

ENGINE REMOVAL AND INSTALLATION

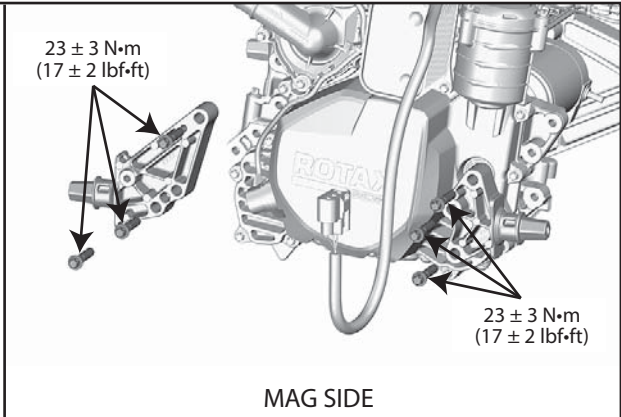
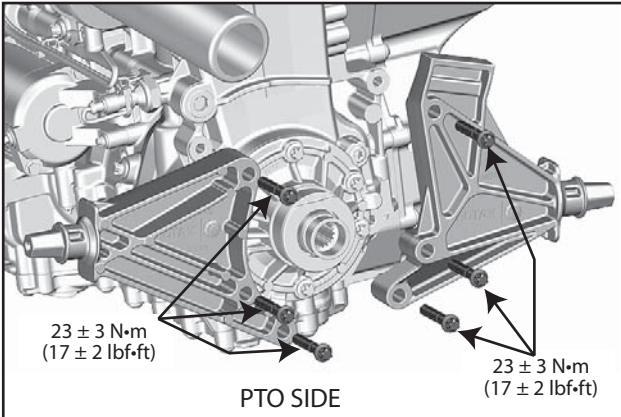
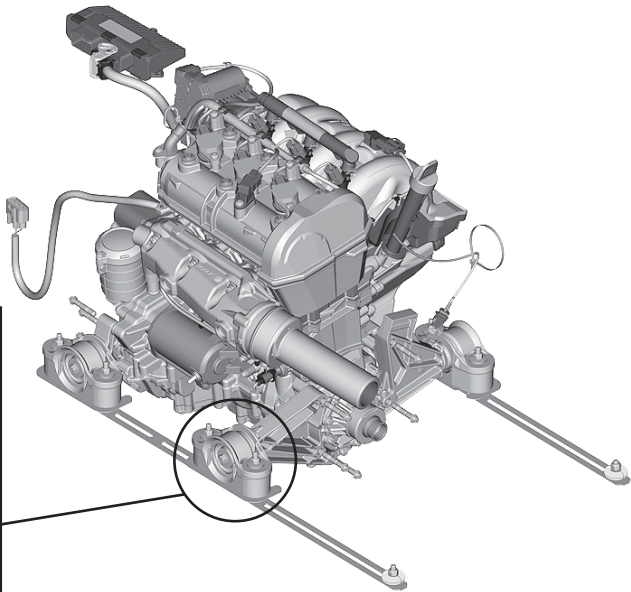
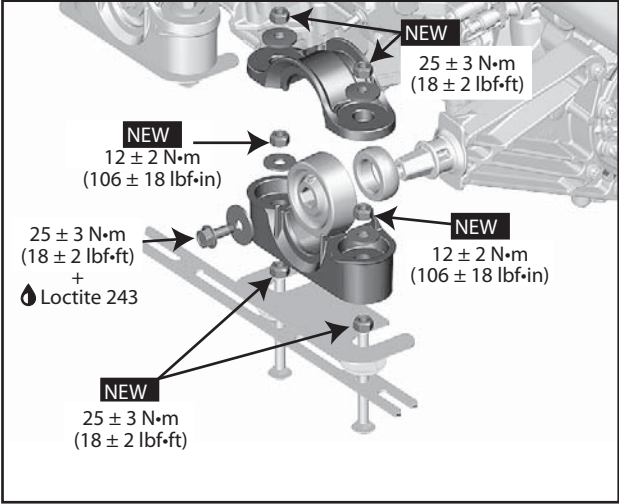
SERVICE TOOLS

Description	Part Number	Page
ALIGNMENT SHAFT SUPPORT	529 035 506	7
ALIGNMENT SHAFT	295 000 141	7-8
ENGINE ALIGNMENT PLATE	529 036 278	7
ENGINE LIFTING TOOL	529 036 217	6
FUEL HOSE DISCONNECT TOOL	529 036 037	3-4
LARGE HOSE PINCHER.....	529 032 500	3-4
SUCTION PUMP	529 035 880	3

SERVICE PRODUCTS

Description	Part Number	Page
PULLEY FLANGE CLEANER	413 711 809	7

Subsection XX (ENGINE REMOVAL AND INSTALLATION)



NEW = Component must be replaced when removed.

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

ENGINE

Engine Removal

REQUIRED TOOLS		
DESCRIPTION		QTY
SUCTION PUMP (P/N 529 035 880)		1
FUEL HOSE DISCONNECT TOOL (P/N 529 036 037)		1
LARGE HOSE PINCHER (P/N 529 032 500)		2

- Place vehicle on a workstation equipped with an engine-lifting hoist.
- Remove the following components:
 - Central body (refer to *BODY* subsection)
 - Jet pump housing (refer to *JET PUMP* subsection)
 - Drive shaft (refer to *DRIVE SHAFT* subsection)
 - Muffler (refer to *EXHAUST SYSTEM* subsection).
- Disconnect **BLACK (-)** lead from battery.
- Drain engine coolant using the **SUCTION PUMP** (P/N 529 035 880).

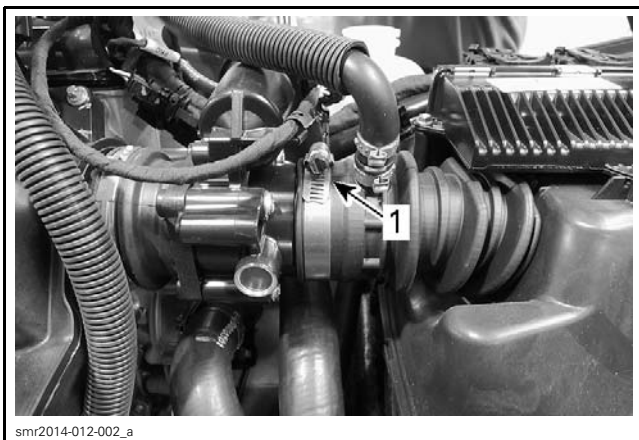


- Coolant reservoir
- Suction pump hose

- Detach air intake silencer hose from throttle body.

- Loosen air intake silencer hose clamp.

Subsection XX (ENGINE REMOVAL AND INSTALLATION)



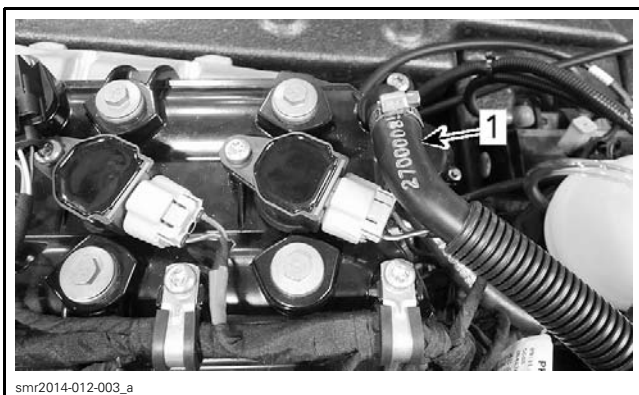
1. Loosen this clamp

5.2 Detach blow-by hose from cylinder valve cover.



8. Disconnect coolant return hose.

8.1 Cut locking tie securing the hose to wiring harness.

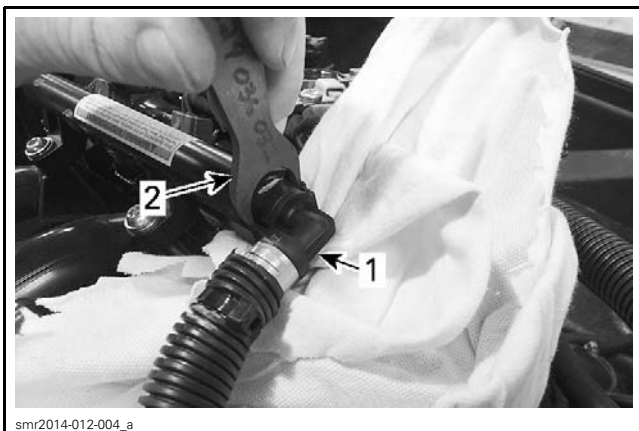


1. Blow-by hose

6. Disconnect fuel inlet hose from fuel rail.

6.1 Place a rag around fuel hose fitting.

6.2 Disconnect fuel hose from fuel rail using the FUEL HOSE DISCONNECT TOOL (P/N 529 036 037)



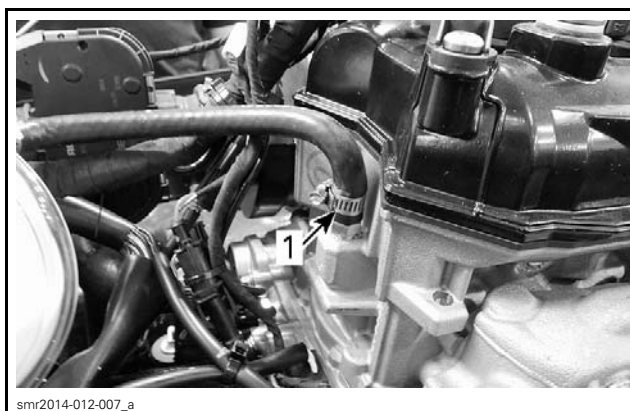
1. Fuel hose fitting

2. Fuel hose disconnect tool

7. Cut locking tie securing fuel hose to intake manifold.



8.2 Loosen clamp on cylinder head.

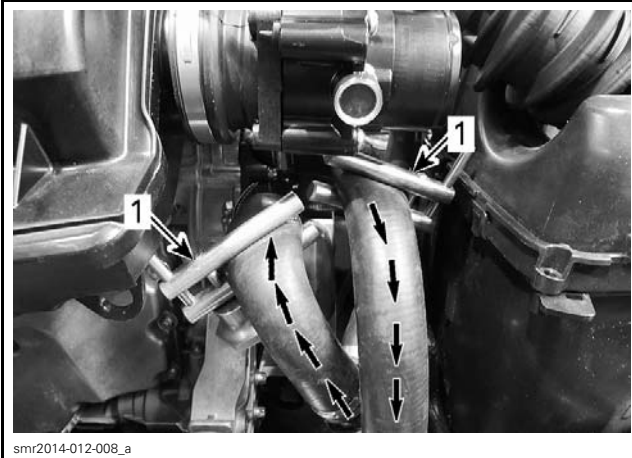


1. Coolant return hose clamp

9. Disconnect inlet and outlet radiator hoses.

9.1 Install a LARGE HOSE PINCHER (P/N 529 032 500) on each hose.

9.2 Loosen hoses clamps and disconnect hoses from thermostat housing.



1. Large hose pinchers

10. Unplug knock sensor connector.



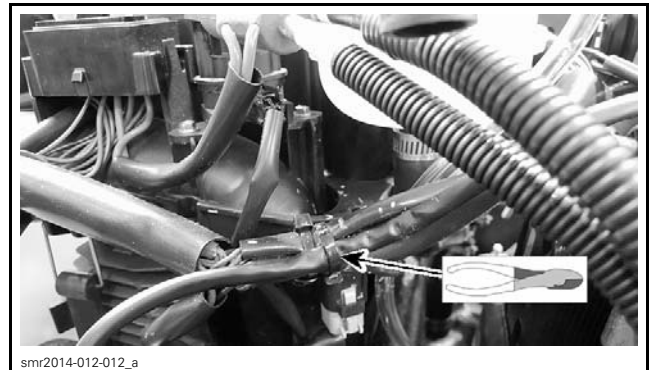
1. Knock sensor connector

11. Unplug the "A" connector from the ECM.

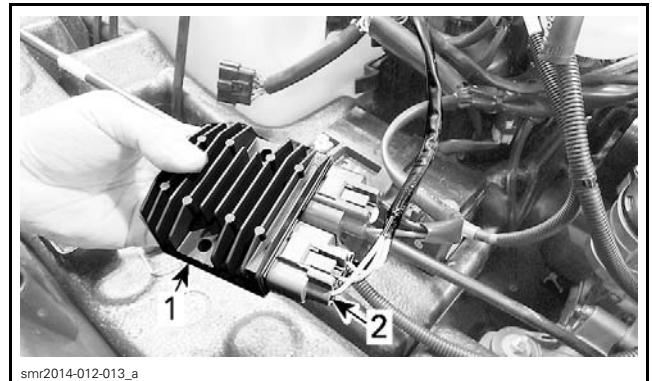


1. ECM "A" connector

12. Cut locking ties securing engine harness to vehicle harness.



13. Unplug magneto connector from voltage regulator/rectifier.



1. Voltage regulator/rectifier
2. Magneto connector

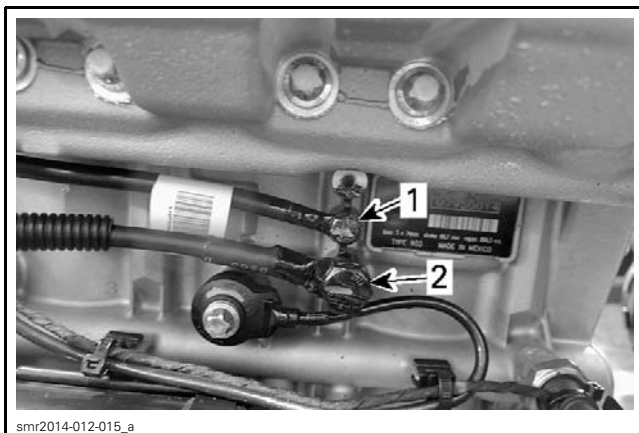
14. Disconnect inlet and outlet hoses from exhaust manifold.

Subsection XX (ENGINE REMOVAL AND INSTALLATION)



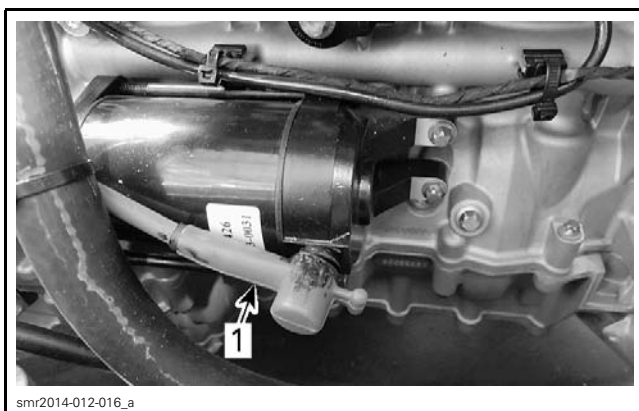
1. Exhaust manifold inlet hose
2. Exhaust manifold outlet hose

15. Unscrew both ground wires from engine.



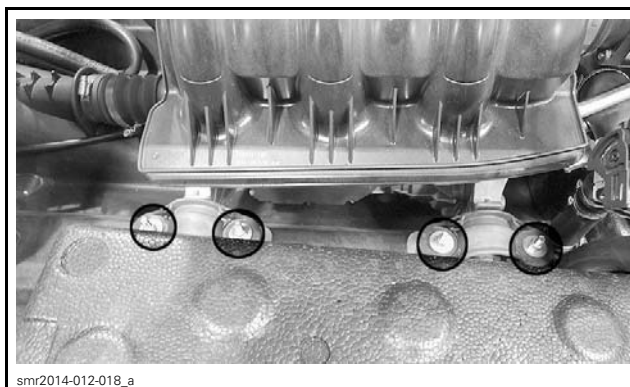
1. Engine/vehicle grounds
2. Battery ground

16. Detach starter cable from starter.

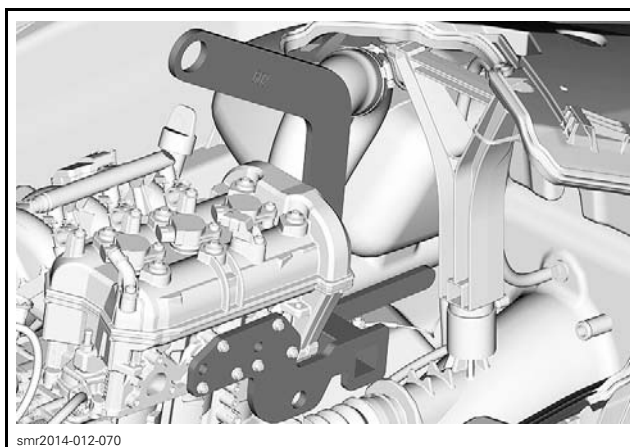
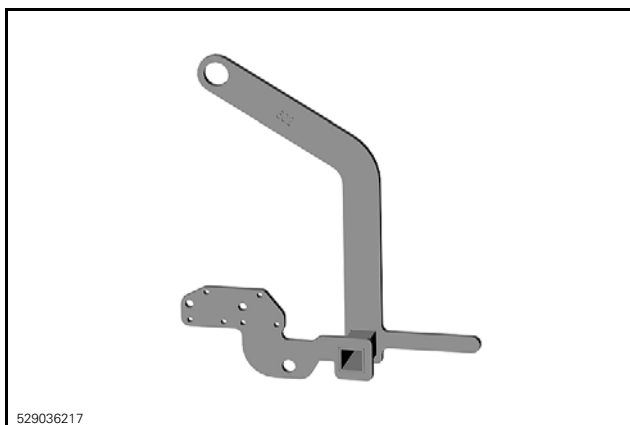


1. Starter cable

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



18. Remove exhaust manifold and install the ENGINE LIFTING TOOL (P/N 529 036 217).



19. Slowly lift the engine out of hull.

Engine Installation

Installation of engine in watercraft is essentially the reverse of removal procedures. However pay particular attention to the following.

Wipe off any spillage in bilge. Clean with the PULLEY FLANGE CLEANER (P/N 413 711 809).

Place engine into vehicle.

Install all engine mount clamps and secure them loosely using new M8 elastic stop nuts.

According to the situation:

- Perform the engine alignment, or
- Tighten all engine mount clamps nuts.

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

ENGINE MOUNT CLAMP NUTS	
Tightening torque	25 N•m ± 3 N•m (18 lbf•ft ± 2 lbf•ft)

Install and properly align muffler. Refer to *EX-HAUST SYSTEM* subsection.

Reinstall all other removed parts.

Check fuel hose condition and pressure test the fuel system, refer to *FUEL SYSTEM* section.

⚠ 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.

Verify all electrical connections (ground wires and battery).

Fill and bleed the engine cooling system. Refer to *COOLING SYSTEM* subsection

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.

Engine Alignment

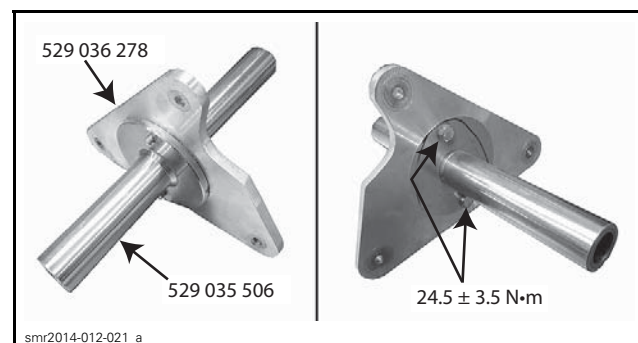
Engine alignment is required only when one of the following parts is removed and/or replaced with new one.

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

REQUIRED TOOLS		
DESCRIPTION		QTY
ENGINE ALIGNMENT PLATE (P/N 529 036 278)		1
ALIGNMENT SHAFT SUPPORT (P/N 529 035 506)		1
ALIGNMENT SHAFT (P/N 295 000 141)		1

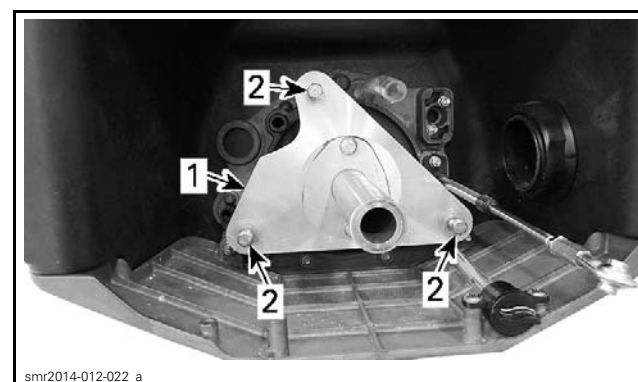
To verify alignment of engine proceed as follows:

1. Remove jet pump, drive shaft and drive shaft boot. Refer to *STEERING AND PROPULSION* section.
2. Assemble alignment tool.
 - 2.1 Install the alignment shaft support on engine alignment plate.
 - 2.2 Secure using M8 x 25 x 1.25 hexagonal screws.



3. Install the alignment tool.

- 3.1 Put the tool against the pump support
- 3.2 Secure it using previously removed jet pump retaining screws.



1. Alignment tool
2. Jet pump retaining nuts

Subsection XX (ENGINE REMOVAL AND INSTALLATION)

ALIGNMENT TOOL SCREWS	
Tightening torque	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

- 4. Carefully slide the ALIGNMENT SHAFT (P/N 295 000 141) through the engine alignment tool.
- 5. Insert alignment shaft end into crankshaft PTO coupler.

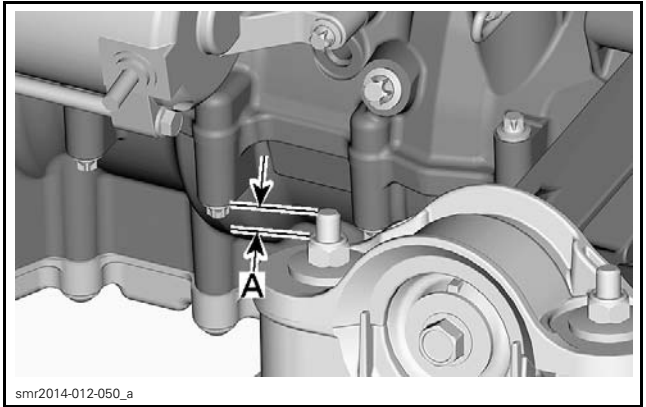
NOTE: A small resistance during shaft insertion is normal.

If The Engine Alignment Correct

Tighten all engine mount clamp nuts.

ENGINE MOUNT CLAMP NUTS	
Tightening torque	25 N•m ± 3 N•m (18 lbf•ft ± 2 lbf•ft)

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.



A. 3 mm (1/8 in) minimum

Reinstall all removed parts in accordance with proper subsection information.

If The Engine Alignment Incorrect

- 1. Remove all engine mount clamps.
- 2. Loosen nuts securing engine mount base.
- 3. Add or remove shims as required.
- 4. Retighten engine mount base nuts.

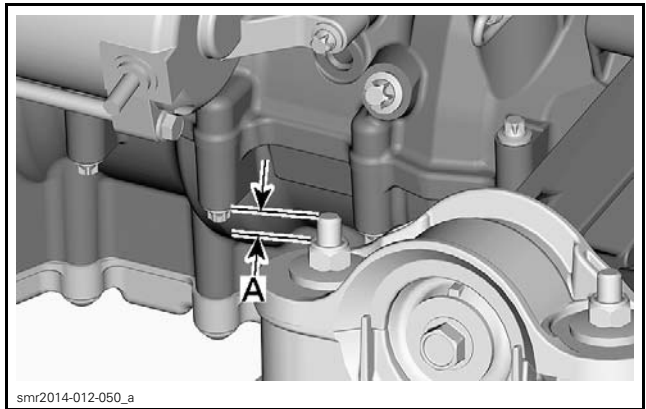
ENGINE MOUNT BASE NUTS	
Tightening torque	12 N•m ± 2 N•m (106 lbf•in ± 18 lbf•in)

- 5. Install and secure engine mount clamps.

ENGINE MOUNT CLAMP NUTS	
Tightening torque	25 N•m ± 3 N•m (18 lbf•ft ± 2 lbf•ft)

- 6. Try to insert the alignment shaft into crankshaft PTO coupler again.
- 7. Repeat all steps until alignment is done.

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.



A. 3 mm (1/8 in) minimum

Reinstall all removed parts in accordance with proper subsection information.