

**TRW Automotive**

Steering &amp; Suspension Systems

**Service Bulletin #COL-144****Double Contact Installation****Kit #SK000246**

Released January, 1999

This is an on-vehicle procedure. Read and understand the entire procedure before beginning.

**Tools Required & Materials Required**

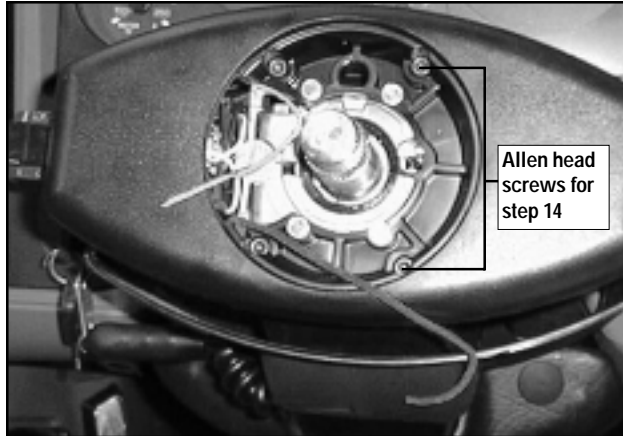
T-15 Torx (or Phillips) Screwdriver  
Steering Wheel Puller  
1 1/4" Socket  
Lbf•ft Torque wrench  
Lbf•in Torque wrench  
1/4" Nut driver  
Wire cutter, stripper & crimper (for insulated terminals)  
Voltmeter  
Clean shop rags

1. Telescope the column to the full up, or fully extended position.
2. Tilt the column toward the driver to the full tilt down position.
3. Start the engine and rotate the steering wheel so that the spoke is vertical in either direction. This will allow access to the screws to remove the keypad.
4. Shut off the engine.
5. Remove the keypad from the steering wheel. Note the wire color connections, then disconnect them from the wheel hub.
6. Remove the steering wheel nut using the 1 1/4" socket. Mark the steering wheel position for reinstallation.
7. Remove the steering wheel using a puller.
8. Push the slip ring off the steering wheel by pressing on the front side connectors then prying the ring off from the back. Discard the slip ring.
9. Push a new slip ring onto the steering wheel hub. Press the back of the slip ring against the wheel hub flange.
10. Squeeze and push the column lower shroud down to gain access to the existing brush wires.
11. Pull the brown wire's brush out of its retaining socket about two inches. Cut the brown wire where it enters the contact. Remove the contact brush and discard.

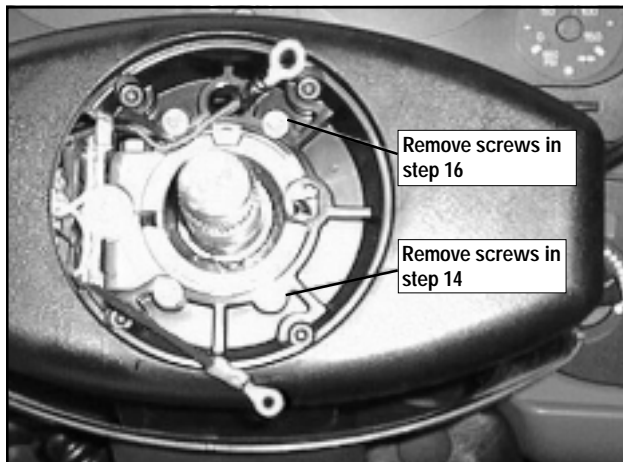
*This TRW Commercial Steering Division service bulletin has been written to help you repair commercial vehicles more efficiently. This bulletin should not replace your manuals; you should use them together. These materials are intended for use by properly trained, professional mechanics, NOT "Do-it-yourselfers". 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.*



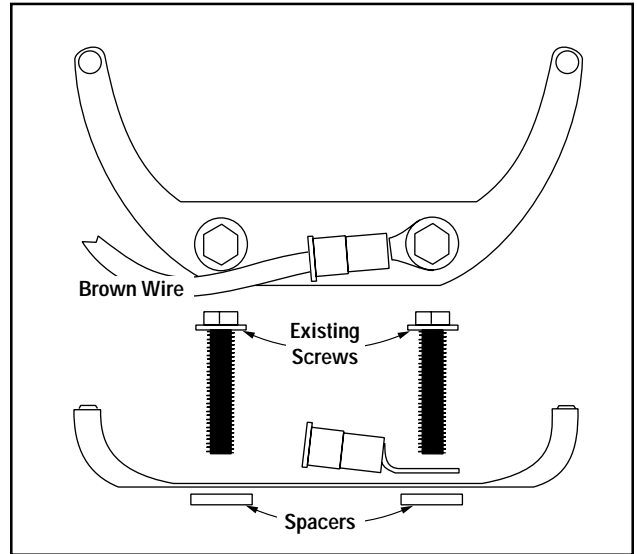
12. Push the yellow wire up from the underside of the aluminum housing to unseat the contact brush; this will keep the wire's insulation intact. Cut the yellow wire where it enters the contact. Remove the contact brush and discard.
13. Pull both the yellow and brown wires down, out of the steering column pivoting head. Reroute the wires up the left side of the steering column. The yellow wire goes above the turn signal bracket; the brown wire goes below the turn signal bracket.



14. Pull both wires tight to the farthest right Allen head screws and cut them at that point. Strip both wire ends. Crimp the large ring terminal on the yellow wire, and a small ring terminal on the brown wire. Always pull on the terminal to make sure you have a good crimp.
15. Remove the lower set of hex head screws which hold the shroud top to the steering column.

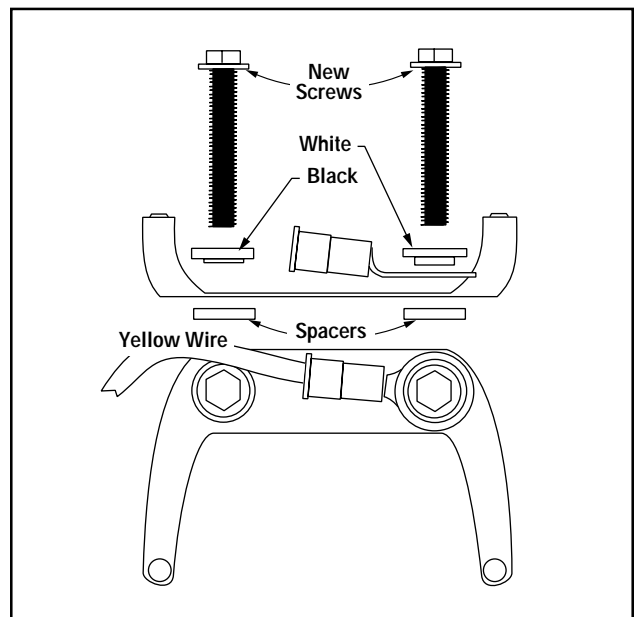


16. Install the outer (larger) ring double contact using existing screws, the brown wire, and two flat white washers. Start the screws by hand (make sure they run in the same threads they came out of). The holes are made to fit tightly, do not modify, **torque to 25-30 lbf•in.**



17. Remove and discard the top set of hex head screws retaining the black plastic shroud top to the steering column head.
18. Install the new inner ring double contact and yellow wire, using (longer) screws provided in the kit. Make sure the shoulder washers fit properly in the contact mounting holes. The tube of the white shoulder washer should be recessed through the large ring terminal, and the contact recessed through the contact hole only. Start the screws by hand. Go slow while torquing to center the collared washers, **torque to 25-30 lbf•in.** Confirm that the contact is tight.

<b>NOTE</b>	It is normal for the horn to honk intermittently during this step.
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19. Tilt the column into a straight, or zero tilt position. Pull the column shroud up and snap it into place.

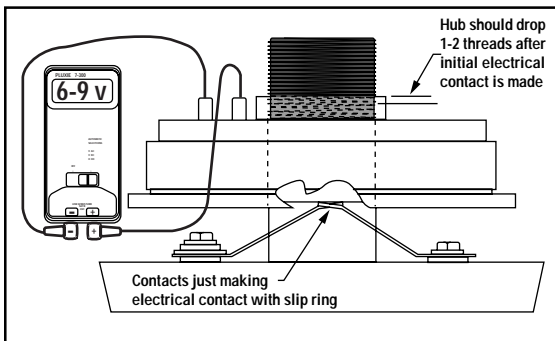
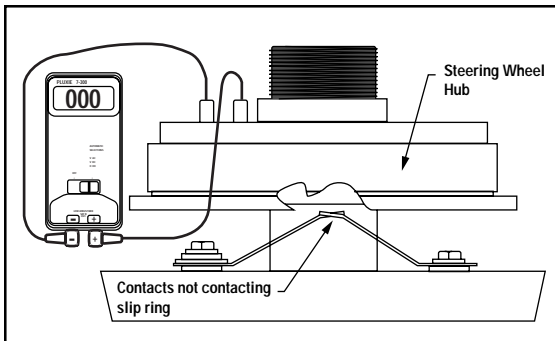
20. Place the steering wheel on the column shaft.

**NOTE**

If you don't have a voltmeter, reconnect the keypad with wires as noted earlier. Hold the horn button down on the keypad. A honking horn will indicate voltage. Using the horn as an indicator follow the instructions below.

21. Adjust the voltage as follows:

- A. Attach a voltmeter to the slip ring contacts on the steering wheel. The meter will read 4-10 volts DC when the wheel is pushed down into place on the column shaft.
- B. Lift the steering wheel slowly until voltage is not indicated. Lower the wheel slowly until voltage is **just** indicated.



- C. From the point of indicated voltage the wheel should drop only another one-half to one thread on the steering shaft. The one-thread test is an indication of the contact pre-load. If it tests OK, remove the voltmeter.
- D. If the wheel drops more than one thread, all the contacts must be adjusted by bending them downward at the base of the leaf.
- E. If no voltage is indicated, pull the wheel off and check the contacts for voltage. If voltage is not present, troubleshoot the system.
- F. If voltage is present, adjust the contacts up by bending them upward at the base of the leaf. Make sure all contact ends are even.

22. Remove the steering wheel from the column.

23. Reconnect the keypad with the brown wire on the outer ring contact on the steering wheel, and the yellow wire on the inner ring contact.

After pushing the electrical contacts onto the terminals, check that the slip ring is still seated properly on the steering wheel hub. Leave the keypad loose, do not completely install it.

- 24. Apply a thin (.020") layer of grease uniformly around both contact rings on the wheel. You do not need to use the whole supply of grease.
- 25. Push the steering wheel onto the steering column shaft in the position noted in step 6.
- 26. Torque the steering wheel nut to 45 lbf•ft.
- 27. Complete the installation of the keypad and check that the lights flash, horn works, etc.
- 28. Start the engine. While holding the horn button down, turn the steering wheel to full turn in both directions. There should be no interruption in horn function.

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