

STEERING SYSTEM

SERVICE TOOLS

Description	Part Number	Page
STEERING ALIGNMENT TOOL.....	529 036 059	3

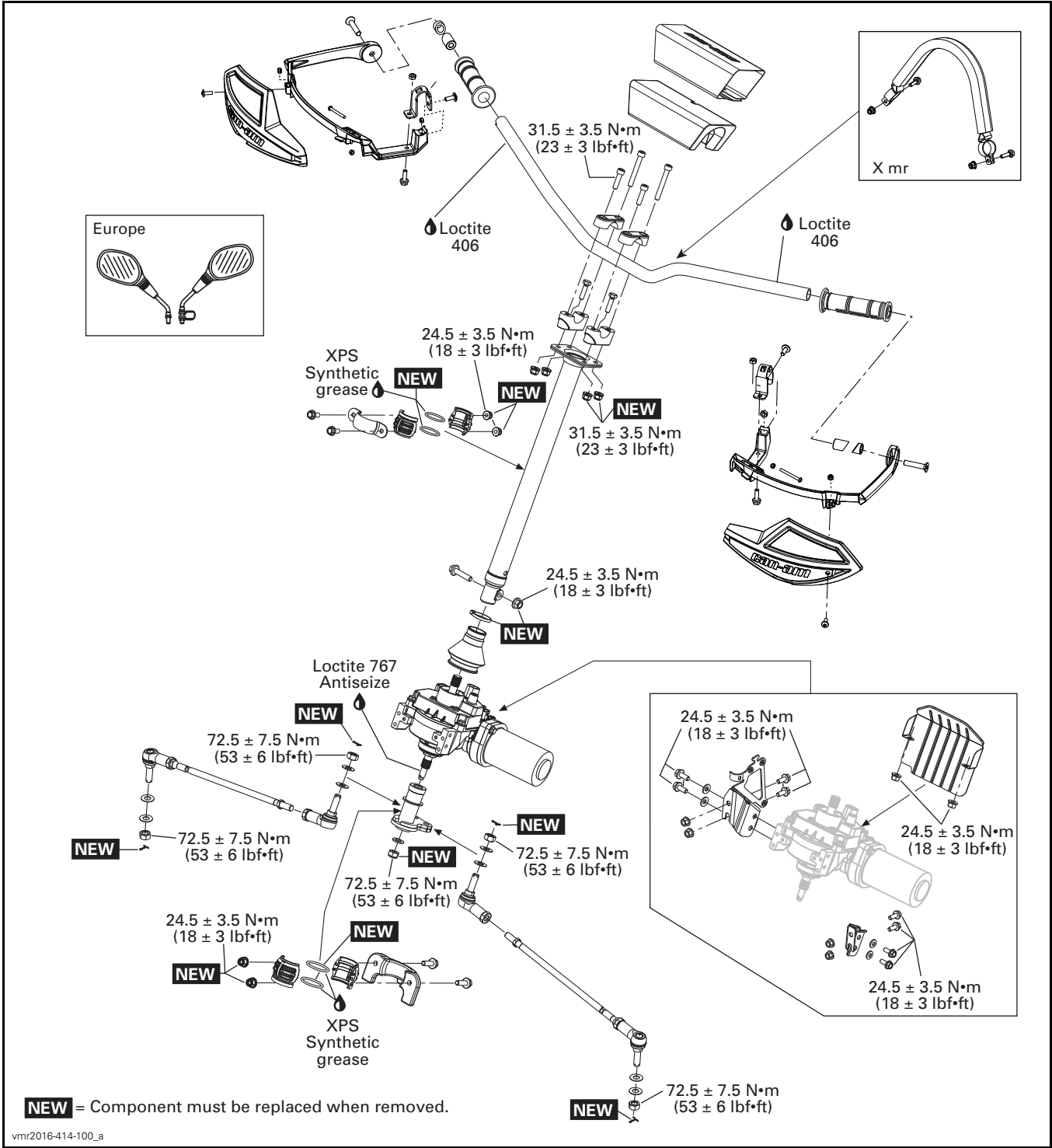
SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
SMOOTHFLOW™ TAPERED TIP	16 ga	4
	#511 rtt-b	

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 406 (GLUE).....	293 800 100	4
LOCTITE 767 (ANTISEIZE LUBRICANT)	293 800 070	9
PULLEY FLANGE CLEANER	413 711 809	4
XPS SYNTHETIC GREASE.....	293 550 010	9

Subsection 01 (STEERING SYSTEM)



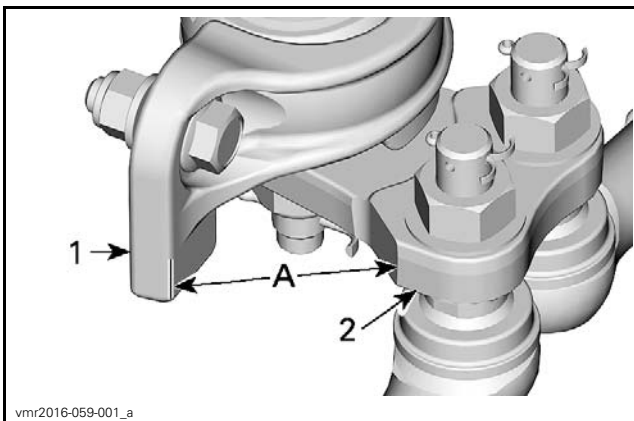
GENERAL

The procedures described below are the same for the RH and LH sides, unless otherwise instructed.

ADJUSTMENT

STEERING ALIGNMENT

1. Place vehicle on a level surface.
2. Check pressure in each tire. Adjust to recommended pressure.
3. Lift and secure vehicle off the ground so that the suspension is fully extended.
4. Remove both inner fenders to have easy access to pitman arm.
5. Center pitman arm by measuring equal distances, $\pm 1\text{mm}$, between the edges as per the following illustration, on both sides of the pitman arm.



A. Equal distance $\pm 1\text{ mm}$ (1/32 in) on both sides

1. Steering column lower attach
2. Pitman arm

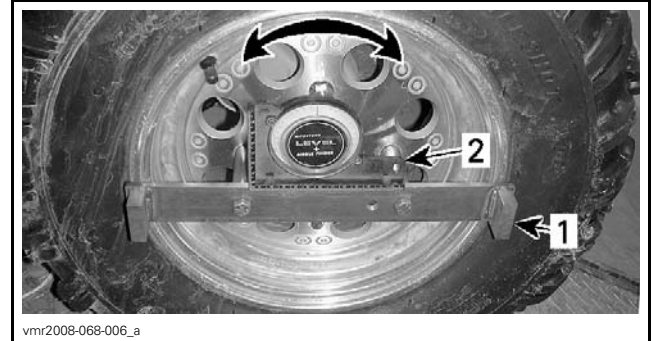
6. Secure handlebar without moving steering column.
7. Make sure pitman arm remains centered. Otherwise, repeat steps 5 and 6.
8. Remove two wheel nuts on the LH rear wheel and install the steering alignment tool.

REQUIRED TOOL	
STEERING ALIGNMENT TOOL (P/N 529 036 059)	

9. Place a rope around all four tires using an elastic, link both ends together.

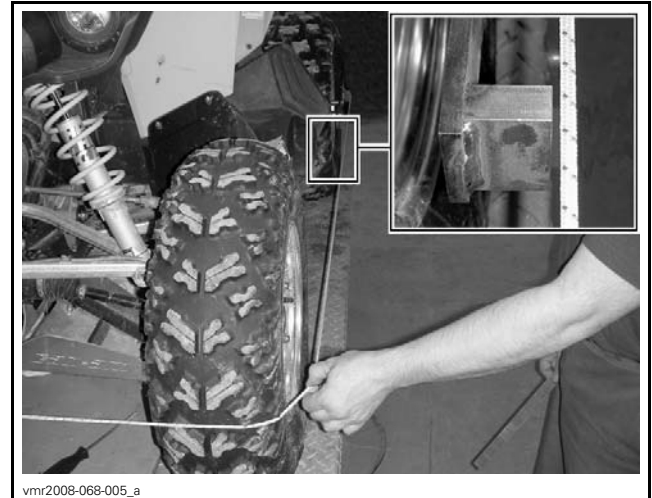
NOTE: The rope must be placed at the center of the wheels.

10. Rotate the front wheel to position the alignment tool level with the rope. Ensure rope passes over the spacer blocks on the alignment tool.



1. Steering adjustment tool
2. Angle gauge or level

11. At the LH front of wheel, near the front of the rim, pull on the rope so that it does not touch the first spacer block on the alignment tool.



TYPICAL

12. Slowly move rope back until it just makes contact with both spacers.

NOTE: Ensure rope remains in this position as you carry out the following steps.



TYPICAL

Subsection 01 (STEERING SYSTEM)

13. Measure the distance between the rope and the rim, at the front and at the rear of the wheel rim.



TYPICAL — FRONT OF WHEEL



TYPICAL — REAR OF WHEEL

14. Calculate the difference between the front and rear measurements and compare with following specification.

SPECIFICATION
0 mm to 3 mm (0 in to .118 in) toe-in

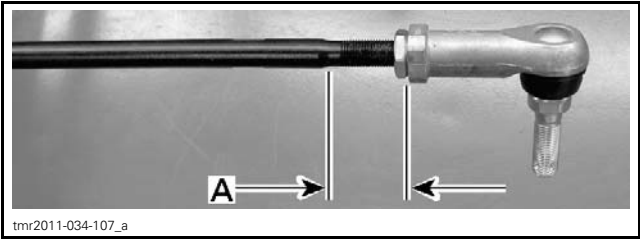
15. If the wheel toe measurement is out of specification, carry out the following:

- 15.1 Loosen tie-rod end lock nuts.
- 15.2 Adjust tie-rod length.

NOTE: For a toe-in adjustment, the distance must be longer at the front of the wheel. Lengthen tie-rod to increase toe-in, and vise-versa.

WARNING

The maximum unengaged tie-rod length must not exceed 32 mm (1.26 in)
Tie rod unengaged length must be the same at both ends of the tie-rod.



A. Maximum tie-rod end length

15.3 Tighten tie-rod end lock nuts to specification.

TIGHTENING TORQUE	
Tie-rod end locking nut	34 N•m ± 2 N•m (25 lbf•ft ± 1 lbf•ft)

- 16. Repeat procedure for other front wheel.
- 17. Put the vehicle back on the ground.
- 18. Remove the handlebar securing device.
- 19. Place the front wheels in straight ahead position and adjust the handlebar in its center position by loosening the 4 bolts clamping the handlebar on the steering column.

PROCEDURES

HANDLEBAR GRIP

Removing the Handlebar Grip

- 1. Loosen the screw at the end of handlebar grip.
- 2. Remove the handlebar grip cap.
- 3. Cut and remove the handlebar grip.

Installing the Handlebar Grip

- 1. Remove all rubber residues of the old grip before installing the new.
- 2. Clean the handlebar with PULLEY FLANGE CLEANER (P/N 413 711 809) or alcohol to remove any greasy matter on it.
- 3. Install handlebar grip by blowing compressed air between handle grip and handlebar.
- 4. Install a SMOOTHFLOW™ TAPERED TIP (P/N 16 GA #511 RTT-B) from EFD Inc on a bottle of LOCTITE 406 (GLUE) (P/N 293 800 100).
- 5. Lift a part of the grip using a small screwdriver and inject glue (about 4 spots per side).

NOTE: The glue dries quickly. Do not apply it before installing grip.

- 6. Apply pressure on the grip for approximately 30 seconds to set the glue.
- 7. Install the handlebar grip cap and tighten screw to specification.

TIGHTENING TORQUE	
Grip cap screw	0.4 N•m ± 0.1 N•m (4 lbf•in ± 1 lbf•in)

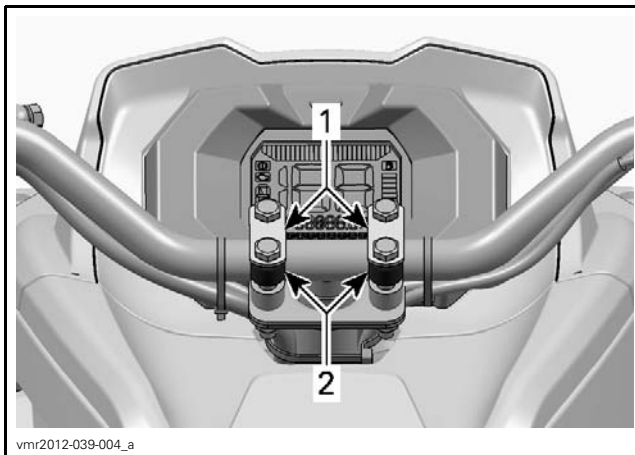
HANDLEBAR

Removing the Handlebar

1. Remove handlebar cover.

NOTE: Remove handlebar grips, throttle handle, brake handle and multifunction switch only if the handlebar is defective and requires replacement.

2. Remove handlebar mounting bolts, stiffener and handlebar clamps.



TYPICAL

1. Stiffeners
2. Handlebar clamps

3. Remove the handlebar.

Handlebar Inspection

Inspect the handlebar for damage, cracks or bending. Replace if any of these problems is detected.

Installing the Handlebar

For the installation, reverse the removal procedure. However, pay attention to the following.

Make sure wheels are straight ahead. Refer to *STEERING ALIGNMENT*.

Position the handlebar straight ahead and tighten its screws.

Tighten handlebar "U" clamps equally (equal distance on each side of clamps).

STEERING CONNECTORS

Steering Connector Access

1. Remove gauge support, refer to *REMOVING THE MULTIFUNCTION GAUGE* in *LIGHTS, GAUGE AND ACCESSORIES* subsection.

Steering Connector Identification

Refer to *WIRING HARNESS AND CONNECTORS* subsection

MULTIFUNCTION SWITCH

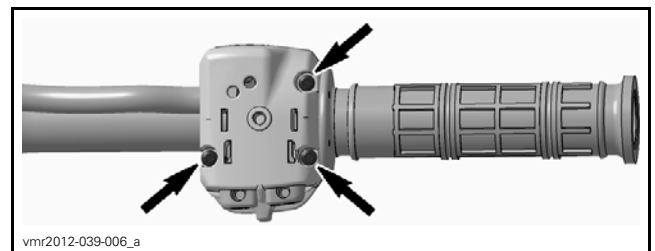
Removing the Multifunction Switch (From Vehicle)

Remove gauge support. Refer to *LIGHTS, GAUGE AND ACCESSORIES* subsection.

Carry out steps in *MULTIFUNCTION SWITCH REMOVAL (AT HANDLEBAR)*.

Removing the Multifunction Switch (At Handlebar)

1. Remove multifunction switch screws.



TYPICAL - MULTIFUNCTION SWITCH

2. Separate multifunction switch from handlebar.
3. Disconnect multifunction switch steering connectors, refer to *WIRING HARNESS AND CONNECTORS* subsection:
 - MG1
 - MG2
4. Take note of the positions of the locking ties securing the steering harness, then cut them and remove the multifunction switch steering harness from the vehicle.

Installing the Multifunction Switch

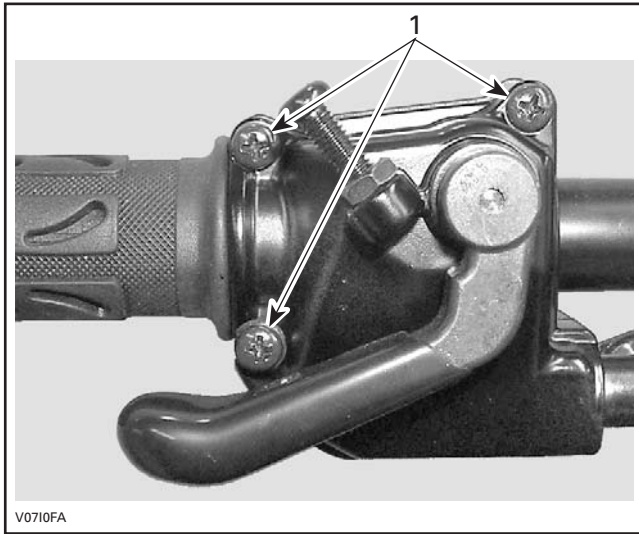
For installation, reverse the removal procedure.

NOTICE Be sure to route and secure the multifunction switch steering harness as noted prior to removal.

THROTTLE LEVER

Removing the Throttle Lever

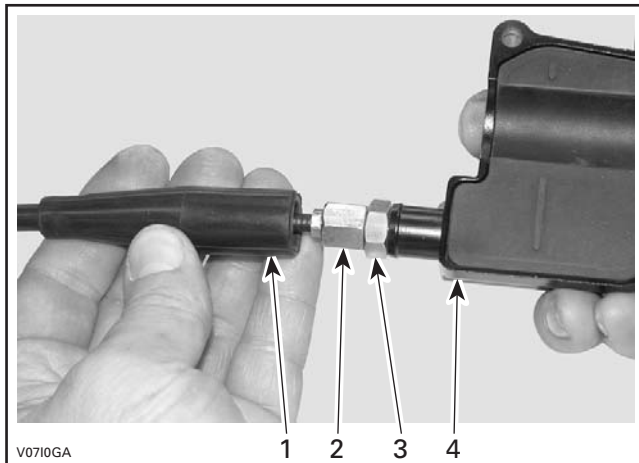
1. Disconnect the BD connector (2/4WD switch), refer to *WIRING HARNESS AND CONNECTORS* subsection.
2. Remove throttle lever housing retaining screws.



TYPICAL - THROTTLE LEVER HOUSING

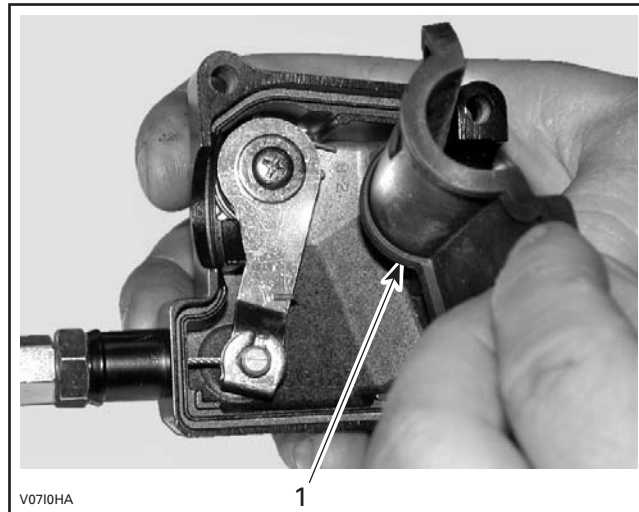
1. Remove retaining screws

3. Separate throttle lever housing from handlebar.
4. Slide rubber protector back to expose throttle cable adjuster.



1. Cable protector
2. Throttle cable adjuster
3. Lock nut
4. Throttle lever housing

5. Loosen lock nut and screw in the throttle cable adjuster.
6. Remove inner housing protector.



1. Inner housing protector

7. Slide cable in clip slot and remove the end of the cable from clip.



8. Remove throttle cable from housing.

Installing the Throttle Lever

For installation, reverse the removal procedure.

Adjust throttle cable. Refer to *THROTTLE CABLE ADJUSTMENT*.

BRAKE LEVER

Removing the Brake Lever (From Vehicle)

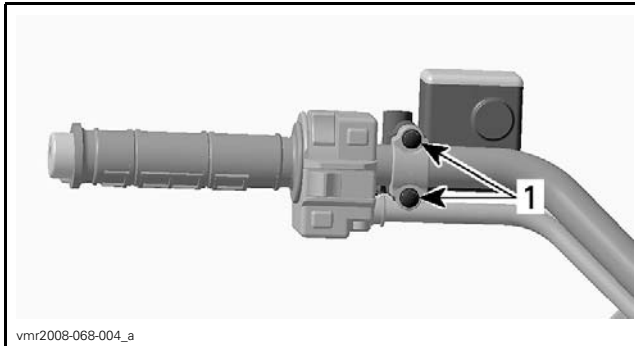
1. Carry out steps in *BRAKE LEVER REMOVAL (FROM HANDLEBAR)*.

NOTICE Avoid spilling brake fluid on plastic, rubber or painted parts.

2. Disconnect brake hose, refer to *BRAKES* subsection.

Removing the Brake Lever (At Handlebar)

1. Remove brake lever retaining screws.



1. Retaining screws

2. Separate brake lever from handlebar.

Installing the Brake Lever

For installation, reverse the removal procedure however, pay attention to the following.

TIGHTENING TORQUE	
Brake lever mounting screw	9 N•m ± 1 N•m (80 lbf•in ± 9 lbf•in)

⚠ WARNING

If brake hose was disconnected, bleed brake system. Refer to *BRAKES* subsection.

STEERING COLUMN BEARING

The steering column bearing(s) used on these vehicles are half bushings.

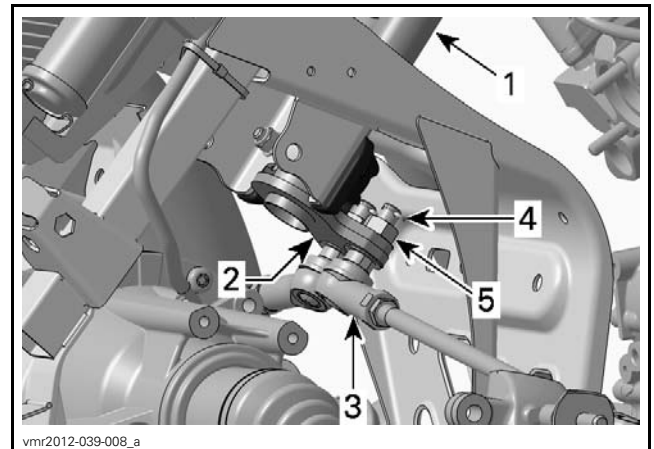
For inspection and replacement of steering column half bushings, refer to *STEERING COLUMN* in this subsection.

STEERING COLUMN

Removing the Steering Column (Without a DPS)

1. Remove gauge support, refer to *REMOVING THE MULTIFUNCTION GAUGE* in *LIGHTS, GAUGE AND ACCESSORIES* subsection.
2. Remove the front body module, refer to *BODY* subsection.
3. Remove the air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.

4. Remove handlebar, refer to *REMOVING THE HANDLEBAR* in this subsection. Also remove locking ties and separate wiring harnesses and hoses from the steering column.
5. Disconnect the tie-rods from the pitman arm at the bottom of the steering column. Refer to *TIE-ROD*, further in this section.

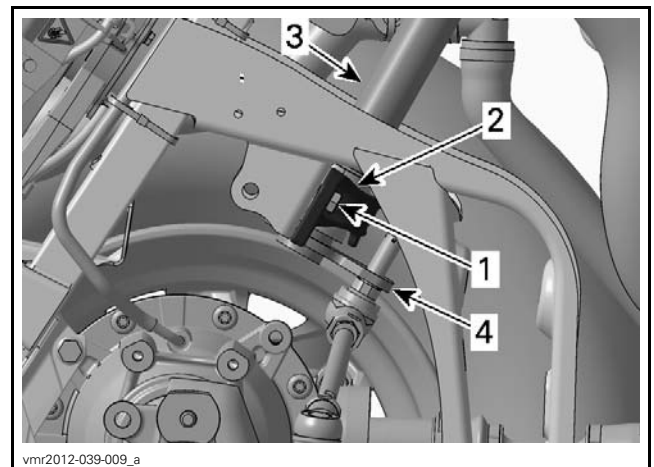


TYPICAL

1. Steering column
2. Pitman arm
3. Tie-rod end
4. Cotter pin
5. Tie-rod retaining nut

NOTE: When removing tie-rods from pitman arm, take note of positions of flat washers for installation.

6. Remove lower half bushing retaining bolts and pull retainer off of half bushings.

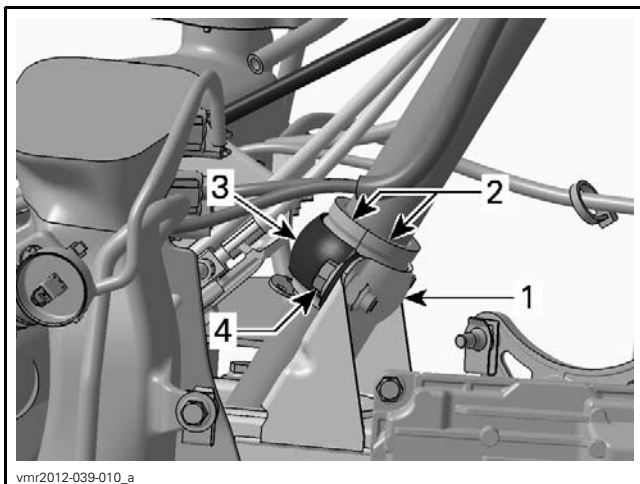


TYPICAL

1. Lower retainer mounting screws (2)
2. Lower half bushing retainer
3. Steering column
4. Pitman arm

7. Remove upper half bushing retaining bolts and pull retainer off of half bushings.

Subsection 01 (STEERING SYSTEM)



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TYPICAL

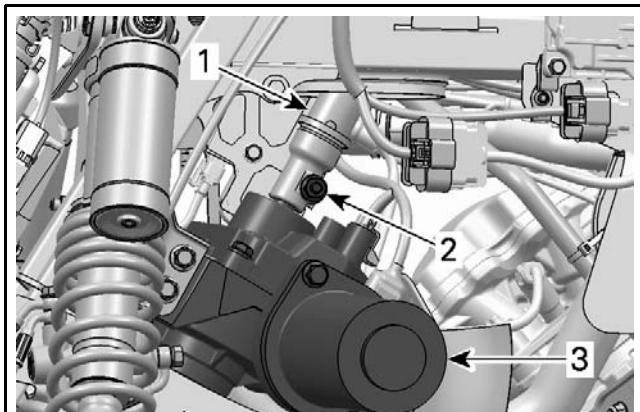
1. Upper steering column support
2. Half bushings
3. Half bushing retainer
4. Retainer mounting screws (2)

8. Pull steering column from vehicle.

Removing the Steering Column (With a DPS)

1. Remove gauge support, refer to *REMOVING THE MULTIFUNCTION GAUGE* in *LIGHTS, GAUGE AND ACCESSORIES* subsection.
2. Remove the front body module, refer to *BODY* subsection.
3. Remove the air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.
4. Remove handlebar, refer to *REMOVING THE HANDLEBAR* in this subsection. Also remove locking ties and separate wiring harnesses and hoses from the steering column.
5. Remove steering column lower pinch bolt, just above the DPS unit.

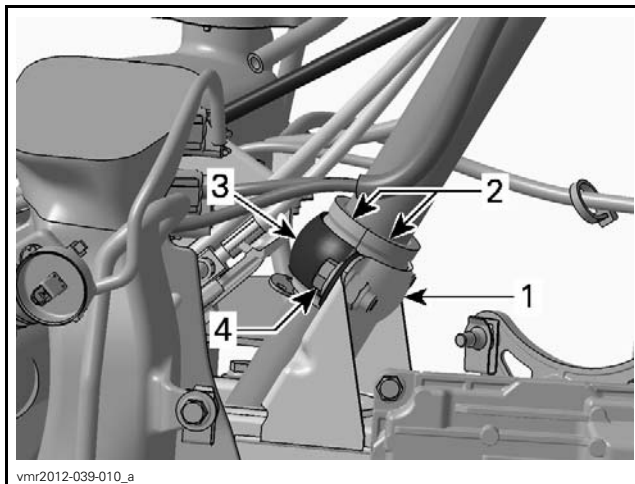
NOTE: Some parts in following illustration not shown for clarity of illustration.



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1. Steering column
2. Steering column lower pinch bolt
3. DPS unit

6. Remove upper half bushing retaining bolts and pull retainer off of half bushings.



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TYPICAL

1. Upper steering column support
2. Half bushings
3. Half bushing retainer
4. Retainer mounting screws (2)

7. Pull steering column from vehicle.

Inspecting the Steering Column

1. Inspect steering column for wear, cracks or bending. Replace if any of these problems is detected.
2. Check steering column O-rings for brittleness, hardness, wear or other damage. Replace if necessary.
3. Clean and check steering column half bushings. If they show signs of wear or cracking, replace them.

Installing the Steering Column

For the installation, reverse the removal procedure however, pay attention to the following.

PRODUCT	
O-rings, half bushings and DPS input shaft splines	XPS SYNTHETIC GREASE (P/N 293 550 010)
DPS output shaft splines	LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070)

Install **NEW** cotter pins (as applicable per model). Both ends of cotter pins must be folded.

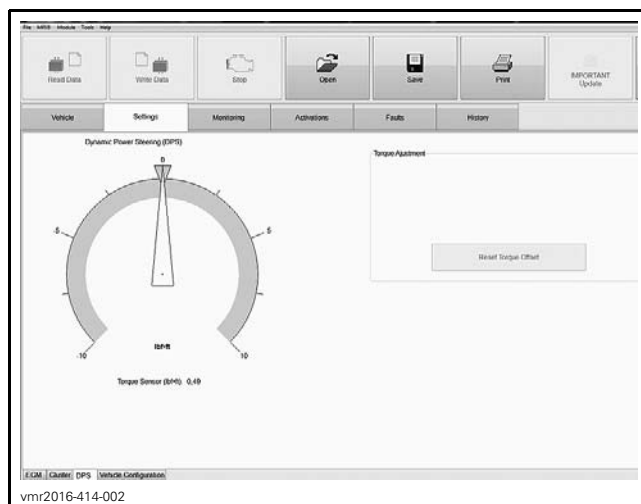
Install **NEW** elastic nuts where used.

Torque all fasteners as specified in the applicable exploded view.

Carry out a *STEERING ALIGNMENT* procedure as detailed in this subsection.

With DPS

Carry out a *TORQUE OFFSET RESET* with B.U.D.S..

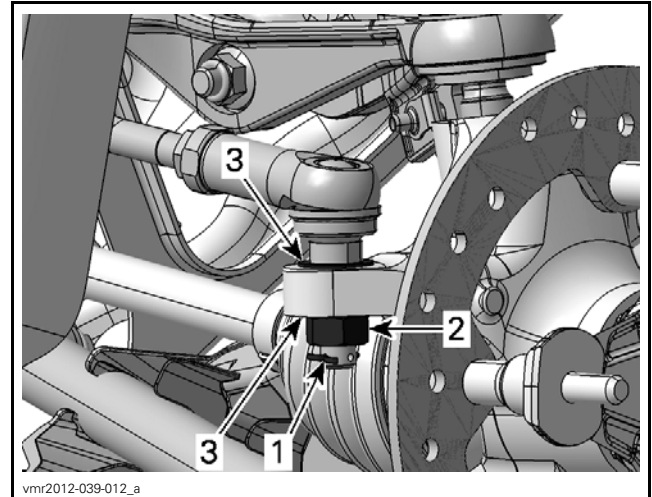


TIE-ROD

NOTE: Use the same procedure for RH and LH side.

Removing the Tie-Rod

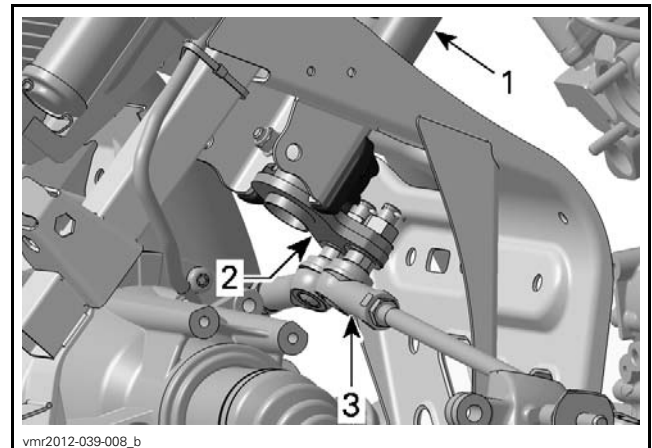
1. Place vehicle on jack stands and remove the applicable wheel.
2. Remove tie-rod end from steering knuckle by removing:
 - Cotter pin (discard)
 - Retaining nut
 - Hardened washers (note position).



TYPICAL - TIE ROD AT STEERING KNUCKLE

1. Cotter pin
2. Elastic nut
3. Hardened washers

3. If completely removing tie-rod from vehicle, repeat previous step at pitman arm.



TYPICAL

1. Steering column
2. Pitman arm
3. Tie-rod end

Inspecting the Tie-Rod

Inspect tie-rod for straightness, cracks and other damages. Replace as required.

Inspect tie-rod ends for wear or excessive play. If excessive, replace the tie-rod end.

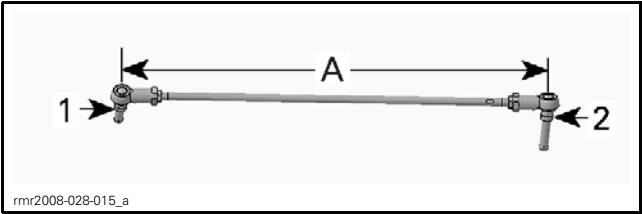
Installing the Tie-Rod

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

When installing a new tie-rod or tie-rod end, adjust tie-rod to nominal length.

TIE-ROD NOMINAL LENGTH	
Dimension "A" - center to center	416.4 mm (16.394 in)

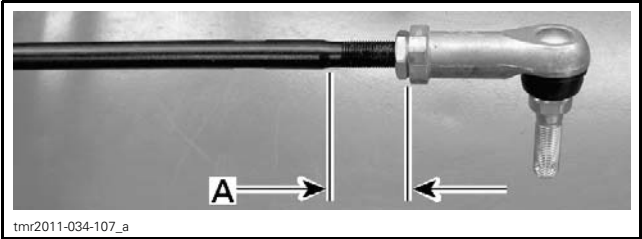
Subsection 01 (STEERING SYSTEM)



NOMINAL LENGTH
1. Pitman arm side
2. Knuckle side
A. 416.4 mm (16.394 in)

TIE-ROD MAXIMUM UNENGAGED LENGTH	
Dimension "A" - Shoulder to tie rod end face	32 mm (1.26 in)

WARNING
Maximum tie-rod unengaged length must not exceed specification. Both tie-rod ends must be engaged equally.



MAXIMUM TIE-ROD UNENGAGED LENGTH
A. 32 mm (1.26 in)

Install **NEW** cotter pins. Both ends of cotter pins must be folded.

Check the steering alignment, refer to *STEERING ALIGNMENT* in this subsection.

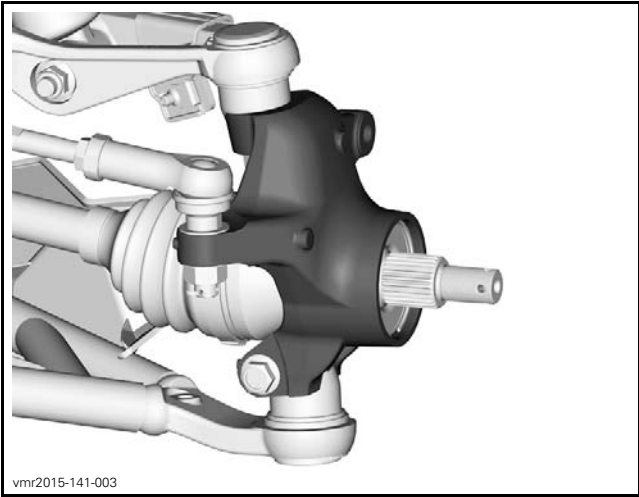
Apply specified torques.

TIGHTENING TORQUE	
Tie-rod lock nut	34 N•m ± 2 N•m (25 lbf•ft ± 1 lbf•ft)
Tie rod end retaining nut	72 N•m ± 7 N•m (53 lbf•ft ± 5 lbf•ft)

KNUCKLE

Removing the Knuckle

1. Safely lift and support the front of vehicle.
2. Remove front wheel.
3. Detach tie-rod end from knuckle, refer to *TIE-ROD END* in this subsection.
4. Remove brake caliper, refer to *BRAKES* subsection.
5. Remove wheel hub, refer to *FRONT DRIVE* subsection.



6. Detach upper suspension arm from knuckle, refer to *FRONT SUSPENSION*.
7. Detach lower suspension arm from knuckle, refer to *FRONT SUSPENSION*.
8. Remove knuckle from vehicle.

Inspecting the Knuckle

Check knuckle for cracks or other damages. Replace if necessary.

Check if wheel bearing turns freely and smoothly. See *WHEEL BEARING* in this subsection.

Installing the Knuckle

The installation is the reverse of removal procedure.

WHEEL BEARINGS

Inspecting the Wheel Bearing (Maintenance)

Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Inspecting the Wheel Bearing (During Component Removal)

Whenever the drive axle or knuckle is removed, check wheel bearing as follows:

- Check if wheel bearing turns freely and smoothly.
- Check seal condition.

Replace if necessary.

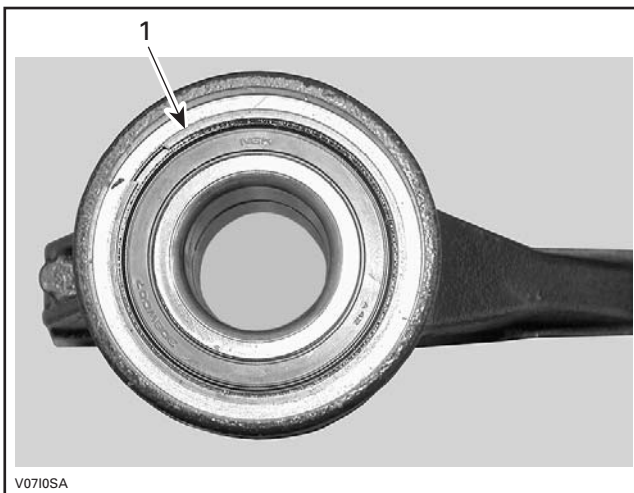
Removing the Wheel Bearing

1. Remove knuckle from vehicle, refer to *REMOVING THE KNUCKLE* in this subsection.
2. Remove and discard knuckle seal.



TYPICAL

3. Remove the circlip.



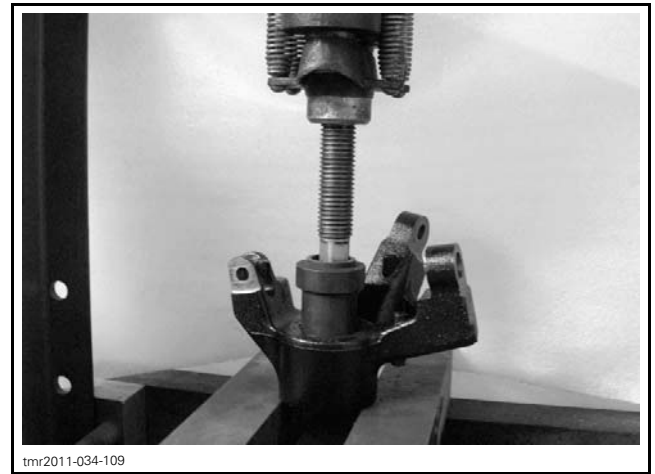
TYPICAL
1. Circlip



TYPICAL
1. Seal
2. Circlip

4. Install knuckle on a press.

5. Remove bearing from knuckle using an appropriate bearing remover.



NOTE: It may be necessary to heat the knuckle to remove bearing.

⚠ WARNING

Clean all grease from outside and inside of knuckle before heating it.

Installing the Wheel Bearing

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

To ease wheel bearing installation:

- Place bearing in a freezer for 10 minutes.
- Place knuckle in oven to 100°C (212°F) for 30 minutes maximum.

When knuckle is cooled down, install **NEW** circlip and **NEW** seal.

PITMAN ARM (WITH A DPS)

Refer to *DYNAMIC POWER STEERING (DPS)* subsection.