

**TRW Automotive**  
Commercial Steering Systems

## Service Bulletin #THP-102

### Poppet Reset Procedure for Freightliner 14-16074-000 THP60021

January, 2007

This TRW Commercial Steering Systems' service bulletin has been written to help you repair commercial vehicles more efficiently. This bulletin should not replace your manuals; you should use them together. These materials are intended for use by properly trained, professional mechanics, NOT "Do-it-yourselfers". You should not try to diagnose or repair steering problems unless you have been trained, and have the right equipment, tools and know-how to perform the work correctly and safely.

#### What are poppets?

Poppets are pressure unloading valves set to trip just before full turn is reached in each direction. When this procedure is completed correctly, system pressure will be reduced before the axle stop screw contacts the axle stop in both directions.

To determine if the poppets require readjustment or if they are performing properly, install a Power Steering System Analyzer (PSSA) between the power steering pump and the steering gear. If poppet readjustment is necessary, you can leave the PSSA in the system to verify that the following procedure is completed properly.

#### Why might poppets need to be readjusted?

- Changing to larger tires
- Reduced vehicle wheelcut
- Pitman arm mistimed, condition corrected
- Steering gear being installed on a different truck
- Steer axle stop bolt(s) were bent or broken
- Steer axle u-bolt(s) were bent or broken

#### NOTE

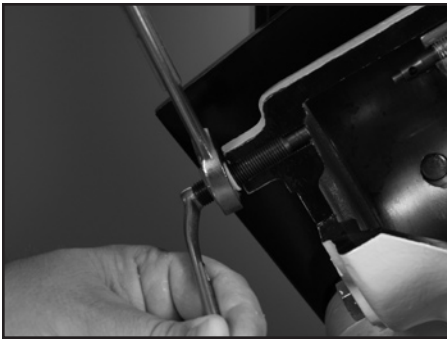
This resetting procedure will work in most cases with at least  $1\frac{3}{4}$  hand-wheel-turns from each side of center. If you're making a large reduction in wheelcut and this procedure does not work, you may have to internally reset the poppets using the procedure described in the THP Service Manual.



**Set axle stops,  
warm-up system**

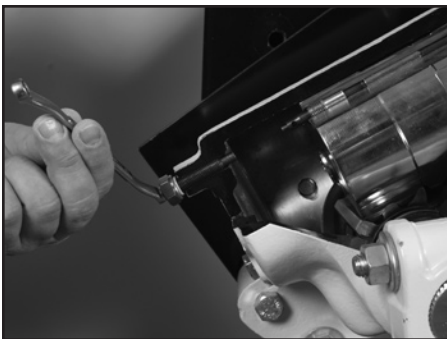
1. Set the axle stops to vehicle manufacturer's wheelcut or clearance specifications.

Start the engine, and allow the vehicle to idle for 5-10 minutes to warm the hydraulic fluid. Shut off the engine.



**Assemble  
adjusting screw  
into nut**

2. Hold the the poppet screw with a ¼ inch wrench and turn the sealing nut back to the wrench until the nut is flush with the base of the hex area of the poppet screw.



**Turn adjusting  
screw assembly  
into housing**

3. Make sure the engine is off and the road wheels are in the straight ahead position. Turn the adjusting screw and sealing nut assembly, without rotating the nut on the screw, into the housing until the nut is firmly against the housing using the ¼ inch wrench. Tighten the sealing nut against the housing.

**⚠ CAUTION** If the drive end of the screw is below the face of the nut, the poppet seat flange will break during step 5d.



**Jack up vehicle**

4. Place a jack under the center of the front axle and jack up the front end of the vehicle so the steer axle tires are off the ground.



**Push upper poppet  
out to prepare it for  
setting**

5.
  - a) Start the engine and let it run at idle speed.
  - b) Note which output shaft timing mark is nearest the housing piston bore.
  - c) Turn the steering wheel in the direction that makes this timing mark move toward the adjusting screw just installed. Turn in this direction until axle stop contact is made.
  - d) Pull hard on the steering wheel (put 30 lbs. rim pull on a 20" dia. steering wheel) after the axle stop is contacted.



### Set upper poppet

6. a) Turn the steering wheel in the opposite direction (end of timing mark away from adjusting screw) until the other axle stop is contacted.
- b) Pull hard on the steering wheel (put 30 lbs. rim pull on a 20" dia. steering wheel).
- c) Release the steering wheel and shut off the engine.



### Back out adjusting screw

7. Loosen the sealing nut and back out the adjusting screw until 1" is past the nut including the external hex portion. Tighten the sealing nut against the housing.

**⚠ CAUTION** Do not hold the steering wheel at full turn for more than 10 seconds at a time; the heat build-up at pump relief pressure may damage components.



### Set lower poppet

8. a) Start the engine and let it idle.
- b) Turn the steering wheel in the original direction (end of timing mark toward adjusting screw), until axle stop contact is made.
- c) Hold the steering wheel in this position (with 30 lbs. rim pull) for 10 seconds, then release. Repeat this hold and release process as many times as necessary while completing step 9.



### Position adjusting screw

9. a) With steering wheel held at full turn, loosen the jam nut and hold it in place with a wrench.
- b) Turn the adjusting screw in (clockwise) using finger-pressure only (don't use a ratchet), until the 1/4 inch wrench comes to a stop. Do not attempt to turn it in farther. Pause the turning-in process each time the driver releases the steering wheel; Continue turning only while the wheel is held at full turn.
- c) Back off the adjusting screw 3/4 turns and tighten the sealing nut. Torque the sealing nut to **35 ft•lb.**

### The procedure is complete

10. The poppets have now been completely reset. Lower the vehicle. Check the reservoir and fill if required.

**⚠ WARNING** The length of the adjusting screw beyond the nut must be **no more than 1 1/16"** for proper thread engagement.

**NOTE** The length of the screw beyond the sealing nut after completing adjustment will vary per vehicle but must not exceed **1 1/16"**.

### TRW Commercial Steering Systems

P.O. Box 60  
Lafayette, IN 47902  
Phone: 765.423.5377  
Fax: 765.429.1868