

DYNAMIC POWER STEERING (DPS)

SERVICE TOOLS

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PITMAN ARM PULLER	529 036 227	533
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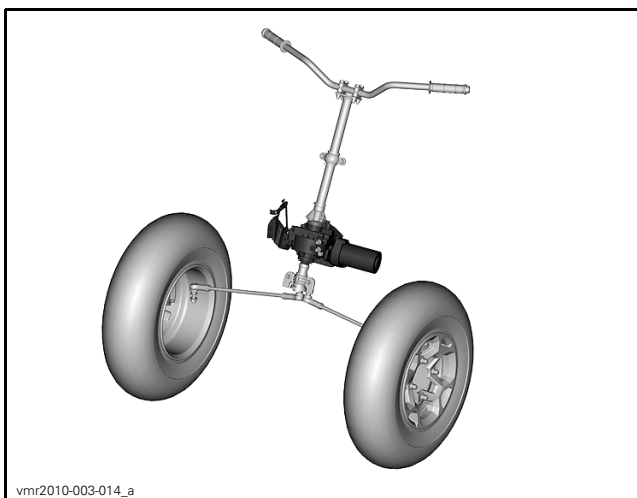
SERVICE PRODUCTS

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GENERAL

SYSTEM DESCRIPTION (FEATURES)

The Dynamic Power Steering (DPS) provides a computer controlled, variable power assist, achieved by an electric motor to optimize the amount of steering input required by the rider.



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1. Dynamic power steering unit (DPS)

The DPS system uses the following parameters to determine how much steering assist it provides:

- Engine RPM
- Battery/electrical system voltage
- Vehicle speed
- DPS shaft torque sensor input.

The amount of steering assist provided is dependent on the handlebar effort (steering torque), electrical power available, and vehicle speed.

The greater the handlebar effort (torque), the greater the assist will be.

The slower the vehicle speed, the greater the assist will be.

If the electrical system is activated but the engine is **not** running, there is **no** power assist provided.

When the handlebar is in the straight ahead position, there is no steering assist.

Steering torque may also come from the wheels due to rough terrain. Steering kickback is reduced while providing feedback to the driver.

The greater the power steering assist, the greater the load on the electrical system.

When the electrical system is under high load (battery not at full charge, operating the vehicle for prolonged periods of time at slow speed and low RPM which, requires higher power steering assist), the battery power reserve will gradually decrease. This further increases the load on the charging system and the electrical system voltage will drop. As system voltage drops, so does power steering assist.

NOTE: It is important to maintain the battery at a full state of charge to ensure proper DPS operation. The magneto output is 650 watts to minimize battery drain and system voltage drop.

DPS Assist Mode

The DPS system provides three rider selectable modes of operation.

DPS MAX provides maximum steering assist for technical low speed riding in rough or muddy terrain, or for touring.

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DPS MED provides normal (medium) steering assist for general all purpose riding.

DPS MIN provides less steering assist for increased feedback and aggressive trail riding.

A fourth mode of operation is available as an accessory to adjust the steering assist level for operation with an approved BRP track kit.

Derating Explanation

Derating is an internal protection system integrated in the DPS electronic module.

This system protects the electronic components when DPS works too hard and the internal temperature reaches a critical level.

It also protects electronics when current ripples in the system are too high. These current ripples can be caused by:

- Loose battery connections
- Low battery voltage
- Bad grounds
- Defective stator or bad stator output wires connection
- Failed regulator
- High electrical loads.

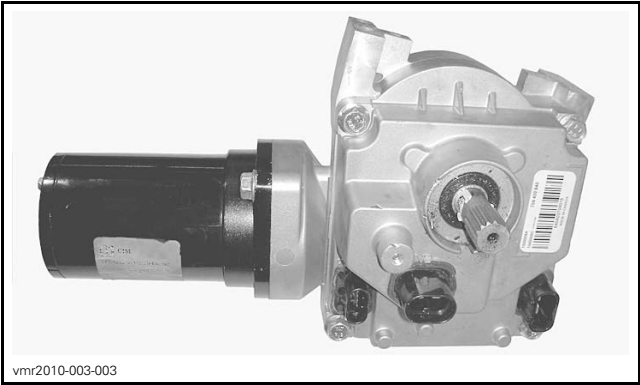
The internal protection system decreases the assistance level available to protect its electronic board. The normal assistance level will return when riding conditions are back to normal and the internal temperature decrease and/or when the ripples in the electric circuit decreases.

NOTE: This reaction is a normal protective behavior of the unit and it does not necessarily raise a fault in the cluster.

DPS SYSTEM DESCRIPTION
(COMPONENTS)

DPS Unit

The DPS unit is a self contained unit that includes the steering gear, the DPS module, the DPS motor, and the torque sensor.



TYPICAL - DPS UNIT

The DPS module provides DC power to the motor. The amount and duration of that DC power is determined by the inputs to the DPS module. The direction in which the motor turns is changed by reversing the polarity of the circuit current.

The DPS motor does not "spin", but rather turns in very small increments based on the amount, duration, and direction of DC power delivered by the DPS module.

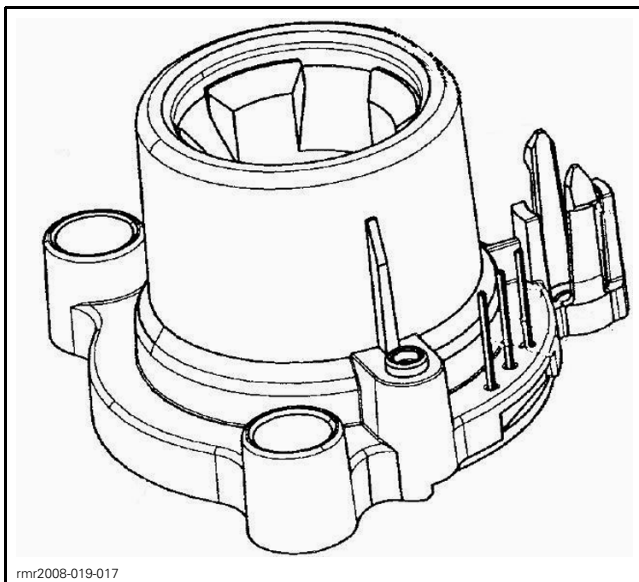
DPS Unit Protection

To protect the DPS electronic components, the steering assist behavior will change as follows.

CONDITION	DPS BEHAVIOR
When motor internal temperature reaches a certain temperature (DPS continuously estimates it)	Steering assist will gradually decrease
DPS internal board temperature is above 85°C (185°F)	
DPS internal board temperature is above 100°C (212°F)	Steering assist is stopped

When the DPS unit temperature is back within normal operating range, normal steering assist will resume.

Steering Torque Sensor



The steering column is connected to the shaft on the DPS unit. A small area of the DPS shaft is magnetized. Inside the DPS unit, a torque sensor surrounds the magnetized area of the DPS shaft.

When the handlebar is turned, torque is applied to the shaft which tends to twist the shaft slightly, deforming the magnetic field in the shaft. The sensor detects the torque by measuring the deviation of the magnetic field.

The torque sensor is very sensitive and can detect very small changes in the magnetic field. The harder the handlebar is turned, the greater the magnetic deviation, the greater the power steering assist.

ADJUSTMENT

TORQUE OFFSET RESET

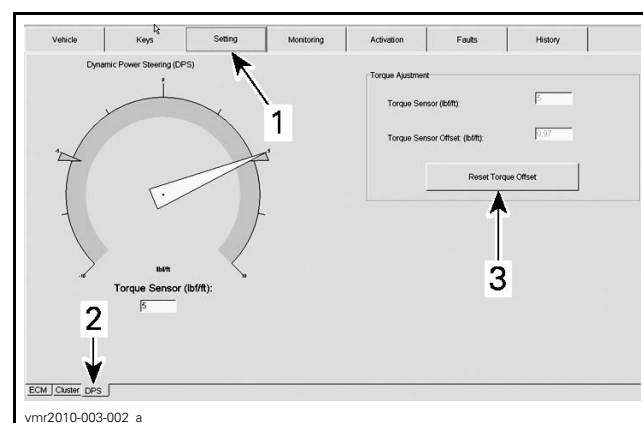
When replacing the following parts or adjusting steering alignment, the sensor torque offset must be reset to zero) for proper system operation.

PART ADJUSTED OR REPLACED	WHAT TO DO
– DPS unit – Steering column half bushings – Steering column – Tie rod – Tie rod end – Knuckle – Wheel bearing – Ball joint – Front suspension arm (lower/upper) – Pitman arm – Steering alignment	Reset Torque Offset in Setting, DPS

1. Ensure proper *STEERING ALIGNMENT*, see procedure in this subsection.
2. Connect vehicle to the latest applicable B.U.D.S. software version.
3. In B.U.D.S., select **Read Data**.
4. Choose the **Setting** page tab.
5. At the bottom LH corner of the **Setting** page, choose the **DPS** tab.

NOTICE Ensure handlebar is free and centered within ± 10 degrees of center position. There **MUST NOT** be any effort applied to the steering column.

6. Press **Reset Torque Offset** button.



DPS TORQUE OFFSET RESET

1. *Setting* page tab
2. *DPS* tab
3. *Reset Torque Offset* button

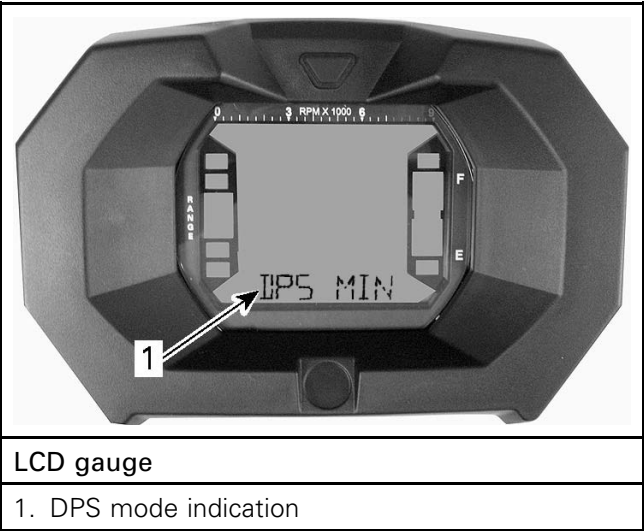
DPS ASSIST MODE

1. To view the active DPS ASSIST mode, momentarily press and release the OVERRIDE/DPS button on the LH multifunction switch assembly.



1. OVERRIDE/DPS/ACS button

The active DPS mode will be displayed in the lower portion of multifunction gauge.



LCD gauge

1. DPS mode indication

2. To change DPS ASSIST mode, press and hold the OVERRIDE/DPS button for approximately 2 seconds to go to the next setting.

The DPS system will toggle to the following available mode. The newly activated DPS mode will be briefly displayed in the multifunction gauge.

3. Repeat previous step to toggle through the available mode.

NOTE: The DPS mode of operation cannot be changed if the vehicle is in reverse. The DPS/Override switch must be released between each DPS mode selection.

TROUBLESHOOTING

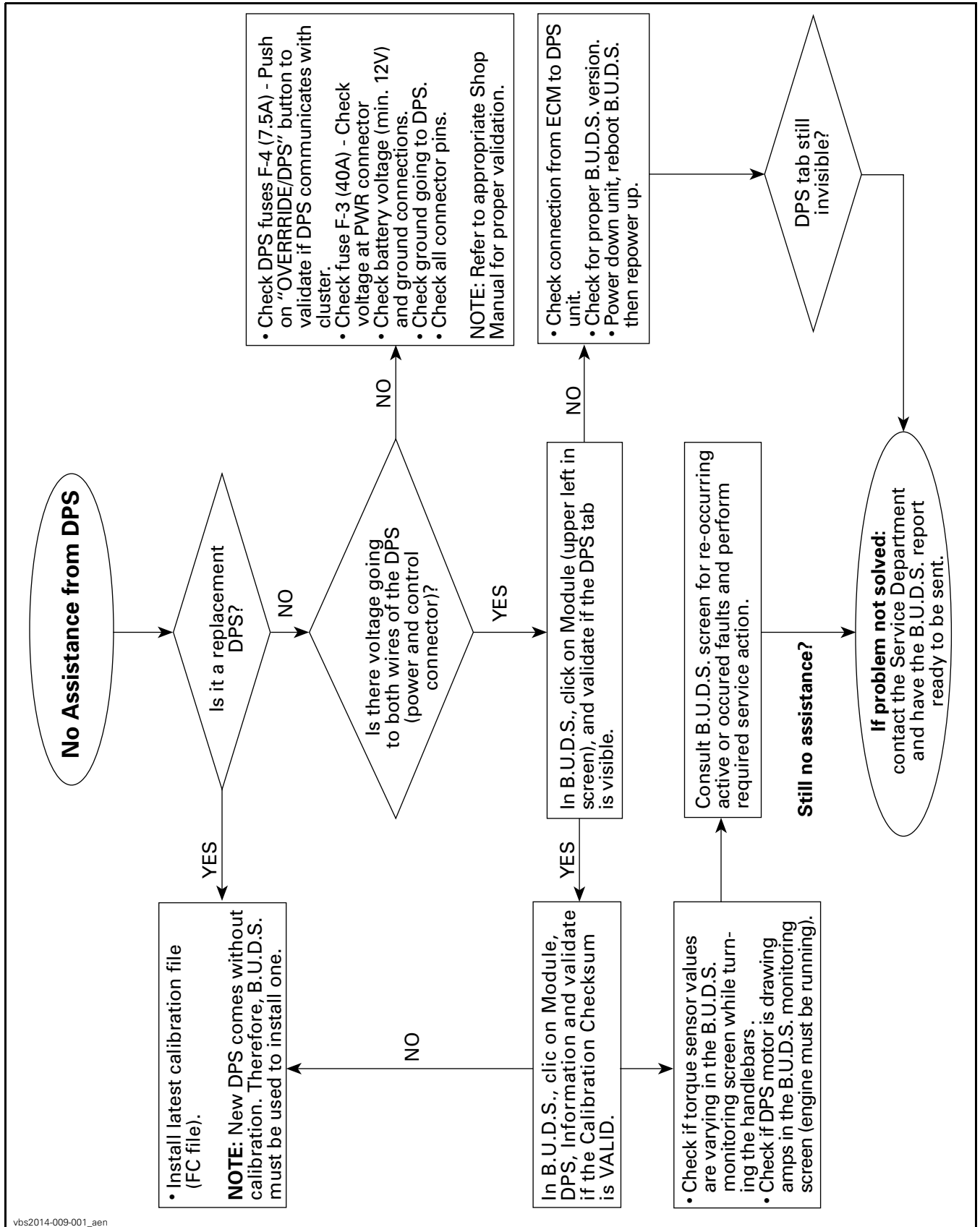
TROUBLESHOOTING FLOW CHARTS

Use the troubleshooting flow charts to diagnose a problem. If a problem cannot be solved, contact a service representative for support before replacing a DPS.

Here is the list of provided flow charts:

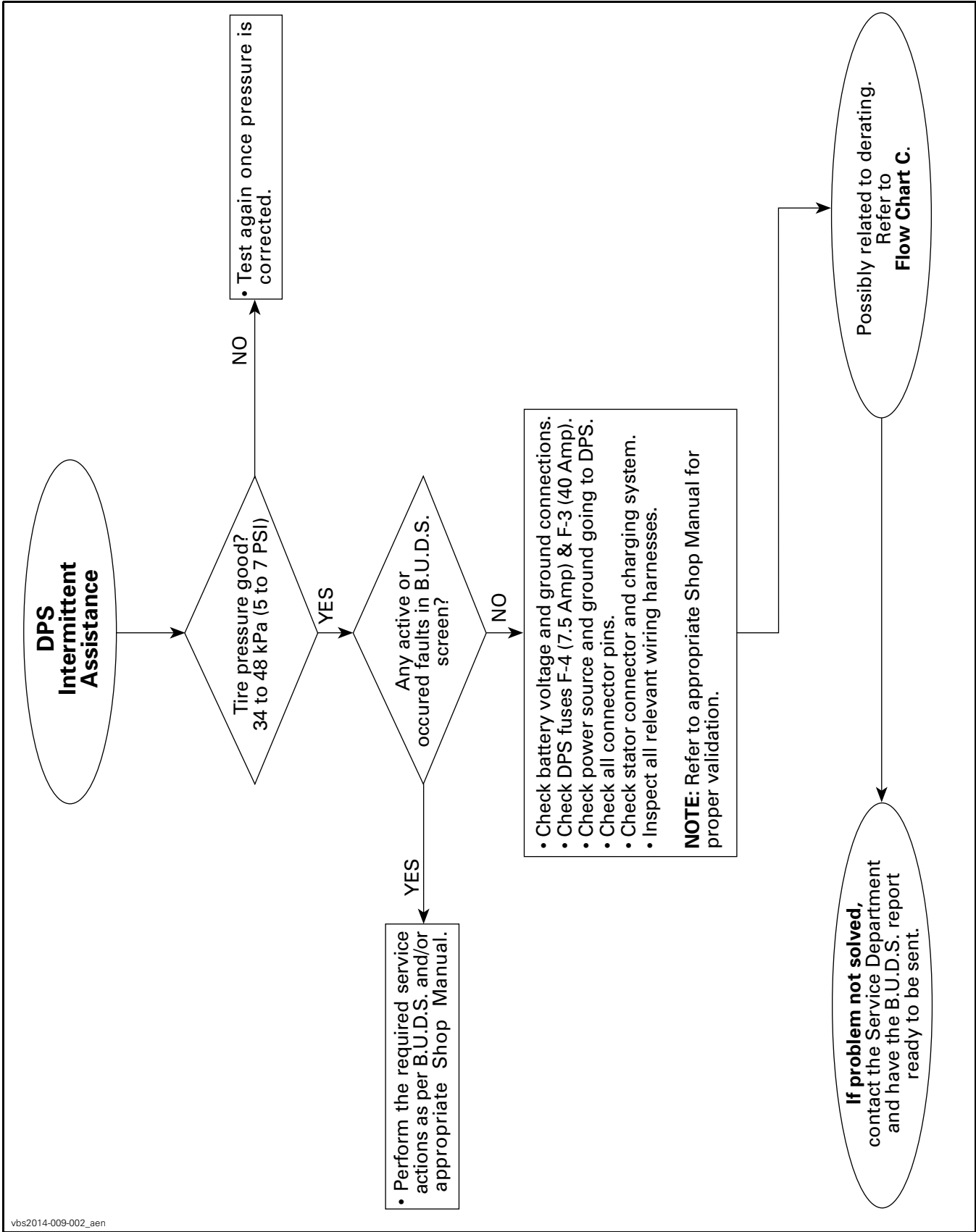
- Flow chart A: No Assistance From DPS
- Flow chart B: DPS Intermittent Assistance
- Flow chart C: Derating or Limited Assistance
- Flow chart D: Free Play Felt in Steering System
- Flow chart E: Steering Turn Easier on One Side than the Other.

Flow Chart A



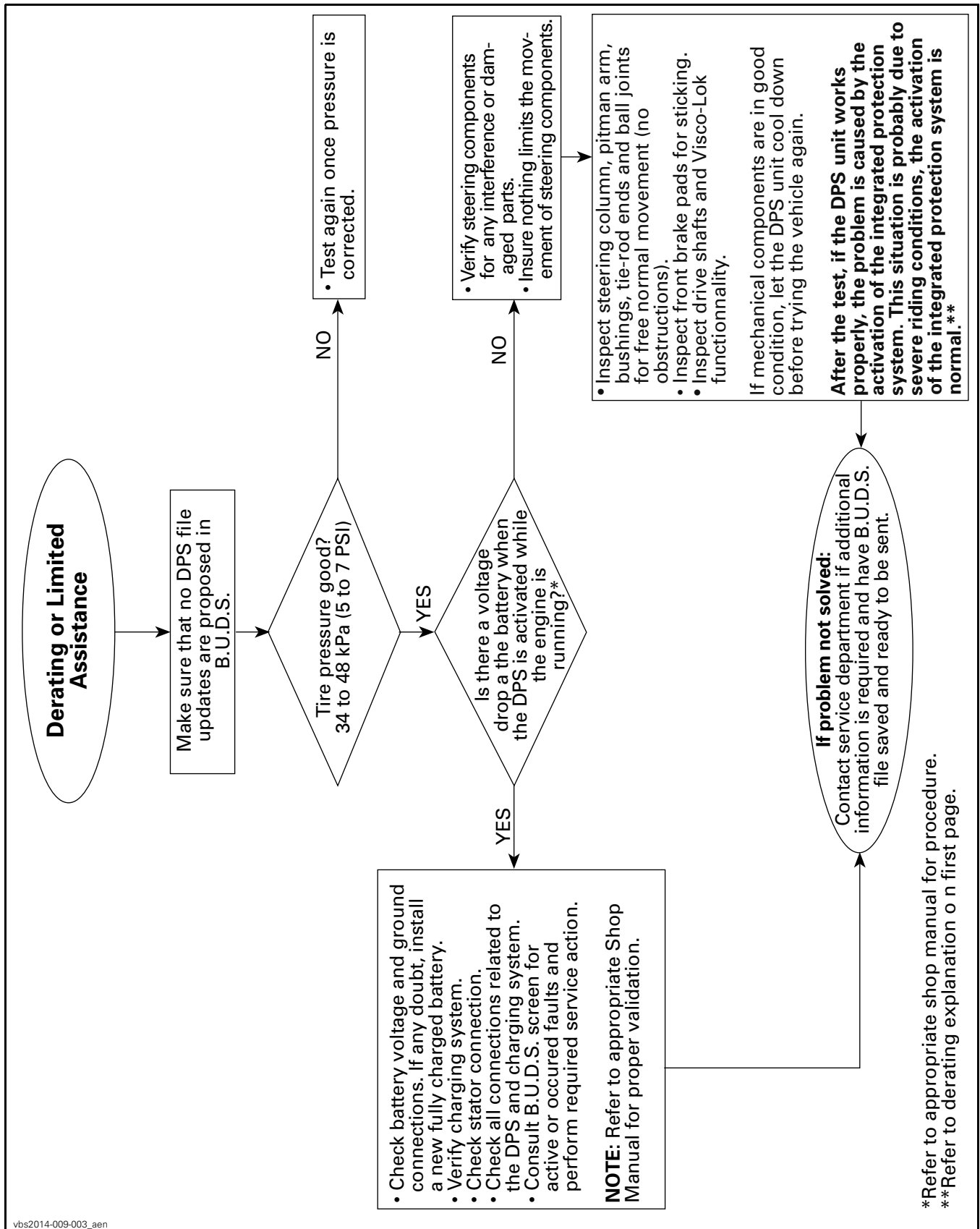
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Flow Chart B

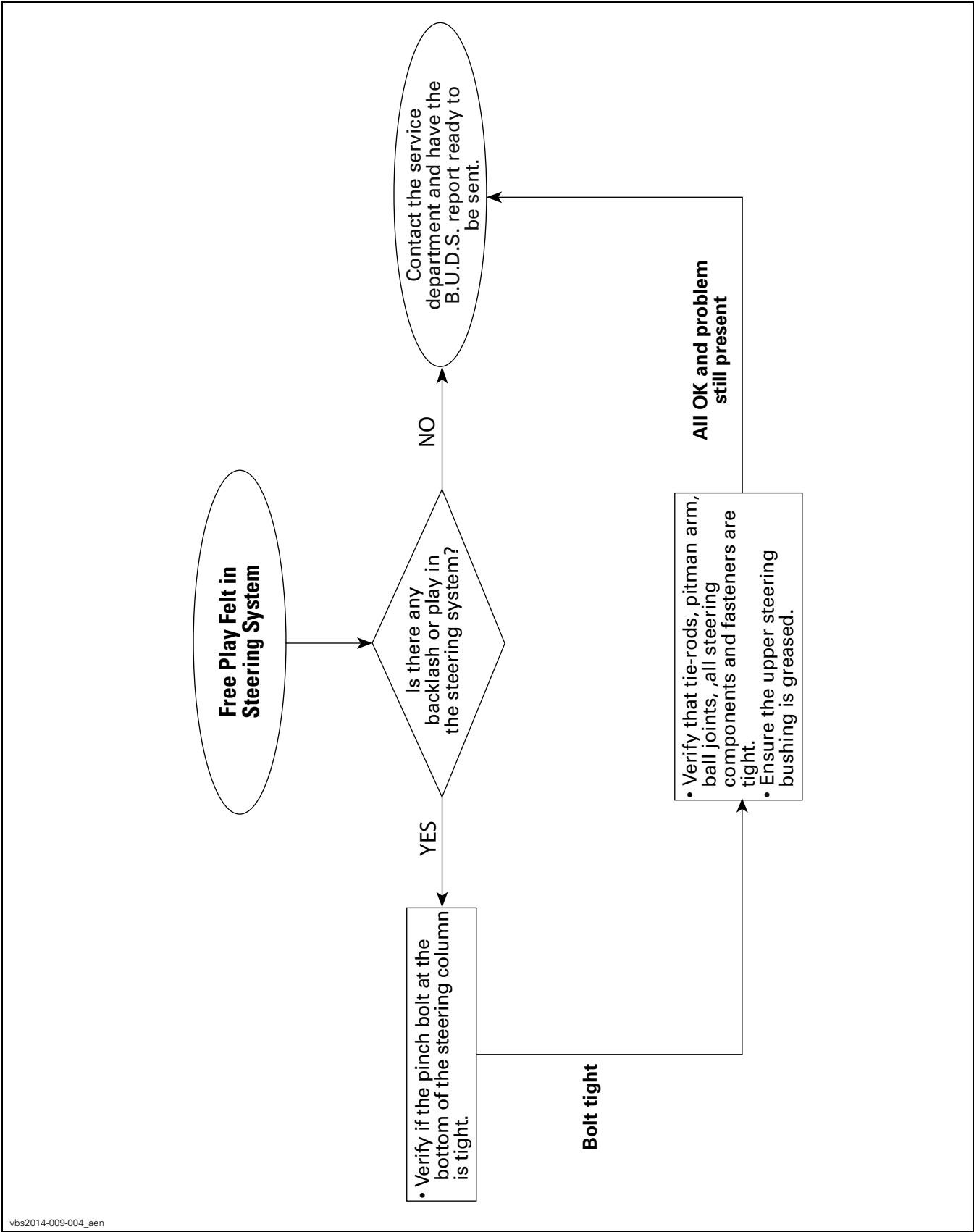


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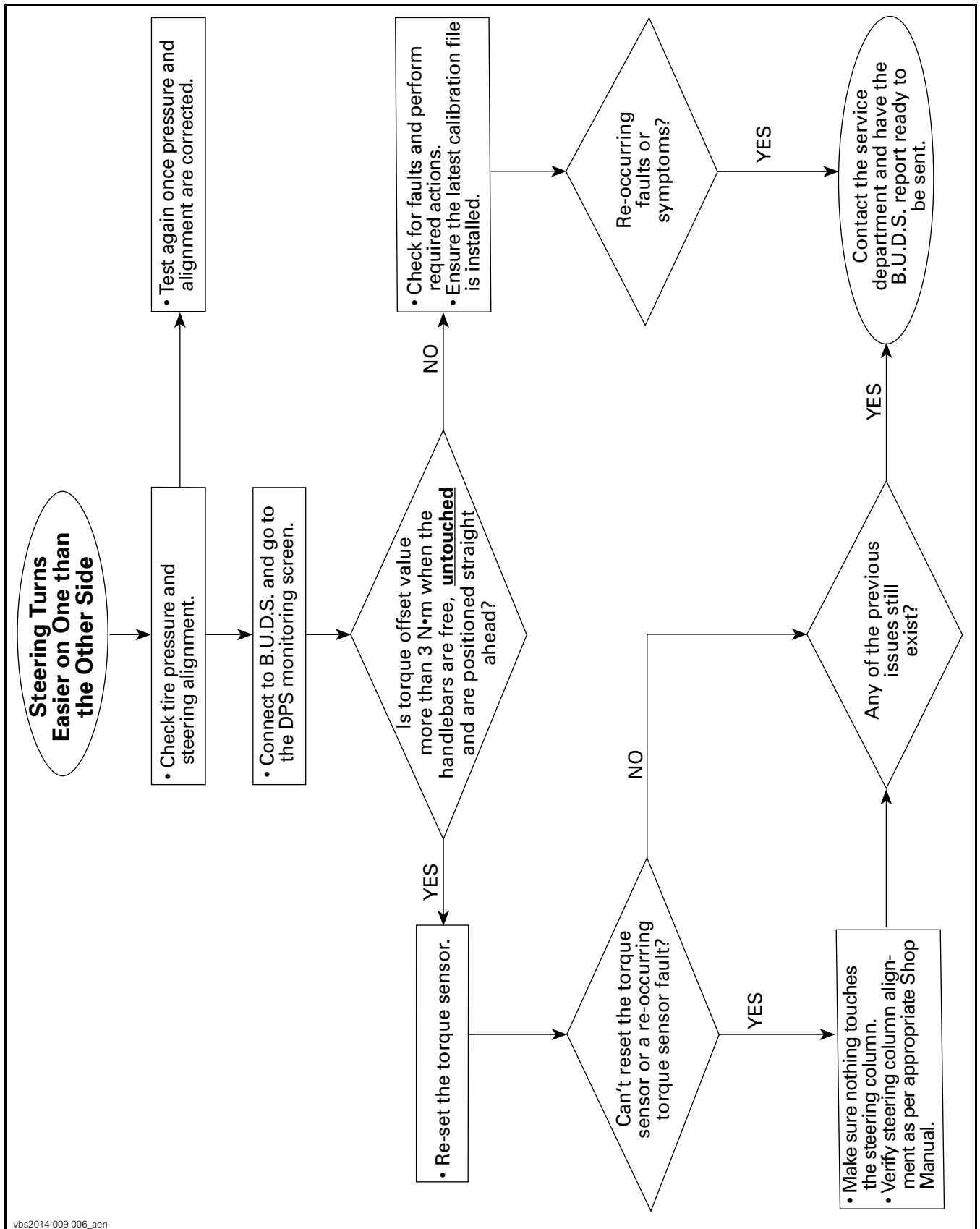
Flow Chart C



Flow Chart D



Flow Chart E



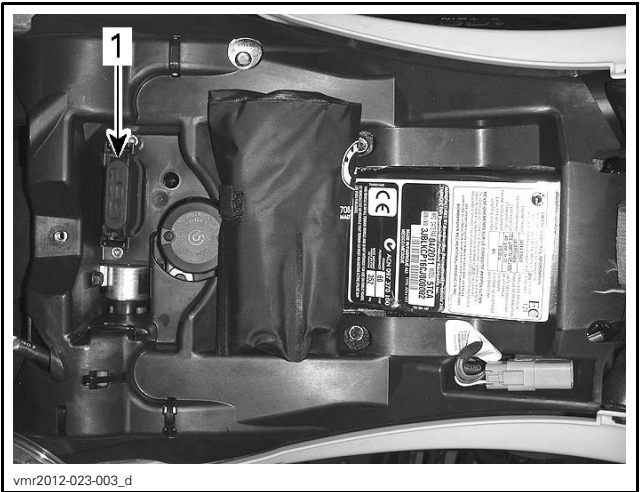
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PROCEDURES

DPS UNIT

DPS Unit Fuse Test

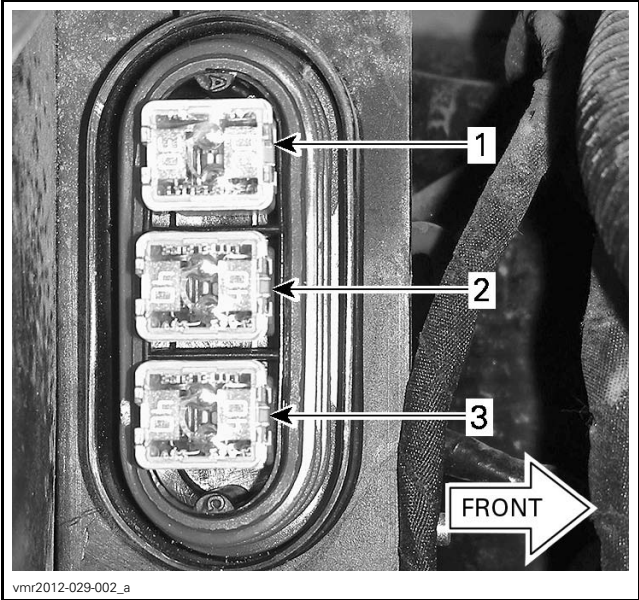
A 40 A DPS fuse located in a fuse holder, on the RH side of the frame, under the battery support, provides power for the DPS motor.



TYPICAL
1. Rear fuse box (PF2)

1. Test DPS fuse (PF2-F3) using a multimeter.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

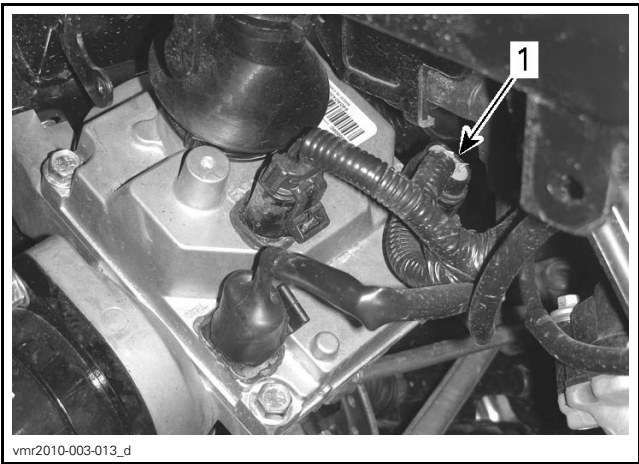


TYPICAL
1. 30 A Main
2. 40 A Fan/accessories
3. 40 amp DPS fuse

2. Replace fuse as required.

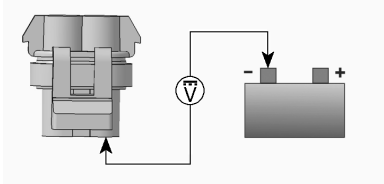
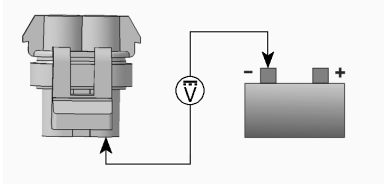
DPS Unit Input Voltage Test (Power Side)

1. Disconnect the DPS PWR (power) connector.



TYPICAL
1. DPS PWR connector (motor power)

2. Test for 12 Vdc DPS motor power at DPS2-A and DPS2-B as per following table.

MULTIMETER PROBE POSITIONS		VOLTAGE
DPS2 power connector pin A	Battery ground	 Battery voltage
DPS2 power connector pin B		
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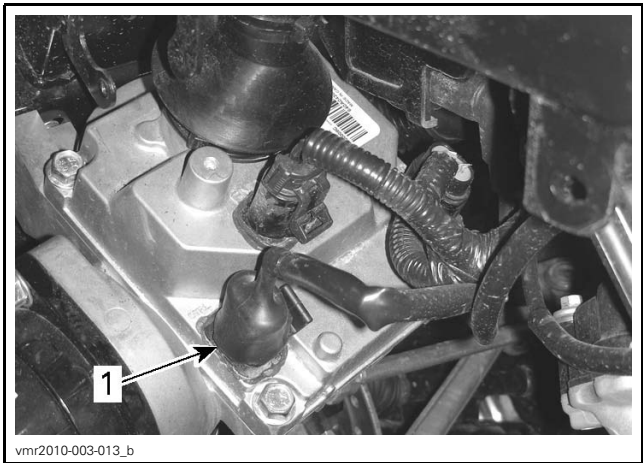
If NO voltage is measured, test the 40 A DPS fuse in the rear fuse holder (PF2-F3). If good, check wires and connector pins. Replace or repair defective parts and reset fault codes.

If battery voltage is measured, carry out the following *DPS UNIT INPUT VOLTAGE TEST (CONTROL SIDE)*.

NOTE: This test may also be carried out by connecting a 12 Vdc test light between each DPS PWR connector pins (A and B), and the battery (-) negative terminal. The test light must come on bright.

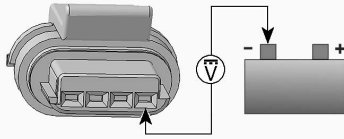
DPS Unit Input Voltage Test (Control Side)

1. Disconnect DPS CTRL (control) connector.



TYPICAL
1. DPS CTRL (control) connector

2. Set the ignition switch to ON.
3. Set the engine RUN/STOP switch to RUN.
4. Test for 12 Vdc power to the DPS module at DPS1-A as per following table.

MULTIMETER PROBE POSITIONS	VOLTAGE
DPS control connector (pin A) and battery ground	Battery voltage
	

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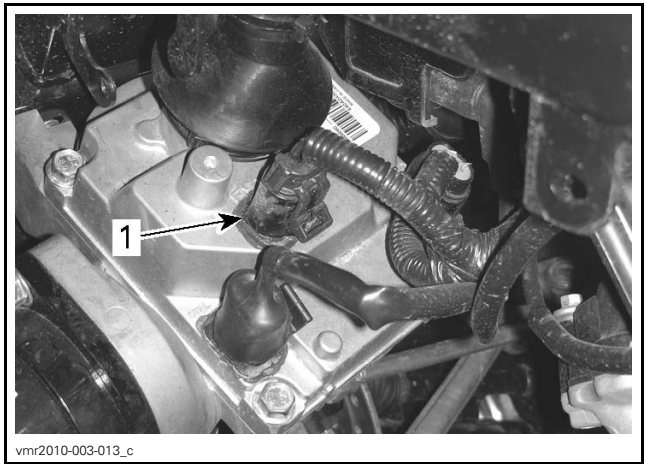
If NO voltage is measured, check wires and connector pins from DPS unit to the Relays/Speedo fuse in front fuse box (PF1-F4). Replace or repair defective parts and reset fault codes.

If battery voltage is measured, carry out the following *DPS UNIT GROUND CIRCUIT TEST*.

NOTE: This test may also be carried out by connecting a 12 Vdc test light between the DPS control connector (pin A), and the battery (-) negative terminal. The test light must come on bright.

DPS Unit Ground Circuit Test

1. Disconnect the DPS ground connector (GDN).



TYPICAL
1. DPS ground connector (GDN)

2. Test for continuity between DPS3-A and DPS3-B to battery ground.

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MULTIMETER PROBE POSITIONS		READING
DPS GDN connector pin A	Battery ground	Continuity (close to 0 Ω)
DPS GDN connector pin B		

If there is NO continuity or a high resistance is measured, check wires and connector pins from DPS unit to chassis ground post. Replace or repair defective parts and reset fault codes.

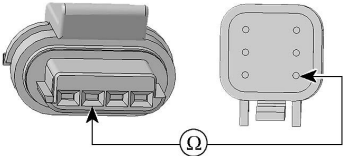
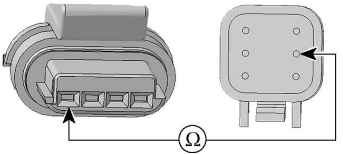
If there is good continuity, carry out the following *DPS UNIT COMMUNICATION LINK (CAN) CONTINUITY TEST*.

NOTE: This test may also be carried out by connecting a 12 Vdc test light between each GDN connector pin and the battery (+) positive terminal. The test light must come on bright.

DPS Unit Communication Link (CAN) Continuity Test

NOTE: DPS unit must receive an RPM signal to provide power steering assist.

1. Disconnect the DPS control connector and the diagnostic connector.
2. Test continuity of CAN Bus Wires at DPS1-C and DPS1-D.

MULTIMETER PROBE POSITIONS	RESISTANCE @ 20°C (68°F)
DPS control connector (pin C) and diagnostic connector (pin 1)	Below 1 Ω
	
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DPS control connector (pin D) and diagnostic connector (pin 2)	
	
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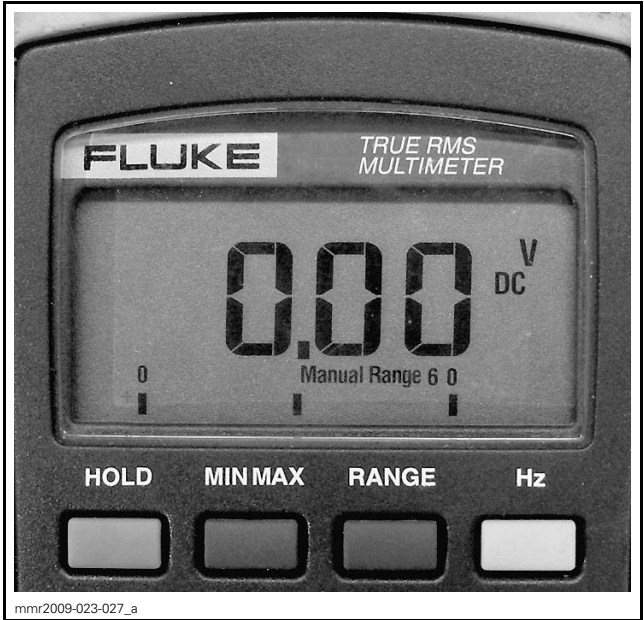
If resistance measured is out of specification, check wires and connector pins. Carry out repairs as required and reset fault codes using B.U.D.S software.

If resistance measured is good, replace the DPS unit and reset fault codes using B.U.D.S software.

DPS System Load Test

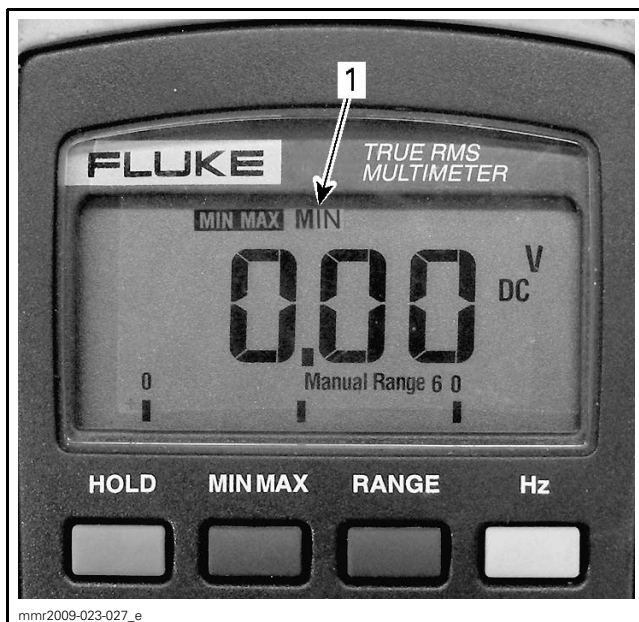
If the charging system cannot sustain normal voltage when the DPS is operating, DPS ASSIST may be greatly reduced or nonexistent. Carry out the following steps.

1. Measure the battery voltage.
- NOTE:** If battery voltage is low, recharge battery.
2. Ensure the vehicle transmission is set to PARK.
3. Start the engine.
4. Note the voltage on the multimeter with the engine running (charging system voltage).
5. Press the **RANGE** button repeatedly to select **Manual Range 6 0**.



VDC SELECTED TO MANUAL RANGE 6 0

6. Press the **MIN MAX** button on the multimeter to engage the MIN function.



1. MIN function selected

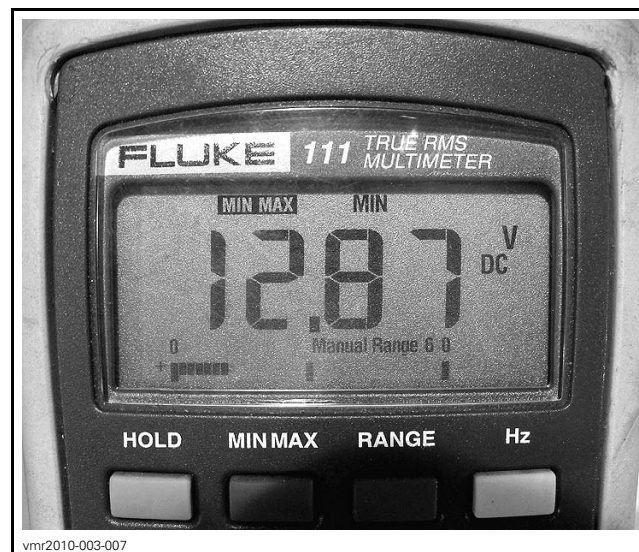
7. Turn the handlebar **momentarily** against the steering frame stops to each side.

NOTE: Do not hold steering against frame stops for an extended period of time.

8. Read the MIN charging system voltage recorded while the handlebar was turned against each stop.

DPS SYSTEM LOAD TEST			
PROBE POSITIONS		STEERING POSITION	VOLTAGE READING
Battery (-) terminal	DPS fuse holder pin B	LH stop	At least 12 Vdc
		RH stop	

NOTE: Turning the handlebar momentarily against the frame stops generates maximum DPS load (maximum current draw on electrical system). Electrical system must sustain at least 12 Vdc for proper DPS operation.



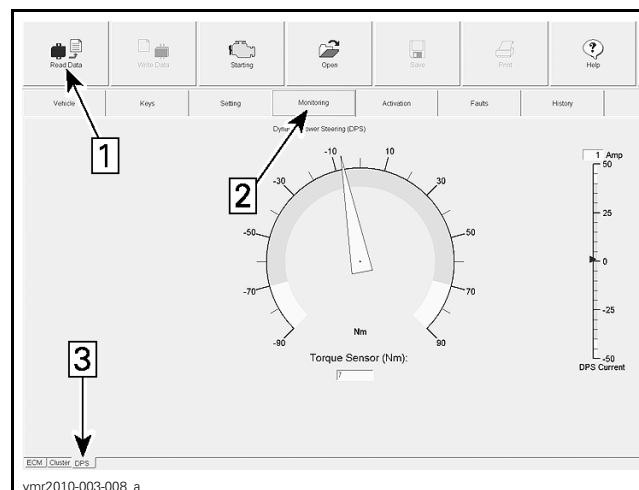
If the electrical system cannot sustain at least 12 Vdc, check the following:

- Battery
- Battery connections
- DPS unit power and ground connections
- Charging system
- Frame and engine ground studs.

If the previously listed items, carry out the following **DPS UNIT CURRENT TEST**.

DPS Unit Current Test

1. Connect vehicle to the latest applicable B.U.D.S. software version.
2. Click on the **Read Data** button.
3. Choose the **Monitoring** page tab.
4. At the bottom of the **Monitoring** page, choose the **DPS** tab.



- Step 1: Press Data button
 Step 2: Select Monitoring page tab
 Step 3: Select DPS tab

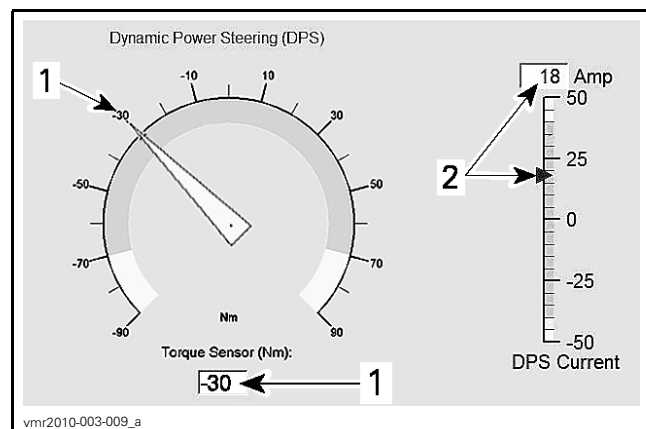
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5. With the vehicle engine running in PARK, turn the handlebar side to side, momentarily against each stop and observe the indications on the B.U.D.S. DPS Monitoring page.

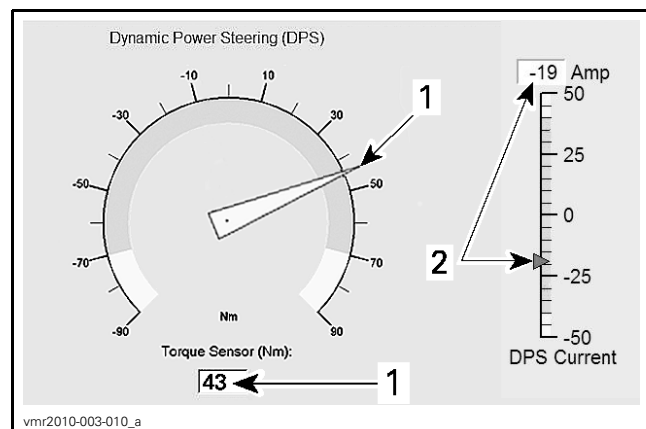
The DPS Torque Sensor Nm increase with torque applied to handlebar.

The DPS Current ammeter should increase proportionately to the torque applied, and decrease with the torque as steering assist is provided.



TYPICAL - LH TURN

1. Torque sensor indication (negative)
2. DPS current indication (positive)



TYPICAL - RH TURN

1. Torque sensor indication (positive)
2. DPS current indication (negative)

NOTE: Increase and decrease in torque and current readings is very brief as steering assist is quickly provided. Current draw should remain within green scale but may momentarily peak to 60 amps, then drop off close to 0 amps as torque applied is nulled out by steering assist. A residual torque of 2 N•m (18 lbf•in) with a corresponding current draw is acceptable.

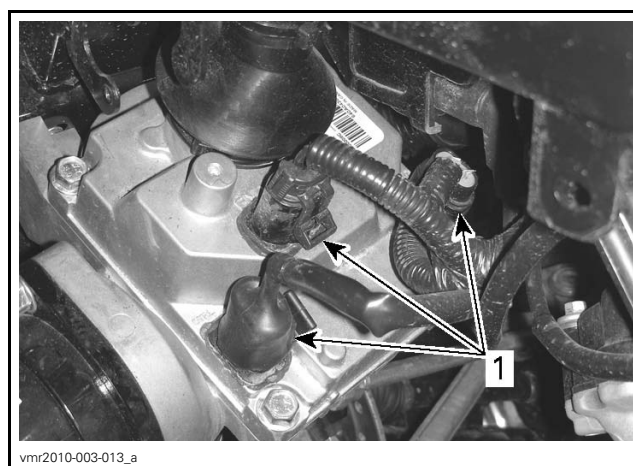
If current draw tends to remain high, carry out the following:

- Steering alignment check.

- Steering column shim adjustment at half bushings as described in the *DPS UNIT INSTALLATION* procedure detailed in this section.
- *TORQUE OFFSET RESET* procedure detailed in this section.
- Replace DPS unit.

DPS Unit Removal

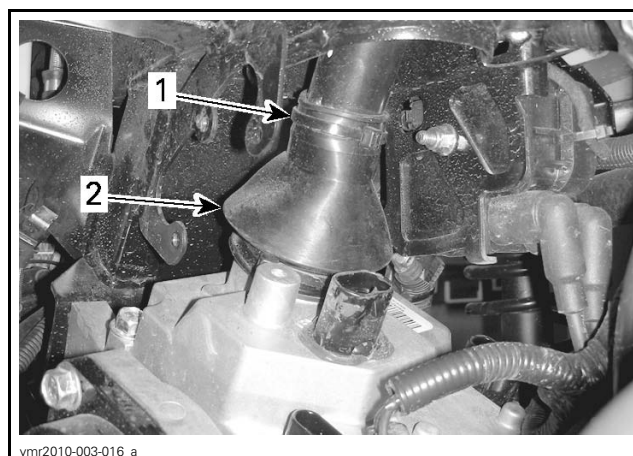
1. Remove the front body module, refer to *BODY* subsection.
2. Remove both inner fender panels
3. Remove the CVT air inlet duct assembly, refer to *AIR INTAKE SYSTEM* subsection.
4. Disconnect the 3 electrical connectors from the DPS unit.



TYPICAL

1. DPS connectors (3x)

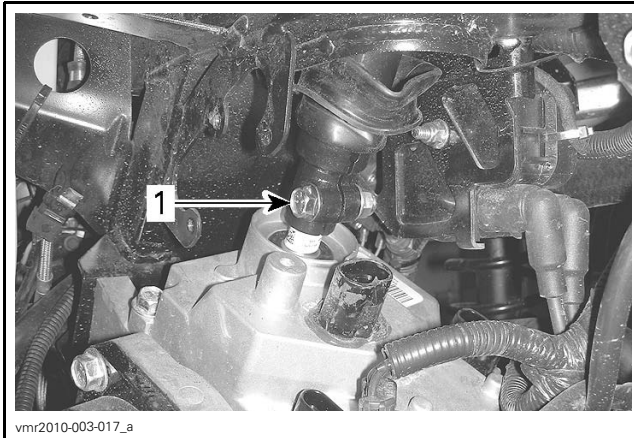
5. Cut the locking tie securing the bellows at the bottom of steering column near the DPS unit, and pull the bellows upwards sufficiently to access the steering column pinch bolt.



TYPICAL

1. Cut this locking tie
2. Steering column bellows

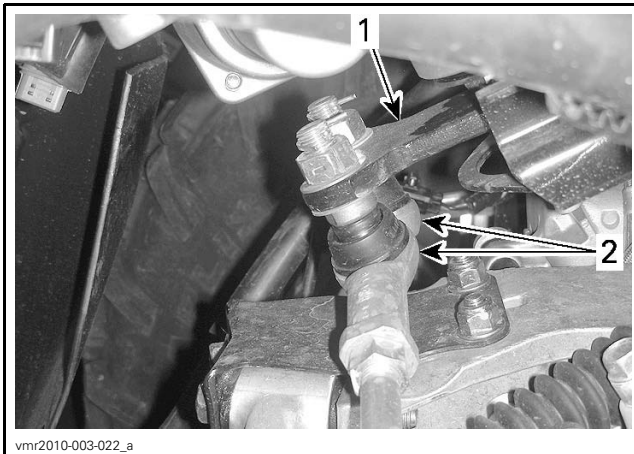
6. Remove the steering column pinch bolt and retaining nut. Discard the retaining nut.



TYPICAL

1. Steering column pinch bolt

7. Remove the hardware that secures both tie-rod ends to the pitman arm (steering lever). Discard cotter pins.



TYPICAL

1. Pitman arm
2. Tie rod ends

8. Turn the steering to each side and disengage each tie-rod end from the pitman arm.

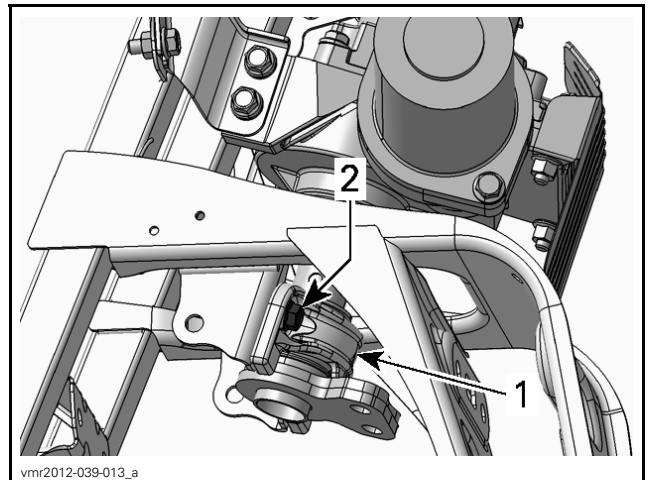


TYPICAL - TIE ROD ENDS (HARDWARE REMOVED)

9. Pull up on the steering column to partly disengage it from the DPS unit.

NOTE: A mechanical stop on the steering column will prevent you from fully disengaging the steering column.

10. Remove the lower half bushing retainer that secures the steering shaft to the frame.

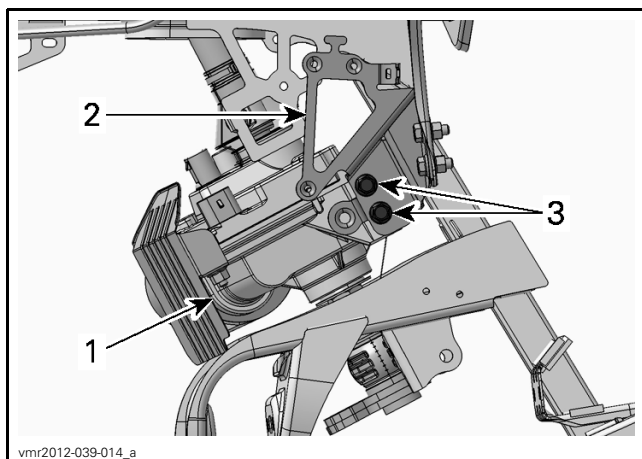


1. Lower half bushing retainer
2. Bolts to remove (2)

11. Remove the 2 hexagonal flanged screws securing the DPS unit to the RH support bracket.

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DPS REMOVAL - RH SIDE

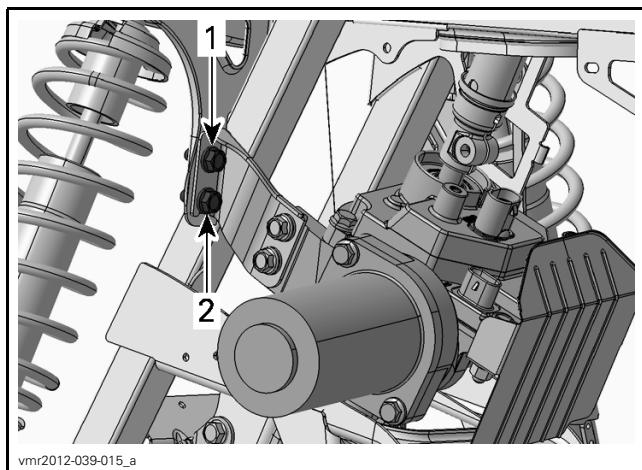
1. DPS
2. RH DPS support bracket
3. Remove these screws (2)

NOTE: Discard the conical spring washers on the DPS retaining screws.

12. On the LH side of the DPS unit, remove the DPS support bracket from the frame in the following manner:

12.1 Remove the top retaining screw.

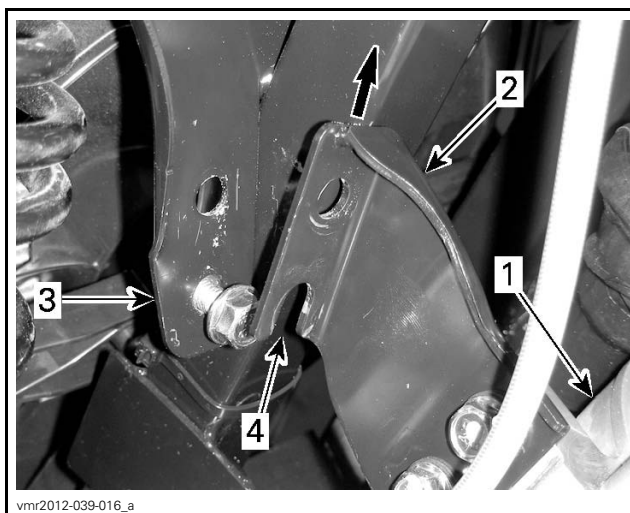
12.2 Loosen the lower retaining screw sufficiently for the bracket to become loose on the frame.



DPS REMOVAL - LEFT SIDE

- Step 1: Remove DPS retaining screws (2 each side)
Step 2: Discard conical washers under screw head

13. Pull up on DPS unit to remove the DPS unit and support bracket from the frame.

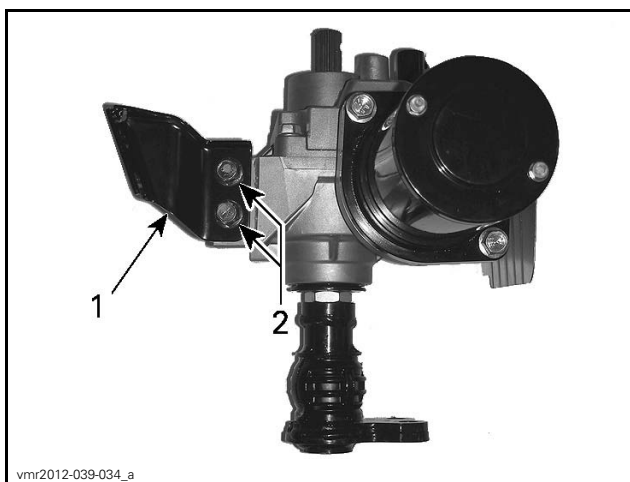


TYPICAL - LH DPS SUPPORT BRACKET

1. DPS unit
2. DPS support bracket
3. Vehicle frame
4. Slotted hole in DPS support bracket

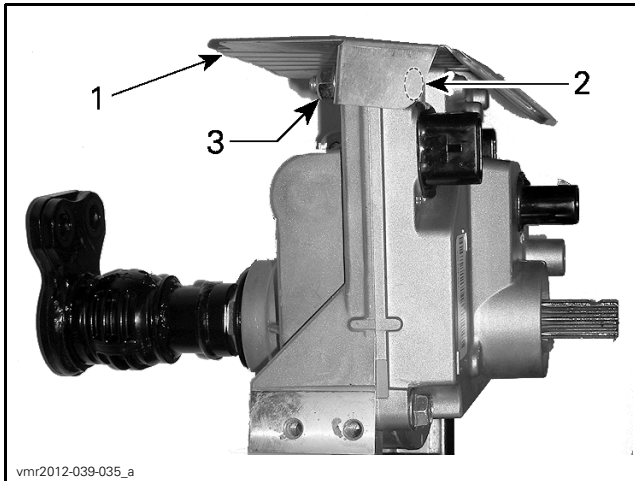
14. If replacing DPS unit, remove the following from the DPS unit:

- LH DPS support bracket
- DPS heat shield.



1. LH DPS support bracket
2. Retaining screws

NOTE: When removing the DPS heat shield, hold the DPS housing screws steady using a wrench to as you remove the 2 heat shield retaining nuts.



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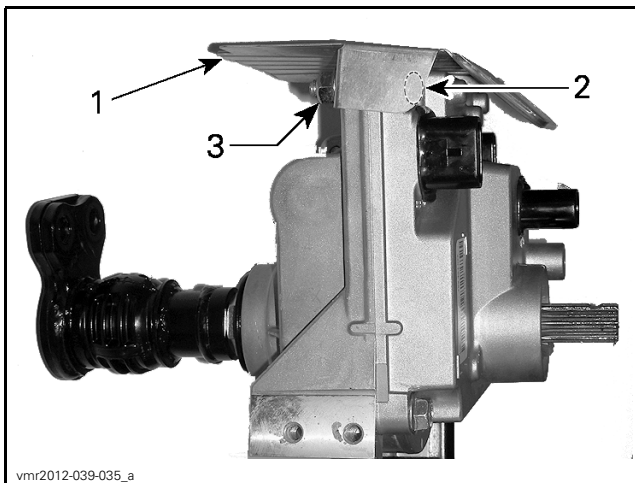
1. DPS heat shield
2. Retaining screws to hold steady (2 not visible)
3. Retaining nuts to remove

DPS Unit Installation

IMPORTANT: The following hardware **must** all be replaced with new ones:

- Hexagonal forming screws with threadlocker
- Conical spring washers
- Elastic nuts.

1. If the DPS unit is being replaced, install heat shield from old DPS unit onto new DPS unit.



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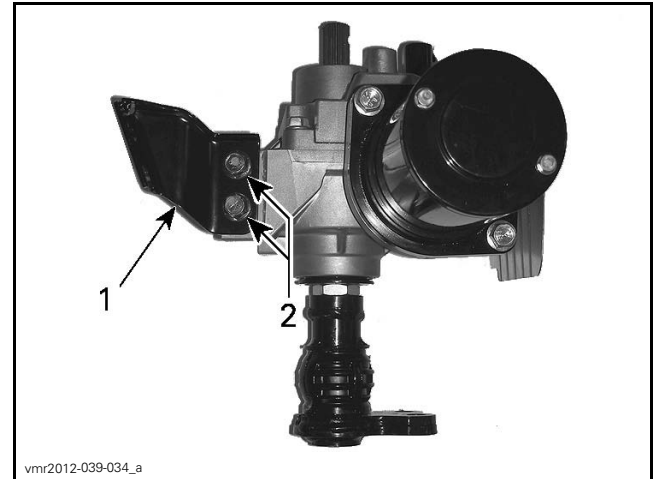
1. DPS heat shield
2. Retaining screws to hold steady (2 not visible)
3. Retaining nuts to remove (2)

NOTE: Important: Hold DPS housing screws steady using a wrench as you apply specified torque to heat shield retaining nuts.

TIGHTENING TORQUE	
Retaining nuts, DPS heat shield	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)

2. Install LH DPS support bracket loosely using **NEW** fasteners.

NOTE: Important: Install the retaining screws to the DPS support bracket loosely at this time. This is required to ensure proper DPS alignment at a later step when all steering and DPS fasteners are tightened to specified torque.



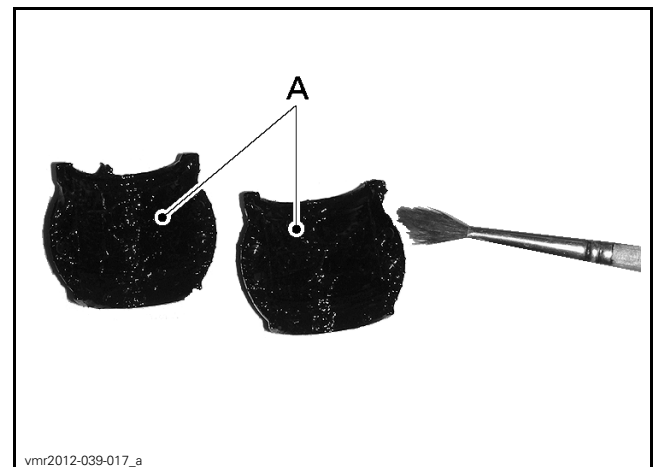
vmr2012-039-034_a

1. LH DPS support bracket
2. Retaining screws

3. Ensure "O" rings on steering shaft are in good condition.

4. Apply XPS SYNTHETIC GREASE (P/N 293 550 010) to:

- The inside of both steering shaft half bushings
- The steering shaft and "O" rings.

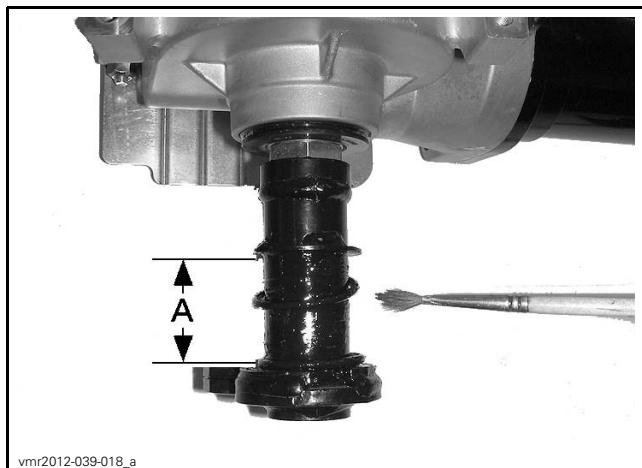


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- A. XPS synthetic grease (P/N 293 550 010) here

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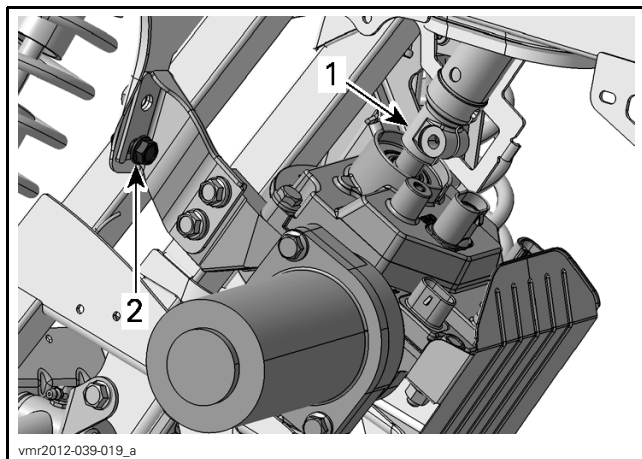
Subsection 03 (DYNAMIC POWER STEERING (DPS))



A. XPS synthetic grease (P/N 293 550 010) here

5. Insert the steering column onto the DPS input shaft

6. Position the LH DPS support bracket onto the hexagonal forming screw that was left on the frame DPS mount.



1. Steering column onto the DPS input shaft here
2. LH DPS support bracket onto the hexagonal forming screw here

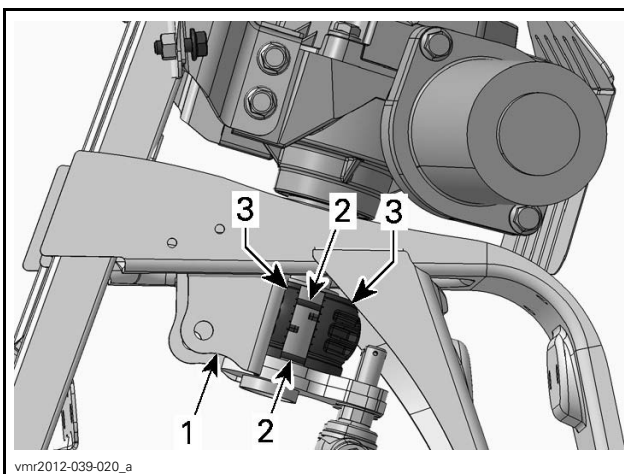
NOTE: The DPS shaft splines have a key which **must be aligned** with the keyway in the steering column.



TYPICAL - STEERING COLUMN INDEXED TO DPS SHAFT SPLINES

7. Ensure the following are properly positioned on the lower steering shaft and lower steering shaft mount.

- O-rings
- Steering shaft half bushings.

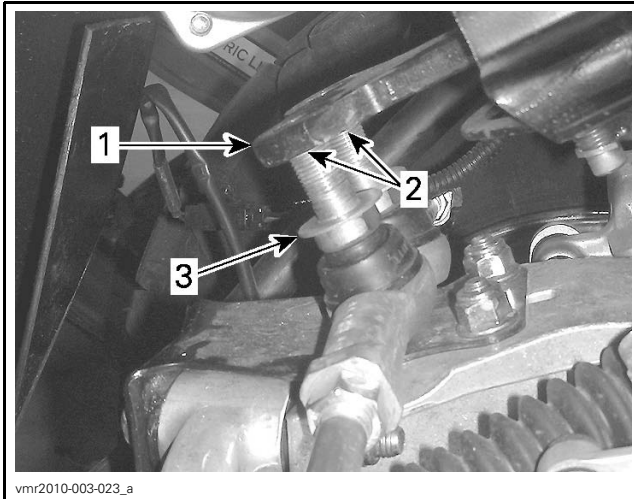


1. Lower steering shaft mount
2. O-rings
3. Steering shaft half bushings

8. Install the 3 remaining hexagonal forming screws that secure the DPS unit **loosely** using **NEW** fasteners.

NOTE: **Ensure** the support bracket retaining screws have a **NEW** conical spring washer between the screw head and the DPS frame support.

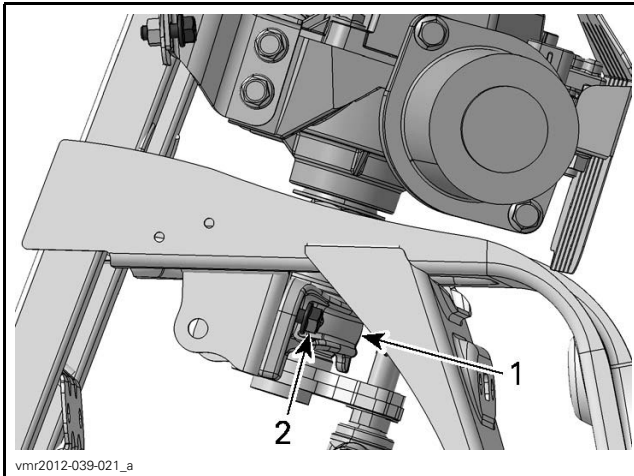
Ensure both tie rod ends have a hardened steel washer on them, then insert the tie-rod ends onto the pitman arm.



TYPICAL

1. Pitman arm
2. Tie rod ends inserted in pitman arm
3. Hardened steel washer on tie rod end

9. Install the lower half bushing retainer **loosely** using **NEW** fasteners.

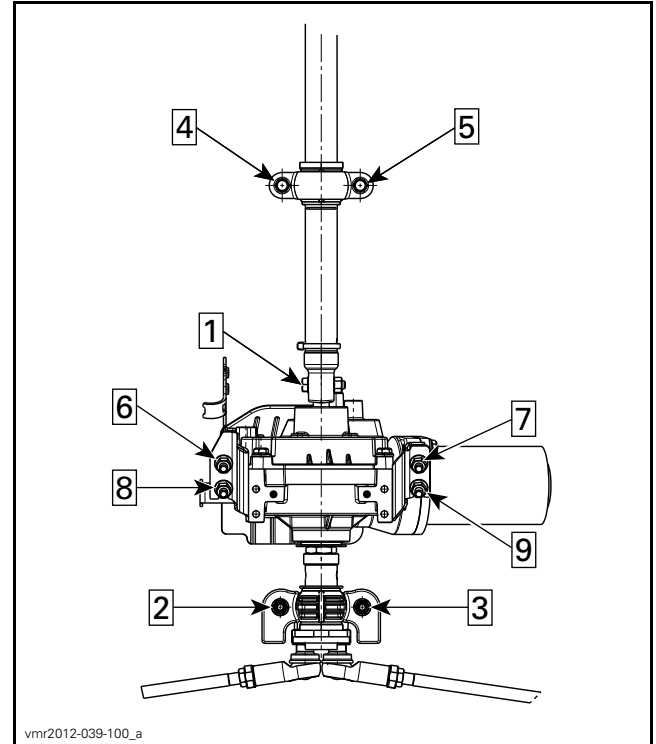


1. Lower half bushing retainer
2. Hexagonal forming screws installed loosely

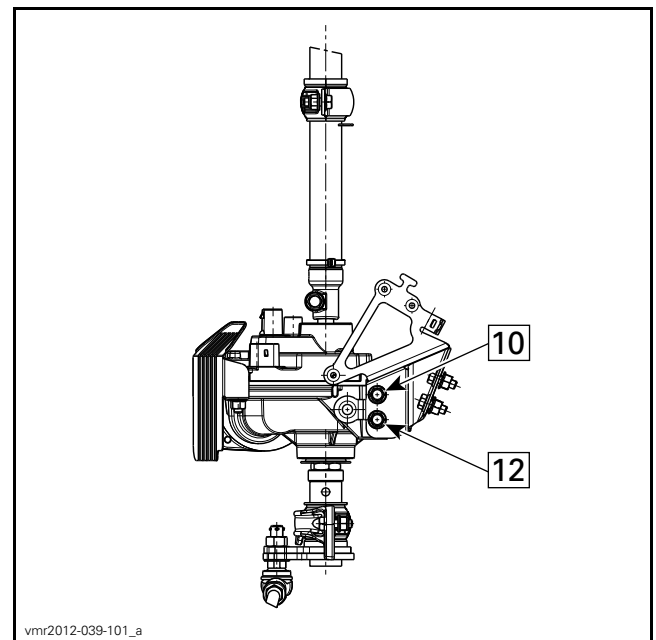
10. Install steering column pinch bolt and a **NEW** elastic nut **loosely**.

11. Tighten the steering and DPS fasteners to specified torque using the torque sequence specified in the following 3 illustrations.

TIGHTENING TORQUE	
DPS retaining screws	24.5 N•m ± 3.5 N•m (18 lbf•ft ± 3 lbf•ft)
DPS bracket retaining screws	
Steering column retainer	
Steering column pinch bolt	



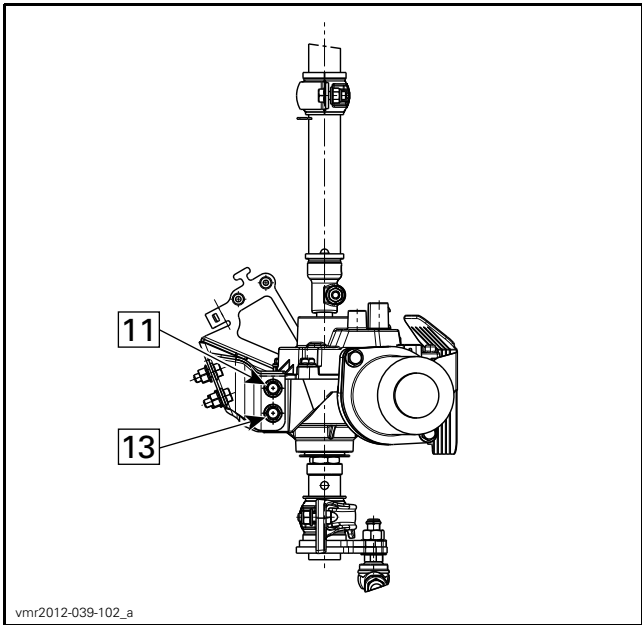
DPS AND STEERING TORQUE SEQUENCE (1 OF 3)



DPS AND STEERING TORQUE SEQUENCE (2 OF 3)

Section 07 CHASSIS

Subsection 03 (DYNAMIC POWER STEERING (DPS))

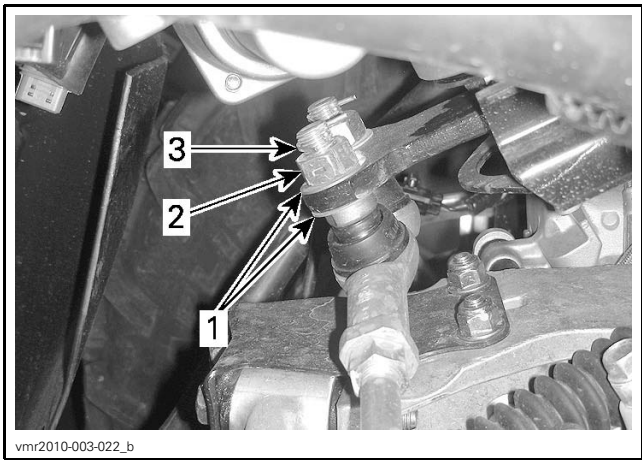


DPS AND STEERING TORQUE SEQUENCE (3 OF 3)

12. Install the second hardened steel washer and nut on each tie-rod end. Tighten retaining nuts as specified.

TIGHTENING TORQUE	
Tie-rod end to pitman arm	72.5 N•m ± 7.5 N•m (53 lbf•ft ± 6 lbf•ft)

13. Install **NEW** cotter pins on the tie-rod ends.

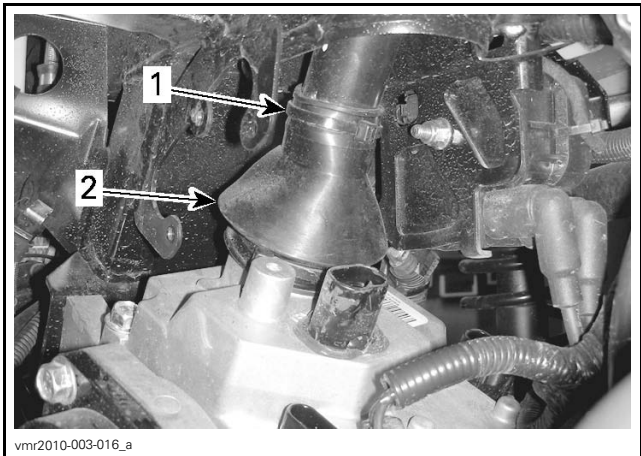


TYPICAL

1. Hardened steel washers (one each side of pitman arm)
2. Tie rod end retaining nut (torque applied)
3. NEW cotter pin installed

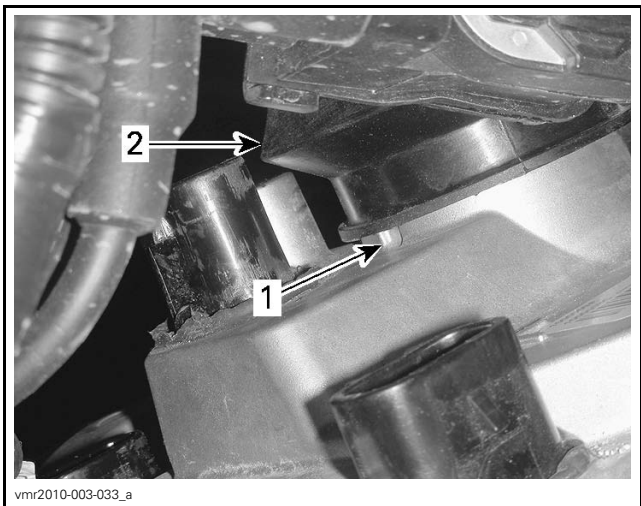
14. Pull bellows down over steering column pinch bolt and edge of DPS unit housing extension. Secure bellows using the appropriate locking tie.

NOTE: Ensure the locking tie is on the tube part of the steering column, **not** on the forged end. Bellows should cover end of ring flange on DPS unit but **not** cover the drainage hole at the bottom of the ring flange. **Do not** install a locking tie on the DPS end of the bellows. Lower portion of bellows **MUST** remain floating over the DPS housing.



TYPICAL

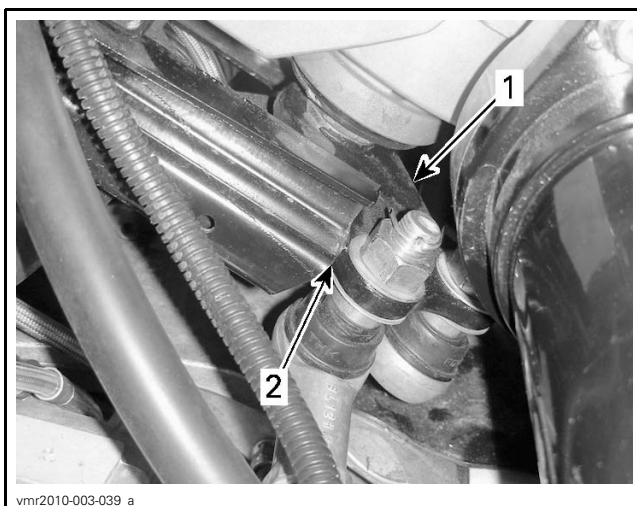
1. Locking tie location
2. Steering column bellows



TYPICAL

1. Drainage hole in DPS ring flange
2. Steering column bellows

15. Turn handlebar fully to each side and check for proper contact between pitman arm and pitman arm frame stops (both sides).



TYPICAL - LH ILLUSTRATED

1. Pitman arm
2. Contact point with frame stop

NOTE: Contact between pitman arm and pitman arm stops must be checked with vehicle weight on wheels.

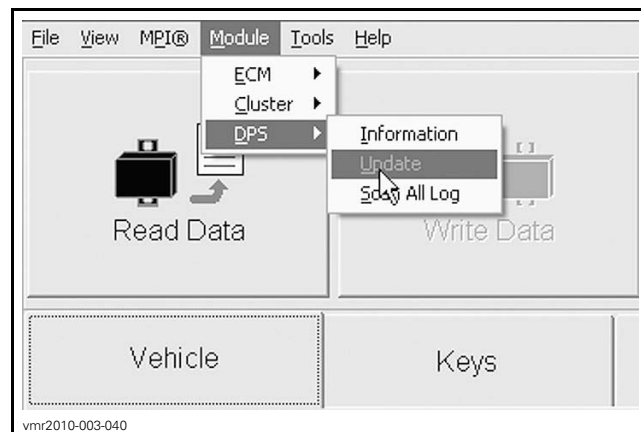
16. Reconnect DPS electrical connectors.
17. Perform a *STEERING ALIGNMENT* as described in the applicable Shop Manual subsection.
18. If installing a replacement DPS unit, refer to *DPS REPLACEMENT* in this subsection.
19. Perform the torque offset reset. Refer to *TORQUE OFFSET RESET* in this subsection.
20. Install all other removed parts in the reverse order of removal.
21. Carry out a test ride of the ATV to ensure proper operation of the DPS unit.

DPS Unit Replacement

New DPS units **do not** come with the required software programmed into the unit. A DPS unit fault will be generated when the vehicle is powered up. The check engine light will come on and a DPS FAULT message will appear in the multi-function gauge.

When DPS unit installation is complete, carry out the following steps.

1. Connect the ATV to the latest applicable B.U.D.S. software version.
2. Select the **Read Data** button.
3. In the **Module** menu, choose the **DPS** sub-menu and install the latest DPS software **Update** file as applicable to the type ATV (Outlander or Renegade).



DPS SOFTWARE UPDATE

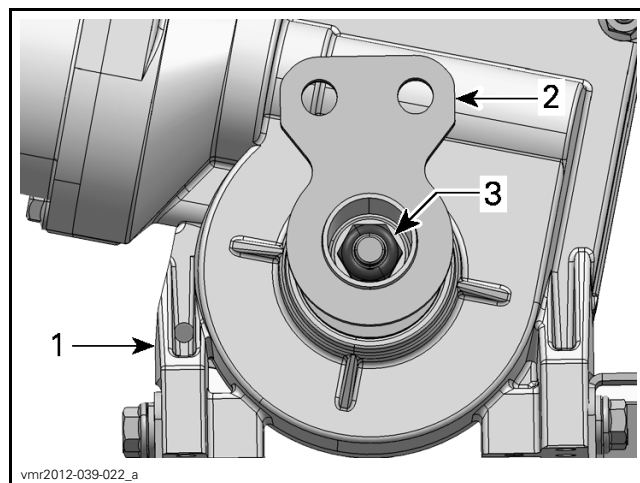
4. Once the correct DPS software file is installed, go to the **Faults** page and clear the fault codes.
5. Carry out the *TORQUE OFFSET RESET* procedure as described in this subsection.
6. Test drive the ATV to ensure proper DPS operation.

PITMAN ARM

NOTE: On models without a DPS, the pitman arm is replaced with the steering column. Refer to *STEERING COLUMN* in this subsection.

Pitman Arm Removal

1. Remove DPS unit from vehicle, refer to *DPS REMOVAL* in this subsection.
2. Remove Pitman arm retaining nut and washer.

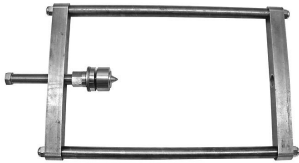


1. DPS
2. Pitman arm
3. Pitman arm nut and washer

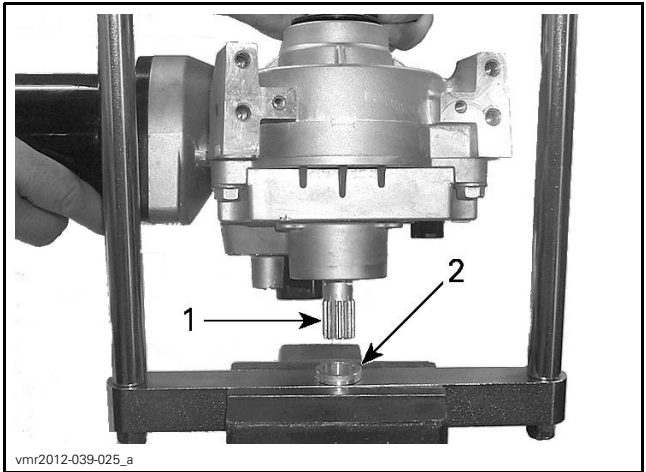
3. Install the pitman arm jig in a vise with the positioning screw upward.

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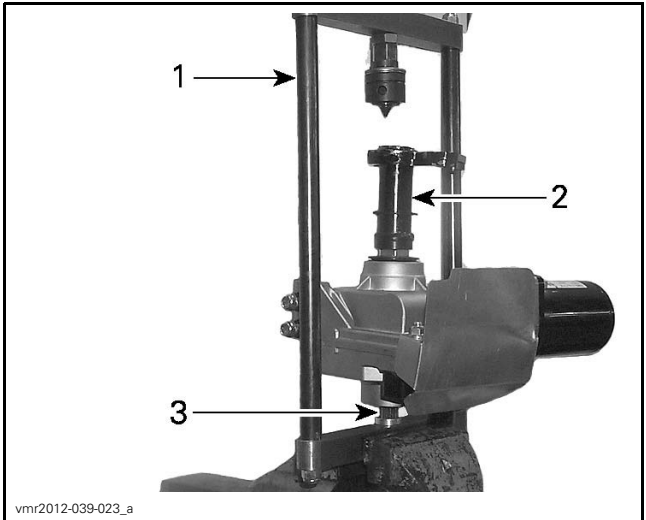
Subsection 03 (DYNAMIC POWER STEERING (DPS))

REQUIRED TOOLS	
PITMAN ARM JIG (P/N 529 036 225)	

4. Insert the DPS input shaft in the Pitman arm jig receptacle with the Pitman arm facing up.



- 1. DPS input shaft
- 2. Shaft receptacle in Pitman arm jig

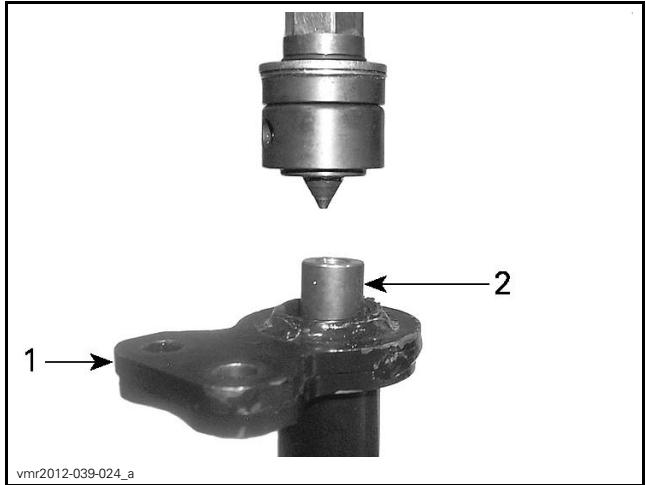


- 1. Pitman arm jig in vice
- 2. Pitman arm up
- 3. DPS input shaft inserted in jig

5. Insert the positioning adaptor in the Pitman arm so its point rests in the DPS output shaft.

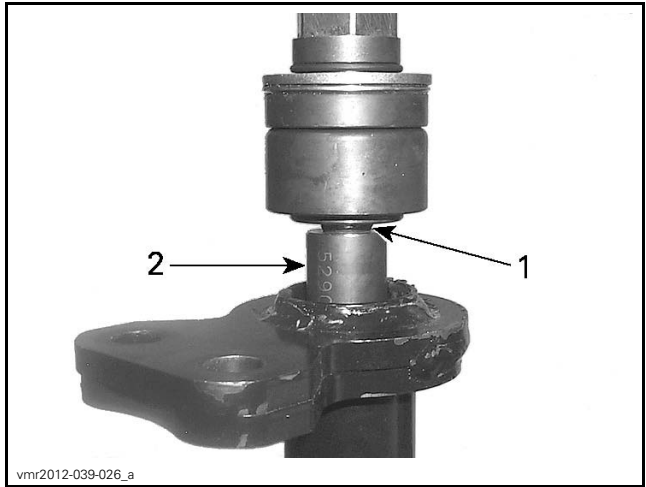
NOTE: A countersunk hole is machined in tip of the DPS output shaft to accept and center the positioning adaptor point.

REQUIRED TOOL	
POSITIONING ADAPTOR (P/N 529 036 230)	



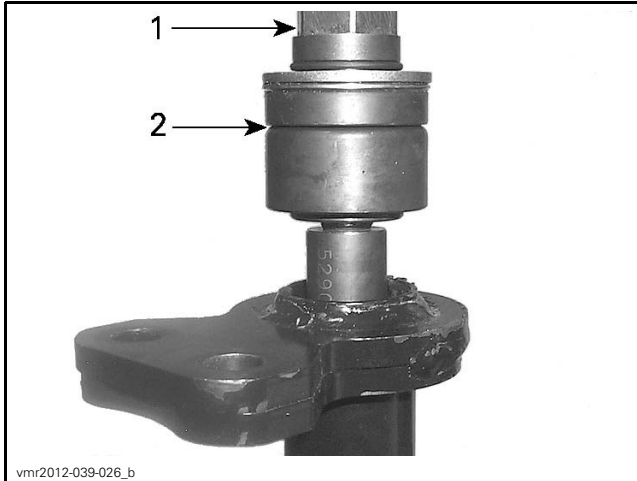
- 1. Pitman arm
- 2. Positioning adaptor

6. Turn the jig positioning screw until the screw tip rests snugly in the positioning adapter.



- 1. Jig screw tip
- 2. Positioning adapter

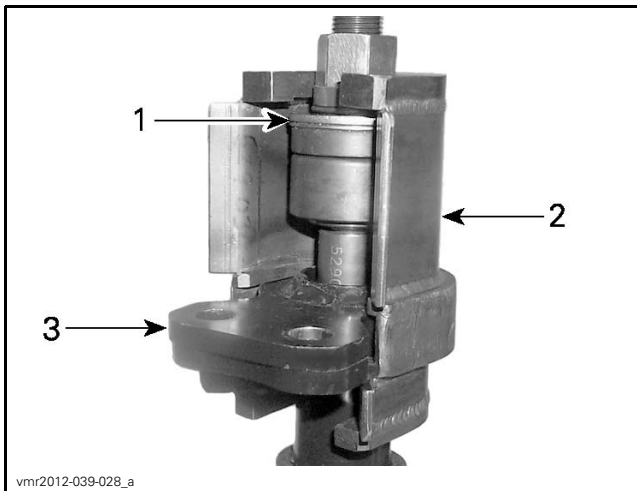
7. Turn the extractor nut down until there is no space between the extractor and the positioning tip.



1. Extractor nut
2. No space here

8. Install the universal Pitman arm puller over the Pitman arm and the extractor thrust bearing.

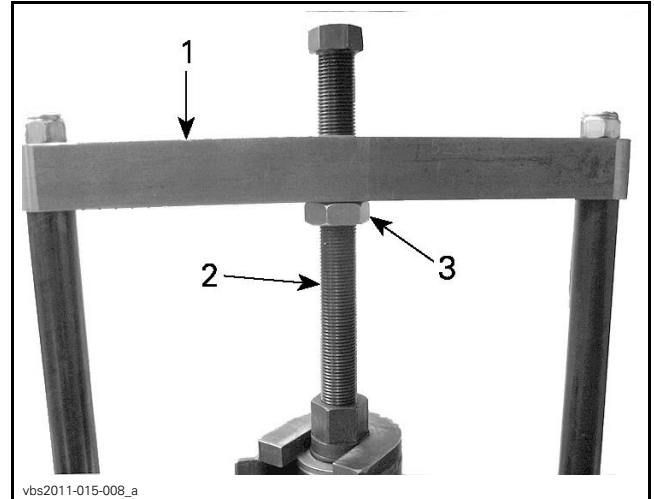
REQUIRED TOOL	
PITMAN ARM PULLER (P/N 529 036 227)	



1. Extractor thrust bearing
2. Pitman arm puller
3. Pitman arm

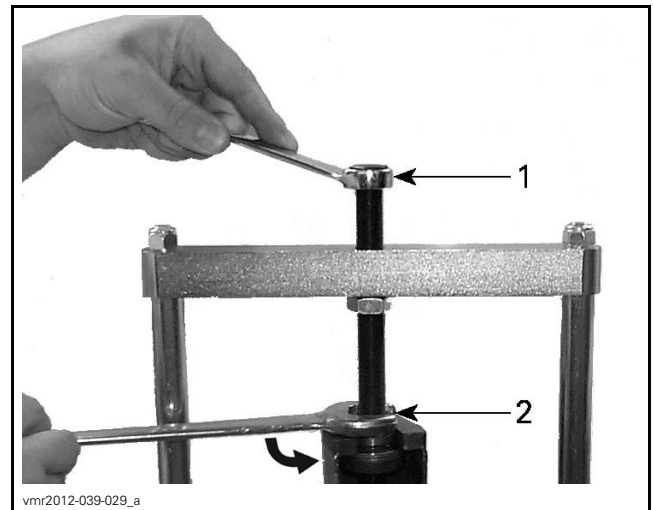
9. Lock the positioning screw by screwing the lock nut tightly against jig upper bar.

NOTE: Be sure to hold the position screw steady to prevent its tip from backing off the positioning adapter.



1. Jig upper bar
2. Positioning screw
3. Lock nut

10. As you hold the positioning screw steady, turn the extractor nut up to pull the Pitman arm off the DPS output shaft.



1. Positioning screw (held steady)
2. Extractor nut (turned up)

11. Remove Pitman arm puller.

12. Unscrew positioning screw.

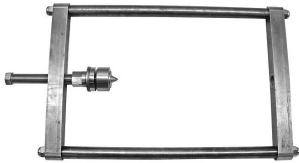
13. Remove Pitman arm from the DPS shaft.

Pitman Arm Installation

1. Install Pitman arm jig in a vise with positioning screw upward.

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Subsection 03 (DYNAMIC POWER STEERING (DPS))

REQUIRED TOOL	
PITMAN ARM JIG (P/N 529 036 225)	

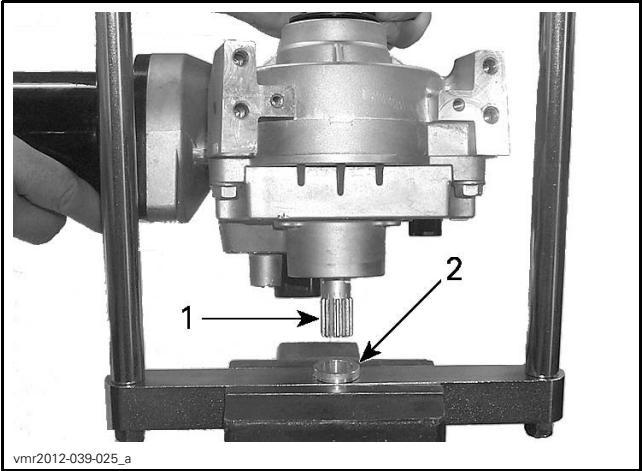
2. Apply antizeize lubricant on DPS output shaft splines; completely cover all the splines with a light coat.

PRODUCT	
DPS output shaft splines	LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070)

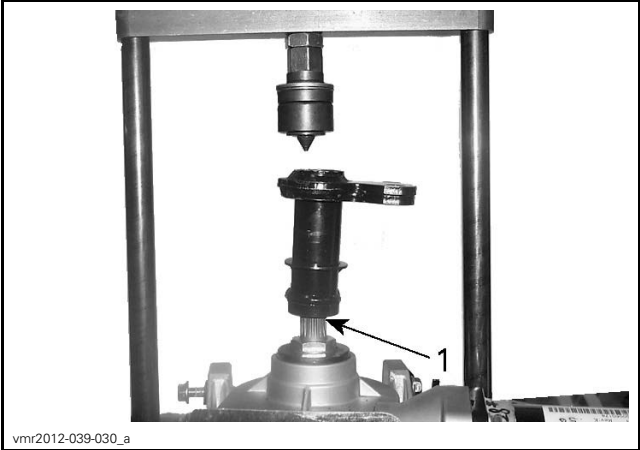
3. Place Pitman arm on DPS shaft as per following illustration.

NOTE: Be sure to correctly align the Pitman arm shaft key with the keyway (ground off splines) on the DPS output shaft.

4. Insert the DPS input shaft in the Pitman arm jig receptacle with the Pitman arm facing up.



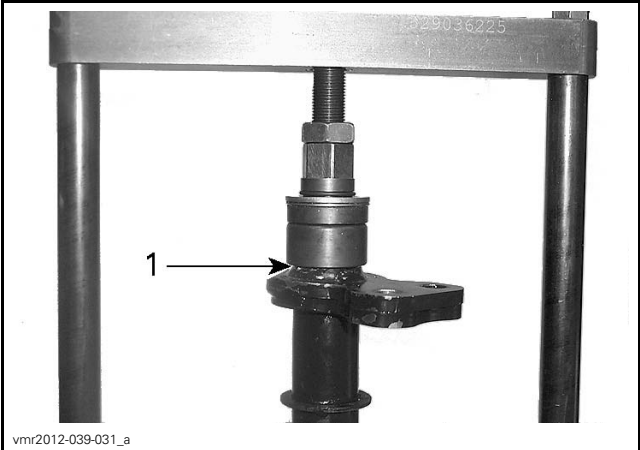
1. DPS input shaft
2. Shaft receptacle in Pitman arm jig



1. Spline keyway alignment here

5. Turn the jig positioning screw until the alignment point makes proper contact with the Pitman arm.

NOTE: Ensure positioning screw is centered in Pitman arm tube.

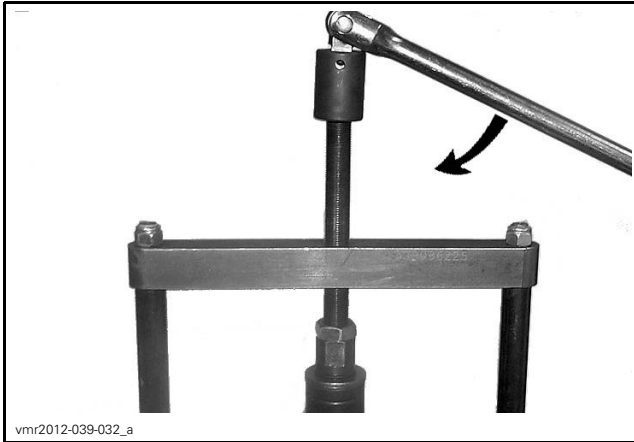


1. Ensure proper contact here

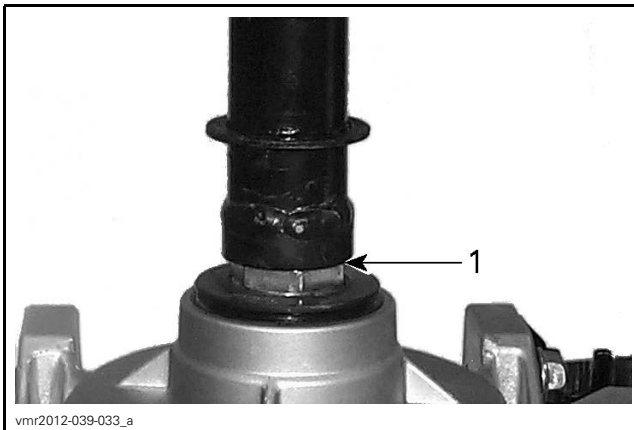
6. Turn the positioning screw to push the Pitman arm on the DPS output shaft until it bottoms out on the DPS output shaft nut.

NOTE: Ensure specified torque is applied.

TIGHTENING TORQUE	
Positioning screw torque	50 N•m (37 lbf•ft)



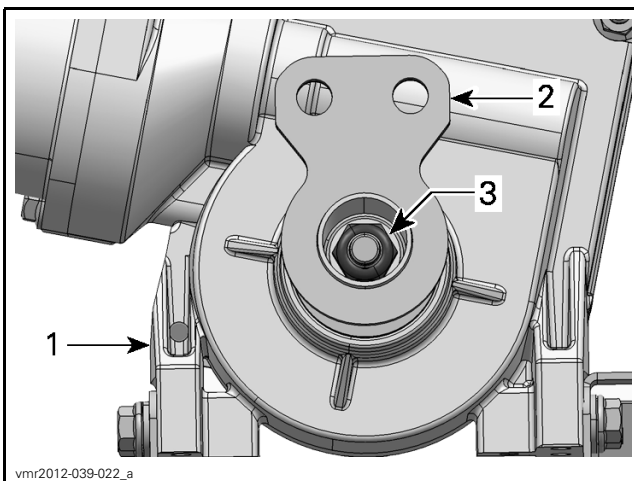
9. Carry out a steering alignment as described in this subsection.



1. Ensure proper contact here

7. Unscrew positioning screw and remove pusher adapter and pull out DPS unit.

8. Install Pitman arm retaining washer and nut. Tighten nut as specified.



- 1. DPS
- 2. Pitman arm
- 3. Pitman arm nut and washer

TIGHTENING TORQUE	
Pitman arm retaining nut	72.5 N•m ± 7.5 N•m (53 lbf•ft ± 6 lbf•ft)