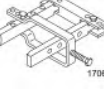
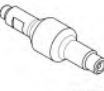
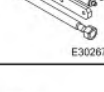
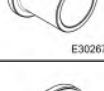
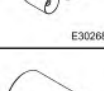


Transmission

Special Tool(s) / General Equipment

 E129694	100-001 (T50T-100-A) Slide Hammer
 E139373	100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge
 E232969	205-1018 Installation Tube
 307-003	307-003 (T57L-500-B) Holding Fixture, Transmission
 17089	307-309 Remover, Torque Converter Seal TKIT-1994-FMH/FLMH TKIT-1994-LMH/MH TKIT-1994-FH
 307-346	307-346 (T97T-7902-A) Retainer, Torque Converter TKIT-1998-LM (NavigatoR) TKIT-1997-F/FLM/LT
 E270043	307-549 Installer, Shift Shaft Fluid Seal TKIT-2005D1-F1
 E216419	307-584 2-6 Spring Compressor TKIT-2006UF-FLM TKIT-2006UF-ROW
 E321855	307-588 Reverse clutch piston and retaining ring set TKIT-2006UF-FLM TKIT-2006UF-ROW
 E216420	307-589 Overdrive clutch and balance piston service set TKIT-2006UF-FLM TKIT-2006UF-ROW
 E321861	307-649 Socket, Output Shaft Nut TKIT-2009C-F TKIT-2009C-ROW
 E321862	307-650 Installer, Output Shaft Seal TKIT-2009C-F TKIT-2009C-ROW
 E270044	307-651 Bracket, Pump Remover/Installer

 E302721	307-651-04 Adapter, Lift Fixture
 E270048	307-662 Gauge, Clutch Pack Endplay TKIT-2009C-F TKIT-2009C-ROW
 E239703	307-691 Tester, Torque Converter Leak
 E302682	307-732/1A Converter flush base
 E302681	307-732-03 Mandrel, Converter Flush 10R140
 E234921	307-741 Spring Compressor, F Clutch
 E302675	307-741-01 Remover, Front Support & Cover
 E302629	307-783 Installer, Roll Pin
 E302673	307-798 Remover/Installer One Way Clutch
 E302676	307-799 Bar, End Play
 E302677	307-800 Puck, Endplay
 E302674	307-807 Installer Converter Seal
 E302694	307-809 push & sizer, F0 Seal guide
 E302718	307-810 pusher & sizer, F9 Seal guide

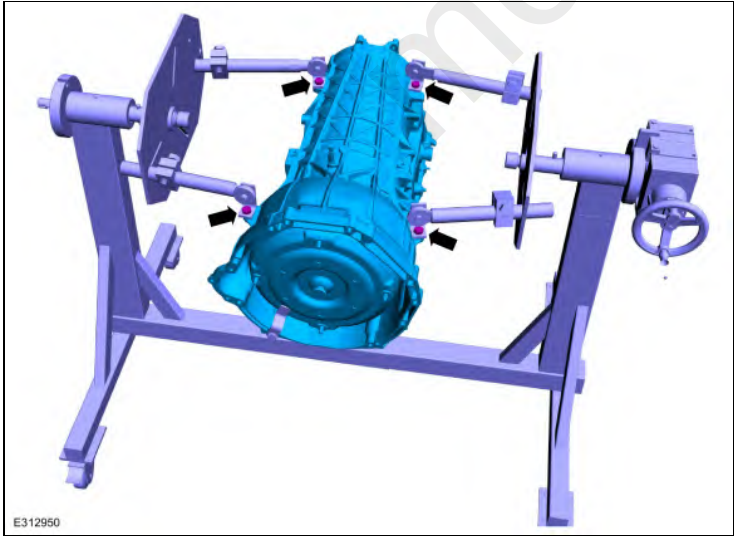
	307-811 pusher & sizer, F2 Seal guide
	307-812 pusher & sizer, F1 Seal guide
	307-813 Installer, Output shaft rear seal
Rubber Mallet	
Mounting Stand	
Hydraulic Press	
Adjustable Mounting Arm	
Punch	
Wooden Block	
Magnet	

Materials

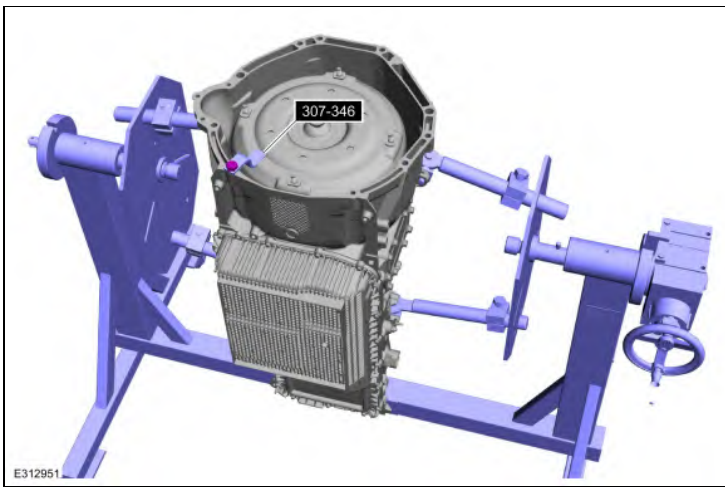
Name	Specification
Motorcraft® MERCON® ULV Automatic Transmission Fluid XT-12-QULV	WSS-M2C949-A, MERCON® ULV

All vehicles

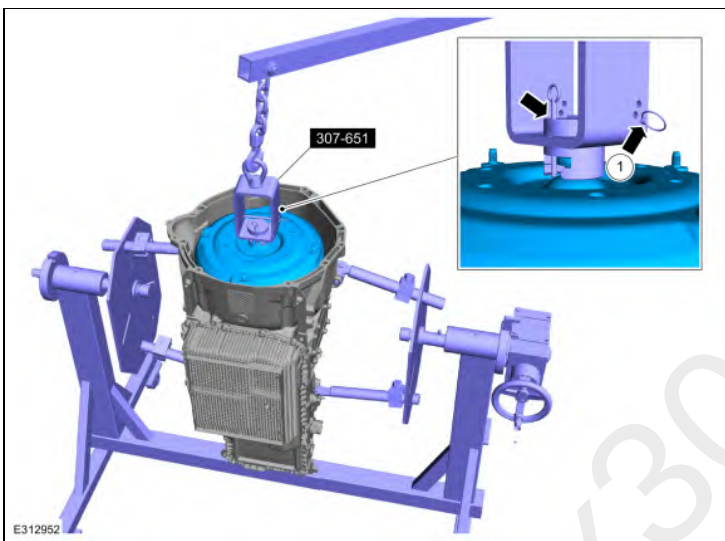
- Transmission overhaul includes the following:
 - Complete disassembly of the transmission
 - Cleaning and inspecting of all components
 - Replacement of all seals, gaskets, and one time use components. Use gasket kit -7153-
 - Complete assembly with clearances adjusted to specification
 - Replacement of any additional parts that may be required if worn or damaged
- For information on component views and base part numbers.
Refer to: Transmission Description (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission 10R140, Description and Operation).
- Mount the transmission to a mounting stand.
Use the General Equipment: Mounting Stand
Use the General Equipment: Adjustable Mounting Arm



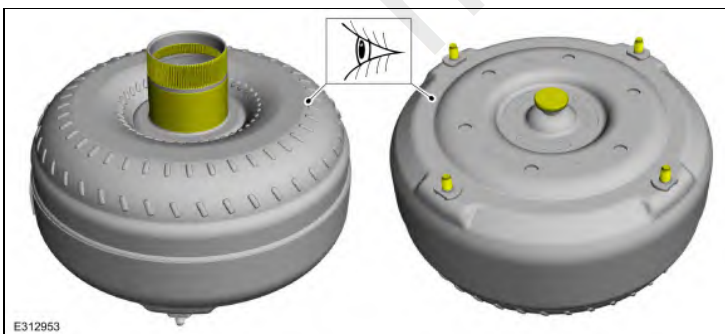
- Remove the special tool.
Use Special Service Tool: 307-346 (T97T-7902-A) Retainer, Torque Converter.



5. Using the special tool and a floor crane, remove the torque converter.
1. Install the pin in the bottom hole.
Use Special Service Tool: 307-651 Bracket, Pump Remover/Installer.



6. A new or remanufactured torque converter must be installed if one or more of the following statements are true:
- The sealing surface has a groove worn from the seal.
 - A torque converter malfunction has been determined based on complete diagnostic procedures.
 - The torque converter stud or studs, threaded pads, impeller hub or bushing are damaged.
 - The torque converter exhibits external discoloration (due to overheating).
 - There is evidence of water or antifreeze contamination.



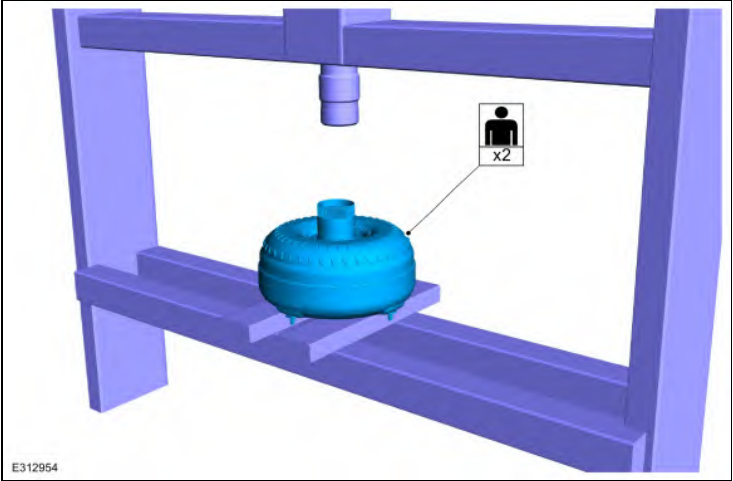
Flush The Torque Converter With The Transmission Cooling System Heated Flusher

7. **NOTE:** Use transmission fluid specified for this transmission. Do not use any supplemental transmission fluid additives or cleaning agents. The use of these products could cause internal transmission components to fail, which will affect the operation of the transmission.

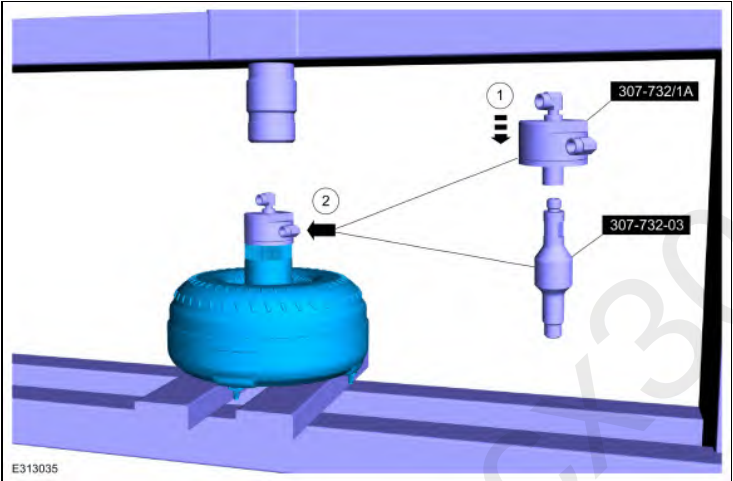
The torque converter must be flushed every time the transmission is overhauled. It is mandatory that proper equipment and procedures be followed when flushing the torque converter. The flushing equipment used MUST:

- Maintain the transmission fluid at 140°F or above
 - Pulsate the transmission fluid during cleaning
 - Have a GPM flow meter
 - Have a filter with a rating of 100 micron or less
 - Have air purge capability before and after flushing
8. If equipment meeting the specifications above is not available, the torque converter must be flushed by hand. Go to Flush The Torque Converter By Hand steps later in this procedure.

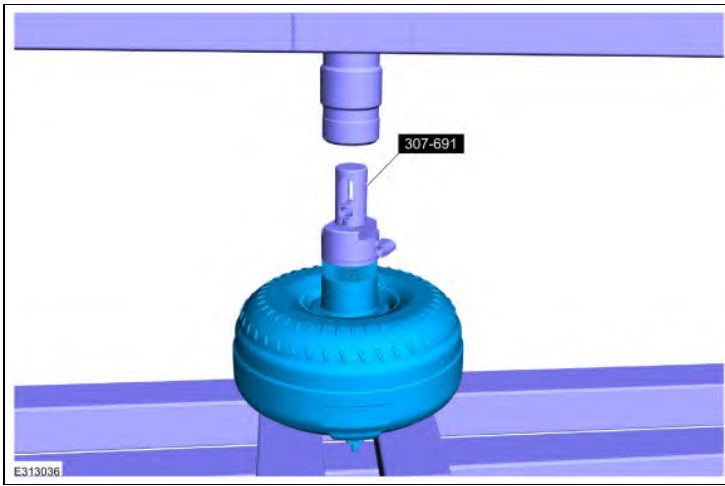
9. Check and top off the transmission fluid level of the transmission cooling system heated flusher with transmission fluid.
10. Turn on the heater and allow the transmission fluid in the transmission cooling system heated flusher 15-30 minutes to heat up to 60Â°C (140Â°F) before using.
11. Place the torque converter in an arbor press. Support the torque converter on the mounting pads.



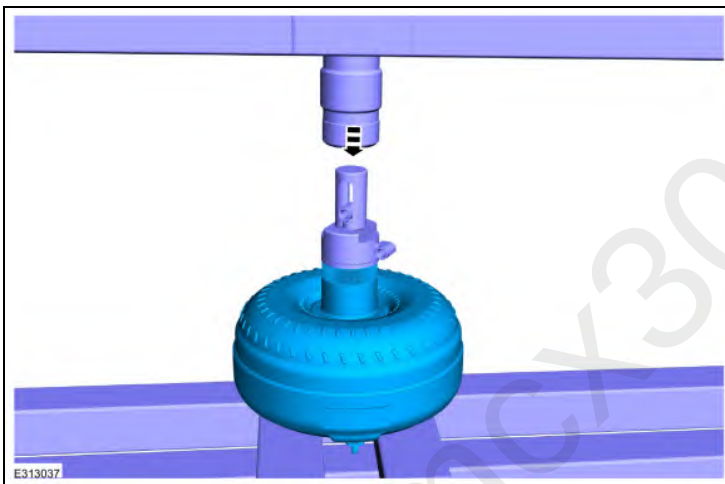
- 12.
1. Assemble the special tools.
Use Special Service Tool: 307-732/1A Converter flush base , 307-732-03 Mandrel, Converter Flush 10R140.
 2. Install the special tools on the torque converter hub.



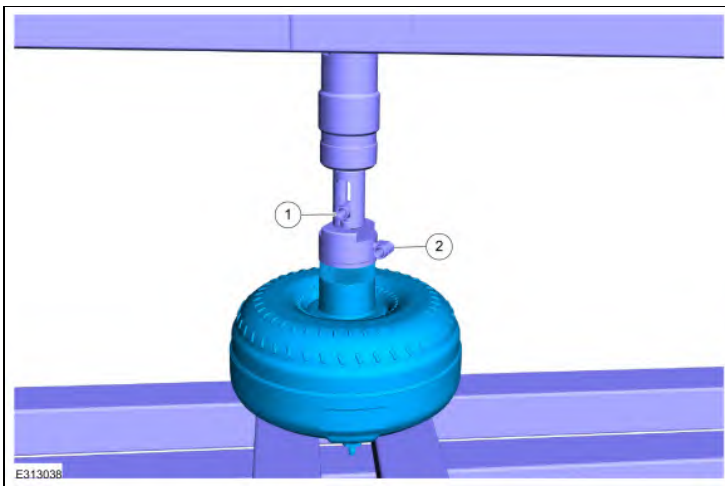
13. Using the special tool, install the slotted cap.
Use Special Service Tool: 307-691 Tester, Torque Converter Leak.



14. Apply enough force from the press to seal the torque converter flush main hub to the torque converter hub.



15. Connect the flush machine to the main hub.
1. Red hose on top.
 2. Blue hose on bottom.



16. Follow the equipment instructions to purge transmission fluid from the torque converter prior to starting the flushing procedure.

17. **WARNING: The torque converter, adaptor 307-732, and the hoses will be hot.**

NOTE: Maintain visual contact with torque converter during the entire flush procedure. Immediately stop the flush machine if a leak develops. Repeat set up steps to reseal the tool to the converter hub and continue flushing.

Forward flush the converter for 15 minutes.

18. Monitor GPM flow meter periodically during the flush procedure. Flow rate above 2.0 gallons per minute is required to break up and dislodge any contamination trapped behind the TCC plate. Service flush machine filter(s) if flow rate drops below 2 GPM.

19. Follow the equipment instructions to purge the torque converter.

20. **WARNING: The torque converter, adaptor 307-732, and the hoses will be hot.**

Allow torque converter and equipment to cool for 30 minutes before handling.

21. Disconnect the hoses and remove the special tools.

Flush The Torque Converter By Hand

NOTICE: Do not use water-based cleaners or mineral spirits to clean or flush the torque converter or transmission damage will occur. Use only clean transmission fluid designated for the transmission and torque converter being serviced.

NOTE: Only flush the torque converter by hand when the transmission cooling system heated flusher is not available.

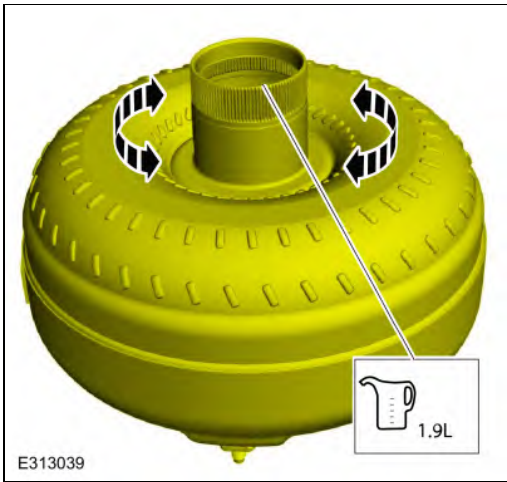
22. Pour a small amount of transmission fluid from the torque converter onto an absorbent white tissue or through a paper filter.

23. Examine the transmission fluid for contaminants. The transmission fluid must be free of metallic contaminants. If metallic contaminants are present, do not continue with hand flushing. The torque converter must be flushed with the transmission cooling system heated flusher.

24. Drain the remaining transmission fluid from the torque converter.

25. Using only the recommended transmission fluid, add 1.9L (2 qt) of clean transmission fluid into the converter and agitate by hand.

Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QLV (WSS-M2C949-A,) (MERCON® ULV)



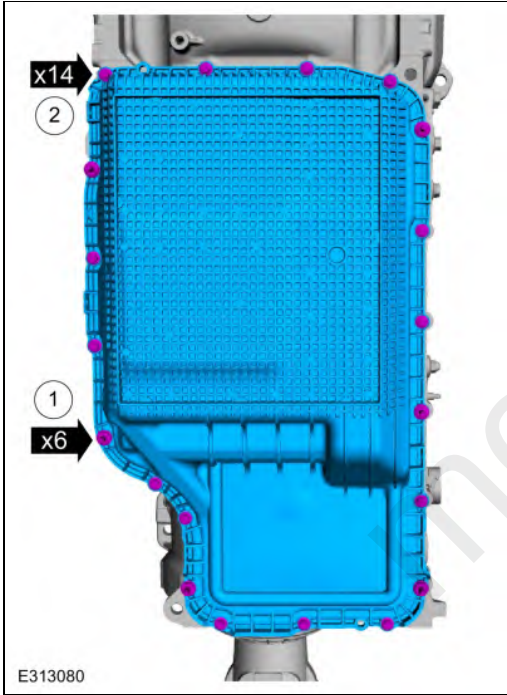
26. Thoroughly drain the transmission fluid.

All vehicles

27. **NOTE:** Note the location of the bolts and studbolts for assembly.

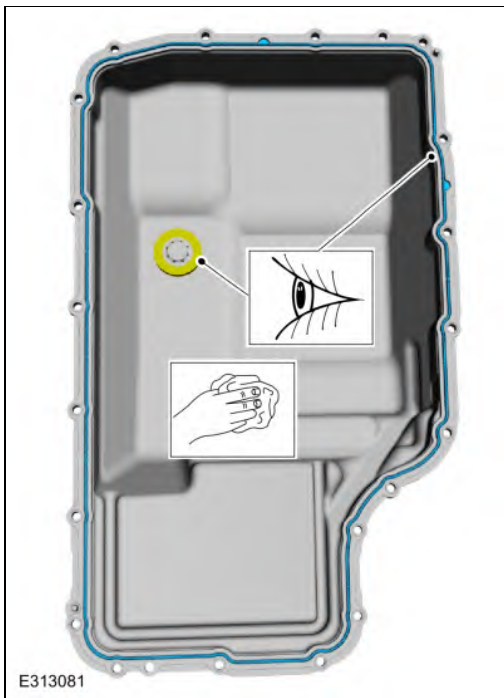
Remove the bolts and studbolts and the transmission fluid pan.

- 1. Studbolts
- 2. Bolts



28. **NOTE:** The transmission fluid pan gasket can be reused if not damaged.

Clean and inspect the pan, gasket and the magnet for damage.

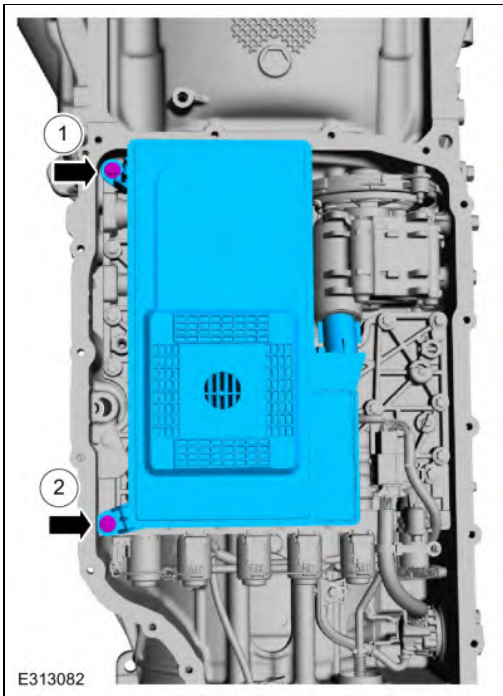


29. **NOTE:** The transmission fluid filter may be reused if no excessive contamination is indicated.

Remove the bolts and the transmission fluid filter.

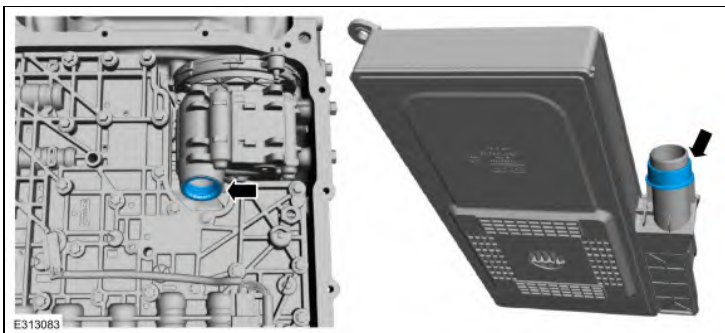
1. bolt
Dimension: 2.68 in (68 mm)
2. bolt
Dimension: 1.97 in (50 mm)

mcx30.com

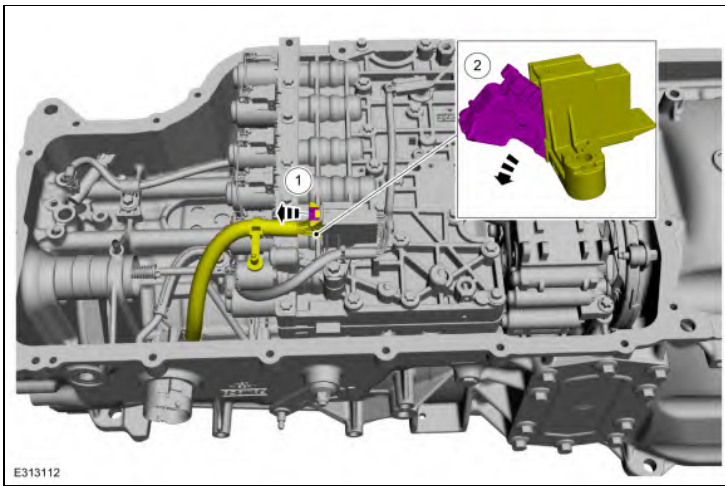


30. **NOTE:** The transmission fluid filter seal will either come off with the transmission fluid filter or it will be stuck in the pump.

Remove the transmission fluid filter seal.

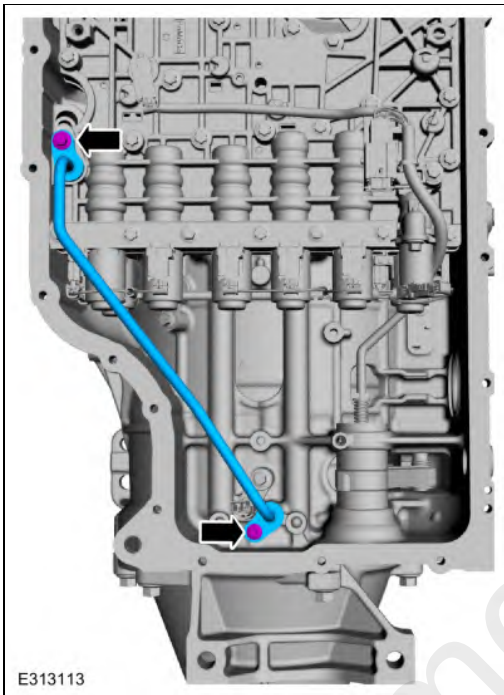


- 31.
- Disconnect the main control main electrical connector.
1. Release the locking tab.
 2. Rotate the locking arm down.

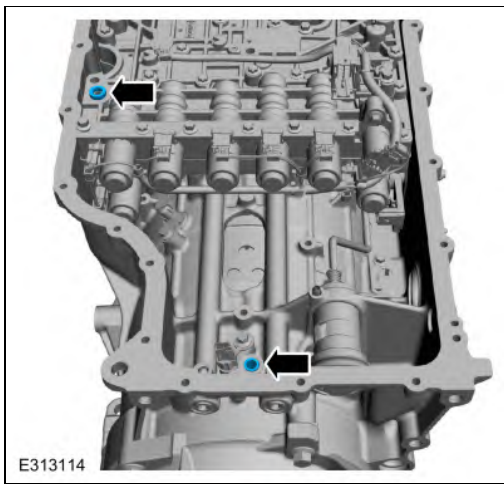


Vehicles equipped with a slip yoke transmission

32. Remove the bolts and the transmission fluid feed tube.

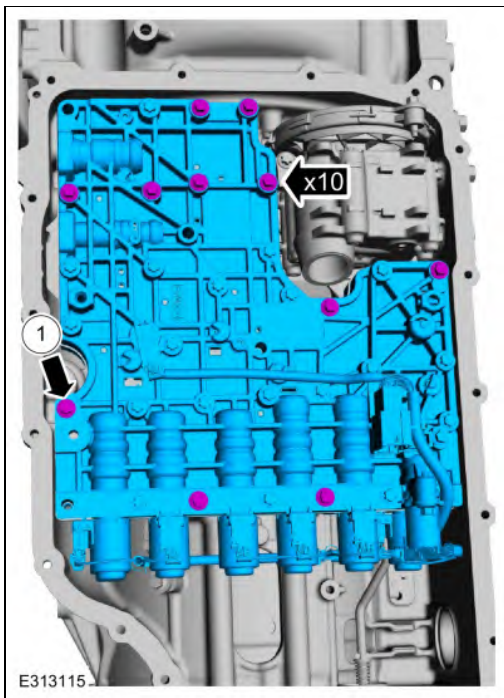


33. Remove the slip yoke transmission fluid feed tube seals.

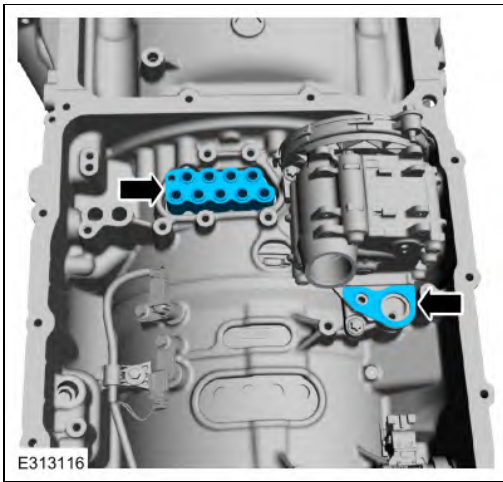


All vehicles

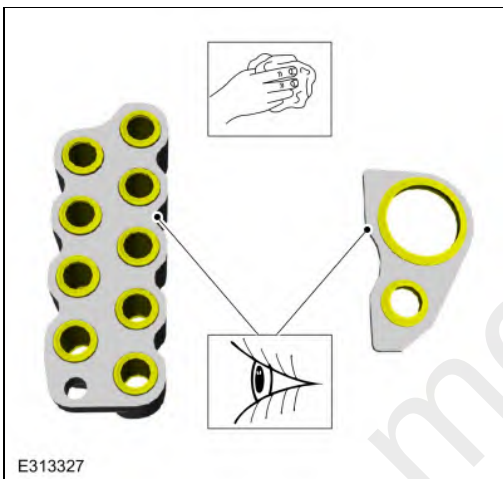
34. Remove the bolts and the main control assembly.
1. **NOTE:** *All except slip yoke transmissions.*



35. Remove the main control manifold seal and the fluid pump gasket.



36. Clean and inspect the main control manifold seal and the fluid pump gasket for damage.

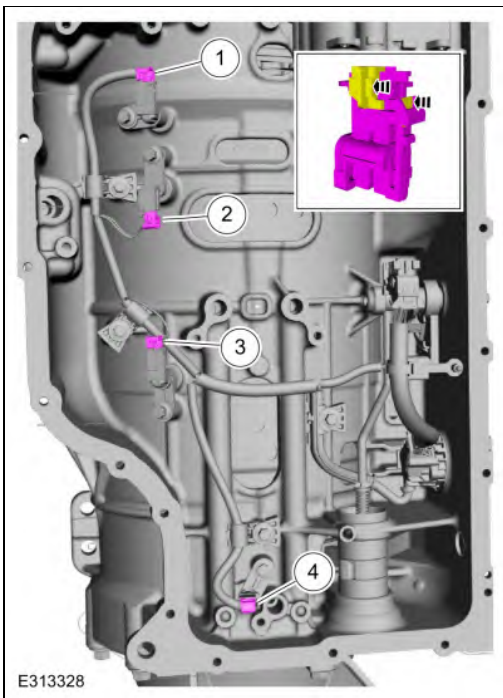


37. Clean and inspect the main control for damage.

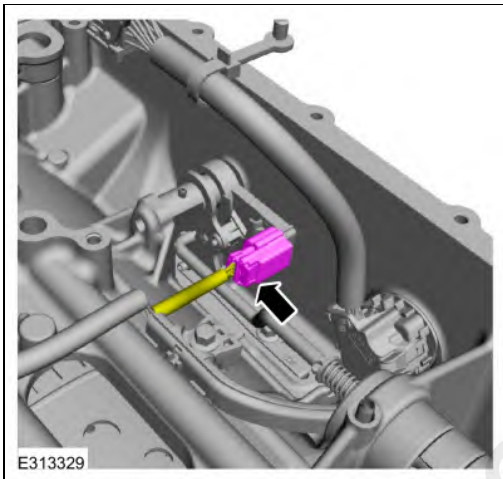
Refer to: Main Control Valve Body (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission & 10R140, Overhaul).

38. Unlock and disconnect the speed sensors.

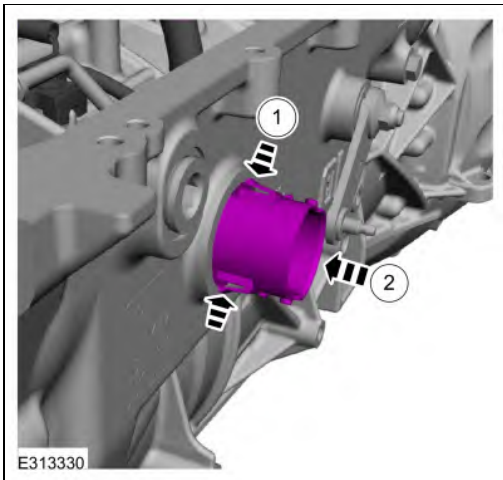
1. Intermediate Speed Sensor A (ISSA)
2. TSS sensor
3. Intermediate Speed Sensor B (ISSB)
4. OSS sensor



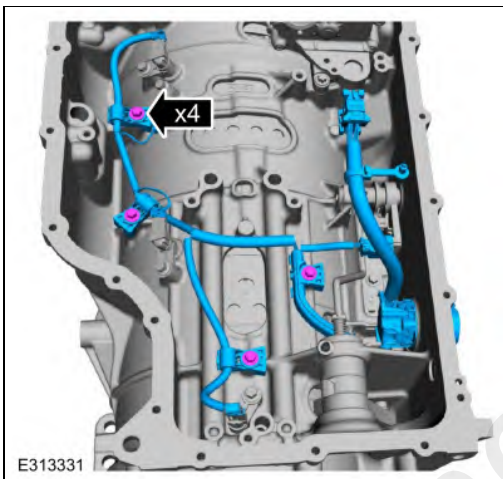
39. Disconnect the TR sensor electrical connector.



40. Disconnect the transmission internal wiring harness connector from the transmission case.
1. Compress the tabs on the transmission internal wiring harness connector.
 2. Push the connector through the case.

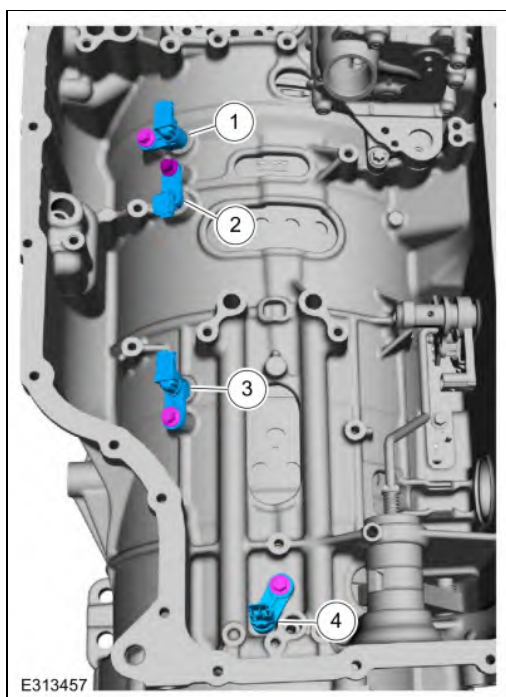


41. Remove the bolts and the transmission internal wiring harness.



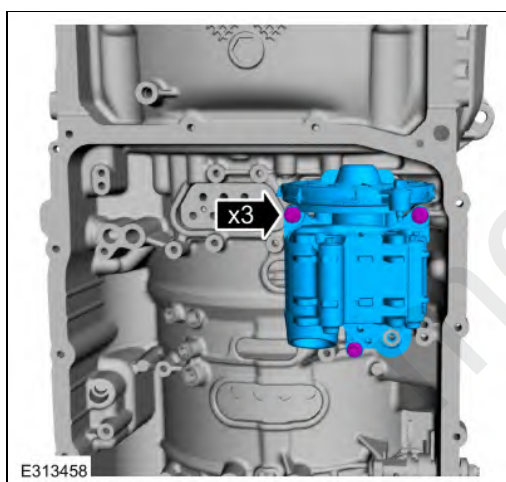
42. Remove the speed sensors.

1. Intermediate Speed Sensor A (ISSA)
2. TSS sensor
3. Intermediate Speed Sensor B (ISSB)
4. OSS sensor



43. **NOTE:** Use a 10ep Torx PlusÂ® socket to remove the bolts.

Remove the bolts and the transmission fluid pump.

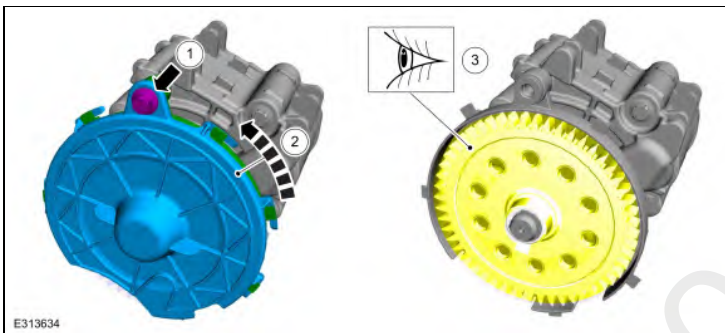


44. Remove the transmission fluid pump seal.



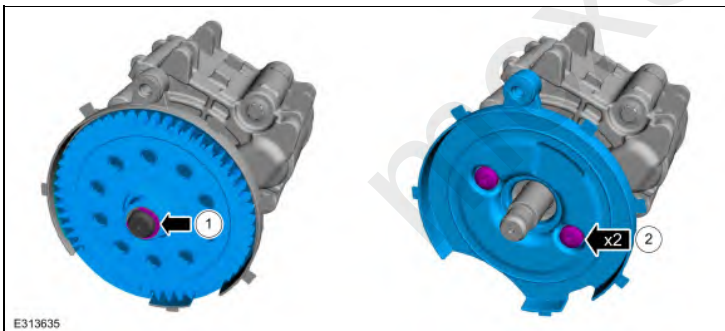
45.

1. Remove the fluid pump driven gear outer cover bolt.
2. Rotate counterclockwise and remove the fluid pump driven gear outer cover.
3. Clean and inspect the fluid pump driven gear for damage.



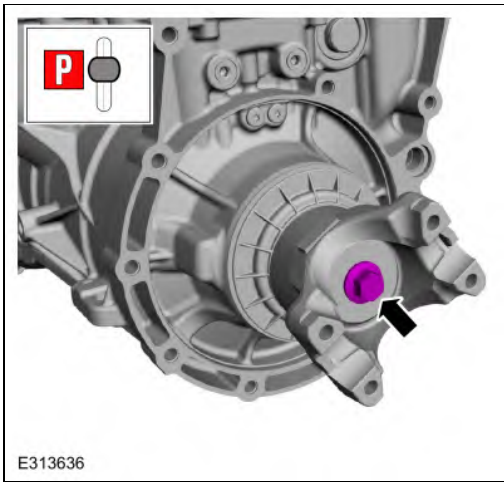
46.

1. If replacing the fluid pump driven gear or fluid pump driven gear inner cover, remove the retaining ring and the fluid pump driven gear.
2. If necessary, remove the bolts and the fluid pump driven gear inner cover.

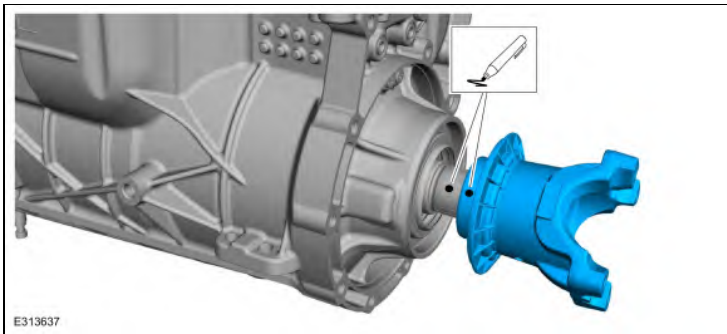


Vehicles equipped with a fixed flange transmission

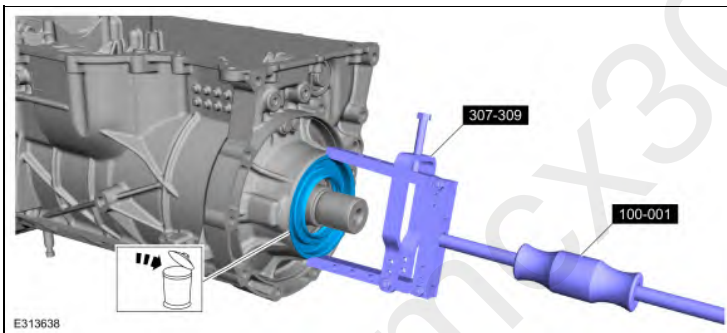
47. Rotate the manual control lever to P. Remove and the output shaft flange bolt.



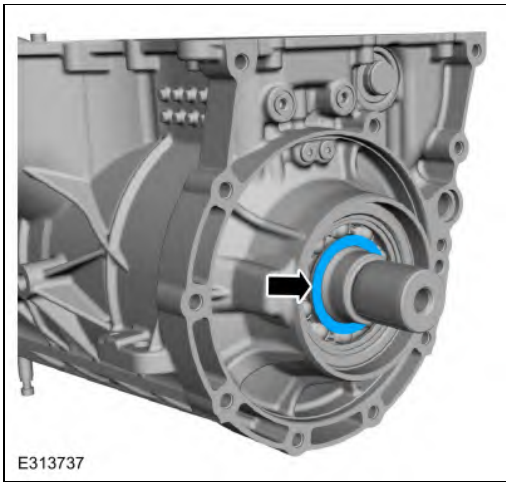
48. If ink marks are not present, index mark the output shaft flange to the output shaft.



49. Using the special tools, remove and discard the output shaft seal.
Use Special Service Tool: 100-001 (T50T-100-A) Slide Hammer, 307-309 Remover, Torque Converter Seal

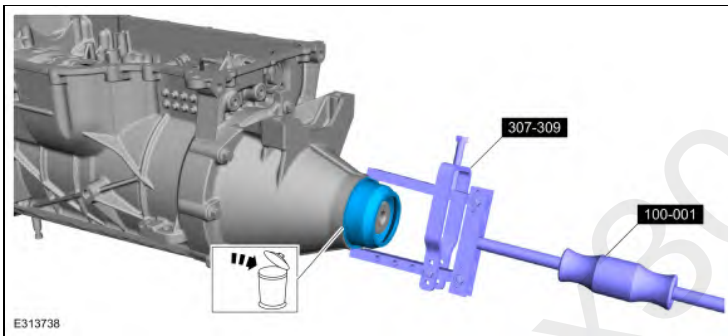


50. Remove the anti-ting washer.

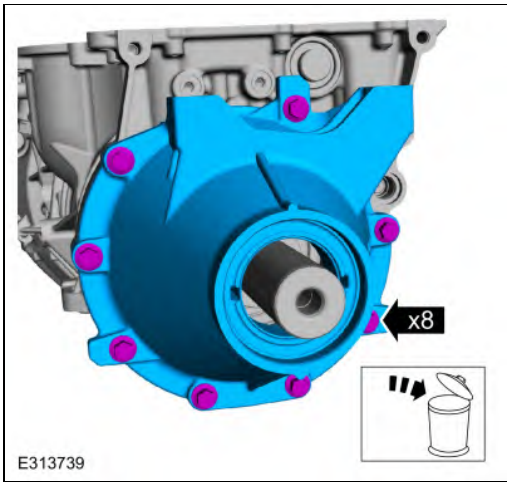


Vehicles equipped with a slip yoke transmission

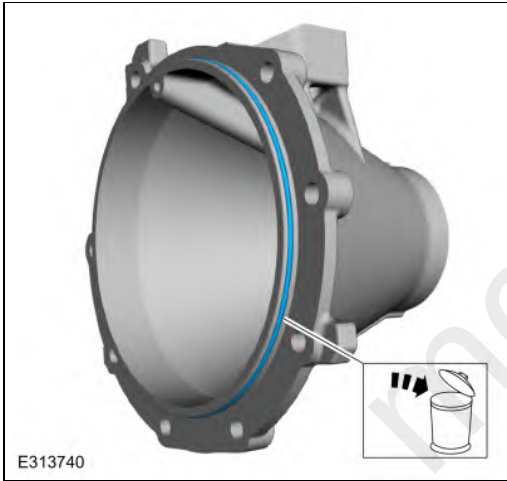
51. Using the special tools, remove and discard the output shaft seal.
 Use Special Service Tool: 100-001 (T50T-100-A) Slide Hammer. , 307-309 Remover, Torque Converter Seal.



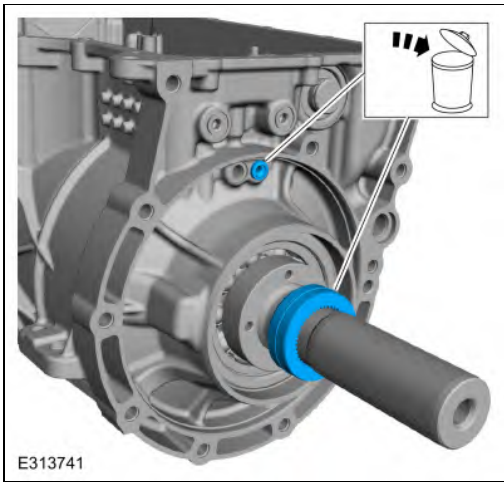
52. Remove and discard the extension housing bolts and remove the extension housing.



53. Remove and discard the O-ring seal from the extension housing.



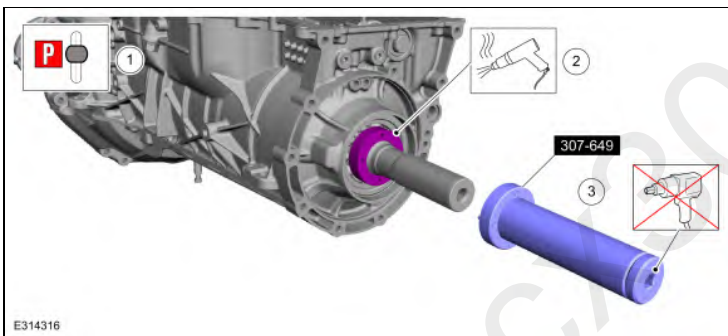
54. Remove and discard the rubber grommet and the rear bushing fluid feed seal.



55. **NOTICE:** The output shaft nut is coated with Loctite®. Failure to loosen the Loctite® by applying heat to the output shaft nut can cause damage to the Output Shaft Nut Socket.

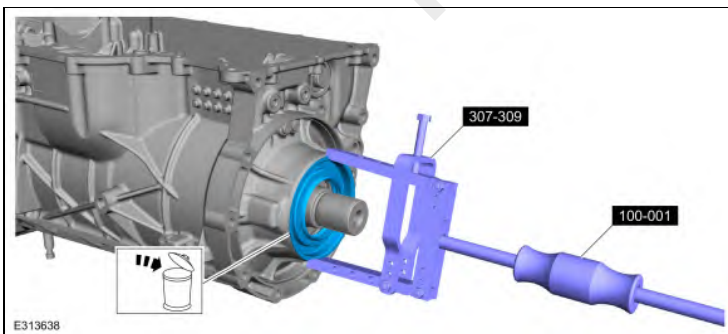
NOTICE: Make sure to clean any debris from the Loctite® that may have fallen into the transmission case when removing the output shaft nut. Failure to clean the debris can result in transmission fluid or filter contamination or damage to the transmission.

1. Rotate the manual control lever to P.
2. Apply heat to the output shaft nut to soften the Loctite®.
3. Using the special tool, remove the output shaft nut.
Use Special Service Tool: 307-649 Socket, Output Shaft Nut.



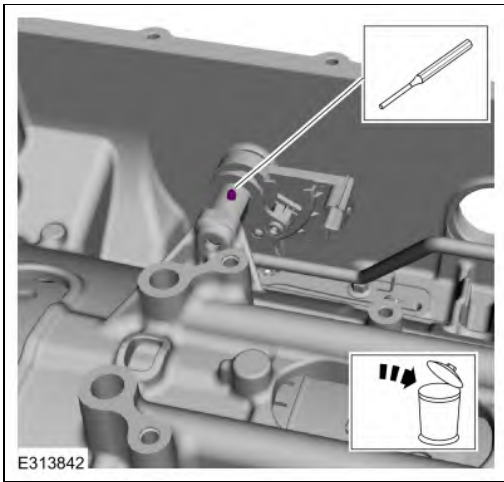
Vehicles equipped with a Four-Wheel Drive (4WD) transmission

56. Using the special tools, remove and discard the output shaft seal.
Use Special Service Tool: 100-001 (T50T-100-A) Slide Hammer. , 307-309 Remover, Torque Converter Seal.

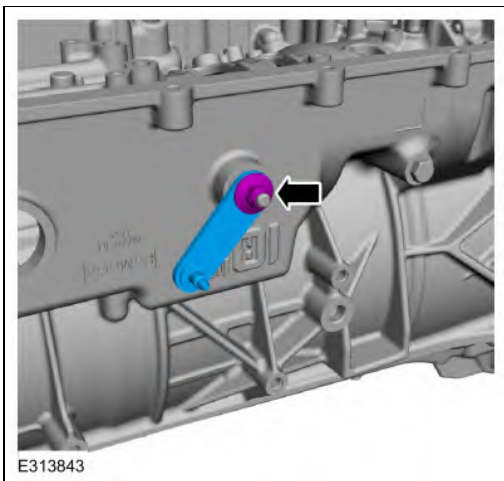


All vehicles

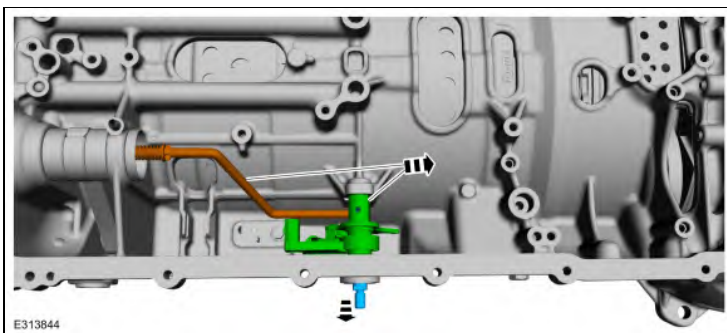
57. Remove and discard the manual control shaft-to-TR sensor roll pin.
Use the General Equipment: Punch



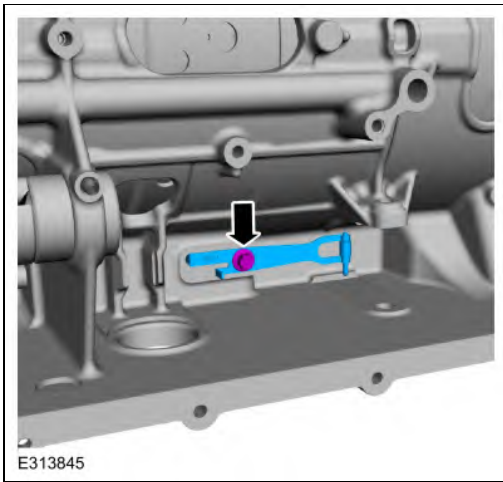
58. Remove the nut and the manual control lever.



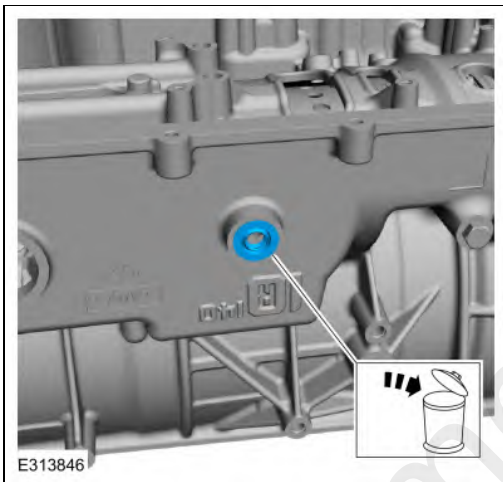
59. Remove the manual control shaft, the TR sensor and the park pawl actuator rod.



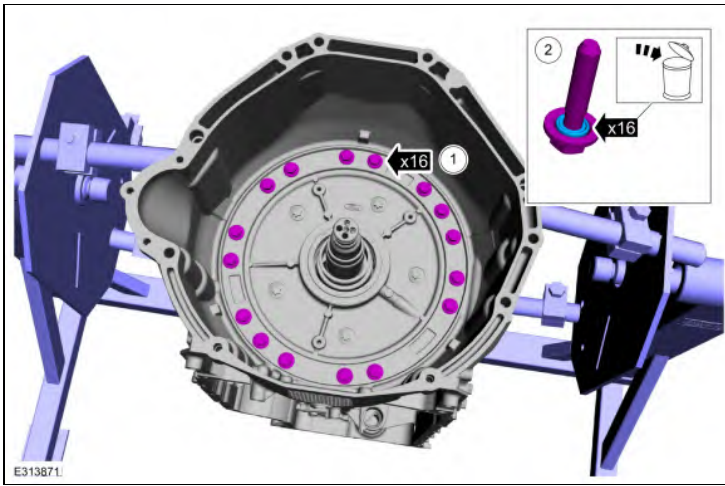
60. Remove the bolt and the TR sensor detent spring.



61. Remove and discard the manual control shaft seal.



62. Rotate the transmission to a vertical position.
1. Remove the front support assembly bolts.
 2. Discard the front support assembly bolt washers.

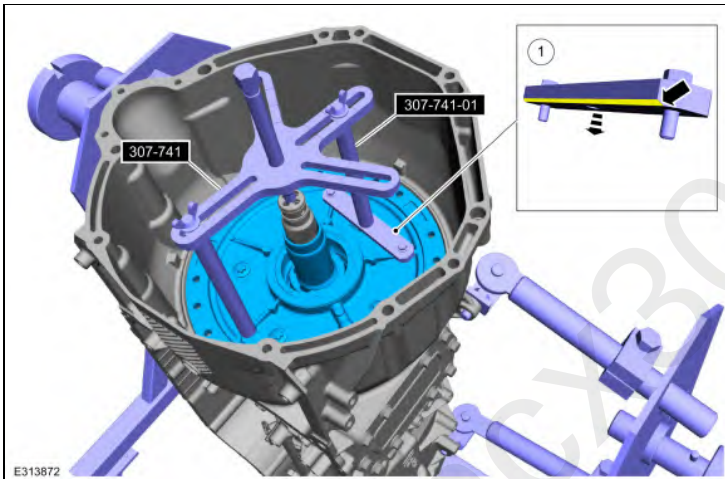


63.

Using the special tools, separate the front support assembly from the transmission case and remove the front support assembly.

1. Install the special tool with the beveled side down.

Use Special Service Tool: 307-741 Spring Compressor, F Clutch , 307-741-01 Remover, Front Support & Cover.

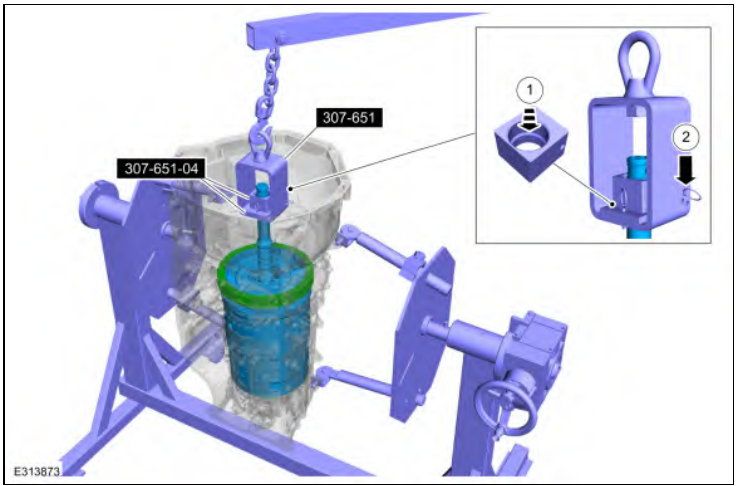


64.

Using the special tools and a floor crane, remove the clutch and planetary assembly.

1. Splines of the special tool facing down.
2. Install the pin in the top hole

Use Special Service Tool: 307-651 Bracket, Pump Remover/Installer. , 307-651-04 Adapter, Lift Fixture.



65. Remove the (T9) thrust bearing.



66. Remove the output shaft and planetary carrier No. 4 assembly.



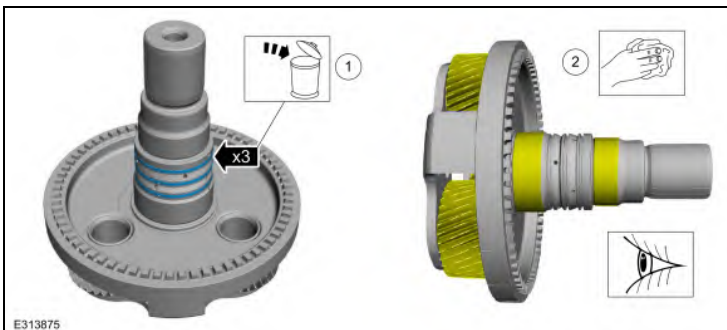
67. **NOTE:** Tap the bearing from the rear race to prevent the bearing from separating.

1. Using a punch, tap the bearing from the rear race to release the clip.
Use the General Equipment: Punch
2. Remove the (T10) thrust bearing.

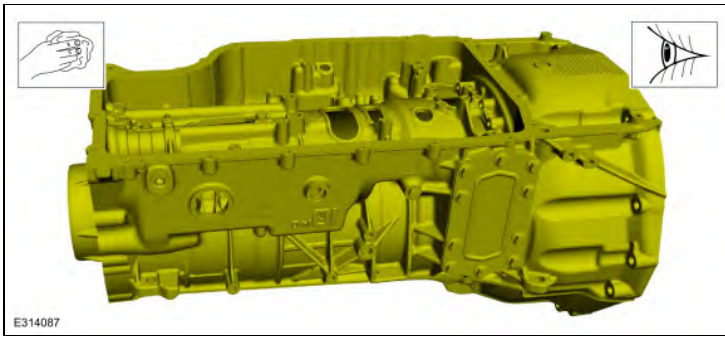


68. **NOTE:** The planetary carrier No. 4 assemblies are equipped with 3 pinion or 4 pinion gear sets.

1. Remove and discard the output shaft seals.
2. Clean and inspect the output shaft and planetary carrier No. 4 assembly for damage.

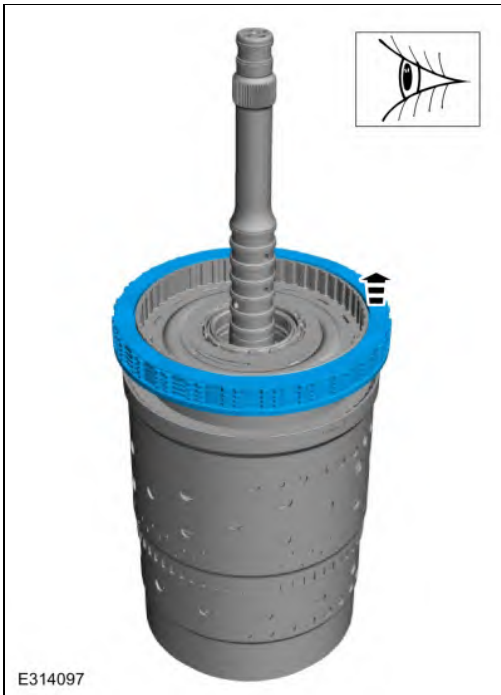


69. Clean and inspect the transmission case and bearings for damage. Check for leaks from plugs and park pawl actuator rod sleeve. Repair or install new as necessary.
Refer to: Transmission Case (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission â€” 10R140, Disassembly).

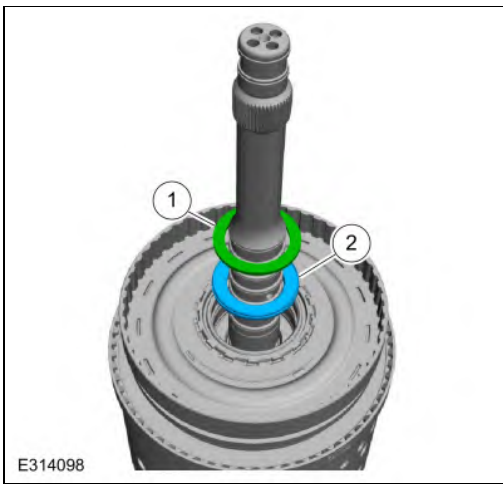


70. **NOTICE:** If replacing A clutch separating springs, all separating springs must be installed new as a matching set or damage can occur.

Remove the A clutch assembly. Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged install new as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



71. Using a magnet, remove the selective shim and the (T3) thrust bearing.
1. Selective shim
 2. (T3) thrust bearing
- Use the General Equipment: Magnet



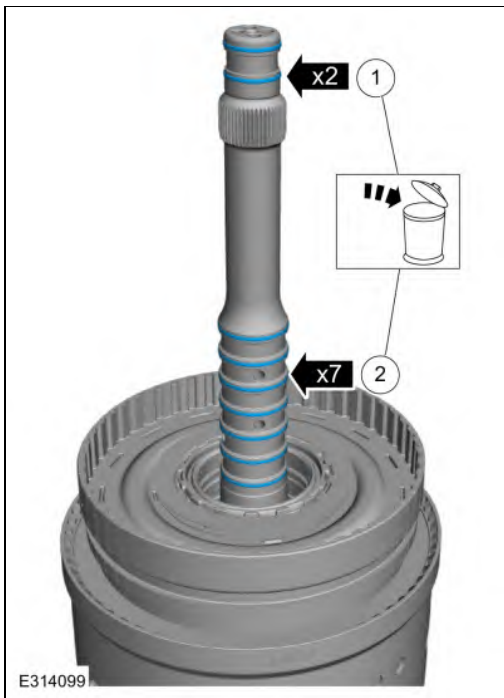
72.

1. **NOTICE:** Use caution not to scratch or gouge the input shaft surface when removing the torque converter (F0) Teflon® seals. The input shaft is not hardened in this area and damage to the input shaft can occur.

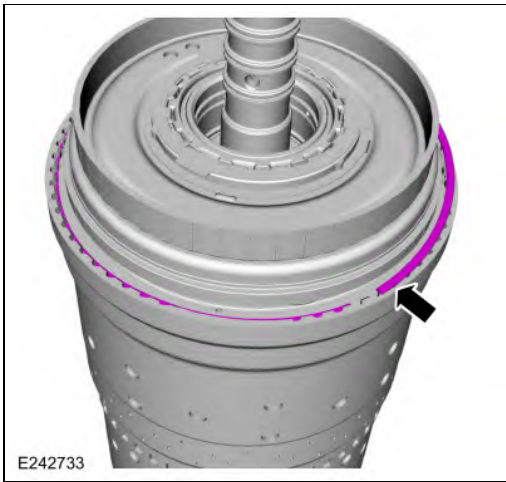
Remove and discard the input shaft torque converter (F0) Teflon® seals.

2. Remove and discard the input shaft front (F2) Teflon® seals.

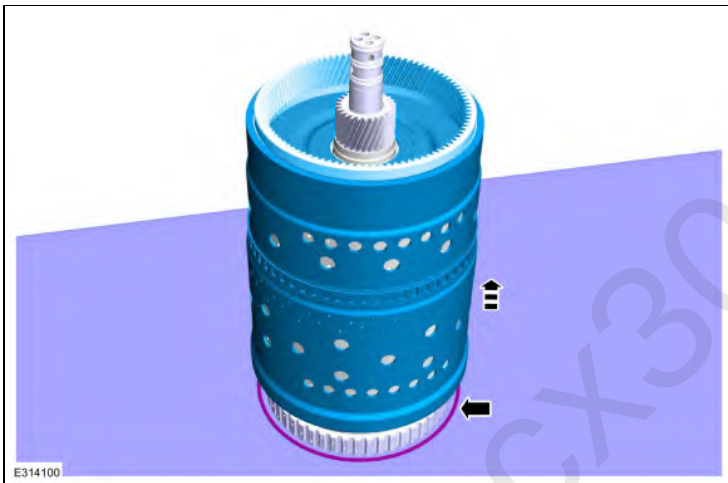
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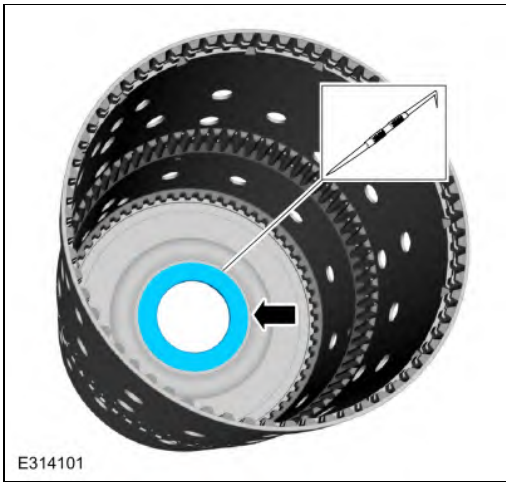
73. Remove one side of the No. 1 planetary carrier snap ring.



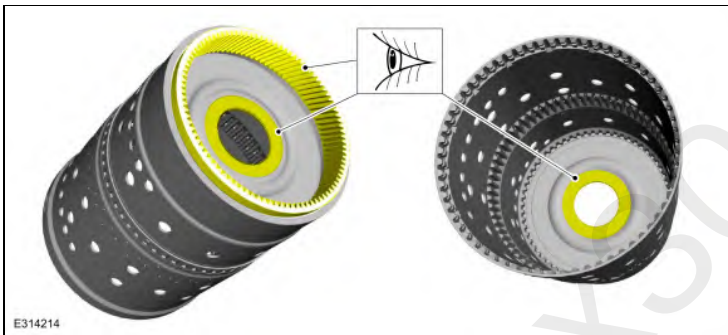
74. Flip the clutch and planetary assembly over with the input shaft through a hole in the bench. Remove the No. 1 planetary carrier snap ring and remove the clutch and planetary container cylinder.



75. Remove the (T8) thrust bearing race.

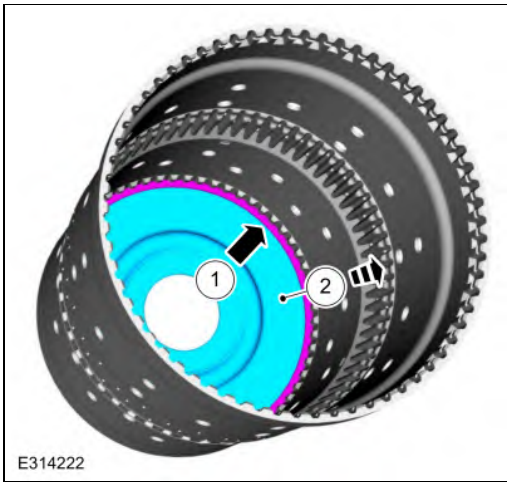


76. Inspect the No. 4 ring gear and the thrust bearing surfaces for damage.

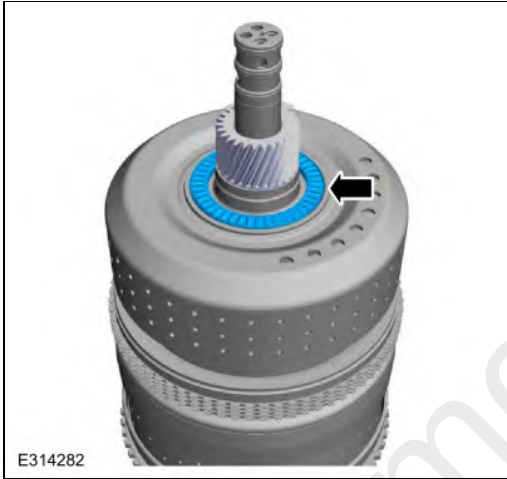


77. **NOTE:** Remove the ring gear when installation of a new component is necessary.

1. If necessary, remove the ring gear snap ring.
2. If necessary, remove the ring gear from the inside of the clutch and planetary container cylinder.



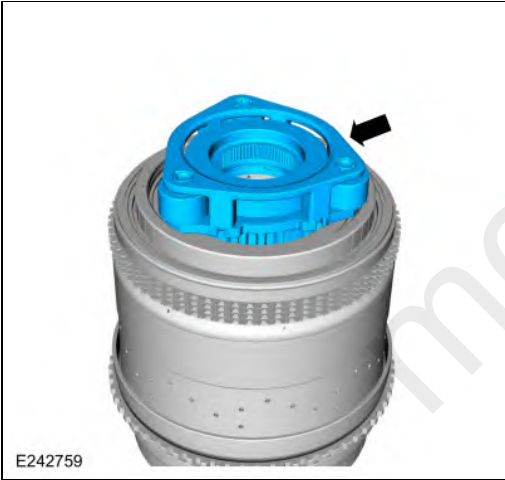
78. Remove the (T8) thrust bearing.



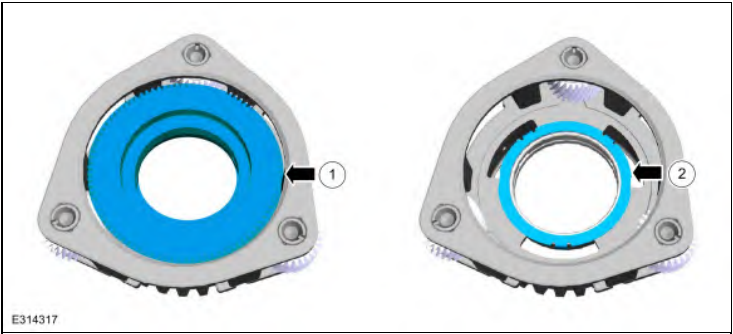
79. Remove the E clutch and input shaft assembly.



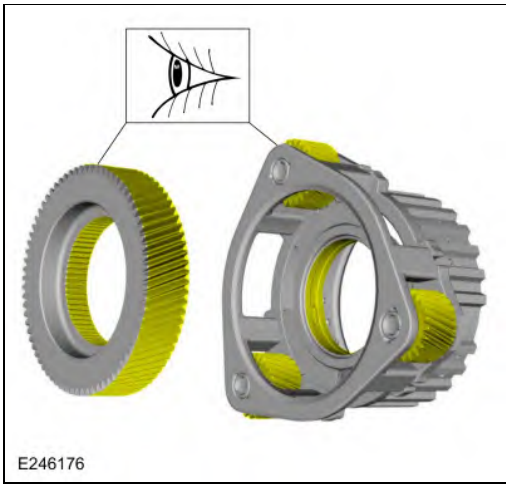
80. Remove the No. 3 planetary carrier and the No. 3 sun gear.



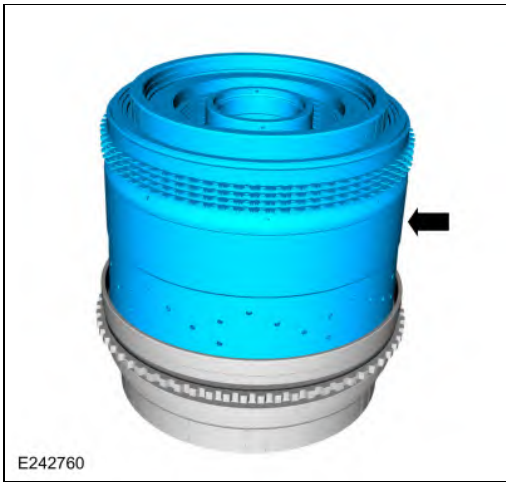
- 81.
1. Remove the No. 3 sun gear.
 2. Remove the No. 3 sun gear thrust washer.



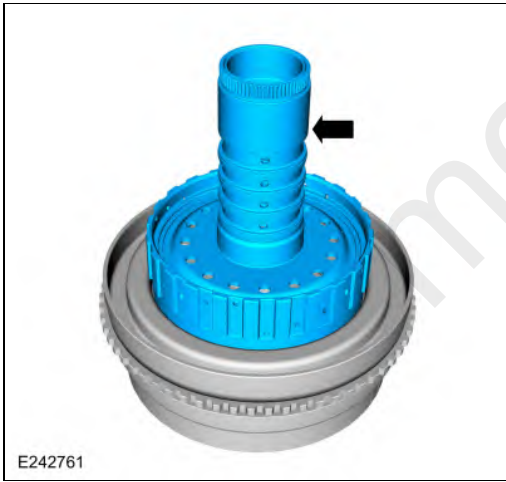
82. Inspect the No. 3 planetary carrier and the No. 3 sun gear for damage.



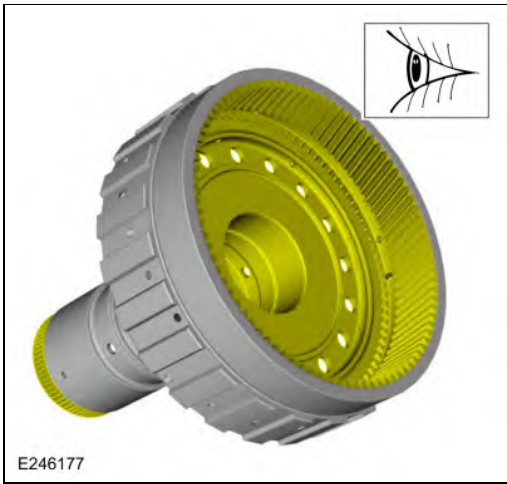
83. Remove the CDF clutch assembly from the planetary carrier assembly.



84. Remove the No. 3 sun gear shaft and No. 2 ring gear assembly.



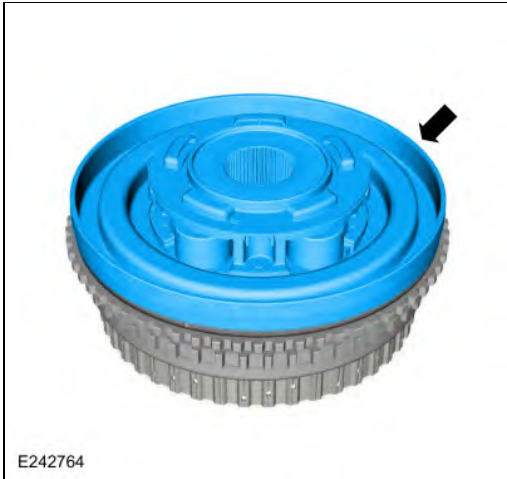
85. Inspect the No. 3 sun gear shaft and No. 2 ring gear assembly for damage.



86. Remove the (T5) thrust bearing.

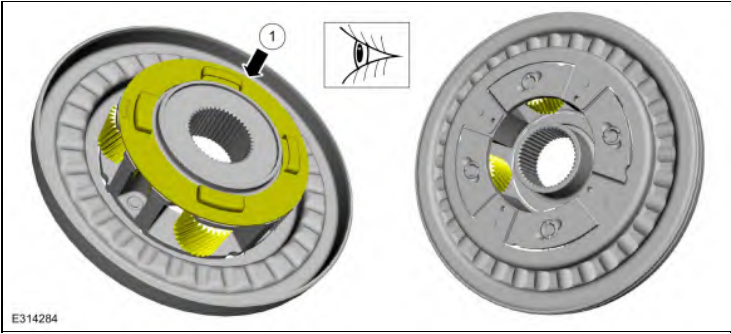


87. Remove the No. 2 planetary carrier.

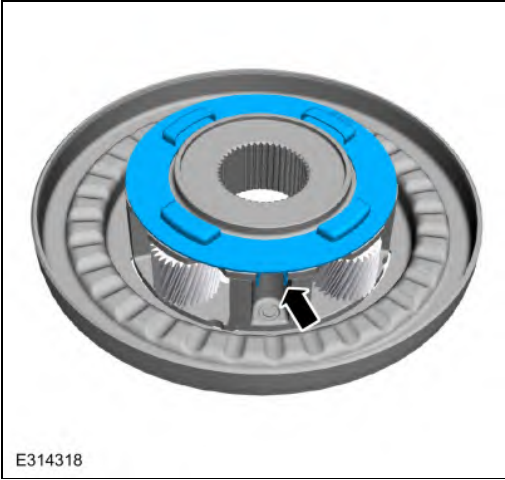


88. **NOTE:** It is not necessary to remove the fluid collector from the No. 2 planetary carrier.

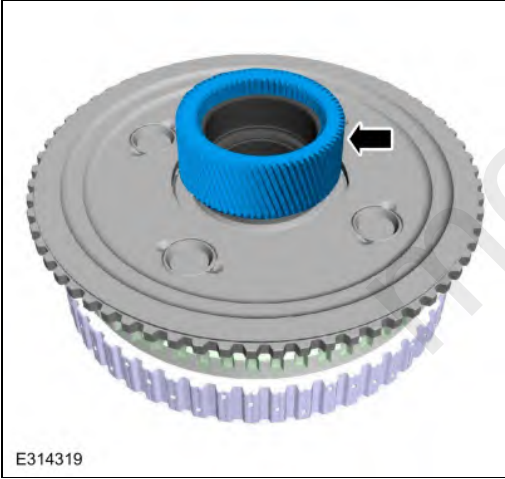
Inspect the No. 2 planetary carrier and the fluid collector for damage.
1. If the fluid collector is broken remove and discard.



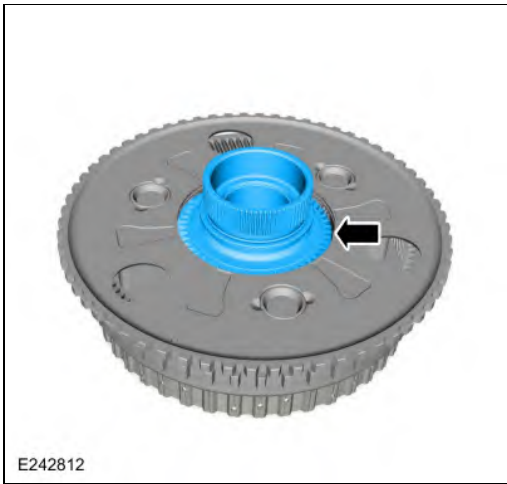
89. If necessary, install a new fluid collector.



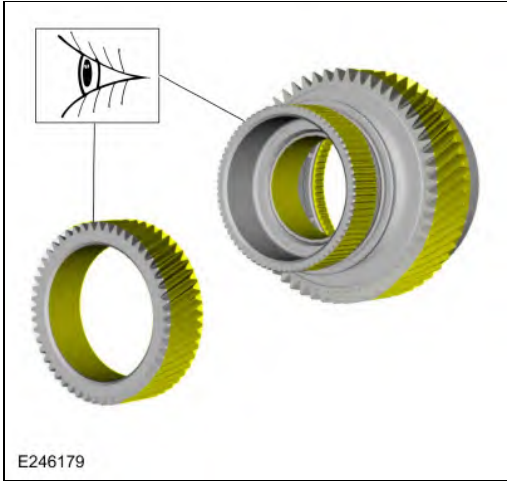
90. Remove the No. 2 sun gear.



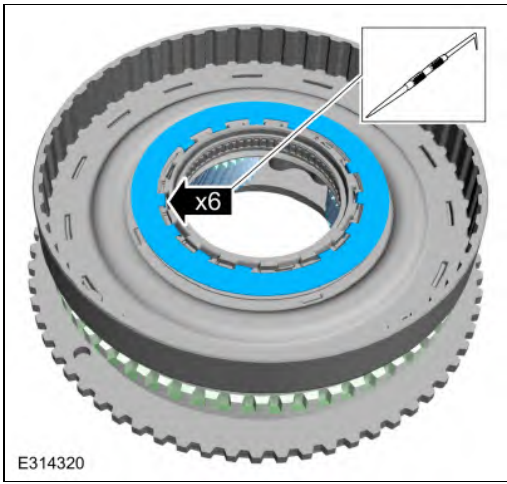
91. Remove the No. 1 sun gear.



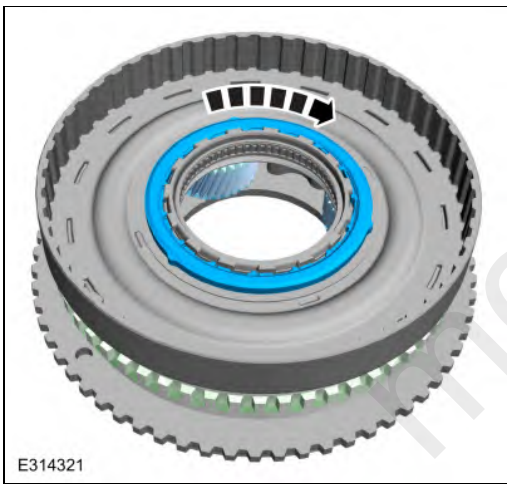
92. Inspect the No. 1 and No. 2 sun gears for damage.



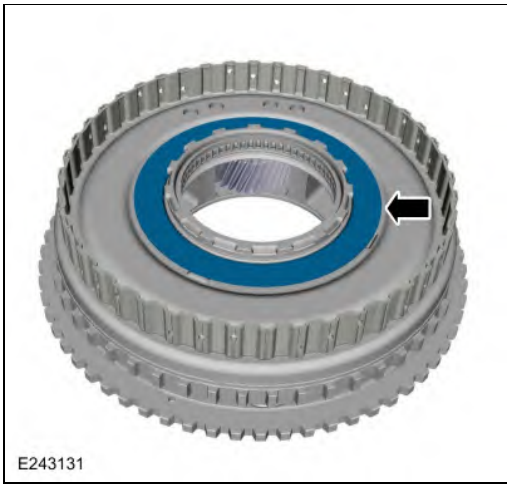
93. Gently pry up on the clips and remove the No. 1 bearing support locking ring.



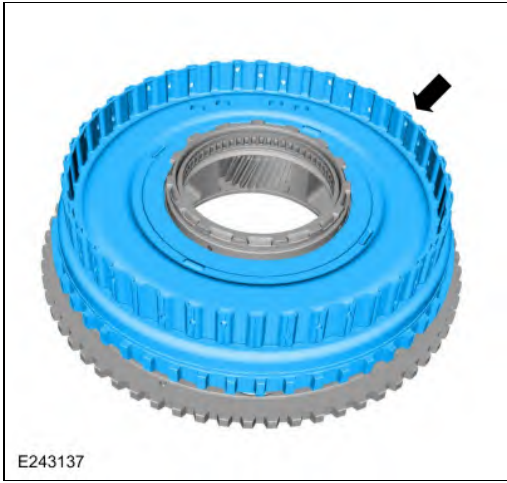
94. Rotate the No. 1 bearing support clockwise and remove the bearing support.



95. Remove the No. 1 ring gear bearing.



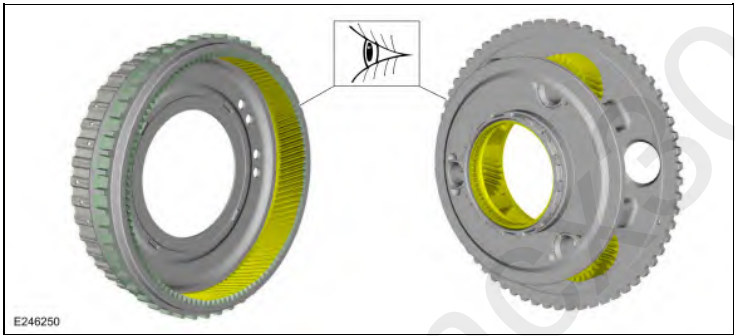
96. Remove the No. 1 ring gear.



97. Remove the ring gear No 1 bearing.



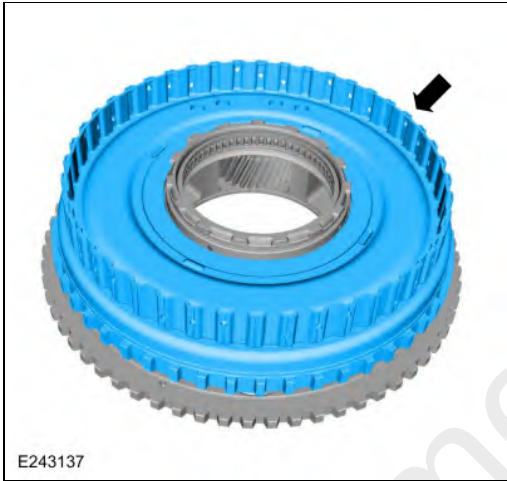
98. Inspect the No. 1 ring gear and the No. 1 planetary carrier for damage.



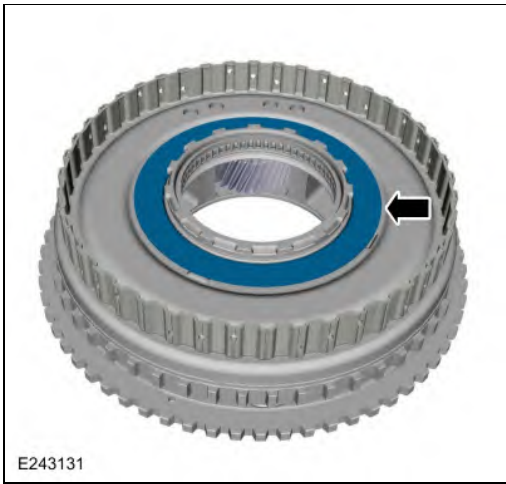
99. Install the ring gear No. 1 bearing



100. Install the No. 1 ring gear.



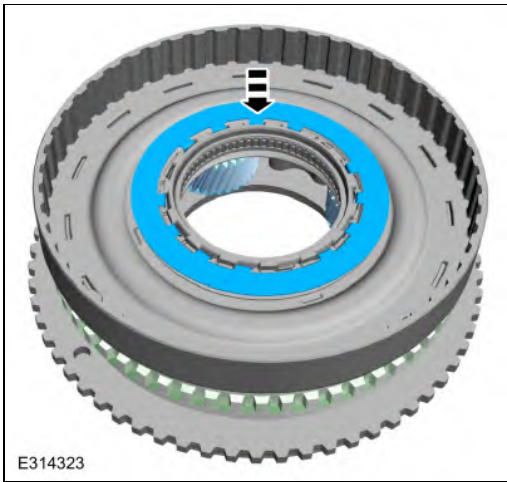
101. Install the No. 1 ring gear bearing



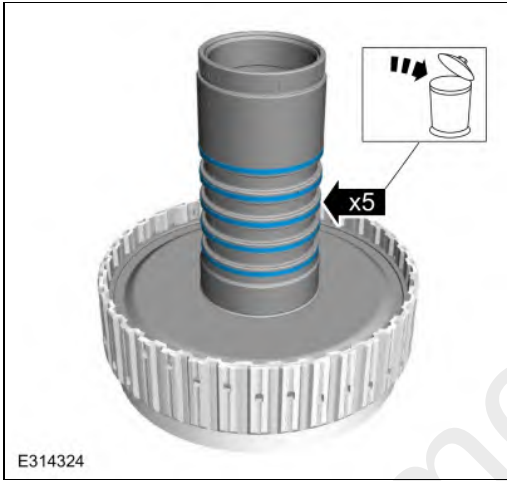
102. Install the ring gear No. 1 bearing support and rotate it counter clockwise to lock it.



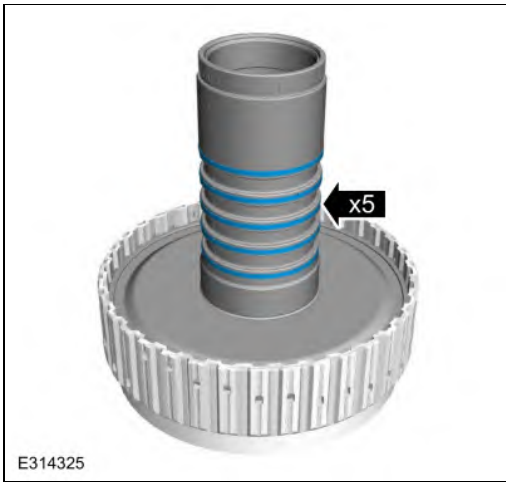
103. Align the tabs with the slots and install the No. 1 bearing support locking ring.



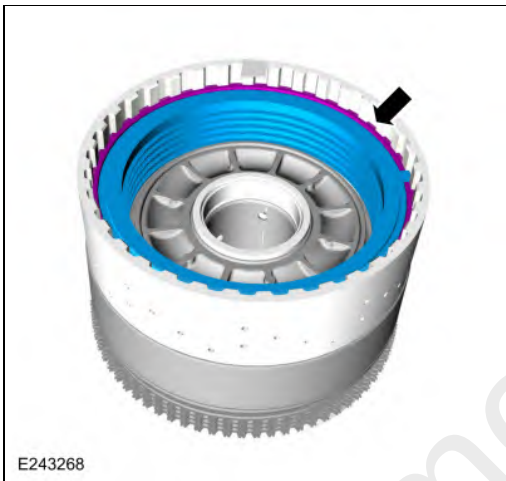
104. Remove and discard the sun gear No. 3 shaft Z-lock seals.



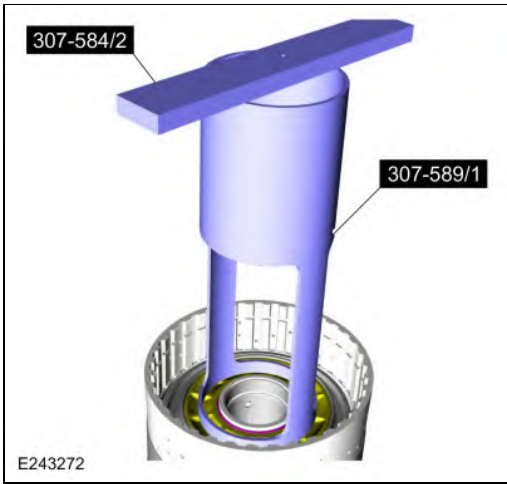
105. Install the new sun gear No. 3 shaft Z-lock seals.



106. Remove the snap ring and the C clutch assembly. Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged install new as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



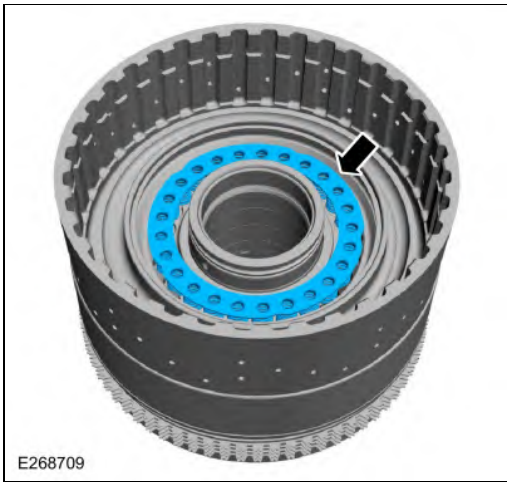
107. Using the special tools and a press, remove the C clutch balance dam retainer.
 Use Special Service Tool: 307-584 2-6 Spring Compressor. , 307-589 Overdrive clutch and balance piston service set.
 Use the General Equipment: Hydraulic Press



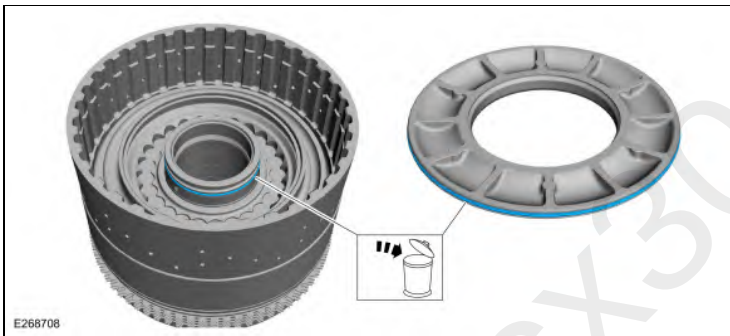
108. Remove the C clutch balance dam.



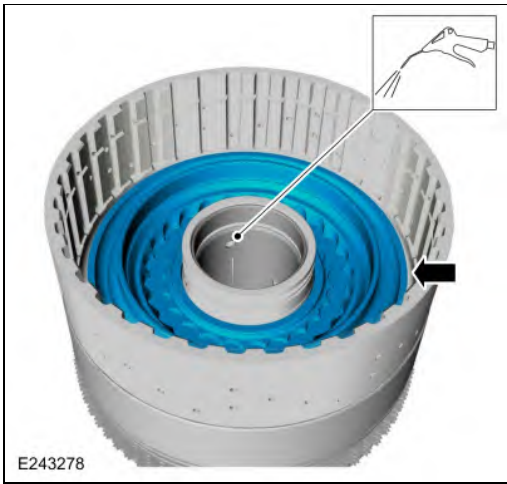
109. Remove the C clutch piston return spring.



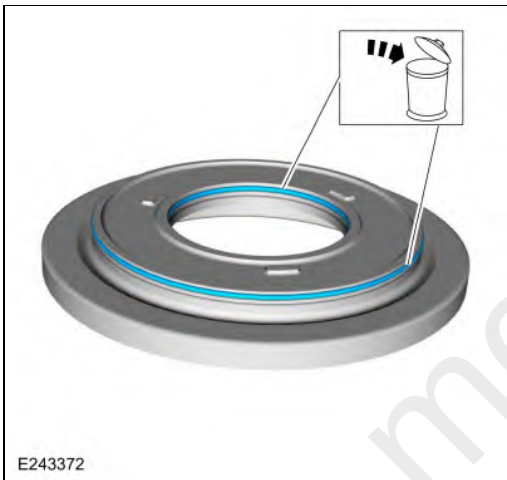
110. Remove and discard the C clutch balance dam inner and outer seals.



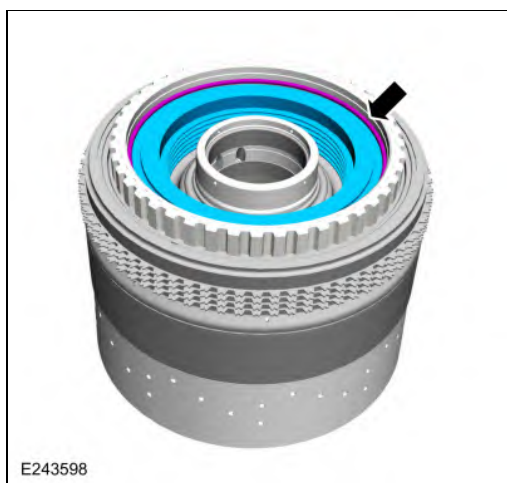
111. Remove the C clutch piston. Use compressed air into one oil passage hole while plugging the hole on the opposite side.



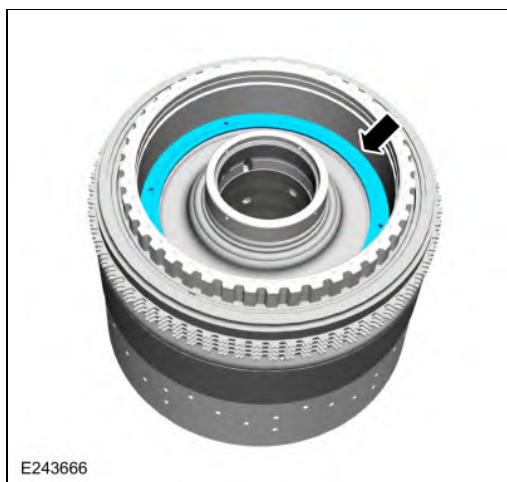
112. Remove and discard the C clutch piston inner and outer seals.



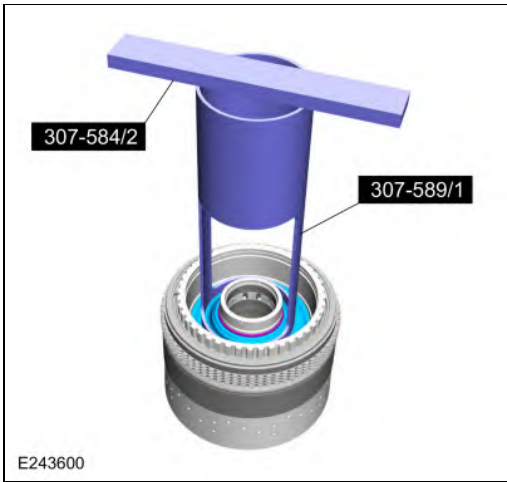
113. Remove the snap ring and the D clutch assembly. Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged install new as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



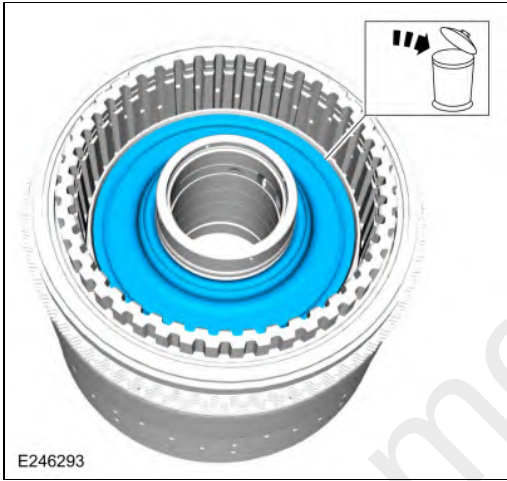
114. Remove the D clutch apply ring



115. Using the special tools and a press, remove the D clutch balance dam retainer.
 Use Special Service Tool: 307-584 2-6 Spring Compressor. , 307-589 Overdrive clutch and balance piston service set.
 Use the General Equipment: Hydraulic Press



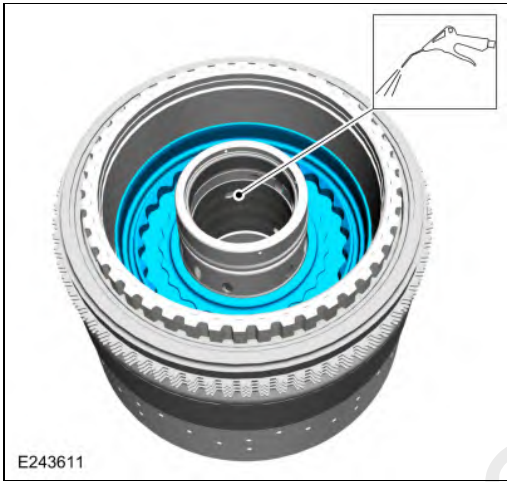
116. Remove and discard the balance dam.



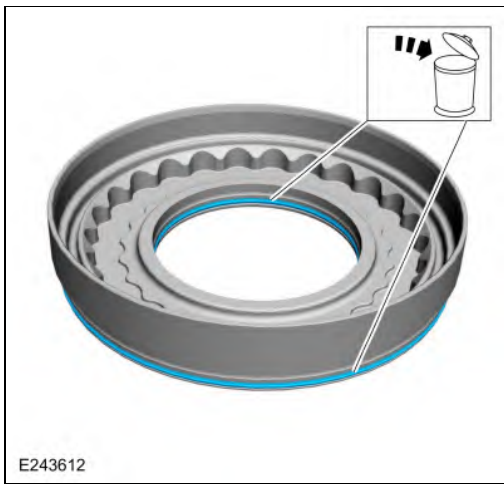
117. Remove the D clutch piston return spring.



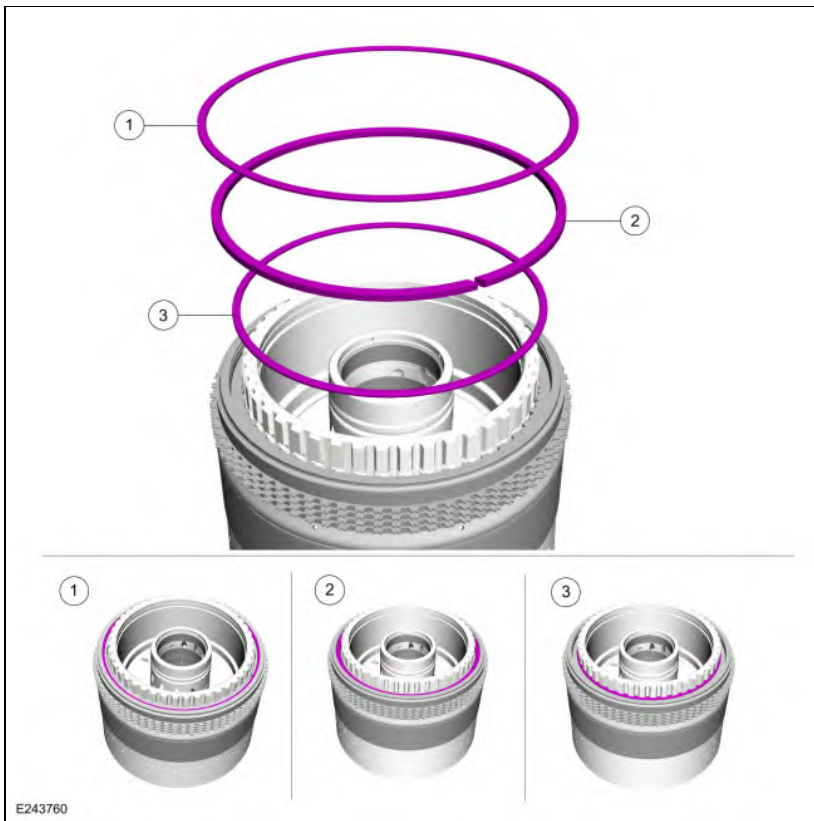
118. Remove the D clutch piston. Use compressed air into one oil passage hole while plugging the hole on the opposite side.



119. Remove and discard the D clutch piston inner and outer seals.



120. Remove the F clutch keeper snap ring, F clutch snap ring keeper and the F clutch snap ring.
1. F clutch keeper snap ring
 2. F clutch snap ring keeper
 3. F clutch snap ring



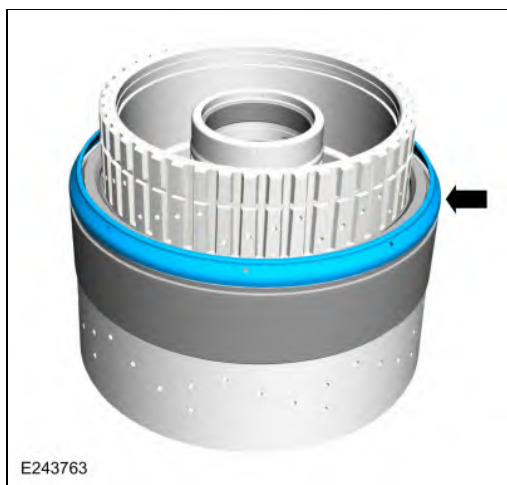
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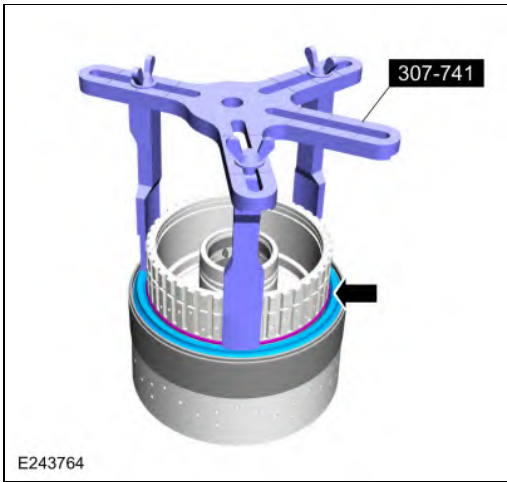
121. Remove the F clutch assembly. Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged install new as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



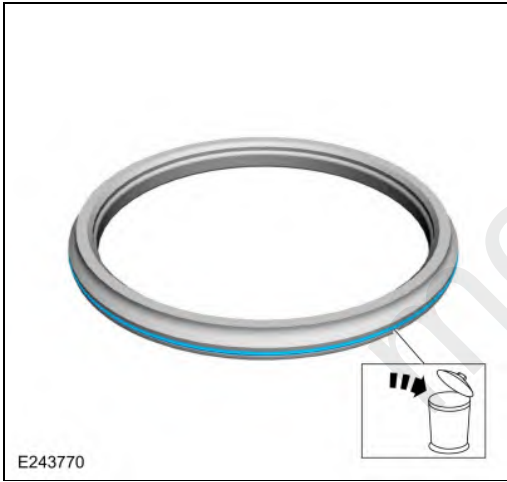
122. Remove the F clutch apply ring.



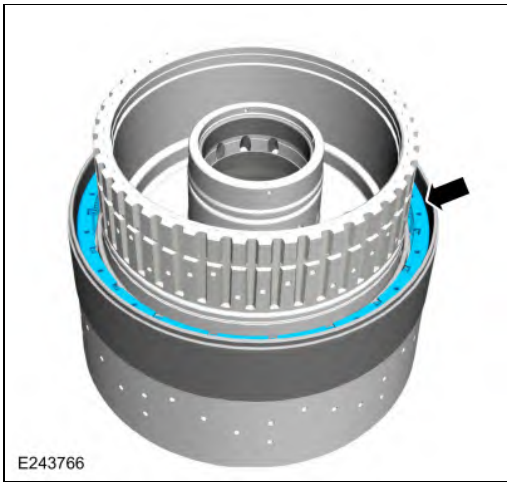
123. Using the special tools and a press, compress the F clutch balance dam and remove the retainer. Remove the F clutch balance dam.
 Use Special Service Tool: 307-741 Spring Compressor, F Clutch.
 Use the General Equipment: Hydraulic Press



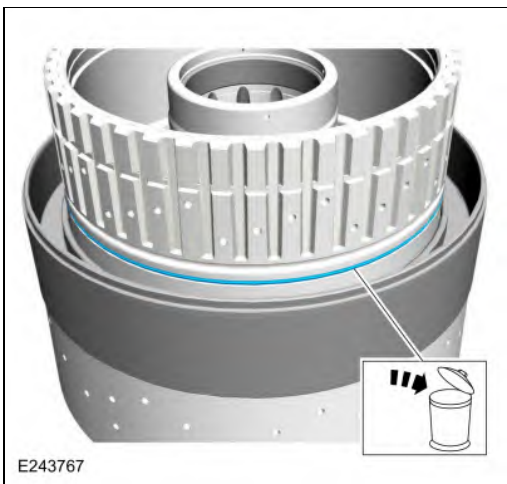
124. Remove and discard the F clutch balance dam outer seal.



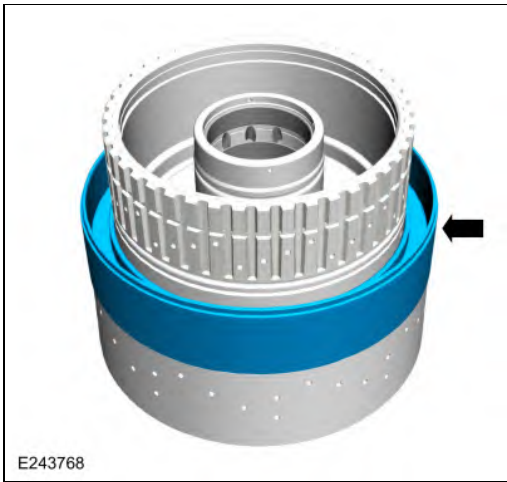
125. Remove the F clutch piston return spring.



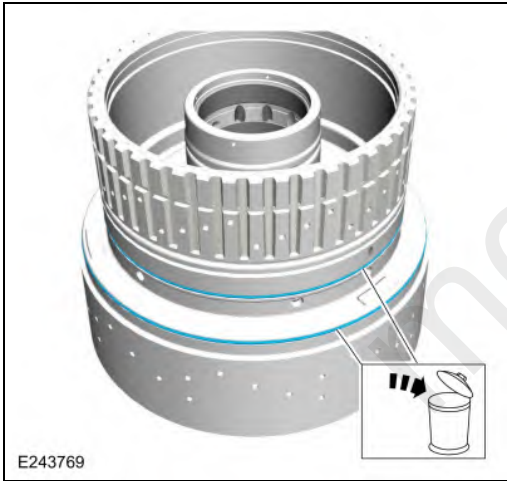
126. Remove and discard the F clutch balance dam inner seal.



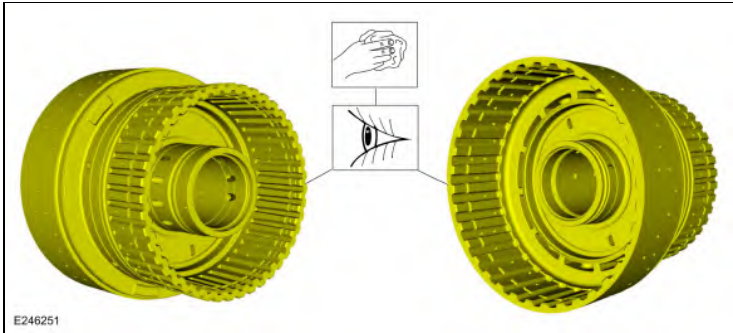
127. Remove the F clutch piston.



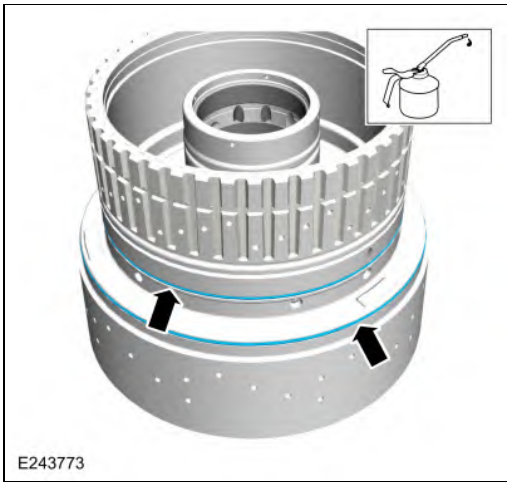
128. Remove and discard the F clutch piston seals.



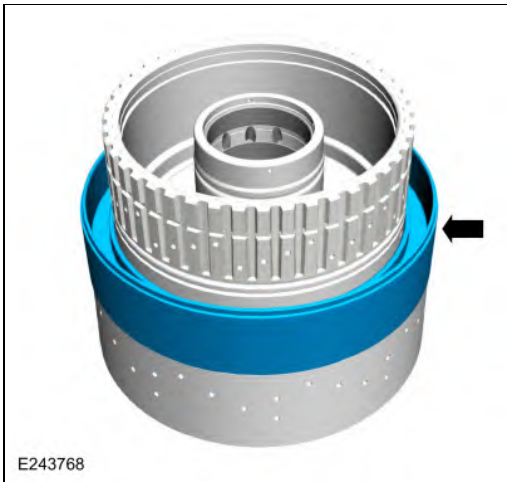
129. Clean and inspect the CDF clutch cylinder for damage.



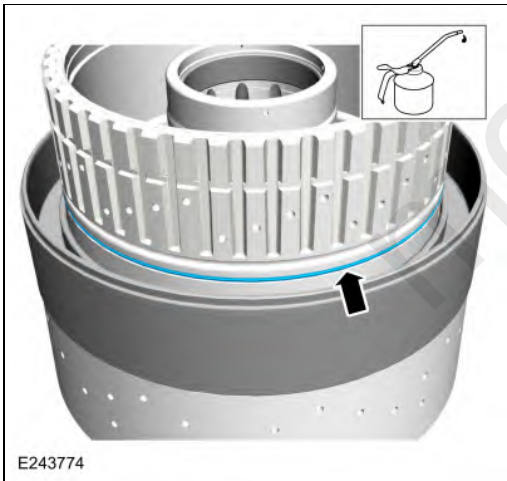
130. Install the new F clutch piston seals. Lubricate the seals with petroleum jelly.



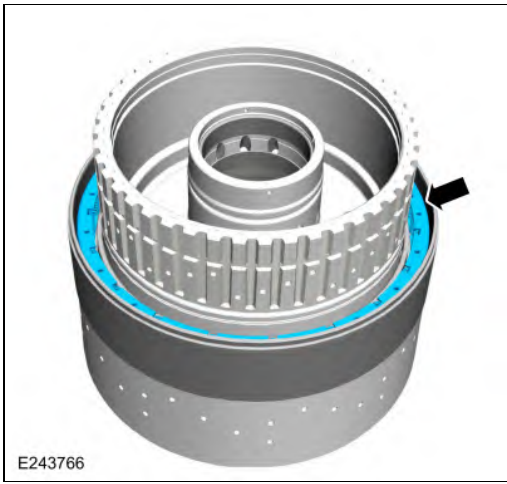
131. Install the F clutch piston.



132. Install a new F clutch balance dam inner seal. Lubricate the seal with petroleum jelly.



133. Install the F clutch piston return spring.

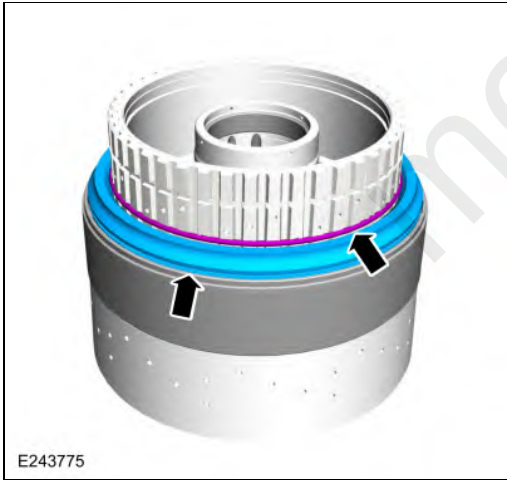


134. Install a new F clutch balance dam outer seal. Lubricate the seal with petroleum jelly.

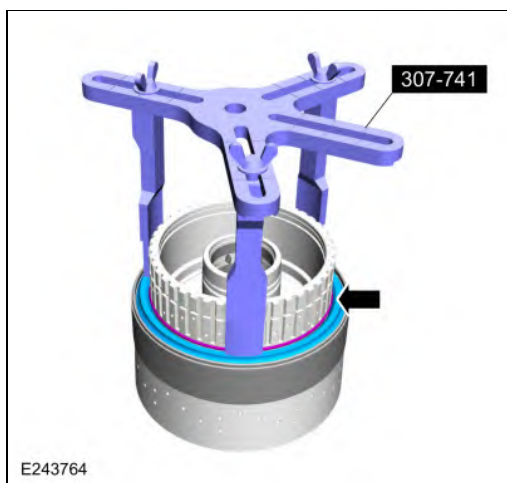


135. **NOTE:** The F clutch balance dam retainer will not be in the groove at this time.

Install the F clutch balance dam and retainer on the CDF clutch cylinder.



136. Using the special tools and a press, compress the F clutch balance dam and install the retainer into the groove.
 Use Special Service Tool: 307-741 Spring Compressor, F Clutch.
 Use the General Equipment: Hydraulic Press



137.

Using the special tools and a press, press the apply ring onto the F clutch piston.

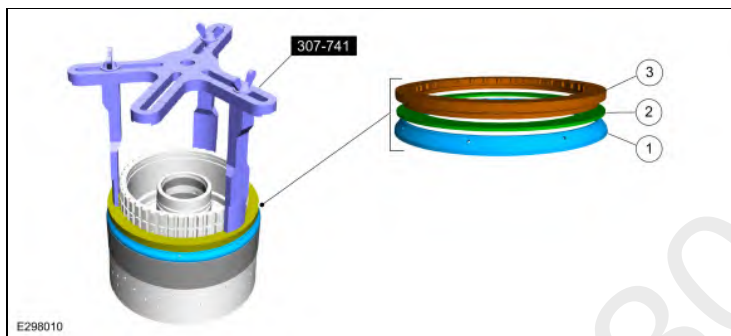
1. F clutch apply ring
2. Clutch steel plate

3. **NOTE:** Position the F clutch pressure plate upside-down onto the clutch steel plate.

F clutch pressure plate

Use Special Service Tool: 307-741 Spring Compressor, F Clutch.

Use the General Equipment: Hydraulic Press



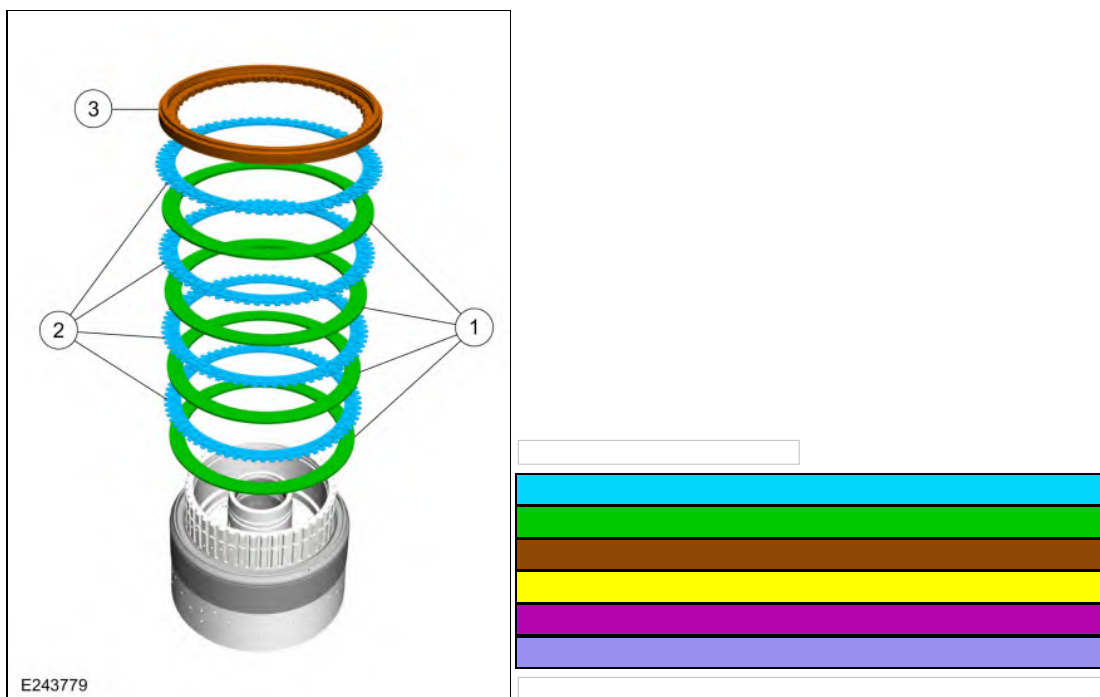
138. **NOTE:** Clutch plate quantity is model dependant based on engine displacement.

Soak the F clutch plates in clean transmission fluid. Install the F clutch assembly.

1. Steel plates
2. Friction plates

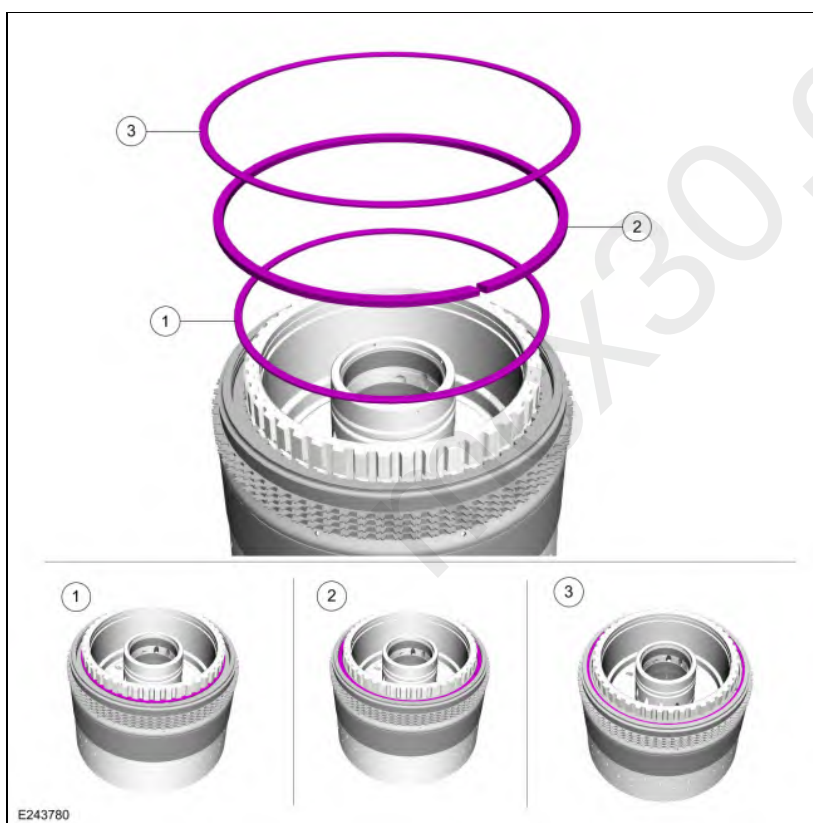
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (WSS-M2C949-A,) (MERCON® ULV)

3. Pressure plate



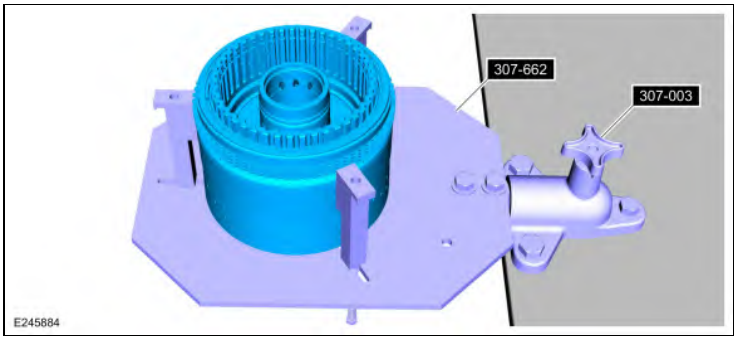
139. Install the F clutch snap ring, F clutch snap ring keeper and the F clutch keeper snap ring .

1. F clutch snap ring
2. F clutch snap ring keeper
3. F clutch keeper snap ring

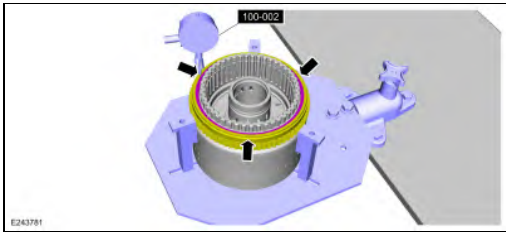


140. Assemble the special tools and position the CDF cylinder with the F clutch facing up.

Use Special Service Tool: 307-662 Gauge, Clutch Pack Endplay. , 307-003 (T57L-500-B) Holding Fixture, Transmission.



141. Using the special tool, measure the F clutch clearance. Position the plunger so it rests on the top surface of the pressure plate. Zero the dial indicator. Pull up on the pressure plate and measure and record the clutch clearance in 3 different places. Average the 3 recorded clutch clearance measurements and compare the measurement to the clutch clearance chart in specifications to determine the correct size snap ring. Install the correct F clutch snap ring.
 Refer to: Specifications (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission & 10R140, Specifications).
 Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



142. Install the new D clutch piston inner and outer seals. Lubricate the seals with petroleum jelly.



143. Install the D clutch piston.



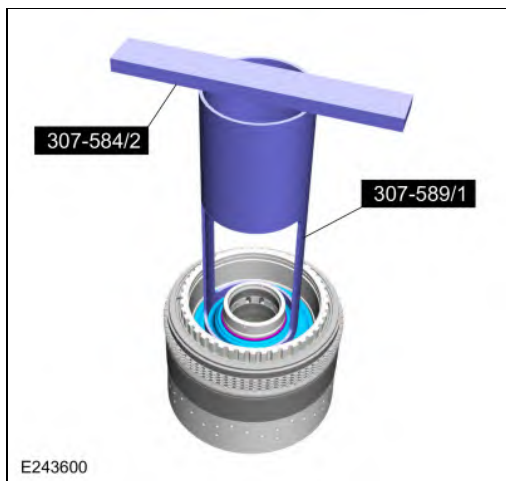
144. Install the D clutch piston return spring.



145. Lubricate the new D clutch balance dam seals with petroleum jelly.



146. Using the special tools and a press, Install the D clutch balance dam and install the retainer.
 Use Special Service Tool: 307-584 2-6 Spring Compressor. , 307-589 Overdrive clutch and balance piston service set.
 Use the General Equipment: Hydraulic Press



147. Install the D clutch apply ring.



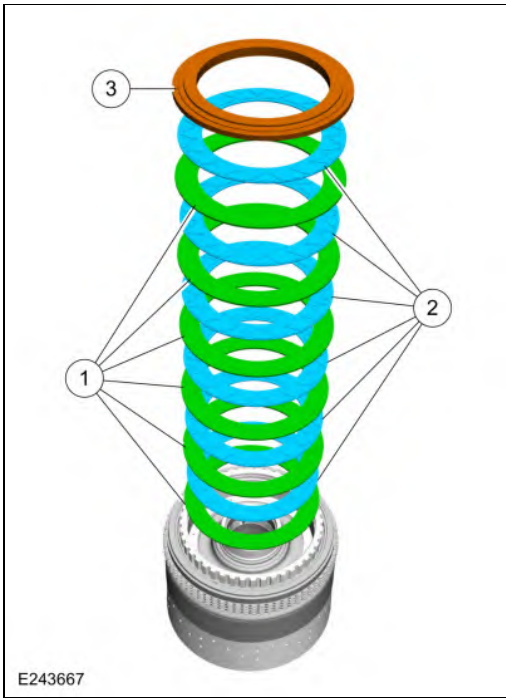
148. **NOTE:** Clutch plate quantity is model dependant based on engine displacement.

Soak the D clutch plates in clean transmission fluid. Install the D clutch assembly.

1. Steel plates
2. Friction plates

Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (WSS-M2C949-A,) (MERCON® ULV)

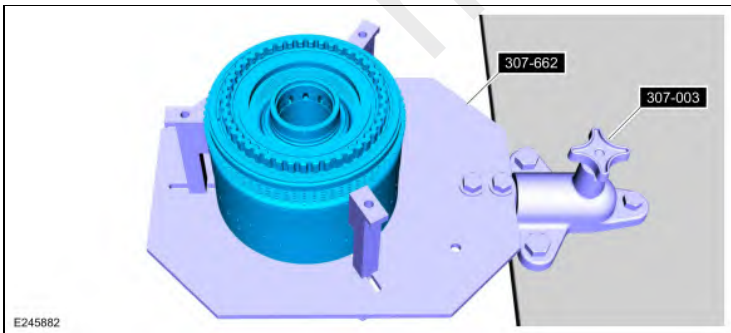
3. Pressure plate



149. Install the D clutch snap ring.

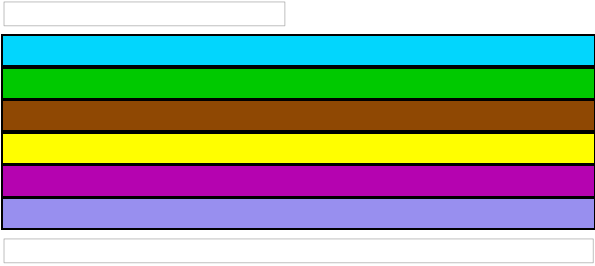
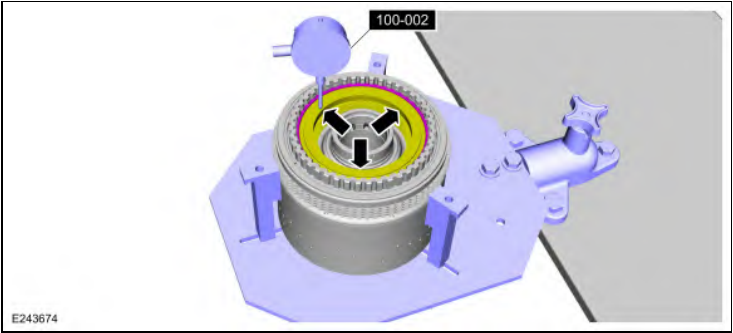


150. Assemble the special tools and position the CDF cylinder with the D clutch facing up.
Use Special Service Tool: 307-662 Gauge, Clutch Pack Endplay, , 307-003 (T57L-500-B) Holding Fixture, Transmission.

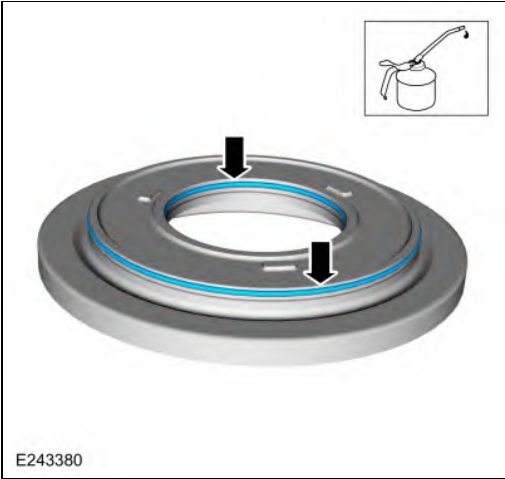


151. Using the special tool, measure the D clutch clearance. Position the plunger so it rests on the top surface of the pressure plate. Zero the dial indicator. Pull up on the pressure plate and measure and record the clutch clearance in 3 different places. Average the 3 recorded clutch clearance measurements and compare the measurement to the clutch clearance chart in specifications to determine the correct size snap ring. Install the correct D clutch snap ring.
Refer to: Specifications (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission & 10R140, Specifications).

Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



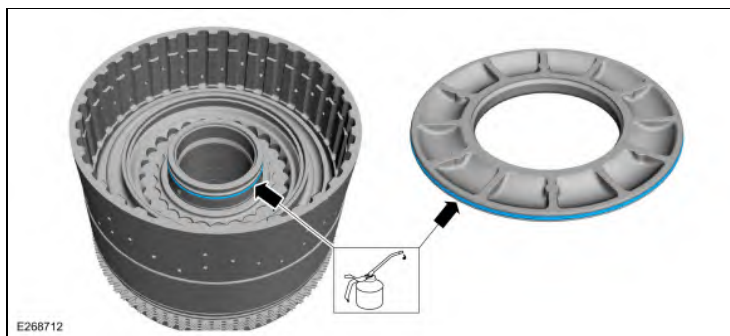
152. Install the new C clutch piston inner and outer seals. Lubricate the seals with petroleum jelly.



153. Install the C clutch piston.



154. Install the new C clutch balance dam seals. Lubricate the seals with petroleum jelly.



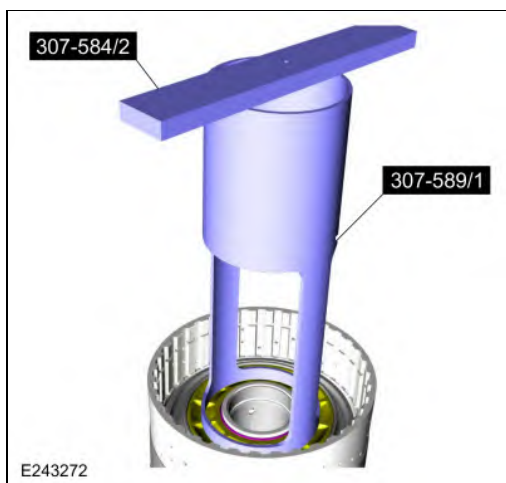
155. Install the C clutch piston return spring.



156. Install the C clutch balance dam.



157. Using the special tools and a press, compress the C clutch balance dam and install the retainer.
 Use Special Service Tool: 307-584 2-6 Spring Compressor. , 307-589 Overdrive clutch and balance piston service set.
 Use the General Equipment: Hydraulic Press

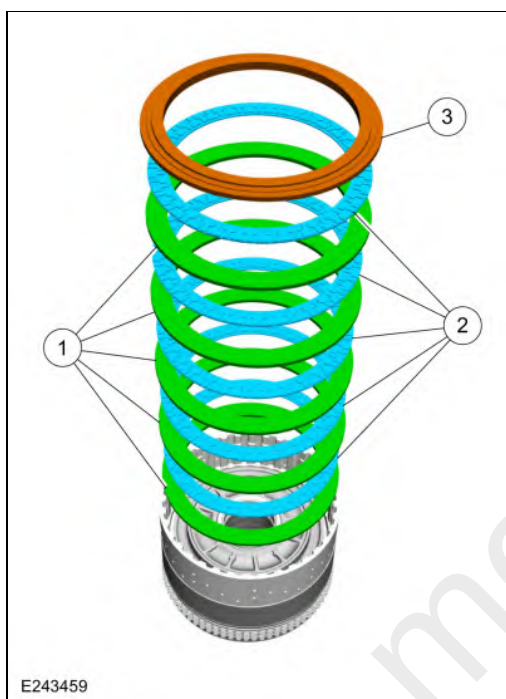


158. **NOTE:** Clutch plate quantity is model dependant based on engine displacement.

Soak the C clutch plates in clean transmission fluid. Install the C clutch assembly.

1. Steel plates
2. Friction plates
3. Pressure plate

Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (WSS-M2C949-A,) (MERCON® ULV)

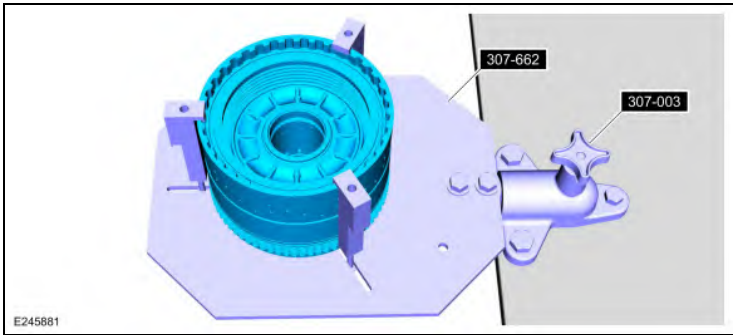


159. Install the C clutch snap ring.

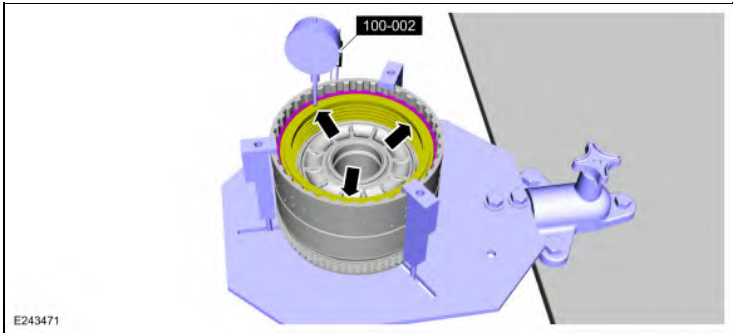


160. Assemble the special tools and position the CDF cylinder with the C clutch facing up.

Use Special Service Tool: 307-662 Gauge, Clutch Pack Endplay. , 307-003 (T57L-500-B) Holding Fixture, Transmission.

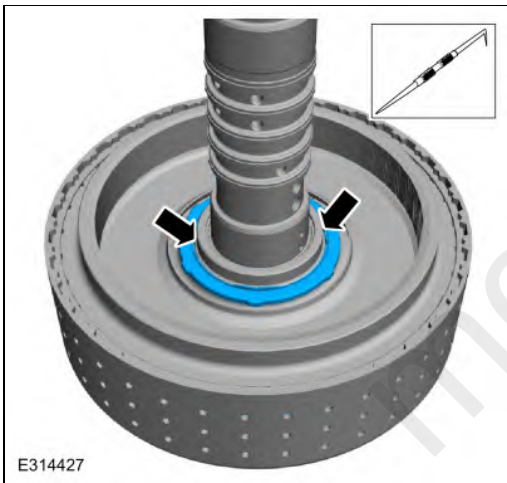


161. Using the special tool, measure the C clutch clearance. Position the plunger so it rests on the top surface of the pressure plate. Zero the dial indicator. Pull up on the pressure plate and measure and record the clutch clearance in 3 different places. Average the 3 recorded clutch clearance measurements and compare the measurement to the clutch clearance chart in specifications to determine the correct size snap ring. Install the correct C clutch snap ring.
 Refer to: Specifications (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission & 10R140, Specifications).
 Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.

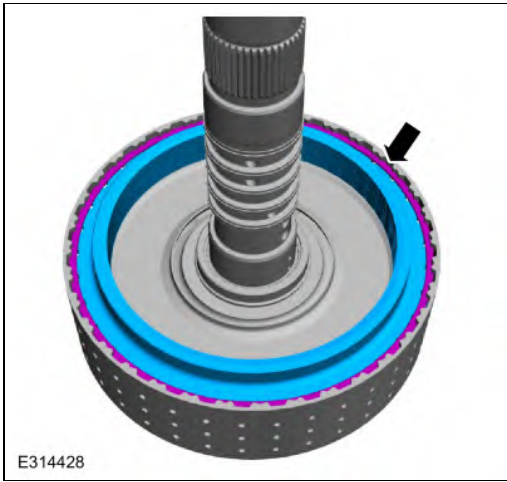


162. **NOTE:** Pry up from the inner bearing race to prevent the bearing from separating.

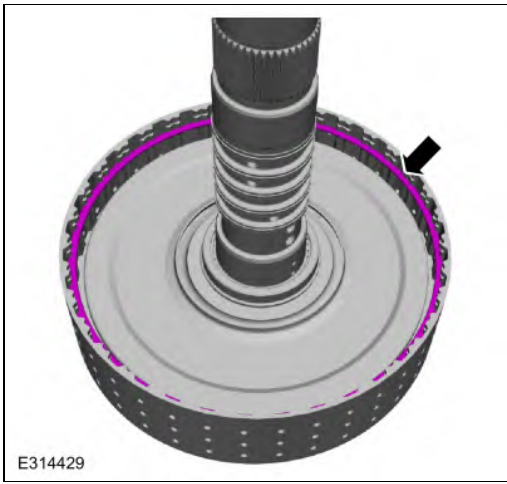
Remove the (T6) thrust bearing.



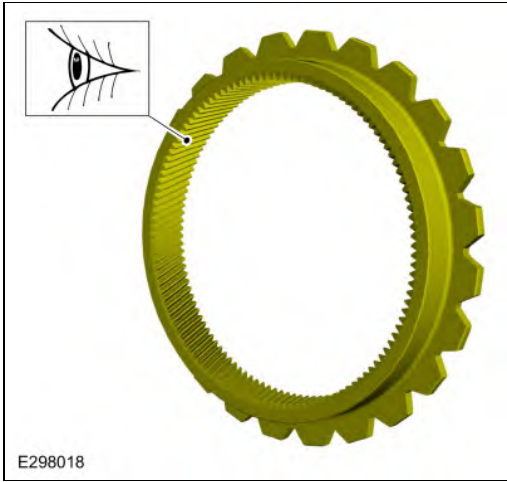
163. Remove the snap ring and the No. 3 ring gear.



164. Remove the rear No. 3 ring gear snap ring.



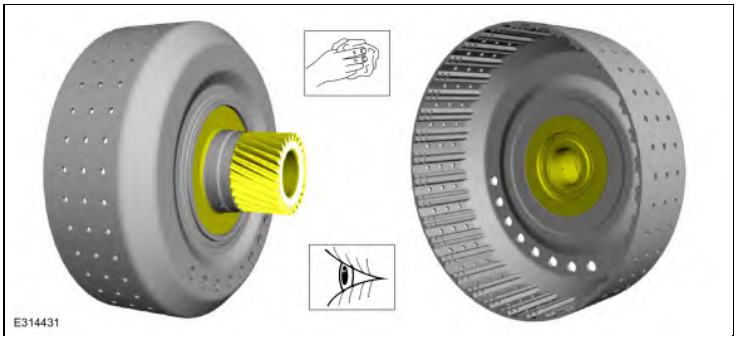
165. Inspect the No. 3 ring gear for damage.



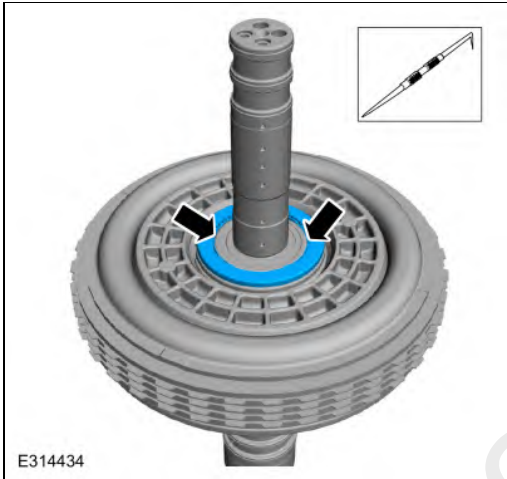
166. Remove the input shaft and the E clutch from No. 4 shell and sun gear.



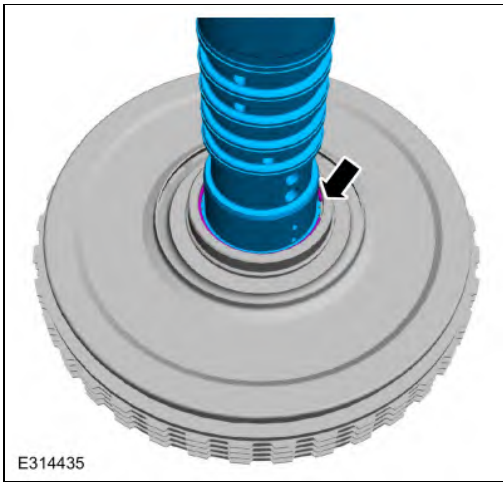
167. Clean and inspect the No. 4 shell and sun gear for damage.



168. **NOTE:** Pry up from the inner bearing race to prevent the bearing from separating.
Remove the (T7) thrust bearing.



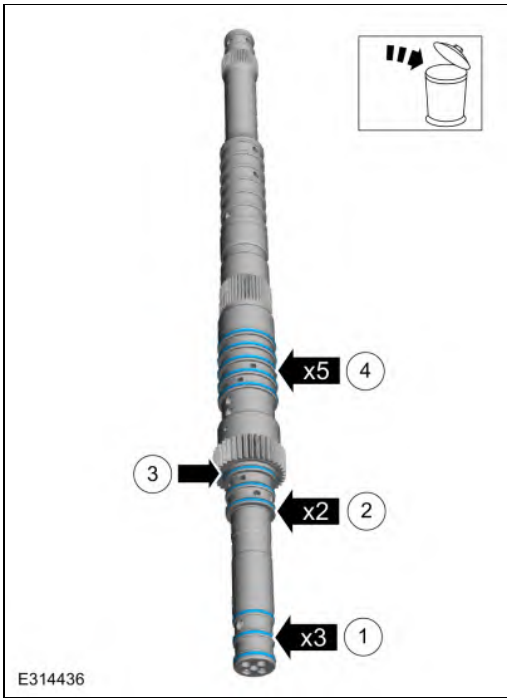
169. Remove the snap ring and remove the input shaft from the E clutch assembly.



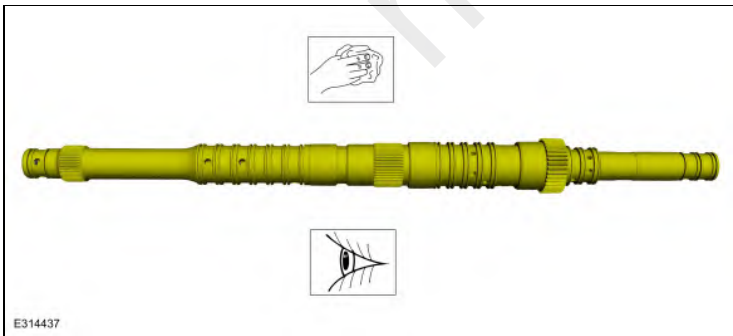
170.

1. **NOTICE:** Use caution not to scratch or gouge the input shaft surface when removing the input shaft (F9) seals. The input shaft is not hardened in this area and damage to the input shaft can occur.

- Remove and discard the input shaft (F9) Teflon® seals.
- Remove and discard the input shaft small O-ring seals.
- Remove and discard the input shaft large O-ring seal.
- Remove and discard the input shaft Z-lock seals.

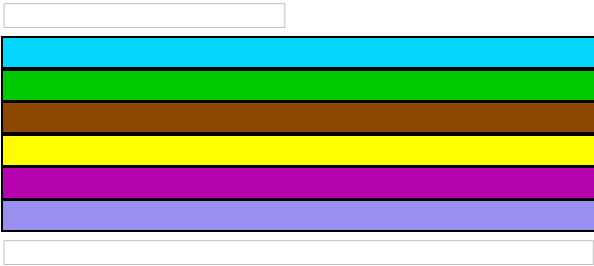
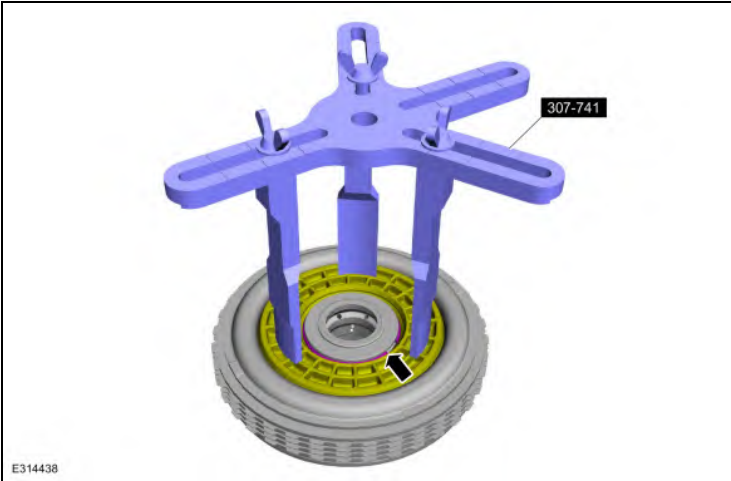


171. Clean and inspect the input shaft for damage.

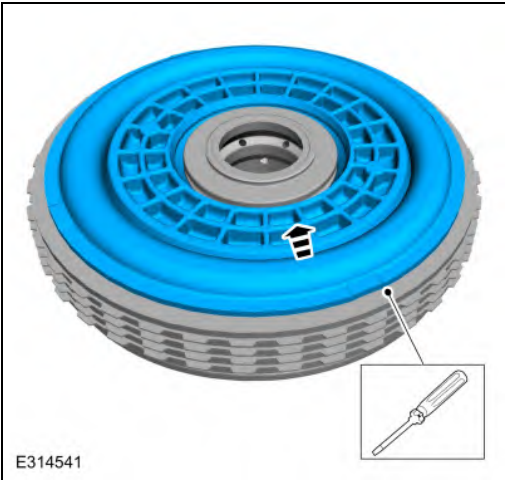


172. **NOTICE: Do not compress the balance dam too far or damage to the E clutch hub can occur. Only compress the E clutch hub far enough to remove the retainer.**

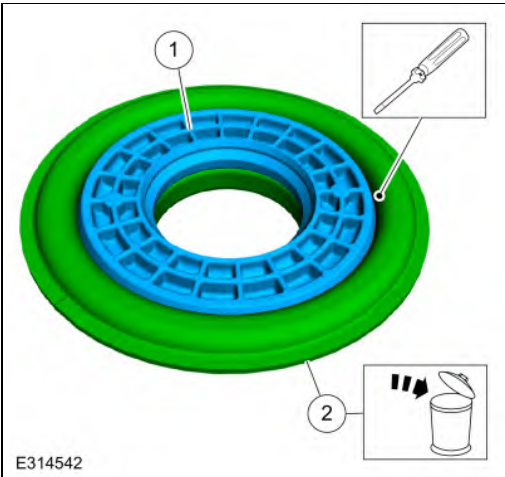
Using the special tool and a press, compress the E clutch balance dam and remove the retainer.
 Use Special Service Tool: 307-741 Spring Compressor, F Clutch.



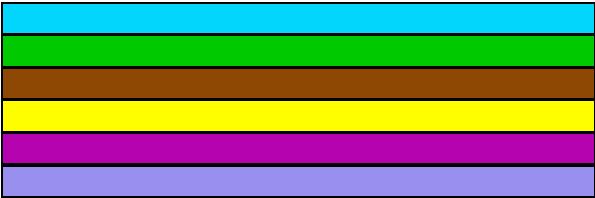
173. Pry the E clutch piston and balance dam upward and remove the piston and balance dam from the E clutch hub.



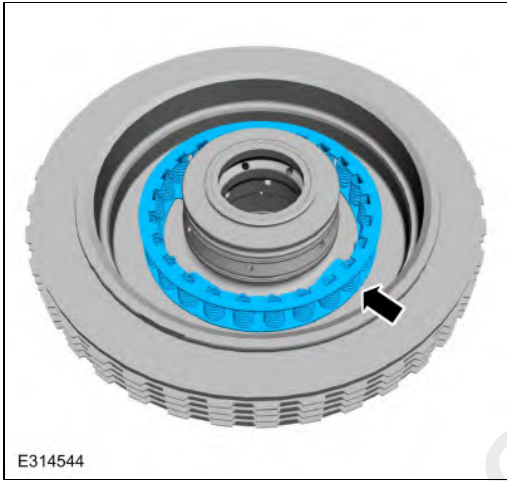
174. Remove the E clutch balance dam and discard the E clutch piston.
- 1. E clutch balance dam
 - 2. E clutch piston



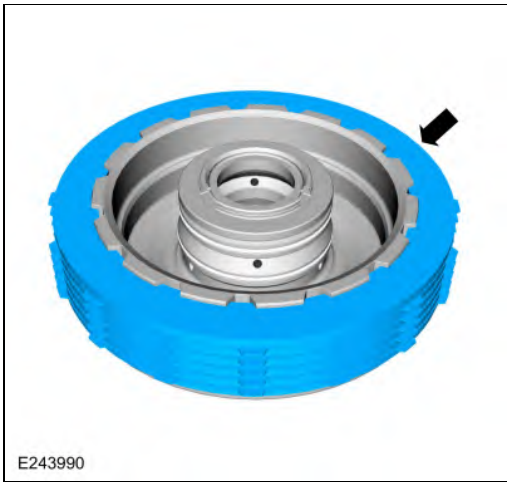
175. Remove and discard the E clutch balance dam outer seal.



176. Remove the E clutch piston return spring.



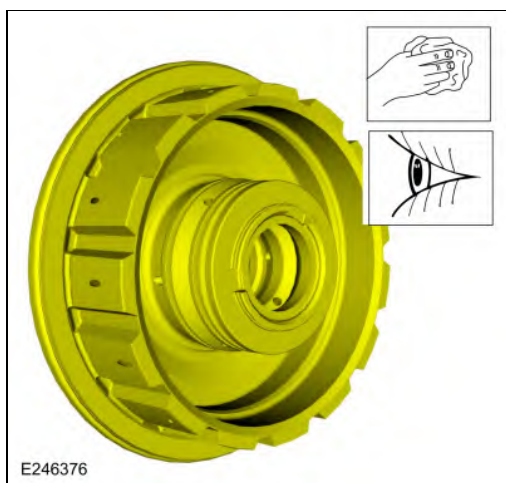
177. Remove the E clutch assembly. Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged replace as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



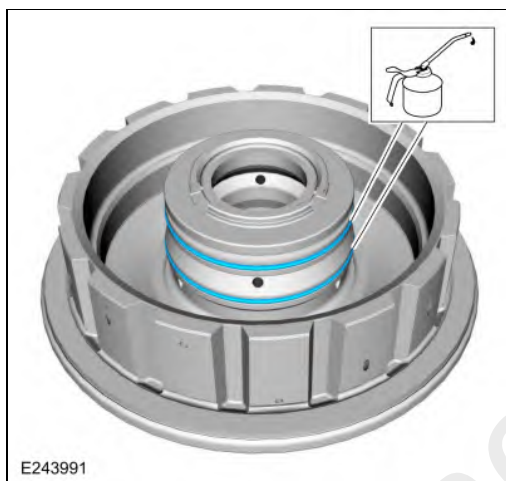
178. Remove and discard the E clutch piston and balance dam inner seals.



179. Clean and inspect the E clutch hub for damage.



180. Install the new E clutch piston and balance dam inner seals. Lubricate the seals with petroleum jelly.



181. **NOTE:** Clutch plate quantity is model dependant based on engine displacement.

Soak the E clutch plates in clean transmission fluid. Install the E clutch assembly.

1. Pressure plate (select fit)
2. Friction plates

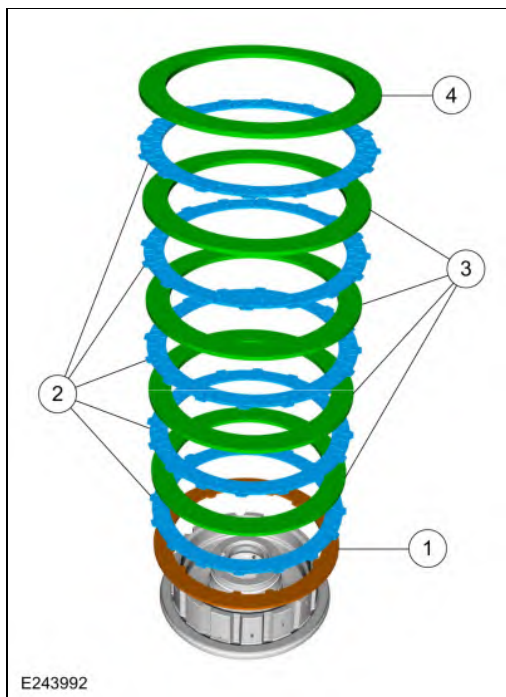
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (WSS-M2C949-A,) (MERCON® ULV)

3. **NOTE:** Align the inner splines of the steel plates with the pressure plate internal splines.

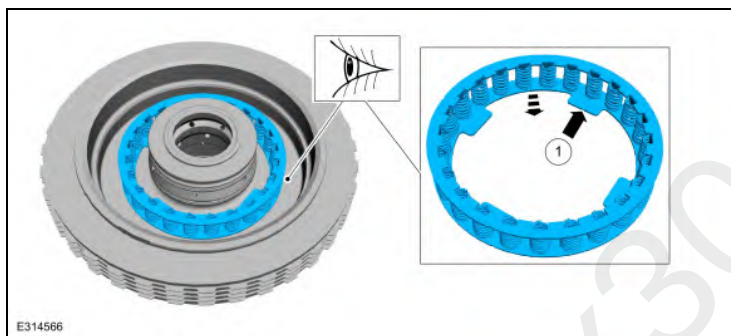
Steel plates

4. Apply plate

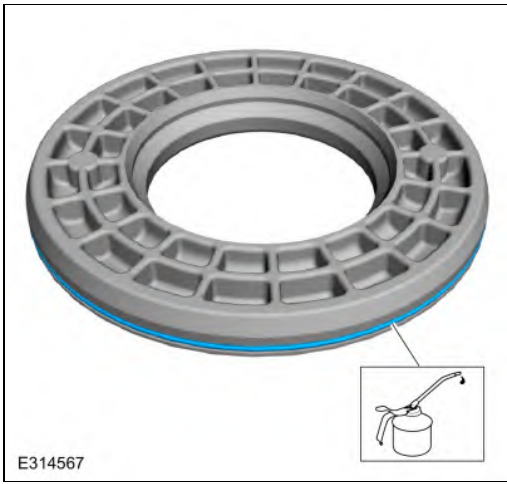
Dimension: 0.114 ±0.018 in (2.9 ±0.3 mm)



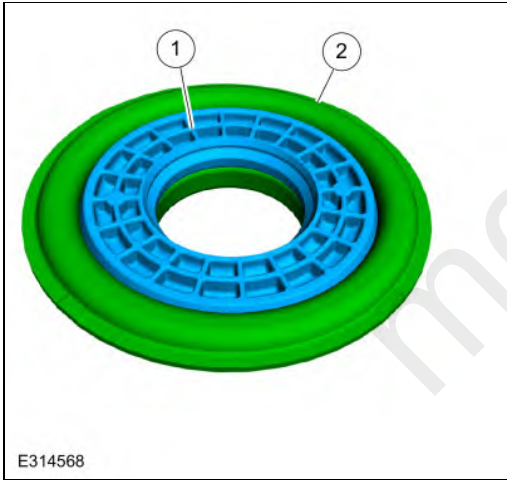
182. Install the E clutch piston return spring with the tabs down.
1. Spring tabs



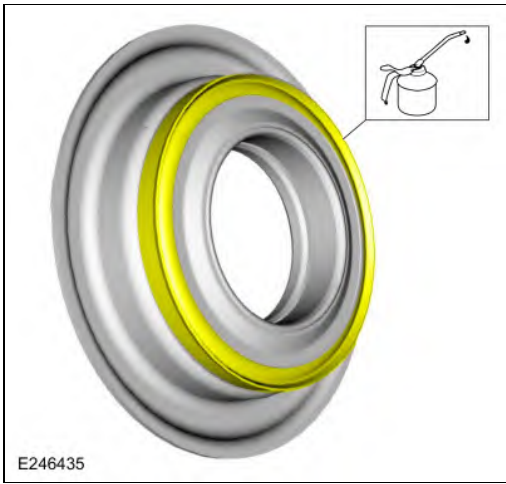
183. Install a new E clutch balance dam outer seal. Lubricate the seal with petroleum jelly.



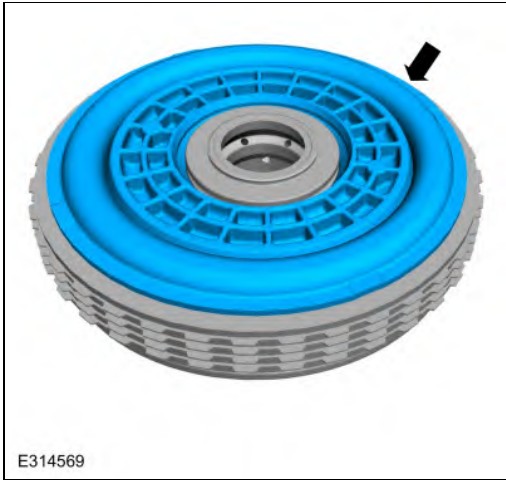
184. Install the E clutch balance dam in the new E clutch piston.
1. E clutch balance dam
 2. E clutch piston



185. Lubricate the new E clutch piston seal with petroleum jelly.

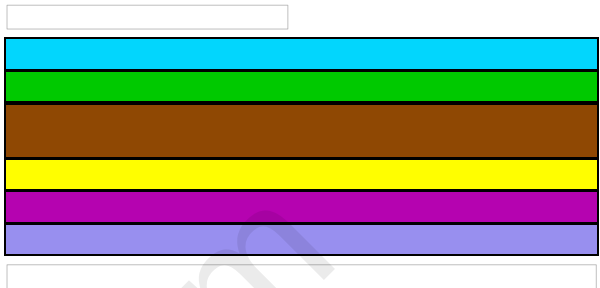
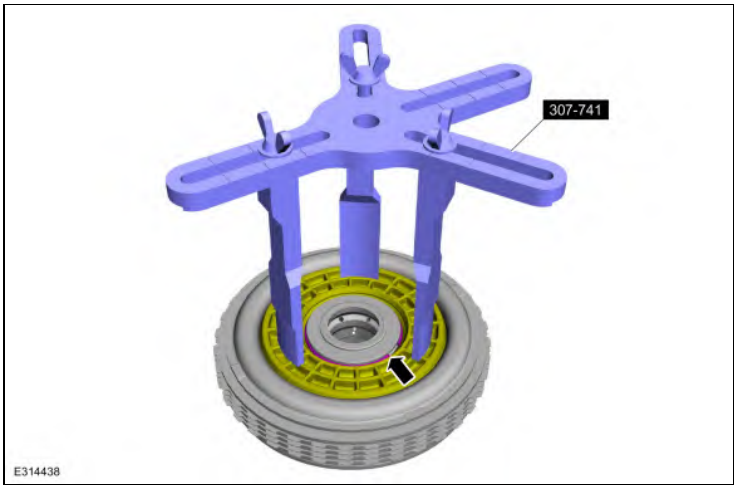


186. Install the new E clutch piston and balance dam in the E clutch hub.

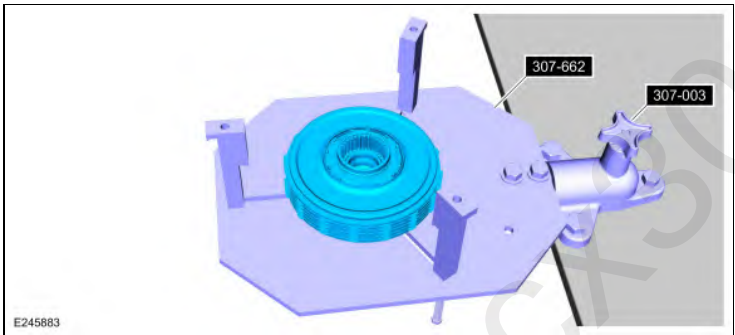


187. **NOTICE: Do not compress the balance dam too far or damage to the E clutch hub can occur. Only compress the E clutch hub far enough to install the retainer.**

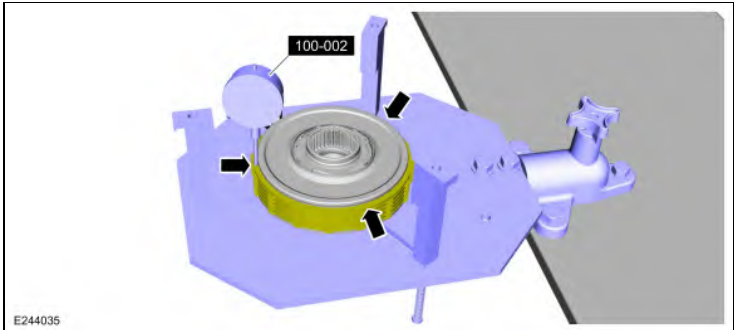
Using the special tool and a press, compress the E clutch balance dam and install the retainer.
 Use Special Service Tool: 307-741 Spring Compressor, F Clutch.
 Use the General Equipment: Hydraulic Press



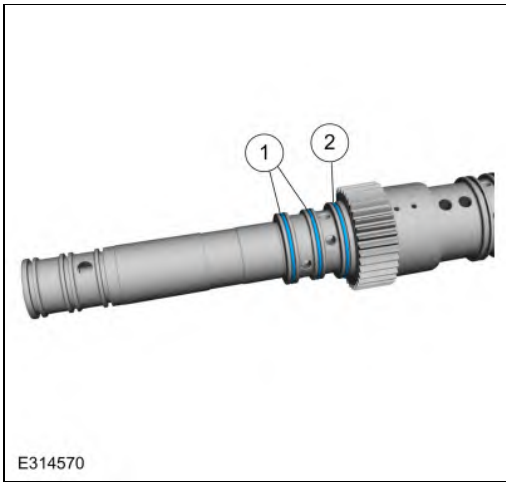
188. Assemble the special tools and position the E clutch assembly on the special tool.
Use Special Service Tool: 307-662 Gauge, Clutch Pack Endplay. , 307-003 (T57L-500-B) Holding Fixture, Transmission.



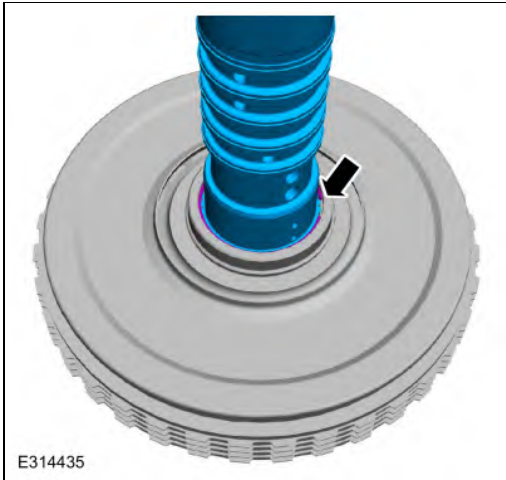
189. Using the special tool, measure the E clutch clearance. Position the plunger so it rests on the top surface of the pressure plate. Zero the dial indicator. Pull up on the pressure plate and measure and record the clutch clearance in 3 different places. Average the 3 recorded clutch clearance measurements and compare the measurement to the clutch clearance chart in specifications to determine the correct size pressure plate. Install the correct E clutch pressure plate.
Refer to: Specifications (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission & 10R140, Specifications).
Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



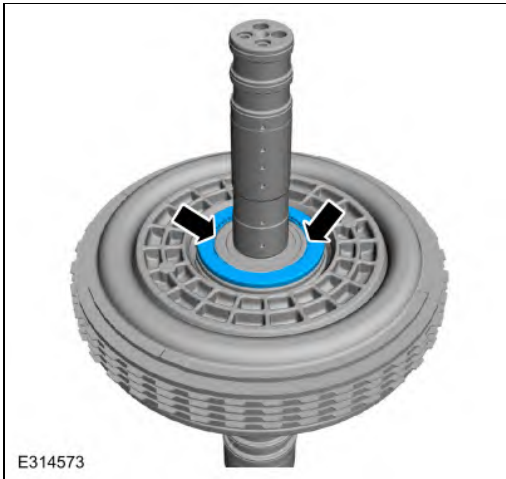
190.
Install the new input shaft O-ring seals.
1. Small O-ring seals (7G242-C)
2. Large O-ring seal (7G242-D)



191. Install the input shaft in the E clutch and install the snap ring.

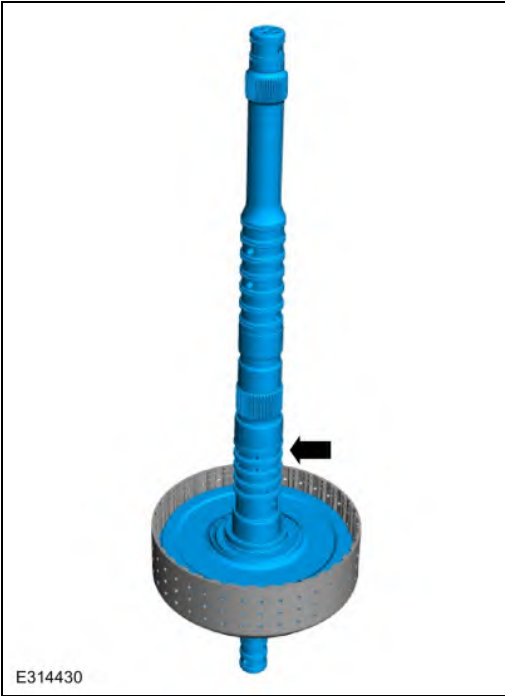


192. Install the (T7) thrust bearing onto the E clutch. Snap the bearing into place.

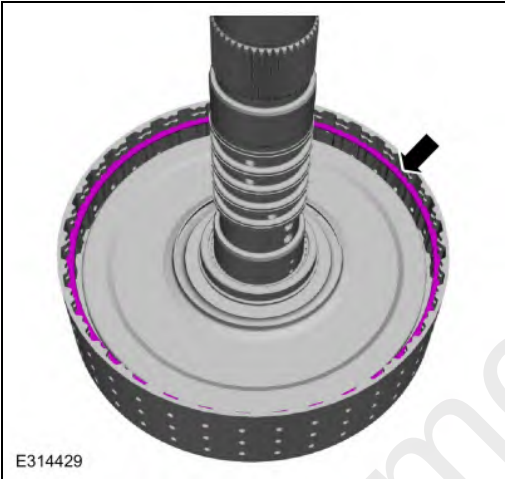


193. **NOTE:** Align the outer splines on the friction plates.

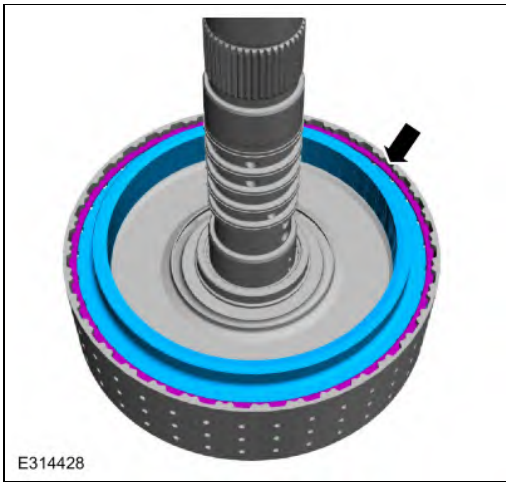
Install the input shaft and the E clutch into the No. 4 shell and sun gear.



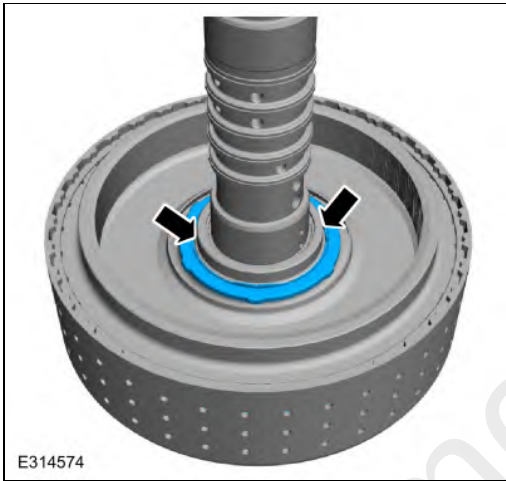
194. Install the lower rear No. 3 ring gear snap ring.



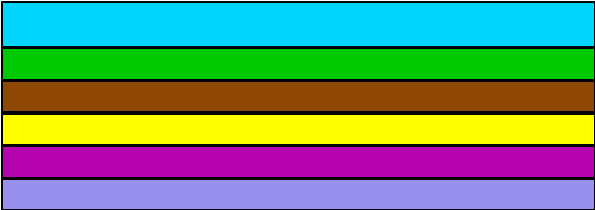
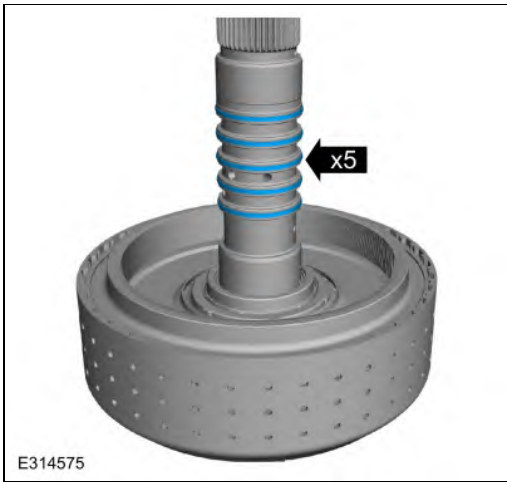
195. Install the No. 3 ring gear and the snap ring. Align the snap ring gap 180° from the bottom snap ring gap.



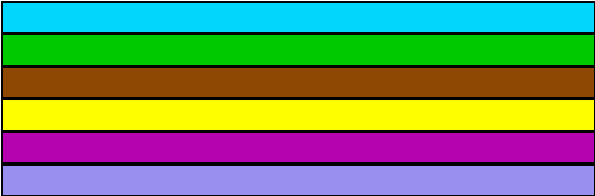
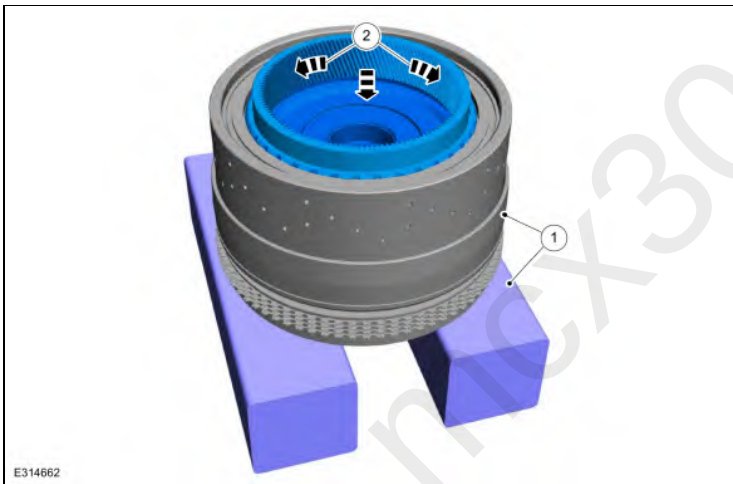
196. Install the (T6) thrust bearing onto the E clutch. Snap the bearing into place.



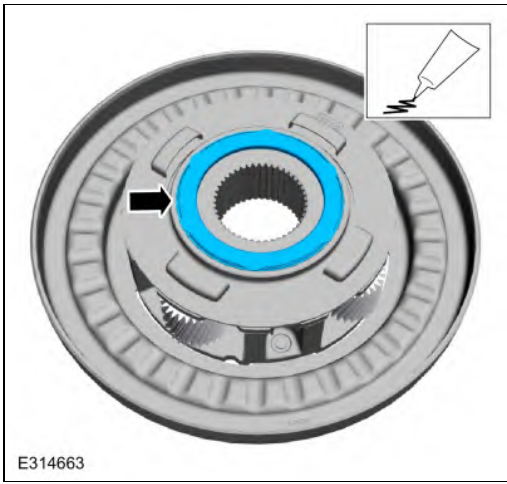
197. Install the new Z-lock seals.



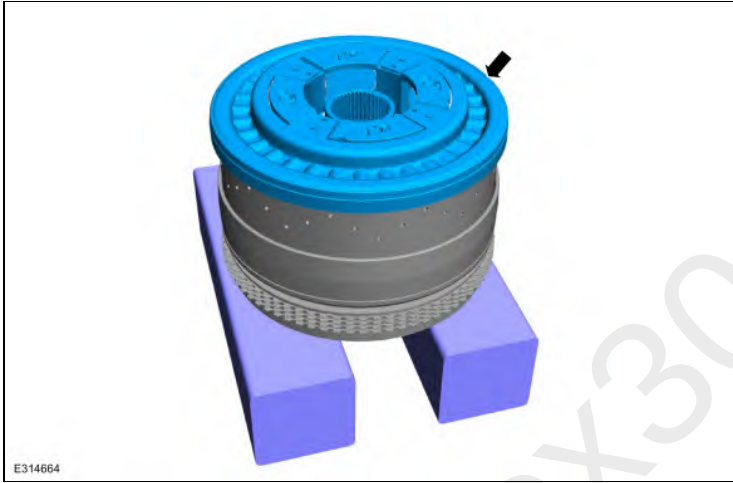
- 198.
- Install the No. 3 sun gear shaft into the CDF clutch assembly.
1. Position the CDF clutch assembly on 2 blocks of wood.
Use the General Equipment: Wooden Block
 2. Rotate the No. 3 sun gear shaft back and forth to install.



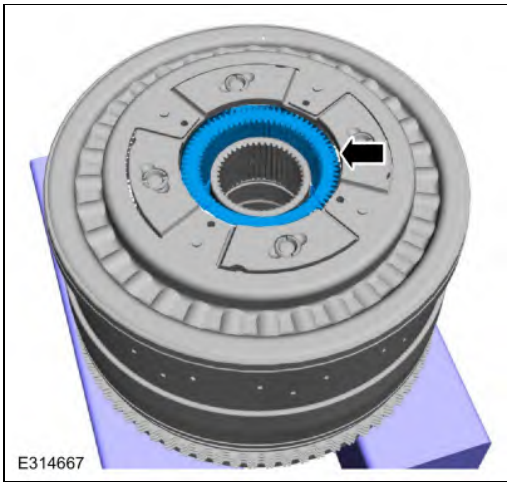
199. Coat the (T5) bearing with petroleum jelly to hold it in place and install the (T5) bearing on to the No. 2 planetary carrier.



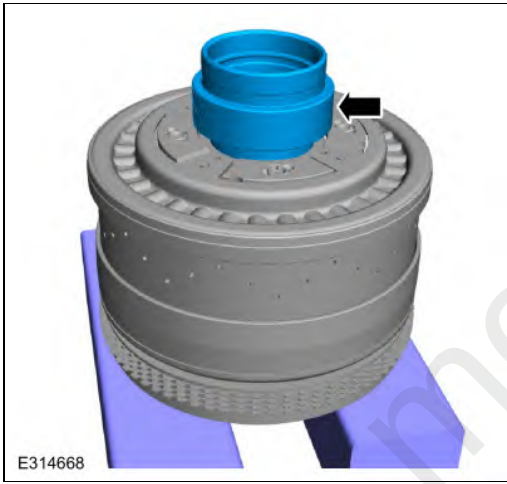
200. Install the No. 2 planetary carrier.



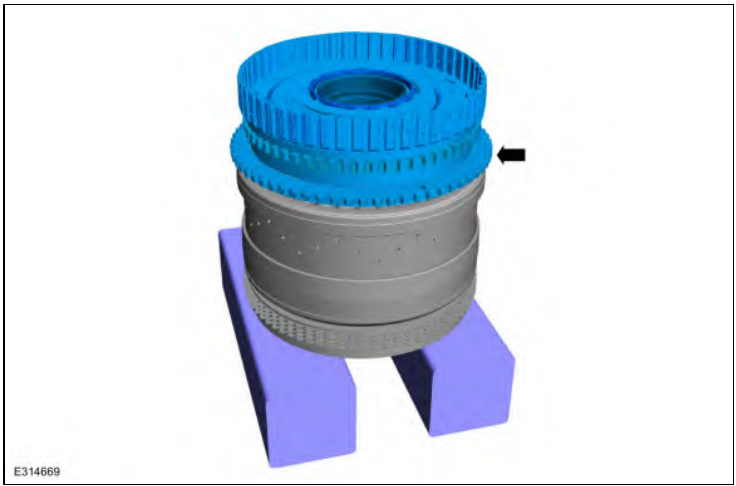
201. Install the No. 2 sun gear.



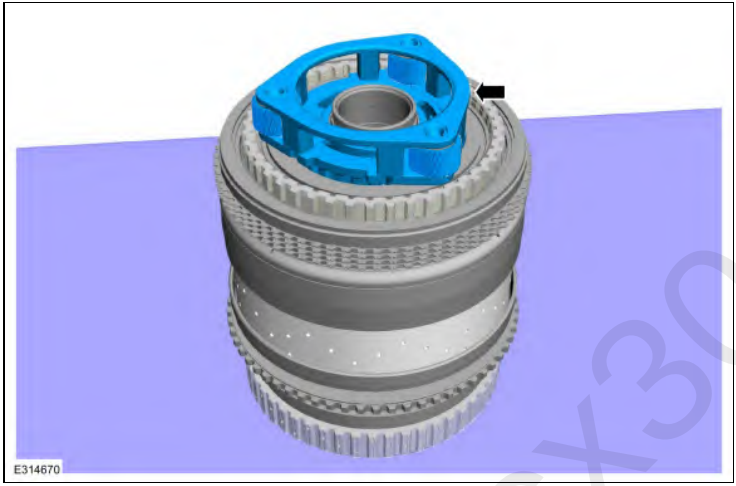
202. Install the No. 1 sun gear.



203. Install the No. 1 planetary carrier assembly on to the No. 2 planetary carrier.



204. Flip the assembly over on to the bench and install the No. 3 planetary carrier.



205. Install the No. 3 sun gear thrust washer.

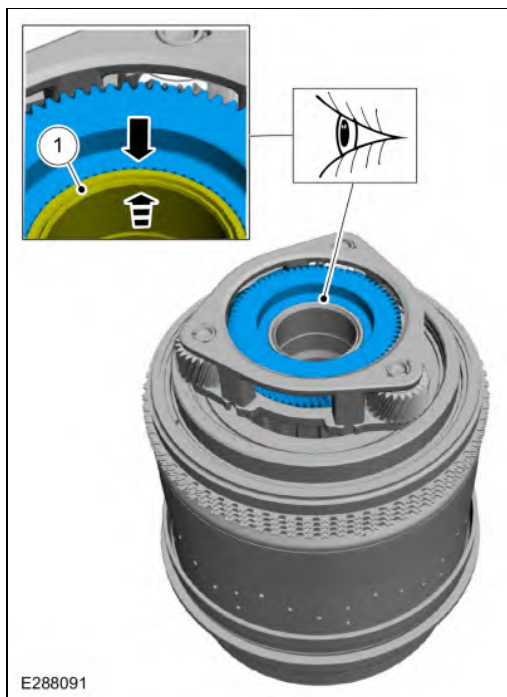


206.

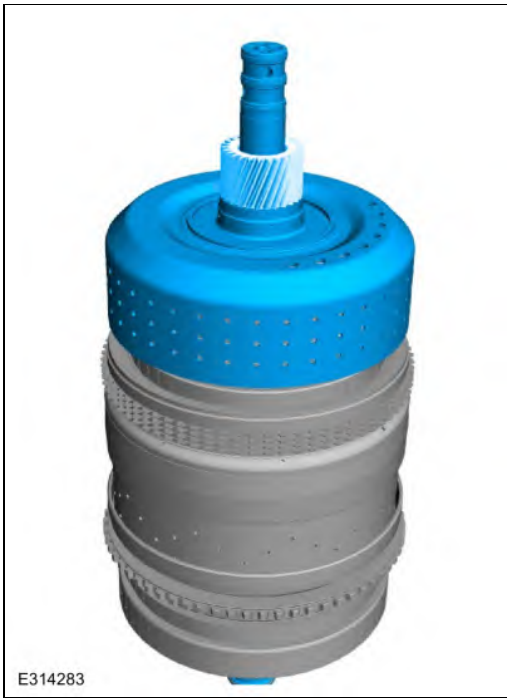
Install the No. 3 sun gear.

1. **NOTE:** *The No. 3 sun gear shaft splines will be flush with the No. 3 sun gear splines when correctly installed.*

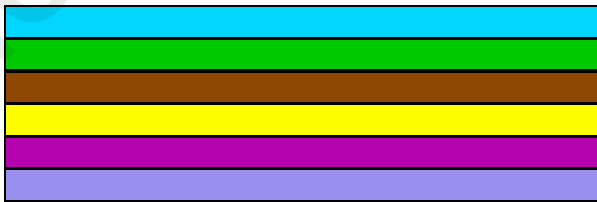
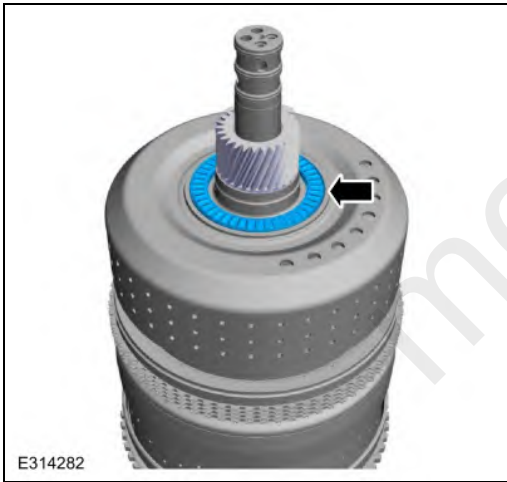
Check the No. 3 sun gear shaft for correct installation.



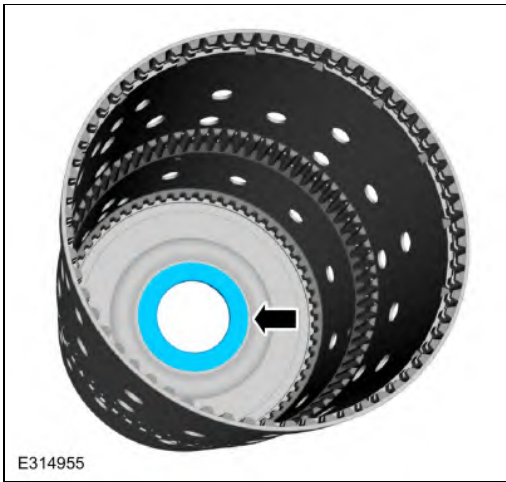
207. Install the E clutch and input shaft assembly.



208. Install the (T8) thrust bearing.

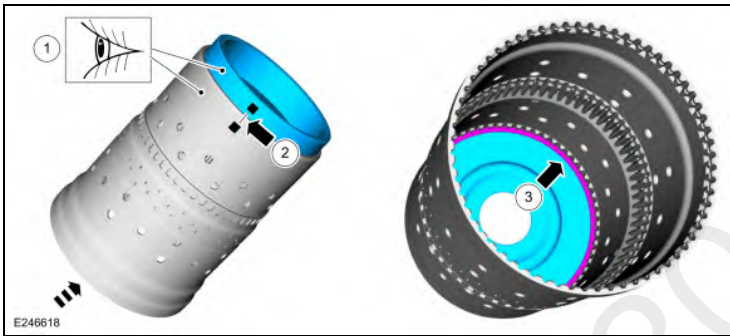


209. Install the (T8) thrust bearing race.



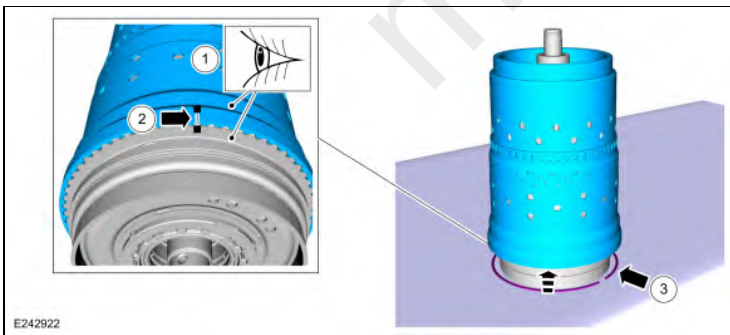
210.

1. If the No. 4 ring gear was removed, inspect the ring gear and the clutch and planetary container cylinder for laser applied ink marks.
2. **NOTICE: If ink marks are present the marks must be aligned or a transmission vibration can occur.**
If ink marks are present align the marks and install the No. 4 ring gear on the clutch and planetary container cylinder.
3. Install the No. 4 ring gear snap ring.

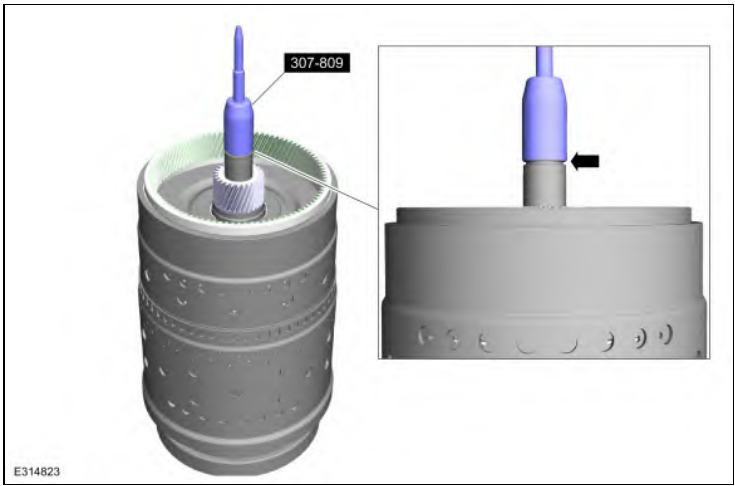


211.

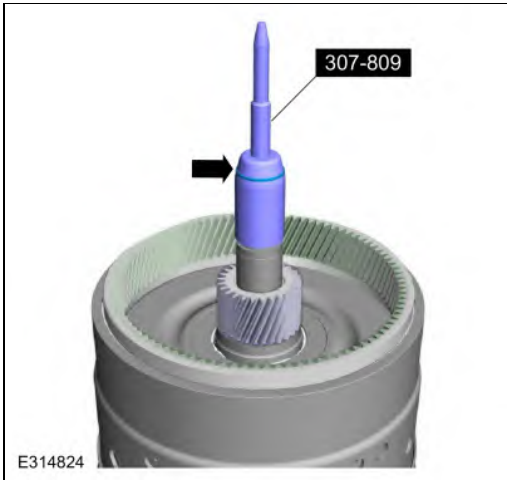
1. Inspect the No. 1 planetary carrier and the clutch and planetary container cylinder for laser applied ink marks.
2. **NOTICE: If ink marks are present the marks must be aligned or a transmission vibration can occur.**
If ink marks are present align the marks and install the clutch and planetary container cylinder onto the No. 1 planetary carrier and install the snap ring. Make sure the snap ring is seated.
3. Install the No. 1 planetary carrier snap ring. Make sure the snap ring is seated.



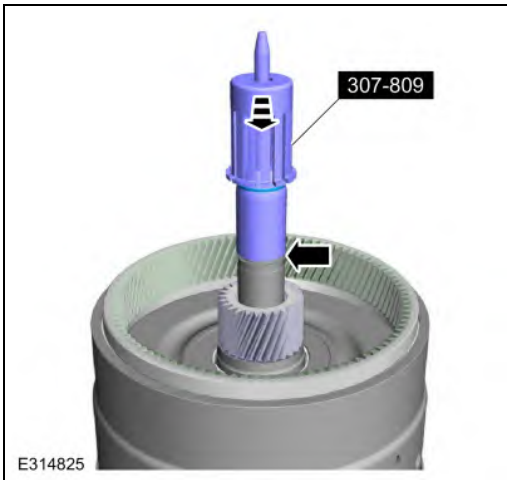
212. Install the special tool and adjust the special tool to align the bottom edge of the tool with the top edge of the bottom Teflon® seal groove.
Use Special Service Tool: 307-809 push & sizer, F0 Seal guide.



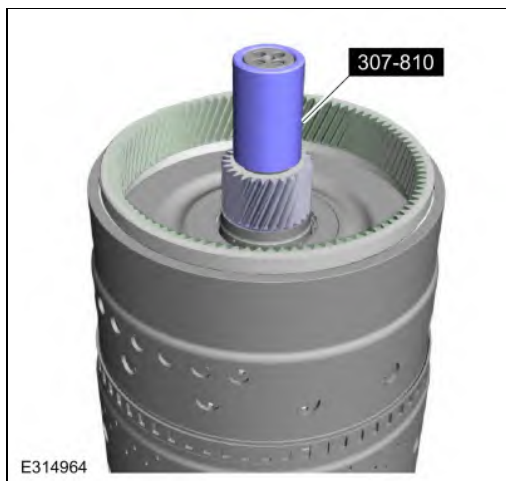
213. Install a new Teflon® seal on the special tool.
Use Special Service Tool: 307-809 push & sizer, F0 Seal guide.



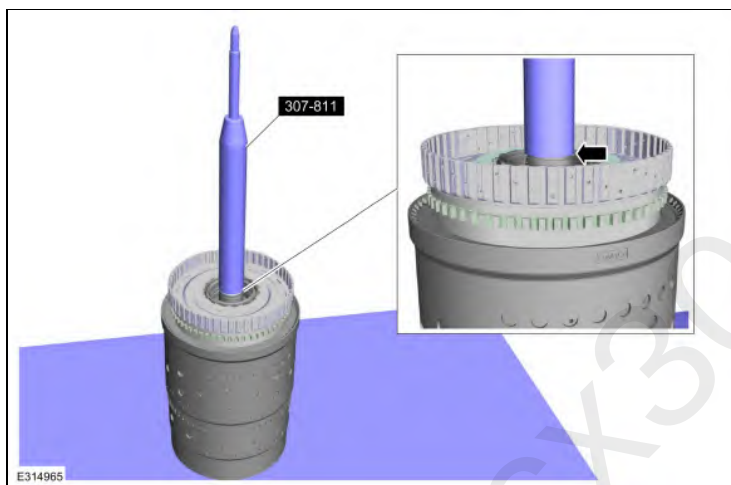
214. Using the top half of the special tool, slide the Teflon® seal into the groove. Remove the special tools and repeat the steps for the other 2 Teflon® seals.
Use Special Service Tool: 307-809 push & sizer, F0 Seal guide.



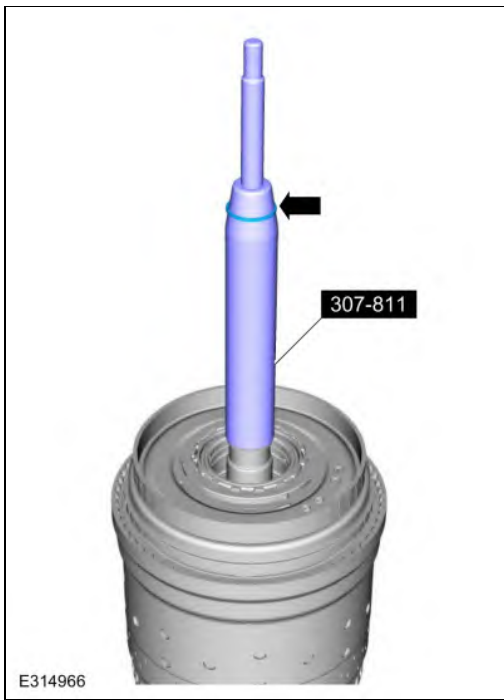
215. Using the special tool, size the Teflon® seal. Allow the special tool to stay on the input shaft until final assembly.
Use Special Service Tool: 307-810 pusher & sizer, F9 Seal guide.



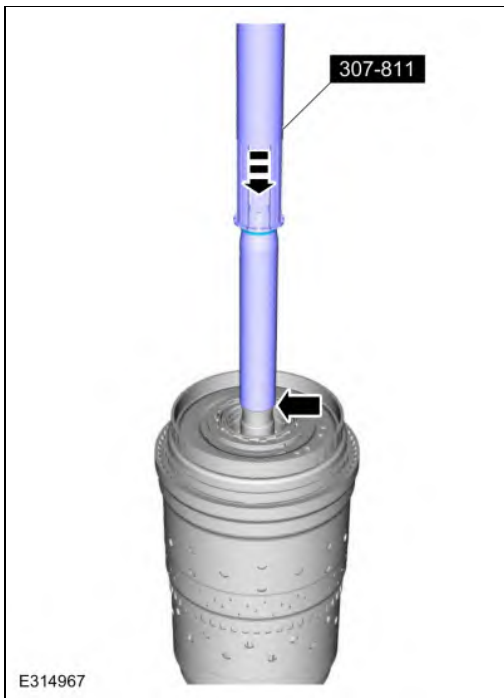
216. Flip the clutch and planetary assembly over and install the special tool and adjust the special tool to align the bottom edge of the tool with the top edge of the bottom Teflon® seal groove.
Use Special Service Tool: 307-811 pusher & sizer, F2 Seal guide.



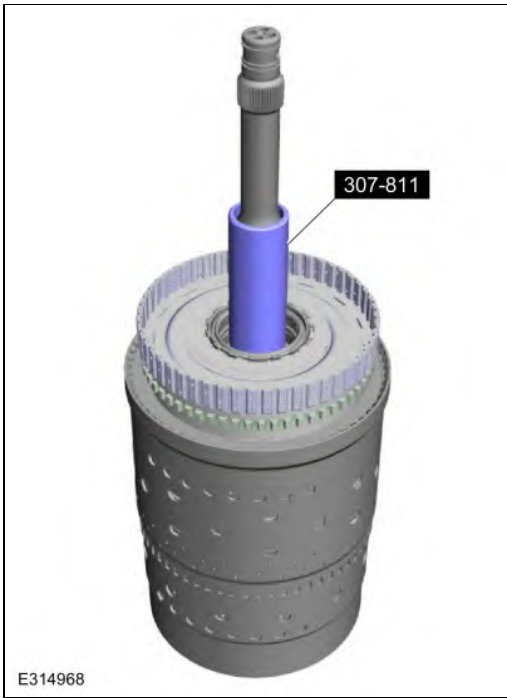
217. Install a new Teflon® seal on the special tool.
Use Special Service Tool: 307-811 pusher & sizer, F2 Seal guide.



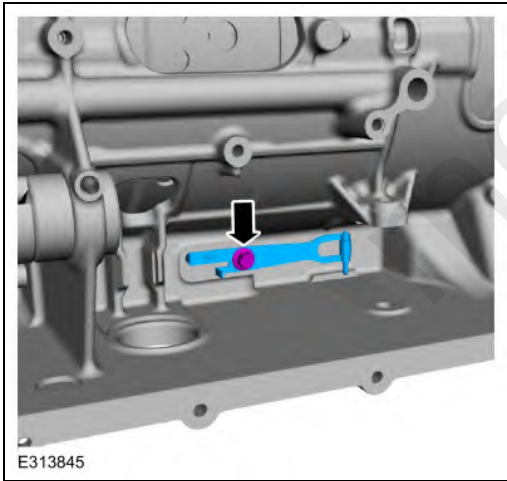
218. Using the top half of the special tool, slide the Teflon® seal into the groove. Remove the special tools and repeat the steps for the other 6 Teflon® seals.
Use Special Service Tool: 307-811 pusher & sizer, F2 Seal guide.



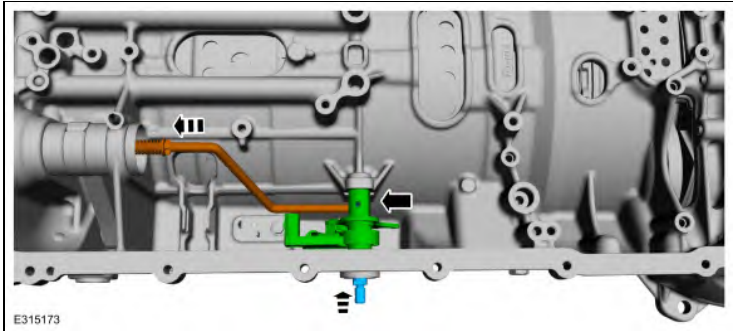
219. Install the special tool to size the 7 Teflon® seals. Allow the special tool to stay on the input shaft until final assembly.
Use Special Service Tool: 307-811 pusher & sizer, F2 Seal guide.



220. Install the TR sensor detent spring and loosely install the bolt.

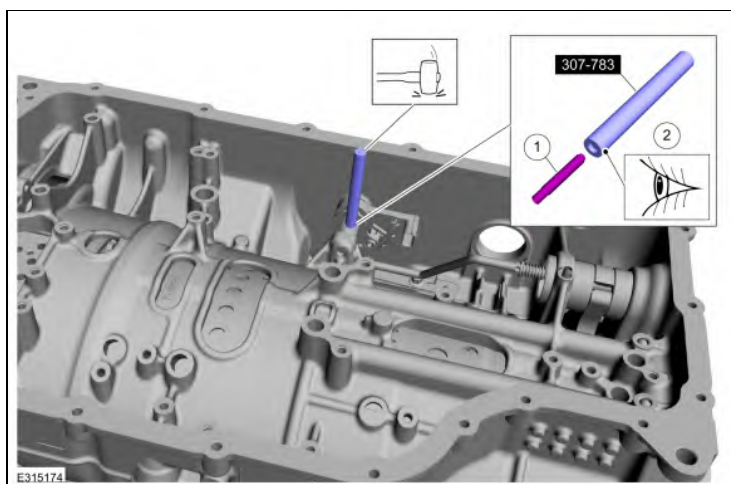


221. Install the park pawl actuator rod, manual shaft and the TR sensor.

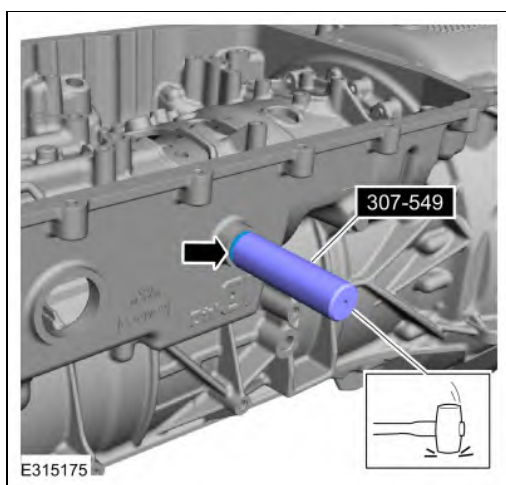


222. Using the cupped end of the special tool, install the new manual shaft-to-TR sensor roll.
 1. New roll pin

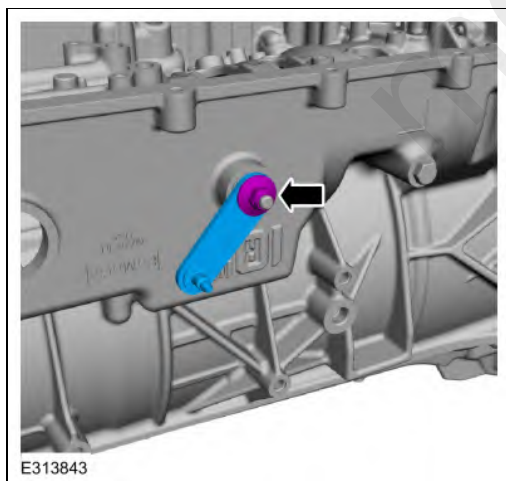
2. Cupped end of special tool
Use Special Service Tool: 307-783 Installer, Roll Pin.
Use the General Equipment: Rubber Mallet



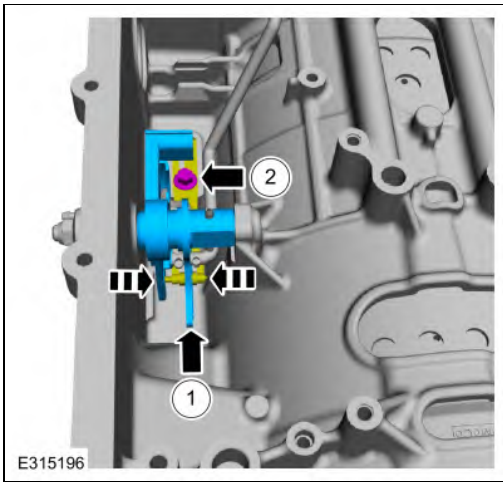
223. Using the special tool install the new manual shaft seal in the transmission case.
Use Special Service Tool: 307-549 Installer, Shift Shaft Fluid Seal.



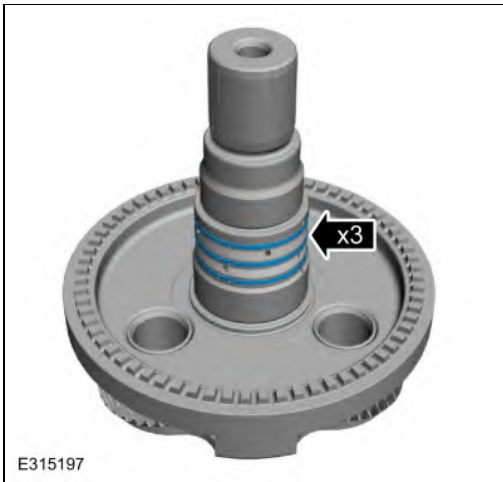
224. Install the selector lever and the nut.
Torque: 106 lb.in (12 Nm)



225.
 1. Align the detent spring in the center of the TR sensor.
 2. *Torque: 97 lb.in (11 Nm)*



226. Install new Z-lock seals on the output shaft.



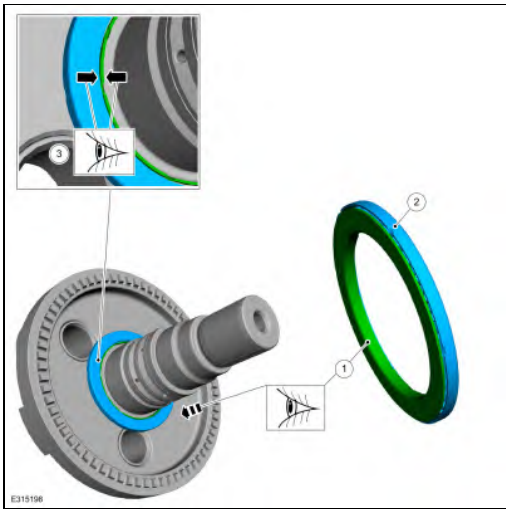
227. **NOTICE:** The (T10) thrust bearing must be installed with the inner bearing race towards the output shaft and planetary carrier or transmission damage can occur.

Snap the (T10) thrust bearing on evenly with the inner race towards the output shaft and planetary carrier.

1. Thrust bearing inner race
2. Thrust bearing outer race

3. **NOTE:** When the (T10) thrust bearing is correctly installed, both the inner and outer bearing races will be visible.

Verify that the (T10) thrust bearing is correctly installed.



228. Rotate the manual lever to N. Install the output shaft and planetary carrier assembly No. 4.



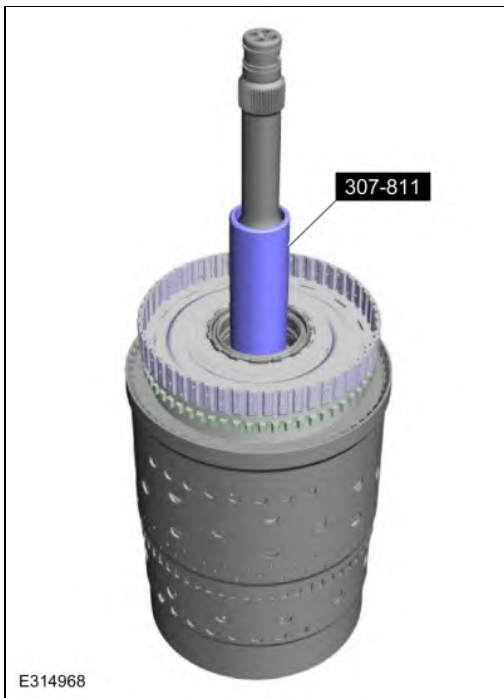
229. Install the (T9) thrust bearing.



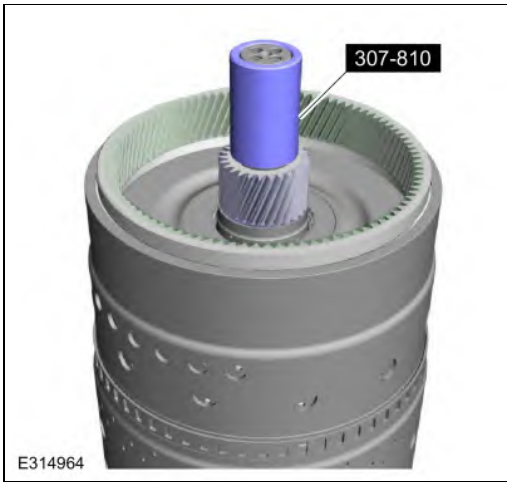
230. Lubricate the output shaft bushing with petroleum jelly.



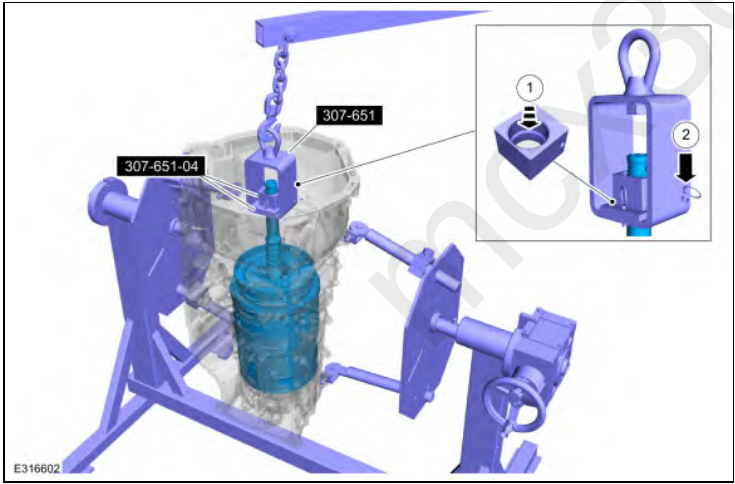
231. Remove Special Service Tool: 307-811 pusher & sizer, F2 Seal guide.



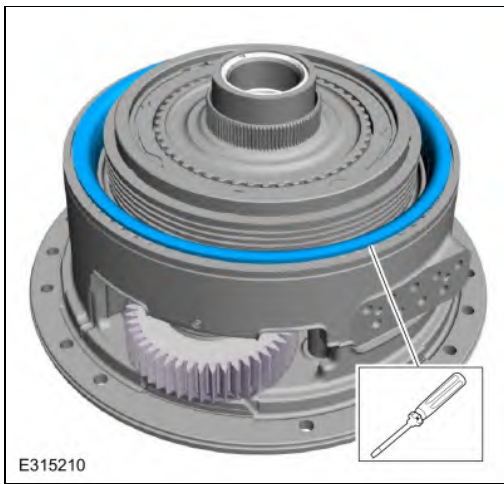
232. Remove Special Service Tool: 307-810 pusher & sizer, F9 Seal guide.



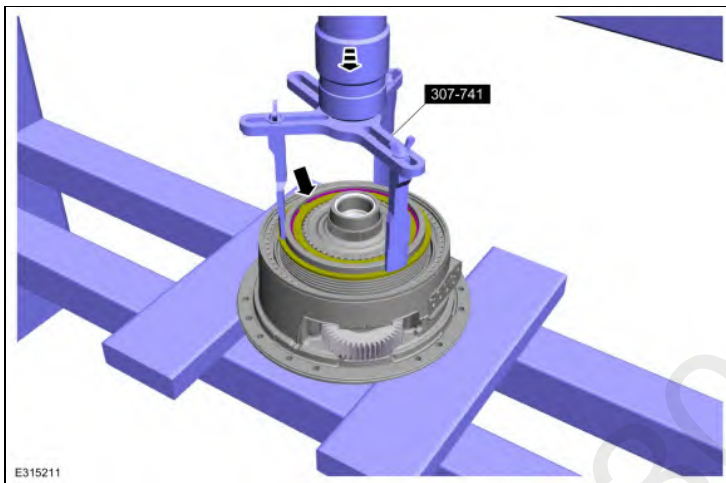
- 233.
- Using the special tools and a floor crane, install the clutch and planetary assembly.
1. Splines of the special tool facing down.
 2. Install the pin in the top hole.
- Use Special Service Tool: 307-651 Bracket, Pump Remover/Installer. , 307-651-04 Adapter, Lift Fixture.



234. Remove the A clutch apply ring.

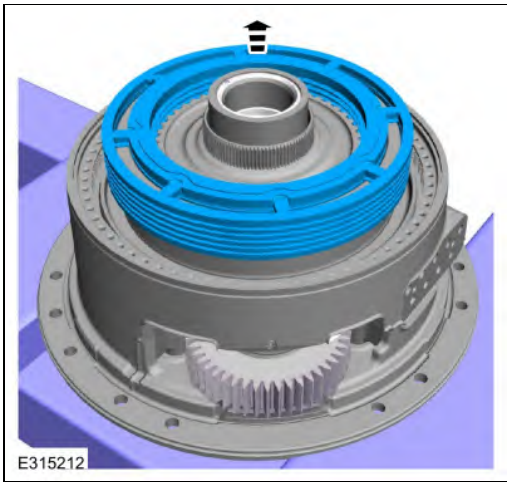


235. Using the special tool and a press, remove the B clutch snap ring.
 Use Special Service Tool: 307-741 Spring Compressor, F Clutch.
 Use the General Equipment: Hydraulic Press

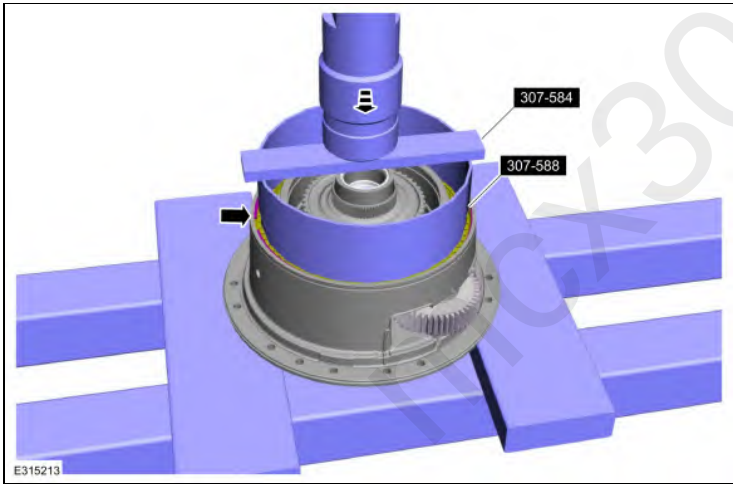


236. **NOTICE: If replacing B clutch separating springs, all separating springs must be replaced as a matching set or damage can occur.**

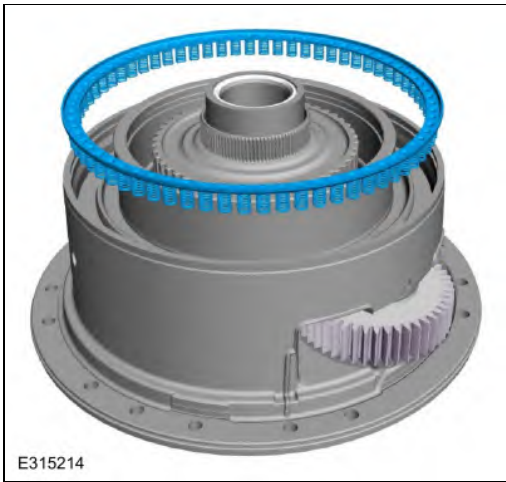
Remove the B clutch assembly from the One-Way Clutch (OWC). Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged replace as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



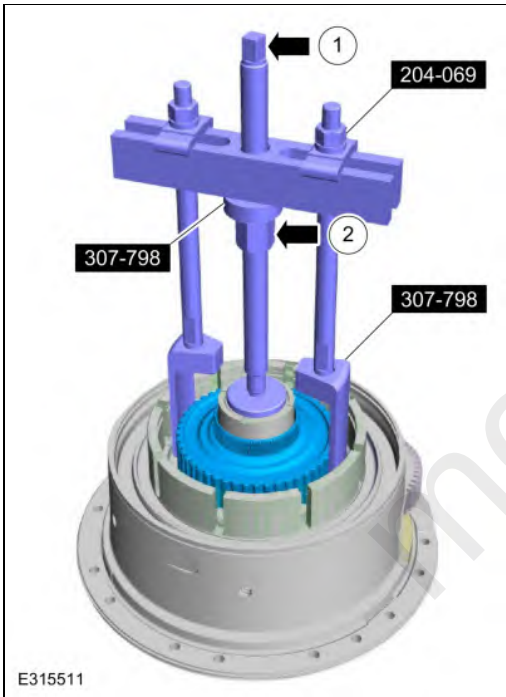
237. Using the special tools and a press, compress the A clutch piston return spring and remove the snap ring.
 Use Special Service Tool: 307-584 2-6 Spring Compressor. , 307-588 Reverse clutch piston and retaining ring set.
 Use the General Equipment: Hydraulic Press



238. Remove the A clutch piston return spring.

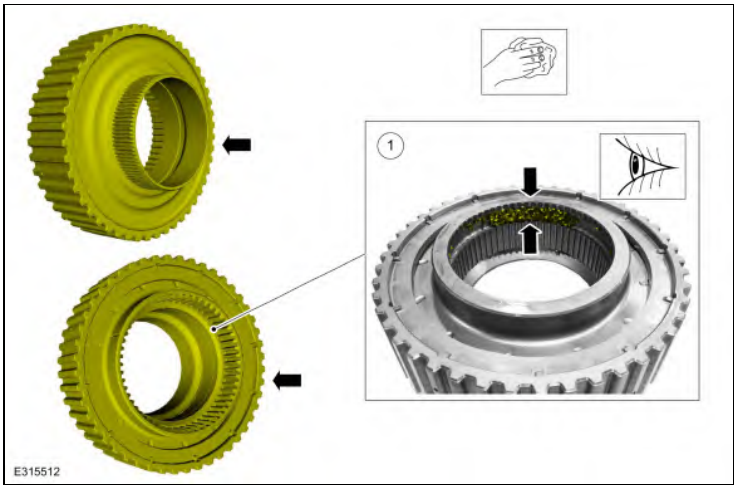


239. Using the special tools, remove the One-Way Clutch (OWC).
1. **NOTICE: Do not turn the special tool forcing screw while removing the One-Way Clutch (OWC). Damage to the special tool will occur.**
Hold the special tool forcing screw.
 2. Turn the special tool nut.

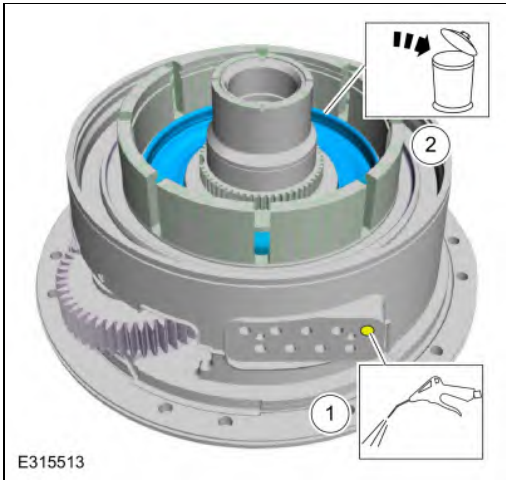


240. **NOTICE: Build-up of metal chips behind the One-Way Clutch (OWC) is a normal condition and is not an indication it needs replacement. Metal chips deposit behind the One-Way Clutch (OWC) during the installation process.**

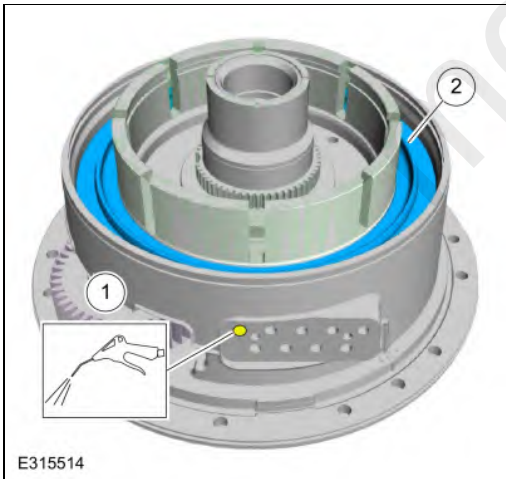
- Clean and inspect the One-Way Clutch (OWC) for damage.
1. Clean the metal chips from behind the One-Way Clutch (OWC).



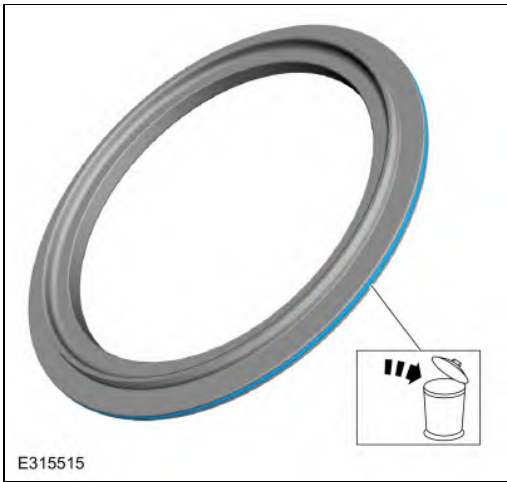
- 241.
1. Use compressed air into the fluid passage hole.
 2. Remove and discard the B clutch piston.



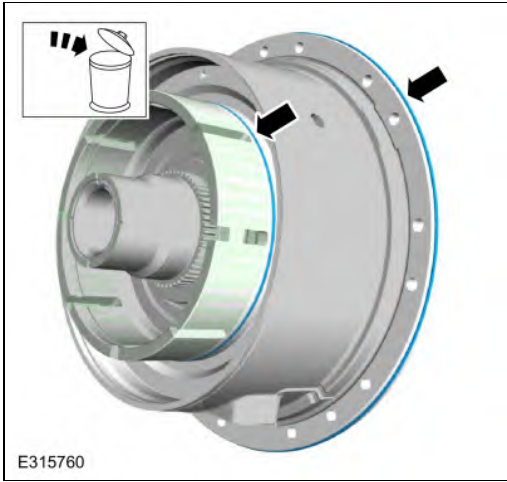
- 242.
1. Use compressed air into the fluid passage hole.
 2. Remove and the A clutch piston.



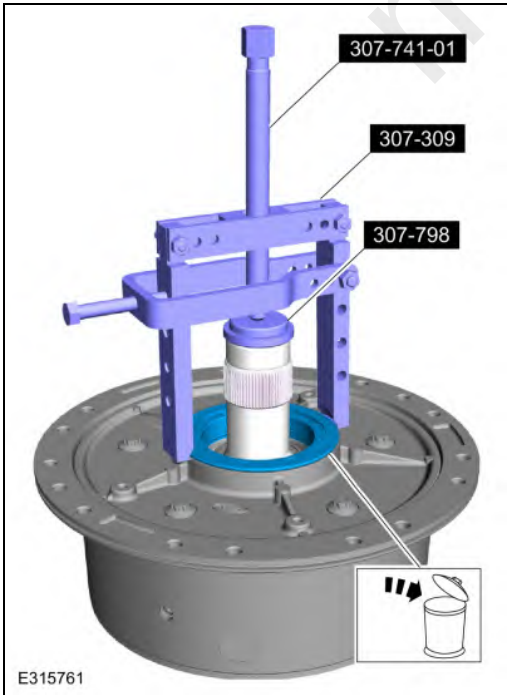
243. Remove and discard the A clutch piston outer seal.



244. Remove and discard the front support-to-case seal and the A clutch piston inner seal.



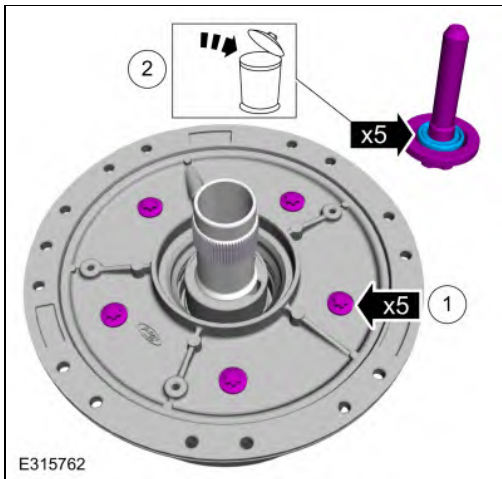
245. Using the special tools, remove and discard the converter hub seal.
Use Special Service Tool: 307-309 Remover, Torque Converter Seal , 307-741-01 Remover, Front Support & Cover , 307-798 Remover/Installer One Way Clutch.



1. **NOTE:** Use a 10ep Torx Plus.Â® socket to remove the bolts.

Remove the front support cover bolts.

2. Remove and discard the front support cover bolt washers.

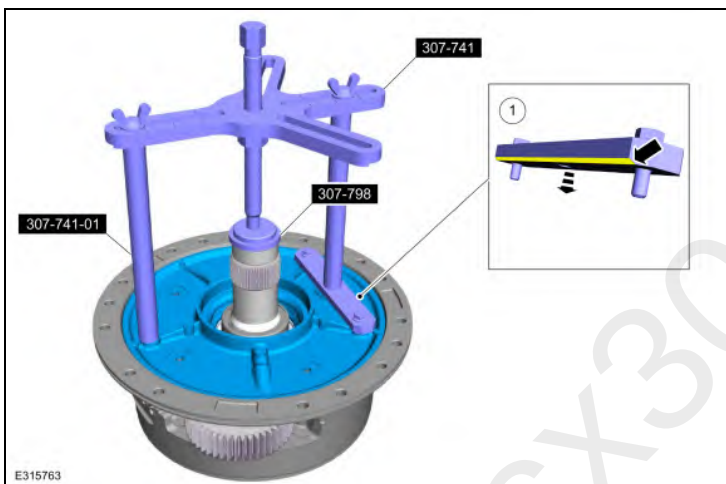


247.

Using the special tools , separate the front support cover from the front support assembly and remove the front support cover.

1. Install the special tool with the beveled side down.

Use Special Service Tool: 307-741 Spring Compressor, F Clutch. , 307-741-01 Remover, Front Support & Cover. , 307-798 Remover/Installer One Way Clutch.

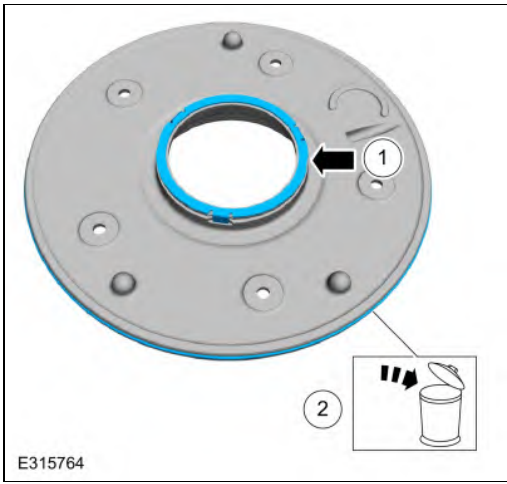


248.

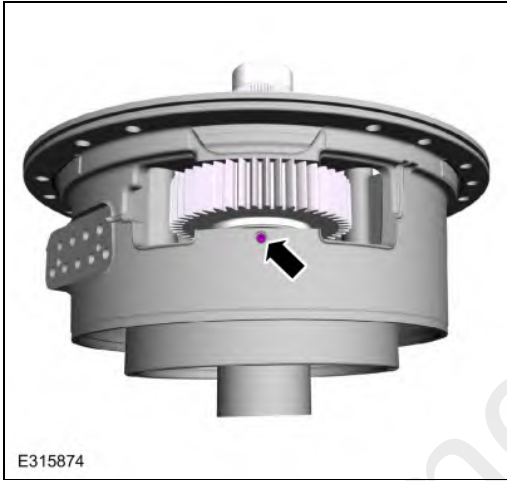
1. **NOTE:** Vehicles equipped with a PTO transmission only.

If equipped, remove the transmission fluid pump drive gear bushing.

2. Remove and discard the front support cover seal.

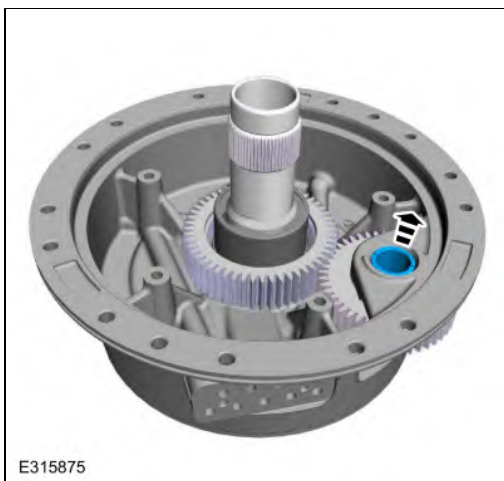


249. Remove the transmission fluid pump idler gear shaft locking pin.



Vehicles equipped with a PTO transmission

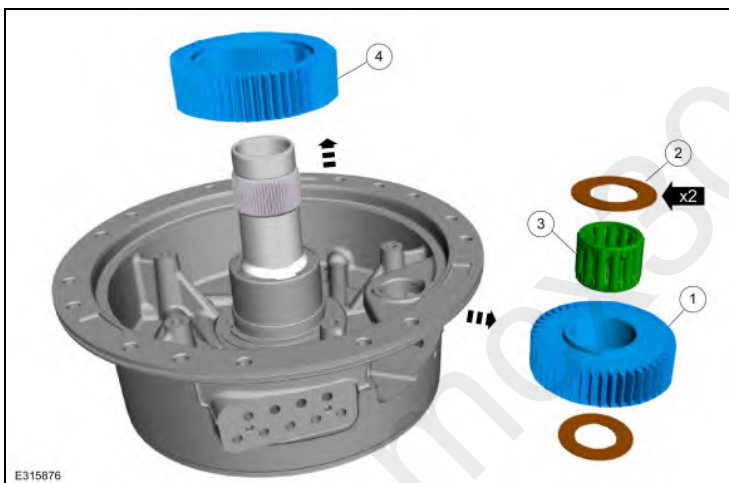
250. Remove the transmission fluid pump idler gear shaft.



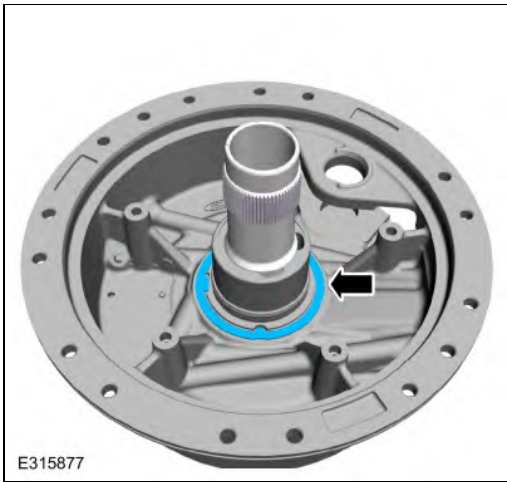
251.

Remove the transmission fluid pump idler gear and drive gear.

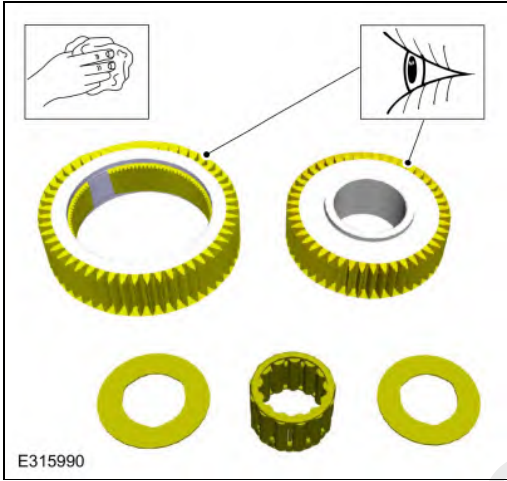
1. Transmission fluid pump idler gear
2. Pump idler gear thrust washers
3. Pump idler gear bearing
4. Transmission fluid pump drive gear



252. Remove the transmission fluid pump drive gear thrust washer.

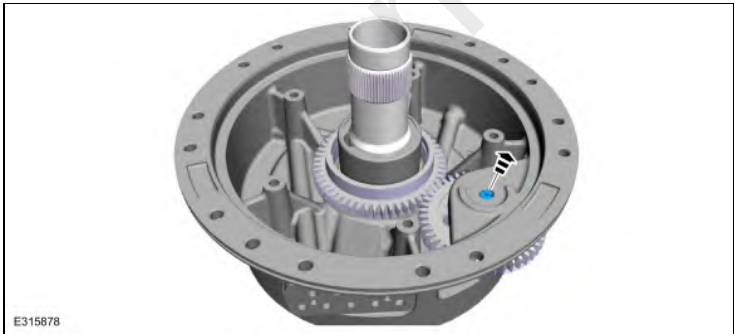


253. Clean and inspect the pump drive and idler gears for damage.

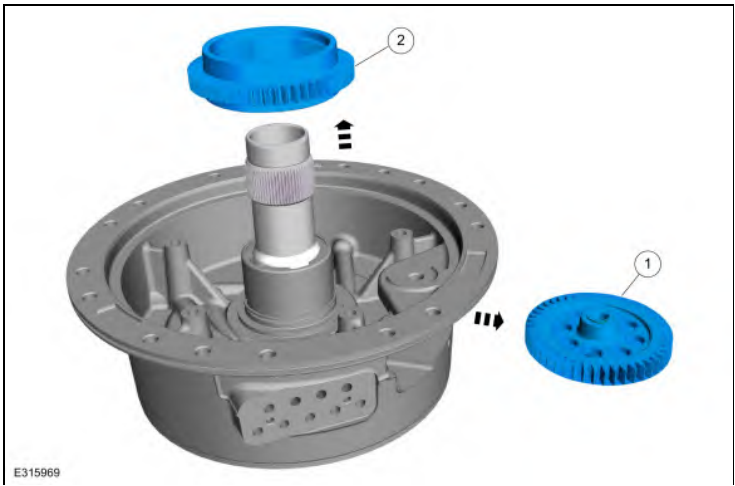


Vehicles equipped without a PTO transmission

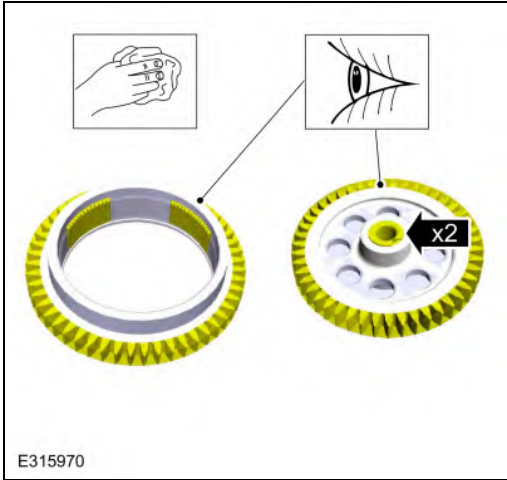
254. Remove the transmission fluid pump idler gear shaft.



- 255.
- Remove the transmission fluid pump idler gear and drive gear.
- 1. Transmission fluid pump idler gear
 - 2. Transmission fluid pump drive gear

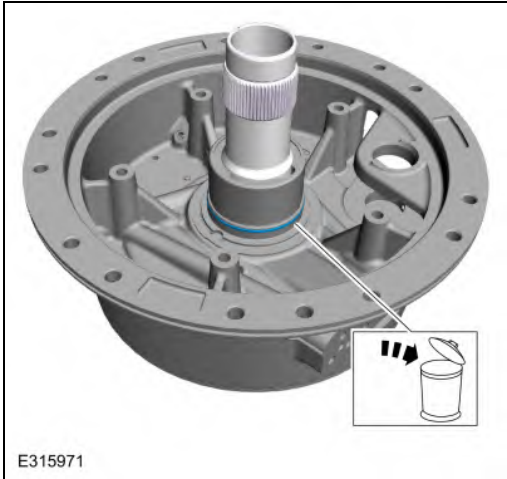


256. Clean and inspect the pump drive and idler gears .



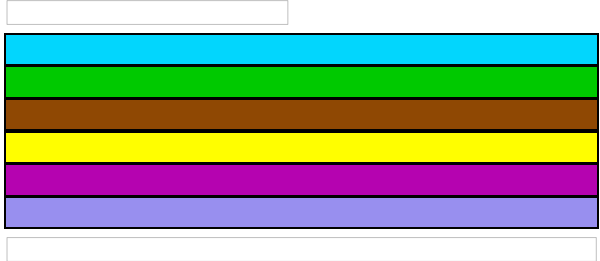
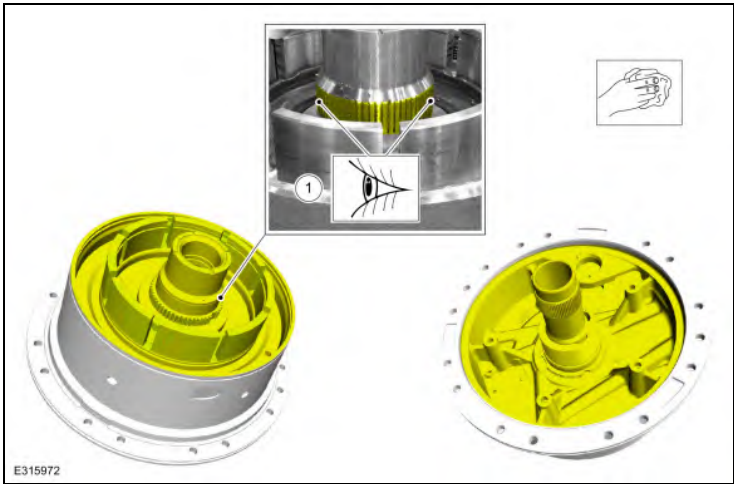
All vehicles

257. Remove and discard the stator support seal.

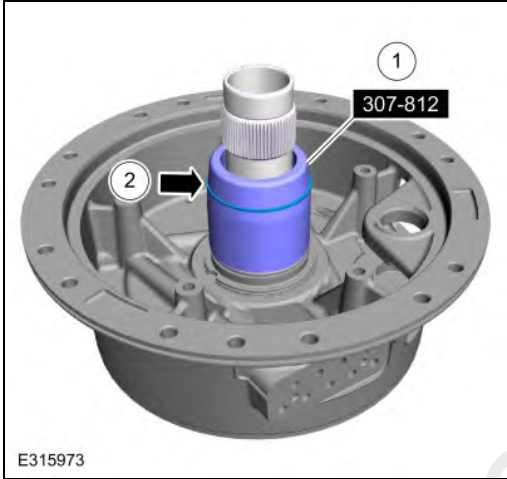


258. Clean and inspect the front support for damage.

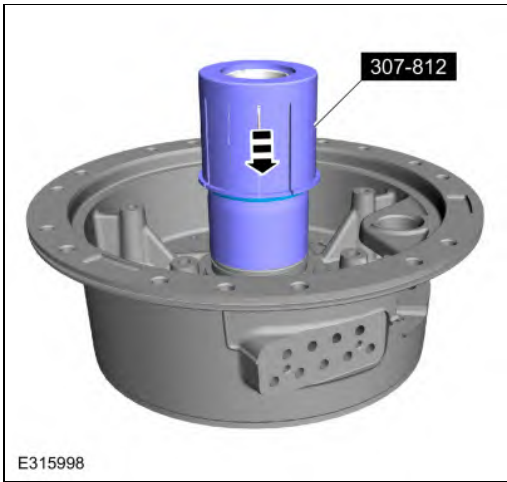
1. **NOTE:** Be sure to clean all metal chips from the front support hub grooves.



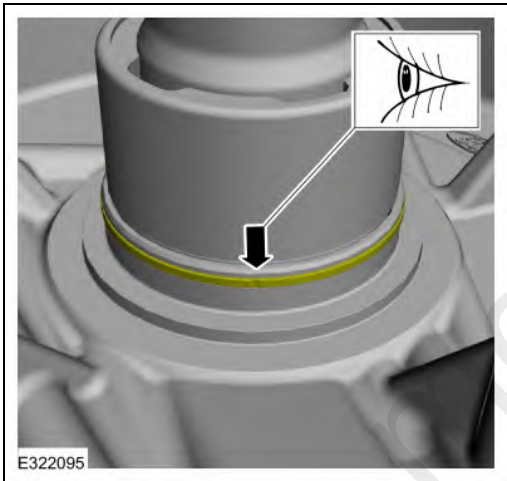
- 259.
1. Install the special tool.
Use Special Service Tool: 307-812 pusher & sizer, F1 Seal guide.
 2. Install a new (F1) Teflon® seal on the special tool.



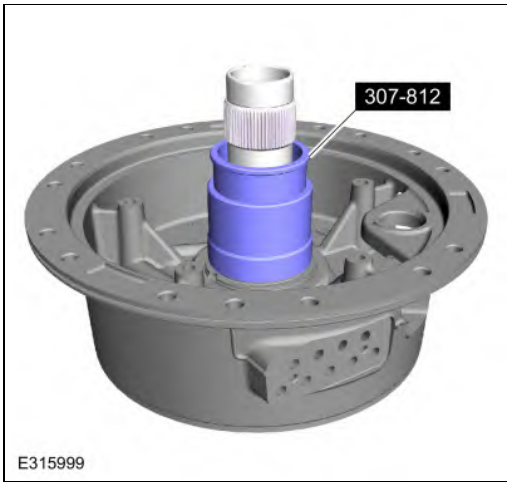
260. Using the top half of the special tool, slide the (F1) Teflon® seal into the groove
Use Special Service Tool: 307-812 pusher & sizer, F1 Seal guide.



261. **NOTE:** When the (F1) Teflon® seal is correctly installed there will be a visible dimple on the outer diameter of the seal.
Check the (F1) Teflon® seal for correct installation.



262. Using the special tool, size the (F1) Teflon® seal. Allow the special tool to stay on until final assembly.
Use Special Service Tool: 307-812 pusher & sizer, F1 Seal guide.

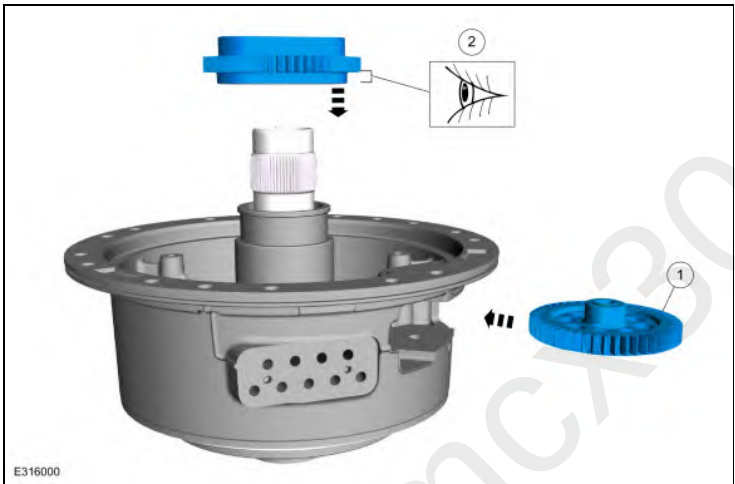


E315999



Vehicles equipped without a PTO transmission

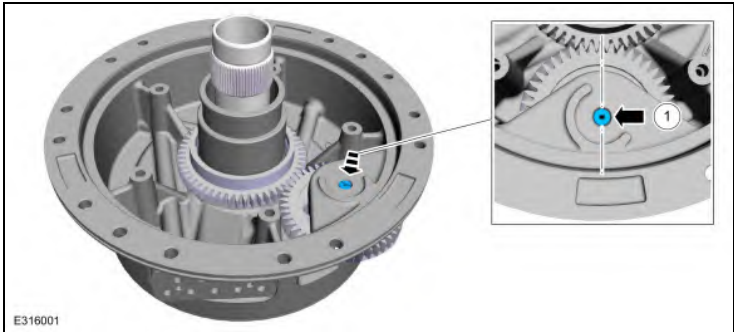
- 263.
- Install the transmission fluid pump idler gear and drive gear.
1. Transmission fluid pump idler gear.
 2. Transmission fluid pump drive gear with the small step down.



E316000



- 264.
- Install the transmission fluid pump idler gear shaft.
1. Align the shaft groove.

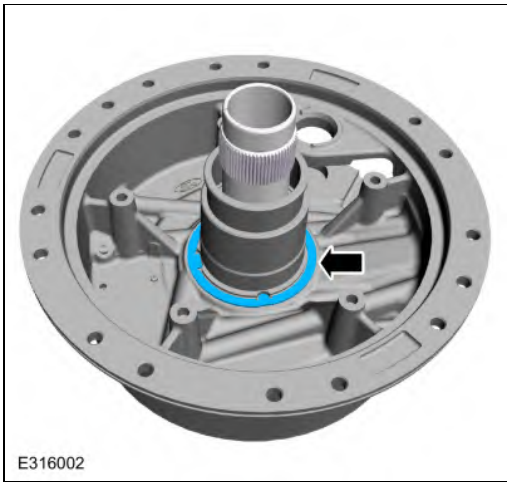


E316001

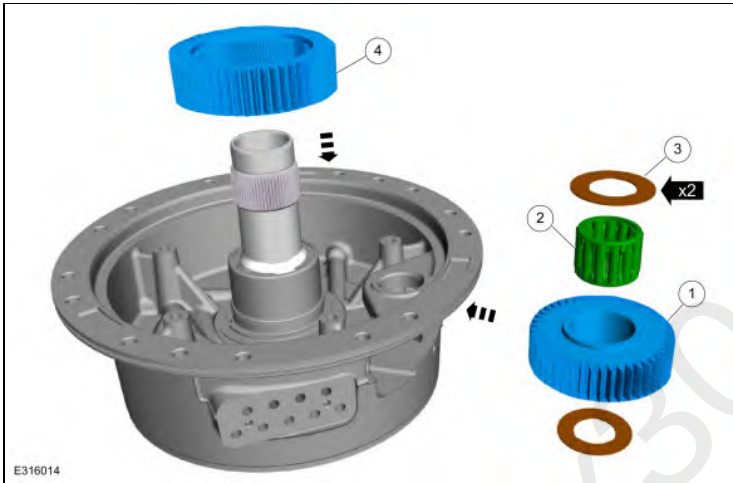


Vehicles equipped with a PTO transmission

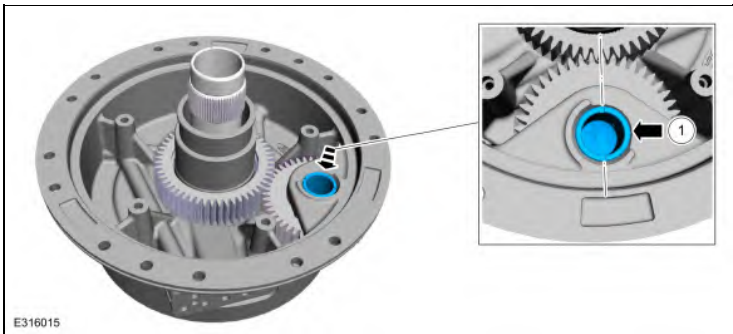
265. Install the transmission fluid pump drive gear thrust washer.



266. Install the transmission fluid pump idler gear and drive gear.
1. Transmission fluid pump idler gear
 2. Pump idler gear bearing
 3. Pump idler gear thrust washers
 4. Transmission fluid pump drive gear

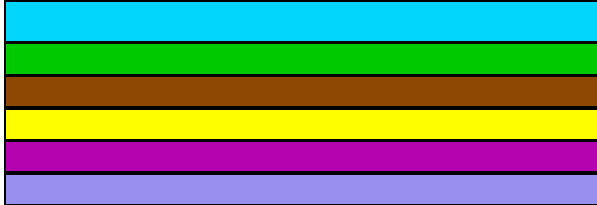
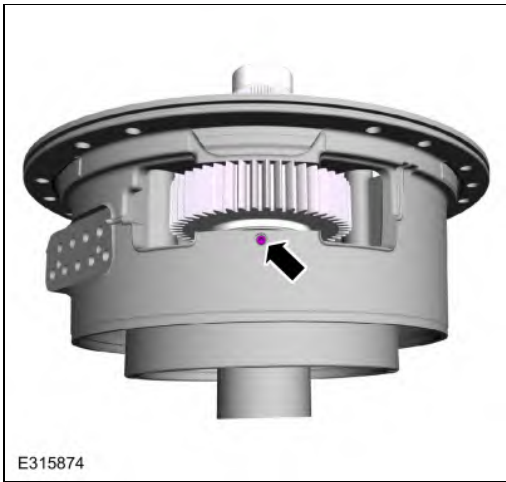


267. Install the transmission fluid pump idler gear shaft.
1. Align the shaft groove.

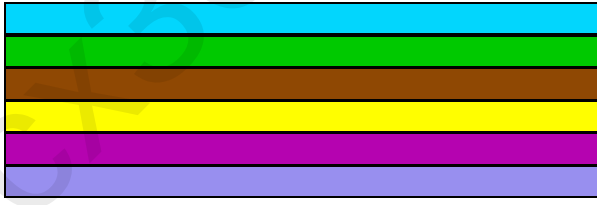
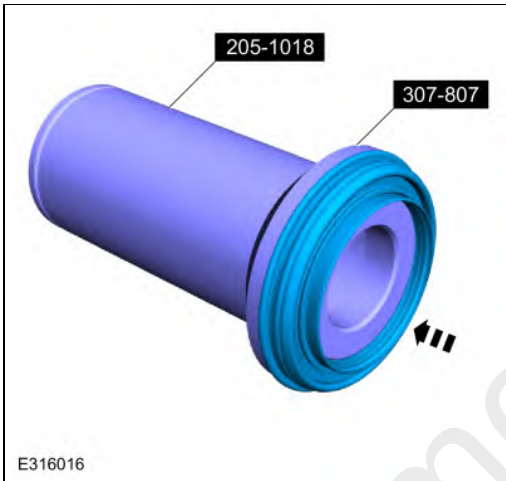


All vehicles

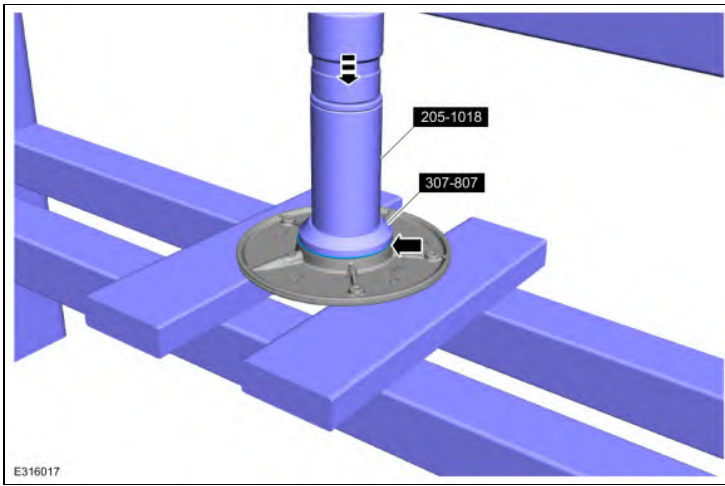
268. Install the transmission fluid pump idler gear shaft locking pin.
Torque: 35 lb.in (4 Nm)



269. Install the new torque converter hub seal on the special tools.
 Use Special Service Tool: 205-1018 Installation Tube. , 307-807 Installer Converter Seal.



270. Using the special tools and a press, install the new torque converter hub seal.
 Use Special Service Tool: 205-1018 Installation Tube. , 307-807 Installer Converter Seal.
 Use the General Equipment: Hydraulic Press

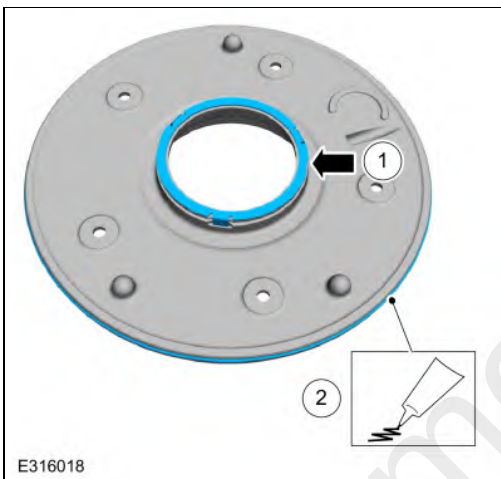


271.

1. **NOTE:** Vehicles equipped with a PTO transmission only.

If equipped, install the transmission fluid pump drive gear bushing.

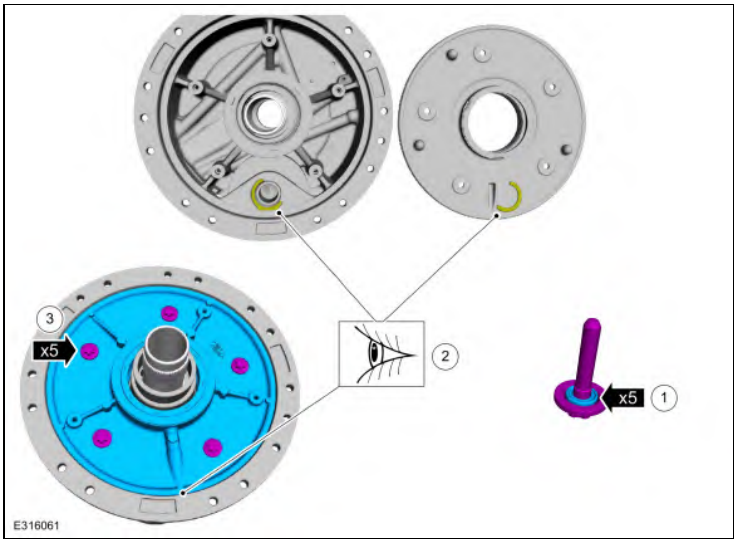
2. Install the new front support cover seal. Lubricate the seal with petroleum jelly.



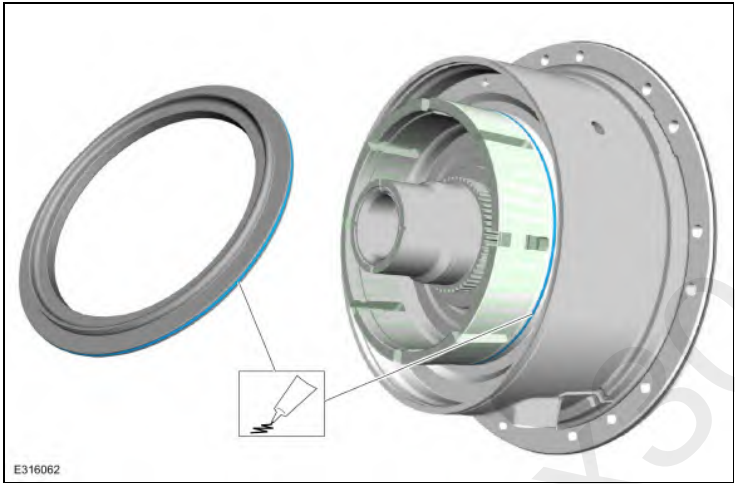
272.

1. Install the new front support cover bolt washers.
2. Align the transmission fluid pump idler gear shaft casting marks.
3. Install the bolts and hand tighten in a crisscross pattern to compress the seal.
 - Torque the bolts in a crisscross pattern.

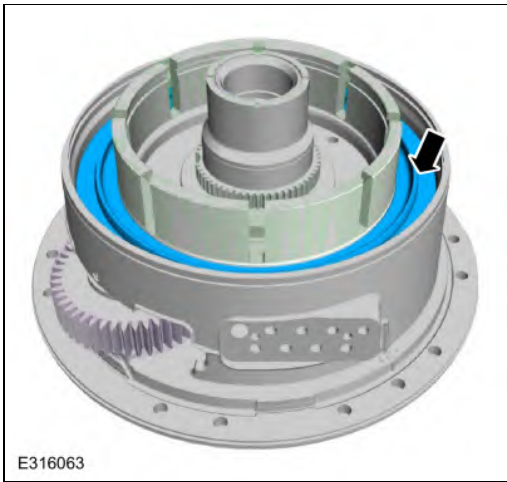
Torque: 159 lb.in (18 Nm)



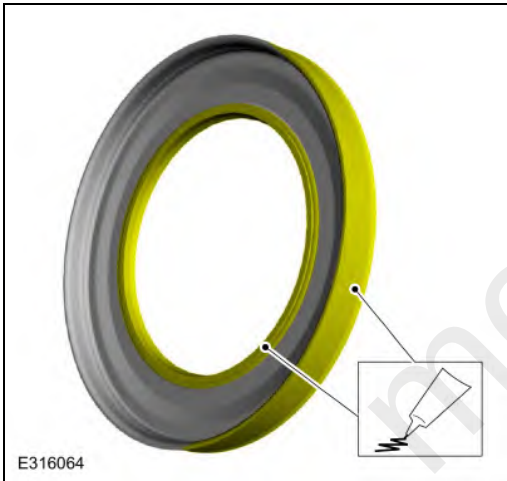
273. Install the new A clutch piston outer seal and the new A clutch piston inner seal. Lubricate the A clutch piston seals with petroleum jelly.



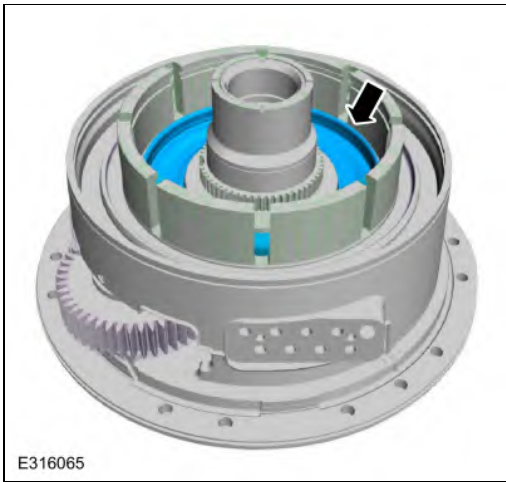
274. Install the A clutch piston.



275. Lubricate the new B clutch piston seals with petroleum jelly.

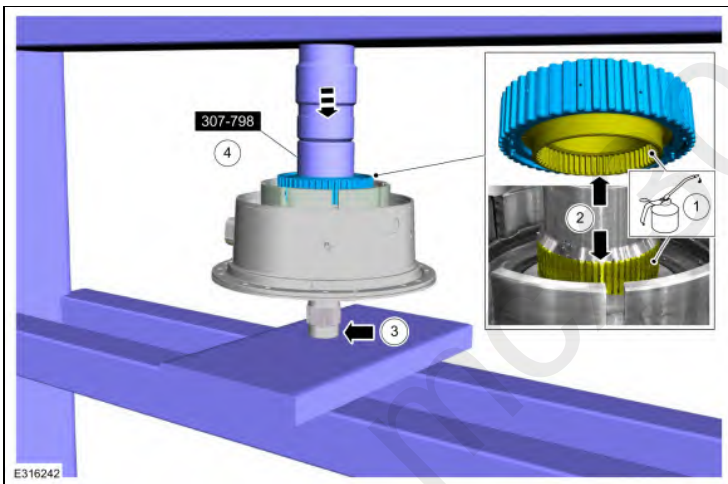


276. Install the new B clutch piston.

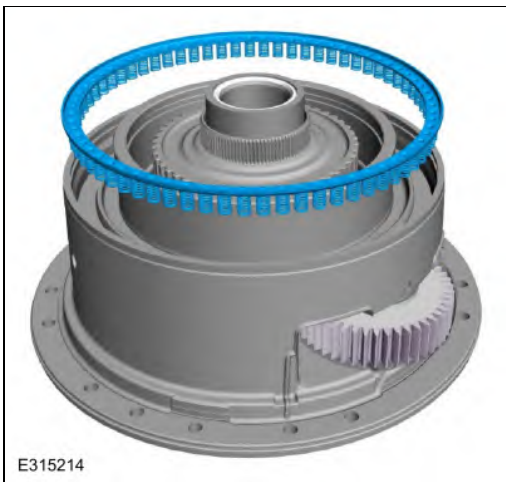


277.

1. Lubricate the hub and the teeth on the One-Way Clutch (OWC) with clean transmission fluid.
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (WSS-M2C949-A,) (MERCON® ULV)
2. Align the grooves on the hub with the teeth on the One-Way Clutch (OWC).
3. **NOTICE: When pressing the One-Way Clutch (OWC), support the front support by the stator only or damage may occur.**
4. Using the special tool and a press, install the One-Way Clutch (OWC).
 Use Special Service Tool: 307-798 Remover/Installer One Way Clutch.
 Use the General Equipment: Hydraulic Press



278. Install the A clutch piston return spring.



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281. Install the B clutch apply plate.



282. **NOTE:** The B clutch separating springs are not installed when measuring the B clutch clearance.
Temporarily install the B clutch friction plates, B clutch steel plates and the B clutch pressure plate to measure the B clutch clearance.



283.
Install the B clutch snap ring with the grooved side down.
1. B clutch snap ring grooved side

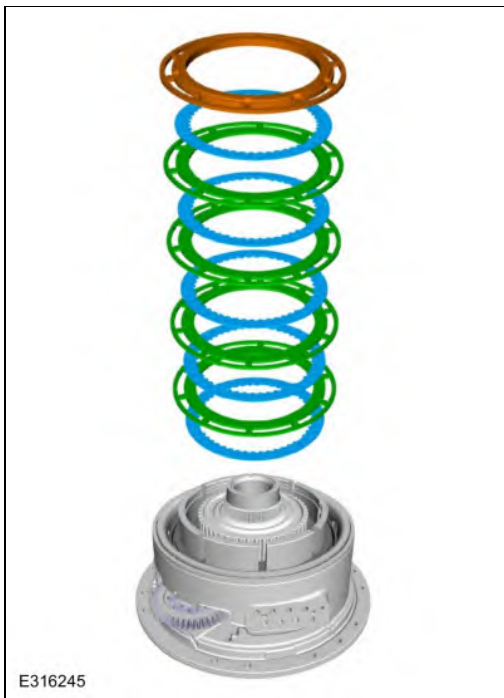


100-002

E316406



286. Remove the B clutch assembly.

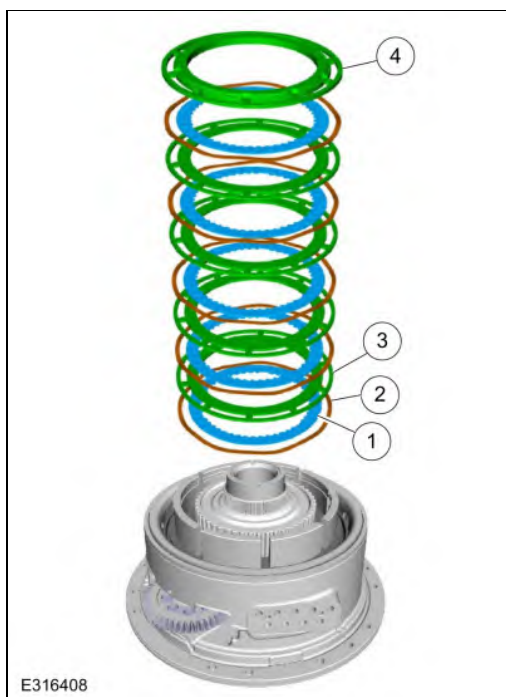


287. **NOTICE:** If replacing B clutch separating springs, all separating springs must be replaced as a matching set or damage can occur.

NOTE: Clutch plate quantity is model dependant based on engine displacement.

Soak the B clutch plates in clean transmission fluid. With the B clutch apply plate installed, correctly install the B clutch plates and springs.

1. B clutch friction plates
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (WSS-M2C949-A,) (MERCON® ULV)
2. B clutch separating springs
3. B clutch steel plates
4. B clutch pressure plate



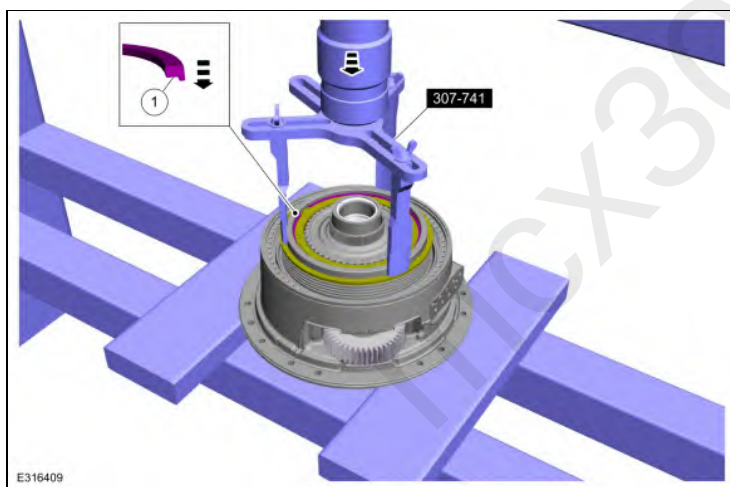
288.

Using the special tool and a press, install the B clutch snap ring with the grooved side down.

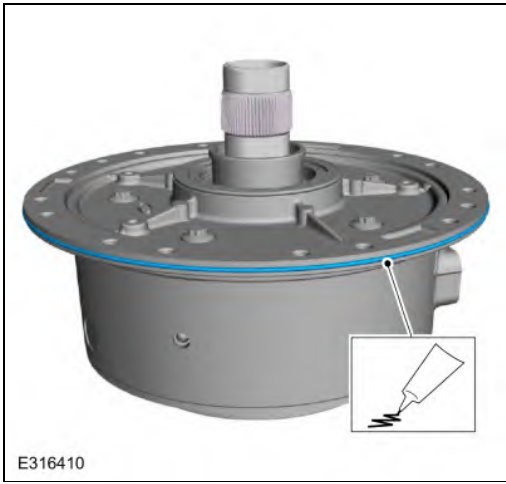
1. B clutch snap ring grooved side

Use Special Service Tool: 307-741 Spring Compressor, F Clutch.

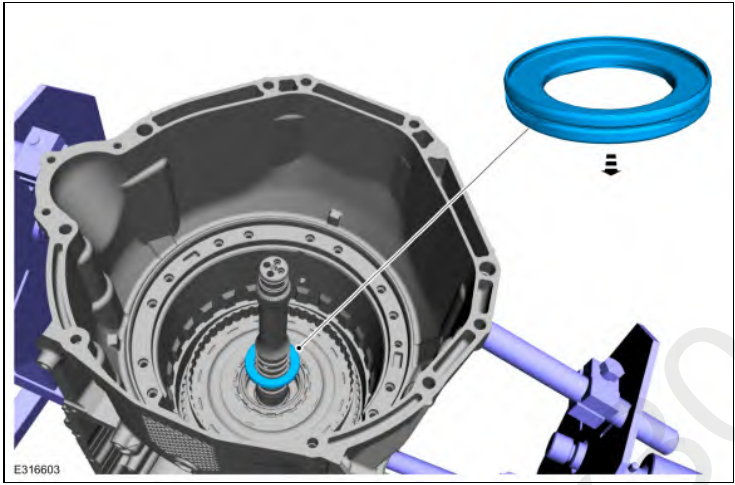
Use the General Equipment: Hydraulic Press



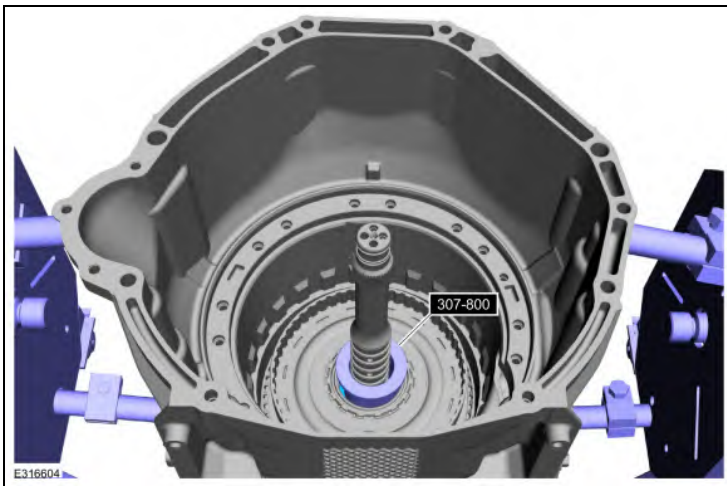
289. Install the new front support-to-case seal. Lubricate the seal with petroleum jelly.



290. Install the (T3) thrust bearing.

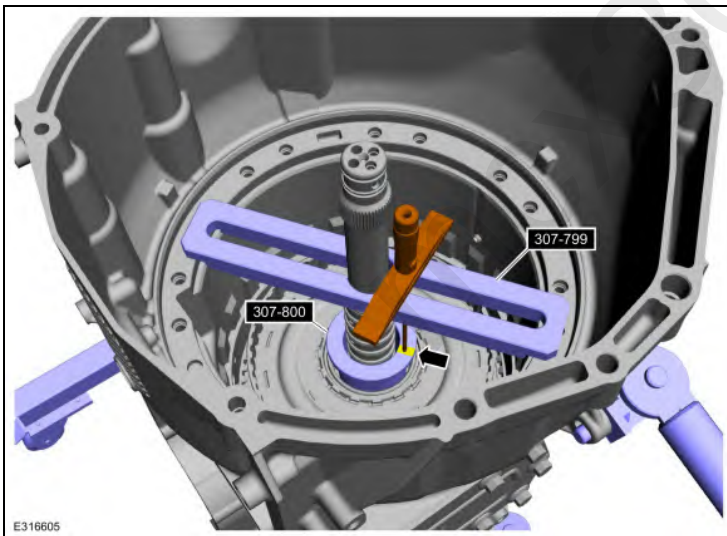


291. Install the special tool.
Use Special Service Tool: 307-800 Puck,Endplay.

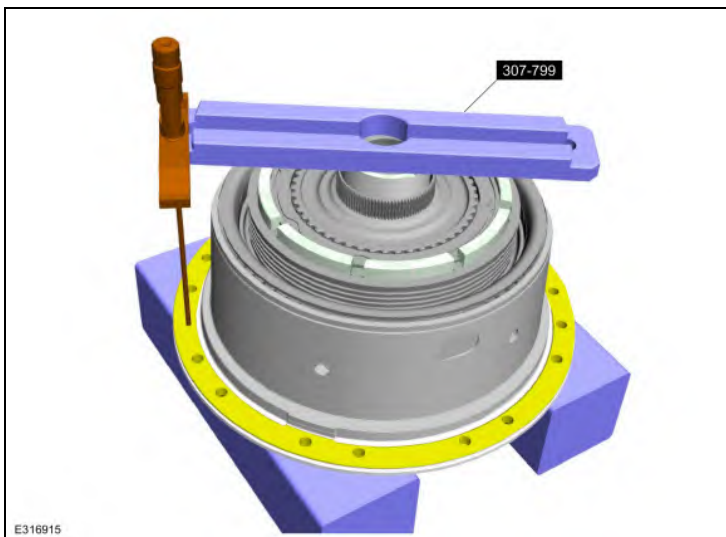


292. **NOTE:** The special tool height 2.50 in (63.5 mm) must be added to the measurement to get the correct measurement A height.

Using the special tools and a depth gauge, measure the distance from the top of the special tool to top of the (T3) thrust bearing special tool in 2 different places. Average the measurements and add 2.5 in (63.5 mm). Record this as measurement A.
 Use Special Service Tool: 307-799 Bar, End Play. , 307-800 Puck, Endplay.



293. Using the special tool and a depth gauge, measure the distance from the step of the special tool to the transmission deck mating surface in 2 different places. Average the measurements. Record this measurement as measurement B.
 Use Special Service Tool: 307-799 Bar, End Play.

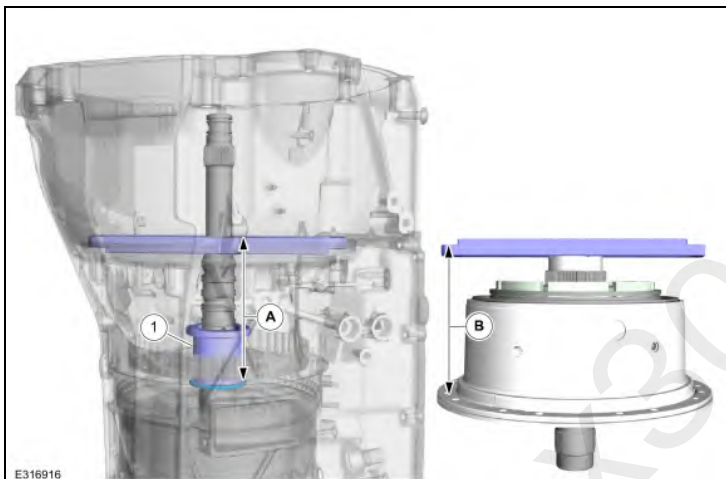


A horizontal bar chart consisting of six equally sized rectangular segments stacked vertically. From top to bottom, the colors are cyan, green, brown, yellow, magenta, and light blue. Each segment has a thin black border. The chart is positioned below a text input field and above a text label.

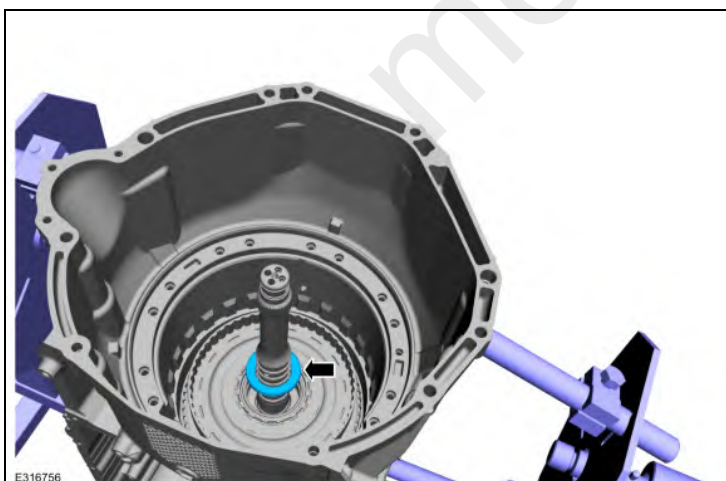
294. Calculate the correct shim thickness. Subtract measurement B from measurement A to get the clearance between the front support and the (T3) thrust bearing. Using the Selective Fit Shim Charts in specifications, select the correct shim.

1. **NOTE:** Special tool height 2.50 in (63.5 mm) was added in to measurement A.

Refer to: Specifications (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission â€“ 10R140, Specifications).



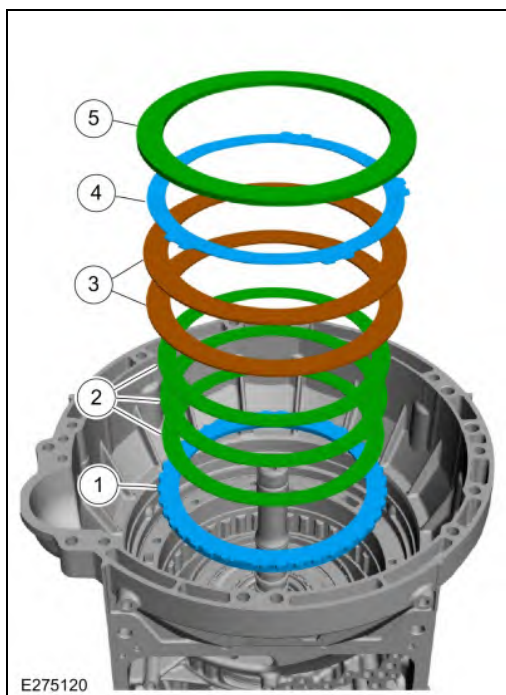
295. Install the correct selective shim.

A horizontal bar chart consisting of six equally sized rectangular segments stacked vertically. From top to bottom, the colors are cyan, green, brown, yellow, purple, and light blue. Each segment has a thin black border. The chart is positioned below a text input field and above a text output field.

296. **NOTE:** The A clutch separating springs are not installed when measuring the A clutch clearance.

Temporarily install the A clutch into the transmission out of order to measure the A clutch clearance.

1. Install the pressure plate.
2. Install the friction plates.
3. Install the steel plates.
4. Install the wave spring.
5. Install the apply plate.

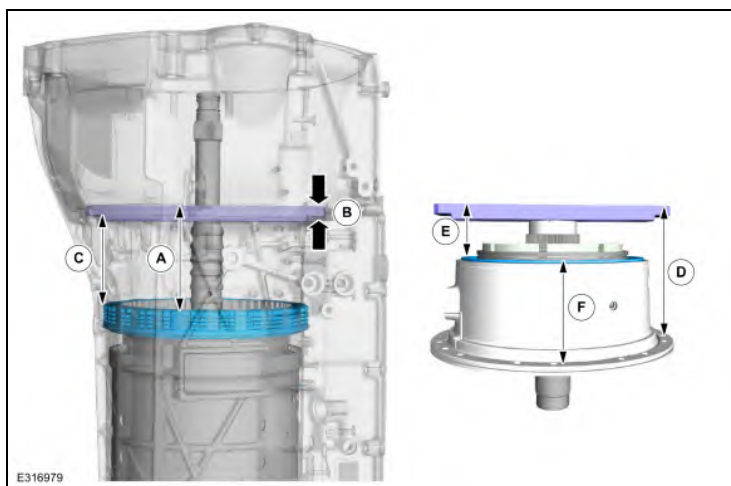


297. Using the special tools and a depth gauge, measure the distance from the top of the special tool to the top of the A clutch apply plate in 2 different places. Average the measurements. Record this as measurement A.
Use Special Service Tool: 307-799 Bar, End Play.



-

299. Using the special tool and a depth gauge, measure the distance from the top of the special tool to the transmission deck mating surface in 2 different places. Average the measurements. Record this as measurement D.
Use Special Service Tool: 307-799 Bar, End Play.



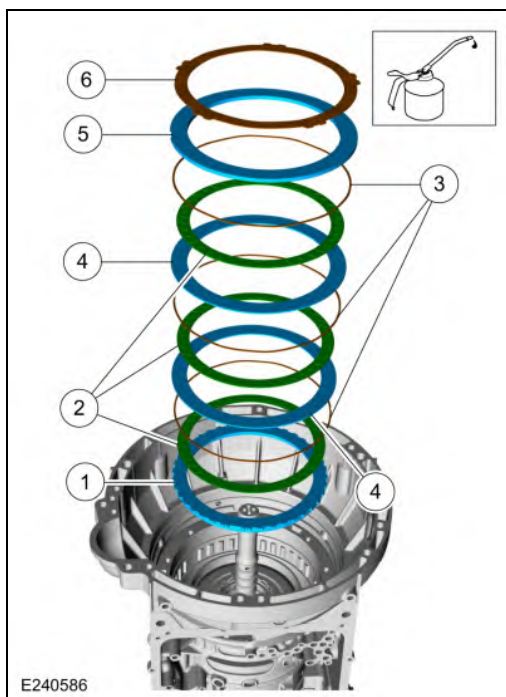
302. **NOTICE:** If replacing A clutch separating springs, all separating springs must be replaced as a matching set or damage can occur.

NOTE: Clutch plate quantity is model dependant based on engine displacement.

Soak the A clutch plates in clean transmission fluid. Install the A clutch assembly.

1. Pressure plate
2. Friction plates
3. Separator springs
4. Steel plates
5. Apply plate (select fit)
6. Wave spring

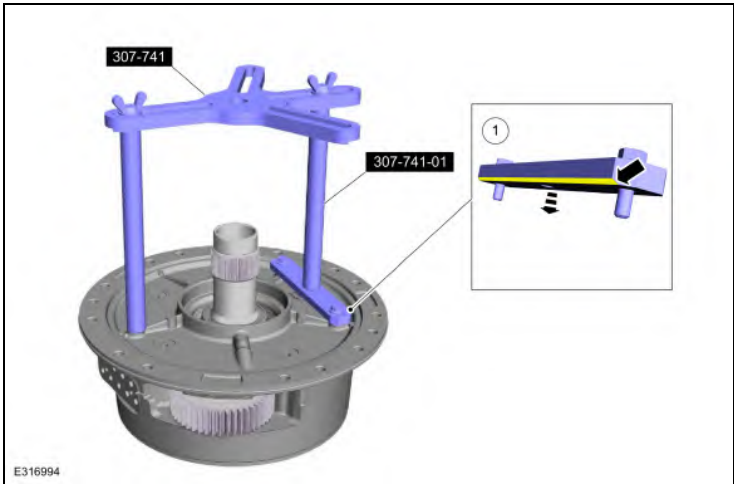
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (WSS-M2C949-A,) (MERCON® ULV)



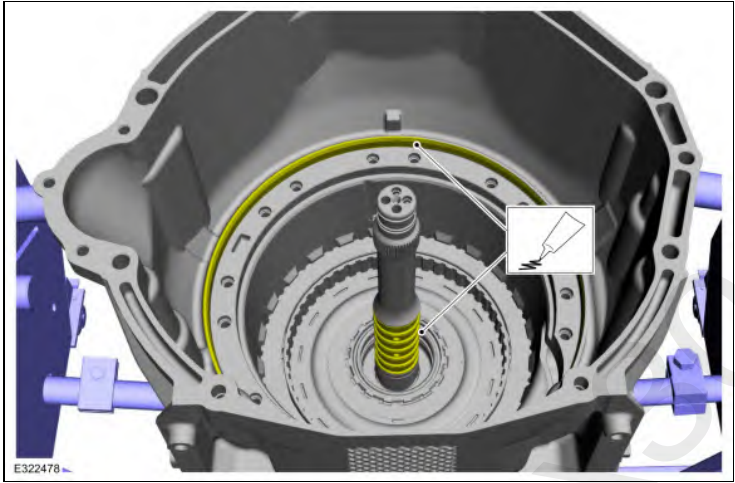
303. Install the special tools on the front support assembly.

1. Install the special tool with the beveled side down.

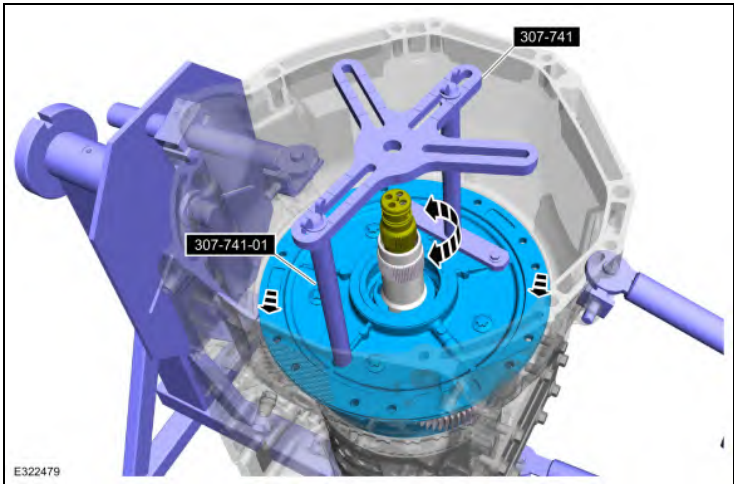
Use Special Service Tool: 307-741 Spring Compressor, F Clutch , 307-741-01 Remover, Front Support & Cover.



304. Lubricate the transmission case-to-front support sealing surface, and the Teflon seals with petroleum jelly.



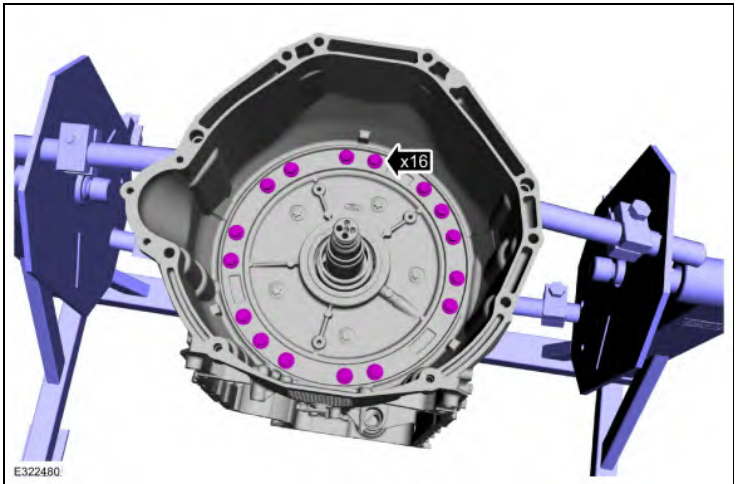
305. Using the special tools, install the front support into the transmission case. Rotate the input shaft while lowering the front support into the transmission case.



306. Install the new front support assembly bolt washers.



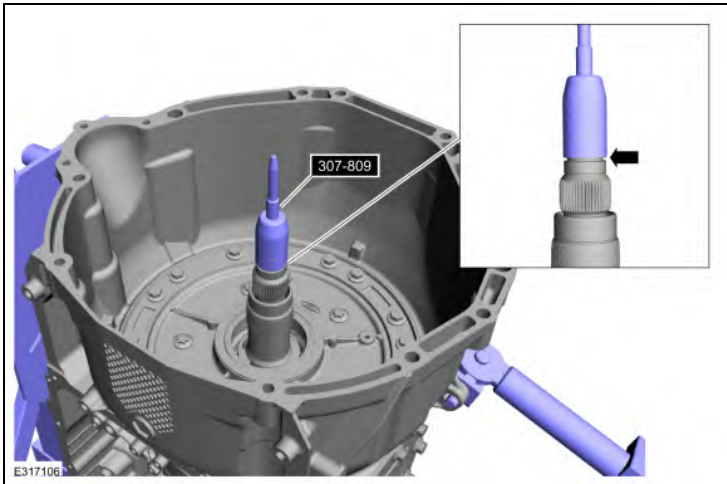
307. Loosely install the front support assembly bolts.



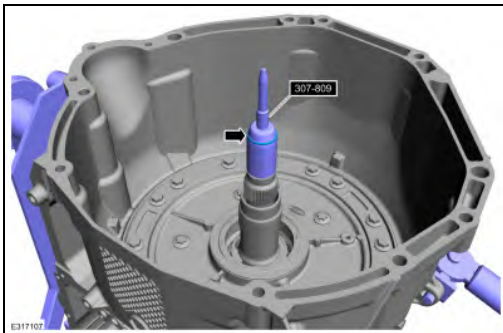
308. Tighten the bolts in the sequence shown.
Torque: 30 lb.ft (40 Nm)



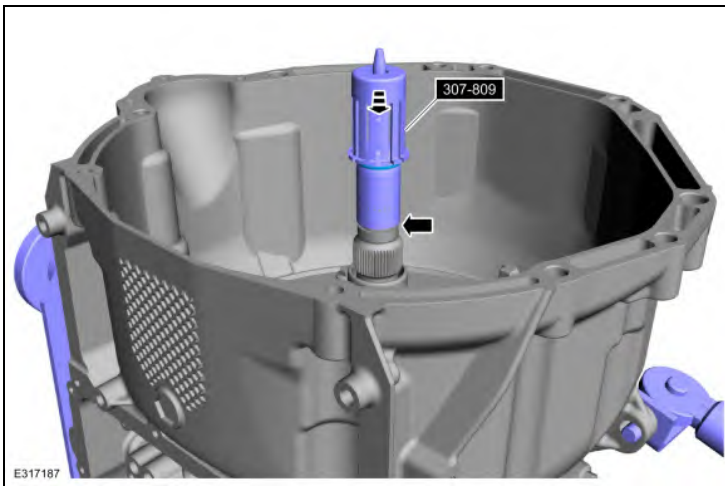
309. Install the special tool and adjust the special tool to align the bottom edge of the tool with the top edge of the bottom Teflon® seal groove.
Use Special Service Tool: 307-809 push & sizer, F0 Seal guide.



310. Install a new Teflon® seal on the special tool.
Use Special Service Tool: 307-809 push & sizer, F0 Seal guide.



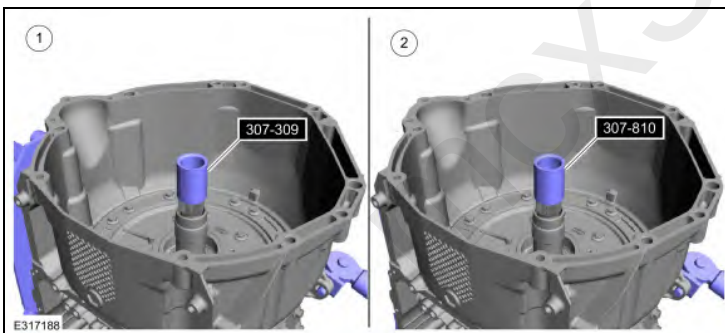
311. Using the top half of the special tool, slide the Teflon® seal into the groove. Remove the special tools and repeat the steps for the other 2 Teflon® seals.
Use Special Service Tool: 307-809 push & sizer, F0 Seal guide.



312.

Using the special tools, size the input shaft torque converter (F0) TeflonÂ® seals with a two step process.

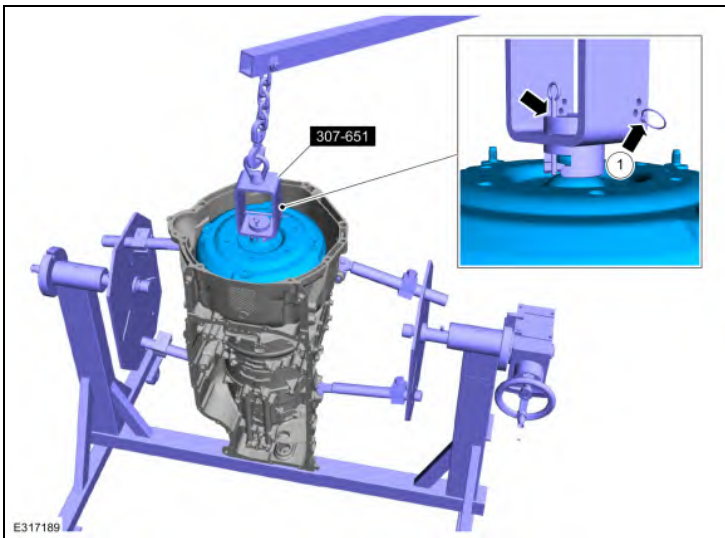
1. Using the special tool, pre-size the input shaft torque converter (F0) TeflonÂ® seals.
Use Special Service Tool: 307-809 push & sizer, F0 Seal guide.
2. Using the special tool, final size the input shaft torque converter (F0) TeflonÂ® seals.
Use Special Service Tool: 307-810 pusher & sizer, F9 Seal guide.



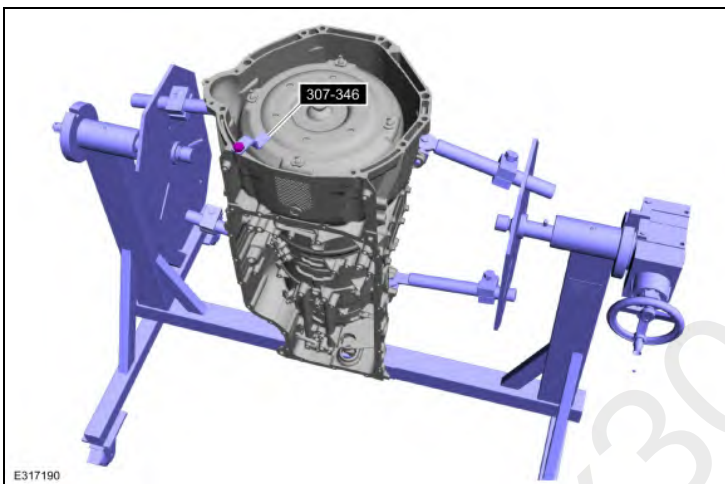
313.

Using the special tool and a floor crane, install the torque converter.

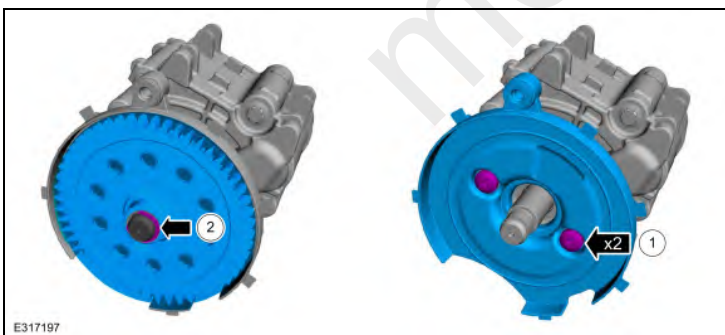
1. Pin in the bottom hole
Use Special Service Tool: 307-651 Bracket, Pump Remover/Installer.



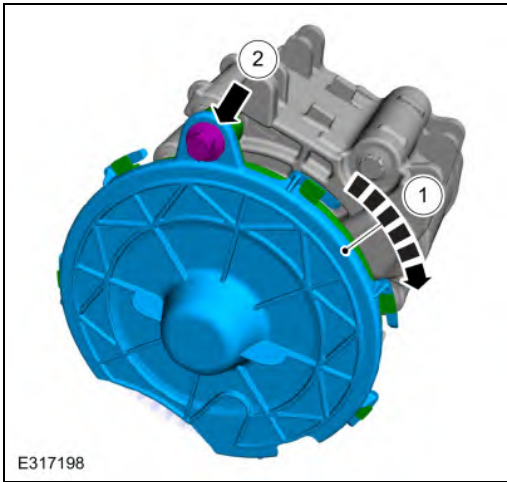
314. Install the special tool to hold the torque converter.
Use Special Service Tool: 307-346 (T97T-7902-A) Retainer, Torque Converter.



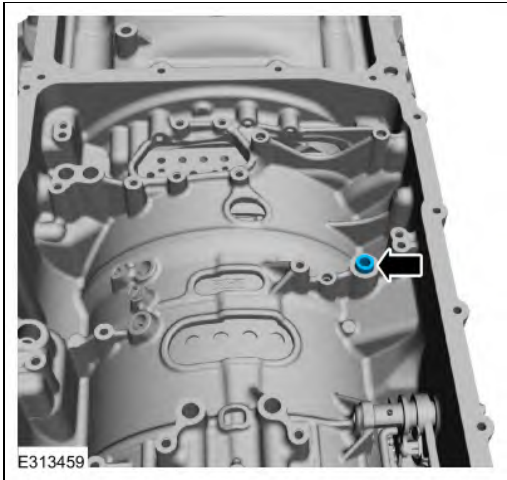
- 315.
1. If removed, install the fluid pump driven gear inner cover and bolts.
Torque: 115 lb.in (13 Nm)
 2. If removed, install the fluid pump driven gear and the retaining ring.



- 316.
1. Install the fluid pump driven gear outer cover and rotate clockwise.
 2. Install the fluid pump driven gear outer cover bolt.
Torque: 97 lb.in (11 Nm)

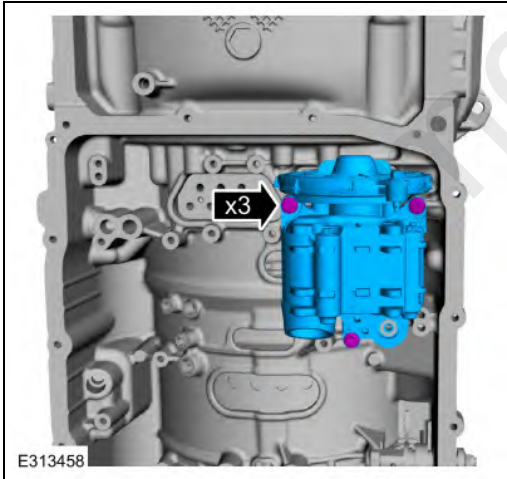


317. Install the transmission fluid pump seal.



318. **NOTE:** Use a 10ep Torx Plus[®] socket to install the bolts.

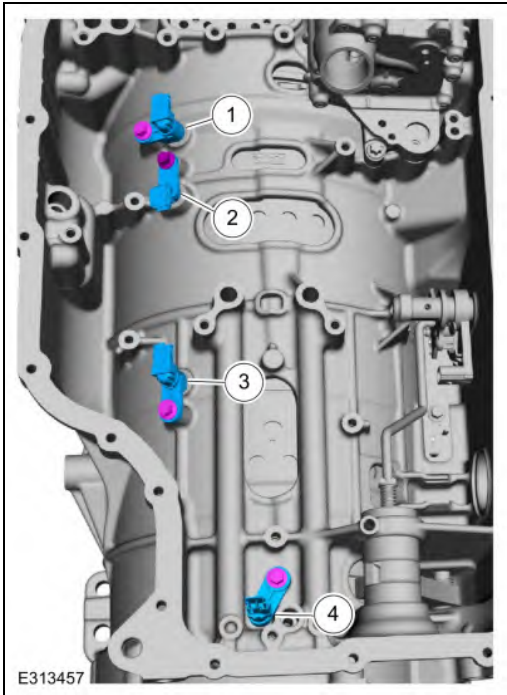
Install the transmission fluid pump and bolts.
Torque: 97 lb.in (11 Nm)



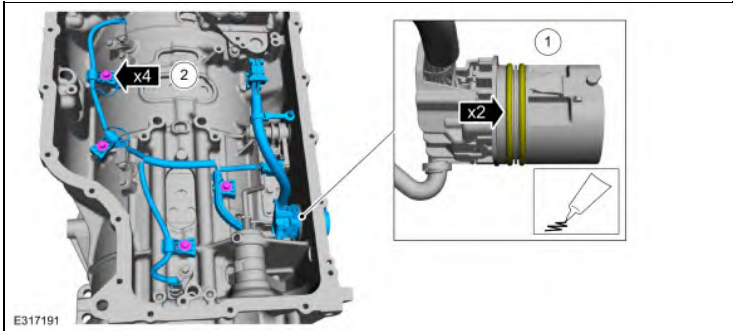
319. Install the speed sensors.

1. Intermediate Speed Sensor A (ISSA)
2. TSS sensor

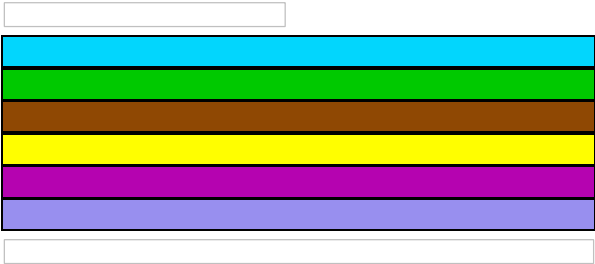
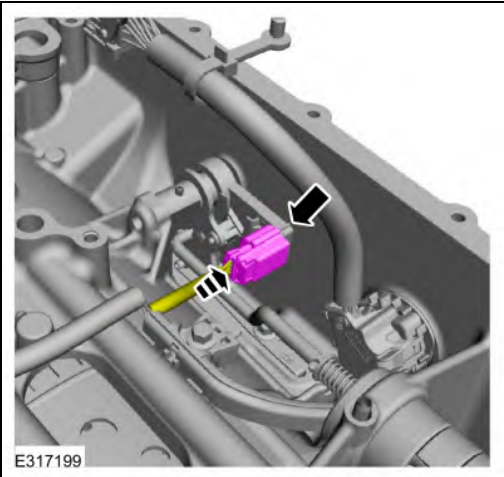
3. Intermediate Speed Sensor B (ISSB)
4. OSS sensor
 - Torque: 62 lb.in (7 Nm)



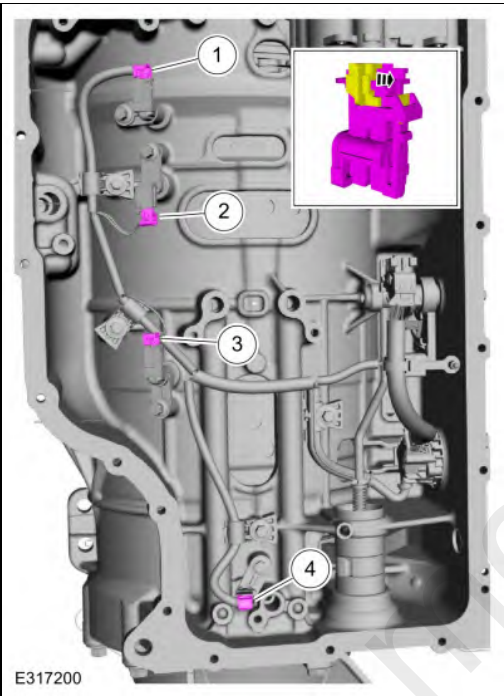
320. Install the transmission internal wiring harness.
1. Lubricate the O-ring seals with petroleum jelly.
 2. Install the bolts.
- Torque: 62 lb.in (7 Nm)



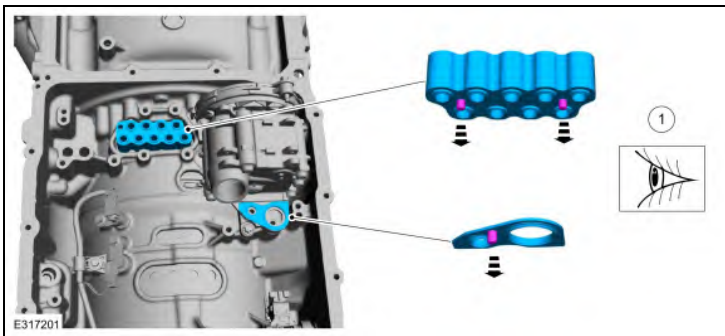
321. Support the opposite side of the TR sensor and connect the electrical connector.



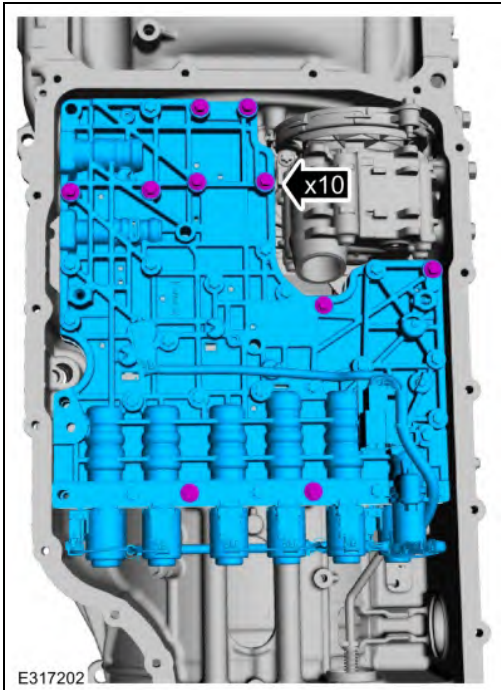
322. Connect and lock the speed sensors.
- 1. Intermediate Speed Sensor A (ISSA)
 - 2. TSS sensor
 - 3. Intermediate Speed Sensor B (ISSB)
 - 4. OSS sensor



323. Install the main control manifold seal and the fluid pump gasket.
- 1. Guide pins into transmission case.



324. Install the main control assembly and loosely install the 2.67 in (68 mm) bolts.

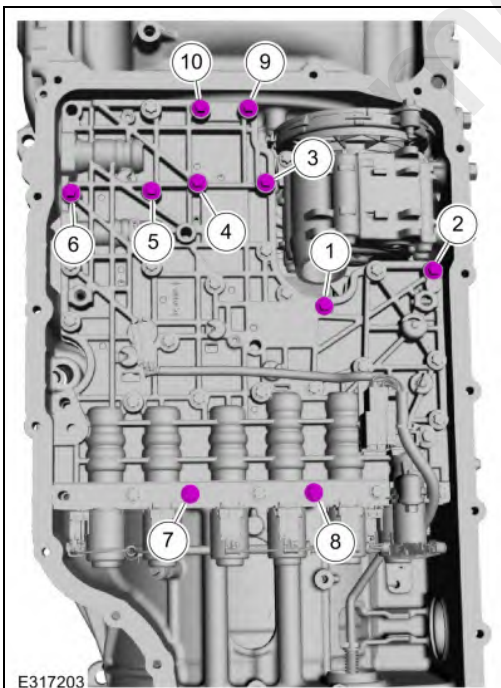


325. Tighten the 2.67 in (68 mm) bolts in the sequence shown.

Torque:

Stage 1: 62 lb.in (7 Nm)

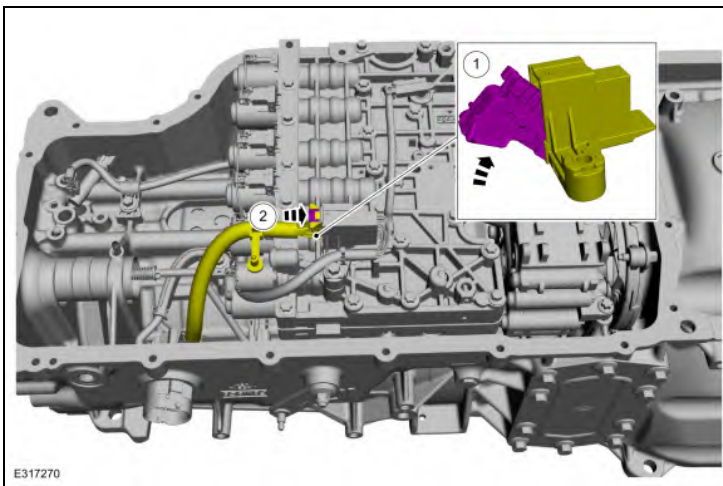
Stage 2: 97 lb.in (11 Nm)



326.

Connect the main control main electrical connector.

1. Rotate the locking arm up.
2. Slide the locking tab in.



327. Install the transmission fluid filter seal in the pump.

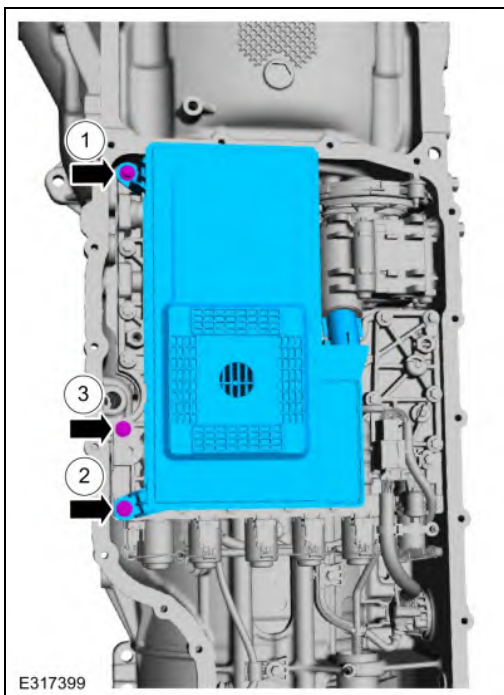


328. **NOTICE:** If the bolts are installed in the wrong locations, transmission damage will occur.

NOTE: The transmission fluid filter may be reused if no excessive contamination is indicated.

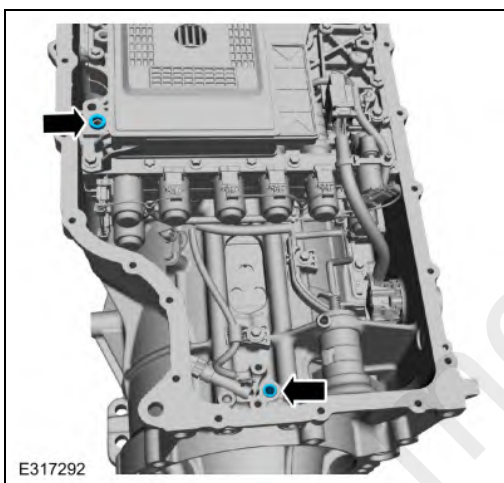
Install the filter and the bolts in the correct locations.

1. bolt
Dimension: 2.68 in (68 mm)
2. bolt
Dimension: 1.97 in (50 mm)
3. **NOTE:** All except slip yoke transmissions.
bolt
Dimension: 2.87 in (73 mm)
 - Torque: 97 lb.in (11 Nm)

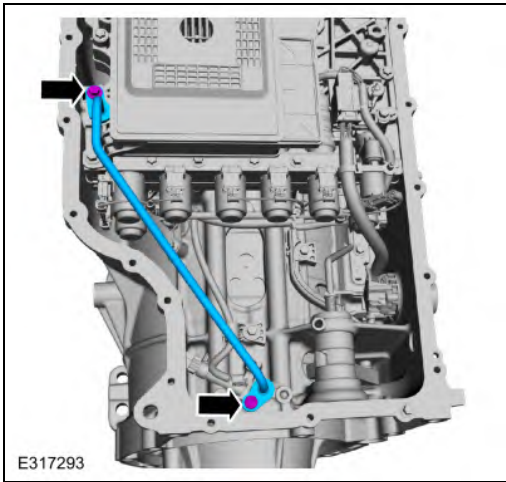


Vehicles equipped with a slip yoke transmission

329. Install the slip yoke transmission fluid feed tube seals.

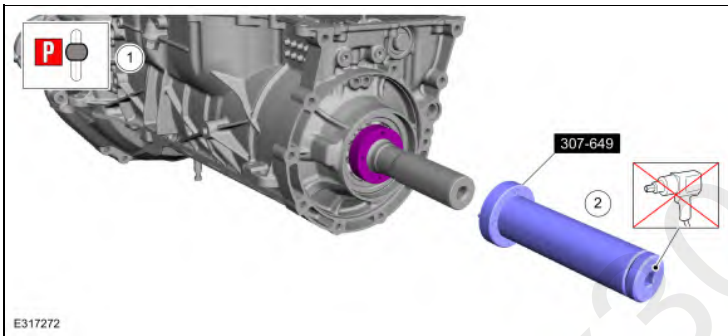


330. Install the transmission fluid feed tube and the bolts.
Torque: 97 lb.in (11 Nm)

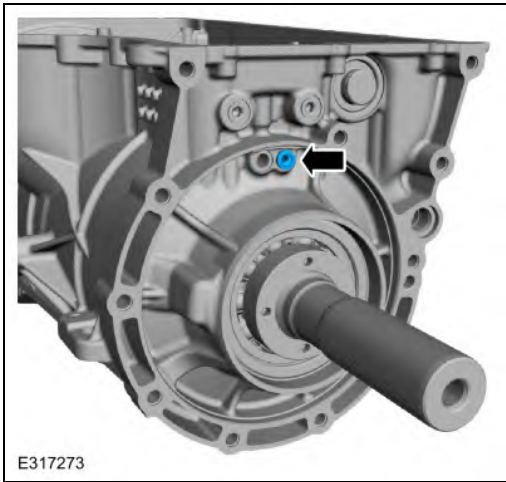


331.

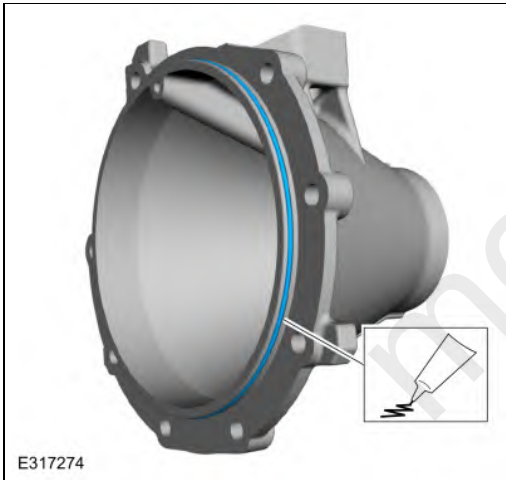
1. Rotate the manual control lever to P.
2. Using the special tool, install the new output shaft nut.
Use Special Service Tool: 307-649 Socket, Output Shaft Nut.
Torque: 148 lb.ft (200 Nm)



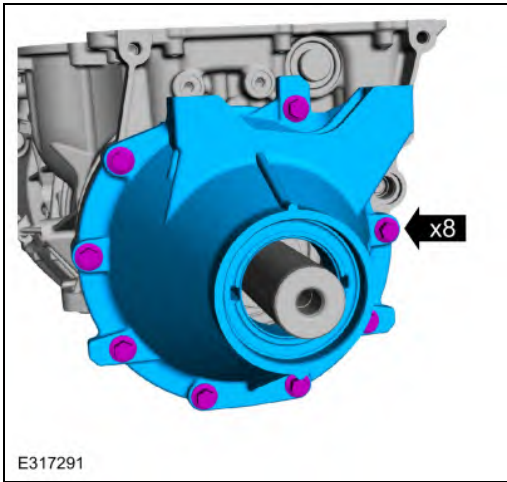
332. Install the new rear bushing fluid feed seal.



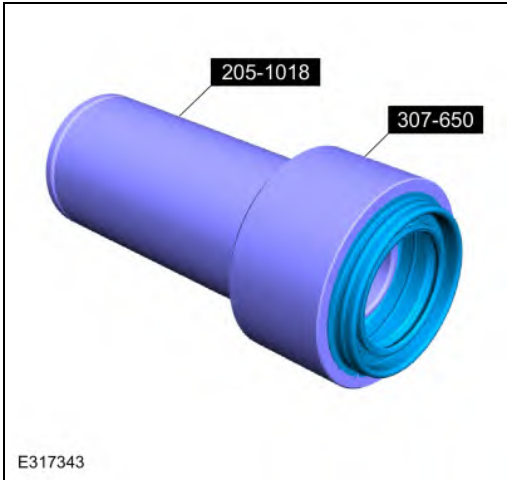
333. Install the new O-ring seal on the extension housing. Lubricate the O-ring seal with petroleum jelly.



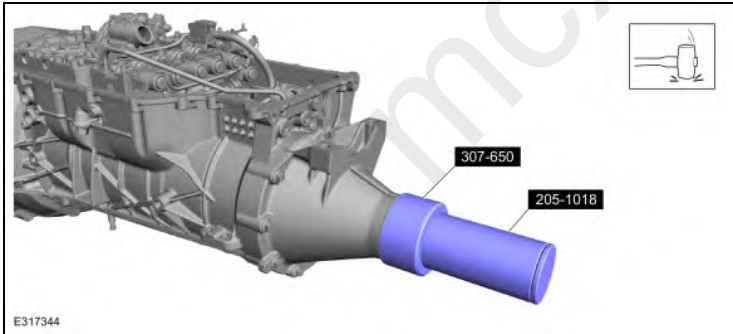
334. Install the new extension housing bolts in a crisscross pattern.
Torque: 30 lb.ft (40 Nm)



335. Position a new output shaft seal on the special tools.
 Use Special Service Tool: 205-1018 Installation Tube. , 307-650 Installer, Output Shaft Seal.

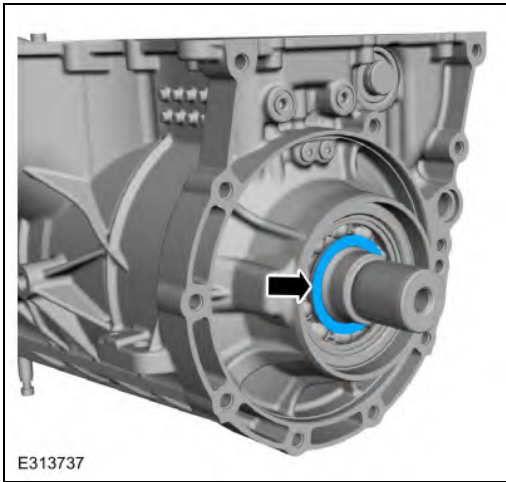


336. Using the special tools, install the new output shaft seal.
 Use Special Service Tool: 205-1018 Installation Tube. , 307-650 Installer, Output Shaft Seal.

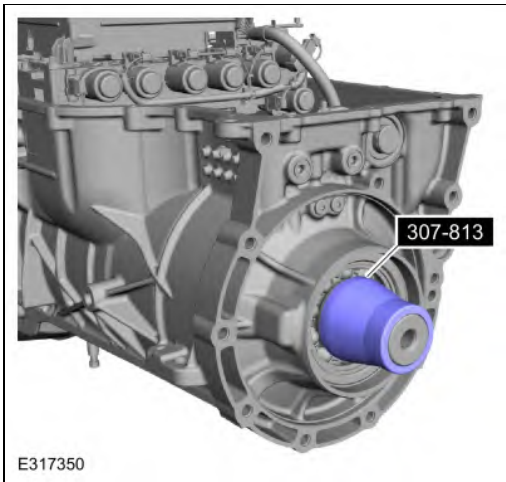


Vehicles equipped with a fixed flange transmission

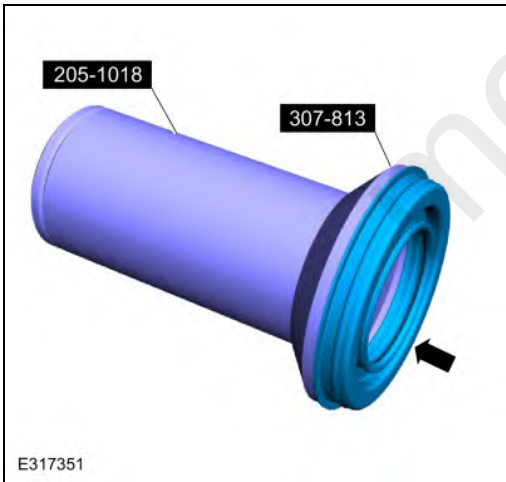
337. Install the anti-ting washer.



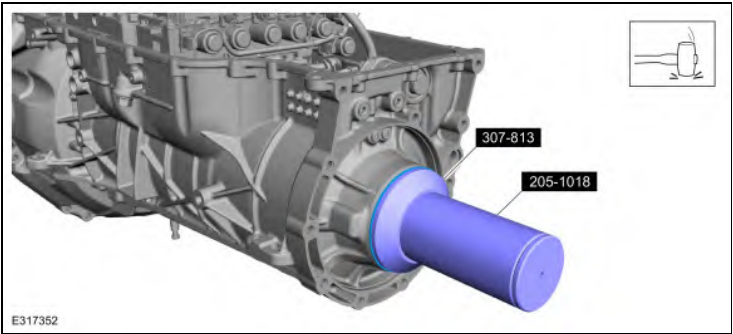
338. Install the special tool.
Use Special Service Tool: 307-813 Installer, Output shaft rear seal.



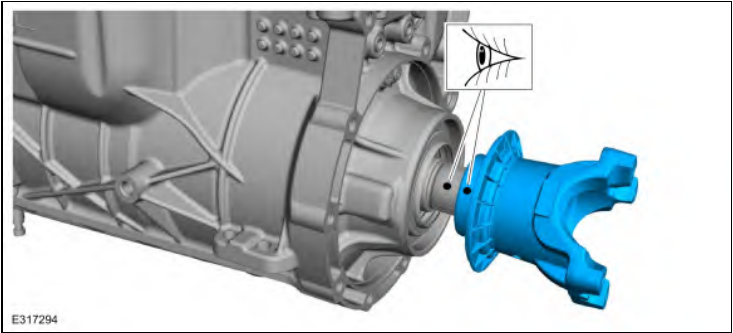
339. Position a new output shaft seal on the special tools.
Use Special Service Tool: 205-1018 Installation Tube. , 307-813 Installer, Output shaft rear seal.



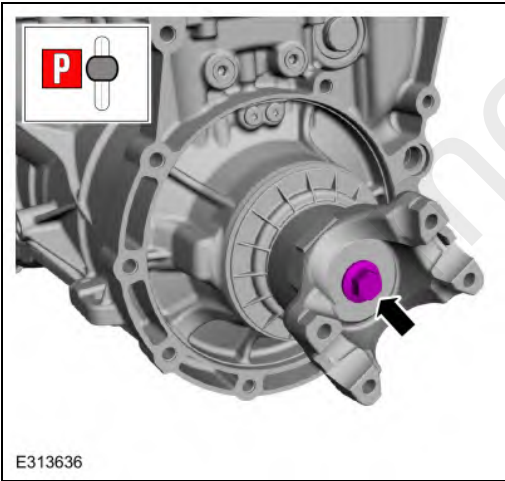
340. Using the special tools, install the new output shaft seal.
Use Special Service Tool: 205-1018 Installation Tube. , 307-813 Installer, Output shaft rear seal.



341. Align the output shaft flange marks to the output shaft.

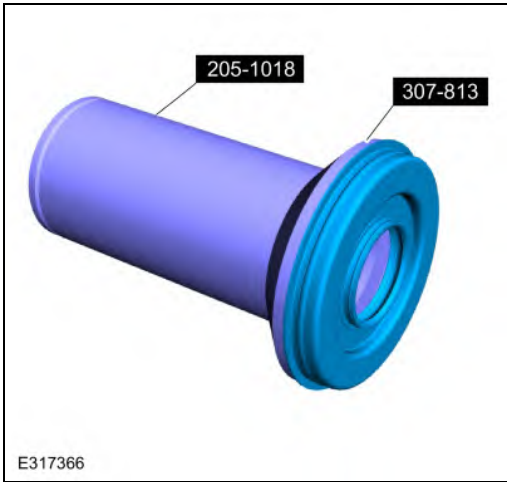


342. Rotate the manual control lever to P. Install and the output shaft flange bolt.
Torque: 129 lb.ft (175 Nm)

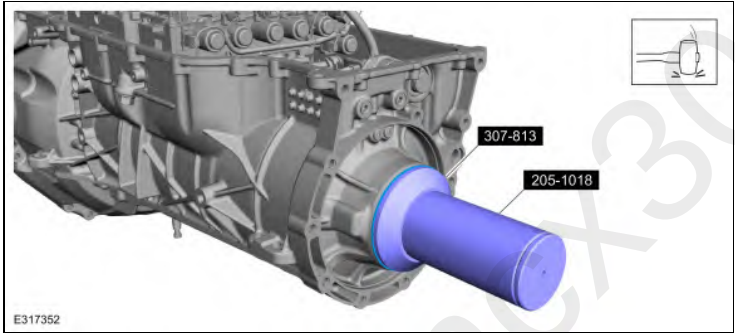


Vehicles equipped with a Four-Wheel Drive (4WD) transmission

343. Position a new output shaft seal on the special tools.
Use Special Service Tool: 205-1018 Installation Tube. , 307-813 Installer, Output shaft rear seal.

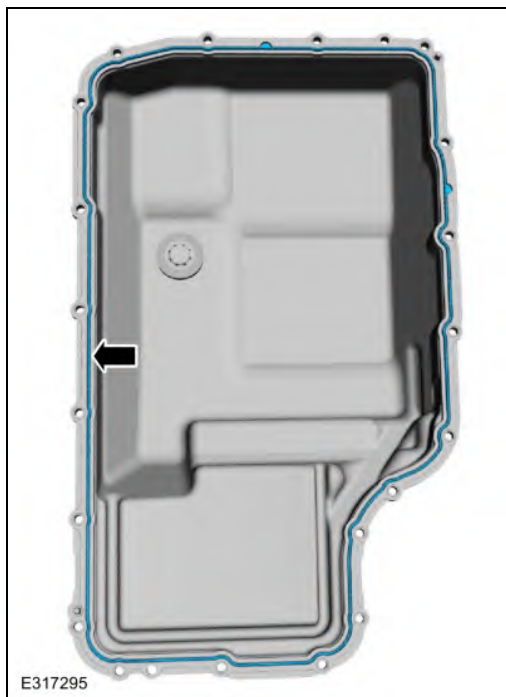


344. Using the special tools, install the new output shaft seal.
Use Special Service Tool: 205-1018 Installation Tube. , 307-813 Installer, Output shaft rear seal.



All vehicles

345. **NOTE:** The transmission fluid pan gasket can be reused if not damaged.
If removed, install the transmission fluid pan gasket.



346. Install the transmission fluid pan and tighten the bolts in a the sequence shown,

1. Bolts
Torque: 97 lb.in (11 Nm)
2. Studbolts
Torque: 106 lb.in (12 Nm)

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