

TOOLS REQUIRED

- Power Steering Analyzer Test Kit (Part No. 5517641)
- 1 to 1-1/2" Steel Block (minimum thickness)
- (2) 7/8" Wrenches
- 3331812K Test Plug (if applicable)
- Drain Pan

Power Steering Internal Leakage Test Procedure

The following procedure can be used to detect internal problems of the steering gear when there is a complaint of hard steering in one or both directions. All other steering components should be inspected to be free of defects prior to conducting this test. History has shown most steering problems are not the result of a faulty steering gear. A complete pressure and flow test should be completed prior to conducting this test.

PROCEDURE

1. Park the vehicle on a clean dry surface, preferably concrete, with the transmission in neutral. Set the parking brake and shut off the engine. Place the drain pan under the steering gear.
2. Install the pressure and flow test kit in series in the pressure line of the power steering pump. Ensure all fittings and connections are tight but do not over tighten them. If the steering gear is built with a pressure relief valve (PRV), it must be removed and replaced with the 3331812K Test Plug for testing purposes only. If the PRV is not replaced with the test plug, the PRV will open during the test and show excessive internal leakage. The PRV looks like a 1-1/2" nut on the side of the steering gear bearing cap. Simply unscrew it and replace it with the test plug. Do not over tighten the plug.
3. Check and correct the fluid level. Start the engine. Check the flow meter to ensure flow is in the proper direction as indicated by the arrow on the flow gage. Close the hand valve until 1000 psi is reached. Maintain this pressure until a temperature reading of 180° Fahrenheit is reached at the reservoir.
4. Close the tester hand valve all the way and note the maximum pump pressure. Make sure the flow drops to zero. Immediately open the valve all the way.



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CAUTION: Keeping the tester hand valve completely closed for longer than 15 seconds at a time can damage the power steering pump.

5. Place the 1" block (minimum thickness) between the axle stop bolt and the axle on the left front wheel. (The block needs to be at least 1" thick to prevent the gear from going into relief.) While holding the block in place have the wheels turned slowly to a full left squeezing the block between the axle stop bolt and the axle. Pull firmly on the steering wheel to ensure the valve in the steering gear is completely open. When properly done, the steering system should achieve maximum pump pressure and flow should be less than one gallon per minute. Note the pressure and flow readings with the 1" block in place.

CAUTION: Take care when squeezing the block between the axle stop and the axle. The block can slip out of place and personal injury could result.

6. Repeat step 5 for a right turn, placing the block between the axle stop bolt and axle on the right side of the vehicle.
7. If excessive internal leakage was noted in one or both directions (flow greater than 1 gpm), the steering gear should be replaced.

NOTE: If this test is being performed on a dual steering gear system (master and slave gear, or assist cylinder) and excessive internal leakage is noted, remove and plug (or cap) the 2 pressure lines coming off the master gear which lead to the slave gear or cylinder. Disconnect the draglink for the slave gear or disconnect one end of the assist cylinder. Repeat steps 5 and 6. If the internal leakage drops below 1 gpm, the problem is in the slave gear or assist cylinder. If the internal leakage is still above 1 gpm, the problem is in the master steering gear.

8. Shut off the engine. Remove the pressure and flow test kit. Replace the test plug (if used) with the PRV. Do not over tighten. Reconnect all lines and linkages previously disconnected.
9. Check and correct the fluid level. Remove the drain pan and return the vehicle to service.

Contact the ULT order desk at 905.612.1256 if you have any questions concerning the diagnosis of a steering complaint or your test results. Refer to the ULT website for additional service information.



Power Steering Troubleshooting Checklist

Before proceeding with the following tests, check all mechanical and external conditions before hydraulic testing. **Do not remove the steering gear or pump until hydraulic tests are completed and an authorization number has been received from Sheppard.**

**ULT RETURNED GOODS
AUTHORIZATION NUMBER:**

Date: / /

Dealer Name: _____ Location: _____

Dealer Contact Name: _____

Contact Phone Number: _____

Servicing Tech Name: _____

Description of Steering Complaint: _____

Vehicle Model: _____ Mileage: _____ VIN: _____

Engine Model: _____ Vehicle Application: _____

Steering Gear Model: _____ Serial No.: _____

Slave Gear Model (if equipped): _____ Serial No.: _____

Pump Manufacturer: _____ Pump Part#: _____

Front Axle Weight Rating: _____ Front Axle Manufacturer: _____

HYDRAULIC TESTS: Refer to RH Sheppard service information available on line at www.rhsheppard.com and in the Sheppard steering gear Service Manuals. Do not remove the steering gear! Install a pressure and flow tester in the pressure line from the pump to the gear as outlined in the

DIAGNOSIS AND TROUBLESHOOTING SECTION. RECORD THE FOLLOWING INFORMATION:

Engine Idle RPM _____ Engine Max RPM _____

Oil Temperature _____ °F (Tests should be run at about 180°F)

System Backpressure @ Idle _____ PSI Backpressure @ Max RPM _____ PSI

Maximum System Pressure (Pump Relief Setting) at Idle _____ PSI at Max RPM _____ PSI

Flow@ Idle with Backpressure Only _____ GPM

Flow@ Max RPM Backpressure Only _____ GPM

Flow@ Idle with 1500 PSI Load Applied _____ GPM

Flow@ Max RPM with 1500 PSI Load Applied _____ GPM

Does steering gear stay in pressure when the steering wheel is released? YES ☐ NO ☐

Static Steer Turning Pressure RIGHT Turn _____ PSI LEFT Turn _____ PSI

Relief Plunger Trip Pressure RIGHT Turn _____ PSI Pressure Drops Down to _____ PSI

Relief Plunger Trip Pressure LEFT Turn _____ PSI Pressure Drops Down to _____ PSI

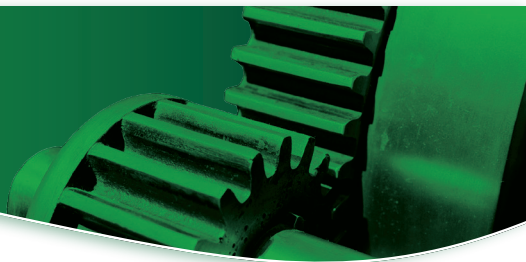
Steering Gear Internal Leakage RIGHT Turn _____ PSI GPM _____

Steering Gear Internal Leakage LEFT Turn _____ PSI GPM _____

Static Steer Turning Input Effort RIGHT Turn _____ In. Lbs LEFT Turn _____ In. Lbs.

Call the ULT order desk at 905.612.1256 for pre-authorization and review of checklist prior to steering gear replacement. Warranty may be denied without a completed checklist.

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Pitman Arm and Pressure & Flow Test Kit



Pitman Arm Puller

Tool for All Models Except Sheppard XD/592
 Part No. 3591842K
 10 lbs. / 8.5" x 5" x 4"



Pitman Arm Puller

Tool for Sheppard XD/592 ONLY
 Part No. 3596372K
 10 lbs. / 8.5" x 5" x 4"



Pitman Arm Puller

Tool for M100, M90 & M80
 Part No. 3574864
 10 lbs. / 7" x 6" x 7"



Pressure & Flow Test Kit

Part No. 5517641
 10 lbs. / 20" x 11" x 7"

TO ORDER ANY OF THESE SHEPPARD TOOLS PLEASE CONTACT:

Edmonton
 Alberta
 833.442.0442

Mount Pearl
 Newfoundland
 844.442.0442

Moncton
 New Brunswick
 844.442.0442

Quebec City
 Quebec
 844.442.0442

Ottawa
 Ontario
 613.749.4858

Mississauga
 Ontario
 833.442.0442

Winnipeg
 Manitoba
 833.442.0442

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