# Internal Leakage Test for TAS85 Steering Gears Equipped With an Internal Pressure Relief Valve

# 46-48

FLA COE
FLB COE
> FLD Conventional
Business Class

FLC 112 Conventional
> Century Class Conventional
Argosy COE
Cargo

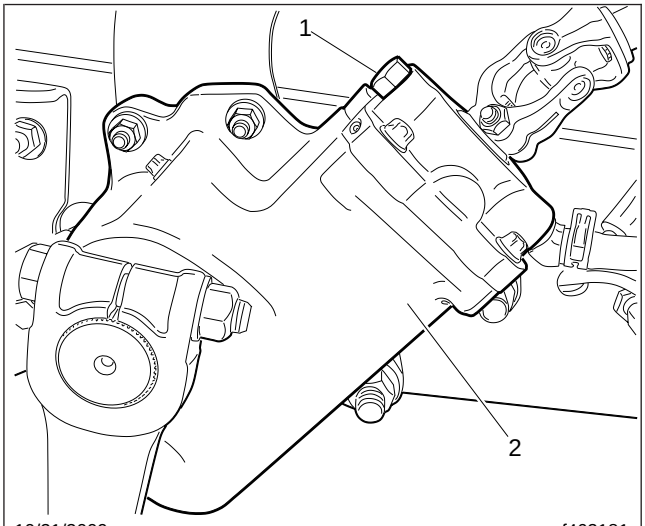
> Columbia
> Coronado
> Business Class M2
> Cascadia

**Freightliner Service Bulletin**

**Description of Revision:** *This bulletin replaces the version dated January 2010. The parts list and steps 10 and 12 have been revised.*

## General Information

Since 2003, some TRW TAS85 steering gears have been equipped with an internal pressure relief valve. See **Fig. 1**. These steering gears are typically installed with power steering pumps that have a pressure relief rating greater than 2175 psi (150 bar). The internal pressure relief valve limits maximum supply pressure to protect the steering gear.




NOTE: The internal pressure relief valve on a TAS85134A gear is located below the input shaft, opposite the location shown here.

1. Internal Pressure Relief Valve
2. Steering Gear

**Fig. 1, TRW TAS85 Steering Gear With Internal Pressure Relief Valve**

When testing the internal leakage of a TAS85 steering gear equipped with an internal pressure relief valve, operation of both the internal pressure relief valve and the poppet relief valves must be prevented.

When using form SD-94, *Checklist for Troubleshooting Power Steering System Performance*, to troubleshoot steering problems on a vehicle with a TAS85 steering gear with an internal pressure relief valve, check the steering gear part number. If the part number is listed in **Table 1**, complete the steps below **instead of** substep 5.9 on the SD-94 checklist.

| TAS85 Steering Gears With an Internal Pressure Relief Valve | |
|---|---|
| **TRW Part Number** | **Daimler Trucks Part Number** |
| TAS85051A | 14-13609-000 |
| TAS85130A | 14-13550-000 |
| TAS85131A | 14-14455-001 |
| TAS85134A | 14-14955-001 |

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| TAS85 Steering Gears With an Internal Pressure Relief Valve | |
|---|---|
| **TRW Part Number** | **Daimler Trucks Part Number** |
| TAS85141A | 14-14982-001 |
| TAS85142A | 14-15332-001 |
| TAS85149A | 14-15994-000 |
| TAS85174A | 14-18065-000 |
| TAS85175A | 14-18066-000 |

**Table 1, TAS85 Steering Gears With an Internal Pressure Relief Valve**

## Parts

See **Table 2** for a list of required leakage test components. The plumbing fittings and hose part numbers are recommended, but may be replaced with identical parts from other suppliers, if necessary.

| TAS85 Steering Gear Internal Leakage Test Components | | | |
|---|---|---|---|
| **Part** | **Available From** | **Part Number (Vendor P/N)** | **Item #, Fig. 2** |
| Power Steering System Analyzer (PSSA) | SPX Kent-Moore | J-26487 | 5 |
| PSSA Adaptor Kit | SPX Kent-Moore | J-28593 | — |
| Relief Valve Plug | SPX Kent-Moore | J-37130 | — |
| Connector, Straight Thread With O-Ring | Daimler Trucks PDC | 23-11470-088 | 6 |
| Power Steering Hose, 42" | Daimler Trucks PDC | 14-12694-042 | 8 |
| Connector, 3/8" Male NPT to 5/8" Beaded Hose Barb | Daimler Trucks PDC | 23-11321-001 | 9 |
| Pipe Coupling, 3/8" NPT | Parker Hannifin | PH 3/8 GG S (3/8 GG-S) | 10 |
| Tee, Male JIC with Male NPT Branch* | Parker Hannifin | PH 8STXS (8 STX-S) | 11 |
| Swivel Adaptor, 3/8" Male NPT to Female 37° JIC (qty 2) | Weatherhead | WH 9100X8X6 (9100x8x6) | 12 |
| Swivel Nut Run Tee | Parker Hannifin | PH 8 R6X S (8 R6X-S) | 13 |
| 3/8" Female NPT Aluminum Relief Valve Threaded Cartridge Body | Parker Hannifin | B10-2-A6P (PH B102A6P) | 14 |
| Aluminum Hydraulic Threaded Cartridge Relief Valve With Knob | Parker Hannifin | PH RAH101K30 (RAH101K30) | 15 |

* Use steel 37° JIC fittings only.

**Table 2, TAS85 Steering Gear Internal Leakage Test Components**

SPX Kent-Moore parts can be ordered from:

SPX Kent-Moore
28635 Mount Road
Warren, Michigan 48092-3499
1-800-328-6657

## Procedure

IMPORTANT: The front wheels must be raised or on turnplates during this procedure.

1. Ensure the engine is off.
2. Remove the relief valve cap, O-ring, and relief valve from the steering gear. See **Fig. 1**.
3. Install the relief valve plug, J-37130, in the internal pressure relief valve hole. Install the relief valve cap and O-ring over the plug.
4. Assemble the relief valve cartridge body, relief valve, and tee fittings as shown in **Fig. 2**.
5. Install the PSSA and other test components as shown in **Fig. 2**.
6. Open the external relief valve (**Fig. 2**, Item 15) on the relief valve cartridge. Ensure the PSSA shutoff valve is fully open.
7. With the engine off, turn the steering wheel to the right and left full-lock positions five times to bleed air from the system.
8. Start the engine and bleed the remaining air out of the system by continuing to turn the wheel from side to side.

### NOTICE

**Do not leave the PSSA shutoff valve fully closed for longer than five seconds. Doing so could damage the power steering system.**

9. With the engine on, close the shutoff valve on the PSSA.
10. Set the system relief pressure by closing the external relief valve (**Fig. 2**, Item 15) until the gauge on the PSSA reaches 2,000 psig (13 790 kPa), then fully open the shutoff valve on the PSSA.

### ⚠ WARNING

**Keep fingers clear of the stop bolt and spacer block during the following steps. Make sure that the spacer block contacts the axle stop squarely. Contact that is not square could break the stop bolts or eject the spacer block, which could cause serious personal injury.**

11. To prevent operation of the poppet relief valve, place a 1-inch (25-mm) thick unhardened steel spacer between the axle and the stop bolt at one side of the axle. The spacer should have an extension long enough to keep fingers clear of the axle stop.

### NOTICE

**Do not allow the temperature to exceed 250°F (121°C) during the following test. Doing so could damage the power steering system.**

12. Have someone turn the steering wheel, applying enough force to completely close the rotary valve. See **Fig. 3**.

    Complete closure of the rotary valve requires approximately 20 lbf (27 N) pull on the steering wheel, and will be indicated by a pressure reading nearly equal to the previously set system relief pressure.
13. Hold the steering wheel in the full-turn position. Note the steering gear internal leakage on the PSSA.
14. Repeat steps 11 through 13 for the opposite direction.

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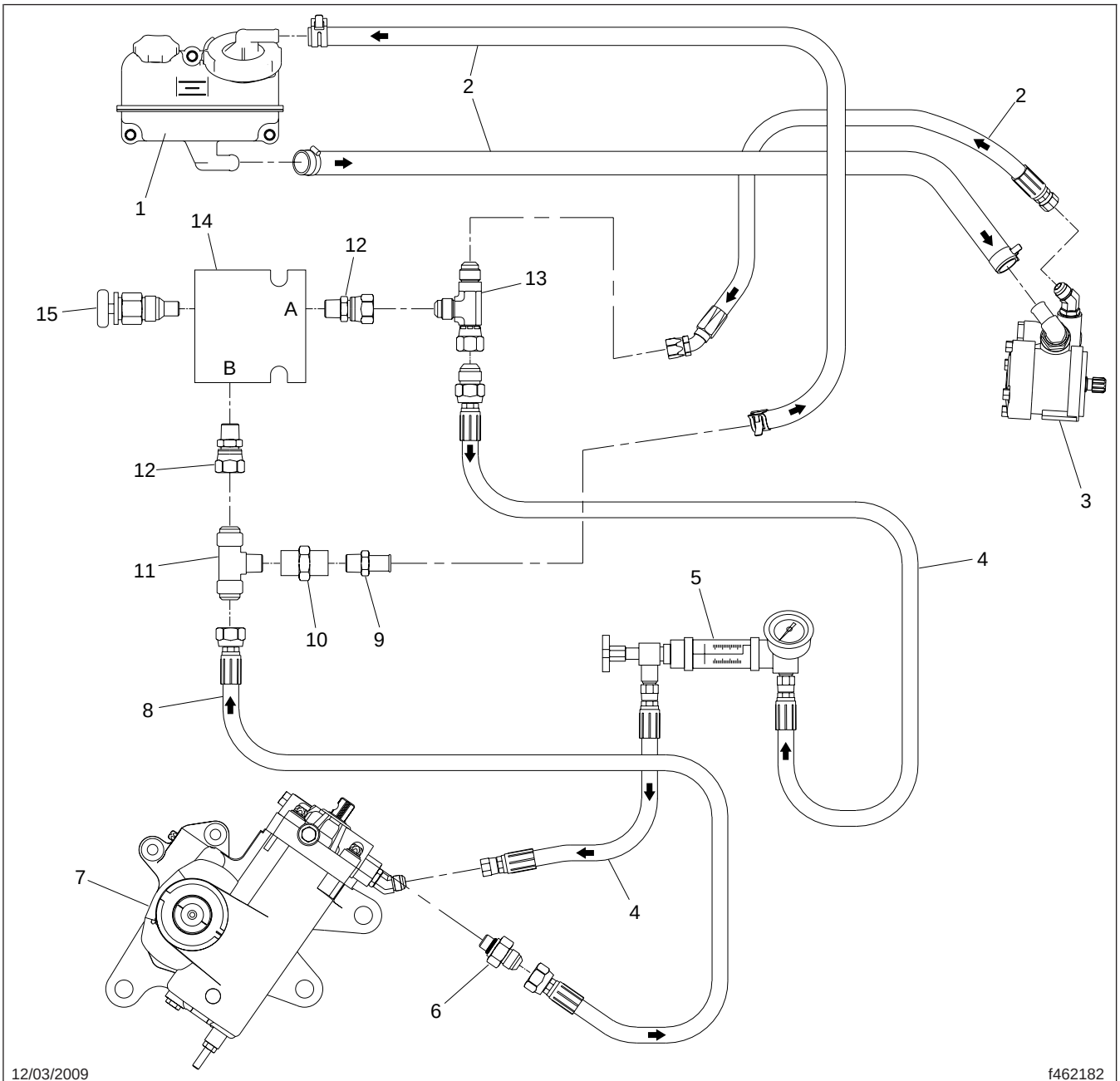


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A. High-Pressure Input Port
B. Low-Pressure Output Port

1. Power Steering Fluid Reservoir
2. Existing Power Steering Fluid Lines (Qty 3)
3. Power Steering Pump
4. PSSA Fluid Lines (Qty 2)
5. PSSA
6. Connector, Straight Thread With O-Ring
7. Power Steering Gear
8. Power Steering Hose, 42"
9. Connector, Male NPT to Beaded Hose Barb
10. Pipe Coupling
11. Tee, Male JIC with Male NPT Branch
12. Swivel Adaptor (Qty 2)
13. Swivel Nut Run Tee
14. Relief Valve Threaded Cartridge Body
15. External Relief Valve, Threaded Cartridge Type

**Fig. 2, Internal Leakage Test Component Installation**

15. The maximum allowable internal leakage for a single-gear system is 1.0 gpm (3.8 L/min). If the internal leakage is more than 1.0 gpm (3.8 L/min), replace the steering gear.

    The maximum allowable internal leakage for systems with two or more steering gears and/or linear cylinders is 1.0 gpm (3.8 L/min) for each steering gear in the system. If the leakage is more than 2.0 gpm (7.6 L/min) on a dual-gear system, isolate the auxiliary gear from the system and test for excessive internal leakage again.

    15.1 Disconnect the auxiliary gear hydraulic lines from the main gear ports.

    15.2 Plug the main steering gear ports with suitable steel or high-pressure plugs.

    15.3 Repeat steps 11 through 14.

    15.4 If the internal leakage is less than 1.0 gpm (3.8 L/min), repair or replace the auxiliary gear. If the internal leakage is greater than 1.0 gpm (3.8 L/min), repair or replace the main gear.

    15.5 Remove the high-pressure plugs from the steering gear ports and connect the auxiliary gear hydraulic lines to the main gear ports.

16. Shut down the engine and remove the relief valve plug from the steering gear and install the relief valve, O-ring, and relief valve cap. Tighten the relief valve cap 25 to 35 lbf·ft (34 to 48 N·m).

17. Remove the internal leakage test components.

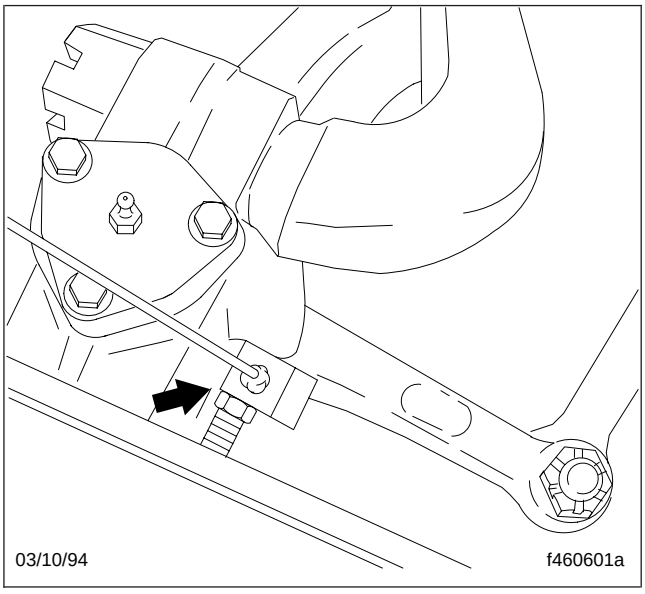


**Fig. 3, Steel Spacer Contacting the Axle Stop**

18. Install the power steering fluid high-pressure and low-pressure lines on the steering gear as shown in **Fig.4**.

19. If no problems were found during the internal leakage test, proceed to step 6 on Form SD-94, *Checklist for Troubleshooting Power Steering System Performance*.

## Warranty

This is an informational bulletin.

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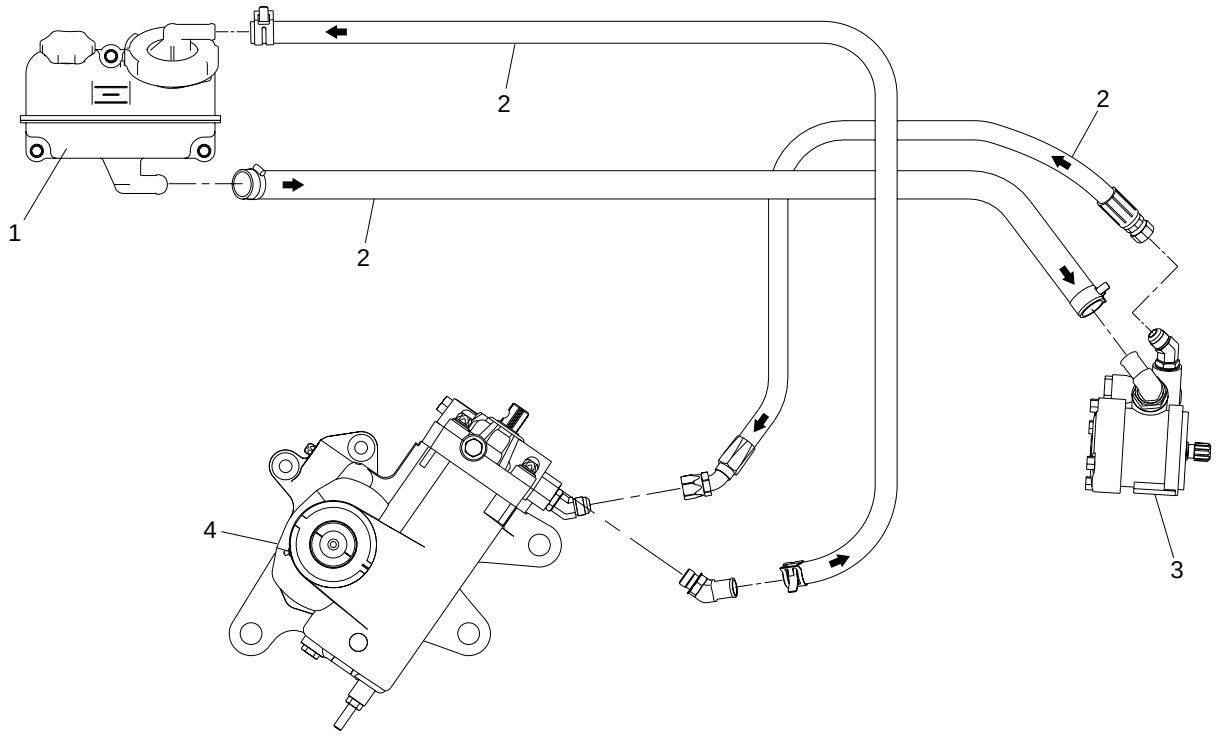


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1. Power Steering Fluid Reservoir
2. Existing Power Steering Fluid Lines (Qty 3)
3. Power Steering Pump
4. Steering Gear

**Fig. 4, Plumbing Schematic for TAS85 Steering Gear**