

TRW Automotive Commercial Steering Systems

# TC34 Steering Column Service Manual

#### TC34 TILT COLUMN



### **TC34 Exploded Assembly View - Typical**



2.	Lower Bearing Housin
2	Deering (1)

- Bearing (4) 3. Self-Tapping Screw (4) -3/8-16X 1.0 Lg. Hex Hd. 4.
- 5. Spring Retaining Rod
- 6. Universal Joint Assembly
- 7. Spring (Extended)
- Jacket Tube 8.
- 9. **Retaining Ring**
- 10. Wheel Tube & Sleeve Assembly
- 11. **Retaining Ring**
- Bearing Spacer 12.
- 13. **Retaining Ring**
- Pipe Plug, 1/8 27 Dry Seal Socket Hd. 14.
- 15. **Retaining Ring**
- 16. Set Screw (2) 10-24 X 3/1 6 Lg.-Soc. Hd.
- Support Bracket 17.
- 18. Main Housing Assembly 19. Pivot Screw (2) 1/2 20 X 1 -1/8 Lg.-Soc. Hd.
- Travel Stop Pin (1 or 2) 20.
- 21. Stop Cover
- Self-Tapping Screw (2) 10-24 X 1/2 Lg.-Hex. Hd. 22.
- 23. Stop Screw-Button Hd.-5/16 18
- 24. Internal Tooth Lock Washer
- 25. Self-Tapping Screw (1 or 3) 10-24 X 5/8 Lg.

- Actuator Housing & Bushing Assembly
- 28. Spring-Actuator Housing
- 29. Lock Pin-Telescope
- 30. Spring-Anti-Rattle
- 31. Pivot Pin
- 32. Cam-Actuator
- 33. Tilt & Telescope Lever
- Plate-Disengaging 34.
- 35. Wedgelock
- 36. Lock Bar
- Spring-Wedgelock 37.
- 38. Spring-Lock Bar
- Spring Cover–Upper 39.
- Spring Cover–Lower 40.
- Spring R.H. (Extend) Green 41.
- Spring L.H. (Extend) 42.
- Hex Head Bolt-1/4-20 X 5/8 43.
- Helical Spring Lock Washer 44.
  - Bracket-Turn Signal 45.
  - Contact Brush Assembly 46.
  - Turn Signal Housing Assembly 47.
  - Self-Tapping Screw (2 or 4) 10-24 X 7/8 Lg. 48.
  - Wheel Nut-7/8 20 49.

#### **TC34 Disassembly Procedures**

WARNING: All steering mechanisms are safety critical items. As such, it is imperative that the instructions in this booklet are followed to the letter. Failure to observe the procedures and instructions set out in this pamphlet may result in loss of steering.

WARNING: The TC34 assembly has components under spring tension. The "tilt" and "telescoping" features should be in the "full up" position to minimize spring tension before removal from vehicle and or disassembly. Wear eye protection and use caution to prevent injury.

CAUTION: Use a suitable "wheel puller" to remove steering wheel.

#### WARNING: To prevent injury, use extreme care when using flammable cleaning solvents.

CAUTION: Do not allow the finish on the jacket tube outside diameter to be scratched, nicked or dented during assembly and disassembly as the finish is crucial to the telescoping action of the unit.

- 1. Remove bolt (43), lock washer (44) and turn signal bracket (45) from turn signal housing (47). Remove turn signal housing and contact brush assembly (46).
- Remove tilt & telescope lever (33), screw (25), spring cover plate (26), four screws (48) or two screws (48) and two screws (25), actuator housing (27), spring (28), actuator cam & pin assembly with cam (32), lock pin (29), pivot pin (31) and spring (30).
- 3. Remove disengaging plate (34), lockbar (36), spring (38), wedge lock (35), and spring (37).
- 4. Detach springs (41 & 42) from main housing (18). Remove upper spring cover (39).
- 5. Remove four screws (4) from support bracket (17) and lower housing (2).

CAUTION: Be ready for the lower housing (2) and universal joint (6) assembly to eject under spring (7) tension from the main housing assembly.

- Remove retaining ring (1) from the lower end of universal Joint (6) and lower housing (2) assembly. Remove the universal Joint assembly (6) from lower bearing housing (2). Remove bearings (3) from lower bearing housing only if the bearings are to be replaced. Suitable bearing puller required. Remove plug (14) from end of splined u-joint column if it is to be replaced. 3/16 inch Allen wrench required.
- 7. Remove lower spring cover (40), springs (41 & 42) and spring retaining rod (5) from lower bearing housing (2). Remove button head stop screw (23) and internal lock washer (24) from main housing (18) assembly.
- 8. Push wheel tube (10) and jacket tube (8) assembly out through the lower end of main housing (18) assembly.

NOTE: If you disassemble the jacket tube and wheel tube assembly further, you must replace the two bearings (3) and retaining ring (11) in the jacket tube because of the press fit and anaerobic locking agent

- 9. To remove the wheel tube and sleeve assembly (10) from jacket tube (8), remove retaining ring (1) from top end of wheel tube and retaining ring (15) from jacket tube. Insert a 8 inch (20 cm) long, 3/4 inch (1.9 cm) diameter rod or tube into the splined sleeve end of wheel tube and press out the wheel tube and bearing assembly while retaining the jacket tube. Do not scratch or nick jacket tube finish.
- 10. Press the bearings (3) off of the wheel tube and splined sleeve assembly (10) using a suitable tubular bearing removal tool and discard bearings. Remove retaining ring (11) from wheel tube and discard.
- 11. If support bracket (17) is to be removed from main housing (18), first remove two self-tapping screws (22), stop cover (21), and the one or two travel stop pins (20), from main housing assembly. Note the letters of the holes with stop pins as they are removed.
- 12. Remove set screws (16) from the two support bracket (17) nuts. Turn the two pivot screws (19) from main housing assembly. Remove support bracket from main housing assembly (18). You must clean off the Loctite applied to the threads in the nuts that are a integral part of the support bracket, the pivot screws and the set screws.

NOTE: Applying heat to support bracket nuts with electric heat gun or 1000 watt hair dryer will facilitate removal of set screws and pivot screws that were Loctited at assembly. Using appropriate size thread chasers on set screws, pivot screws and support bracket nuts, and a suitable solvent will aid in removing Loctite applied at assembly.

CAUTION: Do not exceed 500°F (260°C) or the material hardness may be affected.

Further disassembly of the main housing should not be made as the components cannot be serviced separately, and the collets and spring are staked into the housing. Replace damaged parts.

#### **TC34 Assembly Procedures**

Assemble support bracket (17) into main housing (18) 1. sub-assembly so that the support bracket teeth are on the cam-actuator (32) side of housing and the pivot screw holes are aligned. Turn the two pivot screws (19) loosely into the assembly. Place a 1/2 inch dia. by 3 inch long bolt and nut assembly between the support bracket flanges, close to the bracket nuts, as a tool to spread the support bracket flanges. Begin backing the nut off of the 1/2 inch dia. bolt to spread the bracket flange bosses against the main housing and to provide clearance for lower bearing housing (2) when assembled into the support bracket. Remove pivot screws. Add lithium grease to taper under pivot screw heads. Add Loctite RC680 to threads of pivot screws and two set screws (16). Reassemble pivot screws into main housing and support bracket assembly. Torque the pivot screw on the actuator cam side and then the other pivot screw to 50-60 in. lbs. (5.6-6.8 N m). Torque set screws (16) into bracket nuts to 15-25 in. lbs. (1.7-2.8 N m).

CAUTION: Do not get grease on screw threads or Loctite on screw head.

- Assemble retaining rings (13 &11) onto wheel tube and splined sleeve assembly (10). Apply Loctite RC680 evenly around wheel tube in the lower bearing support area and push **new** lower bearing (3) onto wheel tube, and against retaining ring (11). Apply Loctite evenly around wheel tube at the upper bearing support area, assemble bearing spacer (12) and push **new** upper bearing (3) onto wheel tube until it clears upper retaining ring groove. Assemble bowed retaining ring (1).
- 3. Press the wheel tube, sleeve and bearings as assembled into the jacket tube (8) end that has the counter bore and internal retaining ring groove until the upper bearing (3) is beyond the retaining ring groove. A tubular bearing installer tool pressing against the upper bearing (3) outer race is required. The split in the bearing spacer (12) must be aligned with the screw hole in the top end of jacket tube to allow later assembly of bolt (43). Assemble retaining rings (9 & 15) in their grooves on jacket tube.
- 4. To assemble the wheel tube and jacket tube assembly into the main housing assembly (18), place jacket tube end down on a pedestal about 4 inches (101.6 mm) high x 2-1/4 inches (57.2 mm) diameter. Be sure cutouts of lower collet in main housing assembly (18) align with holes for lock pin (29) and stop screw (23). Be sure ends of the spring in the housing are approximately 90 degrees from the splits in the collets. This will facilitate assembly of jacket tube in housing. Assemble the main housing down over the jacket tube such that jacket tube will enter the housing bore lower collet. As the upper end of the jacket approaches the upper tapered collet, the collet must be pushed down with a screwdriver or a suitable tool that will pilot over the wheel tube and into the housing bore. This will allow the jacket tube assembly to be pushed through the upper collets.
- Align the jacket tube guide slot with the stop screw hole in the main housing assembly (18) and torque button head stop screw (23) and internal tooth lock washer (24) into stop screw hole to 15-20 ft. lbs.(20.3-27.1 N m).
- 6. Press in a **new** bearing (3) into each counter bore in lower bearing housing (2) if the bearings were removed.
- Assemble the lower serrated shaft of universal joint assembly (6) into lower bearing housing assembly (2) until it is seated against a bearing (3). Assemble retaining ring (1) onto universal joint shaft. Turn 1/8 inch pipe plug (14) finger tight into tapped hole in slotted end of u-joint shaft. Assemble spring retaining rod (5) into bearing housing (2).

## CAUTION: If pipe plug is tightened such that the end of U-joint shaft is spread open, the shaft may not assemble into spline sleeve as required.

Place the main housing assembly (18) as assembled, vertical in a 8. soft jawed vise, clamping firmly against the serrated end of wheel tube assembly (10). As an alternative the steering wheel can be set on the wheel tube as a holding fixture and the unit set upside down on a bench for these procedures. Push the wheel tube and jacket to full-down position in the main housing. Assemble spring (7) over lower end of wheel tube and splined sleeve assembly. Assemble universal joint (6) splined shaft into the spring (7) and into splined sleeve so that a slot in the splined shaft aligns with the wide flute in the mating splined sleeve. Two fingers in the lower U-joint shaft yoke will help guide the shaft into the splined sleeve. Push the universal joint assembly and lower housing (2) into the main housing (18) assembly and align the screw holes in the support bracket (17) with the holes in lower housing.

9. While holding the u-joint lower housing assembly in place, torque four self tapping screws (4) into the support bracket (17) and lower housing (2) to 25-35 ft. lbs. (33.9-47.5 N m).

CAUTION: To insure that the u-joint splined shaft assembly does not eject from the splined sleeve, it must be held in position until at least an upper and lower screw are in place.

- Lightly grease and assemble lock bar (36) onto main housing (18) with the locating pin up and engaging the teeth with the support bracket (17) teeth. Assemble spring (38) on end of lock bar.
- 11. Lightly grease and assemble wedge lock (35) next to lock bar with tapered end toward the support bracket teeth and the locating pin up. Assemble spring (37) onto end of wedge lock.
- 12. Lightly grease and assemble disengaging plate (34) with the tabs up, over the lock bar (36) and wedge lock (35) locating pins.
- 13. If disassembled, assemble lock pin (29) into actuator cam (32) with spring hole in cam and lock pin facing each other, and press pivot pin (31) into its hole in the lock pin and actuator cam until it is flush to .015 inches (.381 mm) below actuator cam. Insert end of spring (30) into hole in lock pin, then the other end in actuator cam spring hole. Grease and insert lock pin assembly into its bushing in main housing assembly (18) with actuator cam ears over disengaging plate (34) raised tabs.

#### CAUTION: Use care that spring (30) does not eject from assembly.

- 14. Assemble spring (28) into top of lock pin and assemble actuator housing (27) over actuator and pin assembly. Torque four attaching screws (48) to 40-60 in. lbs. (4.5-6.8 N m) into actuator and main housings, while holding actuator housing firmly down. Two screws (48) and two shorter (5/8") screws (25) are used on some units.
- 15. Assemble spring cover plate (26) over springs(i37 & 38) and firmly hold in position while turning in screw (25) into actuator housing (27). Torque screw to 40-60 in. lbs. (4.5-6.8 N m).
- 16. Assemble tilt & telescope lever (33) into actuator cam (32).
- 17. Tilt and telescope jacket and wheel tube assembly to "full up" position to facilitate spring assembly. While looking down from steering wheel end of the assembly, hook the end of green, R.H. coil spring (41) on the right side of spring retaining rod (5) and L.H. coil spring (42) on the left side. Snap the lower spring cover (40) on the retaining rod between the springs. Assemble upper spring cover (39) over the two springs engaging the lower cover in slot provided. Tilt jacket tube and wheel tube assembly to full down position. Hook the loose end of springs in holes in main housing using suitable spring assembly tool.
- Assemble contact brush assembly (46) into turn signal housing (47) and assemble turn signal housing over jacket tube (8) with horn wire outside the jacket.
- Attach turn signal bracket (45) to signal housing with bolt (43) and lock washer (44) finger tight. The bolt must enter the split in bearing spacer (12). Bolt (43) must be torqued to 6-10 ft. lbs. (8.1.-13.6 N m) after steering wheel is installed and turn signal bowl is adjusted.
- 20. If removed, insert the one or two travel stop pins (20) in the lettered holes they were removed from as noted at disassembly.
- 21. Attach stop cover (21) with two self-tapping screws (22) torqued to 40-60 in. lbs. (4.5-6.8 N m).

22. Push telescoping jacket tube and wheel tube assembly all the way in and turn the 1/8 inch pipe plug (14) into the universal joint slotted shaft, enough to retain the jacket tube and wheel tube position when the telescoping lockpin (29) is disengaged. Then loosen the 1/8 inch pipe plug just enough to allow jacket tube and wheel tube assembly (about 1/8 turn) to telescope freely under spring tension. You will need a 3/16 inch Allen T-bar wrench of suitable diameter and length [.375 inches (9.52 mm) diameter x 12 inches (304.8 mm) long] to reach the pipe plug down through the wheel tube.

When tilt and telescope lever (33) is held in the "up" position, the jacket and wheel tube assembly must be able to **telescope** to "full up" and "full down" position. When tilt lever is held in the "down" position, the jacket and wheel tube assembly must be able to **tilt** to the "full up" and "full down" position. When the tilt lever is released, the tilt lever must return to the **lock** position and maintain the telescope and tilt position of the jacket and wheel tube at which the lever was released.

The tilt/telescoping column assembly is now complete except for a wheel nut (49) to be assembled at installation. The assembly should sit for 24 hours at room temperature before being put into normal use to allow the applied Loctite to set up. Follow the vehicle manufacturer's installation and alignment instructions.

#### Disclaimer

This Service Manual has been prepared by TRW Ross Gear Division for reference and use by mechanics who have been trained to repair and service steering components and systems on heavy commercial vehicles. TRW Ross Gear Division has exercised reasonable care and diligence to present accurate, clear and complete information and instructions regarding the techniques and tools required for maintaining, repairing and servicing a typical TRW Ross Gear Series TC34 Tilt Column Assembly. However, despite the care and effort taken in preparing this general Service Manual, TRW **makes no warranties** that (a) the Service Manual or any explanations, illustrations, information, techniques or tools described herein are either accurate, complete or correct as applied to a specific TC34 Tilt Column Assembly, or (b) any repairs or service of a particular TC34 unit will result in a properly functioning unit,

If inspection or testing reveals evidence of abnormal wear or damage to the TC34 Tilt Column Assembly or if you encounter circumstances not covered in the Manual, STOP - CONSULT THE VEHICLE MANUFACTURER'S SERVICE MANUAL AND WAR-RANTY. DO NOT TRY TO REPAIR OR SERVICE A TC34 TILT COLUMN ASSEMBLY 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.

It is the responsibility of the mechanic performing the maintenance, repairs or service on a particular TC34 Tilt Column Assembly to (a) inspect the unit 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 TC34 Tilt Column Assembly and the vehicle steering system to insure that the repair or service of the TC34 unit has been properly performed and that the unit and steering system will function properly.

**TRW Automotive** Commercial Steering Systems 800 Heath Street Lafayette, IN 47904 Tel 765.423.5377 Fax 765.429.1868 http://www.trw.com/commercialsteering

