TRW Automotive
Steering & Suspension Systems

Installation Bulletin #REM-001

Installation of TRW Remanufactured HF, HFB and TAS Steering Gears

Revised October, 1998

This TRW Commercial Steering Division installation 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.

Gear Installation

1. Flush the hydraulic system before installing this replacement power steering gear unit.

   ⚠ WARNING **Failure to flush the system could introduce contaminants into your remanufactured steering gear. Contaminants will damage the steering gear.**

2. Verify that axle stops are set to manufacturer's wheelcut or clearance specifications.

3. Bolt the gear to the frame, torque to vehicle manufacturer's recommendation.

4. Connect the return line (to the reservoir) to the steering gear's return port.

5. Connect the supply line (from the pump) to the steering gear's pressure port.

6. Connect the steering column to the input shaft. Torque the pinch bolt to vehicle manufacturer's recommendation.

7. Install the pitman arm on the output shaft, with timing marks aligned. Torque the bolt to vehicle manufacturer's recommendation.

8. Connect the drag link to the pitman arm, and torque the ball stud connection to vehicle manufacturer's specifications.

9. Proceed to "Filling the System".

Filling the System

⚠ CAUTION **Do not turn the steering wheel during this procedure. Turning the steering wheel could allow air into the hydraulic system.**

1. Fill the reservoir nearly full. Crank the engine for 10 seconds without allowing it to start, if possible. If the engine does start, shut it off immediately. Check and refill the reservoir. Repeat at least three times, each time checking and refilling the reservoir.

   ⚠ CAUTION **Do not allow the fluid to drop significantly or run out of the reservoir. This may allow air into the hydraulic system.**

2. Start the engine and let it idle for 2 minutes. Shut the engine off and check the fluid level in the reservoir.

3. HF and HFB gears only. Start the engine again. Steer the vehicle from full left to full right turn several times. Add fluid, as necessary, to the fill line on the dipstick.

4. Proceed to "Poppet Setting".

Poppet Setting - HF64 and HFB Gears*

1. Make sure axle stops are set properly.

2. Install a pressure gage or Power Steering System Analyzer into the supply line from the pump to the gear. Make sure the Analyzer can be pressurized.

3. Turn on the engine and let the vehicle idle until hydraulic fluid is at operating temperature.

4. Turn the steering wheel to full turn and pull hard when axle stop contact is made. It doesn't matter which direction the wheel is turned. Hold the steering wheel in this position (in 10-second increments) until the first poppet is set.

> **⚠ CAUTION** **Do not hold the steering wheel against the axle stop for more than 10 seconds at a time. Holding the wheel in this position could damage the pump.**

5. Determine which poppet to adjust by looking at the output shaft timing mark. Adjust the poppet this mark points toward. Loosen that poppet adjusting screw jam nut and the poppet adjusting screw until the pressure gage reads pump relief pressure. The driver should still be pulling hard on the steering wheel at full turn.

6. Manually screw in the poppet adjusting screw until the gage shows a drop of about 200-400 psi below pump relief pressure, and tighten the jam nut.

   Test this poppet to confirm it is set correctly by backing off the steering wheel, and steering into a full turn two or three times. Pressure should be 200-400 psi below pump relief, and flow should remain within normal ranges for the gear.

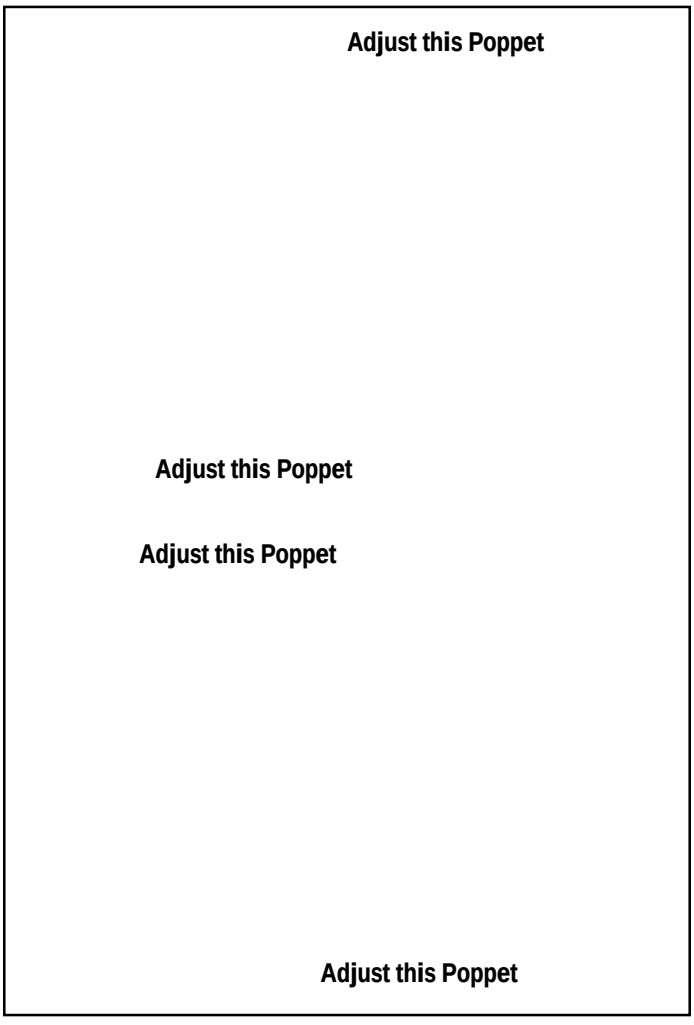
7. After confirming the poppet is set correctly, torque the jam nut as follows:

HF gear:	1/2" jam nut	15-20 lbf•ft
	11/16" jam nut	20-25 lbf•ft
HFB gear:	11/16" jam nut	12-18 lbf•ft
	9/16" jam nut	8-11 lbf•ft

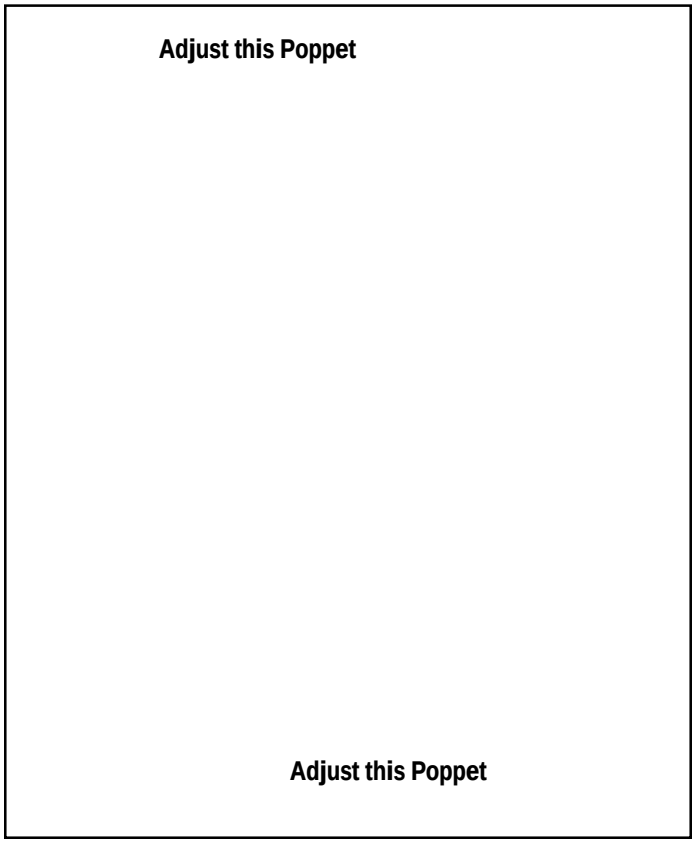
8. Repeat steps 4-7, turning in the opposite direction and adjusting the other poppet.

9. Proceed to "Air Bleeding the System".

HF64 Gears



HFB Gears



Poppet Setting - TAS Gears*

NOTE The following poppet setting procedure applies only to TRW remanufactured units. The automatic poppet adjuster seat and sleeve assemblies have been preset for automatic adjustment after installation.

⚠ CAUTION **The axle stops and all steering linkage must be set according to vehicle manufacturer's specifications, and the pitman arm must be correctly aligned on the sector shaft for poppets to be set correctly.**

1. With the engine at idle and the vehicle unloaded, turn steering wheel to full travel in one direction until axle stop contact is made. Maximum input torque to be applied during this procedure is 40 lb. rim pull (178 N) on a 20 in. (508 mm) diameter steering wheel.

NOTE If you encounter excess rim pull effort, allow the vehicle to roll forward or jack up the vehicle at the front axle.

2. Follow the same procedure while turning the steering wheel in the other direction. The poppets are now positioned to trip and reduce pressure as the steered wheels approach the axle stops in either direction.

3. Proceed to "Air Bleeding the System".

*HFB52033 has automatic poppets which are similar to TAS poppets. Please follow the poppet setting procedure for TAS gears when setting poppets on an HFB52033.

Air Bleeding the System

1. Start the engine. Steer the vehicle from full left to full right turn several times. Add fluid as necessary to the fill line on the dipstick.

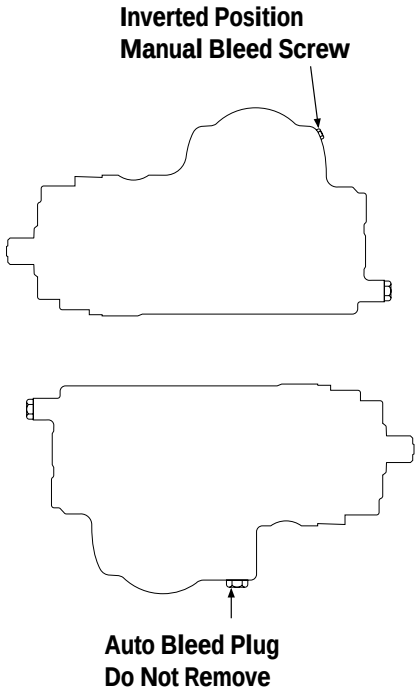
2. If the gear is mounted in an inverted position, and has a manual bleed screw: Steer the vehicle from full left to full right turn several times. Stop steering and loosen the manual bleed screw (5/16" socket) about one turn, allowing air and aerated fluid to "bleed out" around the screw until only clear (non-areated) fluid is "bleeding out", then lightly tighten the bleed screw. Check and refill the reservoir.

3. Repeat step 2 three or four times until only clear fluid is discharged when the bleed screw is loosened. Torque the manual bleed screw to 27-33 lbf•in. (3.1-3.7 N•m). Check and refill the reservoir.

⚠ CAUTION **Do not turn the steering wheel with the bleed screw loosened. This could induce air into the system.**

⚠ WARNING **Do not loosen or remove the automatic bleed screw. Loss of power assist in one direction could result.**

TAS Gears



Important Installation Information

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