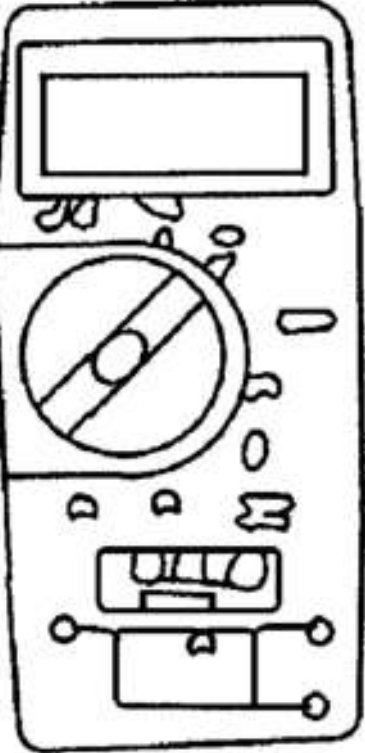


# IN-VEHICLE REPAIR

## MAIN CONTROL VALVE BODY

Special Tool(s)

### SPECIAL TOOL

 <p><b>ST1137-A</b></p>	<p>Worldwide Diagnostic System (WDS) Vehicle Communication Module (VCM) with appropriate adapters, or equivalent diagnostic tool</p>
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### Material

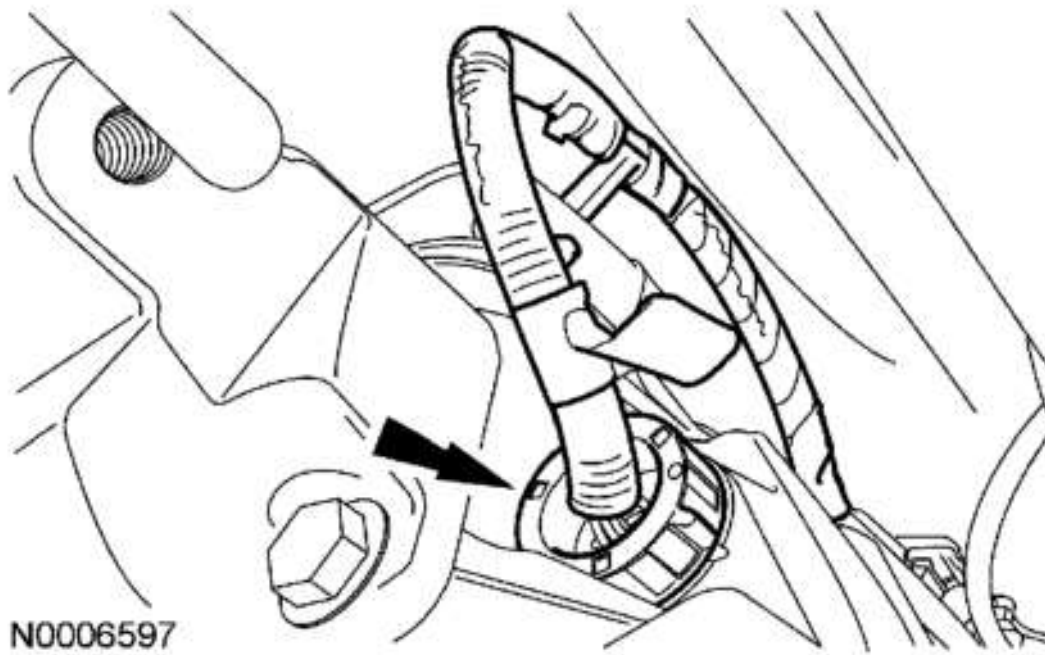
#### MATERIAL SPECIFICATION

Item	Specification
MERCON® SP Automatic Transmission Fluid XT-6-QSP	MERCON® SP

### Removal

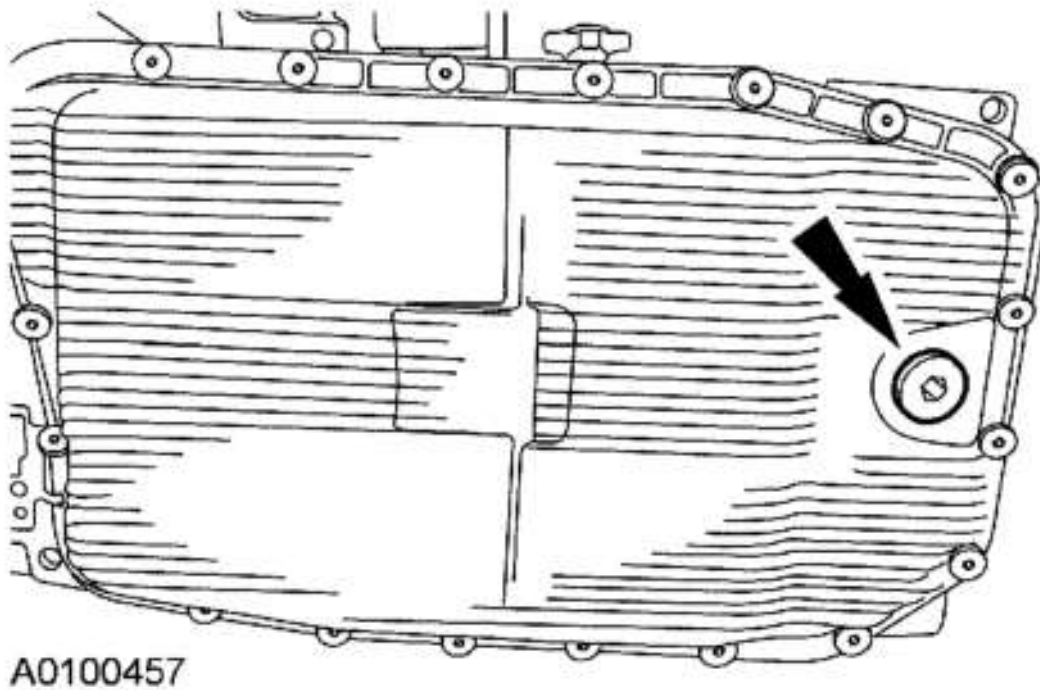
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING** .

**CAUTION: Do not pull on the wire harness to disconnect the connector or damage to the connector will occur.**



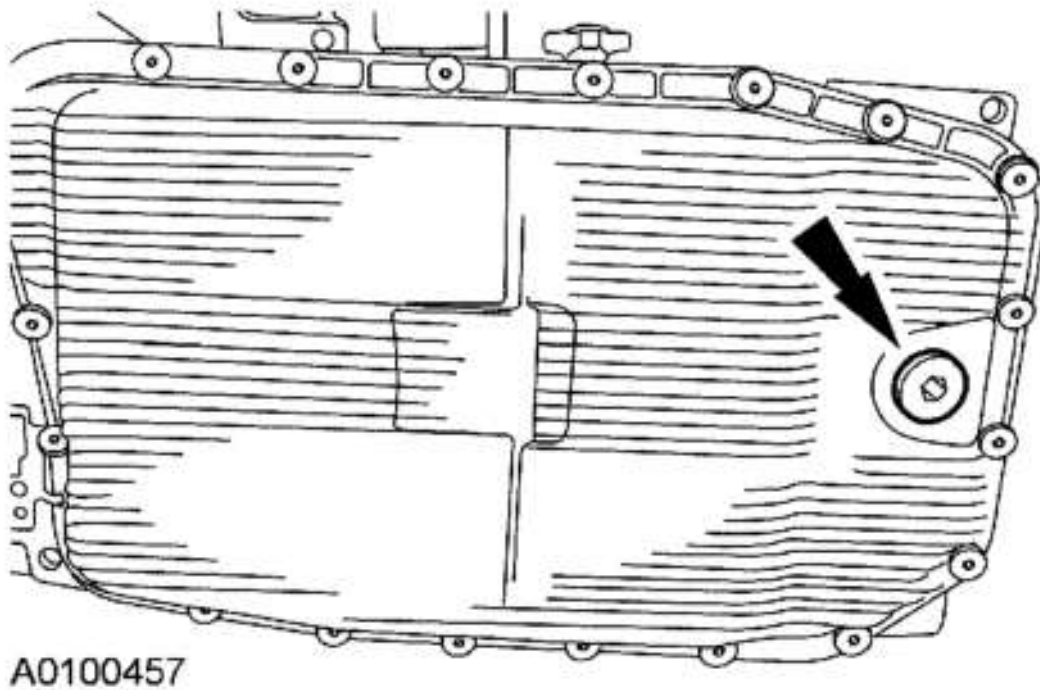
**Fig. 14: Identifying Outer Shell**  
Courtesy of FORD MOTOR CO.

2. Disconnect the main transmission electrical harness by twisting the outer shell and pulling back on the connector.
3. Remove and discard the transmission fluid pan drain plug and allow the fluid to drain.



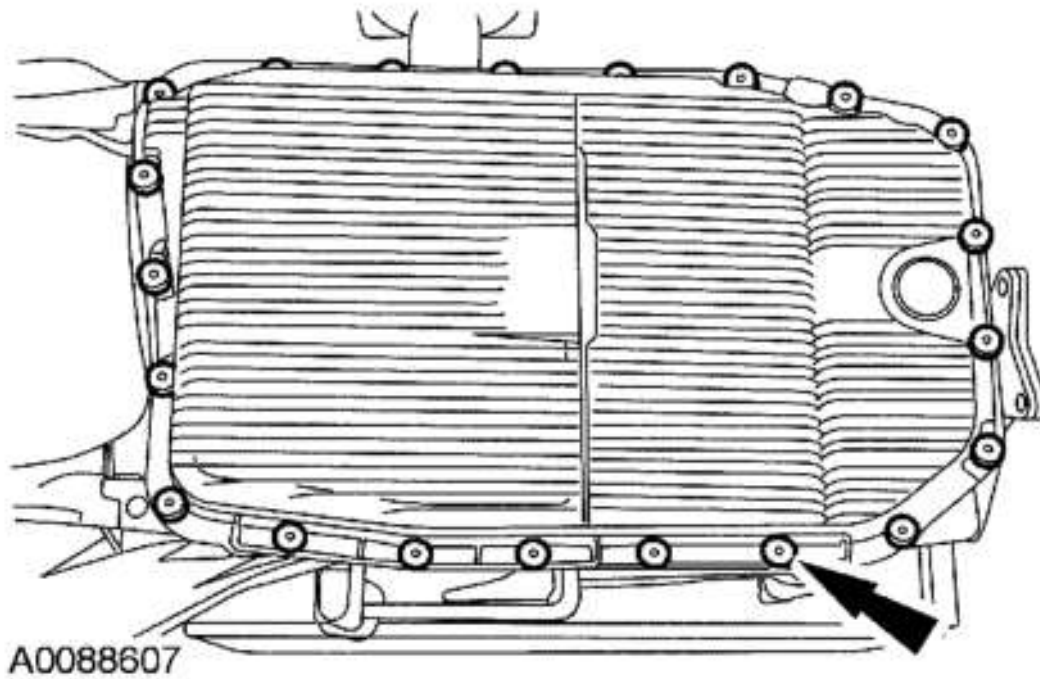
**Fig. 15: Locating Fluid Pan Drain Plug**  
Courtesy of FORD MOTOR CO.

4. Install a new fluid pan drain plug.
  - Tighten to 8 Nm (71 lb-in).



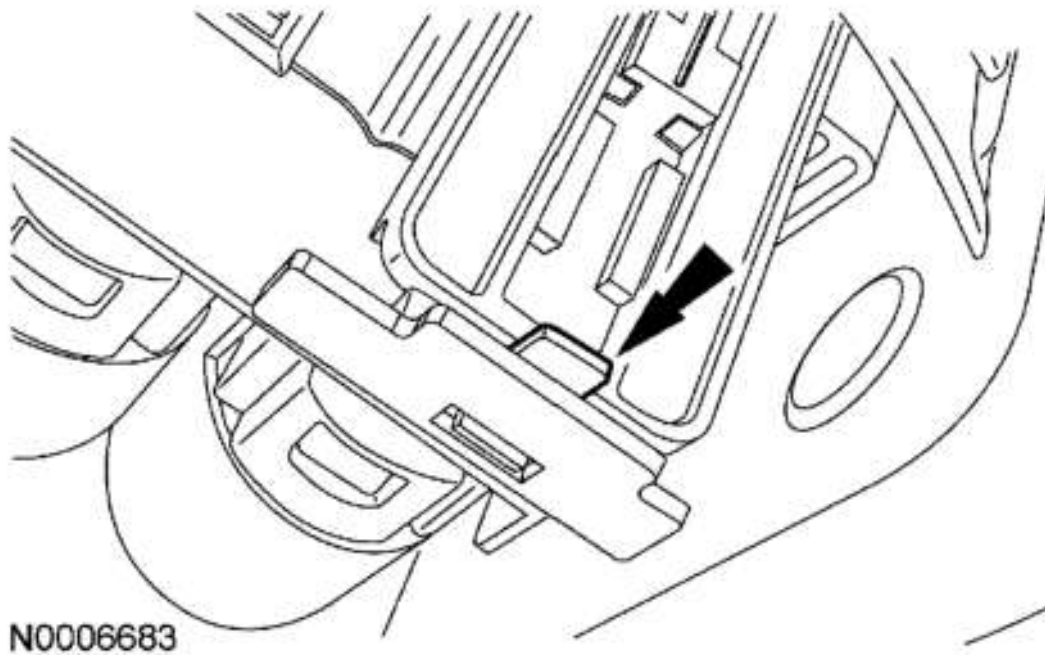
**Fig. 16: Locating Fluid Pan Drain Plug**  
Courtesy of FORD MOTOR CO.

**NOTE:** The transmission fluid pan, gasket, filter and magnets are serviced as a complete unit.



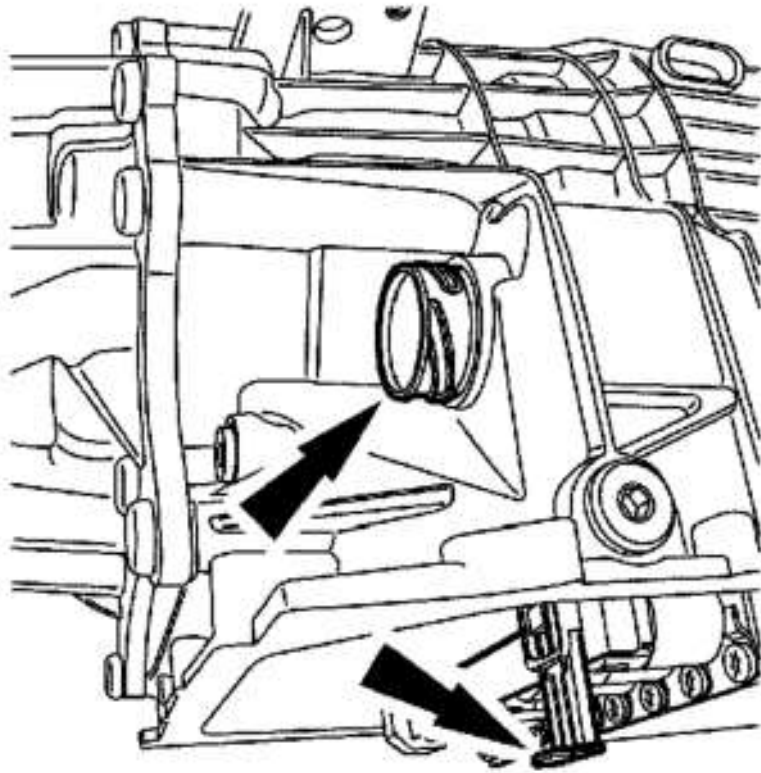
**Fig. 17: Removing Transmission Fluid Pan**  
Courtesy of FORD MOTOR CO.

5. Remove the transmission fluid pan assembly.
6. Press the release tab and pull down on the bulkhead connector retainer.



**Fig. 18: Pressing Release Tab**  
**Courtesy of FORD MOTOR CO.**

7. With the release tab down, pull the outer shell of the bulkhead electrical connector.



N0006684

**Fig. 19: Identifying Outer Shell Of Bulkhead Electrical Connector**  
Courtesy of FORD MOTOR CO.

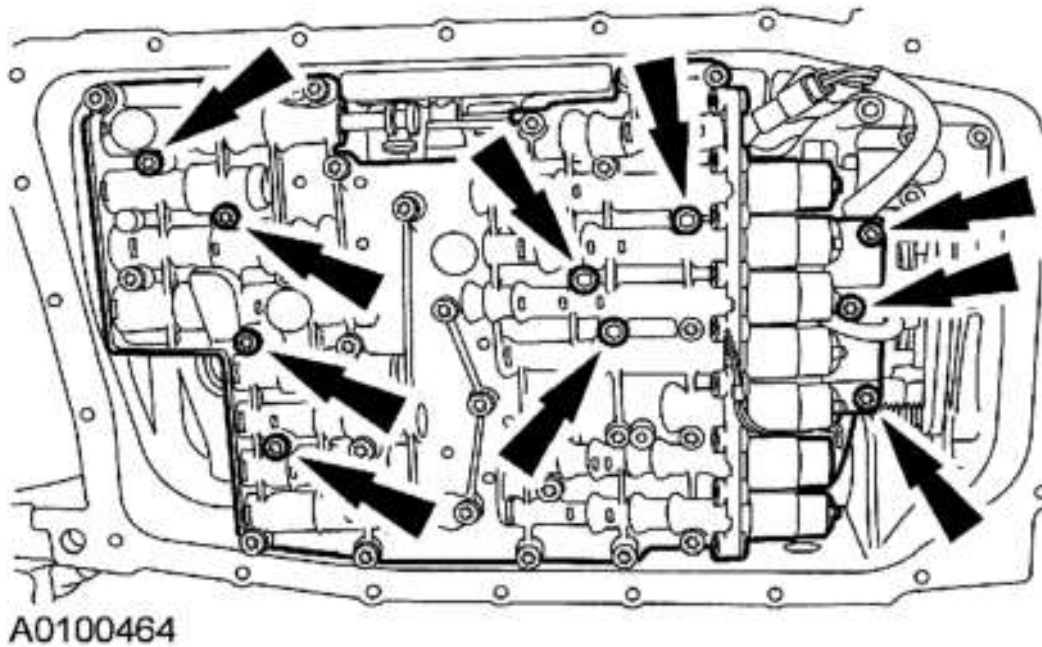
**CAUTION: Do not touch the electrical connector pins. Electrostatic charge may occur and will cause damage to the mechatronic unit.**



**Fig. 20: Pulling Outer Shell Of Bulkhead Electrical Connector**  
Courtesy of FORD MOTOR CO.

8. Pull the outer shell of the bulkhead electrical connector out of the transmission.
9. Remove the 10 bolts from the mechatronic assembly and remove the mechatronic assembly.

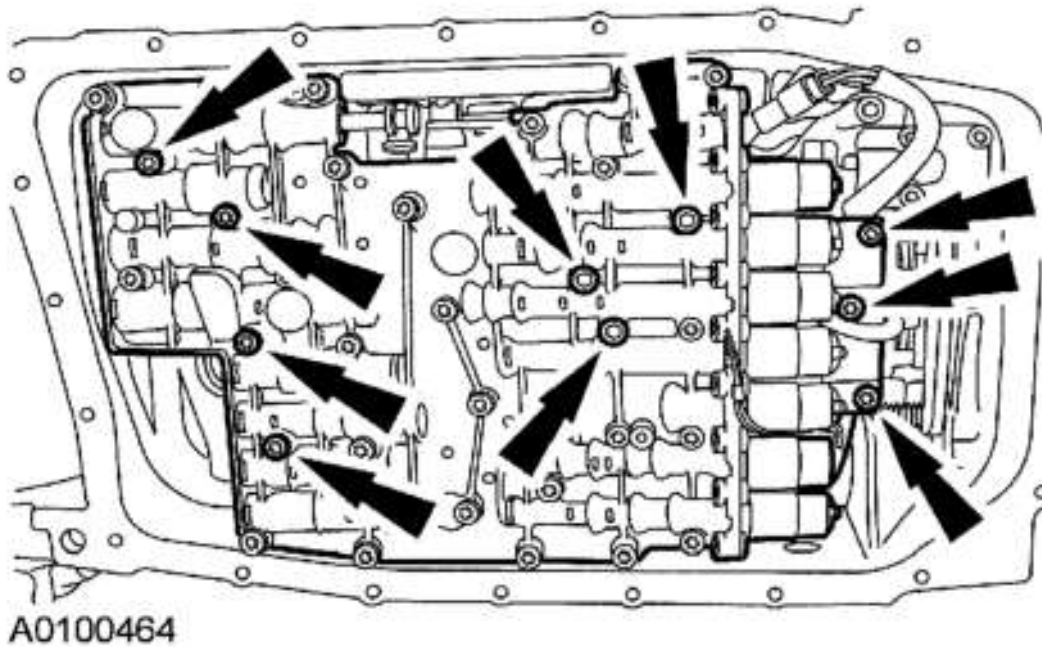




**Fig. 21: Locating Bolts**  
Courtesy of FORD MOTOR CO.

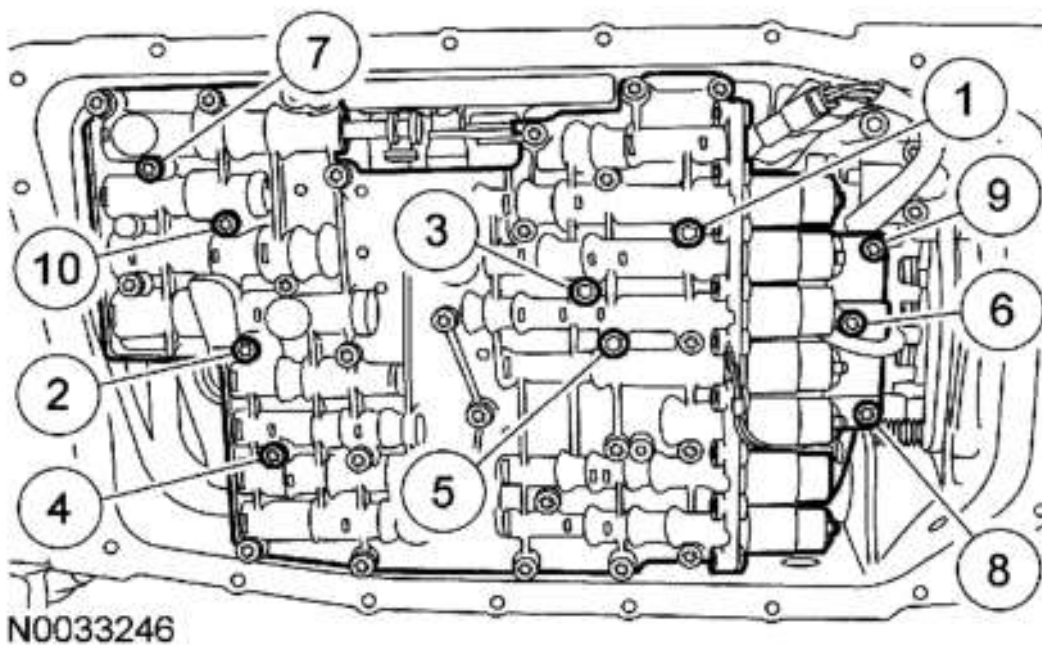
#### **Installation**

1. Position the mechatronic assembly in place and loosely install the 10 retaining bolts.



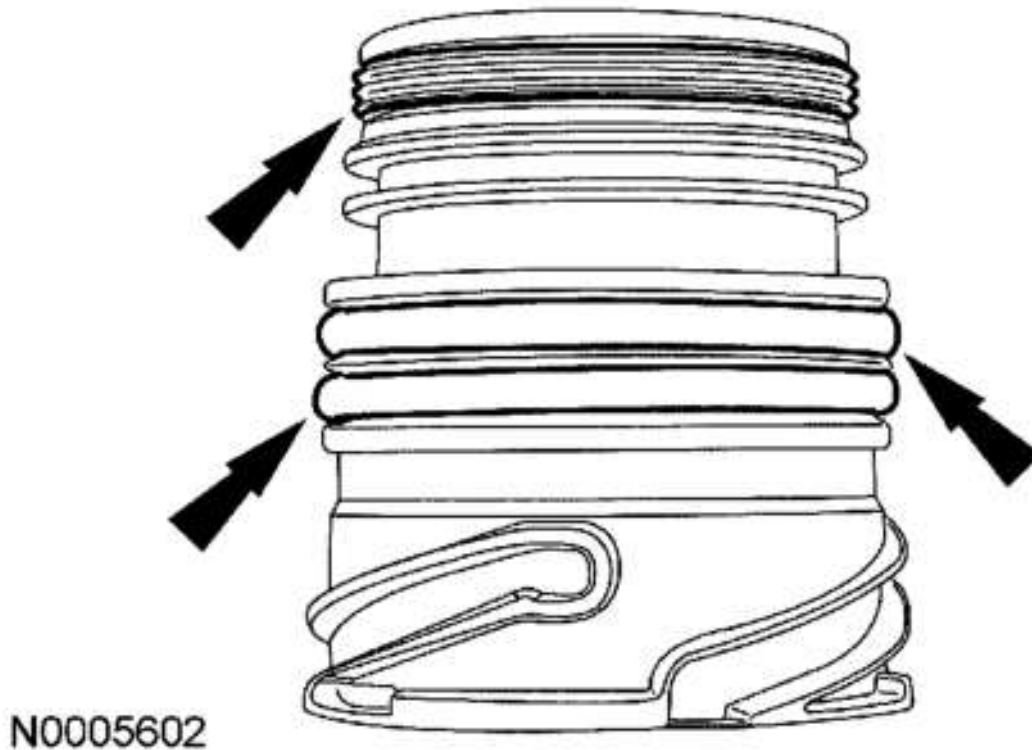
**Fig. 22: Positioning Mechatronic Assembly**  
Courtesy of FORD MOTOR CO.

2. Tighten the mechatronic bolts in the sequence shown.
  - Tighten to 8 Nm (71 lb-in).



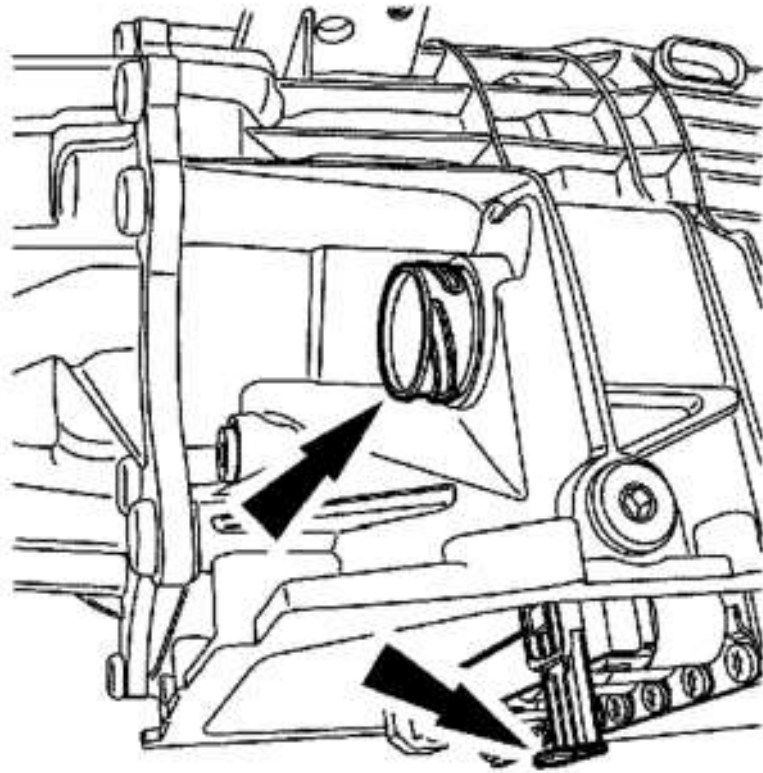
**Fig. 23: Identifying Bolt Tightening Sequence**  
Courtesy of FORD MOTOR CO.

3. Install new O-rings seals on the outer shell of the bulkhead electrical connector.



**Fig. 24: Installing O-Rings Seals**  
Courtesy of FORD MOTOR CO.

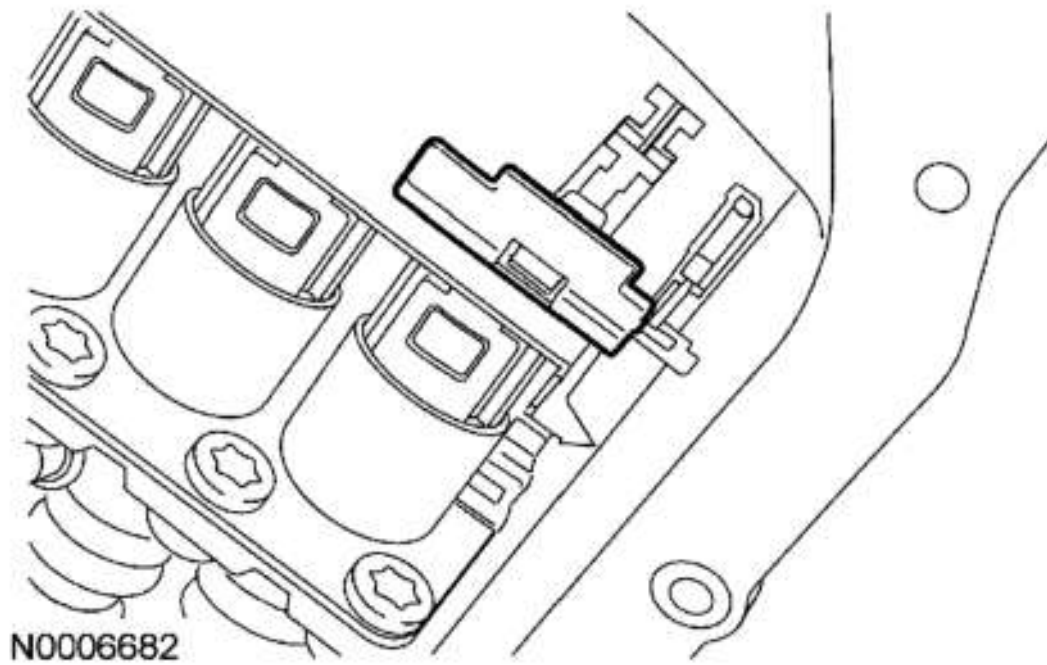
**CAUTION:** Do not touch the electrical connector pins. Electrostatic charge may occur and will cause damage to the mechatronic unit.



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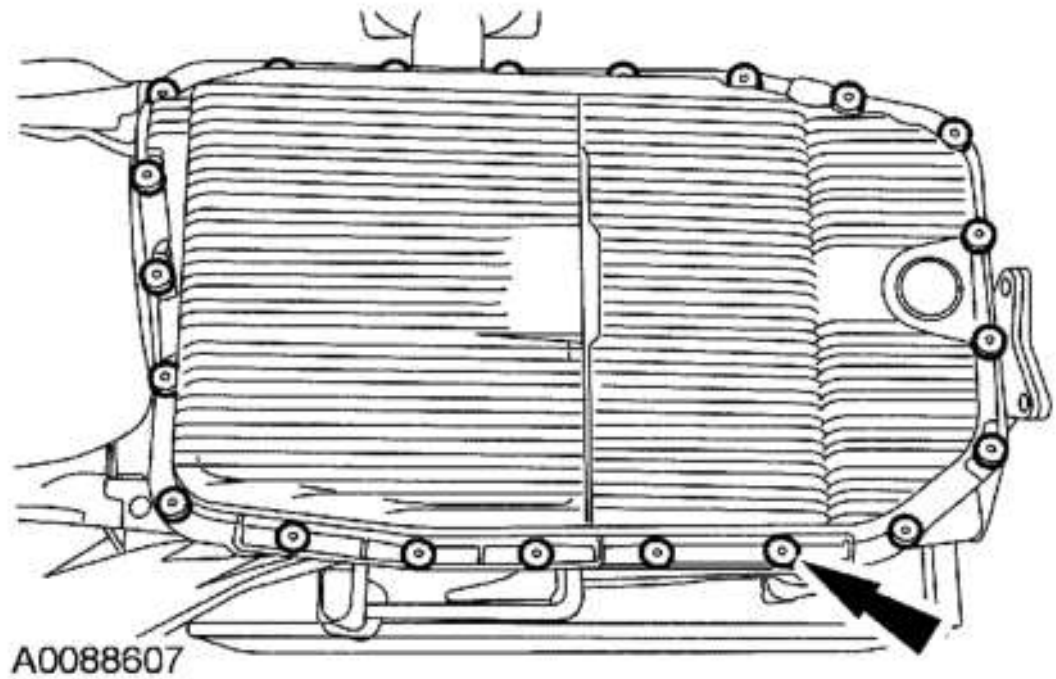
**Fig. 25: Pushing Outer Shell Of Bulkhead Electrical Connector**  
Courtesy of FORD MOTOR CO.

4. With the release tab down, push the outer shell of the bulkhead electrical connector into the transmission.
5. Press up on the tab and lock the outer shell of the bulkhead electrical connector in place.



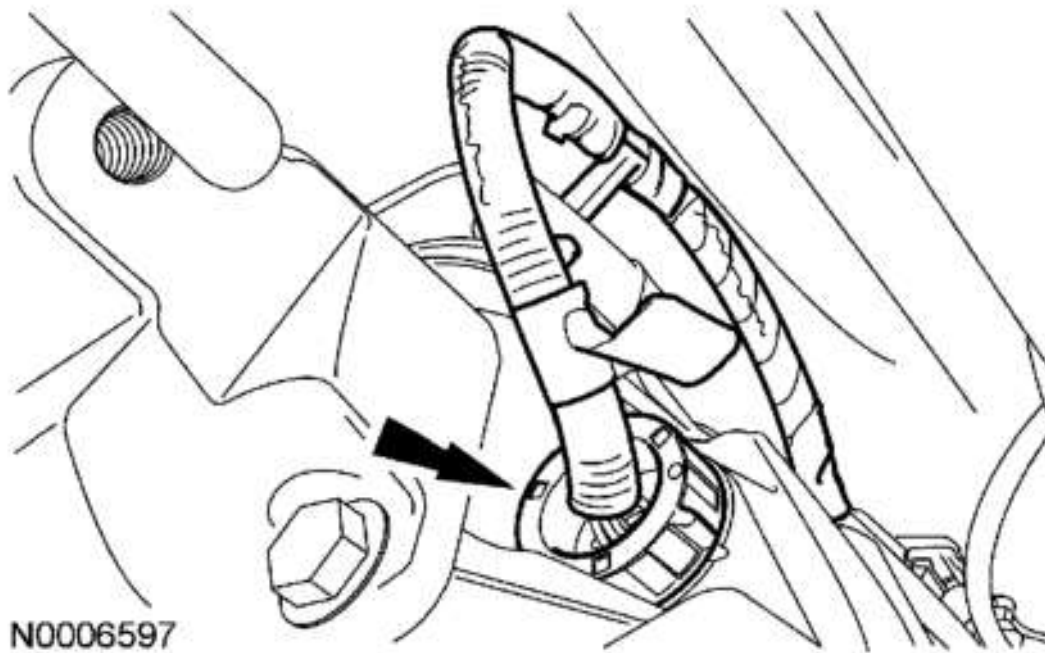
**Fig. 26: Pressing Tab And Lock**  
Courtesy of FORD MOTOR CO.

6. Install the fluid pan.
  - Tighten the bolts in a crisscross pattern.
  - Tighten to 8 Nm (71 lb-in).



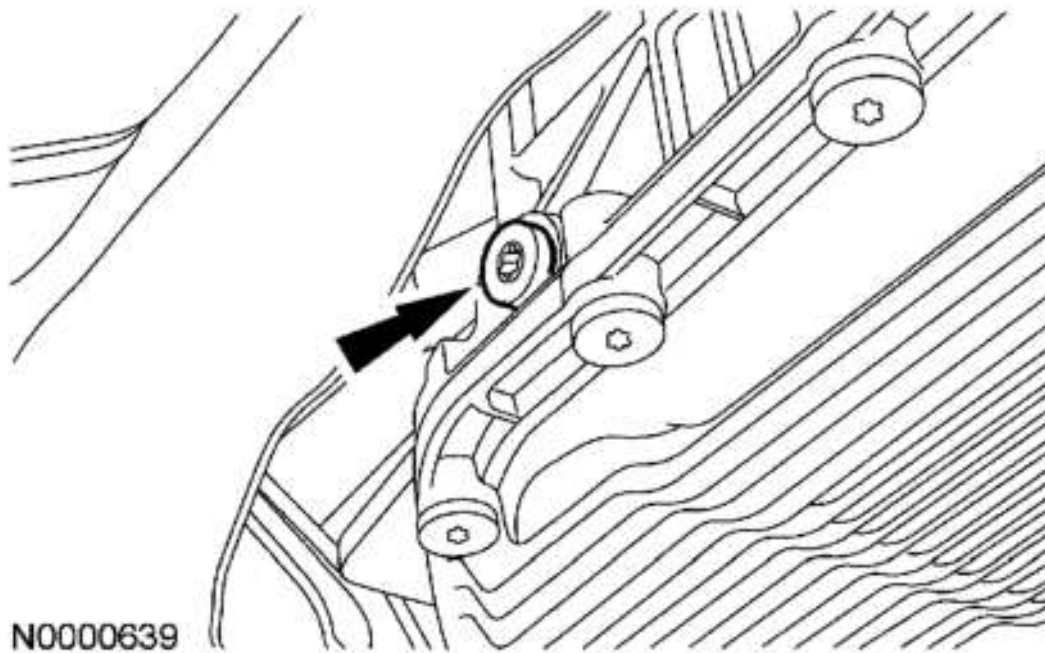
**Fig. 27: Tightening Bolts In Crisscross Pattern**  
Courtesy of FORD MOTOR CO.

7. Connect the main transmission electrical harness by pushing it in and twisting the outer shell to lock it in place.



**Fig. 28: Connecting Main Transmission Electrical Harness**  
Courtesy of FORD MOTOR CO.

**CAUTION:** The fluid fill plug located on the side of the transmission is near the exhaust system. The exhaust will be extremely hot during this procedure. Use care when working near the exhaust and the heat shields.



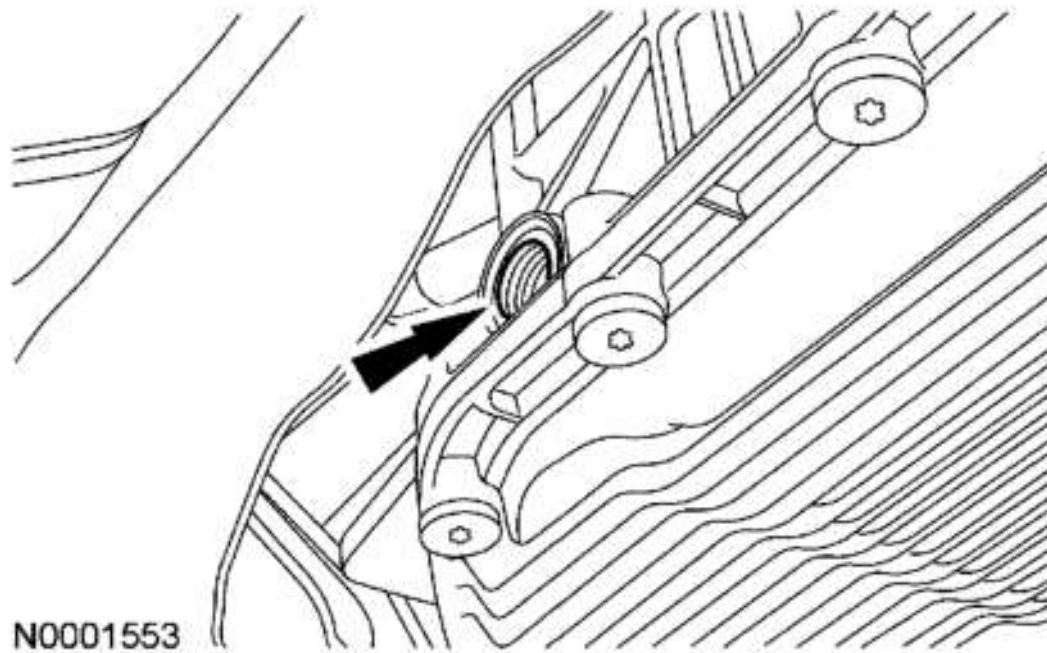
**Fig. 29: Locating Fill Plug**  
Courtesy of FORD MOTOR CO.

8. Remove the fluid fill plug.
  - The fill plug is located on the RH rear side of the case near the transmission electrical connector.

**CAUTION:** The use of any other transmission fluid than specified can result in the transmission failing to operate correctly or transmission failure.

**CAUTION:** The fluid fill plug located on the side of the transmission is near the exhaust system. The exhaust will be extremely hot during this procedure. Use care when working near the exhaust and the heat shields.

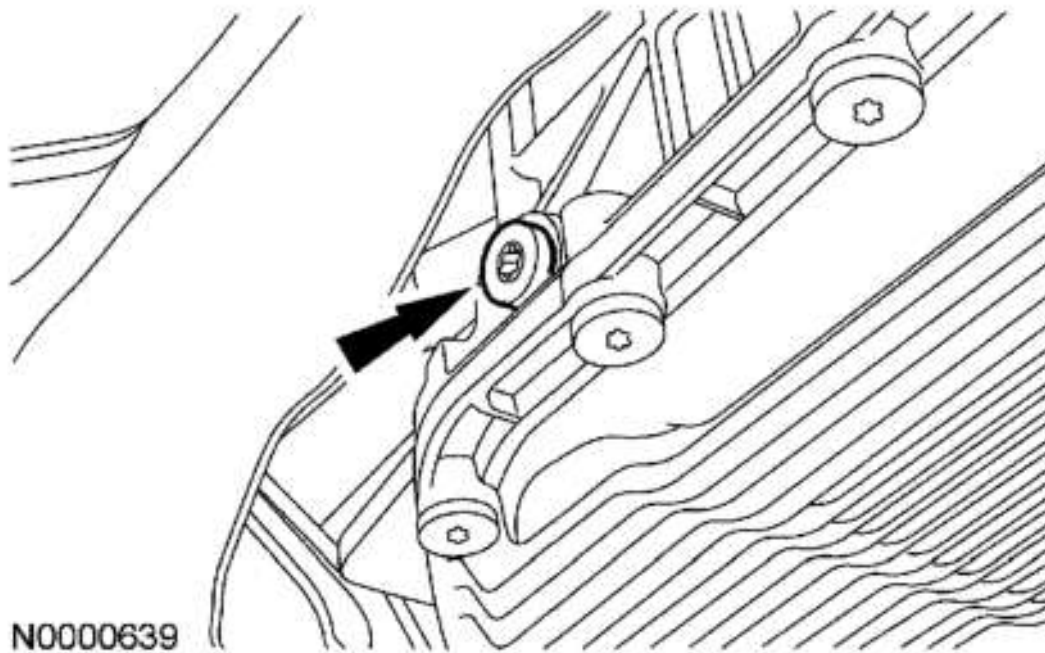




**Fig. 30: Locating Fluid Fill Plug**  
Courtesy of FORD MOTOR CO.

9. Fill the transmission.
  - Add 4.7 liters (5 quarts) of clean automatic transmission fluid to the transmission through the fluid fill hole. Stop when the fluid runs out of the bottom of the hole.

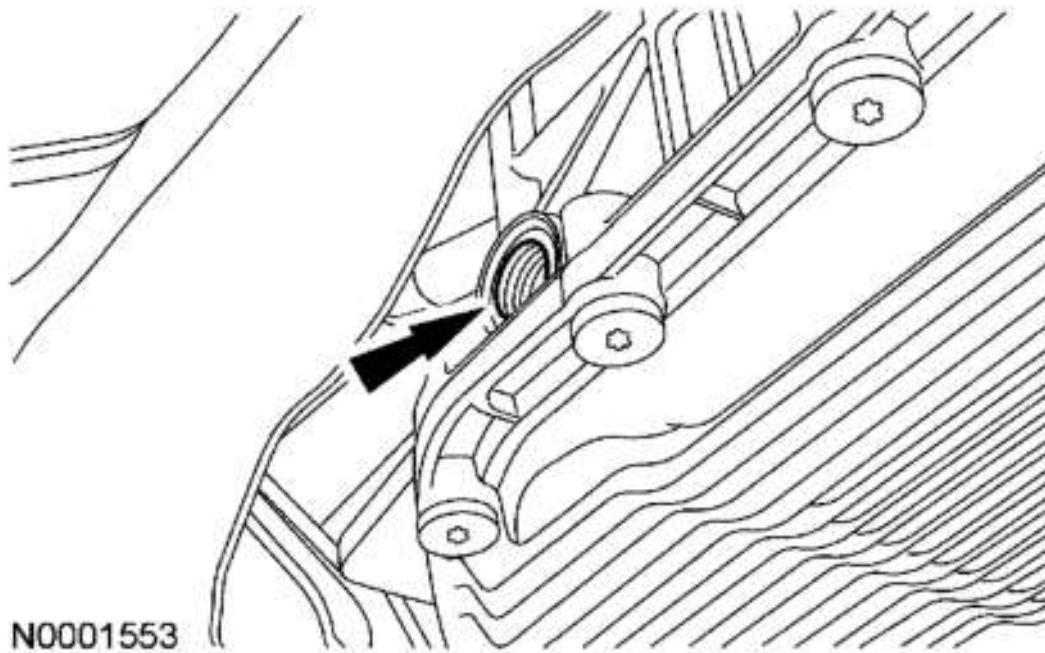
**CAUTION:** The fluid fill plug located on the side of the transmission is near the exhaust system. The exhaust will be extremely hot during this procedure. Use care when working near the exhaust and the heat shields.



**Fig. 31: Locating Fill Plug**  
Courtesy of FORD MOTOR CO.

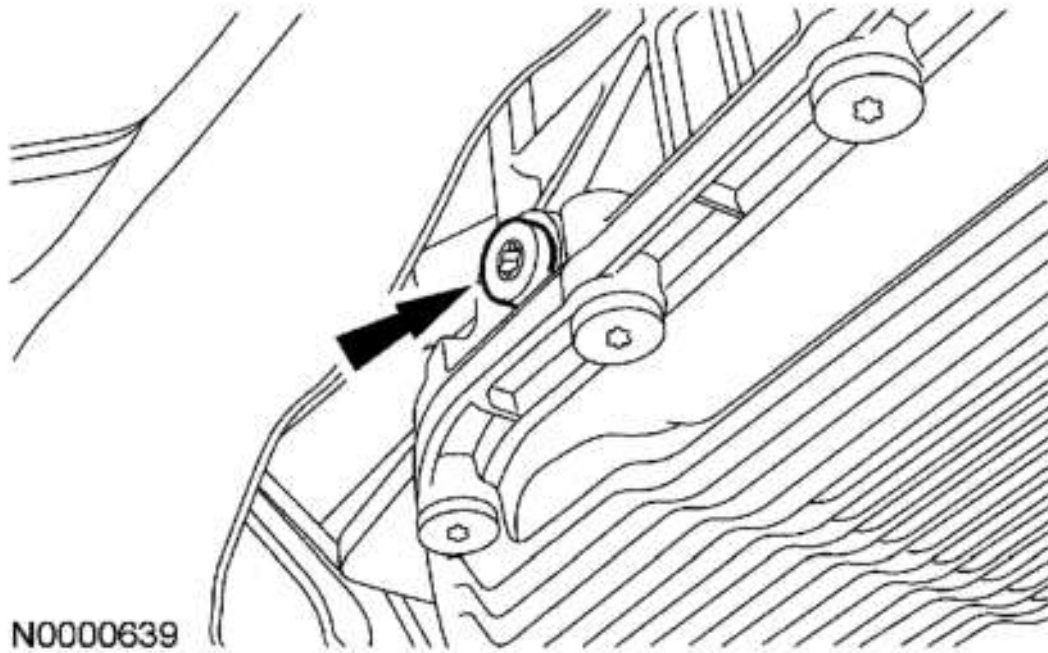
10. Install the fluid fill plug.
  - Tighten to 35 Nm (26 lb-ft).
11. Start the engine. Move the transmission range selector lever through all the gear ranges, checking for engagements.
12. With the engine idling (600-750 rpm) in PARK and the transmission temperature at 30°C-50°C (86° F-122°F), check and adjust the transmission fluid level.

**CAUTION:** The fluid fill plug located on the side of the transmission is near the exhaust system. The exhaust will be extremely hot during this procedure. Use care when working near the exhaust and the heat shields.



**Fig. 32: Locating Fluid Fill Plug**  
Courtesy of FORD MOTOR CO.

13. With the engine still running in PARK, check the fluid level. If more fluid is needed, remove the fluid fill plug and fill with clean automatic transmission fluid until the fluid runs out of the bottom of the hole.
14. Install the fluid fill plug.
  - Tighten to 35 Nm (26 lb-ft).



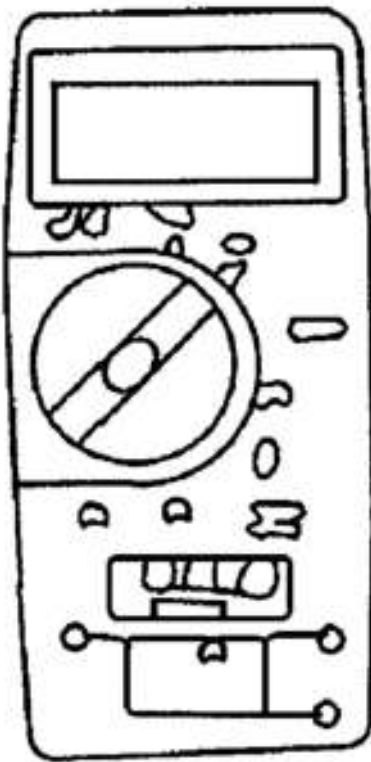
**Fig. 33: Locating Fill Plug**  
 Courtesy of FORD MOTOR CO.

**OUTPUT SHAFT SEAL**

Special Tool(s)

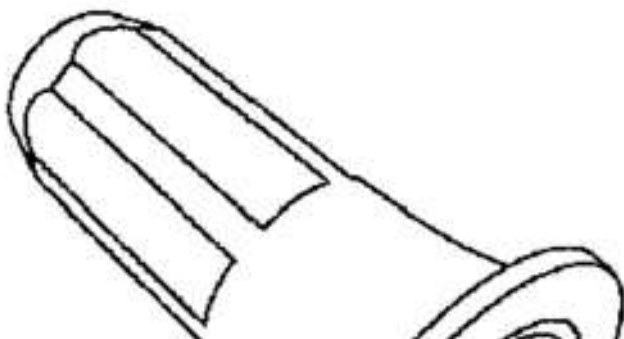
**OUTPUT SHAFT SEAL SPECIAL TOOL**

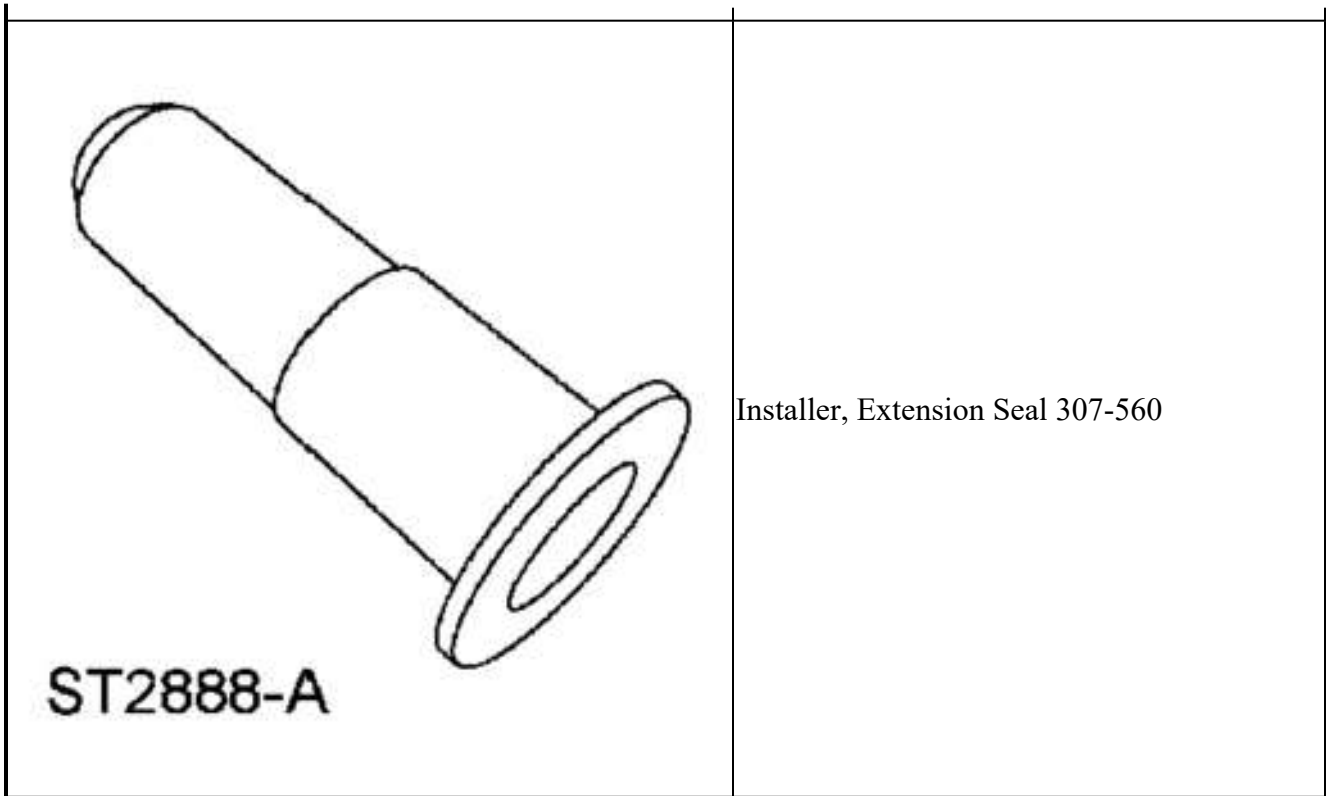
	<p>Worldwide Diagnostic System (WDS)          Vehicle Communication Module (VCM)          with appropriate adapters, or equivalent scan          tool</p>
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**ST1137-A**

Installer, Front Pump Fluid Seal - 4x2 Output  
307-556





**Material**

**MATERIAL SPECIFICATION**

Item	Specification
MERCON® SP Automatic Transmission Fluid XT-6-QSP	MERCON® SP

**Removal**

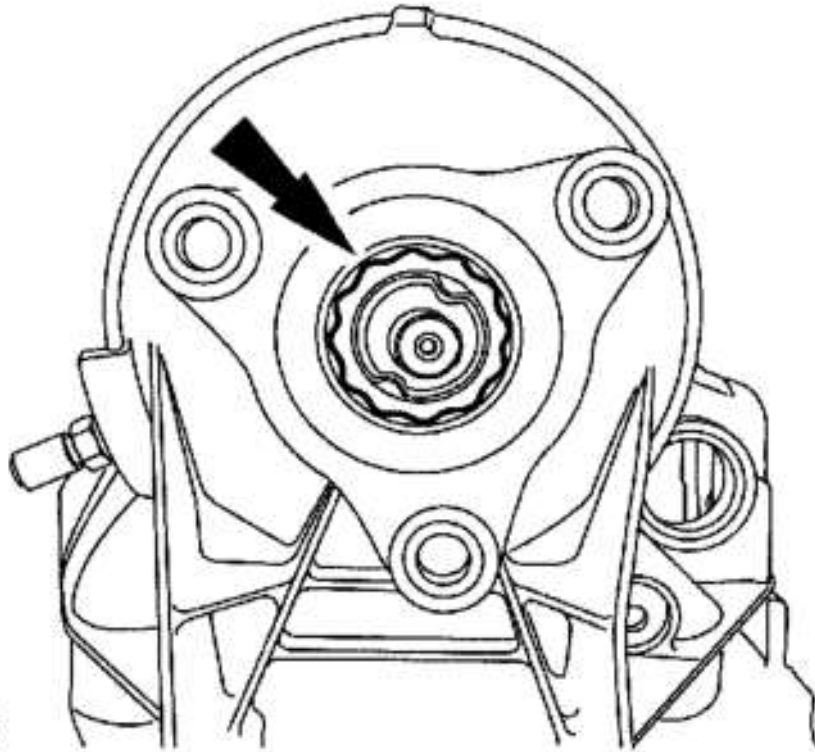
**All vehicles**

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING** .

**4x2 vehicles**

2. Remove the rear driveshaft. For additional information, refer to **DRIVESHAFT** .
3. Remove and discard the output shaft flange nut.

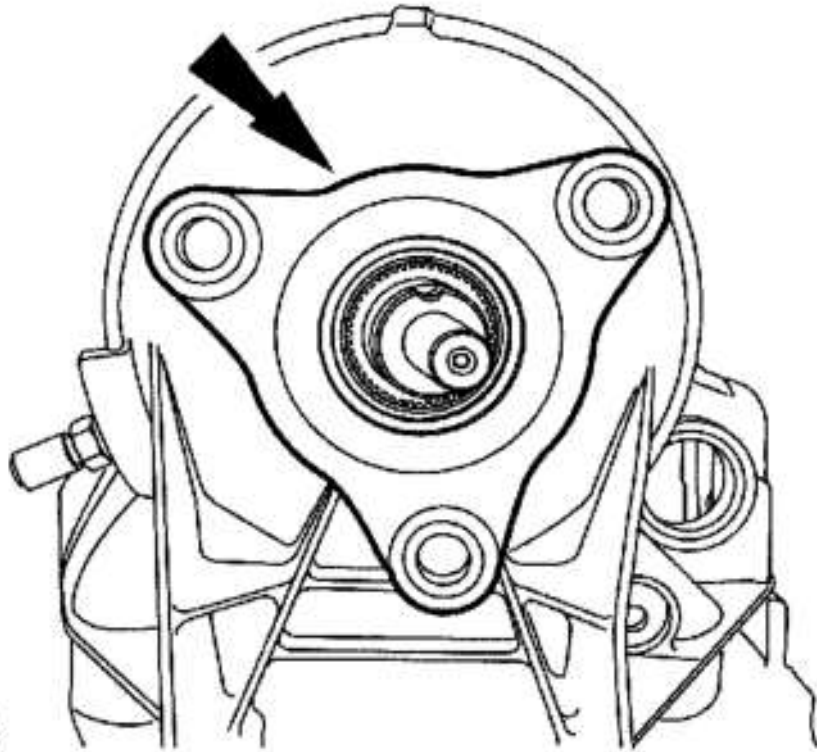
N0000608



**Fig. 34: Removing Output Shaft Flange Nut**  
Courtesy of FORD MOTOR CO.

4. Remove the output shaft flange.

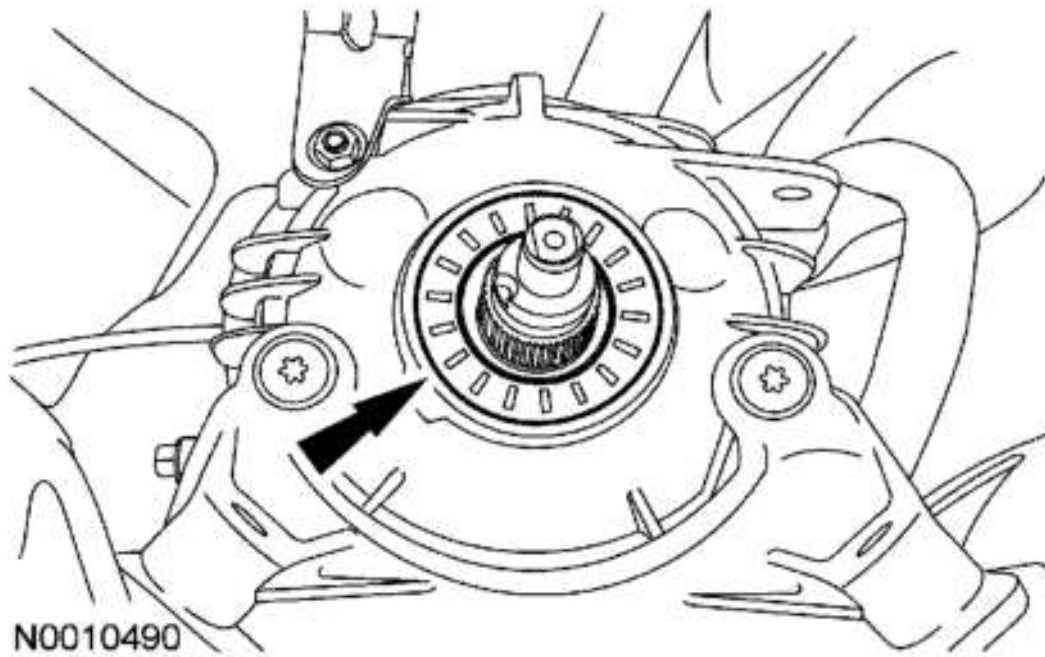
N0000609



**Fig. 35: Removing Output Shaft Flange**  
Courtesy of FORD MOTOR CO.

5. Remove the output shaft seal.

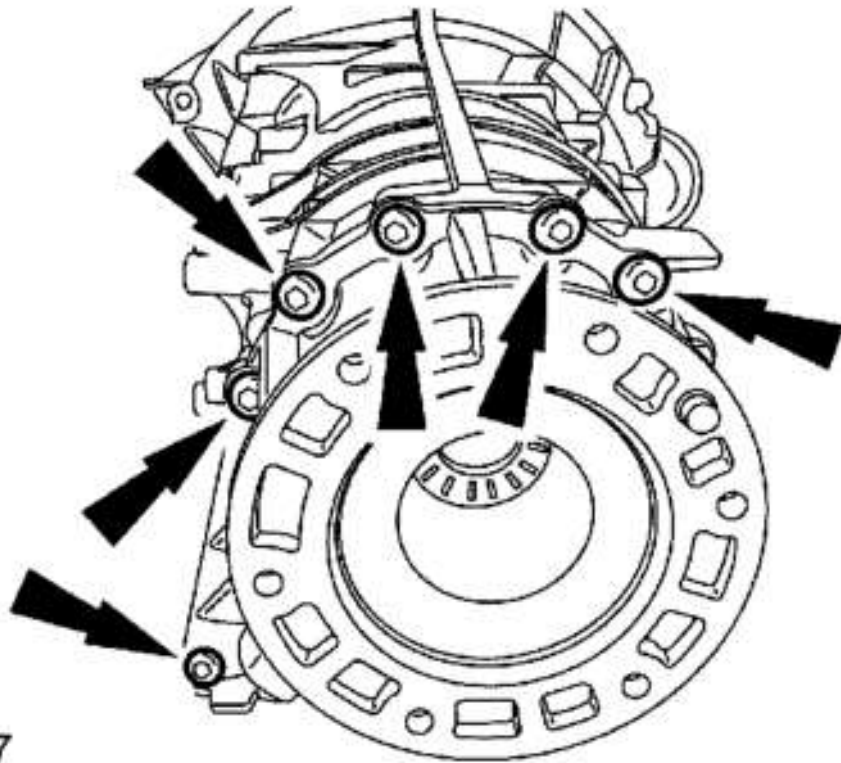




**Fig. 36: Removing Output Shaft Seal**  
Courtesy of FORD MOTOR CO.

**4x4 vehicles**

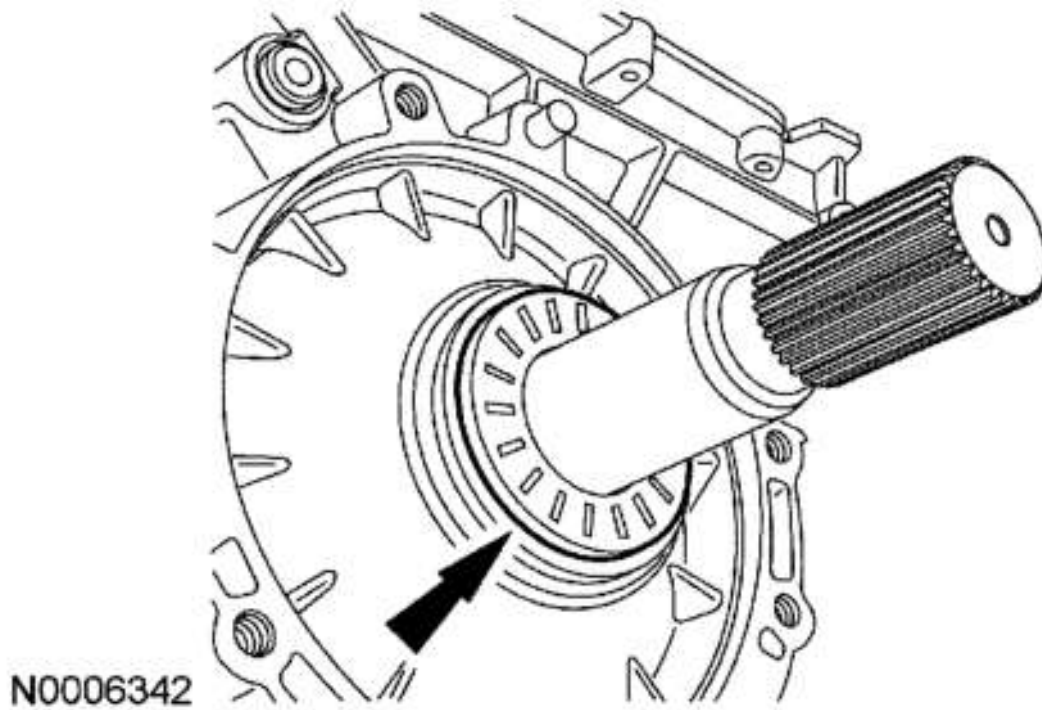
6. Remove the transfer case. For additional information, refer to **TRANSFER CASE - AUTOMATIC SHIFT**.
7. Remove the 11 bolts and the extension housing.



N0005497

**Fig. 37: Removing Extension Housing**  
Courtesy of FORD MOTOR CO.

8. Remove the output shaft seal.

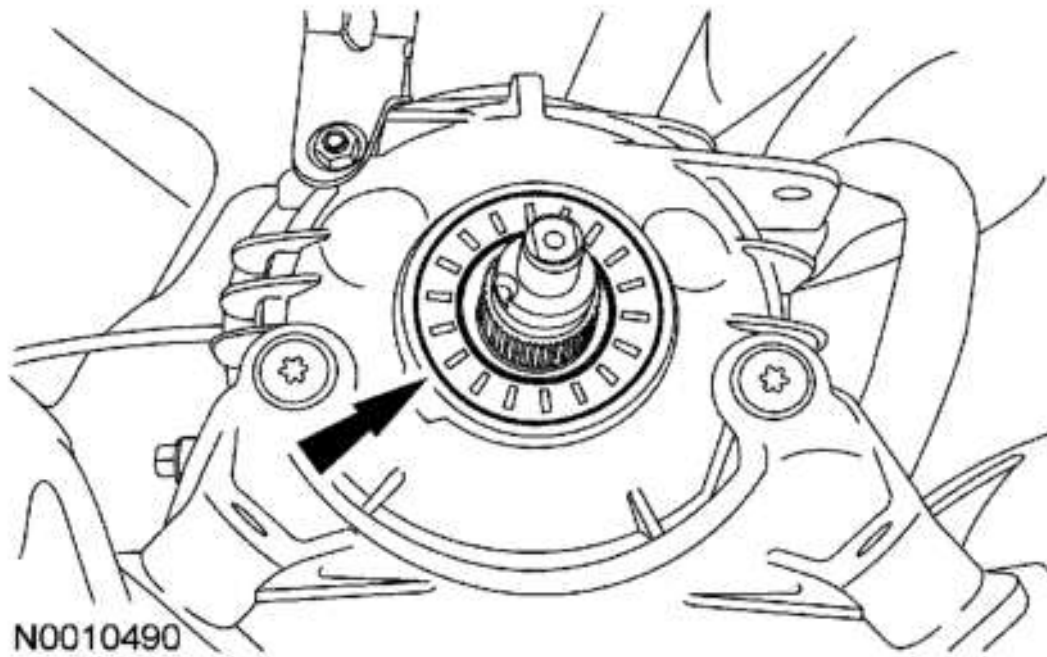


**Fig. 38: Removing Output Shaft Seal**  
Courtesy of FORD MOTOR CO.

**Installation**

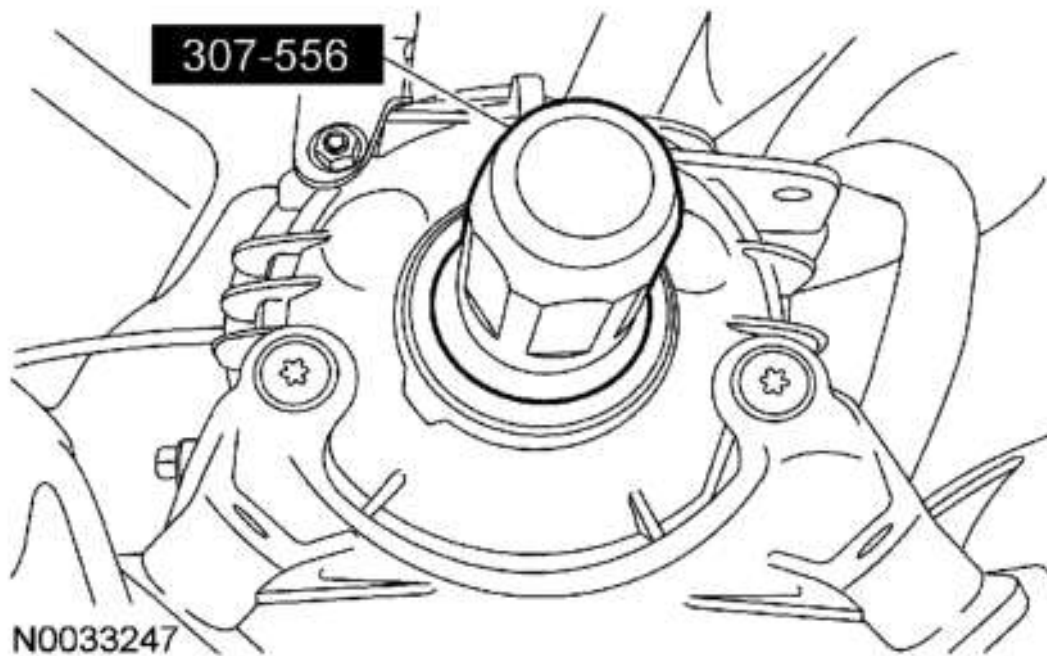
**4x2 vehicles**

1. Position a new output shaft seal.



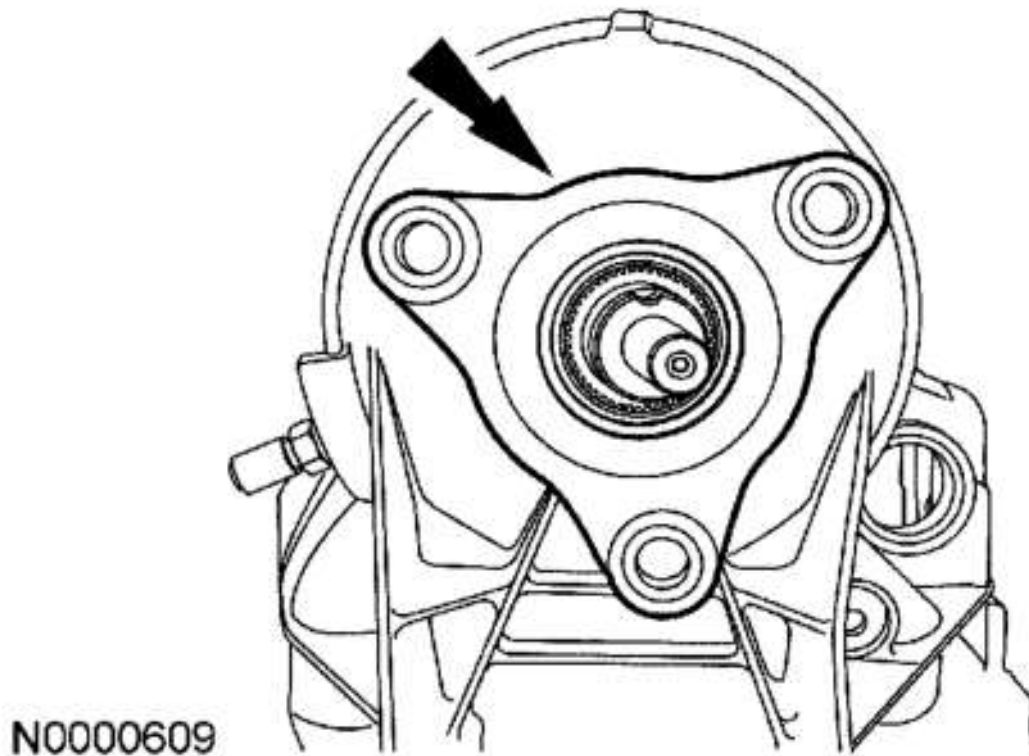
**Fig. 39: Positioning Output Shaft Seal**  
Courtesy of FORD MOTOR CO.

2. Using the special tool, install the output shaft seal.



**Fig. 40: Installing Output Shaft Seal Using Special Tool**  
Courtesy of FORD MOTOR CO.

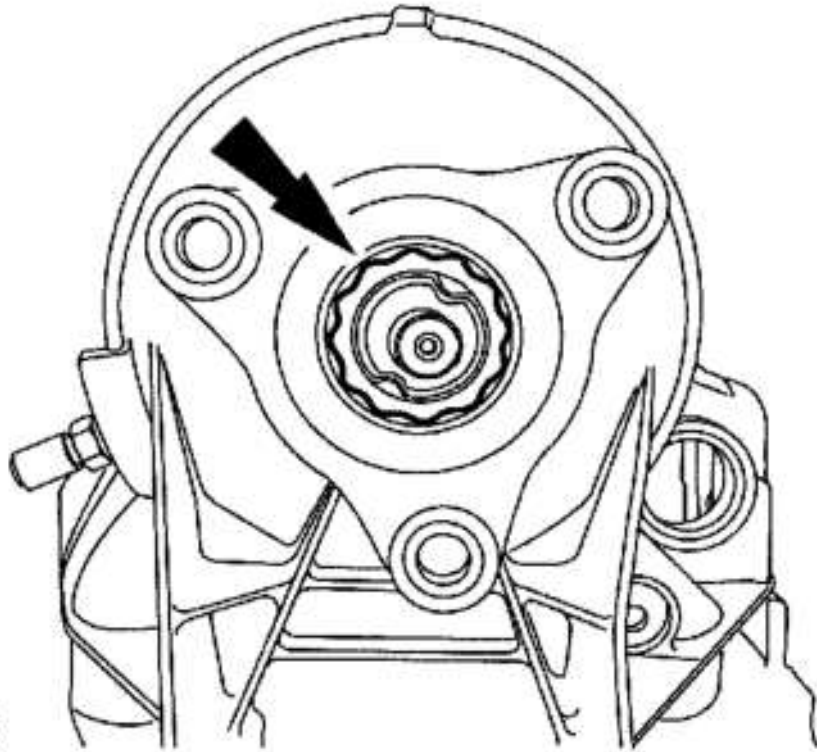
3. Install the output shaft flange.



**Fig. 41: Installing Output Shaft Flange**  
Courtesy of FORD MOTOR CO.

4. Install a new output shaft flange nut.
  - After installing the new nut, it must be staked at the slots to prevent it from coming loose.
  - Tighten to 120 Nm (89 lb-ft).

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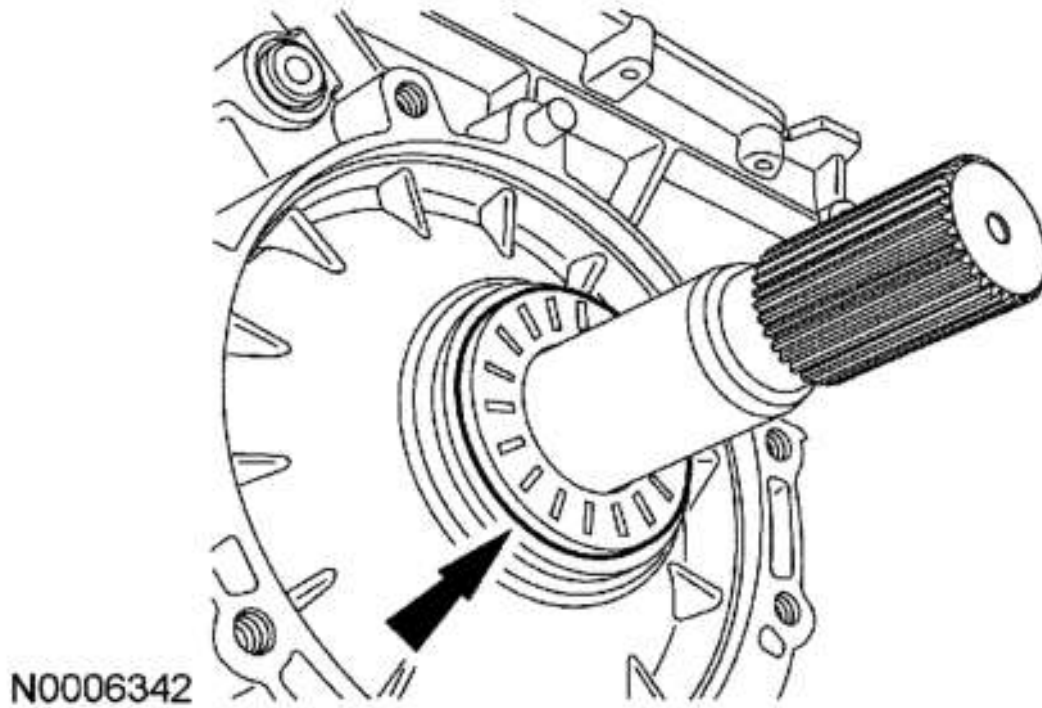


**Fig. 42: Installing Output Shaft Flange Nut**  
Courtesy of FORD MOTOR CO.

5. Install the rear driveshaft. For additional information, refer to **DRIVESHAFT** .

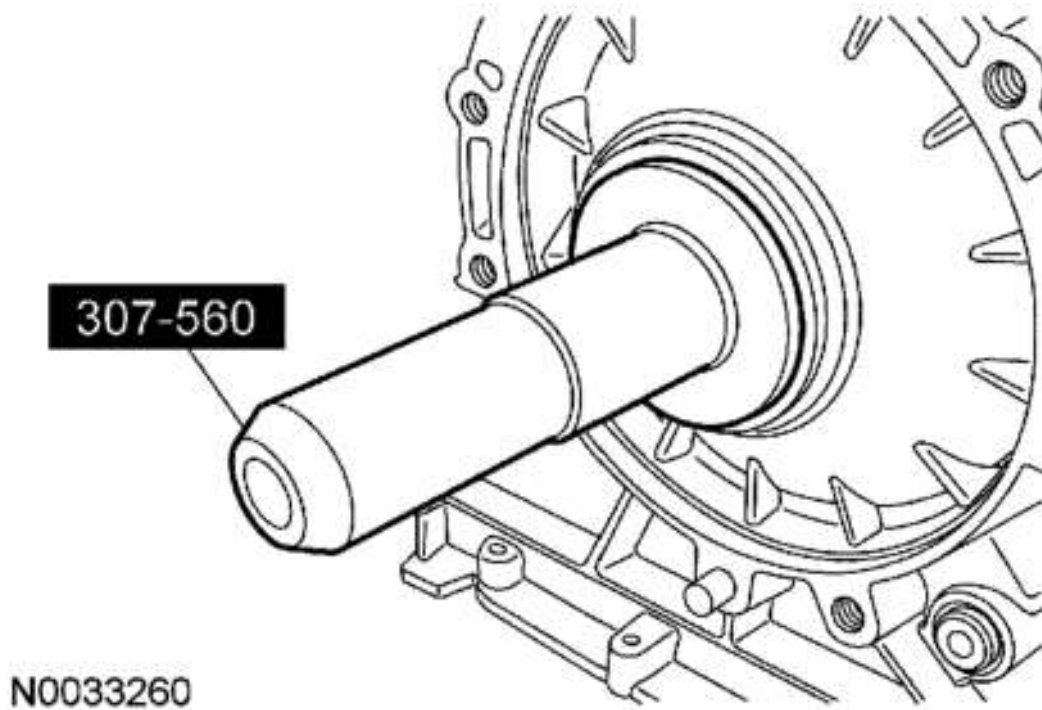
**4x4 vehicles**

6. Position the output shaft seal.



**Fig. 43: Positioning Output Shaft Seal**  
Courtesy of FORD MOTOR CO.

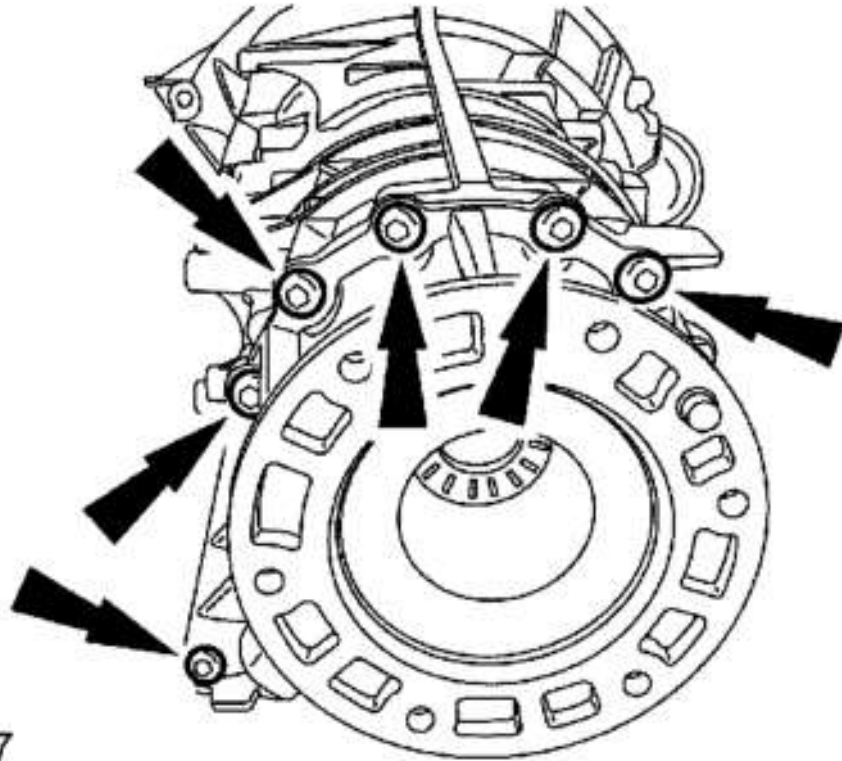
7. Using the special tool, install a new output shaft seal.



**Fig. 44: Installing Output Shaft Seal Using Special Tool**  
Courtesy of FORD MOTOR CO.

8. Install the extension housing and the 11 bolts.
  - Tighten to 48 Nm (35 lb-ft).





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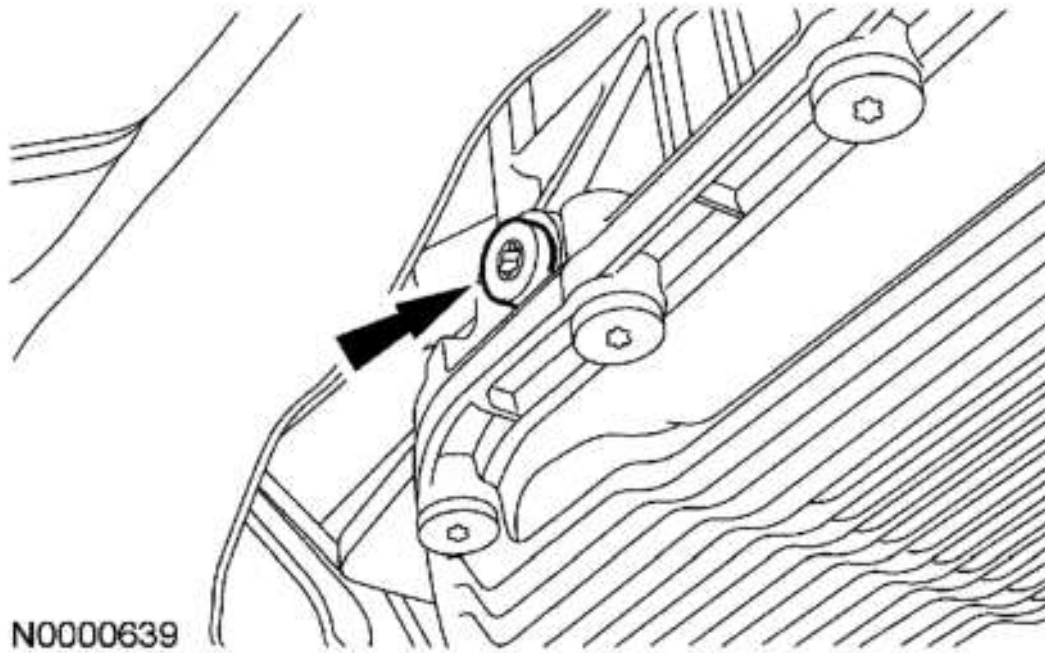
**Fig. 45: Installing Extension Housing Bolts**  
Courtesy of FORD MOTOR CO.

9. Install the transfer case. For additional information, refer to **TRANSFER CASE - AUTOMATIC SHIFT** .

**All vehicles**

10. Start the engine. Move the transmission range selector lever through all the gear ranges, checking for engagements.
11. With the special tool connected, engine idling (600-750 rpm) in PARK and the transmission temperature at 30°C-50°C (86°F-122°F), check and adjust the transmission fluid level.

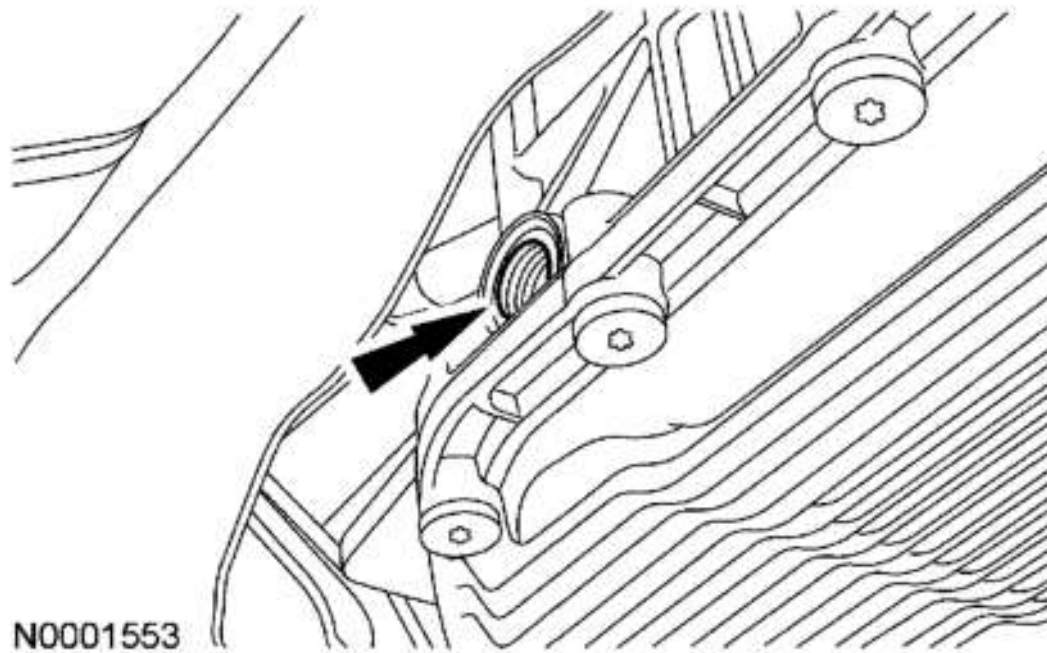
**CAUTION:** The fluid fill plug located on the RH side of the transmission is near the exhaust system. The exhaust will be extremely hot during this procedure. Use care when working near the exhaust and the heat shields.



**Fig. 46: Locating Fill Plug**  
Courtesy of FORD MOTOR CO.

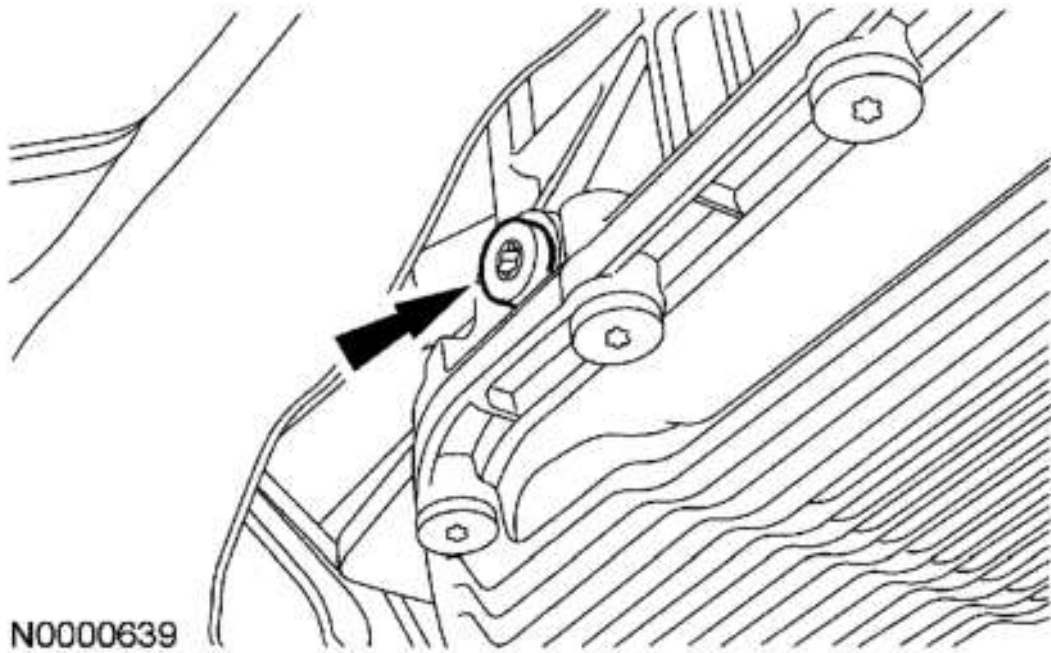
12. With the engine still running and the vehicle in PARK, remove the fluid fill plug.
  - The fill plug is located on the RH rear side of the case near the transmission electrical connector.

**CAUTION: The use of any other transmission fluid than specified can result in the transmission failing to operate in a normal manner or transmission failure.**



**Fig. 47: Locating Fluid Fill Plug**  
Courtesy of FORD MOTOR CO.

13. Fill the transmission.
  - Add clean automatic transmission fluid to the transmission through the fluid fill hole. Stop when the fluid runs out of the bottom of the hole.
14. Install the fluid fill plug.
  - Tighten to 35 Nm (26 lb-ft).



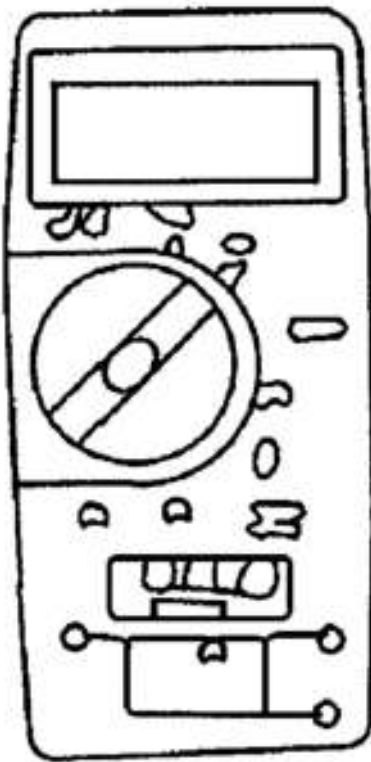
**Fig. 48: Locating Fill Plug**  
 Courtesy of FORD MOTOR CO.

**MANUAL CONTROL LEVER SHAFT AND SEAL**

Special Tool(s)

**MANUAL CONTROL SPECIAL TOOL**

	<p>Worldwide Diagnostic System (WDS)          Vehicle Communication Module (VCM)          with appropriate adapters, or equivalent          diagnostic tool</p>
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**ST1137-A**



**ST2890-A**

Installer, Shift Shaft Fluid Seal 307-559

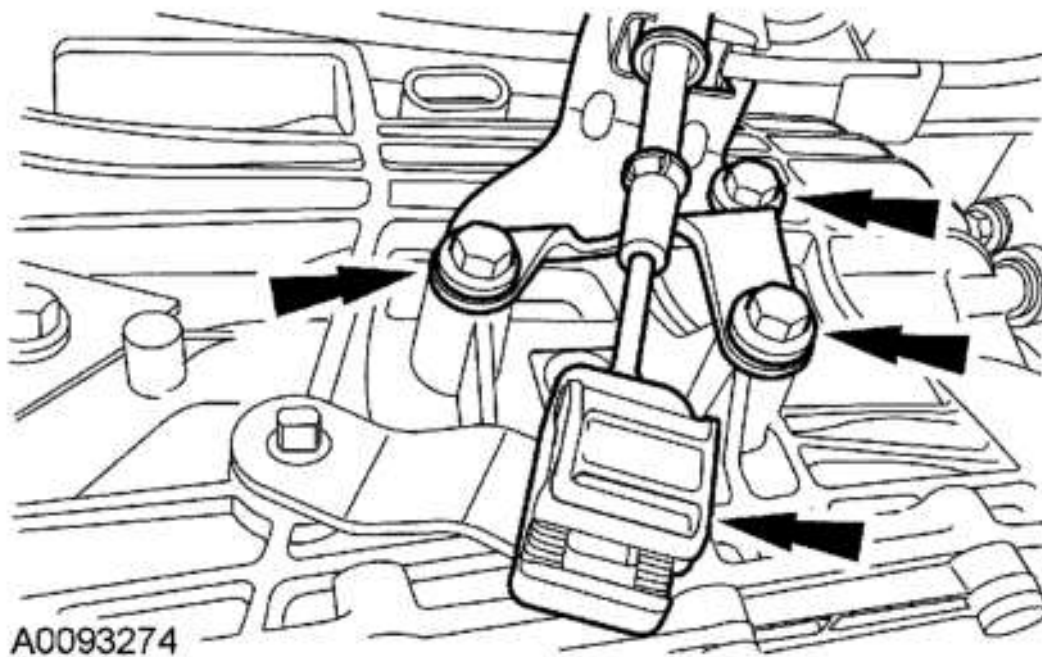
## Material

### MATERIAL SPECIFICATION

Item	Specification
MERCON® SP Automatic Transmission Fluid XT-6-QSP	MERCON® SP

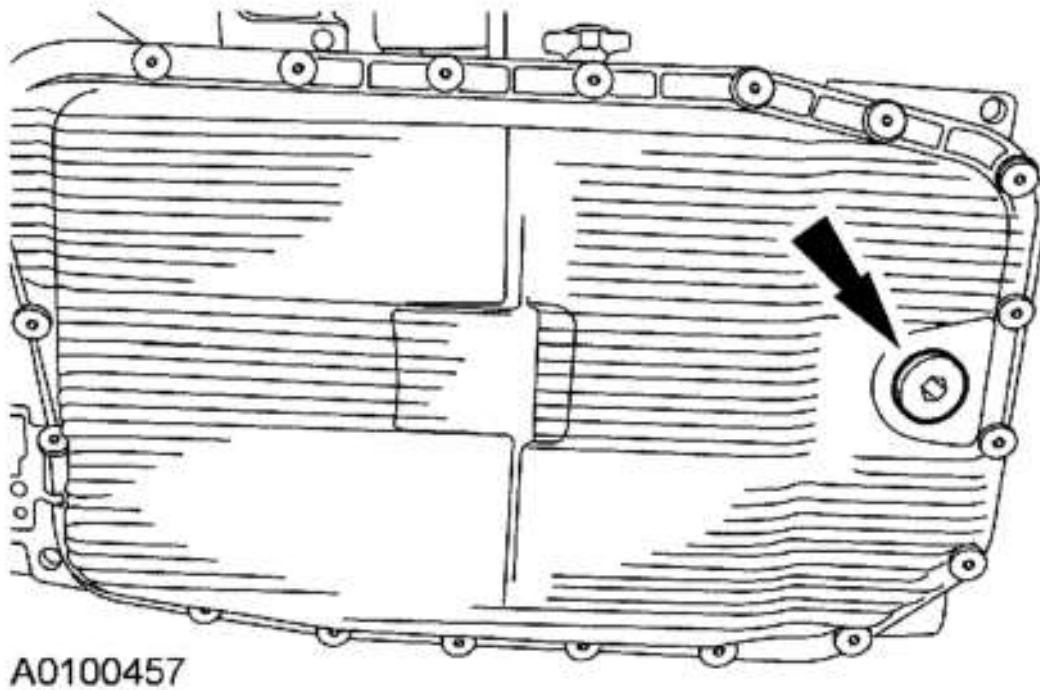
## Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING** .
2. Disconnect the shift cable end and remove the shift cable bracket bolts. Position the cable and bracket aside.



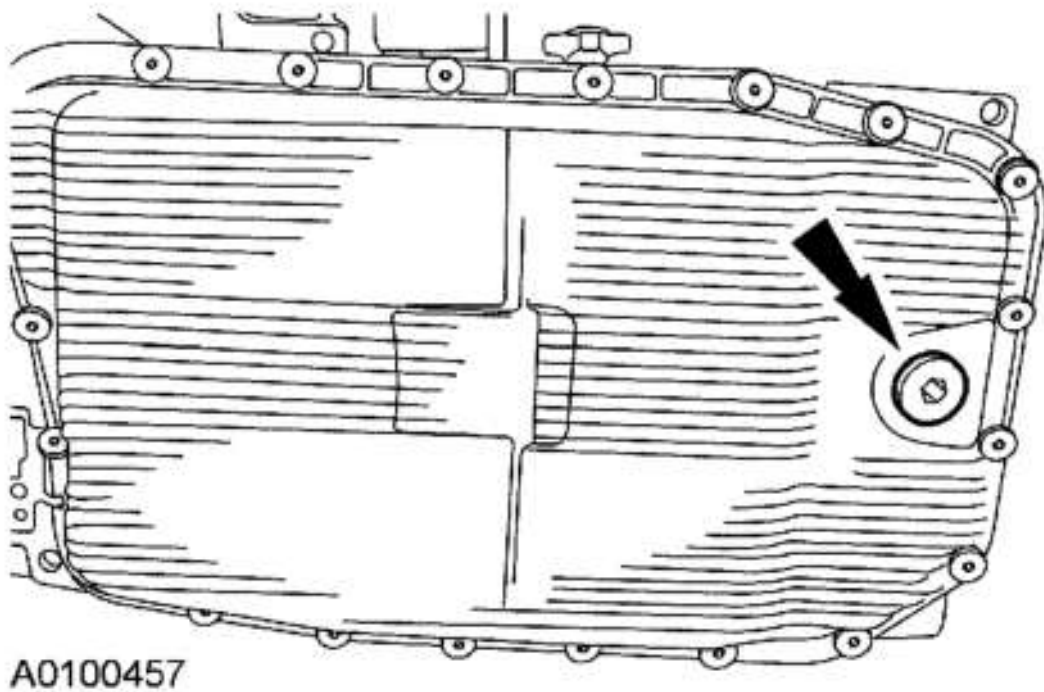
**Fig. 49: Locating Shift Cable Bracket Bolts**  
Courtesy of FORD MOTOR CO.

3. Remove and discard the transmission fluid pan drain plug and allow the fluid to drain.



**Fig. 50: Identifying Fluid Pan Drain Plug**  
Courtesy of FORD MOTOR CO.

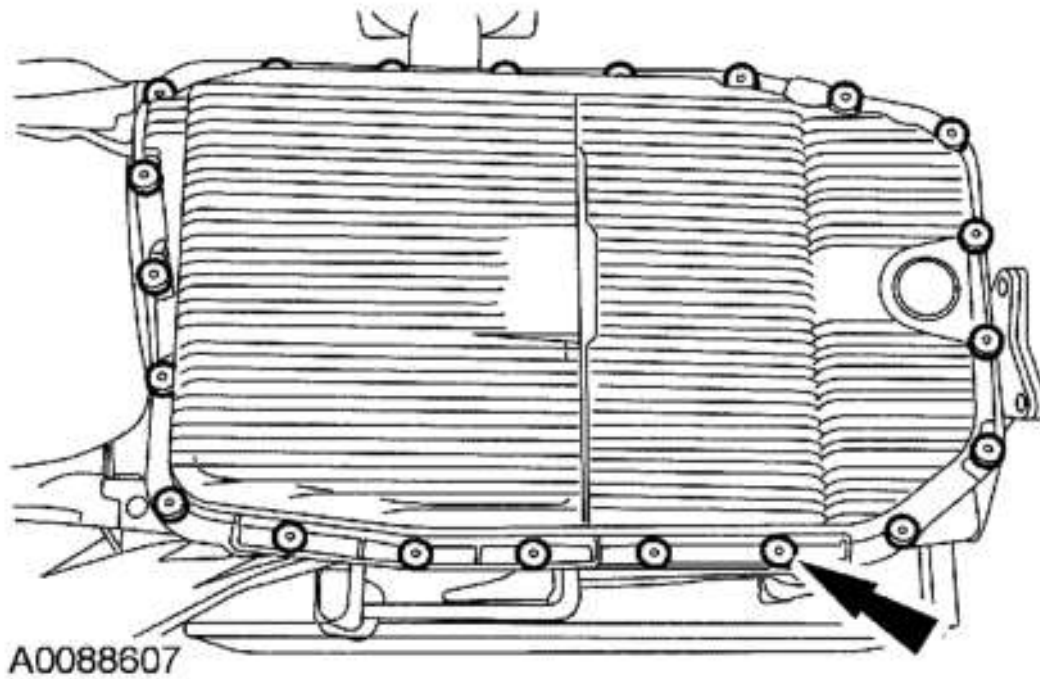
4. Install a new transmission fluid pan drain plug.
  - Tighten to 8 Nm (71 lb-in).



**Fig. 51: Identifying Fluid Pan Drain Plug**  
Courtesy of FORD MOTOR CO.

**NOTE:** The transmission fluid pan, gasket, filter and magnets are serviced as a complete unit.

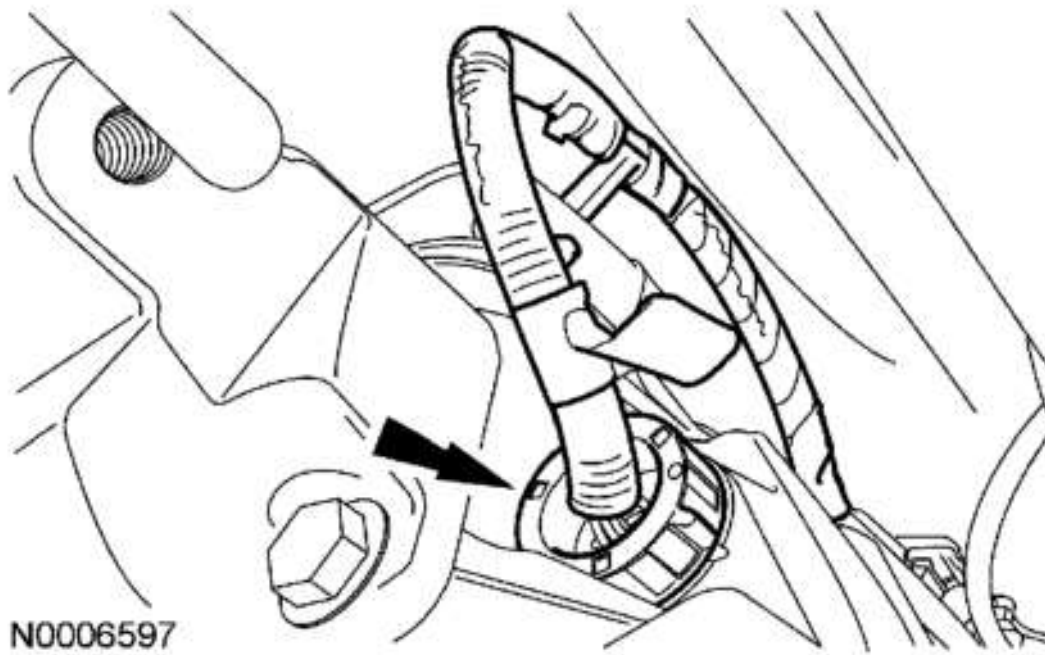




**Fig. 52: Locating Transmission Fluid Pan**  
Courtesy of FORD MOTOR CO.

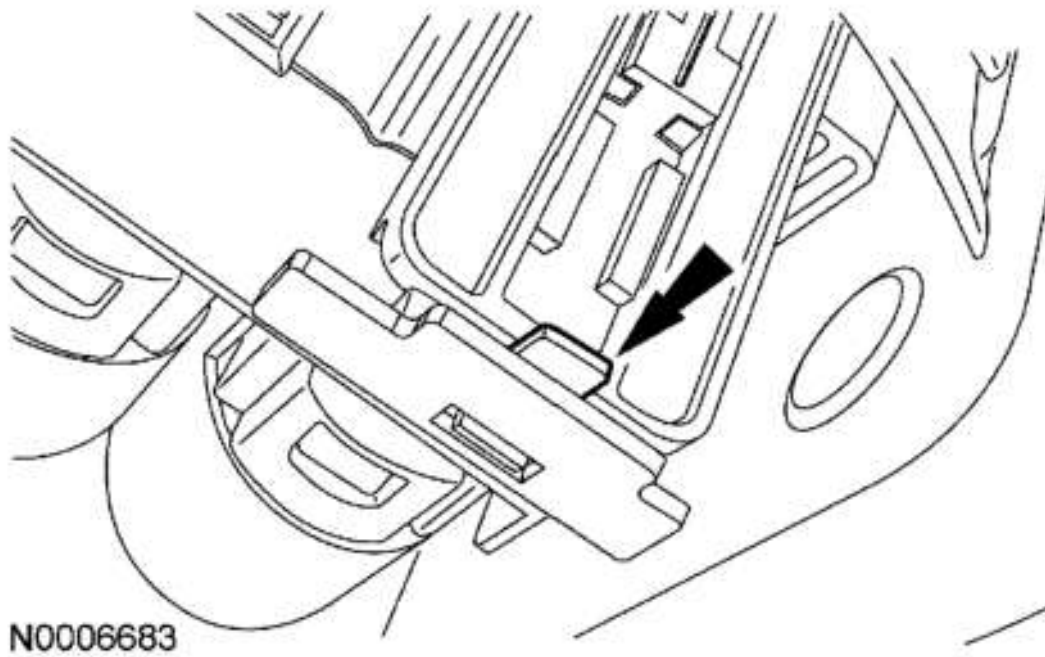
5. Remove the transmission fluid pan assembly.

**CAUTION: Do not pull on the wire harness to disconnect the connector or damage to the connector will occur.**



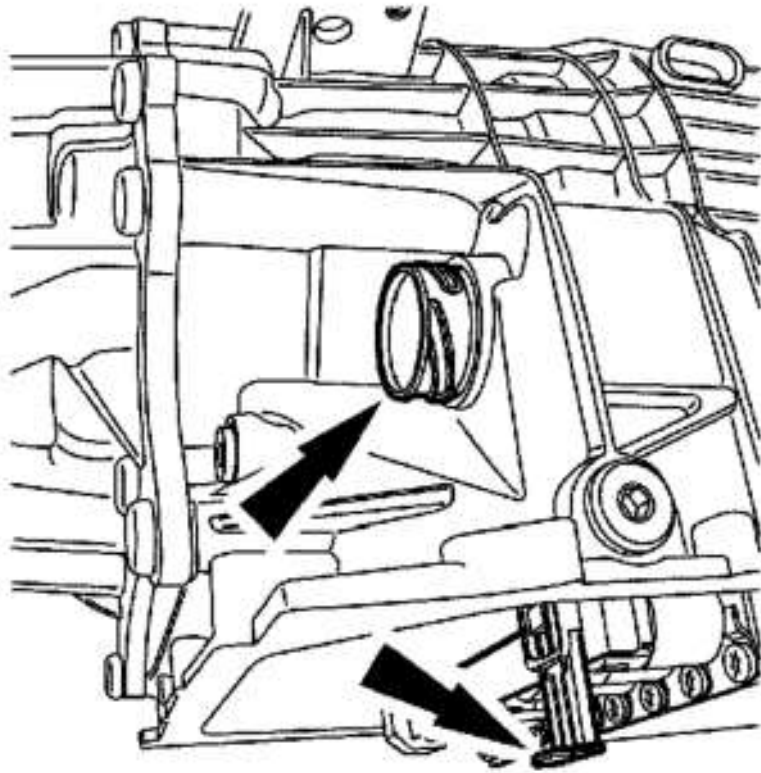
**Fig. 53: Disconnecting Main Transmission Electrical Harness**  
Courtesy of FORD MOTOR CO.

6. Disconnect the main transmission electrical harness by twisting the outer shell and pulling back on the connector.
7. Press the release tab and pull down on the bulkhead connector retainer.



**Fig. 54: Pressing Release Tab**  
**Courtesy of FORD MOTOR CO.**

8. With the release tab down, pull the outer shell of the bulkhead electrical connector.



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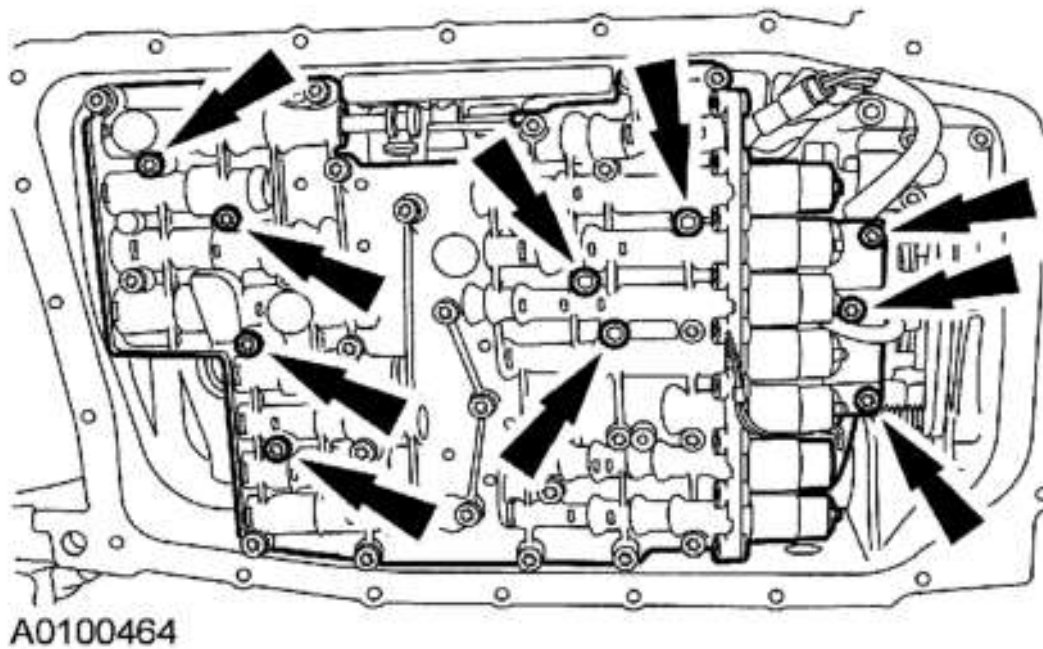
**Fig. 55: Pulling Outer Shell Of Bulkhead Electrical Connector**  
Courtesy of FORD MOTOR CO.

**CAUTION: Do not touch the electrical connector pins. Electrostatic charge may occur and will cause damage to the mechatronic unit.**



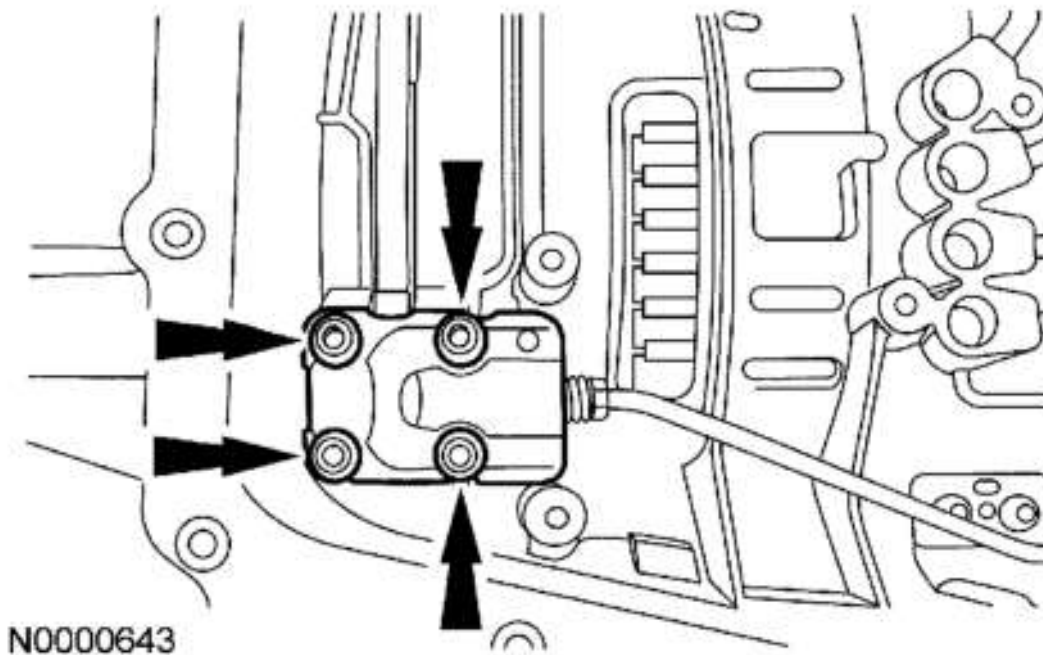
**Fig. 56: Pulling Outer Shell Of Bulkhead Electrical Connector**  
Courtesy of FORD MOTOR CO.

9. Pull the outer shell of the bulkhead electrical connector out of the transmission.
10. Remove the 10 bolts from the mechatronic assembly and remove the mechatronic assembly.



**Fig. 57: Removing Bolts From Mechatronic Assembly**  
Courtesy of FORD MOTOR CO.

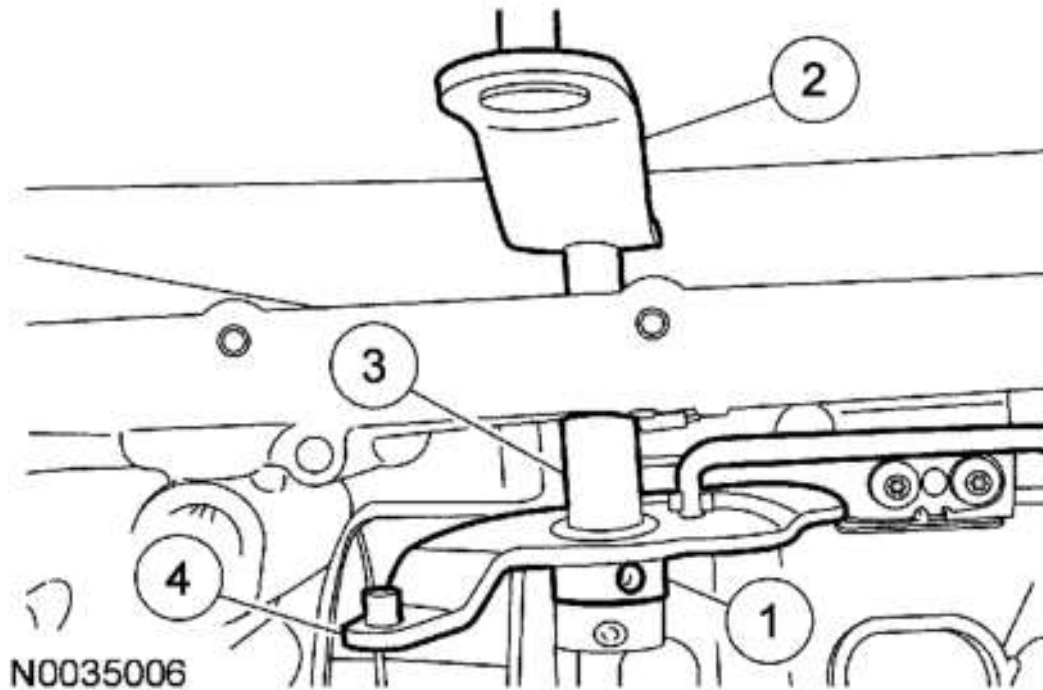
11. Remove the park rod actuating plate.



**Fig. 58: Removing Park Rod Actuating Plate**

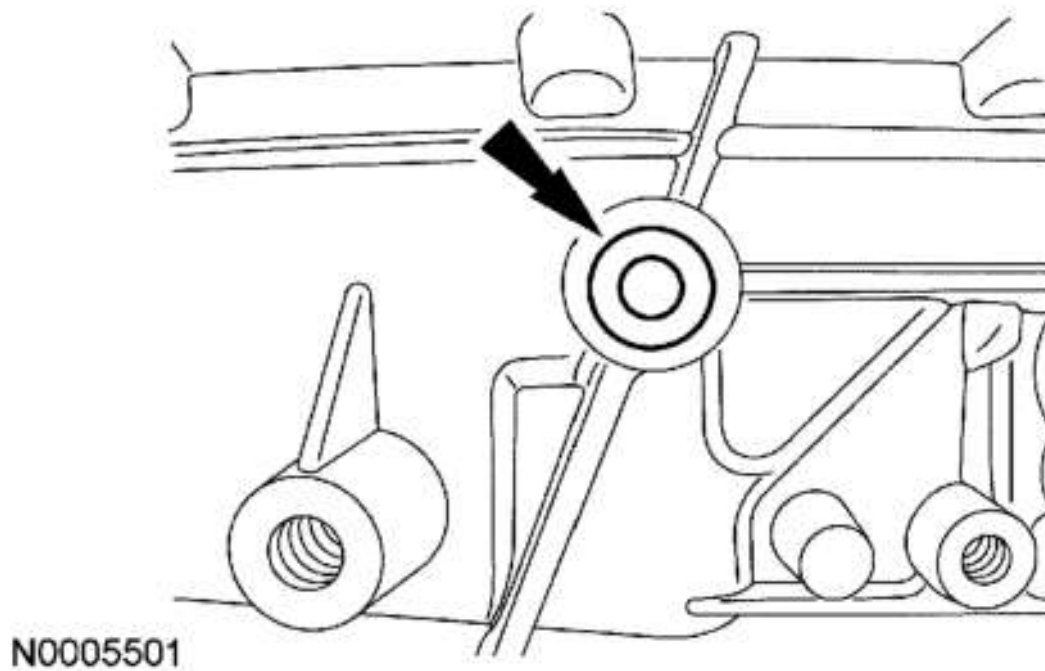
Courtesy of FORD MOTOR CO.

12. Remove the manual control lever.
  1. Remove the roll pin.
  2. Slide the manual control lever shaft out of the case.
  3. Hold the spacer to keep it from falling out of the case.
  4. Remove the manual valve inner lever and the park rod as an assembly.



**Fig. 59: Removing Manual Valve Inner Lever**  
Courtesy of FORD MOTOR CO.

13. Remove and discard the manual control lever seal.

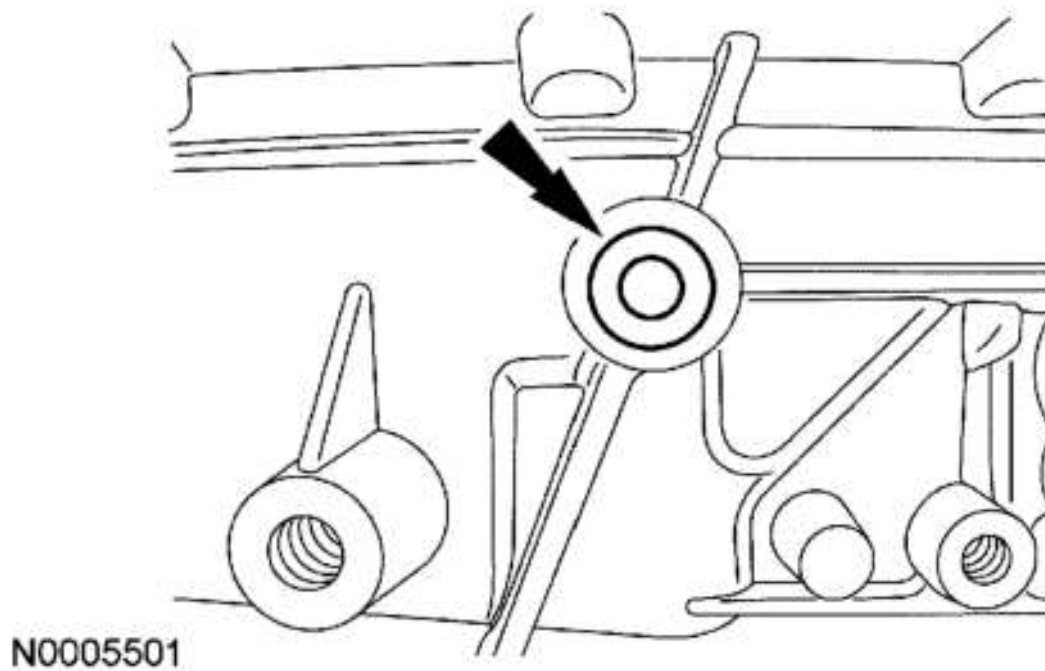


**Fig. 60: Removing Manual Control Lever Seal**  
Courtesy of FORD MOTOR CO.

**Installation**

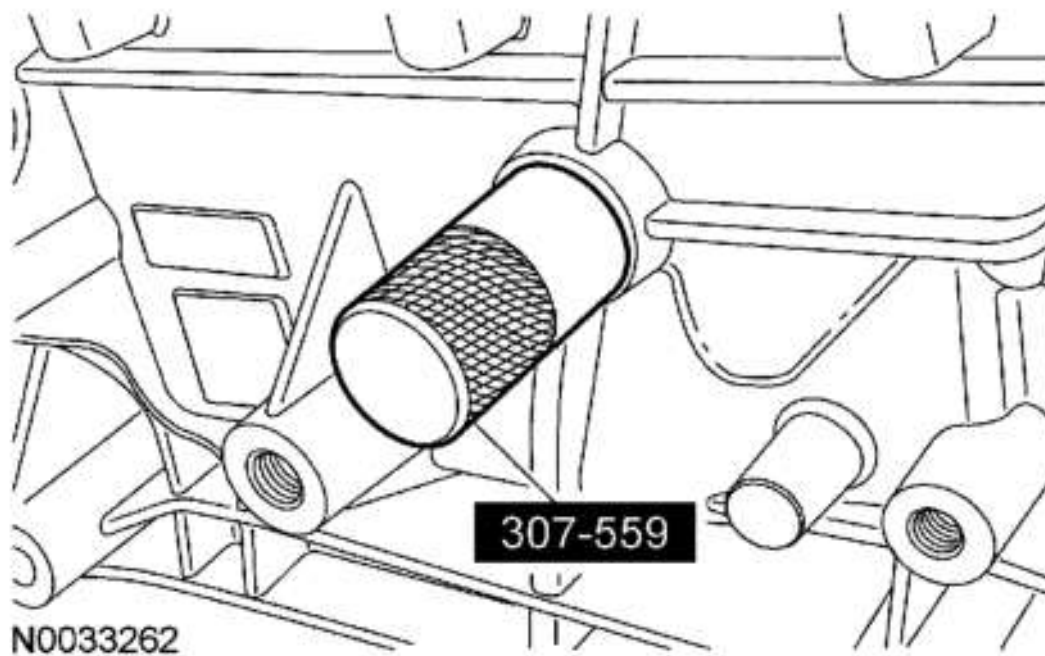
1. Position a new manual control lever seal in place.





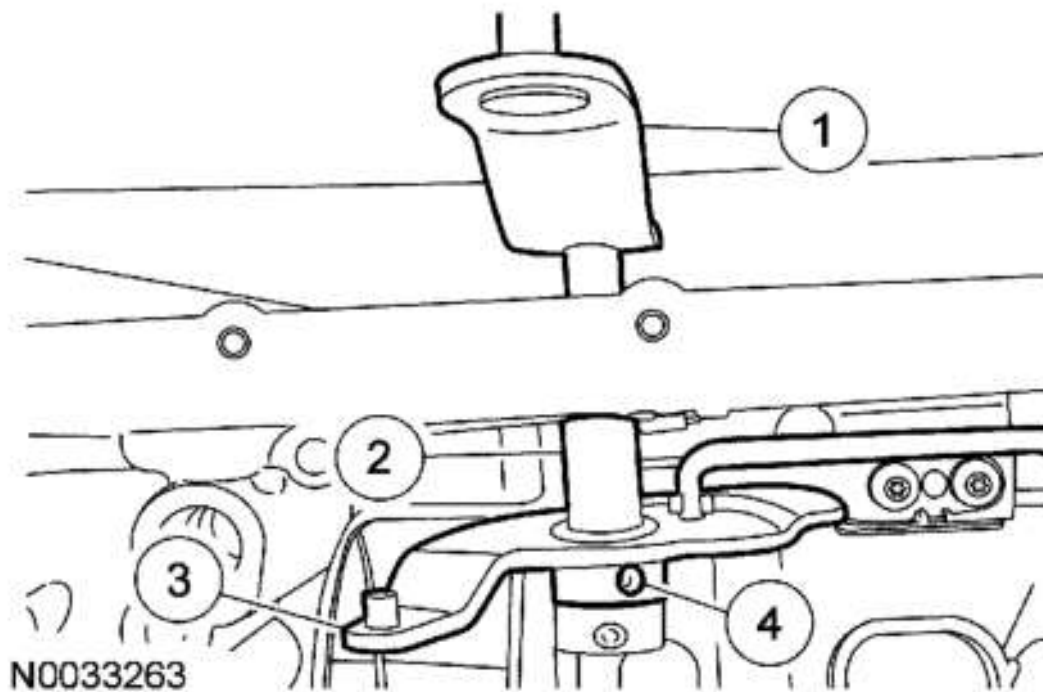
**Fig. 61: Positioning Manual Control Lever Seal**  
Courtesy of FORD MOTOR CO.

2. Using the special tool, install a new manual control lever shaft seal.



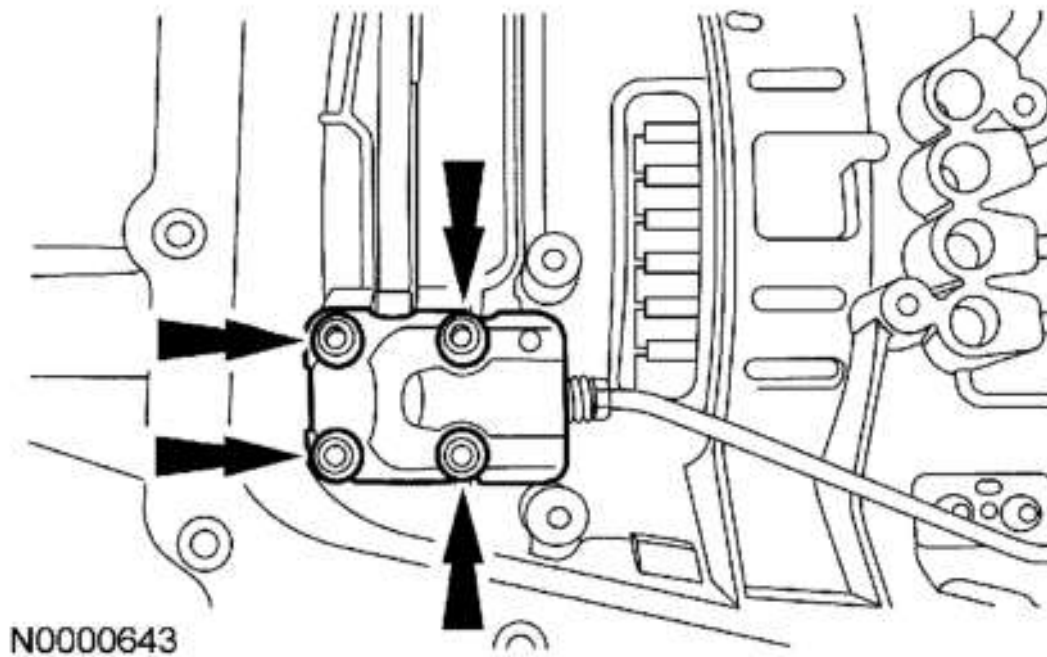
**Fig. 62: Installing New Manual Control Lever Shaft Seal**  
Courtesy of FORD MOTOR CO.

3. Install the manual lever in the case.
  1. Slide the manual lever in the case.
  2. Position the spacer in place while sliding the manual lever into the spacer.
  3. Position the manual valve inner lever while sliding the manual lever and lining up the roll pin hole.
  4. Install the roll pin.



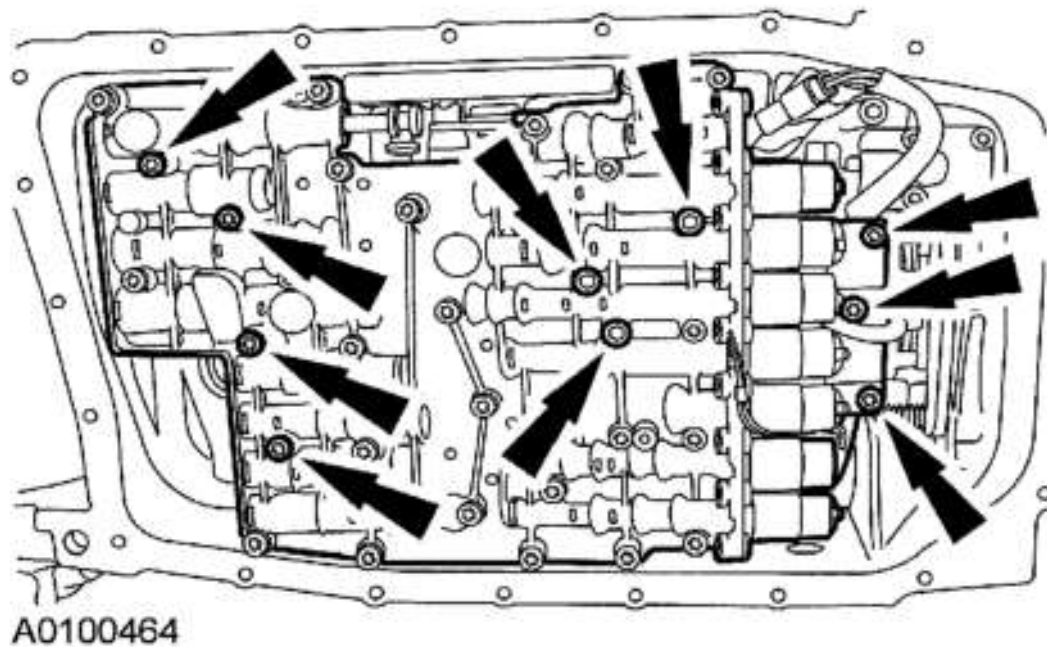
**Fig. 63: Installing Manual Lever**  
Courtesy of FORD MOTOR CO.

4. Position the park rod in place. Push down on the park pawl and position the park rod in place.
5. While holding the park rod down, install the park rod actuating plate.
  - Tighten to 10 Nm (89 lb-in).



**Fig. 64: Installing Park Rod Actuating Plate**  
Courtesy of FORD MOTOR CO.

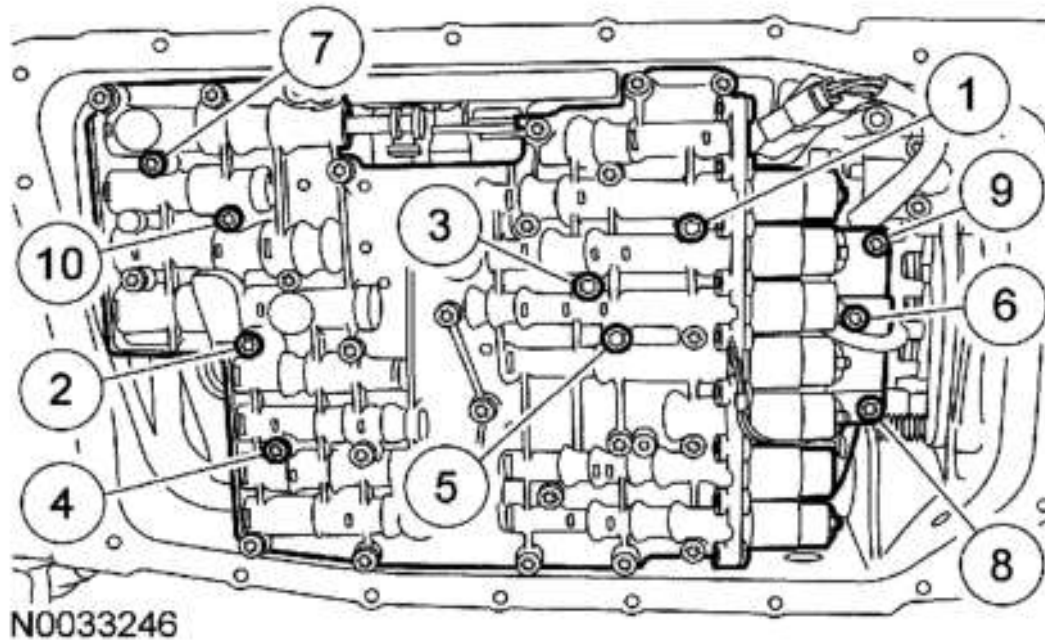
6. Position the mechatronic assembly in place and loosely install the 10 bolts.



**Fig. 65: Positioning Mechatronic Assembly In Place**

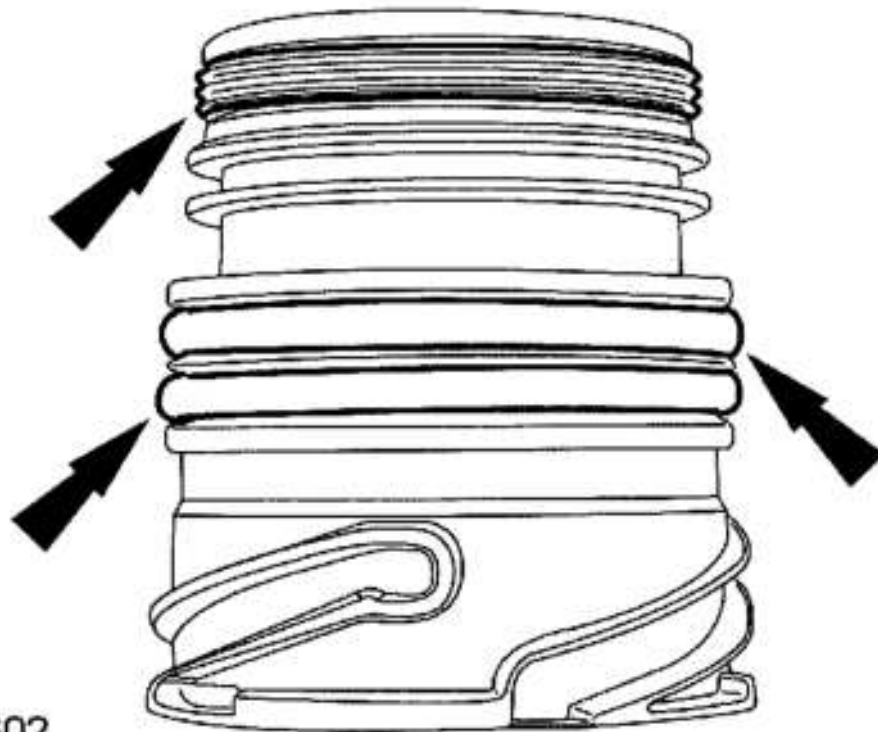
Courtesy of FORD MOTOR CO.

7. Tighten the mechatronic bolts in the sequence shown.
  - Tighten to 8 Nm (71 lb-in).



**Fig. 66: Identifying Mechatronic Bolts Tightening Sequence**  
Courtesy of FORD MOTOR CO.

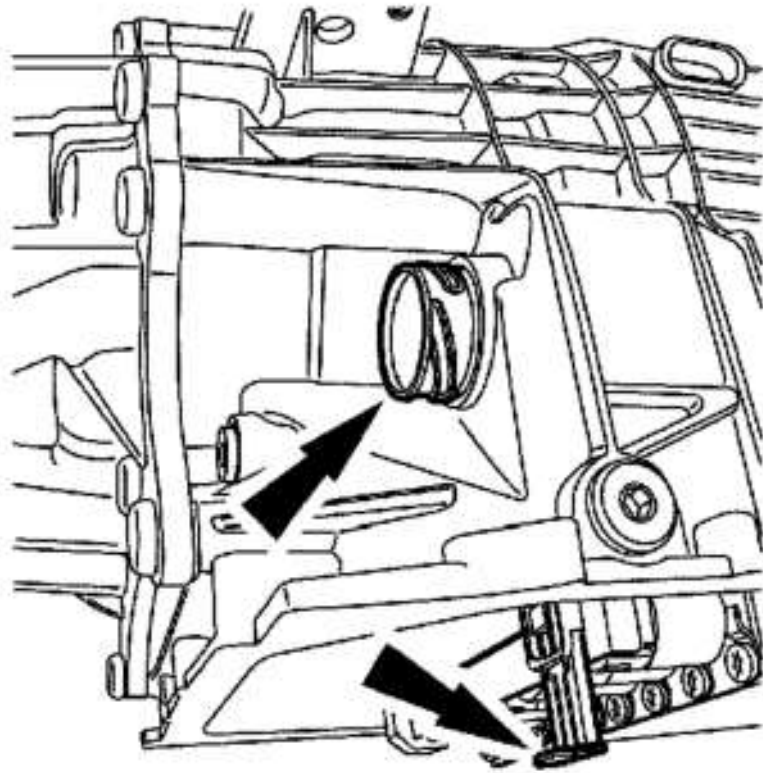
8. Install new O-rings on the outer shell of the bulkhead electrical connector.



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**Fig. 67: Installing O-Rings On Outer Shell**  
Courtesy of FORD MOTOR CO.

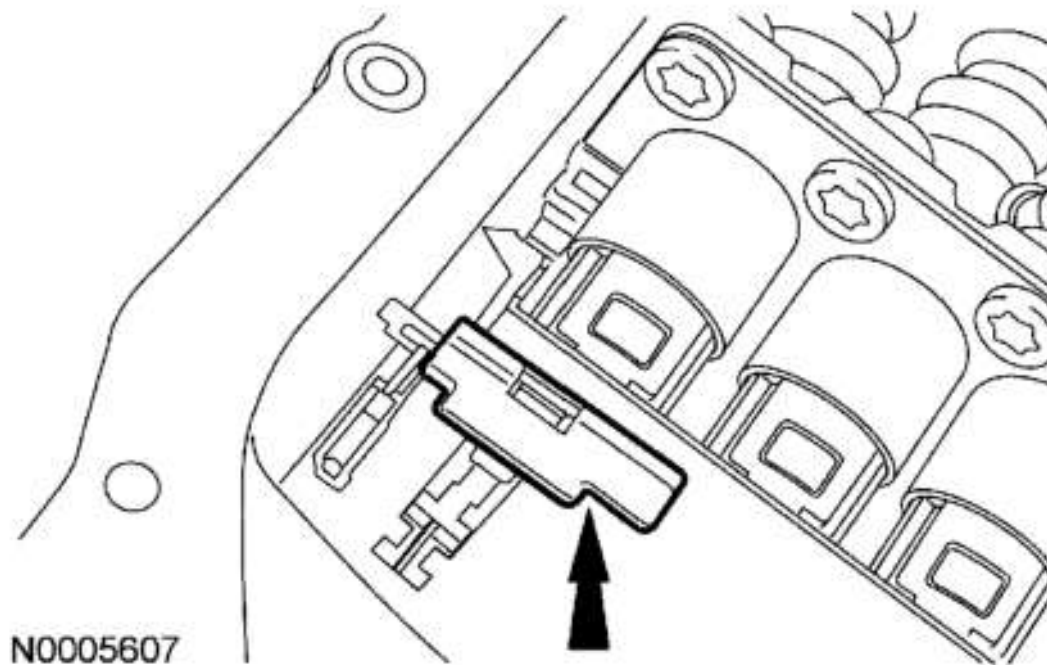
**CAUTION:** Do not touch the electrical connector pins. Electrostatic charge may occur and will cause damage to the mechatronic unit.



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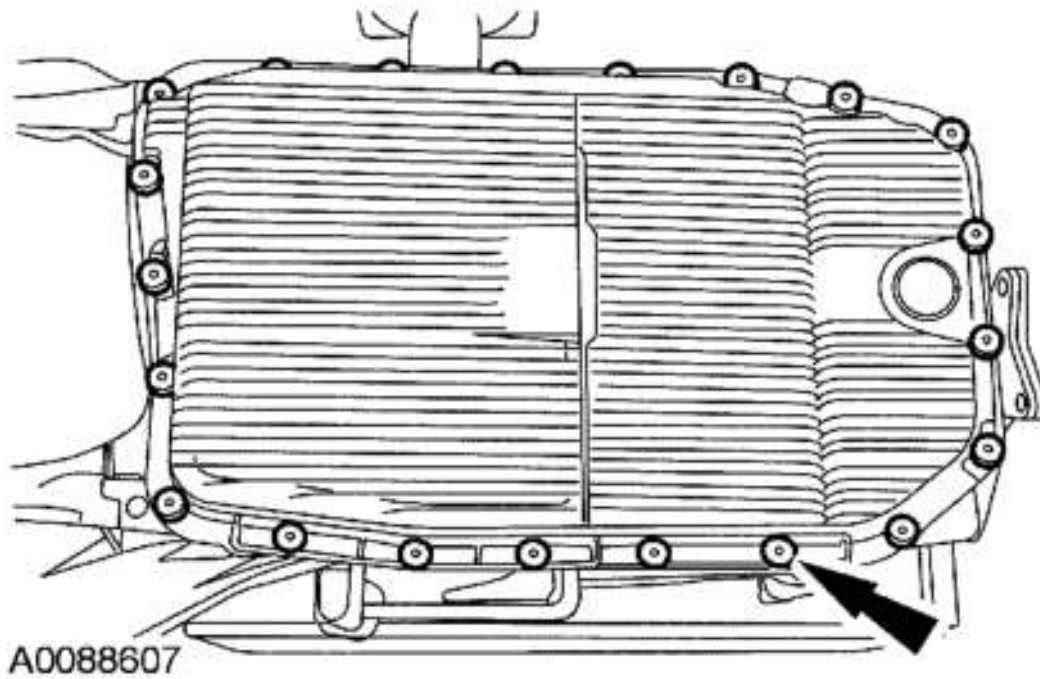
**Fig. 68: Pushing Outer Shell Of Bulkhead Electrical Connector**  
Courtesy of FORD MOTOR CO.

9. With the release tab down, push the outer shell of the bulkhead electrical connector into the transmission.
10. Press up on the tab and lock the outer shell of the bulkhead electrical connector in place.



**Fig. 69: Pressing Tab**  
**Courtesy of FORD MOTOR CO.**

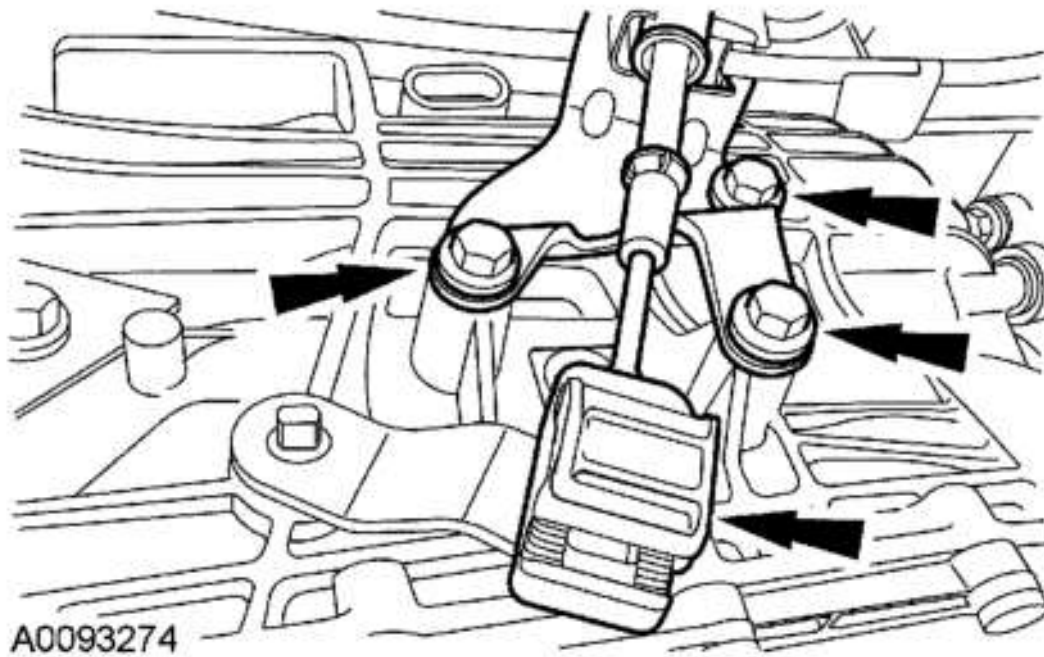
11. Install the transmission fluid pan. Tighten the bolts in a crisscross pattern.
  - Tighten to 8 Nm (71 lb-in).



**Fig. 70: Installing Transmission Fluid Pan**  
Courtesy of FORD MOTOR CO.

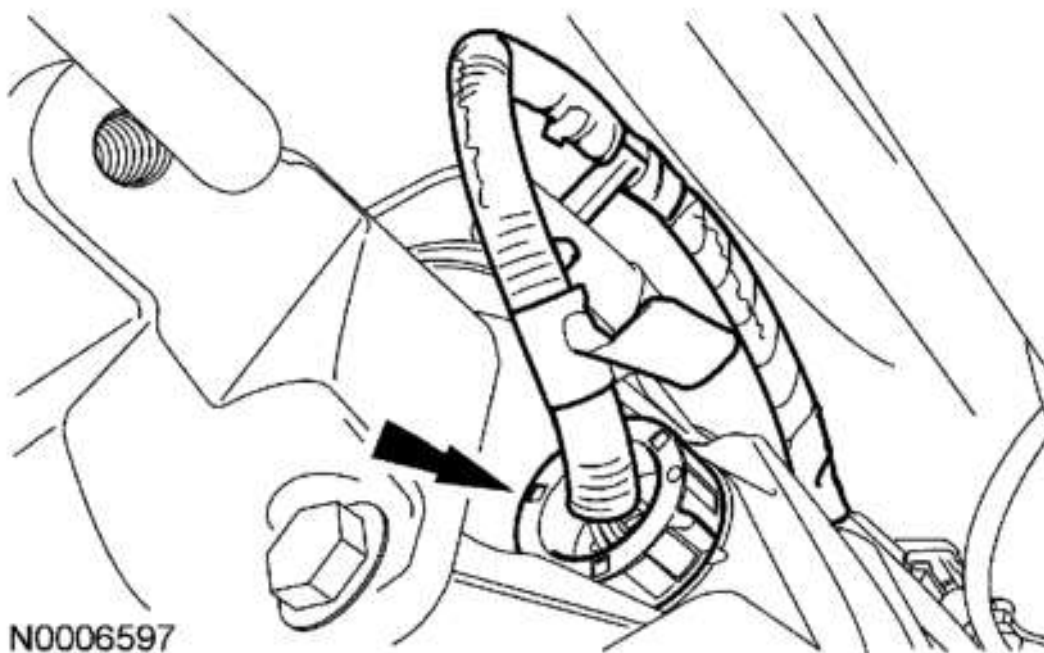
12. Install the shift cable bracket bolts and connect the shift cable end.
  - Tighten to 48 Nm (35 lb-ft).





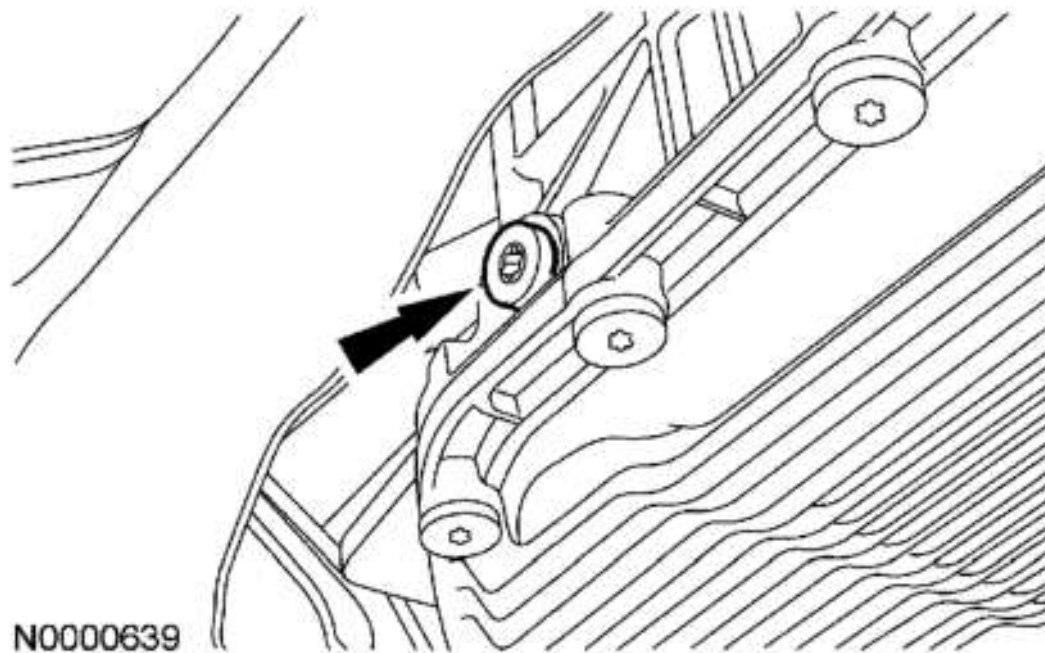
**Fig. 71: Locating Shift Cable Bracket Bolts**  
Courtesy of FORD MOTOR CO.

13. Connect the main transmission electrical harness by pushing it in and twisting the outer shell to lock it in place.



**Fig. 72: Connecting Transmission Electrical Harness**  
Courtesy of FORD MOTOR CO.

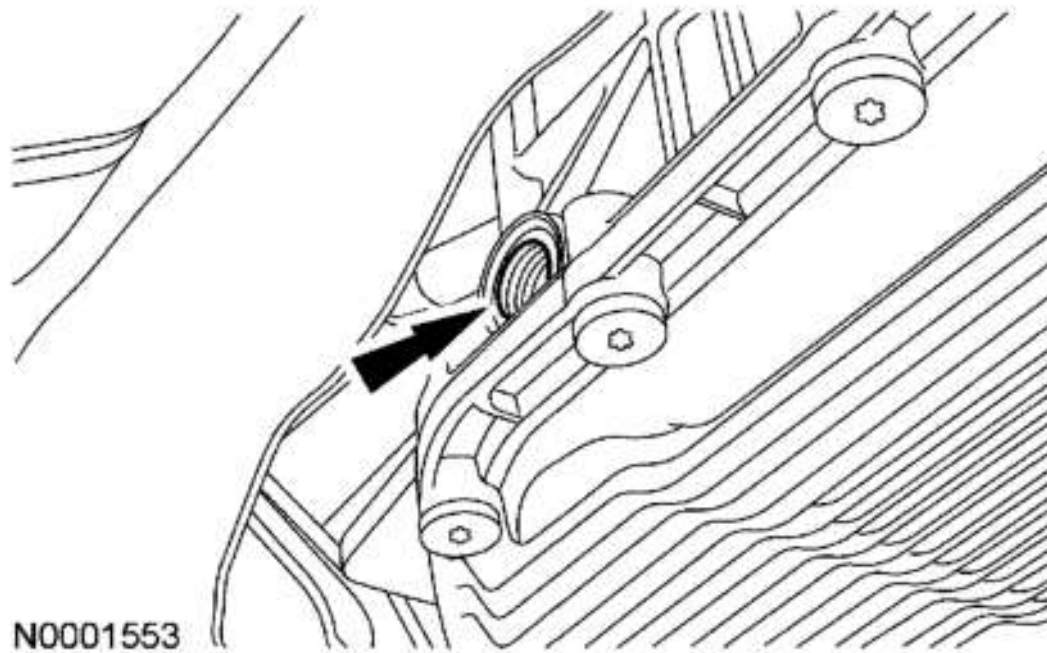
**CAUTION:** The fluid fill plug located on the side of the transmission is near the exhaust system. The exhaust will be extremely hot during this procedure. Use care when working near the exhaust and the heat shields.



**Fig. 73: Locating Fill Plug**  
Courtesy of FORD MOTOR CO.

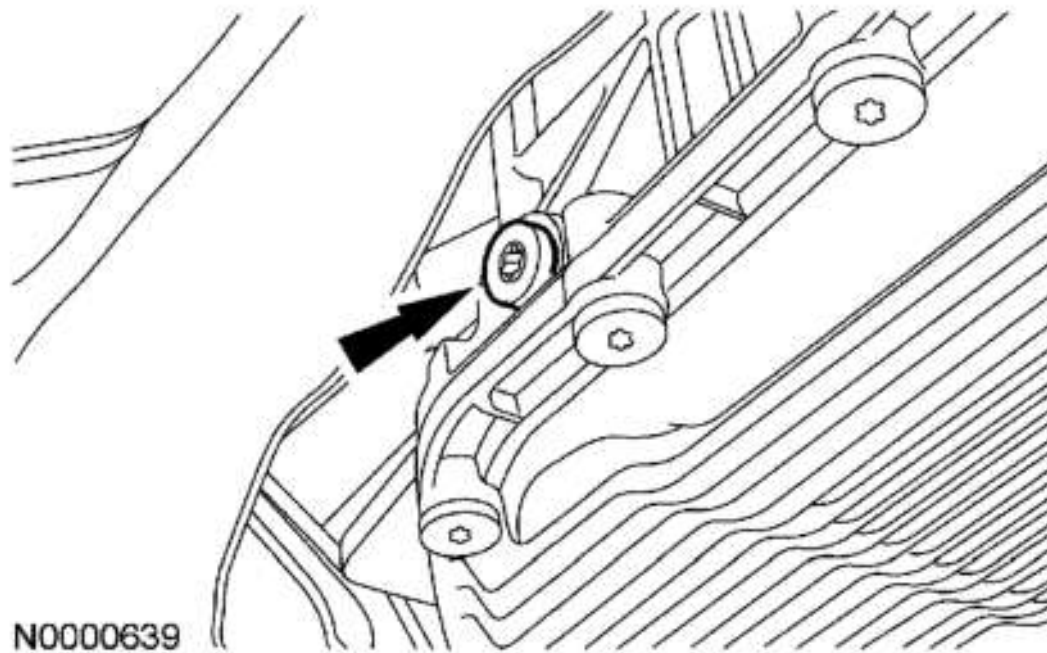
14. Remove the fluid fill plug.
  - The fill plug is located on the RH rear side of the case near the transmission electrical connector.

**CAUTION:** The use of any other transmission fluid than specified can result in the transmission failing to operate in a normal manner or transmission failure.



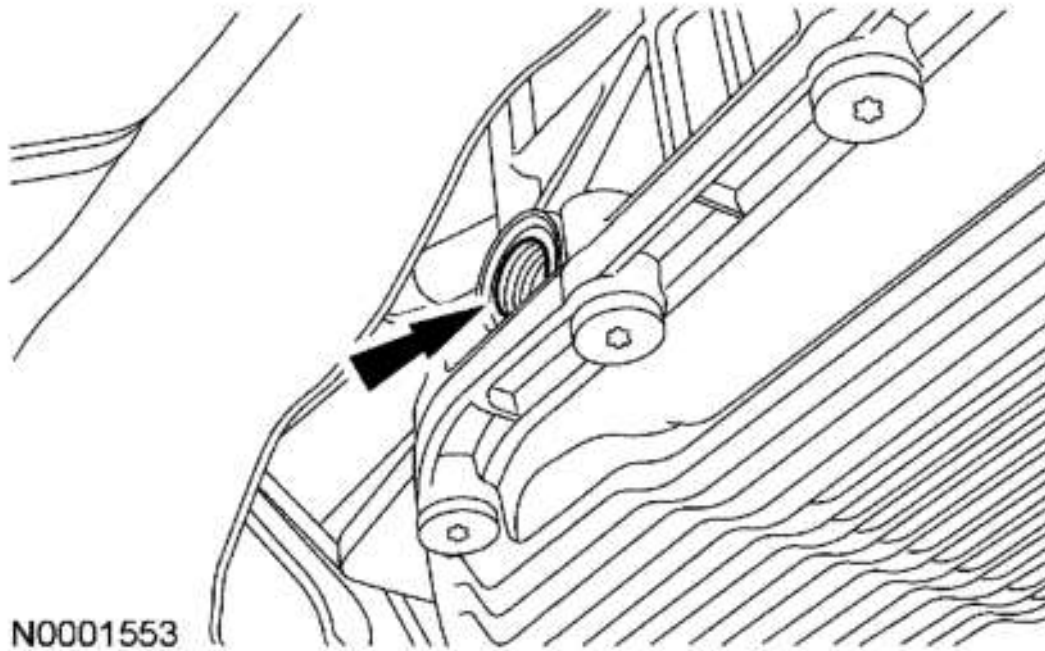
**Fig. 74: Locating Fluid Fill Plug**  
Courtesy of FORD MOTOR CO.

15. Fill the transmission.
  - Add 4.7 liters (5 quarts) of clean automatic transmission fluid to the transmission through the fluid fill hole. Stop when the fluid runs out of the bottom of the hole.
16. Install the fluid fill plug.
  - Tighten to 35 Nm (26 lb-ft).



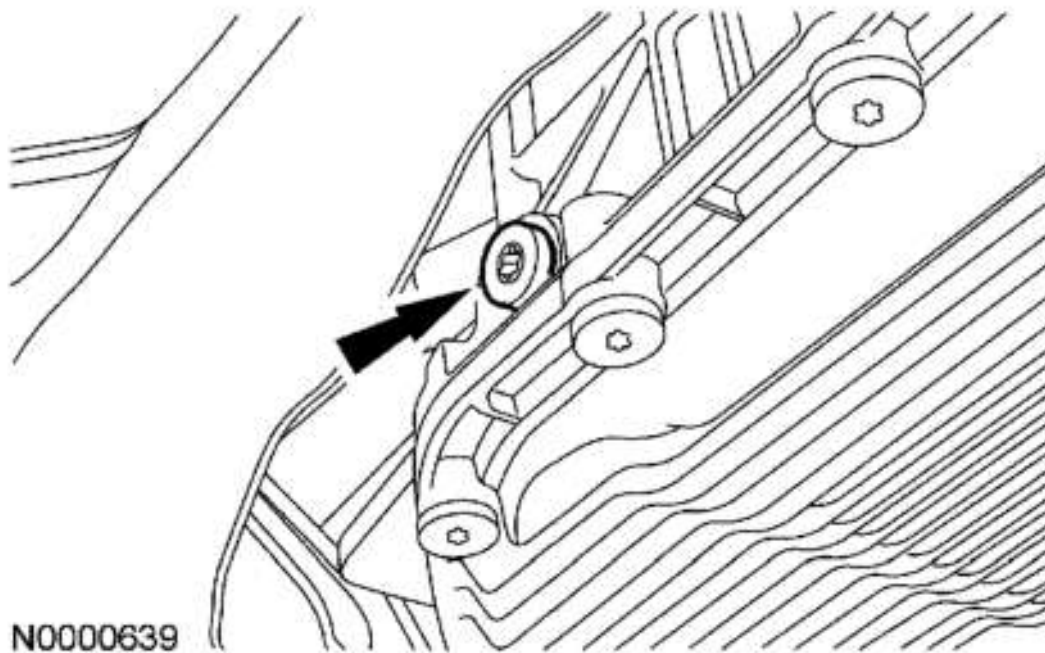
**Fig. 75: Locating Fill Plug**  
Courtesy of FORD MOTOR CO.

17. Start the engine. Move the transmission range selector lever through all the gear ranges, checking for engagements.
18. With the engine idling (600-750 rpm) in PARK and the transmission temperature at 30°C-50°C (86° F-122°F), check and adjust the transmission fluid level.
19. With the engine still running in PARK check the fluid level. If more fluid is needed, remove the fluid fill plug on the side of the case and fill with clean automatic transmission fluid until the fluid runs out of the bottom of the hole.



**Fig. 76: Locating Fluid Fill Plug**  
Courtesy of FORD MOTOR CO.

20. Install the fluid fill plug.
  - Tighten to 35 Nm (26 lb-ft).



**Fig. 77: Locating Fill Plug**  
Courtesy of FORD MOTOR CO.