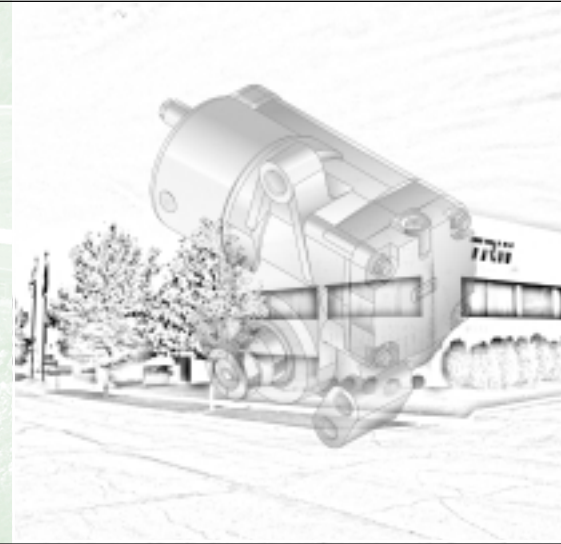






**TRW Automotive**  
Commercial Steering Systems

# RCS Rotary Cylinder Service Manual

RCS 40,55,65, AND 85 SERIES



# Hazard Warning Definitions

 <b>WARNING</b>	A warning describes hazards or unsafe practices which could result in severe personal injury or death.
 <b>CAUTION</b>	A caution describes hazards or unsafe practices which could result in personal injury or product or property damage.
<b>NOTE</b>	A note gives key information to make following a procedure easier or quicker.

## Disclaimer

This Service Manual has been prepared by TRW Commercial Steering Division for reference and use by mechanics who have been trained to repair and service steering components and systems on heavy commercial vehicles. TRW Commercial Steering Division has exercised reasonable care and diligence to present accurate, clear and complete information and instructions regarding the TRW Commercial Steering RCS Series Rotary Cylinders. Since this is a general Service Manual, the photographs and illustrations may not look exactly like the rotary cylinder being serviced. The procedures, therefore, must be carefully read and understood before servicing.

If inspection or testing reveals evidence of abnormal wear or damage to the RCS rotary cylinder, or if you encounter circumstances not covered in the Manual, **Stop - Consult the vehicle manufacturer's Service Manual and warranty. Do not try to repair or service an RCS rotary cylinder which has been damaged or includes any part that shows excessive wear unless the damaged and worn parts are replaced with original TRW replacement and service parts and the unit is restored to TRW's specifications for the RCS rotary cylinder.**

It is the responsibility of the mechanic performing the maintenance, repairs or service on a particular RCS rotary cylinder to (a) inspect the rotary cylinder for abnormal wear and damage, (b) choose a repair procedure which will not endanger his/her safety, the safety of others, the vehicle, or the safe operation of the vehicle, and (c) fully inspect and test the RCS rotary cylinder and the vehicle steering system to ensure that the repair or service of the rotary cylinder has been properly performed and that the rotary cylinder and system will function properly.

## Patents

TRW Commercial Steering Division RCS rotary cylinders are covered by several United States and foreign patents, either issued or pending.

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# Reinstallation

- Verify that axle stops are set to manufacturer's wheelcut or clearance specifications.
- Bolt cylinder to frame, torque to vehicle manufacturer's recommendation.
- Connect the auxiliary ports from the main gear to the appropriate RCS ports. Follow the markings you made when you removed the lines

**⚠ CAUTION** Installing the hoses to the wrong ports could result in damage to the tie rod. Make sure you reconnect hoses to the same ports from which they were removed.

- Install pitman arm on output shaft, with timing marks aligned. Torque bolt to vehicle manufacturer's recommendation.
- Connect drag link to pitman arm.

# Poppet Resetting

**IF** Poppets remain unchanged from when gear was removed from vehicle, and gear is being installed on the same vehicle with no change in axle stops or linkage.



After installation, check to make sure poppets relieve in both turns just before axle stop contact is made. If not, use resetting procedure beginning on page 18.

**IF** Poppets were replaced with new components or reset during gear disassembly, and are ready for automatic positioning.



Use poppet setting procedure on page 13.

**IF** Poppets may have been moved during disassembly or reassembly procedures, or gear is being installed on a different vehicle.



Use poppet resetting procedure beginning on page 18.

# Maintenance Tips

**Never high-pressure wash or steam clean a power steering gear or rotary cylinder while on or off the vehicle. Doing so could force contaminants inside the gear and cause it to malfunction.**

Make sure vehicle wheel cut or clearances meet manufacturer's specifications, and make sure pitman arm timing marks are aligned properly to **prevent internal bottoming** of the steering gear and rotary cylinder.

**Regularly check the fluid** and the fluid level in the power steering reservoir.

**Keep tires inflated** to correct pressure.

**Never use a torch to remove pitman arm.**

Investigate and immediately **correct the cause of any play, rattle, or shimmy** in any part of the steering system.

**Make sure the steering column is aligned properly.**

**Encourage drivers to report any malfunctions or accidents** that could have damaged steering components.

**Do not attempt to weld any broken steering component.** Replace the component with original equipment only.

**Do not cold straighten, hot straighten, or bend any steering system component.**

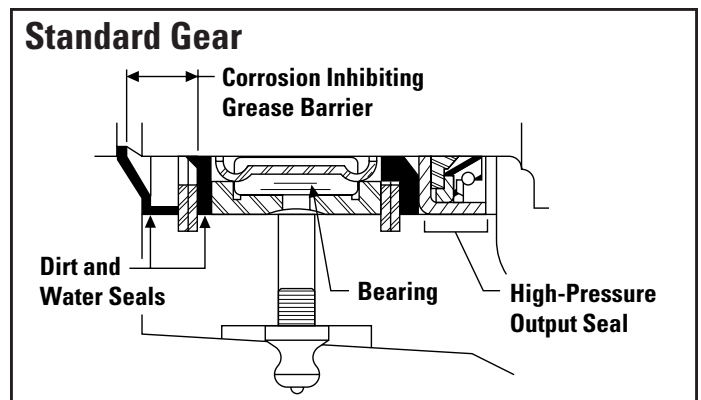
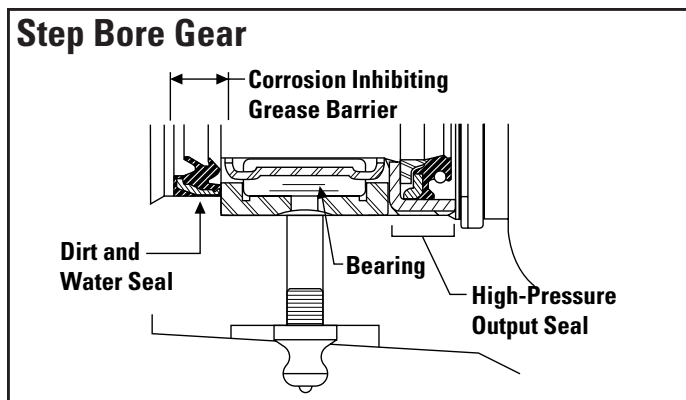
Always **clean off around the reservoir filler cap** before you remove it. Prevent dirt or other foreign matter from entering the hydraulic system.

**Investigate and correct any external leaks**, no matter how minor.

**Replace reservoir filters** according to requirements.

If you feel the vehicle is developing excessively **high hydraulic fluid temperatures**, consult with your vehicle manufacturer for recommendations.

**Maintain grease pack** behind the sector shaft dirt and water seal as a general maintenance procedure at least twice a year, in the Spring and Fall. Grease fitting is provided in housing trunnion. Use only NLGI grade 1 or 2 multipurpose chassis lube, and use only a hand operated grease gun on fitting. Add grease until it begins to extrude past the sector shaft dirt and water seal.



# Glossary

## Aerated Fluid

Fluid with air bubbles

## Automatic Bleed Systems

Gears are mounted in such a way that trapped air can be forced out of the system "automatically" without loosening bleed screw. Follow procedure on page 13.

## Axial

In-out movement along an axis (imaginary straight line on which an object moves)

## Date Code

Date the steering gear was built (Julian date)

## Discoloration

Change in color

## External Leakage

Fluid Leaking out of the system or steering gear

## Full Turn

Hub contacts axle stop

## Internal Leakage

Fluid leaking inside the gear

## Lash

Free play

## Manual Bleed Systems

Gears are mounted in such a way that an air pocket could form in one end of the steering gear. The bleed screw is positioned so trapped air can be forced out when loosened. Follow procedure on page 13.

## OSHA

Occupational Safety and Health Administration

## Poppets

Unloading valves, reduce pressure in full turns.

## Relief Valve

Limits maximum supply pressure

## Scoring

Scratch

## Shock Load

Shake or jar

## Spalling

Flaking or chipping

## Subassembly

An assembled unit that fits into a larger unit

## Twisted Serrations

Output shaft serrations damaged by impact overload. Serrations can be twisted at the area between the large diameter of the shaft and the end of the serrations.



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