

General Information

The tilt/telescoping steering column has a tilt range of 15 degrees and a telescoping range of 2-5/8 inches (67 mm). A control lever (Fig. 1) is located just below the turn signal switch. For operating instructions, refer to the vehicle driver's manual.

At the upper end of the steering column assembly are threads to accept a wheel nut and tapered external serrations to match the internal serrations of the steering wheel hub. At the lower end, the shaft is serrated to connect with the steering driveline upper end yoke.

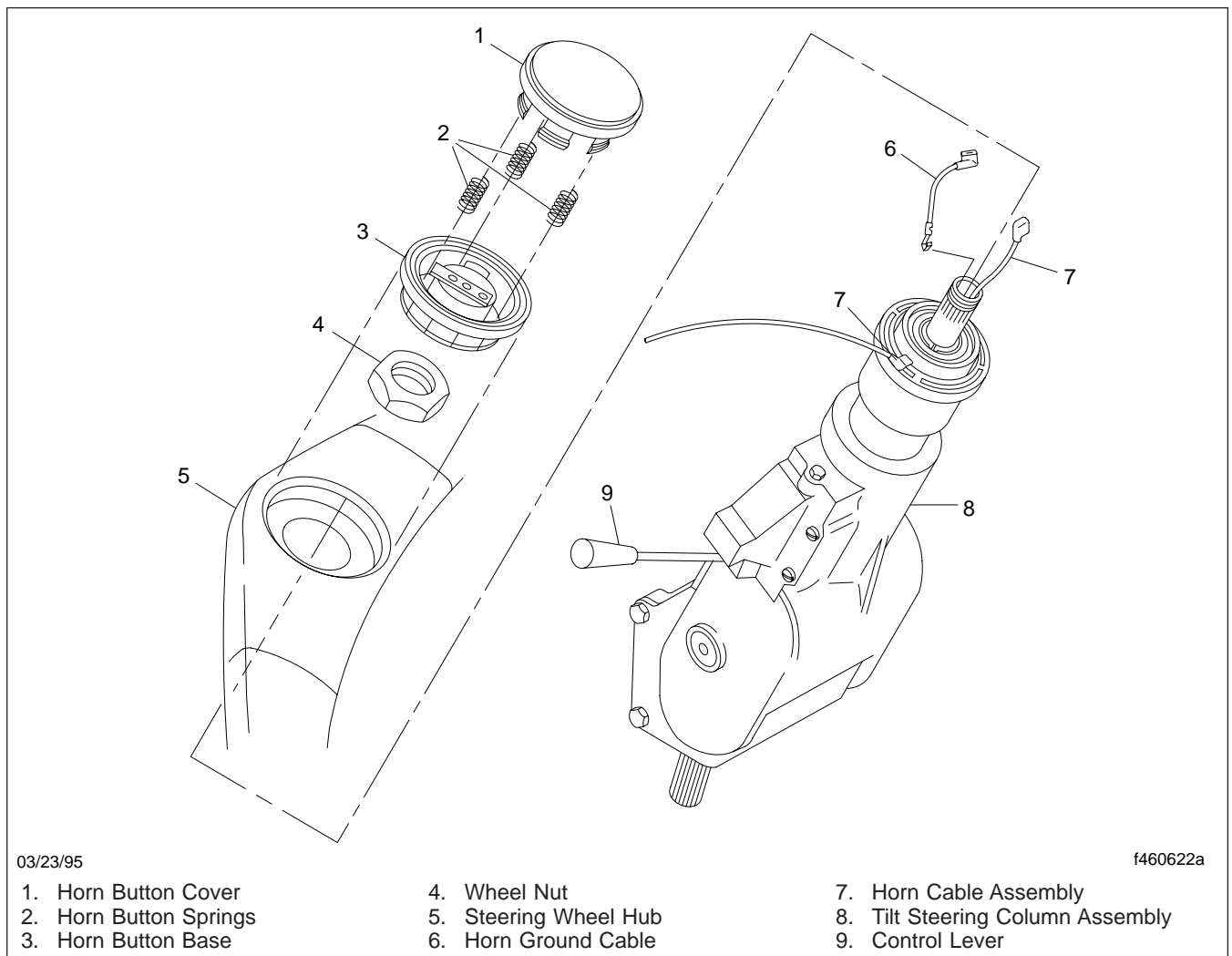


Fig. 1, Steering Wheel Installation

Steering Wheel Removal and Installation

Removal (See Fig. 1)

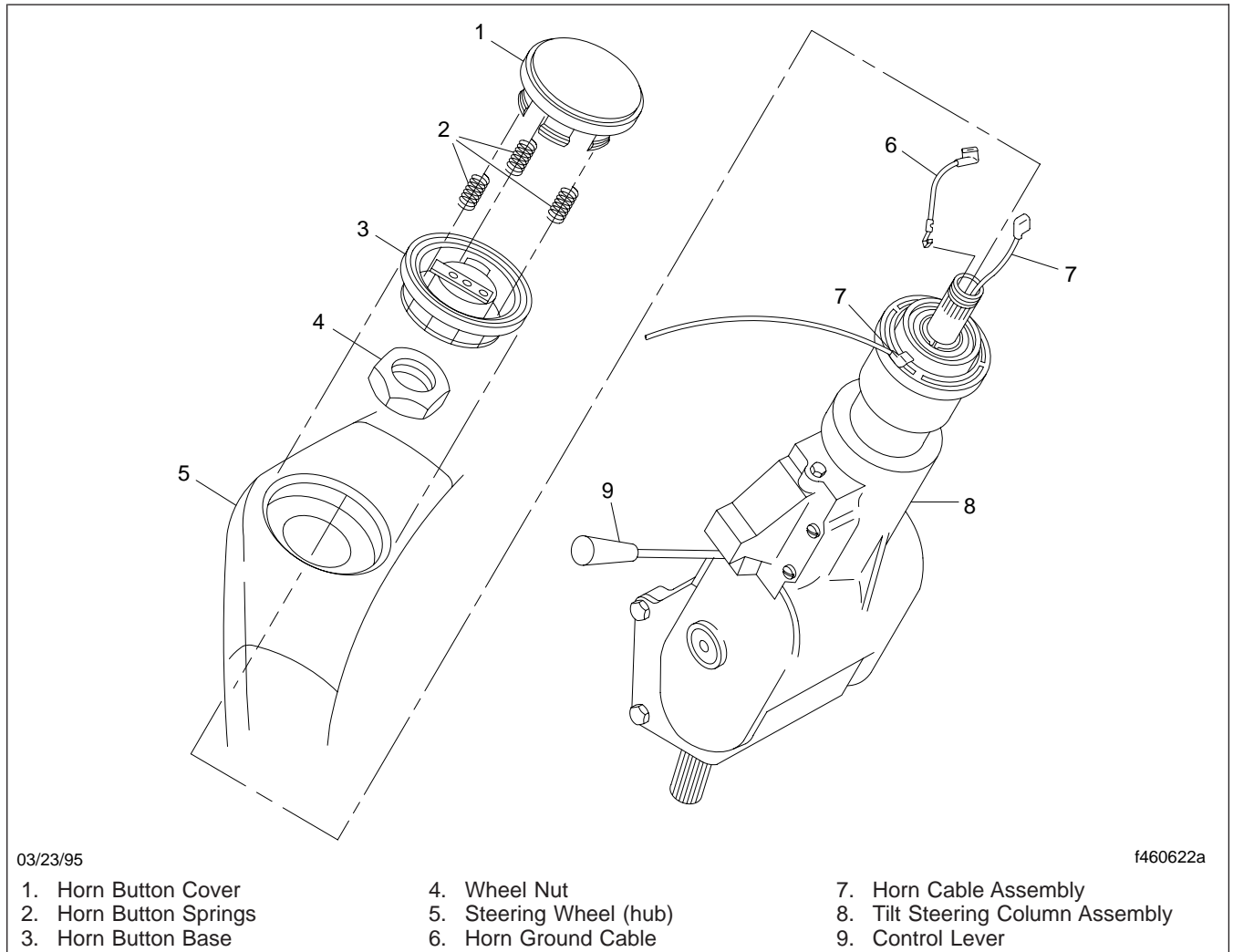


Fig. 1, Steering Wheel Installation

1. Position the front tires straight ahead. If possible, drive the vehicle in a straight line for a short distance, stopping at the spot where service operations will be performed. Do not turn the steering wheel at any time during this procedure.
Apply the parking brakes, and chock the tires.
2. Using a small screwdriver, pry under the outermost ring of the steering wheel horn button. Lift

the horn button from the steering wheel hub, then disconnect the wire terminals at the horn button.

3. Without turning the steering wheel, remove the wheel nut from the end of the wheel tube shaft. Using a steering wheel puller, remove the wheel from the shaft.

IMPORTANT: Be careful when you are removing the steering wheel, or you could damage the horn wires. A steel block measuring 1-5/8 x 5/8

Steering Wheel Removal and Installation

x 1/4 inch can be used with the puller to protect the wires during steering wheel removal.

Installation (See Fig. 1)

NOTE: Before installing the steering wheel, make sure the front tires are pointed straight ahead, and the steering gear is centered.

1. Place the steering wheel on the steering column so that the steering wheel spokes are positioned at 4 o'clock and 8 o'clock, or within 10 degrees of either side. See Fig. 2.

Insert the horn ground wires (from the center of the wheel tube shaft) through the center of the wheel nut. Install the wheel nut, and tighten it 60 lbf-ft (81 N·m).

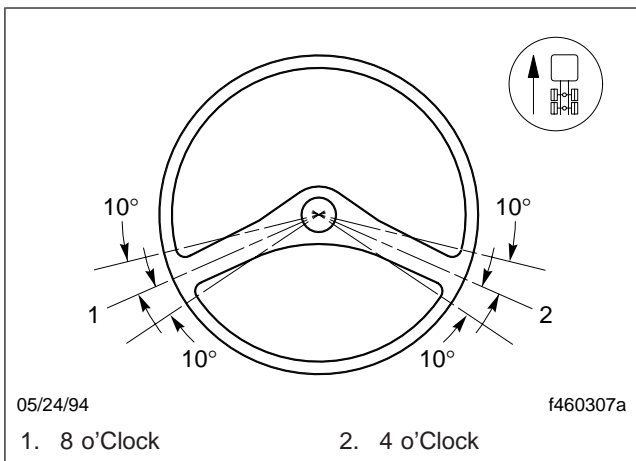


Fig. 2, Center the Steering Wheel

2. Connect the ground wire terminals to the horn button. Pack the horn wires with dielectric grease.
3. With the steering wheel in the straight-ahead position, push the horn button into place (with the logo aligned with the wheel spokes) in the steering wheel hub.

Tilt/Telescoping Column Removal and Installation

Removal

1. Park the vehicle on a level surface. Make sure the front tires are pointing forward. Shut down the engine, apply the parking brakes, and chock the tires.

IMPORTANT: Once the vehicle is parked, do not turn the steering wheel at any time during the following procedures.

2. Disconnect the batteries.
 3. Remove the under-dash panels from each side of the steering column. See [Fig. 1](#).
 4. Remove the lower steering column cover panel.
 5. Remove and discard the pinch bolt and nut from the upper end yoke.
 6. Loosen the clamp which holds the trailer brake control valve mounting bracket to the steering column. Remove the control valve from the steering column by sliding the bracket out of the clamp.
 7. Loosen the clamp bolt on the turn signal switch mounting bracket. Remove the turn signal switch mounting assembly from the steering column. Disconnect the wiring connector from the turn signal switch.
 8. Disconnect the horn wire from the steering column.
 9. Remove the upper end yoke from the steering column shaft.
 10. Remove the two rear capscrews that attach the steering column and spacer block to the mounting bracket.
 11. Loosen the two forward capscrews.
 12. Remove the steering column assembly from the vehicle.
2. Wipe the end of the column shaft with a clean, dry cloth.
 3. Slide the upper end yoke on the column shaft. Install a new pinch bolt. Before installing the nut, make sure the pinch bolt is centered in the steering column shaft notch. The pinch bolt is centered if it can slip in and out of the end yoke with ease. Install and tighten a new nut. Tighten the nut to one of the following torque specs:
 - 55 to 65 lbf-ft (75 to 88 N-m) for a 7/16 pinch bolt and nut
 - 30 to 35 lbf-ft (41 to 47 N-m) for an M10 pinch bolt and nut
 4. Apply torque seal, OGP F900WHITE, to the exposed bolt threads and to the nut.
 5. Connect the horn wire. Secure the wire to the steering column with electrical tape.
 6. Place the turn signal switch mounting assembly on the steering column. Align the switch so that it is pointed directly to the left, toward the driver's door. Firmly tighten the clamp bolt. Connect the turn signal harness connector.

NOTE: Make sure there is slack in the turn signal harness. This will allow the turn signal switch assembly to move with the tilt/telescoping column assembly.

7. Slide the trailer brake control valve mounting bracket through the clamp on the steering column. Firmly tighten the clamp.
8. Install the under-dash panels on each side of the steering column. Tighten the fasteners securely.
9. Install the lower steering column cover. Tighten the fasteners securely.
10. Check the position of the steering wheel when the front tires are pointing forward. The steering wheel spokes must be within ± 10 degrees of the 4 o'clock and 8 o'clock positions. See [Fig. 2](#).

If necessary, remove the steering wheel and reposition it. See [Subject 100](#) for instructions.

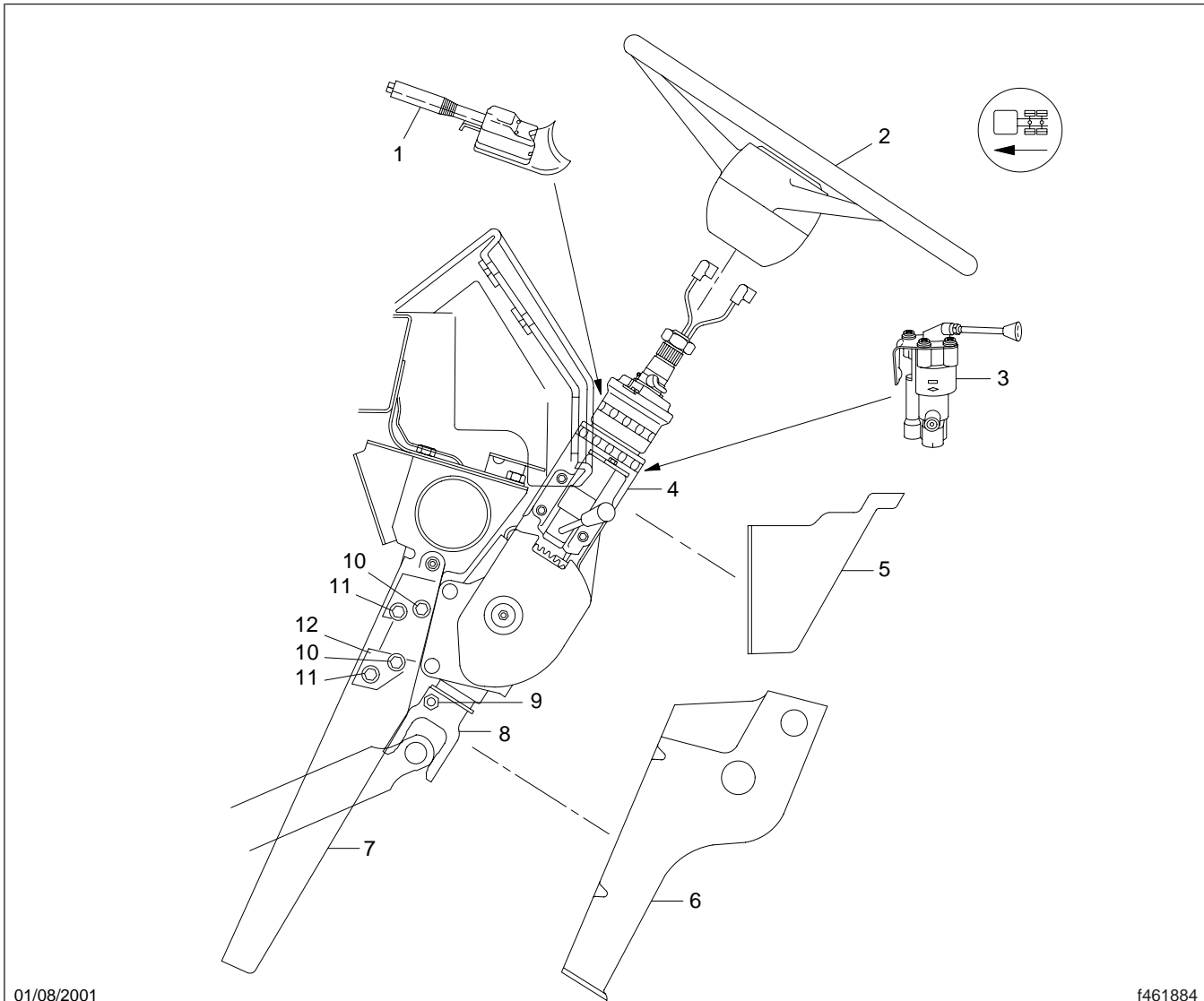
11. Connect the batteries.
12. Remove the chocks from the tires.

Installation

1. Position the steering column and spacer block on the steering column mounting bracket. Tighten the capscrews 15 lbf-ft (20 N-m).

NOTE: To ease installation, hold the column control lever down and tilt the steering column.

Tilt/Telescoping Column Removal and Installation



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NOTE: FLD Conventional steering shaft shown.

- | | |
|--|-------------------------------------|
| 1. Turn Signal Switch and Mounting Bracket | 7. Steering Column Mounting Bracket |
| 2. Steering Wheel | 8. Upper End Yoke |
| 3. Trailer Brake Control Valve | 9. Pinch Bolt and Nut |
| 4. Tilt Steering Column Assembly | 10. Rear 5/16-18 Capscrew |
| 5. Under-Dash Panel | 11. Forward 5/16-18 Capscrew |
| 6. Lower Steering Column Cover | 12. Spacer Block |

Fig. 1, Tilt Steering Column Installation

13. Test drive the vehicle and make sure the steering column assembly operates smoothly. If it does not operate smoothly, repeat the service operations.

Tilt/Telescoping Column Removal and Installation |

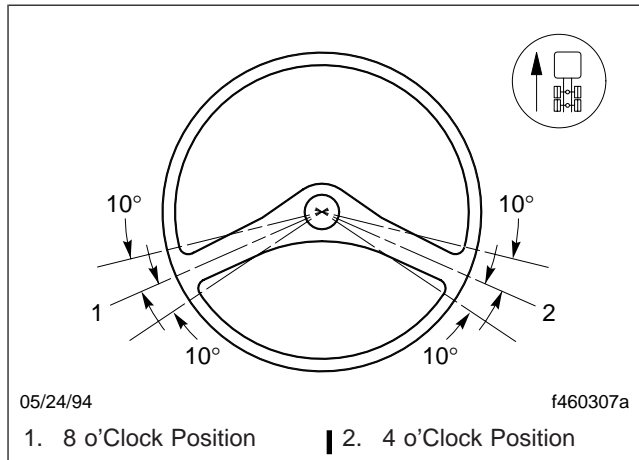


Fig. 2, Steering Wheel Centered |

Column Disassembly and Assembly

Disassembly (See Fig. 1)

 **WARNING**

WARNING: All steering mechanisms are critical safety items. Because of this, follow the instructions in this subject to the letter. Failure to do so may result in loss of steering, which could cause an accident resulting in personal injury or property damage.

Wear eye protection during disassembly of the tilt steering wheel column assembly. Parts of the assembly are spring-loaded, and could be ejected, which could result in serious eye injury.

NOTE: If replacing only the following parts, it is not necessary to remove the steering wheel and column assembly from the vehicle: control lever, spring cover plate, actuator housing, cam actuator, pivot pin, lockpin, antirattle spring, disengagement plate, spring and wedgelock, and the spring and lockbar.

1. To minimize spring tension within the column assembly, hold the control lever all the way down, then move the steering wheel to the upright (non-tilt) position; release the control lever.
Pull up the control lever and move the steering wheel up until it stops; release the control lever.
2. Remove the steering wheel from the column assembly. Refer to **Subject 100** for instructions.
3. Remove the steering column assembly from the vehicle. Refer to **Subject 110** for instructions.
4. Unscrew the control lever (Ref. 36).
5. Remove the 10–24 x 5/8-inch tapping screw (Ref. 32) from the spring cover plate (Ref. 33). Remove the plate.
6. Remove the four tapping screws (Refs. 32 and 34) from the actuator housing and bushing assembly (Ref. 35). Remove the actuator housing.

NOTE: On some tilt/telescoping column assemblies, two of the self-tapping screws (Ref. 32) are 5/8-inch long, and the other two screws (Ref. 34) are 7/8-inch long.

7. Remove the spring (Ref. 31), cam actuator (Ref. 38), pivot pin (Ref. 39), lockpin (Ref. 30), and anti-rattle spring (Ref. 37).
8. Remove the disengagement plate (Ref. 29), spring and wedgelock (Refs. 28 and 40), and spring and lockbar (Refs. 27 and 41).
Remove all grease from the wedgelock/ lockbar cavity.
9. Detach the springs (Refs. 43 and 45) from the main housing assembly (Ref. 26). Remove the upper spring cover (Ref. 42).
10. Remove the four bolts (Ref. 8) from the support bracket (Ref. 25) and lower bearing housing (Ref. 21).
11. Remove the spring (Ref. 8) from the jacket tube (Ref. 16).
12. Remove the lower spring cover (Ref. 44), springs (Refs. 43 and 45), and spring retaining rod (Ref. 22) from the lower bearing housing.
13. Remove the retaining ring (Ref. 19) from the lower end of the universal joint assembly (Ref. 23). Remove the universal joint assembly from the lower bearing housing.
14. Using a suitable bearing puller, remove the bearings (Ref. 20) from the lower bearing housing.
Using a 3/16-inch allen wrench, remove the pipe plug (Ref. 24) from the end of the universal joint assembly.
15. Remove the stopscrew (Ref. 2) and lockwasher (Ref. 1) from the main housing assembly (Ref. 26).
16. Push the wheel tube and jacket tube (Refs. 15 and 16) out through the lower end of the main housing assembly.
17. Remove the two retaining rings (Refs. 9 and 10) from the top end of the wheel tube and sleeve assembly and the jacket tube.

 **CAUTION**

CAUTION: Keep the jacket tube clean and free of lubricant. Also, don't dent or scratch the jacket tube. Dents or scratches could restrict the telescoping action of the tilt steering column assembly.

Column Disassembly and Assembly

18. Insert an 8 x 3/4-inch (20 x 2 cm) rod into the splined sleeve end of the wheel tube. Using a press, press out the wheel tube and sleeve assembly. Remove the retaining ring (Ref. 14).
19. Using a suitable bearing removal tool, press the bearings (Ref. 11) off of the wheel tube and sleeve assembly. Remove the retaining ring (Ref. 13).
20. Remove the self-tapping screws (Ref. 4), stop cover (Ref. 3), and the stop pins (Ref. 5) from the main housing assembly.
21. Remove the setscrews (Ref. 7) from the support bracket. Remove the two pivot screws (Ref. 6), then separate the support bracket (Ref. 25) from the main housing.

NOTE: For ease of removal, it may be necessary to heat the setscrews and pivot screws. Don't exceed 500°F (260°C) as the material hardness of these fasteners will be affected.

WARNING

WARNING: Commercial cleaning solvents are toxic, can cause severe skin irritation, and may be fire hazards. When using solvents, follow the safety precautions recommended by the solvent manufacturer.

22. Using a petroleum-based solvent, clean the pivot screws, setscrews, and the internal threads of the support bracket.

Assembly (See Fig. 1)

WARNING

WARNING: Wear eye protection during assembly of the tilt steering wheel column assembly. Parts of the assembly are spring-loaded, and could be ejected, which could result in serious eye injury.

1. Position the support bracket (Ref. 25) in the main housing (Ref. 26). Make sure that the bracket teeth are on the same side of the housing as the cam actuator (Ref. 38).
2. Install but don't tighten the pivot screws (Ref. 6). Insert a 1/2 x 3 inch (13 x 76 mm) bolt and nut

through the center of the support bracket, between the bracket flanges.

Back off the nut to spread the flange bosses against the main housing and provide clearance for installation of the lower bearing housing (Ref. 21).

Remove the pivot screws (Ref. 6).

3. Apply a light coating of lithium grease under the head of each pivot screw (Ref. 6) then, apply Loctite RC680 to the threads of the pivot screws.

NOTE: Use care and avoid getting any grease on the pivot screw threads, or Loctite RC680 under the pivot screw head.

4. First tighten the pivot screw on the cam-actuator side of the housing 40 to 45 lbf-in (460 to 500 N-cm). Install and tighten the other pivot screw 40 to 45 lbf-in (460 to 500 N-cm).
5. Apply Loctite RC680 to the threads of the setscrews (Ref. 7). Install the setscrews and tighten them 50 to 60 lbf-in (560 to 680 N-cm).

NOTE: Use care and avoid getting any Loctite RC680 under the setscrew head.

6. Remove the 1/2 x 3-inch bolt and nut from the support bracket.
7. Install two new retaining rings (Refs. 13 and 14) on the top end of the wheel tube and sleeve assembly (Ref. 15).
8. Apply Loctite RC680 around the wheel tube in the bearing support area. Install a new bearing (Ref. 11) against the upper retaining ring.
9. Install the bearing spacer (Ref. 12). Install a new bearing (Ref. 11) until it clears the upper retaining ring groove. Install a new retaining ring (Ref. 10).
10. Insert the wheel tube and sleeve assembly (Ref. 15) into the jacket tube (Ref. 16). Align the split in the bearing spacer (Ref. 12) with the screw hole in the top end of the jacket tube.
11. Using a tubular bearing installation tool, apply pressure against the outer race of the upper bearing and press the wheel tube and sleeve assembly into the jacket tube.

Install retaining rings (Refs. 9 and 17) in the grooves of the jacket tube.

Column Disassembly and Assembly

12. Place the jacket tube assembly spring-end down on a pedestal that is about 4 inches (10 cm) high and 2-1/4 inches (6 cm) in diameter. Make sure that the cutouts on the lower collet in the main housing assembly are aligned with the holes for the lockpin (Ref. 30) and stopscrew (Ref. 2).
 13. Slide the main housing assembly down over the jacket tube assembly. As the upper end of the jacket tube approaches the upper tapered collet of the main housing, push the collet down with a screwdriver (or other suitable tool) to pilot the wheel tube assembly into the housing bore.
 14. Align the jacket tube's guide slot with the stopscrew (Ref. 2) hole in the main housing assembly (Ref. 26). Install the lockwasher and stopscrew (Refs. 1 and 2). Tighten the stopscrew 10 to 15 lbf-ft (14 to 20 N·m).
 15. Press a new bearing (Ref. 20) into each end of the lower bearing housing (Ref. 21).
 16. Slide the shaft of the universal joint assembly (Ref. 23) into the lower bearing housing until it seats against the lower bearing.
Install the retaining ring (Ref. 19) on the universal joint shaft.
 17. Install the pipe plug (Ref. 24) in the slotted end of the universal joint shaft. Tighten the pipe plug finger-tight.
- NOTE:** Don't overtighten the pipe plug. Overtightening the pipe plug will make it difficult to install the universal joint shaft in the wheel tube and sleeve assembly (Ref. 15).
18. Install the spring retaining rod (Ref. 22) in the lower bearing housing.
 19. Hook one end of the green spring (Ref. 43) on the right side of the spring retaining rod (Ref. 22). Hook one end of the other spring (Ref. 45) on the left side of the spring retaining rod.
 20. Clamp the serrated end of the wheel tube and sleeve assembly (Ref. 15) in a soft-jawed vise.
 21. Push all the way down on the jacket tube (Ref. 16), then install the spring (Ref. 18).
 22. Install the universal joint assembly (Ref. 23) through the spring (Ref. 18) and into the wheel tube and sleeve assembly (Ref. 15). Make sure that a slot in the splined shaft of the universal joint assembly aligns with the wide groove in the splined sleeve of the wheel tube and sleeve assembly.
23. Holding down on the universal joint assembly, align the lower bearing housing (Ref. 21) and support bracket (Ref. 25) screw holes. Install the bolts (Ref. 8). Tighten them 25 to 35 lbf-ft (34 to 47 N·m).
 24. Position the lockbar (Ref. 41) on the main housing. Make sure that the lockbar locating pin is out, and that the teeth mesh with the support bracket teeth.
 25. With the tapered end pointing towards the support bracket teeth, place the wedgelock (Ref. 40) on the main housing, under the lockbar.
 26. Position the disengagement plate (Ref. 29) over the lockbar and wedgelock locating pins.
 27. Insert the lockpin (Ref. 30) into the cam actuator (Ref. 38). Make sure that the spring hole in the cam and lockpin are facing each other.
Insert the pivot pin (Ref. 39) through the cam actuator and lockpin. Check that the pivot pin is flush at the bottom of the cam actuator.
 28. Attach one end of the anti-rattle spring (Ref. 37) to the lockpin, and the other end to the cam actuator.
Lightly oil the lockpin assembly. Insert the lockpin into the bushing on the main housing assembly. Make sure that the ears on the cam actuator (Ref. 38) fit under the raised tabs on the disengagement plate (Ref. 29).
 29. Insert the actuator housing spring (Ref. 31) into the end of the lockpin (Ref. 30). Using four self-tapping screws (Refs. 32 and 34), attach the actuator housing (Ref. 35) to the main housing. Tighten the screws 40 to 60 lbf-in (460 to 680 N·cm).
- NOTE:** On some tilt/telescoping column assemblies, two of the self-tapping screws (Ref. 32) are 5/8-inch long, and the other two screws (Ref. 34) are 7/8-inch long.
30. Attach the lockbar and wedgelock springs (Refs. 27 and 28). Install the spring cover plate (Ref. 33) over the lockbar and wedgelock springs. Tighten the self-tapping screw (Ref. 32) 40 to 60 lbf ·in (460 to 680 N ·cm).

Column Disassembly and Assembly

31. Screw the control lever (Ref. 36) into the cam actuator (Ref. 38).
32. Push down on the control lever and tilt the steering column all the way down. Release the control lever.
33. Snap the lower spring cover (Ref. 44) onto the retaining rod, between the springs.
34. Slide the upper spring cover (Ref. 42) over the springs, engaging the slot on the lower spring cover.
35. Push down on the control lever, then tilt the steering column all the way up. Release the control lever. Using a suitable spring assembly tool, hook the loose ends of the springs (Refs. 43 and 45) in the holes of the main housing assembly (Ref. 26).
36. Insert and lightly tap the stop pins (Ref. 5) to seat them into the holes lettered "D" and "K."
37. Install the stop cover (Ref. 3) with the self-tapping screws (Ref. 4). Tighten the screws 40 to 60 lbf-in (460 to 680 N-cm).
38. Push the jacket tube (Ref. 16) and wheel tube assembly (Ref. 15) all the way down. Using a 3/16-inch allen wrench that is 12-inches (30-cm) long, tighten the pipe plug (Ref. 24) just enough to keep the jacket tube and wheel tube assembly in position when the lockpin (Ref. 30) is disengaged.

Loosen the pipe plug about a one-eighth turn to allow the wheel tube assembly to telescope freely under spring tension.

39. Check the operation of the tilt/telescoping column assembly as follows:
 - 39.1 Unlock the column assembly by pushing and holding the control lever all the way down. Tilt the column to any position, then release the control lever to lock it in place. Tilt the column to several other positions to ensure proper operation.
 - 39.2 Unlock the column assembly by pulling and holding the control lever all the way up. Move the column up or down to any position, then release the control lever to lock it in place. Telescope the column to several other positions to ensure proper operation.

If the column telescoping action is sluggish or sticks, spray a small amount of Tri-Flow lubricant, or an equivalent, on the jacket tube (Ref. 16) while the column is all the way up.

NOTE: The tilt/telescoping column assembly must sit at room temperature for 24 hours to allow the Loctite RC680 to dry.

40. Install the tilt/telescoping column assembly. Refer to **Subject 110** for instructions.
41. Install the steering wheel. Refer to **Subject 100** for instructions.

Column Disassembly and Assembly

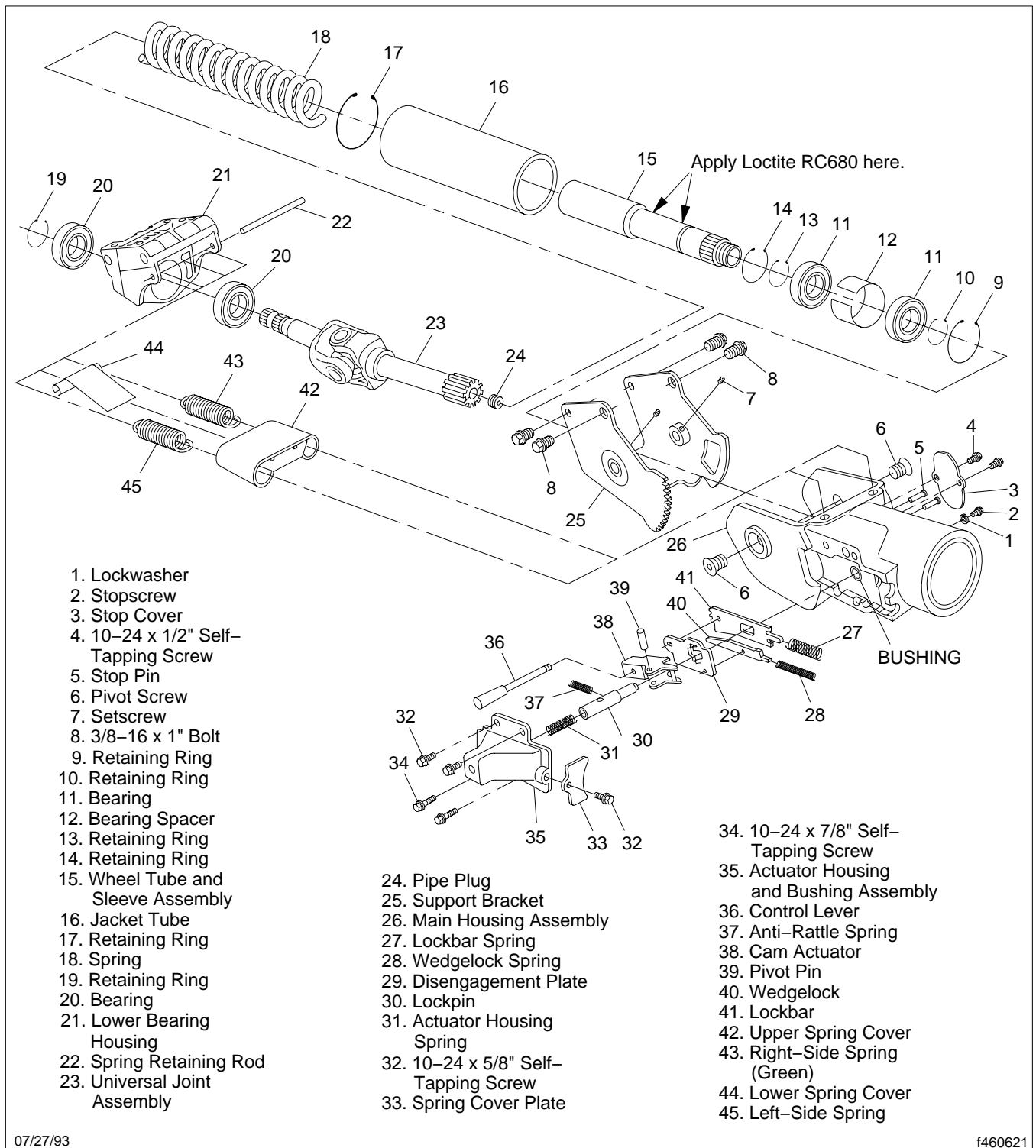


Fig. 1

Torque Values			
Description	Size	Torque	
		lbf·in (N·cm)	lbf·ft (N·m)
Self-Tapping Screws	10–24	40–60 (460–680)	—
Bolts	3/8 x 16 x 1 Inch	—	25–35 (34–47)
Main Housing Stopscrew	—	—	10–15 (14–20)
Support Bracket Setscrews	—	50–60 (560–680)	—
Main Housing Pivot Screws	—	40–45 (460–500)	—
Steering Column Mounting Bracket Capscrews	5/16–18	—	28 (38)
Steering Driveline Upper End Yoke Pinch Bolt Nut	3/8–16	—	35–40 (47–54)
	3/8–24	—	40–48 (54–65)
	M10 x 1.25	—	30–35 (41–47)
Steering Wheel Nut	—	—	60 (81)

Table 1, Torque Values