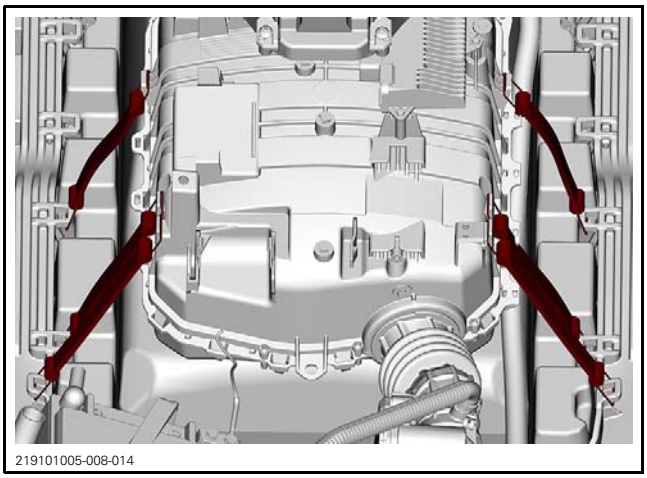
10. Unclip coolant reservoir and set aside.
11. Loosen outlet hose clamp and vent hose clamp to separate air intake silencer from engine.



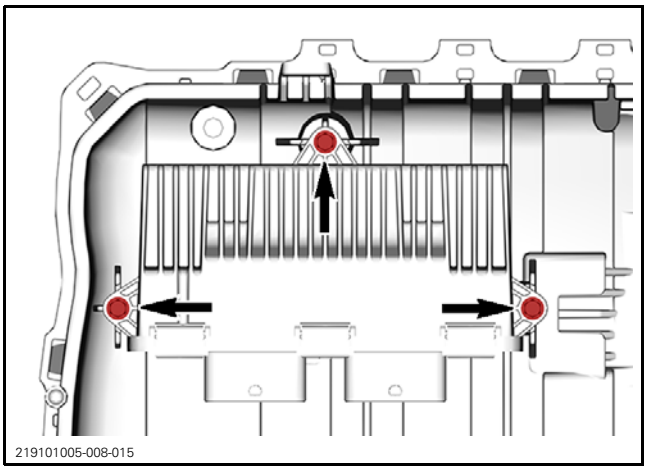
219101005-008-013

1. Outlet hose clamp
2. Vent hose clamp

12. From seat opening, detach the retaining straps.


219101005-008-014

13. Pull air intake silencer forward to remove it from the vehicle.
14. Remove ECM holding screws to remove ECM.


219101005-008-015

Disassembling the Air Intake Silencer

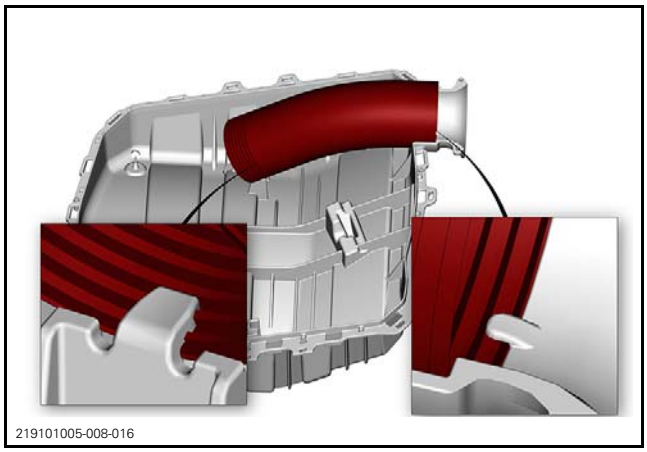
Remove screws securing upper section of air intake silencer to the lower section.

Release all retaining tabs.

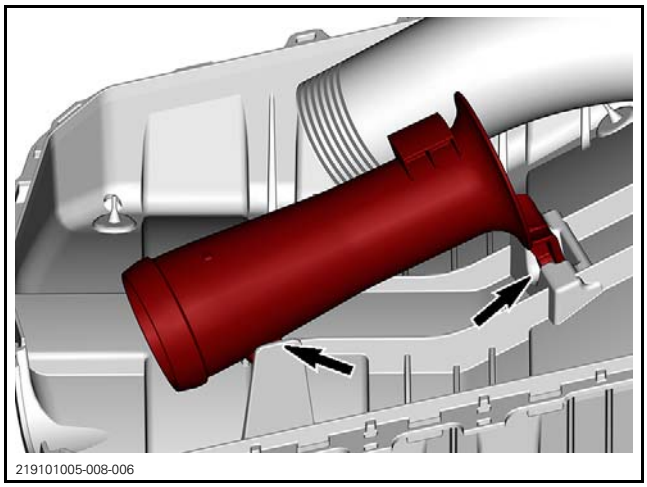
Separate upper and lower sections.

Assembling the Air Intake Silencer

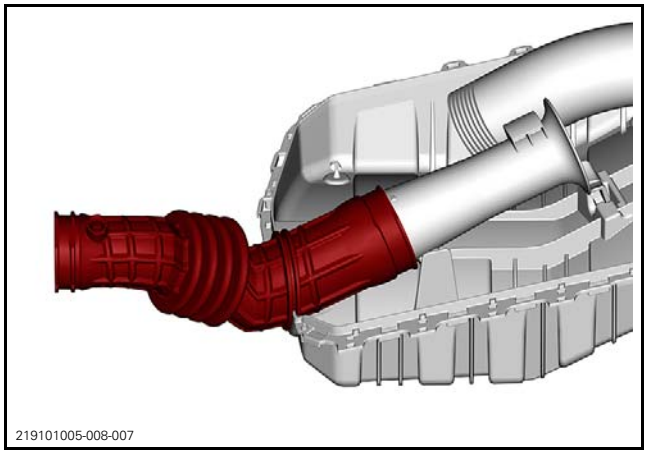
Install the inlet tube. Ensure each end is properly attached.

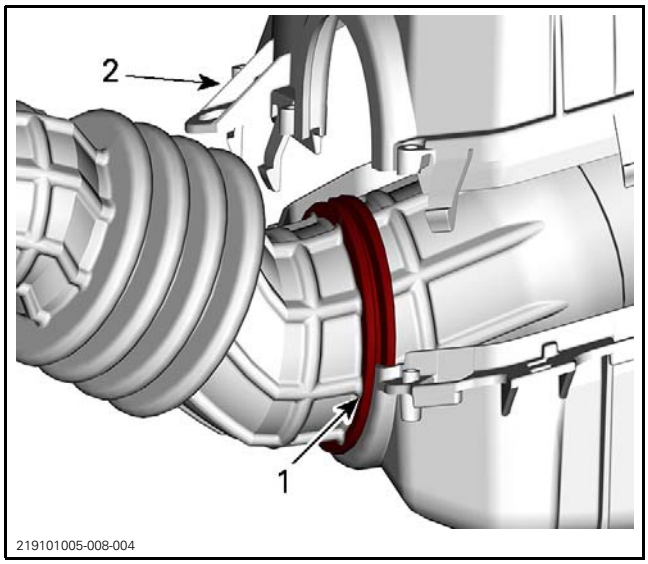

219101005-008-016

Install baffle tab into air intake silencer slots.

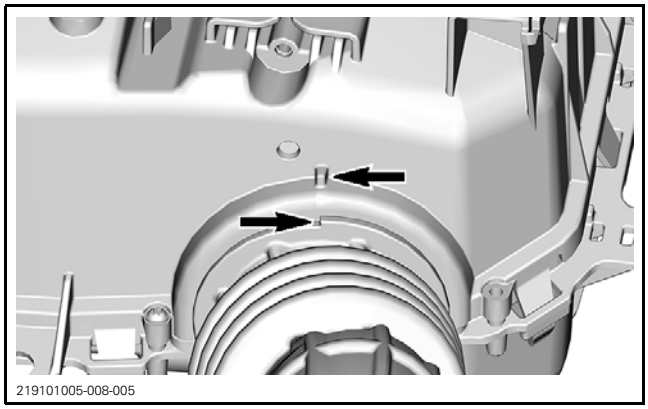

219101005-008-006

Install the outlet hose into the baffle. Ensure air intake silencer rib goes into the outlet hose groove and that marks are aligned.


219101005-008-007



1. Outlet hose groove.
2. Air intake silencer upper section.



Press both halves of the air intake silencer together until all tabs are locked. Do not force, make sure all tubes are properly installed.

Secure the upper section to lower section using previously removed K40 x 16 Torx screws. Refer to exploded view for tightening torque specifications.

Installing the Air Intake Silencer

The installation is the reverse of the removal procedure. However, pay attention to the following.

Refer to exploded view for tightening torque specifications.

Ensure wiring harness and fuel hoses are properly routed.

Install new locking ties.

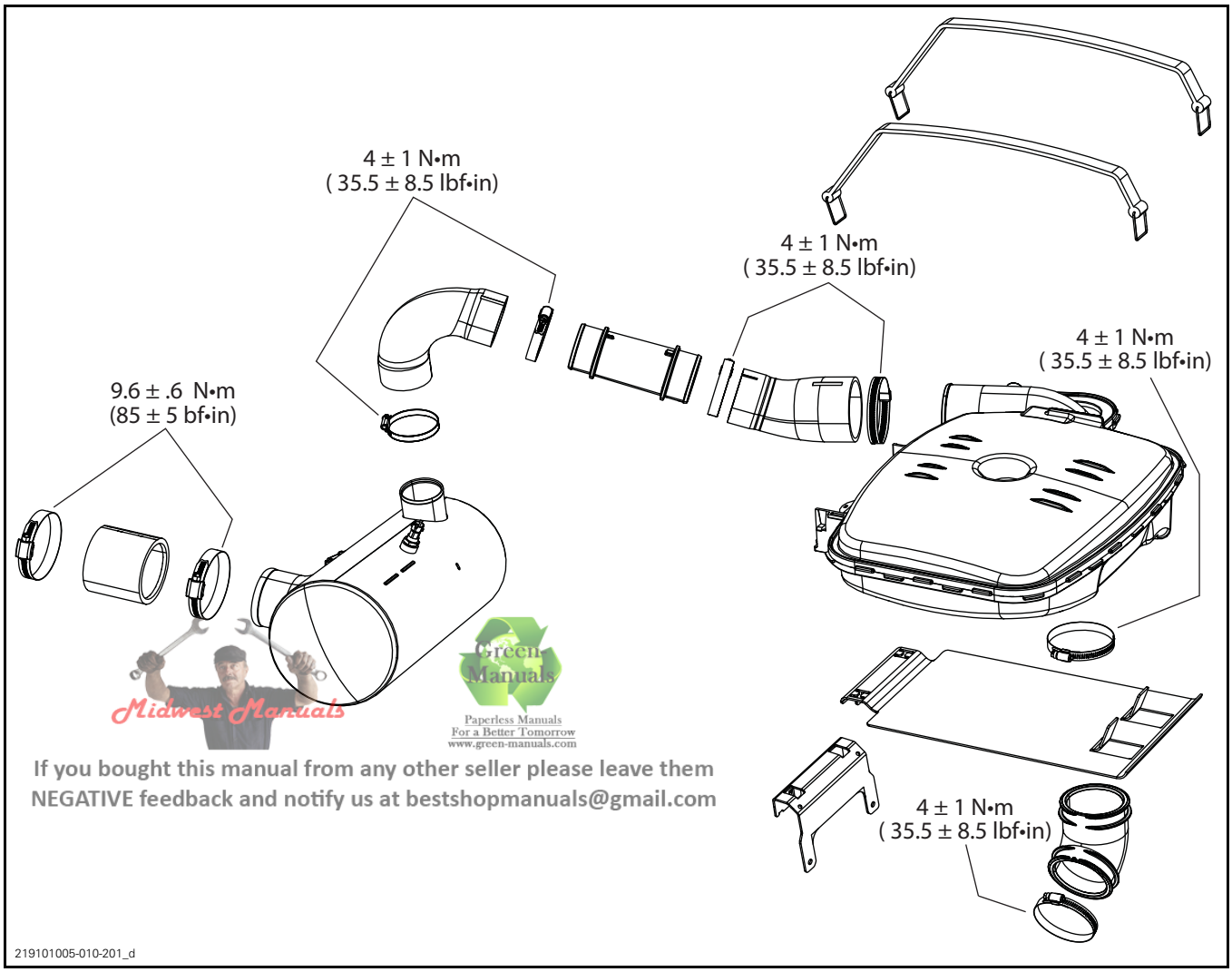
EXHAUST SYSTEM

SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	36
FLUKE 115 MULTIMETER	529 035 868	35
FLUSHING CONNECTOR ADAPTER	295 500 473	34

SERVICE PRODUCTS

Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	36
LOCTITE 518	293 800 038	36
P80 GRIP-IT	296 000 406	39



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GENERAL

SYSTEM DESCRIPTION

The exhaust system is cooled by water provided by a pressurized area in the jet pump (open loop system).

Water exits exhaust manifold through holes to inject water in muffler.

NOTE: For more information on the exhaust manifold, refer to *EXHAUST MANIFOLD* subsection.

Water is evacuated through the exhaust outlet in transom area.

Exhaust System Technical Specifications

TYPE	Total Loss Cooling System (TLCS)
WATER FLOW	Flow from jet pump (no water pump)
TEMPERATURE CONTROL	Calibrated outlet fittings (no thermostat)
SYSTEM BLEEDING	Self-bleed type
SYSTEM DRAINING	Self-drain type

MAINTENANCE

EXHAUST SYSTEM FLUSHING

Flushing the exhaust system with fresh water is essential to neutralize corroding effects of salt or other chemical products present in water. It will help to clean up sand, salt, shells or other particles in water jackets (exhaust system, intercooler and hoses).

Exhaust system flushing should be performed when the watercraft is not expected to be used further the same day or when the watercraft is stored for any extended time.

NOTICE Failure to flush the system, when necessary, will severely damage intercooler and exhaust system. Make sure engine operates during entire procedure.

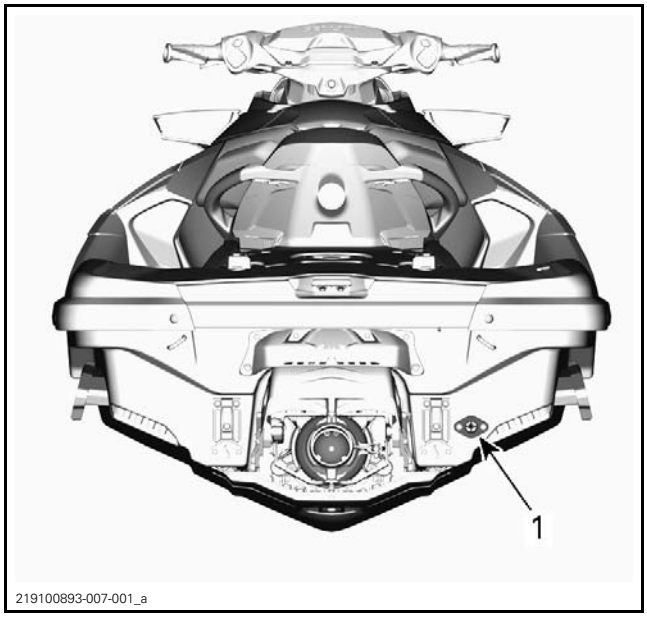
⚠ WARNING

Perform these operations in a well ventilated area. Certain components in the engine compartment may be very hot. Direct contact may result in skin burn. Do not touch any electrical part or jet pump area when engine is running.

⚠ WARNING

When operating the engine while the watercraft is out of the water, the heat exchanger in the ride plate may become very hot. Avoid any contact with ride plate as burns may occur.

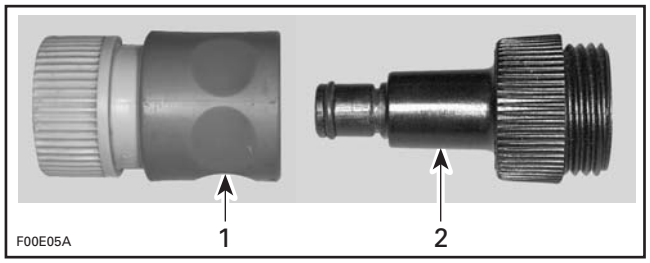
Connect a garden hose to connector located at the rear of watercraft. Do not open water tap yet.



1. Water inlet connector

NOTE: The following tool is recommended when a quick connect adapter is used to ease garden hose installation.

RECOMMENDED TOOL	
FLUSHING CONNECTOR ADAPTER (P/N 295 500 473)	



1. Quick connect adapter
2. Flushing connector adapter

To flush the exhaust system, start the engine then immediately open the water tap.

NOTICE Always start the engine before opening the water tap. Open water tap immediately after engine is started to prevent overheating. Never run engine without supplying water to the exhaust system when watercraft is out of water.

Run the engine about 20 seconds at a fast idle between 4000 - 5000 RPM.

NOTICE Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.

Ensure water flows out of jet pump while flushing.

Close the water tap, then stop the engine.

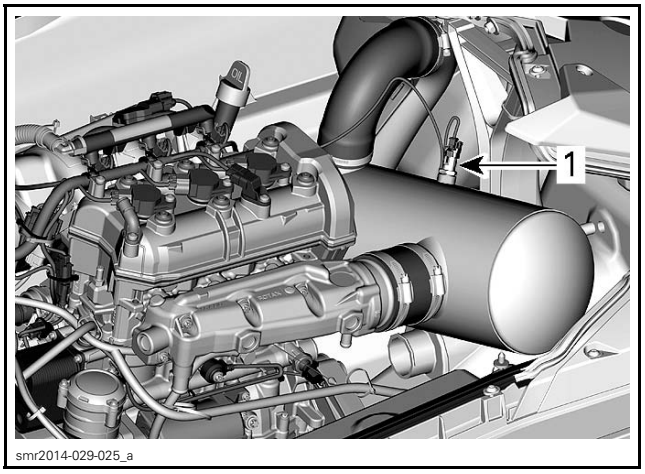
NOTICE Always close the water tap before stopping the engine.

Disconnect the garden hose.

NOTICE Remove flushing connector adapter after operation (if used).

PROCEDURES

EXHAUST GAS TEMPERATURE SENSOR (EGTS)



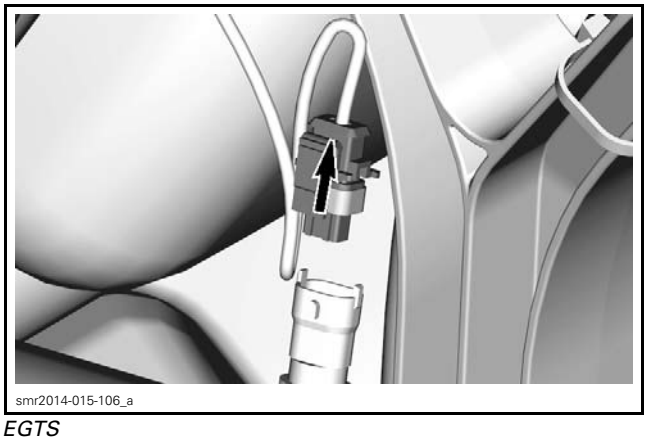
1. Exhaust gas temperature sensor (EGTS)

An overheat signal will come on in the multifunction gauge when the exhaust gases reach the following temperature.

OVERHEAT TEMPERATURE
95°C (203°F)

Testing the EGTS Resistance

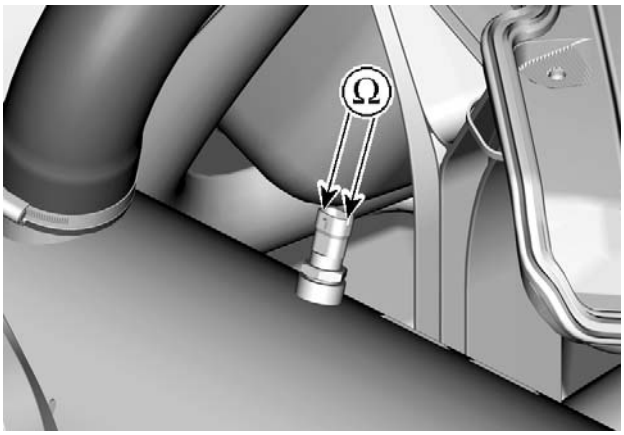
1. Remove the parts required to access the EGTS.
2. Disconnect the EGTS connector.



EGTS

3. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω selection and measure the resistance of the sensor.


529035868



smr2014-029-026_a

The resistance should be as per the *EGTS RESISTANCE CHART* that follows. Otherwise, replace the EGTS.

EGTS TEMPERATURE SENSOR TABLE			
TEMPERATURE		**RESISTANCE (OHMS)**	
°C	°F	LOW	HIGH
- 40	- 40	38457	52630
- 10	14	8208	10,656
20	68	2233	2780
80	176	297	349
120	248	105	122

If the EGTS resistance is within specifications, proceed with the following steps.

1. Reconnect the EGTS.
2. Disconnect ECM-A connector.
3. Using a multimeter and the ECM adapter tool, check the circuit resistance as per following table.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

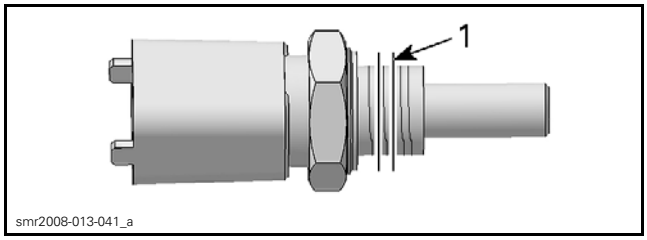
ECM ADAPTER		MEASUREMENT
J4	H4	See *EGTS RESISTANCE CHART*

If resistance value is as specified, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)* subsection.

If resistance value is not within specifications, repair or replace wiring and connectors between the ECM and the EGTS.

Replacing the EGTS

1. Disconnect the EGTS connector.
2. Unscrew EGTS from muffler.
3. ApplyLOCTITE 518 (P/N 293 800 038) on treads of new EGTS.
4. Install new EGTS.



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1. Apply Loctite 518 in this area

TIGHTENING TORQUE	
EGTS	16 N•m ± 2 N•m (142 lbf•**in** ± 18 lbf•**in**)

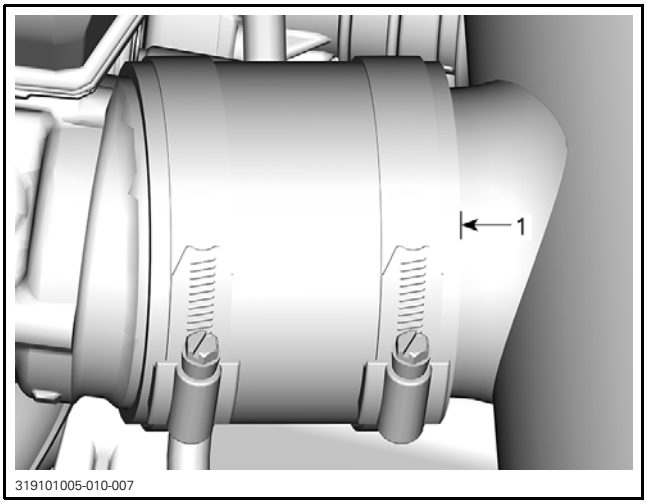
5. Apply DIELECTRIC GREASE (P/N 293 550 004) on EGTS connector before reinstall it.
6. Install all other removed parts, refer to applicable subsections.

MUFFLER

⚠ CAUTION Certain components in the engine compartment may be very hot. Let exhaust system cool down prior to removing parts.

Removing the Muffler

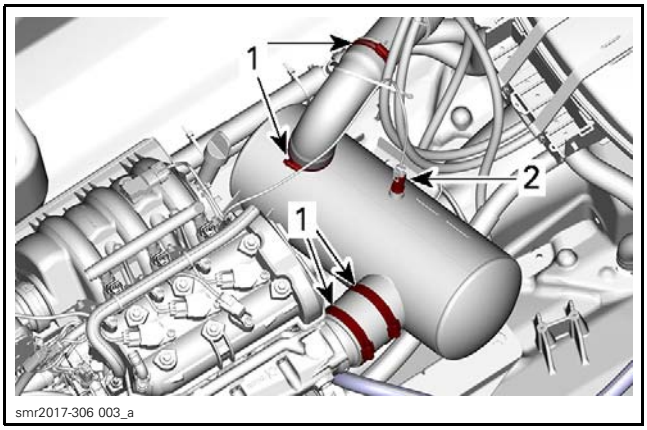
1. Remove or open seat.
2. Set aside the coolant reservoir.
3. Mark manifold to muffler hose location on muffler.



1. Trace a mark here

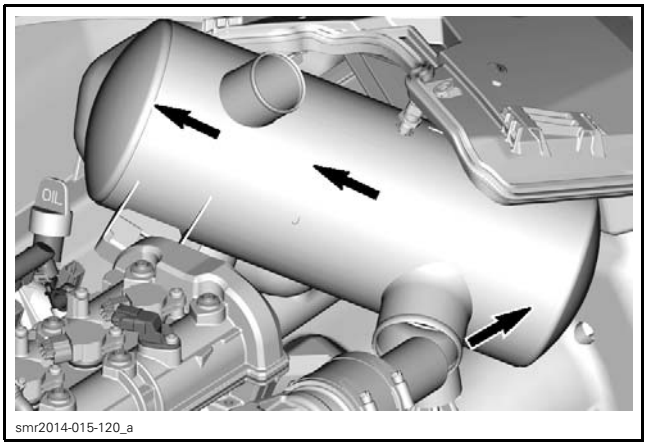
NOTICE Do not use pneumatic or electrical tools as seizure may occur.

4. Loosen muffler hose clamps and disconnect EGTS.



1. Muffler hose clamps
2. EGTS

5. Remove the muffler.



Inspecting the Muffler

Check muffler for:
- Cracks
- Corrosion
- Other damages.

Check if exhaust hose is:
- Brittle
- Hard
- Cracked
- Otherwise damaged.

Replace any defective part.

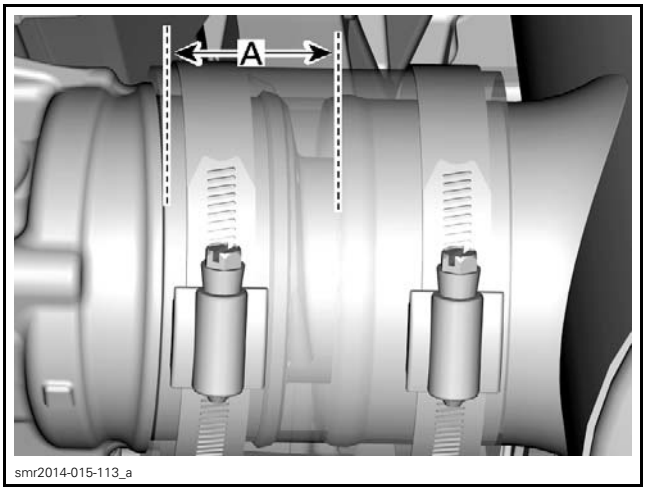
Installing the Muffler

With a new muffler, install the EGTS sensor. Refer to this subsection.

With a new muffler, mark muffler as per specification in step 1.

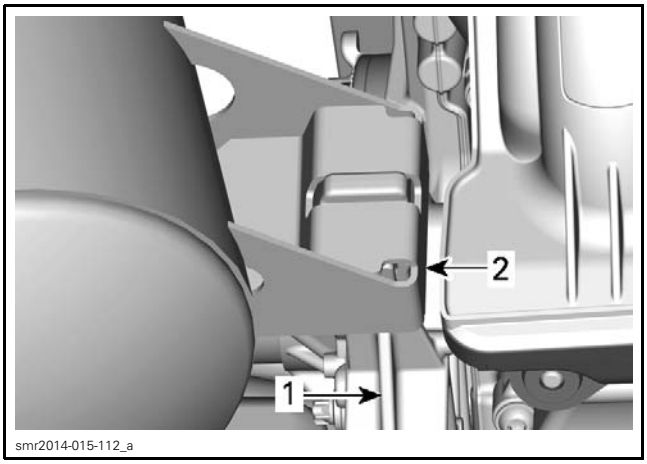
1. Ensure mark on muffler, inscribed during removal, provides correct engagement length into manifold to muffler exhaust hose.

NOTE: Because of manufacturing tolerances, the measurement must be taken as illustrated. From the muffler to the end of the hose.



MANIFOLD TO MUFFLER EXHAUST HOSE - PORT SIDE VIEW
A. Muffler engagement length 40 mm ± 2 mm (1.57 in ± .08 in)

2. Install muffler.
3. Position muffler support on rear starboard engine mount.



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MUFFLER SUPPORT - STARBOARD SIDE VIEW
1. *Rear starboard engine mount*
2. *Muffler support*

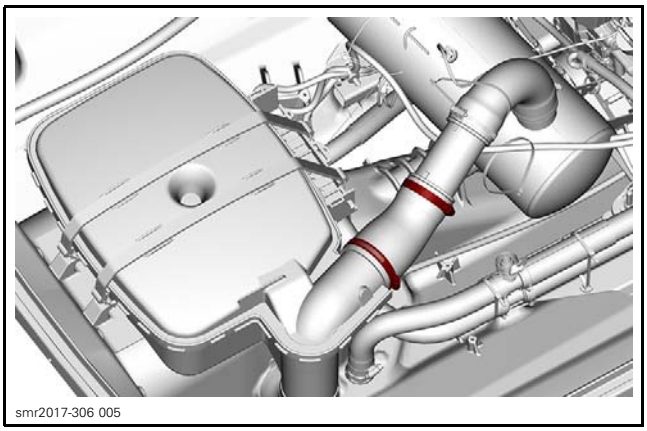
NOTE: Ensure muffler support is properly seated on rear starboard engine mount.
Ensure manifold to muffler exhaust hose is aligned with mark on inscribed muffler.

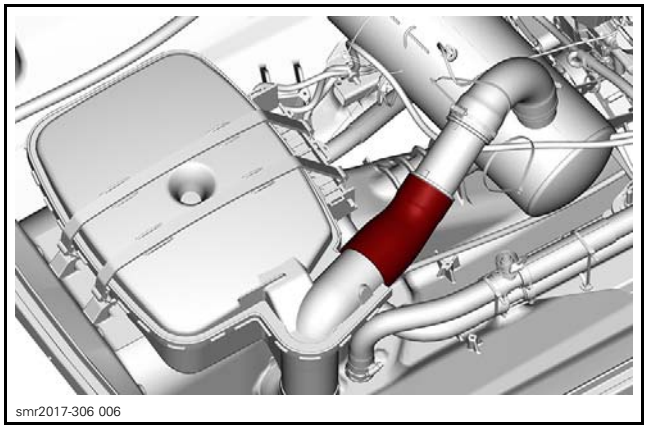
4. Reposition rear support.
5. Install all other removed parts.
6. Test run the engine while supplying water to the exhaust system.
7. After installation, ensure there is no water or exhaust gas leak when engine is running.

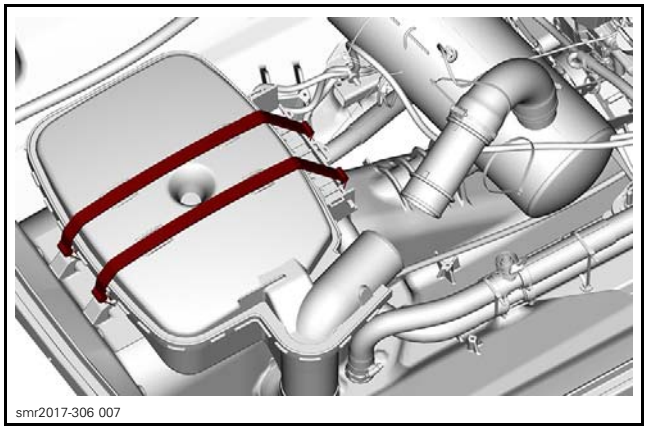
NOTICE **Never run engine without supplying water to the exhaust system when watercraft is out of water.**

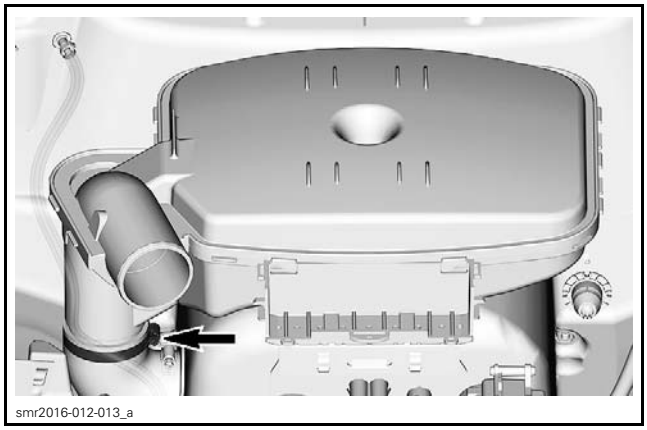
RESONATOR

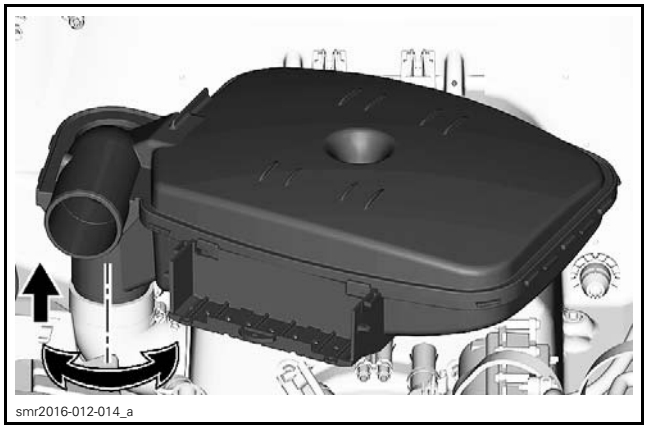
Removing the Resonator


smr2017-306 005


smr2017-306 006


smr2017-306 007


smr2016-012-013_a

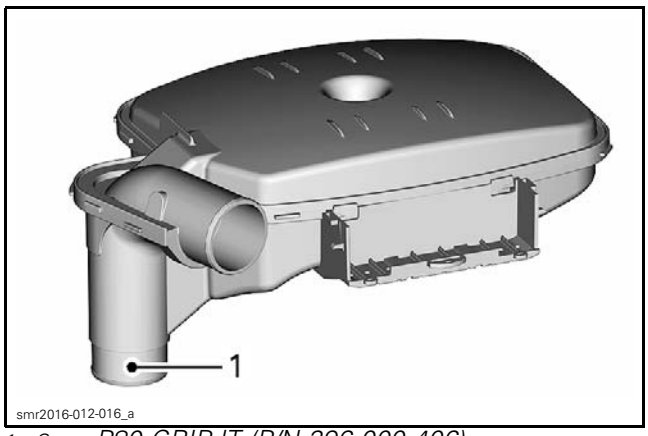

smr2016-012-014_a

Inspecting the Resonator

Inspect parts condition paying attention for deformation, cracks or other damage. Check hoses. Replace any defective part.

Installing the Resonator

The installation is the reverse of the removal procedure. However, pay attention to the following.



1. Spray P80 GRIP-IT (P/N 296 000 406)

After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the exhaust system.

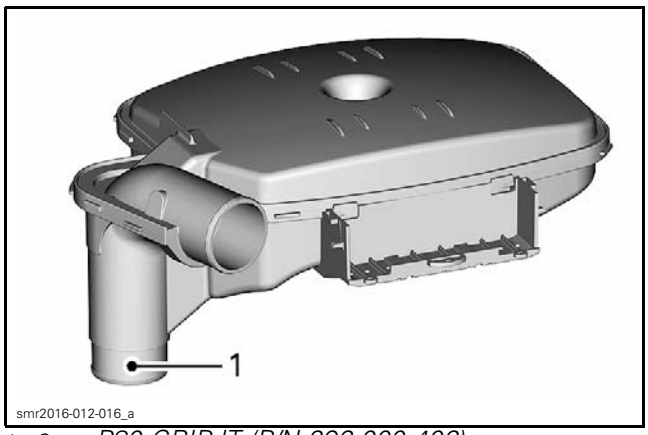
NOTICE Never run engine without supplying water to the exhaust system when watercraft is out of water.

Inspecting the Resonator

Inspect parts condition paying attention for deformation, cracks or other damage. Check hoses. Replace any defective part.

Installing the Resonator

The installation is the reverse of the removal procedure. However, pay attention to the following.



1. Spray P80 GRIP-IT (P/N 296 000 406)

After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the exhaust system.

NOTICE Never run engine without supplying water to the exhaust system when watercraft is out of water.

VEHICLE COOLING SYSTEM

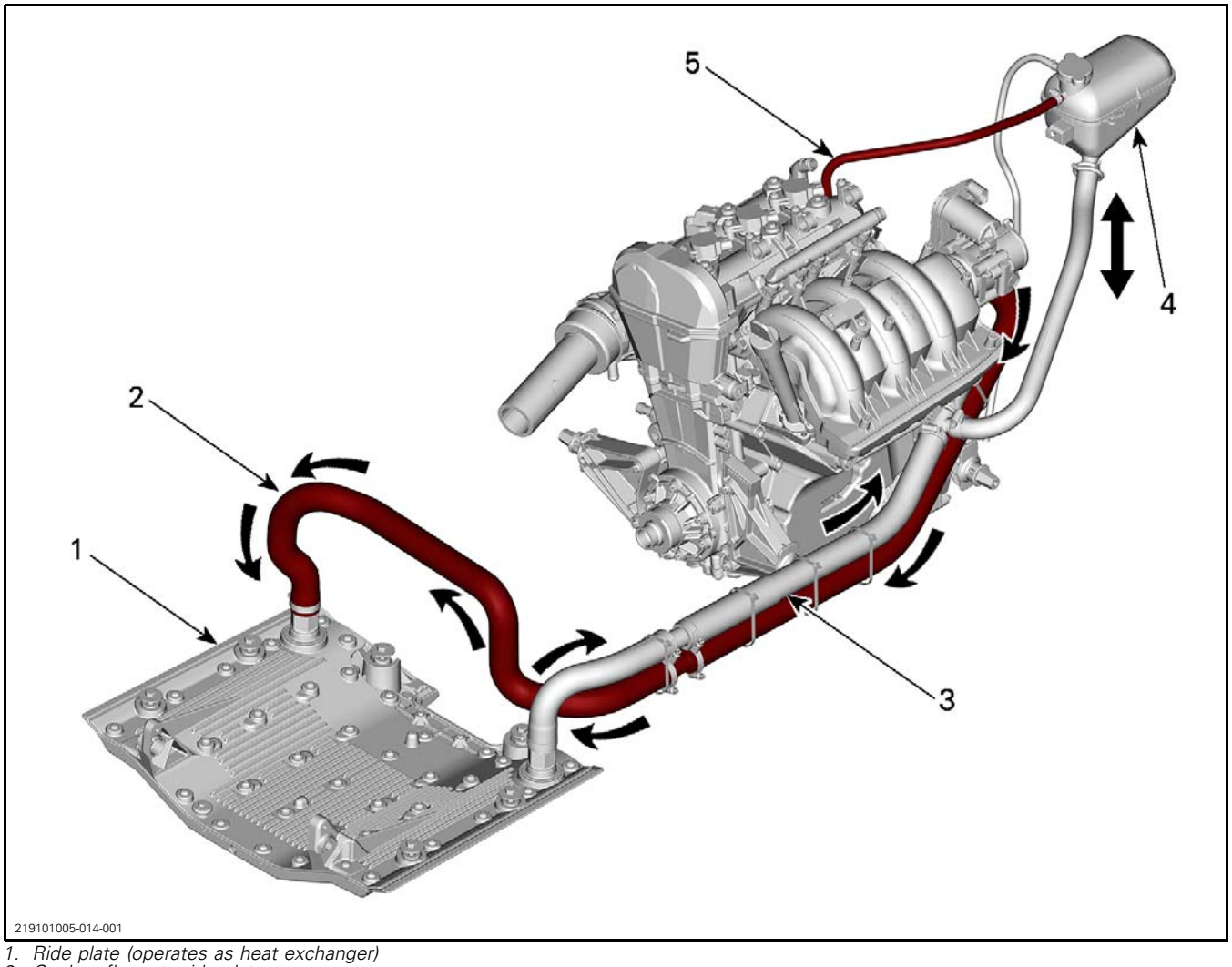
SERVICE TOOLS

Description	Part Number	Page
OETIKER PLIER	295 000 070	47
TEST CAP	529 035 991	46
VACUUM/PRESSURE PUMP	529 021 800	46

SERVICE PRODUCTS

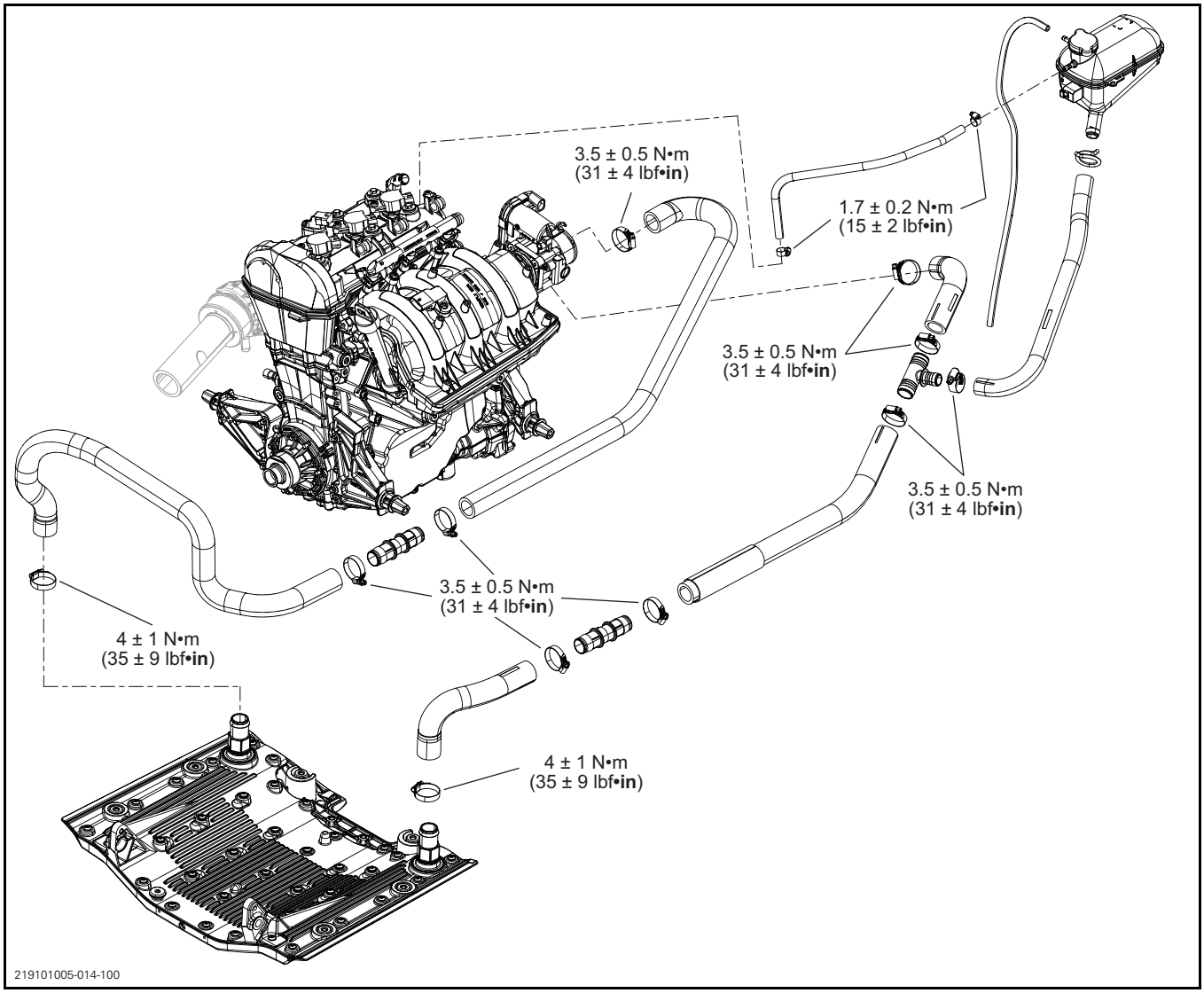
Description	Part Number	Page
EXTENDED LIFE PRE-MIXED COOLANT (EUR)	779223	44
EXTENDED LIFE PRE-MIXED COOLANT	779150	44
LOCTITE 567 (PIPE SEALANT)	293 800 013	45

Cooling System (Closed loop)

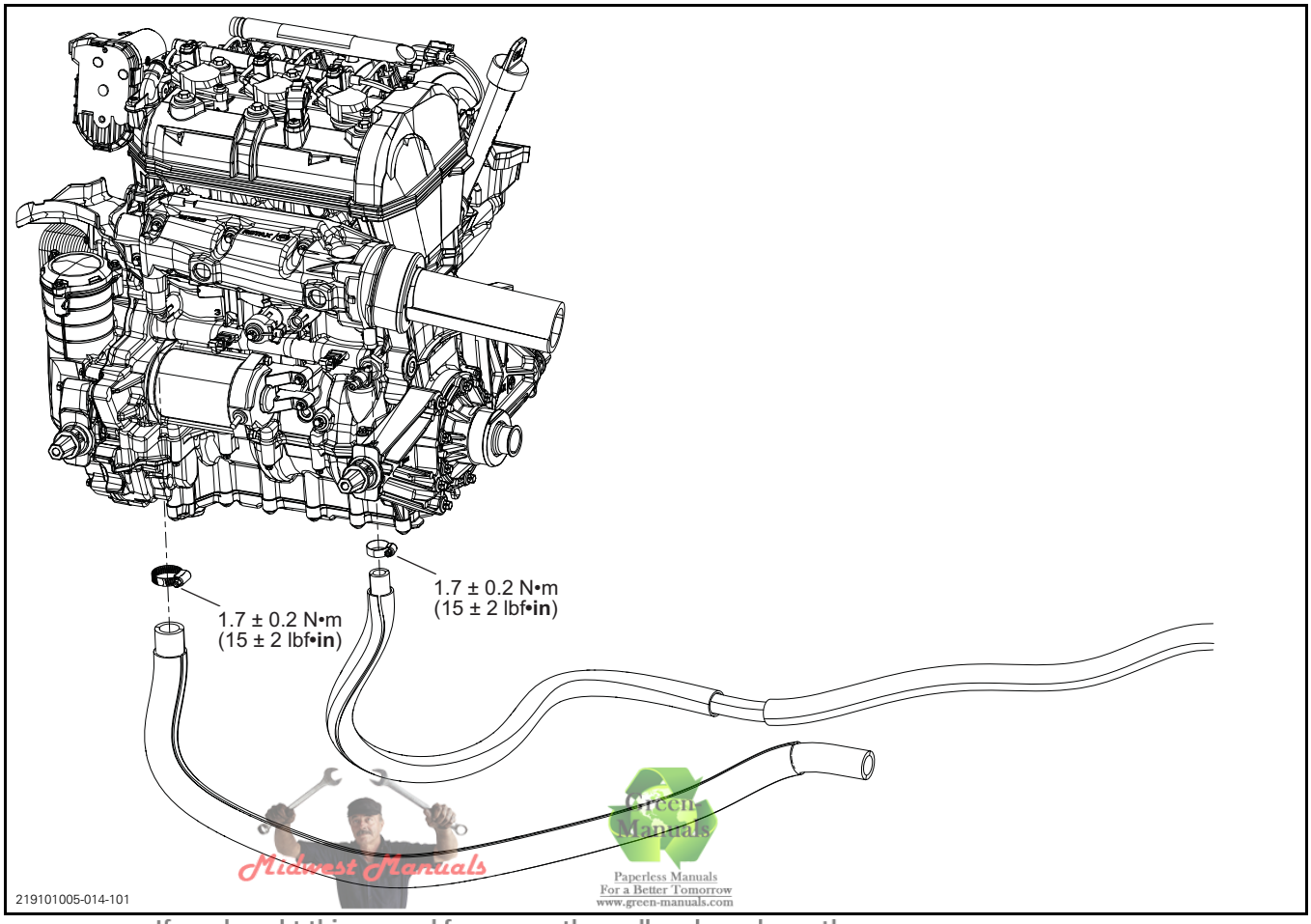


1. *Ride plate (operates as heat exchanger)*
2. *Coolant flows to ride plate*
3. *Coolant returns from ride plate*
4. *Expansion coolant tank*
5. *Bleed hose from cylinder head to expansion coolant tank*

Cooling System (Closed loop)



Cooling System (Open loop)



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GENERAL

SYSTEM DESCRIPTION

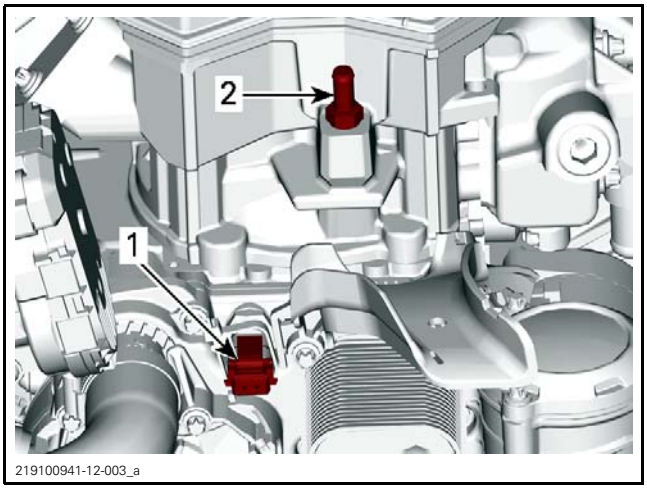
A closed loop cooling system is utilized on all BRP watercraft engines, which offers an efficient engine cooling while keeping dirt and salt water out of the cooling system. This system keeps the temperature constant and prevents internal engine corrosion.

A separate coolant tank ensures that enough engine coolant is in the circuit during any operating condition.

The coolant flow comes from the water pump impeller into the cylinder block. It goes around the cylinders and straight up to the cylinder head. A smaller quantity of engine coolant enters the cylinder block on the exhaust side for a better cooling. In the cylinder head the water channels flow around the exhaust and then the intake valves and leave the engine through a large hose. From there the coolant goes back to the water pump housing and depending on the engine temperature, it flows through the thermostat directly back to the water pump impeller, or it takes its way through the heat exchanger.

Engine coolant is also directed towards the oil cooler (coolant type).

Coolant temperature sensor and bleed hose fitting are located on the cylinder head.



219100941-12-003_a

1. Coolant temperature sensor (CTS)
2. Bleed hose nipple

NOTICE **Never modify cooling system arrangement, otherwise serious engine damage could occur.**

Technical Specifications

TYPE	Closed loop cooling system.
COOLANT FLOW	Flow from water pump.
TEMPERATURE CONTROL	Thermostat. (opens at 80°C (176°F))
SYSTEM BLEEDING	Self-bleed type through coolant tank (hose at uppermost point of circuit).
MONITORING BEEPER	Turns on at 110°C (230°F).

MAINTENANCE

ENGINE COOLANT

⚠ WARNING

To avoid potential burns, do not remove the coolant tank cap or loosen the ride plate drain plug if the engine is hot.

Recommended Coolant

COOLANT	
Scandinavia	EXTENDED LIFE PRE-MIXED COOLANT (EUR) (P/N 779223)
All Other Countries	EXTENDED LIFE PRE-MIXED COOLANT (P/N 779150)
Alternative, or if not available	Distilled water and antifreeze solution (50% distilled water, 50% antifreeze)

If the recommended coolant is not available, use a low silicate, extended life ethylene-glycol premixed coolant (50%-50%) specifically formulated for internal combustion aluminum engines.

To prevent antifreeze deterioration, always use the same brand and grade. Never mix different brands or grades unless cooling system is completely flushed and refilled.

Draining the System

⚠ WARNING

Never drain or refill cooling system when engine is hot.

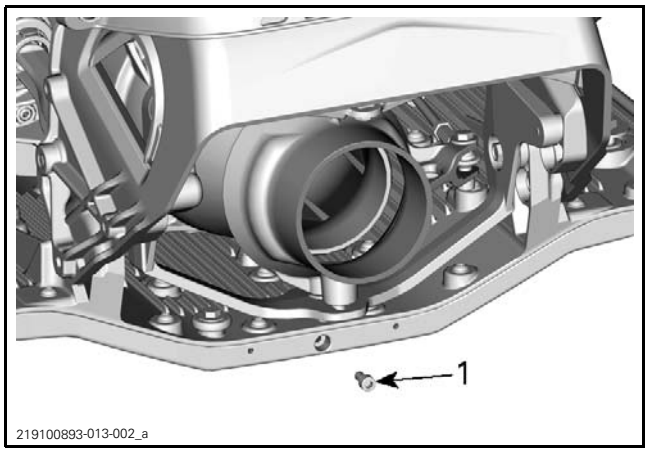
Remove seats.

Remove engine service cover.

Install a drain pan underneath the ride plate.

Unscrew the drain plug on ride plate.

NOTE: Raising the front of the watercraft will contribute to drain the cooling system.



TYPICAL
1. Cooling drain plug

Remove the coolant tank cap.

Dispose coolant as per local regulations.

Do not reinstall drain plug at this time.

Cleaning the System

NOTICE **Cleaning the cooling system as per the following procedure is required when engine overheats (assuming everything else is operating normally) or each time coolant is replaced.**

Drain the cooling system.

Add a cleaning product such as the Zerex® Super Cleaner by Valvoline (or an equivalent) in coolant tank then fill cooling system with demineralized water.

Reinstall cap on coolant tank.

Install watercraft in a test basin or ride on a water plane. Start engine and run for approximately 15 minutes.

IMPORTANT: Ensure thermostat opens so that the cleaning product flows in ride plate properly.

Stop engine and let the cleaning product work for 12 to 16 hours.

Thereafter, engine can be run one last time to soak off deposits.

Drain and thoroughly rinse the cooling system with clean fresh water.

Refill cooling system as described below.

Refilling the System

Watercraft should be level, engine cold and drain plug removed for refilling.

Place a container under drain plug to collect antifreeze.

Apply pipe sealant on drain plug threads.

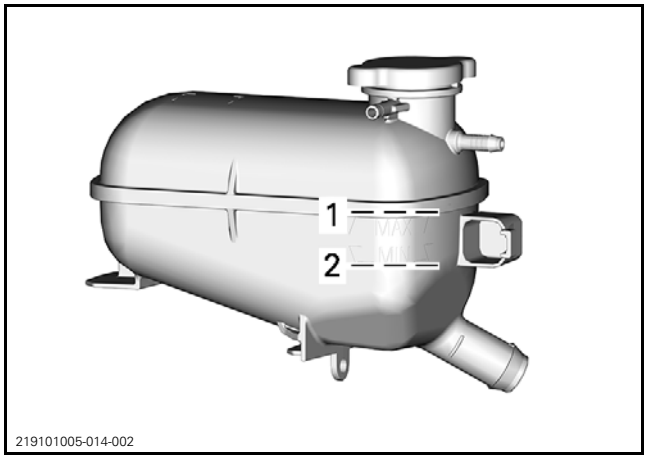
SERVICE PRODUCT
LOCTITE 567 (PIPE SEALANT) (P/N 293 800 013)

Ask someone to pour recommended antifreeze in coolant tank.

When antifreeze flows out from the ride plate drain hole, reinstall drain plug. Tighten drain plug to specification.

TIGHTENING TORQUE	
Drain plug	8.5 N•m ± 0.5 N•m (75 lbf•**in** ± 4 lbf•**in**)

Continue to pour and fill coolant tank between marks.



LEVEL BETWEEN MARKS WHEN ENGINE IS COLD
1. MAX
2. MIN

Do not install pressure cap at this time.

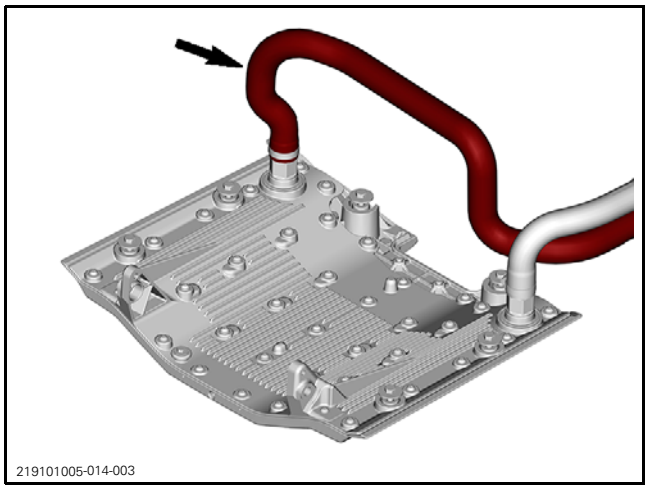
Link a garden hose to the hose adapter at the back of the watercraft. Refer to *FLUSHING THE EXHAUST SYSTEM* in the *EXHAUST SYSTEM* subsection.

NOTICE **Never run engine without supplying water to the exhaust system.**

Start engine and let run for a maximum of 2 minutes. Stop engine and wait 15 minutes to cool down. Refill tank as necessary.

NOTICE **Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.**

Repeat this run-stop cycle 2-3 times until thermostat opens and stop engine.



HOSE HOT WHEN THERMOSTAT OPENS

Last, refill coolant tank and install pressure cap.

When engine has completely cooled down, recheck coolant level in the coolant tank and top up if necessary.

INSPECTION

COOLING SYSTEM LEAK TEST

⚠ WARNING

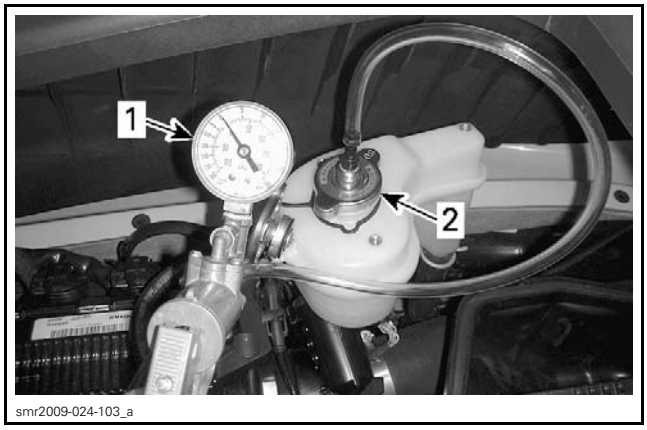
To avoid potential burns, do not remove the coolant tank cap if the engine is hot.

NOTE: This test confirms if there is a leak in the cooling system, including the engine.

Pressurize cooling system through coolant reservoir.

REQUIRED TOOLS	
TEST CAP (P/N 529 035 991)	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

COOLING SYSTEM LEAK TEST
110 kPa (16 PSI)

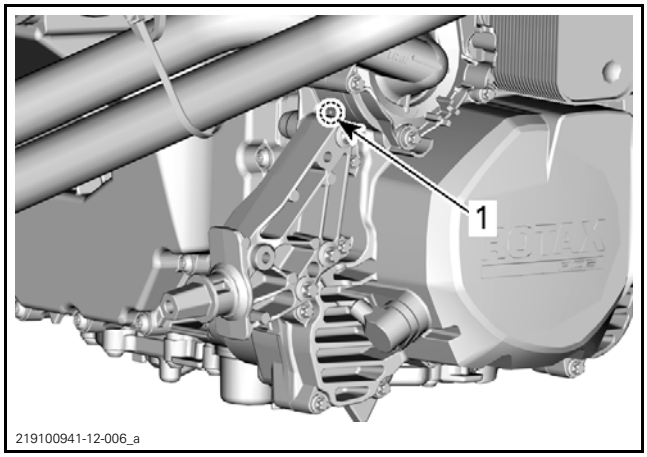


TYPICAL
1. *Vacuum/pressure pump*
2. *Test cap*

If pressure drops, check all hoses, heat exchanger and engine for coolant leaks. Spray a soap/water solution and look for air bubbles.

Check the leak indicator hole if there is oil or coolant leaking.

NOTE: In general, leaking coolant indicates a damaged rotary seal. Leaking oil indicates a damaged oil seal. If either seal is leaking, both seals must be replaced at the same time. Refer to *WATER PUMP* in *COOLING SYSTEM - ENGINE* in the appropriate engine shop manual.



1. *Leak indicator hole*

TROUBLESHOOTING

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and it should not be assumed to list all possible problems.

Always check for fault codes. If a fault code is detected, service the fault code first. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

ENGINE OVERHEATING

1. Low coolant level.
   - *Refill and check for leaks (coolant leaking out of engine leak indicator hole, hoses or clamps missing/defective, cylinder head gaskets leaks, ride plate leaking, etc.). Repair or replace.*
2. Air in cooling system
   - *Refill and bleed cooling system.*
3. Thermostat defective (does not open when engine gets hot)
   - *Replace thermostat housing.*
4. Water pump failure
   - *Inspect and replace defective components.*
5. Water temperature sensor defective
   - *Check or replace. Refer to ELECTRONIC FUEL INJECTION (EFI).*
6. Ride plate or hoses damaged
   - *Check or replace damaged components.*
7. Exhaust system clogged
   - *Flush exhaust system.*
8. Internal passage blocked in cooling system
   - *Inspect and clean.*

PROCEDURES

PRESSURE CAP

Testing the Pressure Cap

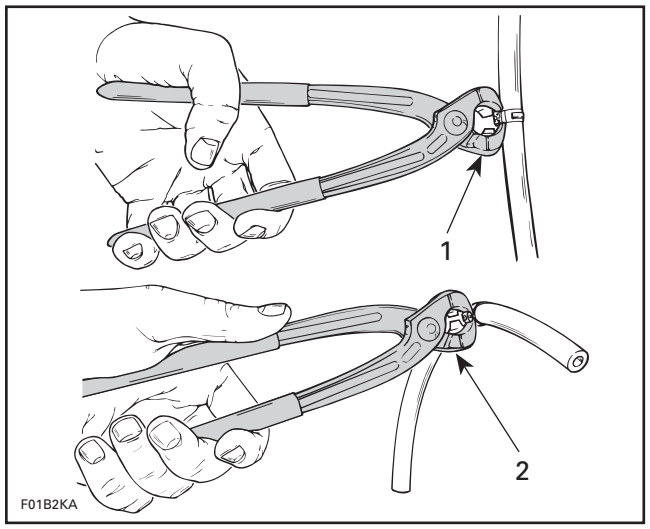
Using a pressure cap tester, check cap opening pressure. If opening pressure is out of range, install a new pressure cap.

CAP OPENING PRESSURE	
Opening range	90 kPa ± 10 kPa (13 PSI ± 1.5 PSI)

CLAMPS

Replacing the Oetiker Clamp

REQUIRED TOOL	
OETIKER PLIER (P/N 295 000 070)	



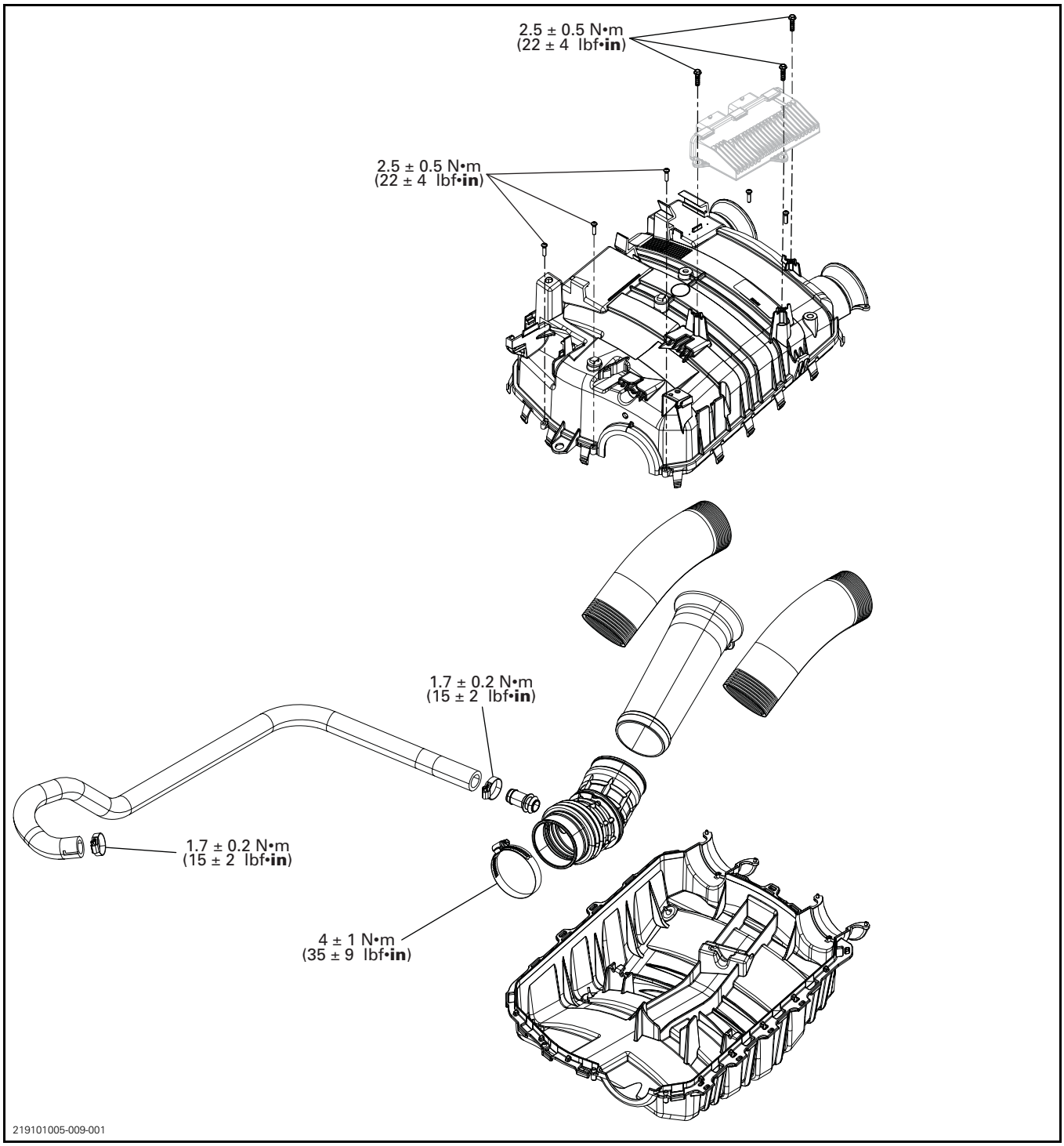
1. Cutting clamp
2. Securing clamp

NOTE: Always check general condition of hoses and clamp tightness.

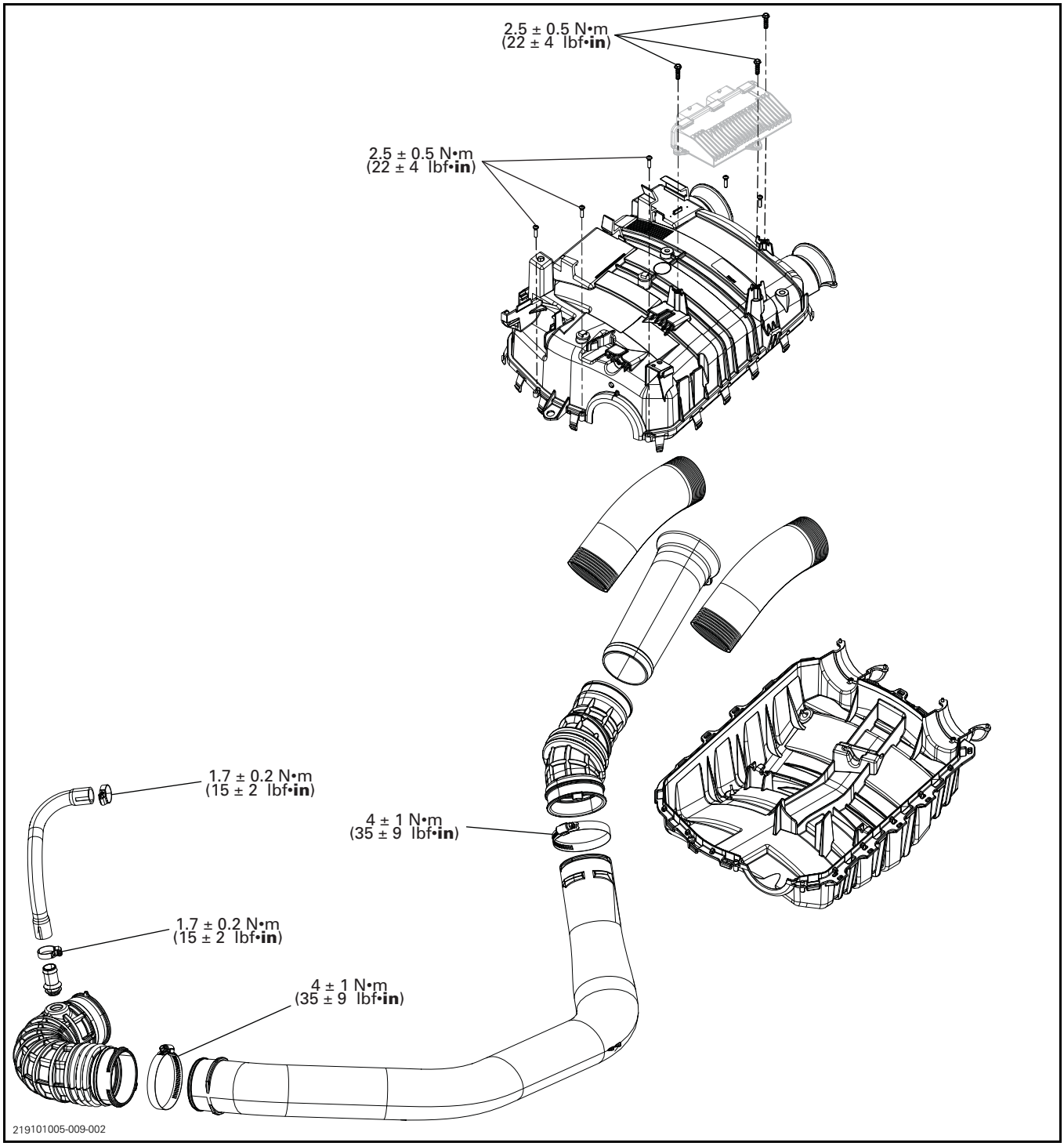
REFER TO ENGINE REMOVAL AND INSTALLATION

AIR INTAKE SYSTEM

130 and 170 Engines



230 Engines

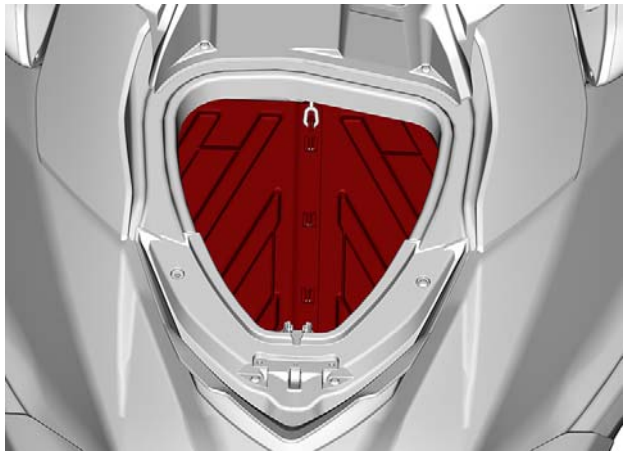

2.5 ± 0.5 N•m
(22 ± 4 lbf•in)
2.5 ± 0.5 N•m
(22 ± 4 lbf•in)
1.7 ± 0.2 N•m
(15 ± 2 lbf•in)
4 ± 1 N•m
(35 ± 9 lbf•in)
1.7 ± 0.2 N•m
(15 ± 2 lbf•in)
4 ± 1 N•m
(35 ± 9 lbf•in)
219101005-009-002

PROCEDURES

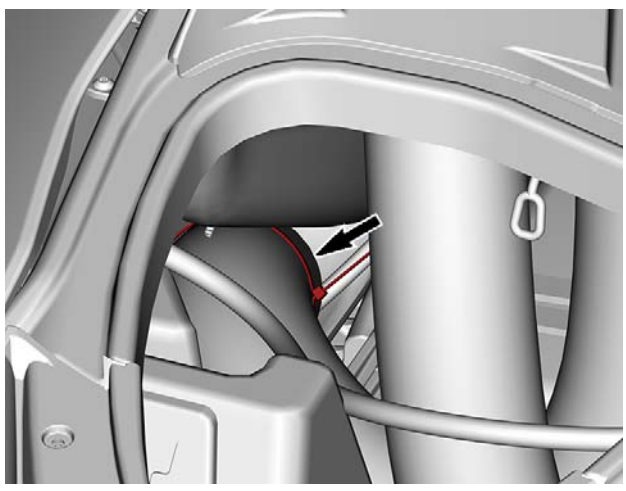
AIR INTAKE SILENCER

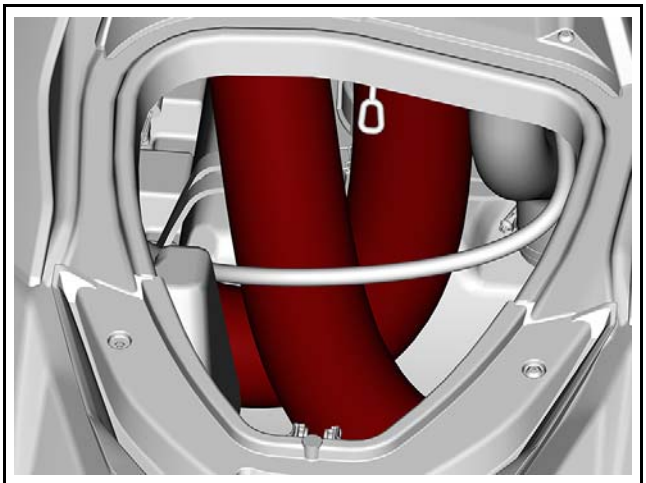
Removing the Air Intake Silencer

1. Remove the seats, storage compartment cover and engine service cover. Refer to *BODY* subsection.
2. Remove partitions.

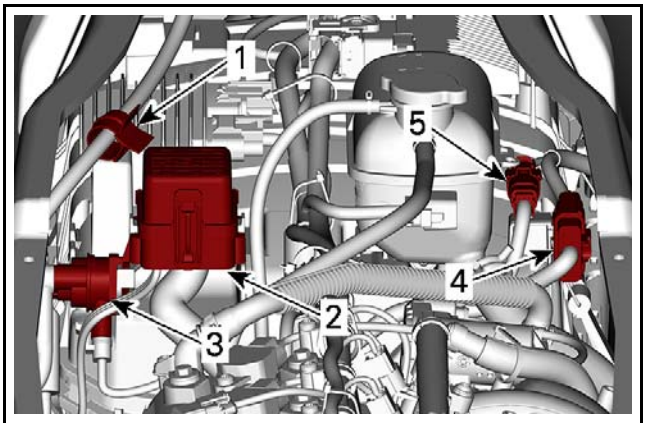

219101005-009-005

3. Cut locking tie and unplug the top of ventilations tubes. Place them lower in hull.


219101005-009-003


219101005-009-004

4. Separate from air intake silencer and set aside the following components.



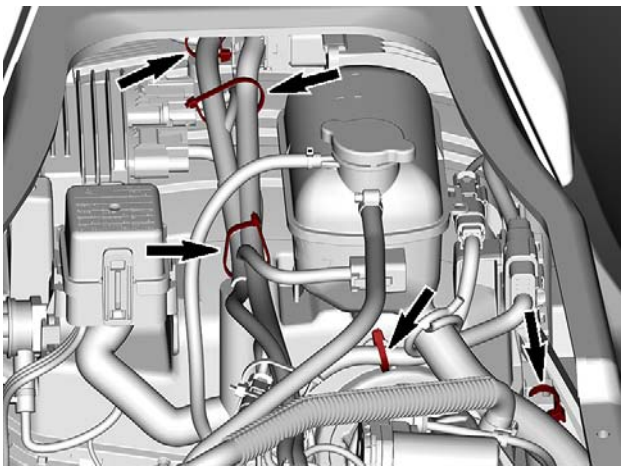
219101005-008-008

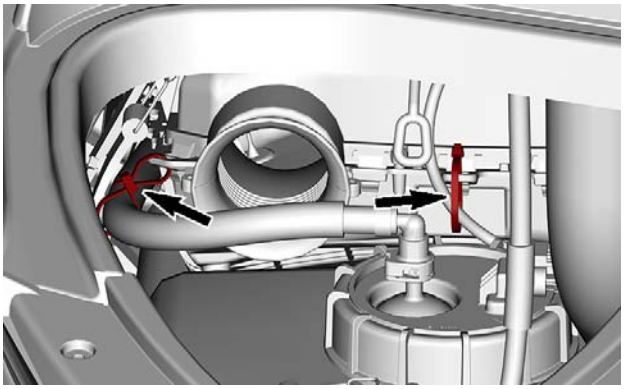
1. Steering cable retainer
2. Fuse box
3. Starter solenoid
4. HIC1 connector
5. HIC2 connector

5. Disconnect the battery.

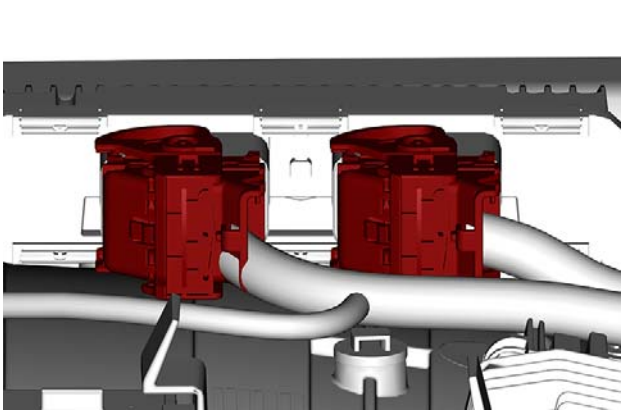
NOTICE Always disconnect the BLACK (-) cable first and reconnect last.

6. Cut locking ties securing wiring harness and fuel hose to air intake silencer.

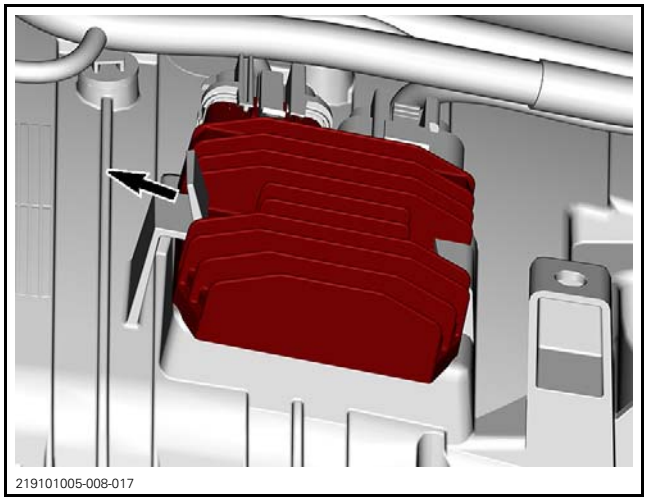

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219101005-009-006

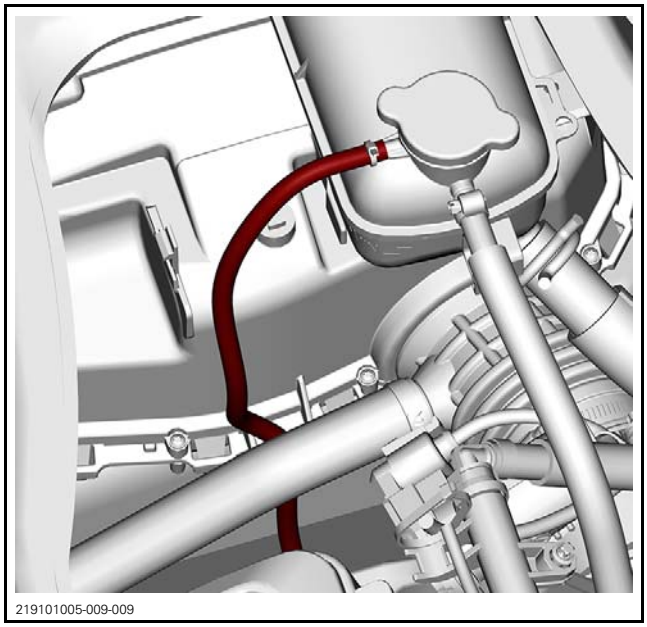
7. Disconnect both ECM connectors.


219101005-008-011

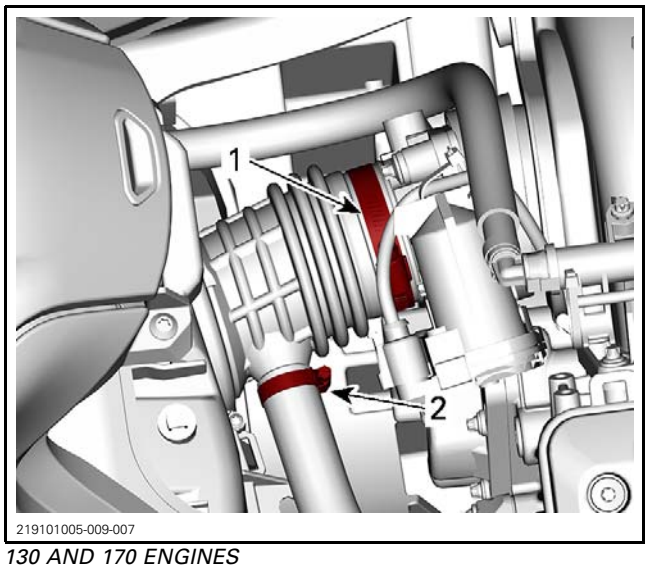
8. Unclip rectifier from air intake silencer and set aside.


219101005-008-017

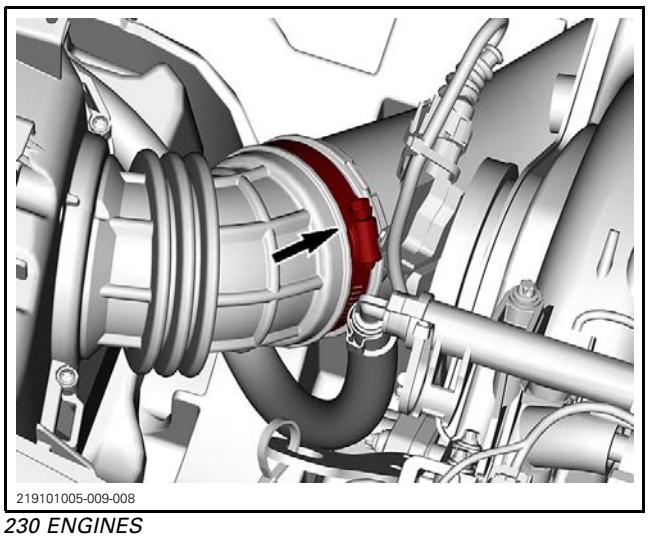
9. Remove coolant hose from coolant reservoir.


219101005-009-009

10. Unclip coolant reservoir and set aside.
11. Loosen clamps to separate air intake silencer from engine.

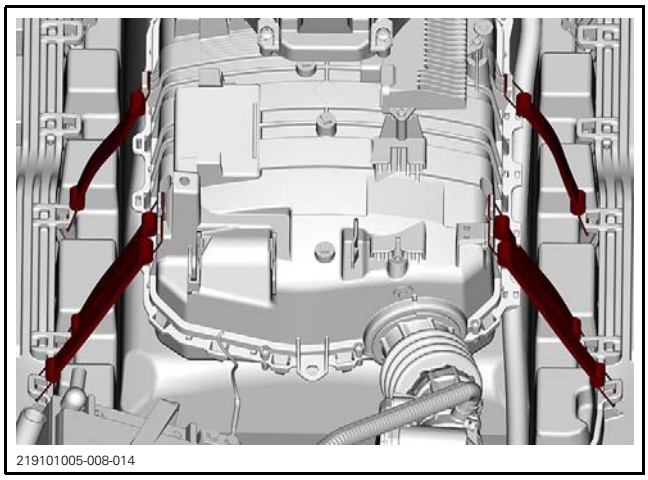


130 AND 170 ENGINES
1. *Outlet hose clamp*
2. *Vent hose clamp*



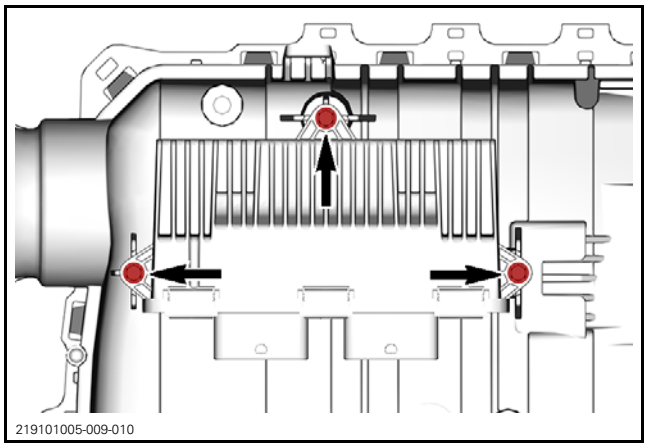
230 ENGINES

12. Detach the retaining straps.



13. Pull air intake silencer forward to remove it from the vehicle.

14. Remove ECM holding screws to remove ECM.



Disassembling the Air Intake Silencer

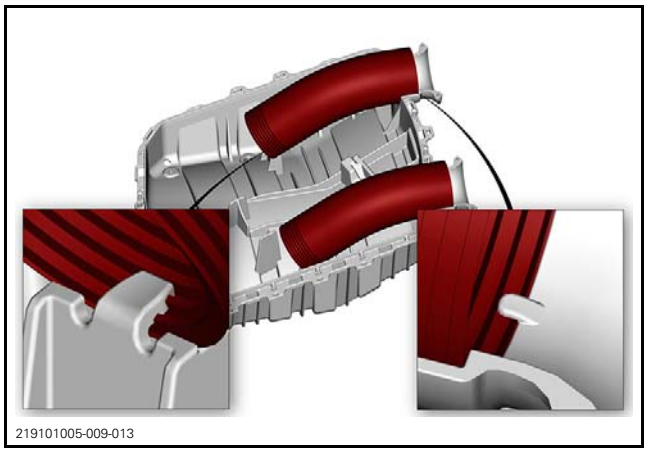
Remove screws securing upper section of air intake silencer to the lower section.

Release all retaining tabs.

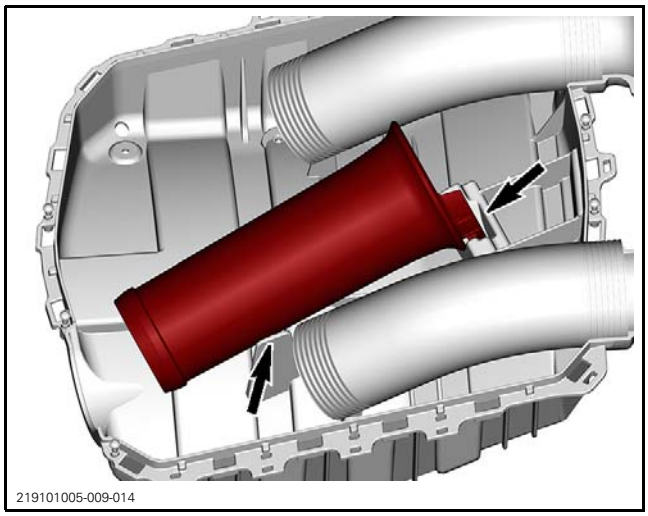
Separate upper and lower sections.

Assembling the Air Intake Silencer

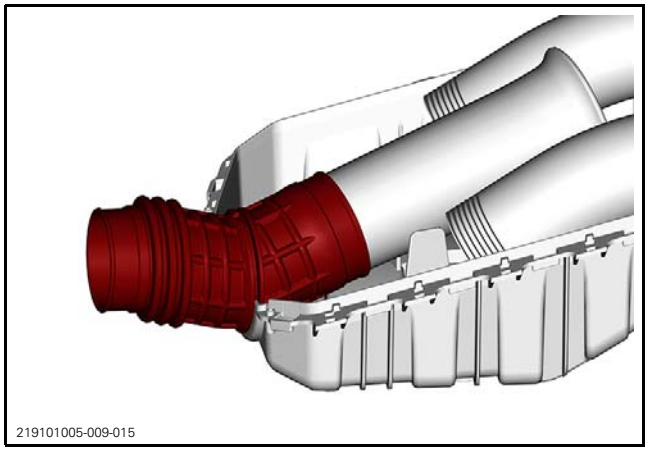
Install the inlet tubes. Ensure each end is properly attached.

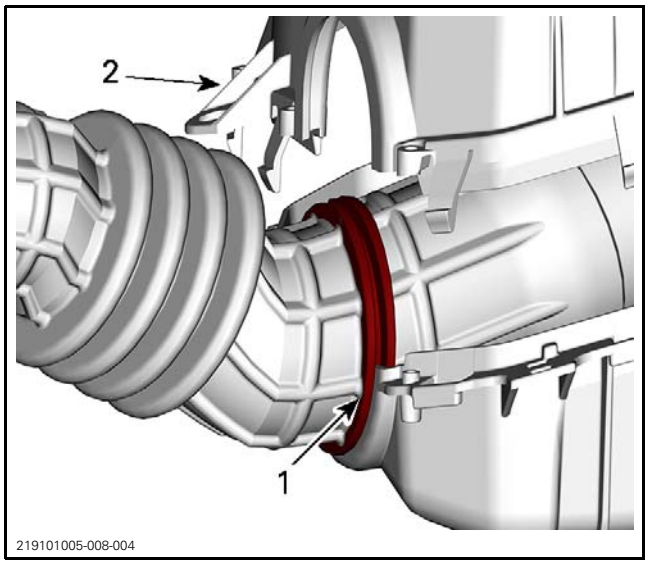


Install baffle tab into air intake silencer slots.


219101005-009-014

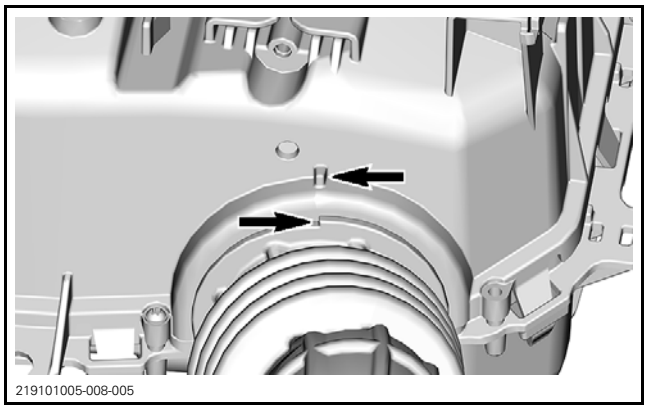
Install the outlet hose into the baffle. Ensure air intake silencer rib goes into the outlet hose groove and that marks are aligned.


219101005-009-015



219101005-008-004

1. Outlet hose groove.
2. Air intake silencer upper section.


219101005-008-005

Press both halves of the air intake silencer together until all tabs are locked. Do not force, make sure all tubes are properly installed.

Secure the upper section to lower section using previously removed K40 x 16 Torx screws. Refer to exploded view for tightening torque specifications.

Installing the Air Intake Silencer

The installation is the reverse of the removal procedure. However, pay attention to the following.

Refer to exploded view for tightening torque specifications.

Ensure wiring harness and fuel hoses are properly routed.

Install new locking ties

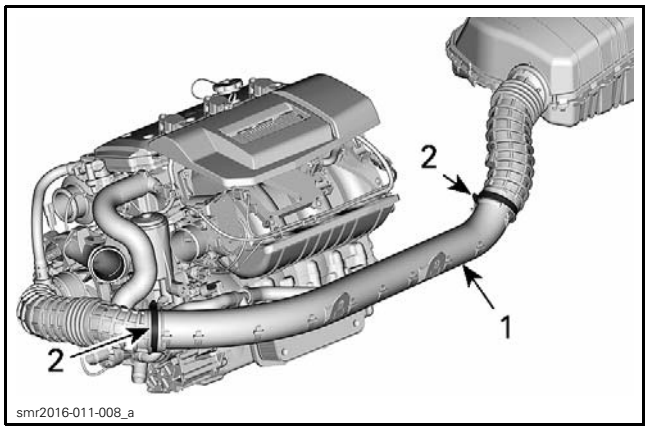
Make sure hoses are perfectly inserted into air intake tube before tightening the clamps.

AIR INTAKE TUBE

Removing the Air Intake Tube

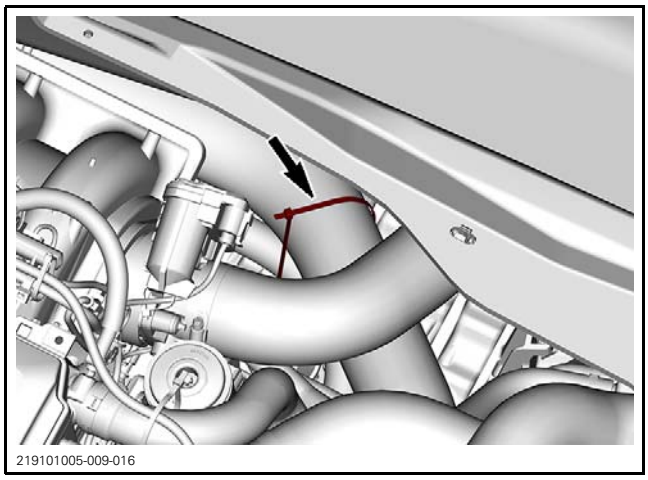
Supercharged Engine

1. Remove the seats and engine service cover. Refer to *BODY* subsection.
2. Loosen clamps to detach the air intake tube from both hoses.



1. Air intake tube
2. Retaining clamps

3. Cut locking tie securing air intake tube to coolant hose.



4. Slide the air intake tube through the engine access opening.

Installing the Air Intake Tube

The installation is the reverse of the removal procedure. However pay attention to the following.

Refer to exploded view for tightening torque specifications.

Install new locking ties.

Make sure air intake tube is perfectly inserted into air intake hoses before tightening the clamps.

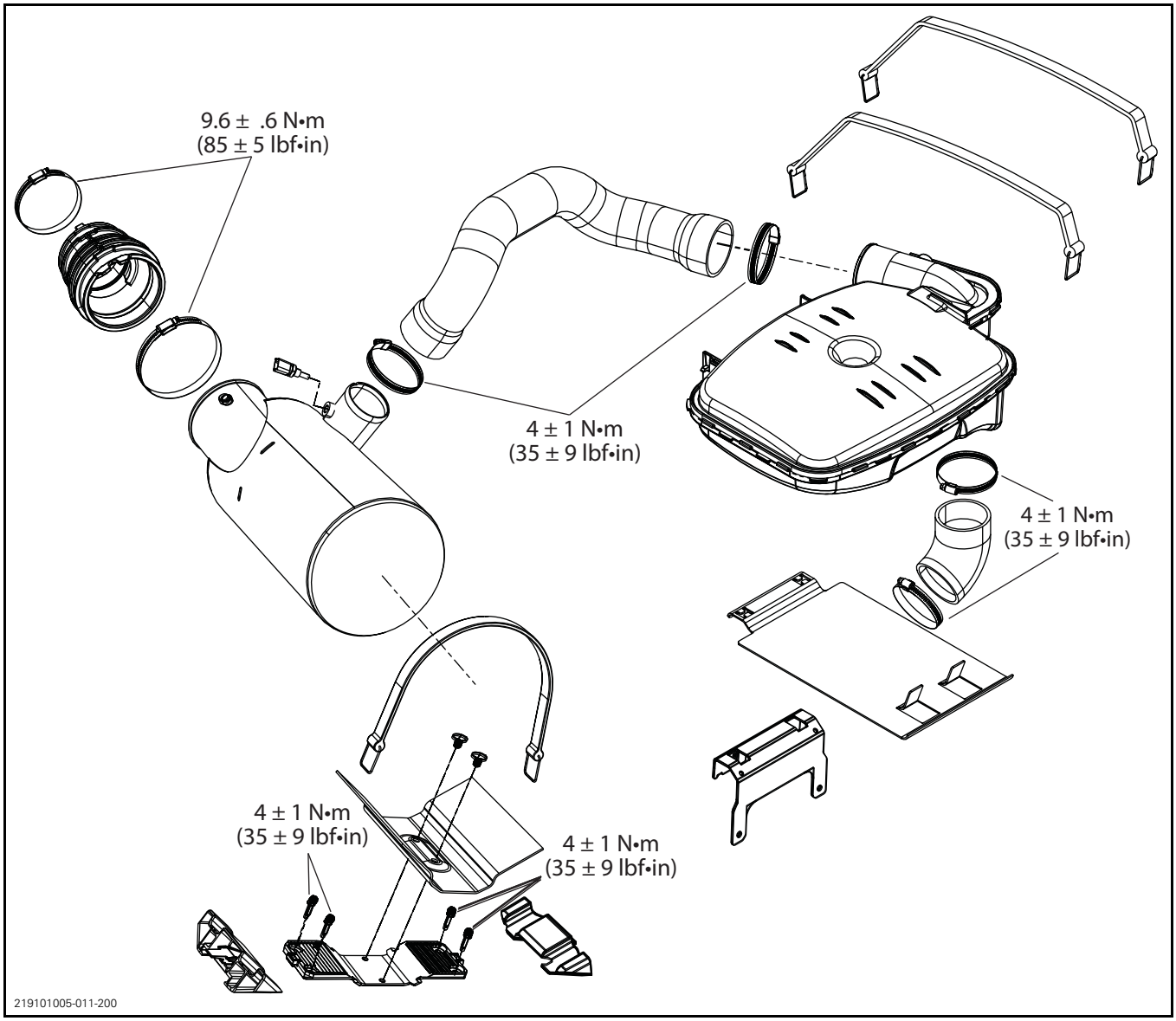
EXHAUST SYSTEM

SERVICE TOOLS

Description	Part Number	Page
FLUSHING CONNECTOR ADAPTER	295 500 473	66

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 518	293 800 038	68
P80 GRIP-IT	296 000 406	72



GENERAL

SYSTEM DESCRIPTION

The exhaust system is cooled by water provided by a pressurized area in the jet pump (open loop system).

Water exits exhaust manifold through holes to inject water in muffler.

NOTE: For more information on the exhaust manifold, refer to *EXHAUST MANIFOLD* subsection.

Water is evacuated through the exhaust outlet in transom area.

Exhaust System Technical Specifications

TYPE	Total Loss Cooling System (TLCS)
WATER FLOW	Flow from jet pump (no water pump)
TEMPERATURE CONTROL	Calibrated outlet fittings (no thermostat)
SYSTEM BLEEDING	Self-bleed type
SYSTEM DRAINING	Self-drain type

MAINTENANCE

EXHAUST SYSTEM FLUSHING

Flushing the exhaust system with fresh water is essential to neutralize corroding effects of salt or other chemical products present in water. It will help to clean up sand, salt, shells or other particles in water jackets (exhaust system, intercooler and hoses).

Exhaust system flushing should be performed when the watercraft is not expected to be used further the same day or when the watercraft is stored for any extended time.

NOTICE Failure to flush the system, when necessary, will severely damage intercooler and exhaust system. Make sure engine operates during entire procedure.

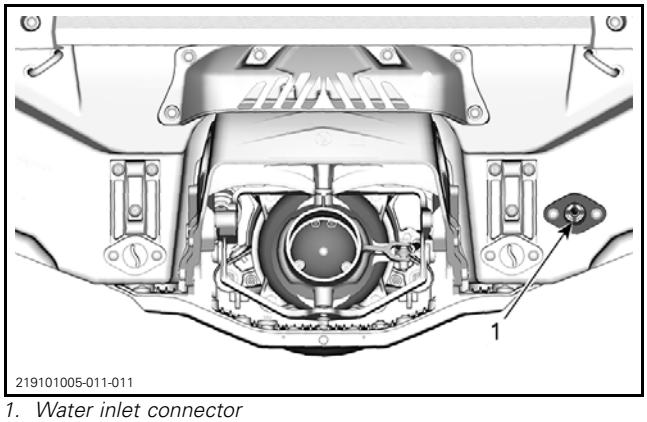
⚠ WARNING

Perform these operations in a well ventilated area. Certain components in the engine compartment may be very hot. Direct contact may result in skin burn. Do not touch any electrical part or jet pump area when engine is running.

⚠ WARNING

When operating the engine while the watercraft is out of the water, the heat exchanger in the ride plate may become very hot. Avoid any contact with ride plate as burns may occur.

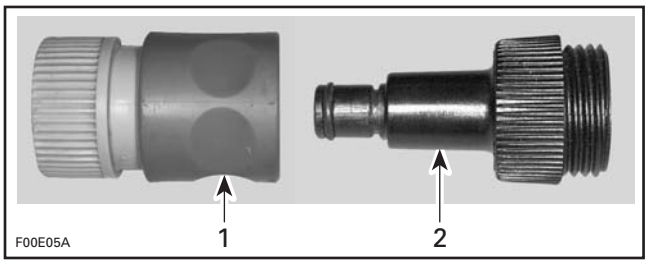
Connect a garden hose to connector located at the rear of watercraft. Do not open water tap yet.



1. Water inlet connector

NOTE: The following tool is recommended when a quick connect adapter is used to ease garden hose installation.

RECOMMENDED TOOL	
FLUSHING CONNECTOR ADAPTER (P/N 295 500 473)	



1. Quick connect adapter
2. Flushing connector adapter

To flush the exhaust system, start the engine then immediately open the water tap.

NOTICE Always start the engine before opening the water tap. Open water tap immediately after engine is started to prevent overheating. Never run engine without supplying water to the exhaust system when watercraft is out of water.

Run the engine about 20 seconds at a fast idle between 4000 - 5000 RPM.

NOTICE Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.

Ensure water flows out of jet pump while flushing.

Close the water tap, then stop the engine.

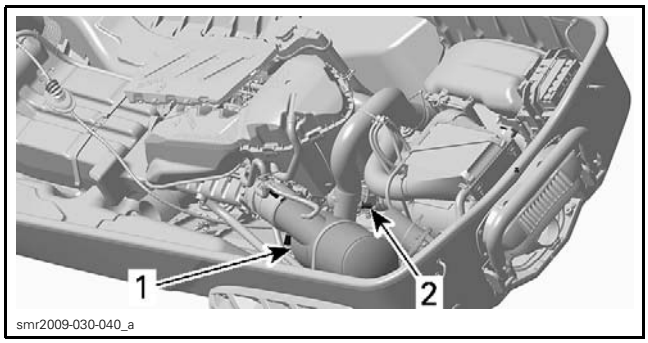
NOTICE Always close the water tap before stopping the engine.

Disconnect the garden hose.

NOTICE Remove flushing connector adapter after operation (if used).

PROCEDURES

EXHAUST GAS TEMPERATURE SENSOR (EGTS)



1. Muffler
2. Exhaust gas temperature sensor (EGTS)

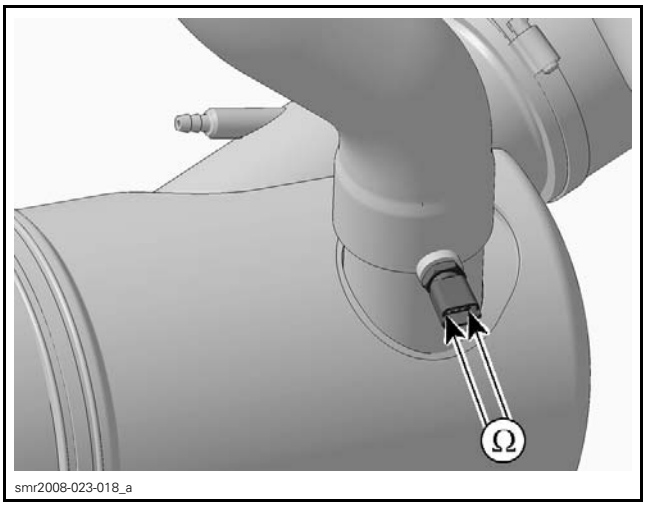
NOTE: An overheat signal will come on in the information center when the exhaust temperature reaches.

OVERHEAT TEMPERATURE
110°C (230°F)

Testing the EGTS Resistance

1. Remove the parts required to access the EGTS.
2. Disconnect the connector from the EGTS.
3. Measure the resistance of the sensor.

EGTS RESISTANCE TEST		
EGTS PIN		MEASUREMENT
1	2	Refer to *EGTS RESISTANCE CHART*

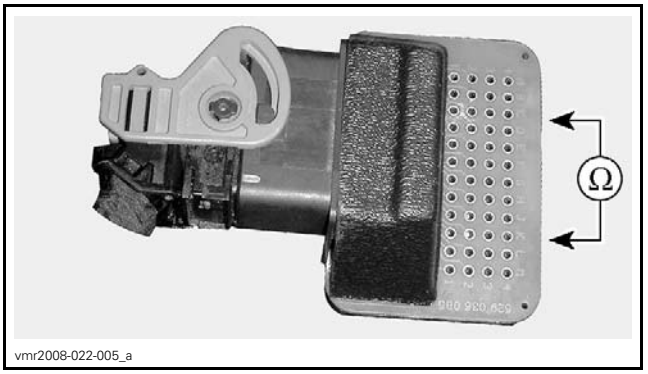


The resistance should be as per the *EGTS RESISTANCE CHART* that follows. Otherwise, replace the EGTS.

If the EGTS resistance is within specifications, proceed with the following steps.

4. Reconnect the EGTS.
5. Disconnect ECM-B connector from the ECM and install it on the ECM adapter tool.
6. Check the circuit resistance as per following table.

EGTS RESISTANCE TEST AT ECM		
ECM ADAPTOR PIN		MEASUREMENT
B-F3	B-G4	Refer to *EGTS RESISTANCE CHART*



EGTS RESISTANCE CHART				
TEMPERATURE		RESISTANCE (OHMS)		
°C	°F	NOMINAL	LOW	HIGH
- 30	- 22	12600	11800	13400
- 20	- 4	11400	11000	11800
- 10	14	9500	8000	11,000
0	32	5900	4900	6900
10	50	3800	3100	4500
20	68	2500	2200	2800
30	86	1700	1500	1900
40	104	1200	1080	1320
50	122	840	750	930
60	140	630	510	750
70	158	440	370	510
80	176	325	280	370
90	194	245	210	280
100	212	195	160	210
110	230	145	125	160
120	248	115	100	125

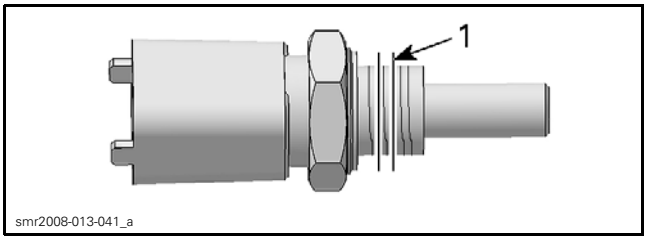
If resistance value is as specified, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)* subsection.

If resistance value is not within specifications, repair or replace wiring and connectors between the ECM and the EGTS.

Replacing the EGTS

1. Disconnect the EGTS connector.
2. Unscrew EGTS from muffler.
3. Apply Loctite 518 on the middle threads of the new EGTS.

SERVICE PRODUCT
LOCTITE 518 (P/N 293 800 038)



1. Apply Loctite 518 in this area

4. Install the EGTS.

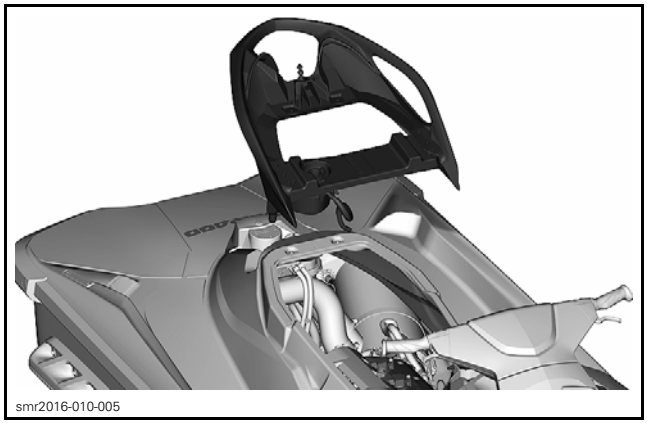
TIGHTENING TORQUE	
EGTS	16 N•m ± 2 N•m (142 lbf•**in** ± 18 lbf•**in**)

5. Install the EGTS connector.
6. Install all other removed parts, refer to applicable subsections.

MUFFLER

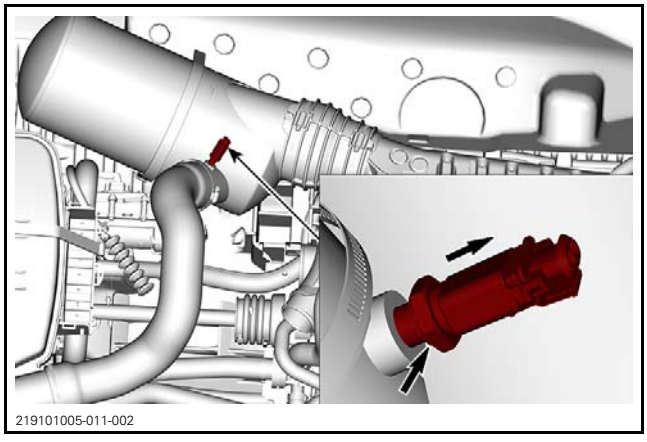
⚠ CAUTION Certain components in the engine compartment may be very hot. Let exhaust system cool down prior to removing parts.

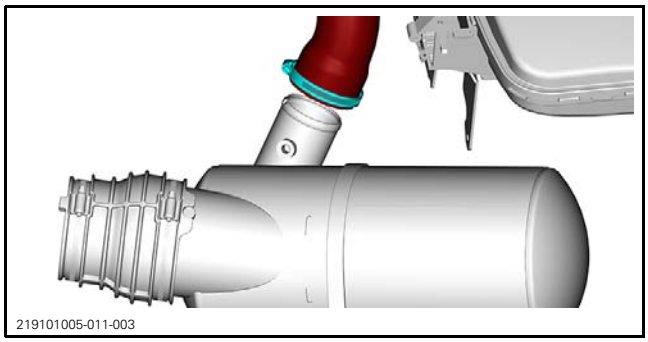
Removing the Muffler

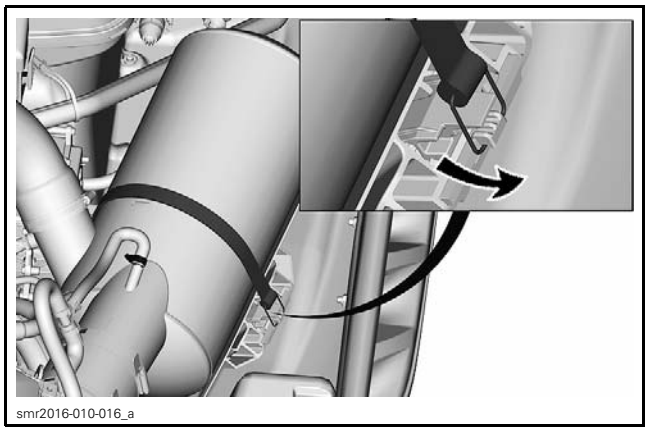


Set aside the coolant reservoir.

NOTICE Do not use pneumatic or electrical tools as seizure may occur.







Remove the muffler.

Inspecting the Muffler

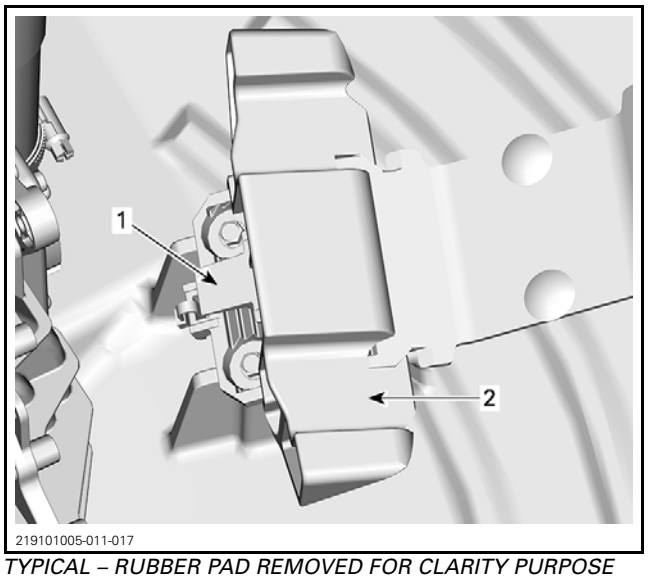
Check muffler for:
- Cracks
- Corrosion
- Other damages.

Check if exhaust hose is:
- Brittle
- Hard
- Cracked
- Otherwise damaged.

Replace any defective part.

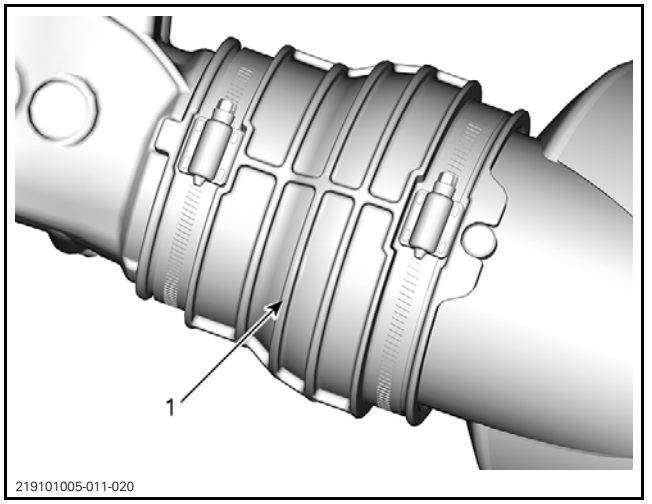
Installing the Muffler

1. With a new muffler, install the EGTS sensor. Refer to this subsection.
2. Open muffler adjusters by sliding adjuster blocks.



TYPICAL – RUBBER PAD REMOVED FOR CLARITY PURPOSE
Step 1: Lift adjuster tab
Step 2: Move adjuster outward

3. Insert the muffler in hull.
4. Align the rubber adaptor flange with the exhaust manifold. Rotate and move muffler so that the rubber adaptor notch fits into the exhaust manifold slot.
5. Install exhaust clamp exactly as shown in the figure below.



1. Rubber adaptor

6. Tighten exhaust clamp to specification.

TIGHTENING TORQUE	
Exhaust clamp	9.6 N•m and .6 N•m (85 lbf•**in** and 5 lbf•**in**)

NOTICE **Do not use pneumatic or electric tools as seizure may occur.**

7. Install the muffler strap.

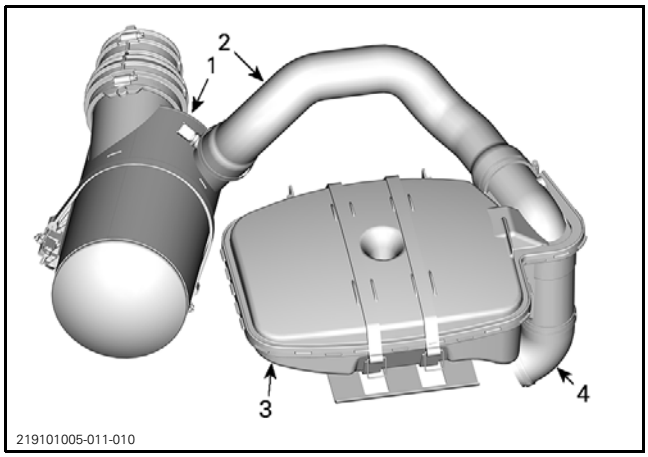
NOTICE Ensure not to rotate muffler during strap installation. The use of a soapy water solution on inner side of muffler strap is recommended.

8. Install all other removed parts.
9. After installation, ensure there is no water or exhaust gas leak when engine is running.

Test run the engine while supplying water to the exhaust system.

NOTICE Never run engine without supplying water to the exhaust system when watercraft is out of water.

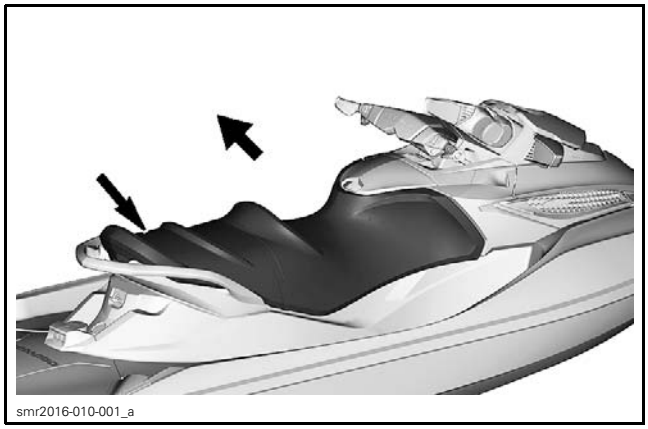
EXHAUST HOSES



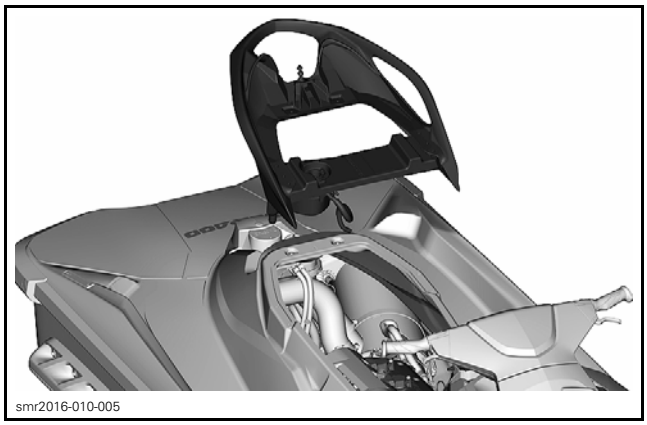
1. Muffler
2. Front exhaust hose
3. Resonator
4. Rear exhaust hose

Front Exhaust Hose

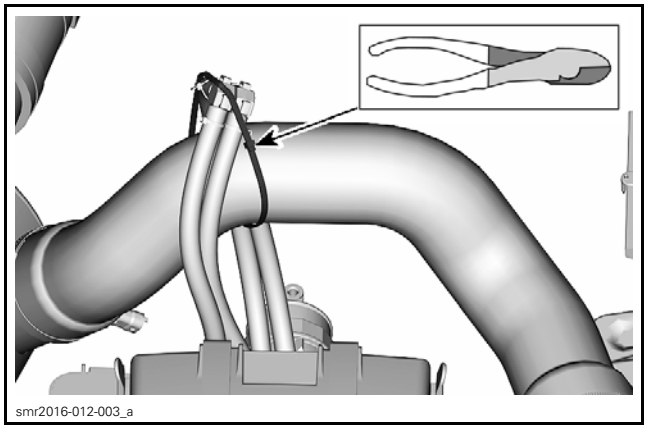
Removing the Front Exhaust Hose

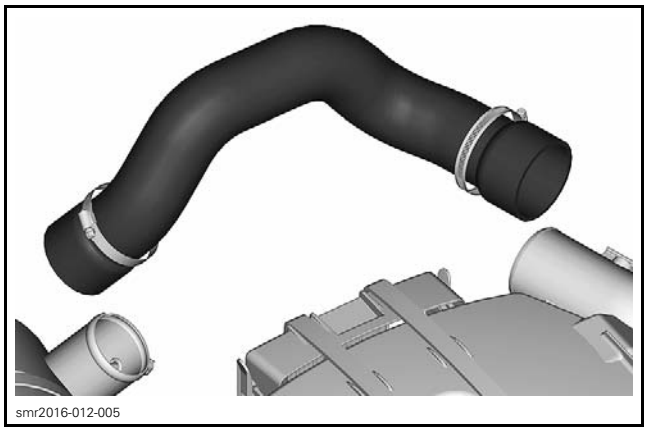


GTX LTD SHOWN



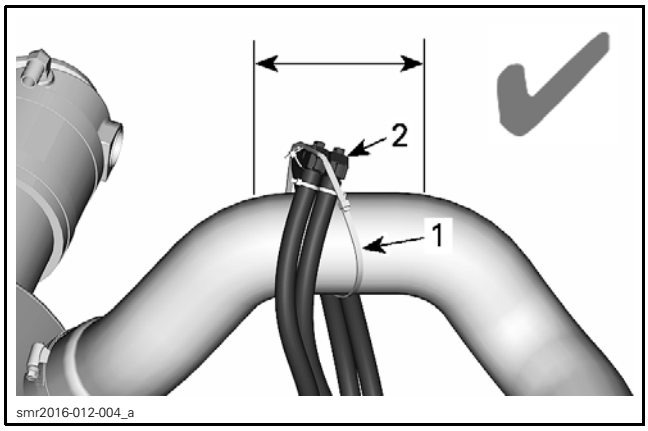
All Models





Installing the Front Exhaust Hose

The installation is the reverse of the removal procedure. However, pay attention to the following.



smr2016-012-004_a

1. New locking tie
2. Elbow fittings tied on highest part of hose

TIGHTENING TORQUE	
Front exhaust hose clamp	4 N•m ± 1 N•m (35 lbf•**in** ± 9 lbf•**in**)

After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the exhaust system.

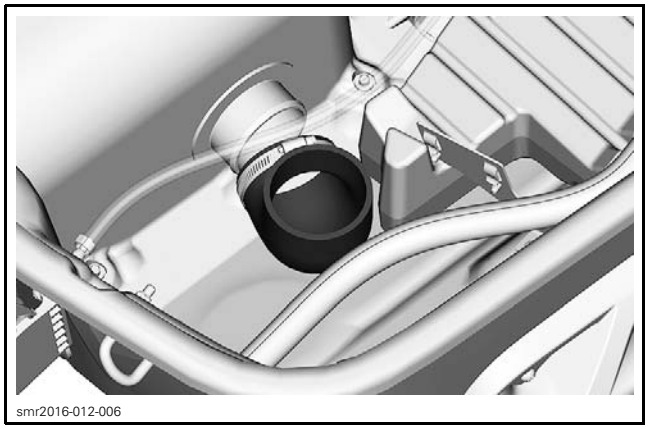
NOTICE **Never run engine without supplying water to the exhaust system when watercraft is out of water.**

Rear Exhaust Hose

Removing the Rear Exhaust Hose

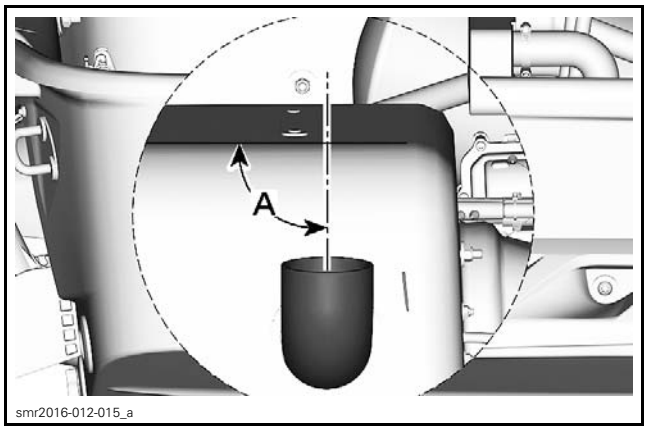
Remove the resonator. See procedure in this subsection.

Loosen clamp securing the rear exhaust hose to RH fixing plate.


smr2016-012-006

Installing the Rear Exhaust Hose

The installation is the reverse of the removal procedure. However, pay attention to the following.



smr2016-012-015_a

A. 90°

TIGHTENING TORQUE	
Rear exhaust hose clamp	4 N•m ± 1 N•m (35 lbf•**in** ± 9 lbf•**in**)

After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the exhaust system.

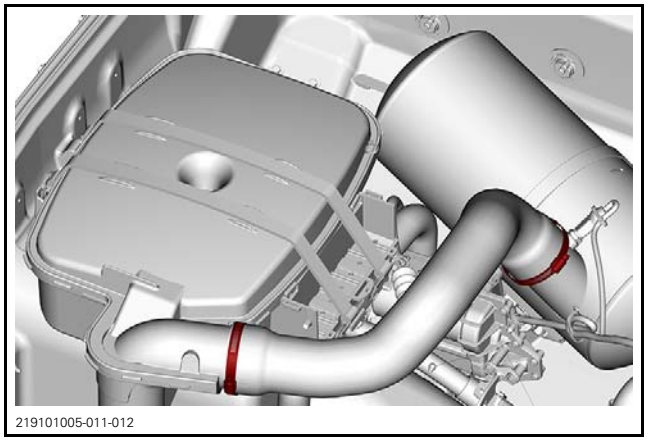
NOTICE **Never run engine without supplying water to the exhaust system when watercraft is out of water.**

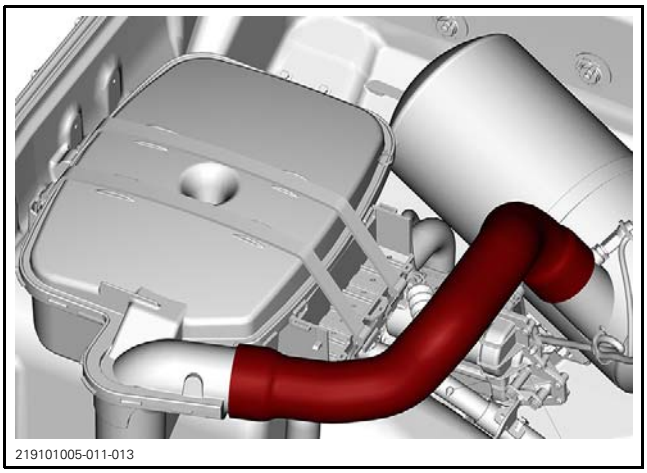
RESONATOR

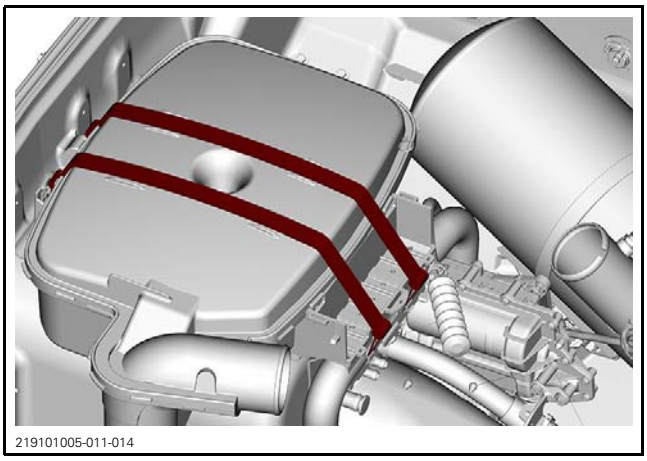
Removing the Resonator

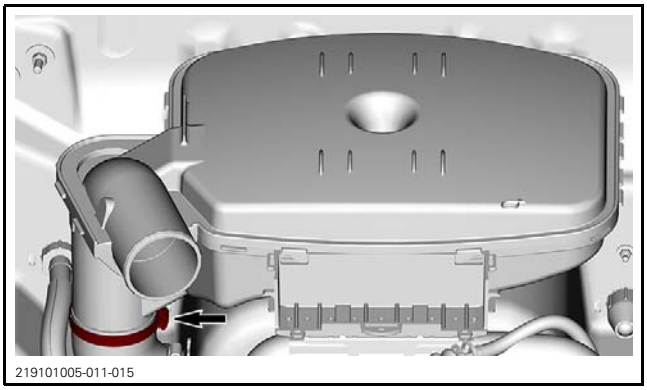
Remove the muffler. See the procedure in this subsection.

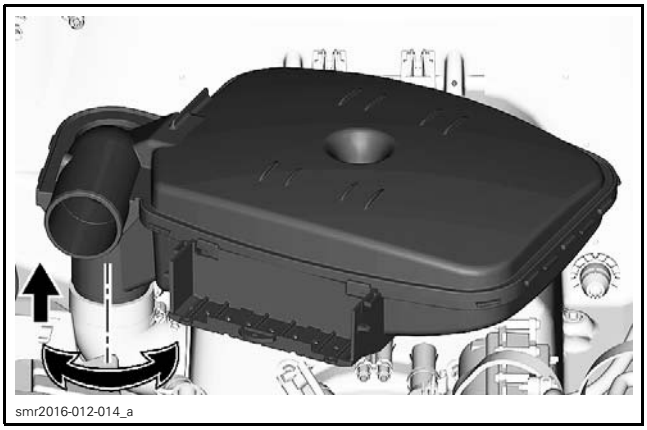
Remove the intercooler. Refer to *INTERCOOLER* subsection.


219101005-011-012


219101005-011-013


219101005-011-014


219101005-011-015

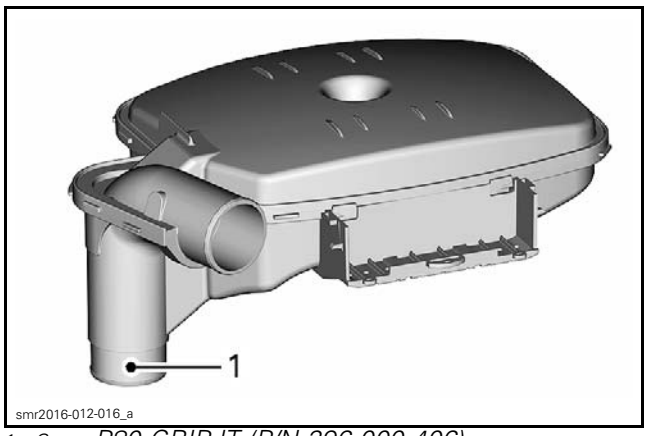

smr2016-012-014_a

Inspecting the Resonator

Inspect parts condition paying attention for deformation, cracks or other damage. Check hoses. Replace any defective part.

Installing the Resonator

The installation is the reverse of the removal procedure. However, pay attention to the following.



smr2016-012-016_a

1. Spray P80 GRIP-IT (P/N 296 000 406)

After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the exhaust system.

NOTICE **Never run engine without supplying water to the exhaust system when watercraft is out of water.**

VEHICLE COOLING SYSTEM

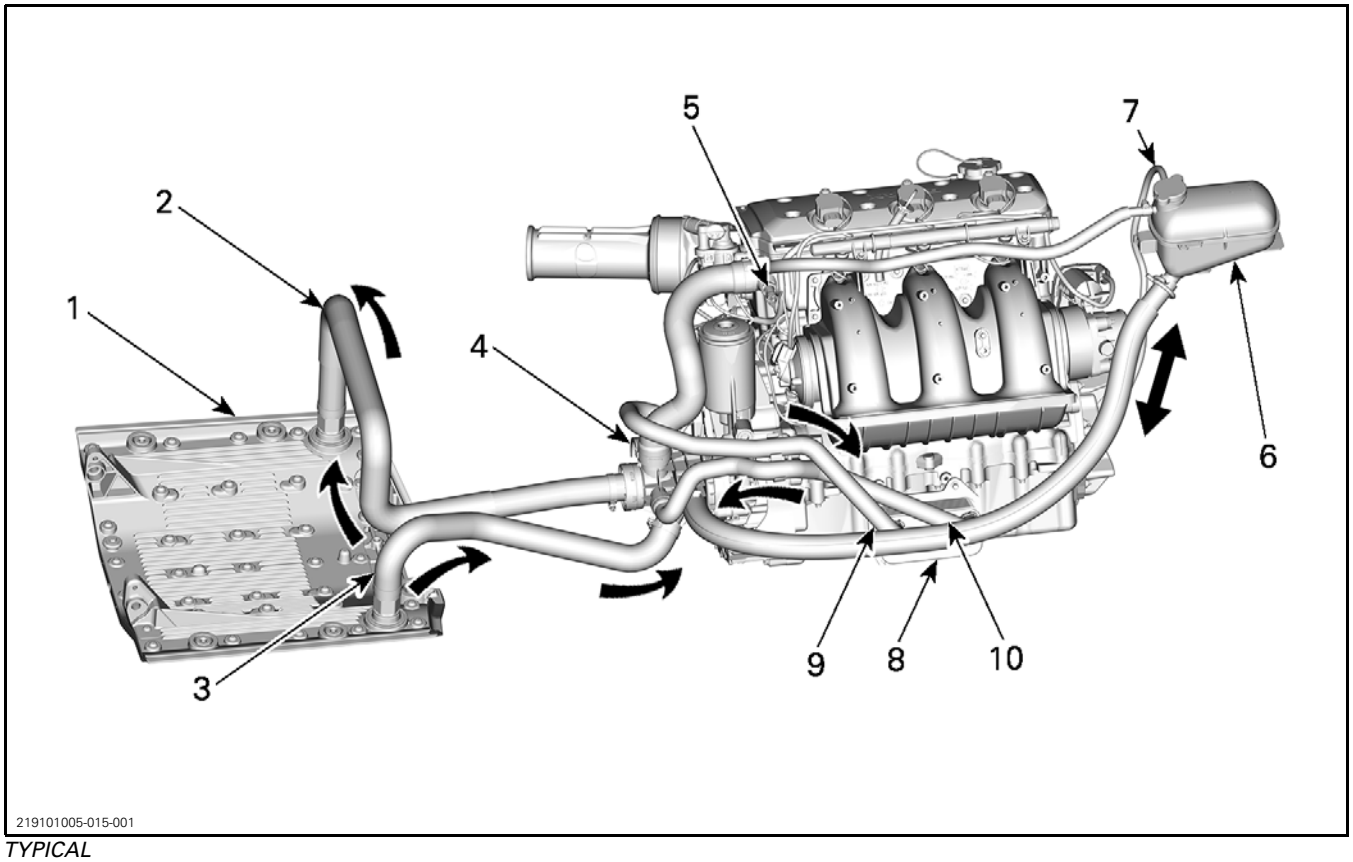
SERVICE TOOLS

Description	Part Number	Page
OETIKER PLIER	295 000 070	82
TEST CAP	529 035 991	81
VACUUM/PRESSURE PUMP	529 021 800	81

SERVICE PRODUCTS

Description	Part Number	Page
EXTENDED LIFE PRE-MIXED COOLANT (EUR)	779223	79
EXTENDED LIFE PRE-MIXED COOLANT	779150	79
LOCTITE 567 (PIPE SEALANT)	293 800 013	80

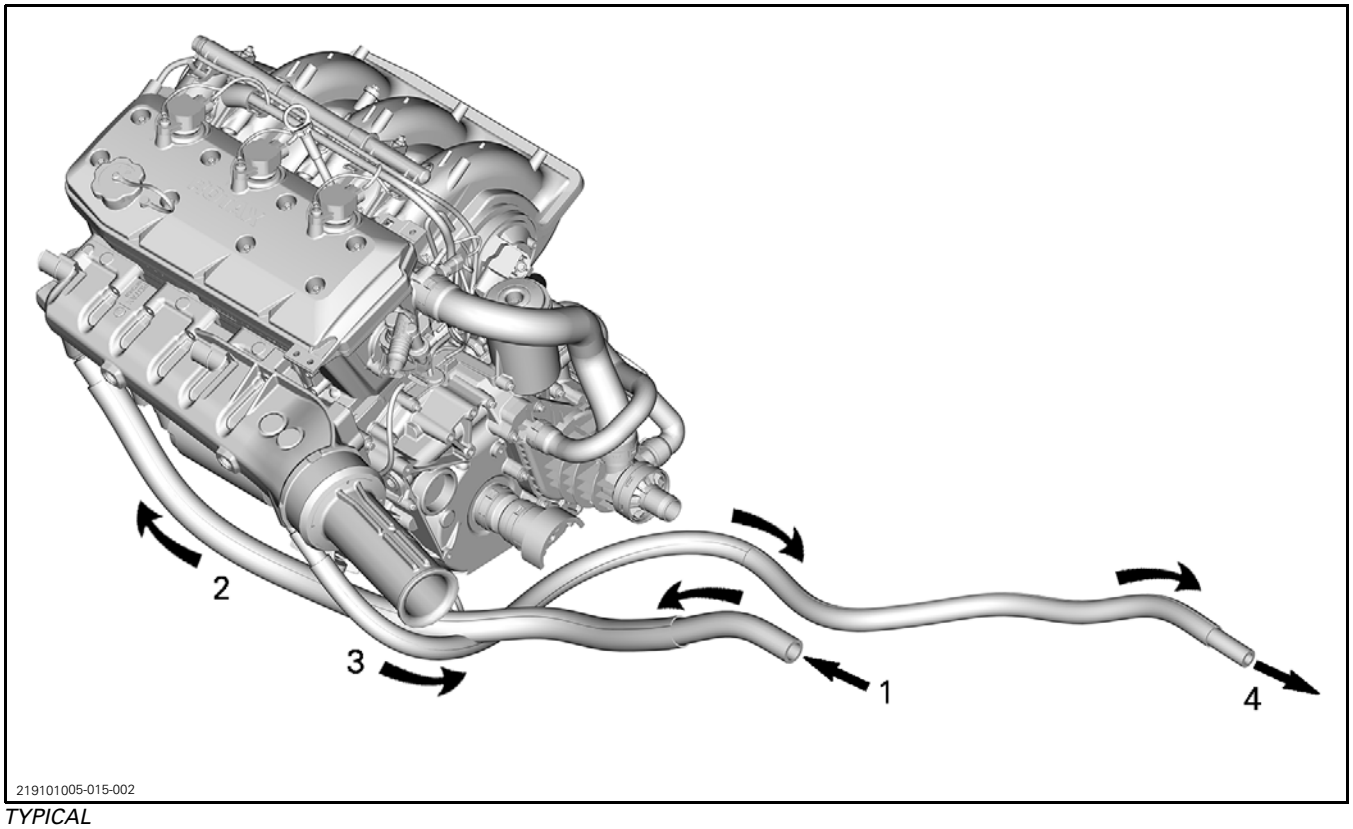
Cooling System (Closed loop)



TYPICAL

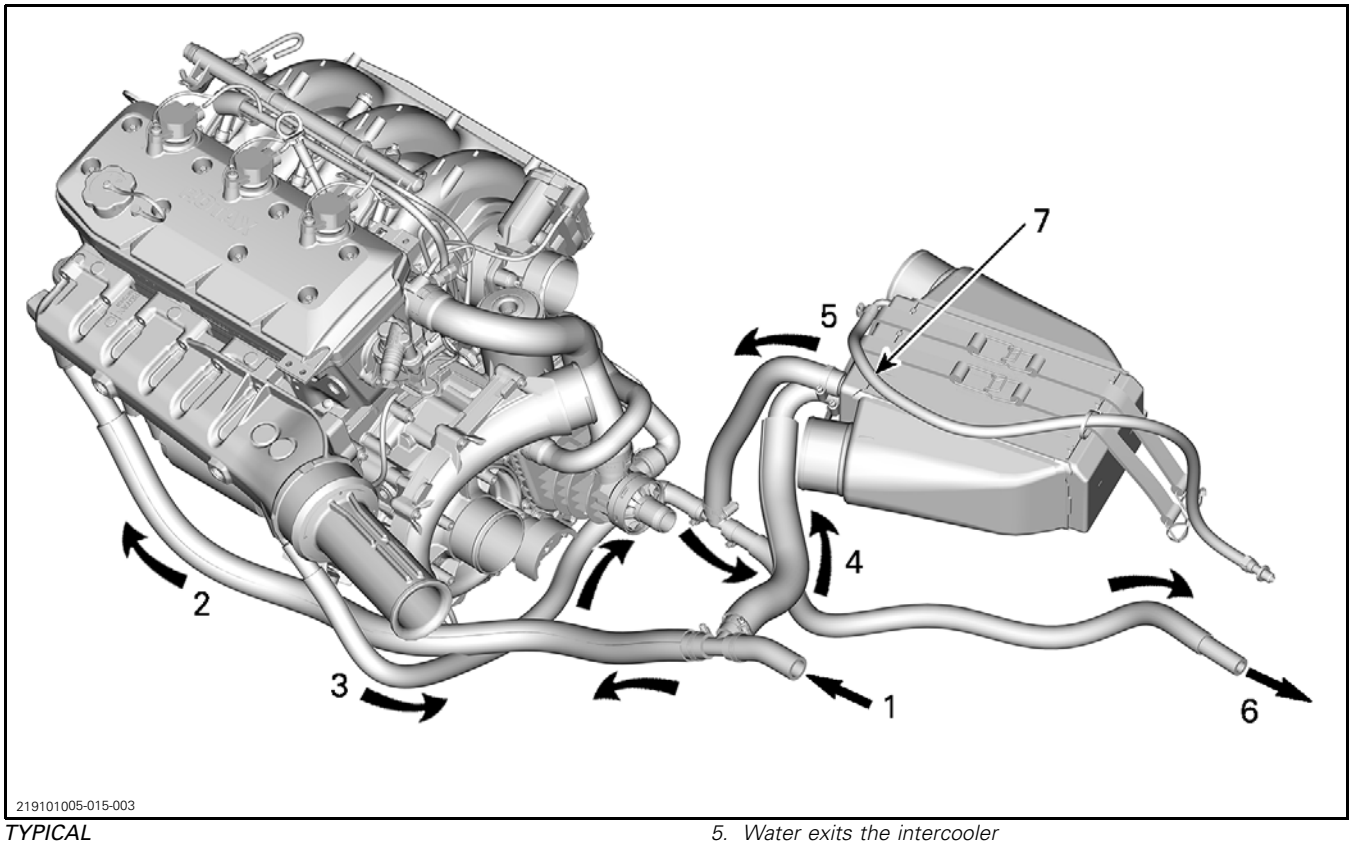
1. *Ride plate (operates as heat exchanger)*
2. *Coolant flows to ride plate*
3. *Coolant returns from ride plate*
4. *Water pump cover / thermostat housing - Thermostat opens at 80°C (176°F)*
5. *Coolant temperature sensor (CTS) - Monitoring beeper turns on at 102°C (216°F) for 130/155/230 engines and 97.5°C (208°F) for 300 engines*
6. *Expansion coolant tank*
7. *Bleed hose from cylinder head to expansion coolant tank*
8. *Oil cooler*
9. *Coolant flows to oil cooler*
10. *Coolant returns from oil cooler*

Cooling system (Open loop without intercooler)



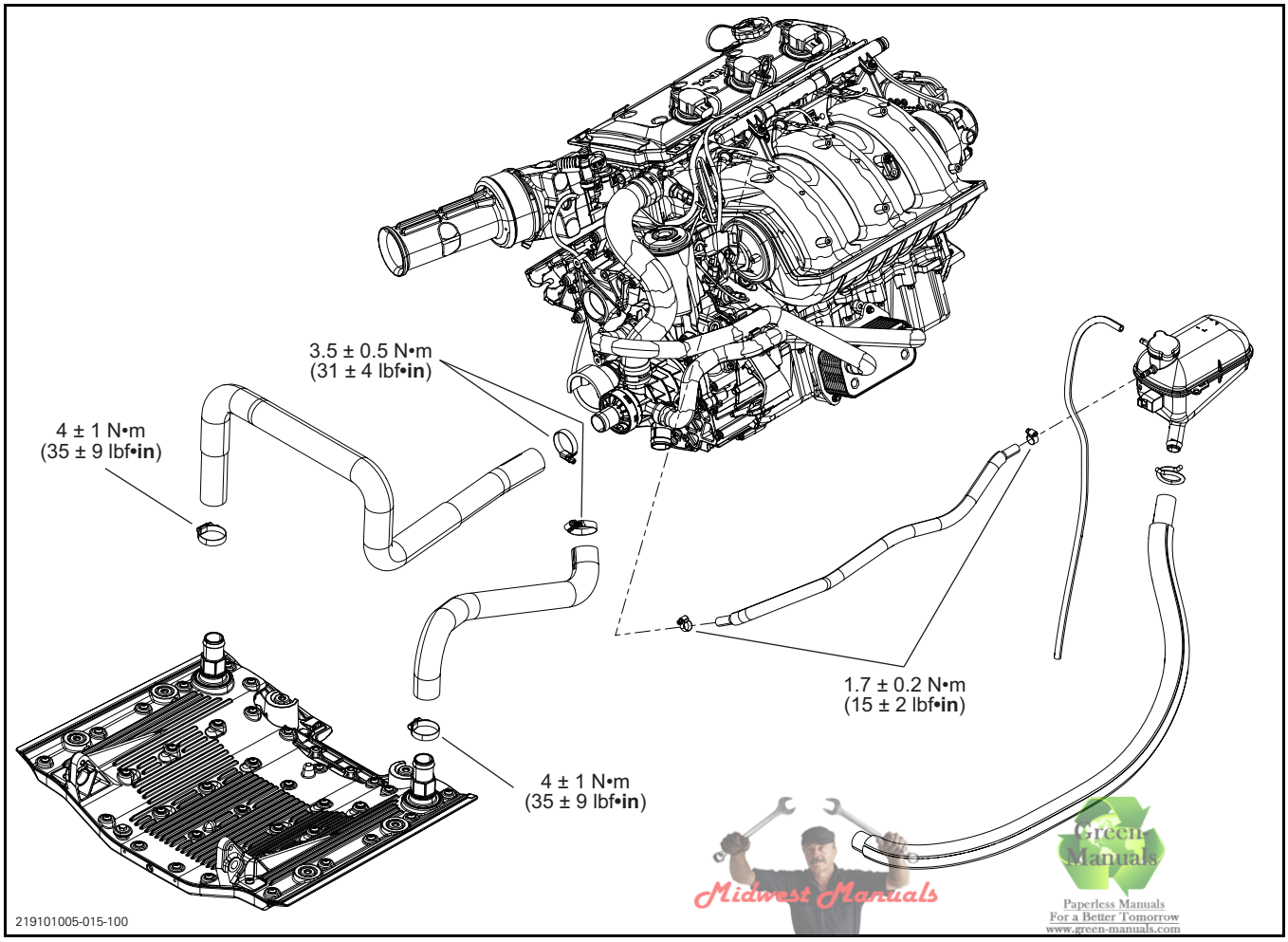
TYPICAL
1. *Water enters system*
2. *Water enters the exhaust manifold*
3. *Water exits the exhaust manifold*
4. *Water exits system*

Cooling system (Open loop with intercooler)



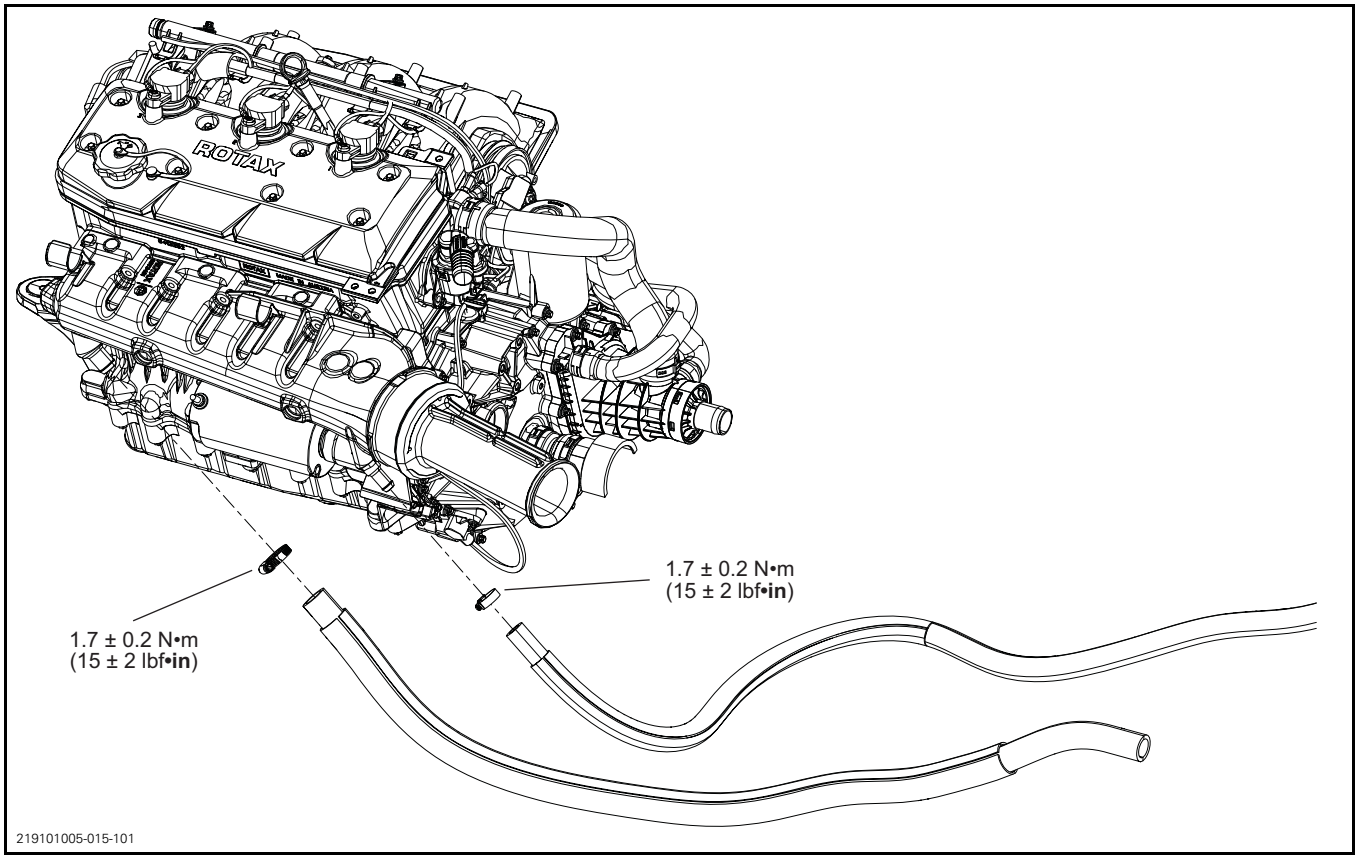
TYPICAL
1. *Water enters system*
2. *Water enters the exhaust manifold*
3. *Water exits the exhaust manifold*
4. *Water enters intercooler*
5. *Water exits the intercooler*
6. *Water exits system*
7. *Bleed hose from intercooler*

Cooling System (Closed loop)

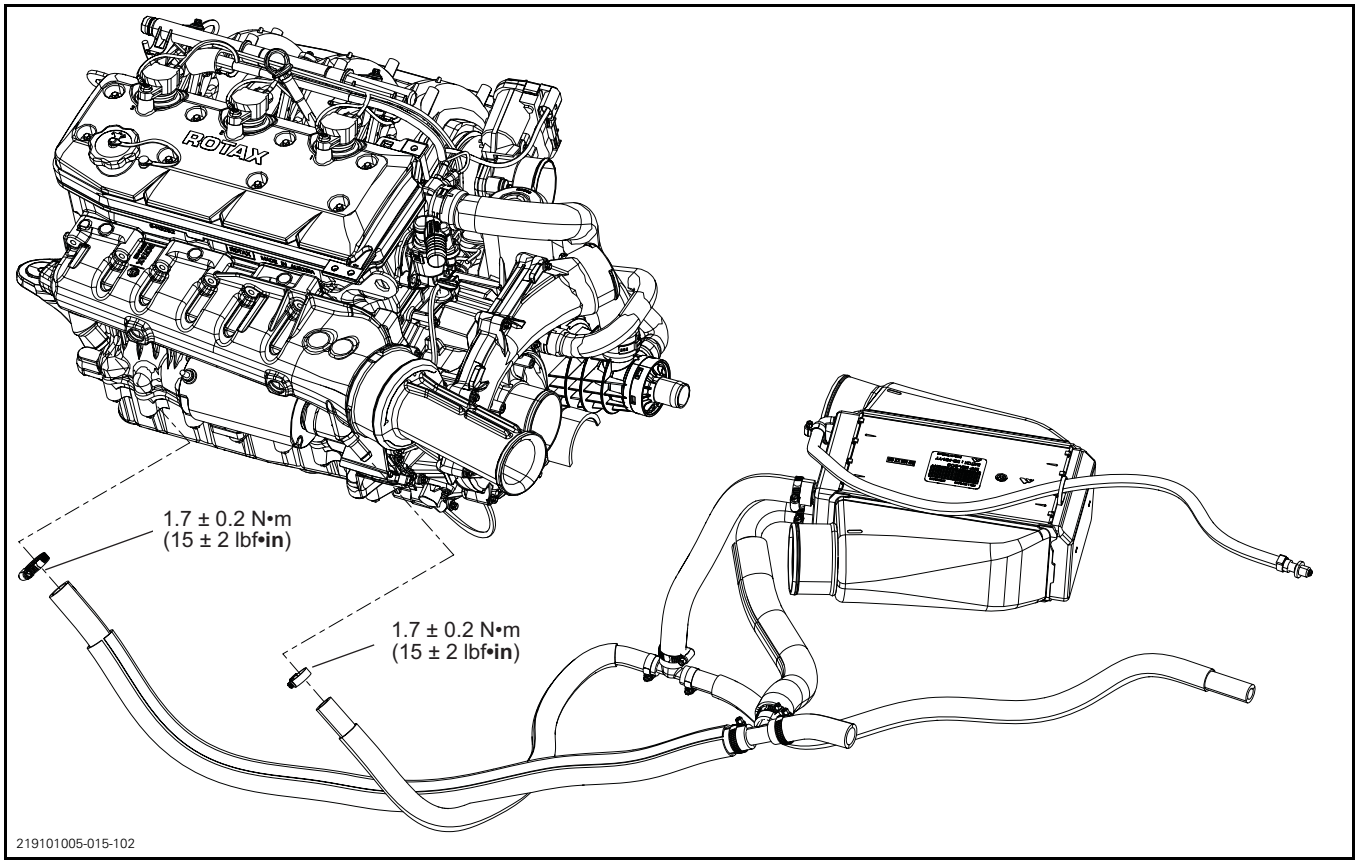


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Cooling System (Open loop without intercooler)



Cooling System (Open loop with intercooler)



GENERAL

NOTICE Never start the engine without coolant in the cooling system, some engine parts can be damaged.

MAINTENANCE

ENGINE COOLANT

⚠ WARNING

To avoid potential burns, do not remove the coolant tank cap or loosen the ride plate drain plug if the engine is hot.

Recommended Coolant

COOLANT	
Scandinavia	EXTENDED LIFE PRE-MIXED COOLANT (EUR) (P/N 779223)
All Other Countries	EXTENDED LIFE PRE-MIXED COOLANT (P/N 779150)
IF THE RECOMMENDED ENGINE COOLANT IS NOT AVAILABLE	
Use a blend of 50% distilled water and 50% antifreeze (especially formulated for aluminum engines)	

To prevent antifreeze deterioration, always use the same brand and grade. Never mix different brands or grades unless cooling system is completely flushed and refilled.

Engine Coolant Level

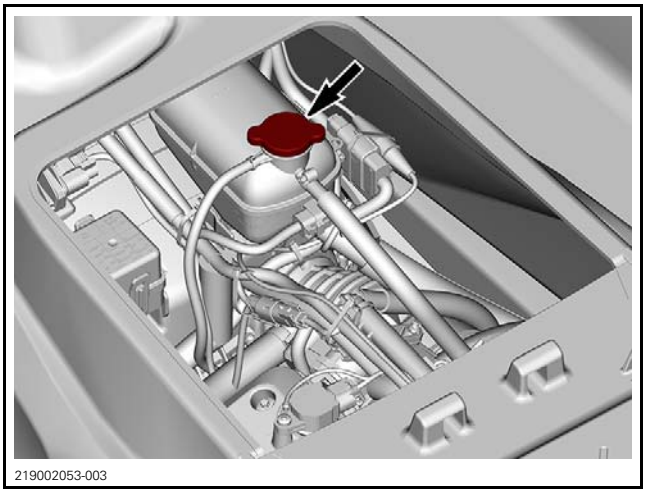
⚠ WARNING

Check coolant level with engine cold. Never add coolant when engine is hot.

⚠ CAUTION Many components in the engine compartment may be very hot. Direct contact may result in skin burn.

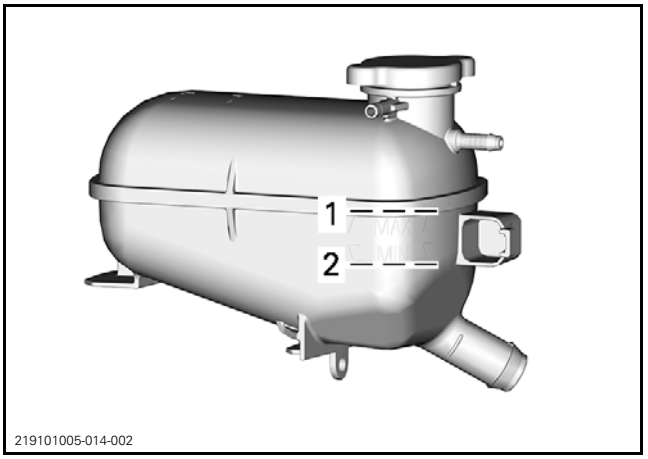
Remove seats.

Locate the expansion tank cap.



TYPICAL

With watercraft on a level surface, coolant level should be between MIN. and MAX. marks on coolant reservoir when engine is cold.



LEVEL BETWEEN MARKS WHEN ENGINE IS COLD
1. *MAX*
2. *MIN*

NOTE: The watercraft is level when it is in water. When on a trailer, raise trailer tow pole and block in this position when bumper rail is level.

Add coolant, see *RECOMMENDED ENGINE COOLANT* for specification, to adjust coolant level between marks as required. Use a funnel to avoid spillage. Do not overfill.

Properly tighten the expansion tank cap. Reinstall seats.

NOTE: A cooling system that frequently requires coolant is an indication of leaks or engine problems. See an authorized Sea-Doo dealer.

Draining the System

⚠ WARNING

Never drain or refill cooling system when engine is hot.

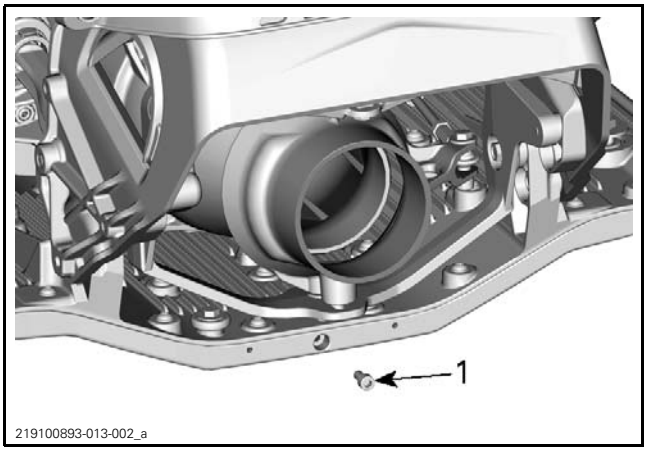
Remove seats.

Remove engine service cover.

Install a drain pan underneath the ride plate.

Unscrew the drain plug on ride plate.

NOTE: Raising the front of the watercraft will contribute to drain the cooling system.



TYPICAL
1. Cooling drain plug

Remove the coolant tank cap.

Dispose coolant as per local regulations.

Do not reinstall drain plug at this time.

Cleaning the System

NOTICE **Cleaning the cooling system as per the following procedure is required when engine overheats (assuming everything else is operating normally) or each time coolant is replaced.**

Drain the cooling system.

Add a cleaning product such as the Zerex® Super Cleaner by Valvoline (or an equivalent) in coolant tank then fill cooling system with demineralized water.

Reinstall cap on coolant tank.

Install watercraft in a test basin or ride on a water plane. Start engine and run for approximately 15 minutes.

IMPORTANT: Ensure thermostat opens so that the cleaning product flows in ride plate properly.

Stop engine and let the cleaning product work for 12 to 16 hours.

Thereafter, engine can be run one last time to soak off deposits.

Drain and thoroughly rinse the cooling system with clean fresh water.

Refill cooling system as described below.

Refilling the System

Watercraft should be level, engine cold and drain plug removed for refilling.

Place a container under drain plug to collect antifreeze.

Apply pipe sealant on drain plug threads.

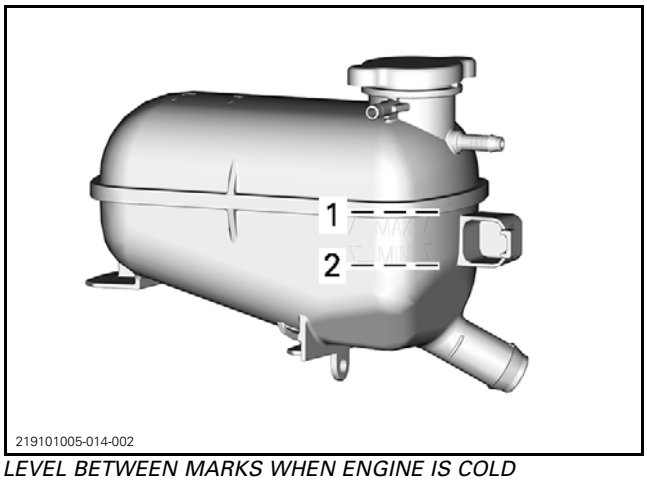
SERVICE PRODUCT
LOCTITE 567 (PIPE SEALANT) (P/N 293 800 013)

Ask someone to pour recommended antifreeze in coolant tank.

When antifreeze flows out from the ride plate drain hole, reinstall drain plug. Tighten drain plug to specification.

TIGHTENING TORQUE	
Drain plug	8.5 N•m ± 0.5 N•m (75 lbf•**in** ± 4 lbf•**in**)

Continue to pour and fill coolant tank between marks.



LEVEL BETWEEN MARKS WHEN ENGINE IS COLD
1. MAX
2. MIN

Do not install pressure cap at this time.

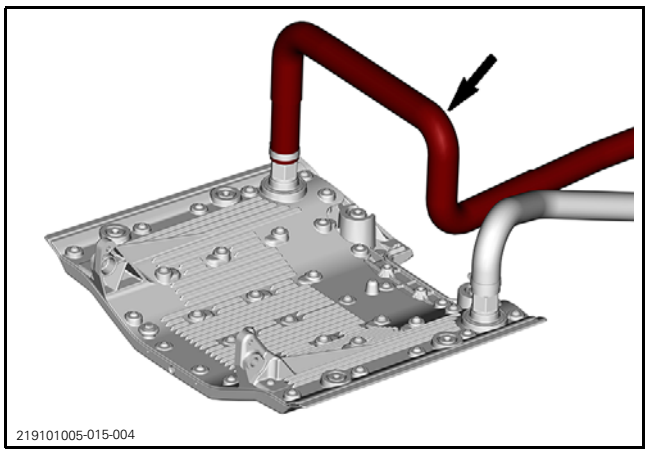
Link a garden hose to the hose adapter at the back of the watercraft. Refer to *FLUSHING THE EXHAUST SYSTEM* in the *EXHAUST SYSTEM* subsection.

NOTICE **Never run engine without supplying water to the exhaust system.**

Start engine and let run for a maximum of 2 minutes. Stop engine and wait 15 minutes to cool down. Refill tank as necessary.

NOTICE Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.

Repeat this run-stop cycle 2-3 times until thermostat opens and stop engine.



HOSE HOT WHEN THERMOSTAT OPENS

Last, refill coolant tank and install pressure cap.

When engine has completely cooled down, recheck coolant level in the coolant tank and top up if necessary.

INSPECTION

COOLING SYSTEM LEAK TEST

⚠ WARNING

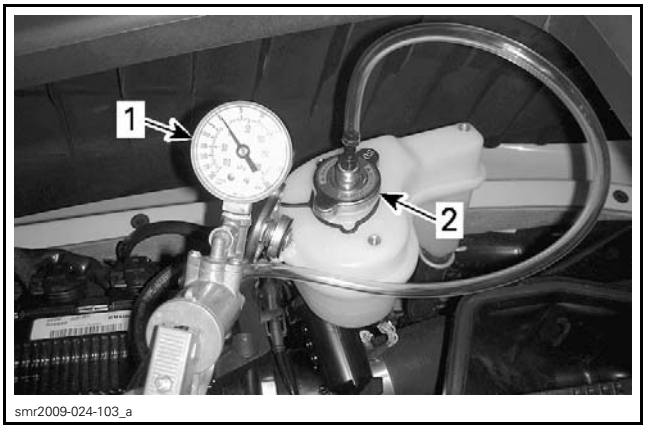
To avoid potential burns, do not remove the coolant tank cap if the engine is hot.

NOTE: This test confirms if there is a leak in the cooling system, including the engine.

Pressurize cooling system through coolant reservoir.

REQUIRED TOOLS	
TEST CAP (P/N 529 035 991)	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

COOLING SYSTEM LEAK TEST
110 kPa (16 PSI)

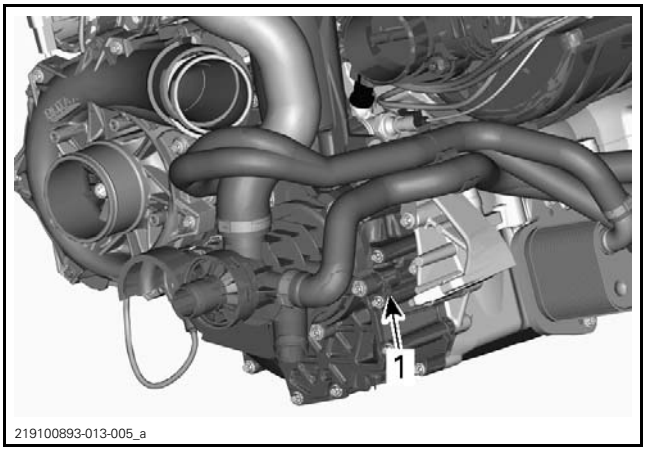


TYPICAL
1. *Vacuum/pressure pump*
2. *Test cap*

If pressure drops, check all hoses, heat exchanger and engine for coolant leaks. Spray a soap/water solution and look for air bubbles.

Check the leak indicator hole if there is oil or coolant leaking.

NOTE: In general leaking coolant indicates a damaged rotary seal. Leaking oil indicates a damaged oil seal. If either seal is leaking, both seals must be replaced at the same time. Refer to *WATER PUMP* in *COOLING SYSTEM - ENGINE* in the appropriate engine shop manual.



1. *Leak indicator hole*

TROUBLESHOOTING

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and it should not be assumed to list all possible problems.

Always check for fault codes. If a fault code is detected, service the fault code first. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

ENGINE OVERHEATING

1. Low coolant level.
   - *Refill and check for leaks (coolant leaking out of engine leak indicator hole, hoses or clamps missing/defective, cylinder head gaskets leaks, ride plate leaking, etc.). Repair or replace.*
2. Air in cooling system
   - *Refill and bleed cooling system.*
3. Thermostat defective (does not open when engine gets hot)
   - *Replace thermostat housing.*
4. Water pump failure
   - *Inspect and replace defective components.*
5. Water temperature sensor defective
   - *Check or replace. Refer to ELECTRONIC FUEL INJECTION (EFI).*
6. Ride plate or hoses damaged
   - *Check or replace damaged components.*
7. Exhaust system clogged
   - *Flush exhaust system.*
8. Internal passage blocked in cooling system
   - *Inspect and clean.*

PROCEDURES

PRESSURE CAP

Testing the Pressure Cap

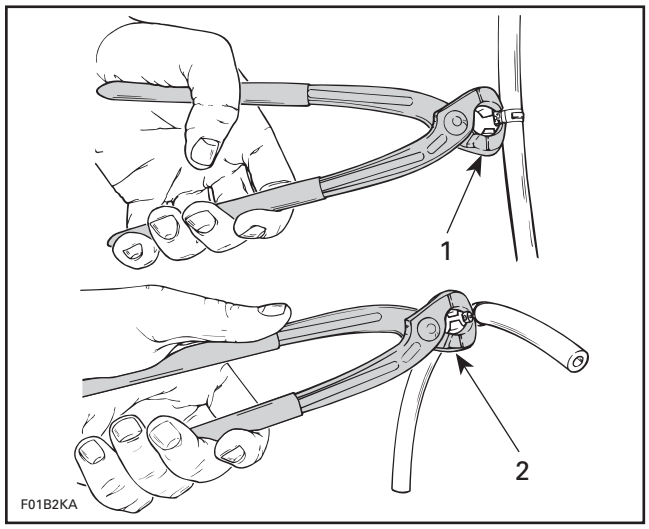
Using a pressure cap tester, check cap opening pressure. If opening pressure is out of range, install a new pressure cap.

CAP OPENING PRESSURE	
Opening range	90 kPa ± 10 kPa (13 PSI ± 1.5 PSI)

CLAMPS

Replacing the Oetiker Clamp

REQUIRED TOOL	
OETIKER PLIER (P/N 295 000 070)	

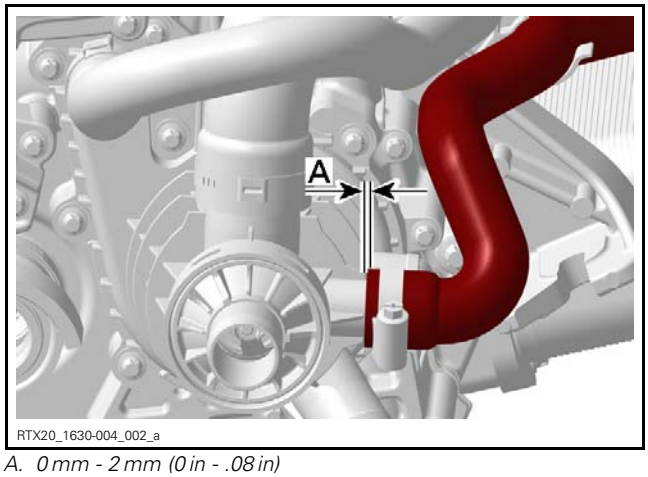


1. Cutting clamp
2. Securing clamp

NOTE: Always check general condition of hoses and clamp tightness.

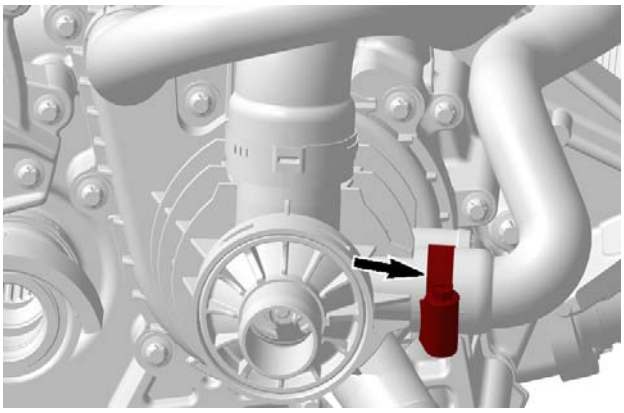
Gear Clamp

Ensure that the gap between the water pump housing and the edge of the hose equals to 0 mm - 2 mm (0 in - .08 in).



A. 0 mm - 2 mm (0 in - .08 in)

Tighten gear clamp to specification.



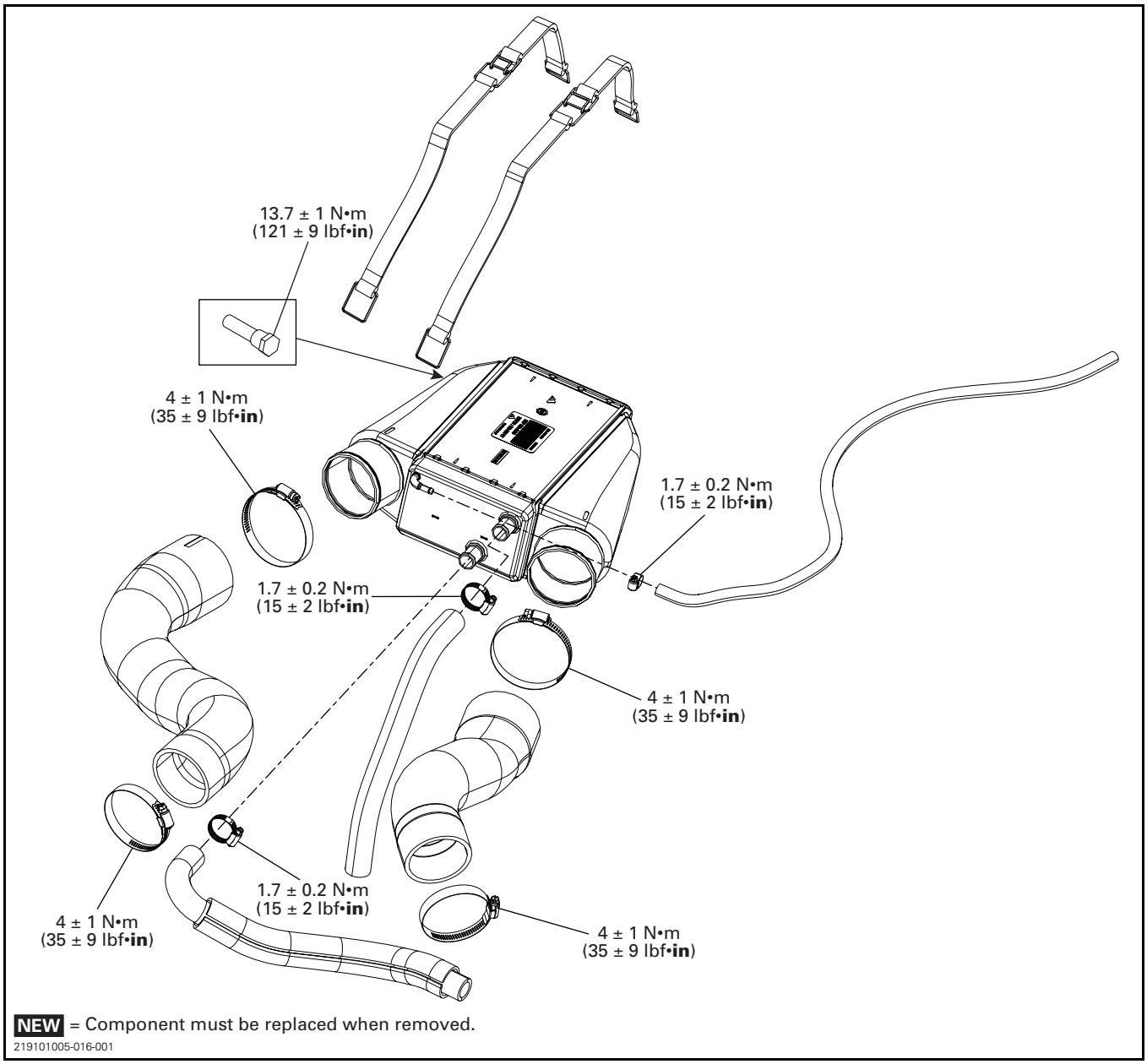
RTX20_1630-004_003_a

TIGHTENING TORQUE	
Gear clamp	3.5 N•m ± 0.5 N•m (31 lbf•**in** ± 4 lbf•**in**)

INTERCOOLER

SERVICE TOOLS

Description	Part Number	Page
LARGE HOSE PINCHER	529 032 500	87
VACUUM/PRESSURE PUMP	529 021 800	87



MAINTENANCE

INTERCOOLER FLUSHING

Flushing the intercooler with fresh water is essential to neutralize corroding effects of salt or other chemical products present in water. It will help to clean up sand, salt, shells or other particles in intercooler.

NOTE: Intercooler is flushed with the exhaust system, as they are on the same circuit.

Exhaust system and intercooler should be flushed each time:

– Watercraft is used in salt water and is not expected to be used further the same day.
– Watercraft is used in foul water.
– Watercraft is stored for any extended time.

Refer to *EXHAUST SYSTEM (1630 ACE)* subsection for flushing procedure.

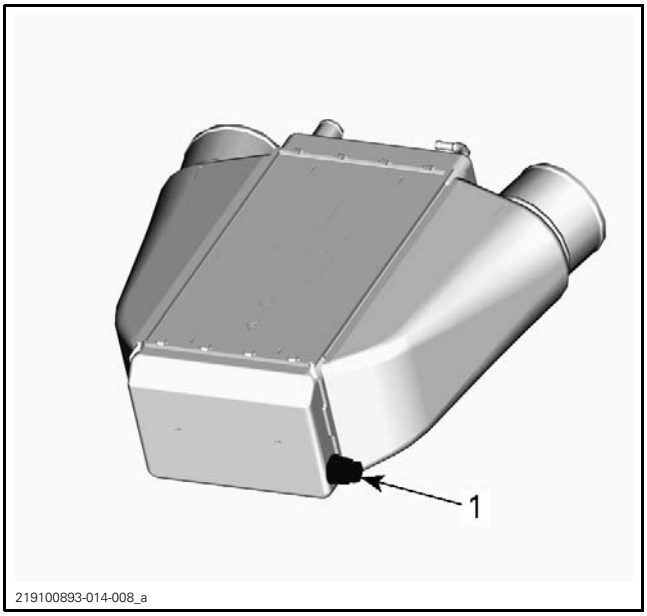
NOTICE Failure to flush the system, when necessary, will severely damage engine intercooler and/or exhaust system.

PROCEDURES

SACRIFICIAL ANODE

Sacrificial Anode location

Sacrificial Anode is located on the back of the intercooler.



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Sacrificial Anode maintenance

Inspect and replace sacrificial anode according to *MAINTENANCE SCHEDULE* subsection.

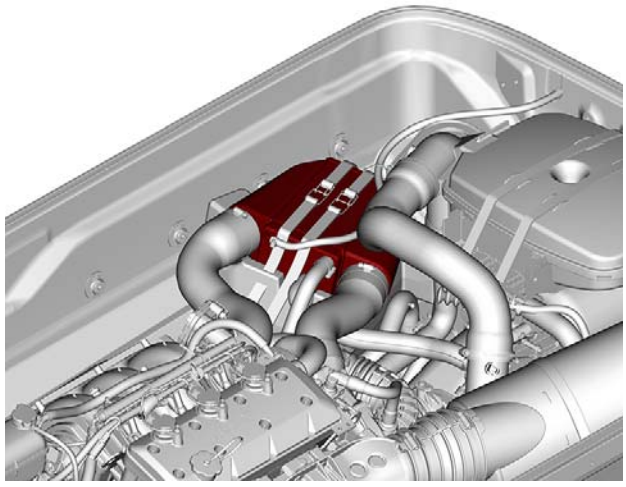
INTERCOOLER

⚠ WARNING

Let engine cool down prior to work on or near intercooler.

Locating the Intercooler

Intercooler is located on the rear right side of the watercraft.


219101005-016-002

PARTS REMOVED FOR CLARITY

Cleaning the Intercooler

If temperature in intake manifold is too high or if engine is down in performance, intercooler may require to be cleaned.

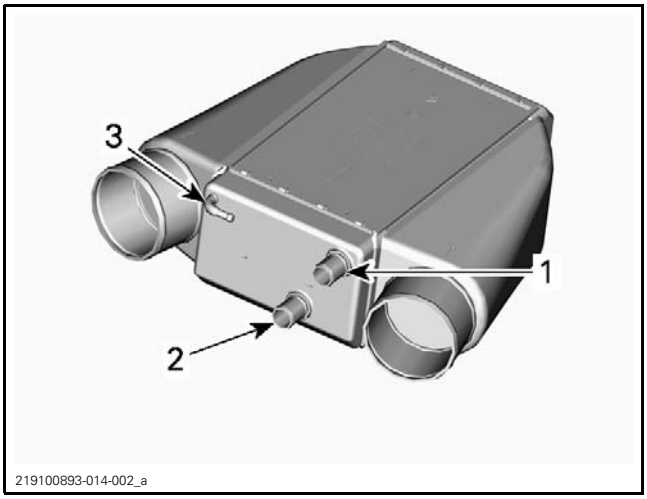
The exhaust system should be flushed first, as it may unclog the intercooler. If not, then proceed with the intercooler cleaning procedure as detailed here.

NOTE: The exhaust temperature will decrease when the intercooler is clogged because more water is rerouted through the exhaust system.

To clean the intercooler, do the following:

NOTICE Never try to clean the intercooler with chemical products. Only use fresh water. Chemical products will permanently damage the internal parts of intercooler.

1. Remove the intercooler from the watercraft. See procedure further in this subsection.
2. Pour fresh water into the water outlet fitting.



1. Intercooler water outlet fitting
2. Intercooler water inlet fitting
3. Intercooler bleeding hose fitting

3. Let water soak in intercooler for a couple of hours. Occasionally, shake the intercooler to soak off deposits.
4. Rinse the intercooler using a garden hose installed on water outlet.
5. Let water flow out of intercooler a few minutes to evacuate internal deposits.
6. Check water flow.

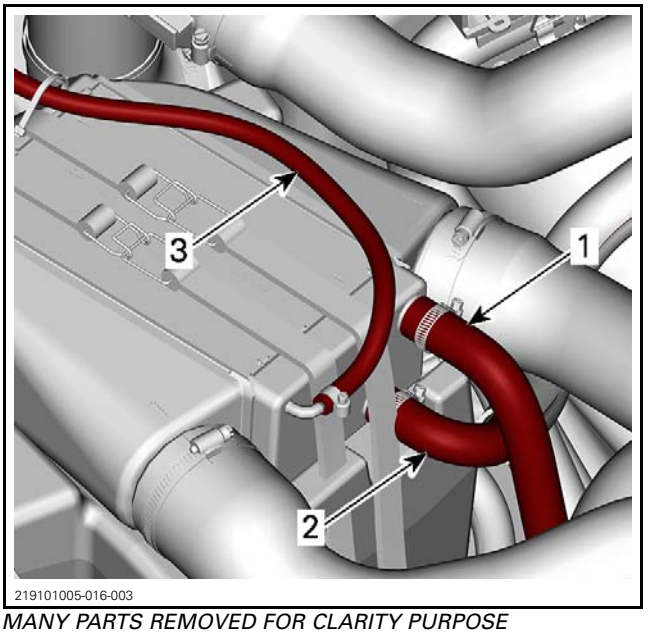
WATER FLOW	
LOW OR ERRATIC	1. Repeat cleaning procedure.
	2. Replace the intercooler.
HIGH AND REGULAR	Intercooler is not clogged.

7. Perform a leak test before installing the intercooler in the watercraft.

Intercooler Leak Test

Block intercooler water outlet hose.

REQUIRED TOOL	
LARGE HOSE PINCHER (P/N 529 032 500)	



MANY PARTS REMOVED FOR CLARITY PURPOSE
1. Intercooler water outlet hose
2. Intercooler water inlet hose
3. Intercooler bleed hose

Block intercooler bleed fitting.

Unplug the intercooler water inlet hose from the intercooler.

Install the vacuum/pressure pump on intercooler water inlet fitting.

REQUIRED TOOL	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

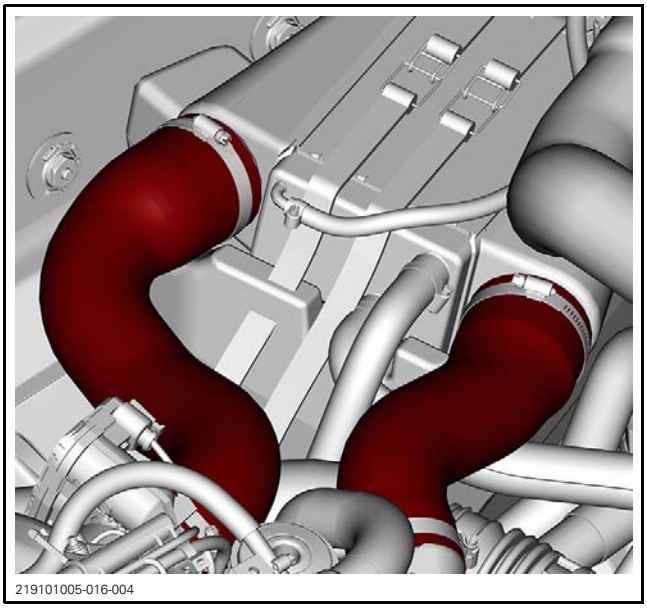
Pressurize the intercooler.

PRESSURE TEST
69 kPa (10 PSI) for 10 minutes minimum

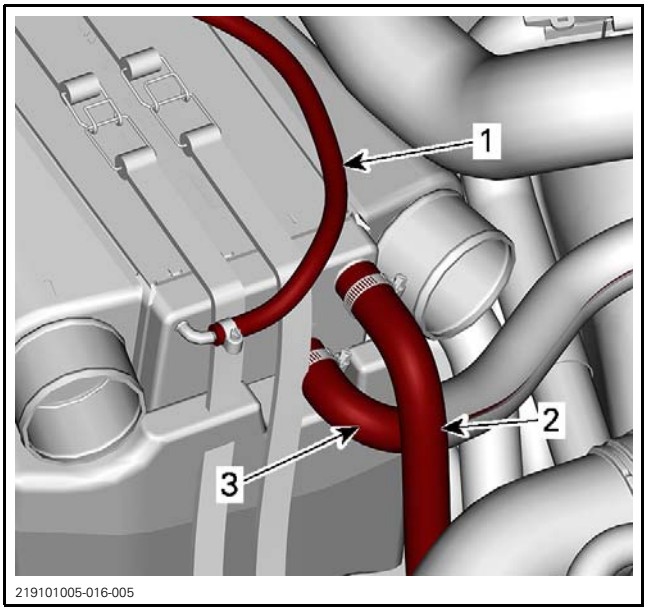
If there is a pressure drop, first spray tool, hoses and adapters with a soapy water solution to ensure they are not leaking. If they are not leaking, replace the intercooler.

Removing the Intercooler

1. Remove seats. Refer to *BODY* subsection.
2. Remove engine service cover. Refer to *BODY* subsection.
3. Remove front exhaust hose. Refer to *EXHAUST SYSTEM* subsection.
4. Disconnect and remove intercooler air hoses.


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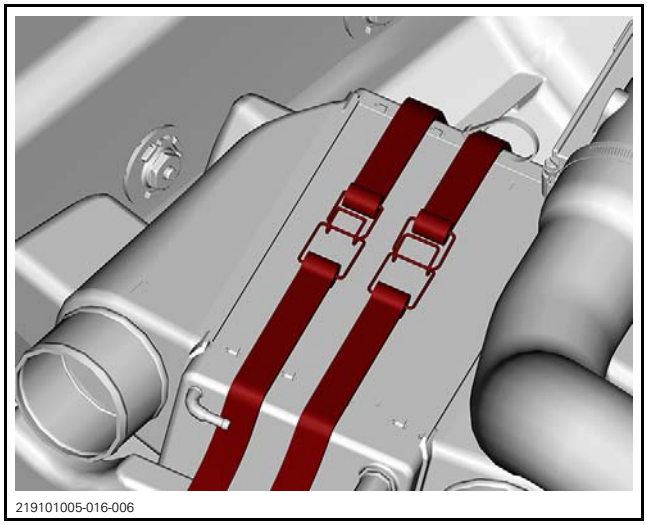
5. Disconnect intercooler water hoses and intercooler bleed hose.



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1. Intercooler bleed hose
2. Intercooler outlet hose
3. Intercooler inlet hose

6. Untie intercooler straps.


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Installing the Intercooler

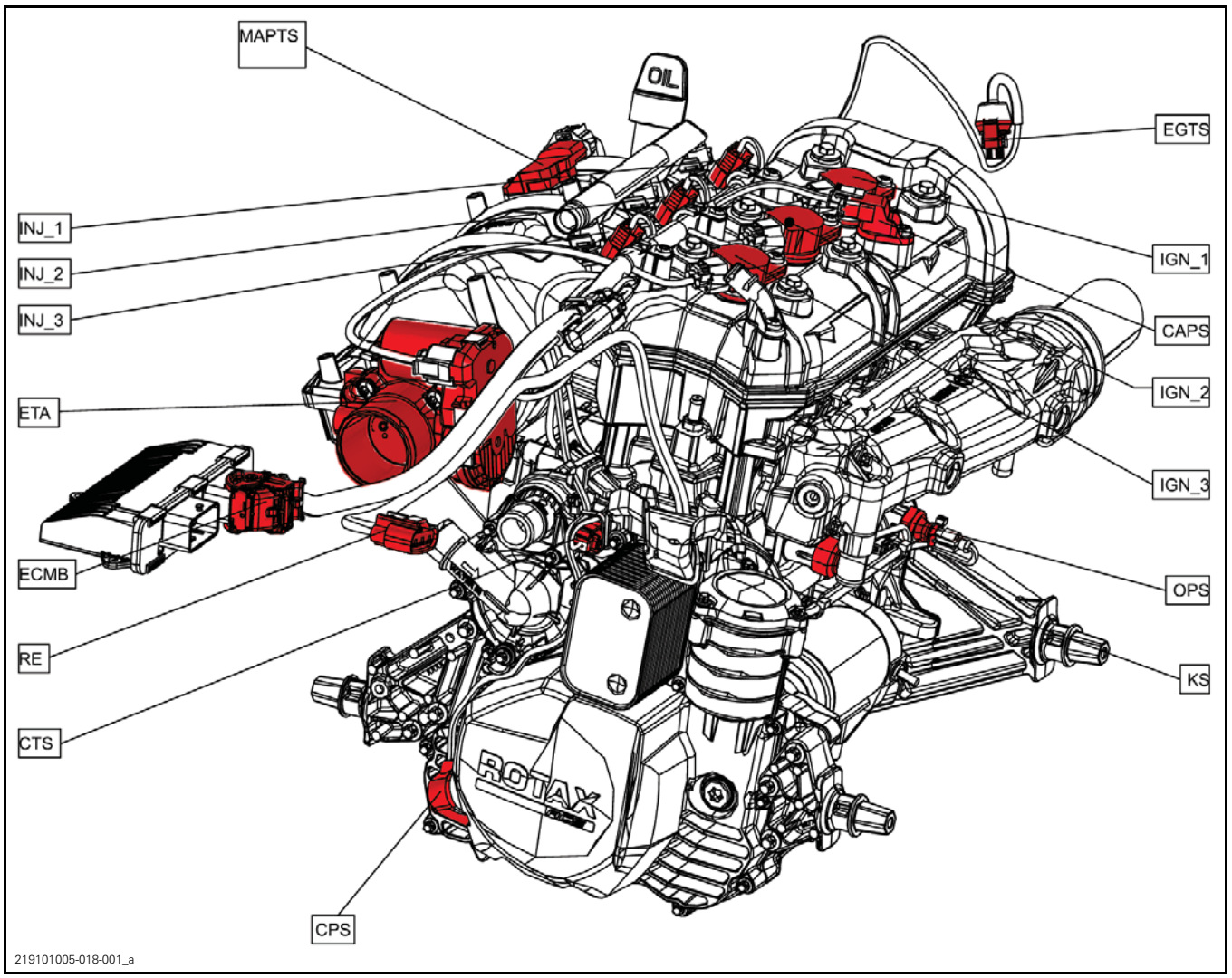
The installation is the reverse of the removal procedure. However, pay attention to the following.

Refer to exploded view for tightening torque specifications.

NOTE: Ensure hoses are routed correctly and locking ties are positioned at proper locations.

ENGINE MANAGEMENT SYSTEM (EMS) (900 ACE)

900 ACE - 90



GENERAL

SYSTEM DESCRIPTION

An engine management system (EMS) is used to ensure a high power output with cleaner combustion.

There are 6 main systems that interact with the engine management system:

1. Electronic fuel injection
2. D.E.S.S. System
3. Ignition System
4. Starting System
5. T.O.P.S.
   (Tip-Over Protection System)
6. iControl System

Air management

The quantity of air admitted into the engine is calculated by the throttle angle (TPS), the intake air temperature (IAT) and the manifold pressure/vacuum sensor (MAP) on the intake manifold.

NOTE: the MAPTS combines the pressure and temperature sensors into one sensor.

The operator's demands on the throttle lever are captured by the throttle accelerator sensor (TAS) and result in the movement of the electronic throttle actuator (ETA).

Fuel management

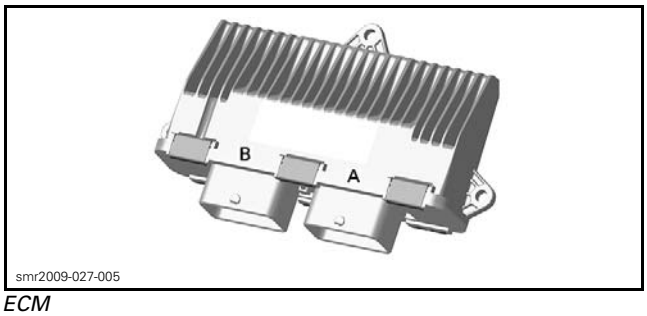
The coolant temperature sensor (CTS) is used to determine engine temperature. The ECM will slightly lean out the fuel mixture to bring a cold engine to operating temperature faster. Once the engine is at operating temperature, this stops.

NOTE: On some engines the oil temperature sensor is also used to calculate engine temperature.

In response to changes in air management, the ECM will adjust the quantity of fuel injected to optimize combustion.

The ECM will vary injection duration and timing to minimize emissions and maximize power.

Engine Control Module (ECM)

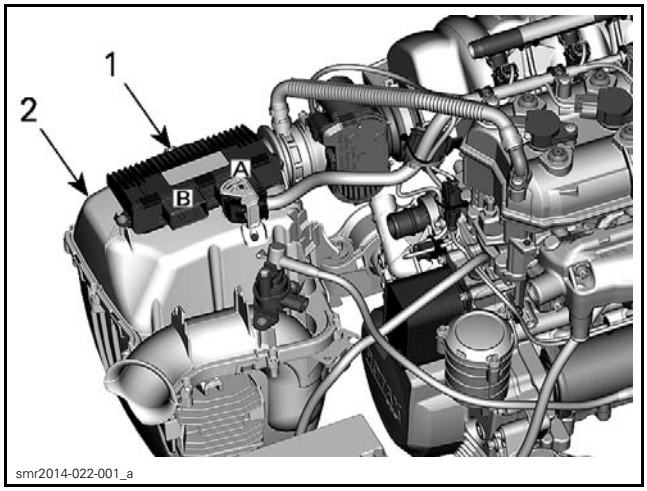


ECM

The ECM is the main component of the engine management system. It controls the electrical system and the engine management functions by processing the information obtained from various switches, controls and sensors that it compares to predetermined parameters stored in the ECM.

It also interacts with the other electronic systems through the CAN bus (multifunction gauge and iControl System) for various functions that affect engine management.

The ECM is mounted on the air intake silencer.



TYPICAL
1. ECM
2. Air intake silencer
A. Connector "A" (Engine harness)
B. Connector "B" (Vehicle harness)

It features a permanent memory that will store fault codes, customer information and other engine information, even when the engine is stopped and the battery is removed from the vehicle.

The ECM controls the following engine management functions:

Throttle Protection

If the throttle is not completely closed during engine startup, the engine will not start.

To revert to normal operation, completely release the throttle lever.

Engine RPM Limiter

The ECM monitors engine RPM through the CPS and CAPS. It then varies fuel injection, ignition and throttle plate opening as necessary to limit maximum engine speed.

Engine Speed Control

The ECM controls the engine idle RPM. In addition, it can vary the engine speed by commanding the electronic throttle actuator (ETA) to open or close based on throttle position and various other inputs. The ETA also allows for other functions of the iControl system.

Monitoring System

The ECM monitors:

- The electrical and electronic components of the engine system
- The iControl system
- The multifunction gauge
- Some components of the electrical system
- Signals from other electronic modules

For more information, refer to *DIAGNOSTIC AND FAULT CODES.*

Limp Home Mode

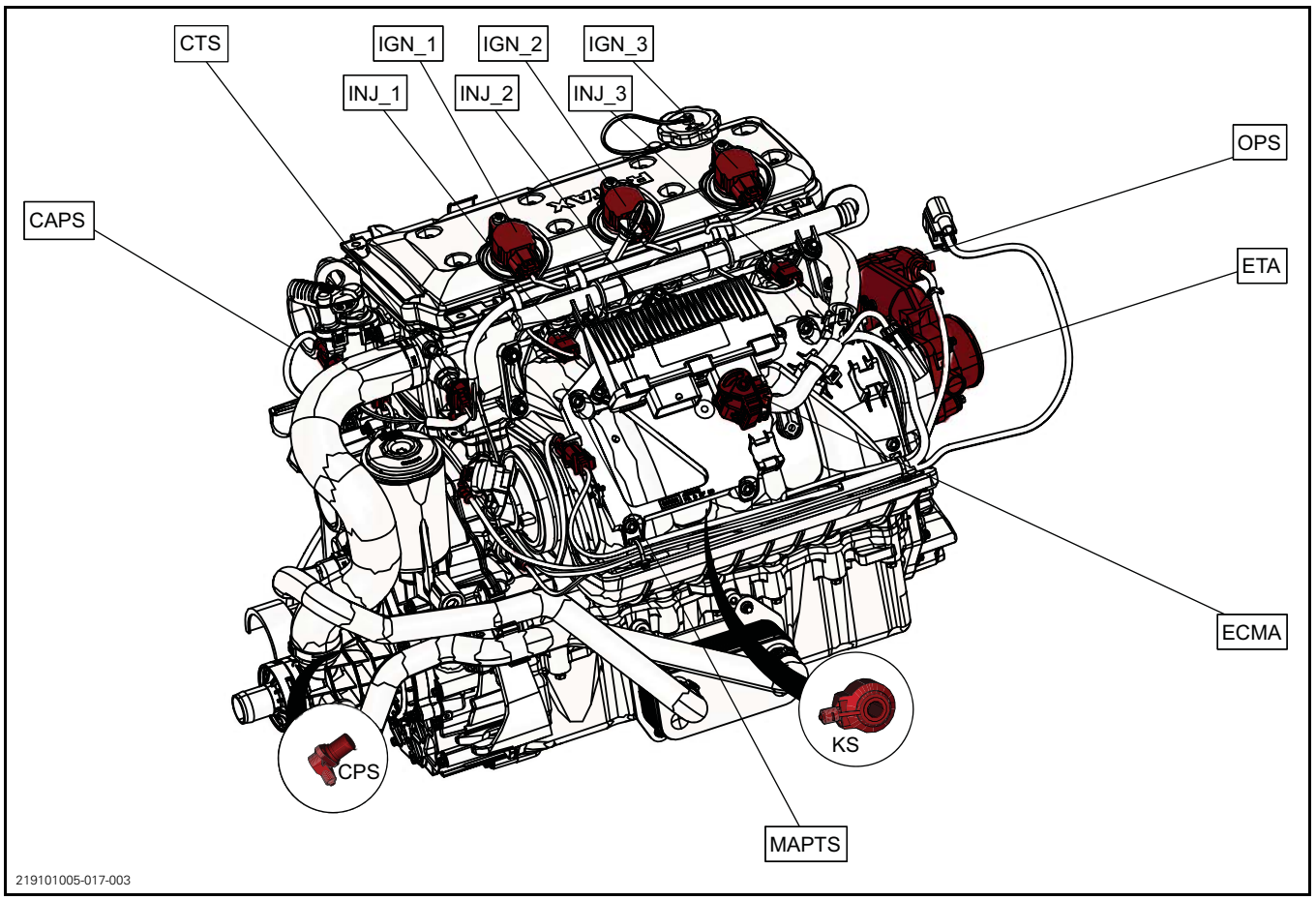
The ECM may automatically set the engine in LIMP HOME MODE using default parameters when certain major faults are detected. For more information, refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Diagnostic Mode

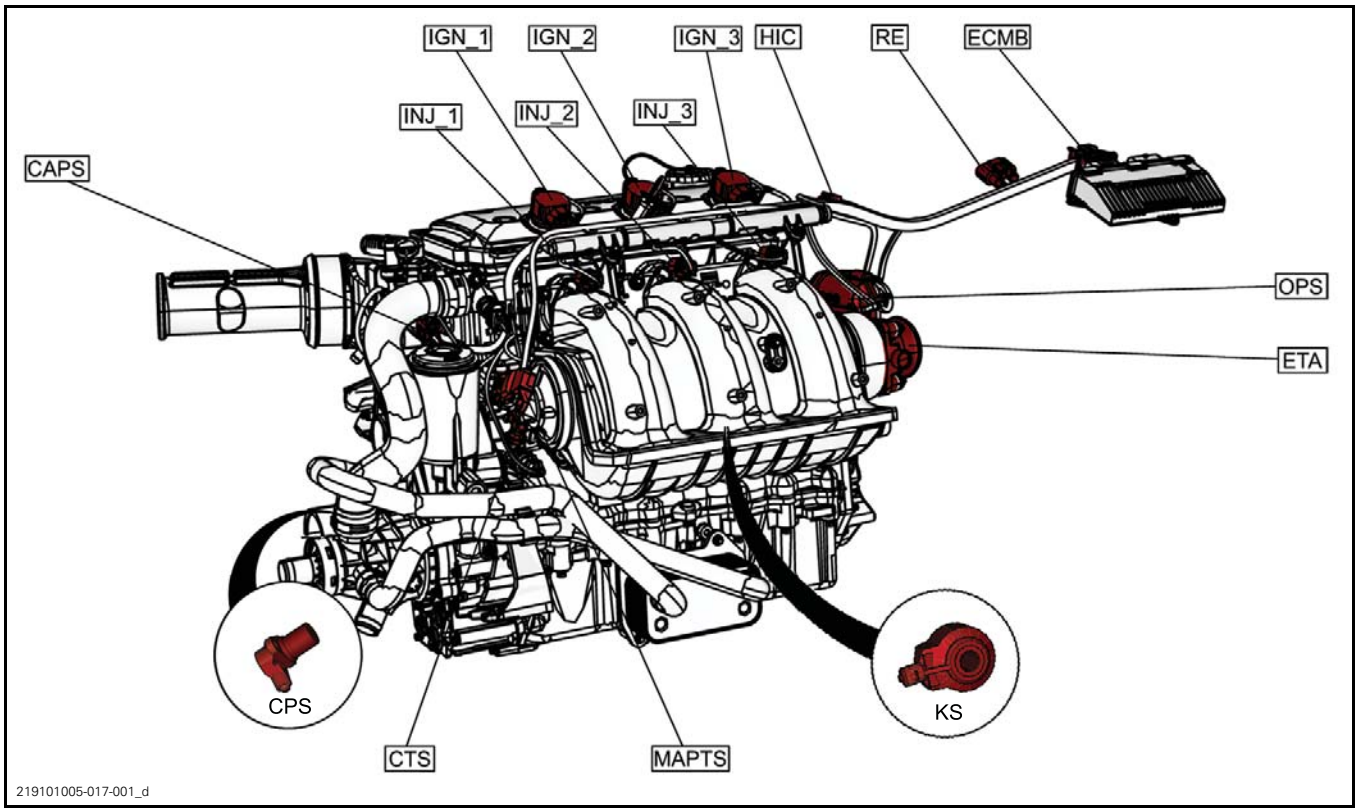
The ECM features a self-diagnostic mode that is initiated on system power up for certain systems and components (when pressing the START button), and when the engine is running for others. Refer to *DIAGNOSTIC AND FAULT CODES* subsection for more information.

ENGINE MANAGEMENT SYSTEM (EMS) (1630 ACE)

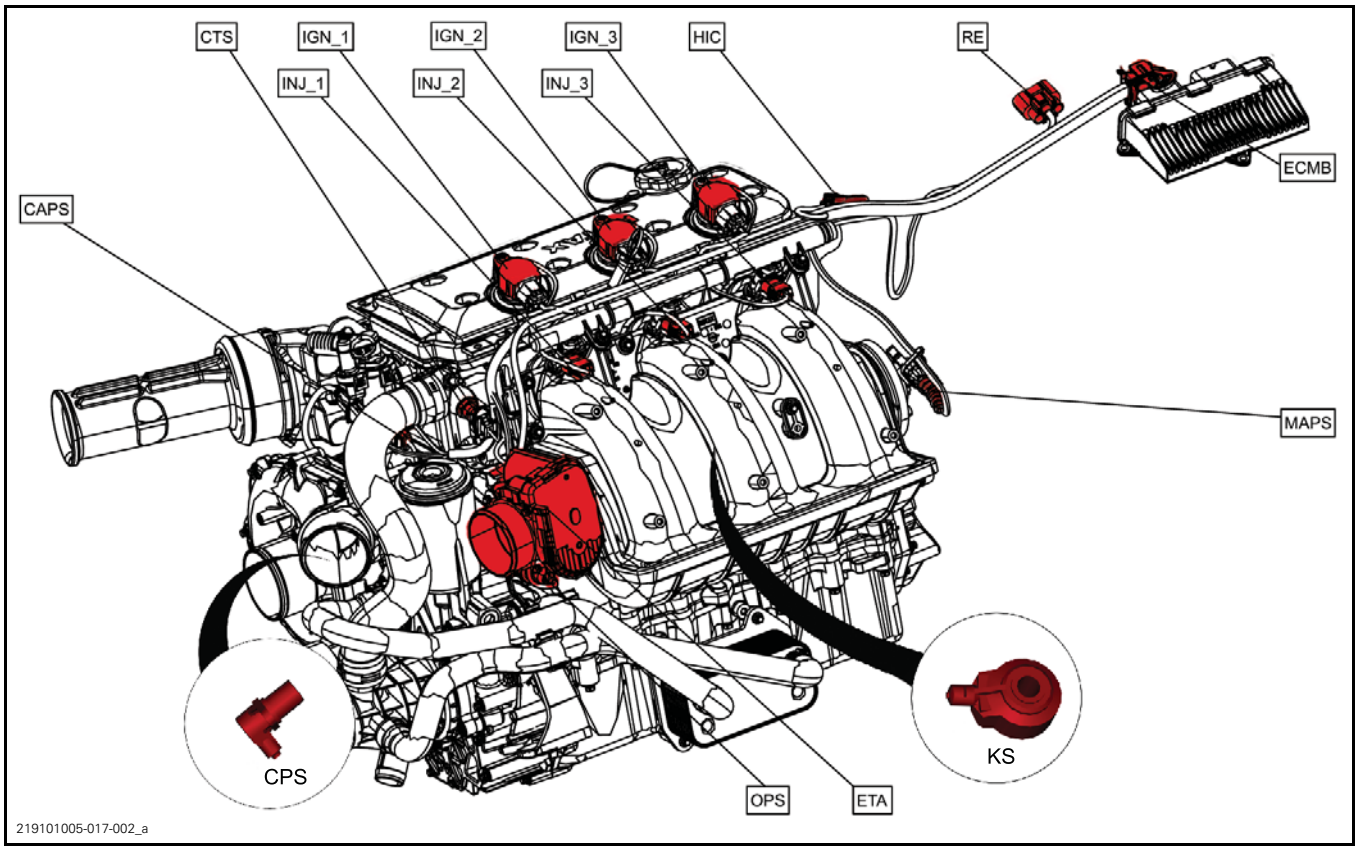
1630 ACE - 130



1630 ACE - 170


IGN_1
IGN_2
IGN_3
HIC
RE
ECMB
INJ_1
INJ_2
INJ_3
CAPS
OPS
ETA
CPS
KS
CTS
MAPTS
219101005-017-001_d

1630 ACE - 230


CTS
IGN_1
IGN_2
IGN_3
HIC
RE
INJ_1
INJ_2
INJ_3
ECMB
CAPS
MAPS
CPS
KS
OPS
ETA
219101005-017-002_a

GENERAL

SYSTEM DESCRIPTION

An engine management system (EMS) is used to ensure a high power output with cleaner combustion.

There are 7 main systems that interact with the engine management system:

1. Electronic fuel injection
2. D.E.S.S. System
3. Ignition System
4. Starting System
5. T.O.P.S.
   (Tip-Over Protection System)
6. iControl System

Air management

The quantity of air admitted into the engine is calculated by the throttle angle (TPS), the intake air temperature (IAT) and the manifold pressure/vacuum sensor (MAP) on the intake manifold.

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Fuel management

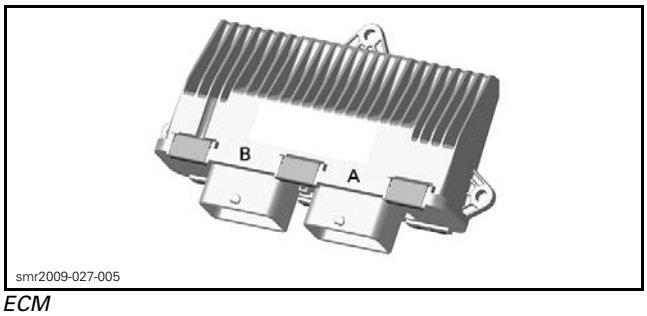
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In response to changes in air management, the ECM will adjust the quantity of fuel injected to optimize combustion.

The ECM will vary injection duration and timing to minimize emissions and maximize power.

Engine Control Module (ECM)



ECM

The ECM is the main component of the engine management system. It controls the electrical system and the engine management functions by processing the information obtained from various switches, controls and sensors that it compares to predetermined parameters stored in the ECM.

It also interacts with the other electronic systems through the CAN bus (information center and iControl System) for various functions that affect engine management.

It features a permanent memory that will store fault codes, customer information and other engine information, even when the battery is removed from the vehicle.

The ECM controls the following engine management functions:

Engine RPM Limiter

The ECM limits maximum engine speed. It monitors engine RPM through the CPS and varies fuel injection, ignition and throttle plate opening as necessary.

Engine Speed Control

The ECM controls the engine idle RPM. In addition, it can vary the engine speed by commanding the electronic throttle actuator (ETA) to open or close based on throttle position and various other inputs. The ETA also allows for other functions of the iControl system.

Monitoring System

The ECM monitors:

– The electrical and electronic components of the engine system
– The iControl system
– The information center (gauge)
– Some components of the electrical system
– Signals from other electronic modules

For more information, refer to *DIAGNOSTIC AND FAULT CODES.*

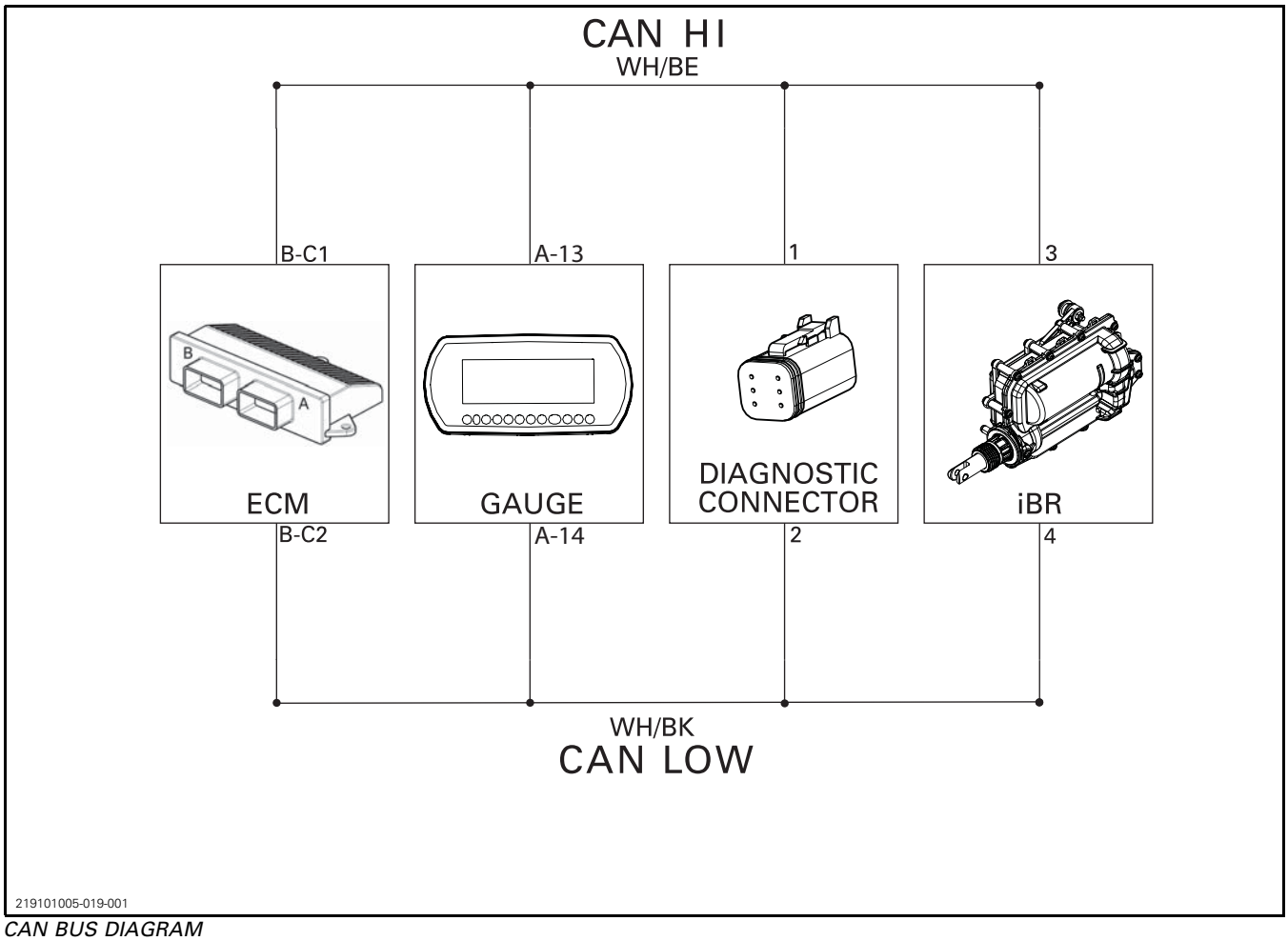
Limp Home Mode

The ECM may automatically set the engine in LIMP HOME MODE using default parameters when certain major faults are detected. For more information, refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Diagnostic Mode

The ECM features a self-diagnostic mode that is initiated on system power up for certain systems and components (when pressing the START button), and when the engine is running for others. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

CONTROLLER AREA NETWORK (CAN)



CAN BUS DIAGRAM

GENERAL

CONTROLLER AREA NETWORK (CAN)

The CAN protocol is an ISO standard for serial data communication.

The ECM forms a network with other components linked with the CAN bus.

The CAN bus (or CAN lines) consist of a pair of wires (WHITE/BEIGE and WHITE/BLACK) that connect every component to each other. The electronic modules are in constant communication within the network.

There are resistors on the CAN lines in the ECM, multifunction gauge and the thermocouple module.

CAN network resistance can be measured from the COM connector pins.

TROUBLESHOOTING

DIAGNOSTIC TIPS

Check the fault codes using the BRP diagnostic software (BUDS2) as a first troubleshooting step.

Make sure the modules are powered before testing CAN.

CAN Communication Problems

The following chart gives some symptoms and behaviors relative to the CAN component in cause. The list is not exhaustive, only the most significant items are given to help in troubleshooting.

CAN FAULTY WIRES (no communication)	VEHICLE BEHAVIOR OR OBSERVATION IN INFORMATION CENTER	OBSERVATION IN BUDS2
Water in holder of diagnostic connector (particularly with salt water)	Communication problems and strange behavior of information center. Inoperative electronic systems in watercraft.	Nothing
Short circuit in CAN wires	Engine is set to limp home mode. iBR gate will return to VTS position. iBR light is ON. Check engine light is ON.	BUDS2 will not be able to communicate with any electronic module. "No vehicle detected" message will be displayed in BUDS2.
Information center (gauge)	Check engine light is ON. iBR light is ON. Some functions not displayed such as: Engine hours, VTS and RPM.	2 modules instead of 3 will be active. "Cluster" tab and its data will not be available in BUDS2 ECM and iBR will report a cluster CAN problem.
ECM (Engine Control Module)	Engine is set to limp home mode. Check engine light is ON. iBR light is ON. iBR gate will return to VTS position. Some functions not displayed such as: Engine hours and RPM.	2 modules instead of 3 will be active. ECM tab and its data will not be available in BUDS2 iBR will report an ECM CAN problem.
iBR (intelligent Brake and Reverse)	Engine is set to limp home mode. iBR gate will return to VTS position. iBR light is ON. Check engine light is ON. Some functions not displayed such as: Lake water temperature, no VTS, no F, N and R indication.	2 modules instead of 3 will be active. iBR tab and its data will not be available in BUDS2 ECM will report an iBR CAN problem.
Diagnostic connector	Nothing will be observable.	BUDS2 will not be able to communicate with any electronic module. "No vehicle detected" message will be displayed in BUDS2.

If the gauge cannot communicate with an optional accessory (e.g.: depth sounder) during the initial power up, the gauge will interpret this as if the vehicle is not equipped with it. No further test of the system occurs and no indication or fault message will be visible. If communication is interrupted after the gauge has already detected them, then the gauge will indicate that there is a communication fault.

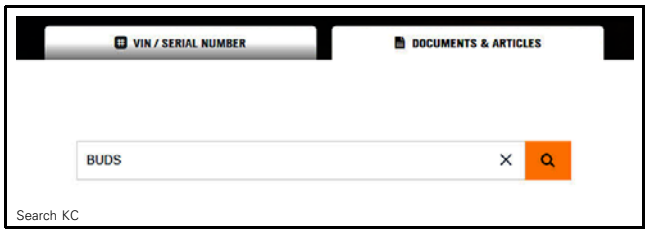
COMMUNICATION TOOLS

GENERAL

Refer to the **B.U.D.S. directory** on *KNOWLEDGE CENTER* for all BUDS2 related information, including:

- Download link
- User manual (programming keys, reading fault codes, writing data to modules etc.)
- Installation instructions
- BRP BUDS chart.

Search keyword: "BUDS".



TROUBLESHOOTING

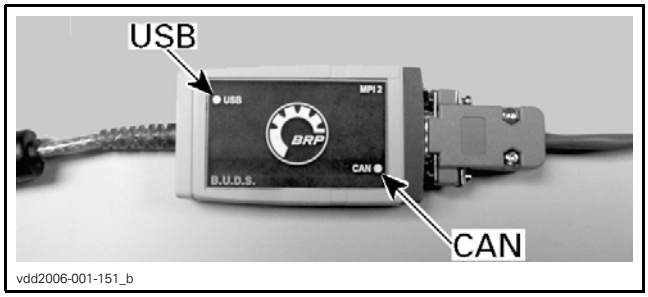
Refer to the BRP BUDS chart to ensure you are using the appropriate hardware and tools.

COMMUNICATION PROBLEMS

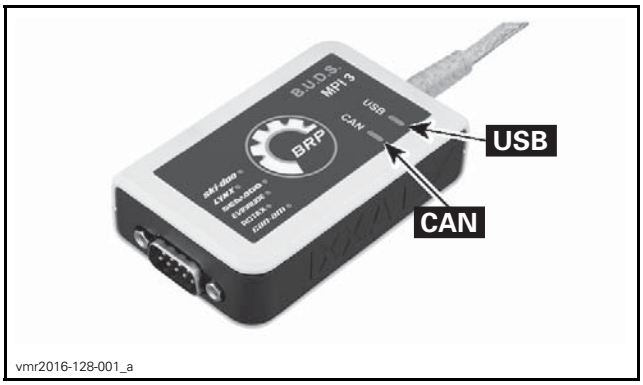
MPI Connection Troubleshooting

MPI Status Lights

The MPI includes 2 status lights to show the connection conditions: USB and CAN. **Both lights must be GREEN** for the MPI to function properly. Otherwise, refer to the following charts.



MPI-2 CARD



MPI-3 CARD

Prerequisite for USB Communication:

- Computer turned ON
- MPI connected to PC computer.

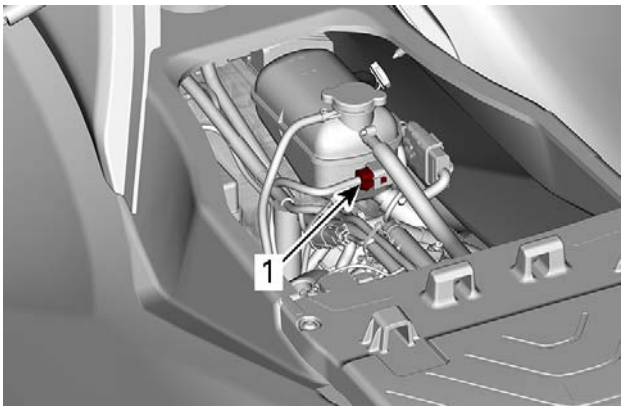
COMMUNICATION PROBLEM (USB)	
STATUS	WHAT TO DO
USB Light is OFF	– Check USB connection between MPI card and PC computer. – Check USB operation on computer (hardware or Windows drivers).
USB Light is GREEN	– Connections are GOOD. Communication can take place on USB side.

Prerequisite for CAN Communication:

1. MPI card connected to diagnostic connector.
2. The tether cord cap (D.E.S.S. key) is installed on the engine cut-off switch.
3. BUDS2 started and logged.
4. ECM is powered.

COMMUNICATION PROBLEM (CAN)	
STATUS	WHAT TO DO
CAN Light is OFF	– BUDS2 does not communicate with the vehicle. – Check connections from computer to vehicle. – Check if BUDS2. is started. – Check if vehicle is powered: is cluster turned ON? If it is not ON, install the tether cord cap (D.E.S.S. key) on the engine cut-off switch.
CAN Light is RED	This occurs when BUDS2 looses communication with vehicle. – Check connections from computer to vehicle. – Check if vehicle is powered: is cluster turned ON? If not, install the tether cord cap (D.E.S.S. key) on the engine cut-off switch.
CAN Light is GREEN	– Connections are GOOD. BUDS2 communicates normally with the vehicle.

Connector Location



219101005-020-001

1. Connector location

DIAGNOSTIC AND FAULT CODES

GENERAL

MONITORING SYSTEM

This system monitors the electronic components of the EMS (engine management system), iBR, information center and other components of the electrical system to detect if they are faulty or defective. The monitoring system becomes active when the START button is pressed.

NOTE: Some components need the engine to be running to be monitored (fuel injectors for example).

The following components or functions are monitored.

EMS MONITORING
Battery voltage
EMS sensors (TAS, TPS, CPS, CAPS, MAPS, MATS, CTS, OPS, EGTS, TOPS, knock sensor). Throttle actuator, ignition coils and fuel injectors
ECM
Engine RPM
CAN
D.E.S.S. system
START switch and starter solenoid
Fuel pump
Information center
iBR module

iBR MONITORING
iBR module and motor
BRLS
Engine RPM
Vehicle speed
iBR gate position
CAN
Lake temperature sensor
Information center
ECM

INFORMATION CENTER MONITORING
Information center
VTS, Sport and ECO switch

INFORMATION CENTER MONITORING
MODE and SET switch
Cruise switch
CAN
GPS
Fuel level sensor
Depth sounder
ECM
iBR module

When a malfunction is currently detected, the related electronic module:

- Sets an active fault code.
- Adapts the proper protection strategy according to the failure.
- Sends out warning signals to the information center/beeper codes to inform the rider of a particular condition.

When a minor or transient fault occurs, the fault message and beeper will cease automatically if the condition that caused the fault does not exist anymore.

If a minor fault is active, the engine will operate without a noticeable loss of performance.

Releasing the throttle and letting the engine return to idle speed may allow normal operation to resume. If this does not work, try the following:

- Remove tether cord from the engine cut-off switch.
- Wait 3 minutes to allow the ECM to shut down.
- Start engine.
- Check if the fault code is still active.

The electronic system will react differently depending on the fault type. If a severe failure occurs, the engine may not be allowed to be started. In other cases, the engine may operate in limp home mode (reduced speed) or not be affected at all.

These strategies are used to protect the engine system from damage and to maintain safe operation of the vehicle.

Limp Home Mode

When a major component of the EMS or the iBR is not operating properly, limp home mode will be set. Engine speed will be limited and therefore vehicle speed.

This mode allows the rider to return home which would otherwise not be possible.

When this mode is active, LIMP HOME MODE will be displayed in the information center.

Indicator Lights and Message Display Information

The fault indicators and messages displayed in the information center will inform you of a particular condition or if an anomaly occurs.

For information on usual indicator lights, refer to *INFORMATION CENTER (GAUGE)*.

4.5'' Digital Display

INDICATOR LIGHT / ICON (ON)	MESSAGE DISPLAY	DESCRIPTION
	LOW or HIGH BATTERY VOLTAGE	Low/high battery voltage
	HIGH TEMPERATURE	Engine or exhaust system overheating
	CHECK ENGINE or LIMP HOME MODE	Check engine (minor fault req. maint.) or LIMP HOME MODE (major eng. fault)
	LOW OIL PRESSURE	Low oil pressure
N/A	IBR MODULE ERROR	Light is steady with a buzzer and a check engine light: iBR system fault (refer to an authorized Sea-Doo dealer)
	–	Light is flashing: iBR system fault (refer to an authorized Sea-Doo dealer)
	–	Light is steady with no buzzer: iBR system still functional but needs to be inspected by an authorized Sea-Doo dealer

MESSAGE DISPLAY INFORMATION	
HIGH EXHAUST TEMPERATURE	High exhaust temperature detected
HIGH ENGINE TEMPERATURE	High engine temperature detected
CHECK ENGINE	Engine system malfunction or maintenance required
LIMP HOME MODE	Major fault detected, engine power limited
FUEL SENSOR FAULT	Fuel level sensor fault
IBR MODULE ERROR	iBR system malfunction
MAINTENANCE REQUIRED	Watercraft maintenance required

NOTICE Running engine with low oil pressure may severely damage the engine.

Beeper Signals

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

BEEPER CODES	DESCRIPTION
1 long beep (while installing tether cord on watercraft engine cut-off switch)	Bad D.E.S.S. system connection. Reinstall tether cord cap correctly on the engine cut-off switch.
	Wrong D.E.S.S. key. Use a tether cord that has been programmed for the watercraft.
	Defective D.E.S.S. key. Use another tether cord with programmed D.E.S.S. key.
	Defective engine cut-off switch. Refer to an authorized Sea-Doo dealer.
	Improper operation of ECM or defective wiring harness.Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA EMISSIONS-RELATED WARRANTY* contained herein for information about warranty claims.
A 2 seconds beep every 15 minutes interval	Engine management system fault. Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA EMISSIONS-RELATED WARRANTY* contained herein for information about warranty claims.
	iBR system fault. Refer to an authorized Sea-Doo dealer.
A 2 seconds beep every 10 minutes interval	Low fuel level. Refill fuel tank. If problem persists, refer to an authorized Sea-Doo dealer.
2 second beeps	High engine temperature coolant. See *ENGINE OVERHEATING*.
	Low oil pressure. Turn off engine as soon as possible. Check oil level and refill. Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA EMISSIONS-RELATED WARRANTY* contained herein for information about warranty claims.
Constant beep (Stops when vehicle is turned OFF)	High exhaust temperature. Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA EMISSIONS-RELATED WARRANTY* contained herein for information about warranty claims.

NOTICE If the monitoring beeper continuously sounds, stop engine as soon as possible.

FAULT CODES

A fault code is an indication that a glitch or malfunction is detected by the monitoring system of the vehicle.

When there is a problem, the ECM can provide fault codes to ease troubleshooting.

The faults registered in the ECM are stored in memory.

IMPORTANT: After a problem has been solved, be sure to clear the fault(s) in the ECM using the BRP diagnostic software (BUDS2). This will properly reset their states.

How to Read Fault Codes

Refer to *COMMUNICATION TOOLS* subsection.

For more information pertaining to the faults code status and report, refer to BUDS2 online help.

How to Find Fault Code Descriptions

Connect the vehicle to the BRP diagnostic software (BUDS2). Refer to *COMMUNICATION TOOLS* subsection.

In BUDS2, go to FAULTS page.

Browse lists of active/ occured and inactive fault codes.

Some newer fault codes are only available on the BRP dealer only site,
most can be found with a Google search.

DIAGNOSTIC AND FAULT CODES

GENERAL

MONITORING SYSTEM

This system monitors the electronic components of the EMS (engine management system), iBR, information center, iS and other components of the electrical system to detect if they are faulty or defective. The monitoring system becomes active when the START button is pressed.

NOTE: Some components need the engine to be running to be monitored (fuel injectors for example).

The following components or functions are monitored.

EMS MONITORING
Battery voltage
EMS sensors (TAS, TPS, CPS, CAPS, MAPS, MATS, CTS, OPS, EGTS, TOPS, knock sensor). Throttle actuator, ignition coils and fuel injectors
ECM
Engine RPM
CAN
D.E.S.S. system
START switch and starter solenoid
Fuel pump
O.T.A.S.
Information center
iBR module

iBR MONITORING
iBR module and motor
BRLS
Engine RPM
Vehicle speed
iBR gate position
CAN
Lake temperature sensor
Information center
ECM

INFORMATION CENTER MONITORING
Information center
VTS, Sport and ECO switch
MODE and SET switch
Cruise switch
CAN
GPS
Fuel level sensor
Depth sounder
ECM
iBR module
iS module

iS MONITORING
iS module and motor
Vehicle speed
Suspension position
CAN
TOPS
Information center
iBR module

When a malfunction is currently detected, the related electronic module:

- Sets an active fault code.
- Adapts the proper protection strategy according to the failure.
- Sends out warning signals to the information center/beeper codes to inform the rider of a particular condition.

When a minor or transient fault occurs, the fault message and beeper will cease automatically if the condition that caused the fault does not exist anymore.

If a minor fault is active, the engine will operate without a noticeable loss of performance.

Releasing the throttle and letting the engine return to idle speed may allow normal operation to resume. If this does not work, try the following:

- Remove tether cord from the engine cut-off switch.
- Wait 3 minutes to allow the ECM to shut down.
- Start engine.
- Check if the fault code is still active.

The electronic system will react differently depending on the fault type. If a severe failure occurs, the engine may not be allowed to be started. In other cases, the engine may operate in limp home mode (reduced speed) or not be affected at all.

These strategies are used to protect the engine system from damage and to maintain safe operation of the vehicle.

Limp Home Mode

When a major component of the EMS or the iBR is not operating properly, limp home mode will be set. Engine speed will be limited and therefore vehicle speed.

This mode allows the rider to return home which would otherwise not be possible without this advanced system.

When this mode is active, LIMP HOME MODE will be displayed in the information center.

Major Fault and Vehicle Reaction

The following EMS conditions will trigger a limp home mode.

ENGINE PROBLEM	MAX ALLOWED RPM
High engine temperature (from 110°C (230°F))	3000
High exhaust temperature (from 110°C (230°F))	3000
Low oil pressure (below 180 - 220 kPa (26 - 32 PSI))	2500

The following conditions will trigger limp home mode.

iBR PROBLEM	SYSTEM BEHAVIOR
Any active fault code related to the iBR that prevents its proper operation	iBR gate will be moved and locked in forward position (if possible)
	Engine will be set in limp home mode (reduced speed)

The following conditions will stop the suspension.

iS PROBLEM	SYSTEM BEHAVIOR
Any active fault code related to the iS that prevents its proper operation	Suspension operation will be disabled
	It will remain at the position it was at when the fault code was set

Indicator Lights and Message Display Information

The fault indicators and messages displayed in the information center will inform you of a particular condition or if an anomaly occurs.

GTI/GTR/GTS Series and Wake

FAULT INDICATOR (ON)	MESSAGE DISPLAY	DESCRIPTION
	HIGH TEMPERATURE	Engine or exhaust system overheating
	CHECK ENGINE or LIMP HOME MODE	Check engine (minor fault req. maint.) or iBR system fault or LIMP HOME MODE (major eng. fault)
	LOW or HIGH BATTERY VOLTAGE	Low/high battery voltage
	LOW OIL PRESSURE	Low engine oil pressure detected
	iBR MODULE ERROR	iBR system fault

RXT/GTX/RXP Series and Wake Pro

PILOT LAMPS (ON)	MESSAGE DISPLAY	DESCRIPTION
	LOW or HIGH BATTERY VOLTAGE	Low/high battery voltage
	HIGH TEMPERATURE	Engine or exhaust system overheating
	CHECK ENGINE or LIMP HOME MODE	Check engine (minor fault req. maint.) or LIMP HOME MODE (major eng. fault)
	LOW OIL PRESSURE	Low oil pressure
	_	iBR system fault
	_	OTAS system fault

FAULT MESSAGES	
RIGHT KEYPAD ERROR	Gauge control button malfunction
LOW OIL PRESSURE	Engine low oil pressure detected
HIGH EXHAUST TEMPERATURE	High exhaust temperature detected
HIGH TEMPERATURE	High engine temperature detected
CHECK ENGINE	Engine management system malfunction or maintenance required
HIGH BATTERY VOLTAGE	High battery voltage detected
LOW BATTERY VOLTAGE	Low battery voltage detected
LIMP HOME MODE	Major fault detected, engine power limited
FUEL SENSOR DEFECTIVE	Fuel level sensor fault
WATER TEMP SENSOR DEFECTIVE	Problem in iBR, not sending water temperature info
CALIBRATION CHECKSUM ERROR	Information center programming corrupted
MAINTENANCE REQUIRED	Watercraft maintenance required
DEPTH SOUNDER MODULE COMMUNICATION PROBLEM	Error message if depth sounder is disconnected while riding
IS MODULE COMMUNICATION PROBLEM	Error message if communication with the suspension module is lost while riding
iBR MODULE ERROR	Error message if communication with the iBR module is lost while riding
FUNCTION CANNOT BE ACTIVATED	Message when a function is not or cannot be properly activated
WRONG KEY	Key not programmed for this watercraft
O.T.A.S. MAINTENANCE REQUIRED	Maintenance on O.T.A.S. required

Beeper Signals

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

BEEPER CODES	DESCRIPTION
A 1 second beep every 5 second interval (while installing D.E.S.S. key on engine cut-off switch if ECM is on)	**Bad D.E.S.S. system connection.** Reinstall tether cord correctly over engine cut-off switch.
	Wrong D.E.S.S. key. Use a tether cord with a D.E.S.S. key that has been programmed for the watercraft.
	Defective D.E.S.S. key. Use another programmed D.E.S.S. key.
	Dried salt water in D.E.S.S. key. Clean D.E.S.S. key with fresh water to remove salt water.
	Defective engine cut-off switch. Check. Refer to *IGNITION SYSTEM* subsection.
	Improper operation of ECM or defective wiring harness. Check. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
A 2 second beep every 5 minute interval	**Low fuel level.** Refill fuel tank. If problem persists, check sensor and circuit. Refer to *FUEL TANK AND FUEL PUMP* subsection.
	Fuel tank level sensor or circuit malfunction. Check sensor and circuit. Refer to *FUEL TANK AND FUEL PUMP* subsection.
Continuously beeps	**High engine coolant temperature.** Refer to *COOLING SYSTEM* subsection.
	High exhaust temperature. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
	Low oil pressure. Turn off engine as soon as possible. Check oil level and refill. Refer to *LUBRICATION* subsection.

FAULT CODES

A fault code is an indication that a malfunction is detected by the monitoring system of the vehicle.

Fault Code Categories

A fault code consists of an alphanumeric designator followed by a hexadecimal number of 3 digits. The alphanumeric designator defines the category of the fault code while the hexadecimal number refers to a unique fault.

FAULT CODE CATEGORIES		
ALPHANUMERIC DESIGNATOR	MODULE/ SYSTEM	EXAMPLE OF FAULT CODE
From B0 to B3	Body (include information center and switch faults)	B2211
From C0 to C3	iBR and iS	C007B
From P0 to P3	Power train and related system faults (includes ECM)	P062F
From U0 to U3	Communication between modules and sensors	U0179

RELATED MODULE AND FAULTS	
MODULE	FAULT CODE CATEGORY
ECM (engine control module)	Stores mainly “P” codes and some “U” codes
iBR (intelligent brake and reverse)	Stores mainly “C” codes and a few “U” codes
iS (intelligent suspension)	Stores mainly “C” codes and a few “U” codes
Cluster	Stores mainly “C” codes and a few “U” codes

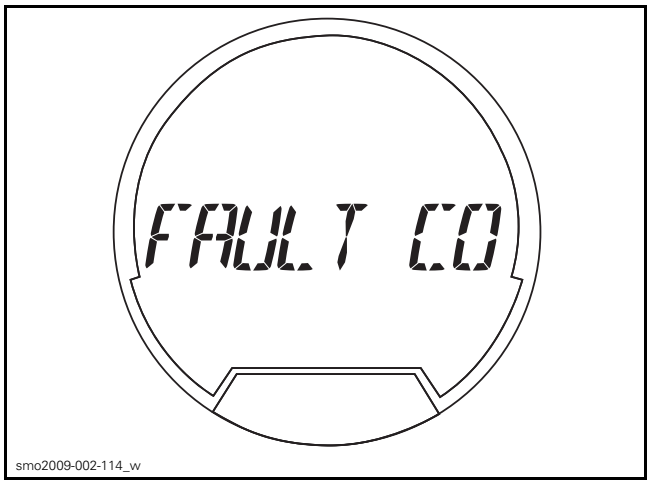
Reading Fault Codes Using the Information Center

NOTE: A fault code must have the "Active" state to be displayed in the multifunction gauge.

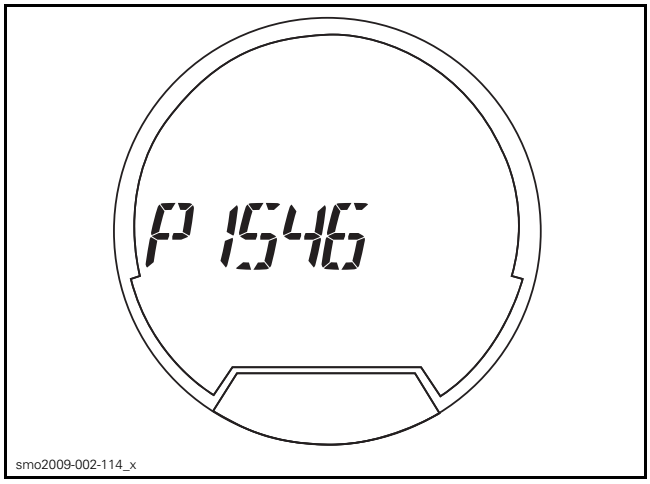
1. Press the MODE button repeatedly until the FAULT CODE function is visible in the multifunction display.
2. Press the SET button or the UP or DOWN arrow button to enter the function and display the first fault code.
3. Press the UP or DOWN arrow button repeatedly to display each subsequent code.

NOTE: When the last fault code has been displayed and the button is pressed again, the system loops back to the first fault code displayed, and all fault codes can again be displayed. If there was one active fault code when entering FAULT CODE mode, and it becomes occurred (no longer active), a NO ACTIVE FAULT CODE message will scroll in the display.

4. To exit the FAULT CODE display function, the MODE or SET button must be pressed once. There is no time out on this function.



FAULT CODE DISPLAY FUNCTION



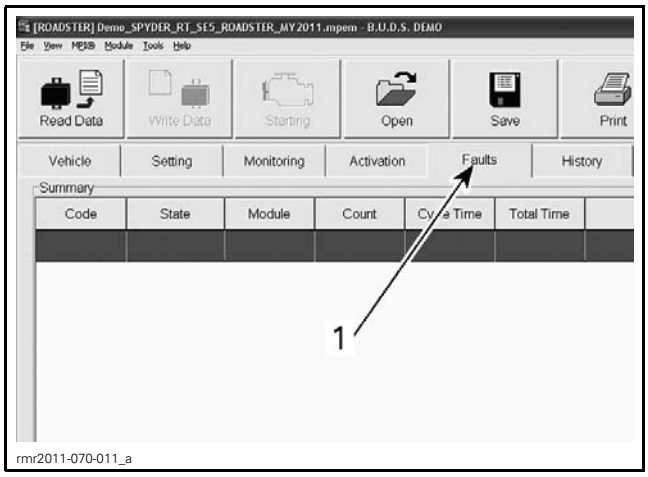
TYPICAL - ENGINE FAULT CODE EXAMPLE

Reading Fault Codes Using B.U.D.S. Software

NOTE: All fault code types can be read with B.U.D.S.

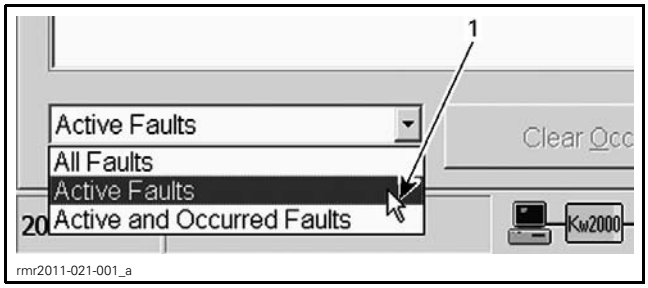
1. Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

2. Click on the **Read Data** button.
3. Click on the **Faults** tab.



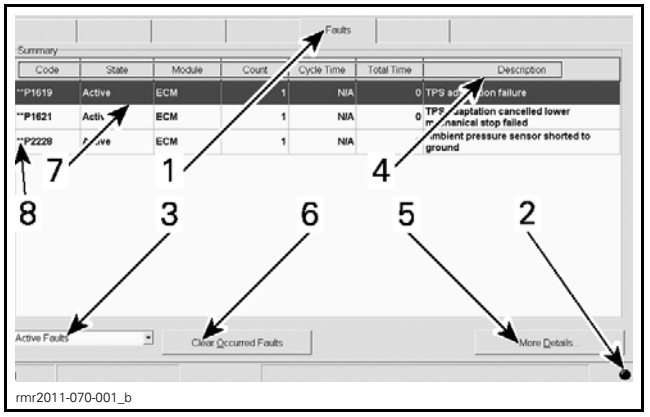
TYPICAL
1. Fault tab

4. Click on the drop-down list on the LH lower corner.
5. Choose the fault state to display.



TYPICAL
1. Drop down list

FAULT STATE	INFORMATION
All faults	Display all possible faults regardless of state
Active faults	Display only faults matching this state. Empty area if there is no active fault
Active and occurred faults	Display only faults that have either state. Empty area if there is neither active nor occurred fault



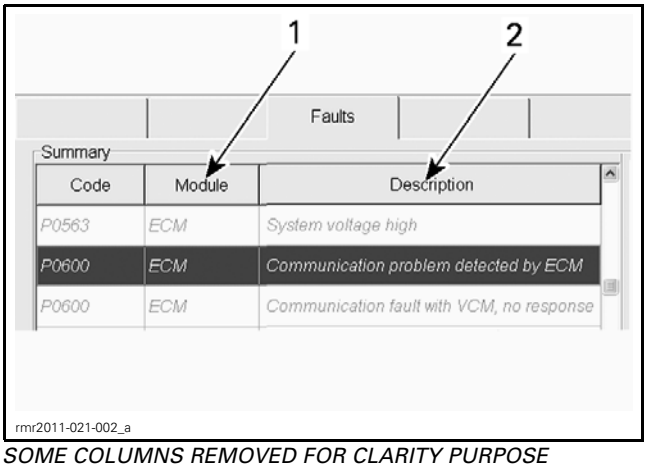
TYPICAL FAULT PAGE
1. Fault tab
2. Fault indicator light
3. Fault code state drop box
4. Fault nomenclature
5. More details button
6. Clear occurred faults button
7. Selected fault
8. More information indicator

FAULT PAGE DESCRIPTION	
ITEM	INFORMATION
Fault tab	Click tab to display the fault page
Fault indicator light	When flashing, it indicates there is active fault(s)
Fault code state drop box	Click drop box to select the type of faults to display
Fault nomenclature	Display specific information and statistics related to the fault (see fault nomenclature table)
More details button	To display possible causes and service actions related to the selected fault
Clear occurred faults button	To clear all occurred faults in related ECU(s)
Selected fault	When a fault is selected, additional information pertaining to that fault will be displayed when clicking the "More details" button. To select a fault, click on the fault with the mouse or use the cursor up or down to scroll to the desired fault

FAULT NOMENCLATURE	
COLUMN	INFORMATION
Code	Fault code number. When 2 stars (**) precedes the code, detailed conditions when the fault occurred, can be displayed by clicking the "More details" button
State	Display the fault state (active, occurred, inactive)
Module	Displays the module that reports the fault code. This is the module that detects or has received a message of an anomaly and reports it. List of modules: Multifunction gauge ECM (engine control module) iBR (intelligent brake and reverse) iS (intelligent suspension)
Count	Number of times this fault occurred within the driving cycle Value: From 0 to 255
Cycle time	Not to be used Value: From 0 to 255 minutes
Total time	Not to be used Value: From 0 to 64 255 minutes
Description	Provides a short description of the fault

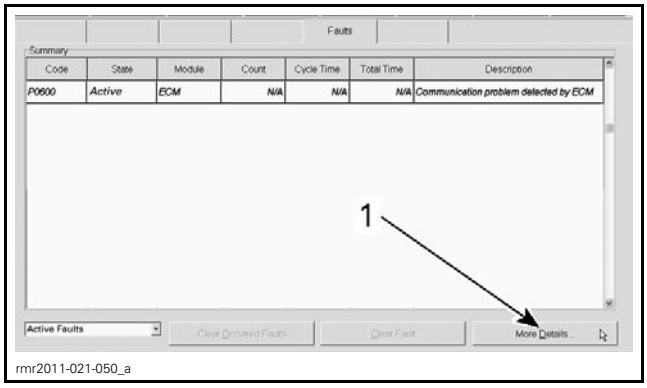
When reading a fault code in B.U.D.S., pay particular attention to which module reports a fault. It is indicated in the **Module** column.

The **Description** column gives a short description of the fault.

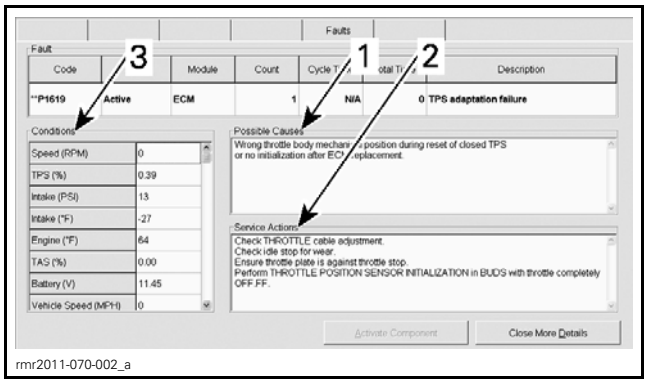


SOME COLUMNS REMOVED FOR CLARITY PURPOSE
1. *Module that reports a fault*
2. *Fault description*

Click on the **More Details** button, on the RH lower corner, to display the "Possible Causes" and the "Service Actions" to step further in the diagnosis.



TYPICAL
1. *Click here*



TYPICAL — MORE DETAILS PAGE
1. *Possible causes related to the selected fault*
2. *Service actions*
3. *Operating conditions when fault occurred*

MORE DETAILS PAGE DESCRIPTION	
ITEM	INFORMATION
Possible causes	List the possible causes that triggered the fault
Service actions	List the possible actions to perform to solve the fault
Conditions when fault occurred	List the operating conditions of the engine and/or vehicle when the fault was triggered

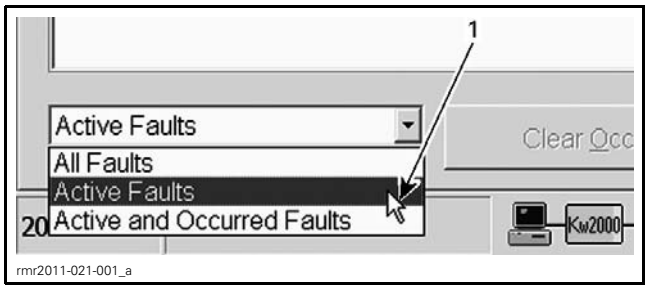
Fault Code States

The various electronic control units (ECUs) used in the vehicle can generate a variety of fault codes depending on the level of monitoring they are capable of. Fault codes have 3 possible states:

– Active
– Occurred
– Inactive.

Click the **Fault** tab then click on the drop-down list on the LH lower corner.

Choose the fault code state you want to display.



TYPICAL
1. Drop down list

FAULT STATE	INFORMATION
All faults	Display all possible faults regardless of state
Active faults	Display only faults matching this state. Empty area if there is no active fault
Active and occurred faults	Display only faults that have either state. Empty area if there is neither active nor occurred fault

Active Fault Codes

An active fault code is an indication of a fault that is **currently triggered**.

The active fault may or may not compromise normal operation of the related system(s). Service action in B.U.D.S. should be used to correct the problem that caused the fault code.

Once the fault condition(s) of the active fault is no longer present, its state will change to "occurred".

Occurred Fault Codes

An occurred fault code indicates a fault that was active, but **no longer** is.

The occurred fault does not presently affect system or component operation but is retained as a history of the faults that were detected.

Inactive Fault Codes

An inactive fault code represents a fault code that is neither active, nor occurred. It is simply part of a list of all possible faults which may be monitored by the various ECUs, which may become active or occurred if the monitoring system detects an applicable fault.

How to Clear Fault Codes Using B.U.D.S.

Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

Click on the **Read Data** button.

Click on the **Faults** tab.

NOTE: Only the **Occurred** state faults can be cleared.

Click the "Clear Occurred Faults" button.



CLEAR OCCURED FAULTS

This will reset the appropriate counter(s) and will also record that the problem has been fixed in the related module memory.

Observe the "Occurred" fault(s). They should all disappear. Otherwise, follow this procedure.

– Remove tether cord cap from engine cut-off switch.
– Wait 3 minutes.
– Repeat procedure to clear faults again.

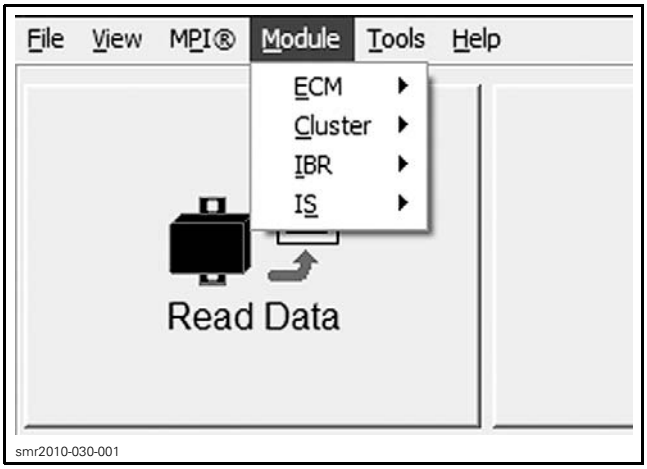
FAULT CODE DIAGNOSTIC

Missing Module

If a module is missing, several fault codes will appear.

To quickly find which module is missing, perform the following:

1. Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Click on the **Read Data** button.
3. Click **Module** in the menu bar.
4. Look at the list of modules.
5. If a module is not visible, then it is not communicating through the CAN bus (controller area network).



TYPICAL — MODULE SUBMENU LIST (MODELS WITH iBR AND iS)

6. Refer to the following table to find the appropriate subsection in this manual to diagnose the missing module.

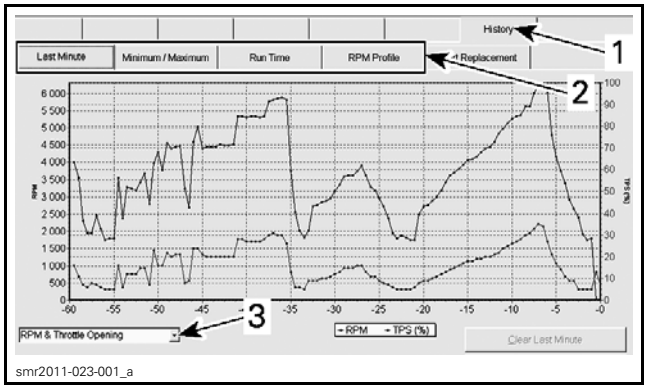
MISSING MODULE	SECTION TO REFER TO
ECM	*ELECTRONIC FUEL INJECTION (EFI)*
Cluster	*GAUGE*
iBR	*iBR AND VTS*
iS	*SUSPENSION (iS)*

Diagnostic Tips Using B.U.D.S.

History Page

HISTORY PAGE DESCRIPTION	
ITEM	INFORMATION
Last minute	Displays several parameters recorded in the last minute of engine operation
Minimum/ Maximum	Display the minimum and maximum values encountered. Click "Clear Min/Max" to reset the values
Run time	Display the time proportion in what mode the engine was running in
RPM profile	Display the RPM range proportion in which the engine was running in

To see the last minute of operating conditions, click on the **History** tab in B.U.D.S.

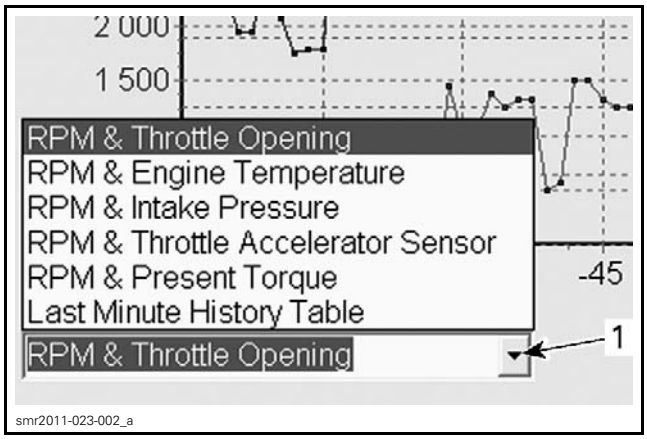


1. *History tab*
2. *Additional history pages*
3. *Drop-down list in Last Minute page*

Last Minute Drop-Down List:

From the **Last Minute** page, click on the drop-down list on the LH lower corner.

Choose the values to display.



1. *Drop down list*

Guidelines to Solve Fault Codes

CONDITION	ACTION
Troubleshooting vehicle	Use B.U.D.S. to: Read fault codes. Display "Active" faults to see components currently not operating normally. Display "Occurred" faults to troubleshoot intermittent problems. Monitor system(s), sensor(s), switches and actual conditions. Activate component(s) for troubleshooting. Set components etc. Know the last minute of operating conditions by using the "History" page. Know the operating conditions, if available, when a fault code occurred by using the "More details" button in the fault page.
New fault(s) appear after a vehicle maintenance or repair	Check sensor connections or mixed up connections. **Before** vehicle maintenance: Read the electronic modules with B.U.D.S. Save and print the B.U.D.S. file (keep faults option only). **After** vehicle maintenance: Read the electronic modules with B.U.D.S. Compare the fault code(s) before and after the maintenance using the printed copy and the current B.U.D.S. reading. Investigate only the newly fault codes. Clear all occurred faults in B.U.D.S.
Communication faults displayed as "Occurred" after module flashing	Normal behavior when flashing a module. Clear all occurred faults and check again.
Sensor "Active" fault	Read the fault description in B.U.D.S. Click on the "More Details" button. Look at the "Conditions" when available. Read the "Possible Causes". Apply the "Service Actions".
Several fault codes active at the same time	Likely to be caused by burnt fuse(s) or bad bus bar connection(s).
Low system voltage on one module Power problem on sensor(s)	Check related fuse(s) and relay. Check related power and ground wires. Check for common power supply to several sensors/modules (refer to *POWER DISTRIBUTION AND GROUNDS)*. **NOTE:** Some sensors are supplied by the battery while others are supplied by a module.
Low system voltage on several modules (several communication faults will also appear)	Check battery condition and connections. Check related fuse(s) and relay. Check voltage regulator/rectifier.
High system voltage on several modules	A battery charger has likely been used to substitute the vehicle battery. Clear all occurred faults and check again. Check voltage regulator/rectifier.
When all modules report that a module is missing	Check the module that is reported as missing. Check related fuse(s) and relay. Check related power and ground wires.
When several modules are in fault	Search for a common problem such as a faulty sensor.

CONDITION	ACTION
CAN bus failure, CAN buss OFF	When several modules and sensors report that a module is missing. The missing module may report CAN bus failure, CAN bus off. Check related CAN wires (continuity, short to ground, short between CAN low and high). Check module pins and wiring terminals. Then, the other modules should stop reporting that module is missing.
Occurred fault(s)	May have been generated due to a system or component that was momentarily operating outside normal parameters.
	May be generated when disconnecting and reconnecting a component, replacing a burnt fuse, or may be due to a momentary high or low voltage.
	Before being "Occurred", a fault has always been "Active" for a certain time, indicating that an unexpected condition or problem has been present during the driving cycle. A frequent momentarily fault or an intermittent fault may never be seen as "Active" in B.U.D.S. while there is still a pending problem. This type of malfunctions can be discovered by looking at the "Occurred" faults and then by evaluating the fault count. As long as a fault is present, it is displayed as "Active".
Fault count (0 - 255)	**Low value:** Suggests handling problems (connections, terminal contact/shape etc.). **High value:** Suggests a frequent and unsolved problem. The problem should be investigated.
Fault conditions (More details button)	Look for abnormal, excessive values.
Hard to find problems	When the basic troubleshooting has been done and the fault code(s) persists, often the problem is related to the wiring harness, connections or electromechanical components. Short to ground, to battery or between wires. Wire splices, chafing, terminal problems (pulled out, bent, out of shape, corroded etc.). Bad contacts in switch or relay.

GUIDELINES TO SOLVE SPECIFIC FAULT CODES

Several Fault Codes Are Active Simultaneously

If this occurs, check the following:

– Check the 30 A fuses in fuse box.
– Check the bus bar condition and connections in the fuse box(es).
– Check the diagnostic connector for the presence of water or corrosion.
– Check the CAN wires.

Fault Code C2100

iBR Sensors calibration is corrupted If the fault comes active when the iBR is activated and stays active, verify if a software update is available.

Fault Code C2120

iBR Application calibration is corrupted If the fault comes active when the iBR is activated and stays active, verify if a software update is available.

Fault Code C2121, C2221

iBR or iS application parameters corrupted (backup no. 1 or no. 2). This fault may occasionally appear as occurred. It happens when power to the module is shut off before the module has time to complete its shutdown. Normal operation is not affected. If it occurs often, check supply voltage to module.

Fault Code C2150, C2233, C2250

iBR or iS motor or system current software breaker. Motor or module current too high. This fault may occasionally appear as occurred. Normal operation is not affected. If it the count is high, check the moving mechanism of the system if it is stiffer than normal to operate.

Fault Code C2232

Motor open. If suspension operates when using the iS Up/Down switches, the suspension will operate normally when riding even if this fault is active. In this case, the fault can be ignored. The fault will be set to "occurred" when the iS module will be shut down. If the suspension does not operate when using the iS Up/Down switches, refer to *SUSPENSION (iS)* subsection.

Fault Code P0122 and P0123

The TAS signal #1, the TOPS and MAPS sensors share the same 5 volt supply. If one of the sensor is using too much power, the voltage will drop which may result in the fault codes appearing on the other sensors. If the fault code becomes active verify power input in all 3 sensors.

Fault Code P0562

Battery voltage too low. It occurs when both battery voltage and engine RPM conditions are met. See following chart. Refer to *CHARGING SYSTEM* subsection.

BATTERY VOLTAGE	ENGINE SPEED
Lower than 6.5 Vdc	Lower than 1280 RPM
Lower than 11.8 Vdc	Greater than 1280 RPM

Fault Code P0563

Battery voltage too high. It occurs when battery voltage is above 16 Vdc when engine is running. Refer to *CHARGING SYSTEM*.

Fault Code P0171

Multiplicative mixture adaptation exceeds upper limit--> mixture too lean. An open signal on the engine coolant temperature (CTS) can trigger that fault. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Fault Code P0172

Multiplicative mixture adaptation below lower limit--> mixture too rich. An open signal on the engine coolant temperature (CTS) can trigger that fault. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Fault Code P1171

Additive mixture adaptation exceeds upper limit--> mixture too lean. An open signal on the engine coolant temperature (CTS) can trigger that fault. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Fault Code P1172

Additive mixture adaptation below lower limit --> mixture too rich. An open signal on the engine coolant temperature (CTS) can trigger that fault. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Fault Code U016A

Loss of vehicle speed. This fault may occasionally appear as occurred. Normal operation is not affected. If the count is high, check the related components.

Fault Code U0129

CAN communication error between iS and iBR modules or **iBR CAN message time-out or validity.** This fault may occasionally appear as occurred. Normal operation is not affected. If the count is high, check the related components. Ensure connector is plugged.

Fault Code U0300

Incorrect ECM or information center for the engine. Installed part is not appropriate for the vehicle. Using BUDS, check if the security coding of the cluster is matched with the ECM security coding. **Engine will crank but will not start**. Refer to *PARTS CATALOGS* for proper part according to vehicle.

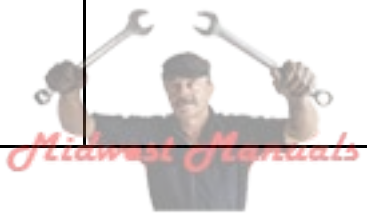
FAULT CODE TABLE

NOTE: Always refer to the fault code list available in the latest applicable version of B.U.D.S. software.

When using the service action suggested in the Fault section of B.U.D.S., the system circuits are referred as A-M4 for instance. It means ECM connector "A" and the circuit wire M4 as found in the *WIRING DIAGRAM*.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
B2210	CLUSTER	Left keypad fault (Switch kept activated more than 60 seconds)	Problem with left keypad.	The switch may be defective, verify the functionnality of the switch or the wires. Refer to the shop manual for switch diagnosis/testing procedure.
B2211	CLUSTER	Suspension UP/DOWN or SPORT / ECO switches shorted to ground fault	Problem with left keypad.	Look for pin B if shorted to ground or pin C.
B2212	CLUSTER	Suspension UP/DOWN or SPORT / ECO switches disconnected fault	Problem with left keypad.	Look for pin B if disconnected to pin 14 on the cluster. Look for pin C if disconnected to pin 15 on the cluster .
B2213	CLUSTER	VTS UP/DOWN switches shorted to ground fault	Problem with left keypad.	Look for pin A if shorted to ground or pin C.
B2214	CLUSTER	VTS UP/DOWN switches disconnected fault	Problem with left keypad.	Look for pin A if disconnected to pin 13 on the cluster. Look for pin C if disconnected to pin 15 on the cluster .
B2220	CLUSTER	Right keypad fault (Switch kept activated more than 60 seconds)	Problem with right keypad.	The switch may be defective, verify the functionnality of the switch or the wires. Refer to the shop manual for switch diagnosis/testing procedure.
B2221	CLUSTER	MODE/SET switches shorted to ground fault	Problem with right keypad.	Look for pin B if shorted to ground or pin C.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
B2222	CLUSTER	MODE/SET switches disconnected fault	Problem with right keypad.	Look for pin B if disconnected to pin 17 on the cluster. Look for pin C if disconnected to pin 18 on the cluster.
B2223	CLUSTER	UP/DOWN switches shorted to ground fault	Problem with right keypad.	Look for pin A if shorted to ground or pin C.
B2224	CLUSTER	UP/DOWN switches disconnected fault	Problem with right keypad.	Look for pin A if disconnected to pin 16 on the cluster. Look for pin C if disconnected to pin 18 on the cluster.
C0042	IBR	Brake Lever Sensor (BRLS) signals A open/shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C0042	IBR 2013	Brake Lever Sensor (BRLS) signals A open/shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C0043	IBR	Brake Lever Sensor (BRLS) signals B open/shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C0043	IBR 2013	Brake Lever Sensor (BRLS) signals B open/shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C0073	IBR	Torque request failure	CPS wires shorted. Bad connection on the engine coolant temp sensor.	Perform ECM software update if available. Verify CPS connection. Verify engine temperature if it is plausible. A bad connection with the CTS can generate this fault when the iBR is used.



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P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
C0073	IBR 2013	Torque request failure	CPS wires shorted. Bad connection on the engine coolant temp sensor.	Perform ECM software update if available. Verify CPS connection. Verify engine temperature if it is plausible. A bad connection with the CTS can generate this fault when the iBR is used.
C2100	IBR	Sensors calibration is corrupted	Incompatible firmware or memory failure.	If the fault comes active when the iBR is activated and stays active, verify if a software update is available. Refer to the service manual for more details.
C2100	IBR	Actuator movement	The reverse gate cannot move to the desired position. (stuck or motor open)	Clean and check for damage/wear parts in the reverse system and nozzle area. Check iBR electrical motor wiring. Isolate the iBR output shaft from the reverse system and activate the iBR, if the fault comes active, replace iBR. Refer to the service manual for more details.
C2100	IBR 2013	Sensors calibration is corrupted	Incompatible firmware or memory failure.	If the fault comes active when the iBR is activated and stays active, verify if a software update is available. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
C2101	IBR	Actuator movement warning	The reverse gate cannot move to the desired position within expected time.	Clean and check for damage/wear parts in the reverse system and nozzle area. Check iBR electrical motor wiring. Isolate the iBR output shaft from the reverse system and activate the iBR, if the fault comes active, replace iBR. Refer to the service manual for more details.
C2101	IBR 2013	Actuator movement warning	The reverse gate cannot move to the desired position within expected time.	Clean and check for damage/wear parts in the reverse system and nozzle area. Check iBR electrical motor wiring. Isolate the iBR output shaft from the reverse system and activate the iBR, if the fault comes active, replace iBR. Refer to the service manual for more details.
C2102	IBR 2013	Actuator movement	The reverse gate cannot move to the desired position. (stuck or motor open)	Clean and check for damage/wear parts in the reverse system and nozzle area. Check iBR electrical motor wiring. Isolate the iBR output shaft from the reverse system and activate the iBR, if the fault comes active, replace iBR. Refer to the service manual for more details.

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P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
C2110	IBR	Reverse gate position sensor error	iBR malfunction.	If the fault comes active when the iBR is activated and stays active, verify if a software update is available. Refer to the service manual for more details.
C2110	IBR	Angle position sensor warning	iBR malfunction.	If the fault comes active when the iBR is activated and stays active, verify if a software update is available. Refer to the service manual for more details.
C2110	IBR	iBR overheat	iBR cooling system failure. iBR unit failure.	Check iBR cooling circuit. Refer to the service manual for more details.
C2110	IBR	Monitoring CPU message timeout or validity	iBR malfunction.	Perform an iBR software update if available and clear the fault. Replace the iBR unit if the fault remains active. Refer to the service manual for more details.
C2110	IBR	Monitoring CPU limp force	iBR malfunction.	Perform an iBR software update if available. Replace the iBR unit if the fault remains active Refer to the service manual for more details.
C2110	IBR 2013	Reverse gate position sensor error	iBR malfunction.	If the fault comes active when the iBR is activated and stays active, verify if a software update is available. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
C2111	IBR	ECM erratic RPM signal	RPM signal received from engine ECM not plausible.	Check CPS sensor connection
C2112	IBR 2013	Angle position sensor warning	iBR malfunction.	If the fault comes active when the iBR is activated and stays active, verify if a software update is available. Refer to the service manual for more details.
C2113	IBR 2013	iBR overheat	iBR cooling system failure. iBR unit failure.	Check iBR cooling circuit. Refer to the service manual for more details.
C2114	IBR 2013	Monitoring CPU message timeout or validity	iBR malfunction.	Perform an iBR software update if available and clear the fault. Replace the iBR unit if the fault remains active. Refer to the service manual for more details.
C2115	IBR 2013	Monitoring CPU limp force	iBR malfunction.	Perform an iBR software update if available. Replace the iBR unit if the fault remains active Refer to the service manual for more details.
C2120	IBR	Application calibration is corrupted	Incompatible firmware or memory failure.	If the fault comes active when the iBR is activated and stays active, verify if a software update is available. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
C2120	IBR 2013	Application calibration is corrupted	Incompatible firmware or memory failure.	If the fault comes active when the iBR is activated and stays active, verify if a software update is available. Refer to the service manual for more details.
C2121	IBR	Application parameters corrupted (backup #1 or #2)	Unexpected battery power lost or memory failure. Ignore fault if "occured"	Verify starting and charging system circuits. Clear fault Refer to the service manual for more details.
C2121	IBR 2013	Application parameters corrupted (backup #1 or #2)	Unexpected battery power lost or memory failure. Ignore fault if "occured"	Verify starting and charging system circuits. Clear fault Refer to the service manual for more details.
C2130	IBR	Motor current software breaker	iBR motor current too high. Battery power failure. iBR unit failure.	Clean and check for damage in the reverse gate and nozzle area. Refer to the service manual for more details.
C2130	IBR	Internal motor drive failure	Motor voltage feedback not fitting with the command.	
C2130	IBR 2013	Motor current software breaker	iBR motor current too high. Battery power failure. iBR unit failure.	Clean and check for damage in the reverse gate and nozzle area. Refer to the service manual for more details.
C2131	IBR	iBR DC motor shorted to ground or 12V	iBR motor failure. iBR motor wires dammaged. Battery power failure. iBR unit failure.	Perform an iBR update with BUDS Check iBR battery power Check iBR Motor Wiring Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
C2131	IBR 2013	iBR DC motor shorted to ground or 12V	iBR motor failure. iBR motor wires dammaged. Battery power failure. iBR unit failure.	Perform an iBR update with BUDS Check iBR battery power Check iBR Motor Wiring Refer to the service manual for more details.
C2132	IBR	Motor Open	No current while activated.	Verify if the motor is properly connected to the iBR housing
C2132	IBR 2013	Motor Open	No current while activated.	Verify if the motor is properly connected to the iBR housing
C2133	IBR 2013	Internal motor drive failure	Motor voltage feedback not fitting with the command.	
C2142	IBR	Brake Lever Sensor (BRLS)signals A shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C2142	IBR 2013	Brake Lever Sensor (BRLS)signals A shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C2143	IBR	Brake Lever Sensor (BRLS) signals B shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C2143	IBR 2013	Brake Lever Sensor (BRLS) signals B shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C2144	IBR	Brake Lever Sensor (BRLS) power shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 4.5 to 5 volts on sensor connector pin A & D. Refer to the service manual for more details.
C2144	IBR 2013	Brake Lever Sensor (BRLS) power shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 4.5 to 5 volts on sensor connector pin A & D. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
C2145	IBR	Brake Lever Sensor (BRLS) power shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 4.5 to 5 volts on sensor connector pin A & D. Refer to the service manual for more details.
C2145	IBR 2013	Brake Lever Sensor (BRLS) power shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 4.5 to 5 volts on sensor connector pin A & D. Refer to the service manual for more details.
C2146	IBR	Brake Lever Sensor (BRLS) signals A/B reading difference	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C2146	IBR 2013	Brake Lever Sensor (BRLS) signals A/B reading difference	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0,5 to 3V on pin F and 0,25 to 1.5 on pin C.
C2150	IBR	System current software breaker	iBR input current too high.	Clean and check for damage in the reverse gate and nozzle area. Refer to the service manual for more details.
C2150	IBR 2013	System current software breaker	iBR input current too high.	Clean and check for damage in the reverse gate and nozzle area. Refer to the service manual for more details.
C2151	IBR	System disabled and need activation	System is locked. Need activation.	Use B.U.D.S. iBR unlock function. Refer to the service manual for more details.
C2151	IBR 2013	System disabled and need activation	System is locked. Need activation.	Use B.U.D.S. iBR unlock function. Refer to the service manual for more details.
C2155	IBR	Water temperature sensor overheat	iBR cooling system failure. iBR unit failure.	Check iBR cooling circuit. Replace iBR unit. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
C2155	IBR 2013	Water temperature sensor overheat	iBR cooling system failure. iBR unit failure.	Check iBR cooling circuit. Replace iBR unit. Refer to the service manual for more details.
C2161	IBR	Low voltage detected	Battery failure, rectifier failure, damaged circuit wires, battery terminal connection, damaged AC generator or damaged connectors. Ignore fault if "occured"	Check fuses #6 (REFER TO WIRING DIAGRAM). Check ground continuity to the engine block. Refer to the service manual for more details.
C2161	IBR 2013	Low voltage detected	Battery failure, rectifier failure, damaged circuit wires, battery terminal connection, damaged AC generator or damaged connectors. Ignore fault if "occured"	Check fuses #6 (REFER TO WIRING DIAGRAM). Check ground continuity to the engine block. Refer to the service manual for more details.
C2200	IS	Sensors calibration is corrupted	Incompatible firmware or memory failure.	If the fault comes active when the iS is activated and stays active, verify if a software update is available. Refer to the service manual for more details.
C2210	IS	Bridge/CPU temperature sensor overheat	Hardware failure or external heat source.	Check for over utilization / heat.
C2220	IS	Application calibration is corrupted	Incompatible firmware or memory failure.	If the fault comes active when the iS is activated and stays active, verify if a software update is available. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
C2221	IS	Application parameters corrupted (backup #1 or #2)	Unexpected battery power lost or memory failure. Ignore fault if "occured"	Verify starting and charging system circuits. Clear fault Refer to the service manual for more details.
C2230	IS	Internal motor drive failure	Motor voltage feedback not fitting with the command.	If the fault comes active when the iS is activated and stays active, verify if a software update is available. Refer to the service manual for more details.
C2231	IS	Motor shorted to ground/battery	Current leak detected when the bridge is off.	Check suspension actuator pump wiring.
C2232	IS	Motor open	No current while activated.	Check suspension actuator pump and/or wiring.
C2233	IS	Motor current software breaker	Motor current too high.	Check suspension actuator pump.
C2240	IS	Seat position sensor error Open, Shorted to Gnd	Sensor not connected.	Check system circuit at iS module. (REFER TO WIRING DIAGRAM)
C2250	IS	System current software breaker	Battery input current too high.	Check suspension actuator pump.
C2251	IS	System disabled and need activation	System is locked for safety. Need activation.	Activate iS using B.U.D.S. activation function.
C2252	IS	TOPS active	Warning only: TOPS detected by the system, the suspension is disable while the TOPS is "ON".	Refer to the service manual for more details.
C2260	IS	System under voltage	System under voltage warning.	Check battery and charging system.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0106	ECM	Manifold Intake pressure sensor out of range	Sensing port dirty or blocked. Sensor failure or unexpected reading at idle. Sensor fallen out of housing or leaking inlet. For a leak of the Intake Manifold, the ECM will diagnose it only if the RPM is greater than 5000 RPM.	Check system circuits A-B4, A-G4, A-H2. Make sure that the sensor housing is correctly inserted into the manifold. Check sensor connector for: a) 5 volts supply from ECM on pin 1. b) Ground supply from ECM on pin 2. c) Analog voltage from sensor to ECM on pin 3. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current.
P0107	ECM	Manifold absolute pressure sensor shorted to ground or not connected.	Sensing port dirty or blocked. Sensor failure or unexpected reading at idle. Sensor fallen out of housing or leaking inlet. Connector disconnected.	Check system circuits A-B4, A-G4, A-H2. Make sure that the sensor housing is correctly inserted into the manifold. Check sensor connector for: a) 5 volts on pin 1. b) 0 volt on pin 2. c) 0 volt on pin 3. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0108	ECM	Manifold absolute pressure sensor open circuit or shorted to battery	Sensing port dirty or blocked. Sensor failure or unexpected reading at idle. Sensor fallen out of housing or leaking inlet.	Check system circuits A-B4, A-G4, A-H2. Make sure that the sensor housing is correctly inserted into the manifold. Check sensor connector for: a) 5 volts on pin 1. b) 0 volt on pin 2. c) 0 volt on pin 3. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current.
P0112	ECM	Intake manifold temperature sensor shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-H3 and A-J3. Refer to the service manual for more details.
P0113	ECM	Intake manifold temperature sensor open circuit or shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-H3 and A-J3. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0116	ECM	Engine coolant temperature signal not plausible	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check for debris or blockage in cooling system. Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-A1 and A-J2. Refer to the service manual for more details.
P0117	ECM	Engine coolant temperature sensor fault - Short circuit to GND	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check for debris or blockage in cooling system. Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-A1 and A-J2. Refer to the service manual for more details.
P0118	ECM	Engine coolant temperature sensor fault - Short circuit to V+ or connector disconnected.	Engine overheated or damaged sensor. Connector disconnected.	Check for debris or blockage in cooling system. Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-A1 and A-J2. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0122	ECM	TAS (Throttle Accelerator sensor) 1 fault (short circuit to GND)	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-E1, B-K1, B-K3. Check for 0 volt on sensor connector pin E. Check for 5 volts on sensor connector pin D. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current. Check for 0.5 to 3 volts on sensor connector pin F. Refer to the service manual for more details.
P0123	ECM	TAS (Throttle Accelerator sensor) 1 fault (short circuit to battery)	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-E1, B-K1, B-K3. Check for 0 volt on sensor connector pin E. Check for 5 volts on sensor connector pin D. The 5 volt supply is shared between the TLS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current. Check for 0.5 to 3 volts on sensor connector pin F. Refer to the service manual for more details.
P0127	ECM	Intercooler system fault	High air intake temperature detected. Fault detected when the engine is running and stopped. Blocked intercooler water circuit.	Clean intercooler water circuit system. Refer to the service manual for more details.

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P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0171	ECM	Multiplicative mixture adaptation exeeds upper limit--> mixture too lean		An open signal on the Engine coolant temperature (CTS) can trigger that fault
P0172	ECM	Multiplicative mixture adaptation below lower limit--> mixture too rich		An open signal on the Engine coolant temperature (CTS) can trigger that fault
P0201	ECM	Injection Power Stage fault - open line / Cylinder 1	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 2 and ECM connector pin A-B3. Check for 12 volts on pin 2 of injector connector. Check FUSE#13 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Refer to the service manual for more details.
P0202	ECM	Injection Power Stage fault - open line / Cylinder 2	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 2 and ECM connector pin A-K1. Check for 12 volts on pin 2 of injector connector. Check FUSE#14 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0203	ECM	Injection Power Stage fault - open line / Cylinder 3	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 3 and ECM connector pin A-J1. Check for 12 volts on pin 2 of injector connector. Check FUSE#15 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Refer to the service manual for more details.
P0217	ECM	High engine coolant temperature detected	High engine coolant temperature detected	Check for debris or blockage in cooling system. Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-A1 and A-J2. Refer to the service manual for more details.
P0222	ECM	TAS (Throttle Accelerator sensor) 2 fault (short circuit to GND)	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-A3, B-B3, B-J3. Check for 0 volt on sensor connector pin B. Check for 5 volts on sensor connector pin A. Check for 0.25 to 1.5 volts on sensor connector pin C. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0223	ECM	TAS (Throttle Accelerator sensor) 2 fault (short circuit to battery)	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-A3, B-B3, B-J3. Check for 0 volt on sensor connector pin B. Check for 5 volts on sensor connector pin A. Check for 0.25 to 1.5 volts on sensor connector pin C. Refer to the service manual for more details.
P0231	ECM	Fuel pump open circuit or short to ground	Damaged pump, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 1 ohm between pins A and B of the fuel pump connector. Check FUSE#18 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Check for damaged connector, damaged ECM output pins or ECM failure. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0232	ECM	Fuel pump short circuit to battery	Damaged pump, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 1 ohm between pins A and B of the fuel pump connector. Check FUSE#18 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Check for damaged connector, damaged ECM output pins or ECM failure. Refer to the service manual for more details.
P0261	ECM	Injector 1 open circuit or shorted to ground	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 1 and ECM connector pin A-B3. Check for 12 volts on pin 2 of injector connector. Check FUSE#13 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0262	ECM	Injector 1 shorted to battery	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 1 and ECM connector pin A-B3. Check for 12 volts on pin 2 of injector connector. Check FUSE#13 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Refer to the service manual for more details.
P0264	ECM	Injector 2 open circuit or shorted to ground	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 2 and ECM connector pin A-K1. Check for 12 volts on pin 2 of injector connector. Check FUSE#14 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0265	ECM	Injector 2 shorted to battery	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 2 and ECM connector pin A-K1. Check for 12 volts on pin 2 of injector connector. Check FUSE#14 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Refer to the service manual for more details.
P0267	ECM	Injector 3 open circuit or shorted to ground	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 3 and ECM connector pin A-J1. Check for 12 volts on pin 2 of injector connector. Check FUSE#15 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0268	ECM	Injector 3 shorted to battery	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 3 and ECM connector pin A-J1. Check for 12 volts on pin 2 of injector connector. Check FUSE#15 (REFER TO WIRING DIAGRAM) Check for damaged circuit wires. Refer to the service manual for more details.
P0300	ECM	Multiple misfire detected		
P0301	ECM	Misfire cylinder 2 (physical cylinder 1)		
P0302	ECM	Misfire cylinder 0 (physical cylinder 2)		
P0303	ECM	Misfire cylinder 1 (physical cylinder 3)		
P0325	ECM	Knock sensor 1 fault	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins. Open circuit.	Bring engine to 5000 RPM. If fault code appears then check for approximately 5 Mohms between system circuits A-C3 and A-G2. Refer to the service manual for more details.
P0335	ECM	Crankshaft signal error	Damaged sensor, damaged circuit wires, damaged connector, damaged ECM pins or damaged tooth wheel. Connector disconnected.	For the CPS, check for 700 to 900 ohms between terminals A-H1 and A-K2 of ECM connector. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0340	ECM	Camshaft 1 signal error	Damaged sensor, damaged circuit wires, damaged connector, damaged ECM pins or damaged tooth wheel.Connector disconnected.	For the CAPS, check for 12 volts on sensor connector pin 3. Check continuity for circuits A-D4, A-E2 and terminal 4 on engine connector. Check FUSE#12 (REFER TO WIRING DIAGRAM) Engine must run to erase the corrected fault. Refer to the service manual for more details.
P0351	ECM	Ignition coil 1 open circuit or shorted to ground or to battery	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M4. Check for 12 volts on pin 2 of coil connector. Check FUSE#13 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.
P0352	ECM	Ignition coil 2 open circuit or shorted to ground or to battery	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M2. Check for 12 volts on pin 2 of coil connector. Check FUSE#14 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0353	ECM	Ignition coil 3 open circuit or shorted to ground or to battery	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 3 and ECM connector pin A-M1. Check for 12 volts on pin 2 of coil connector. Check FUSE#15 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.
P0354	ECM	Ignition Power Stage fault - short circuit to GND / Cylinder 1	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M4. Check for 12 volts on pin 2 of coil connector. Check FUSE#13 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.
P0355	ECM	Ignition Power Stage fault - short circuit to GND / Cylinder 2	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M2. Check for 12 volts on pin 2 of coil connector. Check FUSE#14 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0356	ECM	Ignition Power Stage fault - short circuit to GND / Cylinder 3	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 3 and ECM connector pin A-M1. Check for 12 volts on pin 2 of coil connector. Check FUSE#15 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.
P0357	ECM	Ignition Power Stage fault - short circuit to V+ / Cylinder 1	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M4. Check for 12 volts on pin 2 of coil connector. Check FUSE#13 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.
P0358	ECM	Ignition Power Stage fault - short circuit to V+ / Cylinder 2	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M2. Check for 12 volts on pin 2 of coil connector. Check FUSE#14 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.

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P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0359	ECM	Ignition Power Stage fault - short circuit to V+ / Cylinder 3	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 3 and ECM connector pin A-M1. Check for 12 volts on pin 2 of coil connector. Check FUSE#15 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.
P0360	ECM	Ignition Power stage max error & false detection of low battery voltage / Cylinder 1	Signal not plausible, verify battery voltage too low during ignition.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M4. Check for 12 volts on pin 2 of coil connector. Check FUSE#13 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.
P0361	ECM	Ignition Power stage max error & false detection of low battery voltage / Cylinder 2	Signal not plausible, verify battery voltage too low during ignition.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M2. Check for 12 volts on pin 2 of coil connector. Check FUSE#14 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0362	ECM	Ignition Power stage max error & false detection of low battery voltage / Cylinder 3	Signal not plausible, verify battery voltage too low during ignition.	Check for 0.85 to 1.15 ohms between engine connector pin 3 and ECM connector pin A-M1. Check for 12 volts on pin 2 of coil connector. Check FUSE#15 (REFER TO WIRING DIAGRAM) Refer to the service manual for more details.
P0512	ECM	Starter power stage detects high current	Damaged solenoid, damaged circuit wires, damaged connector or damaged ECM.	Verify FUSE#16 (5AMP). Check for 12 volts on pin 2 of the starter relay. Refer to the service manual for more details.
P0513	ECM	Invalid D.E.S.S. Key detected	Key not programmed in ECU.	Program a good key
P0520	ECM	Oil pressure switch functional problem	Engine leak, oil pump failure, damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check resistance at 0 RPM and above 3500 RPM. Switch is normally closed, ECM connector pin A-E3 Refer to the service manual for more details.
P0523	ECM	Oil pressure sensor fault	Engine leak, oil pump failure, damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins. Fault detected when the engine is running or stopped.	Check resistance at 0 RPM and above 3500 RPM. Refer to the service manual for more details.
P0524	ECM	Low oil pressure condition	Low oil level, engine leak, oil pump fault.	Check oil level. Check impedance of sensor. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0544	ECM	Exhaust gas temperature sensor functional problem	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the service manual for more details.
P0545	ECM	Exhaust gas temperature sensor shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the service manual for more details.
P0546	ECM	Exhaust gas temperature sensor open circuit or shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the service manual for more details.
P0560	ECM	Battery voltage not plausible	Battery failure, rectifier failure, damaged circuit wires, battery terminal connection, damaged AC generator or damaged connectors.	Check fuses #6 (REFER TO WIRING DIAGRAM). Check ground continuity to the engine block. Refer to the service manual for more details.
P0562	ECM	Battery voltage too low	Battery failure, rectifier failure, damaged circuit wires, battery terminal connection, damaged AC generator or damaged connectors.	Check fuses #6 (REFER TO WIRING DIAGRAM). Check ground continuity to the engine block. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0563	ECM	Battery voltage too high	Battery failure, rectifier failure or battery terminal connection.	Check for regulator-rectifier failure. Refer to the service manual for more details.
P0564	CLUSTER	Cruise switch fault	The cruise switch is shorted or activated more than 60 seconds.	Verify the cruise switch if it is normally open and close when activated.
P0606	ECM	ECM ADC fault	Damaged ECM.	Replace ECM
P060D	ECM	TAS (Throttle Accelerator sensor) synchronization error	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-E1, B-K1, B-K3, B-A3, B-B3, B-J3 Check for 0 volt on sensor connector pin B & E. Check for 5 volts on sensor connector pin A & D. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current. Check for 0.5 to 3 volts on sensor connector pin Fand 0.25 to 1.5 on C Refer to the service manual for more details.
P060E	ECM	Throttle Actuator - Controller Fault- digital position control exceeds limit		
P0610	ECM	Variant coding fault		

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P0629	CLUSTER	Fuel sensor disconnected fault	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 2.6 ohms (full tank) to 93.6 ohms (empty tank) between pin C and pin D at the fuel pump connector. Check system circuit at the gauge Pin 19 and 20. (REFER TO WIRING DIAGRAM)
P062F	ECM	ECM EEPROM fault - exchange ECM	Damaged ECM.	Replace ECM.
P06B6	ECM	ECM Fast ADC fault (knock detection line)		
P1030	ECM	Heater Power Stage fault for lambda sensor upstreams of catalyst - open line		
P1106	ECM	Altitude correction factor (fho) not plausible - out of range		
P1120	ECM	Throttle positions calculated from TPS 1 and TPS 2 not corresponding	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1130	ECM	Lambda Sensor fault upstreams of catalyst - open line		
P1171	ECM	Additive mixture adaptation exceeds upper limit –> mixture too lean		An open signal on the Engine coolant temperature (CTS) can trigger that fault
P1172	ECM	Additive mixture adaptation below lower limit –> mixture too rich		An open signal on the Engine coolant temperature (CTS) can trigger that fault

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P1502	ECM	T.O.P.S. functional problem	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins.	Check continuity for circuits A-C4, A-G1, A-F4. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current. Refer to the service manual for more details.
P1503	ECM	T.O.P.S. switch short circuit to 12V	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins.	Check continuity for circuits A-C4, A-G1, A-F4. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current. Refer to the service manual for more details.
P1504	ECM	T.O.P.S. switch short circuit ground	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins.	Check continuity for circuits A-C4, A-G1, A-F4. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current. Refer to the service manual for more details.
P1505	ECM	T.O.P.S. switch fault non plausible state	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins. Open circuit.	Check continuity for circuits A-C4, A-G1, A-F4. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P1506	ECM	T.O.P.S. switch open circuit	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins. Open circuit.	Check continuity for circuits A-C4, A-G1, A-F4. The 5 volt supply is shared between the TAS signal 1, TOPS and MAPS. Verify all three sensor if one is pulling too much current. Refer to the service manual for more details.
P1550	ECM	Otas sensor voltage not plausible	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM. Open circuit.	Check continuity for circuits B-H3, B-H1 and FUSE#12. Refer to the service manual for more details.
P1606	ECM	ECM ADC fault - exchange ECM	Damaged ECM.	No service action available for fault P1606.
P160E	ECM	Throttle Actuator - Controller Fault - digital position control below limit	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1610	ECM	Throttle Actuator - Power Stage fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1611	ECM	Throttle Actuator - Power Stage fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1612	ECM	Throttle Actuator - Power Stage fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P1613	ECM	Throttle Actuator - Power Stage fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1614	ECM	Throttle Actuator - Return-Spring check not passed / Spring does not close	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1615	ECM	Throttle Actuator - Position monitoring fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1616	ECM	Throttle Actuator - Default position check or learning fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1619	ECM	Throttle Actuator - Adaptation of upper mechanical limit failed	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1620	ECM	Throttle Actuator - Adaptation of lower mechanical limit failed	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1621	ECM	Throttle Actuator - Abortion of adaptation	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P1622	ECM	Throttle Actuator - Repeated abortion of adaptation	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1654	ECM	Voltage of D.E.S.S. key switch out of range	Damaged D.E.S.S. key switch, damaged circuit wires, damaged connector or damaged ECM output pins.	Remove D.E.S.S. key and check system circuit B-B2. Refer to the service manual for more details.
P1657	ECM	Electrical fault of D.E.S.S. key communication line	Damaged D.E.S.S. key switch, damaged circuit wires, damaged connector or damaged ECM output pins.	Remove D.E.S.S. key and check system circuit B-B2. Refer to the service manual for more details.
P1658	ECM	Faulty D.E.S.S. key communication	Damaged D.E.S.S. key switch, damaged circuit wires, damaged connector or damaged ECM output pins.	Remove D.E.S.S. key and check system circuit B-B2. Refer to the service manual for more details.
P1661	ECM	iBR malfunction	iBR fault detected by ECM.	Remove D.E.S.S. key Perform an electrical system shut down. Clear fault.
P1662	ECM	iBR torque request is not plausible	iBR fault detected by ECM.	Perform iBR software update if available or replace iBR.
P1679	ECM	Main Relay Sticking	Permanent 12V is present on ECM Pin B-M4.	ECU pin B-M4 is permanently supplied thru 15 amp fuse and it should be accessory 12 Vdc.
P16B6	ECM	ECU Fast ADC fault (knock detection line)		
P16B7	ECM	ECU Fast ADC fault (knock detection line)		
P16B8	ECM	ECU Fast ADC fault (knock detection line)		
P16C0	ECM	Fault of ECM ADC		
P16C1	ECM	Fault of ECM ADC		

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P16C2	ECM	Fault of ECM monitoring module		
P16C3	ECM	Monitoring fault due to Accelerator Sensor check		
P16C4	ECM	Monitoring fault due to engine speed check		
P16C5	ECM	Safety fuel cut off activ - Monitoring level 1		
P16C6	ECM	Safety fuel cut off activ - Monitoring level 2		
P16C7	ECM	Monitoring fault due to throttle valve plausibility check	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P16C8	ECM	Monitoring fault due to exceeding permitted throttle valve position	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P16C9	ECM	Monitoring detected non plausible D.E.S.S. key state	Damaged D.E.S.S. key switch, damaged circuit wires, damaged connector or damaged ECM output pins.	Remove D.E.S.S. key and check system circuit B-B2. Refer to the service manual for more details.
P16CA	ECM	ECU detected faulty watch dog line ECU defect	Damaged ECM.	Replace ECM.
P16CB	ECM	ECU switch off through watch dog line (hardware fault) ECU defect	Damaged ECM.	Replace ECM.
P2080	ECM	Exhaust temperature not plausible	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P2081	ECM	Exhaust temperature sensor fault	Intremittent connection. Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the service manual for more details.
P212C	ECM	Electrical lower-range violation TPS 2	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, replace ECM
P212D	ECM	Electrical upper-range violation TPS 2	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, replace ECM
P2159	ECM	TAS (Throttle Accelerator sensor) signal not plausible		
P2279	ECM	Air intake manifold leak downstream of throttle		
P2428	ECM	High exhaust temperature detected	Exhaust overheat, damaged sensor or damaged circuit wires.	Check cooling system for blockage. Check if the exhaust injection valve is properly calibrated. Refer to the service manual for more details.
P2620	ECM	TPS value not plausible	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM
P2621	ECM	Electrical lower-range violation TPS 1	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
P2622	ECM	Electrical upper-range violation TPS 1	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM
U0129	ECM	CAN communication error between ECM and iBR module	iBR fault detected by ECM. C.A.N. circuit failure, iBR or ECM failure. Disconnected connector.	Check C.A.N. circuits wires. Replace iBR. Refer to the service manual for more details.
U0129	IS	IBR CAN messages timeout or validity	Warning only: the iS module lost communication with the iBR.	If fault ACTIVE, verify CAN connection between iBR and iS
U0300	ECM	Exchange security - Wrong ECM	Incorrect ECM or cluster for engine.	Install proper recommended ECM or cluster for vehicle.
U0401	IBR	ECM CAN messages timeout or validity	C.A.N. circuit failure, ECM software failure.	Check C.A.N. circuits wires. Replace ECM. Refer to the service manual for more details.
U0401	IS	ECM CAN messages timeout or validity	Warning only: the iS module lost communication with the engine ECU.	If fault ACTIVE, verify CAN connection between ECM and iS
U0401	IBR 2013	ECM CAN messages timeout or validity	C.A.N. circuit failure, ECM software failure.	Check C.A.N. circuits wires. Replace ECM. Refer to the service manual for more details.
U0457	IBR	Cluster CAN messages timeout or validity	C.A.N. circuit failure, Cluster software failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the service manual for more details.
U0457	IS	Cluster CAN messages timeout or validity	Warning only: the iS module lost communication with the Cluster.	If fault ACTIVE, verify CAN connection between Cluster and iS

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
U0457	IBR 2013	Cluster CAN messages timeout or validity	C.A.N. circuit failure, Cluster software failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the service manual for more details.
U16A1	ECM	Cluster CAN Timeout error-Missing CAN ID 514h	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the service manual for more details.
U16A2	ECM	Cluster CAN Timeout error-Missing CAN ID 230h	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the service manual for more details.
U16A3	ECM	Cluster CAN Timeout error-Missing CAN ID 408h	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the service manual for more details.
U16A4	ECM	iBR CAN Timeout error-Missing CAN ID 010h	iBR fault detected by ECM. C.A.N. circuit failure, iBR or ECM failure. Disconnected connector.	Check C.A.N. circuits wires. Replace iBR. Refer to the service manual for more details.
U16A5	ECM	iBR CAN Timeout error-Missing CAN ID 012h	iBR fault detected by ECM. C.A.N. circuit failure, iBR or ECM failure. Disconnected connector.	Check C.A.N. circuits wires. Replace instrument iBR. Refer to the service manual for more details.
U16A6	ECM	Cluster check sum error - CAN ID230h	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the service manual for more details.

P-CODE	MODULE	DESCRIPTION	CAUSE	ACTION
U16A7	ECM	Cluster check sum error - CAN ID408h	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the service manual for more details.
U16A8	ECM	iBR check sum error - CAN ID010h	iBR fault detected by ECM. C.A.N. circuit failure, ECM software failure.	Check C.A.N. circuits wires. Replace iBR. Refer to the service manual for more details.
U16A9	ECM	iBR check sum error - CAN ID012h	iBR fault detected by ECM. C.A.N. circuit failure, ECM software failure.	Check C.A.N. circuits wires. Replace iBR. Refer to the service manual for more details.
U16AA	ECM	Cluster CAN Timeout error-Missing CAN ID 410h		
U16AB	ECM	Cluster check sum error - CAN ID410h		

INTELLIGENT THROTTLE CONTROL (iTC)

SERVICE TOOLS

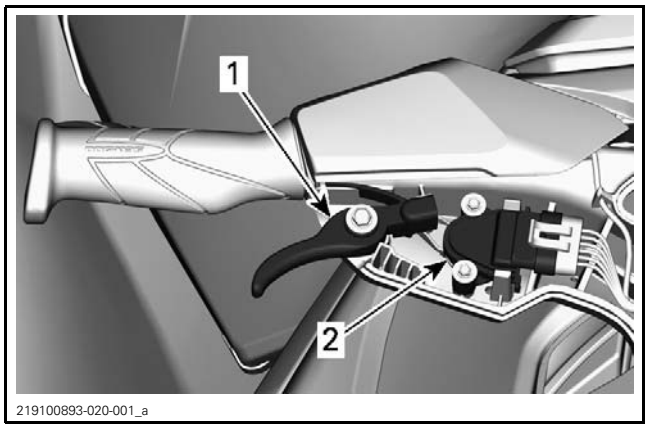
Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 384	112
FLUKE 115 MULTIMETER	529 035 868	114

GENERAL

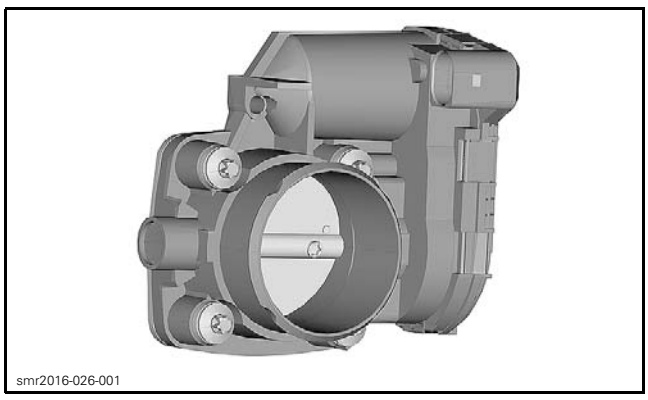
SYSTEM DESCRIPTION

Some functions or features described in this section may not apply to every PWC model, or may be available as an option.

The iTC is an electronic throttle control system that includes a cableless throttle control located on the RH side of handlebar, an electric throttle actuator (ETA) located on the throttle body and the engine control module (ECM). The iTC is often referred to as a "throttle by wire" system.



1. Throttle lever
2. Throttle accelerator sensor (TAS)



The throttle lever operates the throttle accelerator sensor (TAS). It is a double output hall effect sensor. The redundancy is used for security purposes.

The throttle actuator (ETA) is a DC motor on the throttle body that regulates the throttle plate via a drive gear. Pulse width modulation (PWM) is used to control the motor. In the throttle body, there is a double throttle position sensor (TPS). The redundancy is used for security purposes. The TPS is a potentiometer that supplies the ECM the actual angle position of the throttle plate.

According to the torque demand from the TAS, the ECM powers the ETA motor to rotate towards open or close the throttle plate. When the ECM detects through the TPS that the throttle plate has reached the targeted opening, the ECM stops the throttle actuator.

The iTC allows the throttle actuator to be moved irrespective of the accelerator sensor position since it is not directly linked by a throttle cable.

While the throttle lever might be fully pulled in and held, the ECM could close the throttle plate instead of opening it if the iBR lever were pulled in. Then, the ECM could open the throttle plate to accelerate the engine to increase the braking effect. These different throttle plate movements could be achieved while the throttle lever was still fully pulled in. This is one of the great flexibility of the iTC.

The use of the iTC allows the following additional engine modes of operation.

Default riding mode

Default riding mode allows the operator to choose for progressive throttle response at certain engine speed.

Available engine power and acceleration is reduced when accelerating from a complete stop and when operating in the low engine power range under certain conditions.

When throttle is applied, the engine will progressively accelerate to an operating range whereby full power eventually becomes available. If the engine is throttled down sufficiently and for a long enough period of time, engine power and acceleration will again be reduced.

Sport Mode

Sport mode allows the operator for instant throttle response.

Maximum engine power is available throughout the engine operational range.

ECO Mode

When ECO mode is selected (fuel economy mode), engine RPM is limited whereby an optimal cruising speed is maintained in order to reduce fuel consumption.

Speed limiter mode

Cruise mode is a function of iTC (intelligent Throttle Control) system that allows the operator to set the desired maximum watercraft speed.

This is useful when cruising for long distances, operating in limited speed zones, or towing a tuber, skier or wake boarder.

Cruise mode only limits forward speed, the operator must keep the throttle depressed to maintain forward speed.

Once the maximum cruise speed is set, the operator can vary the watercraft speed from idle speed up to the set cruise speed using the throttle lever. The set cruise speed will not be exceeded even if the throttle lever is fully depressed.

As you proceed under a constant cruising speed setting, keep your attention level up to maintain good situational awareness.

Slowing down is a matter of releasing the throttle lever further than the set point, or by pulling the iBR lever in or decrease speed with the DOWN button.

If the iBR lever is pulled in for braking, CRUISE mode is overridden but **not deactivated**.

Once the iBR lever is released and the throttle is pulled in to engage forward position, the cruise function will reengage to limit the watercraft speed as it was set before iBR lever activation.

Slow Speed Mode

The Intelligent Throttle Control also allows for a Slow Speed Mode where the driver can adjust and set idle speed. This is useful when operating in slow speed zones where the driver must be especially attentive to possible obstacle avoidance.

The throttle plate will open and close as necessary to maintain the set speed.

Ski Mode (If equipped)

Ski mode allows for repeated and precisely controlled launches and a set towing speed, designed specifically for towing a skier or wake boarder.

RAMP Function

The RAMP function available in ski mode is a preprogrammed function used for launching and accelerating the PWC when towing a skier or wakeboarder.

TARGET SPEED Function

The TARGET SPEED function limits the maximum towing speed.

Learning

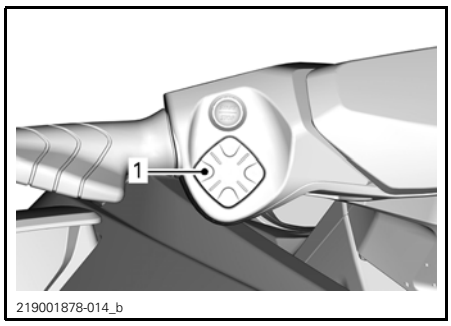
Learning limit the watercraft maximum speed. The full stroke of the throttle lever is used while only a partial stroke of the throttle plate is achieved. Therefore, greater throttle lever movement is used while a smaller engine speed and torque variation is applied through the throttle actuator. This permits a more accurate and easier throttle operation to control the engine within a specified torque curve and maximum speed setting for a learner.

OPERATING MODES

	GTI	GTI SE	GTR	WAKE
Default riding mode	X	X	X	X
Sport mode	X	X	X	X
ECO mode	X	X	X	X
Speed Limiter mode	N/A	X	X	X
Slow speed mode	N/A	X	X	X
Ski mode	N/A	-	-	X
Learning key modes	X	X	X	X

X = Indicates a **standard** feature
- = See your Sea-Doo dealer for availability.
N.A. = Not Applicable

To change the operating mode;
– Press MODE button,
– Acknowledge the safety message by pressing and holding MODE button will get the SPORT mode,
– Pressing MODE button again will activate the SKI mode,
– Pressing the MODE button again will activate the ECO mode.



1. Mode button

Default riding Mode

By default, the watercraft is set to DEFAULT riding mode of operation when started.

Sport Mode

SPORT MODE provides for instant throttle response and more rapid accelerations than TOURING MODE.

Once activated, SPORT MODE will remain active until it is deactivated by the operator, or the engine is shut down whereby it defaults back to TOURING MODE.

Activating Sport Mode

To activate the Sport mode, press once on the mode button while in touring mode. The sport icon will start to flash and a safety message will scroll. For safety reason, follow the instruction in the safety message to activate the sport mode. Once activated, the SPORT icon will turn ON.

Deactivating Sport Mode

A single press on mode button will take you to the SKI mode (if available) or ECO mode.

ECO Mode (Fuel Economy Mode)

ECO mode provides a smoother throttle application and increased fuel economy.

Speed Limiter Mode (if equipped)

Speed limiter mode is a function of iTC (intelligent Throttle Control) system that allows the operator to set the desired maximum watercraft speed.

This is useful when cruising for long distances, operating in limited speed zones, or towing a tuber, skier or wake boarder.

The operator must keep the throttle depressed to maintain forward speed.

Once the maximum speed is set, the operator can vary the watercraft speed from idle speed up to the set speed using the throttle lever. The set speed will not be exceeded even if the throttle lever is fully depressed.

As you proceed under a constant speed setting, keep your attention level up to maintain good situational awareness.

Slowing down is a matter of releasing the throttle lever further than the set point, or by pulling the iBR lever in.

If the iBR lever is pulled in for braking, Speed Limiter mode is overridden but **not deactivated**.

Once the iBR lever is released and the throttle is pulled in to engage forward thrust, the speed limiter function will reengage to limit the watercraft speed as it was set before.

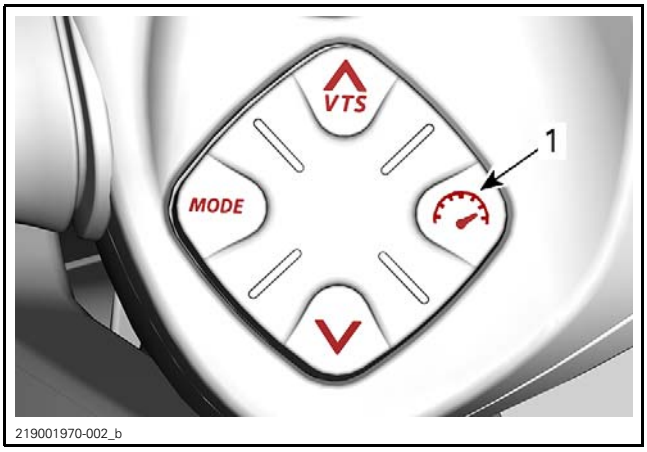
Prerequisite for Speed Limiter Mode Activation

NOTE: Speed limiter mode is not available if slow speed mode or ski mode (if equipped) is engaged.

Speed limiter MODE can be activated when the watercraft is going at more then 15m/h.

Activating Speed Limiter Mode

1. Maintain a constant speed.
2. Press the Speed Control button.



1. Speed Control button

You will hear a beep indicating that you are now in speed limiter mode, and a speed limiter MODE indicator will be lit.



TYPICAL

NOTE: Activating speed limiter mode of operation only limits the maximum speed available when depressing the throttle lever. The throttle lever must be held in to maintain forward speed. Watercraft speed can be varied from idle up to the set cruise speed using the throttle lever once the speed limiter function is activated. Watercraft speed may vary depending on water conditions during use.

To change the set speed; keep throttle lever fully depressed and press the UP or DOWN arrow button.

Deactivating Speed Limiter Mode

To deactivate speed limiter mode:

1. Release the throttle lever.
2. Long press the speed limiter button.

Deactivation of speed limiter mode is indicated by:

– The speed limiter indicator will go off.

NOTE: If the throttle lever is not fully released when the button is pressed to deactivate the speed limiter mode, the speed limiter MODE indicator will remain on. The speed limiting function will stay active until the throttle is fully released, then the speed limiter MODE indicator will go out.

Slow Speed Mode

The Intelligent Throttle Control also allows for a Slow Speed Mode where the driver can adjust and set idle speed. This is usefull when operating in slow speed zones where the driver must be especially attentive to possible obstacle avoidance.

The operator can set idle speed between 1.6 km/h to 11 km/h (1 MPH to 7 MPH).

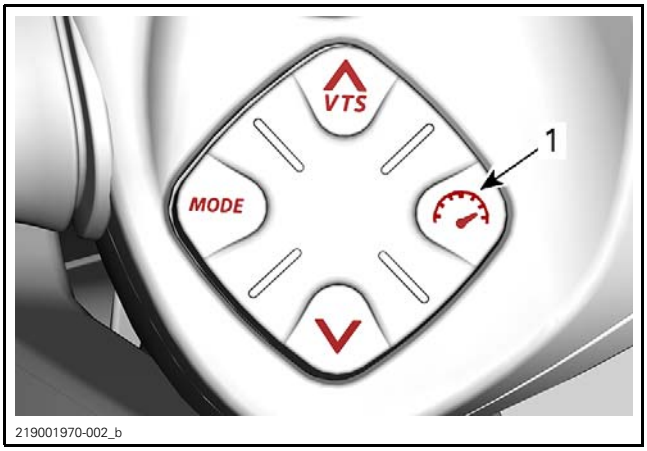
If you accelerate above approximately15 km/h (9 MPH) , Slow Speed Mode will be deactivated and the engine will return to idle RPM when the throttle is released.

Should a situation arise where the operator must stop or accelerate quickly away from a hazardous situation, pulling in the iBR lever, or pulling in on the throttle lever will deactivate slow speed mode and normal control of the watercraft will be returned to the operator.

Activating Slow Speed Mode

To activate slow speed mode of operation:

1. Release the throttle lever to idle RPM.
2. Press the Speed Control button.



1. Speed Control button

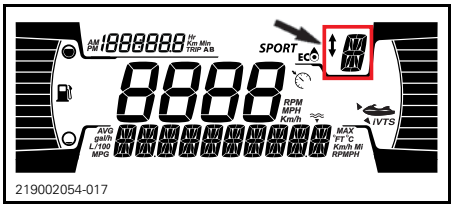
The Speed limiter/Slow Speed indicator will come on in the multifunction display to indicate activation.



TYPICAL

A message will scroll in the multifunction display to specify that you are now in slow speed mode.

The default slow speed setting of 5 will show in the numerical display.



Changing Set Slow Speed

To **increase** or **decrease** the set slow speed, press the UP/DOWN button on the RH handlebar once, or repeatedly.

NOTE: There are 9 slow speed settings available (1 through 9). Adjust slow speed mode to desired speed.

When pressing the up/down button, a message ''SET LEVEL'' will appear. You can select from one of the 9 slow speed setting (1 to 9).

Level 5 is the default and it correspond to the normal idle of the vehicle. By using level 1-4 you can slow down the vehicle and go as slow as 1.5 km/h (1 MPH). The slow speed mode can be used as a trolling mode and is useful for fishing. Level 6-9 gives you the ability to go up to 12 km/h (7 MPH) without touching the throttle lever.

NOTE: Speed will vary depending on load, wind and waves conditions

Deactivating Slow Speed Mode

The slow speed mode can be deactivated using any of the following methods:

– Pressing the Speed Control button.
– Depressing the iBR lever.
– Accelerating past the set slow speed.

When deactivating SLOW SPEED MODE by accelerating using the throttle lever, the iBR gate stays in the forward position.

When using the iBR lever, the iBR gate will move towards the reverse position, then neutral when the lever is released.

SLOW SPEED MODE deactivation will be indicated in the following manner:

– The Speed Limiter indicator will go out

Ski Mode (If equipped)

Ski mode allows for repeated and precisely controlled launches, and a set towing speed, specifically for towing a skier or wake boarder.

RAMP Function

The RAMP function offers a pre-programmed setting for launching and accelerating the PWC.

RAMP 1 provides:

– Slowest launch (smoothest)
– Slowest acceleration rate

RAMP 5 provides:

– Quickest launch
– Quickest acceleration rate

TARGET SPEED Function

The TARGET SPEED function limits the maximum towing speed.

Once the RAMP has been selected, an average PWC target speed for that RAMP will be visible in the numerical display.

The operator may increase or decrease the target speed to any value within the selected RAMP speed range.

Using Ski Mode

Press MODE button to select the SKI mode.

1. Press OK button when SKI icon flashes.

2. Select ski ramp by using the UP or DOWN arrow button. Ramp 1 will give the slowest acceleration.

NOTE: Acceleration ramp will not behave the same depending on the vehicle type, vehicle load and water conditions. For safety reasons, always start using ramp # 1 to familiarize your skier with acceleration and then change the ramp as needed.

3. Press RIGHT arrow button to confirm acceleration ramp.
4. Select the maximum target speed by using the UP or DOWN arrow button.
5. Press RIGHT arrow button to confirm.

NOTE: At any moment you can use the left and right arrow to change the ramp and speed selection.

6. After your selection and when your are ready, press the OK button to activate the function.

The message SKI READY will display.

Keep throttle fully applied to ski.

Releasing the throttle or applying the brake will pause the SKI mode, simply press OK button to reactivate the SKI mode.

Deactivating Ski Mode

To end a ski run and completely deactivate ski mode, release the throttle to idle, then press the MODE button.

Learning Key Mode

The learning I key provides a mode of operation whereby engine power and speed is limited.

There are 5 speed settings available.

By default, the speed setting is no 1.

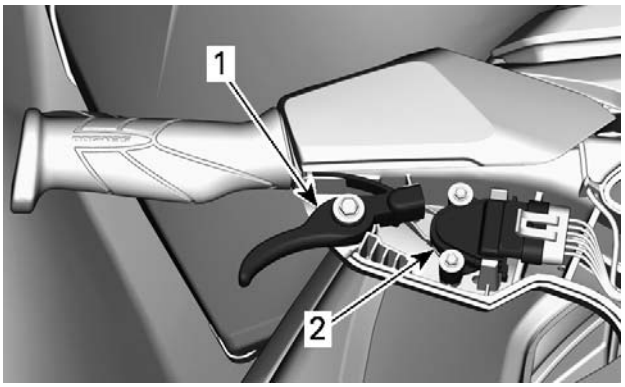
Refer to *4.5 DIGITAL DISPLAY* for adjustment.

PROCEDURES

THROTTLE ACCELERATOR SENSOR (TAS)

General

The throttle accelerator sensor (TAS) is a double hall effect sensor that sends a signal to the ECM which is proportional to the throttle lever angle.

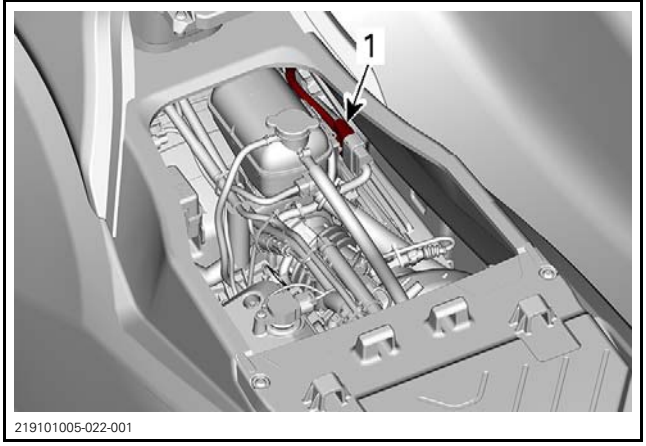


1. Throttle lever
2. Throttle accelerator sensor (TAS)

First ensure the throttle lever functions adequately. Pull the throttle lever fully in towards the handlebar, then release it. It must reach the wide open position and return to the idle position freely when released. Otherwise, refer to *STEERING SYSTEM* for an inspection.

Testing TAS Voltage

1. Disconnect the 20-pin steering connector.



1. 20-pin connector

2. Connect the diagnostic harness to make an in-line connection between the disconnected connectors.

REQUIRED TOOL	
DIAGNOSTIC HARNESS (P/N 529 036 384)	

3. Install the tether cord on the engine cut-off switch.
4. Briefly press the START button to wake up the ECM.

5. Measure the voltage readings on the installed diagnostic harness connector as follows. Refer to wiring diagram for details.

20-PIN CONNECTOR		IDLE POSITION	WIDE OPEN POSITION
PIN		VOLTAGE (VDC)	
13 (VI/BU)	14 (BK)	4.9 - 5.1	
14 (BK)	15 (YL/BU)	0.15 - 0.35	1.4 - 1.6
16 (VI/GN)	17 (BK)	4.9 - 5.1	
17 (BK)	18 (YL/GY)	0.4 - 0.6	2.9 - 3.1

If voltage is as per specification, the TAS sensor is functional.

If voltage is out of specification, check continuity of wires between the ECM and the sensor. If continuity is good, replace sensor.

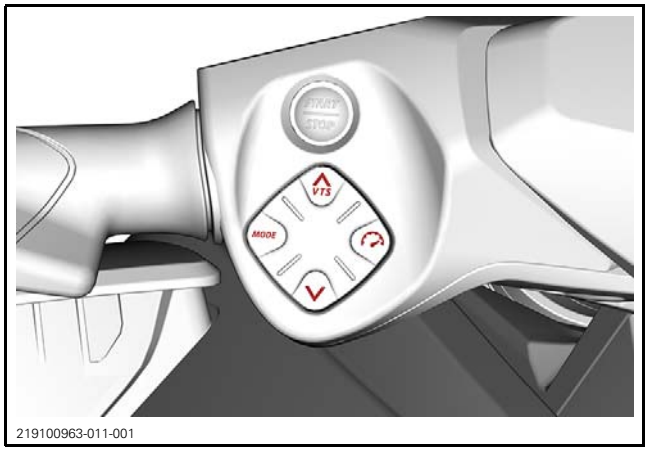
6. Reinstall removed components.

Replacing the TAS

Refer to BRLS in iBR subsection.

MODE/SPEED CONTROL SWITCH

Mode/Speed Control Switch Overview



219100963-011-001

The Mode/Speed Control switch contain a series of 4 diodes for the Mode and Speed Control switches.

The center wire to the switches (pin C), is common for Mode/Speed Control switch and VTS switch. The other two wires (pins A and B), act as signal wires for each set of switches to the gauge. They actually each form one branch of an electronic circuit within the gauge.

Each diode (in circuit) drops a nominal 0.6 Vdc when conducting electricity. If the circuit current passes through all four diodes (if the Mode/Speed Control switch is open), a drop of 2.4 Vdc would be measured across the 4 the diodes (pin A to pin C). This 2.4 Vdc at pin A tells the gauge the Mode/Speed Control switch is open.

If the Mode button is pressed, 2 diodes are bypassed. The remaining two diodes in the circuit drop 1.2 Vdc (at pin A).

If the Speed Control button is pressed, 1 diode is bypassed. The remaining three diodes in the circuit drop 1.8 Vdc (at pin A).

The gauge senses these voltages and interprets them as signals that tell it which switch is activated.

When Mode or Speed Control button is pressed, a circuit within the gauge will translate it to CAN protocol and transmit it through the CAN bus. The ECM (engine control module) will react to the command and carry out the function.

NOTE: The above stated voltages vary slightly depending on the actual voltage applied to the circuit and the current flow through the diodes. When using a Fluke 115 multimeter for testing in diode test mode, the voltage and current applied by the multimeter are lower than in circuit. The quality of probe contact, the actual probes and leads, and the precision of the meter calibration will all affect the results, which will most likely be slightly lower than nominal values stated.

Testing the Mode/Speed Control Switch

If Mode/Speed Control switches do not allow the selection, test the switches as follows:

– Connect the vehicle to the BRP diagnostic software (BUDS2). Refer to *COMMUNICATION TOOLS* subsection.
– Check if there is any occurred or active fault code(s). If not, proceed with the following test.
– In BUDS2, go to:
  - **Measurements** page
  - **Cluster** button
  - **Cluster** - **Basic** tab
– Depress the Mode button on steering and check the **Mode** light status.
– Repeat with the Speed Control switch. **Speed Control** light status should change

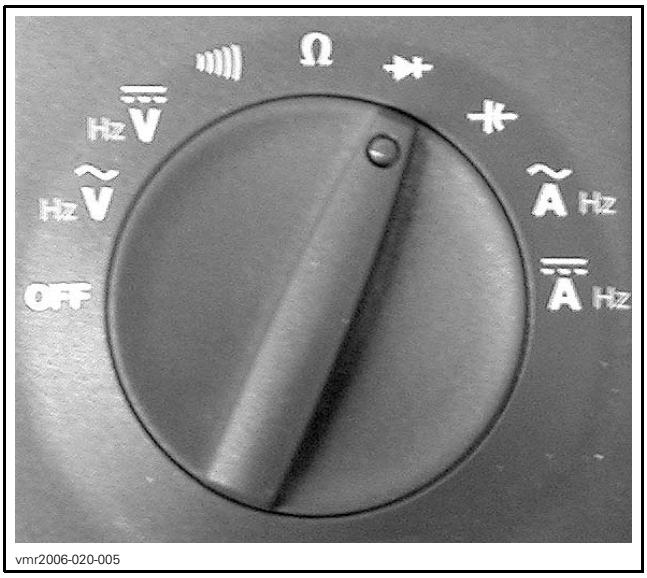
If one switch does not function, replace Mode/Speed Control switch.

If both switches stay off, do the following to verify the circuit.

1. Remove the gauge support cover.
2. Disconnect the gauge connector.
3. Using the multimeter set to the diode test function, test the Sport or ECO switches as per following tables.

REQUIRED TOOL
FLUKE 115 MULTIMETER (P/N 529 035 868)

NOTE: In diode test mode, the multimeter will test the voltage drop through the diodes.



vmr2006-020-005

MULTIMETER LEAD/ GAUGE CONNECTOR	SWITCH POSITION	VOLTAGE
RED lead/Pin 16 BLACK lead/Pin 2	Both switches released	± 2.4 Vdc
	Speed Control switch depressed	OL
	Mode switch depressed	± 1.2 Vdc
RED lead/Pin 16 BLACK lead/Pin 2	Both switches released	OL
	Speed Control switch depressed	
	Mode switch depressed	

NOTE: Remember that each diode should drop approximately 0.6 Vdc when positively biassed, and read as an OL (open circuit) when negatively biassed (leads reversed).

If, when measuring between pins 16 and 2 an OL is obtained with both positive and negative diode biassing, test the wiring harness continuity between the gauge and switch assembly. If harness continuity is good, replace the switch assembly.

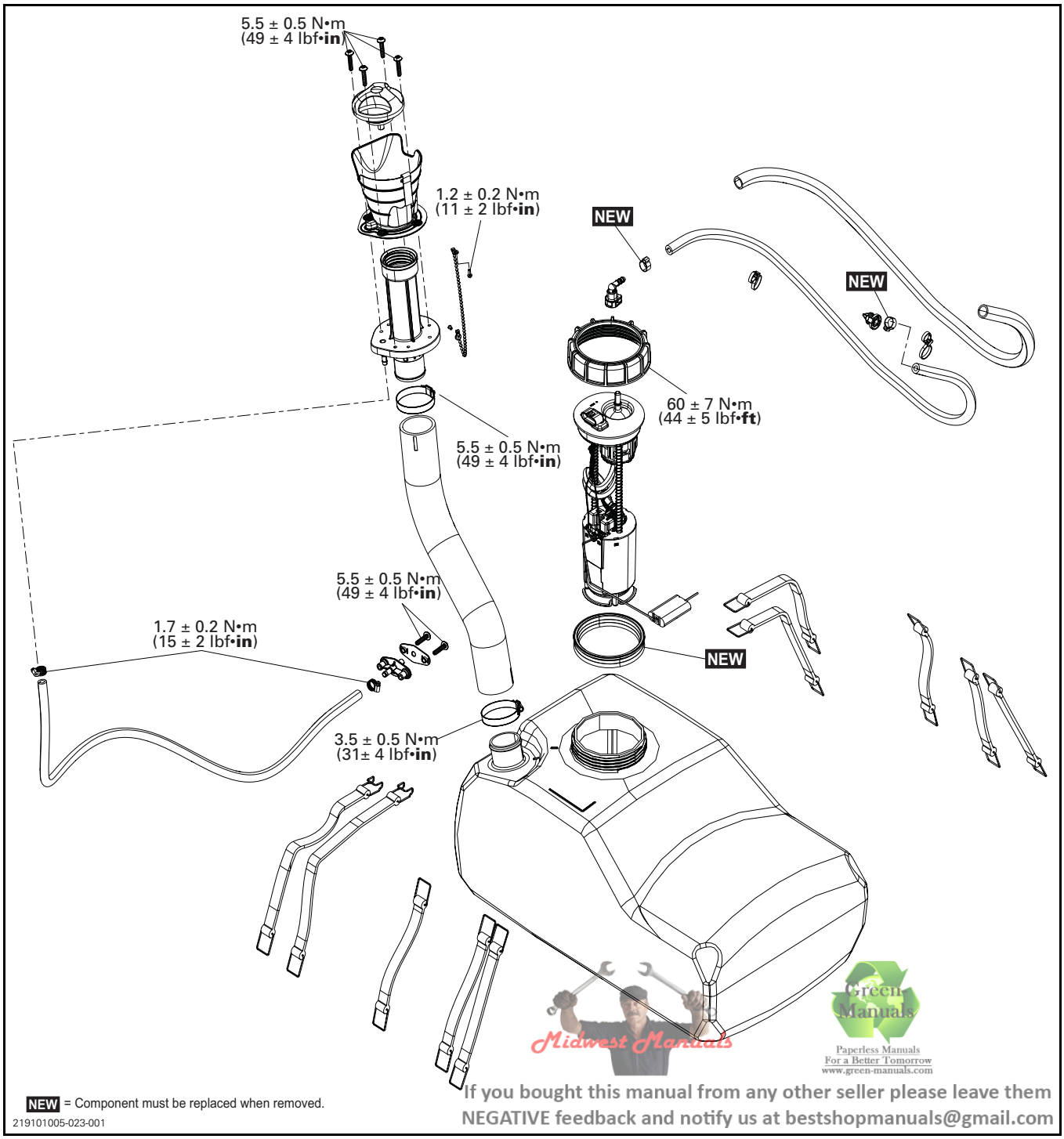
If any reading is significantly different than listed, carry out the same test at the switch connector, refer to the wiring diagram. If you obtain the same results, replace the switch assembly.

If voltages measured on every switch are as listed in the previous tables (or very close to it), the switches and the wiring harness are good. The fault may be within the gauge, or in the circuit or component the function applies to.

FUEL TANK AND FUEL PUMP

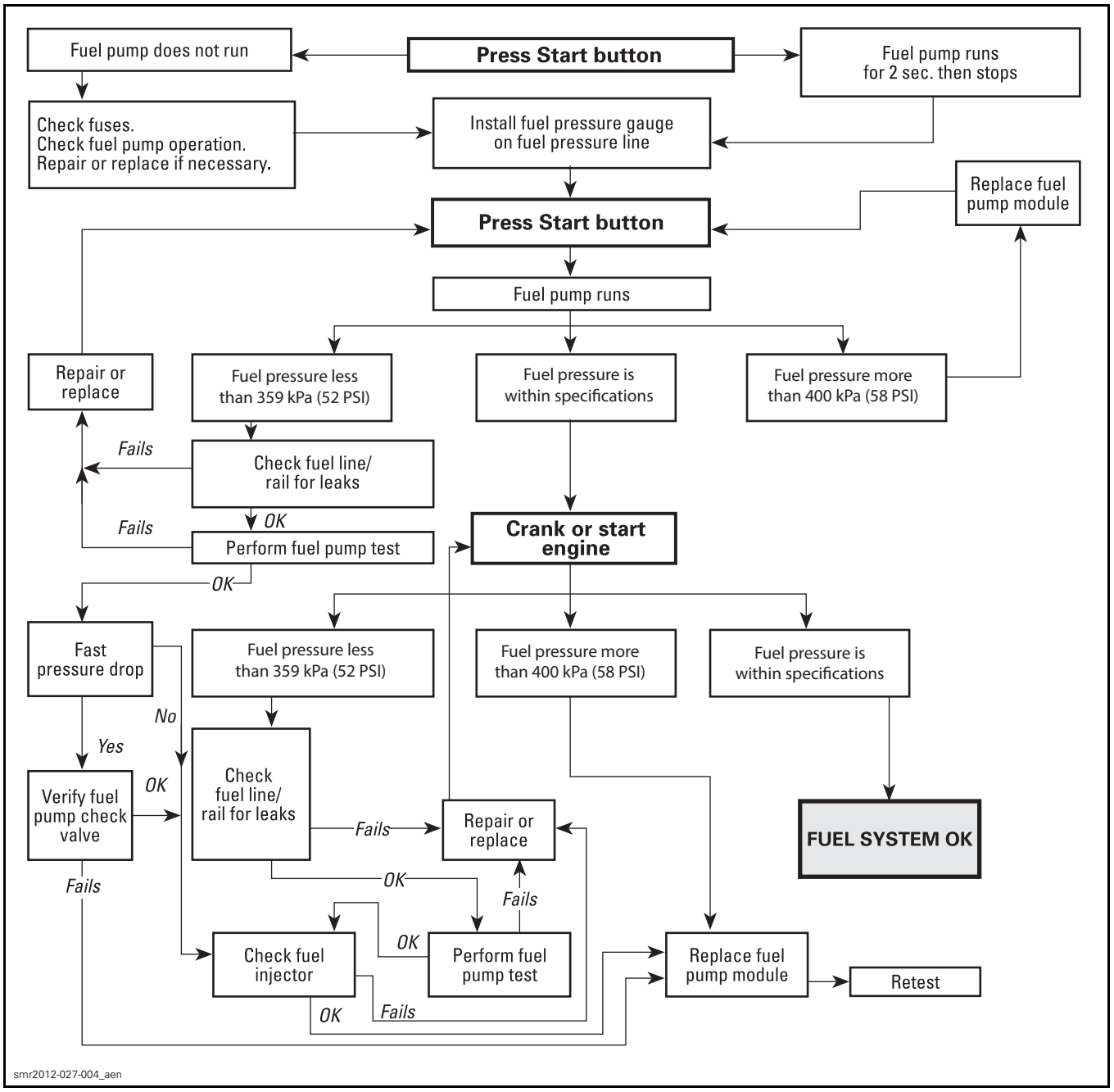
SERVICE TOOLS

Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 384	128
ECM ADAPTER TOOL	529 036 166	118
FLUKE 115 MULTIMETER	529 035 868	118
FUEL HOSE ADAPTER	529 036 396	122
FUEL PUMP MODULE SOCKET	529 036 125	118
FUEL TANK TEST CAP	529 036 242	120
OETIKER PLIER	295 000 070	124
PRESSURE GAUGE	529 036 395	122
VACUUM/PRESSURE PUMP	529 021 800	118
VENTED CAP TEST ADAPTER (THREADED)	529 036 243	121



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FUEL SYSTEM DIAGNOSTIC FLOW CHART



GENERAL

The following tools are required to test most of the electrical parts.

REQUIRED TOOLS	
ECM ADAPTER TOOL (P/N 529 036 166)	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

The following tool is required to perform most leak test.

REQUIRED TOOL	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

The following tool is required to remove and install fuel pump locking ring.

REQUIRED TOOL	
FUEL PUMP MODULE SOCKET (P/N 529 036 125)	

⚠ WARNING

Fuel lines remain under pressure at all times. Always proceed with care and use appropriate safety equipment when working on a pressurized fuel system. Wear safety glasses.

⚠ WARNING

Always disconnect battery prior to working on the fuel system. Fuel vapors are flammable and explosive under certain conditions. Always work in a well ventilated area. Do not allow fuel to spill on hot engine parts and/or on electrical connectors. Proceed with care when removing/installing high pressure test equipment or disconnecting fuel line connections. Cover the fuel line connection with an absorbent shop rag. Wipe off any fuel spillage in the bilge.

⚠ WARNING

When the repair is completed, ensure that hoses and connections from fuel rail to the fuel pump are properly secured. Then, pressurize the fuel system. After carrying out a fuel pump pressure test, use the valve on the fuel pressure gauge to release the pressure (if so equipped).

⚠ WARNING

The fuel pump is energized for a few seconds each time the START button is depressed. It builds fuel system pressure very quickly. Prior to pressing the START button, ensure there are no disconnected or damaged fuel lines that may leak fuel. A high pressure leak test must be carried out whenever a fuel system component has been disconnected.

⚠ WARNING

Ensure wires and hoses are routed and secured away from any vibrating, rotating, moving or hot components or sharp edges. Use appropriate shields and fastening devices as per factory standards.

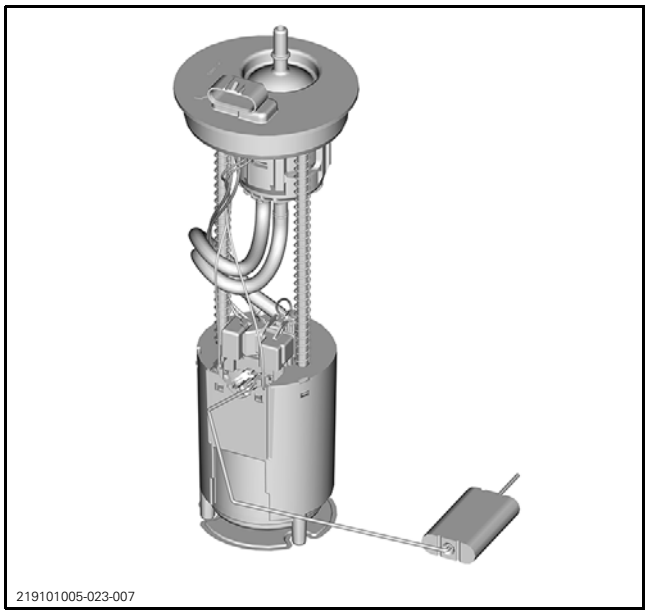
NOTICE Whenever repairing the fuel system, always check for water infiltration in the fuel tank. Replace any damaged, leaking or deteriorated fuel line.

SYSTEM DESCRIPTION

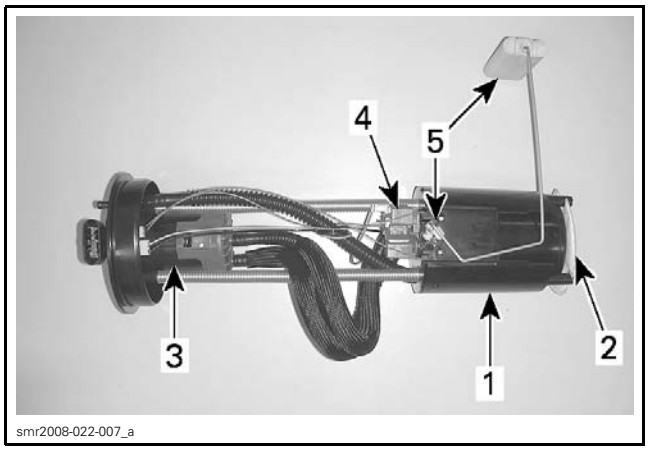
The fuel system is comprised of:
- A fuel tank
- A vented fuel tank cap
- A fuel pump module mounted inside the fuel tank
- A variety of hoses.

The fuel pump module is basically comprised of:
- An electric fuel pump mounted inside a canister type pump reservoir
- A lower inlet filter
- An upper outlet filter
- A pressure regulator
- A float type fuel level sensor.

Fuel Pump Module



The fuel pump module is inserted in the fuel tank. It provides fuel delivery for the EFI system and includes the following components.



FUEL PUMP MODULE COMPONENTS
1. *Fuel pump reservoir*
2. *Lower inlet filter*
3. *Upper outlet filter*
4. *Fuel pressure regulator*
5. *Float type fuel level sensor*

Fuel Pump Operation

When the pump is in operation, it draws fuel into the reservoir through a lower inlet filter and a disk type valve.

The pressurized fuel is pushed through an upper outlet filter to the fuel rail.

Excess fuel pressure generated by the pump is routed from the upper filter back to the pump canister reservoir by a pressure regulator mounted on the pump reservoir cover.

When the START button is pressed, the electrical system is powered. The fuel pump will turn on momentarily to pressurize the fuel rail in preparation for the engine start.

The ECM supplies the ground (power control signal) to turn on the fuel pump motor.

The pressure regulator will ensure appropriate fuel pressure is supplied to the injectors.

When the ECM receives a signal to shut down the engine (START/STOP switch, engine cut-off switch, or T.O.P.S. switch) it removes the fuel pump ground signal.

Fuel Level Indication

An electric float type fuel level sensor is mounted on the side of the fuel pump reservoir. As the float moves with changing fuel levels, it varies a resistance that changes the voltage signal coming from the information center (digital display). This signal is representative of the fuel level.

The information center interprets the fuel level voltage signal that comes back from the fuel level sensor. It then displays the proper fuel level in the information center and a low fuel warning message when required.

The information center will also trigger the beeper which produces the appropriate beep signal to warn the driver of a low fuel condition.

The fuel level sensor resistance is at its lowest value when the fuel tank is full, and at its highest value when the tank is empty.

Refer to the *FUEL LEVEL SENSOR* in this subsection for fuel level sensor testing procedures.

Fuel Tank Venting

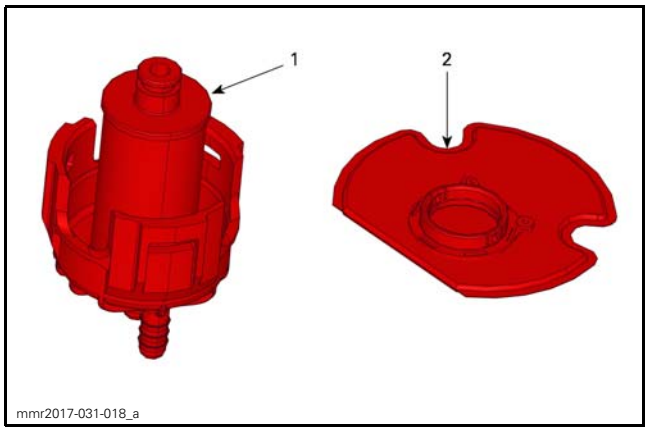
The entire vent system is incorporated within the fuel tank cap.

⚠ WARNING

If the cap requires replacement, it must be replaced with an approved vented cap of the same type supplied by BRP. Use of any other cap, or use of a non-vented cap will not allow proper venting of the fuel tank. The result may be engine fuel starvation, fuel tank overpressure, or fuel leaks which could lead to a fire or an explosion.

NOTE: BRP is the only supplier of the vented fuel tank cap. There is no equivalent vented fuel tank cap available on the market today.

Fuel Filters

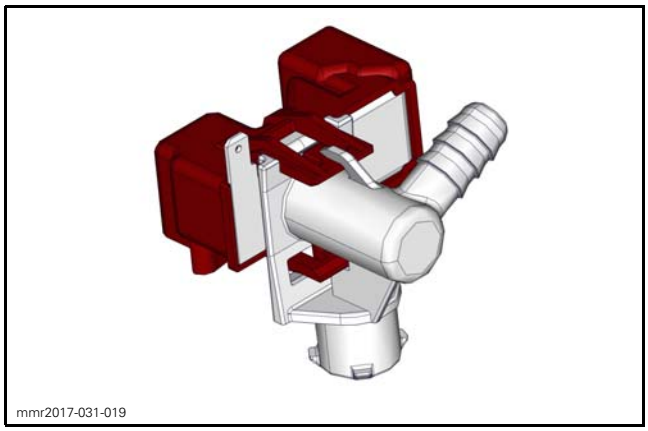


FUEL FILTERS
1. *Upper outlet filter*
2. *Lower inlet filter*

The system comprises two levels of filtration.

A lower inlet filter (prefilter) attached to the bottom of the pump, and a upper outlet filter that is integral to the fuel pump module.

Fuel Pump Pressure Regulator



The fuel pressure regulator is integral to the fuel pump module. The pressure regulator maintains proper fuel pressure for the EFI system.

Fuel Tank Vent System

The fuel tank is equipped with a vent system that ensures the fuel tank remains at ambient pressure.

Air can enter and exit the fuel tank at all times through the fuel tank vent valve. This prevents negative pressure within the fuel tank which could cause fuel starvation.

The vent valve also prevents fuel from flowing out through the inlet of the vent system should the vehicle be overturned.

INSPECTION

FUEL TANK LEAK TEST

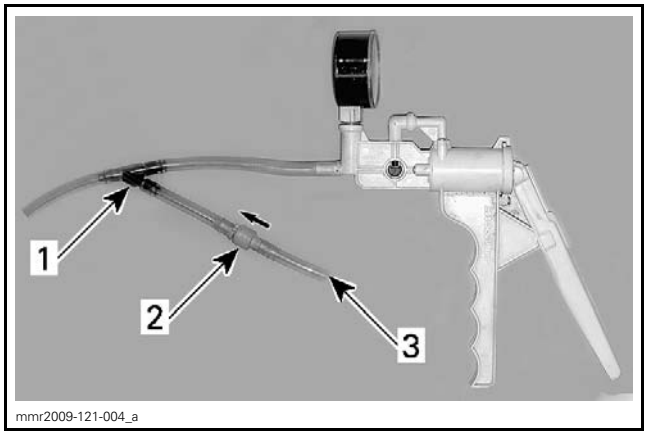
⚠ WARNING

Always carry out a fuel tank leak test whenever the fuel tank shows signs of wear or damage which may cause a leak, or when the fuel pump has been removed or replaced, or if you suspect a leak. If the fuel tank is damaged, the fuel tank should be replaced even if no leak is present. Do not attempt to repair the fuel tank.

1. Visually inspect condition of hoses and clamps.
2. Remove fuel tank cap.
3. Install test cap on filler neck.
4. Use the following tool and vacuum/pressure pump to pressurize fuel tank.

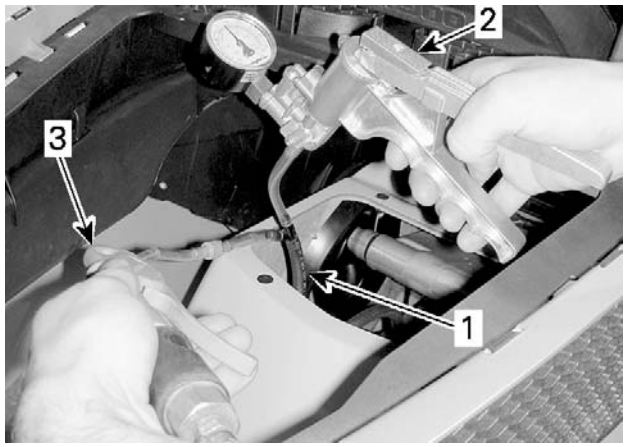
REQUIRED TOOL	
FUEL TANK TEST CAP (P/N 529 036 242)	

NOTE: A Y-fitting and a check valve can be installed to use compressed air for quick pressure build-up when the fuel tank is not full.



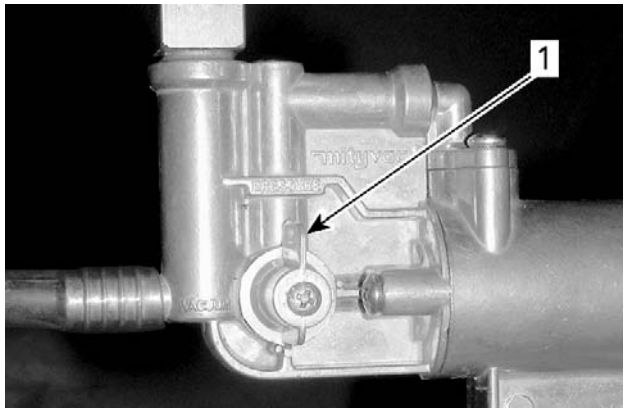
1. *Y-fitting (P/N 293 710 059)*
2. *Check valve (P/N 275 500 505)*
3. *Apply compressed air here*

5. Connect the vacuum/pressure pump to the nipple of fuel tank test cap.



TYPICAL
1. *Inlet valve end*
2. *Vacuum/pressure pump*
3. *Compressed air supply*

6. Set vacuum/pressure pump to PRESSURE.



1. *Pressure selected*

7. Pressurize fuel tank to specification.

NOTICE Do not exceed the specification when pressurizing the fuel tank.

FUEL TANK LEAK TEST	
PRESSURE	TIME WITHOUT PRESSURE DROP
21 kPa (3 PSI)	10 minutes

If the pressure drops, locate fuel leak(s), repair/replace leaking component(s) and retest.

NOTE: In case of fuel tank leak, do not attempt repair. Fuel tank must be replaced.

Possible leak areas are:
– Filler neck with cup, hose and connections
– Fuel tank
– Fuel tank neck
– Fuel pump gasket

To locate a leak, check for a fuel smell or leaking fuel.

If a leak is not visible, spray a soapy water solution on components to ease locating the leak(s); bubbles will indicate the leak location(s).

NOTICE When the fuel system leak test is completed, thoroughly rinse all components of the soapy water solution with clear water. A soapy water residue may cause premature deterioration and must be rinsed away.

⚠ WARNING

If a leak is found, do not start the engine. Wipe off any fuel that leaked and ventilate the hull thoroughly to remove any accumulated fuel vapors. Do not use electric powered tools on watercraft unless system has passed the leak test.

8. Remove test cap.

FUEL TANK CAP LEAK TEST

To test the fuel tank cap, use the following tool and vacuum/pressure pump.

REQUIRED TOOL	
VENTED CAP TEST ADAPTER (THREADED) (P/N 529 036 243)	

Inlet Check Valve Function Test

Install the fuel tank cap onto the vented cap test adapter.

Set vacuum/pressure pump to the VACUUM function.

Connect vacuum/pressure pump to nipple of vented cap test adapter.

Squeeze the vacuum/pressure pump handle several times to draw air in through the check valve of fuel tank cap.

Air should be drawn in freely and vacuum indication on pump should remain at zero. If vacuum rises, replace the fuel tank cap.

Pressure Relief Valve Function Test

Set the vacuum/pressure pump to the PRESSURE function.

Squeeze the vacuum/pressure pump handle to apply pressure to the check valve of fuel tank cap and observe the pressure rise. It should be as per specification.

PRESSURE RELIEF VALVE FUNCTION TEST	
PRESSURE	TEST RESULT
Up to 6.9 kPa (1 PSI)	Pressure must hold
Above 6.9 kPa (1 PSI) and below 13.8 kPa (2 PSI)	Pressure must release

If pressure holds above specification, replace the fuel tank cap.

Remove test adapter.

Reinstall/close fuel tank cap.

FUEL SYSTEM HIGH PRESSURE LEAK TEST

⚠ WARNING

A high pressure leak test must be carried out before starting the engine anytime a fuel system component has been disconnected for maintenance or replacement.

1. Visually inspect fuel system to ensure all fuel system connections are properly made.
2. Lightly pull on hoses at each connection to ensure they are properly locked at the quick connect fittings.
3. Remove tether cord from the engine cut-off switch to prevent engine starting.
4. Press the START button to turn on the fuel pump for a few seconds and pressurize the fuel system.
5. Check for fuel odor and visually inspect hoses, fittings and components for leaking fuel.
6. If a leak is detected, repair or replace the leaking component and repeat leak test after the repair.
7. If no leak is found, engine can be started.

FUEL PUMP PRESSURE TEST

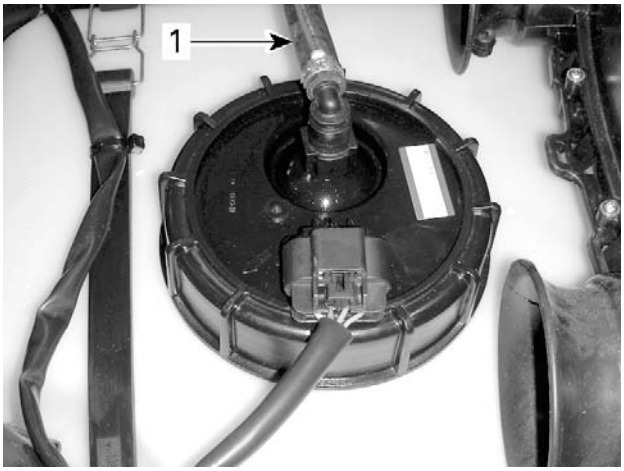
Preparation

The pressure test will show the available pressure at the fuel pump outlet. It validates the pressure regulator, the fuel pump and check valve and it tests for leaks in the system.

1. Ensure the battery is fully charged, refer to *CHARGING SYSTEM* subsection.
2. Ensure hoses and fittings are not leaking. Repair any leak.
3. Ensure the fuel level in the fuel tank is sufficient.
4. Disconnect the pressure outlet hose from the fuel pump.

⚠ WARNING

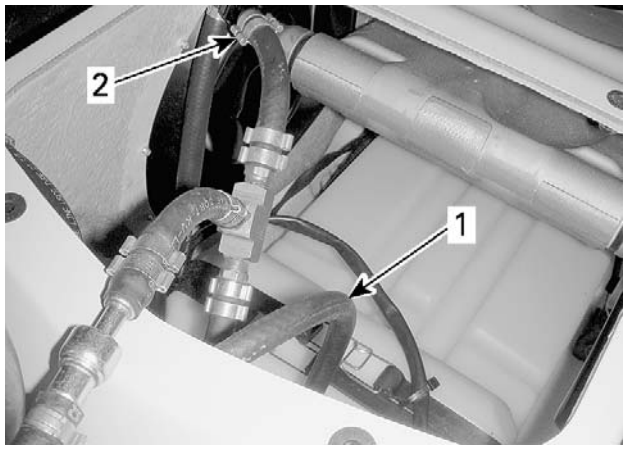
Cover the fuel line connection with an absorbent shop rag. Wipe off any fuel spillage inside the bilge.



1. Outlet hose

5. Install pressure test tools between disconnected hose and fuel pump fitting (in line installation).

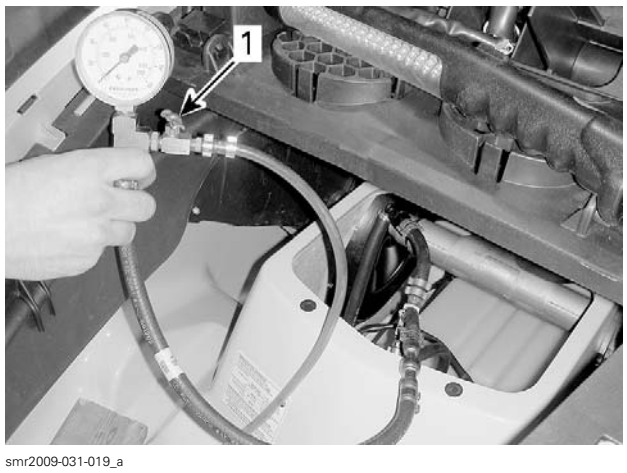
REQUIRED TOOLS	
PRESSURE GAUGE (P/N 529 036 395)	
FUEL HOSE ADAPTER (P/N 529 036 396)	



TYPICAL
1. Connect to fuel pump
2. Connect to outlet hose

Test when Engine Is Stopped

1. Remove tether cord from the engine cut-off switch to prevent engine starting.
2. Press the START button and observe fuel pressure.
3. Release pressure in system using the valve on the pressure gauge between each test so that the reading returns to zero (0).
4. Repeat test twice and compare readings to specifications in following table.



FUEL PUMP PRESSURE TEST
1. Valve on gauge

FUEL PRESSURE (WHEN PRESSING THE START BUTTON)
386 kPa - 414 kPa (56 PSI - 60 PSI)

Test when Cranking or Starting Engine

1. **Crank or start engine** and observe fuel pressure. The fuel pressure should be the same as in previous test.

If pressure is good, fuel pump and pressure regulator are functioning correctly.

2. Stop the engine.

A rapid pressure drop indicates leakage either from the fuel rail or from the fuel pump check valve. Check fuel rail for leaks.

If a pressure drop occurs when pressing the START button and the fuel rail is not leaking, then replace the fuel pump module.

A slow pressure drop indicates leakage either from a fuel injector or from the fuel pressure regulator in the fuel pump module. To check fuel injectors for leaks, refer to the *ELECTRONIC FUEL INJECTION (EFI)* subsection. If injectors are not leaking, then replace fuel pump.

3. Release fuel pressure in system using the valve on the pressure gauge.
4. Remove pressure gauge and reinstall fuel hose on fuel pump module.

⚠ WARNING

Wipe off any fuel spillage in the bilge. Fuel is flammable and explosive under certain conditions.

5. Reinstall all other removed parts, refer to applicable subsections.

PROCEDURES

FUEL HOSES AND OETIKER CLAMPS

Inspecting the Fuel Hose

1. Inspect all fuel hoses for wear, kinks, cracks or any other types of damages.
2. Inspect all clamps for tightness.

Replacing the Fuel Hose

When replacing fuel hoses, be sure to use hoses and clamps as available from BRP parts department. This will ensure continued proper and safe operation.

⚠ WARNING

Use of fuel lines other than those recommended by BRP may compromise fuel system integrity.

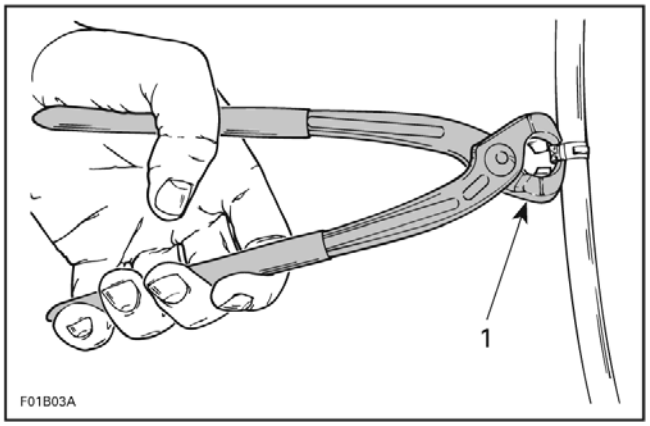
⚠ WARNING

- Never use a hose pincher on high pressure hoses.
- Never change the routing of a fuel hose.
- Always reinstall the corrugated protective tubing on fuel hoses.
- Secure fuel hoses using the appropriate locking tie or fastener to prevent contact with sharp edges or hot, rotating and moving parts.
- After connecting a hose or a quick connect fitting, pull on the hose near the fitting to make sure it is securely locked.
- Always validate fuel system tightness by performing a *FUEL PUMP PRESSURE TEST*.

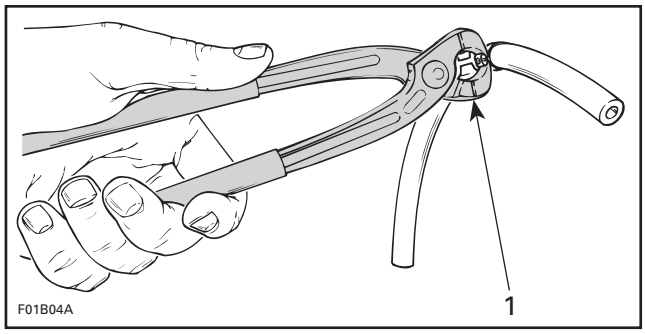
Replacing the Oetiker Clamps

To secure or cut Oetiker clamps on fuel lines, use appropriate pliers.

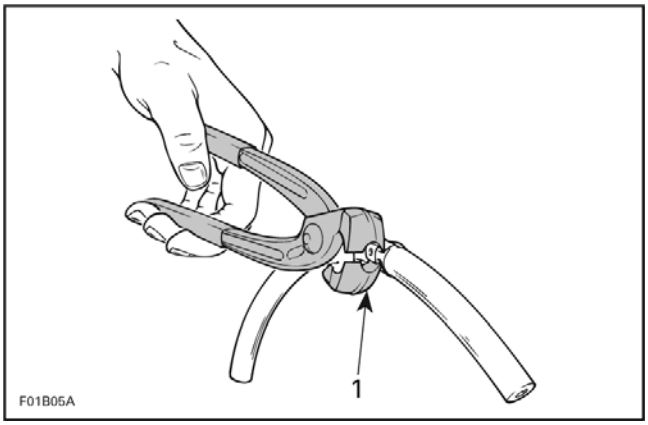
REQUIRED TOOL	
OETIKER PLIER (P/N 295 000 070)	



1. Cutting clamp



1. Securing clamp



1. Securing clamp in limited access

⚠ WARNING

Whenever removing a hose in the fuel system, always use new Oetiker clamps at assembly.

FUEL PUMP

Fuel Pump Operation Test

1. Remove tether cord from the engine cut-off switch to prevent engine starting.
2. Press START button.
3. The fuel pump should run for 2 seconds to build up fuel system pressure.
4. If fuel pump runs, carry out the *FUEL PUMP PRESSURE TEST* as described in *INSPECTION* in this subsection.
5. If the fuel pump does not run:
   - Ensure ECM is powered. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
   - Check fuse F2. If fuse is faulty, replace it and repeat test. If fuse is good, carry out the *FUEL PUMP INPUT VOLTAGE TEST* in this subsection.

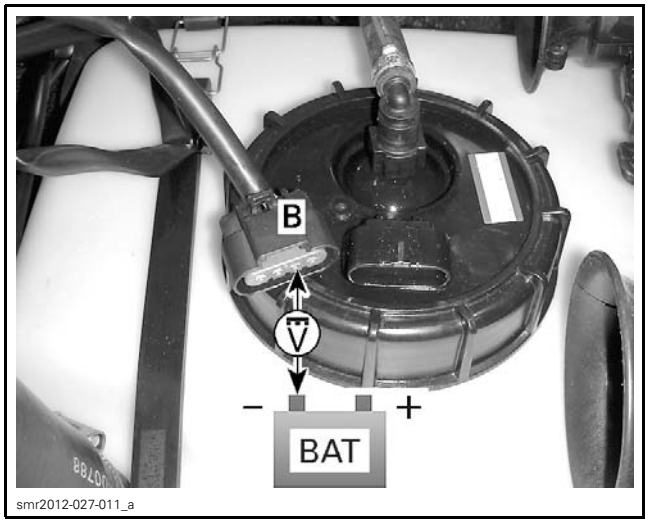
Fuel Pump Pressure Test

Refer to *INSPECTION* in this subsection.

Fuel Pump Input Voltage Test

1. Ensure the fuel pump fuse (F2) is in good condition.
2. Disconnect fuel pump harness connector. Refer to *FUEL PUMP REMOVAL* in this subsection.
3. Use multimeter and select Vdc.
4. Press the START button.
5. Read voltage at fuel pump harness connector as per following table.

FUEL PUMP INPUT VOLTAGE TEST		
TEST PROBES		VOLTAGE
Pin B (+ probe)	Battery ground (- probe)	Battery voltage



FUEL PUMP INPUT VOLTAGE TEST

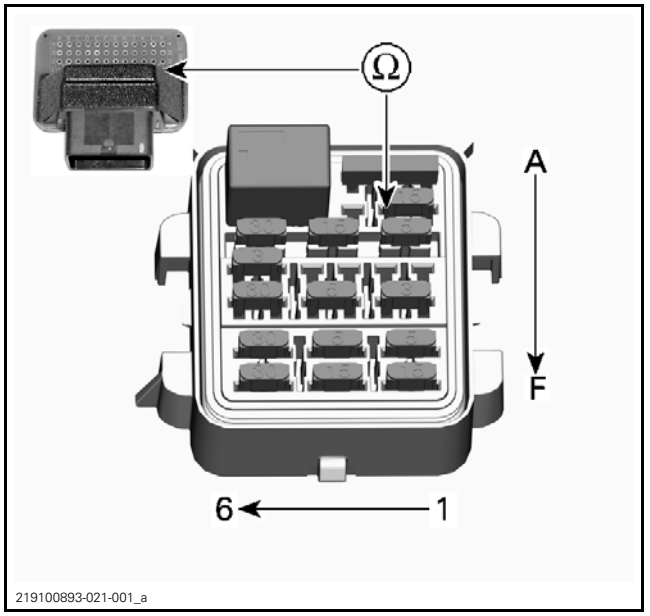
If battery voltage is read, power circuit is good. Test the fuel pump circuit. Refer to *FUEL PUMP CIRCUIT TEST* in this subsection.

If battery voltage is not read, power circuit is faulty. Test continuity of power circuit wiring between fuse box and fuel pump. Refer to *FUEL PUMP CIRCUIT TEST* in this subsection.

Fuel Pump Circuit Test

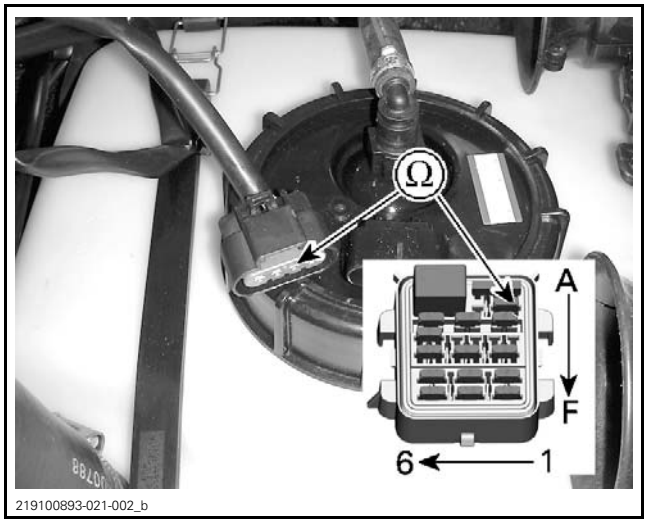
1. Reconnect the fuel pump harness connector.
2. Remove cover of fuse box.
3. Remove ECM connector "B" and install it on the ECM adapter.
4. Set multimeter to Ω and test pump circuit as per following table.

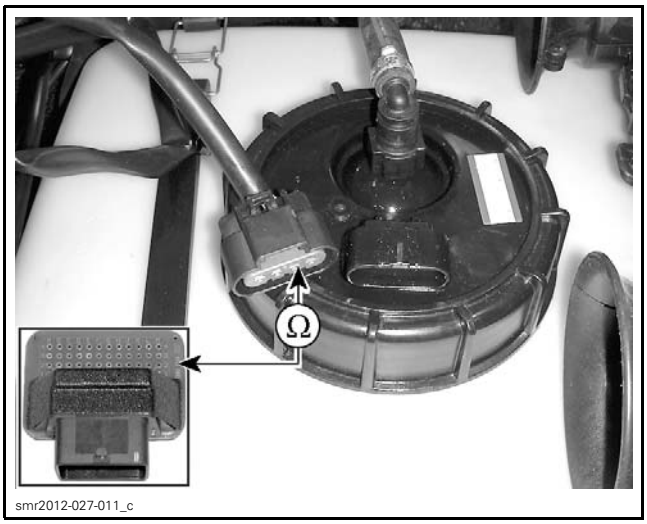
PUMP CIRCUIT TEST THROUGH FUEL PUMP		
TEST PROBES		RESISTANCE @ 20°C (68°F)
Fuse box terminal B2	ECM connector B pin B-M1	Approx. 12 Ω



5. If test succeeded, the fuel pump, its fuse and its wiring harness are good.
6. If test failed, test wiring continuity as per table.

FUEL PUMP HARNESS CONTINUITY TEST (WIRING ONLY)		
TEST PROBES		RESISTANCE @ 20°C (68°F)
Pump harness connector pin B	Fuse box terminal B1	Close to 0 Ω (continuity)
Pump harness connector pin A	ECM connector B pin B-M1	





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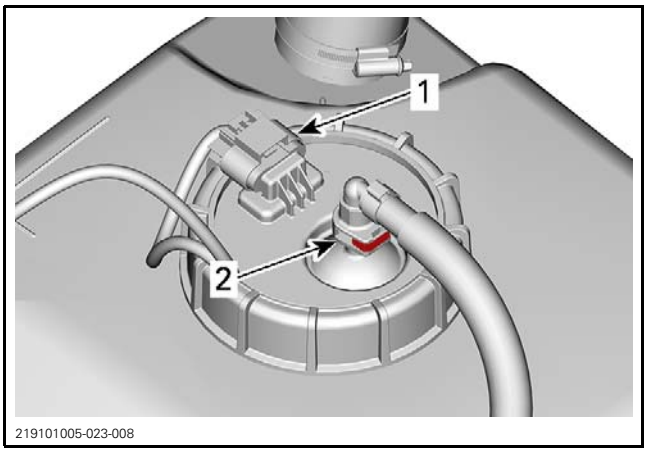
If there is an open circuit to FB-F2, repair wiring/connector between fuel pump and fuse box.

If there is good continuity to FB-F2 and fuel pump fuse (F18) is good, check continuity of the wire jumper between D2 and E2. Repair or replace wiring as required.

If every test succeeded and fuel pump still does not work, replace ECM. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Removing the Fuel Pump

1. Disconnect the negative battery terminal, refer to *CHARGING SYSTEM* subsection.
2. Disconnect fuel pump electrical connector.
3. Wrap shop rags around the high pressure fuel hose fitting, push the red locking tab of the quick connect fitting out than push down to disconnect the hose.

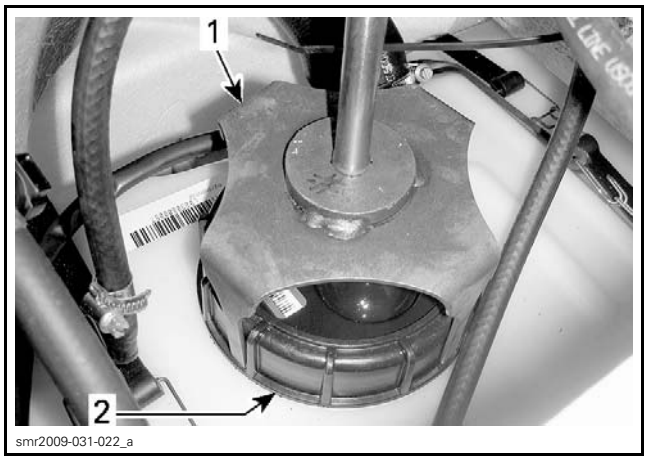


219101005-023-008

1. Quick connect fitting (high pressure fuel hose)
2. Harness connector

4. Unscrew the fuel pump retaining nut using the fuel pump module socket.

NOTICE Ensure the fuel pump does not turn while unscrewing the retaining nut.



smr2009-031-022_a

1. Fuel pump module socket
2. Fuel pump retaining nut

NOTICE While pulling out the fuel pump module, pay attention to the corrugated tubes and fuel sensor float arm. Float arm can get caught up and bend which will reduce fuel sensor accuracy. If fuel pump module is dropped or damaged, it must be replaced.

5. Slowly pull fuel pump module up through opening until corrugated tubes contact sides of opening. Tilt the fuel pump module as you slowly pull the pump upwards.

⚠ WARNING

The upper filter and fuel pump reservoir on the fuel pump module contain fuel which will drain out when fuel pump module is not in an upright position.

6. Carefully pull fuel pump module out.

⚠ WARNING

Always wipe off any fuel spillage from the watercraft. When working with fuel or fuel system and its components, always work in a well ventilated area.

Installing the Fuel Pump

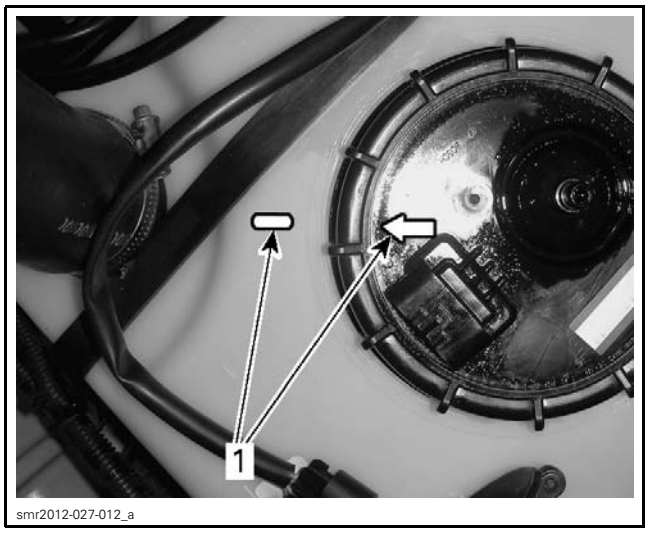
The installation is the reverse of the removal procedure. However, pay attention to the following.

1. Install a NEW fuel pump module gasket each time the module is reinstalled.
2. Carefully insert fuel pump module in fuel tank so as not to bend float arm.

NOTE: Wipe off parts to prevent fuel pump from turning while torquing fuel pump nut.

3. Align arrow on top of fuel pump module with index mark on top of fuel tank or fuel sensor accuracy will be affected.

NOTE: Index mark and arrow locations are highlighted for clarity in following illustration.



FUEL PUMP MODULE INDEXING
1. Align marks

4. Tighten fuel pump nut to specification using the fuel pump module socket.

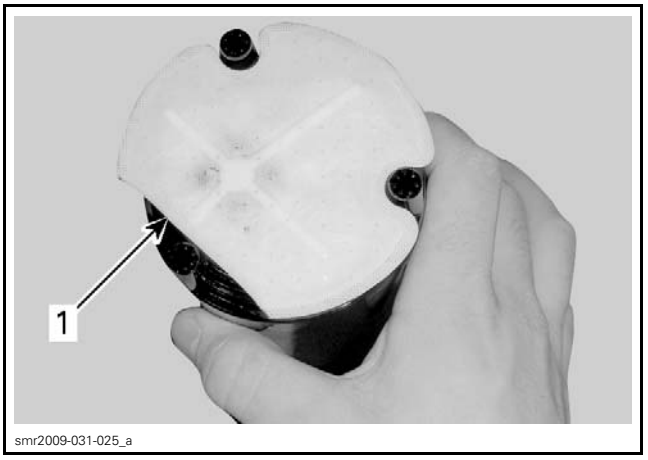
TIGHTENING TORQUE	
Fuel pump locking ring	60 N•m ± 7 N•m (44 lbf•ft ± 5 lbf•ft)

5. Refill fuel tank and ensure there are no leaks by performing a *FUEL TANK LEAK TEST* and a *FUEL SYSTEM HIGH PRESSURE LEAK TEST* as described in this subsection.

FUEL FILTER

Fuel Filter Inspection

Inspect fuel filter. If dirty, partially clogged or damaged, replace it.



1. Fuel filter

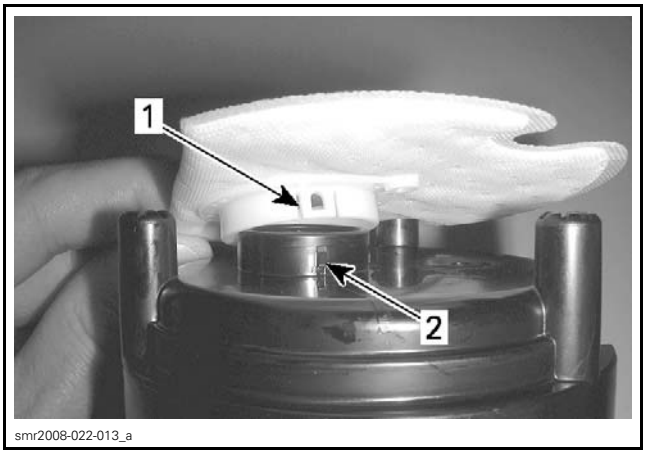
Removing the Fuel Filter

NOTE: The lower fuel filter on the fuel pump module does not require replacement under normal operating conditions. Replace only if permanently clogged or damaged.

1. Remove fuel pump. Refer to *FUEL PUMP* in this subsection.

NOTE: The upper filter and fuel pump reservoir on the fuel pump module contain fuel which will drain out when fuel pump module is not in an upright position.

2. Turn fuel pump upside down.
3. Using a small flat screwdriver, pry up the filter locking tabs.



1. Fuel filter locking tab (x2)
2. Filter locking pin (x2)

4. Pull filter off fuel pump reservoir housing.

Installing the Fuel Filter

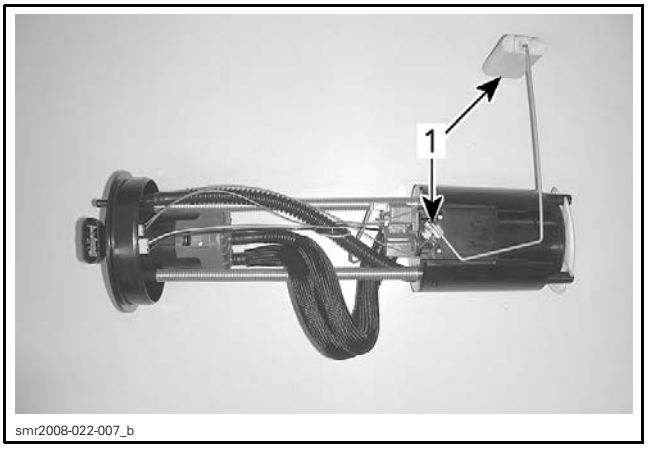
1. Align new filter with pump reservoir housing.
2. Press new filter on by hand. Ensure it is fully seated and locked onto the pump reservoir housing.

3. Reinstall fuel pump as per procedure in this subsection.
4. Carry out a *FUEL SYSTEM HIGH PRESSURE LEAK TEST* as described in this subsection.

FUEL LEVEL SENSOR

Fuel Level System Overview

A float type fuel level sensor mounted on the fuel pump module sends a signal to the information center.



TYPICAL — FUEL PUMP MODULE
1. Fuel level sensor

The information center interprets this signal and turns on the appropriate number of segments of a bar type fuel level indication in the lower RH side of the digital screen in the information center.

Fuel Level Troubleshooting

FUEL LEVEL TROUBLESHOOTING	
SYMPTOM	POSSIBLE CAUSE
Fuel gauge always display EMPTY	– Wiring/connectors – Fuel level sensor – Float stuck in low position
Fuel gauge always display FULL	– Water in fuel pump connector – Float stuck in full position
Fuel level sensor fault code	– Wiring/connectors – Fuel level sensor
Fuel gauge displays wrong level	– Low battery voltage – Fuel level sensor fault

Connect vehicle to BRP diagnostic software (BUDS2). Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Fuel Level Sensor Voltage Test

1. Ensure battery is fully charged.
2. Disconnect the steering connector (HIC1). Refer to *WIRING HARNESS AND CONNECTORS* subsection.
3. Connect the diagnostic harness to make an in-line connection between the disconnected connectors.

REQUIRED TOOL	
DIAGNOSTIC HARNESS (P/N 529 036 384)	

4. Briefly press the START button to wake up the ECM.
5. Install the tether cord on the engine cut-off switch.
6. Use the multimeter and select Vdc.
7. Measure the voltage at the test connector of the diagnostic harness as follows.

FUEL LEVEL SENSOR VOLTAGE TEST		
FUEL TANK LEVEL	TEST CONNECTOR OF DIAGNOSTIC HARNESS	VOLTAGE
Full	Pins 12 and 19	0.14 Vdc
Empty		2.7 Vdc

NOTE: Voltage could be slightly different depending on battery voltage but should remain relatively close to this range. If fuel tank is not full or empty, the voltage value will be proportional to the fuel level (somewhere in-between).

If voltage is as per specifications the fuel level circuit and sensor are good. If fuel level does not work in information center, replace fuel level sensor.

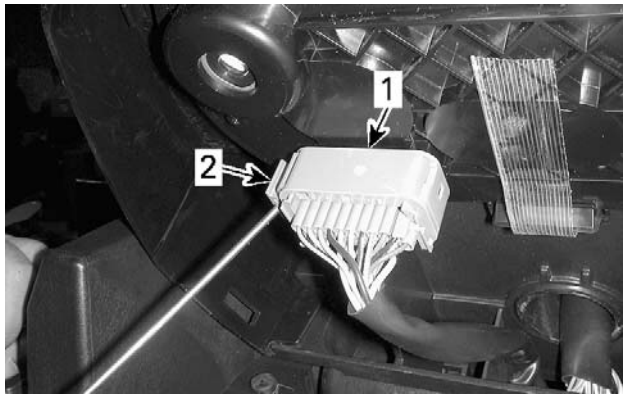
If voltage is out of specifications, carry out the *FUEL LEVEL SENSOR RESISTANCE TEST AT INFORMATION CENTER* as described in this subsection.

Remove diagnostic harness and reconnect connector.

Fuel Level Sensor Resistance Test at Information Center

1. Disconnect information center (digital display) connector. Refer to *INFORMATION CENTER* subsection.

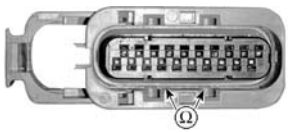
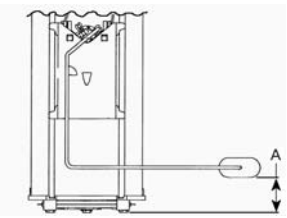
NOTICE Pull connector lock out. Do not twist the screwdriver.



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1. Gauge connector
2. Pull out to unlock connector

2. Use the multimeter and select Ω.
3. Alternately drain then fill fuel tank and measure the sensor resistance between pins 19 and 20 as follows.

RESISTANCE (Ω)	FLOAT HEIGHT (MM)
4.8 ± 2.2	268.9 ± 3.0 (FULL)
17.8 ± 2.2	240.6 ± 3.0
27.8 ± 2.2	219.1 ± 3.0
37.8 ± 2.2	193.8 ± 3.0
47.8 ± 2.2	161.9 ± 3.0 (HALF)
57.8 ± 2.2	128.3 ± 3.0
67.8 ± 2.2	94.1 ± 3.0
77.8 ± 2.2	60.6 ± 3.0
89.8 ± 2.2	28.8 ± 3.0 (EMPTY)
	 A. Float height

NOTE: If fuel tank is not full or empty, the resistance value will be proportional to the fuel level (somewhere in-between).

If readings are as per specifications, the fuel level circuit and sensor are good. If fuel level does not work in information center, try a new one.

If readings are out of specifications, perform the *FUEL LEVEL SENSOR RESISTANCE TEST AT FUEL PUMP*.

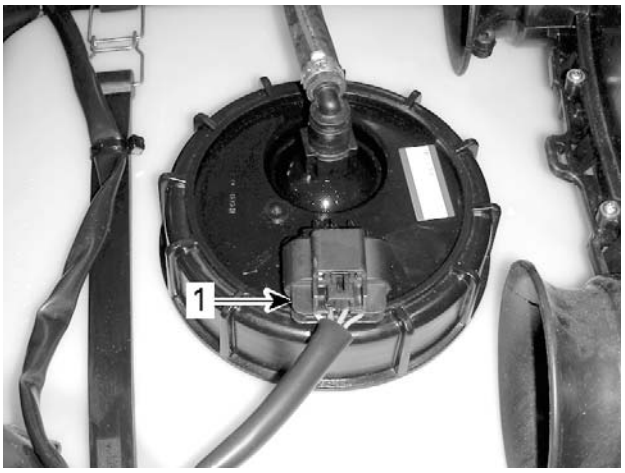
If an open circuit is measured, carry out a continuity test of the wiring from the information center to the 20-pin steering connector, and from the 20-pin steering connector to the fuel pump module connector. Refer to *WIRING DIAGRAM*.

If the wiring is good, carry out a *FUEL LEVEL SENSOR RESISTANCE TEST AT FUEL PUMP*.

4. Reconnect information center (digital display) connector.

Fuel Level Sensor Resistance Test at Fuel Pump

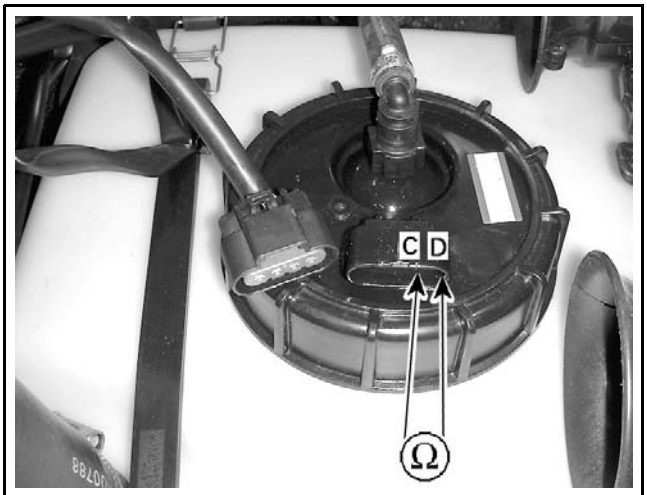
1. Disconnect fuel pump module connector.



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FUEL PUMP MODULE
1. Fuel pump module connector

2. Alternately drain then fill fuel tank and measure the sensor resistance between pins "C" and "D" of the fuel pump connector. See table in *FUEL LEVEL SENSOR RESISTANCE TEST AT INFORMATION CENTER*.



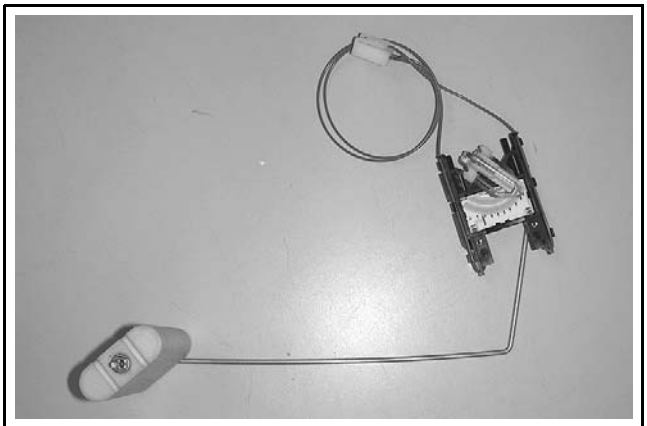
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FUEL LEVEL SENSOR RESISTANCE TEST

If readings are out of specifications, replace sensor.

When everything else has been tested and fuel level is still not working, try a new information center.

Removing the Fuel Level Sensor


smr2008-022-029

FUEL LEVEL SENSOR

1. Remove fuel pump module from fuel tank, see *FUEL PUMP REMOVAL* in this subsection.

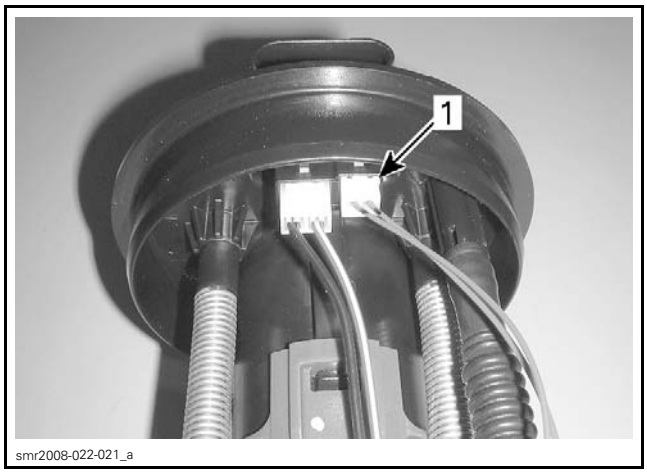
⚠ WARNING

The upper filter and fuel pump reservoir on the fuel pump module contain fuel which will drain out when fuel pump module is not in an upright position.

2. Drain all fuel from the upper fuel filter and fuel pump reservoir in an appropriate container.

NOTE: Note routing of fuel level sensor wires prior to disconnecting the sensor from the fuel pump module flange.

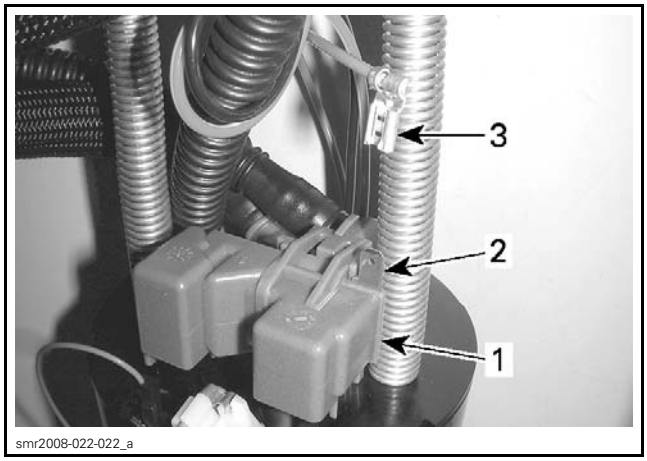
3. Disconnect the fuel level sensor connector from the fuel pump module upper flange.



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1. Fuel level sensor connector

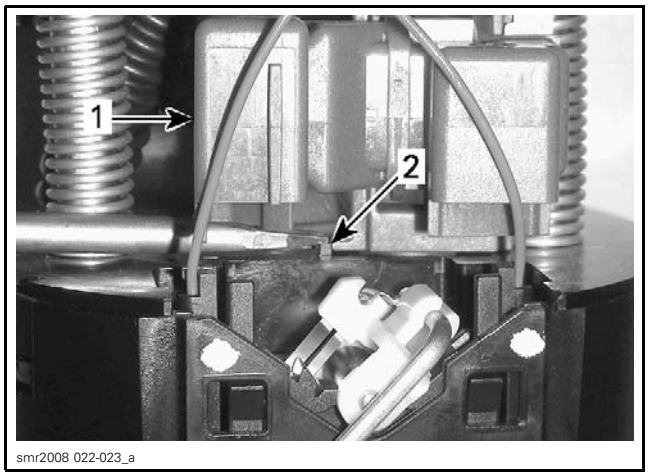
4. Disconnect the ground wire from the pressure regulator. Be careful not to bend the ground contact on the pressure regulator.



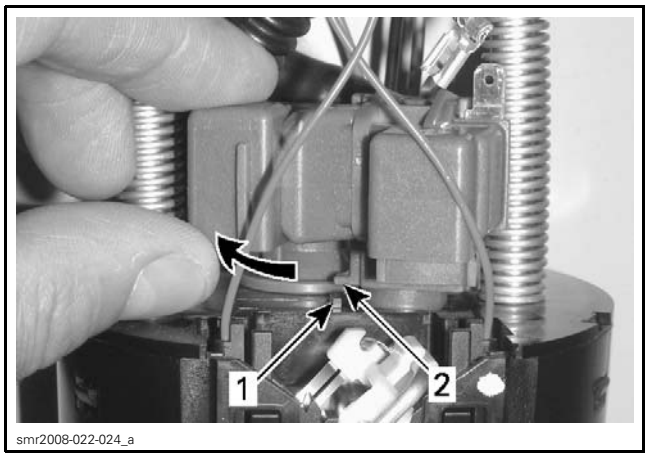
smr2008-022-022_a

1. Pressure regulator
2. Ground wire contact on pressure regulator
3. Ground wire disconnected

5. Using a flat screwdriver, press down on the locking tab just below the pressure regulator to release it from the pump reservoir cover, and rotate it clockwise simultaneously so that it slips over the locking tab.

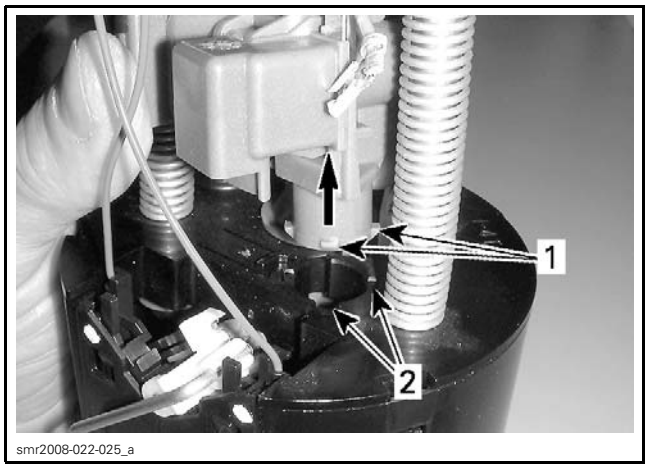


1. Pressure regulator
2. Pressure regulator locking tab



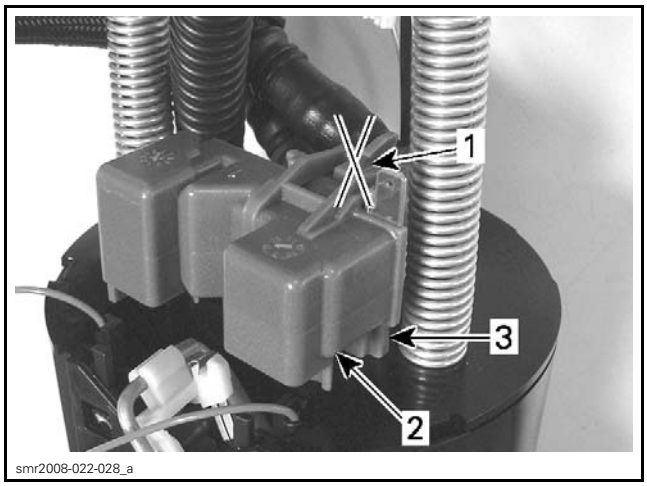
1. Pressure regulator locking tab
2. Pressure regulator rotated clockwise over locking tab

6. Once the pressure regulator is rotate over the locking tab, pull up on it to remove it from the pump reservoir cover.



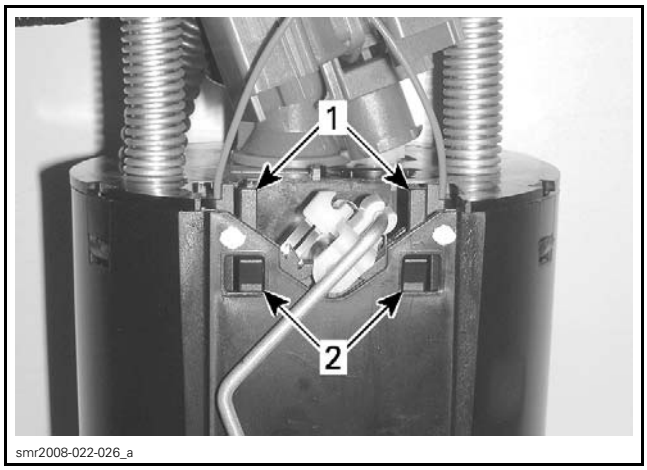
1. Pressure regulator alignment tabs
2. Fuel pump reservoir alignment tabs

NOTE: The pressure regulator cover must not be removed from the pressure regulator housing assembly.

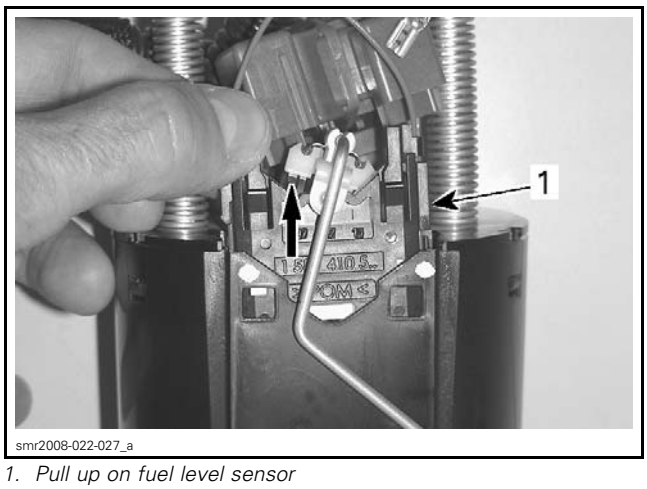


1. Do not remove pressure regulator cover at locking tabs
2. Pressure regulator cover
3. Pressure regulator housing

7. Push in on the release tabs at the top of the fuel level sensor to unlock it from the fuel pump reservoir housing, and simultaneously pull up on the fuel level sensor to remove it.



1. Fuel level sensor release tabs
2. Locking pins

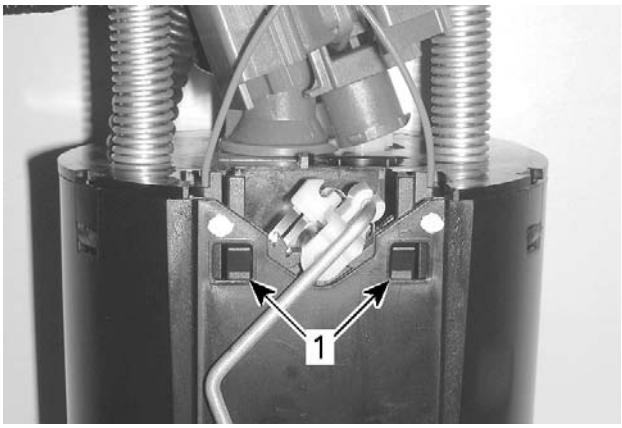


1. Pull up on fuel level sensor

Installing the Fuel Level Sensor

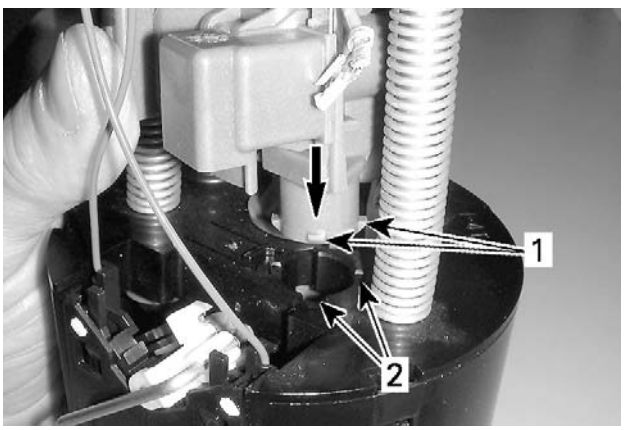
Installation is the reverse of the removal procedure however, pay attention to the following.

1. Ensure fuel level sensor locking pins are properly engaged into the fuel pump reservoir.

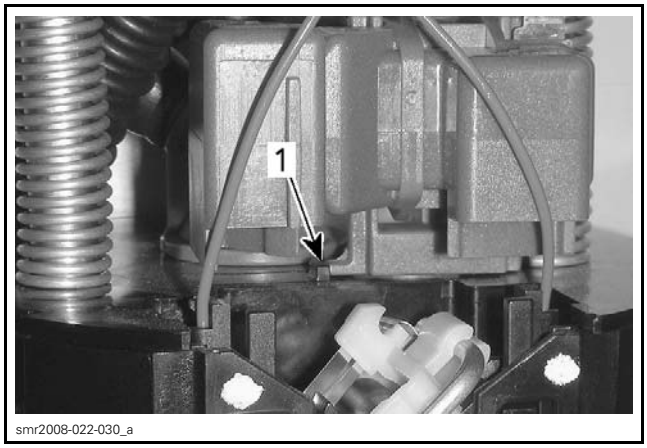


1. Ensure engagement of sensor locking pins

2. Align the fuel pressure regulator tabs into the pump reservoir cover and turn it counterclockwise until it locks properly.

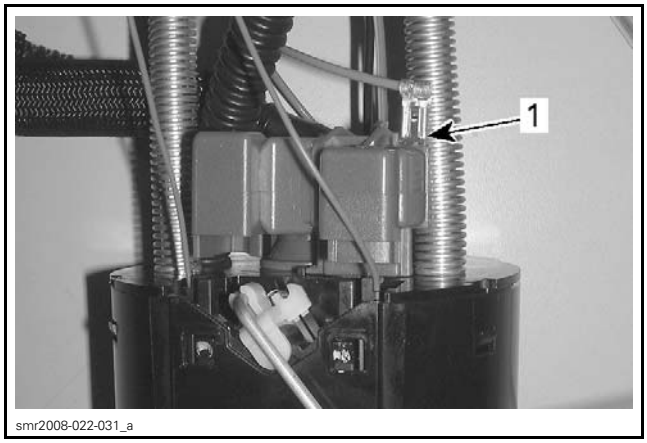


PRESSURE REGULATOR INSERTION INTO PUMP RESERVOIR COVER
1. Pressure regulator alignment tabs
2. Fuel pump reservoir alignment tabs



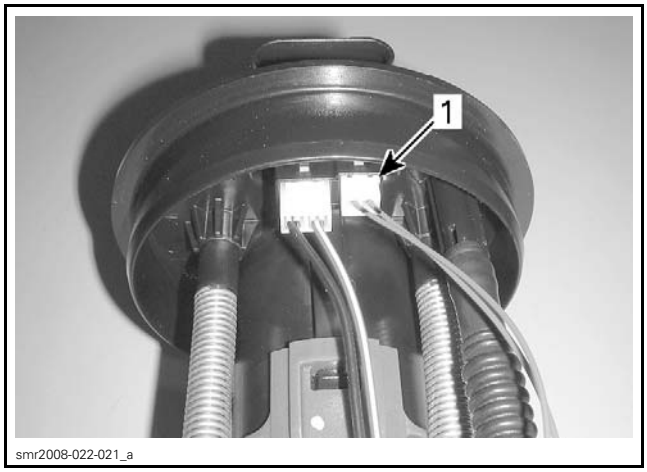
TAB UP WHEN PRESSURE REGULATOR PROPERLY LOCKED
1. Pressure regulator locking tab

3. Reconnect the ground wire onto the pressure regulator.



1. Pressure regulator ground wire installed

4. Ensure fuel level sensor connector is locked into the module flange connector.



1. Fuel level sensor connector

5. Carry out a *FUEL LEVEL SENSOR RESISTANCE TEST* as described in this subsection.

6. Reinstall the fuel pump module. Refer to *FUEL PUMP INSTALLATION* in this subsection.

FUEL TANK

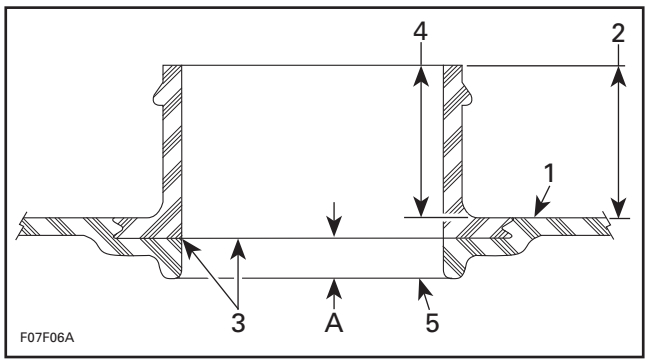
Draining the Fuel Tank

Remove fuel tank cap and siphon gas into an approved fuel container.

Fuel Tank Inspection

1. Drain fuel tank. Refer to *DRAINING THE FUEL TANK* above in this subsection.
2. Inspect fuel tank retaining straps for wear, cracks or any other damages. Inspect strap clip anchors and bolts.
3. Inspect fuel tank for wear caused by any abnormal contact or rubbing with other component(s).
4. Disconnect fuel filler hose from fuel tank.
5. Inspect fuel tank filler hose for wear, cracks or other damages.
6. Visually inspect the inside and outside of the fuel tank filler necks for crack(s). If crack(s) are found, replace fuel tank.
7. With your fingers, feel the inside and outside surfaces of fuel tank, especially near the filler neck.
8. Flex fuel tank neck to ensure there are no hidden cracks.

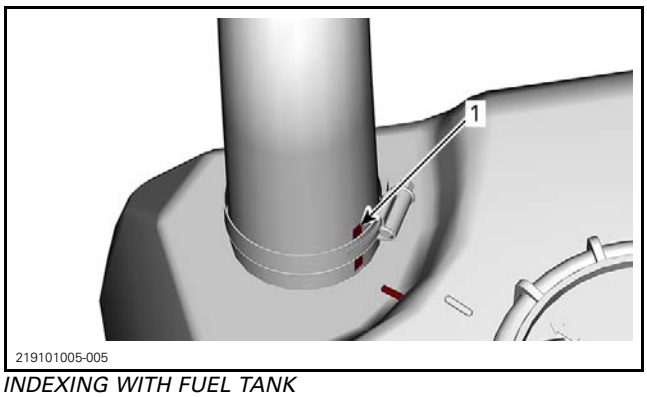
NOTE: The 60 liters fuel tank is comprised of 2 components: the tank and the filler neck. The filler neck is injection molded and the tank is then blow molded over the neck. During the molding process, a small molding seam may appear on the inner side of the neck at approximately 4 mm (5/32 in) from the base of the neck. It is normal to have a molding seam and it should not be confused with a crack.



1. *Tank upper surface area*
2. *Inspect outer upper surface at filler neck*
3. *Normal molding seam*
4. *Inspect upper surface area inside filler neck*
5. *Base of filler neck*

A. *Approx. 4 mm (5/32 in)*

9. Install filler hose and tighten the retaining clamps.



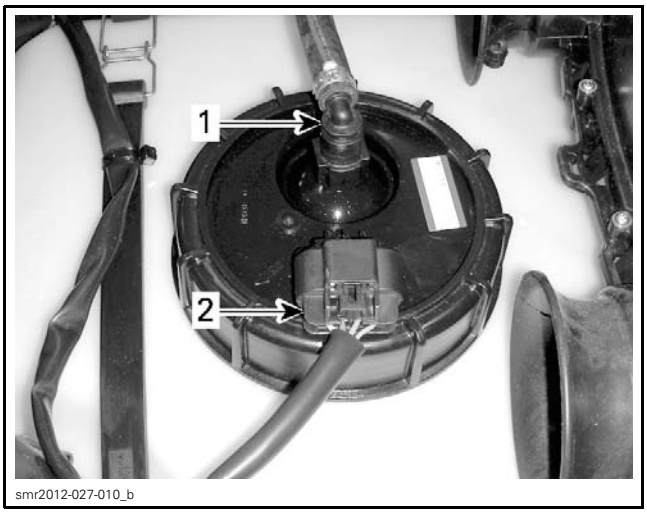
INDEXING WITH FUEL TANK
1. *Align mark with the writing on hose*

TIGHTENING TORQUE	
Filler hose retaining clamps	3.5 N•m ± 0.5 N•m (31 lbf•**in** ± 4 lbf•**in**)

10. Reinstall all other removed parts. Refer to appropriate subsection.

Removing the Fuel Tank

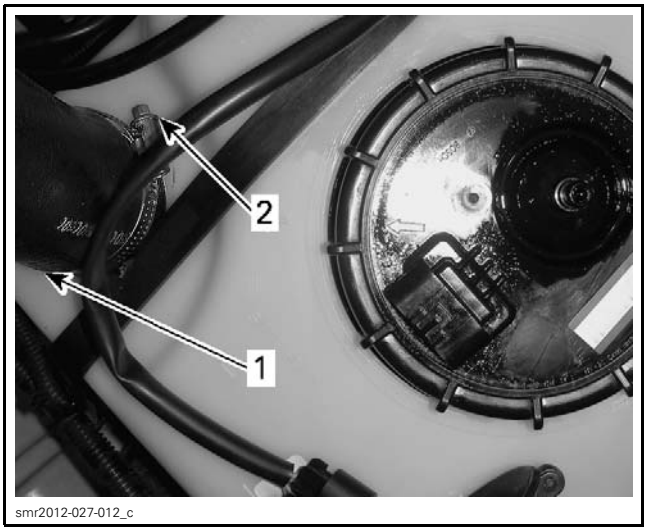
1. Remove engine. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
2. Remove the air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.
3. Drain fuel tank. Refer to *DRAINING THE FUEL TANK* above in this subsection.
4. Disconnect fuel pump connections.



TYPICAL
1. *Quick connect fitting (high pressure fuel hose)*
2. *Harness connector*

5. Disconnect filler hose from fuel tank.

NOTE: Removing the hood and then removing retaining screws of the filler neck may help to disconnect hose from fuel tank.



1. *Filler hose*
2. *Retaining clamp*

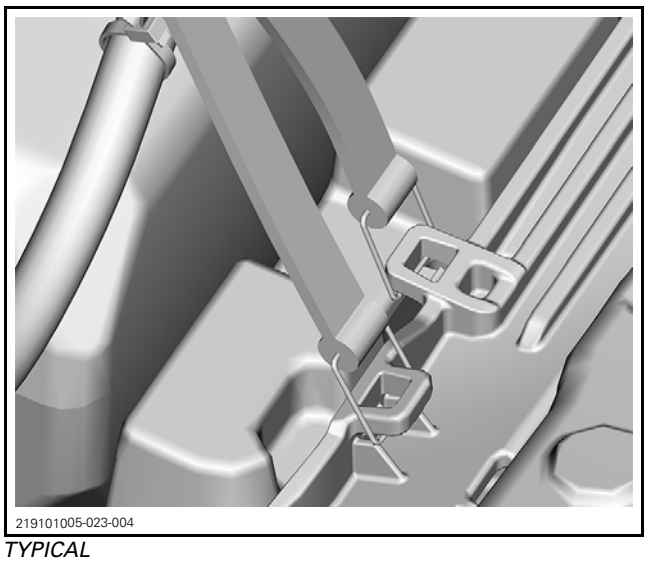
NOTE: Take note of wiring harness, hose and cable routing for proper reinstallation. Also note method used for securing with locking ties.

6. Detach fuel tank retaining straps.
7. Remove fuel tank from the vehicle.
8. Remove fuel pump as necessary. Refer to *FUEL PUMP* in this subsection.
9. Inspect hull and flotation foams for wear.

Installation the Fuel Tank

The installation is the reverse of the removal procedure. However, pay attention to the following.

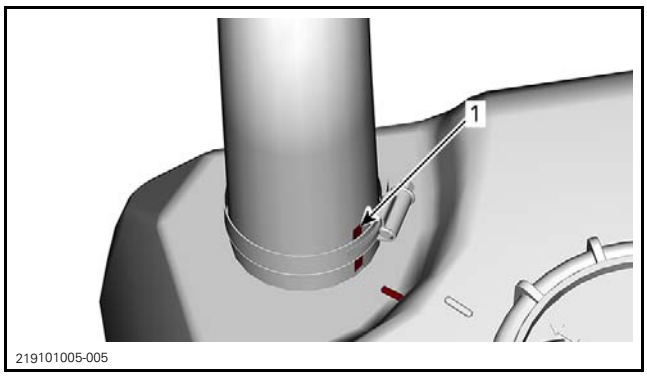
1. Reinstall fuel pump if it was removed. Refer to *FUEL PUMP* in this subsection.
2. Ensure flotation foams are properly positioned under fuel tank.
3. Insert fuel tank in hull.
4. Place fuel tank retaining strap ends in anchoring clips. Temporarily use tape to hold straps on the top of fuel tank.



TYPICAL

5. Secure retaining strap ends on top of fuel tank.
6. Properly secure wire harness, cables and hose as prior to removal using appropriate locking ties.
7. Install fuel tank filler hose as illustrated.

NOTE: Reinstall retaining screws and hood. Tighten to specification.



INDEXING WITH FUEL TANK
1. *Align mark with the writing on hose*

TIGHTENING TORQUE	
Filler hose retaining clamps	3.5 N•m ± .5 N•m (31 lbf•**in** ± 4 lbf•**in**)
Retaining screw	5.5 N•m ± .5 N•m (49 lbf•**in** ± 4 lbf•**in**)

8. Reinstall all other removed parts. Refer to their subsections.
9. When vehicle reassembly is complete, carry out a *FUEL TANK LEAK TEST* and a *FUEL SYSTEM HIGH PRESSURE LEAK TEST* as described in this subsection.

POWER DISTRIBUTION AND GROUNDS

GENERAL

OVERVIEW

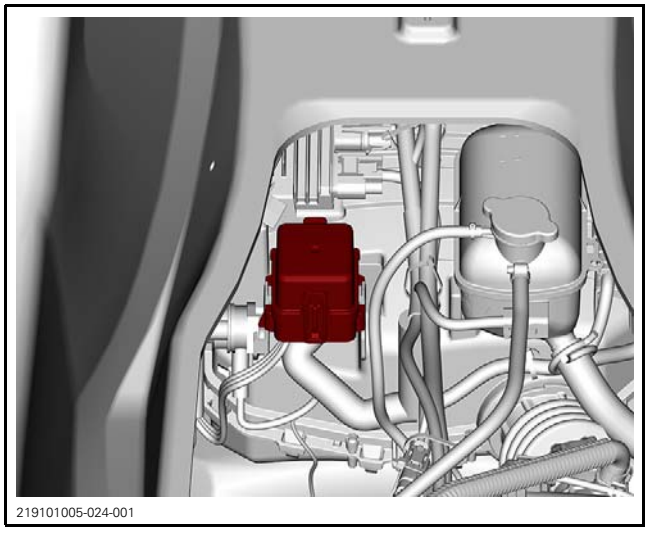
The battery is the primary source of power for the electrical system, it is recharged by the magneto.

Some components are permanently connected to the battery (unswitched) while some require a relay or switch to be closed (switched).

At high RPM if the magneto power is greater than the loads, the rectifier/regulator will regulate power as necessary.

The system uses an external voltage regulator/rectifier.

FUSE BOX (FB)

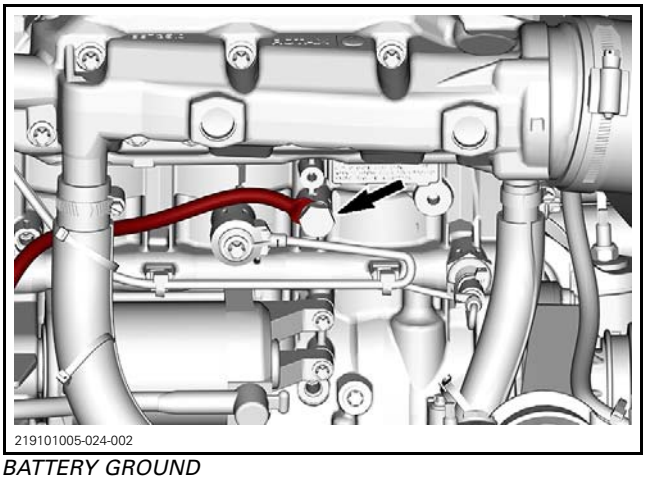


219101005-024-001

GROUND LOCATIONS

900 ACE Engine

The battery ground is located under the exhaust manifold.

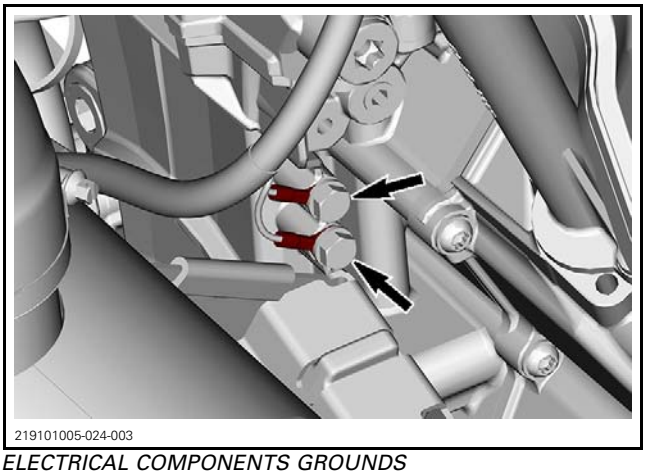


219101005-024-002

BATTERY GROUND

TIGHTENING TORQUE	
Battery ground terminal	23.5 N•m ± 1.5 N•m (17 lbf•ft ± 1 lbf•ft)

Electrical components grounds are located on rear of engine.



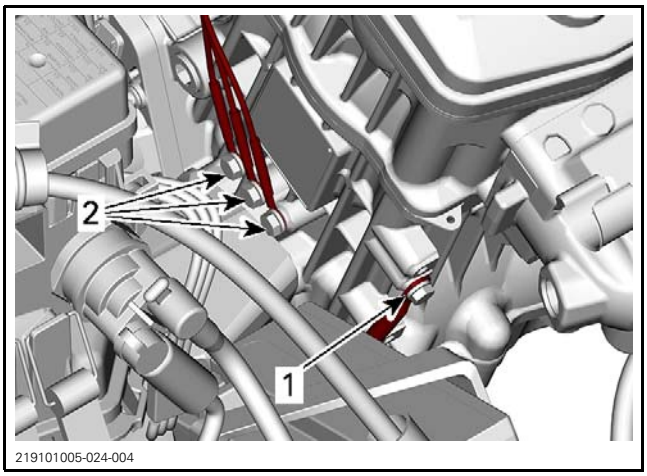
219101005-024-003

ELECTRICAL COMPONENTS GROUNDS

TIGHTENING TORQUE	
Electrical components ground terminals	10 N•m ± 2 N•m (89 lbf•**in** ± 18 lbf•**in**)

1630 ACE Engine

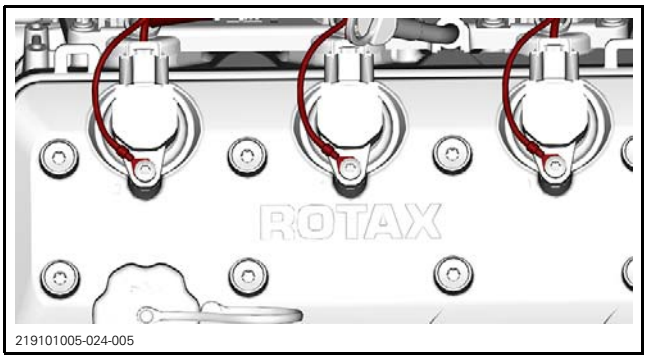
Battery and electrical components grounds are located on front of engine.



1. Battery ground
2. Electrical components grounds

TIGHTENING TORQUE	
Ground terminals	10 N•m ± 2 N•m (89 lbf•**in** ± 18 lbf•**in**)

Coil grounds are located on top of engine.



COIL GROUNDS

WIRING HARNESS AND CONNECTORS

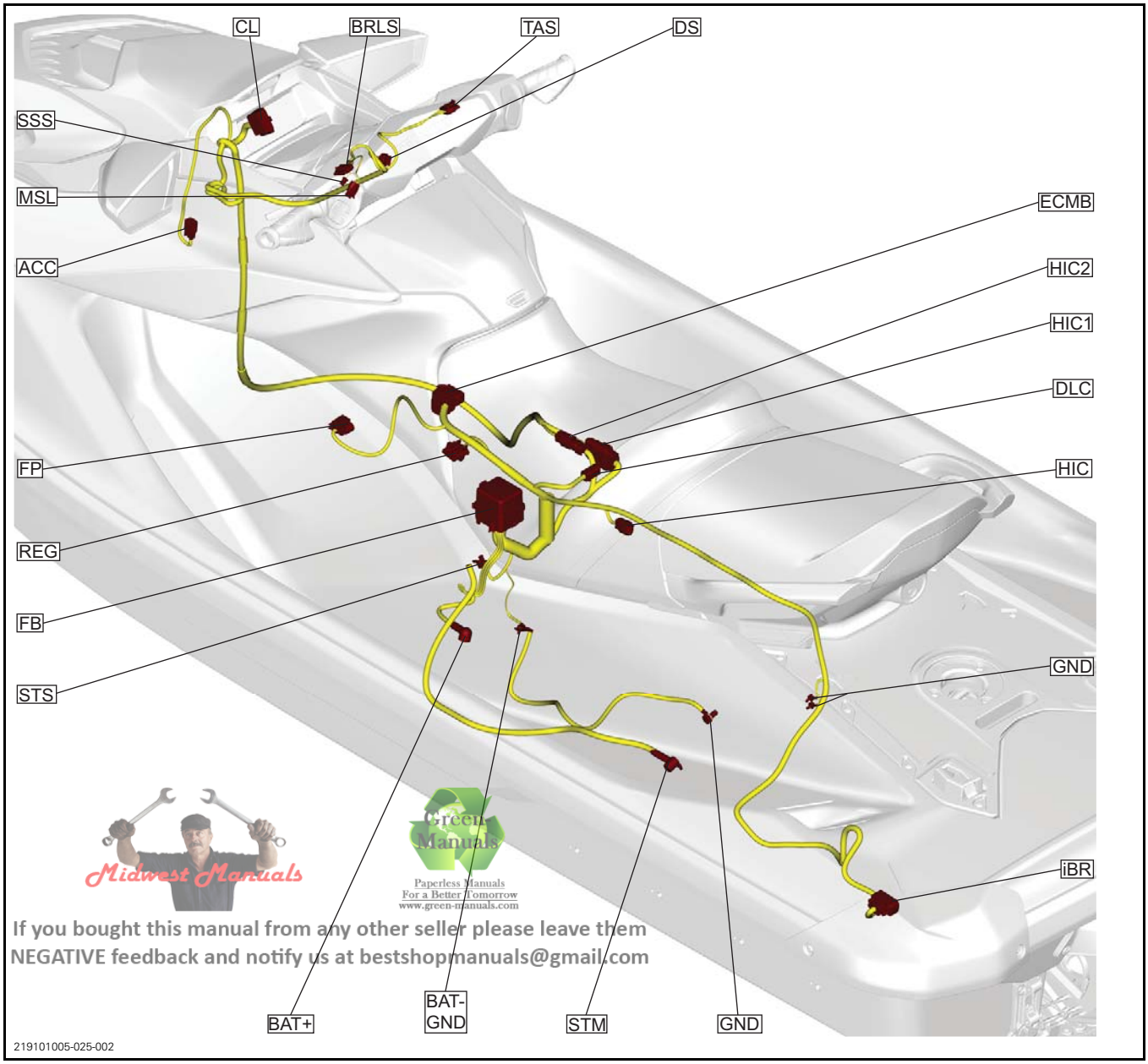
SERVICE TOOLS

Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 384	152
ECM ADAPTER TOOL	529 036 166	150
ECM TERMINAL REMOVER 2.25	529 036 175	150
ECM TERMINAL REMOVER 3.36	529 036 174	150

SERVICE TOOLS – OTHER SUPPLIER

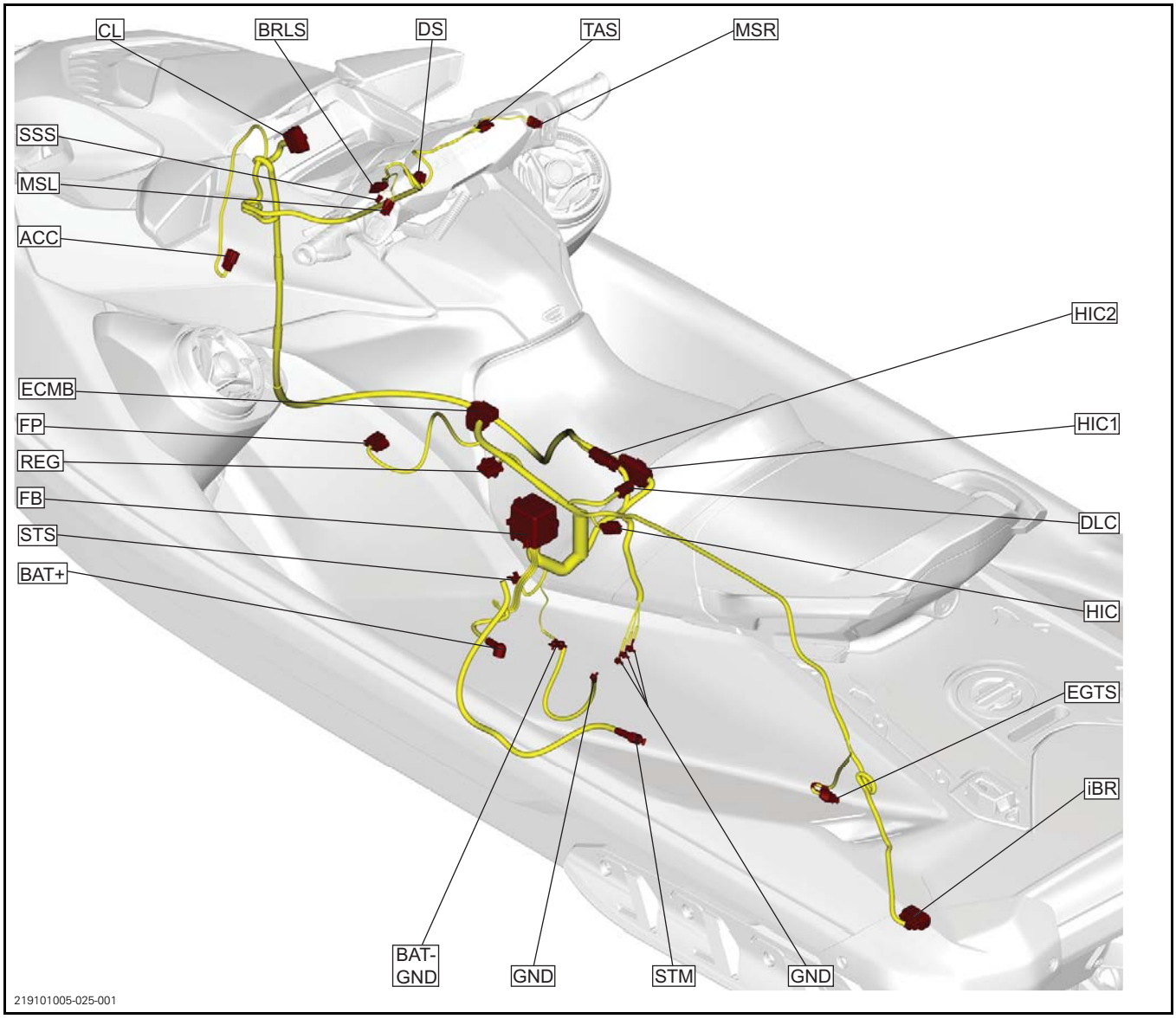
Description	Part Number	Page
DELPHI TERMINAL EXTRACTOR	12094429	151
FCI TERMINAL EXTRACTOR TOOL	54241678	153
GM TERMINAL EXTRACTOR	12094430	154
MOLEX 150 TERMINAL EXTRACTOR TOOL	63813 - 1500	153

900 ACE Engines

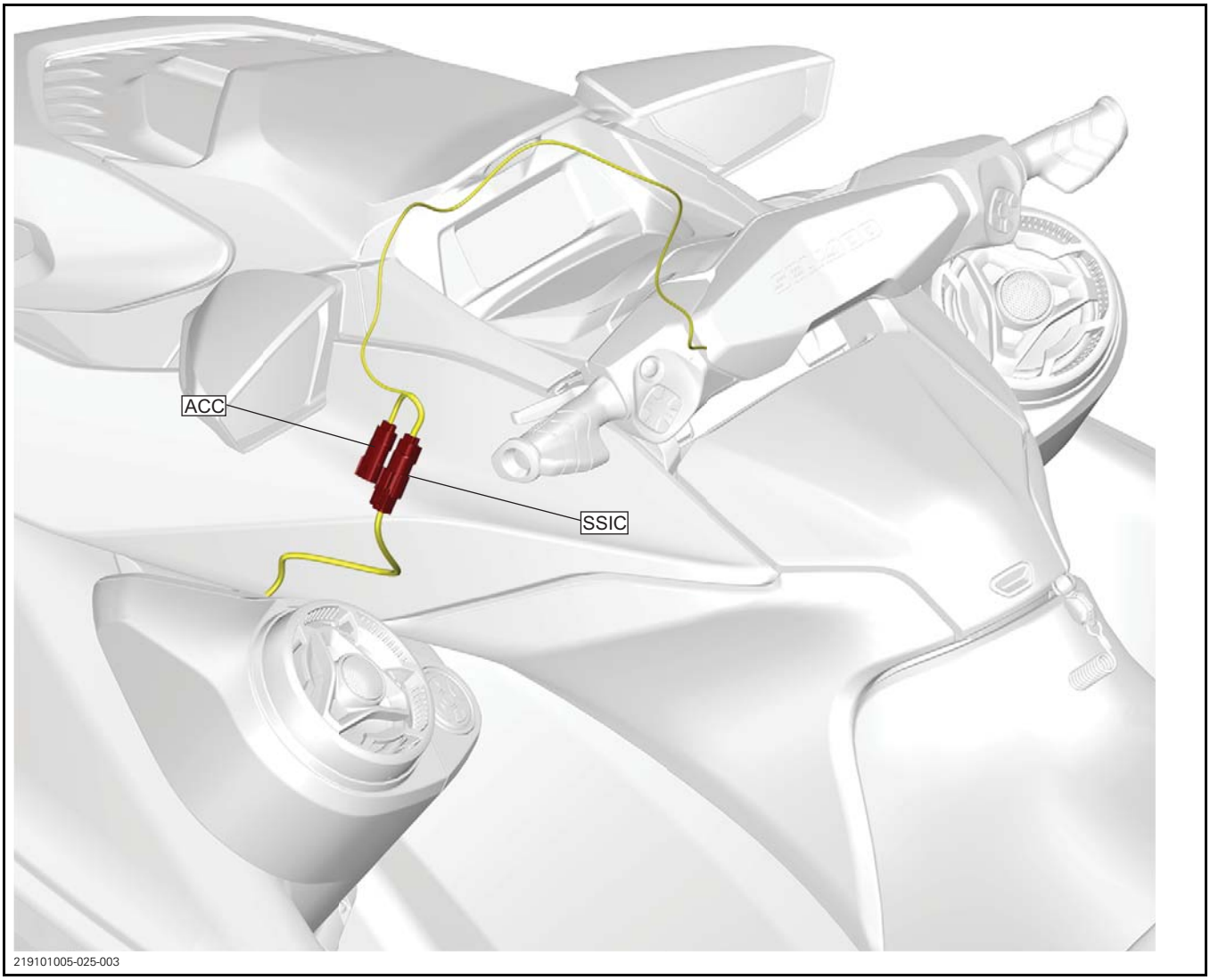


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1630 ACE Engines

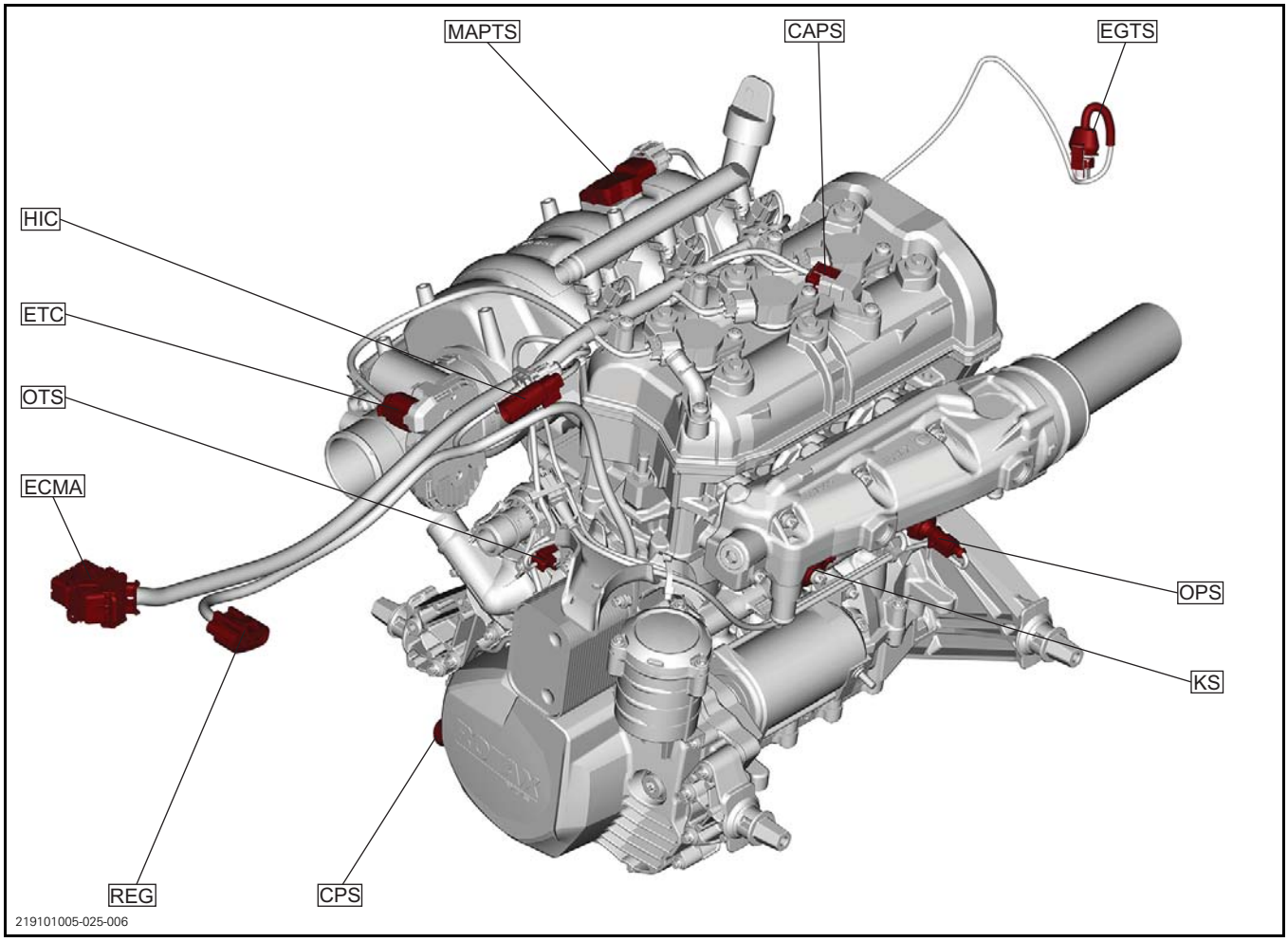


Sound System Option

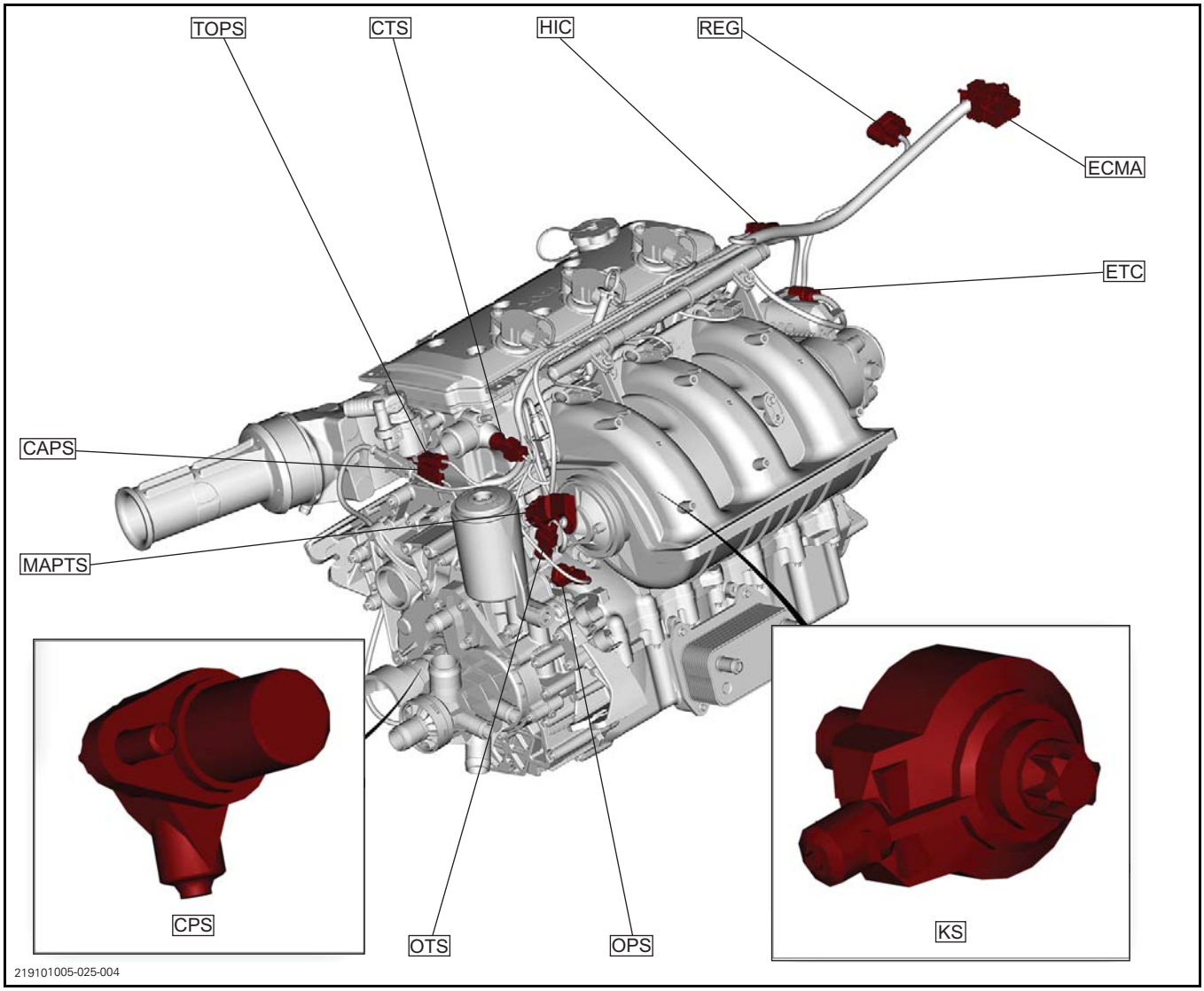


219101005-025-003

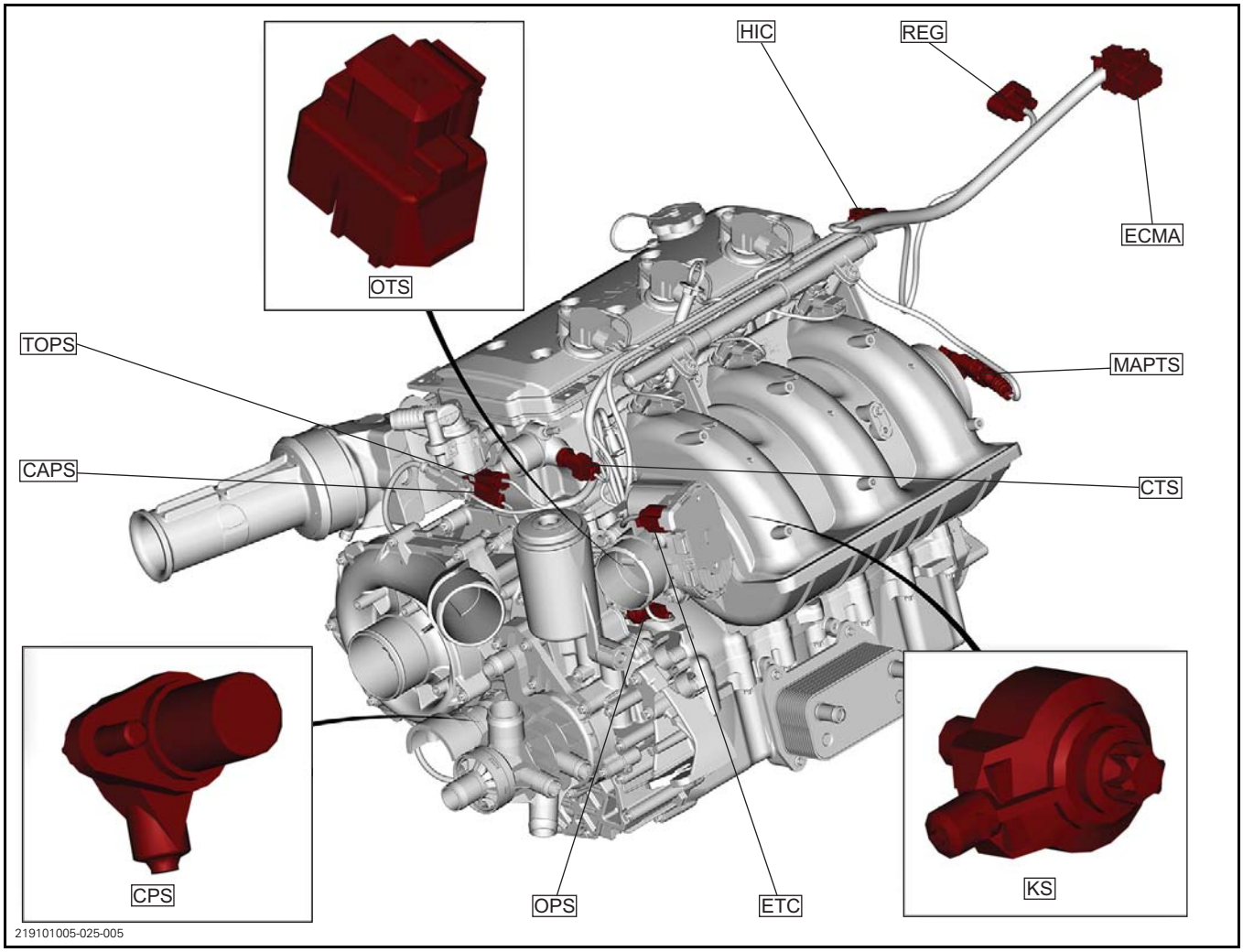
900 ACE engines



1630 ACE - 130 and 170 engines



1630 ACE - 230 engines



GENERAL

ACRONYM	DESCRIPTION	ACRONYM	DESCRIPTION
ACC	Accessories	HIC	Harness Inter Connector to Engine
BAT+	Battery +	HIC1	Harness Inter Connector to Steering 1
BAT-	Battery -	HIC2	Harness Inter Connector to Steering 2
BRLS	Brake and Reverse Lever Sensor	iBR	Intelligent Braking and Reverse
CAPS	Camshaft Position Sensor	KS	Knock Sensor
CL	Cluster	MAPTS	Manifold Air Pressure And Temperature Sensors
CPS	Crankshaft Position Sensor	MSL	Multi Function Switch Left
CTS	Coolant Temperature Sensor	MSR	Multi Function Switch Right
DLC	Data Link Connector	OPS	Oil Pressure Sensor
DS	DESS post	OTS	Oil Temperature Sensor
ECMA	ECM connector A	REG	Voltage Regulator/Rectifier connector
ECMB	ECM connector B	SSIC	Sound System Inter Connector
EGTS	Exhaust Gas Temperature Sensor	SSS	Start/Stop Switch
ETC	Electronic Throttle Control	STM	Starter Motor
FB	Fusebox	STS	Starter Solenoid
FP	Fuel Pump	TAS	Throttle Accelerator Sensor
GND	Ground	TOPS	Tip Over Position Sensor

NOTE: Multi Function Switch Right (MSR) only available on applicable models.

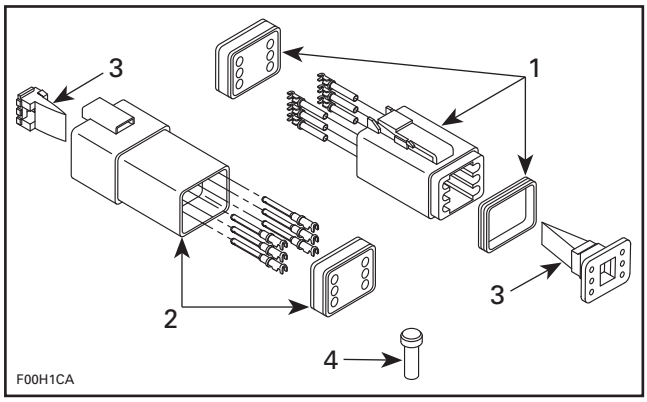
PROCEDURES

⚠ WARNING

When disassembling any connector for repair or replacement on the vehicle, always disconnect the battery to ensure all electrical power is removed and prevent any possibility of a short circuit. Refer to *CHARGING SYSTEM* subsection.

DATA LINK CONNECTOR (DEUTSCH)

Disassembling and reassembling the Connector

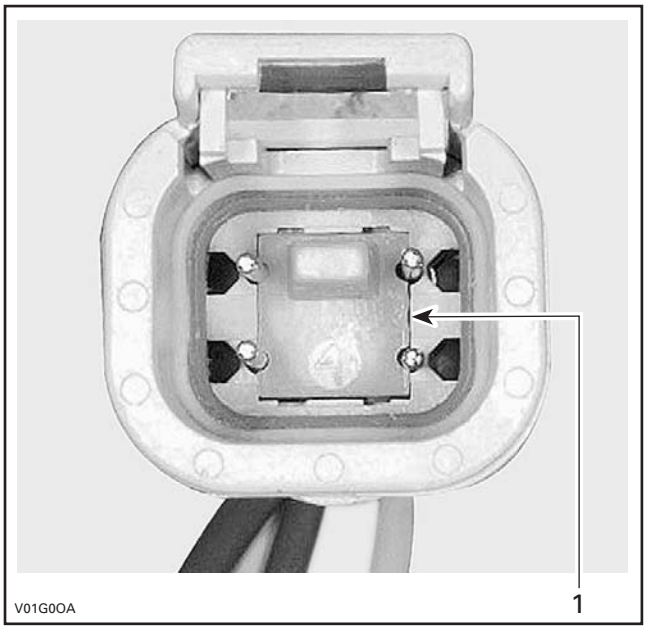


TYPICAL - DEUTSCH CONNECTOR
1. *Male connector*
2. *Female connector*
3. *Secondary lock*
4. *Sealing cap*

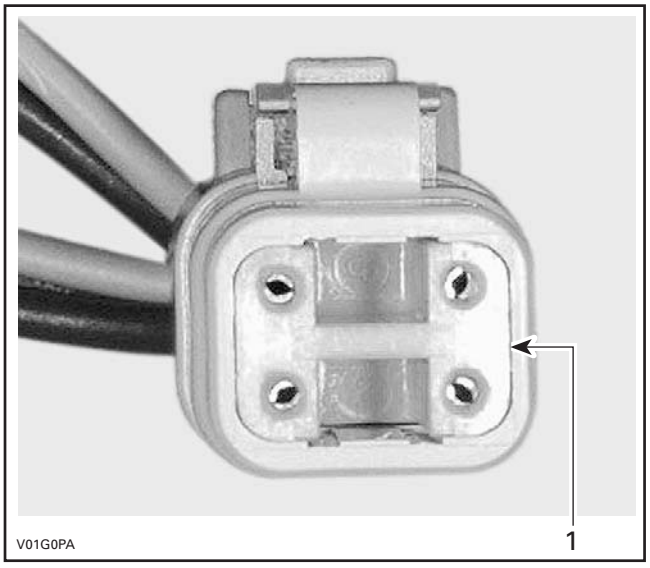
NOTICE Do not apply dielectric grease on terminal inside connector.

To remove terminals from connector, proceed as follows:

1. Using long nose pliers, pull out the plastic lock from between the terminals.



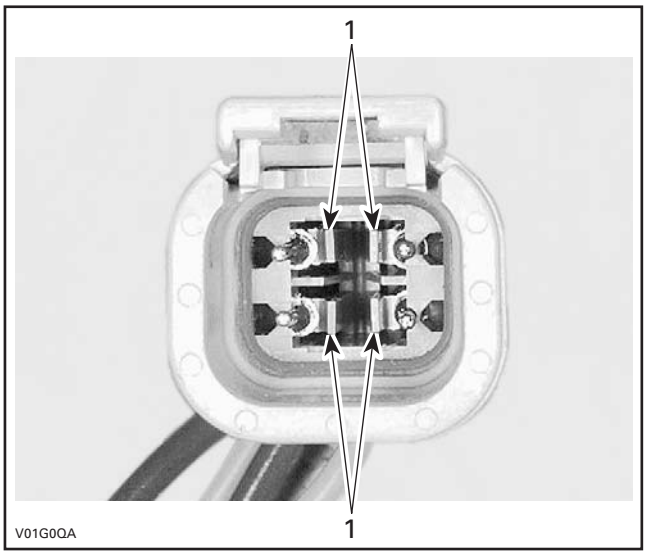
TYPICAL - FEMALE CONNECTOR
1. *Female lock*



TYPICAL - MALE CONNECTOR
1. *Male lock*

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

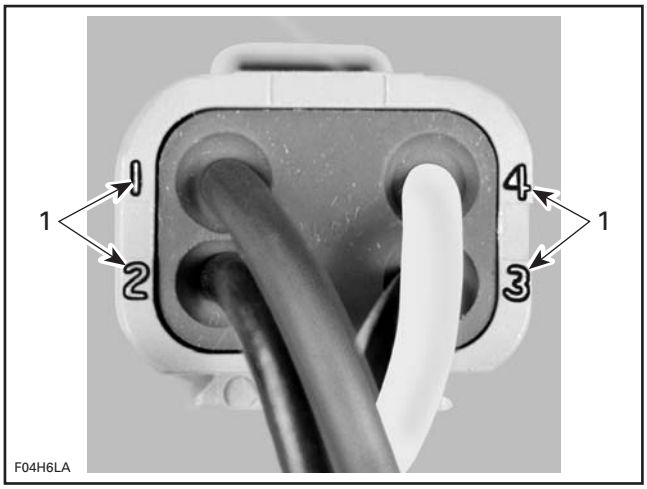
2. Insert a 4.8 mm (.189 in) wide screwdriver blade inside the front of the terminal cavity.
3. Pry the retaining tab away from the terminal while gently pulling the wire and terminal out of the back of the connector.



TYPICAL - FEMALE CONNECTOR
1. Retaining tabs

To install:

1. For insertion of a terminal, ensure the plastic lock is removed.
2. Insert terminal through the back of the connector in the appropriate position, and push it in as far as it will go. You should feel or hear the terminal lock engage.
3. Pull back on the terminal wire to ensure the retention fingers are holding the terminal.
4. After all required terminals have been inserted, the lock must be installed.



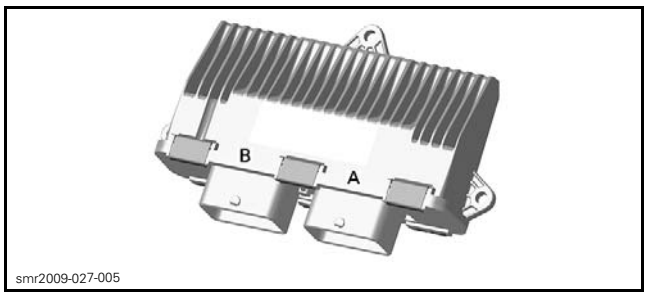
TYPICAL - CONNECTOR PIN-OUT
1. Terminal position identification numbers

ECM CONNECTOR (MOLEX)

There are 2 connectors on the ECM.

The engine wiring harness connector is connected to ECM connector "A". The vehicle wiring harness connector is connected to ECM connector "B".

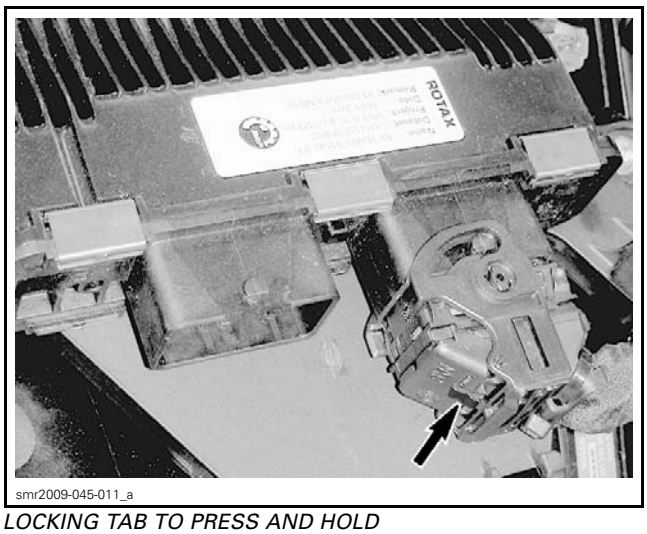
Each ECM connector has 48 pins however, connectors "A" and "B" are not interchangeable due to their specific keyways.



ECM CONNECTORS

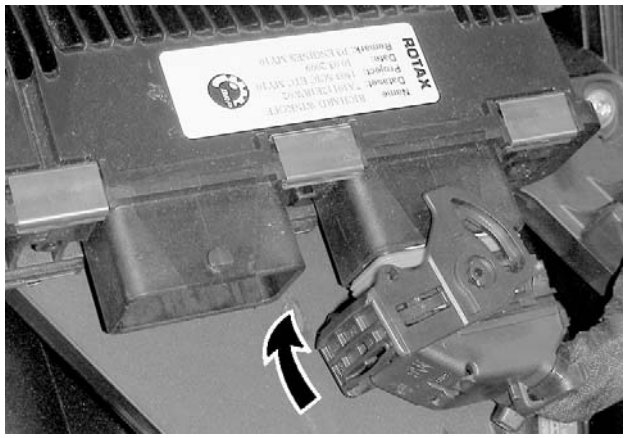
Removing Connector

1. To access the ECM, refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
2. Press **and hold** the locking tab on the connector to be disconnected.



LOCKING TAB TO PRESS AND HOLD

3. As you hold the locking tab, rotate the connector locking cam until it stops.



smr2009-045-012_a

CONNECTOR LOCKING CAM ROTATION TO RELEASE

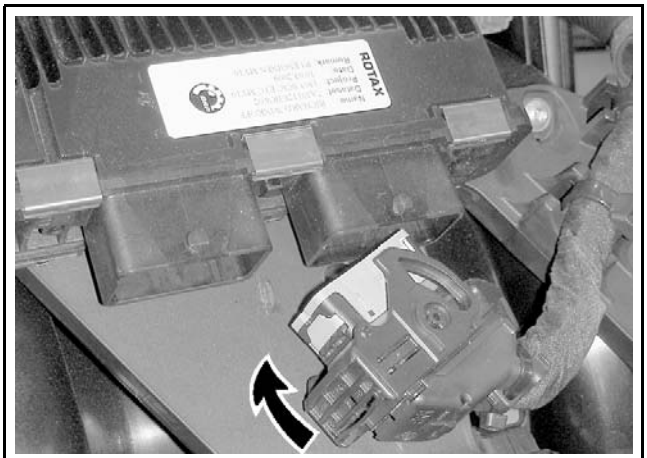
4. Pull connector off ECM.



smr2009-045-013_a

Installing the Connector

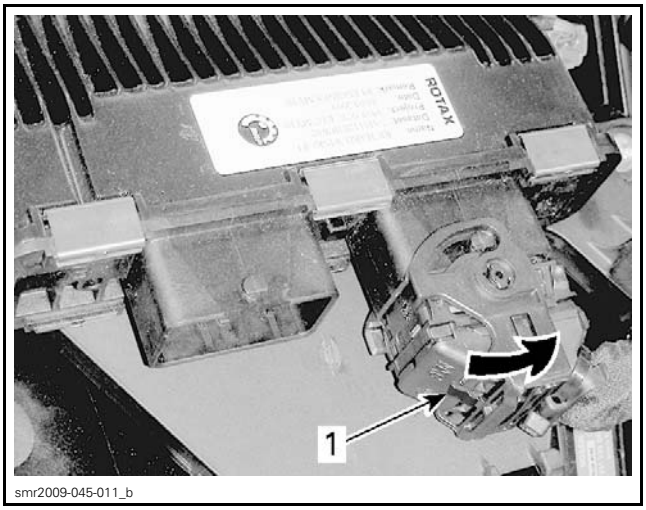
1. Fully open connector locking cam.



smr2009-045-013_b

CONNECTOR LOCKING CAM IN RELEASE POSITION

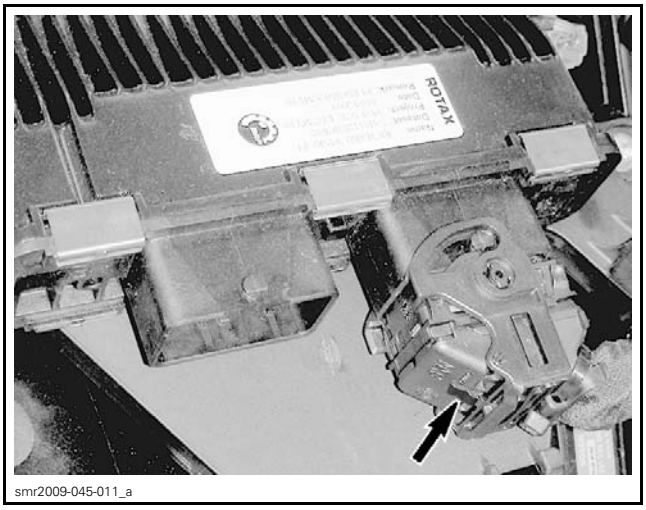
2. Insert connector on ECM.
3. As you push the connector onto the ECM, rotate the connector locking cam until it snaps locked.



smr2009-045-011_b

1. Locked here

4. Ensure the locking tab is fully out.



smr2009-045-011_a

LOCKING TAB FULLY OUT

Inspecting the Connector

Before replacing an ECM, always check electrical connections.

1. Ensure connector locking mechanism is functioning properly.
2. Ensure all wire terminals (pins) are properly locked in the connector.
3. Ensure they are very tight, make good contact with the pins in the ECM.
4. Ensure the pins in the harness connector and the ECM connector are clean, shiny and corrosion-free.
5. Check wiring harness for signs of scoring.

NOTE: A "defective ECM module" could possibly be repaired simply by disconnecting and reconnecting it.

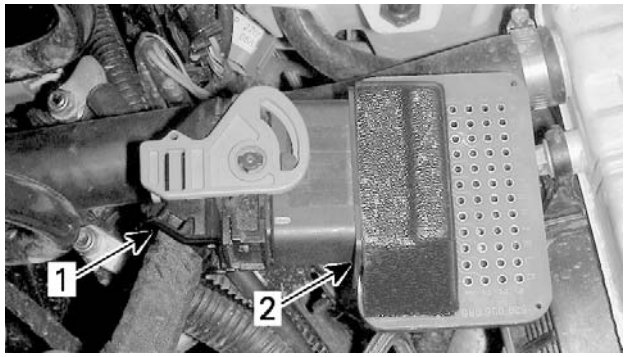
NOTICE Do not apply any lubricant product to the pins of the ECM connector.

Probing the Connector

The most recommended and safest method to probe the MOLEX (ECM) connector terminals is to use the ECM adapter tool. This tool will prevent deforming or enlarging of the terminals, which would lead to bad ECM terminal contact creating intermittent or permanent problems.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

1. Disconnect the ECM connector to be probed, and reconnect it on the ECM adapter.
2. Probe wire terminals of the circuit to be tested directly in the adapter holes.



vmr2008-139-016_a

TYPICAL
1. ECM connector
2. ECM adapter

NOTICE Never probe directly on the ECM harness connector. This could change the shape or enlarge the terminals and create intermittent or permanent contact problems.

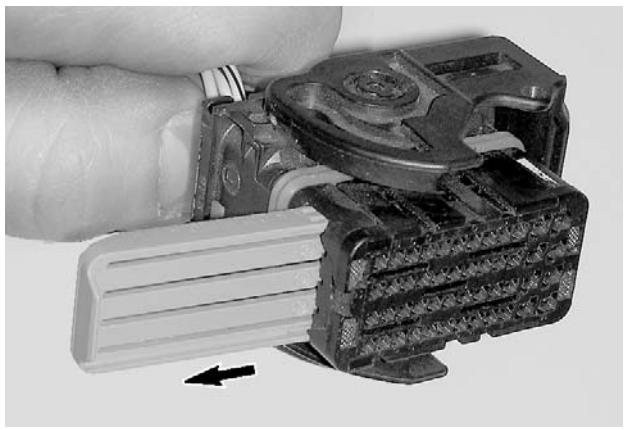
Removing Connector Terminal (Harness Connector)

To remove a signal terminal from the ECM harness connector, use the ECM terminal remover 2.25.

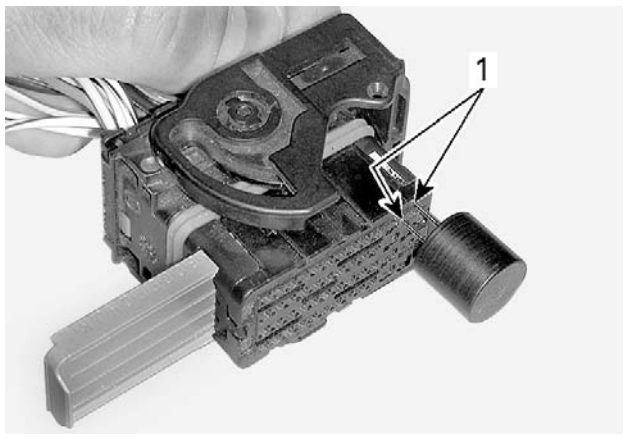
To remove a power terminal, use the ECM terminal remover 3.36.

REQUIRED TOOLS	
ECM TERMINAL REMOVER 2.25 (P/N 529 036 175)	
ECM TERMINAL REMOVER 3.36 (P/N 529 036 174)	

1. Remove rear protector from connector.
2. Pull out the connector lock.


smr2009-045-025_a

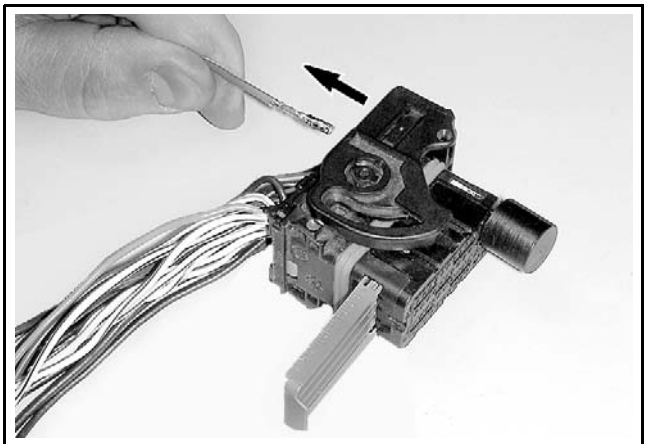
3. Insert tool to unlock terminal.



smr2009-045-026_a

1. Unlock here

4. Gently pull on the wire to extract the terminal out the back of the connector.


smr2009-045-027_a

NOTICE Before installing wire terminals in the connector, ensure all terminals are properly crimped on wires. After installation of wire terminals in the connectors, ensure they are properly locked by gently pulling on them as if to extract them.

DS, STS, FP, TAS, BRLS, FB, MSL, MSR CONNECTORS (DELPHI/PACKARD)

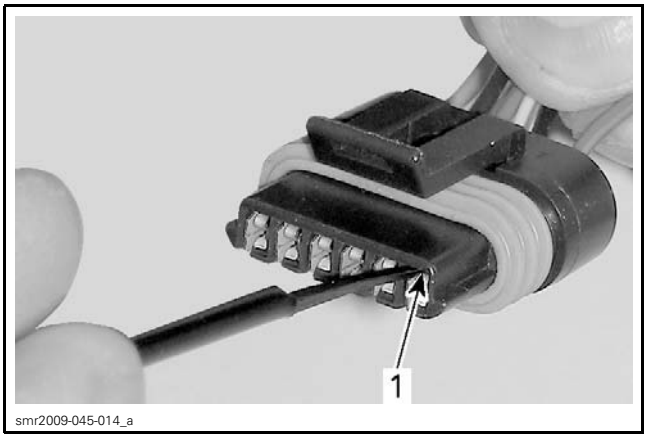
Removing the Connector Terminal

To remove a terminal (pin) from the connector, use a special tool such as the Delphi terminal extractor.

REQUIRED TOOL	
DELPHI TERMINAL EXTRACTOR (P/N 12094429)	

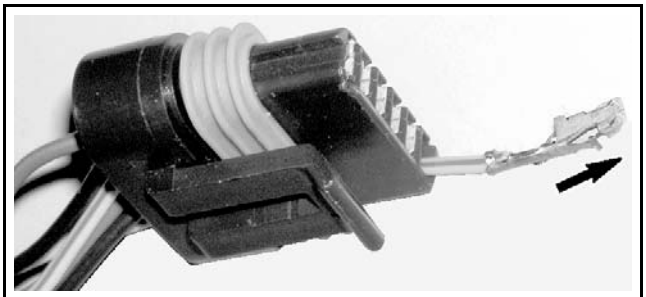
NOTE: Grinding the tool end to a taper is required.

1. Carefully insert the tool in the space provided to release the pin lock.
2. Push the pin out the front of the connector by pushing on the wire.



smr2009-045-014_a

1. Unlock terminal here

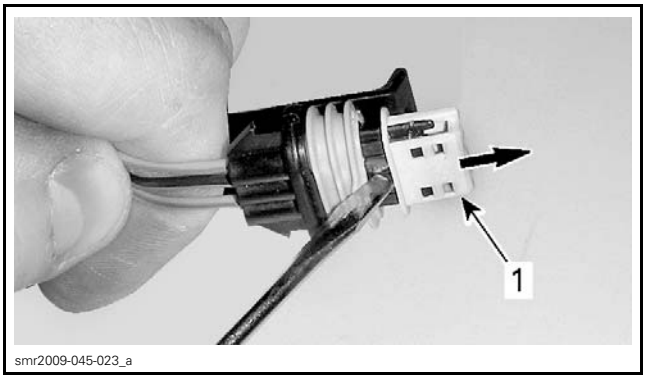

smr2009-045-015_a

NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.

MSL, MSR CONNECTORS (DELPHI)

Removing the Terminal

1. To remove a terminal from connector, first remove the locking cap.

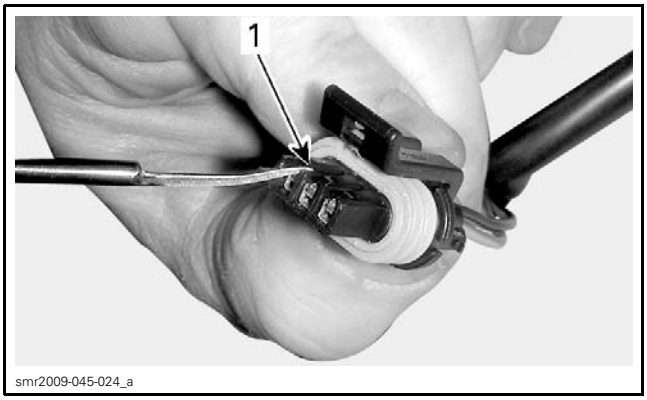


smr2009-045-023_a

1. Pry out locking cap

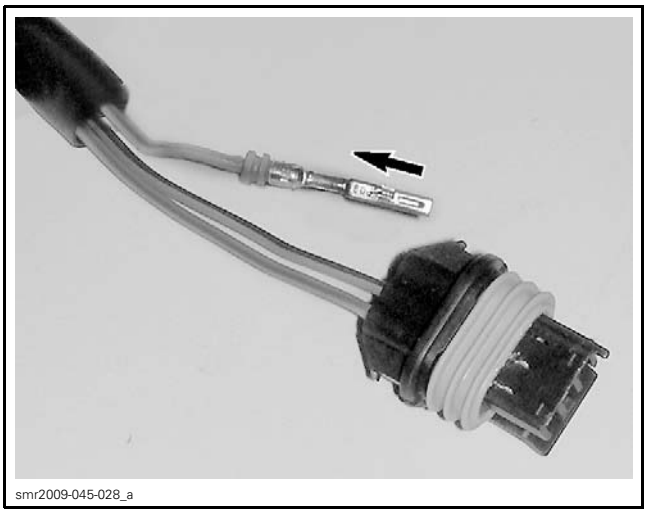
2. Carefully insert the Delphi terminal extractor in the space provided to release the pin lock.

REQUIRED TOOL	
DELPHI TERMINAL EXTRACTOR (P/N 12094429)	



1. Unlock here

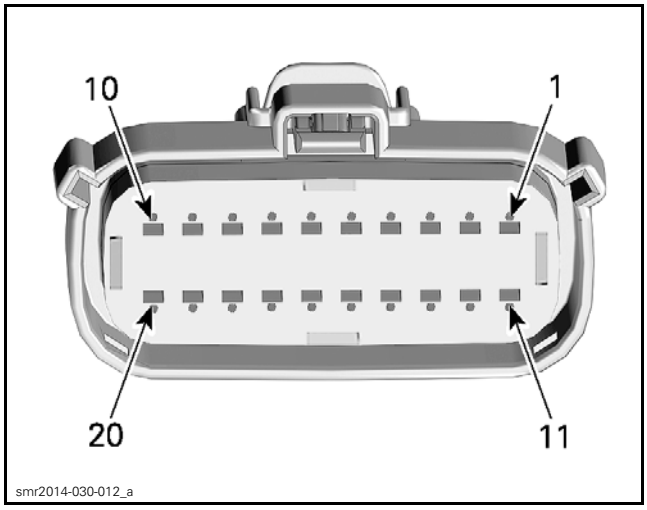
3. Gently pull on the wire to extract the pin out the back of the connector.



NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.

ACC, SSIC, HIC, HIC1,HIC2 (MOLEX)

NOTE: 20 pin Molex is shown



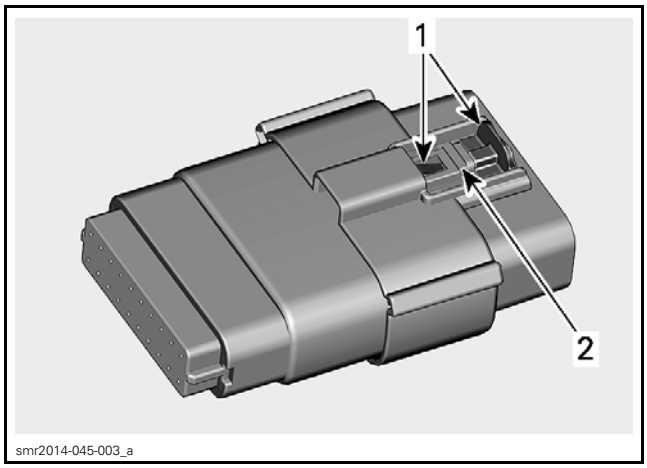
1. Female connector pin-out (sockets)

Disconnecting the Connector

Pull back the red secondary lock from the connector latch lever. Do not remove it from the latch.

Push the two connector assemblies together to unload the latch.

Depress the latch lever and pull the two connector assemblies apart.



1. Red secondary lock (shown out)
2. Latch lever

Probing the Connector

1. Disconnect the steering connector in the vehicle and connect it to the diagnostic harness.

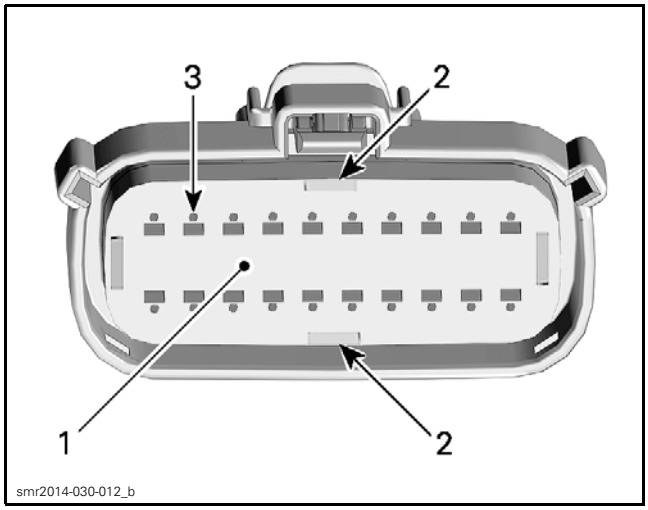
REQUIRED TOOL	
DIAGNOSTIC HARNESS (P/N 529 036 384)	

2. Probe the applicable circuit using the test connector on the diagnostic harness.

NOTICE Attempting to probe the connector without using the diagnostic connector may damage the connector pins, or even cause a short circuit if testing an energized circuit.

Extracting the Socket (Female Connector)

1. Insert a small flat screwdriver in the pry holes of the socket locator, on the socket side of the connector.



1. Socket locator
2. Pry holes
3. Holes for inserting terminal extractor tool

2. Carefully pull out the socket locator out to the detent position (approximately 5 mm).

NOTE: Do not remove the socket locator from the connector housing.

3. Insert the extractor tool in the small hole adjacent to the socket.

NOTE: Push the extractor tool in only as far as required to release the lock from the socket. The tool should slide along the socket and be inserted between the socket and the lock.

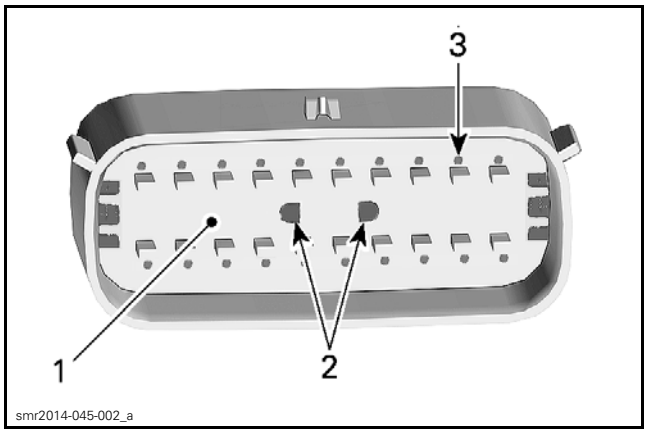
REQUIRED TOOLS	
FCI TERMINAL EXTRACTOR TOOL (P/N 54241678) or,	
MOLEX 150 TERMINAL EXTRACTOR TOOL (P/N 63813 - 1500)	

4. Gently pull on the wire to extract the socket out the back of the connector.

Extracting the Pin (Male Connector)

1. Using a pair of thin long nose pliers, pull the pin locator out to the detent position (approximately 5 mm). This will allow unlocking of the pins.

NOTICE Do not attempt to remove the pin locator or damage will occur. Be careful not to bend the pins when using the pliers.



1. Pin locator
2. Insert long nose pliers here
3. Holes for inserting terminal extractor tool

2. Insert the extractor tool in the small hole adjacent to the pin.

NOTE: Push the extractor tool in only as far as required to release the lock from the pin. The tool should slide along the pin and be inserted between the pin and the lock.

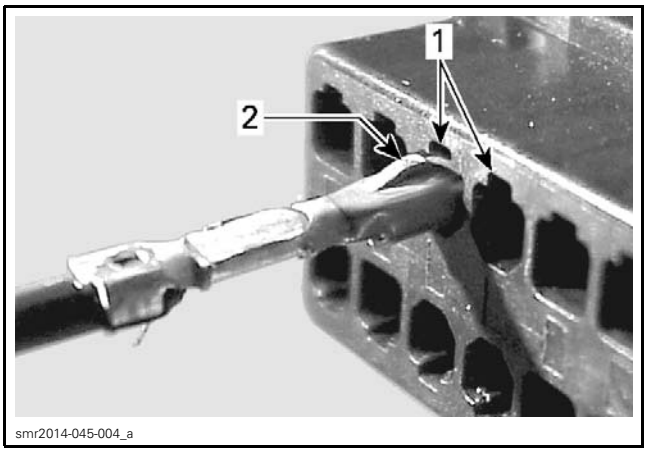
REQUIRED TOOLS	
FCI TERMINAL EXTRACTOR TOOL (P/N 54241678) or,	
MOLEX 150 TERMINAL EXTRACTOR TOOL (P/N 63813 - 1500)	

3. Gently pull on the wire to extract the pin out the back of the connector.

Inserting the Pin

1. Ensure the terminal (pin) is properly crimped onto the wire.
2. Ensure the pin locator (the white plastic insert in the connector) is out in the detent position.
3. Insert the pin in through the back of the connector.

NOTE: When inserting the pin, insert the stepped portion facing the notch in the connector pin hole.

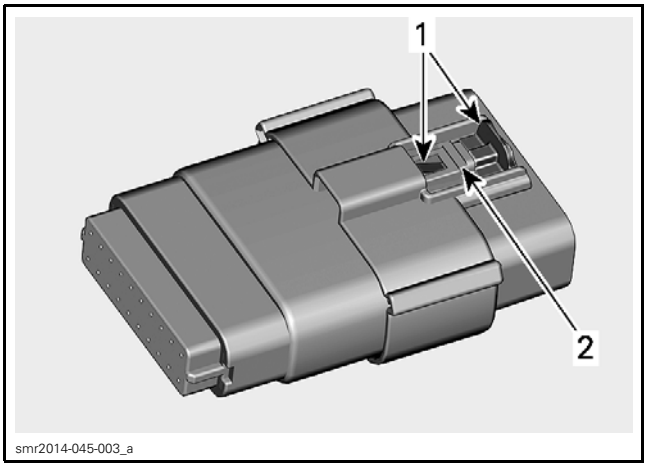


TYPICAL - PIN INSERTION
1. Notch
2. Stepped portion towards notch

4. Push the pin in until the pin lock engages the pin.
5. Gently pull on the pin to ensure it is properly locked.
6. Repeat previous steps for each pin to be inserted.
7. Push the pin locator into the connector to the locked position.

Reconnecting the MOLEX Connector

1. Insert the male connector into the female connector and push it in until the latch lever fully engages.
2. Push in the secondary lock (red tab) until it fully engages into the latch lever.

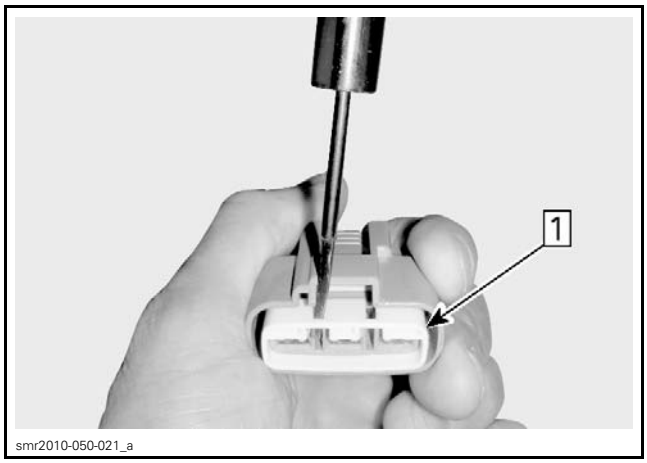


1. Red secondary lock (shown out)
2. Latch lever

VOLTAGE REGULATOR/RECTIFIER CONNECTOR (FURUKAWA)

Removing the Terminal

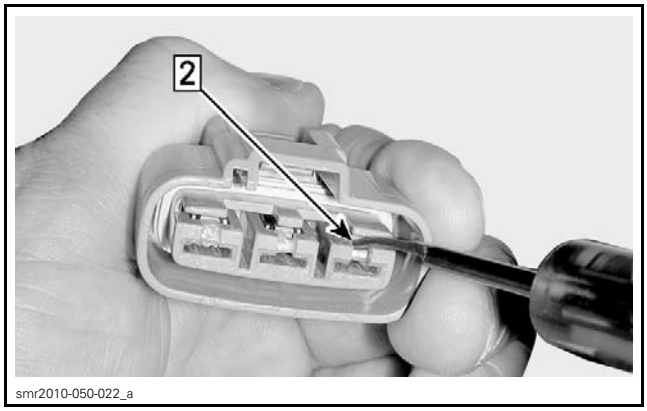
1. Remove the secondary lock (plastic insert).



Step 1: Remove the secondary lock

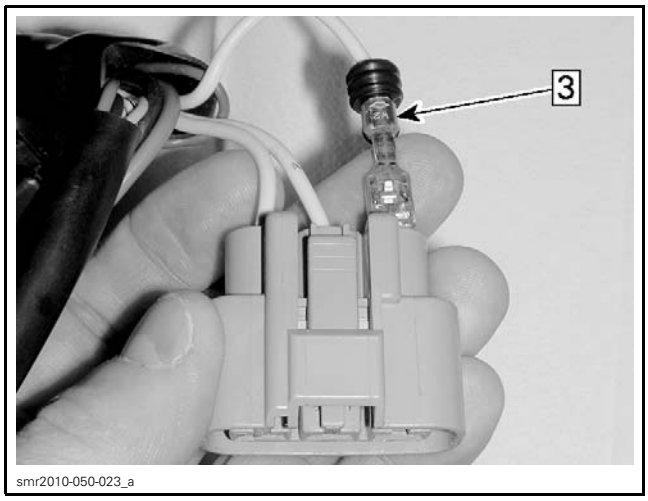
2. Carefully insert the GM terminal extractor between the lock and the pin to release the pin.

REQUIRED TOOL	
GM TERMINAL EXTRACTOR (P/N 12094430)	



Step 2: Insert GM extractor tool (P/N 12094430)

3. Gently pull on the wire to extract the pin out the back of the connector.



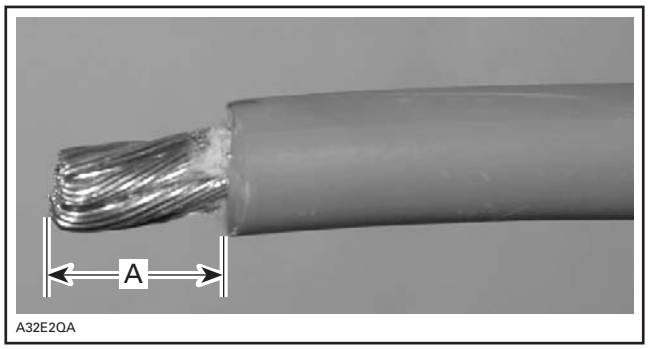
Step 3: Pull wire to extract pin

NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.

BATTERY CABLES

Crimping the Battery Cable

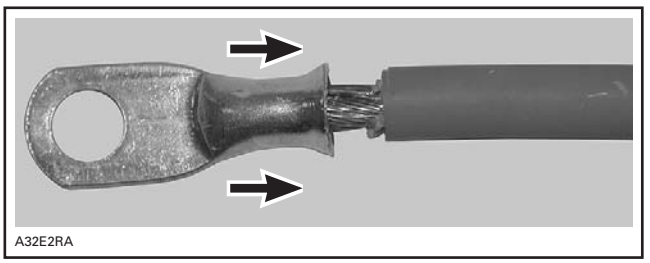
Carefully strip the wire approximately to 10 mm (3/8 in) in length, using a wire stripping tool or sharp blade/knife.



A. 10 mm (3/8 in)

NOTE: Make sure not to cut wire strands while stripping the wire.

Install the appropriate terminal on the wire according to the requirement.

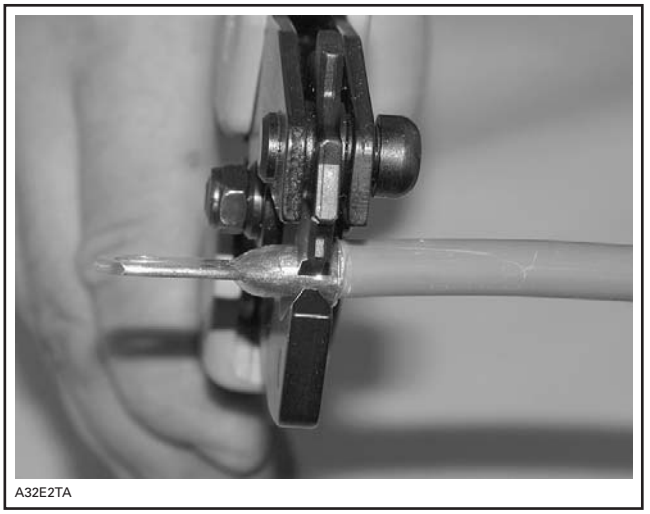


INSTALLATION OF TERMINAL

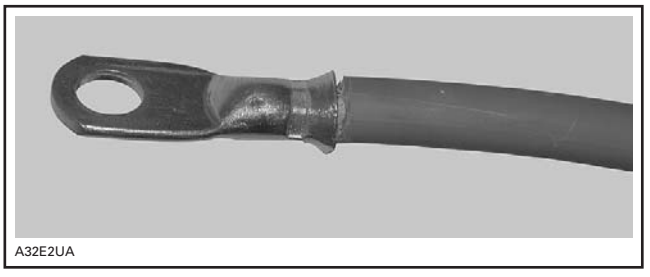
Follow the instructions provided with the crimping tool to select the proper position of the tool.

NOTE: Different wires require different crimping pliers settings, so make sure to follow the instruction supplied with the tool.

After positioning the crimping pliers, crimp the terminal already installed on wire.



CRIMPING OF WIRE



PROPERLY CRIMPED WIRE

To verify, if the wire is properly crimped, apply some pulling force on wire and the terminal at the same time from both directions.

NOTICE Never weld the wire to the terminal. Welding can change the property of the wire and it can become brittle and break.

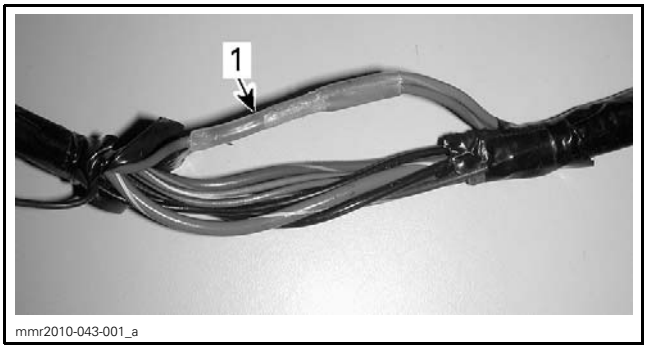
Install the protective heat shrink rubber tube on the terminal. Heat the heat shrink rubber tube using the heat gun so that it grasps the wire and the terminal.

NOTICE Make sure that the protective heat shrink rubber tube has been properly installed and no part of wire is exposed.

SPLICES REPAIR PROCEDURE

CASE 1: Wire Detached from Splice

1. Remove wires from protector tube.
2. Locate the shrink tube protecting the defective splice.



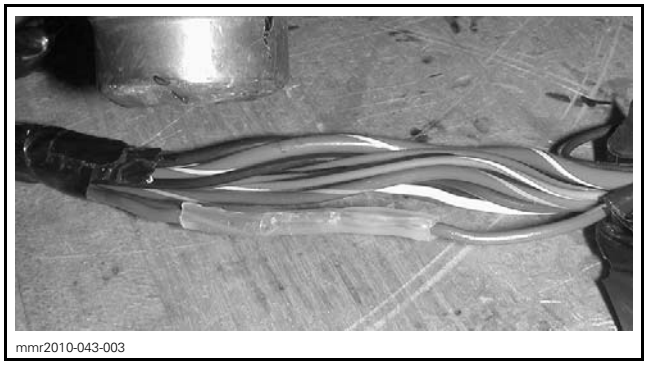
1. Shrink tube

3. Remove the shrink tube.
   3.1 Using a blade, cut the shrink tube.



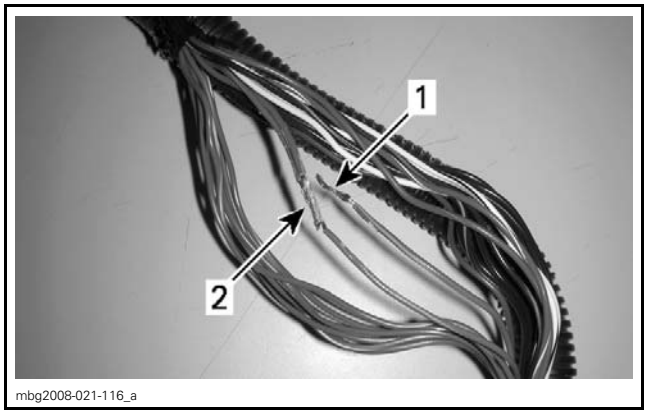
NOTICE Be careful with the blade to avoid cutting wires insulation.

   3.2 Slightly heat the shrink tube using a heat gun.



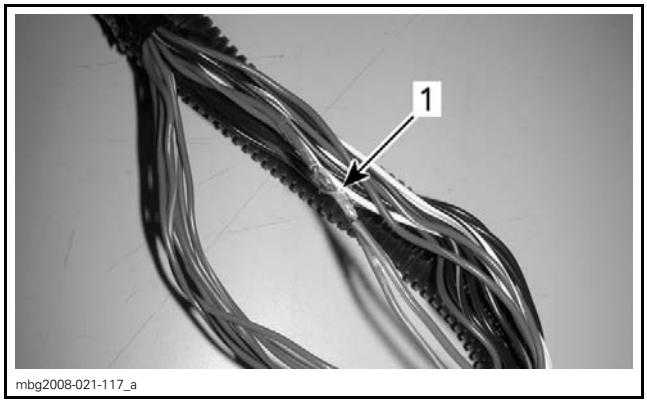
   3.3 Remove the shrink tube with long nose pliers.

4. Locate detached wire from splice.



1. Detached wire
2. Splice

5. Twist detached wire around splice.



1. Twisted wire

6. Perform a tin solder on twisted wire.
7. Apply electrical tape to cover splice.

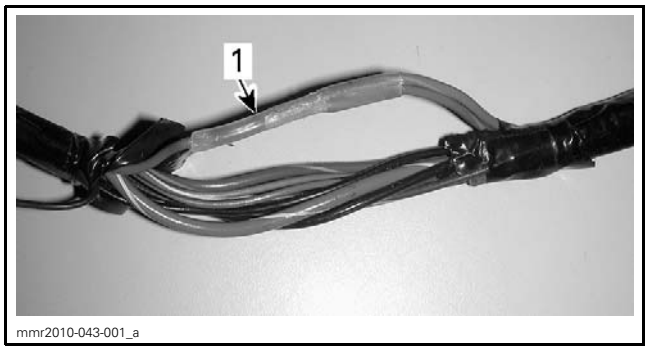
NOTE: Make sure tape overlaps on wire insulation, approximately 13 mm (1/2 in) each side.

8. Reinstall wires into protector tube.

CASE 2: Wire Broken from Splice

1. Remove wires from protector tube.

2. Locate the shrink tube protecting the defective splice.



1. Shrink tube

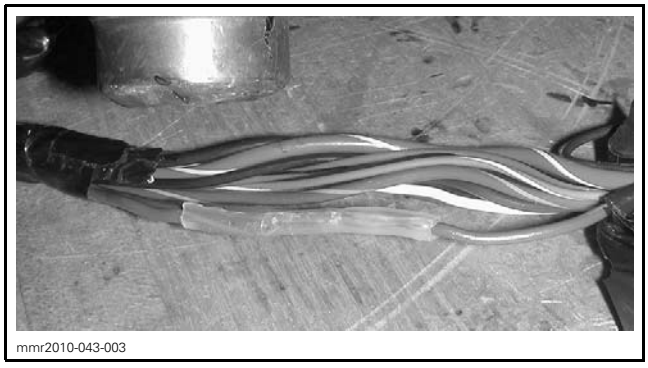
3. Remove the shrink tube.

3.1 Using a blade, cut the shrink tube.



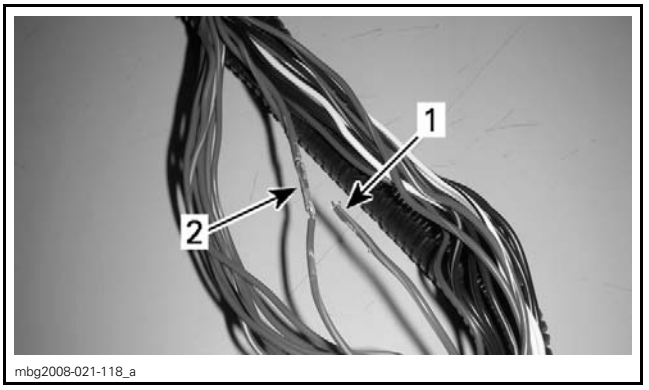
NOTICE Be careful with the blade to avoid cutting wires insulation.

3.2 Slightly heat the shrink tube using a heat gun.



3.3 Remove the shrink tube with long nose pliers.

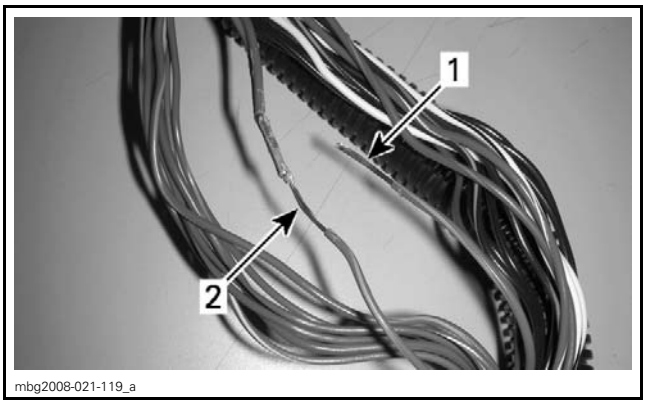
4. Locate broken wire from splice.



1. Broken wire
2. Splice

5. Strip wire insulation at the end of broken wire.

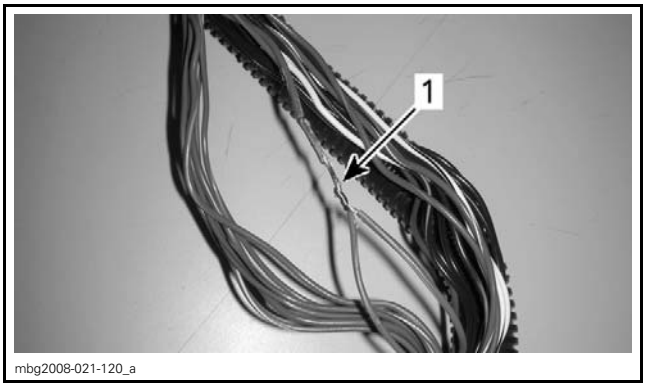
6. Strip wire insulation below the splice.



1. Broken wire stripped
2. Splice wire stripped

7. Cut splice wire and insert a new shrink tube.

8. Twist wire around stripped wire.



1. Twisted wire

9. Perform a tin solder on twisted wire.

10. Apply electrical tape to cover splice.

NOTE: Make sure tape overlaps on wire insulation, approximately 13 mm (1/2 in) each side.

11. Install the shrink tube as it was before removal.

12. Reinstall wires into protector tube.

NOTE: Always perform a solder on a bigger wire (lower gage).

CHARGING SYSTEM

SERVICE TOOLS

Description	Part Number	Page
SPRING INSTALLER/REMOVER	529 035 983	162

GENERAL

SYSTEM DESCRIPTION

The purpose of the charging system is to maintain the battery at a full state of charge and to provide the electrical system with the required electrical power for normal vehicle operation.

Magneto

The magneto is the primary source of electrical energy. It transforms a magnetic field into an electric current (AC).

The magneto has a 3 phase stator.

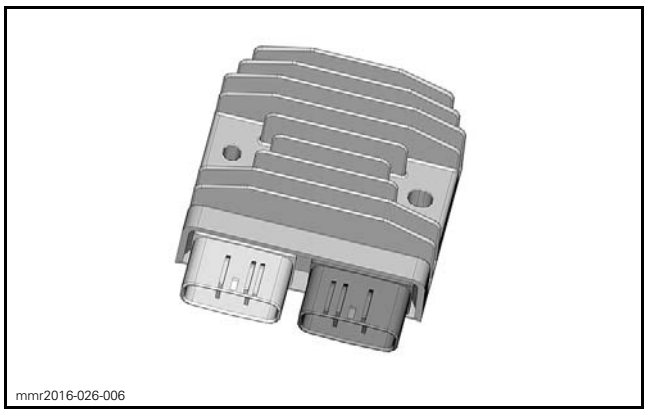


TYPICAL

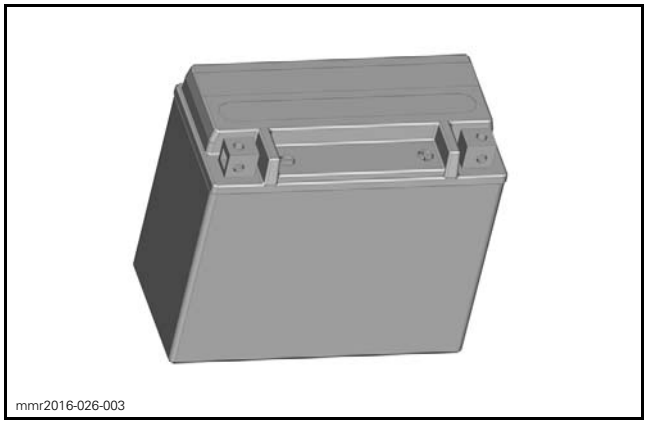
Voltage Regulator/Rectifier

The rectifier receives AC current from the magneto and transforms it into direct current (DC).

The voltage regulator, included in the same unit, limits voltage to a maximum level to prevent any damage to electrical components.



Battery



The battery supplies DC power to the electric starter for cranking the engine. During engine starting, it also supplies DC power to every electrical and electronic system in the vehicle as well as all accessories.

At low engine RPM operation and high current load conditions, it supplements the magneto output and helps to maintain a steady system voltage.

INSPECTION

CHARGING SYSTEM OUTPUT

First ensure that battery is in good condition prior to performing the following tests.

NOTE: It is good practice to check for fault codes using the BRP diagnostic software (BUDS2) as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Testing Output Voltage Using BUDS2

Connect the vehicle to BRP diagnostic software (BUDS2).

Go to:
- **Measurements** page
- **ECM** button
- **Battery voltage** (V)

1. Start engine.

NOTE: Connect a garden hose to cool exhaust system. Refer to *EXHAUST SYSTEM* subsection.

2. Increase engine RPM as specified in the following table and read voltage.

OUTPUT VOLTAGE TEST USING A MULTIMETER	
TEST ENGINE SPEED	VOLTAGE (DC)
5500 RPM	14.5 ± .5 Vdc

If voltage is above specification, replace voltage regulator/rectifier.

If voltage is below specification, check stator output and wiring harness prior to concluding that voltage regulator/rectifier is defective. Refer to *STARTING SYSTEM* subsection.

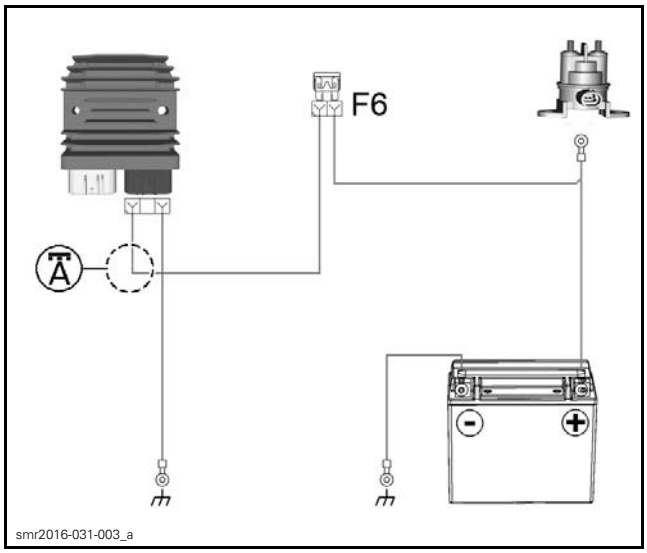
Testing Output Current with an Inductive Ammeter

Use an inductive ammeter that can read at least 200 Aac and 40 Adc current.

1. Turn on the ammeter and select 40 Adc.

NOTE: Zero set the ammeter before use or reading may be erroneous.

VOLTAGE REGULATOR
RE1-1



2. Start engine.

NOTE: Connect a garden hose to cool exhaust system. Refer to *EXHAUST SYSTEM* subsection.

3. Increase engine RPM as specified in the following table and read current with the ammeter.

TEST ENGINE SPEED	CURRENT
5500 RPM	Approx. 10 A

NOTE: Initial current reading will be higher than specified due to the battery drain from the engine start. This is an indication that the charging system is operating normally. Current load will come down as the battery recovers its charge.

If current reading is far below specification, test stator output and wiring harness prior to concluding the voltage regulator/rectifier is faulty.

NOTE: If the battery is in poor condition or is not at a full state of charge, current reading will be above specification. Refer to *BATTERY* in this subsection for battery testing.

TROUBLESHOOTING

DISCHARGED OR WEAK BATTERY

1. **Battery posts and/or cable terminal oxidized.**
   - *Clean battery terminals, posts, and coat with dielectric grease.*
2. **Loose or bad connections.**
   - *Check for wiring and connector tightness, frayed or broken wires. Repair or replace cables or connectors.*

3. Worn or faulty battery (sulfated, fretting, shorted plates or cell, damaged casing, loose post).
   - *Test BATTERY VOLTAGE (LOAD APPLIED).*
   - *Replace battery.*
4. Burnt fuse(s) or faulty rectifier.
   - *First check fuse(s). If in good condition, check voltage regulator/rectifier.*
5. Faulty stator.
   - *Test stator and replace as required.*
6. 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 infiltration in connectors, or partial short circuits that slowly drain a battery without causing a fuse to burn.

LOW OR NO CHARGING SYSTEM VOLTAGE

1. Blown F4 on 900 engine or F6 on all other engines.
   - *Check F4 or F6 fuse.*
2. Defective stator.
   - *Test stator. Refer to STARTING SYSTEM subsection.*
3. Defective charging system wiring or connections.
   - *Check for damaged wiring.*
   - *Check for damaged or loose connections.*

REPETITIVE BLOWN F4 (900) OR F6 (ALL OTHERS) FUSE

1. Voltage regulator/rectifier internal circuit shorted to ground.
   - *Refer to TESTING VOLTAGE REGULATOR/RECTIFIER FOR BLOWN F6 FUSE in this subsection.*

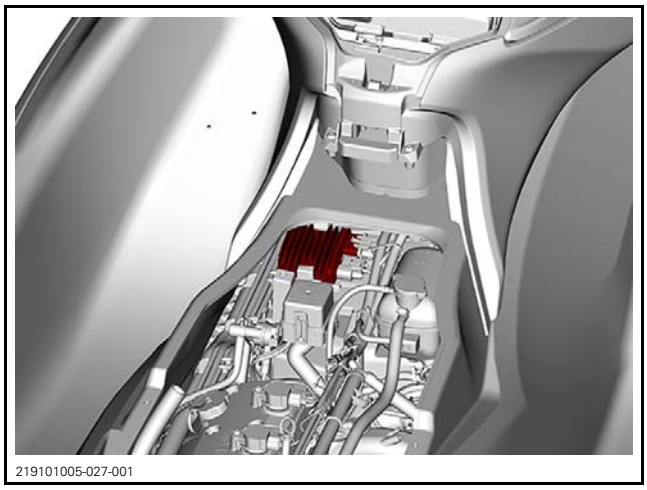
PROCEDURES

VOLTAGE REGULATOR/RECTIFIER

Testing the Voltage Regulator Continuity

Due to internal circuitry, there is no static test available to check continuity.

Voltage Regulator/Rectifier Location



219101005-027-001

Testing Voltage Regulator/Rectifier for Blown F6 Fuse

1. Remove the voltage regulator/rectifier from the air intake silencer. Refer to *REMOVING THE VOLTAGE REGULATOR/RECTIFIER* in this subsection.
2. Install a new fuse.

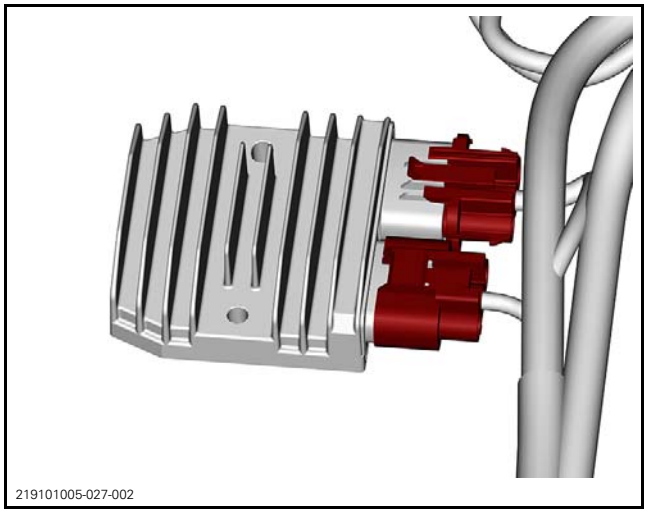
If the fuse still burns, check for a shorted wire or connector pin.

If fuse does not burn, replace regulator/rectifier.

Removing the Voltage Regulator/Rectifier

Unclip the voltage regulator/rectifier from the air intake silencer.

Disconnect both connectors from voltage regulator/rectifier.

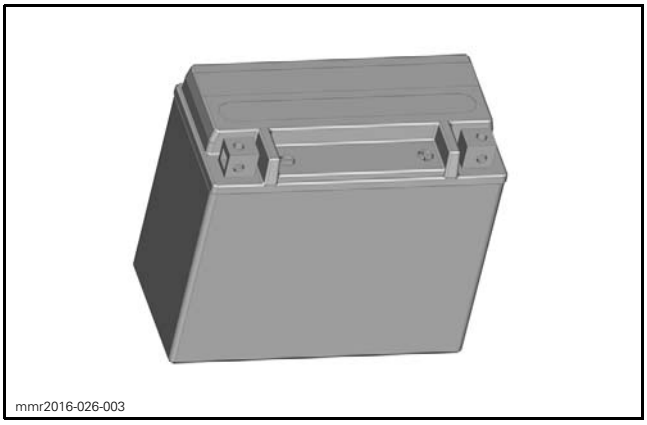


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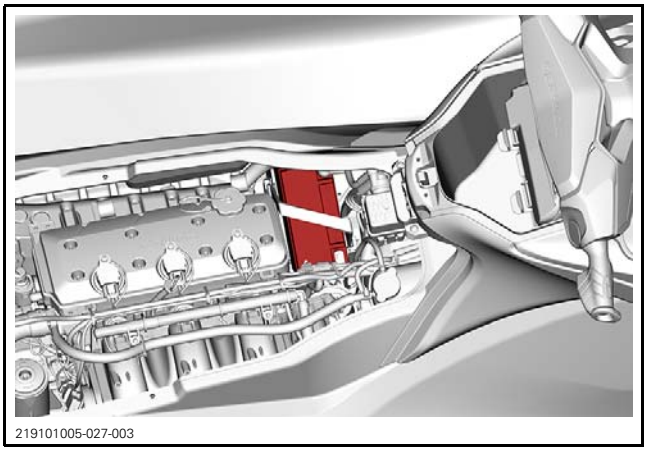
Installing the Voltage Regulator/Rectifier

The installation is the reverse of the removal procedure.

BATTERY

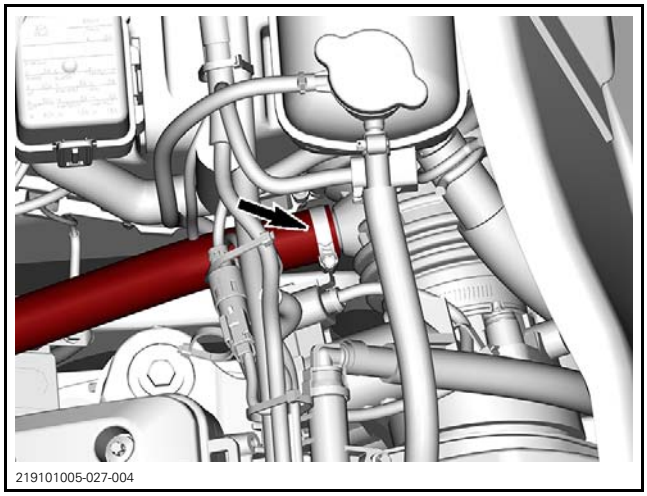

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Battery Location


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Removing the Battery

1. On 130 and 170 engines, remove clamp to disconnect vent hose from outlet hose. Set aside.

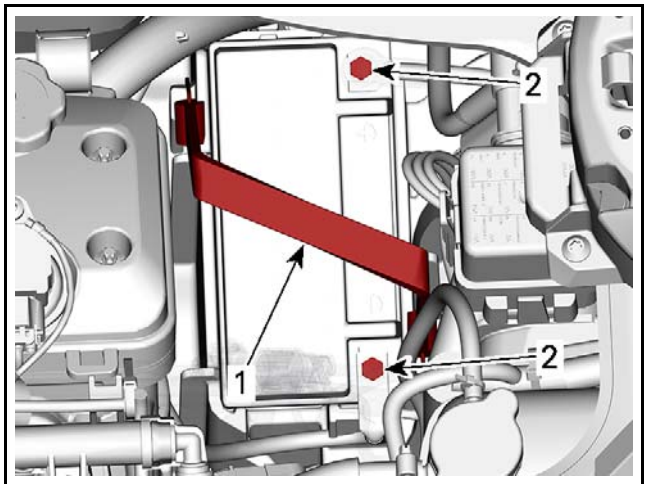

219101005-027-004

⚠ CAUTION It is recommended to wear appropriate protective gloves for the following procedure.

2. Use an appropriate tool to remove the battery strap.

REQUIRED TOOL	
SPRING INSTALLER/REMOVER (P/N 529 035 983)	

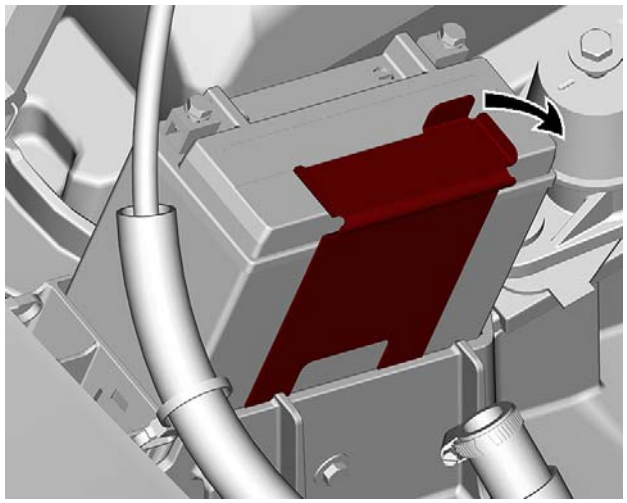
3. Disconnect battery posts.



219101005-027-005

1. Remove strap.
2. Disconnect battery posts.

4. Bend the superior battery support rearwards until the battery can be removed.


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NOTE: Do not excessively bend the superior battery support.

NOTICE **Always disconnect the BLACK (-) battery cable first and reconnect last.**

Cleaning the Battery

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

NOTICE **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.

Inspecting the Battery

- Keep the top free of grime
- Check casing, cables, clamps, and case for obvious damage or loose connections.
- Clean terminals and connectors as necessary

Refer to battery manufacturer guidelines.

Testing the Battery

There are 2 types of battery tests.

TEST METHOD	COMMENT
Testing voltage (load applied)	A dynamic voltage test with a load applied gives an accurate indication of the condition of the battery. **This is the most recommended method.**
Testing voltage (no load)	A static voltage test is carried out without discharging current. It is the simplest and most commonly used but the most likely to give false results.

Testing Battery Voltage (Load Applied)

1. Connect a battery load tester to battery.
2. Ensure proper test conditions:
   - Initial battery voltage above 12.5 Vdc
   - Engine OFF
   - Ambient temperature of 20°C (68°F)

If battery voltage has dropped below specification, the battery storage capacity has decreased appreciably and the battery should be replaced.

Testing Battery Voltage (No Load)

NOTE: Be aware that the voltage test can indicate that the battery is in good condition even though the battery does not have enough stored energy to crank the engine. A load test gives a more accurate indication of the condition of the battery.

If the battery has just received a charge, wait 1-2 hours before taking a voltage reading.

Set multimeter to Vdc and measure voltage at battery terminals.

FULLY CHARGED BATTERY VOLTAGE (NO LOAD)
12.6 Vdc minimum

Storing the Battery

Disconnect and remove battery from watercraft. Refer to *REMOVING THE BATTERY* in this subsection.

NOTICE **Battery storage is critical for battery life. Regularly charging the battery during storage will prevent cell sulfation. Keeping the battery in vehicle for storage may lead to contacts degradation/corrosion and case damage if freezing occurs. A discharged battery will freeze and crack in areas where freezing conditions are experienced. Electrolyte leakage will damage surrounding parts. Always remove battery from vehicle for storage and regularly recharge it to keep an optimal condition.**

The battery must always be stored fully charged.

NOTICE **Battery electrolyte temperature must not exceed 50°C (122°F) during charging. The battery casing should not feel hot to the touch.**

Clean battery terminals and cable connections using a wire brush.

Apply a light coat of dielectric grease on terminals.

Clean battery casing and caps using a solution of baking soda and water.

Rinse battery with clear water and dry well using a clean cloth.

Store battery in a cool dry place. Such conditions reduce self-discharging and keep fluid evaporation to a minimum. Keep battery away from dew, high moisture and direct sunlight.

AMBIENT TEMPERATURE	CHARGING FREQUENCY
Below 16°C (60°F)	Every month
Above 16°C (60°F)	Every 2 weeks

⚠ WARNING

Batteries must always be stored out of reach of children.

Activating a New Battery

YTX20-L batteries are factory activated. Test and charge battery as required before installing it.

Charging a Used Battery

To find the recommended charger current output in amps for a specific battery, divide the battery amp hour rating by 10. For example a 14 AH battery should be charged at 1.4 amps (14 AH ÷ 10 = 1.4 amp current).

⚠ WARNING

Never charge battery while installed in watercraft.

For best results, battery should be charged when it is at room temperature. A battery that is cold may not accept current for several hours after charging has begun.

Do not charge a frozen battery. If the battery charge is very low, the battery may freeze. If you suspect the battery to be frozen, move it to a heated area for about 2 hours (or more if required) to let it thaw out before charging.

⚠ WARNING

Always charge a battery in a well ventilated area.

The time required to charge a battery will vary depending on several factors, such as:

– Battery temperature: The charging time is increased for a cold battery as charging current accepted by a cold battery will be lower than for a warm battery. As the battery warms up, it will accept a higher rate of charge.
– State of charge: As a battery discharges, it gives up its stored energy. The greater the discharge, the longer it will take to fully recharge it.
– Type of charger: Battery chargers vary in the amount of voltage and current that they can supply.

Charging a Very Flat or Completely Discharged Battery

The battery charger used should have an adjustable charging rate. A unit which can be adjusted in small increments is acceptable.

The battery charger must be equipped with an ammeter capable of accurately measuring current of less than 1 ampere.

Unless this procedure is properly followed, a good battery may be needlessly replaced.

1. Measure the voltage at the battery posts with an accurate voltmeter. If it is below 10 volts, the battery will accept current at very low rate. It could be some time before the charging rate increases. Such low current flow may not be detectable on some charger ammeters and the battery will not seem to accept the charge.
2. Exceptionally for this particular case, set the charger to a high rate.

NOTE: Some chargers have a polarity protection feature which prevents charging unless the charger leads are connected to the correct battery terminals. A completely discharged battery may not have enough voltage to activate this circuitry, even though the leads are connected properly. This will make it appear that the battery will not accept a charge. Follow the charger manufacturer's instruction on how to bypass or override this circuitry so that the charger will turn on and charge a low-voltage battery.

3. Since battery chargers vary in the amount of voltage and current they provide, the time required for the battery to accept a measurable charger current may be up to 10 hours or more.
4. If the charging current is not up to a measurable amount after 10 hours, the battery should be replaced.
5. If the charging current is measurable before the end of the 10 hour period, the battery is good and charging should be completed at a lower rate.
6. It is recommended that any battery recharged using this procedure be tested under load prior to returning it to service.

Installing the Battery

Installation is the reverse of removal procedure, however pay attention to the following.

NOTICE **Always connect battery cables in the specified order, RED positive cable first, BLACK negative cable last.**

1. Connect RED (+) cable.
2. Connect BLACK (-) cable last.
3. Apply dielectric grease on battery posts.
4. Verify cable routing and attachments.

STARTING SYSTEM

SERVICE TOOLS

Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 384	167
ECM ADAPTER TOOL	529 036 166	167
FLUKE 115 MULTIMETER	529 035 868	167

GENERAL

BASIC STARTING SYSTEM OPERATION

Engine Cranking Conditions

The following conditions must be met to allow engine cranking:

1. START/STOP button pressed and released to activate the ECM.
2. The tether cord securely installed on the engine cut-off switch and the D.E.S.S. key recognized by the ECM as valid (2 short beeps)
3. START/STOP button pressed and held.

Starting System Logic

If the ECM recognizes a valid D.E.S.S. key, it allows engine cranking by providing the ground to the starter solenoid when the START/STOP button is pressed and held.

If the START/STOP button is activated while the throttle lever is depressed more than 60%, the engine will crank but will not start (engine drowned mode).

If the START/STOP button is held after engine has started, the ECM automatically stops the starter if engine speed reaches at least 1400 RPM.

If the START/STOP button is pressed when the engine is running, the engine will shut down.

Required Tools

To perform the tests in this subsection, the following tools are required.

REQUIRED TOOLS	
ECM ADAPTER TOOL (P/N 529 036 166)	
FLUKE 115 MULTIMETER (P/N 529 035 868)	
DIAGNOSTIC HARNESS (P/N 529 036 384)	

TROUBLESHOOTING

DIAGNOSTIC TIPS

NOTE: It is a good practice to check for fault codes using the BRP diagnostic software (BUDS2) as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Starting system failures are not necessarily related to the starter but may be due to one the following:

- Starter solenoid fuse
- Battery, refer to *CHARGING SYSTEM* subsection
- START/STOP switch
- Starter solenoid
- Engine cut-off switch
- ECM
- Wiring/connections.

Check these components before removing the starter.

NOTE: This subsection assumes the problem is related to an electrical component of the starting system. If the starting system tests good, ensure engine and jet pump integrity. Refer to applicable subsection.

DIAGNOSTIC GUIDELINES

NOTHING HAPPENS WHEN START/STOP BUTTON PRESSED

1. Battery not connected
   - *Connect battery.*
2. Burnt fuse
   - *START/STOP switch circuit.*
   - *Main DC power fuses.*
   - *ECM power fuse.*
3. Defective relay or related circuits
   - *Test relay and circuits.*
4. Defective START/STOP switch
   - *Test START/STOP switch, wiring and connections.*

ENGINE DOES NOT CRANK

1. Burnt fuse
   - *Starter solenoid power. Carry out TESTING THE SOLENOID INPUT VOLTAGE.*
2. Discharged battery
   - *Recharge and test. Refer to CHARGING SYSTEM subsection.*
3. Battery connections
   - *Check/clean/tighten.*
4. Poor/bad or corroded ground contacts (engine, battery ground cable, starter etc.)
   - *Check/clean/repair, refer to POWER DISTRIBUTION AND GROUNDS subsection.*
5. Starter solenoid
   - *Test solenoid, wiring and connections.*
6. Damaged starter or ground cables
   - *Carry out TESTING THE SOLENOID (DYNAMIC).*
7. Obstructed starter drive gear assembly
   - *Check/repair, refer to PTO HOUSING, MAGNETO AND STARTER subsection.*
8. No ground provided by ECM to starter solenoid
   - *Refer to TESTING THE START/STOP SWITCH CIRCUIT CONTINUITY in this subsection.*
9. Engine cannot be rotated (possibly seized or jet pump blocked)
   - *Refer to JET PUMP subsection.*

ENGINE CRANKS SLOWLY

1. Loose, corroded or dirty battery cable connections
   - *Check/clean/tighten.*
2. Discharged/weak battery
   - *Recharge and test. Refer to CHARGING SYSTEM subsection.*
3. Low voltage from starter solenoid
   - *Carry out a TESTING THE SOLENOID (DYNAMIC).*
4. Damaged starter or ground cables
   - *Carry out TESTING THE SOLENOID (DYNAMIC).*
5. Worn starter
   - *Check starter motor.*

STARTER TURNS, BUT STARTER DRIVE DOES NOT MESH WITH RING GEAR

1. Worn starter drive gear/starter gear/ring gear
   - *Replace worn parts. Refer to PTO HOUSING, MAGNETO AND STARTER subsection.*
2. Defective drive
   - *Replace starter drive. Refer to PTO HOUSING, MAGNETO AND STARTER subsection.*

STARTER KEEPS RUNNING

1. Shorted solenoid winding
   - *Replace solenoid.*
2. Melted solenoid contacts
   - *Replace solenoid.*
3. Sticking or defective starter drive
   - *Lubricate or replace. Refer to PTO HOUSING, MAGNETO AND STARTER subsection.*

PROCEDURES

NOTICE When carrying out any kind of maintenance on the starting system, always disconnect the battery ground cable. This will eliminate the possibility of shorting out a power cable, and generating a spark which could result in a fire or an explosion. Do not place any tool on the battery.

ENGINE START/STOP SWITCH

Testing the START/STOP Switch Circuit Continuity

1. Remove START/STOP switch fuse.

For fuse box access, refer to *POWER DISTRIBUTION AND GROUNDS* subsection.

Disconnect connector "B" from the ECM, refer to *WIRING HARNESS AND CONNECTOR* subsection.

Install ECM adapter tool on ECM harness connector "B".

Set the multimeter to Ω.

Press and hold the START/STOP switch and test for continuity of the switch circuit as per following table.

CONTINUITY TEST OF START/STOP SWITCH CIRCUIT (BUTTON PRESSED AND HELD)		
FUSE BOX	ECM CONNECTOR B	RESISTANCE
Pin E3	B-D1	Close to 0 Ω (continuity)

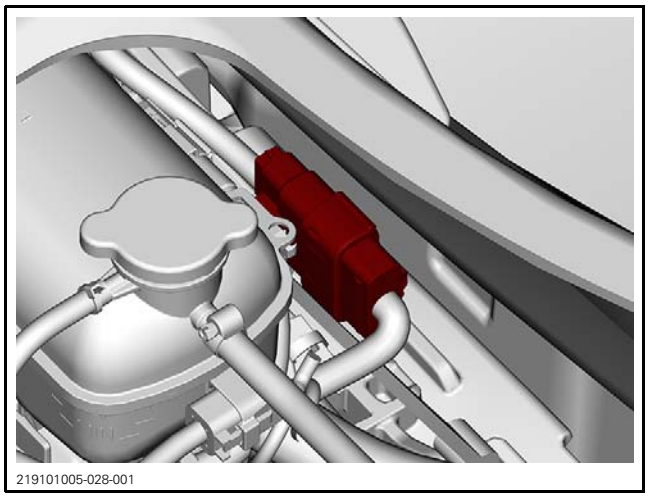
2. If the reading is as specified, the START/STOP switch and its wiring are good.
3. If a high resistance or an open circuit is measured, carry out *TESTING THE START/STOP SWITCH CONTINUITY*.

Testing the START/STOP Switch Continuity

1. Remove START/STOP switch fuse.

Remove seats and engine service cover. Refer to *BODY* subsection.

2. Disconnect the 20-pin steering connector (HIC1):



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3. Connect the diagnostic harness to make an in-line connection between the disconnected connector.
4. Use the multimeter and select Ω.
5. Measure resistance through switch as per following table.

CONTINUITY TEST OF START/STOP SWITCH CIRCUIT		
SWITCH POSITION	DIAGNOSTIC HARNESS CONNECTOR	RESISTANCE
Released	Pins 1 and 4	Infinite (OL)
Pressed and held		Close to 0 Ω

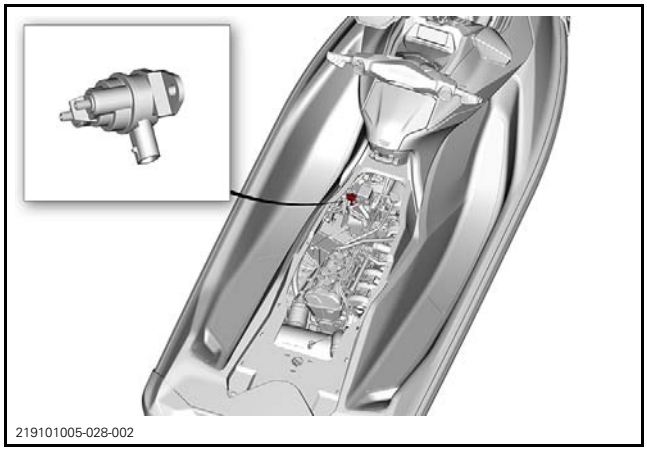
If the switch does not test as specified, replace the engine START/STOP switch.

If the switch tests as specified, check for an open circuit between connections as per table:

OPEN CIRCUIT TEST		
CIRCUIT CONNECTIONS		RESISTANCE
Fuse box pin E3	Steering connector pin 1	Must be close to 0 Ω
Steering connector pin 4	ECM connector B, pin D1	

STARTER SOLENOID

Starter Solenoid Location



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Testing Solenoid Input Voltage

1. Make sure the starter solenoid fuse is powered and in good condition before testing.
2. Disconnect solenoid connector.
3. Set the multimeter to Vdc.
4. Install tether cord on the engine cut-off switch.
5. Press the START/STOP button to activate ECM.
6. Measure voltage within 3 minutes after START/STOP switch has been depressed.

SOLENOID INPUT VOLTAGE TEST (SOLENOID COIL)		
TEST PROBES		VOLTAGE READING
Pin A	Battery ground	Battery voltage

If test succeeded, carry out *TESTING SOLENOID CONTROL CIRCUIT CONTINUITY*.

If test failed, carry out *TESTING THE START/STOP SWITCH CIRCUIT CONTINUITY*.

Testing Solenoid Control Circuit Continuity

1. Set the multimeter to Ω.
2. Disconnect connector "B" from ECM.
3. Install ECM adapter tool on ECM harness connector.
4. Test continuity of wiring from solenoid to ECM as per following table.

SOLENOID CONTROL CIRCUIT TEST		
SOLENOID CONNECTOR	ECM CONNECTOR B	RESISTANCE
Pin B	B-L4	Close to 0 Ω (continuity)

If test failed, repair or replace wiring/connectors.

If test succeeded, carry out *TESTING SOLENOID COIL RESISTANCE*.

Testing Solenoid Coil Resistance

1. Set multimeter to Ω.
2. Disconnect solenoid connector.
3. Measure solenoid coil resistance as per following table.

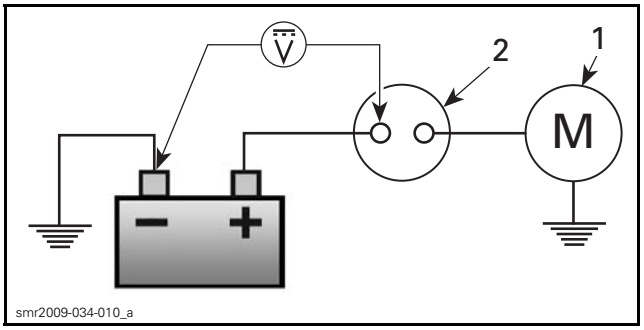
SOLENOID COIL RESISTANCE TEST		
SOLENOID CONNECTOR		RESISTANCE
Pin A	Pin B	4.5 to 5.5 Ω

If test fails, replace solenoid.

Testing Solenoid (Dynamic)

1. Ensure starter solenoid fuse, battery and starter solenoid are properly connected.
2. Make sure the battery ground cable is securely connected to the engine. Refer to *POWER DISTRIBUTION AND GROUNDS* subsection.
3. Set ECM in engine drowned mode:
   3.1 Depress throttle lever.
   3.2 Install a rubber band to hold lever in full throttle position.
4. Set multimeter to Vdc.
5. Crank engine.
6. **As engine is cranking**, measure the voltage as per following tables.

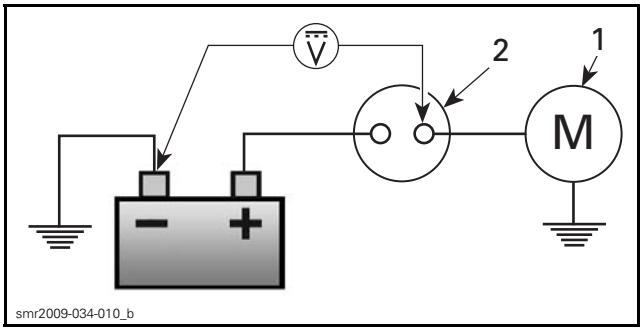
SOLENOID DYNAMIC TEST (ENGINE CRANKING)		
TEST PROBES		VOLTAGE (DC)
Solenoid battery post	Battery ground	Battery voltage



1. Starter motor
2. Starter solenoid

7. If test failed, check battery positive cable (from battery to solenoid).
8. If test succeeded, continue with next step.

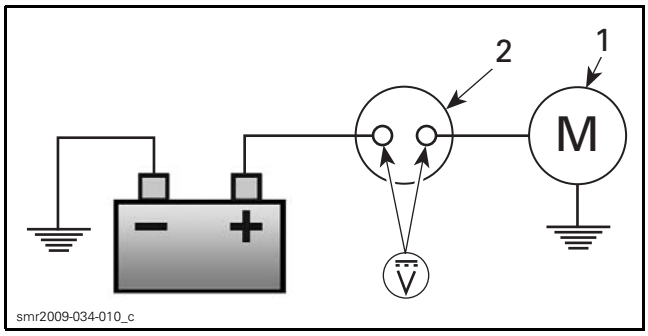
SOLENOID DYNAMIC TEST (ENGINE CRANKING)		
TEST PROBES		VOLTAGE (DC)
Solenoid starter post	Battery ground	Battery voltage



1. Starter motor
2. Starter solenoid

9. If test failed, carry out *TESTING SOLENOID INPUT VOLTAGE*.
10. If test succeeded, continue with next step.

SOLENOID DYNAMIC TEST (ENGINE CRANKING)		
TEST PROBES		VOLTAGE (DC)
Solenoid battery post	Solenoid starter post	0.2 Vdc max.



1. Starter motor
2. Starter solenoid

If test failed, replace solenoid.

If all solenoid dynamic tests are as specified, replace starter.

11. Remove rubber band from throttle lever.

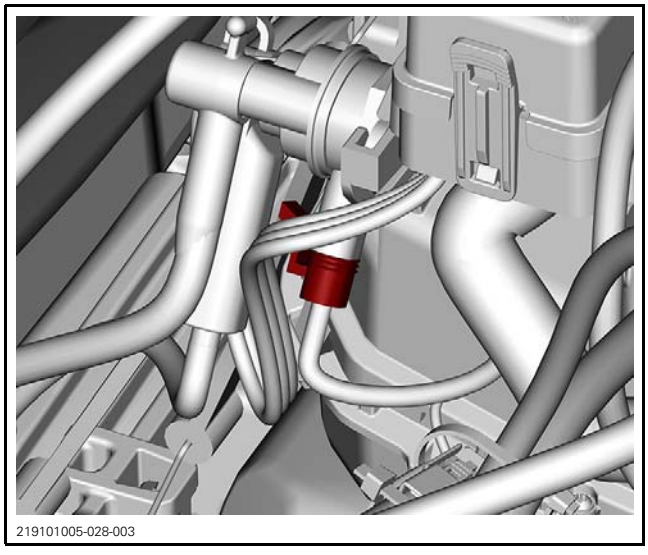
12. Reinstall removed parts.

Removing the Solenoid

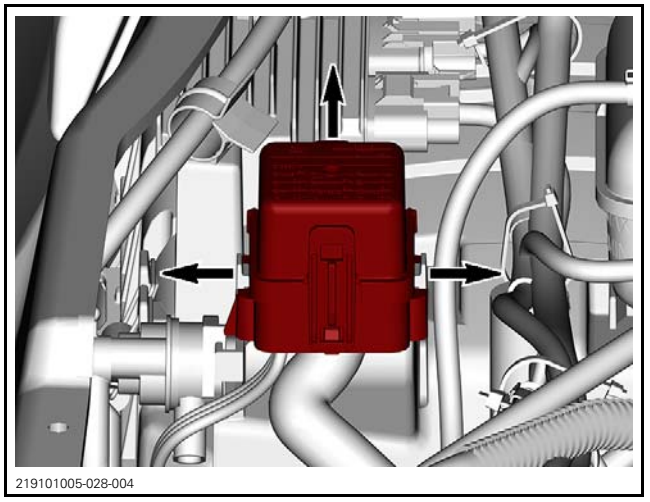
1. Disconnect battery. Refer to *CHARGING SYSTEM* subsection.

NOTICE **Always disconnect the BLACK (-) battery cable first and reconnect last.**

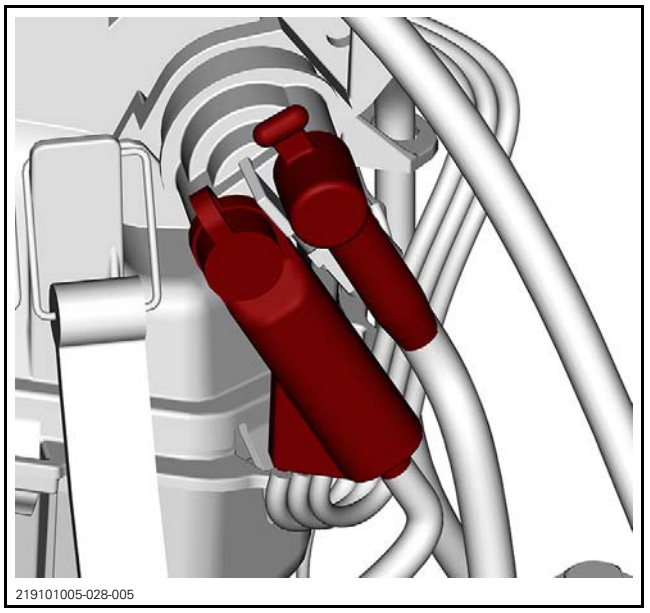
2. Disconnect solenoid connector.



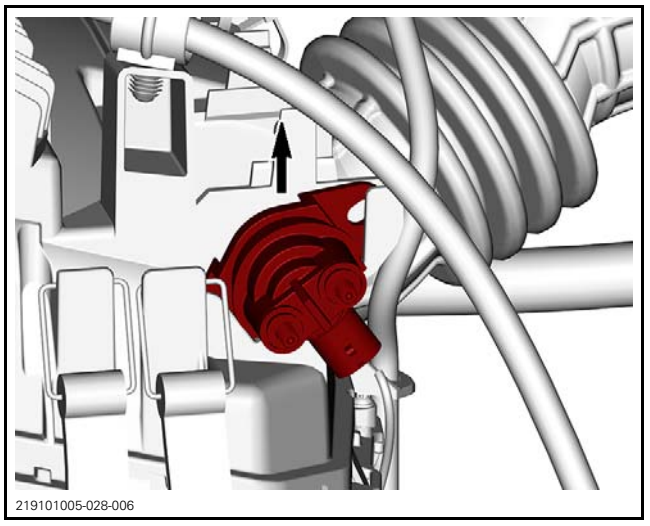
3. Unclip fuse box from air intake silencer and set aside.



4. Disconnect solenoid cables.



5. Lift starter solenoid.



Installing the Solenoid

The installation is the reverse of the removal procedure.

STARTER

For starter information, refer to *PTO HOUSING, MAGNETO AND STARTER* subsection.

RFID DIGITALLY ENCODED SECURITY SYSTEM (RF D.E.S.S.)

SERVICE TOOLS

Description	Part Number	Page
D.E.S.S. POST REMOVER	529 035 943	175
DIAGNOSTIC HARNESS	529 036 188	175
FLUKE 115 MULTIMETER	529 035 868	175

GENERAL

SYSTEM DESCRIPTION

The following components are specially designed for this system: ECM, D.E.S.S. key (inside tether cord cap) and engine cut-off switch.

The D.E.S.S. key contains a magnet and a RFID chip.

– The magnet closes the hall effect switch inside the engine cut-off switch.
– The RFID chip contains a unique digital code. It is the equivalent of the tooth-pattern cut on a conventional ignition key.

The D.E.S.S. system allows the engine to start only if a tether cord cap is installed on the engine cut-off switch and the D.E.S.S. key is recognized as valid by the ECM.

The D.E.S.S. key is quite flexible:

– Up to 8 D.E.S.S. keys may be programmed in the ECM memory using the BRP diagnostic system (BUDS2) The keys can also be erased individually.
– The same D.E.S.S. key can be used on another vehicle equipped with the D.E.S.S. system. It only needs to be programmed for that vehicle.

D.E.S.S. Key Types

Upon tether cord installation, the key type used is momentarily displayed by the digital display.

Learning keys provide a mode of operation whereby engine power and speed is limited.

There are 5 speed settings available for the learning key mode. By default, the key modes are preset to the speed setting (3). Refer to *INTELLIGENT THROTTLE CONTROL (iTC)* subsection.

NOTE: Changing key settings is only available when the engine is not running.

TROUBLESHOOTING

DIAGNOSTIC GUIDELINES

The following is provided to help in diagnosing the probable cause of a problem. It is a guideline and should not be assumed to list all possible causes.

GAUGE DISPLAYS "READING KEY" AND THERE IS NO KEY INSTALLED ON ENGINE CUT-OFF SWITCH

1. Gauge shuts-down after 3 minutes: Defective engine cut-off switch
   - *Check engine cut-off switch.*

KEY NOT READ (CONDITION CAN BE DUPLICATED WITH A MAGNET ON THE D.E.S.S. POST)

1. Damaged RFID chip
2. Engine stop switch is in OFF position (if equipped)
3. No voltage at RFID-D connector
4. No voltage at RFID-C connector
   - *Try a new key*
   - *Refer to WIRING DIAGRAM and / or IGNITION SYSTEM subsection and troubleshoot D.E.S.S. / Engine Cut-Off Switch*

KEY NOT PRESENT (CONDITION CAN BE DUPLICATED BY UNPLUGGING THE RFID CONNECTOR)

1. No key installed
2. No **ground** at RFID-A connector
3. No voltage at RFID-B connector
4. No voltage at RFID-C connector
5. No voltage at RFID-D connector
   - *Refer to WIRING DIAGRAM and / or IGNITION SYSTEM subsection and troubleshoot D.E.S.S. / Engine Cut-Off Switch*

INVALID KEY

1. Key not programmed to ECM
   - *Program key*

PROCEDURES

D.E.S.S. KEY

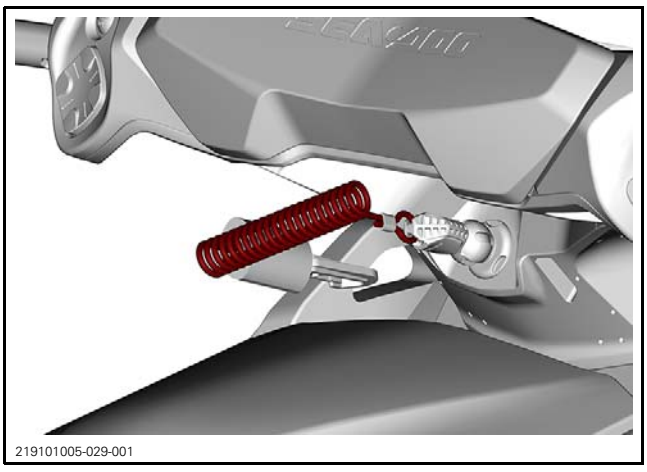
D.E.S.S. Key Recognition

To allow key recognition, carry out the following steps:

1. Briefly press the START/STOP button to wake up the ECM.
2. Securely install the tether cord on watercraft engine cut-off switch.
3. Press and hold the START/STOP button to start engine.

Programming D.E.S.S. Keys

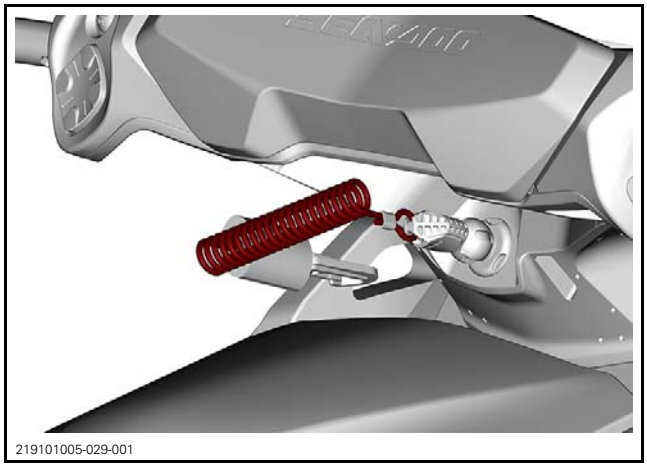
1. Connect the vehicle to the BRP diagnostic software (BUDS2). Refer to *COMMUNICATION TOOLS* subsection.
2. Briefly press START/STOP button to power the ECM.
3. Install a tether cord on the engine cut-off switch to program a D.E.S.S. key.


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4. Go to the key page.
5. Ensure that anti-theft system is activated. If not, activate it before trying to add a key.
6. Install new key on the D.E.S.S. post.
7. Press the READ button (top right of the table).
8. Select key type
9. Press ADD button to register the key. The new key should be displayed in the table. Repeat steps 6 to 9 to add other keys.

Erasing Keys

1. Install the D.E.S.S. key (tether cord) on the D.E.S.S. post (engine cut-off switch).


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2. Click on **Erase Key**.

After approximately 10 seconds the following message will appear.

The key is now erased.

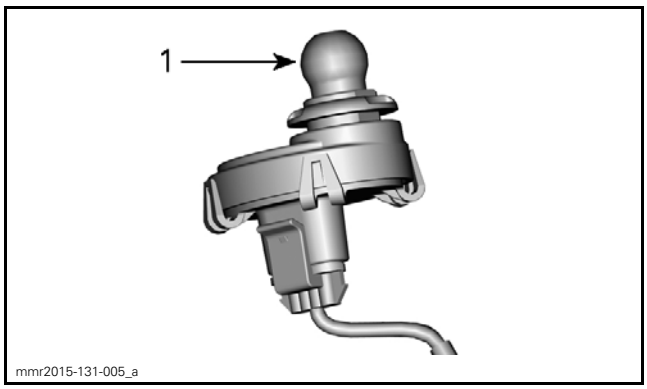
Erasing All Keys

1. Click on **Erase All Keys**.
2. When done, program at least one new key to the vehicle. Refer to *PROGRAMMING D.E.S.S. KEY* in this subsection.

D.E.S.S. / Engine Cut-Off Operation

Normal Operation

The electrical system provides power to RFID-D. The ECM provides 5Vdc to the DESS module DS-B. The ECM provides a ground to the DESS module DS-A. When the D.E.S.S. key (tether cord) is installed on the D.E.S.S. post (engine cut-off), a hall effect switch closes and sends a 12-15Vdc signal to the ECM.



1. RFID D.E.S.S. post

RFID CONNECTOR PIN	SPECIFICATIONS WITH D.E.S.S. KEY INSTALLED AND ELECTRICAL SYSTEM (WAKE-UP OR ON)
A	ECM ground
B	3.3 Vdc
C	Data communication 2 -4.5 Vdc
D	12 - 15 Vdc

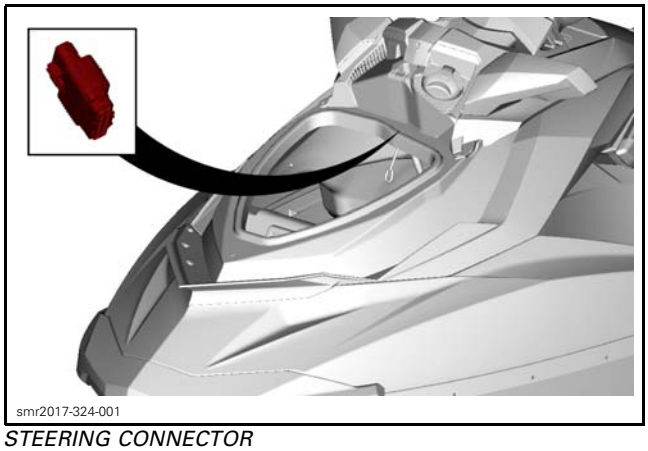
Testing Engine Cut-Off Switch

Connect BUDS2 and use the **Measurements** page to monitor key status and ensure the D.E.S.S. module recognizes that a key is installed on the D.E.S.S. post.

Ensure power and ground are available at D.E.S.S. connector.

REQUIRED TOOLS	
DIAGNOSTIC HARNESS (P/N 529 036 188)	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

1. Connect the diagnostic harness to the vehicle steering connector.



STEERING CONNECTOR

2. Push start button to wake up ECM.

NOTICE **Do not attempt to probe the steering connector on the watercraft. Use the test connector on the diagnostic harness.**

3. Set multimeter to Vdc.
4. Measure voltage as follows.

D.E.S.S. KEY	DIAGNOSTIC HARNESS	READING
Removed	Probe between pins 11 and 13	3.3 Vdc
Installed		0 Vdc

NOTE: This tests for voltage at D.E.S.S. connector pin B.

If test fails:

– Check steering harness between steering connector and D.E.S.S. module. Repair or replace.
– If harness is good, replace the D.E.S.S. module.

Replacing Engine Cut-Off Switch

REQUIRED TOOL	
D.E.S.S. POST REMOVER (P/N 529 035 943)	

INFORMATION CENTER (DIGITAL DISPLAY)

SERVICE TOOLS

Description	Part Number	Page
FLUKE 115 MULTIMETER	529 035 868	177

GENERAL

Most of the electrical tests require the following tool.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

Refer to *WIRING DIAGRAM INFORMATION* subsection for diagnostic tips on troubleshooting electrical problems.

NOTICE It is recommended to always disconnect the battery when replacing any electrical component. Always disconnect battery as specified, BLACK (-) cable first.

INDICATOR LAMPS DESCRIPTION

Important information about vehicle condition is displayed on the digital display. When starting the engine, always look at the display for any indicator lamps or special messages.

INDICATOR LAMPS (MALFUNCTIONS)			
INDICATOR LAMP(S)	DIGITAL WARNING	CAUSE	WHAT TO DO
None	BAD KEY	Defective key	- Program a new key if the previous key is defective. - Check wiring and connectors. Refer to the *WIRING DIAGRAM*.
None	CHECK KEY	Wrong key	Use the right key for the vehicle.
 ON	HIGH ENGINE TEMPERATURE	Engine is overheating	- Stop and wait for engine to cool off. - Check for leaks. - Check and adjust the coolant level.
 ON	LO BATT VOLT or HI BATT VOLT	Low or high battery voltage	- Recharge battery. - Check battery connections. - Check the charging system.
 ON	CHECK ENGINE	Engine management component malfunction	- Stop the engine. Connect the vehicle to the BRP diagnostic software (BUDS2). Check faults codes and perform recommended actions.
 FLASHING	LIMP HOME MODE	Important engine management component or VSS malfunction	- Connect the vehicle to the BRP diagnostic software (BUDS2). Check faults codes and perform recommended actions.

INDICATOR LAMPS (MALFUNCTIONS)			
INDICATOR LAMP(S)	DIGITAL WARNING	CAUSE	WHAT TO DO
ON	NONE	Low oil pressure	- Check for oil leaks. - Check and adjust the engine oil.
ON	Variable messages - Connect the vehicle to the BRP diagnostic software (BUDS2) for proper diagnostic.		

TROUBLESHOOTING

DIAGNOSTIC TIPS

IMPORTANT: When solving an electrical problem, the first thing to do is to check the battery condition as well as its cables and connections.

Make sure the battery is fully charged or install a power pack for any tests that involves a prolonged "key ON" period. If battery voltage gets too low, not only test results can be altered, but the vehicle electrical system may not operate normally.

Pay attention to ground wires. They could become loose or corroded which causes them to act as an additional load in a circuit, dropping voltage and reducing current to components. Some components may be grounded through their outer casing and mounted hardware. This should also be considered.

Electrical Connectors

Pay particular attention to ensure that pins are not out of their connectors, loose, or damaged. The troubleshooting procedures may not cover problems resulting from one of these causes.

NOTICE **Ensure all terminals are properly crimped on wires and connector housings are properly fastened. When replacing any electric or electronic part(s), always check electrical connections. Make sure that they are clean, corrosion-free, tight and make good contact. The voltage and current might be too weak to go through dirty or corroded connector pins or terminals.**

DIGITAL DISPLAY TROUBLESHOOTING

DISPLAY FUNCTIONS INOPERATIVE OR WORKING INTERMITTENTLY

1. Power supply or ground problem
   - Check power supply and ground circuits.

PROCEDURES

DIGITAL DISPLAY

Testing the Digital Display

Before beginning any troubleshooting, test or repair, always check for fault codes.

1. Check for fault codes using BUDS2.
2. Record all fault codes, then erase them.
3. Perform a complete shutdown of the electrical system and reactivate it.
4. Check fault codes. If a previous fault codes reappears, perform the required service actions.

Testing the Digital Display Using BRP Diagnostic Software (BUDS2)

Connect the vehicle to the BRP diagnostic software (BUDS2).

In BUDS2, select the following:

– **Functions** page

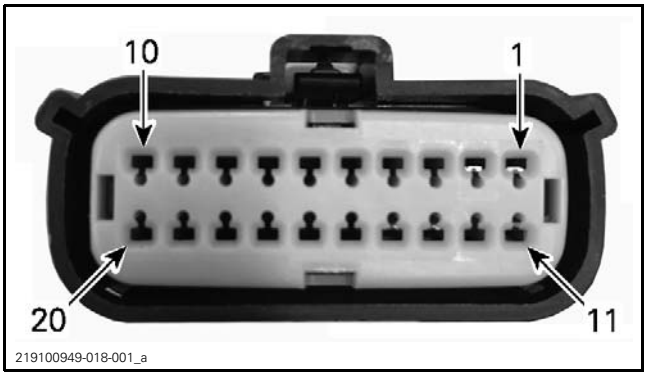
– **Routines - Execute Cluster WOW test**.

All indications will come and stay ON so that you can verify each indication.

NOTE: The **WOW Test** only tests the display **LEDs** and **LCD**. It does not test the actual circuit functions related to each indication.

Testing the Digital Display Power Input

1. Remove digital display.
2. Perform the test at digital display connector as per following illustration and tables.



DIGITAL DISPLAY CONNECTOR (PIN-OUT)

DIGITAL DISPLAY POWER SUPPLY TEST		
CL CONNECTOR PIN	BATTERY POST	SPECIFICATION
With the D.E.S.S. key installed		
11	Negative (-)	Battery voltage
With the D.E.S.S. key installed and START button pressed		
1	Negative (-)	Battery voltage

If there is no power at pin 1, check fuse F10 and the related circuit.

If there is no power at pin 11, in check fuse F7, MAIN relay RY1, and the related circuit.

If the power test is within specification, continue with *TESTING THE DIGITAL DISPLAY GROUND CIRCUIT*.

Testing the Digital Display Ground Circuit

Test as per the following table.

DIGITAL DISPLAY GROUND TEST		
CL CONNECTOR PIN	BATTERY POST	SPECIFICATION
2	Negative (-)	1 Ω

If the ground at pin 2 is not within specification, check the related circuit.

If the ground tested to specification, continue with *TESTING THE DIGITAL DISPLAY CAN WIRE CIRCUIT*.

Testing the Digital Display CAN Circuit

1. Remove the seats for access to the DLC (Diagnostic Link Connector). Refer to *BODY* subsection.
2. Test as per the following table.

DIGITAL DISPLAY CAN WIRE TEST		
CL CONNECTOR PIN	DLC PIN	SPECIFICATION
13 (CAN HI)	1	0.4 Ω
14 (CAN LO)	2	0.4 Ω

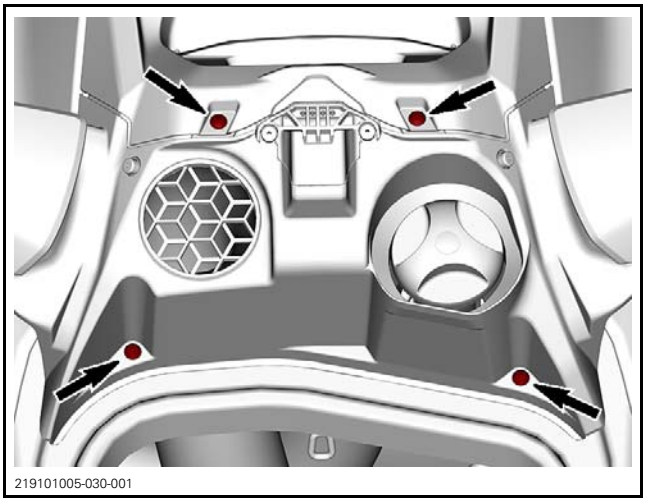
If the CAN wire verification test fails, check the related circuit.

If the digital display functions, however there is a suspected communication problem with another component, perform this test between the digital display and that component.

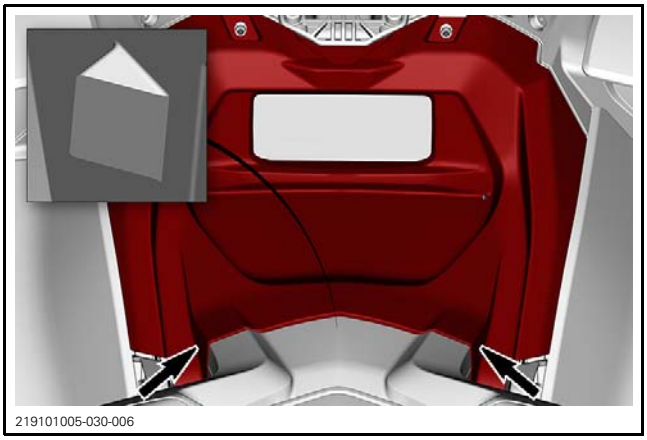
If the digital display power, ground and CAN verification tests are all to specifications and the digital display is inoperative, replace the digital display.

Removing the Digital Display

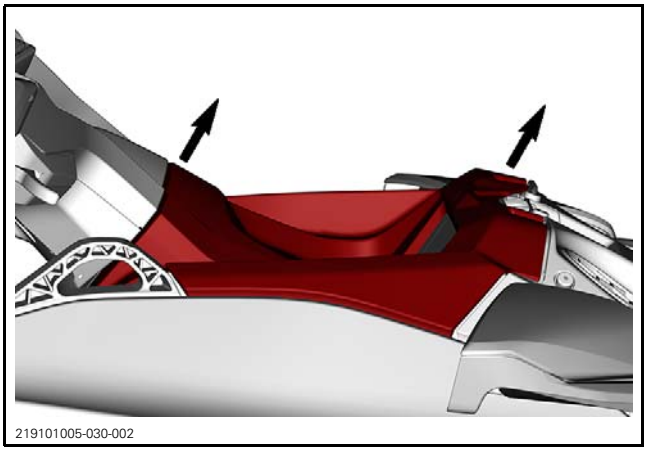
1. Open storage compartment to access and remove mirror support and console panel retaining screws.



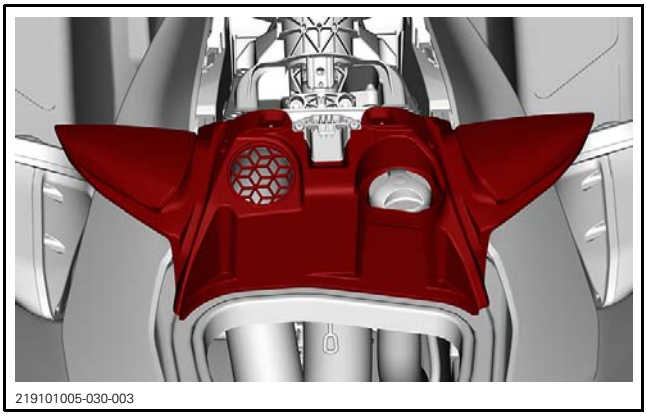
2. Remove console panel.
   2.1 Push on both rear ends of the console panel towards the center of the vehicle to release tab.


219101005-030-006

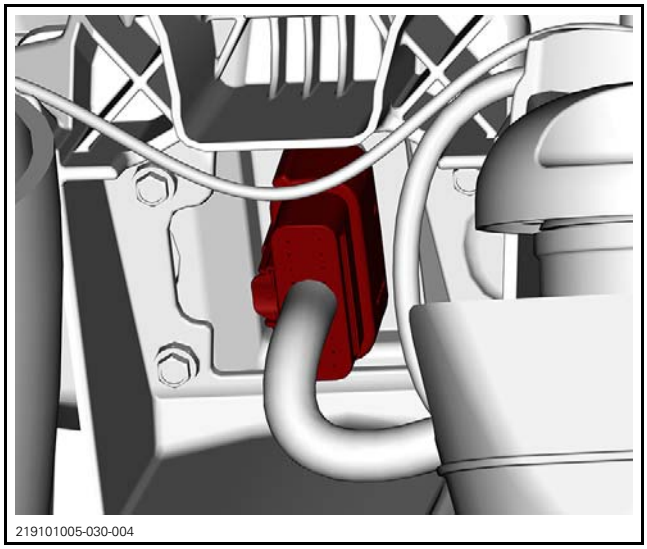
2.2 Pull the console panel upwards.


219101005-030-002

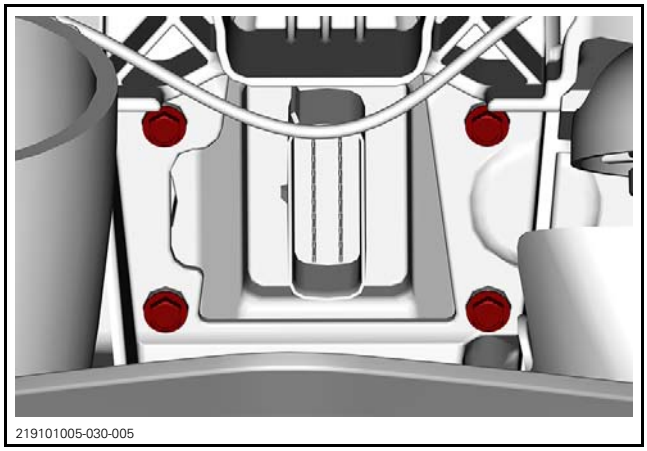
3. Remove mirror support.


219101005-030-003

4. Disconnect cluster connector (CL1).


219101005-030-004

5. Remove K50 screws securing the display to the console.


219101005-030-005

6. Remove digital display.

Installing the Digital Display

The installation is the reverse of the removal procedure. However pay attention to the following.

TIGHTENING TORQUES	
Mirror support / Console panel retaining screws	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**)
K50 screws	2.5 N•m ± 0.5 N•m (22 lbf•**in** ± 4 lbf•**in**)

If the digital display was replaced, connect the vehicle to the BRP diagnostic software (BUDS2) and apply any available updates.

When updates are completed, perform the following:

– Transfer the vehicle mileage as described in *VEHICLE MILEAGE TRANSFER*.
– Change settings as per customer preferences (language and units) as described in *SETTING LANGUAGE AND UNITS OF MEASUREMENT*

Vehicle Mileage Transfer

1. In BUDS2, go to:
   – SETTINGS page
   – CLUSTER button
   – SETTINGS tab.
2. Select Increase Odometer Mileage.
3. Click on the upper right arrow in the green circle.
4. Read carefully the on-screen instructions before clicking in the value box.
5. Enter the new mileage if it is different from the indicated one.
6. Press SET button.
7. Press the WRITE TOTAL button.
8. Select OK to confirm the mileage.
9. Close the window.

Setting Language and Units of Measurement

1. Connect the vehicle to the BRP diagnostic software (BUDS2), refer to the *COMMUNICATION TOOLS* subsection.
2. Press the START/STOP button to energize the electrical system.
3. In BUDS2, go to:
   – SETTINGS page
   – CLUSTER button
   – SETTINGS tab
   – CONFIGURE LANGUAGE AND UNITS.

ACCESSORIES

GENERAL

Refer to *WIRING DIAGRAM* subsection for diagnostic tips on troubleshooting electrical problems.

NOTE: The accessory circuit stays ON for a period of up to 60 minutes after the engine is turned OFF if the key remains on the D.E.S.S. post. If battery voltage drops below 12.3V, the ECM will not allow the accessory circuit back ON until the engine has been started.

⚠ WARNING

It is recommended to always disconnect the battery when replacing any electrical component. Always disconnect battery as specified, BLACK (-) cable first. Do not place tools on battery.

TROUBLESHOOTING

DIAGNOSTIC TIPS

IMPORTANT: When solving an electrical problem, the first thing to do is to check the battery condition as well as its cables and connections.

Install a battery charger on battery terminals for any tests that involves a prolonged "key ON" period. If battery voltage gets too low, not only test results can be altered, but the vehicle electrical system may not operate normally.

Pay attention to ground wires. They could become loose or corroded which causes them to act as an additional load in a circuit, dropping voltage and reducing current to components. Some components may be grounded through their outer casing and mounted hardware. This should also be considered.

Electrical Connectors

Pay particular attention to ensure that pins are not out of their connectors, loose, or damaged. The troubleshooting procedures may not cover problems resulting from one of these causes.

NOTICE **Ensure all terminals are properly crimped on wires and connector housings are properly fastened. When replacing any electric or electronic part(s), always check electrical connections. Make sure that they are clean, corrosion-free, tight and make good contact. The voltage and current might be too weak to go through dirty or corroded connector pins or terminals.**

PROCEDURES

REMOVING AND INSTALLING THE SOUND SYSTEM

Refer to *BODY* subsection.

PREREQUISITES OF SOUND SYSTEM TESTS

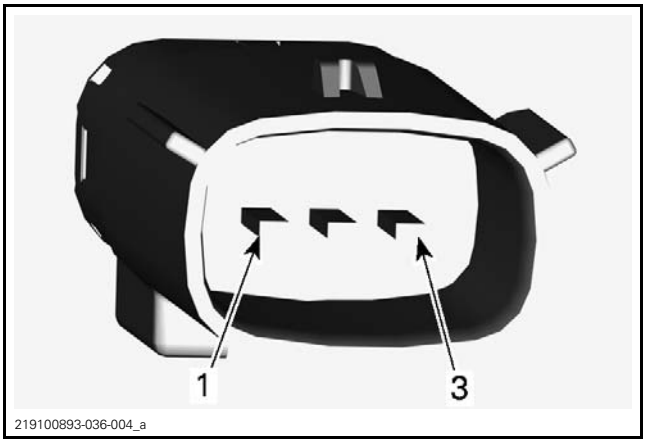
Make sure diagnostic tool 1 fuse (F14) and cluster fuse (F7) is in good condition and powered.

Make sure the battery is fully charged.

TESTING SOUND SYSTEM GROUND WIRE CONTINUITY

1. Remove lateral trim panels. Refer to *BODY* subsection.
2. Disconnect the sound system connector.

GROUND TEST AT SOUND SYSTEM CONNECTOR		
PROBE		RESISTANCE
Pin 3	Battery -	Close to 0 Ohms



SOUND SYSTEM CONNECTOR PIN-OUT

If ground test is good, test the INPUT VOLTAGE.

TESTING SOUND SYSTEM INPUT VOLTAGE

Press the START button and install the tether cord on the engine cut-off switch.

INPUT VOLTAGE TEST AT SOUND SYSTEM CONNECTOR		
PROBE		VOLTAGE
Pin 1 (Hot at all times)	Pin 3 (Permanent ground)	Battery voltage
Pin 2 (Hot with main relay on)		

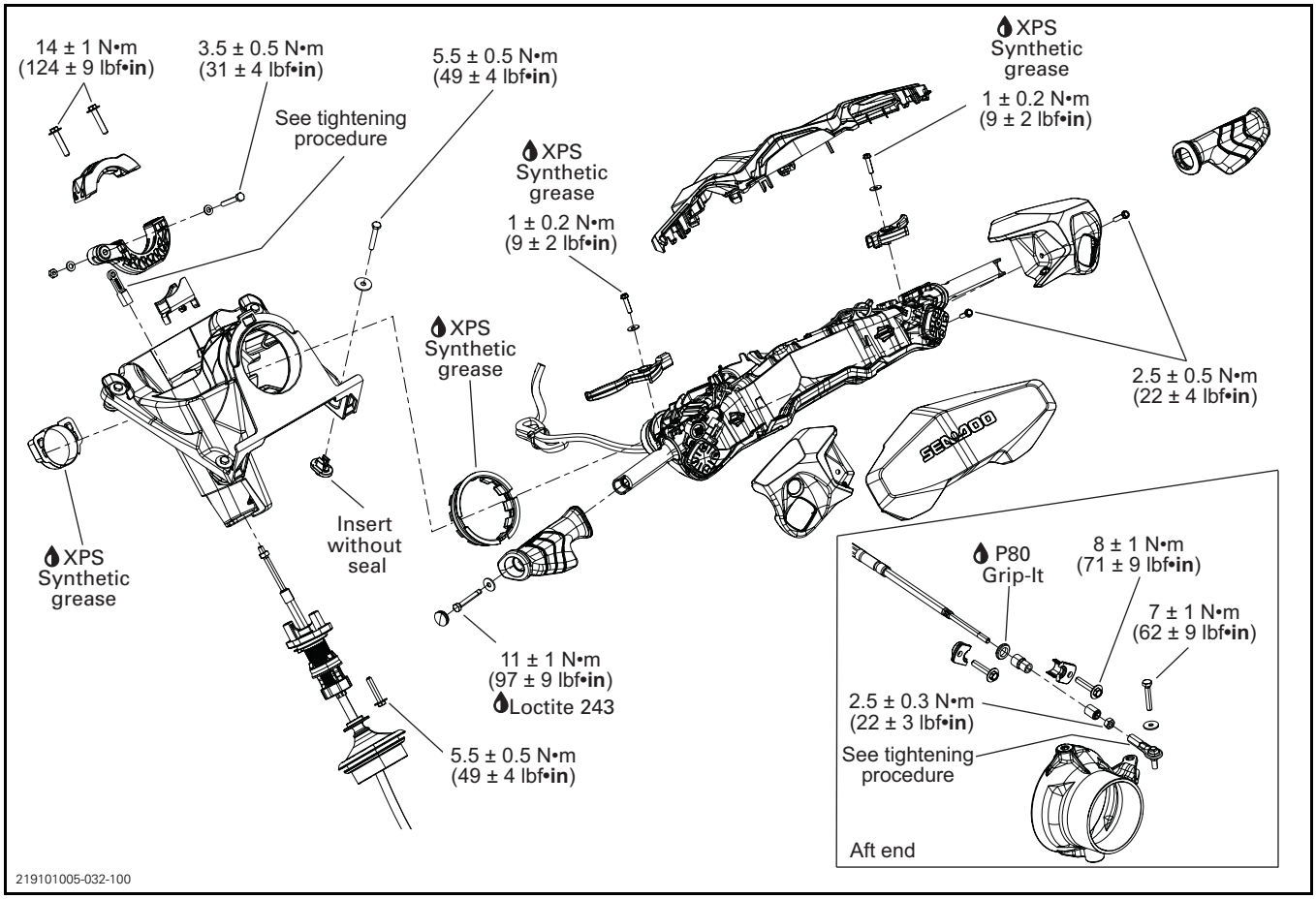
Repair wiring and connectors as required.

STEERING SYSTEM

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	188
P80 GRIP-IT	296 000 406	194
SYNTHETIC GREASE (EUR)	779231	191
SYNTHETIC GREASE	779162	191

STEERING COLUMN

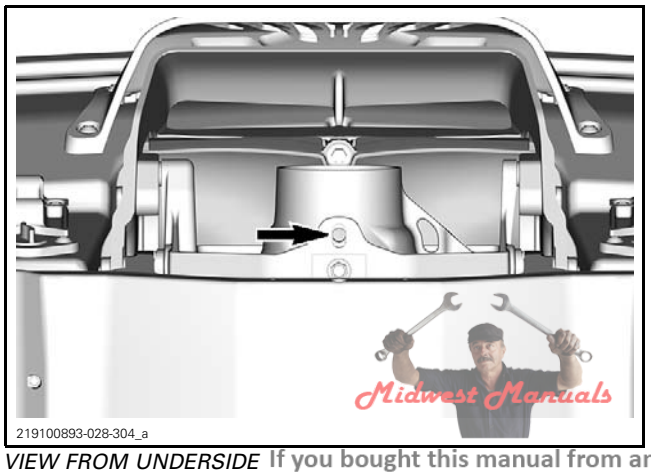


ADJUSTMENT

ADJUSTING THE ALIGNMENT OF THE STEERING

Remove the lateral trim panels. Refer to *BODY* subsection.

1. Raise the iBR gate by activating the iBR override function.
2. Lock the jet pump nozzle position by installing a 10 mm (3/8 in) rod through the trimming ring as the following illustration.

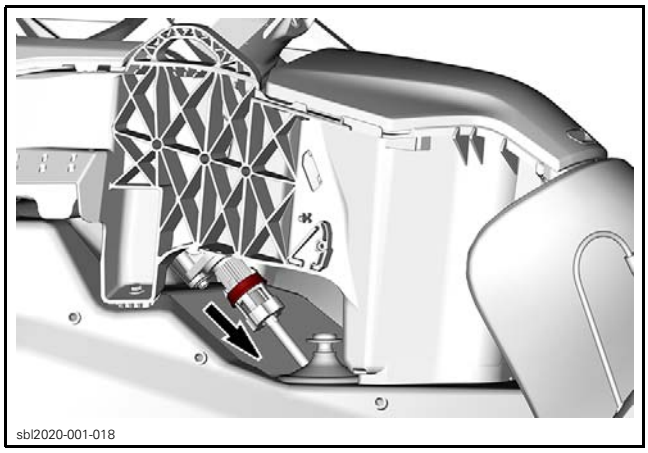


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VIEW FROM UNDERSIDE

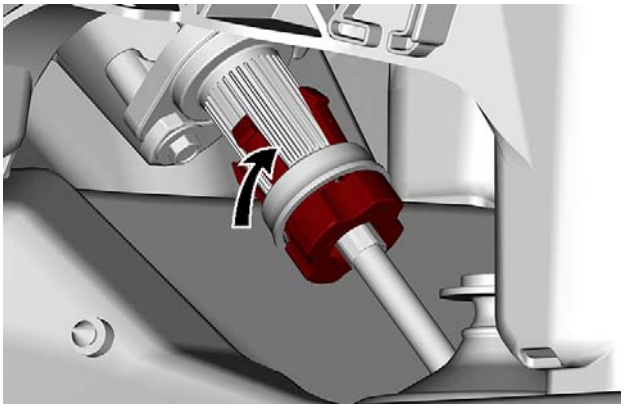
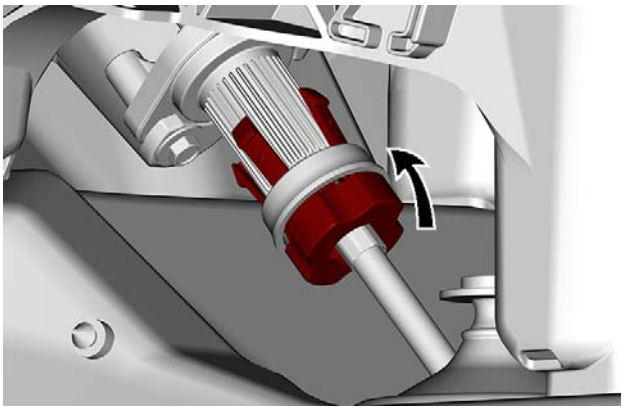
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Paperless Manuals
For a Better Tomorrow
www.green-manuals.com
If you bought this manual from any other seller please leave them NEGATIVE feedback and notify us at bestshopmanuals@gmail.com

3. Slide the cable lock toward the bottom of watercraft.

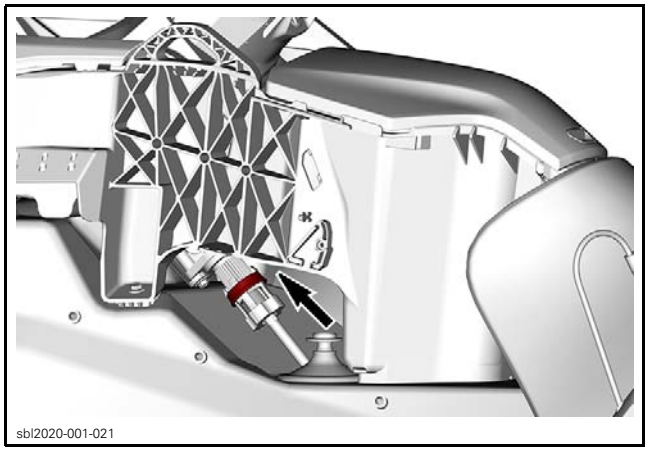


sbl2020-001-018

4. Turn adjustment 1 turn at a time in the direction shown in following table.

WATERCRAFT BEHAVIOR	WHAT TO DO
Pulls on left side	
Pulls on right side	

5. Slide back the cable lock in place.

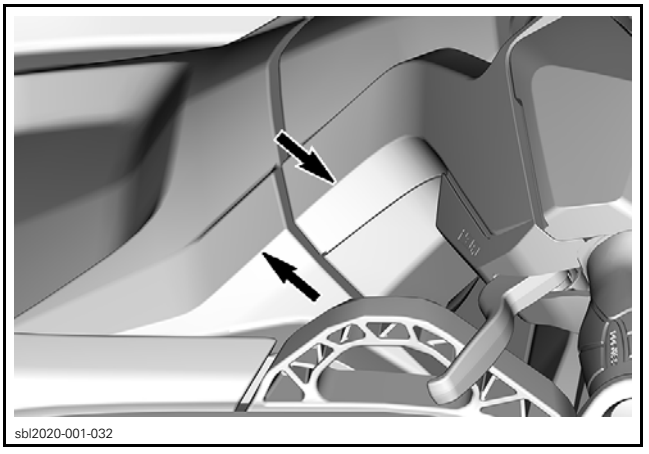

sbl2020-001-021

6. Perform adjustments until steering column is centered and body lines align.
7. Test watercraft.
8. Readjust as necessary.

NOTICE **When the handlebar is turned completely to the left or right side, verify that there is no interference between the jet pump and the iBR system parts.**

9. Once the steering is correctly adjusted, reinstall all previously removed parts.

NOTE: It is a good starting point to align body lines when replacing the steering cable.


sbl2020-001-032

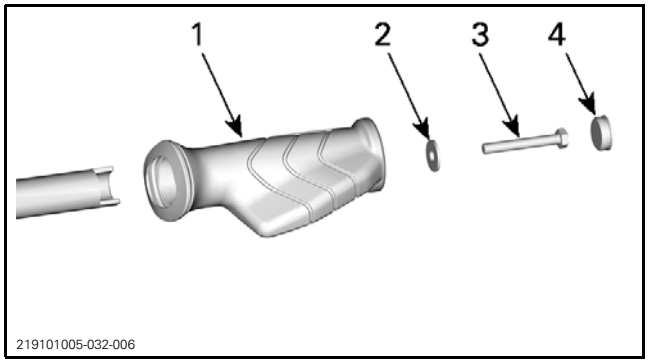
PROCEDURES

HANDLEBAR GRIP

Removing the Handlebar Grip

To remove handlebar grip, remove the cap, then the retaining screw.

Pull out handlebar grip from handlebar.



1. *Handlebar grip*
2. *Handlebar grip screw*
3. *Handlebar grip cap*

Installing the Handlebar Grip

Install handlebar grip on handlebar matching it to the notch in the handlebar.

Apply blue Loctite on screw threads (or use new self-locking screws).

SERVICE PRODUCT
LOCTITE 243 (BLUE) (P/N 293 800 060)

Install handlebar grip screw.

Torque handlebar grip screw to specification.

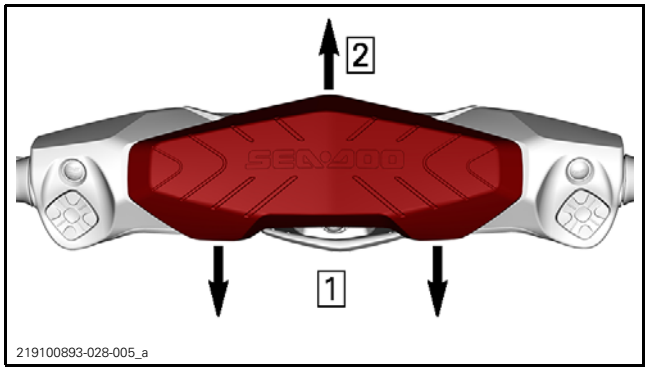
TIGHTENING TORQUE	
Handlebar grip screw	11 N•m ± 1 N•m (97 lbf•**in** ± 9 lbf•**in**)

Install cap.

HANDLEBAR SWITCH COVER (LH OR RH)

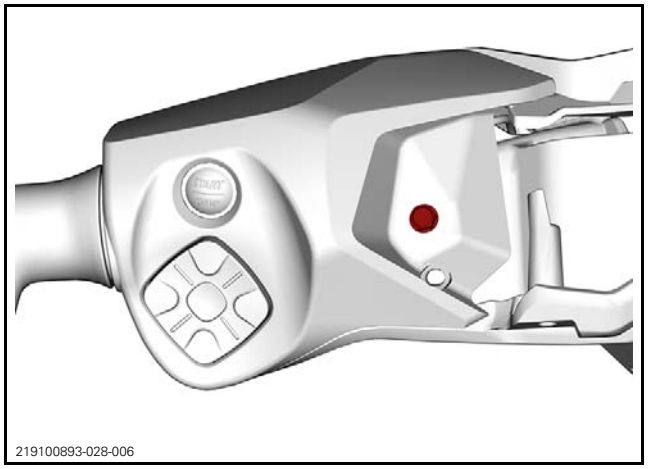
Removing the Handlebar Switch Cover (LH or RH)

1. Remove steering pad by pulling the bottom first and then the top.



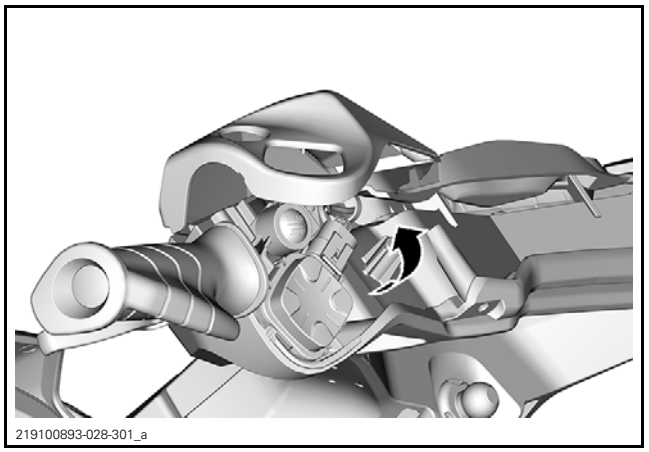
TYPICAL

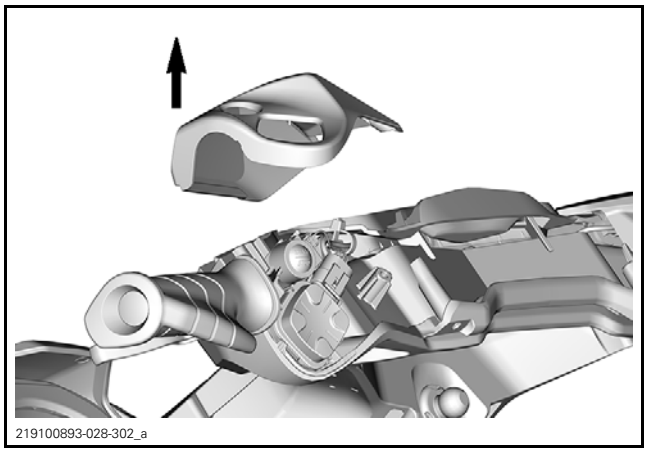
2. Remove the switch cover retaining screw.



LH SIDE SHOWN

3. Remove the switch cover.





Installing the Handlebar Switch Cover (LH or RH)

Installation is the reverse of the removal procedure. However, pay attention to the following.

1. Route wires to avoid pinching them.

2. Position the switch cover onto the steering cover.
3. Ensure positioning of steering electrical harness.
4. Ensure proper engagement of the upper housing and cover tabs.
5. Ensure proper engagement of upper and lower switch covers.
6. Tighten housing cover screw to specification.

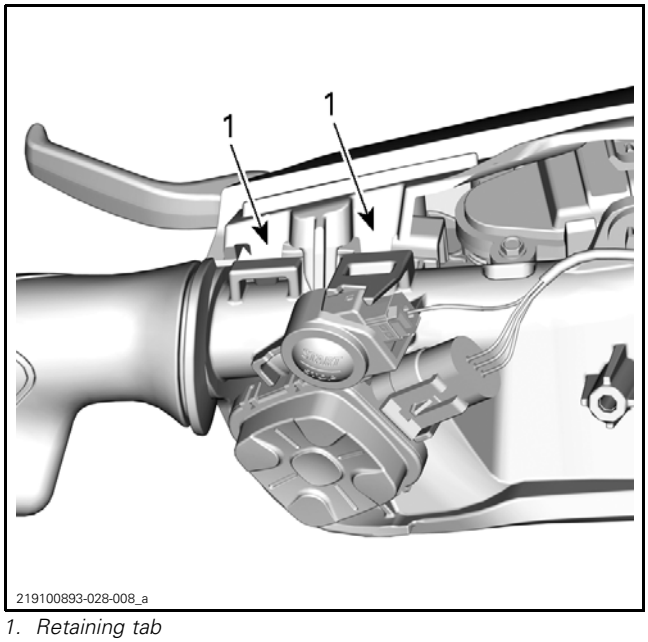
TIGHTENING TORQUE	
Housing cover screw	2.5 N•m ± 0.5 N•m (22 lbf•**in** ± 4 lbf•**in**)

STEERING COVER

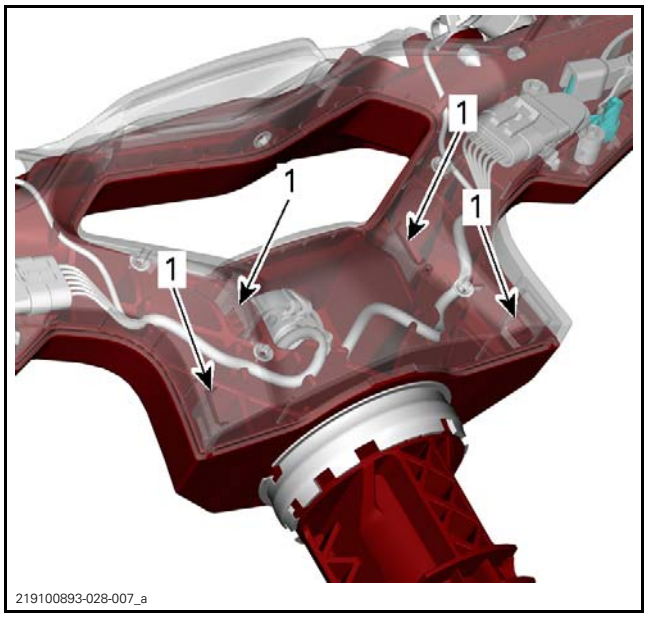
Removing the Steering Cover

1. Remove steering pad and both handlebar switch covers. Refer to this subsection.
2. Unlock steering cover from steering.
   2.1 Insert a small tool, such as a small flat screwdriver, into a steering cover hole. Press the tool against the retaining tab to unlock it. Repeat for the other side.

   NOTICE **The tool must be inserted perfectly straight to avoid breaking the tab holder.**

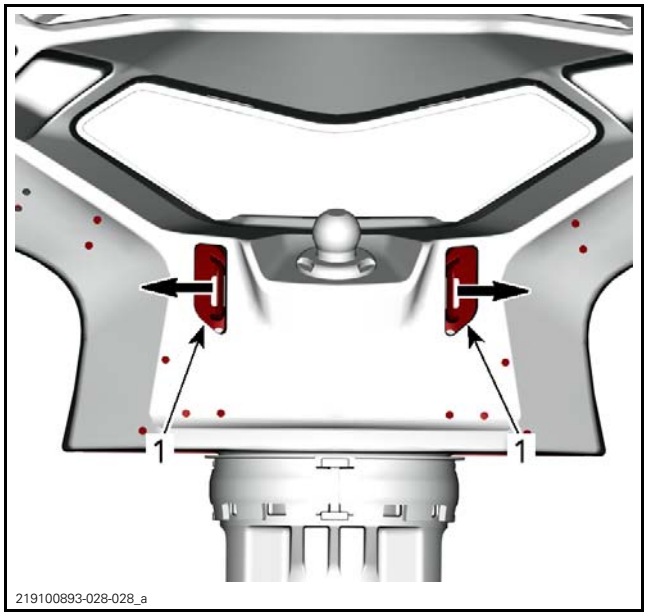


1. Retaining tab

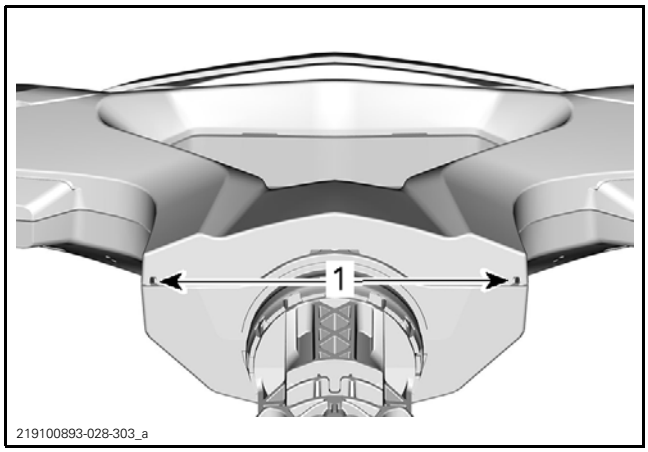


1. Retaining tab

   2.2 In both cavities under the steering cover, release both inner retaining tabs using a long screwdriver.

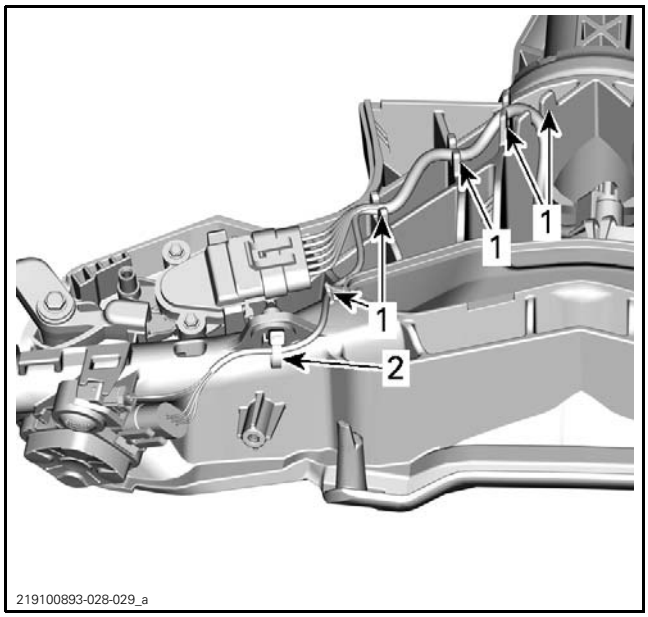


VIEWED FROM UNDERNEATH
1. Rear cavity



Installing the Steering Cover

1. Make sure all harnesses are routed properly into their positioning slots and are away from the outer edges. This will ensure the wires will not get pinched.



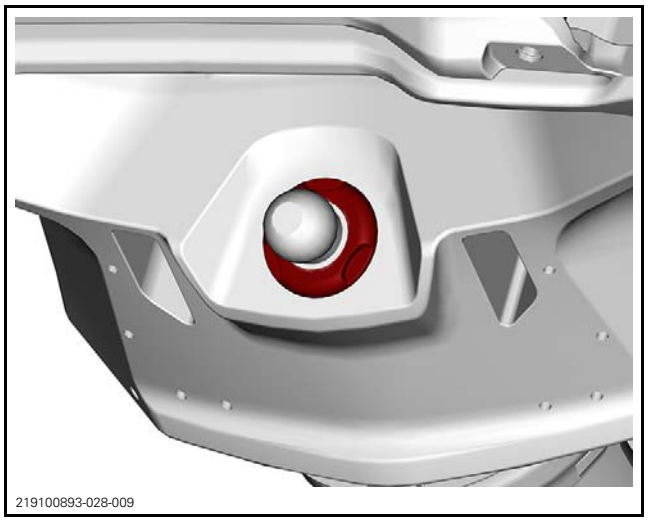
1. Harness slots
2. Locking tie

2. Clip the top of the cover.
3. Push both side of the cover to lock it with the steering column.
4. Install switch covers.

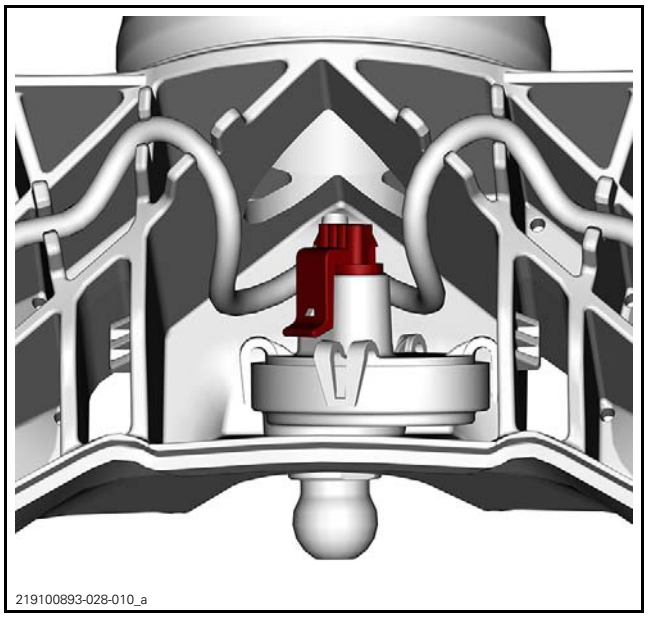
REPLACING THE ENGINE CUT-OFF SWITCH

Remove steering pad. Refer to procedure in this subsection.

Remove cut-off switch nut.

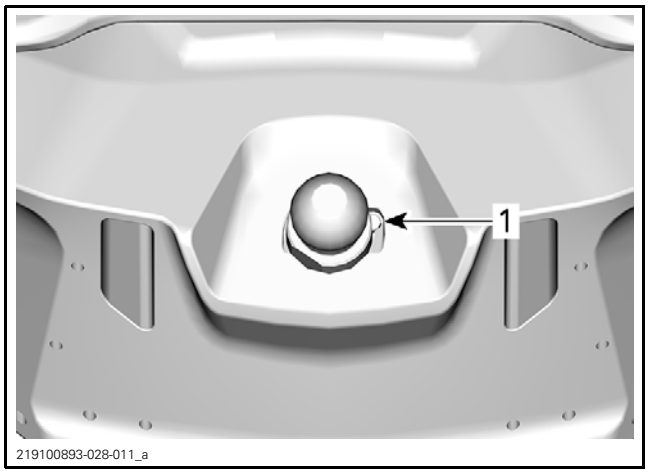


Disconnect cut-off switch connector.



Push cut-off switch out of the steering column.

Install the engine cut-off switch by aligning the alignment pin into the notch of steering column.



1. Alignment pin

Connect and install all removed parts using appropriate procedures.

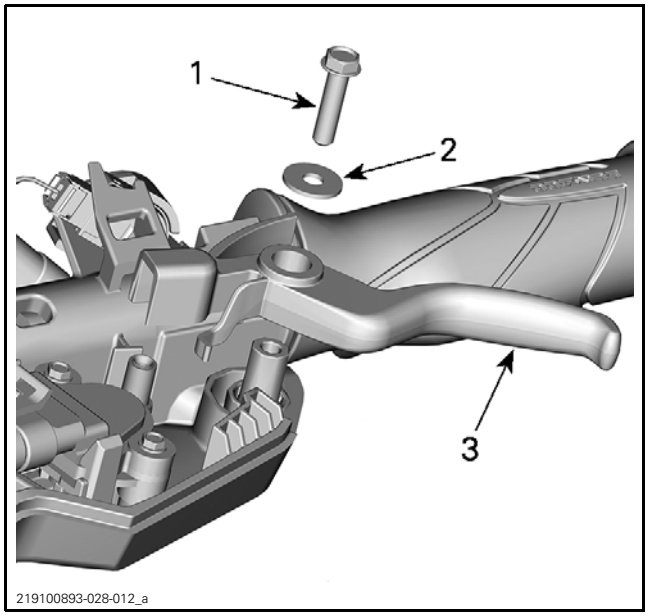
TIGHTENING TORQUE	
Engine cut-off switch nut	2 N•m (18 lbf•**in**)

THROTTLE AND iBR LEVERS

NOTE: The following procedure demonstrates the replacement of the throttle lever but the same procedure will be used for the iBR lever.

Replacing the Lever

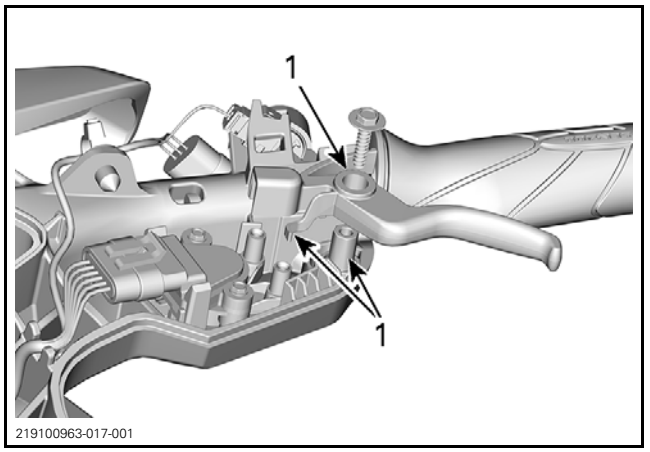
1. Remove steering cover. Refer to procedure in this subsection.
2. Remove the screw and washer securing throttle lever.
3. Remove throttle lever.



1. Retaining screw
2. Washer
3. Throttle lever

4. Clean throttle lever area from dust or any deposits.
5. Apply grease on pivot and the outer surface of the return tab.

SERVICE PRODUCT	
Scandinavia	SYNTHETIC GREASE (EUR) (P/N 779231)
All other countries	SYNTHETIC GREASE (P/N 779162)



1. Apply grease here

6. Install the lever.
   6.1 Install lever on pivot.
   6.2 Insert sensor lever end into throttle lever fork.
   6.3 Position the return tab against the handlebar.
   6.4 Secure the lever with washer and screw.

TIGHTENING TORQUE	
Lever screw	1 N•m ± 0.2 N•m (9 lbf•**in** ± 2 lbf•**in**)

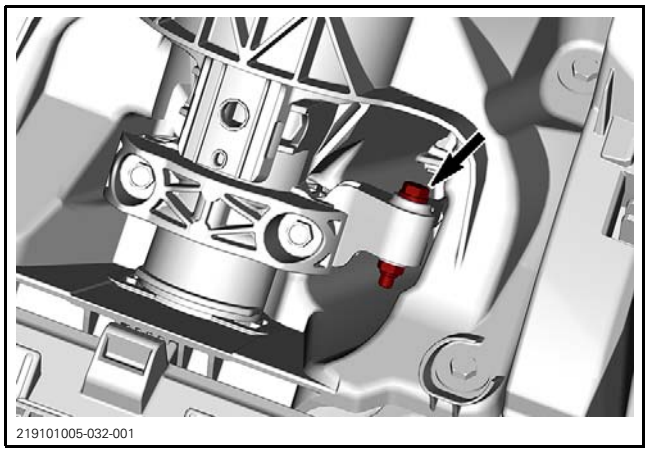
7. Reinstall all removed parts using appropriate procedures.

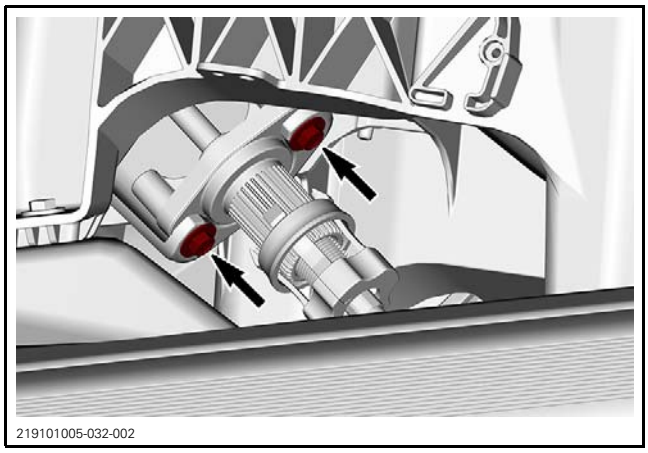
STEERING CABLE

Replacing the Steering Cable

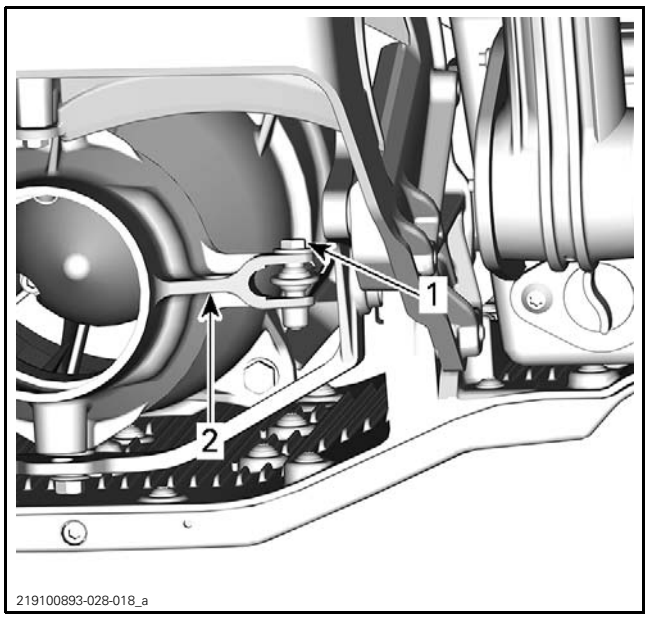
Remove the gauge support, the seat and the service cover. Refer to *BODY* subsection.

1. Detach steering cable from steering column.
   1.1 Remove following fasteners.


219101005-032-001


219101005-032-002

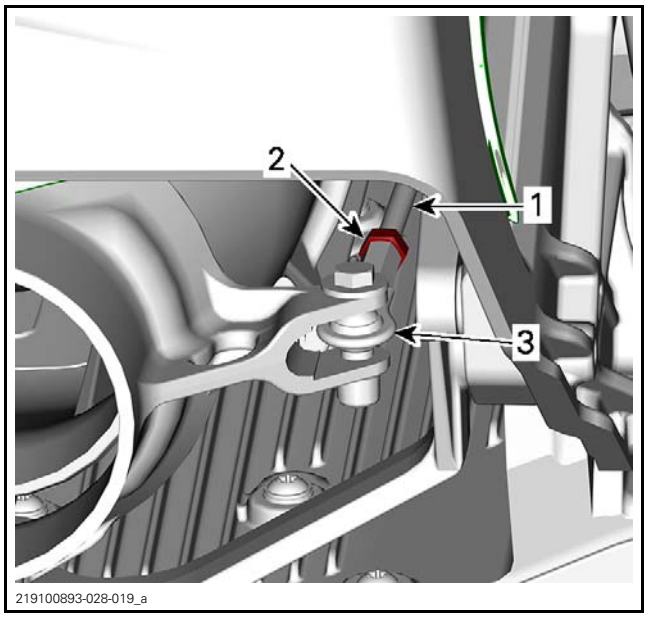
2. At rear of the watercraft, disconnect ball joint from jet pump nozzle arm.



219100893-028-018_a

1. Steering cable bolt
2. Nozzle arm

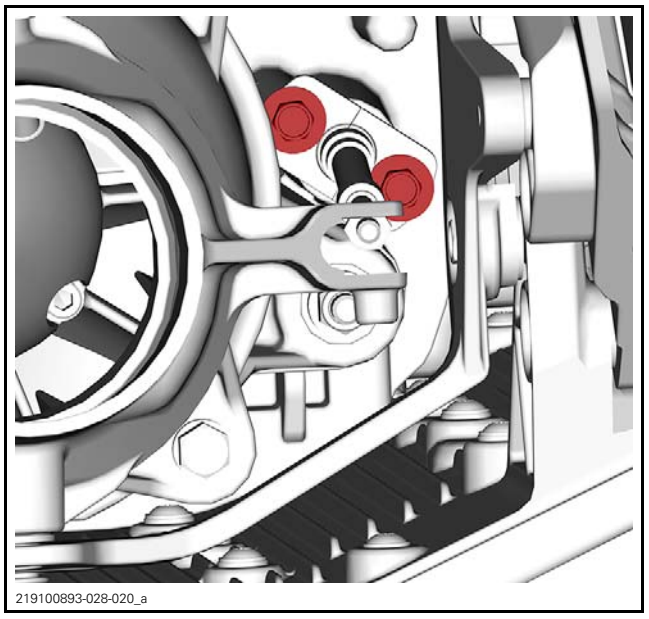
3. Remove ball joint and jam nut from cable.



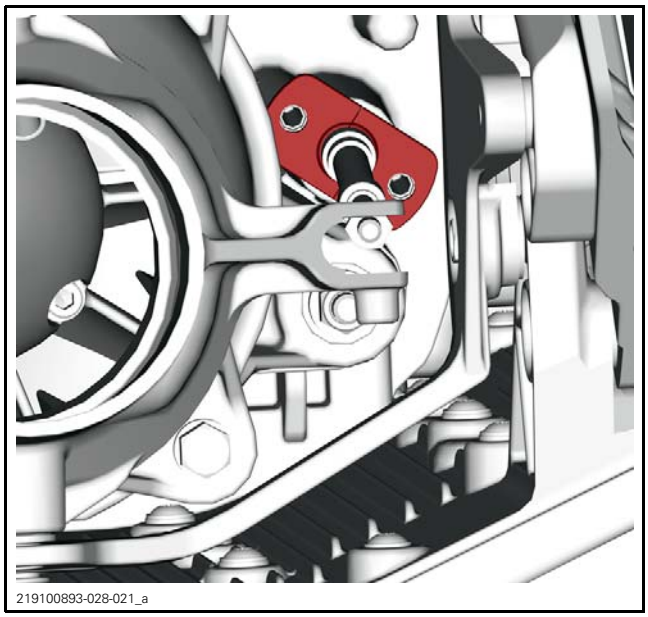
219100893-028-019_a

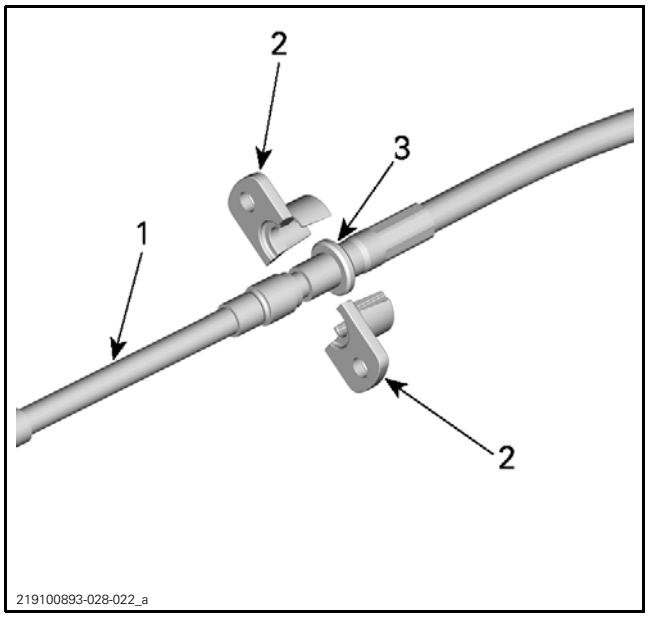
1. Steering cable
2. Jam nut
3. Ball joint

4. Remove half-rings retaining screws.


219100893-028-020_a

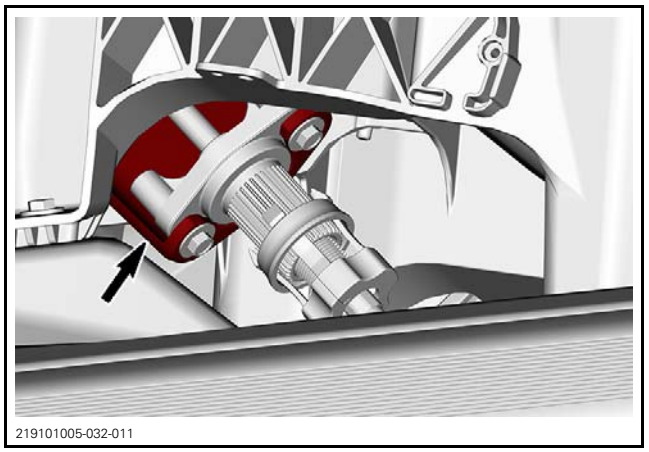
5. Pull the cable assembly to remove the half-rings and O-ring.





1. *Steering cable*
2. *Half ring*
3. *O ring*

6. Carefully slide cable plastic adjustment fittings out of steering support tunnel.



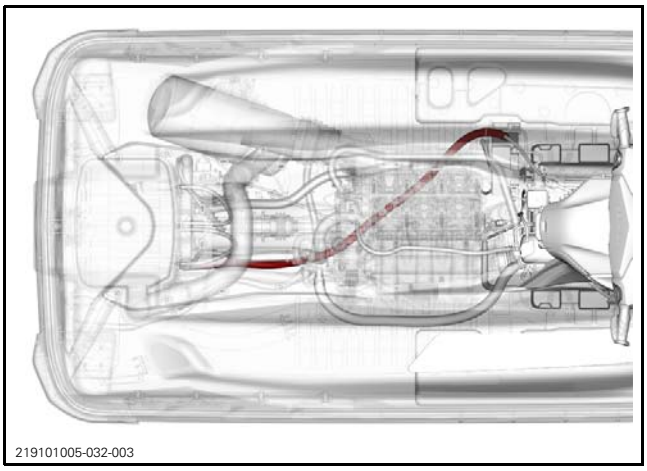
STEERING SUPPORT TUNNEL

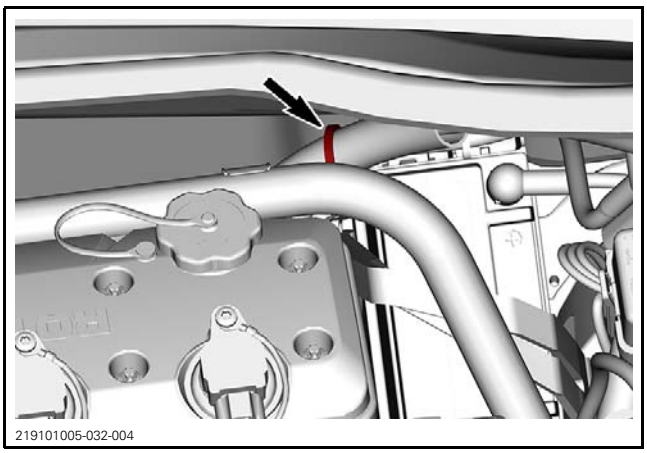
TIP : Remove steering support from console to ease procedure. Refer to procedure in this subsection.

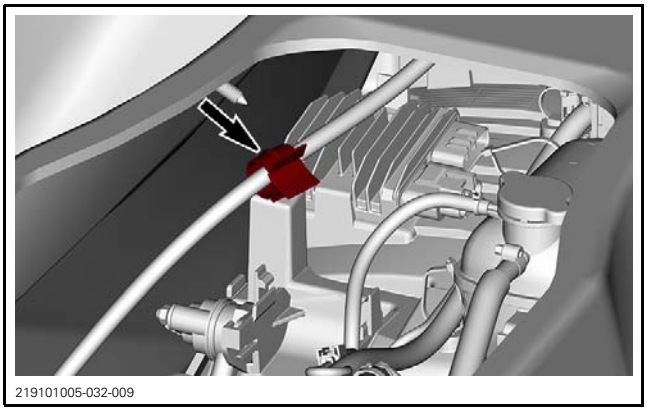
7. Remove the adjusting nut from the new steering cable.
8. Using a piece of hose, attach the aft end of cable to 2.5 m (8.25 ft) long hose / fish tape. As you pull out the cable from the deck and the cable rubber bellows, the fish tape will gradually take the place of the previous cable. This ensure proper routing.

NOTE: Make sure cable hose / fish tape is long enough to stay outside hull (pump box).

9. From inside the hull, pull the aft end of the cable through the hull fitting.
10. Slowly pull the cable out of the vehicle through the gap from the lateral trim panel. Make sure the corrugated sheath stays on the cable.
11. Inspect cable and sheath. Replace as required.
12. Route the aft end of the cable through the cable rubber bellows.
13. Route the cable as shown and secure it using locking tie near battery.


219101005-032-003


219101005-032-004


219101005-032-009

NOTE: The cable is initially routed under the engine. Make sure the cable is loose before the next step.

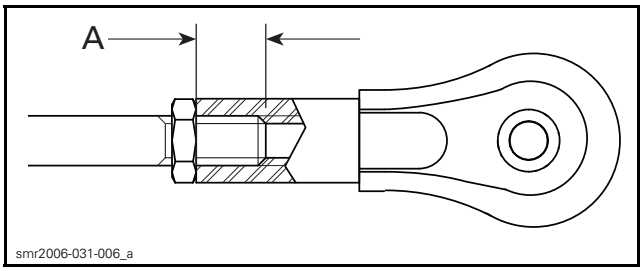
14. From inside of the hull, route the aft end of the cable through the hull fitting.
15. Secure the steering cable to the hull fitting.
    15.1 Apply lubricant on O-ring and install it with half rings.

SERVICE PRODUCT
P80 GRIP-IT (P/N 296 000 406)

    15.2 Tighten the half-rings retaining screws to specification.

TIGHTENING TORQUE	
Half-rings retaining screws	8 N•m ± 1 N•m (71 lbf•**in** ± 9 lbf•**in**)

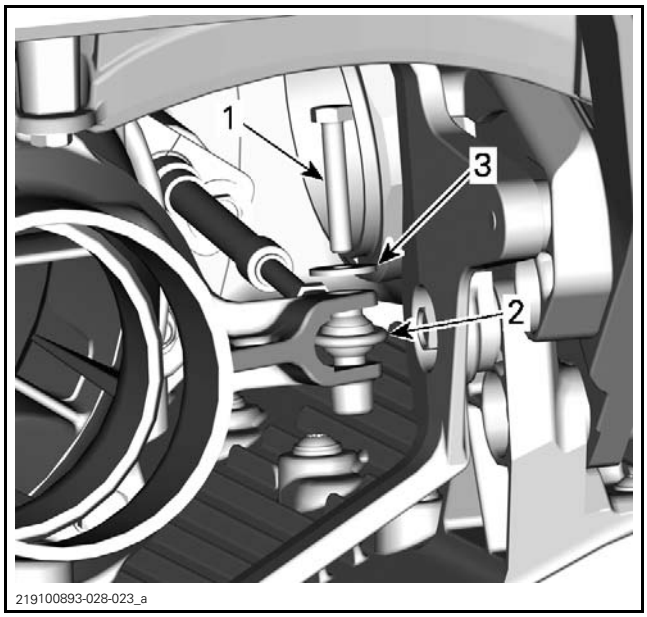
16. Install the ball joint on the end of the steering cable.
    16.1 The threaded portion of steering cable inserted into ball joint should be within 9 mm ± 1 mm (.354 in ± .039 in).



smr2006-031-006_a

A. 9 mm ± 1 mm (.354 in ± .039 in)

    16.2 Tighten jam nut to specification.
    16.3 Position the steering cable ball joint to the nozzle as per following illustration.



219100893-028-023_a

1. Ball joint bolt
2. Ball joint
3. Washer

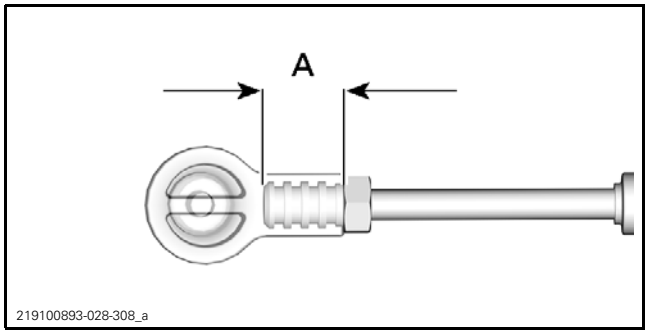
TIGHTENING TORQUE	
Ball joint jam nut	2.5 N•m ± 0.3 N•m (22 lbf•**in** ± 3 lbf•**in**)
Ball joint bolt	7 N•m ± 1 N•m (62 lbf•**in** ± 9 lbf•**in**)

The installation of the steering cable to the steering column is the reverse of the removal procedure. However, pay attention to the following.

TIGHTENING TORQUE	
Cable support retaining screw	3.5 N•m ± 0.5 N•m (31 lbf•**in** ± 4 lbf•**in**)

Carry out *ADJUSTING THE ALIGNMENT OF THE STEERING*. See procedure in this subsection.

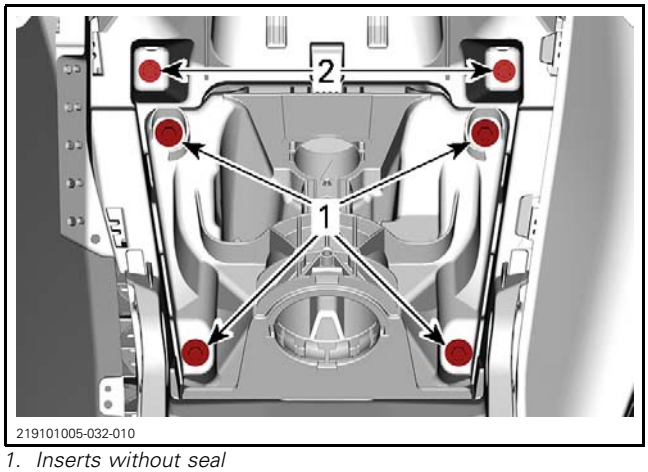
The threaded portion of steering cable inserted into the end fitting should be 9 mm ± 1 mm (.354 in ± .039 in).



A. 9 mm ± 1 mm (.354 in ± .039 in)

Install all removed parts using appropriate procedure.

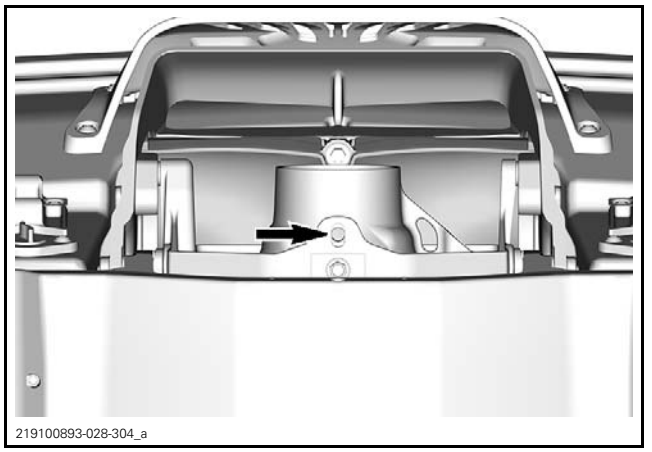
NOTE: Be aware that some inserts have a seal and others do not. Refer to the following image.



1. Inserts without seal
2. Inserts with seal

Adjusting the Steering Cable

1. Steering cable adjustment is required only if:
   – A steering cable end ball joint has been replaced or loosened/tightened.
   – Steering cable adjustment nut has been loosened/tightened.
   – Steering cable has been replaced.
   – Steering column or support has been replaced.
2. Lock the jet pump nozzle position by installing a 10 mm (3/8 in) rod through the trimming ring as the following illustration.



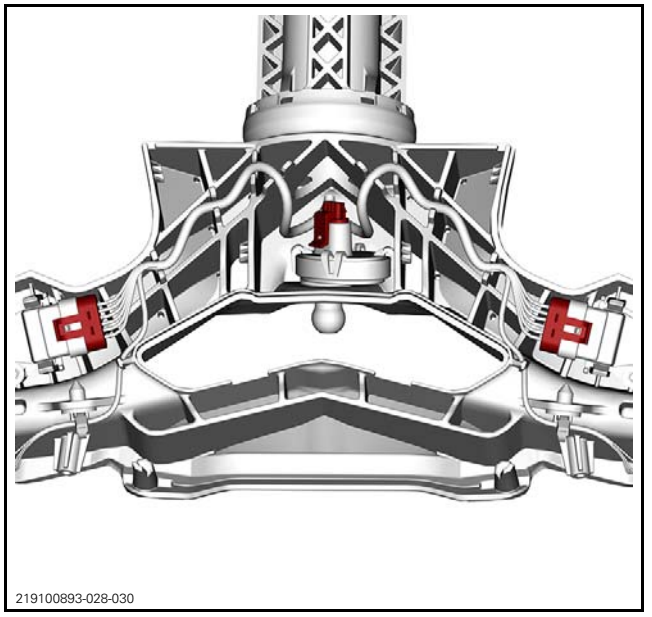
VIEW FROM UNDERSIDE

3. Adjust steering cable as described in *STEERING ALIGNMENT* in this subsection.

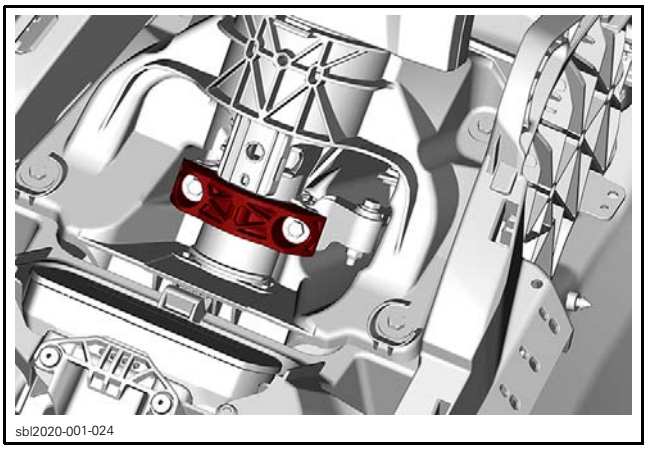
STEERING COLUMN

Removing the Steering Column

1. Remove the top cover and the gauge support, Refer to *BODY* subsection.
2. Remove the steering cover.
3. Disconnect both iBR and throttle connectors and engine cut off switch connector.



4. Remove both screws securing the steering column arm and clamp.

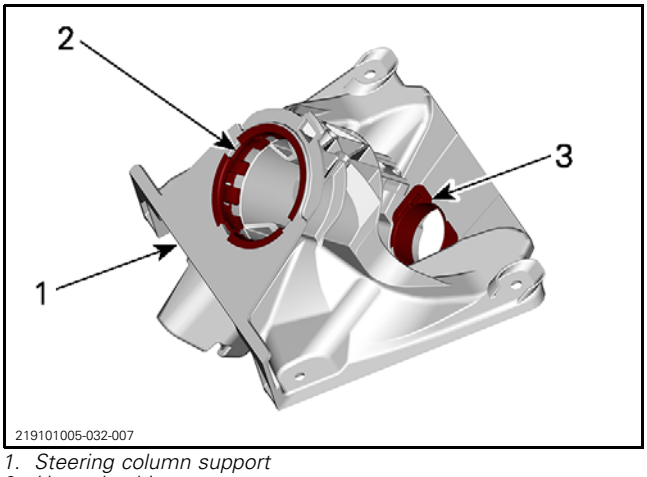

sbl2020-001-024

5. Pull steering column out of its support.

Inspecting the Steering Column

Check steering column for:
– Cracks
– Stress marks
– Signs of wear.

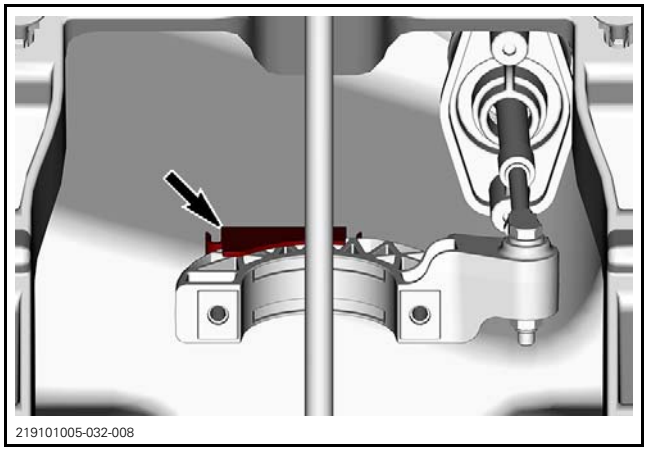
Check steering column support bushings.



219101005-032-007

1. Steering column support
2. Upper bushing
3. Lower bushing

Check wear sleeve behind the steering column arm.


219101005-032-008

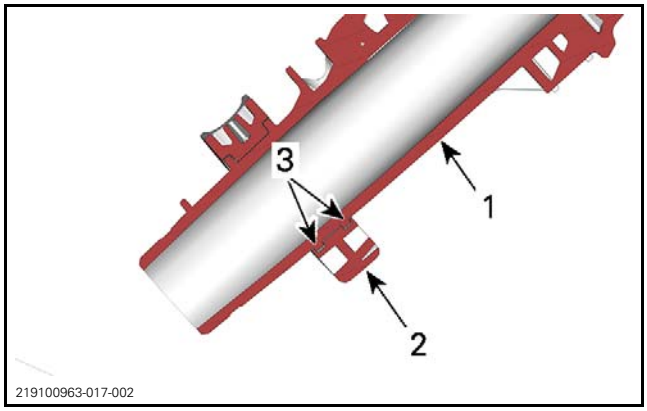
Replace any damaged or worn parts.

Installing the Steering Column

The installation is the reverse of the removal procedure. However, pay attention to the following.

Carefully, drive steering column through steering column support.

Make sure the locating grooves of the steering column arm are properly engaged in the steering column as shown.



219100963-017-002

1. Steering column
2. Steering arm
3. Locating grooves

Tighten steering column arm screws to specifications.

TIGHTENING TORQUE	
Steering column arm screws	14 N•m ± 1 N•m (124 lbf•**in** ± 9 lbf•**in**)

NOTICE **Ensure the head of the screws touches the upper steering arm.**

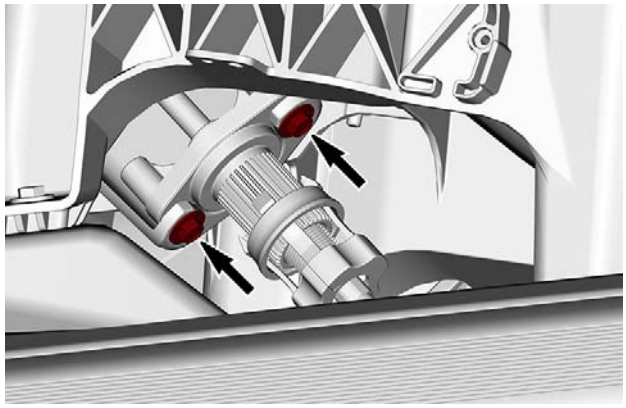
Ensure the steering system is working properly by turning side to side.

Reinstall all removed parts using appropriate procedure.

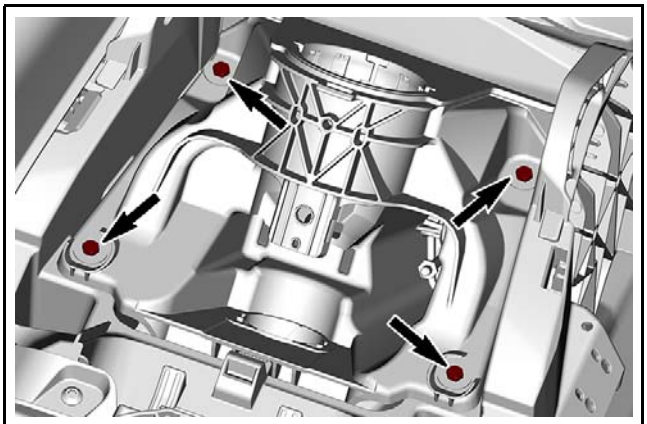
STEERING COLUMN SUPPORT

Removing the Steering Column Support

1. Remove steering column, refer to *REMOVING THE STEERING COLUMN* in this subsection.
2. Remove following fasteners.



219101005-032-002



219101005-032-005

3. Remove steering column support from vehicle.

Installing the Steering Column Support

The installation is the reverse of the removal procedure. However, pay attention to the following.

TIGHTENING TORQUE	
Steering column support retaining screws	5.5 N•m ± 0.5 N•m (49 lbf•**in** ± 4 lbf•**in**)

iBR, REVERSE AND VTS

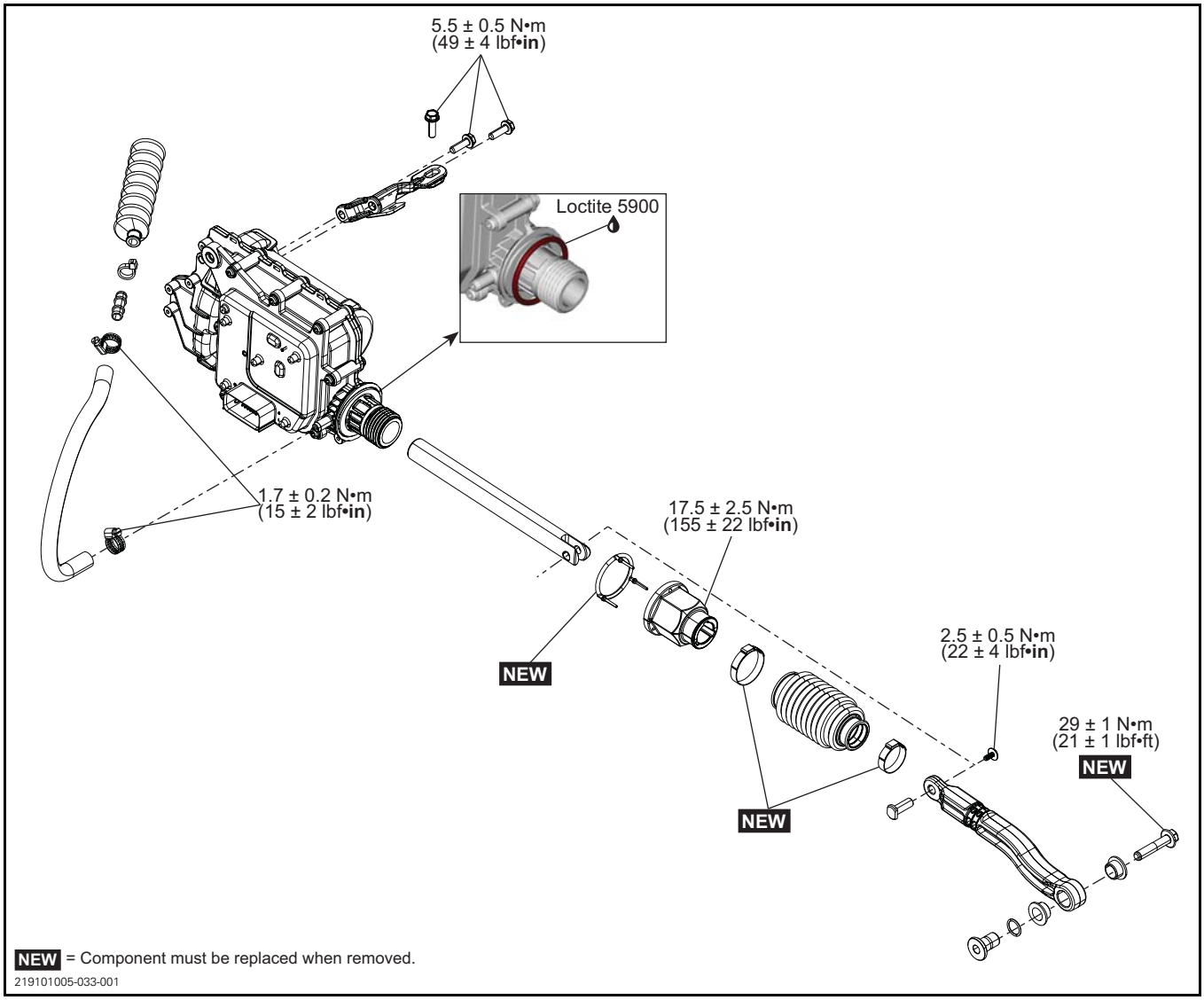
SERVICE TOOLS

Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 384	214
IBR NUT SOCKET	529 036 379	210

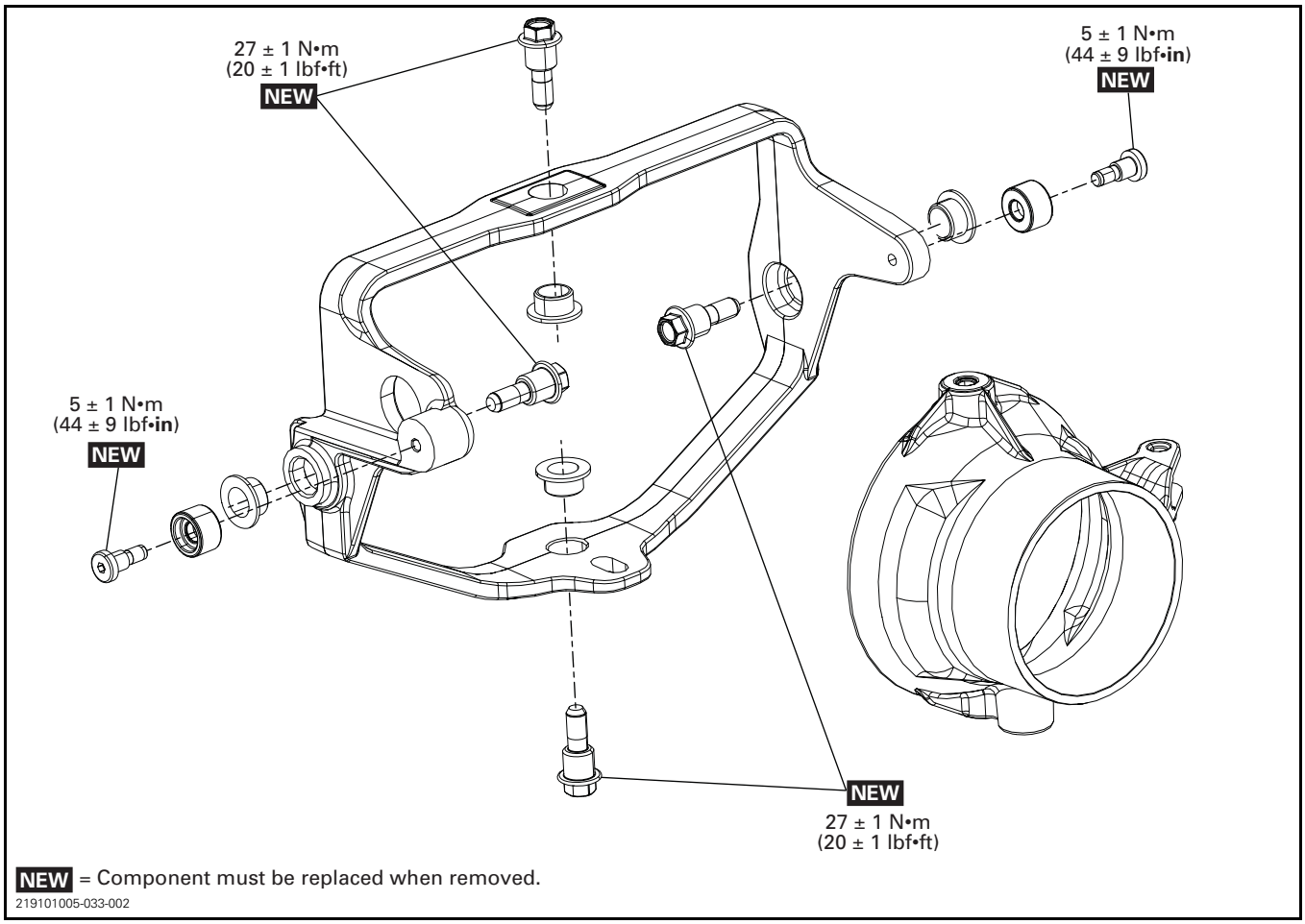
SERVICE PRODUCTS

Description	Part Number	Page
CLEAR SILICONE SEALANT	296 000 309	211
LOCTITE 5900	293 800 066	211

iBR ACTUATOR



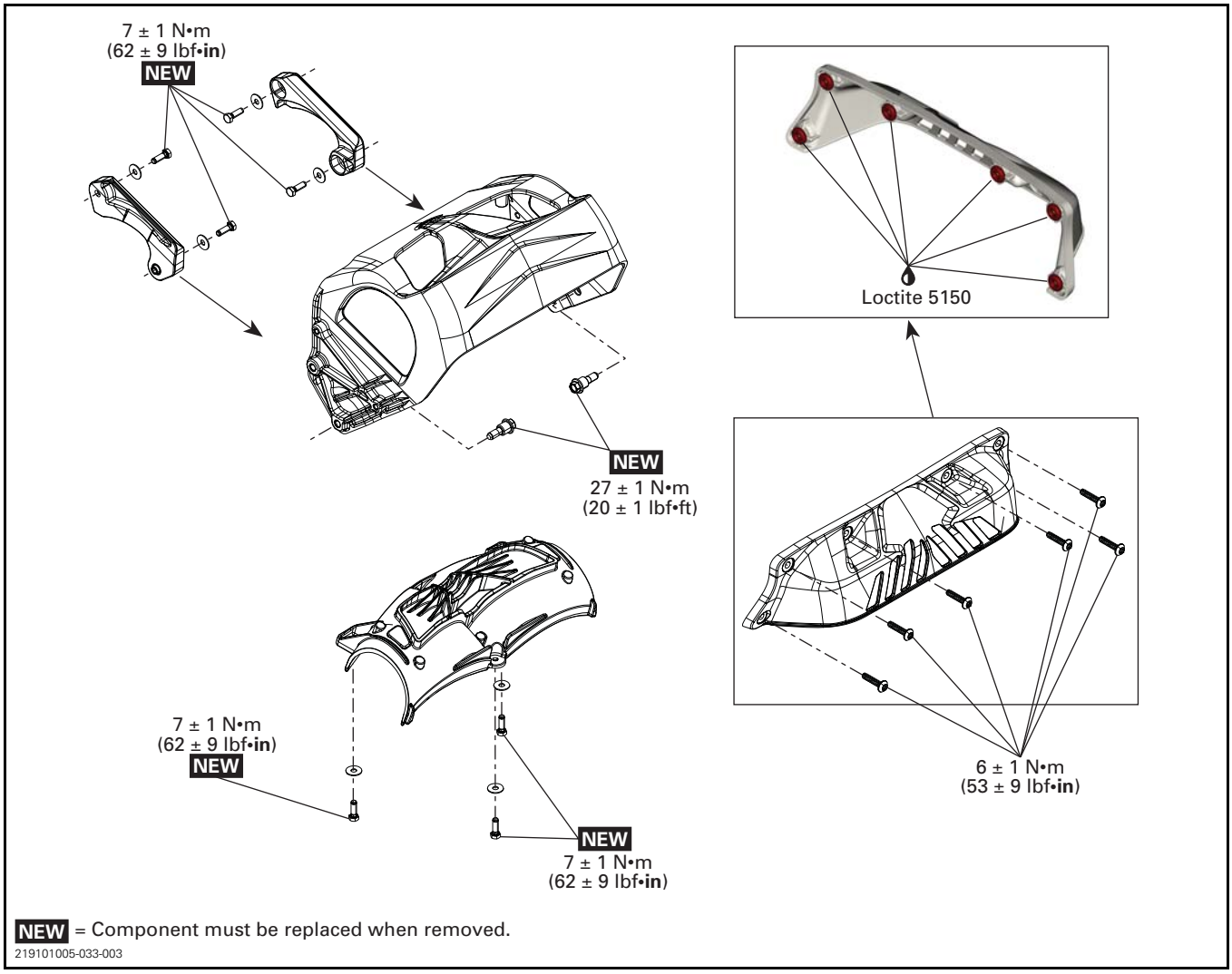
VTS TRIM RING AND NOZZLE



NEW = Component must be replaced when removed.

219101005-033-002

iBR GATE



NEW = Component must be replaced when removed.

219101005-033-003

GENERAL

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

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

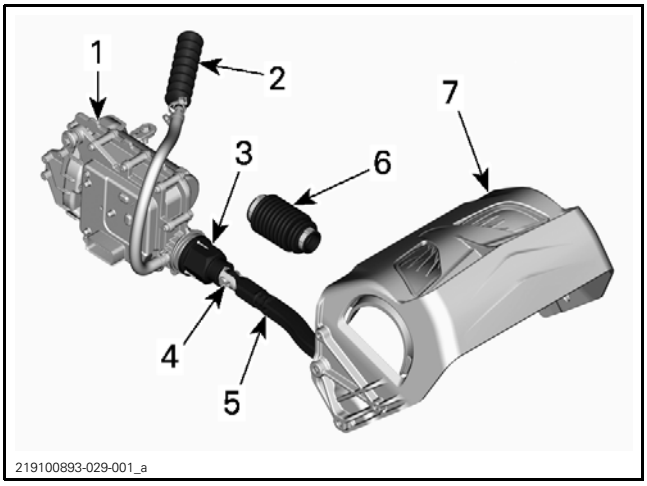
⚠ WARNING

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 ones.

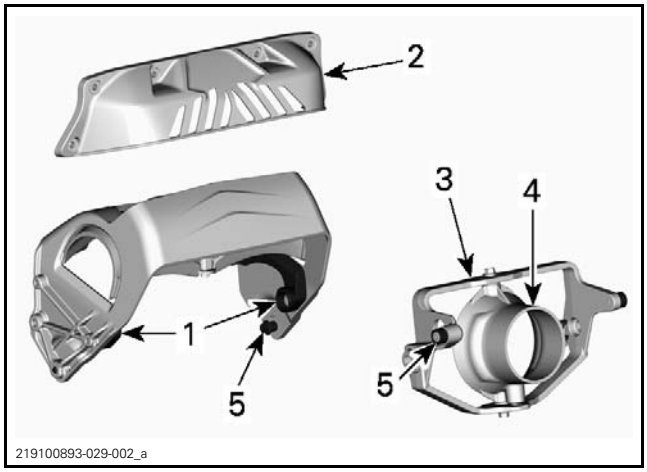
Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

SYSTEM DESCRIPTION (iBR)

iBR System Components



TYPICAL
1. *Actuator*
2. *Air chamber*
3. *iBR nut*
4. *Actuator shaft*
5. *Connecting arm*
6. *Connecting arm bellows*
7. *iBR Reverse Gate*



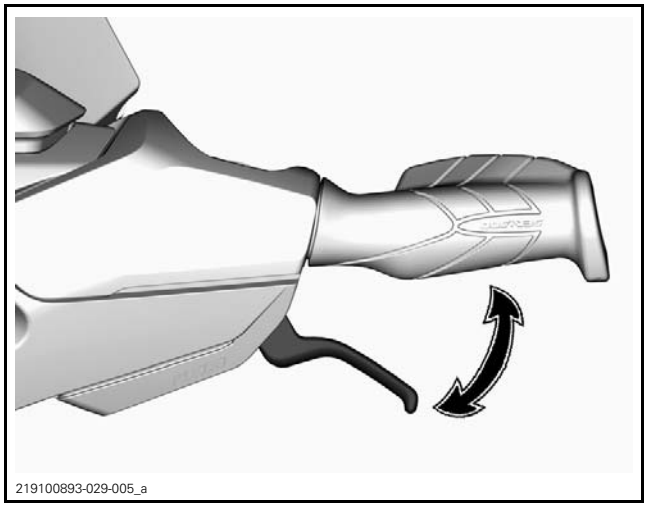
1. *Support plates*
2. *Protective guard*
3. *VTS trim*
4. *Nozzle*
5. *Friction sleeves*

The iBR (intelligent Brake and Reverse) is an electronically controlled braking and reverse system.

The iBR module controls the position of the iBR gate to provide forward thrust, reverse thrust, braking thrust, and neutral.

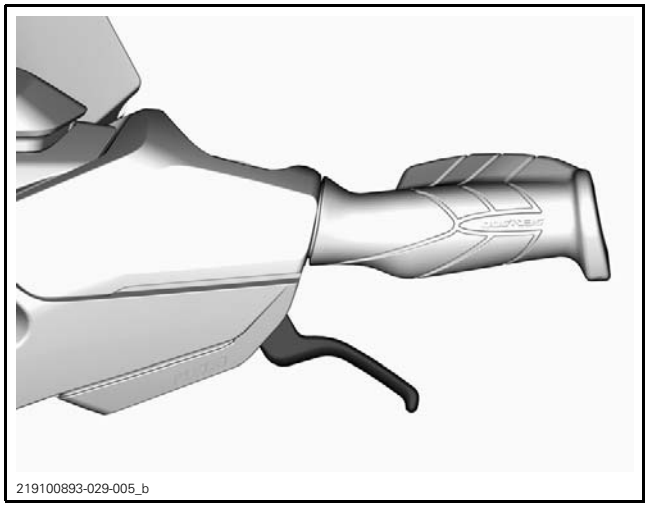
The operator commands the position of the iBR gate using either the throttle lever for forward thrust, or the iBR lever for neutral, reverse, and for the braking function.

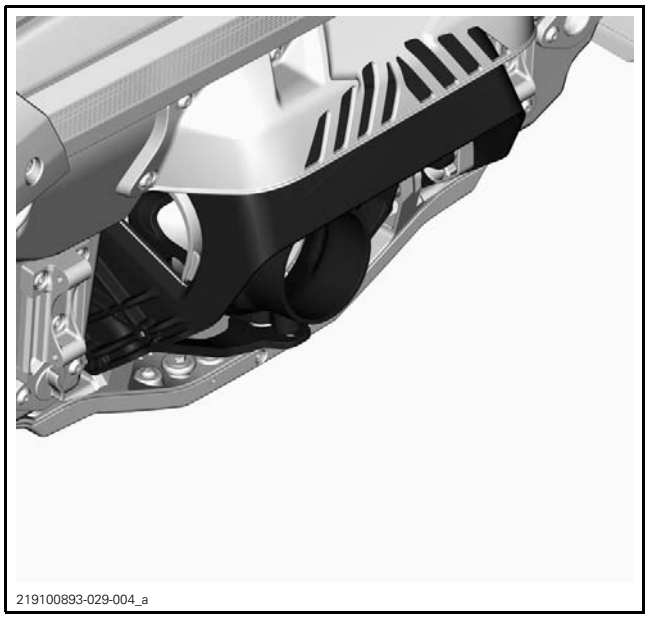
The iBR lever is located on the LH side of the handlebar.



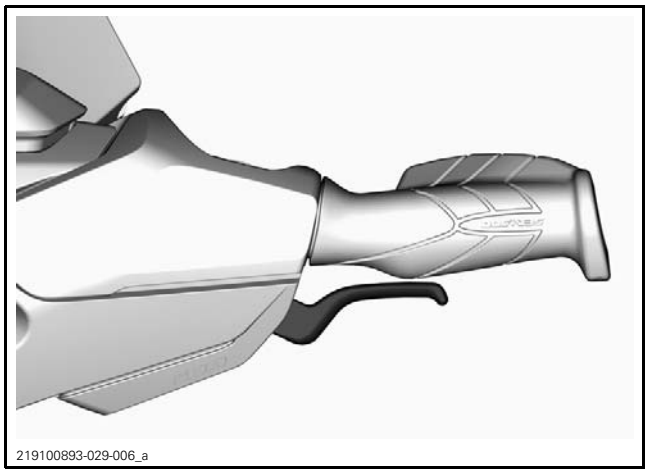
When the iBR lever is pulled in, it operates the brake and reverse lever sensor (BRLS). It is a double output hall effect sensor. The redundancy is used for security purposes.

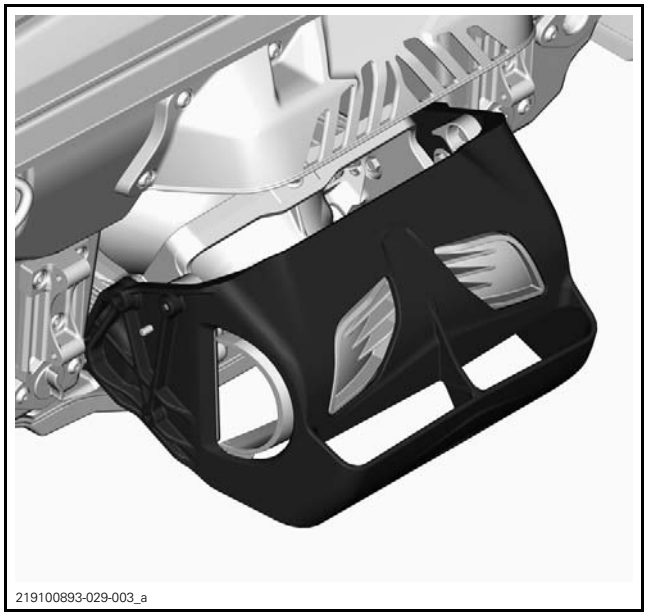
The BRLS sends the signals to the iBR module. The iBR module controls an electric motor that in turn raises or lowers the iBR gate through a mechanical drive unit.



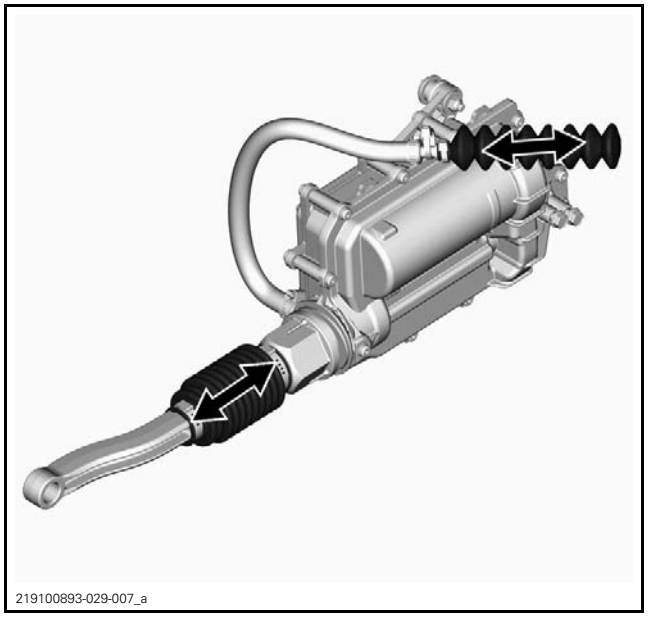


FORWARD





REVERSE



iBR ACTUATOR AIR CHAMBER MOVEMENT

NOTE: The iBR gate will move when commanded by the iBR lever only if the engine is running. For maintenance purposes, the iBR OVERRIDE function available through the gauge can be used to electrically move the gate to the desired position.

Depending on vehicle speed and how far the iBR lever is pulled in, the iBR module will automatically adjust the iBR gate movement speed and stroke.

NOTE: The iBR lever must be pulled in at least 25% of its travel (approximately) before the iBR gate starts to move. The first 25% of iBR lever travel has no effect on the iBR gate.

Every time the iBR gate moves when commanded by the iBR lever, engine RPM is momentarily reduced to idle speed as the gate moves.

⚠ WARNING

If it is necessary to remove any foreign object catch in the iBR gate, nozzle or linkages, strictly observe the following before proceeding:
- **Remove tether cord from engine cut-off switch.**
- **Wait at least 5 minutes or remove iBR fuses.**
- **Do not press on START/STOP button. If START/STOP button is pressed, wait another 5 minutes.**

iBR Override Function

iBR override moves the iBR actuator through its full range of motion.

NOTICE **Remove any foreign object that may obstruct iBR actuator movement.**

Activating iBR Override Function

1. Press the START/STOP button.
2. Install the tether cord.

NOTE: Do not start the engine. The tether cord must be installed to ensure the information center will not shut off all indications after its self test function. Briefly press the START/STOP button to reactivate the electrical system when required.

3. Pull in the iBR lever;
   - 3.1 There will be a beep.
   - 3.2 Press the SET or OK button on the information center (gauge).
4. Press the VTS UP or DOWN button to move the iBR gate.

Forward Mode

To engage forward:
- Start engine
- Pull in the throttle lever.

The iBR gate will automatically move to the forward position (full up).

NOTE: The full up position of the iBR gate is dependent on the selected VTS trim position.

Reverse Mode

If the watercraft speed is below 14 km/h (9 MPH) when the iBR lever is pulled in, reverse mode is engaged.

When the iBR lever is pulled in to engage the reverse, the following occurs:
- Engine RPM is reduced to idle.
- The iBR gate moves to the reverse position.
- Engine RPM ramps up to the engine power commanded by the throttle lever.

When operating in reverse mode, the iBR lever controls the iBR gate position and the engine RPM is controlled by the throttle lever.

Maximum engine RPM in reverse is 5000 RPM.

Braking Mode

If the watercraft speed is 14 km/h (9 MPH) per hour and above when the iBR lever is pulled in, braking mode is engaged.

When the iBR lever is pulled in to engage braking, the following occurs:
- Engine RPM is reduced to idle.
- The iBR gate moves to the maximum down position.
- Engine RPM ramps up to the engine power commanded by the iBR lever.

When operating in braking mode, the iBR gate always moves to the maximum down position. The throttle lever signal is overridden and engine RPM is now dependent on watercraft speed and how far the iBR lever is pulled in.

If watercraft speed is high when braking is applied, engine power will be initially low and then ramp up to the power commanded by the iBR lever position. The engine RPM may be increased, as necessary, to apply a stronger braking effect with the jet pump thrust when the conditions dictate.

As the watercraft slows to less than 8 km/h (5 MPH), the following occurs:
- Braking mode ceases.
- Reverse mode takes over if the iBR lever is not released.
- Throttle control reverts back to the throttle lever.

Neutral Mode

Every time the iBR lever is pulled in and released, the iBR gate will default to the **neutral** position, except if the throttle lever is still pulled in when the iBR lever is released. If the throttle lever is still pulled, the iBR gate will move to the forward position when the iBR lever is released and the watercraft will accelerate forward.

SYSTEM DESCRIPTION (VTS)

The VTS system is actually part of the iBR system.

It provides watercraft pitch trim adjustments by adjusting the vertical position of the jet nozzle.

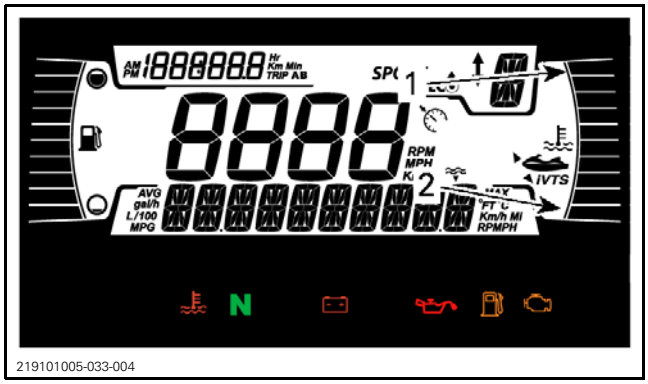
The VTS can be electrically trimmed to the desired attitude within the VTS range, or to one of 2 preset trim positions (on applicable models).

The VTS switch (or Up/Down switch) sends command signals to the gauge. The gauge converts them to CAN protocol and sends them through the CAN bus to the iBR module on the iBR actuator. The actuator then moves the iBR gate which moves the nozzle to the desired trim position.

NOTE: The nozzle and iBR gate move together in the VTS trim range up to the maximum nozzle down position. If NEUTRAL, BRAKING or REVERSE is engaged, the iBR gate moves past the VTS full down position. When FORWARD thrust is reengaged, the nozzle and iBR gate move up to the last selected VTS trim position.

The nozzle trim position can be seen on the VTS position indicator in the information center.

NOTE: Changing the VTS trim position only changes the indication. The nozzle will move to the selected VTS trim position when forward thrust is engaged.



219101005-033-004

INFORMATION CENTER — VTS POSITION INDICATOR
1. *Bow up*
2. *Bow down*

NOTE: Only the segment indicating the relative position of the VTS will be on. The illustration shows all segments on as can be seen during the self test function.

The VTS system provides the following features according to models
– Nozzle trimming
– Selection of 3 preset trim positions

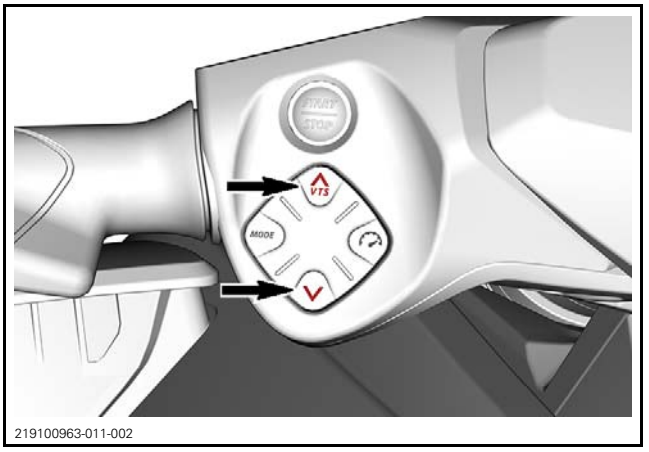
Nozzle Trimming

Watercraft must be operating in forward position.

9 trim positions are available.

Using the VTS Button (LH Side of Handlebar)

Press the UP or DOWN arrow button to change the VTS setting.



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Using Preset Trim Positions

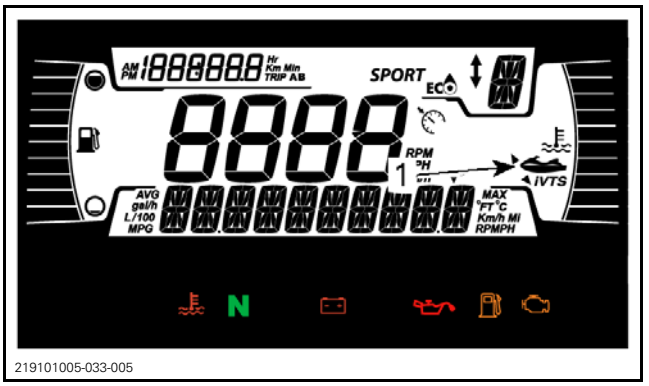
Three preset trim positions can be selected.

To select the **highest** trim position, double-click on the VTS UP arrow button (bow up).

To select the **lowest** trim position, double-click on the VTS DOWN arrow button (bow down).

Launch Control (If equipped)

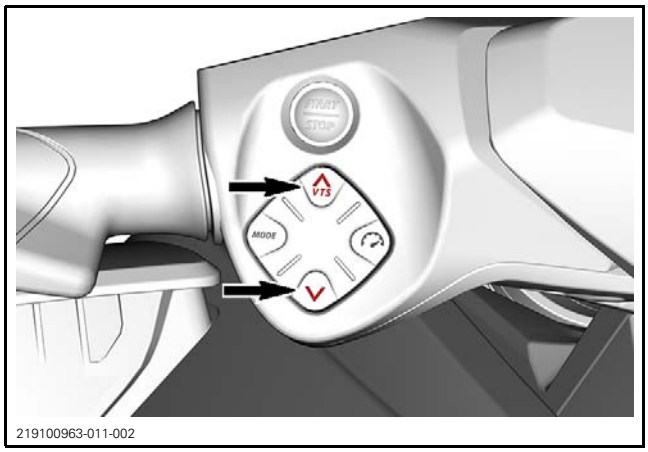
The Launch Control is an automatic adjustment of the VTS to achieve optimum acceleration. When the speed is below 20 km/h (12 MPH), the VTS lowers to it's lowest position and the iVTS indicator flashes to indicate the system is ready. When the speed exceed 30 km/h (19 MPH) the VTS return to the user selected position.



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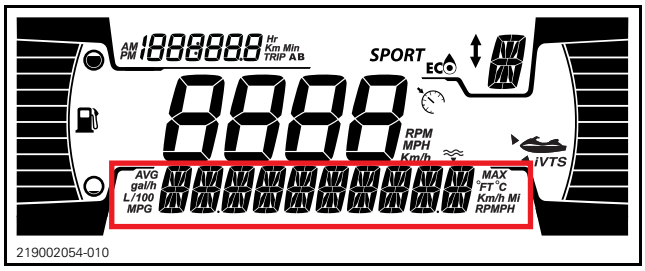
1. Launch Control indicator

To activate the Launch Control, press simultaneously both the VTS UP and DOWN buttons.



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The message **LAUNCH ON** will be displayed.



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To deactivate the **Launch Control**, press simultaneously both UP/DOWN buttons again.

The message **LAUNCH OFF** will be displayed.

Lock/Unlock iBR Actuator

Locking/Unlocking the iBR Actuator

When working on the iBR, lock the iBR to avoid accidental movement.

Connect the vehicle to the BRP diagnostic software (BUDS2).

In BUDS2, go to:
- **Settings** page
- **iBR** button
- **Configuration - Lock/Unlock iBR**

ADJUSTMENT

iBR FLASHING

NOTICE Make sure the unit's battery is fully charged before undertaking this operation.

NOTICE Continuous power to the computer is mandatory while performing this operation.

Perform after replacing the iBR actuator.

Connect the vehicle to the BRP diagnostic software (BUDS2).

In BUDS2, go to:
- **Flash** page
- **iBR** button

Select the update file in the *VALID FIRMWARE UPDATES* window and click *YES* when prompted.

The following message will confirm that the update has been donne successfully.

Click *OK* and proceed to the *IBRM* update.

iBRM FLASHING

NOTICE Make sure the unit's battery is fully charged before undertaking this operation.

NOTICE Continuous power to the computer is mandatory while performing this operation.

Perform after flashing the iBR.

Connect the vehicle to the BRP diagnostic software (BUDS2).

In BUDS2, go to:
- **Flash** page
- **iBRM** button

Select the update file in the *VALID FIRMWARE UPDATES* window and click *YES* when prompted.

The following message will confirm that the update has been donne successfully.

iBR AUTO CALIBRATION

NOTICE iBR auto-calibration must be performed with the complete reverse gate assembly properly installed. Performing the auto-calibration procedure without the reverse gate assembly in place will damage the actuator.

Perform after repairing or removing the jet pump and/or iBR system components.

Connect the vehicle to the BRP diagnostic software (BUDS2).

In BUDS2, go to:
- **Functions** page
- **iBR** button
- **Functions** tab
- **Routines - Auto Calibrate iBR**

NOTICE Make sure the iBR actuator is unlocked before pressing the Auto Calibration button.

MAINTENANCE

Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection of this shop manual.

INSPECTION

The iBR system is self monitoring. If a fault occurs in the iBR system, it will raise a fault code and communicate it to the information center through the CAN bus. The information center will turn on the iBR indicator light to advise the operator of the iBR system fault. If the fault remains active, it may be displayed in the gauge. If it is no longer active, the BRP diagnostics software (BUDS2) must be used to read the fault.

TESTING SEQUENCE

To troubleshoot the iBR system, carry out the following in this order:

- Ensure the iBR gate movement is not obstructed in any way.
- Ensure the iBR gate mechanism is in good condition and does not show signs of excessive wear or friction.
- Check system fuses.
- Check battery condition and state of charge.
- Make sure battery connections are clean and tight.
- Connect the vehicle to the BRP diagnostic software (BUDS2) to check for iBR system or CAN bus related fault codes. Carry out service actions as indicated in BUDS2.
- If a CAN bus communication fault with the iBR actuator is indicated, or the iBR actuator is not visible in BUDS2, carry out a continuity test of the CAN bus wires. Refer to *TESTING CAN COMMUNICATION* in this subsection.
- Try moving the iBR using the iBR UP and iBR DOWN buttons on the iBR activation page in BUDS2.
- Check for proper gate and actuator movement. Refer to *TESTING THE iBR SYSTEM FUNCTION* in this subsection.
- Visually inspect system connectors for moisture ingress, corrosion, and proper contact.
- Remove the screw retaining the gate to the connecting arm. Move the gate up and down by hand to check for freedom of movement.

TESTING THE IBR SYSTEM FUNCTION

This test requires two persons. One person to start engine and operate controls, and one person to observe iBR gate movement.

Provide adequate ventilation of exhaust gases or move watercraft outside.

NOTICE Do not install an exhaust ventilation hose in the iBR gate area or damage may occur when the iBR gate moves downward during operation.

NOTICE

- Ensure there are no tools or other object that may interfere with the iBR gate movement.
- Do not run engine for more than 2 minutes out of water or damage may occur.

⚠ WARNING

The person observing the iBR gate movement must stand to the side of the stern well clear of the iBR gate and pump nozzle in full view of the operator.

Test out of Water

NOTICE This procedure must be completed within one minute of the engine starting.

1. Connect a water hose to the watercraft to provide exhaust system cooling when operating engine. DO NOT open water tap yet.
2. Start engine, open water tap and let idle.

NOTE: If iBR gate was not in the neutral position, it will move to the neutral position on engine start up.

3. Depress the throttle lever slightly and visually confirm the iBR gate moves to the forward position (up to the VTS trim position), then release throttle. The iBR gate must remain in the forward position.
4. Depress the iBR lever fully and confirm the iBR gate moves to the full down position.
5. Release the iBR lever completely and confirm the iBR gate moves to the neutral position.
6. Close water tap and shut engine off.
7. Remove water hose from vehicle.

Test with Watercraft on a Waterway

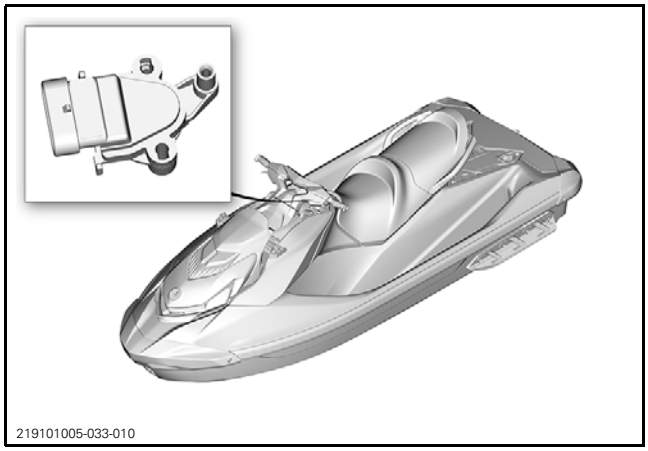
1. Start engine.

NOTE: If iBR gate is not in the neutral position before the engine start, it will move to the neutral position on engine start up.

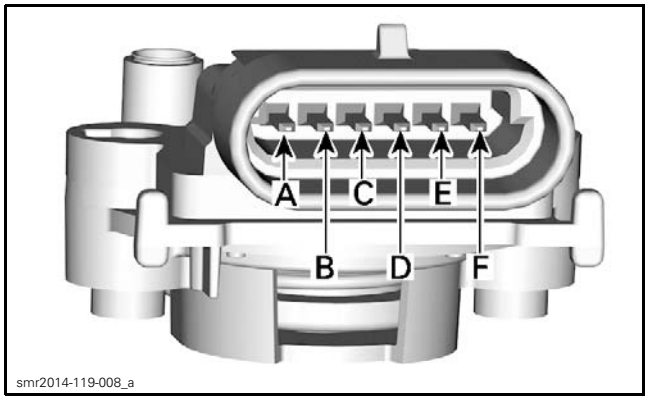
2. Depress the throttle lever slightly, then release it. Forward movement of the watercraft confirms the iBR gate has moved to the forward position.
3. Depress the iBR lever fully. Rearward movement of the watercraft confirms the iBR gate has moved to the reverse position.
4. Release the iBR lever completely. Reverse thrust should cease and the watercraft should continue to drift rearward on momentum.
5. Apply a small amount of forward thrust to stop rearward velocity, then tap the iBR lever to return the iBR gate to neutral.
6. Shut engine off.

PROCEDURES

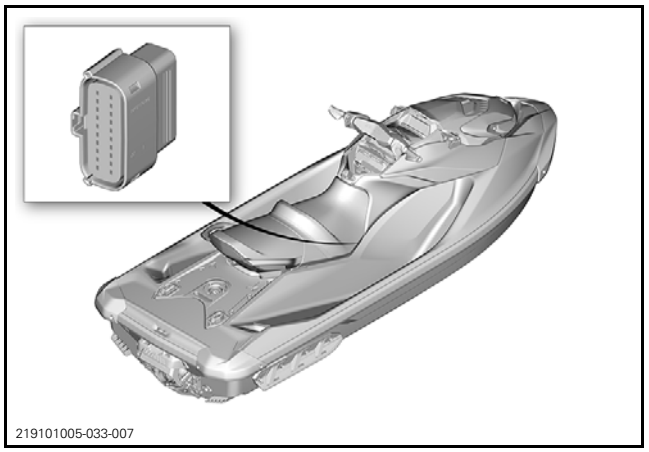
SWITCHES LOCATION AND PIN-OUT



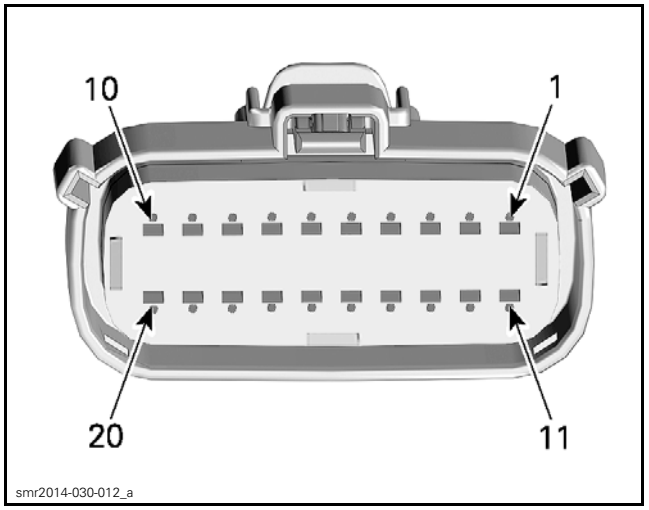
BRLS LOCATION



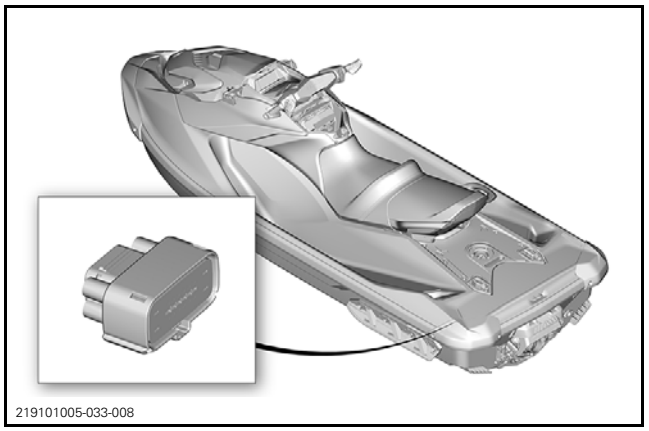
BRLS PINOUT



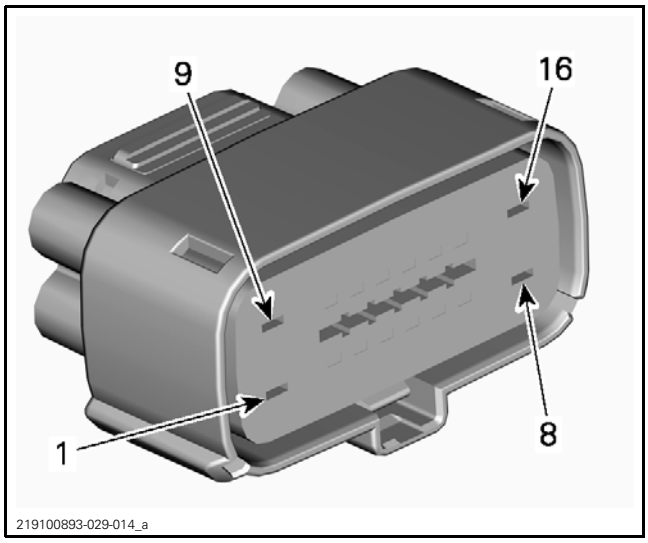
STEERING CONNECTOR LOCATION



STEERING CONNECTOR



IBR ACTUATOR CONNECTOR LOCATION



IBR ACTUATOR CONNECTOR

iBR ACTUATOR

Specifications

IBR ACTUATOR CONNECTOR	
PIN	SIGNAL
iBR-1	Battery voltage (Hot at all times)
iBR-2	Battery voltage (Hot with main relay on)
iBR-8	Ground

iBR ACTUATOR CURRENT DRAW	
DOWN SELECTION	-5 to -15 A
UP SELECTION	+10 to +20 A

Testing iBR Actuator Operation

1. Connect the vehicle to the BRP diagnostic software (BUDS2).
2. In BUDS2, go to:
   – **Functions** page
   – **iBR** button
   – **Functions** tab
   – **Move iBR Up/Down**
3. Click **iBR UP** and **iBR DOWN** buttons alternately and look for a change in **iBR Position (Deg)**.

If the iBR moves using these buttons but does not move using the iBR lever, test *BRLS VOLTAGE* in this subsection.

If the iBR does not move, check the iBR fuse(s) in fuse box. If fuse(s) are good, check power and ground circuits.

Testing iBR Actuator Motor Current

1. Connect the vehicle to the BRP diagnostic software (BUDS2).
2. In BUDS2, go to:
   – **Measurements** page
   – **iBR** button
3. Note the **Gate Position (°)** indication.
4. Activate the iBR override function.
5. Move the iBR to the full up position and look for the **Motor Current (A)** indication. Also look for a change of **Gate Position (°)** indication.

NOTE: Current draw indication will not be stable. High and low peaks will be observed. Look for the maximum average current draw.

6. Move the iBR to the full down position and look for the **Motor Current (A)** draw indication. Also look for a change of **iBR Position (°)** indication.

If current draw is abnormally high (between 20 and 30 A), check the following:
– Ensure iBR gate is free of debris.
– Check for excessive friction in gate movement.
– Check roller bushings, plastic bushings and iBR ramps.
– Check for proper voltage to the iBR actuator.
– Check for fault codes using .

Remove debris, replace iBR gate components, or replace the iBR actuator as applicable.

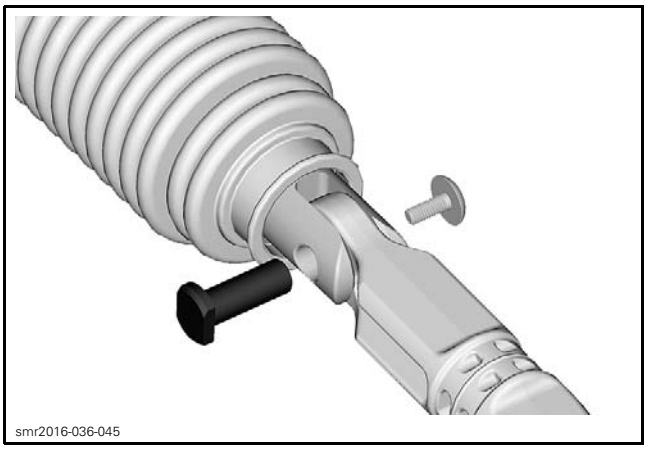
Removing the iBR Actuator

NOTICE **Do not try to manually force the iBR gate when all components are installed.**

1. Remove iBR reverse gate. Refer to *iBR REVERSE GATE* in this subsection.
2. Remove VTS trim ring. Refer to *VTS TRIM RING* in this subsection.
3. Remove the small Oetiker clamp retaining the connecting arm bellows.


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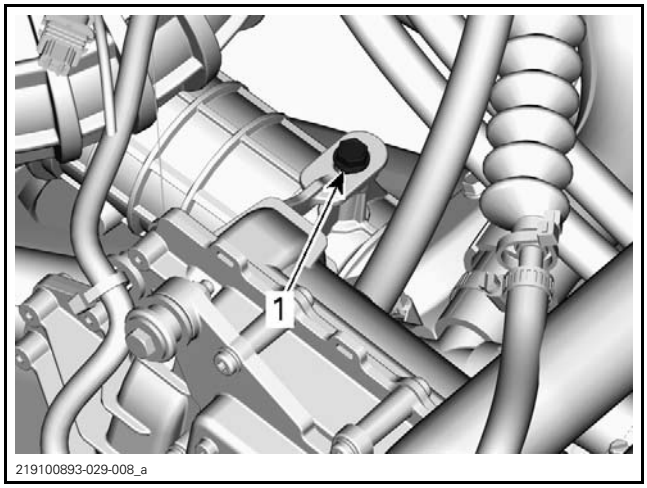
4. Remove connecting arm pin and screw.


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5. Remove iBR nut and bellows using the IBR nut socket.

REQUIRED TOOL	
IBR NUT SOCKET (P/N 529 036 379)	

6. Move muffler. Refer to *EXHAUST SYSTEM* subsection.
7. Unplug electrical connector.
8. Remove actuator retaining screw.



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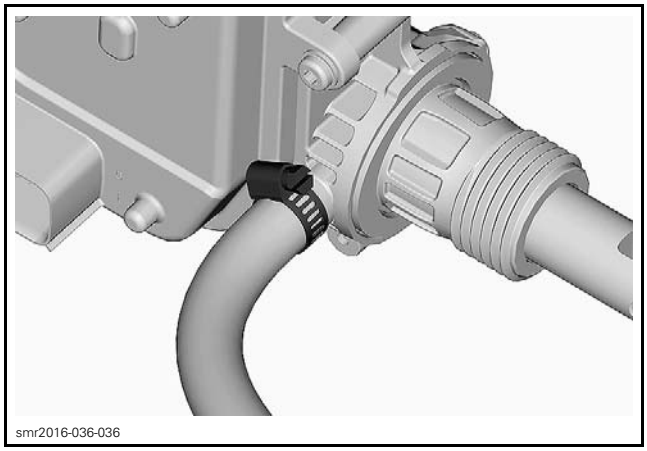
1. Actuator retaining screw

9. Remove iBR actuator and air chamber.

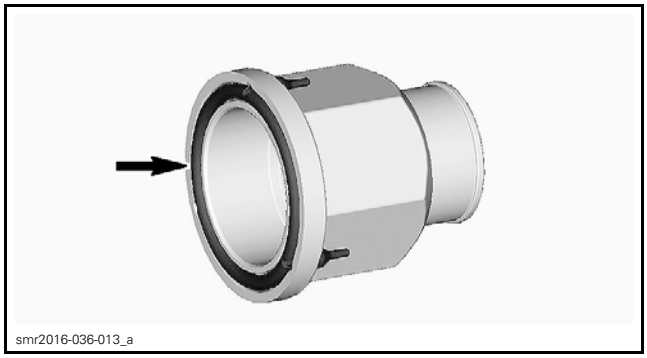
Installing the iBR Actuator

NOTICE **Failure to adhere to the sequence in the following steps will cause the iBR air chamber to rupture or burst and cause premature failure of the iBR actuator.**

1. Install the air chamber on the iBR actuator.
   1.1 Tighten the clamp.


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2. Connect iBR actuator connector.
3. Slide the O-ring into position on iBR nut.


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4. If the same actuator is reinstalled, clean all residues of sealing compound near the threaded area.
5. Apply Loctite 5900 on actuator, between actuator housing and threads, as shown in the exploded view.

SERVICE PRODUCT
LOCTITE 5900 (P/N 293 800 066)

NOTICE Ensure no sealing agents contact the iBR shaft.

6. Tighten iBR nut to specification. Refer to exploded view.
7. Install actuator retaining screw. Refer to exploded view for tightening torque specifications.
8. Install connecting arm.
9. Reinstall other removed parts.

NOTICE Allow 24 hours for thread locker on retaining screws to cure.

Perform *iBR FLASHING* procedure.

Perform *iBR AUTO-CALIBRATION* procedure.

iBR REVERSE GATE



Removing the iBR Reverse Gate

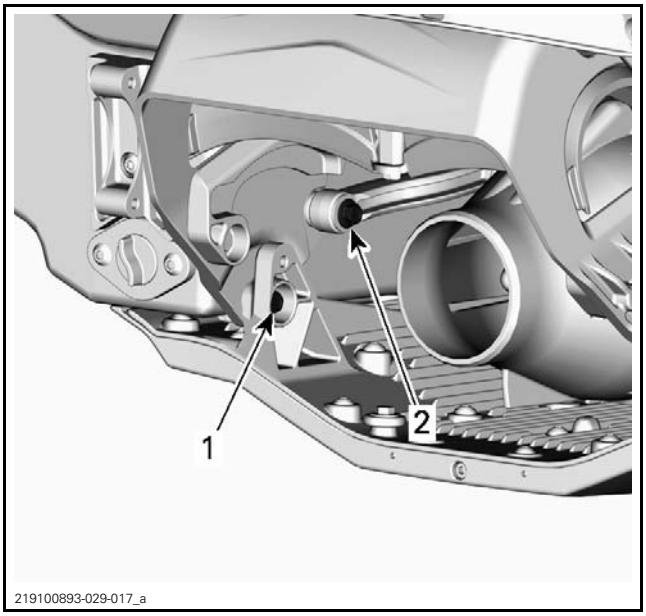
Remove the guard.



Remove VTS trim ring.

Remove the iBR reverse gate retaining screws.

Remove the connecting arm retaining screw.



1. iBR retaining screw
2. Connecting arm retaining screw

Installing the iBR Reverse Gate

Installation is the reverse of the removal procedure. However, pay attention to the following.

Refer to exploded view for tightening torque specifications.

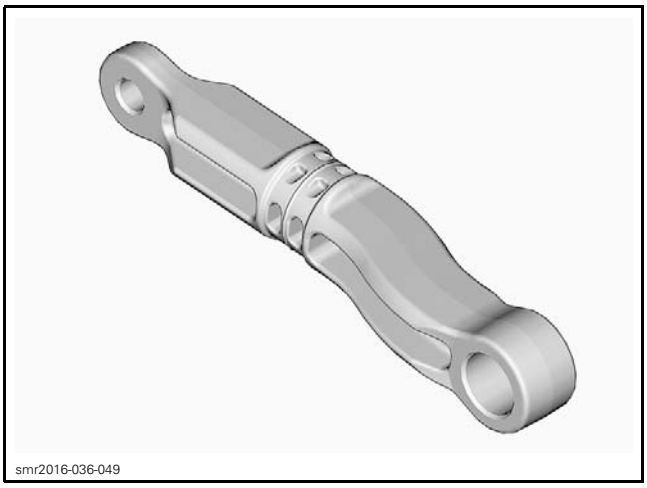
Apply service product on guard screws.

SERVICE PRODUCT
CLEAR SILICONE SEALANT (P/N 296 000 309)

NOTICE Allow 24 hours for thread locker on retaining screws to cure

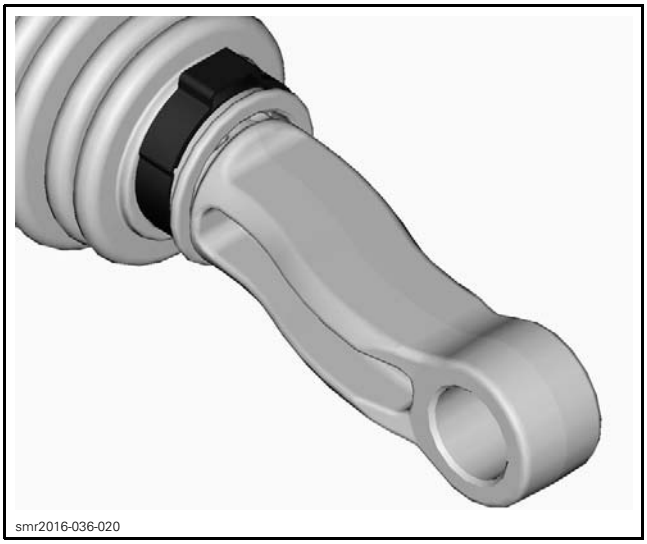
Perform *iBR AUTO-CALIBRATION* procedure.

CONNECTING ARM

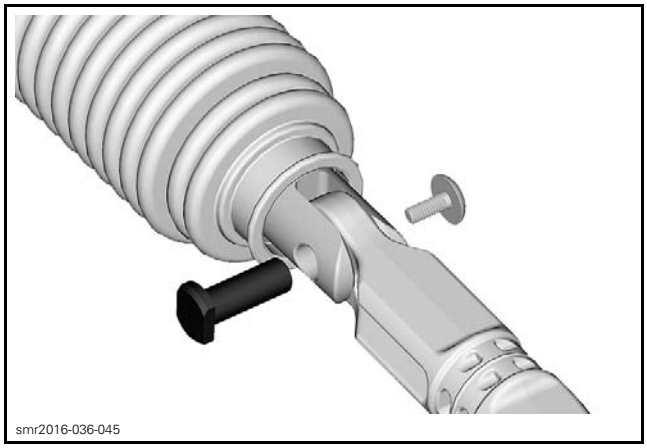

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Removing the Connecting Arm

1. Remove VTS trim ring. Refer to *VTS TRIM RING* in this subsection.
2. Remove iBR Reverse Gate. Refer to *iBR REVERSE GATE* in this subsection.
3. Remove the small Oetiker clamp retaining the connecting arm bellows.


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4. Remove connecting arm pin and screw.

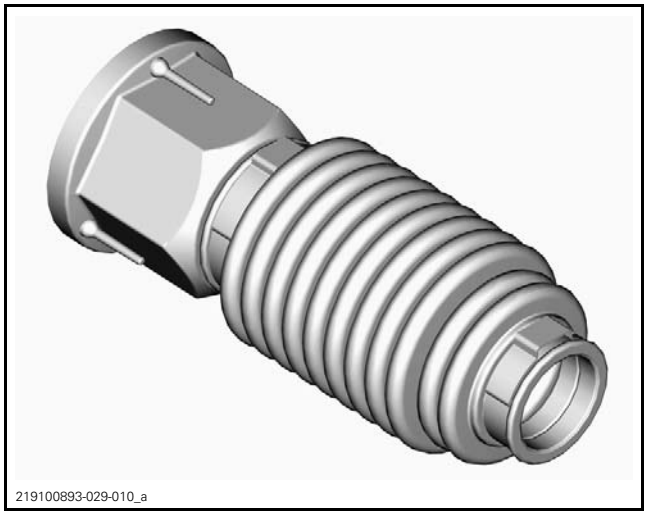

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5. Remove connecting arm.

Installing the Connecting Arm

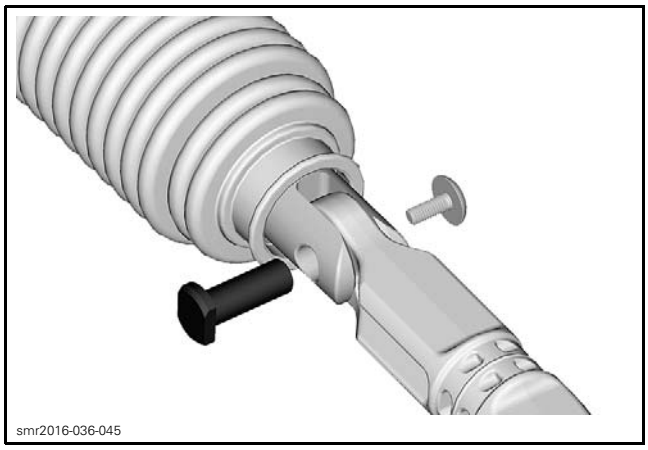
Use iBR override function to move iBR actuator to the full down setting.

NOTE: The bellows should already be installed and clamped on the iBR nut.

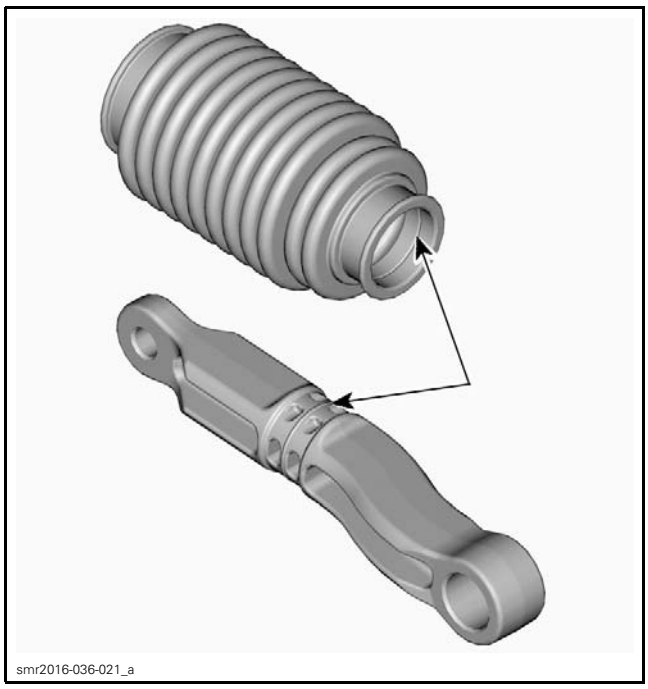

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NOTICE Failure to adhere to the sequence in the following steps will cause the iBR air chamber to rupture or burst and cause premature failure of the iBR actuator.

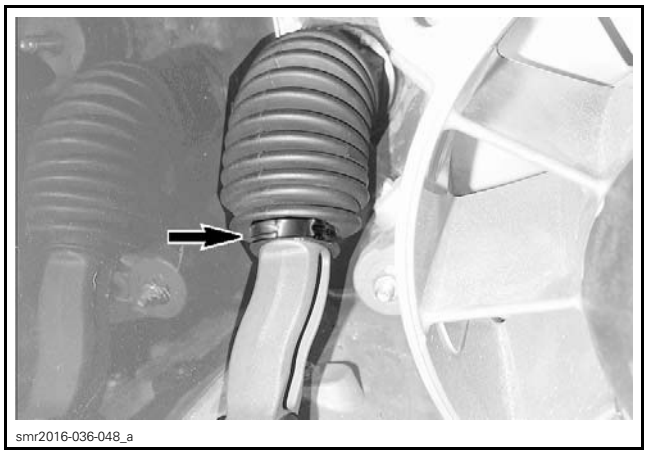
1. Push the bellows back towards iBR actuator.
2. Install connecting arm pin and screw.
   2.1 Tighten screw.


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3. Position the bellows over the connecting arm.


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4. Compress the air chamber (attached to iBR actuator).
   4.1 Clamp the Oetiker clamp on the connecting arm bellows.


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5. Reinstall other removed parts.

Perform *IBR AUTO-CALIBRATION* procedure.

ACTUATOR OUTPUT SHAFT

Removing the Actuator Output Shaft

1. Remove the connecting arm.
2. Unscrew the output shaft from the iBR actuator.

Installing the Actuator Output Shaft

The Installation is the reverse of the removal procedure. However, pay attention to the following.

TIGHTENING TORQUE	
Actuator output shaft	4.3 N•m (38 lbf•**in**)

Make sure output shaft is aligned with the connecting arm by only unscrewing the shaft no more than 1/2 of a turn after tightening. Do not thread the shaft in further to align the connecting arm. Over tightening the shaft may result in iBR malfunction

Perform *iBR AUTO-CALIBRATION* procedure. Refer to *IBR AUTO-CALIBRATION* in this subsection.

VTS TRIM RING


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Removing the VTS Trim Ring

1. Disconnect the steering cable. Refer to *STEERING* subsection.
2. Remove VTS trim ring retaining screws.
3. Remove nozzle pivot screws.

Installing the VTS Trim Ring

The installation is the reverse of the removal procedure. However, pay attention to the following.

Refer to exploded view for tightening torque specifications.

Perform *IBR AUTO-CALIBRATION* procedure. refer to *IBR AUTO-CALIBRATION* in this subsection.

BRAKE AND REVERSE LEVER SWITCH (BRLS)

Testing and Specifications

BRLS PINOUT	
PIN	SIGNAL
BRLS-A	5 VDC
BRLS-B	GND
BRLS-C	View signal % in BUDS2
BRLS-D	5VDC
BRLS-E	GND
BRLS-F	View signal % in BUDS2

NOTE: When moving BRLS lever, the BRLS percentage should increase or decrease in a steady linear fashion.

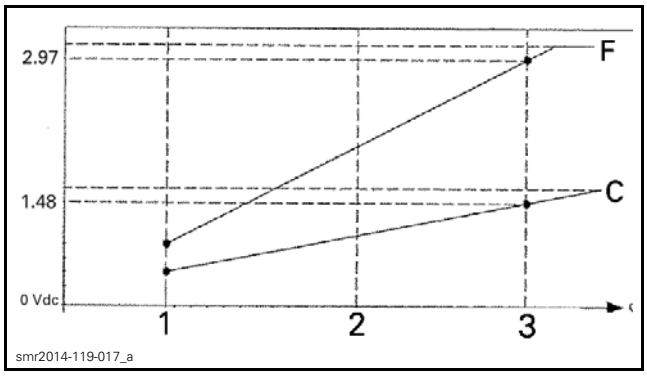
If BUDS2 does not show BRLS percentage moving or if reading is erratic:

– Check for BRLS reference voltage.
– Check for BRLS ground.
– Carry out a continuity test of the wiring between the iBR actuator and the BRLS.

NOTE: When installed on vehicle the BRLS-C Vdc signal should always be half of the BRLS-F Vdc signal when testing with a multimeter.

To test, install Diagnostic harness between steering harness connectors.

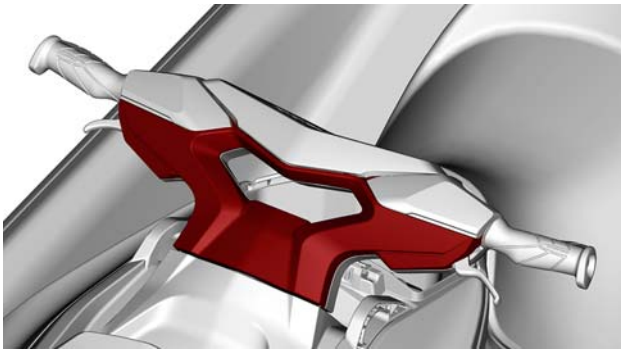
REQUIRED TOOL	
DIAGNOSTIC HARNESS (P/N 529 036 384)	

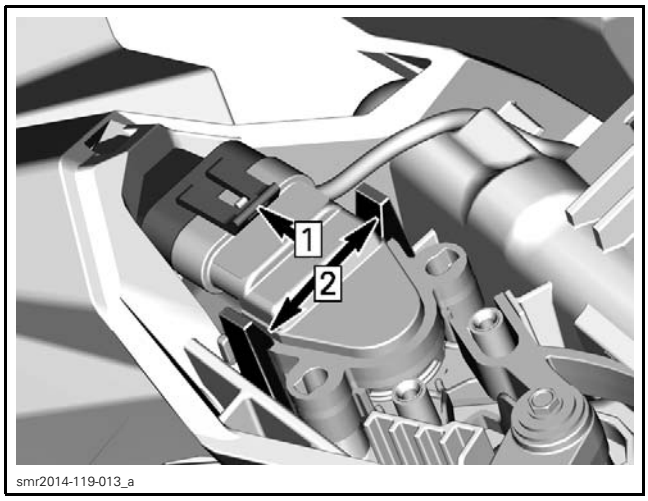


smr2014-119-017_a

APPROXIMATE BRLS SIGNAL VOLTAGE CURVE PINS F AND C
1. BRLS released
2. BRLS at 50% pulled
3. BRLS fully pulled

Removing the BRLS


219101005-033-009



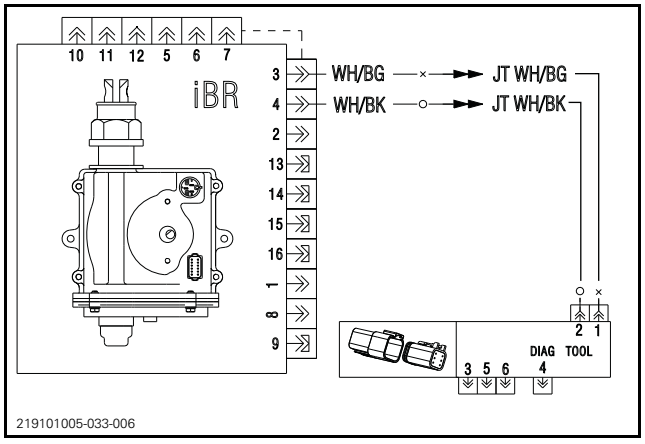
smr2014-119-013_a

Installing the BRLS

The installation is the reverse of the removal procedure.

TESTING CAN COMMUNICATION

CAN WIRE RESISTANCE TEST		
IBR ACTUATOR CONNECTOR PIN	DLC CONNECTOR PIN	SPECIFIED RESISTANCE
iBR-3	DLC-1	0 Ω
iBR-4	DLC-2	0 Ω



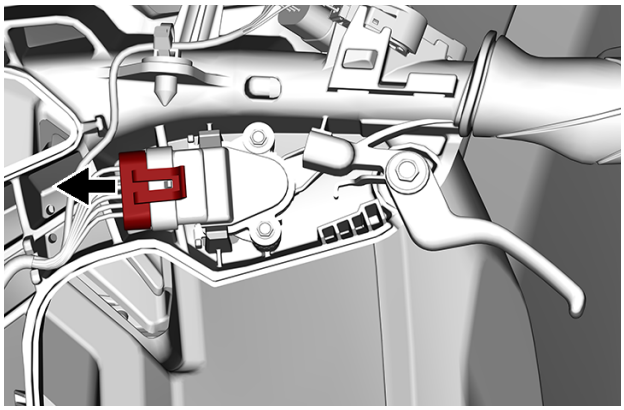
219101005-033-006

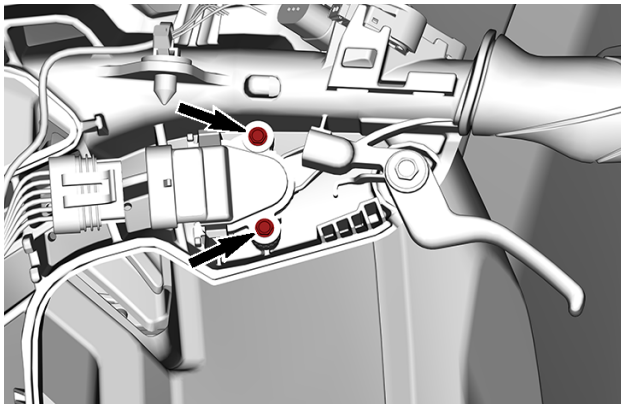
Refer to *PROCEDURES* in this subsection for pinouts.

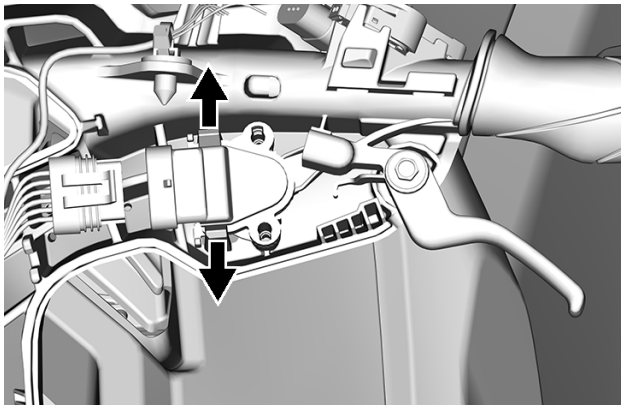
Refer to *CONTROLLER AREA NETWORK (CAN)* subsection for additional information.

Replacing the BRLS

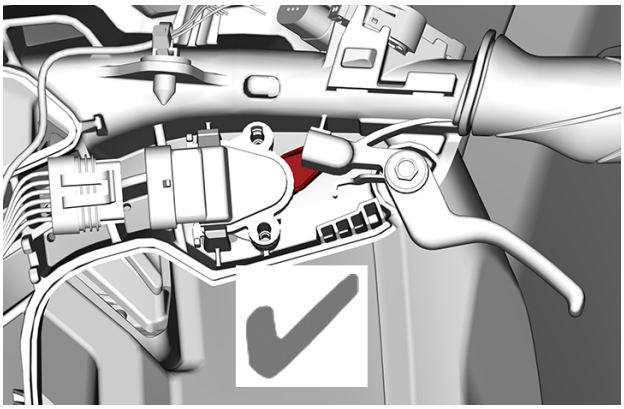
1. Remove LH steering cover. Refer to *Steering System*.
2. Remove sensor.

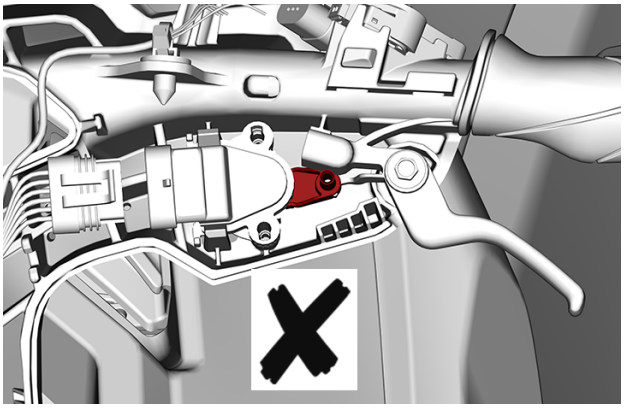






3. The installation is the reverse of the removal procedure. However pay attention to the following.
4. Ensure to properly install the lever arm on the sensor.





5. Press sensor into position until locking tabs engage. Ensure it is properly locked in place.
6. Tighten screws to specification.

Tightening Torque	
BRLS screw	0.7 ± 0.1 Nm (6 ± 1 lbf-in)

7. When installation is complete, ensure BRLS lever functions properly.

JET PUMP

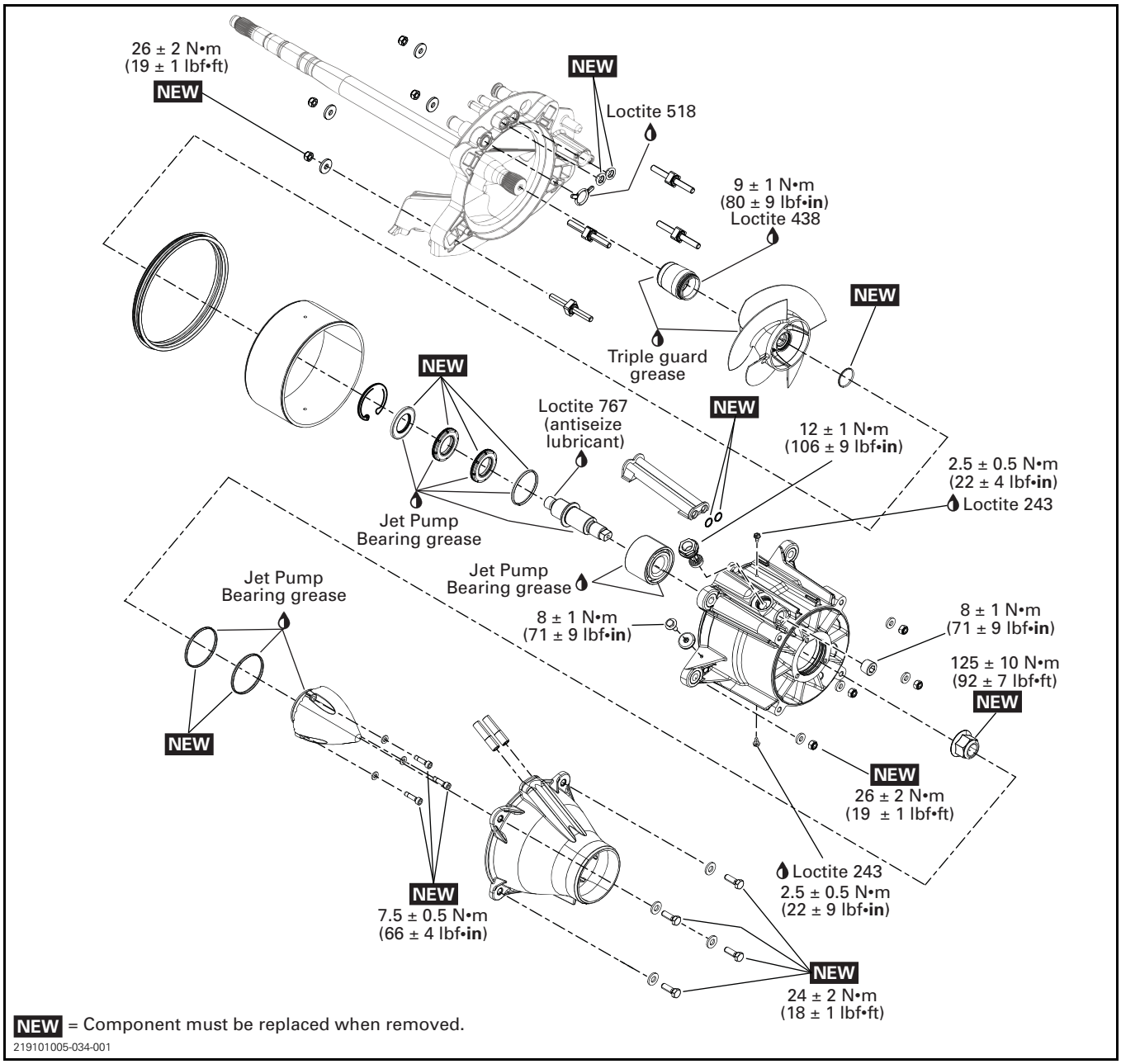
SERVICE TOOLS

Description	Part Number	Page
IMPELLER REMOVER/INSTALLER	529 035 956	219
IMPELLER SHAFT BEARING TOOL	529 036 168	219
IMPELLER SHAFT PUSHER	529 035 955	219
PRESSURE CAP	529 036 283	220
PUMP PLATE	529 036 224	222
VACUUM/PRESSURE PUMP	529 021 800	220

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SERVICE PRODUCTS

Description	Part Number	Page
CLUTCH AND PULLEY FLANGE CLEANER PRO S1	779244	222
JET PUMP BEARING GREASE	293 550 032	225, 230–231, 233
LOCTITE 243 (BLUE)	293 800 060	228
LOCTITE 438	296 000 424	227
LOCTITE 518	293 800 038	223
LOCTITE 767 (ANTI-SEIZE LUBRICANT)	293 800 070	226
LUBRICANT AND ANTI-CORROSIVE (EUR)	779224	224, 227
LUBRICANT AND ANTI-CORROSIVE	779168	224, 227
TRIPLE-GUARD GREASE	508298	222–223, 227

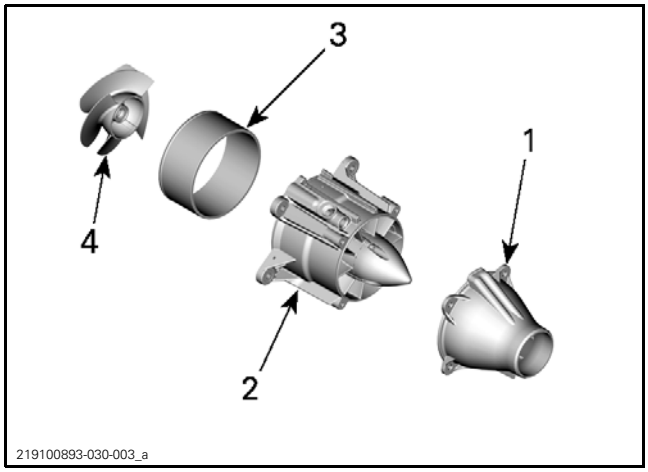

26 ± 2 N•m
(19 ± 1 lbf•ft)
NEW
NEW
Loctite 518
9 ± 1 N•m
(80 ± 9 lbf•in)
Loctite 438
NEW
Triple guard
grease
NEW
Loctite 767
(antiseize
lubricant)
NEW
12 ± 1 N•m
(106 ± 9 lbf•in)
2.5 ± 0.5 N•m
(22 ± 4 lbf•in)
Loctite 243
Jet Pump
Bearing grease
Jet Pump
Bearing grease
Jet Pump
Bearing grease
8 ± 1 N•m
(71 ± 9 lbf•in)
8 ± 1 N•m
(71 ± 9 lbf•in)
125 ± 10 N•m
(92 ± 7 lbf•ft)
NEW
NEW
NEW
26 ± 2 N•m
(19 ± 1 lbf•ft)
Loctite 243
2.5 ± 0.5 N•m
(22 ± 9 lbf•in)
NEW
7.5 ± 0.5 N•m
(66 ± 4 lbf•in)
NEW
24 ± 2 N•m
(18 ± 1 lbf•ft)
NEW = Component must be replaced when removed.
219101005-034-001

GENERAL

The following tools are required to perform the installation and removal of impeller related components.

REQUIRED TOOLS	
IMPELLER SHAFT PUSHER (P/N 529 035 955)	
IMPELLER REMOVER/INSTALLER (P/N 529 035 956)	
IMPELLER SHAFT BEARING TOOL (P/N 529 036 168)	

JET PUMP MAIN COMPONENTS

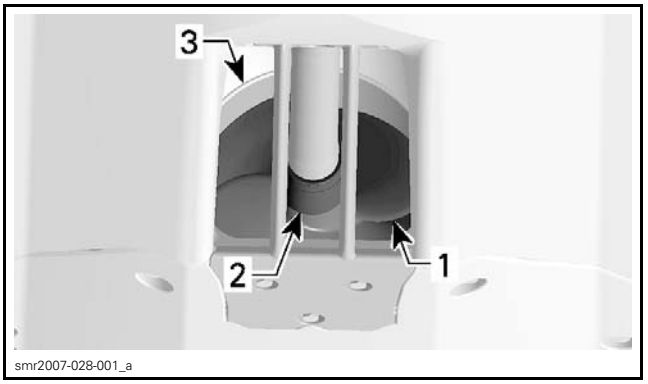


1. Venturi
2. Jet pump housing
3. Wear ring
4. Impeller

INSPECTION

IMPELLER CONDITION

Condition of impeller, impeller boot and wear ring can be quickly checked from underneath the watercraft. With the vehicle on the trailer, use a flashlight to visually inspect them through the inlet grate.



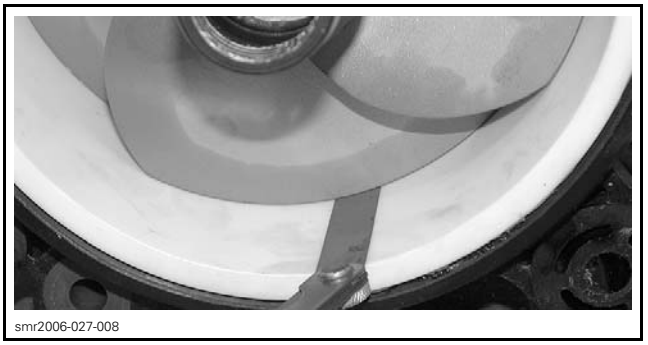
TYPICAL — UNDERNEATH HULL
1. Impeller
2. Impeller boot
3. Wear ring

IMPELLER/WEAR RING CLEARANCE

This clearance is critical for jet pump performance.

To check clearance, remove jet pump.

Using a feeler gauge, measure clearance between impeller blade tip and wear ring. Measure each blade at its center.



MODEL	MAXIMUM WEAR CLEARANCE
All models	0.35 mm (.014 in)

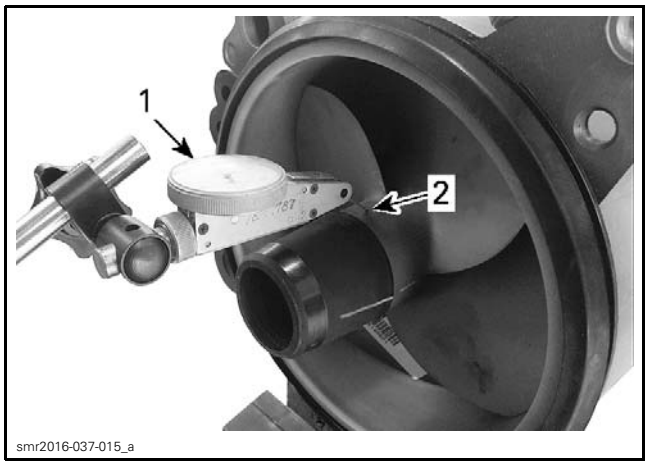
IMPELLER SHAFT RADIAL PLAY

Radial play is critical for jet pump life span.

To check radial play, remove jet pump.

Make sure impeller shaft turns freely and smoothly.

1. Retain housing in a soft jaw vise making sure not to damage housing lug.
2. Set a dial gauge and position its tip onto metal end, close to the end of the impeller hub.
3. Move shaft end up and down. Difference between highest and lowest dial gauge reading is radial play.



TYPICAL — MEASURING IMPELLER SHAFT RADIAL PLAY
1. Dial gauge
2. Measure close to impeller hub end

RADIAL PLAY
0.5 mm (.02 in)

Excessive play can come either from worn bearing or damaged jet pump housing bearing surface.

LEAK TEST

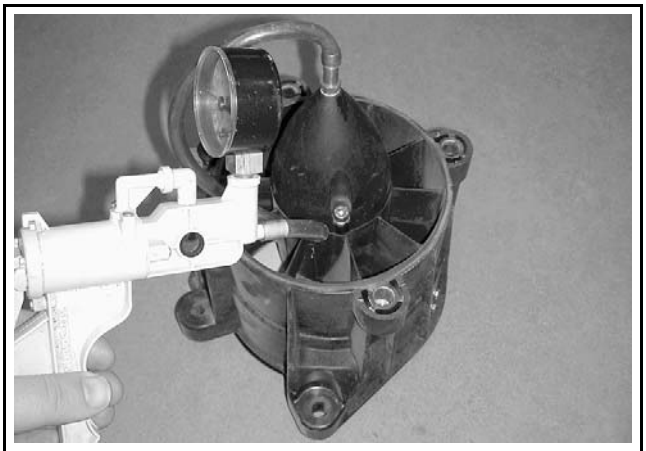
Whenever performing any type of repair on the jet pump, a leak test should be carried out.

Proceed as follows:

1. Remove impeller cover. Refer to *IMPELLER COVER* in this subsection.
2. Install the pressure cap on pump housing.

REQUIRED TOOLS	
PRESSURE CAP (P/N 529 036 283)	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

3. Connect the vacuum/pressure pump to the pressure cap fitting.



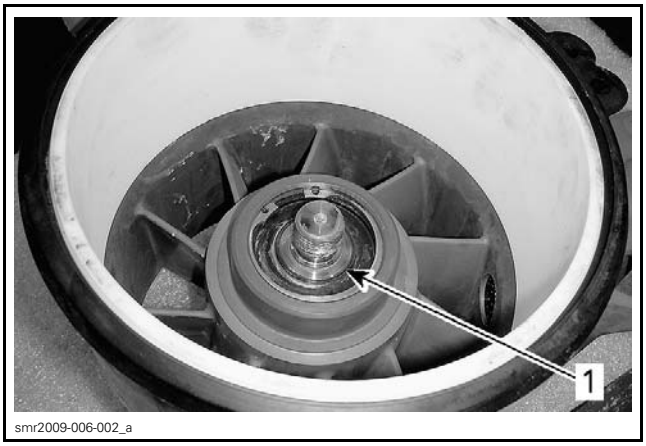
TYPICAL

4. Pressurize pump.

LEAK TEST PRESSURE
Maximum 70 kPa (10 PSI)

5. Pump must maintain this pressure for at least 5 minutes.

NOTE: Only 2 or 3 bubbles coming out from the seal on the impeller side is acceptable. Leaks from other areas must be repaired.



TYPICAL
1. Small leak here is acceptable

NOTICE **Repair any leak. Failure to correct a leak will lead to premature wear of pump components.**

6. Disconnect pump and remove pressure cap.
7. Reinstall impeller cover. Refer to *IMPELLER COVER* in this subsection.

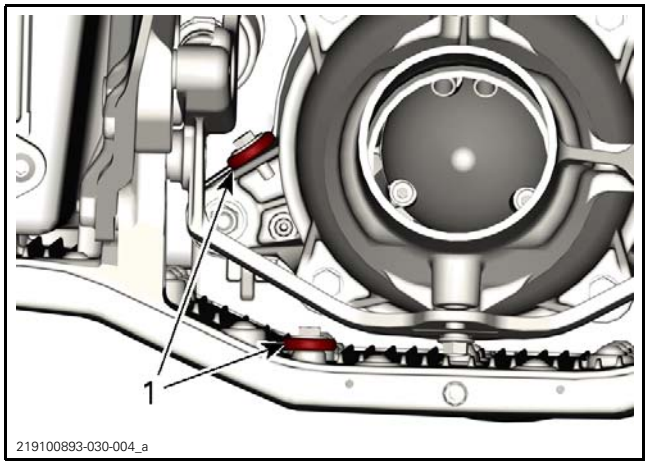
PROCEDURES

NOTE: Whenever removing a part, visually check for damage such as: corrosion, cracks, split, break, porosity, cavitation, deformation, distortion, heating discoloration, wear pattern, defective plating, missing or broken balls in ball bearing, water damage diagnosed by black-colored spots on metal parts, etc. Replace any damaged parts. As a quick check, manually feel clearance and end play, where applicable, to detect excessive wear.

SACRIFICIAL ANODES

Inspecting the Sacrificial Anodes

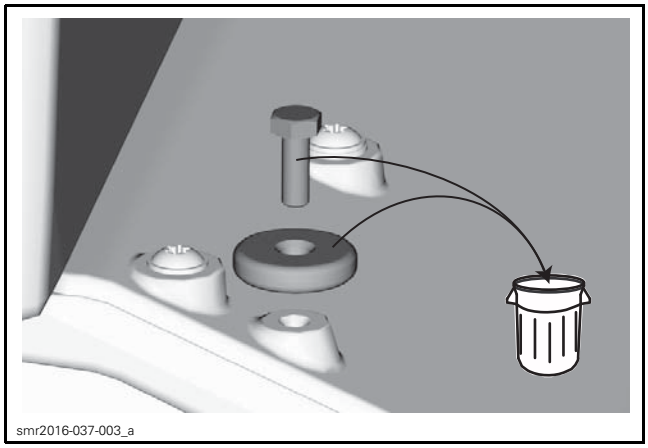
Check for wear. If worn more than half, replace anode.

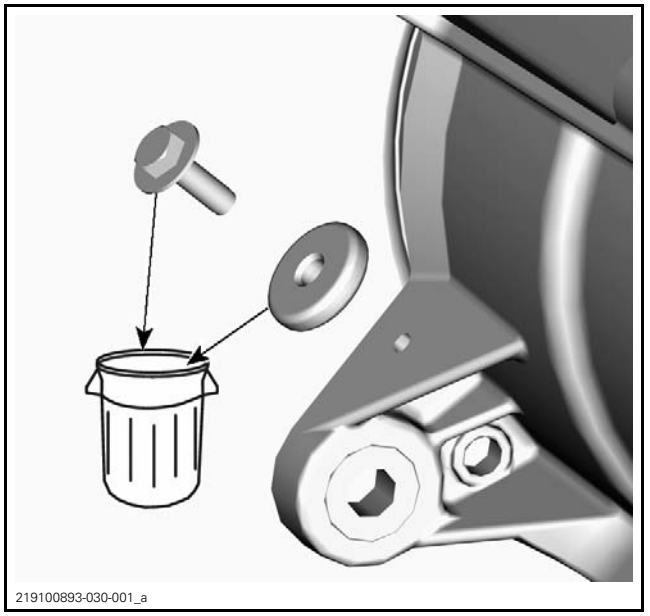


1. Sacrificial anode location

Removing the Sacrificial Anode

Remove and discard screw and anode.





Installing the Sacrificial Anode

Installation is the reverse of the removal procedure. However, pay attention to the following.

Refer to exploded view for tightening torque specifications.

VENTURI

Removing the Venturi

1. Remove the iBR gate, VTS trim ring and nozzle. Refer to *iBR, REVERSE AND VTS* subsection.
2. Remove the venturi from the jet pump housing.

Installing the Venturi

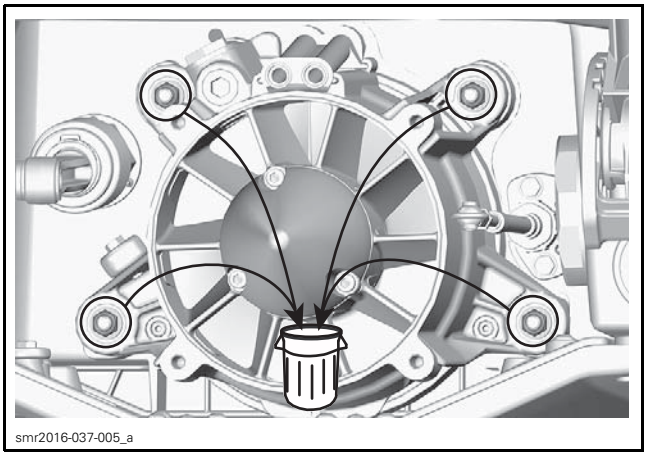
The installation is the reverse of the removal procedure. However pay attention to the following.

Refer to exploded view for tightening torque specifications.

JET PUMP HOUSING

Removing the Jet Pump Housing

1. Remove the iBR gate, VTS trim ring and nozzle. Refer to *iBR, REVERSE AND VTS* subsection.
2. Remove the venturi.
3. Remove and discard the nuts that retain the jet pump to the pump support.


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4. Pull back jet pump housing to remove it from the pump support. It may be necessary to wiggle it slightly as you pull back on the pump.

Temporarily fasten the engine alignment plate to pump support to support drive shaft and avoid PTO oil seal damage.

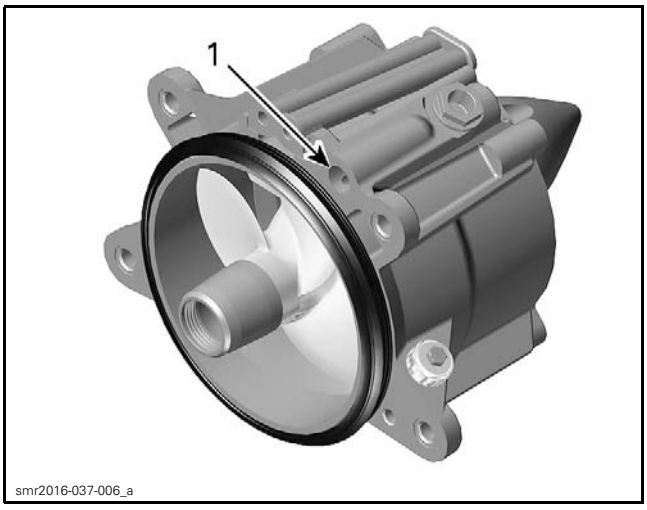
REQUIRED TOOL	
PUMP PLATE (P/N 529 036 224)	

Inspecting and Cleaning the Jet Pump Housing

1. Visually inspect jet pump housing. Pay attention to the stator. Ensure the assembly is clean and free of any debris and defects.

Do the following as applicable.

2. Blow low pressure compressed air through the pressure outlet fitting and make sure it is clear.

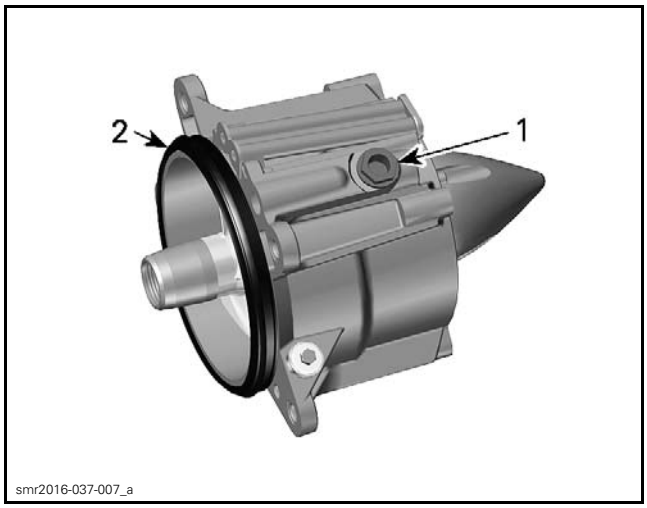


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1. Pressure outlet

3. Ensure cap screw is tight.

4. Ensure the neoprene seal is in good condition. Replace as required.



smr2016-037-007_a

1. Cap screw
2. Neoprene seal

Installing the Jet Pump Housing

The installation is the reverse of the removal procedure. However, pay attention to the following.

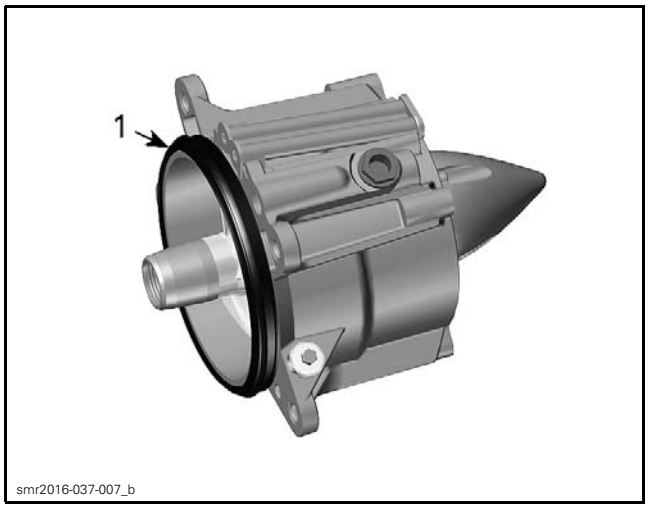
Clean impeller splines and drive shaft splines with Clutch and pulley flange cleaner or equivalent. Splines must be free of any residue.

NOTICE **To avoid damaging the drive shaft finish, never use a metallic brush.**

Lubricate drive shaft splines, impeller splines and the inside of the impeller boot with grease.

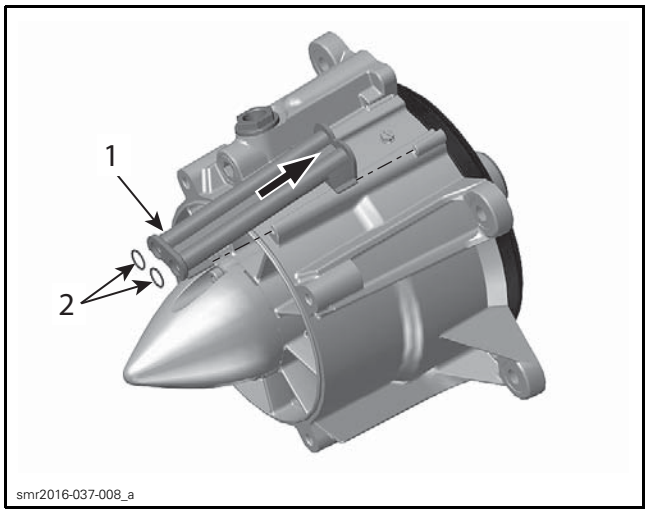
SERVICE PRODUCTS
CLUTCH AND PULLEY FLANGE CLEANER PRO S1 (P/N 779244)
TRIPLE-GUARD GREASE (P/N 508298)

Ensure the neoprene seal is properly installed on the jet pump.



1. Neoprene seal

Install new O-rings then slide water outlet adapter onto pump.

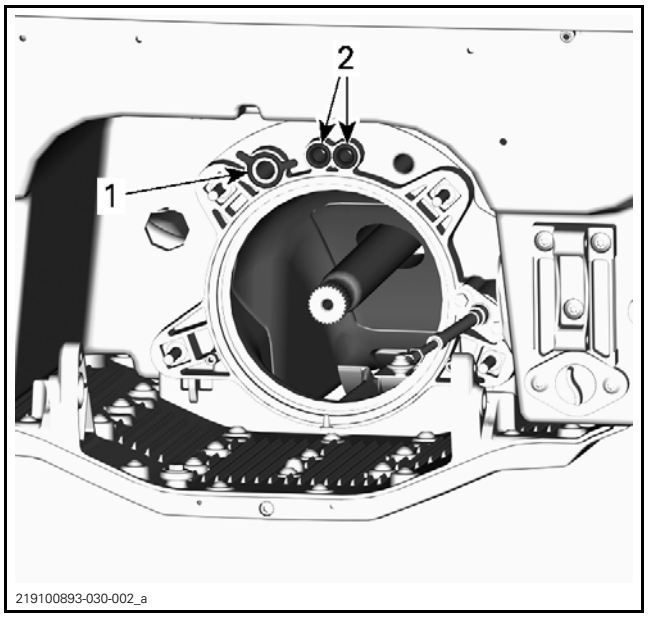


1. Slide adapter onto pump
2. New O-rings here

Install new O-rings on pump support.

Apply a thin layer of Loctite on the rounded portion of the O-rings to hold it against the support.

SERVICE PRODUCT
LOCTITE 518 (P/N 293 800 038)



1. Install new O-rings
2. O-rings (with tabs)

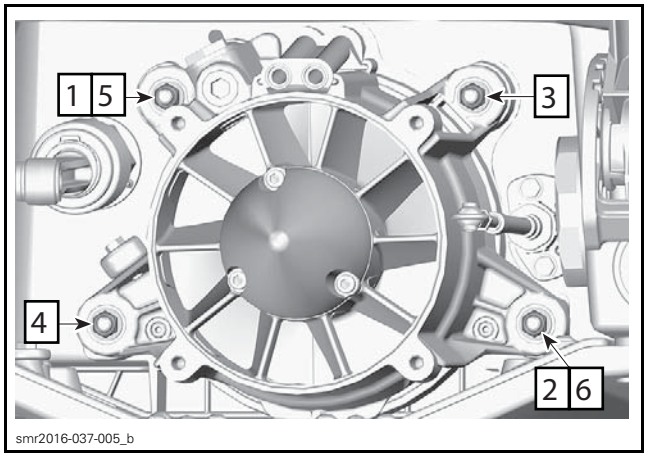
Generously apply grease on drive shaft splines.

SERVICE PRODUCT
TRIPLE-GUARD GREASE (P/N 508298)

Install jet pump.

NOTE: If necessary, wiggle jet pump to engage drive shaft splines in impeller.

Install new nuts and tighten as per table and the illustrated sequence. Refer to exploded view for tightening torque specifications.



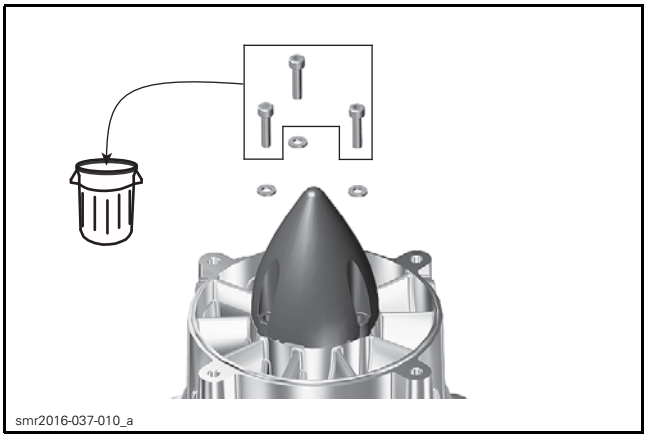
Slightly lubricate wear ring with Lubricant and anti-corrosive to minimize friction during initial impeller start.

SERVICE PRODUCTS	
Scandinavia	LUBRICANT AND ANTI-CORROSIVE (EUR) (P/N 779224)
All other countries	LUBRICANT AND ANTI-CORROSIVE (P/N 779168)

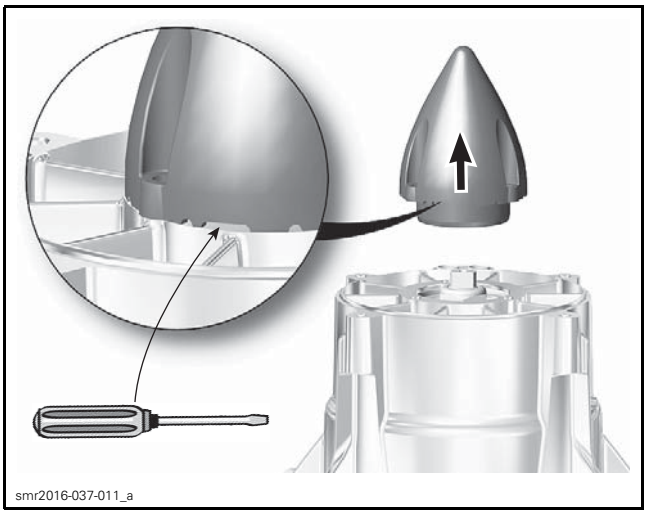
IMPELLER COVER

Removing the Impeller Cover

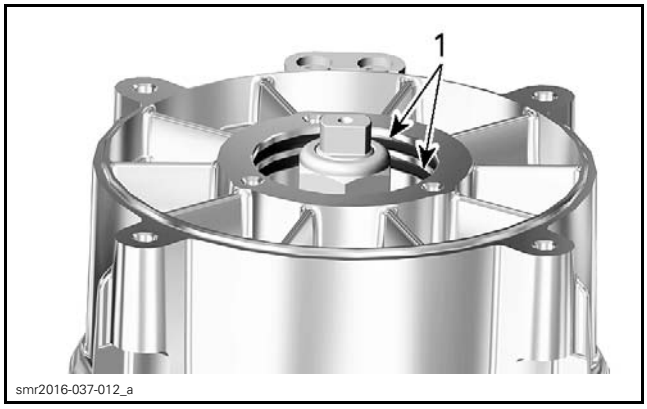
1. Remove the jet pump housing.
2. With pump housing in vertical position, remove and discard the 3 retaining screws.


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3. Using a fiber hammer, gently tap impeller cover to help release it from the jet pump housing.
4. Use a flat screwdriver in the slots provided as pry points to remove it from the jet pump housing.


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5. Remove both cover O-rings.

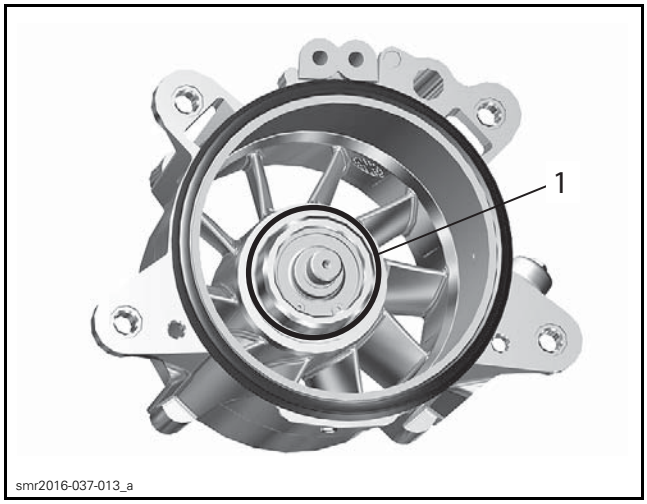


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1. Cover O-rings

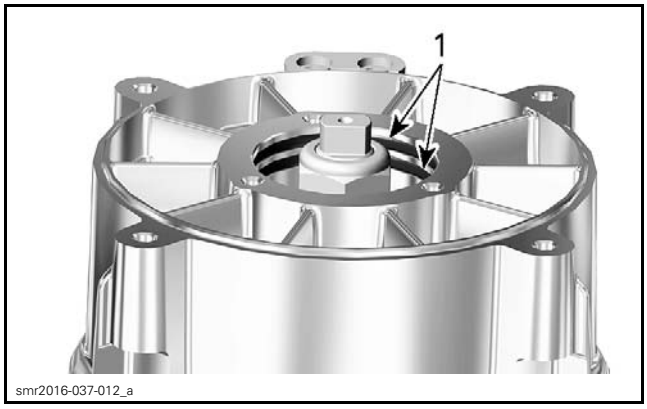
Inspecting the Impeller Cover

Check for presence of water in cover and bearing area. If water is found, replace seals on impeller side. Also replace O-rings and/or impeller cover.



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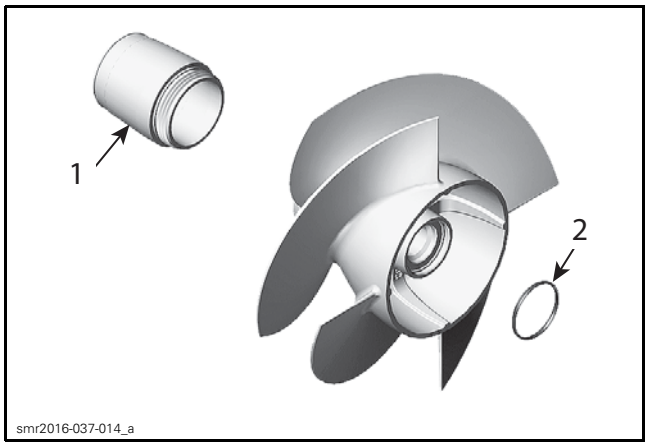
1. Seal on impeller side



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1. Cover O-rings

Check impeller boot and O-rings condition on impeller. Replace as required.



1. Impeller boot
2. Impeller O-ring

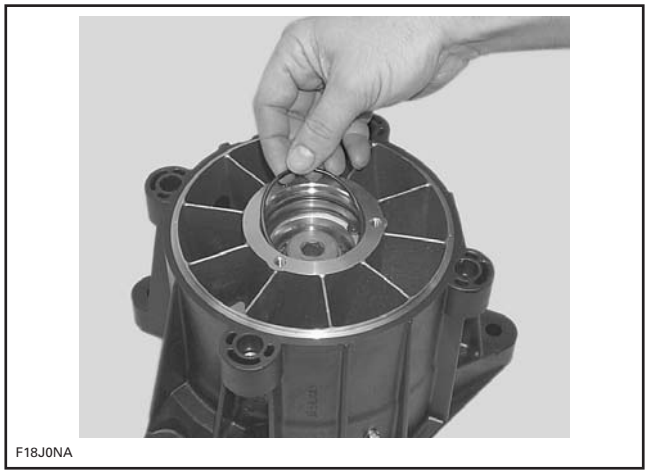
Perform a leak test. Refer to *LEAK TEST* in this subsection.

Installing the Impeller Cover

1. Apply a thin layer of grease in O-ring grooves.

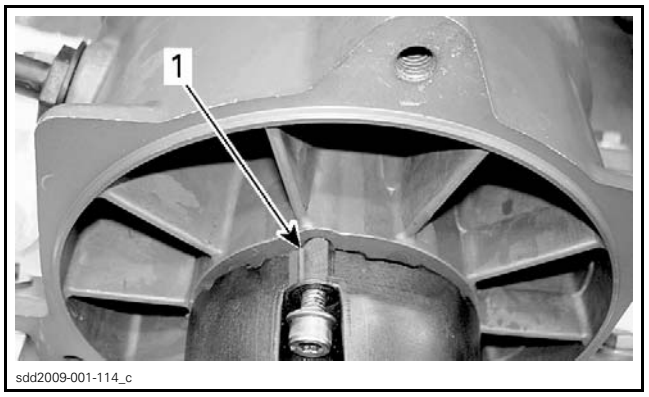
SERVICE PRODUCT
JET PUMP BEARING GREASE (P/N 293 550 032)

2. Install O-rings in their respective groove and make sure they are properly lubricated.



TYPICAL

3. Install impeller cover by aligning the cover index mark with the pump top fin as shown.



1. Align mark with top fin

NOTE: Cover can only be installed in one position as screw holes are not located symmetrically.

4. Secure cover with **NEW** self-locking screws. Refer to exploded view for tightening torque specifications.

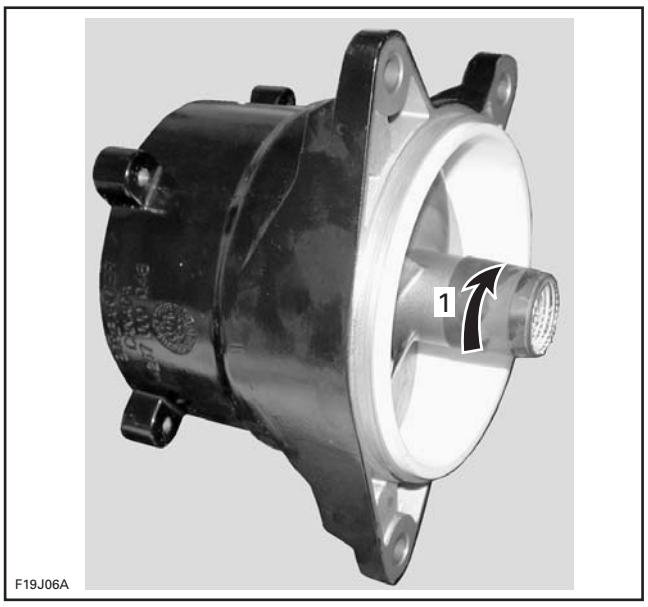
NOTE: Push cover against pump housing while alternately tightening screws. Make sure O-rings are positioned correctly and they are not damaged when pushing the cover.

IMPELLER

Removing the Impeller

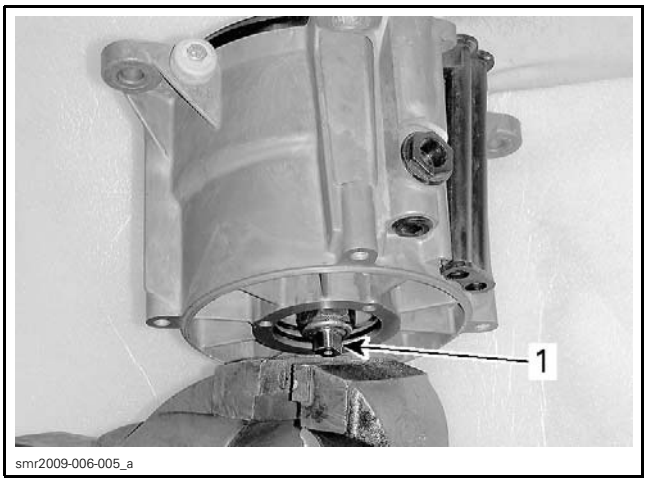
NOTE: If impeller shaft is to be disassembled, loosen the impeller shaft nut prior to removing the impeller.

1. Remove jet pump housing. Refer to *JET PUMP HOUSING* in this subsection.
2. Remove impeller cover. Refer to *IMPELLER COVER* in this subsection.
3. Remove impeller boot by turning it **clockwise** (LH threads).



TYPICAL
1. Unscrew **clockwise**

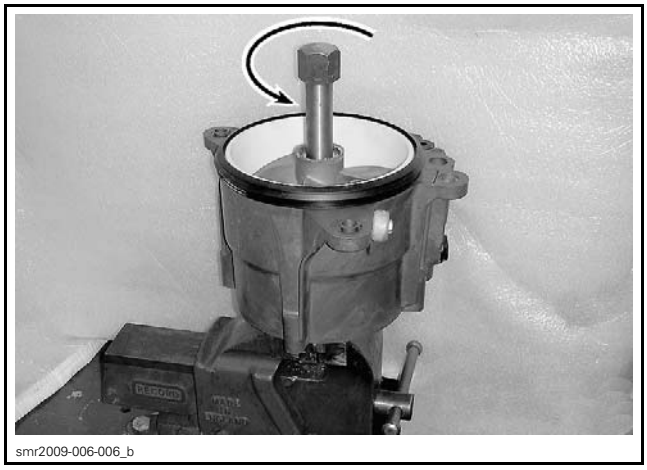
4. Mount the flat sides of impeller shaft in a vise.



TYPICAL
1. Flat side

5. Unscrew the impeller counterclockwise using the impeller remover/installer.

NOTICE **Never use an impact wrench to loosen impeller.**

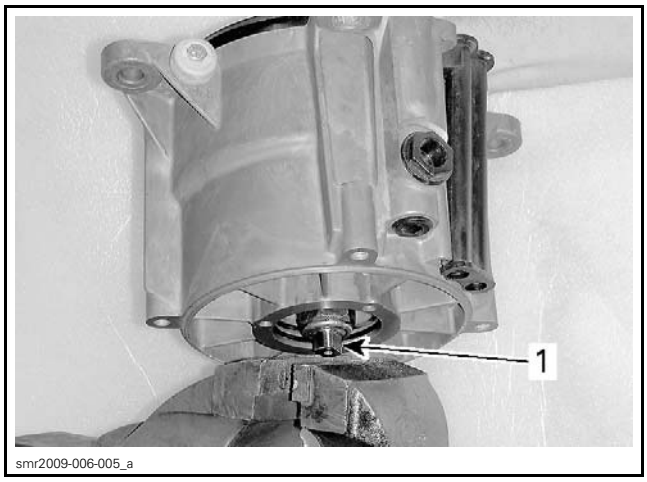


TYPICAL

6. To pull impeller out of the pump, apply a rotating movement as you pull on the impeller.

Installing the Impeller

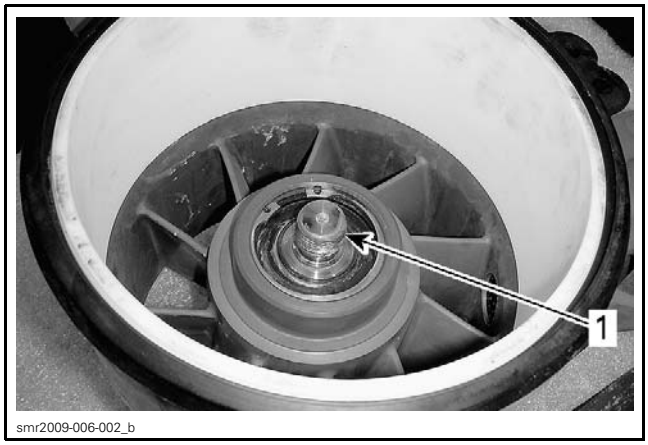
1. Mount the flat sides of the impeller shaft in a vise.



TYPICAL
1. Flat side

2. Apply antiseize lubricant on threads of impeller shaft.

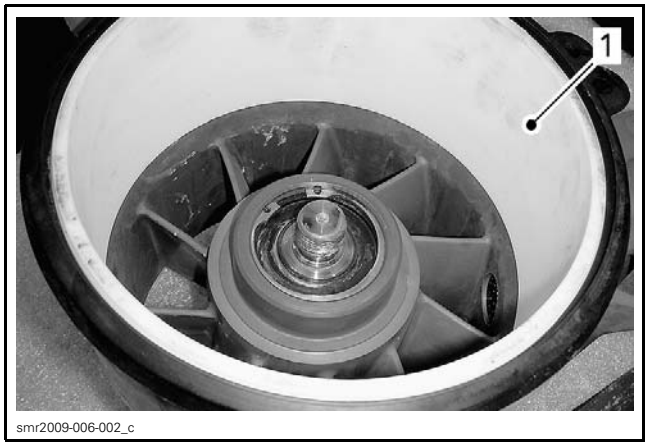
SERVICE PRODUCT
LOCTITE 767 (ANTI-SEIZE LUBRICANT) (P/N 293 800 070)



TYPICAL
1. Antiseize lubricant

3. Apply Lubricant and anti-corrosive on the wear ring surface.

SERVICE PRODUCTS	
Scandinavia	LUBRICANT AND ANTI-CORROSIVE (EUR) (P/N 779224)
All other countries	LUBRICANT AND ANTI-CORROSIVE (P/N 779168)



TYPICAL
1. Spray XPS lube on this surface

4. Start screwing the impeller on its shaft.



TYPICAL

5. Mount the impeller remover/installer in impeller splines.
6. Tighten impeller to specification.

NOTICE Never use an impact wrench to tighten impeller shaft.

TIGHTENING TORQUE	
Impeller	125 N•m ± 10 N•m (92 lbf•ft ± 7 lbf•ft)

Remove tool.

7. Apply Loctite on impeller boot threads.
8. Apply grease inside impeller boot.

SERVICE PRODUCTS
LOCTITE 438 (P/N 296 000 424)
TRIPLE-GUARD GREASE (P/N 508298)

9. Install impeller boot on impeller and tighten **counterclockwise**.

WEAR RING

Inspecting the Wear Ring

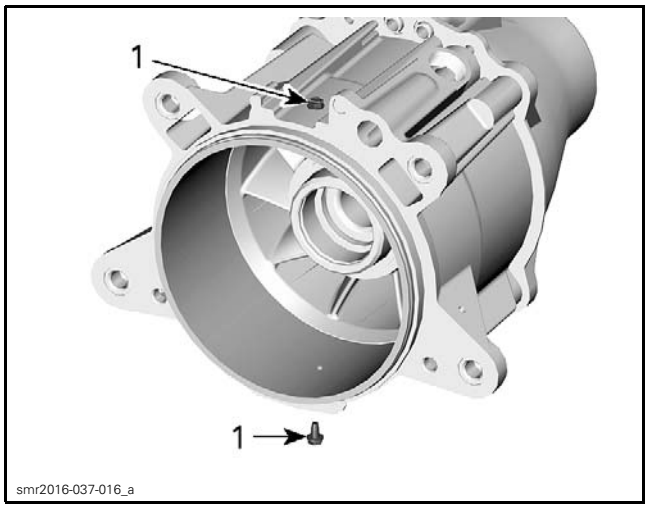
Check wear ring for:
– Deep scratches
– Irregular surface
– Any apparent damage.

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

Removing the Wear Ring

1. Remove jet pump housing. Refer to *JET PUMP HOUSING* in this subsection.
2. Remove impeller, refer to *IMPELLER* in this subsection.

3. **On models equipped with the 230 engine**, remove screws securing the wear ring.



1. Wear ring screws

Two methods can be used to remove the wear ring, use the most appropriate as your situation.

Method Using a Freezer

1. Place the jet pump housing and the new wear ring in a freezer for approximately 1-1/2 hour at -10°C (14°F).
2. Remove the housing from the freezer and pull the wear ring out.

NOTE: The freezer method will help but the 230 wear ring will not come completely loose using this method.

Method by Cutting the Wear Ring

1. Place jet pump housing in a vise with soft jaws. It is best to clamp housing using a lower ear.
2. Cut wear ring at two places.

NOTICE **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.

3. After cutting ring, insert a screwdriver blade between jet pump housing and ring outside diameter.
4. Push ring so that it can collapse internally.
5. Pull ring out.

Installing the Wear Ring

Like the removing procedure, two methods can be used to install the wear ring, use the most appropriate as your situation.

Method Using a Freezer

While the housing is still cold, insert the new wear ring (previously placed in the freezer) in the housing.

On models equipped with the 230 engine, the wear ring must be secured by screws. Drill pilot holes in the wear ring using a #24 drill bit (5/32 in) and apply blue Loctite on screw threads.

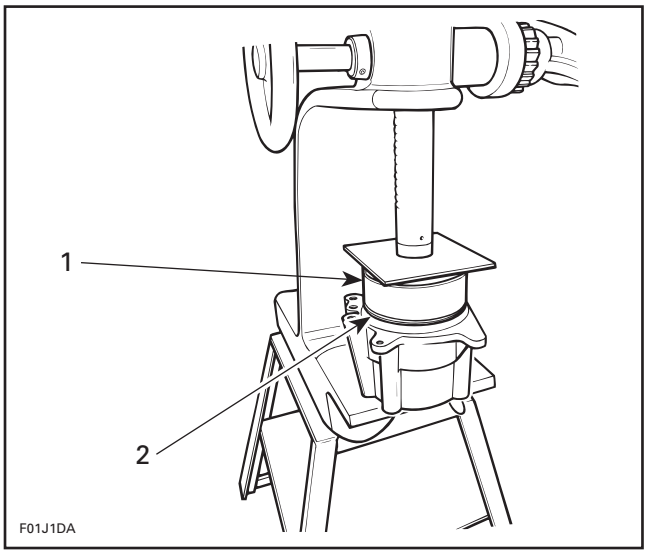
Refer to exploded view for tightening torque specifications.

SERVICE PRODUCT
LOCTITE 243 (BLUE) (P/N 293 800 060)

Method Using a Press

To install wear 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

On models equipped with the 230 engine, the wear ring must be secured by screws. Drill pilot holes in the wear ring using a #24 drill bit (5/32 in) and apply blue Loctite on screw threads.

Refer to exploded view for tightening torque specifications.

SERVICE PRODUCTS
LOCTITE 243 (BLUE) (P/N 293 800 060)

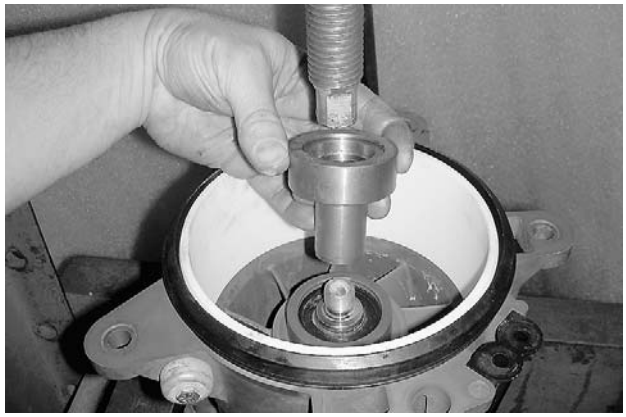
IMPELLER SHAFT, BEARING AND SEALS

Removing the Impeller Shaft, Bearing and Seals

Removing the Shaft

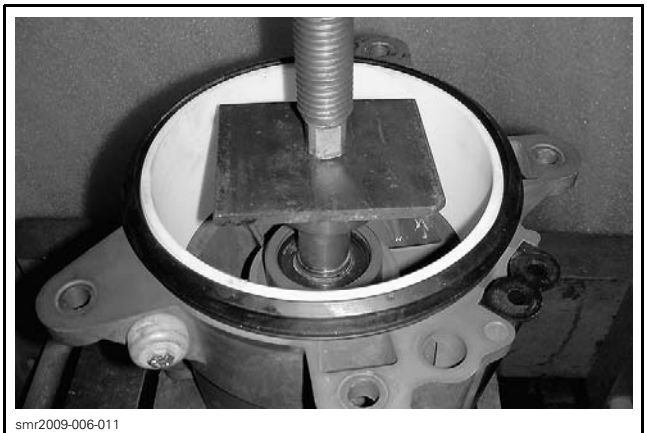
1. Remove impeller. Refer to *IMPELLER* in this subsection.
2. Use the impeller shaft pusher tool to press impeller shaft out of pump housing.

NOTE: Bearing will come out with the impeller shaft.



smr2009-006-010_a

TYPICAL

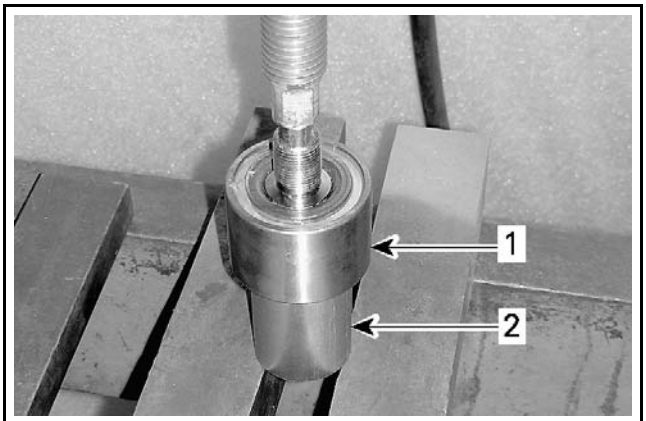


smr2009-006-011

TYPICAL

Removing the Bearing

1. Remove the bearing retaining nut.
2. Use the Impeller shaft bearing tool to press bearing off impeller shaft.

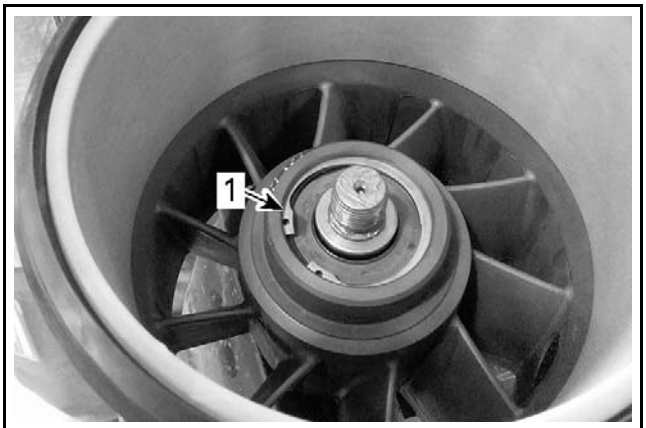


smr2009-006-012_a

TYPICAL
1. Impeller shaft and bearing
2. Bearing tool on INNER race

Removing The Seals

1. Remove and discard the circlip securing the seals.



smr2016-037-017_a

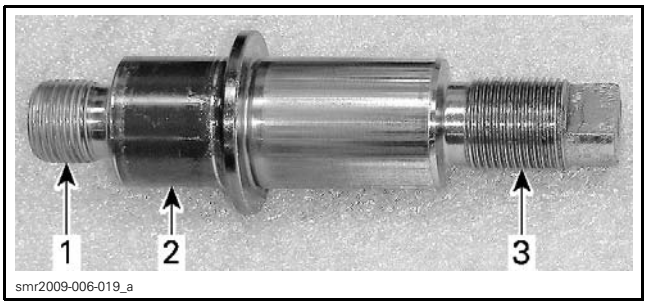
1. Circlip

2. Using an appropriate tool, press seals out of the housing.

Inspecting the Impeller Shaft and its Bearing

With your finger nail, feel seal lip contact surface on shaft. If any irregular surface is found, replace shaft and seals.

Check condition of shaft threads.



TYPICAL
1. *Threads*
2. *Seal lip contact surface*
3. *Threads*

Inspect ball bearing for corrosion.

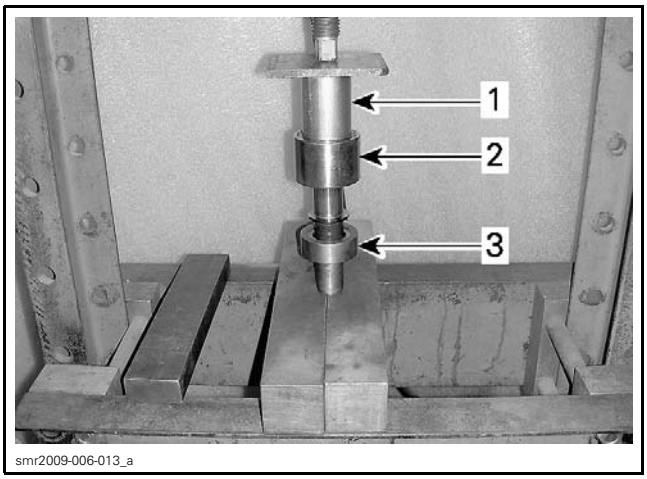
Installing the Impeller Shaft, Bearing and Seals

Installing the Bearing

The installation is essentially the reverse of the removal procedure. However, pay attention to the following.

1. Using the Impeller shaft bearing tool on the bearing inner race, press the bearing on the impeller shaft.
2. Use the Impeller shaft pusher tool to protect the impeller shaft threads.

NOTE: The bearing can be installed in either direction.



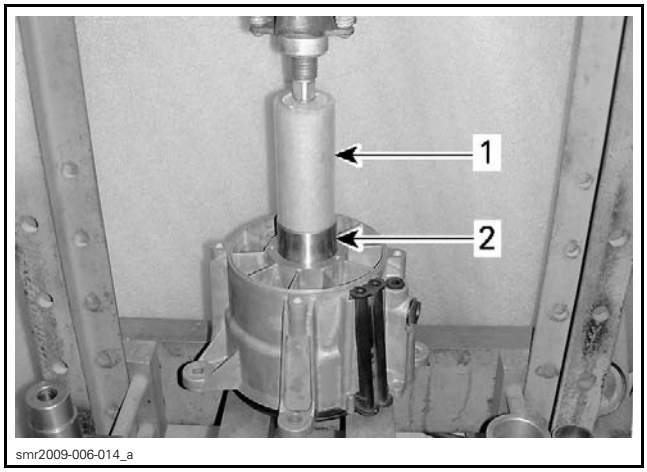
TYPICAL
1. *Impeller shaft bearing tool on INNER race*
2. *Impeller shaft and bearing*
3. *Impeller shaft installer/pusher tool*

3. Press bearing until it bottoms.

Installing the Impeller Shaft and Seals

NOTE: Ensure there is no O-ring in pump housing on the cover side.

1. From the outlet side of pump, press impeller shaft assembly into housing using the Impeller shaft bearing tool.



TYPICAL
1. *Bearing tool*
2. *Impeller shaft and bearing*

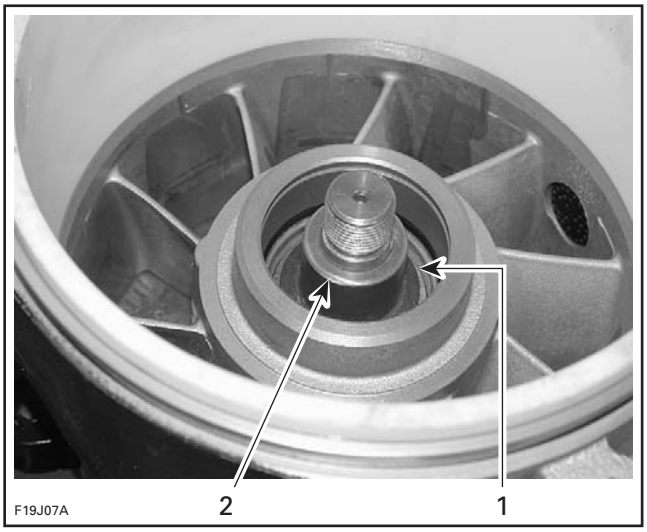
2. Press bearing until it bottoms.

NOTE: Ensure impeller shaft turns freely and smoothly.

3. Turn pump upside down.
4. Coat shaft surface and O-ring with grease.

SERVICE PRODUCT
JET PUMP BEARING GREASE (P/N 293 550 032)

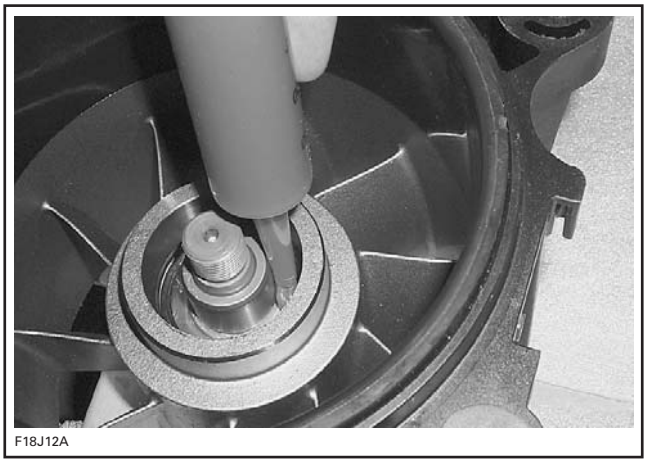
5. Install greased O-ring at bottom.



TYPICAL
1. *O-ring at bottom*
2. *Coat surface*

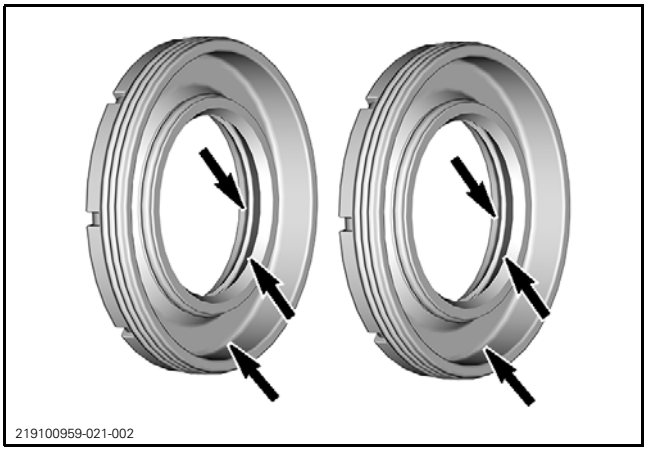
6. Apply 5 g (.2 oz) of grease on bearing.

SERVICE PRODUCT
JET PUMP BEARING GREASE (P/N 293 550 032)


F18J12A

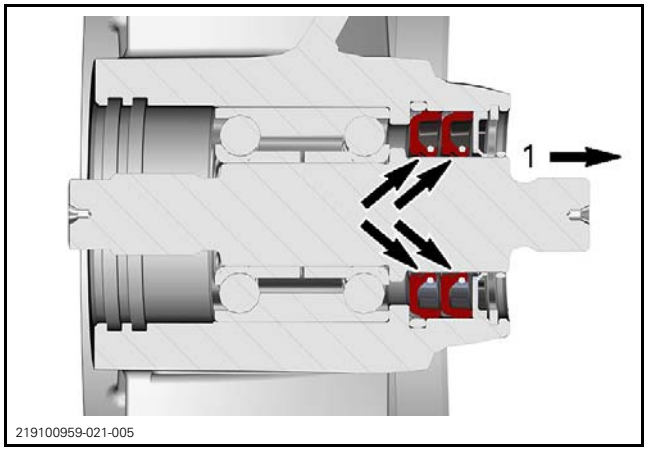
TYPICAL

7. Apply 11 g (.4 oz) of grease inside NEW double lip seal and in the seal lips.

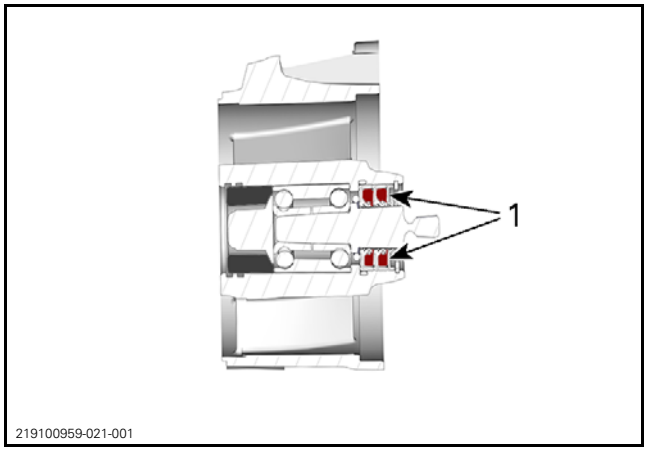


PUT GREASE IN ALL SEAL CAVITIES.

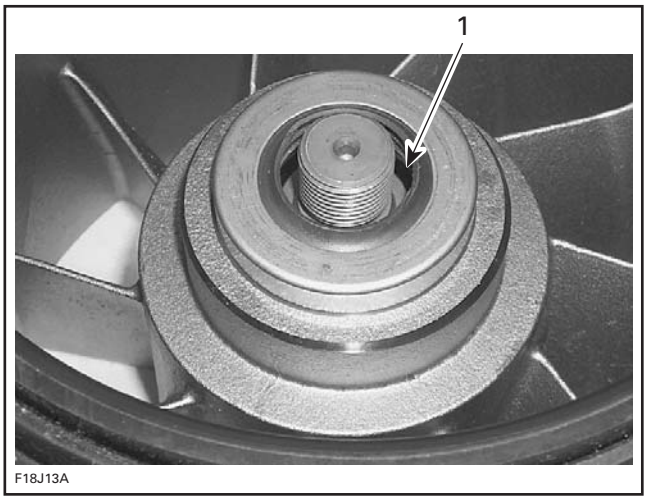
8. Install double lip seals making sure seal lip are facing upwards (toward impeller side).



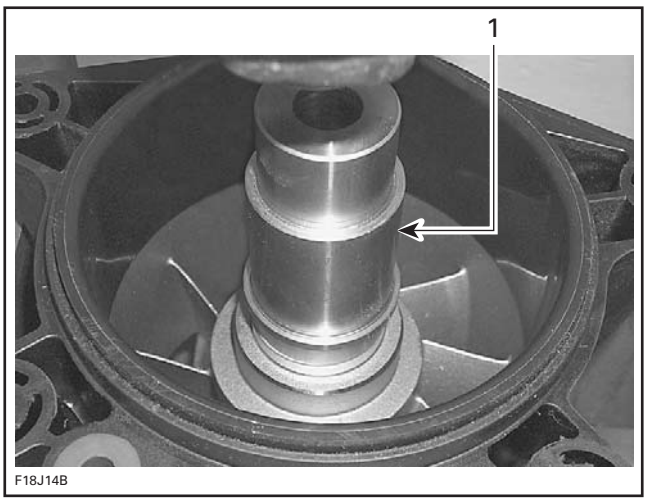
1. Toward impeller



1. Grease in seals cavities

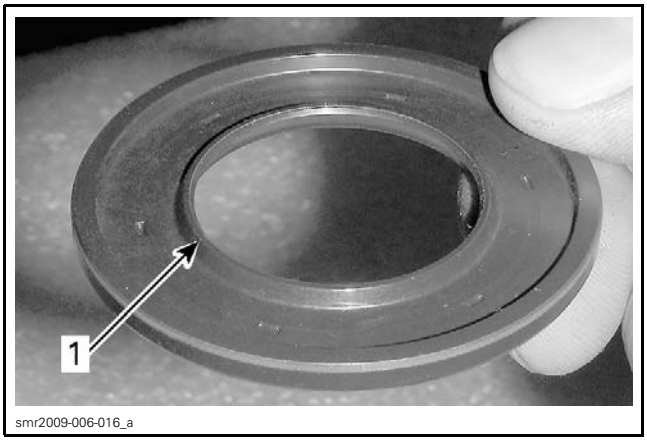


1. Seal lip facing up



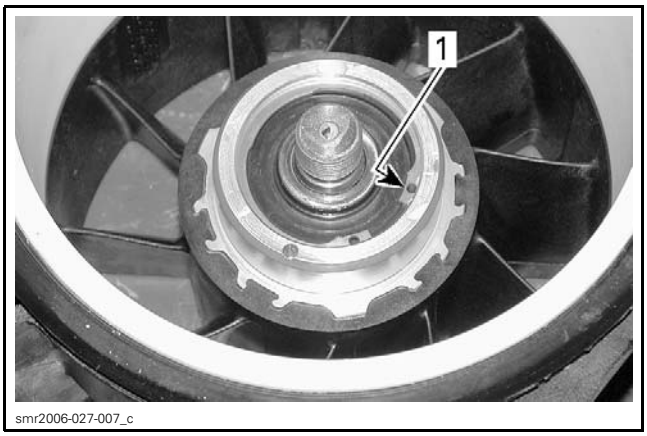
TYPICAL
1. Seal/bearing pusher

9. Install the other seal (thin). Ensure seal lip is facing up.



1. Seal lip facing up

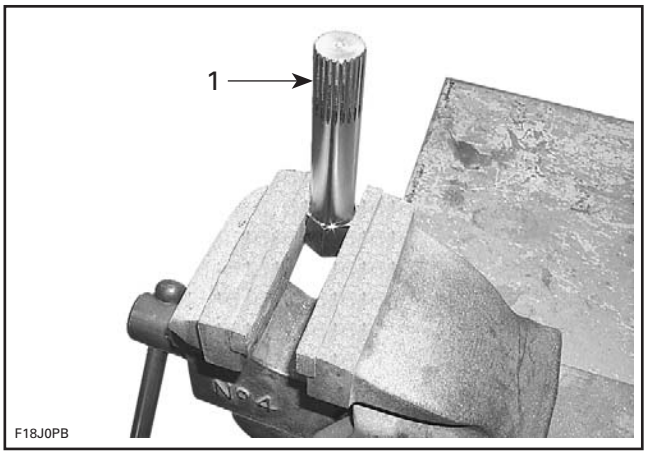
10. Install circlip.



TYPICAL
1. Circlip

11. Turn pump upside down.

12. Before installing any other parts, pressurize jet pump to insure proper seal installation. Refer to *LEAK TEST* in this subsection.
13. Install impeller. Refer to *IMPELLER* in this subsection.
14. Mount in a vise the impeller remover/installer.



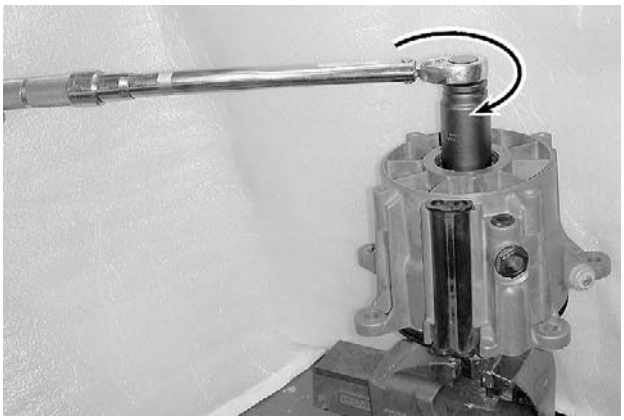
1. Impeller remover/installer tool

15. Install jet pump housing over tool.



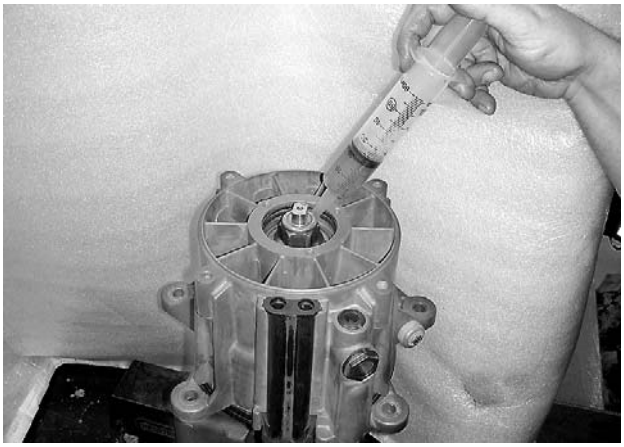
TYPICAL

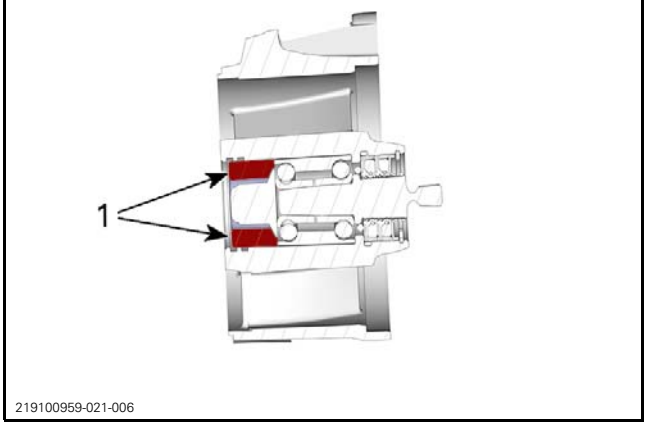
16. Using a 30 mm socket, screw the impeller shaft nut on clockwise.
17. Tighten nut as specified in exploded view.


smr2009-006-009_b

18. Apply 30 g (1.1 oz) of grease around nut.

SERVICE PRODUCT
JET PUMP BEARING GREASE (P/N 293 550 032)

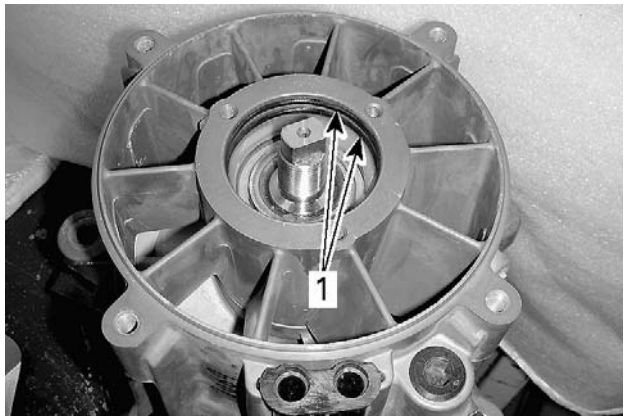

smr2009-006-018



219100959-021-006

1. Grease around nut

19. Install the two O-rings in pump housing and make sure they are properly lubricated.



smr2009-006-017_a

TYPICAL
1. O-rings

20. Install the impeller cover. Refer to *IMPELLER COVER* in this subsection.

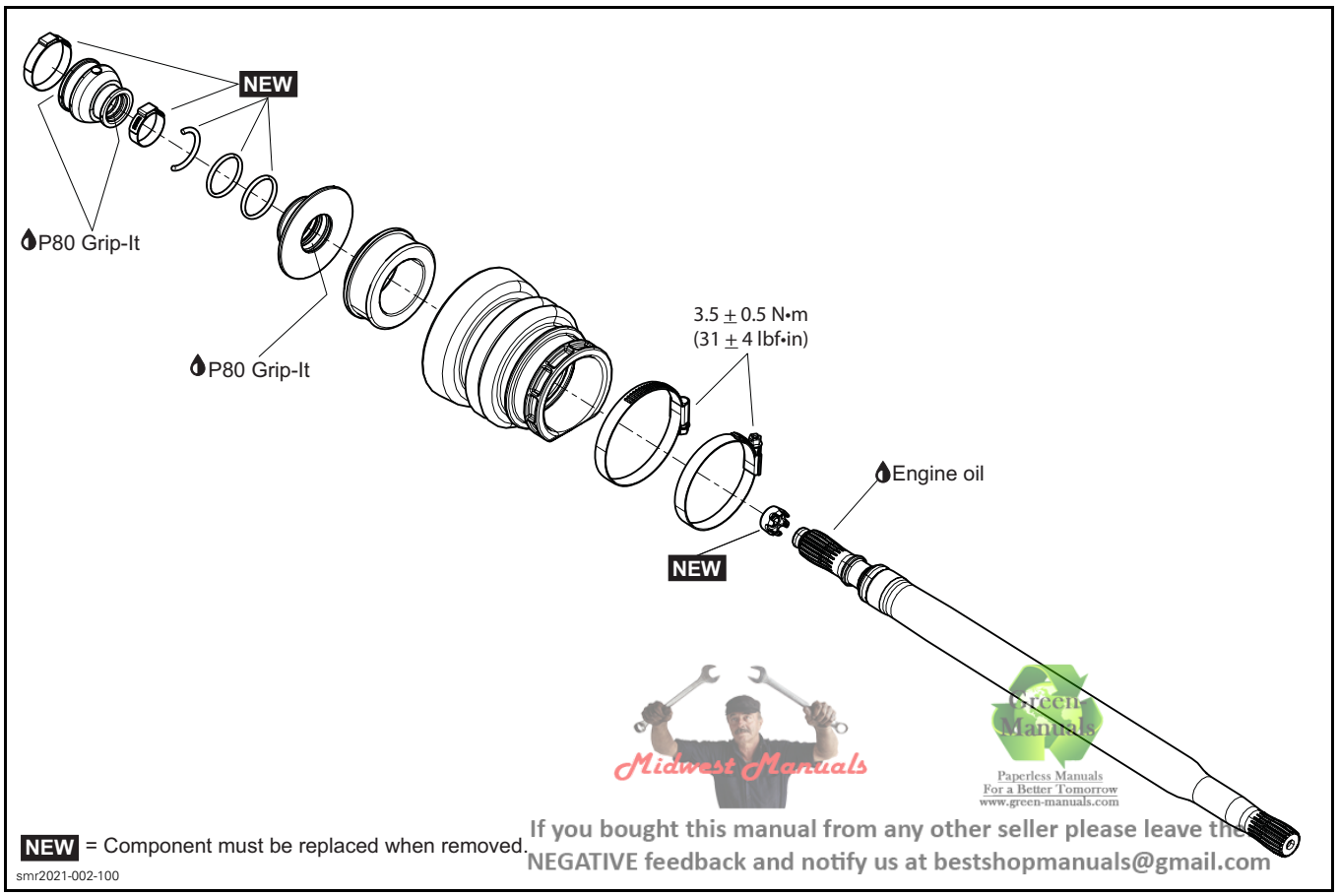
DRIVE SHAFT (900 ACE)

SERVICE TOOLS

Description	Part Number	Page
DRIVE SHAFT C-CLIP REMOVER	529 036 026	3
OETIKER PLIER	295 000 070	6

SERVICE PRODUCTS

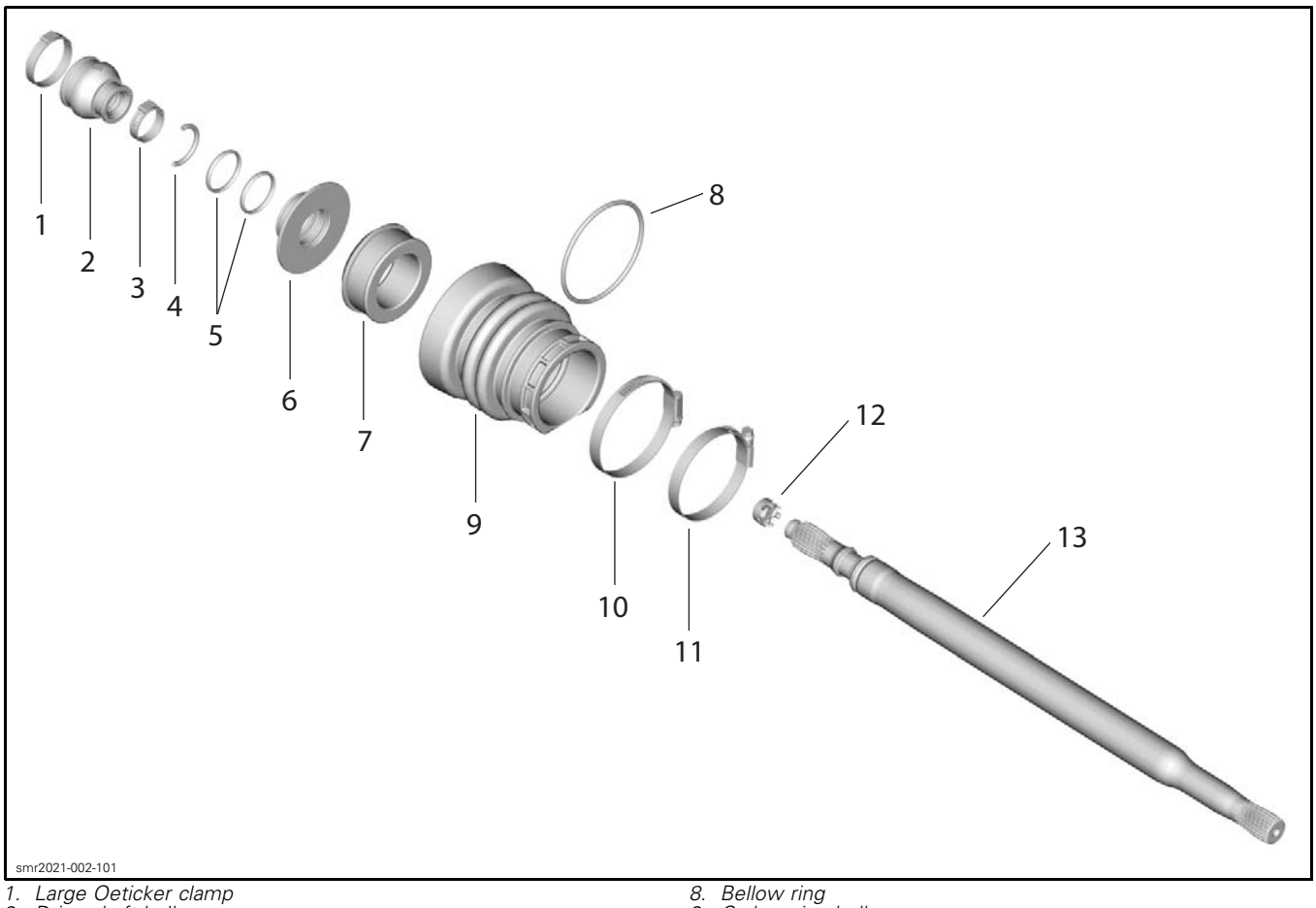
Description	Part Number	Page
P80 GRIP-IT	296 000 406	6



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GENERAL

NOMENCLATURE



1. *Large Oeticker clamp*
2. *Drive shaft bellows*
3. *Small Oeticker clamp*
4. *C clip*
5. *O-rings*
6. *Floating ring*
7. *Carbon ring*
8. *Bellow ring*
9. *Carbon ring bellows*
10. *Large gear clamp*
11. *small gear clamp*
12. *Drive shaft damper*
13. *Drive shaft*

PROCEDURES

DRIVE SHAFT

Drive Shaft Access

Spark Models

1. Remove the central body.

All Models

2. Remove muffler. Refer to *EXHAUST SYSTEM*.

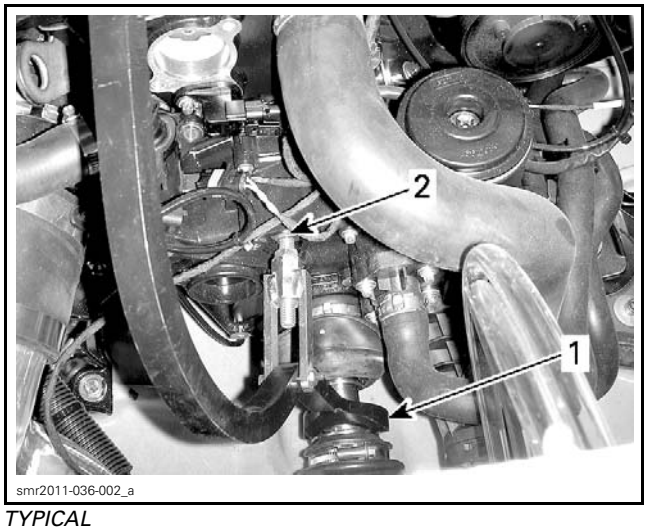
Removing the Drive Shaft

1. Confirm the floating ring is not stuck on drive shaft as follows:

REQUIRED TOOL	
DRIVE SHAFT C-CLIP REMOVER (P/N 529 036 026)	

1.1 Place the fork of drive shaft C-clip remover against floating ring.

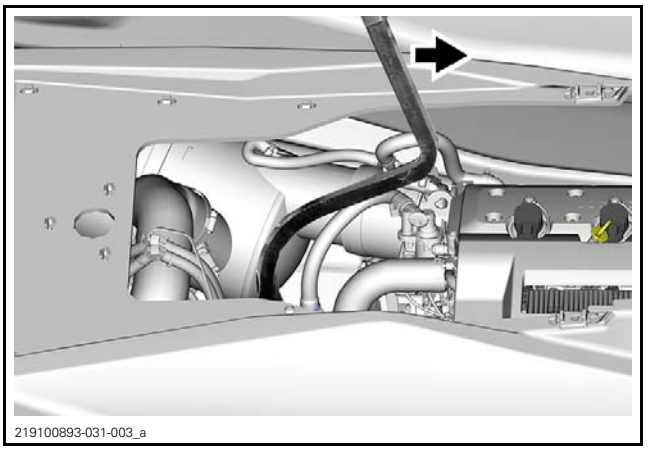
1.2 Place the adjustable arm against the engine block.



TYPICAL
1. *Fork against floating ring*
2. *Adjustable arm*

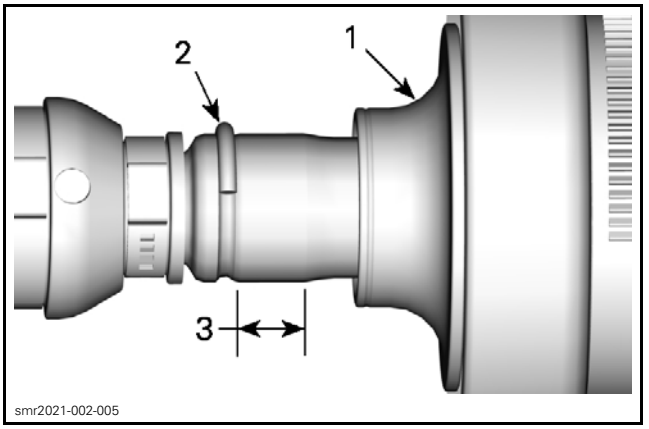
1.3 Move the tool handle toward the front of vehicle to push floating ring rearward.

NOTICE Applying too much pressure may damage the tool.



If the floating ring is stuck:

2. Have an assistant gently tap on the curved section of the tool whit a soft hammer while keep pushing on the handle, to help get the floating ring moving freely.
3. Once the floating ring has cleared the O-rings area, remove the floating ring tool.



1. *Floating ring*
2. *C-clip*
3. *O-rings contact area*

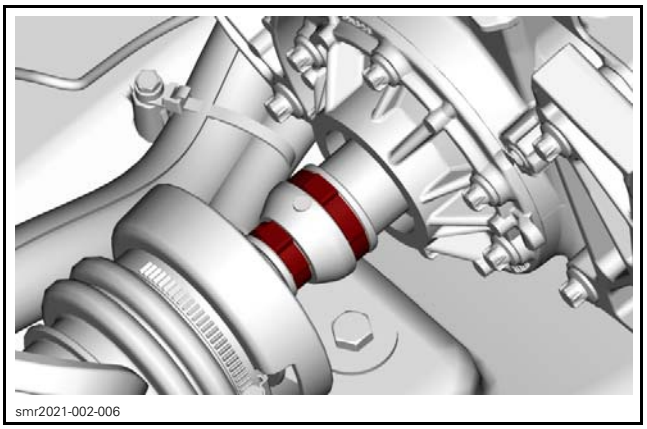
4. Remove the C-clip and discard it.
5. Lubricate the O-rings contact area.

SERVICE PRODUCT
Anti-Corrosive Lubricant

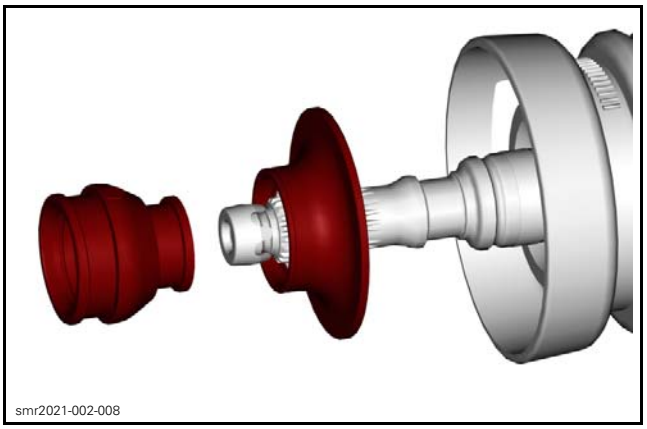
6. Place rags under PTO housing to prevent spillage. If spillage occurs, clean immediately with pulley flange cleaner to prevent oil stains.

SERVICE PRODUCT
Clutch and Pulley Flange Cleaner PRO S1

7. Remove the jet pump. Refer to *JET PUMP*.
8. Remove and discard both clamps from the drive shaft bellows.


smr2021-002-006

9. Remove the drive shaft.
   9.1 Slide the bellows and the floating ring off the drive shaft from inside the hull.

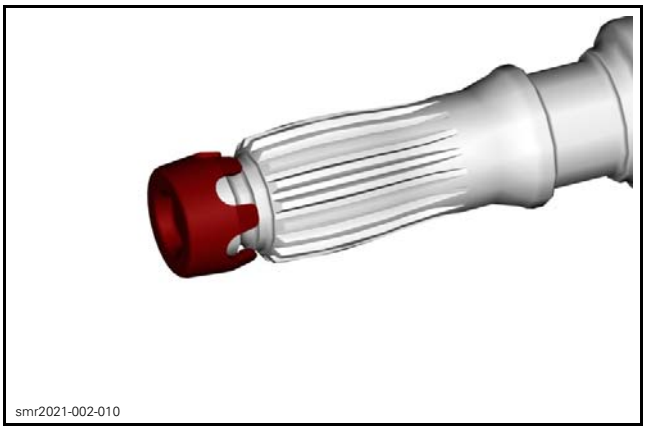

smr2021-002-008

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

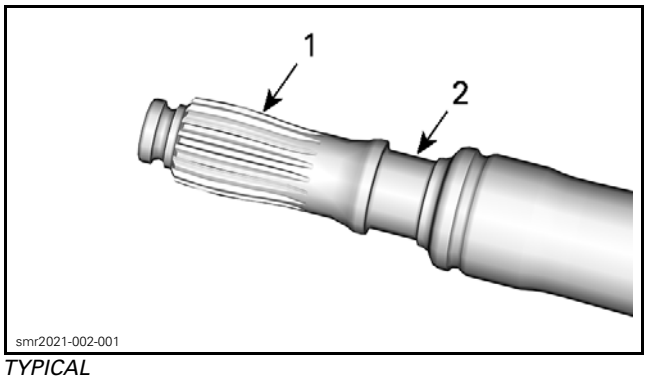
Inspecting the Drive Shaft

1. Remove and discard the drive shaft damper.

If the damper is not on the drive shaft, make sure it is not stuck inside the PTO.


smr2021-002-010

2. Inspect condition of drive shaft splines. If splines are damaged, replace drive shaft.
3. With your finger nail, feel machined surface of drive shaft. If any irregular surface is found, replace drive shaft.

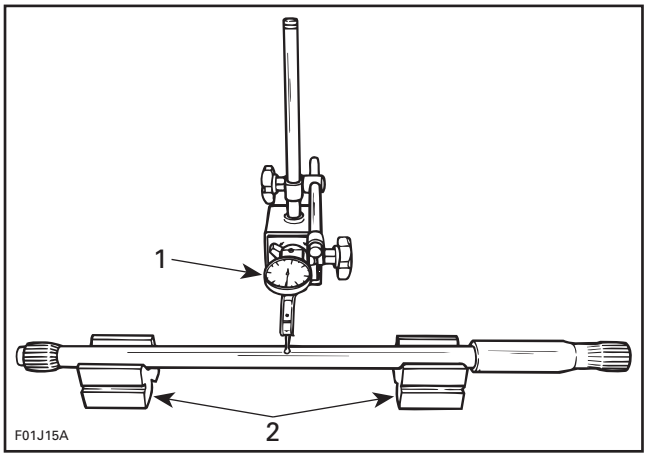


smr2021-002-001

TYPICAL
1. Splines condition
2. Surface condition

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

4. Place drive shaft on V-blocks and set-up a dial gauge in center of shaft. Slowly rotate shaft; difference between highest and lowest dial gauge reading is deflection. Refer to the following illustration.

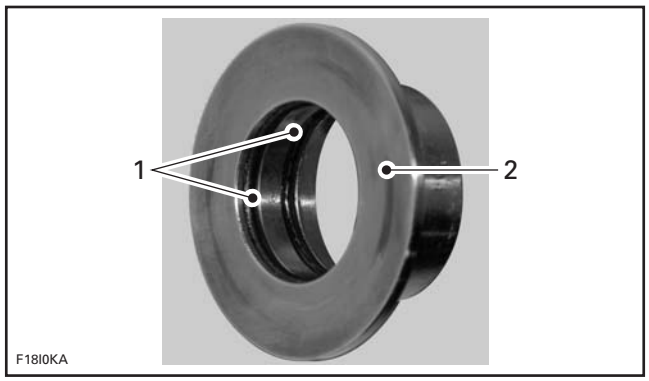


MEASURING DRIVE SHAFT DEFLECTION
1. Dial gauge
2. V-blocks

MAXIMUM DEFLECTION
0.5 mm (.02 in)

Floating Ring

1. Remove and discard the O-rings.
2. Inspect condition of the contact surface of floating ring. Replace as required.



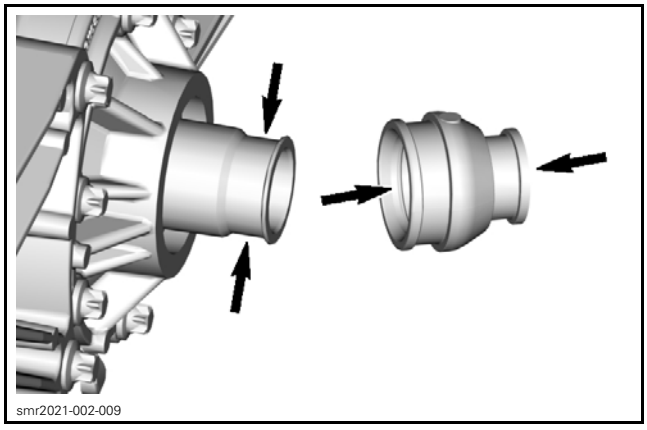
1. O-rings
2. Contact surface

Installing the Drive Shaft

NOTICE **The PTO sleeve, the floating ring and the drive shaft must be free of grease or other contaminants.**

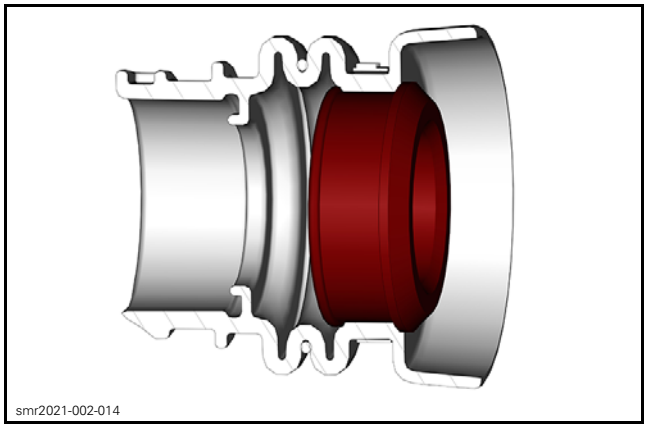
SERVICE PRODUCT
Clutch and Pulley Flange Cleaner PRO S1

1. Clean the outer flange of the PTO sleeve and the drive shaft bellows.



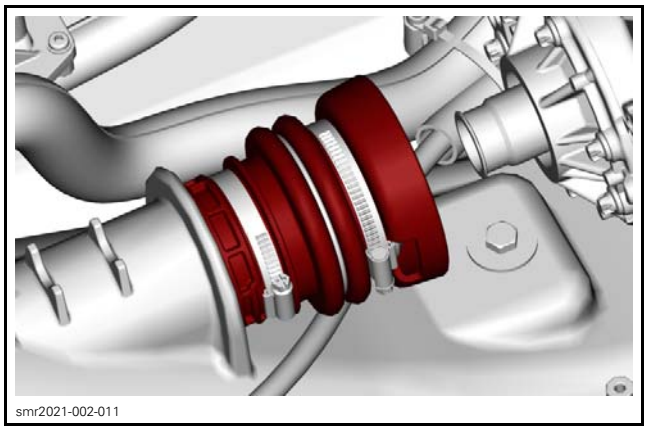
SERVICE PRODUCT
Clutch and Pulley Flange Cleaner PRO S1

2. Make sure the carbon ring is correctly installed in its bellows.



TYPICAL

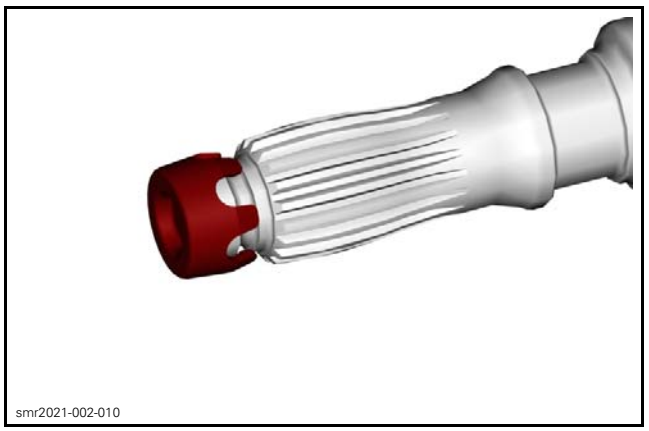
3. If the carbon ring bellows was completely removed, reinstall it on the hull.



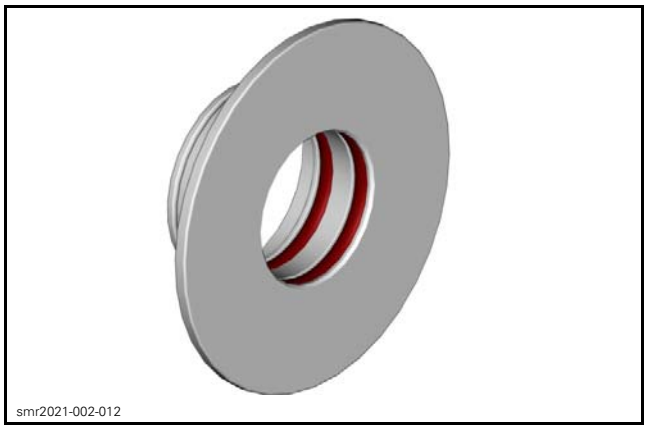
4. Tighten the gear clamps.

TIGHTENING TORQUE	
Bellows clamp	3.5 N•m ± 0.5 N•m (31 lbf•**in** ± 4 lbf•**in**)

5. Install a new damper on the drive shaft.



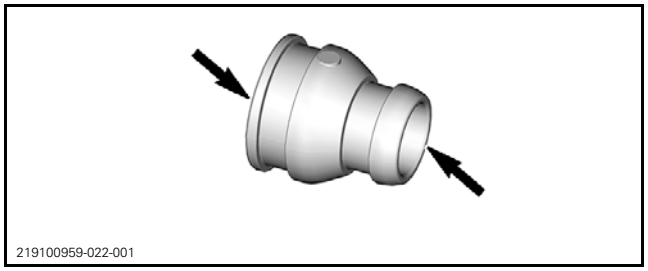
6. Pass the drive shaft through the hull.
7. Install new O-rings inside the floating ring.

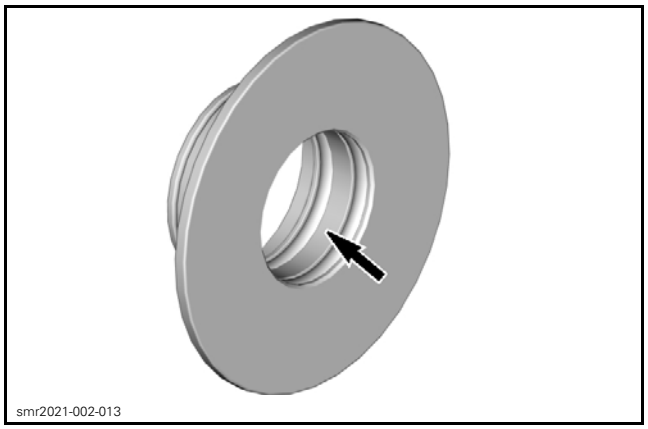

smr2021-002-012

8. Lubricate the inside of the drive shaft bellows and the floating ring.

SERVICE PRODUCT
P80 GRIP-IT (P/N 296 000 406)

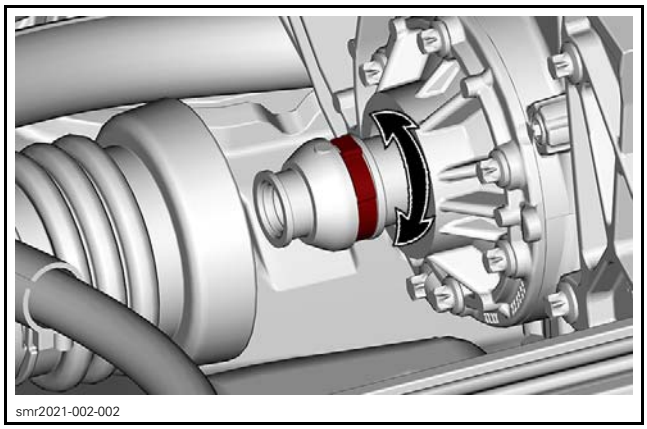
NOTICE Do not use any other type of lubricant.


219100959-022-001

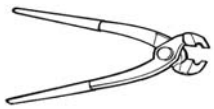

smr2021-002-013

9. Slide the floating ring onto the drive shaft. Do not install the C-clip yet.
10. Install the drive shaft bellows onto the PTO sleeve.
11. Install the large Oetiker clamp on the bellows.

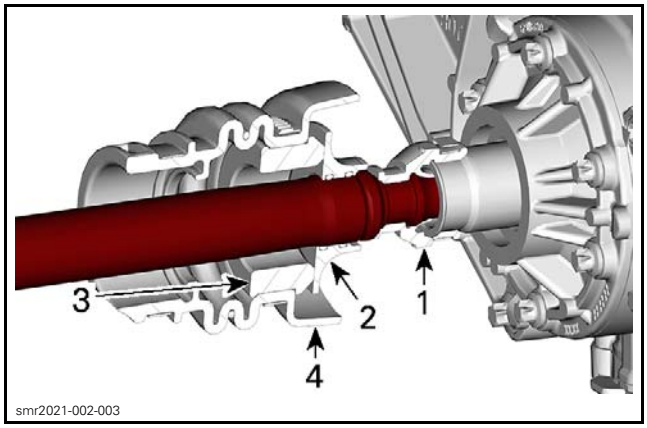
NOTICE The clamp turns only if the bellows is correctly positioned in the groove.


smr2021-002-002

12. Crimp the Oetiker clamp.

REQUIRED TOOL	
OETIKER PLIER (P/N 295 000 070)	

13. Slide the drive shaft into the PTO sleeve.

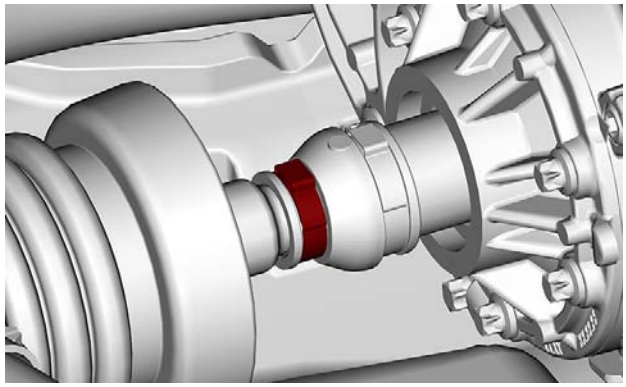


smr2021-002-003

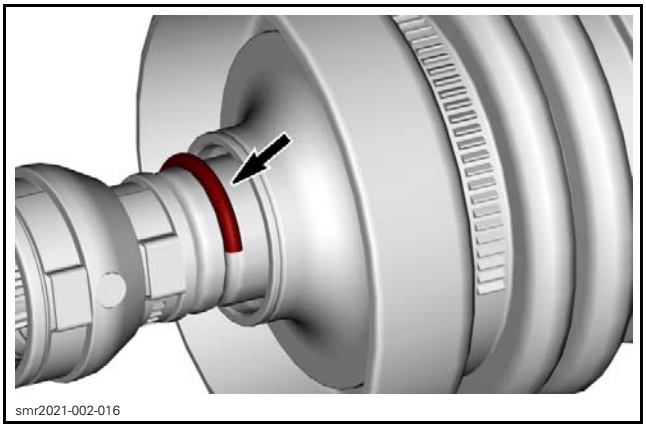
1. Drive shaft bellows
2. Floating ring
3. Carbon ring
4. Carbon ring bellows

14. Make sure the drive shaft bellows is correctly installed onto the drive shaft groove.
15. Install the small Oetiker clamp on the bellows.

NOTICE The clamp turns only if the bellows is correctly positioned in the groove.


smr2021-002-015

16. Crimp the Oetiker clamp.
17. Install a new C-clip.


smr2021-002-016

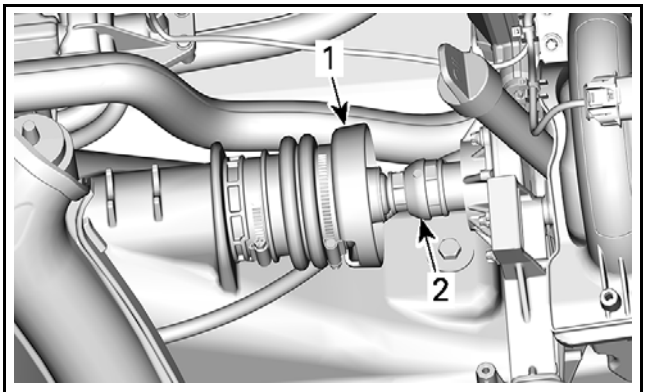
Test watercraft then ensure there is:

– No water intrusion by the thru-hull fitting area (carbon ring bellows).

CARBON RING AND DRIVE SHAFT BELLOWS

Inspecting the Bellows

1. Get access to the drive shaft. Refer to *DRIVE SHAFT ACCESS*.
2. Inspect the condition of the bellows. If there is any damage or evidence of wear, replace it.



smr2021-002-004

1. Carbon ring bellows
2. Drive shaft bellows

Removing the Bellows

Refer to *REMOVING THE DRIVE SHAFT* in this subsection.

Installing the Bellows

Refer to *INSTALLING THE DRIVE SHAFT* in this subsection.

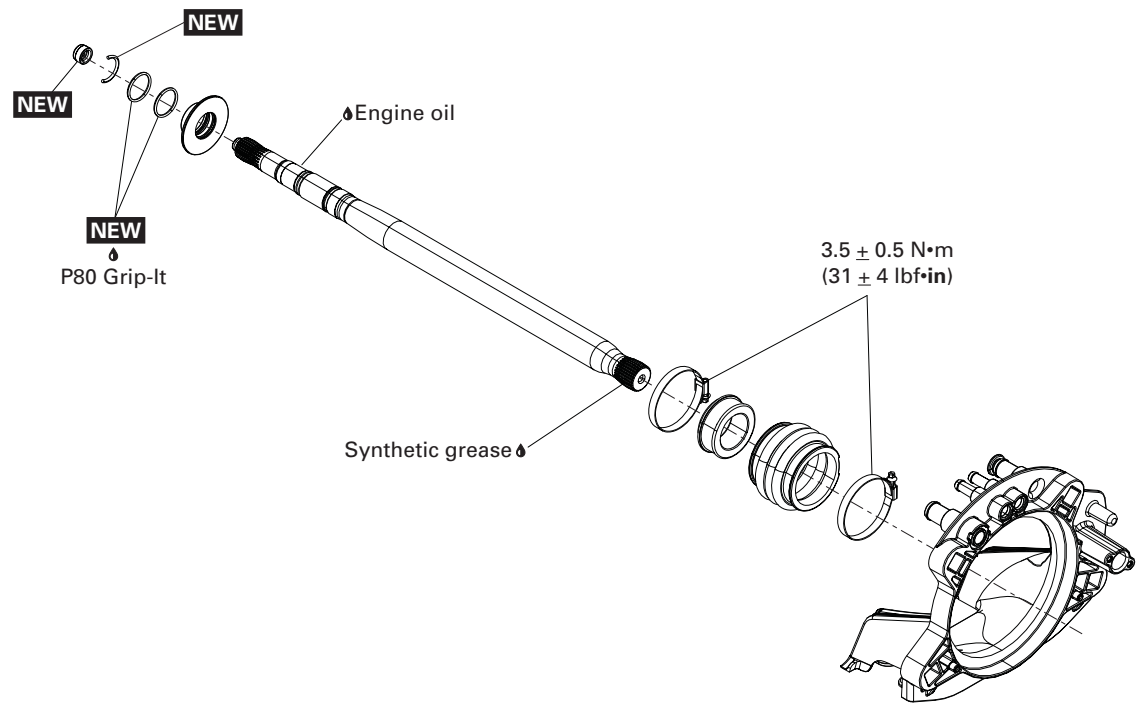
DRIVE SHAFT (1630 ACE)

SERVICE TOOLS

Description	Part Number	Page
DRIVE SHAFT C-CLIP REMOVER	529 036 026	242
FLOATING RING TOOL (TYPE II)	529 036 116	242
PTO SUPPORT TOOL	529 035 842	243, 246

SERVICE PRODUCTS

Description	Part Number	Page
CLUTCH AND PULLEY FLANGE CLEANER PRO S1	779244	244
LUBRICANT AND ANTI-CORROSIVE (EUR)	779224	243
LUBRICANT AND ANTI-CORROSIVE	779168	243
P80 GRIP-IT	296 000 406	246



NEW = Component must be replaced when removed

219100963-020-400

PROCEDURES

DRIVE SHAFT

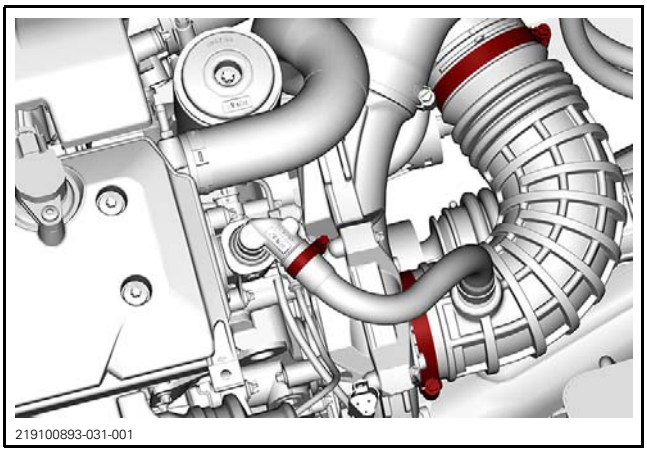
Accessing the Drive Shaft

Remove the seat and engine service cover. Refer to *BODY* subsection.

Removing the Drive Shaft

NOTE: Ensure jet pump is installed before beginning this procedure.

1. On supercharged engines, remove air intake hose.

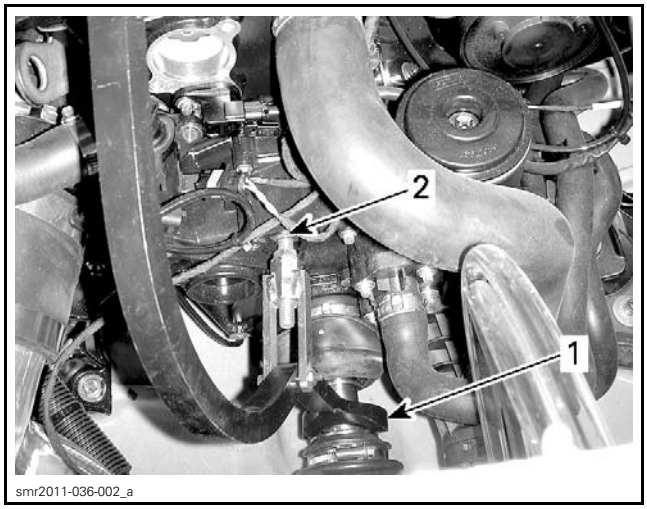

219100893-031-001

2. Lift rubber protector to expose PTO seal assembly.
3. Confirm the floating ring is not stuck on drive shaft as follows:

REQUIRED TOOL	
DRIVE SHAFT C-CLIP REMOVER (P/N 529 036 026)	

3.1 Place the fork of drive shaft C-clip remover against floating ring.

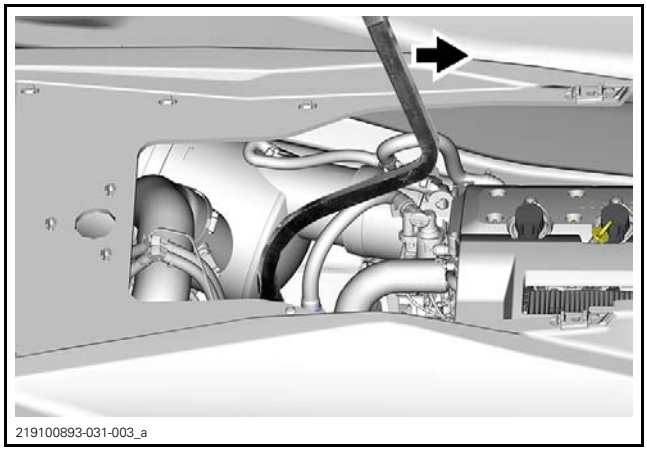
3.2 Place the adjustable arm against the engine block or the supercharger.



smr2011-036-002_a

TYPICAL
1. Fork against floating ring
2. Adjustable arm

3.3 Move the tool handle toward the front of vehicle to push floating ring rearward.

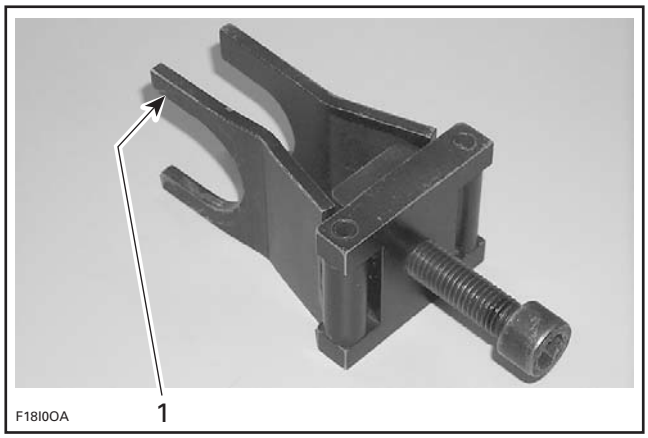

219100893-031-003_a

The next steps (4 to 12) should be performed only if the floating ring seems stuck or hard to move. Otherwise, go to the step 13.

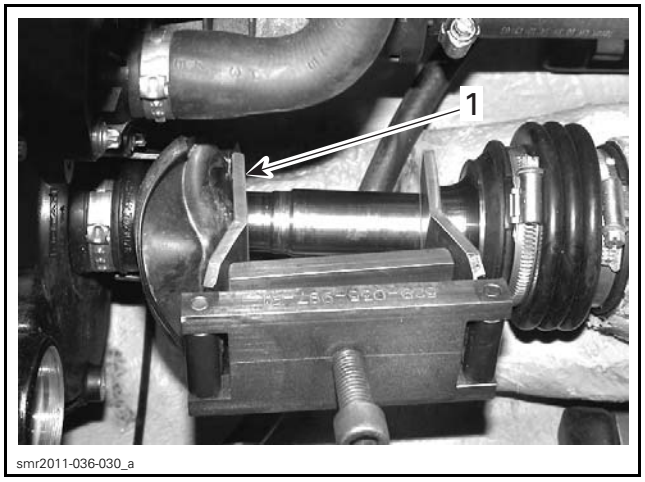
NOTE: Do not remove circlip at this time.

4. Remove the drive shaft C-clip remover.
5. If equipped, remove the supercharger. Refer to *SUPERCHARGER* subsection.
6. Install the following tool on drive shaft with its largest opening on PTO side.

REQUIRED TOOL	
FLOATING RING TOOL (TYPE II) (P/N 529 036 116)	



TYPICAL
1. Largest opening on PTO seal side



TYPICAL
1. Largest opening here

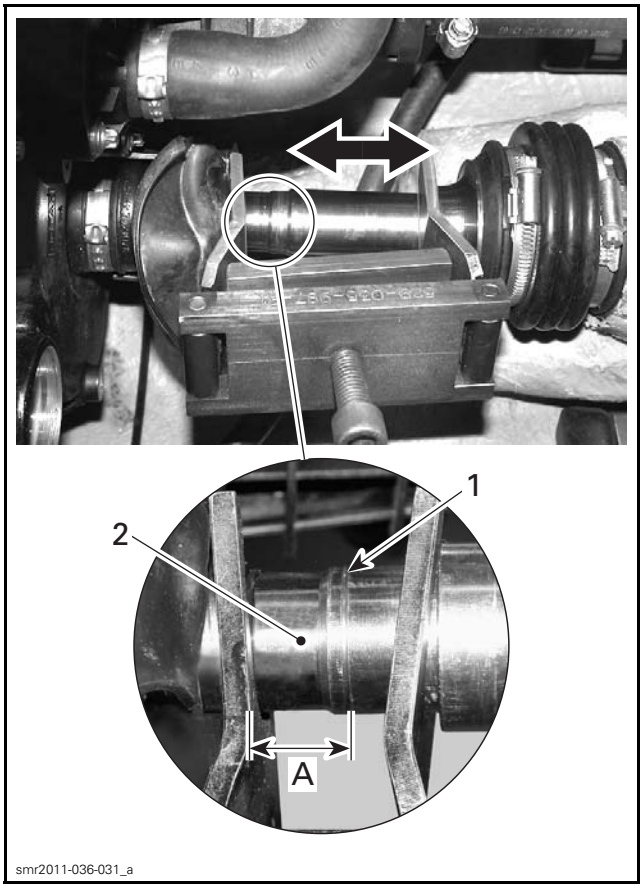
7. To expose the O-ring contact area, tighten tool screw until the following gap is obtained.

GAP BETWEEN TELLTALE GROOVE AND TOOL EDGE
18 mm (11/16 in)

8. Lubricate O-ring contact area with anti-corrosive lubricant.

SERVICE PRODUCT	
Scandinavia	LUBRICANT AND ANTI-CORROSIVE (EUR) (P/N 779224)
All other countries	LUBRICANT AND ANTI-CORROSIVE (P/N 779168)

NOTE: This is necessary to ease drive shaft removal later in this procedure.

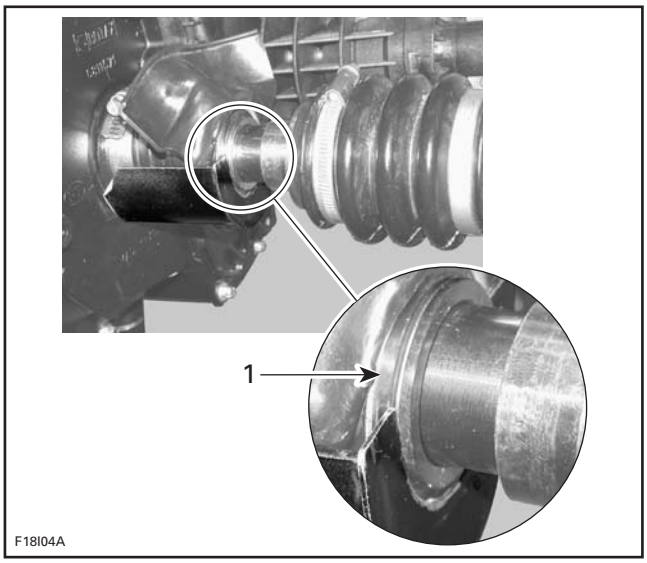


TYPICAL
1. Telltale groove
2. Lubricate this area
A. 18 mm (11/16 in)

9. Remove the floating ring tool.

10. Install the following tool to PTO seal assembly.

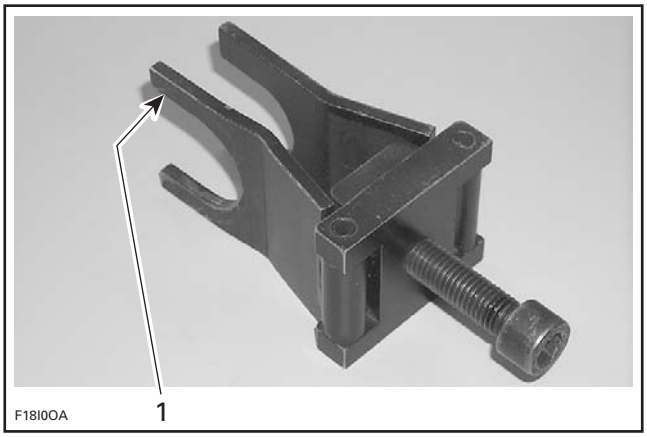
REQUIRED TOOL	
PTO SUPPORT TOOL (P/N 529 035 842)	



1. Insert in groove of PTO seal assembly

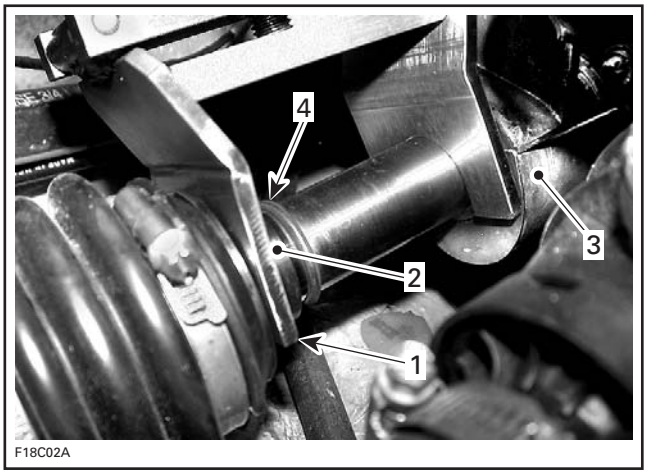
NOTICE Strictly follow this procedure otherwise damage to component might occur.

11. Reinstall the floating ring tool as shown.



TYPICAL
1. Largest opening on PTO seal side

12. Tighten tool screw to push floating ring rearward and expose circlip.
13. Remove and discard circlip.



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

14. Remove the floating ring tool.
15. Place rags under PTO housing to prevent spillage. If spillage occurs, clean immediately with pulley flange cleaner to prevent oil stains.

SERVICE PRODUCT
CLUTCH AND PULLEY FLANGE CLEANER PRO S1 (P/N 779244)

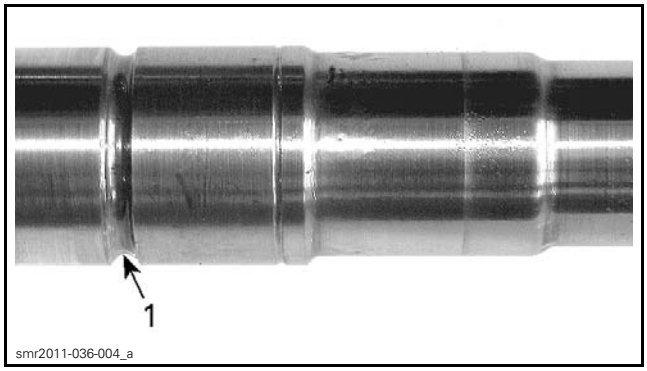
16. Remove jet pump. Refer to *JET PUMP* subsection.
17. Remove drive shaft.

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

Inspecting the Drive Shaft

Drive Shaft

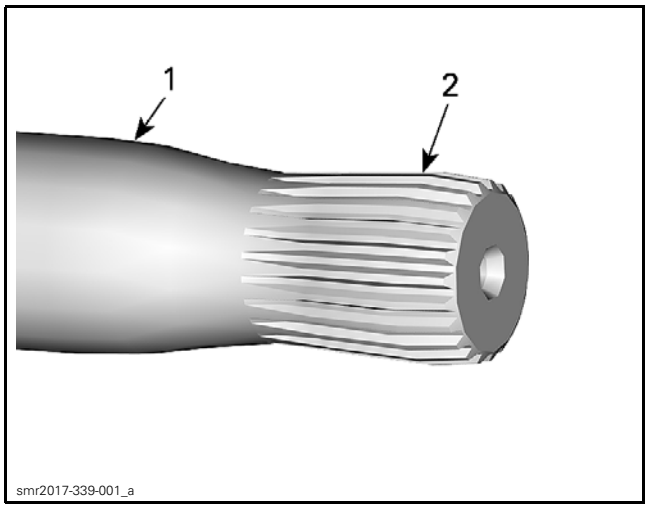
Inspect condition of circlip groove. If there is any damage or severe wear, replace drive shaft.



1. Circlip groove

Inspect condition of drive shaft splines. If splines are damaged, replace drive shaft and check splines of impeller and PTO housing.

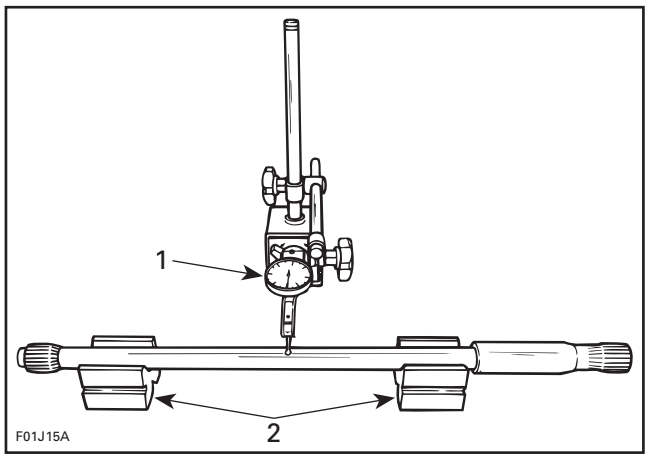
With your finger nail, feel machined surface of drive shaft. If any irregular surface is found, replace drive shaft.



TYPICAL
1. *Surface condition*
2. *Splines condition*

Place drive shaft on V-blocks and set-up a dial gauge in center of shaft. Slowly rotate shaft; difference between highest and lowest dial gauge reading is deflection. Refer to the following illustration.

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



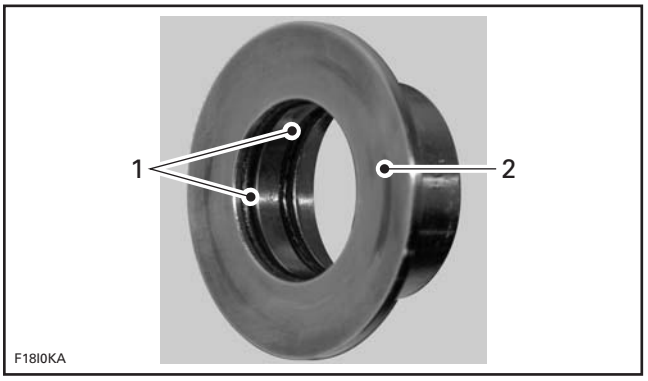
MEASURING DRIVE SHAFT DEFLECTION
1. *Dial gauge*
2. *V-blocks*

MAXIMUM DEFLECTION
0.5 mm (.02 in)

Floating Ring

Inspect condition of O-rings and contact surface of floating ring.

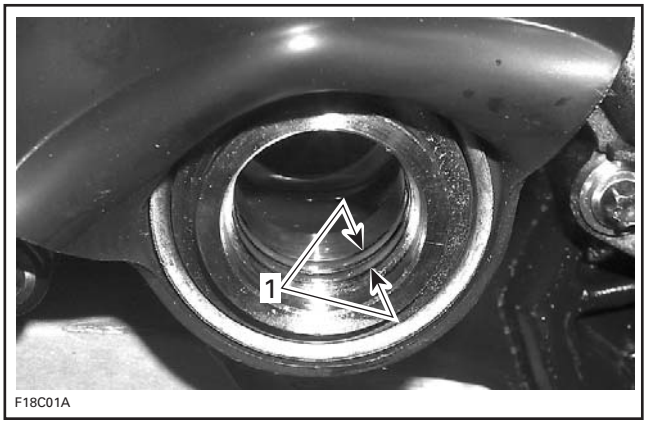
Replace as required.



1. *O-rings*
2. *Contact surface*

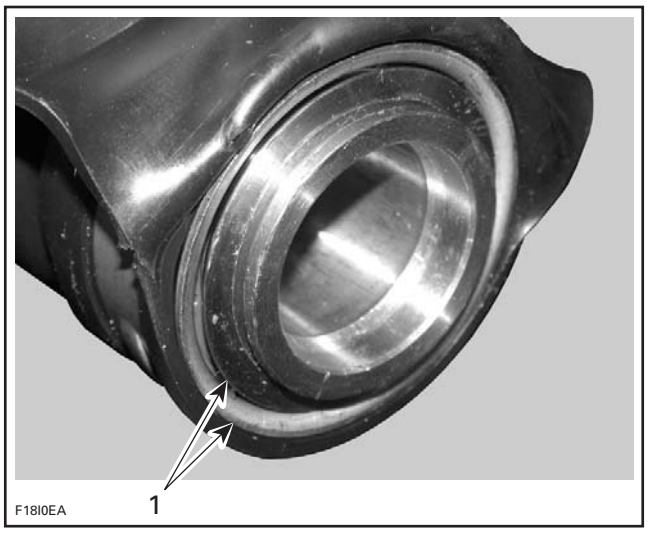
Installing the Drive Shaft

Before installing drive shaft, discard both O-rings inside PTO seal and install NEW ones.

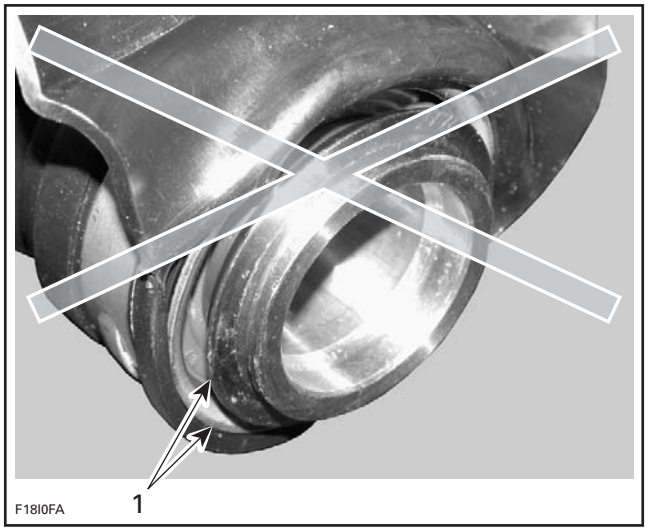


1. *O-rings*

Inspect PTO seal assembly. The inner sleeve must be flush with outer circumference of the assembly. Otherwise, gently push or tap on inner sleeve until flush.

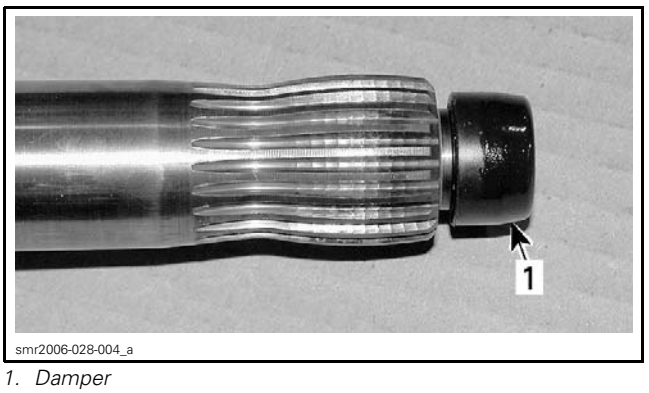


CORRECT POSITION
1. Inner sleeve flush with outer circumference



INCORRECT POSITION
1. Inner sleeve not flush with outer circumference

Remove the damper at the end of drive shaft and replace it with a NEW one.



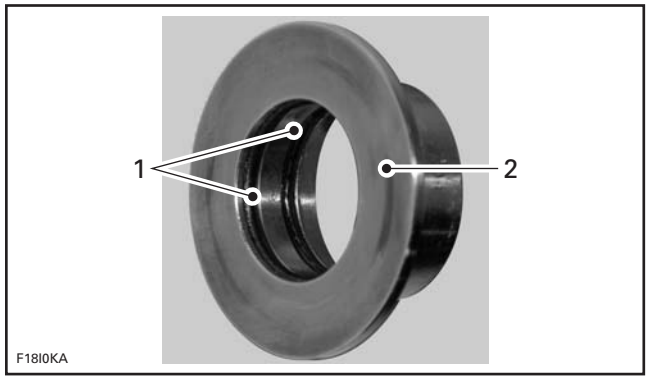
1. Damper

Install the PTO support tool on PTO seal assembly.

REQUIRED TOOL
PTO SUPPORT TOOL (P/N 529 035 842) 

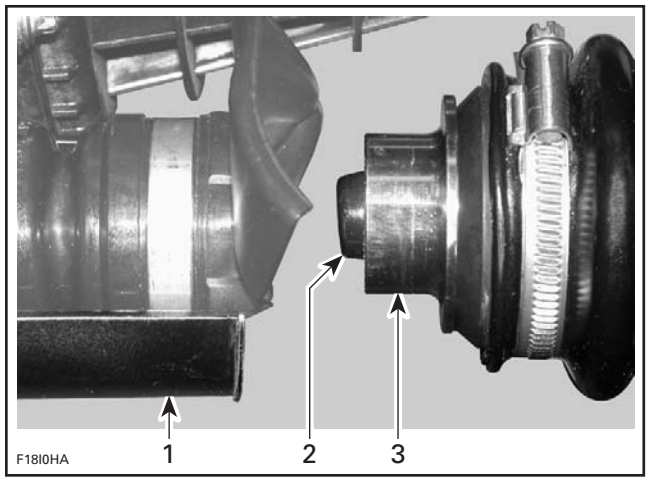
Apply a thin coat of Grip-it on the floating ring O-rings. Do not get grease on floating ring contact surface.

SERVICE PRODUCT
P80 GRIP-IT (P/N 296 000 406)



1. P80 Grip-it on O-rings
2. No lubrication on contact surface

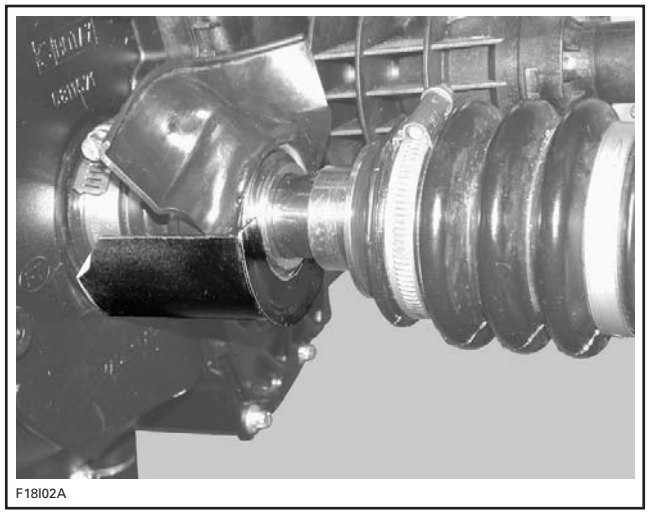
Slide drive shaft far enough to install floating ring.



1. PTO seal support
2. Drive shaft end
3. Insert floating ring on shaft end

Continue pushing drive shaft towards engine carefully guiding it in the PTO seal then in crankshaft splines. It may be necessary to move PTO seal assembly up and down to position it in the same axis as the drive shaft.

NOTE: If drive shaft does not enter into the PTO seal, check engine alignment.

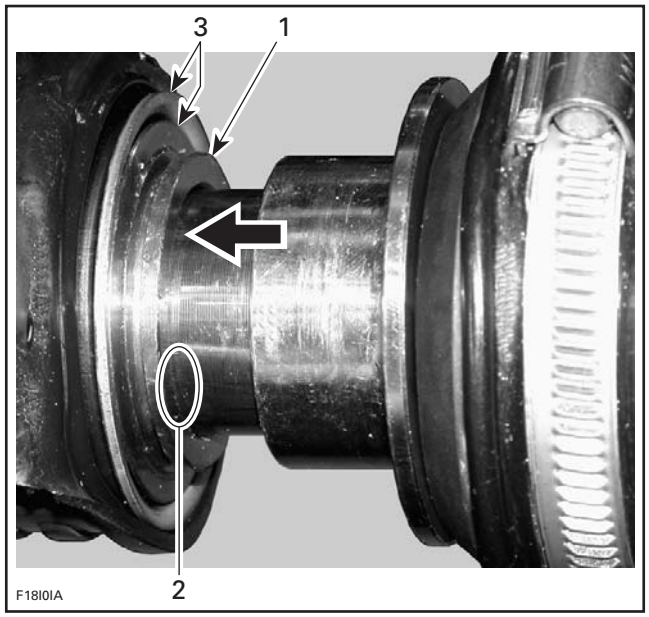


TYPICAL

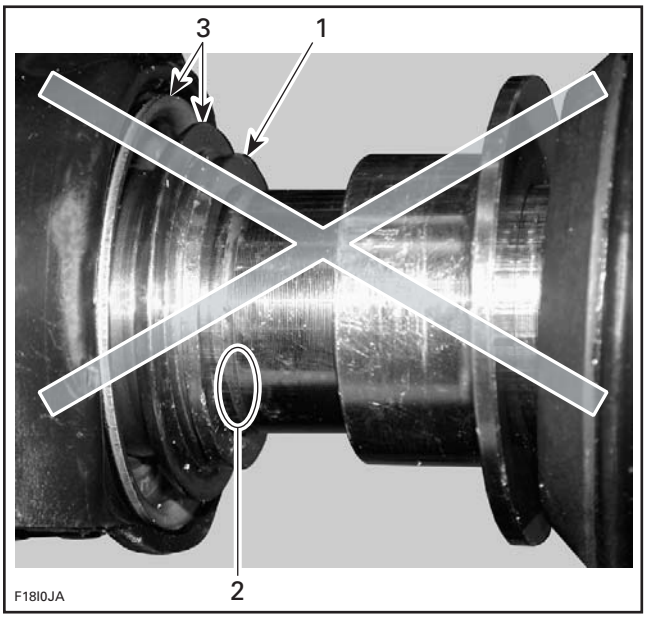
Maintain PTO seal assembly in the proper position and tap shaft end until it bottoms against engine.

At this time, the telltale groove MUST NOT be visible. This validates the correct position.

NOTICE **If the telltale groove is exposed, the installation is wrong and PTO seal assembly will be pressed into crankshaft splines which could rub a hole in seal thus creating an oil leak.**



CORRECT INSTALLATION
1. *PTO seal assembly*
2. *Shaft pushed in, hiding telltale groove*
3. *Inner sleeve flush with outer circumference*



IMPROPER INSTALLATION
1. *PTO seal assembly*
2. *Telltale groove visible*
3. *Inner sleeve NOT flush with outer circumference*

Temporarily install the jet pump housing.

Push floating ring rearwards and install a NEW circlip.

Ensure everything is properly positioned:
- Telltale groove is not visible
- Inner sleeve is flush with outer circumference of PTO seal assembly
- Circlip is not exposed.

If telltale groove is visible, pull PTO seal assembly rearwards to fully extend it.

If inner sleeve is not flush, gently tap it until it is flush.

Reposition rubber protector.

Permanently install jet pump. Refer to *JET PUMP* subsection.

Test watercraft then ensure there is:
- No oil leak in PTO seal area
- No water intrusion by the thru-hull fitting area.

DRIVE SHAFT BELLOWS

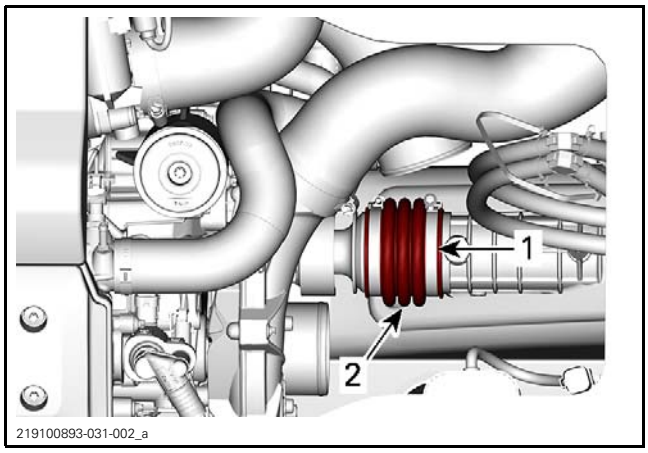
Inspecting the Drive Shaft Bellows

Inspect the condition of bellows. If there is any damage or evidence of wear, replace it.

Removing the Drive Shaft Bellows

Remove drive shaft. Refer to *REMOVING THE DRIVE SHAFT* in this subsection.

Loosen gear clamp holding bellows, then carefully pull bellows and carbon ring from hull insert.



TYPICAL
1. Loosen this clamp
2. Drive shaft bellows

Installing the Drive Shaft Bellows

The installation is the reverse of the removal procedure.

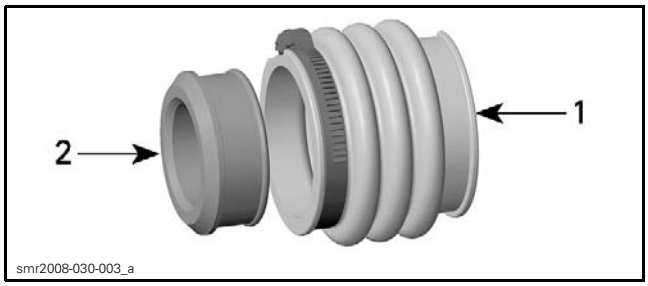
CARBON RING

Removing the Carbon Ring

NOTE: Always replace the floating ring when replacing the carbon ring.

Remove drive shaft bellows. Refer to *REMOVING THE DRIVE SHAFT BELLOWS* in this subsection.

Loosen gear clamp then pull carbon ring from drive shaft bellows.



1. Drive shaft bellows
2. Carbon ring

Installing the Carbon Ring

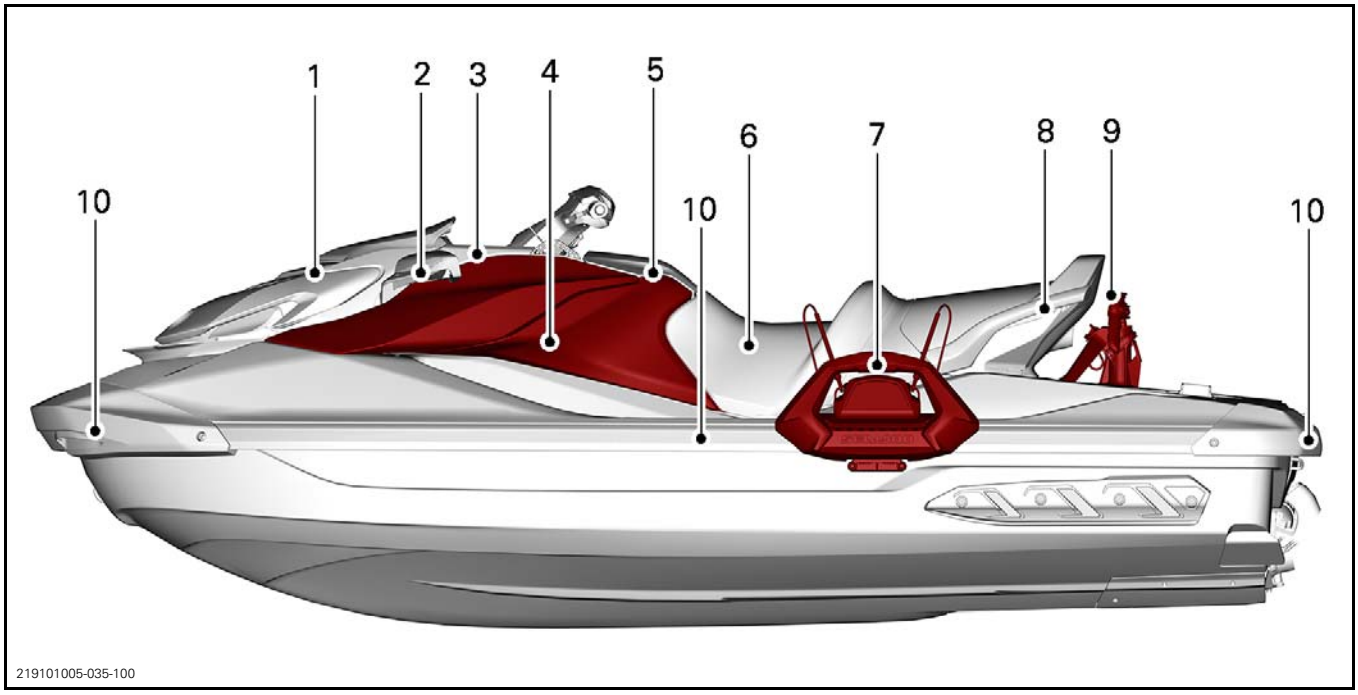
The installation is the reverse of the removal procedure.

BODY

SERVICE PRODUCTS

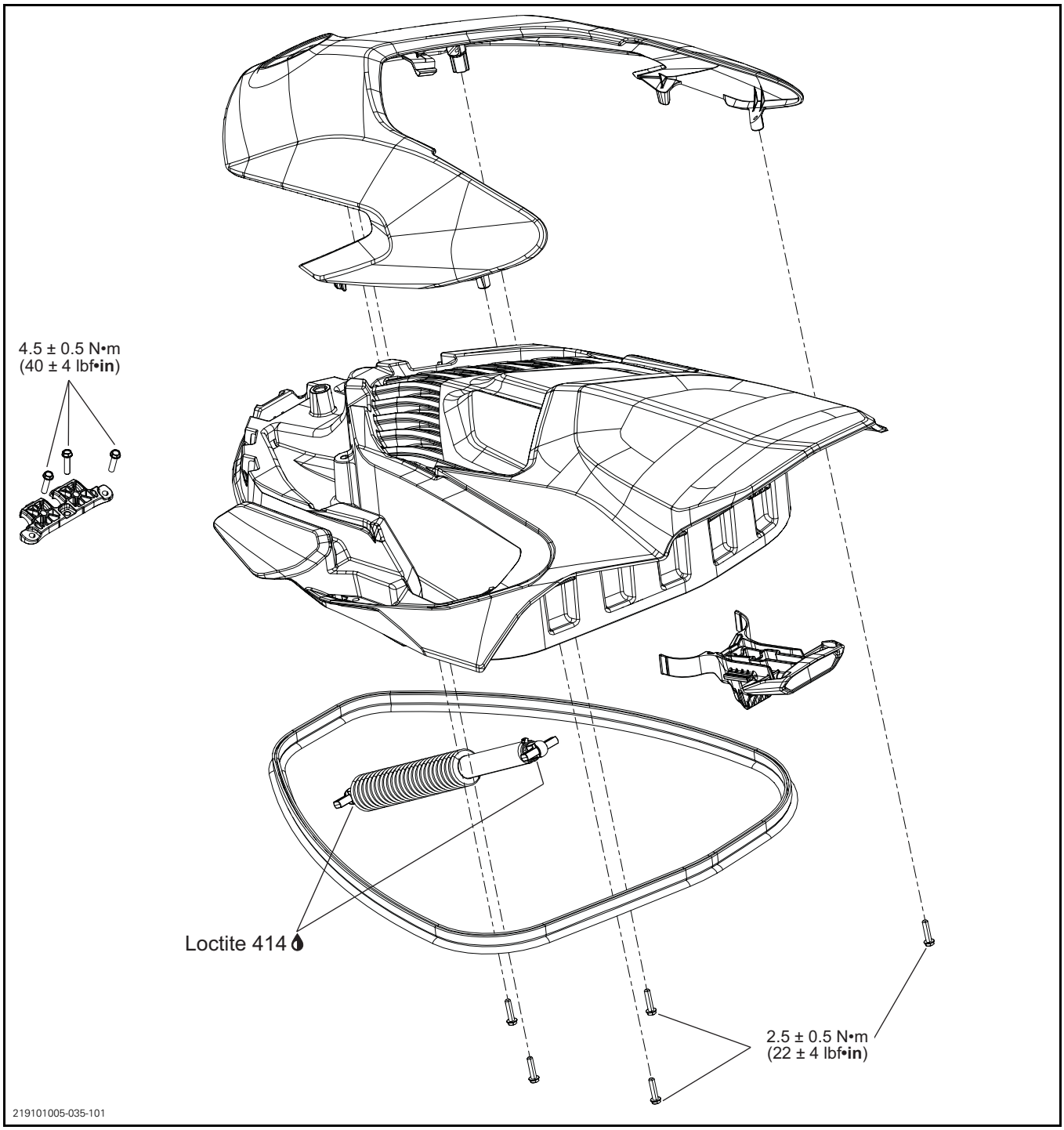
Description	Part Number	Page
LOCTITE 414	413 705 800	257
LOCTITE 5900	293 800 066	259, 264, 270
SYNTHETIC GREASE (EUR)	779231	266–267
SYNTHETIC GREASE	779162	266–267

BODY PARTS NOMENCLATURE (WAKE MODEL SHOWN)

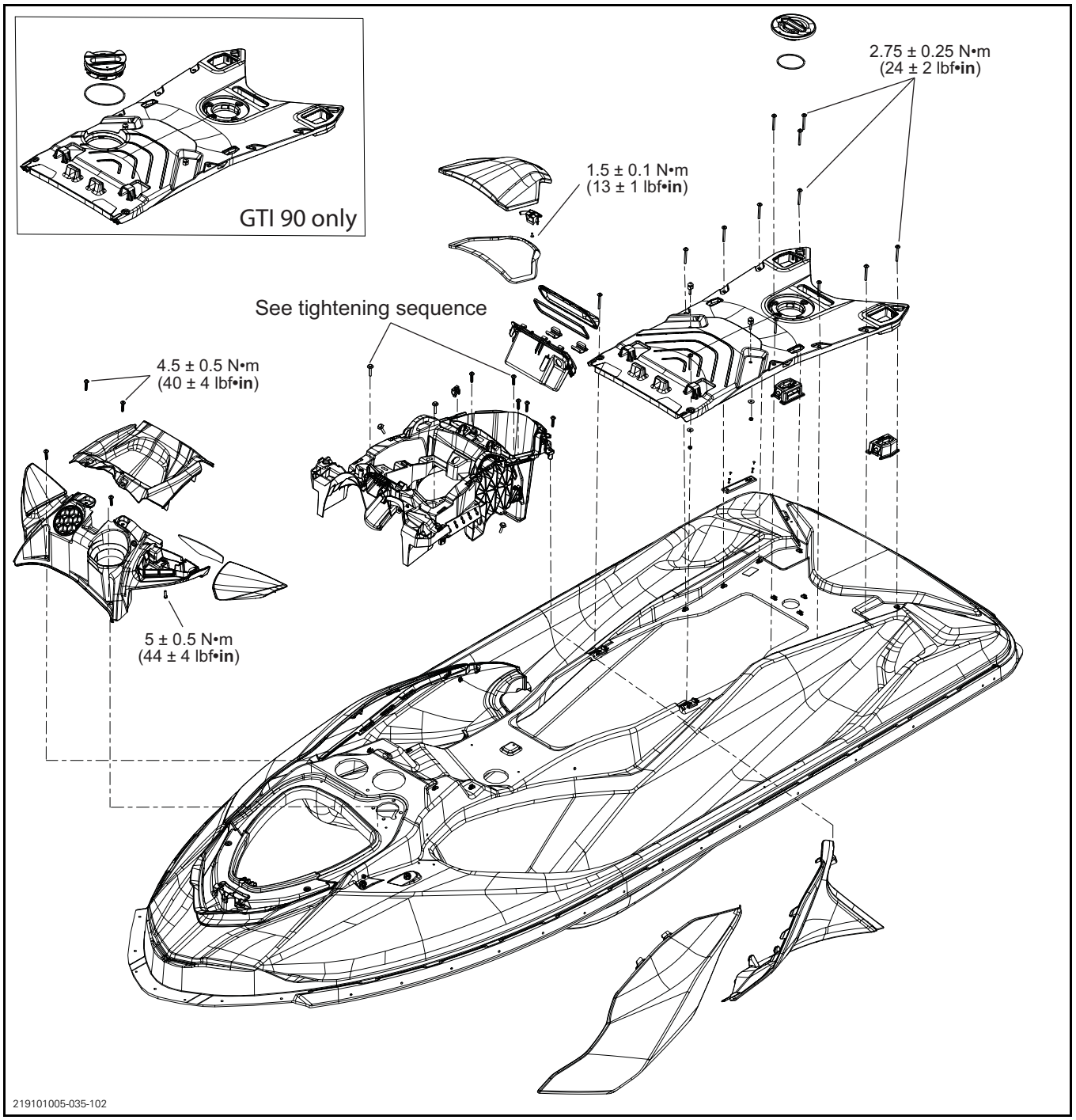


1. *Storage compartment cover*
2. *Mirror support*
3. *Gauge panel*
4. *Lateral trim panels*
5. *Glove box cover*
6. *Seat*
7. *Wakeboard rack (Wake model only)*
8. *Passenger handholds*
9. *Retractable Ski Pylon (Wake model only)*
10. *Bumper*

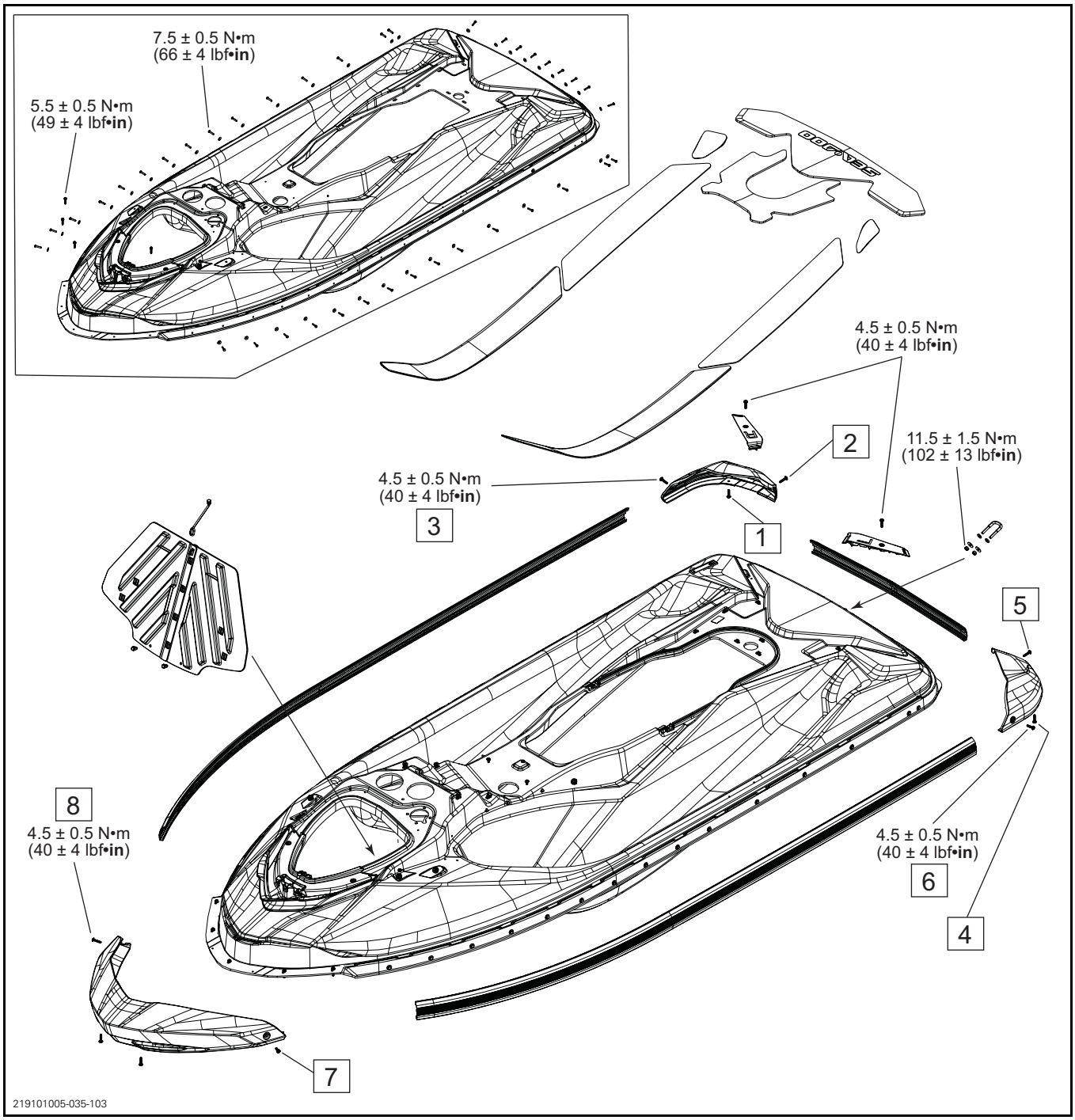
STORAGE COMPARTMENT COVER



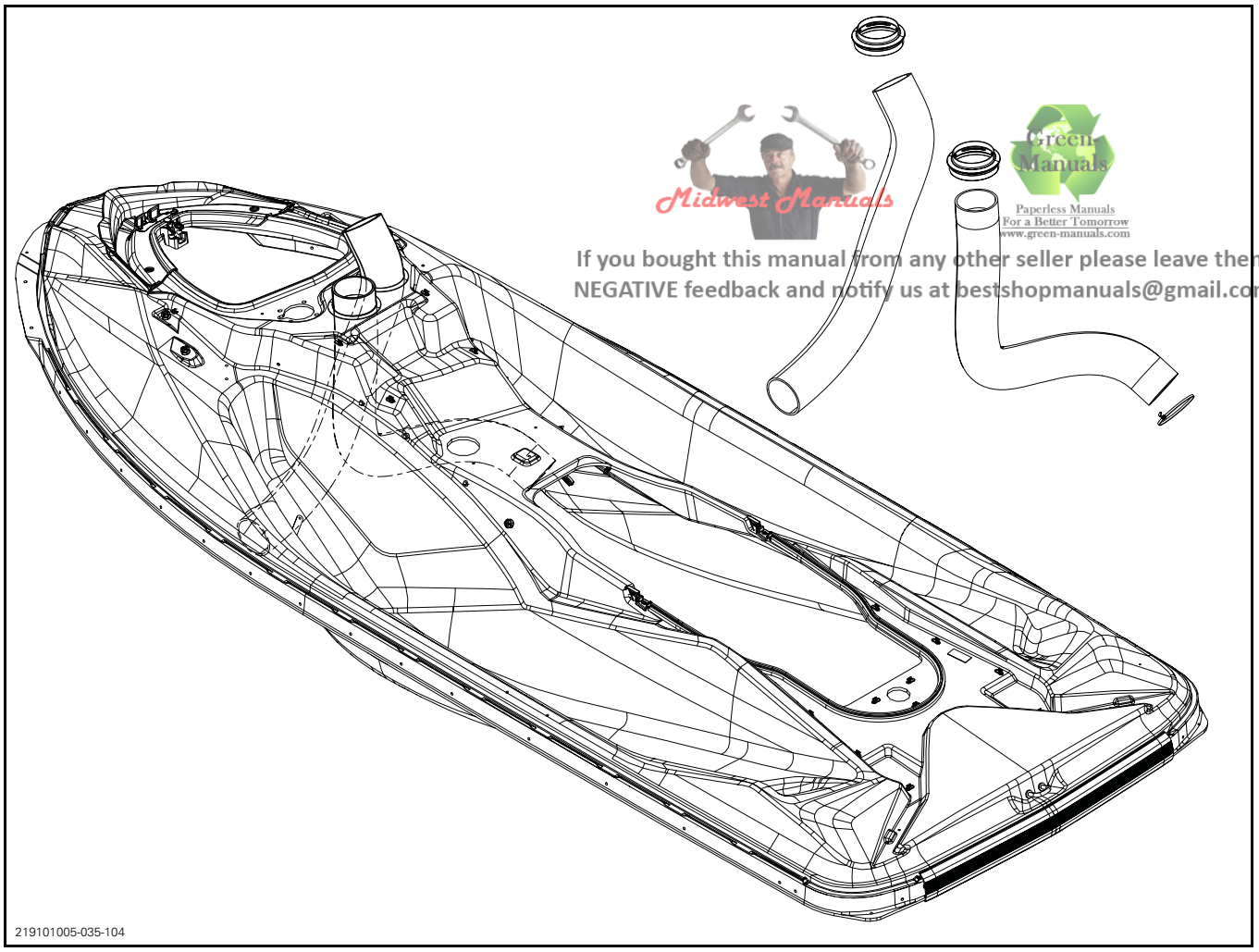
BODY PARTS


GTI 90 only
2.75 ± 0.25 N•m
(24 ± 2 lbf•**in**)
1.5 ± 0.1 N•m
(13 ± 1 lbf•**in**)
See tightening sequence
4.5 ± 0.5 N•m
(40 ± 4 lbf•**in**)
5 ± 0.5 N•m
(44 ± 4 lbf•**in**)
219101005-035-102

BODY PARTS

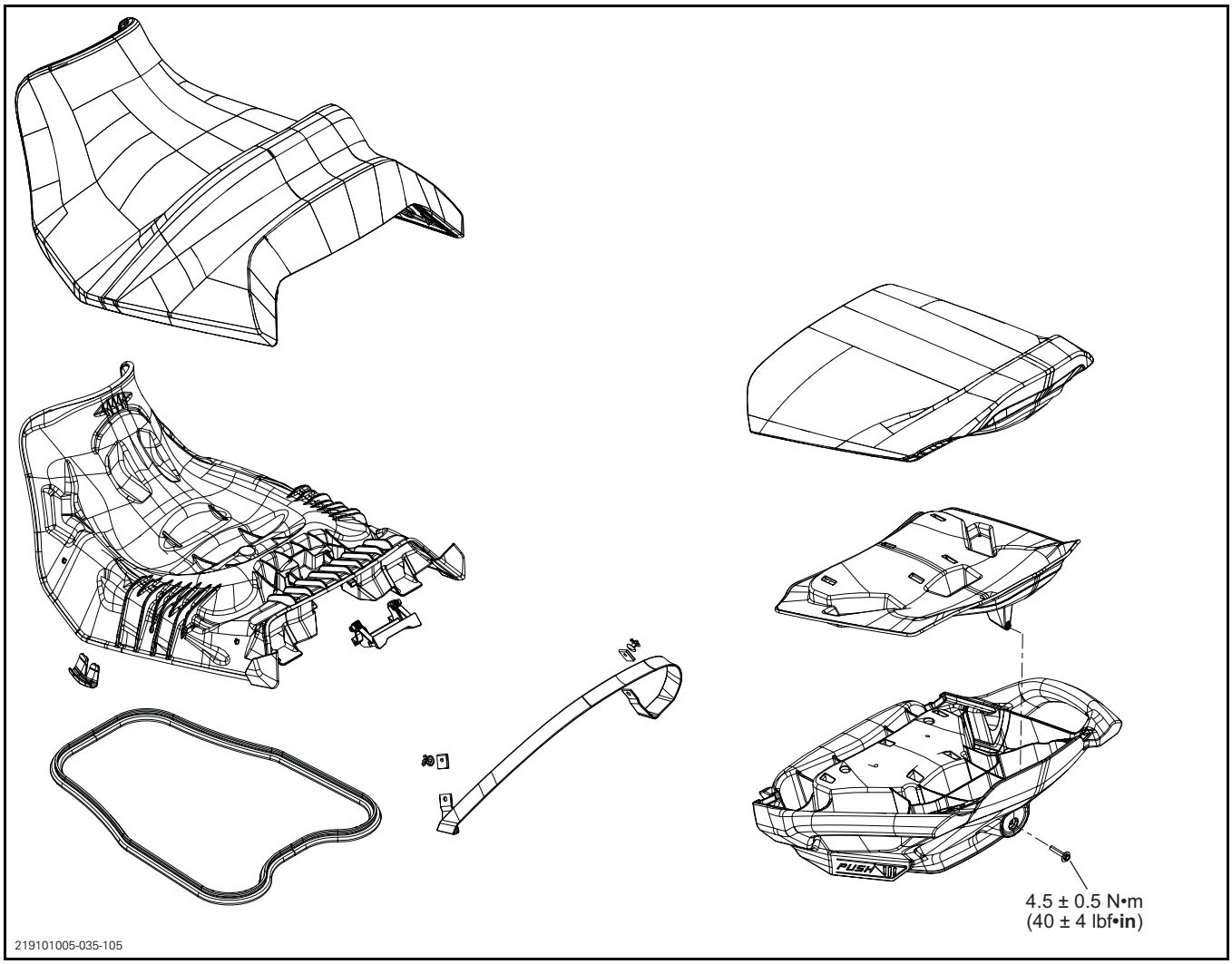

7.5 ± 0.5 N•m
(66 ± 4 lbf•in)
5.5 ± 0.5 N•m
(49 ± 4 lbf•in)
4.5 ± 0.5 N•m
(40 ± 4 lbf•in)
11.5 ± 1.5 N•m
(102 ± 13 lbf•in)
4.5 ± 0.5 N•m
(40 ± 4 lbf•in)
3
2
1
5
8
4.5 ± 0.5 N•m
(40 ± 4 lbf•in)
4.5 ± 0.5 N•m
(40 ± 4 lbf•in)
6
4
7
219101005-035-103

VENTILATION



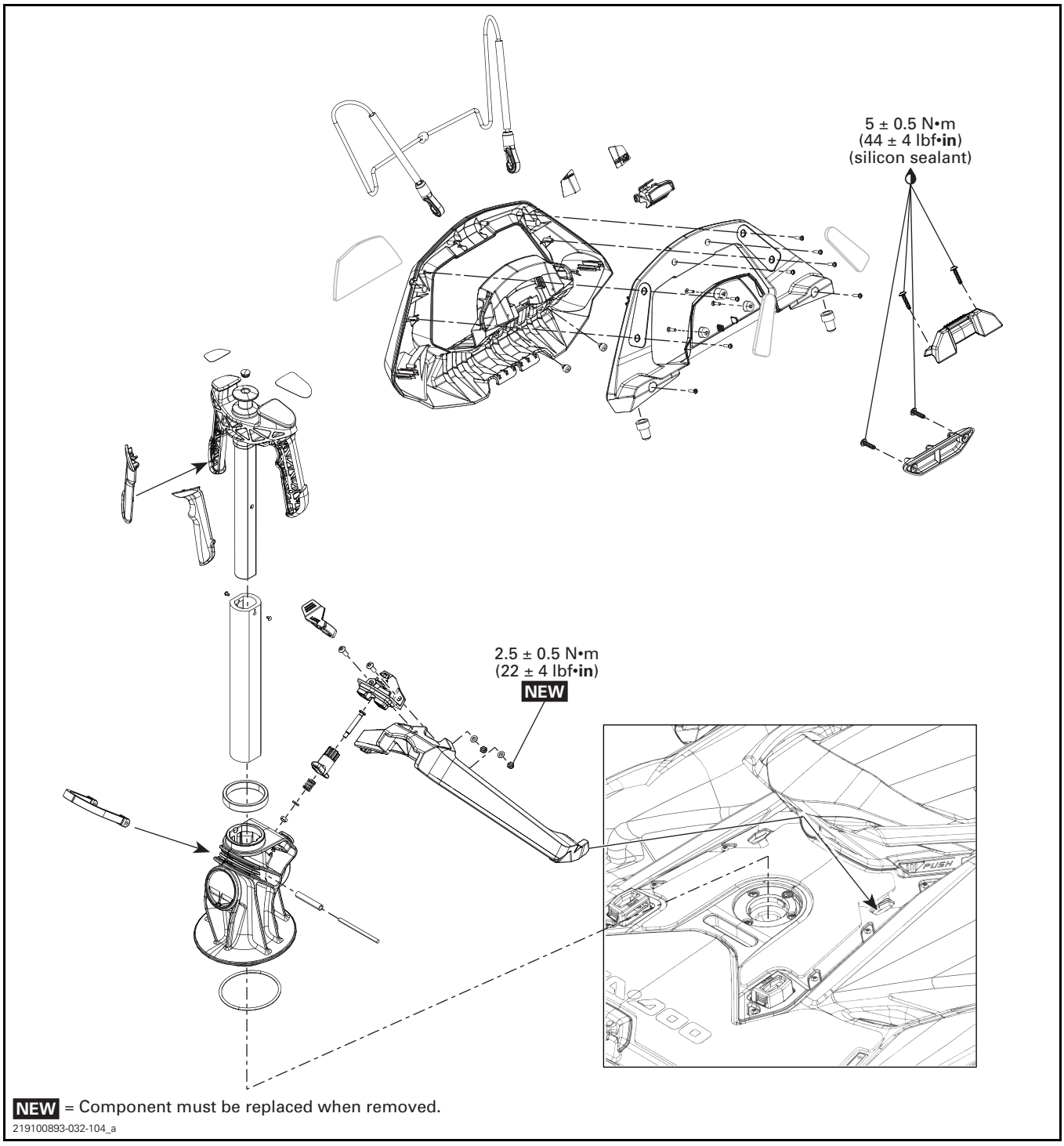
Midwest Manuals
Green Manuals
Paperless Manuals
For a Better Tomorrow
www.green-manuals.com
If you bought this manual from any other seller please leave them
NEGATIVE feedback and notify us at bestshopmanuals@gmail.com

SEAT



WAKEBOARD RACK AND WAKE PYLON

Wake 170



NEW = Component must be replaced when removed.

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PROCEDURES

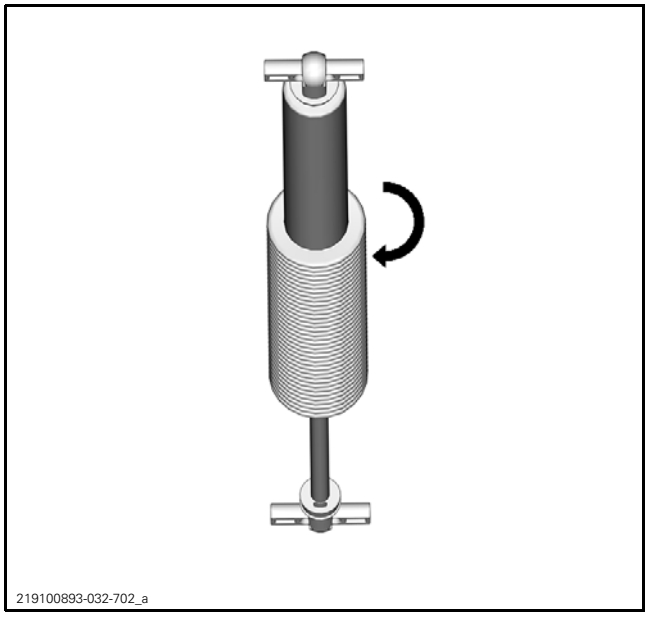
DECALS AND CARPETS

For information and repair, refer to appropriate *CARE AND REPAIR ONLINE BOOKLET* on www.operatorsguides.brp.com.

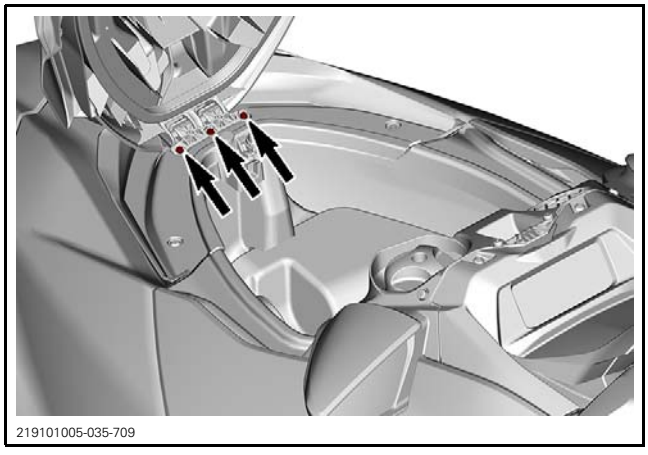
STORAGE COMPARTMENT COVER

Removing the Storage Compartment Cover

1. Open storage compartment cover.
2. Remove gas shock by turning it.



3. Remove hinge screws.

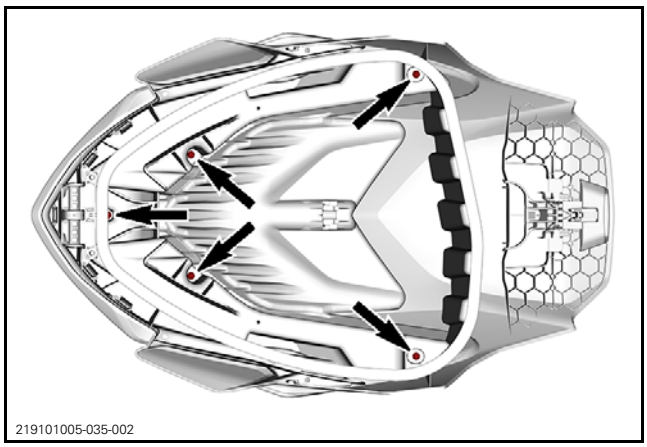


4. Remove storage compartment cover.

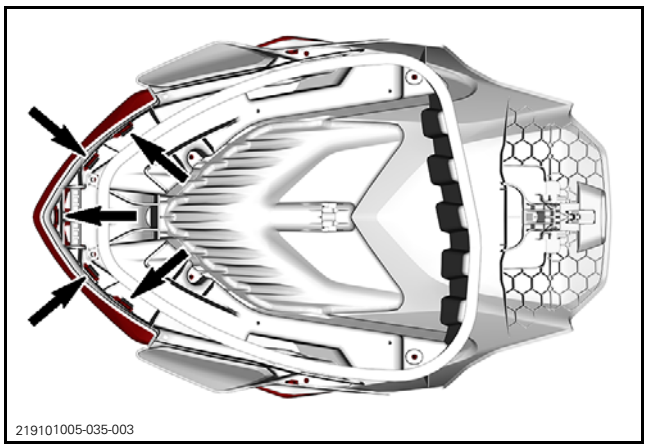
Disassembling the Storage Compartment Cover

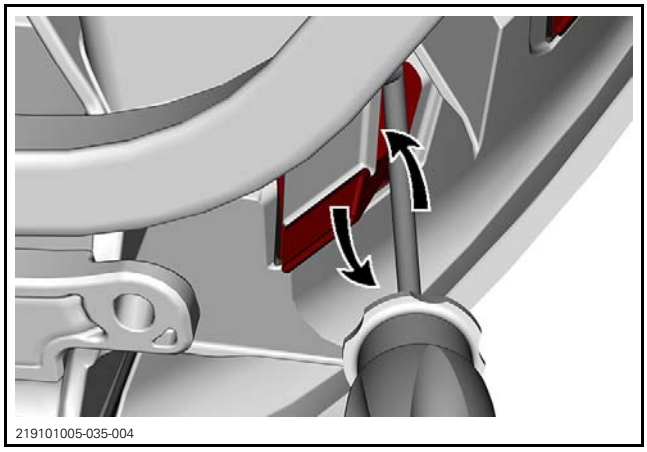
Storage Compartment Cover Inner Shell

1. Remove inner shell retaining screws.



2. Unlatch simultaneously the following retaining tabs using screwdrivers.

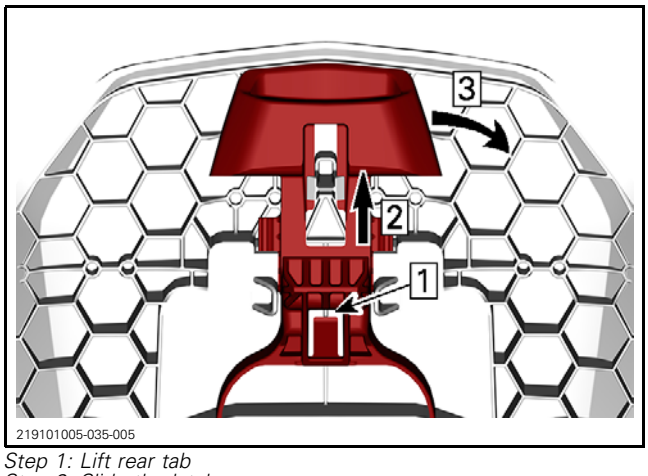




3. Disassemble inner shell from storage compartment cover.

Storage Compartment Cover Latch

1. Open storage compartment cover.
2. Lift the rear tab. An appropriate tool might be required to ease lifting.
3. Slide the latch.
4. Remove latch from hood.



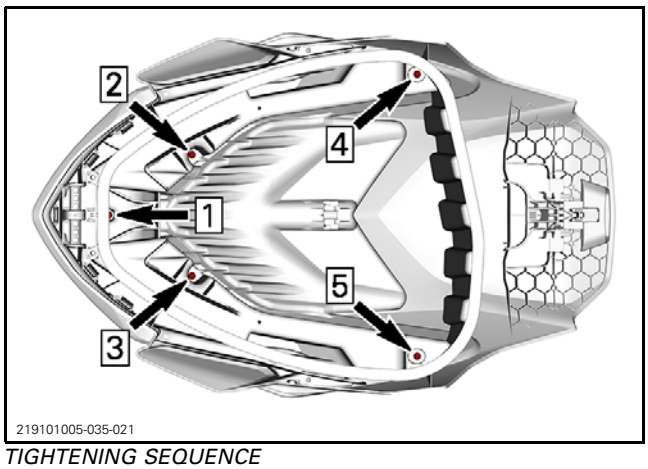
Step 1: Lift rear tab
Step 2: Slide the latch
Step 3: Remove latch

Assembling the Storage Compartment Cover

The assembly is the reverse of the disassembly procedure. However, pay attention to the following.

Tighten inner shell retaining screws and bolt to specification as per the following sequence.

TIGHTENING TORQUE	
Inner shell retaining screws	2.5 N•m ± 0.5 N•m (22 lbf•**in** ± 4 lbf•**in**)



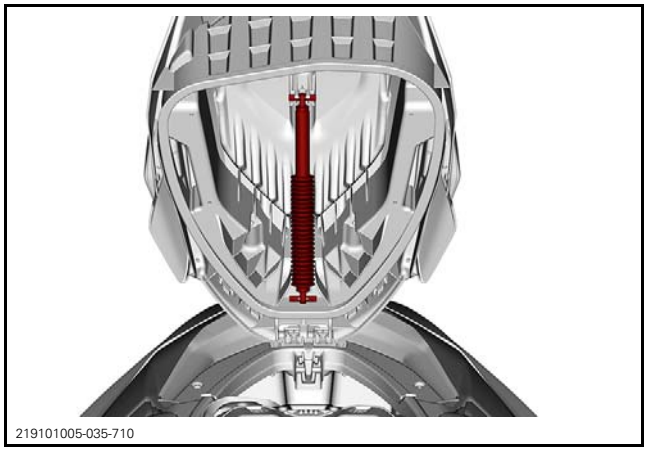
TIGHTENING SEQUENCE

Installing the Storage Compartment Cover

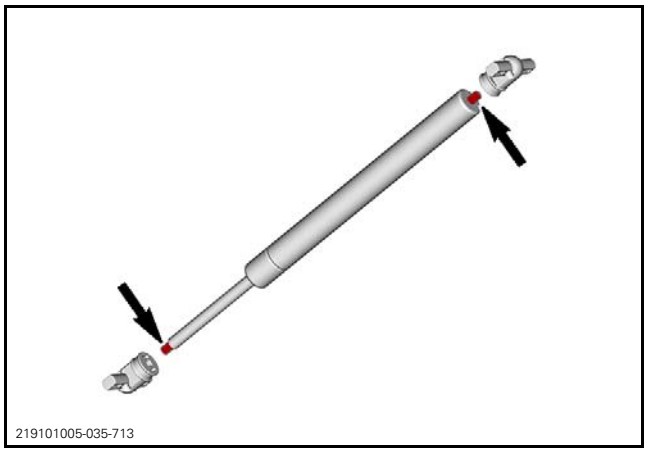
The installation is the reverse of the removal procedure. However, pay attention to the following.

Install shock at the end of the assembly procedure.

When reinstalling gas shock, make sure to place the rod at the bottom.



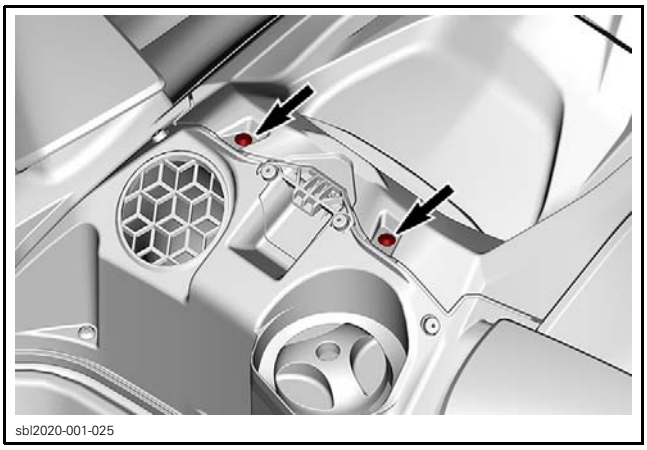
NOTE: If the shock ends have been removed, apply LOCTITE 414 (P/N 413 705 800) before installation.

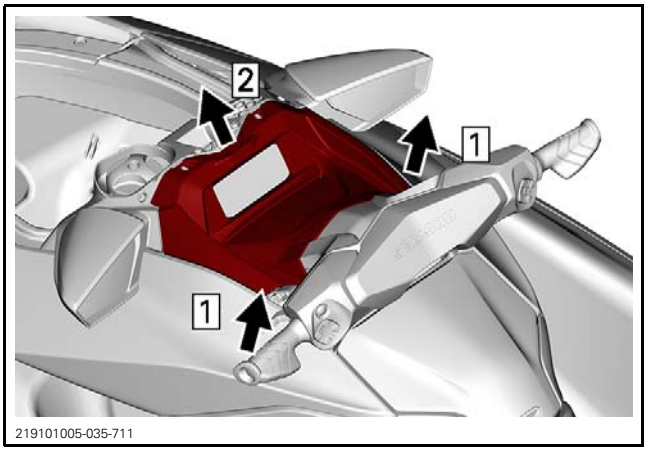


GAUGE PANEL

Removing the Gauge Panel

1. Open storage compartment cover.
2. Remove following retaining screws.


sbl2020-001-025



219101005-035-711

Step 1: Push upwards on each side to disengage central tab
Step 2: Pull rearwards to remove gauge panel

3. Remove lateral trim panels. Refer to procedure in this subsection.
4. Remove gauge panel from mirror support.

Installing the Gauge Panel

The installation is the reverse of the removal procedure. However, pay attention to the following.

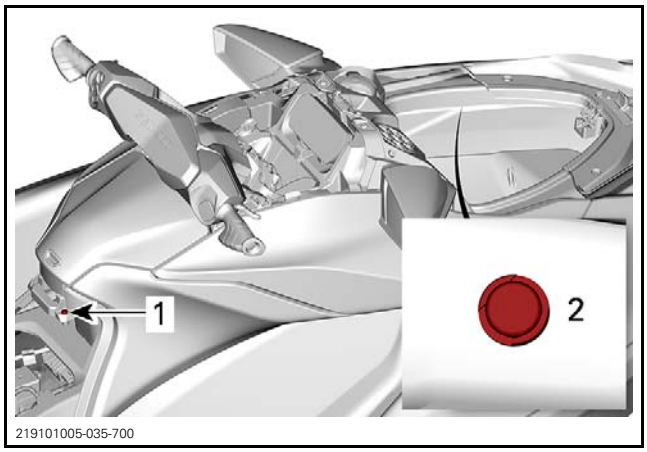
Prior to inserting gauge panel into mirror support, ensure that all tabs are properly aligned.

TIGHTENING TORQUE	
Gauge panel screws	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**)

LATERAL TRIM PANEL

Removing the Lateral Trim Panel

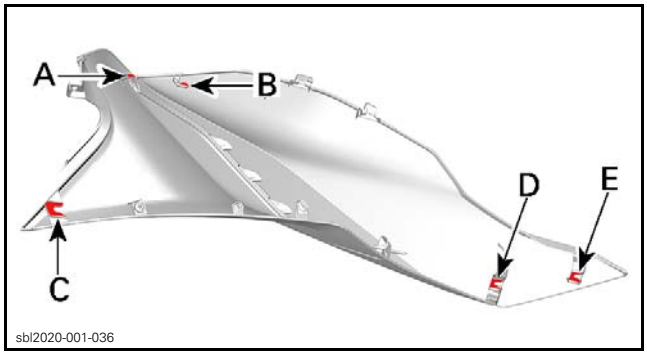
1. Remove seat. Refer to procedure in this subsection
2. Remove following fasteners



219101005-035-700

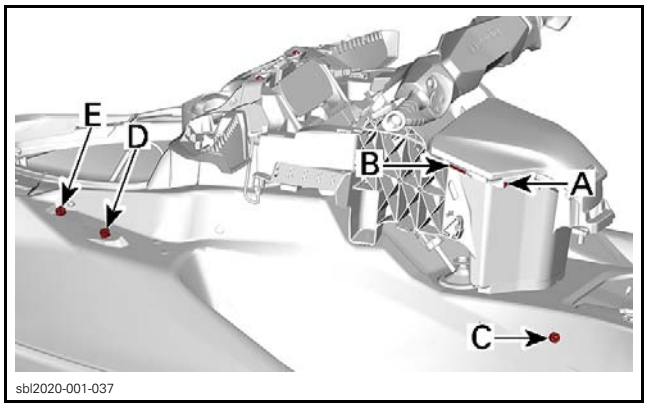
1. Screw
2. Plastic rivet

3. Disengage tabs A and B.



sbl2020-001-036

4. Pull toward the rear to disengage both lateral trim panels
5. Slide until all the darts are disengaged.

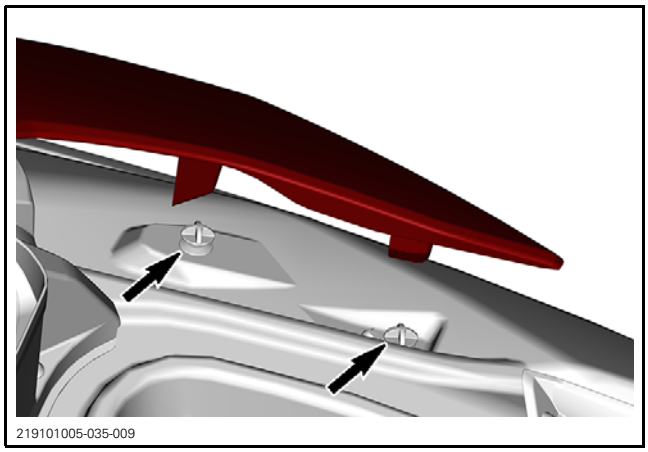


sbl2020-001-037

Installing the Lateral Trim Panel

The installation is the reverse of the removal procedure. However, pay attention to the following.

Make sure to properly install the front darts into the front grooves of the lateral trim panel.

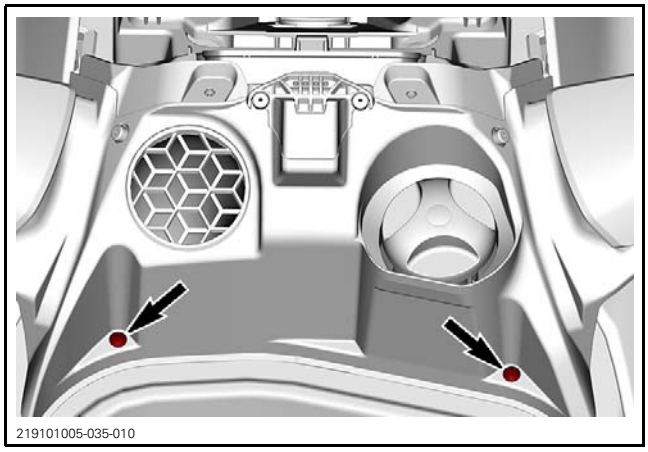


Make sure to properly secure all the rubber stoppers and tape of the lateral trim panel on vehicle as well as the plastic rivets.

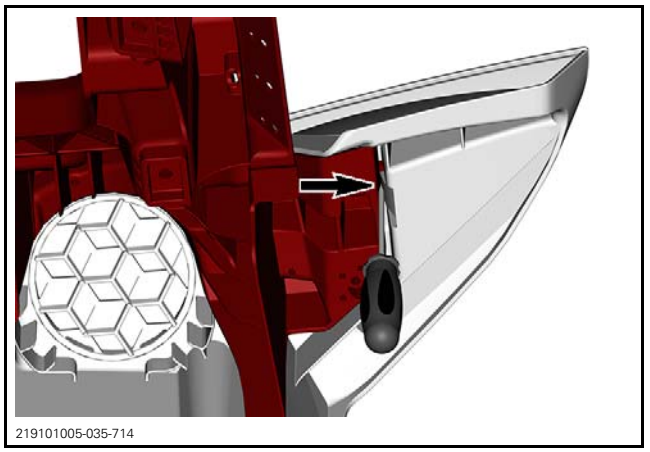
MIRROR SUPPORT

Removing the Mirror Support

1. Remove gauge support and side panels. Refer to procedure in this subsection.
2. Remove the following screws.



3. From underneath, push locking tabs outwards using a flat screwdriver.



4. Remove mirror support by pulling it upwards.

Installing the Mirror Support

The installation is the reverse of the removal procedure. However, pay attention to the following.

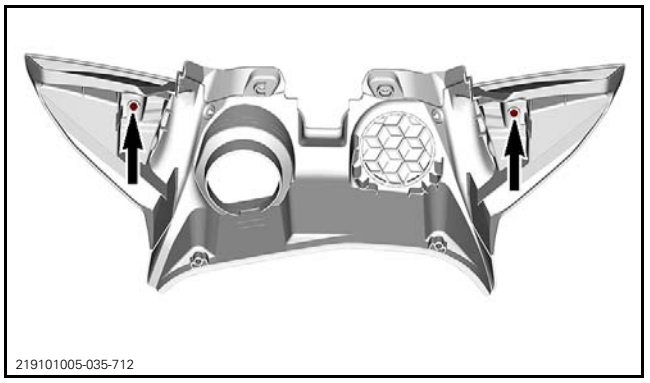
TIGHTENING TORQUE	
Mirror support screws	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**) + LOCTITE 5900 (P/N 293 800 066)
Gauge panel screws	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**)

MIRRORS

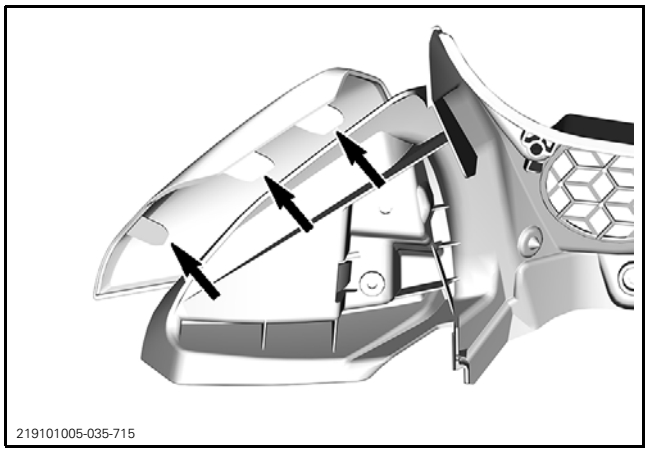
Replacing the Mirror Cover

Remove mirror support. Refer to *REMOVING THE MIRROR SUPPORT* in this subsection.

Remove screws from underneath.



Slide cover to release tabs.



The installation is the reverse of the removal procedure.

Replacing the Mirror

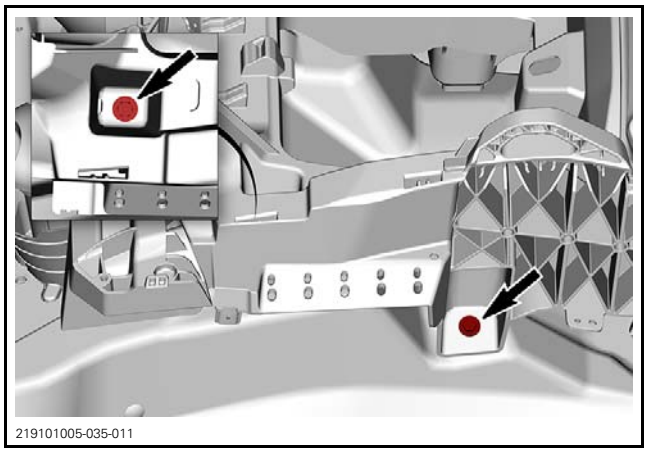
1. Remove mirror support. Refer to procedure in this subsection.
2. From inside mirror support, slightly heat mirror.
3. Push at the back of mirror to remove it.
4. Properly clean mirror support surface of any glue residue.
5. Perform a flame treatment.
6. Install mirror using adhesive tape at the back of mirror.

The installation is the reverse of the removal procedure.

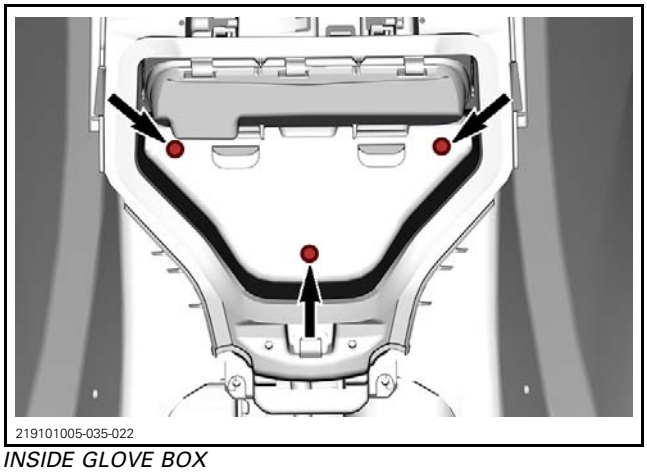
CONSOLE

Removing the Console

1. Remove gauge panel. Refer to procedure in this subsection.
2. Disconnect all accessories plugged on console.
3. Remove seat. Refer to procedure in this subsection.
4. Remove steering column support. Refer to *STEERING SYSTEM* subsection.
5. Remove side panels.
6. Remove the following screws securing console to deck.



CONSOLE SIDE



INSIDE GLOVE BOX

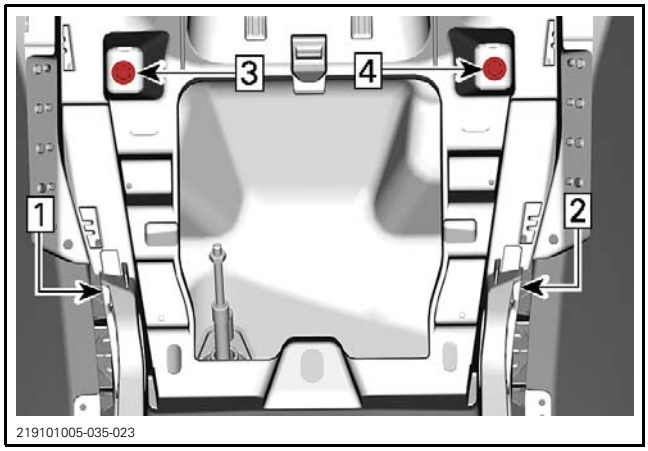
7. Remove console by pulling it upwards.

Installing the Console

The installation is the reverse of the removal procedure. However, pay attention to the following.

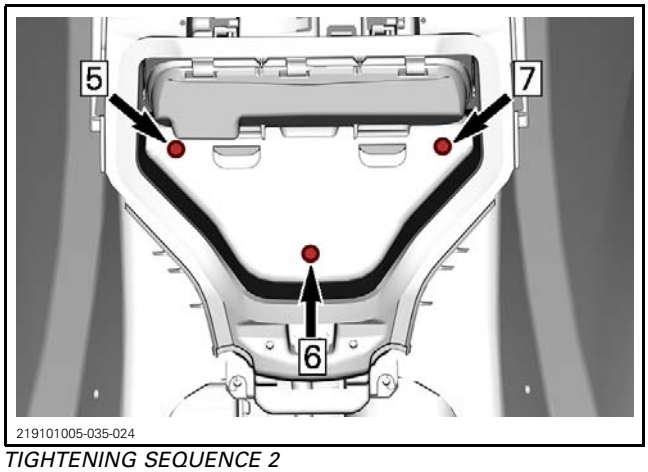
Tighten console screws to specification as per the following sequence.

TIGHTENING TORQUE	
Hexagonal head M6 console screws (Step 1 to 4)	5.5 N•m ± 0.5 N•m (49 lbf•**in** ± 4 lbf•**in**)
Plastite console screws (Step 5 to 7)	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**)



219101005-035-023

TIGHTENING SEQUENCE 1



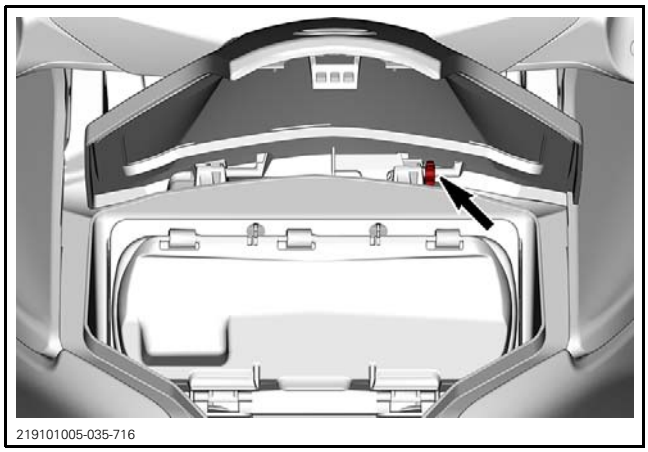
219101005-035-024

TIGHTENING SEQUENCE 2

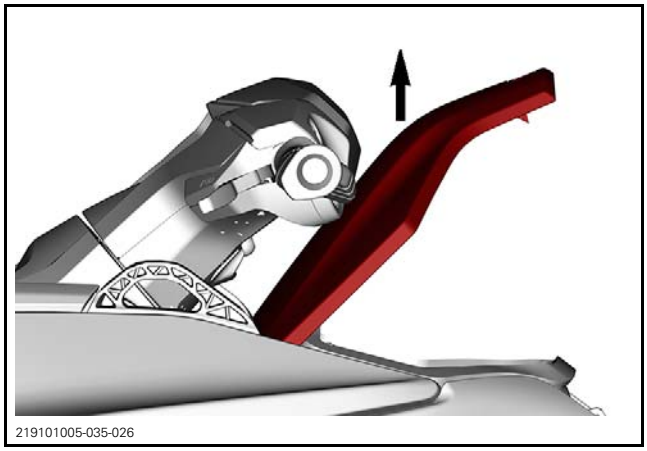
GLOVE BOX COVER

Replacing the Glove Box Cover

1. Open glove box cover.
2. Remove retainer using long nose pliers.


219101005-035-716

3. Slide cover sideways 6 mm (1/4 in).
4. Pull glove box cover upwards to release it from console hinge.


219101005-035-026

The installation is the reverse of the removal procedure.

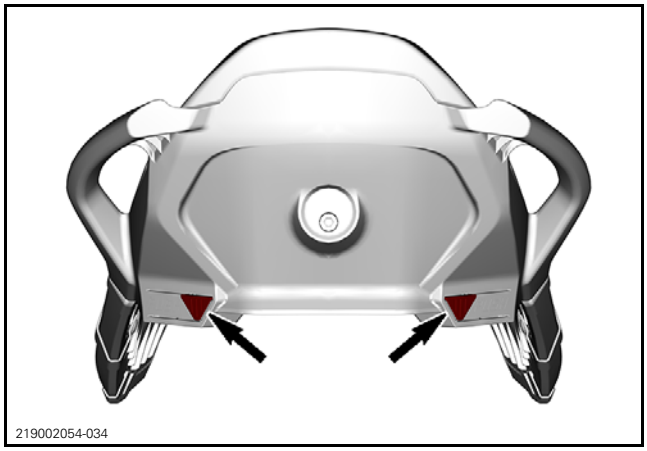
SEAT

Cleaning the Seat

For information, refer to appropriate *CARE AND REPAIR ONLINE BOOKLET* on www.operators-guides.brp.com.

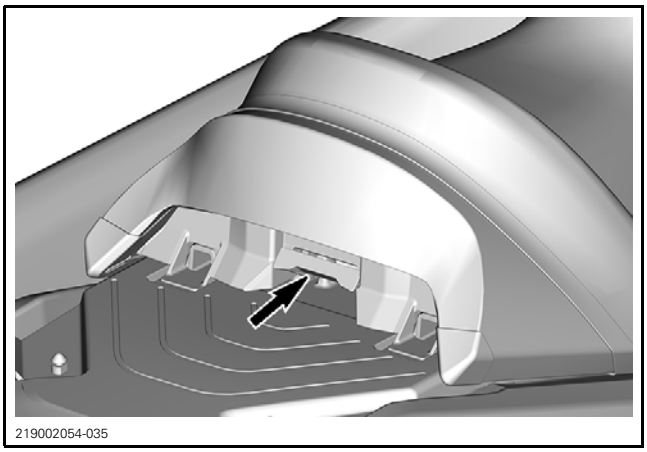
Removing the Seat

To remove the seat, push on the two release buttons and lift the back end of the rear seat.


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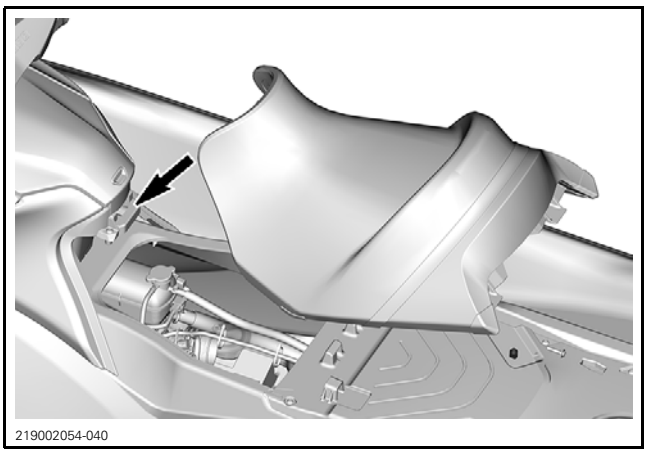
RELEASE BUTTONS

Then pull the latch handle up and remove the front seat from the watercraft.



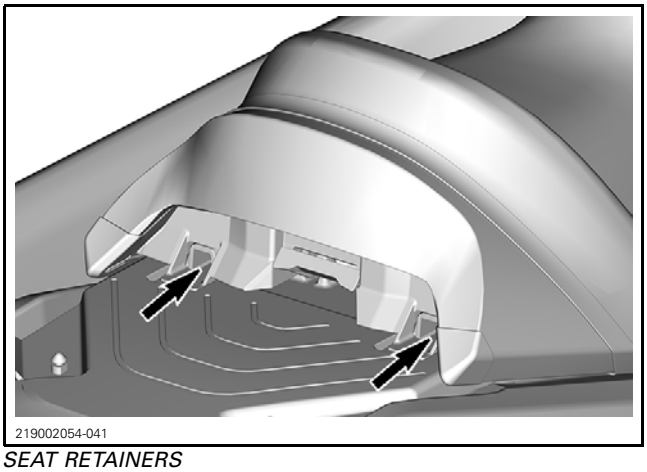
Installing the Seat

To install the seat, insert the forward end of the front seat in its retainer.



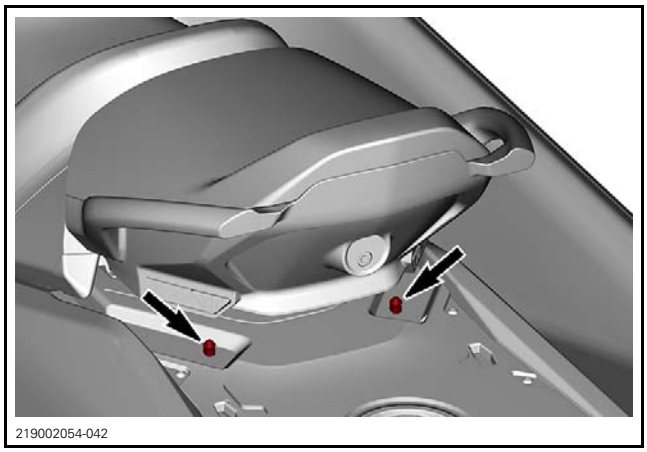
SEAT RETAINER

Insert the forward part of the rear seat into the retainers.



SEAT RETAINERS

Align the seat latch with the latch pins and firmly press down on the rear portion of the seat to lock it in place.



LATCH PINS

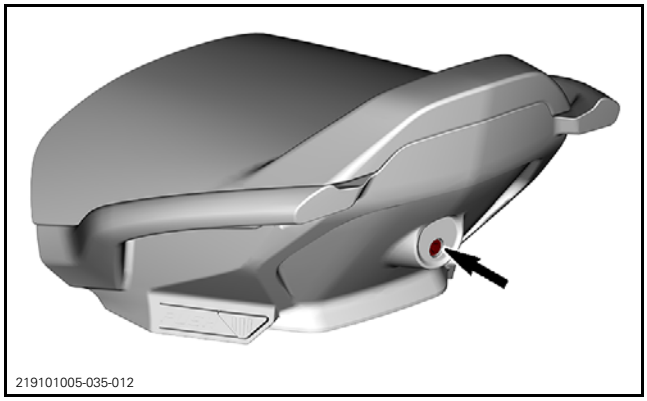
Pull up on the rear portion of the seat to ensure it is properly latched.

⚠ CAUTION Ensure the latch is properly locked onto the pin.

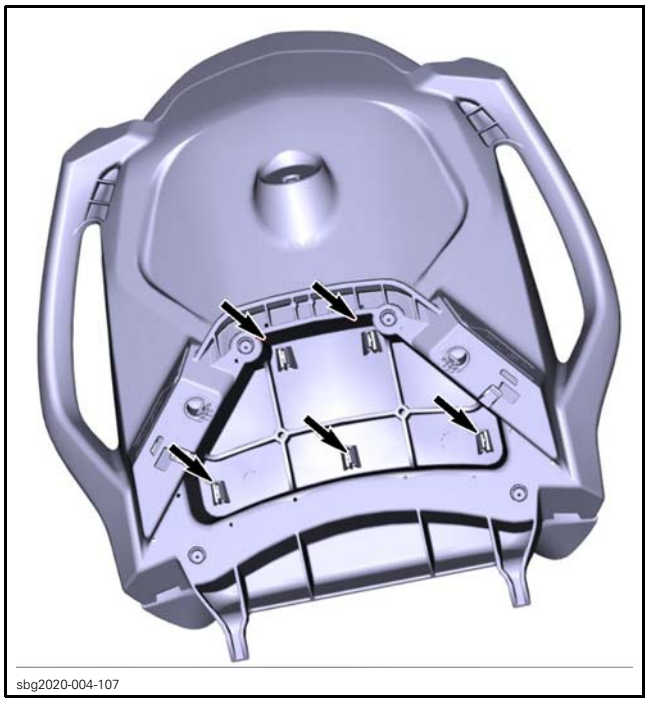
REAR HANDLE

Removing the Rear Handle

1. Remove seat. Refer to procedure this subsection.
2. Remove and discard the BRP logo.
3. Remove and keep the screw retaining the foam seat in place.



4. Unclip the 5 tabs under the base.
5. Using a flat screwdriver, open the tabs under the seat.


sbg2020-004-107

6. Remove the rear handle.

Installing the Rear Handles

The installation is the reverse of the removal procedure. However, pay attention to the following.

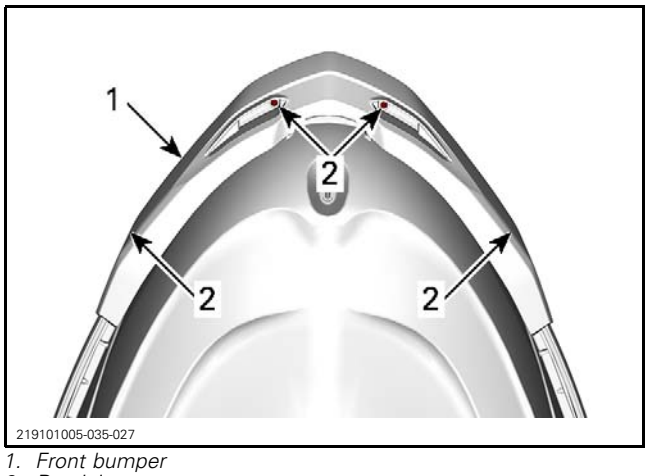
TIGHTENING TORQUE	
Rear handle screw	6.5 N•m ± 0.5 N•m (58 lbf•**in** ± 4 lbf•**in**)

Install a new BRP logo.

BUMPER

Removing the Bumper

Front Bumper



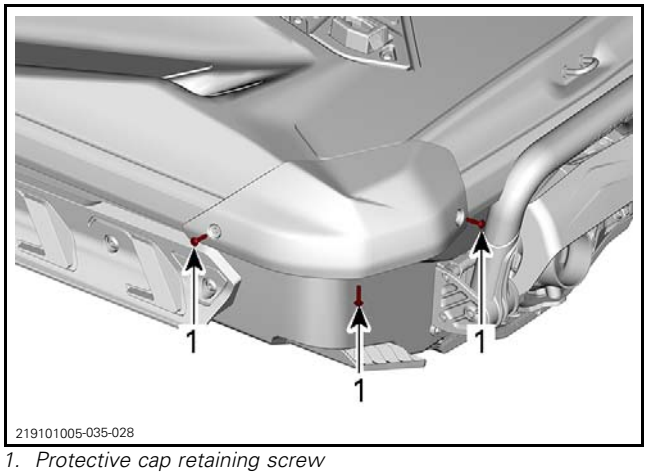
219101005-035-027

1. *Front bumper*
2. *Retaining screw*

1. Remove screws securing front bumper to body.
2. Remove front bumper from vehicle.

Rear Bumper

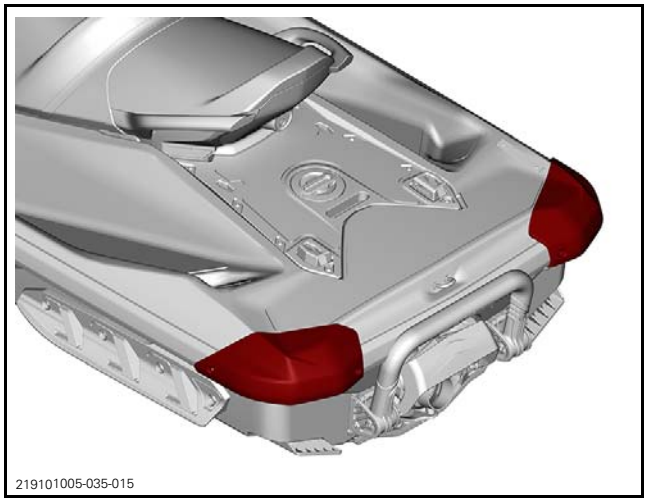
1. Remove protective caps retaining screws.



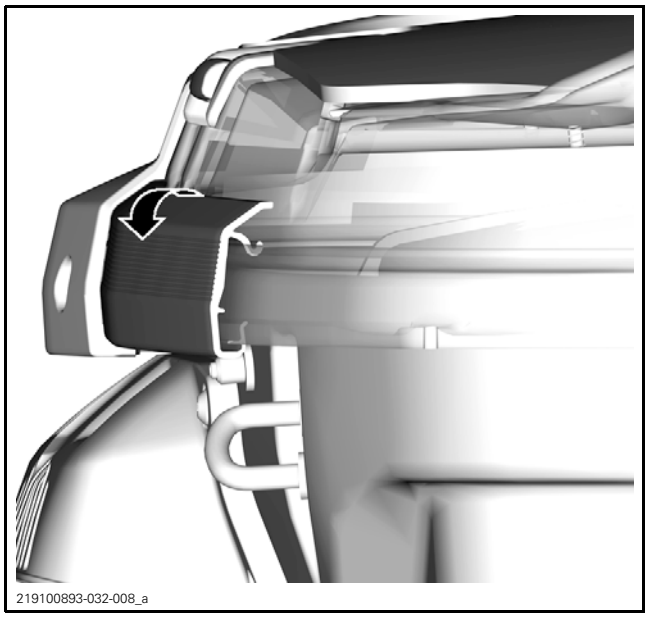
219101005-035-028

1. *Protective cap retaining screw*

2. Remove both protective caps.


219101005-035-015

3. Pull the top of bumper to unclip it from body.



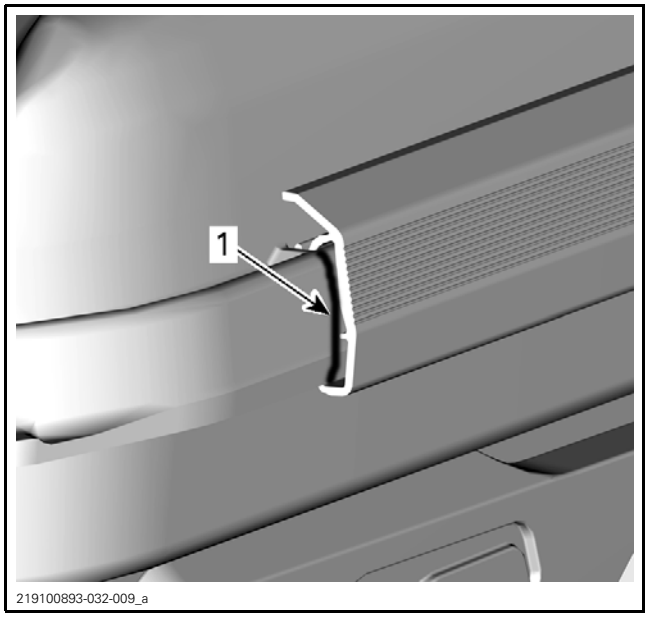
TYPICAL

4. Remove rear bumper from vehicle.

Side Bumpers

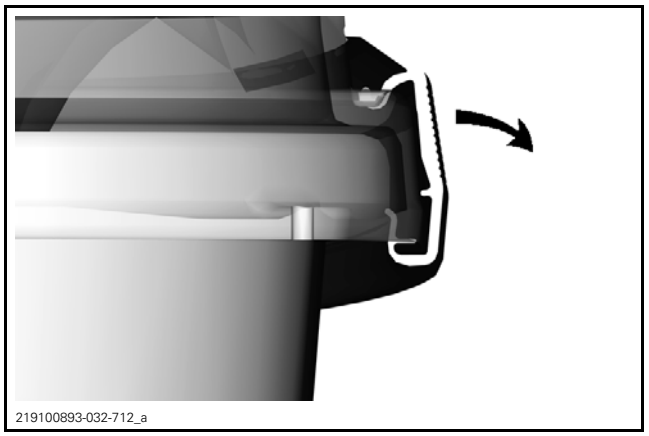
1. Remove front and rear bumpers.
2. Using a marker, trace a line at bumper end.

NOTE: These marks will be used during installation.



1. Trace a line at end of bumper

3. Pull the top of bumper to unclip it from body.



TYPICAL

Installing the Bumper

The installation is the reverse of the removal procedure. However, pay attention to the following.

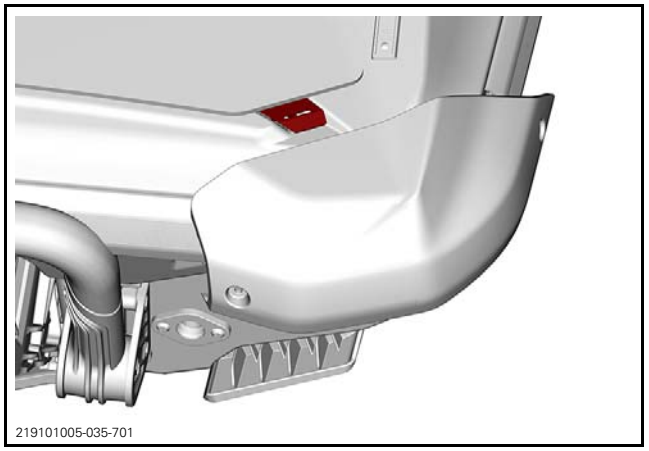
Make sure the double face tape on the bumper is still sticky. Replace as required.

Tighten front bumper lower retaining screws to specification.

TIGHTENING TORQUE	
Front bumper lower screws	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**)

Tighten bumper retaining screws to specification as per the following sequence. Refer to exploded view.

Ensure the clips are properly engaged.



TIGHTENING TORQUE		
1-4	Rear corner bumper center screws	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**) + LOCTITE 5900 (P/N 293 800 066)
2-3-5 6-7-8	Lateral bumper end screws	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**)

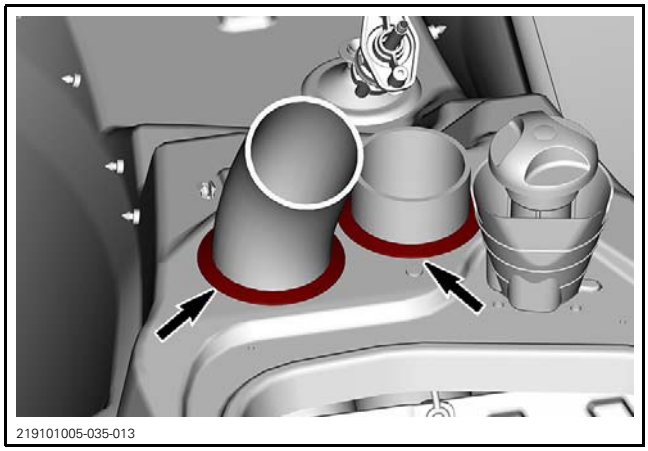
VENTILATION DUCT

Replacing the Ventilation Duct

1. Open storage cover.
2. Remove mirror support . Refer to procedure in this subsection.

NOTE: The console can be removed for easier access.

3. Disconnect all connectors that might be in the way.
4. Remove ventilation duct support.



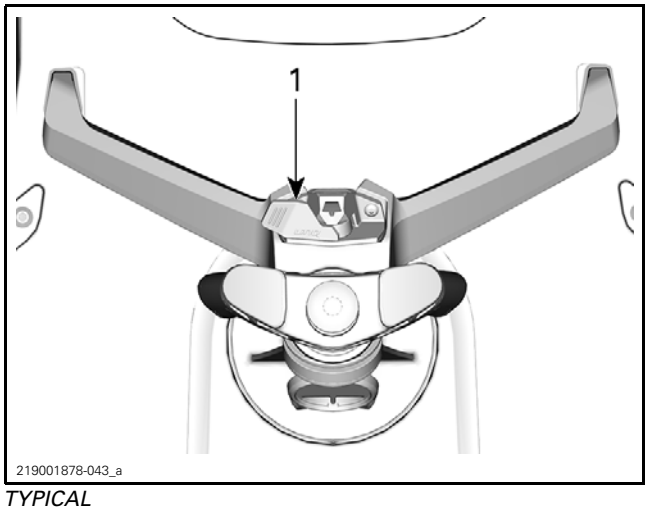
The installation is the reverse of the removal procedure.

WAKE PYLON (WAKE)

Removing the Wake Pylon

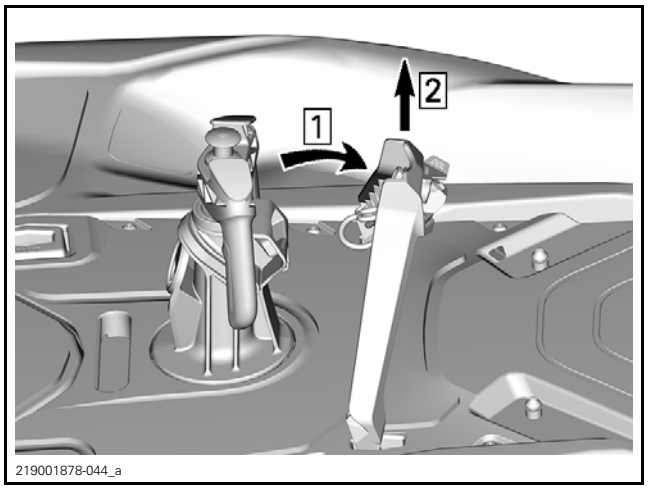
Remove the rear seat.

Unlock the LinQ attachment.



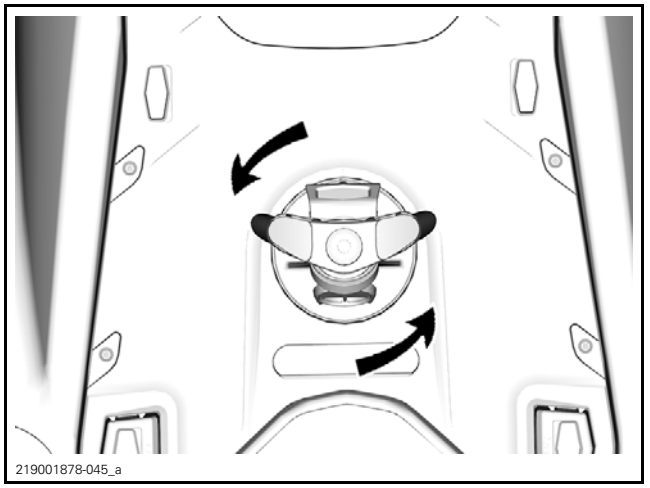
TYPICAL
1. LinQ lever

Tilt the support toward the front and lift.



TYPICAL
Step 1: Tilt support
Step 2: Lift support

Unscrew the pole by turning it one quarter of a turn and lifting it.



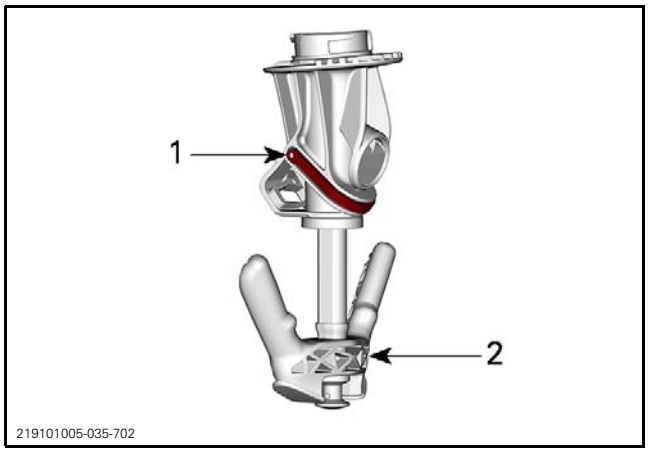
TYPICAL

Disassembling the Wake Pylon

Extend the handle completely.

Turn the wake pylon upside down.

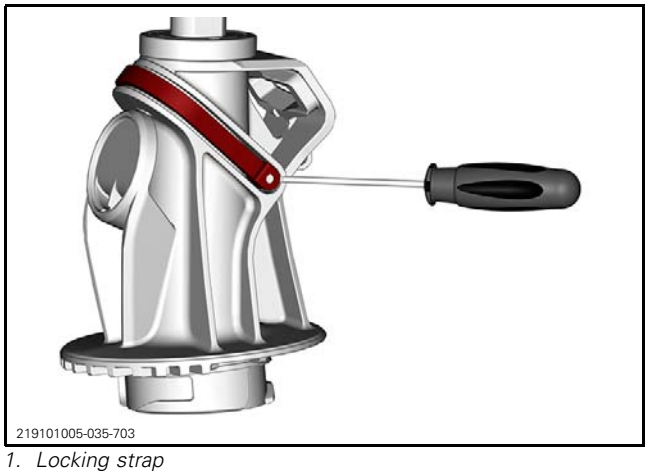
Move both ends of locking strap to disengage the inner lock and free the handle.



1. Locking strap end
2. Handle stem

Locking Strap

Using a screwdriver or any other suitable tool, detach a side of the locking strap from retaining pin.

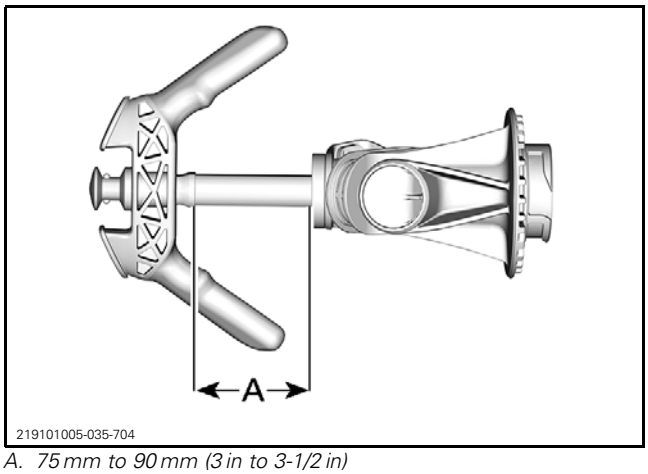


1. Locking strap

Remove locking strap and the inner lock.

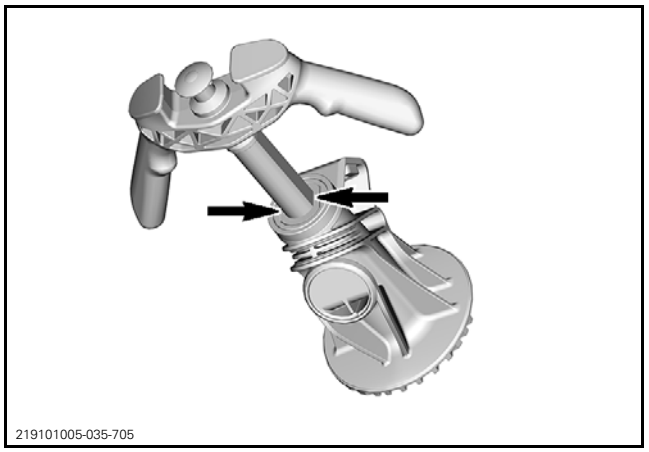
Handle

Extend handle approximately 75 mm to 90 mm (3 in to 3-1/2 in).



A. 75 mm to 90 mm (3 in to 3-1/2 in)

Insert two thin feeler gauges between handle stem and extension tube.



1. Handle stem
2. Feeler gauges
3. Extension tube

Place a rag around the joint to catch balls and spring.

Hold feeler gauges and pull the handle.

Assembling the Wake Pylon

Handle

Install a loose locking tie on handle stem.

Apply grease on each ends of spring.

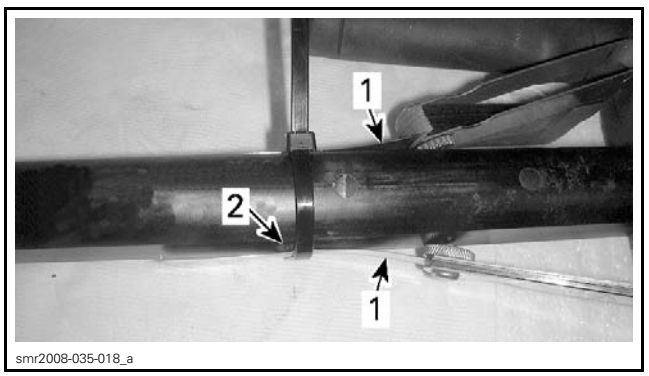
SERVICE PRODUCT	
Scandinavia	SYNTHETIC GREASE (EUR) (P/N 779231)
All other countries	SYNTHETIC GREASE (P/N 779162)

Insert the spring in the handle stem hole.

Position a ball on each ends of spring.

Install a feeler gauge over each balls.

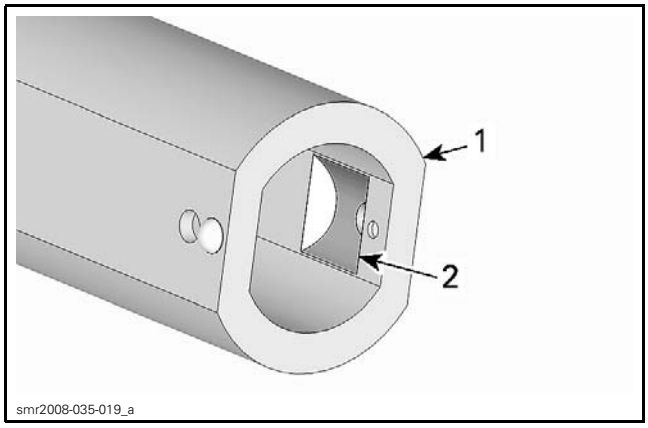
Tighten the locking tie in order to retain feeler gauges and balls.



1. Feeler gauges
2. Ball

Apply grease in both recesses of the extension tube.

SERVICE PRODUCT	
Scandinavia	SYNTHETIC GREASE (EUR) (P/N 779231)
All other countries	SYNTHETIC GREASE (P/N 779162)



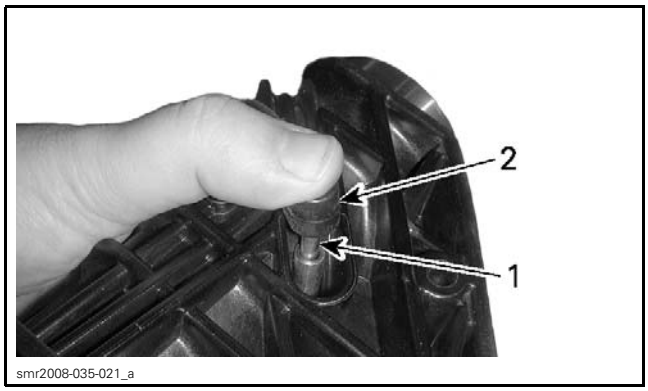
1. Extension tube
2. Recesses

Slide the handle stem into the extension tube.

Remove feeler gauges and locking tie.

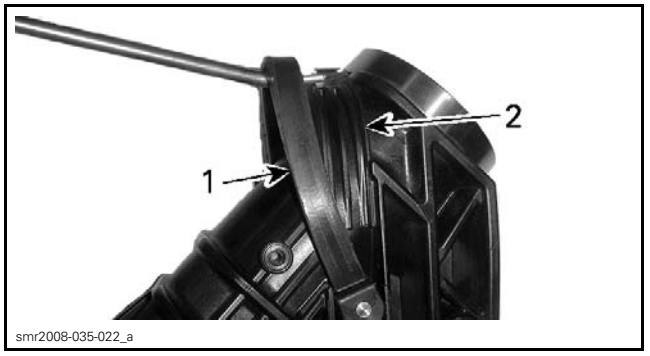
Locking Strap

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.

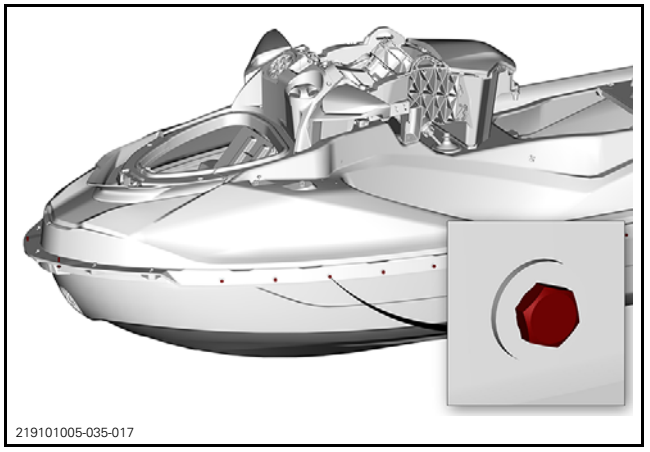
Installing the Wake Pylon

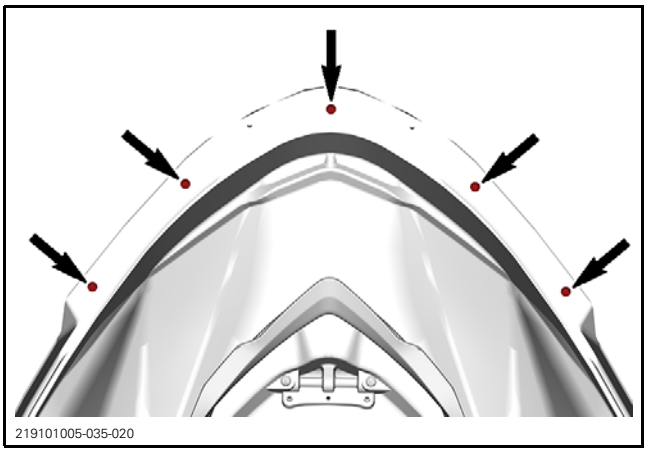
The installation is the reverse of the removal procedure.

BODY

Removing the Body

1. Remove steering column. Refer to *STEERING SYSTEM* subsection.
2. Remove bumpers, gauge support, seat and service cover. Refer to procedure in this subsection.
3. Remove wakeboard support and wake pylon (if equipped). Refer to procedure in this subsection.
4. Insert a clean cloth rag in the fuel tank nozzle.
5. Remove following fasteners.




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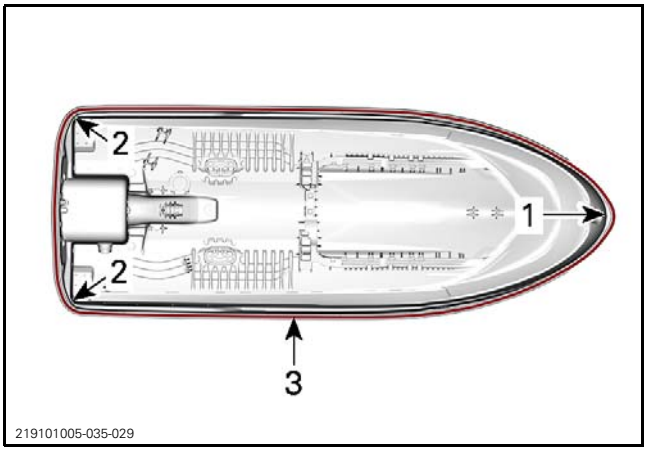
6. Remove the body.
7. Remove and discard the seal.

Installing the Body

NOTICE If installing the deck on a new hull, refer to instruction sheet includes with the hull to drill the holes and prepare the hull properly.

1. Install a new seal.

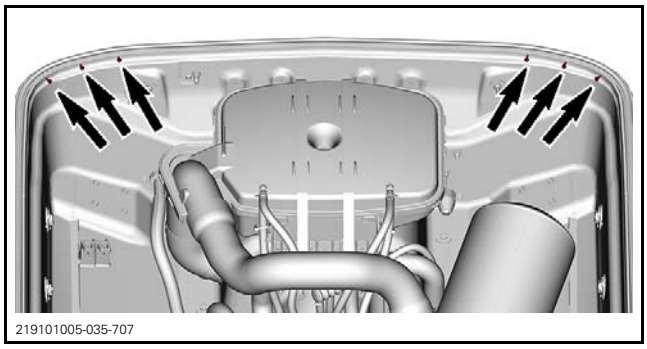
NOTE: Double face tape can be used to maintain the hull seal in place while installing the body.



219101005-035-029

DOUBLE FACE TAPE LOCATION
1. Bow
2. Stern
3. Seal joint

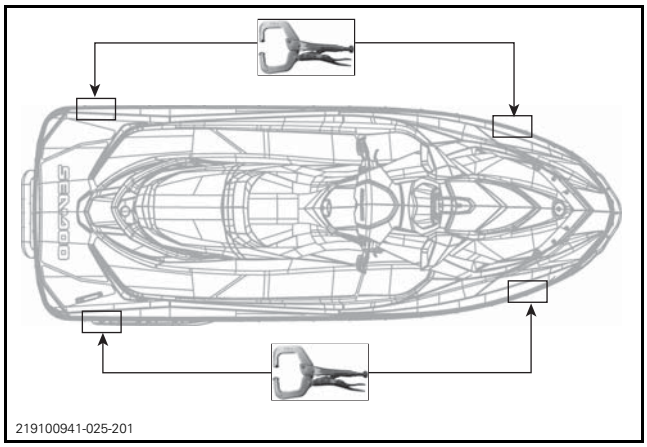
2. Install holding screws. Tighten to specification.


219101005-035-707

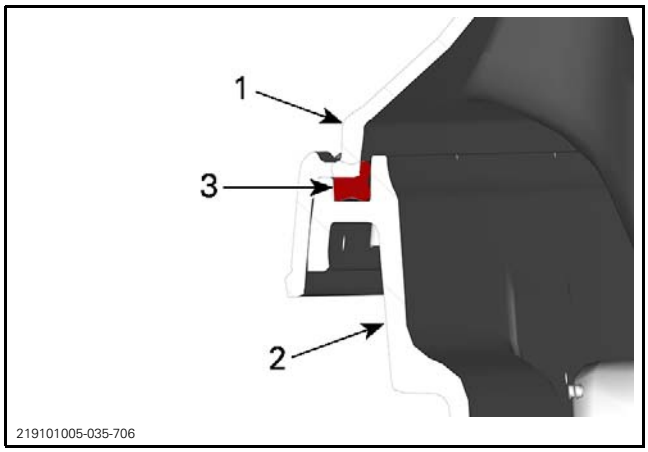
TIGHTENING TORQUE	
Holding screws	3.5 N•m ± 0.5 N•m (31 lbf•**in** ± 4 lbf•**in**)

3. Make sure hull and body holes are aligned when installing screws.
   3.1 Secure the deck on the hull using four C-clamp pliers, one at each corner.

   NOTE: Ensure to have the smallest gap between the rear of the deck and the hull.


219100941-025-201

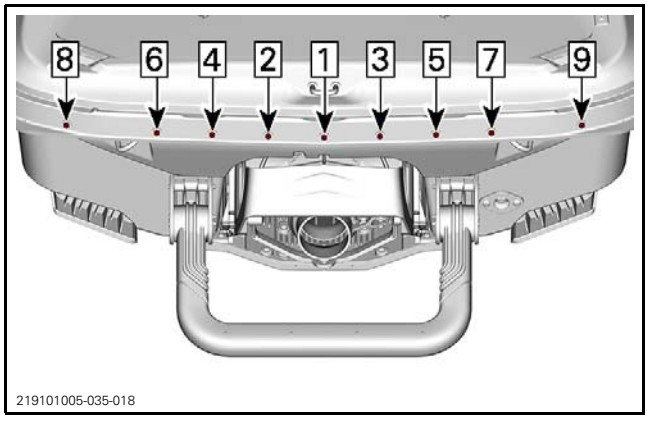
NOTICE The pliers must be enough tight to compress the seal and align holes of deck and hull but without damaging the deck surface layer.



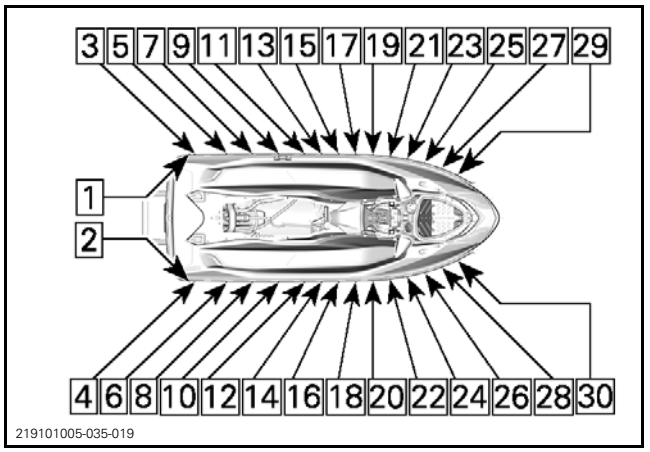
CUTAWAY VIEW
1. *Body*
2. *Hull*
3. *Seal*

4. Install and tighten rear screws first.
   4.1 Install another C-clamp pliers near a hole to compress the seal properly and make sure holes are aligned.
   4.2 Install the screw.
   4.3 Remove the pliers and repeat the procedure for all other holes.

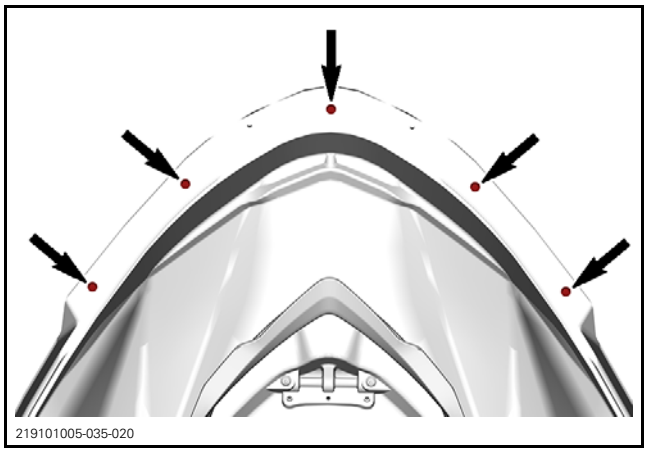
Tighten the screws to specification. See tightening sequence.



5. Start sides sequence with the left rear screw then alternate between right side and left side up to the front.



6. Install and tighten following screws



TIGHTENING TORQUE	
Body screws	7.5 N•m ± 0.5 N•m (66 lbf•**in** ± 4 lbf•**in**)

Reinstall all previously removed parts.

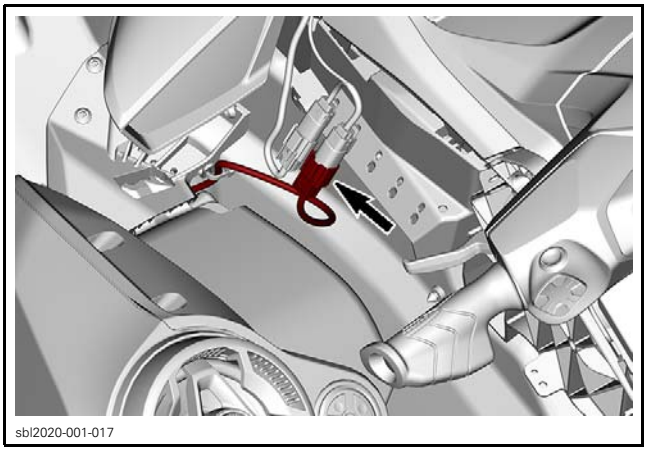
NOTE: Make sure to remove the cloth rag in the fuel tank nozzle.

PREMIUM AUDIO SYSTEM

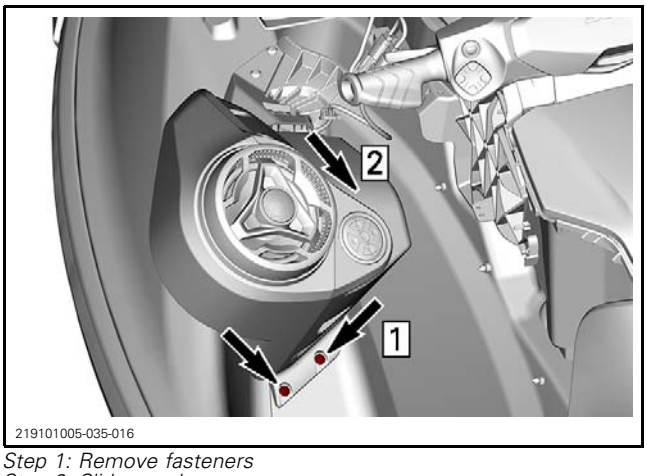
Removing the Premium Audio System

LH side shown, the procedure is the same for both sides.

1. Remove both lateral trim panels. Refer to procedure in this subsection.
2. Disconnect following connector and remove locking tie.

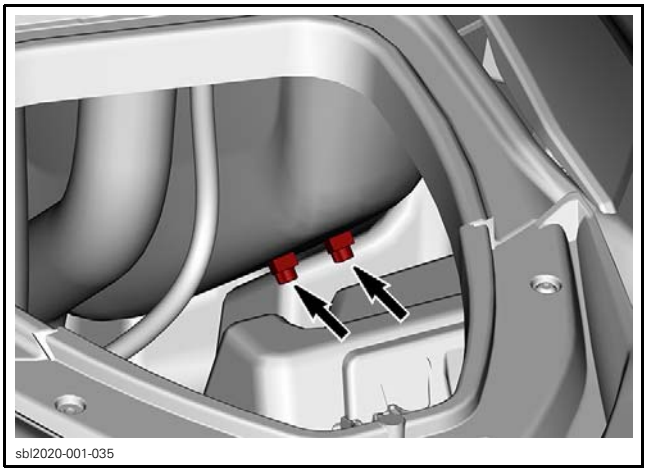

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3. Remove following fasteners and slide the left speaker to remove it.



219101005-035-016

Step 1: Remove fasteners
Step 2: Slide speaker


sbl2020-001-035

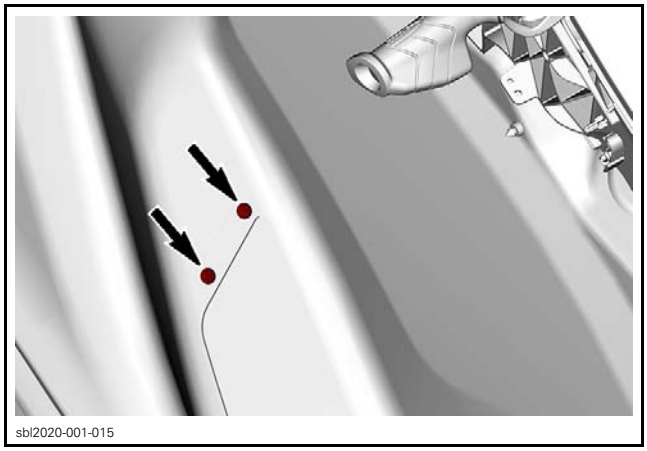
PARTS REMOVED FOR CLARITY

Installing the Premium Audio System

NOTE: Make sure to perform a steering alignment before installing the Premium Audio System. Refer to *STEERING SYSTEM* subsection.

The installation is the reverse of the removal procedure. However, pay attention to the following.

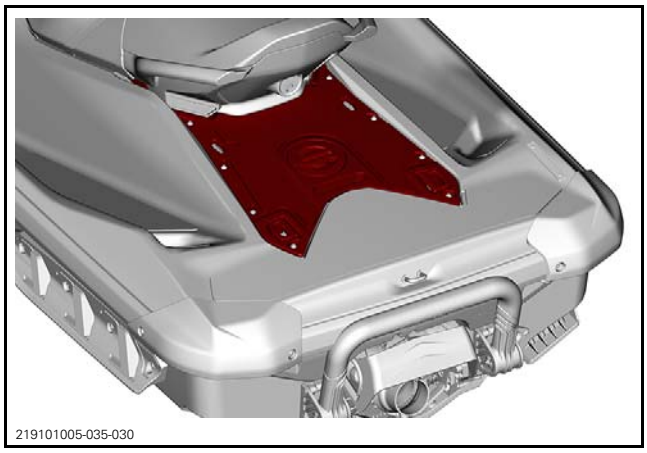
Apply a small amount of sealant in each hole.


sbl2020-001-015

SERVICE PRODUCT
LOCTITE 5900 (P/N 293 800 066)

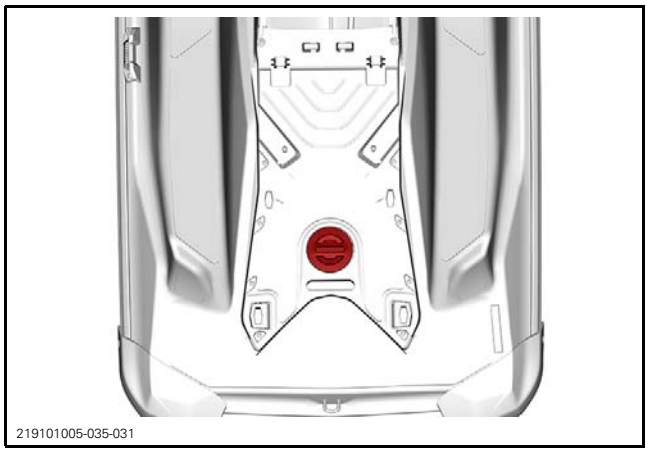
TIGHTENING TORQUE	
Premium Audio System screws	6.5 N•m ± 0.5 N•m (58 lbf•**in** ± 4 lbf•**in**)

ENGINE SERVICE COVER

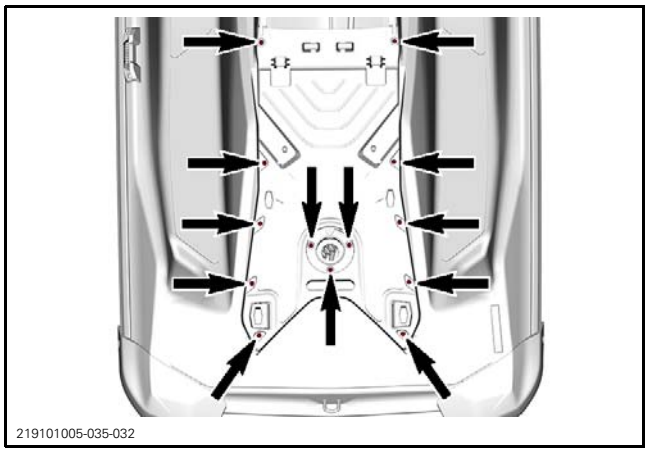

219101005-035-030

Removing the Engine Service Cover

1. Remove seats.
2. Remove wake pole cover.



3. Remove the following screws.



Installing the Engine Service Cover

The installation is the reverse of the removal procedure. However, pay attention to the following.

Install all screws.

Tighten screws to specification.

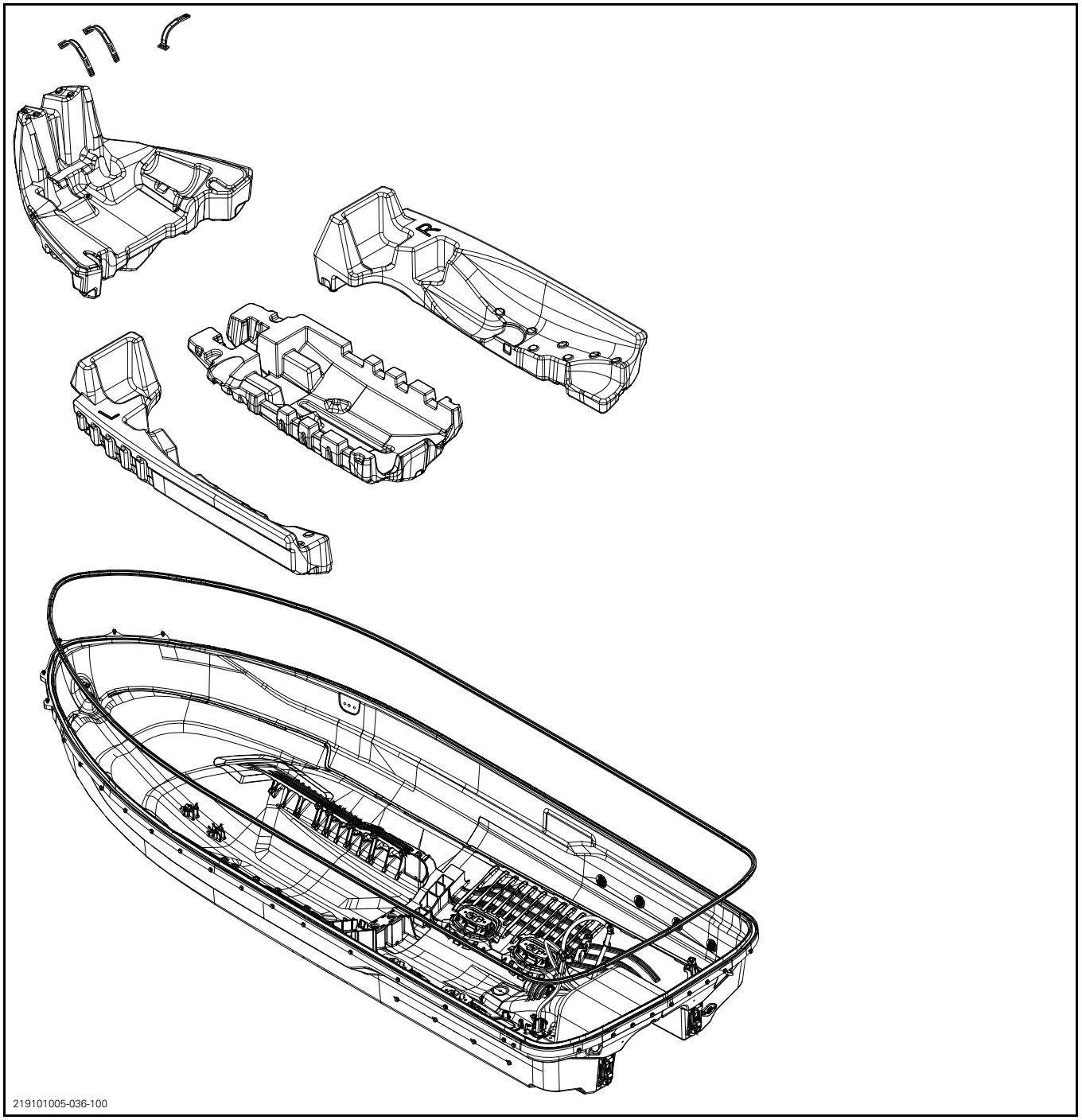
TIGHTENING TORQUE	
Engine service cover screw	2.75 N•m ± 0.25 N•m (24 lbf•**in** ± 2 lbf•**in**)

HULL

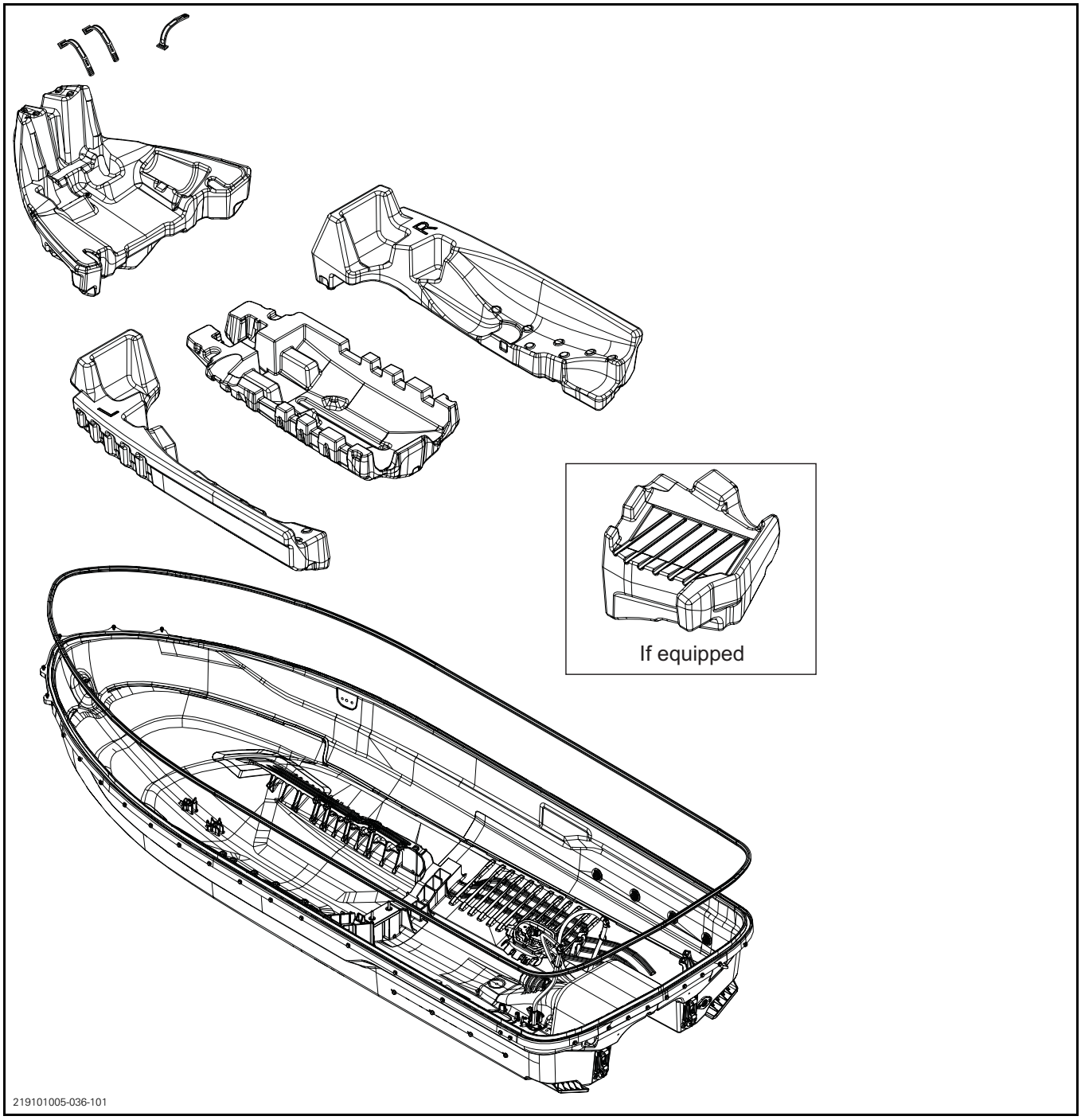
SERVICE PRODUCTS

Description	Part Number	Page
BRP HEAVY DUTY CLEANER	293 110 001	278, 280, 282
CLEAR SILICONE SEALANT	296 000 309	283, 285
LOCTITE 5900	293 800 066	278, 280, 282

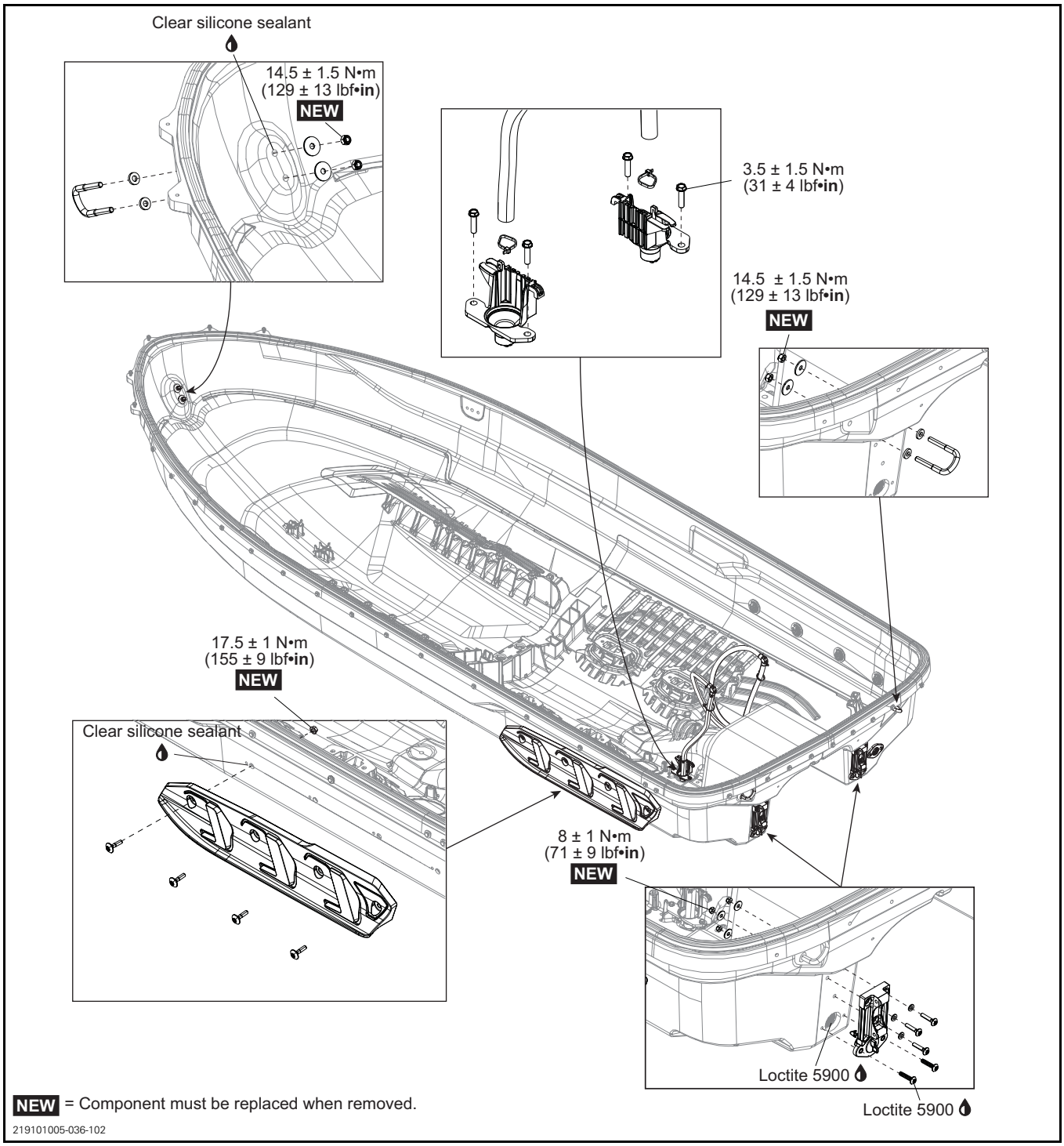
Models GTI 90



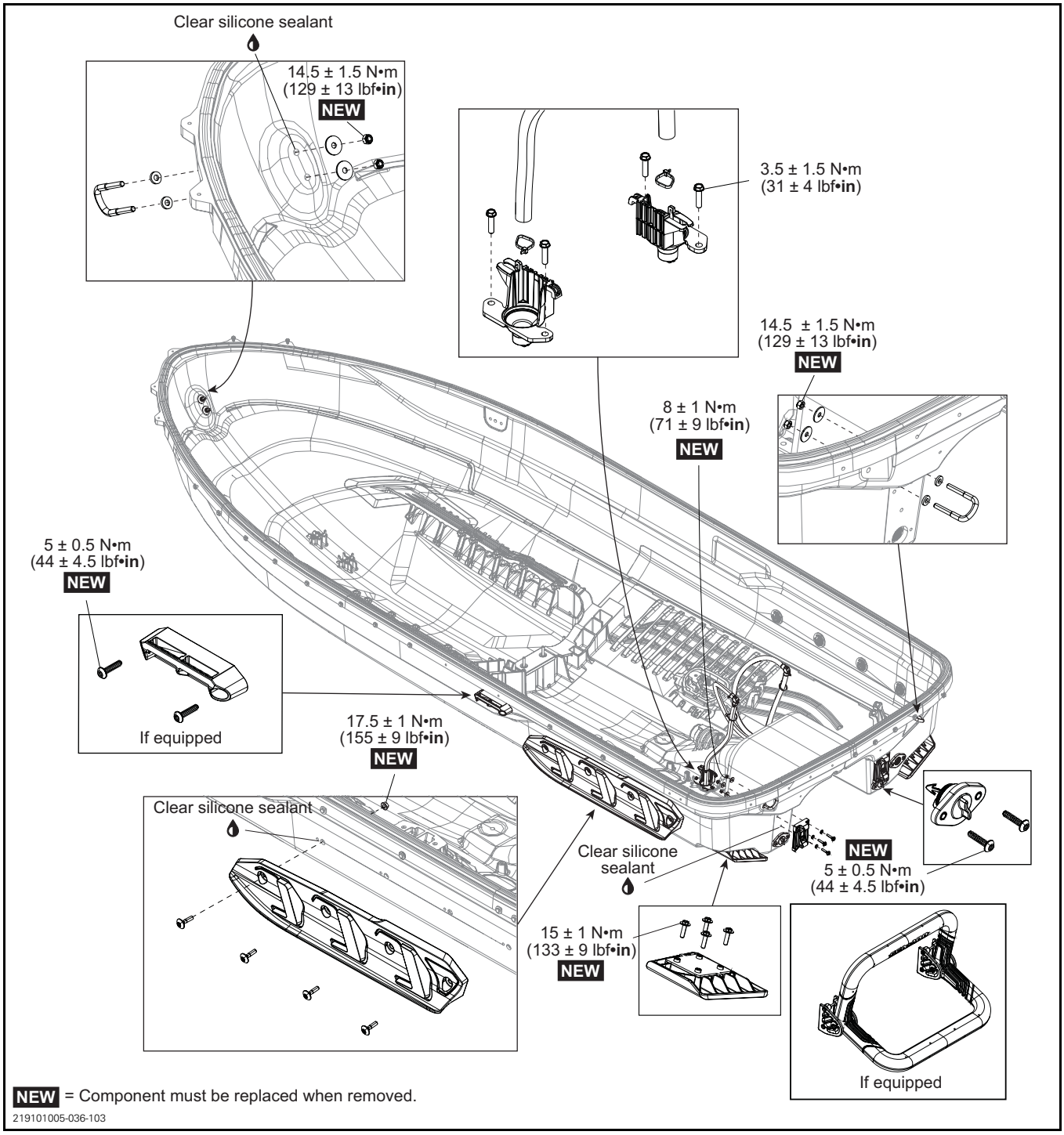
Models GTI 130, GTI 170, Wake 170 and GTR 230

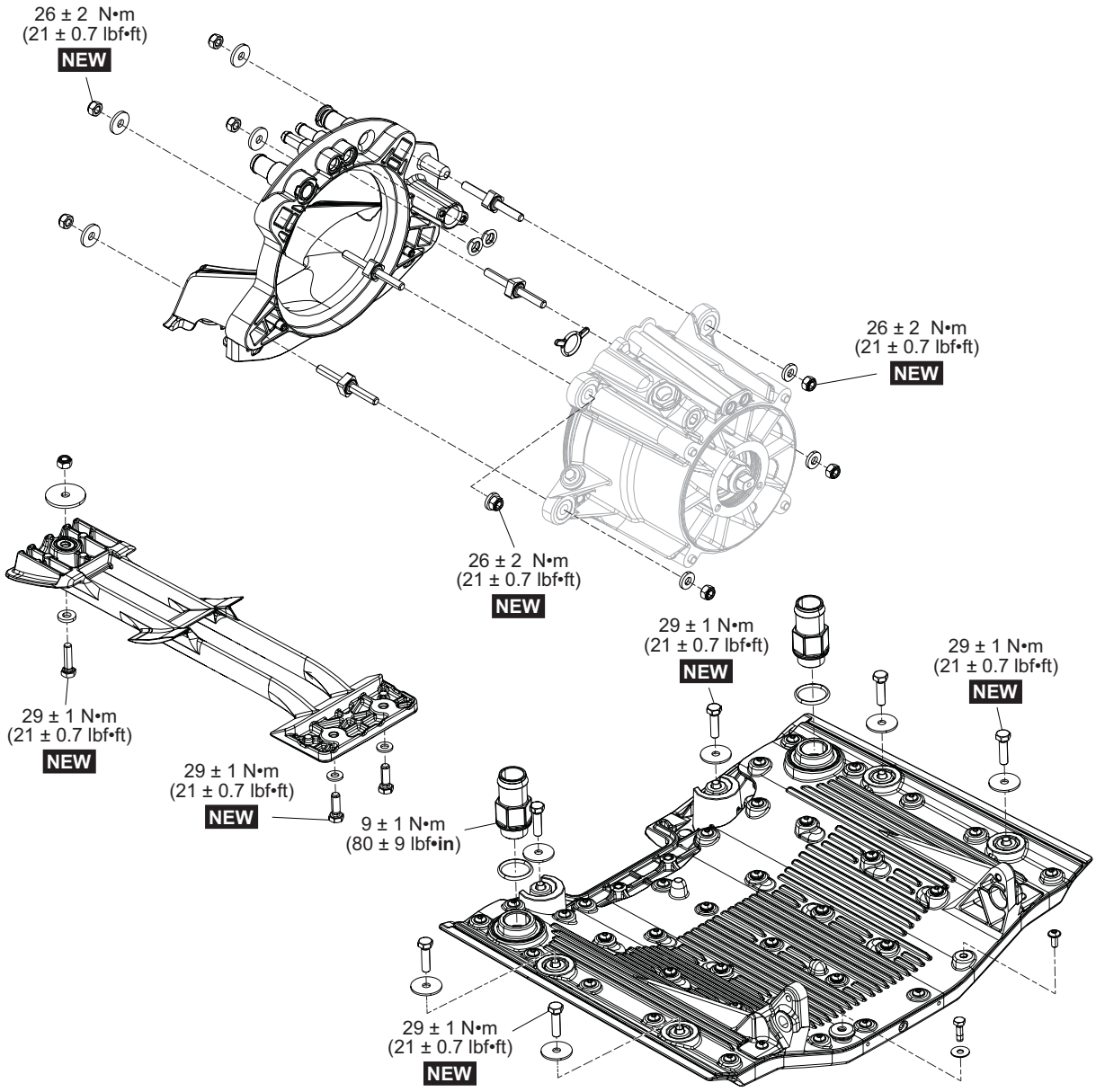


Models GTI 90



Models GTI 130, GTI 170, Wake 170 and GTR 230





NEW = Component must be replaced when removed.

219101005-036-104

PROCEDURES

HULL

Repairing the Hull

For hull repair, refer to appropriate *CARE AND REPAIR ONLINE BOOKLET* on www.operators-guides.brp.com.

Replacing the Hull

The hull is sold separately and may be replaced if damage is deemed too severe.

NOTICE **The following list is not exhaustive and represents the general order in which to proceed with hull replacement.**

Remove the following components:

1. Deck. Refer to *BODY*.
2. Battery.
3. Jet pump. Refer to *JET PUMP*.
4. Drive shaft. Refer to *DRIVE SHAFT*.
5. Air intake silencer. *AIR INTAKE SYSTEM*.
6. Engine. Refer to *ENGINE REMOVAL AND INSTALLATION*.
7. Remaining cooling system components. Refer to *COOLING SYTEM*.
8. Remaining exhaust system components. Refer to *EXHAUST SYSTEM*.
9. Remaining fuel system components. Refer to *FUEL SYSTEM*.
10. Electrical harness.
11. Steering cable. Refer to *STEERING* subsection
12. Remaining hull components.

Reverse steps for reassembling.

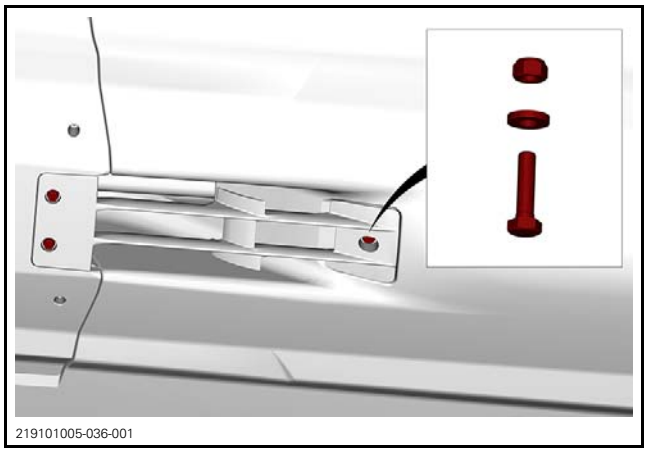
Refer to *INSTALLING THE BODY* in *BODY* subsection for hull seal installation.

NOTE: If a new hull is installed, perform a flame treat where required, to increase the adhesion of the Loctite 5900.

INLET GRATE

Removing the Inlet Grate

1. Remove inlet grate retaining screws using an impact tool. Discard screws, and nut.


219101005-036-001

2. Remove inlet grate.

Cleaning the Inlet Grate

Carefully scrape off all excess sealant from inlet grate, jet pump support and hull.

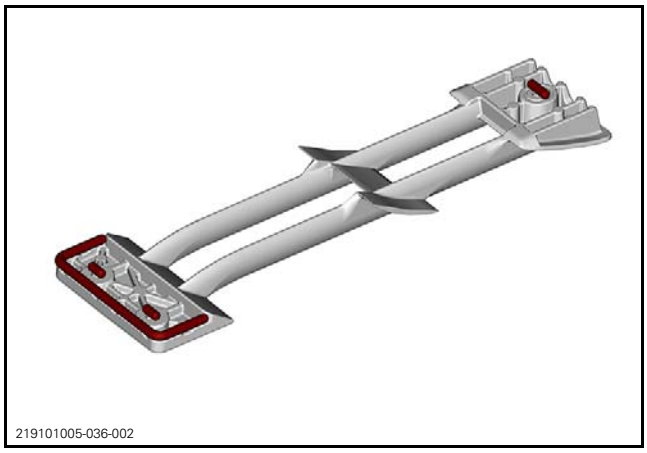
Clean ride plate and hull surface with recommended cleaner to eliminate grease, dust and sealant residue. Clean fitting threads.

SERVICE PRODUCT
BRP HEAVY DUTY CLEANER (P/N 293 110 001)

Installing the Inlet Grate

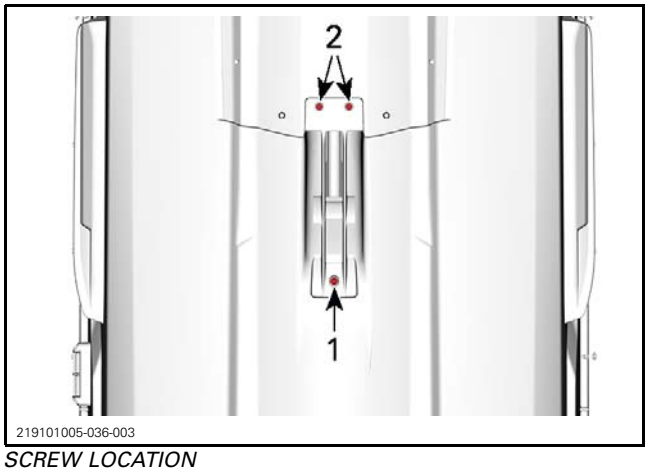
1. Apply Loctite on the inlet grate all around the front screw hole and on the edge that make contact with the jet pump support.

SERVICE PRODUCT
LOCTITE 5900 (P/N 293 800 066)


219101005-036-002

2. Install new inlet grate retaining screws and nut at the proper location.

INLET GRATE SCREWS	
LOCATION	SCREW SIZE
Front	M8 x 45
Rear	M8 x 16

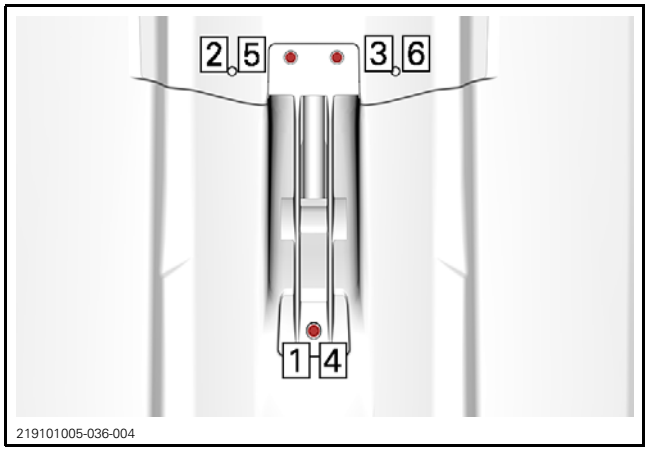


SCREW LOCATION
1. *Front*
2. *Rear*

3. Tighten screws to the specified torque and sequence.

NOTE: Start the tightening sequence by hand tighten.

TIGHTENING TORQUE		
INLET GRATE SCREWS	First step (1-4)	Hand tighten
	Second step (5-8)	27 N•m ± 1 N•m (20 lbf•ft ± 1 lbf•ft)

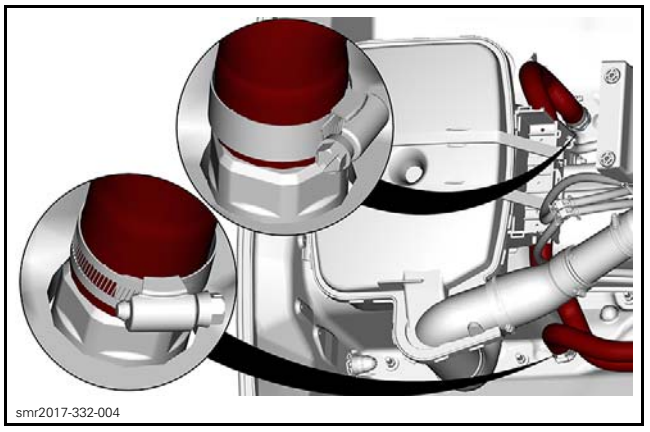


TIGHTENING SEQUENCE

RIDE PLATE

Removing the Ride Plate

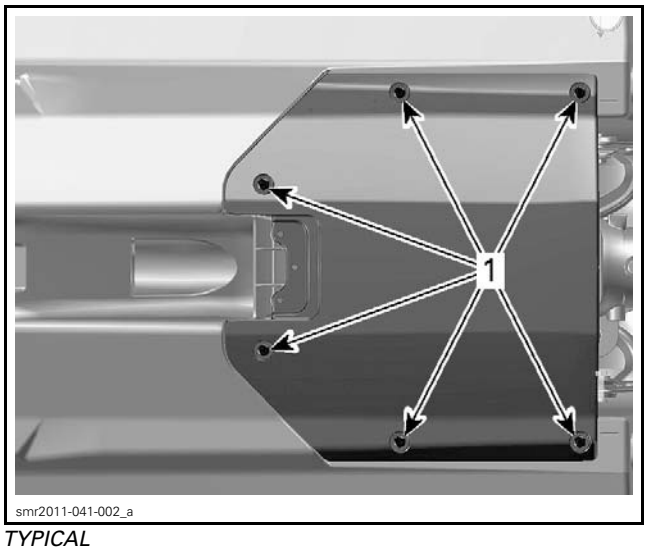
1. Remove the deck. Refer to *BODY* subsection.
2. Remove inlet grate. Refer to procedure in this subsection.
3. Remove jet pump. Refer to *JET PUMP*.
4. Drain cooling system. Refer to *COOLING SYSTEM*.
5. From inside the hull, disconnect coolant hoses from the ride plate.



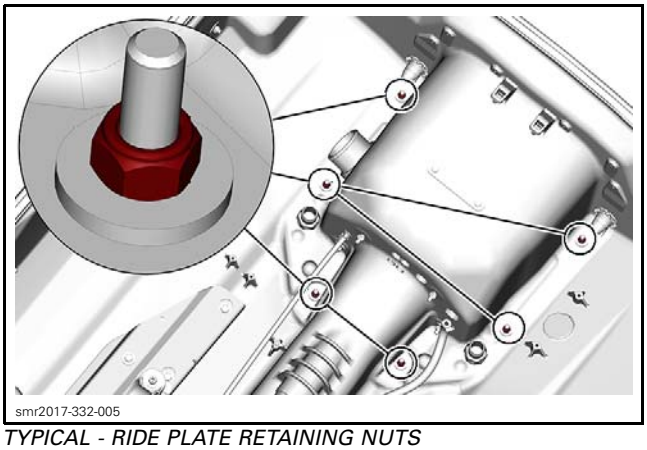
6. Remove coolant hose fittings from the ride plate.

NOTICE **If possible, remove the hose fittings from the ride plate before removing the ride plate. If fittings cannot be removed, proceed with care when removing the ride plate.**

7. Using an impact tool, remove nuts and screws and discard nuts.

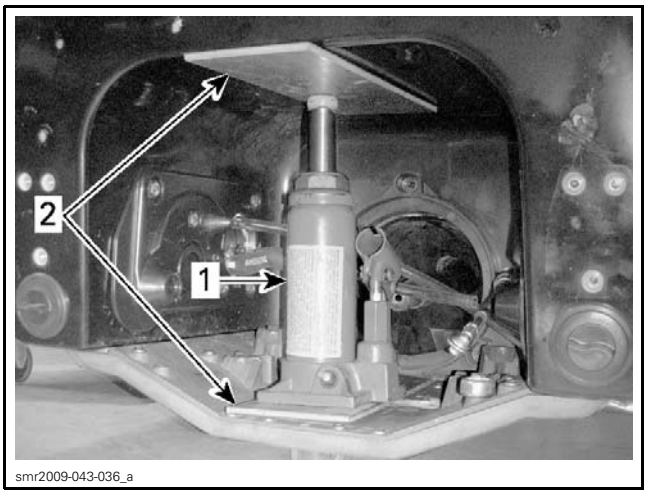


TYPICAL
1. *Ride plate retaining screws*


smr2017-332-005

TYPICAL - RIDE PLATE RETAINING NUTS

8. Install a low height hydraulic bottle jack and 2 steel plates between ride plate and hull as per following illustration.



smr2009-043-036_a

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

9. Start pumping the hydraulic jack slowly.
10. Using a sharp knife, carefully cut the sealant around the ride plate edges.
11. Pump the hydraulic jack slowly to pry the ride plate from the hull.

Cleaning the Ride Plate

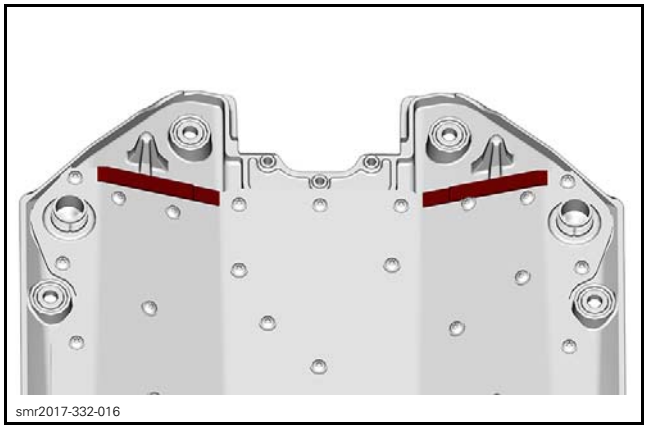
Carefully scrape off all excess sealant from ride plate and hull.

Clean ride plate and hull surface with recommended cleaner to eliminate grease, dust and sealant residue. Clean fitting threads.

SERVICE PRODUCT
BRP HEAVY DUTY CLEANER (P/N 293 110 001)

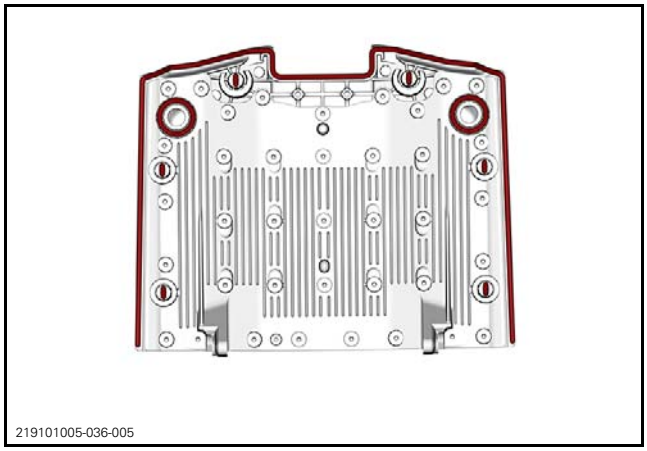
Installing the Ride Plate

1. Install seals on ride plate.


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2. Apply Loctite sealant as illustrated.

SERVICE PRODUCT
LOCTITE 5900 (P/N 293 800 066)


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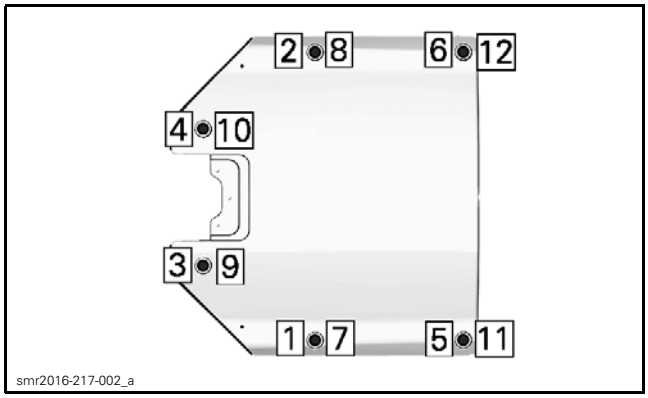
SEALANT APPLICATION

3. Install both hose fittings on the ride plate. Tighten to the specified torque.

TIGHTENING TORQUE	
Hose fittings	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

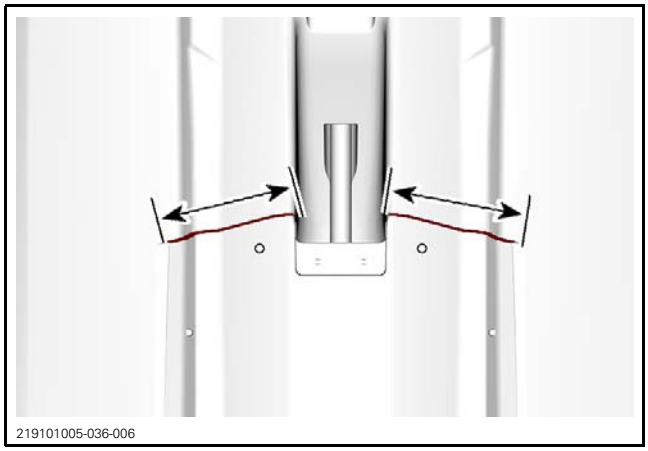
4. Position ride plate on hull and thread new nuts by hand.
5. Position inlet grate and thread new screws 5 turns by hand. Refer to *INLET GRATE* in this subsection.
6. Tighten screws and nuts to the specified torque and sequence.

TIGHTENING TORQUE		
Ride plate nuts	First step (1-6)	Hand tighten
	Second step (7-12)	25 N•m ± 1 N•m (18 lbf•ft ± 1 lbf•ft)

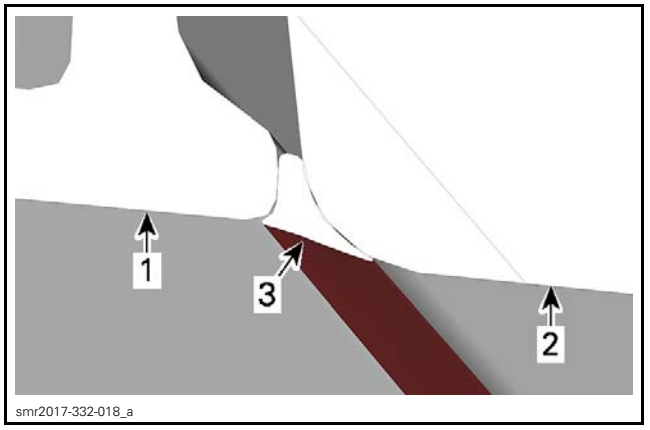


TYPICAL - RIDE PLATE TIGHTENING SEQUENCE

7. Tighten inlet grate screws to the specified torque and sequence. Refer to *INLET GRATE* in this subsection.
8. Remove the excess sealant.
9. Smooth the sealant in the gap between the ride plate and the hull.



GAP BETWEEN RIDE PLATE AND HULL



CROSS CUT - SIDE VIEW
1. *Ride plate*
2. *Hull*
3. *Smoothed sealant*

10. Reinstall coolant hoses on ride plate fittings.

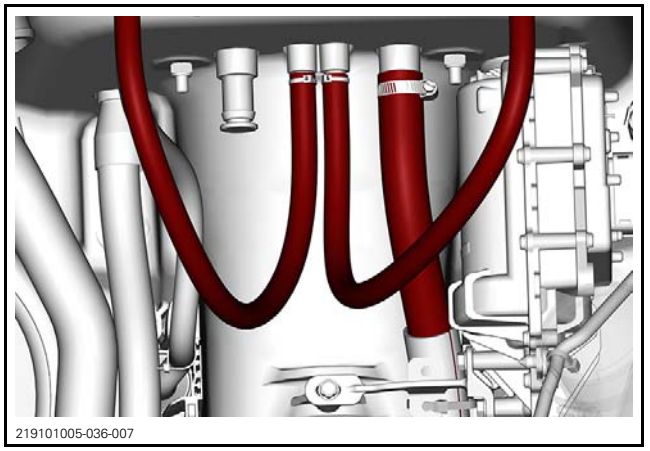
NOTICE **Make sure the coolant hose clamp screws do not rub on any component.**

11. Fill and bleed cooling system and carry out a leak test. Refer to *COOLING SYSTEM* subsection.
12. Install all remaining parts. Refer to the applicable procedures.

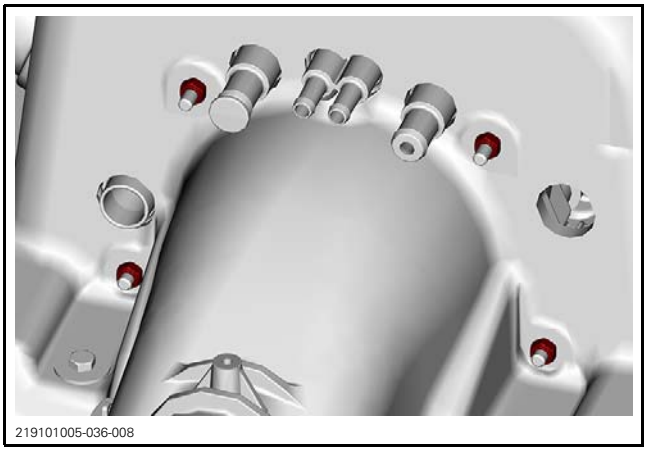
JET PUMP SUPPORT

Removing the Jet Pump Support

1. Remove the ride plate. Refer to procedure in this subsection.
2. Disconnect hoses from jet pump support.



3. Remove jet pump support retaining nuts and washers.



4. Pull jet pump support off the hull.
5. Note the alignment shims location.

NOTICE **Alignment shims have to be reinstalled at the same location.**

Cleaning the Jet Pump Support

Scrape off all excess sealant from jet pump support, ride plate, and hull.

Inspect pump support for cracks or other damage.

Clean jet pump support and hull surface with recommended cleaner to eliminate grease, dust, and sealant residue.

SERVICE PRODUCT
BRP HEAVY DUTY CLEANER (P/N 293 110 001)

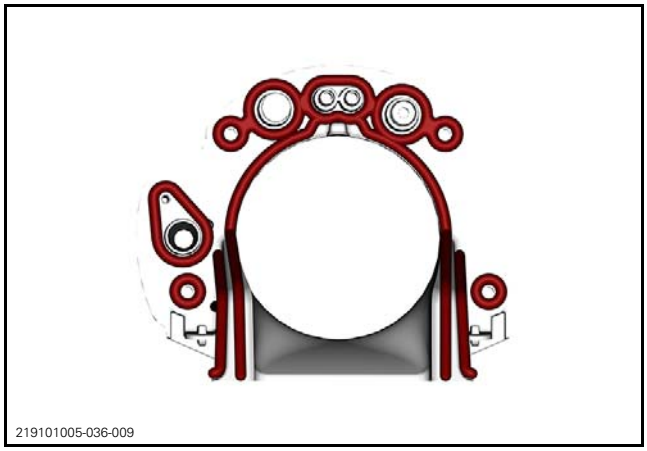
Installing the Jet Pump Support

1. Make sure sealant contact areas are clean and dry.

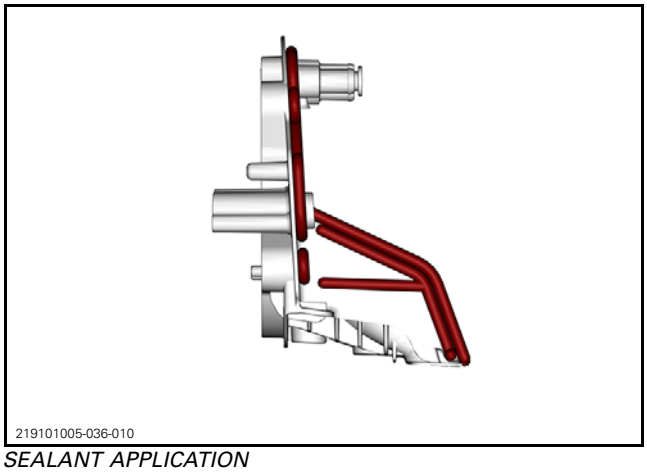
NOTE: If a new jet pump support is installed, perform a flame treat to increase the adhesion of the Loctite 5900.

2. Apply Loctite on the jet pump support as shown.

SERVICE PRODUCT
LOCTITE 5900 (P/N 293 800 066)



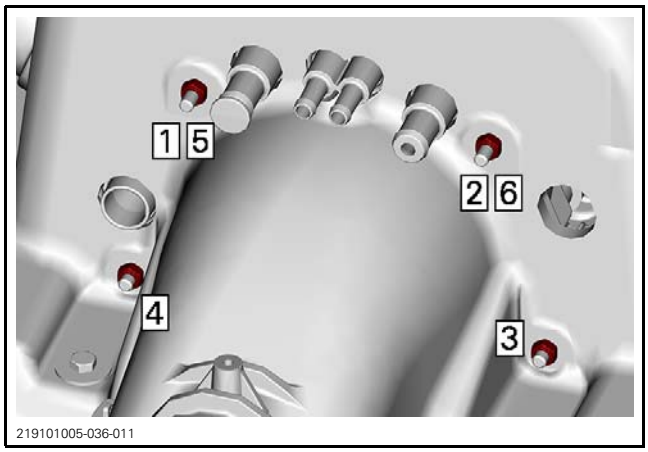
SEALANT APPLICATION



SEALANT APPLICATION

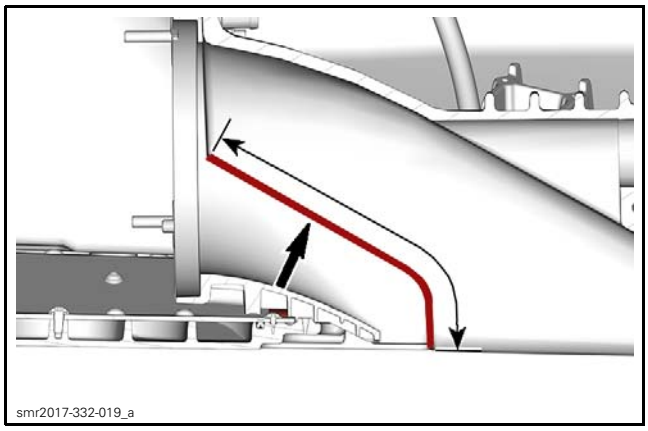
3. Insert the studs in the jet pump support square holes.
4. Slide the alignment shims on the studs.
5. Position the jet pump support against the hull.
6. Inside the hull, thread all 4 retaining nuts.
7. Tighten retaining nuts to the specified torque and sequence.

TIGHTENING TORQUE	
Jet pump support retaining nuts	25 N•m ± 1 N•m (18 lbf•ft ± 1 lbf•ft)

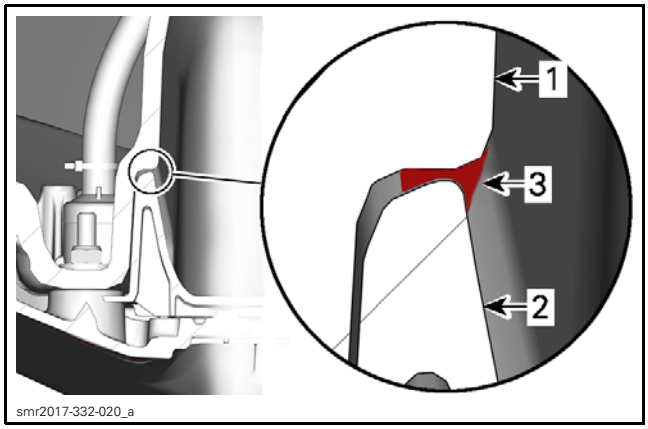


JET PUMP SUPPORT TIGHTENING SEQUENCE

8. Remove excess sealant.
9. Smooth the sealant in the gap between the jet pump support and the hull.



GAP BETWEEN JET PUMP SUPPORT AND HULL



CROSS CUT - REAR VIEW
1. Hull
2. Jet pump support
3. Smoothed sealant

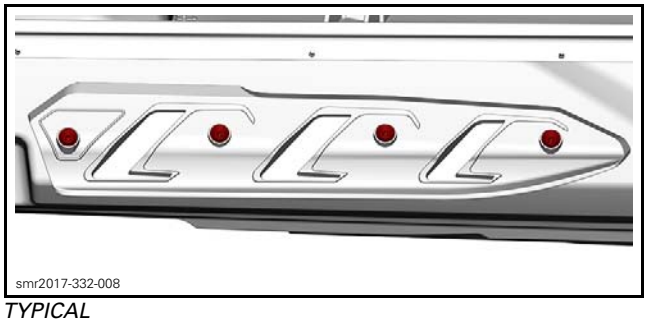
10. Reinstall other removed parts. Refer to appropriate subsections for procedures.

FIXED REAR SPONSONS

NOTE: Removal and installation procedure for RH and LH sponson is similar.

Removing the Fixed Rear Sponson

From inside hull, hold sponson nuts while removing sponson retaining bolts and washers.

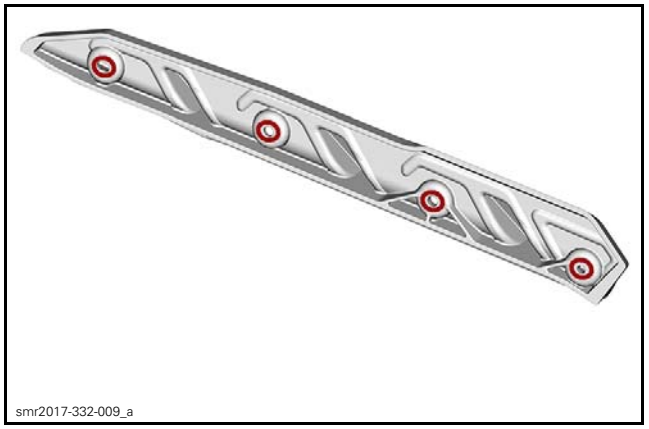


TYPICAL

Installing the Fixed Rear Sponson

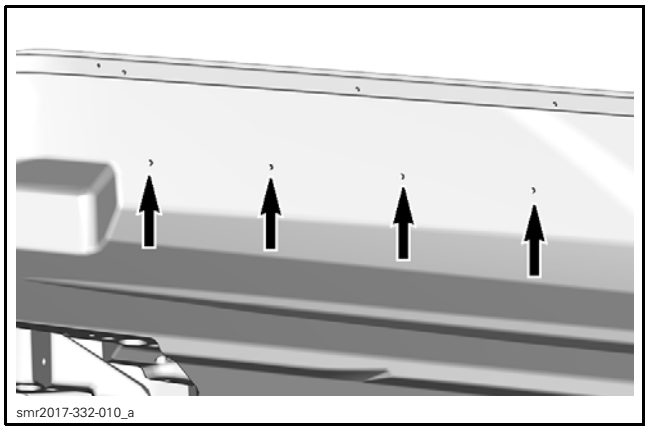
1. Clean any residues of silicone sealant on hull and sponsons.
2. Apply clear silicone sealant on back side of sponson around screw holes.

SERVICE PRODUCT
CLEAR SILICONE SEALANT (P/N 296 000 309)



TYPICAL

3. Apply a small amount of silicone into each hull hole.


smr2017-332-010_a

TYPICAL

4. Insert a bolt with washer through each hole and install the sponson against the hull.
5. From inside hull, secure each bolt with a washer and a new elastic stop nut.
6. Tighten nuts to specification.

TIGHTENING TORQUE	
Sponson retaining nuts	17.5 N•m ± 1 N•m (155 lbf•**in** ± 9 lbf•**in**)

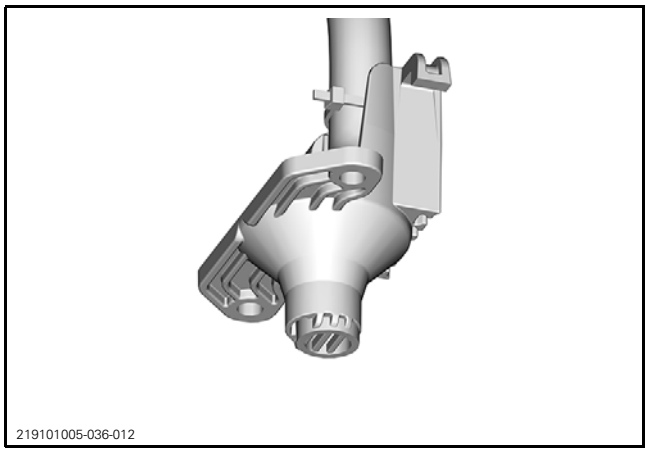
BAILERS

Two bailers (one each side), draw water from the bilge when watercraft is in operation.

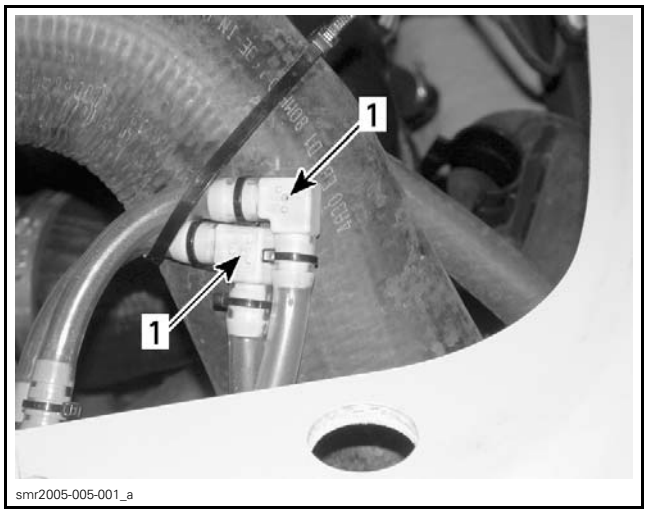
The bailers are connected to syphon tubes mounted in the jet pump venturi that use the jet pump thrust to create a vacuum.

Inspecting the Bailer

Check opening in the bailer to see if they are obstructed. Clean if necessary.


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Check if the hole on each bailer hose elbow fitting is obstructed. Clean elbow fittings if necessary.



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TYPICAL
1. Elbow fitting holes

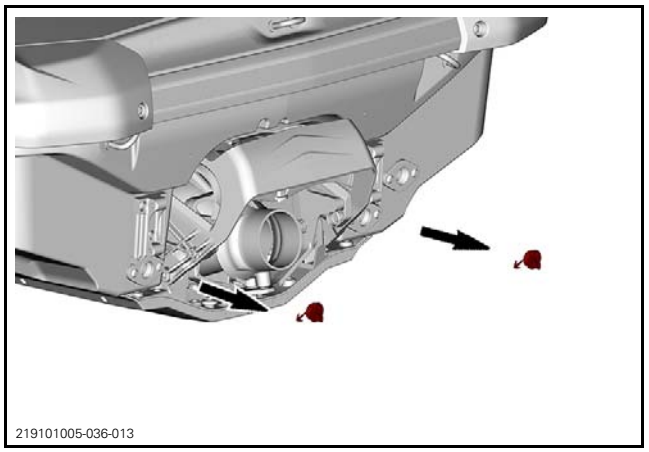
NOTE: When repositioning the bailer hose elbows, attach them at the highest available point on the exhaust hose.

DRAIN PLUGS

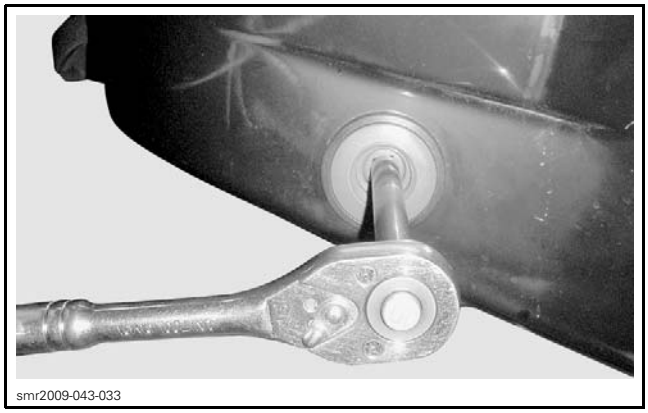
NOTE: Each drain plug on the stern are each connected to a bailer. When watercraft is off the water, the drain plugs can be removed to manually drain the bilge.

Removing the Drain Plug Neck

1. Unscrew the drain plug. from the drain neck.
2. Use a small flat screwdriver to release the arrow head from the drain plug neck.


219101005-036-013

3. Insert a ratchet extension in the square hole, then unscrew the drain neck from the hull.


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DRAIN NECK REMOVAL

Installing the Drain Plug Neck

The installation is the reverse of the removal procedure. However, pay attention to the following.

TIGHTENING TORQUE	
Drain plug neck	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

BOW AND STERN EYELETS

Accessing Bow Eyelet

Open the front storage cover.

Accessing Stern Eyelets

Remove seat.

Removing Eyelets

1. Unscrew and discard both bow eyelet retaining nuts.

NOTE: Keep all washers for installation. Bow and stern eyelets have the same hardware layout.


smr2017-332-013

TYPICAL

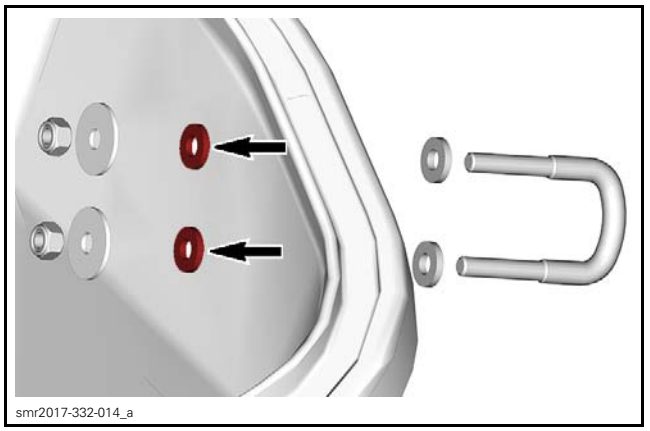
2. Pull eyelet off the hull.

Installing Eyelets

The installation is the reverse of the removal procedure. However, pay attention to the following.

Apply clear silicone sealant inside the hull, around the hole.

SERVICE PRODUCT
CLEAR SILICONE SEALANT (P/N 296 000 309)


smr2017-332-014_a

TYPICAL

TIGHTENING TORQUE	
Eyelet retaining nuts	14.5 N•m ± 1.5 N•m (128 lbf•**in** ± 13 lbf•**in**)

VEHICLES

COOLING SYSTEM		
Type		Closed loop cooling system
Coolant		BRP long life antifreeze Low silicate, extended life ethylene-glycol premixed coolant (50%-50%) specifically formulated for internal combustion aluminum engines.
Cooling system capacity	900 ACE Series	4 L (4.23 qt (U.S. liq.)) total
	1630 ACE Series	5.4 L (5.71 qt (U.S. liq.)) total
Radiator cap opening pressure		90 kPa (13 PSI)

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EXHAUST SYSTEM		
Type		D-Sea-Bel sound reduction system. Water cooled/water injected (open loop). Direct flow from jet pump
Water injection in muffler	900 ACE Series	4 x 3.5 mm (.138 in) on exhaust pipe
	1630 ACE Series	3 x 3.5 mm (.138 in) on exhaust pipe and 1 x 3.5 mm (.138 in) on muffler

FUEL SYSTEM		
Fuel type	Inside North America ((RON + MON)/2)	87 recommended
	Outside North America (RON)	91 recommended
Fuel tank (including reserve)		60 L (15.9 U.S. gal.)
Fuel tank reserve (from low level signal)		approx. 14 L (3.7 U.S. gal.)

ELECTRICAL SYSTEM	
Battery	Battery 12 volt, 18 A.h. Yuasa - YTX20HL
Anti-start system	RF D.E.S.S. with selectable maximum vehicle speed settings for learning key

ELECTRICAL SYSTEM			
Fuses	#1:	Not used	—
	#2:	Fuel Inj., Ing. Coils and Fuel Pump	15 A
	#3:	Bilge Pump (if equipped)	3 A
	#4:	Not used	—
	#5:	Not used	—
	#6:	Charge	30 A
	#7:	Cluster	5 A
	#8:	Not used	—
	#9:	iBR	30 A
	#10:	Start/Stop	5 A
	#11:	ECM	5 A
	#12:	Battery	30 A
	#13:	Diagnostic Tool 2	15 A
	#14:	Diagnostic Tool 1, Accessory connector	15 A

STEERING	
Steering	Fixed column
Steering nozzle pivoting angle	20°

PROPULSION			
Jet pump	Type		Axial flow single stage
	Grease type		Jet pump bearing grease (P/N 293550032)
Impeller	Rotation (seen from rear)		Counterclockwise
	Pitch	GTI 90	11.5°/16°
		GTI 130 GTI SE 130 GTI SE 170 Wake 170	11°/18°
		GTR 230	12°/17°
	Outside diameter	GTI 90	150 mm ± 0.06 mm (5.906 in ± .002 in)
		GTI 130 GTI SE 130 GTI SE 170 Wake 170	155.5 mm ± 0.06 mm (6.122 in ± .002 in)
		GTR 230	161 mm ± 0.06 mm (6.339 in ± .002 in)
Impeller/wear ring clearance	New		0 mm to 0.23 mm (0 in to .009 in)
	Wear limit		0.35 mm (.0138 in)

PROPULSION		
Impeller shaft	End play (new)	0
	Side play	0
Drive shaft	Coupling type	Crowned splines, direct drive
	Deflection (max.)	0.5 mm (.02 in)
Minimum required water level for propulsion system		90 cm (3 ft) underneath the lowest rear portion of hull

iBR AND VTS			
Description			Intelligent Brake and Reverse activated by a LH lever. Electronically-controlled iBR gate to provide brake, reverse, neutral and forward position
Gate angle (from horizontal line of watercraft)	Forward	Normal	Approx. from +5° to -3°
		X package X module (PAC)	Approx. from +10° to -5°
	Neutral		Approx. -55°
	Braking		Approx. -70°
	Reverse		Approx. -70°
VTS system			Electronically-controlled through the VTS control button with 3 presets position full up
VTS range angle		Normal	+8° / -3°
		X package X module (PAC)	+10° / -5°
Actuator			12 V, 75 A max. capacity. Reversible PWM (pulse-width modulation) motor

WEIGHT AND LOADING CAPACITY		
Dry weight	GTI 90	303 kg (668 lb)
	GTI 130 GTI SE 130 GTI SE 170	335 kg (739 lb)
	GTR 230	351 kg (774 lb)
	Wake 170	339 kg (747 lb)
Number of passenger (driver incl.)		3
Load limit (passenger(s) and luggages)		272 kg (600 lb)
Storage capacity		160.8 L (42.5 U.S. gal.)

DIMENSIONS	
Overall length	331.8 cm (130.6 in)
Overall width	125 cm (49.2 in)
Overall height	114 cm (44.9 in)

MATERIALS	
Impeller material	Stainless steel
Impeller housing/stator	Aluminum/aluminum
Deck	CM-TEC process, composite
Hull	Polytech process
	Fiberglass reinforced polypropylene
	CM-TEC process, composite
Inlet grate	Aluminum
Steering cover	Thermoplastic
Venturi	Aluminum
Nozzle	Aluminum
Fuel tank	Polyethylene
Seat	Polyurethane/foam

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WIRING DIAGRAM INFORMATION

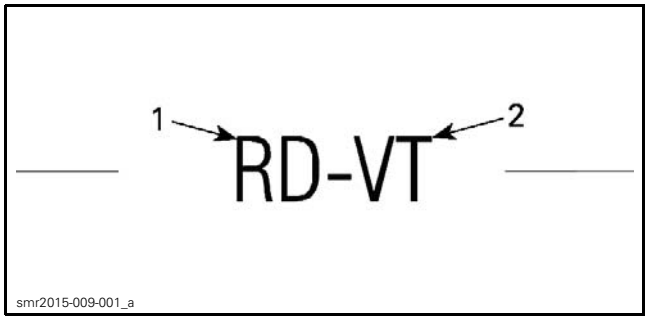
GENERAL

WIRING DIAGRAM LOCATION

The wiring diagrams are in the back cover pocket.

WIRING DIAGRAM CODES

Wire Color Codes



1. Wire main color
2. Tracer (thin colored line)

General Wire Color Use

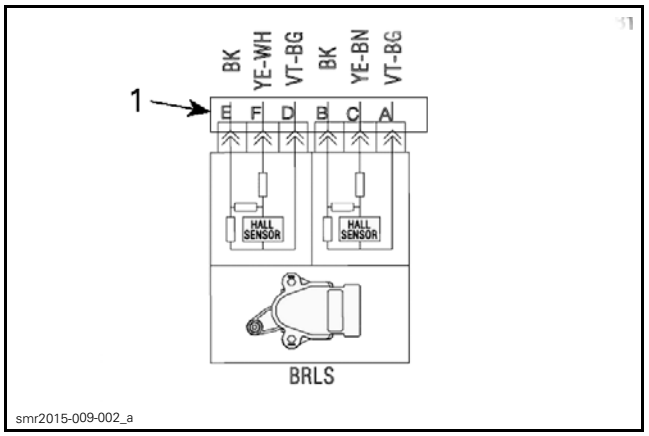
COLOR	USE
RED	Battery power (12 Vdc directly connected to battery)
RED + tracer	Fused 12 Vdc power or switched power from relay
VIOLET or VIOLET + tracer	Fused 12 Vdc accessory power from fuse box
YELLOW	Alternating current (AC) from magneto
BLACK	Ground
WHITE/BEIGE WHITE/BLACK	CAN HI wires, CAN LO wires

Color Codes

COLOR CODES			
CODE	COLOR	CODE	COLOR
BG	BEIGE (TAN)	OR / OG	ORANGE
BK	BLACK	PK	PINK
BN	BROWN	RD	RED
BU	BLUE	VT	VIOLET
GN	GREEN	WH	WHITE
GY	GRAY	YE	YELLOW

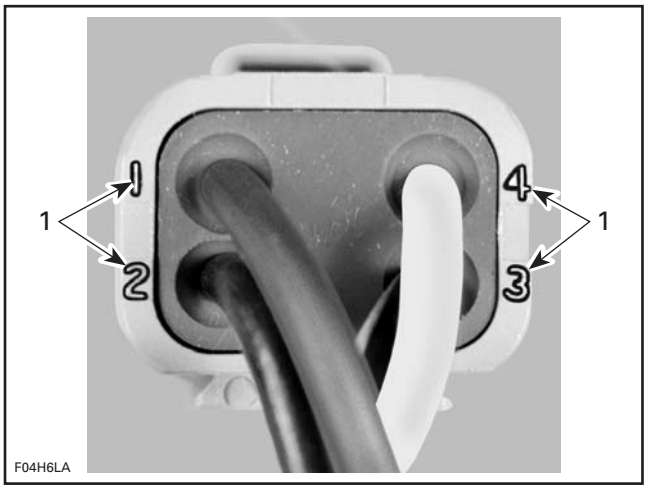
Terminal Identification on Connector

On the wiring diagram, a letter or a digit is used to identify the terminal position in a connector.



1. Terminal position

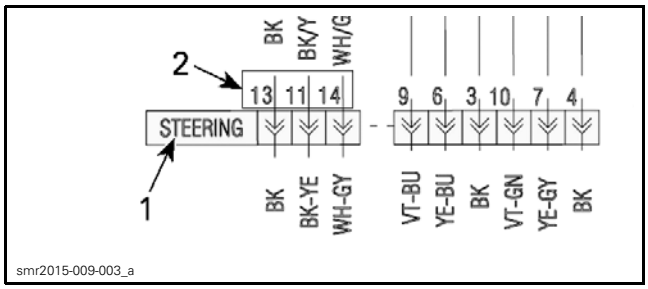
On a connector, a letter or a digit is usually molded on the connector to identify the terminal position.



TYPICAL
1. Wire identification numbers

Terminal Identification on a Wiring Diagram

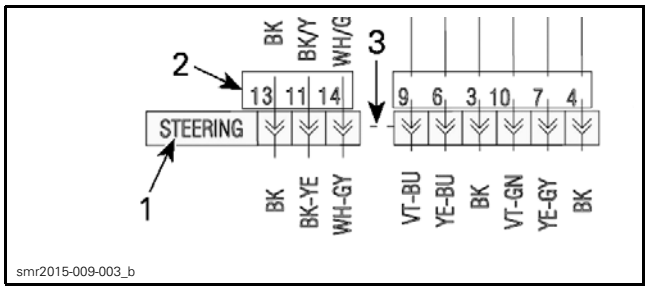
In-line connectors of wiring harnesses are identified on the wiring diagram with their approximate location and the following information.



TYPICAL
1. *Connector location*
2. *Wire pin location in connector*

Connectors Linked by a Dashed Line

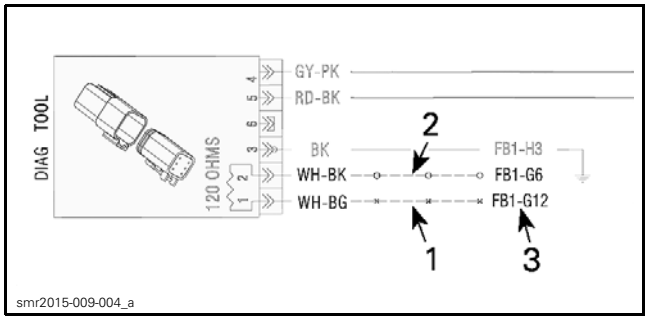
Connectors may be divided into segments linked by dashed lines, however, some segments of the same connector may be found elsewhere on the wiring diagram.



TYPICAL
1. *Connector identification and location*
2. *Connector pin number*
3. *Dashed line links connector segments as one*

CAN Wire Circuit References

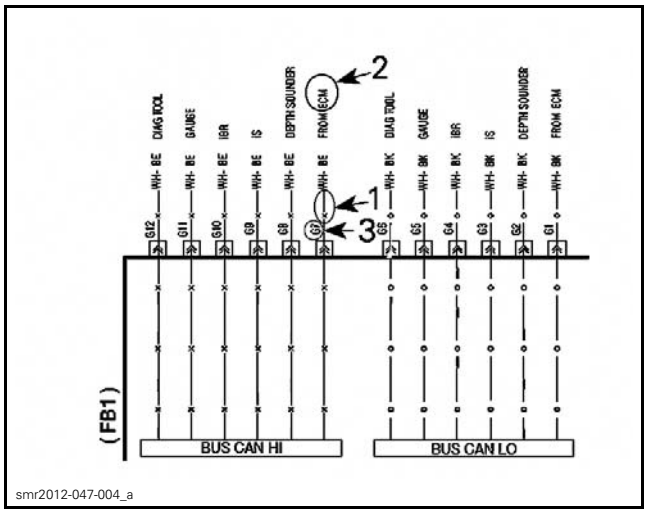
On the wiring diagram, CAN linked components use the following coding.



TYPICAL
1. *CAN HI wire (x)*
2. *CAN LOW wire (o)*
3. *Wire destination*

FB1 - G12 = : Terminal G12 in the fuse box no. 1

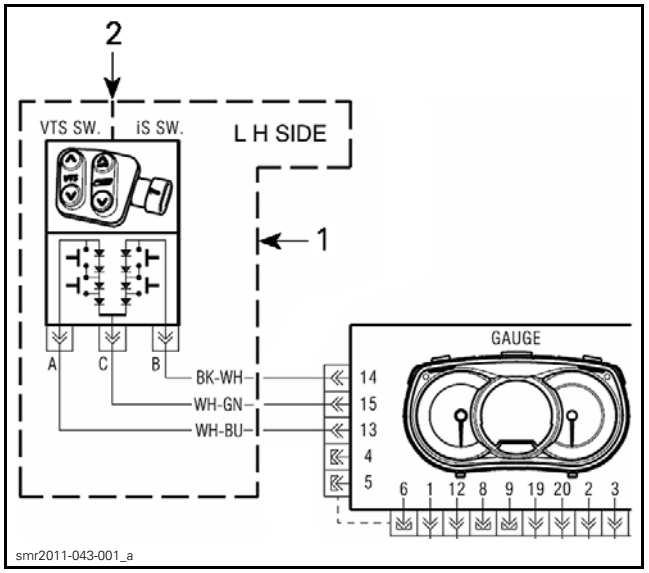
Corresponding CAN links are identified at fuse box using the following coding.



TYPICAL
1. *CAN wire*
2. *Wire origin*
3. *Destination terminal (as referenced at ECM)*

Component Application

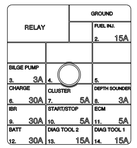
If a component in the wiring diagram is not applicable to every vehicle model, or can be installed as an option or accessory on certain models, the component shall be enclosed in a dash line.



1. *Component(s) optional or applicable to certain models*
2. *Indicates each switch is a separate component*

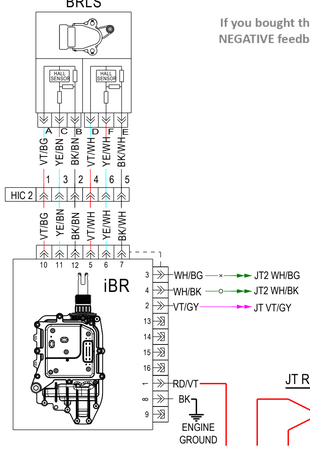
2022 Main Harness

GTI / GTX / RXT / WAKE / RXP



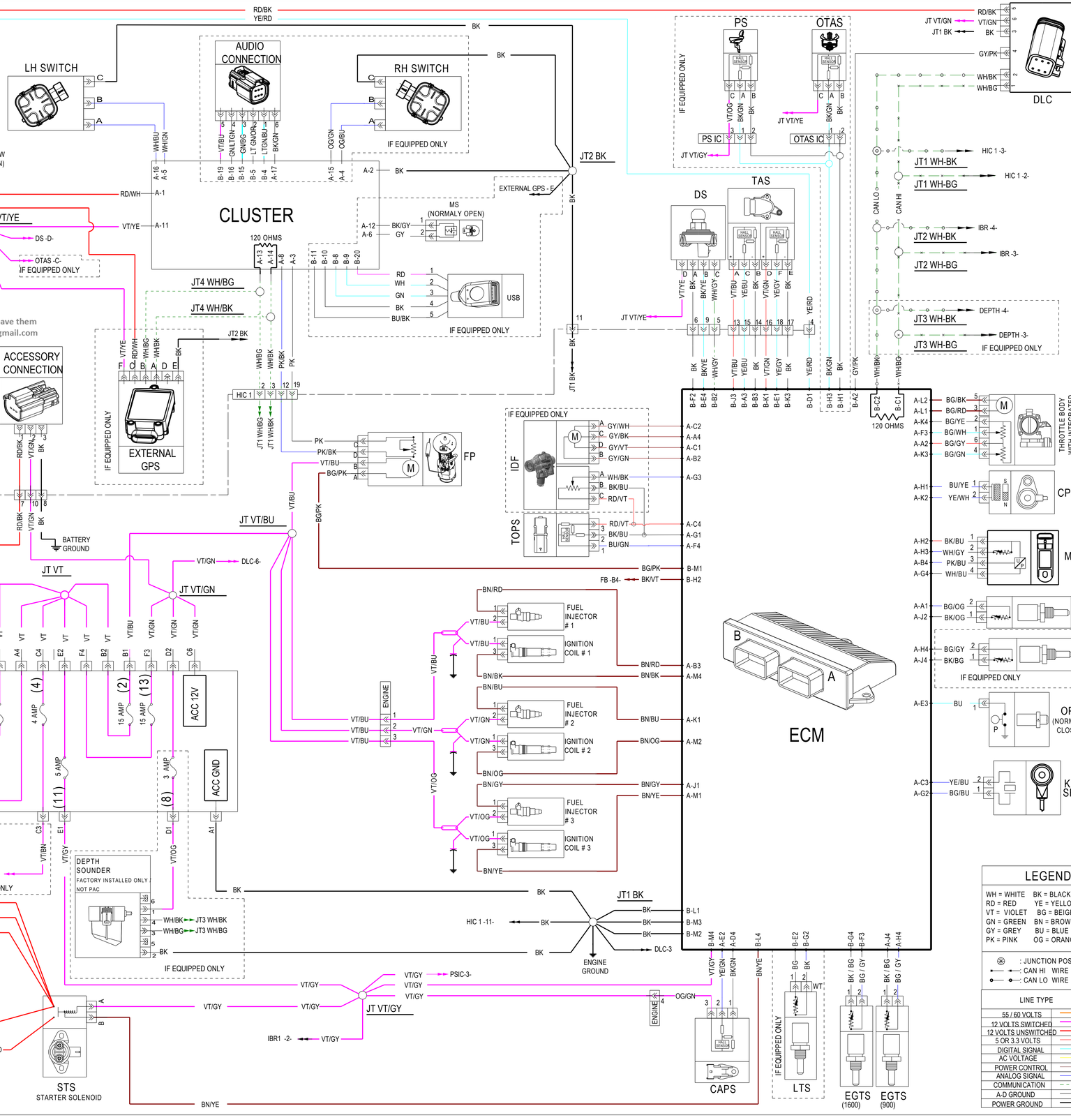
FUSE BOX (FB)

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LEGEND

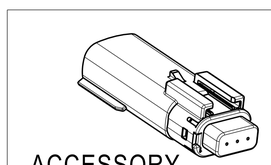
WH = WHITE	BK = BLACK
RD = RED	YE = YELLOW
VT = VIOLET	BG = BEIGE (TAN)
GN = GREEN	BN = BROWN
GY = GREY	BU = BLUE
PK = PINK	OG = ORANGE

: JUNCTION POSITION
: CAN HI WIRE
: CAN LO WIRE

LINE TYPE

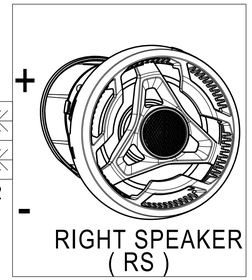
55 / 60 VOLTS
12 VOLTS SWITCHED
12 VOLTS UNSWITCHED
5 OR 3.3 VOLTS
DIGITAL SIGNAL
AC VOLTAGE
POWER CONTROL
ANALOG SIGNAL
COMMUNICATION
A-D GROUND
POWER GROUND

2022 ***SOUND SYSTEM WITH BLUETOOTH DONGLE***
GTI / GTR



1 RD / BK
3 BK
2 VT / GN

RIGHT SPEAKER ENCLOSURE



1 GY
2 GY / BK

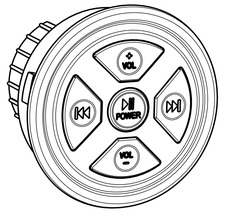
2 3 1 4 5 6

LINE TYPE	
55 / 60 VOLTS	
12 VOLTS SWITCHED	
12 VOLTS UNSWITCHED	
5 OR 3.3 VOLTS	
DIGITAL SIGNAL	
AC VOLTAGE	
POWER CONTROL	
ANALOG SIGNAL	
COMMUNICATION	
A-D GROUND	
POWER GROUND	

LEGEND

WH = WHITE BK = BLACK
RD = RED YE = YELLOW
VT = VIOLET BG = BEIGE (TAN)
GN = GREEN BN = BROWN
GY = GREY BU = BLUE
PK = PINK OG = ORANGE

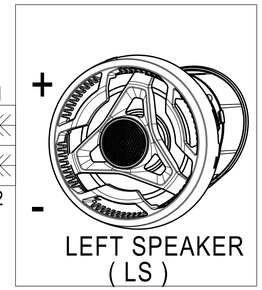
: JUNCTION POSITION
: CAN HI WIRE
: CAN LO WIRE



BLUETOOTH DONGLE
(BDG)

1 VT / GN
3 BK
4
2 VT / BU
5 LT GN / BU
6 LT GN / OR
7 GN / BG
8 GN / LT GN

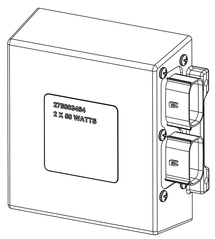
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1 BU
2 BU / BK

GN / LT GN
GN / BG
LT GN / OR
LT GN / BU
VT / BU
BK
RD / BK
GY
GY / BK
BU
BU / BK

8 7 6 5 2 4 3 1 11 12 9 10



AMPLIFIER
(AMP)

LEFT SPEAKER ENCLOSURE

2022
Service Manual

Sea-Doo® 900 ACE Engines

ROTAX®

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(P/N 529 036 037)



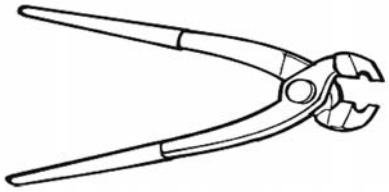
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INTAKE MANIFOLD

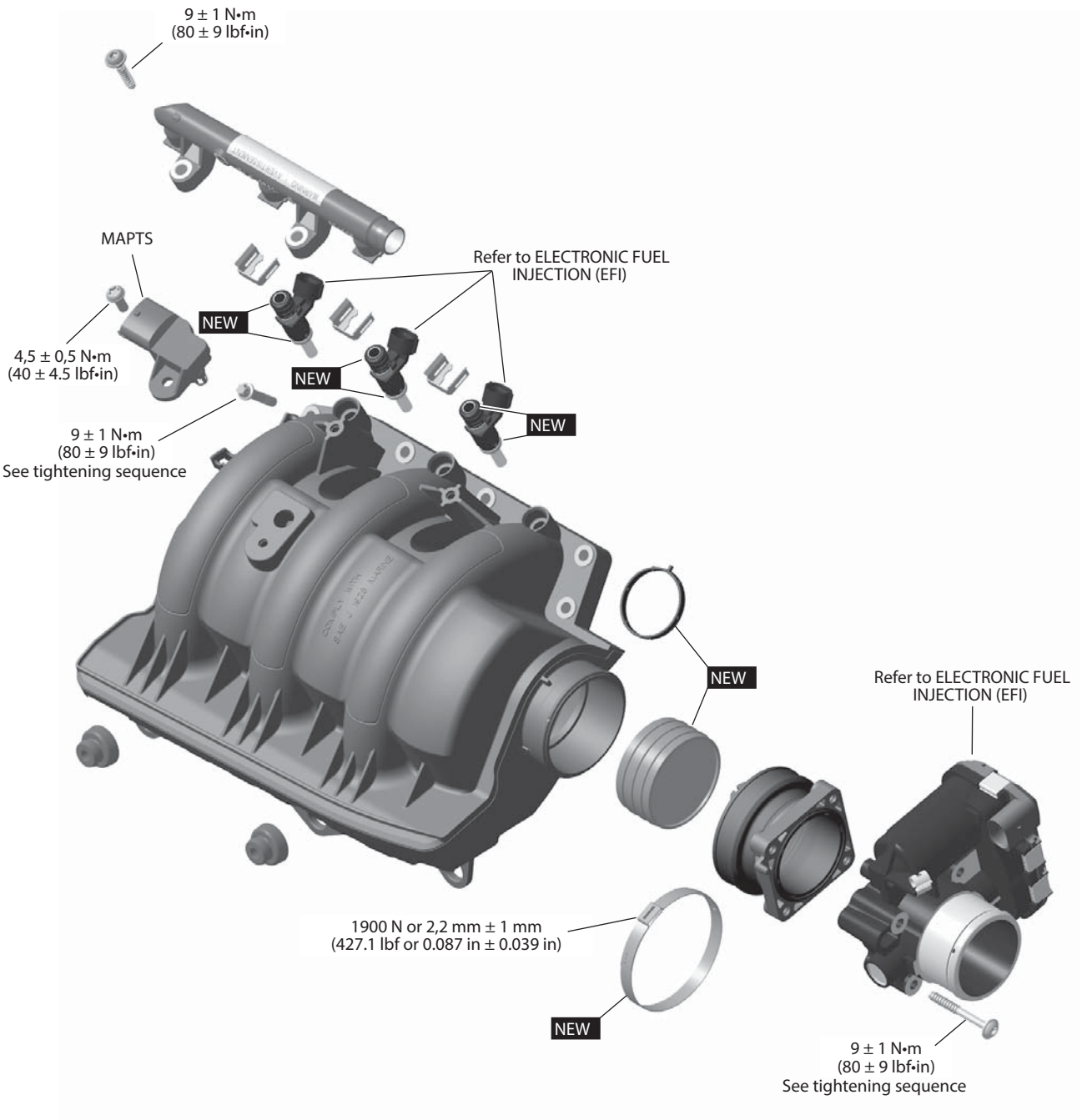
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INTAKE MANIFOLD



NEW = Component must be replaced when removed.

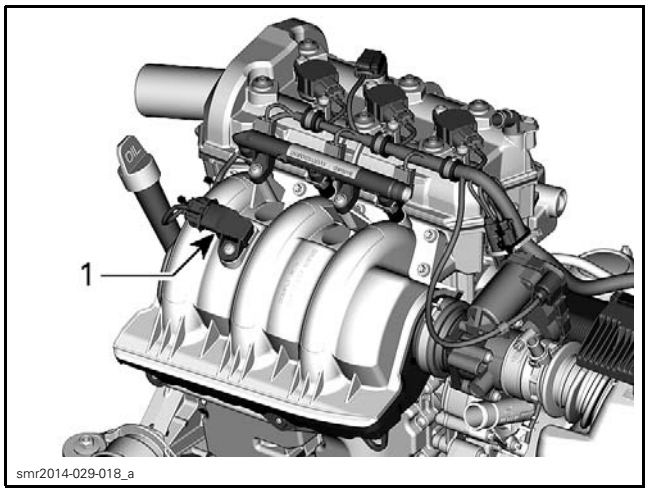
smr2014-013-200

PROCEDURES

MANIFOLD ABSOLUTE PRESSURE AND TEMPERATURE SENSOR (MAPTS)

NOTE: This sensor is a multifunction device. It measures manifold absolute pressure and intake air temperature for air flow calculations.

MAPTS Access



MAPTS LOCATION
1. Manifold air pressure and temperature sensor (MAPTS)

MAPTS Pressure Function

Before the engine is started, when power is applied to the system, the sensor measures the ambient atmospheric air pressure. The ambient air pressure is at that moment stored in the ECM. Thereafter, once the engine is started, it measures the air pressure in the intake manifold at operating RPMs.

The sensor must be correctly installed on the intake manifold. Otherwise, the MAPTS could generate a fault code for an unexpected sensor range at idle when it reads an erroneous intake manifold pressure. If this is the case, remove sensor and check for oil or dirt on its end and if problem persists, check throttle plate condition/position and the wiring harness. Perform the following tests.

MAPTS Quick Test (Pressure Function)

1. Connect vehicle to BUDS2 Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2, select the following:
   – Scan
   – Measurements page tab
   – ECM page.
3. Look for and take note of the MAPTS pressure reading while the engine is stopped.

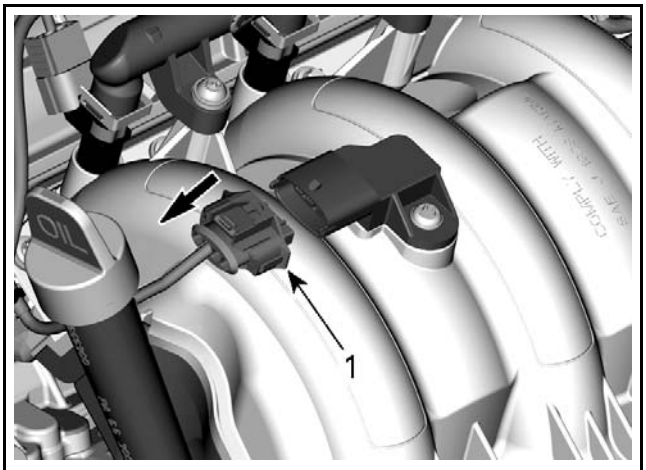
NOTE: The indicated intake air pressure in BUDS2 must be within 3.4 kPa (.5 PSI) of local atmospheric pressure when the engine is stopped.

MAPTS PRESSURE FUNCTION QUICK TEST			
RESULT	Service action		
NO READING	Circuit Continuity Test of MAPTS Pressure Function	MAPTS Input Voltage Test	Repair or replace wiring
VALUE IS OUT OF RANGE	Replace MAPTS		

4. Perform the same test with a new MAPTS and compare both readings.

Testing the MAPTS Input Voltage

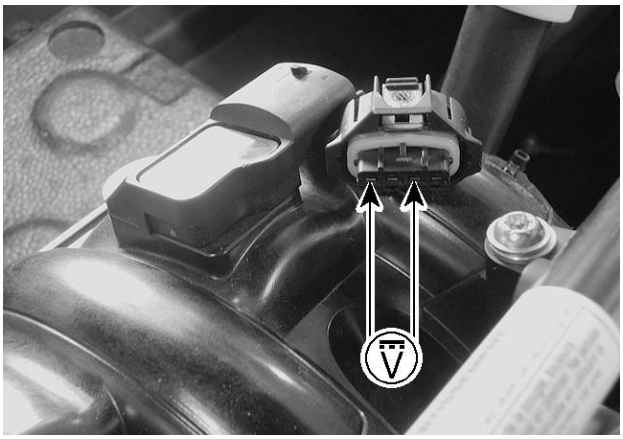
1. Remove parts required to access the MAPTS, refer to *MAPTS ACCESS*.
2. Remove electrical connector from MAPTS.



1. MAPTS connector

3. Briefly press START/STOP button.
4. Install tether cord cap on engine shut-off switch.
5. Using a FLUKE 115 MULTIMETER (P/N 529 035 868) set to Vdc, measure for MAPTS input voltage as per following table.

MAPTS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
1	3	5 Vdc


smr2014-029-033_a

If voltage test is good, replace the MAPTS.

If voltage test is not good, carry out the *MAPTS CIRCUIT CONTINUITY TEST (PRESSURE FUNCTION)*.

Testing the MAPTS Circuit Continuity (Pressure Function)

1. Remove parts required to access ECM connectors, refer to *ECM CONNECTOR ACCESS* in this subsection.
2. Disconnect the ECM-A connector from the ECM and connect it to the ECM adapter tool.

ECM ADAPTER TOOL (P/N 529 036 166)	

3. Using the FLUKE 115 MULTIMETER (P/N 529 035 868) set to Ω and check continuity of the following circuits.


529035868

MAPTS CIRCUIT CONTINUITY (PRESSURE FUNCTION)		
ECM-A	MAPTS CONNECTOR	RESISTANCE VALUE
Pin B4	Pin 3	Close to 0 Ω
Pin G4	Pin 4	
Pin H2	Pin 1	

If resistance is not within specification, repair or replace the wiring harness between ECM connector and the MAPTS. Refer to *WIRING DIAGRAM.*

MAPTS Temperature Function

The MAPTS also monitors the temperature of the air in the intake manifold.

Testing the MAPTS (Temperature Function)

1. Connect vehicle to BUDS2 Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2, select the following:
   – Scan
   – Measurements page tab
   – ECM page.
3. Look for the Intake Air temperature reading while the engine is stopped.

NOTE: If the complete vehicle is at room temperature, BUDS2 should display the ambient air temperature at the intake manifold.

4. Perform the same test with a new MAPTS and compare both readings.

If the engine's MAPTS temperature reading is significantly different than the new MAPTS, replace it.

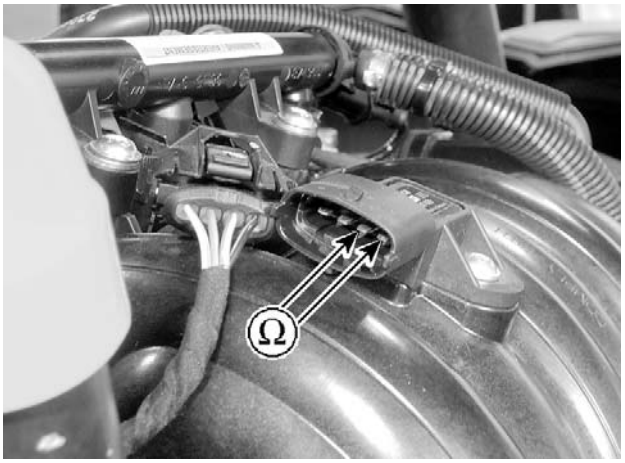
NOTE: Both sensors must feel same ambient air temperature.

If there is no reading, carry out a *MAPTS RESISTANCE TEST (TEMPERATURE FUNCTION)*.

Testing the MAPTS Resistance (Temperature Function)

1. Disconnect the MAPTS connector.
2. Using the FLUKE 115 MULTIMETER (P/N 529 035 868) set to Ω, test MAPTS resistance at the sensor as per following tables.

MAPTS		MEASUREMENT
PIN		Refer to MAPTS TEMPERATURE SENSOR TABLE
1	2	



smr2014-029-034_a

MAPTS TEMPERATURE SENSOR TABLE		
TEMPERATURE		**RESISTANCE (ohms)**
°C	°F	MAPTS
- 40	- 40	40528 TO 56935
- 10	- 14	8103 to 10919
20	68	2193 to 2863
80	176	294 to 368
120	248	98 to 122

If resistance is not within specification, replace the MAPTS.

If resistance tests good, reconnect the MAPTS and proceed with the following steps.

3. Disconnect the ECM-A connector.
4. Install ECM-A connector on the ECM adapter tool.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

5. Using a multimeter, recheck resistance value as per following table.

ECM ADAPTER		**MEASUREMENT**
PIN		Refer to MAPTS TEMPERATURE SENSOR TABLE
H2	H3	

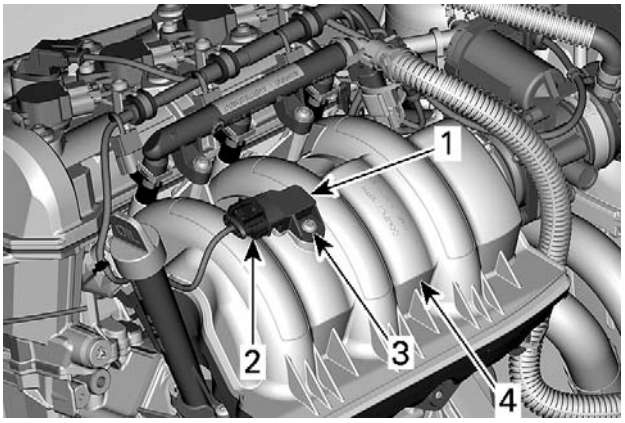
MAPTS TEMPERATURE SENSOR TEST RESULTS			
RESULT	Service action		
NO READING	Circuit Continuity Test of MAPTS Temperature Function	MAPTS Input Voltage Test	Repair or replace wiring
INCORRECT RESISTANCE VALUE	Check condition of connector pins, replace MAPTS		
CORRECT RESISTANCE VALUE	Try a new ECM		

Testing the MAPTS Circuit Continuity (Temperature Function)

MAPTS CIRCUIT CONTINUITY (TEMPERATURE FUNCTION)		
ECM ADAPTER	MAPTS CONNECTOR	RESISTANCE VALUE
Pin H2	Pin 1	Close to 0 Ω
Pin H3	Pin 2	

Repair or replace wiring as required.

Replacing the MAPTS



smr2014-029-022_a

1. MAPTS
2. MAPTS connector
3. Retaining screw
4. Intake manifold

1. Disconnect MAPTS connector and remove the MAPTS from the intake manifold.
2. Install new MAPTS as per following table.

TIGHTENING TORQUE	
MAPTS screw	4.5 N•m ± 0.5 N•m (40 lbf•**in** ± 4 lbf•**in**)

Apply DIELECTRIC GREASE (P/N 293 550 004) on MAPTS connector.

FLAME ARRESTOR

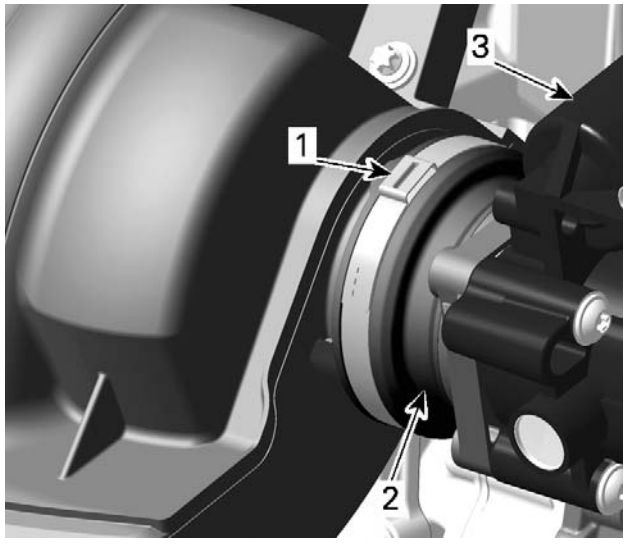
Location of the Flame Arrestor

The flame arrestor is integrated in the intake manifold.

Accessing the Flame Arrestor

Remove Oetiker clamp and discard it.

REQUIRED TOOL	
OETIKER PLIER (P/N 295 000 070)	



smr2014-013-003_a

1. Oetiker clamp
2. Connecting socket
3. Throttle body

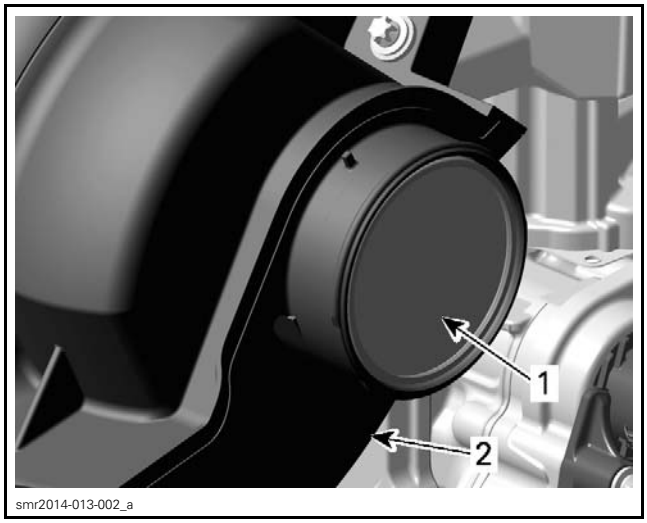
Remove connecting socket from intake manifold.

Move connecting socket with throttle body aside.

Inspecting the Flame Arrestor

Check if flame arrestor is clogged.

NOTE: A clogged flame arrestor may have a negative impact on engine performance.



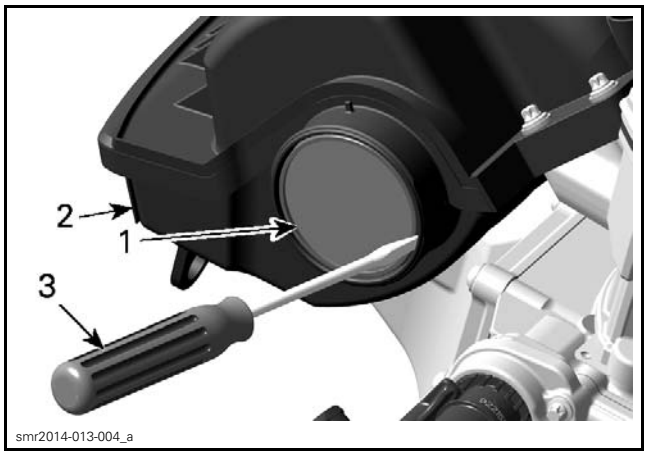
smr2014-013-002_a

1. Flame arrestor
2. Intake manifold

Removing the Flame Arrestor

Carefully insert a small flat screwdriver between flame arrestor gasket and intake manifold.

Pry out flame arrestor from intake manifold in alternate diagonally order.



smr2014-013-004_a

1. Flame arrestor
2. Intake manifold
3. Flat screwdriver

Cleaning the Flame Arrestor

Clean flame arrestor with solvent and compressed air.

Inspecting the Connecting Socket

Check if connecting socket is cracked, brittle or otherwise damaged. Replace if necessary.


smr2014-013-012

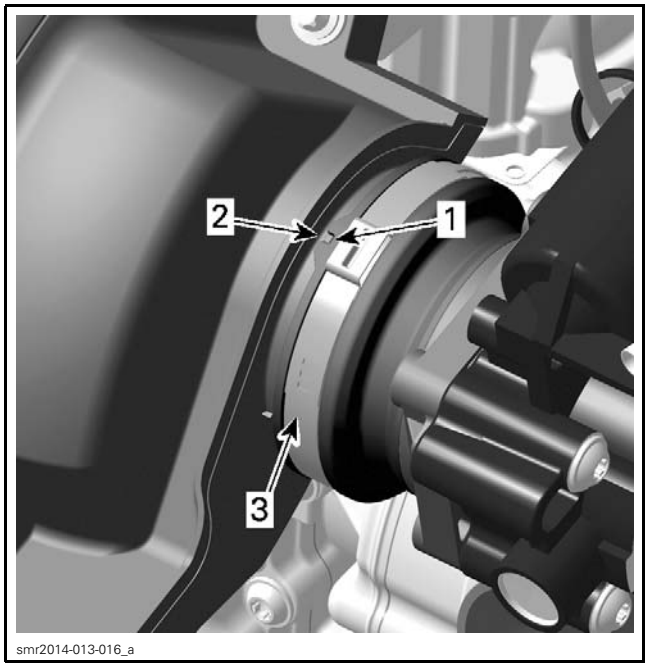
CONNECTING SOCKET

Installing the Flame Arrestor

The installation is the reverse of the removal procedure. However, pay attention to the following.

Always install a **NEW** gasket on the flame arrestor.

Make sure to index connecting socket notch with intake manifold tab.

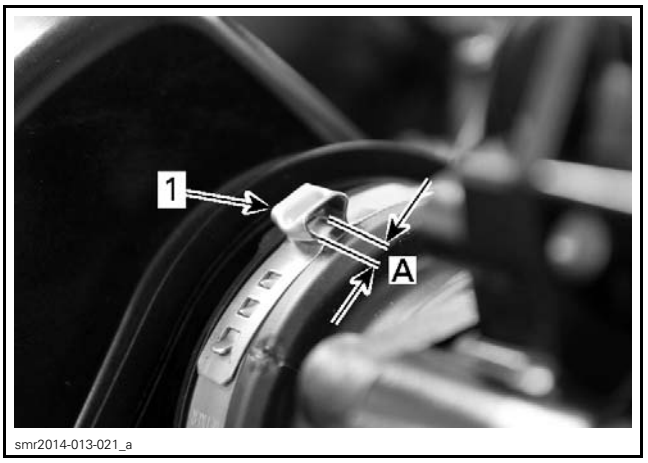


smr2014-013-016_a

1. *Connecting socket notch*
2. *Intake manifold tab*
3. *Oetiker clamp*

Crimp Oetiker clamp beside the intake manifold tab. Refer to exploded view for crimping specifications.

REQUIRED TOOL	
OETIKER PLIER (P/N 295 000 070)	



smr2014-013-021_a

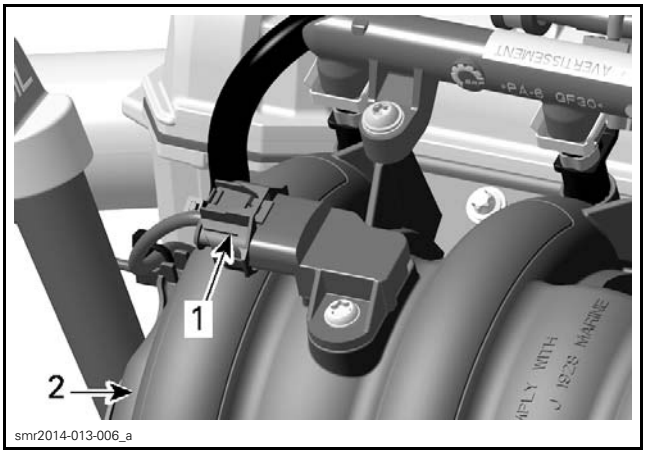
1. *Oetiker clamp*

A. Crimp to 2.2 mm ± 1 mm (.087 in ± .039 in)

INTAKE MANIFOLD

Removing the Intake Manifold

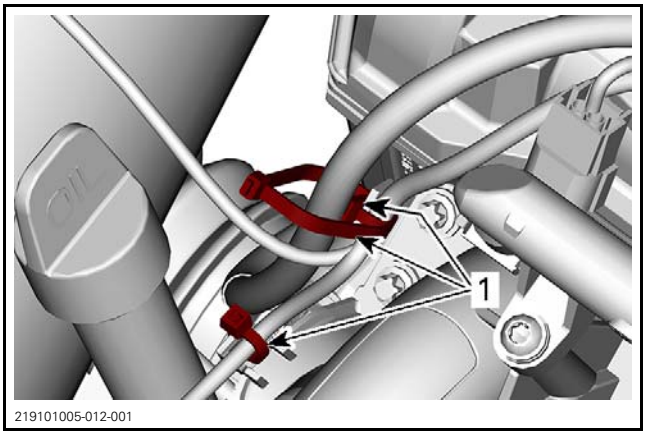
1. Disconnect manifold absolute pressure and temperature sensor (MAPTS).



smr2014-013-006_a

1. *MAPTS connector*
2. *Intake manifold*

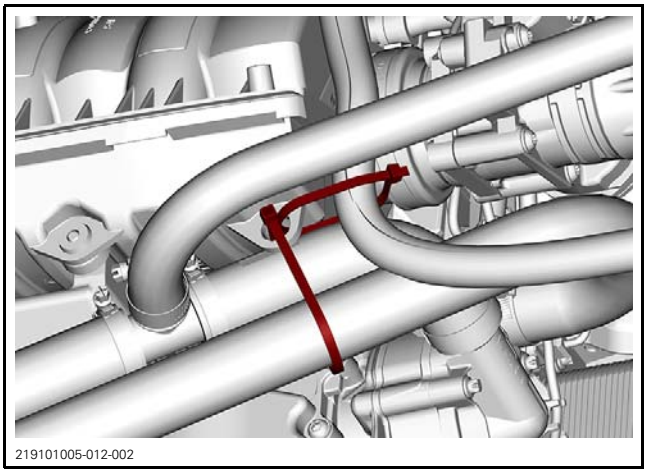
2. Cut locking ties securing MAPTS and iBR harness to intake manifold.



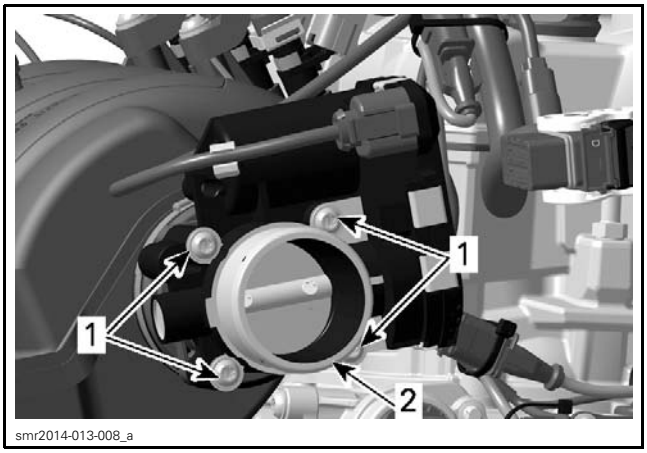
219101005-012-001

1. *Locking ties*

3. Cut locking ties securing fuel and coolant hoses to intake manifold.


219101005-012-002

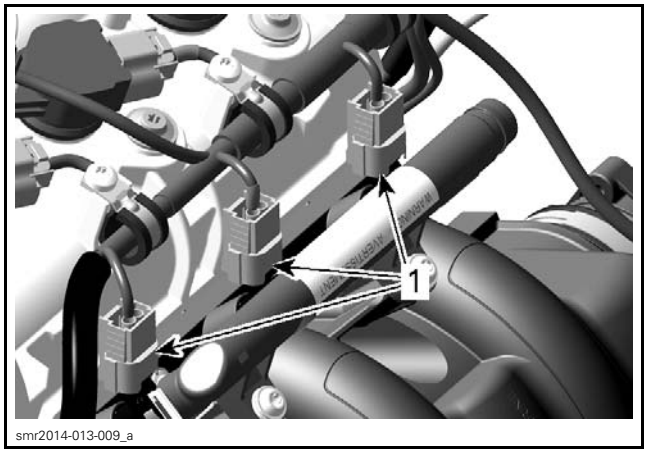
4. Remove screws retaining the throttle body to connecting socket.



smr2014-013-008_a

1. Retaining screws
2. Throttle body

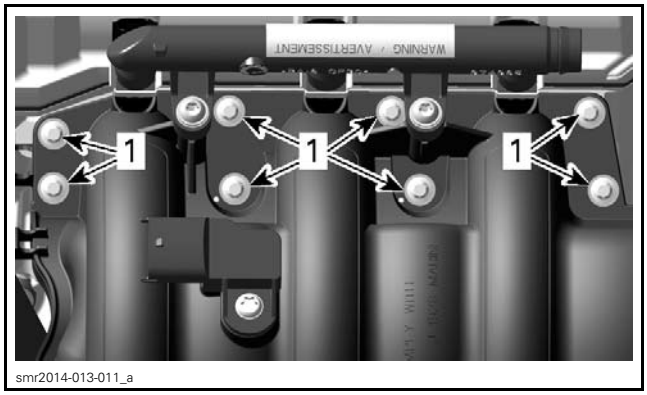
5. Move throttle body aside.
6. Disconnect fuel hose connector at fuel rail. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
7. Disconnect fuel injector connectors.



smr2014-013-009_a

1. Fuel injector connectors

8. Remove screws securing intake manifold to cylinder head.



smr2014-013-011_a

1. Intake manifold screws

9. Remove intake manifold from engine.
10. Remove and discard intake manifold gaskets.
11. If required, remove the following parts from intake manifold:
    - Connecting socket. Refer to *FLAME ARRESTOR* in this subsection.
    - Flame arrestor. Refer to *FLAME ARRESTOR* in this subsection.
    - MAPTS. Refer to this subsection.
    - Fuel rail with injectors. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Inspecting the Intake Manifold

Check intake manifold for cracks, warping at flanges or any other visible damages. Replace if required.

Check if intake manifold gaskets are brittle, hard or otherwise damaged. Replace if necessary.

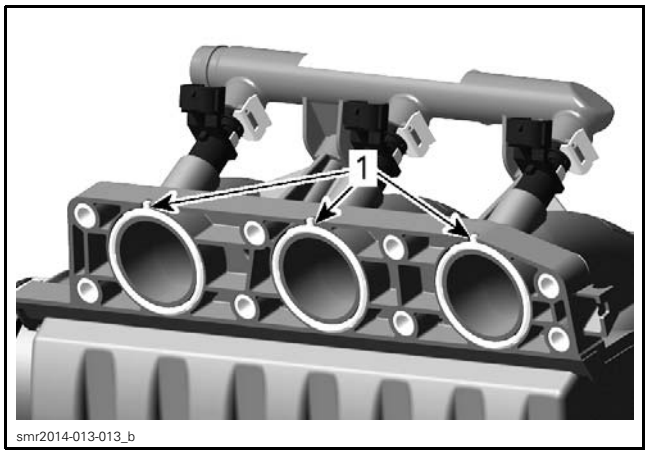
Drain intake manifold if any liquids accumulated.

Flush intake manifold with solvent and let it dry out.

Installing the Intake Manifold

The installation is the reverse of the removal procedure. However, pay attention to the following.

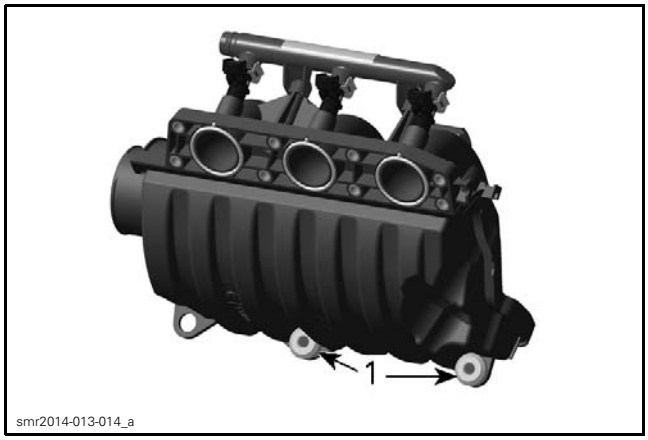
Install **NEW** gaskets with tab properly inserted into notch.



1. Gaskets tab properly inserted

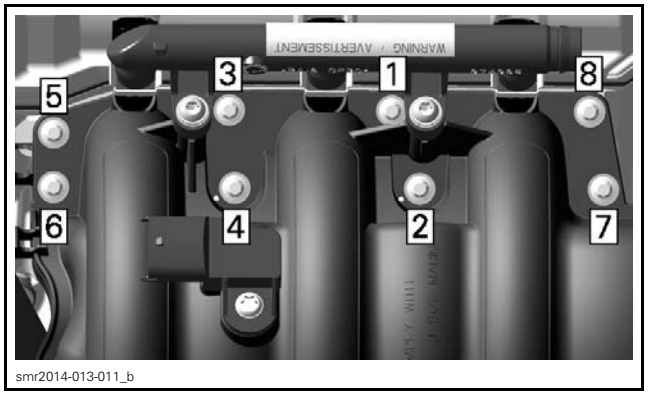
Install **NEW** locking ties.

Ensure that rubber grommets are properly inserted.



1. Rubber grommets

Tighten intake manifold screws as per the following sequence. Refer to exploded view for tightening torque specifications.



TIGHTENING SEQUENCE

Refer to *FLAME ARRESTOR* in this subsection to install:

– Flame arrestor
– Connecting socket.

Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection to install:

– Throttle body
– Fuel rail with injectors.

LUBRICATION SYSTEM

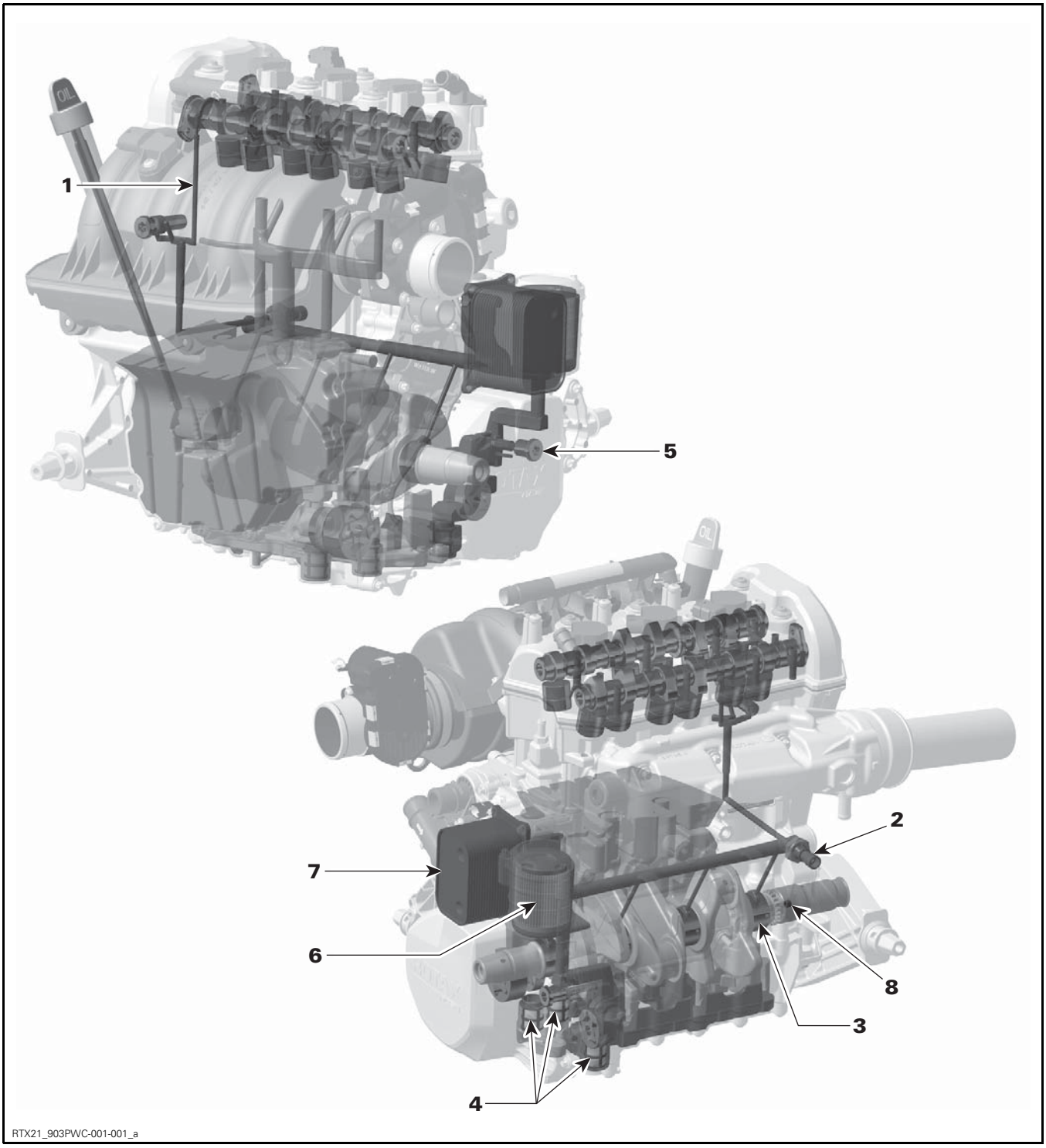
SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	18
FLUKE 115 MULTIMETER	529 035 868	18
OIL PRESSURE HOSE	529 036 394	16
PRESSURE GAUGE	529 036 395	16

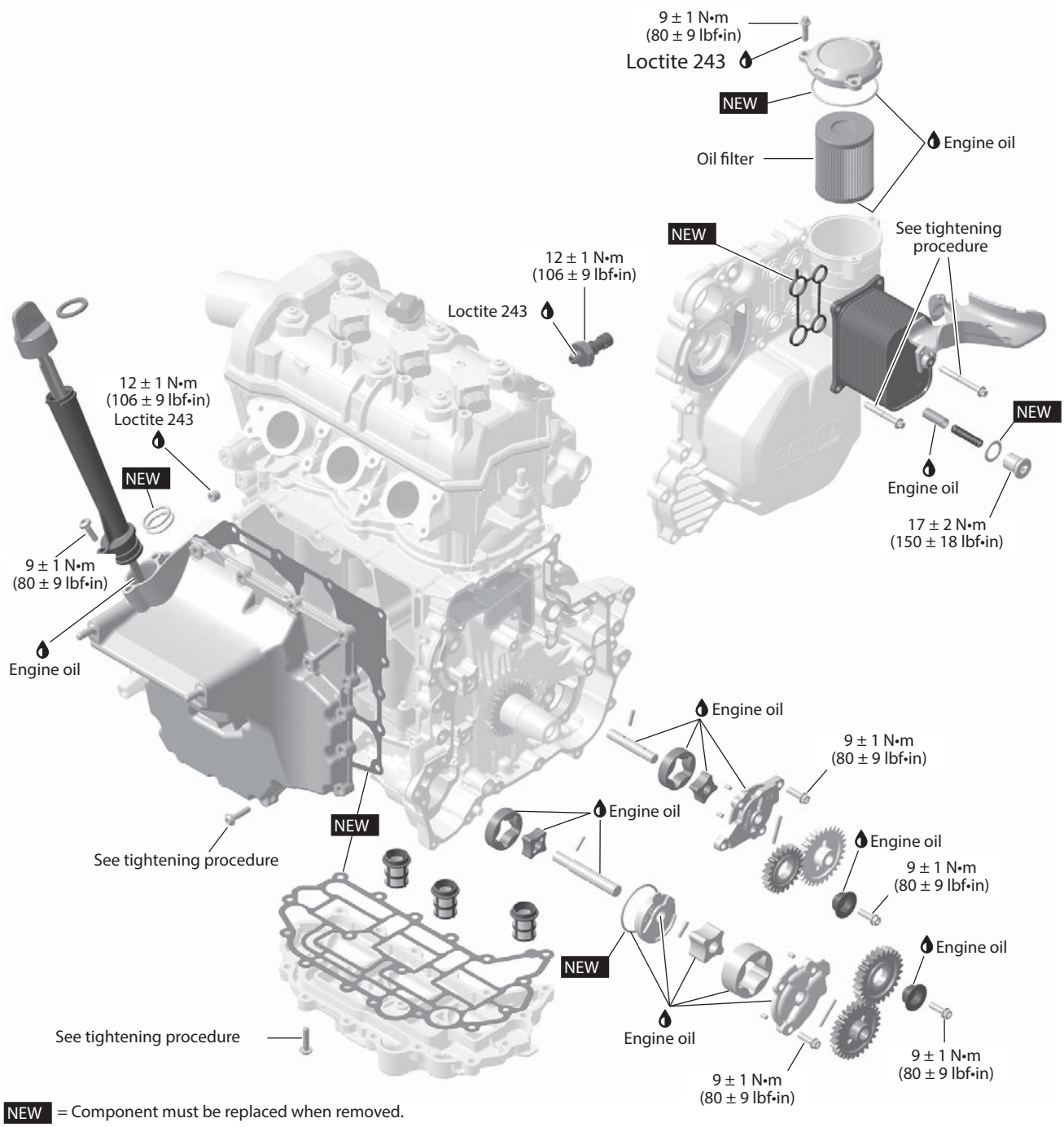
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NEGATIVE feedback and notify us at bestshopmanuals@gmail.com

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	16, 19



ENGINE LUBRICATION CIRCUIT
1. *Oil channel to camshaft bearing*
2. *Oil pressure switch*
3. *Crankshaft main bearing*
4. *Oil strainers*
5. *Oil pressure regulator*
6. *Oil filter*
7. *Oil cooler*
8. *Oil nozzle in crankshaft to lubricate PTO spline*



NEW = Component must be replaced when removed.

R900ACE_MY17-002-200

GENERAL

SYSTEM DESCRIPTION

This engine uses dry sump lubrication. The oil from the cylinder block, timing chain chamber and magneto cover is pumped by two suction pumps.

Both suction pumps are integrated into one module.

The large 20 mm (.79 in) oil suction pump returns the crankshaft and magneto chamber oil to the reservoir.

The small 11 mm (.43 in) oil suction pump returns the timing chain chamber oil to the oil reservoir.

An oil filter and three oil strainers are used to filter dirt and debris from the oil circuit.

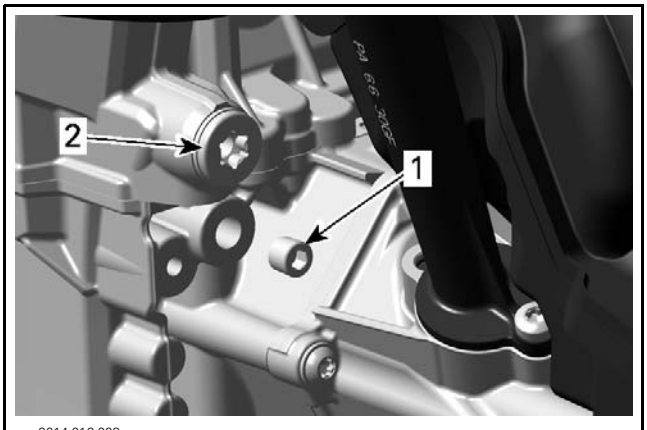
The oil strainers are located between oil sump cover and crankcase underneath the oil pressure pump.

The oil pressure is provided by a pump and regulated by a spring loaded pressure regulator.

INSPECTION

ENGINE OIL PRESSURE

1. Remove central body. Refer to *BODY* subsection.
2. Remove oil pressure test plug screw from cylinder block.

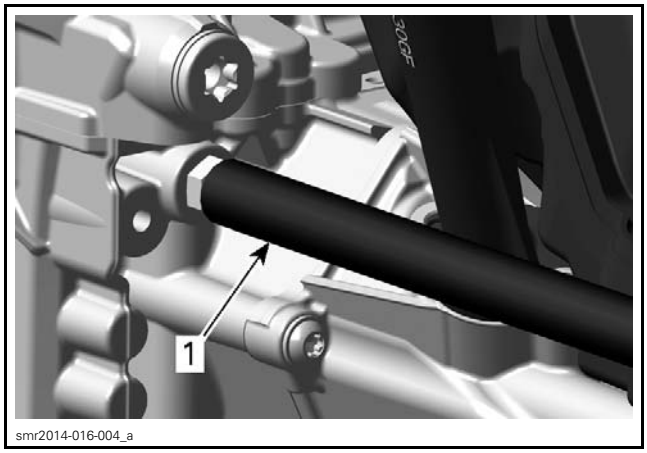


smr2014-016-003_a

1. Oil pressure test plug screw
2. Timing chain tensioner

3. Install the adapter hose on cylinder block.

REQUIRED TOOL	
OIL PRESSURE HOSE (P/N 529 036 394)	



smr2014-016-004_a

1. Adapter hose

4. Connect the pressure gauge to adapter hose.

REQUIRED TOOL	
PRESSURE GAUGE (P/N 529 036 395)	

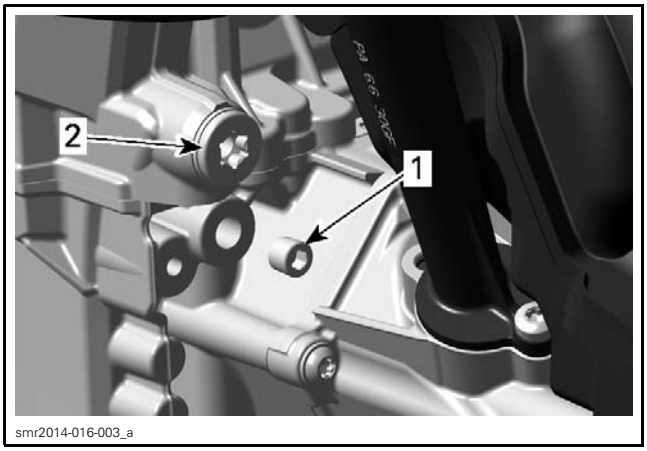
5. Start engine and check the oil pressure.

ENGINE OIL PRESSURE @ 100°C (212°F)	
ENGINE SPEED	MINIMUM PRESSURE
Idle	80 kPa (11.6 PSI)
4000 RPM	270 kPa (39.16 PSI)
6000 to 8000 RPM	350 kPa (50.76 PSI)

If the engine oil pressure is out of specification, refer to *TROUBLESHOOTING* in this subsection.

6. Remove engine oil pressure test tools.
7. Clean threads of oil pressure test plug screw before installing the plug screw.
8. Tighten oil pressure test plug screw to specification.

TIGHTENING TORQUE	
Oil pressure test plug screw	12 N•m ± 1 N•m (106 lbf•**in** ± 9 lbf•**in**) + LOCTITE 243 (BLUE) (P/N 293 800 060)



smr2014-016-003_a

1. Oil pressure test plug screw
2. Timing chain tensioner

9. Reinstall all removed parts.

TROUBLESHOOTING

Always check for fault codes. If a fault code is detected, service the fault code first.

LOW OR NO ENGINE OIL PRESSURE

1. Oil level is too low.
   - *Refill engine oil.*
   - *Check for high oil consumption. See below.*
   - *Check for oil leaks (oil leaking out of leak indicator hole, gaskets, oil seal or O-rings). Repair or replace.*
2. Defective or clogged oil filter.
   - *Replace engine oil and filter.*
3. Use of a bad grade oil.
   - *Replace engine oil with BRP recommended oil.*
4. Oil pressure regulator valve sticks open, or spring load is insufficient.
   - *Clean oil regulator piston and its bore. Replace if necessary.*
   - *Measure spring free length. Replace if out of specification.*
5. Oil pump(s) worn or damaged.
   - *Check if oil pump drive gears are damaged. Replace if necessary.*
   - *Check oil pump rotors and its bore for wear limits. Replace if out of specification.*
6. Engine oil strainer is clogged.
   - *Remove and clean engine oil strainer.*
7. Heavy wear on plain bearings.
   - *Check radial clearance of plain bearings. Replace if out of specification.*

HIGH OIL CONSUMPTION

1. Oil in breathing system.
   - *Check if breather V-ring is brittle, hard or damaged. Replace V-ring.*
   - *Check if oil separator cover is damaged or missing.*
2. Valve stem seals worn or damaged.
   - *Replace valve stem seals.*
3. Piston rings worn out (blue colored exhaust smoke).
   - *Replace piston rings.*

OIL CONTAMINATION (WHITE APPEARANCE)

NOTICE Inspect and replace engine coolant if contaminated.

1. Oil seal and rotary seal on water pump shaft leaking.
   - *Replace oil seal, rotary seal and water pump shaft. Change engine oil.*
2. Cylinder head gasket leaking.
   - *Replace cylinder head gasket. Change engine oil.*
3. Cylinder head screws not properly tightened.
   - *Retighten screws with recommended torque. Change engine oil.*
4. Oil cooler gasket leaking.
   - *Replace oil cooler gasket. Change engine oil.*
5. PTO seal leaking.
   - *Replace PTO seals. Change engine oil.*

PROCEDURES

OIL PRESSURE SWITCH (OPS)

OPS Activation

The oil pressure switch activates when the engine oil pressure is lower than following specified pressure range.

NOTE: ECM does not trigger the OPS signal below 4500 rpm.

OIL PRESSURE SWITCH ACTIVATION RANGE
130 kPa to 170 kPa (18.85 PSI to 24.66 PSI)

OPS Access

Remove central body. Refer to *BODY* subsection.

OPS Inspection

First, ensure oil pressure is adequate. Refer to *ENGINE OIL PRESSURE*.

If the oil pressure is good, check the resistance of the oil pressure switch.

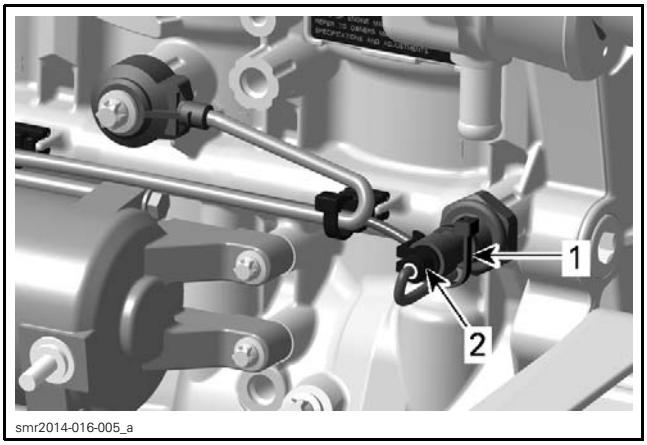
Inspecting the OPS Resistance

The engine must be warm to check the oil pressure switch properly.

⚠ WARNING

Be careful when working near hot part. To avoid potential burns, never touch exhaust system components immediately after the engine has been running as these components are very hot. Always use long sleeves and gloves.

1. Cut locking tie and disconnect the OPS connector.



smr2014-016-005_a

UNDER EXHAUST MANIFOLD
1. *Locking tie*
2. *OPS connector*

2. Check the oil pressure switch resistance.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

3. Read result and compare to table.

RESISTANCE (Ω)		
ENGINE NOT RUNNING		
OPS pin	Engine ground	Close to 0 Ω (normally closed switch)

If resistance is out of specification, replace the oil pressure switch.

If the resistance is correct, continue procedure. It will be necessary to use jumper wires.

4. Start engine.

5. Read result and compare to table.

RESISTANCE (Ω)		
ENGINE RUNNING		
OPS pin	Engine ground	Infinitely high (OL)

If resistance is out of specification, replace the oil pressure switch.

If the resistance is correct, check the oil pressure switch circuit continuity.

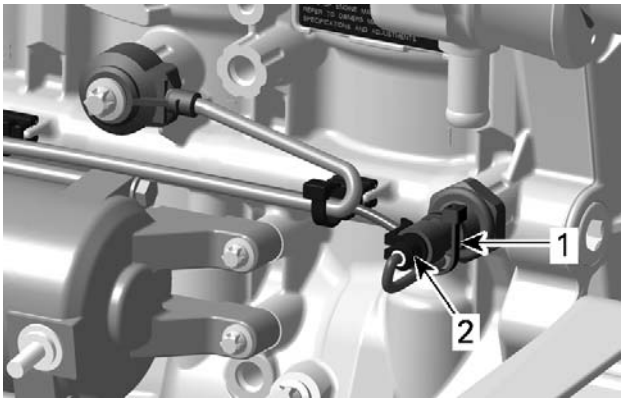
Testing the OPS Circuit Continuity

1. Disconnect ECM connector A. Refer to *ECM CONNECTOR ACCESS*.

2. Install connector A to the ECM adapter.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

3. Cut locking tie and disconnect the OPS connector.



smr2014-016-005_a

1. *Locking tie*
2. *OPS connector*

4. Check continuity as follows.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

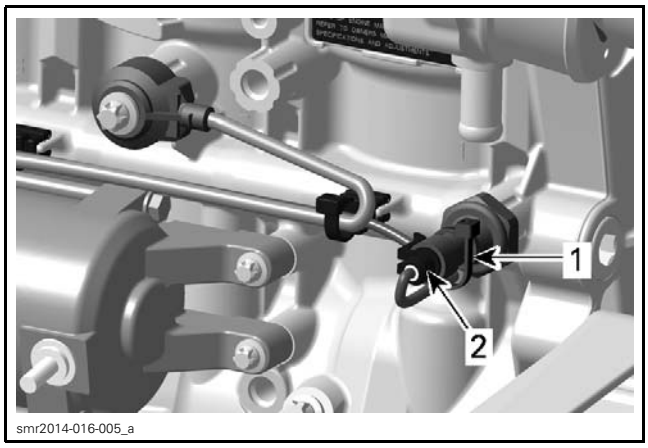
CIRCUIT CONTINUITY		
OPS connector	ECM A pin E3	Close to 0 Ω

If the continuity is good and all other tests, try a **NEW** ECM.

If the continuity is bad, repair or replace defective wire or connectors.

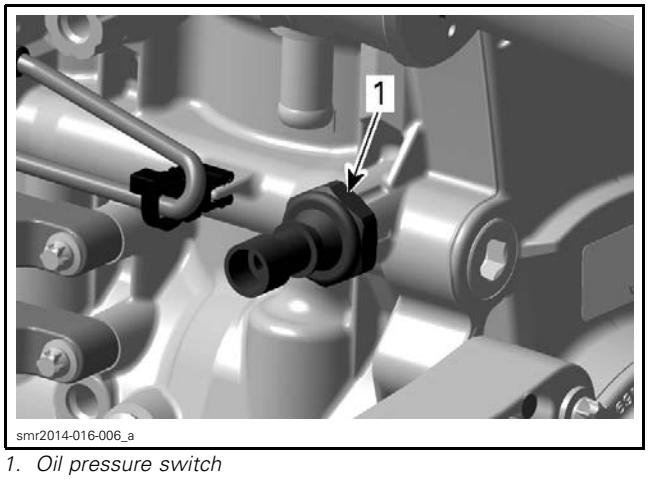
Removing the OPS

1. Cut locking tie and unplug the OPS switch connector.



1. Locking tie
2. OPS connector

2. Unscrew and remove the OPS.



1. Oil pressure switch

Installing the OPS

Install oil pressure switch as per the following informations.

TIGHTENING TORQUE	
Oil pressure switch	12 N•m ± 1 N•m (106 lbf•**in** ± 9 lbf•**in**) + LOCTITE 243 (BLUE) (P/N 293 800 060)

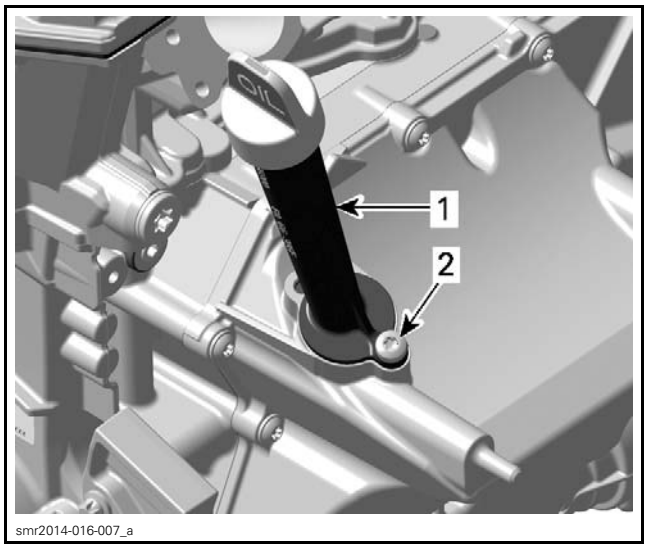
Install all other removed parts.

NOTICE **When installing the locking tie on the OPS connector, take care that the wires do not make a sharp bend.**

OIL FILLER TUBE

Removing the Oil Filler Tube

1. Remove intake manifold, refer to *AIR INTAKE SYSTEM* subsection.
2. Remove the oil filler tube retaining screw.

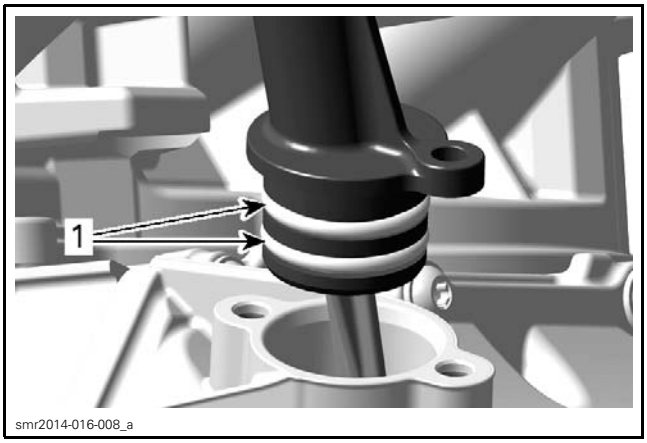


1. Oil filler tube
2. Retaining screw

3. Pull filler tube out of the oil tank cover.

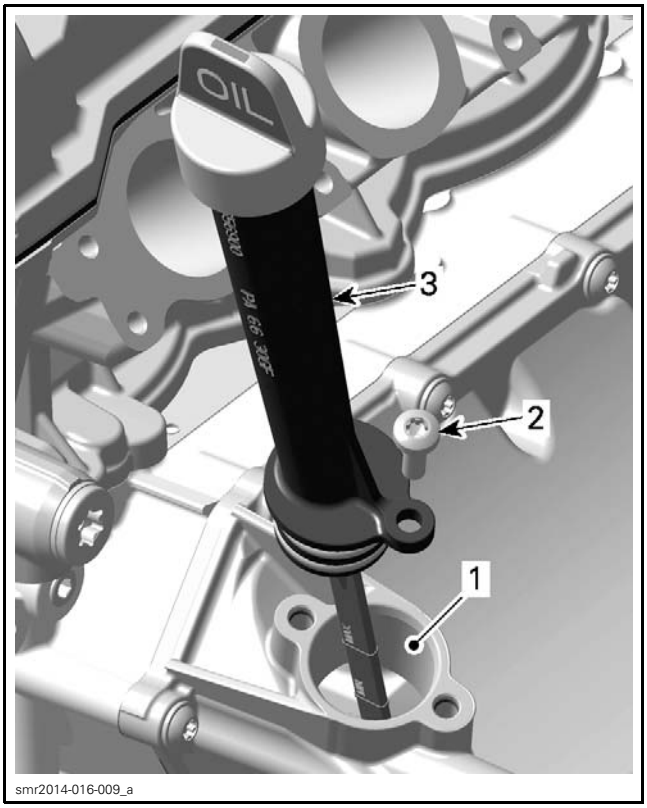
Installing the Oil Filler Tube

1. Install **NEW** O-rings on the oil filler tube.



1. Oil filler tube O-rings

2. Lubricate the oil tank cover bore with engine oil.



1. Lubricate the oil tank cover bore
2. Retaining screw
3. Oil filler tube

3. Install the oil filler tube.

4. Tighten retaining screw to the specified torque.

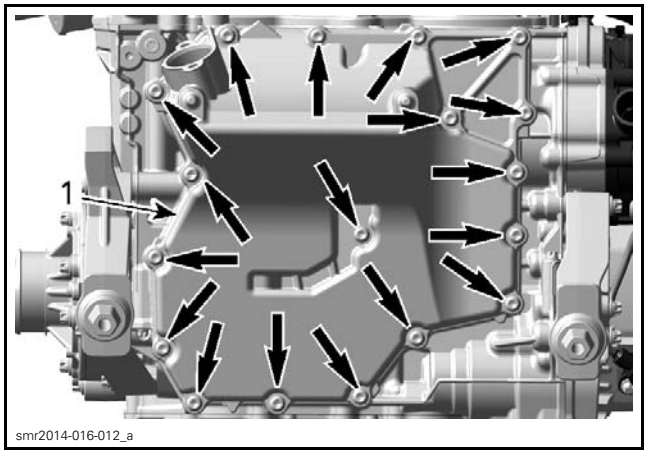
TIGHTENING TORQUE	
Oil filler tube screw	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

5. Install all other removed parts.

OIL TANK

Removing the Oil Tank Cover

1. Drain engine oil.
2. Remove the engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
3. Remove intake manifold. Refer to *AIR INTAKE SYSTEM* subsection.
4. Place a drain pan underneath oil tank.
5. Unscrew oil tank cover retaining screws.



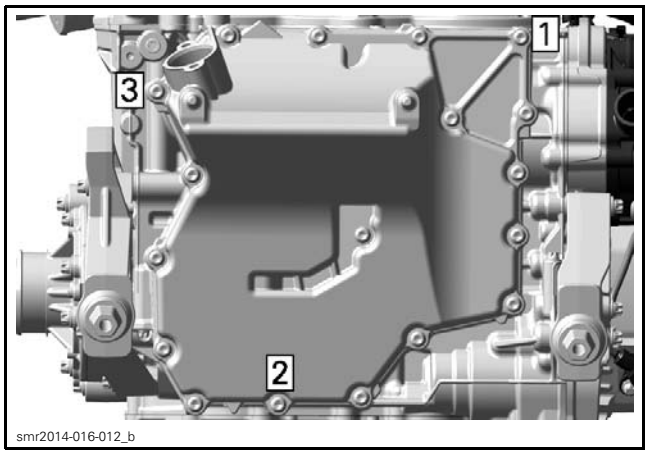
RETAINING SCREWS
1. Oil tank

6. Remove oil tank from the engine.

Installing the Oil Tank Cover

1. Install NEW gasket.
2. Install the oil tank on the engine, then tighten screws in two steps as follows:
   2.1 Tighten the following screws to the specified torque and sequence.

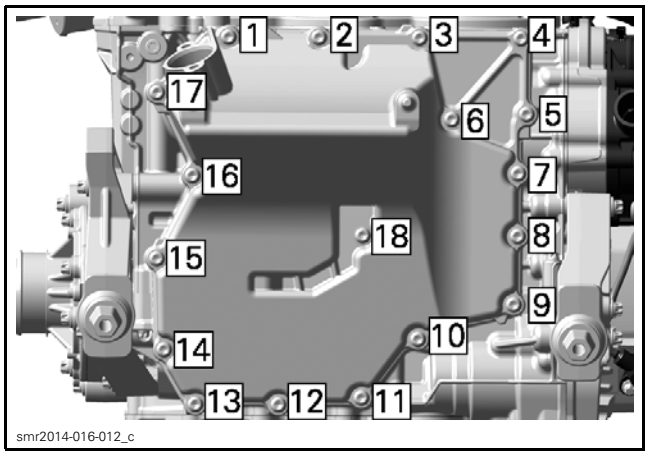
TIGHTENING TORQUE		
Oil tank screws	Step A	5 N•m ± 0.6 N•m (44 lbf•**in** ± 5 lbf•**in**)



TIGHTENING SEQUENCE STEP A

2.2 Tighten the following screws to the specified torque and sequence.

TIGHTENING TORQUE		
Oil tank screws	Step B	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)



TIGHTENING SEQUENCE STEP B

3. Wipe off any oil spillage.
4. Install the engine in the vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
5. Install intake manifold. Refer to *AIR INTAKE SYSTEM* subsection.
6. Fill up oil tank and check oil level.

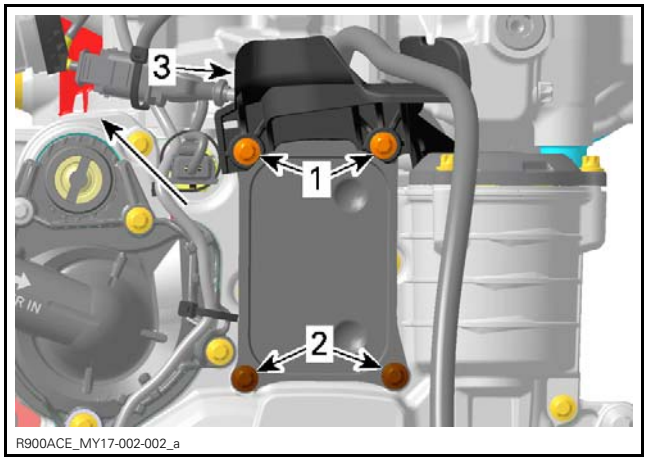
OIL COOLER

Oil Cooler Access

Remove central body. Refer to *BODY* subsection.

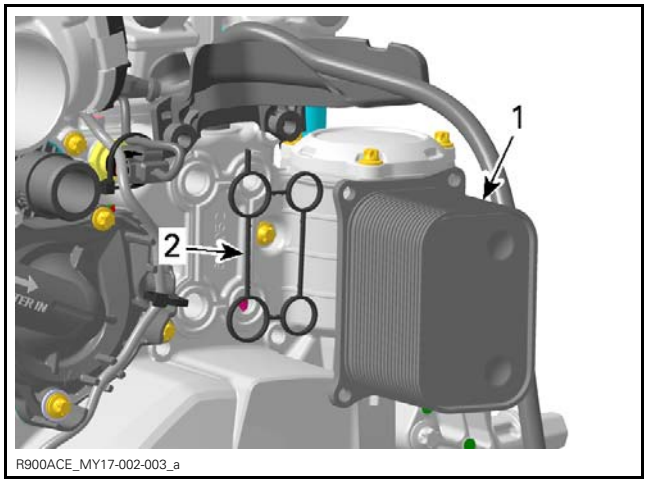
Removing the Oil Cooler

1. Refer to the appropriate subsection to:
   – Drain engine oil
   – Drain cooling system.
2. Place rags or towels under oil cooler to catch remaining oil and coolant.
3. Remove oil cooler retaining screws.
4. Lift harness bracket.



1. *Retaining screws M6x55*
2. *Retaining screws M6x45*
3. *Harness bracket*

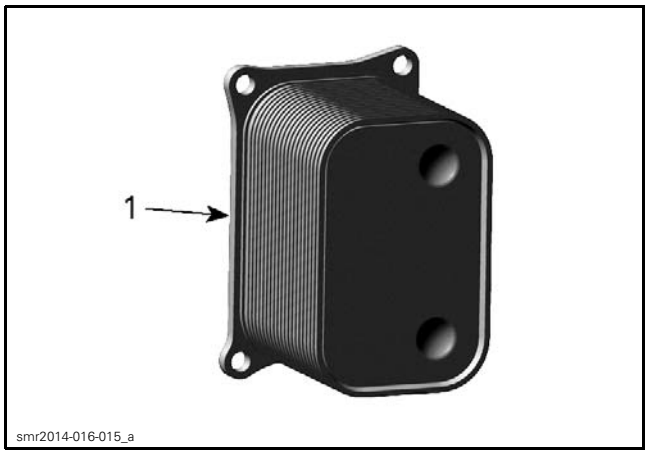
5. Remove:
   – Oil cooler
   – Gasket (discard it)



1. *Oil cooler*
2. *Gasket*

Inspecting the Oil Cooler

Check oil cooler for cracks and other damage.



1. Check for cracks

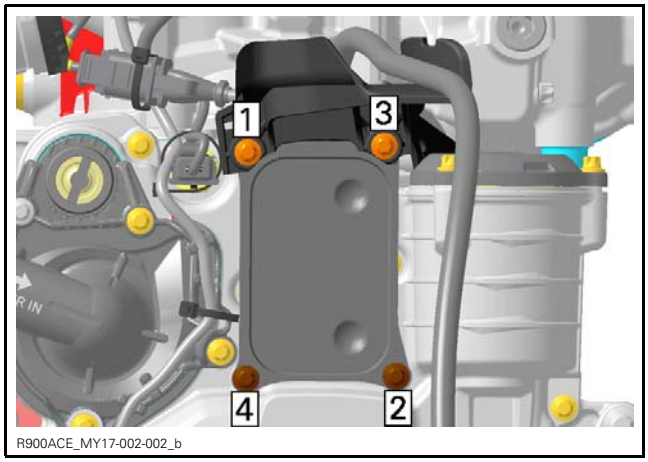
Replace parts as necessary.

Installing the Oil Cooler

For installation, reverse the removal procedure. However, pay attention to the following.

Tighten oil cooler screws in two steps to the specified torque following the illustrated sequence.

TIGHTENING TORQUE		
Oil tank screws	Step A	5 N•m ± 0.6 N•m (44 lbf•**in** ± 5 lbf•**in**)
	Step B	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)



TIGHTENING SEQUENCE OIL-COOLER

Wipe off any oil and coolant spillage.

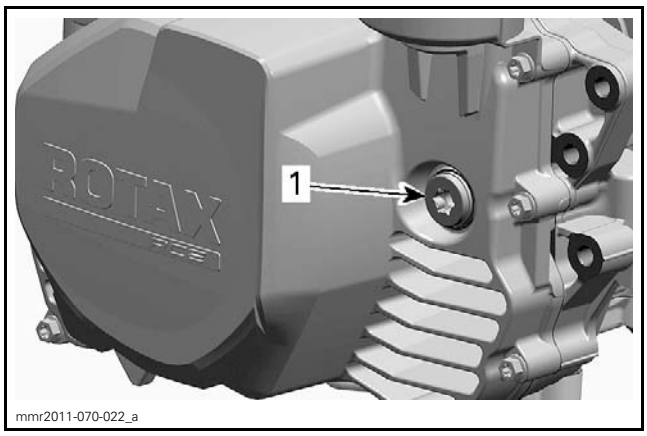
Refer to the appropriate subsection for following procedures:

– Fill up oil tank and check oil level.
– Refill and bleed cooling system.

OIL PRESSURE REGULATOR

Oil Pressure Regulator Location

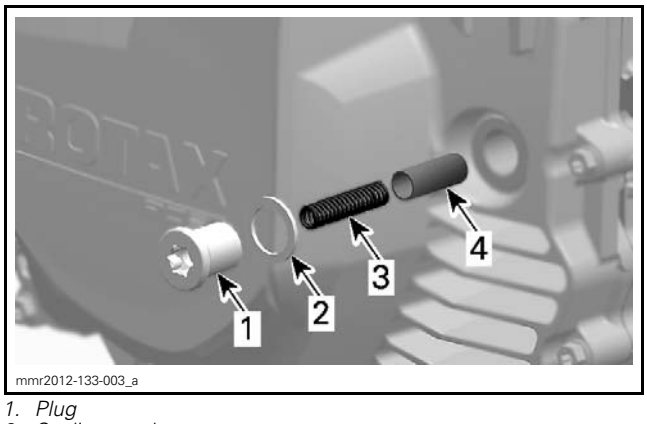
The engine oil pressure regulator is located inside the magneto cover.



1. Engine oil pressure regulator location

Removing the Oil Pressure Regulator

1. Drain engine oil.
2. Remove regulator plug and sealing washer. Discard sealing washer.
3. Pull oil pressure regulator parts out of the magneto cover.



1. Plug
2. Sealing washer
3. Regulator spring
4. Regulator piston

Inspecting the Oil Pressure Regulator

Clean bore and thread in the magneto cover from any contamination.

Inspect oil pressure regulator piston and its bore in cylinder block for scoring or other damages.

Check if piston moves easily in its bore.

Check compression spring for free length.

SPRING FREE LENGTH	
New nominal	46 mm (1.811 in)
Service limit	45 mm (1.772 in)

Visually check compression spring for squareness.

Replace worn or damaged components.

Installing the Oil Pressure Regulator

For installation, reverse the removal procedure. However, pay attention to the following.

Install a NEW sealing washer on plug.

Tighten regulator plug to the specified torque.

TIGHTENING TORQUE	
Oil pressure regulator plug	17 N•m ± 2 N•m (150 lbf•**in** ± 18 lbf•**in**)

Wipe off any oil spillage.

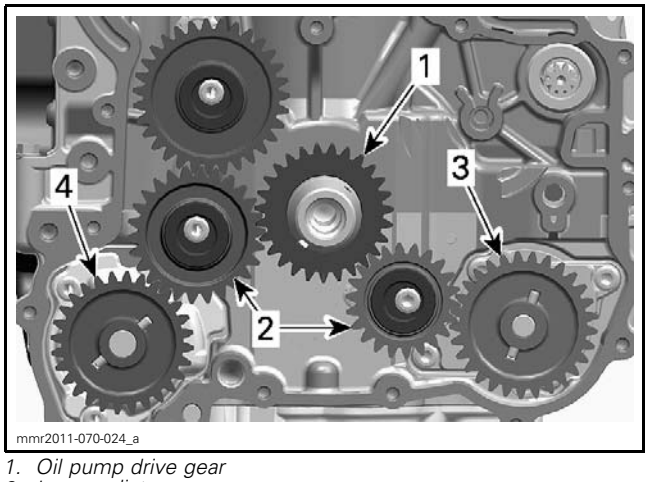
Fill up oil tank and check oil level.

Install all other removed parts.

OIL PUMP DRIVE GEARS

Oil Pump Drive Gear Location

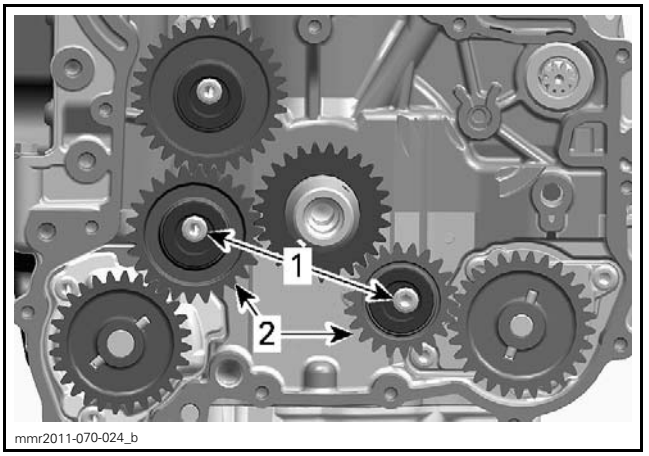
The oil pump gears are located on the MAG side, behind the magneto cover.



1. Oil pump drive gear
2. Intermediate gears
3. Oil pressure pump gear
4. Oil suction pump gear

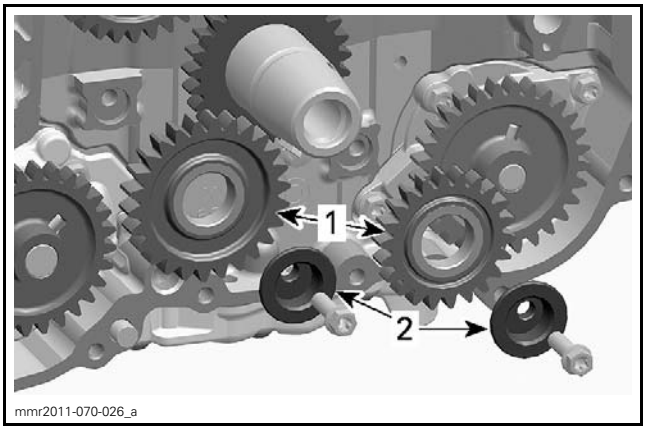
Oil Pump Drive Gear Removal

1. Refer to *MAGNETO AND STARTER* subsection to remove:
   – Magneto cover
   – Rotor
   – Sprag clutch gear.
2. Unscrew oil pump intermediate gear screws.



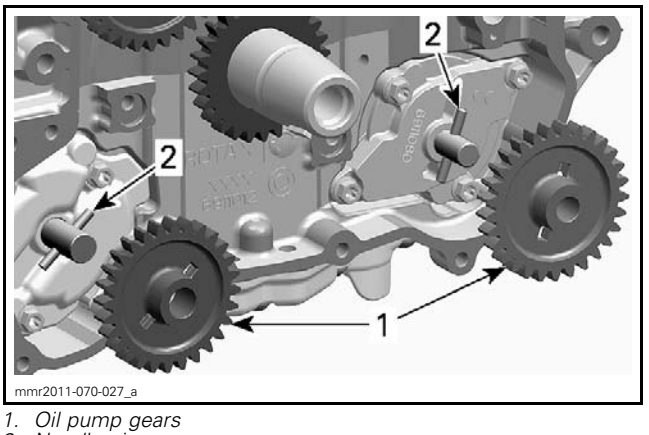
1. Retaining screws
2. Intermediate gears

3. Remove bearing sleeves and oil pump intermediate gears.



1. Intermediate gears
2. Bearing Sleeves

4. Remove oil pump gears and needle pins.



1. Oil pump gears
2. Needle pins

Inspecting the Oil Pump Drive Gear

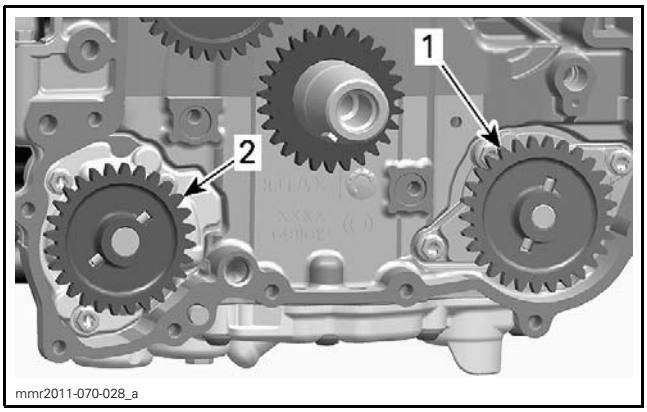
Inspect gears for wear, cracks or other damage.

Replace if damaged.

Installing the Oil Pump Drive Gear

For installation, reverse the removal procedure, however, pay attention to the following.

1. Ensure not to mix up the oil pump gears, see next illustration.
   1.1 Install the BROWN oil pump gear (29 teeth) on oil pressure pump.
   1.2 Install the BLACK oil pump gear (28 teeth) on oil suction pump.



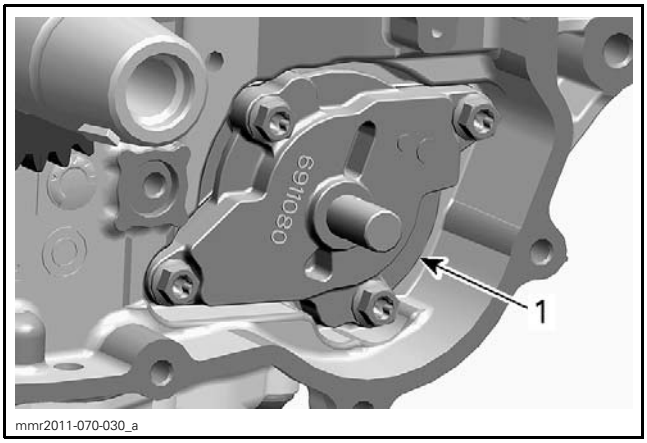
1. BROWN oil pump gear - 29 teeth
2. BLACK oil pump gear - 28 teeth

2. Lubricate intermediate gears bearing sleeves with engine oil, then install gears.
3. Install all other removed parts.
4. Fill up oil tank and check oil level.

OIL PRESSURE PUMP

Oil Pressure Pump Location

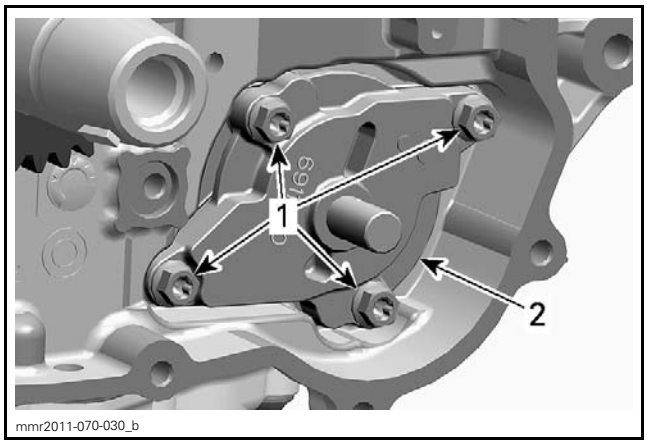
The oil pressure pump is located in the cylinder block, behind the magneto cover.



1. Oil pressure pump

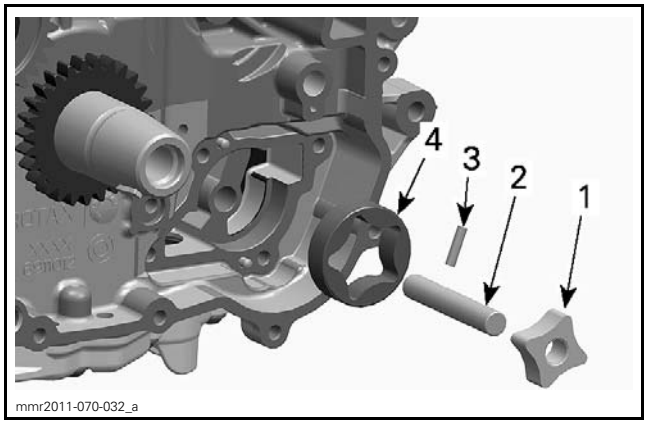
Removing the Oil Pressure Pump

1. Remove *OIL PUMP DRIVE GEARS*, see procedure in this subsection.
2. Remove oil pump cover.



1. Retaining screws
2. Oil pump cover

3. Remove the following parts.



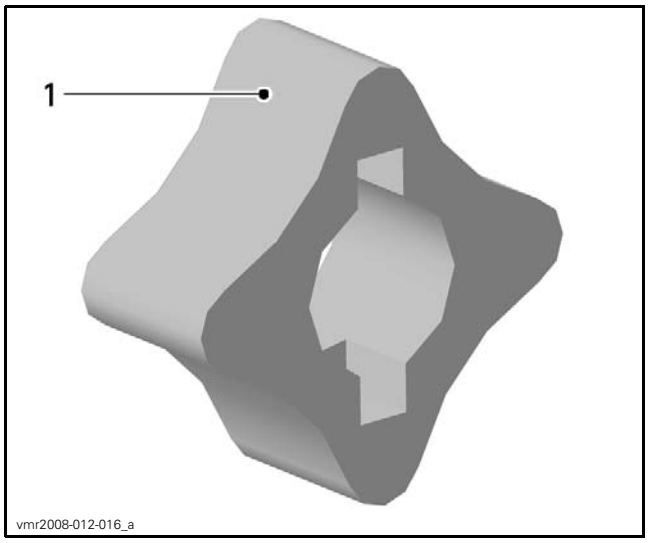
1. Inner rotor
2. Oil pump shaft
3. Needle pin
4. Outer rotor

Inspecting the Oil Pressure Pump

Inspect oil pump and oil pump cover bore for marks, scratches or other damage. Replace any damaged parts.

Check oil pump cover for damages and for surface straightness with a straight edge.

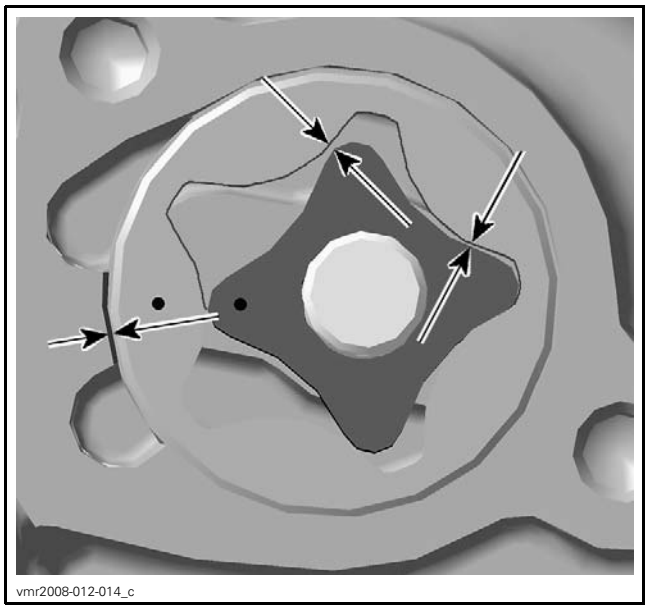
Check inner rotor for corrosion, worn pin slots or other damages. If so, replace inner and outer rotor at the same time.



1. Pitting on the teeth

Radial Clearance

Using a feeler gauge, measure the clearance of outer rotor and inner rotor where shown with the arrows.

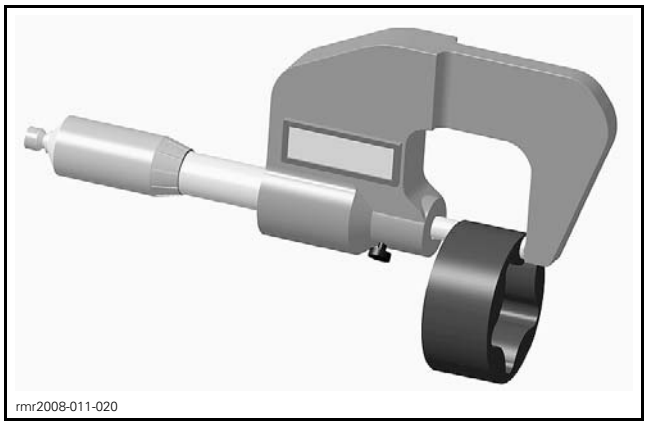


OIL PUMP RADIAL CLEARANCE	
Service limit	0.25 mm (.0098 in)

NOTE: If clearance of inner and outer rotors exceeds the tolerance, replace oil pump.

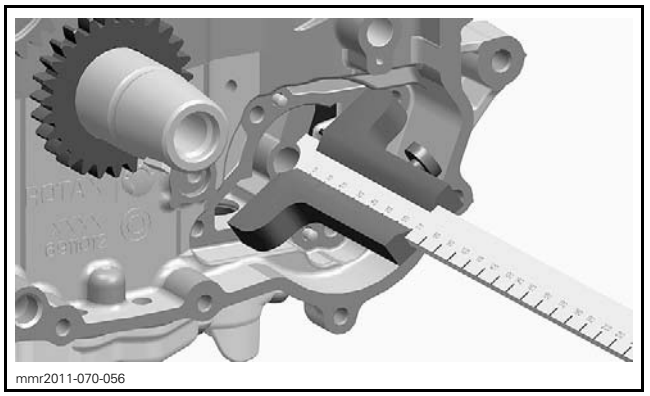
Axial Clearance

Measure outer rotor thickness with a micrometer.



OUTER ROTOR THICKNESS

Using a depth gauge, measure the depth of oil pump bore in the lower crankcase.



OIL PUMP BORE DEPTH (OIL PUMP COVER)

Substract bore depth from rotor thickness to obtain axial clearance.

OIL PUMP AXIAL CLEARANCE	
Service limit	0.15 mm (.0059 in)

NOTE: When the axial clearance of the oil pump assembly increases, the oil pressure decreases.

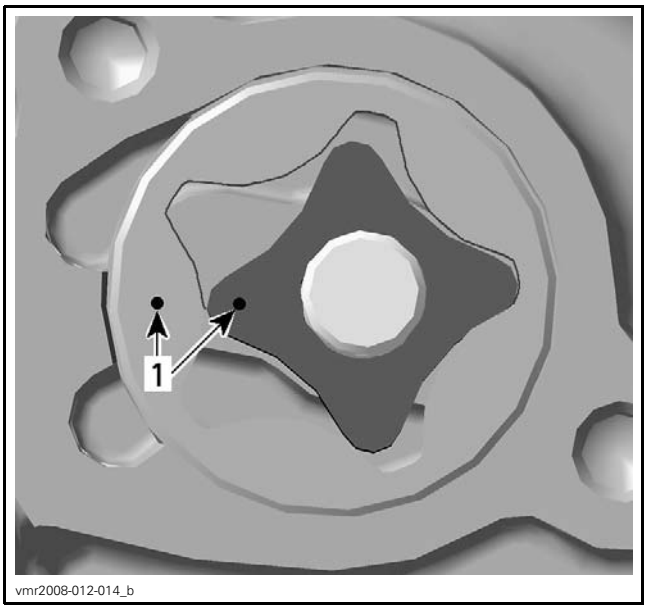
Installing the Oil Pressure Pump

For installation, reverse the removal procedure, however, pay attention to the following.

1. Lubricate outer rotor with engine oil.

NOTICE **Install rotors with the marks outwards.**

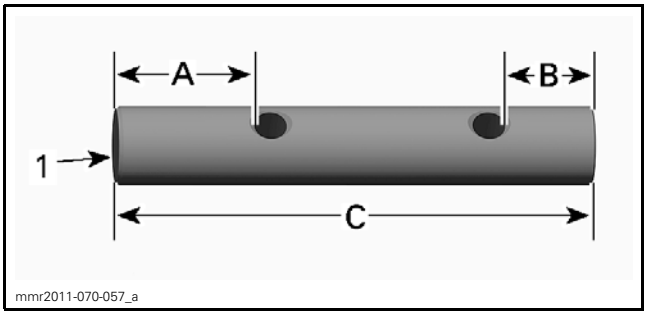
2. Install outer rotor into crankcase oil pump bore.



TYPICAL
1. Marks on inner and outer rotor

3. Install needle pin in oil pump shaft.

NOTICE The oil pump shaft is not symmetrical, the longer side must be installed inward.



1. Towards engine
A. 16.96 mm (.67 in)
B. 11.43 mm (.45 in)
C. 60.5 mm (2.38 in)

4. Place inner rotor onto the oil pump shaft. Lubricate oil pump shaft and inner rotor with engine oil.
5. Install oil pump shaft assembly into the crankcase.

After installation of the remaining parts, check for smooth operation of the oil pump assembly and axial play of the oil pump shaft.

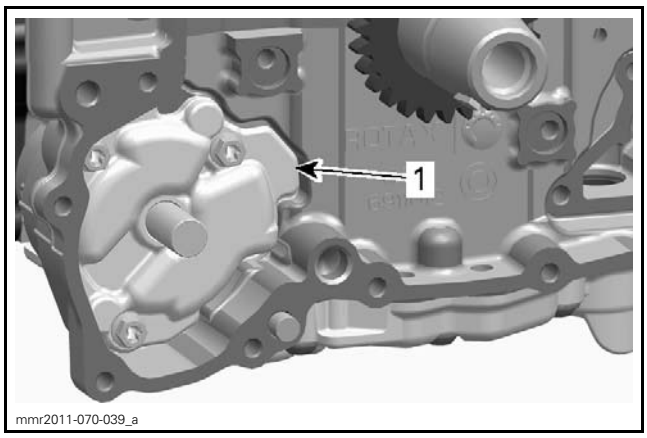
6. Fill up oil tank and check oil level.

Start engine and make sure oil pressure is within specifications (refer to *ENGINE OIL PRESSURE* in this subsection).

OIL SUCTION PUMP MODULE

Oil Suction Pump Module Location

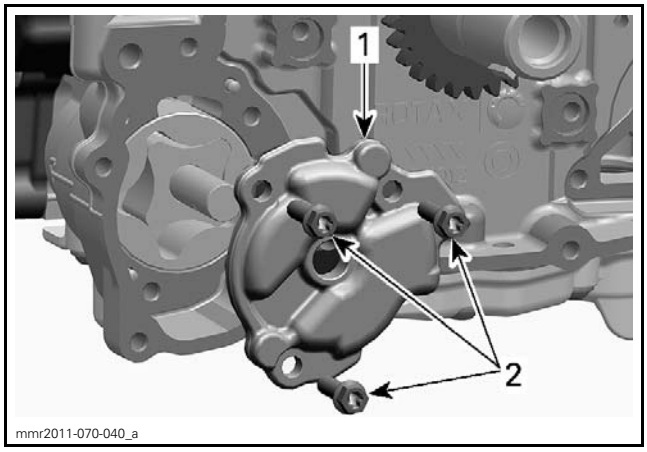
The oil suction pump module is located in the cylinder block, behind the magneto cover.



1. Oil suction pump module

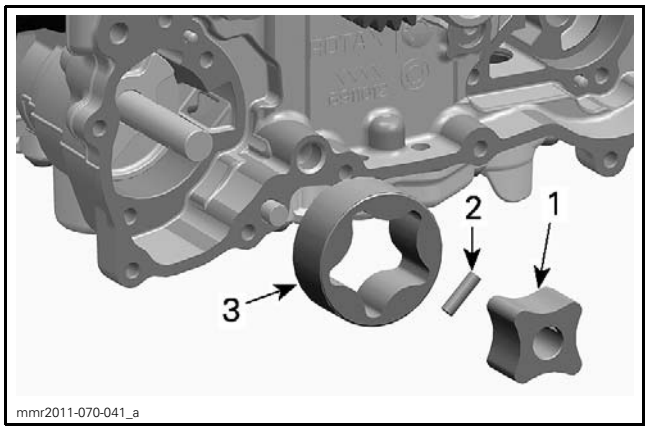
Disassembling the Oil Suction Pump Module

1. Remove *OIL PUMP DRIVE GEARS*, see procedure in this subsection.
2. Remove oil pump module cover.



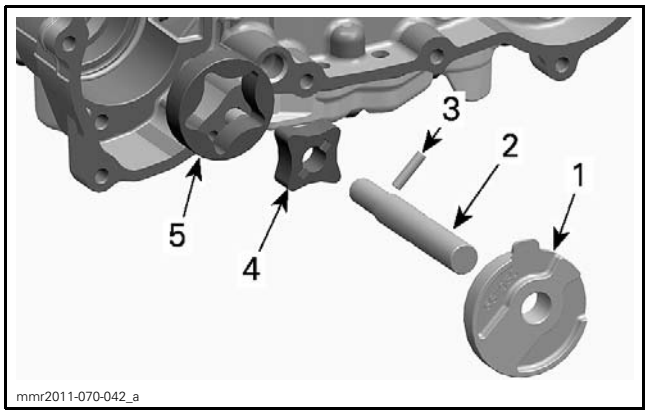
1. Oil pump module cover
2. Retaining screws

3. Disassemble the large oil suction pump as shown.



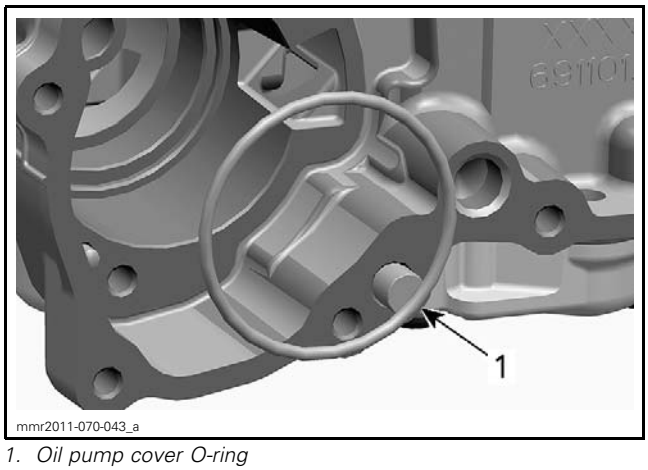
1. Inner rotor
2. Needle pin
3. Outer rotor

4. Disassemble the small oil suction pump as shown.



1. Oil pump cover
2. Oil pump shaft
3. Needle pin
4. Inner rotor
5. Outer rotor

5. Remove and discard the oil pump cover O-ring.



1. Oil pump cover O-ring

Inspecting the Oil Suction Pumps

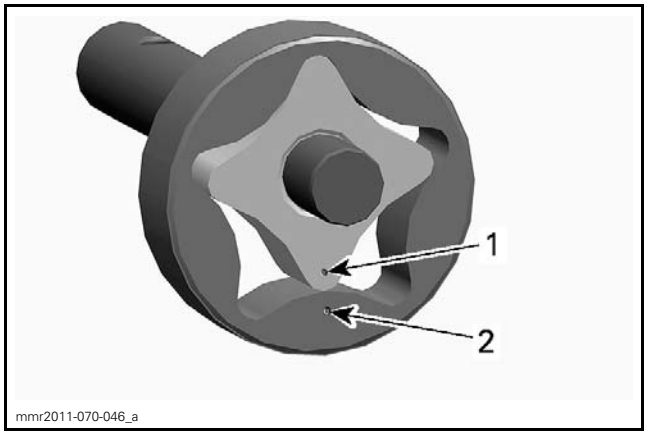
The inspection of both oil suction pumps is the same as for the oil pressure pump. Refer to *OIL PRESSURE PUMP* in this subsection.

Assembling the Oil Suction Pump Module

For installation, reverse the removal procedure, however, pay attention to the following.

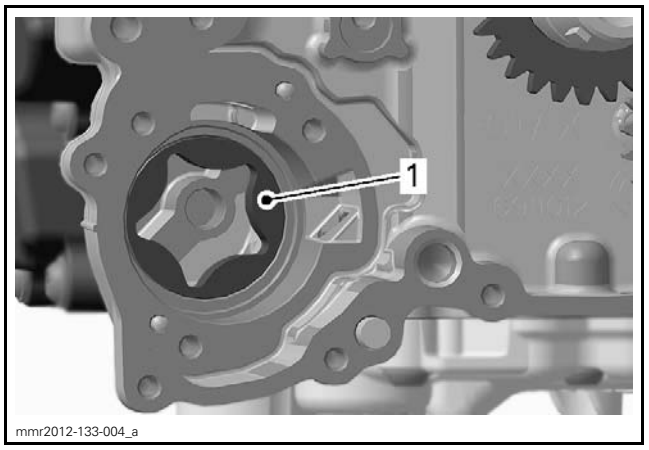
1. Lubricate small oil suction pump outer rotor with engine oil.

NOTICE When installing the oil pump rotors, make sure both marks are pointing toward the inside of the crankcase.



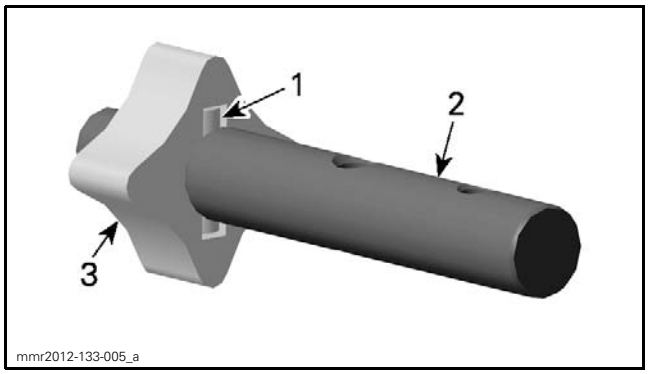
1. Mark on inner rotor
2. Mark on outer rotor

2. Install small oil suction pump outer rotor into crankcase oil pump bore.



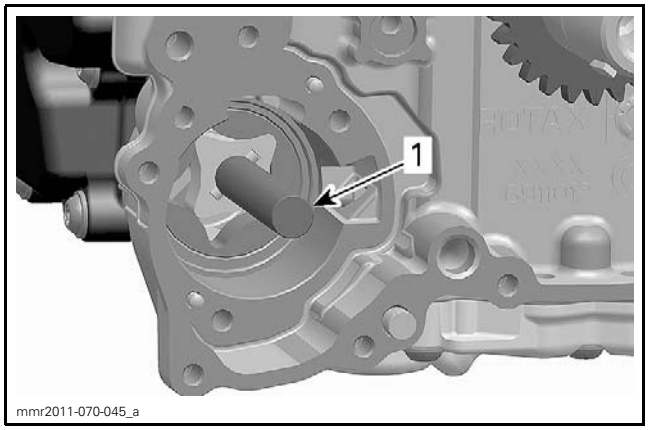
1. Small oil suction pump outer rotor

3. Install needle pin in bore of the oil pump shaft and place the small inner rotor on the shaft.



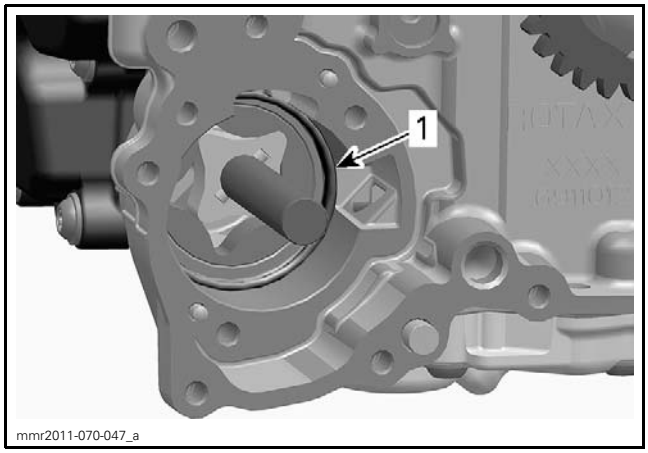
1. Needle pin
2. Oil pump shaft
3. Small suction pump inner rotor

4. Lubricate oil pump shaft and inner rotor with engine oil.
5. Install oil pump shaft assembly into the crankcase.



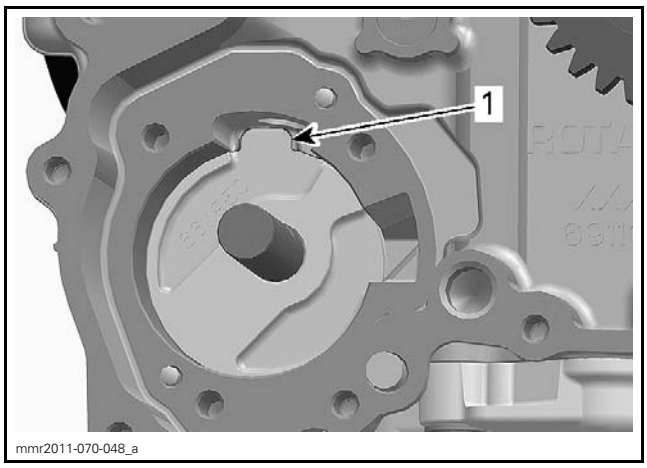
1. Oil pump shaft with small oil suction pump

6. Install a NEW oil pump cover O-ring.



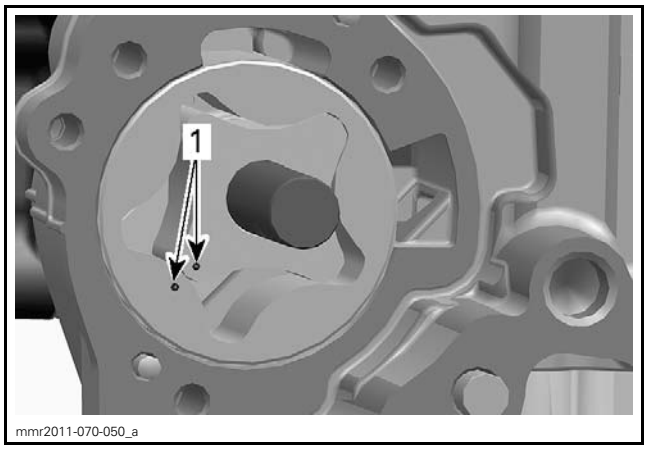
1. Oil pump cover O-ring

7. Lubricate both sides of the oil pump cover with engine oil.
8. Align tab of the oil pump cover with the upper recess in the crankcase. Push cover in until a click is heard, indicating the cover is properly installed.



1. Oil pump cover tab properly positioned

9. Install large oil suction pump needle pin.
10. Install large oil suction pump inner rotor and outer rotor with the marks outwards.



1. Marks on inner and outer rotor

11. Lubricate large oil suction pump parts with engine oil.
12. Install other removed parts.

After installation is complete, check for smooth operation of the oil pump assembly and axial play of the oil pump shaft.

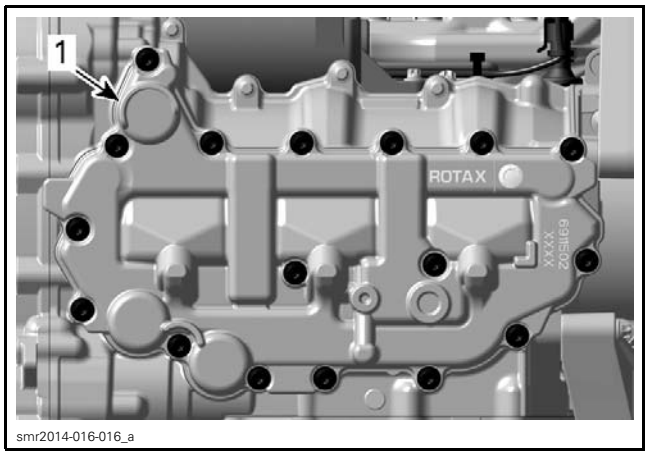
13. Fill up oil tank and check oil level.

Start engine and make sure oil pressure is within specifications (refer to *ENGINE OIL PRESSURE* in this subsection).

OIL SUMP COVER

Oil Sump Cover Location

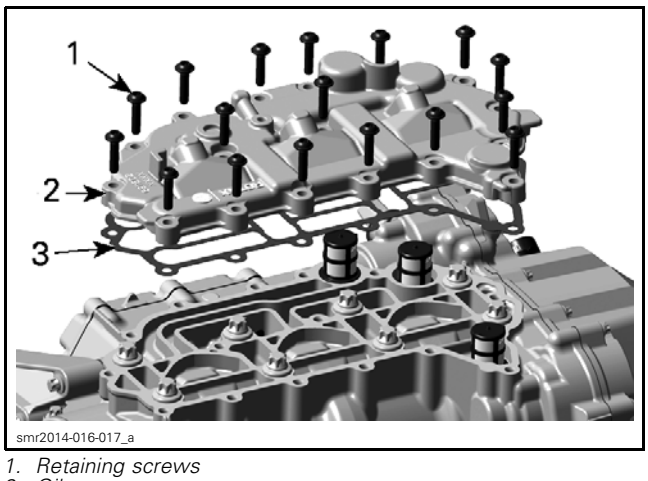
The oil sump cover is located on the engine bottom.



BOTTOM OF ENGINE
1. *Oil sump cover*

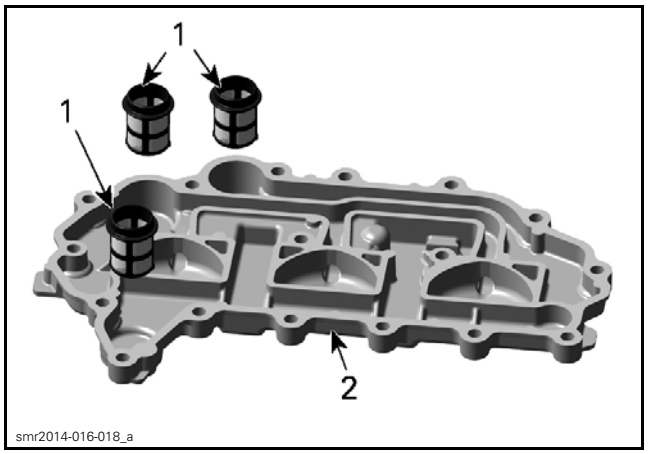
Removing the Oil Sump Cover

1. Remove engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
2. Drain engine oil.
3. Unscrew oil sump cover retaining screws.
4. Remove oil sump cover. Discard gasket.



1. *Retaining screws*
2. *Oil sump cover*
3. *Gasket*

5. Remove and clean engine oil strainers.

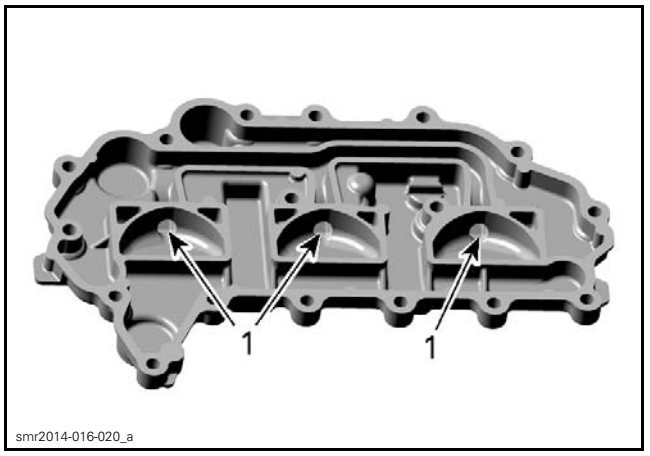


1. *Engine oil strainers*
2. *Oil sump cover*

Inspecting the Oil Sump Cover

Clean oil sump cover and engine oil strainers with a part cleaner, then use an air gun to dry it.

Blow out the oil orifices and check if they are not clogged.



1. *Oil drain bores*

Check oil sump cover for cracks or other damage.

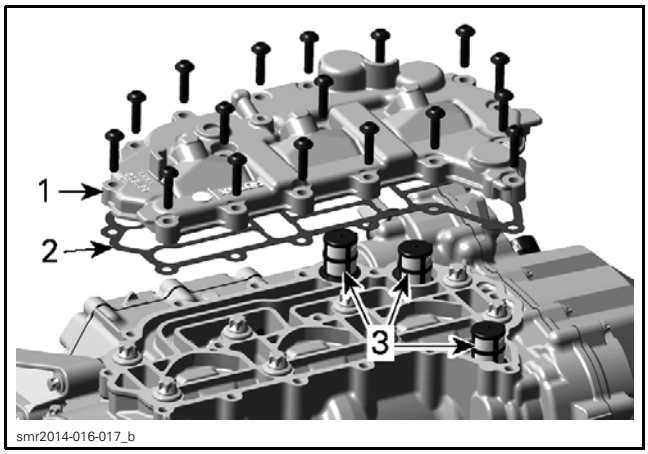
Check oil sump cover for flatness with straight edge.

Replace oil sump cover if necessary.

Check engine oil strainers for damage and change if necessary.

Installing the Oil Sump Cover

1. Install a NEW oil sump cover gasket.
2. Install the strainers as shown.

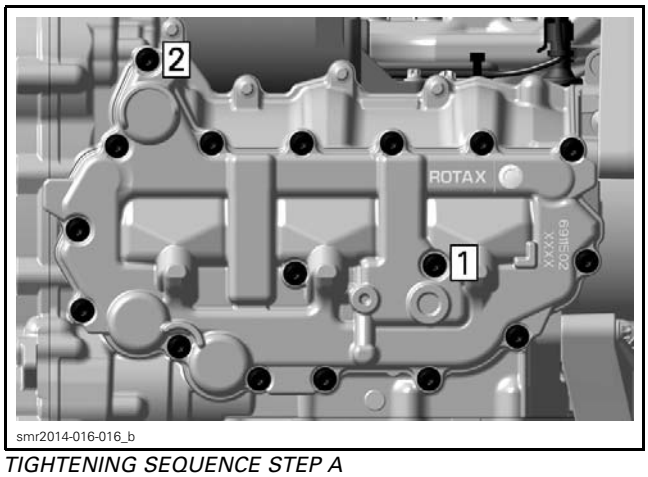


1. Oil sump cover
2. Gasket
3. Engine oil strainers

3. Install the oil sump cover on the engine, then tighten screws in two steps as follows:

   3.1 Tighten the following screws to the specified torque and sequence.

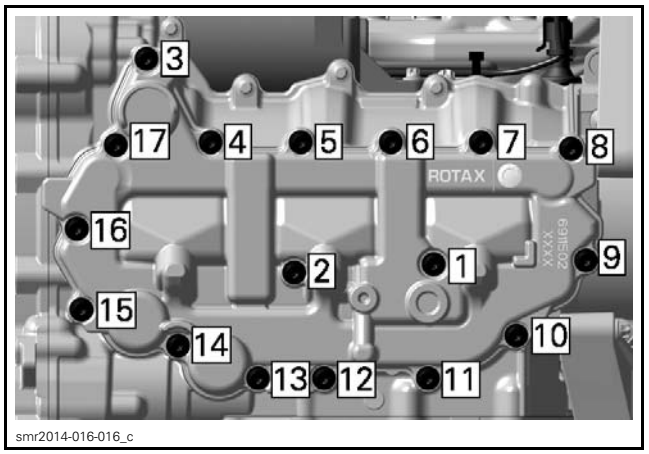
TIGHTENING TORQUE		
Oil sump cover screws	Step A	5 N•m ± 0.6 N•m (44 lbf•**in** ± 5 lbf•**in**)



TIGHTENING SEQUENCE STEP A

   3.2 Tighten the following screws to the specified torque and sequence.

TIGHTENING TORQUE		
Oil sump cover screws	Step B	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)



TIGHTENING SEQUENCE STEP B

4. Install engine in vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
5. Fill up oil tank and check oil level.

COOLING SYSTEM - ENGINE COMPONENTS

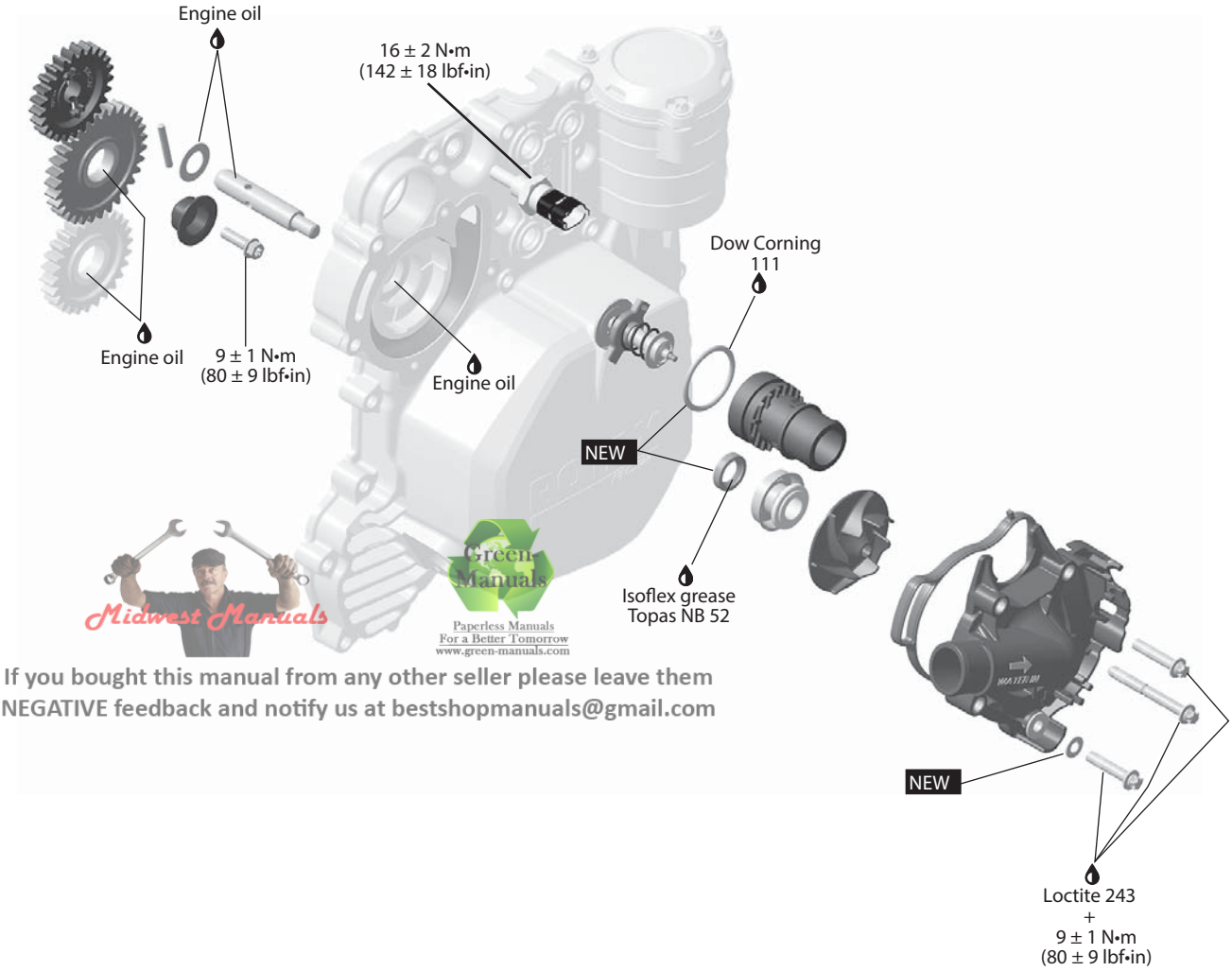
SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	36
HANDLE	420 877 650	41
OETIKER PLIER	295 000 070	36
OIL SEAL PUSHER	529 036 210	41
ROTARY SEAL INSTALLER	529 036 211	41
TEST CAP	529 035 991	34
VACUUM/PRESSURE PUMP	529 021 800	34

SERVICE PRODUCTS

Description	Part Number	Page
DOW CORNING 111	413 707 000	37
ISOFLEX GREASE TOPAS NB 52	293 550 021	41
LOCTITE 243 (BLUE)	293 800 060	42

ENGINE COMPONENTS

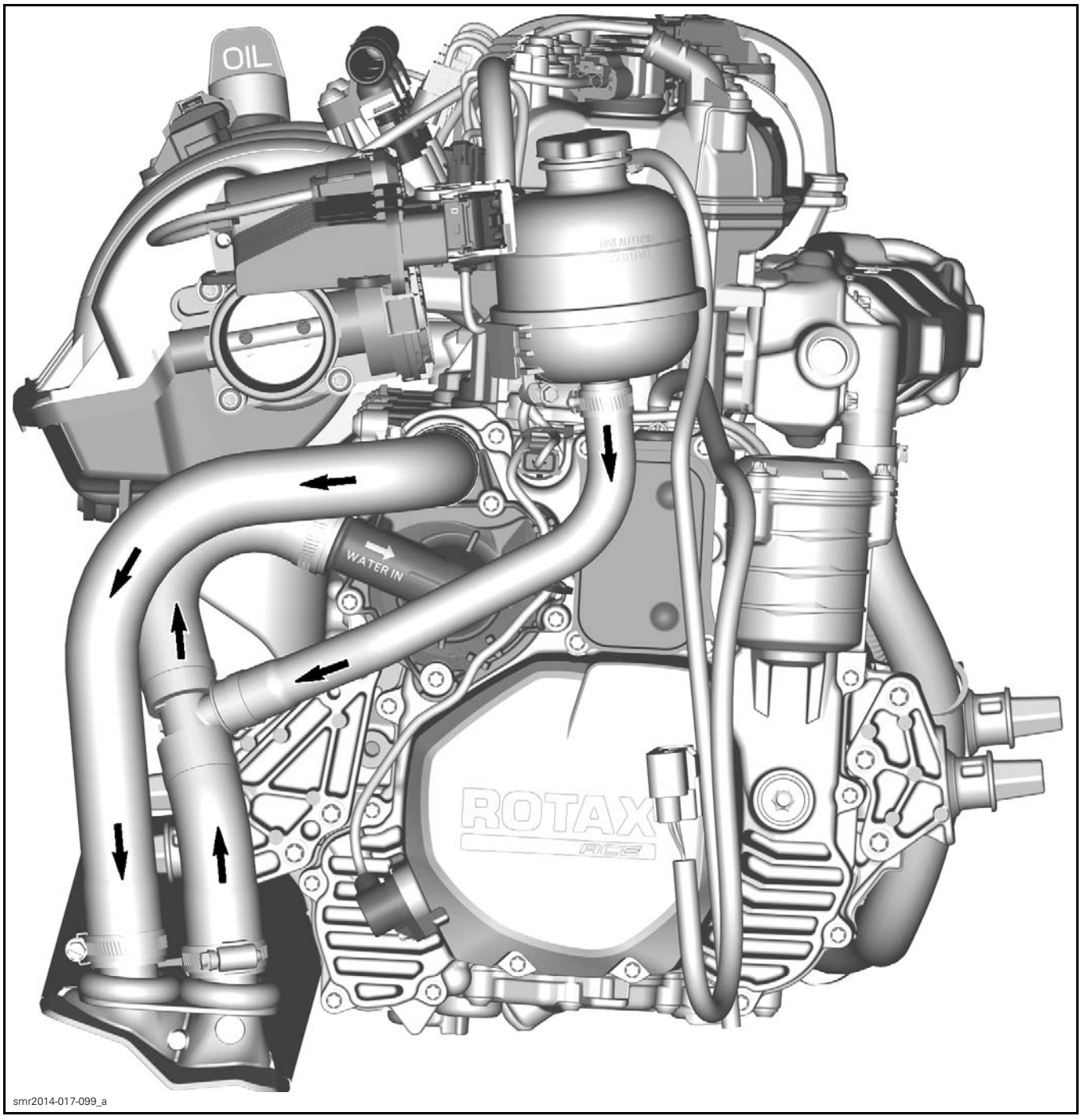


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NEW = Component must be replaced when removed.

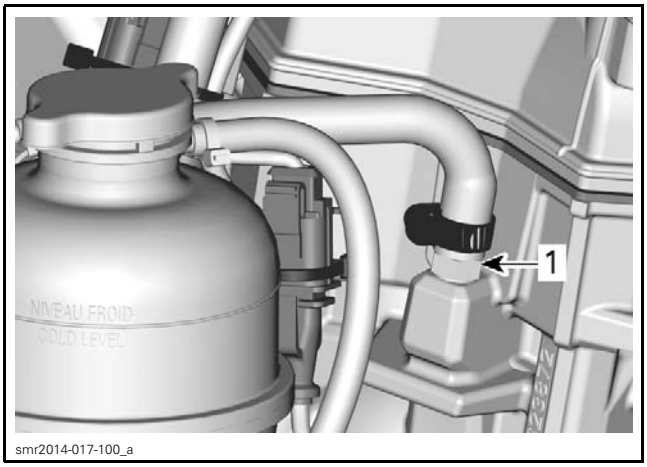
Smr2014-017-200

COOLANT FLOW



GENERAL

Coolant bleed hose nipple is located on the cylinder head.



smr2014-017-100_a

1. Bleed hose nipple

NOTE: It is a good practice to check for fault codes using the BRP diagnostic software BUDS2 as a first troubleshooting step. Refer to the *DIAGNOSTIC AND FAULT CODES* subsection.

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

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

⚠ WARNING

To avoid potential burns, do not remove the coolant tank cap or loosen the cooling drain plug if the engine is hot.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, cotter pin, etc.) must be replaced with new ones.

NOTICE **Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.**

INSPECTION

COOLING SYSTEM LEAK TEST

⚠ WARNING

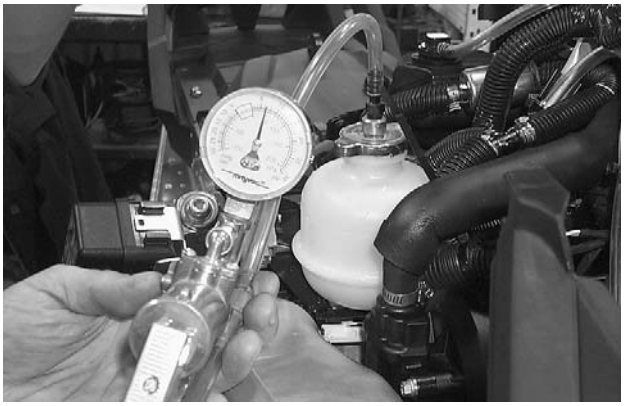
To avoid potential burns, do not remove the coolant tank cap if the engine is hot.

NOTE: This test confirms if there is a leak in the cooling system, including the engine.

Pressurize cooling system through coolant reservoir.

REQUIRED TOOL	
TEST CAP (P/N 529 035 991)	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

COOLING SYSTEM LEAK TEST
110 kPa (16 PSI)

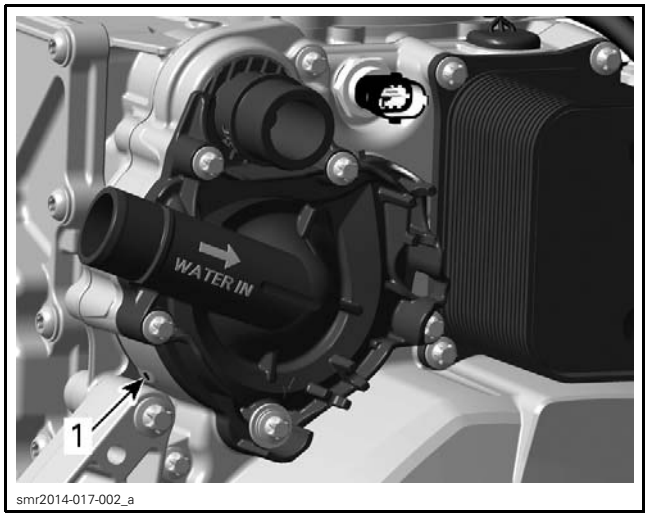

mmr2009-112-033

TYPICAL

If pressure drops, check all hoses, heat exchanger and engine for coolant leaks. Spray a soap/water solution and look for air bubbles.

Check the leak indicator hole if there is oil or coolant leaking.

NOTE: In general leaking coolant indicates a damaged rotary seal. Leaking oil indicates a damaged oil seal. If either seal is leaking, both seals must be replaced at the same time. Refer to *WATER PUMP* in this subsection.



1. Leak indicator hole

TROUBLESHOOTING

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and should not be assumed to show all causes for all problems.

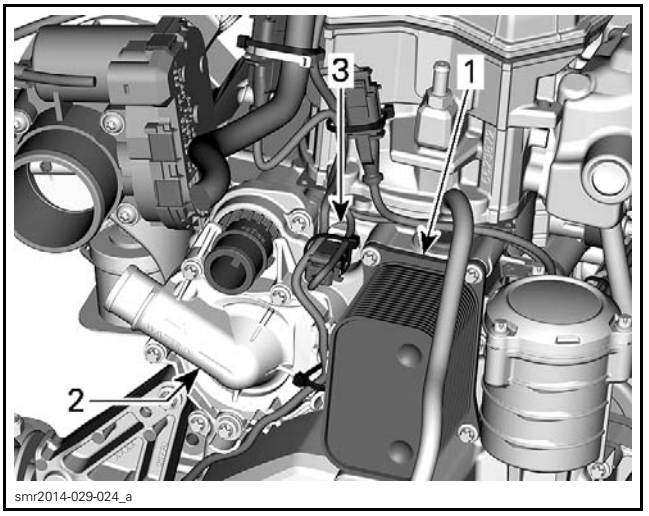
Always check for fault codes. If a fault code is detected, service the fault code first.

ENGINE OVERHEATING

1. Low coolant level.
   - *Refill and check for leaks (coolant leaking out of leak indicator hole, hoses or clamps missing or defective, or cylinder head gaskets leaks). Repair or replace.*
2. Dirty heat exchanger.
   - *Flush heat exchanger. Replace heat exchanger as required.*
3. Air in cooling system.
   - *Refill. Perform COOLING SYSTEM LEAK TEST.*
4. Defective thermostat (does not open when engine is warm up).
   - *Replace thermostat.*
5. Exhaust system clogged
   - *Flush exhaust system.*
6. Defective water pump.
   - *Inspect and replace defective components.*
7. Coolant temperature sensor defective.
   - *Check and replace if necessary.*
8. Wrong coolant concentration.
   - *Check and adjust coolant concentration according to BRP's recommendations or replace coolant.*
9. Defective coolant reservoir cap.
   - *Replace cap.*
10. Internal passage blocked in cooling system
    - *Inspect and clean.*

PROCEDURES

COOLANT TEMPERATURE SENSOR (CTS)



TYPICAL - FORWARD END OF ENGINE
1. Oil cooler
2. Water pump
3. Coolant temperature sensor (CTS)

Overheat Warning

The CTS will cause the engine overheat warning to come on when the coolant temperature is above 100°C (212°F).

Testing the CTS

1. Connect the vehicle BUDS2 Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2, select the following:
   – Scan button
   – Measurements page tab
   – ECM page.
3. Look for the engine temperature indication.

The engine temperature gauge in BUDS2 should provide an indication of the actual engine coolant temperature. Otherwise, perform the *TESTING THE CTS RESISTANCE*.

Testing the CTS Resistance

1. Remove parts required to access ECM connectors, refer to *ECM CONNECTOR ACCESS* in this subsection.
2. Disconnect the ECM-A connector.

3. Install ECM-A connector on the ECM adapter tool.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

4. Using a multimeter, check resistance from the ECM connector as per following table.

ECM ADAPTER		MEASUREMENT
PIN		Refer to CTS TEMPERATURE SENSOR TABLE
A1	J2	

If resistance test is good, refer to *REPLACING THE ECM*.

If resistance is out of specification, proceed with the following steps.

5. Disconnect the CTS connector.
6. Check continuity of wiring between ECM and CTS connector, refer to *WIRING DIAGRAM*. If there is an open circuit, repair or replace wiring and connectors.
7. If continuity of wiring is good, test the resistance of the sensor as per following tables.

CTS SENSOR		MEASUREMENT
PIN		Refer to CTS TEMPERATURE SENSOR TABLE
1	2	

CTS TEMPERATURE SENSOR TABLE			
TEMPERATURE		RESISTANCE (OHMS)	
°C	°F	LOW	HIGH
- 40	- 40	38457	52630
- 10	14	8208	10,656
20	68	2233	2780
80	176	297	349
120	248	105	122

NOTE: To test sensor at various temperatures, remove sensor and use a heat gun, ice and a thermometer. Refer to *REPLACING THE CTS*.

If resistance value is correct, repair the connectors or replace the wiring harness between ECM connector and CTS connector.

If resistance value is incorrect, replace the CTS.

Replacing the CTS

1. Drain engine coolant to below CTS level, refer to *COOLING SYSTEM* subsection.
2. Cut locking ties on wiring harnesses and move wiring aside for access. Be sure to take note of their position.
3. Disconnect CTS connector.
4. Remove CTS from engine.
5. Install new CTS and tighten to specified torque.

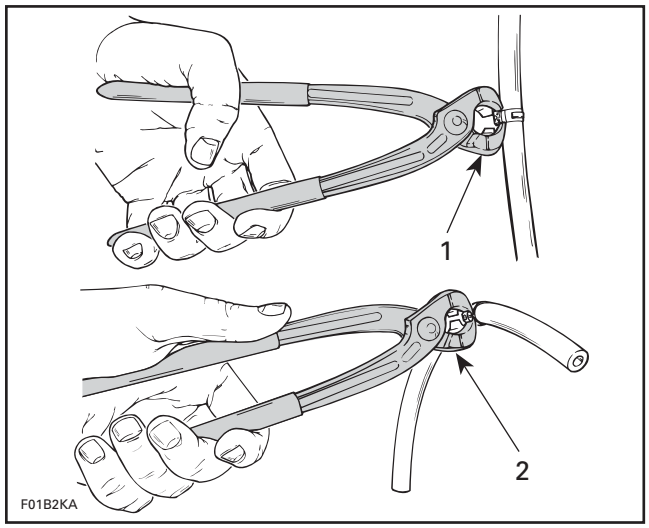
TIGHTENING TORQUE	
CTS	16 N•m ± 2 N•m (142 lbf•**in** ± 18 lbf•**in**)

6. Reinstall remaining removed parts. Be sure to secure wiring harnesses as noted prior to removal.
7. Refill and bleed the cooling system.

CLAMPS

Replacing Oetiker Clamp

To cut or secure Oetiker clamps of cooling system hoses, use the OETIKER PLIER (P/N 295 000 070).



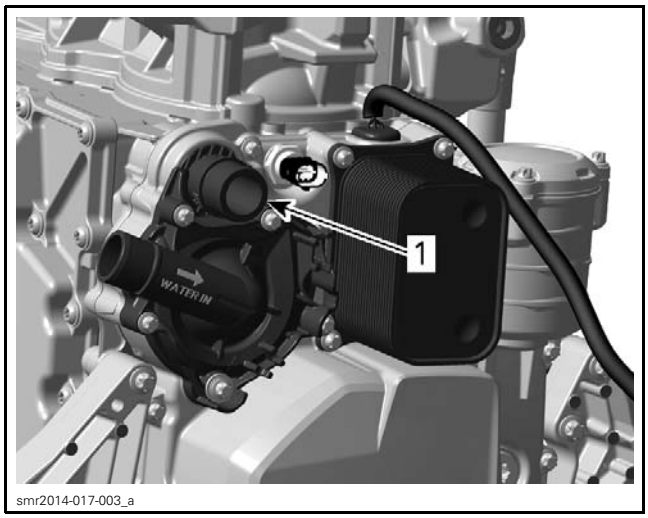
1. Cutting clamp
2. Securing clamp

NOTE: Always check general condition of hoses and clamp tightness.

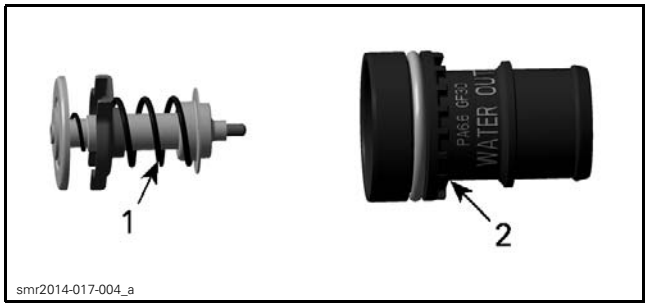
THERMOSTAT

Thermostat Location

The thermostat is located on engine MAG side.



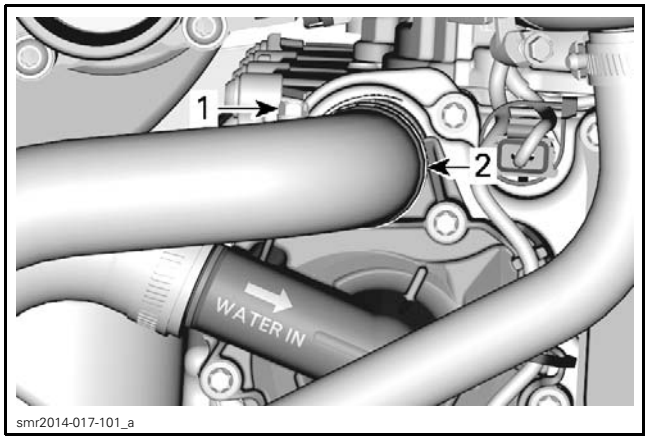
1. Thermostat housing



1. Thermostat
2. Thermostat housing

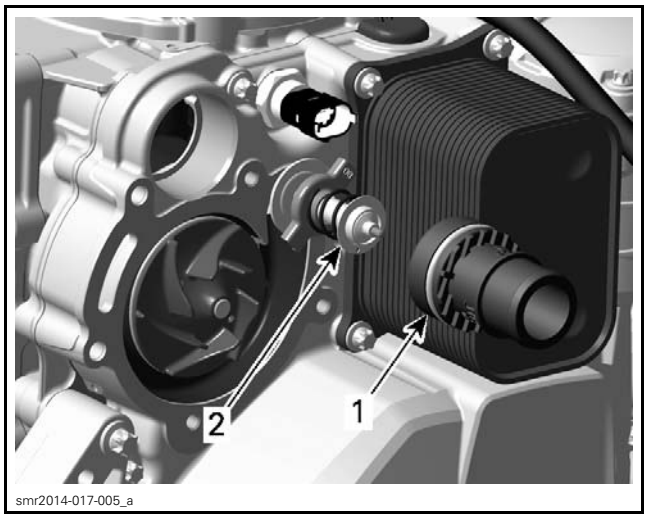
Removing the Thermostat

1. Drain engine coolant..
2. Disconnect outlet hose from thermostat housing.



1. Thermostat housing outlet hose clamp
2. Thermostat housing outlet hose

3. Remove the water pump. See the procedure in this subsection
4. Remove thermostat housing then thermostat.



1. Thermostat housing
2. Thermostat

NOTE: Use shop rags to catch any spilled engine coolant.

Testing the Thermostat

To check thermostat, put it in water and heat water.

THERMOSTAT TEMPERATURE	
Starts to open	80°C (176°F)
Fully open	95°C (203°F)

Replace thermostat if out of specification.

Installing the Thermostat

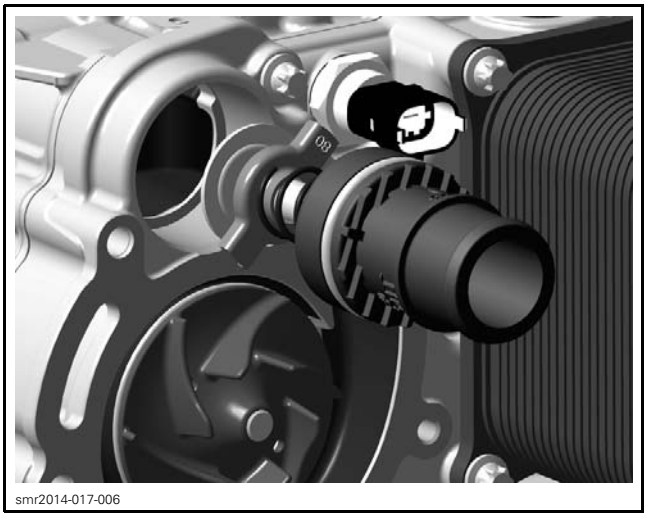
The installation is the reverse of removal procedure, however pay attention to the following.

Install NEW O-ring on thermostat housing.

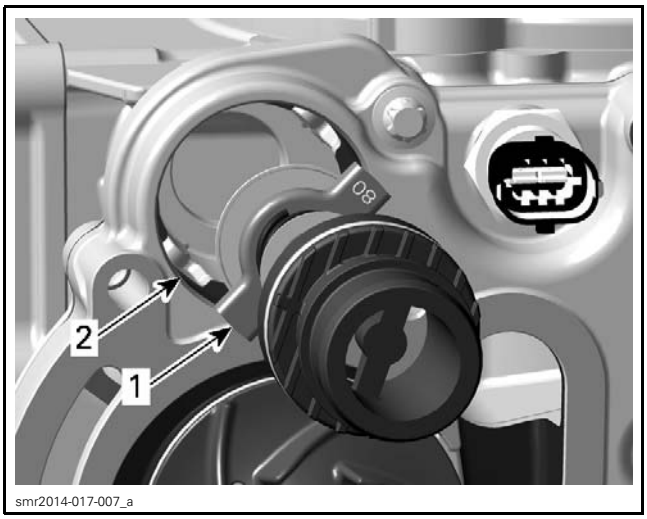
Lubricate O-ring.

THERMOSTAT HOUSING O-RING	
Service Product	DOW CORNING 111 (P/N 413 707 000)

Fit thermostat in thermostat housing.


smr2014-017-006

Align both tabs of thermostat with the recess in the magneto cover.



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1. Thermostat tabs
2. Magneto cover recess

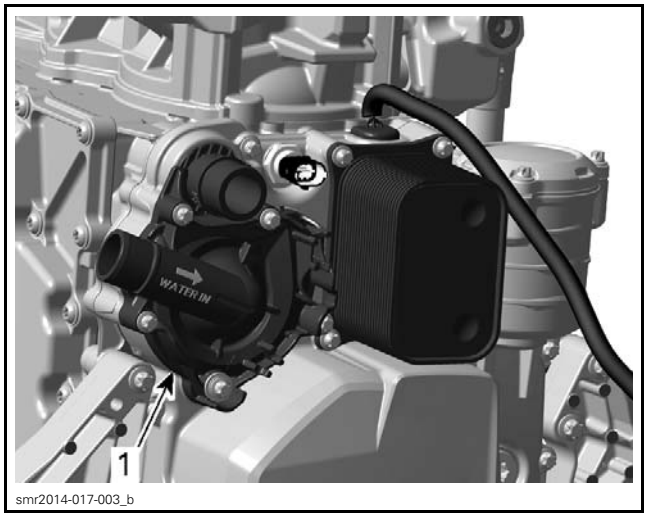
Install water pump housing, refer to *INSTALLING THE WATER PUMP HOUSING* in this subsection.

Refill and bleed cooling system.

WATER PUMP

Water Pump Location

The water pump is located on engine MAG side.

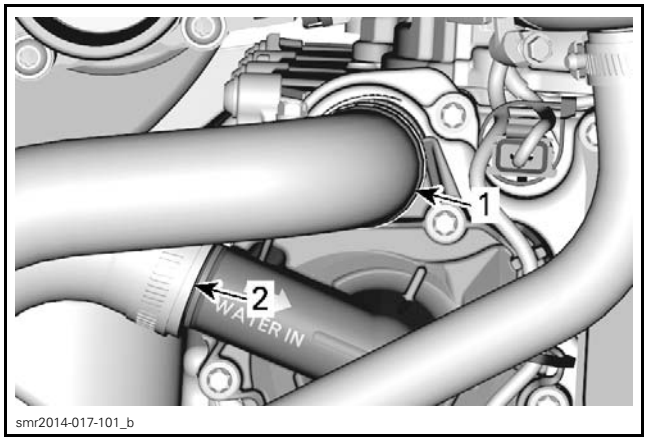


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1. Water pump

Removing the Water Pump Housing

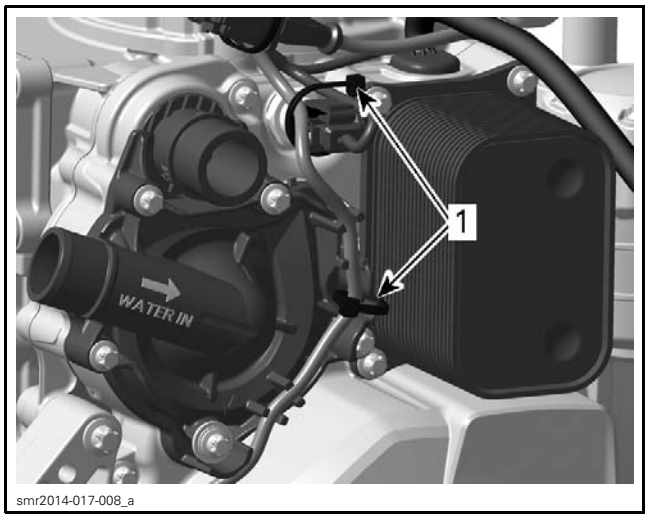
1. Drain engine coolant.
2. Disconnect outlet hose from thermostat housing.
3. Disconnect inlet hose from water pump.



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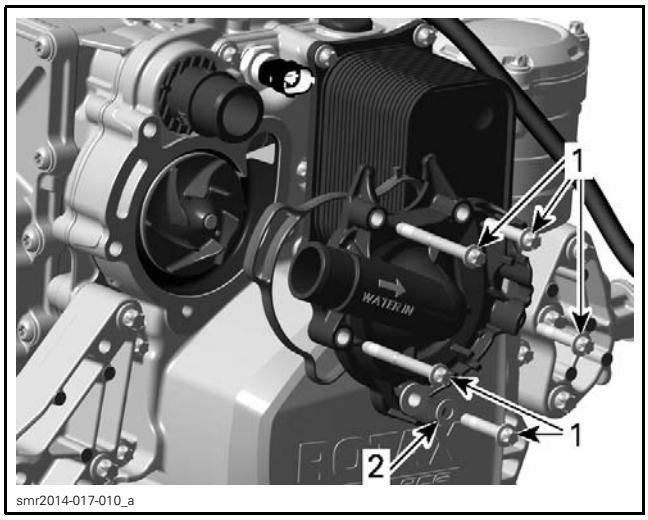
1. Water pump outlet hose
2. Water pump inlet hose

4. Remove both locking ties securing magneto wires.



1. Locking ties

5. Remove retaining screws of water pump housing.
6. Discard sealing washer.
7. Remove water pump housing from magneto cover.

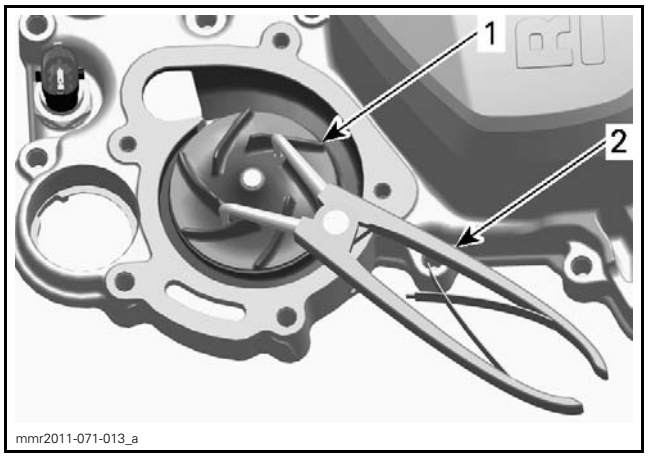


1. Retaining screws
2. Sealing washer

NOTE: Use shop rags to catch any spilled engine coolant.

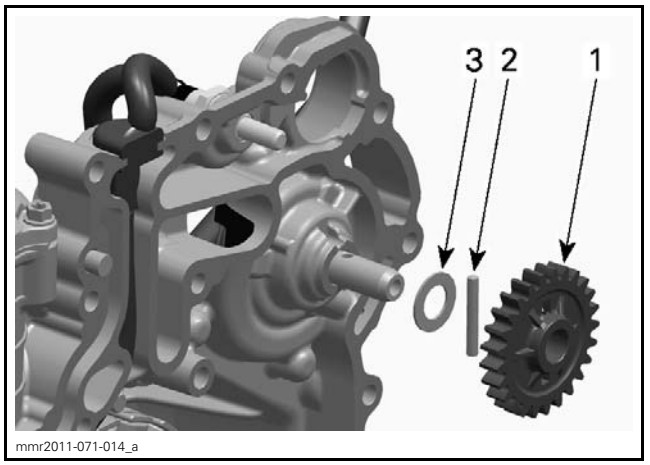
Disassembling the Water Pump

1. Unscrew impeller counterclockwise using appropriate pliers.



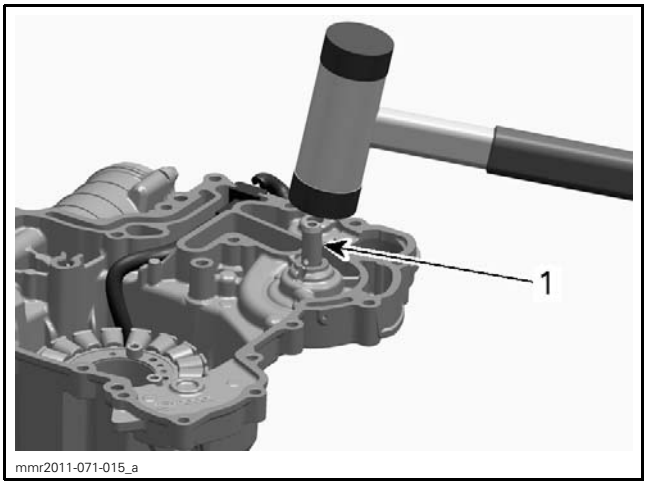
1. Impeller
2. Pliers

2. Remove magneto cover. Refer to *MAGNETO AND STARTER* subsection.
3. Remove the following components from magneto cover:
   – Water pump gear
   – Needle pin
   – Thrust washer.



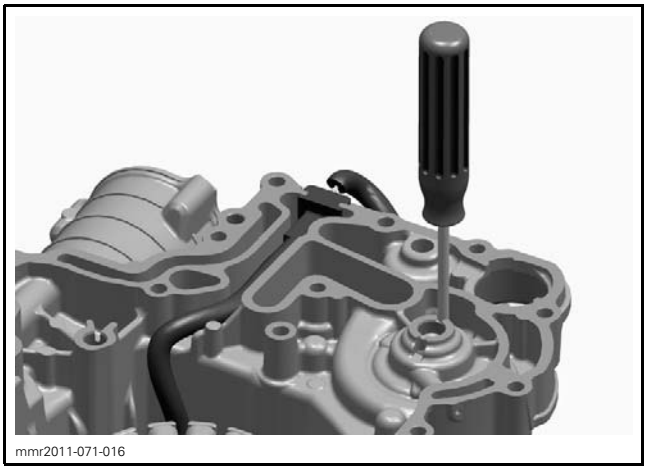
1. Water pump gear
2. Needle pin
3. Thrust washer

4. Remove water pump shaft using a plastic mallet.



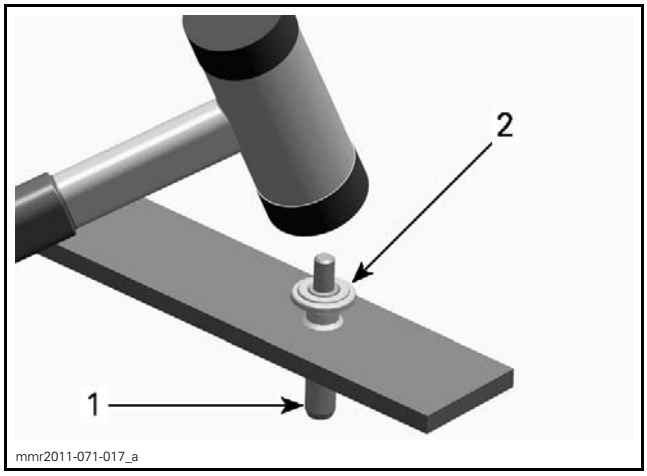
1. Water pump shaft

5. Remove the following components from magneto cover:
   – Oil seal
   – Remaining parts of rotary seal.



NOTICE Be careful not to damage the surface of the rotary seal bore in the magneto cover.

6. Separate rotary seal from water pump shaft.



1. Water pump shaft.
2. Rotary seal

Inspecting the Water Pump

Check area of water pump housing for cracks or other visible damage.

Check water pump gear for wear or broken teeth.

Check if housing gasket is brittle, hard or damaged.

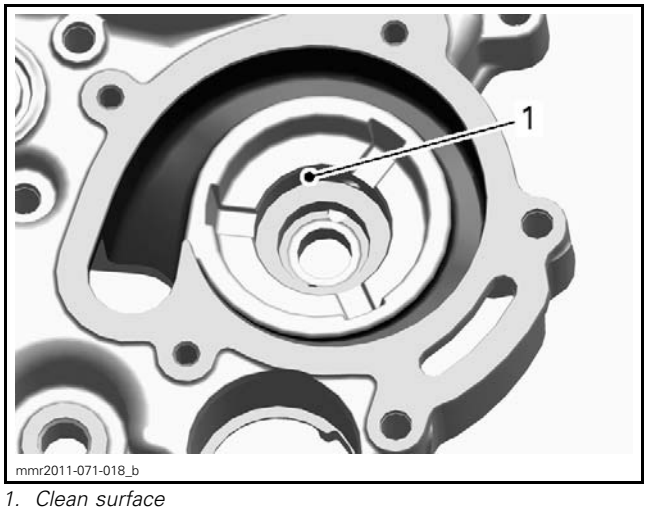
Check water pump shaft for visible damage.

Replace parts if necessary.

Assembling the Water Pump

NOTE: Always replace oil seal and rotary seal at the same time.

1. Clean rotary seal surface from old sealant.



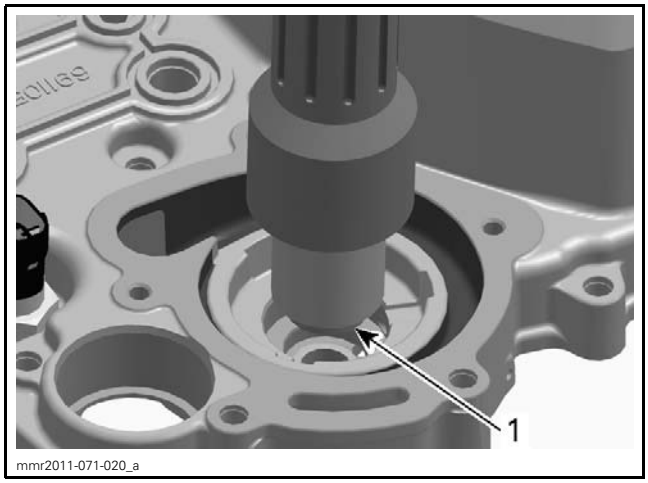
1. Clean surface

2. Apply engine oil on the press fit area of oil seal.

NOTICE Never use engine oil on the press fit area of the rotary seal.

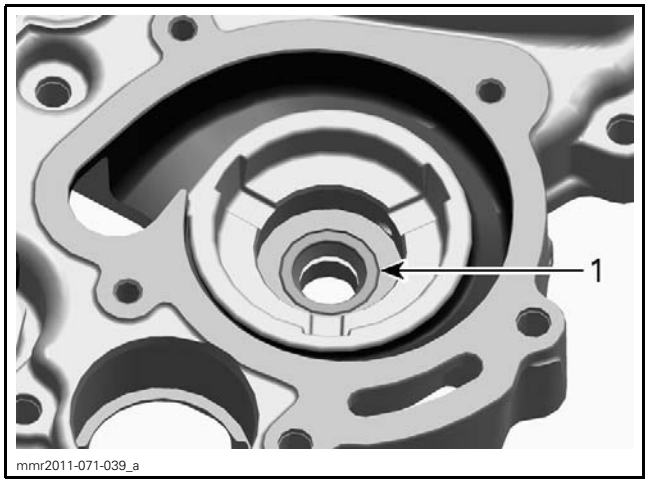
3. Install NEW oil seal.

REQUIRED TOOL	
OIL SEAL PUSHER (P/N 529 036 210)	
HANDLE (P/N 420 877 650)	



mmr2011-071-020_a

1. Oil seal



mmr2011-071-039_a

1. Oil seal correctly installed

4. Lubricate sealing lip of the oil seal.

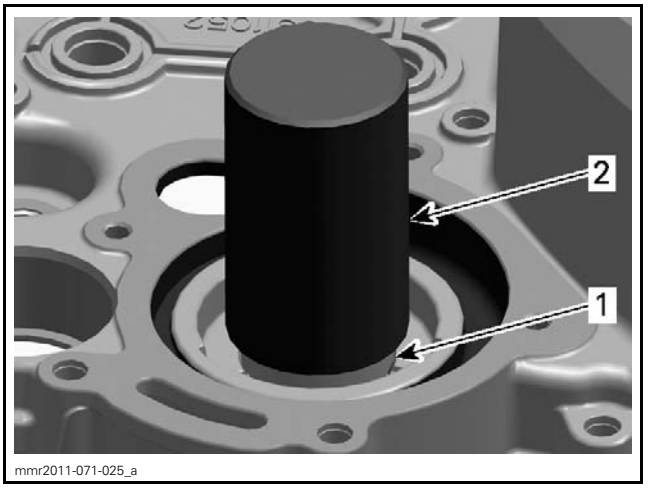
OIL SEAL	
Service Product	ISOFLEX GREASE TOPAS NB 52 (P/N 293 550 021)

5. Install **NEW** rotary seal.

NOTE: Prior to installing, ensure that press fit sealing of rotary seal is not damaged.

REQUIRED TOOL	
Press	
ROTARY SEAL INSTALLER (P/N 529 036 211)	

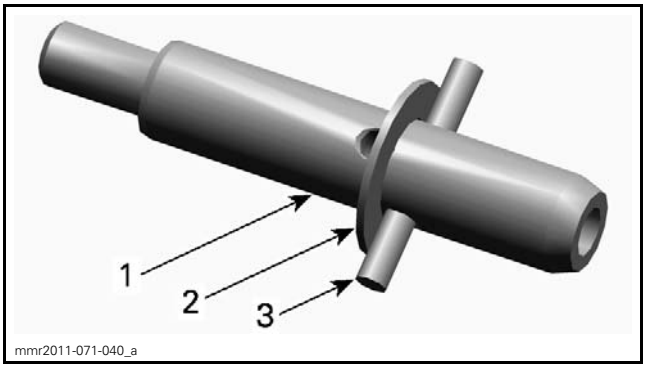
NOTICE Never use a hammer for rotary seal installation. Only use a press to avoid damaging the ceramic component.



mmr2011-071-025_a

1. Rotary seal
2. Rotary seal installer

6. Assemble the following components onto water pump shaft.
   – Needle pin
   – Thrust washer.

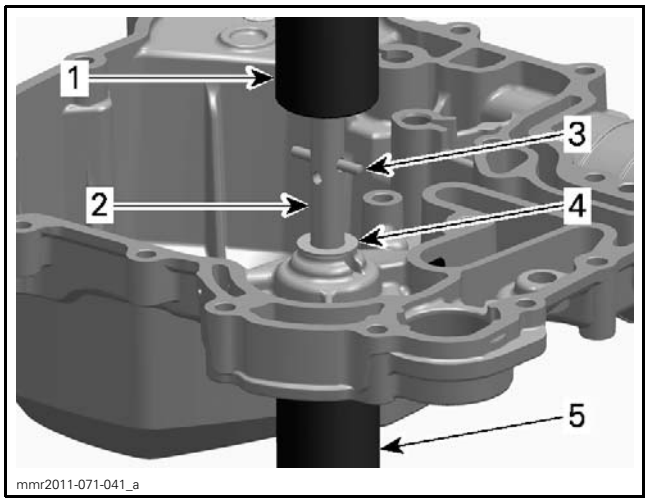


mmr2011-071-040_a

1. Water pump shaft
2. Thrust washer
3. Needle pin

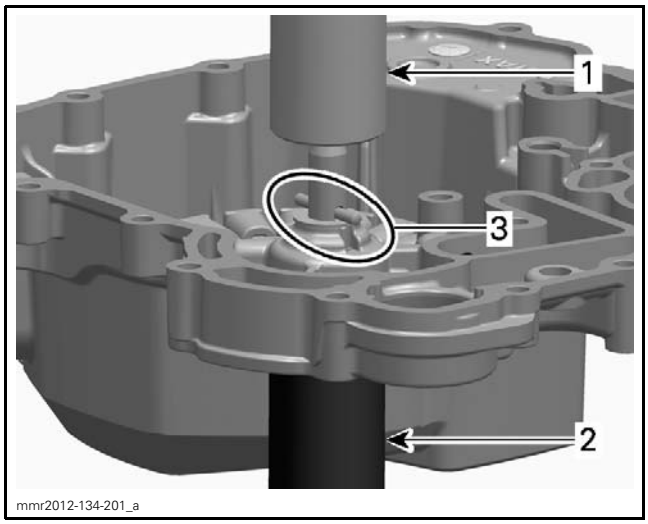
7. Slide water pump shaft into rotary seal using a press.

NOTE: To avoid damaging the rotary seal and to achieve the proper preload support the rotary seal with the ROTARY SEAL INSTALLER (P/N 529 036 211)



1. Press
2. Water pump shaft
3. Needle pin
4. Thrust washer
5. Rotary seal installer

8. Carefully press water pump shaft until needle pin touches thrust washer.



1. Press
2. Rotary seal installer
3. Needle pin touches thrust washer

NOTICE Never use a hammer to install water pump shaft into rotary seal.

NOTE: After installation, water pump shaft must rotate freely.

9. Screw impeller clockwise using appropriate pliers.

NOTICE Be careful not to damage impeller wings during its installation.

10. Install magneto cover. Refer to *MAGNETO AND STARTER* subsection.

Installing the Water Pump Housing

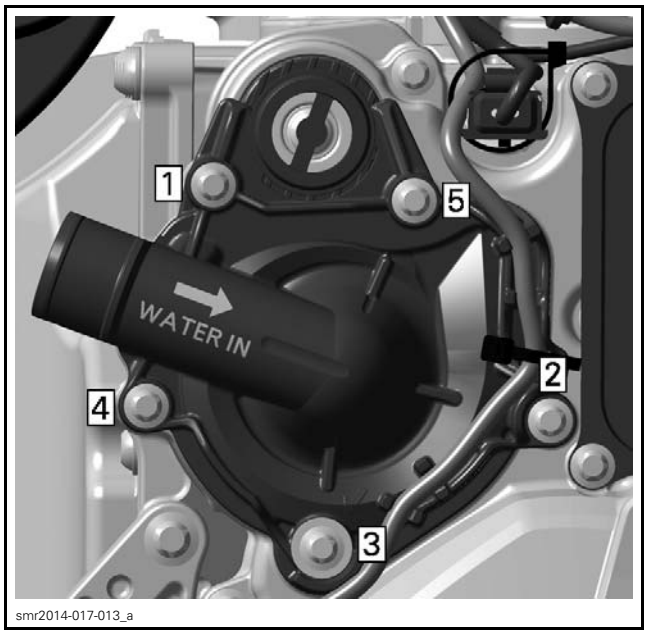
The installation is the reverse of the removal procedure. However, pay attention to the following.

NOTICE To prevent leaking, take care that the new gasket is exactly in groove when you reinstall the water pump housing.

Install a NEW sealing washer on drain screw.

Tighten water pump housing retaining screws to specification as per the following procedure.

TIGHTENING TORQUE	
Water pump housing screws	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**) + LOCTITE 243 (BLUE) (P/N 293 800 060)



TIGHTENING SEQUENCE

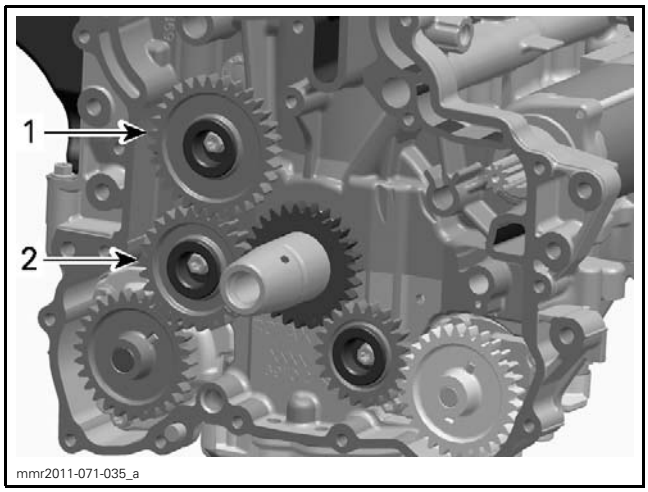
Tighten coolant hose clamps to specification.

TIGHTENING TORQUE	
Coolant hose clamps	4 N•m ± 1 N•m (35 lbf•**in** ± 9 lbf•**in**)

WATER PUMP DRIVE GEAR

Water Pump Drive Gear Location

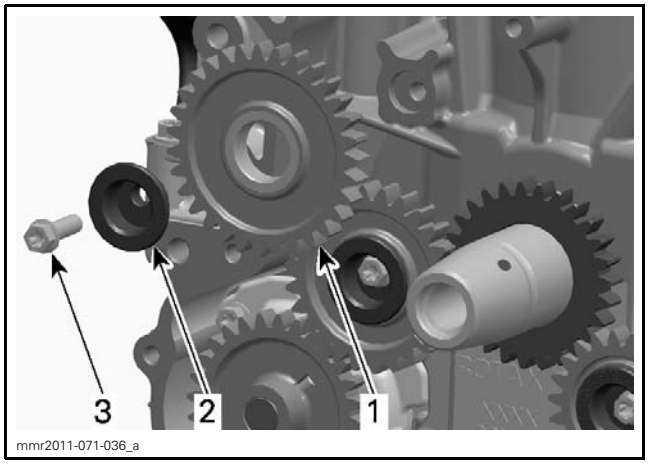
The water pump drive gear is located behind the magneto cover.



1. Water pump drive gear 31 T
2. Intermediate gear, refer to LUBRICATION SYSTEM

Removing the Water Pump Drive Gear

1. Remove the magneto cover and the magneto flywheel. Refer to *MAGNETO AND STARTER* subsection.
2. Remove screw securing water pump drive gear.
3. Remove bearing sleeve.
4. Slide off water pump drive gear.



1. Water pump drive gear 31 T
2. Bearing sleeve
3. M6 x 20 screw

Inspecting the Water Pump Drive Gear

Inspect gear for wear or other damage.

Replace gear if necessary.

Installing the Water Pump Drive Gear

The installation is the reverse of the removal procedure. However, pay attention to the following.

Apply engine oil on bearing sleeve.

Tighten water pump drive gear retaining screw to specification.

TIGHTENING TORQUE	
Water pump drive gear screws	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

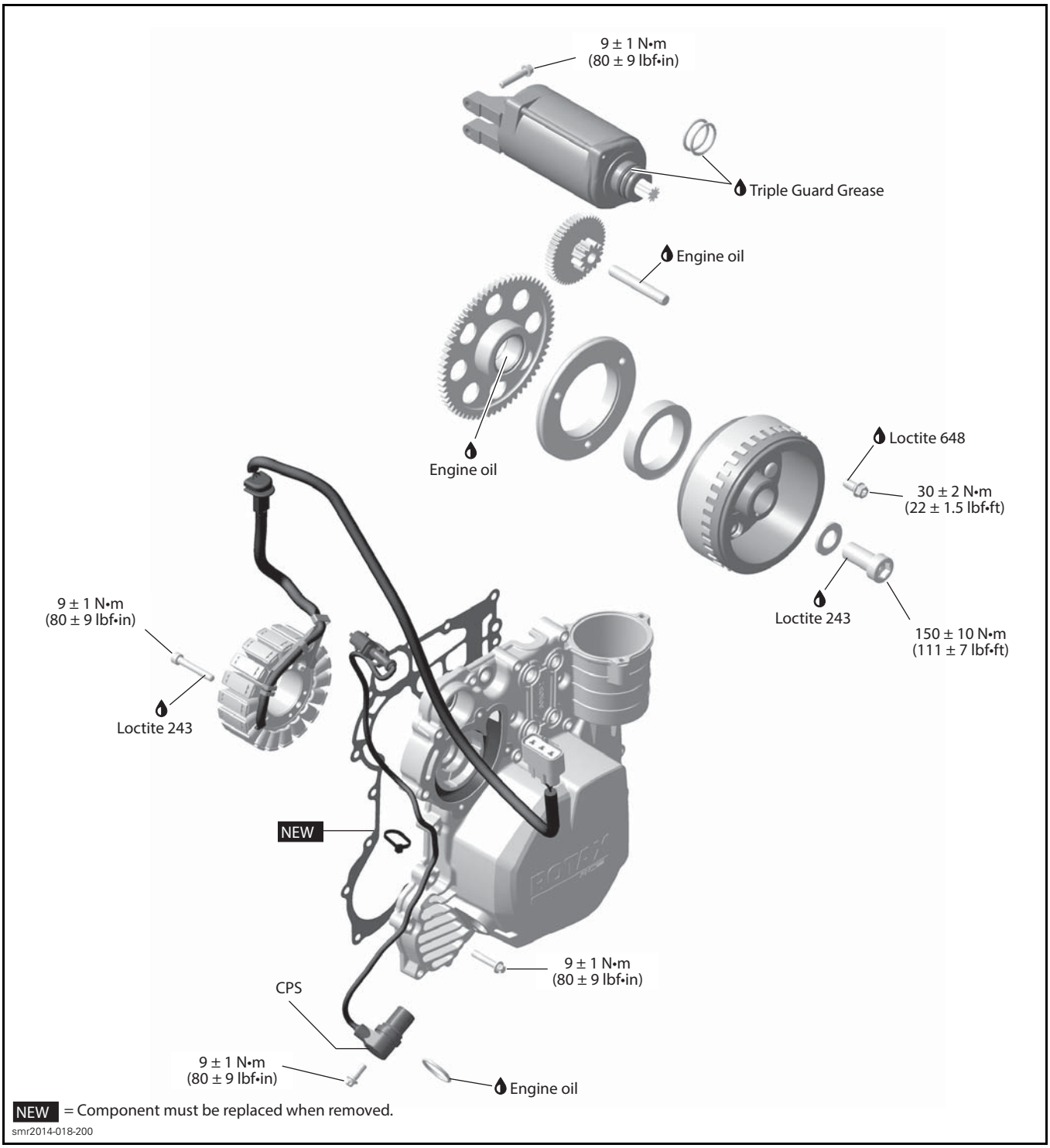
MAGNETO AND STARTER

SERVICE TOOLS

Description	Part Number	Page
CRANKSHAFT PROTECTOR	529 036 213	54
ECM ADAPTER TOOL	529 036 166	47
FLUKE 115 MULTIMETER	529 035 868	47, 52, 58
FLYWHEEL PULLER	420 976 235	54

SERVICE PRODUCTS

Description	Part Number	Page
CLUTCH AND PULLEY FLANGE CLEANER PRO S1	779244	54, 56
DIELECTRIC GREASE	293 550 004	49
LOCTITE 243 (BLUE)	293 800 060	49, 53, 55
LOCTITE 648 (GREEN)	413 711 400	56
LOCTITE CHISEL (GASKET REMOVER)	413 708 500	50
TRIPLE-GUARD GREASE	508298	58



NEW = Component must be replaced when removed.

smr2014-018-200

GENERAL

NOTICE Always disconnect BLACK (-) battery cable first and reconnect last.

During assembly/installation, use the 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 strictly be adhered to.
Locking devices when removed (ex: locking tabs, cotter pin, etc.) must be replaced.

NOTICE Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

PROCEDURES

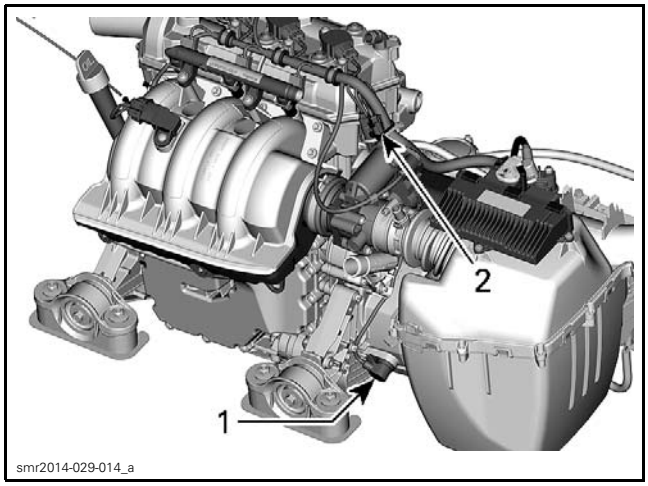
CRANKSHAFT POSITION SENSOR (CPS)

CPS TROUBLESHOOTING

When troubleshooting a CPS fault, take into account that a CPS fault can be triggered by bent or missing encoder wheel teeth.

Push START/STOP button and crank engine. If engine does not start within 15 seconds check for fault codes using BUDS2.

CPS and CPS Connector Location



TYPICAL - RH SIDE OF ENGINE
1. *CPS location*
2. *CPS connector location*

Testing the CPS Resistance at ECM Connector

1. Remove parts required to access ECM-A connector, refer to *ECM CONNECTOR ACCESS* in this subsection.
2. Disconnect ECM-A connector from the ECM and connect it to the ECM adapter.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

3. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω.



4. Measure the resistance of the sensor as per following table.

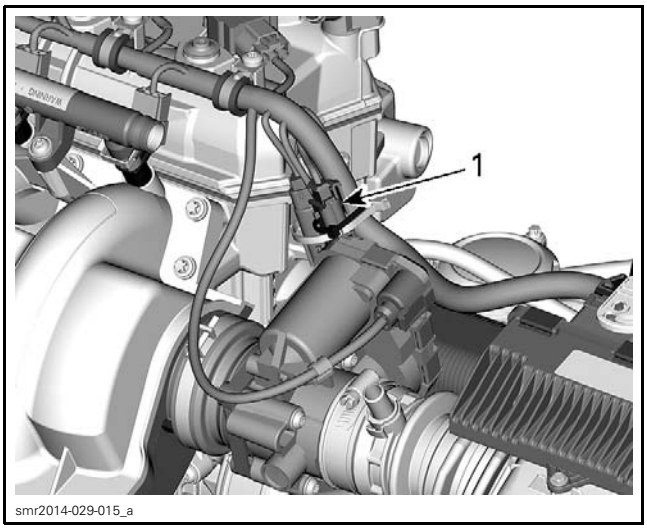
ECM A CONNECTOR		RESISTANCE @ 20°C (68°F)
Pin H1	Pin K2	775 - 950 Ω

If resistance is as specified, test continuity of wiring between ECM-A and CPS connectors. Refer to *WIRING DIAGRAM* subsection.

If resistance value is not as specified, reconnect ECM-A connector to the ECM and refer to *CPS RESISTANCE TEST AT CPS CONNECTOR*.

Testing the CPS Resistance at CPS Connector

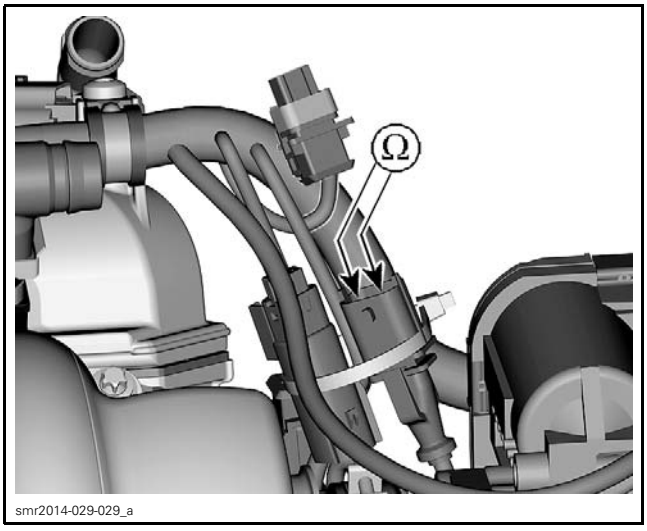
1. Disconnect CPS wiring harness connector.



FRONT OF ENGINE
1. CPS connector location

2. Probe CPS connector terminals as per following table.

CPS CONNECTOR		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
1	2	775 - 950 Ω



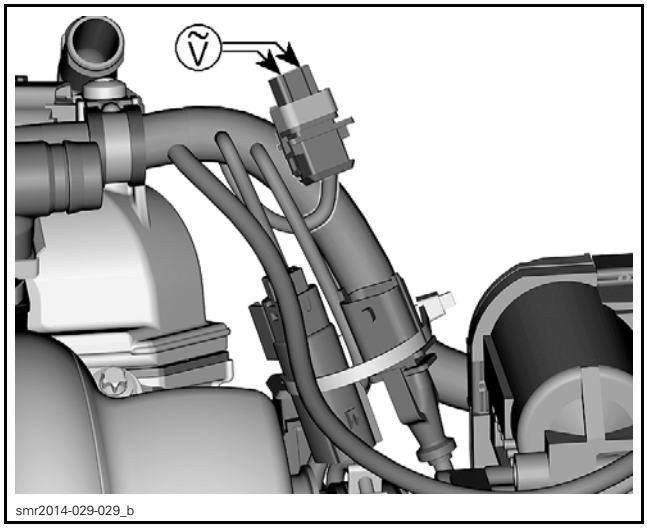
If resistance is not within specifications, replace the CPS.

If resistance tests good, carry out a *CPS OUTPUT VOLTAGE TEST*.

Testing the CPS Voltage

1. Press the START/STOP button to wake up the ECM.
2. Install the tether cord on the engine cut-off switch.
3. Pull the throttle lever completely in to the handlebar and hold (drowned mode).
4. While cranking the engine, probe CPS terminals.

CPS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
1	2	Approximately 3.7 Vac

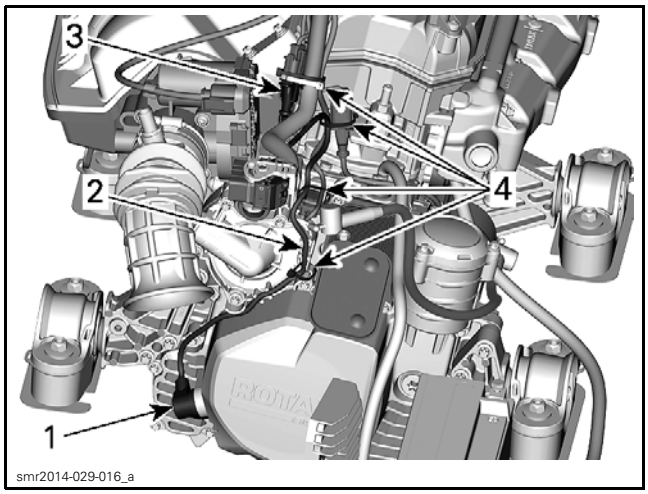


If voltage is not as specified, carry out a *CPS RESISTANCE TEST*.

If voltage is as specified, check continuity of wiring between CPS connector and ECM connector. Refer to *WIRING DIAGRAM*.

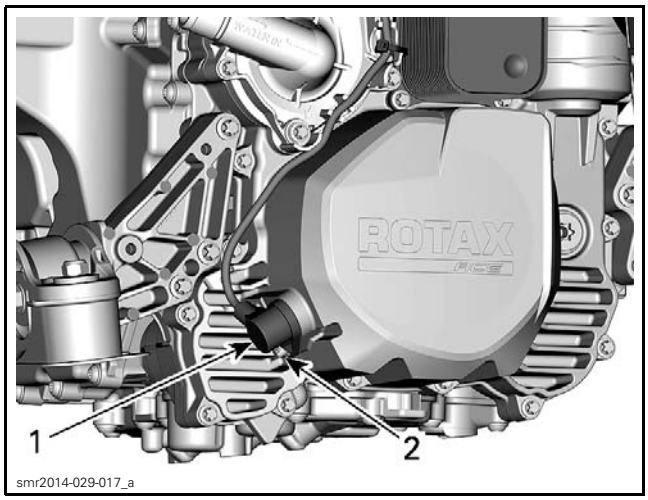
Replacing the CPS

1. Remove air intake silencer to access the CPS, refer to *AIR INTAKE SYSTEM* subsection.
2. Take note of factory CPS wire harness routing for reinstallation.
3. Disconnect CPS connector and cut harness locking ties.



1. CPS
2. CPS wiring harness
3. CPS connector
4. Locking ties

4. Remove CPS retaining screw and pull on CPS to remove it from engine.



1. CPS
2. Retaining screw

5. Apply engine on O-ring of the new CSP.
6. Install the CPS.

TIGHTENING TORQUE	
CPS screw	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**) + LOCTITE 243 (BLUE) (P/N 293 800 060)

Apply DIELECTRIC GREASE (P/N 293 550 004) on CPS connector.

7. Route and secure CPS harness using locking ties as noted prior to removal.
8. Reconnect CPS connector.
9. Install air intake silencer, refer to *AIR INTAKE SYSTEM* subsection.

NOTE: Ensure tab on air hose is aligned between the two marks on the intake silencer.

10. Install all remaining removed parts, refer to applicable subsection.

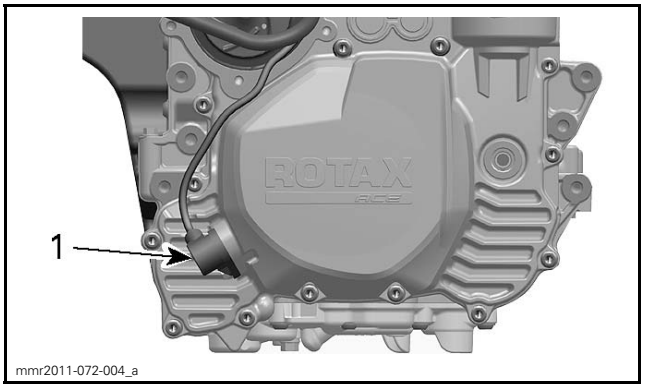
MAGNETO COVER

Accessing the Magneto Cover

1. Remove central body. Refer to *BODY*.
2. Remove battery. Refer to *CHARGING SYSTEM*.
3. Remove air intake silence. Refer to *AIR INTAKE SYSTEM*.
4. Remove fuel tank. Refer to *FUEL TANK AND FUEL PUMP*.
5. Remove central foam (under fuel tank).

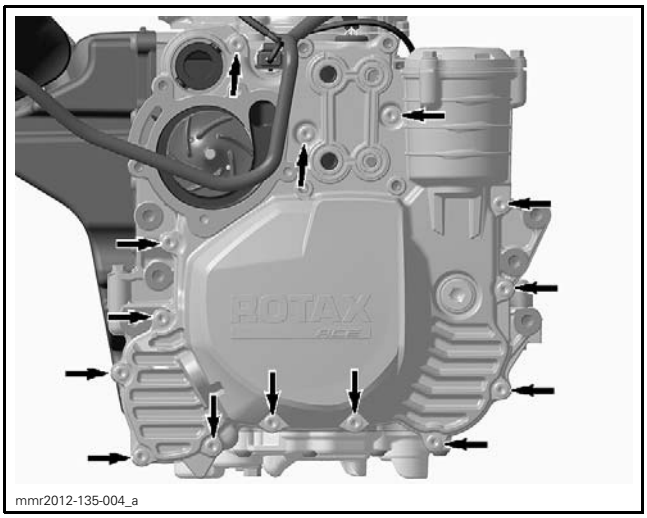
Removing the Magneto Cover

1. Refer to the appropriate subsection and:
   – Drain coolant
   – Drain engine oil.
2. Refer to *COOLING SYSTEM* and remove:
   – Water pump housing
   – Thermostat housing.
3. Refer to *LUBRICATION SYSTEM* subsection and remove:
   – Oil pressure regulator
   – Oil cooler.
4. Remove the CPS.



1. CPS

5. Remove magneto cover retaining screws.



MAGNETO COVER SCREWS

6. Place an oil pan under magneto area to catch remaining oil.
7. Pull magneto cover off.

Inspecting the Magneto Cover

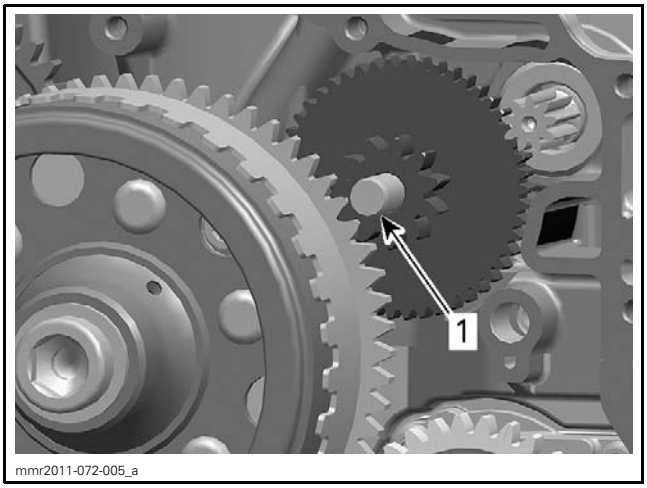
Check magneto cover for cracks or other damage. Replace if necessary.

Installing the Magneto Cover

1. Clean magneto cover.

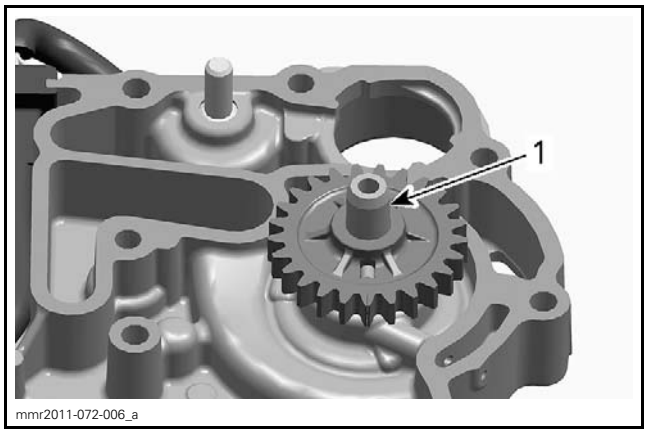
MAGNETO COVER CLEANING	
Service product	LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500)

2. Install a NEW magneto cover gasket.
3. Ensure starter drive gear pin is in place.
4. Apply engine oil on starter drive gear pin.



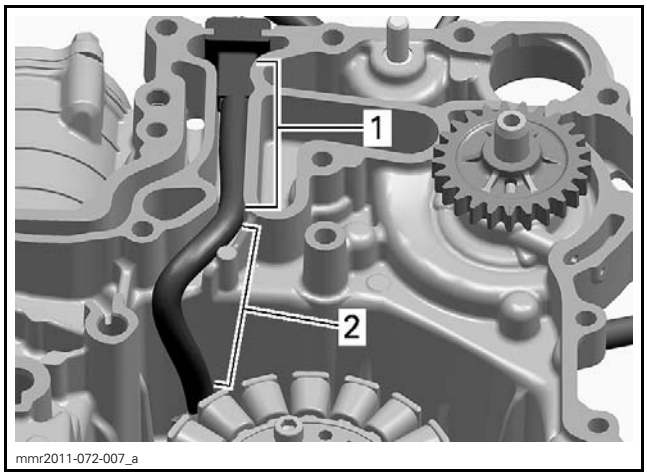
1. Starter drive gear pin

5. Apply engine oil on water pump shaft.



1. Water pump shaft - apply engine oil

NOTICE Make sure that the stator cable harness is embedded into the channel. The part of the harness that is out of the channel must be tight, otherwise it might chafe or jam.



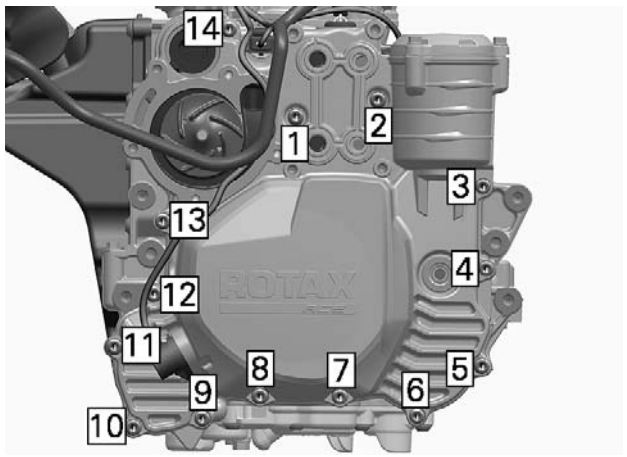
1. Embedded in that area
2. Tight in this area

6. Carefully install magneto cover.

⚠ CAUTION Magnetic force between magneto flywheel and stator is very high. Avoid finger contusions.

7. Tighten magneto cover screws according to the following sequence.

TIGHTENING TORQUE	
Magneto cover screws	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)



TIGHTENING SEQUENCE

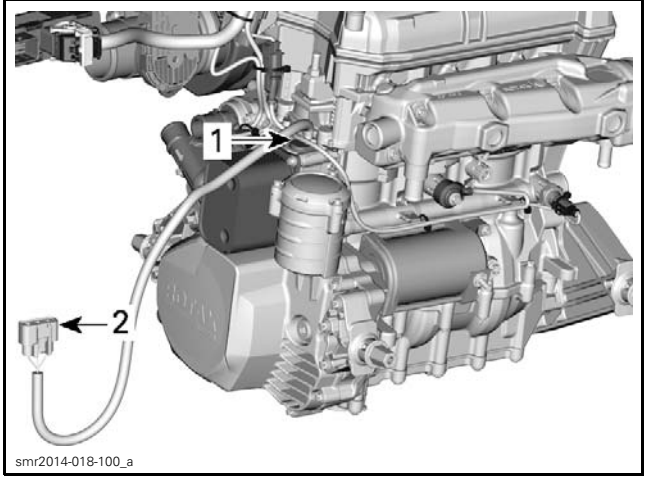
8. Install all other removed parts.

STATOR

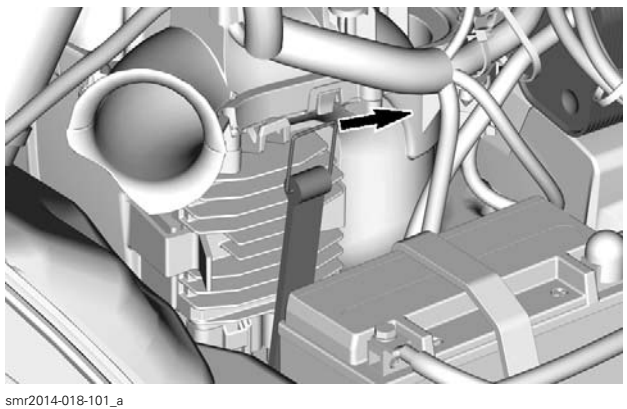
Accessing the Stator Connector

Remove central body. Refer to *BODY*.

Follow image sequence.

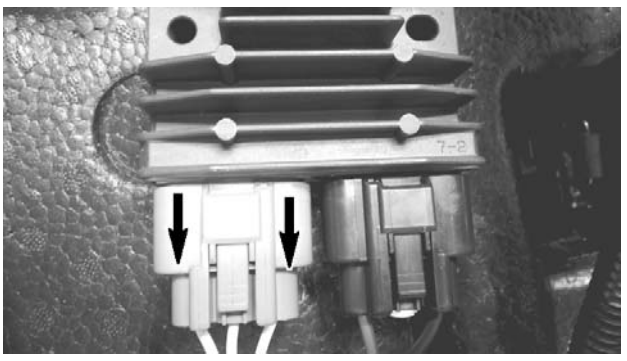


STATOR CONNECTOR ACCESS
1. *Stator harness at magneto cover*
2. *Stator connector*









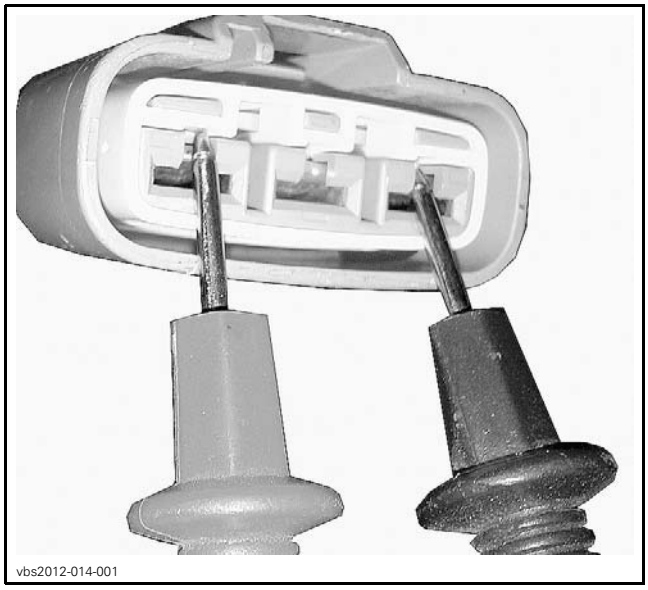
Testing the Stator Continuity

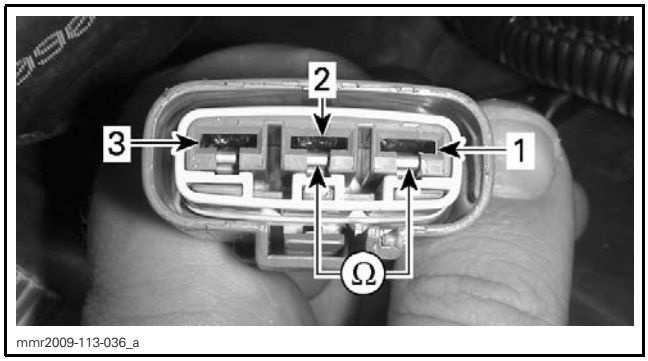
1. Disconnect battery.
2. Disconnect the stator connector from voltage regulator, refer to *STATOR CONNECTOR ACCESS* in this subsection.
3. Set the multimeter to Ω.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

4. Probe each pair of YELLOW wires by touching (NOT inserting) terminals lock tabs as shown.

NOTICE Never insert a multimeter probe into a terminal as it would ruin the terminal.


vbs2012-014-001



mmr2009-113-036_a

1. Pin #1
2. Pin #2
3. Pin #3

5. Read resistance as per following table.

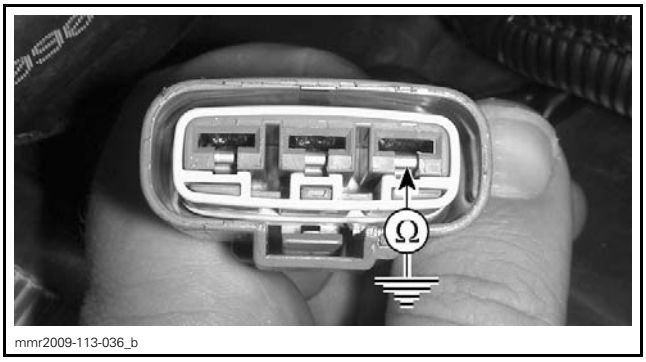
STATOR CONTINUITY TEST	
YELLOW WIRES (EACH PAIR)	RESISTANCE @ 20°C (68°F)
Pins 1 and 2	0.1 - 1 Ω
Pins 1 and 3	
Pins 2 and 3	

If any resistance reading is not as specified, the stator or the wiring (including connector) is open and needs to be repaired or replaced.

If resistance is good, perform the stator insulation test.

Testing the Stator Insulation

1. Connect multimeter between any YELLOW wire and chassis ground.



mmr2009-113-036_b

2. Read resistance.

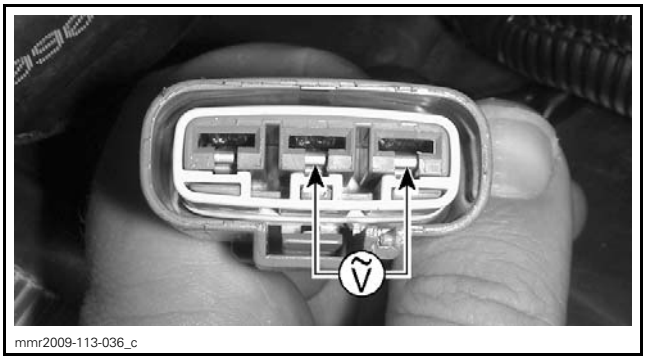
STATOR INSULATION TEST	
PROBE POSITIONS	RESISTANCE @ 20°C (68°F)
Any YELLOW wire and chassis ground	Infinity (OL)

If any resistance reading is not as specified, the stator or the wiring is shorted to ground and needs to be repaired or replaced.

If the insulation test is good, perform the output voltage test.

Testing the Stator Output Voltage

1. With the stator connector unplugs from the voltage regulator/rectifier, start engine and let it reach its operating temperature.
2. Set multimeter to Vac scale.
3. With engine idling, connect multimeter between each pair of YELLOW wires.



mmr2009-113-036_c

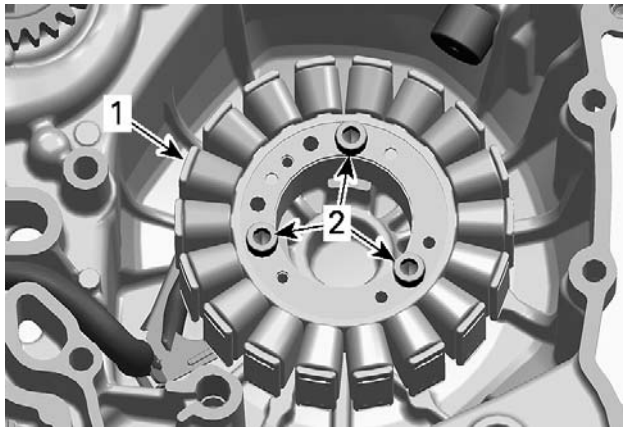
4. Read voltage.

STATOR OUTPUT VOLTAGE TEST		
TEST ENGINE SPEED	TERMINAL	VOLTAGE
Idle speed	1 and 2	± 25 Vac
	1 and 3	
	2 and 3	

If any voltage reading is significantly lower than specification, replace the stator.

Removing the Stator

1. Remove the *MAGNETO COVER*, see procedure in this subsection.
2. Remove stator retaining screws.



mmr2011-072-008_a

1. Stator
2. Stator retaining screws

3. Remove stator.

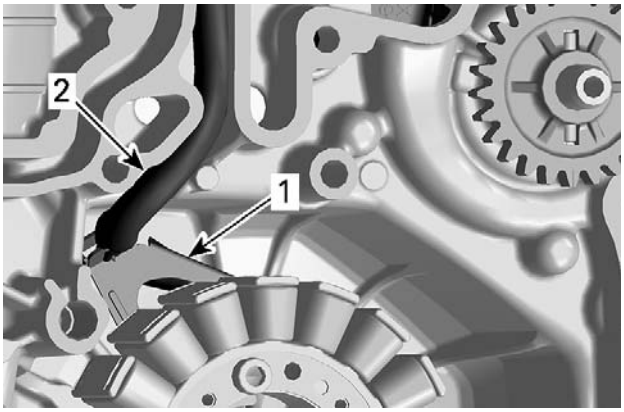
Inspecting the Stator

Check stator windings and insulation for cracks and other damages. If damaged replace it.

Check if stator wires are brittle, hard or otherwise damaged.

Installing the Stator

1. Ensure that the stator cable is underneath the cable holder during installation of the stator.



mmr2011-072-009_a

1. Cable holder
2. Stator cable

2. Install stator retaining screws and tighten to the specified torque.

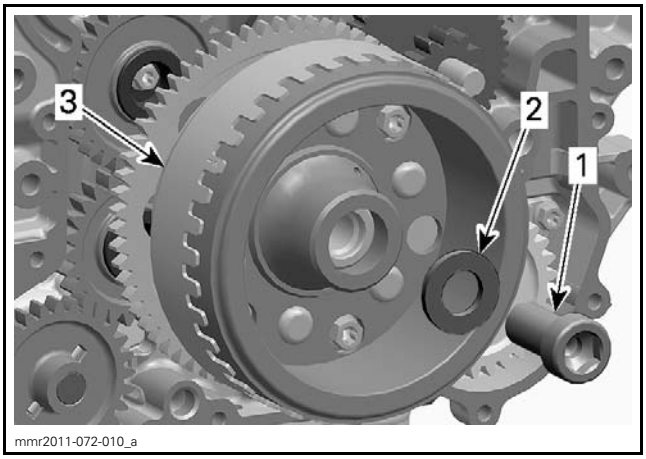
TIGHTENING TORQUE	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Stator retaining screws	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

3. Reinstall *MAGNETO COVER*, see procedure in this subsection.

ROTOR

Removing the Rotor

1. Remove the *MAGNETO COVER*, see procedure in this subsection.
2. Lock crankshaft. Refer to *CYLINDER BLOCK* subsection.
3. Remove rotor retaining screw and lock washer.



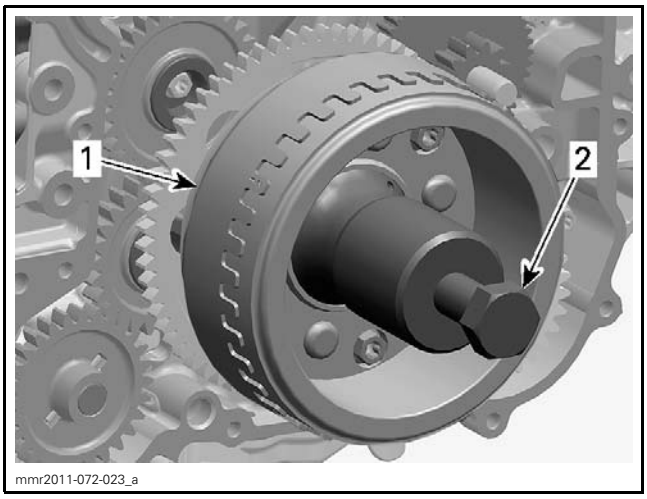
mmr2011-072-010_a

1. Retaining screw
2. Lock washer
3. Rotor

4. Remove rotor.

REQUIRED TOOLS	
CRANKSHAFT PROTECTOR (P/N 529 036 213)	
FLYWHEEL PULLER (P/N 420 976 235)	

NOTE: Apply some grease on the crankshaft protector surface to ease puller operation.



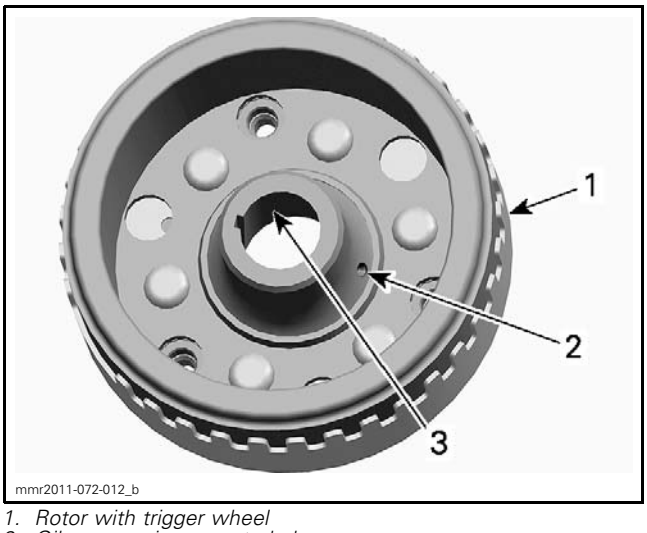
1. Rotor
2. Flywheel puller screw

Inspecting the Rotor

Check the inner side of the rotor for scratches or other damage.

Check keyway for wear or damages.

Check if trigger wheel teeth are bent or otherwise damaged.



1. Rotor with trigger wheel
2. Oil passage in magneto hub
3. Rotor taper

Check woodruff key and keyway on the crankshaft for wear or damages.

Replace parts as necessary.

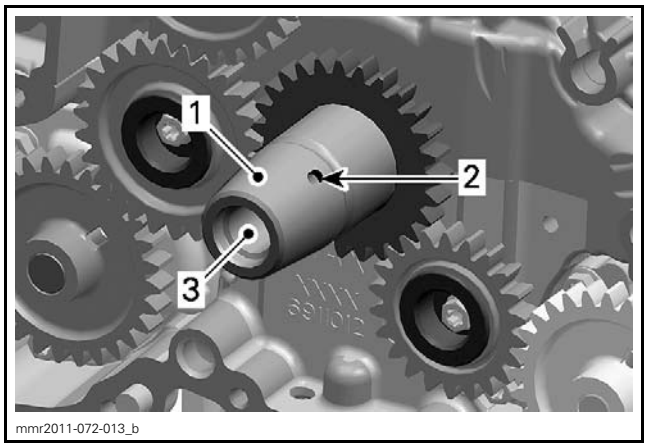
Installing the Rotor

Installation is the reverse of the removal procedure. However, pay attention to the following.

1. Blow the oil passage in the magneto hub using compressed air. Check if it is clogged.
2. Using a parts cleaner, clean:
   – The oil passage
   – The crankshaft thread
   – The crankshaft taper
   – The rotor taper.

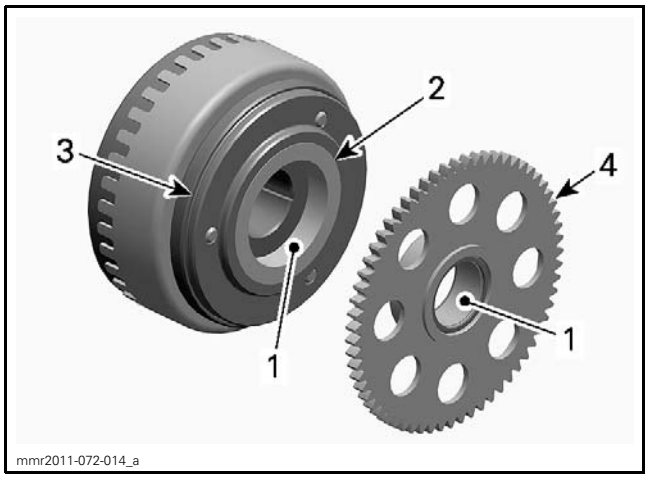
SERVICE PRODUCT
CLUTCH AND PULLEY FLANGE CLEANER PRO S1 (P/N 779244)

NOTICE Taper on crankshaft and rotor must be free of grease.



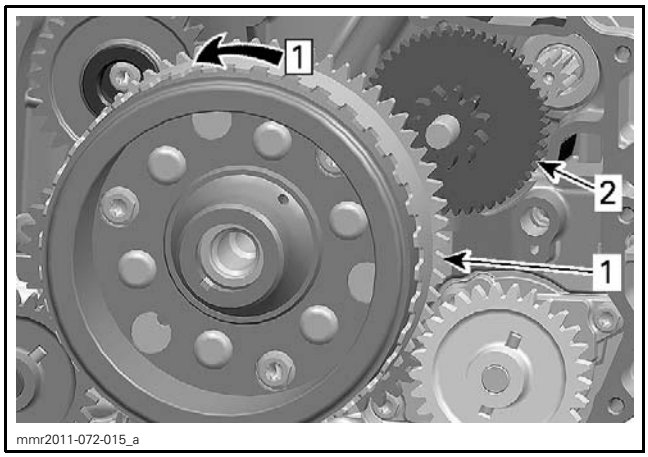
1. Crankshaft taper
2. Oil passage
3. Thread

3. Apply oil on sprag clutch and needle bearing.
4. Install sprag clutch gear onto the rotor.



1. Apply engine oil here
2. Sprag clutch
3. Sprag clutch housing
4. Sprag clutch gear

5. Slide rotor along with the sprag clutch gear onto the crankshaft. The woodruff key and keyway must be aligned.
6. Rotate sprag clutch gear counterclockwise to align with starter double gear.



Step 1: Rotate to align teeth

1. Sprag clutch gear
2. Starter double gear

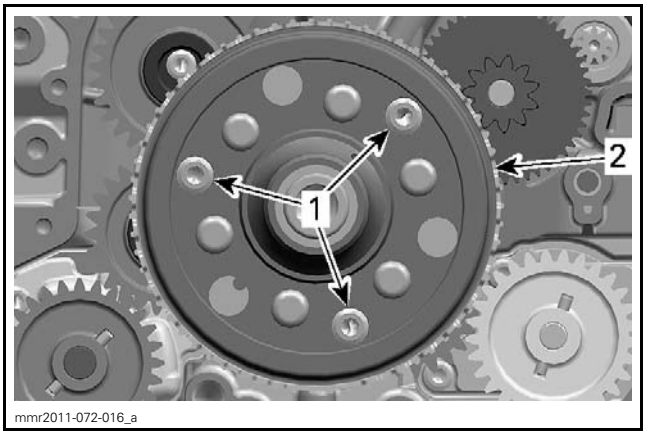
7. Install washer and retaining screw.
8. Tighten to the specified torque.

TIGHTENING TORQUE	
Rotor retaining screw	150 N•m ± 10 N•m (111 lbf•ft ± 7 lbf•ft) + LOCTITE 243 (BLUE) (P/N 293 800 060)

SPRAG CLUTCH

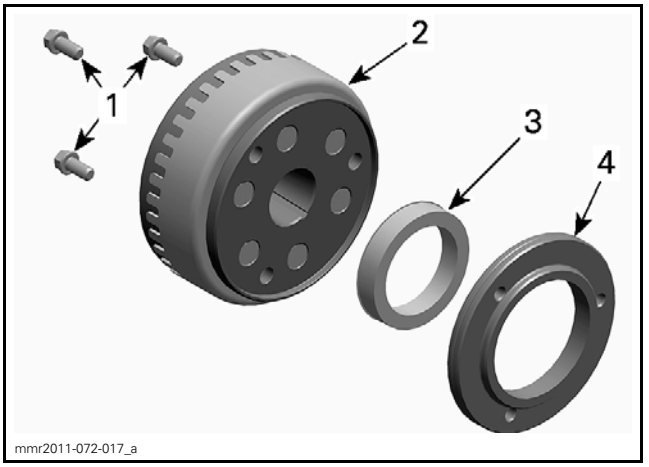
Removing the Sprag Clutch

1. Remove the *MAGNETO COVER*, see procedure in this subsection.
2. Lock crankshaft. Refer to *CYLINDER BLOCK* subsection.
3. Loosen and remove sprag clutch housing screws.



1. Sprag clutch housing screws
2. Rotor

4. Remove *ROTOR*, see procedure in this subsection.
5. Remove sprag clutch housing.
6. Remove sprag clutch from sprag clutch housing.



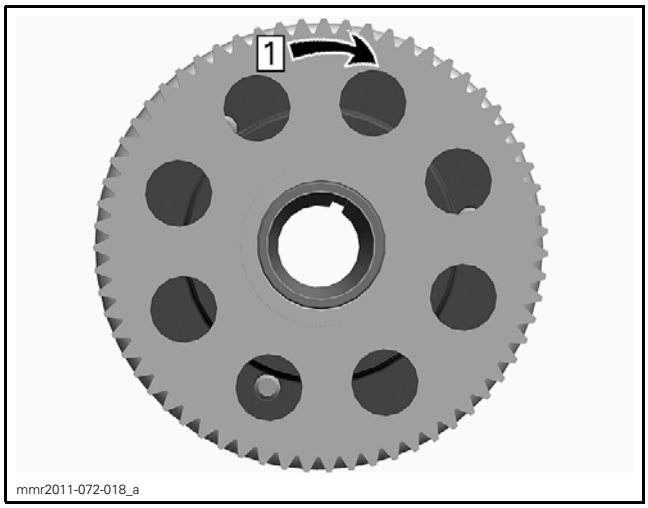
1. Sprag clutch housing screws
2. Rotor
3. Sprag clutch
4. Sprag clutch housing

Inspecting the Sprag Clutch

Inspect sprag clutch and sprag clutch housing for wear and damage.

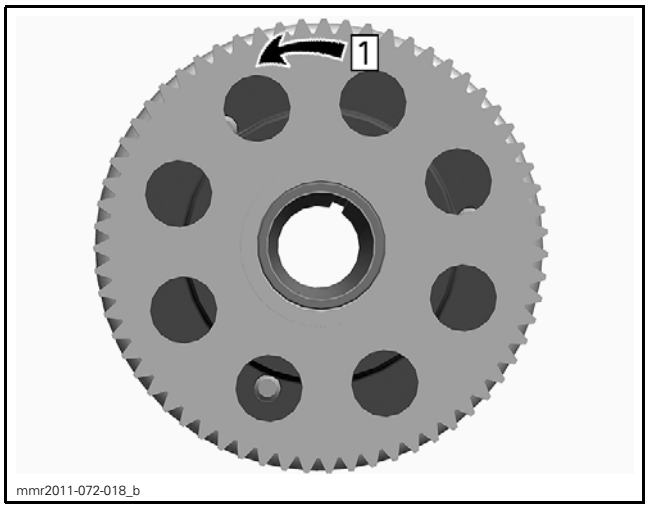
Check the collar of the sprag clutch gear, refer to *SPRAG CLUTCH GEAR*.

Rotate sprag clutch gear clockwise. Gear must rotate freely.



Step 1: Free

Rotate sprag clutch gear counterclockwise. Gear must lock.



Step 1: Lock

Installing the Sprag Clutch

1. Clean sprag clutch housing with a parts cleaner.

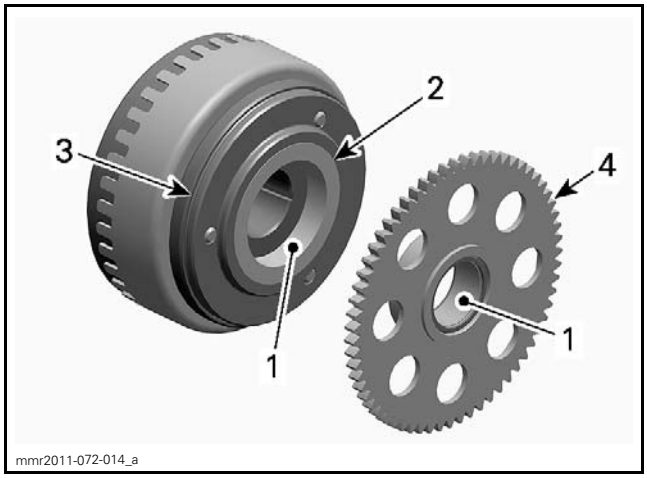
NOTICE **Threads of sprag clutch housing must be free of any lubricants.**

SERVICE PRODUCT
CLUTCH AND PULLEY FLANGE CLEANER PRO S1 (P/N 779244)

2. Apply thread locker on threads of sprag clutch housing screws.

SERVICE PRODUCT
LOCTITE 648 (GREEN) (P/N 413 711 400)

3. Loosely install screws.
4. Apply engine oil on sprag clutch and sprag clutch gear needle bearing.



1. *Apply engine oil here*
2. *Sprag clutch*
3. *Sprag clutch housing*
4. *Sprag clutch gear*

5. Install *ROTOR*, see procedure in this subsection.
6. Tighten sprag clutch housing screws to the specified torque.

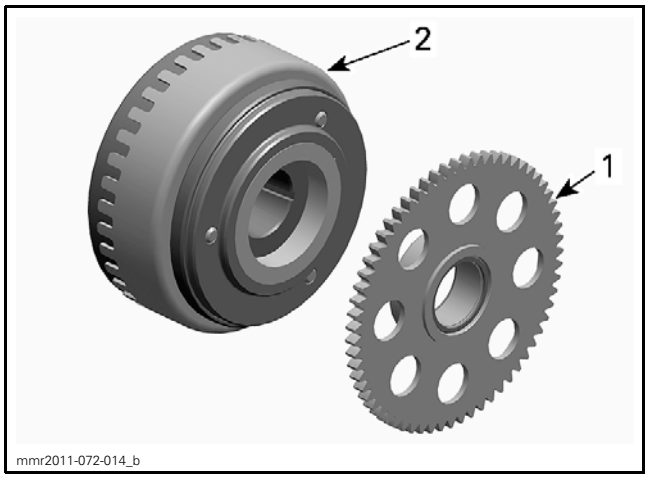
TIGHTENING TORQUE	
Sprag clutch housing screws	30 N•m ± 2 N•m (22 lbf•ft ± 1 lbf•ft)

7. Install all other removed parts.

SPRAG CLUTCH GEAR

Removing the Sprag Clutch Gear

1. Remove rotor and sprag clutch gear together. Refer to *ROTOR* in this subsection.
2. Pull sprag clutch gear out of the rotor.

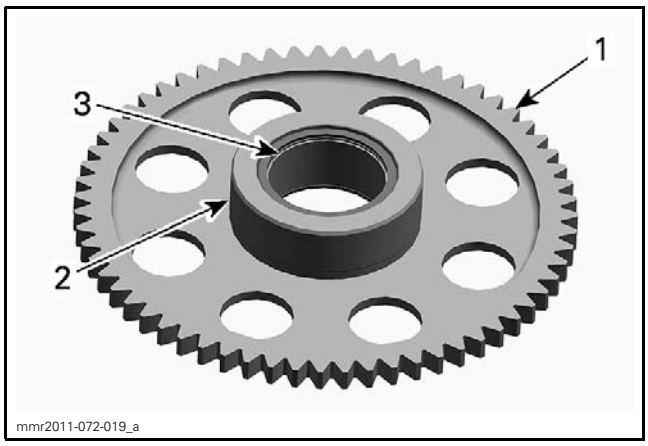


1. Sprag clutch gear
2. Rotor

Inspecting the Sprag Clutch Gear

Inspect gear, especially teeth and sprag clutch collar for wear and other damage.

Check needle bearing for wear and pittings.



1. Teeth
2. Collar
3. Needle bearing

Replace sprag clutch gear if necessary.

Installation the Sprag Clutch Gear

The installation is the reverse of the removal procedure. However, pay attention to the following.

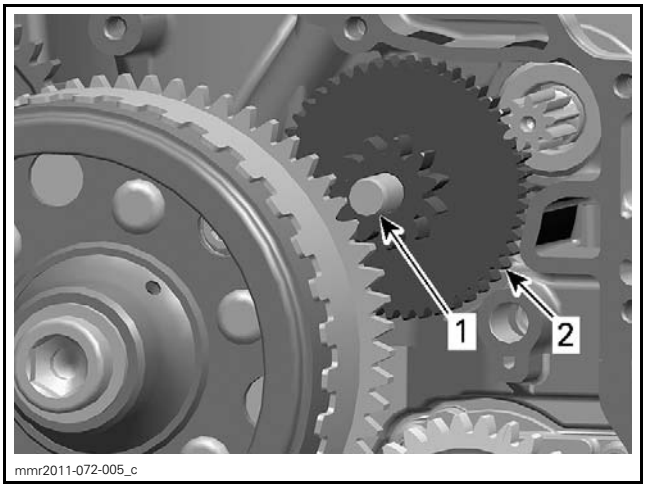
NOTE: Apply engine oil on needle bearing and collar of sprag clutch gear.

STARTER DRIVE GEARS

The starter drive gears are located on the engine MAG side behind the magneto cover.

Removing the Starter Drive Gear

1. Remove *MAGNETO COVER*, see procedure in this subsection.
2. Remove location pin and starter double gear.



1. Location pin
2. Starter double gear

Inspecting the Starter Drive Gear

Inspect starter drive gears and location pin for wear and damage.

Replace parts if necessary.

Installing the Starter Drive Gear

The installation is the reverse of the removal procedure. However, pay attention to the following.

Apply engine oil on the location pin.

STARTER

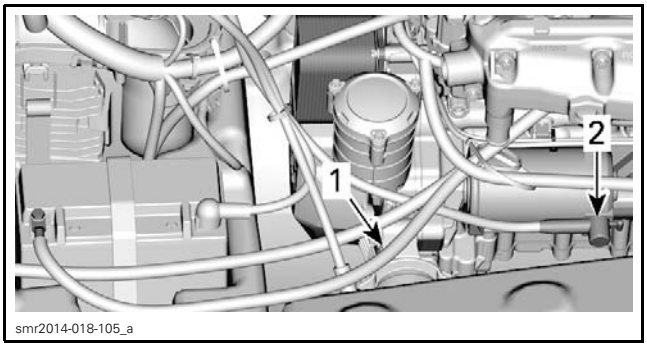
Testing the Starter Operation

Before carrying out any starter test, make sure:
- Battery is fully charged and in good condition.
- Cable connections at battery, starter and solenoid are tight.
- Cables are in good condition.

1. Disconnect the negative battery cable.
2. Using booster cables and a fully charged battery or a power pack, carefully supply current directly to the starter.
   - 2.1 Connect the negative booster cable or power pack cable to a good ground such as an engine support.
   - 2.2 Temporarily touch the starter positive terminal.

⚠ WARNING

Sparks can occur when connecting jumper cables. To avoid fire hazard, be sure that no flammable liquids or fuel vapors are in the test area.



1. Engine support
2. Starter positive terminal

If starter turns at normal speed, test the starting circuit. Refer to *STARTING SYSTEM* subsection.

If starter turns slowly, carry out the *STARTER VOLTAGE DROP TEST (AT BATTERY)*.

If starter does not turn, replace starter.

Testing the Starter Voltage Drop (at Battery)

NOTE: This test will confirm if starter draws too much current. Battery must be fully charged and in good condition.

1. Set the multimeter to Vdc.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

2. Probe the battery posts.
3. Crank engine in drowned mode. Refer to *ENGINE MANAGEMENT SYSTEM*.
4. Read voltage while cranking.

NOTE: Battery voltage will drop approximately 2 Vdc and fluctuate with starter cranking load.

If the result is close to battery voltage, the starter is in good condition.

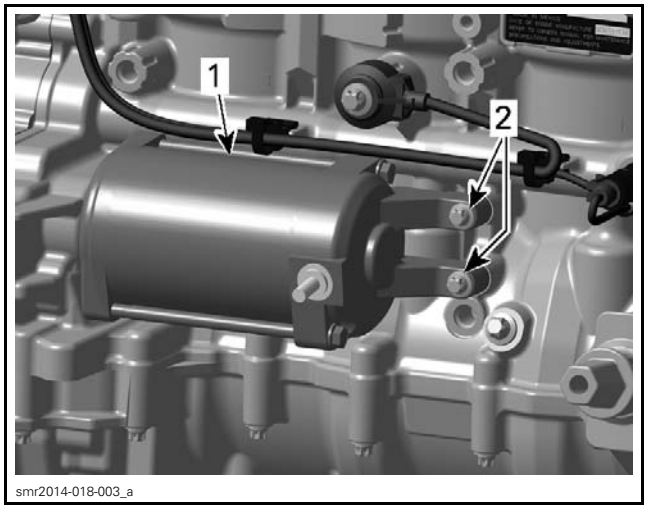
If the result is below battery voltage (- 2 Vdc and more), the starter may be defective.

Accessing the Starter

Remove central body. Refer to *BODY*.

Removing the Starter

1. Disconnect the BLACK (–) cable from the battery.
2. Remove the starter cable from starter.
3. Remove starter retaining screws.



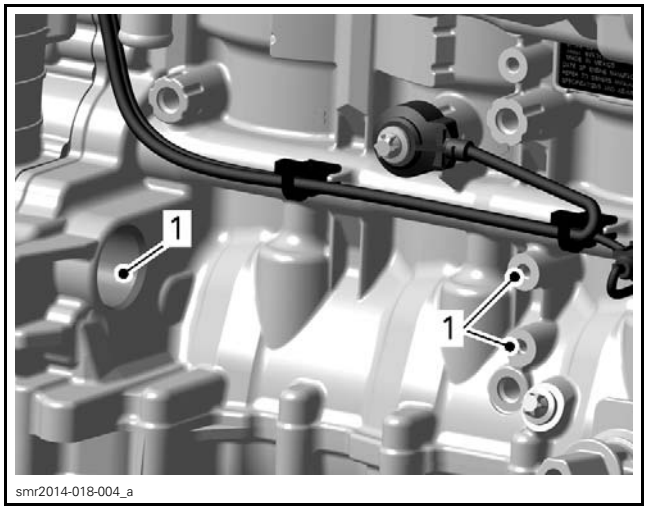
1. Starter
2. Starter retaining screws

4. Pull starter off the cylinder block.

Installing the Starter

1. Ensure starter and engine mating surfaces are free of debris.

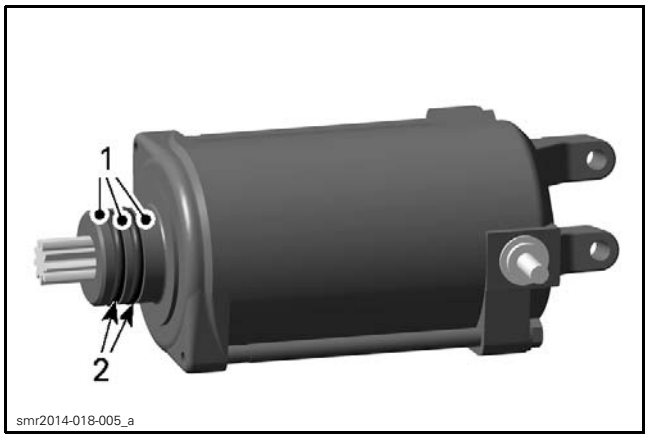
NOTICE **Serious problems may arise if the starter is not properly aligned.**



1. Clean mating surfaces

2. Lubricate on starter end and starter O-rings before installation.

SERVICE PRODUCT
TRIPLE-GUARD GREASE (P/N 508298)



1. Lubricate starter end
2. Lubricate starter O-rings

3. Insert starter gear into engine.
4. Install starter screws and tighten to the specified torque.

TIGHTENING TORQUE	
Starter screws	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

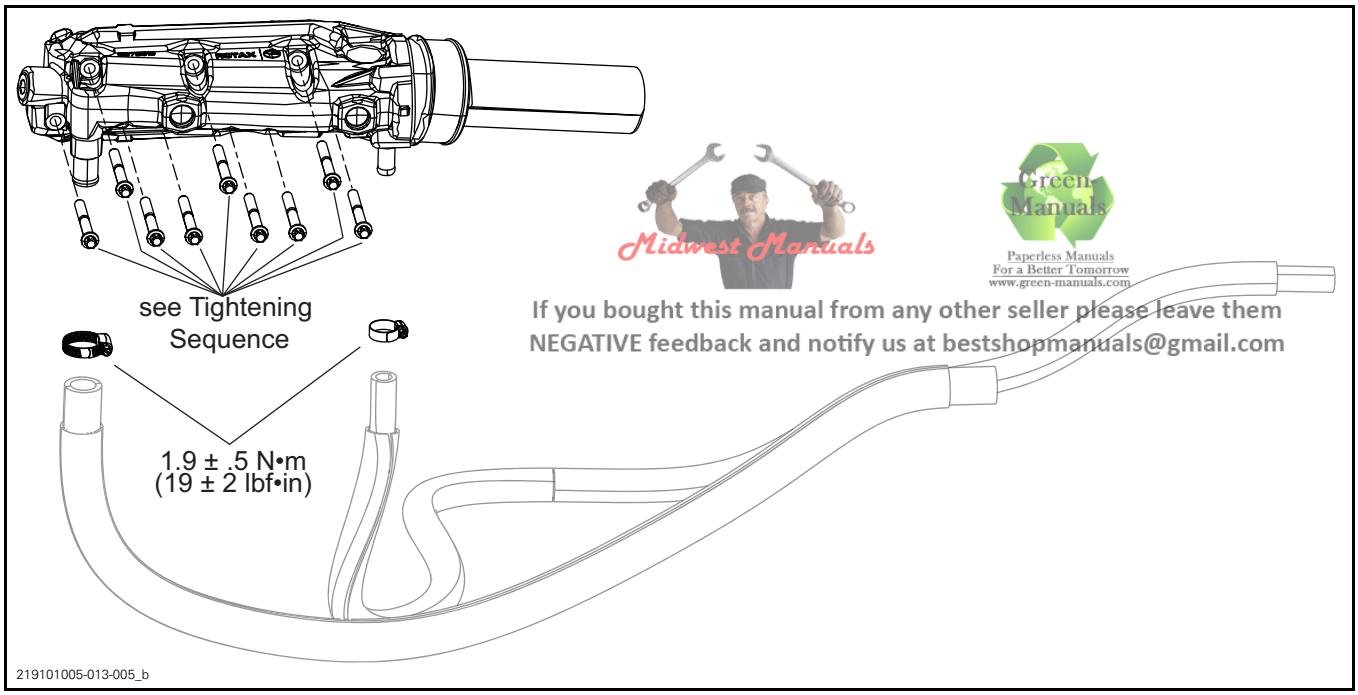
5. Connect the starter cable to the starter and tighten nut to the specified torque.

TIGHTENING TORQUE	
Starter cable nut	7 N•m ± 1 N•m (62 lbf•**in** ± 9 lbf•**in**)

6. Install all other removed parts.
7. Reconnect BLACK (–) cable on battery post.
8. Test for proper starter operation.

EXHAUST MANIFOLD

EXHAUST MANIFOLD



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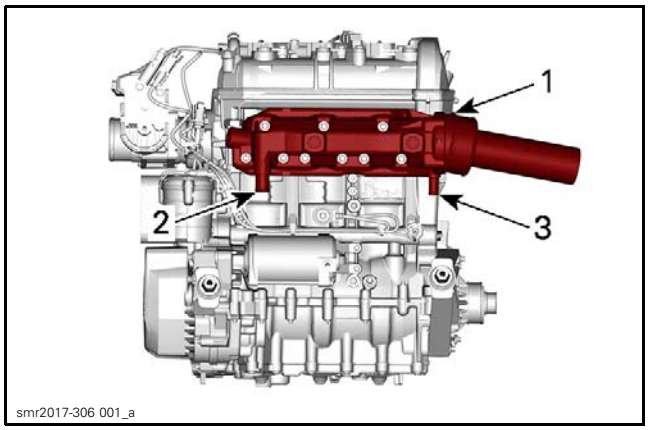
GENERAL

MANIFOLD DESCRIPTION

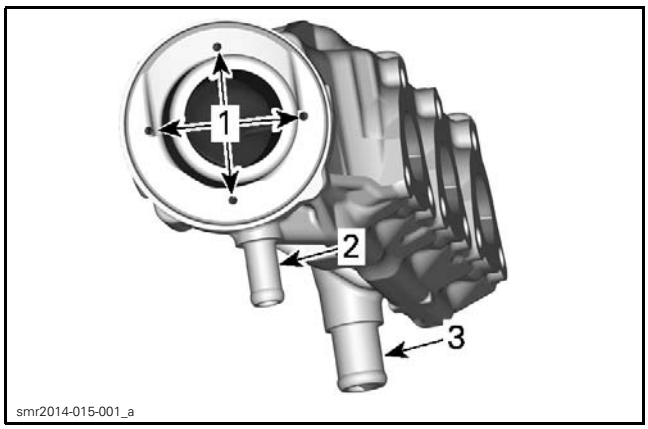
The exhaust system is cooled by water provided by a pressurized area in the jet pump (open loop system).

Water exits exhaust manifold through holes to inject water in muffler.

NOTE: For more information on the exhaust system, refer to *EXHAUST SYSTEM (900 ACE)* subsection.



1. *Exhaust manifold*
2. *Exhaust manifold water inlet*
3. *Exhaust manifold water outlet (to hull)*



EXHAUST MANIFOLD
1. *Injection holes*
2. *Manifold outlet to jet pump support*
3. *Manifold inlet from jet pump support*

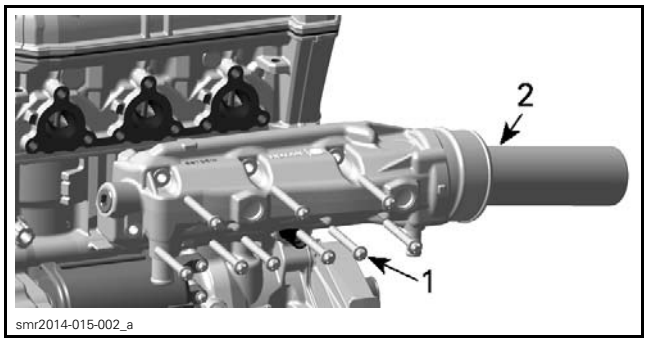
PROCEDURES

EXHAUST MANIFOLD

Removing the Exhaust Manifold

Move muffler rearwards to make room. Refer to *EXHAUST SYSTEM (900 ACE)* subsection.

Unscrew the exhaust manifold screws.



1. *Exhaust manifold screws*
2. *Exhaust manifold*

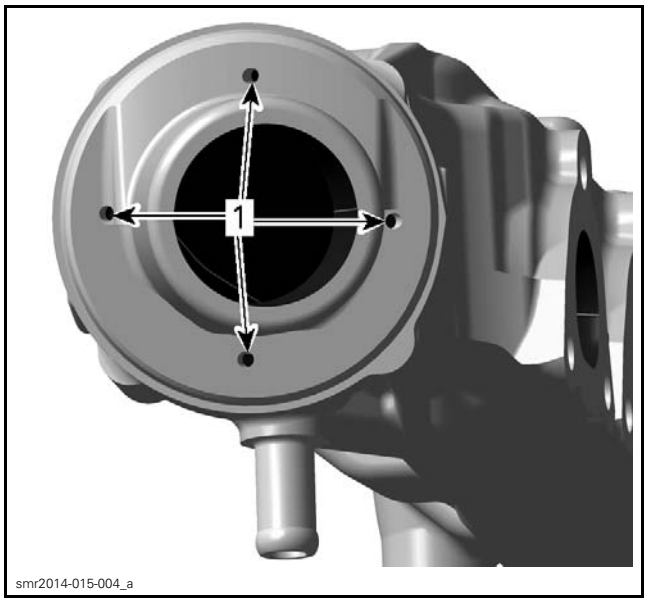
Inspecting the Exhaust Manifold

Inspect exhaust manifold condition paying attention for cracks or other damage. Check contact surfaces and hose. Replace any defective part.

Inspect plane surfaces for warpage. Small deformation can be corrected by grinding surface with a fine sand paper. Install sand paper on a flat surface and rub part against oiled sand paper.

Clean all metal components in a solvent.

Check if the injection holes (4x) are not clogged.



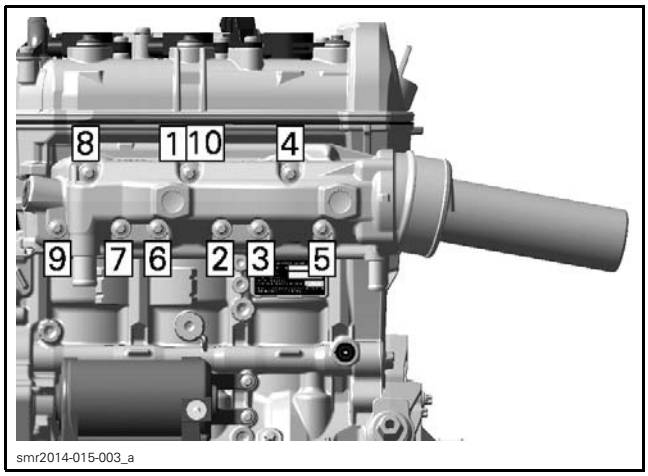
1. *Injection holes*

Installing the Exhaust Manifold

The installation is the reverse of the removal procedure. However, pay attention to the following.

NOTE: There is no gasket between cylinder block and exhaust manifold.

Insert the exhaust manifold into the exhaust hose.



EXHAUST MANIFOLD TIGHTENING SEQUENCE

Tighten screws to specification as per following illustrated sequence. Repeat the procedure twice.

TIGHTENING TORQUE	
Exhaust manifold screw	23 N•m ± 3 N•m (17 lbf•ft ± 2 lbf•ft)

TIGHTENING TORQUE	
Exhaust manifold hose clamp	1.7 N•m ± 0.2 N•m (15 lbf•**in** ± 2 lbf•**in**)

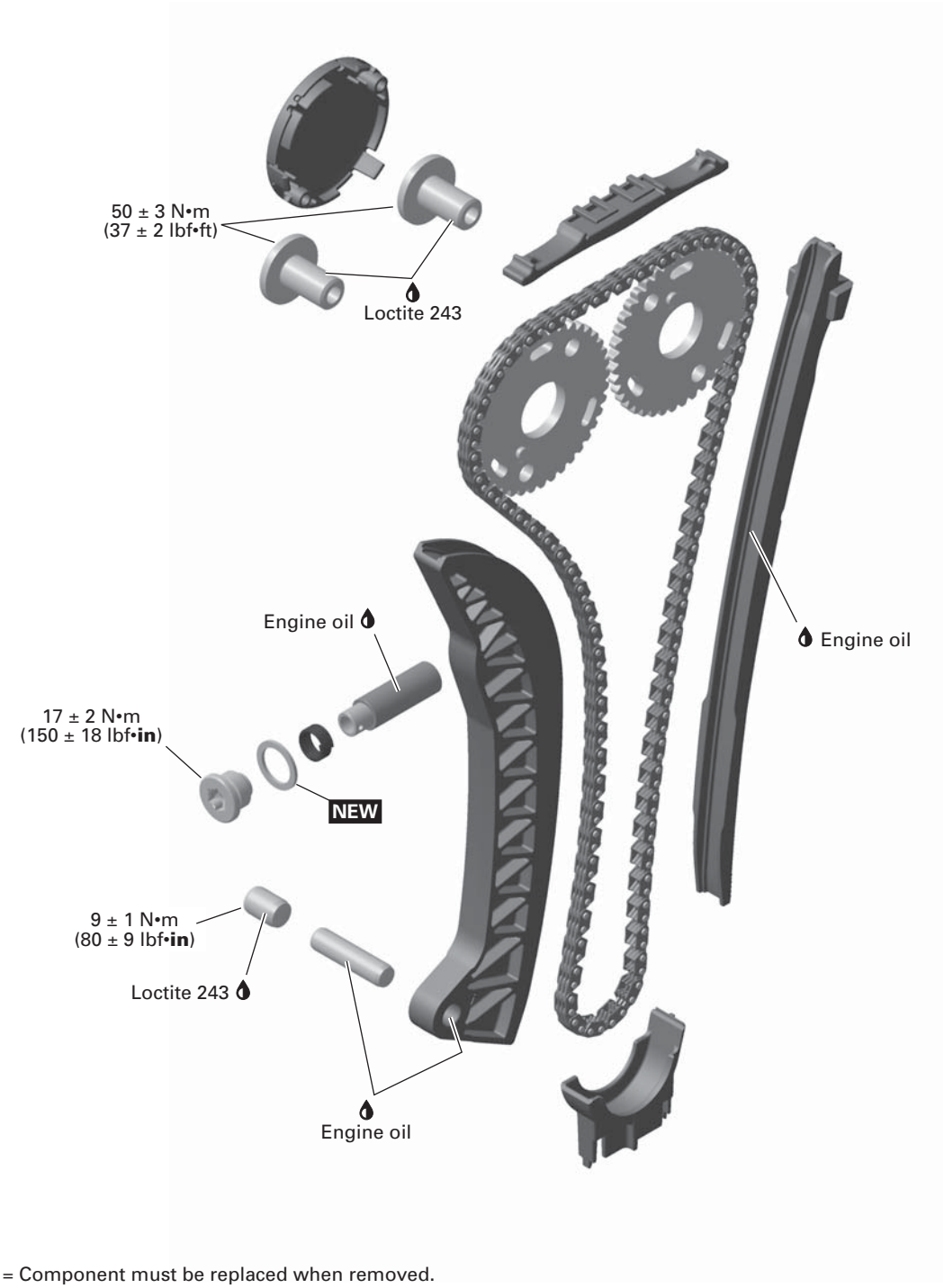
After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the flushing connector.

NOTICE **Never run engine without supplying water to the exhaust system when watercraft is out of water.**

TIMING CHAIN

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	68, 72



NEW = Component must be replaced when removed.

smr2014-019-001_a

GENERAL

Engine removal is necessary to work on the following components:
– Timing chain
– Timing chain guide (tensioner side).

Always disconnect BLACK (-) cable from the battery, then RED (+) cable before working on the engine.

⚠ WARNING

Always disconnect BLACK (-) cable first and reconnect last.

During assembly/installation, use torque values and service products as specified 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 when removed (e.g.: locking tabs, elastic stop nuts, cotter pin, etc.) must be replaced.

Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

When disassembling parts that are duplicated in the engine, (e.g.: valves, springs, etc.), it is strongly recommended to note their position and to keep the parts of the same assembly as a "group". If you find a defective component, it will be much easier to find the cause of the failure. Since parts were broken-in together during engine operation, they will maintain their matched fit when reassembled together within their "group".

TROUBLESHOOTING

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and should not be assumed to provide solutions to every cause of all problems.

UNUSUAL ENGINE NOISE OR VIBRATIONS

1. Faulty chain tensioner.
   - *Replace chain tensioner.*
2. Chain guide(s) worn out.
   - *Replace chain guide(s).*
3. Stretched timing chain or worn sprockets.
   - *Replace timing chain and sprockets.*
4. Camshaft timing gear screws loose.
   - *Retighten screws to recommended torque.*
5. Incorrect camshaft timing adjustment.
   - *Replace damaged components and readjust camshaft timing.*

ENGINE LACKS ACCELERATION OR POWER

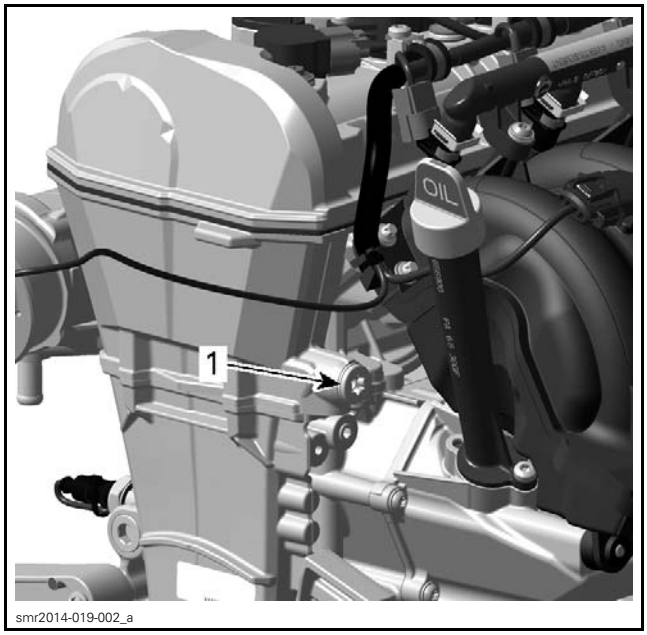
1. Incorrect camshaft timing adjustment.
   - *Replace damaged components and readjust camshaft timing.*

PROCEDURES

TIMING CHAIN TENSIONER

Timing Chain Tensioner Location

The timing chain tensioner is located in the cylinder head beside the intake port of the PTO cylinder.



1. Screw plug location, timing chain tensioner

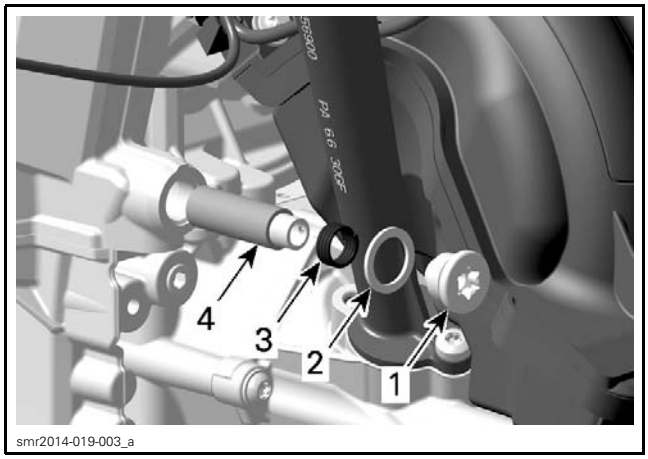
Timing Chain Tensioner Access

Remove central body. Refer to *BODY*.

Timing Chain Tensioner Removal

1. Lock crankshaft, refer to *CYLINDER BLOCK* subsection.

2. Remove screw plug and discard the sealing washer.
3. Pull out spring and chain tensioner.



1. Screw plug
2. Sealing washer
3. Spring
4. Chain tensioner

Timing Chain Tensioner Inspection

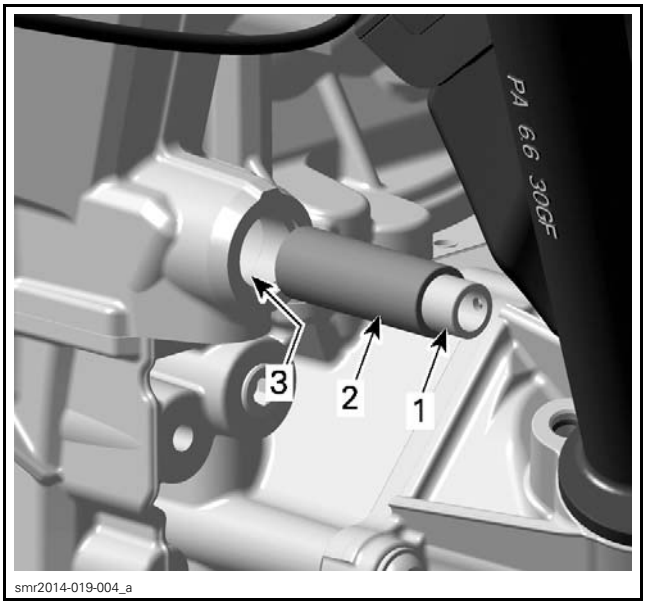
1. Check chain tensioner for scoring and freedom of movement in bore.
2. Compress chain tensioner and check for proper operation.

NOTE: The chain tensioner is difficult to compress when properly charged with oil, and easily compressed when it is not.

3. Check spring for straightness, corrosion and other visible damage.

Timing Chain Tensioner Installation

1. Apply engine oil on chain tensioner.
2. Insert chain tensioner in its bore with the plunger pointing outwards.



TIMING CHAIN TENSIONER INSTALLATION
1. Plunger
2. Chain tensioner
3. Tensioner bore in cylinder head

3. Install spring on chain tensioner.
4. Tighten screw plug to specified torque.

SCREW PLUG TIMING CHAIN TENSIONER	
Sealing washer	NEW
Tightening torque	17 N•m ± 2 N•m (150 lbf•**in** ± 18 lbf•**in**)

5. Install all other removed parts.

CAMSHAFT TIMING GEARS

Camshaft Timing Gear Removal

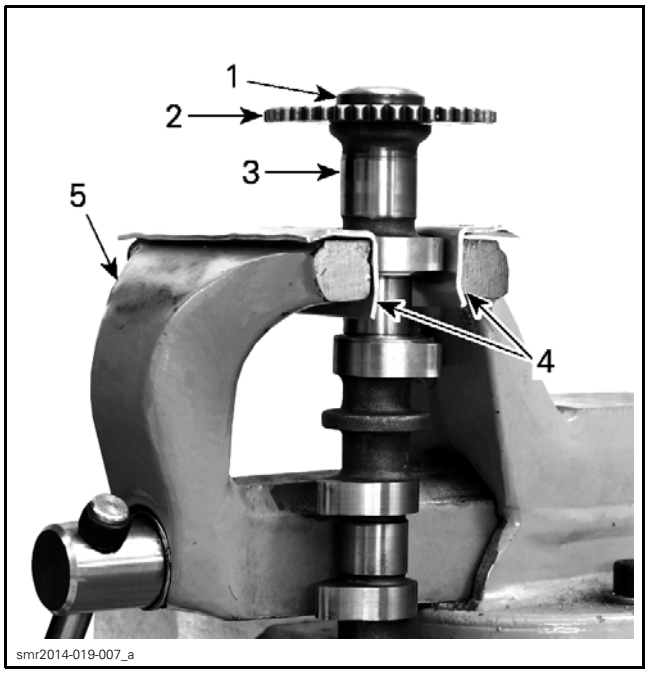
Remove camshaft assembly. Refer to *CYLINDER HEAD* subsection.

Clamp camshaft in a vice using aluminium protectors.

NOTICE **Take care not damaging the cams.**

Unscrew and remove camshaft timing gear screw.

Remove camshaft timing gear.



smr2014-019-007_a

1. *Camshaft timing gear screw*
2. *Camshaft timing chain gear*
3. *Camshaft*
4. *Aluminium protectors*
5. *Vice*

Camshaft Timing Gear Inspection

Check camshaft timing gears for wear or deterioration. If a gear is worn or damaged, replace camshaft timing gears and timing chain as a set.

NOTE: For crankshaft timing gear inspection, refer to *CYLINDER BLOCK* subsection.

Camshaft Timing Gear Installation

Installation is the reverse of the removal procedure. However, pay attention to the following details.

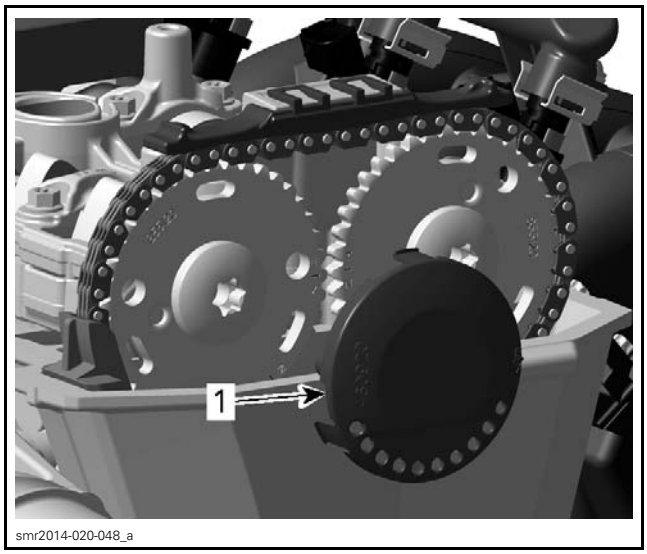
Tighten camshaft timing gear screw to specification.

NOTICE **Do not torque timing gear screws when camshafts are installed in cylinder head to avoid overstressing timing chain.**

TIMING GEAR SCREWS	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Tightening torque	50 N•m ± 3 N•m (37 lbf•ft ± 2 lbf•ft)

NOTICE **Improper camshaft timing will damage engine components. Make sure camshafts and crankshaft are still locked. If not, lock them before beginning this procedure. Refer to *CAMSHAFTS* in the *CYLINDER HEAD* subsection.**

Install breather cover on exhaust camshaft.



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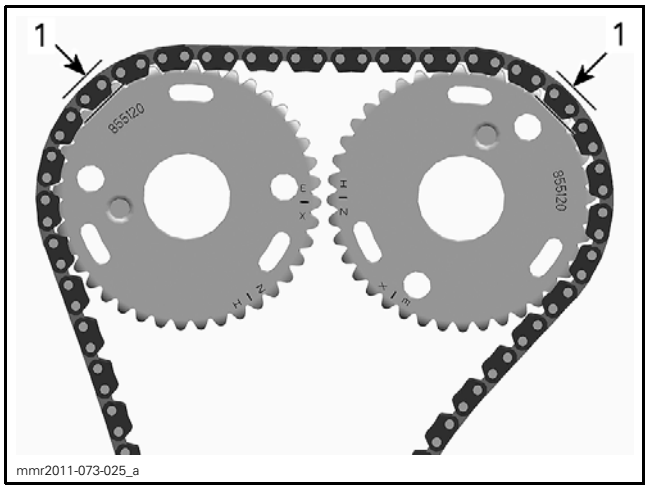
1. *Breather cover*

Install remaining parts.

TIMING CHAIN

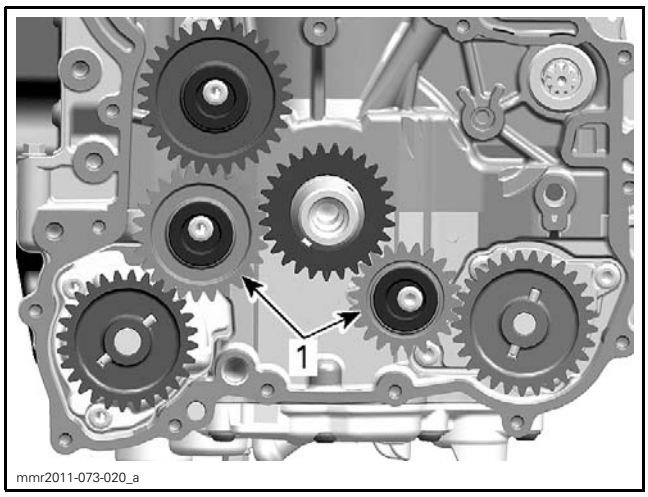
Timing Chain Removal

1. Remove engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
2. Remove air intake manifold, refer to *AIR INTAKE SYSTEM* subsection.
3. Remove valve cover, refer to *CYLINDER HEAD* subsection.
4. Refer to *LUBRICATION SYSTEM* subsection and remove the following parts:
   – Oil tank
   – Oil pressure regulator valve
   – Oil cooler
   – Oil sump cover.
5. Refer to *COOLING SYSTEM* subsection and remove following parts:
   – Water pump housing
   – Thermostat.
6. Check timing chain for excessive radial play while still installed on timing gears.



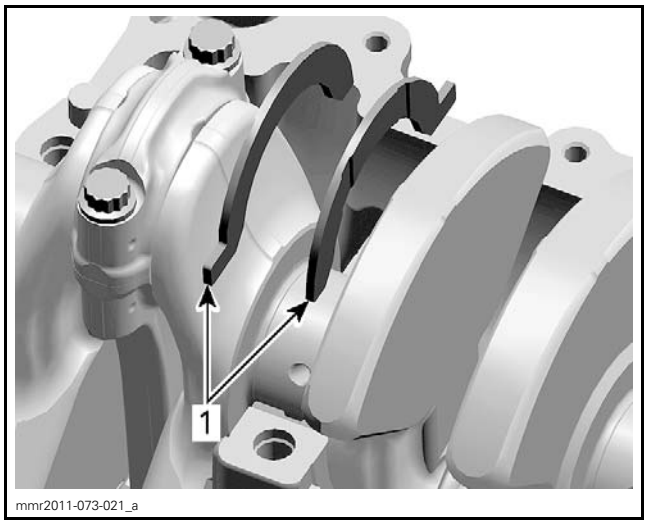
1. Radial play

7. Remove the *CAMSHAFTS*, refer to *CYLINDER HEAD* subsection.
8. Refer to *MAGNETO AND STARTER* subsection and remove the following parts:
   – Magneto cover
   – Rotor
   – Starter drive gears.
9. Remove oil pump intermediate gears, refer to *LUBRICATION SYSTEM* subsection.



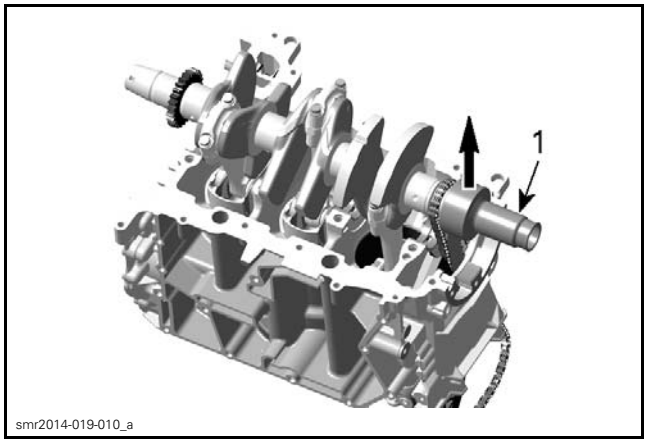
1. Oil pump intermediate gears

10. Remove crankshaft locking bolt.
11. Separate cylinder block, refer to *CYLINDER BLOCK* subsection.
12. Remove crankshaft thrust washers.



1. Crankshaft thrust washers

13. Slightly lift the crankshaft.

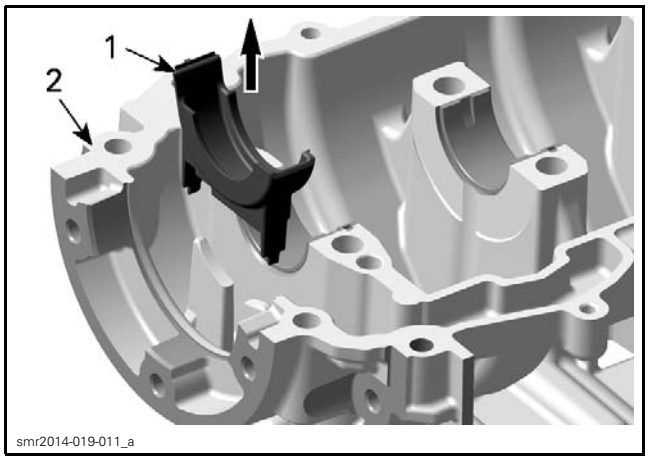


LIFT CRANKSHAFT
1. Crankshaft

14. Remove timing chain.

NOTE: Make a mark on the timing chain to indicate the operating direction of the chain before removal.

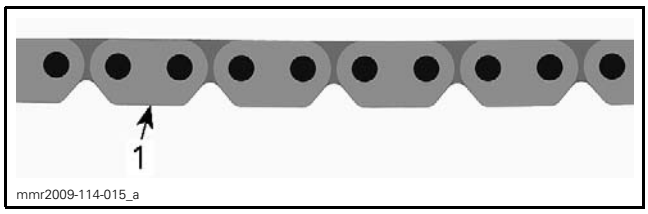
15. Remove lower timing chain guide from lower half of cylinder block.



1. Lower timing chain guide
2. Lower half of cylinder block

Timing Chain Inspection

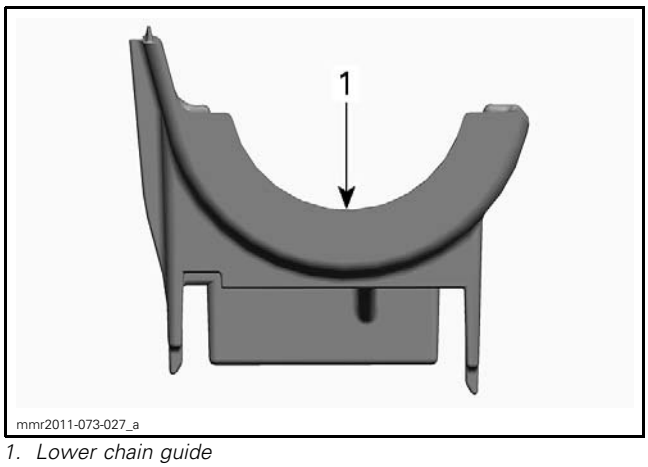
Check timing chain for wear and teeth condition.



1. Check teeth condition

NOTICE If timing chain is excessively worn or damaged, replace timing chain and camshaft timing gears as a set.

Check lower chain guide for wear, cracks or deformation. Replace as required.



1. Lower chain guide

Replace lower chain guide if timing chain wear grooves are visible.

CHAIN GUIDE GROOVE DEPTH	
SERVICE LIMIT	No timing chain wear groove allowed

NOTE: Also check the chain guide, tensioner side. Refer to *CHAIN GUIDE INSPECTION (TENSIONER SIDE)* in this subsection.

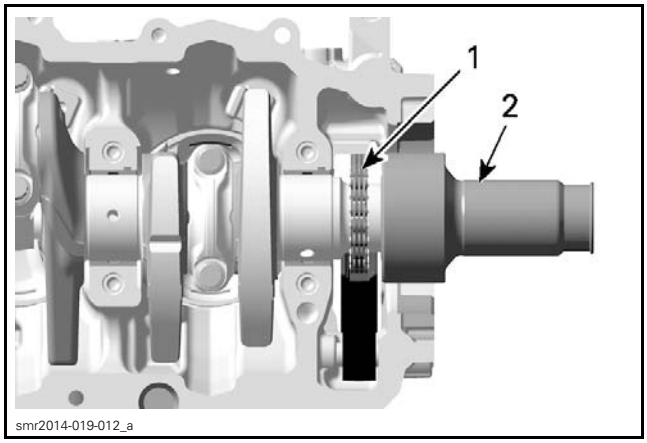
Timing Chain Installation

Installation is the reverse of the removal procedure. However, pay attention to the following details.

1. Install timing chain on crankshaft timing gear.

NOTE: If the same timing chain is reinstalled, be sure to reinstall it in the same operating direction as marked during removal procedure.

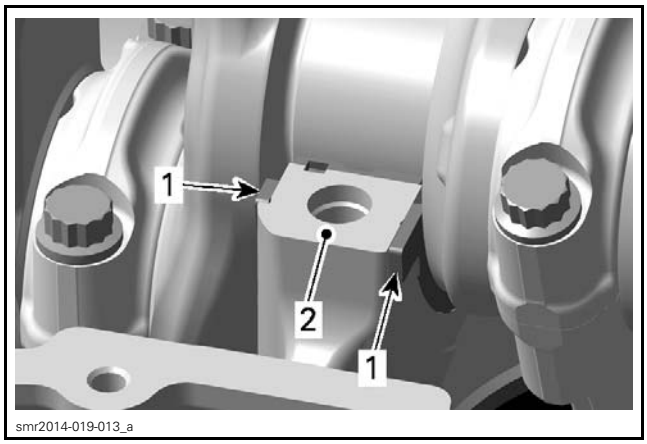
2. Install crankshaft.



1. Timing chain
2. Crankshaft

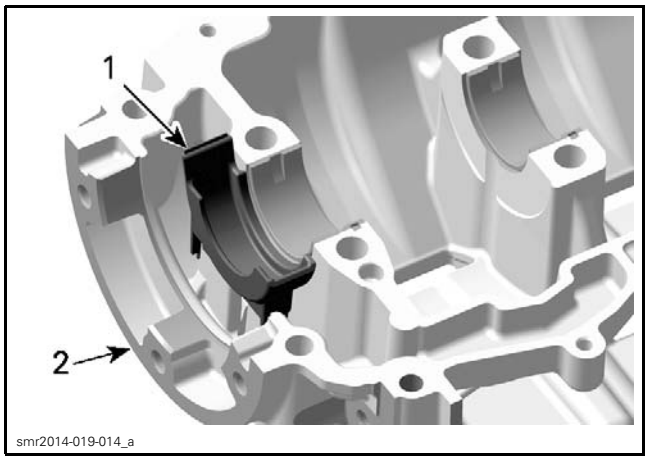
3. Properly install the crankshaft thrust washers with the slots facing against crankshaft counterweights.

NOTE: Crankshaft thrust washers must be flush with the cylinder block sealing surface.



1. Crankshaft thrust washers
2. Sealing surface

4. Reinstall lower chain guide in lower half of cylinder block.



1. Lower chain guide
2. Lower half of cylinder block

5. Reassemble cylinder block, refer to *CYLINDER BLOCK* subsection.
6. Lock crankshaft, refer to *CRANKSHAFT LOCKING PROCEDURE* in the *CYLINDER BLOCK* subsection.
7. Reinstall timing chain properly on camshaft timing gears. Refer to *CAMSHAFT INSTALLATION* in the *CYLINDER HEAD* subsection.

NOTICE **Improper camshaft timing will damage engine components.**

8. Install all other removed parts.

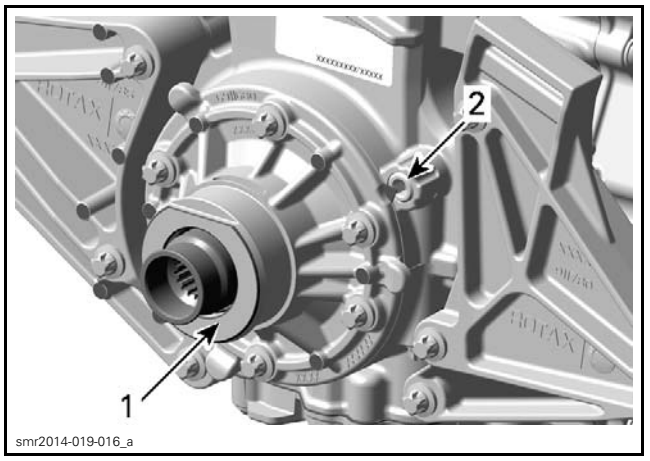
NOTE: Be sure to remove camshaft and crankshaft locking tools when timing chain is completely installed.

CHAIN GUIDE (TENSIONER SIDE)

Chain Guide Removal (Tensioner Side)

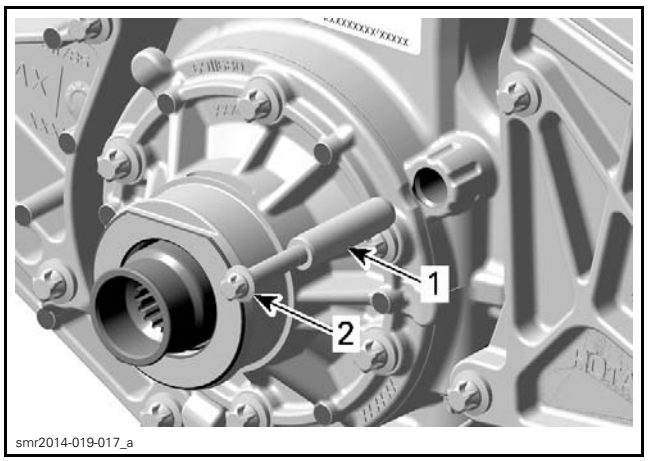
NOTE: Removal of chain guide is not recommended if there is no need for replacement.

1. Remove the *CAMSHAFTS*. Refer to *CYLINDER HEAD* subsection.
2. Remove screw plug that covers the chain guide bearing pin.



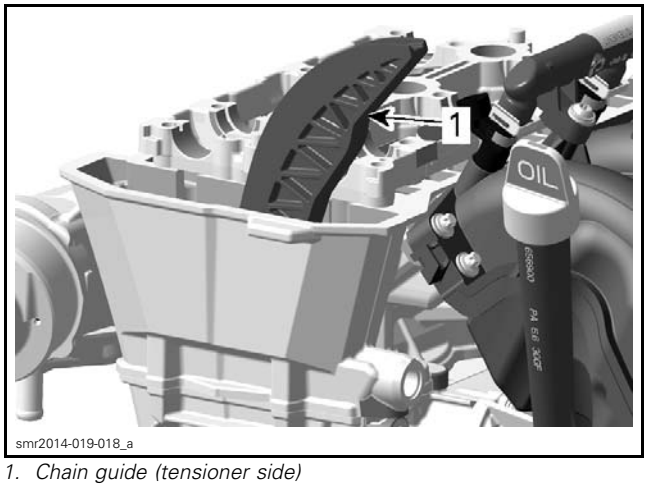
1. PTO cover
2. Screw plug location

3. Use an M6 bolt to pull chain guide bearing pin out of cylinder block.



1. Chain guide bearing pin
2. M6 bolt

4. Remove chain guide (tensioner side).



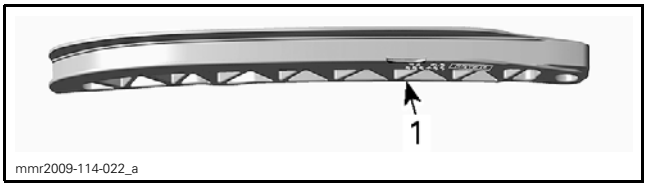
1. Chain guide (tensioner side)

Chain Guide Inspection (Tensioner Side)

Check chain guide for wear, cracks or deforming. Replace as required.

Replace chain guide if groove depth caused by timing chain exceeds service limit.

CHAIN GUIDE GROOVE DEPTH	
SERVICE LIMIT	1 mm (.039 in)



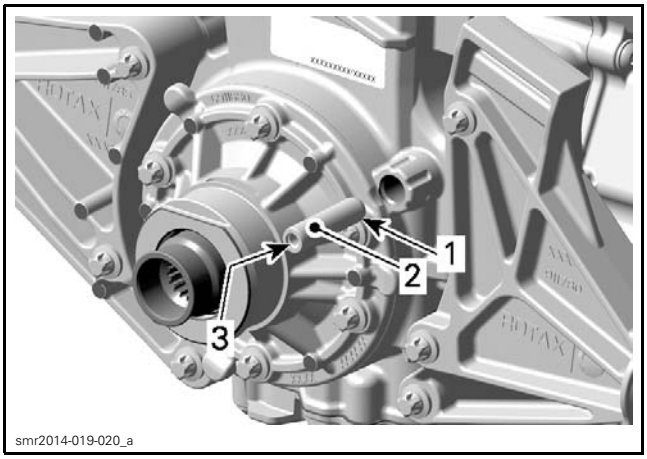
TYPICAL
1. Chain guide

Chain Guide Installation (Tensioner Side)

Installation is the reverse of the removal procedure however, pay attention to the following details.

1. Insert chain guide.
2. Apply engine oil on bearing pin and install it with M6 threads facing outwards.

NOTICE Ensure chain guide bearing pin is properly inserted in the chain guide.



1. Bearing pin
2. Apply engine oil here
3. M6 threads facing outwards

3. Tighten screw plug as specified.

NOTE: Install screw plug only in final assembled cylinder block to avoid warpage of sealing surface.

SCREW PLUG	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Tightening torque	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

4. Properly reinstall camshafts. Refer to *CAMSHAFTS* in the *CYLINDER HEAD* subsection.

NOTICE Improper camshaft timing will damage engine components.

CYLINDER HEAD

SERVICE TOOLS

Description	Part Number	Page
CAMSHAFT LOCKING TOOL (900 ACE)	529 036 206	87
ENGINE LEAK DOWN TEST KIT	529 035 661	77
FLUKE 115 MULTIMETER	529 035 868	79
VALVE SPRING COMPRESSOR CUP	529 036 209	93
VALVE SPRING COMPRESSOR	529 035 724	93

SERVICE TOOLS – OTHER SUPPLIER

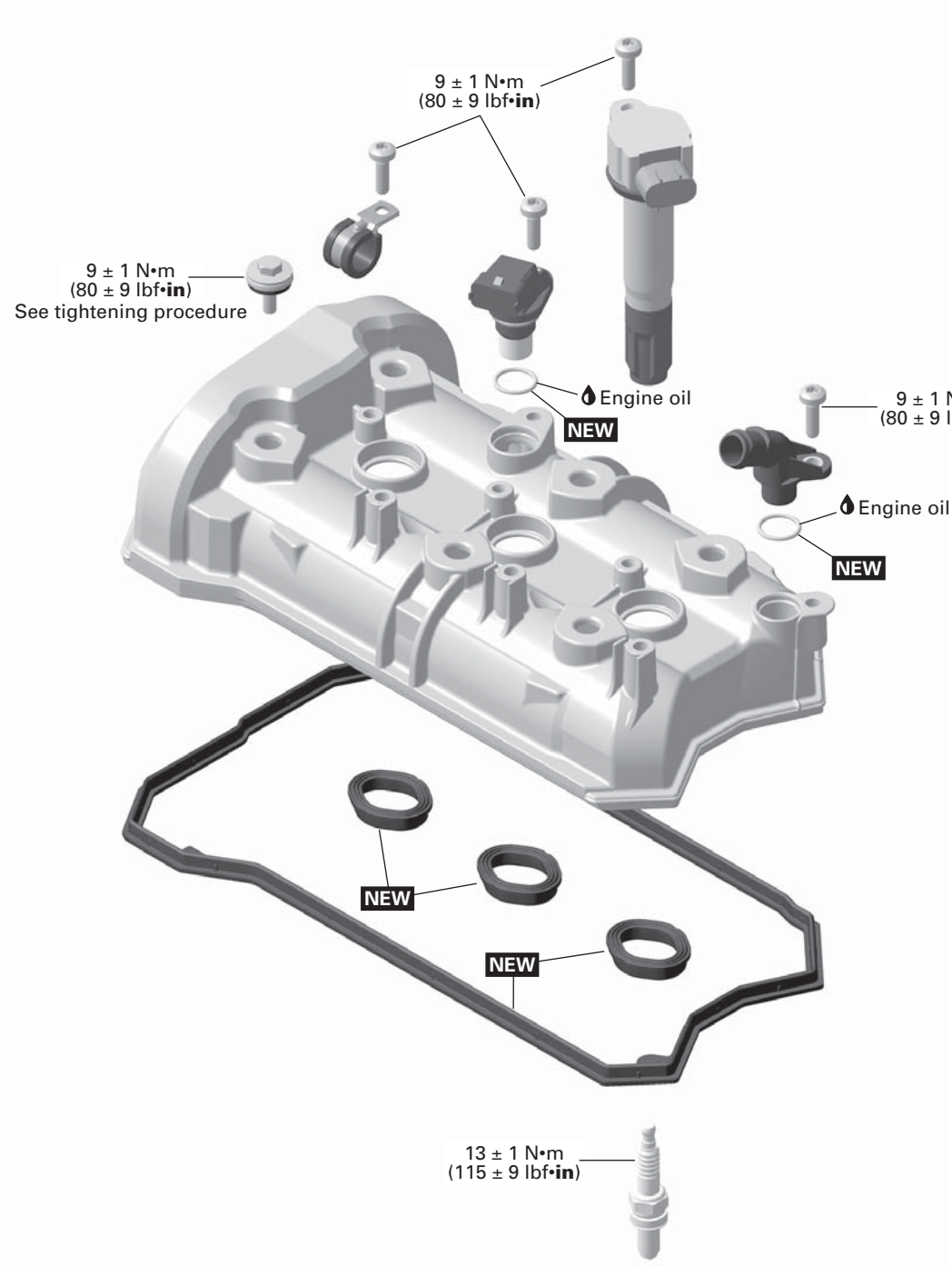
Description	Part Number	Page
FLUKE AUTOMOTIVE BACK PROBE PIN	TP40	80
FLUKE SUREGRIP INSULATED TEST LEADS	TL224	80
SNAP-ON VALVE HOLDER	VL2	96
SNAP-ON VALVE STEM SEAL PLIERS	YA 8230	94

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SERVICE PRODUCTS

Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	81

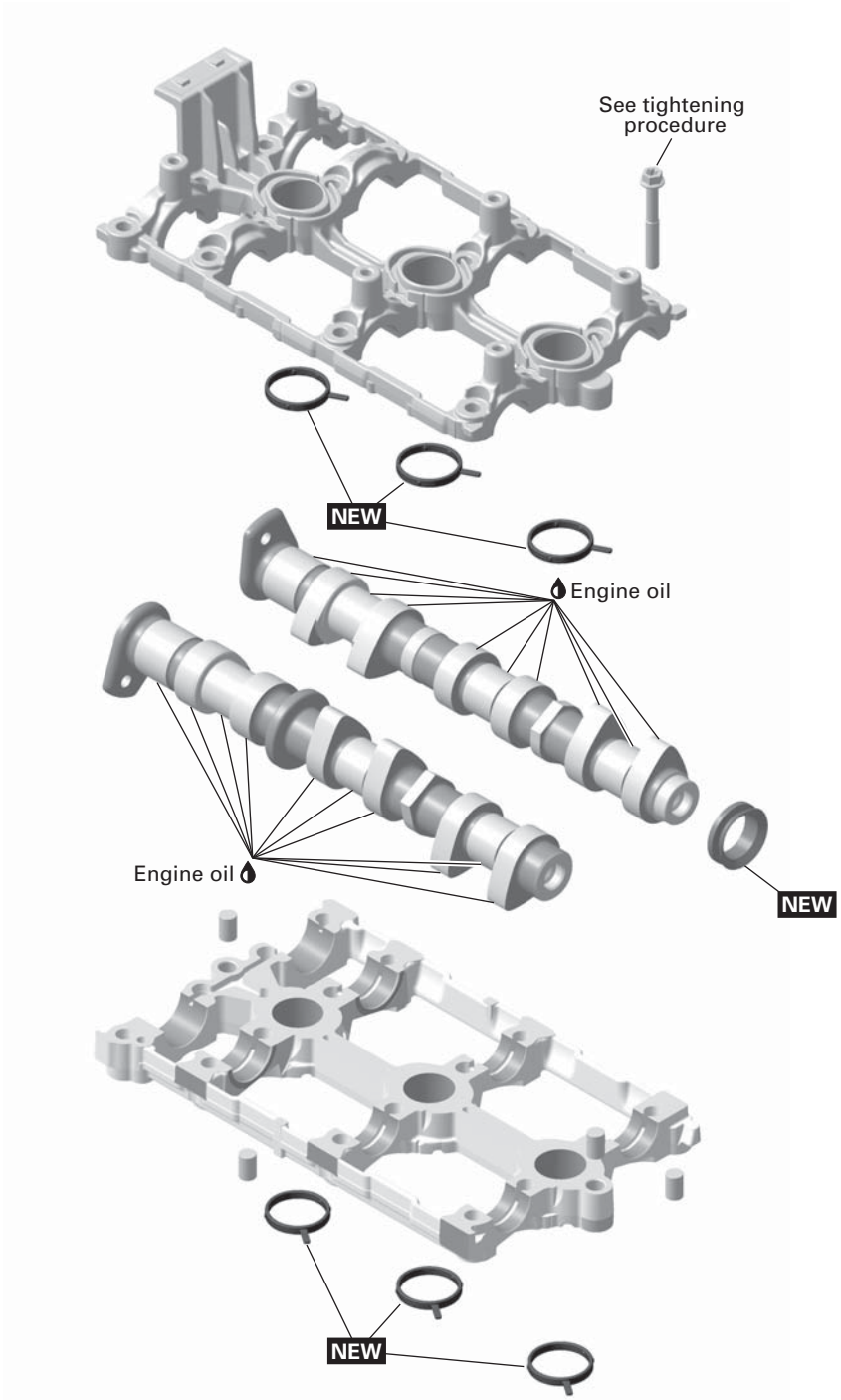
VALVE COVER



NEW = Component must be replaced when removed.

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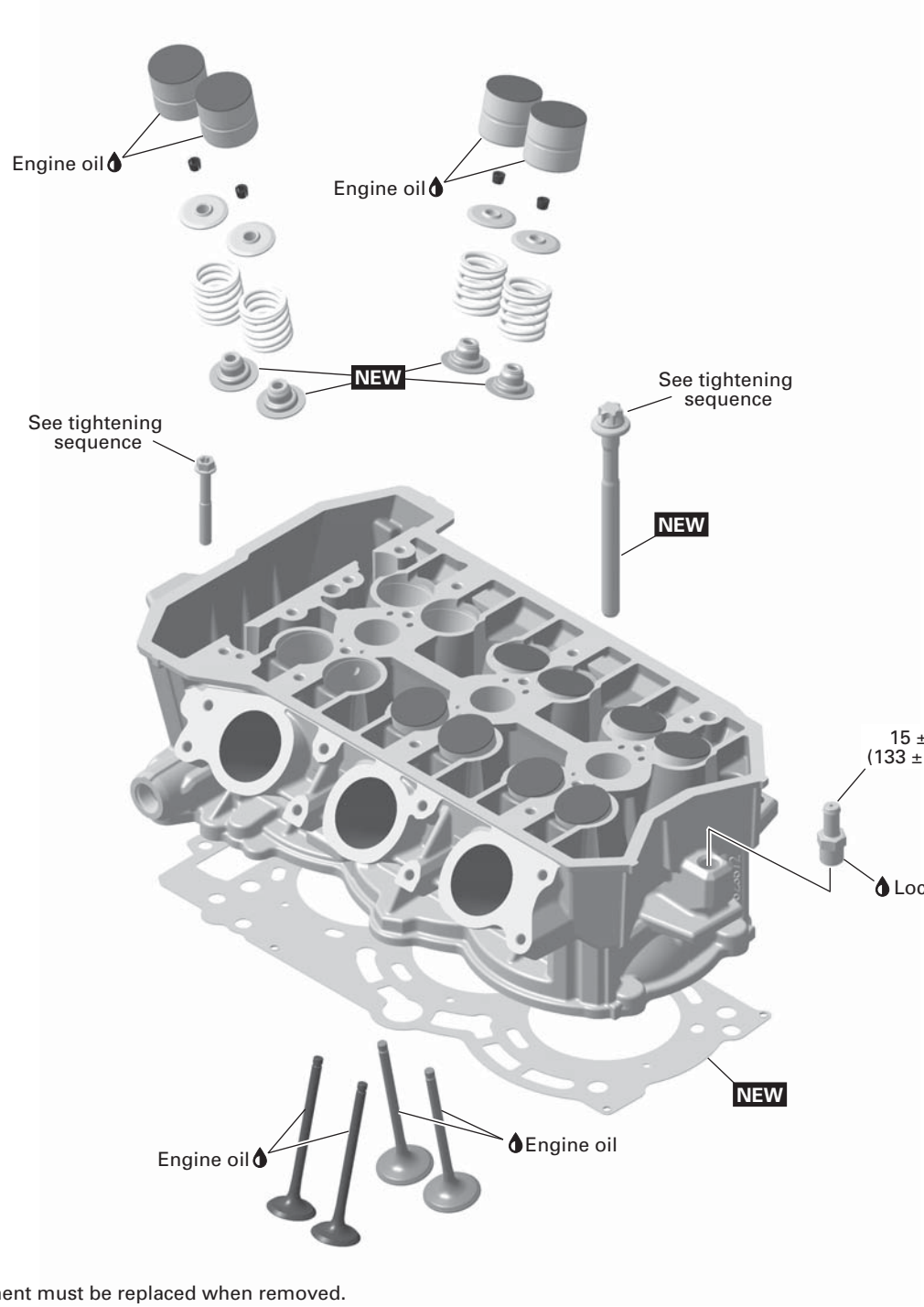
CAMSHAFTS



NEW = Component must be replaced when removed.

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CYLINDER HEAD



NEW = Component must be replaced when removed.

smr2014-020-003_a

GENERAL

NOTE: For a better understanding, some illustrations are taken with engine out of the vehicle.

When disassembling parts that are duplicated in the engine, (e.g.: valves, springs, etc.), it is strongly recommended to note their position and to keep the parts of the same assembly as a "group". If you find a defective component, it will be much easier to find the cause of the failure. Since parts were broke-in together during engine operation, they will maintain their matched fit when reassembled together within their "group".

INSPECTION

CYLINDER LEAK TEST

General

Before performing the cylinder leak test, verify the following:

– Clamp tightness
– Hoses condition.

NOTE: For best accuracy, the leak test should be done with the engine at normal operating temperature.

⚠ CAUTION Engine parts could be hot.

NOTE: The following steps are the same for each cylinder.

Preparation

1. Remove the *VALVE COVER*, see procedure in this subsection.
2. Remove spark plug.
3. Turn the engine counterclockwise to bring piston to TDC of compression stoke. Use a dial gauge or a suitable tool to position the piston to TDC.

REQUIRED TOOL	
(P/N 529 036 273)	

NOTE: The piston must be set precisely to TDC of compression stroke. If not, the engine will continue to rotate when pressure builds up.

Leak Test

1. Install a gauge adaptor into spark plug hole.

REQUIRED TOOL	
ENGINE LEAK DOWN TEST KIT (P/N 529 035 661)	

2. Connect the leak down tester to an adequate air supply.
3. Set gauge needle to zero.

NOTE: All testers have specific instructions on gauge operation and required pressure. Refer to manufacturer's instructions.

4. Supply combustion chamber with air pressure.
5. Note the amount or percentage of leakage (depending on tester).

LEAKAGE PERCENTAGE	ENGINE CONDITION
0% to 15%	Excellent condition
16% to 25%	Good condition
26% to 40%	Fair condition; reduced engine performance
41% and higher	Poor condition, diagnose and repair engine

Diagnosis

Listen for air leaks.

– Air escaping on intake port or throttle body means leaking intake valve(s).
– Air escaping on exhaust port means leaking exhaust valve(s).
– Air bubbles out of coolant tank means leaking cylinder head gasket.
– Air or coolant escaping from cylinder head means damaged gasket or loosened screws.
– Air escaping into crankcase area means excessively worn cylinder or broken piston rings.
– Air or oil escaping from crankcase means damaged gasket or loosened screws.

Repair Tips

Blue exhaust gas means damaged or worn piston rings or valve stem seals.

White exhaust gas means damaged cylinder head gasket.

Coolant tank cap opening without overheat means damaged cylinder head gasket.

Leaking valves can be caused by carbon deposits or burnt valve face.

Assembly

Reverse the preparation procedure.

TROUBLESHOOTING

Always check for fault codes. If a fault code is detected, service the fault code first. Refer to *DIAGNOSTIC SYSTEM AND FAULT CODES* subsection.

NOTE: When diagnosing an engine problem, always perform the cylinder leak test. This will help pinpoint a problem. Refer to *CYLINDER LEAK TEST* in this subsection.

UNUSUAL ENGINE NOISE OR VIBRATIONS

1. Discharged or defective valve lifters.
   - *Check engine oil pressure, refer to LUBRICATION SYSTEM subsection.*
   - *Replace valve lifters.*
2. Camshaft(s) or camshaft holder(s) worn out.
   - *Check and replace damaged parts.*
3. Faulty chain tensioner.
   - *Replace chain tensioner. Refer to TIMING CHAIN subsection.*
4. Chain guide(s) worn out.
   - *Replace chain guide(s). Refer to TIMING CHAIN subsection.*
5. Stretched timing chain or worn out sprockets.
   - *Replace timing chain and sprockets. Refer to TIMING CHAIN subsection.*
6. Loose timing chain gear screws.
   - *Retighten screws with recommended torque.*
7. Incorrect camshaft timing.
   - *Replace damaged components and readjust camshaft timing.*

OIL LEAKAGE FROM CYLINDER HEAD

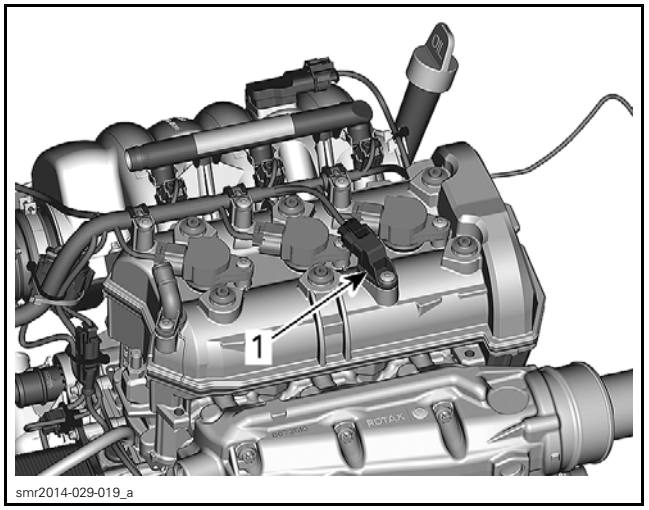
1. Leaking valve cover gasket.
   - *Replace valve cover gaskets and retighten valve cover with recommended torque.*
   - *Check valve cover for cracks or other damage.*
2. Leaking spark plug tube O-rings.
   - *Replace spark plug tube O-rings.*
   - *Clean spark plug area from oil spillage.*
3. Blow-by connector is leaking.
   - *Replace blow by connector O-ring.*
4. Leaking cylinder head gasket.
   - *Check cylinder head for damage.*
   - *Replace cylinder head gasket and retighten screws with recommended torquing procedure.*

ENGINE SUDDENLY TURNS OFF OR LACKS ACCELERATION OR POWER

1. Incorrect camshaft timing.
   - *Replace damaged components and readjust camshaft timing.*
2. Leaking intake or exhaust valves.
   - *Perform a CYLINDER LEAK TEST. Repair or replace damaged components.*
3. Broken valve spring(s).
   - *Replace defective parts.*

PROCEDURES

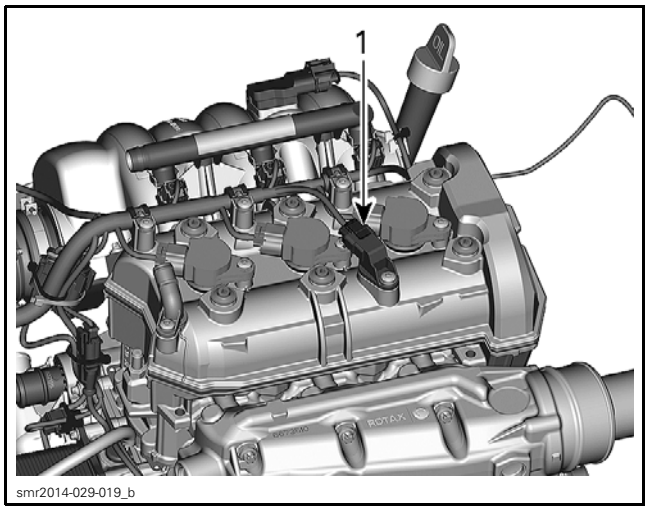
CAMSHAFT POSITION SENSOR (CAPS)



1. CAPS

Testing the CAPS Voltage(Harness Side)

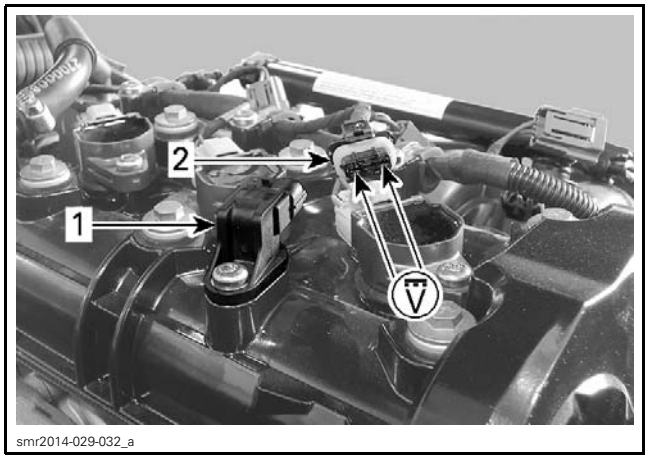
1. Remove the parts required to access the CAPS.
2. Disconnect CAPS connector.



1. CAPS connector

3. Press the START/STOP button to wake up the ECM.
4. Install tether cord on engine cut-off switch.
5. Probe harness connector terminals as per following table.

CAPS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
3	1	Battery voltage

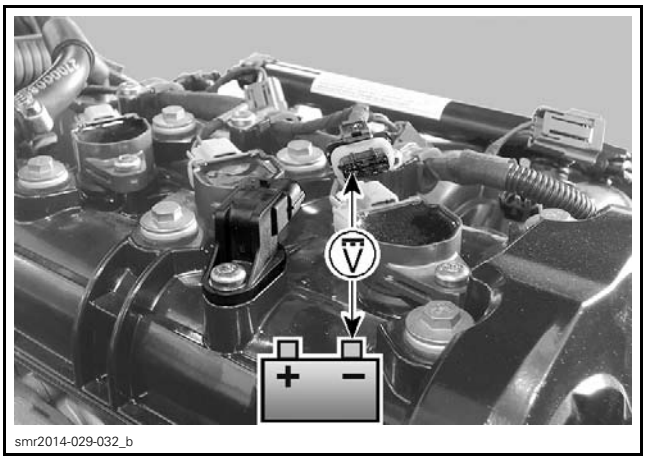


1. CAPS
2. CAPS connector

If battery voltage is read, proceed with *CAPS DYNAMIC TEST* further in this subsection.

If battery voltage is not read, probe circuit as per following table.

CAPS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
3	Battery ground	Battery voltage

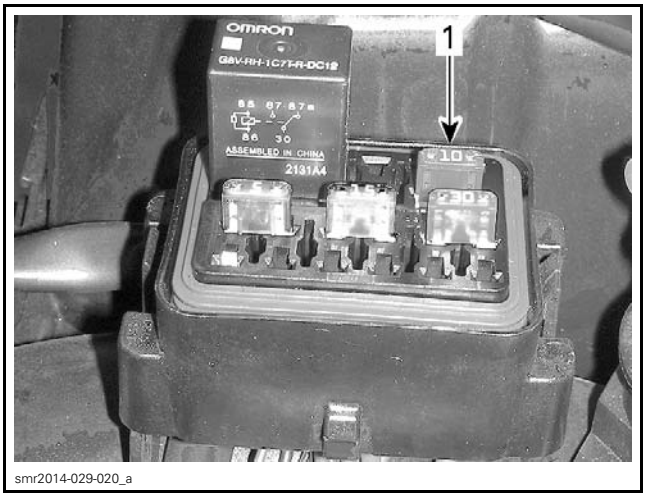


If voltage is read to battery ground, check continuity of ground circuit between CAPS pin 1 and ECM connector "A" pin E2. Repair or replace wiring and connectors.

If voltage is not read to battery ground, carry out a *CONTINUITY TEST OF CAPS POWER CIRCUIT*.

Testing the Continuity of CAPS Power Circuit

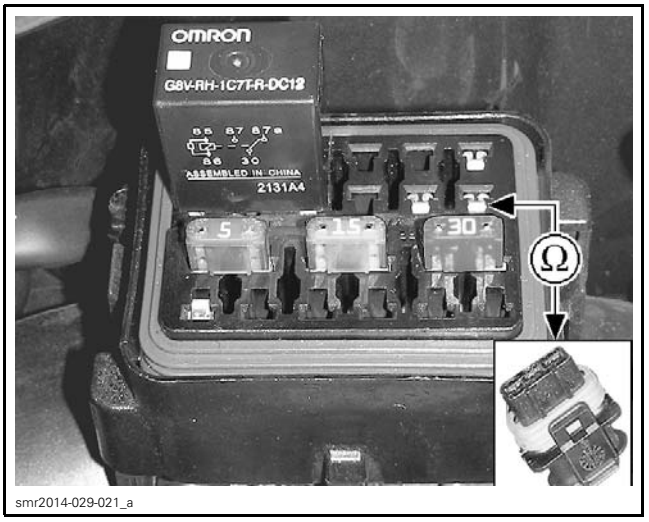
1. Remove cover from fuse box. Refer to *POWER DISTRIBUTION*.
2. Remove 10 amp ACC fuse (F1).



1. Pull out fuse (F1)

3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
4. Read resistance of the CAPS circuit as per following table.

FUSE BOX	CAPS CONNECTOR	RESISTANCE
TERMINAL	PIN	Ω
B1	3	Close to 0 Ω (continuity)



smr2014-029-021_a

If continuity is good, wiring and connectors are functional.

If a high resistance or an open circuit is measured, refer to *WIRING DIAGRAM* and check the following:

– Continuity from CAPS connector pin 3 to engine connector pin 4
– Continuity from engine connector pin 4 to fuse box contact B1

Pay attention to connector pin contact and junction JT-1 (VT/GY).

Repair or replace wiring and connectors as required.

5. Reinstall all removed parts.

Testing the CAPS (Dynamic)

1. Remove the parts required to access the CAPS.
2. Remove CAPS sensor from engine.
3. Back-probe connector and read voltage as follows.

NOTE: To safely probe wire terminals through the back of the connector, use the following tool or an equivalent.

REQUIRED TOOL
FLUKE AUTOMOTIVE BACK PROBE PIN (P/N TP40)


TP40

FLUKE AUTOMOTIVE BACK PROBE PIN P/N TP40

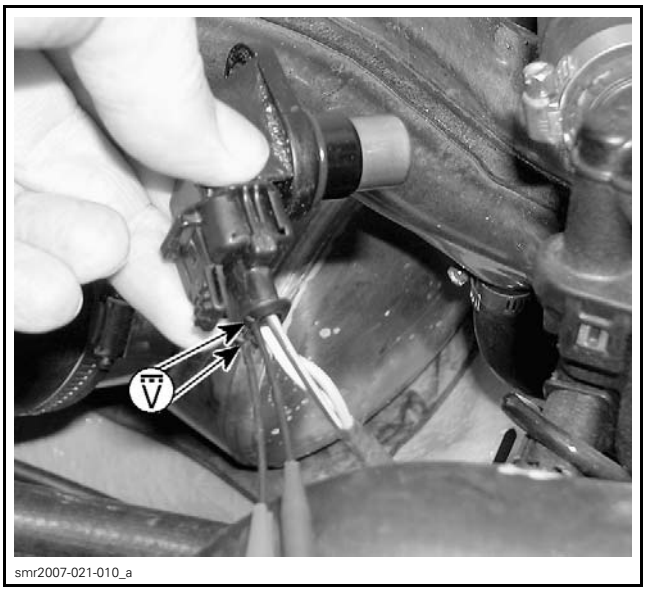
NOTICE Do not use sharp end probes. They could damage the connector seal.

Probes can be inserted at the end of the FLUKE SUREGRIP INSULATED TEST LEADS (P/N TL224).


tl224

4. Briefly press the START/STOP button to wake up the ECM.
5. Install the tether cord cap on the engine cut-off switch.
6. Read voltage as per following tables.

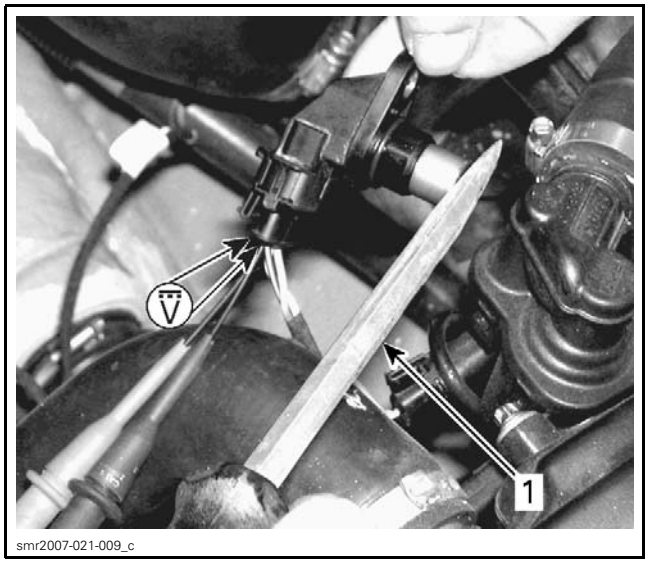
CAPS CONDITION	CAPS CONNECTOR		VOLTAGE
Free	3	2	Close to 0 Vdc



smr2007-021-010_a

TYPICAL

CAPS CONDITION	CAPS CONNECTOR		VOLTAGE
Metallic object on sensor	3	2	Battery voltage



TYPICAL
1. Metallic object

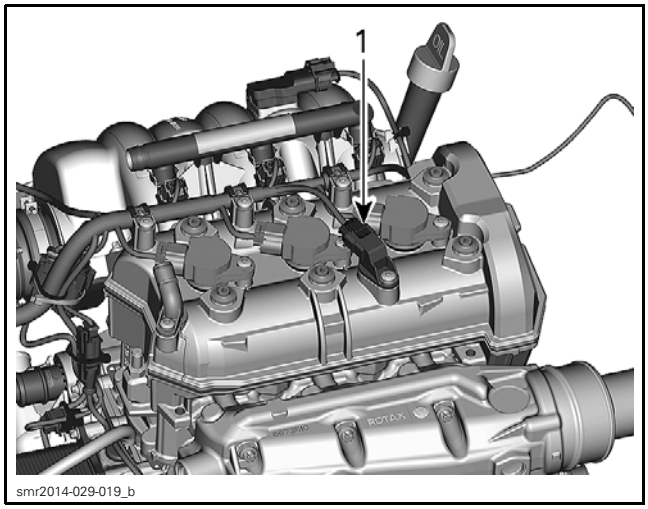
If voltage is as specified, repair or replace wiring and connectors between sensor and ECM.

If wiring is good, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)*.

If battery voltage is not measured as specified, try a new CAPS.

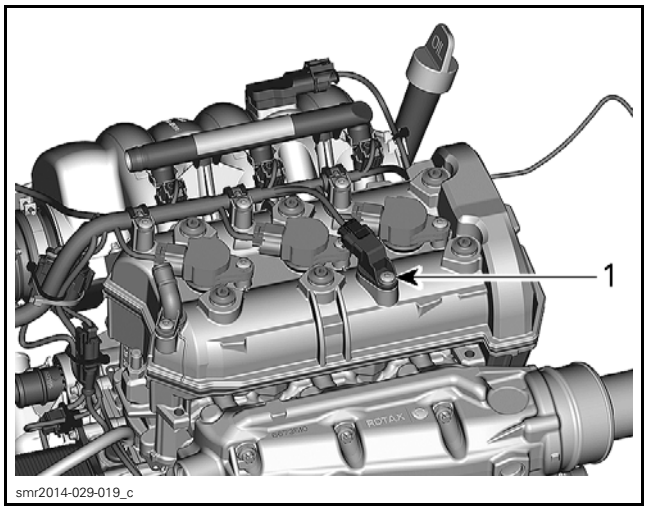
Replacing the CAPS

1. Disconnect CAPS connector.



1. CAPS connector

2. Unscrew the CAPS retaining screw.



1. CAPS retaining screw

3. Pull CAPS from engine.

4. Install the new CAPS.

NOTICE **Be sure to install new O-ring on the new CAPS.**

TIGHTENING TORQUE	
CAPS screw	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

Apply DIELECTRIC GREASE (P/N 293 550 004) on CAPS connector.

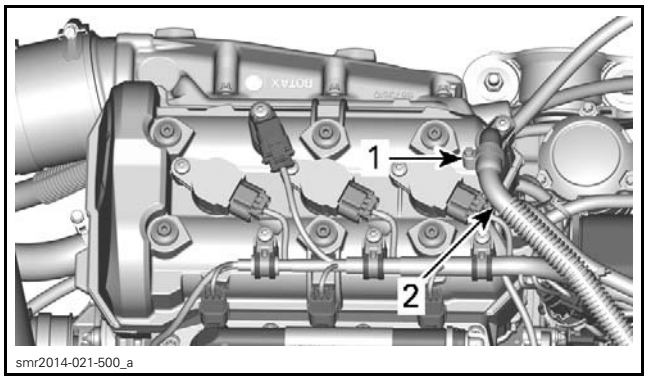
VALVE COVER

Valve Cover Access

Remove central body. refer to *BODY*.

Remove the air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.

Disconnect vent tube from the blow-by-connector.

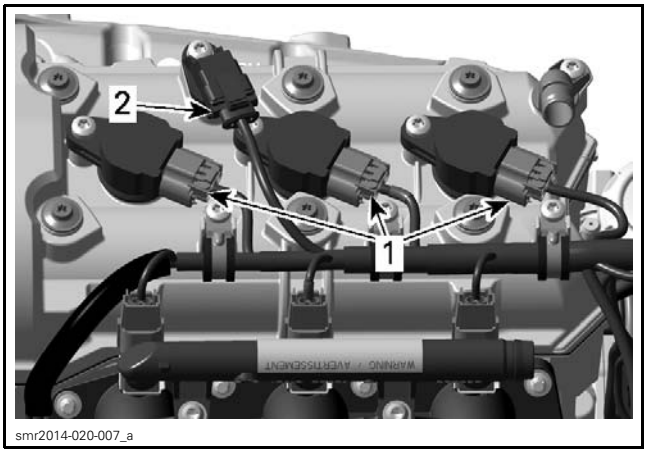


1. Clamp
2. Vent tube

Valve Cover Removal

1. Unplug CAPS (camshaft position sensor).

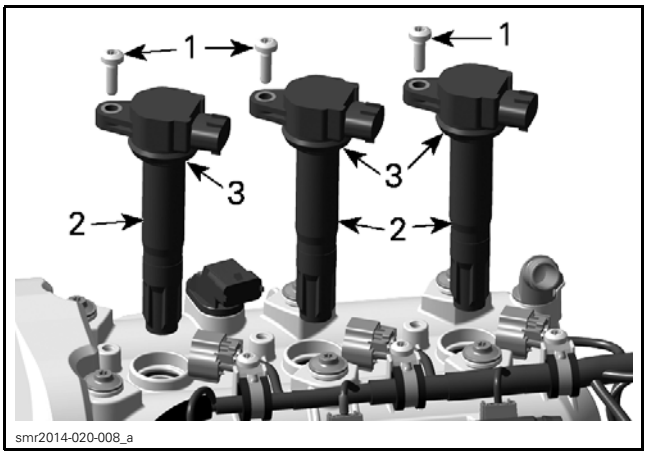
2. Unplug ignition coils.



smr2014-020-007_a

1. Ignition coil connectors
2. CAPS connector

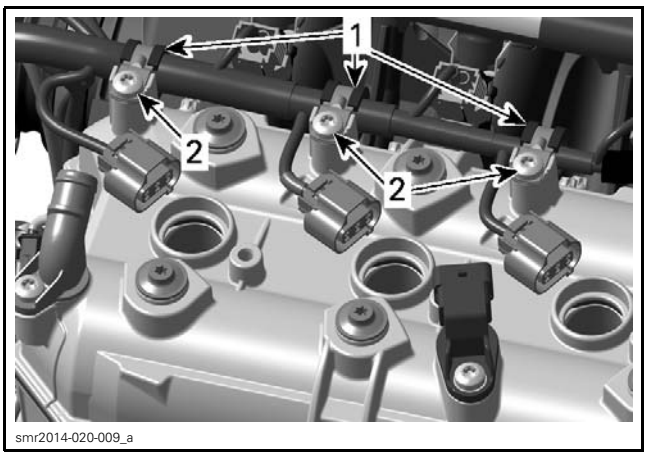
3. Remove ignition coils with gaskets.



smr2014-020-008_a

1. Retaining screws
2. Ignition coils
3. Gaskets

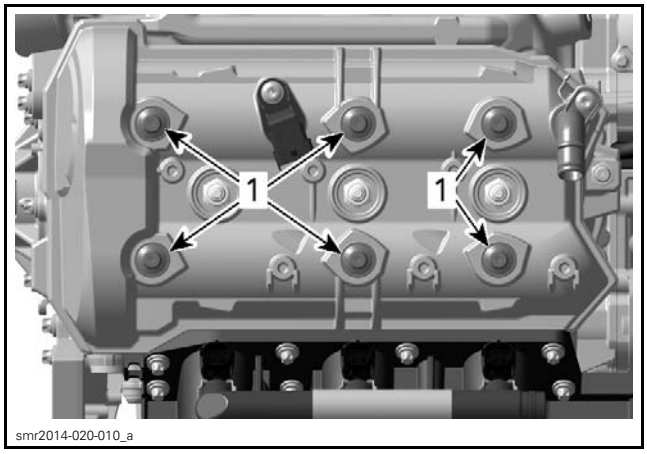
4. Remove screws securing the electrical harness to the valve cover.



smr2014-020-009_a

1. Cable clamps
2. Retaining screws

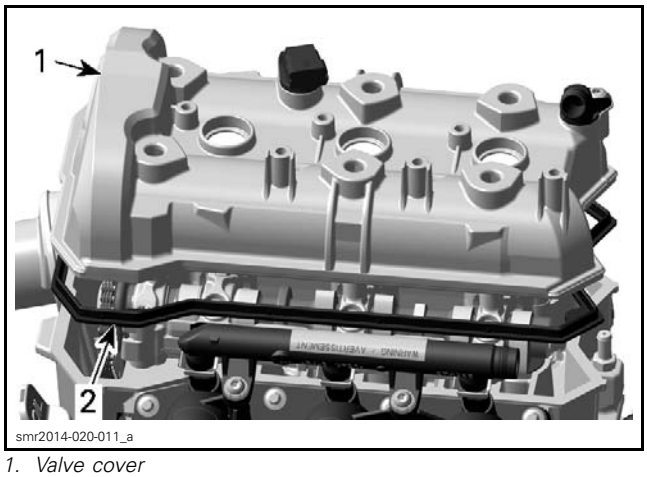
5. Remove valve cover retaining screws.



smr2014-020-010_a

1. Valve cover screws

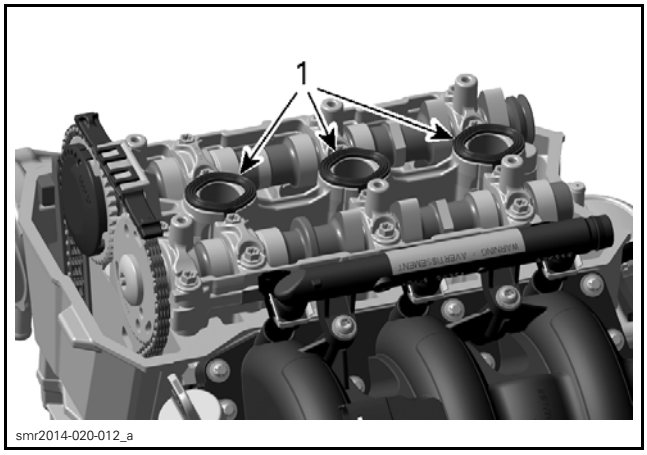
6. Remove the valve cover and its gasket.



smr2014-020-011_a

1. Valve cover
2. Gasket

7. Remove valve cover small gaskets (spark plug tubes).



smr2014-020-012_a

1. Small gaskets

Valve Cover Inspection

Check the valve cover for cracks or other damage.

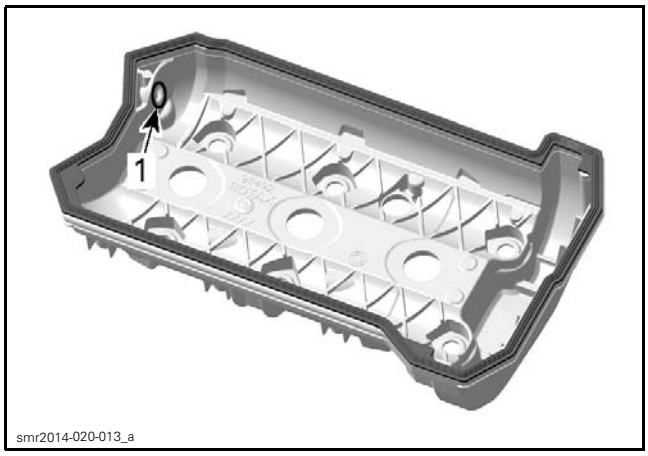
Check if the valve cover gaskets are brittle, hard or otherwise damaged.

Replace defective parts.

Valve Cover Installation

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

1. Properly fit the small gaskets into the camshaft holder grooves.
2. Properly fit the large gasket into the valve cover groove.
3. Apply engine oil to the sealing surface of the V-ring.

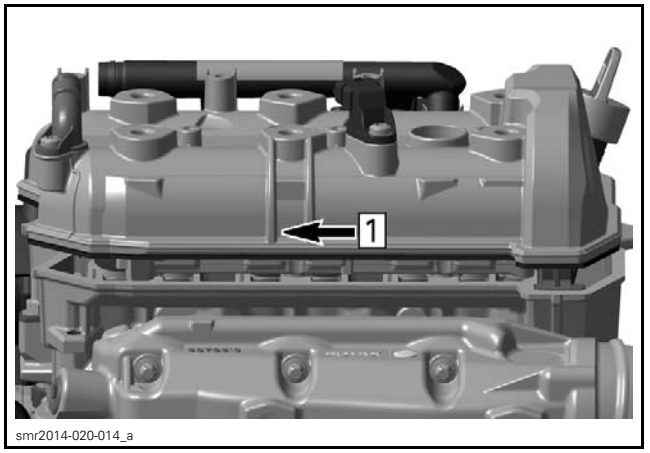


INSIDE VALVE COVER
1. Apply engine oil here

4. If engine is in the vehicle, slide the valve cover inside engine compartment by the LH side of the vehicle.
5. Install valve cover.

NOTICE **Adhere to the following procedure, otherwise damage to the V-ring will occur causing crankcase venting malfunction.**

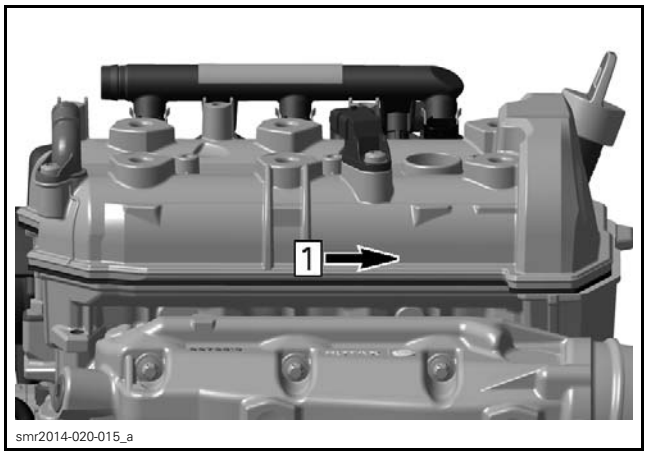
5.1 Move the valve cover towards the MAG side.



Step 1: Move valve cover towards MAG side

5.2 Put valve cover onto cylinder head.

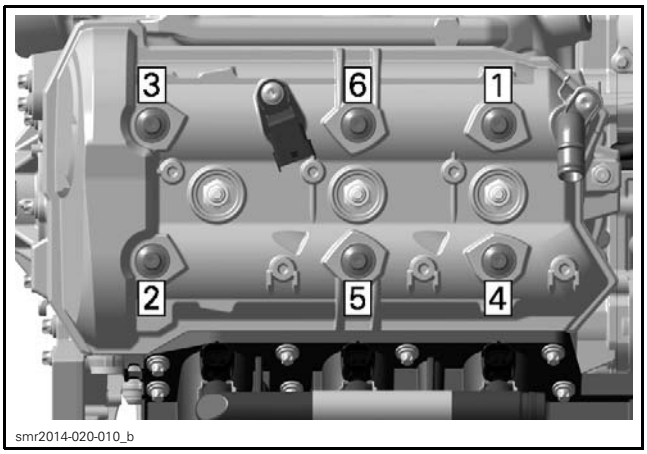
5.3 Push valve cover towards the PTO side to ensure that the V-ring properly seals on sealing surface inside the cover.



Step 1: Push valve cover towards PTO side

6. Install valve cover screws and tighten as per following sequence:

VALVE COVER SCREWS TIGHTENING PROCEDURE	
Step A	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)
Step B	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)



smr2014-020-010_b

TIGHTENING SEQUENCE

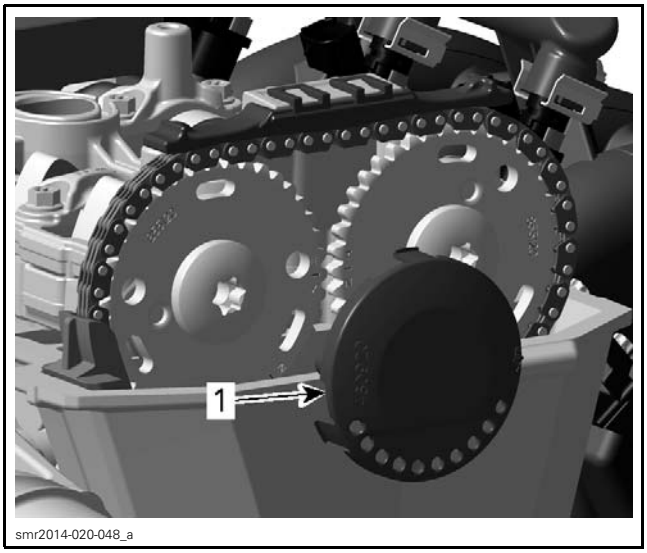
CAMSHAFTS

Camshaft Removal

1. Remove *VALVE COVER*, see procedure in this subsection.
2. Lock crankshaft, refer to *CRANKSHAFT LOCKING PROCEDURE* in the *CYLINDER BLOCK* subsection.

Remove timing chain tensioner. Refer to *TIMING CHAIN* subsection.

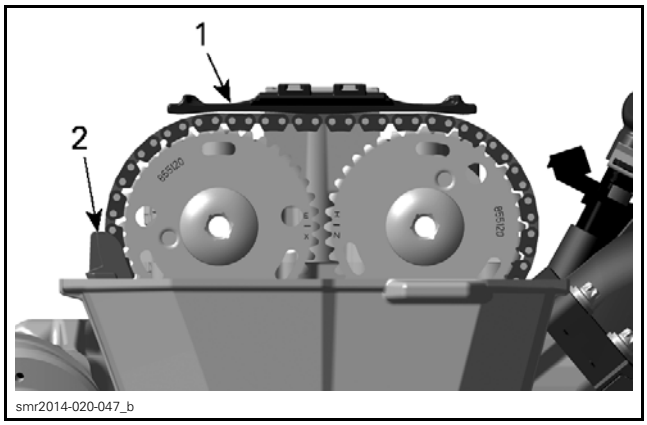
3. Remove:
   3.1 Breather cover



smr2014-020-048_a

1. Breather cover

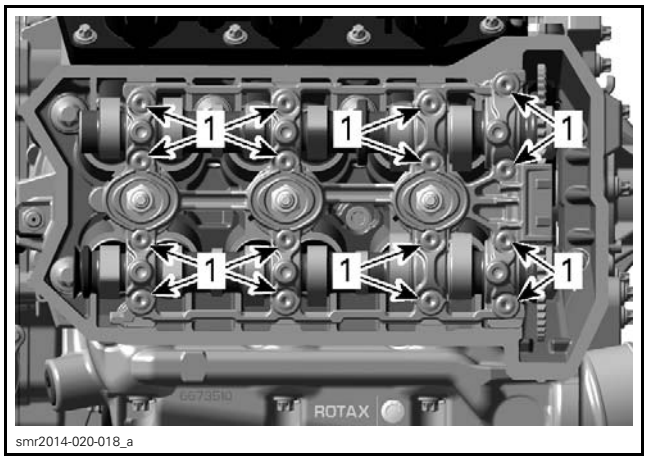
   3.2 Upper timing chain guide
   3.3 Timing chain guide.



smr2014-020-047_b

1. Upper timing chain guide
2. Timing chain guide

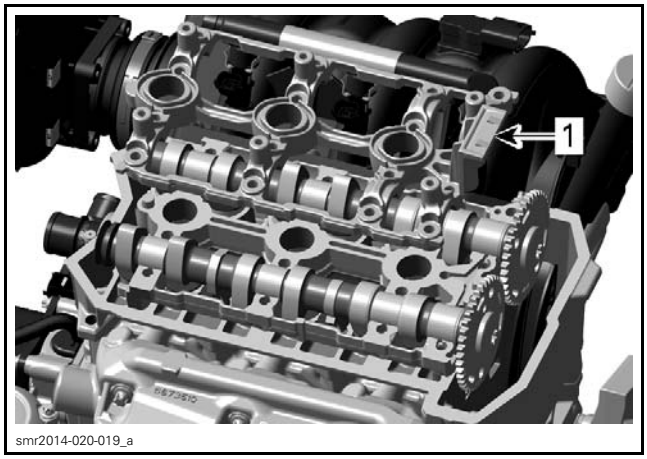
4. Remove timing chain from camshaft timing gears.
5. Remove camshaft holder retaining screws (16).



smr2014-020-018_a

1. Camshaft holder retaining screws

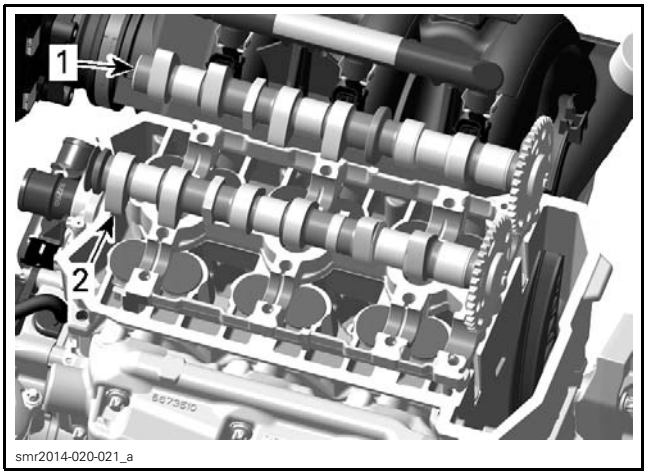
6. Remove the camshaft holder upper half.



smr2014-020-019_a

1. Upper half of camshaft holder

7. Put timing chain aside.
8. Remove camshafts with timing gears.

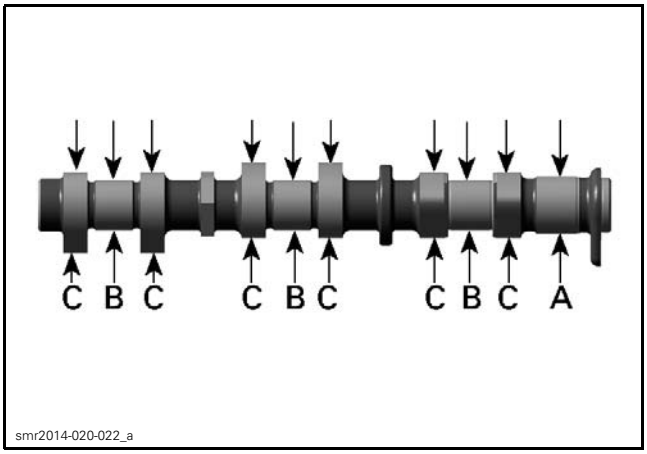


1. Intake camshaft
2. Exhaust camshaft

9. Remove camshaft timing gears only if necessary. Refer to *TIMING CHAIN* subsection.

Camshaft Inspection

1. Check each lobe and bearing journal for scoring, scuffing, cracks, or other signs of wear.
2. Check V-ring if it is brittle, hard or otherwise damaged.
3. Measure camshaft bearing journal diameter and lobe height, using a micrometer.



A. Camshaft journal (PTO)
B. Camshaft journal (center and MAG)
C. Camshaft lobes

CAMSHAFT JOURNAL DIAMETER	
PTO JOURNAL (A)	
NEW	25.967 mm to 25.980 mm (1.0223 in to 1.0228 in)
SERVICE LIMIT	25.940 mm (1.0213 in)
CENTER AND MAG JOURNAL (B)	
NEW	22.957 mm to 22.970 mm (.9038 in to .9043 in)
SERVICE LIMIT	22.930 mm (.9028 in)

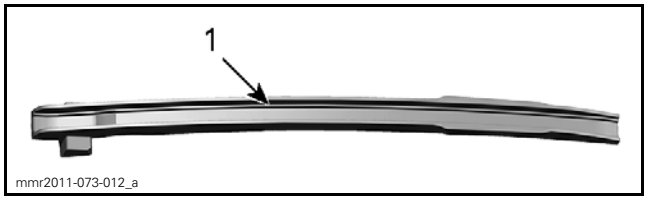
CAMSHAFT LOBE HEIGHT	
EXHAUST and INTAKE CAMSHAFT (C)	
NEW	38.35 mm to 38.55 mm (1.51 in to 1.518 in)
SERVICE LIMIT	38.33 mm (1.509 in)

Replace parts if necessary.

For camshaft journal radial clearance and camshaft holder bearing diameter refer to *CAMSHAFT HOLDER* in this subsection.

4. Check timing chain guide for wear, cracks or deformation. Replace as required.
5. Replace timing chain guide if any groove caused by timing chain exceeds service limit.

CHAIN GUIDE GROOVE DEPTH	
SERVICE LIMIT	1 mm (.039 in)

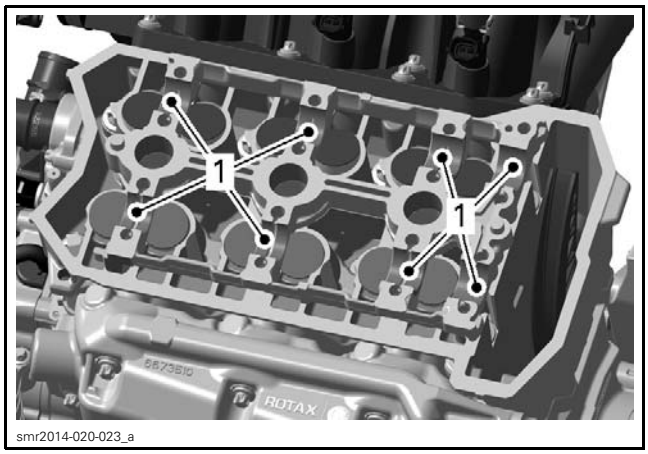


1. Timing chain guide

Camshaft Installation

The assembly is the reverse of the removal procedure. However pay attention to the following details.

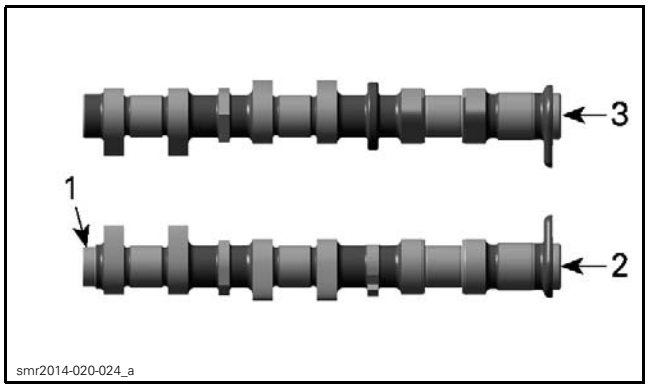
1. Ensure crankshaft is still locked.
2. Apply engine oil on camshaft bearings.



smr2014-020-023_a

1. Areas where to apply engine oil

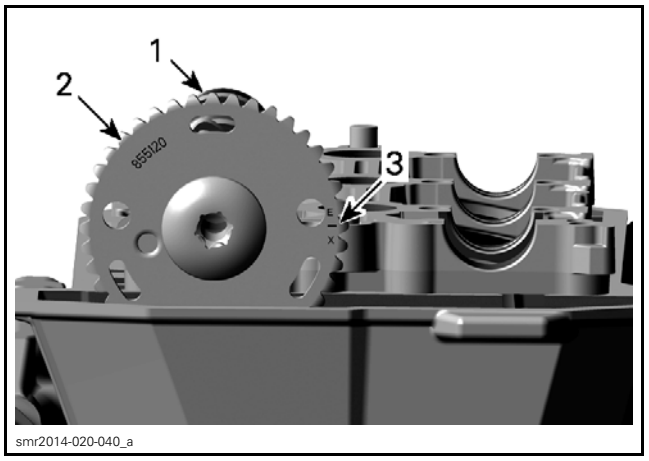
NOTE: The camshafts are not identical. Any mix-up of the components would lead to engine damage. The exhaust camshaft has a machined area on MAG side for the V-ring.



smr2014-020-024_a

1. Machined area
2. Exhaust camshaft
3. Intake camshaft

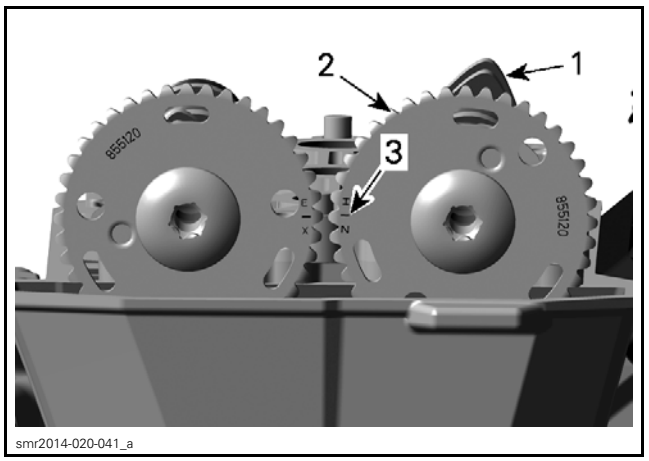
3. If removed, reinstall camshaft timing gears on camshafts. Refer to *CAMSHAFT TIMING GEARS* in the *TIMING CHAIN* subsection.
4. Apply engine oil on camshaft journal diameter.
5. Install exhaust camshaft assembly with mark "EX" parallel to cylinder head gasket.



smr2014-020-040_a

1. Exhaust camshaft
2. Camshaft timing gear
3. Mark "EX"

6. Install intake camshaft assembly with mark "IN" parallel to cylinder head gasket.

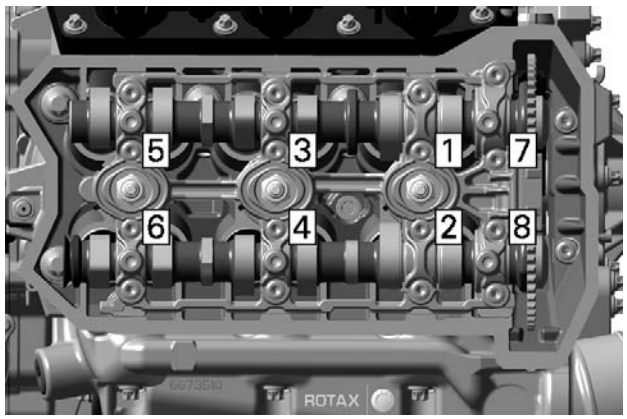


smr2014-020-041_a

1. Intake camshaft
2. Camshaft timing gear
3. Mark "IN"

7. Install the camshaft holder upper half, then tighten screws as per following sequence:

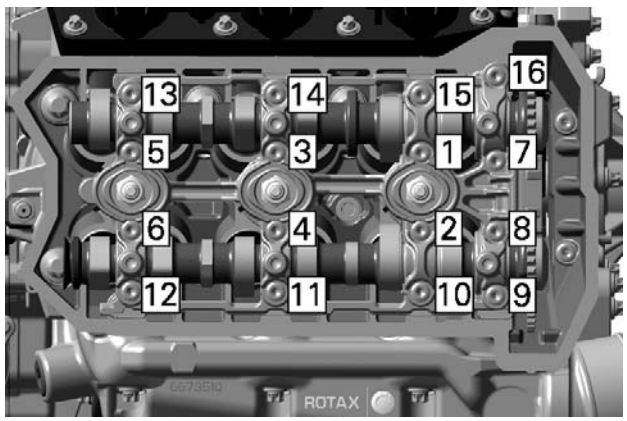
CAMSHAFT HOLDER TIGHTENING PROCEDURE	
STEP A	5 N•m ± 0.5 N•m (44 lbf•**in** ± 4 lbf•**in**)



smr2014-020-018_b

CAMSHAFT HOLDER TIGHTENING SEQUENCE - STEP A

CAMSHAFT HOLDER TIGHTENING PROCEDURE	
STEP B	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)



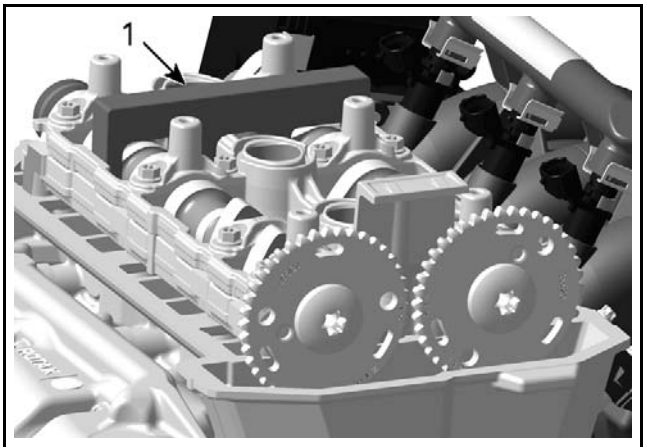
smr2014-020-018_c

CAMSHAFT HOLDER TIGHTENING SEQUENCE - STEP B

NOTE: After the reassembly of the camshafts is completed, check if camshafts can be turned easily.

8. Lock camshafts.

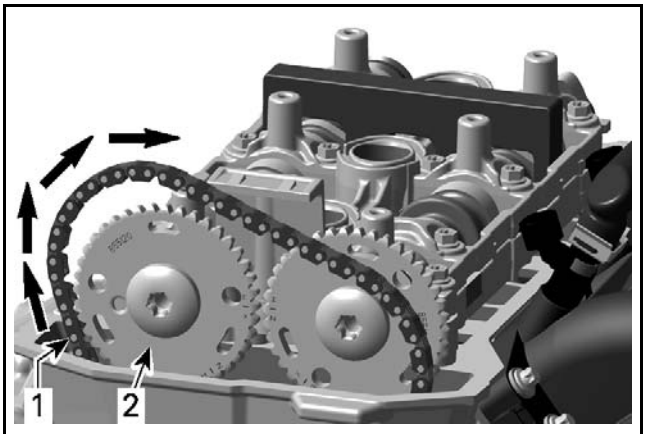
REQUIRED TOOL	
CAMSHAFT LOCKING TOOL (900 ACE) (P/N 529 036 206)	



smr2014-020-042_a

1. Camshaft locking tool

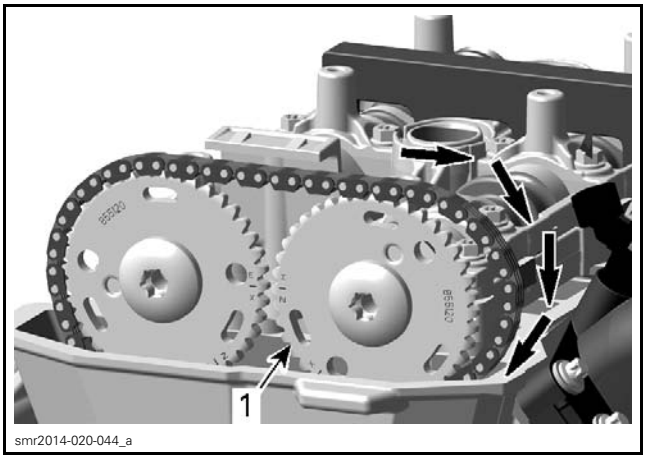
9. Lift timing chain out of timing chain compartment.
10. Pull timing chain up on exhaust side and install it on the exhaust camshaft timing gear.



smr2014-020-043_a

1. Timing chain
2. Exhaust camshaft timing gear

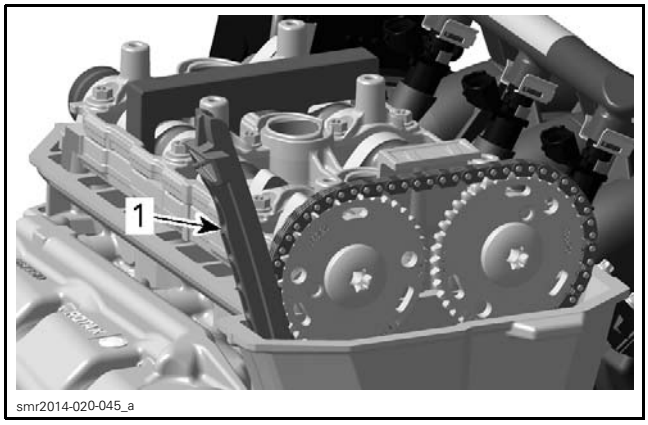
11. Pull timing chain towards intake side and install it on the intake camshaft timing gear.



smr2014-020-044_a

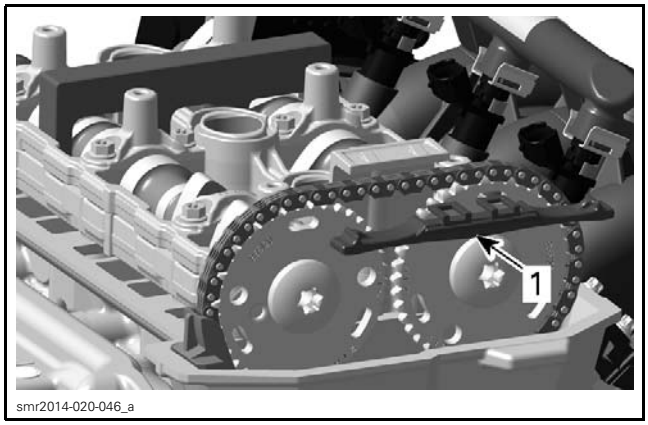
1. Intake camshaft timing gear

12. Install timing chain guide.



1. Timing chain guide

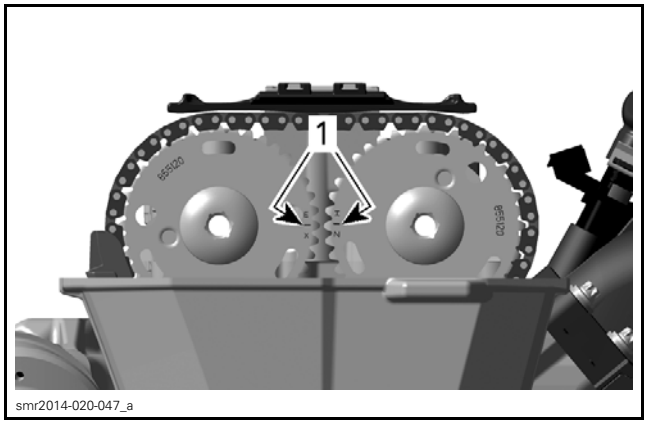
13. Install upper timing chain guide on camshaft holder.



1. Upper timing chain guide

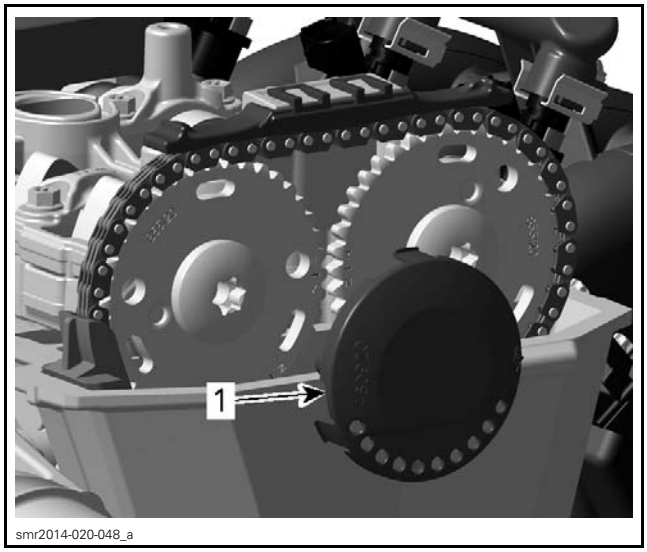
14. Install *TIMING CHAIN TENSIONER*, refer to *TIMING CHAIN* subsection.
15. Ensure marks on camshaft timing gears are still aligned. If not, repeat procedure.

NOTICE After installation of timing chain tensioner, the marks "IN" on intake and "EX" on exhaust camshafts must be aligned.



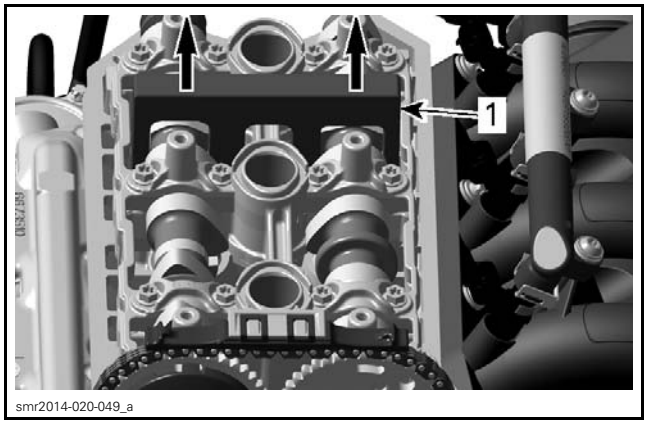
CAMSHAFT TIMING GEARS
1. Marks must be aligned

16. Install breather cover.



1. Breather cover

17. Remove camshaft locking tool.



1. Camshaft locking tool removal

18. Remove crankshaft locking tool.

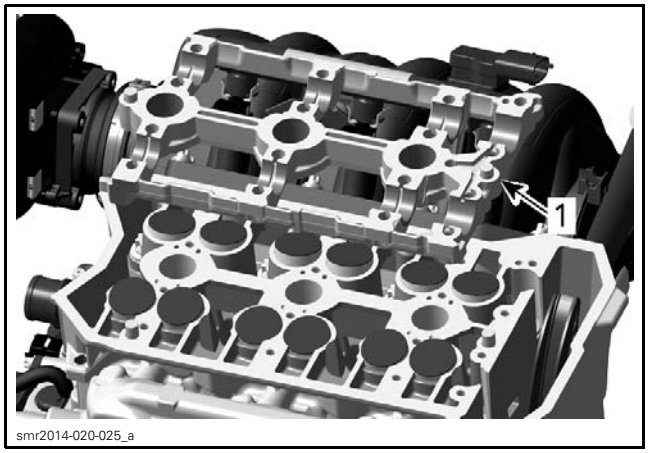
CAMSHAFT HOLDER

Camshaft Holder Removal

Remove camshafts, see procedure in this subsection.

Remove the camshaft holder lower half with gaskets from cylinder head.

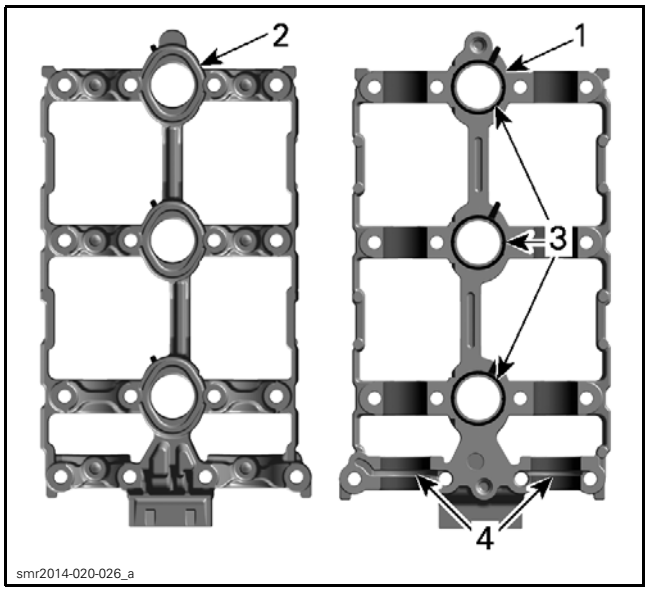
Remove gaskets from camshaft holder halves and discard gaskets.



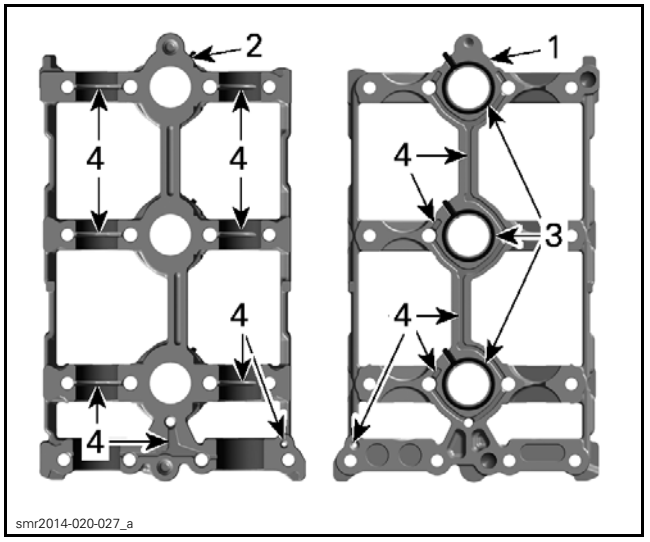
1. Camshaft holder lower half

Camshaft Holder Inspection

1. Check camshaft holder for scoring, scuffing, cracks, or other signs of wear.
2. Make sure oil orifices are not clogged. Blow them out with pressurized air.



1. Camshaft holder upper half - view from beneath
2. Camshaft holder upper half - view from above
3. Gaskets
4. Oil orifices

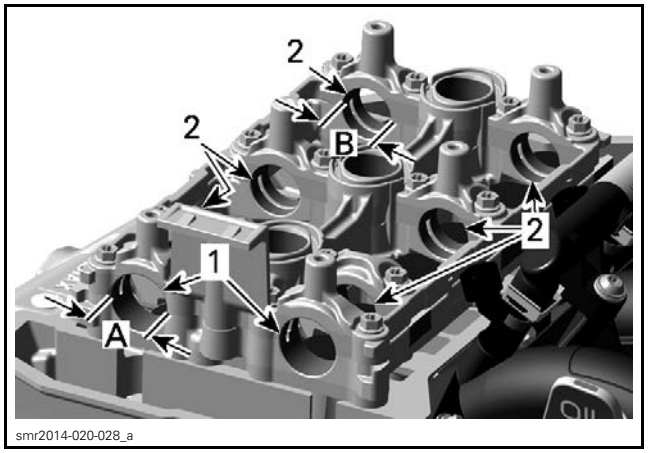


1. Camshaft holder lower half - view from beneath
2. Camshaft holder lower half - view from above
3. Gaskets
4. Oil orifices

Install camshaft holder on cylinder head.

Tighten camshaft holder screws to specification, refer to *CAMSHAFT INSTALLATION* in this subsection.

Measure camshaft holder bearing diameter.



CAMSHAFT HOLDER BEARINGS
1. PTO bearings
2. Center and MAG bearings
A. Diameter PTO bearing
B. Diameter center and MAG bearing

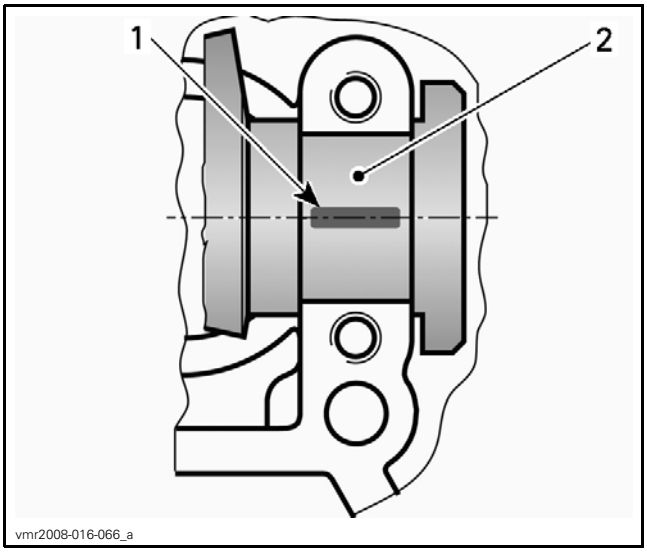
CAMSHAFT HOLDER BEARING DIAMETER	
PTO BEARING	
NEW	26.000 mm to 26.021 mm (1.024 in to 1.024 in)
SERVICE LIMIT	26.050 mm (1.026 in)
CENTER AND MAG BEARING	
NEW	23.000 mm to 23.021 mm (.906 in to .906 in)
SERVICE LIMIT	23.050 mm (.907 in)

Measure clearance between camshaft journals and camshaft holder, using the plastic feeler gauge.

NOTE: The plastic feeler gauge is available at automotive parts retailer.

Install camshaft holder lower half on cylinder head.

Place the camshafts in the camshaft holder lower half and apply a plastic-gauge on the camshaft bearing journal.

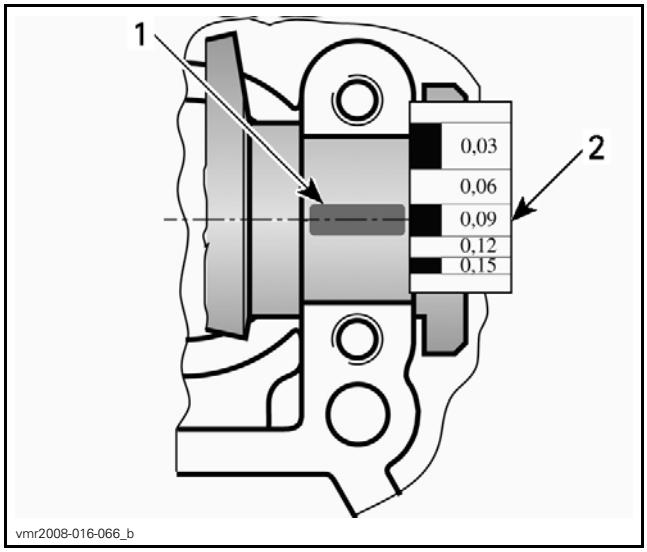


TYPICAL
1. *Plastic gauge*
2. *Camshaft bearing journal*

Install camshaft holder upper half in the proper position and tighten screws to specification, refer to *CAMSHAFT INSTALLATION* in this subsection.

Unfasten camshaft holder.

Measure the maximum width of the pressed plastic gauge with the corresponding graduated scale.



TYPICAL
1. *Pressed plastic gauge*
2. *Graduated scale*

CAMSHAFT JOURNAL RADIAL CLEARANCE	
PTO, CENTER AND MAG BEARING	
NEW	0.020 mm to 0.054 mm (.001 in to .002 in)
SERVICE LIMIT	0.080 mm (.003 in)

Replace parts if necessary.

Camshaft Holder Installation

Install camshaft holder lower half.

Continue procedure as explained in *CAMSHAFT INSTALLATION* in this subsection.

HYDRAULIC VALVE LIFTERS

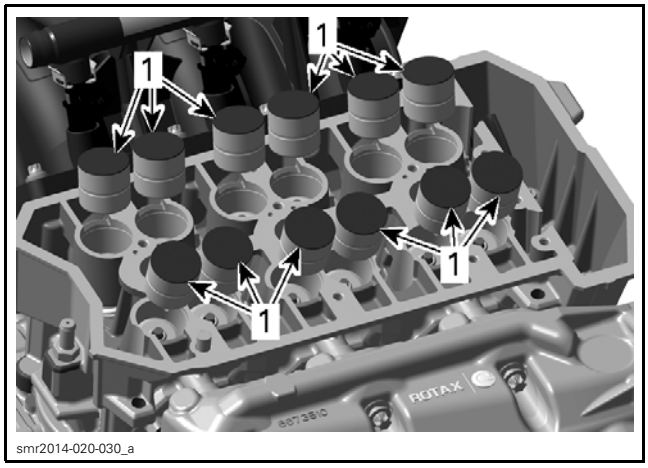
Hydraulic Valve Lifter Removal

NOTE: Hydraulic valve lifter are maintenance free.

See procedures in this subsection to remove:
- Valve cover
- Camshafts
- Camshaft holder.

Pull hydraulic valve lifter off the cylinder head.

NOTE: When disassembling the hydraulic valve lifter, it is strongly recommended to note their original position.



smr2014-020-030_a

1. Hydraulic valve lifter

Hydraulic Valve Lifter Inspection

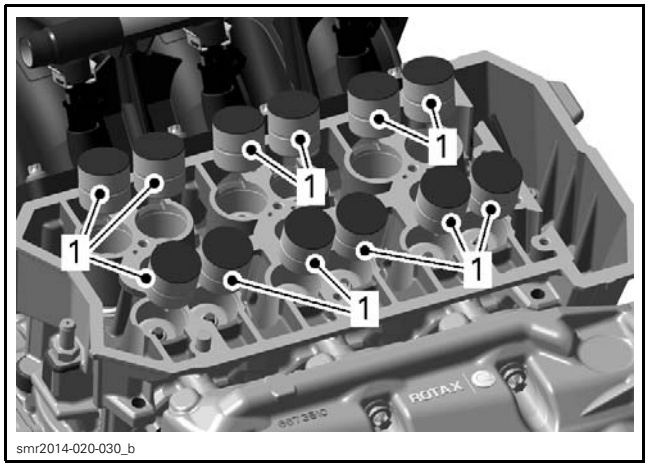
1. Check surface of hydraulic valve lifter for scoring or other damage.
2. Measure valve lifter diameter. Replace if out of specification.

HYDRAULIC VALVE LIFTER	
NEW	28.354 mm to 28.370 mm (1.1163 in to 1.1169 in)
SERVICE LIMIT	28.34 mm (1.1157 in)
HYDRAULIC VALVE LIFTER RADIAL CLEARANCE	
SERVICE LIMIT	0.100 mm (.0039 in)

Hydraulic Valve Lifter Installation

For installation reverse the removal procedure. However pay attention to the following details.

1. Apply engine oil on the outside diameter of the hydraulic valve lifter.



smr2014-020-030_b

1. Apply engine oil on outer diameter

CYLINDER HEAD

Cylinder Head Access

Remove central body. Refer to *BODY*.

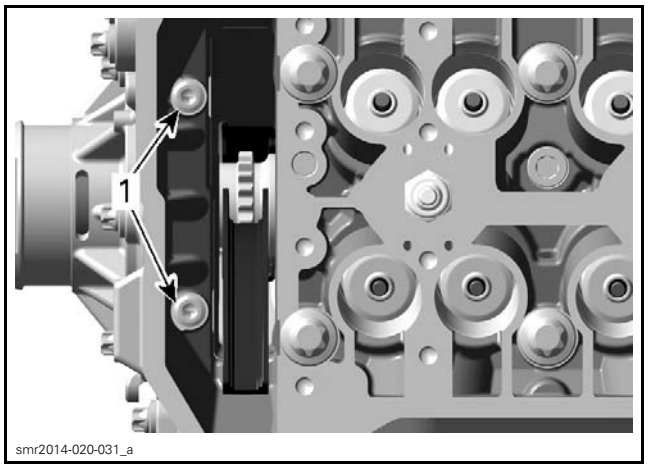
Remove exhaust manifold. Refer to *EXHAUST*.

Remove intake manifold. Refer to *AIR INTAKE SYSTEM*.

Cylinder Head Removal

See procedures in this subsection to remove:
- Valve cover
- Camshafts
- Camshaft holder
- Hydraulic valve lifters.

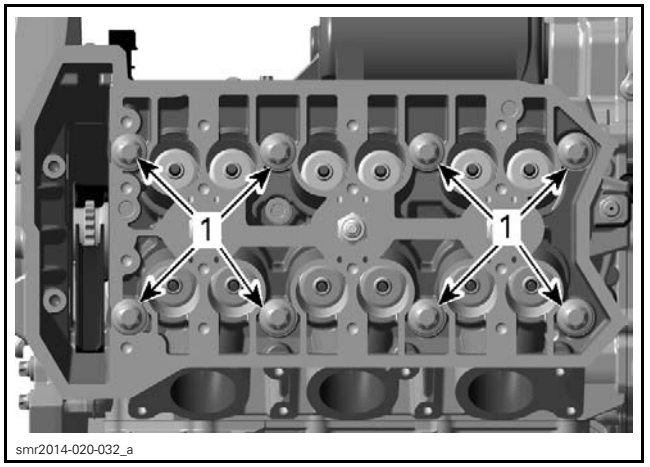
Remove M6 cylinder head screws.



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1. Remove M6 cylinder head screws

Remove and discard M9 cylinder head screws.



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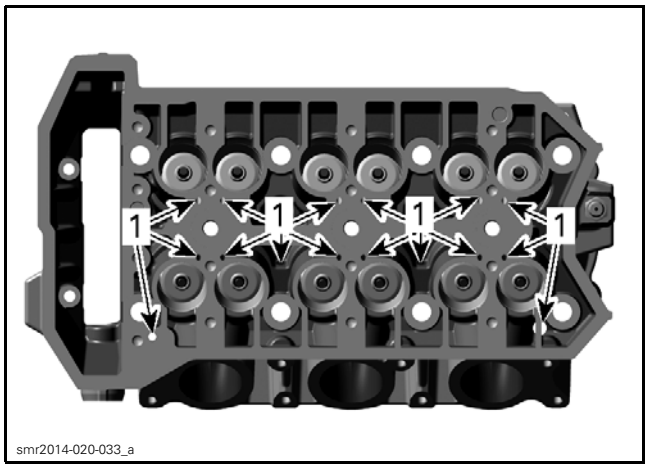
1. Remove M9 cylinder head screws

Pull cylinder head off the cylinder block.

Remove and discard cylinder head gasket.

Cylinder Head Cleaning

1. Remove carbon deposits from combustion chambers, exhaust ports and piston tops.
2. Clean cylinder head, especially cylinder head screw surface from oil spillage.
3. Blow out the oil orifices with pressurized air and make sure they are not clogged.



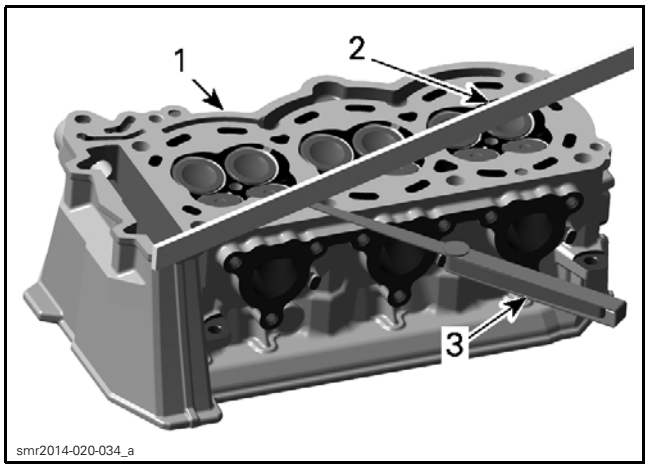
1. Oil orifices

Cylinder Head Inspection

Check for cracks between valve seats or other damage, if so, replace cylinder head.

Check cylinder head mating surface for flatness using a straight edge.

Check hydraulic valve lifter bores for scoring or other damage, if so, replace cylinder head.



1. Cylinder head
2. Straight edge
3. Feeler gauge

Check cylinder head warpage.

CYLINDER HEAD WARPAGE	
SERVICE LIMIT	0.15 mm (.0059 in)

If warpage exceeds specification, resurface the cylinder head as follows.

Use a 400 - 600 grit wet sandpaper on a surface plate and gently grind off the mating surface.

NOTE: To ensure an even surface, rotate cylinder head several times during resurfacing.

Replace cylinder head, if resurfacing fails.

Cylinder Head Installation

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

1. Install a NEW cylinder head gasket.

NOTICE **Each installation of the cylinder head requires a NEW cylinder head gasket. Using a gasket twice would cause engine damage.**

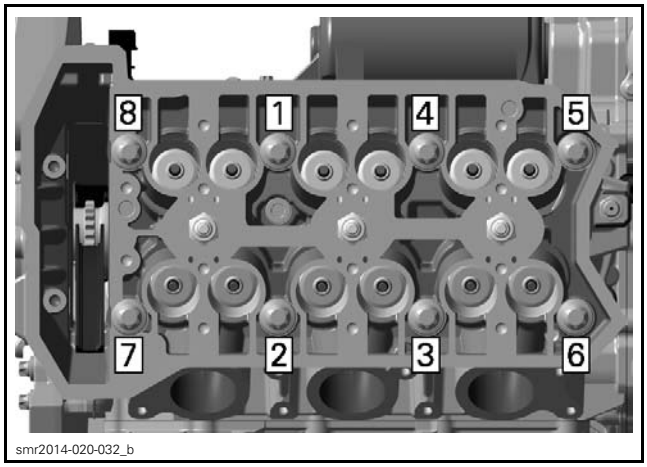
2. Install cylinder head on the cylinder block.
3. Install NEW M9 cylinder head screws.

NOTICE **This assembly uses stretch screws. Always use NEW screws and strictly adhere to the tightening procedure.**

4. Tighten cylinder head screws as follows:

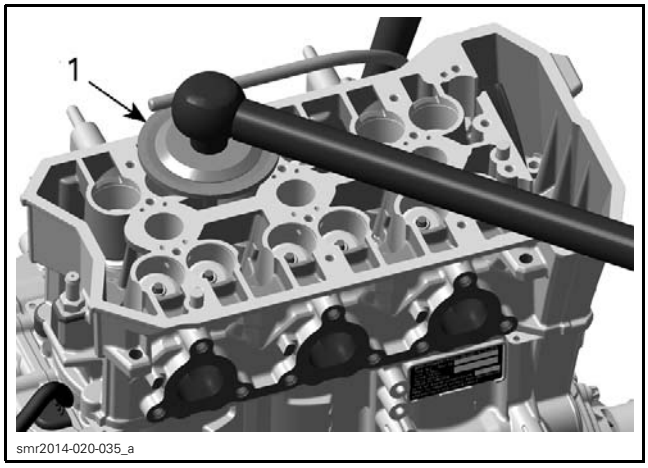
NOTE: Always perform step 1 on all M9 cylinder head screws before going to the next step.

CYLINDER HEAD M9 SCREWS TIGHTENING PROCEDURE	
STEP A	20 N•m ± 2 N•m (15 lbf•ft ± 1 lbf•ft)
STEP B	Additional 150° ± 5°



M9 SCREWS TIGHTENING SEQUENCE

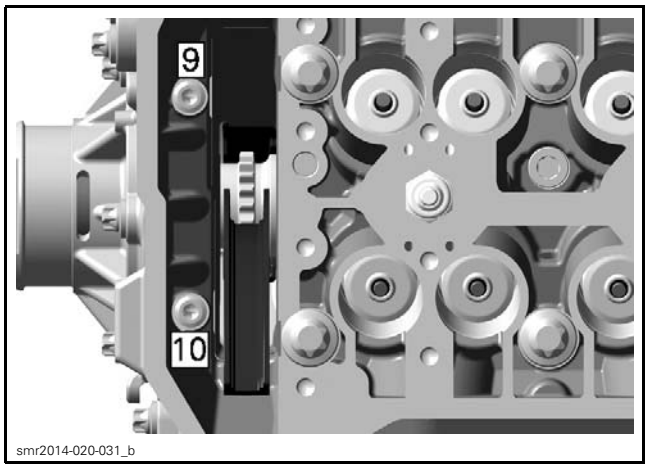
NOTE: Use a torque angle gauge to carry out the second step.



1. Torque angle gauge

5. Install M6 screws. Tighten as follows.

M6 CYLINDER HEAD SCREWS	
Tightening torque	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)



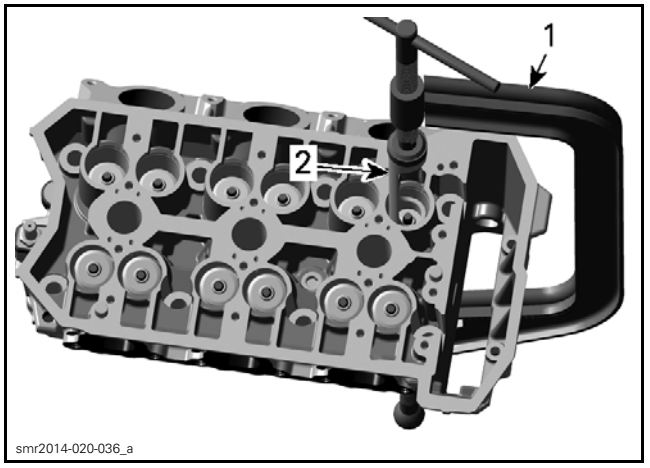
M6 SCREWS TIGHTENING SEQUENCE

VALVE SPRINGS

Valve Spring Removal

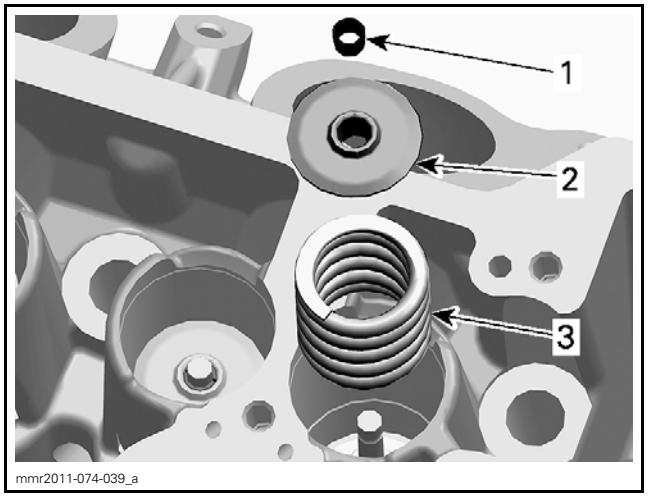
1. Remove *CYLINDER HEAD*, see procedure in this subsection.
2. Compress valve spring.

REQUIRED TOOLS	
VALVE SPRING COMPRESSOR (P/N 529 035 724)	
VALVE SPRING COMPRESSOR CUP (P/N 529 036 209)	



1. Valve spring compressor clamp
2. Valve spring compressor cup

3. Remove valve cotters.
4. Withdraw valve spring compressor tools.
5. Remove valve spring retainer and valve spring.

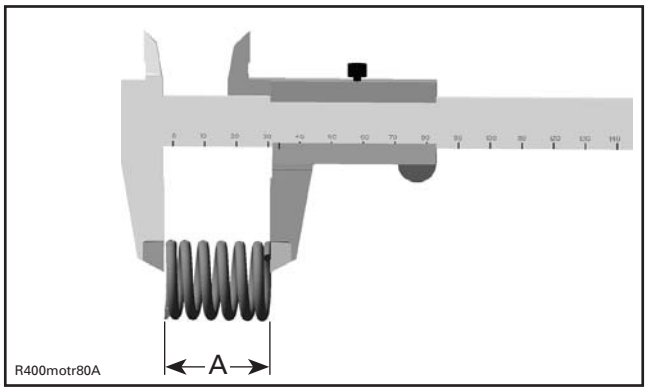


1. Valve cotters
2. Valve spring retainer
3. Valve spring

NOTE: Identify the position of each part very carefully, so it can be reinstalled in its original place.

Valve Spring Inspection

1. Check valve spring for rust, corrosion or other visible damage.
2. Check valve spring free length and straightness.



A. Spring free length

VALVE SPRING FREE LENGTH	
NEW	31.35 mm (1.2343 in)
SERVICE LIMIT	29.5 mm (1.1614 in)

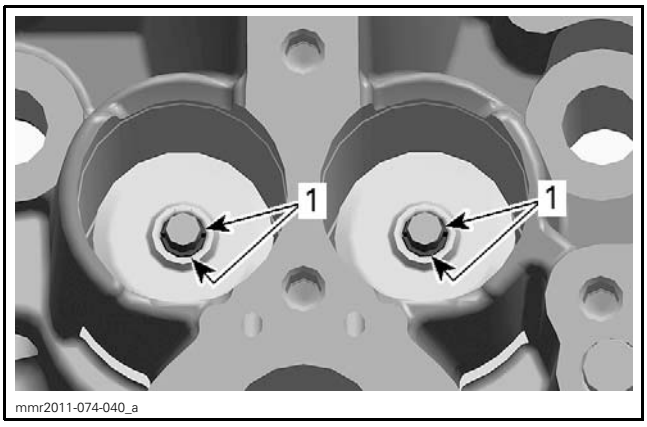
Replace valve spring, if out of specification.

Valve Spring Installation

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

NOTE: Ensure to reinstall all parts in their original position as marked during removal.

1. Apply some grease on valve cotters, so that they remain in place while releasing the valve spring.
2. Make sure valve cotters are properly engaged into valve stem groove.



1. Valve cotters

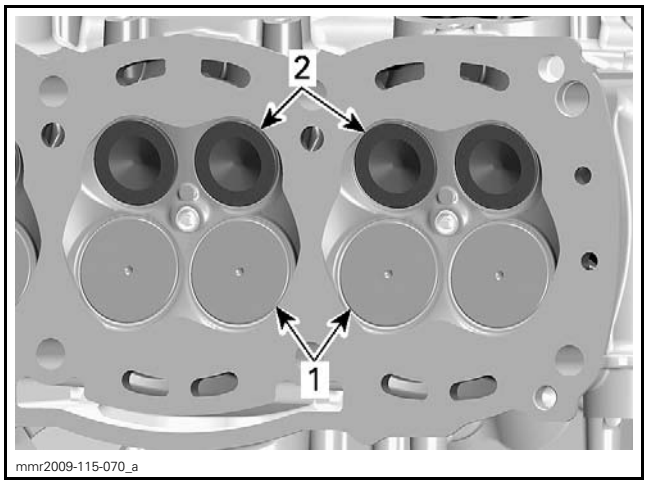
3. After spring is installed, ensure it is properly locked by lightly tapping on valve stem end with a soft punch and a hammer so that valve opens and closes a few times.

NOTICE **Improperly locked valve spring will cause severe engine damage and hitting the valve stem end with excessive force could damage the valve.**

VALVES

Valve Removal

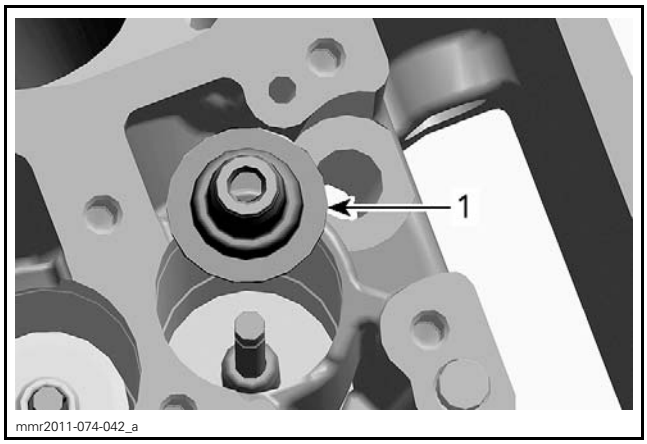
1. Remove *VALVE SPRING*, see procedure in this subsection.
2. Push on the valve stem, then pull valves out of cylinder head.



1. Intake valves 29 mm
2. Exhaust valves 25 mm

3. Remove and discard valve stem seal with special pliers.

REQUIRED TOOL	
SNAP-ON VALVE STEM SEAL PLIERS (P/N YA 8230)	

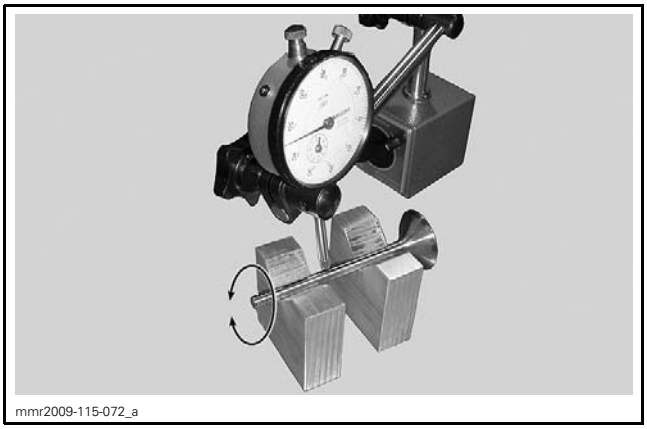


1. Valve stem seal

NOTE: Identify the position of each part very carefully, so it can be reinstalled in its original place.

Valve Inspection

Inspect valve surface, check for abnormal stem wear and bending.

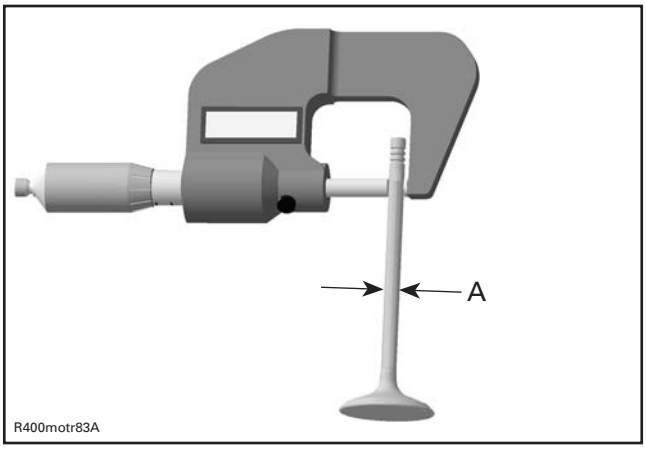

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VALVE OUT OF ROUND INTAKE AND EXHAUST VALVE	
NEW	0.005 mm (.0002 in)
SERVICE LIMIT	0.06 mm (.0024 in)

Replace valve if out of specification.

Valve Stem and Valve Guide Clearance

1. Measure valve stem at three places, using a micrometer.



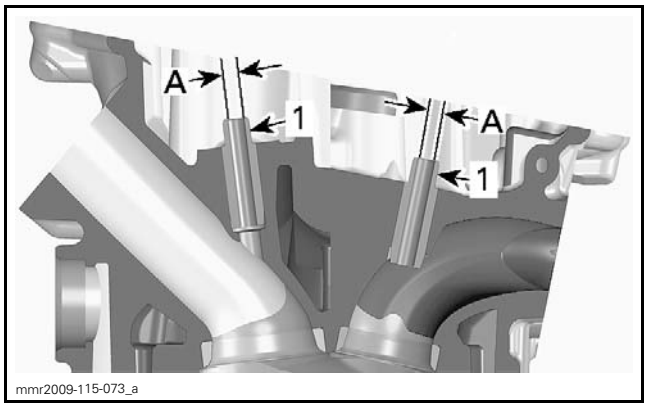
A. Valves stem diameter

VALVE STEM DIAMETER	
INTAKE VALVE	
NEW	4.958 mm to 4.972 mm (.1952 in to .1957 in)
SERVICE LIMIT	4.94 mm (.1945 in)
EXHAUST VALVE	
NEW	4.956 mm to 4.970 mm (.1951 in to .1957 in)
SERVICE LIMIT	4.94 mm (.1945 in)

Replace valve if stem is out of specification or if its surface is damaged or worn.

2. Measure valve guide inner diameter, using a small bore gauge.

NOTE: Clean valve guide from carbon deposits before measuring.

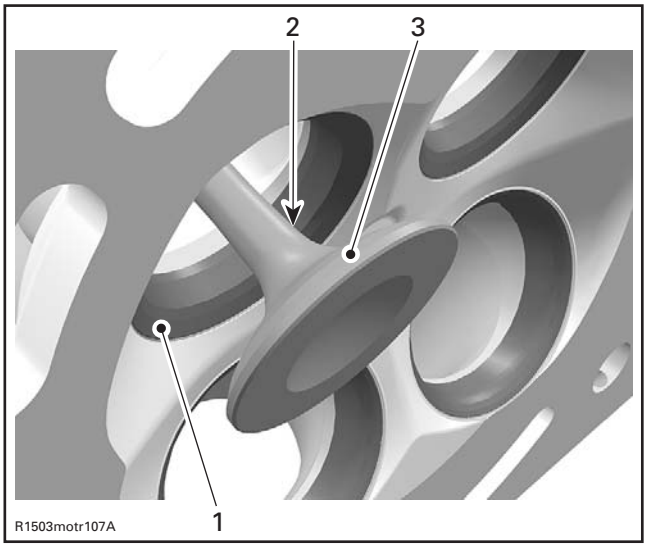


1. Valve guides
A. Valve guide inner diameter

VALVE GUIDE INNER DIAMETER	
NEW	5.000 mm to 5.012 mm (.1969 in to .1973 in)
SERVICE LIMIT	5.05 mm (.1988 in)

Replace cylinder head, if valve guide is out of specification.

Valve Face and Seat



TYPICAL
1. Valve seat
2. Exhaust valve contaminated area
3. Valve face (contact surface to valve seat)

1. Check valve face and seat for burning, pitting and other signs of damage.

2. Check if valve seats properly in cylinder head. Proceed as follows.
   2.1 Apply some lapping compound on valve face and work valve on its seat with a lapping tool.

REQUIRED TOOL
SNAP-ON VALVE HOLDER (P/N VL2)

   NOTE: The location of contact area should be in center of valve face.
   2.2 Repeat procedure until valve seat and valve face fit together.
3. Measure valve seat contact width, using a caliper.



A. Valve face contact width
B. Valve seat contact width

VALVE SEAT CONTACT WIDTH (B)	
INTAKE VALVE	
NEW	1.05 mm to 1.35 mm (.041 in to .053 in)
SERVICE LIMIT	1.7 mm (.067 in)
EXHAUST VALVE	
NEW	1.25 mm to 1.45 mm (.049 in to .057 in)
SERVICE LIMIT	1.8 mm (.0709 in)

Replace parts if out of specification.

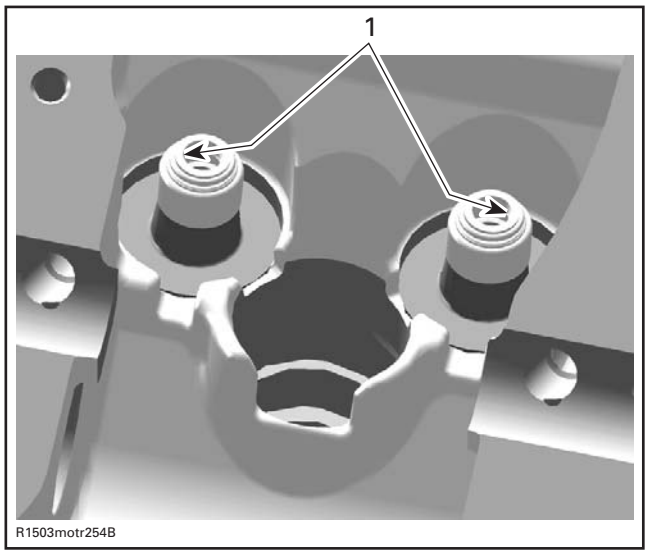
Valve Installation

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

NOTE: Ensure to reinstall all parts in their original position as marked during removal.

1. Install a NEW valve stem seal whenever valve is removed.
2. Apply engine oil on valve stem and carefully slide through cylinder head and valve stem seal.

NOTICE Be careful when passing the valve stem through the sealing lip of the seal.



TYPICAL
1. Sealing lips of valve stem seal

3. Install *VALVE SPRING*. See procedure in this subsection.
4. Install all other removed parts.

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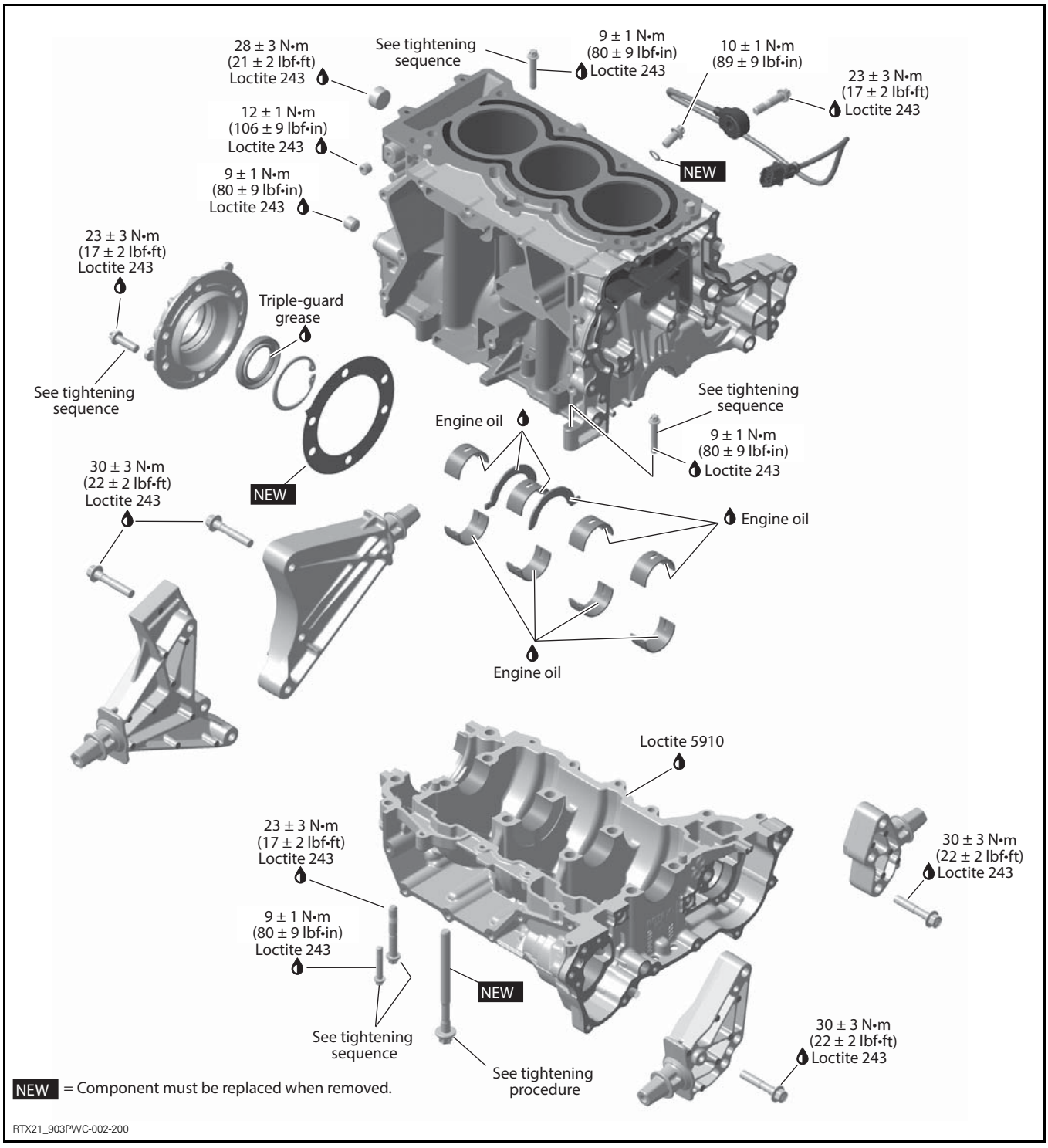
CYLINDER BLOCK

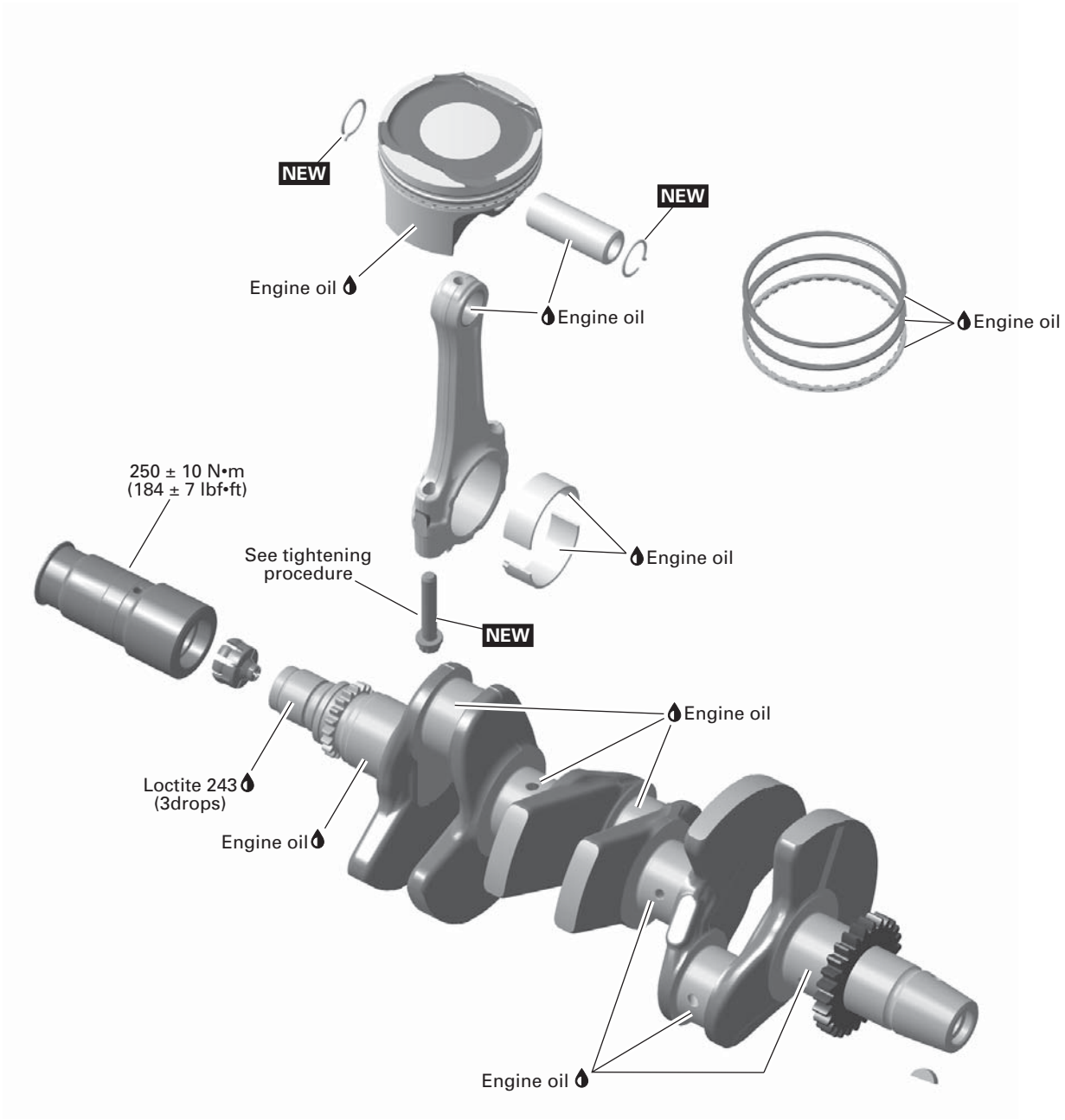
SERVICE TOOLS

Description	Part Number	Page
CRANKSHAFT LOCKING TOOL	529 036 407	111
ECM ADAPTER TOOL	529 036 166	101
OIL SEAL INSTALLER	529 036 277	102
PISTON CIRCLP INSTALLER	529 036 207	117
PISTON RING COMPRESSOR	529 036 208	119
PTO SHAFT ADAPTER	529 036 401	103, 111

SERVICE PRODUCTS

Description	Part Number	Page
CLUTCH AND PULLEY FLANGE CLEANER PRO S1	779244	103
DIELECTRIC GREASE	293 550 004	101
LOCTITE 243 (BLUE)	293 800 060	101, 103–104
LOCTITE 5910	293 800 081	109
LOCTITE CHISEL (GASKET REMOVER)	413 708 500	107
TRIPLE-GUARD GREASE	508298	102


28 ± 3 N•m
(21 ± 2 lbf•ft)
Loctite 243
See tightening sequence
9 ± 1 N•m
(80 ± 9 lbf•in)
Loctite 243
10 ± 1 N•m
(89 ± 9 lbf•in)
23 ± 3 N•m
(17 ± 2 lbf•ft)
Loctite 243
12 ± 1 N•m
(106 ± 9 lbf•in)
Loctite 243
NEW
9 ± 1 N•m
(80 ± 9 lbf•in)
Loctite 243
23 ± 3 N•m
(17 ± 2 lbf•ft)
Loctite 243
Triple-guard grease
See tightening sequence
NEW
See tightening sequence
Engine oil
9 ± 1 N•m
(80 ± 9 lbf•in)
Loctite 243
30 ± 3 N•m
(22 ± 2 lbf•ft)
Loctite 243
Engine oil
Engine oil
Loctite 5910
23 ± 3 N•m
(17 ± 2 lbf•ft)
Loctite 243
30 ± 3 N•m
(22 ± 2 lbf•ft)
Loctite 243
9 ± 1 N•m
(80 ± 9 lbf•in)
Loctite 243
NEW
See tightening sequence
See tightening procedure
30 ± 3 N•m
(22 ± 2 lbf•ft)
Loctite 243
NEW = Component must be replaced when removed.
RTX21_903PWC-002-200



NEW = Component must be replaced when removed.

RTX21_903PWC-002-002_a

GENERAL

When disassembling parts that are duplicated in the engine, (e.g.: pistons, connecting rods etc.), it is strongly recommended to note their position and to keep the parts of the same assembly as a "group". If you find a defective component, it would be much easier to find the cause of the failure. Since parts were broken-in during engine operation, they will maintain their matched fit when reassembled together within their "group".

TROUBLESHOOTING

Always check for fault codes. If a fault code is detected, service the fault code first. Refer to *DIAGNOSTIC SYSTEM AND FAULT CODES* subsection.

UNUSUAL ENGINE NOISE OR VIBRATIONS

1. Heavy wear on plain bearings.
   - *Check radial play of plain bearings. Replace if out of specification.*
2. Crankshaft axial play out of specification.
   - *Measure crankshaft axial play. If crankshaft axial play is out of specification, replace thrust washers.*
3. Connecting rod axial play out of specification.
   - *Measure connecting rod axial play on crankshaft. Replace connecting rod or crankshaft if out of specification.*
4. Connecting rod screws got loose.
   - *Replace damaged components and retighten screws with the recommended torque.*

BLUE SMOKE IN THE EXHAUST

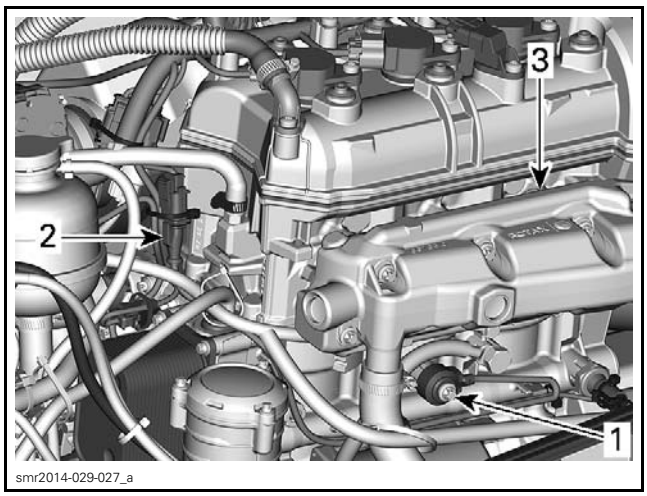
1. Oil scraper rings worn out.
   - *Replace piston rings.*

ENGINE SUDDENLY TURNS OFF (POOR IDLING)

1. Piston rings worn out.
   - *Replace piston rings.*
2. Piston/cylinder clearance out of specification.
   - *Check piston/cylinder clearance. Replace if out of specification.*
3. Melted or broken piston.
   - *Replace piston and cylinder block if necessary.*

PROCEDURES

KNOCK SENSOR (KS)



KNOCK SENSOR LOCATION - LH SIDE OF ENGINE
1. Knock sensor (KS)
2. Knock sensor connector
3. Exhaust manifold

Testing the KS (Dynamic)

1. Connect watercraft to BUDS2 software, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2, click the Faults tab and look for a Knock sensor fault.

NOTICE **The engine must not be run out of water without providing proper cooling to the exhaust system. Maximum engine run time out of water is 2 minutes. Failure to do so may result in damage to the exhaust system and engine. Refer to *EXHAUST SYSTEM* subsection.**

3. Start engine and throttle it to above 5000 RPM.
4. Using the BUDS2 software, monitor the knock sensor for a fault code.

If no fault occurs, knock sensor is good.

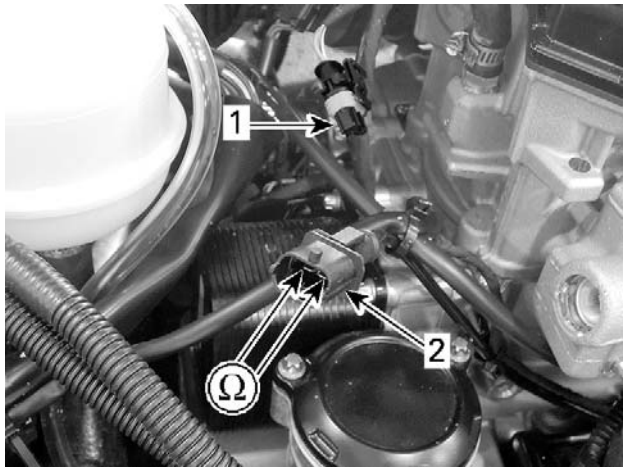
If a fault occurs, carry out following steps.

5. Ensure sensor and cylinder head contact surfaces are clean.
6. Ensure correct mounting bolt and washer are used and properly torqued.
7. Check knock sensor resistance, refer to *TESTING THE KS RESISTANCE*.

Testing the KS Resistance

1. Remove parts required to access knock sensor, refer to *REPLACING THE KS*.

2. Disconnect knock sensor connector.
3. Using a multimeter, measure the resistance between the knock sensor terminals.



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KNOCK SENSOR RESISTANCE @ 20°C (68°F)
Approximately 5 MΩ

If resistance is not as specified, replace knock sensor.

If resistance is as specified, carry on with the following steps.

4. Reconnect knock sensor connector.
5. Disconnect ECM-A connector.
6. Using a multimeter and ECM adapter tool, check circuit resistance through the knock sensor as per following table.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

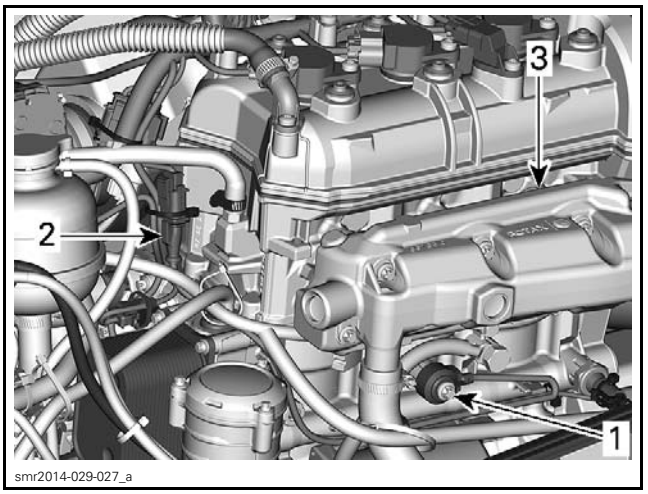
ECM ADAPTER		MEASUREMENT
PIN		RESISTANCE @ 20°C (68°F)
A-C3	A-G2	Approximately 5 MΩ

If wiring harness is good, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)* in this section.

If an open circuit is measured, repair or replace wiring and connectors between ECM and knock sensor.

Replacing the KS

1. Disconnect KS sensor connector.
2. Unscrew and remove knock sensor from engine.



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1. Knock sensor (KS)
2. Knock sensor connector
3. Exhaust manifold

3. Clean contact surfaces.
4. Apply LOCTITE 243 (BLUE) (P/N 293 800 060)in threaded hole then install the new knock sensor.
5. Tighten sensor retaining screw as specified.

TIGHTENING TORQUE	
KS mounting screw	23 N•m ± 3 N•m (17 lbf•ft ± 2 lbf•ft)

NOTICE **Improper torque may interfere with knock sensor operation and lead to severe internal engine damage.**

6. Reconnect knock sensor connector. Apply DIELECTRIC GREASE (P/N 293 550 004) on knock sensor connector before reinstall it. .
7. Reinstall remaining removed parts, refer to applicable subsections.

PTO COVER AND PTO OIL SEAL

PTO Cover Access

NOTE: To replace the PTO oil seal, it is not necessary to remove engine from the vehicle.

Remove central body. Refer to *BODY*.

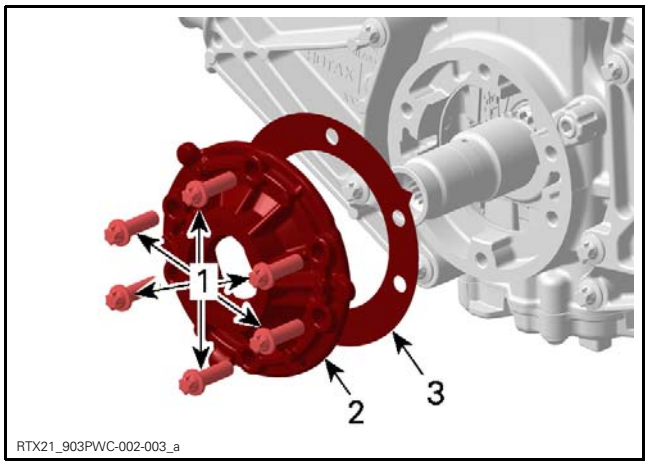
Remove drive shaft. Refer to *DRIVE SHAFT*.

Removing the PTO Cover

Place rags under PTO cover to catch up spilled engine oil.

Remove screws retaining the PTO cover.

Remove PTO cover and discard gasket.

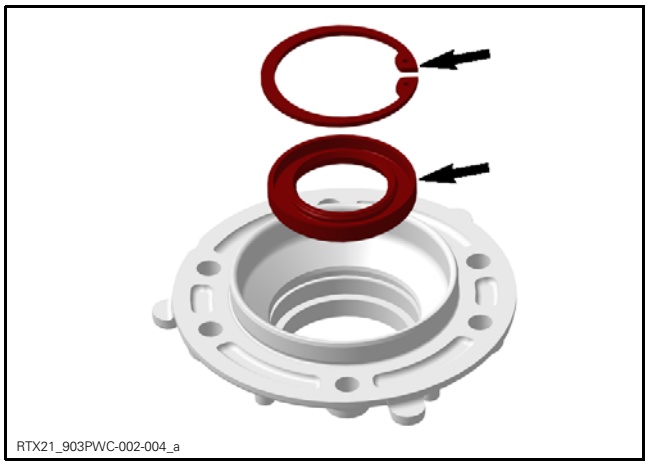


1. PTO cover screws
2. PTO cover
3. Gasket

PTO Oil Seal Replacement

PTO Oil Seal Removal

1. Use pliers to remove retaining ring.
2. Pry out oil seal and discard it.



Installing the PTO Oil Seal

NOTE: Check the oil seal running surface of crankshaft for grooves and deposits, before installation of NEW oil seal.

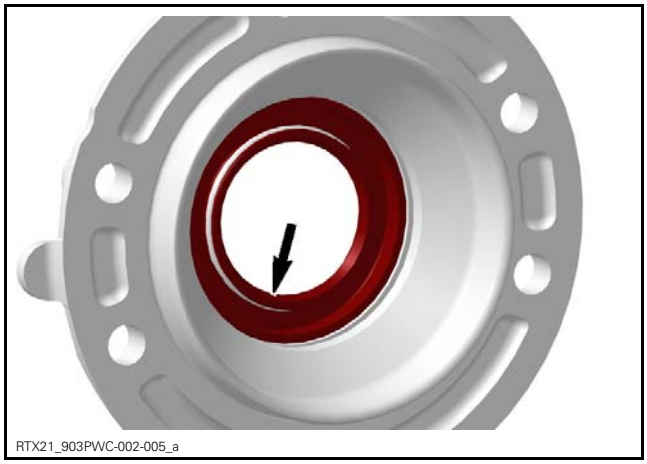
1. Clean crankshaft PTO side from deposits.
2. Clean oil seal area in PTO cover.
3. Apply engine oil on oil seal seat in PTO cover.
4. Press NEW oil seal in PTO cover.

REQUIRED TOOL	
OIL SEAL INSTALLER (P/N 529 036 277)	

NOTICE **Oil seal must be installed with sealing lip towards the engine.**

5. Lubricate sealing lip of oil seal.

SERVICE PRODUCT
TRIPLE-GUARD GREASE (P/N 508298)

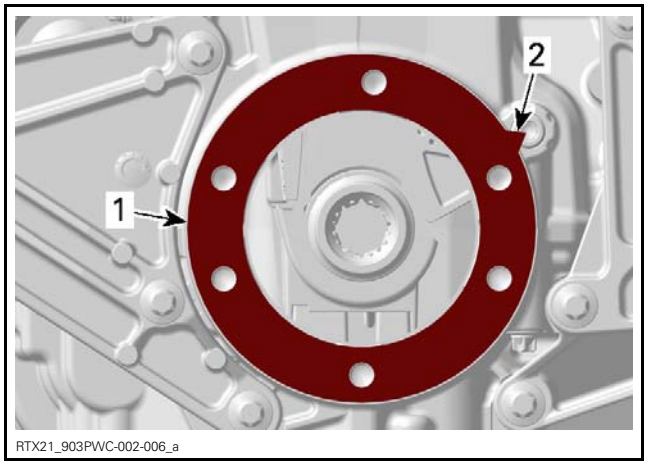


6. Install retaining ring.

Installing the PTO Cover

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

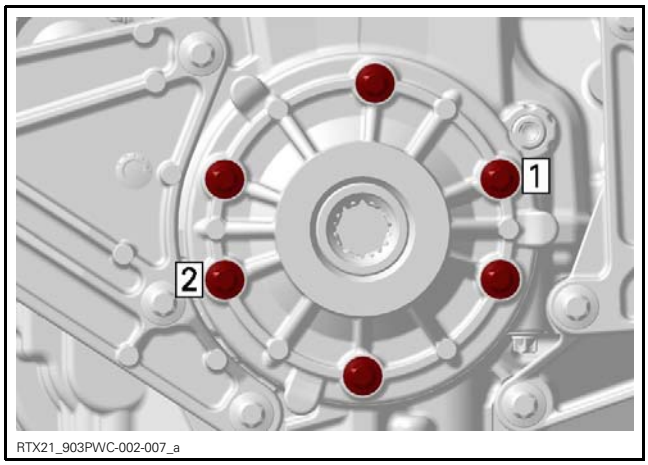
Install a NEW PTO cover gasket in proper position.



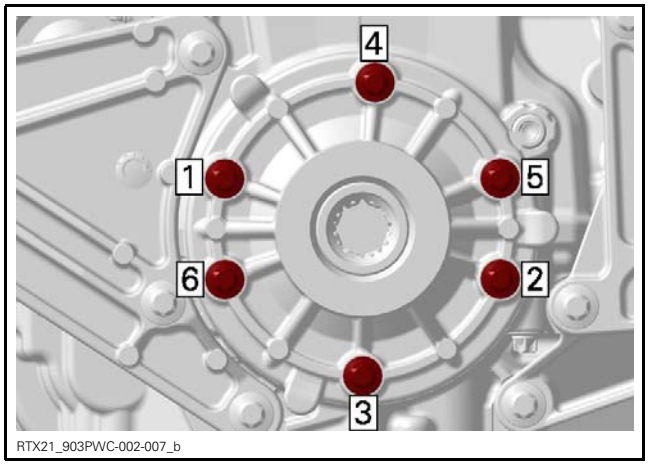
1. Gasket
2. Tab

Tighten PTO cover screws as per following sequence.

TIGHTENING TORQUE		
PTO cover screws	STEP A	5 N•m ± 0.6 N•m (44 lbf•**in** ± 5 lbf•**in**) + LOCTITE 243 (BLUE) (P/N 293 800 060)
	STEP B	23 N•m ± 3 N•m (17 lbf•ft ± 2 lbf•ft)



STEP A



STEP B

PTO SLEEVE

Replacing the PTO Sleeve

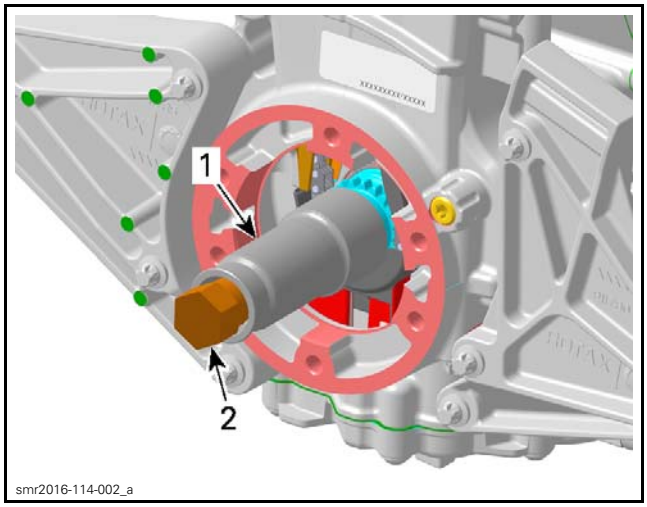
1. Remove:
   - Jet pump housing, refer to *JET PUMP* subsection
   - Drive shaft, refer to *DRIVE SHAFT* subsection
   - Muffler, refer to *EXHAUST SYSTEM* subsection.
2. Lock crankshaft, refer to *CRANKSHAFT* in this subsection.
3. Remove PTO cover, refer to *PTO COVER AND PTO OIL SEAL* in this subsection.
4. Unscrew PTO sleeve.

NOTE: If splines are damaged, strike the adapter to insert it in the PTO sleeve.

⚠ CAUTION PTO sleeve can loosen abruptly.

REQUIRED TOOL	
PTO SHAFT ADAPTER (P/N 529 036 401)	

NOTICE This service tool is specially designed for this application. Other tools can break during the removal or the installation of the PTO sleeve.



1. *PTO sleeve*
2. *PTO adapter*

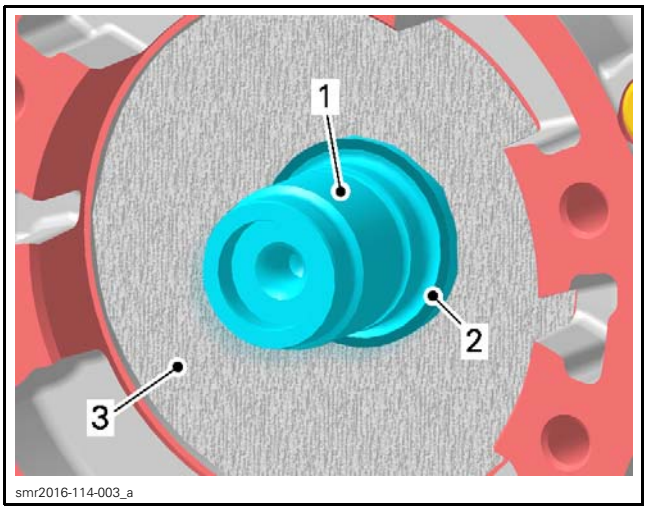
5. Clean crankshaft PTO thread and sleeve mating surface.

NOTE: Place clean rags inside crankcase to avoid debris in engine.

If necessary use a small screw driver or small brush to remove thread locker residues.

Clean crankshaft using a part cleaner and compressed air.

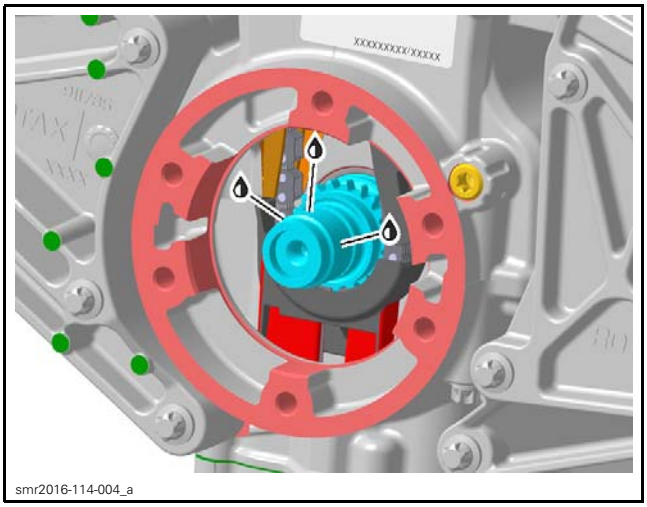
SERVICE PRODUCT
CLUTCH AND PULLEY FLANGE CLEANER PRO S1 (P/N 779244)



CLEAN
1. *Thread*
2. *Sleeve mating surface*
3. *Rags*

6. Remove rags.
7. Apply threadlocker on crankshaft PTO thread as specified.

CRANKSHAFT PTO THREAD	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Quantity	3 drops



APPLY 3 DROPS OF THREAD LOCKER

8. Tighten new PTO sleeve to specification.

TIGHTENING TORQUE	
PTO sleeve	250 N•m ± 10 N•m (184 lbf•ft ± 7 lbf•ft)

9. Remove crankshaft locking bolt.
10. Replace PTO oil seal, refer to *PTO COVER AND PTO OIL SEAL* in this subsection.
11. Install PTO cover, refer to *PTO COVER AND PTO OIL SEAL* in this subsection.
12. Check engine oil level.

CYLINDER BLOCK

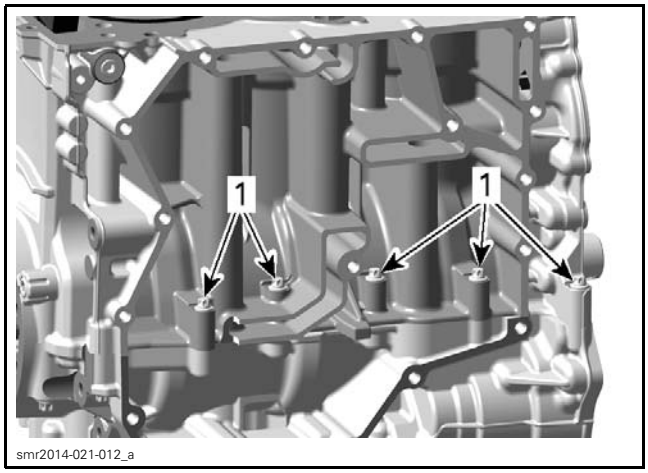
Disassembling the Cylinder Block

1. Remove engine from the vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
2. Drain engine oil.
3. Refer to *CYLINDER HEAD* subsection and remove:
   - Ignition coils
   - Valve cover
   - Spark plugs.
4. Lock crankshaft, refer to *CRANKSHAFT LOCKING PROCEDURE* in this subsection.
5. Remove air intake manifold. Refer to *AIR INTAKE SYSTEM* subsection.
6. Refer to *COOLING SYSTEM* subsection and remove:
   - Water pump housing
   - Thermostat
   - Water pump drive gear.
7. Refer to *LUBRICATION SYSTEM* subsection and remove:
   - Oil tank
   - Oil cooler
   - Oil pressure regulator
   - Oil pump drive gears and oil pumps
   - Oil sump cover
   - Oil strainers.
8. Refer to *MAGNETO AND STARTER* subsection and remove:
   - Magneto cover
   - Rotor
   - Starter drive gears
   - Electric starter.
9. Remove engine mount brackets.
10. Refer to *TIMING CHAIN* subsection and remove:
    - Timing chain tensioner
    - Timing chain guides.
11. Refer to *CYLINDER HEAD* subsection and remove:
    - Camshaft holders
    - Cylinder head.

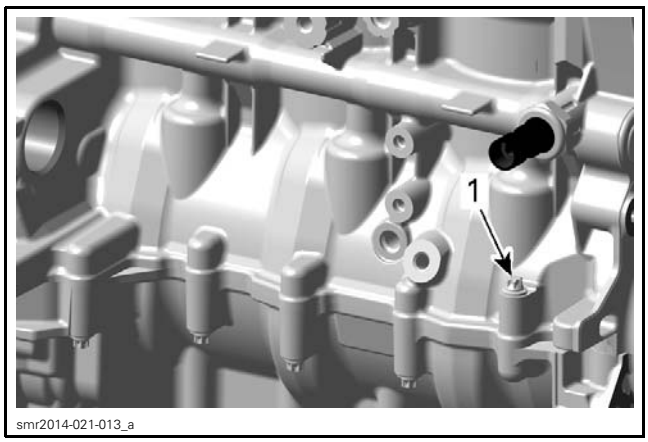
12. Remove PTO cover. Refer to *PTO COVER AND PTO OIL SEAL* in this subsection.

NOTE: Before splitting the cylinder block, measure crankshaft axial play. Refer to *CRANKSHAFT* in this subsection.

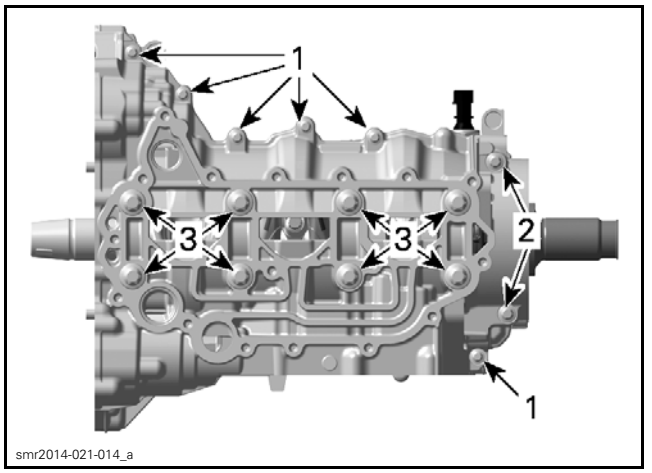
13. Remove crankshaft locking tool.
14. Remove cylinder block screws.
    14.1 Start removing the M6 screws.
    14.2 Then remove the M8 screws.
    14.3 Finally remove and discard the M9 screws.



INTAKE SIDE
1. Cylinder block screws (M6) screwed from top to bottom



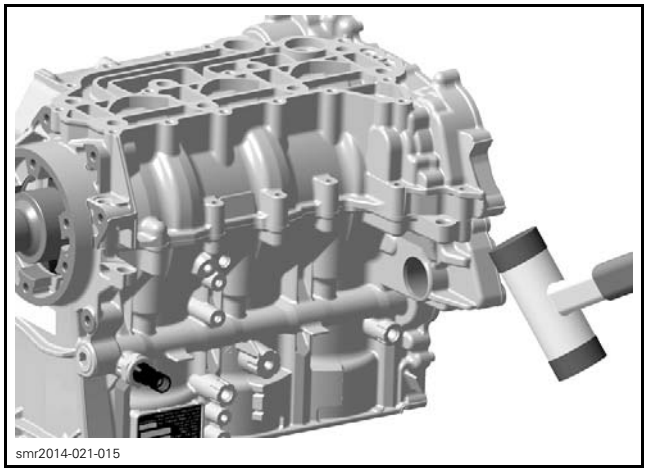
EXHAUST SIDE
1. Cylinder block screw (M6) screwed from top to bottom



BOTTOM SIDE
1. M6 screws
2. M8 screws
3. M9 screws (discard)

15. Carefully remove cylinder block lower half by using a soft hammer.

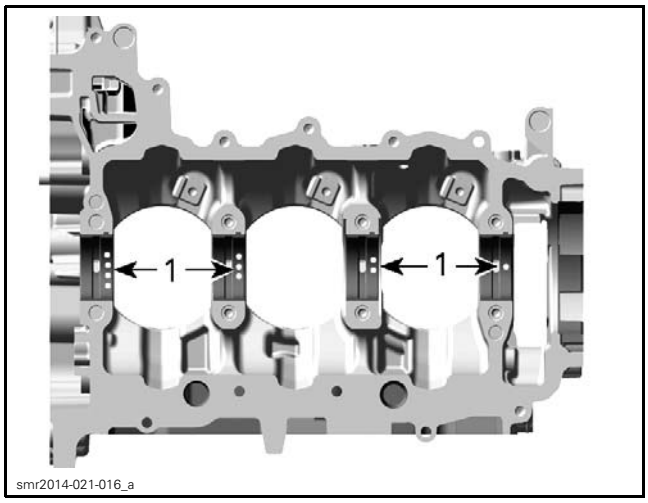
NOTE: Take care not to damage the sealing surfaces of the cylinder block halves.



16. Remove connecting rod caps. Refer to *PISTONS AND CONNECTING RODS* in this subsection.
17. Refer to *CRANKSHAFT* in this subsection and remove:
    – Crankshaft thrust washers
    – Crankshaft.
18. Remove pistons and connecting rods. See procedure in this subsection.

Removing the Plain Bearing

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

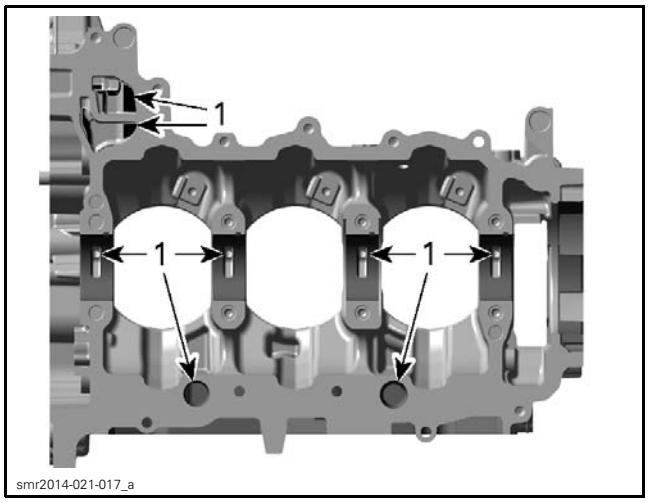


1. Mark on crankshaft plain bearings

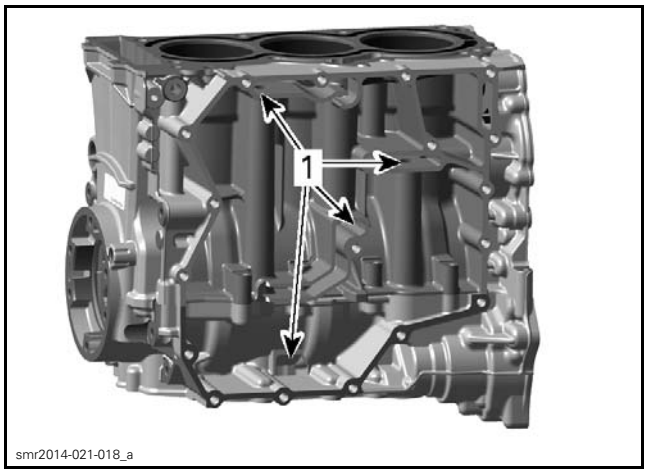
Cleaning the Cylinder Block

Clean cylinder block using a part cleaner, then use compressed air to dry it.

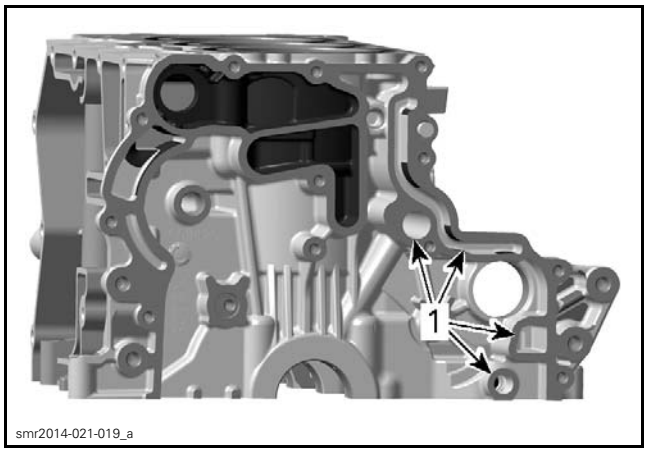
Blow out the oil orifices using compressed air and make sure they are not clogged.



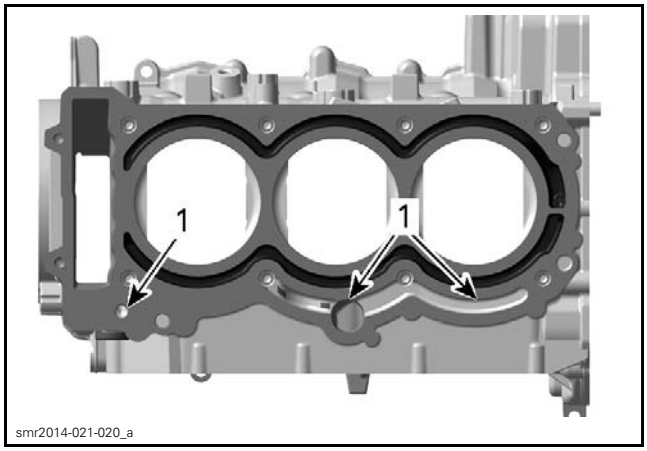
CYLINDER BLOCK UPPER HALF
1. Oil orifices



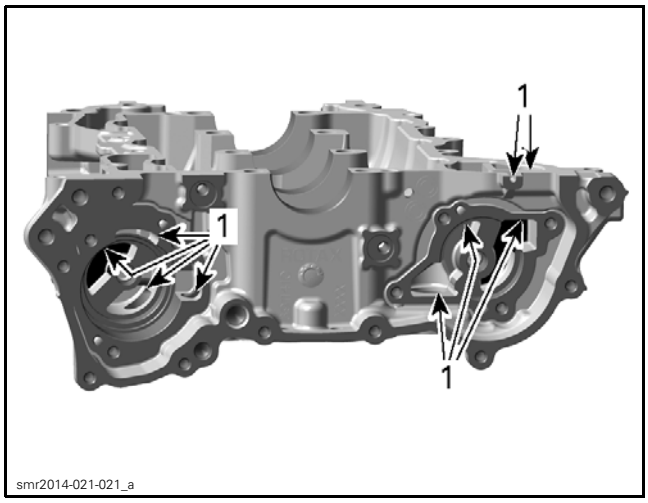
CYLINDER BLOCK - REAR
1. Oil orifices



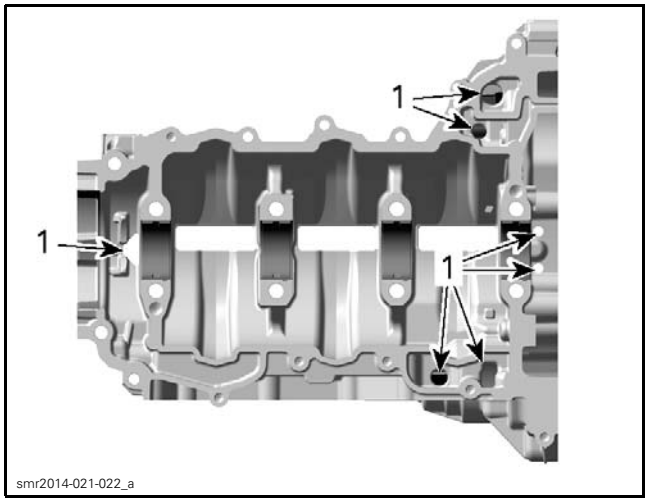
CYLINDER BLOCK - MAG SIDE
1. Oil orifices



CYLINDER BLOCK - TOP
1. Oil orifices



CYLINDER BLOCK LOWER HALF
1. Oil orifices



CYLINDER BLOCK LOWER HALF
1. Oil orifices

Clean all metal components in a solvent.

Clean cylinder block mating surfaces using gasket remover and a brass brush. Brush a first pass in one direction then make the final brushing perpendicularly (90°) to the first pass (cross hatch).

SERVICE PRODUCT
LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500)

NOTE: Do not wipe with rags. Use a new clean hand towel only.

Inspecting the Cylinder Block

Check cylinder block for cracks or other damage.

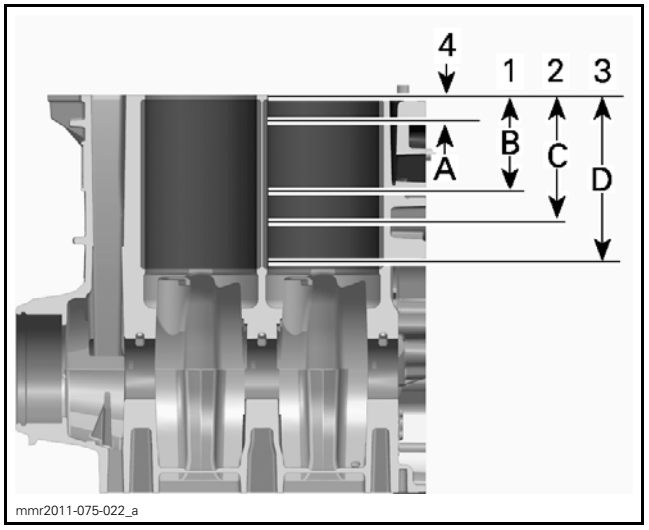
Check cylinder block mating surfaces for flatness using a straight edge.

Replace cylinder block if necessary.

Check cylinder bores for cracks, scoring and wear ridges on top and bottom of the cylinders.

Cylinder Taper

Measure cylinder bore diameter at 4 recommended positions. See illustration.



TYPICAL
1. First measure
2. Second measure
3. Third measure
4. Fourth measure

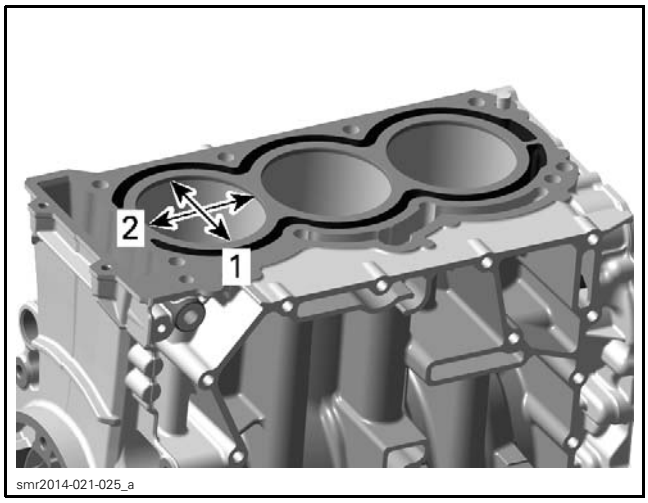
A. 5 mm to 10 mm (.197 in to .394 in)
B. 30 mm to 35 mm (1.181 in to 1.378 in)
C. 57 mm to 62 mm (2.244 in to 2.441 in)
D. 111 mm to 113 mm (4.37 in to 4.449 in)

The difference between measurements should not exceed the service limit mentioned in next table.

CYLINDER TAPER	
NEW MAXIMUM	0.030 mm (.0012 in)
SERVICE LIMIT	0.050 mm (.002 in)

Cylinder Out of Round

Measure cylinder bore diameter as shown and at the same measuring points as for *CYLINDER TAPER*.



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1. Perpendicular to piston pin axis
2. Parallel to piston pin axis

To obtain the cylinder out of round, calculate the difference between the perpendicular measures.

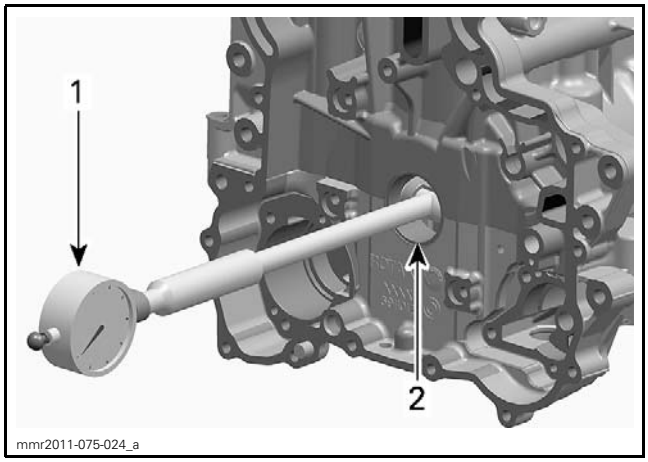
CYLINDER OUT OF ROUND	
NEW MAXIMUM	0.008 mm (.0003 in)
SERVICE LIMIT	0.030 mm (.0012 in)

Crankshaft Plain Bearings Inside Diameter

Check the plain bearings for scoring or other damages.

Measure plain bearing inside diameter and compare with crankshaft bearing journal diameter (refer to *CRANKSHAFT* in this subsection). Proceed as follows.

– Use the OLD plain bearings and put both cylinder block halves together.
– Tighten screws as described in *CYLINDER BLOCK ASSEMBLY*.
– Measure the inside diameter of the crankshaft plain bearings using a bore gauge.



mmr2011-075-024_a

1. Bore gauge
2. Crankshaft plain bearing

CRANKSHAFT PLAIN BEARING INSIDE DIAMETER	
SERVICE LIMIT	36.080 mm (1.4205 in)

Replace bearings if they are out of specifications.

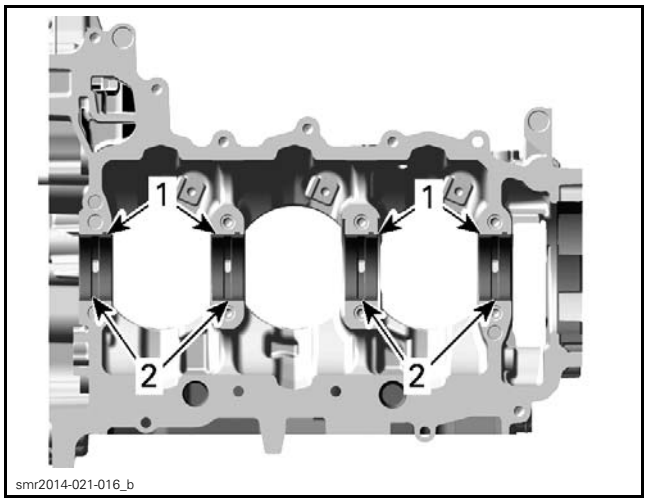
Assembling the Cylinder Block

For assembly, reverse the disassembly procedure. Pay attention to the following details.

1. Correctly reinstall plain bearings as follows.

1.1 Use NEW bearings if diameters are out of specification. Refer to *PLAIN BEARING INSPECTION* in this subsection.

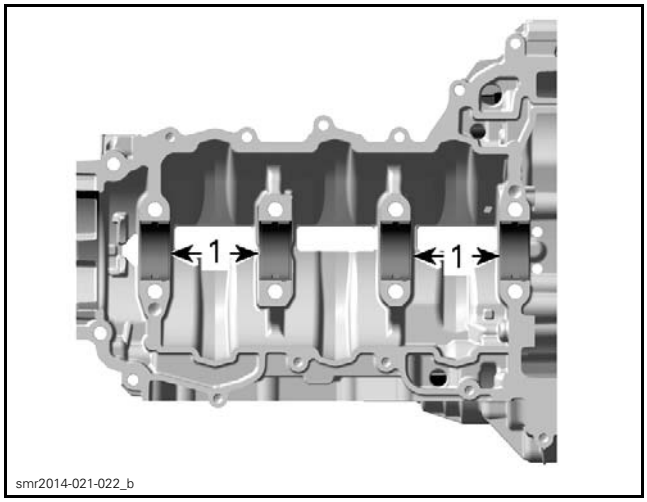
1.2 Install bearings with lubrication grooves in the cylinder block upper half.



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1. Plain bearings
2. Lubrication grooves

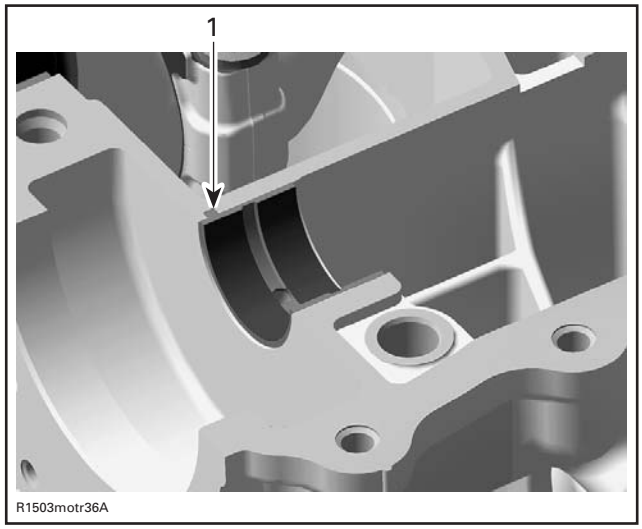
1.3 Install flat bearings in the cylinder block lower half.



smr2014-021-022_b

1. Flat bearings

1.4 Bearings must be flush with the cylinder block split surface and their protrusions have to fit in the notched areas in the cylinder block seat.

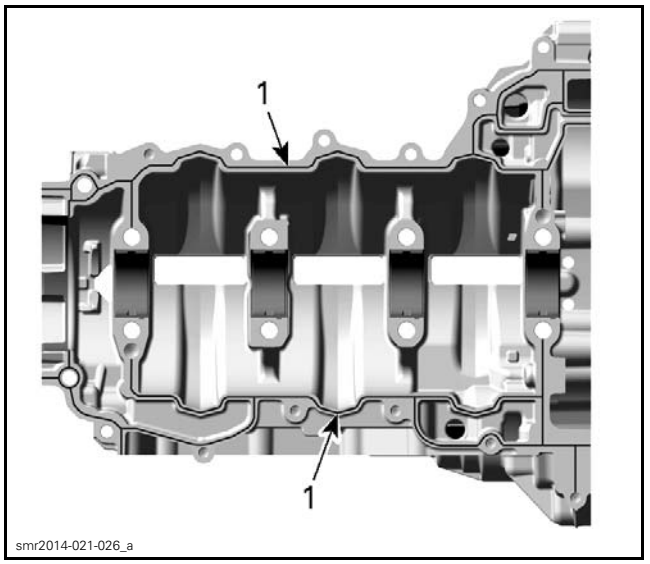


TYPICAL
1. Bearing protrusion in cylinder block notch

2. Install pistons, refer to *PISTONS AND CONNECTING RODS* in this subsection.
3. Apply engine oil on all plain bearings.
4. Install the following components:
   – Crankshaft and thrust washers (refer to *CRANKSHAFT*)
   – Connecting rod caps (refer to *PISTONS AND CONNECTING RODS*).
5. Apply sealant on mating surface of cylinder block lower half as shown on next illustration.

SERVICE PRODUCT
LOCTITE 5910 (P/N 293 800 081)

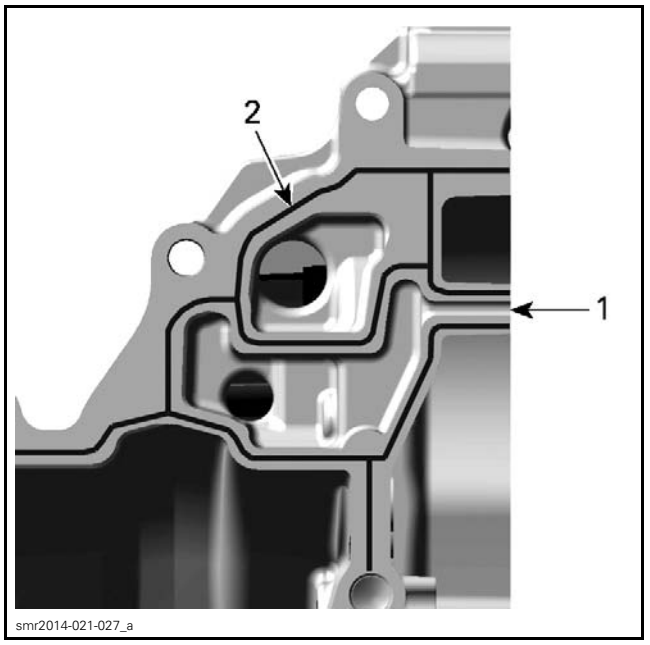
IMPORTANT: When beginning the application of the cylinder block sealant, the assembly and first tightening have to be done within 12 minutes. It is suggested to have all you need on hand to save time.



1. Apply Loctite 5910 following this pattern

NOTICE Ensure not to apply too much sealant, as it will spread out inside the cylinder block.

NOTICE Take care that the bypass passage of the engine oil pressure regulator is not clogged with sealant.



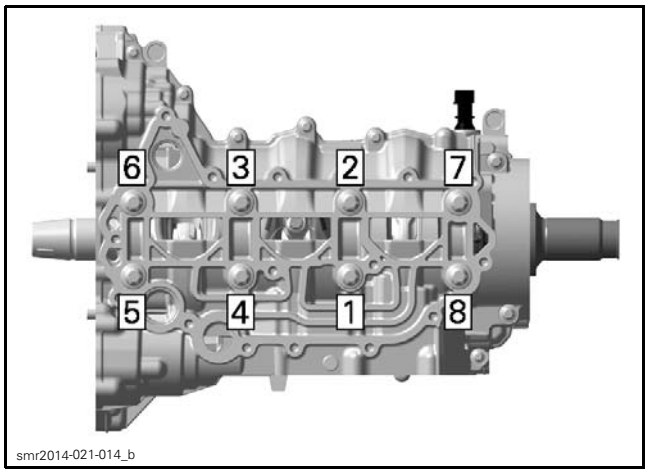
1. Bypass passage of engine oil pressure regulator
2. Loctite 5910 applied

6. Install NEW M9 cylinder block screws and tighten as follows.

NOTICE This assembly uses stretch screws. Always use NEW screws and strictly adhere to the tightening procedure.

6.1 Torque the M9 screws according the sequence.

6.2 Use a torque angle gauge to carry out the second step, following the same sequence.

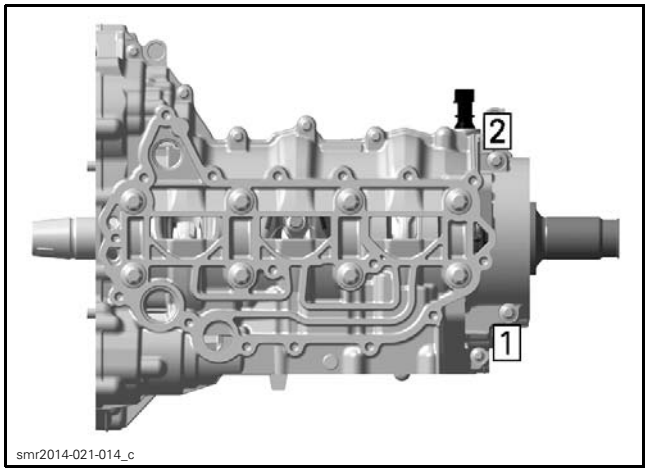


M9 SCREWS TIGHTENING SEQUENCE - FIRST AND SECOND STEPS

TIGHTENING TORQUE		
M9 cylinder block screws	STEP A	20 N•m ± 2 N•m (15 lbf•ft ± 1 lbf•ft)
	STEP B	Additional 150° ± 5°

7. Install the M8 screws and tighten as follows.

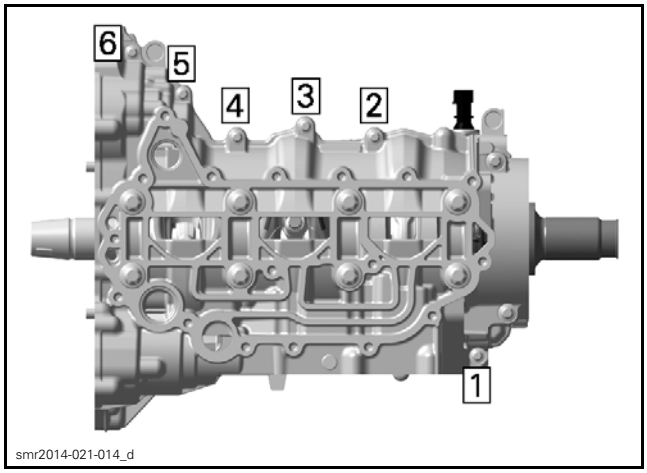
TIGHTENING TORQUE	
M8 Cylinder block screws	23 N•m ± 2 N•m (17 lbf•ft ± 1 lbf•ft)



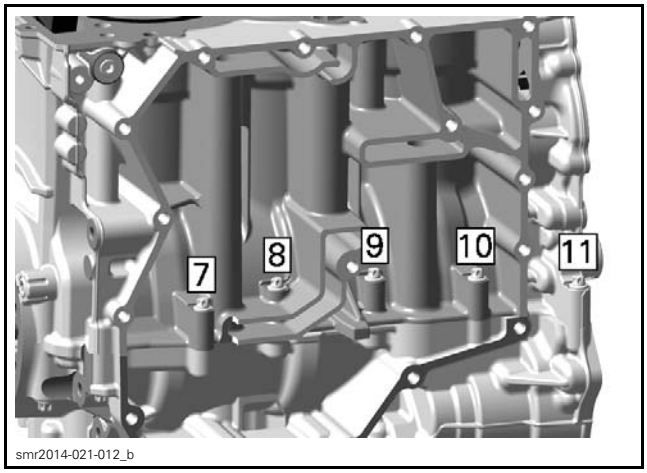
M8 SCREWS TIGHTENING SEQUENCE

8. Install the M6 screws and tighten as follows.

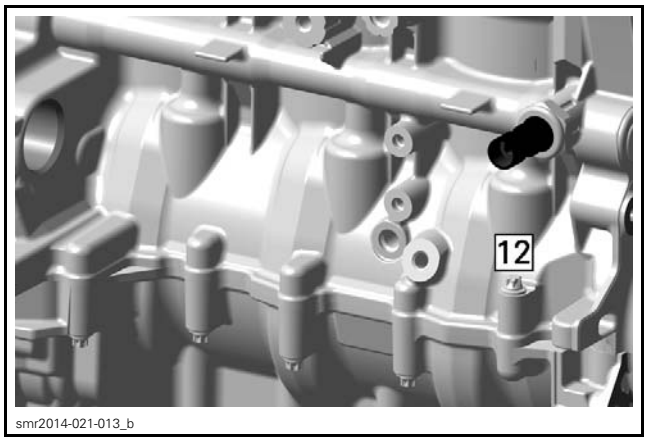
TIGHTENING TORQUE	
M6 cylinder block screws	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)



M6 SCREWS TIGHTENING SEQUENCE (BOTTOM OF CRANKCASE)



M6 SCREWS TIGHTENING SEQUENCE (INTAKE SIDE OF CRANKCASE)



M6 SCREW TIGHTENING SEQUENCE (EXHAUST SIDE OF CRANKCASE)

NOTE: Check the crankshaft axial play before continuing the assembly. Refer to *CRANKSHAFT* in this subsection for the procedure.

9. Lubricate PTO oil seal properly before reinstalling the PTO cover. Refer to *PTO COVER AND PTO OIL SEAL* in this subsection.
10. Reassemble engine in accordance with the proper assembly procedures.

CRANKSHAFT

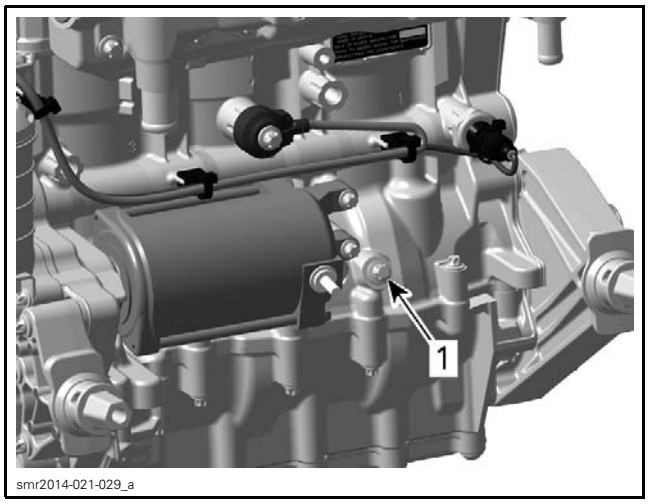
Crankshaft Locking Procedure

NOTICE When crankshaft is locked, the second cylinder is set to TDC.

Crankshaft must be locked whenever the magneto rotor retaining screw has to be removed or whenever working on the valve train.

NOTICE When working on the valve train or timing chain, crankshaft must be locked with the marks "IN" and "EX" on the camshaft timing gears facing each other.

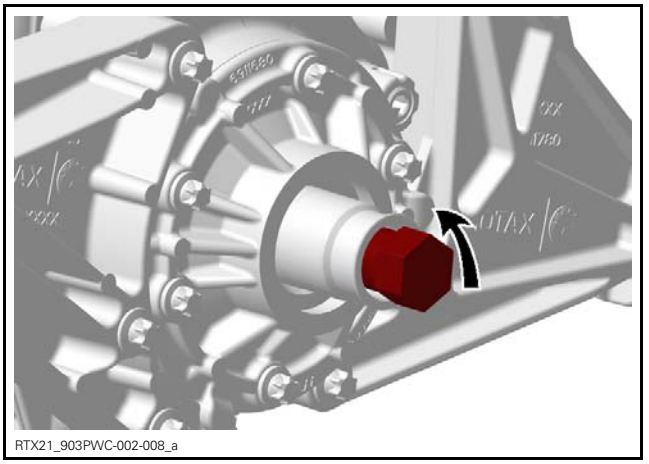
1. If working on the valve train or timing chain, remove the valve cover. Refer to *CYLINDER HEAD* subsection.
2. Remove spark plugs.
3. Remove crankshaft access plug and discard gasket ring.



1. Crankshaft access plug

4. Turn engine on PTO side counterclockwise to bring crankshaft to locking position.

REQUIRED TOOL	
PTO SHAFT ADAPTER (P/N 529 036 401)	



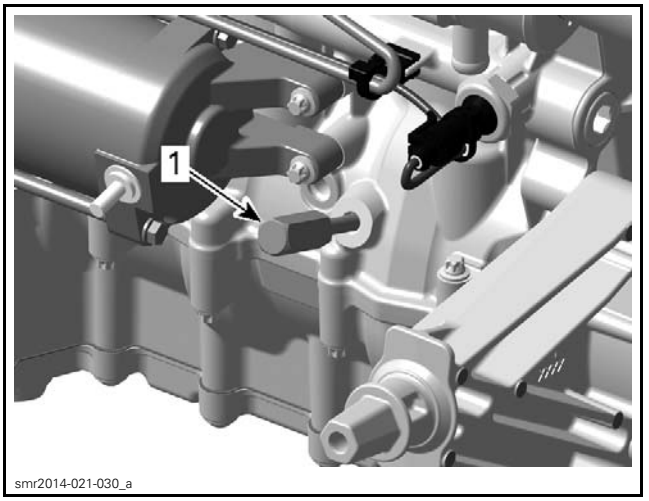
NOTICE Crankshaft locking position is reached when marks "IN" and "EX" on the camshaft timing gears face each other.

5. Use a flashlight to check if the groove in the crankshaft is aligned with the hole.
6. Lock crankshaft.

REQUIRED TOOL	
CRANKSHAFT LOCKING TOOL (P/N 529 036 407)	

Tighten service tool to specification.

TIGHTENING TORQUE	
Crankshaft locking bolt	23 N•m ± 2 N•m (17 lbf•ft ± 1 lbf•ft)

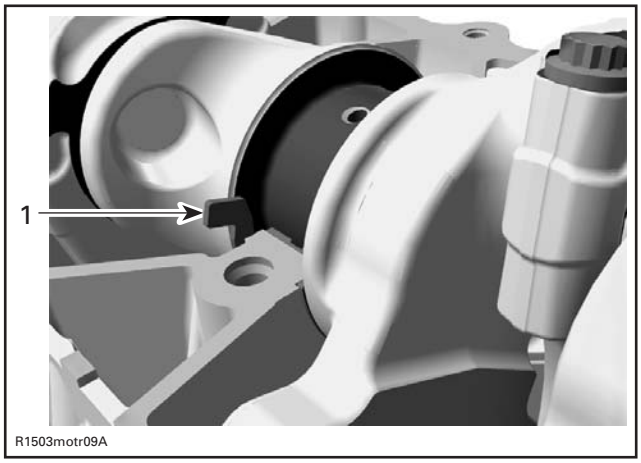


1. Crankshaft locking tool

Removing the Crankshaft

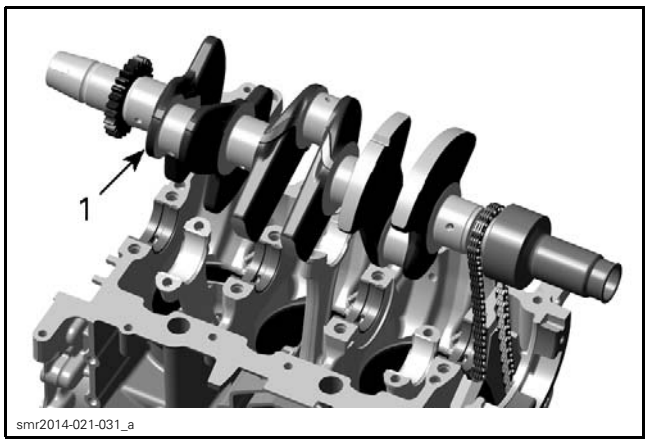
1. Disassemble *CYLINDER BLOCK*, see procedure in this subsection.
2. Remove connecting rod caps. Refer to *PISTONS AND CONNECTING RODS* in this subsection.

3. Remove crankshaft thrust washers.



TYPICAL
1. Thrust washer

4. Remove crankshaft from cylinder block.

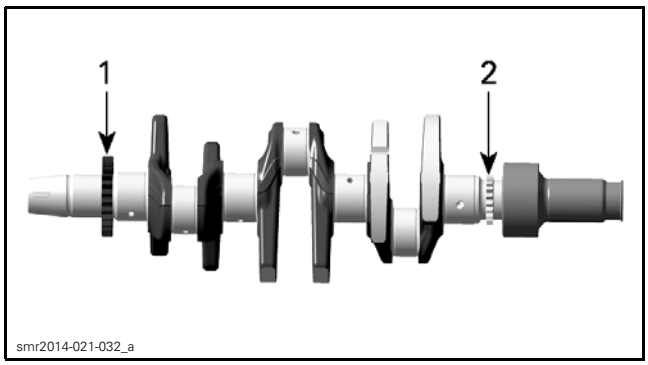


1. Crankshaft

Inspecting the Crankshaft

Check each bearing journal of crankshaft for scoring, scuffing, cracks or other signs of wear.

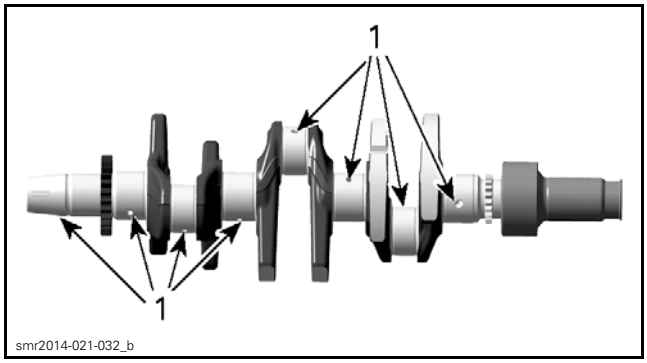
Check if crankshaft gears are worn or otherwise damaged.



1. Oil pump drive gear
2. Crankshaft timing gear

Replace crankshaft if damaged.

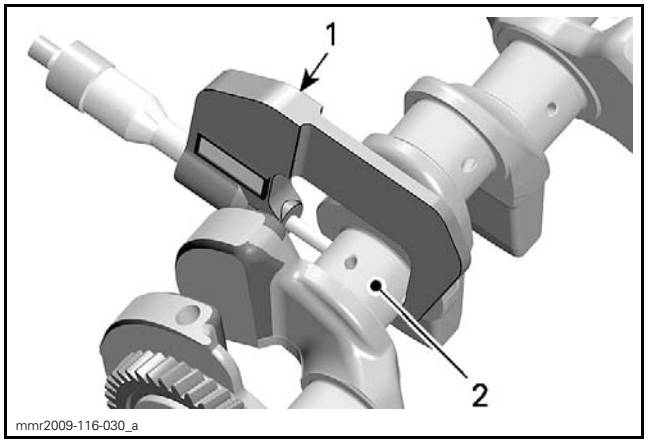
Blow the oil orifices using compressed air and make sure they are not clogged.



1. Check oil orifices

Crankshaft Radial Play

Measure crankshaft bearing journal diameter, using a micrometer.



TYPICAL
1. Micrometer
2. Crankshaft area for plain bearing

To obtain the radial play, calculate the difference between the bearing journal diameter and the crankshaft plain bearings inner diameter (see *CYLINDER BLOCK*).

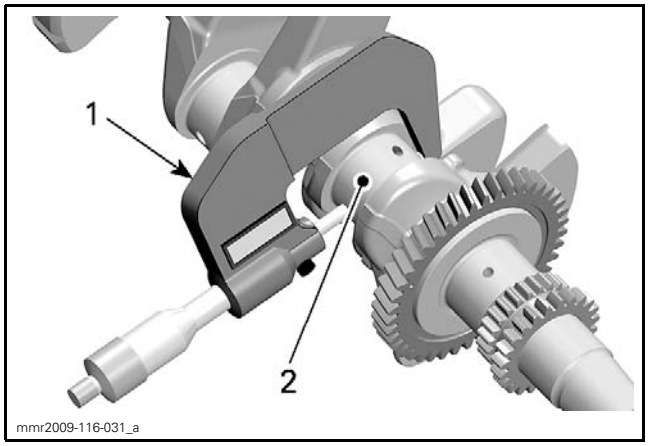
CRANKSHAFT BEARING JOURNAL DIAMETER	
NEW	35.990 mm to 36.006 mm (1.4169 in to 1.4176 in)
SERVICE LIMIT	35.960 mm (1.4157 in)

CRANKSHAFT RADIAL PLAY	
SERVICE LIMIT	0.08 mm (.0031 in)

Crankshaft Pin Diameter

Measure crankshaft pin diameter, using a micrometer.

To obtain the radial play, calculate the difference between the crankshaft pin diameter and the connecting rod plain bearings inner diameter (see *CONNECTING ROD INSPECTION*).



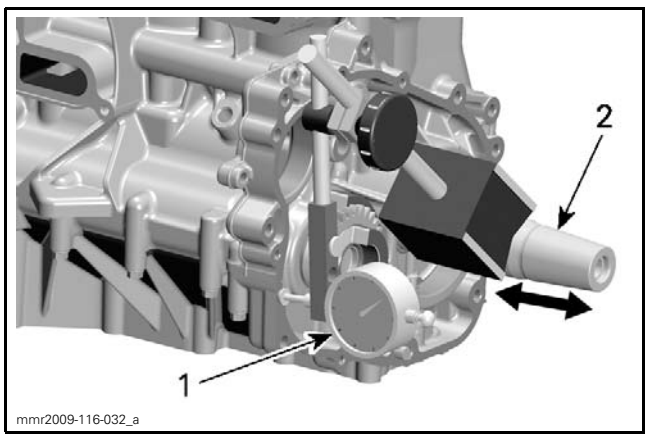
TYPICAL
1. *Micrometer*
2. *Crankshaft pin area for plain bearing*

CRANKSHAFT PIN DIAMETER	
NEW	35.979 mm to 35.995 mm (1.416 in to 1.417 in)
SERVICE LIMIT	35.969 mm (1.416 in)

CONNECTING ROD BIG END RADIAL PLAY	
SERVICE LIMIT	0.08 mm (.0031 in)

Crankshaft Axial Play

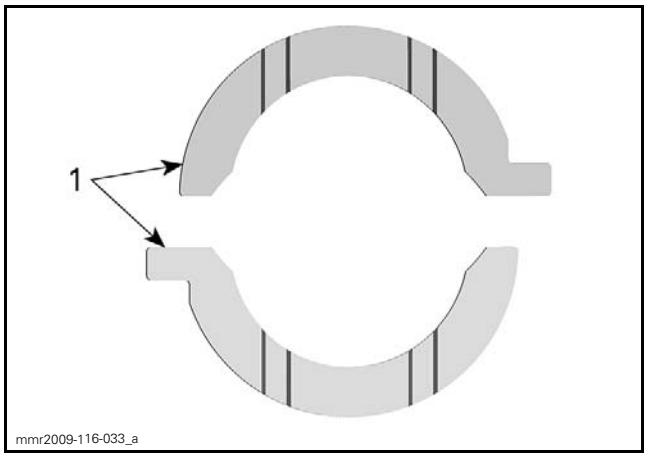
With the crankshaft in the cylinder block, measure the crankshaft axial play, using a dial indicator.



TYPICAL
1. *Dial indicator*
2. *Crankshaft*

CRANKSHAFT AXIAL PLAY	
NEW	0.120 mm to 0.352 mm (.005 in to .014 in)
SERVICE LIMIT	0.450 mm (.018 in)

If play is out of specification, replace the crankshaft thrust washers and repeat measurement.



TYPICAL
1. *Crankshaft thrust washers*

Installing the Crankshaft

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

Turn cylinder block upside down.

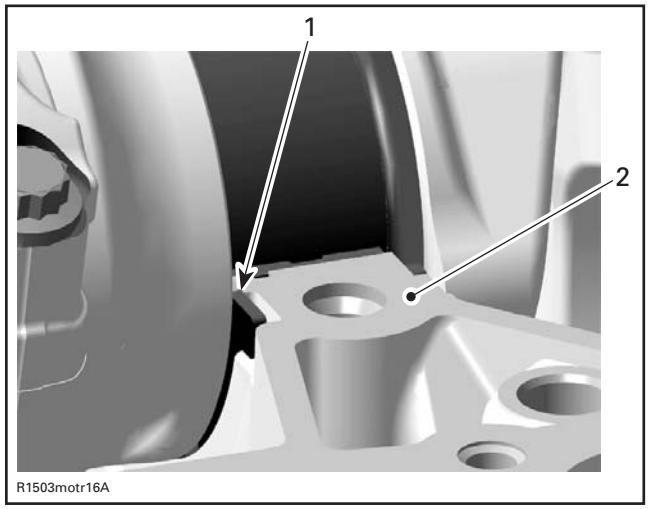
NOTICE **Be careful that connecting rods do not hit the cylinder block.**

Apply engine oil on all plain bearings before installing them.

Install crankshaft along with the timing chain.

Lubricate (both sides) and reinstall crankshaft thrust washers with the slots facing against crankshaft counterweights.

NOTE: Thrust washers have to be flush with the cylinder block sealing surface.



TYPICAL
1. *Thrust washer*
2. *Sealing surface*

Install connecting rod caps. Refer to *PISTONS AND CONNECTING RODS* in this subsection.

NOTICE It is absolutely necessary to follow this procedure. Otherwise severe engine damage can occur.

Install cylinder block lower half. Refer to *CYLINDER BLOCK* in this subsection.

Lock crankshaft before further assembly of the engine. See *CRANKSHAFT LOCKING PROCEDURE* in this subsection.

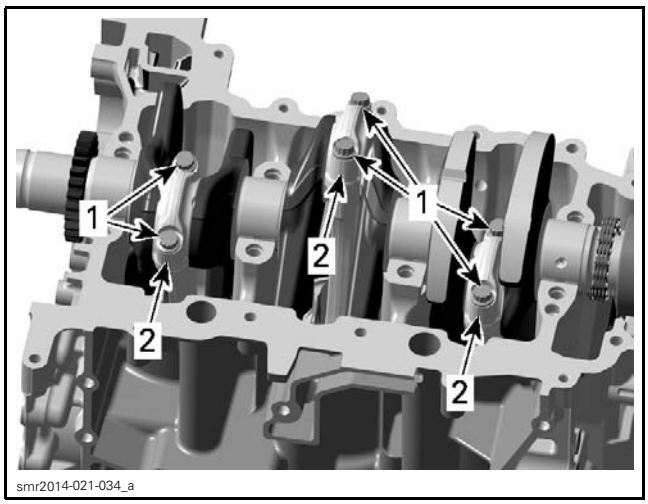
PISTONS AND CONNECTING RODS

Removing the Piston and Connecting Rod

NOTE: It is recommended to measure connecting rod big end axial play prior to remove connecting rod. Refer to *INSPECTING THE CONNECTING ROD*.

1. Disassemble *CYLINDER BLOCK* as per procedure in this subsection.
2. Remove connecting rod cap.

NOTICE Mark cylinder position of connecting rod before disassembly.

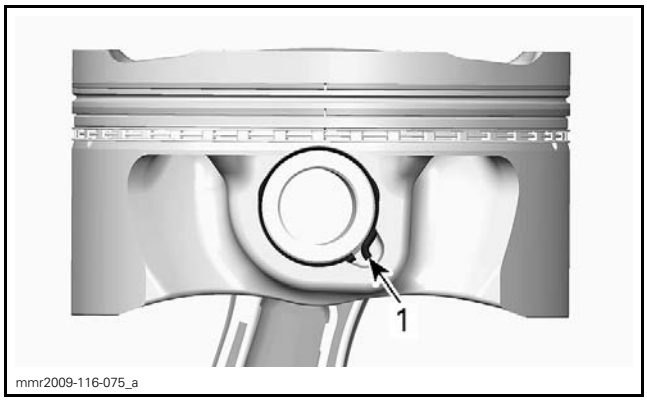


1. Connecting rod screws
2. Connecting rod cap

3. Remove *CRANKSHAFT* as per procedure in this subsection.
4. Turn cylinder block and push piston with connecting rod out of the cylinder.

Disassembling the Piston and Connecting Rod

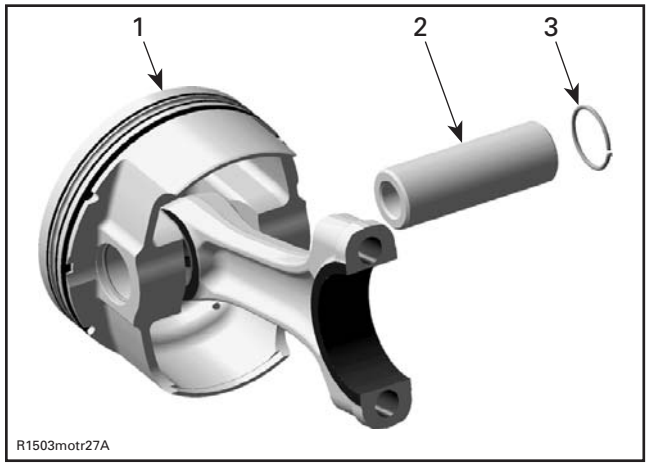
1. Remove one piston pin circlip and discard it.



TYPICAL
1. Piston pin circlip

NOTE: The removal of both piston pin circlips is not necessary to remove the piston pin.

2. Push piston pin out of the piston.



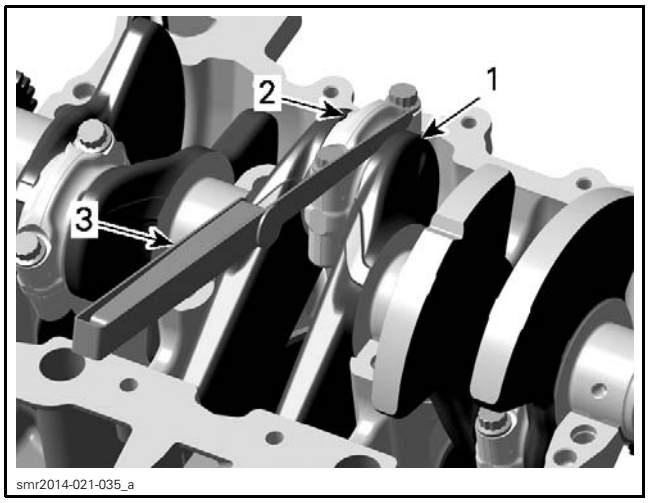
TYPICAL
1. Piston
2. Piston pin
3. Circlip

3. Detach piston from connecting rod.

Inspecting the Connecting Rod

Connecting Rod Big End Axial Play

Using a feeler gauge, measure distance between butting face of connecting rod and crankshaft counterweight. If the distance exceeds specified tolerance, replace the worn part.

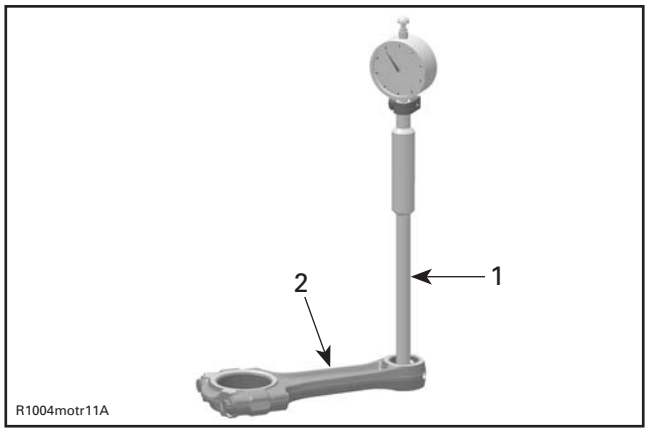


1. Crankshaft
2. Connecting rod
3. Feeler gauge

CONNECTING ROD BIG END AXIAL PLAY	
NEW	0.100 mm to 0.352 mm (.004 in to .014 in)
SERVICE LIMIT	0.450 mm (.018 in)

Connecting Rod Small End Radial Play

Measure connecting rod small end, using a bore gauge.



TYPICAL
1. Bore gauge
2. Connecting rod

CONNECTING ROD SMALL END DIAMETER	
NEW	17.010 mm to 17.020 mm (.6697 in to .6701 in)
SERVICE LIMIT	17.060 mm (.6717 in)

If the connecting rod small end diameter is out of specification, replace the connecting rod.

To obtain the radial play, calculate the difference between the piston pin diameter (*INSPECTING THE PISTON PIN*) and the connecting rod small end inner diameter.

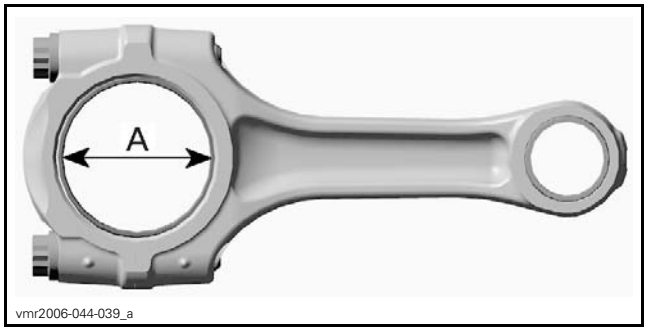
CONNECTING ROD SMALL END RADIAL PLAY	
SERVICE LIMIT	0.040 mm (.0016 in)

Connecting Rod Big End Radial Play

1. Measure inside diameter of connecting rod big end.
   1.1 Install the OLD plain bearings as they were mounted initially.
   1.2 Perform the tightening procedure as described in *INSTALLING THE PISTON AND CONNECTING ROD* in this subsection.

   NOTE: To measure the connecting rod big end diameter, ALWAYS use the OLD connecting rod screws.

   1.3 Measure inside diameter in longitudinal direction of the connecting rod.



TYPICAL
A. Connecting rod big end bearing

CONNECTING ROD BIG END DIAMETER	
SERVICE LIMIT	36.06 mm (1.4197 in)

To obtain the connecting rod big end radial play, calculate the difference between the big end diameter and the crankshaft pin diameter (see *INSPECTING THE CRANKSHAFT*).

CONNECTING ROD BIG END RADIAL PLAY	
SERVICE LIMIT	0.080 mm (.0031 in)

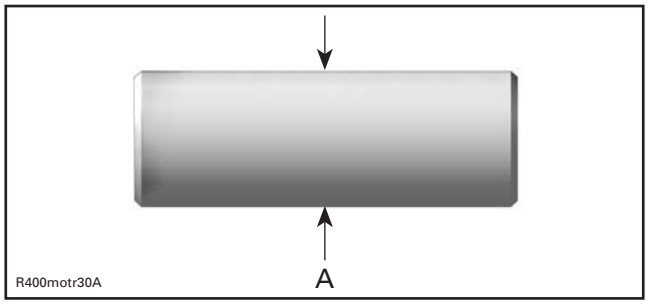
If connecting rod big end diameter is out of specification, install NEW plain bearings.

Inspecting the Piston Pin

Using synthetic abrasive woven, clean piston pin from deposits.

Inspect piston pin for scoring, cracks or other damage.

Measure piston pin diameter, using a micrometer. See the following illustration for the proper measurement position.



TYPICAL
A. Measure piston pin diameter here

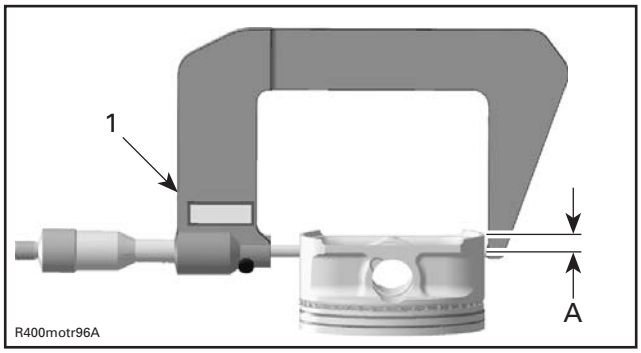
PISTON PIN DIAMETER	
NEW	16.996 mm to 17.00 mm (.6691 in to .6693 in)
SERVICE LIMIT	16.986 mm (.6687 in)

Replace the piston pin if it is out of specification.

Inspecting the Piston

Inspect piston for scoring, scuffing, cracks or other damage. Replace piston and piston rings if necessary.

Using a micrometer, measure piston perpendicularly (90°) to piston pin axis at 8.5 mm (11/32 in) from the skirt edge.



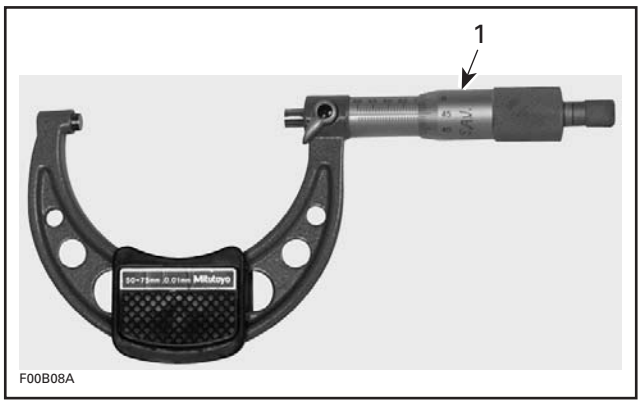
TYPICAL
1. Measuring perpendicularly (90°) to piston pin axis
A. 8.5 mm (11/32 in)

PISTON MEASUREMENT	
NEW	73.950 mm to 73.966 mm (2.911 in to 2.912 in)
SERVICE LIMIT	73.92 mm (2.9102 in)

Replace piston if it is out of specification.

Piston/Cylinder Clearance

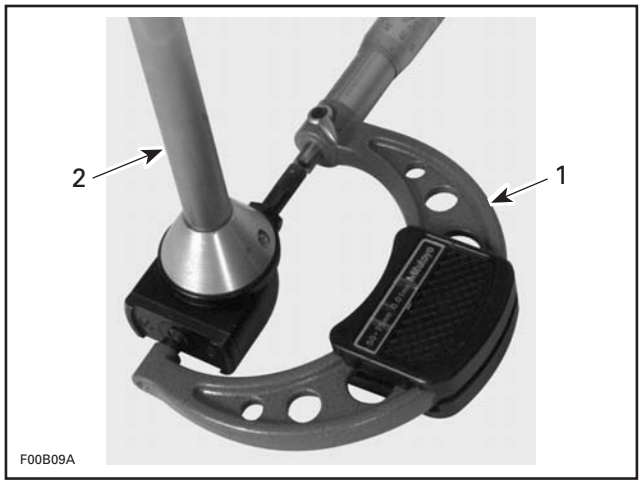
1. Adjust and lock a micrometer to the piston dimension.



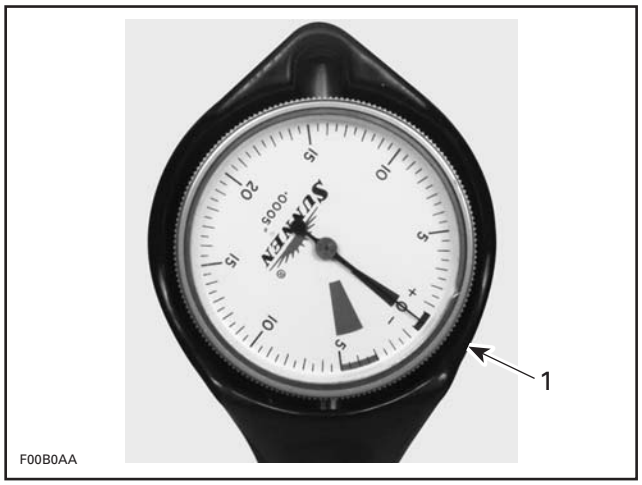
TYPICAL
1. Micrometer set to the piston dimension

NOTE: Make sure used piston is not worn.

2. With the micrometer locked at step 1, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0 (zero).



TYPICAL
1. Use the micrometer to set the cylinder bore gauge
2. Cylinder 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.

3. Position the cylinder bore gauge 35 mm (1-3/8 in) below the cylinder head mating surface, measuring perpendicularly (90°) to piston pin axis.
4. Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder clearance.

PISTON/CYLINDER CLEARANCE	
NEW	0.037 mm to 0.067 mm (.0015 in to .0026 in)
SERVICE LIMIT	0.080 mm (.0031 in)

If clearance exceeds the specified tolerance, replace the piston and repeat the measurement procedure.

Assembling the Piston and Connecting Rod

For assembly, reverse the disassembly procedure. Pay attention to the following details.

1. Apply engine oil on the piston pin.
2. Insert piston pin into piston and connecting rod.

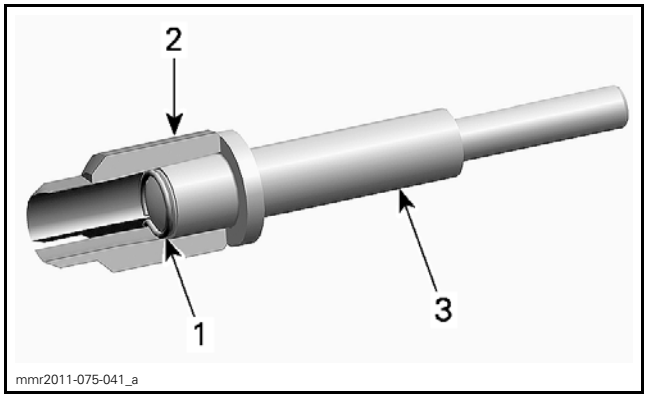
NOTE: Ensure to reinstall all parts in their original position as marked during removal.

3. Install NEW piston pin circlip(s).

REQUIRED TOOL	
PISTON CIRCLP INSTALLER (P/N 529 036 207)	

NOTICE Always replace removed piston pin circlips by NEW ones.

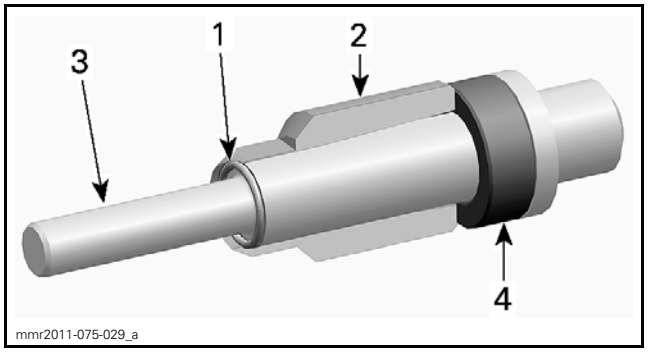
3.1 Place the circlip in the sleeve and push piston circlip installer handle until circlip reaches the mid position in the sleeve.



TYPICAL
1. Circlip
2. Sleeve
3. Installer handle

3.2 Put the distance sleeve on the installer handle.

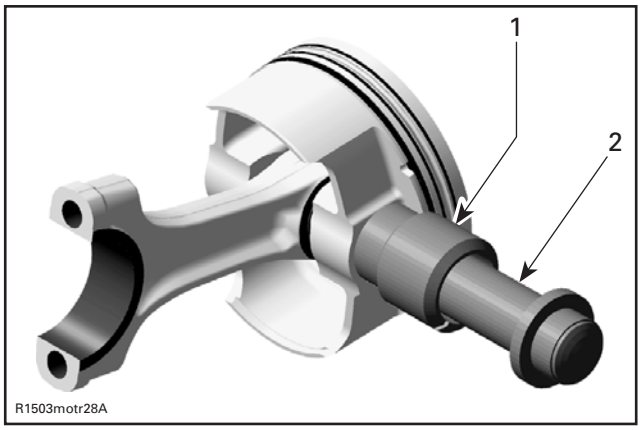
3.3 Push piston circlip installer handle until distance sleeve makes contact with the sleeve.



1. Circlip
2. Sleeve
3. Installer handle
4. Distance sleeve

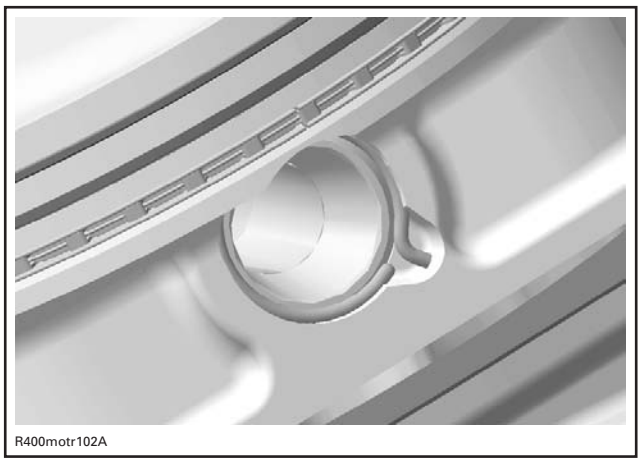
3.4 Remove distance sleeve and insert installer handle into the sleeve.

3.5 Insert the end of the handle into the piston pin, then push to engage the circlip into the piston groove.



TYPICAL
1. Sleeve with piston circlip inside
2. Piston clip installer handle

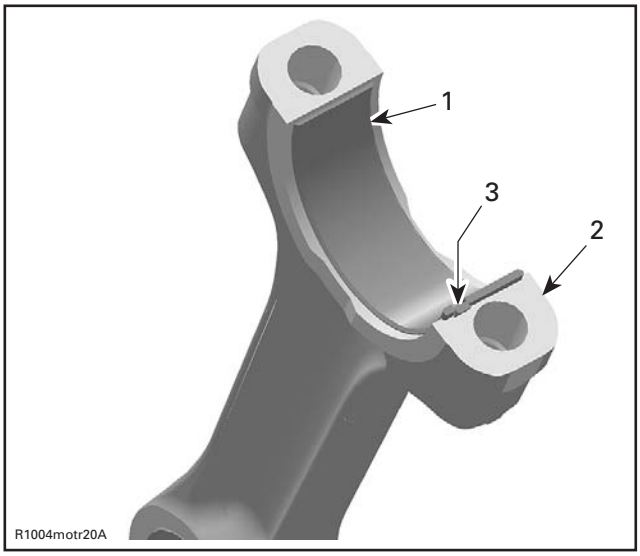
NOTE: Take care that the hook of the piston pin circlip is positioned properly.



CORRECT POSITION OF THE PISTON PIN CIRCLIP

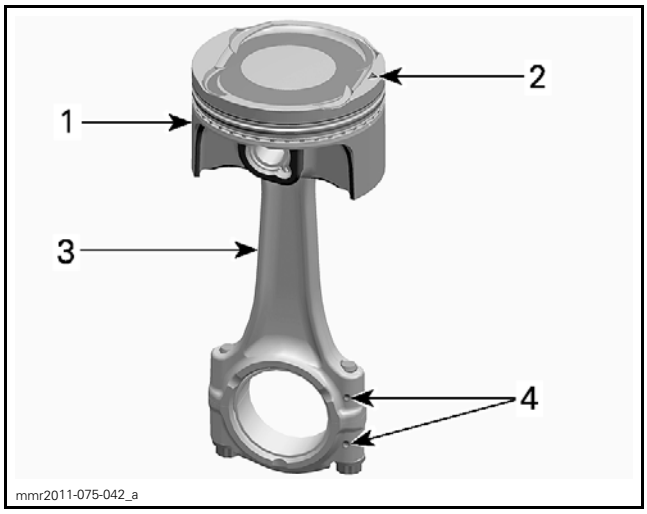
NOTICE If piston pin circlip installation fails, repeat step 3 by using a NEW circlip.

4. Correctly install plain bearings and carefully clean split surface on both sides (cracked area) with compressed air.



TYPICAL
1. Half bearing of connecting rod big end
2. Split surface of the connecting rod
3. Protrusion of bearing in line with connecting rod groove

NOTICE The arrow on top of the piston and the punched marks on the connecting rods must always point towards exhaust.

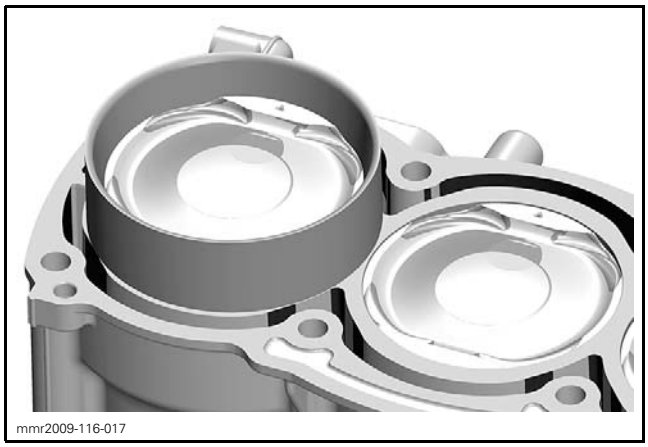


1. Piston
2. Arrow on top
3. Connecting rod
4. Punched marks

Installing the Piston and Connecting Rod

1. Use engine oil and lubricate:
   – Piston
   – Piston rings
   – Cylinder bore
   – Connecting rod bearings.
2. Slide piston into cylinder bore. Pay attention to the following.

REQUIRED TOOL	
PISTON RING COMPRESSOR (P/N 529 036 208)	

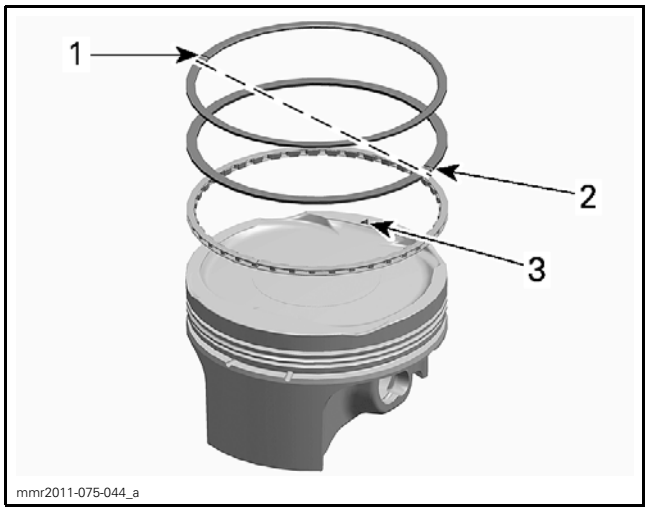


TYPICAL

2.1 If reused, install piston in its original bore.

2.2 Make sure piston rings are properly spaced.

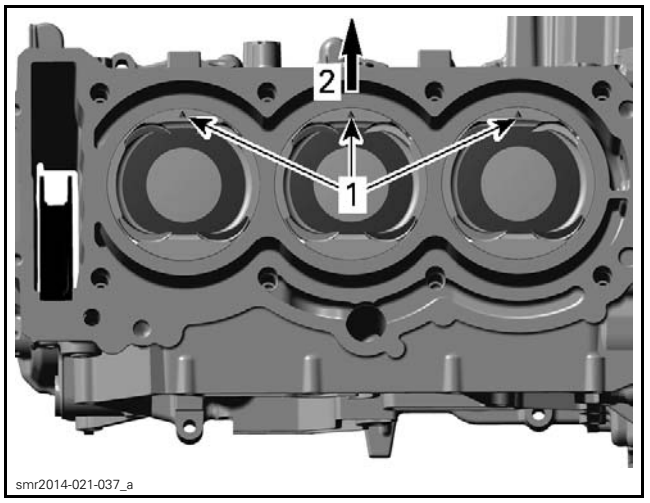
NOTICE The ring gaps of both compression rings should always be 180° from each other and 90° from the arrow on top of the piston.



RING GAPS AT 180° FROM EACH OTHER AND 90° FORM ARROW
1. *Rectangular ring - ring gap*
2. *Taper-face ring - ring gap*
3. *Arrow*

2.3 The arrow on top of the piston must point towards exhaust.

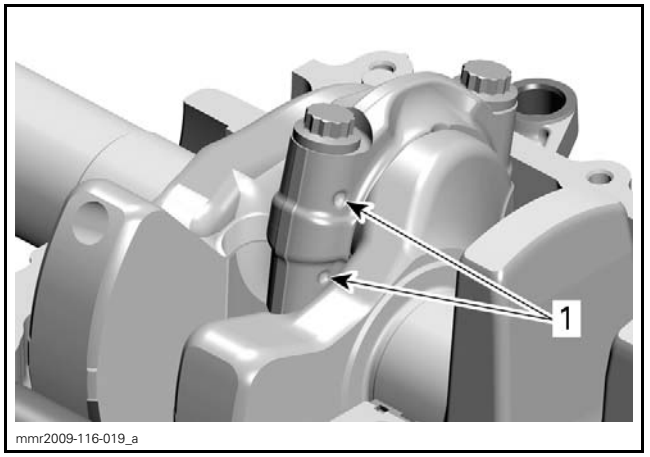
NOTICE Piston installed with the arrow in the wrong direction would cause serious engine damage.



1. *Arrows*
2. *Exhaust*

3. Turn cylinder block upside down.
4. Install *CRANKSHAFT* as per procedure in this subsection.
5. Oil the crankshaft pin.
6. Install connecting rod caps.

NOTE: Printed marks on connecting rod and cap must point together.



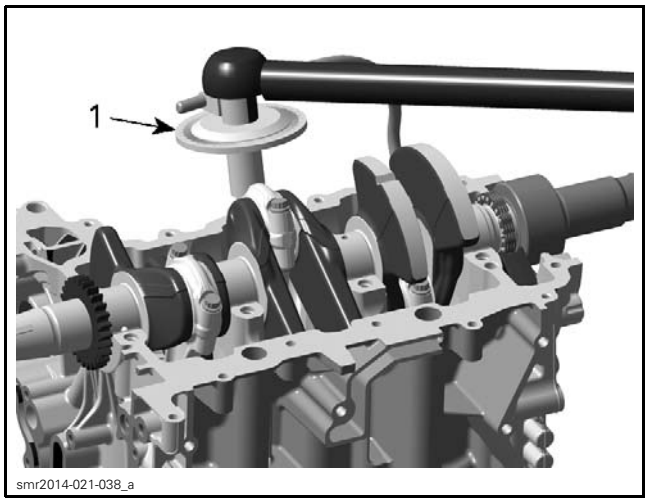
TYPICAL
1. *Printed marks*

NOTICE This assembly uses stretch screws. Always use NEW screws and strictly adhere to the tightening procedure.

7. Tighten connecting rod screws as follows:

7.1 Torque both connecting rod screws of a connecting rod.

7.2 Use a torque angle gauge to carry out the second step.



1. Torque angle gauge

TIGHTENING TORQUE		
Connecting rod screws	STEP A	12 N•m ± 0.2 N•m (106 lbf•**in** ± 2 lbf•**in**)
	STEP B	Additional 70° ± 5°

NOTICE **Failure to strictly follow this procedure may cause screws to loosen and lead to severe engine damage.**

8. Install all other removed parts.

PISTON RINGS

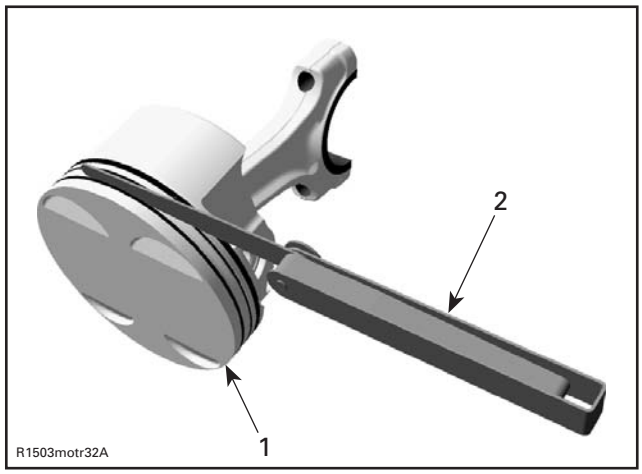
Removing the Piston Ring

1. Remove piston, see procedure in this subsection.
2. Remove rings from piston.

Inspecting the Piston Ring

Ring/Piston Groove Clearance

Using a feeler gauge measure each ring/piston groove clearance.



TYPICAL
1. Piston
2. Feeler gauge

RING/PISTON GROOVE CLEARANCE	
UPPER COMPRESSION RING	
NEW	0.030 mm to 0.066 mm (.0012 in to .0026 in)
SERVICE LIMIT	0.12 mm (.0047 in)
LOWER COMPRESSION RING	
NEW	0.020 mm to 0.056 mm (.0008 in to .0022 in)
SERVICE LIMIT	0.12 mm (.0047 in)
OIL SCRAPER RING	
NEW	0.010 mm to 0.040 mm (.0004 in to .0016 in)
SERVICE LIMIT	0.15 mm (.0059 in)

If clearance is out of specification, the piston and rings should be replaced.

Ring End Gap

1. Place piston ring in the cylinder bore between 8 mm to 16 mm (5/16 in to 5/8 in) from the top of cylinder.

NOTE: In order to correctly position the ring in the cylinder bore, use a piston as a pusher.

2. Using a feeler gauge, check ring end gap.

RING END GAP	
UPPER COMPRESSION RING	
NEW	0.20 mm to 0.35 mm (.008 in to .014 in)
SERVICE LIMIT	1.2 mm (.047 in)
LOWER COMPRESSION RING	
NEW	0.30 mm to 0.50 mm (.012 in to .02 in)
SERVICE LIMIT	1.2 mm (.047 in)
OIL SCRAPER RING	
NEW	0.20 mm to 0.70 mm (.0079 in to .0276 in)
SERVICE LIMIT	1.2 mm (.047 in)

If ring end gap is out of specification, replace piston rings.

Installing the Piston Ring

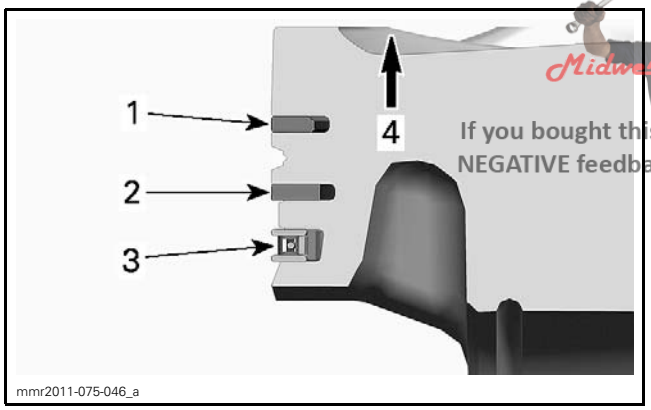
1. Install piston rings in the following order.

   NOTE: Use a ring expander to prevent breakage during installation. The oil ring must be installed by hand.

   1.1 Install oil scraper ring.

   1.2 Install the lower compression ring with the letter "N" facing up.

   1.3 Install upper compression ring with the letter "N" facing up.



1. Rectangular ring
2. Taper-face ring
3. Oil scraper ring
4. Letter "N" facing up

NOTICE Ensure that upper and lower compression rings are not interchanged.

2. Check that rings rotate smoothly after installation.

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ELECTRONIC CONTROL MODULE

SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	125–126
FLUKE 115 MULTIMETER	529 035 868	125–126

GENERAL

SYSTEM DESCRIPTION

Electrical System

ECM (Engine Control Module)

The ECM reads input signals that it receives from the throttle lever as well as various sensors. Through calculation of several variables, which it compares to stored parameters (fuel maps), the ECM controls the iTC (intelligent Throttle Control), the injection system and the ignition system to meet driver demands and to ensure safe engine operation.

Through its management of the engine systems, the ECM ensures the engine is delivering optimum performance, fuel economy and meets emission regulations. The ECM also controls idle RPM by modulating the electric throttle actuator (ETA) and limits maximum engine speed through ETA, the ignition system, and fuel injection system.

TROUBLESHOOTING

DIAGNOSTIC TIPS

Electrical Related Problems

Electrical Connections

Pay particular attention to ensure that terminals and pins are not out of their connectors, corroded, or out of shape.

When probing terminals, pay attention not to deform the terminals as this could cause a loose or intermittent connection that would be difficult to troubleshoot.

NOTE: Do not apply dielectric grease or other lubricants on the ECM connectors and on the starter relay connector.

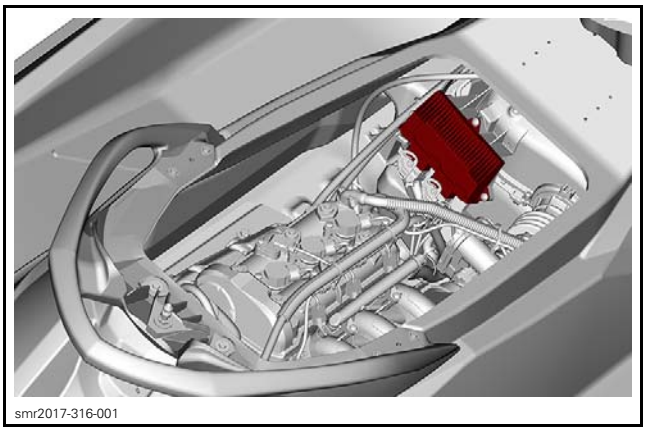
PROCEDURES

ENGINE CONTROL MODULE (ECM)

NOTE: As a first troubleshooting step, always check for applicable fault codes using the BRP diagnostic software BUDS2.

ECM Location

The ECM is located in front of the engine.

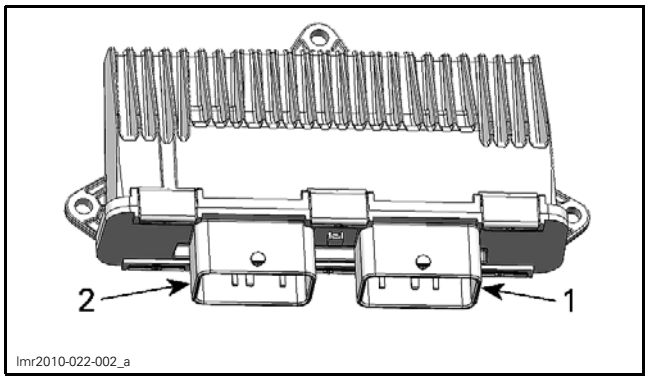


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ECM Connector Identification

There are 2 connectors connected to the ECM:

– Engine harness connected to ECM-A
– Vehicle system control harness connected to ECM-B.

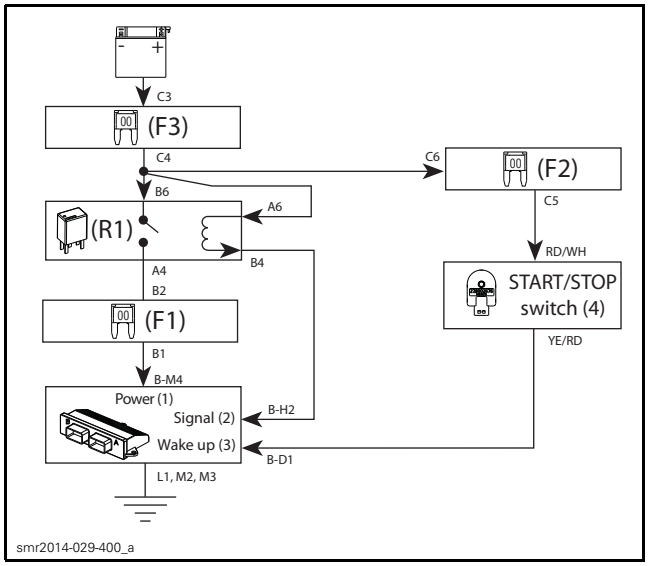


ECM CONNECTOR IDENTIFICATION - COOLING FINS FACING OUT
1. *Connector A*
2. *Connector B*

The ECM connectors have 48 pins.

NOTE: For connector information, cleaning and probing, refer to *WIRING HARNESS AND CONNECTOR* subsection.

ECM Power Circuit Diagram



1. *Power*
2. *Signal*
3. *Wake up*
4. *START/STOP switch*

Validating the ECM Power Circuit

Briefly press START/STOP button.

This should wake up the ECM . The ECM will then activate relay 1 which will turn ON all power. After approximately 12 seconds, the multifunction gauge indications will go out if the tether cord is not installed, and all electrical power will be turned off after approximately 3 minutes.

If the tether cord is installed when the START/STOP button is pressed, the multifunction gauge and electrical power will stay on for approximately 3 minutes if the START/STOP button is not pressed again, or if the engine is not started.

QUICK INDICATION THAT ECM IS POWERED (ASSUMING THE OBSERVED COMPONENT IS WORKING)
Multifunction gauge comes ON.
Fuel pump turns on for approx. 2 seconds (if tether cord installed).

If ECM does not turn on, check the following:
– Fuse F1, F2 and F3.
– Battery voltage. Refer to *CHARGING SYSTEM* subsection.
– Relay R1.
– START/STOP switch. Refer to *STARTING SYSTEM* subsection.
– ECM power circuit wires and ground wires.

For testing of fuses and relay R1, refer to *POWER DISTRIBUTION AND GROUNDS* subsection.

NOTE: When relay 1 is not working, the EMS (engine management system) and the complete vehicle electrical system will not be powered.

ECM Wake Up Logic

With Tether Cord Installed

When the START/STOP button is pressed to start engine:
– ECM pin B-D1 receives current from battery via the START/STOP switch. ECM is woken up.
– ECM pin B-H2 provides a ground to the relay coil in fuse box.
– The relay contacts close and provide main 12 Vdc power to the ECM at pin B-M4.
– The relay also powers the other components in the electrical system.
– ECM pin B-E4 monitors for a tether cord installed on the engine cut-off switch.
– When the tether cord is installed on the engine cut-off switch, it completes a circuit that provides a ground to the ECM, pin B-F2. This tells the ECM the tether cord is installed and the engine can be started. If the engine is not started, the power will be turned off after approximately 3 minutes.

Without a Tether Cord Installed

When the START/STOP button is pressed:

– The multifunction gauge turns on, goes through the self-test function, displays applicable messages and turns off a few seconds later.
– The engine cannot be cranked.
– The ECM stays powered up until it removes the ground to the relay coil after 3 minutes (pin B-H2).
– Relay contacts open and power to the ECM is removed.
– Power is also removed on all other electrical systems.

Testing Electrical System Power After Multifunction Gauge Shutdown

1. Remove LH access cover.
2. Remove fuse box cover.
3. Using a multimeter set to Vdc, check for power at the contacts on top of the ACC 10A fuse (F1).

REQUIRED TOOL
FLUKE 115 MULTIMETER (P/N 529 035 868)



MULTIMETER PROBES		READING	CONDITION
Fuse F1 contacts	Battery ground	Battery voltage	Power is ON
		No voltage	Power is OFF

ECM Shut Down Logic

When the engine is stopped by using the START/STOP button or by removing the tether cord from the engine cut-off switch, the following occurs:

– ECM stops the engine.
– After a few seconds, the multifunction gauge turns off.
– After 60 seconds, ECM (pin B-H2) removes the ground to the relay coil.
– Relay contacts open and power to the ECM is removed.
– Power is also removed on all other electrical systems.

Testing the ECM Wake Up Circuit

1. Disconnect ECM-B connector
2. Install ECM-B connector on the ECM adapter tool.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

3. Use a multimeter and select Vdc.
4. While pressing START/STOP button, read voltage as follows.

ECM ADAPTER	BATTERY	MEASUREMENT
D1	Battery ground	Battery voltage

If voltage is as per specification, refer to *TESTING THE ECM POWER CIRCUIT*.

If voltage is out of specification:

– Test the START/STOP switch, refer to *STARTING SYSTEM* subsection.
– If START/STOP switch tests good, test wiring and connectors from battery to ECM. Refer to *WIRING DIAGRAM*.

Testing the ECM Power Circuit

1. Connect ECM connector "B" on the ECM adapter tool.

ECM ADAPTER TOOL (P/N 529 036 166)	

2. Install an appropriate fused jumper wire between the following terminals on the ECM adapter tool.

JUMPER WIRE COORDINATES ON ECM ADAPTER	
H2	M2, M3 or L1

NOTE: When the jumper is installed, the multifunction gauge should come on.

If the multifunction gauge did not come on, check the following:

– Fuses F1, F2 and F3

– Relay 1
– Wiring between ECM-B contact 2H and fuse F3, refer to the *WIRING DIAGRAM* subsection
– ECM ground circuit, refer to *CONTINUITY TEST OF ECM GROUND CIRCUITS* in this subsection.

For testing of fuses and relay R1, refer to *POWER DISTRIBUTION AND GROUNDS* subsection.

If gauge came on, carry on with the following step.

3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Vdc.
4. Check for voltage as follows.

ECM ADAPTER	BATTERY	VOLTAGE
B-4M	Negative post	Battery voltage

If voltage is not measured, check the wiring and connections between ECM and junction JT-1 VT/GY, refer to the *WIRING DIAGRAM* subsection.

If all items mentioned in this test and in *TESTING THE ECM WAKE UP CIRCUIT* tested good, try a new ECM.

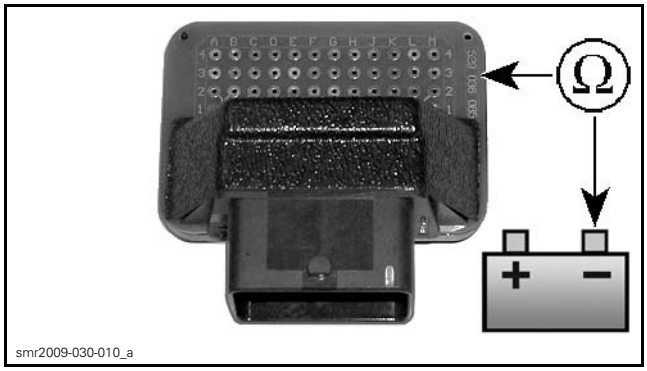
Testing the Continuity of ECM Ground Circuits

1. Connect ECM-B connector on the ECM adapter tool.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

2. Using the FLUKE 115 MULTIMETER (P/N 529 035 868) set to Ω, probe adapter terminals as per following table.

ECM ADAPTER	BATTERY POST	RESISTANCE
Pins L1, M2 and M3	Ground	Close to 0 Ω (continuity)



If any measurement is out of specification refer to *POWER DISTRIBUTION AND GROUNDS* subsection and check the following:
– Wiring and connections
– Engine grounds
– Battery ground.

Removing the ECM

NOTE: If a new ECM is to be installed, first read the procedures in *REPLACING THE ECM* in this subsection.

1. Disconnect battery cables.

NOTICE **Always disconnect the BLACK negative (–) battery cable first, then disconnect RED positive (+) cable.**

2. Disconnect both ECM connectors from ECM.
3. Remove ECM retaining screws and remove the ECM.

Installing the ECM

1. Reverse removal procedure however, pay attention to the following.

TIGHTENING TORQUE	
ECM screws	5.3 N•m ± 0.7 N•m (47 lbf•**in** ± 6 lbf•**in**)

2. Reconnect ECM connectors.
3. Reconnect battery cables.

⚠ WARNING

Always reconnect the RED positive (+) battery cable first, then reconnect BLACK negative (–) cable.

4. If a new ECM is installed, refer to *REPLACING THE ECM* in this subsection.

NOTICE **Always replace ECM by the same part number or by a BRP approved equivalent.**

Replacing the s ECM

NOTE: Prior to replacing an ECM, ensure that all the recommendations in the general introduction of this subsection have been followed and all applicable testing procedures have been carried out.

When installing a new ECM, data must be entered and a reset is required.

ECM Data Entry for ECM Replacement

Use one of the following 2 methods to collect the required information. The 1st being the easiest:

1. Use BUDS2 to obtain the data from a saved .buds2 file on your PC computer.
2. Collect the information from the vehicle and on the Knowledge Center.

Once the required information has been collected, refer to *ENTERING THE COLLECTED INFORMATION INTO THE ECM*.

1st Collecting Method: Obtaining the Data from a Saved .buds2 File

1. Start the BRP diagnostic software BUDS2

NOTE: It is not necessary to perform any connection. The PC computer can be used alone.

2. In BUDS2, click on the **Open a BUDS2 file** button.

Make sure you are at: C:\Program Files(x86)\BRP\BUDS2\Files.

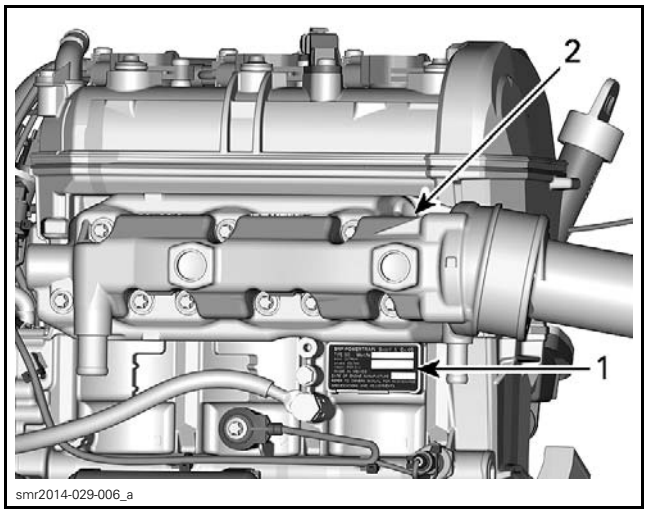
IMPORTANT: Be sure to use the file that specifically matches the vehicle you are servicing.

NOTE: The file name structure is as follows:
VIN_date read (yyyymmdd)_hour read (hhmmss).mpem
Example: 2BPSBK8C68V000168_20090206_111640.buds2 Therefore: VIN: 2BPSBK8C68V000168 Date: 2009 02 06 Hour: 11h 16m 40s

3. Select the **Summary/ Vehicle** page tab and record (write down) the following information.
   1. Vehicle serial number
   2. Engine serial number
   3. Vehicle model number
   4. Customer name.

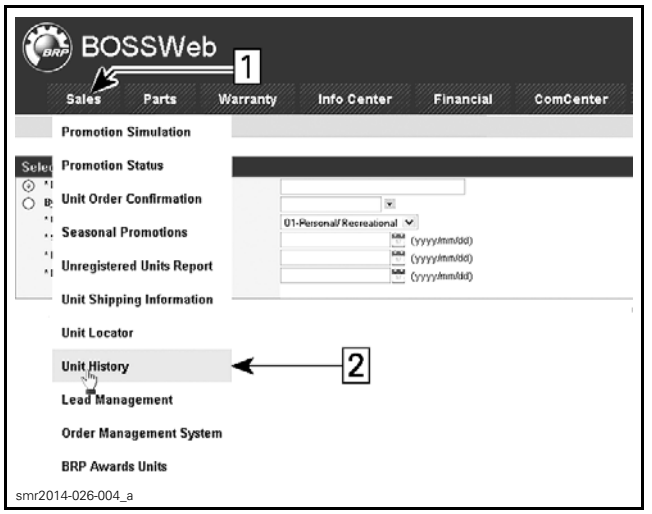
2nd Collecting Method: Collect the Information from the Vehicle and BOSSWeb

1. Record engine serial number.

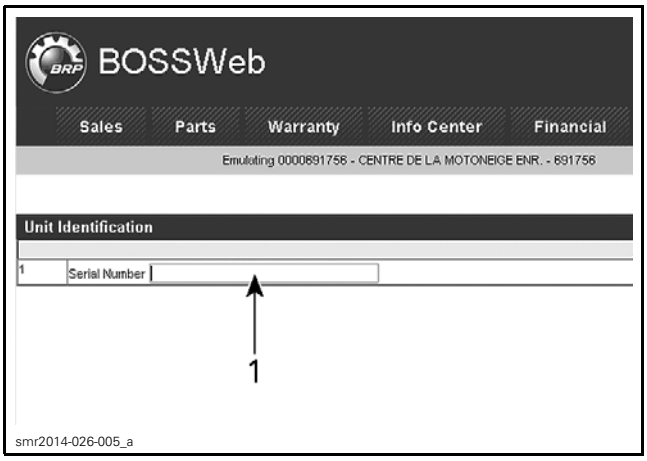


LH SIDE OF ENGINE
1. *Engine serial number plate*
2. *Exhaust manifold*

2. Record the following numbers from BOSSWeb. Look in **Sales** menu and choose **Unit history**.
   1. Vehicle serial number
   2. Vehicle model number
   3. Customer name.



SERVICE, UNIT HISTORY
1. *Click on* **SALES** *menu*
2. *Select* **Unit History**



1. Vehicle Serial Number here

3. Enter the recorded data in the new ECM as detailed in *ENTERING THE COLLECTED INFORMATION INTO THE ECM*.

Entering the Collected Information Into the ECM

1. Connect the vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In BUDS2, click the **Scan** button to read the new ECM.
3. Select the **Summary/ Vehicle** page tab and write all of the following information you recorded previously.
   1. Vehicle serial number (VIN)
   2. Engine serial number
   3. Vehicle model number
   4. Customer name.

NOTICE **Do not enter SBOAT for a PWC. Enter only the appropriate product model number as obtained when gathering the information.**

NOTICE **Pay particular attention when typing the V.I.N. and model numbers. Once Write Data button is pressed, the data cannot be modified.**

4. Perform the *CLOSED THROTTLE RESET* procedure, refer to *ADJUSTMENTS* in this subsection.
5. Start the engine and ensure proper operation.

NOTICE **The engine must not be run out of water without providing proper cooling to the exhaust system. Maximum engine run time out of water is 2 minutes. Failure to do so may result in damage to the exhaust system and engine. Refer to *EXHAUST SYSTEM* subsection.**

6. Reinstall any remaining removed parts.

ELECTRONIC FUEL INJECTION (EFI)

SERVICE TOOLS

Description	Part Number	Page
FLUKE 115 MULTIMETER	529 035 868	133, 136
FUEL HOSE DISCONNECT TOOL	529 036 037	133

GENERAL

⚠ WARNING

When electrically disconnecting or removing the throttle body from the intake manifold, always remove the tether cord from the engine cut-off switch and disconnect the battery.

⚠ WARNING

Always disconnect battery prior to working on the fuel system. Always disconnect battery exactly in the specified order, BLACK (-) cable first. Electrical connections should be disconnected prior to disconnecting fuel lines.

⚠ WARNING

Fuel is flammable and explosive under certain conditions. Work in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity.

⚠ WARNING

Fuel lines remain under pressure at all times. Always proceed with care and use appropriate safety equipment when working on a pressurized fuel system. Wear safety glasses. Do not allow fuel to spill on hot engine parts and/or on electrical connectors. Proceed with care when removing or installing high pressure test equipment, or disconnecting fuel line connections. Wipe off any fuel spillage in the bilge. Never use a hose pincher on high pressure hoses.

Desactivate the fuel pump and run the engine until it stalls.

Cover the fuel line connection with an absorbent shop rag before disconnecting them. Slowly disconnect the fuel hose to minimize spilling.

When the repair is completed, ensure the hose from the fuel rail to the fuel pump is properly connected and secured in its support. Perform the *FUEL SYSTEM HIGH PRESSURE LEAK TEST* as described in *FUEL TANK AND FUEL PUMP* subsection.

⚠ WARNING

Replace any damaged, leaking or deteriorated fuel lines or connections. After working on the fuel system, always pressurize the fuel system and check for fuel leaks. Refer to *FUEL SYSTEM PRESSURIZATION* in *FUEL TANK AND FUEL PUMP* subsection.

⚠ WARNING

Always perform the fuel system high pressure leak test if any fuel line has been removed or disconnected from a component.

⚠ WARNING

If a gasoline leak and/or odor is present, do not start the engine. Repair the leak.

SYSTEM DESCRIPTION

The electronic fuel injection system (EFI) is comprised of various sensors used for detecting ongoing operating conditions of the engine, and includes all the components that perform the required adjustments to the engine.

Electrical System

EFI Sensors

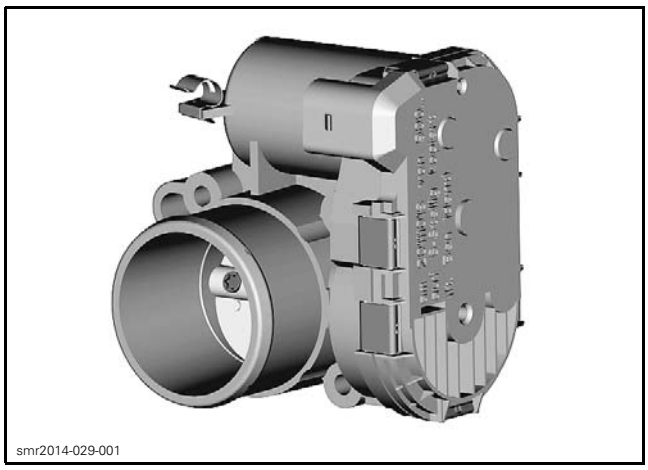
To control the injection system, the engine management uses input signals from the following sensors:

- Camshaft position sensor (CAPS)
- Crankshaft position sensor (CPS)
- Manifold absolute pressure and temperature sensor (MAPTS)
- Throttle position sensor (TPS)
- Throttle accelerator sensor (TAS).

The ECM reads the inputs from the sensors which it compares to predetermined parameters stored in the ECM (fuel and ignition maps), makes computations, and activates the outputs accordingly (injectors, ignition coils etc.).

Air Intake System

Throttle Body


smr2014-029-001

A 46 mm throttle body is mounted on the intake manifold.

Air for combustion is drawn in by the engine. The air flows through the throttle body and is controlled by a throttle plate.

Fitted on the throttle body, an electric throttle actuator (ETA) allows the ECM to electronically control the throttle plate opening which regulates the amount of air that enters the engine, and therefore engine speed.

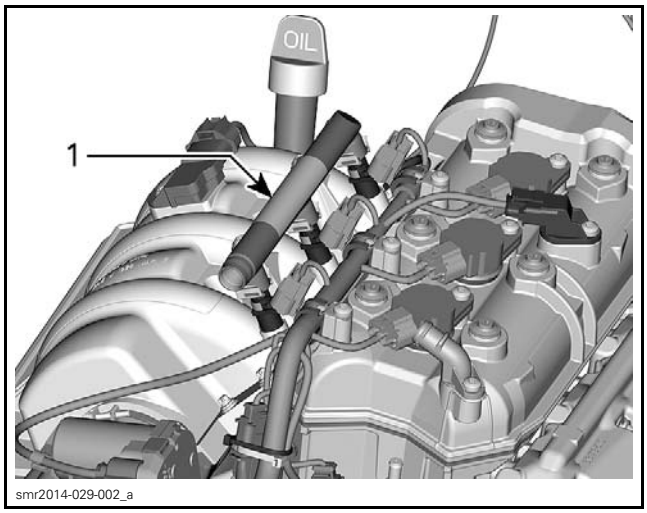
There is no idle air control valve (IACV).

Fuel System

Fuel Rail

A fuel rail is mounted on the intake manifold. The fuel rail, which is used to secure the injectors to the manifold, also provides to the injectors the fuel pressure that it receives from the fuel pump.

The fuel pressure applied to the fuel rail is regulated by the fuel pressure regulator located in the fuel pump module.

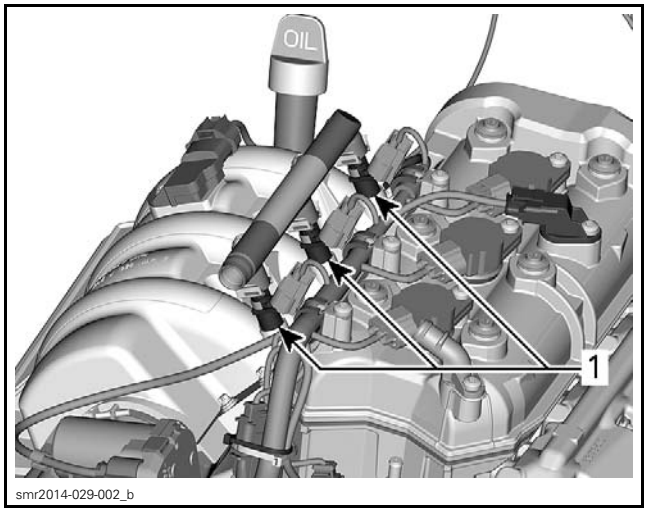


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1. Fuel rail

Fuel Injectors

Three fuel injectors are used to inject fuel into the intake ports of the cylinder head. One injector is used per cylinder.



smr2014-029-002_b

1. Fuel injectors

Fuel is injected in accordance with injection signals received from the ECM.

Fuel Pump

An electric fuel pump with an integrated pressure regulator and fuel system filters is used. For more details on the fuel pump unit, refer to *FUEL TANK AND FUEL PUMP* subsection.

ADJUSTMENT

IDLE SPEED

Idle speed is not adjustable. The EMS (Engine Management System) controls the idle speed of the engine through the iTC system by controlling throttle plate opening using the ETA (electric throttle actuator).

With the engine running, engine RPM may be verified using BUDS2 software, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

NOTICE **The engine must not be run out of water without providing proper cooling to the exhaust system. Maximum engine run time out of water is 2 minutes. Failure to do so may result in damage to the exhaust system and engine. Refer to *EXHAUST SYSTEM* subsection.**

CLOSED THROTTLE RESET

General Information

This operation performs a reset of the TPS values of the throttle body in the ECM.

The Closed throttle Reset must be carried out only when:

– Replacing the throttle body.
– Replacing the ECM.

Closed Throttle Reset Procedure

Use the BUDS2 software to perform this setting. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

1. Press the START/STOP button to wake up the ECM.
2. Install the tether cord on the engine cut-off switch.
3. Ensure throttle lever is completely released.
4. In BUDS2, select
   – **Settings** button
   – **ECM** page tab
   – **Initialization Tab** page
   – **Reset TPS**.

Reset is completed.

NOTE: It is not necessary to click on the Write button in BUDS2.

Exit BUDS2.

NOTE: If the throttle valve was not within the allowed range when the Closed Throttle Reset was carried out, no error message would be displayed. However, a fault code would be set when the engine is started.

5. Start engine and make sure it operates normally through its full engine RPM range.

NOTICE **The engine must not be run out of water without providing proper cooling to the exhaust system. Maximum engine run time out of water is 2 minutes. Failure to do so may result in damage to the exhaust system and engine. Refer to *EXHAUST SYSTEM* subsection.**

6. Check for fault codes using BUDS2 If a fault code related to the throttle actuator appears, clear it, then carry out another Closed Throttle Reset procedure. To clear faults, refer to *DIAGNOSTIC AND FAULT CODES* subsection.

TROUBLESHOOTING

DIAGNOSTIC TIPS

Engine problems are not necessarily related to the fuel injection system.

It is important to ensure that the engine and propulsion system, fuel delivery and electrical systems are functioning normally.

For diagnostics purposes, use BUDS2 software. See *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

After a problem has been solved, be sure to clear the fault(s) recorded in the ECM using the BRP diagnostic software BUDS2.

⚠ WARNING

Electrical actuators and electronic modules may be powered up as soon as the START/STOP button is depressed. Always disconnect the battery prior to disconnecting any electrical or electronic parts.

IMPORTANT: Never use a battery charger to temporarily substitute the battery as it may cause the ECM to function erratically, or not at all.

Check related-circuit fuse solidity and condition with an ohmmeter. A visual inspection could lead to a false diagnosis.

Poor Idling

If poor idling is experienced, check the following:
– Poor quality fuel or water in the fuel
– Fault codes using BUDS2
– Throttle body and flame arrestor cleanliness
– Engine leaks or other mechanical problem.

Electrical Related Problems

It is important to check the following in the electrical system:
– Battery voltage
– Fuses
– Ground connections
– Wiring and connectors.

Ensure that all electronic components are original BRP recommended components. Any modification to the wiring harness may lead to poor system operation or generate fault codes.

Electrical Connections

Pay particular attention to ensure that terminals and pins are not out of their connectors, corroded, or out of shape.

When probing terminals, pay attention not to deform the terminals as this could cause a loose or intermittent connection that would be difficult to troubleshoot.

NOTE: Do not apply dielectric grease or other lubricants on the ECM connectors and on the starter relay connector.

PROCEDURES

THROTTLE POSITION SENSOR (TPS)

General

NOTE: The TPS is part of the throttle body.

The throttle position sensor (TPS) is a double potentiometer that sends signals to the ECM that are proportional to the throttle plate angle. The TPS is located inside the throttle body.

Testing the TPS Wear

1. With the engine turned off, slowly pull in throttle lever and pay attention for smooth operation without physical stops.
2. Press the START/STOP button to wake up the ECM.
3. Install the tether cord on the engine cut-off switch.
4. Connect watercraft to BUDS2 software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
5. In BUDS2 click the following:
   – **Measurements** tab
   – **ECM** tab.
6. Slowly and regularly depress the throttle lever.
7. Observe the Throttle Opening needle movement in BUDS2

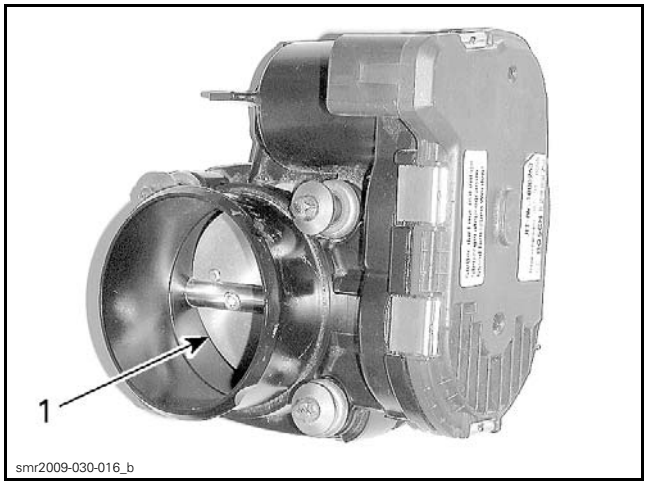
NOTE: The needle should move gradually and regularly as you move the throttle lever. If the needle "sticks", bounces or suddenly drops, it may indicate a worn TPS that needs to be replaced. An initial slight delay after the throttle lever is pulled and before the needle starts to move is normal.

If the needle behavior is not as expected, proceed with the following steps.

8. Manually move the throttle plate in throttle body using a blunt tool (without sharp tip).

⚠ WARNING

Do not move throttle plate with your fingers. Otherwise, if ECM should turn off, it would quickly close the throttle plate which could cause serious finger injury.



1. Push here

9. Check needle movement again.

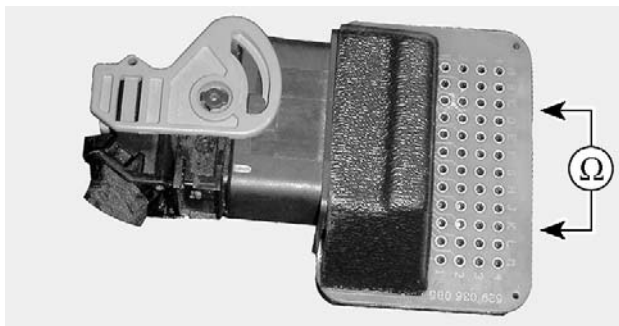
– If needle moves as expected, check the throttle accelerator sensor (TAS). Refer to *THROTTLE ACCELERATOR SENSOR (TAS)* in the *INTELLIGENT THROTTLE CONTROL (ITC)* subsection.
– If needle does not move as expected, go to *TESTING THE TPS RESISTANCE* in this subsection.

Testing the TPS Resistance

1. Remove the parts required to access the throttle body, refer to *REMOVING THE THROTTLE BODY* in this subsection.
2. Ensure the throttle body connector is properly connected.
3. Disconnect ECM-A connector from the ECM, refer to *ECM CONNECTOR ACCESS* in this subsection.
4. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
5. Probe circuit as per following table while using a finger to manually move throttle plate.

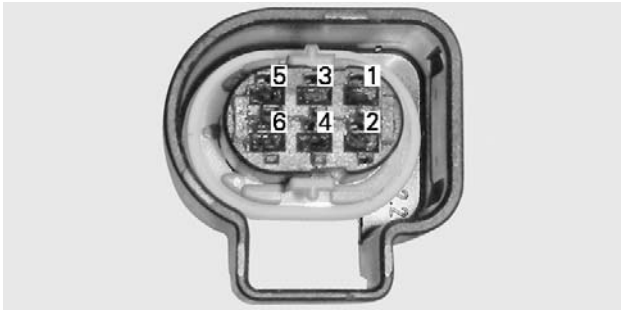
ECM ADAPTER		FULLY CLOSED THROTTLE PLATE (1)		FULLY OPEN THROTTLE PLATE	
		RESISTANCE (Ω)			
PIN		MIN.	MAX.	MIN.	MAX.
A-A2	A-K4	625	3000	625	3000
A-A2	A-K3	678	3768	163	1260
A-A2	A-F3	178	1368	700	3840
A-K3	A-K4	163	1260	678	3768
A-K3	A-F3	925	4800	925	4800
A-K4	A-F3	700	3840	178	1368

(1) To obtain the fully closed position, it is necessary to push against the throttle plate in the throttle body with a finger and hold it in this position for the measurement.



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If any resistance value is incorrect, check wire continuity between ECM and throttle body before assuming the TPS is at fault. Refer to *WIRING DIAGRAM* subsection.



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TPS CONNECTOR PIN-OUT

If the TPS resistance values are correct, try a new ECM. Refer to *ENGINE CONTROL MODULE (ECM)* in this subsection.

FUEL RAIL

Removing the Fuel Rail

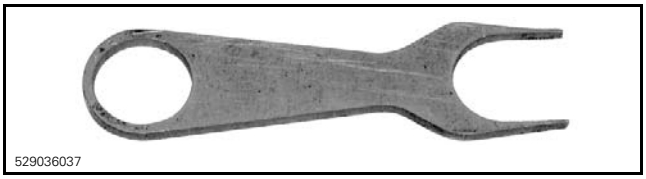
Disconnect battery, refer to *POWER DISTRIBUTION AND GROUNDS*.

Remove central body. Refer to *BODY* subsection.

Disconnecting the Fuel Rail Hose

1. Place an absorbent shop rag around the fuel supply hose fitting at the fuel rail to catch any fuel leakage.
2. Disconnect fuel hose from fuel rail.

REQUIRED TOOL
FUEL HOSE DISCONNECT TOOL (P/N 529 036 037)

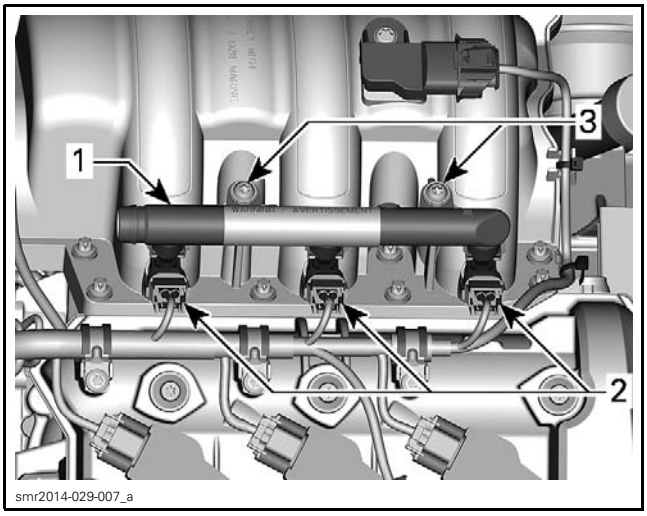

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NOTE: It may be necessary to rotate fuel hose fitting to align the tool ends with the openings of the locking mechanism.

Removing the Fuel Rail

1. Disconnect all injector connectors.
2. Remove screws retaining the fuel rail.



1. Fuel rail
2. Fuel injector connectors
3. Retaining screws

3. Gently wiggle fuel rail side to side as you pull the fuel rail out with fuel injectors.

Installing the Fuel Rail

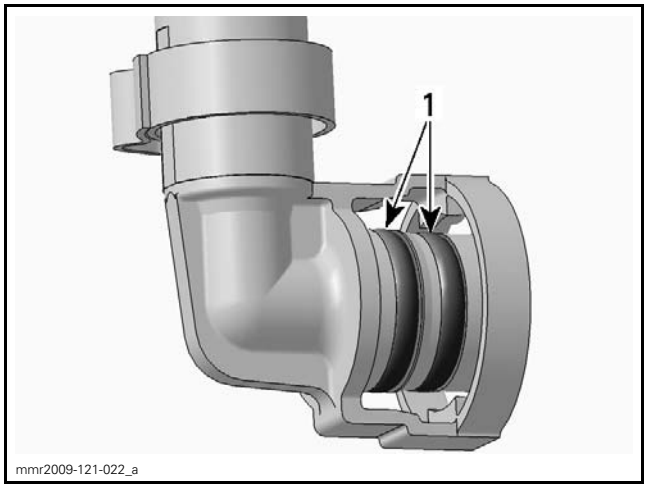
Reverse the removal procedure. However, pay attention to the following.

Apply engine oil on each injector O-rings.

TIGHTENING TORQUE	
Fuel rail screws	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

Fuel Rail Hose Connection

1. Apply engine oil on O-rings of the fuel rail hose connector.



1. Apply oil on O-rings

2. Connect fuel hose to fuel rail.

IMPORTANT: Push fuel hose fitting on fuel rail until you hear a "click". Try pulling fuel hose off fuel rail to ensure fitting is properly locked.

3. Pressurize the fuel system and check for a fuel leak. Refer to *FUEL SYSTEM HIGH PRESSURE LEAK TEST* in *FUEL TANK AND FUEL PUMP* subsection.

⚠ WARNING

Failure to pressurize the fuel system may result in severe injury or a life threatening situation should a leak occur.

4. Reinstall all remaining removed parts.

FUEL INJECTOR

Testing the Fuel Injector Operation (Dynamic)

1. Connect watercraft to BUDS2 software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. Start engine.

NOTICE **The engine must not be run out of water without providing proper cooling to the exhaust system. Maximum engine run time out of water is 2 minutes. Failure to do so may result in damage to the exhaust system and engine. Refer to *EXHAUST SYSTEM* subsection.**

3. In BUDS2, click the following:
   - **Scan** button
   - **Functions** tab.
4. Using the BUDS2 software, shut down each engine cylinder one at a time by clicking on the button under the applicable cylinder.

If the engine RPM drops when clicking on a cylinder, the injector and the ignition of this cylinder are functioning normally.

If the engine RPM does not drop when clicking on a cylinder, this cylinder is not functioning properly. Check the following:

– Fuel injector operation. Refer to *TESTING THE FUEL INJECTOR OPERATION WITH BUDS2 (STATIC)*.
– Spark plug and ignition coil. Refer to *IGNITION SYSTEM*.
– Engine condition.

Testing the Fuel Injector Operation (Static)

NOTICE **After fuel injector activation using BUDS2, always crank engine in drowned mode to ventilate engine and prevent a potential backfire due to fuel accumulation in the engine.**

1. Connect watercraft to BUDS2 software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. Press the START/STOP button to wake up the ECM.
3. Install the tether cord on the engine cut-off switch.
4. In BUDS2, click the following:
   – **Scan** button
   – **Functions** tab
   – **ECM** page.
5. click on the fuel injector to be tested
6. Listen for the injector activation.

If you can hear the injector, it validates its operation. Carry out the *FUEL INJECTOR BALANCE TEST*.

If you do not hear the injector, carry out the *TESTING THE INJECTOR INPUT VOLTAGE*.

Testing the Fuel Injector Balance with BUDS2

NOTICE **After fuel injector activation using BUDS2, always crank engine in drowned mode to ventilate engine and prevent a potential backfire due to fuel accumulation in engine.**

1. Install a fuel pressure gauge as described in *FUEL PUMP PRESSURE TEST* of *FUEL TANK AND FUEL PUMP* subsection.
2. Connect watercraft to BUDS2 software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
3. Press the START/STOP button to wake up the ECM.
4. Install tether cord on engine cut-off switch.
5. In BUDS2, click the following:
   – **Scan** button
   – **Functions** tab
   – **ECM** page.
6. click the Fuel Pump button to activate fuel pump.

Fuel pressure must be within specification. Refer to *FUEL TANK AND FUEL PUMP* subsection. Re-activate fuel pump as necessary.

7. In BUDS2, energize fuel injector **no. 1**.
8. Record the fuel pressure drop for injector **no. 1**.
9. click the Fuel Pump button to activate fuel pump.
10. Repeat step 6 and 7 for fuel injectors **no. 2** and **no. 3** and record the pressure drop for each injector.

The maximum fuel pressure drop between injectors should not exceed the following specification:

MAXIMUM FUEL PRESSURE DROP ALLOWED BETWEEN FUEL INJECTORS
10 kPa (1.5 PSI)

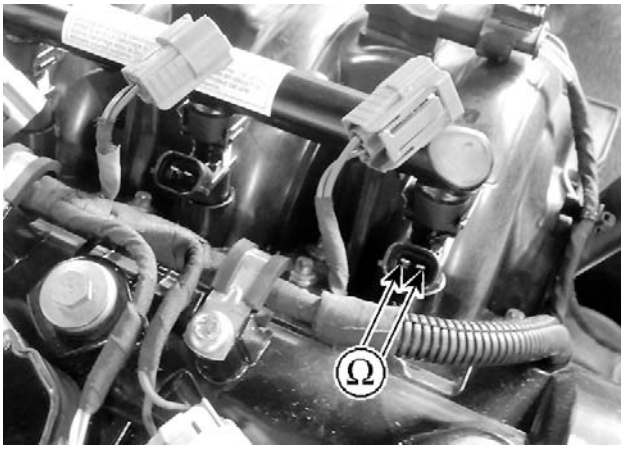
If pressure drop of any fuel injector is greater than the specification, replace that injector then repeat the test.

11. Using the valve on the fuel pressure gauge, release the pressure in the system (if so equipped).
12. Remove fuel pressure gauge and reinstall removed parts.

Testing the Fuel Injector Resistance (at Component)

1. Remove injector connector.
2. Check resistance value between injector pins as per followings table.

INJECTOR PIN		RESISTANCE @ 20°C (68°F)
1	2	11.4 - 12.6 Ω



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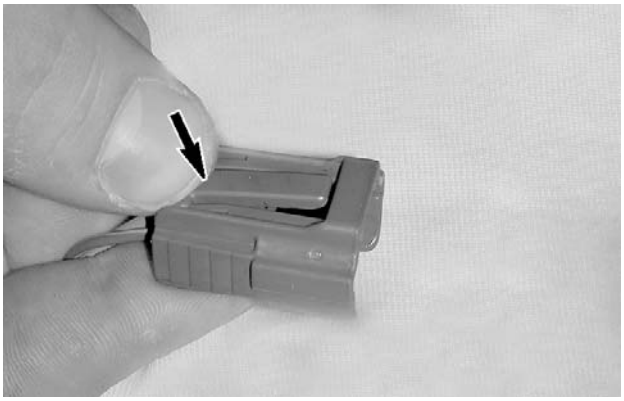
If readings are not as specified, replace injector.

If readings are as specified, repair or replace wiring and connectors from ECM to injector.

Testing the Fuel Injector Input Voltage

1. Disconnect fuel injector connectors.

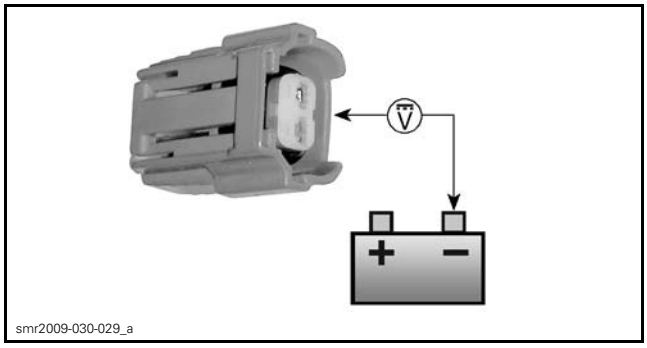
NOTE: Press against tab underneath connector as illustrated to unlock it.


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PRESS HERE TO UNLOCK

2. Press the START/STOP button to wake up the ECM.
3. Install tether cord on engine cut-off switch.
4. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Vdc.
5. Read input voltage to the applicable injector as per following table.

PROBE INJECTOR CONNECTOR	MEASUREMENT
VIOLET wire with a tracer to battery ground	Battery voltage



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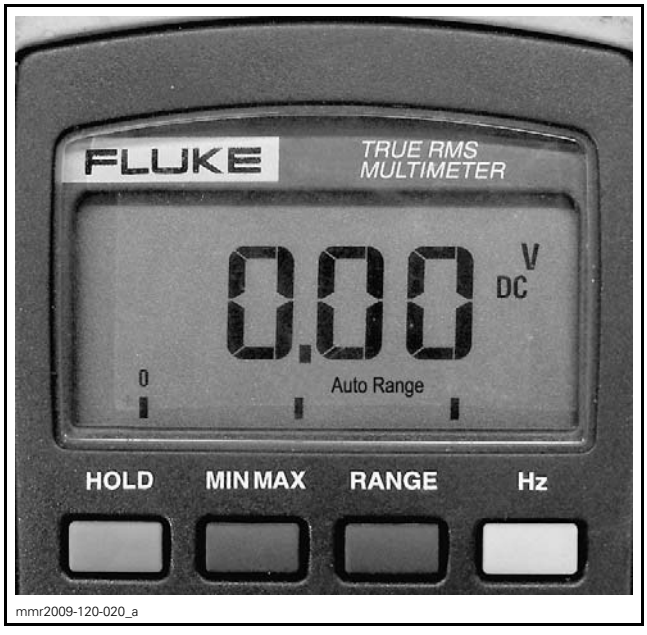
If battery voltage is measured, refer to *TESTING THE FUEL INJECTOR SIGNAL*.

If battery voltage is not measured, check continuity between fuse box and injector. Refer to *WIRING DIAGRAM*.

Testing the Fuel Injector Signal

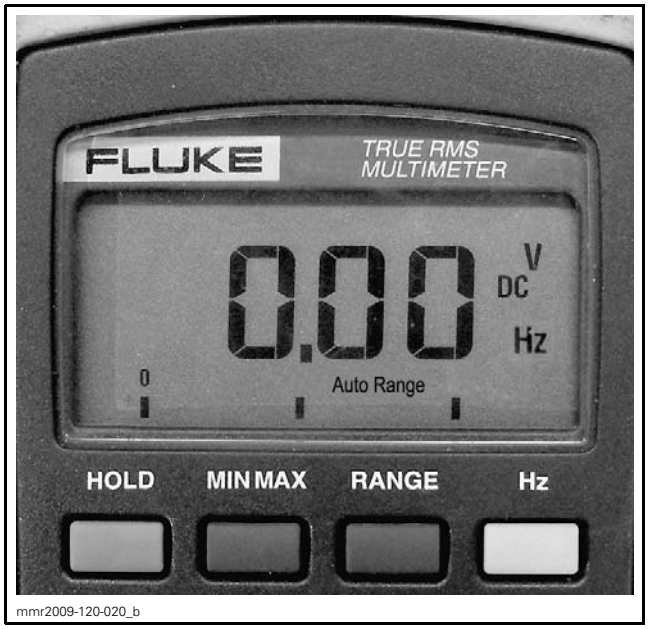
1. Connect vehicle to BUDS2 Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Press the START/STOP button to wake up the ECM.
3. Install the tether cord on the engine cut-off switch.
4. In BUDS2, select:
   - **Scan** button
   - **Functions** tab.
5. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and set it to Vdc.

NOTE: Make sure multimeter is in the **Auto Range** mode.



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6. Press the **Hz** button so that the display shows Hz.



mmr2009-120-020_b

7. Connect the multimeter probes as indicated in the following table and using the BUDS2 software, activate each injector and read the frequency on the multimeter.

NOTE: The multimeter counts the pulses per seconds (Hertz) of current the ECM sends to the injector.

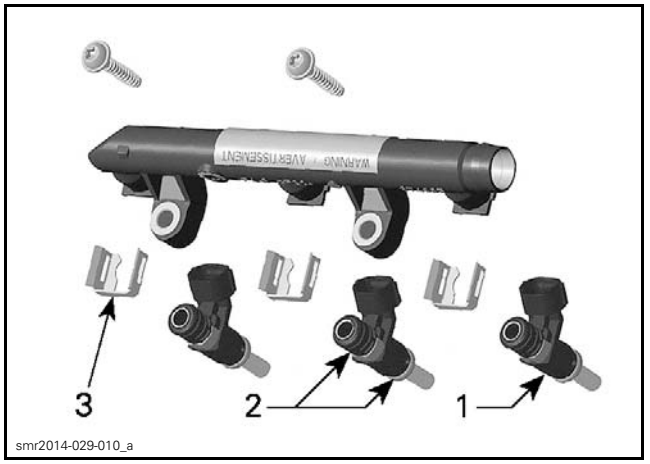
INJECTOR	INJECTOR CONNECTOR CONTACT	BATTERY	MEASUREMENT
No. 1	BROWN/RED wire	Battery ground	Approximately 40 Hz
No. 2	BROWN/BLUE wire		
No. 3	BROWN/Gray wire		

If there is a frequency reading, the control circuit is functional.

If there is no reading, check continuity of control circuit (ECM to injectors). Refer to *WIRING DIAGRAM* for circuit details.

Removing the Fuel Injector

1. Remove fuel rail and injectors as an assembly. Refer to *FUEL RAIL* in this subsection.
2. Remove the injector retaining clip.



smr2014-029-010_a

FUEL RAIL ASSEMBLY
1. *Fuel injector*
2. *O-rings*
3. *Injector retaining clip*

3. Pull the fuel injector out of the fuel rail and discard the O-rings..

Installing the Fuel Injector

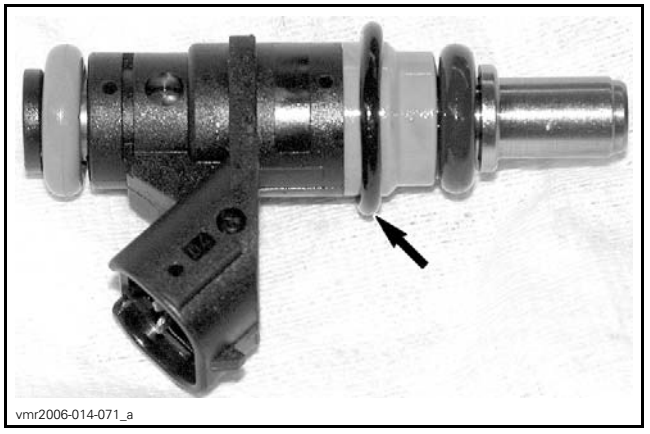
NOTICE If installing the removed injector(s), always install NEW O-rings.

1. Apply a thin film of engine oil to O-rings to prevent possible damage and to ease insertion in rail.

NOTICE Install fuel injector with your hand. Do not use any tool.

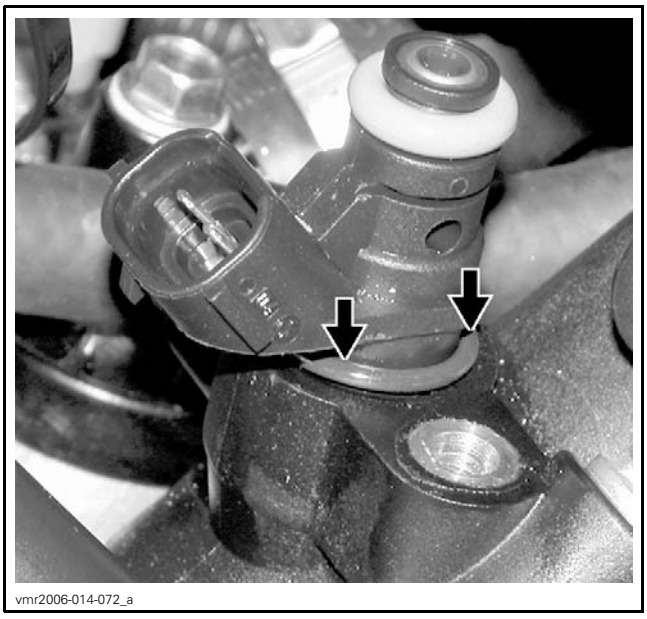
For the installation, reverse the removal procedure however, pay attention to the following details.

2. Ensure proper positioning of the intake manifold O-ring on injector as in following illustration.


vmr2006-014-071_a

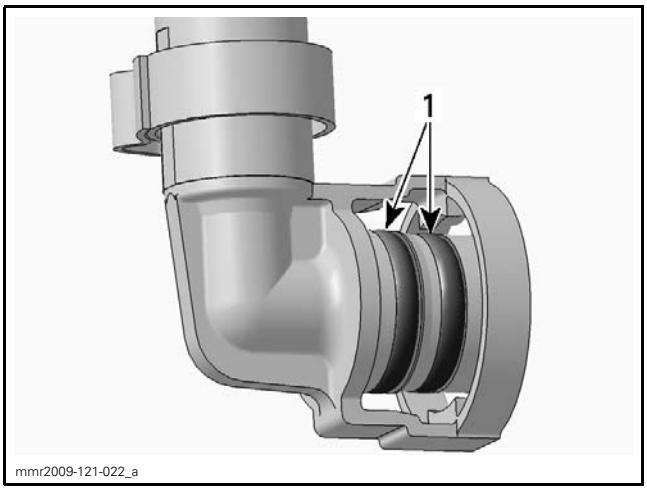
TYPICAL - INTAKE MANIFOLD O-RING POSITION

NOTICE Gently push O-ring in evenly all around while inserting injector. O-ring must be completely inserted and not visible, before completing the insertion of the injector.


vmr2006-014-072_a

TYPICAL

3. Firmly push injector in until it bottoms out.
4. Install fuel rail on injectors. Refer to *INSTALLING THE FUEL RAIL* in this subsection.
5. Apply engine oil on O-rings of fuel pressure hose fitting.



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FUEL PRESSURE HOSE FITTING
1. Apply oil on O-rings

6. Connect fuel pressure hose to fuel rail.

IMPORTANT: Push fuel hose fitting on fuel rail until you hear a "click". Try pulling on fuel hose fitting to ensure it is properly locked.

7. Pressurize the fuel system and check for fuel leaks. Refer to *FUEL SYSTEM PRESSURIZATION* in *FUEL TANK AND FUEL PUMP* subsection.

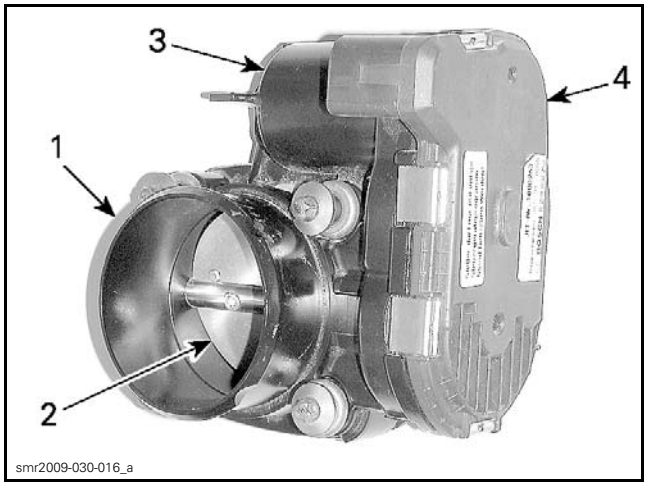
⚠ WARNING

Failure to pressurize the fuel system and checking for fuel leaks may result in severe injury or a life threatening situation should a leak occur.

8. Reinstall all remaining removed parts.

THROTTLE BODY

Throttle Body Description



smr2009-030-016_a

1. Throttle body
2. Throttle plate
3. Throttle actuator (electric motor inside)
4. Throttle position sensor (TPS) (inside)

Electric Throttle Actuator (ETA)

The electric throttle actuator (ETA) is a DC motor on the throttle body that regulates the throttle plate via a drive gear. It receives its control signal from the ECM. Pulse width modulation (PWM) is used to control the motor.

Throttle Plate Operating Positions

Two torsional springs are connected to the throttle plate. A main spring and another one in a plunger mechanism.

When there is no power to the throttle actuator (ETA), the plunger mechanism maintains the throttle plate at a rest position. This also serves as the limp home position.

When the throttle plate is opened by the ETA as commanded by the ECM, it acts against the main spring. If the ETA failed, the return spring would bring the throttle plate back to the limp home position.

ECM	ENGINE	THROTTLE BODY
OFF	Stopped	Throttle actuator: Off. Throttle plate: Rest position, maintained opened at approximately 8° (1). This is also the limp home position.
ON	Not started	Throttle actuator: On. Throttle plate: Moves from the rest position to approximately 15°. It then moves back to the rest position. This is the diagnostic mode where the rest position, actuator opening force to overcome the return springs and the motor return rate are monitored. If any of these parameters are out of range, a fault code is initiated.
ON	Started. Normal operation at idle	Throttle actuator: On. Throttle plate: Moves from the rest position to idle position (approximately 1-3°) according to ECM injection and ignition maps. Throttle plate is opened and closed as necessary to control the idle speed.
ON	Started. Normal operation at various RPM	Throttle actuator: On. Throttle plate: Opens and closes according to ECM torque management priorities.
(1) Degree values are given from the fully closed position.		

Throttle-Body Faults and Effects

NOTE: Among other things, a weak or broken spring and a sticky throttle plate are validated by the throttle body diagnostic mode.

FAULT	EFFECT
Partial failure of TAS sensor (one internal sensor only)	Limp home mode. Engine speed limited to idle. ECM will use the remaining TAS sensor. Fault code set and beeper activated to emit warning signals. Check engine light is turned ON. Driveability could be reset by releasing and reapplying the throttle.
Complete failure of TAS sensor (both internal sensors)	Limp home mode. Engine speed limited to 2500 RPM. Fault code set and beeper activated to emit warning signals. Check engine light is turned ON.
Any throttle body failure	Limp home mode. Engine speed limited to 2500 RPM. Engine speed can still be increased up to 3200 RPM using the throttle lever. Fault code set and beeper activated to emit warning signals. Check engine light is turned ON.
NOTE: When one of these faults is active, O.T.A.S. will continue to monitor its input signals. However, since the engine speed is limited, the O.T.A.S. will not be activated.	

Lubricating the Throttle Body

No lubrication is required.

Testing the Electric Throttle Actuator (ETA)

Electric Throttle Actuator (ETA) Test

1. Connect vehicle to BUDS2. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Press the START/STOP button to wake up the ECM.
3. Install the tether cord on the engine cut-off switch.
4. In BUDS2, select:
   - **Scan** button
   - **Setting** page tab.

NOTE: Use the **Setting** page to confirm ETA movement. The Measurements page will not read the actual ETA movement.

5. Slowly depress the throttle lever from the idle to WOT. The ETA should go from almost 10% to 100%.

If result is out of specification, carry out a *CLOSED THROTTLE RESET*. Refer to *ADJUSTMENT* in this subsection.

NOTE: The ETA is reset at the same time as the TPS.

After the reset, test ETA again.

If the result is still out of specification, check wire continuity between ECM and throttle body before assuming the ETA is at fault.

Inspecting the Throttle Body

Always check for corroded terminals or damaged wiring when diagnosing throttle body problems.

Throttle Body Dynamic Tests

1. Remove the parts required to access the throttle body, refer to *THROTTLE BODY REMOVAL.*
2. Remove the air inlet hose from the throttle body.
3. Observe the throttle plate with the engine stopped.

NOTE: The throttle plate should be in the rest position (slightly opened).

⚠ WARNING

Keep your fingers out of the throttle plate area while the ECM turns on. The throttle actuator will cycle. This could cause serious finger injuries as throttle plate quickly moves.

4. As you observe the throttle plate, have someone press the START/STOP button to wake up the ECM.

NOTE: The throttle plate should cycle quickly from the rest position to a partially open position (approximately 15°), then back to the rest position.

5. Install the tether cord on the engine cut-off switch.

NOTE: The throttle plate should cycle again.

6. As you observe the throttle plate, have someone gradually and evenly pull in the throttle lever, then release it in the same way.

NOTE: The throttle plate should open then close according to throttle lever position however, the movement of the throttle plate may not be linear with the displacement of the throttle lever.

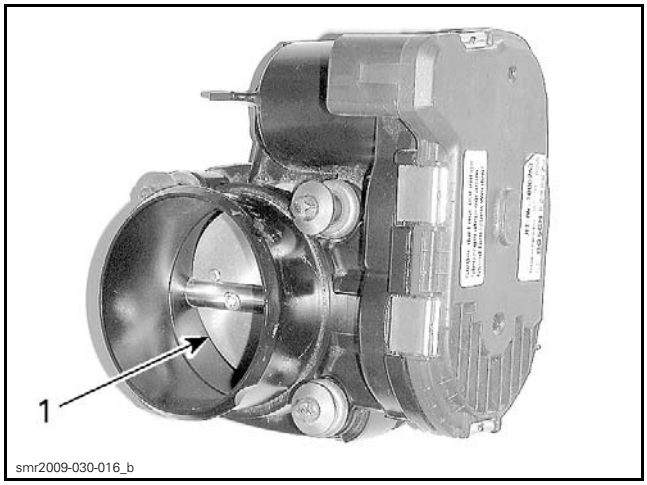
If any test failed, proceed with the *THROTTLE BODY STATIC TESTS.*

Throttle Body Static Tests

⚠ WARNING

First ensure the ECM is off. Do not move the throttle plate using your fingers. Otherwise, should the START/STOP button be pressed, the ECM would turn on and quickly cycle the throttle plate which could cause serious finger injury.

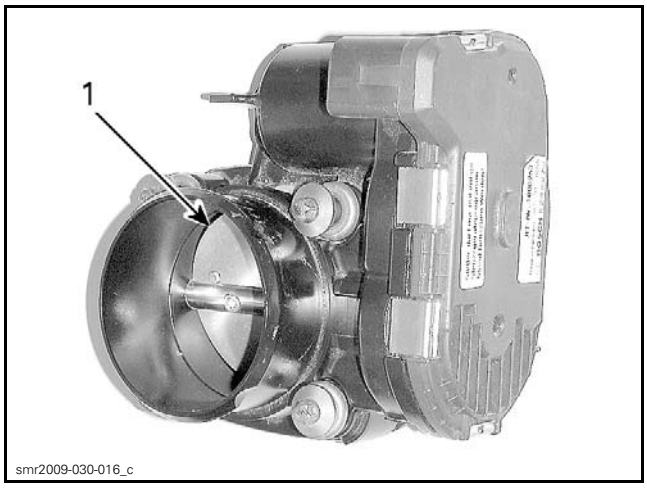
1. Using a blunt tool, push in on the throttle plate and ensure it opens smoothly within the throttle body.



1. Push here to open

NOTE: The throttle plate must open fully and return freely to the rest position (slightly opened) when released.

2. Push throttle plate closed as indicated in following illustration. It must close completely and return freely to the rest position (slightly opened) when released.



1. Push here to close

If the throttle plate does not move smoothly or does not return freely to the rest position, the problem is mechanical. Check for salt accumulation on throttle plate shaft. It may also be an actuator or gear problem. Replace throttle body as necessary.

If throttle plate operates normally, the problem is electrical. Check electric throttle actuator (ETA) wiring continuity, throttle position sensor (TPS) and throttle accelerator sensor (TAS).

⚠ WARNING

If the throttle plate does not return to its rest position properly after a proper cleaning, replace the throttle body.

Cleaning the Throttle Body

Remove the parts required to access the throttle body, refer to *REMOVING THE THROTTLE BODY*.

Check throttle body cleanliness using a flashlight. Fully open throttle plate and verify:

– Throttle body bore
– Throttle plate edge.

Look for:

– Dirt
– Oily surfaces
– Carbon and salt deposits on throttle plate and the surrounding bore.

Clean as necessary.

NOTICE **Only use an appropriate throttle body cleaner that will not damage O-rings and EFI sensors.**

⚠ WARNING

Use the product in well ventilated area. Refer to product manufacturer's warnings. Wipe off any product leakage in bilge.

To avoid getting dirt into engine, spray cleaner on a clean rag (outside the bilge) then rub rag against throttle plate and bore. A toothbrush works well too.

⚠ WARNING

First ensure ECM is off. Otherwise, if ECM should suddenly turn off, it would quickly close the throttle plate which could cause serious finger injury.

Manually open throttle and hold fully open to reach all surfaces.

⚠ WARNING

Ensure nobody presses the START/STOP button. The ECM would turn on and the throttle actuator (ETA) would cycle. This could cause serious finger injury as the throttle plate moves quickly.

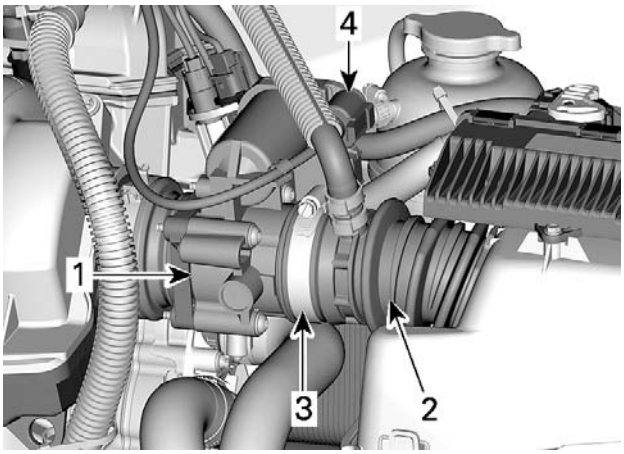
To remove residual dirt, spray cleaner on throttle plate and on bore.

Reinstall removed parts.

Replacing the Throttle Body

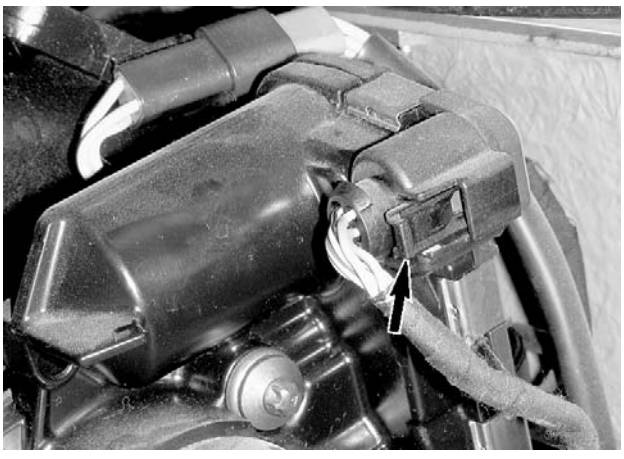
Removing the Throttle Body

1. Remove central body. Refer to *BODY* subsection.
2. Disconnect inlet hose from throttle body.
3. Disconnect throttle body connector.



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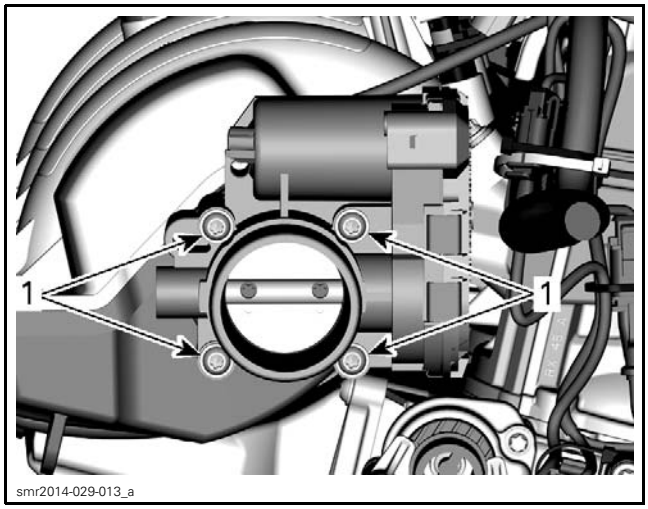
TYPICAL
1. *Throttle body*
2. *Inlet hose*
3. *Inlet hose clamp*
4. *Throttle body connector*



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PRESS HERE TO UNLOCK

4. Remove retaining screws from throttle body.



1. Throttle body screws

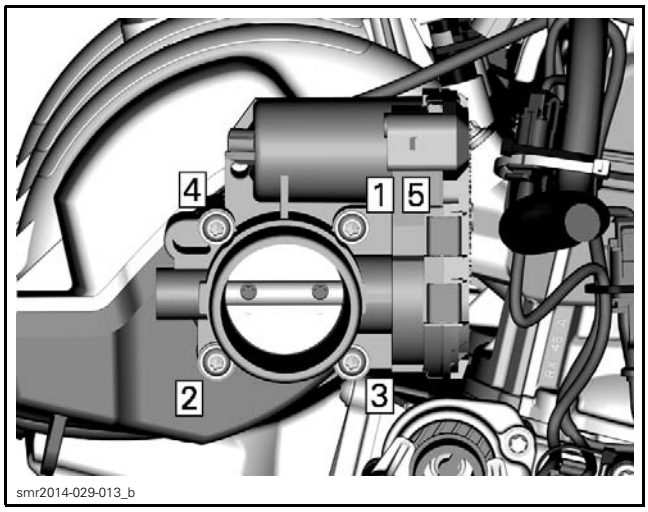
5. Pull throttle body off intake manifold.

Installing the Throttle Body

Installation of the new throttle body is the reverse of the removal procedure. However, pay attention to the following.

1. Tighten retaining screws to specification as per following sequence.

TIGHTENING PROCEDURE		
Throttle body screws	Step 1	5 N•m ± 0.6 N•m (44 lbf•**in** ± 5 lbf•**in**)
	Step 2 through 5	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)



2. Perform the *CLOSED THROTTLE RESET*. See procedure in *ADJUSTMENTS*.

IGNITION COILS AND SPARK PLUGS

SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	146

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 767 (ANTI-SEIZE LUBRICANT)	293 800 070	148

GENERAL

⚠ WARNING

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

Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

⚠ WARNING

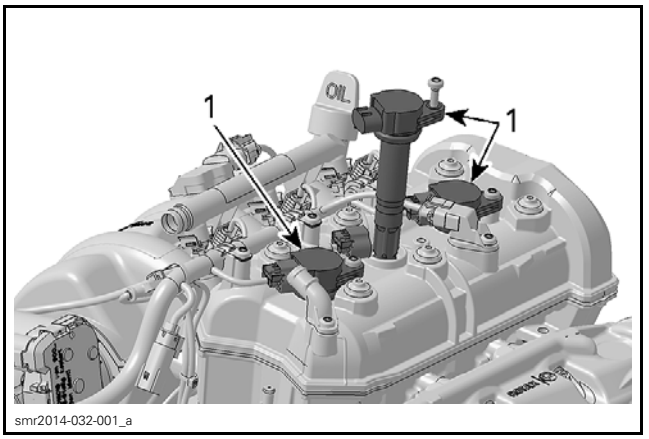
Never check for engine ignition spark from an open coil and/or spark plug as spark may cause potential fuel vapors to ignite. Always use an approved spark tester.

SYSTEM DESCRIPTION

The ignition system is a digital inductive type (IDI) system.

Ignition system parameters such as ignition timing, spark duration, and firing order, as well as many other engine related functions are controlled by the engine management system (EMS) in order to meet engine operational requirements. The EMS can detect many abnormalities including a short circuit in the primary winding of the ignition coils as well as its associated circuits.

Three direct ignition coils receive power from the fuse F3 through the relay.

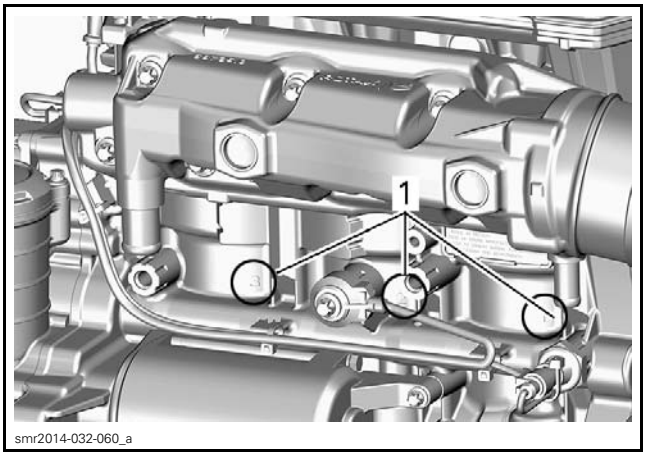


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1. Ignition coils

When a ground signal is provided by the ECM, the primary ignition coil winding starts charging. When the ECM releases the ground signal, a high voltage is induced in the coil secondary winding that is used to produce a spark at the spark plug electrode.

Cylinder 1 is located on the PTO side of the engine. Each cylinder is identified by a number on cylinder block housing.



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1. Cylinder identification numbers

Ignition Timing

Ignition timing is not adjustable.

The ECM is programmed with data (ignition mappings) that it uses to establish optimum ignition timing under all engine operating conditions.

It receives signals from a variety of sensors that it compares with the ignition mappings and uses it to control the ignition spark timing, duration and firing order.

The firing of each spark plug is independent of the others.

Engine RPM Limiter

The ECM will limit the maximum engine speed by cutting off ignition spark and fuel at a predetermined engine RPM.

ENGINE SPEED LIMITER SETTING	8300 RPM

Knock Sensor

A knock sensor is mounted on the cylinder block below the exhaust manifold, see *ENGINE MANAGEMENT SYSTEM (EMS)* subsection. It detects specific vibrations that would typically be generated by engine detonation.

If detonation occurs, the knock sensor detects it and the ECM goes into a specific operating mode whereby it temporarily retards the ignition advance until detonation stops.

The ECM is able to identify in which cylinder the knocking occurs and modifies the ignition advance on that cylinder only.

Refer to the *ELECTRONIC FUEL INJECTION (EFI)* subsection for testing and replacement procedures.

TROUBLESHOOTING

It is good practice to check for fault codes using BUDS2 as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Refer to *POWER DISTRIBUTION AND GROUNDS* for fuses and relay information.

Always refer to the *WIRING DIAGRAM* when troubleshooting an electrical circuit.

IGNITION SYSTEM TESTING

The ECM controls the ignition system.

If a fault is detected by the ECM, the check engine light will turn on.

The ECM can detect a problem on the primary winding or circuit of the ignition coils.

The secondary winding of the ignition coils is not monitored by the ECM.

Other sensors in relation with the ignition system are also monitored by the ECM.

Ignition System Testing Sequence

Check for fault codes using BUDS2 software as a first troubleshooting step. Refer to *DIAGNOSTIC SYSTEM AND FAULT CODES* subsection.

Ensure fuse F3 and relay are powered and in good condition.

If a fuse is burnt, test for a short circuit or faulty component on that fuse circuit before replacing the fuse.

⚠ WARNING

Due to the possibility of flammable vapors accumulating in the bilge, you should always test for a short circuit which may produce a spark and ignite the vapors before replacing a burnt fuse.

Check ignition spark, refer to *IGNITION COIL QUICK TEST USING BUDS2* in this subsection.

DIAGNOSTIC GUIDELINES

The following is provided to help in diagnosing the probable cause of a problem. It is a guideline and should not be assumed to list all possible causes.

ENGINE WILL NOT STOP WHEN REMOVING KEY FROM ENGINE CUT-OFF SWITCH

1. Defective engine cut-off switch
   - *Check engine cut-off switch. Replace if necessary.*

ENGINE WILL NOT START (ENGINE TURNS OVER)

1. Fouled or defective spark plug
   - *Check spark plug condition. Replace if necessary.*
2. Defective CPS
   - *Test CPS, refer to ELECTRONIC FUEL INJECTION (EFI) subsection.*
3. Defective trigger wheel
   - *Check. Refer to MAGNETO AND STARTER subsection.*
4. Defective ignition circuit
   - *Check fuses, ignition coils, wiring and connectors.*

ENGINE HARD TO START

1. Faulty, fouled or worn out spark plug
   - *Check spark plug condition. Replace if necessary.*
2. Drowned engine
   - *Check engine temperature value using BUDS2. monitoring page. If the temperature read is lower than the ambient temperature, CTS sensor may be defective or have a bad connection. Therefore, the ECM would erroneously set the engine in cold start mode and it could flood the spark plugs.*

ENGINE MISFIRES, RUNS IRREGULARLY

1. Fouled, defective, worn spark plugs
   - *Check spark plug condition. Replace if necessary.*
2. Damaged trigger wheel/loose CPS
   - *Check. Refer to MAGNETO AND STARTER subsection.*
3. Defective ignition circuit
   - *Check fuses, ignition coils, wiring and connectors.*
4. Poor engine grounds
   - *Check ground condition, refer to POWER DISTRIBUTION AND GROUNDS subsection.*

ENGINE CONTINUALLY BACKFIRES

1. Fouled, defective spark plugs
   - *Check spark plug condition. Replace if necessary.*
2. Damaged trigger wheel/defective or loose CPS
   - *Check, refer to MAGNETO AND STARTER and ELECTRONIC FUEL INJECTION (EFI) subsections.*

ENGINE DETONATION OR PINGING

1. Faulty or disconnected knock sensor
   - *Check, refer to ELECTRONIC FUEL INJECTION (EFI) subsection.*

ENGINE LACKS ACCELERATION OR POWER

1. Weak spark
   - *Check spark plugs, coils, wiring and connections.*

PROCEDURES

IGNITION COILS

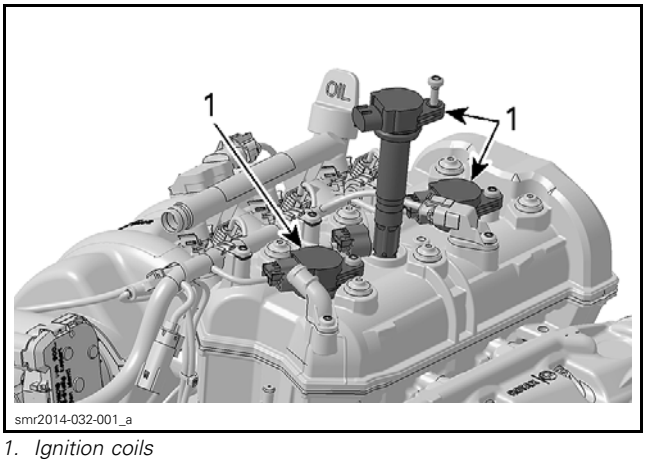
⚠ WARNING

Never check for engine ignition spark from an open coil and/or spark plug in the engine compartment as a spark may cause fuel vapors which may have accumulated in the bilge to ignite.

Ignition Coil Location

1. Remove the seat.

Ignition coils are located on top of the valve cover.



1. Ignition coils

Testing Ignition Coils Using BUDS2

1. Connect BUDS2. Refer to *COMMUNICATION TOOLS* subsection.
2. Select the **Functions** page.
3. Activate the ignition coil to be tested.

You should hear the spark occurring. If in doubt, use a sealed **vapor proof** spark tester or an inductive spark tester as available from tool suppliers, to prevent a spark from occurring in the bilge.

If there is no ignition at one or more coils, carry out a *TESTING IGNITION COIL INPUT VOLTAGE*.

If spark is weak, try a new spark plug. If spark is still weak, try a new ignition coil.

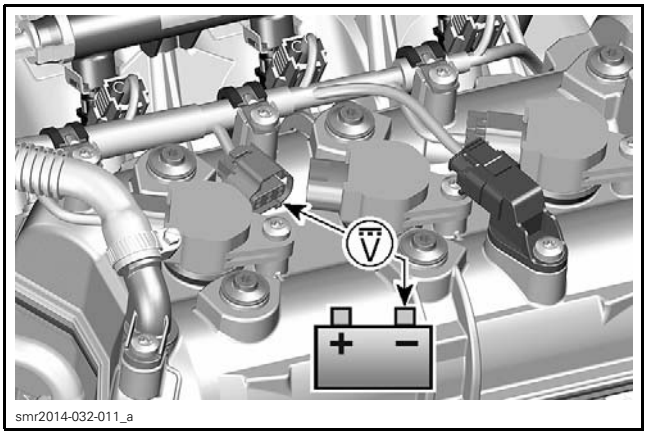
NOTE: The voltage required to produce a spark in the combustion chamber is higher when the engine is running.

Testing Ignition Coil Input Voltage

Make sure fuse F3 and the relay are good before testing.

1. Disconnect the applicable ignition coil connector.
2. Remove tether cord from the engine cut-off switch.
3. Set the multimeter to Vdc.
4. Press the START button to activate the ECM.
5. Measure voltage.

TEST PROBES		VOLTAGE
VIOLET/BLUE wire (ignition coil no. 1)	Battery ground	Battery voltage
VIOLET/GREEN wire (ignition coil no. 2)		
VIOLET/ORANGE wire (ignition coil no. 3)		



IGNITION COIL INPUT VOLTAGE TEST

If test succeeds, carry out an *TESTING IGNITION COIL RESISTANCE*.

If test fails, carry out an *TESTING IGNITION COIL POWER CIRCUIT CONTINUITY*.

Testing Ignition Coil Power Circuit Continuity

1. Set the multimeter to Ω.
2. Read resistance of the desired ignition coil circuit.

IGNITION COIL	IGNITION COIL WIRE	FUSE BOX	MEASUREMENT
1 (rear)	VT/BU	Terminal A4	Close to 0 Ω
2	VT/GN		
3	VT/OG		

If test fails at any ignition coil, test the following items separately and repair/replace wiring or terminals from fuse box to the applicable ignition coil. Refer to *WIRING DIAGRAM* for details.

– Wiring from fuse box to engine connector
– Wiring from engine connector to ignition coil.

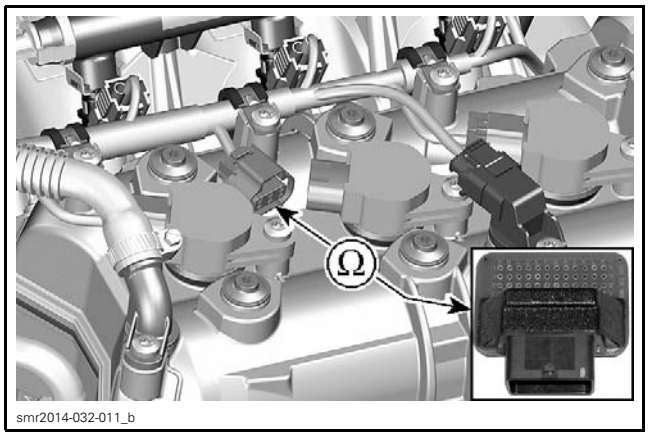
Testing Ignition Coil Control Circuit Continuity

1. Disconnect ECM connector "A". For connector identification, refer to *WIRING HARNESS AND CONNECTOR* subsection.
2. Connect ECM connector to the ECM adapter tool.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

3. Disconnect ignition coil connector.
4. Test for continuity of circuit as per following table.

IGNITION COIL	IGNITION COIL WIRE	ECM ADAPTER	RESISTANCE
Cylinder 1 (rear)	BN/BK	ECMA-M4	Close to 0 Ω (continuity)
Cylinder 2	BN/OG	ECMA-M2	
Cylinder 3	BN/YE	ECMA-M1	



IGNITION COIL CONTROL CIRCUIT TEST

If test fails, repair the connector or replace the engine wiring harness.

Testing Ignition Coil Resistance

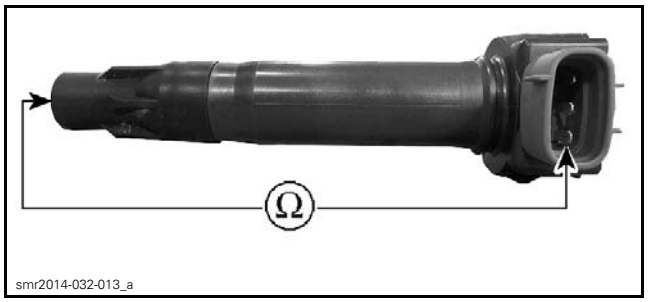
An ignition coil with a good resistance measurement can still be faulty. Current leakage can occur at high voltage levels which is not detectable with an ohmmeter. Replacing the ignition coil may be necessary as a test.

1. Remove ignition coil. Refer to *REMOVING THE IGNITION COIL* in this subsection.
2. Perform a visual inspection of the ignition coils. Check for corrosion, bent pins, loose or burnt contacts, and cracked or torn insulator.
3. Using a multimeter, test the resistance in both primary and secondary windings.



PRIMARY WINDING

CIRCUIT	TERMINAL	RESISTANCE @ 20°C (68°F)
Primary winding	1 and 2	0.85 - 1.15 Ω



SECONDARY WINDING

CIRCUIT	TERMINAL	RESISTANCE @ 20°C (68°F)
Secondary winding	1 and spark plug terminal	9.5 - 13.5 kΩ

If any test fails, replace ignition coil.

If test succeeds, carry out an *TESTING IGNITION COIL CONTROL CIRCUIT CONTINUITY*.

Removing the Ignition Coil

1. Disconnect ignition coil connector.
2. Remove ignition coil retaining screw.

NOTICE **Do not pry on ignition coil with a tool.**

3. Remove ignition coil from spark plug by rotating coil side to side as you pull up.

Installing the Ignition Coil

Install the ignition coil on the spark plug.

Align the retaining screw hole of the ignition coil with the threaded hole on the valve cover.

Push the ignition coil all the way down until it rests on the valve cover.

Install and tighten retaining screw.

TIGHTENING TORQUE	
Ignition coil retaining screw	9 N•m ± 1 N•m (80 lbf•**in** ± 9 lbf•**in**)

Connect ignition coil connector.

SPARK PLUG

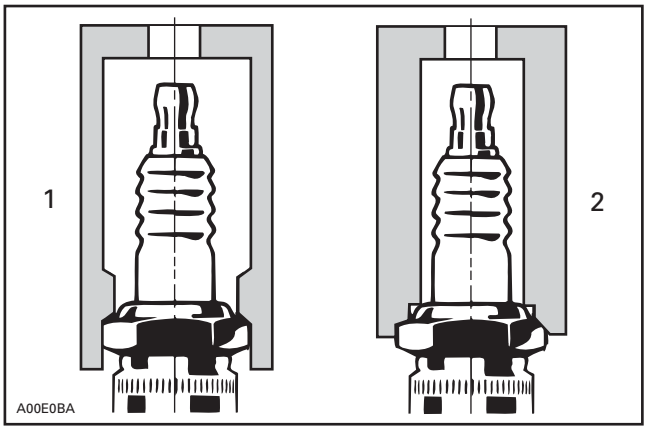
Removing the Spark Plug

1. Remove ignition coil. Refer to *REMOVING THE IGNITION COIL* in this subsection.

⚠ WARNING

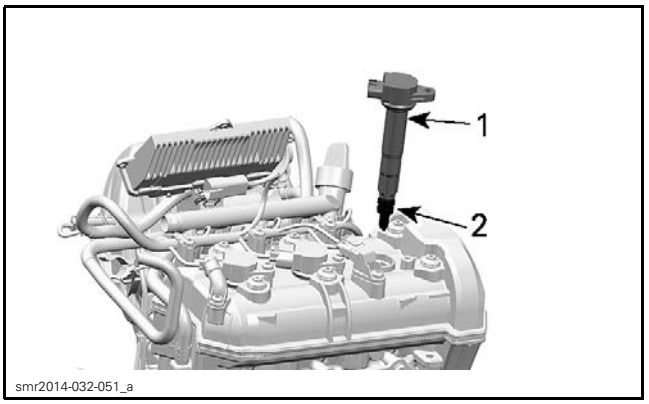
Never remove an ignition coil from a spark plug without disconnecting it from the wiring harness. Flammable vapors may be present in the bilge. Should the tether cord be installed on the engine cut-off switch, a spark could be generated at the spark plug end of the coil possibly resulting in an explosion.

2. Using a spark plug socket, release the torque applied to the spark plug.



1. Approved socket
2. Improper socket

3. Clean the spark plug and cylinder head with pressurized air.
4. Unscrew spark plug then use the ignition coil to take spark plug out of spark plug hole.



1. Ignition coil
2. Spark plug

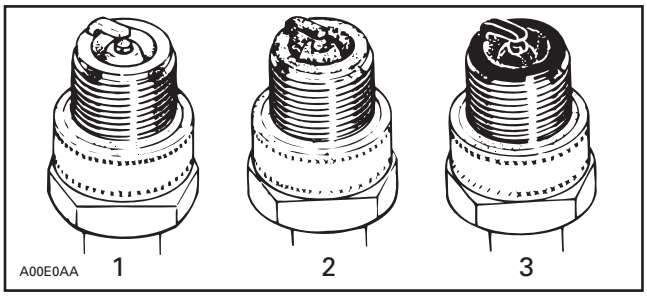
Troubleshooting a Fouled Spark Plug

Fouling of the spark plug is indicated by irregular running or misfiring of the engine, decreased engine speed due to misfiring, reduced performance, and increased fuel consumption.

Other possible causes are: use of an incorrect or bad fuel, defective ignition system, incorrect spark plug gap, loss of compression, or lubricating oil entering the combustion chamber.

The plug face of a fouled spark plug has either a wet or dry black carbon deposit. Such coatings form a conductive connection between the center electrode and the ground electrode.

Spark Plug Analysis



TYPICAL
1. Overheated (light gray, white)
2. Normal (light brown, brown)
3. Fouled (black, wet or dry, dark deposits, gray, melted coating)

The plug face reveals the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at prescribed intervals, examining the plug face (i.e. the part of the plug projecting into the combustion chamber).

Installing the Spark Plug

Prior to installation, ensure the contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, check electrode gap as specified in *TECHNICAL SPECIFICATIONS*.
2. Apply LOCTITE 767 (ANTI-SEIZE LUBRICANT) (P/N 293 800 070) over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head. Then, tighten the spark plug to specification with an approved spark plug socket.

TIGHTENING TORQUE	
Spark plug	13 N•m ± 1 N•m (115 lbf•**in** ± 9 lbf•**in**)

4. Install ignition coil. Refer to *INSTALLING THE IGNITION COIL* in this subsection.
5. Complete the installation in the reverse order of the removal.

ENGINE

ENGINE			
Engine type			ROTAX® 900 ACE and 900 ACE HO 4-stroke, Double Over Head Camshaft (DOHC), dry sump, liquid cooled
Number of cylinders			3
Number of valves			12 valves (self adjusting hydraulic valve lifters)
Bore			74 mm (2.91 in)
Stroke			69.7 mm (2.74 in)
Displacement			899.31 cm³ (54.88 in³)
Compression ratio			11.0 : 1
Maximum HP RPM			8000 (± 100) RPM
Intake valve opening			5° ATDC
Intake valve closing			40° ABDC
Exhaust valve opening			40° BBDC
Exhaust valve closing			5° BTDC
Valve stem diameter	Intake	New	4.958 mm to 4.972 mm (.1952 in to .1957 in)
		Service limit	4.940 mm (.1945 in)
	Exhaust	New	4.956 mm to 4.970 mm (.1951 in to .1957 in)
		Service limit	4.940 mm (.1945 in)
Valve guide diameter		New	5.0 mm to 5.012 mm (.1969 in to .1973 in)
		Service limit	5.050 mm (.1988 in)
Valve out of round		New	0.005 mm (.0002 in)
		Service limit	0.060 mm (.0024 in)
Valve spring free length		New	31.35 mm (1.2343 in)
		Service limit	29.50 mm (1.1614 in)
Valve seat contact width	Intake	New	1.05 mm to 1.35 mm (.0413 in to .0531 in)
		Service limit	1.70 mm (.0669 in)
	Exhaust	New	1.25 mm to 1.45 mm (.0492 in to .0571 in)
		Service limit	1.80 mm (.0709 in)
Cylinder head warpage		Service limit	0.15 mm (.0059 in)
Piston measurement		New	73.95 mm to 73.966 mm (2.9114 in to 2.912 in)
		Service limit	73.920 mm (2.9102 in)

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ENGINE			
Piston/cylinder wall clearance		New	0.037 mm to 0.067 mm (.0015 in to .0026 in)
		Service limit	0.080 mm (.0031 in)
Piston ring type		1st	Upper compression ring, rectangular
		2nd	Lower compression ring, tapered face
		3rd	Oil scraper ring
Ring end gap	Rectangular	New	0.20 mm to 0.35 mm (.0079 in to .0138 in)
		Service limit	1.20 mm (.0472 in)
	Taper-face	New	0.30 mm to 0.50 mm (.0118 in to .0197 in)
		Service limit	1.20 mm (.0472 in)
	Oil scraper ring	New	0.20 mm to 0.70 mm (.0079 in to .0276 in)
		Service limit	1.20 mm (.0472 in)
Ring/piston groove clearance	Rectangular	New	0.030 mm to 0.066 mm (.0012 in to .0026 in)
		Service limit	0.120 mm (.0047 in)
	Taper-face	New	0.020 mm to 0.056 mm (.0008 in to .0022 in)
		Service limit	0.120 mm (.0047 in)
	Oil scraper ring	New	0.010 mm to 0.040 mm (.0004 in to .0016 in)
		Service limit	0.150 mm (.0059 in)
Cylinder bore		New	74.003 mm to 74.017 mm (2.9135 in to 2.9141 in)
Cylinder taper		Maximum New	0.030 mm (.0012 in)
		Service limit	0.050 mm (.002 in)
Cylinder out of round		Maximum New	0.008 mm (.0003 in)
		Service limit	0.03 mm (.0012 in)
Camshaft bearing journal diameter	PTO	New	25.967 mm to 25.980 mm (1.0223 in to 1.0228 in)
		Service limit	25.940 mm (1.0213 in)
	MAG/Center	New	22.957 mm to 22.970 mm (.9038 in to .9043 in)
		Service limit	22.930 mm (.9028 in)
Camshaft holder bore diameter	PTO	New	26.00 mm to 26.021 mm (1.0236 in to 1.0244 in)
		Service limit	26.05 mm (1.0256 in)
	MAG/Center	New	23.00 mm to 23.021 mm (.9055 in to .9063 in)
		Service limit	23.05 mm (.9075 in)

ENGINE			
Camshaft journal radial play	All	New	0.020 mm to 0.054 mm (.0008 in to .0021 in)
		Service limit	0.080 mm (.0031 in)
Camshaft lobe height	Intake	New	38.35 mm to 38.55 mm (1.51 in to 1.518 in)
		Service limit	38.33 mm (1.509 in)
	Exhaust	New	38.35 mm to 38.55 mm (1.51 in to 1.518 in)
		Service limit	38.33 mm (1.509 in)
Crankshaft bearing journal diameter		New	35.990 mm to 36.006 mm (1.4169 in to 1.4176 in)
		Service limit	35.960 mm (1.4157 in)
Crankshaft radial play		Service limit	0.08 mm (.003 in)
Crankshaft pin diameter		New	35.979 mm to 35.995 mm (1.416 in to 1.417 in)
		Service limit	35.969 mm (1.416 in)
Crankshaft axial play		New	0.120 mm to 0.353 mm (.0047 in to .0139 in)
		Service limit	0.450 mm (.0177 in)
Crankshaft deflection (maximum)		MAG	0.050 mm (.002 in)
		CENTER	0.050 mm (.002 in)
		PTO	0.080 mm (.003 in)
Crankshaft plain bearing inside diameter		Service limit	36.08 mm (1.4205 in)
Connecting rod big end diameter		Service limit	36.06 mm (1.4197 in)
Connecting rod big end radial play		Service limit	0.08 mm (.0031 in)
Connecting rod big end axial play		New	0.100 mm to 0.352 mm (.0039 in to .0139 in)
		Service limit	0.450 mm (.0177 in)
Connecting rod small end diameter		New	17.010 mm to 17.020 mm (.6697 in to .6701 in)
		Service limit	17.060 mm (.6717 in)
Piston pin diameter		New	16.996 mm to 17.000 mm (.6691 in to .6693 in)
		Service limit	16.986 mm (.6687 in)
Connecting rod small end radial play		Service limit	0.04 mm (.0016 in)
Chain guide groove depth		Service limit	1 mm (.039 in)

AIR INTAKE SYSTEM	
Intake spark arrestor	Tubular, wire screen

LUBRICATION SYSTEM		
Type		Dry sump. Replaceable oil filter
Oil filter		BRP Rotax paper type, replaceable
Engine oil	Capacity (oil change with filter)	1.8 L (1.9 qt (U.S. liq.))
	Capacity (dry fill)	3.5 L (3.7 qt (U.S. liq.))
	Recommended	XPS 4-Stroke synthetic blend oil (Summer) (P/N 293 600 121) (if not available, use a SAE 5W 40 or 10W 40 API service SN synthetic oil)
Engine oil pressure at 100°C (212°F)	Minimum	80 kPa (11.6 PSI) @ idle speed
		350 kPa (51 PSI) @ 6000 to 8000 RPM
Oil pressure regulator spring free length	New	46 mm (1.811 in)
	Service limit	45 mm (1.772 in)
Oil pump radial clearance	Service limit	0.25 mm (.0098 in)
Oil pump axial clearance	Service limit	0.15 mm (.0059 in)

COOLING SYSTEM		
Type		Closed loop cooling system
Coolant		Ethyl glycol and distilled water (50%/50%) or coolant specifically formulated for aluminum engines For best performance use BRP LONG LIFE ANTIFREEZE (P/N 219702685) or (P/N 619590204)
Thermostat opening temperature		80°C (176°F)
Monitoring beeper setting		100°C (212°F)

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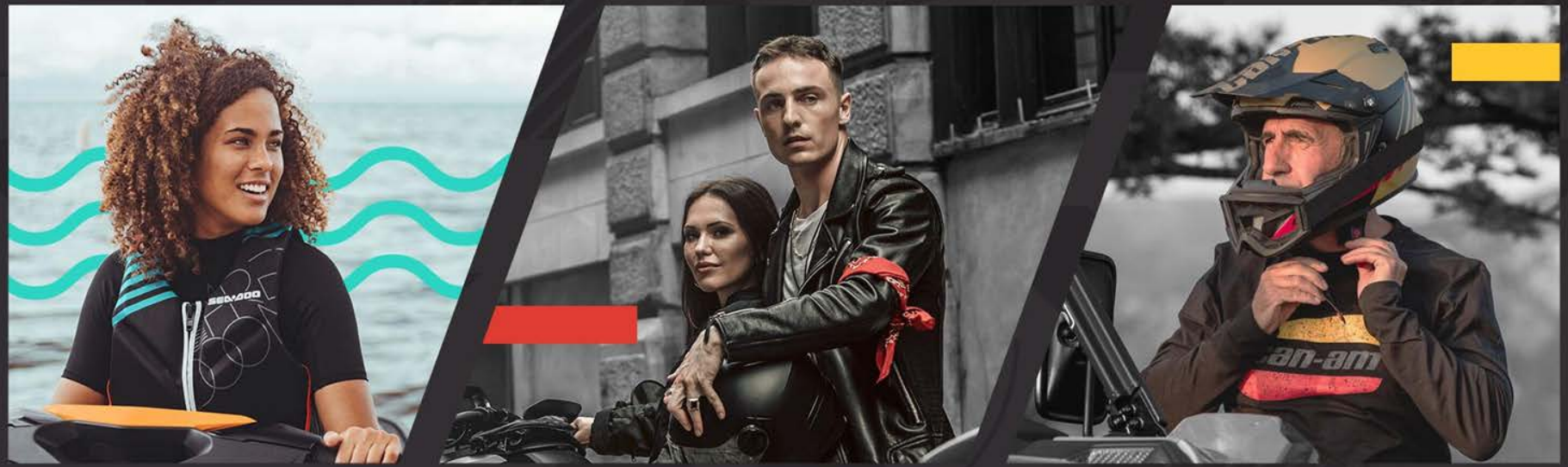
FUEL SYSTEM		
Fuel injection type		Multipoint fuel injection
Throttle body type		46 mm heated Dell'Orto throttle body with iTC (intelligent Throttle Control)
Fuel injector	Quantity	3
Idle speed	Normal idle	1400 ± 100 RPM

ELECTRICAL SYSTEM	
Magneto generator output	420 W @ 6000 RPM @ 14 V
Magneto stator resistance (between any pair of yellow wires)	0.1 to 1 Ω @ 20°C (68°F)

ELECTRICAL SYSTEM		
Ignition type		IDI (Inductive Digital Ignition)
Ignition timing		Variable (electronically control)
Spark plug	Make and type	NGK CR8EB
	Gap	.70 mm to 0.80 mm (.028 in to .031 in)
Ignition coil	Primary	0.80 to 0.97 Ω
	Secondary	9.5 to 13.5 Ω
Engine speed limiter setting		8300 RPM

CLUB BRP 2022

SEA-DOO can-am



SEA-DOO WHAT'S NEW – PWC

11 / AUGUST / 2021

OVER THE YEARS, SEA-DOO HAS INTRODUCED REVOLUTIONARY NEW MODELS OFFERING AN INDUSTRY LEADING EXPERIENCE ACROSS ALL SEGMENTS

2018

Revolutionary new platform

GTX / WAKE PRO / RXT



2019

1st purpose-built fishing PWC

FISHPRO



2020

Unmatched value

GTI / WAKE / GTR



2021

Unbeatable Performance

RXP-X



FULLY REVAMPED LINE-UP

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

1

Grow the sport fishing segment by launching a complete fishing ecosystem and model line-up

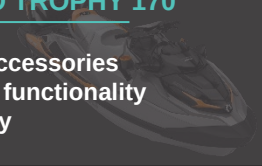
1) FISHPRO SCOUT 130

- Added Storage
- Improved Comfort
- Extended Technology



2) FISHPRO TROPHY 170

- Additional Fishing Accessories
- Enhanced comfort & functionality
- Extended Technology

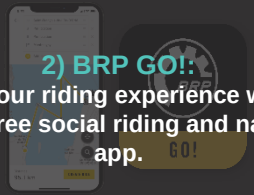


2

Enhance the consumer experience with further deployment of the full color LCD display & iDF System



1) High-resolution full color display:
The most innovative gauge in the industry, now available on more models



2) BRP GO!:
Boost your riding experience with an intuitive, free social riding and navigation app.



3) iDF System:
The industry-first debris-free system is now available on more models.

3

Leverage beyond the ride opportunities with increased innovative cargo storage solution

The beginning of a new era of modularity and versatility opens up opportunities for new waterborne experiences



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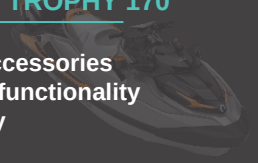
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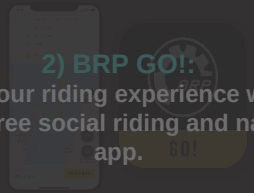


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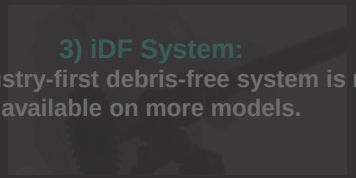
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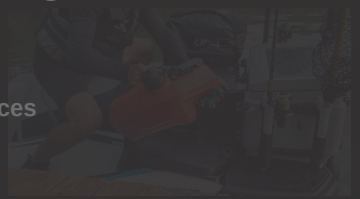


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RECREATIONAL FISHING IS ONE OF THE MOST PRACTICED OUTDOOR ACTIVIIES WORLDWIDE



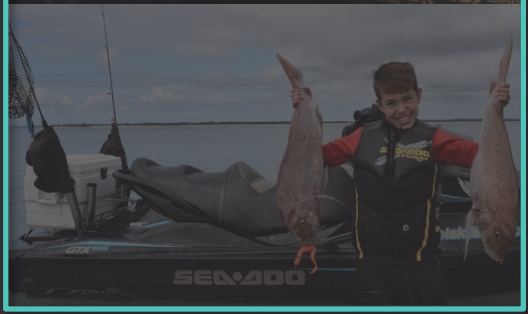
Over 700 million anglers
participate in recreational fishing worldwide

approximately $190 Billion
Is annually spending related to recreational fishing

RECREATIONAL FISHING IS ONE OF THE MOST PRACTICED OUTDOOR ACTIVIIES WORLDWIDE



Over the past decade, the trend of PWC's accessorized for fishing has steadily increased.



In 2019, Sea-Doo took the fishing experience to the next level with the industry's first dedicated fishing model

THE FIRST PURPOSE-BUILT FISHING PWC

FishPro



1 Sport fishing is now the fastest growing segment in the PWC industry

2 65%+ of customers are NEW ENTRANTS to PWC

FISHPRO CONTINUES TO DRIVE NEW OPPORTUNITIES

1

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

Grow the sport fishing segment by launching a complete fishing ecosystem and model line-up.

AFFORDABLE FISHING EXPERIENCE **TO** **SUPERIOR FISHING EXPERIENCE**

FishPro SCOUT 130



FishPro SPORT 170



FishPro TROPHY 170



OCCASIONAL FISHERMAN

AVID FISHERMAN

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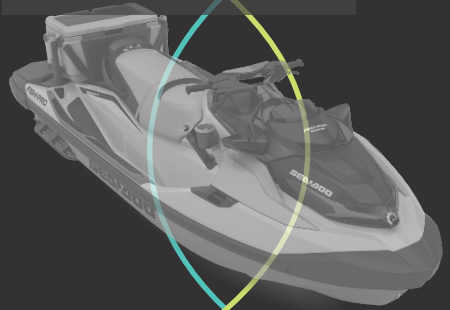
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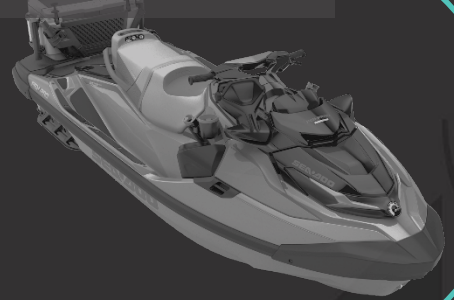
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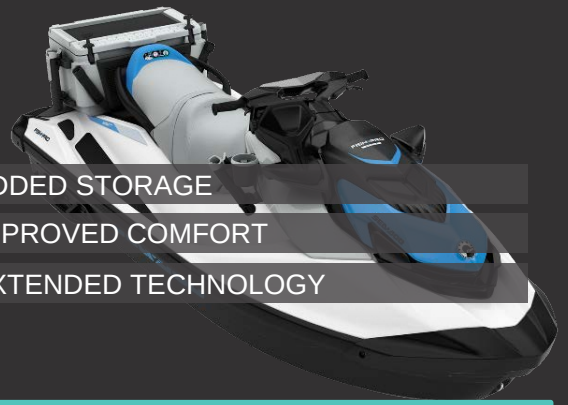
GTI SE 130



SAME PLATFORM

FishPro SCOUT 130

Accessible all-around fishing experience



+ ADDED STORAGE
+ IMPROVED COMFORT
+ EXTENDED TECHNOLOGY

Nimble and lightweight platform ideal for both fishing adventures and recreational purposes.

1

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Grow the sport fishing segment by launching a complete fishing ecosystem and model line-up.

ADDED STORAGE | IMPROVED COMFORT | EXTENDED TECHNOLOGY

51L LINQ FISHING COOLER

- Large rugged design
- Easy to install in seconds thanks to the LinQ cargo system located on the swim platform
- This purpose-built cooler includes everything you need to fish on a PWC



3 x ROD HOLDERS

- Store your rods in a space-saving and secure location
- With two angled trolling slots, set your rods in the perfect position for trolling.





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ADDED STORAGE | IMPROVED COMFORT | EXTENDED TECHNOLOGY

LINQ FRONT SUPPORT

- Perfectly placed support bracket that allows quick connection of rod holders & cup holders for improved trolling experience and increased access to a water bottle
- 1x Cup holder included



FRONT BIN ORGANIZER

- A convenient, well-integrated bin organizer for easy storage of tackle boxes and fishing gear. Can be removed in seconds to be used on the go





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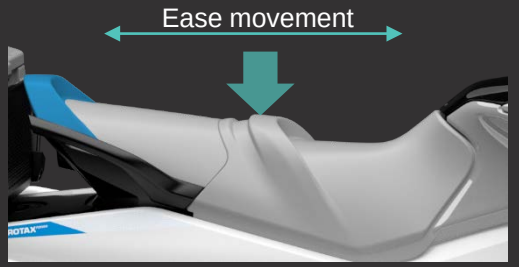
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Grow the sport fishing segment by launching a complete fishing ecosystem and model line-up.

ADDED STORAGE | **IMPROVED COMFORT** | EXTENDED TECHNOLOGY

FISHING BENCH SEAT

- A seat designed with a lower lumbar support to ease movement from front to back and side to side



CUP HOLDER

- Direct from factory, a practical cup holder keeps refreshments within arm's reach





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ADDED STORAGE | IMPROVED COMFORT | **EXTENDED TECHNOLOGY**

6’’ GARMIN FISHFINDER & GPS

- High-end navigation and fish-finding capability with an in-hull transducer and mid-CHIRP technology
- Mark waypoints, seek out a marina, save routes and more
- Now comes with a map token* for free download of your local maps

**Value of $150+ USD*



iDF SYSTEM

- Equipped standard with the innovative iDF system allowing anglers to explore further with more peace of mind
- The system allows for quick removal of debris from the intake grate without taking your hands off the handlebars





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IMPROVED COMFORT

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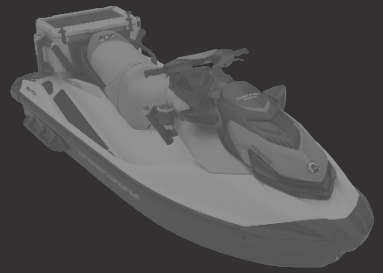
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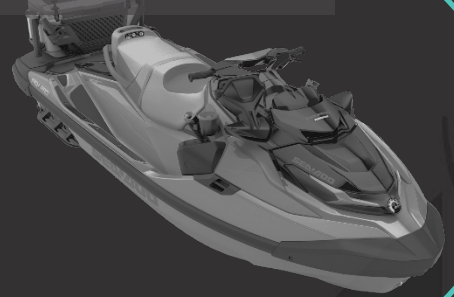
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OCCASIONAL FISHERMAN

AVID FISHERMAN

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The original FishPro that everyone knows and loves

The perfect choice for versatility that meets occasional-to-avid angler needs

Now with a new sporty name	FishPro SPORT 170

New features include:

- USB port
- Map Token for free download of your regional map



FishPro SPORT 170

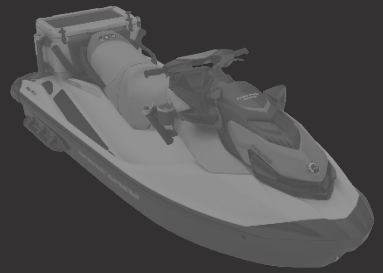
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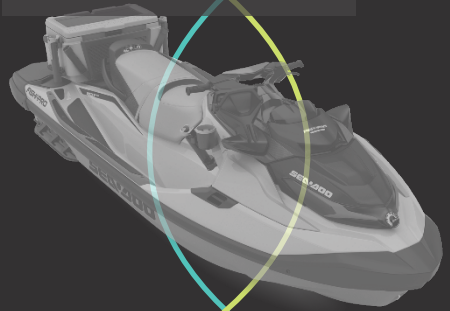
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FishPro SPORT 170



SAME PLATFORM

FishPro TROPHY 170

The pinnacle for Sea-Doo fishing



+ ADDITIONAL FISHING ACCESSORIES
+ ENHANCED COMFORT & FUNCTIONALITY
+ EXTENDED TECHNOLOGY

A stable and predictable ride for rougher water conditions while offering more flexibility with its larger rear platform and 2nd set of of LinQ.

1

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ADDITIONAL FISHING ACCESSORIES | ENHANCED COMFORT & FUNCTIONALITY | EXTENDED TECHNOLOGY

QUICK-CONNECT LIVEWELL WITH INTEGRATED WASHDOWN

- Fully integrated plug-in livewell system using a 800 GPH aerator pump
- Fills the existing 51L fishing cooler in 2-3 minutes
- Also features an intermittent mode to avoid draining the batteries
- Can be used as a raw water washdown to clean your vehicle as needed



ANCHORING SYSTEM

- The rubber compartment is located at an ideal location for easy access
- Keeps the dirty rope outside of the front bin storage, thanks to its integrated storage bag
- Enhances the Fish and Go experience from a fishing spot to another one
- Features an integrated cleat for easy setting and adjustment
- The anchor is tightly secured for added peace of mind while riding in rougher water conditions





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ADDITIONAL FISHING ACCESSORIES | **ENHANCED COMFORT & FUNCTIONALITY** | EXTENDED TECHNOLOGY

MODULAR SWIVEL SEAT

- The pedestal seat is simple to install and includes 3 pieces : Backrest, Passenger Seat and Post. They all have their dedicated location for storage
- The seat can swivel 360 degrees for enhanced comfort and visibility when fishing at rest.
- Enhances the jigging experience by providing more vertical distance between the rod and the water for longer jig strokes.
- Improve casting accuracy thanks to an optimized line of sight and more ergonomic position.
- All pieces floats







FishPro TROPHY 170

1

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

Grow the sport fishing segment by launching a complete fishing ecosystem and model line-up.

ADDITIONAL FISHING ACCESSORIES | ENHANCED COMFORT & FUNCTIONALITY | **EXTENDED TECHNOLOGY**

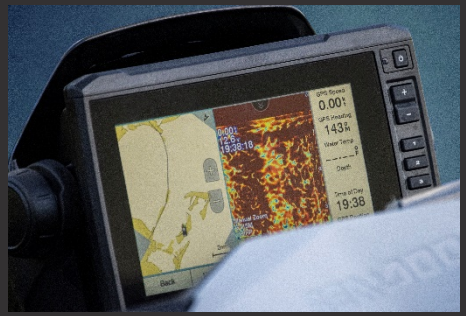
ADVANCED BATTERY SYSTEM

- 2nd battery
- 650-watt generator for quicker recharge
- Voltage management system allows for keeping all accessories ON while engine is turned off for up to 60 minutes or until voltage reaches a predetermined threshold. The system ensure there's always plenty of battery power to turn back ON the engine.



GARMIN 7'' TOUCHSCREEN FISHFINDER & GPS

- Larger and easier to read
- touchscreen capability offers intuitive navigation through all the modes and features
- Same in-hull transducer as on previous models
- A map token is offered with the unit to download free local maps





FishPro TROPHY 170

1

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Grow the sport fishing segment by launching a complete fishing ecosystem and model line-up.

PREMIUM COLOR AND EXCLUSIVE FIT & FINISH

Contemporary functional & technical tones
+ refined style & finish







1

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PREMIUM COLOR AND EXCLUSIVE FIT & FINISH









Functional finishes:
Solid, glossy, easy to repair

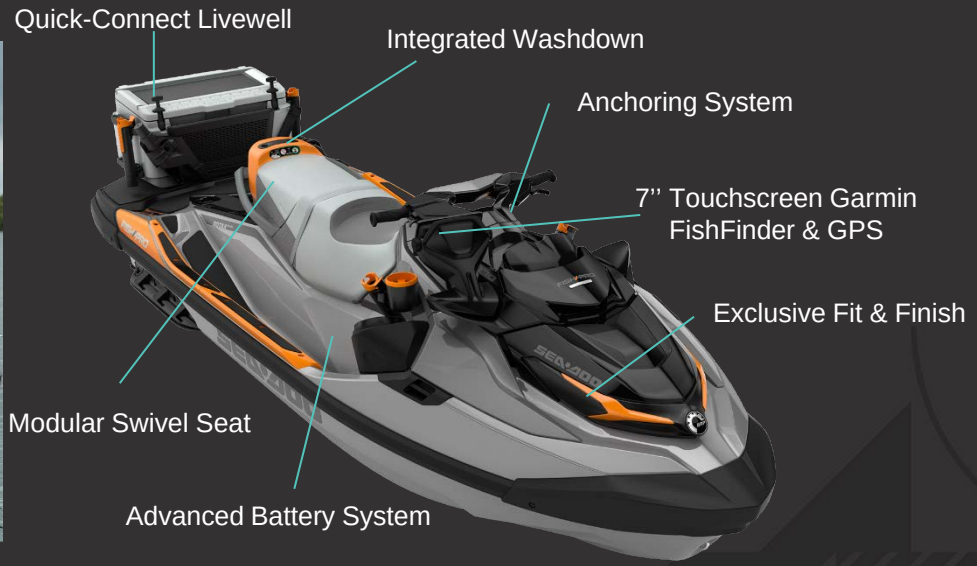
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Grow the sport fishing segment by launching a complete fishing ecosystem and model line-up.

ADDITIONAL FISHING ACCESSORIES | ENHANCED COMFORT & FUNCTIONALITY | EXTENDED TECHNOLOGY







FishPro TROPHY 170

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

1

Grow the sport fishing segment by launching a complete fishing ecosystem and model line-up

1) FISHPRO SCOUT 130

- Added Storage
- Improved Comfort
- Extended Technology

2) FISHPRO TROPHY 170

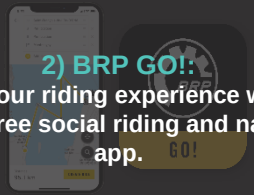
- Additional Fishing Accessories
- Enhanced comfort & functionality
- Extended Technology

2

Enhance the consumer experience with further deployment of the full color LCD display & iDF System



1) High-resolution full color display:
The most innovative gauge in the industry, now available on more models



2) BRP GO!:
Boost your riding experience with an intuitive, free social riding and navigation app.

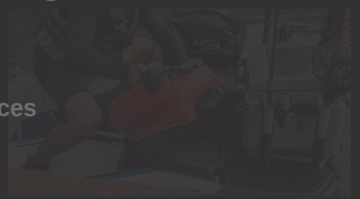


3) iDF System:
The industry-first debris-free system is now available on more models.

3

Leverage beyond the ride opportunities with increased innovative cargo storage solution

The beginning of a new era of modularity and versatility opens up opportunities for new waterborne experiences



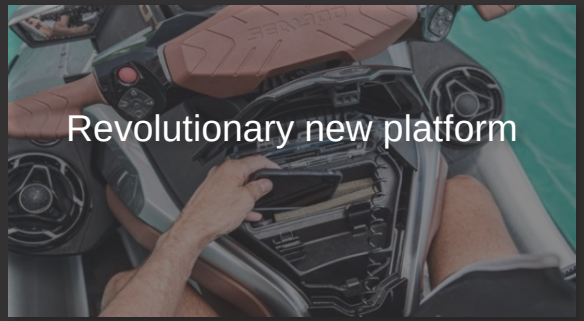
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SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

Enhance the consumer experience with further deployment of the full color LCD display & iDF System

FULL COLOR LCD DISPLAY | BRP GO! | iDF SYSTEM

2018 — **2021** — **2022**



- Bluetooth Audio System
- Watertight Phone Compartment



- Full color LCD display

ON GTX LTD ONLY



Further Deployment

2

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

Enhance the consumer experience with further deployment of the full color LCD display & iDF System

FULL COLOR LCD DISPLAY | BRP GO! | iDF SYSTEM



7.8’’ wide full color LCD display

Expanding our industry-leading infotainment system across the line-up

THE NEW TECH PACKAGE : *INCLUDES LCD COLOR DISPLAY & AUDIO*

RXT-X 300 with AUDIO



FishPro TROPHY 170 with AUDIO



RXP-X 300 with AUDIO



WAKE PRO 230 AUDIO



2

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

Enhance the consumer experience with further deployment of the full color LCD display & iDF System

FULL COLOR LCD DISPLAY | **BRP GO!** | iDF SYSTEM



2

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Enhance the consumer experience with further deployment of the full color LCD display & iDF System

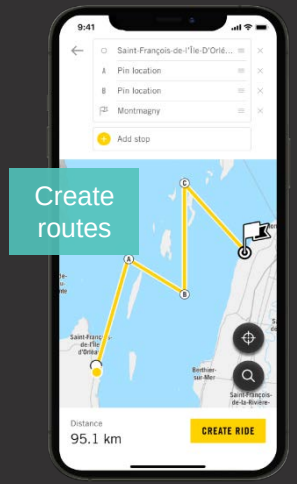
FULL COLOR LCD DISPLAY | **BRP GO!** | iDF SYSTEM

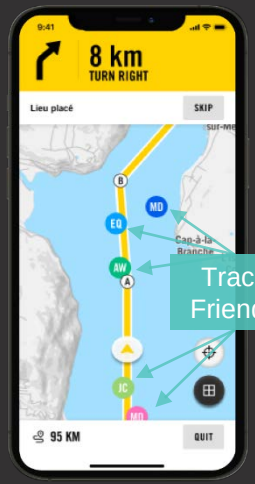
RIDE SPONTANEOUSLY

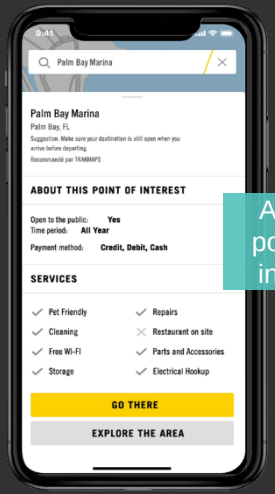
PLAN YOUR JOURNEY

OFFICIAL POINTS OF INTEREST

RIDE WITH FRIENDS







GO!

- BRP GO! is free and offers simple navigation for ease of use

2

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Enhance the consumer experience with further deployment of the full color LCD display & iDF System

FULL COLOR LCD DISPLAY | **BRP GO!** | iDF SYSTEM

WHAT'S NEXT

UPCOMING FEATURES (POST-LAUNCH)

- Detailed marine charts (In-app purchase with annual subscription fees)
- More Points of Interests



2

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FULL COLOR LCD DISPLAY | **BRP GO!** | iDF SYSTEM

KEY REGIONS

NAVIGATION WILL INITIALLY BE AVAILABLE IN THESE REGIONS:

- Canada
- US
- Australia
- New Zealand
- Brazil
- Sweden
- Norway
- Finland
- France
- Spain
- Italy
- Japan
- UK

…MORE TO COME



INITIALLY AVAILABLE LANGUAGES:

- English
- French
- Spanish
- Portuguese
- Russian
- German
- Italian
- Swedish
- Finnish
- Norwegian
- Japanese
- Chinese

…MORE TO COME

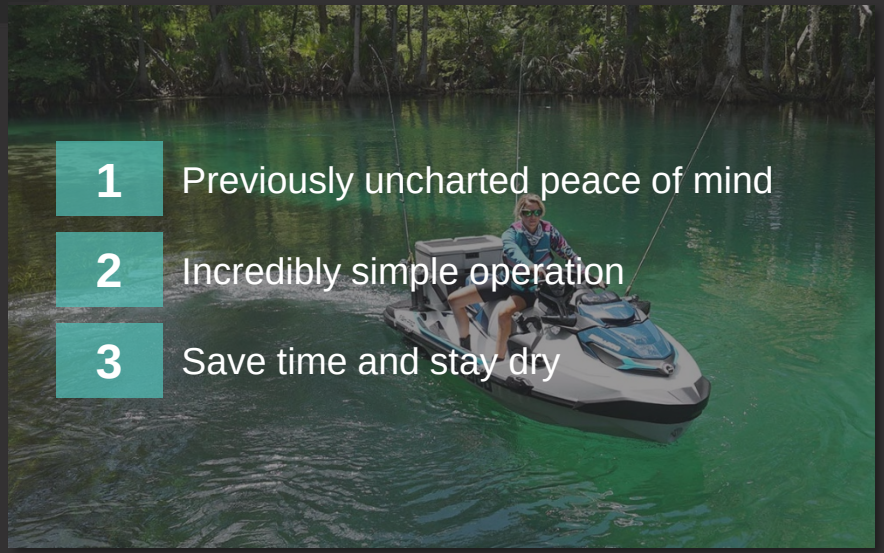
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Enhance the consumer experience with further deployment of the full color LCD display & iDF System

FULL COLOR LCD DISPLAY | BRP GO! | **iDF SYSTEM**

Inteligent debris free pump system (iDF)



1. Previously uncharted peace of mind
2. Incredibly simple operation
3. Save time and stay dry

Now available on GTI SE models with audio



SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

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- Extended Technology

2) FISHPRO TROPHY 170

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3

Leverage beyond the ride opportunities with increased innovative cargo storage solution

The beginning of a new era of modularity and versatility opens up opportunities for new waterborne experiences



3

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

Leverage beyond the ride opportunities with increased innovative cargo storage solution

LinQ Evolution

Cover Offer Expansion

Electronic & Line-up Updates

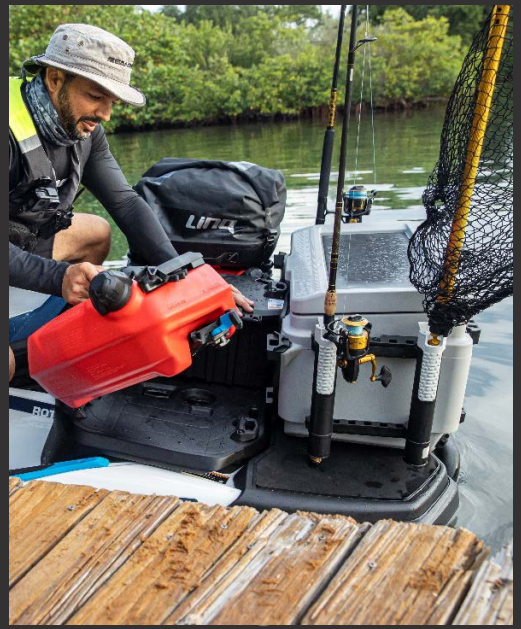
Addition of Sea-Doo Bundles

Explore the possibilities



LinQ Multi Cargo Rack

Adds up to three times the available LinQ mounts to your watercraft.





Rear Deck Extension with LinQ

Adds 12 inches of platform space to the rear of the watercraft.

3

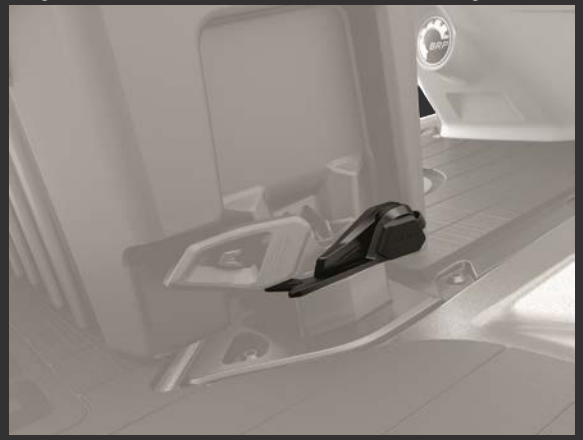
SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

Leverage beyond the ride opportunities with increased innovative cargo storage solution

LinQ Evolution | **Cover Offer Expansion** | **Electronic & Line-up Updates** | **Addition of Sea-Doo Bundles**

LinQ Lock

The easiest and quickest way to securely lock most of your LinQ accessories to your watercraft.





3

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LinQ Evolution | **Cover Offer Expansion** | **Electronic & Line-up Updates** | **Addition of Sea-Doo Bundles**

LinQ® Modular Boxes

New ways to organise your gear



10 L

$124,99US / $159,99CA



20 L

$144,99US / $184,99CA



30 L

$164,99US / $209,99CA



Thermal Insert

Fits inside LinQ Modular Cargo Box - 10 L

$49,99US / $59,99CA



3

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LinQ Evolution | **Cover Offer Expansion** | **Electronic & Line-up Updates** | **Addition of Sea-Doo Bundles**

Coolers

NEW



Thermal Insert

MSRP: $49,99US / 59,99$CA

NEW



Sea-Doo 14 L Cooler Bag

MSRP: $174,99US / 199,99$CA



LinQ 4.2 US Gal (16 L) Cooler

MSRP: $329,99US / 399,99$CA



LinQ 13.5 US Gal (51 L) Cooler

MSRP: $859,99US / 719,99$CA

Need even more space?



LinQ 13.5 US Gal (51 L) Cooler Extension

MSRP: $249,99US / 319,99$CA

Keep your food & beverages COLD and FRESH for those HOT DAYS on the water!

3

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Leverage beyond the ride opportunities with increased innovative cargo storage solution

LinQ Evolution | **Cover Offer Expansion** | Electronic & Line-up Updates | Addition of Sea-Doo Bundles

Covers

New cover category to capture the shrink wrap off season storage business.



GTX, RXT-X, WAKE PRO, FISH PRO (2018 and up), GTI, GTR, WAKE (2020 and up) & RXP-X (2021 and up)

Not for trailering.



SPARK 2up, SPARK 3up

The Storage Covers offer ultimate protection from rain, snow, leaves, dust and more.

3

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Leverage beyond the ride opportunities with increased innovative cargo storage solution

LinQ Evolution | Cover Offer Expansion | Electronic & Line-up Updates | Addition of Sea-Doo Bundles

GPS & Transducer Update

Garmin† ECHOMAP™ UHD 72sv GPS



- New screen 7'' inch touchscreen for better visibility & easier interaction

$949,99US / 1199,99$CA

Garmin† GT15M-IH Transducer



- Provides accurate depth readings even at high speed
- Can be used with a hull deadrise angle between 0 and 25 degrees

$329,99US / 399,99$CA

3

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Leverage beyond the ride opportunities with increased innovative cargo storage solution

LinQ Evolution | Cover Offer Expansion | Electronic & Line-up Updates | Addition of Sea-Doo Bundles

Line-up Changes

NEW 295100950



LinQ Stackable Fuel Caddy – 4 Gallons

NEW 715008110



LinQ Watertight Bag

NEW 715008111



LinQ Box

Inter: **NEW 295101043**

NA: **NEW 295101042**



BRP Audio-Portable System

NEW 295101051



BRP Audio-Portable System Support Base

NEW 295101035



Bilge Pump Kit

NEW 295101072



Bolt-On Retractable Ratcheting Tie-Downs

NEW 715008309



Ratchet Tie-Downs

NEW 295101071



Ratchet Tie-Downs

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.



LINE-UP NOVELTIES

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

REC-LITE

RECREATION

TOW SPORTS

TOURING

SPORT FISHING

PERFORMANCE

New distinctive colors add swagger to the line-up

SPARK

2 x New Colors
+NEW Color-in front arm

NEW Reef Blue / Manta Green



NEW Orange Crush / Lava Red



SPARK TRIXX

1 x New Color

Lava Red / Deep Black



NEW Dazzling Blue / Deep Black



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REC-LITE

RECREATION

TOW SPORTS

TOURING

SPORT FISHING

PERFORMANCE

New distinctive colors add swagger to the line-up

GTI 90/130

Carry Over

White / Reef Blue



GTI SE 130/170

1 x New Color
+NEW Optional iDF System

NEW Coral Blast / Eclipse Black



Neon Yellow / Ice Metal



SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

REC-LITE

RECREATION

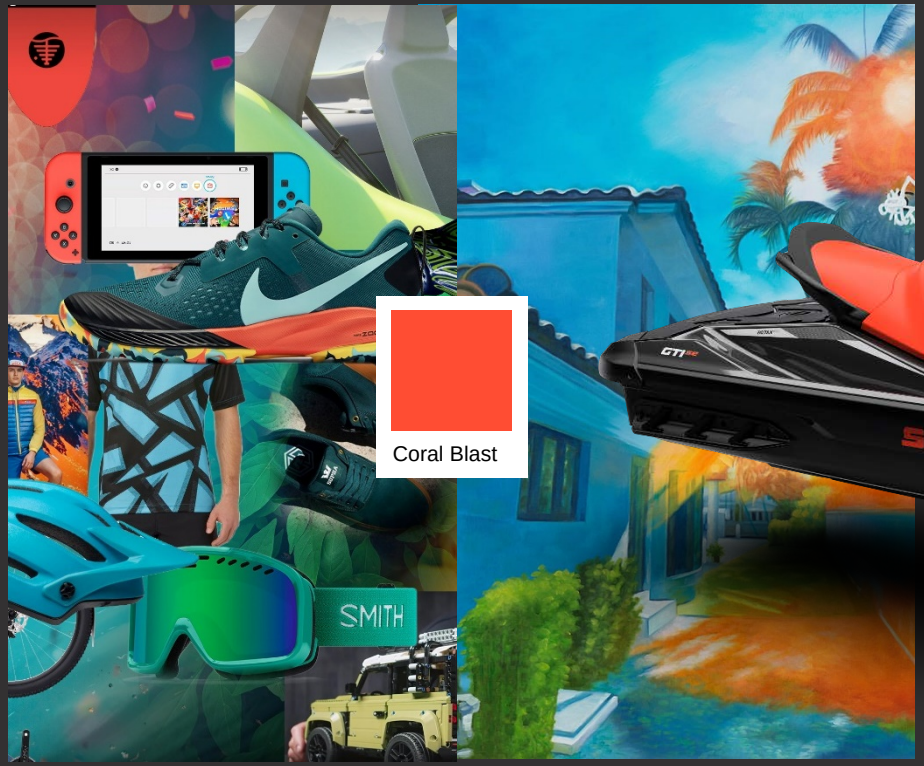
TOW SPORTS

TOURING

SPORT FISHING

PERFORMANCE

New distinctive colors add swagger to the line-up



Optimistic and conscious coral tone that brings a fresh alternative to traditional reds.



Coral Blast / Eclipse Black

SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

REC-LITE

RECREATION

TOW SPORTS

TOURING

SPORT FISHING

PERFORMANCE

New distinctive colors add swagger to the line-up

WAKE 170

1 x New Color

NEW Neo Mint



WAKE PRO 230

1 x New Color
+NEW LCD Display with BRP Connect

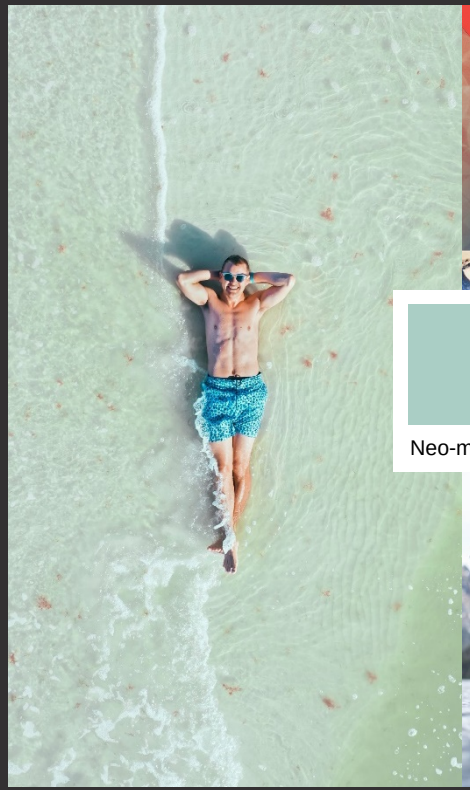
NEW Neo Mint

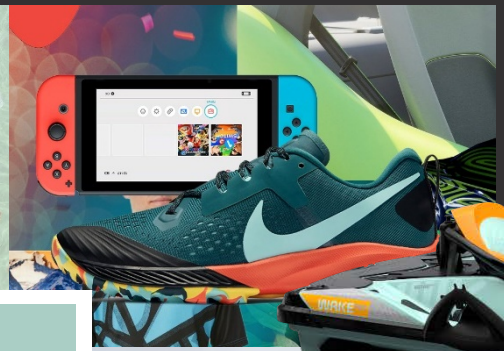


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- REC-LITE
- RECREATION
- TOW SPORTS
- TOURING
- SPORT FISHING
- PERFORMANCE

New distinctive colors add swagger to the line-up





Neo-mint



Color becomes inclusive and optimistic, this mint shade feels like a stream of fresh water .



Neo Mint

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- REC-LITE
- RECREATION
- TOW SPORTS
- TOURING
- SPORT FISHING
- PERFORMANCE

New distinctive colors add swagger to the line-up

GTX 170/230/300

Carry Over

Eclipse Black / Orange Crush



GTX LTD 300

2 x New Colors (including 1 premium color)

PREMIUM

NEW Metallic Sage



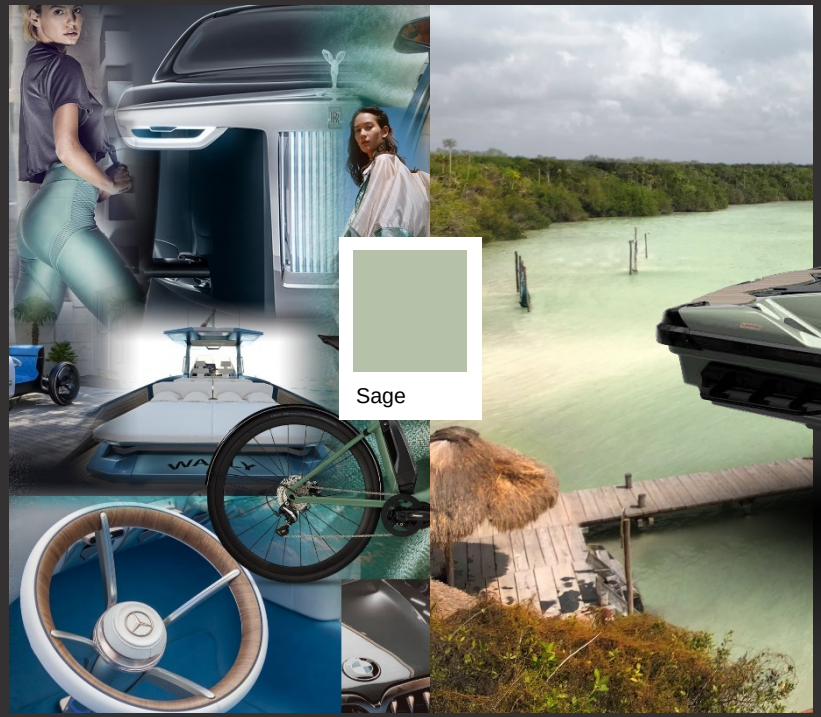
NEW Liquid Titanium / Black



SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

- REC-LITE
- RECREATION
- TOW SPORTS
- TOURING
- SPORT FISHING
- PERFORMANCE

New distinctive colors add swagger to the line-up



A refined and elevated view of green, the color of calm waters and nature.



Metallic Sage

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REC-LITE

RECREATION

TOW SPORTS

TOURING

SPORT FISHING

PERFORMANCE

New distinctive colors add swagger to the line-up

NEW FishPro SCOUT 130

Based on a GTI SE 130:

+All the fishing essentials
(51L Cooler, 3x Rod Holders, 6" Garmin FishFinder)
+USB Port
+iDF System

White / Gulf Stream Blue



FishPro SPORT 170

Traditional FishPro renamed

+USB Port
+Map Token for Free Local Maps

White / Gulf Stream Blue



NEW FishPro TROPHY 170

Based on the FishPro SPORT 170:

+Quick-Connect Livewell & Washdown system
+Modular Swivel Seat
+7'' Garmin FishFinder
+Advanced Battery System
+Anchoring System
+ Optional LCD Display with BRP Connect

NEW
Shark Grey / Orange Crush



SEA-DOO CONTINUES TO REVOLUTIONIZE THE ON-WATER EXPERIENCE THROUGH RELENTLESS INNOVATION WITH TWO NEW PURPOSE-BUILT NEW MODELS AND THE FURTHER DEPLOYMENT OF EXCLUSIVE TECHNOLOGIES.

REC-LITE

RECREATION

TOW SPORTS

TOURING

SPORT FISHING

PERFORMANCE

New distinctive colors add swagger to the line-up

GTR 230

New Color

NEW Millenium Yellow



RXP-X 300

1x New Color (Premium)
+NEW optional LCD Display with BRP Connect

PREMIUM

NEW Triple Black



Millenium Yellow



RXT-X 300

1x New Color (Premium)
+NEW LCD Display with BRP Connect

PREMIUM

NEW Triple Black



Millenium Yellow



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- REC-LITE
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- TOW SPORTS
- TOURING
- SPORT FISHING
- PERFORMANCE

New distinctive colors add swagger to the line-up



Blackout

Black continues to be trendy.Treating surfaces with different finishes creates depth and enhances shapes.



Triple Black

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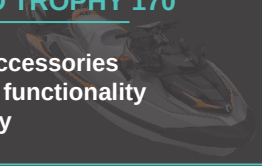
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- Added Storage
- Improved Comfort
- Extended Technology



2) FISHPRO TROPHY 170

- Additional Fishing Accessories
- Enhanced comfort & functionality
- Extended Technology

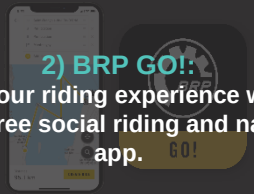


2

Enhance the consumer experience with further deployment of the full color LCD display & iDF System



1) High-resolution full color display:
The most innovative gauge in the industry, now available on more models



2) BRP GO!:
Boost your riding experience with an intuitive, free social riding and navigation app.



3) iDF System:
The industry-first debris-free system is now available on more models.

3

Leverage beyond the ride opportunities with increased innovative cargo storage solution

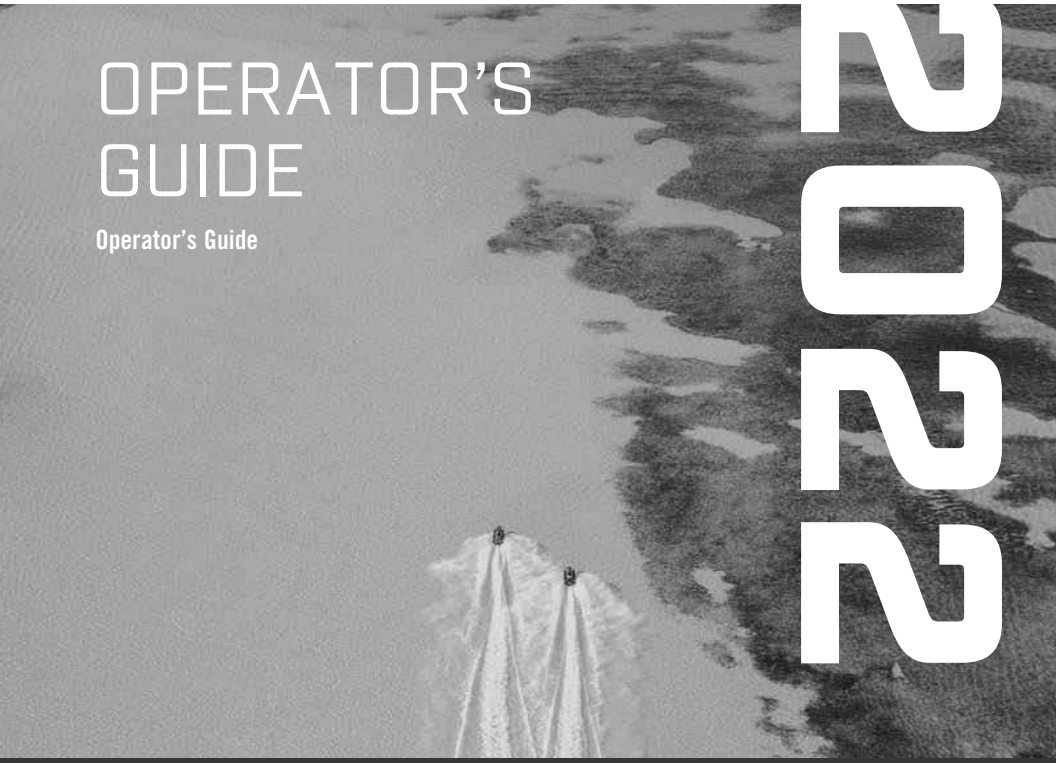
The beginning of a new era of modularity and versatility opens up opportunities for new waterborne experiences



CLUB BRP 2022

SEA-DOO

GTI GTR AND WAKE SERIES



OPERATOR'S GUIDE

Operator's Guide

2022

⚠ WARNING

Read this Operator's Guide thoroughly. It contains important safety information. Minimum recommended operators age: 16 years old. Keep this Operator's Guide in the watercraft.

219002218_rev1

Original Instructions

⚠ WARNING

Disregarding any of the safety precautions and instructions contained in the Operators's Guide, SAFETY VIDEO and on-product safety labels could cause injury including the possibility of death.

CALIFORNIA PROPOSITION 65 WARNING

⚠ WARNING

Operating, servicing and maintaining a recreational marine vessel can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to www.p65warnings.ca.gov/products/passenger-vehicle.

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KNOW BEFORE YOU GO

Basic Rules for Safe PWC Operation

Know Before You Go: Basic Rules For Safe PWC Operation

Improper operation can result in severe injury or death.

Operators Must Be Qualified

Make sure operator is 16 or older and has taken a boater course. Your state (pr province) may have additional requirements.



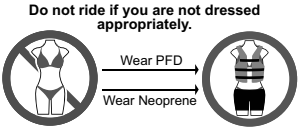
Operators Must Avoid Collisions

- ☑ Scan constantly for people, objects and other watercraft.
- ☑ Stay far enought away from others so you can always safely coast to a stop.
- ☒ Do not release throttle when trying to steer aways from objects-as with other powerboats, **you need throttle to steer**.



Protect All Riders

- ☑ Falls can result in severe injury or death.
- ☑ All riders must wear shorts with neoprene (wet suit material) to keep water from being forcefully injected into rectum or vagina during a fall backward. riders not wearing neoprene shorts have received severe rectal, vaginal, and internal injuries resulting in permanent damages.



- ☑ All riders must wear an approved PFD (Personal Flotation Device). Wear Neoprene.
- ☑ Be sure riders are properly seated and holding on. Riders can be thrown off PWC during unexpected acceleration or aggressive operation. Avoid aggressive operation, sharp turns, and unexpected acceleration.



- ☒ Do not apply throttle when anyone is boarding or at rear of PWC.
- ☒ Do not jump wakes or waves - jumping can cause injuries such as back or spinal injury (paralysis).

Do not permit reckless operation:

- ☒ Do not go near others to spray or splash them with water, go too close to other boats, or go too fast for traffic conditions.
- ☒ Never ride after consuming alcohol or drugs.

Available Languages

Deutsch	Dieses Handbuch ist möglicherweise in Ihrer Landessprache verfügbar. Bitte wenden Sie sich an Ihren Händler oder besuchen Sie: **www.operatorsguides.brp.com**
English	This guide may be available in your language. Check with your dealer or go to: **www.operatorsguides.brp.com**
Español	Es posible que este manual esté disponible en su idioma. Consulte a su distribuidor o visite: **www.operatorsguides.brp.com**
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Svenska	Denna bok kan finnas tillgänglig på ditt språk. Kontakta din återförsäljare eller gå till: **www.operatorsguides.brp.com**

Covered Models
GTI 90 GTI 130
GTI SE 130 GTI SE 170 GTI SE 130 iDF and Audio GTI SE 170 iDF and Audio
GTR 230 GTR 230 Audio
Wake 170 Wake 170 Audio

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GENERAL INFORMATION

FOREWORD

Congratulations on your purchase of a new Sea-Doo® personal watercraft (PWC). It is backed by the BRP warranty and a network of authorized Sea-Doo personal watercraft dealers ready to provide the parts, service or accessories you may require.

Your dealer is committed to your satisfaction. He has taken training to perform the initial setup and inspection of your watercraft as well as completed the final adjustment before you took possession. If you need more complete servicing information, please ask your dealer.

At delivery, you were also informed of the warranty coverage and signed the *Pre-Delivery Check List* to ensure your new watercraft was prepared to your entire satisfaction.

Know Before You Go

To learn how to reduce the risk for you or other persons being injured or killed, read the following sections before you operate the watercraft:

– *Safety Information*
– *Watercraft Information*.

Read and understand all safety labels on your watercraft and watch attentively the *Safety Video* located at:

https://www.sea-doo.com/safety

Or, use the following QR code.

Safety Messages

This Operator's Guide utilizes the following symbols and words to emphasize particular information:

The safety alert symbol ⚠ indicates a potential injury hazard.

⚠ WARNING

Indicates a potential hazard which, if not avoided, could result in serious injury or death.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates an instruction which, if not followed, could severely damage watercraft components or other property.

About this Operator's Guide

This Operator's Guide has been prepared to acquaint the owner/operator or passenger with this personal watercraft and its various controls, maintenance and safe riding instructions.

Keep this Operator's Guide in the watercraft as you can refer to it for the operation, instructing others, maintenance and troubleshooting. This Operator's Guide needs to remain with the watercraft when it's sold.

This guide is available in several languages. In the event of any discrepancy, the English version shall prevail.

If you want to view and/or print an extra copy of your Operator's Guide, simply visit the following website:

www.operatorsguides.brp.com

The informations contained in this document are correct at the time of publication. However, BRP maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on

products previously manufactured. Due to late changes, some differences between the manufactured product and the descriptions and/or specifications in this guide may occur. BRP reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring any obligation upon itself.

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SAFETY INFORMATION

BEFORE YOU GO

⚠ WARNING

Disregarding any of the safety precautions and instructions contained in this section could cause injury including the possibility of death.

Operating Age and Ability

Operators must be qualified. Make sure the operator is 16 or older and has taken a boater safety course. Your state (or province) may have additional requirements. Laws regarding the minimum age and licensing requirements vary from one jurisdiction to another. Be sure to contact the local boating authorities for information regarding the legal operation of a PWC in the intended jurisdiction of use.

Operation of this PWC with a disability that impairs vision, reaction time, judgment, or operation of the controls is not recommended.

Remember that sun, wind, fatigue or illness may impair your judgment and reaction time.

Each passenger must be able to simultaneously place both feet firmly flat against each footwell when properly seated.

Drugs and Alcohol

Never ride after consuming alcohol or drugs. Riding on a watercraft requires the operator and passenger (s) to be sober, attentive and alert. The use of drugs and alcohol, singly or in combination, decreases reaction time, impedes judgment, impairs vision, and inhibits your ability to safely ride on a watercraft.

Safe Boating Courses

Many countries recommend or require a boating safety course. Check with your local competent authorities.

Applicable Boating Laws

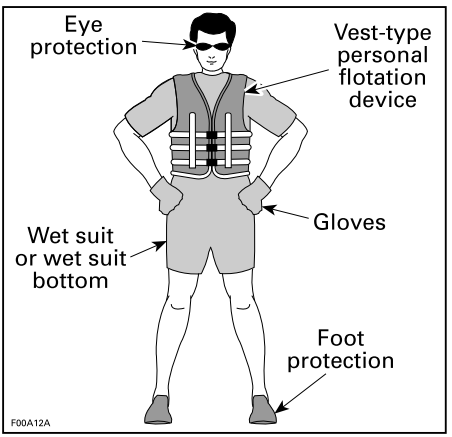
Check boating laws applicable to the waterways where you intend to use your watercraft. Learn the local navigation rules.

Protective Gear

All riders MUST wear:

1. An approved **Personal Flotation Device (PFD)** meeting your country regulations. The size of the PFD shall be appropriate for the wearer.
2. **Shorts with neoprene** (wetsuit material) to keep water from being forcefully injected into rectum or vagina during a fall backward. Riders not wearing neoprene shorts have received severe rectal, vaginal, and internal injuries resulting in permanent damage. Normal swimwear does not adequately protect against forceful entry of water into the lower male or female body opening(s).

Footwear, gloves, safety goggles or glasses can be worn. Wind, water spray, bugs and speed may cause a person's eyes to water and create blurred vision.



If you are planning a ride in cold weather or water, consider adding appropriate warm clothing such as a

complete wet suit or dry suit. Not only will it make your ride more comfortable, but it may delay or protect you from hypothermia if you fall into cold water. Be prepared for changing conditions.

Helmets: Weighing the Risks vs Benefits

Since each option minimizes some risks, but increases others, before each ride you must decide whether to wear or not wear a helmet based on your particular situation. If you decide to wear a helmet, look for helmets that meet DOT or Snell standards, and if possible, choose one designed for motorized watersports.

Helmets are designed to offer some degree of protection in case of impacts to the head. In most motorized sports, the benefits of wearing a helmet clearly outweigh the drawbacks. However, in the case of motorized watersports such as riding personal watercraft, this is not necessarily true as there are some particular risks associated with the water.

Benefits

A helmet helps to reduce the risk of injury in case of a head impact against a hard surface such as another craft in the case of a collision. Similarly, a helmet with a chin guard might help prevent injuries to the face, jaw or teeth.

Risks

On the other hand, in some situations when falling off the watercraft, helmets have a tendency to catch the water, like a “bucket”, and put severe stresses on the neck or spine. This could result in choking, severe or permanent neck or spine injury or death. Helmets may also interfere with peripheral vision and hearing, or increase fatigue which could contribute to increase the risk of a collision.

Required Equipment

As the owner of the watercraft, you are responsible for ensuring that all required safety equipment is aboard. Check your local regulations about requirements.

This could include:

- Fire extinguisher. Maintenance, repair and refilling must be carried out in accordance with the manufacturer’s instructions.
- A watertight flashlight or approved flares
- Sound-producing device (horn, whistle or bell etc.)
- Visual Distress Signal
- Phone in a watertight compartment designed for this application
- Current local map
- First aid kit
- Throw rope.

GET FAMILIAR WITH THE PWC

The performance of this watercraft may exceed the performance of other watercrafts you may have operated. Do not assume that all PWCs handle identically.

Make sure you read and understand the content of this Operator's Guide to become completely familiar with the controls and operation of the watercraft before embarking on your first trip, or taking on a passenger (s). If you have not had the opportunity to do so, practice driving solo in a suitable traffic-free area to become accustomed to the feel and response of each control. Be fully familiar with all controls before accelerating above idle speed.

Jet Thrust

Your PWC features a jet drive propulsion system. The water is drawn up from underneath the PWC from the intake grate and is accelerated by the venturi to produce thrust. This accelerated water is going out at the rear of the craft.

All riders must wear Shorts with neoprene (wetsuit material) to keep water from being forcefully injected into rectum or vagina during a fall backward. Riders not wearing neoprene shorts have received severe rectal, vaginal, and internal injuries resulting in permanent damage. Normal swimwear does not adequately protect against forceful entry of water into the lower male or female body opening(s).

The jet pump may pick up debris and throw it rearward causing a risk of injuring people, damaging the jet pump, or other property.

Do not start the engine or operate the watercraft if anyone is in the water nearby, or near the rear of the watercraft.

Steering

Your watercraft has a steerable nozzle at the rear of the boat controlled by the handlebars which direct the stream of water from left to right. To turn the watercraft, both steering and throttle are necessary.

Do not release throttle when trying to steer away from objects — as with other powerboats, you need throttle to steer.

If the engine is shut off, steering is lost.

Tether Cord

Keep the tether cord lip attached to the operator's PFD or wrist (wrist strap required) at all times and keep it free from snagging on the handlebars to help ensure the engine stops should the operator fall off.

If the operator falls off the watercraft and the tether cord is not attached as recommended, the watercraft engine will not stop and your PWC may continue to move forward. You may not be able to swim back to it.

After riding, always remove the tether cord from the engine cut-off switch to avoid unauthorized use by children or others and to prevent starting in a closed environment (e.g.: garage).

To prevent accidental starting, always detach the tether cord from the engine cut-off switch when swimmers are boarding, nearby, or during removal of any weeds or debris from the intake grate.

Braking (if Equipped with iBR)

Most watercrafts have no means of braking.

On some models, advancement in technologies now permits us to offer a braking system called the iBR (intelligent Brake and Reverse). Practice

braking maneuvers in a safe traffic--free area to become familiar with handling under braking and with stopping distances under various operating conditions.

Stopping distance will vary depending on initial speed, load, wind, number of riders and water conditions. The amount of braking power commanded by the operator using the iBR lever will also affect stopping distance.

When braking, riders must brace themselves against the deceleration force to prevent from moving forward on the watercraft and losing balance.

When operating an iBR equipped watercraft, be aware that other boats following or operating in close proximity may not be able to stop as quickly. When at speed and the brake is first applied, a plume of water will shoot up in the air behind the watercraft which may cause the operator of the following watercraft to momentarily lose sight of your PWC. Inform the operator of a watercraft who intends to follow you in a convoy formation of the braking capability of your PWC, the meaning of the plume of water and the need of keeping a greater distance between watercraft.

The brake feature of the iBR system cannot prevent your PWC from drifting due to current or wind. It has no braking effect on the rearward velocity. Also note that your engine must be running to be able to use the brake.

Learning Key (if Equipped)

The Sea-Doo LK™ learning key limits the speed of the watercraft. It could be an option for first time users and less experienced operators to learn how to operate the watercraft.

Please consult your BRP authorized Sea-Doo dealer to see if this accessory is available for your model.

Cargo and Storage

Do not store any objects in areas that are not designed specifically for storage.

Do not transport cargo on the rear platform unless it is properly secured with a BRP LinQ™ certified accessory. Compatible accessories which are not BRP certified may not be considered as fit for this purpose.

When carrying loads on the rear platform of the watercraft or onto cargo accessories, reduce your speed and adapt your driving behavior to reduce the risk of ejection from watercraft or contact with cargo possibly leading to injuries.

Do not exceed the payload or passenger capacities for your watercraft. Overloading can affect manoeuvrability, stability and performance. Also, heavy seas reduce capacity.

Never carry loads on the rear platform when practicing watersports. The cargo may interfere with the rope and unsecure it, becoming an obstacle to the person being towed.

Refer to *Technical Specifications* for the maximum loading capacity.

Accessories and Modifications

Any modifications or addition of accessories approved by BRP may affect the handling of your vehicle. It is important to take the time to get familiar with the vehicle once modifications are made to understand how to adapt your driving behavior accordingly.

Avoid installing equipment not specifically approved by BRP for the vehicle and avoid unauthorized modifications. These modifications and equipment have not been tested by BRP and may create hazards. For example, they could:

– Create a loss of control and increase risk of crash
– Cause overheating or short circuits increasing the risk of fire or burn injuries
– Affect the protection features provided by the vehicle.

Your vehicle may also become illegal to ride.

As an example, installing an additional GPS or cell phone support may prevent the driving capabilities of the vehicle and increase the risk of a loss of control.

Ask your authorized BRP dealer for suitable available accessories for your vehicle.

RIDE SAFELY

Riding with Passenger(s)

The operator is responsible to inform and protect the passenger(s) invited to ride.

Instruct all passenger(s) to use the handholds, seat strap, or to hold on to the waist of the person in front of them. Each passenger must be able to simultaneously place both feet firmly flat against each footwell when properly seated.

Be sure riders are properly seated and holding on. Riders can be thrown off PWC during unexpected acceleration or aggressive operation. Avoid aggressive operation, sharp turns, and unexpected acceleration.

Falls can result in severe injury or death.

All riders must wear shorts with neoprene (wet suit material) to keep water from being forcefully injected into rectum or vagina during a fall backward. Riders not wearing neoprene shorts have received severe rectal, vaginal, and internal injuries resulting in permanent damage.

When going over waves, riders(s) may raise their body slightly off the seat to absorb the shocks with their legs.

When braking or decelerating, riders must brace themselves against the deceleration force to prevent from moving forward on the watercraft and losing balance.

Riding with passenger(s) makes the PWC handle differently and requires greater skill.

Avoiding Collisions

Scan constantly for people, objects and other watercraft.

Stay far enough away from others so you can always safely coast to a stop. Do not release throttle when trying to steer away from objects – as with other powerboats, you need throttle to steer.

Be alert for conditions that may limit your visibility or block your vision of others.

Do not go near others to spray or splash them with water, go too close to other boats, or go too fast for traffic conditions. You may misjudge the ability of the watercraft or your own riding skills and strike a boat or person.

If your watercraft is equipped with a braking system, be aware that other boats following or operating in close proximity may not be able to stop as quickly.

Stopping distance will vary depending on initial speed, load, wind and water conditions. The amount of braking power commanded by the operator using the iBR lever will also affect stopping distance.

Although the preferable manoeuvre to avoid an obstacle is to steer away while applying throttle, the iBR can also be used by fully braking and turning in the direction to avoid the obstacle.

Riding Behaviors

Ride within your limits and level of riding ability.

Scan constantly for people, objects and other watercraft. Stay far enough away from others so you can always safely coast to a stop.

Avoid aggressive operation, sharp turns, and unexpected acceleration that can cause riders to be thrown off.

Avoid riding in very rough waters or practicing extreme manoeuvres like jumping wakes or waves - jumping can cause injuries such as back or spinal injuries (paralysis).

Speeding

Speeding While your watercraft has the capacity of operating at high speeds, it is strongly recommended that high-speed operation only be applied when ideal conditions exist and are permitted. Higher speed operation requires a higher degree of skill and increases the risk of severe injuries.

The forces generated on the body of riders while turning, negotiating waves or wakes, operating in choppy waters, or falling off the watercraft, especially at higher speeds, may cause injury including the possibility of broken bones or more serious bodily injuries.

Reboarding

Reboarding Operator and passenger(s) need to know how to swim and how to reboard the PWC from the water. Boarding in deep water can be strenuous.

Also, make sure you and all passengers know how to reboard when accessories are installed at the rear. Board the watercraft from the rear and carefully get around the accessories. If you have difficulties, you should know how to remove the accessories and move them towards the front to provide better access to the boarding platform.

If the accessories are too heavy, swim toward the side, use passenger handhold and/or seat strap to lift yourself aboard.

Ask inexperienced riders to practice how to board the watercraft close to shore (all methods explained here) before venturing into deep water, especially when cargo is installed aboard on the rear platform.

To prevent accidental starting, always detach the tether cord from the engine cut-off switch when passenger(s) swimmers are boarding.

Moving Parts

Never turn handlebar while someone is near the rear of watercraft. Keep away from steering moving parts (nozzle, iBR gate, linkages, etc.).

Keep away from the intake grate while the engine is running. Items such as long hair, loose clothing, or PFD straps can become entangled in moving parts.

Be aware of the iBR gate movement when starting the engine, shutting down the engine or using the iBR lever. Automatic movement of the gate may squeeze fingers or toes of people taking a hold on the back or your PWC.

Know the Waters

Know the waters in which the watercraft is to be operated.

Current, tides, rapids, hidden obstacles, wakes and waves, etc., can affect safe operation. It is not advisable to operate the watercraft in rough waters or inclement weather. Keep an eye on the weather. Check local weather broadcasts before departure. Be alert to changing conditions.

Keep accurate and up-to-date charts of the boating area on board. Before getting underway, check water conditions in the planned boating area.

Ensure there is enough fuel on board for the planned trip. Always verify fuel level before use and during the ride. Apply the principle of 1/3 of the fuel to reach your destination, 1/3 to return, and keep 1/3 in reserve. Allow for changes due to adverse weather or other delays.

In shallow water, proceed with caution and at very low speeds. Grounding or abrupt stops may result in injury and watercraft damage. Debris may also be picked up and thrown rearward by the jet pump onto people.

Navigation Rules

Always ride responsibly and safely. Use common sense and courtesy.

Operating a watercraft can be compared with driving on unmarked highways and roads. To prevent collisions or avoid other boaters, a system of operating rules must be followed. Generally keep to your right and safely avoid collisions by keeping a safe distance from other watercrafts, boats, people and objects.

Make sure you know and understand the navigation system applicable to the waterways where you intend to use the watercraft.

Navigational aids on shore or on waters, such as signs or buoys, can assist you in identifying safe waters. They can indicate:

– whether you should keep to the right (starboard) or to the left (port) of the buoy
– which channel you can continue
– whether you are entering a restricted or controlled area such as a no wake or low speed zone
– hazards
– speed limits, no power craft or boating, anchorage and other useful information.

Respect no wake zones, the environment, and the rights of other users of the waterways.

Night-Time Operation

PWCs are not designed for night-time operation.

Carbon Monoxide Poisoning

All engine exhaust contains carbon monoxide, a deadly gas. Breathing carbon monoxide can cause headaches, dizziness, drowsiness, nausea, confusion and eventually death.

Carbon monoxide is a colorless, odorless, tasteless gas that may be present even if you do not see or smell any engine exhaust. Deadly levels of carbon monoxide can collect rapidly, and you can quickly be overcome and unable to save yourself. Also, deadly levels of carbon monoxide can linger for hours or days in enclosed or poorly ventilated areas. If you experience any symptoms of carbon monoxide poisoning, leave the area immediately, get fresh air and seek medical treatment.

To prevent serious injury or death from carbon monoxide:

– Never run the watercraft in poorly ventilated or partially enclosed areas such as boat houses, garage, seawalls or other boats in close proximity. Even if you try to ventilate engine exhaust, carbon monoxide can rapidly reach dangerous levels.
– Never run the watercraft outdoors where engine exhaust can be drawn into a building through openings such as windows and doors.
– Never stand behind the watercraft while the engine is running. A person standing behind a running engine may inhale high concentrations of exhaust fumes.

After riding, always remove the tether cord from the engine cut-off switch to avoid unauthorized use by children or others and to prevent starting in a closed environment (ex: garage).

Gasoline Fires and Other Hazards

Gasoline is extremely flammable and highly explosive. Fuel vapors can spread and be ignited by a spark or flame many feet away from the engine. To reduce the risk of fire or explosion, follow these instructions:

– Use only an approved red gasoline container to store fuel.
– Strictly adhere to the instructions in *Fueling* section.
– Never start watercraft if gasoline or gasoline vapor odors is present in the engine compartment.
– Never start or operate the engine if the fuel cap is not properly secured.
– Do not carry gasoline containers in the front storage compartment.
– Use only a BRP approved LinQ fuel caddy, which shall be properly installed and secured.
– Never refill the fuel caddy on the PWC, refill on shore.
– On a 3–up vehicle, never tow a skier or a wakeboarder while having a fuel caddy installed.

Gasoline is poisonous and can cause injury or death.

– Never siphon gasoline with your mouth.
– If you swallow gasoline, get any in your eyes, or inhale gasoline vapors, see a doctor immediately.

If gasoline is spilled on you, wash thoroughly with soap and water and change your clothes.

Burns From Hot Parts

Certain components may become hot during operation. Avoid contact during and shortly after operation to avoid burns.

Watersports (Towing with the PWC)

3–UP Models Only

Attachment and Towing Devices

Certain PWC models come equipped with tow eyelets or a ski pylon.

Use ski pylon to attach a tow rope for a skier or wake boarder.

Use rear tow eyelet to attach a tow rope for a tube.

Do not use these attachment points or any other portion of the watercraft to tow a parasail, kites, gliders or any devices which can become airborne or for pulling any other craft. Personal injury or severe damage may occur.

Never carry loads on the rear platform when practicing watersports. The cargo may interfere with the rope and unsecure it, becoming an obstacle to the person being towed.

PWC Capacity When Towing

Always carry an observer to observe the person being towed and inform the operator about the participants' hand signals. The operator must focus his attention on operating the watercraft and the waters ahead.

You need to have seats for everyone: operator, observer, towed person. Therefore, if you are the only vessel, a 3-seater PWC is necessary and you can tow only one person.

Towing and Observing

If you have never towed someone behind your PWC before, it is a good idea to spend some hours as an observer, working with and learning from an experienced operator. It is also important to be aware of the skill and experience of the person being towed.

Pulling a tube, skier or wakeboarder makes the watercraft handle differently and requires greater skill.

Always respect the safety and comfort of the person being towed.

Proceed with only as much speed as required and follow the observers' instructions.

Do not make tight sharp turns or use the braking system unless absolutely necessary. Remember that although this PWC is manoeuvrable and has stopping capabilities, the person in tow may not be able to avoid an obstacle, or your PWC.

If you are the observer, make sure you and the person being towed know the hand signals.

Hand Signals	
1. Speed up Thumbs up 	**5. Cut motor** Slashing hand across throat 
2. Slow down Thumbs down 	**6. OK after all** Hands clasped over the head 
3. Turn Circling motion above head followed by pointing in the direction of the turn 	**7. Stop** Hand raised with fingers outstretched 
4. Back to shore Pat top of head 	**8. All OK** An "0" made with the thumb and index finger 

Give immediate attention to a person who has fallen. He or she is vulnerable in the water alone and may not be seen by other boaters.

Participate in watersports only in safe areas. Stay away from other boats, channels, beaches, restricted areas, swimmers, and heavily travelled waterways and underwater obstructions.

Tow Rope

Never wrap the tow rope around your wrist, hand or any body part. The rope may suddenly lose its slack and cause you serious injuries such as amputation.

Both the operator and observer shall monitor the location of the tow rope when participating in watersports. A slack tow rope can become entangled with a person(s) or objects on the PWC or in the water, particularly when making a tight turn or circling, and cause serious personal injury.

Do not pull the tow rope in front of other boats and be careful not to run over the rope with the PWC because it could get trapped in the jet pump.

Do not tow a person in any watersport on a short tow rope such that the person inhales exhaust fumes in concentration. Inhalation of concentrated exhaust fumes, which contain carbon monoxide, can result in CO poisoning, personal injury and death.

Use a tow rope of sufficient length and size and make sure it is adequately secured to your watercraft.

Always store tow rope when not in use. While some watercrafts are equipped or can be fitted with a specially designed towing mechanism, avoid installing a tow pole on a PWC. It can become a hazard should someone fall on it.

PRACTICES EXERCISES

It is always a good idea to practice and get familiar with all controls, functions and handling characteristics of your watercraft before venturing on the water.

Where to Practice Exercises

Find a suitable area to practice the exercises. Ensure the area meet the following requirements:

– No traffic
– No obstacles
– No swimmers
– No current
– Ample space to maneuver
– Water depth is adequate.

Practice Exercises

Practice alone the following exercises.

Turning

Practice turning in circles in both directions at slow speed.

When comfortable with the exercise, increase difficulty by making some figure 8.

When this is mastered, repeat the above exercises but at increased speed.

Stopping Distances

Practice stopping the watercraft in a straight line at various speeds and braking force. Remember that watercraft speed, load, water conditions, current and wind also affect stopping distances.

Practice releasing the throttle while going at speed and feel the deceleration rate with different speed.

Repeat exercise, but this time while applying iBR lever (if equipped). Note that the iBR system takes control of the throttle.

Steering and Avoiding an Obstacle

Practice obstacle avoidance (choose a virtual point on the water) by steering watercraft and maintaining throttle.

Repeat exercise, but this time release throttle while turning.

Repeat exercise, but this time while applying iBR lever (If equipped). Note that the iBR system takes control of the throttle.

NOTE:
With this exercise, you will learn that you need throttle to steer the watercraft in a different direction.

Reverse

Practice reverse operation to learn how the watercraft operates in reverse and reacts with steering inputs.

NOTE:
Remember that steering direction is reversed when backing.

Docking

Practice docking using the throttle, the steering and the iBR (if equipped) to become familiar with the response if the PWC and to develop good control skills.

Slow Speed Mode, Ski Mode and Speed Limiter Mode (if equipped)

If your watercraft has any of these modes, it is also important to understand their operation and to become familiar with these features prior to using them on a ride with other people.

⚠ WARNING

The ski and the speed limiter modes are not an automatic pilot; they will not drive the watercraft for you.

FUELING

Fueling Procedure

Fuel is flammable and explosive under certain conditions. Do not smoke or allow open flames or sparks in the vicinity.

1. Stop engine.
2. Have the operator and passenger(s) get out of watercraft.
3. If on the water, moor the watercraft securely to the dock.
4. Unscrew slowly the fuel cap counterclockwise to stabilize pressure before removing it.

NOTE:
A short whistling sound is normal.

5. Insert the spout into the filler neck.

NOTE:
Be certain that you are putting fuel in the right location and not using a ventilation hole or ski pylon hole by mistake.

6. Pour fuel slowly so the air can escape from the tank and prevent fuel flow back. Be careful not to spill fuel.
7. Stop filling after the release of the gas pump nozzle handle and wait a moment before removing the spout. Do not retract the gas pump nozzle to put more fuel into the fuel tank. Do not overfill.
8. Reinstall the fuel cap and fully tighten it.
9. Always wipe off any fuel spillage from the watercraft.
10. After refueling, always open or remove the seat or the lateral panel (depending on models) and ensure there is no gasoline odor inside the engine compartment. Do not start watercraft if you smell gasoline odor.

Fuel Requirements

NOTICE

Always use fresh gasoline.

Gasoline will oxidize; the result is loss of octane, volatile compounds, and the production of gum and varnish deposits which can damage the fuel system.

Alcohol fuel blending varies by country and region. Your vehicle has been designed to operate using the recommended fuels, however, be aware of the following:

– Use of fuel containing alcohol above the percentage specified by government regulations is not recommended and can result in the following problems in the fuel system components:
  – Starting and operating difficulties.
  – Deterioration of rubber or plastic parts.
  – Corrosion of metal parts.
  – Damage to internal engine parts.

– Inspect frequently for the presence of fuel leaks or other fuel system abnormalities if you suspect the presence of alcohol in gasoline exceeds the current government regulations.
– Alcohol blended fuels attract and hold moisture which may lead to fuel phase separation and can result in engine performance problems or engine damage.

Recommended Fuel

The gasoline must have the following minimum octane requirements:

Engine	Recommended Fuel
300	Use Premium gasoline with an AKI (RON+MON)/2 octane rating of 92 or an RON octane rating of 95.
All other	Use common gasoline with an AKI (RON+MON)/2 octane rating of 87 or an RON octane rating of 91.

Use unleaded gasoline containing MAXIMUM 10% ethanol.



NOTICE

Never experiment with other fuels. Engine or fuel system damages may occur with the use of an inadequate fuel.

NOTICE

Do NOT use fuel from fuel pumps labeled E85.

Use of fuel labeled E15 is prohibited by U.S. EPA Regulations.

TRAILERING INFORMATION

NOTICE

The span of the trailer bunks including bunk width should be adjusted to provide support throughout the full length of the hull. The ends of both trailer bunks should not exceed the length of the watercraft.

Ensure the trailer wheels are positioned so that the center of gravity of the watercraft is slightly ahead of the wheels to properly support the weight of the watercraft.

Carry the watercraft in its normal operating position.

Check the applicable laws and regulations in your area concerning towing a trailer, especially for the following items:

- Brake system
- Tow vehicle weight
- Mirrors.

Respect tow vehicle maximum weight capacity and the tongue weight capacity as recommended by the manufacturer.

Tie the watercraft to both front and rear (bow/stern) eyelets so that it is firmly secured on the trailer. Use additional tie-downs if necessary.

Ensure fuel tank cap, front storage compartment cover, glove box cover, boarding platform and seat are properly latched.

Remove all cargo and equipment attached.

Observe trailering safety precautions.

Do not route ropes or tie-downs over the seat or attach them to the grab handle to avoid these parts permanently damaged. Wrap ropes or tie--downs with rags or similar protectors where they can come into contact with the watercraft body.

A Sea-Doo cover can protect the watercraft, particularly when driving on dirt roads, to prevent dirt entry through the air inlet openings.

When trailering 2 watercrafts, it may be necessary to remove the inner wakeboard rack, if equipped.

For more information, see the following video: SEA-DOO HOW TO SERIES - PROPER WATERCRAFT TRAILERING

https://www. youtube. com/watch?v=mXtHWIdt7yI

Or, use the following QR code.

IMPORTANT ON-PRODUCT LABELS

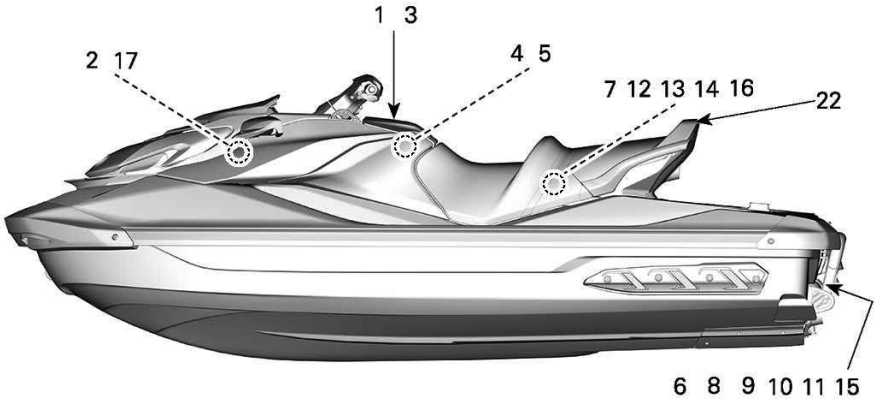
Watercraft Safety Labels

These labels are affixed to the vehicle for the safety of the operator, passengers or bystanders.

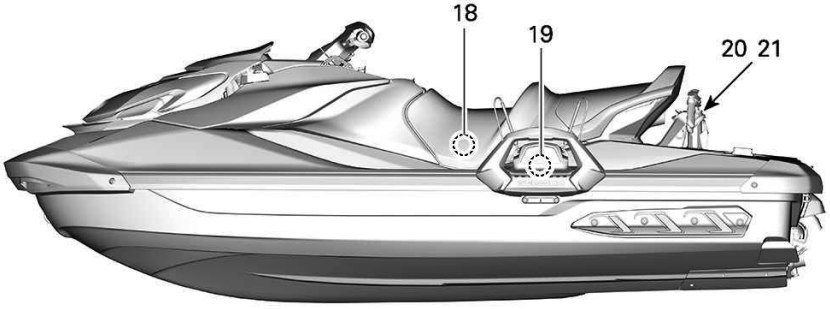
The operator and when applicable, the passenger, shall read and understand this information before riding.

The labels illustrated on the following pages are on your watercraft. If missing or damaged, they can be replaced free of charge. See an authorized Sea-Doo dealer.

NOTE:
In the event of any discrepancy between this guide and the vehicle, the safety labels on the vehicle have precedence over the labels in this guide.



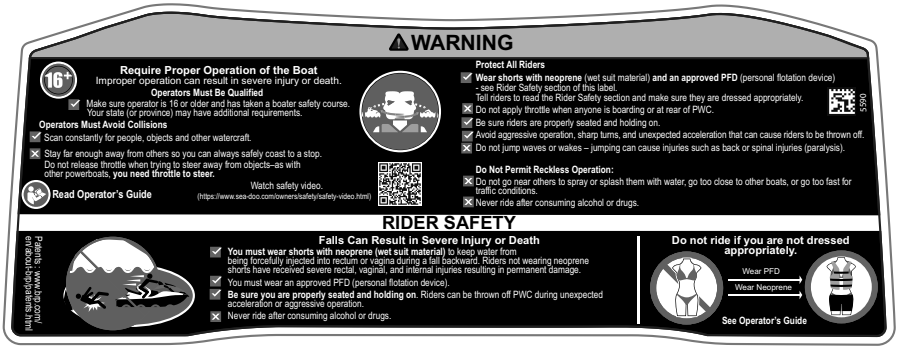
ALL MODELS EXCEPT WAKE



WAKE SPECIFIC

1. High Performance Vehicle Label
2. Storage Compartment Label
3. General Warning Label
4. Battery Label
5. Glove Box Use Label
6. Re-Boarding Label
7. Coolant Hot - Do Not Open Label
8. Tip Over Label
9. iBR Protector Label - Moving Parts
10. iBR Gate Label - Moving parts
11. Do Not Use To Onboard
12. Engine Oil and Components Hot
13. Do Not Sit Pictogram
14. Checking Engine Oil Label
15. Exhaust System Flushing Label (GTR Models)
16. Fuel Warning Label
17. Air Intake Silencer Label
18. Wakeboard Support Label (Wake Models)
19. Retractable Ski Post - Post (Wake Models)
20. Retractable Ski Post - Spotter and Weight (Wake Models)
21. Passenger Transportation - Appropriate Wearing

General Warning Label



Storage Compartment Label



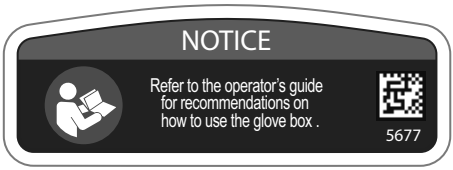
High Performance Vehicle Label

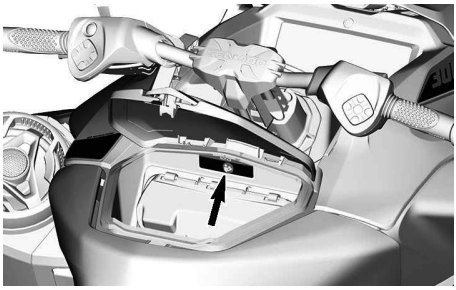


Fuel Warning Label



Glove Box Use Label





Re-Boarding Label

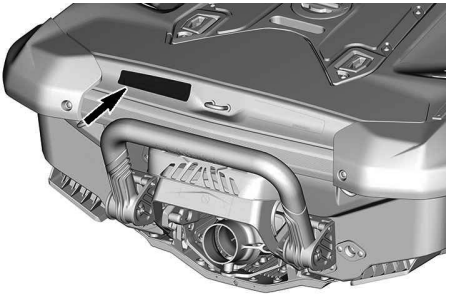
⚠ WARNING

AVOID SERIOUS INJURY OR DEATH:
- Engine must be turned off before re-boarding.
- Keep away from propulsion system and intake grate.

WHEN RE-BOARDING:
- Re-board one person at a time.
- Stay centered to keep balance.

Never use the boarding step (if so equipped) for pulling, towing, jumping or boarding a PWC that is out of water or any purpose for which it was not designed.

219905498



iBR Gate Protector Pictogram - Moving part



Tip Over Label

⚠ CAUTION

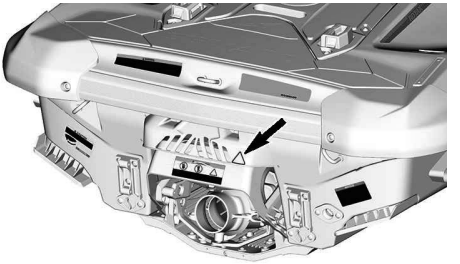
When operating the engine while the watercraft is out of thewater, the heat exchanger in the ride plate may become very hot. Avoid any contact with plate as burns may occur.

219905494



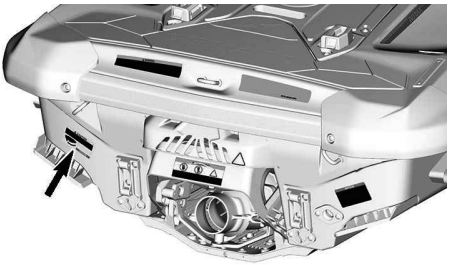
- Roll boat
- Grab inlet grate and step on bumper rail.
- Make sure engine is off.

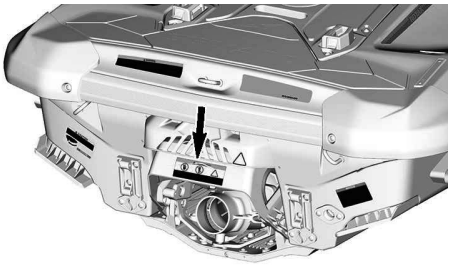
NOTICE



iBR Gate Label - Moving Part





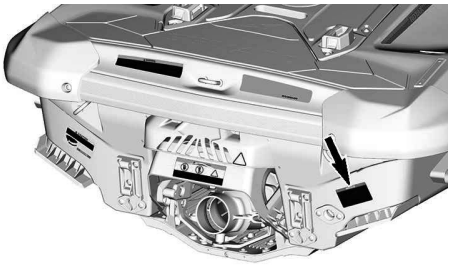


Exhaust System Flushing Label

NOTICE

It is very important to flush the exhaust system with fresh water (from 1-1/2 to 2 minutes) after each use in salt water or foul water.

219905495



Do Not Use To Onboard



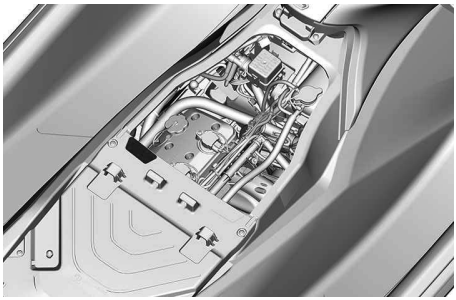


Checking Engine Oil Level

NOTICE

CHECKING ENGINE OIL LEVEL

- Make sure engine is at operating temperature. (Never let engine run out of water without the flush kit connected as it may damage the engine.)
- Vehicle must be level to perform verification.
- Let engine running at idle for at least 30 seconds.
- Stop engine and wait at least 30 seconds.
- Check oil level using the dipstick.

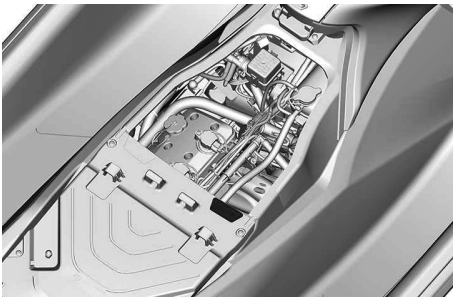


Engine Oil and Components Hot

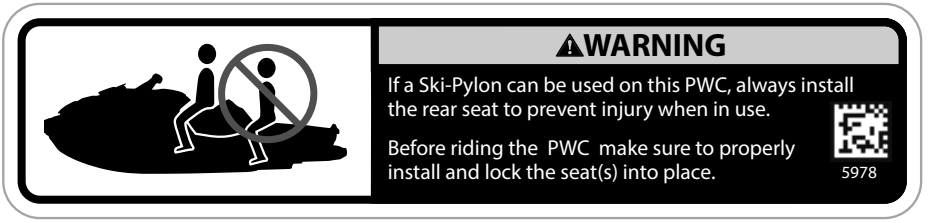
CAUTION

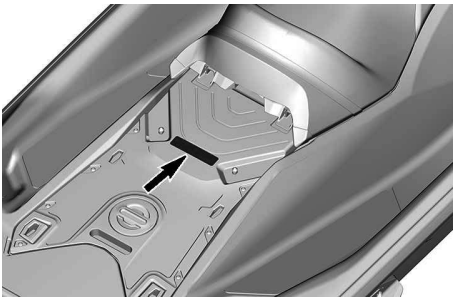
ENGINE OIL AND CERTAIN COMPONENTS IN THE ENGINE COMPARTMENT MAY BE HOT.
DIRECT CONTACT MAY RESULT IN SKIN BURN.

219905037



Do Not Sit Pictogram





Battery Label



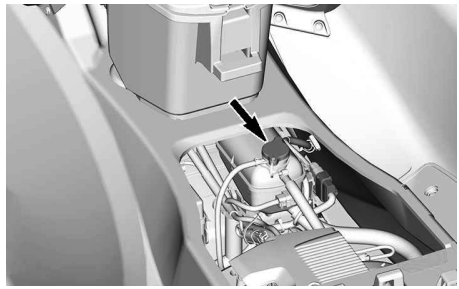
ROLL AROUND THE RED (+) BATTERY LEAD



Coolant Hot - Do Not Open Label



F00A2TY



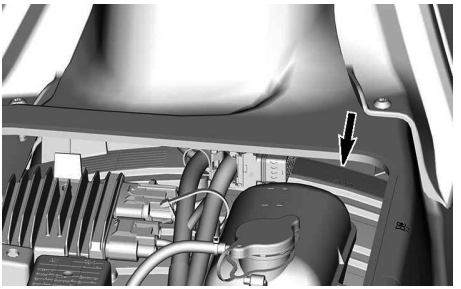
Air Intake Silencer Label

NOTICE

- **To comply with noise regulations, this engine is designed to operate with an air intake silencer.**
- **Operation without air intake silencer or with one not properly installed may cause engine damage.**

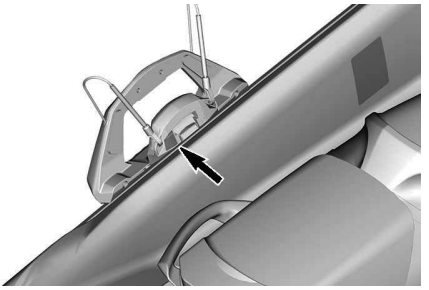
219903177A

LOCATED ON THE TOP OF THE AIR INTAKE SILENCER - UNDER THE ECM



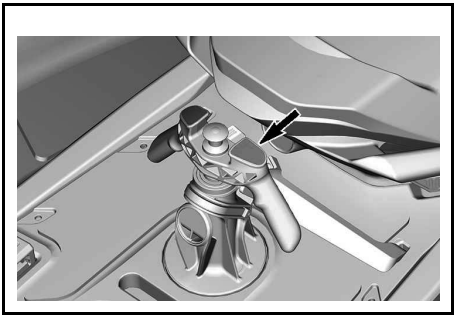
Wakeboard Support Label



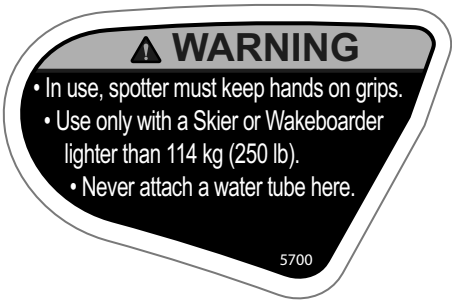


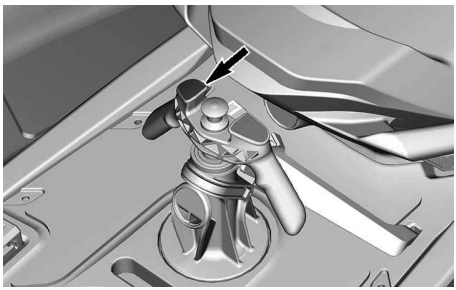
Retractable Ski Post — USe





Retractable Ski Post - Spotter and Weight

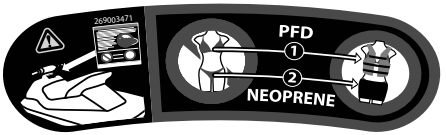




Passenger Transportation - Appropriate Wearing

⚠ WARNING

- **Never carry passengers on rear platform, always use the rear seat to carry passengers.**
- **Wear shorts with neoprene and approved PFD.**





Molded Safety Pictogram

⚠ WARNING

Never put gasoline in this hole. Gasoline is extremely flammable and highly explosive. Fuel vapors can spread and be ignited by a spark or flame many feets away.



LABEL 1

Hang Tag

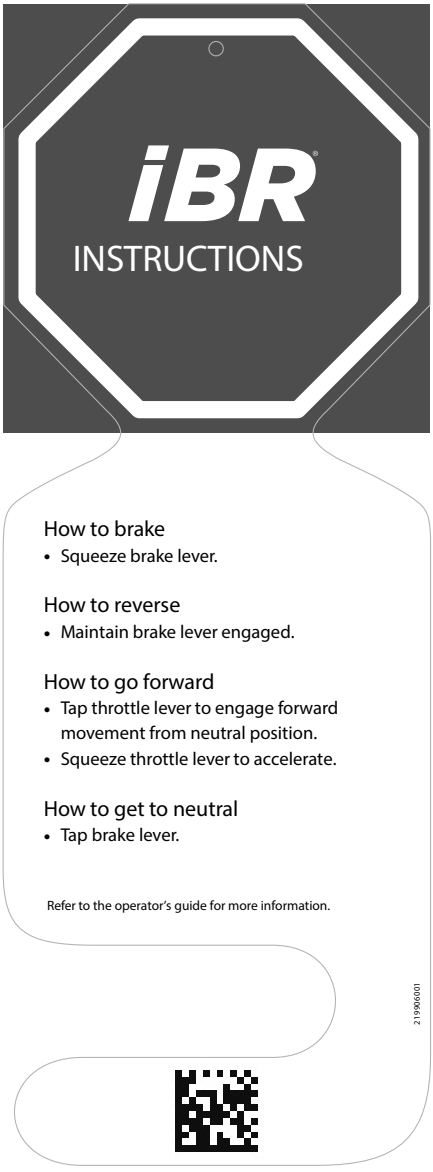
California Proposition 65 Warning

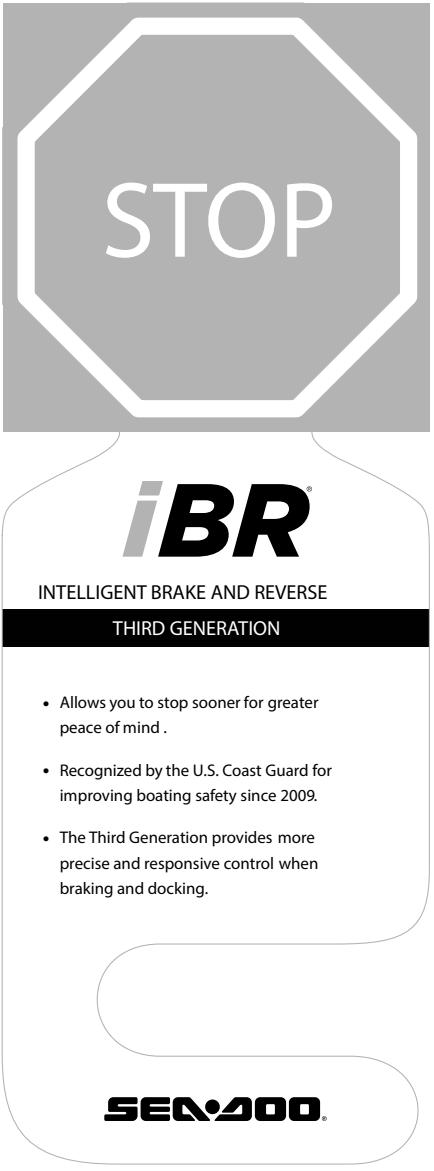
⚠ **WARNING**. Operating, servicing and maintaining a recreational marine vessel can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, service your vessel in a well-ventilated area and wear gloves or wash your hands frequently when servicing this vessel.

For more information go to www.P65warnings.ca.gov/products/marine

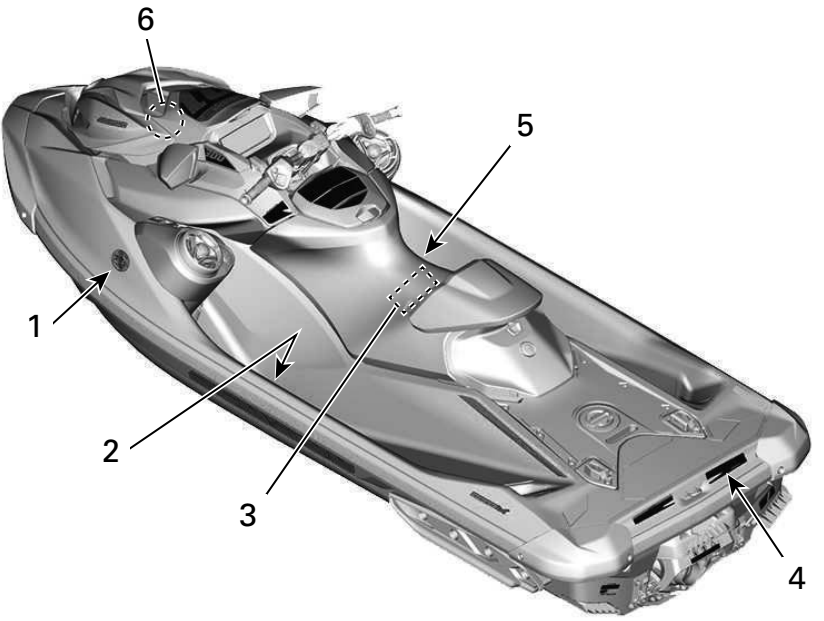
219905280

iBR Hang Tag


iBR
INSTRUCTIONS
How to brake
• Squeeze brake lever.
How to reverse
• Maintain brake lever engaged.
How to go forward
• Tap throttle lever to engage forward movement from neutral position.
• Squeeze throttle lever to accelerate.
How to get to neutral
• Tap brake lever.
Refer to the operator's guide for more information.
219906001


STOP
iBR
INTELLIGENT BRAKE AND REVERSE
THIRD GENERATION
• Allows you to stop sooner for greater peace of mind .
• Recognized by the U.S. Coast Guard for improving boating safety since 2009.
• The Third Generation provides more precise and responsive control when braking and docking.
SEA-DOO

Compliance Labels and Hang Tag





LABEL 1

CANADIAN COMPLIANCE NOTICE
AVIS DE CONFORMITÉ CANADIEN

MAXIMUM RECOMMENDED SAFE LIMITS
LIMITES MAXIMALES DE SÉCURITÉ RECOMMANDÉES





CATEGORY / CATÉGORIE: C

MAXIMUM WAVE / VAGUE MAXIMALE: **2.0 m**
MAXIMUM WIND SPEED / VITESSE DE VENT MAXIMALE: **33 knots/noeuds**

BOMBARDIER RECREATIONAL PRODUCTS INC. (YDV)
VALCOURT, QUEBEC, CANADA
SKALDENSTRAAT 125, GENT, 9042, BE

MODEL / MODÈLE :

THE MANUFACTURER DECLARES THAT THIS PRODUCT COMPLIES WITH THE CONSTRUCTION REQUIREMENTS OF THE SMALL VESSEL REGULATIONS, AS THEY READ ON THE DAY ON WHICH THE CONSTRUCTION OF THE VESSEL WAS STARTED OR ON THE DAY ON WHICH THE VESSEL WAS IMPORTED.
LE FABRICANT ATTESTE QUE CE PRODUIT EST CONFORME AUX EXIGENCES DE CONSTRUCTION DU REGLEMENT SUR LES PETITS BÂTIMENTS EN VIGUEUR À LA DATE DU DÉBUT DE SA CONSTRUCTION OU DE SON IMPORTATION.

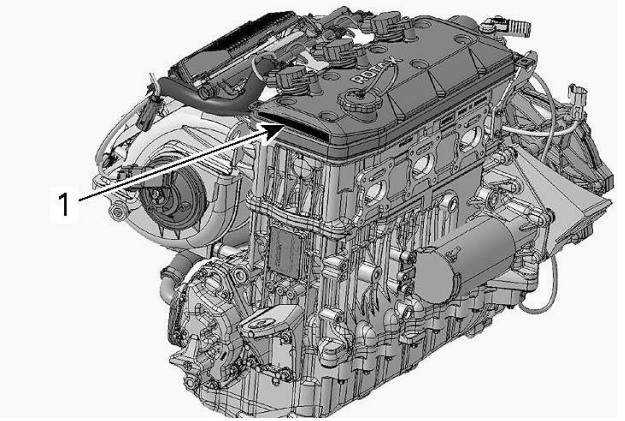
MAXIMUM CAPACITIES
ABOVE INFORMATION ALSO
APPLIES IN THE U.S.A.



LABEL 2- LOCATED INSIDE THE LH FOOTREST.

UK CA CE ROTAX STRASSE 1
A-4623. GUNSKIRCHEN. AT

LABEL 3 - ENGINE MANUFACTURER IDENTIFICATION



TYPICAL

1. Engine Manufacturer Identification

THIS BOAT IS MANUFACTURED BY
BOMBARDIER RECREATIONAL PRODUCTS INC. PER 46 U.S.C. 4305 AND U.S. COAST GUARD GRANT OF EXEMPTION (CGB 88-001),THE COAST GUARD EXEMPTS THIS VESSEL FROM ONE OR MORE SAFETY REGULATIONS. CGB 88-001 STATES THAT CERTAIN REGULATIONS ARE INAPPLICABLE IN LIGHT OF THIS VESSEL'S CHARACTERISTICS AND THAT THE EXEMPTION WILL NOT HAVE AN ADVERSE EFFECT ON RECREATIONAL BOATING SAFETY. THIS BOAT COMPLIES WITH U.S. COAST GUARD SAFETY STANDARDS IN EFFECT ON THE DATE OF CERTIFICATION. ALL PERSONS SHOULD WEAR A LIFEJACKET (PERSONAL FLOTATION DEVICE) WHILE OPERATING OR RIDING ON THIS WATERCRAFT.

ASSEMBLED IN MEXICO

5497

LABEL 4

EMISSION CONTROL SYSTEM INFORMATION
BOMBARDIER RECREATIONAL PRODUCTS INC.
THIS ENGINE CONFORMS TO U.S. EPA & CALIFORNIA EMISSIONS REGULATIONS FOR MARINE SI ENGINES.
RENSEIGNEMENT SUR LE DISPOSITIF ANTIPOLLUTION
CE MOTEUR EST CONFORME AUX NORMES DE L'EPA DES É.-U. POUR LES MOTEURS MARINS À ALLUMAGE COMMANDÉ.

EC 121

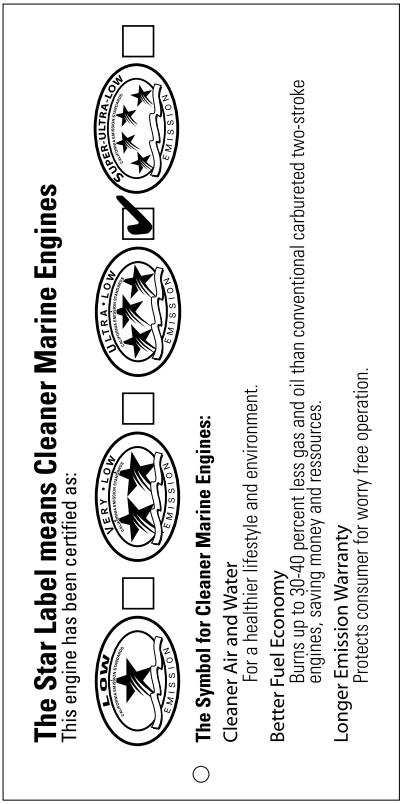
	ENGINE FAMILY / FAMILLE DE MOTEUR
(EPA FEL) (CA FEL)	CERTIFICATION STANDARDS NORMES DE CERTIFICATION
	EMISSION CONTROL SYSTEM SYSTÈME DE CONTRÔLE DES ÉMISSIONS

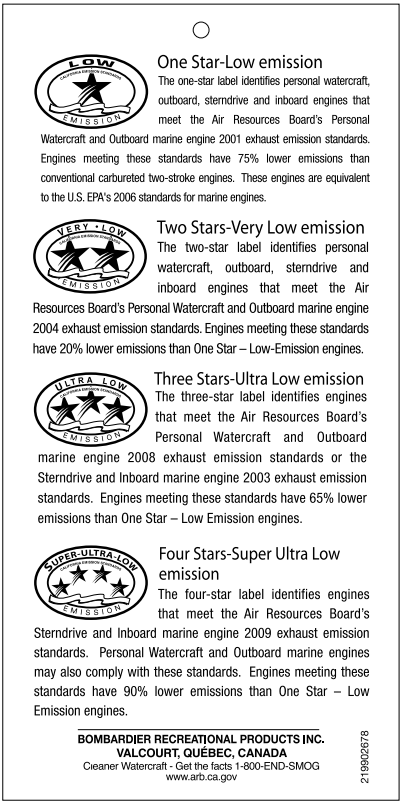
MEETS CALIFORNIA EVAP EMISSIONS REGULATIONS FOR SPARK IGNITION MARINE WATERCRAFT. EVAP FAMILY
EVAPORATIVE EMISSION CONTROL SYSTEM: SO
SEE OPERATOR'S GUIDE FOR MAINTENANCE SCHEDULE AND FUEL, OIL AND SPARK PLUG SPECIFICATIONS. VOIR LE CALENDRIER D'ENTRETIEN ET LES SPÉCIFICATIONS D'ESSENCE, D'HUILE ET DE BOUGIE D'ALLUMAGE DANS LE GUIDE DE L'OPÉRATEUR.
219905703

LABEL 5 - APPLICABLE FOR ALL MODELS IN CANADA AND UNITED STATES, APPLICABLE FOR MODELS EVERYWHERE EXCEPT CANADA AND UNITED STATES WHEN EQUIVALENT TO A MODEL CERTIFIED TO US. EPA STANDARDS



LABEL 6 - LOCATED NEAR GAS CAP





STAR LABEL HANG TAG

PRE-RIDE INSPECTION

We encourage you to have an Annual Safety Inspection of your vehicle. Please contact an authorized BRP dealer for further details. Though not required, it is recommended that an authorized BRP dealer performs the preseason preparation of your vehicle. Each visit to your authorized BRP dealer is a great opportunity for your dealer to verify if your vehicle is included in any safety campaign. We also urge you to visit your authorized BRP dealer in a timely manner if you become aware of any safety related campaigns.

⚠ WARNING

Perform a pre-ride inspection before each ride to detect potential problems during operation. The pre-ride inspection can help you monitor wear and deterioration before they become a problem. Correct any problems that you discover to reduce the risk of a breakdown or crash.

Before performing the pre-ride inspection, read and understand the *Controls* section.

What to Do Before Launching the Watercraft

⚠ WARNING

Engine should be off and the tether cord cap should always be removed from the engine cut-off switch prior to verifying any of the following points. Only start watercraft once all items have been checked and operate properly.

NOTE: Before starting the engine and taking off, it is recommended to shake vertically the rear of the watercraft to shake away any sand that may have accumulated near the propulsion and reverse systems.

Check the items listed in the following table before launching the watercraft.

ITEM	OPERATION
Hull	Inspect hull, ride plate and water inlet grate for damages
Jet pump water intake	Inspect/clean
Drain plugs	Tighten
Fuel tank	Refill
Engine compartment	Check for any visible fluid leaks and gasoline vapor odor
Engine oil level	Check/refill
Engine coolant level	Check/refill
Steering system	Check operation

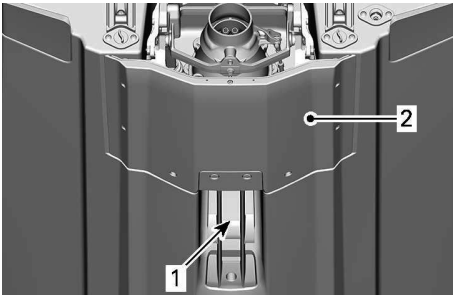
iTC lever	Check operation. (Depress and release the lever to check for freedom of movement. If any friction is felt, the lever must be taken apart, cleaned, inspected for wear and lubricated)
iBR lever (if equipped)	Check operation. (Depress and release the lever to check for freedom of movement. If any friction is felt, the lever must be taken apart, cleaned, inspected for wear and lubricated)
Front storage compartment cover (if equipped), glove box and seat	Ensure they are closed and latched.
Wakeboard rack (if equipped)	– Ensure rack is properly installed and secured. – Make sure bungee cords are in good condition. – Ensure wakeboard is correctly installed in rack and secured.
Ski/wakeboard pylon (if equipped)	Inspect and check operation.
Engine START/STOP button	Check operation
Engine cut-off switch and the monitoring beeper	Check operation
Battery condition and connections	Check every month
Sacrificial anodes	Inspect every month (more often in saltwater use) and change if necessary

Hull

Inspect hull for cracks and other damages.

Jet Pump Water Intake

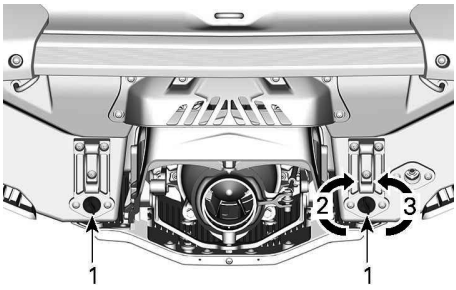
Remove weeds, shells, debris or anything else that could restrict the flow of water and damage the propulsion unit. Clean as necessary. If any obstruction cannot be removed, refer to an authorized *Sea-Doo* dealer for servicing.



1. *Water intake*
2. *Ride plate*

Drain Plugs

Secure bilge drain plugs.



1. *Bilge drain plug*
2. *Tighten*
3. *Untighten*

⚠ WARNING

Ensure bilge drain plugs are properly secured prior to launching the watercraft in water.

Fuel Tank

Fill the fuel tank.

⚠ WARNING

Strictly adhere to instructions detailed in *Fueling Procedure*.

Engine Compartment

Inspect the engine compartment for fuel vapor odor.

⚠ WARNING

Should any leak or gasoline odor be present, do not apply electrical power or start the engine. You should seek service from an authorized *Sea-Doo* dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA Emissions-related warranty* contained herein for information about warranty claims.

To access the engine compartment, remove the seats. Refer to *Removing the Seat*.

Engine Oil

Ensure oil level is within specification as described in *Maintenance Procedures* section.

Engine Coolant

Ensure coolant level is within specification as described in *Maintenance Procedures* section.

Check for coolant leaks on engine, in bilge and from ride plate.

⚠ CAUTION

When operating the engine with the watercraft out of the water, the engine and heat exchanger in the ride plate may become very hot. Avoid any contact with hot engine parts and the ride plate as burns may occur.

Steering System

Assisted by another person, check steering operation for free movement.

When the handlebar is horizontal, the jet pump nozzle should be in the straight ahead position. Ensure the jet pump nozzle pivots easily and in the same direction as the handlebar (e.g.: when handlebar is turned to the left, the nozzle opening must point towards the LH side of watercraft).

⚠ WARNING

Check handlebar and corresponding steering nozzle operation before starting. Never turn handlebar while someone is near the rear of the watercraft. Keep away from steering moving parts (nozzle, iBR gate, linkages etc.).

Throttle Lever

Check the Electronic Throttle Control lever (ETC) for free and smooth operation. It should return to its initial position immediately after it is released.

⚠ WARNING

Check throttle lever operation before starting the engine. If any friction is felt in the throttle lever, refer to an authorized *Sea-Doo* dealer.

iBR Lever

Check the iBR lever for free and smooth operation. It should return to its initial position immediately after it is released.

⚠ WARNING

Check iBR lever operation before starting the engine. If any friction is felt in the iBR lever, refer to an authorized *Sea-Doo* dealer.

Storage Compartments, Boarding Platform and Seat

Ensure the glove box, boarding platform, access panels, and seat are closed and latched.

⚠ WARNING

Ensure the seat, boarding platform, access panels, and all storage compartment covers are securely latched.

Wakeboard Rack (if equipped)

⚠ WARNING

Ensure wakeboard rack is properly secured to watercraft body, and that the wakeboard is properly positioned and secured to the rack prior to using watercraft. Ensure wakeboard retaining straps are in good condition.

Ski/Wakeboard Pylon (if equipped)

Make sure ski/wakeboard pylon is fully extended and locked before use. Completely retract and lock when not used.

⚠ WARNING

When using the ski pylon, never carry cargo or accessories on the boarding platform.

⚠ WARNING

Use caution with skier/wakeboarder in tow as tow rope may backlash to watercraft when released. Never perform a sharp turn when towing a skier, wakeboarder or any toy. Always store tow rope when not in use.

NOTICE

The ski/wakeboard pylon is designed for towing a skier or wakeboarder with a maximum weight of 114 kg (250 lb).

⚠ CAUTION

Never use the ski pylon to tow an inflatable tube. Always use the rear cleat for towing an inflatable tube.

Engine Cut-Off Switch and Engine START/STOP Button

Press the start button once without installing the tether cordon the engine cut-off switch.

Install the tether cord cap on the engine cut-off switch.

Press the START/STOP button to start the engine, then stop it by pressing the START/STOP button a second time.

Restart the engine, then stop it by removing the tether cord from the engine cut-off switch.

⚠ WARNING

Should the tether cord cap be loose or fail to remain on the engine cut-off switch, replace the tether cord immediately in order to avoid unsafe use. If removing the tether cord cap from the engine cut-off switch or pressing the START/STOP button does not stop the engine, do not use the watercraft. See your authorized *Sea-Doo* dealer.

What to Do After Launching the Watercraft

Check the items listed in the following table after launching the watercraft and before going for a ride.

⚠ WARNING

Engine should be off and the tether cord cap should always be removed from the engine cut-off switch prior to verifying any of the following points. Only start watercraft once all items have been checked and operate properly.

NOTE: Before starting the engine and taking off, it is recommended to shake vertically the rear of the watercraft to shake away any sand that may have accumulated near the propulsion and reverse systems.

Check the items listed in the following table before launching the watercraft.

ITEM	OPERATION
Information Center	Check operation.
Intelligent Brake and Reverse System (iBR)	Check operation.
Variable Trim System (VTS)	Check operation.

Information Center (Gauge)

1. Press START/STOP button and install tether cord on the engine cut-off switch.
2. As the information center cycles through its self-test function, ensure all indications come on.

⚠ WARNING

Always attach the tether cord clip to your PFD or to the wrist (wrist strap required).

iBR System

NOTICE

Ensure there is sufficient space ahead and behind watercraft to safely carry out the iBR system test to avoid a collision. Watercraft will move during test.

1. Remove the moorings lines securing the watercraft to the dock.
2. Start the engine and ensure the watercraft does not move.
3. On the left handlebar, depress the iBR lever completely in, the watercraft should move slowly backwards.
4. Release the iBR lever, there should not be any reverse thrust.

⚠ WARNING

Always ensure proper iBR system operation before taking the watercraft out for a ride.

Variable Trim System (VTS) (if equipped)

With the engine running in forward thrust, use the VTSTM system to move the jet pump nozzle up, and then down alternately to check VTS operation. Confirm the VTS position indicator movement in the information center.

Also test the VTS preset trim positions by double clicking the VTS UP/DOWN button (as applicable to model).

Refer to *Operating Instructions* for detailed instructions.

REGULAR MAINTENANCE

We encourage you to have an Annual Safety Inspection of your vehicle. Please contact an authorized BRP dealer for further details.

It is also recommended that an authorized Sea-Doo dealer performs the preseason preparation of your vehicle.

Each visit to your authorized Sea-Doo dealer is a great opportunity for your dealer to verify if your vehicle is included in any safety campaign. We also urge you to visit your authorized Sea-Doo dealer in a timely manner if you become aware of any safety related campaigns.

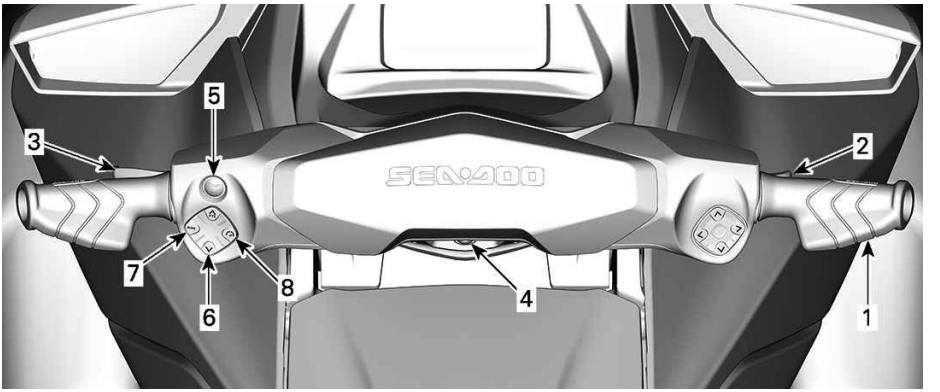
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WATERCRAFT INFORMATION

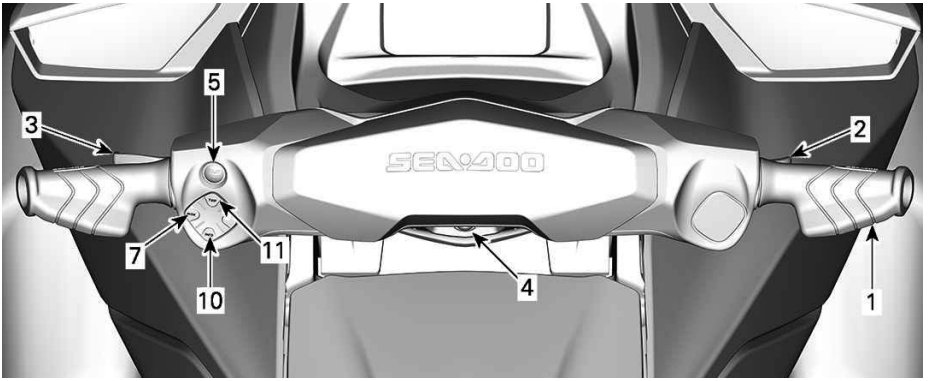
CONTROLS

Some vehicle safety labels are not shown on illustrations. For information on vehicle safety labels, refer to *Important On-Product Labels*.

Some indications, functions and features described in this section may not apply to every PWC model, or may be available as an option.



TYPICAL - 2 KEYPADS



TYPICAL - 1 KEYPAD

Equivalent Buttons Between 1 and 2 Keypads Models		
Actions	**1 Keypad**	**2 Keypads**
Navigate in the menu	Single press on INFO	LEFT/RIGHT
Enter menu	Long press INFO	OK (CLOCK and EXIT menus only)
Edit value	Single press on INFO	UP/DOWN
Change information display	Press TRIP	UP/DOWN (TRIP menu only)

Equivalent Buttons Between 1 and 2 Keypads Models		
Actions	**1 Keypad**	**2 Keypads**
Reset Trip when displayed)	Long press TRIP	Long press UP/DOWN
Fault codes/ Maintenance	Long press INFO	OK

Handlebar

The handlebar controls the direction of the watercraft. During forward operation, turning the handlebar to the right steers the watercraft to the right and inversely.

⚠ WARNING

Check handlebar and corresponding steering nozzle operation before starting. Never turn handlebar while someone is near the rear of the watercraft. Keep away from propulsion system.

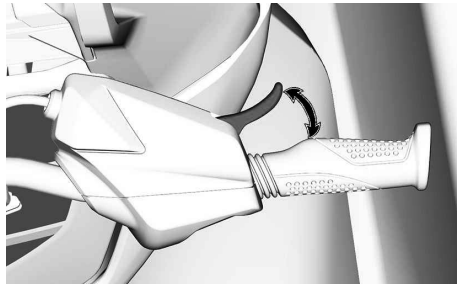
When operating in reverse, steering direction is reversed. Turning the handlebar to the right while backing up steers the watercraft to the left.

Throttle Lever

The throttle lever on the RH handlebar controls electronically the engine speed.

To increase or maintain watercraft speed, pull the throttle lever with your finger.

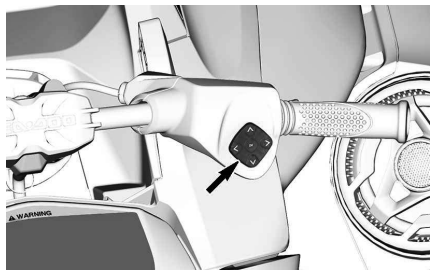
To decrease watercraft speed, release the throttle lever.



The throttle lever is spring loaded and should return to rest position (idle) when not pressed.

Right Controller

The right controller is located on the RH side of the handlebar.

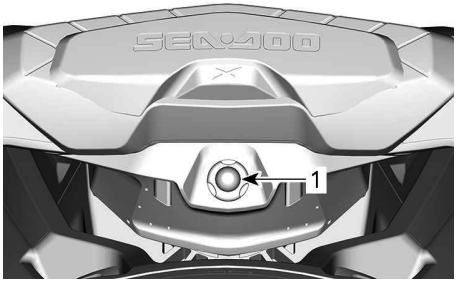


The right controller includes controls to navigate in the multifunction gauge.

- Arrow UP
- Arrow RH
- Arrow Down
- Arrow LH
- OK button.

Engine Cut-Off Switch

The engine cut-off switch is located in the middle of the handlebar.



To allow engine starting, the tether cord cap must be securely snapped to the engine cut-off switch.

⚠ WARNING

Always attach the tether cord clip to the operator's personal flotation device (PFD) or wrist (wrist strap required).



TYPICAL

1. *Tether cord cap on the engine cut-off switch*
2. *Tether cord secured to operator's PFD*

To stop engine, pull the tether cord cap from the engine cut-off switch.

⚠ WARNING

Should the engine be stopped, the brake function and all watercraft directional control is lost.

⚠ WARNING

Always disconnect tether cord when watercraft is not in operation in order to prevent accidental engine starting or to avoid unauthorized use by others, children, and to prevent theft.

Radio Frequency Digitally Encoded Security System (RF D.E.S.S.)

The tether cord cap contains an electronic circuit (D.E.S.S.™ key) that is programmed to give it a unique electronic serial number. This is the equivalent of a conventional key.

The D.E.S.S. system reads the key installed on the engine cut-off switch and only allows engine starting for keys it recognizes.

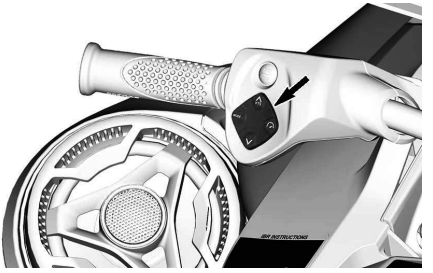
The D.E.S.S. system brings great flexibility. You can buy additional tether cords and have the D.E.S.S. keys programmed for your watercraft.

A total of ten D.E.S.S. keys can be programmed.

To have a key programmed to your watercraft, see your authorized BRP Sea-Doo dealer.

Left Controller

The left controller is located on the LH side of the handlebar.



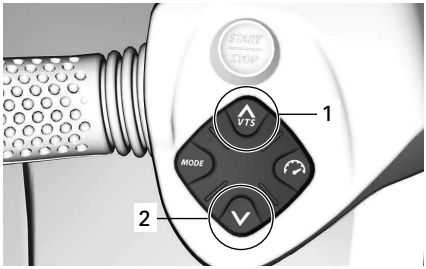
Variable Trim System (VTS) Button

It provides watercraft pitch trim adjustments by adjusting the vertical position of the jet nozzle.

The VTS can be electrically trimmed to desired attitude, or to one of tree preset trim positions (full up, middle and full down).

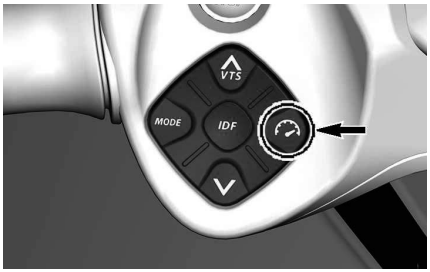
Refer to *Operating Instructions* for details.

NOTE:
The VTS button is used for Neutral adjustment. This is to adjust the neutral position of the watercraft. Refer to *Operating Modes* for details



1. *Bow up*
2. *Bow down*

Speed Control Button

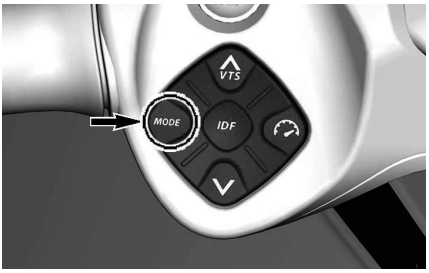


TYPICAL

Allow to set and control the speed related functions.

– Speed limiter
– Slow speed mode.

Mode Button



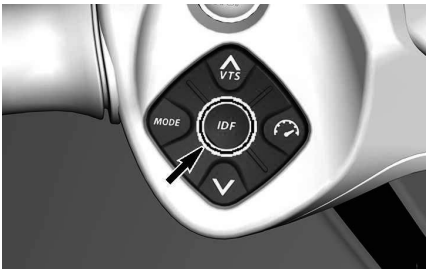
TYPICAL

It is used to choose between Normal, Sport or Eco mode.

Refer to *Operating Modes* for details.

intelligent Debris Free Pump (iDF) Button

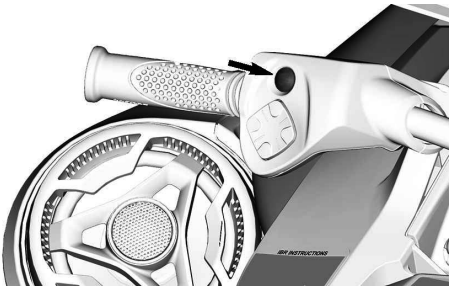
Located in the center of the left controller.



It allows to activate the iDF system. Refer to *How to Use the intelligent Debris Free Pump System* in *Operating Instructions* section.

Engine START/STOP Button

The engine START/STOP button is located on the LH handlebar.



Engine Starting and Stopping

Refer to *Operating Instructions* for complete procedures on how to start and stop the engine.

Waking Up the Electrical System

Press the START/STOP button once without installing the tether cord on the engine cut-off switch.

This will power up the electrical system; the information center will cycle through a self-test function.

The electrical system will stay powered up for approximately 75 seconds after the START/STOP button was depressed.

When the tether cord is installed on the engine cut-off switch, the system will be powered for 60 minutes.

Every time the START/STOP button is pressed, the countdown restarts. When the battery voltage drops below 12.3V, the LOW BATTERY indicator lamp will light up and the electrical system will shut down after 75 seconds.

Post-Drive Battery Management

This feature allows keeping the electrical system awake to allow using accessories when the engine is turned off. It also prevents draining the battery too much when using accessories. When the battery voltage reaches 12.3V or less, the system will automatically shut down to ensure being able to start the engine.

When the electrical system is activated by pressing start-stop briefly while the engine is shutdown the wake-up time will be managed as follows:

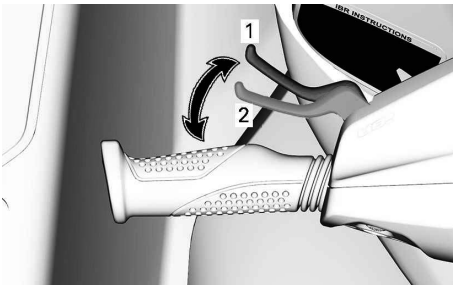
– Key off: System will shut down after 75 seconds.
– Key on: System will shut down after 60 minutes or if the voltage threshold is reached.

intelligent Brake and Reverse (iBR) Lever

The iBR lever on the LH handlebar can electronically command:

– Brake
– Reverse
– Neutral.

NOTE:
A minimum of 25% of iBR lever stroke is required to activate iBR functions.



1. *Lever rest position*
2. *25% stroke required to activate iBR functions*

At speed above 14 km/h (9 MPH), pulling the iBR lever will engage the brake.

NOTE:
If water current is 14 km/h (9 MPH) or above, the reverse can not be engaged as the speed threshold for the reverse is exceeded.

At speed below 14 km/h (9 MPH), pulling the iBR lever will engage reverse.

When the iBR lever is released after braking or reverse operation, the neutral is engaged.

⚠ WARNING

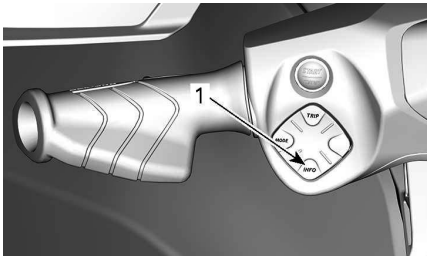
If throttle lever is still pulled in when releasing the iBR lever, forward movement will be initiated after a short delay. If forward acceleration is not desired, release the throttle lever.

NOTE:
The neutral position can be fine tuned by trimming the iBR system.

Refer to *Operating Instructions* for detailed instructions.

INFO Button (If Equipped)

The INFO button is located on the LH handlebar.



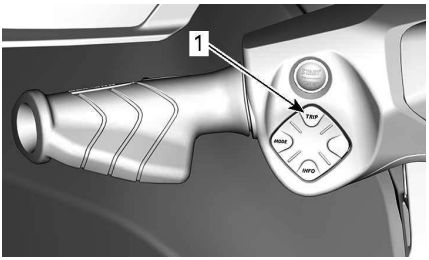
1. INFO button

It is used to navigate through the menus and to change some settings.

Refer to *Operating Modes* for details.

TRIP Button (If Equipped)

The TRIP button is located on the LH handlebar.



1. TRIP button

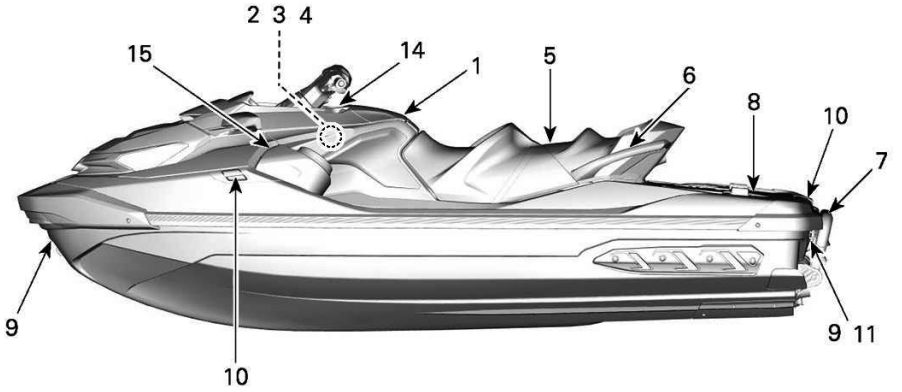
It is used to cycle through the tripmeter displays and the clock on the upper left display.

Refer to *Operating Modes* for details.

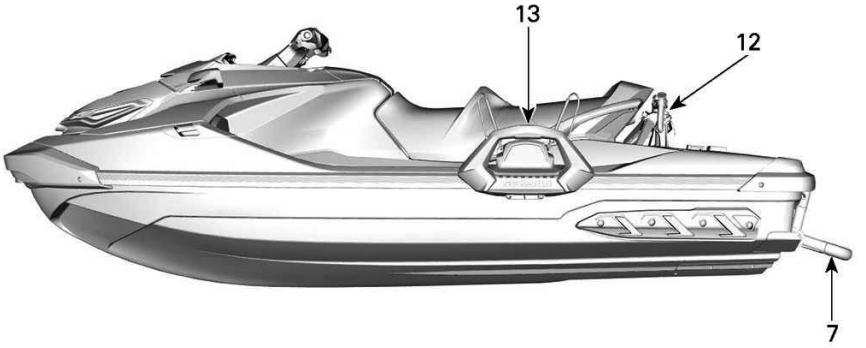
EQUIPMENT

Illustrations may not be accurate for every model and are only provided as a visual guide.

Some vehicle safety labels are not shown on illustrations. For information on vehicle safety labels, refer to *Watercraft Safety Labels*.



TYPICAL



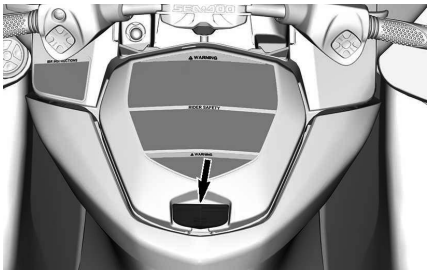
WAKE PRO MODELS

1. Glove Box
2. Storage Bin
3. Fire Extinguisher Holder
4. Safety Kit Holder
5. Seat
6. Passenger Handholds
7. Boarding Ladder (If Equipped)
8. Boarding Platform
9. Front and Rear Eyelets
10. Mooring Cleats
11. Bilge Drain Plugs
12. Retractable Ski Pylon (Wake PRO Model)
13. Wakeboard Rack (Wake PRO Model)
14. Steering Tilt Handle
15. BRP Audio Premium System (If Equipped)

Glove Box

A small, storage compartment for personal articles.

Pull on cover latch to open glove box.



Watertight Compartment

Inside the glove box is located a small watertight storage compartment for personal articles. Pull backwards on the two latches to open.



There is a protective foam located inside the watertight compartment to protect a phone from damages. Make sure the smartphone is held in place by the foam and not the edges of the receptacle and that you can close the lid. Always make sure the foam is completely dry before using.

Refer to *Maximum Phone Size* chart.

Maximum Phone Size	
Length	160 mm (6.3 in)
Width	85 mm (3.3 in)

NOTE:
Due to variation in smartphone sizes and cases styles, ensure there is no pressure on connector and/or phone when closing the lid.

Some models are equipped with a USB port used for charging. When using the USB port to charge a smartphone, always make sure to route the cable such that there is no pressure on either ends of the cable to prevent damage to cable or smartphone connectors.

NOTE:
For optimum performance, always use OEM USB cables. Low cost aftermarket cables may not have data lines and/or higher impedance which may result in poor charging performance or overheating.

Many models of smartphones have a brittle female connector so extra care should be taken when inserting in the watertight compartment. BRP recommends to use a short cable (no more than 25 cm (10 in)) so there is less extra cable length to stow.

The models not equipped with USB charging port are instead equipped with a rubber seal to ensure watertightness. There is a ventilation membrane that balance pressure inside and outside the compartment to ensure it can be opened without suctioning water droplets inside. The membrane itself is watertight. Watertightness of the compartment is finally ensured by pressing the compartment's door on the surrounding seal, using the two latches.

To ensure that articles inside the compartment are protected from the environment, the following recommendations should be followed:

Before and during use:

- Make sure the seal is intact, cleared and properly positioned.
- Make sure the ventilation membrane is intact and properly positioned.
- Make sure the seal around the USB charging port (or rubber seal) is intact and properly positioned.

– Completely dry the compartment and its contents before closing.
– Make sure nothing gets pinched between cover and box when closing compartment.
– Always close the compartment completely using the 2 latches.

After use:

– Remove smartphone from compartment.
– The USB charging port's integrated rubber cap should be installed to cover the connector.
– Always close the compartment completely using the 2 latches.

NOTE:
Use of desiccant in the watertight compartment is recommended to eliminate condensation. Replace desiccant frequently.

Front Storage Compartment

The front storage compartment that can be used to carry larger personal articles is located under the front cover.



FRONT STORAGE COMPARTMENT

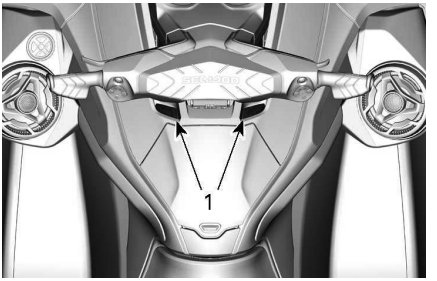
How to Open Front Storage Compartment Cover

Stop engine.

⚠ WARNING

When the front storage compartment cover is opened, the controls are not accessible to the driver.

Open the storage bin by pressing on the two release buttons and lifting the handlebar.



1. Release buttons

NOTICE

The maximum load allowable for the front storage compartment is 13 kg (30 lb) evenly distributed.

⚠ WARNING

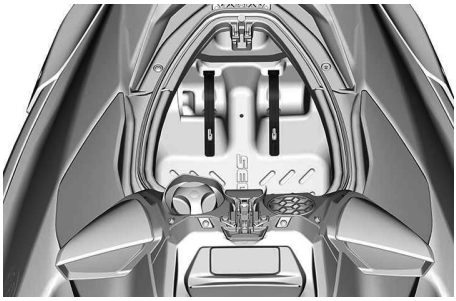
Never leave any heavy or breakable objects loose in the front storage compartment. Do not overload.Never store or transport fuel or any other flammable products in this storage compartment. Never operate the watercraft with the storage compartment cover open or with improperly secured cargo.

Fire Extinguisher Holder

NOTE:
Fire extinguisher is sold separately.

The fire extinguisher support is located under the front storage bin cover.

Use the rubber tie-downs to properly secure the fire extinguisher.

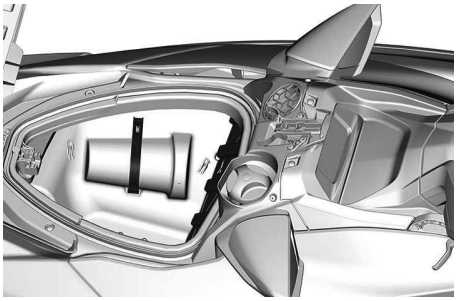


Safety Kit Holder

NOTE:
Safety kit is sold separately.

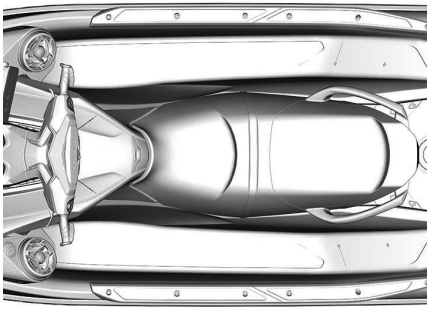
The safety kit support is located in the front storage bin.

Use the rubber tie-downs to properly secure the safety kit.



Seat

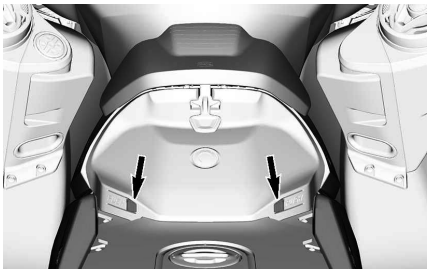
This model comes equipped with an ergonomic seat narrowing towards the front with knee grab design allowing you to position your legs towards the inside of the footwells, minimizing upper body fatigue and granting you more control when cornering.



ERGONOMIC SEAT

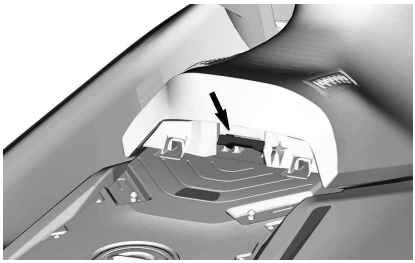
Removing the Seat

1. Unlatch and remove the seat saddle, if installed.
2. Push on the two release buttons and lift the back end of the seat.



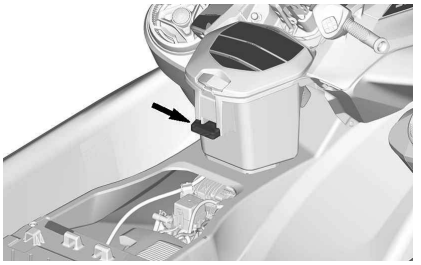
RELEASE BUTTONS

3. Then pull the latch handle up and remove the seat from the watercraft.

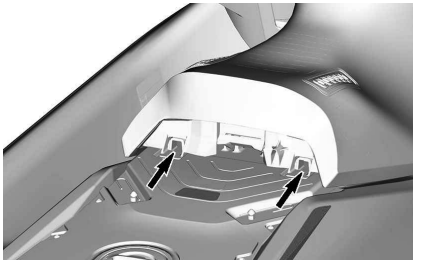


Installing the Seat

1. Insert the forward end of the seat in its retainer.



2. Insert the forward part of the seat back end into the retainers.



3. Align the seat back end latches with the latch pins and firmly press down on the seat back end to lock it in place.



4. Pull up on the seat back end to ensure it is properly latched.

⚠ CAUTION

Ensure the latches are properly locked onto the pins.

5. Secure the seat saddle.

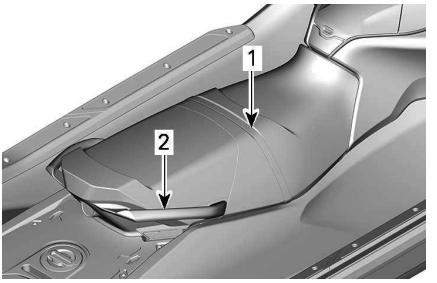
Passenger Handholds

The seat strap provides a handhold for a passenger to hold on to when riding.

The sides of the molded grab handle at the rear of the seat also provide a handhold for a passenger. The rear portion of the molded grab handle provides a handhold for the skier/wakeboarder (if applicable) spotter or boarding the watercraft from the water.

NOTICE

Never use the molded grab handle to tow anything or to lift the watercraft.

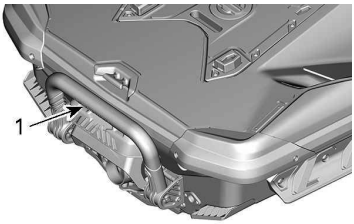


PASSENGER HANDHOLDS

1. Seat strap
2. Molded grab handle

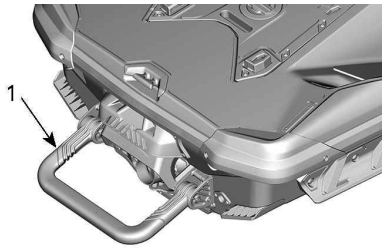
Boarding Ladder (If Equipped)

A convenient ladder used for boarding the watercraft from the water.



TYPICAL

1. Boarding ladder



TYPICAL

1. Boarding ladder in lowered position

⚠ WARNING

Do not apply throttle when anyone is boarding or at rear of PWC. You can shut down the engine

Pull down the ladder with your hand and hold until a foot or a knee is put on the ladder.

NOTICE

- **Never use the ladder for boarding a watercraft that is out of water.**
- **Never use the ladder for pulling, towing, diving or jumping, or any other purpose other than as a boarding ladder.**
- **Stay on center of the ladder.**
- **Only one person at a time on the ladder.**

⚠ WARNING

Be aware of the iBR gate movement when starting the engine, shutting down the engine or using the iBR lever. Automatic movement of the gate may squeeze fingers or toes of people taking a hold on the back or your PWC. Never use iBR gate as a supporting point to board the watercraft.

Boarding Platform

A boarding platform covers the rear deck area.

⚠ CAUTION

The two LinQ attachment points are used to carry accessories and should always be retracted when not in use.

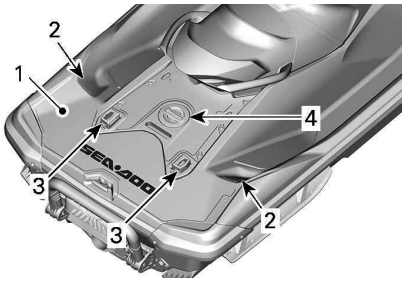
Two indentations in the platform are used as foot rests for the rear facing

spotter when towing a skier, wakeboarder or tuber.

A ski pylon can be installed by removing the ski pylon hole cover in the middle of the platform. The ski pylon hole cover is **not** the fuel cap.

⚠ CAUTION

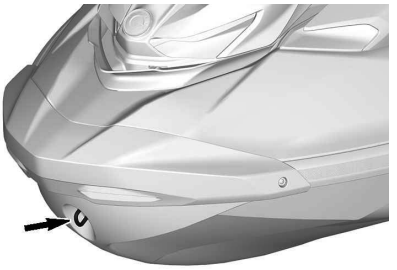
Always install ski pylon hole cover when ski pylon is not installed.



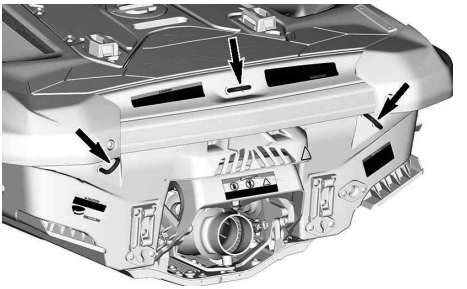
1. *Boarding platform*
2. *Spotter foot rests*
3. *LinQ attachments*
4. *Ski pylon hole cover*

Front and Rear Eyelets

Eyelets can be used for mooring, towing and as tie-down points when trailering your watercraft.



FRONT EYELET



REAR EYELETS

⚠ WARNING

- **The front and rear eyelets are rated at a breaking strength in the horizontal direction equivalent to the mass of the PWC in the fully loaded ready-for-use condition.**
- **Do not use these eyelets to lift the PWC, they are meant for pulling and towing. Doing so could result in serious injury.**

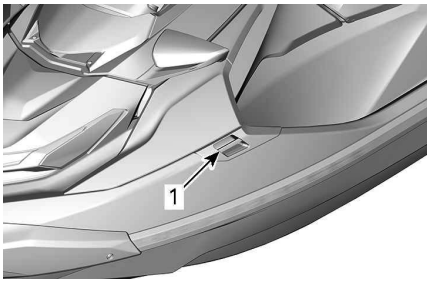
NOTE:

- **Responsibility**: It is the owner's/operator's responsibility to ensure that mooring lines, towing lines, anchor chain(s), anchor lines and anchor(s) are adequate for the vessel's intended use, i.e. the lines or chains do not exceed 80 % of the breaking strength of the respective strong point. Owners should also consider what action will be necessary when securing a tow line on board.
- **Non-metallic strong points**: Where non-metallic strong points are installed, their limited life time shall be taken into consideration. They shall be replaced once they show any signs of deterioration, visible surface cracks or permanent deformation.

Mooring Cleats

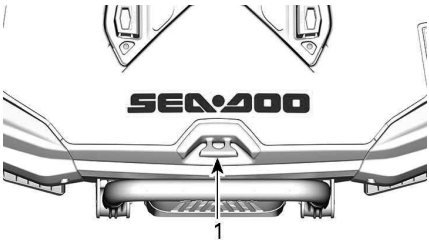
These cleats can be used for temporary docking such as when refueling.

The rear cleat can be used to tow an inflatable tube.



TYPICAL

1. Mooring cleats



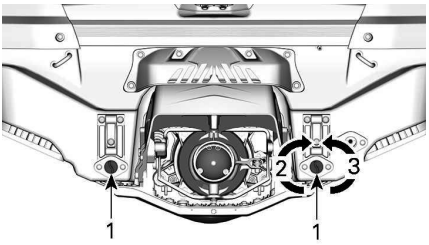
1. Mooring cleat

NOTICE

Never use mooring cleats to pull or lift the watercraft.

Bilge Drain Plugs

Unscrew drain plugs whenever watercraft is on the trailer. This will allow water accumulated in the bilge to be evacuated and helps to reduce condensation.



TYPICAL

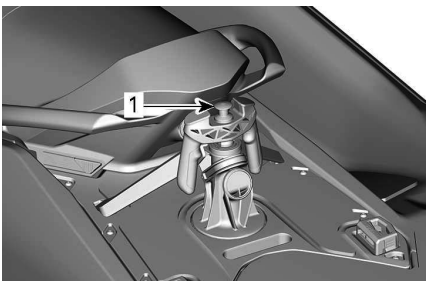
1. Drain plugs
2. Tighten
3. Loosen

NOTICE

Ensure drain plugs are properly secured prior to launching the watercraft in water.

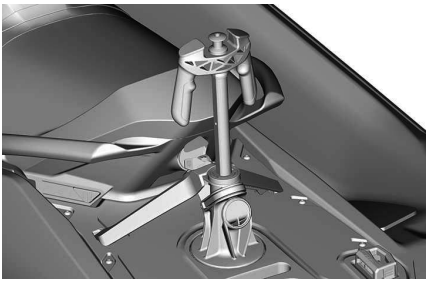
Retractable Ski Pylon (WAKE Models)

Pull up on the knob to extend the pylon. Ensure both sections of pylon are fully extended and properly locked before attaching ski or wakeboard rope.



SKI PYLON RETRACTED

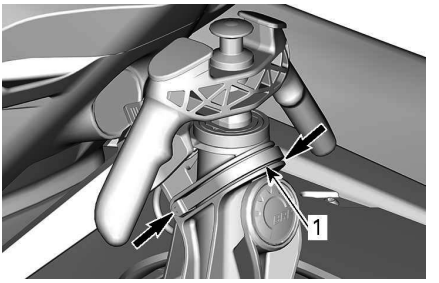
1. Pull on this knob to extend



SKI PYLON EXTENDED

To retract the pylon, push straight down on the top.

If the pylon becomes difficult to extend or retract, simultaneously push in on both sides of the locking clip toward front of watercraft.



TYPICAL - PUSH TOWARD FRONT TO UNLOCK AND REMOVE PYLON

1. Locking clip

⚠ WARNING

Make sure ski pylon is fully extended and locked before use. Completely retract and lock when not used. Use caution with skier/wakeboarder in tow as tow rope may backlash to watercraft when released. Never perform a sharp turn when towing a skier or wakeboarder. Always store tow rope when not in use.

⚠ WARNING

When using the ski pylon, never carry cargo or accessories on the boarding platform.

⚠ WARNING

Always install the passenger seat when the ski pylon is installed.

NOTICE

The ski pylon is designed for towing a skier or wakeboarder with a maximum weight of 114 kg (250 lb).

Always have one person other than the operator as an observer.

NOTE:
The handles on the ski pylon are provided as a handhold for the observer.

NOTICE

Never use the ski pylon to tow other watercrafts. Respect the maximum load limit rating of the ski pylon. Overloading can affect maneuverability, stability and performance. In case of emergency, use rear mooring cleat to tow other watercraft.

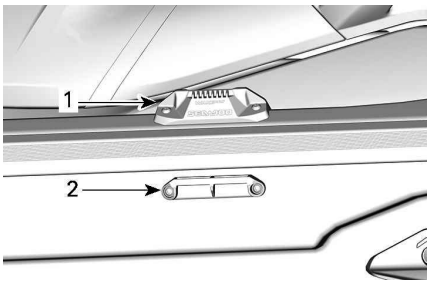
Wakeboard Rack (WAKE Models)

A convenient removable rack to carry a wakeboard on the watercraft when on the water.

NOTE:
The wakeboard rack can be installed on the LH side of the watercraft.

To install:

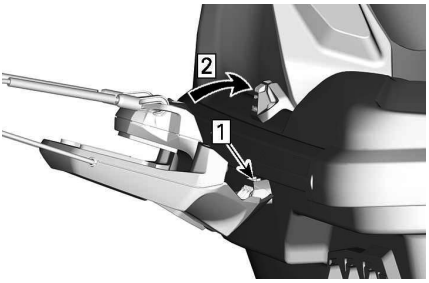
1. Insert the hooks on the lower portion of the rack into the lower retaining bracket located on the hull under the LH side bumper.



RETAINING BRACKETS FOR WAKEBOARD RACK

1. Upper retaining bracket
2. Lower retaining bracket

2. Rotate the rack upwards and push the top of the rack inboard until the handle locks into the top retaining bracket.



1. Insert
2. Rotate

⚠ WARNING

If rack is not properly secured on the watercraft, it could become loose and detach unexpectedly, creating a risk of injury to people nearby. Periodically ensure the rack is properly locked on its support.

   1. Insert the hooks of the lower portion of the rack into the lower retaining bracket
   2. Rotate the rack upwards and push the top of the rack inboard.
3. When installing a wakeboard on the rack, position wakeboard fin(s) outward with the heel of the boots facing down near freeboard of the PWC.
4. Secure wakeboard using bungee cords.

⚠ WARNING

To avoid possible injuries and cuts from the wakeboards fin(s), always place FIN(S) OUTWARDS.



WAKEBOARD INSTALLED WITH FINS OUTWARD

5. After installation, pull and push wakeboard to ensure it is tightly secured to rack.

⚠ WARNING

If the wakeboard is not properly secured on the rack, it could become loose and detach unexpectedly, creating a risk of injury to people nearby. To avoid:

- **Inspect bungee cords condition and replace if damaged.**
- **Secure wakeboard properly on rack.**
- **Periodically ensure the board is properly attached.**

NOTE:
When the wakeboard is removed from its rack, secure the bungee cords so that they will not move freely when riding watercraft.

NOTICE

The rack is designed to hold one wakeboard. Do not use to hold more than one wakeboard or to transport skis or any other object. Do not use rack(s) as mooring points or to reboard.

⚠ WARNING

With wakeboard and/or rack installed, operate with extra caution:

- **NEVER perform aggressive maneuvers including a spin-out.**
- **NEVER jump waves.**
- **Use common sense and limit speed.**

Otherwise, the wakeboard could detach or occupants could fall off and injure themselves against the wakeboard or rack.

⚠ WARNING

When trailering the watercraft, NEVER leave a wakeboard installed on the rack. Otherwise, wakeboard fin(s) could cause injury to bystanders or wakeboard could fly off on the road. The bungee cords are under tension and could spring back and whip someone when released. Use caution.

To remove the wakeboard rack, depress the lever at the top of the rack and remove it from its retaining brackets.



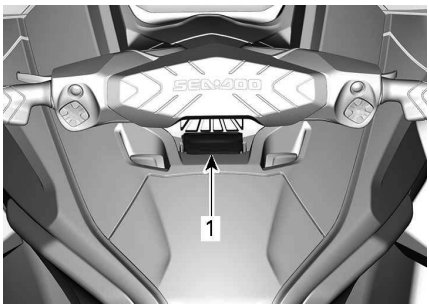
WAKEBOARD RACK REMOVAL

1. Press this handle to release wakeboard rack

Steering Tilt Handle

The handlebar position can be adjusted to suit rider preferences.

To perform this adjustment, pull on the release handle at the base of the steering column just ahead of the glove box, and tilt the handlebars to the desired position.

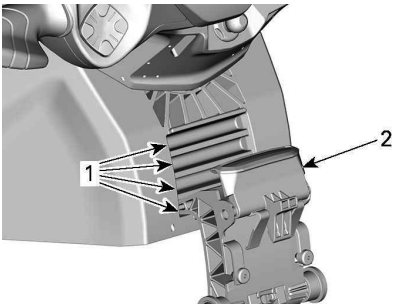


1. Release handle

When the handlebars are at the desired position, release the latch handle and ensure the latch pawl properly engages a groove in the steering support. Also ensure the latch handle is in the forward position.

⚠ WARNING

To prevent sudden movement of the steering column, always ensure the pawl on the steering column latch is properly engaged in one of the grooves on the steering support.



STEERING COLUMN ADJUSTMENT LATCH SECURED

1. *Steering support grooves*
2. *Release handle locked*

BRP Audio Premium System

The BRP Audio Premium sound system is composed of two waterproof speaker enclosures that connect via Bluetooth to a smartphone.

When the START/STOP button is pressed, the system will be powered for 75 seconds. When the tether cord is installed on the engine cut-off switch and the START/STOP switch is depressed, the system will be powered for 60 minutes. This will permit listening to the BRP Audio Premium system for an extended period. When the battery drops below 12.3V, the LOW BATTERY indicator lamp will light up and the electrical system will shut down after 10 seconds to allow enough power in the battery to start the engine.

Bluetooth Pairing Mode - When the unit is powered On, the remote will automatically try to pair with the last connected device or will go in pairing mode if no paired devices are detected. When the system is in pairing mode, the **Play/Pause/Power** (1) light will blink. To manually enter the pairing mode, hold down the **Play/Pause/Power** button for 1 second. The unit will emit 2 small beeps and the Play/Pause/Power button will start blinking to indicate it's in pairing mode.

Search for BRP REMOTE from your device's Bluetooth menu.

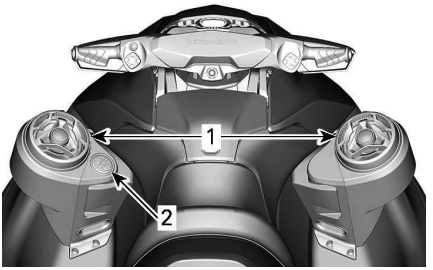
NOTE:
All previously paired devices nearby must be turned OFF.

When paired, select a playlist or other source of music from your smartphone.

Never pair a smartphone or change the playlist or music source on the device while driving or operating the vehicle.

⚠ WARNING

Using a smartphone or trying to pair a device while driving can distract the driver from operating the watercraft. Always use buttons with caution and always stay alert on the water, keeping eye contact with your environment at all times.



TYPICAL

1. *Speakers*
2. *Keypad*

The keypad is used to control the sound system.

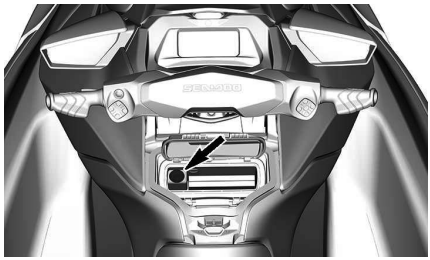


1. *Play/Pause/Power*
2. *Volume UP*
3. *Volume DOWN*
4. *Previous track*
5. *Next track*

Play/Pause/Power - This button gives you the ability to play or to pause the current track with a single press. Pressing the button will turn the unit On if currently Off or holding the button for 3 seconds will turn the unit Off if currently On. The unit will emit 4 small beeps to indicate when power is turned Off. Note that all the buttons will illuminate when the unit is powered On.

Volume Up and Volume Down - These buttons will turn up or turn down the output of the volume. When the unit has reached the minimum or maximum output level, the unit will beep to indicate that no further adjustment is possible.

On all vehicles except the ones equipped with the *Large Panoramic 7.8" Wide LCD Display*, the USB port located inside the glove box watertight compartment is only used to charge the smartphone, not to transfer the music.

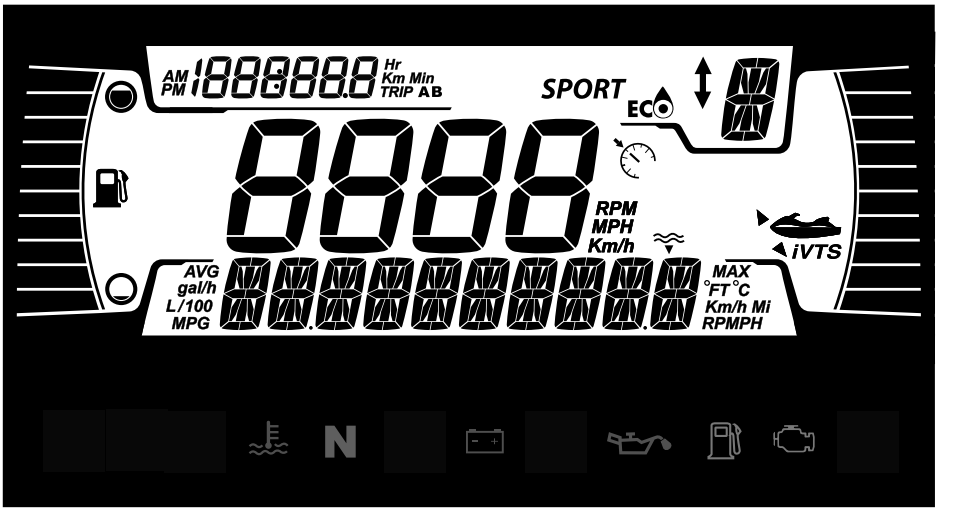


⚠ CAUTION

Prolonged exposition to loud music can damage your hearing. Therefore, we suggest a 10 minutes break time every 45 minutes of listening.

4.5" DIGITAL DISPLAY

Multifunction Gauge Description

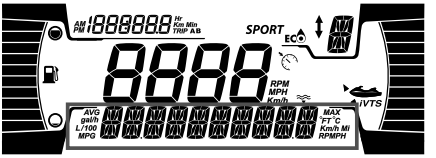


⚠ WARNING

Reading or tempering with the multifunction gauge can distract you from the operation of the vehicle, particularly from constantly scanning the environment. Always pay attention to water conditions, ensure your environment is clear and free from obstacles. Furthermore, when riding, only glance at the multifunction gauge briefly to stay focused on your environment.

The multifunction gauge includes digital gauges (temperature and tachometer), telltale lights, icons and a digital screen to see important information (speed, RPM, etc.).

Lower Display



User can decide to display one the following:

- RPM
- Water temp : Displays the temperature of the water
- Depth (if equipped)
- Settings
- Messages
- Speed Stat (if equipped)

Left Lateral Display



The left lateral display includes:

- Fuel level indicator

Right Lateral Display



The right lateral display includes:

– VTS position

Central Display



The central display includes:

– Vehicle speed
– Speed control indicator (if equipped)

The speed control indicator in this display is only activated when a target speed is set.

iBR Position Display



This display shows gears position of the iBR (if equipped):

– N (neutral)
– F (forward)
– R (reverse)

It can also display the selected speed level (1 to 9) when the slow speed mode is selected.

Left Upper Display



The left lateral display includes:

– Tripmeter
– Clock

User can decide to display one the following on the tripmeter:

– Vehicle hours : Displays the total vehicle hours
– Trip KM : Displays the distance since the last reset.
– Trip HR : Displays the time since the last reset.

NOTE:
Clock is shown only if the integrated GPS receives a signal from the satellites. This may take several seconds after waking up the system.

MODE Display



The MODE display indicate the selected alternative mode of operation:

– SPORT
– ECO

To cycle through the MODES;

– Press MODE button,
– Acknowledge the safety message by pressing and holding MODE button will get the SPORT mode,
– Pressing MODE button again will activate the SKI mode (if equipped),
– Pressing MODE button again will activate the ECO mode.

NOTE:
The SKI mode has no icon in the digital display. Refer to *operating modes* for more details.

Warning Lamps and Indicators

The following indicator lamps will alert you to a vehicle condition that may become serious. Some lamps will illuminate when starting the vehicle to make sure they work. If any lamps remain on after starting the vehicle, refer to the respective system warning lamp for further information.

NOTE:
Some warning indicators appear in the display of the multifunction gauge and function the same as an indicator lamp but do not display when starting the vehicle.

Telltale Lights - Lower Bar



Lights	Description
!	ORANGE - Vehicle malfunction
	RED - The engine temperature is too high.
N	GREEN - The neutral gear is selected
	RED - If illuminate while driving, it indicates a malfunction. Turn off all unnecessary electrical equipment and have the electrical and charging systems checked.
	RED - If illuminate while the engine running or while driving, this indicates a malfunction. Stop the vehicle as soon as it is safe to do so and turn the engine off. Check the engine oil level. Have the lubrication system checked a soon as possible, even if the level being correct.
	ORANGE - Illuminate when the fuel level is low or when the fuel tank is near empty. Refuel as soon as possible.
	ORANGE **Turned on**: Malfunction of the vehicle emissions control system **Blink**: Engine limitation, the limp home mode is activated. Have the vehicle serviced immediately.

Icons and Indicators - Multifunction Display

Icons	Description
SPORT	Denotes SPORT mode is selected.
ECO	Denotes ECO mode is selected.
	Steady ON: indicates that the VTS is activated (if equipped).
	Denotes Speed Limiter or Slow Speed mode (if equipped)

Settings

To...	Action
Navigate in the menu	Single press on INFO
Enter menu	Long press INFO
Edit value	Single press on INFO
Change information display	Press TRIP
Reset Trip (when displayed)	Long press TRIP
Fault codes/ Maintenance	Long press INFO

Use the RIGHT arrow button or LEFT arrow button to navigate through setting menus. Use OK button to enter setting menu, to confirm selection or reset some values. Use UP arrow or DOWN arrow to change selected value.

Settings Menu

Using the RIGHT or LEFT arrow button, select **SETTINGS** and press OK button to enter setting menus.

Maintenance Reset

Select **RES MAINT** and hold OK button to reset maintenance.

NOTE:
The maintenance reset can only be done within the first 15 seconds of ECM wake-up when a maintenance is required.

Display Codes

Refer to *Displaying Fault Codes*.

Setting Tripmeter

Select **TRIP** and press UP or DOWN arrow button to cycle through **Vehicle Hours**, **Trip KM** and **Trip HR**.

Press and hold OK button to reset selected trip info.

Setting Learning Key

Connect a normal key to the vehicle. Select **L-KEY #** and press UP or DOWN arrow button to set the desired learning key level between 1 and 5.

Press and hold OK button to confirm.

NOTE:
The default learning key level is 1 (lowest performance).

Unit Selection

Select **UNITS** and press UP or DOWN arrow button to change units.

NOTE:
Changing units will apply to all the displayed units.

Setting Brightness

Select **BRIGHTNESS** and press UP or DOWN arrow button to adjust brightness level (from -4 to 4).

Setting Clock

Select **CLOCK**.

1. Press INFO button to select clock display.
2. Long press INFO button to enter clock editing.
3. Press INFO button to select 12:00 AM PM or 24:00 time base.
4. Long press INFO button to confirm and display hours.
5. Press INFO button to change hours.
6. Long press INFO button to confirm.

NOTE:
Menu available only if GPS is synchronized.

To exit **SETTINGS**, select **EXIT** and press OK button.

2 Keypads Models

1. Press OK button to select clock display.
2. Press UP or DOWN arrow button to select 12:00 AM PM or 24:00 time base.
3. Press OK button to confirm.
4. Press UP or DOWN arrow button to change hours.
5. Press OK button to confirm.

Resetting Speed Statistics (If Equipped)

Select **SPEED STAT** and press and hold OK button to reset the speed statistics.

NOTE:
The speed statistics are automatically reset after the gauge shut down.

Setting Language

The language of the display is factory setup by default in English. Refer to an authorized Sea-Doo dealer for language availability and to setup the gauge to your preference.

BREAK-IN PERIOD

Operation During Break-In Period

A break-in period of 10 operating hours is required before running the watercraft at sustained full throttle.

During this period, maximum throttle should not exceed 1/2 to 3/4 opening. However, brief full acceleration and speed variations contribute to a good break-in.

NOTICE

Continued wide open throttle accelerations or operation, prolonged cruising speeds are detrimental during the break-in period.

NOTE:
GTR 230: During the first 5 hours of operation, the engine management limits the engine maximum speed for engine protection. The engine performance will progressively increase during this period.

⚠ WARNING

Always perform the *Pre-Ride Inspection* before operating this watercraft. Be sure to read the *Safety Information* and the *Watercraft Information* sections and be thoroughly familiar with the iControl technology.

Should any control or instruction not be fully understood, refer to an authorized Sea-Doo dealer.

Boarding the Watercraft

As with any watercraft, boarding should be done carefully.

Make sure to practice each boarding methods until fully able to safely board in any potential condition.

⚠ WARNING

Do not apply throttle when anyone is boarding or at rear of PWC. You can shut down the engine

Watercraft with iBR system

⚠ WARNING

Be aware of the iBR gate movement when starting the engine, shutting down the engine or using the iBR lever. Automatic movement of the gate may squeeze fingers or toes of people taking a hold on the back or your PWC. Never use iBR gate as a supporting point to board the watercraft.

Boarding from a Dock

1. Slowly place one foot on the watercraft footboard nearest the dock while holding the handlebar, and at the same time, transfer the body weight to the other side in order to balance the watercraft.
2. Then bring the other foot over the seat and place it on the other footboard.
3. Push the watercraft away from the dock.



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Boarding from Shallow Water

⚠ WARNING

Keep limbs away from propulsion system or intake grate.Never use propulsion systems a supporting point to board the watercraft.

1. Board the watercraft from either the side or the rear.
2. Ensure there is at least 90 cm (3 ft) of water underneath the lowest rear portion of the hull.

NOTE:
Take into account that the hull will be lower in the water when all passengers are aboard. Be certain to maintain the specified depth so sand, pebbles and rocks will not be drawn up in the jet pump.



A. Maintain at least 90 cm (3 ft) underneath the lowest rear portion of the hull when all passengers are aboard

NOTICE

Starting the engine or riding the watercraft in shallower water may damage the impeller or other jet pump components.Stay on center of the step.Only one person at a time on the ladder.

Boarding in Deep Water

⚠ WARNING

Keep limbs away from propulsion system or intake grate.Never use propulsion systems a supporting point to board the watercraft.

⚠ WARNING

Ask inexperienced riders to practice how to board the watercraft close to shore (all methods explained here) before venturing into deep water, especially when cargo is installed aboard on the rear platform.

Operator Alone Without a Boarding Ladder

1. Using one hand, grab the rear handle.



1. Rear handle

NOTE:
If cargo is properly secured on the boarding platform, it can be used as a handle or removed and set aside in the footwell to get access to the handle. Always properly secure the cargo before riding.

2. With the other hand on the boarding platform, lift your body until you can lay one knee on the boarding platform.
3. Lay the other knee on the boarding platform.



TYPICAL

4. Take hold the seat or the seat strap to help maintain your balance and step forward onto the footboards on either side of the seat.



TYPICAL

5. Sit astride the seat.

   It is possible to swim toward side, use passenger handhold and/or seat strap to lift yourself aboard.

NOTE:
The side boarding method is not recommended as a first try boarding method. It must only be used in last resort as it is not the easiest method to board a watercraft.

Operator Alone With a Boarding Ladder

1. Swim to the rear of the watercraft.
2. Using one hand, lower the boarding ladder.



TYPICAL

3. Using the other hand, take hold of the edge of the boarding platform, then pull yourself up so that you can knee onto the boarding ladder.



TYPICAL

NOTICE

- **Stay on center of the ladder.**
- **Only one person at a time on the ladder.**

4. Reach forward with one hand and take hold of the molded handles on the sides of the back seat or the rear handle, then stand on the boarding ladder.



1. Rear handle



TYPICAL

NOTE:
If cargo is properly secured on the boarding platform, it can be used as a handle or removed and set aside in the footwell to get access to the handle. Always properly secure the cargo before riding.

5. With both hands on the handle behind the seat, step up onto the boarding platform.



TYPICAL



TYPICAL

6. Take hold of the seat strap to help maintain your balance and step forward onto the footboards on either side of the seat.



TYPICAL

7. Sit astride the seat.

Operator with a Passenger

1. The operator climbs on the watercraft in the same way as explained previously.

   In choppy water, while in the water, the passenger may hold the watercraft steady to help the operator climb aboard.



TYPICAL

NOTICE

Stay on center of the step.Only one person at a time on the step.

2. The passenger then climbs onto the watercraft while the operator maintains balance by sitting as close as possible to the console.



TYPICAL - MODEL WITH BOARDING LADDER SHOWN



TYPICAL



TYPICAL

3. The passenger must sit astride the seat and maintain a firm grip of a handhold or the waist of the person in front of them.



TYPICAL

How to Start the Engine

⚠ WARNING

Before starting the engine, the operator and passenger(s) should always:

- **Be properly seated on the watercraft.**
- **Have a firm grip on a handhold or hold on to the waist of the person in front of them.**
- **Wear appropriate protective clothing including a PFD approved by local authorities and a wet suit bottom.**

NOTICE

Ensure there is at least 90 cm (3 ft) of water under the lowest rear portion of the hull when all passengers are aboard prior to starting the engine. Otherwise damage to the propulsion system components may occur.

1. Attach the tether cord clip to your PFD or to the wrist (wrist strap required).

⚠ WARNING

The tether cord shall always be attached to the operators personal flotation device or to the wrist (wrist strap required) when starting or operating the watercraft.

2. Firmly grip handlebar with your left hand and place both feet on the footboards.
3. Press the engine START/STOP button to wake up the electrical system.
4. As the information center cycles through its self test function, install the tether cord on the engine cut--off switch.
5. Depress the START/STOP button to start the engine.

NOTICE

In the event the engine does not start right away, do not hold START/STOP button more than 10 seconds to avoid starter overheating. A rest period should be observed between the cranking cycles to allow the starter to cool down. Refer to *Troubleshooting* section.

6. Release engine START/STOP button after engine is started.

How to Stop the Engine

⚠ WARNING

To maintain watercraft directional control, the engine shall be running until the watercraft is stopped.

To shut off the engine:

- Press the engine START/STOP button, or
- Pull off the tether cord cap from the engine cut-off switch.

⚠ WARNING

Never leave the tether cord on the engine cut-off switch when disembarking watercraft to prevent theft, accidental engine starting, and to avoid unauthorized use by children or others.

If the engine is shut off using the START/STOP button and the tether cord is left on the engine cut-off switch, the electrical power will shut off after approximately 60 minutes to prevent battery discharge.

How to Steer the Watercraft



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Turning the handlebar pivots the jet pump nozzle which controls the watercraft direction. Turning the handlebar to the right will turn the watercraft to the right and inversely. You need to apply throttle to steer.

⚠ WARNING

Throttle must be applied and handlebar turned to change the direction of the watercraft. Steering efficiency will differ depending on the amount of throttle applied, the number of passengers, the load, the water conditions and the environmental factors such as the wind.

Unlike a car, a watercraft needs some throttle to turn. Practice in a safe area applying the throttle and turning away from an imaginary object. This is a good collision avoidance technique.

⚠ WARNING

Directional control is reduced when the throttle is released and lost when the engine is off.

The watercraft behaves differently with a passenger and requires greater skill. The passenger(s) shall grip the seat strap, the molded grab handle, or the waist of the person ahead of them. Reduce speed and avoid sharp turns. Avoid choppy water conditions when carrying a passenger.

Tight Turns and Other Special Maneuvers

Any tight turns or special maneuvers that will cause the air inlet openings to be kept under water for a prolonged time, water will seep into the bilge.

Combustion engines need air to operate; consequently this watercraft cannot be totally watertight.

NOTICE

If the air inlet openings are kept under water, such as turning constantly in tight circles, plunging the bow through waves, or capsizing the watercraft, water may seep into the bilge, which may cause severe damage to internal parts of the engine. Refer to the *Warranty* section contained in this guide.

How to Engage Neutral

⚠ WARNING

The drive shaft and impeller are always turning when the engine is running, even when the iBR gate is set to the neutral position. Keep away from the propulsion system of the watercraft.

When the watercraft is first started, the iBR system automatically sets the iBR gate to the neutral position by default.

If the gate is in forward thrust position, tap the iBR lever. The gate will move to neutral.

If braking or reverse is used, the iBR gate will move to the neutral position when the iBR lever is released, if throttle is not applied.

NOTE:
The throttle lever must be fully released for the iBR gate to move to the neutral position when the iBR lever is released.

If the engine is stopped in forward or reverse, the iBR gate will move to the neutral position on engine shutdown.

How to Trim the Neutral Position of the iBR

When in NEUTRAL, if the watercraft creeps forward or backward, the iBR system may be trimmed.

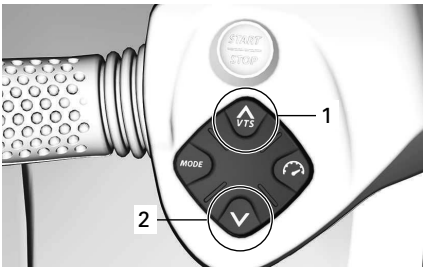
NOTE:
Movement of the watercraft when operating in neutral may be due to wind or water current.

To enter the Neutral Adjustment mode, hold down the VTS up or down button for 0.5 Sec.

The message **Neutral Adjust** will be displayed.

To adjust the neutral position:
– Watercraft is moving forwards - press the VTS DOWN button.
– Watercraft is reversing - press the VTS UP button.

Adjust to achieve no movement when the engine is at idle.



1. Bow up
2. Bow down

To exit the **Neutral Adjust**, press OK button or wait 25 sec.

How to Engage Forward

To engage forward thrust from neutral, tap on the throttle lever.

The gate will move to forward thrust position and the watercraft will accelerate forward.

To engage forward thrust from reverse, release the iBR lever while applying throttle moderately.

To re-engage forward thrust from braking, simultaneously pull in the throttle lever while releasing the iBR lever. The watercraft will accelerate forward after a short delay.

How to Engage and Use Reverse

Reverse can only be engaged between idle speed and the threshold forward speed of 14 km/h (9 MPH).

1. Pull in the iBR lever at least 25% of the lever travel.

2. Release the iBR lever to end reverse operation.
3. Apply enough throttle to stop rearward movement.

⚠ WARNING

The brake function has no effect when travelling in reverse.

When operating the iBR lever in reverse mode, the throttle lever can be used to control engine RPM, and thus the amount of reverse thrust produced.

By modulating both the iBR and throttle levers simultaneously, reverse thrust can be more precisely controlled. Too much RPM will create water turbulence and reduce reverse efficiency.

NOTE:
Engine power will be reduced to idle whenever the iBR lever position is changed.

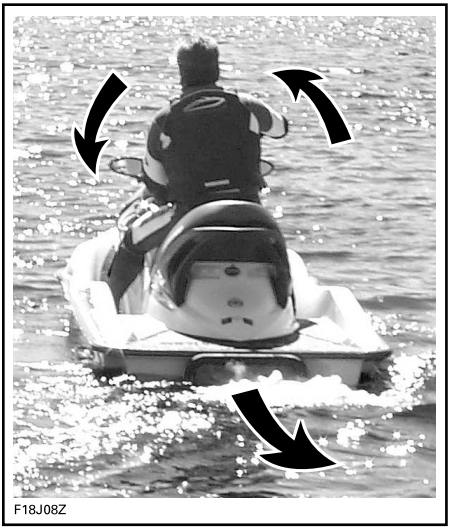
Available engine power is limited in reverse mode, which limits reverse speed. However, speeds above 14 km/h (9 MPH) may be obtained in reverse depending on conditions.

⚠ WARNING

Only use reverse at slow speed and for the shortest time possible. Always ensure the path behind is clear of objects, obstacles and people.

When operating in reverse, turn the handlebar in the opposite direction that you want to move the rear of the watercraft.

For example, to steer the rear of the watercraft to port (left), turn the handlebar to starboard (right).



TYPICAL - STEERING DIRECTION REVERSED WHEN BACKING

⚠ CAUTION

Steering direction in reverse thrust is opposite of forward thrust. To steer the stern to port (left) in reverse, turn the handlebar to starboard (right). To steer the stern to starboard (right), turn the handlebar to port (left). Reverse thrust operation should be practiced in open waters in order to become fully familiar with the controls and watercraft handling characteristics before operating in close quarters.

How to Engage and Use Braking

⚠ WARNING

The engine must be running to be able to use the brake.The brake is only applicable when operating in forward movement, it has no effect on rearward velocity.The brake cannot prevent your PWC from drifting due to current or wind.

The braking function can only be engaged during forward operation at or above the threshold speed of 14 km/h (9 MPH).

Braking is engaged and controlled when the iBR lever on the LH handlebar is pulled in at least 25% of its travel.

⚠ WARNING

Braking should be practiced in open waters and at gradually increasing speeds in order to become fully familiar with the controls and watercraft handling characteristics.

When iBR lever is applied, the throttle lever command is overridden and engine throttle control is now dependant on the iBR lever position. Braking can thus be modulated by using only the iBR lever.

Watercraft deceleration is proportional to the braking force. The more the iBR lever is pulled in, the greater the braking force applied.

NOTE:
Be careful to gradually actuate the iBR lever to adjust intensity of the braking force and simultaneously release the throttle lever.

⚠ CAUTION

When braking, riders must brace themselves against the deceleration force to prevent from moving forward on the watercraft and losing balance. The operator should always keep both hands on the handlebars, and all passengers should maintain a firm grip of a handhold or the waist of the person in front of them.

⚠ WARNING

Stopping distance will vary depending on initial speed, load, wind, number of riders, water conditions, and the amount of braking power commanded by the operator. Always adjust your riding style accordingly.

When the watercraft slows to less than 14 km/h (9 MPH), braking mode ends and reverse mode is engaged. Release the iBR lever once the watercraft is stopped. Otherwise, a rearward movement will be initiated.

⚠ CAUTION

As the watercraft slows to a stop, the wake created by the watercraft will catch up and tend to push the watercraft forward. Ensure there are no obstacles or bathers in the direction of travel.

If the throttle lever is still pulled in when releasing the iBR lever, the watercraft will accelerate forward after a short delay. Acceleration will be proportional to the throttle lever position.

⚠ WARNING

If forward acceleration is not desired when the brake lever is released, release the throttle lever.

When at speed and the brake is first applied, a plume of water will shoot up in the air behind the watercraft which may cause the operator of a following watercraft to momentarily loose sight of your PWC.

⚠ WARNING

It is important to inform other operators who intends to follow in a convoy formation of the braking and maneuvering capability of your vehicle, what the plume of water indicates, and that a greater distance should be maintained.

Braking in a Turn

Throttle must be applied for turning to ensure directional control. However braking can be initiated during a turn using the iBR lever as previously described. Get ready to maintain your balance while the wake is crossing your PWC.

⚠ CAUTION

As the watercraft slows to a stop while braking in a turn, the wake created by the watercraft will catch up and tend to push the watercraft sideways. Be prepared to maintain balance as the wake crossed the watercraft.

How to Use the Variable Trim System

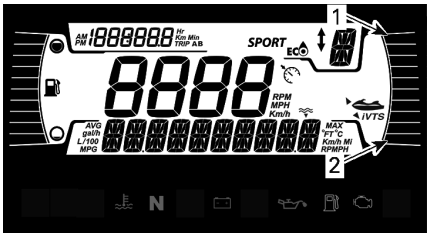
The variable trim system (VTS) changes the vertical position of the jet pump nozzle to provide the operator with a fast, effective system to compensate for load, thrust, riding position and water conditions. Correctly adjusted, it can improve handling, reduce porpoising, and position the watercraft at its best riding attitude to attain maximum performance.

When first using the watercraft, the operator should become familiar with the use of the variable trim system (VTS) at varying speeds and water conditions. A mid-range trim is generally used when cruising. Experience alone will dictate the best trim for the conditions. During the watercraft break-in period, when lower speeds are recommended, it is an excellent opportunity to become familiar with trim adjustment and its effects.

When the nozzle is positioned in an upward angle, the water thrust directs the bow of the watercraft upward. This position is used to optimize high speed.

When the nozzle is directed downward, the bow is forced downward and increases the watercraft turning capabilities. As with any watercraft, speed and operator body position and movement (body English), will determine the degree and sharpness of the watercraft turn. Porpoising can be reduced or eliminated if the nozzle is downward and speed is adjusted proportionately.

NOTE:
VTS position is indicated on a bar gauge in the right lateral display of the information center.



1. *Bow up*
2. *Bow down*

The VTS system allows for manually adjusting the trim position of the nozzle.

VTS Trimming Methods

Available VTS Trimming Methods				
	GTI	GTI SE	GT R	WA KE
VTS trim button	N/A	X	X	X
VTS "Double Click" trimming	N/A	X	X	X
VTS "Pre sets"	N/A	X	X	X
Launch Control	N/A	-	N/A	-
X = Indicates a **standard** feature - = See your Sea-Doo dealer for availability. N/A = Not Available				

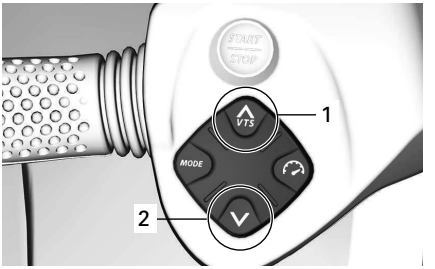
Trimming the VTS Using the VTS Button

Nine trim positions are available.

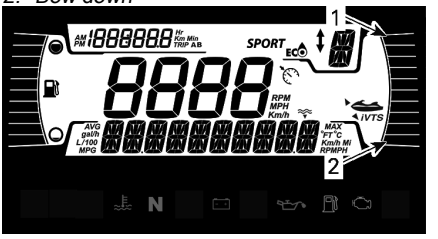
With the watercraft operating in forward thrust, proceed as follows.

NOTE:
Pressing the VTS trim button without the engine in forward thrust will only change the indication. The nozzle will move to the selected VTS trim position when forward thrust is engaged.

1. Press the VTS UP button once to trim the bow of the watercraft up to the next up trim position.
2. Press the VTS DOWN button once to trim the bow of the watercraft down to the next down trim position.



1. *Bow up*
2. *Bow down*



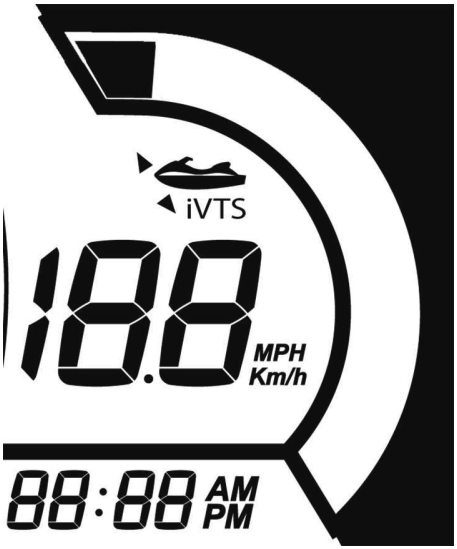
1. *Bow up*
2. *Bow down*

NOTE:
If the VTS UP or DOWN button is pressed and held, the pump nozzle will keep moving until the button is released at the desired trim attitude or the maximum trim position (up or down) is reached.

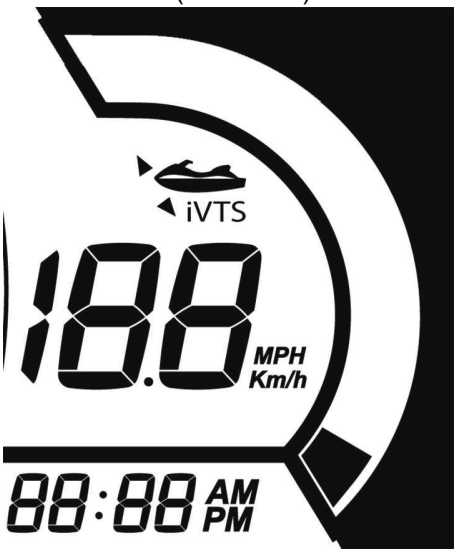
Using Preset Trim Positions

Three preset trim positions can be selected.

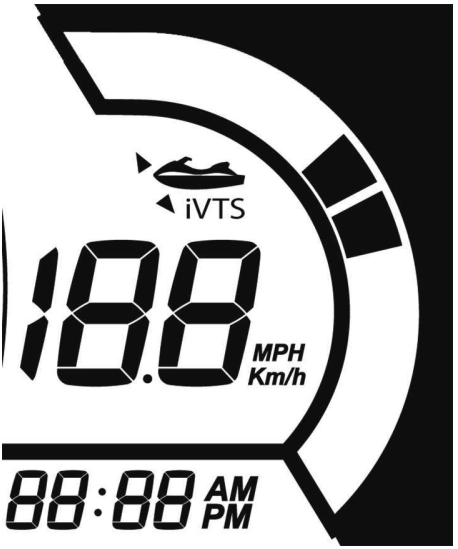
To select the highest trim position recorded, double-click on the VTS UP button (bow up).



To select the lowest trim position recorded, double-click on the VTS DOWN button (bow down).



To select the mid trim position, it depends on the actual trim position. Double-click on the VTS UP button if it is positioned below mid trim or double-click on the VTS DOWN button if it is positioned above mid trim.



NOTE:
These preset trim positions are not adjustable.

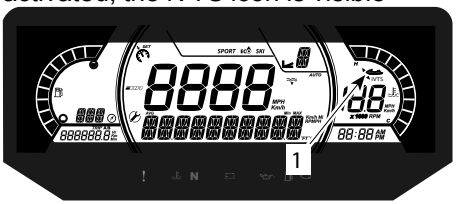
Launch Control

The launch control is an automatic adjustment of the VTS to achieve optimum acceleration by getting on plane faster.

When the speed is below 20 km/h (12 MPH), the VTS lowers to it's lowest position and the VTS indicator flashes to indicate the system is ready for an acceleration.

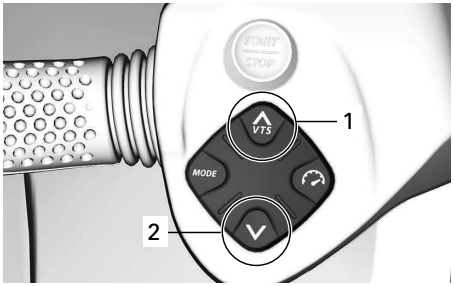
When the speed exceeds 30 km/h (19 MPH), the VTS returns to the user selected position.

When the launch control function is activated, the iVTS icon is visible



1. Launch control indicator

To activate the **Launch Control**, press simultaneously both VTS UP and VTS DOWN buttons.



1. Up
2. Down

The message **ONE LAUNCH** will be displayed. The launch control will deactivate itself after one use.

Press simultaneously both VTS UP and VTS DOWN buttons again.

The message **LAUNCH ON** will be displayed. The launch control will stay active until manually deactivated.

To deactivate the launch control, press simultaneously both VTS UP and VTS DOWN buttons again.

The message **LAUNCH OFF** will be displayed and the last selected driving mode will be activated.

NOTE: The launch control function is deactivated when the engine system is turn off

General Operating Recommendations

NOTICE

Combustion engines need air to operate; consequently this PWC cannot be totally watertight. Any maneuvers such as turning constantly in tight circles, plunging the bow through waves, or capsizing the watercraft, that cause the air inlet openings to be under water may cause severe engine problems due to water ingestion. Refer to *How to Steer the Watercraft* in the *Operating Instructions* section and the *Warranty* section contained in this Operator's Guide.

Rough Water or Poor Visibility Operation

Avoid operation in these conditions. If you must do so, proceed with caution using minimum speed.

Crossing Wakes or Waves

1. The operator must grip the handlebar firmly and keep both feet on the footboards.
2. The passenger must grip the handholds with both hands and keep both feet on the footboards.
3. Reduce speed.
4. Always be prepared to steer and maintain your balance as necessary.
5. When going over waves, raise your body slightly off the seat to absorb the shocks with your legs.
6. When crossing wakes, always keep a safe distance from watercraft ahead.

⚠ WARNING

When crossing wakes or waves, slow down. Operator and passenger(s) should brace themselves and adopt a semi-standing position to help absorb the bumps.Do not jump wakes or waves - jumping can cause injuries such as back or spinal injury (paralysis).

Stopping/Docking

When the throttle is released, the watercraft is slowed by water drag against the hull. The stopping distance will vary depending on the watercraft size, weight, speed, water surface condition, presence and direction of wind and current.

The iBR system can also be used for slowing down or for stopping more quickly, and for increasing maneuverability especially when docking.



F18A03Y

The operator should practice in open waters at various speeds to become familiarized with the stopping distances under different conditions. Stopping using the iBR system in a straight line and in a turn should be practiced extensively to become familiar with the handling characteristics of the watercraft under partial or full braking conditions.

⚠ WARNING

Always practice braking in open waters ensuring there are no watercrafts or boats in your immediate vicinity, especially astern. Other users of the waterways may not be able to maneuver or stop in time to avoid you should you unexpectedly come to a full stop in front of them.

When at speed and the brake is first applied, a plume of water will shoot up in the air behind the watercraft and may cause the operator of a following watercraft to momentarily loose sight of your PWC.

⚠ WARNING

It is important to inform other operators who intends to follow in a convoy formation of the braking and maneuvering capability of your vehicle, what the plume of water indicates, and that a greater distance should be maintained.

The operator should also practice docking with an imaginary dock using the various controls available (iBR lever and throttle lever).

Release the throttle at a sufficient distance before the expected landing area.

Reduce speed to idle.

Maneuver using a combination of the iBR lever and throttle lever, shifting to neutral, reverse, or forward as required.

Remember that when operating in reverse, steering direction is reversed. Turning the handlebars to the left will move the stern to the right when backing up, and vice-versa.

⚠ WARNING

Directional control is reduced when the throttle is released and/or when engine is off. Steering direction is reversed when operating the watercraft in reverse.

Beaching

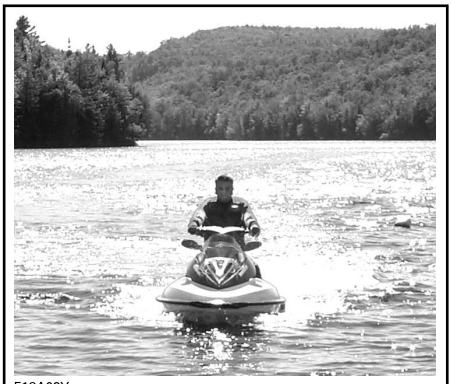
NOTICE

It is not recommended to run the watercraft to the beach.

Drive slowly towards the beach and shut off the engine before the water is less than 90 cm (3 ft) deep under the lowest rear portion of the hull. Then pull the watercraft to the beach.

NOTICE

Riding the watercraft in shallow water may result in damage to the impeller, iBR components, or other jet pump components. Always shut off the engine before water is less than 90 cm (3 ft) deep and never use reverse or braking.



F18A03Y

How to Use the intelligent Debris Free Pump System (iDF System)

The iDF system is designed to allow removing small debris or a cord caught in the jet pump by turning the propeller in reverse during a few seconds.

To activate the system, do the following:

1. Stop the engine.
2. Press and hold the iDF button.

   The following messages can appear in the digital display during this step.
   - **Engaging + R icon blinking** - The request is accepted and the sequence begins.
   - **Stop engine then hold iDF** - Engine is still running and must be stopped before pressing the iDF button again.
   - **High exhaust temperature** - Exhaust temperature is too high and needs to cool down before activating the sequence.
   - Disable - The iDF system is not enabled on your PWC, see an authorized Sea-Doo dealer to enable it.
3. Start engine when the message **Press start to go** is displayed.

   When the sequence is completed, the message **Ready to start** will be displayed.
4. Apply throttle when requested.

   If the message **Impeller blocked** is displayed - this indicates that the blocking is too important and the system cannot turn the propeller in the opposite direction. Have the PWC servicing by an authorized Sea-Doo dealer.
5. After a few seconds, the engine will shut down automatically. **Engaging + R icon blinking** will appear.
6. Start engine when the message **Press start to go** is displayed.

   When the sequence is completed, the message **Ready to start** will be displayed.

7. Start the engine and try the PWC when the message **Ready to start** will be displayed.
8. If the propulsion system has not returned to 100% of its original performance due to any remaining debris, stop engine and perform these steps again.

   A moderate clog of weeds may require multiple cycles before they can be entirely cleared out.

   – Between cycles, it is more efficient to try to drive the PWC to permit to it to plane in order to help dislodge any remaining weeds before reattempting the iDF cycle.

   If the problem persists after several tries, try the *On-Beach Water Cleaning* procedure, refer to *Jet pump Water Intake and Impeller Cleaning* in *Special Procedures* section.

OPERATING MODES

	GTI	GTI SE	GTR	WAKE
Default riding mode	X	X	X	X
Sport mode	X	X	X	X
ECO mode	X	X	X	X
Speed Limiter mode	N/A	X	X	X
Slow speed mode	N/A	X	X	X
Ski mode	N/A	-	-	X
Learning key modes	X	X	X	X

X = Indicates a **standard** feature
- = See your Sea-Doo dealer for availability.
N/A = Not Applicable

To change the operating mode;

– Press MODE button,
– Acknowledge the safety message by pressing and holding MODE button will get the SPORT mode,
– Pressing MODE button again will activate the SKI mode (if equipped),
– Pressing MODE button again will activate the ECO mode.



TYPICAL

Default Riding Mode

By default, the watercraft is set to DEFAULT riding mode of operation when started.

Sport Mode

SPORT MODE provides for instant throttle response and more rapid accelerations than DEFAULT riding MODE.

Once activated, SPORT MODE will remain active until it is deactivated by the operator, or the engine is shut down whereby it defaults back to DEFAULT riding MODE.

Activating Sport Mode

To activate the Sport mode, press once on the MODE button while in DEFAULT riding mode. The sport icon will start to flash and a safety message will scroll. For safety reason, follow the instruction in the safety message to activate the sport mode. Once activated, the SPORT icon will turn ON.

Deactivating Sport Mode

A single press on MODE button will take you to the ECO mode.

ECO Mode (Fuel Economy Mode)

ECO mode provides a smoother throttle application and increased fuel economy.

Speed Control Modes (If Equipped)

To enter one of the speed control modes, press SPEED CTRL button. Depending of the speed of the watercraft, only one of the following modes will be activated.

Once the desired mode is activated, press the SPEED CTRL button then change the value with the UP or DOWN arrow button while the **SET LEVEL** or **SET SPEED** message is active.

To exit the selected speed control mode, press MODE button or long press SPEED CTRL button.

Speed Limiter Mode

Speed limiter mode is a function of iTC (intelligent Throttle Control) system that allows the operator to set the desired maximum watercraft speed.

This is useful when cruising for long distances, operating in limited speed zones, or towing a tuber, skier or wake boarder.

The operator must keep the throttle depressed to maintain forward speed.

Once the maximum speed is set, the operator can vary the watercraft speed from idle speed up to the set speed using the throttle lever. The set speed will not be exceeded even if the throttle lever is fully depressed.

As you proceed under a constant speed setting, keep your attention level up to maintain good situational awareness.

Slowing down is a matter of releasing the throttle lever further than the set point, or by pulling the iBR lever in.

If the iBR lever is pulled in for braking, Speed Limiter mode is overridden but **not deactivated**.

Once the iBR lever is released and the throttle is pulled in to engage forward thrust, the speed limiter function will reengage to limit the watercraft speed as it was set before.

Prerequisite for Speed Limiter Mode Activation

Speed limiter MODE can be activated when the watercraft is going at more then 15 km/h (9 MPH).

NOTE:
Speed limiter mode is not available if slow speed mode is engaged.

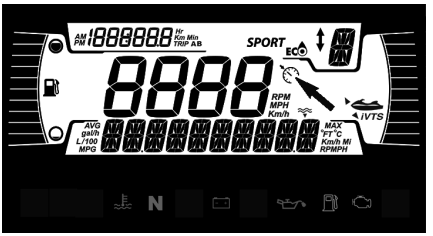
Activating Speed Limiter Mode

1. Maintain a constant speed.
2. Press the Speed Control button on the left keypad.



1. Speed Control button

You will hear a beep indicating that you are now in speed limiter mode, and the speed control MODE indicator will be lit.



TYPICAL

NOTE:
Activating speed limiter mode of operation only limits the maximum speed available when depressing the throttle lever. The throttle lever must be held in to maintain forward speed. Watercraft speed can be varied from idle up to the set cruise speed using the throttle lever once the speed limiter function is activated. Watercraft speed may vary depending on water conditions during use.

Deactivating Speed Limiter Mode

To deactivate speed limiter mode:

1. Release the throttle lever.
2. Press and hold the SPEED CTRL button or press MODE button.

Deactivation of speed limiter mode is indicated by:

– The speed limiter indicator will go off.

NOTE:
If the throttle lever is not fully released when the button is pressed to deactivate the speed limiter mode, the speed control MODE indicator will remain on. The speed limiting function will stay active until the throttle is fully released, then the speed control MODE indicator will go out.

Slow Speed Mode

The Intelligent Throttle Control also allows for a Slow Speed Mode where the driver can adjust and set idle speed. This is useful when operating in slow speed zones where the driver must be especially attentive to possible obstacle avoidance.

If you accelerate above approximately 15 km/h (9 MPH) , Slow Speed Mode will be deactivated and the engine will return to idle RPM when the throttle is released.

Should a situation arise where the operator must stop or accelerate quickly away from a hazardous situation, pulling in the iBR lever, or pulling in on the throttle lever will deactivate slow speed mode and normal control of the watercraft will be returned to the operator.

Prerequisite for Slow Speed Mode Activation

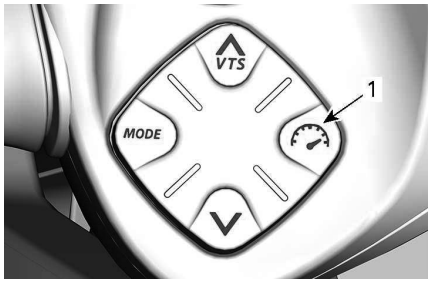
Slow Speed MODE can be activated when the watercraft is going at less then 15 km/h (9 MPH).

NOTE:
Slow speed mode is not available if speed limiter mode is engaged.

Activating Slow Speed Mode

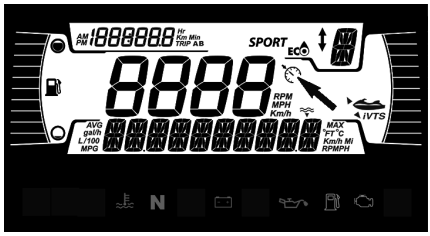
To activate slow speed mode of operation:

1. Release the throttle lever to idle RPM.
2. Press the SPEED CONTROL button on the left keypad.



1. Speed Control button

The Speed Control indicator will come on in the multifunction display to indicate activation.



TYPICAL

A message will scroll in the multifunction display to specify that you are now in slow speed mode.

The default slow speed setting of 5 will show in the numerical display.



Changing Set Slow Speed

To **increase** or **decrease** the set slow speed, press the UP/DOWN button on the RH handlebar once, or repeatedly.

NOTE:
There are 9 slow speed settings available (1 through 9). Adjust slow speed mode to desired speed.

When pressing the up/down button, a message "SET LEVEL" will appear.

You can select from one of the 9 slow speed setting (1 to 9).

Level 5 is the default and it correspond to the normal idle of the vehicle. By using level 1-4 you can slow down the vehicle and go as slow as 1.5 km/h (1 MPH). The slow speed mode can be used as a trolling mode and is useful for fishing. Level 6-9 gives you the ability to go up to 12 km/h (7 MPH) without touching the throttle lever.

⚠ WARNING

The operator must always be seated in driving position at all times when pwc is at speed. - The tether cord must be attached to the operator's PFD or wrist (wrist strap required) at all times.

NOTE:
Speed will vary depending on load, wind and waves conditions

Deactivating Slow Speed Mode

The slow speed mode can be deactivated using any of the following methods:

– Pressing and holding the Speed Control button.
– Depressing the iBR lever.
– Accelerating past the set slow speed.

When deactivating SLOW SPEED MODE by accelerating using the throttle lever, the iBR gate stays in the forward position.

When using the iBR lever, the iBR gate will move towards the reverse position, then neutral when the lever is released.

SLOW SPEED MODE deactivation will be indicated in the following manner:

– The Speed Limiter indicator will go out

Ski Mode (If Equipped)

Ski mode allows for repeated and precisely controlled launches, and a set towing speed, specifically for towing a skier or wake boarder.

NOTE: A GPS signal is required in order for the ski function to appear in the cluster. To obtain a suitable GPS signal, we recommend that you take the vehicle outside.

RAMP Function

The RAMP function offers a pre-programmed setting for launching and accelerating the PWC.

RAMP 1 provides:

– Slowest launch (smoothest)
– Slowest acceleration rate

RAMP 5 provides:

– Quickest launch
– Quickest acceleration rate

TARGET SPEED Function

The TARGET SPEED function limits the maximum towing speed.

Once the RAMP has been selected, an average PWC target speed for that RAMP will be visible in the numerical display.

The operator may increase or decrease the target speed to any value within the selected RAMP speed range.

Using Ski Mode

Press MODE button to select the SKI mode.

Models with 2 Keypads only

1. Press OK button when SKI icon flashes.
2. Select ski ramp by using the UP or DOWN arrow button. Ramp 1 will give the slowest acceleration.

NOTE:
Acceleration ramp will not behave the same depending on the vehicle type, vehicle load and water conditions. For safety reasons, always start using ramp # 1 to familiarize your skier with acceleration and then change the ramp as needed.

3. Press OK or RIGHT arrow button to confirm acceleration ramp.
4. Select the maximum target speed by using the UP or DOWN arrow button.
5. Press OK or RIGHT arrow button to confirm.

NOTE:
At any moment you can use the LEFT and RIGHT arrow buttons to change the ramp and speed selection.

6. After your selection and when your are ready, press the OK button to activate the function.

NOTE:
MODE remains active and ready until another driving mode is chosen.

Deactivating Ski Mode

To end a ski run and completely deactivate ski mode, release the throttle to idle, then press the MODE button.

Learning Key Mode

The learning key provides a mode of operation whereby engine power and speed is limited.

There are 5 speed settings available.

By default, the speed setting is no 1.

Refer to *4.5" Digital Display* for adjustment.

Jet Pump Water Intake and Impeller Cleaning

⚠ WARNING

Keep away from intake grate while engine is running. Items such as long hair, loose clothing or personal flotation device straps can become entangled in moving parts.

Weeds, shells or debris can get caught on the intake grate, drive shaft and/or impeller. A clogged water intake may cause troubles such as:

– **Cavitation:** Engine speed is high but watercraft moves slowly due to reduced jet thrust, jet pump components may be damaged.
– **Overheating:** Since the jet pump operation controls the flow of water to cool the exhaust system, a clogged intake will cause the engine to overheat and damage engine internal components.

A weed clogged area can be cleaned as follows:

⚠ WARNING

If it is necessary to reach in to remove any foreign object caught in the propulsion system, the tether cord MUST BE REMOVED from the engine cut-off switch.

In-Water Cleaning

NOTICE

Ensure there is at least 90 cm (3 ft) of water under the lowest rear portion of the hull when all passengers are aboard prior to starting the engine. Otherwise damage to the propulsion system components may occur.

Models equipped with the iDF system

If the watercraft is equipped with the iDF system, use it now. Refer to *How to Use the intelligent Debris Free Pump System* in *Operating Instructions* section.

Models without iDF system

1. Rock the watercraft several times. Most of the time, this will remove the blockage.
2. Start engine and make sure watercraft operates properly.

   If the aforementioned method does not work:
3. With engine running and before applying throttle, pull the iBR lever in to select reverse operation.
4. Vary throttle quickly several times.
5. Repeat procedure if necessary.

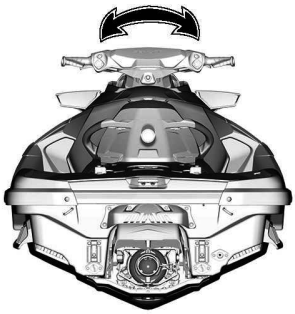
   If system is still blocked, move the watercraft out of the water for cleaning. Refer to *On-Beach Water Cleaning*.

On-Beach Water Cleaning

⚠ WARNING

The tether cord MUST BE REMOVED from the engine cut-off switch to prevent accidental engine starting before cleaning the jet pump area.

1. Place a cardboard or a carpet beside the watercraft to prevent scratching when turning the watercraft for cleaning.
2. Rotate the watercraft to any side for cleaning.



TYPICAL

3. If equipped, move the iBR to the forward position. Refer to *iBR Override Function* for detailed instructions.
4. Clean the water intake area.

   If the system is still clogged, refer to an authorized Sea-Doo dealer for servicing.

NOTICE

Inspect water intake grate for damage. Refer to an authorized Sea-Doo dealer for repair as necessary.

iBR Override Function

When the iBR override function is activated, it allows the user to electrically move the iBR gate and nozzle through its full range of motion using the VTS control button.

NOTE:
The iBR override function is only available when the engine is not running.

⚠ WARNING

When moving the iBR gate using the iBR override function, ensure no one is near the rear of the watercraft. Movement of the gate may squeeze fingers.

NOTICE

An object or tool caught in the iBR system when using the iBR override function may cause damage to the iBR components. Remove all rigid foreign objects that may obstruct the iBR gate travel before moving it.

⚠ WARNING

If it is necessary to reach in to remove any foreign object caught in the propulsion system, strictly observe the following before proceeding:

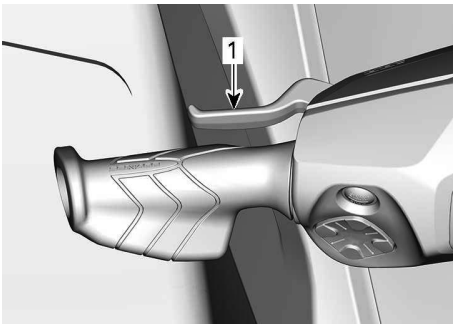
- **Remove tether cord from the engine cut-off switch.**
- **Wait at least 5 minutes.**
- **Do not press on START/STOP button. Should the START / STOP button be pressed, wait another 5 minutes.**

Activating iBR Override Function

1. Power up the electrical system by pressing the START/STOP button.
2. Install the tether cord on the engine cut-off switch.

NOTE: The tether cord must be installed to ensure the information center will not shut off all indications after its self test function. Electrical power will stay on for approximately 1 hour.

3. Pull in and hold the iBR lever for the entire procedure.



1. iBR lever pulled and held

4. When the **IBR OVERRIDE - PRESS MODE BUTTON** message appears in the multifunction gauge, press the MODE button.

   When the function is activated, a ON message will be shown.
5. While still holding the iBR lever in, press the VTS UP/DOWN button to move the iBR gate to the desired position. Ensure the VTS indication in the multifunction gauge changes with the iBR gate movement. If the iBR gate moves upwards, the indication moves upwards.
6. Release the iBR lever.
7. Remove the tether cord from the engine cut-off switch.

⚠ WARNING

If it is necessary to reach in to remove any foreign object caught in the propulsion system, strictly observe the following before proceeding:

- **Remove tether cord from the engine cut-off switch.**
- **Wait at least 5 minutes.**
- **Do not press on START/STOP button. Should the START / STOP button be pressed, wait another 5 minutes.**

Capsized Watercraft

The watercraft is designed so that it should not turn over easily. Two sponsons mounted on the side of the hull assist watercraft stability. If it turns over, it will remain capsized.

To turn the watercraft upright, ensure the engine is off and the D.E.S.S. key is **NOT** on its post, then grab the inlet grate, step on a side bumper rail and use your weight to rotate the watercraft towards you.

NOTE:
A label on the stern near the flushing connector provides instructions on how to turn the watercraft right side up. The label is upside down so that it can be read when the watercraft is overturned.



TYPICAL

The engine features a Tip-Over Protection System (T. O. P. S.™). When the watercraft tips over, the engine is automatically stopped.

When the watercraft is returned to its normal operating position, the engine can be started normally.

NOTICE

When the watercraft has been turned over 5 minutes, do not attempt to crank the engine to avoid water ingestion that would damage the engine. See an authorized Sea-Doo dealer as soon as possible.

NOTICE

If the engine does not crank, do not attempt to start it anymore. Otherwise, the engine could be damaged. See an authorized Sea-Doo dealer as soon as possible.

As soon as possible, check for presence of water in the bilge. Drain as necessary when back to the shore.

Submerged Watercraft

To limit damages to the engine, perform the following procedure as soon as possible.

1. Drain bilge.
2. If it was submerged in salt water, spray bilge and all components with fresh water using a garden hose to stop the salt corroding effect.

NOTICE

Never try to crank or start the engine. Water trapped in intake manifold would flow towards the engine and possibly cause severe engine damage.

3. Bring the watercraft to an authorized Sea-Doo dealer as soon as possible to have it serviced.

NOTICE

Failure to have the engine properly serviced may cause severe engine damage.

Water-Flooded Engine

NOTICE

Never try to crank or start the engine. Water trapped in intake manifold would flow towards the engine and possibly cause severe engine damage.

Bring the watercraft to an authorized Sea-Doo dealer as soon as possible to have it serviced.

NOTICE

Failure to have the engine properly serviced may cause severe engine damage.

Towing the Watercraft in Water

Special precautions should be taken when towing a Sea-Doo watercraft in water.

The maximum recommended towing speed is 8 km/h (5 MPH).

This will prevent the exhaust system from filling with water, which may lead to water being injected into and filling the engine. Without the engine running, there isn't any exhaust pressure to push the water out the exhaust outlet.

NOTICE

Failure to follow these instructions may result in damage to the engine. If you must tow a stranded watercraft in water, be sure not to exceed the maximum towing speed of 8 km/h (5 MPH).

NOTICE

Never tow a watercraft facing backwards as water intrusion may occur.

⚠ CAUTION

A tow line shall always be made fast in such a way that it can be released when under load.

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MAINTENANCE

MAINTENANCE SCHEDULE

Maintenance is very important for keeping the watercraft in a safe operating condition. The watercraft should be serviced as per the maintenance schedule.

⚠ WARNING
Failure to properly maintain the vehicle according to the maintenance schedule and procedures can make it unsafe to operate.

EPA Regulation - Canadian and USA Vehicles

A repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems. These instructions do not require components or service by BRP or authorized Sea-Doo dealers.

Although an authorized Sea-Doo dealer has an in-depth technical knowledge and tools to service your vehicle, the emission-related warranty is not conditioned on the use of an authorized Sea-Doo dealer or any other establishment with which BRP has a commercial relationship.

Proper maintenance is the owner’s responsibility. A warranty claim may be denied if, among other things, the owner or operator caused the problem through improper maintenance or use.

For emission-related warranty claims, BRP is limiting the diagnosis and repair of emission-related parts to the authorized Sea-Doo dealers. For more information, please refer to the *US EPA Emission-Related Warranty* contained in the *Warranty* section.

You must follow the instructions for fuel requirements in the fueling section of this manual. Even if gasoline containing greater than ten volume percent ethanol is readily available, the US EPA issued a prohibition against the use of gasoline containing greater than 10 vol% ethanol that applies to this vehicle. The use of gasoline containing greater than 10 vol% ethanol with this engine may harm the emission control system.

The maintenance schedule does not exempt the Pre-Ride Inspection and Post--Operation Care.

After Each Ride in Salt or Dirty Water
Rinse engine compartment with fresh water and drain salt water
Flush exhaust system

Every Month in Salt or Dirty Water
Spray anticorrosion lubricant to metallic components in engine compartment (every 10 hours in salt water use)
Inspect sacrificial anodes

Every Year at Preseason or 100 Hours of Operation (Whichever Comes First)
Inspect sacrificial anodes
Check for fault codes
Perform all items indicated in the Pre-Ride Inspection and Post-Operation Care
Replace engine oil and filter
Inspect engine rubber mounts
Inspect the cooling system (coolant level, hoses and fasteners for leaks)
Visually inspect connection between throttle body and intake manifold
Inspect the air intake for damage on hoses and clamps
Inspect electrical connections and fastening (ignition system, starting system, fuel injectors, fuse box etc.)
Visually inspect area around carbon ring and drive shaft rubber bellows for the following signs of failure: black carbon dust and water sprays (more frequently when using PWC in dirty water)
Visually inspect impeller and bellow
Visually inspect impeller and wear ring for deep scratches, nicks and grooves
Remove impeller cover and inspect for signs of water intrusion
Visually inspect reverse gate bushing for excessive play
Inspect fuel cap, filler neck, fuel tank, straps, fuel lines and connections

EVERY 2 YEARS OR 200 HOURS OF OPERATION (Whichever Comes First)
Replace spark plugs
Inspect flame arrestor (Rotax 900 ACE - 90 engines)
Validate condition of jet pump bearing by manually spinning impeller checking for radial shaft play or noise
Verify and lubricate splines of the drive shaft and impeller

Every 5 Years or 300 Hours of Operation (Whichever Comes First)
Replace the coolant

MAINTENANCE PROCEDURES

This section includes instructions for basic maintenance procedures.

⚠ WARNING

Turn off the engine and follow these maintenance procedures when performing maintenance. If you do not follow proper maintenance procedures you can be injured by hot parts, moving parts, electricity, chemicals or other hazards.

⚠ WARNING

Should removal of a locking device (e.g. lock tabs, self-locking fasteners, etc.) be required, always replace with a new one.

NOTICE

Never leave any object, rag, tool, etc., in the engine compartment or in the bilge.

Engine Oil

Recommended Engine Oil

Rotax® engines were developed and validated using the XPS™ oil. BRP recommends the use of its XPS engine oil or an equivalent at all time. Do not add any additives to the recommended engine oil. Damages caused by the use of an oil not suitable for the engine or by adding of an additives may not be covered by the BRP Limited Warranty.

XPS Recommended Engine Oil	
4T 5W40 Synthetic blend oil	
If the Recommended XPS Engine Oil is Not Available	
Engine **Without** Supercharger	Use a 5W40 4-stroke SAE synthetic engine oil meeting or exceeding the following lubricant industry specifications. Always check the API service label certification on the oil container, it must contain at least one of the indicated standards. **API service classification SJ, SL, SM or SN**
Engine **With** Supercharger	Use a 5W40 4-stroke SAE motorcycle engine oil compatible with wet clutches meeting or exceeding the following lubricant industry specifications. Always check the API service label certification on the oil container, it must contain at least one of the indicated standards. **JASO-MA2** **API service classification SJ, SL, SM or SN**

Do not add any oil additives to the recommended engine oil. Damages caused by the use of an oil not suitable for the engine or by adding of an

oil additives may not be covered by the BRP Limited Warranty.

Engine Oil Level

NOTICE

Operating the engine with an improper level may severely damage engine.

⚠ CAUTION

Many components in the engine compartment may be very hot. Direct contact may result in skin burn.

If Watercraft is Out of the Water

NOTICE

Watercraft must be level.

⚠ CAUTION

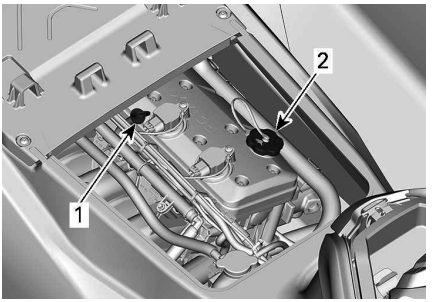
When operating the engine while the watercraft is out of water, the heat exchanger in the ride plate may become very hot. Avoid any contact with the ride plate as burns may occur.

1. Raise trailer tow pole, then block in position when bumper rail is level.
2. Install a garden hose on the exhaust system flushing connector. Refer to *Exhaust System* in this section and follow the procedure.

NOTICE

Never run engine without supplying water to the exhaust system. Failure to cool exhaust system may severely damage it.Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.

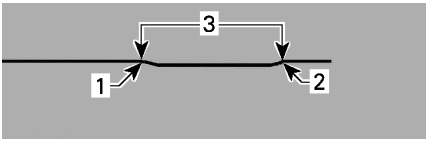
3. Remove the seat(s).
4. Start the engine.
5. Open the water tap.
6. Run the COLD engine at **idle for 30 seconds**.
7. Close water tap.
8. Bring engine RPM to 4000-4500 RPM for 15 seconds.
9. Stop the engine abruptly by pressing the start/stop button or removing the tether cord.
10. Wait at least 30 seconds for the oil to settle in the engine, then pull dipstick out and wipe clean.



TYPICAL

1. Oil dipstick
2. Oil filler cap

11. Reinstall dipstick, push in completely.
12. Remove dipstick again and read oil level. It should be between the FULL and ADD marks.



TYPICAL

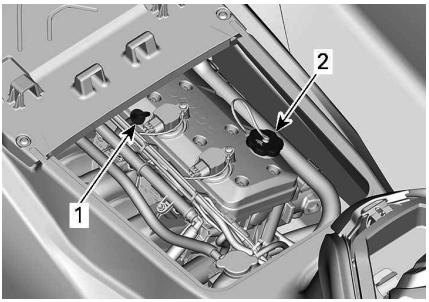
1. Full
2. Add
3. Operating range

13. Add oil to ensure the level is between marks as required.
    1. Remove oil cap.
    2. Place a funnel in valve cover opening.

3. Add a small amount of the recommended oil to reach the proper level.

NOTICE

Do not overfill.



TYPICAL

1. Oil dipstick
2. Oil filler cap

NOTE:
Every time oil is added in the engine, the complete procedure explained in this section must be carried out again. Otherwise, you will obtain a false oil level reading.

14. Properly reinstall oil cap and dipstick.

NOTICE

Ensure that oil filler cap is tighten properly. Otherwise engine oil can spill out.

Engine Oil Change and Oil Filter Replacement

The oil change and filter replacement may be performed by an authorized Sea-Doo dealer, repair shop, or person of your own choosing.

Engine Coolant

Recommended Engine Coolant

XPS Recommended Coolant
Extended life pre-mixed coolant
If the Recommended XPS Coolant is Not Available
Use a low silicate, extended life ethylene-glycol premixed coolant (50%-50%) specifically formulated for internal combustion aluminum engines.

NOTICE

Always use ethylene-glycol antifreeze containing corrosion inhibitors specifically for internal combustion aluminum engines.

To prevent antifreeze deterioration, always use the same brand and grade. Never mix different brands or grades unless cooling system is completely flushed and refilled.

Engine Coolant Level

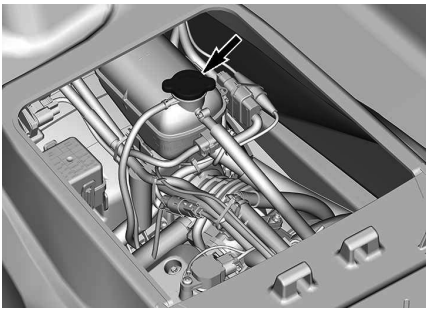
⚠ WARNING

Check coolant level with engine cold. Never add coolant when engine is hot.

⚠ CAUTION

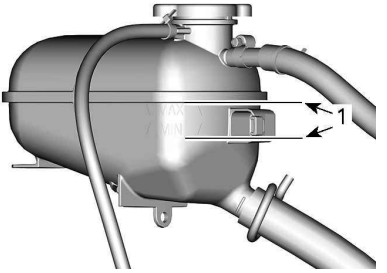
Many components in the engine compartment may be very hot. Direct contact may result in skin burn.

1. Remove seats.
2. Locate the expansion tank cap.



TYPICAL

With watercraft on a level surface, coolant level should be between MIN. and MAX. marks on coolant reservoir when engine is cold.



COOLANT EXPANSION TANK

1. Level between marks when engine is cold

NOTE:
The watercraft is level when it is in water. When on a trailer, raise trailer tow pole and block in this position when bumper rail is level.

Add coolant, see *Recommended Engine Coolant* for specification, to adjust coolant level between marks as required. Use a funnel to avoid spillage. Do not overfill.

3. Properly tighten the expansion tank cap. Reinstall seats.

NOTE:
A cooling system that frequently requires coolant is an indication of leaks or engine problems. See an authorized Sea-Doo dealer.

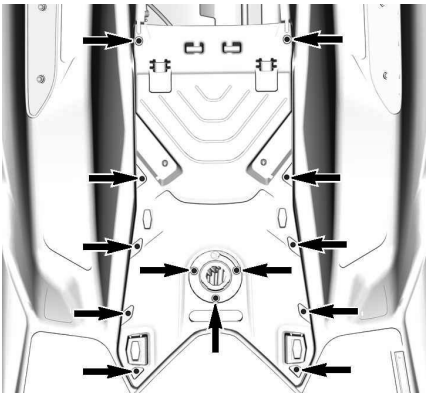
Engine Coolant Replacement

Coolant replacement should be performed by an authorized Sea-Doo dealer.

Ignition Coils

Ignition Coil Access

1. Remove tether cord from the engine cut-off switch.
2. Remove seat(s).
3. Remove engine service cover by removing the retaining screws.



Ignition Coil Removal

1. Disconnect ignition coil connector.

NOTICE

Do not pry on ignition coil using any tool.

2. Remove ignition coil retaining screw.
3. Remove ignition coil from spark plug by rotating coil side to side as you pull up.

Ignition Coil Installation

1. Install ignition coil on spark plug.
2. Align the retaining screw hole of the ignition coil with the threaded hole on the valve cover.
3. Push the ignition coil all the way down until it rests on the valve cover.
4. Install and tighten retaining screw.

Tightening Torque	
Ignition coil retaining screw	9 ± 1 Nm (80 ± 9 lbf-in)

5. Reconnect ignition coil connector.
6. Install the engine service cover and tighten the screws to specification.

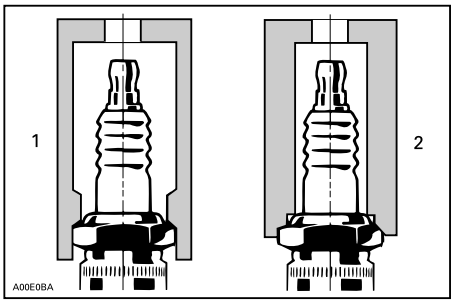
Tightening Torque	
Engine service cover screws	2.75 ± 0.25 Nm (24 ± 2 lbf-in)

7. Install the seats.

Spark Plugs

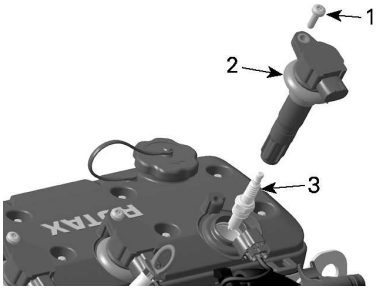
Spark Plug Removal

1. Remove ignition coils. Refer to *Ignition Coil Removal*.
2. Unscrew spark plug completely using a spark plug socket.



1. Approved socket
2. Improper socket

3. Clean the spark plug and cylinder head with compressed air.
4. Use the ignition coil to take spark plug out of its hole.



1. *Retaining screw*
2. *Ignition coil*
3. *Spark plug*

Spark Plug Installation

Prior to installation, ensure the contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, check electrode gap as specified in *Technical Specifications*.
2. Hand screw spark plug into cylinder head. Then, tighten the spark plug to specification with a spark plug socket.

Tightening Torque	
Spark plug	18 ± 2 Nm (159 ± 18 lbf-in)

3. Install ignition coils. Refer to *Ignition Coil Installation*.

Exhaust System

Exhaust System Flushing

Flushing the exhaust system with fresh water is essential to neutralize corroding effects of salt or other chemical products present in water. It will help to remove sand, salt, shells or other particles in water jackets and/or hoses.

Exhaust system flushing should be performed when the watercraft is not expected to be used further the same day or when the watercraft is stored for any extended time.

NOTICE

Failure to flush the system, when necessary, will severely damage exhaust system. Make sure engine operates during entire procedure.

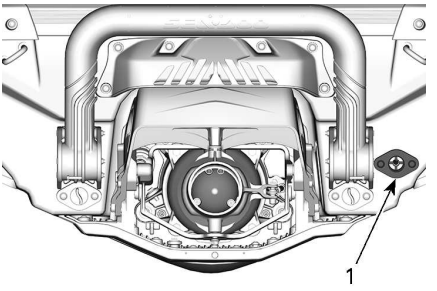
⚠ WARNING

Perform these operations in a well ventilated area. Certain components in the engine compartment may be very hot. Direct contact may result in skin burn. Do not touch any electrical part or jet pump area when engine is running.

⚠ WARNING

When operating the engine while the watercraft is out of the water, the heat exchanger in the ride plate may become very hot. Avoid any contact with ride plate as burns may occur.

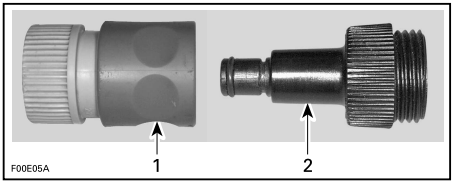
1. Connect a garden hose to connector located at the rear of watercraft. **Do not open water tap yet.**



1. *Water inlet connector*

NOTE:
The following tool is recommended when a quick connect adapter is used to ease garden hose installation.

Recommended Tool	
Flushing connector adapter 295 500 473	



1. Quick connect adapter
2. Flushing connector adapter

2. Start the engine then immediately open the water tap.

NOTICE

Always start the engine before opening the water tap. Open water tap immediately after engine is started to prevent overheating. Never run engine without supplying water to the exhaust system when watercraft is out of water.

3. Run the engine 90 seconds at idle.

NOTICE

Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.

4. Ensure water flows out of jet pump while flushing.
5. Close the water tap, run the engine at 5000 RPM for 5 seconds and then stop the engine.

NOTICE

Always close the water tap before stopping the engine.

6. Disconnect the garden hose and the flushing connector adapter (if used).

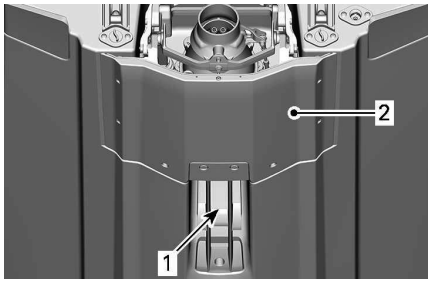
Ride Plate and Water Intake Grate

Ride Plate and Water Intake Grate Inspection

Inspect ride plate and jet pump water intake grate for damage. See your Sea-Doo dealer to have any damaged part repaired or replaced.

⚠ WARNING

The tether cord must always be removed from the engine cut-off switch prior to inspecting the intake grate.



INSPECT THESE AREAS

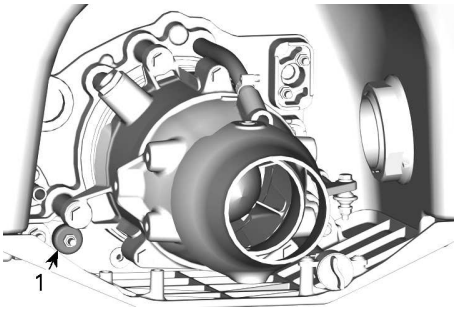
1. Water intake
2. Ride plate

Sacrificial Anodes

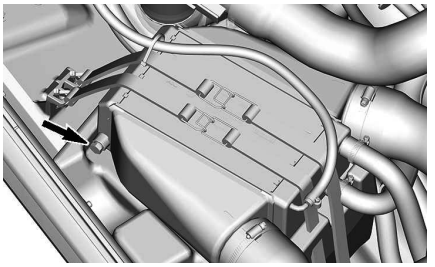
Sacrificial Anode Inspection

Sacrificial anodes are present on:

– Pump
– Ride plate
– Intercooler (if equipped).



1. Sacrificial anode location



INTERCOOLER (IF EQUIPPED)

Ski/Wakeboard Pylon (Wake)

Ski/Wakeboard Pylon Inspection

Check ski/wakeboard pylon operation. Ensure it slides up and down easily.

Check locking mechanism operation.

Check fasteners tightness. If something is found defective, don't use ski/wakeboard pylon and see an authorized Sea-Doo dealer for repair.

Ski/Wakeboard Pylon Lubrication

Clean ski/wakeboard pylon and apply a light coat of super lube grease or equivalent.

Lubricate pylon throughout its length.

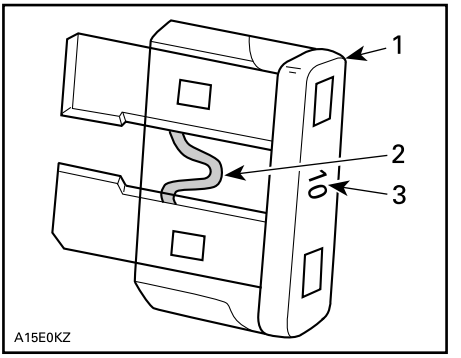
Wipe off all excess grease and reinstall pylon.

Extend and retract several times to distribute the lubricant.

Fuses

Fuse Inspection

If an electrical problem occurs, check the fuses. If a fuse is burnt, replace by one of the same rating.



TYPICAL

1. Fuse
2. Check if melted
3. Ampere rating

NOTICE

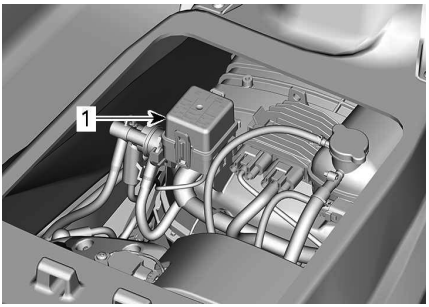
Do not use a higher rated fuse as this can cause severe damage. If a fuse has burnt out, the source of the malfunction should be determined and corrected before restarting. See an authorized Sea-Doo dealer for servicing.

Fuse Location

All fuses are located inside a single fuse box.

To access the fuse box:

Remove seat(s).



TYPICAL

1. Fuse box

To remove a fuse box cover, squeeze locking tabs together, hold and pull fuse box cover to open.

NOTE:
Fuse ratings and positions are illustrated on the fuse box cover.

Use the fuse remover/installer included in the fuse box to ease fuse removal.

Fuse Description

Fuse	Rating	Description
1	-	Not used
2	15 A	Fuel Inj., Ign. Coils and Fuel Pump
3	3 A	Bilge Pump (if equipped)
4	-	Not used
5	-	Not used
6	30 A	Charge
7	5 A	Cluster
8	-	Not used
9	30 A	iBR
10	5 A	Start/Stop
11	5 A	ECM
12	30 A	Battery
13	15 A	Diagnostic Tool 2
14	15 A	Diagnostic Tool 1, Accessory connector

WATERCRAFT CARE

Remove the watercraft from the water every day.

Post-Operation Care

Exhaust System Flushing

The exhaust system should be flushed daily when watercraft is used in salt or foul water.

Refer to *Maintenance Procedures*.

Additional Care for Foul Water or Salt Water Operation

When the watercraft is operated in foul water and particularly in salt water, additional care should be taken to protect the watercraft and its components.

Rinse watercraft bilge area with fresh water.

Never use a high pressure washer to clean the bilge. **USE LOW PRESSURE ONLY (such as a garden hose).**

High pressure can cause damages to electrical or mechanical systems.

⚠ CAUTION

Allow engine to cool before performing any maintenance.

NOTICE

Failure to perform proper care such as: watercraft rinsing, exhaust system flushing and anti-corrosion treatment, when watercraft is used in salt water, will result in damage to the watercraft and its components. Never leave the watercraft stored in direct sunlight.

Seat Cleaning

Before applying a cleaning product on the seat, try removing marks with a white eraser.

Many marks, as shoes marks, can be removed easily with this method.

Body and Hull

Repair

If any repairs are needed to body components or to the hull, contact your authorized Sea-Doo dealer.

Cleaning

Wash the body and the hull with a soap and water solution (use only mild detergent). Rinse thoroughly with fresh water.

Remove marine organisms from the inside and outside of the hull.

NOTICE

Never clean using the following products:

- **BRP Heavy Duty Cleaner**
- **Strong detergent**
- **Degreasing agent**
- **Ammonia**
- **Acetone or other ketones**
- **Alcohol**
- **Toluene or other aromatic solvents**
- **Chlorinated solvents**
- **Mineral spirits**
- **Paint thinners**
- **Petroleum based products.**

Stains may be removed from the seat and fiberglass using the XPS All Purpose Cleaner and Degreaser or the equivalent.

To clean the carpets, use 3M™ Citrus Base Cleaner (24 oz spray can) or an equivalent.

⚠ WARNING

Never apply plastic or vinyl protector on the carpets or seat as the surface will become slippery and the occupants may slip off the watercraft.

Respect the environment by ensuring fuel, oil or cleaning solutions do not drain into the waterways.

Protection

Apply a good quality marine wax to the body.

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.

NOTICE

The watercraft should never be left in water for storage. Never leave the watercraft stored in direct sunlight. Never store watercraft in a plastic bag.

STORAGE

⚠ WARNING

Because fuel and oil are flammable, you should have an authorized Sea-Doo dealer, repair shop, or person of your own choosing to inspect the fuel system integrity as specified in the periodic inspection chart.

It is recommended that the watercraft be serviced by an authorized Sea-Doo dealer, repair shop, or person of your own choosing for storage, however the following operations can be performed by you with a minimum of tools.

NOTE:
Carry out the following tasks in the same order as detailed in this section.

NOTICE

Do not run the engine during the storage period.

Propulsion System

Jet Pump Cleaning

⚠ WARNING

Always remove tether cord from the engine cut-off switch to prevent unexpected engine starting before cleaning the jet pump area. Engine must not be running for this operation.

Rinse the jet pump by spraying water through its inlet and outlet openings.

Spray an anti-corrosive product on the propulsion system pars.

Service Product
Lubricant and anti-corrosive or equivalent

Jet Pump Inspection

See your authorized Sea-Doo dealer.

Fuel System

Fuel System Protection

A fuel stabilizer should be added in the fuel tank to prevent fuel deterioration and fuel system gumming. Follow stabilizer manufacturers' instructions for proper use.

Service Product
Fuel stabilizer

NOTICE

It is highly recommended to add fuel stabilizer at storage in order to maintain fuel system in good condition. Fuel stabilizer should be added prior to engine lubrication and fuel tank top up to ensure fuel system components protection against varnish deposits.

Fill up fuel tank completely as explained in *Fueling* section. Make sure there is no water inside fuel tank.

NOTICE

Should any water be trapped inside fuel tank, severe internal damage will occur to the fuel injection system.

Engine and Exhaust

Exhaust System Flushing

Perform procedure as described in *Maintenance Procedures* section.

Engine Oil and Filter Replacement

The oil change and filter replacement may be performed by an authorized Sea-Doo dealer, repair shop, or person of your own choosing.

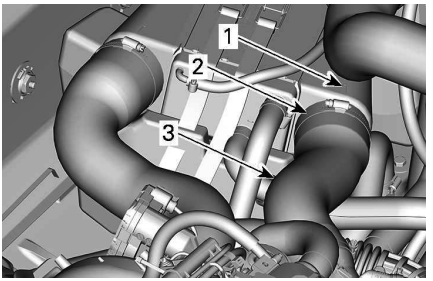
Models with 230 Engines

It is important to expel any trapped water that may have accumulated from condensation in the intercooler.

Proceed as follows:

1. Lift seat.
2. Ensure there is an alignment line drawn on the intercooler inlet hose. This will ensure the hose is not twisted or kinked on reinstallation.
3. Loosen the clamp retaining the intercooler inlet hose.
4. Remove the intercooler inlet hose from the intercooler.

NOTE:
This hose feeds the hot, compressed air from the engine supercharger to the intercooler inlet.



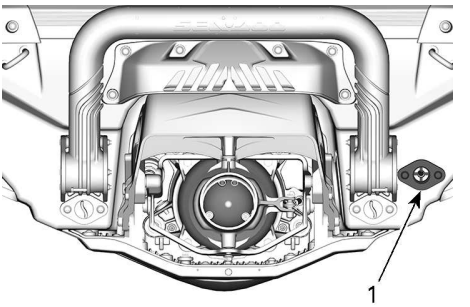
1. *Hose alignment lines*
2. *Hose clamp*
3. *Intercooler inlet hose*

5. The intercooler air side is self--draining into the intercooler inlet--side manifold. By disconnecting the intercooler inlet hose, the presence of condensated water can be visually assessed and properly drained off without the engine running.
6. Reinstall the intercooler air outlet hose, ensure it is properly aligned as prior to removal to ensure proper engine operation.

Exhaust System Draining

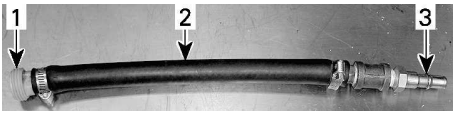
In areas where temperature may freeze, water trapped in the exhaust system and intercooler must be removed.

Using the flushing connector, inject pressurized air at 379 kPa (55 lbf/in²) into system until there is no more water flowing from jet pump.



1. *Flushing connector*

The following hose can be fabricated to ease draining procedure.



TYPICAL

1. *Flushing connector adapter*
2. *Hose 12.7 mm (1/2 in)*
3. *Air hose male adapter*

NOTICE

Failure to drain the exhaust system may cause severe damage to the exhaust manifold.

Remove special tools.

Engine Internal Lubrication

1. Remove the seat(s).
2. Remove spark plugs. Refer to *Maintenance Procedures* section.
3. By the spark plug holes, lubricate each cylinder.

Service Product
Lubricant and anti-corrosive or equivalent

4. Fully depress the throttle lever. Depressing the throttle lever will prevent fuel from being injected and to disable the ignition during engine cranking.
5. Press the START/STOP button to crank the engine a few turns. This will distribute the oil on the cylinder walls.
6. Apply anti-seize lubricant on spark plug threads, then reinstall them in the engine. Refer to *Maintenance Procedures* section.
7. Install the ignition coils. Refer to *Maintenance Procedures* section.

Engine Coolant Test

If antifreeze is not replaced, test its density.

The antifreeze replacement and a density test should be performed by an authorized Sea-Doo dealer. Refer to *Maintenance Schedule*.

NOTICE

Improper antifreeze density may result in freezing of the liquid in the cooling system if the watercraft is stored in an area where the freezing point is attained. This would seriously damage the engine.

Electrical System

Battery Removal and Charging

Contact your authorized Sea-Doo dealer.

⚠ WARNING

Never charge or boost the battery while installed in the watercraft.

Engine Compartment

Engine Compartment Cleaning

1. Clean the bilge with hot water and detergent or with bilge cleaner.
2. Rinse thoroughly.
3. Lift front end of watercraft to completely drain bilge through the bilge drain plugs.

Anticorrosion Treatment

Wipe off any residual water in the engine compartment.

Spray lubricant and anti-corrosive or equivalent over all metallic components in engine compartment.

NOTE:
The seat should be removed during storage. This will prevent engine compartment condensation and possible corrosion.

Body and Hull

Repair, clean and protect the watercraft as per procedures in *Watercraft Care* section.

PRESEASON PREPARATION

Maintenance preparation must be performed in conjunction with *Maintenance Schedule*.

Ensure to perform all tasks included in the **Every Year or 100 Hours** table.

Preseason maintenance preparation may be performed by an authorized Sea-Doo dealer, repair shop or person of your own choosing.

NOTE:
Though not required, it is recommended that an authorized Sea-Doo dealer perform preseason maintenance preparation at the same time that any safety-related factory campaigns are performed by the authorized Sea-Doo dealer.

⚠ WARNING

Only perform procedures as detailed in the *Maintenance Schedule*. It is recommended that the assistance of an authorized Sea--Doo dealer be periodically obtained on other components and systems not covered in this guide.

NOTICE

When component conditions seem less than satisfactory, replace using genuine BRP parts, or equivalents.

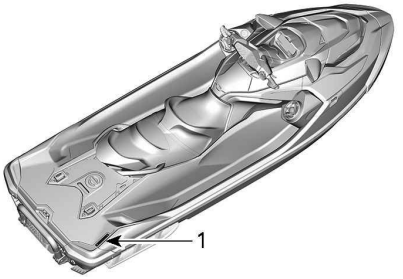
TECHNICAL INFORMATION

WATERCRAFT IDENTIFICATION

The main components of the watercraft (engine and hull) are identified by different serial numbers. It may sometimes become necessary to locate these numbers for warranty purposes or to trace the watercraft in the event of theft.

Hull Identification Number

The Hull Identification Number (HIN) is located on footboard at the rear of watercraft.



TYPICAL

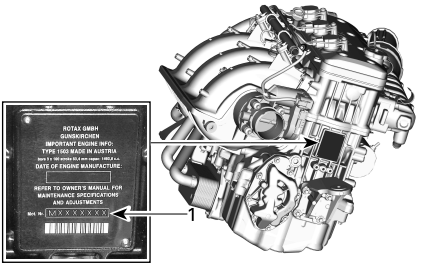
1. Hull Identification Number (HIN)

It is composed of 12 digits:

YDV	12345	L	8	09
				Model year
				Year of production
				Month of production
				Serial number (a letter may also be used as a digit)
				Manufacturer

Engine Identification Number

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



TYPICAL

1. Engine Identification Number (EIN)

RF D.E.S.S. KEY

This device complies with FCC Part 15 and Industry Canada license exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC Registration Number: 12006A-1001002222

FCC ID: 2ACER-1001002222

We, the party responsible for compliance, declare under our sole responsibility that the device is in conformity with the provisions of the following Council Directive: 2014/53/EU. To which this declaration relates is in conformity with the essential requirements and other relevant requirements. The product is in conformity with the following directives, harmonized standards and regulations:

Radio Equipment Directive (RED) 2014/53/EU and Harmonized Standards:

EN 300 330-2, EN 60950-1

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS (s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage;

(2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radio Equipment Directive (RED)	2014/53/EU
Article 3.1a	Safety and health IEC 62368-1:2014
Article 3.1b	EMC CISPR 25:(2016); conducted emission CISPR 25:(2016); radiated emission ISO 11452-2 (2004); radiated electromagnetic field immunity
Article 3.2	Spectrum usage efficiency ETSI EN 300 330 V2.1.1 (2017-2)

MULTIFUNCTION GAUGE REGULATORY INFORMATION

Technical Information

Transmitter:

– BT operating frequency range: 2402 – 2480 MHz
– BT version: 4.2 (no BTLE)
– BT output power: < 8.5 dBm

Receiver:

– FM operating range: 76 - 108 MHz

Manufacturer and Address

Manufacturer:

– Robert Bosch LLC

Address:

– 38000 Hills Tech Drive, Farmington Hills, MI 48331, USA

To display the regulatory information on the vehicle digital display: From the home screen, access the main menu and keep the joystick pressed down for more than 10 seconds.

USA and Canada

This device complies with FCC Part 15 and Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC: 22868 - VDIBRHS01

FCC ID: 2AMJS - VDIBRHS01

RF exposure:

1. The equipment complies with FCC RF exposure limits set forth for an uncontrolled environment.
2. This equipment must be installed and operated with a separation distance of at least 20 cm from all persons.
3. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Mexico

IFETEL

Marca: Robert Bosch LLC

Modelo(s): VIPHI2BT

Número: RCPBOVI18-0967

NOM-121-SCT1-2009

La operación de este equipo está sujeta a las siguientes dos condiciones: (1) es posible que este equipo o dispositivo no cause interferencia perjudicial y (2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

Brazil



03473-18-04473

Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.

Japan

This device is granted pursuant to the Japanese Radio Law (電波法) and the Japanese Telecommunications Business Law (電気通信事業法).

This device should not be modified (otherwise the granted designation number will become invalid).

Europe

Declaration of Conformity

Simplified EU Declaration of Conformity according Radio Equipment Directive 2014/53/EU

CE

DE
Hiermit erklärt Robert Bosch LLC, dass der Funkanlagentyp VIPHI2BT der Richtlinie 2014/53/EU entspricht.
Der vollständige Text der EU-Konformitätserklärung ist unter der folgenden Internetadresse verfügbar: eu-doc.bosch.com
FR
Le soussigné, Robert Bosch LLC, déclare que l'équipement radioélectrique du type VIPHI2BT est conforme à la directive 2014/53/UE.
Le texte complet de la déclaration UE de conformité est disponible à l'adresse internet suivante:eu-doc.bosch.com
BG
С настоящото Robert Bosch LLC декларира, че този тип радиосъоръжение VIPHI2BT е в съответствие с Директива 2014/53/ЕС.
Цялостният текст на ЕС декларацията за съответствие може да се намери на следния интернет адрес: eu-doc.bosch.com
EL
Με την παρούσα ο/η Robert Bosch LLC, δηλώνει ότι ο ραδιοεξοπλισμός VIPHI2BT πληροί την οδηγία 2014/53/ΕΕ.
Το πλήρες κείμενο της δήλωσης συμμόρφωσης ΕΕ διατίθεται στην ακόλουθη ιστοσελίδα στο διαδίκτυο: eu-doc.bosch.com
CS
Tímto Robert Bosch LLC prohlašuje, že typ rádiového zařízení VIPHI2BT je v souladu se směrnicí 2014/53/EU.
Úplné znění EU prohlášení o shodě je k dispozici na této internetové adrese: eu-doc.bosch.com
DA
Hermed erklærer Robert Bosch LLC, at radioudstyrstypen VIPHI2BT er i overensstemmelse med direktiv 2014/53/EU.
EU-overensstemmelseserklæringens fulde tekst kan findes på følgende internetadresse: eu-doc.bosch.com
ET
Käesolevaga deklareerib Robert Bosch LLC, et käesolev raadioseadme tüüp VIPHI2BT vastab direktiivi 2014/53/EL nõuetele.
ELi vastavusdeklaratsiooni täielik tekst on kättesaadav järgmisel internetiaadressil: eu-doc.bosch.com
ES
Por la presente, Robert Bosch LLC declara que el tipo de equipo radioeléctrico VIPHI2BT es conforme con la Directiva 2014/53/UE.
El texto completo de la declaración UE de conformidad está disponible en la dirección Internet siguiente: eu-doc.bosch.com
FI
Robert Bosch LLC vakuuttaa, että radiolaitetyyppi VIPHI2BT on direktiivin 2014/53/EU mukainen.
EU-vaatimustenmukaisuusvakuutuksen täysimittainen teksti on saatavilla seuraavassa internetosoitteessa: eu-doc.bosch.com
EN
Hereby, Robert Bosch LLC declares that the radio equipment type VIPHI2BT is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address: eu-doc.bosch.com
HR
Robert Bosch LLC ovime izjavljuje da je radijska oprema tipa VIPHI2BT u skladu s Direktivom 2014/53/EU.
Cjeloviti tekst EU izjave o sukladnosti dostupan je na sljedećoj internetskoj adresi: eu-doc.bosch.com
HU
Robert Bosch LLC igazolja, hogy a VIPHI2BT típusú rádióberendezés megfelel a 2014/53/EU irányelvnek.
Az EU-megfelelőségi nyilatkozat teljes szövege elérhető a következő internetes címen: eu-doc.bosch.com
IT
Il fabbricante, Robert Bosch LLC, dichiara che il tipo di apparecchiatura radio VIPHI2BT è conforme alla direttiva 2014/53/UE.
Il testo completo della dichiarazione di conformità UE è disponibile al seguente indirizzo Internet: eu-doc.bosch.com

LT
Aš, Robert Bosch LLC, patvirtinu, kad radijo įrenginių tipas VIPHI2BT atitinka Direktyvą 2014/53/ES.
Visas ES atitikties deklaracijos tekstas prieinamas šiuo interneto adresu: eu-doc.bosch.com
LV
Ar šo Robert Bosch LLC deklarē, ka radioiekārta VIPHI2BT atbilst Direktīvai 2014/53/ES.
Pilns ES atbilstības deklarācijas teksts ir pieejams šādā interneta vietnē: eu-doc.bosch.com
MT
B'dan, Robert Bosch LLC, niddikjara li dan it-tip ta' tagħmir tar-radju VIPHI2BT huwa konformi mad-Direttiva 2014/53/UE.
It-test kollu tad-dikjarazzjoni ta' konformità tal-UE huwa disponibbli f'dan l-indirizz tal-Internet li ġej: eu-doc.bosch.com
NL
Hierbij verklaar ik, Robert Bosch LLC, dat het type radioapparatuur VIPHI2BT conform is met Richtlijn 2014/53/EU.
De volledige tekst van de EU-conformiteitsverklaring kan worden geraadpleegd op het volgende internetadres: eu-doc.bosch.com
PL
Robert Bosch LLC niniejszym oświadcza, że typ urządzenia radiowego VIPHI2BT jest zgodny z dyrektywą 2014/53/UE.
Pełny tekst deklaracji zgodności UE jest dostępny pod następującym adresem internetowym: eu-doc.bosch.com
PT
O(a) abaixo assinado(a) Robert Bosch LLC declara que o presente tipo de equipamento de rádio VIPHI2BT está em conformidade com a Diretiva 2014/53/UE.
O texto integral da declaração de conformidade está disponível no seguinte endereço de Internet: eu-doc.bosch.com
RO
Prin prezenta, Robert Bosch LLC declară că tipul de echipamente radio VIPHI2BT este în conformitate cu Directiva 2014/53/UE.
Textul integral al declarației UE de conformitate este disponibil la următoarea adresă internet: eu-doc.bosch.com
SV
Härmed försäkrar Robert Bosch LLC att denna typ av radioutrustning VIPHI2BT överensstämmer med direktiv 2014/53/EU.
Den fullständiga texten till EU-försäkran om överensstämmelse finns på följande webbadress: eu-doc.bosch.com
SL
Robert Bosch LLC potrjuje, da je tip radijske opreme VIPHI2BT skladen z Direktivo 2014/53/EU.
Celotno besedilo izjave EU o skladnosti je na voljo na naslednjem spletnem naslovu: eu-doc.bosch.com
SK
Robert Bosch LLC týmto vyhlasuje, že rádiové zariadenie typu VIPHI2BT je v súlade so smernicou 2014/53/EÚ.
Úplné EÚ vyhlásenie o zhode je k dispozícii na tejto internetovej adrese: eu-doc.bosch.com
IS
Robert Bosch LLC lýsir því hér með yfir að þráðlausi fjarskiptabúnaðurinn VIPHI2BT er í samræmi við tilskipun 2014/53/ESB.
Óstyttan texta ESB-samræmisyfirlýsingarinnar er að finna á veffanginu: eu-doc.bosch.com
Liechtenstein
Hiermit erklärt Robert Bosch LLC, dass der Funkanlagentyp VIPHI2BT der Richtlinie 2014/53/EU entspricht.
Der vollständige Text der EU-Konformitätserklärung ist unter der folgenden Internetadresse verfügbar: eu-doc.bosch.com
NO
Hermed erklærer Robert Bosch LLC at radioutstyrstypen VIPHI2BT er i samsvar med direktiv 2014/53/EU.
Hele teksten i EU-samsvarserklæringen finnes på følgende internettadresse: eu-doc.bosch.com
RU
Компания Robert Bosch LLC настоящим заявляет, что радиотехническое оборудование категории VIPHI2BT отвечает требованиям Директивы 2014/53/EU.
Полный текст декларации соответствия ЕС доступен на сайте eu-doc.bosch.com.

PREMIUM AUDIO SOUND SYSTEM

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, this is no guaranty that interference will occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off or on, you are encouraged to try to correct the interference by one or more of the following measure:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a different circuit than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by Mitek Corporation could void the user's authority to operate this equipment. This device complies with Part 15 of the FCC rules.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

IC Registration Number: 2AAOY278003465

FCC ID: 22793-278003464

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage;

(2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radio Equipment Directive (RED) 2014/53/EU and Harmonized Standards:

- ETSI EN 300 328 V2.1.1 (2016-11)
- ETSI EN301 489-1 V2.1.1 (2017-02)
- ETSI EN301 489-17 V3.1.1 (2017-02)
- EN 62479:2010

ENGINE EMISSIONS INFORMATION

Manufacturer's Responsibility

Beginning with 1999 model year engines, PWC manufacturers of marine engines must determine the exhaust emission levels for each engine horsepower family and certify these engines with the United States of America Environmental Protection Agency (EPA). An emissions control information label, showing emission levels and engine specifications, must be placed on each watercraft at the time of manufacture.

Dealer's Responsibility

When performing service on all 1999 and more recent Sea-Doo watercraft that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the engine in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturer's prescribed changes, such as altitude adjustments for example.

Owner’s Responsibility

The owner/operator is required to have engine maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

EPA Emission Regulations

All 1999 and more recent Sea-Doo watercraft manufactured by BRP are certified to the EPA as conforming to the requirements of the regulations for the control of air pollution from new watercraft engines. This certification is contingent on certain adjustments being set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, whenever practicable, returned to the original intent of the design.

The responsibilities listed above are general and in no way a complete listing of the rules and regulations pertaining to the EPA requirements on exhaust emissions for marine products. For more detailed information on this subject, you may contact:

U. S. Environmental Protection Agency
Certification Division
Gasoline Engine Compliance Center
2000 Traverwood Drive
Ann Arbor MI 48105
USA

EPA INTERNET WEB SITE:
www.epa.gov/otaq

Evaporative Emission Control System

Starting with MY 2018; personal watercraft sold in the State of California are certified to the California evaporative emissions regulations for spark ignition marine watercraft of the California Air Resources Board (13 CCR 2850 to 2869). These models are equipped with an evaporative emission control system consisting of Low Permeation Fuel Tank (LPFT), Low Permeation Fuel Line (LPFL) and a Pressure Relief Valve (PRV).

EAC DECLARATION OF CONFORMITY

Left blank for Eurasian Conformity mark where applicable

EC-DECLARATION OF CONFORMITY

565 de la Montagne Street
Valcourt (Québec) J0E 2L0
Canada

ADVENTURE BY DESIGN

Declaration of Conformity for Sea-Doo Personal Watercraft
with the requirements of Directive 2013/53/EU

Manufacturer: Bombardier Recreational Products Inc.
Address: 565 de la Montagne, Valcourt, J0E 2L0, Canada

Authorised Representative: BRP Europe N.V.
Address: Skaldenstraat 125, Gent, 9042, Belgium

Notified Body for noise emission assessment:
International Marine Certification Institute
Address: Rue Abbe Cuypers 3, Brussels, B-1040, Belgium.
ID Number: 0609

Notified Body for exhaust emission assessment:
International Marine Certification Institute
Address: Rue Abbe Cuypers 3, Brussels, B-1040, Belgium.
ID Number: 0609

Assessment Module of construction: A ☒ , of noise emission: Aa/A1 ☒ , of exhaust emission: B+C ☒

Other Community Directives applied: RED 2014/53/EU (EN 300 330-2, EN 60950-1) , EMC 2014/30/EU

Engine combustion cycle: 2 stroke ☐, 4 stroke ☒	Design and construction	ISO 13590:2003, ISO 10087:2019
Engine fuel type: Petrol: ☒, Diesel: ☐	Exhaust emission	ISO 18854:2015
Craft Design Category: C ☒, D ☐	Noise emission	ISO 14509-1:2008
Craft Trademark : Sea-Doo	Electromagnetic Compatibility	EN 55012:2007/A1:2009, EN 61000-6-1:2007

Sea-Doo PWC model	Propulsion engine	Exhaust emission certificate	Engine displ. (cm^3)	Rated Power (kW)	Noise emission certificate	# of persons	Length of hull	Width of hull
FishPro SCOUT 130	Rotax 1630 ACE-130	EXBORP009	1630,5	100	SDBORP014	3	3,27	1,23
FishPro SPORT 170	Rotax 1630 ACE-170	EXBORP009	1630,5	125,03	SDBORP013	3	3,64	1,25
FishPro TROPHY 170	Rotax 1630 ACE-170	EXBORP009	1630,5	125,03	SDBORP013	3	3,64	1,25
GTI 130	Rotax 1630 ACE-130	EXBORP009	1630,5	100	SDBORP014	3	3,27	1,23
GTI 90	Rotax 900 ACE-90	EXBORP004	899,3	66,19	SDBORP014	3	3,27	1,23
GTI SE 130	Rotax 1630 ACE-130	EXBORP009	1630,5	100	SDBORP014	3	3,27	1,23
GTI SE 170	Rotax 1630 ACE-170	EXBORP009	1630,5	125,03	SDBORP014	3	3,27	1,23
GTR 230	Rotax 1630 ACE-230	EXBORP010	1630,5	169,16	SDBORP014	3	3,27	1,23
GTX 170	Rotax 1630 ACE-170	EXBORP009	1630,5	125,03	SDBORP013	3	3,35	1,25
GTX 230	Rotax 1630 ACE-230	EXBORP010	1630,5	169,16	SDBORP013	3	3,35	1,25
GTX Limited 300	Rotax 1630 ACE-300	EXBORP006	1630,5	217	SDBORP013	3	3,35	1,25
GTX PRO 130	Rotax 1630 ACE-130	EXBORP009	1630,5	100	SDBORP013	3	3,35	1,25
RXP-X RS 300	Rotax 1630 ACE-300	EXBORP006	1630,5	217	SDBORP015	2	3,27	1,22
RXT-X RS 300	Rotax 1630 ACE-300	EXBORP006	1630,5	217	SDBORP013	3	3,35	1,25
SPARK 2up	Rotax 900 ACE-60	EXBORP004	899,3	44,13	SDBORP010	2	2,77	1,17
SPARK 2up	Rotax 900 ACE-90	EXBORP004	899,3	66,19	SDBORP010	2	2,77	1,17
SPARK 2up TRIXX	Rotax 900 ACE-90	EXBORP004	899,3	66,19	SDBORP010	2	2,77	1,17
SPARK 3up	Rotax 900 ACE-90	EXBORP004	899,3	66,19	SDBORP010	3	3,02	1,18
SPARK 3up IBR	Rotax 900 ACE-90	EXBORP004	899,3	66,19	SDBORP010	3	3,02	1,18
SPARK 3up TRIXX	Rotax 900 ACE-90	EXBORP004	899,3	66,19	SDBORP010	3	3,02	1,18
WAKE 170	Rotax 1630 ACE-170	EXBORP009	1630,5	125,03	SDBORP014	3	3,27	1,23
WAKE PRO 230	Rotax 1630 ACE-230	EXBORP010	1630,5	169,16	SDBORP013	3	3,35	1,25

This declaration of conformity is issued under the sole responsibility of the personal watercraft manufacturer. I declare on behalf of the above personal watercraft manufacturer that the **model year 2022** watercraft models and engines mentioned above which are CE marked comply with all applicable requirements in the way specified and are in conformity with the type for which above mentioned EU type-examination certificate(s) has(have) been issued.

Name & function : Martin Lachance

Martin Lachance (Apr 29, 2021 22:22 EDT)

Apr 29, 2021

Signature and title: Director, Product Development, Sea-Doo

Date (yr/month/day) : 2021/04/29, Valcourt, QC, Canada

ski-doo LYNX SEA-DOO EVINRUDE ROTAX can-am

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

Rotax 900 ACE - 90 engines

Engine	
Engine type	4-stroke, Single Over Head Camshaft (SOHC)
Declared Power(1)	66.19 kW @ 8000 RPM
Induction	Naturally-Aspirated
Number of cylinders	3
Number of valves	12 valves with hydraulic lifters (no adjustment)
Bore	74 mm (2.9 in)
Stroke	69.7 mm (2.7 in)
Displacement	899.3 cm³ (54.9 in³)
Compression ratio	11.0:1

(1) Declared power as per ISO 8665 at propeller-shaft.

Lubrication System		
Engine oil	Recommended oil	4T 5W40 Synthetic blend oil
	Alternate oil if XPS products are not available	If not available, use a 5W40 motor oil that meets the requirements for API service classification SJ, SL, SM or SN. Refer to *Recommended Oil*
	Capacity	3 l (3.2 qt(liq.,US)) oil change w/ filter 5 l (5.3 qt(liq.,US)) total

Cooling System		
Type		Closed loop cooling system
Coolant	Recommended	Extended life pre-mixed coolant

Cooling System		
	Alternative, or if not available	Use a low silicate, extended life ethylene-glycol premixed coolant (50%-50%) specifically formulated for internal combustion aluminum engines.
Cooling system capacity		4 l (4.23 qt(liq.,US)) total

Fuel System		
Fuel injection type		Multipoint fuel injection with iTC (intelligent Throttle Control). Single throttle body (60 mm (2.36 in)) with an actuator
Fuel type	Premium unleaded gasoline - Refer to *Fuel Requirements*	87 Pump Posted AKI (RON+MON)/2 (Inside North America) 91 (RON) E10 (Outside North America)
Fuel tank capacity (including reserve)		55 l (14.5 gal(liq.,US))

Electrical System		
Ignition system type		IDI (Inductive Discharge Ignition)
Battery		Sealed, 12 V, 18 A•h
Spark plug	Make and type	NGK, CR8EB with solid post or equivalent
	Gap	0.7 to 0.8 mm (.028 to .031 in)

Propulsion		
Jet pump	Type	Axial flow single stage
Drive shaft	Coupling type	Crowned splines, direct drive

Weight and Loading Capacity	
Dry weight	303 kg (668 lb)
Number of passenger (driver incl.)	3
Load limit (passenger and luggage)	272 kg (600 lb)
Storage capacity	152.8 l (40.3 gal(liq.,US))

Dimensions	
Overall length	331.8 cm (130.6 in)
Overall width	125 cm (49.2 in)
Overall height	113.7 cm (44.8 in)

Materials	
Impeller material	Stainless steel
Impeller housing/stator	Aluminum/aluminum

Rotax 1630 ACE - 130, Rotax 1630 ACE - 170 and 1630 ACE - 230 engines

Engine		
Engine type		4-stroke, Single Over Head Camshaft (SOHC)
Declared Power(1)	Rotax 1630 ACE - 130	100 kW @ 7300 RPM
	Rotax 1630 ACE - 170	125.03 kW @ 8000 RPM
	1630 ACE - 230	169.16 kW @ 8000 RPM
Induction	Rotax 1630 ACE - 130 Rotax 1630 ACE - 170	Naturally-Aspirated

Engine		
	1630 ACE - 230	Supercharged intercooled
Number of cylinders		3
Number of valves		12 valves with hydraulic lifters (no adjustment)
Bore		100 mm (3.9 in)
Stroke		69.2 mm (2.7 in)
Displacement		1 630.5 cm³ (99.5 in³)
Compression ratio	Rotax 1630 ACE - 130 Rotax 1630 ACE - 170	11:1
	1630 ACE - 230	8.3:1

(1) Declared power as per ISO 8665 at propeller-shaft.

Lubrication System			
Engine oil	Recommended oil	130 engine 170 engine 230 engine	4T 5W40 Synthetic blend oil
		Alternate oil if XPS products are not available	If not available, use a 5W40 motor oil that meets the requirements for API service classification SJ, SL, SM or SN. Refer to *Recommended Engine Oil*
	Capacity		2.01 l (2.12 qt(liq.,US)) oil change w/ filter(2)

Cooling System		
Type		Closed loop cooling system
Coolant	Recommended	Extended life pre-mixed coolant

Cooling System		
	Alternative, or if not available	Use a low silicate, extended life ethylene-glycol premixed coolant (50%-50%) specifically formulated for internal combustion aluminum engines.
Cooling system capacity		3.0 l (3.2 qt(liq.,US))

Fuel System		
Fuel injection type		Multipoint fuel injection with iTC (intelligent Throttle Control). Single throttle body (60 mm) with an actuator
Fuel type	Regular unleaded gasoline - Refer to *Fuel Requirements*	87 AKI ((RON + MON)/2) inside North America 91 (RON) E10 outside North America
Fuel tank capacity (including reserve)		60 l (15.9 gal(liq.,US))

Electrical System		
Ignition system type		IDI (Inductive Discharge Ignition)
Battery		12 V, 18 A•h
Spark plug	Make and type	NGK, DCPR8E with solid post or equivalent
	Gap	0.80 to 0.90 mm (.031 to .035 in)
Capacity		135 ml (4.6 fl oz(US))

Propulsion		
Jet pump	Type	Axial flow single stage
Drive shaft	Coupling type	Crowned splines, direct drive

iBR and VTS	
VTS system	Electronically-controlled through the VTS control button with 3 preset positions

Weight and Loading Capacity		
Dry weight	GTI 130 GTI SE 130 GTI SE 170	335 kg (739 lb)
	GTR 230	351 kg (774 lb)
	Wake 170	339 kg (747 lb)
Number of passenger (driver incl.)		3
Load limit (passenger(s) and luggage)		272 kg (600 lb)
Storage capacity	GTR 230	160.8 l (42.5 gal(liq.,US))
	All other models	152.8 l (40.3 gal(liq.,US))

Dimensions	
Overall length	331.8 cm (130.6 in)
Overall width	125 cm (49.2 in)
Overall height	113.7 cm (44.8 in)

Materials	
Impeller material	Stainless steel
Impeller housing/stator	Aluminum/aluminum

NOTE:
BRP reserves the right to make changes in design and specifications and/or to make additions to, or improvements in its products without imposing any obligation upon itself to install them on its products previously manufactured.

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TROUBLESHOOTING

TROUBLESHOOTING GUIDELINES

ENGINE WILL NOT START

1. **Tether cord removed.**
   - *Press START/STOP button.*
   - *Install tether cord cap over engine cut-off switch within 5 seconds after depressing the START/STOP button.*
   - *Press START/STOP button.*
2. **ECM does not recognize the D.E.S.S. key.**
   - *Refer to an authorized Sea-Doo dealer.*
3. **Burnt fuse: main, electric starter or ECM.**
   - *Check wiring then replace fuse(s).*
4. **Discharged battery.**
   - *Refer to an authorized Sea-Doo dealer.*

⚠ WARNING

Do not charge or boost the battery while installed on the watercraft. Electrolyte is poisonous and dangerous. Avoid contact with eyes, skin and clothing.

5. **Battery connections, corroded or loose. Bad ground.**
   - *Refer to an authorized Sea-Doo dealer.*
6. **Water-flooded engine.**
   - *Refer to Water-Flooded Engine in Special Procedures.*
7. **Faulty sensor or ECM.**
   - *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*
8. **Seized jet pump.**
   - *Try to clean. Otherwise, refer to an authorized Sea-Doo dealer.*

ENGINE CRANKS SLOWLY

1. **Loose battery cable connections.**
   - *Check/clean/tighten.*
2. **Discharged or weak battery.**
   - *Refer to an authorized Sea-Doo dealer.*
3. **Worn starter.**
   - *Refer to an authorized Sea-Doo dealer.*

ENGINE TURNS NORMALLY BUT WILL NOT START

1. **Fuel tank empty or water-contaminated.**
   – *Refill. Siphon and fill with fresh fuel.*
2. **Fouled/defective spark plugs.**
   – *Replace.*
3. **Blown fuse.**
   – *Check wiring then replace fuse(s).*
4. **Water-flooded engine.**
   – *Refer to Water-Flooded Engine in Special Procedures.*
5. **Engine management system fault detected (check engine pilot lamp is ON).**
   – *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*
6. **Faulty fuel pump.**
   – *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*

ENGINE MISFIRES, RUNS IRREGULARLY

1. **Fouled/defective/worn spark plugs.**
   – *Replace.*
2. **Fuel: Level too low, stale or water-contaminated.**
   – *Siphon and/or refill.*
3. **Faulty ignition coil(s).**
   – *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*
4. **Clogged injectors.**
   – *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*
5. **Engine management system fault detected (check engine pilot lamp is ON).**
   – *Refer to Monitoring System.*

ENGINE SMOKE

1. **Oil level too high.**
   – *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*
2. **Water ingestion, coolant leak or damaged cylinder head gasket.**
   – *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*
3. **Internal engine damage.**
   – *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*

ENGINE OVERHEATS

1. **Clogged exhaust system.**
   – *Flush exhaust system.*
2. **Engine coolant level too low.**
   – *Refer to Maintenance Procedures.*
3. **Quick connect adapter left in flushing connector.**
   – *Remove adapter from flushing connector and retry watercraft. If problem persists, seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*

ENGINE LACKS ACCELERATION OR POWER

1. **Learning key used.**
   - *Use a Normal key.*
2. **Not in Sport mode.**
   - *Select Sport mode.*
3. **Jet pump water intake clogged.**
   - *Clean. Refer to Jet Pump Water Intake and Impeller Cleaning in Special Procedures section.*
4. **Damaged impeller or worn-out wear ring.**
   - *Replace. Refer to an authorized Sea-Doo dealer.*
5. **Engine oil level too high.**
   - *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*
6. **Weak spark.**
   - *Refer to ENGINE MISFIRES, RUNS IRREGULARLY.*
7. **Engine management system fault detected (check engine pilot lamp is ON).**
   - *Refer to Monitoring System.*
8. **Clogged injectors.**
   - *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*
9. **Low fuel pressure.**
   - *Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the US EPA Emission-Related Warranty contained herein for information about warranty claims.*
10. **Water in fuel.**
    - *Siphon and replace.*
11. **Engine damaged by water ingestion.**
    - *Refer to an authorized Sea-Doo dealer.*

WATERCRAFT CAN NOT REACH TOP SPEED

1. **Jet pump water intake clogged.**
   – *Clean. Refer to Jet Pump Water Intake and Impeller Cleaning in Special Procedures section.*
2. **Damaged impeller or worn-out wear ring.**
   – *Replace. Refer to an authorized Sea-Doo dealer.*
3. **Engine management system fault detected (check engine pilot lamp is ON).**
   – *Refer to Monitoring System.*

WATERCRAFT STAYS IN NEUTRAL AFTER OPERATING THE iBR LEVER

1. **The iBR gate stays in neutral.**
   – *Release the throttle to idle RPM.*

iBR WILL NOT RETURN TO NEUTRAL POSITION (iBR INDICATOR LIGHT ON)

1. **iBR jammed with debris.**
   – *Clean and check for damage in the iBR gate and nozzle area.*
2. **iBR system malfunction.**
   – *Remove tether cord, wait four minutes, reinstall key and check iBR light to ensure fault is cleared.*
   – *Refer to an authorized Sea-Doo dealer if fault persists or reoccurs frequently.*

iBR WILL NOT RETURN TO NEUTRAL POSITION (IBR INDICATOR LIGHT OFF)

1. **Throttle lever not fully released during operation.**
   – *Release throttle lever fully to ensure iBR gate returns to neutral.*
2. **Throttle lever does not fully return to null when released.**
   – *Refer to an authorized Sea-Doo dealer.*

ABNORMAL NOISE FROM PROPULSION SYSTEM

1. **Weeds or debris jammed around impeller.**
   - *Clean. Refer to Jet Pump Water Intake and Impeller Cleaning in Special Procedures section.*
   - *Check for damage.*
2. **Damaged impeller shaft or drive shaft.**
   - *Refer to an authorized Sea-Doo dealer.*
3. **Water intrusion in jet pump causing bearing seizure.**
   - *Refer to an authorized Sea-Doo dealer.*

WATER FOUND IN BILGE

1. **Bailer system malfunction.**
   - *Have system inspected by an authorized Sea-Doo dealer.*
2. **Exhaust system leak.**
   - *Refer to an authorized Sea-Doo dealer.*
3. **Carbon ring at drive shaft worn.**
   - *Refer to an authorized Sea-Doo dealer.*

MONITORING SYSTEM

A system monitors the electronic components of the EMS (engine management system) iBR, and other components of the electrical system. When a fault occurs, it sends visual messages through the information center and/or audible signals through a beeper to inform you of a particular condition.

A fault code may also be recorded.

When a minor or transient fault occurs, the fault message and beeper will cease automatically if the condition that caused the fault does not exist anymore.

Releasing the throttle and letting the engine return to idle speed may allow normal operation to come back. If this does not work, try removing and reinstalling the tether cord on the engine cut-off switch.

The electronic system will react differently depending on the fault type. In severe failure, the engine may not be allowed to be started. In other cases, the engine will operate in limp home mode (reduced speed).

When a fault occurs, please refer to the *US EPA Emission-Related Warranty* contained herein for information about warranty claims.

Fault Codes

When a fault occurs, a numerical fault code may be recorded depending on the fault type and system.

These fault codes are used by authorized Sea-Doo dealers for troubleshooting the watercraft systems when comparing them to a fault list.

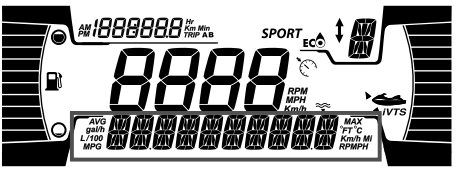
Fault codes can be viewed in the information center multifunction display however, this function is only available if a fault is still active.

If there is an active fault code, it may be viewed by the operator on the multifunction display. The operator may then choose to call his authorized Sea-Doo dealer to pass on the fault code. The dealer will then advise the operator on the steps to take to solve the problem, or to stop using the watercraft and to bring it in to the dealer for repairs.

Displaying Fault Codes

Select **CODES**. If a fault code has occurred during your riding cycle, a CODES menu will be available in the settings menu. Press OK to see the list of faults.

NOTE:
During normal riding conditions some fault codes may occur. Before contacting your local dealer, remove the key, make sure to wait 2 minutes until the electrical system shut down, then press start to wake up the electrical system. This will ensure occurred fault to disappear and only the active codes will remain ON in the CODES menu.



Indicator Lights and Message Display Information

The indicator lights (pilot lamps) and messages displayed in the information center will inform you of a particular condition or if an anomaly occurs.

For information on usual indicator lights, refer to appropriate digital display.

Indicator Light / Icon (ON)	Message Display	Description
	LOW or HIGH BATTERY VOLTAGE	Low/high battery voltage
	HIGH TEMPERATURE	Engine or exhaust system overheating
	CHECK ENGINE or LIMP HOME MODE	Check engine (minor fault req. maint.) or LIMP HOME MODE (major eng. fault)
	LOW OIL PRESSURE	Low oil pressure
	IBR MODULE ERROR	Light is steady with a buzzer and a check engine light: iBR system fault (refer to an authorized Sea-Doo dealer)
	–	Light is flashing: iBR system fault (refer to an authorized Sea-Doo dealer)
	–	Light is steady with no buzzer: iBR system still functional but needs to be inspected by an authorized Sea-Doo dealer

Message Display Information	
HIGH EXHAUST TEMPERATURE	High exhaust temperature detected
HIGH ENGINE TEMPERATURE	High engine temperature detected
CHECK ENGINE	Engine system malfunction or maintenance required
LIMP HOME MODE	Major fault detected, engine power limited
FUEL SENSOR FAULT	Fuel level sensor fault
WATER TEMP SENSOR DEFECTIVE	Problem with water temperature sensor, not sending water temperature info.
IBR MODULE ERROR	iBR system malfunction
MAINTENANCE REQUIRED	Watercraft maintenance required

NOTICE

Running engine with low oil pressure may severely damage the engine.

Beeper Code Information

Beeper Codes	Description
1 long beep (while installing tether cord on watercraft engine cut-off switch)	**Bad** D.E.S.S. **system connection.** Reinstall tether cord cap correctly on the engine cut-off switch.
	Wrong D.E.S.S. **key.** Use a tether cord that has been programmed for the watercraft.
	Defective D.E.S.S. **key.** Use another tether cord with programmed D.E.S.S. key.
	Defective engine cut-off switch. Refer to an authorized Sea-Doo dealer.
	Improper operation of ECM or defective wiring harness. Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA Emission-Related Warranty* contained herein for information about warranty claims.
A 2 seconds beep every 15 minutes interval	**Engine management system fault.** Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA Emission-Related Warranty* contained herein for information about warranty claims.
	iBR system fault. Refer to an authorized Sea-Doo dealer.
A 2 seconds beep every 10 minutes interval	**Low fuel level.** Refill fuel tank. If problem persists, refer to an authorized Sea-Doo dealer.

Beeper Codes	Description
2 second beeps	**High engine temperature coolant.** See *Engine Overheating*.
	Low oil pressure. Turn off engine as soon as possible. Check oil level and refill. Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA Emission-Related Warranty* contained herein for information about warranty claims.
Constant beep (Stops when vehicle is turned OFF)	**High exhaust temperature.** Seek service from an authorized Sea-Doo dealer, repair shop, or person of your own choosing for maintenance, repair, or replacement. Please refer to the *US EPA Emission-Related Warranty* contained herein for information about warranty claims.

NOTICE

If the monitoring beeper continuously sounds, stop engine as soon as possible.

WARRANTY

BRP LIMITED WARRANTY – USA AND CANADA: 2022 SEA-DOO PERSONAL WATERCRAFT

1. SCOPE

Bombardier Recreational Products Inc. (“BRP”) warrants its model-year 2022 Sea-Doo personal watercraft sold by authorized BRP Dealers (as defined below) in the United States of America (“USA”) and in Canada from defects in material or workmanship for the period and under the conditions described below. This limited warranty will become null and void if:

1. (1) The Sea-Doo personal watercraft was used for racing or any other competitive activity, at any point, even by a previous owner; or
2. The Sea-Doo personal watercraft has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or has been altered or modified to change its intended use.

Non-factory installed parts and accessories are not covered under this limited warranty. Please refer to the applicable parts and accessories limited warranty text.

2. LIMITATIONS OF LIABILITY

THIS WARRANTY IS EXPRESSLY GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME STATES/PROVINCES DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM STATE TO STATE, OR PROVINCE TO PROVINCE.

Neither the distributor, any BRP dealer nor any other person has been authorized to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against BRP. BRP reserves the right to modify this limited warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the products sold while this warranty is in effect.

3. EXCLUSIONS – ARE NOT WARRANTED

The following are not warranted under any circumstances:

– Normal wear and tear;
– Routine maintenance items, tune ups, adjustments;
– Damage caused by failure to provide proper maintenance and/or storage, as described in the Operator’s Guide;
– Damage resulting from removal of parts, improper repairs, service, maintenance, modifications or use of parts not manufactured or approved by BRP or resulting from repairs done by a person that is not an authorized servicing BRP dealer;

- Damage caused by abuse, abnormal use, neglect, or operation of the product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from accident, submersion, fire, theft, vandalism or any act of God;
- Operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operator's Guide);
- Damage from rust, corrosion or exposure to the elements;
- Damage from cooling system or jet pump blockage by foreign material;
- Water damages caused by water ingestion;
- Damages related to gel coat finish including but not limited to cosmetic gel coat finish, blisters or fiberglass delamination caused by blisters, crazing, spider or hairline cracks; and
- Incidental or consequential damages, or damages of any kind including without limitation towing, storage, telephone, rental, taxi, inconvenience, insurance coverage, loan payments, loss of time, loss of income.

4. WARRANTY COVERAGE PERIOD

This limited warranty will be in effect from (1) the date of delivery to the first retail consumer or (2) the date the product is first put into use, whichever occurs first and for the applicable period below:

1. TWELVE (12) CONSECUTIVE MONTHS for private use owners.
2. FOUR (4) CONSECUTIVE MONTHS for commercial use owners. A personal watercraft is used commercially when it is used in connection with generating income or any work or employment during any part of the warranty period. A personal watercraft is also used commercially when, at any point during the warranty period, it has commercial tags or is licensed for commercial use. This is a minimal warranty period which can be extended by any applicable warranty promotional program, as the case may be.
3. For emission-related components; please also refer to the *US EPA Emission-related warranty* contained herein.
4. For Sea-Doo personal watercrafts produced by BRP for sale in the State of California or New York that are originally sold to a resident or subsequently warranty registered to a resident in the State of California or New York, please also refer to the applicable California and New York Emissions Control Warranty Statement contained herein.
5. For Sea-Doo personal watercrafts produced by BRP for sale in the State of California that are originally sold to a resident or subsequently warranty registered to a resident in the State of California, please also refer to the CALIFORNIA EVAPORATIVE EMISSIONS CONTROL SYSTEM WARRANTY STATEMENT contained herein.

The repair or replacement of parts or the performance of service under any applicable warranty does not extend the life of such warranty beyond its original expiration date.

5. CONDITIONS REQUIRED FOR WARRANTY COVERAGE

This limited warranty coverage is available **only** if **each** of the following conditions has been fulfilled:

- The 2022 Sea-Doo personal watercraft must be purchased as new and unused by its first owner from a BRP dealer authorized to distribute Sea-Doo personal watercraft in the country in which the sale occurred;
- The BRP specified predelivery inspection process must be completed and documented and signed by the purchaser;
- The 2022 Sea-Doo personal watercraft must have undergone proper registration by an authorized BRP dealer;
- The 2022 Sea-Doo personal watercraft must be purchased in the country in which the purchaser resides; and
- Routine maintenance outlined in the Operator's Guide must be timely performed in order to maintain warranty coverage. BRP reserves the right to make warranty coverage contingent upon proof of proper maintenance.

BRP will not honour this limited warranty to any private use owner or commercial use owner if one of the preceding conditions has not been met. Such limitations are necessary in order to allow BRP to preserve both the safety of its products, and also that of its consumers and the general public.

6. WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The customer must cease using the Sea-Doo personal watercraft upon the appearance of an anomaly. The customer must notify an authorized servicing BRP dealer within three (3) days of the appearance of a defect, and provide it with reasonable access to the product and reasonable opportunity to repair it. The customer must also present to the authorized BRP dealer, proof of purchase of the product and must sign the repair/work order prior to the start of the repair in order to validate the warranty repair. All parts replaced under this limited warranty become the property of BRP.

7. WHAT BRP WILL DO

BRP's obligations under this warranty are limited to, at its sole discretion, repairing parts found defective under normal use, maintenance and service, or replacing such parts with new genuine BRP parts without charge for parts and labor, at any authorized BRP dealer during the applicable warranty coverage period under the conditions described herein. No claim of breach of warranty shall be the cause for cancellation or rescission of the sale of the Sea-Doo personal watercraft to the owner.

In the event that service is required outside of the country of original sale, the owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve or modify products from time to time without assuming any obligation to modify products previously manufactured.

8. TRANSFER

If the ownership of a product is transferred during the warranty coverage period, this limited warranty, subject to its terms and conditions, shall also be transferred and be valid for the remaining coverage period provided BRP or an authorized

Sea-Doo Distributor/Dealer receives a proof that the former owner agreed to the transfer of ownership, in addition to the coordinates of the new owner.

9. CONSUMER ASSISTANCE

In the event of a controversy or a dispute in connection with this BRP limited warranty, BRP suggests that you try to resolve the issue at the dealership level. We recommend discussing the issue with the authorized BRP dealer's service manager or owner.

If the matter still remains unresolved, contact BRP by filling out the customer contact form at www.brp.com or contact BRP by mail at one of the addresses listed under the *Contact Us* section of this guide.

US EPA EMISSION-RELATED WARRANTY

Bombardier Recreational Products Inc. (“BRP”) warrants to the ultimate purchaser and each subsequent purchaser that this new engine, including all parts of its exhaust emission control system and its evaporative emission control system, meets two conditions:

1. It is designed, built, and equipped so it conforms at the time of sale to the ultimate purchaser with the requirements of 40 CFR 1045 and 40 CFR 1060.
2. It is free from defects in materials and workmanship that may keep it from meeting the requirements of 40 CFR 1045 and 40 CFR 1060.

Where a warrantable condition exists, BRP will repair or replace, as it elects, any part or component with a defect in materials or workmanship that would increase the engine’s emissions of any regulated pollutant within the stated warranty period at no cost to the owner, including expenses related to diagnosing and repairing or replacing emission-related parts. All defective parts replaced under this warranty become the property of BRP.

For all emission-related warranty claims, BRP is limiting the diagnosis and repair of emission-related parts to the authorized Sea-Doo dealers, unless for emergency repairs as required by item 2 of the following list.

As a certifying manufacturer, BRP will not deny emission-related warranty claims based on any of the following:

1. Maintenance or other service BRP or BRP's authorized facilities performed.
2. Engine/equipment repair work that an operator performed to correct an unsafe, emergency condition attributable to BRP as long as the operator tries to restore the engine/equipment to its proper configuration as soon as possible.
3. Any action or inaction by the operator unrelated to the warranty claim.
4. Maintenance that was performed more frequently than BRP specify.
5. Anything that is BRP fault or responsibility.
6. The use of any fuel that is commonly available where the equipment operates unless BRP written maintenance instructions state that this fuel would harm the equipment’s emission control system and operators can readily find the proper fuel. See maintenance information section and fuel requirements of fueling section.

Emission-Related Warranty Period

The emission-related warranty is valid for the following period whichever comes first:

	Hours	Months
Exhaust emission-related components	175	30
Evaporative emission-related components	N/A	24

Components Covered

The emission-related warranty covers all components whose failure would increase an engine’s emissions of any regulated pollutant, including the following listed components:

1. For exhaust emissions, emission-related components include any engine parts related to the following systems:
   – Air-induction system
   – Fuel system
   – Ignition system
   – Exhaust gas recirculation systems
2. The following parts are also considered emission-related components for exhaust emissions:
   – Aftertreatment devices
   – Crankcase ventilation valves
   – Sensors
   – Electronic control units
3. The following parts are considered emission-related components for evaporative emissions:
   – Fuel tank
   – Fuel cap
   – Fuel line
   – Fuel line fittings
   – Clamps*
   – Pressure relief valves*
   – Control valves*
   – Control solenoids*
   – Electronic controls*
   – Vacuum control diaphragms*
   – Control cables*
   – Control linkages*
   – Purge valves
   – Vapor hoses
   – Liquid/vapor separator
   – Carbon canister
   – Canister mounting brackets
   – Carburetor purge port connector

NOTE:
Items with * as related to the evaporative emission control system.

4. Emission-related components also include any other part whose only purpose is to reduce emissions or whose failure will increase emissions without significantly degrading engine/equipment performance.

Limited Applicability

As a certifying manufacturer, BRP may deny emission-related warranty claims for failures that have been caused by the owner's or operator's improper maintenance or use, by accidents for which the manufacturer has no responsibility, or by acts of God. For example, an emission-related warranty claim need not be honored for failures that have been directly caused by the operator's abuse of the engine/equipment or the operator's use of the engine/equipment in a manner for which it was not designed and are not attributable to the manufacturer in any way.

If you have any questions regarding your warranty rights and responsibilities or for the name and location of the nearest authorized BRP Dealer you should contact BRP by filling out the customer contact form at *www.brp.com* or contact BRP by mail at one of the addresses listed under the *CONTACT US* section of this guide, or call at 1-888-272-9222

CALIFORNIA EVAPORATIVE EMISSIONS CONTROL SYSTEM WARRANTY STATEMENT

Your Warranty Rights and Obligations

The California Air Resources Board is pleased to explain the evaporative emissions control system's warranty on your 2022 spark-ignition marine watercraft (SIMW). In California, new spark-ignition marine watercraft must be designed, built, and equipped to meet the State's stringent anti-smog standards. Bombardier Recreational Products Inc. must warrant the evaporative emissions control system on your spark-ignition marine watercraft for the period listed below, provided there has been no abuse, neglect or improper maintenance of your spark-ignition marine watercraft.

Your evaporative emissions control system may include parts such as: canisters, carburetors, clamps, connectors, filters, fuel caps, fuel lines, fuel tanks, valves, vapor hoses, and other associated evaporative emissions control system components.

MANUFACTURER'S WARRANTY COVERAGE:

This evaporative emissions control system is warranted for two years. If any evaporative emission-related part on your spark-ignition marine watercraft (SIMW) is defective, the part will be repaired or replaced by Bombardier Recreational Products Inc.

PARTS COVERED:

1. Clamp(s)*
2. Fuel Cap
3. Fuel Line
4. Fuel Line Fitting(s)
5. Fuel Tank
6. Pressure Relief Valve(s)*
7. Vapor Hose(s)
8. All other parts not listed that may affect the evaporative emissions control system

NOTE:
Items with * as related to the evaporative emission control system.

OWNER'S WARRANTY RESPONSIBILITIES:

As the personal watercraft owner, you are responsible for performance of the required maintenance listed in your owner's manual. Bombardier Recreational Products Inc. recommends that you retain all receipts covering maintenance on your spark-ignition marine watercraft (SIMW), but Bombardier Recreational Products Inc. cannot deny warranty solely for the lack of receipts.

As the spark-ignition marine watercraft (SIMW) owner, you should however be aware that Bombardier Recreational Products Inc. may deny you warranty coverage if your spark-ignition marine watercraft (SIMW) or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your spark-ignition marine watercraft (SIMW) to a Bombardier Recreational Products Inc. distribution center or service center

as soon as the problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 calendar days. If you have question regarding your warranty coverage, you should contact Bombardier Recreational Products at 1-888-272-9222.

CALIFORNIA AND NEW YORK EMISSION CONTROL WARRANTY STATEMENT FOR MODEL YEAR 2022 SEA-DOO PERSONAL WATERCRAFT

Your Warranty Rights and Obligations

The California Air Resources Board, the New York State Department of Environmental Conservation and Bombardier Recreational Products Inc. ("BRP") are pleased to explain the emission control system warranty on your Model Year 2022 Sea-Doo personal watercraft. In California and New York, new personal watercraft engines must be designed, built and equipped to meet the State's stringent anti-smog standards. BRP must warrant the emission control system on your personal watercraft engine for the period of time listed below provided there has been no abuse, neglect or improper maintenance of your personal watercraft engine.

Your emission control system may include parts such as the fuel injection system, the ignition system and catalytic converter. Also included may be hoses, belts, connectors and other emission related assemblies.

Where a warrantable condition exists, BRP will repair your personal watercraft engine at no cost to you including diagnosis, parts and labor provided that such work is performed by an authorized BRP dealer.

Manufacturer's Limited Warranty Coverage

This emission limited warranty covers Model Year 2022 Sea-Doo personal watercrafts certified and produced by BRP for sale in California or New York, that are originally sold in California or New York to a California or New York resident or subsequently warranty registered to a California or New York resident. The BRP limited warranty conditions for Sea-Doo personal watercrafts are still applicable to these models with the necessary modifications. Select emission control parts of your 2022 Sea-Doo personal watercrafts are warranted from the date of delivery to the first retail consumer for a period of 4 years, or for 250 hours of use, whichever occurs first. However, warranty coverage based on the hourly period is only permitted for personal watercraft equipped with the appropriate hour meters or their equivalent. If any emission-related part on your engine is defective under warranty, the part will be repaired or replaced by BRP.

Parts covered for a Model Year 2022 Sea-Doo personal watercraft:

Supercharger	Air intake adapter
Throttle position sensor	Spark plugs
Intake manifold air pressure sensor	Ignition coils
Intake manifold air temperature sensor	Air box
Engine temperature sensor	Intake and exhaust valve and seals
Knock sensor	Intake manifold
Engine control module ECM	Crankcase ventilation valve

Throttle body	Throttle body seal
Fuel rail	Intake manifold seal
Fuel injectors	Wire harness and connectors
Fuel pressure regulator	Fuel filter
Fuel pump	-

The emission warranty covers damage to other engine components that is caused by the failure of a warranted part. The BRP Operator's Guide provided contains written instructions for the proper maintenance and use of your personal watercraft. All emission warranty parts are warranted by BRP for the entire warranty period of the personal watercraft, unless the part is scheduled for replacement as required maintenance in the Operator's Guide.

Emission warranty parts that are scheduled for replacement, as required maintenance, are warranted by BRP for the period of time before the first scheduled replacement date for that part. Emission warranty parts that are scheduled for regular inspection, but not regular replacement, are warranted by BRP for the entire warranty period of the personal watercraft. Any emission warranty part repaired or replaced under the terms of this warranty statement is warranted by BRP for the remainder of the warranty period of the original part. All parts replaced under this limited warranty become the property of BRP.

Maintenance receipts and records should be transferred to each subsequent owner of the personal watercraft.

Owner's Warranty Responsibilities

As the owner of a 2022 Sea-Doo personal watercraft, you are responsible for the performance of the required maintenance listed in your Operator's Guide. BRP recommends that you retain all receipts covering maintenance of your personal watercraft engine, but BRP cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.

As the owner of a Sea-Doo personal watercraft, you should however be aware that BRP may deny you warranty coverage if your engine(s) or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your engine to an authorized BRP Sea-Doo Dealer as soon as a problem exists. The warranty repairs will be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities or for the name and location of the nearest authorized BRP Sea-Doo dealer you should contact the Customer Assistance Center at 1-888-272-9222.

Star Rating System

For California and New York, your 2022 Sea-Doo spark-ignition marine watercraft (SIMW) has a special environmental label required by the California Air Resources Board. The label has 1, 2, 3 or 4 stars. A hangtag, provided with your spark-ignition marine watercraft (SIMW), describes the meaning of the star rating system.

The Star Label Means Cleaner Marine Engines

The Symbol for Cleaner Marine Engines:



F18L3CQ

Cleaner Air and Water

For a healthier lifestyle and environment.

Better Fuel Economy

Burns up to 30 - 40 percent less gas and oil than conventional carbureted two-stroke engines saving money and resources.

Longer Emission Warranty

Protects consumer for worry free operation.

One Star – Low Emission

The one-star label identifies personal watercraft, outboard, stern drive and inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.

Two Stars – Very Low Emission

The two-star label identifies personal watercraft, outboard, stern drive and inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emission standards. Engines meeting these standards have 20% lower emissions than One Star - Low-Emission engines.

Three Stars – Ultra Low Emission

The three-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emission standards or the Stern drive and Inboard marine engine 2003 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star – Low Emission engines.

Four Stars – Super Ultra Low Emission

The four-star label identifies engines that meet the Air Resources Board's Stern--drive and Inboard marine engine 2012 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emissions than One Star – Low Emission engines.

For more information:	Cleaner Watercraft – Get the Facts 1 800 END-SMOG **www.arb.ca.gov**

BRP INTERNATIONAL LIMITED WARRANTY: 2022 SEA-DOO PERSONAL WATERCRAFT

1. SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products Inc. (“BRP”) warrants its 2022 Sea-Doo personal watercraft ("personal watercraft") sold by distributors or dealers authorized by BRP to distribute Sea-Doo personal watercrafts ("Sea-Doo Distributor/Dealer") outside of the fifty United States, Canada, member states of the European Economic Area (which is comprised of the member states of the European Union plus the United Kingdom, Norway, Iceland and Liechtenstein) ("EEA"), member states of the Commonwealth of the Independent States (including Ukraine and Turkmenistan) ("CIS") and Turkey, from defects in material or workmanship for the period and under the conditions described below.

Non-factory installed parts and accessories are not covered under this limited warranty. Please refer to the applicable parts and accessories limited warranty text.

This limited warranty will become null and void if:

1. The personal watercraft was used for racing or any other competitive activity, at any point, even by a previous owner; or
2. The personal watercraft has been altered or modified in such a way so as to adversely affect its operation, performance or durability or
3. The personal watercraft has been altered or modified to change its intended use.

2. LIMITATIONS OF LIABILITY

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY IS EXPRESSLY GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME JURISDICTIONS DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC RIGHTS AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM COUNTRY TO COUNTRY. (FOR PRODUCTS PURCHASED IN AUSTRALIA SEE CLAUSE 4 BELOW).

Neither the Sea-Doo distributor/dealer nor any other person has been authorized to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against BRP.

BRP reserves the right to modify this warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the products sold while this warranty is in effect.

3. EXCLUSIONS – ARE NOT WARRANTED

The following are not warranted under this limited warranty under any circumstances:

- Replacement of parts due to normal wear and tear;
- Routine maintenance parts and services, including but not limited to tune ups, adjustments, oil, lubricant and coolant changes, spark plug replacement, water pumps and the like;
- Damage caused by negligence or failure to provide proper maintenance and/or storage, as described in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, modification or use of parts or accessories not manufactured or approved by BRP which in its reasonable judgment are either incompatible with the product or adversely affect its operation, performance and durability, or resulting from repairs done by a person that is not an authorized servicing Sea-Doo Distributor/Dealer;
- Damage caused by abuse, misuse, abnormal use, neglect, racing, improper operation or operation of the product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from external damage, accident, submersion, fire, foreign object or water ingestion, theft, vandalism or any act of God;
- Operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operator's Guide);
- Damage resulting from rust, corrosion or exposure to the elements;
- Damages from cooling system or jet pump blockage by foreign material;
- Damages to gel coat finish including but not limited to cosmetic gel coat finish defects, blisters, starring, crazing and fiberglass delamination caused by blisters, crazing, spider or hairline cracks; and
- Incidental or consequential damages, or damages of any kind including without limitation towing, storage, transportation expenses, telephone, rental, taxi, inconvenience, insurance coverage, loan payments, loss of time, loss of income or time missed for downtime experience due to service work.

4. WARRANTY COVERAGE PERIOD

This limited warranty will be in effect from (1) the date of delivery to the first retail consumer or (2) the date the product is first put into use, whichever occurs first and for a period of:

1. TWELVE (12) CONSECUTIVE MONTHS for private, recreational use. For AUSTRALIA and NEW ZEALAND only, TWENTY-FOUR (24) CONSECUTIVE MONTHS for private, recreational use.
2. FOUR (4) CONSECUTIVE MONTHS for commercial use,
   This is a minimal warranty period which can be extended by any applicable warranty promotional program, as the case may be. A personal watercraft is used commercially when it is used in connection with generating income or any work or employment during any part of the warranty period. A personal watercraft is also used commercially when, at any point during the warranty period, it has commercial tags or is licensed for commercial use.

The repair or replacement of parts or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

Note that the duration and any other modalities of the warranty coverage are subject to the applicable national or local legislation in the customer's country.

FOR PRODUCTS SOLD IN AUSTRALIA ONLY

Nothing in these Warranty terms and conditions should be taken to exclude, restrict or modify the application of any condition, warranty, guarantee, right or remedy conferred or implied under the Competition and Consumer Act 2010 (Cth), including the Australian Consumer Law or any other law, where to do so would contravene that law, or cause any part of these terms and conditions to be void. The benefits given to you under this limited warranty are in addition to other rights and remedies that you have under Australian law.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

5. CONDITIONS TO HAVE WARRANTY COVERAGE

This warranty coverage is available **only** if **each** of the following conditions has been fulfilled:

- The 2022 Sea-Doo personal watercraft must be purchased as new and unused by its first owner from a Sea-Doo distributor/dealer authorized to distribute Sea-Doo personal watercrafts in the country in which the sale occurred;
- The BRP specified pre-delivery inspection process must be completed and documented;
- The 2022 Sea-Doo personal watercraft must have undergone proper registration by an authorized Sea-Doo distributor/dealer;
- The 2022 Sea-Doo personal watercraft must have been purchased in the country or union of countries in which the purchaser resides.
- Routine maintenance outlined in the Operator’s Guide must be timely performed in order to maintain warranty coverage. BRP reserves the right to make warranty coverage contingent upon proof of proper maintenance.

BRP will not honor this limited warranty to any private use owner or commercial use owner if one of the preceding conditions has not been met. Such limitations are necessary in order to allow BRP to preserve both the safety of its products, and also that of its consumers and the general public.

6. WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The customer must cease using the Sea-Doo personal watercraft upon the appearance of an anomaly. The customer must notify a servicing Sea-Doo distributor/dealer within two (2) days of the appearance of a defect, and provide it with reasonable access to the product and reasonable opportunity to repair it. The customer must also present to the authorized Sea-Doo distributor/dealer, proof of purchase of the product and must sign the repair/work order prior to starting the repair in order to validate the warranty repair. All parts replaced under this limited warranty become the property of BRP.

Note that the notification period is subject to the applicable national or local legislation in customer's country.

7. WHAT BRP WILL DO

To the extent permitted by law, BRP's obligations under this warranty are limited to, at its sole discretion, repairing parts found defective under normal use, maintenance and service, or replacing such parts with new genuine BRP parts without charge for parts and labor, at any authorized Sea-Doo distributor/dealer during the warranty coverage period under the conditions described herein. BRP's responsibility is limited to making the required repairs or replacements of parts. No claim of breach of warranty shall be cause for cancellation or rescission of the sale of the Sea-Doo personal watercraft to the owner. You may have other legal rights which may vary from country to country.

In the event that service is required outside of the country of original sale, the owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve or modify products from time to time without assuming any obligation to modify products previously manufactured.

8. TRANSFER

If the ownership of a product is transferred during the warranty coverage period, this limited warranty, subject to its terms and conditions, shall also be transferred and be valid for the remaining coverage period provided BRP or an authorized Sea-Doo distributor/dealer receives a proof that the former owner agreed to the transfer of ownership, in addition to the coordinates of the new owner.

9. CONSUMER ASSISTANCE

In the event of a controversy or a dispute in connection with this BRP limited warranty, BRP suggests that you try to resolve the issue at the dealership level. We recommend discussing the issue with the authorized BRP dealer's service manager or owner.

If the matter still remains unresolved, contact BRP by filling out the customer contact form at www.brp.com or contact BRP by mail at one of the addresses listed under the *Contact Us* section of this guide.

BRP LIMITED WARRANTY FOR THE EUROPEAN ECONOMIC AREA, THE COMMONWEALTH OF THE INDEPENDENT STATES AND TURKEY: 2022 SEA-DOO PERSONAL WATERCRAFT

1. SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products Inc. (“BRP”) warrants its 2022 Sea-Doo personal watercraft ("personal watercraft") sold by distributors or dealers authorized by BRP to distribute Sea-Doo personal watercrafts ("Sea-Doo distributor/dealer") in member states of the European Economic Area (which is comprised of the member states of the European Union plus the United Kingdom, Norway, Iceland and Liechtenstein) ("EEA"), in member states of the Commonwealth of the Independent States (including Ukraine and Turkmenistan) ("CIS") and Turkey from defects in material or workmanship for the period and under the conditions described below.

Non-factory installed parts and accessories are not covered under this limited warranty. Please refer to the applicable parts and accessories limited warranty text.

This limited warranty will become null and void if:

1. The personal watercraft was used for racing or any other competitive activity, at any point, even by a previous owner; or
2. The personal watercraft has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or
3. The personal watercraft has been altered or modified to change its intended use.

2. LIMITATIONS OF LIABILITY

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY IS EXPRESSLY GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME JURISDICTIONS DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM COUNTRY TO COUNTRY.

Neither the Sea-Doo distributor/dealer nor any other person has been authorized to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against BRP.

BRP reserves the right to modify this warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the products sold while this warranty is in effect.

3. EXCLUSIONS – ARE NOT WARRANTED

The following are not warranted under this limited warranty under any circumstances:

- Replacement of parts due to normal wear and tear;
- Routine maintenance parts and services, including but not limited to tune ups, adjustments, oil, lubricant and coolant changes, spark plug replacement, water pumps and the like;
- Damage caused by negligence or failure to provide proper maintenance and/or storage, as described in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, modification or use of parts or accessories not manufactured or approved by BRP which in its reasonable judgement are either incompatible with the product or adversely affect its operation, performance and durability, or resulting from repairs done by a person that is not an authorized servicing Sea-Doo distributor/dealer;
- Damage caused by abuse, misuse, abnormal use, neglect, racing, improper operation or operation of the product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from external damage, accident, submersion, fire, foreign object or water ingestion, theft, vandalism or any act of God;
- Operation with fuel, oils or lubricants which are not suitable for use with the product (see the Operator's Guide);
- Damage resulting from rust, corrosion or exposure to the elements;
- Damages from cooling system or jet pump blockage by foreign material;
- Damages to gel coat finish including but not limited to cosmetic gel coat finish defects, blisters, starring, crazing and fiberglass delamination caused by blisters, crazing, spider or hairline cracks; and
- Incidental or consequential damages, or damages of any kind including without limitation towing, storage, transportation expenses, telephone, rental, taxi, inconvenience, insurance coverage, loan payments, loss of time, loss of income; or time missed for downtime experience due to service work.

4. WARRANTY COVERAGE PERIOD

This limited warranty will be in effect from (1) the date of delivery to the first retail consumer or (2) the date the product is first put into use, whichever occurs first and for a period of:

1. Twenty four (24) CONSECUTIVE MONTHS, for private, recreational use,
2. FOUR (4) CONSECUTIVE MONTHS for commercial use,
   A personal watercraft is used commercially when it is used in connection with generating income or any work or employment during any part of the warranty period. A personal watercraft is also used commercially when, at any point during the warranty period, it has commercial tags or is licensed for commercial use.

The repair or replacement of parts or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

Note that the duration and any other modalities of the warranty coverage are subject to the applicable national or local legislation in the customer's country.

5. CONDITIONS TO HAVE WARRANTY COVERAGE

This warranty coverage is available **only** if **each** of the following conditions has been fulfilled:

- The 2022 Sea-Doo personal watercraft must be purchased as new and unused by its first owner from a Sea-Doo distributor/dealer authorized to distribute Sea-Doo personal watercrafts in the country in which the sale occurred;
- The BRP specified pre-delivery inspection process must be completed and documented;
- The 2022 Sea-Doo personal watercraft must have undergone proper registration by an authorized Sea-Doo distributor/dealer;
- The 2022 Sea-Doo personal watercraft must be purchased within the EEA by an EEA resident, in the CIS for residents of the countries comprised in such area and in Turkey for residents of Turkey; and
- Routine maintenance outlined in the Operator's Guide must be timely performed in order to maintain warranty coverage. BRP reserves the right to make warranty coverage contingent upon proof of proper maintenance.

BRP will not honor this limited warranty to any private use owner or commercial use owner if one of the preceding conditions has not been met. Such limitations are necessary in order to allow BRP to preserve both the safety of its products, and also that of its consumers and the general public.

6. WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The customer must cease using the Sea-Doo personal watercraft upon the appearance of an anomaly. The customer must notify a servicing Sea-Doo distributor/dealer within two (2) months of the appearance of a defect, and provide it with reasonable access to the product and reasonable opportunity to repair it. The customer must also present to the authorized Sea-Doo distributor/dealer, proof of purchase of the product and must sign the repair/work order prior to starting the repair in order to validate the warranty repair. All parts replaced under this limited warranty become the property of BRP.

Note that the notification period is subject to the applicable national or local legislation in customer's country.

7. WHAT BRP WILL DO

To the extent permitted by law, BRP's obligations under this warranty are limited to, at its sole discretion, repairing parts found defective under normal use, maintenance and service, or replacing such parts with new genuine Sea-Doo parts without charge for parts and labor, at any authorized Sea-Doo distributor/dealer during the warranty coverage period under the conditions described herein. BRP's responsibility is limited to making the required repairs or replacements of parts. No claim of breach of warranty shall be cause for cancellation or rescission of the sale of the Sea-Doo personal watercraft to the owner. You may have other legal rights which may vary from country to country.

In the event that service is required outside of the country of original sale, or for EEA residents, if service is required outside of the EEA, for CIS residents, if service is required outside of the CIS, the owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other

financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve or modify products from time to time without assuming any obligation to modify products previously manufactured.

8. TRANSFER

If the ownership of a product is transferred during the warranty coverage period, this warranty shall also be transferred and be valid for the remaining coverage period provided BRP or an authorized Sea-Doo distributor/dealer receives a proof that the former owner agreed to the transfer of ownership, in addition to the coordinates of the new owner.

9. CONSUMER ASSISTANCE

In the event of a controversy or a dispute in connection with this BRP limited warranty, BRP suggests that you try to resolve the issue at the dealership level. We recommend discussing the issue with the authorized BRP dealer's service manager or owner.

If the matter still remains unresolved, contact BRP by filling out the customer contact form at www.brp.com or contact BRP by mail at one of the addresses listed under the *Contact Us* section of this guide.

MAINTENANCE RECORDS

Send photocopy of maintenance record to BRP if needed.

Predelivery

Serial number: _____
Mileage / km: _____
Hours: _____
Date: _____
Dealer no.: _____
Notes: _____

Signature/Print:

Refer to vehicle Pre-Delivery Bulletin for detailed installation procedures

First Inspection

Mileage / km: _____
Hours: _____
Date: _____
Dealer no.: _____
Notes: _____

Signature/Print:

For maintenance schedule, refer to Maintenance Information section of this operator's guide

Service

Mileage / km: _____
Hours: _____
Date: _____
Dealer no.: _____
Notes: _____

Signature/Print:

For maintenance schedule, refer to Maintenance Information section of this operator's guide

Service

Mileage / km: _____
Hours: _____
Date: _____
Dealer no.: _____
Notes: _____

Signature/Print:

For maintenance schedule, refer to Maintenance Information section of this operator's guide

Service

Mileage / km: _____
Hours: _____
Date: _____
Dealer no.: _____
Notes: _____

Signature/Print:

For maintenance schedule, refer to Maintenance Information section of this operator's guide

Service

Mileage / km: _____
Hours: _____
Date: _____
Dealer no.: _____
Notes: _____

Signature/Print:

For maintenance schedule, refer to Maintenance Information section of this operator's guide

Service

Mileage / km: _____
Hours: _____
Date: _____
Dealer no.: _____
Notes: _____

Signature/Print:

For maintenance schedule, refer to Maintenance Information section of this operator's guide

Service	
Mileage / km: _____ Hours: _____ Date: _____ Dealer no.: _____ Notes: _____ _____ _____	Signature/Print:
For maintenance schedule, refer to Maintenance Information section of this operator's guide	

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CUSTOMER INFORMATION

PRIVACY INFORMATION

BRP wishes to inform you that your coordinates will be used for safety and warranty related purposes. Furthermore, BRP and its affiliates may use its customer list to distribute marketing and promotional information about BRP and related products.

To exercise your right to consult or correct your data, or to be removed from the addressee-list for direct marketing, please contact BRP.

CHANGE OF ADDRESS/OWNERSHIP

If your address has changed or if you are the new owner of the boat, be sure to notify BRP.

In case of change of ownership, please join a proof that the former owner agreed to the transfer.

Notifying BRP, even after the expiration of the limited warranty, is very important as it enables BRP to reach the boat owner if necessary, like when safety recalls are initiated. It is the owner's responsibility to notify BRP.

STOLEN UNITS: In the event that your boat is stolen, you should notify your area's distributor warranty department of such. We will ask you to provide your name, address, phone number, Hull Identification Number and date it was stolen.

CHANGE OF ADDRESS ❑ CHANGE OF OWNERSHIP ❑

VEHICLE IDENTIFICATION NUMBER

Model Number | Vehicle Identification Number (V.I.N.)

OLD ADDRESS OR PREVIOUS OWNER:

NAME

NO. STREET APT

CITY STATE/PROVINCE ZIP/POSTAL CODE

COUNTRY TELEPHONE

NEW ADDRESS OR NEW OWNER:

NAME

NO. STREET APT

CITY STATE/PROVINCE ZIP/POSTAL CODE

COUNTRY TELEPHONE

E-MAIL ADDRESS

CHANGE OF ADDRESS ❑ CHANGE OF OWNERSHIP ❑

VEHICLE IDENTIFICATION NUMBER

Model Number | Vehicle Identification Number (V.I.N.)

OLD ADDRESS OR PREVIOUS OWNER:

NAME

NO. STREET APT

CITY STATE/PROVINCE ZIP/POSTAL CODE

COUNTRY TELEPHONE

NEW ADDRESS OR NEW OWNER:

NAME

NO. STREET APT

CITY STATE/PROVINCE ZIP/POSTAL CODE

COUNTRY TELEPHONE

E-MAIL ADDRESS

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CHANGE OF ADDRESS ❑ CHANGE OF OWNERSHIP ❑

VEHICLE IDENTIFICATION NUMBER

Model Number | Vehicle Identification Number (V.I.N.)

OLD ADDRESS OR PREVIOUS OWNER:

NAME

NO. STREET APT

CITY STATE/PROVINCE ZIP/POSTAL CODE

COUNTRY TELEPHONE

NEW ADDRESS OR NEW OWNER:

NAME

NO. STREET APT

CITY STATE/PROVINCE ZIP/POSTAL CODE

COUNTRY TELEPHONE

E-MAIL ADDRESS

CHANGE OF ADDRESS ❑ CHANGE OF OWNERSHIP ❑

VEHICLE IDENTIFICATION NUMBER

Model Number | Vehicle Identification Number (V.I.N.)

OLD ADDRESS OR PREVIOUS OWNER:

NAME

NO. STREET APT

CITY STATE/PROVINCE ZIP/POSTAL CODE

COUNTRY TELEPHONE

NEW ADDRESS OR NEW OWNER:

NAME

NO. STREET APT

CITY STATE/PROVINCE ZIP/POSTAL CODE

COUNTRY TELEPHONE

E-MAIL ADDRESS

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NOTE:

NOTE:

NOTE:

NOTE:

WATERCRAFT
Model No. _____

HULL
Identification Number (H.I.N.) _____

ENGINE
Identification Number (E.I.N.) _____

OWNER: _____
NAME

_____
No. STREET APT

_____
CITY STATE/PROVINCE ZIP/POSTAL CODE

Purchase Date _____ _____ _____
YEAR MONTH DAY

Warranty Expiry Date _____ _____ _____
YEAR MONTH DAY

To be completed by the authorized Sea-Doo dealer at the time of the sale.

DEALER IMPRINT AREA

⚠ WARNING

Before you operate this vehicle, read this Operator's Guide, all on-product safety labels and watch the safety video.

SKI-DOO®
SEA-DOO®
CAN-AM®
LYNX®
EVINRUDE®
ROTAX®
MANITOU®
ALUMACRAFT®

219002218

LIVE THE

SEA-DOO

LIFE



Product spec book 2022

Vehicles • Accessories • Parts & Maintenance
Apparel • Play & Licensing Products

Product spec book 2022

Vehicle Specifications

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Vehicle Specifications

Vehicle Specifications

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SEA-DOO


SEA-DOO
FISH PRO

SPARK®

One-of-a kind fun.



KEY FEATURES

- **Lightweight and playful platform**
- **Able to tow with most mid-size cars**
- **Up to 3 passengers**
- **Convenience Plus Package**
  (opt. w/900 ACE – 90 only)
  - iBR – Intelligent Brake & Reverse
  - BRP Audio – portable system (opt. w/ 3up only)
  - Front storage bin kit
  - Boarding step
  - RF D.E.S.S.™ key*

NEW Orange Crush & Lava Red

NEW Reef Blue & Manta Green

CAPACITY

Model	SPARK® 2up, Rotax® 900 ACE™ – 60	SPARK® 2up, Rotax® 900 ACE™ – 90	SPARK® 3up, Rotax® 900 ACE™ – 90
Rider Capacity	2	2	3
Weight Capacity	352 lb/160 kg	352 lb/160 kg	450 lb/205 kg
Fuel Capacity	7.9 US gal/30 L		
Glove Box	0.42 US gal/1.6 L		
Front Bin	7 US gal/27 L (accessory)	7 US gal/27 L (optional)	

DIMENSIONS

Length (bumper to bumper)	110"/279 cm	120"/305 cm
Width	46.4"/118 cm	
Height	41.1"/104.5 cm	

HULL

Type	SPARK® hull
Material	Polytec™

OTHER FEATURES

- Slim seat
- Seat strap
- LinQ® attachment system (accessory)
- Wetgrip footboard
- Knee pads
- Handle grips with palm rest
- Tow hook

ROTAX® ENGINE

	900 ACE™ – 60	900 ACE™ – 90	
Model	Spark 2up	Spark 2up	Spark 3up
Horsepower	60 hp	90 hp	
Intake System	Naturally aspirated		
Displacement	899 cc		
Cooling	Closed-Loop Cooling System (CLCS)		
Reverse System	Manual reverse kit (accessory)	Electronic iBR®**	Electronic iBR® (optional)
Fuel Type	87 octane		
Throttle System	iTC™ (Intelligent Throttle Control) system		
Exhaust System	D-Sea-Bel™ system		

GAUGE

Type of Gauge	Compact		
Main Functions	• Speedometer • RPM	• Vehicle hours	
iTC System – Mode		• Sport mode (90 hp only)	

WEIGHT

Dry Weight	410 lb/186 kg	423 lb/192 kg***	425 lb/193 kg***

WARRANTY

BRP limited warranty covers the watercraft for one year.

*May not be available at the time of purchase. Please check with your dealer. **Electronic brake, neutral and reverse. ***iBR® and Convenience Package Plus adds 21 lb (9 kg).

SPARK©

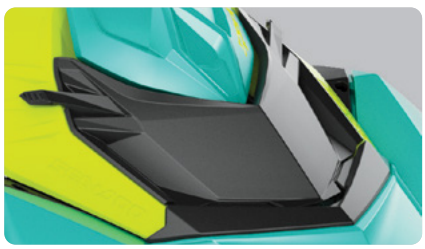


NEW Reef Blue & Manta Green

FEATURE HIGHLIGHTS



BRP Audio – Portable System (Optional)
High-quality waterproof 50-watt Bluetooth‡ portable sound system.



Front Storage Bin Kit (Optional)
Additional storage space to bring more gear on board.



Slim Seat
Designed to improve freedom of movement while riding.



ROTAX® 900 ACE™ – 60 / 90
Two fuel-efficient, compact and lightweight Rotax engine options.



Polytec™
Innovative material that reduces weight while optimizing performance and efficiency. The color-in molding is more scratch-resistant than fiberglass.



Boarding Step (Optional)
Makes boarding from the water easier and quicker.

‡Bluetooth is a registered trademark owned by Bluetooth SIG, Inc. and any use of such trademarks by BRP is under license.

SPARK® TRIXX™

Playful trickster.



KEY FEATURES

- **Lightweight and playful platform**
- **Able to tow with most mid-size cars**
- **Up to 3 passengers**
- **BRP Audio – portable system** (optional)
- **TRIXX™ Package:**
  - Handlebar with adjustable riser
  - iBR – Intelligent Brake & Reverse
  - Extended Range VTS
  - Exclusive coloration

NEW Dazzling Blue & Deep Black

Lava Red & Deep Black

CAPACITY

Model	SPARK® TRIXX™ 2up	SPARK® TRIXX™ 3up
Rider Capacity		
Weight Capacity	352 lb/160 kg	450 lb/205 kg
Fuel Capacity	7.9 US gal/30 L	
Glove Box	0.42 US gal/1.6 L	
Front Bin	7 US gal/27 L (accessory)	

DIMENSIONS

Length (bumper to bumper)	110"/279 cm	120"/305 cm
Width	46.4"/118 cm	
Height	42.1"/107 cm	

HULL

Type	SPARK® hull
Material	Polytec™

OTHER FEATURES

- Slim seat
- Seat strap
- LinQ® attachment system (accessory)
- RF D.E.S.S.™ key**
- Wetgrip footboard
- Knee pads
- Handle grip
- Tow hook

ROTAX® ENGINE 900 ACE™ – 90

Model	SPARK® TRIXX™ 2up	SPARK® TRIXX™ 3up
Horsepower	90 hp	
Intake System	Naturally aspirated	
Displacement	899 cc	
Cooling	Closed-Loop Cooling System (CLCS)	
Reverse System	Electronic iBR®*	
Fuel Type	87 octane	
Throttle System	iTC™ (Intelligent Throttle Control) system	
Exhaust System	D-Sea-Bel™ system	

GAUGE

Type of Gauge	Compact	
Main Functions	• Speedometer • RPM	• VTS™ display • Vehicle hour display
iTC System – Mode	• Sport mode	

WEIGHT

Dry Weight	428 lb/194 kg	439 lb/199 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse. **May not be available at the time of purchase. Please check with your dealer.

SPARK® TRIXX™



Lava Red & Deep Black

FEATURE HIGHLIGHTS



BRP Audio – Portable System (Optional)
High-quality waterproof 50-watt Bluetooth‡ portable sound system.



Handlebar With Adjustable Riser
A telescopic steering system that optimizes the experience for varying rider sizes.



Extended Range VTS™ (Variable Trim System)
Offers double the range of the regular VTS™ for greater ease when executing tricks.



Step Wedges
Provides enhanced stability and confidence in different riding positions, making it easier to pull off tricks like a pro.



iBR® (Intelligent Brake & Reverse)
Exclusive to Sea-Doo®, iBR® stops the watercraft sooner and provides more control and maneuverability at low speeds and in reverse.



Exclusive Colors and Graphics
Exclusive bold Trixx™ colors and graphics.

‡Bluetooth is a registered trademark owned by Bluetooth SIG, Inc. and any use of such trademarks by BRP is under license.

GTI™ 90 / 130

Style, stability and some serious fun.

KEY FEATURES

- Large swim platform with LinQ attachment system
- Ergolock™ two-piece seat
- Large front storage
- iBR® – Intelligent Brake & Reverse*
- Watertight phone compartment



White & Reef Blue

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	15.9 US gal/60 L
Glove Box	2.3 US gal/8.8 L
Front Bin	38 US gal/144 L
Storage Capacity – Total	40.3 US gal/152.8 L

DIMENSIONS

Length (bumper to bumper)	130.6"/331.8 cm
Width	49.2"/125 cm
Height	44.8"/113.7 cm

HULL

Type	GTI™ Hull
Material	Polytec™ Gen II

OTHER FEATURES

- Seat strap
- RF D.E.S.S.™ key**
- BRP Audio – premium system (accessory)
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpet
- Swim platform carpet
- Tow hook

ROTAX® ENGINE

	900 ACE™ – 90	1630 ACE™ – 130
Model	**GTI 90**	**GTI 130**
Horsepower	90 hp	130 hp
Intake System	Naturally aspirated	
Displacement	899 cc	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)	
Reverse System	Electronic iBR®*	
Fuel Type	87 octane	
Throttle System	iTC™ (Intelligent Throttle Control)	
Exhaust System	D-Sea-Bel™ system	

GAUGE

Type of Gauge	4.5" digital display	
Main Functions	• Speedometer • RPM	• Clock • Vehicle hour display
iTC System – Mode	• Sport Mode	• ECO® Mode

WEIGHT

Dry Weight	668 lb/303 kg	739 lb/335 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

GTI™ 90 / 130

FEATURE HIGHLIGHTS



iBR® (Intelligent Brake & Reverse)
Exclusive to Sea-Doo®, iBR® stops the watercraft sooner and provides more control and maneuverability at low speeds and in reverse.



Swim Platform with Integrated LinQ® System
Exclusive quick-attach system on a large swim platform that allows for easy installation of accessories.



ECO® Mode
This exclusive Sea-Doo® feature optimizes power output for up to 46% improved fuel efficiency.



ROTAX® 900 ACE™ – 90/1630 ACE™ – 130
The Rotax® 900 ACE™ – 90 gives crisp acceleration with impressive fuel economy. And for those who want added performance, the extra horsepower of the 1630 ACE™ – 130 is all about fun and acceleration.



GTI Hull
This moderate V-shaped hull guarantees a stable, enjoyable ride in variable water conditions. Confident, predictable handling but incredibly playful when you want it to be.



Large Front Storage
An impressive 38 gallons of sealed storage space allows riders to safely stow belongings while riding.

GTI™ SE 130 / 170

More convenience and comfort for days of family fun.



KEY FEATURES

- **BRP Audio – premium system** (optional)
- **iDF Intelligent Debris-Free pump system** (optional)
- **Boarding ladder**
- **iBR® – Intelligent Brake & Reverse**
- **Variable Trim System (VTS™)**
- **Slow mode/speed regulator**
- **Two color options**

NEW Coral Blast & Eclipse Black
Neon Yellow

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	15.9 US gal/60 L
Glove Box	2.3 US gal/8.8 L
Front Bin	38 US gal/144 L
Storage Capacity – Total	40.3 US gal/152.8 L

DIMENSIONS

Length (bumper to bumper)	130.6"/331.8 cm
Width	49.2"/125 cm
Height	44.8"/113.7 cm

HULL

Type	GTI™ Hull
Material	Polytec™ Gen II

OTHER FEATURES

- Ergolock™ two-piece seat
- Seat strap
- RF D.E.S.S.™ key**
- Large front storage
- Watertight phone compartment
- LinQ® attachment system
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpets
- Large swim platform with carpet
- Tow hook

ROTAX® ENGINE

ROTAX® ENGINE	**1630 ACE™ – 130**	**1630 ACE™ – 170**
Model	**GTI SE 130**	**GTI SE 170**
Horsepower	130 hp	170 hp
Intake System	Naturally aspirated	
Displacement	1,630 cc	
Cooling	Closed-Loop Cooling System (CLCS)	
Reverse System	Electronic iBR®	
Fuel Type	87 octane	
Throttle System	iTC™ (Intelligent Throttle Control) system	
Exhaust System	D-Sea-Bel™ system	

GAUGE

Type of Gauge	4.5" digital display	
Main Functions	• Speedometer • RPM • Clock	• VTS™ display • Vehicle hour display
iTC System – Mode	• Sport mode • ECO® mode	• Slow mode • Speed regulator

WEIGHT

Dry Weight	739 lb/335 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

GTI™ SE 130 / 170



GTI™ SE 170

Neon Yellow



GTI™ SE 130

NEW Coral Blast & Eclipse Black

FEATURE HIGHLIGHTS



BRP Audio – Premium System (Optional)
An industry-first manufacturer-installed truly waterproof Bluetooth‡ audio system.



Swim Platform with Integrated LinQ® System
Exclusive quick-attach system on a large swim platform that allows for easy installation of accessories.



iDF – Intelligent Debris-Free Pump System (Optional)
An innovative, industry-first system that allows you to free your pump of weeds and debris with intuitive handlebar-activated controls.



ROTAX® 1630 ACE™ – 130 / 170
Enjoy plenty of pep with the 1630 ACE™ – 130 or opt for the 170 hp version, the most powerful naturally aspirated Rotax engine ever on a Sea-Doo watercraft.



Boarding Ladder
Makes boarding from the water easier and quicker.



Large Front Storage
An impressive 38 gallons of sealed storage space allows riders to safely stow belongings while riding.

WAKE™ 170

Made to make the most of the wake.

KEY FEATURES

- **BRP Audio – premium system** (optional)
- **Large front storage**
- **Watertight phone compartment**
- **Boarding ladder**
- **iBR® – Intelligent Brake & Reverse***
- **WAKE Package:**
  -LinQ retractable ski pylon
  -Speed-based ski mode
  -Removable wakeboard rack
  -WAKE™ graphics



NEW Neo Mint

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	15.9 US gal/60 L
Glove Box	2.3 US gal/8.8 L
Front Bin	38 US gal/144 L
Storage Capacity – Total	40.3 US gal/152.8 L

DIMENSIONS

Length (bumper to bumper)	130.6"/331.8 cm
Width	49.2"/125 cm
Height	44.8"/113.7 cm

HULL

Type	GTI™ Hull
Material	Polytec™ Gen II

OTHER FEATURES

- Ergolock™ two-piece touring seat
- Seat strap
- VTS™ – Variable Trim System
- RF D.E.S.S.™ key**
- LinQ® attachment system
- Wide-angle mirrors
- Handlegrip with palm rests
- Footwell carpets
- Large swim platform with carpet
- Tow hook

ROTAX® ENGINE

	1630 ACE™ – 170
Horsepower	170 hp
Intake System	Naturally aspirated
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR
Fuel Type	87 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	4.5" digital display	
Main Functions	• Speedometer • RPM • Clock	• VTS™ • Fuel autonomy • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode • Slow mode	• Speed regulator • Ski mode

WEIGHT

Dry Weight	747 lb/339 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

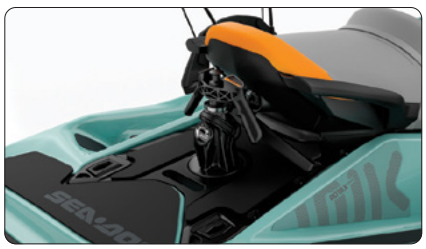
*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

WAKE™ 170

FEATURE HIGHLIGHTS



Ski Mode
Five preset acceleration profiles make it easy to deliver a smooth launch and maintain consistent pace.



LinQ® Retractable Ski Pylon
A quick-install retractable ski pylon that stows away when not in use. Features spotter hand grips and rope storage.



Wakeboard Rack
Provides easy transport of a wakeboard.[1]



ROTAX® 1630 ACE™ – 170
The new Rotax® 1630 ACE™ – 170 is the most powerful naturally aspirated Rotax engine ever on a Sea-Doo watercraft.



BRP Audio – Premium System (Optional)
An industry-first manufacturer-installed truly waterproof Bluetooth[1] audio system.



Watertight Phone Compartment
Waterproof and shockproof compartment specifically designed for phone protection.[3]

[1] Wakeboard and rope not included. Wake PRO 230 shown. [2] Cell phone is not included.

WAKE™ PRO 230

Stability, power and music to tow like a pro.

KEY FEATURES

- **NEW Full-color 7.8" wide display**
- **BRP Audio – premium system**
- **Direct-access front storage**
- **Watertight phone compartment**
- **iBR® – Intelligent Brake & Reverse***
- **Boarding ladder**
- **WAKE™ Package:**
  -LinQ retractable ski pylon
  -Speed-based ski mode
  -Removable wakeboard rack
  -WAKE graphics



NEW Neo Mint

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	18.5 US gal/70 L
Glove Box	0.8 US gal/2.9 L
Front Bin	25.3 US gal/96 L
Storage Capacity – Total	26.1 US gal/98.9 L

DIMENSIONS

Length (bumper to bumper)	135.9"/345.1 cm
Width	49.4"/125.5 cm (w/o rack)
Height	44.8"/114 cm

HULL

Type	ST3 Hull™
Material	Fiberglass

OTHER FEATURES

- Ergolock™ two-piece seat
- Seat strap
- VTS™ – Variable Trim System
- RF D.E.S.S.™ key**
- LinQ® attachment system
- Wide-angle mirrors
- Handlegrip with palm rests
- Footwell carpets
- Large swim platform with carpet
- Tilt steering
- Ski tow eye

ROTAX® ENGINE 1630 ACE™ – 230

Horsepower	230 hp
Intake System	Supercharged with external intercooler
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR
Fuel Type	87 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	Large panoramic 7.8" wide LCD display
Main Functions	• BRP Connect • Music • Weather • Bluetooth connectivity • Speedometer • RPM • Clock • VTS™ • Fuel consomption • Fuel autonomy • Water temperature • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode • Slow mode • Speed regulator • Ski mode

WEIGHT

Dry Weight	829 lb/376 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse. **May not be available at the time of purchase. Please check with your dealer.

WAKE™ PRO 230

FEATURE HIGHLIGHTS



NEW Full-Color 7.8" Wide Display

Full-color display with incredible visibility and a new level of functionality. Bluetooth and smartphone app integration provides music, weather, navigation and more.



BRP Audio – Premium System

An industry-first manufacturer-installed, truly waterproof, Bluetooth[1] audio system.



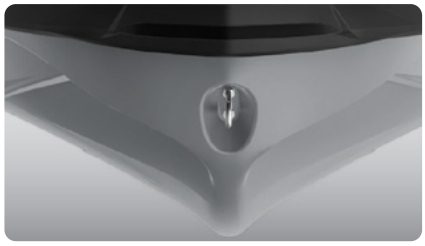
Wakeboard Rack

Provides convenient storage and transport of a wakeboard.[1]



ROTAX® 1630 ACE™ – 230 Engine

This powerful engine comes standard with a supercharger and external intercooler. It is optimized to run on regular fuel, which lowers fuel costs.



ST3 Hull™

An innovative hull that sets the benchmark for rough water handling, stability and offshore performance.



LinQ® Retractable Ski Pylon

A quick-install retractable ski pylon that stows away when not in use. Features spotter handgrips and rope storage.

[1] Wakeboard and rope not included.

GTX™ PRO 130

Rental model.

KEY FEATURES

- **LinQ® attachment system**
- **18.5 US gal/70 L fuel tank capacity**
- **Boarding ladder**
- **Direct-access front storage**
- **iBR® – Intelligent Brake & Reverse*** (optional)
- **Watertight phone compartment**
- **Heavy-duty parts: electrical harness, handlegrips, seat, wear ring, drive shaft and impeller**



White & Reef Blue

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	18.5 US gal/70 L
Glove Box	0.8 US gal/2.9 L
Front Bin	25.3 US gal/96 L
Storage Capacity – Total	26.1 US gal/98.9 L

DIMENSIONS

Length (bumper to bumper)	135.9"/345.1 cm
Width	49.4"/125.5 cm
Height	44.8"/114 cm

HULL

Type	ST3 Hull™
Material	Fiberglass

OTHER FEATURES

- Heavy-duty seat with thermoformed vinyl
- Seat strap
- RF D.E.S.S.™ key**
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpets
- Large swim platform with carpet
- Tow hook

ROTAX® ENGINE

	1630 ACE™ – 130
Horsepower	130 hp
Intake System	Naturally aspirated
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR® (optional)
Fuel Type	87 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	4.5" digital display	
Main Functions	• Speedometer • RPM	• Vehicle hours
iTC System – Mode	• Sport mode	• ECO® mode

WEIGHT

Dry Weight	785 lb/356 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.
[1] Actual engine image may vary.

GTX™ PRO 130

FEATURE HIGHLIGHTS



Heavy-Duty Components
Heavy-duty wear ring, wiring harness, seat, handlegrips, drive shaft and impeller designed to last longer.



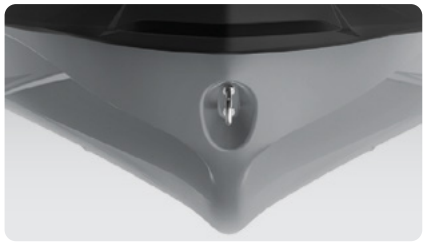
ECO® Mode
This exclusive Sea-Doo® feature optimizes power output for up to 46% improved fuel efficiency.



iBR® (Intelligent Brake & Reverse)
(Optional)
Exclusive to Sea-Doo®, iBR® stops the watercraft sooner and provides more control and maneuverability at low speeds and in reverse.



ROTAX® 1630 ACE™ – 130 Engine
The powerful and reliable naturally aspirated 1630 ACE™ – 130 is all about fun and acceleration while providing excellent fuel efficiency.



ST3 Hull™
Stable and predictable for a versatile, safe and smooth ride in moderate and rough water conditions.[2]



Boarding Ladder
Makes boarding from the water easier and quicker.

GTX™ 170 / 230 / 300

Comfort, control and power are always in style.

KEY FEATURES

- **iDF – Intelligent Debris-Free pump system** (optional 170 and 230)
- **BRP Audio – premium system** (opt. on 300)
- **Direct-access front storage**
- **Watertight phone compartment**
- **LinQ® attachment system**
- **iBR® – Intelligent Brake & Reverse***
- **Boarding ladder**
- **VTS™ – Variable Trim System**



Eclipse Black & Orange Crush

CAPACITY

Rider Capacity	3
Weight Capacity	600 lb/272 kg
Fuel Capacity	18.5 US gal/70 L
Glove Box	0.8 US gal/2.9 L
Front Bin	25.3 US gal/96 L
Storage Capacity – Total	26.1 US gal/98.9 L

DIMENSIONS

Length (bumper to bumper)	135.9"/345.1 cm
Width	49.4"/125.5 cm
Height	44.8"/113.8 cm

HULL

Type	ST3 Hull™
Material	Fiberglass

OTHER FEATURES

- Ergolock™ two-piece seat with stepped design
- Seat strap
- RF D.E.S.S.™ key**
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpets
- Large swim platform with carpet
- Tilt steering
- Ski tow eye

ROTAX® ENGINE	**1630 ACE™ – 170**	**1630 ACE™ – 230**	**1630 ACE™ – 300**
Model	GTX† 170	GTX† 230	GTX† 300
Horsepower	170 hp	230 hp	300 hp
Intake System	Naturally aspirated	Supercharged with external intercooler	
Displacement	1,630 cc		
Cooling	Closed-Loop Cooling System (CLCS)		
Reverse System	Electronic iBR®		
Fuel Type	87 octane	87 octane	91 octane
Throttle System	iTC™ (Intelligent Throttle Control)		
Exhaust System	D-Sea-Bel™ system		

GAUGE

Type of Gauge	7.6" wide digital display	
Main Functions	• Speedometer • RPM • Clock • VTS™	• Fuel consomption • Fuel autonomy • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode	• Slow mode • Speed regulator

WEIGHT

Dry Weight	776 lb/352 kg	805 lb/365 kg	819 lb/371 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

GTX™ 170 / 230 / 300

FEATURE HIGHLIGHTS



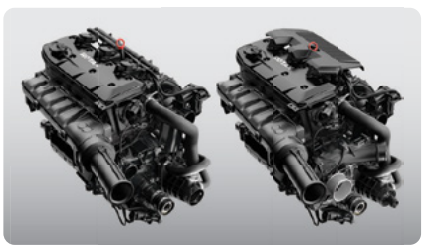
iDF – Intelligent Debris-Free Pump System (Optional)
An innovative, industry-first system that allows you to free your pump of weeds and debris with intuitive handlebar-activated controls.



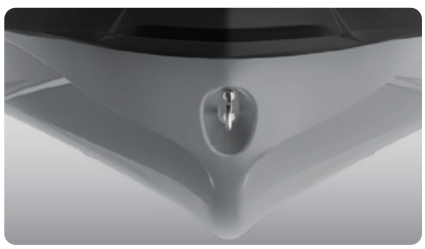
BRP Audio – Premium System (Optional)
An industry-first manufacturer-installed truly waterproof Bluetooth‡ audio system.



Direct-Access Front Storage
Large front storage area that's easily accessible from a seated position.[1]



ROTAX® 1630 ACE™ – 170 / 230 / 300
The Rotax® 1630 ACE engine block is offered in three configurations on this versatile platform. The 170 hp boasts naturally aspirated punch with optimal fuel economy. Both 230 hp and 300 hp supercharged versions allow you to level up the performance to your liking.



ST3 Hull™
An innovative hull that sets the benchmark for rough water handling, stability and offshore performance.



Swim Platform with Integrated LinQ® System
Exclusive quick-attach system on the largest swim platform in the industry allows for easy installation of storage accessories.

[1] Larger storage front bin organizer is not included.

GTX™ LIMITED 300

The standard for high-end touring performance.



KEY FEATURES

- **Rotax 1630 ACE – 300 engine**
- **BRP Audio – premium system**
- **Full-color 7.8" wide display**
- **iDF – Intelligent Debris Free pump system**
- **Direct-access front storage**
- **Limited Package:**
  -USB port
  -Watercraft cover
  -Storage bin organizer
  -Knee pads
  -Depth finder
  -Exclusive coloration and more

NEW ***Premium*** Metallic Sage

NEW Liquid Titanium & Black

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	18.5 US gal/70 L
Glove Box	0.8 US gal/2.9 L
Front Bin	25.3 US gal/96 L
Storage Capacity – Total	26.1 US gal/98.9 L

DIMENSIONS

Length (bumper to bumper)	135.9"/345.1 cm
Width	49.4"/125.5 cm
Height	44.8"/114 cm

HULL

Type	ST3 Hull™
Material	Fiberglass

OTHER FEATURES

- Ergolock™ two-piece seat with stepped design
- Seat strap
- iBR – Intelligent Brake & Reverse
- VTS™ – Variable Trim System
- Boarding ladder
- RF D.E.S.S.™ key**
- Watertight phone compartment
- LinQ® attachment system
- Knee pads
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpets
- Large swim platform with carpet
- Tilt steering
- Ski tow eye

ROTAX® ENGINE

	1630 ACE™ – 300
Model	GTX 300
Horsepower	300 hp
Intake System	Supercharged with external intercooler
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR® *
Fuel Type	91 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	Large panoramic 7.8" wide LCD display	
Main Functions	• BRP Connect • Music • Weather • Bluetooth connectivity • Speedometer • RPM • Clock	• VTS™ • Fuel consomption • Fuel autonomy • Water temperature • Depth finder • Speed statistics • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode	• Slow mode • Speed regulator

WEIGHT

Dry Weight	849 lb/385 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

GTX™ LIMITED 300



NEW Liquid Titanium & Black

FEATURE HIGHLIGHTS



iDF – Intelligent Debris-Free Pump System

An innovative, industry-first system that allows you to free your pump of weeds and debris with intuitive handlebar-activated controls.



BRP Audio – Premium System

The industry's first manufacturer-installed truly waterproof Bluetooth‡ audio system.



Full-Color 7.8" Wide Display

Full-color display with incredible visibility and a new level of functionality. Bluetooth and smartphone app integration provides music, weather, navigation and more.



ROTAX® 1630 ACE™ – 300

The Rotax® 1630 ACE – 230 offers instant acceleration by way of a powerful supercharger, while the new Rotax® 1630 ACE™ – 300 is the most powerful Rotax engine ever on a Sea-Doo.



ST3 Hull™

An innovative hull that sets the benchmark for rough water handling, stability and offshore performance.



Swim Platform with Integrated LinQ® System

Exclusive quick-attach system on the largest swim platform in the industry allows for easy installation of storage accessories.

NEW

FISHPRO™ Scout 130

Accessible, versatile and all-around fun.



White & Gulfstream Blue

KEY FEATURES

- **iDF – Intelligent Debris-Free pump system**
- **Ergolock™ two-piece fishing seat**
- **3 fishing rod holders**
- **Garmin† 6" GPS & Fish Finder**
  - Includes free regional map token
- **LinQ® fishing cooler (13.5 US gal/51 L)**
- **Trolling mode (slow mode)**
- **Front storage lid organizer**
- **2 LinQ front supports**
- **Cup holder**

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	15.9 US gal/60 L
Glove Box	2.3 US gal/8.8 L
Front Bin	38 US gal/144 L
LinQ® Fishing Cooler	13.5 US gal/51 L
Storage Capacity – Total	43.8 US gal/203.8 L

DIMENSIONS

Length (bumper to bumper)	130.6"/331.8 cm
Width	49.2"/125 cm
Height	46.1"/117 cm

HULL

Type	GTI™ hull
Material	Polytec™ Gen II

OTHER FEATURES

- Seat strap
- iBR – Intelligent Brake & Reverse
- VTS™ (Variable Trim System)
- Boarding ladder
- RF D.E.S.S.™ key**
- Watertight phone compartment
- LinQ® attachment system
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpets
- Large swim platform with carpet
- Tow hook

ROTAX® ENGINE

1630 ACE™ – 130	
Horsepower	130 hp
Intake System	Naturally aspirated
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR®*
Fuel Type	87 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	4.5" digital display	
Main Functions	• Speedometer • RPM • Clock • VTS™ display	• Fuel autonomy • Water temperature • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode	• Trolling mode (slow mode) • Speed regulator

WEIGHT

Dry Weight	783 lb/355 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

FISHPRO™ Scout 130

FEATURE HIGHLIGHTS



iDF – Intelligent Debris-Free Pump System
An innovative, industry-first system that allows you to free your pump of weeds and debris with intuitive handlebar-activated controls.



Garmin† 6" GPS & Fish Finder
A top-of-the-line navigation, charting and fish-finding system using an in-hull transducer and mid-CHIRP sonar. Includes token for access to free upgraded regional maps.



LinQ® Fishing Cooler & Fishing Rod Holders
A spacious, quick-attach fishing cooler designed for easy access and equipped with numerous convenient features.



Fishing Bench Seat
Designed for easier movement from front to rear and from side to side.



Front Storage Organizer
Easily store tackle and other small items in this conveniently located organizer.



Trolling Mode
Enables precise control of speed. Choose one of several presets and adjust as needed.

FISHPRO™ Sport 170

The original game changer. Find yourself a new perspective on sport fishing.

KEY FEATURES

- **iDF – Intelligent Debris-Free pump system**
- **Extended rear platform with second LinQ® attachment system**
- **Garmin† 6" GPS & Fish Finder**
  - Includes free regional map token
- **LinQ fishing cooler (13.5 US gal/51 L)**
- **5 fishing rod holders**
- **Angled gunwale footrests**
- **BRP Audio – premium system** (optional)
- **Direct access front storage with bin organizer**



White & Gulfstream Blue

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	18.5 US gal/70 L
Glove Box	0.8 US gal/2.9 L
Front Bin	25.3 US gal/96 L
LinQ® Fishing Cooler	13.5 US gal/51 L
Storage Capacity – Total	39.6 US gal/149.9 L

DIMENSIONS

Length (bumper to bumper)	146.8"/373 cm
Width	49.4"/125 cm
Height	45.3"/115 cm

HULL

Type	ST3 Hull™
Material	Fiberglass

OTHER FEATURES

- Ergolock two-piece fishing seat
- Seat strap
- iBR – Intelligent Brake & Reverse
- VTS™ (Variable Trim System)
- Boarding ladder
- RF D.E.S.S.™ key**
- Watertight phone compartment
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpets
- Large swim platform with carpet
- 2 LinQ front supports
- Cup holder
- USB port
- Tilt steering
- Ski tow eye

ROTAX® ENGINE

	1630 ACE™ – 170
Horsepower	170 hp
Intake System	Naturally aspirated
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR®*
Fuel Type	87 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	7.6" wide digital display	
Main Functions	• Speedometer • RPM • Clock • VTS™	• Fuel autonomy • Water temperature • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode	• Trolling mode (slow mode) • Speed regulator

WEIGHT

Dry Weight	858 lb/389 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

FISHPRO™ Sport 170

GOOD DESIGN AWARD® WINNER

FEATURE HIGHLIGHTS



iDF – Intelligent Debris-Free Pump System

An innovative, industry-first system that allows you to free your pump of weeds and debris with intuitive handlebar-activated controls.



Garmin† 6" GPS & Fish Finder

A top-of-the-line navigation, charting and fish-finding system using an in-hull transducer and mid-CHIRP sonar. Includes token for access to free upgraded regional maps.



LinQ® Fishing Cooler & Fishing Rod Holders

A spacious, quick-attach fishing cooler designed for easy access and equipped with numerous convenient features.



Extended Rear Platform with Second LinQ® Attachment System

Adds 11.5 inches to the back of the watercraft to increase stability, space and storage capability.



Angled Gunwale Footrests

Ensures an ergonomic and secure posture while fishing from a side position.



Trolling Mode

Enables precise control of speed. Choose one of several presets and adjust as needed.

NEW

FISHPRO™ Trophy 170

The most advanced sport fishing personal watercraft on the water.

KEY FEATURES

- **iDF – Intelligent Debris-Free pump system**
- **Modular swivel seat**
- **Advanced battery system**
- **LinQ® fishing cooler (13.5 US gal/51 L)**
- **Quick-connect livewell**
- **Garmin† 7" touchscreen GPS & Fish Finder**
  - Includes free regional map token
- **Anchoring system**
- **NEW Tech Package: BRP Audio – premium system and full-color 7.8" wide display** (optional)



NEW Shark Grey & Orange Crush

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	18.5 US gal/70 L
Glove Box	0.8 US gal/2.9 L
Front Bin	25.3 US gal/96 L
LinQ® Fishing Cooler	13.5 US gal/51 L
Storage Capacity – Total	39.6 US gal/149.9 L

DIMENSIONS

Length (bumper to bumper)	146.8"/373 cm
Width	49.4"/125 cm
Height (pedestal seat uninstalled)	45.3"/115 cm

HULL

Type	ST3 Hull™
Material	Fiberglass

OTHER FEATURES

- Ergolock™ two-piece fishing with modular swivel seat
- Seat strap
- iBR – Intelligent Brake & Reverse
- VTS™ – Variable Trim System
- Boarding ladder
- RF D.E.S.S.™ key**
- Direct-access front storage
- Storage bin organizer
- Watertight phone compartment
- Two sets of LinQ® attachment points
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpets
- Large swim platform with carpet
- 5 fishing rod holders
- Angled gunwale footrests
- Integrated washdown
- Extended rear platform
- 2 LinQ front supports
- Cup holder
- USB port
- Tilt steering
- Ski tow eye

ROTAX® ENGINE

	1630 ACE™ – 170
Horsepower	170 hp
Intake System	Naturally aspirated
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR®*
Fuel Type	87 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	Large panoramic 7.8" wide LCD display (Opt. w/ audio) 7.6" wide digital display (w/o audio)
Main Functions	• BRP Connect (opt.) • Music (opt.) • Weather (opt.) • Bluetooth connectivity (opt.) • Speedometer • RPM • Clock • VTS™ • Fuel consumption (opt. w/ audio) • Fuel autonomy • Water temperature • Speed statistics (opt. w/ audio) • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode • Trolling mode (slow mode) • Speed regulator

WEIGHT

Dry Weight	898 lb/407 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

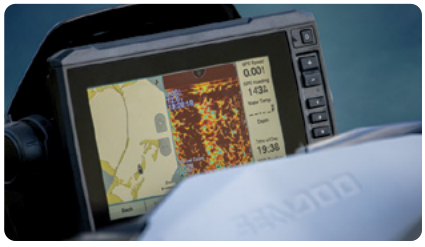
*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

FISHPRO™ Trophy 170

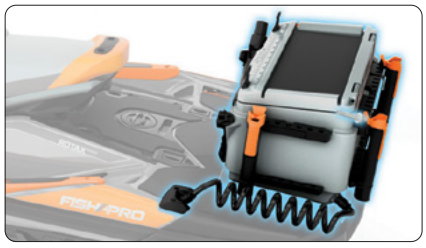
FEATURE HIGHLIGHTS



Anchoring System
Allows quick access and easy storage of the anchor. It also keeps your front storage neat by eliminating the need to store a rope and anchor there.



Garmin† 7" Touchscreen GPS & Fish Finder
A large 7-inch touchscreen top-of-the-line navigation, charting and fish-finding system using an in-hull transducer and mid-CHIRP sonar. Includes token for access to free upgraded regional maps.



Quick-Connect Livewell
Turn the LinQ Fishing Cooler into a livewell in seconds. An integrated pump constantly feeds fresh water into the reservoir keeping your catch or your bait alive all day.



Modular Swivel Seat
Brings flexibility to the fisherman to comfortably cast and jig for longer period from a more upright position. Installs and stows in seconds.



Advanced Battery System
With dual batteries and a 650-watt voltage generator, even the most demanding electrical needs are sure to be met.



Full-Color 7.8" Wide Display (Optional)
Full-color display with incredible visibility and a new level of functionality. Bluetooth and smartphone app integration provides music, weather, navigation and more.

GTR™ 230

Accessible power and performance.

KEY FEATURES

- **ROTAX® 1630 ACE™ – 230 engine**
- **BRP Audio – premium system** (optional)
- **Large front storage**
- **Watertight phone compartment**
- **LinQ® attachment system**
- **VTS™ – Variable Trim System**



NEW Millennium Yellow

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	15.9 US gal/60 L
Glove Box	2.3 US gal/8.8 L
Front Bin	40.2 US gal/152 L
Storage Capacity – Total	42.5 US gal/160.8 L

DIMENSIONS

Length (bumper to bumper)	130.6"/331.8 cm
Width	49.2"/125 cm
Height	44.8"/113.7 cm

HULL

Type	GTI Hull
Material	Polytec™ Gen II

OTHER FEATURES

- Ergolock™ two-piece touring seat
- Seat strap
- iBR – Intelligent Brake & Reverse
- RF D.E.S.S.™ key**
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpets
- Large swim platform with carpet
- Tow hook

ROTAX® ENGINE

ROTAX® ENGINE	1630 ACE™ – 230
Horsepower	230 hp
Intake System	Supercharged with external intercooler
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR®*
Fuel Type	87 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	4.5" digital display	
Main Functions	• Speedometer • RPM • Clock	• VTS™ • Fuel autonomy • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode	• Slow mode • Speed regulator

WEIGHT

Dry Weight	774 lb / 351 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

GTR™ 230

FEATURE HIGHLIGHTS



BRP Audio – Premium System (Optional)
The industry's first manufacturer-installed truly waterproof Bluetooth‡ audio system.



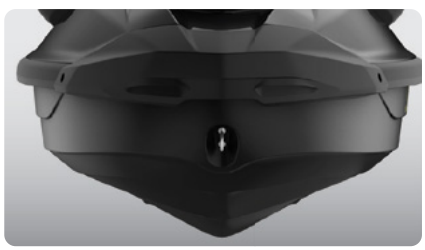
VTS™ (Variable Trim System)
Provides handlebar-activated settings so riders can easily find the ideal trim for varying conditions.



Swim Platform with Integrated LinQ® System
Exclusive quick-attach system on a large swim platform that allows for easy installation of storage accessories.



ROTAX® 1630 ACE™ – 230 Engine
This powerful engine comes standard with a supercharger and external intercooler. It is optimized to run on regular fuel, which lowers fuel costs.



GTI Hull
This moderate V-shaped hull guarantees a stable, enjoyable ride in variable water conditions. Confident, predictable handling but incredibly playful when you want it to be.



Large Front Storage
An impressive 40 gallons of sealed storage space allows riders to safely stow belongings while riding.

RXP®-X® 300

Race-ready performance watercraft, reimagined.



KEY FEATURES

- **Rotax 1630 ACE – 300 engine**
- **Ergolock™ R racing seat**
- **T3-R hull**
- **NEW Tech Package:** BRP Audio – premium system and full-color 7.8" wide display (optional)
- **Launch control**
- **Low-rise racing handlebar**
- **Double-angled footwell wedges**
- **X-sponsons**

NEW ***Premium*** Triple Black

Millennium Yellow

CAPACITY

Rider Capacity	
Weight Capacity	400 lb/182 kg
Fuel Capacity	18.5 US gal/70 L
Glove Box	2.56 US gal/9.7 L
Front Bin	37,78 US gal/143 L
Storage Capacity – Total	40.6 US gal/153.7 L

DIMENSIONS

Length (bumper to bumper)	130.6"/331.8 cm
Width	49.2"/125 cm
Height	44"/111 cm

HULL

Type	T3-R Hull™
Material	Fiberglass

OTHER FEATURES

- iBR – Intelligent Brake & Reverse
- Extended VTS™ (Variable Trim System)
- RF D.E.S.S.™ key**
- Watertight phone compartment
- LinQ® attachment system
- Wide-angle mirrors
- Round handle grips
- Footwell carpets
- Large swim platform with carpet
- Ski tow eye

ROTAX® ENGINE

	1630 ACE™ – 300
Horsepower	300 hp
Intake System	Supercharged with external intercooler
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR®*
Fuel Type	91 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	Large panoramic 7.8" wide LCD display optional (w/audio) 7.6" wide digital display (w/o audio)
Main Functions	• BRP Connect (opt.) • Music (opt.) • Weather (opt.) • Bluetooth connectivity (opt.) • Speedometer • RPM • Clock • VTS™ • Fuel consumption (opt.) • Fuel autonomy • Speed statistics • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode • Slow mode • Speed regulator • Launch control

WEIGHT

Dry Weight	780 lb/354 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.

RXP®-X® 300



Millennium Yellow

FEATURE HIGHLIGHTS



ERGOLOCK™ R System
A narrow seat profile with deep knee pockets and a revolutionary adjustable saddle that allows riders to lock in to the machine like never before.



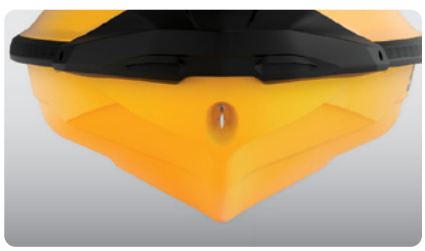
BRP Audio – Premium System (Optional)
The industry's first manufacturer-installed truly waterproof Bluetooth‡ audio system.[2]



Full-Color 7.8" Wide Display (Optional)
Full-color display with incredible visibility and a new level of functionality. Bluetooth and smartphone app integration provides music, weather, navigation and more.



ROTAX® 1630 ACE™ – 300 Engine
The Rotax 1630 ACE is the most powerful Rotax engine ever, delivering high efficiency and best-in-class acceleration.



T3-R Hull™
A deep-V design that offers unrivaled handling and acceleration and a new level of control at high speed.



Large Front Storage
An impressive 38 gallons of sealed storage space allows riders to safely stow belongings while riding.

RXT®-X® 300

The ultimate off-shore performance watercraft.

KEY FEATURES

- **Rotax 1630 ACE – 300 engine**
- **Ergolock two-piece racing seat**
- **ST3 hull**
- **NEW Tech Package:** BRP Audio – premium system and full-color 7.8" wide display
- **Launch control**
- **Tilt steering**
- **Full-length angled footwell wedges**
- **X-sponsons**



NEW ***Premium*** Triple Black

Millennium Yellow

CAPACITY

Rider Capacity	
Weight Capacity	600 lb/272 kg
Fuel Capacity	18.5 US gal/70 L
Glove Box	0.8 US gal/2.9 L
Front Bin	25.3 US gal/96 L
Storage Capacity – Total	26.1 US gal/98.9 L

DIMENSIONS

Length (bumper to bumper)	135.9"/345.1 cm
Width	49.4"/125.5 cm
Height	45.2"/114.7 cm

HULL

Type	ST3 Hull™
Material	Fiberglass

OTHER FEATURES

- Seat strap
- iBR – Intelligent Brake & Reverse
- Extended VTS™ (Variable Trim System)
- RF D.E.S.S.™ key**
- Watertight phone compartment
- LinQ® attachment system
- Knee pads
- Wide-angle mirrors
- Handle grips with palm rest
- Footwell carpets
- Large swim platform with carpet
- Ski tow eye

ROTAX® ENGINE

	1630 ACE™ – 300
Horsepower	300 hp
Intake System	Supercharged with external intercooler
Displacement	1,630 cc
Cooling	Closed-Loop Cooling System (CLCS)
Reverse System	Electronic iBR®*
Fuel Type	91 octane
Throttle System	iTC™ (Intelligent Throttle Control)
Exhaust System	D-Sea-Bel™ system

GAUGE

Type of Gauge	Large panoramic 7.8" wide LCD display optional
Main Functions	• BRP Connect • Music • Weather • Bluetooth connectivity • Speedometer • RPM • Clock • VTS™ • Fuel consumption • Fuel autonomy • Speed statistics • Vehicle hours
iTC System – Mode	• Sport mode • ECO® mode • Slow mode • Speed regulator • Launch control

WEIGHT

Dry Weight	829 lb/376 kg

WARRANTY

BRP limited warranty covers the watercraft for one year.

*Electronic brake, neutral and reverse.
**May not be available at the time of purchase. Please check with your dealer.
†Bluetooth is a registered trademark owned by Bluetooth SIG, Inc. and any use of such trademarks by BRP is under license.

RXT®-X® 300



Millennium Yellow

FEATURE HIGHLIGHTS



Ergolock™ System
A narrow seat profile with deep knee pockets lets riders sit naturally and use the lower body to hold onto the machine for more control.



BRP Audio – Premium System
The industry's first manufacturer-installed truly waterproof Bluetooth‡ audio system.[3]



Full-Color 7.8" Wide Display
Full-color display with incredible visibility and a new level of functionality. Bluetooth and smartphone app integration provides music, weather, navigation and more.



ROTAX® 1630 ACE™ – 300 Engine
The Rotax 1630 ACE – 300 is the most powerful Rotax engine ever, delivering high efficiency and best-in-class acceleration.



ST3 Hull™
An innovative hull that sets the benchmark for rough water handling, stability and offshore performance.



Direct-Access Front Storage
Large front storage area that's easily accessible from a seated position.[1]

[1] Bin organizers are not included.

Comparative Chart

	REC LITE				RECREATION			
	SPARK®		SPARK® TRIXX™		GTI™		GTI™ SE	
	One-of-a-kind fun.		Playful trickster.		Style, stability and some serious fun.		More convenience and comfort for days of family fun.	
MODELS	SPARK® 2up Rotax® 900 ACE™ – 60	SPARK® 2up Rotax® 900 ACE™ – 90	SPARK® 3up Rotax® 900 ACE™ – 90	SPARK® TRIXX™ 2up	SPARK® TRIXX™ 3up	GTI™ 90	GTI™ 130	GTI™ SE 130	GTI™ SE 170
COLORS	 NEW Orange Crush & Lava Red			 NEW Dazzling Blue & Deep Black		 White & Reef Blue		 NEW Coral Blast & Eclipse Black	
	 NEW Reef Blue & Manta Green			 Lava Red & Deep Black				 Neon Yellow	
Key features									
	• Lightweight and playful platform • Able to tow with most mid-size cars • Up to 3 passengers **Convenience Plus Package** (optional with 900 ACE – 90 only): • iBR – Intelligent Brake & Reverse • BRP Audio – portable system (optional with 3up only) • Front storage bin kit • Boarding step • RF D.E.S.S.™ key			• Lightweight and playful platform • Able to tow with most mid-size cars • Up to 3 passengers • BRP Audio – portable system (optional) **TRIXX™ Package:** • Handlebar with adjustable riser • iBR – Intelligent Brake & Reverse • Extended Range VTS • Exclusive coloration		• Large swim platform with LinQ attachment system • Ergolock™ two-piece seat • Large front storage • iBR® – Intelligent Brake & Reverse • Watertight phone compartment		• BRP Audio – premium system (optional) • iDF Intelligent Debris-Free pump system (optional) • Boarding ladder • iBR® – Intelligent Brake & Reverse • Variable Trim System (VTS™) • Slow mode/speed regulator • Two color options	
Capacity									
RIDERS	2	2	3	2	3	3		3	
WEIGHT	352 lb/ 160 kg	352 lb/ 160 kg	450 lb/ 205 kg	352 lb/160 kg	450 lb/205 kg	600 lb/272 kg		600 lb/272 kg	
FUEL	7.9 US gal/30 L			7.9 US gal/30 L		15.9 US gal/60 L		15.9 US gal/60 L	
TOTAL STORAGE	7 US gal/27 L (accessory)	7 US gal/27 L (optional)		7 US gal/27 L (accessory)		40.3 US gal/152.8 L		40.3 US gal/152.8 L	
Rotax engine									
ROTAX® ENGINE	900 ACE™ – 60	900 ACE™ – 90		900 ACE™ – 90		900 ACE™ – 90	1630 ACE™ – 130	1630 ACE™ – 130	1630 ACE™ – 170
INTAKE SYSTEM	Naturally aspirated			Naturally aspirated		Naturally aspirated		Naturally aspirated	
DISPLACEMENT	899 cc			899 cc		899 cc	1,630 cc	1,630 cc	
REVERSE SYSTEM	Manual reverse kit (accessory)	Electronic iBR®	Electronic iBR® (optional)	Electronic iBR®		Electronic iBR®		Electronic iBR®	
FUEL TYPE	87 octane			87 octane		87 octane		87 octane	

	TOW SPORTS		TOURING		
	WAKE™	**WAKE™ PRO**	**GTX™ PRO**	**GTX™**	**GTX™ LIMITED**
	Made to make the most of the wake.	**Stability, power and music to tow like a pro.**	**Rental model.**	**Comfort, control and power are always in style.**	**The standard for high-end touring performance.**
MODELS	WAKE™ 170	WAKE™ PRO 230	GTX™ PRO 130	GTX™ 170 | GTX™ 230 | GTX™ 300	GTX™ LIMITED 300
COLORS	 NEW Neo Mint	 NEW Neo Mint	 White & Reef Blue	 Eclipse Black & Orange Crush	 NEW Premium Metallic Sage  NEW Liquid Titanium & Black

Key features

• BRP Audio – premium system (optional) • Large front storage • Watertight phone compartment • Boarding ladder • iBR® – Intelligent Brake & Reverse **WAKE™ Package:** • LinQ retractable ski pylon • Speed-based ski mode • Removable wakeboard rack • WAKE™ graphics	• NEW Full-color 7.8" wide display • BRP Audio – premium system • Direct-access front storage • Watertight phone compartment • iBR® – Intelligent Brake & Reverse • Boarding ladder **WAKE™ Package:** • LinQ retractable ski pylon • Speed-based ski mode • Removable wakeboard rack • WAKE™ graphics	• LinQ® attachment system • 18.5 US gal/70 L fuel tank capacity • Boarding ladder • Direct-access front storage • iBR® – Intelligent Brake & Reverse (optional) • Watertight phone compartment • Heavy-duty parts: electrical harness, handlegrips, seat, wear ring, drive shaft and impeller	• iDF – Intelligent Debris-Free pump system (optional 170 and 230) • BRP Audio – premium system (optional on 300) • Direct-access front storage • Watertight phone compartment • LinQ® attachment system • iBR® – Intelligent Brake & Reverse • Boarding ladder • VTS™ – Variable Trim System	• Rotax 1630 ACE – 300 engine • BRP Audio – premium system • Full-color 7.8" wide display • iDF – Intelligent Debris-Free pump system • Direct-access front storage **Limited Package:** • USB port • Watercraft cover • Storage bin organizer • Knee pads • Depth finder • Exclusive coloration and more

Capacity

RIDERS	3	3	3	3	3
WEIGHT	600 lb/272 kg	600 lb/272 kg	600 lb/272 kg	600 lb/272 kg	600 lb/272 kg
FUEL	15.9 US gal/60 L	18.5 US gal/70 L	18.5 US gal/70 L	18.5 US gal/70 L	18.5 US gal/70 L
TOTAL STORAGE	40.3 US gal/152.8 L	26.1 US gal/98.9 L	26.1 US gal/98.9 L	26.1 US gal/98.9 L	26.1 US gal/98.9 L

Rotax engine

ROTAX® ENGINE	1630 ACE™ – 170	1630 ACE™ – 230	1630 ACE™ – 130	1630 ACE™ – 170	1630 ACE™ – 230	1630 ACE™ – 300
INTAKE SYSTEM	Naturally aspirated	Supercharged with external intercooler	Naturally aspirated	Naturally aspirated	Supercharged with external intercooler	Supercharged with external intercooler
DISPLACEMENT	1,630 cc	1,630 cc	1,630 cc	1,630 cc		1,630 cc
REVERSE SYSTEM	Electronic iBR®	Electronic iBR®	Electronic iBR®* (optional)	Electronic iBR®		Electronic iBR®
FUEL TYPE	87 octane	87 octane	87 octane	87 octane	91 octane	91 octane

Comparative Chart

	SPORT FISHING			PERFORMANCE		
	FISHPRO™			GTR™ 230	RXP®-X® 300	RXT®-X® 300
	Accessible, versatile and all-around fun.	**The original game changer. Find yourself a new perspective on sport fishing.**	**The most advanced sport fishing personal watercraft on the water.**	**Accessible power and performance.**	**Race-ready performance watercraft, reimagined.**	**The ultimate off-shore performance watercraft.**
MODELS	FISHPRO™ Scout	FISHPRO™ Sport	FISHPRO™ Trophy	GTR™ 230	RXP®-X® 300	RXT®-X® 300
COLORS	 White & Gulfstream Blue	 White & Gulfstream Blue	 NEW Shark Grey & Orange Crush	 NEW Millennium Yellow	 NEW Premium Triple Black  Millenium Yellow	 NEW Premium Triple Black  Millenium Yellow
Key features						
	• iDF – Intelligent Debris-Free pump system • Ergolock™ two-piece fishing seat • 3 fishing rod holders • Garmin† 6" GPS & Fish Finder - Includes free regional map token • LinQ® fishing cooler (13.5 US gal/51 L) • Trolling mode (slow mode) • Front storage lid organizer • 2 LinQ front supports • Cup holder	• iDF – Intelligent Debris-Free pump system • Extended rear platform with second LinQ® attachment system • Garmin† 6" GPS & Fish Finder - Includes free regional map token • LinQ fishing cooler (13.5 US gal/51 L) • 5 fishing rod holders • Angled gunwale footrests • BRP Audio – premium system (optional) • Direct access front storage with bin organizer	• iDF – Intelligent Debris-Free pump system • Modular swivel seat • Advanced battery system • LinQ® fishing cooler (13.5 US gal/51 L) • Quick-connect livewell • Garmin† 7" touchscreen GPS & Fish Finder - Includes free regional map token • Anchoring system • NEW Tech Package: BRP Audio – premium system and full-color 7.8" wide display (optional)	• ROTAX® 1630 ACE™ – 230 engine • BRP Audio – premium system (optional) • Large front storage • Watertight phone compartment • LinQ® attachment system • VTS™ – Variable Trim System	• ROTAX® 1630 ACE – 300 engine • Ergolock™ R racing seat • T3-R hull • NEW Tech Package: BRP Audio – premium system and full-color 7.8" wide display (optional) • Launch control • Low-rise racing handlebar • Double-angled footwell wedges • X-sponsons	• ROTAX® 1630 ACE – 300 engine • Ergolock two-piece racing seat • ST3 hull • NEW Tech Package: BRP Audio – premium system and full-color 7.8" wide display • Launch control • Tilt steering • Full-length angled footwell wedges • X-sponsons
Capacity						
RIDERS	3	3	3	3	2	3
WEIGHT	600 lb/272 kg	600 lb/272 kg	600 lb/272 kg	600 lb/272 kg	400 lb/182 kg	600 lb/272 kg
FUEL	15.9 US gal/60 L	18.5 US gal/70 L	18.5 US gal/70 L	15.9 US gal/60 L	18.5 US gal/70 L	18.5 US gal/70 L
TOTAL STORAGE	43.8 US gal/203.8 L	39.6 US gal/149.9 L	39.6 US gal/149.9 L	42.5 US gal/160.8 L	40.6 US gal/153.7 L	26.1 US gal/98.9 L
Rotax engine						
ROTAX® ENGINE	1630 ACE™ – 130	1630 ACE™ – 170	1630 ACE™ – 170	1630 ACE™ – 230	1630 ACE™ – 300	1630 ACE™ – 300
INTAKE SYSTEM	Naturally aspirated	Naturally aspirated	Naturally aspirated	Supercharged with external intercooler	Supercharged with external intercooler	Supercharged with external intercooler
DISPLACEMENT	1,630 cc	1,630 cc	1,630 cc	1,630 cc	1,630 cc	1,630 cc
REVERSE SYSTEM	Electronic iBR®	Electronic iBR®	Electronic iBR®	Electronic iBR®	Electronic iBR®	Electronic iBR®
FUEL TYPE	87 octane	87 octane	87 octane	87 octane	91 octane	91 octane



Accessories

Accessories

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42 Lifestyle Bundles
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48 Bags and Storage
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50 Steps and Ladder
50 Controls and Grips
53 Tech Accessories
54 Electronics and Electricals
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59 Docking
61 Riding Essentials
62 Covers
64 Graphic Kits

Sea-Doo Accessories limited warranty*

1-Year on BRP Accessories

*Purchased at an authorized BRP dealership/distributor or on a BRP-authorized online store. Unless otherwise stipulated or required by law. Other exclusions may apply. See complete limited warranty or contact your authorized Sea-Doo dealer. This limited warranty does not apply to factor-installed accessories.

Essential Bundles



STARTER

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ADVANCED

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295100851	Dock Tie	p. 60
295100418	Snap-In Fenders	p. 59
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295100901	All-climate Storage cover	p. 62
779310	XPS Wash & Wax	p. 74
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PEAK

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Note that the price does not include installation requirements and that parts numbers may vary depending on vehicle model.

Lifestyle Bundles



WATERSPORTS

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PERFORMANCE

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295100846	Pump Seal Kit	p. 69
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Note that the price does not include installation requirements and that parts numbers may vary depending on vehicle model.



FISHING

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295101033	LinQ 13.5 US Gal (51 L) Cooler Extension	p. 46
295101057	Garmin† ECHOMAP™ UHD 72sv GPS	p. 54
295100972	Garmin† GT15M-IH Transducer	p. 54
295100991	Seconday Battery Harness Kit	p. 55
295100793	Angles Gunwale Footrests	p. 58
295100948	LinQ Front Support (LH)	p. 46
295100949	LinQ Front Support (RH)	p. 46
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295100935	LinQ Cup Holder	p. 46
715005494	LinQ Modular Cargo Box 10 L	p. 44
219401110	Thermal Insert for LinQ Modular Cargo Box (10 L)	p. 45

ADVENTURE

SKU	NAME	PAGE
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295101034	LinQ installation base kit For LinQ Multi Cargo Rack	p. 47
295100950	LinQ Stackable Fuel Caddy	p. 44
295101009	LinQ installation base kit For LinQ Stackable Fuel Caddy	p. 47
295100812	Heated Grips	p. 52
860202478	LinQ Lock - Pack of 2	p. 47
715005494	LinQ Modular Cargo box 10 L	p. 44
715007112	LinQ Modular Cargo box 20 L	p. 44
219401110	Thermal Insert for LinQ Modular Cargo Box (10 L)	p. 45
715008110	LinQ Watertight Bag	p. 44
295100948	LinQ Front Support (LH)	p. 46
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Note that the price does not include installation requirements and that parts numbers may vary depending on vehicle model.

LinQ Accessories

LinQ Stackable Fuel Caddy - 4 Gallons

Models with LinQ Base Kit

295100950



- Quickly and easy, secure installation with the LinQ accessory system.
- No-spill spout designed for easy pouring.
- 3.8 US Gal (14.5 L) capacity.
- Allows for added storage by stacking LinQ Watertight Bag (715008110).
- Marinized for saltwater use.

Notes: LinQ Base Installation Kit is required to install LinQ accessories when not standard on the watercraft.
Fuel caddies cannot be stacked. Stacking LinQ Watertight Bag requires LinQ Base Installation kit (295101009).

LinQ Fuel Caddy Replacement Rubber Cap

295100791



LinQ Fuel Caddy Replacement Cap and Nozzle

(Not illustrated)

860202529

LinQ Watertight Bag

Models with LinQ Base Kit

715008110



- Fully waterproof roll-top design secures gear tightly.
- 10.6 US Gal (40 L) of adjustable capacity.
- Heavy-duty rigid plastic base.
- Foam-lined bottom for additional protection.
- Integrated handle for easy transportation on/off the vehicle.
- Equipped with Marinized LinQ Hardware Kit.

Note: LinQ Base Installation Kit is required to install LinQ accessories when not standard on the watercraft.

LinQ Box

Models with LinQ Base Kit

715008111



- High-precision injected HDPE construction provides rigidity and durability.
- 5 US Gal (19 L) maximum capacity.
- Weather-resistant, sealed and lockable cover.
- Equipped with Marinized LinQ Hardware Kit.

Note: LinQ Base Installation Kit is required to install LinQ accessories when not standard on the watercraft.

NEW LinQ Modular Cargo Box 10 L

Models with LinQ Base Kit

715005494



- 10 L (2.6 US Gal) of hard-sided modular storage capacity.
- Heavy duty construction with weather resistant sealed lid.
- Stackable with single LinQ bag or additional modular boxes for the ideal storage solution.

Note: LinQ Base Installation Kit is required to install LinQ accessories when not standard on the watercraft.

NEW LinQ Modular Cargo Box 20 L

Models with LinQ Base Kit

715007112



- 20 L (5.2 US Gal) of hard-sided modular storage capacity.
- Heavy duty construction with weather resistant sealed lid.
- Stackable with single LinQ bag or additional modular boxes for the ideal storage solution.

Note: LinQ Base Installation Kit is required to install LinQ accessories when not standard on the watercraft.

NEW LinQ Modular Cargo Box 30 L

Models with LinQ Base Kit

715006830



- 30 L (7.8 US Gal) of hard-sided modular storage capacity.
- Heavy duty construction with weather resistant sealed lid.
- Stackable with single LinQ bag or additional modular boxes for the ideal storage solution.

Note: LinQ Base Installation Kit is required to install LinQ accessories when not standard on the watercraft.

NEW Thermal Insert for LinQ Modular Cargo Box (10 L)

219401110



- Insulated liner.
- Fits very well in the LinQ Modular Box (10 L).
- Can contain five 473 ml cans or six 355 ml cans.

NEW LinQ Multi Cargo Rack

GTX, RXT-X, WAKE PRO (2018 and up) / GTI, GTR, WAKE (2020 and up) / RXP-X (2021 and up) / All FISHPRO models (2019 and up)

295101015



- Adds up to three times the available LinQ accessory to your watercraft.
- Enables multiple LinQ accessory configurations - including stackable accessories for even more carrying capacity.
- Provides a larger lounging area or casting platform and easier reboarding.
- Uses equipped LinQ attachment system for quick, easy installation.
- Two LinQ Base Installation kits included. Additional base installation kits sold separately (295101034).

NEW Rear Deck Extension with LinQ

GTX, RXT, RXT-X & WAKE PRO (2018 and up)

295101059



- Adds 11.5 inches of platform space to the rear of the watercraft.
- Includes retractable LinQ attachment point to allow for easy LinQ accessory installation and stow out of the way when not in use.
- Easy access to water for swimming and other watersports.
- Extra space for onboard lounging, fishing and more.
- Also compatible with the Ladder.

LinQ 4.2 US Gal (16 L) Cooler

Models with LinQ Base Kit

295100698



- Secure, easily installed LinQ-mounted cooler.
- Premium-quality foam insulation holds ice up to five days.
- Rotomolded construction for exceptional rigidity and durability.
- Sealed lid for airtight, weather-tight closure.
- Heavy duty T-Handle latches resistant to marine environments.
- Marinized hardware suited for saltwater applications.

Notes: Cannot be mounted on the LinQ Stackable Fuel Caddy. LinQ Base Installation Kit is required to install LinQ accessories when not standard on the watercraft.

LinQ 13.5 US Gal (51 L) Cooler (Single Latch)

RXT, RXT-X, GTX, GTX Ltd, WAKE PRO (2018 and up) / RXP-X (2021 and up) / GTI, GTI SE, GTR, WAKE (2020 and up)

269800943



- 13.5 US Gal (51 L) of insulated, water-resistant capacity.
- Exceptionally rigid and highly durable with premium-quality foam insulation for optimal ice retention.
- Sealed cover keeps the heat and water out.
- Heavy duty external storage pocket adds extra room for non-cooled essentials like utensils, tackle and more.
- Top features recessed workspace with anti-slip surface ideal for baiting hooks, and includes fish ruler molded into the top for quickly measuring your catch.
- Two drain plugs for easily emptying water.
- Pre-molded slots for easy installation of rod holders or cup holders on each side.
- Angled trolling slots for the perfect multi-rod trolling setup where regulations allow.
- LinQ 13.5 US Gal (51 L) Cooler Extension (29510888) can be added on top for more storage.

Notes: LinQ Locking Anchor Base Kit (295100858) is required for installation on 2018 models and on some 2019 models.
If your watercraft is not equipped with a ladder, adding one for easy reboarding is recommended.
Cooler does not fit with LinQ Ski Pylon when in forward position.

LinQ 13.5 US Gal (51 L) Cooler Extension (Single Latch)

LinQ 13.5 US Gal (51 L) Cooler (Single Latch)

295100888



- Add 5.3 US Gal (20 L) of extra storage to your existing 13.5 US Gal (51 L) cooler.
- Fully insulated and easy to install.
- Ideal, e.g., for separating your lunch from your catch or a seperate tackle box.
- Requires LinQ 13.5 US gal (51 L) Cooler (Single Latch) (269800943) for installation.

LinQ 13.5 US Gal (51 L) Cooler (Double Latch)

RXT, RXT-X, GTX, GTX Ltd, WAKE PRO (2018 and up) / RXP-X (2021 and up) / GTI, GTI SE, GTR, WAKE (2020 and up)

269801151



- 13.5 US Gal (51 L) of insulated, water-resistant capacity.
- Exceptionally ridgid and highly durable with premium-quality foam insulation for optimal ice retention.
- Sealed cover keeps the heat and water out.
- Heavy duty external storage pocket adds extra room for non-cooled essentials like utensils, tackle and more.
- Top features recessed workspace with anti-slip surface ideal for baiting hooks, and includes fish ruler molded into the top for quickly measuring your catch.
- Two drain plugs for easily emptying water.
- T-Handle heavy-duty latchs are durable and resistant to marine environments including salt water.
- Pre-molded slots for easy installation of rod holders or cup holders on each side.
- Angled trolling slots for the perfect multi-rod trolling setup where regulations allow.
- LinQ 13.5 US GAL (51 L) Cooler Extension (295101033) can be added on top for more storage.

Note: LinQ Locking Anchor Base Kit (295100858) is required for installation on 2018 models and on some 2019 models.
If your watercraft is not equipped with a ladder, adding one for easy reboarding is recommended.
Cooler does not fit with LinQ Ski Pylon when in forward position.

LinQ 13.5 US Gal (51 L) Cooler Extension (Double Latch)

LinQ 13.5 US Gal (51 L) Cooler (Double Latch) (269801151)

295101033



- Add 5.3 US Gal (20 L) of extra storage to your existing 13.5 US Gal (51 L) cooler.
- Fully insulated and easy to install.
- Ideal, e.g., for separating your lunch from your catch or a seperate tackle box.
- Requires LinQ 13.5 US gal (51 L) Cooler (Double Latch) (269801151) for installation.

LinQ Rod Holder

Fits LinQ Front Supports and LinQ 13.5 US Gal (51 L) Coolers

295100795



- Perfect to safely transport your fishing rods to your favorite fishing spots or for trolling.
- Features quick attachment system with release lever for easy installation onto / removal from any of the 30 different positions on the LinQ 13.5 Gal (51 L) Cooler or in front of some vehicle using the LinQ Front Supports.
- Firmly holds fishing rod using a molded rubber cap specifically designed to quickly secure or remove the fishing rod using the reel arm.

LinQ Front Support

RXT, RXT-X, GTX, WAKE PRO (2018 and up), FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY

295100948 Left side
295100949 Right side

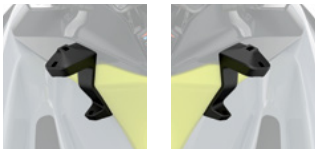


- Enables the installation of front-mounted LinQ Rod Holder (295100795) or LinQ Cup Holder (295100935) (sold separetely).
- Allows for easy access to beverages or rod during trolling without impeding the driver.

NEW LinQ Front Support

GTI, GTR, WAKE (2020 and up), FISHPRO SCOUT

295101039 Left side
295101040 Right side



- Enables the installation of front-mounted LinQ Rod Holder (295100795) or LinQ Cup Holder (295100935) (sold separetely).
- Allows for easy access to beverages or rod during trolling without impeding the driver.

LinQ Cup Holder

295100935



- Cup holder fits most beverage containers thanks to flexible fins that adjust to size of beverage.
- Can be installed on the 13.5 US Gal (51L) cooler or on LinQ Front Supports.
- Tool-less installation.

NEW LinQ Lock

Retrofits most LinQ accessories

860201968 Pack of 1 with 2 keys
860202478 Pack of 2 with 4 keys



- Simple way to securely lock most LinQ accessories to your watercraft.
- Lock cover protects lock from the elements. Corrosion resistant.
- Not compatible with LinQ 4.2 US gal (16 L) Cooler, LinQ Retractable Ski Pylon and LinQ Box.

LinQ Base Installation Kit

GTI, GTS, GTR (2011-2019) / GTR-X (2017-2019) / RXP (2012-2020)	**295100803**
GTX (2016-2017) / RXT-X (2016-2017)	**295100842**



(295100803 illustrated)

- Allows you to install LinQ mounted accessories on your Sea-Doo watercraft to extend cargo options and journey opportunities.
- Allow the installation of LinQ accessories to the back of your watercraft.
- Not compatible with the LinQ 13.5 US Gal (51 L) Cooler.
- Includes 2 LinQ bases and hardware.
- If your watercraft is not equipped with a ladder, adding one for easy reboarding is recommended.

Note: Not compatible with rear Speed Tie.

LinQ Base installation Kit

SPARK 2up	**295100883**
SPARK 3up*	**295100802**



(295100883 illustrated)

- Allows you to install LinQ mounted accessories on your Sea-Doo watercraft to extend cargo options and journey opportunities.
- Allow the installation of LinQ accessories to the back of your watercraft.
- Not compatible with the LinQ 13.5 US Gal (51 L) Cooler.
- Includes 2 LinQ bases and hardware
- If your watercraft is not equipped with a ladder, adding one for easy rebording is recommended.

**Not compatible with the Tow Pro (295100605).*

LinQ Base Installation Kit

Fits LinQ Stackable Fuel Caddy

295101009



- LinQ Base kit allows select Sea-Doo LinQ accessories to be stacked on top of the LinQ Stackable Fuel Caddy (295100950).
- Includes 2 LinQ bases and marinized hardware for quick install.

LinQ Base Installation Kit

Fits LinQ Multi Cargo Rack

295101034



- LinQ Base kit allows use of up to three Sea-Doo LinQ accessories simultaneously on the LinQ Multi Cargo Rack.
- Includes 2 LinQ bases and marinized hardware for quick install.

LinQ Update Locking Anchor Base Kit

(Not illustrated)

RXT, RXT-X, GTX, GTX Ltd and WAKE PRO (2018 and some 2019)

295100858

- LinQ bases with locking system for staying in the "up" position while installing LinQ accessories.
- Required on 2018 models and some 2019 models, to install the LinQ 13.5 Gal (51 L) Cooler (269800943) .
- Replaces standard LinQ bases.
- Standard on all vehicle with LinQ (from factory) 2020 and up.

Marinized LinQ Hardware Kit

295100751



- Essential upgrade for LinQ Bags when used on watercraft in saltwater.
- Includes stainless steel LinQ hardware to render your LinQ fully corrosion proof.
- Quick and easy installation.
- Not required for installation of the LinQ Coolers, LinQ Watertight Bag and LinQ Box.

Bags and Storage

NEW Sea-Doo 14 L Cooler Bag

GTI, GTI SE, GTR, WAKE 170 (2020 and up) / GTX, GTX LTD, RXT-X, WAKE PRO (2018 and up) / All FISHPRO models (2019 and up)

295100965



- 14 L (3.7 US Gal) of thermal insulated soft-sided storage.
- Waterproof sealed construction.
- Magnetic top opening for quick access and sure seal when closed.
- Can hold ice for 2 days.
- Robust outer material for durability with a modern look.
- Carry handles and removable straps for easy transport to and from the water.
- Outside identification pocket.
- Dimensions: 13 ¾" L x 12 ¼" W x 9" H (35 cm L x 31 cm W x 22.5 cm H).

Removable Storage Bin Organizer

RXT, RXT-X, GTX, WAKE PRO (2018 and up) / FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY — **295100732**

GTI, GTI SE, GTR and WAKE 170 (2020 and up) / RXP-X (2021 and up) / FISHPRO SCOUT — **295100814**



- Breathable front bin organizer made from high-quality premium-coated synthetic mesh.
- Perfect for storing wet clothes away from the rest of your gear or to transport gear to/from the watercraft.
- Carrying handle and easy storage on or off the watercraft.
- Quick-attach fasteners to secure the bag in place inside the storage bin.
- Designed to be installed with the Storage Bin Organizer (295100835) for a complete set-up (295100732 only).

Storage Bin Organizer

RXT, RXT-X, GTX, WAKE PRO (2018 and up) / FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY

295100835



- Leave-in breathable premium-coated synthetic mesh organizer.
- Perfect for safely storing and organizing smaller valuables.
- Designed to be installed in conjunction with the Removable Storage Bin Organizer for a complete set-up (295100732).
- Standard on GTX Ltd models (2018 and up).

Lid Organizer

GTI, GTI SE, GTR and WAKE 170 (2020 and up) / RXP-X (2021 and up) / FISHPRO SCOUT

295100862



- Practically positioned in an easily accessible location in front compartment.
- Keep your small items dry in splash-proof inner pocket.
- External mesh pocket allows you to store more items while keeping them in view.
- 1.6 US Gal (6 L) volume.

Dry Bag - 10 L

269502121



- Watertight bag.
- Puncture-resistant PVC coated polyester fiber material.
- Reinforced bottom.

Dry Bag - 25 L

269001936



- Watertight bag.
- Puncture-resistant PVC coated polyester fiber material.
- Reinforced bottom.
- Includes a shoulder strap.
- 420-denier resistant polyester with TPU coating.

Front Deflector Lid Kit

SPARK

295100865



- Made of polypropylene, this removable deflector directs water away from the driver's feet and legs for a drier ride.
- BRP Audio-Portable System compatible.

Front Storage Bin Kit

SPARK

295100864



- Soft-sided design matches the contours of the SPARK to maximize storage.
- 7.4 US Gal (28 L) capacity.
- Polyurethane construction protects items from rough waves.
- Drain holes at bottom.
- BRP Audio-Portable System compatible.
- Front Deflector Lid Kit is included.

Front Storage Tray

RXP-X (2012-2020) / GTI and GTS (2011-2019) / GTR (2012-2019) / WAKE 155 (2011-2019)

295100583*



- Optimizes storage space.
- 3.2 US Gal (12 L) capacity.

Watersport Accessories

Tow Pro

SPARK 3up

295100605



- Three accessories in one – a tow pylon, spotter handle and equipment rack.
- Add more fun to pulling wakeboarders, wakeskaters and tubers thanks to higher tow point.
- Gives the spotter more confidence with ergonomic grab handles.
- Carry your board out to clear water.
- Includes a strap for conveniently stowing your tow rope.
- Not compatible with SPARK 3 up LinQ Base Installation Kit (296100802).

Note: Never use the Ski Pylon to tow an inflatable or similar toy. Always use the rear cleat.

LinQ Retractable Ski Pylon

RXT, RXT-X, GTX, GTX Ltd (2018 and up) / GTI, GTI SE, GTR (2020 and up) / All FISHPRO models (2019 and up)

295100909



- High-rise pylon keeps rope out of water for better watersport fun.
- Features built-in spotter grab handles and retracts out of the way when not in use.

Note: Never use the Ski Pylon to tow an inflatable or similar toy. Always use the rear cleat.

Strap Replacement Kit

295100740



Wakeboard Rack

RXT, RXT-X, GTX, GTX Ltd, WAKE PRO (2018 and up) / GTI, GTI SE, GTR, WAKE (2020 and up) / FISHPRO SCOUT

295100838



- Easy, safe onboard storage for your wakeboard.
- Convenient quick-release button for fast access.
- EVA foam cushion protects board edge while underway.
- Bungee cord with rubber pads holds board in place while preventing wear on the cord.
- Accommodates most sizes and styles of wakeboards and wakeskates.
- Sold individually, each rack holds one wakeboard.
- Standard on WAKE and WAKE PRO models.
- Parts numbers 291003104- 291002864 required for installation on GTI and GTS (2011-2019).
- Parts numbers 291003582-291002864 required for installation on RXT and GTX (2010-2017).
- Not compatible with angled gunwale footrests (stock on FishPro Sport and FishPro Trophy)

*While supplies last.

Shock Tube

295100662



- Protects passengers from ski rope kick-back and keeps it away from impellers.
- Durable nylon covered closed-cell foam.

Ski Tow Eye

GTX, GTS, GTI, RXT and GTR

291002351



- Replaces existing U-ring for easy towing of skiers and tubes.

Steps and Ladder

Boarding Step

SPARK

295100642



- Convenient step with knee-friendly surface.
- Installs easily on the right side of a SPARK and can hold up to 250 lb (113 kg).
- Easily mounts on the transom and can be installed by any authorized Sea-Doo dealer in minutes.

Boarding Ladder

RXT, RXT-X, GTX and WAKE PRO (2018 and up) / GTI, GTI SE, GTR and WAKE 170 (2020 and up) / RXP-X (2021 and up) / All FISHPRO models (2019 and up)

295100869

GTI, GTS, GTR (2006-2019) / RXP (2006 - 2020) / RXT-X and GTX (2006-2017)

295100742



- Retractable boarding step designed for your watercraft.
- Makes boarding from the water much easier.
- Spring-loaded platform that stays in the "up" position.
- Direct bolt-on installation, thanks to integrated mounting points on the watercraft.

Controls and Grips

Handlebar with Adjustable Riser

SPARK

295100746



- The one-of-a-kind handlebar with adjustable riser gives you more leverage to easily maneuver the SPARK and customize your experience to your personal riding style.
- Quickly adjust steering to a variety of heights - use the lower position for cruising/sitdown riding, or extend to maximum height in seconds for stand-up riding.
- Adjustable length of 1.6" to 4" (42.5 mm to 103.5 mm).
- Just flip the lever to make the adjustment, no tool required.

Part numbers you will also need for installation:

SPARK without iBR*
- 2016 and prior: 278003491, 295100702
- 2017 and up: 278003491

SPARK with iBR
- 2016 and prior: 278003490, 295100702
- 2017: 278003490
- 2018 and up: 278003823

**Intelligent Brake and Reverse (iBR).*

Adjustable Riser

RXP-X (2021 and up) — **295100922**



- Replaces stock fixed extrusion to allow vertical adjustment length of +⅝ to 3 ⅝ (+16mm to 92 mm) from stock.
- Ergonomically better in stand-up riding position.
- Includes all hardware required for installation.

Adjustable Riser Retrofit Kit

SPARK (2016 and prior) — **295100702**



- Replaces stock central console to allow for installation of Handlebar with Adjustable Riser.
- Handlegrips with Palm Rest included.
- Reinforced design, includes all hardware required for installation.

Step Wedges

SPARK — **295100705**



- Provide more stability and confidence in different tail stand riding positions.
- Rear footrest with a 45-degree slope to enable you to stand upright on your watercraft when performing tail stands and ultimately expand your range of possibilities by making it easier to pull off even more tricks.

Extended Range Variable Trim System (VTS)

(Not illustrated)

SPARK with iBR (2017 and up - full extended range), (2016 and prior - stock range) — **295100704**

- This Sea-Doo exclusive accessory lets you exaggerate how high you can raise the nose or how deep you can bury it in the water.
- The extended range VTS doubles the range of adjustment compared to our current standard VTS.
- Adjustments are instantaneous thanks to the quick activation switch mounted on the handlebar to allow fine tuning of the watercraft trim angle while riding.
- Simple plug-in connection, and includes switch, cap and hardware necessary for installation.
- Standard on SPARK TRIXX.

Wiring Harness

SPARK with iBR (2017 and prior)	**278003490**
SPARK with iBR (2018 and up)	**278003823**
SPARK without iBR	**278003491**



- Required in order to install the Handlebar with Adjustable Riser (295100746) and/or RF D.E.S.S Key (295100945).
- Works for either accessory or when using both at the same time, so no need to buy a second harness.

Handlebar

GTR-X (2016-2019) / RXP-X (2016 and up) / SPARK with Adjustable Riser

- **277002069** Neon Yellow
- **277002173** Dragon Red
- **277002172** White
- **277002123** Jungle Green
- **277002139** Millenium Yellow
- **277002161** Manta Green



- ⅞" (22 mm) colored stainless steel handlebar.

Wind Deflectors for Handlebar

GTX, RXT, RXT-X, and WAKE PRO (2010 and up) / GTI, GTS and WAKE (2011 and up) / GTR and RXP-X (2012 and up) / SPARK (2014 and up) — **295100762**



- Design delivers better protection and great style.
- Protection from cold wind and water splashes.
- Sold in pairs.

Heated Grips

RXT, RXT-X, GTX, GTX Ltd, WAKE PRO (2018 and up) / RXP-X (2021 and up) / GTI, GTI SE, GTR, WAKE (2020 and up) / All FISHPRO models (2019 and up)
Heated grip harness required to install on other vehicles

295100812



- Heated grips with integrated button on the left grip.
- 5 levels of heat.
- Slip on to replace existing grips.
- Integrate Sea-Doo's renowned palm rest design.
- Use with Wind Deflectors for handlebar (295100762) for maximum performance.
- Harness (278003684) is needed if installed with audio system or with GARMIN ECHOMAP™ UHD 72sv or 62cv GPS.

Heated Grips Harness

Needed for installation on some vehicles: GTX, RXT, WAKE PRO (2011-2017) / GTI,GTS, GTR, WAKE (2011-2019) / GTR-X (2018-2019) / RXP-X (2018-2020) / SPARK

295100906



Handlegrips Kit

Fits all watercraft (2000 and up) except SPARK (2015 and prior)

- **295500976** Blue/Black · Pairs
- **295500979** Red/Black · Pairs
- **295500981** Yellow/Black · Pairs
- **277001336** Slate Grey/Black · Sold individually



- Better control and comfort using dual density rubber design.

Handlegrip with Palm Rest

GXT, RXT, RXT-X and WAKE PRO (2010 and up) / GTI, GTS and WAKE (2011 and up) / GTR (2012 and up) / RXP-X (2012 and up) / SPARK (2014 and up) / All FISHPRO models

- **277001946** Black · Right
- **277002014** Red · Right
- **277001958** Black · Left
- **277002015** Red · Left



- Designed and profiled to deliver a much firmer grip with less effort, allowing you greater control and comfort on longer rides, minus the hand fatigue.
- Sold individually.

NEW Performance Handlegrip

Fits all watercraft (2000 and up) except SPARK (2015 and prior)

277001624



- Race-inspired rounded design for superior comfort.
- Designed for more surface contact with the handlebars for awesome confidence when riding aggressively.
- Sold individually.

Tech Accessories

BRP Audio-Portable System

SPARK

295101042



- 50 watt audio system with Bluetooth† connectivity.
- Fully submersible and removable, can be used on and off the watercraft.
- Front mounted and positioned toward driver for maximum sound clarity.
- Control pad on the speaker for volume and song adjustment.
- Powered with a rechargeable lithium battery that offers 24 hours* of autonomy.
- Support base with quick-attach system is required (295101051).

- Needed if installed in front of the Spark: Front Deflector Replacement Lid (295100870) is required when installing the sound system on 2018 and prior models with iBR and Convenience Package or when the Front Storage Bin Kit (295100864) or the Front Deflector Lid Kit (295100865) is installed.
- Adjustable Riser Retrofit Kit (295100702) is required to install on SPARK (2016 and prior).

Front Deflector Replacement Lid

SPARK

295100870



- Required when installing the BRP Audio-Portable System (295101042) on SPARK with iBR and Convenience Package (2018 and prior).
- Also needed when the Front Storage Bin Kit (295100864) or the Front Deflector Lid Kit (295100865) is installed on the watercraft.

- Included on 2019 and up models equipped with the same feature.
- To install the audio system in front of the Spark only.

BRP Audio-Portable System Support Base

SPARK

295101051



- Required to install the BRP Audio-Portable System (295101042).

BRP Audio-Premium System

RXT, RXT-X, GTX, WAKE PRO (2018 and up) / FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY

295100711

GTI, GTI SE, GTR and WAKE 170 (2020 and up) / RXP-X (2021 and up) / FISHPRO SCOUT

295100839



- Fully integrated Audio System with Bluetooth connectivity.
- Fully submersible.
- Two powerful 50 watt speakers for music clarity, even while riding.

- Remote control pad on left speaker to quickly and easily change songs and volume.
- Music will play even after engine is turned off.
- Need harness (278003684) if installed with the Garmin ECHOMAP™ UHD 72sv or 62cv GPS or heated grips.

USB Port

RXT, RXT-X, GTX, WAKE PRO (2018 and up) / RXP-X (2021 and up) / GTI, GTI SE, GTR, WAKE (2020 and up) / All FISHPRO models (2019 and up)

295100710



- Allows to charge your devices like phone and action camera.
- USB charger equipped with a smart module that detects the amperage your phone needs so you always enjoy consistent charge time and never have to worry about frying your device.

Electronics and Electricals

NEW Garmin† ECHOMAP™ UHD 72sv GPS

RXT, RXT-X, GTX, WAKE PRO (2019 and up) / GTI, GTI SE, GTR and WAKE 170 (2020 and up) / RXP-X (2021 and up)

295101057



- Bright, sunlight-readable 7" (17.8 cm) touchscreen.
- Transducer not included, provides GPS function only.
- Features a quick-release bail mount for quick installation and removal.
- Preloaded worldwide basemaps and compatible with Bluechart ® G3 coastal charts (sold separately)
- Share data and maps with select ECHOMAP devices on your network.
- Use built-in Wi-Fi® to pair with the free ActiveCaptain™ app for access to OneChart™, smart notifications†, Garmin Quickdraw™ Community data and more.
- Standard on FishPro Trophy model.

NEW Garmin† GT15M-IH Transducer

295100972



- Garmin's GT15M-IH In-Hull Mid-band CHIRP Transducer provides accurate depth readings even at high speed.
- Ideal for watercrafts that want to install the transducer inside a fiberglass hull and not on the transom.
- It can be used with a hull deadrise angle between 0 and 25 degrees and is excellent for watercrafts traveling at high speeds.
- In-Hull installation, no need to drill through the vessel; no drag.
- The 8-pin transducer with 4 plastic tanks features mid-band CHIRP traditional sonar (85-165 kHz) and has a power rating of 600 W.
- Requires Garmin† ECHOMAP™ UHD 72sv or 62cv GPS.
- Standard on FishPro Trophy model.

Garmin† ECHOMAP™ 62cv GPS with GT15M-IH Transducer

RXT, RXT-X, GTX, WAKE PRO (2019 and up*) / GTI, GTI SE, GTR and WAKE 170 (2020 and up) / RXP-X (2021 and up)

295100921



- Bright, sunlight-readable 6" (15.2 cm) monitor.
- Includes transducer for Garmin CHIRP traditional sonar.
- GT15M-IH In-Hull Mid-band CHIRP Transducer provides accurate depth readings even at high speed.
- Ideal for watercrafts that want to install the transducer inside a fiberglass hull and not on the transom.
- Features a quick-release bail mount for quick installation and removal.
- Preloaded worldwide basemaps and compatible with Bluechart ® G3 coastal charts (sold separately).
- Use built-in Wi-Fi to pair with the free ActiveCaptain† app for access to OneChart†, smart notifications, Garmin Quickdraw† Community data and more.
- Share waypoints and routes with other ECHOMAP or STRIKER† units.
- Need harness (278003684) if installed with the BRP Audio-Premium System or with heated grips.
- Standard on FishPro Sport and FishPro Scout models.

**For 2018 models, see your certified BRP dealer to validate compatibility.*

Garmin† ECHOMAP™ 62cv GPS

RXT, RXT-X, GTX, WAKE PRO (2019 and up*) / GTI, GTI SE, GTR and WAKE 170 (2020 and up) / RXP-X (2021 and up)

295100871



- Bright, sunlight-readable 6" (15.2 cm) monitor.
- Transducer not included, provides GPS function only.
- Features a quick-release bail mount for quick installation and removal.
- Preloaded worldwide basemaps and compatible with Bluechart ® G3 coastal charts (sold separately)
- Use built-in Wi-Fi to pair with the free ActiveCaptain† app for access to OneChart†, smart notifications, Garmin Quickdraw† Community data and more.
- Share waypoints and routes with other ECHOMAP or STRIKER† units.
- Need harness (278003684) if installed with the BRP Audio-Premium System or with heated grips.

**For 2018 models, see your certified BRP dealer to validate compatibility.*

Secondary Battery Harness Kit

GTI, GTI SE, GTR and WAKE 170 (2020 and up) / FISHPRO SCOUT
RXT, RXT-X, GTX and WAKE PRO (2018 and up) / FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY

295100990
295100991



(295100990 illustrated)

- Allows you to add a second unit to your dual battery setup.
- Will give you the extra juice you'll need to power electrical components like the BRP Audio-Premium System or Garmin Echomap GPS for longer periods.
- Kit includes necessary wiring and battery holder.
- Additional battery sold separately (410301203).

Battery Charger/Maintainer

715005061



- Fully automatic 3 Amp battery charger/maintainer.
- Keeps stored lead-acid batteries charged.
- Charges and maintains small batteries.
- Microprocessor controlled multi-stage charging for added precision, safety and battery life.
- Auto-voltage detection.
- Automatically detects 6 or 12 Volt batteries.
- Float mode monitoring automatically maintains optimum battery charge.
- Reverse hook-up protection helps protect battery and charger from damage.
- Hook attachment hangs outside the work area for safety and convenience.
- Display/on button.
- Press the display button to show the charge progress.
- Meets the highest industry standards for energy efficiency/eco friendliness.
- Content: 3 Amp battery charger, clamp adapter, DC adapter, 24" fused ring leads harness with weather cap, owner's manual.

RF Programmable D.E.S.S.™ Key Kit

SPARK

295100945



- Digitally Encoded Security System (D.E.S.S) key's ball-and-socket design provides riders with easy and quick starts every time.
- Anti-theft technology, the key communicates with the vehicle wirelessly, so the vehicle starts only when the key code matches the vehicle, for ultimate peace of mind.
- The RF Programmable D.E.S.S. Key can also be programmed to limit the speed of the watercraft enabling first time users and less experienced operators to learn how to operate while gaining the necessary confidence and control.
- Can be used as replacement key or second key.
- Includes RF programmable D.E.S.S.TM Key and D.E.S.S. post.
- Unlike previous D.E.S.S. Key kits, harness now sold separately.

Part numbers you will also need for installation:

- SPARK without iBR*: 278003491
- SPARK with iBR:
  2017 and prior: 278003490
  2018 and up: 278003823
- SPARK TRIXX:
  2017 and prior: 278003490 and 278003195
  2018 and up: 278003823 and 278003195

**Intelligent Brake and Reverse (iBR).*

RF programmable D.E.S.S.™ Key

All vehicles with D.E.S.S. key (2015 and up)

278003401 Green (Learning Key)
278003400 Yellow
278003402 Black
278003403 Orange



- Digitally Encoded Security System (D.E.S.S) key's ball-and-socket design provides riders with easy and quick starts every time.
- Anti-theft technology, the key communicates with the vehicle wirelessly, so the vehicle starts only when the key code matches the vehicle, for ultimate peace of mind.
- The RF Programmable D.E.S.S. Key can also be programmed to limit the speed of the watercraft enabling first time users and less experienced operators to learn how to operate while gaining the necessary confidence and control.
- Color options facilitate the differentiation between the programmed keys.
- Can be used as replacement key or second key.

Programmable D.E.S.S.™ Key

DI and 4-TEC models (2014 and prior)
All models (2014 and prior)

278002203 (Learning Key)
278002199



- Digitally Encoded Security System (D.E.S.S) key snaps on easily on the vehicle and provides riders easy and quick starts every time
- Anti-theft technology, the key communicates with the vehicle wirelessly, so the vehicle starts only when the key code matches the vehicle, for ultimate peace of mind.
- The Programmable D.E.S.S. Key can also be programmed to limit the speed of the watercraft enabling first time users and less experienced operators to learn how to operate while gaining the necessary confidence and control.
- Can be used as replacement key or second key.

12-Volt Outlet and Installation Kit



SPARK / GTI, GTS, GTR, WAKE 155 (2019 and prior) / RXP-X (2020 and prior)	**295100577**
GTX and RXT without suspension (2015 and prior) / WAKE PRO (2015 and prior)	**295100612***
GTX and RXT without suspension and WAKE PRO (2016-2017)	**295100675***

- Use this 12V outlet to charge your phone or GPS unit.
- Equipped with waterproof cover to prevent water infiltration.

Ski and X Package Module
(Not illustrated)

RXT, RXT-X, GTX, GTX Ltd, WAKE PRO (2018 and up) / GTI (2018-2019) / GTI SE, GTI LTD, GTR, WAKE (2018 and up) / All FISHPRO models (2019 and up) — **295100857**

- One module that includes both Ski and X Package functions:
- Activates ski mode: Offers a choice of different preset acceleration curves for perfect launch every time when towing a skier or wakeboarder, plus steady tow speed.
- Activates X package functions on gauge. See Xpackage module description to find out what are the X features that it unlocks on your vehicle.
- User-friendly interface on gauge.
- Simple plug-in connection.
- Includes hardware necessary for installation.

X Package Module
(Not illustrated)

RXT, GTX, GTX Ltd, WAKE PRO (2018 and up) / GTI (2018-2019) / GTI SE, GTI LTD, GTR, WAKE (2018 and up) / All FISHPRO models (2019 and up) — **295100757**

- User-friendly interface on gauge.
- Simple plug-in connection.
- Includes hardware necessary for installation.

Note: Harness (278002569) and 3 amps. fuse (710001008) are required to install on 2011 to 2017 models

For GTX, RXT and WAKE PRO (2018 and up), GTI, GTS, GTR and WAKE 155 (2020 and up) the features are:

- Average and top speed/RPM display unlocks launch mode control and the complete VTS range (50% more range)

For GTI, GTS, GTR and WAKE 155 (2011-2019) the features are:

- Lap timer, fuel time and distance to "empty", average and top speed/RPM display and engine temperature.

Ski Module
(Not illustrated)

GTI (2018-2019) / GTI SE, GTI LTD, GTR (2018 and up) / RXT, RXT-X, GTX LTD (2018 and up) — **295100756**

- Activates ski mode.
- Offers a choice of different preset acceleration curves for perfect launch every time when towing a skier or wakeboarder, plus steady tow speed.
- User-friendly interface on gauge.
- Simple plug-in connection.
- Includes hardware necessary for installation.

Note: Harness (278002569) and 3 amps. fuse (710001008) are required to install on 2011 to 2017 models.

*While supplies last.

DEPTH FINDERS

- Display the water depth below the hull.
- Plug-and-play connection.
- Standard on GTX Ltd models.

MODEL	YEAR	SKU
SPARK	2014 and up*	**295100679**
GTI 90, GTS 90 [Polytec Hull]	2017-2019*	**295100679**
GTI, GTR, GTR-X [Fiberglass Hull]	2011-2017	**295100679**
	2018-2019	**295100927**
GTI [Polytec Hull]	2019**	**295100927**
WAKE	2011-2017	**295100679**
	2018-2019**	**295100927**
GTI 90*, GTI 130, GTI SE, GTR, WAKE 170	2020 and up	**295100872**
GTX	2011-2017	**295100679**
	2018 and up	**295100927**
GTX iS/S/aS	2011-2017	**295100679**
GTX LTD	2011-2017	**295100679**
	2018 and up	**295100927**
RXT, RXT-X	2011-2017	**295100679**
	2018 and up	**295100927**
RXT iS, RXT-X aS	2011-2016	**295100679**
RXP, RXP-X	2012-2017	**295100679**
	2018 and up	**295100927**
WAKE PRO	2011-2017	**295100679**
	2018 and up	**295100927**

*Electric Connection Kit (295100599) required for installation.

**Mounting bracket (278002495) required for installation.

BILGE PUMP KITS

- Keeps engine compartment dry for added peace of mind.
- Includes all necessary items for installation (bilge pump, mounting bracket, bilge fitting, hose and hardware).
- Plug and play installation: Plugs directly to watercraft fuse box.

MODEL	YEAR	SKU
SPARK	2014 and up	**295100497**
GTI, GTI SE, GTS, GTR [Fiberglass hull]	2011-2019	**295100681**
GTI, GTS [Polytec Hull]	2011-2019	**295100497**
WAKE	2011-2017*	**295100681**
	2018-2019	**295100497**
	2020 and up	**295101035**
GTI, GTI SE, GTR	2020 and up	**295101035**
FISHPRO (All models)	2019 and up	**295101035**
GTX	2010-2015**	**295100681**
	2016-2017	**295100678**
GTX, GTX LTD	2018 and up	**295101035**
RXT, RXT-X	2010-2015**	**295100681**
	2016-2017	**295100678**
	2018 and up	**295101035**
RXP-X	2012-2015**	**295100681**
	2016-2017	**295100678**
	2021 and up	**295101035**
WAKE PRO	2010-2015**	**295100681**
	2016-2017	**295100678**
	2018 and up	**295101035**

For 2014 and 2015** models, see your certified BRP dealer to match the right kit to your watercraft.

Electric Connection Kit

All SPARK models, GTI 90 (2017 and up) | 295100599



- A very convenient and safe way to add electrical accessories.
- Plug-and-play connection.
- Required in order to install the Depth Finder on specific models (Refer to the Depth Finders table).

Body accessories

Ergolock Knee Pads

RXT, RXT-X, GTX and WAKE PRO (2018 and up) / FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY	**295100744** Silver
RXT, RXT-X, GTX and WAKE PRO (2018 and up) / FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY	**295100804** Black
SPARK	**295100810** Black



- Allow you to rest your knees on a comfortable pad.
- Help keep your legs locked in place on the Ergolock System.
- To be combined with the Floorboard Wedges for improved balance on the vehicle.

Floorboard Wedges

RXT, GTX and WAKE PRO (2018 and up) / FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY, Standard on RXT-X (2018 and up)	**295100745**
GTI, GTI SE, GTR, WAKE 170 (2020 and up) / FISHPRO SCOUT, Standard on RXP-X (2021 and up)	**295100926**
SPARK	**295100875**



- Designed for high performance riding, extended angled floorboard wedges will keep all riders and passengers firmly planted, comfortable and secure.
- When used in conjunction with our Ergolock Knee Pads, the wedges ensure everyone can enjoy the full capabilities of the watercraft.

Angled Gunwale Footrests

RXT, RXT-X, GTX and WAKE PRO (2018 and up) — **295100793**



- 4' long angled footrests with integrated mats, fixed on the upper outside edge of the footwell on each side of the watercraft.
- Provide a comfortable and secure position for the feet and legs while fishing from the side of the watercraft.
- Protect the paint finish on the edge of the footwells from abrasion caused by fishing.
- Standard on FISHPRO models.
- Not compatible with Wakeboard Holder.

Side Protectors

SPARK — **295100575**



- This 6-piece rubber formed protectors are specifically designed for the SPARK.
- Its curves and angles follow the lines of the watercraft to enhance the look while protecting it from small impacts and wear.
- Doesn't get in the way of Snap-in Fenders or any maintenance you need to perform.

Mirrors

SPARK — **295100881**



- Durable and rugged construction for withstanding rough riding conditions.
- Perfectly integrated to the vehicle.
- Convex lens for wide angle view.
- Sold in pairs.

Comfort Seat

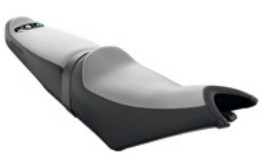
SPARK 2up — **295100893**



- Seat specially designed to increase riding comfort on extended rides.
- Features a formed and larger sitting surface for better weight spread and stability in rough water.
- Constructed with soft foam.
- Direct replacement of the standard seat.

Comfort Seat

SPARK 3up — **295100894**



- Seat specially designed to increase riding comfort on extended rides.
- Features a formed and larger sitting surface for better weight spread and stability in rough water.
- Constructed with soft foam.
- Direct replacement of the standard seat.

Passenger Seat	RXP-X (2021 and up)	**295100923**



- Only way to have a passenger on a stock RXP-X.
- Two grab options for passengers, side and middle.
- No tools required for installation – simply remove driver cushion, unclip base, clip on passenger seat.

Fishing Seat	RXT, RXT-X, GTX and WAKE PRO (2018 and up)	**295100882**



- Designed for ease of movement from driver position to passenger for fishing.
- Optimized for fishing facing sideways with increased lateral stability when combined with the Angled Gunwale Footrests (295100793).
- Fits all watercraft colorations.

Docking

Snap-in Fenders	Fit on all watercraft	**295100418**



- Protect your investment from dock damage with these easy to install and remove fenders designed specifically for Sea-Doo watercraft.
- Front and rear on the SPARK models ensure a solid mount in the optimal spot.
- The Snap-in Fenders float and the high-visibility orange color keeps them in sight.
- Requires Snap-in Fenders Installation Kit (295100550, 295100729 or 295100944) to install on models other than SPARK.
- Patent pending.
- Sold in pairs.

Snap-in Fenders Installation Kit	RXP-X (2012-2020) / GTI, GTR and GTS (2011-2019) / GTX, RXT, RXT-X and WAKE PRO (2010-2017)	**295100550**



- Lets you enjoy the fastest, easiest way to install protective fenders on your watercraft.
- Not required for SPARK models.

Snap-in Fenders Installation Kit	RXT, RXT-X, GTX and WAKE PRO (2018 and up) / FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY	**295100729**



- Lets you enjoy the fastest, easiest way to install protective fenders on your watercraft.
- Not required for SPARK models.

Snap-in Fenders Installation Kit	GTI, GTR and WAKE 170 (2020 and up) / RXP-X (2021 and up) / FISHPRO SCOUT	**295100944**



- Lets you enjoy the fastest, easiest way to install protective fenders on your watercraft.
- Not required for SPARK models.

Speed Tie

GTX, RXT, RXT-X, WAKE PRO (2018 and up)

295100885



- Fully-integrated watercraft mooring system, providing the ultimate in convenient, quick and secure docking.
- A must-have accessory that frees up storage space and ensures you have a dock line at all times.
- Easy to use, integrated rope management system.
- ¼ inch (6.4 mm) double braided rope, 5.2 feet (1.6 m) at front and 9 feet (2.8 m) at rear.
- Positive locking for worry-free docking.

Speed Tie

FISHPRO (2019-2021), FISHPRO SPORT, FISHPRO TROPHY

295100924



- Fully-integrated watercraft mooring system, providing the ultimate in convenient, quick and secure docking.
- A must-have accessory that frees up storage space and ensures you have a dock line at all times.
- Easy to use, integrated rope management system.
- ¼ inch (6.4 mm) double braided rope, 11.5 feet (3.5 m) at front.
- Positive locking for worry-free docking.

Speed Tie

SPARK

295100496

GTR (2012-2019) / GTI, GTI SE and GTS (2011-2019) / GTX without suspension (2010-2017) / WAKE PRO (2017 and prior) / RXT and RXT-X without suspension (2010-2017) / WAKE 155 (2010-2019)

295100680*



- Fully-integrated watercraft mooring system, providing the ultimate in convenient, quick and secure docking.
- A must-have accessory that frees up storage space and ensures you have a dock line at all times.
- Stores 5 ½' (1.7 m) of rope and locks to desired length.
- Standard equipment on the GTX Ltd models (2017 and prior).
- Sold in pairs.

Speed Tie for Dock

(Not illustrated)

295100336

- Same exclusive mooring system available as a watercraft accessory, adapted for dock mounting.
- Provides quick and secure mooring for all watercraft, eliminating excessive rope on deck.
- Bolts directly to dock.
- Stores 5 ½' (1.7 m) of rope and locks to desired length.
- Sold individually.

Folding Anchor

295100750



- 3.5 lb (1.6 kg) grapnel folding anchor with protective coating.
- Perfect for temporary mooring of watercraft and small boats in mud, sand, gravel, and rock.
- Includes a 25' (7.62 m) marine grade rope with an in-line buoy, heavy-duty stainless steel snap hook, and a nylon storage case.
- Compact enough for the storage compartment.

Sandbag Anchor

295100661 Yellow



- Made of 600-denier solution-dyed yellow polyester fabric capable of holding an estimated 45 lb (20 kg) of wet sand.
- Measures 15 ¾" x 9" (40 cm x 22.9 cm).
- 16' half-inch nylon strap (4.9 m x 1.3 cm).
- Plastic hook attachment and molded floater.

Dock Tie

295100851



- Moor your watercraft with this floating Sea-Doo shock cushioned nylon rope.
- Provides security to keep your watercraft and dock attached.
- One per package.

*While supplies last.

Manual Reverse Kit

SPARK without iBR — **295100596**



- This kit can be easily added to your SPARK and will help immensely in docking maneuvers and trailer loading.
- A lever located on the left side makes it easy to engage reverse and avoid the need for aggressive or dangerous maneuvers.

Fender

295100877



- Polyform strength and dependability with a vinyl valve system for quick, flexible adjustment of firmness.
- One 16" fender and one rope per package.

Riding Essentials

Safety Equipment Kit

295100330



- This kit includes all the essentials for your watercraft.
- 50' (15 m) of buoyant heaving line, bailer, whistle and watertight flashlight.

Whistle

295500554



- Pea-less whistle.
- Produces an extremely loud, high, penetrating sound that can be heard over long distances.
- Unaffected by water; just clear with one quick blow.

Fire Extinguisher

295100833 White



- A requirement for any watercraft.
- Designed to fit in any fire extinguisher case holder.
- Ideal for grease, oil and electrical fires.
- US and Canadian Coast Guard approved.

Registration Kit

3" (7.6 cm) All watercraft	**295100570** Black
3" (7.6 cm) All watercraft	**295100578** Light Grey
4" (10.2 cm) All watercraft · Meets international laws.	**295100631** Black



- High-quality UV-resistant registration kit.
- Easy to install without deformation, with a glue that will adhere to all surfaces, including SPARK.
- Available in two contrasting colors that meet mandatory regulations for height and size.

Blank Sheet for Stickers

(Not illustrated)

295100654 White

- Apply this self-adhesive sheet on your vehicle so you can add your own regional or other personalized stickers.

Covers

NEW All-Climate Storage Cover

GTX, RXT-X, WAKE PRO (2019 and up) / GTI, GTR, WAKE (2020 and up) / RXP-X (2021 and up) / All FISHPRO models (2019 and up)	**295100901**
SPARK 2up, SPARK 3up	**295100905**



- Protects watercraft surfaces from elements, dust, dirt, sun fading and more during storage.
- 100% waterproof plastic extrusion construction.
- Fused seams prevent leaking during rain or snow.
- Air vents allow circulation and prevent moisture build up.
- Soft inner lining protects watercraft from abrasion.
- Specifically designed for the perfect fit for easy installation and removal.
- Ideal replacement for shrink wrap storage for an eco-friendly solution.

**Not for use during trailering.*

Covers Key Features

- Weather-resistant trailering cover protects your watercraft during storage and transportation.
- Made of heavy-duty UV-resistant solution-dyed polyester canvas.
- Soft inner lining prevents panel abrasion.
- Areas prone to higher wear are reinforced with a layer of double canvas.
- A perfect fit for your watercraft, with or without installed Sea-Doo accessories.
- Standard on GTX LTD models.



1 Yellow fabric indicates handle insertion points.
2 Zippered openings allow easy access to mooring cleats.
3 Zippered opening permits easy access to the glove box 3.1, front storage 3.2 and for refueling 3.3.
4 Zippered opening accommodates LinQ accessories on the rear deck with the cover in place.
5 Patented air release vent system for trailering.
6 Side hooks secure the cover while trailering.
7 Zippered opening allows the use of tie-downs for securing covered watercraft on the trailer.
8 Speed tie ready.
9 FISH finder and GPS ready.

Features may vary depending on watercraft model cover.

MODEL		1	2	3.1	3.2	3.3	4	5	6	7	8	9	COLORS	SKU
GTX, RXT models with suspension	GTX S, GTX Limited S (2012-2017)	●	●					●	●	●	●		Black/ Light Grey	**295100718**
	RXT iS, GTX iS, GTX Limited iS (2009-2016)	●	●					●	●	●	●			**280000460**
	RXT-X aS (2011-2016)	●	●					●	●	●				**280000586**
GTX, RXT, WAKE PRO, FISHPRO models without suspension	RXT, RXT-X, GTX, WAKE PRO (2018 and up)	●	●	●	●	●	●	●	●	●	●	●	Black	**295101014**
	GTX S, GTX Limited, RXT, RXT-X (2010-2017)	●	●					●	●	●	●		Black/ Light Grey	**295100719**
	WAKE PRO (2010-2017)	●	●					●	●	●	●		Black	**295100720**
	FISHPRO SPORT, FISHPRO TROPHY	●	●	●	●	●	●	●	●	●		●	Black	**295100925**
RXP-X, GTR-X models	RXP-X (2012-2020)	●	●					●	●	●	●		Black/ Light Grey	**295100721**
	GTR-X (2017-2019)	●	●					●	●	●	●			**295100721**
	RXP-X (2021 and up)	●	●		●	●	●	●	●	●	●			**295100889**
GTS, GTI, GTR, WAKE models, FISHPRO SCOUT	GTS, GTS Rental, GTI, GTI SE, GTI Limited (2011-2019)	●	●					●	●	●	●		Black/ Light Grey	**295100722**
	GTR (2012-2019)	●	●					●	●	●	●			**295100723**
	WAKE (2011-2019)	●	●					●	●	●	●		Black	**295100724**
	GTI, GTI SE, GTR, WAKE 170 (2020 and up) / FISHPRO SCOUT	●	●		●	●	●	●	●	●	●	●	Black	**295100928**
SPARK models	SPARK 2up	●	●	●		●	●	●	●	●	●		Black	**295100912**
	SPARK 3up	●	●	●		●	●	●	●	●	●			**295100789**

Note: For prior model years, ask your dealer for details.



295100718
295100719
280000460
280000586



295101014



295100720



295100925



295100721
295100889



295100722
295100723



295100724



295100928

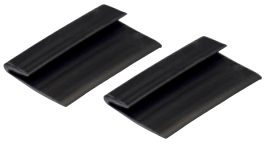


295100912
295100789

Cover Replacement Hooks	All models (2017 and up)	295100754



Cover Replacement Hooks	All models (2016 and prior)	295100407



Graphic Kits

Enjoy a wide range of combinations with any of our different graphic kits, available in 4 or 5 customization levels across multiple color themes.

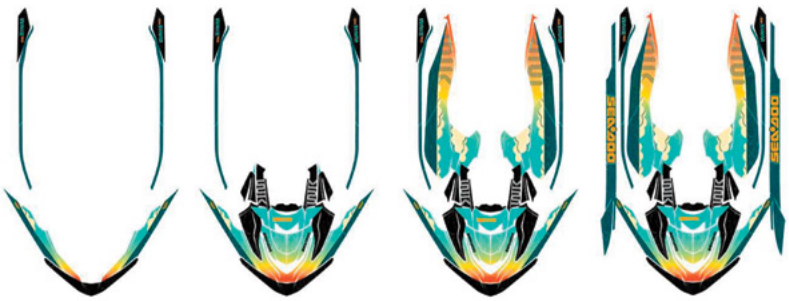
BOLD CUSTOMISATION LEVELS

These Sea-Doo exclusive Attitude Graphic Kits let you customize your vehicle, whether for a simple facelift or because you want your watercraft to turn heads.

SPARK
5 Levels



All Other Models
4 Levels



SCS UNLIMITED

Customize your wrap coloration, design and even add registration numbers. For more details, see **scsunlimited.com**

NEW GRAPHIC KITS

RXT-X
Particles



GTX LIMITED
Big Boss



GTI
Tsunami



TWAKE
Sanctuary



WAKE PRO
Golden
Hour



RXP-X
Heat



FISHPRO
Slayer



SPARK TRIXX
Launch



SPARK TRIXX
Icon





Parts & Maintenance

Parts & Maintenance

67 Replacement Parts
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71 Engine Oils
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72 Lubricants
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Sea-Doo limited warranty*

1-Year on BRP Parts

*Purchased at an authorized BRP dealership/distributor or on a BRP-authorized online store. Unless otherwise stipulated or required by law. Other exclusions may apply. See complete limited warranty or contact your authorized Sea-Doo dealer. This limited warranty does not apply to factor-installed accessories.

Replacement Parts

Battery 18 amps (HTX20L-FA)

18 amps, Wet (HTX20L-FA) — **296000441**



- OEM Sea-Doo battery made from absorbed glass mat (AGM) offering longer storage life and better performance than standard wet batteries.
- A factory filled permanently sealed / non-spillable battery for maintenance free use.(no need to check levels or add water).

Lift Kit

295100758



- Accurately lifts and positions your watercraft with a lift kit of nylon webbing and vinyl-coated steel lift plates.
- Lifting capacity of 1,200 lb (544 kg).
- Allows lifting from both straight and angled positions.

Sacrificial Anodes

Outside diameter: 26 mm. Height: 6 mm — **271001920**

Outside diameter: 26 mm. Height: 13 mm — **271001813**



- Sacrificial anodes are specifically designed to protect parts of your personal watercraft that are underwater from galvanic corrosion.
- Like the name implies, they essentially "sacrifice" themselves by absorbing the electrochemical process of corrosion to prevent metal components like the impeller, jet pump nozzle or engine from being "eaten away" instead.
- Galvanic corrosion can cause major damage if not controlled.
- Inspect your sacrificial anode at least once a month.
- Replace it when it is 50% depleted.

Sacrificial Anodes

1/4-18 NPT Anode for intercooler on models 260 and 300 hp (2016 and up). — **271001942**



- Sacrificial anodes are specifically designed to protect parts of your personal watercraft that are underwater from galvanic corrosion.
- Like the name implies, they essentially "sacrifice" themselves by absorbing the electrochemical process of corrosion to prevent metal components like the impeller, jet pump nozzle or engine from being "eaten away" instead.
- Galvanic corrosion can cause major damage if not controlled.
- Inspect your sacrificial anode at least once a month.
- Replace it when it is 50% depleted.

Supercharger Repair Kit

Fits all 215, 255 and 260 hp models — **420881102**



- Complete kit to rebuild your supercharger.
- Made of quality Sea-Doo genuine parts and metal washers to increase reliability.

See your certified BRP dealer to match the right parts to your watercraft.

IMPELLERS



High-performance impellers designed specifically to enhance engine performances and calibration. Offer perfect fit with wear ring and driveshaft components.

ENGINE	MODEL	YEAR	SKU
60/90	SPARK	2014 and up	**267000948**
	GTI GTS GTI SE 90	2017-2019	**267000919**
	GTI 90	2020 and up	**267001046**
130/155	GTI 130&155 GTI SE 130&155 GTS 130	2009-2019	**267000940**
	GTI 130 GTI SE 130	2020 and up	**267001044**
	GTI PRO GTX PRO	2020/2021	**267001076**
	WAKE 155	2011-2017	**267000940**
		2018-2019	**267001019**
	GTX 155 GTX S 155	2011-2017	**267000943**
		2018- 2019	**267001019**
	FISHPRO 155	2019	**267001019**
	FISHPRO SCOUT 130	2022	**267001044**
170	GTI SE 170 GTX 170 WAKE 170 FISHPRO 170 FISHPRO SPORT 170 FISHPRO TROPHY 170	2020 and up	**267001044**
215	GTR 215	2014-2016	**267000801**
	GTX 215 GTX LTD 215 WAKE PRO 215	2011-2016	**267000756**
230	GTR 230 GTR-X 230	2017-2019	**267000957**
	GTX-LTD 230 WAKE PRO 230	2017	**267000954**
	GTX 230 GTX LTD 230 WAKE PRO 230 RXT 230	2018	**267001021**
		2019	**267001038**
	GTX 230 GTX-LTD 230 WAKE PRO 230	2020 and up	**267001045**
255/260	GTX LTD iS & S 260	2012-2016	**267000945**
	RXP-X 255	2009-2011	**267000994**
	RXP-X 260	2012-2015	**267000984**
	RXT- X 260 RXT IS 255 & 260	2009-2010	**267000974**
	RXT 260 RXT AS 260 RXT IS 260	2011-2017	**267000945**
300	GTX LTD RXT-X 300	2016 and up	**267000951**
	RXP-X 300	2016-2020	**267000951**
	RXP-X	2021 and up	**267001050**

See your certified BRP dealer to match the right parts to your watercraft.

WEAR RINGS



- Simple, cost-effective way to keep the pump system operating like new.
- Restore tight clearance to your impeller.
- Reduce cavitation and recover lost performance caused by a worn ring.

MODEL	YEAR	SKU
SPARK	2014-2022	**267000925**
GTI 90	2017-2022	**267000897**
GTI SE 90	2017-2018	**267000897**
GTI PRO	2020	**267001036**
GTI/GTI SE 130	2009-2022	**267000419**
GTI SE 155	2009-2019	**267000419**
GTR 215	2012-2016	**267000372**
GTR 230 (all models)	2017-2022	**267000917**
GTS 90	2017-2019	**267000897**
GTS 130	2011-2016	**267000419**
GTS PRO 130 (Europe)	2011	**267000419**
GTS RENTAL 130	2014-2015	**267000419**
GTX 155	2009-2019	**267000419**
GTX S 155	2009-2017	**267000419**
GTX 170	2021-2022	**267000419**
GTX 215/255/260	2009-2017	**267000372**
GTX 230	2018	**267000372**
	2019-2022	**267000917**
GTX Ltd 230	2017 -2021	**267000917**
GTX Ltd 300	2016 -2022	**267000917**
GTX PRO	2020	**267001036**
FISHPRO SPORT, FISHPRO SCOUT, FISHPRO TROPHY	2019-2022	**267000419**
RXP-X (all models, except 300 hp)	2009-2015	**267000372**
RXP-X 300	2016-2022	**267000917**
RXT (all models, except 300 hp)	2009-2018	**267000372**
RXT 230	2019	**267000917**
RXT-X 300	2016-2022	**267000917**
WAKE 155	2009-2019	**267000419**
WAKE 170	2021-2022	**267000419**
WAKE PRO 215	2011-2016	**267000372**
WAKE PRO 230	2009-2018	**267000372**
WAKE PRO 230	2019-2022	**267000917**

See your certified BRP dealer to match the right parts to your watercraft.

Performance Accessories

Top-Loader Intake Grate

SPARK — **295100845**



- Intake grate with unique wing design for enhanced acceleration and top speed.
- Deep side rails improve straight line stability and handling.
- Durable black race coating protects from corrosion.
- IJSBA race legal.
- Pump Seal Kit (295100846) is required to fully unlock the benefits of the grate.

Pump Seal Kit

SPARK — **295100846**



- Location specific, molded inserts fill voids in intake grate shoe that can bleed air into pump causing cavitation.
- Allows for a positive seal for maximum performance.
- Required when installing the Top-Loader Intake Grate (295100845).

Pro-Series Sponson Kit

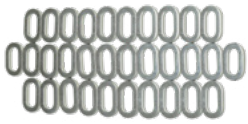
SPARK — **295100847**



- Race proven Pro-Series Sponsons will dramatically improve the handling of your watercraft with their superior blade and backing plate design.
- Includes a bulletproof mounting system that features a solid backing plate and four anchor points with billet aluminum inserts in sponson fins.
- Sponson depth is adjustable to control the amount of influence they have on the craft.
- Easy installation, uses original mounting studs.

Front and Rear Deck Hardware Upgrade Kit

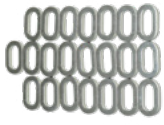
SPARK — **295100849**



- Includes 31 washers for front and rear deck, plus one extra washer.
- Sturdy stainless steel washer kit directly replaces the original plastic deck washers.
- Provides an awesome cosmetic upgrade along with increased durability.
- Precision machined washers are electropolished, providing excellent fit and finish.
- A must for repeatedly removing and replacing your deck for regular maintenance and inspection.

Main Deck Hardware Upgrade Kit

SPARK — **295100848**



- Includes 22 washers for main (center) engine access deck, plus one extra washer.
- Sturdy stainless steel washer kit directly replaces the original plastic deck washers.
- Provides an awesome cosmetic upgrade along with increased durability.
- Precision machined washers are electropolished, providing excellent fit and finish.
- A must for repeatedly removing and replacing your deck for regular maintenance and inspection.

Stainless Steel Wear Ring

230 hp (2020 and up), 300 hp (2016 and up)	**267001060**
GTI, GTS, WAKE, GTX 130, 155 and 170 (2011 and up)	**267000800**
SPARK	**295100649**
GTR 215 (up to 2016), RXT and GTX 260 (2009-2017), RXT and GTX 230 (2017-2018), RXT and GTX 215 (2009-2017)	**296000431**

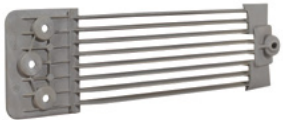


- Strong and durable stainless steel replacement wear ring.
- Resists debris damage and corrosion.
- Recommended if watercraft usage includes frequent beaching or shallow and swift water riding.
- Direct replacement and easy press-in installation.

Note: Please contact your nearest Sea-Doo dealer for suggested retail prices of those products.

Anti-Debris Water Intake Grate

GTI, GTS and WAKE (2011-2019) — **271001948**



- Protects jet pump assembly and cooling system by blocking rocks and debris larger than 0.39" (10 mm).
- Helps avoid damage and premature wear of the impeller and the wear ring.
- Also helps reduce algae accumulation.
- Recommended if watercraft usage includes frequent beaching or shallow and swift water riding.
- Expect a slight performance reduction.

Maintenance Products

Salt-Away†

295100219 Refill 1 US gal. (3.785 L)	
295100220 Refil 1 quart (946 ml)	
295100218 Concentrate with dispenser 1 quart (946 ml)	



- Mixed with water, it washes away the salt and leaves a protective coating on the surface to prevent rust and corrosion.
- Can also be used for trailer wash and maintenance.

Salt-Away† - Dispenser Unit

295100221



Flush Kit

SPARK (Standard on 2015 and up models)	**295100555**
For watercraft that do not yet have a "T" fitting and don't have the threaded water outlet on the ride shoe.	**295500068**



- A must to help keep your engine corrosion-free and to maximize performance.
- Kit includes all necessary components for a hassle-free flush.

Flush Adapter

295500473



- For most watercraft models with a threaded water outlet fitting on the ride shoe.

Coupler Hose

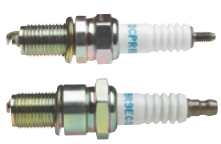
295500258



- For most watercraft models that already have a "T" fitting.
- Also for watercraft models that use the flush adapter on the ride shoe water outlet

NGK† Spark Plugs

DCP-R8E	**707000246**
KR9E-G	**296000421**
CR8EB	**415129403**



- BRP dealers carry the full line of premium NGK Spark Plugs for Sea-Doo watercraft.

Oil Filter

420956123 Rotax 900 ACE engine
420956744 Rotax 1500 cc or more engine



- Ask your certified BRP dealer to match the right parts to your watercraft.

Oil Vaccum Tool

295100244



- Safely and easily removes engine oil.
- Activate with a power drill.

Handpump with container

529035880



Engine Oils

XPS 4T 5W-40 Synthetic Blend Oil Change Kit

779250 Rotax 900 ACE engine
779251 Rotax 1500 cc or more engine



- Ultra-convenient "all-in-one" oil change kit saves time and money.
- Includes XPS Synthetic Blend Oil, oil filter, o-rings and washer.

XPS 4T 5W40 Synthetic Blend Oil

779133 1 qt. / 0.946 L
779134 1 US gal. / 3.785 L



- Designed for high-performance off-road, on-road and PWC 4-stroke engines, including turbo or supercharged powersports engines.
- Off-road formula with premium antiwear and anti-corrosion additives.
- Provides superior engine and transmission protection against rust and corrosion even in extreme conditions.

XPS 2T PWC Synthetic Blend Oil

779465 1 qt. / 0.946 L
779466 1 US gal. / 3.785 L



- Designed for all fuel injection, carbureted, oil injection or premix 2-stroke personal watercraft.
- Provides low smoke, easy cold starting.
- Ensures maximum protection against corrosion and wear by keeping engine parts lubricated and clean.

XPS 2T Racing Synthetic Oil

779180 1 qt. / 0.946 L
779181 1 US gal. / 3.785 L



- Designed for all fuel injection, carbureted, oil injection or premix 2-stroke personal watercraft.
- Provides low smoke, easy cold starting.
- Ensures maximum protection against corrosion and wear by keeping engine parts lubricated and clean.

Functionnal Fluids

Extended Life Pre-Mixed Coolant

779150 1 qt. / 0.946 L



- Antifreeze/Coolant contains the correct dilution and the necessary additives to prevent corrosion and inhibit cavitation in BRP cooling systems.
- Long-life, 5-year formula specially formulated for BRP vehicles.
- Superior heat transfer.
- Ideal replacement for vehicles that normally use a 2-year antifreeze/coolant (green).
- 5 years (orange).

Lubricants

Synthetic Grease

779162 14 oz. / 400 g



- Recommended for marine applications.
- This synthetic grease provides the best wear protection and water resistance available.

Synthetic Jet Pump Oil

779221 6 fl. oz. / 178 ml



- Synthetic Jet Pump Oil uses a unique combination of synthetic base stocks and additives that allow higher loads, superior shear stability and reduced oxidation compared to other synthetics and conventional API GL-5 oils.
- Recommended for use in Sea-Doo jet pump requiring oil.

Triple-Guard† Marine Grease

296000329 8 oz. / 227 g



- This tough grease stays in place and is unaffected by vibration, salt water or cold temperatures.
- Reformulated for high water resistance and improved adhesion to metal.
- Won't swell seals, packing or o-rings.
- Totally waterproof to prevent water wash-off.

Anti-Corrosive Lubricant

779166 14 oz. / 400 g



- Multipurpose lubricant that can also be used to prevent rust, corrosion and moisture intrusion.
- It contains extreme pressure additives that work as an all-around lubricant for just about anywhere lubrication is needed.

Anti-Corrosion Spray

219700304 11 oz. / 312 g



- Heavy, waxy coating specifically designed to protect your engine from rust and corrosion.
- Highly effective against corrosion caused by salt water and salt spray.

XPS Storage Oil

779173 12 oz. / 350 g



- High-performance fogging oil designed to protect internal engine parts from rust and corrosion.
- It coats engine internals throughout out the whole storage period and is burned away through combustion when engine is started.
- Protects engines during non-use or storage.
- Burns complete upon start up.

Fuel Stabilizer

779171 8 fl. oz. / 236 ml



- Ethanol-compatible and will stabilize fuel in your tank to keep it from breaking down and causing hard starting, throttle hesitation and poor run quality.
- Ethanol attracts moisture, and this product contains powerful anti-corrosion additives to protect fuel system components.
- Prevents problems associated with E10 fuels.

Fuel Treatment Carbon Free

779169 12 fl. oz. / 355 ml



- Combination of a fuel treatment and a fuel system cleaner that can be used periodically to restore lost starting or throttle performance, as well as maintain fuel system integrity and keep internal engine parts clean.
- It treats fuel for storage and addresses the moisture problems inherent in today's Ethanol-blended fuels, keeping ferrous and soft metal parts clean and free of corrosion.
- Uses patented, state-of-the-art additives.
- Cleans valves, sticky rings and combustion chamber.

Fuel Treatment Carburator Cleaner

779172 12 fl. oz. / 355 ml



- Complete fuel treatment specially formulated to prevent small engine problems caused by Ethanol-blended fuels.
- It removes fuel system gum and varnish that may have accumulated during storage, stabilizes fuel against breakdown for 12 months or more, and adds corrosion protection from moisture for short- and long-term storage.
- It also helps restore throttle response and easy starting.
- It can be used periodically to maintain fuel system integrity, keep carburetor jets clean, and also combat moisture problems caused by Ethanol-blended fuels to keep ferrous and soft metal parts clean and free of corrosion.

Cleaning Products

Sea-Doo® Hull Cleaner

779309 22 fl. oz. / 650 ml



- Eco-Friendly formula for use on all Sea-Doo® hulls including acrylic surfaces.
- Effective on waterline stains, algae, rust, scum and more, it dissolves grime without heavy scrubbing.
- Deep cleaning formula is safe on acrylic surfaces, fiberglass, gelcoat and painted surfaces of your hull.

All Purpose Cleaner & Degreaser

779313 22 fl. oz. / 650 ml
779314 2 qt. / 1.89 L



- Works above and below deck on tough stains, grease and grime.
- Effective on vinyl for mold and mildew too.
- This fast-acting phosphate free eco-friendly formula is safe on all boat surfaces.

Multi-Surface & Glass Cleaner

779316 22 fl. oz. / 650 ml



- Waterless all-purpose polymer cleaning solution for vinyl, paint, glass, plastic and chrome.
- Removes grime easily and leaves a thin protective layer, making future cleaning easier.
- Dries quickly with no streaks or marks left behind.

Wash & Wax

779310 16 fl. oz. / 473 ml
779311 2 qt. / 1.89 L



- One step wash and wax is eco-friendly and biodegradable.
- Contains wax and polymers to leave a brilliant shine.
- Safe and effective for all boat surfaces including non-skid, vinyl and canvas.
- Low suds formula rinses easily.

Wax & Sealant Nano-Polymer

779319 16 fl. oz. / 473 ml



- Premium polish and sealant for gelcoat, fiberglass and painted surfaces using nanotechnology for surface penetration and adhesion.
- Superior blend of two cross linked polymers, pure wax and silicone for the ultimate shine and long-lasting protection.
- Unmatched resistance to marine contaminants like UV rays, salt spray, water spots, bird droppings and insects.

Vinyl & Plastic UV Protectant

779317 16 fl. oz. / 473 ml



- Powerful UV blockers protect boat surfaces.
- Leaves a clean, non-greasy, satin finish that restores color and luster and prevents fading and cracking.
- Perfect for synthetic and natural rubber, plus it works on fiberglass, gelcoat and most plastic.
- Anti-static properties repel dust and grime.

Spray Wax with Polymer

779320 16 fl. oz. / 473 ml



- This nanotechnology approach combines polymers and wax for superior shine and protection that penetrates and adheres better to outperform other waxes.
- This premium product is perfect for acrylic surfaces, fiberglass, gelcoat, paint or plastic boat surfaces for a long-lasting protective barrier from the elements including the sun's UV rays.
- Safe to use even in direct sunlight.

Fabric Waterproofing

779321 22 fl. oz. / 650 ml



- Restores and preserves boat canvas and fabrics to keep them performing like new.
- Unique fluoropolymer formula restores water repellency, adds UV protection, stain protection and prevents color fading and premature aging of boat fabrics.
- Safe for natural and synthetic fibers, does not affect the fabric's feel, color or breathability.



Apparel

Apparel

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What do you need to wear on the water

Eyewear UV eyewear that stays secure on your ride and protects you from splash and spray.



PFD to keep you afloat during your ride.



Protective Bottoms: Undershorts or a neoprene bottom for protection from sun and water intrusion.



UV protection: Hats, caps, rashguards and neck rags for sun and splash protection.



Gloves: for better grip and hand protection.



Airflow PFD



1. **Airflow System:** keeps the life jackets surface away from the skin for a dryer more comfortable ride.
2. **Lumbar Comfort Zone:** Extra padding to minimize the pressure on your lower back and bolstering support.
3. **Mesh Panel:** Drain away excess water for quick drying and thermal regulated comfort.
4. Side panels in stretch lining fabric for improved mobility.
5. Durable YKK front zipper.
6. Armholes cut large for riding comfort.
7. Environmentally friendly ecoprene material.
8. Coast Guard approved

Explorer PFD

1. Reflective details for better visibility and security whenever the time of the day.
2. Heavy-duty Rip-stop Nylon material.
3. Durable YKK front zipper.
4. Armholes cut large for riding comfort.
5. Camera mount.
6. Whistle for better safety.
7. Multiple pockets for more storage during your adventure.
8. Handheld VHF radio holder.
9. Segmented foam at back bottom for increased comfort while seated.
10. Coast Guard approved.





PFD decision guide



Airflow

For ultimate comfort

- Lightweight and Quick dry.
- Airflow construction for extra breathability.
- Eco friendly materials.

M/F/U/T/K: M/F

Material:
- Ecoprene Shell.
- PVC free Gaïa foam.



Freedom

For freedom of movement

- Lightweight and Quick dry.
- Eco friendly materials.

M/F/U/T/K: M/F

Material:
- Ecoprene shell.
- PVC and PE foam inserts.



Explorer

For any adventure

- Storage for your adventures.
- Super durable material.
- Camera mount.

M/F/U/T/K: U

Material:
- Heavy-duty Rip-stop Nylon material.
- Polyethylene foam inserts.



Motion

Durable yet comfortable

- Durable yet comfortable.
- Freedom of movement .

M/F/U/T/K: M/F

Material:
- Heavy-duty polyester material.
- Polyethylene foam inserts.



Navigator

The affordable option

- Affordable.
- Entry level PFD.

M/F/U/T/K: U

Material:
- Heavy-duty polyester material.
- Polyethylene foam inserts.



Explorer JR

For your teen

- Specially developed for teens.
- Lightweight quick dry.
- Ecofriendly material.

M/F/U/T/K: T

Material:
- Ecoprene shell.
- PVC and PE foam inserts.



Sandsea

For your kids

- Protection for your young kids.
- Durable and safe.

M/F/U/T/K: K

Material:
- Heavy-duty polyester material.
- Polyethylene foam inserts.

Neoprene decision guide







	Undershorts	Neoprene shorts	3 mm Escape Shorty Wetsuit
	Breathable lightweight, with integrated protection against elements	**Great protection against the elements**	**Great protection against the elements, built for speed**
Top selling point	• Lightweight breathable fabric for warm weather. • To be worn under your boardshorts • Neoprene Protective panels for water intrusion protection.	• Stretch neoprene fabric for all around protection from water intrusion. • UV protection.	• Stretch neoprene fabric for all around protection from water intrusion. • Suited for moderate to cooler temperatures. • UV protection.
M/F/U/T/K	M/F	M/F	M/F
Usage	• Warm weather. • Water intrusion protection.	• Moderate weather. • Water intrusion protection.	• Moderate weather. • Performance speed protection. • Water intrusion protection.





	Montego Jacket & Pants	Riding jacket
	For layering on cold days or for ultimate protection for performance riders	**To be worn over you PFD for layering on colder days, and ultimate protection from the elements**
Top selling point	• Stretch neoprene fabric for all around protection from water intrusion. • Suited for high- speed impact protection or cooler temperatures. • Athletic fit.	• Stretch neoprene fabric for all around protection. • Best used for layering over PFD on colder days. • Relaxed fit.
M/F/U/T/K	M/F	M/F
Usage	• Cold weather. • Performance speed protection. • Water intrusion protection.	• Cold weather. • Performance speed protection.

Personal Flotation Device

MEN'S – PERSONAL FLOTATION DEVICE

NEW Men's Airflow Refraction Edition PFD

285966 S, M, L, XL, 2XL, 3XL

Black with Graphics (94),
Hi-Vis Yellow (26)



Descriptions:

- Soft and light PFD with a ultra-durable ecoprene outer shell and new Refraction design.

Features and technologies:

- Environmentally friendly ecoprene material that is rubber free, flexible, lightweight, breathable and quick dry.
- Vest interior constructed of eco-friendly 100% PVC-free Gaia foam.
- AIRFLOW SYSTEM: Interior EVA molding that keeps the life jackets surface away from the skin.
- LUMBAR COMFORT ZONE: Extra foam padding to minimize the pressure on your lower back while bolstering support.
- MESH PANEL: Drain away excess water for quick drying and thermal regulated comfort.
- Comfortable fit.
- YKK front zipper.
- Side panels in stretch lining fabric for improved comfort.
- Armholes cut large for riding comfort.
- Loop at back neck to attach your goggles to your vest.
- D-ring for key lanyard.
- Coast Guard approved.

Men's Airflow PFD

285938 S, M, L, XL, 2XL, 3XL

Black (90)



Descriptions

- Soft and light PFD with a ultra-durable ecoprene outer shell.

Features and technologies

- Environmentally friendly ecoprene material that is rubber free, flexible, lightweight, breathable and quick dry.
- Vest interior constructed of eco-friendly 100% PVC-free Gaiafoam.
- AIRFLOW SYSTEM: Interior EVA molding that keeps the life jackets surface away from the skin.
- LUMBAR COMFORT ZONE: Extra foam padding to minimize the pressure on your lower back while bolstering support.
- MESH PANEL: Drain away excess water for quick drying and thermal regulated comfort.
- Comfortable fit.
- YKK front zipper.
- Side panels in stretch lining fabric for improved comfort.
- Armholes cut large for riding comfort.
- Loop at back neck to attach your goggles to your vest.
- D-ring for key lanyard.
- Coast Guard approved.

Men's Freedom PFD

285942 S, M, L, XL, 2XL, 3XL

Black (90),
Orange (12),
Starlight Blue (84),
Sunburst Yellow (96)



Descriptions

- PFD with a ultra-durable ecoprene outer shell.

Features and technologies

- Environmentally friendly ecoprene material that is rubber free, flexible, lightweight, breathable and quick dry.
- Combination of PVC and polyethylene foam inserts.
- LUMBAR COMFORT ZONE: Extra foam padding to minimize the pressure on your lower back while bolstering support.
- MESH PANEL: Drain away excess water for quick drying and thermal regulated comfort.
- Comfortable fit.
- YKK front zipper.
- Segmentations at front and back for better comfort and ease of movement.
- Side panels in stretch lining fabric for improved comfort.
- Armholes cut large for riding comfort.
- Loop at back neck to attach your goggles to your vest.
- D-ring for key lanyard.
- Coast Guard approved.

NEW Men's Motion PFD

286800 S, M, L, XL, 2XL, 3XL, 4XL

- Hi-Vis Yellow (26),
- Navy (89),
- Red (30)



Descriptions

- PFD with heavy-duty polyester outer shell.

Features and technologies

- Heavy-duty polyester material.
- Polyethylene foam inserts.
- Segmented foam at back bottom for increased comfort while seated.
- Armholes cut large for riding comfort.
- Loop at back neck to attach your goggles to your vest.
- Coast Guard approved.

UNISEX – PERSONAL FLOTATION DEVICE

NEW Explorer PFD

285964 XS, S, M, L, XL, 2XL, 3XL, 4XL

- Black (90)



Descriptions

- PFD made of Heavy-duty Rip-stop Nylon outer shell.

Features and technologies

- Heavy-duty Rip-stop Nylon material.
- Polyethylene foam inserts.
- Segmented foam at back bottom for increased comfort while seated.
- Armholes cut large for riding comfort.
- Camera mount.
- Whistle.
- Handheld VHF radio holder.
- Loop at back neck to attach your goggles to your vest.
- D-ring for key lanyard.
- Multiple pockets.
- Coast Guard approved.

Navigator PFD

285947 XS, S/M, L/XL, 2XL/3XL, 4XL/6XL

- Charcoal Grey (07),
- Navy (89)



Descriptions

- PFD with a ultra-durable polyester outer shell.

Features and technologies

- Unisex value built PFD
- Polyethylene foam inserts.
- Dual-sized making it perfect for sharing
- Comfortable fit.
- Armholes cut large for riding comfort.
- Loop at back neck to attach your goggles to your vest.
- D-ring for key lanyard.
- Coast Guard approved.

LADIES' – PERSONAL FLOTATION DEVICE

NEW Ladies' Airflow Refraction Edition PFD

285968 S, M, L, XL, 2XL, 3XL

- Deep Purple (42),
- Turquoise (Aqua) (76)



Descriptions

- Soft and light PFD with a ultra-durable ecoprene outer shell and new Refraction design.

Features and technologies

- Environmentally friendly ecoprene material that is rubber free, flexible, lightweight, breathable and quick dry.
- Vest interior constructed of eco-friendly 100% PVC-free Gaia foam.
- AIRFLOW SYSTEM: Interior EVA molding that keeps the life jackets surface away from the skin.
- LUMBAR COMFORT ZONE: Extra foam padding to minimize the pressure on your lower back while bolstering support.
- MESH PANEL: Drain away excess water for quick drying and thermal regulated comfort.
- Comfortable fit.
- YKK front zipper.
- Side panels in stretch lining fabric for improved comfort.
- Armholes cut large for riding comfort.
- Loop at back neck to attach your goggles to your vest.
- D-ring for key lanyard.
- Coast Guard approved.

Ladies' Airflow PFD

285940 S, M, L, XL, 2XL, 3XL

- Raspberry (39)



Descriptions

- Soft and light PFD with a ultra-durable ecoprene outer shell.

Features and technologies

- Environmentally friendly ecoprene material that is rubber free, flexible, lightweight, breathable and quick dry.
- Vest interior constructed of eco-friendly 100% PVC-free Gaia foam.
- AIRFLOW SYSTEM: Interior EVA molding that keeps the life jackets surface away from the skin.
- LUMBAR COMFORT ZONE: Extra foam padding to minimize the pressure on your lower back while bolstering support.
- MESH PANEL: Drain away excess water for quick drying and thermal regulated comfort.
- Comfortable fit.
- YKK front zipper.
- Side panels in stretch lining fabric for improved comfort.
- Armholes cut large for riding comfort.
- Loop at back neck to attach your goggles to your vest.
- D-ring for key lanyard.
- Coast Guard approved.

Ladies' Freedom PFD

285945 S, M, L, XL, 2XL, 3XL

- Black (90),
- Light Blue (81),
- Turquoise (Aqua) (76)



Descriptions

- PFD with a ultra-durable ecoprene outer shell.

Features and technologies

- Environmentally friendly ecoprene material that is rubber free, flexible, lightweight, breathable and quick dry.
- Combination of PVC and polyethylene foam inserts.
- LUMBAR COMFORT ZONE: Extra foam padding to minimize the pressure on your lower back while bolstering support.
- MESH PANEL: Drain away excess water for quick drying and thermal regulated comfort.
- Comfortable fit.
- YKK front zipper.
- Segmentations at front and back for better comfort and ease of movement.
- Side panels in stretch lining fabric for improved comfort.
- Armholes cut large for riding comfort.
- Loop at back neck to attach your goggles to your vest.
- D-ring for key lanyard.
- Coast Guard approved.

NEW Ladies' Motion PFD

286803 S, M, L, XL, 2XL, 3XL, 4XL

- Navy (89),
- Red (30)



Descriptions

- PFD with a ultra-durable polyester outer shell.

Features and technologies

- Heavy-duty polyester material.
- Polyethylene foam inserts.
- Segmented foam at back bottom for increased comfort while seated.
- Armholes cut large for riding comfort.
- Loop at back neck to attach your goggles to your vest.
- Coast Guard approved.

JUNIOR – PERSONAL FLOTATION DEVICE

Junior Explorer PFD (US/CA)

285954 L (55-88 lbs) (25-40 kg) | Blue (80)



Descriptions

- PFD made of ultra-durable ecoprene outer shell for kids.

Features and technologies

- Environmentally friendly ecoprene material that is rubber free, flexible, lightweight, breathable and quick dry.
- East of movement.
- Fitted.
- Combination of PVC and polyethylene foam inserts.
- YKK front zipper.
- Armholes cut large for riding comfort.
- For kids of 50 to 90 lbs.
- Coast Guard Approved.

KIDS' – PERSONAL FLOTATION DEVICE

Kids' Sandsea PFD

285950 M (33-55 lbs) (15-25 kg), L (55-88 lbs) (25-40 kg) | Charcoal Grey (07)



Descriptions

- PFD made of heavy-duty polyester outer shell for kids.

Features and technologies

- Heavy-duty polyester material.
- Polyethylene foam inserts.
- Armholes cut large for comfort.
- Life jacket size Small: comes with Coast Guard approved pillow. Certified for general boating use, not watercraft.
- Coast Guard approved.

Kids' Sandsea PFD

285949 S (0-30 lbs) (0-14 kg) | Navy (89)



Descriptions

- PFD made of heavy-duty polyester outer shell for kids.

Features and technologies

- Features and technologies:
- Heavy-duty polyester material.
- Polyethylene foam inserts.
- Armholes cut large for comfort.
- Life jacket size Small: comes with Coast Guard approved pillow. Certified for general boating use, not watercraft.
- Coast Guard approved.

Rashguards

MEN'S – RASHGUARDS

NEW Long Sleeve Rashguard Beach

454493 S, M, L, XL, 2XL

● Black (90)



Descriptions:

- Long Sleeve Rashguard Beach with athletic fit.

Features and technologies:

- 87% polyester, 13% spandex.
- UV protection 50 UPF.
- Athletic fit.
- 4-way stretch.
- Quick dry.

Long Sleeve Rashguard Adventure

454460 S, M, L, XL, 2XL

● Black (90),
● Turquoise (Aqua) (76)



Descriptions:

- Long Sleeve Rashguard Adventure with a relaxed fit.

Features and technologies:

- 87% polyester, 13% spandex.
- UV protection 50 UPF.
- Relaxed fit.
- 4-way stretch.
- Quick dry.

Long Sleeve Rashguard Signature

454459 S, M, L, XL, 2XL

● Black (90),
● Warm Grey (15)



Descriptions:

- Long Sleeve Rashguard Signature with a relaxed fit.

Features and technologies:

- 87% polyester, 13% spandex.
- UV protection 50 UPF.
- Relaxed fit.
- 4-way stretch.
- Quick dry.

Short Sleeve Rashguard Beach

286798 S, M, L, XL, 2XL

● Hi-Vis Yellow (26),
● Warm Grey (15)



Descriptions:

- Short Sleeve Rashguard Beach with athletic fit.

Features and technologies:

- 87% polyester, 13% spandex.
- UV protection 50 UPF.
- Athletic fit.
- 4-way-stretch.
- Quick dry.

Short Sleeve Rashguard Signature

454487 S, M, L, XL, 2XL

- Black (90),
- Turquoise (Aqua) (76)



Descriptions:

- Short Sleeve Rashguard Signature with a relaxed fit.

Features and technologies:

- 87% polyester, 13% spandex.
- UV protection 50 UPF.
- Relaxed fit.
- 4-way stretch.
- Quick dry.

LADIES' – RASHGUARDS

Ladie's Long Sleeve Rashguard Beach

454464 S, M, L, XL

- Turquoise (Aqua) (76)



Descriptions:

- Ladies Long Sleeve Rashguard Beach with relaxed fit.

Features and technologies:

- 87% polyester, 13% spandex.
- UV protection 50 UPF.
- Relaxed fit.
- 4-way stretch.
- Quick dry.

Ladies' Long Sleeve Rashguard Signature

454465 S, M, L, XL

- Black (90),
- Navy (89)



Descriptions:

- Ladies Long Sleeve Rashguard Signature with a relaxed fit.

Features and technologies:

- 87% polyester, 13% spandex.
- UV protection 50 UPF.
- Relaxed fit.
- 4-way stretch.
- Quick dry.

Ladies' Short Sleeve Rashguard Beach

454461 S, M, L, XL

- Navy (89),
- Warm Grey (15)



Descriptions:

- Ladies Short Sleeve Rashguard Beach with athletic fit.

Features and technologies:

- 87% polyester, 13% spandex.
- UV protection 50 UPF.
- Athletic fit.
- 4-way stretch.
- Cap sleeves.
- Quick dry.

Ladies' Short Sleeve Rashguard Signature

454484 S, M, L, XL

- Black (90),
- Ivory (97)



Descriptions:

- Ladies Short Sleeve Rashguard Signature with a relaxed fit.

Features and technologies:

- 87% polyester, 13% spandex.
- UV protection 50 UPF.
- Relaxed fit.
- 4-way stretch.
- Quick dry.

Wetsuits

MEN'S – WETSUITS

Neoprene Riding Jacket

286787 S, M, L, XL, 2XL, 3XL | Orange (12)



Descriptions:

- 2/1,5mm Neoprene Riding Jacket to be worn over your PFD for extra warmth and protection of the elements.

Features and technologies:

- 90% Neoprene stretch fabric, 10% Nylon.
- 1, 5mm neoprene super stretch fabric at underarm, cuff and sleeve tabs.
- UV protection.
- Adjustable hood & cuff.
- YKK durable front and pockets zippers.

3 mm Escape Shorty Wetsuit

286788 XS, S, M, L, XL, 2XL, 3XL | Navy (89)



Descriptions:

- 3mm Neoprene Escape Shorty Wetsuit for extra protection.

Features and technologies:

- 90% Neoprene stretch fabric, 10% Nylon.
- UV protection.
- Open collar for better mobility with adjustable velcro.
- YKK durable back zipper.
- Glideskin seals on the edge of arms & legs.
- Back zip with extended puller.

Montego Jacket

286810 S, M, L, XL, 2XL | Navy (89)



Descriptions:

- 3mm neoprene Montego Jacket for protection against the elements.

Features and technologies:

- 90% Neoprene stretch fabric, 10% Nylon.
- Super stretch fabric on sides: 82% nylon, 18% spandex.
- UV protection.
- Athletic fit.
- YKK durable front zipper.
- Hidden keyloop.
- Super stretch neoprene at cuff for easy wrist opening.
- Flatlock stitch construction to prevent chafing.

NEW Montego Pants

286809 S, M, L, XL, 2XL | Black (90)



Descriptions:

- 3/2mm neoprene Montego Pants for protection against the elements.

Features and technologies:

- 90% Neoprene, 10% Nylon.
- 2mm super stretch fabric on sides: 82% nylon, 18% spandex.
- 1mm neoprene + abrasion resistant knees for better durability.
- UV protection.
- Athletic fit.
- Ergonomic waistband and tall back for more coverage.
- Side pocket with zipper + Key loop

NEW Neoprene Shorts

286808 S, M, L, XL, 2XL, 3XL | Black (90)



Descriptions:

- 2mm neoprene shorts.

Features and technologies:

- 90% Neoprene stretch fabric, 10% Nylon.
- UV protection.
- Fitted.
- Ergonomic waistband and tall back for more coverage.
- Seamless seam construction to prevent friction on the skin.
- Side pocket + key loop.

NEW Protective Undershorts

454581 XS, S, M, L, XL, 2XL, 3XL | Black (90)



Descriptions:

- New breathable Protective Riding Shorts perfect for warmer weather.

Features and technologies:

- 80% Nylon, 20% Spandex.
- 2mm neoprene stretch fabric around seating area for better protection.
- UV protection.
- Inner elastic waistband.
- Inseam: 6 ¾"

LADIES' – WETSUITS

NEW Ladies' 3 mm Exotic Shorty Wetsuit

286813 XS, S, M, L, XL, 2XL | Deep Purple (42)



Descriptions:

- 3/2mm neoprene Exotic Shorty Wetsuit.

Features and technologies:

- 90% neoprene stretch fabric, 10% nylon.
- 2mm side super sretch fabric: 94% Nylon, 6% Spandex.
- 3mm neoprene outershell and under flap.
- UV protection.
- Open collar for better movement ease with adjustable velcro.
- Glideskin seals on the edge of arm & leg.
- YKK durable back zipper with Sea Doo puller.
- Side pocket + key loop.

Ladies' Montego Jacket

286812 XS, S, M, L, XL, 2XL | Deep Purple (42)



Descriptions:

- Ladies 3mm neoprene Montego Jacket for protection against the elements.

Features and technologies:

- 90% neoprene, 10% nylon.
- Super stretch fabric: 82% nylon, 18% spandex.
- UV protection.
- Athletic fit.
- YKK durable front and pockets zippers.
- Hidden keyloop.
- Super stretch neoprene at cuff for easy wrist opening.
- Flatlock stitch construction to prevents chafing.

LADIES' – WETSUITS

NEW Ladies' Montego Pants

286811 XS, S, M, L, XL, 2XL | ● Black (90)



Descriptions:

- Ladies 3/2mm neoprene Montego Pants for protection against the elements.

Features and technologies:

- 90% Neoprene, 10% Nylon.
- 2mm super stretch fabric on sides: 82% nylon, 18% spandex.
- 1mm neoprene + abrasion resistant knees for better durability.
- UV protection.
- Athletic fit.
- Ergonomic waistband and tall back for more coverage.
- Side pocket with zipper + Key loop

Ladies' Neoprene Shorts

286786 XS, S, M, L, XL, 2XL | ● Black (90)



Descriptions:

- Ladies 2mm Neoprene Riding Shorts.

Features and technologies:

- 90% Neoprene stretch fabric, 10% Nylon.
- UV protection.
- Made to protect from water intrusion and overall safety.
- Yoga-type waistband.
- Flatlock stitched construction is non chaffing on skin.
- Sea-doo print on side.

NEW Ladies' Protective Undershorts

286799 XS, S, M, L, XL, 2XL, 3XL | ● Black (90)



Descriptions:

- New breathable Protective Riding Shorts perfect for warmer weather.

Features and technologies:

- 82% Nylon, 18% Spandex.
- 2mm neoprene super stretch fabric around seating area for protection against water instrusion.
- UV protection.
- Inner elastic waistband.
- Inseam: 4 ¼"

Eyewear

UNISEX – GOGGLES

Sea-Doo Riding Goggles

448623 Onesize

Green (70), Orange (12), Silver (08)



Features and technologies:

- Featuring anti-fog technology with colored chrome lenses.
- Indirect ventilation frame.
- Adjustable strap system.
- Goggles-to-PFD attachment safety cord.
- Optional Riding Goggles RX Insert (448624) (sold separately).
- 90% plastic, 10% neoprene.

NEW Sea-Doo Wave Polarized Floating Sunnies

448717 Onesize

Gold (11), Green (70), Red (30), Silver (08), Turquoise (Aqua) (76)



Features and technologies:

- Polarized chrome colored lenses.
- Floating frame technologies.
- UV400 Protection.
- Air-injected arms for floatability and light weight.
- Adjustable safety strap system.
- 90% plastic, 10% neoprene.

NEW Sea-Doo Sand Polarized Floating Sunnies

448746 Onesize

Blue (80), Gold (11), Green (70), Orange (12), Red (30)



Features and technologies:

- Polarized chrome colored lenses.
- Floating frame technologies.
- UV400 Protection.
- Air-injected arms for floatability and light weight.
- Removable and adjustable safety strap system.
- 90% plastic, 10% neoprene.

NEW Sea-Doo Lagoon Polarized Floating Sunnies Goggles

448747 Onesize

Blue (80), Brown (04), Orange (12), Pink (36)



Features and technologies:

- Polarized chrome colored lenses.
- Floating frame technologies.
- UV400 Protection.
- Air-injected arms for floatability and light weight.
- Removable and adjustable safety strap system.
- 90% plastic, 10% neoprene.

Handwear

UNISEX – HANDWEAR

Neoprene Gloves

286729 XS, S, M, L, XL, 2XL

● Black (90)



Descriptions:

- 1.5mm Neoprene Gloves for cold.

Features and technologies:

- 90% Neoprene, 10% Nylon.
- UV protection.
- Super stretch material for superior comfort and mobility.
- Anti-slip rubberized print at palms.
- Pre-shaped fingers.

NEW Sea-Doo Choppy Gloves

446332 XS, S, M, L, XL, 2XL, 3XL

● Black (90),
● Deep Purple (42),
● Turquoise (Aqua) (76)



Descriptions:

- Sea-Doo Choppy Gloves with stretch fabric.

Features and technologies:

- 74% nylon, 17% polyurethane, 8% chloroprene Rubber, 1% polyester.
- Double stitching in high stress areas for durability.
- Touch screen.
- Clarino† Nash palm material with 2mm padding and rubberized Pro-Grip at palm to ensure a solid hold.
- Stretch neoprene cuffs.

NEW Sea-Doo Choppy Shorty Gloves

446333 XS, S, M, L, XL, 2XL, 3XL

● Black (90),
● Turquoise (Aqua) (76)



Descriptions:

- Sea-Doo Choppy Shorty Gloves with stretch fabric.

Features and technologies:

- 75% nylon, 18% polyurethane, 7% chloroprene Rubber.
- Double stitching in high stress areas for durability.
- Clarino† Nash palm material with 2mm padding and rubberized Pro-Grip at palm to ensure a solid hold.
- Stretch neoprene cuffs.

Footwear

UNISEX – FOOTWEAR

Sea-Doo Riding Boots

444257 7, 8, 9, 10, 11, 12, 13

● Black (90)



Descriptions:

- Sea-Doo Boots made for performance riding.

Features and technologies:

- 50% EVA, 40% mesh, 10% lycra.
- Antimicrobial treatment.
- Lightweight EVA midsoles.
- All-around protective urethane coating.
- Mesh uppers and perforated insoles for fast water evacuation.
- Non-slip and non-marking outsoles.
- These amphibian mid cut boots will allow you to ride hard while protecting your ankles from impact against the hull.

Sea-Doo Water Shoes

444256 7, 8, 9, 10, 11, 12, 13

● Turquoise (Aqua) (76),
○ White (01)



Descriptions:

- Lightweight Sea-Doo Water Shoes.

Features and technologies:

- 45% mesh, 40% EVA, 15% lycra.
- Antimicrobial treatment.
- Lightweight EVA midsoles.
- All-around protective urethane coating.
- Mesh uppers and perforated insoles for fast water evacuation.
- Non-slip and non-marking outsoles.
- Amphibian low cut shoes that offer protection on the water and running shoe like outside the water."

Sea-Doo Neoprene Boots

286702 5, 6, 7, 8, 9, 10, 11, 12, 13

● Black (90)



Descriptions:

- 5mm Neoprene Boots to keep you feet warm during your ride.

Features and technologies:

- 90% Neoprene, 10% Nylon.
- Double-glued and blind stitched neoprene construction.
- Non-corrosive heavy-duty zipper.
- Flexible rubber toe and heel protection caps.
- Molded outsole with non-slip tread design.
- Anti-slip insole.

Sportswear

MEN'S – SPORTSWEAR

NEW Windproof Jacket

454483 S, M, L, XL, 2XL, 3XL

● Black (90)



Descriptions:
- Windproof Lightweight jacket.

Features and technologies:
- 100% polyester.
- Water resistant, windproof and quick dry.
- Stowable hood.
- 2 hand pockets & 1 chest pocket.

Sea-Doo Sunset Tech Zip-up

454458 S, M, L, XL, 2XL, 3XL

● Navy (89)



Descriptions:
- Sea-Doo Sunset Tech Zip-up hoodie.

Features and technologies:
- 95% polyester, 5% spandex.
- Kangaroo pocket.
- Adjustable hood.
- 2 hand pockets & 1 chest pocket.

Sea-Doo Hoodie Signature

454456 S, M, L, XL, 2XL, 3XL

● Heather Grey (27)



Descriptions:
- Sea-Doo Hoodie Signature.

Features and technologies:
- 60% cotton, 40% polyester fleece.
- Kangaroo pocket.
- Drawcord adjustable hood.

NEW Adventure Cargo Shorts

454490 S, M, L, XL, 2XL, 3XL

● Black (90), ● Warm Grey (15)



Descriptions:
- Adventure Cargo Shorts with relaxed fit.

Features and technologies:
- 92% nylon, 8% spandex.
- UV protection 30 UPF.
- Breathable Fabric.
- Relaxed fit.
- Stretch engineered waistband with belt and buckle.
- 2 Hand pocket & 1 side pocket.
- Hidden Key loop.
- Inseam: 9".

NEW Beach Boardshorts

454491 S, M, L, XL, 2XL, 3XL

● Black (90),
● Turquoise (Aqua) (76)



Descriptions:

- Beach Boardshorts with light fabric.

Features and technologies:

- 90% polyester, 10% spandex.
- 4-way stretch fabric.
- Adjustable waist with drawcord
- Back zippered pocket.
- Inseam: 8".

Sea-Doo Signature Cap

454518 Onesize

● Black (90), ● Navy (89),
● Pink (36), ● Warm Grey (15)



Descriptions:

- Sea-Doo Signature Cap.

Features and technologies:

- 100% Cotton.
- Snapback closure at back.

NEW Sea-Doo Tech Short Sleeve Polo

454482 S, M, L, XL, 2XL, 3XL

● Heather Charcoal (29),
● Heather Grey (27),
○ White (01)



Features and technologies:

- 85% polyester, 15% spandex.
- Relaxed fit.
- Quick dry.
- 2 buttons placket on neck line.
- UPF 30 UV protection.

NEW Sea-Doo UV Protection T-Shirt

454486 S, M, L, XL, 2XL, 3XL

● Heather Charcoal (29),
● Navy (89)



Features and technologies:

- 100% polyester.
- UV protection 30 UPF.
- Relaxed fit.
- Quick dry.
- 3D chest logo.
- Shoulder black welding band.

Retro Sea-Doo T-Shirt

454457 S, M, L, XL, 2XL, 3XL

● Black (90), ○ White (01)



Features and technologies:
- 100% cotton.
- Relaxed fit.

Stamp Sea-Doo T-Shirt

454453 S, M, L, XL, 2XL, 3XL

● Heather Grey (27),
● Turquoise (Aqua) (76)



Features and technologies:
- 60% cotton, 40% polyester jersey.
- Relaxed fit.

Sea-Doo Signature T-Shirt

454452 S, M, L, XL, 2XL, 3XL

● Black (90),
● Turquoise (Aqua) (76),
○ White (01)



Features and technologies:
- 100% cotton.
- Relaxed fit.

LADIES' – SPORTSWEAR

NEW Ladies' Windproof Jacket

454481 S, M, L, XL, 2XL, 3XL

● Navy (89)



Descriptions:
- Ladies Windproof lightweight jacket.

Features and technologies:
- 100% nylon.
- Water resistant, windproof and quick dry.
- Stowable hood.
- 2 exterior hand pockets.
- Sea-Doo hologram logo at back.

NEW Ladies' Crewneck Sweatshirt

454485 XS, S, M, L, XL, 2XL

○ Ivory (97), ● Yellow (10)



Descriptions:
- Ladies Crewneck Sweatshirt with relaxed fit.

Features and technologies:
- Real heather: 100% cotton.
- Solid color: 60% cotton, 40% polyester jersey.
- Relaxed fit.
- Rib on collar, cuffs and hem.
- Real heather.

Ladies' Beach Cap

454469 Onesize

● Navy (89)



Descriptions:
- Ladies lightweight Beach Cap.

Features and technologies:
- 80% polyester, 20% cotton.
- Mesh at back.
- Foam crown.
- Snapback closure at back.

NEW Ladies' Visor Cap

454480 Onesize

● Black (90)



Descriptions:
- Ladies Visor Cap.

Features and technologies:
- 100% cotton.
- Back adjustment.

NEW Ladies' Racerback Tank

454488 XS, S, M, L, XL, 2XL

○ White (01)



Descriptions:
- Ladies Racerback Tank with relaxed fit.

Features and technologies:
- 77% polyester, 18% tencel, 5% spandex.
- Breathable, lightweight and comfortable fabric.
- Relaxed fit.
- Longer at back.

Ladies' Retro T-Shirt

454468 XS, S, M, L, XL, 2XL

● Navy (89)



Features and technologies:
- 95% cotton, 5% spandex jersey.
- Fitted fit.
- Stretch fabric.

LADIES' – SPORTSWEAR

Ladies' Sea-Doo Signature T-Shirt

454451 XS, S, M, L, XL, 2XL

Heather Grey (27),
Navy (89), White (01)



Features and technologies:

- 95% cotton, 5% spandex jersey.
- Stretch fabric.
- Fitted fit.

KIDS'/TEEN – SPORTSWEAR

Youth Sea-Doo T-Shirt

454462 3-4, 5-6, 7-8, 10-12, 14-16

Navy (89), White (01)



Features and technologies:

- 100% cotton.
- Relaxed fit.

UNISEX'

NEW Sea-Doo Bucket Hat

454624 Onesize

Black (90)



Descriptions:

- Sea-Doo Bucket Hat with logo patch.

Features and technologies:

- 100% cotton twill.

Adventure Wide Brim Hat

454478 Onesize

Navy (89), Warm Grey (15)



Descriptions:

- Adventure Wide Brim Hat.

Features and technologies:

- 100% cotton.
- Stretch and quick-drying fabric.
- Adjustable cord chin strap.
- Snap-up sides.
- Side air vents.

Retro Flat Cap

454466 Onesize

● Black (90), ● Navy (89)



Descriptions:

- Lightweight Retro cap with flat peak.

Features and technologies:

- 60% polyester, 40% cotton.
- Mesh at back.
- Foam crown.
- Snapback closure at back.

Sea-Doo Mesh Cap

454470 Onesize

● Black (90), ● Hi-Vis Yellow (26), ● Navy (89)



Descriptions:

- Lightweight Sea-Doo Mesh Cap.

Features and technologies:

- 60% polyester, 40% cotton.
- Snapback closure at back.

Sea-Doo Rag

454455 Onesize

● Black (90), ○ White (01)



Descriptions:

- Fast-drying Sea-Doo Rag.

Features and technologies:

- 100% polyester.
- Lightweight, moisture-wicking, breathable fabric.
- SPF 50 UV protection.
- Instantly transform into a headband or a facemask.

Play & Licensing Products

Sea-Doo Quick-Dry Changing Ponchos by Slowtide†

B107287280 (S-M)
B107287380 (L-XL)
B107297270 (S-M)
B107297370 (L-XL)



B107297270
B107297370



B107287280
B107287380

- Made from 100% recycled materials, these Quick-Dry Changing Ponchos offer the lightweight comfort you deserve.
- Made from 100% post-consumer waste, primarily plastic water bottles.
- Highly absorbent, fast drying and sand free.
- Make changing in and out of your wetsuit or swimwear easy, comfortable and warm.
- Double-sided print.
- Kangaroo pocket keeps your hands warm and is built for storage.
- Hidden internal access opening so you can change privately in public.
- Double-layer hood for warmth and extra water absorption.
- Snap front placket with drawcords.
- Easy change short sleeve design.
- Care friendly: Simply machine wash and hang to dry.
- Content: 80% Polyester, 20% Polyamide.

(S-M)
- Height range: 5' - 5' 7" (1.52 m - 1.7 m).
- Weight range: 100 -145 lb (46 kg - 65.7 kg).
- Dimensions: 41" L x 25 ½" W (104 cm L x 65 cm W).

(L-XL)
- Height range: 5' 7" - 6' 2" (1.57 m - 1.88 m).
- Weight range: 130 - 249 lb (59 kg - 112 kg).
- Dimensions: 44 ½" L x 31 ½" W (113 cm L x 80 cm W).

Sea-Doo Quick-Dry Towels by Slowtide

B107300070
B107310080



B107300070



B107310080

- Made from 100% recycled materials, our quick-dry towels are the perfect companion for any adventure.
- Made from 100% post-consumer waste, primarily plastic water bottles.
- Highly absorbent, fast drying, sand free.
- Compact and ultra-lightweight.
- Double sided-print.
- Hanging loop.
- Sustainable design.
- Care friendly: Simply machine wash and hang to dry.
- Content: 80% Polyester, 20% Polyamide.
- Dimensions: 60" L x 30" W (152 cm L x 76 cm W).

Sea-Doo Beach Towel by Slowtide

B107320070



- Equipped with a hanging loop feature and made from 100% sustainably sourced cotton, you are guaranteed the best drying experience.
- Super soft and absorbent 100% cotton.
- Reactive dye that helps prevent fading.
- One-sided print.
- Lightweight (460 g).
- Hanging loop.
- For all bodies of water.
- Care friendly: Simply machine wash and dry at low temperature.
- Content: 100% cotton.
- Dimensions: 60" L x 30" W (152 cm L x 76 cm W).

Towable Tube Ropes

B104860000
B104770000



- Solution-dyed and sun-resistant polyethylene to protect against UV rays.
- Loops on both ends.
- Conveniently store in webbing handily equipped with eyelet to hang on wall.

B104860000
- 60' (18.3 m) rope for 1 passenger tube.
- Resists a 1,500 lb (680 kg) tensile strength.

B104770000
- 60' (18.3 m) rope for 2 to 4 passenger towable tube.
- Resists a 4,100 lb (1860 kg) tensile strength.

Sea-Doo One-Person Triangle Tube

B106670000



- Designed for one person.
- Sit-in position.
- 24-gauge robust PVC bladder with 420 deniers partial heavy-duty nylon cover.
- Double webbing foam handles with knuckle guards to avoid chafing.
- Self-bailing drain vents.
- Reinforced tow system.
- Quick-connect tow hook.
- Padded valve cover.
- Puncture repair kit.
- Boston valve for bladder and normal air valve in floor.
- Diameter: 48" x 50" (124 cm x 128 cm) when inflated.

Sea-Doo Two-Person Two-Way Sit-in Tube

B107090000



- Designed for two persons.
- Multiple sit-in riding positions, sitting with their back against the backrest or on their knees.
- Can be pulled from the front or the rear depending of the choice of your riding position.
- 24-gauge robust PVC bladder with 840/420 deniers heavy-duty full nylon cover.
- Includes soft foam area for sitting and foam knuckle-protection pads to avoid chafing.
- 4 self-bailing drain vents.
- Tow system reinforced with 840 deniers nylon.
- Quick-connect tow hook.
- Padded valve cover.
- Puncture repair kit.
- 2 Boston valves and one normal air valve in floor.
- Dimensions: 68" x 67" (172 cm x 170 cm) when inflated.

Sea-Doo Two-Person Deck Tube

B107110000



- Designed for up to two persons and to ride lying down.
- 26-gauge robust PVC bladder with 420 deniers heavy-duty full nylon cover.
- Double webbing soft foam handles with knuckle guards to prevent chafing.
- Comfortable foam pad.
- 1 self-bailing drain vent.
- Reinforced tow system.
- Quick-connect tow hook.
- Padded valve cover.
- Puncture repair kit.
- Boston valve.
- Dimensions: 69" x 72" (175 cm x 182 cm) when inflated.

Sea-Doo Three-Person Two-Way Sit-in Tube

B107100000



- Designed for three riders.
- Multiple sit-in riding positions, sitting with their back against the backrest or on their knees.
- Can be pulled from the front or the rear depending of the choice of your riding position.
- 26-gauge robust PVC bladder with 840/420 deniers heavy-duty full nylon cover.
- 4 self-bailing drain vents.
- Includes soft foam area for sitting and foam knuckle-protection pads to avoid chafing.
- Tow system reinforced with 840 deniers nylon.
- Quick-connect tow hook.
- Padded valve cover.
- Puncture repair kit.
- 2 Boston valves and one normal air valve in floor.
- Dimensions: 70" x 87" (177 cm x 220 cm) when inflated.

Sea-Doo Three-Person Sit-on-Top Tube

B107120000



- Designed for up to three persons sitting with their back against the backrest.
- 26-gauge robust PVC bladder with 840/420 deniers heavy-duty full nylon cover.
- Self-bailing drain vent.
- Includes soft foam area for sitting and foam knuckle-protection pads to avoid chafing.
- 4-point tow system reinforced with 840 deniers nylon.
- Quick-connect tow hook.
- Padded valve cover.
- Puncture repair kit.
- 2 Boston valves and one normal air valve in floor.
- Dimensions: 79" x 88" (200 cm x 223 cm) when inflated.

Sea-Doo Inflatable Stand up Paddle Board 11'6" (3.5 m)

B106660000



- Inflatable, light and easy to carry.
- PVC drop stitch fabric and EVA anti-sliding foot pad.
- Can be inflated up to 15 PSI.
- Can be rolled into a packable size and inserted in a backpack for ease of transportation.
- Kit includes: paddle board, paddle, backpack with wheels, 3 removable fins, foot leash, repair kit, and dual action hand pump for fast and easy inflation.
- Maximum weight capacity: 286 lb (130 kg).
- Dimensions: 11'6" L x 34.5" W x 6" T (3.5 m L x 88 cm W x 15 cm T).

Stand Up Paddle Board

B104570000



- Inflatable, and only 19 lb (8.6 kg), making it light to maneuver and easy to carry.
- Heavy-duty PVC and soft EVA traction pad.
- Tail D-ring for attaching ankle leash.
- Bungee system for securing gear.
- Single fin system for enhanced mobility.
- Removable injection-molded tail fin.
- Carry handle facilitates transportation of board to and from water.
- Can be rolled into a packable size and stored in the wheel-equipped durable travel backpack (included).
- Dimensions: 10'5" L x 30" W x 6" T (3.2 m L x 76 cm W x 15 cm T).
- Maximum weight capacity: 286 lb (130 kg).
- Kit includes: paddle board, adjustable 3-piece paddle, backpack with wheels, fin, 8' (2.5 m) ankle leash, repair kit, and dual-action pump for fast and easy inflation.

Bodyboard 36" (91 cm)

B104990000



- Full-sized slick-bottom recreational board ideal for beginners looking to catch their first waves for that perfect day at the beach.
- Features an EPS core which makes the board lightweight, durable and buoyant.
- XPE deck construction amps up rider comfort and resistance to wear for longer lasting use.
- HDPE bottom provides a smooth hydrodynamic surface for generating more speed, while the rear channels and crescent tail design dispense excellent control and more maneuverability in all wave conditions.
- Includes a leash-equipped neoprene wrist strap that attaches to the bodyboard.
- Silkscreened printed logo.
- Length: 36" (91 cm).
- For ages 5 and up.

Bodyboard 41 ½" (105 cm)

B105000000



- Full-sized slick-bottom recreational board ideal for beginners looking to catch their first waves for that perfect day at the beach.
- Features an EPS core which makes the board lightweight, durable and buoyant.
- XPE deck construction amps up rider comfort and resistance to wear for longer lasting use.
- HDPE bottom provides a smooth hydrodynamic surface for generating more speed, while the rear channels and crescent tail design dispense excellent control and more maneuverability in all wave conditions.
- Includes a leash-equipped neoprene wrist strap that attaches to the bodyboard.
- Silkscreened printed logo.
- Length: 41 ½" (105 cm).
- For ages 12 and up.

Floating Lounger

B104300000



- 100% NBR vinyl closed-cell 1 ½" (4 cm) foam.
- Soft, comfortable and easy to clean floating mat.
- Designed for comfort with a cool and refreshing ripple surface.
- Can be used in the pool, at the lake or at the beach for summer fun.
- Dimensions: 74" L x 26" W (188 cm L x 66 cm W).

Sea-Doo 14 L Cooler Bag

295100965



- 14 L (3.7 US gal) of thermal insulated soft-sided storage.
- Can hold ice for 2 days.
- Waterproof sealed construction.
- Magnetic top opening for quick access and sure seal when closed.
- Robust outer material for durability with a modern look.
- Carry handles and removable shoulder strap for easy transport to and from the water.
- Stows perfectly in the Single Seat underseat storage of all Switch models.
- Outside identification pocket.
- Dimensions: 13 ¾" L x 12 ¼" W x 9" H (35 cm L x 31 cm W x 22.5 cm H).

Sizing Chart

HOW TO MEASURE

For best results, have someone else take measurements. Measure body in swimsuit or undergarments. Tape must be snug but not tight. If measurements fall between two sizes, order the larger size.

Chest

Measure under your arms, around the fullest part of your chest.

Waist

Measure around your waist at the narrowest place.

Hips

Stand with legs together, measure around the fullest part of your hips, ensuring the tape is level.

Arm Length

Let your arms hang down on the side in a slightly bent position. Measure from the center of the back of your neck, along the length of your arm, to the wrist.

Inseam

Without shoes, from crotch to the floor.

What code represents your size?

1 Find your size.

2 The corresponding code is THE CODE you use to complete the part number on your order.
Example: 440227_90
Size: M = Code "06", therefore 4402270690

Size	Code	Size	Code	Size	Code
ONE SIZE	00	3XL	16	6	25
2XS	01	4XL	18	7	27
XS	02	XS/S	90	8	28
S	04	S/M	72	9	29
M	06	L/XL	73	10	30
L	09	2XL/3XL	74	11	31
XL	12	4XL/6XL	75	12	32
2XL	14	5	24	13	33

PERSONAL FLOTATION DEVICE

Men's Freedom and Airflow

Sizes	XS	S	M	L	XL	2XL	3XL
Chest (in)	30-33	33-37	37-41	41-45	45-49	49-53	53-58

Ladies' Freedom and Airflow

Sizes	S	M	L	XL	2XL	3XL	4XL
Chest (in)	30-33	33-37	37-41	41-45	45-49	49-53	53-58

Force Pullover

Sizes	XS/S	M	L	XL	2XL/3XL
Chest (in)	34-36	37-39	39-41	41-43	44-47

Men's Motion

Sizes	XS	S	M	L	XL	2XL	3XL	4XL
Chest (in)	30-33	33-37	37-41	41-45	45-49	49-53	53-57	57-61

Ladies' Motion

Sizes	S	M	L	XL	2XL	3XL	4XL	5XL
Chest (in)	30-33	33-37	37-41	41-45	45-49	49-53	53-57	57-61

Adults' Navigator

Sizes	XS	S/M	L/XL	2XL/3XL	4XL/6XL
Chest (in)	28-32	32-40	40-52	50-60	61-66

Adults' Explorer Unisex

Sizes	XS	S	M	L	XL	2XL	3XL	4XL
Chest (in)	30-33	33-37	37-41	41-45	45-49	49-53	53-57	57-61

Jr. Explorer

Sizes	L
Weight	55-88 lb

Kids' Sandsea

Sizes	S	M	L
Weight	0-30 lb	30-50 lb	50-90 lb

GLOVES (MEASURE PALM WIDTH)

Sizes	XS	S	M	L	XL	2XL	3XL
Palm (in)	3	3¼	3½	4	4 ½	5	5½

WETSUITS, ATHLETIC FIT RASHGUARDS AND NEOPRENE SHORTS

Men's

Sizes	XS	S	M	L	XL	2XL	3XL
Chest (in)	34-38	36-40	38-42	40-44	42-46	44-48	46-50
Waist (in)	28-32	30-34	32-36	34-38	36-40	38-42	40-44
Hips (in)	34-38	36-40	38-42	40-44	42-46	44-48	46-50
Height	5'4"-5'6"	5'5"-5'7"	5'8"-6'	5'9"-6'1"	6'1"-6'3"	6'2"-6'4"	6'3"-6'5"
Weight (lb)	110-160	120-170	130-180	150-200	170-220	190-240	210-270

Ladies'

Sizes	XS	S	M	L	XL	2XL
Chest (in)	32-35	34-37	36-39	38-41	40-43	42-45
Waist (in)	24-26	26-28	28-30	30-32	32-34	34-36
Hips (in)	34-34	36-38	38-40	40-42	42-44	44-46
Height	5'2"-5'4"	5'3"-5'5"	5'5"-5'7"	5'6"-5'8"	5'7"-5'9"	5'9"-6'1"
Weight (lb)	90-140	100-150	110-160	130-180	150-200	170-220

RIDING SUIT, RELAXED FIT RASHGUARDS AND SPORTSWEAR

Men's – Regular 5' 7"- 6' 0"

Sizes	XS	S	M	L	XL	2XL	3XL	4XL	5XL
Chest (in)	33-35	35-38	38-41	41-45	45-49	49-53	53-57	57-61	61-65
Waist (in)	27-29	29-32	32-35	35-39	39-43	43-48	48-52	52-57	57-62
Hips (Seat) (in)	33-35	35-38	38-41	41-45	45-49	49-53	53-57	57-61	61-65
Arm length (in)	30	31	32	33	34	35	35	36	36
Inseam (in)	31	31 ½	32	32	32	32	32	32	32

Ladies' – Regular 5' 3"- 5' 8"

Sizes	XS	S	M	L	XL	2XL	3XL	4XL	5XL
Chest (in)	32-35	35-37	37-40	40-43	43-47	47-51	51-55	55-59	59-63
Waist (in)	26-29	29-31	31-34	34-37	37-42	42-46	46-51	51-55	55-60
Hips (Seat) (in)	35-38	38-40	40-43	43-46	46-50	50-54	54-58	58-62	62-66
Arm length (in)	29	30	30	31	31	32	32	33	33
Inseam (in)	30	30	30	30	30	30	30	30	30

FOOTWEAR (MEASURE FOOT LENGTH)

Sea-Doo Riding Boots and Water Shoes

Sizes (US)	7	8	9	10	11	12	13
Sizes (EU)*	39½	41	42	43	44½	46	47

*Use US codes to complete the part number on your order.

Sea-Doo Neoprene Boots

Sizes (US)	5	6	7	8	9	10	11	12	13
Sizes (EU)*	36	37-38	39	40-41	42	43-44	45	46-47	48

Notes

Notes

Rec Lite

Recreation

SPARK®

One-of-a-kind fun.

SPARK 2UP | SPARK 3UP



—NEW— Orange Crush & Lava Red



—NEW— Reef Blue & Manta Green

SPARK TRIXX™

Playful trickster.

SPARK TRIXX 2UP | SPARK TRIXX 3UP



—NEW— Dazzling Blue & Deep Black



Lava Red & Deep Black

GTI™

Style, stability and some serious fun.

GTI 90 | GTI 130



White & Reef Blue

GTI SE

More convenience and comfort for days of family fun.

GTI SE 130 | GTI SE 170



—NEW— Coral Blast & Eclipse Black



Neon Yellow

KEY FEATURES

- Lightweight and playful platform
- Able to tow with most mid-size cars

Convenience Plus Package (optional):
- iBR - Intelligent Brake & Reverse
- BRP Audio – portable system (optional with 3up Convenience Package only)
- Front storage bin kit
- Boarding step

- Lightweight and playful platform
- Able to tow with most mid-size cars

TRIXX Package:
- BRP Audio – portable system (optional)
- Extended Range VTS™
- Step wedges
- Handlebar with adjustable riser
- iBR - Intelligent Brake & Reverse

Base Package:
- Large swim platform with LinQ attachment system
- Ergolock two-piece seat
- Large front storage
- iBR - Intelligent Brake & Reverse
- Watertight phone compartment

SE Package:
- iDF - Intelligent Debris-Free Pump System (optional)
- BRP Audio - premium system (optional)
- Ergolock two-piece touring seat
- Large swim platform with LinQ attachment system
- Boarding ladder
- Large front storage
- Variable Trim System (VTS)

CAPACITY

2	2	3	2	3	3	3	

ROTAX ENGINE

900 ACE™ - 60	900 ACE - 90	900 ACE - 90		900 ACE - 90	1630 ACE - 130	1630 ACE - 130	1630 ACE - 170

Tow Sports

Touring

WAKE™	WAKE PRO	GTX†	GTX LIMITED
Made to make the most of the wake.	**Stability, power and music to tow like a pro.**	**Comfort, control and power are always in style.**	**The standard for touring performance.**
WAKE 170	WAKE PRO 230	GTX 170 | GTX 230 | GTX 300	GTX LIMITED 300
			
—NEW— Neo Mint	—NEW— Neo Mint	Eclipse Black & Orange Crush	—NEW— Premium Metallic Sage
			
			—NEW— Liquid Titanium

KEY FEATURES

• BRP Audio - premium system (optional) • Large front storage • Watertight phone compartment • Boarding ladder • iBR – Intelligent Brake & Reverse **WAKE Package:** • LinQ retractable ski pylon • Ski mode • Wakeboard rack	• NEW Full-color 7.8" wide display • BRP Audio – premium system • Direct-access front storage • Watertight phone compartment • iBR - Intelligent Brake & Reverse • Boarding ladder **WAKE Package:** • LinQ retractable ski pylon • Ski mode • Wakeboard rack	• iDF - Intelligent Debris-Free Pump System (optional on 170 & 230) • BRP Audio – premium system (optional on 300) • Direct-access front storage • Watertight phone compartment • LinQ attachment system • iBR - Intelligent Brake & Reverse • Variable Trim System (VTS)	• BRP Audio – premium system • Full-color 7.8" wide display • iDF – Intelligent Debris-Free Pump System • Direct-access front storage • iBR - Intelligent Brake & Reverse **Limited Package:** • USB port • Watercraft cover • Storage bin organizer • Knee pads • Depth finder • Exclusive coloration and more

CAPACITY

3	3	3	3

ROTAX ENGINE

1630 ACE - 170	1630 ACE - 230	1630 ACE - 170	1630 ACE - 230	1630 ACE - 300	1630 ACE - 300

Sport Fishing

FISHPRO

Accessible, versatile and all-around fun.	**The original game-changer. Find yourself a new perspective on sport fishing.**	**The most advanced sport fishing personal watercraft on the water.**
FishPro Scout 130	FishPro Sport 170	FishPro Trophy 170
		
White & Gulfstream Blue	White & Gulfstream Blue	Flint Grey & Orange Crush
KEY FEATURES		
• iDF - Intelligent Debris-Free Pump System • 3 fishing rod holders • Garmin† 6" GPS & Fish Finder • LinQ™ fishing cooler • Trolling mode • Front Storage Bin Organizer • 2 LinQ Front Supports • Cupholder	• iDF - Intelligent Debris-Free Pump System • Extended rear platform with second LinQ attachment system • Garmin† 6" GPS & Fish Finder • LinQ fishing cooler • 5 fishing rod holders • Angled gunwale footrests • BRP Audio – premium system (optional) • Direct access front storage with bin organizer	• iDF - Intelligent Debris-Free Pump System • Modular swivel seat • Advanced battery system • Quick-connect livewell • Anchoring system • Garmin† 7" touchscreen GPS & Fish Finder • LinQ fishing cooler • NEW Tech Package: BRP Audio – premium system & full-color 7.8" wide display (optional)
CAPACITY		
3	3	3
ROTAX ENGINE		
1630 ACE - 130	1630 ACE - 170	1630 ACE - 170

Performance

GTR™ 230	RXP®-X® 300	RXT®-X® 300
Accessible power and performance.	**Race-ready performance watercraft, reimagined.**	**The ultimate off-shore performance watercraft.**
GTR 230	RXP-300	RXT-300
		
—NEW— Millennium Yellow	—NEW— Premium Triple Black Millennium Yellow	—NEW— Premium Triple Black Millennium Yellow
KEY FEATURES		
• BRP Audio - premium system (optional) • Large front storage • Watertight phone compartment • LinQ attachment system • Variable Trim System (VTS™)	• Ergolock™ R racing seat • T3-R hull • NEW Tech Package: BRP Audio – premium system & full-color 7.8" wide display (optional) • Launch control • Low-rise racing handlebar • Double-angled footwell wedges • X-sponsons	• Ergolock R racing seat • ST3 hull • NEW Tech Package: BRP Audio – premium system & full-color 7.8" wide display • Launch control • Tilt steering • Full-length angled footwell wedges • X-sponsons
CAPACITY		
3	2	3
ROTAX ENGINE		
1630 ACE - 230	1630 ACE - 300	1630 ACE - 300

Pontoon

SEA-DOO SWITCH

A brand new way to live the Sea-Doo life. Fun, adaptable and modern with never-before-seen value.

COMPACT' | 16' | 19'

Available color:
Caribbean Blue


Compact – Caribbean Blue


16' – Caribbean Blue


19' – Caribbean Blue

SEA-DOO SWITCH SPORT

Geared toward your active lifestyle with watersports-ready features.

COMPACT' | 18' | 21'

Available colors:
Caribbean Blue, Coral Blast, Neon Yellow


Compact – Caribbean Blue


18' – Coral Blast


21' – Neon Yellow

SEA-DOO SWITCH CRUISE

Taking your on-water journey with friends and family to a new level of comfort and convenience.

18' | 21'

Available colors:
Caribbean Blue, Coral Blast, Neon Yellow


18' – Coral Blast


21' – Neon Yellow

KEY FEATURES

• iBR - Intelligent Brake & Reverse • iDF – Intelligent Debris-Free Pump System • 1 adjustable table • Retractable boarding ladder • Glove box with dual USB port • 12V outlet • LinQ attachment points • Under-deck storage compartment • Under seat storage • Integrated anchor storage • BRP Audio System (Accessory)	• iBR - Intelligent Brake & Reverse • iDF – Intelligent Debris-Free Pump System • Garmin† 7" touchscreen GPS • Switch bimini top • Unique front lounge area with sun pads & backrests • Stern lounge • Quick-attach inflatable holder • Rearview mirror • 2 corner table • Driver seat with bolster • Glove box with dual USB port • 12V outlet • Swim platform with LinQ attachment points (18' & 21' only) • Retractable boarding ladder • LinQ attachment points • LED Courtesy light • Under-deck storage compartment • Integrated anchor storage • Under seat & corner table storage • BRP Audio System (18' & 21' only) • Wind deflector	• iBR - Intelligent Brake & Reverse • iDF – Intelligent Debris-Free Pump System • Garmin† 7" touchscreen GPS • Switch bimini top • Stern lounge • Deck mat • 4 corner table & 1 adjustable table • Driver seat with bolster • Glove box with dual USB port • 12V outlet • Swim platform with LinQ attachment points • Retractable boarding ladder • LinQ attachment points • LED Courtesy light • Under-deck storage compartment • Integrated anchor storage • Under seat & corner table storage • BRP Audio System • Wind deflector

CAPACITY

5	7	9	5	7	9	7	7	9	9

ROTAX ENGINE

1630 ACE	1630 ACE	1630 ACE

HORSEPOWER

100 hp	100 hp	170 hp	170 hp	230 hp	230 hp	100 hp	170 hp	170 hp	230 hp

TRAILER TYPE

Painted		Painted with brakes	Painted		Painted with brakes				

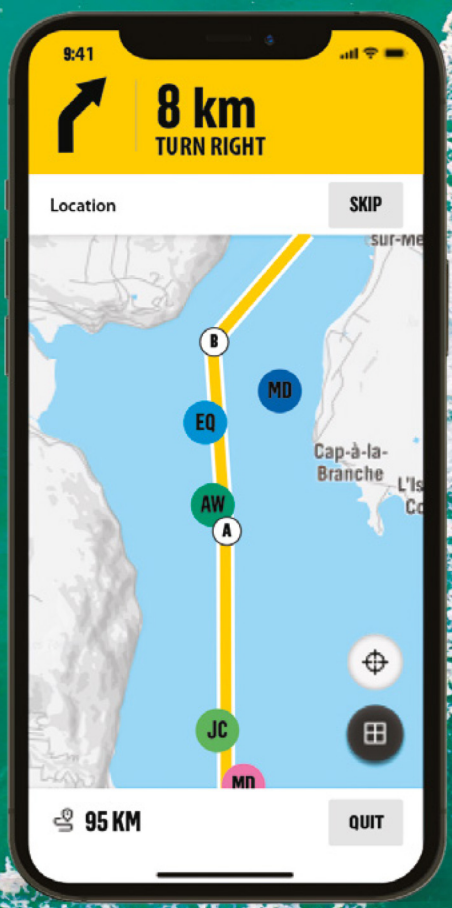
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FIND POINTS OF INTERESTS

RIDE WITH FRIENDS



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