

FRONT DRIVE

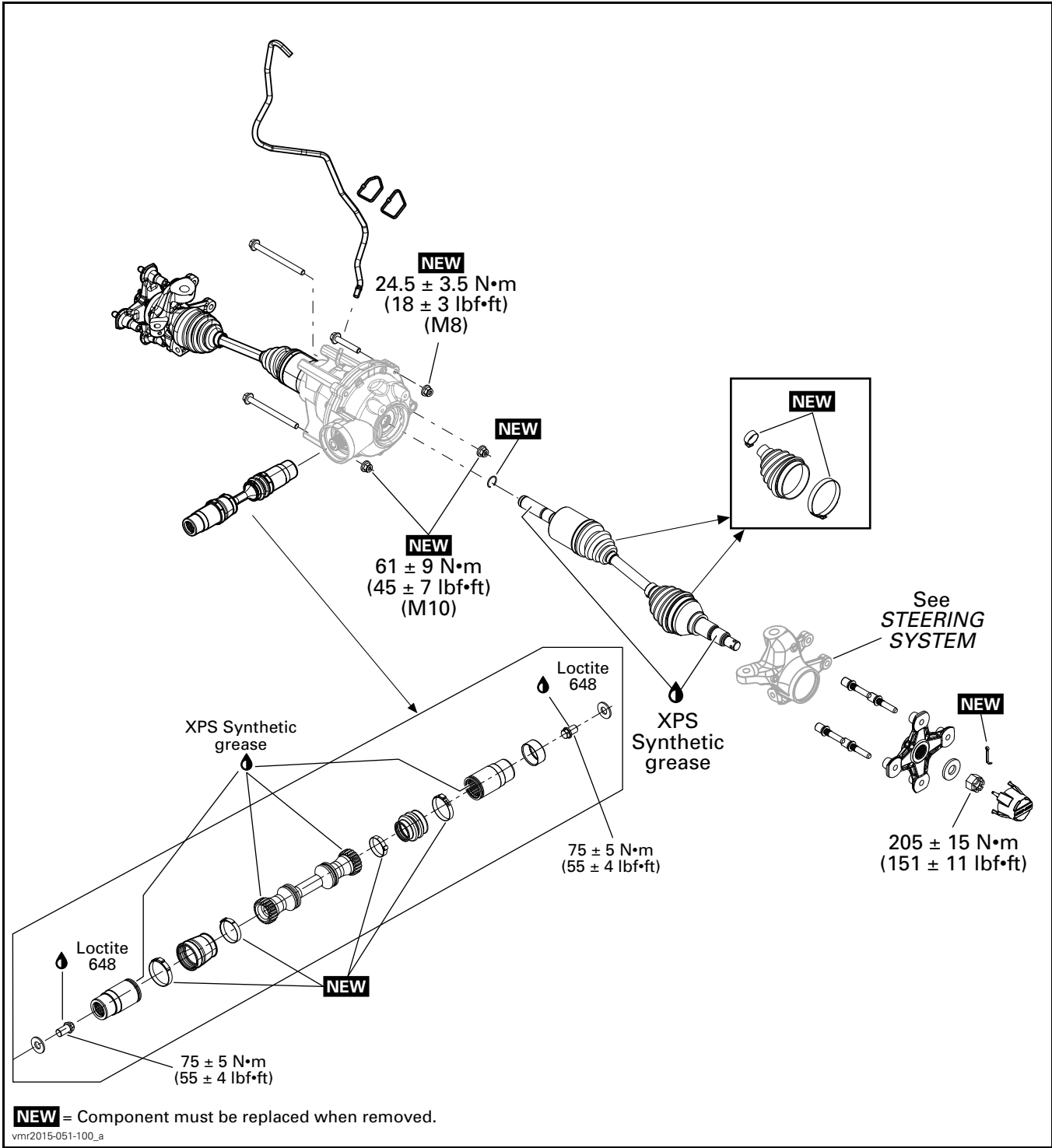
SERVICE TOOLS

Description	Part Number	Page
BACKLASH MEASUREMENT TOOL.....	529 035 665	469
CV BOOT CLAMP PLIER	529 036 120	467
CV JOINT EXTRACTOR.....	529 036 005	467
SPANNER SOCKET	529 035 649	471

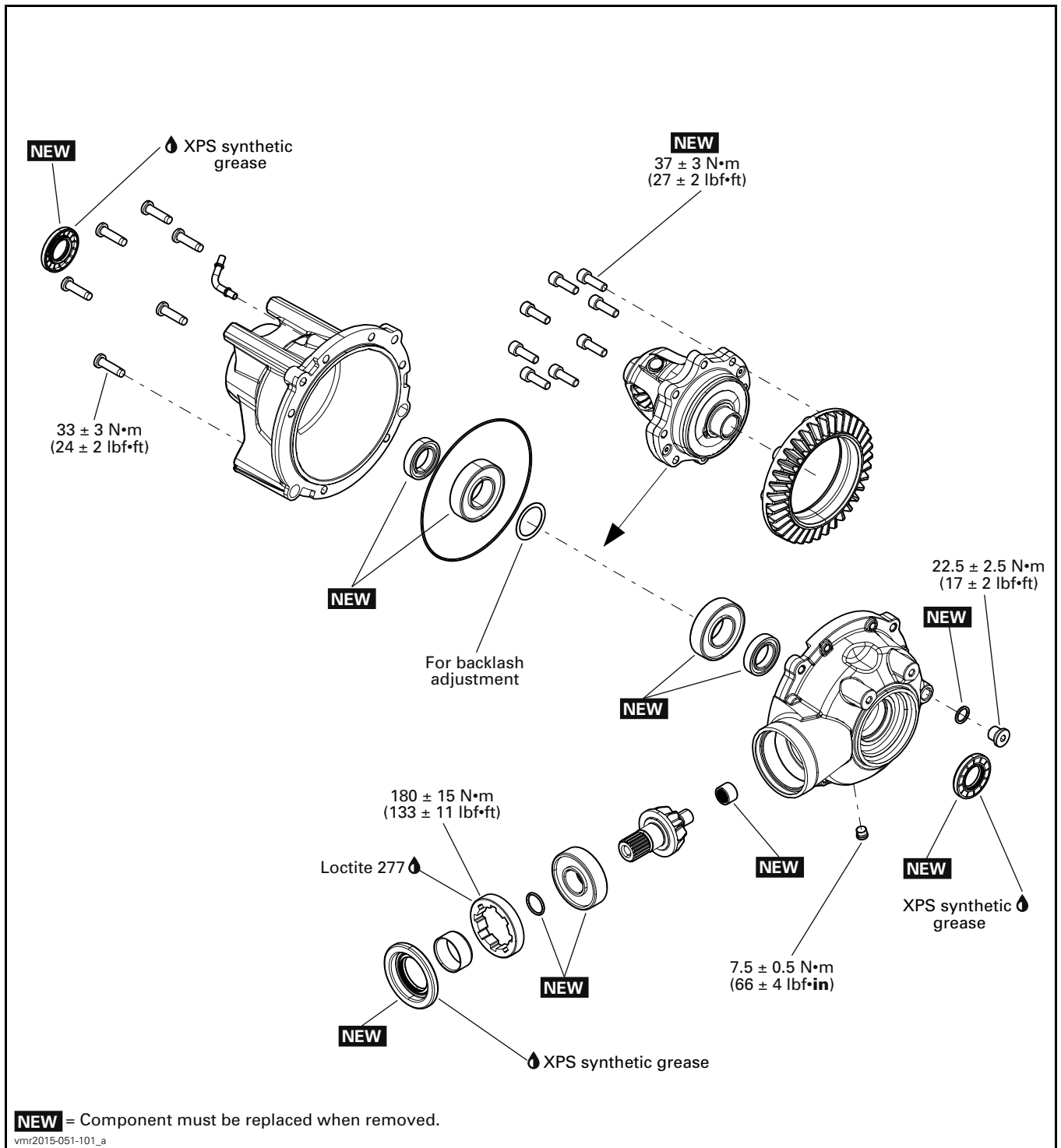
SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 277	293 800 073	473
LOCTITE 648 (GREEN)	413 711 400	475
XPS SYNTHETIC GREASE.....	293 550 010	467, 473, 475

FRONT DRIVE SHAFTS AND FRONT PROPELLER SHAFT



FRONT DIFFERENTIAL



GENERAL

The procedure explained below is the same for the RH and LH sides unless otherwise instructed.

SYSTEM DESCRIPTION

The Visco-Lok® system constantly monitors front wheel speed and, if it detects one wheel spinning faster than its mate, it progressively sends more power to the wheel with the better traction.

The Visco-Lok system is comprised of two principal components, a shear pump and the controlled multi-plate clutch.

A unique feature of the shear pump is that it is self-contained and independent. It does not require an external source of hydraulic fluid. The self-contained viscous shear pump generates a pressure proportional to wheel speed differential - meaning the difference in rotational speed between the two wheels. This pressure engages the friction clutch via a piston to transmit the torque.

In the event of a failure, the Visco-Lok carrier/ring gear and pinion gear will have to be replaced.

NOTE: The Visco-Lok shear pump is not serviceable. If the pump is disassembled, the viscous fluid contained inside will be lost and it cannot be replaced.

PROCEDURES

WHEEL HUB

Wheel Hub Removal

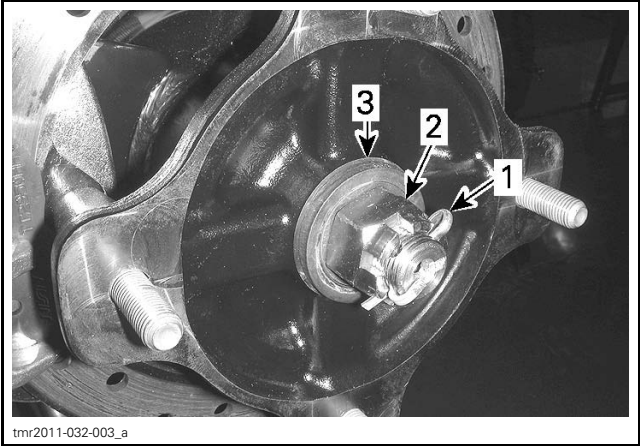
Lift and support vehicle.

Select the 4WD position and place the transmission lever on "P".

Remove caliper from knuckle. Refer to *BRAKES* subsection.

Remove the following parts:

- Wheel cap
- Cotter pin
- Castellated nut
- Belleville washer.



TYPICAL
1. Cotter pin
2. Castellated nut
3. Belleville washer

Remove wheel hub.

Wheel Hub Inspection

Check wheel hub for cracks or other damages.

Check inner splines for wear or other damages.

If any damage is detected on wheel hub, replace it with a new one.

Wheel Hub Installation

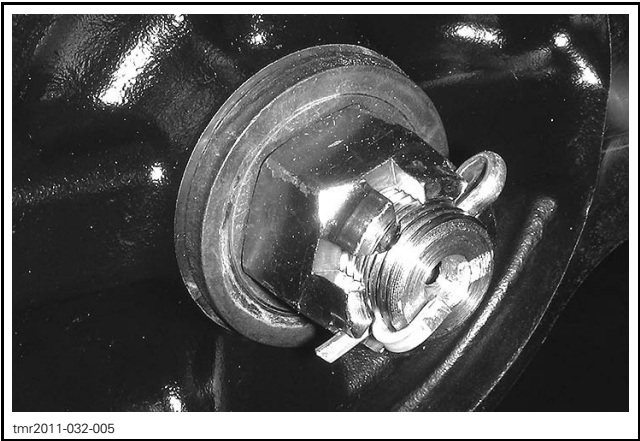
The installation is the reverse of the removal procedure. However, pay attention to the following. Install Belleville washer with its convex side outwards.

Tighten castellated nut to specification.

TIGHTENING TORQUE	
Castellated nut	205 N•m ± 15 N•m (151 lbf•ft ± 11 lbf•ft)

NOTE: Tighten further castellated nut if required to align grooves with drive shaft hole.

Install a **NEW** cotter pin.



FRONT DRIVE SHAFT

Front Drive Shaft Removal

Lift and support vehicle.

Remove inner fender panel(s). Refer to *BODY* subsection.

Remove the *KNUCKLE*. Refer to *STEERING SYSTEM* subsection.

Remove shock absorber lower bolt.

Lift and attach the following parts to make room.

- Shock absorber
- Upper suspension arm.

Strongly pull drive shaft out of differential.



PULL DRIVE SHAFT

Discard the stop ring at the end of the shaft.

Front Drive Shaft Inspection

Inspect the condition of boots. If there is any damage or evidence of leaking lubricant, replace them. Refer to *DRIVE SHAFT BOOT* in this subsection.

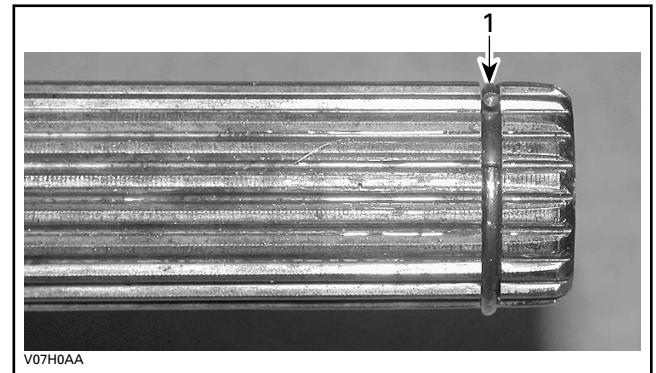
Check splines for excessive wear. Replace if necessary.

NOTE: If the splines on plunging joint are worn, a check of differential inner splines should be done.

Front Drive Shaft Installation

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

Install a **NEW** stop ring.



TYPICAL

1. Stop ring

Apply XPS SYNTHETIC GREASE (P/N 293 550 010) on the splines.

Ensure that wear ring is close to the differential.

DRIVE SHAFT BOOT

Drive Shaft Boot Removal

Remove *FRONT DRIVE SHAFT*. See procedure in this subsection.

Remove drive shaft boot clamps.

REQUIRED TOOL
CV BOOT CLAMP PLIER (P/N 529 036 120)



Dislodge the large end of the boot.

Separate the joint from the shaft. Two procedures can be done.

Without the Special Tool

Clamp joint housing in a vise.

Align shaft with joint.

Pull hard on shaft to remove from joint.

Remove boot from drive shaft.

Remove and discard the circlip. A new one is included in the boot kit.

With the Special Tool

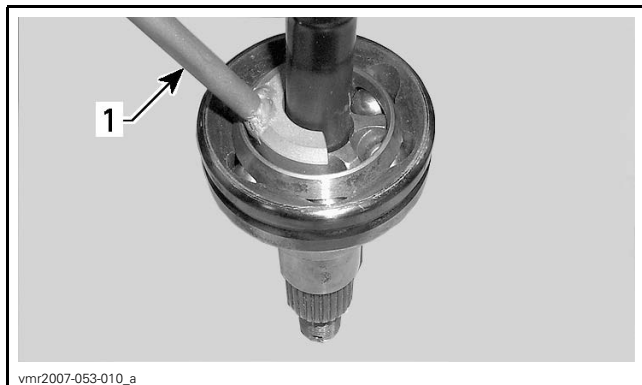
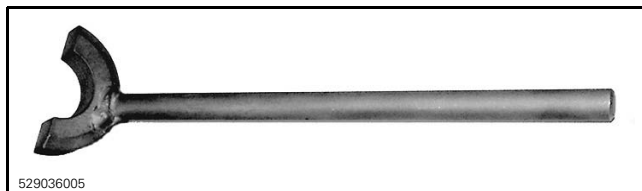
Place drive shaft in vice with the joint downward.

Install the tool on bearing.

REQUIRED TOOL
CV JOINT EXTRACTOR (P/N 529 036 005)

Section 06 DRIVE SYSTEM

Subsection 01 (FRONT DRIVE)



TYPICAL — CV JOINT SHOWN

1. Joint extractor tool

With an hammer, hit on the tool to separate joint from shaft.

When joint and shaft are separated, remove boot from drive shaft.

Remove and discard the circlip. A new one is included in the boot kit.

Drive Shaft Boot Installation

The installation is the reverse of the removal procedure. However, pay attention to the following. Install the **NEW** circlip.

Pack bearing area with grease (included with the new boot kit).

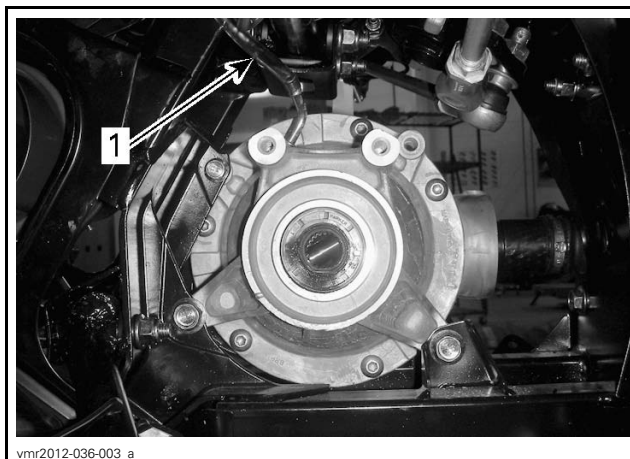
NOTE: Do not use or add other grease.

Install **NEW** drive shaft boot clamps.

FRONT DIFFERENTIAL

Front Differential Removal

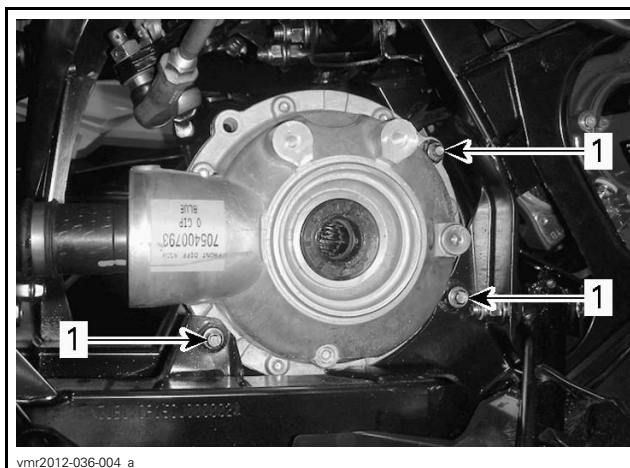
1. Drain front differential. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
2. Remove both front drive shafts. Refer to *FRONT DRIVE SHAFT* in this subsection.
3. Detach vent hose from front differential.



FROM LH SIDE

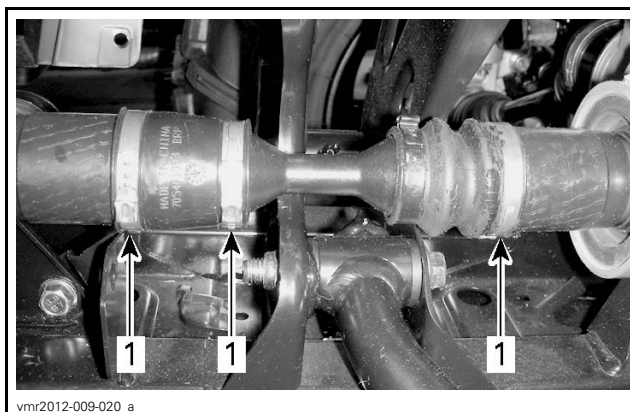
1. Vent hose

4. Remove bolts securing front differential to frame.



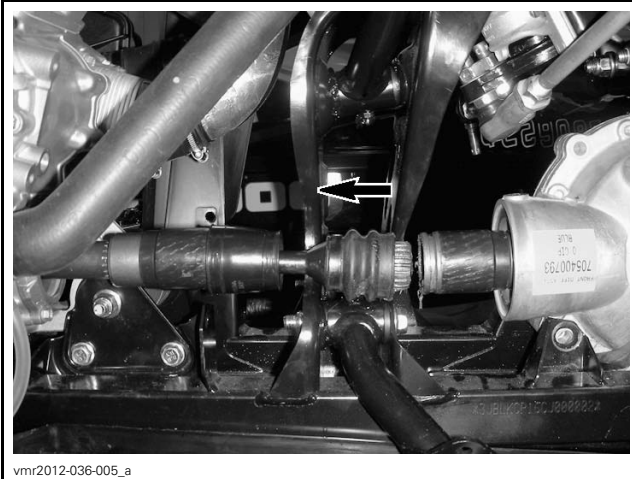
1. Bolts securing front differential to frame

5. Remove the following Oetiker clamps from front propeller shaft.



1. Oetiker clamps

6. Detach front propeller shaft from front differential by moving it rearward.



FRONT PROPELLER SHAFT MOVED REARWARD

7. Remove front differential by pulling it from RH side.

NOTICE Be careful not to knock or to bend vent hose fitting while removing front differential.

Front Differential Inspection (Assembled)

Manually turn the pinion gear; it should turn smoothly. Repair if necessary.

Check if oil seals are brittle, hard or damaged. Replace if necessary.

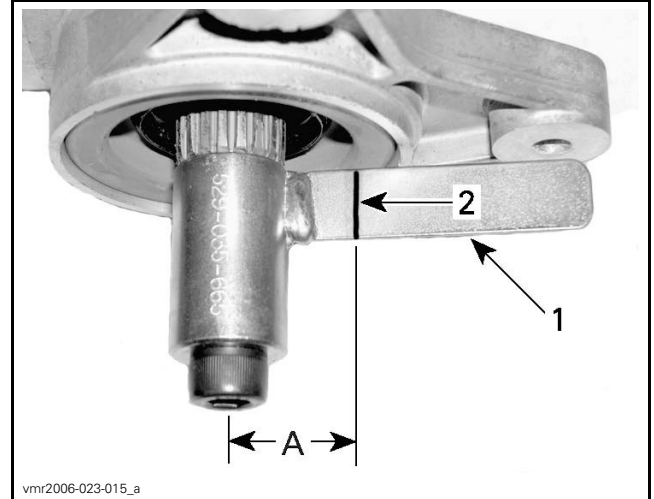
Backlash Inspection

When measuring backlash, the differential cover should be upside down to pull the ring gear out of mesh.

Using a dial indicator and the BACKLASH MEASUREMENT TOOL (P/N 529 035 665), measure the backlash.

Place the backlash measurement tool at the end of pinion gear.

From center of tool bolt, measure 25.4 mm (1 in) and scribe a mark on the tab.



1. Tab of backlash measurement tool
 2. Mark on tab
- A. 25.4 mm (1 in)

Position the dial indicator tip against the tab at a 90° angle and right on the previously scribed mark. Gently, move the tool tab back and forth. Note the backlash result.



Rotate pinion gear 1/2 turn and recheck backlash. Note the result.

Rotate pinion gear 1 turn and recheck backlash.

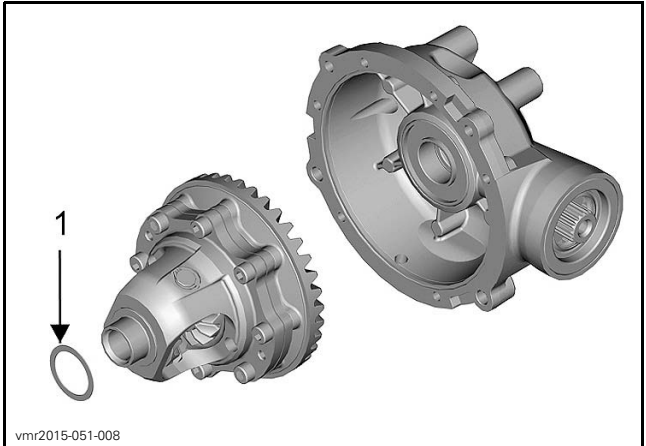
BACKLASH SPECIFICATION
0.1 mm (.004 in) to 0.25 mm (.01 in)

If backlash is out of specification, split final drive housing and adjust shim thickness as per following guideline.

Section 06 DRIVE SYSTEM

Subsection 01 (FRONT DRIVE)

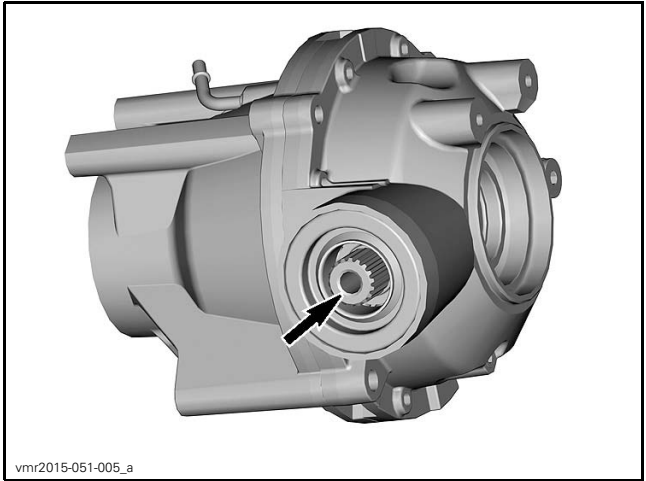
BACKLASH ADJUSTMENT GUIDELINE	
BACKLASH MEASUREMENT	WHAT TO DO
Below 0.1 mm (.004 in)	Remove shim(s) and recheck backlash
Above 0.25 mm (.01 in)	Add shim(s) and recheck backlash



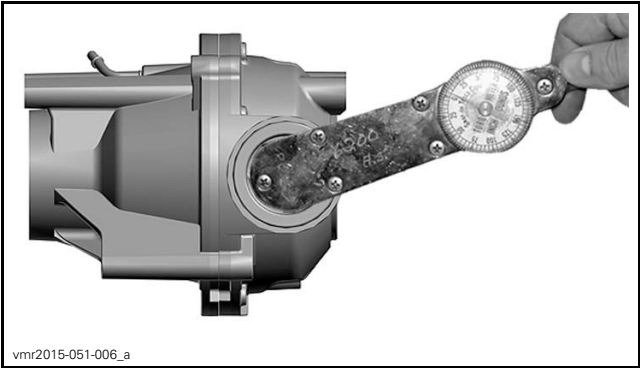
1. Backlash shim

Preload Inspection

Screw the propeller shaft screw in pinion gear.



Using a needle torque wrench, measure the preload.



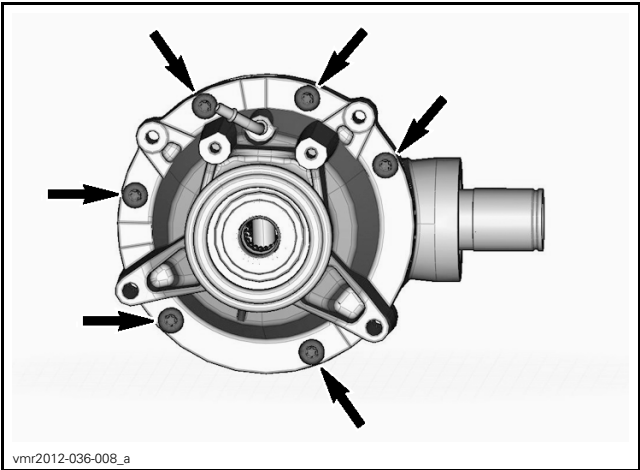
PRELOAD SPECIFICATION
Maximum 0.50 N•m (4 lbf•in)

If preload is out of specification, split front differential housing and check all bearings conditions.

Front Differential Disassembly

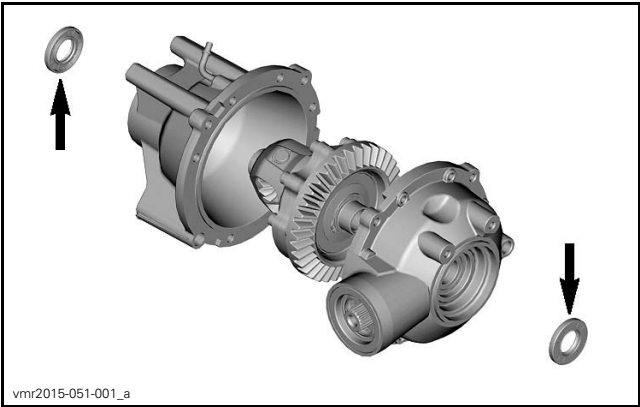
Differential Housing

Remove front differential housing screws.



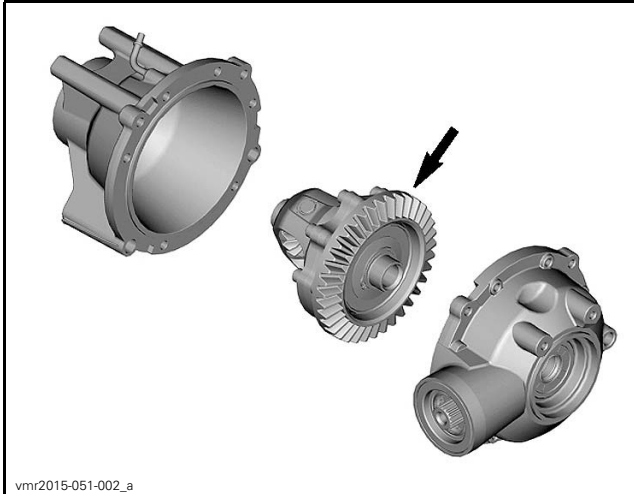
Separate half housings.

Remove oil seals.



Visco-Lok Carrier/Ring Gear

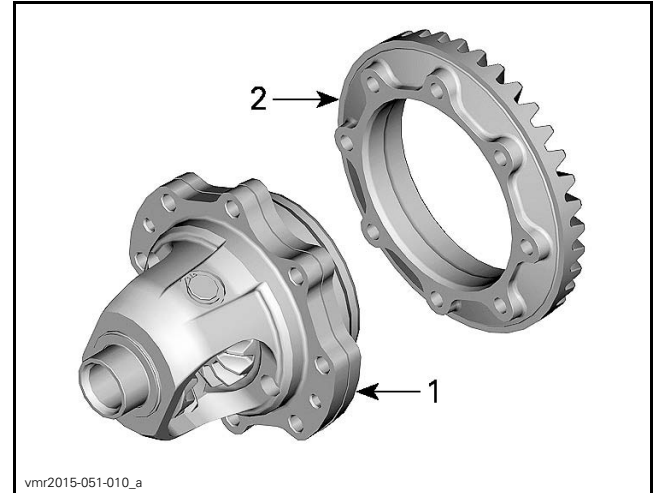
Remove Visco-Lok carrier/ring gear out of half housing.



Remove screws securing ring gear to Visco-Lok unit.



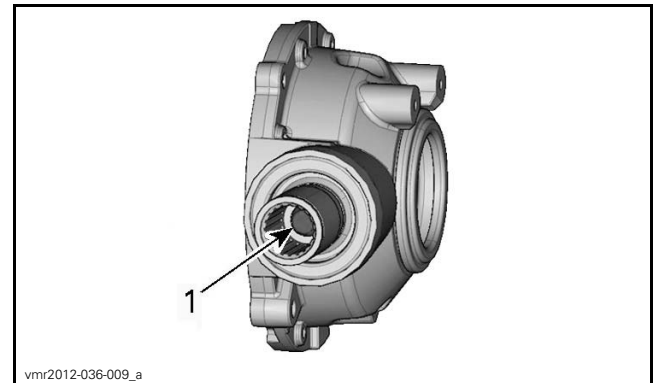
Separate ring gear from Visco-Lok unit.



1. Visco-Lok unit
2. Ring gear

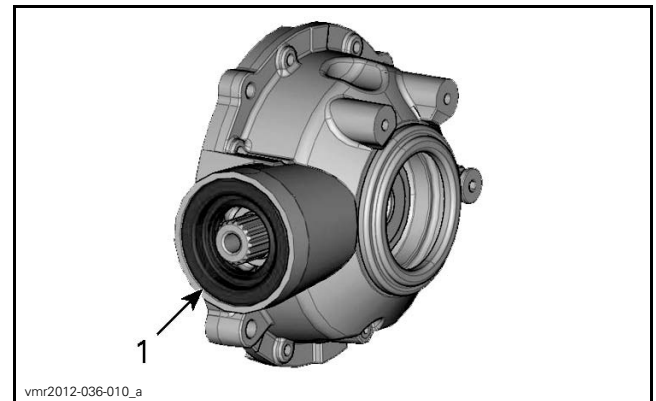
Pinion Gear

Remove screw retaining front propeller shaft adapter.



1. Retaining screw

Remove and discard oil seal.



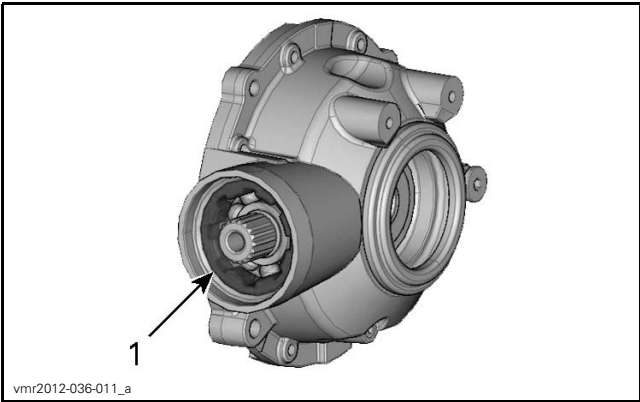
1. Oil seal

Unscrew the pinion nut.

REQUIRED TOOL
SPANNER SOCKET (P/N 529 035 649)

Section 06 DRIVE SYSTEM

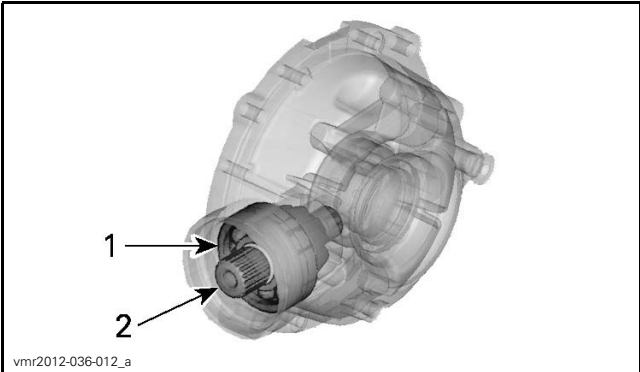
Subsection 01 (FRONT DRIVE)



1. Pinion nut

Remove bearing and pinion gear together.

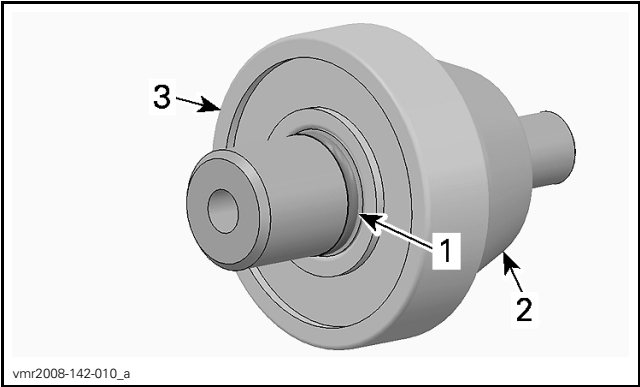
RECOMMENDED TOOLS	QTY
Pipe: 78 mm (3-1/16 in) diameter x 127 mm (5 in) in length	1
Threaded rod: M10 x 1.25, 178 mm (7 in) length	1
M10 x 1.25 nut	3
Flat bar	1



1. Bearing
2. Pinion gear

Remove and discard O-ring.

Remove bearing from pinion gear.



1. O-ring
2. Pinion gear
3. Bearing

Remove and discard the needle bearing.

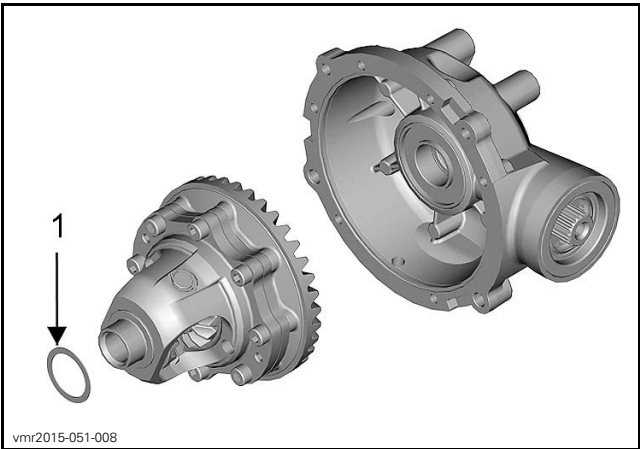
Front Differential Assembly

Adjustment is required when any of the following part is changed.

- Pinion gear
- Ring gear
- Viscolok unit
- Housing.

As a preliminary setup, install shim according to the following table.

RECOMMENDED SHIM THICKNESS	
BACKLASH	0.5 mm (.02 in) (as a preliminary adjustment)



1. Backlash shim

Prior to finalizing assembly, proceed in this order:

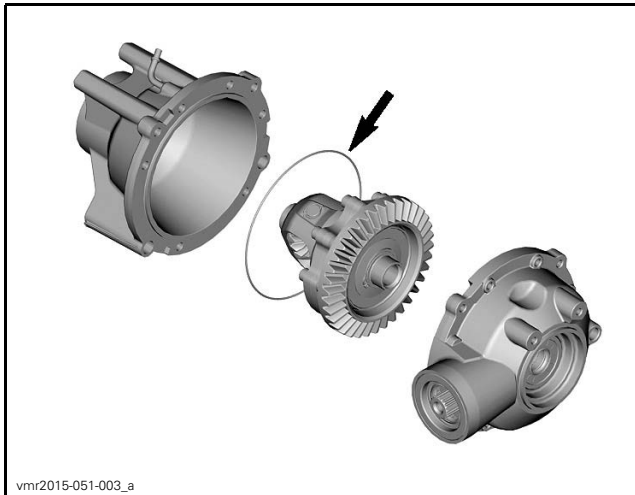
- Temporarily assemble final drive using recommended torques.
- Do not apply thread locker product.
- Do not install a new pinion nut.
- Check backlash.
- Check preload.

Visco-Lok Carrier/Ring Gear

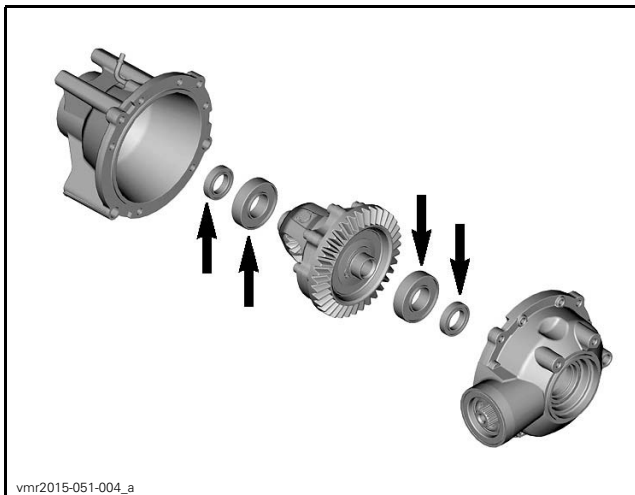
The installation is the reverse of the removal procedure. However, pay attention to the following. Tighten Visco-Lok / ring gear screws to specification.

TIGHTENING TORQUE	
Visco-Lok / ring gear screws	37 N•m ± 3 N•m (27 lbf•ft ± 2 lbf•ft)

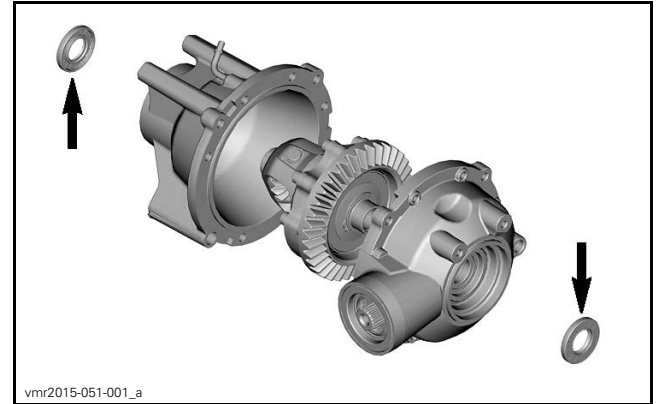
Check condition of seal. Replace if damaged.



Check bearings. Replace with **NEW** bearings if necessary.



Apply XPS SYNTHETIC GREASE (P/N 293 550 010) on **NEW** oil seals and install.



Tighten differential housing screws to specification.

TIGHTENING TORQUE	
Differential housing screws	23.5 N•m ± 3.5 N•m (17 lbf•ft ± 3 lbf•ft)

Pinion Gear

Install a **NEW** ball bearing.

Install a **NEW** O-ring.

Install a **NEW** needle bearing.

Apply LOCTITE 277 (P/N 293 800 073) to pinion nut.

Install and tighten the pinion nut to specification.

TIGHTENING TORQUE	
Pinion nut	180 N•m ± 15 N•m (133 lbf•ft ± 11 lbf•ft) + LOCTITE 277 (P/N 293 800 073)

Apply XPS SYNTHETIC GREASE (P/N 293 550 010) on **NEW** oil seal and install.

Tighten front propeller shaft adapter retaining screw to specification.

TIGHTENING TORQUE	
Front propeller shaft adapter retaining screw	75 N•m ± 5 N•m (55 lbf•ft ± 4 lbf•ft)

Front Differential Installation

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

When inserting the small portion of propeller shaft into propeller shaft boot, make sure both parts of propeller shaft are well indexed.

Section 06 DRIVE SYSTEM

Subsection 01 (FRONT DRIVE)

TIGHTENING TORQUE	
M8 nut securing front differential to frame	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)
M10 nuts securing front differential to frame	61 N•m ± 9 N•m (45 lbf•ft ± 7 lbf•ft)

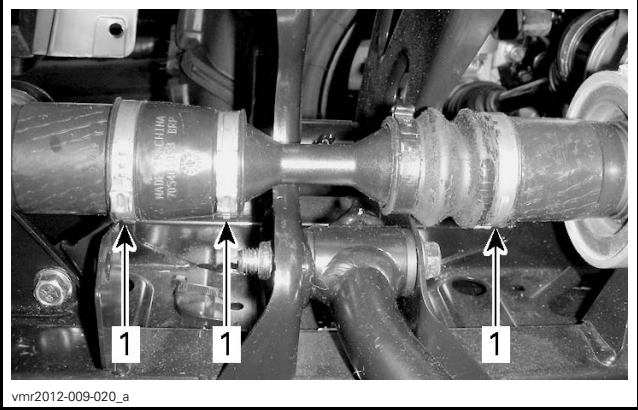
Install **NEW** Oetiker clamps.

Refill front differential with recommended oil. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

FRONT PROPELLER SHAFT

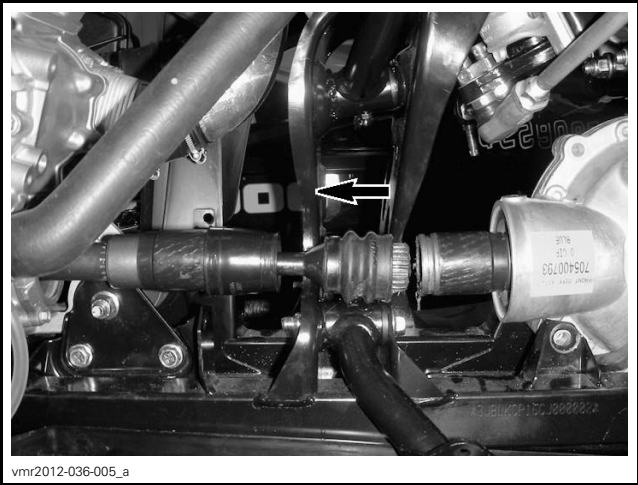
Front Propeller Shaft Removal

1. Lift and support vehicle.
2. Remove front wheel. Refer to *WHEELS AND TIRES* subsection.
3. Remove inner fender panel(s). Refer to *BODY* subsection.
4. Remove bolts securing front differential to frame.



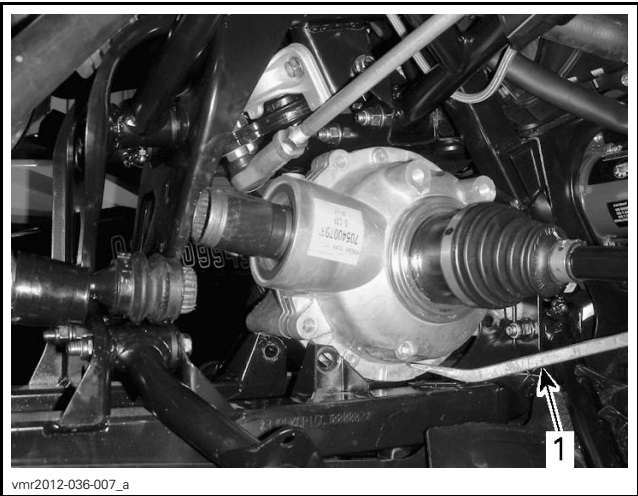
1. Oetiker clamps

6. Detach front propeller shaft from front differential by moving it rearward.



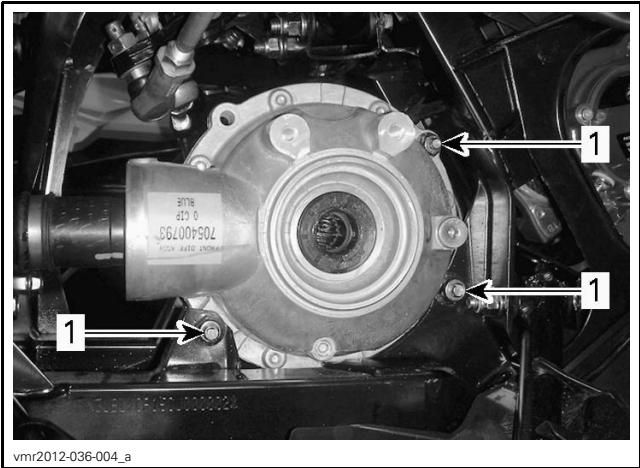
FRONT PROPELLER SHAFT MOVED REARWARD

7. Pry front differential upwards to make room.



1. Pry bar

8. Remove front propeller shaft by pulling it forward.



1. Bolts securing front differential to frame

5. Remove the following Oetiker clamps from front propeller shaft.

9. Remove front propeller shaft adapters from engine and from front differential.

Front Propeller Shaft Inspection

Inspect if propeller shaft is not bent or twisted.

Check propeller shaft splines for wear or damage.

Check if propeller shaft bellows is pierced or brittle.

Front Propeller Shaft Installation

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

Apply XPS SYNTHETIC GREASE (P/N 293 550 010) on splines.

Tighten propeller shaft adapter screw to specification.

TIGHTENING TORQUE	
Propeller shaft adapter screw (differential side: M10x16)	75 N•m ± 5 N•m (55 lbf•ft ± 4 lbf•ft) + LOCTITE 648 (GREEN) (P/N 413 711 400)
Propeller shaft adapter screw (engine side: M12x20)	75 N•m ± 5 N•m (55 lbf•ft ± 4 lbf•ft) + LOCTITE 648 (GREEN) (P/N 413 711 400)