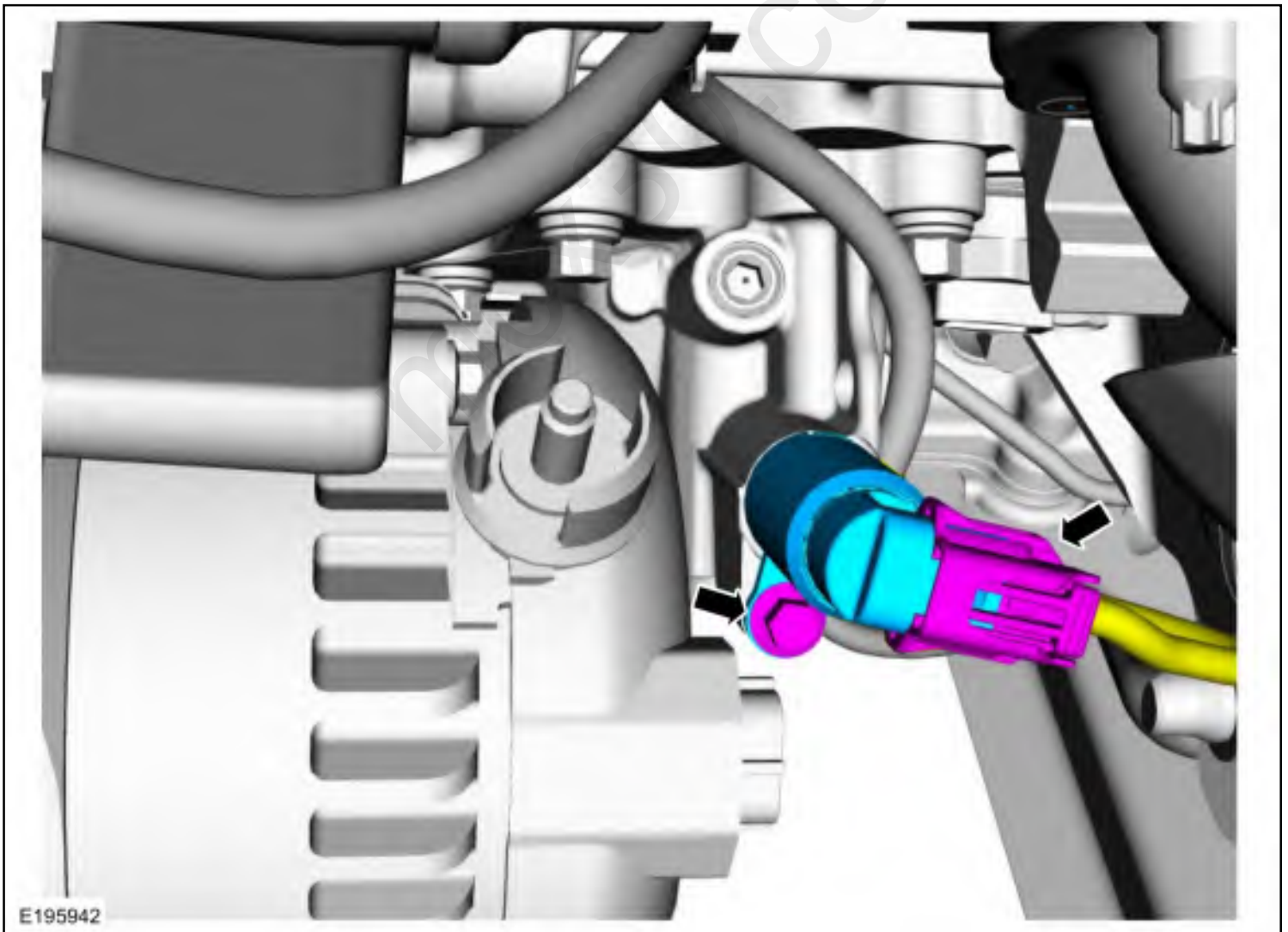


Oil Pressure Control Solenoid

Removal

NOTE: Removal steps in this procedure may contain installation details.

1. Remove the LH fender splash shield.
Refer to: [Fender Splash Shield](#) (501-02 Front End Body Panels, Removal and Installation).
2. Disconnect the electrical connector, remove the bolt and the oil pressure control solenoid.
Torque: 97 lb.in (11 Nm)



Installation

1. To install, reverse the removal procedure.

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Specifications

Lubricants, Fluids, Sealers and Adhesives

	Specifications
Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV	MERCON® ULV / WSS-M2C949-A

Capacities

	Liters
Transmission fluid	13 qt (12.3 L)

General Specification

NOTICE: Transmission fluids are not interchangeable. The use of any other fluid or cleaning agents will cause internal transmission damage.

Item	Specification
Transmission fluid	Transmission fluid should be checked with the vehicle on a level surface and at normal operating temperature. (Normal operating temperature 96°C (206°F) to 101°C (215°F)).

Fluid Filter	Internal to the transmission

General Specification

Transmission Weight	Specification
RWD vehicle	234.06 lb (106.17 kg)
4X4 vehicle	230.87 lb (104.72 kg)

Clutch Application Chart

Gear	A Clutch (1, 2, 3, 4, 5, 6, M1, M2, R)	B Clutch (2, 8, 9, 10, M1, M2, R)	C Clutch (2, 3, 4, 5, 7, 9, 10, M2)	D Clutch (2, 3, 4, 6, 7, 8, 10, M2, R)	E Clutch (1, 3, 5, 6, 7, 8, 9, M1)	F Clutch (4, 5, 6, 7, 8, 9, 10, R)	Low - OWC
Park	H	H	-	H	-	-	-
Reverse	H	H	-	D	-	D	-
Neutral	H	H	-	H	-	-	-
1st Gear D	H	-	-	^a	D	-	H
2nd Gear D	H	-	D	D	-	-	H
3rd Gear D	H	-	D	D	D	-	O/R
4th Gear D	H	-	D	D	-	D	O/R
5th Gear D	H	-	D	-	D	D	O/R
6th Gear D	H	-	-	D	D	D	O/R
7th Gear D	-	-	D	D	D	D	O/R
8th Gear D	-	H	-	D	D	D	-
9th Gear D	-	H	D	-	D	D	-

10th Gear D	-	H	D	D	-	D	-
1st Gear Manual	H	H	-	a	D	-	H
2nd Gear Manual	H	H	D	D	-	-	H
Planetary Component	Ring Gear No. 1	Low - OWC	Ring Gear No. 2 and Sun Gear No. 3	Planetary No. 3	Ring Gear No. 3 and Sun Gear No. 4	Ring Gear No. 4 and Planetary No. 1	Sun Gear No. 1 and Sun Gear No. 2 in H direction

- H = Holding
- D = Driven
- O/R = Overrunning
- Applied to reduce frictional losses from a released clutch, but does not contribute to powerflow.

Solenoid Operation Chart

Selector Lever Position	Commanded Gear	SSA (1, 2, 3, 4, 5, 6, M1, M2, R)	SSB (2, 8, 9, 10, M1, M2, R)	SSC (2, 3, 4, 5, 7, 9, 10, M2)	SSD (2, 3, 4, 6, 7, 8, 10, M2, R)	SSE (1, 3, 5, 6, 7, 8, 9, M1)	SSF (4, 5, 6, 7, 8, 9, 10, R)	TCC Solenoid
P	P	On	On	Off	On	Off	Off	Off
R	R	On	On	Off	On	Off	On	Off
N	N	On	On	Off	On	Off	Off	Off
D	1	On	Off	Off	On ^a	On	Off	Off
	2	On	Off	On	On	Off	Off	On/Off
	3	On	Off	On	On	On	Off	On/Off
	4	On	Off	On	On	Off	On	On/Off

	5	On	Off	On	Off	On	On	On/Off
	6	On	Off	Off	On	On	On	On/Off
	7	Off	Off	On	On	On	On	On/Off
	8	Off	On	Off	On	On	On	On/Off
	9	Off	On	On	Off	On	On	On/Off
	10	Off	On	On	On	Off	On	On/Off
M1	1	On	On	Off	On ^a	On	Off	Off
M2	2	On	On	On	On	Off	Off	Off

- On to reduce frictional losses from a released clutch, but does not contribute to powerflow.

Clutch Plate Quantity

Clutch	Number of Friction Plates	Number of Steel Plates	Number of Separating Springs
A clutch (1, 2, 3, 4, 5, 6, M1, M2, R)	3	2	3
B clutch (2, 8, 9, 10, M1, M2, R)	5	4	5
C clutch (2, 3, 4, 5, 7, 9, 10, M2)	5	4	-
D clutch (2, 3, 4, 6, 7, 8, 10, M2, R)	6	6	-
E clutch (1, 3, 5, 6, 7, 8, 9, M1)	5	5	-
F clutch (4, 5, 6, 7, 8, 9, 10, R)	4	4	-

Clutch Clearance

Clutch	Specifications
A clutch	0.029–0.048 in (.73–1.23 mm)
B clutch	0.052–0.069 in (1.31–1.74 mm)
C clutch	0.062–0.074 in (1.57–1.87 mm)
D clutch	0.069–0.081 in (1.75–2.05 mm)
E clutch	0.044–0.068 in (1.12–1.72 mm)
F clutch	0.048–0.060 in (1.22–1.52 mm)

Transmission Front End Clearance

Transmission	Specifications
RWD Vehicle	0.007–0.016 in (.17–.41 mm)
4X4 Vehicle	0.002–0.011 in (.05–.29 mm)

A Clutch Selective Apply Plate Chart

Clearance ^a	Selective Apply Plate Part Number	Apply Plate Thickness
0.214–0.222 in (5.44–5.64 mm)	7A406-AA	0.177 in (4.5 mm)
0.222–0.230 in (5.65–5.84 mm)	7A406-BA	0.185 in (4.7 mm)
0.230–0.238 in (5.84–6.04 mm)	7A406-CA	0.193 in (4.9 mm)
0.238–0.246 in (6.05–6.24 mm)	7A406-DA	0.201 in (5.1 mm)
0.246–0.254 in (6.25–6.44 mm)	7A406-EA	0.205 in (5.2 mm)

- The target clearance with the correct selective apply plate installed is between 0.026–0.058 in (.67–1.47 mm).

B Clutch Selective Snap Ring Chart

Part Number	Snap Ring Thickness
HL3P-7M157-AA	0.089–0.093 in (2.25–2.35 mm)
HL3P-7M157-BA	0.100–0.104 in (2.55–2.65 mm)
HL3P-7M157-CA	0.112–0.116 in (2.85–2.95 mm)
HL3P-7M157-DA	0.124–0.128 in (3.15–3.25 mm)
HL3P-7M157-EA	0.136–0.140 in (3.45–3.55 mm)
HL3P-7M157-FA	0.148–0.152 in (3.75–3.85 mm)

C Clutch Selective Snap Ring Chart

Part Number	Snap Ring Thickness
HL3P-7H076-AA	0.059 in (1.5 mm)
HL3P-7H076-BA	0.067 in (1.7 mm)
HL3P-7H076-CA	0.075 in (1.9 mm)
HL3P-7H076-DA	0.083 in (2.1 mm)
HL3P-7H076-EA	0.091 in (2.3 mm)

D Clutch Selective Snap Ring Chart

Part Number	Snap Ring Thickness
HL3P-7B421-AA	0.071 in (1.8 mm)
HL3P-7B421-BA	0.079 in (2 mm)
HL3P-7B421-CA	0.087 in (2.2 mm)

HL3P-7B421-DA	0.094 in (2.4 mm)
HL3P-7B421-EA	0.102 in (2.6 mm)
HL3P-7B421-FA	0.110 in (2.8 mm)

E Clutch Selective Pressure Plate Chart

Part Number	Pressure Plate Thickness
HL3P-7B066-AA	0.083–0.087 in (2.1–2.2 mm)
HL3P-7B066-BA	0.094–0.098 in (2.4–2.5 mm)
HL3P-7B066-CA	0.106–0.110 in (2.7–2.8 mm)
HL3P-7B066-DA	0.118–0.122 in (3–3.1 mm)
HL3P-7B066-EA	0.130–0.134 in (3.3–3.4 mm)
HL3P-7B066-FA	0.142–0.146 in (3.6–3.7 mm)

F Clutch Selective Snap Ring Chart

Part Number	Snap Ring Thickness
HL3P-7P174-AA	0.059 in (1.5 mm)
HL3P-7P174-BA	0.067 in (1.7 mm)
HL3P-7P174-CA	0.075 in (1.9 mm)
HL3P-7P174-DA	0.083 in (2.1 mm)
HL3P-7P174-EA	0.091 in (2.3 mm)
HL3P-7P174-FA	0.098 in (2.5 mm)

Selective Fit Shim Chart RWD Vehicles

Clearance ^a	Selective Fit Shim Part Number	Selective Fit Shim Thickness
0.150–0.155 in (3.8–3.94 mm)	7J300-BA	0.120–0.124 in (3.05–3.15 mm)
0.156–0.161 in (3.95–4.09 mm)	7J300-CA	0.126–0.130 in (3.2–3.3 mm)
0.161–0.167 in (4.1–4.24 mm)	7J300-DA	0.132–0.136 in (3.35–3.45 mm)
0.167–0.173 in (4.25–4.39 mm)	7J300-EA	0.138–0.142 in (3.5–3.6 mm)
0.173–0.179 in (4.4–4.54 mm)	7J300-FA	0.144–0.148 in (3.65–3.75 mm)
0.179–0.185 in (4.55–4.69 mm)	7J300-GA	0.150–0.154 in (3.8–3.9 mm)

- The target clearance with the correct selective fit shim installed is between 0.026–0.035 in (.65–.89 mm).

Selective Fit Shim Chart 4X4 Vehicles

Clearance ^a	Selective Fit Shim Part Number	Selective Fit Shim Thickness
0.144–0.149 in (3.65–3.79 mm)	7J300-DA	0.132–0.136 in (3.35–3.45 mm)
0.150–0.155 in (3.8–3.94 mm)	7J300-EA	0.138–0.142 in (3.5–3.6 mm)
0.156–0.161 in (3.95–4.09 mm)	7J300-FA	0.144–0.148 in (3.65–3.75 mm)
0.161–0.167 in (4.1–4.24 mm)	7J300-GA	0.150–0.154 in (3.8–3.9 mm)
0.167–0.173 in (4.25–4.39 mm)	7J300-HA	0.156–0.159 in (3.95–4.05 mm)
0.173–0.179 in (4.4–4.54 mm)	7J300-JA	0.161–0.165 in (4.1–4.2 mm)
0.179–0.185 in (4.55–4.69 mm)	7J300-KA	0.167–0.171 in (4.25–4.35 mm)

- The target clearance with the correct selective fit shim installed is between 0.008–0.017 in (.2–.44 mm).

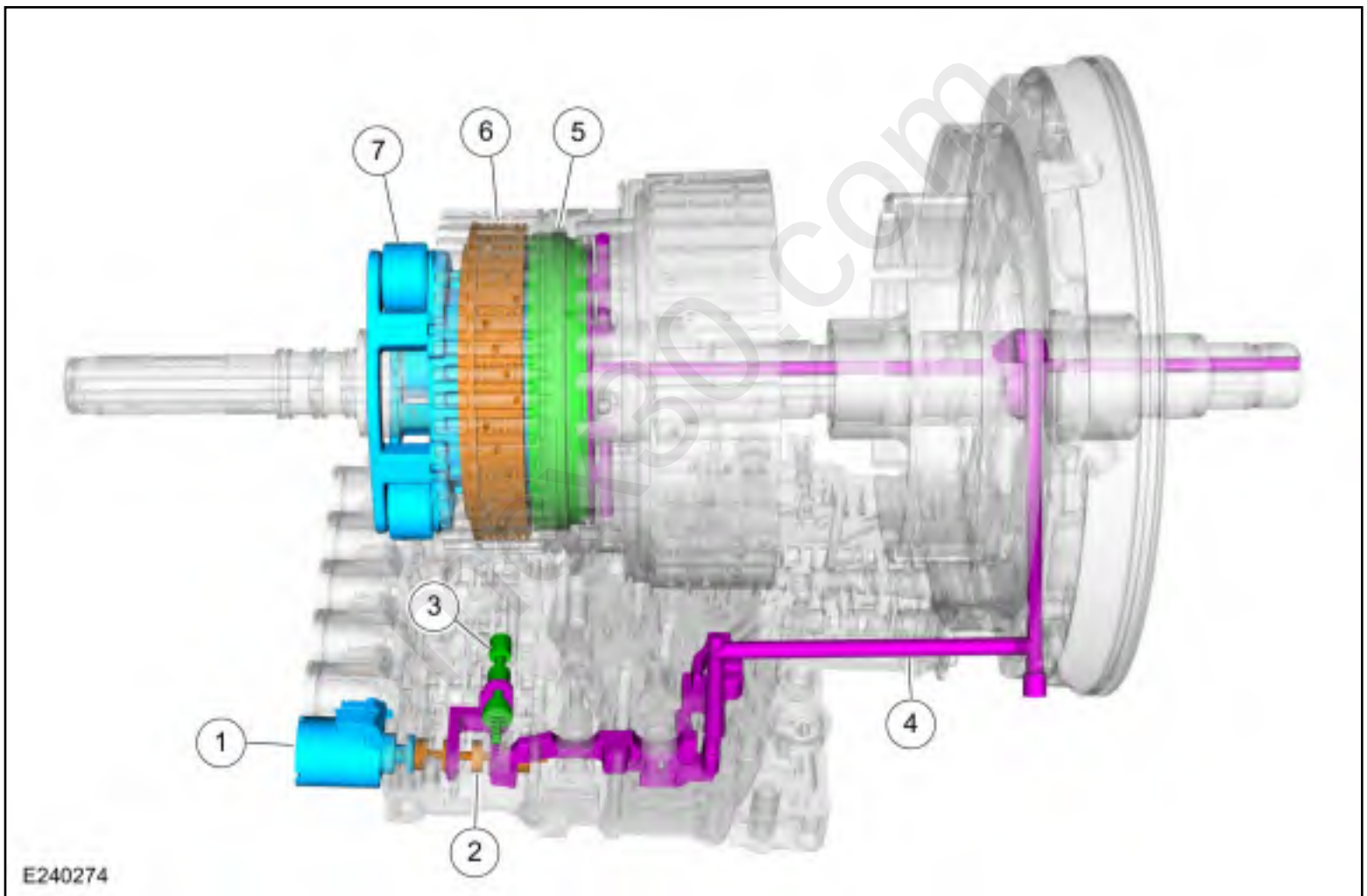
Gear Ratio Chart

Gear	Ratio
1st	4.69:1
2nd	2.98:1
3rd	2.14:1
4th	1.76:1
5th	1.52:1
6th	1.27:1
7th	1:1
8th	0.85:1
9th	0.68:1
10th	0.63:1
Reverse	4.86:1

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D Clutch

Overview

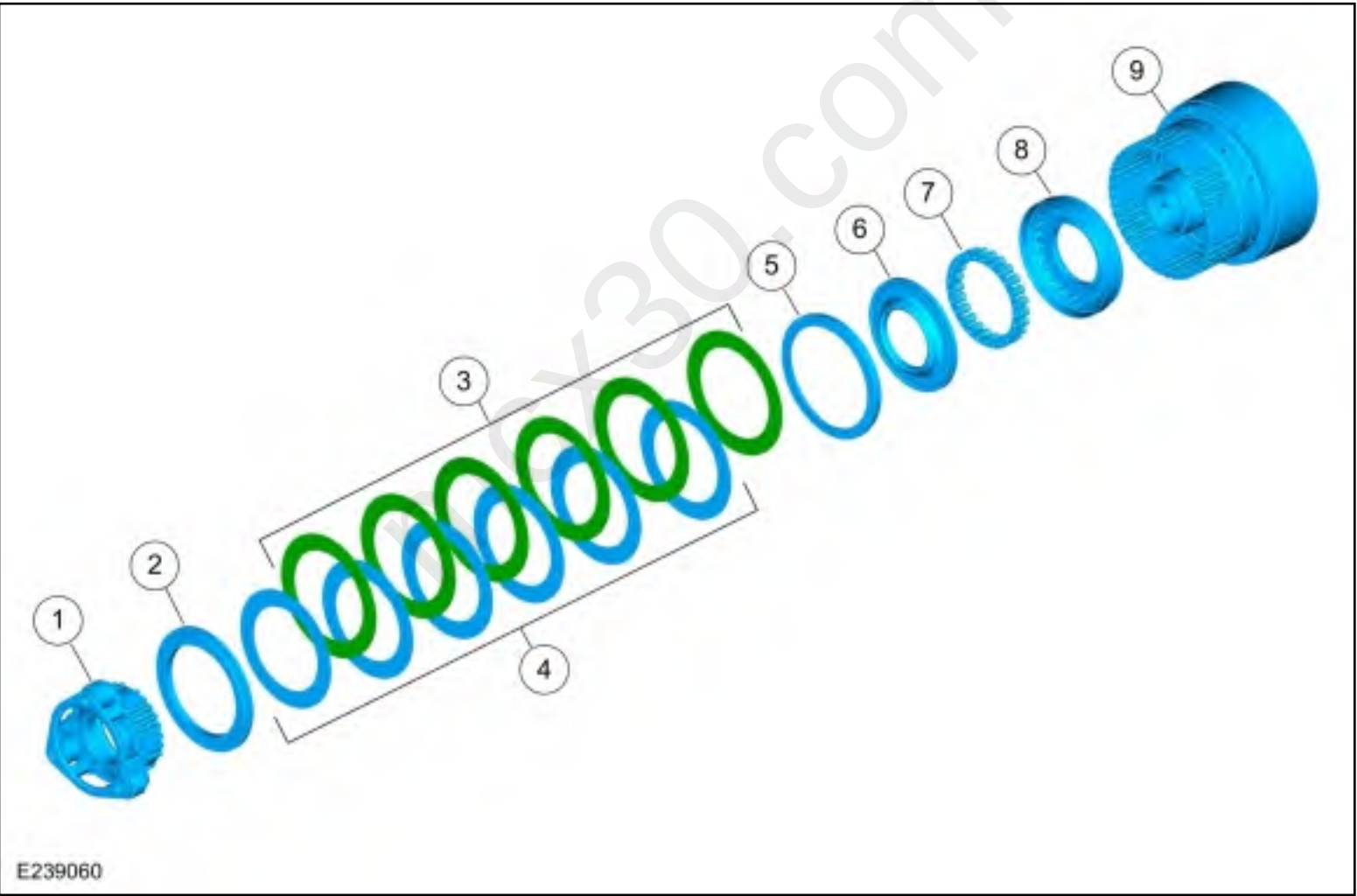


Item	Description
1	SSD
2	D clutch control valve

3	Clutch gain control valve
4	D clutch apply circuit
5	D clutch piston
6	D clutch assembly
7	Planetary carrier No. 3

Planetary carrier No. 3 is located in the CDF clutch and planetary carrier assembly. Planetary carrier No. 3 is connected to the D clutch. When the D clutch applies, the planetary carrier No. 3 may be connected to ring gear No. 2.

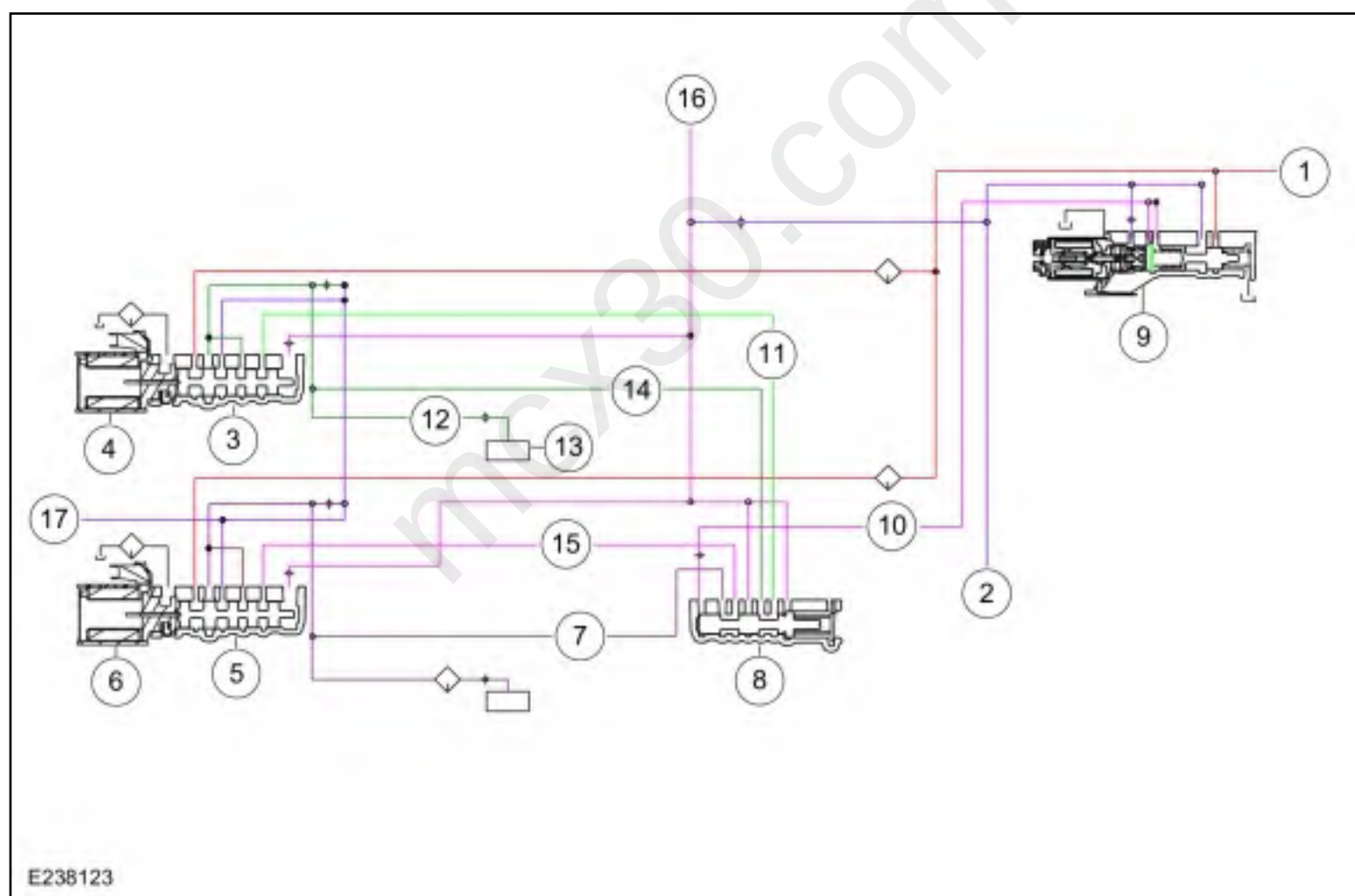
D Clutch Exploded View



Item	Description
1	Planetary carrier No. 3

2	D clutch pressure plate
3	D clutch steel plates
4	D clutch friction plates
5	D clutch apply ring </td
6	D clutch balance dam
7	D clutch piston return spring
8	D clutch piston
9	CDF clutch cylinder

D Clutch Hydraulic Circuits



Item	Description
1	Line pressure

2	Pump output
3	D clutch control valve
4	SSD
5	E clutch control valve
6	SSE
7	E clutch apply pressure to clutch gain control valve
8	Clutch gain control valve
9	LPC solenoid
10	LPC pressure
11	D clutch feedback pressure
12	Apply pressure to mechanical D clutch
13	Mechanical D clutch
14	D clutch apply pressure to clutch gain control valve
15	E clutch feedback pressure
16	Elevated exhaust pressure
17	Clutch exhaust

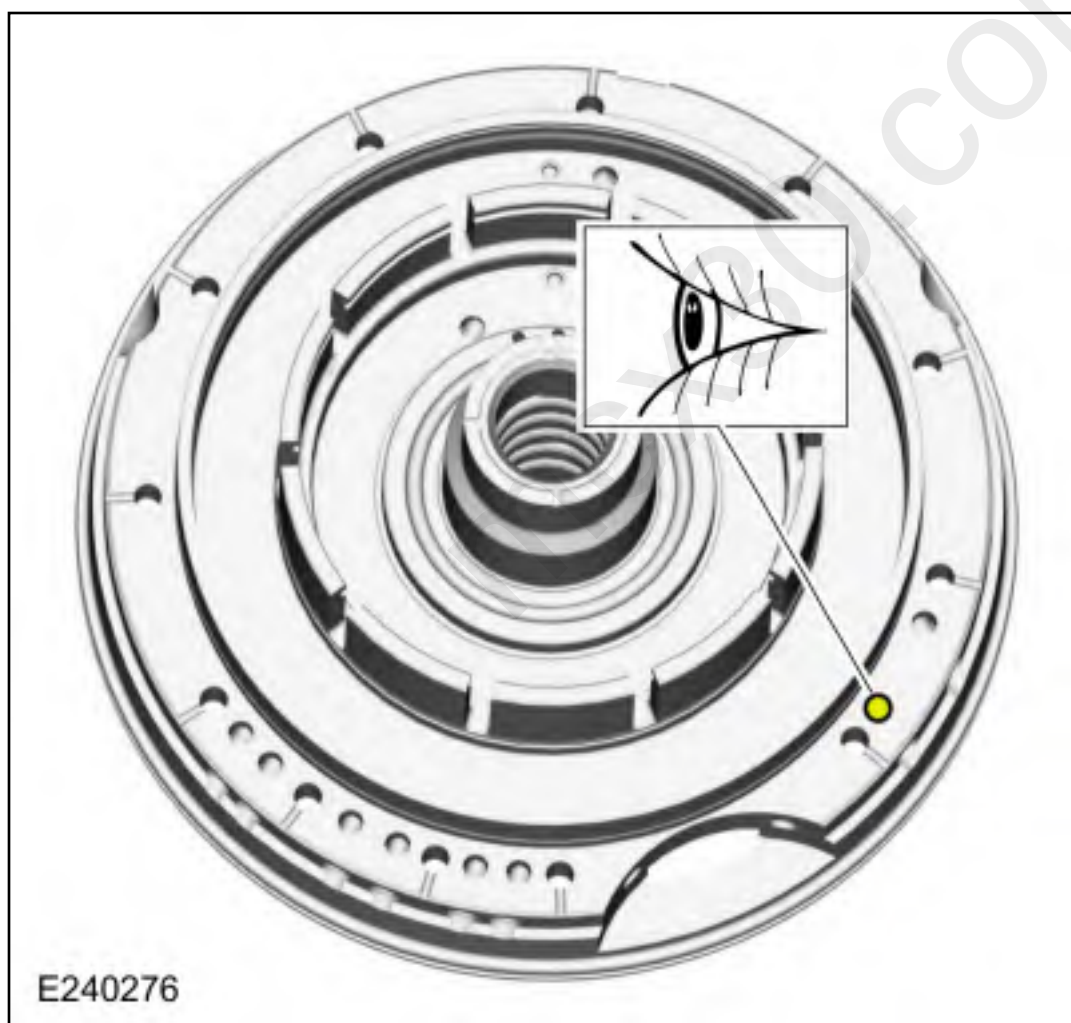
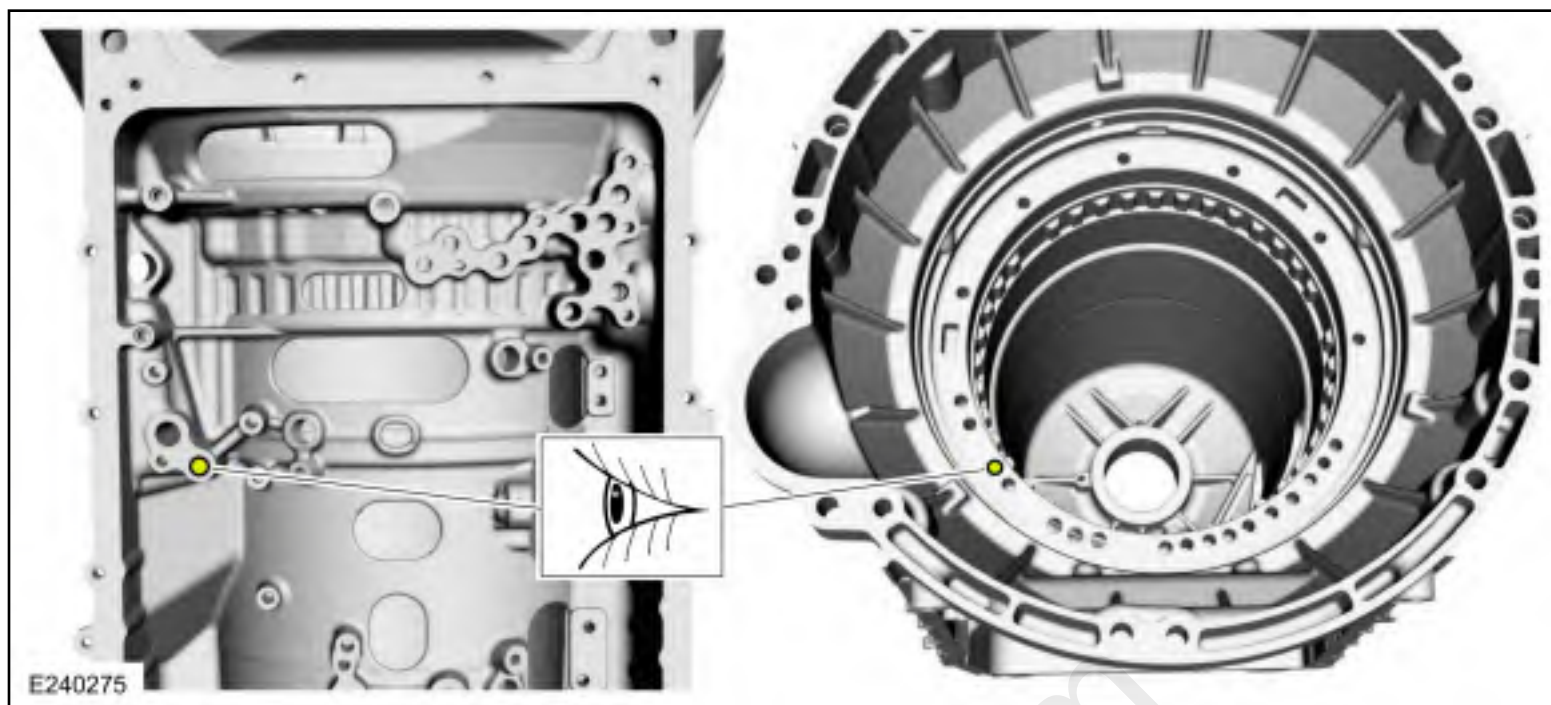
D Clutch Hydraulic Operation 5th-6th Shift

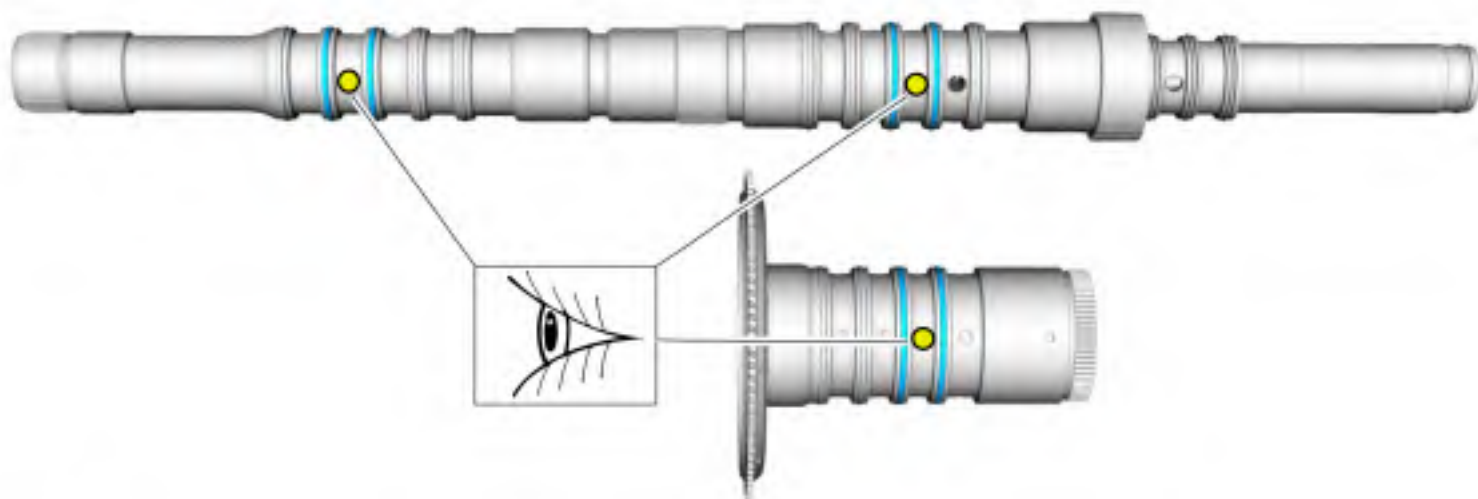
Line pressure is supplied to the D clutch control valve. LPC pressure is supplied to the gain control valve. LPC pressure positions the gain control valve to the right end of the valve bore. As SSD turns on, it moves the D clutch control valve allowing regulated line pressure to flow to the mechanical D clutch.

D Clutch Hydraulic Operation 2nd-3rd, 4th-5th, and 9th-10th Shifts

Line pressure is supplied to the D clutch control valve. LPC pressure is supplied to the gain control valve. The LPC pressure is low and the gain control valve stays in the default position at the left end of the valve bore. As SSD turns on, it moves the D clutch control valve allowing regulated line pressure to flow to the mechanical D clutch.

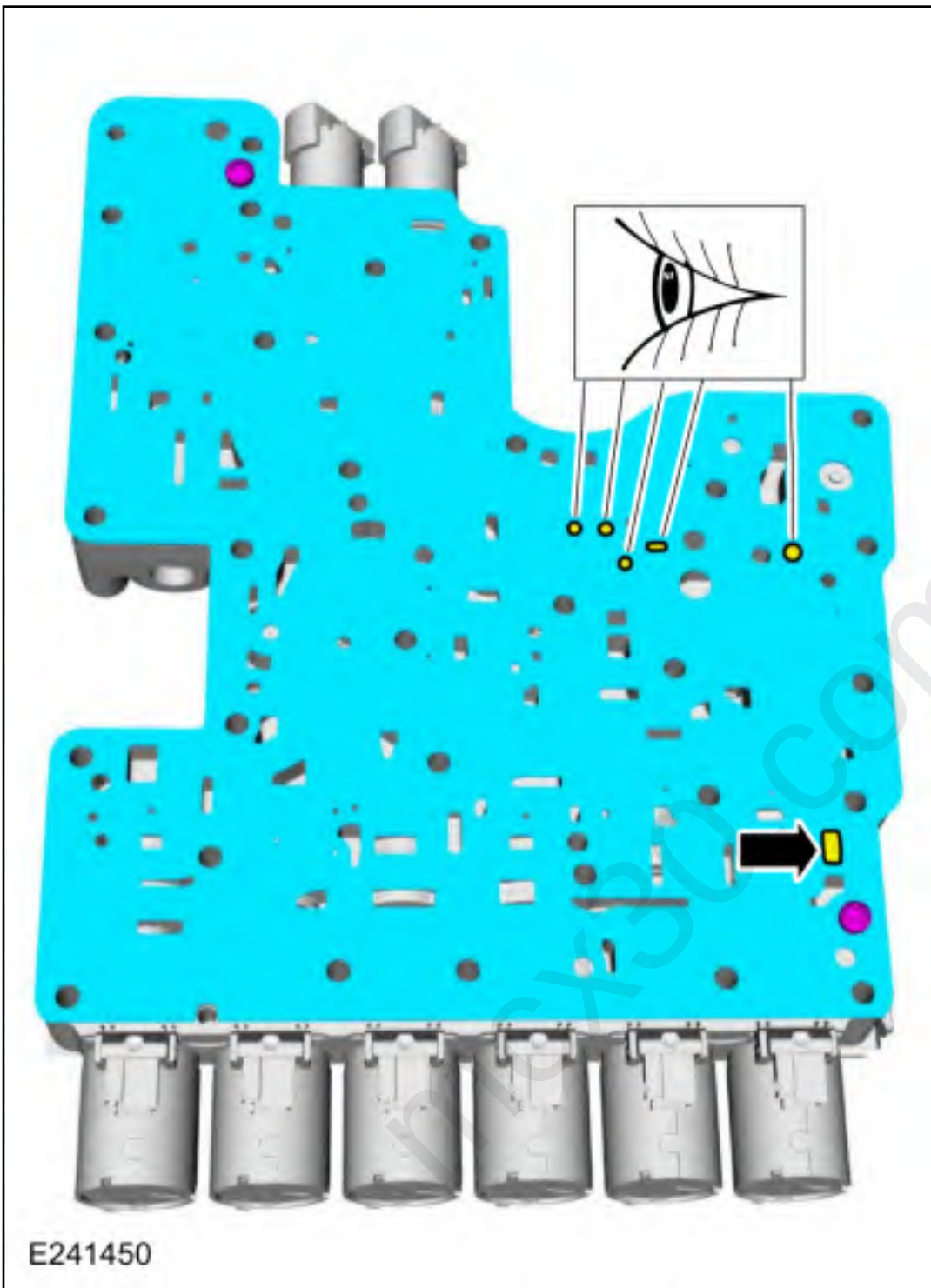
D Clutch Hydraulic Passages





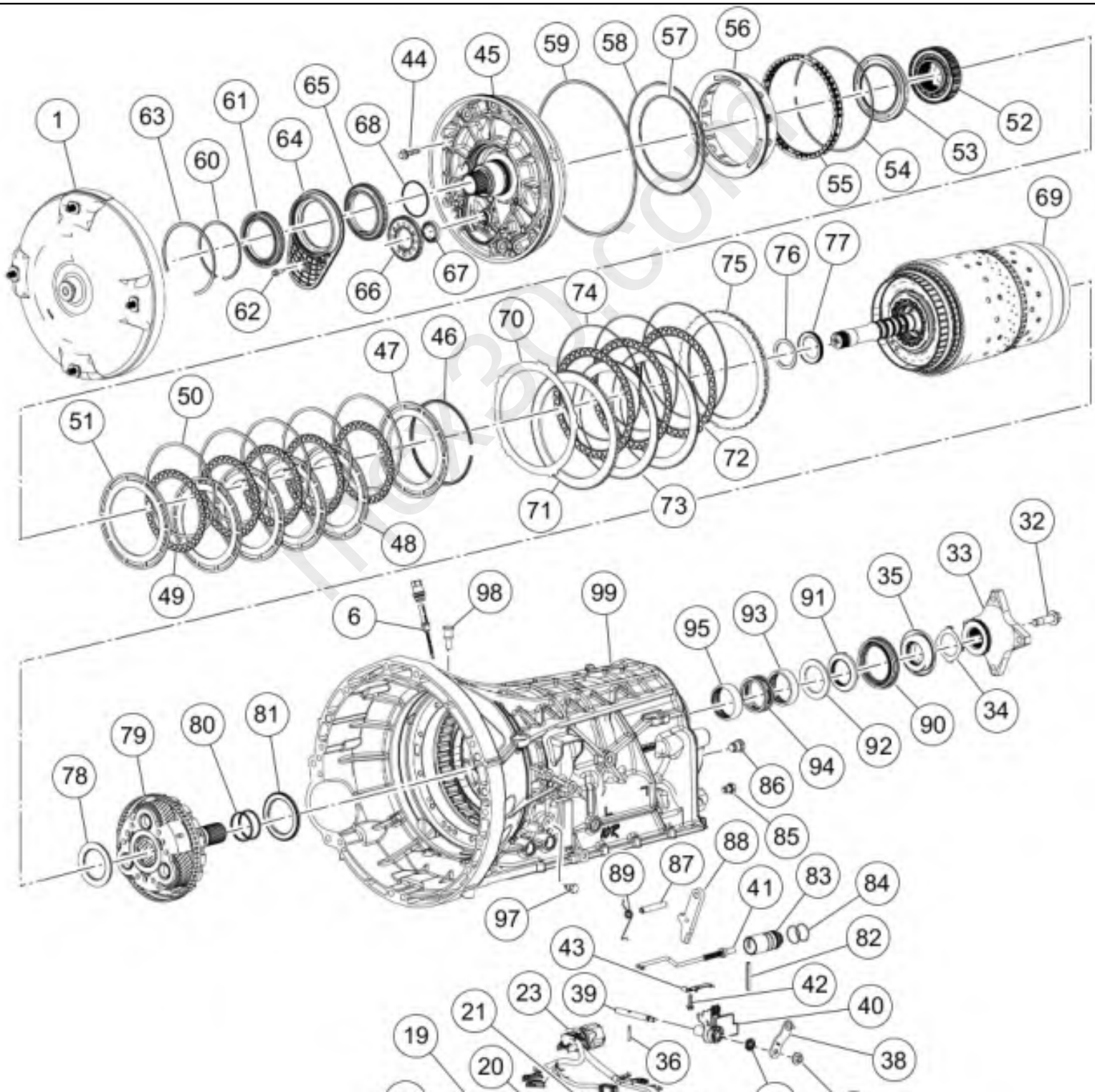
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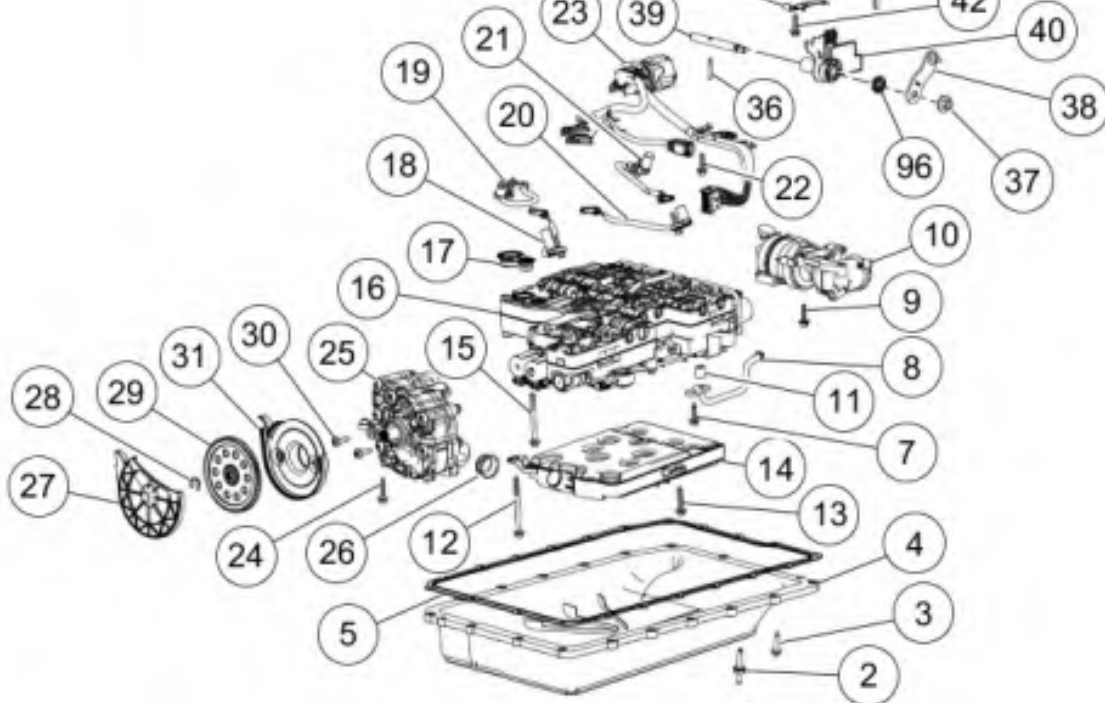
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Transmission Description

Transmission Assembly





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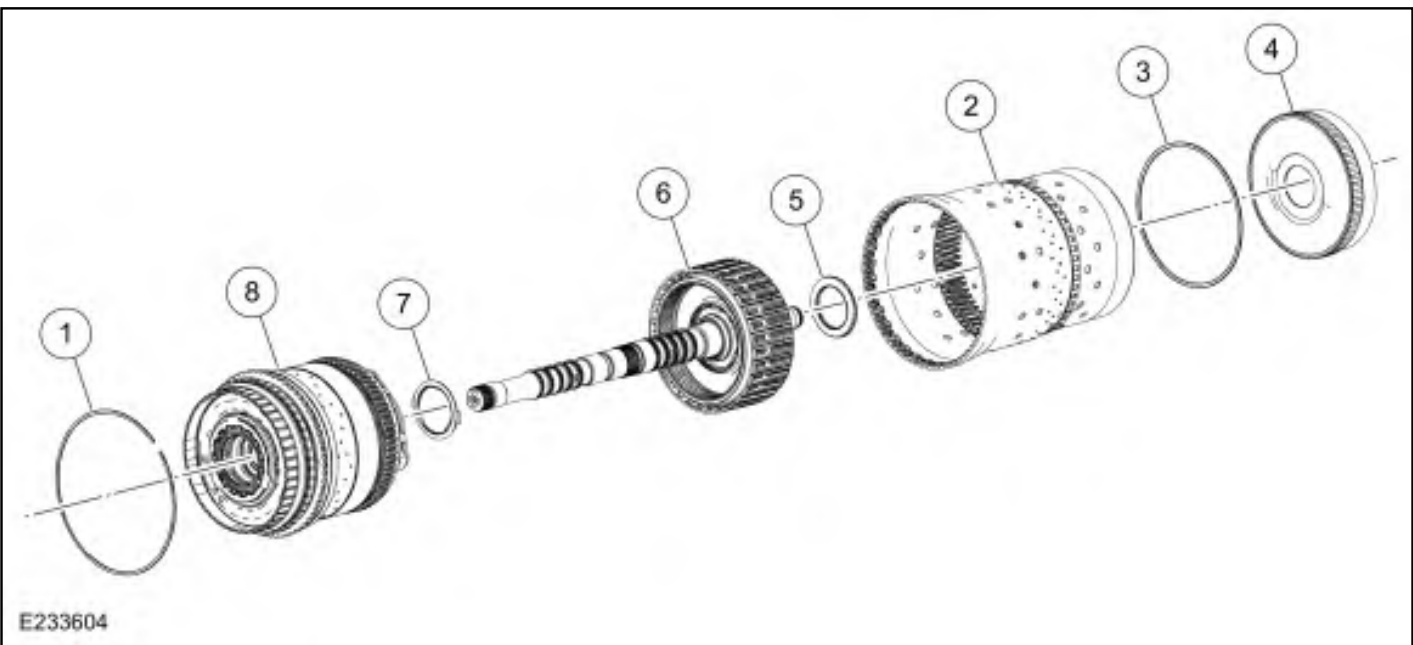
Item	Part Number	Description
1	7902	Torque converter
2	W714629	Transmission fluid pan stud bolts (6 required)
3	W500215	Transmission fluid pan bolts (12 required)
4	7A194	Transmission fluid pan
5	7A191	Transmission fluid pan gasket
6	7E389	Transmission fluid level indicator and plug assembly
7	W708500	Transmission fluid auxiliary pump tube bolt
8	7J441	Transmission fluid auxiliary pump tube
9	W718548	Transmission fluid auxiliary pump bolts (3 required)
10	7P086	Transmission fluid auxiliary pump
11	7J135	Transmission fluid auxiliary pump tube seal
12	W700123	Transmission fluid filter bolt (71 mm length)
13	W500214	Transmission fluid filter bolt (20 mm length)
14	7G186	Transmission fluid filter
15	W708500	Main control-to-transmission case bolts (68 mm length) (8 required)
16	7A100	Main control assembly
17	7N265	Main control-to-transmission fluid pump seal
18	7M183	Intermediate Speed A (ISSA) sensor
19	7M101	Turbine Shaft Speed (TSS) sensor

20	7H103	Intermediate Speed B (ISSB) sensor
21	7H103	Output Shaft Speed (OSS) sensor
22	W500213	Transmission internal wiring harness bolts (2 required)
23	7G276	Transmission internal wiring harness
24	W500215	Transmission fluid pump bolts (3 required)
25	7A103	Transmission fluid pump
26	7Z302	Transmission fluid pump seal
27	6658	Transmission fluid pump driven gear outer cover
28	W718158	Transmission fluid pump retaining ring
29	7A080	Transmission fluid pump driven gear
30	W504755	Transmission fluid pump driven gear inner cover bolts (2 required)
31	6658	Transmission fluid pump driven gear inner cover
32	7N134	Output shaft flange bolt (RWD only)
33	7K177	Output shaft flange (RWD only)
34	7N135	Output shaft flange anti-ting ring (RWD only)
35	7085	Output shaft nut (RWD only)
36	7G100	Manual control shaft-to-Transmission Range (TR) sensor roll pin
37	W718322	Manual control lever nut
38	7A256	Manual control lever (model dependent)
39	7C493	Manual control shaft
40	7H557	Transmission Range (TR) sensor (model dependent)
41	7D410	Park pawl actuator rod
42	W716607	Transmission Range (TR) sensor detent spring bolt
43	7E332	Transmission Range (TR) sensor detent spring
44	7N134	Front support assembly bolts (12 required)
45	7F363	Front support assembly
46	7M157 -C-C	B clutch (overdrive) snap ring
47	7C576	B clutch (overdrive) pressure plate
48	7B442 -A-A	B clutch (overdrive) steel plates (quantity model dependent)

49	7B164	B clutch (overdrive) friction plates (quantity model dependent)
50	7J402	B clutch (overdrive) separating springs (quantity model dependent)
51	7B442 -B-B	B clutch (overdrive) apply plate
52	7G206	One-Way Clutch (OWC)
53	7G418	B clutch (overdrive) piston
54	7N169	A clutch (intermediate) piston return spring snap ring
55	7G297	A clutch (intermediate) piston return spring
56	7J015	A clutch (intermediate) piston
57	7F225	A clutch (intermediate) piston inner seal
58	7F224	A clutch (intermediate) piston outer seal
59	7B031	Front support-to-case seal
60	7M157 -J-J	Torque converter hub seal snap ring
61	7A248	Torque converter hub seal
62	7N134 -C-C	Front support cover and seal assembly bolt
63	7M157	Front support cover and seal assembly snap ring
64	7570	Front support cover and seal assembly
65	7F073	Transmission fluid pump drive gear
66	6651	Transmission fluid pump idler gear
67	7Z426	Transmission fluid pump idler gear bearing
68	7G090	Stator support seal
69	—	Clutch and planetary assembly
70	7P080	A clutch (intermediate) wave spring
71	7A406	A clutch (intermediate) apply plate (select fit)
72	7F219	A clutch (intermediate) friction plates (quantity model dependent)
73	7F220	A clutch (intermediate) steel plates (quantity model dependent)
74	7G159	A clutch (intermediate) separating springs (quantity model dependent)
75	7B437	A clutch (intermediate) pressure plate
76	7J300	Selective shim
77	7H032	Thrust bearing (T3)

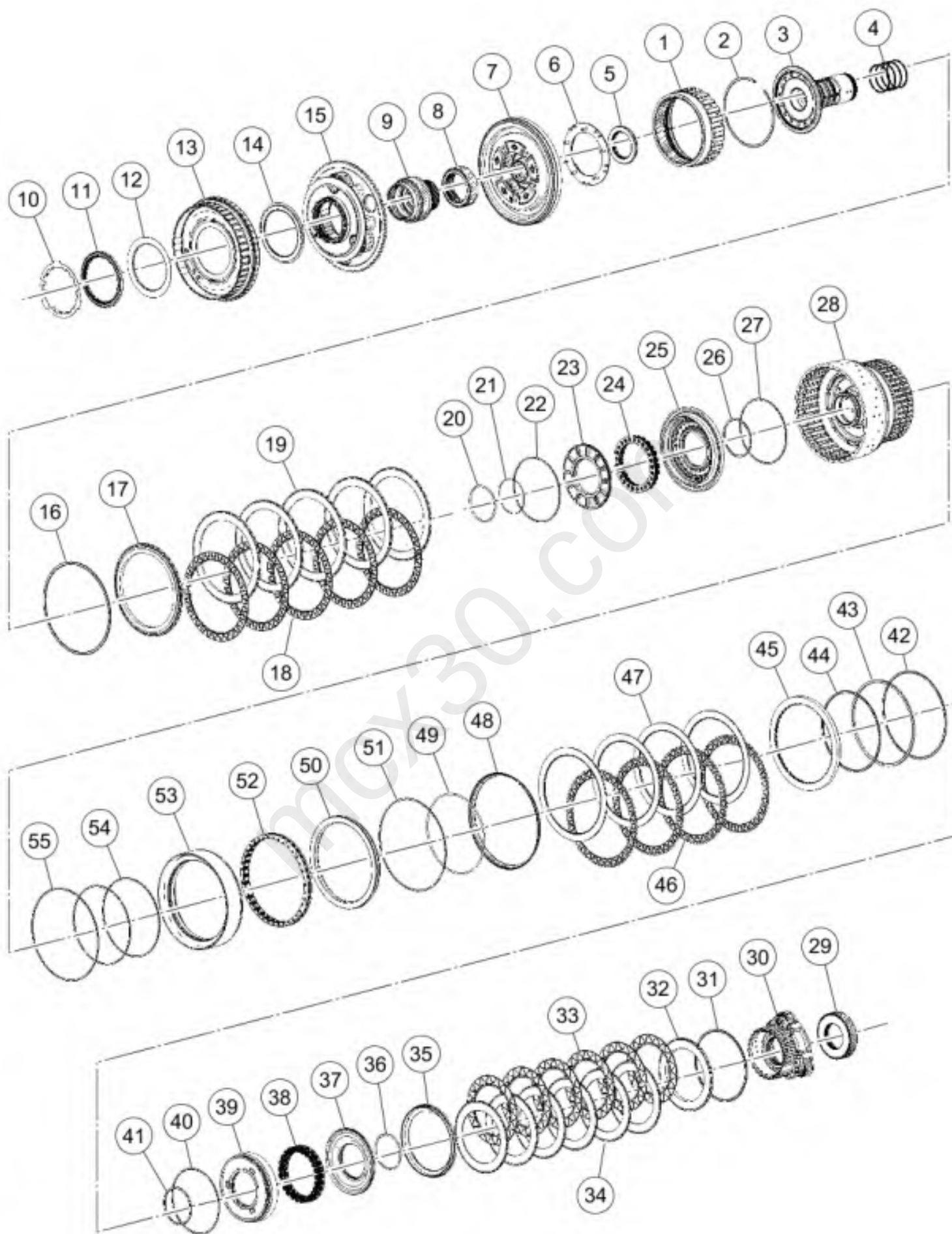
78	7M152 -A-A	Thrust bearing (T9)
79	7P198	Output shaft and planetary carrier No. 4 assembly (model dependent)
80	7D019	Output shaft seals (2 required)
81	7D146	Thrust bearing (T10)
82	W717404	Park pawl actuator rod sleeve roll pin
83	2N613	Park pawl actuator rod sleeve
84	2D330	Park pawl actuator rod sleeve seals (2 required)
85	W715937	Plug assembly transmission case
86	W716240	Plug assembly park pawl shaft
87	7D071	Park pawl shaft
88	7A441	Park pawl
89	7D070	Park pawl return spring
90	7052	Output shaft seal (model dependent)
91	7G355	Thrust bearing (T11) (RWD only)
92	7A433	Thrust washer (RWD only)
93	7A415 -B-B	Output shaft bearing (outer)
94	7B314	Fluid passage sleeve
95	7A415 -A-A	Output shaft bearing (inner)
96	7F337	Manual control shaft seal
97	W715937	Plug (line pressure tap)
98	7G063	Transmission case vent assembly
99	7006	Transmission case

Clutch and planetary assembly



Item	Part Number	Description
1	7H579	Planetary carrier No.1 snap ring
2	7B177	Cylinder (clutch and planetary container)
3	7B002	Ring gear No. 4 snap ring
4	7D163	Ring gear No. 4
5	7M152	Thrust bearing (T8)
6	—	E clutch and input shaft assembly
7	7F373	Thrust bearing (T6)
8	—	CDF clutch and planetary carrier assembly

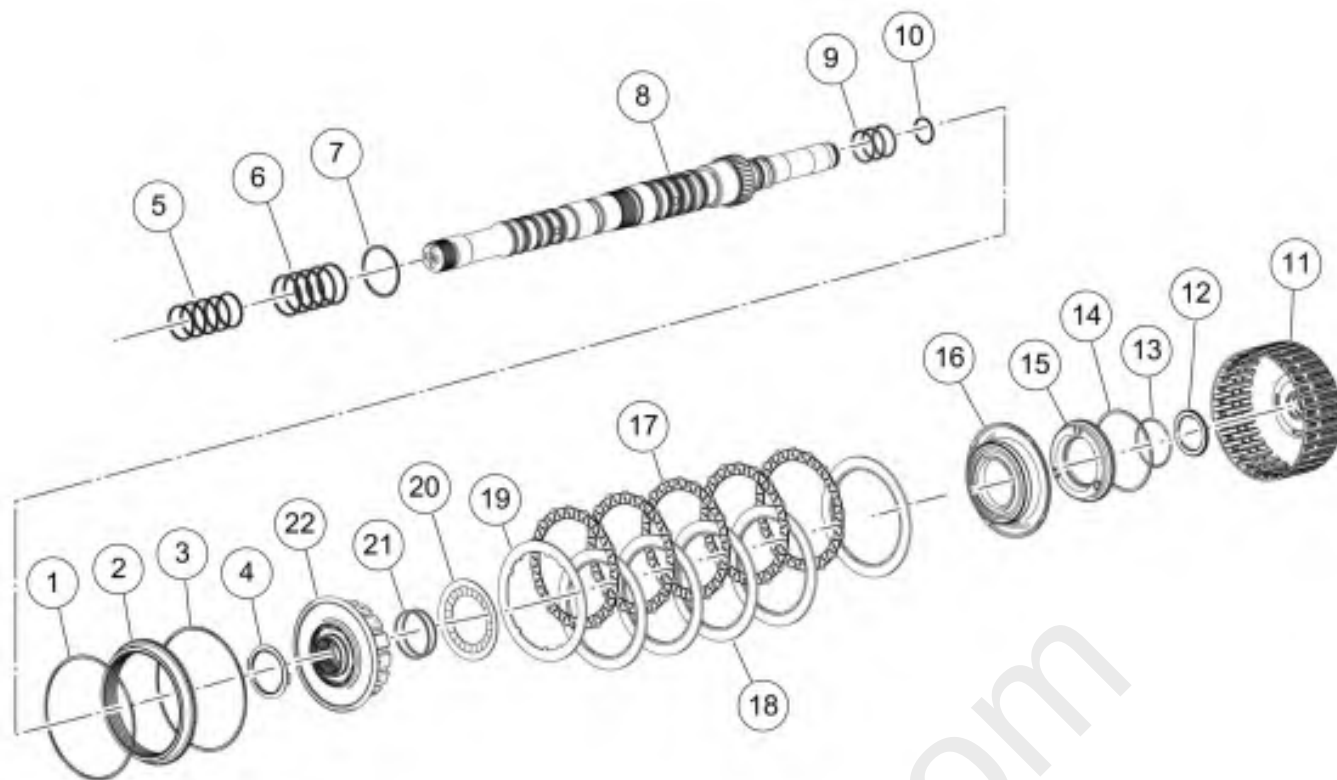
CDF Clutch and planetary carrier assembly



Item	Part Number	Description
1	7D392	Ring gear No. 2
2	7H379	Ring gear No. 2 snap ring
3	7D159	Shaft (sun gear No 3)
4	7B399	Shaft (sun gear No 3) Teflon® seals (4 required)
5	7D283	Thrust bearing (T5)
6	7H578	Fluid collector
7	7A398	Planetary carrier No. 2
8	7H580	Sun gear No. 2
9	7G230	Sun gear No. 1
10	1195	Ring gear No. 1 bearing support locking ring
11	7P074	Ring gear No. 1 bearing support
12	7C096	Ring gear No. 1 bearing
13	7P136	Ring gear No. 1
14	7C096	Ring gear No. 1 bearing
15	7G218	Planetary carrier No. 1
16	7H076	C clutch (direct) snap ring
17	7B477	C clutch (direct) pressure plate
18	7H095	C clutch (direct) friction plates (quantity model dependent)
19	7F238	C clutch (direct) steel plates (quantity model dependent)
20	7B492	C clutch (direct) balance dam retainer
21	7F234	C clutch (direct) balance dam inner seal
22	7C000	C clutch (direct) balance dam outer seal
23	7H359	C clutch (direct) balance dam
24	7B488	C clutch (direct) piston return spring
25	7C117	C clutch (direct) piston
26	7G444	C clutch (direct) piston inner seal
27	7C000	C clutch (direct) piston outer seal
28	7P182	CDF clutch cylinder

29	7D063	Sun gear No. 3
30	7D006	Planetary carrier No. 3
31	7B421	D clutch (low) snap ring
32	7G486	D clutch (low) pressure plate
33	7E312	D clutch (low) friction plates (quantity model dependent)
34	7G474	D clutch (low) steel plates (quantity model dependent)
35	7P176	D clutch (low) apply ring
36	7B492	D clutch (low) balance dam retainer
37	7D343	D clutch (low) balance dam
38	7D405	D clutch (low) piston return spring
39	7D402	D clutch (low) piston
40	7G445	D clutch (low) piston outer seal
41	7G444	D clutch (low) piston inner seal
42	7P200	F clutch (high) keeper snap ring
43	7H318	F clutch (high) snap ring keeper
44	7P174	F clutch (high) snap ring
45	7A450	F clutch (high) pressure plate
46	7E313	F clutch (high) friction plates (quantity model dependent)
47	7E316	F clutch (high) steel plates (quantity model dependent)
48	7P175	F clutch (high) apply ring
49	7P172	F clutch (high) balance dam retainer
50	7P171	F clutch (high) balance dam
51	7A590	F clutch (high) balance dam outer seal
52	7C295	F clutch (high) piston return spring
53	7R247	F clutch (high) piston
54	7A590 -B-B	F clutch (high) piston and balance dam seals (2 required)
55	7A590 -A-A	F clutch (high) piston seal

E Clutch and input shaft assembly

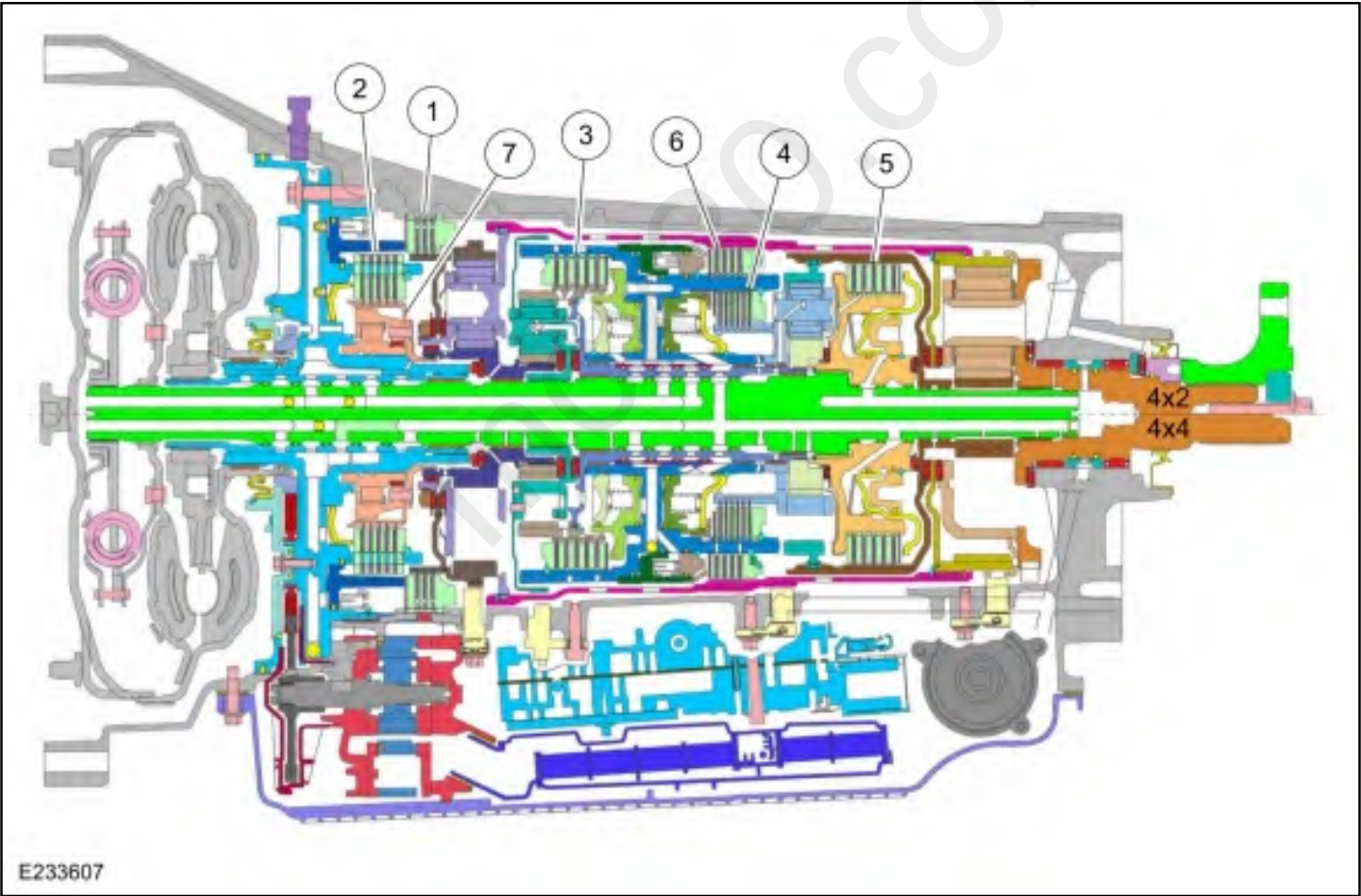


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Item	Part Number	Description
1	7H361	Ring gear No. 3 outer snap ring
2	7H053	Ring gear No. 3
3	7H361	Ring gear No. 3 inner snap ring
4	7F373	Thrust bearing (T6)
5	7G091 -A-A	Input shaft front Teflon® seals (5 required)
6	7G091 -B-B	Input shaft-to-sun gear No 3 shaft Teflon® seals (5 required)
7	7J410	Input shaft snap ring
8	7015	Input shaft
9	7G242	Input shaft D-ring seals (3 required)
10	7G091	Input shaft Teflon® seal
11	7D062	Shell and sun gear No. 4
12	7G008	Thrust bearing (T7)
13	7H365	E clutch (forward) balance dam retainer
14	7F227	E clutch (forward) balance dam outer seal

15	7P169	E clutch (forward) balance dam
16	7A262	E clutch (forward) piston
17	7H091	E clutch (forward) friction plates (quantity model dependent)
18	7H089	E clutch (forward) steel plates (quantity model dependent)
19	7B066	E clutch (forward) pressure plate (select fit)
20	7B070	E clutch (forward) piston return spring
21	7G242	E clutch (forward) piston and balance dam inner seals (2 required)
22	7P211	E clutch (forward) hub

Component Location



Item	Part Number	Description
1	—	A clutch assembly

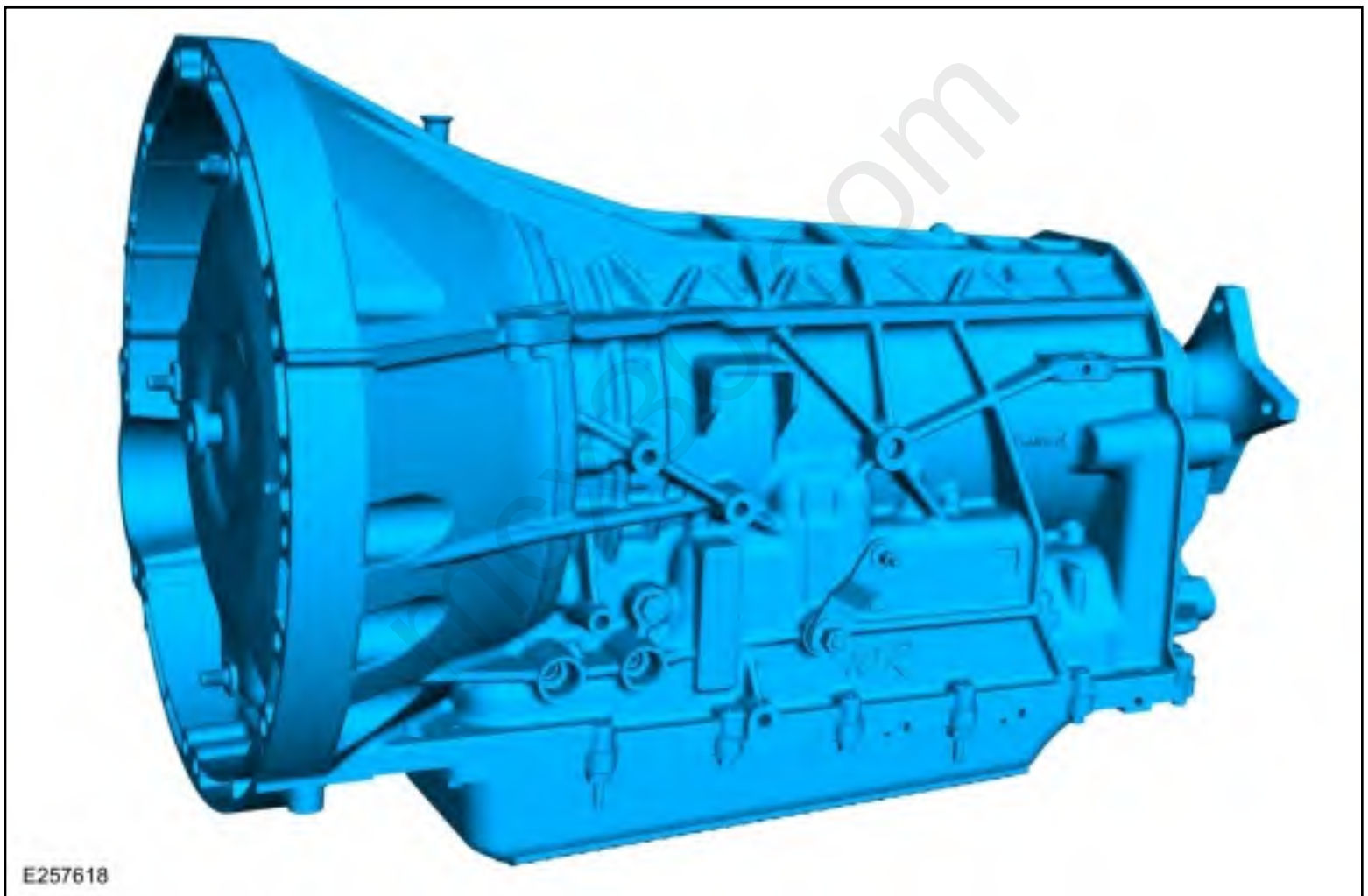
2	—	B clutch assembly
3	—	C clutch assembly
4	—	D clutch assembly
5	—	E clutch assembly
6	—	F clutch assembly
7	—	One-Way Clutch (OWC)

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Transmission Description - Overview

Overview



This transmission is a 10-speed electronically controlled transmission which uses planetary gears. Gear selection is achieved by the electronic control of transmission fluid flow to operate various internal clutches.

This transmission includes:

- Torque converter with an integral converter clutch
- Electronic shift and pressure controls
- Four planetary gearsets
- Two multi-disc holding clutches
- Four multi-plate drive clutches
- One one way holding clutch
- Main control valve body unit

The main control consists of a valve body assembly with solenoids inside the transmission and is controlled by a PCM or a TCM with 3.5L EcoBoost engines. The PCM or TCM operates the electrical components to provide refined engagement feel, shift feel, and shift scheduling.

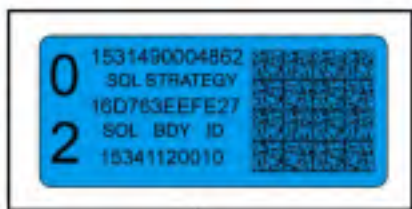
Engine power reaches the transmission by a torque converter with an integral clutch. The 10 forward gears and one reverse gear are obtained from 4 planetary gearsets.

This automatic transmission is a 10-speed electronically controlled transmission with a main control valve body unit with 8 solenoids and a torque converter. Gear selection is achieved by the control of transmission fluid to operate various internal clutches. The PCM or TCM operates the electrical components and provides control of gear selection, shift pressure and torque converter slip.

Identification Tags

Identification Tag Location

1



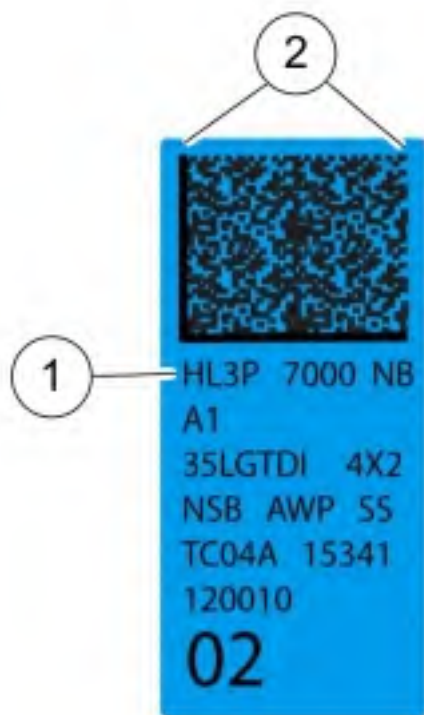
2



E239315

Item	Description
1	Solenoid body identification tag
2	Transmission identification tag

Transmission identification tag

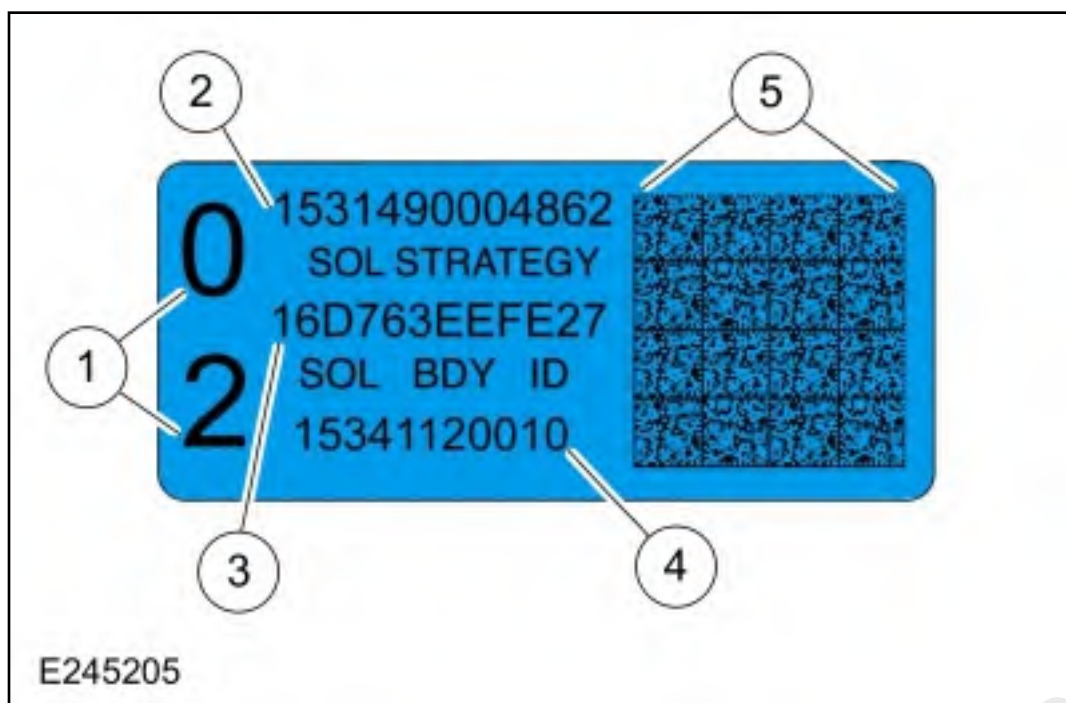


E246768

Item	Description
1	Transmission part number
2	Two-dimensional matrix barcode

When servicing the transmission, use the transmission identification tag located on the right side of the transmission case.

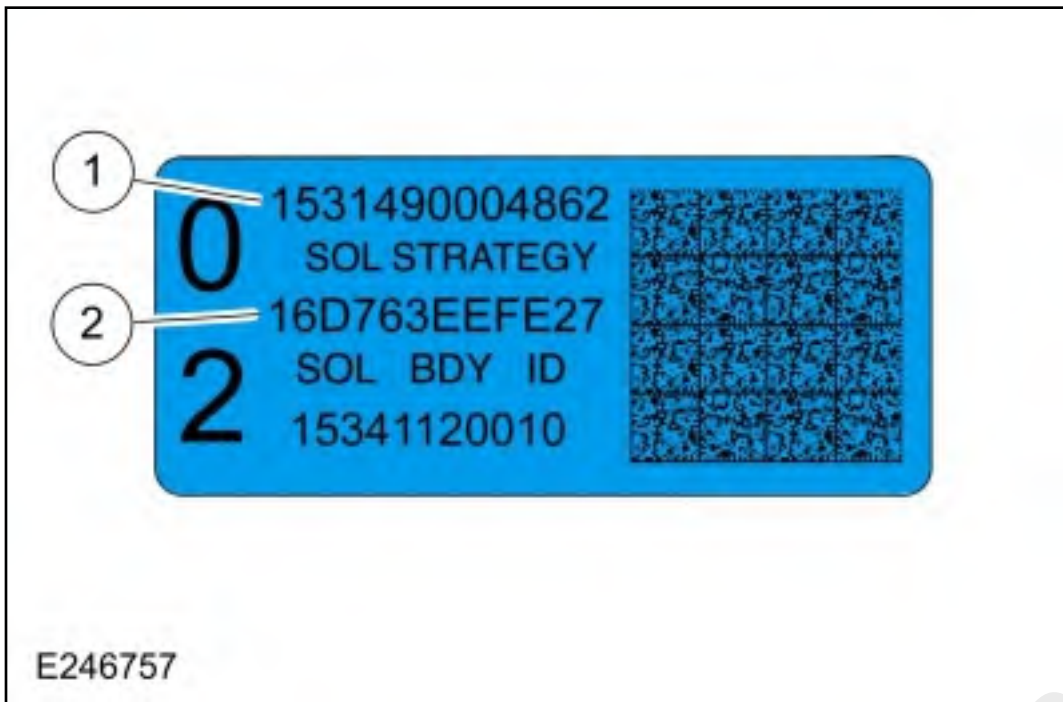
Original Solenoid Body Tag



Item	Description
1	Two-digit transmission model code
2	Thirteen-digit solenoid body strategy
3	Twelve-digit solenoid body identification
4	Eleven-digit transmission unique running number
5	Two-dimensional matrix barcode with TRID transmission characterization data

The solenoid body strategy is a file programmed into the PCM or the TCM with 3.5L EcoBoost engines to control the shift, LPC and TCC solenoids to improve shift quality. The solenoid body tag on the transmission case contains the 13-digit solenoid body strategy and the 12-digit solenoid body identification.

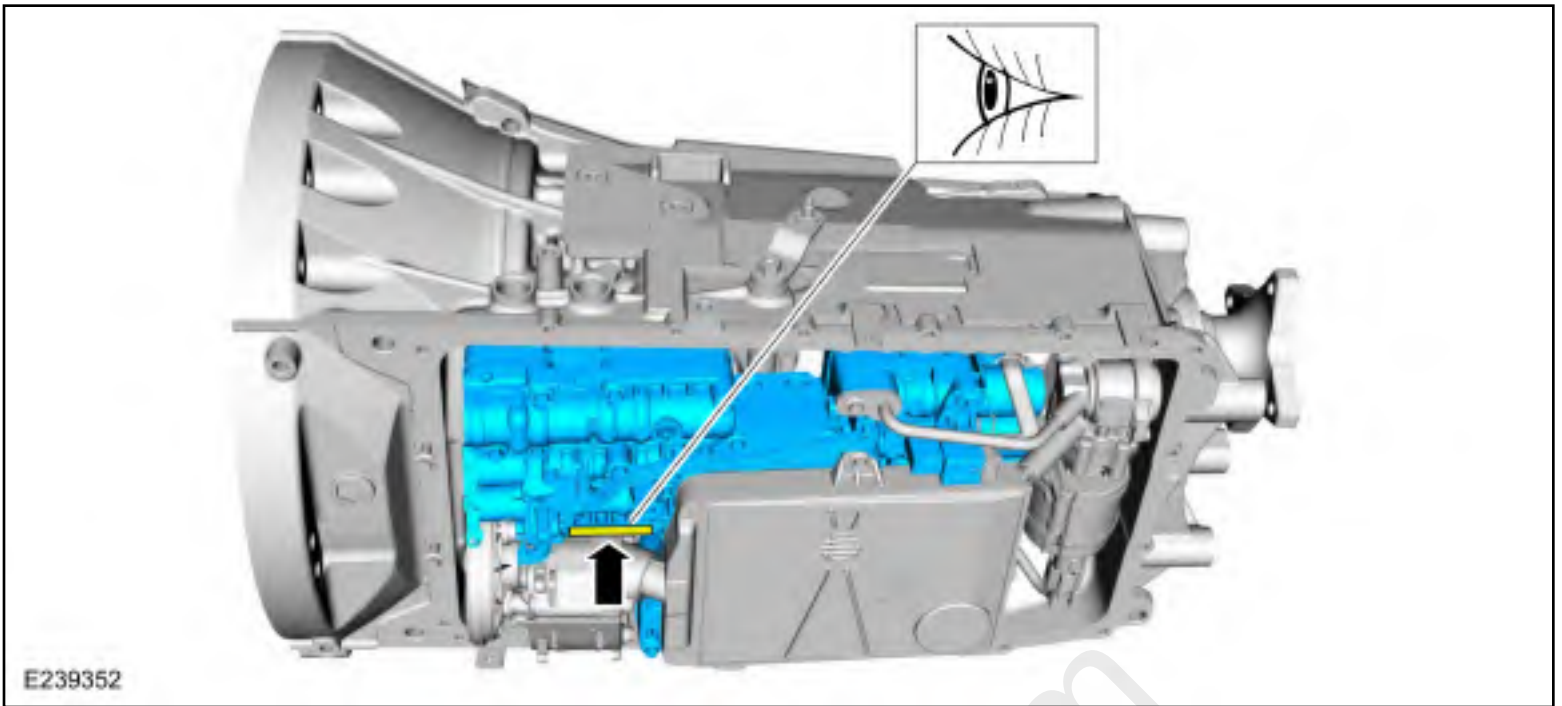
Replacement Solenoid Body Tag



Item	Description
1	Thirteen-digit solenoid body strategy
2	Twelve-digit solenoid body identification

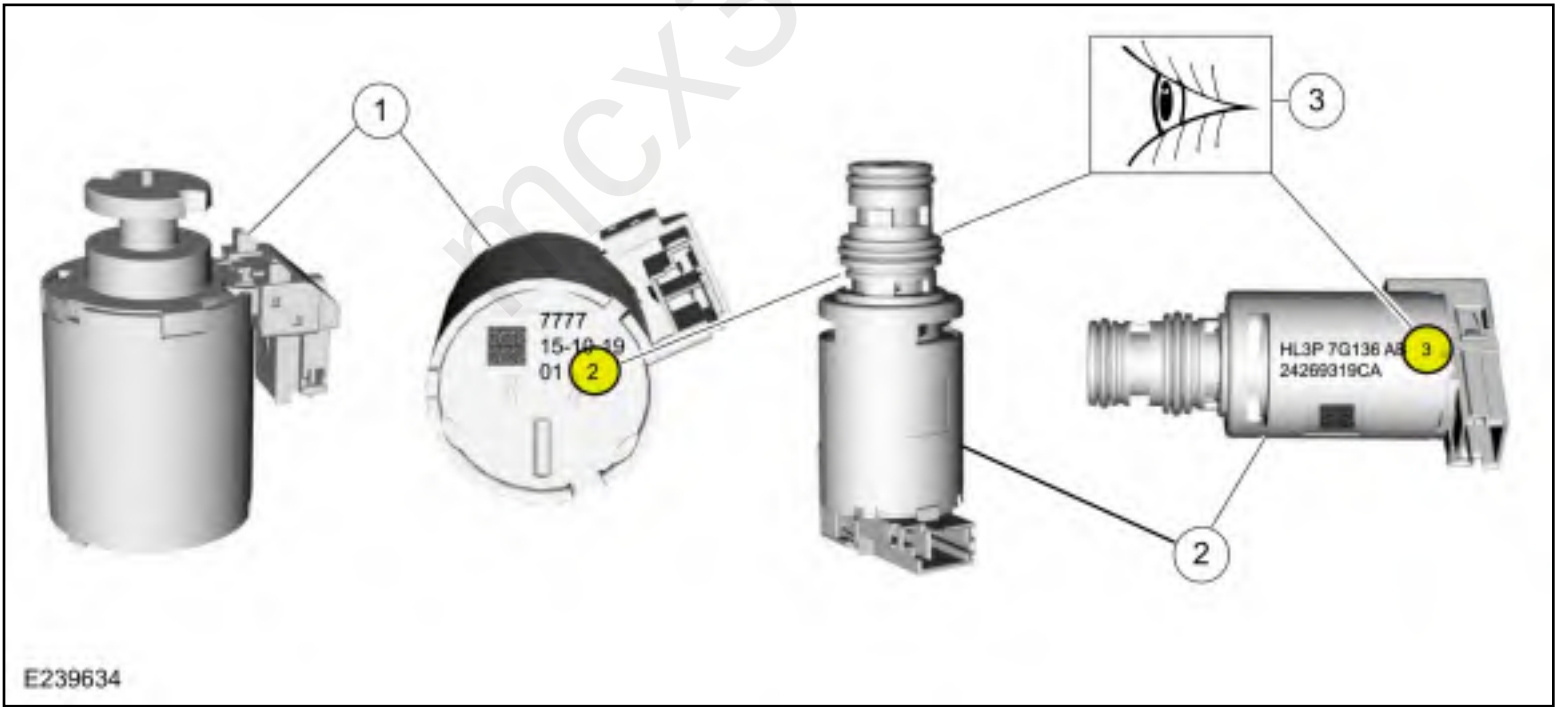
Anytime a new main control is installed, a new solenoid body strategy file is downloaded into the PCM or the TCM with 3.5L EcoBoost engines using the scan tool. A replacement solenoid body tag is supplied with the new solenoid body which contains the 13-digit solenoid body strategy and the 12-digit solenoid body identification. The new tag is placed over the original solenoid body tag.

Solenoid Body Identification and Strategy



If the solenoid body strategy etched on the main control does not match what the scan tool displays, the solenoid body strategy must be downloaded into the PCM or the TCM with 3.5L EcoBoost engines or harsh shifts will result.

Solenoid Band Number



Item	Description

1	CIDAS (casting integrated direct acting solenoid)
2	VFS (variable force solenoids)
3	Band number

The solenoids are calibrated from the factory and are not all the same. There are 2 types of VFS (variable force solenoids), normally high and normally low solenoids. The CIDASs are all normally low solenoids. The solenoids can be replaced separately, but only with the same type of solenoid. The replacement solenoid band number must match the band number of the solenoid being replaced. The band number is printed on the solenoids in the location shown and will be a 1, 2, 3, 4 or 5.

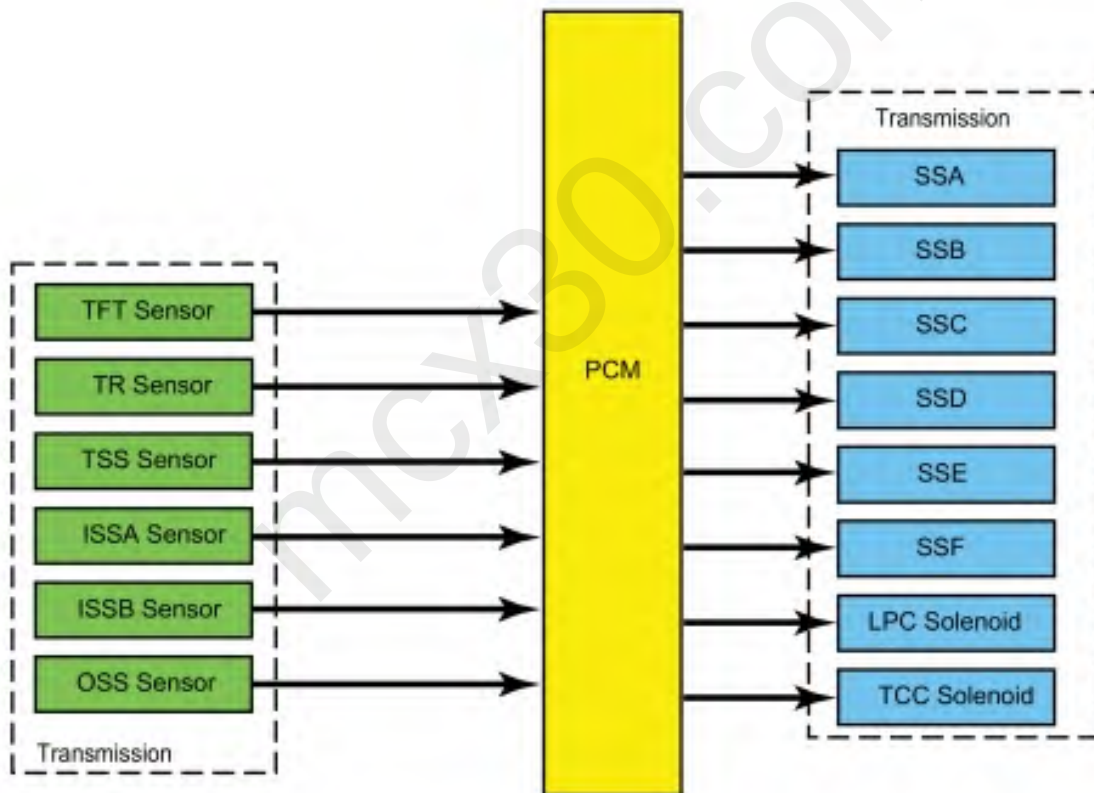
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Transmission Description - System Operation and Component Description

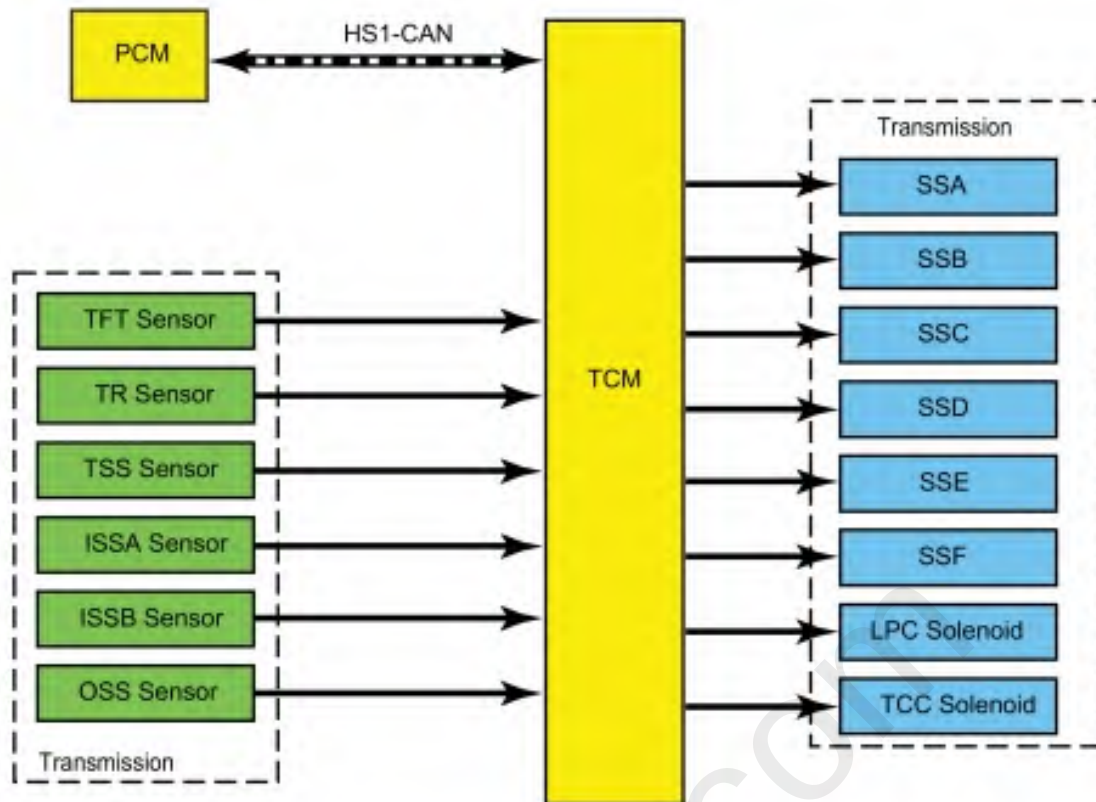
System Diagram

2.7L EcoBoost and 5.0L 32V Ti-VCT Engines



E259531

3.5L EcoBoost Engines



E241728

Network Message Chart

Broadcast Message	Originating Module	Message Purpose
Engine Speed	TCM	Directly affects shift scheduling, TCC control, line pressure and transmission diagnostics. Indirectly affects shift pressure control.
Engine torque estimate	TCM	Directly affects shift pressure control, TCC control and transmission diagnostics. Indirectly affects shift scheduling and TCC scheduling.
APP	PCM	Directly affects shift scheduling, TCC scheduling and transmission diagnostics. Indirectly affects TCC control and shift control.
Commanded engine torque	PCM	Directly affects shift scheduling, TCC scheduling and transmission diagnostics. Indirectly affects shift control.

System Operation

The 10R80 transmission is a 10-speed, step ratio rear wheel drive transmission that is controlled by a PCM or a TCM with 3.5L EcoBoost engines. The 10R80 has ten forward speeds, one reverse speed, four planetary gear sets, one mechanical One-Way Clutch or OWC, six friction clutches, an upper valve body, a lower valve body with

eight solenoids, and PCM or TCM controlled electronics. The 10R80 utilizes six shift (A-F) solenoids that are linear force solenoids. Unlike previous shift solenoids they are mechanical in nature in that no transmission fluid passes through them. CIDASs use a armature/pin assembly that moves a control valve in the main control valve body to control and apply hydraulic fluid pressure. Each clutch (A-F) is controlled by a corresponding shift solenoid (A-F). These solenoids are directly proportional in that zero current equals zero pressure and maximum current equals maximum pressure. If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically OFF, none of the clutch packs are able to engage and there is no fail safe operation.

Upshift Gear Sequence

At times the 10-speed transmission may **skip** gears when the vehicle starts from a complete stop. This is **normal** and desired **behavior**.

At part pedal when acceleration is brisk, single step upshifts would result in very frequent shift events (very short time in gear). Double step upshifts results when a longer time is spent in gear.

However, at light pedal or road load, single step upshifts **will** occur. The small 10-speed gear steps allow the engine speed to drop to lower values than it would in the 6-speed transmission; providing for the best fuel economy. In contrast, when the 10-speed transmission is at heavy or max pedal, the small steps keep the engine closer to the horsepower peak for best performance.

Down shift Gear Sequence

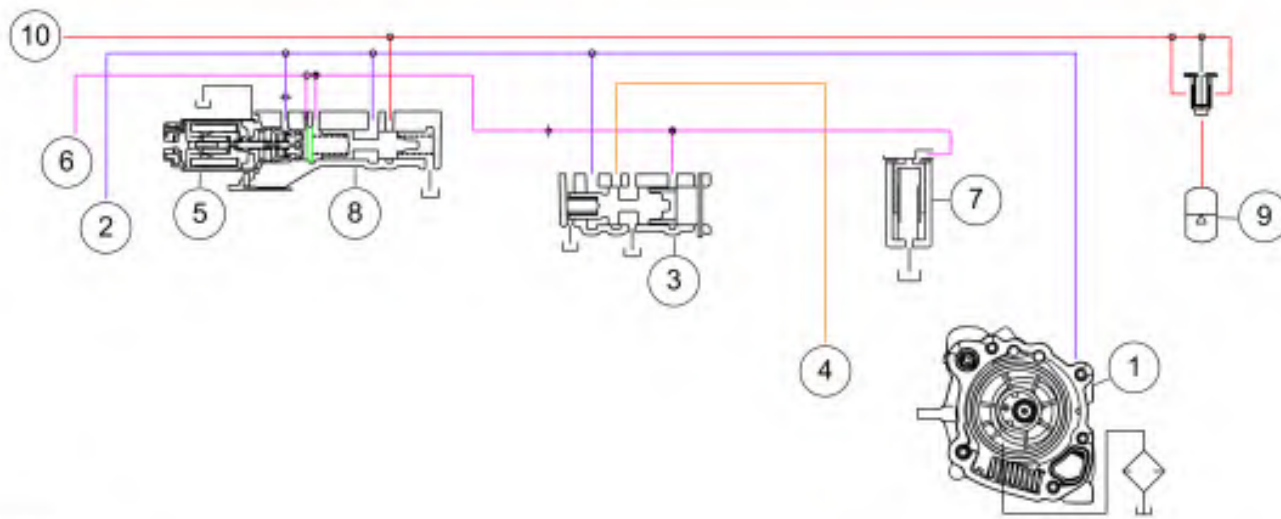
At times the 10-speed transmission may **skip** gears when the vehicle down shifts to a complete stop. This is **normal** and desired **behavior**.

The same **skip** shift strategy that is used for the upshift may be applied during down shift.

Component Description

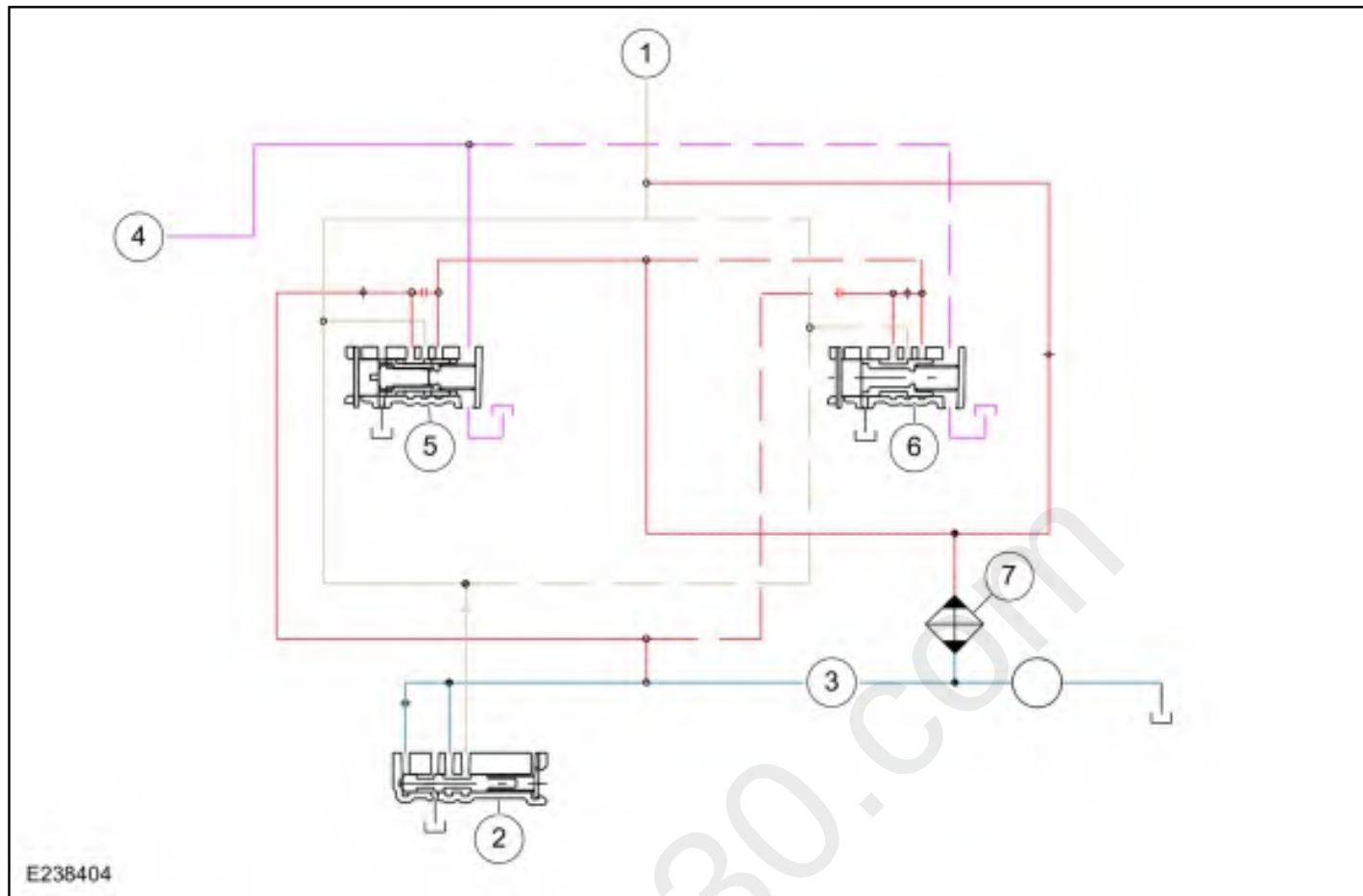
Hydraulic Circuits

Line Pressure Hydraulic Circuits



Item	Description
1	Mechanical pump
2	Pump output
3	Main regulator valve
4	Pump output decreased
5	LPC solenoid
6	LPC pressure
7	Isolator valve
8	Anti-backflow valve
9	Transmission fluid auxiliary pump
10	Line pressure

Lubrication Hydraulic Circuits



Item	Description
1	Fluid from torque converter
2	Lube control valve
3	Lube fluid circuit
4	Elevated exhaust pressure
5	Thermal bypass valve without active warm up
6	Bypass valve with active warm up
7	Fluid cooler

A small amount of hot fluid from the torque converter is routed through a small orifice in the separator plate to the transmission fluid cooler or transmission fluid warmer/cooler. This fluid purges the cooler or warmer/cooler of air and keeps the cooler or warmer/cooler full of fluid when the vehicle is running.

On vehicles without active warm up, most of the hot fluid from the torque converter is routed to the thermal bypass valve. When TFT is below a specified temperature, the thermal bypass valve directs the fluid to the lube circuit.

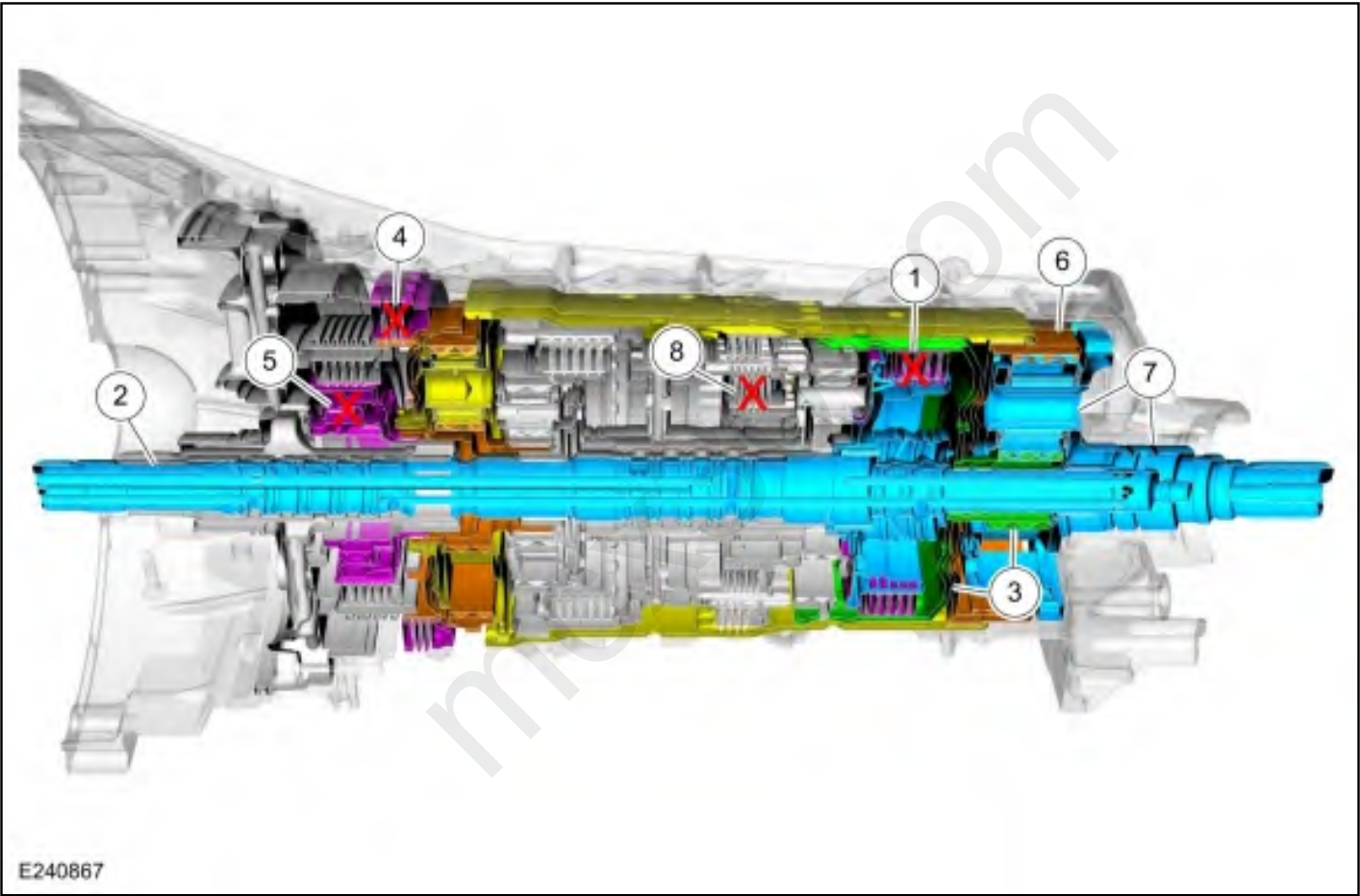
When TFT is above a specified temperature, the thermal bypass valve directs fluid to the transmission fluid cooler. Cold fluid from the transmission fluid cooler is routed to the lube circuit.

On vehicles with active warm up, most of the hot fluid from the torque converter is routed through the bypass valve to the transmission fluid warmer/cooler. Cold fluid from the transmission fluid cooler is routed to the lube circuit.

Fluid in the lube circuit enters the input shaft through the front support assembly and flows through passages in the input shaft and output shaft to provide lubrication for the transmission.

Powerflows

1st Gear

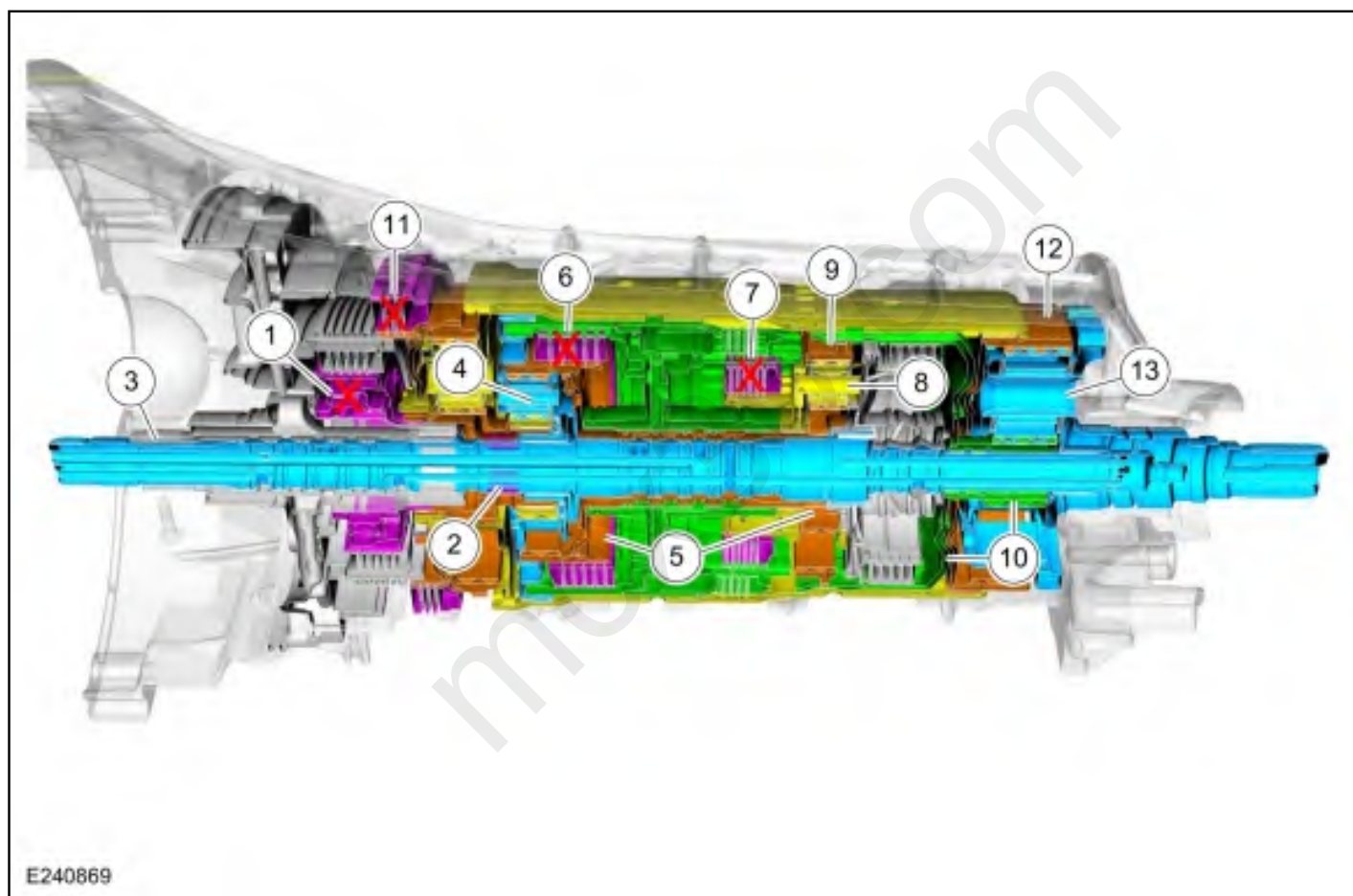


Item	Description
1	E clutch
2	Input shaft
3	Shell and sun gear No. 4
4	A clutch
5	One-Way Clutch (OWC)

6	Ring gear No. 4
7	Output shaft and planetary carrier No. 4
8	D clutch

The E clutch is applied allowing torque to be transferred from the input shaft to the shell and sun gear No. 4. The A clutch and the One-Way Clutch (OWC) are both applied to hold the ring gear No. 4 stationary on acceleration. The shell and sun gear No. 4 drives the pinions of the output shaft and planetary carrier No. 4 in a 4.69 reduction gear ratio. The D clutch is applied to reduce frictional losses from a released clutch, but does not contribute to powerflow.

2nd Gear

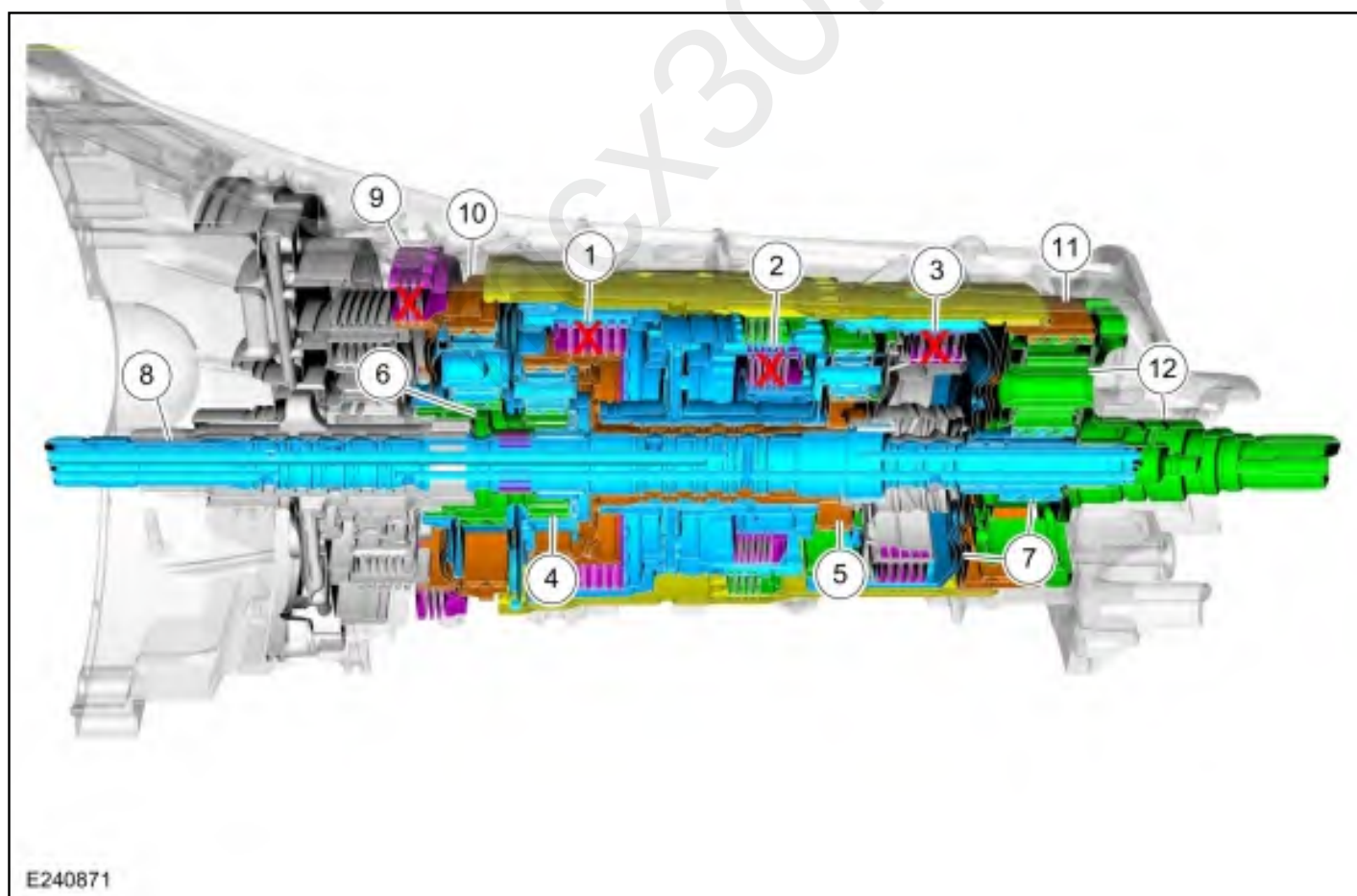


Item	Description
1	One-Way Clutch (OWC)
2	Sun gear No. 2
3	Input shaft
4	Planetary carrier No. 2
5	Ring gear No. 2 and sun gear No. 3

6	C clutch
7	D clutch
8	Planetary carrier No. 3
9	Ring gear No. 3
10	Shell and sun gear No. 4
11	A clutch
12	Ring gear No. 4
13	Output shaft and planetary carrier No. 4

The One-Way Clutch (OWC) holds the sun gear No. 2 stationary on acceleration. The input shaft turns the planetary carrier No. 2 and causes the ring gear No. 2 and sun gear No. 3 to rotate at a 0.63 overdrive ratio. The C clutch and the D clutch are applied allowing torque to be transferred from the ring gear No. 2 to the planetary carrier No. 3 at a 0.63 overdrive gear ratio. The 2 inputs to the 3rd planetary gear set cause the ring gear No. 3 and the planetary carrier No. to rotate at a 0.63 overdrive ratio. The A clutch and the One-Way Clutch (OWC) are both applied to hold the ring gear No. 4 stationary on acceleration. The shell and sun gear No. 4 drives the pinions of the output shaft and planetary carrier No. 4 in a 2.98 reduction gear ratio.

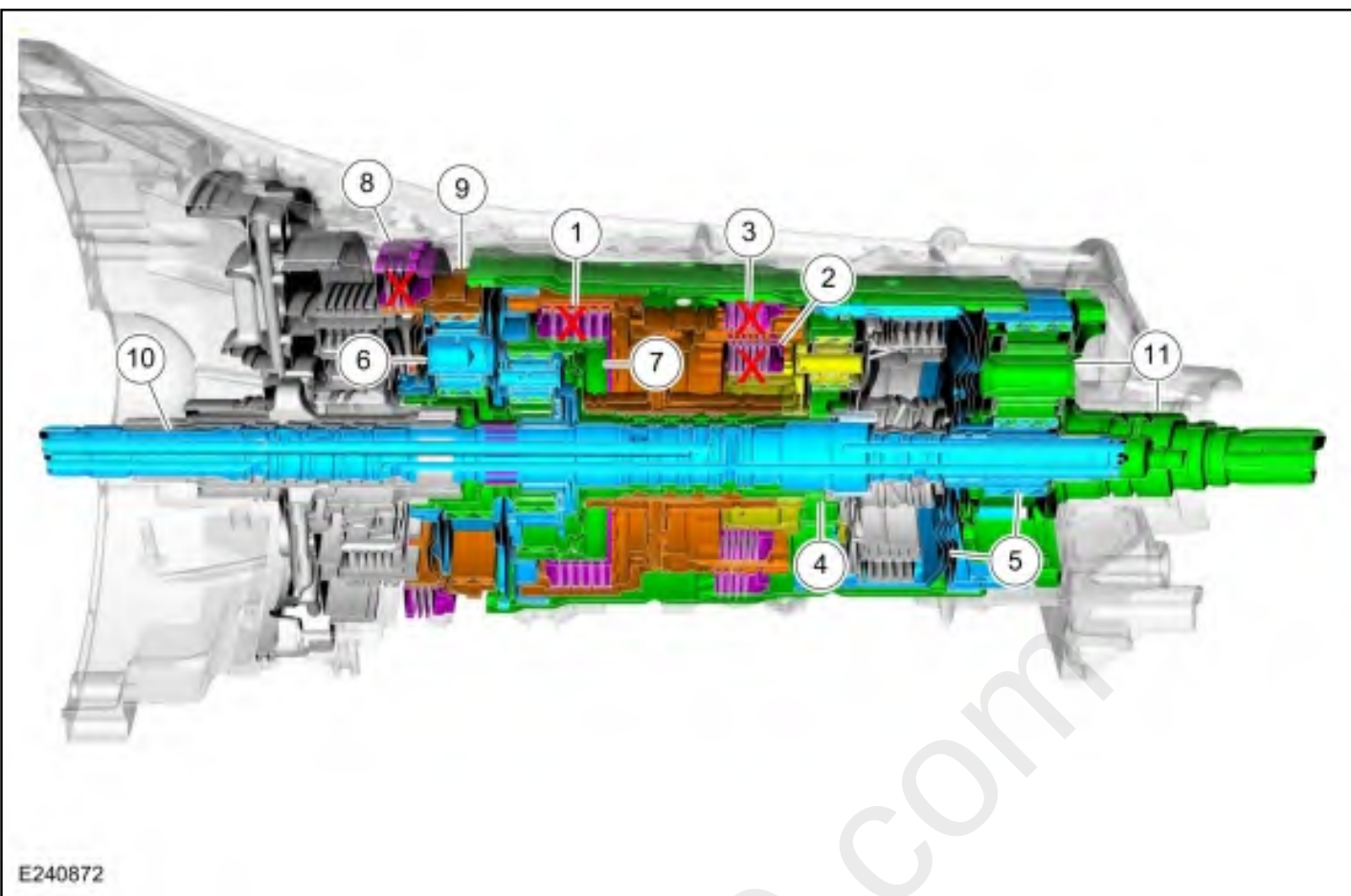
3rd Gear



Item	Description
1	C clutch
2	D clutch
3	E clutch
4	Planetary gear set No. 2
5	Planetary gear set No. 3
6	Sun gear No. 1
7	Shell and sun gear No. 4
8	Input shaft
9	A clutch
10	Ring gear No. 1
11	Ring gear No. 4
12	Output shaft and planetary carrier No. 4

The C clutch, D clutch, and the E clutch are applied to provide multiple inputs at the same speed to the 2nd and 3rd planetary gears sets. These inputs effectively lock the 2nd and 3rd planetary gears sets and cause sun gear No. 1 and the shell and sun gear No. 4 to rotate at a 1:1 ratio with the input shaft. The A clutch is holding the ring gear No. 1 stationary causing the planetary carrier No. 1 and the ring gear No. 4 to rotate at a 3.11 reduction ratio. The 2 inputs to the 4th planetary gear set cause the output shaft and planetary carrier No. 4 to rotate at a 2.15 ratio.

4th Gear

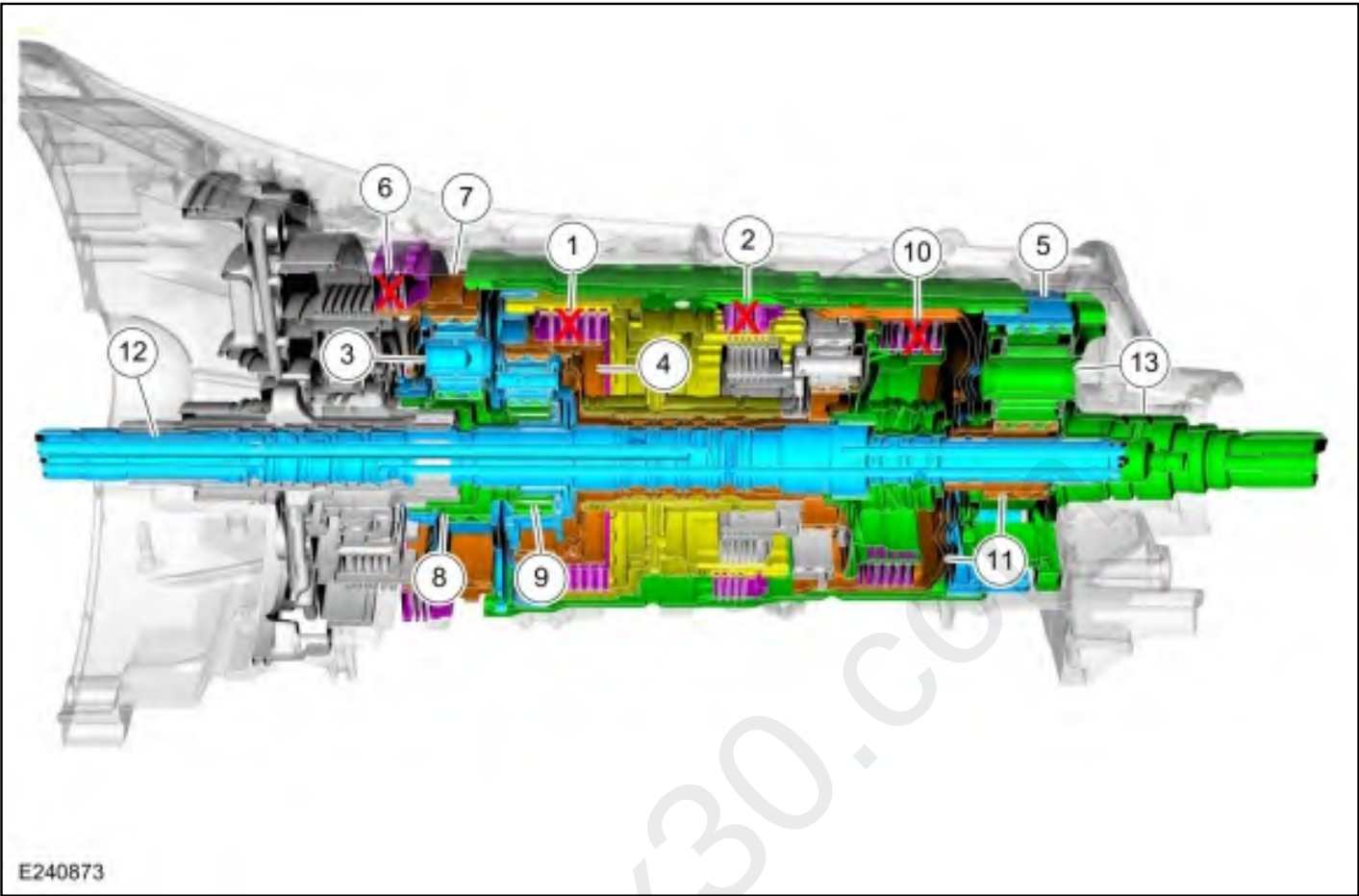


Item	Description
1	C clutch
2	D clutch
3	F clutch
4	Planetary gear set No. 3
5	Planetary gear set No. 4
6	Planetary carrier No. 1
7	Ring gear No. 2
8	A clutch
9	Ring gear No. 1
10	Input shaft
11	Output shaft and planetary carrier No. 4

The C clutch, D clutch, and F clutch are applied effectively locking the 3rd and 4th planetary gear sets, the planetary carrier No. 1, and the ring gear No. 2 together. The A clutch is holding the ring gear No. 1. The 2 inputs to the planetary gear set No. 1 cause the sun gear No. 1 and the sun gear No. 2 to rotate at a 0.56 overdrive ratio. The input shaft turns the planetary carrier No. 2 and causes the ring gear No. 2 and the 4th planetary gear set to

rotate at a 1.77 ratio.

5th Gear

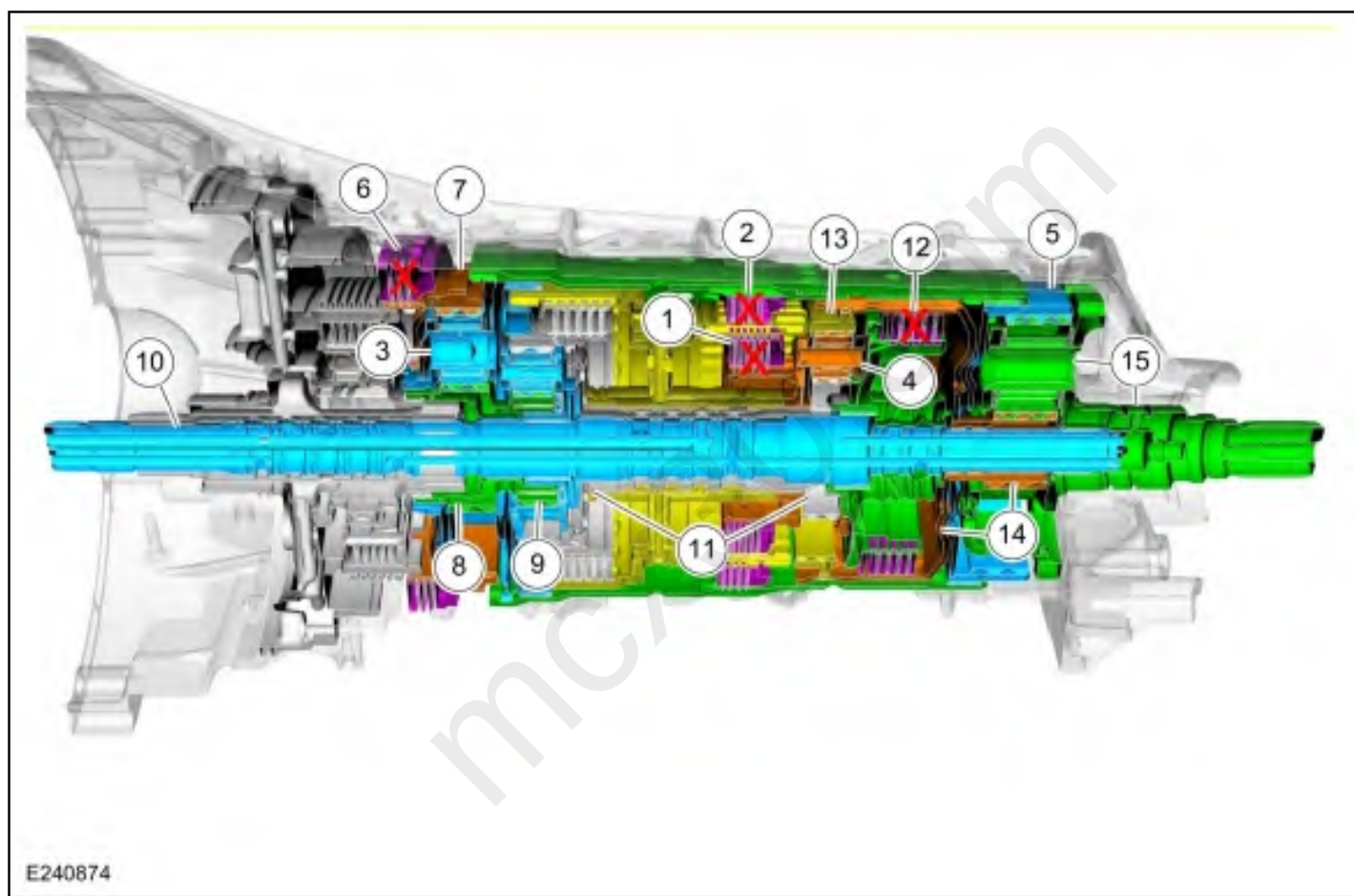


Item	Description
1	C clutch
2	F clutch
3	Planetary carrier No. 1
4	Ring gear No. 2
5	Ring gear No. 4
6	A clutch
7	Ring gear No. 1
8	Sun gear No. 1
9	Sun gear No. 2
10	E clutch
11	Shell and sun gear No. 4

12	Input shaft
13	Output shaft and planetary carrier No. 4

The C clutch and F clutch are applied effectively locking the planetary carrier No. 1, the ring gear No. 2, and ring gear No. 4 together at a 1.77 ratio. The A clutch is holding the ring gear No. 1. The 2 inputs to the planetary gear set No. 1 cause the sun gear No. 1 and the sun gear No. 2 to rotate at a 0.56 overdrive ratio. The E clutch is applied to transfer torque to the sun gear No. 4. The 2 inputs to the 4th planetary gear set cause the output shaft and planetary carrier No. 4 to rotate at a 1.52 ratio.

6th Gear

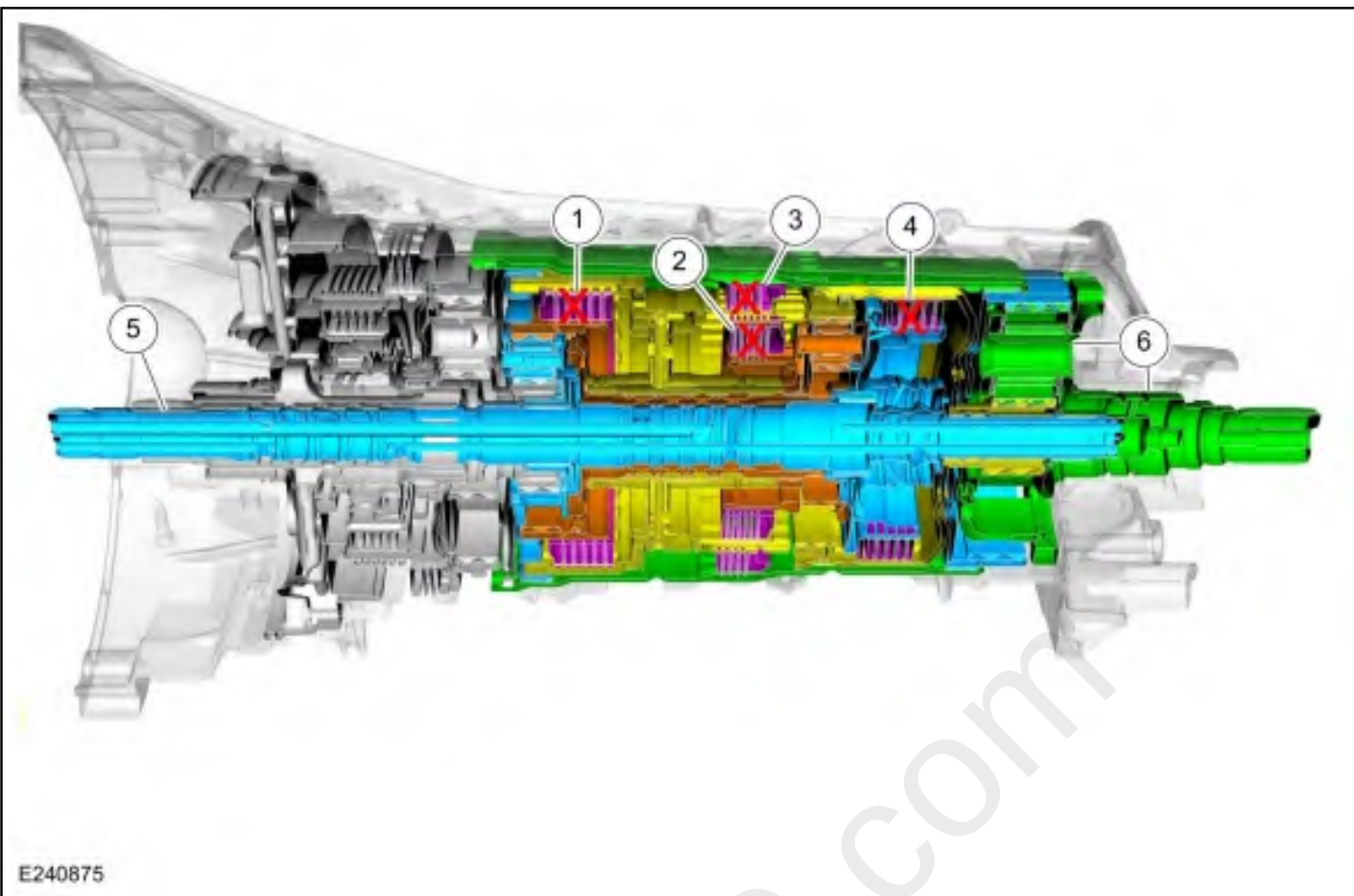


Item	Description
1	D clutch
2	F clutch
3	Planetary carrier No. 1
4	Planetary carrier No. 3
5	Ring gear No. 4
6	A clutch

7	Ring gear No. 1
8	Sun gear No. 1
9	Sun gear No. 2
10	Input shaft
11	Ring gear No. 2 and sun gear No. 3
12	E clutch
13	Ring gear No. 3
14	Shell and sun gear No. 4
15	Output shaft and planetary carrier No. 4

The D clutch and F clutch are applied effectively locking the planetary carrier No. 1, the planetary carrier No. 3, and the ring gear No. 4 together. The A clutch is holding the ring gear No. 1. The 2 inputs to the planetary gear set No. 1 cause the sun gear No. 1 and the sun gear No. 2 to rotate at a 0.44 overdrive ratio. The input shaft turns the planetary carrier No. 2 and causes the ring gear No. 2 and sun gear No. 3 to rotate at a 3.58 ratio. The E clutch is applied to transfer torque from the input shaft to the ring gear No. 3 and the shell and sun gear No. 4. The 2 inputs to the 3rd planetary gear set cause the planetary carrier No. 3 and ring gear No. 4 to rotate at a 1.38 ratio. The 2 inputs to the 4th planetary gear set cause the output shaft and planetary carrier No. 4 to rotate at a 1.28 ratio.

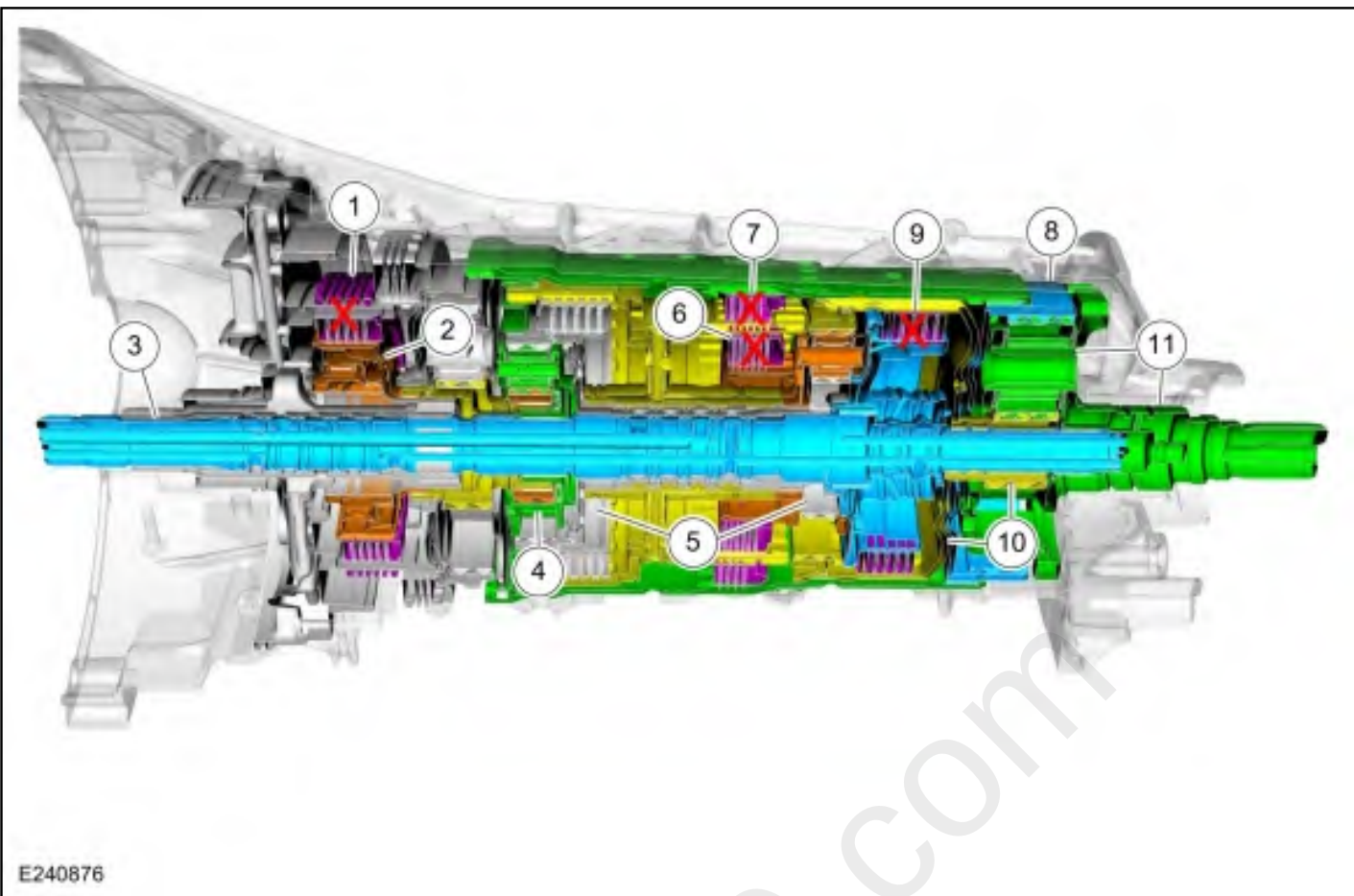
7th Gear



Item	Description
1	C clutch
2	D clutch
3	F clutch
4	E clutch
5	Input shaft
6	Output shaft and planetary carrier No. 4

The C clutch, D clutch, F clutch and the E clutch are applied to provide multiple inputs at the same speed to all four planetary gears sets. These inputs effectively lock all four planetary gears sets causing the output shaft and planetary carrier No. 4 to rotate at a 1:1 ratio with the input shaft.

8th Gear

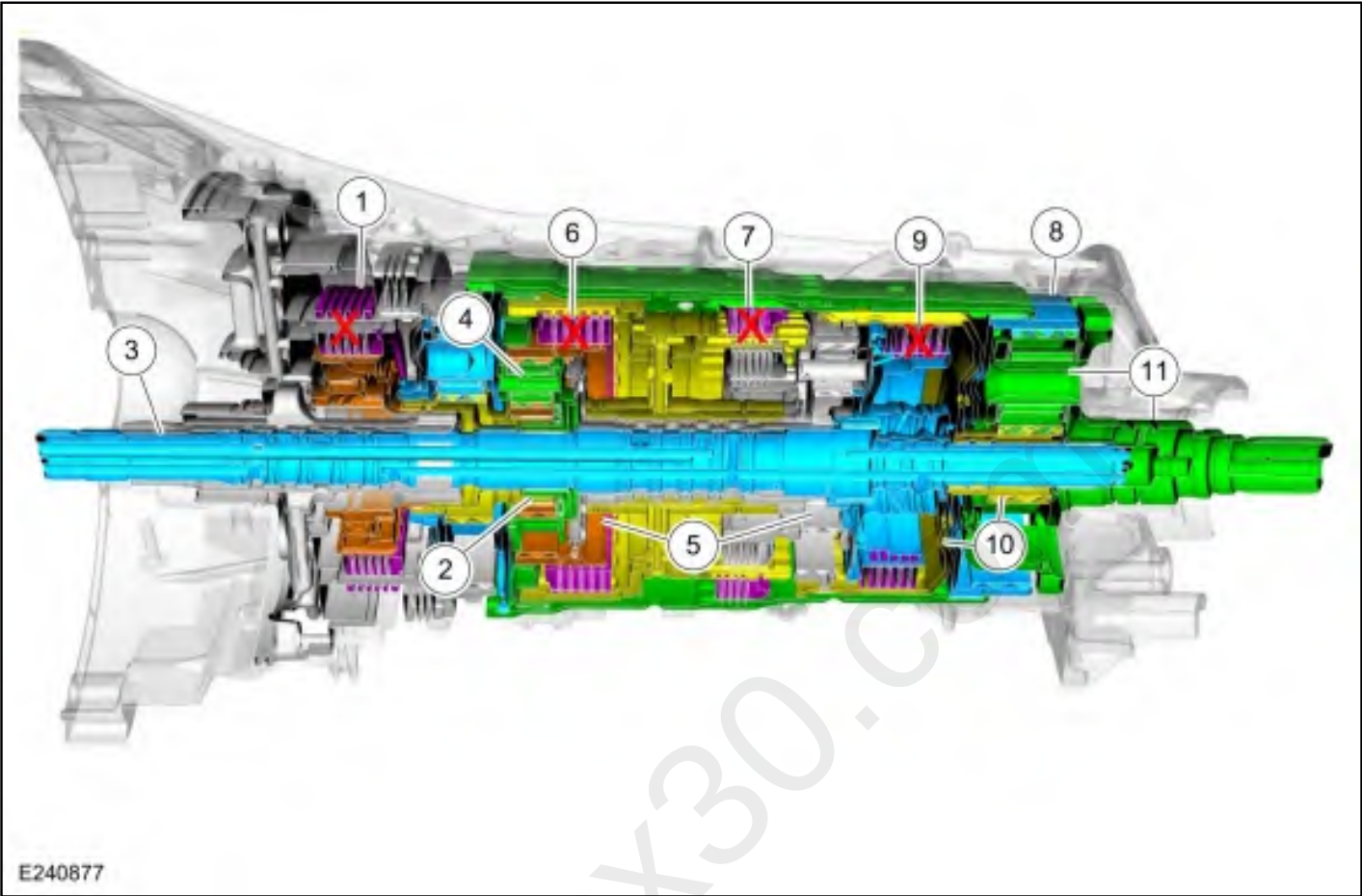


Item	Description
1	A clutch
2	One-Way Clutch (OWC)
3	Input shaft
4	Sun gear No. 2
5	Ring gear No. 2 and sun gear No. 3
6	D clutch
7	F clutch
8	Ring gear No. 4
9	E clutch
10	Shell and sun gear No. 4
11	Output shaft and planetary carrier No. 4

The B clutch is holding the sun gear No. 2 stationary. The input shaft turns the planetary carrier No. 2 and causes the ring gear No. 2 and sun gear No. 3 to rotate at a 0.63 overdrive ratio. The D clutch and F clutch are applied allowing torque to be transferred from the planetary No. 3 to the ring gear No. 4 at a 0.82 overdrive gear ratio. The E clutch is applied allowing torque to be transferred from the input shaft to the shell and sun gear No. 4 at a 1:1

ratio. The 2 inputs to the 4th planetary gear set cause the output shaft and planetary carrier No. 4 to rotate at a 0.85 ratio.

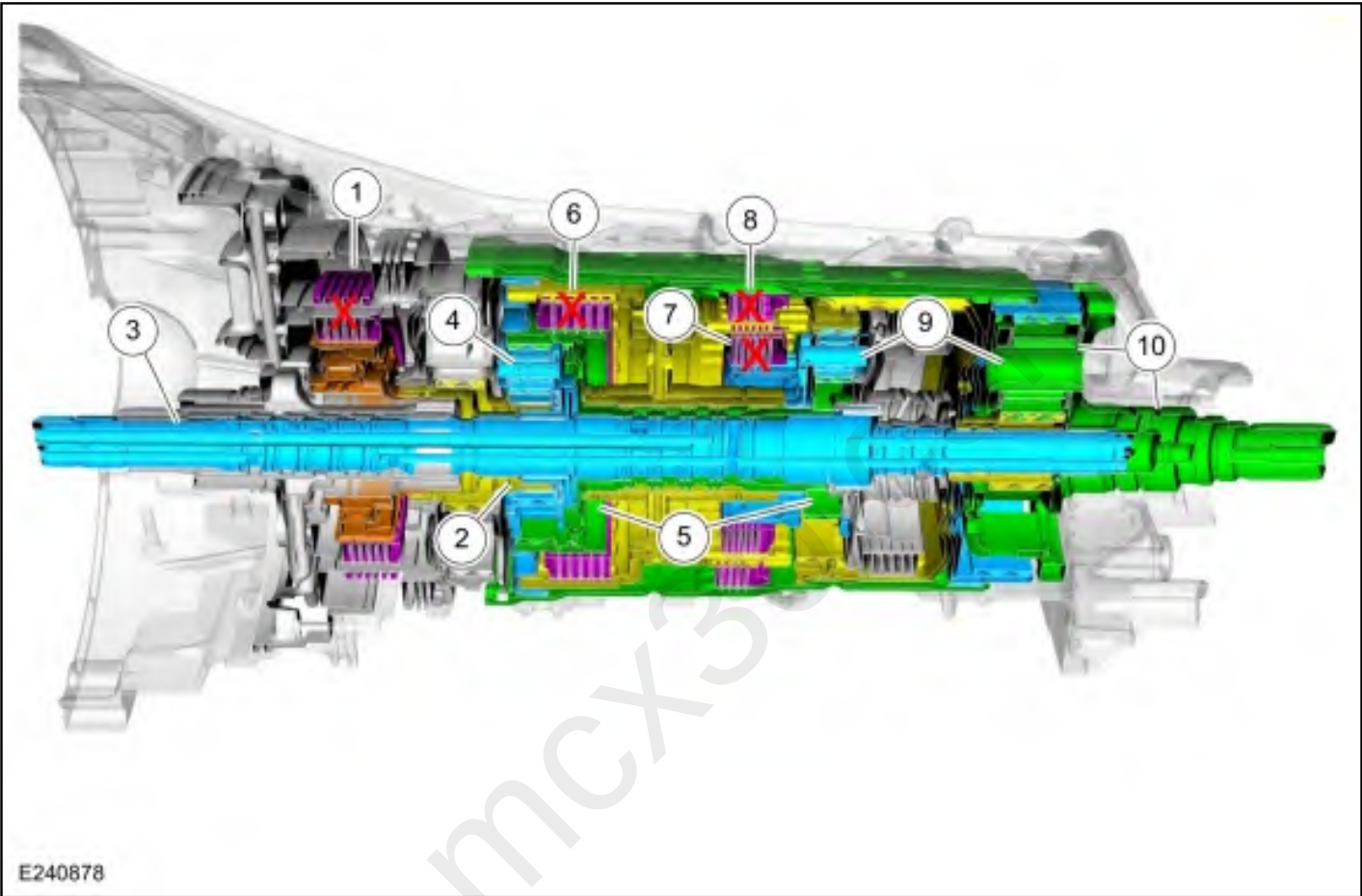
9th Gear



Item	Description
1	B clutch
2	Sun gear No. 2
3	Input shaft
4	Planetary carrier No. 2
5	Ring gear No. 2 and sun gear No. 3
6	C clutch
7	F clutch
8	Ring gear No. 4
9	E clutch
10	Shell and sun gear No. 4
11	Output shaft and planetary carrier No. 4

The B clutch is holding the sun gear No. 2 stationary. The input shaft turns the planetary carrier No. 2 and causes the ring gear No. 2 to rotate. The C clutch and F clutch are applied allowing torque to be transferred from the ring gear No. 2 to the ring gear No. 4 at a 0.63 overdrive gear ratio. The E clutch is applied allowing torque to be transferred from the input shaft to the shell and sun gear No. 4 at 1:1 ratio. The 2 inputs to the 4th planetary gear set cause the output shaft and planetary carrier No. 4 to rotate at a 0.69 ratio.

10th Gear

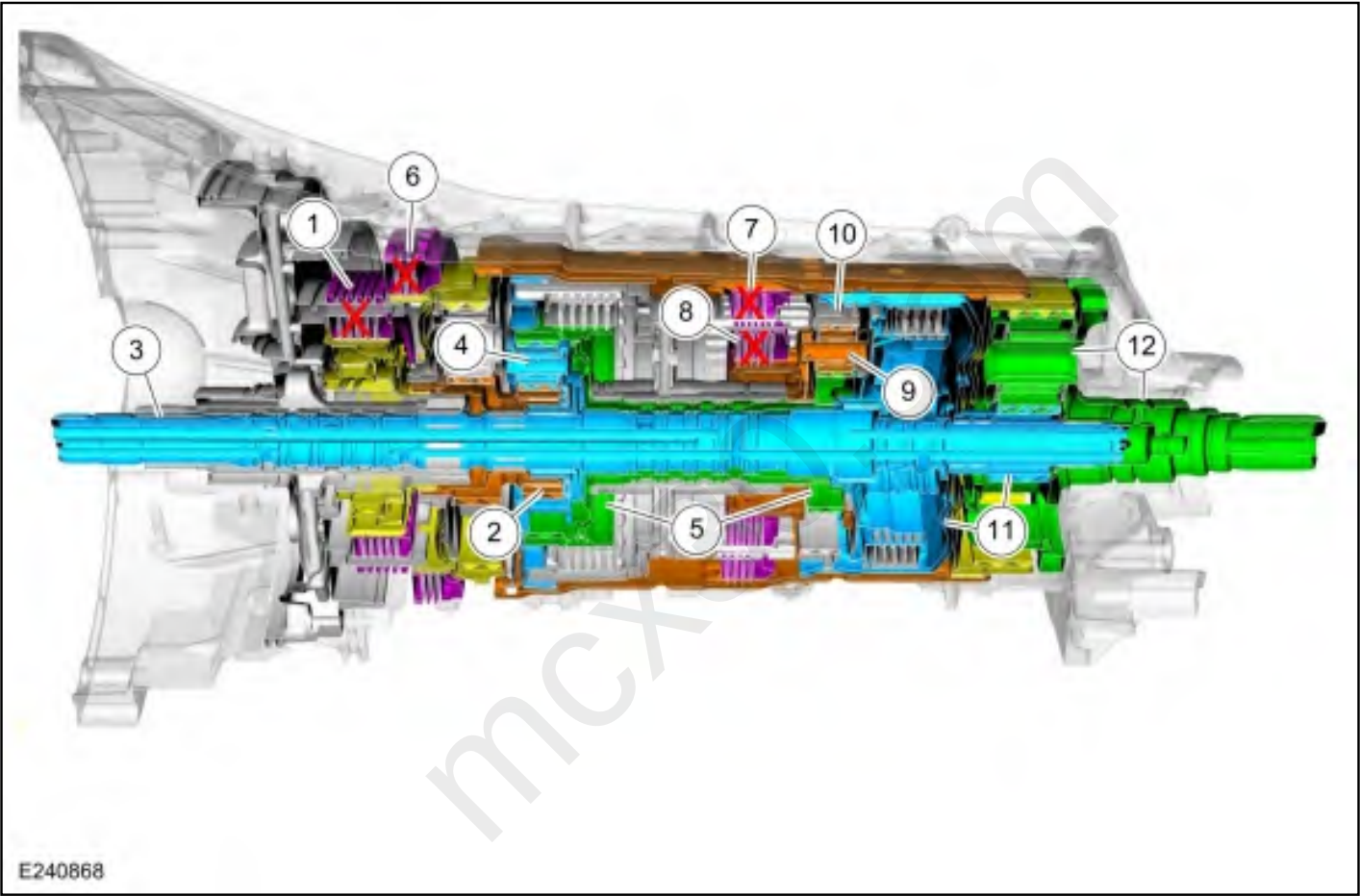


Item	Description
1	B clutch
2	Sun gear No. 2
3	Input shaft
4	Planetary carrier No. 2
5	Ring gear No. 2 and sun gear No. 3
6	C clutch
7	D clutch
8	F clutch

9	Planetary gear set No. 3 and planetary gear set No. 4
10	Output shaft and planetary carrier No. 4

The B clutch is holding the sun gear No. 2 stationary. The input shaft turns the planetary carrier No. 2 and causes the ring gear No. 2 and sun gear No. 3 to rotate. The C clutch, D clutch, and the F clutch are applied to provide torque input from the ring gear No. 2 at an overdrive ratio of 0.56. This torque input effectively locks the 3rd and 4th planetary gears sets causing the output shaft and planetary carrier No. 4 to rotate at a 0.64 ratio.

Reverse



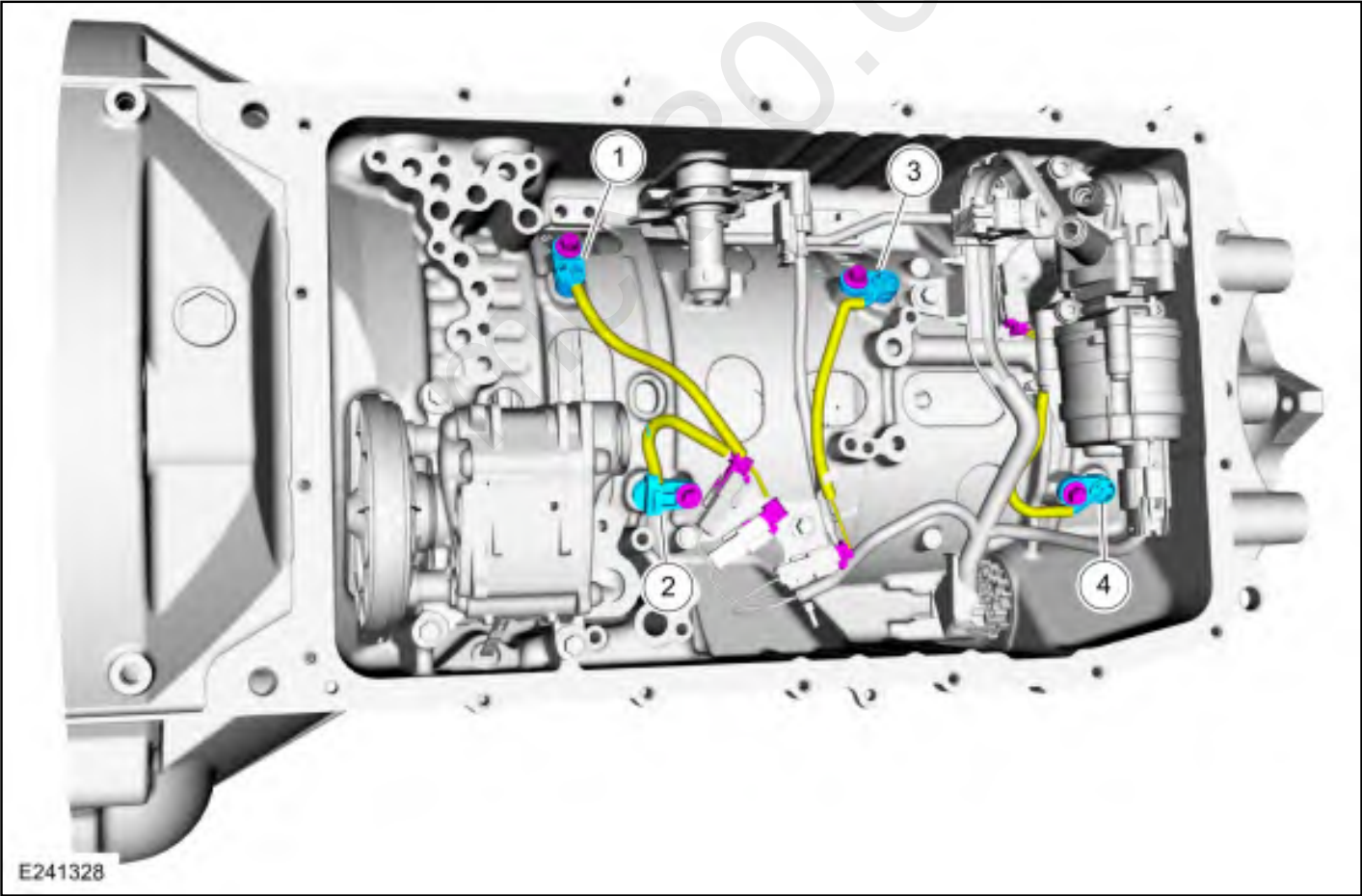
Item	Description
1	B clutch
2	Sun gear No. 2
3	Input shaft
4	Planetary carrier No. 2
5	Ring gear No. 2 and sun gear No. 3
6	A clutch

7	F clutch
8	D clutch
9	Planetary carrier No. 3
10	Ring gear No. 3
11	Shell and sun gear No. 4
12	Output shaft and planetary carrier No. 4

The B clutch is applied to hold the sun gear No. 2 stationary. The input shaft turns the planetary carrier No. 2 and causes the ring gear No. 2 and the sun gear No. 3 to rotate at a 0.63 overdrive ratio. The A clutch, F clutch, and the D clutches are applied to hold the planetary carrier No. 3 stationary. The 2 inputs to the 3rd planetary gearset cause the ring gear No. 3 and the planetary carrier No. 4 to rotate at a 1.03 ratio in the reverse direction. The A clutch and F clutch are applied to hold the ring gear No. 4 stationary. The 2 inputs to the 4th planetary gearset cause the output shaft and planetary carrier No. 4 to rotate at a 4.85 reduction ratio in the reverse direction.

Component Description

Transmission Sensors



Item	Description

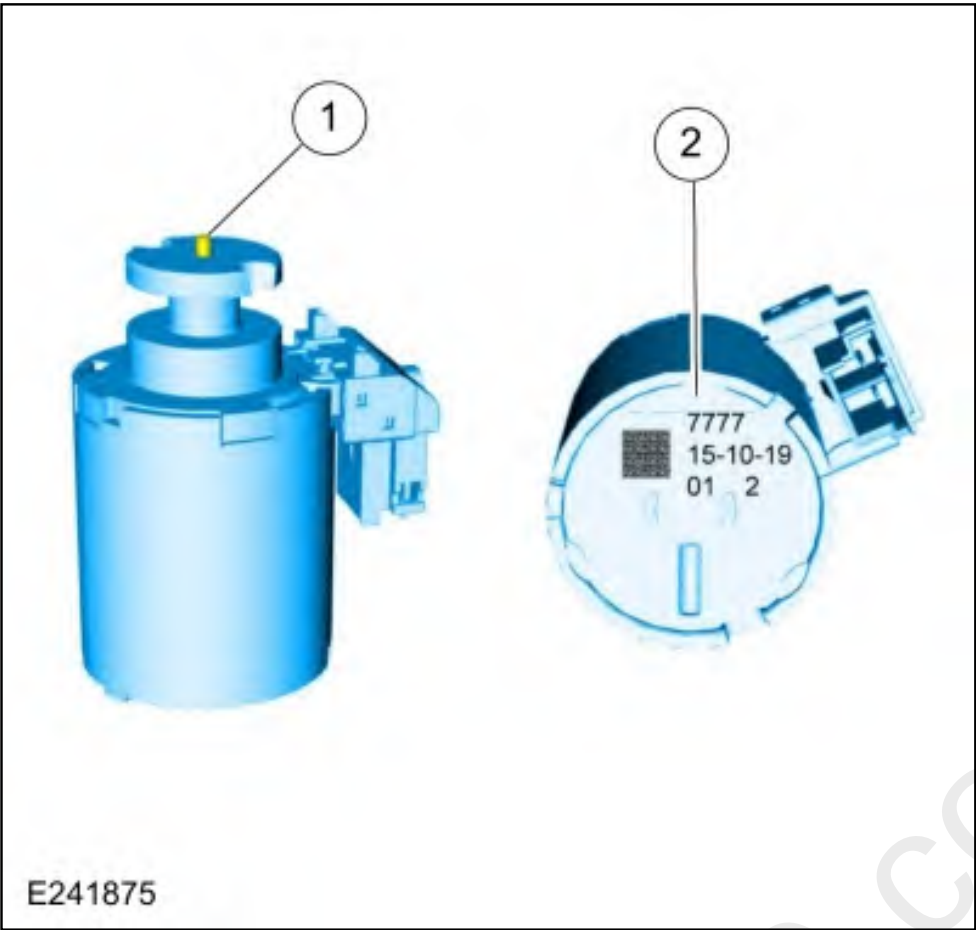
1	Intermediate speed sensor A
2	TSS sensor
3	Intermediate speed sensor B
4	OSS sensor

The PCM or the TCM with a 3.5L EcoBoost engine controls the electronic functions of this transmission. The PCM or TCM receives input signals from engine and transmission sensors and uses these inputs to control line pressure, shift time, TCC and shift solenoids.

Item	Description
TFT Sensor	The TFT sensor is located in the transmission main control valve body. It is a temperature-sensitive device called a thermistor. The resistance value of the TFT sensor will vary with temperature change. The PCM or the TCM with a 3.5L EcoBoost engine monitors the voltage across the TFT sensor to determine the temperature of the transmission fluid. The PCM or TCM uses this initial signal to determine whether a cold start shift schedule is necessary. The cold start shift schedule allows delayed shifts when the transmission fluid is cold to help warm the transmission fluid. The PCM or TCM also inhibits TCC operation at low transmission fluid temperatures and adjusts line pressure for temperature.
TR Sensor	The TR sensor is composed of a dual set of TR sensors. The manual shifter engages and disengages Park and the shifter position is detected by reading TR sensors A and B. There is no manual valve, the PCM or the TCM with a 3.5L EcoBoost engine provides forward or reverse based on the dual TR sensor inputs. The 10R80 transmission uses a dual PWM output (at 125 Hz) TR sensors where: TR sensor A increases as the shifter is moved from Park to Sport and TR sensor B decreases as the shifter is moved from Park to Sport, together the sum of the two signals should add up to 100%. The 10R80 transmission mechanical shifter variant is range by wire with mechanical Park. The dual TR sensor's signals are used to determine customer selected range (P, R, N, D, S). PIDs, TR_A_DC and TR_B_DC may be utilized to monitor the TR sensor duty cycles.
TSS Sensor	The TSS sensor is a 2-Wire Hall-effect type sensor that provides a TSS signal to the PCM or the TCM with 3.5L EcoBoost engines that changes in frequency as the magnetic trigger wheel part of the planetary carrier No. 2 varies in speed or direction. The TSS information is compared to engine rpm to determine TSS performance. TSS is also compared to OSS to determine shift quality and clutch performance. The TSS sensor is mounted to the transmission case.

OSS Sensor	The OSS sensor is a 2-Wire Hall-effect type sensor that provides a OSS signal to the PCM or the TCM with 3.5L EcoBoost engines that changes in frequency as the trigger wheel part of the output shaft and planetary carrier No. 4 varies in speed or direction. The OSS is used for shift scheduling. OSS is also compared to TSS to determine shift quality and clutch performance. The OSS sensor is mounted to the transmission case.
Intermediate Speed Sensor A	The intermediate speed sensor A (ISSA), is a 2-Wire Hall-effect type sensor that provides a intermediate speed sensor A (ISSA) signal to the PCM or the TCM with 3.5L EcoBoost engines that changes in frequency as the trigger wheel part of the No. 1 ring gear varies in speed or direction. The intermediate speed sensor A (ISSA) is used to monitor clutch states for transmission fault detection and diagnostics. The intermediate speed sensor A (ISSA) is mounted to the transmission case.
Intermediate Speed Sensor B	The intermediate speed sensor B (ISSB), is a 2-Wire Hall-effect type sensor that provides a intermediate speed sensor B (ISSB) signal to the PCM or the TCM with 3.5L EcoBoost engines that changes in frequency as the trigger wheel part of the clutch and planetary container cylinder varies in speed or direction. The intermediate speed sensor B (ISSB) is used to monitor clutch states for transmission fault detection and diagnostics. The intermediate speed sensor B (ISSB) is mounted to the transmission case.

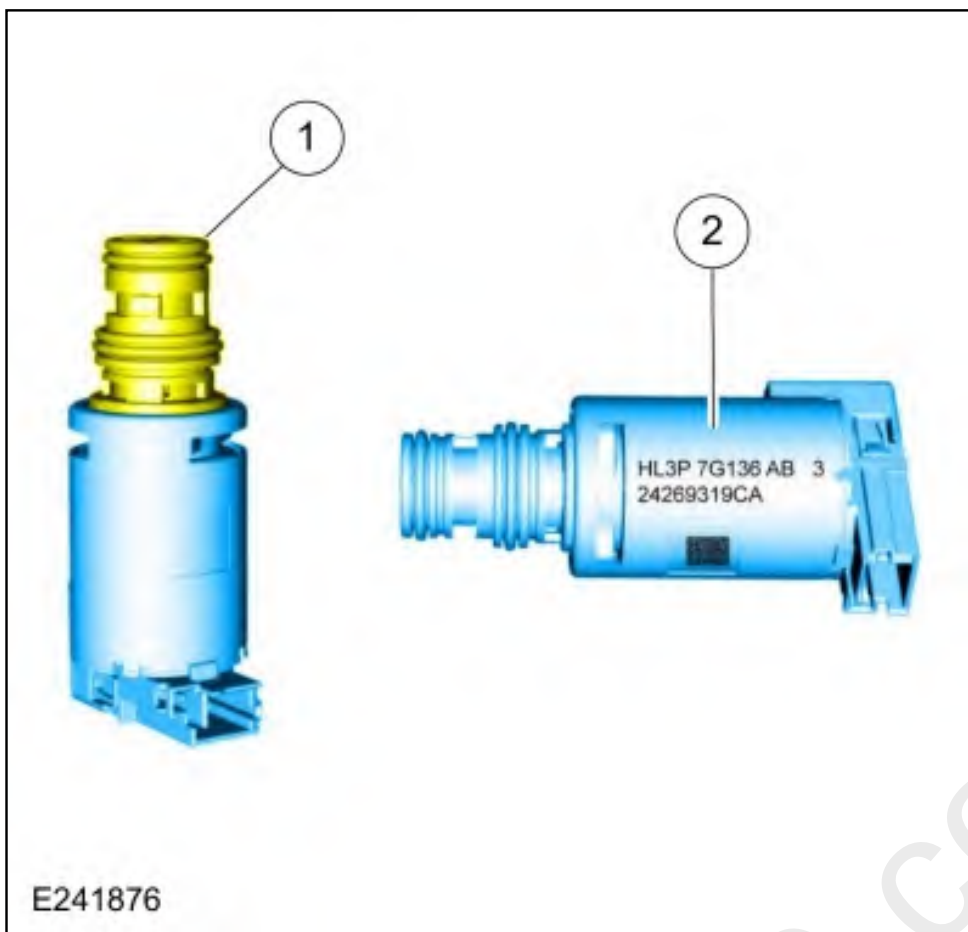
Shift Solenoids



Item	Description
1	Armature/pin assembly
2	Part information

The 10R80 utilizes six shift (A-F) solenoids that are linear force solenoids. Unlike previous shift solenoids they are mechanical in nature in that no transmission fluid passes through them. CIDASs use a armature/pin assembly that moves a control valve in the main control valve body to control and apply hydraulic fluid pressure. Each clutch (A-F) has a corresponding shift solenoid (A-F) that is directly proportional in that zero current equals zero pressure and maximum current equals maximum pressure. Since there is no pressure with zero current if the power is interrupted to the shift solenoids none of the clutch packs are able to engage.

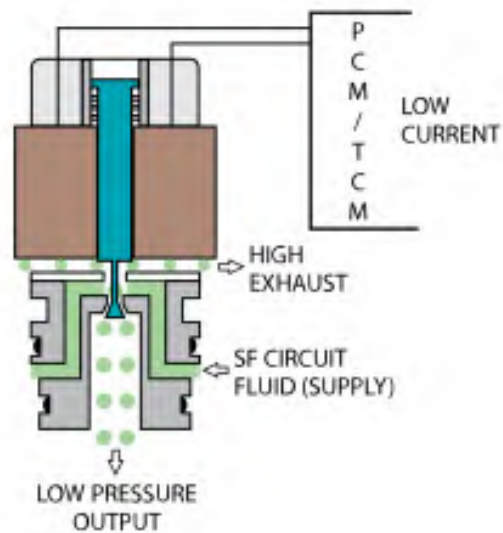
Torque Converter Clutch (TCC) Proportional (VFS)



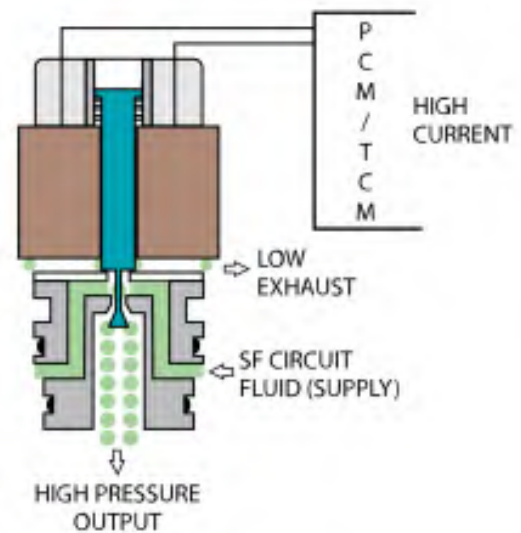
Item	Description
1	Solenoid nozzle
2	Part information

The TCC solenoid is a variable force solenoid that varies hydraulic pressure by actuating a hydraulic valve. The TCC solenoid uses proportional operation. As the current from the PCM or the TCM with a 3.5L EcoBoost engine decreases, the pressure from the solenoid decreases. As the current from the PCM or the TCM increases, the pressure from the solenoid increases.

Normally Low Solenoid

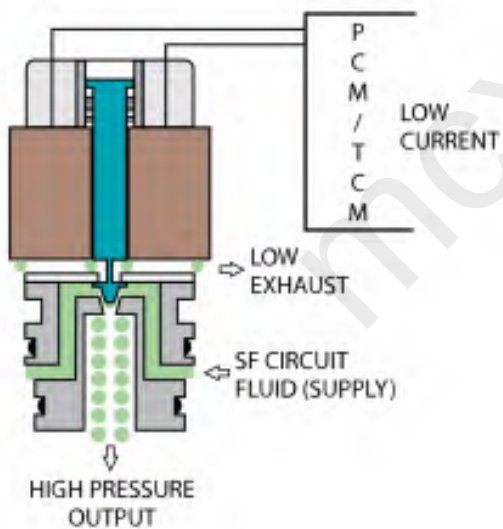


E215789

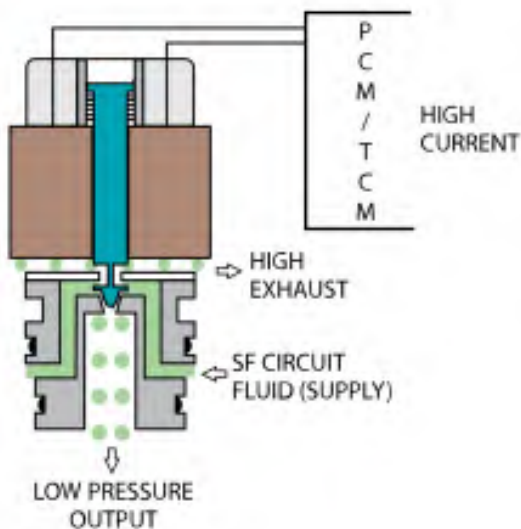


Line Pressure Control (LPC) Solenoid (Inversely-Proportional (VFS))

Normally High Solenoid



E215790



Normally high solenoids provide pressure inversely-proportional to supplied current. Normally high solenoids provide full output of pressure with low or no current (50 mA) and very low pressure with high current (850 mA). The LPC solenoid is a normally high solenoid so if power is lost to the solenoid the pressure is at full output.

Transmission External Sealing

The front support cover and seal assembly has a bonded rubber seal around the outside that seals to the front support housing. A removable rubber seal on the inside of the front support cover seals the area around the front support cover bolt. A torque converter hub seal is held into the front support cover with a snap ring and is serviced as an assembly.

The front support assembly uses a large rubber seal that seals the support housing to the transmission case.

The transmission fluid cooler tubes use 2 rubber seals with plastic backing rings to seal the tubes to the transmission case.

On the left side of the transmission case, there is a line pressure tap plug.

The manual control shaft has a lip seal that is pressed in the transmission case.

The transmission fluid pan has a reusable gasket.

The output shaft uses a lip-type seal that seals to the transmission case and output shaft nut. The output shaft nut has a bonded rubber O-ring on the inside that seals to the shaft threads.

The large transmission case housing plug provides access to the park pawl shaft and has an O-ring seal.

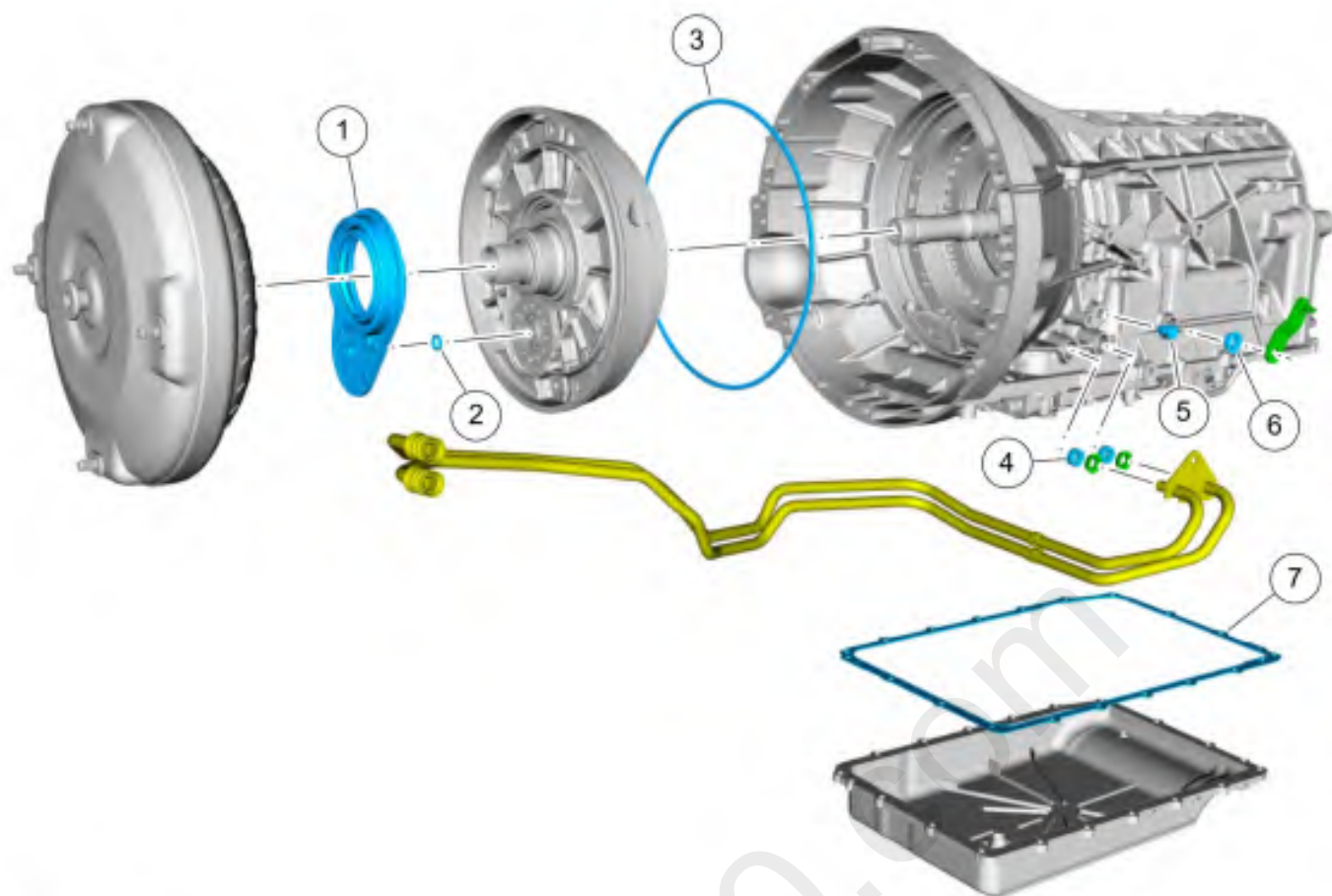
The park pawl actuator sleeve has 2 O-ring seals that seal to the transmission case.

A plug seals the E clutch fluid passage in the rear of the transmission case.

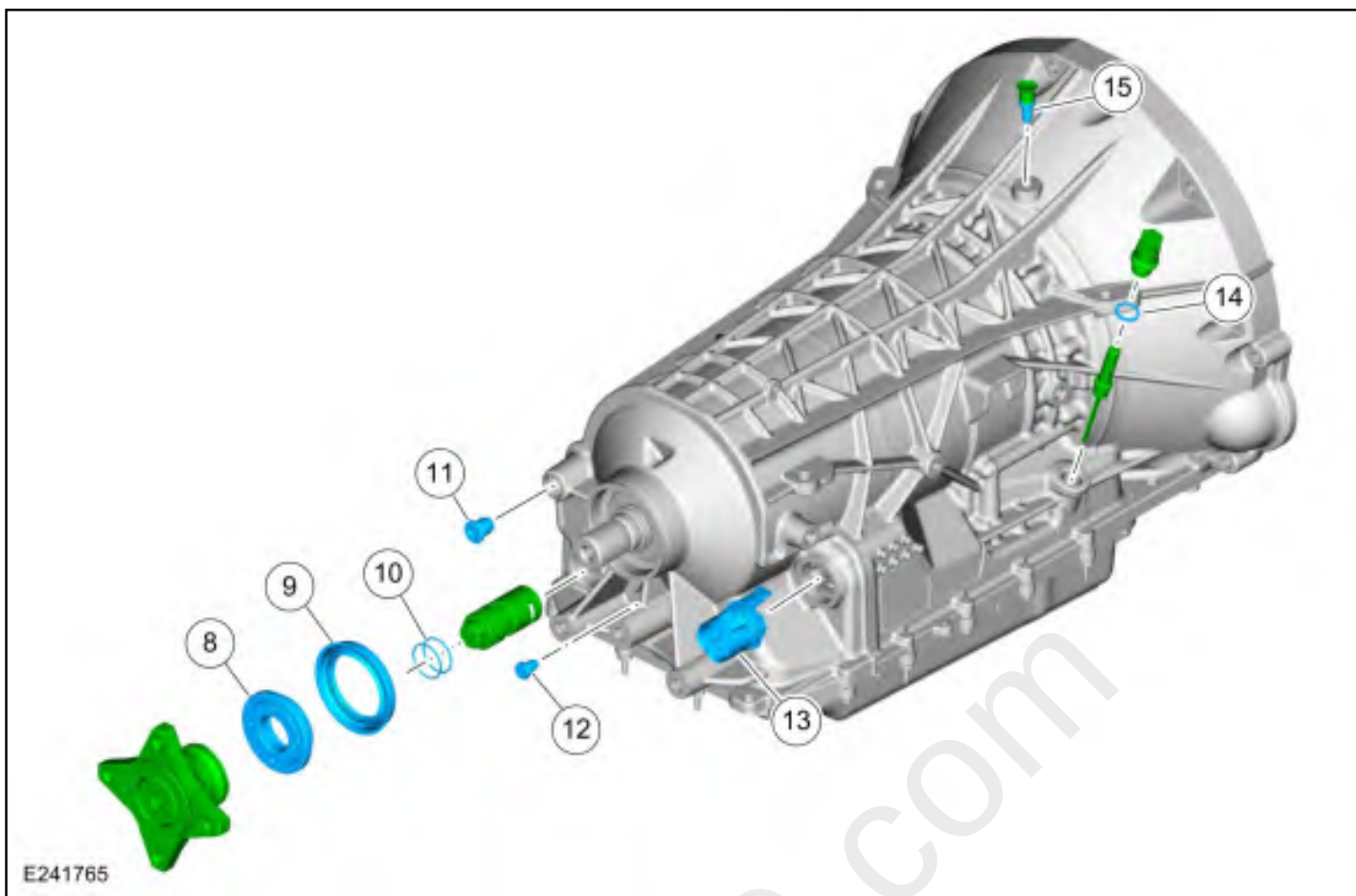
The internal wiring harness bulkhead connector has 2 O-ring seals for the transmission case bore.

The transmission fluid level indicator plug uses an O-ring seal.

The transmission vent tube is pressed into the transmission case.



E241764



Item	Description
1	Front support cover and seal assembly
2	Seal part of front support cover and seal assembly
3	Front support-to-case seal
4	Transmission fluid cooler tube seals (2 required)
5	Line pressure tap plug
6	Manual control shaft seal
7	Transmission fluid pan gasket
8	Output shaft nut
9	Output shaft seal
10	Park pawl actuator rod sleeve seals (2 required)
11	Park pawl shaft plug
12	Transmission case plug
13	Internal wiring harness bulkhead connector O-rings
14	Transmission fluid level indicator plug O-ring

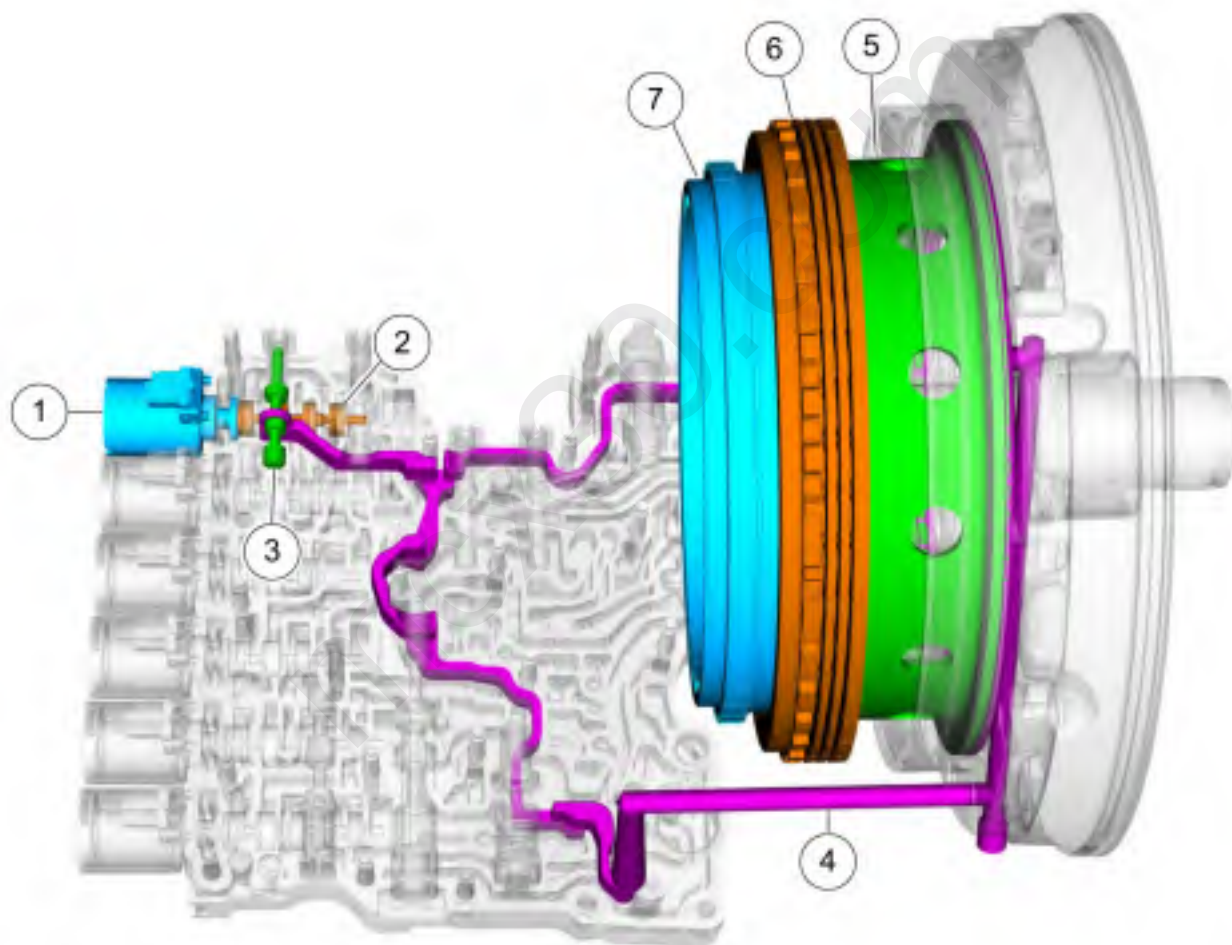
15	Transmission vent tube

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A Clutch

Overview



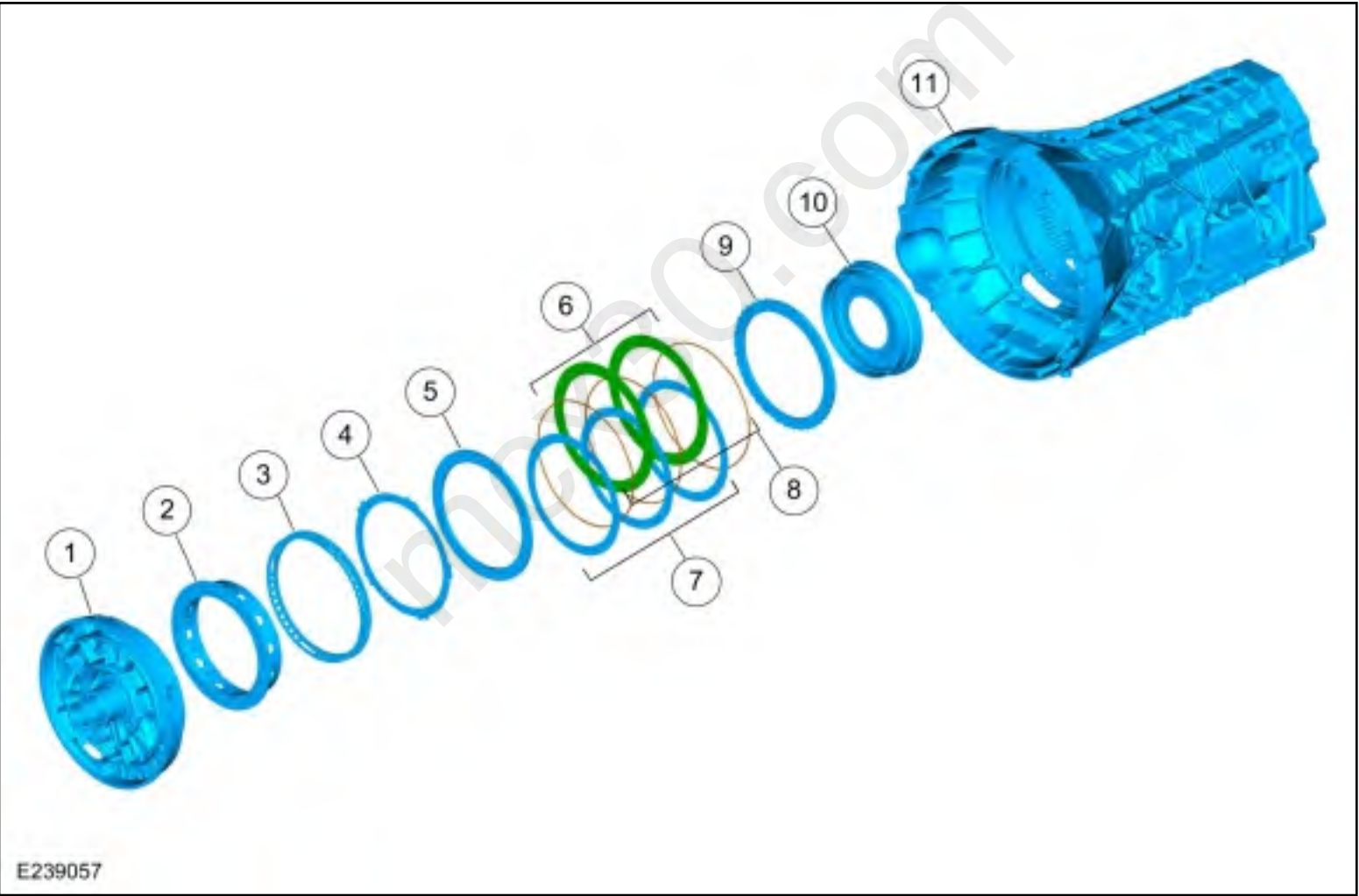
E240067

Item	Description
1	SSA
2	A clutch control valve

3	A clutch latch valve
4	A clutch apply circuit
5	A clutch piston
6	A clutch assembly
7	Ring gear No. 1

Ring gear No. 1 is connected to the A clutch. When the A clutch applies, it holds the ring gear No. 1 stationary.

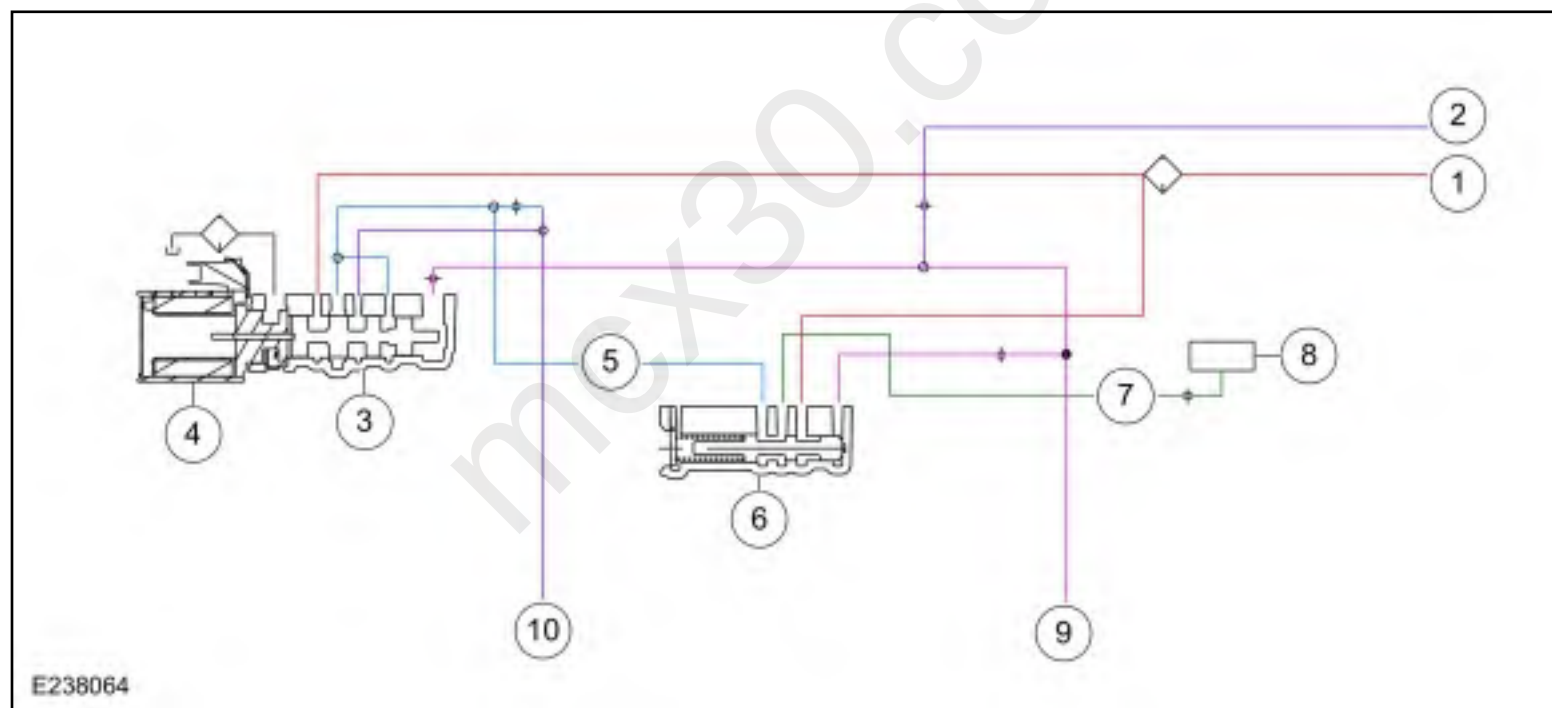
A Clutch Exploded View



Item	Description
1	Front support assembly

2	A clutch piston
3	A clutch piston return spring
4	A clutch wave spring
5	A clutch apply plate
6	A clutch steel plates
7	A clutch friction plates
8	A clutch separating springs
9	A clutch pressure plate
10	Ring gear No. 1
11	Transmission case

A Clutch Hydraulic Circuits



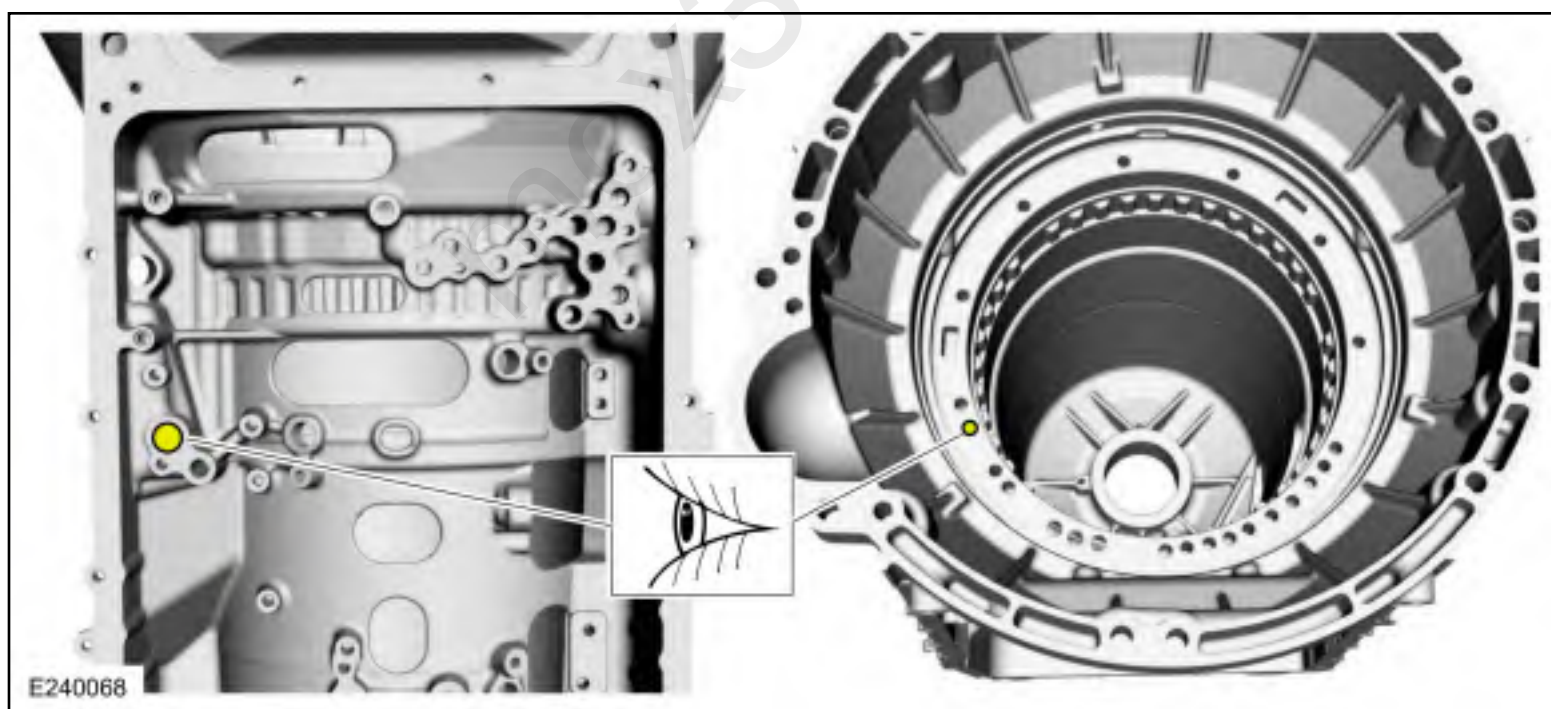
Item	Description
1	Line pressure
2	Pump output
3	A clutch control valve

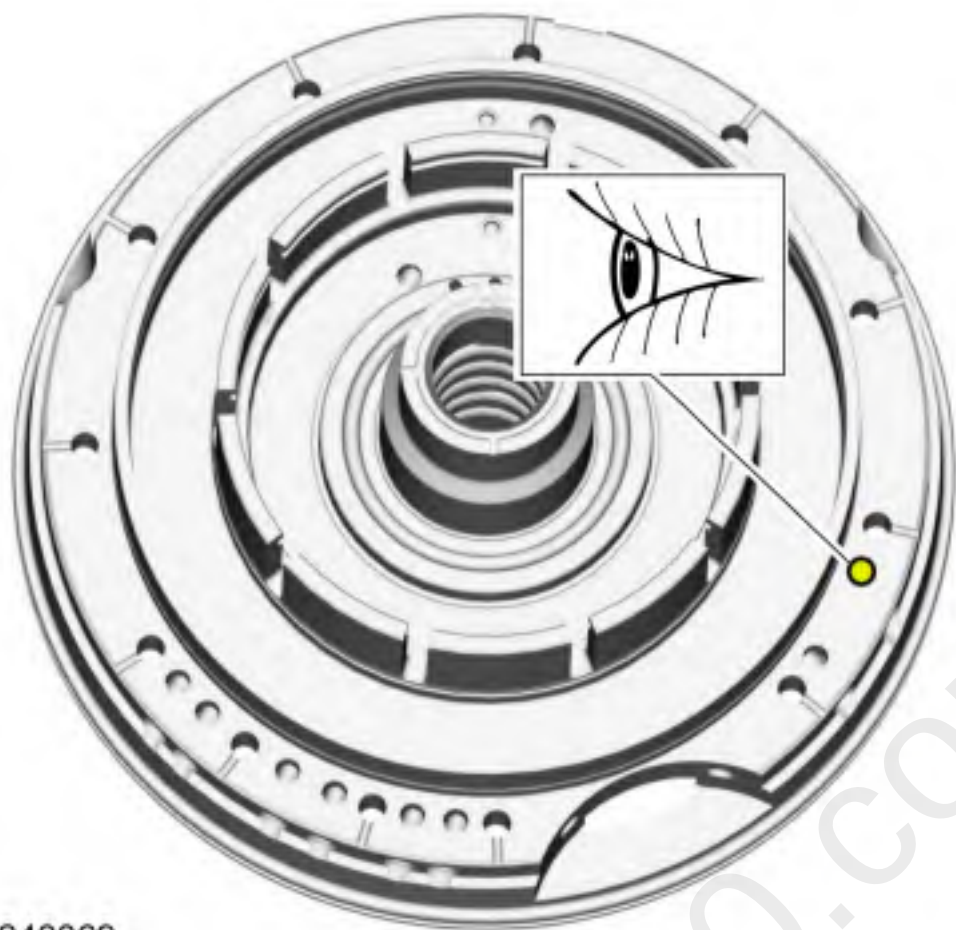
4	SSA
5	Control pressure to latch valve
6	A clutch latch valve
7	Apply pressure to mechanical A clutch
8	Mechanical A clutch
9	Elevated exhaust pressure
10	Clutch exhaust

A Clutch Hydraulic Operation

Line pressure is supplied to the A clutch control valve and the A clutch latch valve. As SSA turns on, it moves the control valve allowing regulated line pressure to flow to the A clutch latch valve and then to the mechanical A clutch. When the regulated line pressure in the A clutch control circuit reaches approximately 100 psi, the mechanical A clutch is fully applied. The pressure in the A clutch control circuit moves the A clutch latch valve to the left which allows line pressure to hold the mechanical A clutch applied.

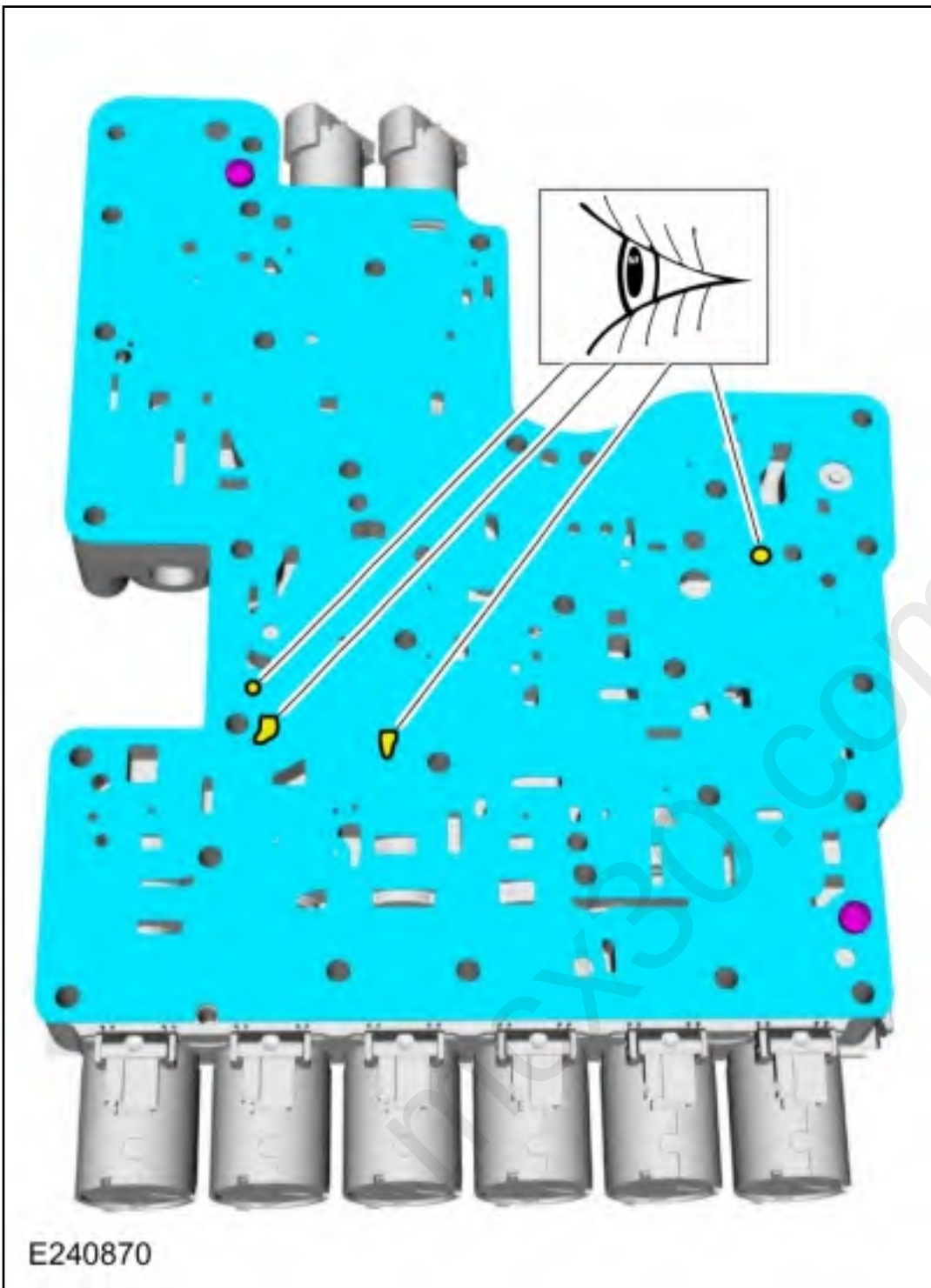
A Clutch Hydraulic Passages





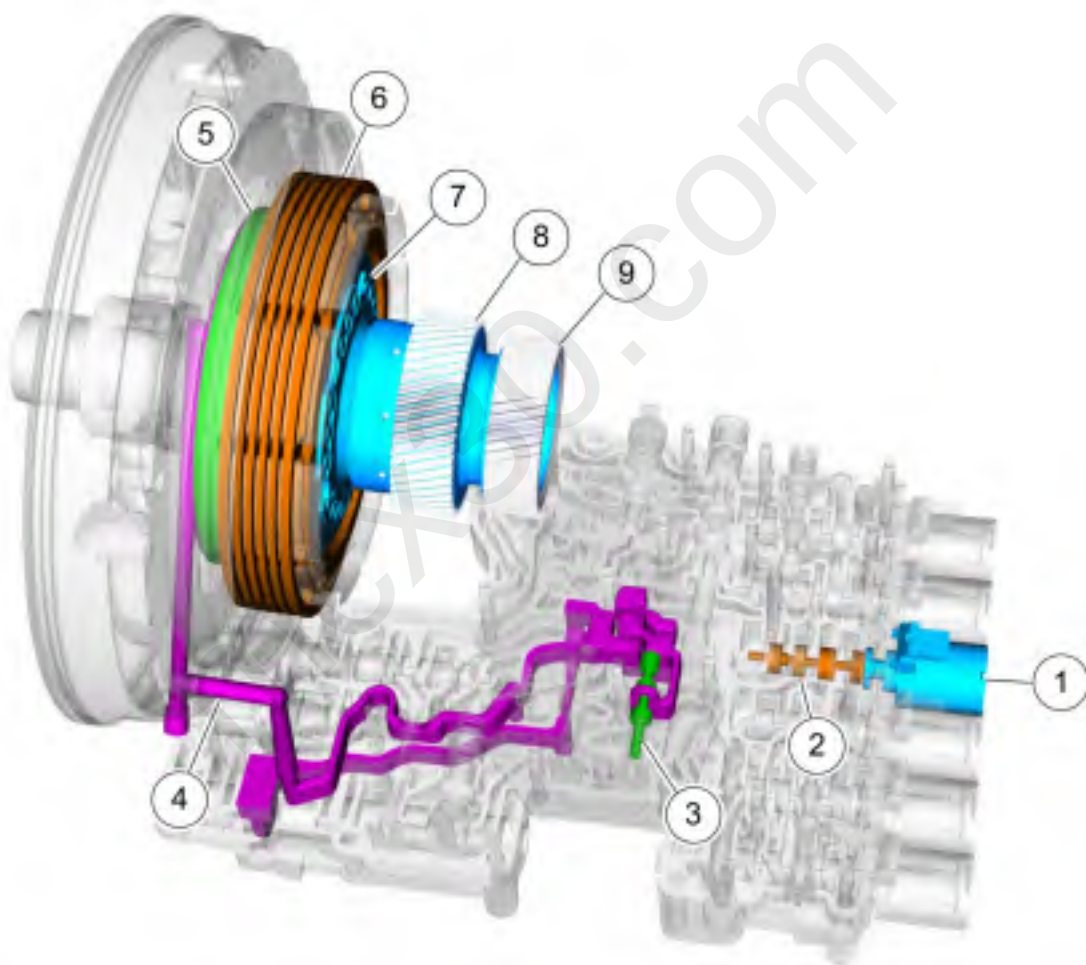
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B Clutch

Overview

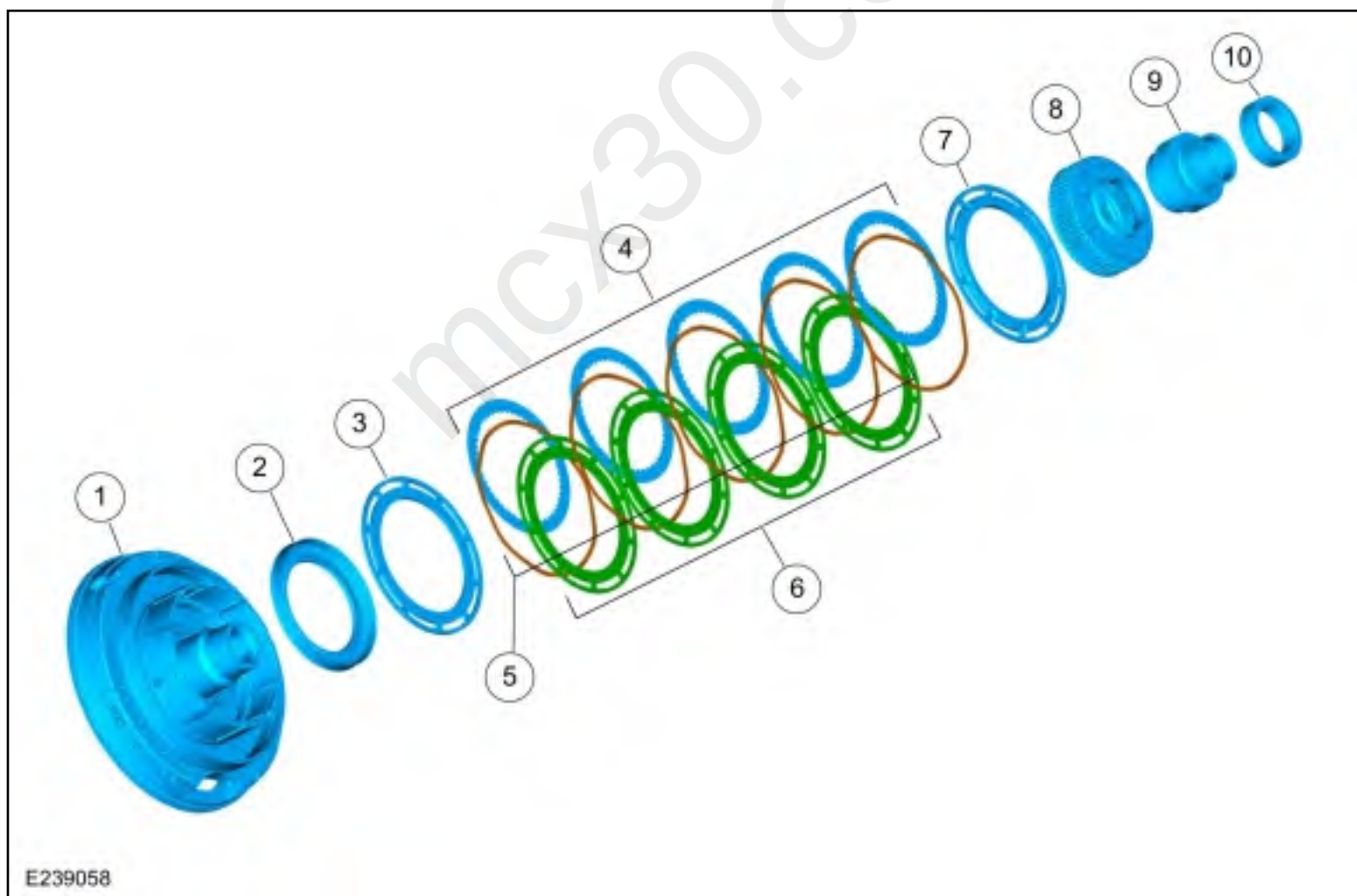


Item	Description
1	SSB
2	B clutch control valve

3	B clutch latch valve
4	B clutch apply circuit
5	B clutch piston
6	B clutch assembly
7	One-Way Clutch (OWC)
8	Sun gear No. 1
9	Sun gear No. 2

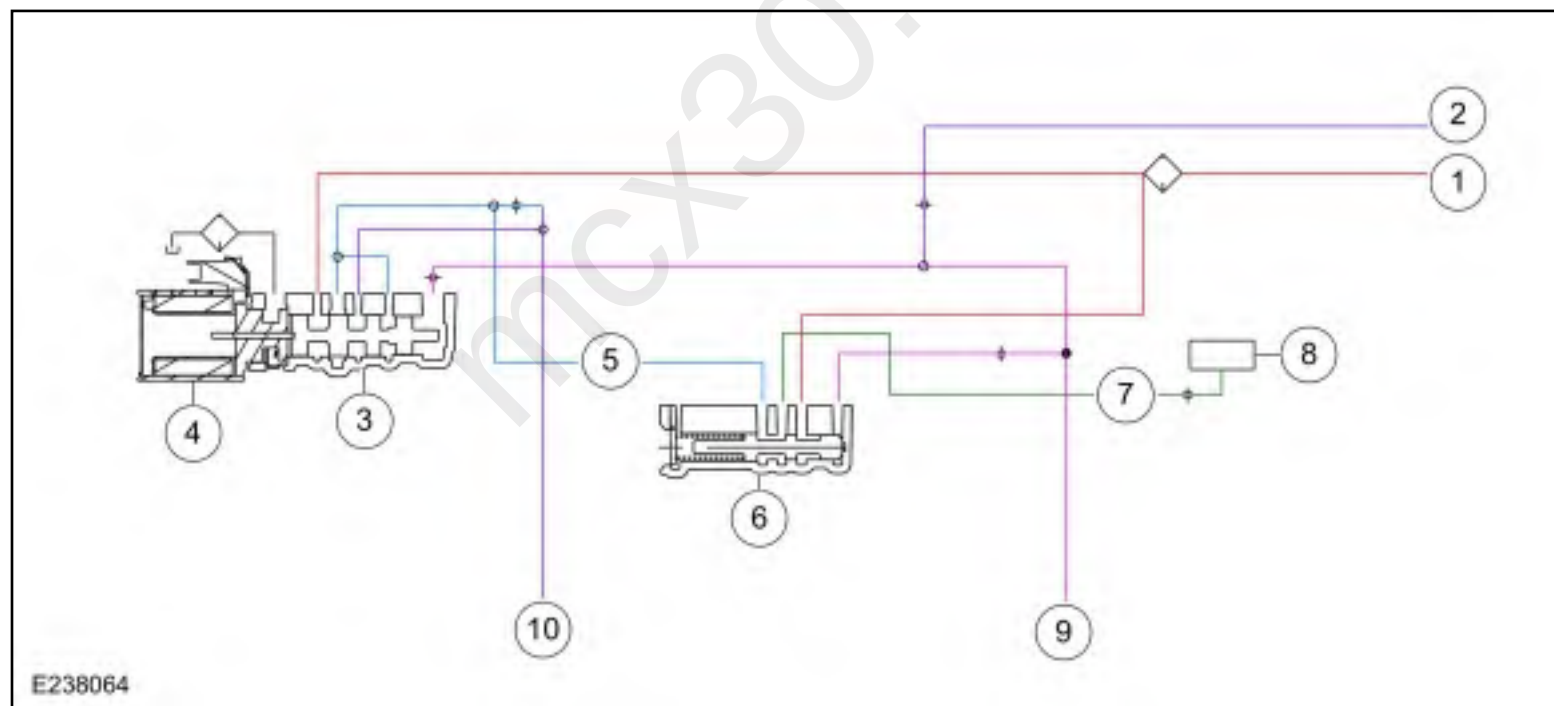
Sun gear No. 1 is mechanically connected to sun gear No. 2. Sun gear No. 1 is also connected to the B clutch. When the B clutch applies, it holds the sun gear No. 1 and sun gear No. 2 stationary. The One Way Clutch (OWC) also holds the sun gear No. 1 and sun gear No. 2 stationary during acceleration in first and second gear when the shifter is in the D position.

B Clutch Exploded View



Item	Description
1	Front support assembly
2	B clutch piston
3	B clutch apply plate
4	B clutch friction plates
5	B clutch separating springs
6	B clutch steel plates
7	B clutch pressure plate
8	One-Way Clutch (OWC)
9	Sun gear No. 1
10	Sun gear No. 2

B Clutch Hydraulic Circuits



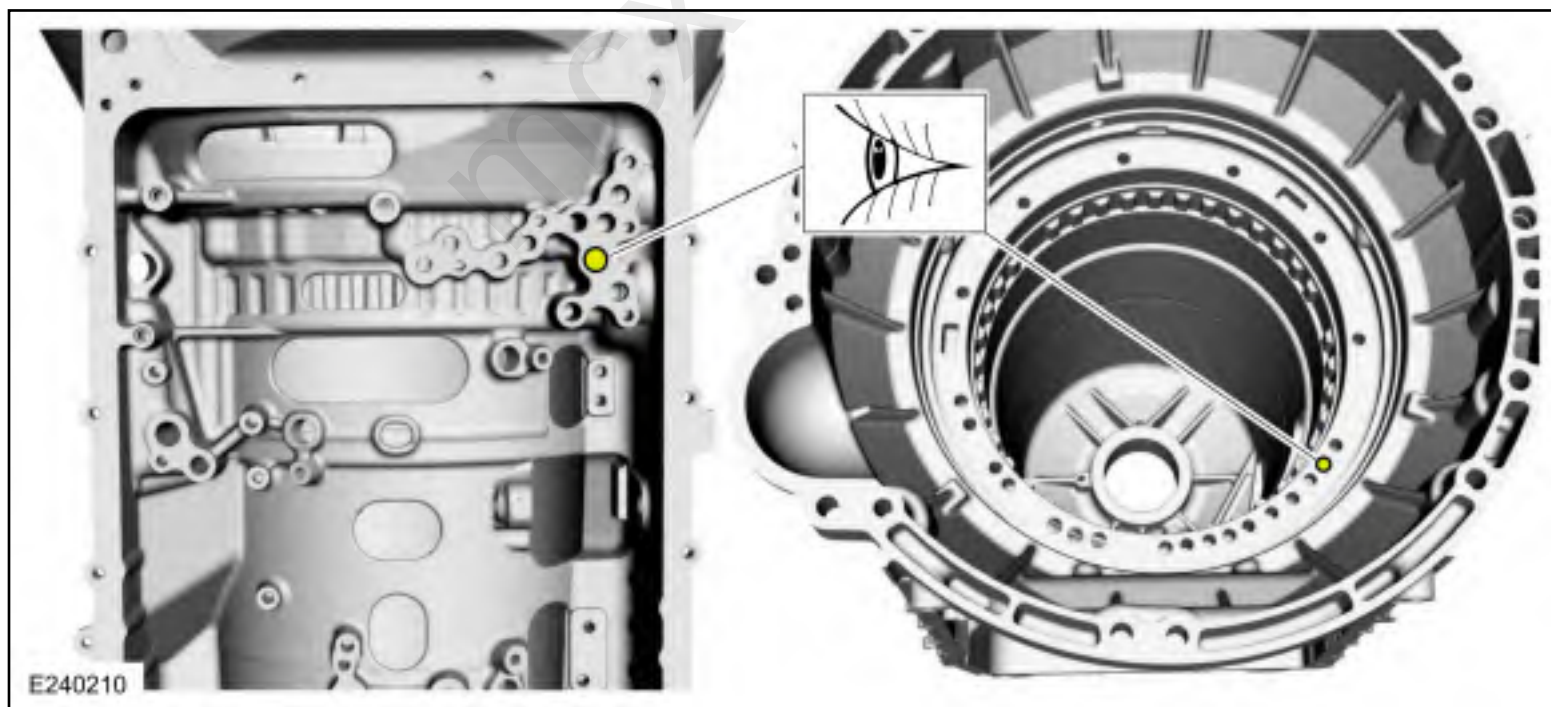
Item	Description
1	Line pressure
2	Pump output

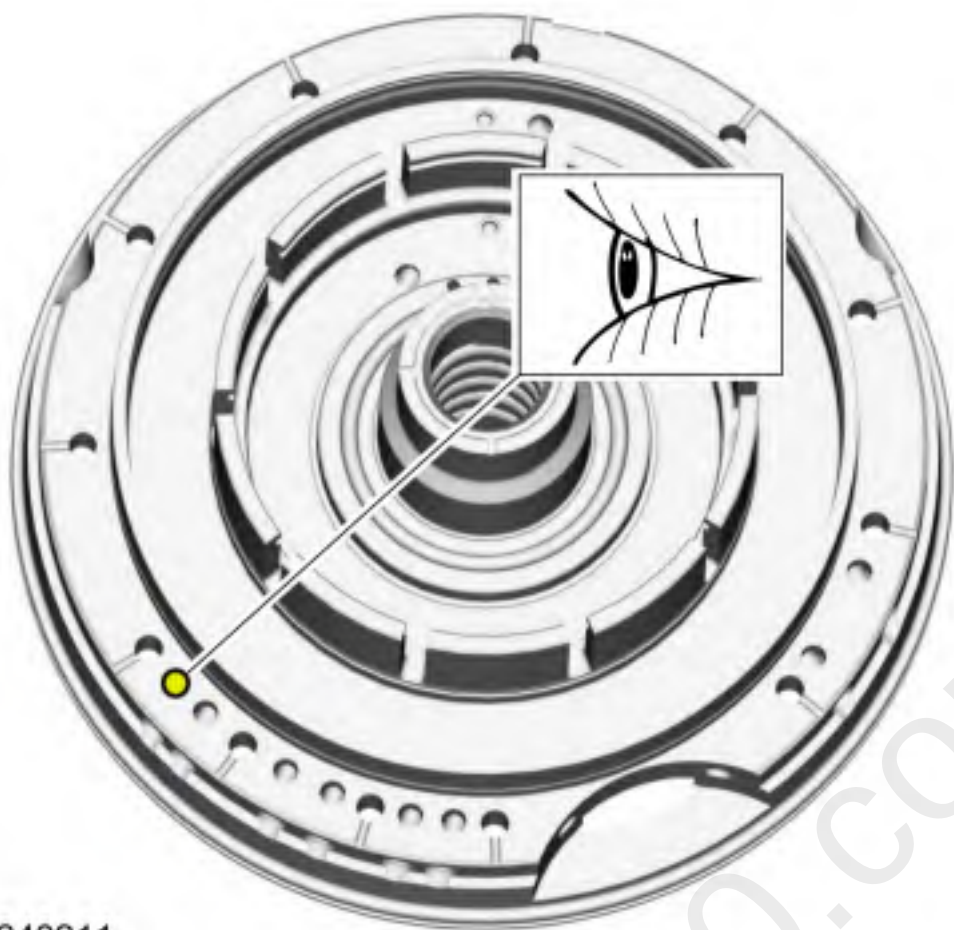
3	B clutch control valve
4	SSB
5	Control pressure to latch valve
6	B clutch latch valve
7	Apply pressure to mechanical B clutch
8	Mechanical B clutch
9	Elevated exhaust pressure
10	Clutch exhaust

B Clutch Hydraulic Operation

Line pressure is supplied to the B clutch control valve and the B clutch latch valve. As SSB turns on, it moves the control valve allowing regulated line pressure to flow to the B clutch latch valve and then to the mechanical B clutch. When the regulated line pressure in the B clutch control circuit reaches approximately 100 psi, the mechanical B clutch is fully applied. The pressure in the B clutch control circuit moves the B clutch latch valve to the left which allows line pressure to hold the mechanical B clutch applied.

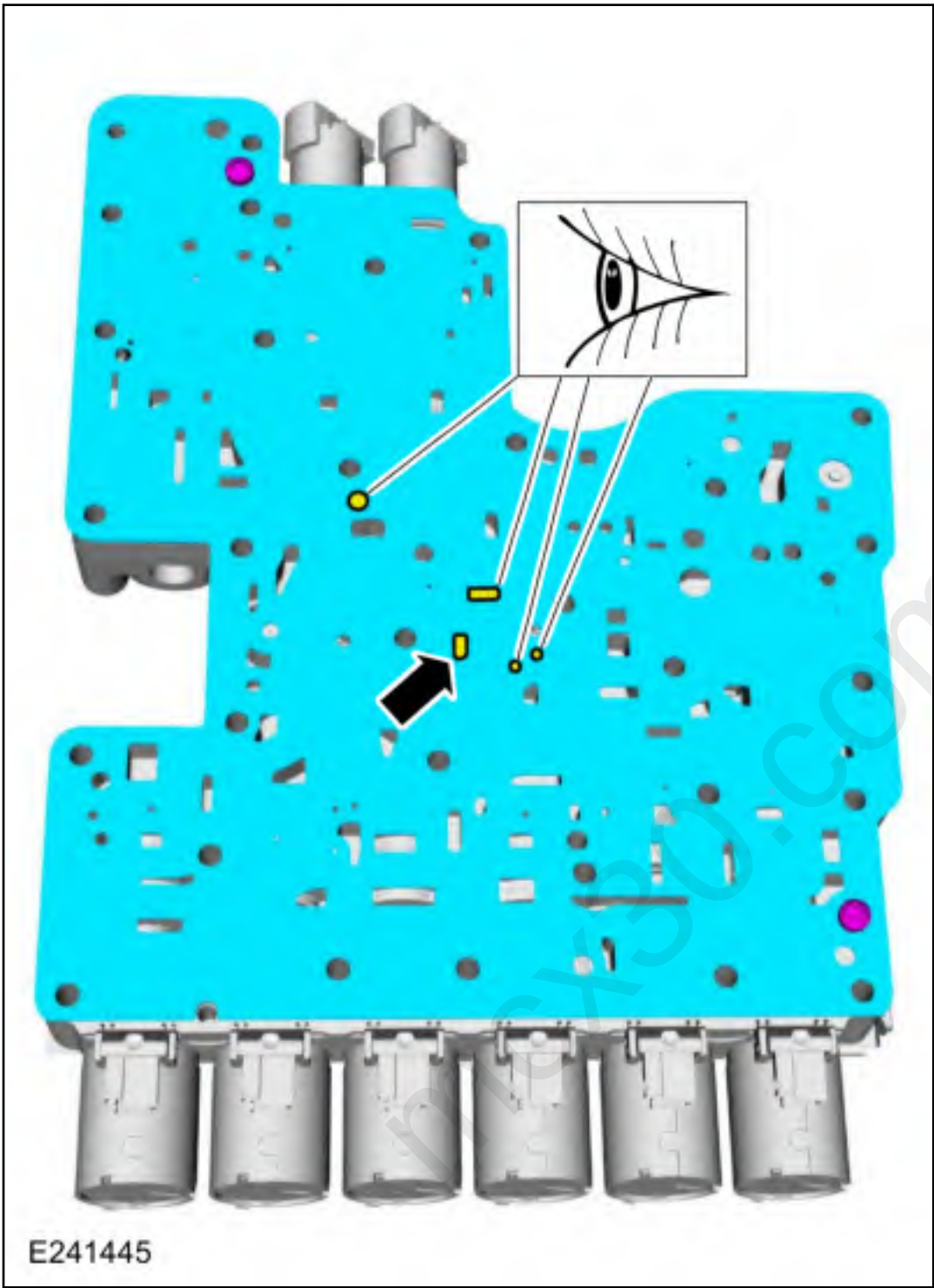
B Clutch Hydraulic Passages





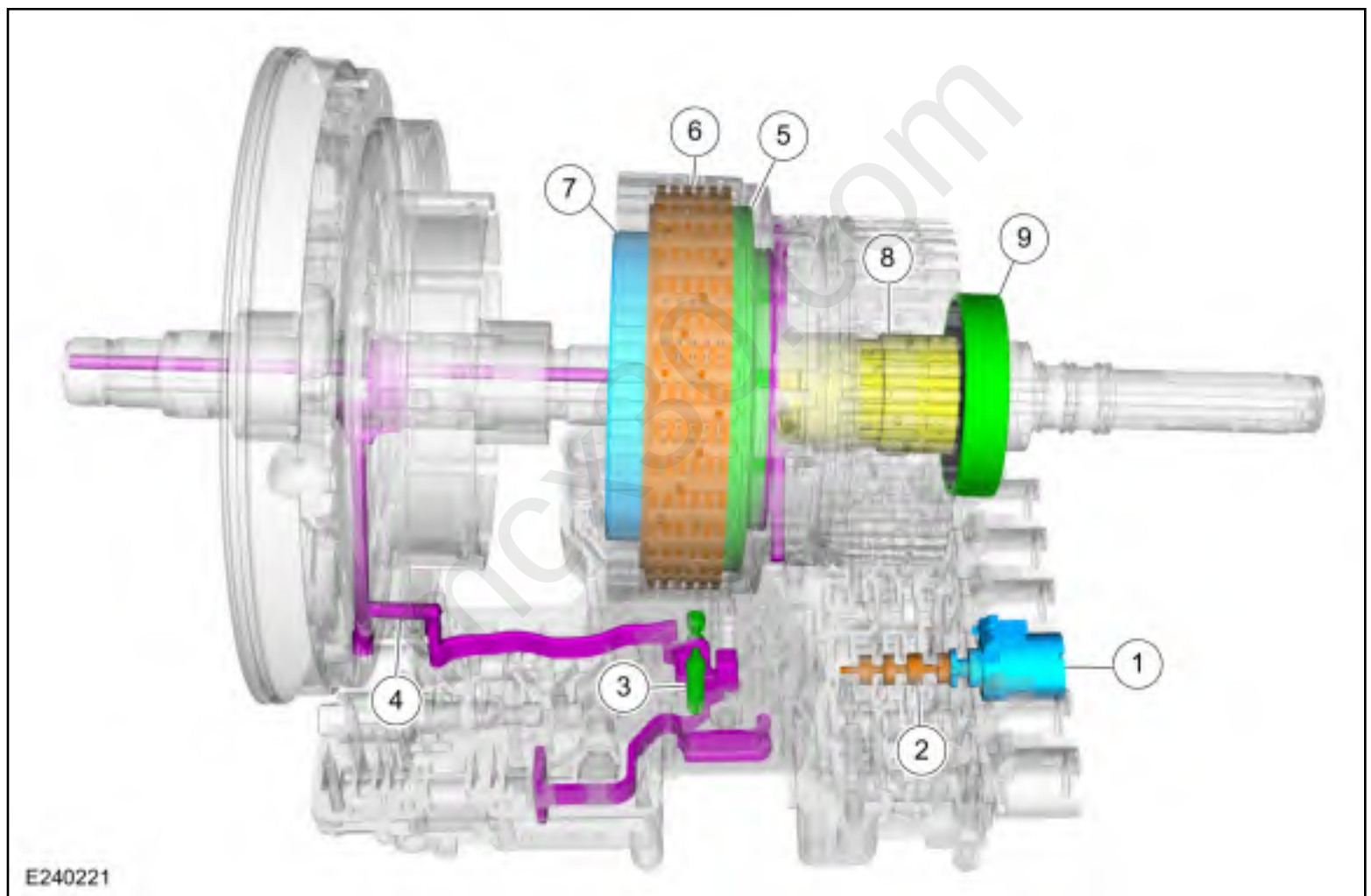
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C Clutch

Overview

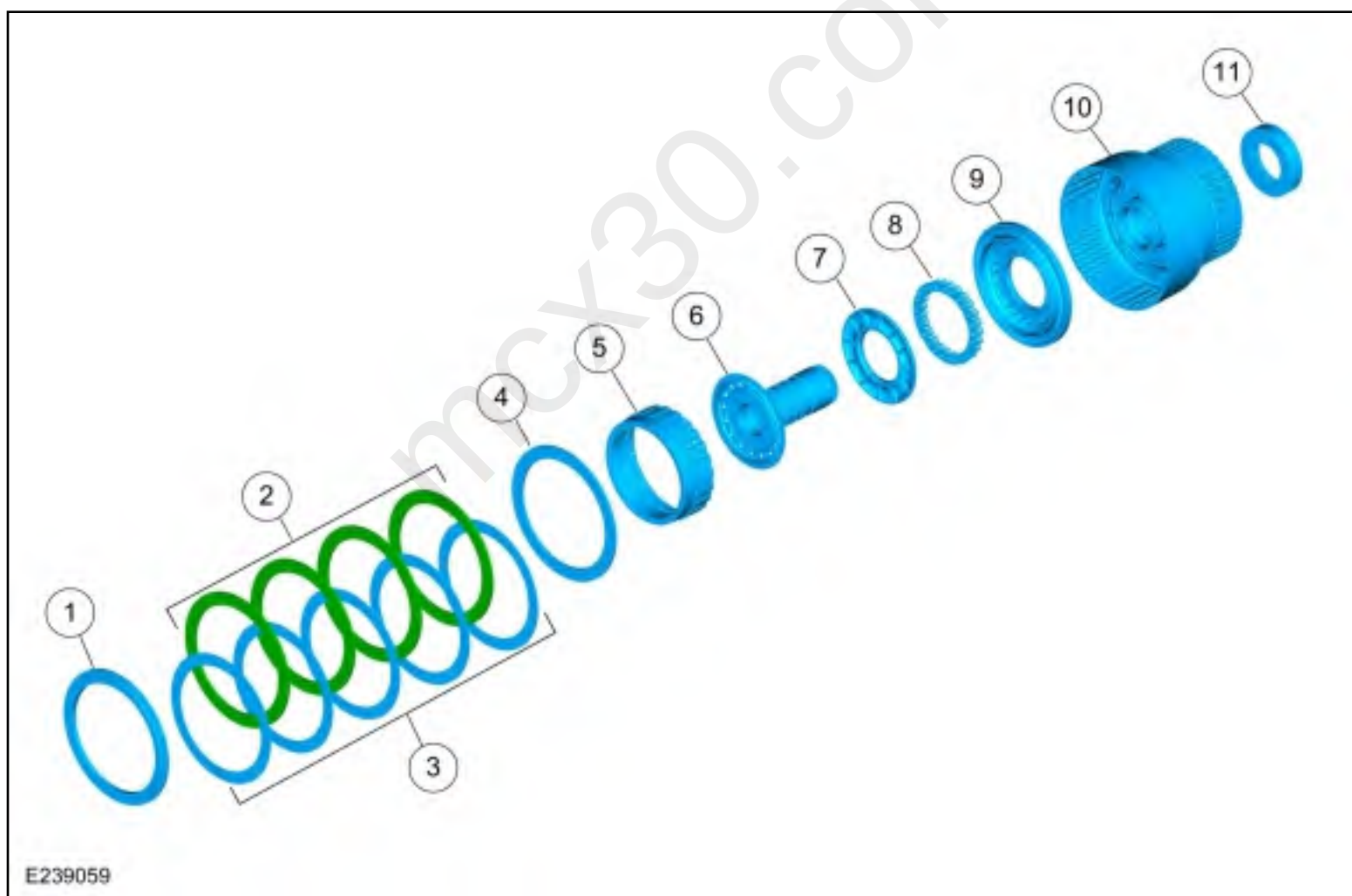


Item	Description
1	SSC
2	C clutch control valve

3	C clutch latch valve
4	C clutch apply circuit
5	C clutch piston
6	C clutch assembly
7	Ring gear No. 2
8	Shaft (sun gear No. 3)
9	Sun gear No. 3

Ring gear No. 2 is mechanically connected to sun gear No. 3 and is also connected to the C clutch. When the C clutch applies, torque from ring gear No. 2 may be applied the planetary carrier No. 3.

C Clutch Exploded View

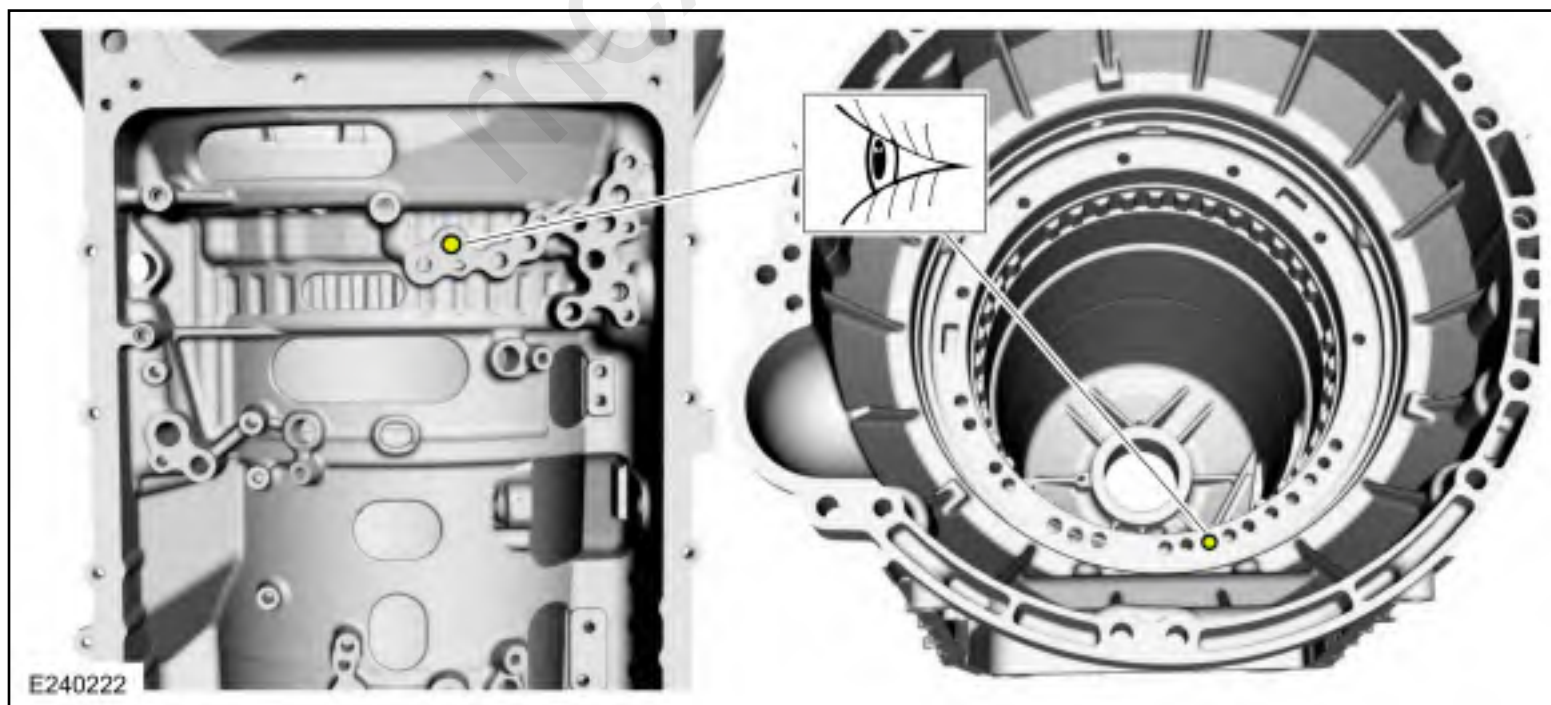


2	Pump output
3	C clutch control valve
4	SSC
5	Control pressure to latch valve
6	C clutch latch valve
7	Apply pressure to mechanical C clutch
8	Mechanical C clutch
9	Elevated exhaust pressure
10	Clutch exhaust

C Clutch Hydraulic Operation

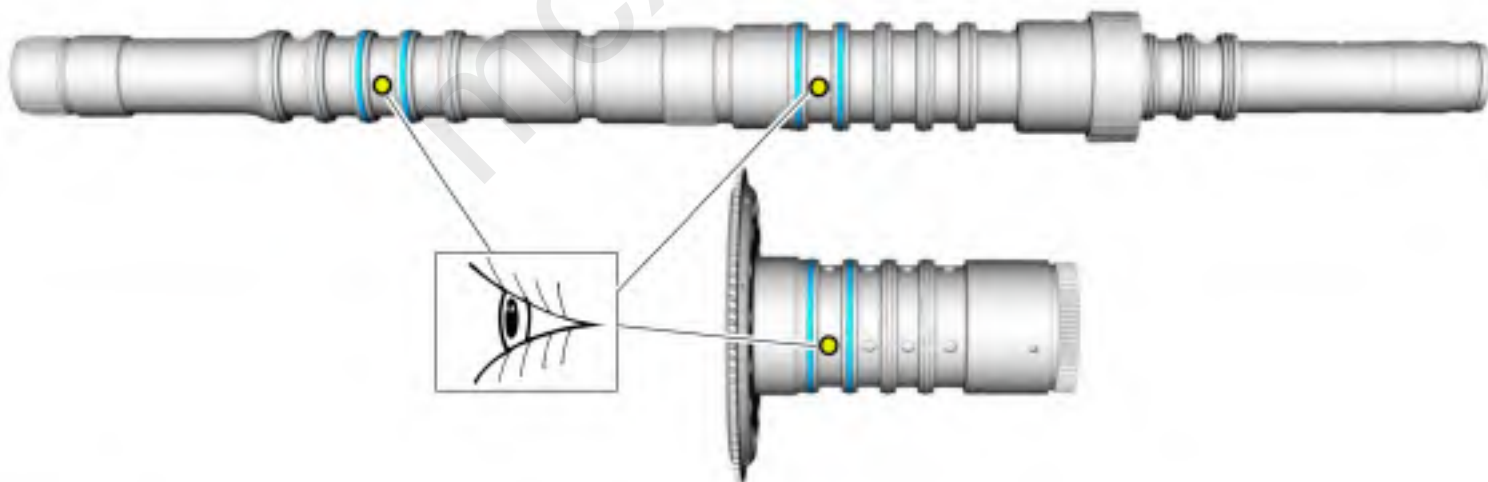
Line pressure is supplied to the C clutch control valve and the C clutch latch valve. As SSC turns on, it moves the control valve allowing regulated line pressure to flow to the C clutch latch valve and then to the mechanical C clutch. When the regulated line pressure in the C clutch control circuit reaches approximately 100 psi, the mechanical C clutch is fully applied. The pressure in the C clutch control circuit moves the C clutch latch valve to the left which allows line pressure to hold the mechanical C clutch applied.

C Clutch Hydraulic Passages

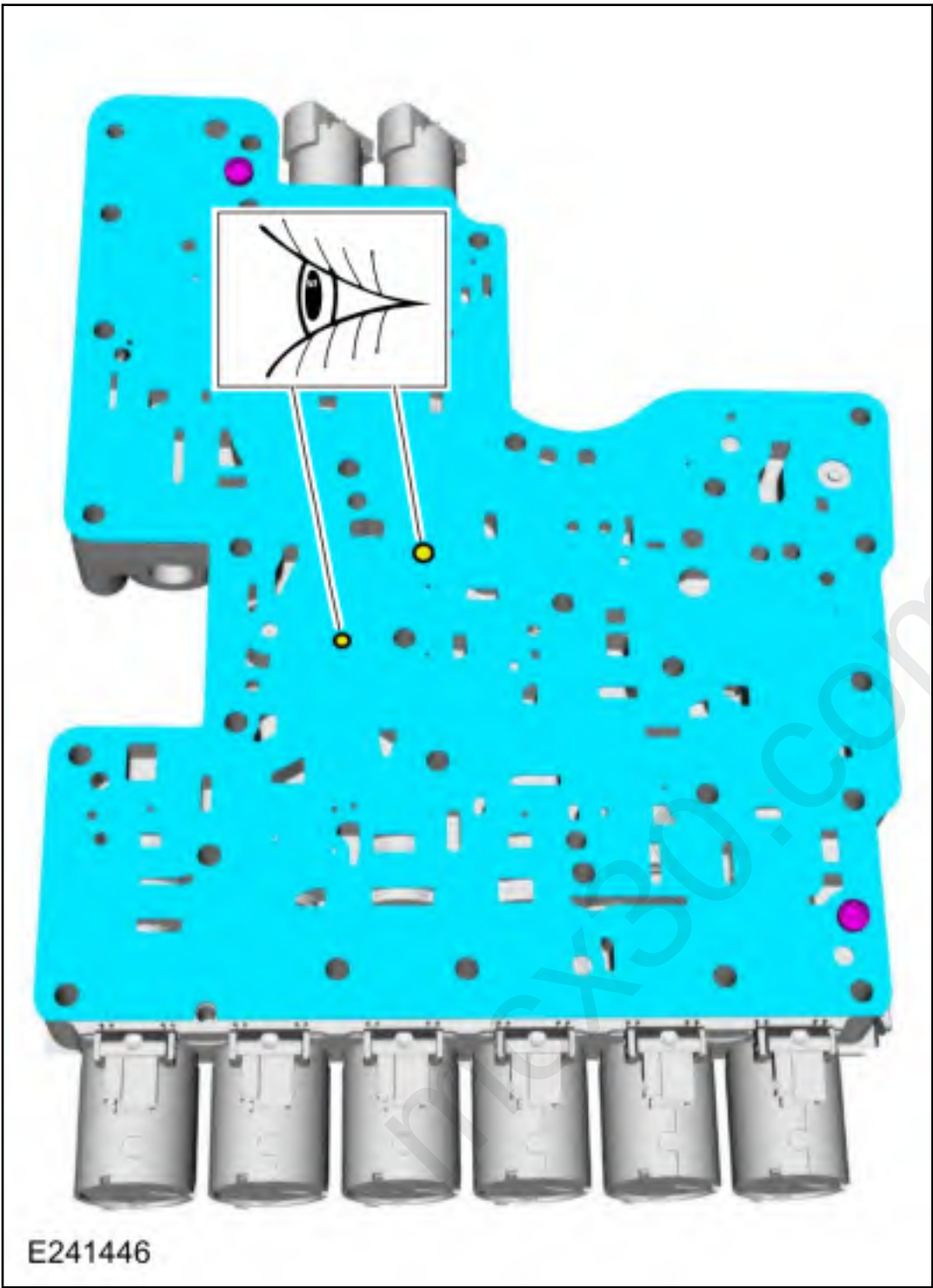




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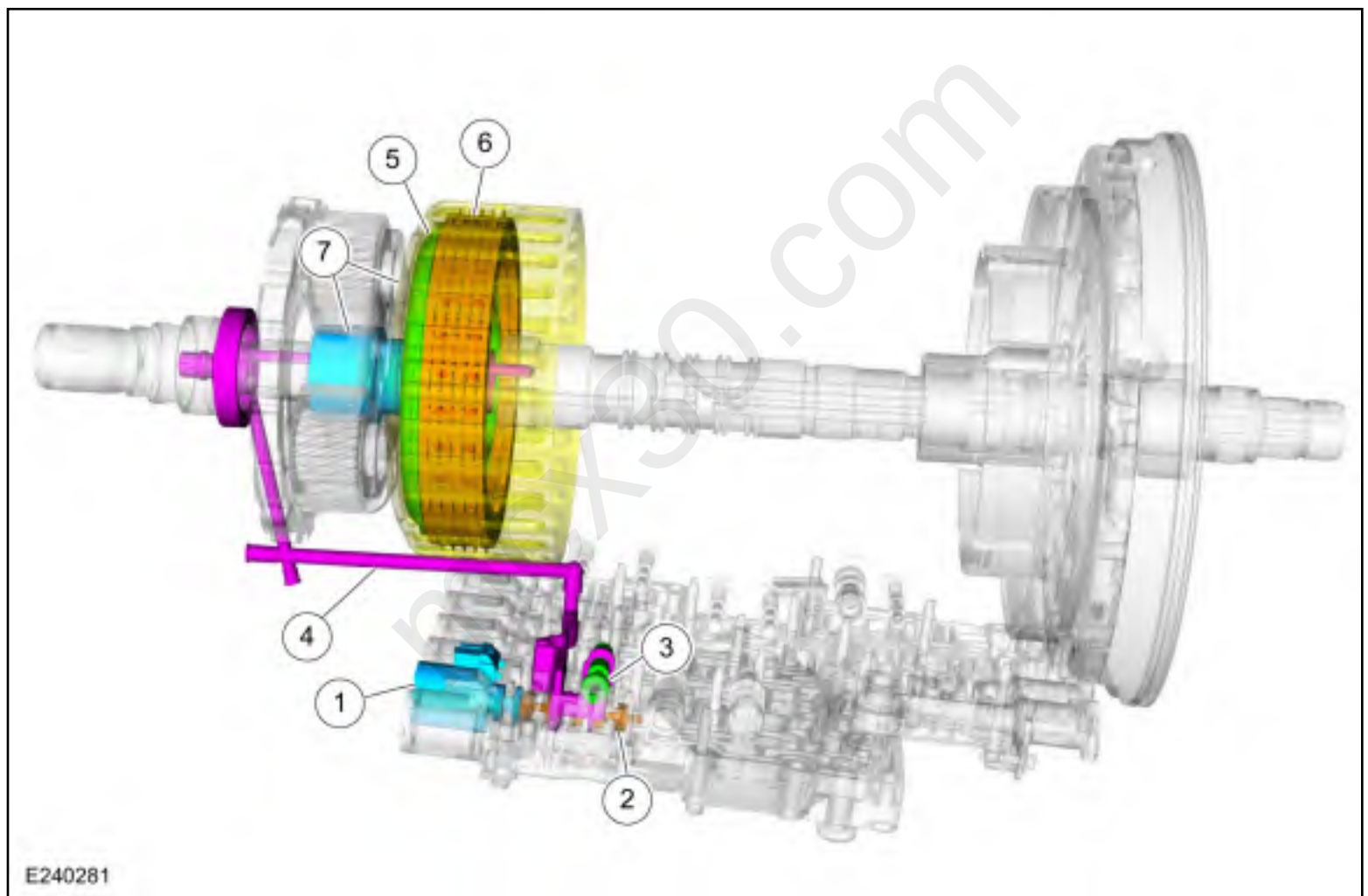


E240253



E Clutch

Overview

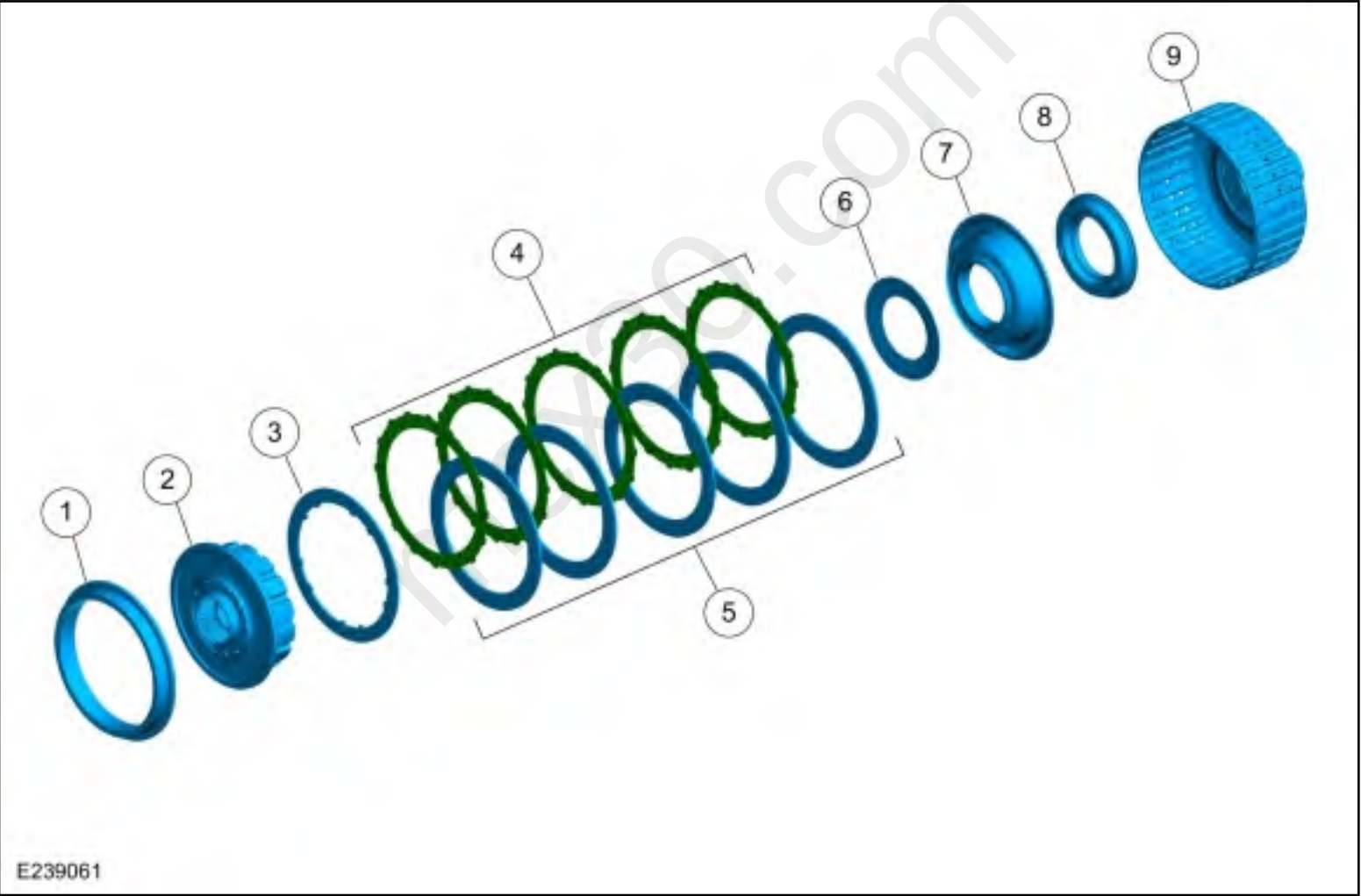


Item	Description
1	SSE
2	E clutch control valve

3	Clutch gain control valve
4	E clutch apply circuit
5	E clutch piston
6	E clutch assembly
7	Shell and sun gear No. 4

Ring gear No. 3 is mechanically connected to sun gear No. 4 is and connected to the E clutch. When the E clutch applies, torque from the input shaft is transferred to ring gear No. 3 and sun gear No. 4.

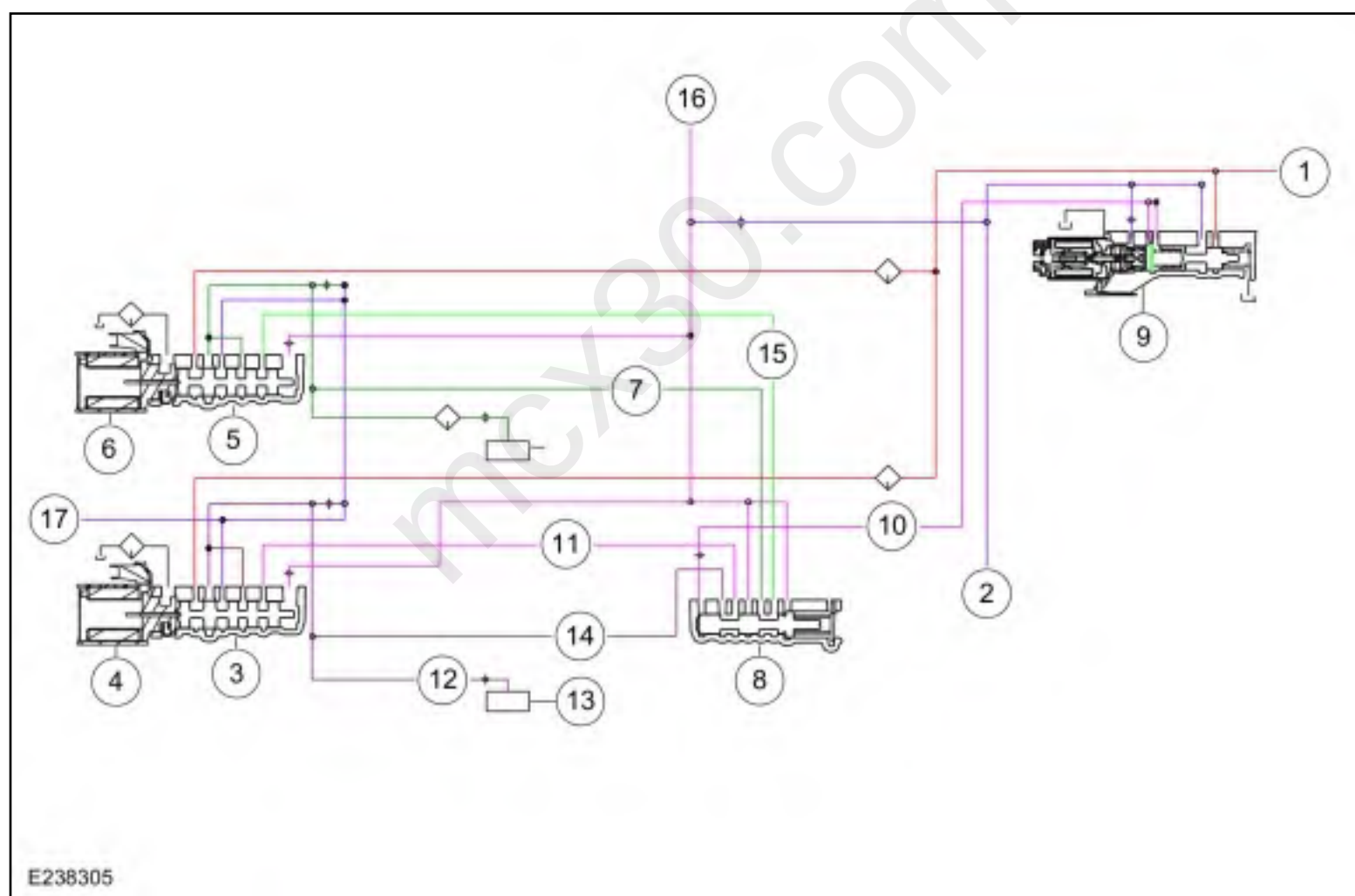
E Clutch Exploded View



Item	Description
1	Ring gear No. 3

2	E clutch hub
3	E clutch pressure plate
4	E clutch friction plates
5	E clutch steel plates
6	E clutch piston return spring
7	E clutch piston
8	E clutch balance dam
9	Shell and sun gear No. 4

E Clutch Hydraulic Circuits



Item	Description
1	Line pressure

2	Pump output
3	E clutch control valve
4	SSE
5	D clutch control valve
6	SSD
7	D clutch apply pressure to clutch gain control valve
8	Clutch gain control valve
9	LPC solenoid
10	LPC pressure
11	E clutch feedback pressure
12	Apply pressure to mechanical E clutch
13	Mechanical E clutch
14	E clutch apply pressure to clutch gain control valve
15	D clutch feedback pressure
16	Elevated exhaust pressure
17	Clutch exhaust

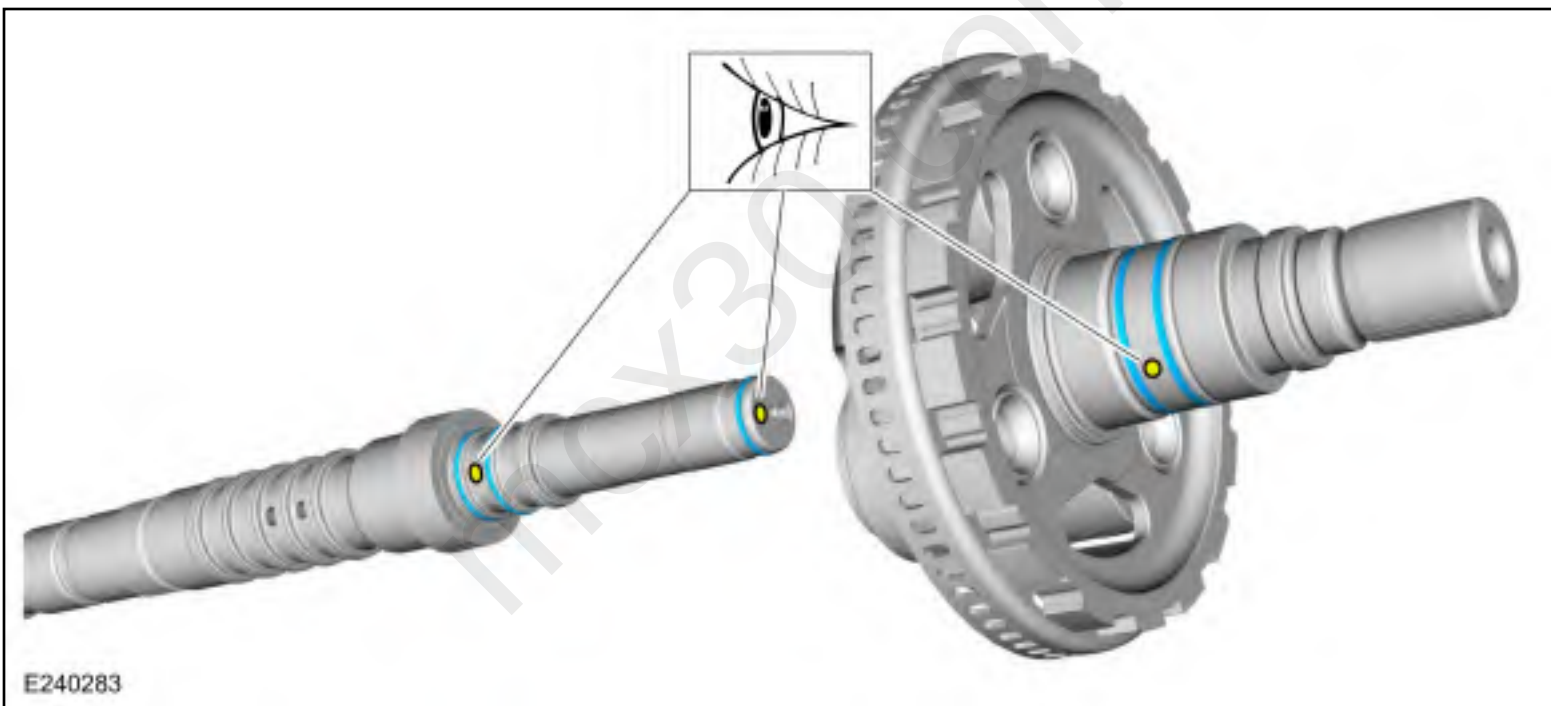
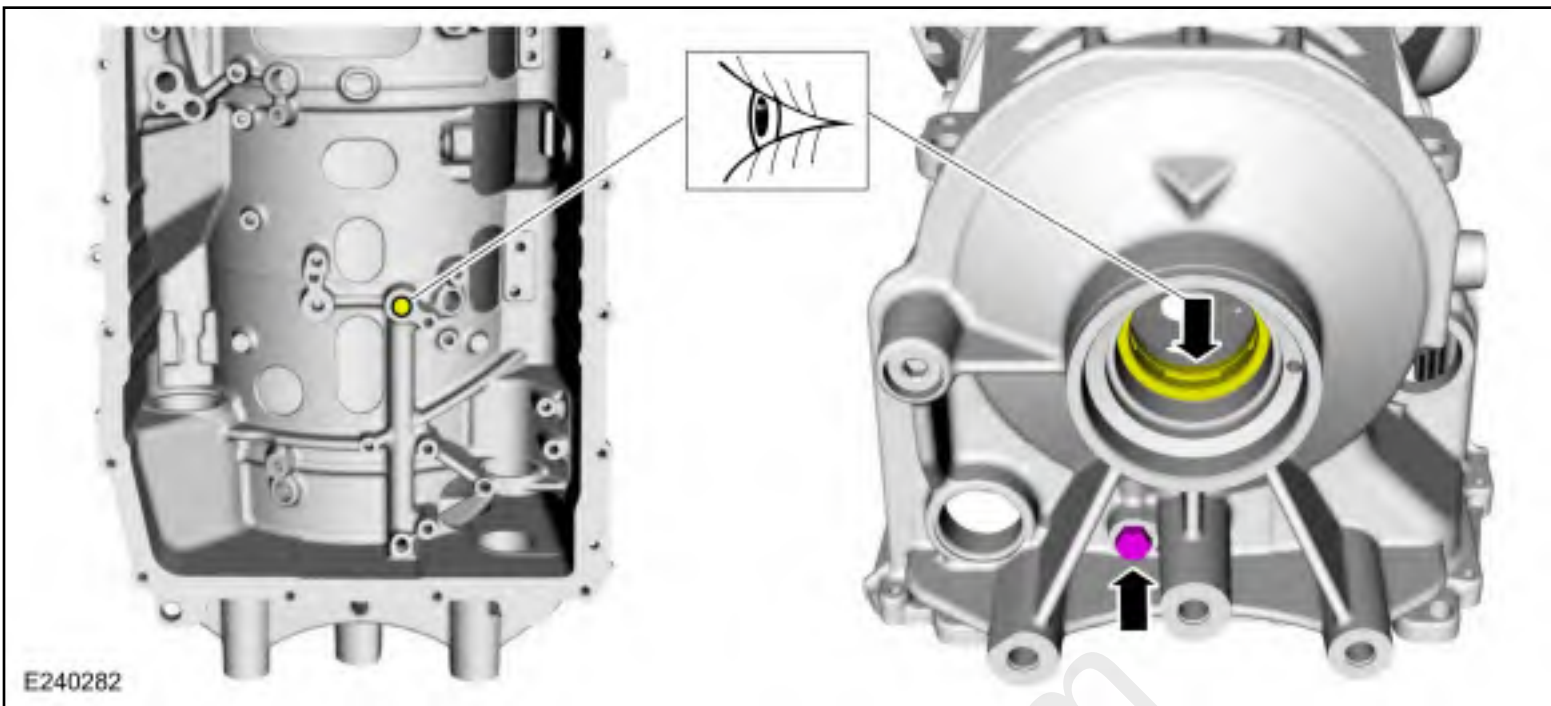
E Clutch Hydraulic Operation 5th-6th Shift

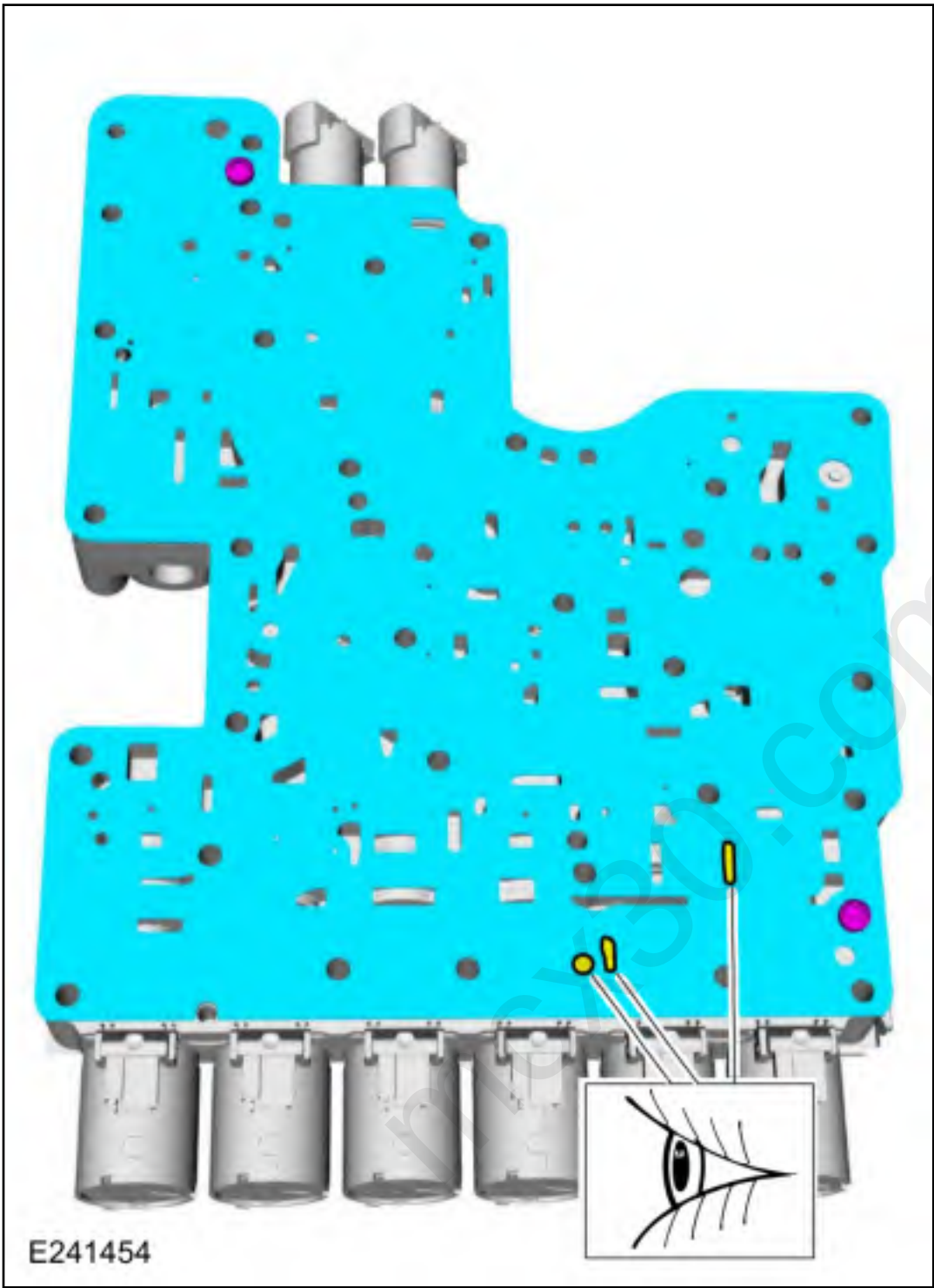
Line pressure is supplied to the E clutch control valve. LPC pressure is supplied to the gain control valve. LPC pressure positions the gain control valve to the right end of the valve bore. As SSE turns on, it moves the E clutch control valve allowing regulated line pressure to flow to the mechanical E clutch.

E Clutch Hydraulic Operation 2nd-3rd, 4th-5th, and 9th-10th Shifts

Line pressure is supplied to the E clutch control valve. LPC pressure is supplied to the gain control valve. The LPC pressure is low and the gain control valve stays in the default position at the left end of the valve bore. As SSE turns on, it moves the D clutch control valve allowing regulated line pressure to flow to the mechanical E clutch.

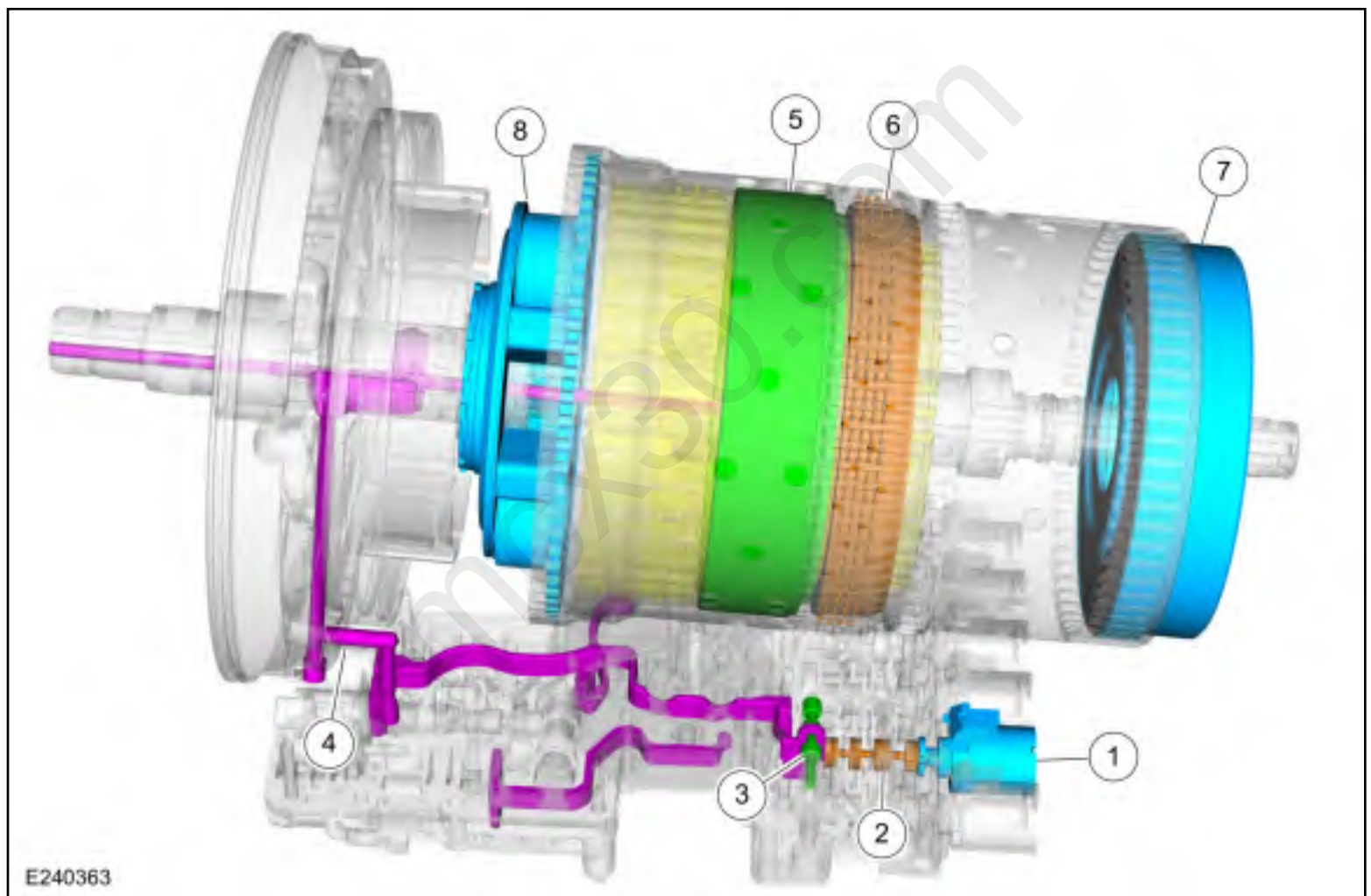
E Clutch Hydraulic Passages





F Clutch

Overview

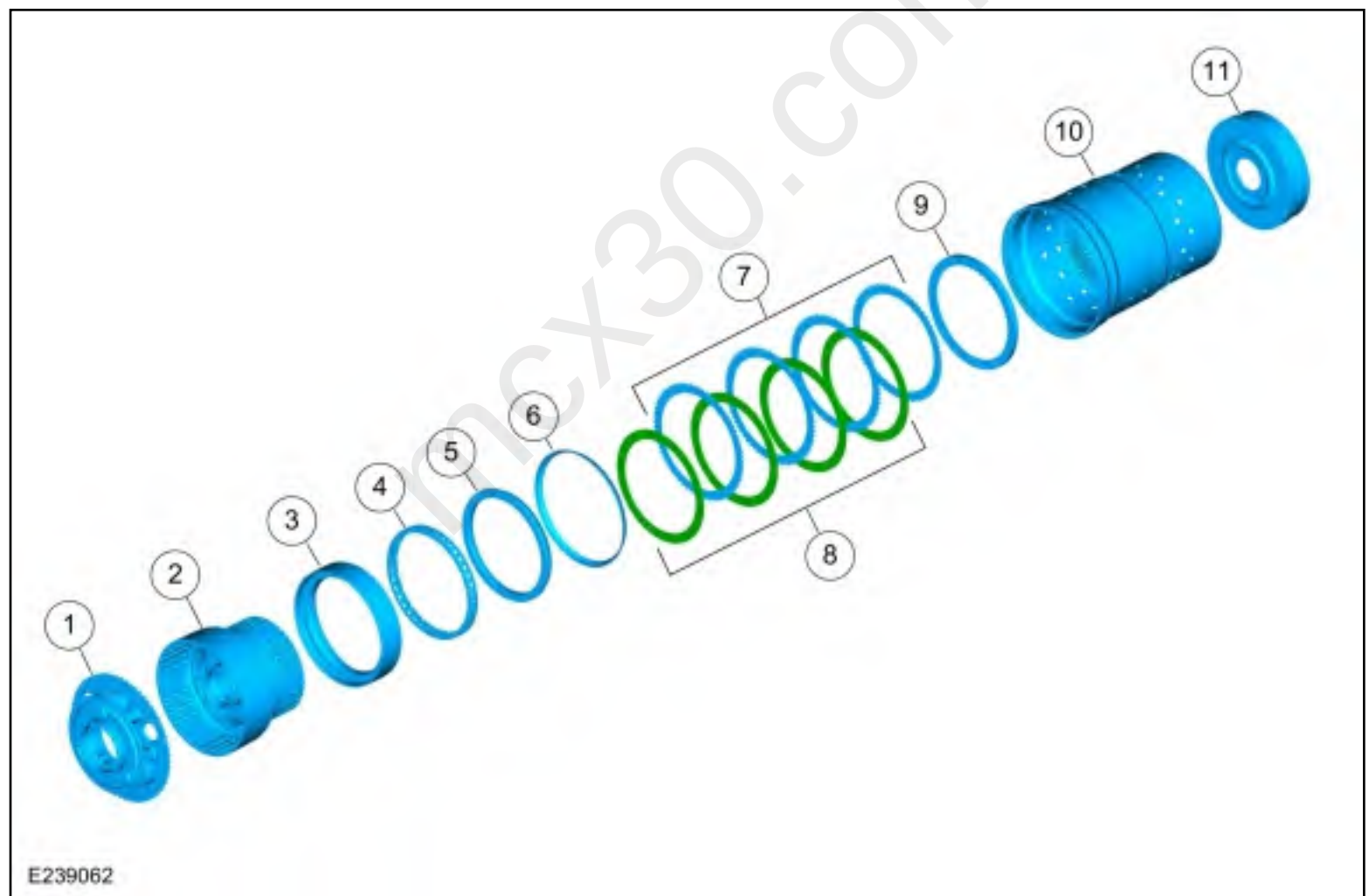


Item	Description
1	SSF
2	F clutch control valve

3	F clutch latch valve
4	F clutch apply circuit
5	F clutch piston
6	F clutch assembly
7	Ring gear No. 4
8	Planetary carrier No. 1

Ring gear No. 4 is mechanically connected to planetary carrier No. 1 and connected to the F clutch. When the F clutch applies, the ring gear No. 4 may be connected to ring gear No. 2 through the C clutch. Ring gear No. 4 may also connect to planetary carrier No. 3 through the D clutch.

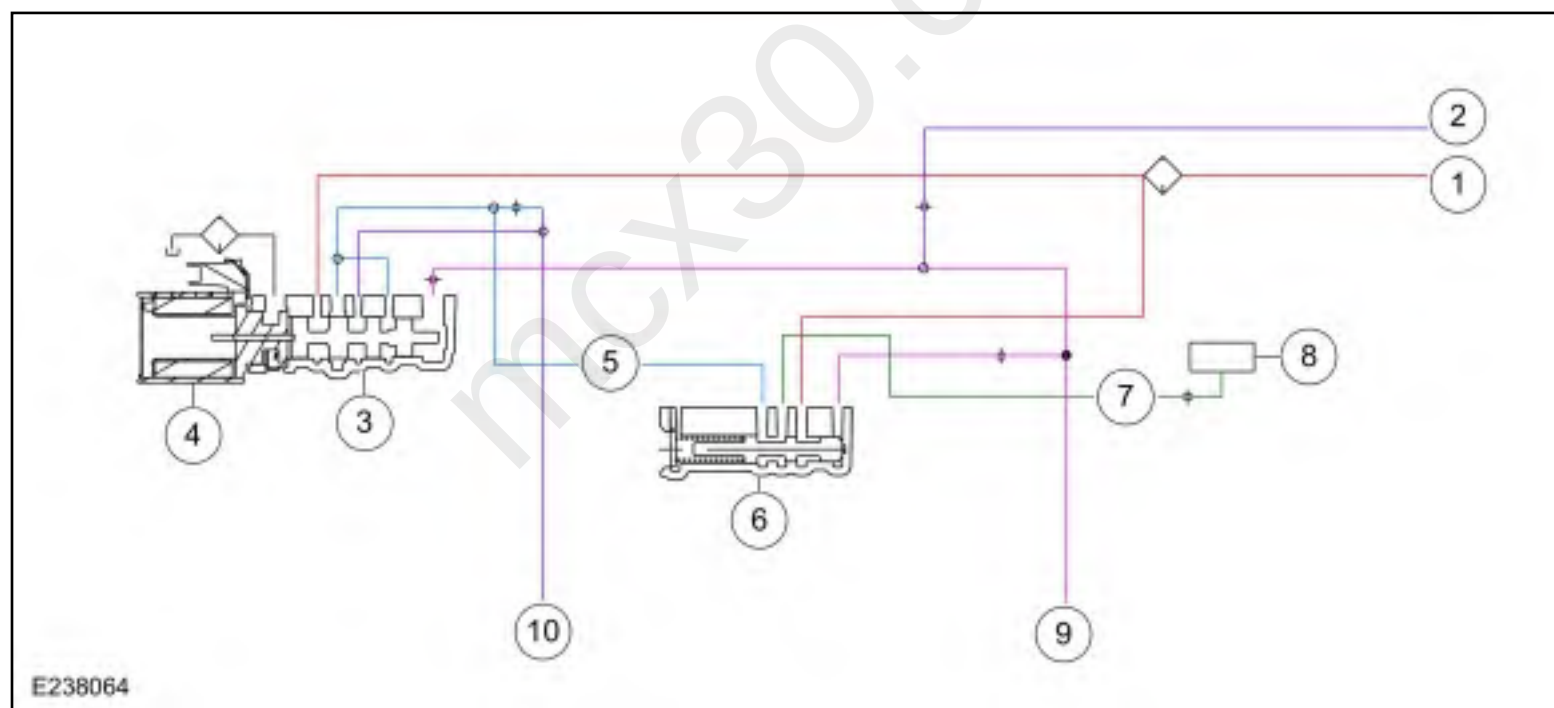
F Clutch Exploded View



Item	Description

1	Planetary carrier No. 1
2	CDF clutch cylinder
3	F clutch piston
4	F clutch piston return spring
5	F clutch balance dam
6	F clutch apply ring
7	F clutch friction plates
8	F clutch steel plates
9	F Clutch pressure plate
10	Cylinder (clutch and planetary container)
11	Ring gear No. 4

F Clutch Hydraulic Circuits



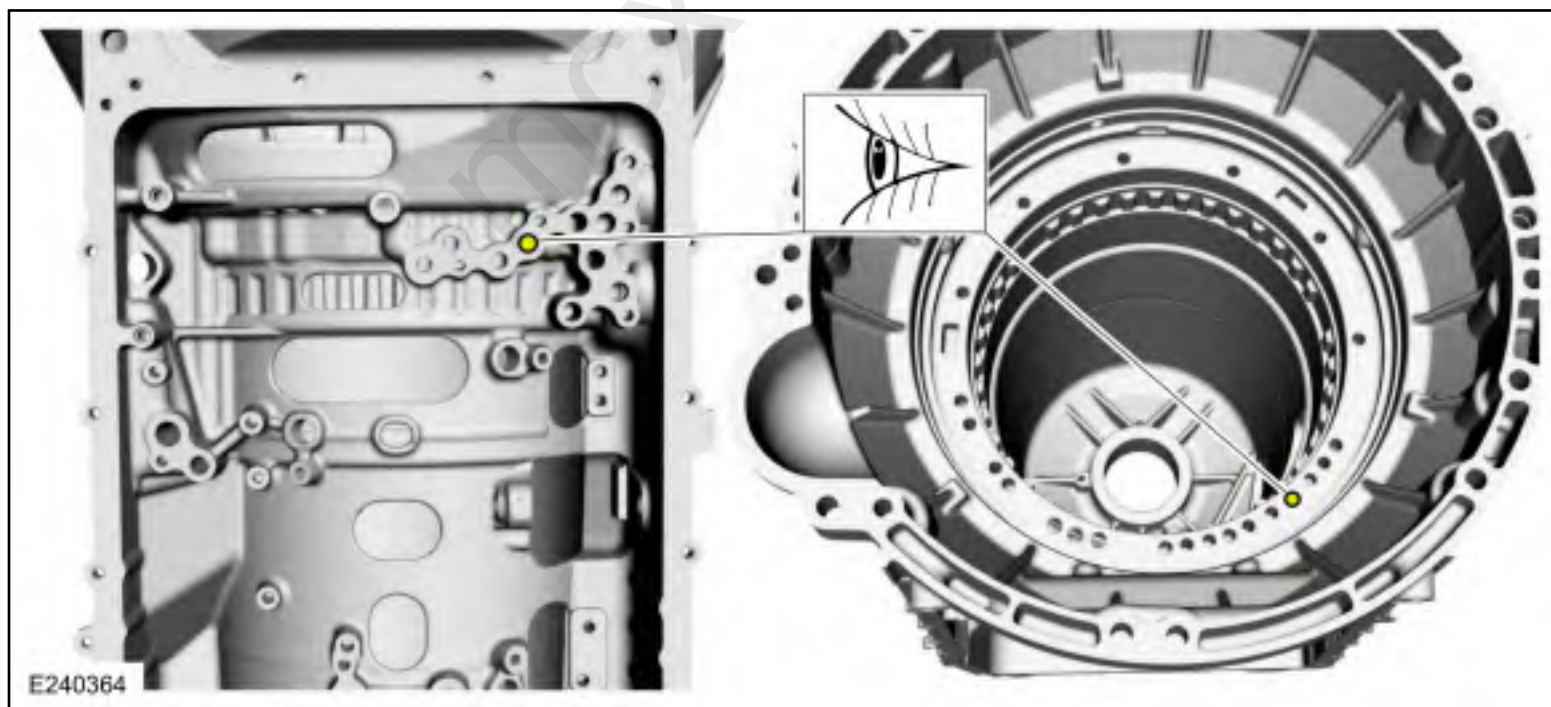
Item	Description
1	Line pressure
2	Pump output

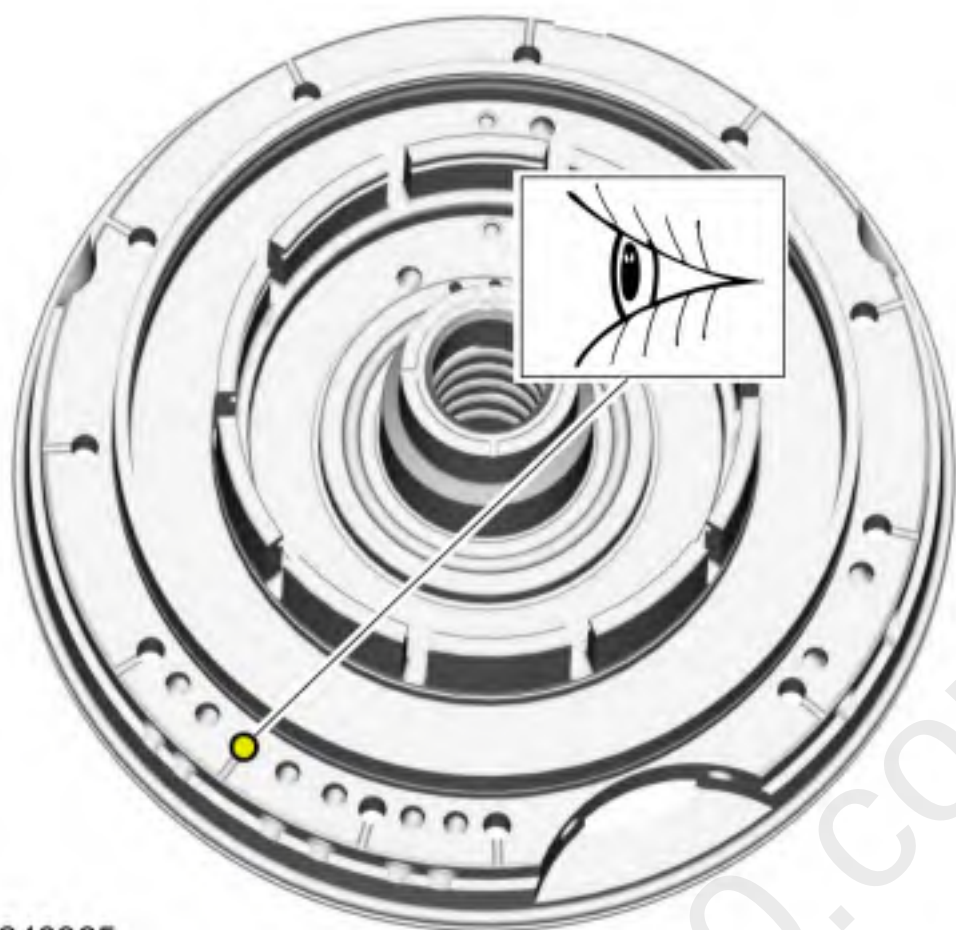
3	F clutch control valve
4	SSF
5	Control pressure to latch valve
6	F clutch latch valve
7	Apply pressure to mechanical F clutch
8	Mechanical F clutch
9	Elevated exhaust pressure
10	Clutch exhaust

F Clutch Hydraulic Operation

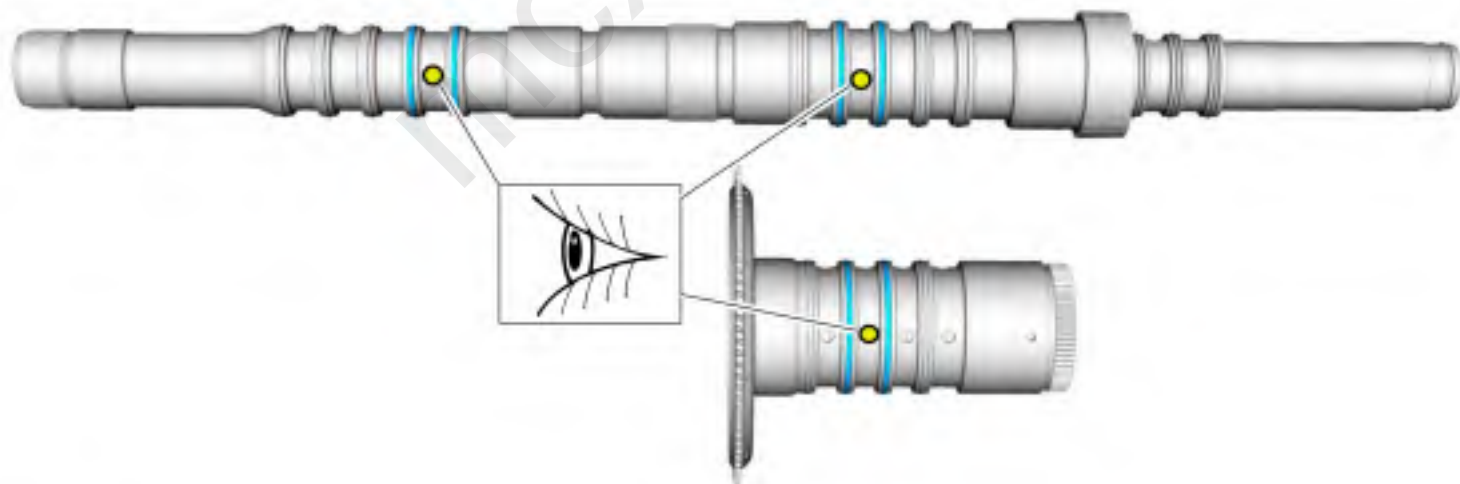
Line pressure is supplied to the F clutch control valve and the F clutch latch valve. As SSF turns on, it moves the control valve allowing regulated line pressure to flow to the F clutch latch valve and then to the mechanical F clutch. When the regulated line pressure in the F clutch control circuit reaches approximately 100 psi, the mechanical F clutch is fully applied. The pressure in the F clutch control circuit moves the F clutch latch valve to the left which allows line pressure to hold the mechanical F clutch applied.

F Clutch Hydraulic Passages

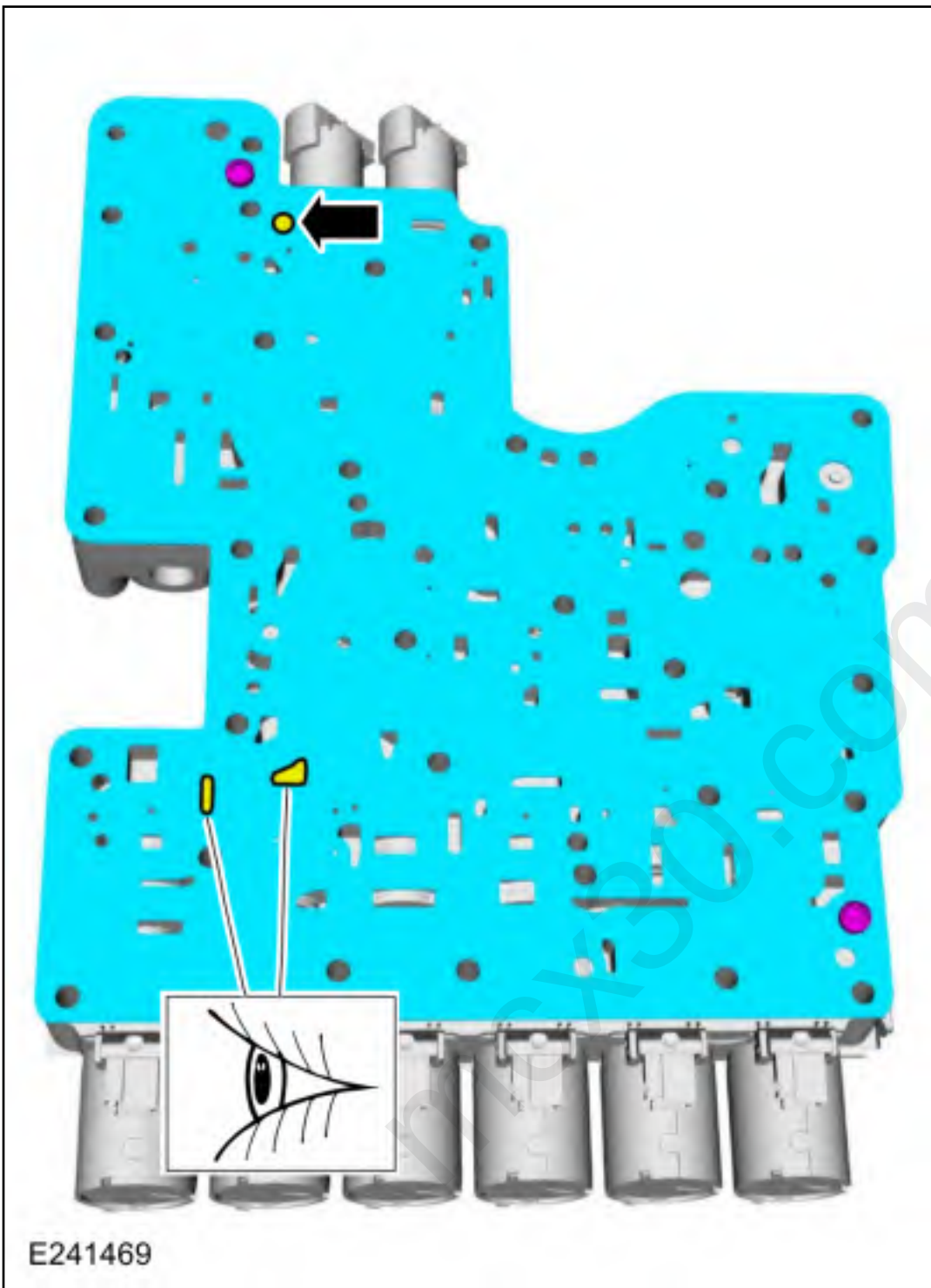




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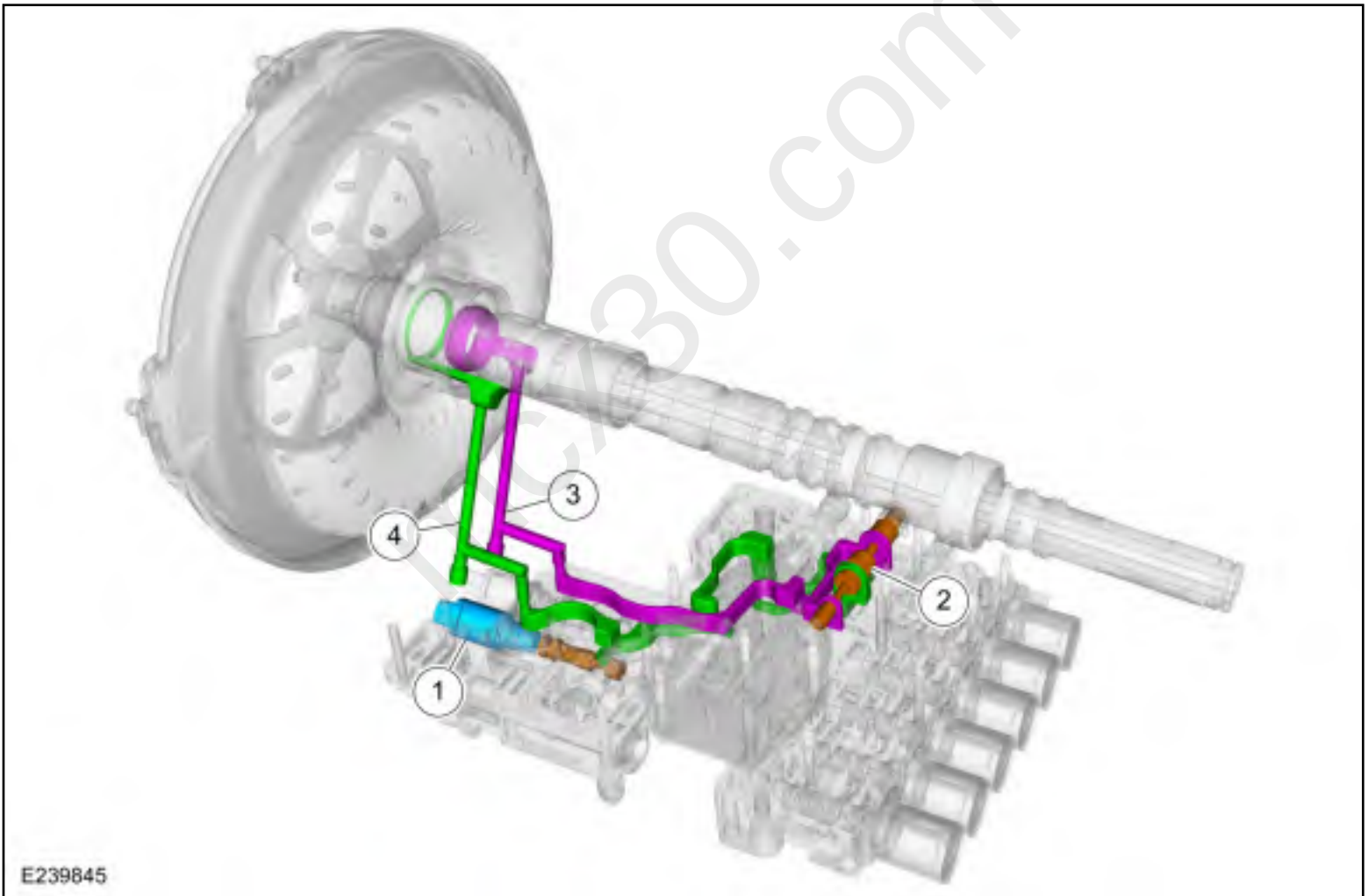
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Torque Converter

Base Part Number: Base Part Number: 7902

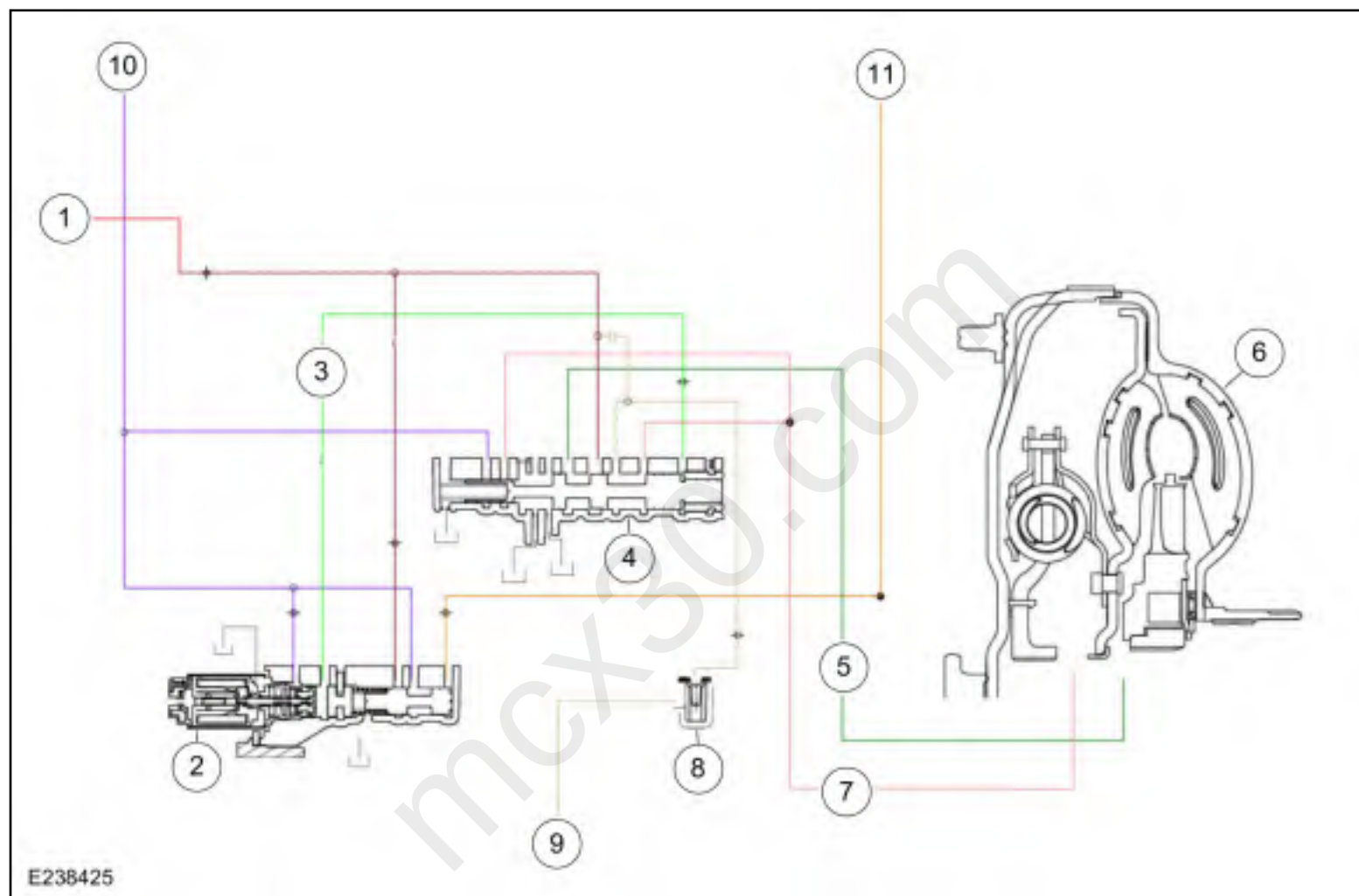
Overview



Item	Description
1	TCC solenoid

2	TCC regulator valve assembly
3	TCC apply circuit
4	TCC release circuit

Torque Converter Hydraulic Circuits (TCC Released)

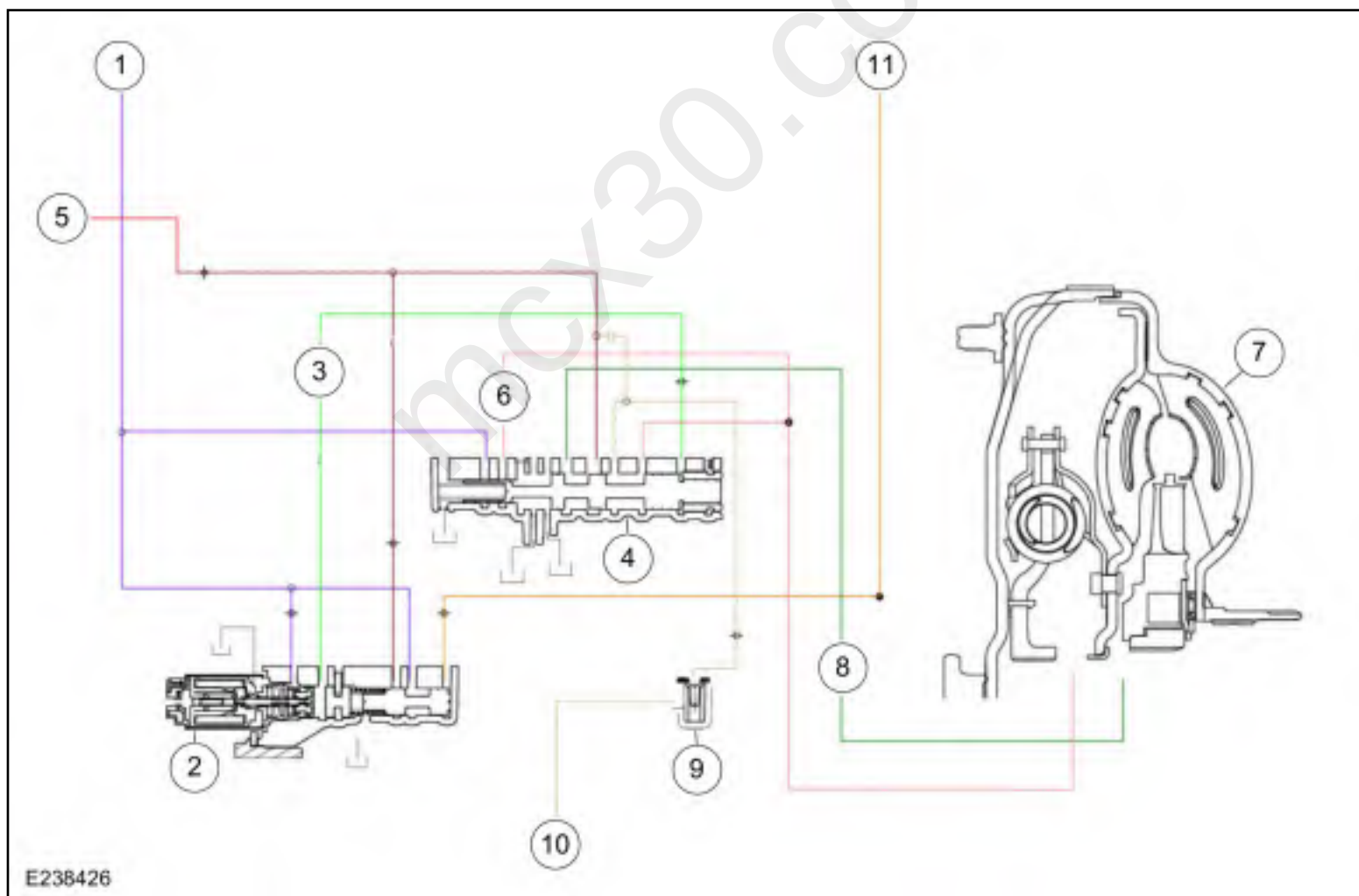


Item	Description
1	LPC pressure
2	TCC solenoid
3	TCC control pressure
4	TCC regulator valve
5	TCC release pressure
6	TCC

7	TCC exhaust to TCC regulator valve
8	Torque converter anti-drainback valve
9	TCC exhaust
10	Pump output
11	Decreased pressure from main regulator valve

Line pressure fills the converter feed circuit with fluid up to 160 PSI. The converter feed blow off valve prevents excessive pressure from reaching the torque converter. When the TCC solenoid is commanded off, the TCC regulator valve connects the converter feed circuit to the converter release circuit and fluid flows into the torque converter. Fluid exits the torque converter in the converter apply circuit. The TCC regulator valve connects the converter apply circuit and the from converter circuit. The from converter circuit flows past the converter anti-drainback valve and on to the cooler bypass valve.

Torque Converter Hydraulic Circuits (TCC Applied)

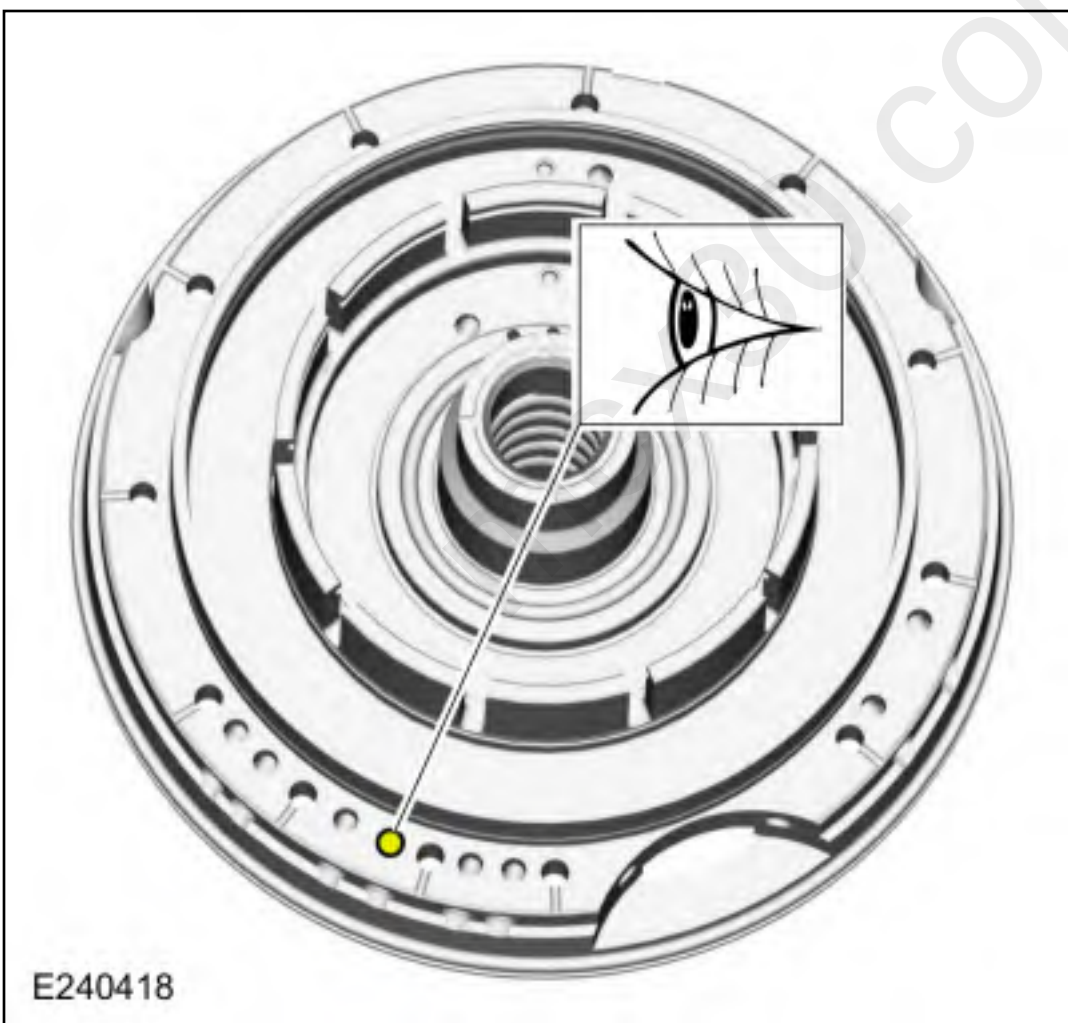
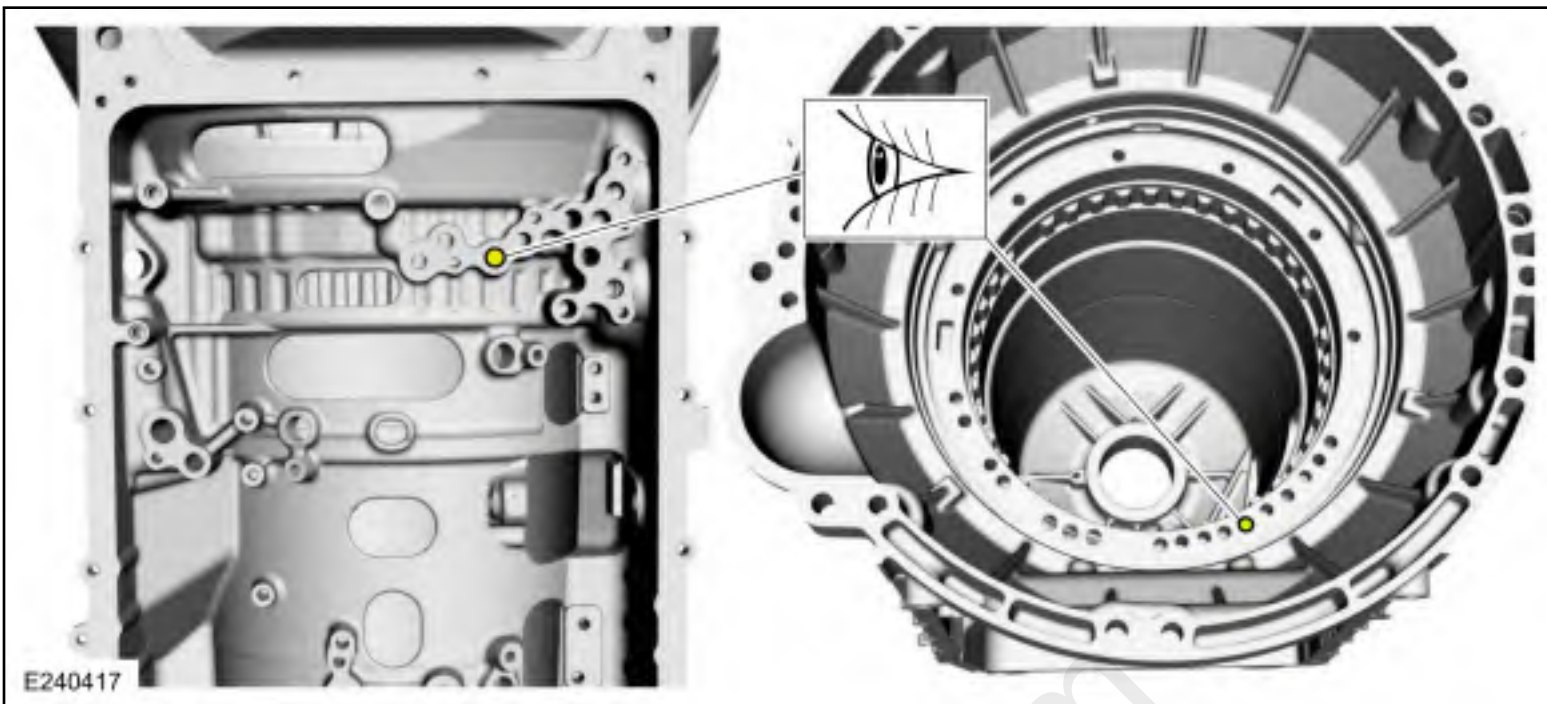


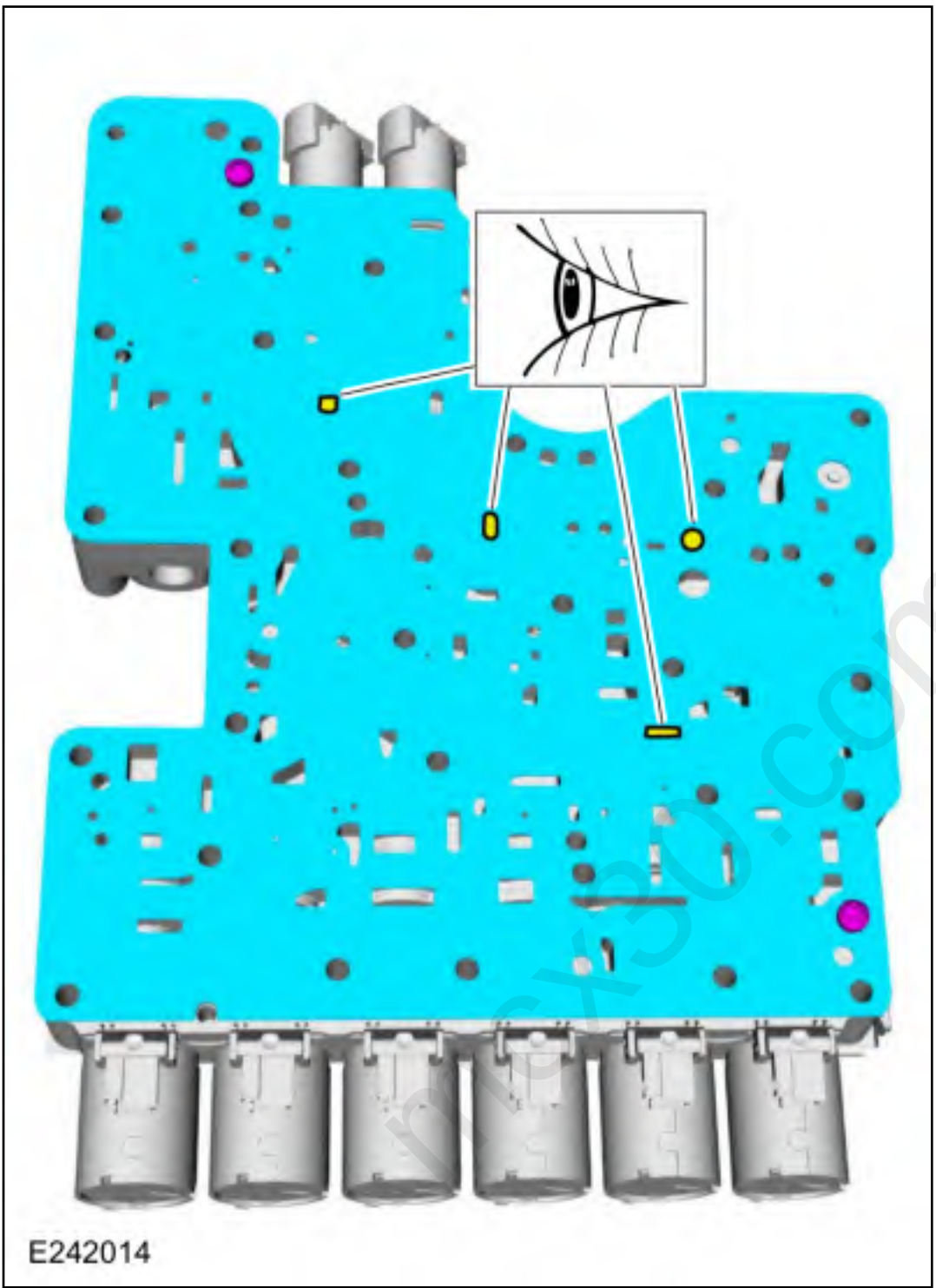
Item	Description
1	Pump output
2	TCC solenoid
3	TCC control pressure
4	TCC regulator valve
5	LPC pressure
6	TCC apply pressure
7	TCC
8	TCC exhaust to TCC regulator valve
9	Torque converter anti-drainback valve
10	TCC exhaust
11	Decreased pressure from main regulator valve

To apply to TCC, the TCC solenoid directs TCC control pressure to the TCC regulator valve, moving the valve to the left against the spring pressure. The TCC regulator valve is positioned to connect pump output to the converter apply circuit. Fluid in the apply circuit is routed to the converter and applies the TCC. Fluid exits the torque converter in the converter release circuit. The TCC regulator valve connects the converter release to exhaust and fluid returns to the sump.

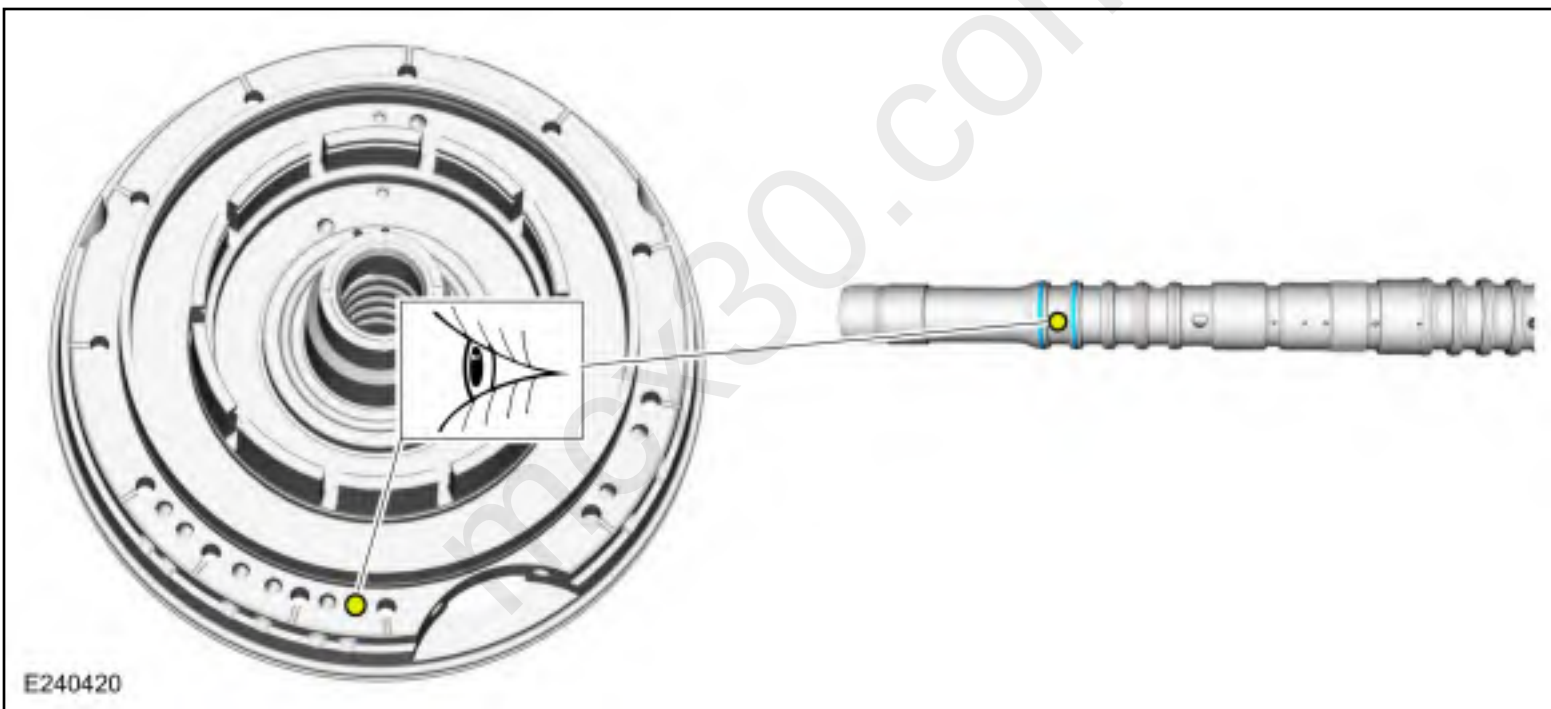
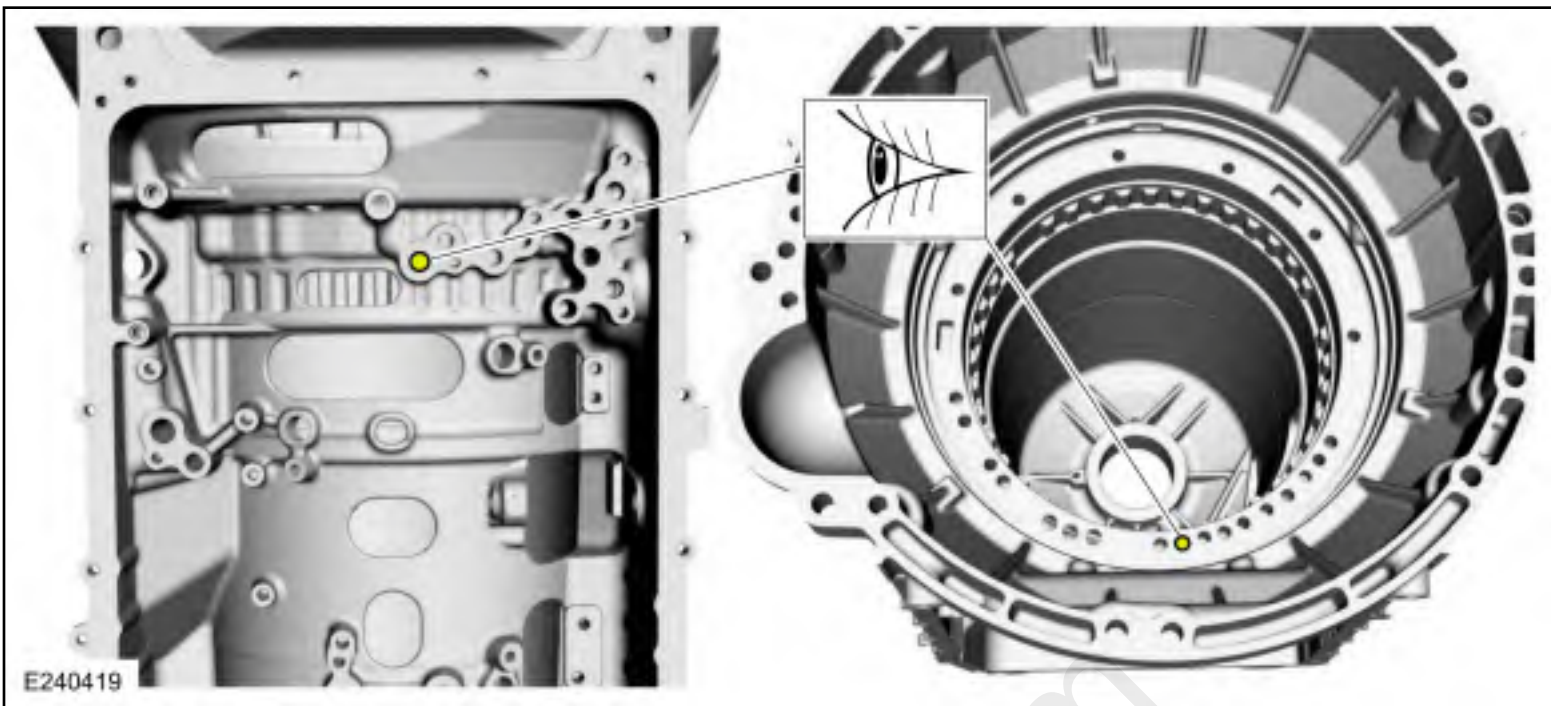
When the TCC regulator valve is in the TCC applied position, the converter feed circuit is connected to the from converter circuit allowing continued fluid flow to the cooler bypass valve.

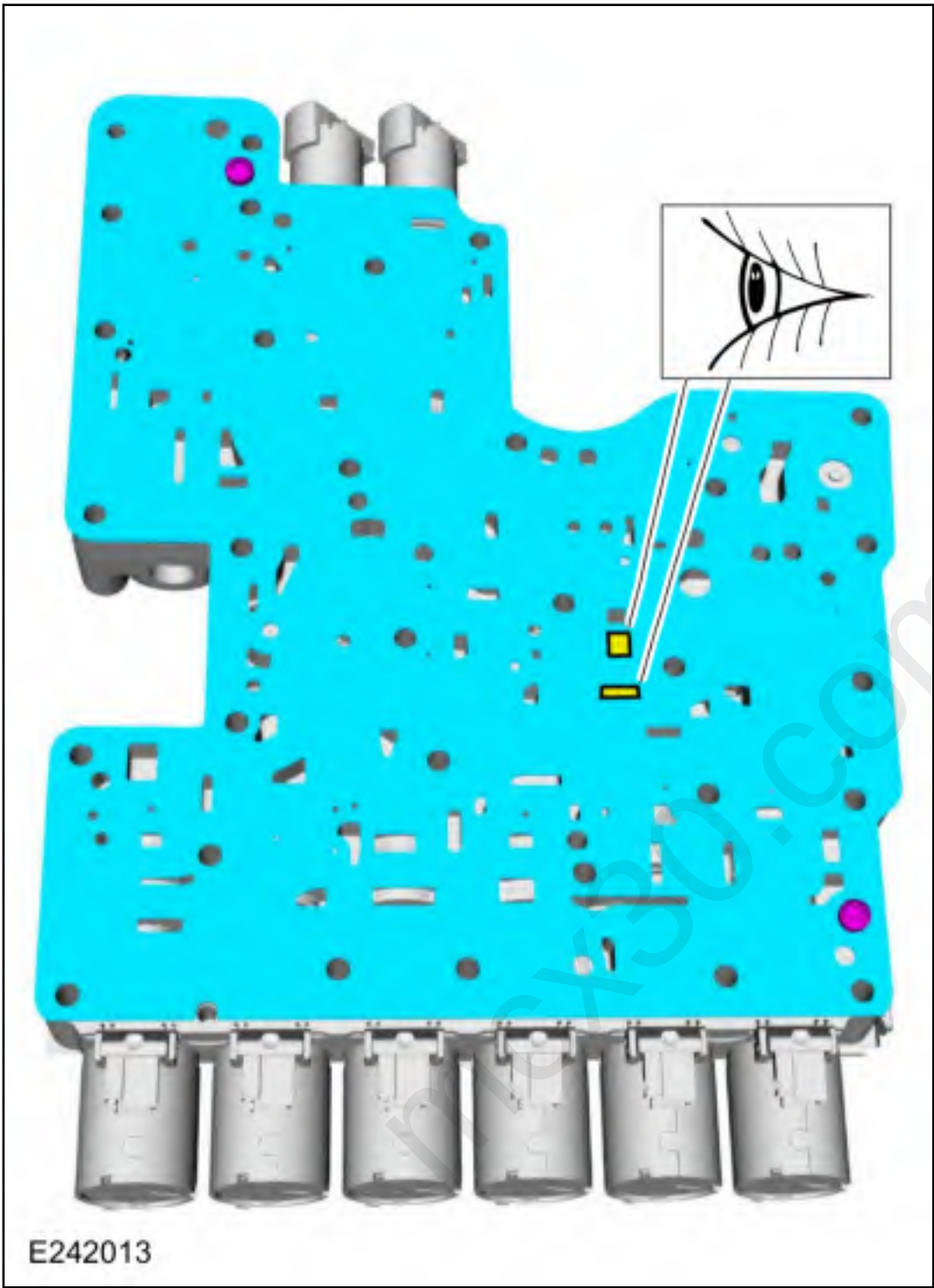
Torque Converter Hydraulic Passages (TCC Released)





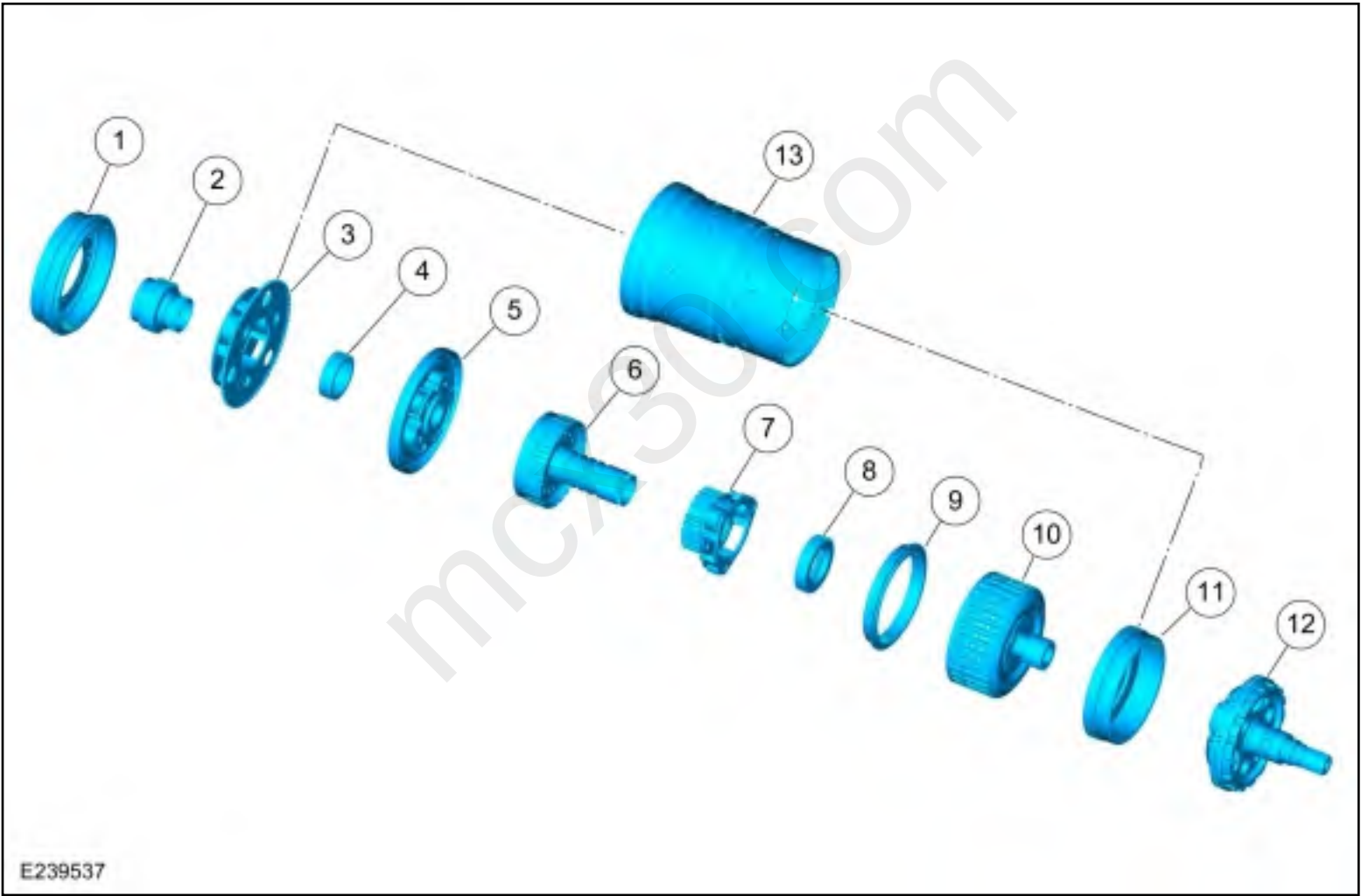
Torque Converter Hydraulic Passages (TCC Applied)





Planetary Assembly

Planetary Gearset Exploded View



Item	Description
1	Ring gear No. 1
2	Sun gear No. 1

3	Planetary carrier No. 1
4	Sun gear No. 2
5	Planetary carrier No. 2
6	Ring gear No. 2
7	Planetary carrier No. 3
8	Sun gear No. 3
9	Ring gear No. 3
10	Shell and sun gear No. 4
11	Ring gear No. 4
12	Output shaft and planetary carrier No. 4 assembly
13	Cylinder (clutch and planetary container)

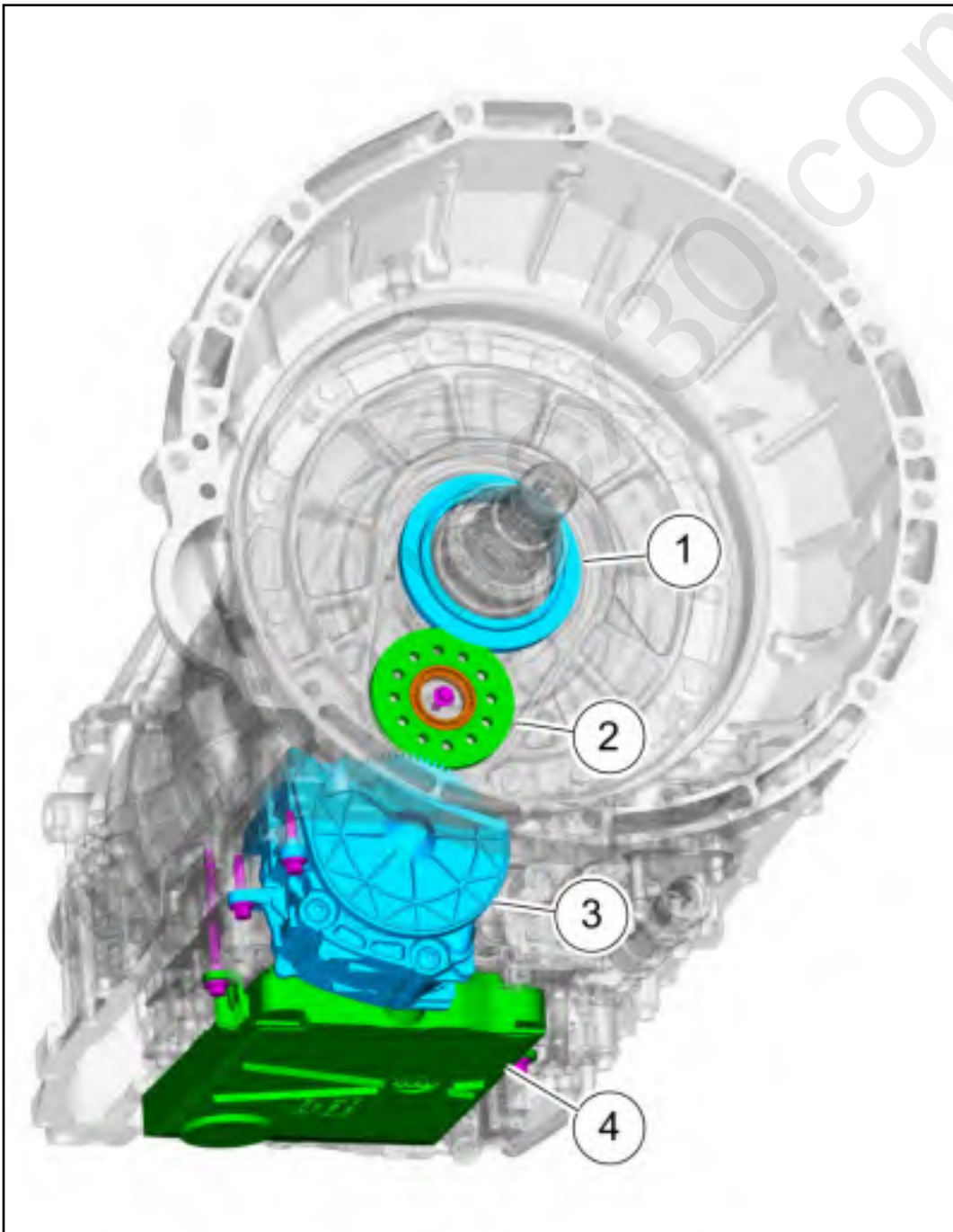
The 10R80 transmission has 4 planetary gear sets. Each gear set consists of a ring gear, a sun gear and a carrier. The gear sets are numbered 1 thru 4, from the front to the back of the transmission. There are several direct connections between the gear sets:

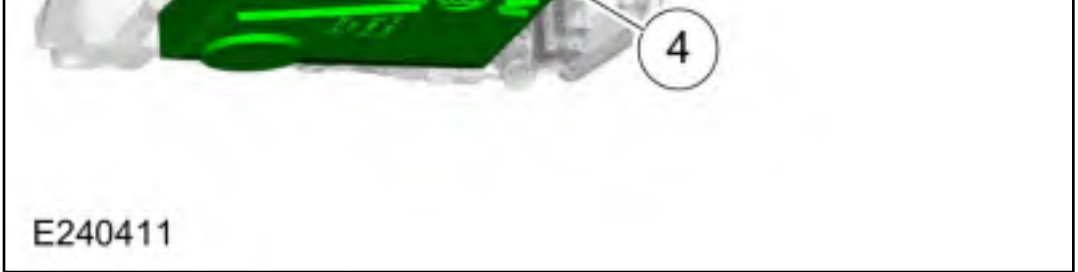
- Sun gears No. 1&2 are directly connected together with gear splines.
- Planetary carrier No. 1 and ring gear No. 4 are directly connected together with the cylinder (clutch and planetary container).
- Ring gear No. 2 and sun gear No. 3 are directly connected together with a shaft.
- Ring gear No. 3 and shell and sun gear No. 4 are directly connected together through the shell of the shell and sun gear No. 4.

Pump Assembly

Base Part Number: Base Part Number: 7A103

Overview

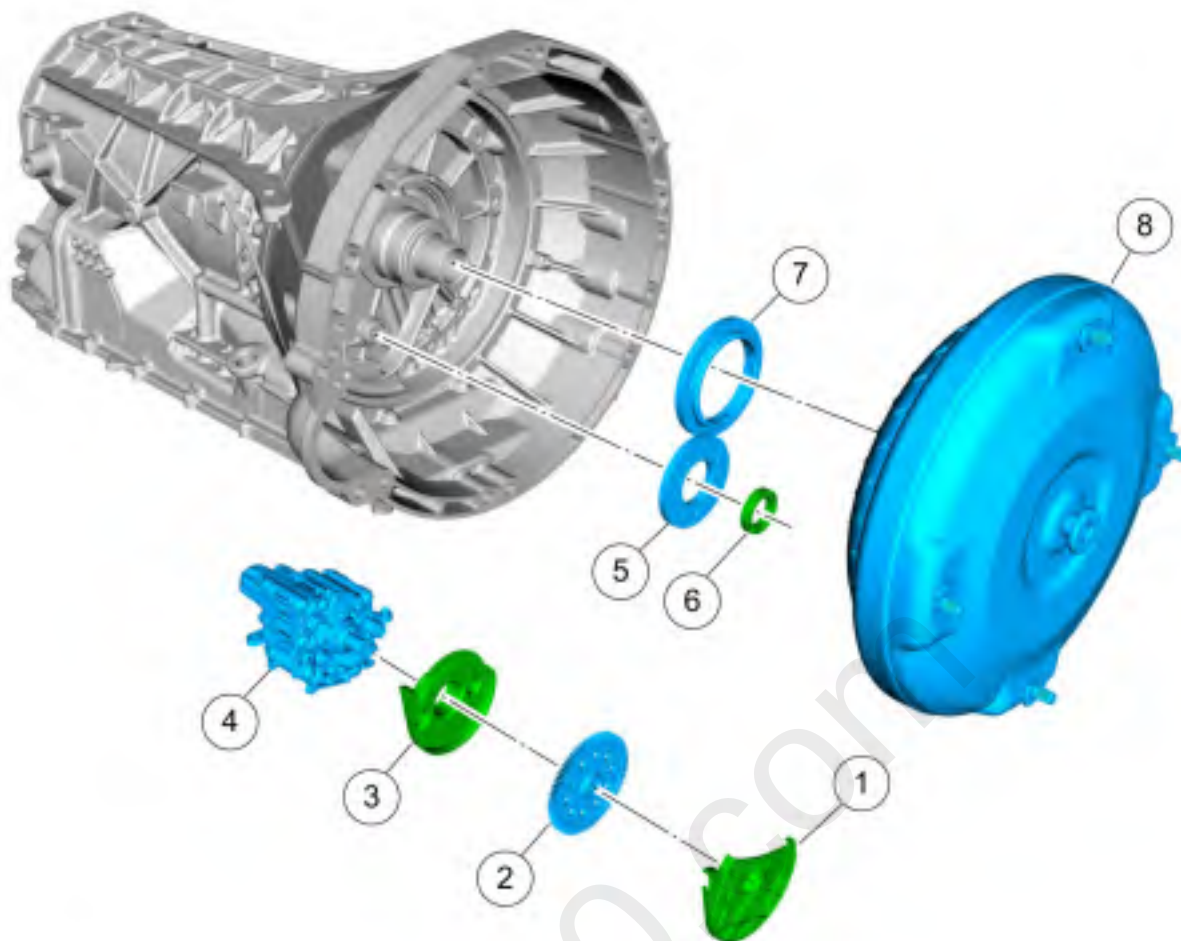




Item	Description
1	Transmission fluid pump drive gear
2	Transmission fluid pump idler gear
3	Transmission fluid pump assembly
4	Transmission fluid filter

The transmission fluid in the sump area at the bottom of the transmission case flows through a transmission fluid filter to the pump assembly. The pump is bolted to the bottom of the case and is driven by a set of gears mounted on the stator support and turned by the torque converter.

Pump Assembly Exploded View

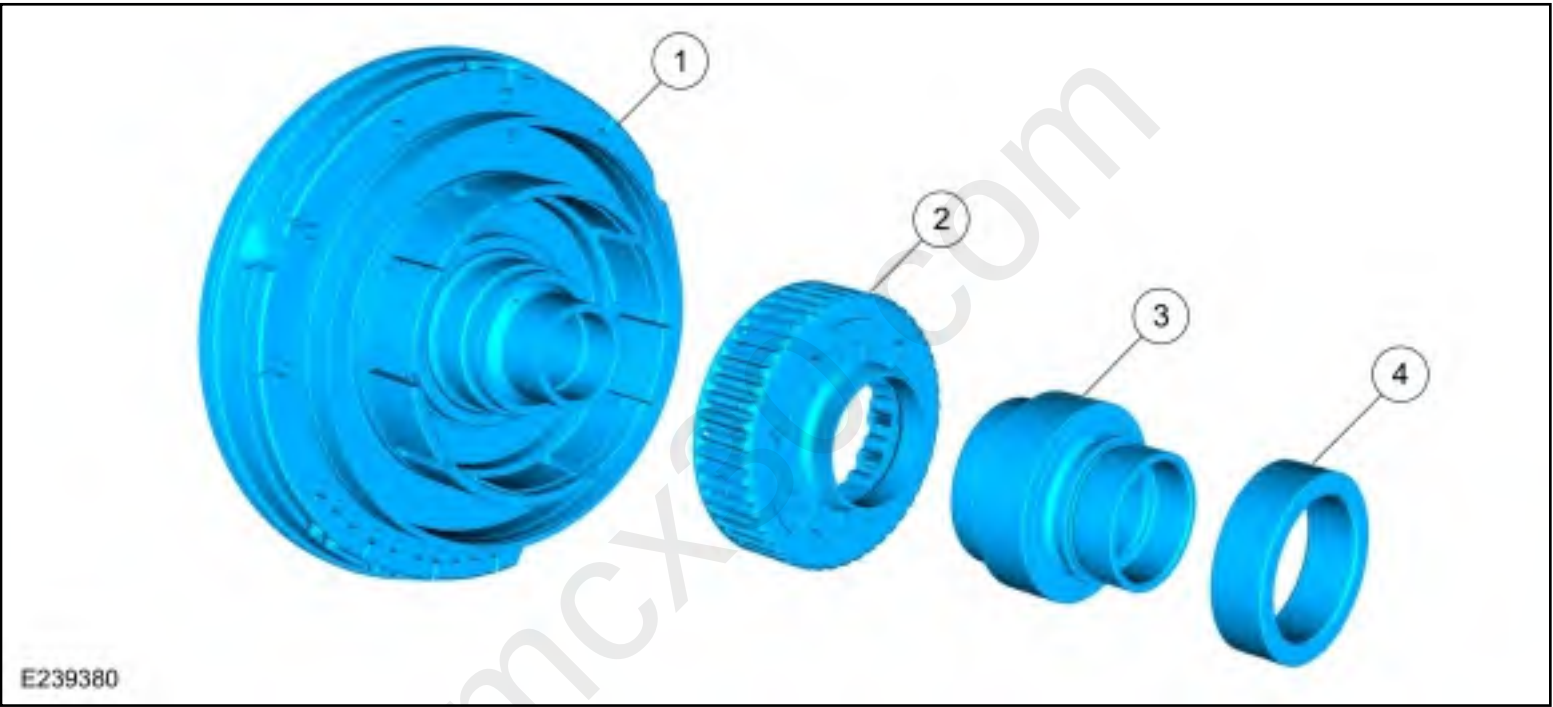


E239579

Item	Description
1	Transmission fluid pump driven gear outer cover
2	Transmission fluid pump driven gear
3	Transmission fluid pump driven gear inner cover
4	Transmission fluid pump
5	Transmission fluid pump idler gear
6	Transmission fluid pump idler gear bearing
7	Transmission fluid pump drive gear
8	Torque converter

Low One-Way Clutch Assembly

One-Way Clutch (OWC) Exploded View



Item	Description
1	Front support assembly
2	One-Way Clutch (OWC)
3	Sun gear No. 1
4	Sun gear No. 2

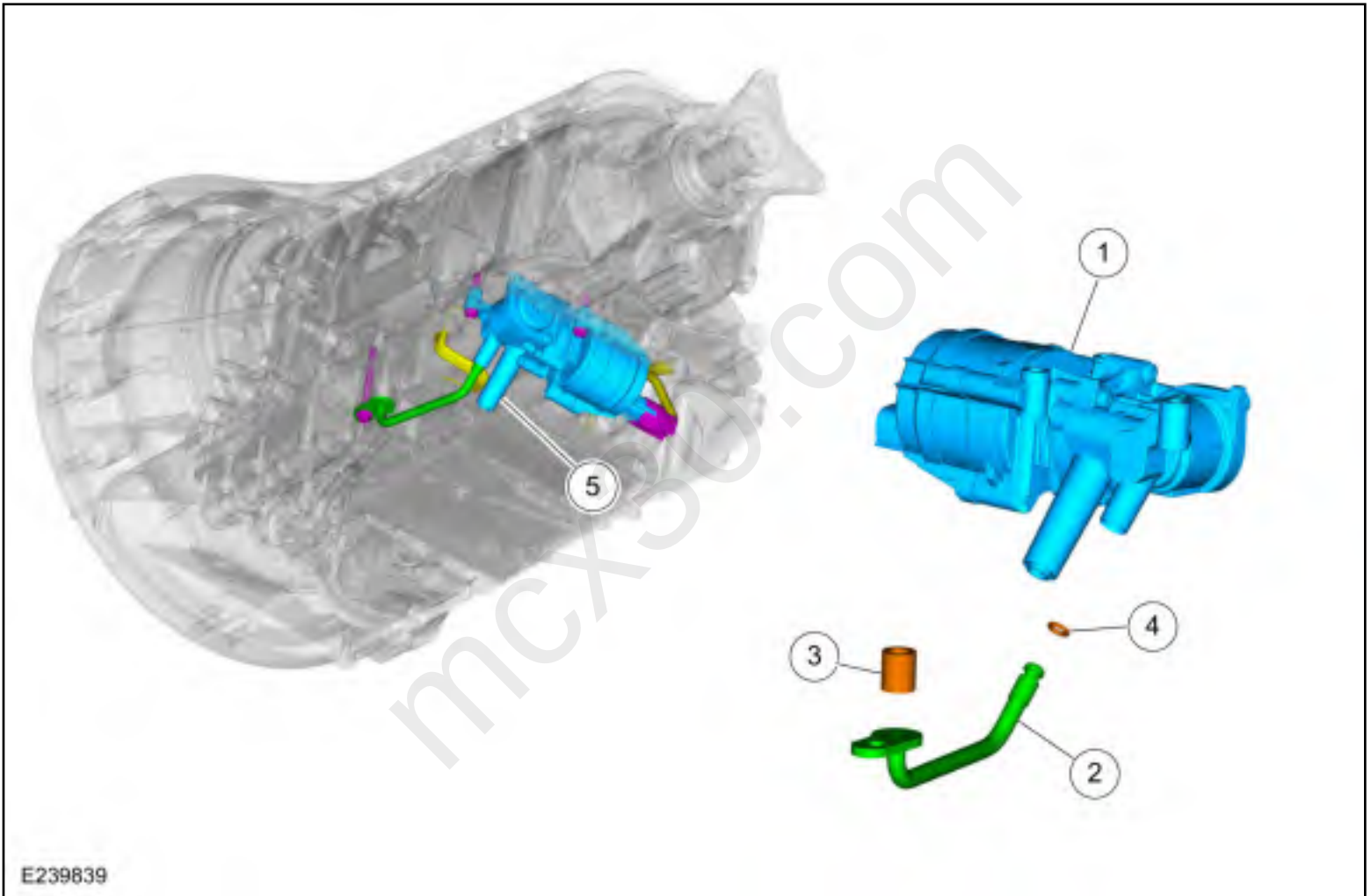
One-Way Clutch (OWC) Mechanical Operation



The One-Way Clutch (OWC) is a brake clutch that holds the sun gears No. 1&2 in one direction and allows it to freewheel in the opposite direction eliminating engine braking in 1st gear when the transmission is in drive. The rollers of the One-Way Clutch (OWC) lock to a inner race that is part of the front support assembly.

- 1. One-Way Clutch (OWC) rollers
- 2. One-Way Clutch (OWC) inner race

Transmission Fluid Auxiliary Pump



Item	Description
1	Transmission fluid auxiliary pump
2	Transmission fluid auxiliary pump tube
3	Transmission fluid auxiliary pump tube seal
4	Transmission fluid auxiliary pump tube O-ring

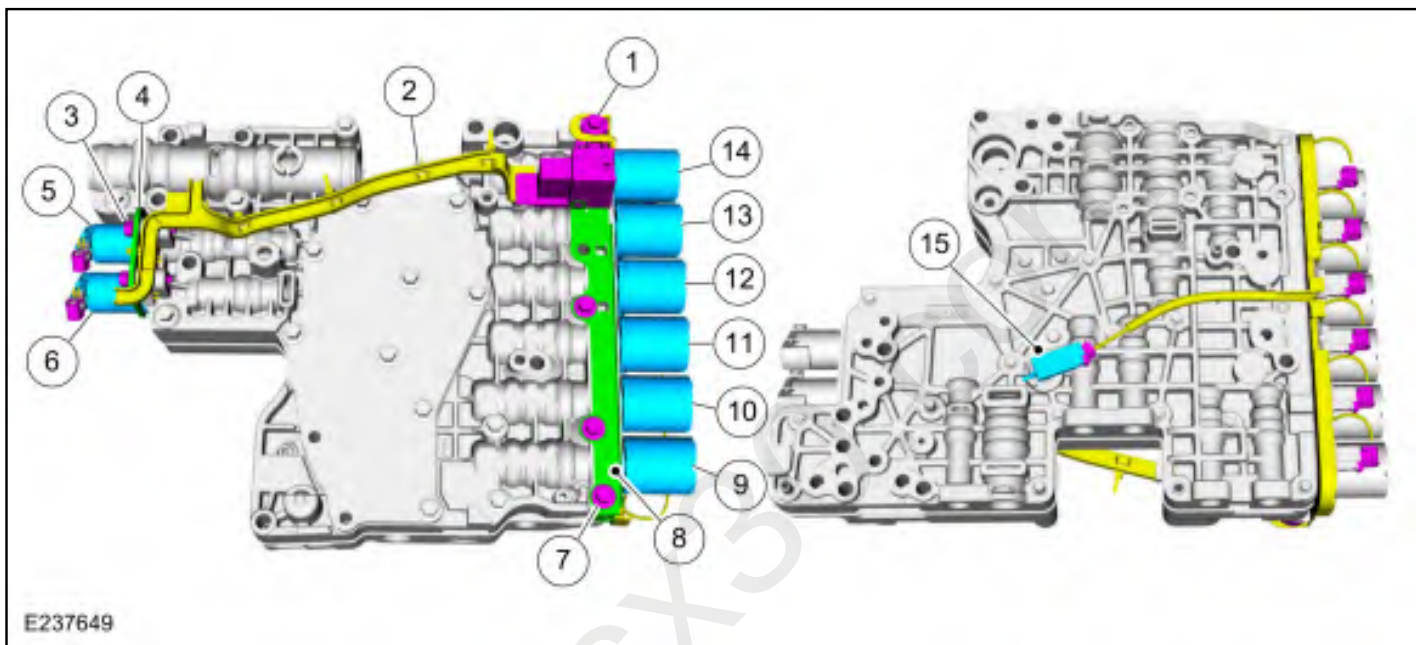
On vehicles equipped with Auto-Start-Stop the 10R80 comes is equipped with an transmission fluid auxiliary pump, an electronic pump that can be turned on before an engine stop event, allowing the transmission to stay engaged during the stop event. This allows quick response on the engine restart because the transmission is already in gear. The transmission fluid auxiliary pump does not have sufficient flow to apply clutches, but can keep clutches on when the engine stops and the main hydraulic pump stops providing pressure.

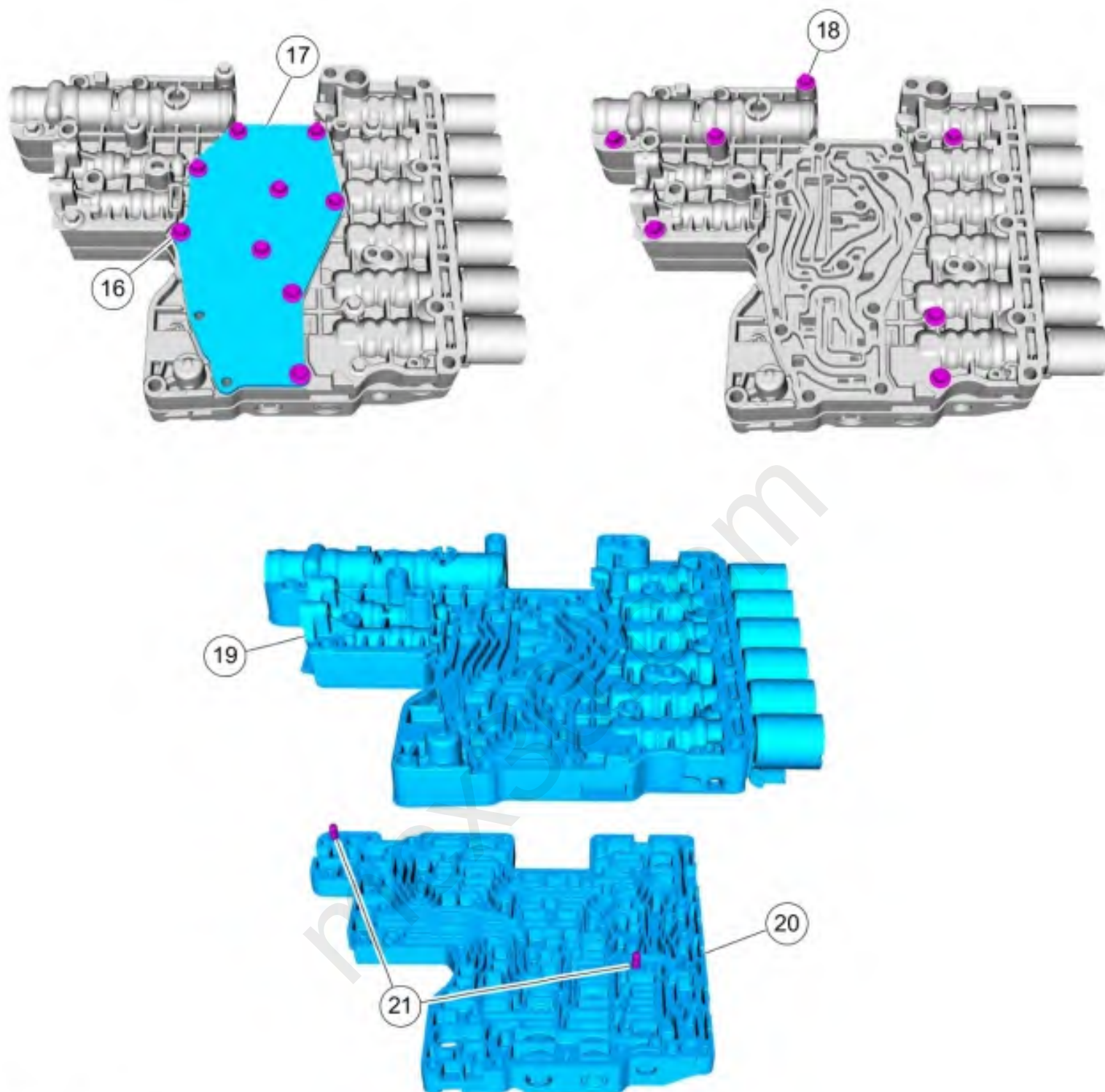
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Main Control Valve Body

Base Part Number: Base Part Number: 7A100



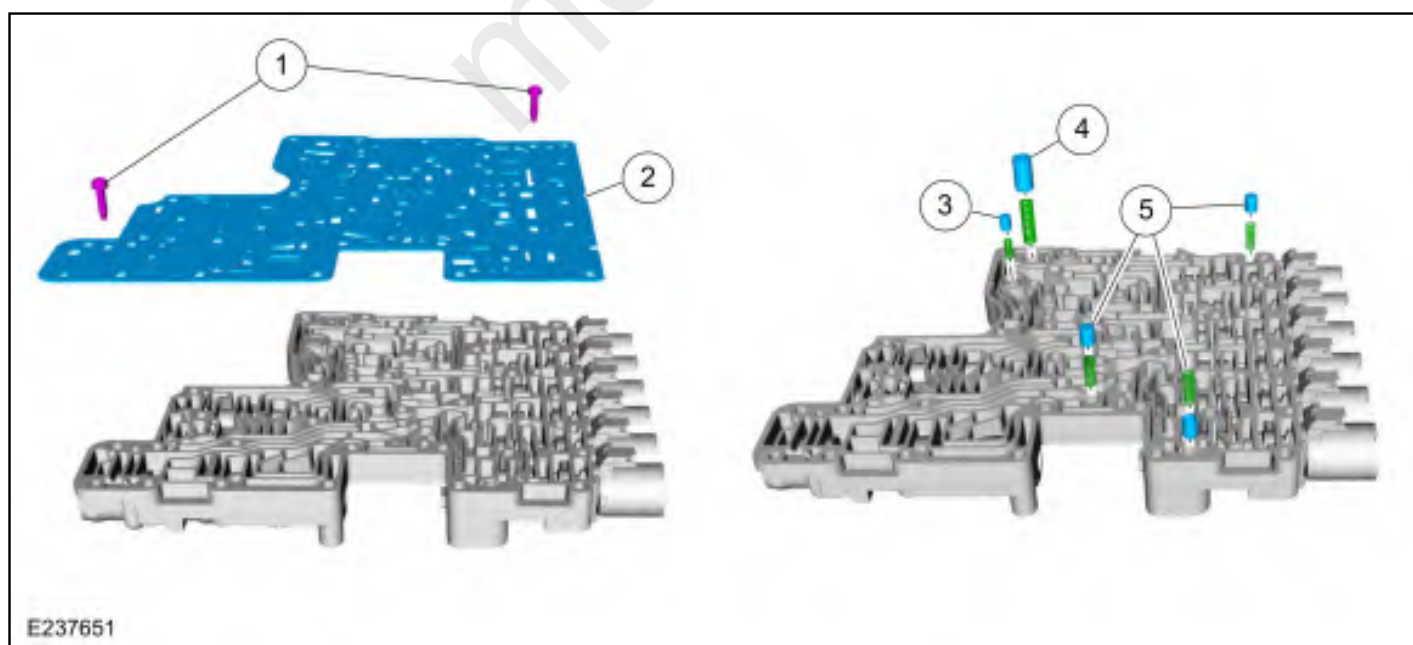


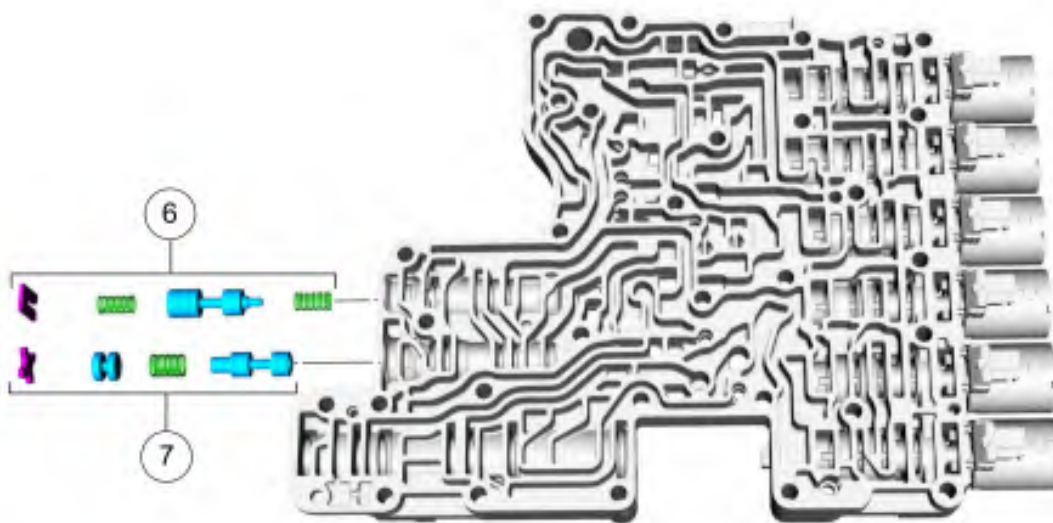
E237650

Item	Description
1	Internal wiring harness retaining bolt
2	Internal wiring harness
3	Solenoid retaining plate bolts

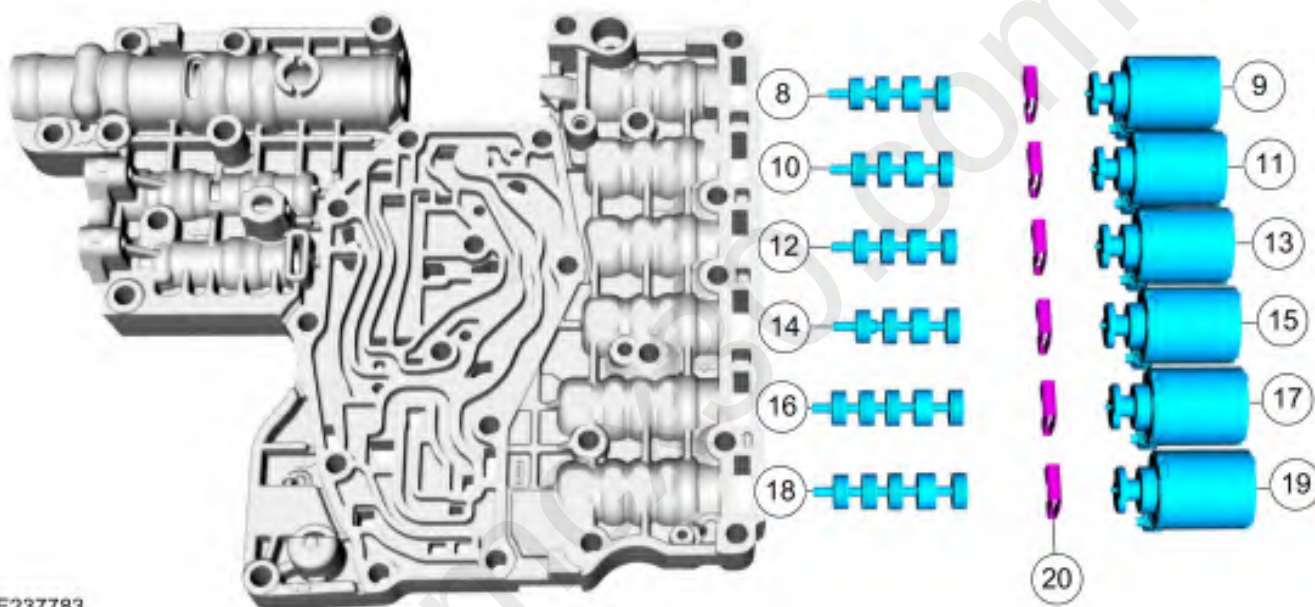
4	Solenoid retaining plate
5	TCC solenoid
6	LPC solenoid
7	Shift solenoid retaining plate bolts
8	Shift solenoid retaining plate
9	SSD
10	SSE
11	SSB
12	SSC
13	SSF
14	SSA
15	TFT
16	Valve channel plate bolts
17	Valve channel plate
18	Lower-to-upper valve body bolts
19	Lower valve body
20	Upper valve body
21	Valve body dowel pins

Lower Valve Body





E237782

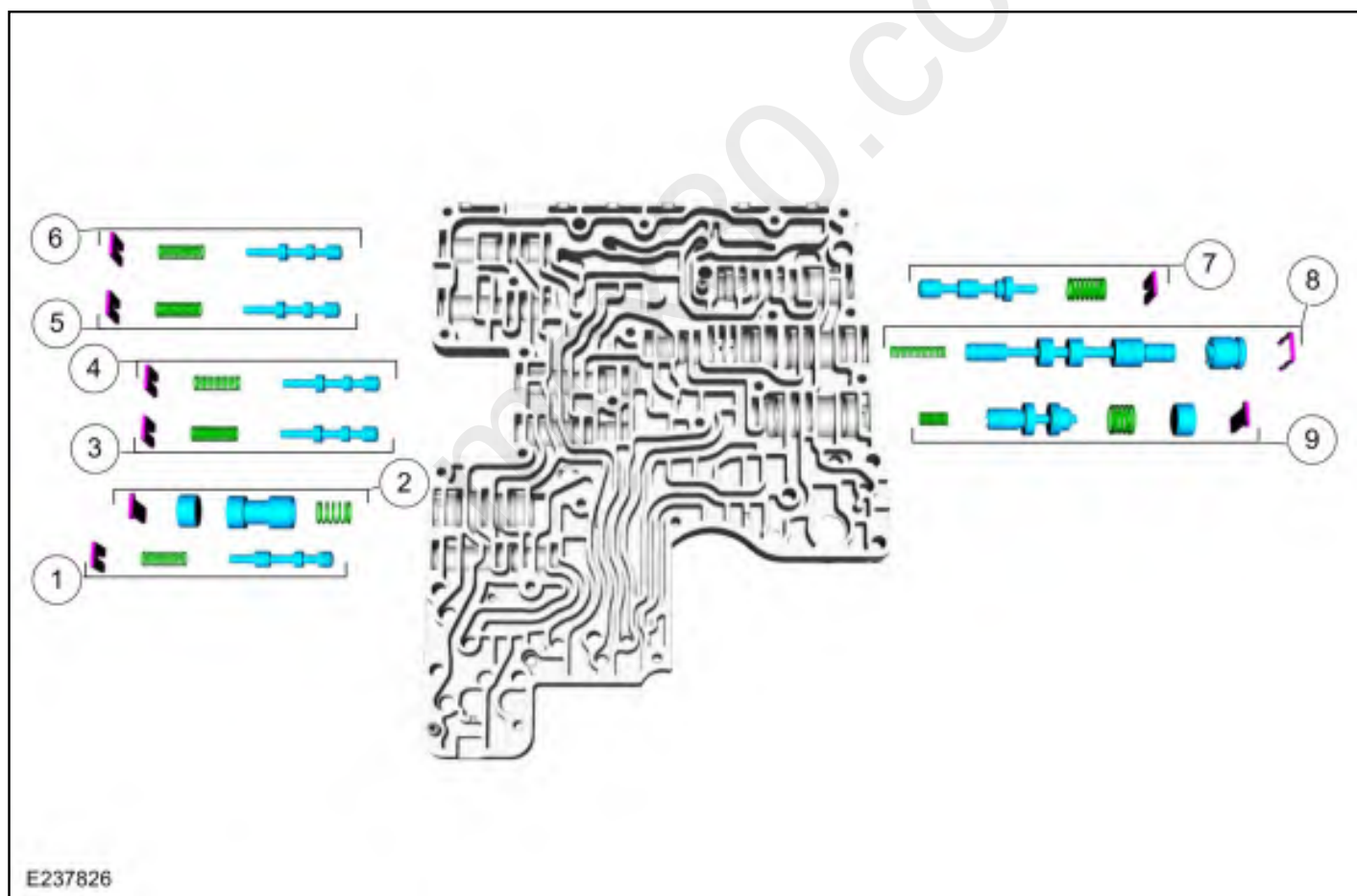


E237783

1	Valve body separator plate bolts
2	Valve body separator plate
3	TCC damper assembly
4	LPC damper assembly
5	Check valve assemblies
6	LPC anti-backflow valve assembly
7	TCC priority valve assembly
8	A clutch control valve
9	SSA

10	F clutch control valve
11	SSF
12	C clutch control valve
13	SSC
14	B clutch control valve
15	SSB
16	E clutch control valve
17	SSE
18	D clutch control valve
19	SSD
20	Shift solenoid retainers

Upper Valve Body



1	Lube control valve assembly
2	Bypass valve assembly

3	C clutch latch valve assembly
4	B clutch latch valve assembly
5	F clutch latch valve assembly
6	A clutch latch valve assembly
7	Clutch gain control valve assembly
8	TCC regulator valve assembly
9	Main regulator valve assembly

The main control consists of a upper and lower valve body with solenoids that are controlled by a PCM or a TCM with 3.5L EcoBoost engines. The PCM or TCM operates the electrical components to provide refined engagement feel, shift feel, and shift scheduling.

Clutch Control Valves

The A, B, C, and F clutch control valves are used to regulate line pressure for smooth clutch application. The clutch control valve design includes a slightly smaller land at the right end of the valve. The adjacent different diameter lands creates a differential chamber. Fluid under pressure in this chamber will apply more force to the larger diameter land than to the smaller diameter land.

- The clutch control valve moves to open or close a passage between line pressure and the clutch control circuit. With the valve at the left of the bore, the passage between line pressure and X clutch control is restricted (closed) and the clutch is released. With the valve at the right of the bore, the passage between line pressure and X clutch control is not restricted (open) and the clutch is applied.
- The clutch control valve is positioned in the bore by balancing two opposing forces. On the left side of the valve is the shift solenoid that pushes the valve to the right and thereby opening the passage and increasing pressure in the clutch control circuit.
- Clutch control pressure in the differential chamber applies more force to the land on the left pushing the valve towards the solenoid and thereby lowering pressure in the clutch control circuit.
- When the shift solenoid is de-energized, the weight of the fluid in the elevated exhaust circuit acts on the clutch control valve to keep it positioned against the solenoid pintle. The passage from line pressure to X clutch control is closed.
- To apply the clutch, the PCM or the TCM applies current to the shift solenoid and hydraulic pressure in the X clutch control circuit increases proportionally.
- As the solenoid force increases, the clutch control valve moves and connects line pressure to X clutch control.
- X clutch control fluid begins to fill the clutch. X clutch control also acts on the clutch control valve via the differential chamber.
- The clutch control valve cycles rapidly as the X clutch control pressure increases and the clutch applies.

The D and E clutch control valves are used to regulate line pressure for smooth clutch application. The clutch control valve design is similar to the A, B, C, and F clutch control valves, except there are 2 progressively smaller diameter lands at the right end of the valve. The different diameter lands create two differential chambers. Valve operation is identical to the other clutch control valves except the D and E clutch control valve can use 2 different

forces to balance the valve against the solenoid. Under low load conditions, the X clutch control circuit feeds both differential chambers resulting more force acting against the solenoid. The clutch control valve is positioned relatively close to the solenoid and about 100 PSI of regulated line pressure applies or holds the clutch. Under high load conditions, the X clutch control circuit feeds only 1 differential chamber resulting less force acting against the solenoid. The clutch control valve is positioned relatively further away from the solenoid and about 200 PSI of regulated line pressure applies or holds the clutch.

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B Clutch

Symptom Chart

B Clutch

For B clutch operation,
REFER to: [B Clutch](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80,
Description and Operation).

B Clutch

Condition	Possible Sources	Action
B clutch does not apply	SSB is mechanically stuck OFF	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	B Clutch regulator valve stuck OFF	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

	PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
B CL CONTR, hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
B clutch hub	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
B clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
B clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

B clutch always applied	SSB mechanically stuck	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	B Clutch regulator valve or CL B latch valve stuck ON	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	B CL CONTR, hydraulic circuit cross leaks	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

	B clutch hub, clutch and planetary carrier, No. 4 ring gear	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	B clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	B clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
B clutch delayed/soft/slipping apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	Low line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSB mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

B Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
B CL CONTR, hydraulic circuits blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
B clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
B clutch piston seals	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

B clutch harsh apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	High line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSB mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	B Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

B CL CONTR hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
B clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
B clutch piston return springs	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

Preliminary Inspection

Overview

The preliminary inspection is part of Automatic Transmission Diagnosis. The preliminary inspection is used to find obvious causes for transmission concern.

Underhood Inspection

To correctly diagnose a concern, first understand the customer concern or condition. Customer contact may be required to understand the conditions, including when the concern occurs. For example:

1. Look for missing or damaged air induction components.
2. Inspect the wire harness for proper routing, especially near the rear of the cylinder heads. Make sure the harness is not chafed or pinched.
3. Inspect transmission fluid cooler for proper mounting and check for any missing air deflectors.

Under Vehicle Inspection

1. Place the selector lever in D.
2. With the vehicle in NEUTRAL, position it on a hoist.
REFER to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
3. Inspect transmission case for evidence of leaks.
4. Inspect transmission fluid cooler lines for proper routing, pinches, or kinks.
5. Inspect transmission fluid cooler mounting and check for any missing air deflectors.

6. Adjust the selector lever cable. (If equipped)

REFER to: [Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Column Shift](#) (307-05 Automatic Transmission External Controls, General Procedures).

REFER to: [Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Floor Shift](#) (307-05 Automatic Transmission External Controls, General Procedures).

Transmission Fluid Inspection

Transmission fluid condition can provide many clues to the nature of the transmission concern. Proper transmission fluid level can only be determined with the transmission fluid at a specified temperature range. It is not necessary to verify exact transmission fluid level at this time. If the transmission fluid is below operating temperature, it is expected to be low on the transmission fluid level indicator. Transmission fluid temperatures below 30.2°F (-1°C) may not show up on a transmission fluid level indicator.

1. With the vehicle in NEUTRAL, position it on a hoist.
REFER to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
Remove the transmission fluid fill plug and transmission fluid level indicator.
2. Allow the transmission fluid to drip onto a facial tissue or white sheet of paper.
3. Examine the stain.
4. Small black particles are typically burnt friction material.
5. Small shiny metallic particles indicate excessive hard part wear.
6. Foamy pink color indicates either water or engine coolant in the transmission.

Water in Transmission Fluid

To correctly repair an automatic transmission that has had water or coolant introduced into the system, completely disassemble, clean, and replace the following parts:

- All internal and external seals
- All friction material
- Torque converter
- All parts with bonded seals

- All solenoids
- All transmission fluid filters

Prior to installing the transmission, flush and clean the transmission fluid cooler(s) and the transmission fluid cooler tubes and hoses.

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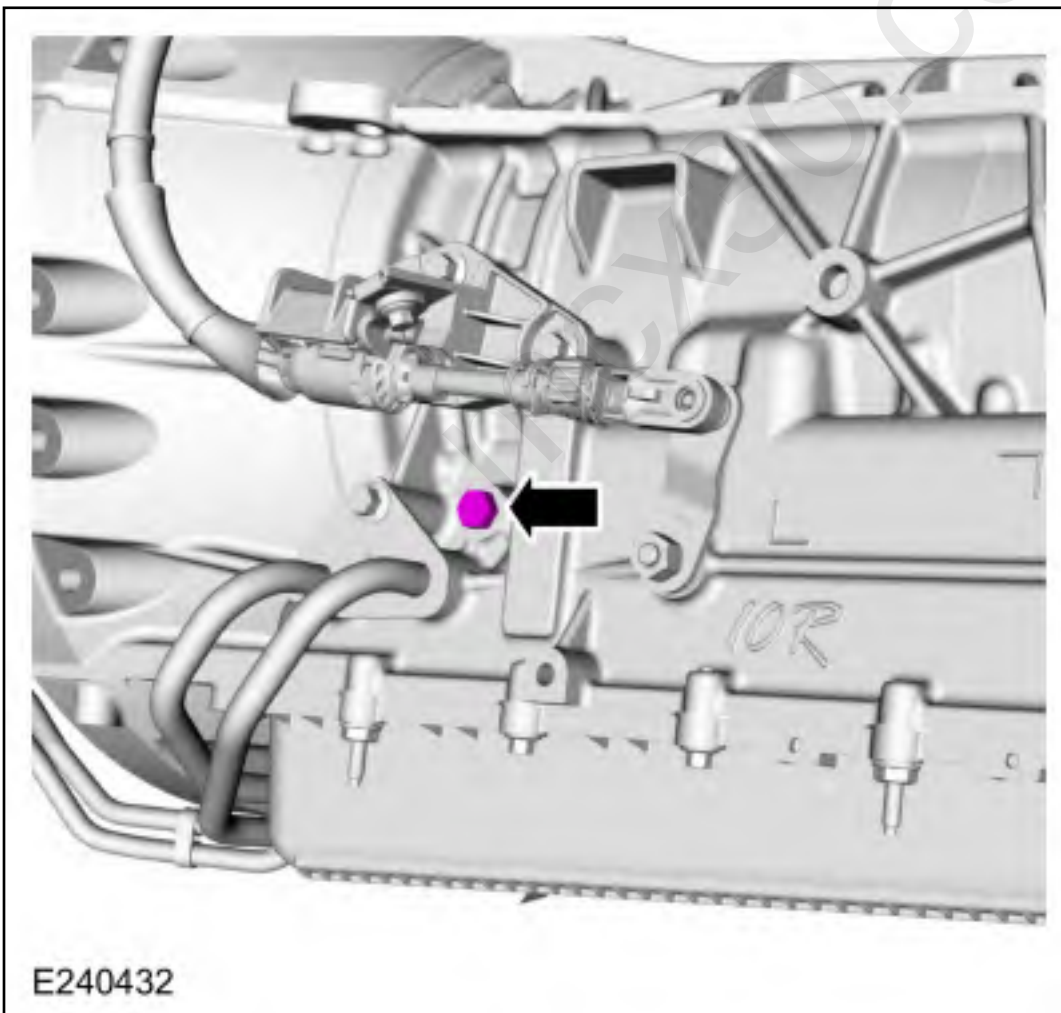
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Special Testing Procedures

Line Pressure Test

NOTE: Carry out the Line Pressure Test prior to carrying out the Stall Speed Test. If the line pressure is low at stall, do not carry out the Stall Speed Test or further transmission damage will occur. Do not maintain Wide Open Throttle (WOT) in any transmission range for more than 5 seconds.

This test verifies that the line pressure is within specification.



1. **NOTE:** The line pressure tap is an M10 X 1.00 thread. Do not use a National Pipe Thread (NPT) fitting when installing a pressure gauge. If a NPT fitting is used, damage to the transmission case will occur.

Connect the Transmission Fluid Pressure Gauge to the line pressure tap using an M10 X 1.00 fitting.

2. Start the engine and check the line pressures. Refer to the Line Pressure Chart to determine if the line pressure is within specification.

Line Pressure Chart

NOTE: Actual and commanded pressures vary based on calibration and transmission adaptive strategies. All pressures listed are approximate.

Gear	Line Pressure — kPa (psi)		Commanded — LPC pressure kPa (psi) a	
	Idle	WOT Stall	Idle	WOT Stall
P, N	619 (90)	-	94 (14)	-
R	619 (90)	1,675 (240)	94 (14)	410 (60)
(D)	619 (90)	1,600 (230)	94 (14)	375 (55)
3	619 (90)	1,230 (180)	94 (14)	275 (40)
2	619 (90)	1,675 (240)	94 (14)	410 (60)
1	619 (90)	1,600 (230)	94 (14)	375 (55)

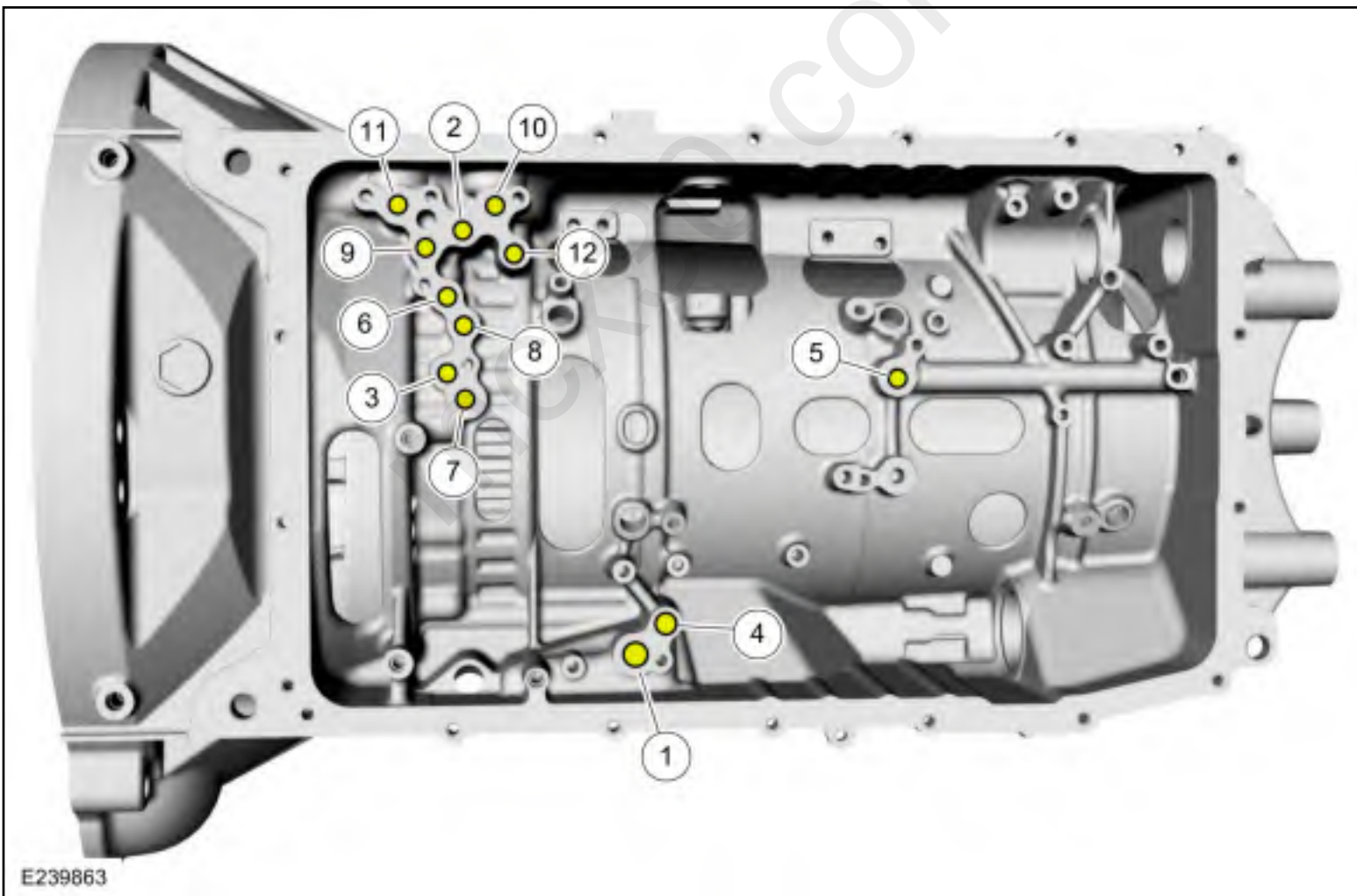
aCommanded pressure as viewed on diagnostic equipment.

3. If the line pressure is not within specification, refer to the Line Pressure Diagnosis Chart.
4. When the pressure tests are complete, install the line pressure tap plug.
1. Tighten to 11 Nm (97 lb-in).

Test Results	Possible Source

HIGH at IDLE - ALL RANGES	• Wiring harnesses • LPC solenoid • LPC valve
LOW at IDLE - ALL RANGES	• Low fluid level • Fluid inlet filter/seal • Main control • Cross leaks • Gaskets • Pump • Separator plate

Air Pressure Test



10R80 Air Ports

Item	Description
1	A clutch
2	B clutch
3	C clutch
4	D clutch
5	E clutch
6	F clutch
7	TCC apply
8	TCC release
9	Lube
10	To cooler
11	From cooler
12	Line pressure tap

NOTE: When applying air pressure to the clutches using the indicated ports, restrict air pressure to no more than 276 kPa (40psi).

A no-drive condition can exist even with correct transmission fluid pressure because of inoperative clutches. Refer to the Clutch Application Chart to determine which clutch is applied in each gear range. A clutch concern can be located through a series of checks by substituting air pressure for fluid pressure to determine the location of the conce

Stall Speed Test

NOTE: Carry out the Line Pressure Test prior to the Stall Speed Test. If line pressure is low, do not carry out the stall test or additional transmission damage will occur. Do not maintain Wide Open Throttle (WOT) in any gear range for more than 5 seconds.

NOTE: After testing each of the ranges, move the selector lever into the NEUTRAL position and run the engine at 1,000 rpm for about 15 seconds to allow the torque converter to cool off before continuing onto the next range.

NOTE: If the engine speed exceeds maximum specified rpm, release the accelerator pedal immediately.

NOTE: Only perform the stall speed test with the engine and transmission at normal operating

temperatures.

The Stall Speed Test checks the operation of the following items:

- Torque converter clutch stator
- A clutch
- B clutch
- C clutch
- D clutch
- E clutch
- F clutch

1. Connect a scan tool.
2. Press the accelerator pedal to WOT in each range. Record the rpm reached in each range. Stall speeds should be in the appropriate range.

Stall Speed

Engine	Drive	Reverse
3.5L	3478-3845 rpm	3478-3845 rpm

Test Results Possible Source Stall speed high — R only	Possible Source
Stall speed high — R only	• General line pressure concerns • F clutch
Stall speed high — 1st and 3rd gears	• E clutch
Stall speed high — Both 2nd and 3rd gears	• C clutch
Stall speed high — 2nd, 3rd and R gears	• D clutch

Stall speed high — All ranges	• A clutch
Stall speed high — R and 1st, 2nd	• Engine driveability concern • TCC stator

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Diagnosis By Symptom

Symptom Chart(s)

Symptom Chart: Automatic Transmission

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

In most circumstances the PCM/ TCM sets a DTC to help guide with diagnostics. Refer to the DTC Chart before using the Symptom Chart. The Condition column lists the vehicle condition. The Possible Sources column lists a detailed vehicle condition. The Action column lists the action to be performed to determine the cause of the condition. Each action lists the components that can cause the symptom and the individual components in that system. The components are listed in order of disassembly. Use the list of components and the required action to focus on disassembly inspections for the root cause of the concern.

Symptom	Possible Sources	Action
Engagement concerns	No forward	- CHECK A clutch for damage. REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). - CHECK E clutch for damage. REFER to: E Clutch (307-01B Automatic

		Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • CHECK the low one way clutch for damage. REFER to: Low One-Way Clutch Assembly (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	• No reverse	• CHECK A clutch for damage. REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • CHECK B clutch for damage. REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • CHECK D clutch for damage. REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

	CHECK F clutch for damage. REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
Harsh reverse	- CHECK B clutch for damage. REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). - CHECK F clutch for damage. REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
Harsh forward	- CHECK E clutch for damage. REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). - CHECK A clutch for damage. REFER to: A Clutch (307-01B Automatic

	Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• Delayed/soft reverse	• CHECK the transmission fluid level. REFER to: Transmission Fluid Level Check (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures). • CHECK line pressure. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • CHECK B clutch for damage. REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • CHECK F clutch for damage. REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic

	Transmission - 10R80, Diagnosis and Testing).
• Delayed soft/forward	• CHECK the transmission fluid level. REFER to: Transmission Fluid Level Check (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures). • CHECK line pressure. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • CHECK E clutch for damage. REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

- No forward and no reverse

- CHECK the transmission fluid level.
REFER to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

- INSPECT the filter and filter to pump seal/gasket.
REFER to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

- INSPECT the pump assembly.
REFER to: [Transmission](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

- INSPECT main pressure regulator valve for damage, scoring, or sticking.
REFER to: [Main Control Valve Body](#)

	(307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul). INSPECT turbine shaft splines on transmission input shaft and in the torque converter turbine. REPLACE damaged components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
Delayed/soft forward and reverse	- CHECK the transmission fluid level. REFER to: Transmission Fluid Level Check (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures). - CHECK line pressure. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

- INSPECT the filter and filter to pump seal/gasket.

REFER to:

[Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B

Automatic

Transmission - 10-

Speed Automatic

Transmission - 10R80,

Removal and

Installation).

- INSPECT main pressure regulator valve for damage, scoring, or sticking.

REFER to: [Main](#)

[Control Valve Body](#)

(307-01B Automatic

Transmission - 10-

Speed Automatic

Transmission - 10R80,

Overhaul).

- INSPECT the pump assembly.

REFER to:

[Transmission](#) (307-

01B Automatic

Transmission - 10-

Speed Automatic

Transmission - 10R80,

Overhaul).

• Neutral after launch	• The Low One way clutch is not holding on acceleration. REFER to: Low One-Way Clutch Assembly (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• Harsh/soft/delayed engagement after stop/start restart.	• CHECK auxilliary transmission oil pump, pick up screen/check ball (If equipped). Pump tube to case O-ring missing or damaged. Pump output tube blocked/restricted LPC valve not returning to center (sticking valve/broken springs). REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Shift concerns	Slip on hard acceleration in 1st or 2nd	One way clutch (sprag type slipping). REFER to: Low One-Way Clutch Assembly (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	No 1-2 shift/harsh/soft/slipping	- C, D clutch may be damaged or worn. See condition C or D clutch does not apply. REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). - The A clutch may be slipping during the shift. See condition A clutch delayed/soft/slipping apply. REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). - The E clutch may be seized Stuck on.

	REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• No 2-3 shift/harsh/soft/slipping	• The E clutch may be damaged or worn. REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • One Way clutch seized/stuck holding. REFER to: Low One-Way Clutch Assembly (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The A, C, or D clutch may be slipping during the shift. See condition A, C, or D clutch delayed/soft/slipping apply. REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic

	Transmission - 10R80, Diagnosis and Testing). REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• No 3-4 shift/harsh/soft/slipping	• The E clutch may be damaged or worn. See condition E clutch does not apply. REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The A, C, or D clutch may be slipping during the shift. See condition A, C, or D clutch delayed/soft/slipping apply. REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic

	Transmission - 10R80, Diagnosis and Testing). • The E clutch may not be releasing properly. See condition E clutch always applied. REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• No 4-5 shift/harsh/soft/slipping	• The E clutch may be damaged or worn. See condition, E clutch does not apply. REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The A, C, F clutch may be slipping during the shift. See condition A, C, F clutch delayed/soft/slipping apply. REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

REFER to: [F Clutch](#)
(307-01B Automatic
Transmission - 10-
Speed Automatic
Transmission - 10R80,
Diagnosis and Testing).

- The D clutch may not be releasing properly. See condition D clutch always applied.
REFER to: [D Clutch](#)
(307-01B Automatic
Transmission - 10-
Speed Automatic
Transmission - 10R80,
Diagnosis and Testing).

- No 5-6 shift/harsh/
soft/slipping

- The D clutch may be damaged or worn. See condition D clutch does not apply.
REFER to: [D Clutch](#)
(307-01B Automatic
Transmission - 10-
Speed Automatic
Transmission - 10R80,
Diagnosis and Testing).
- The A, E, F clutch may be slipping during the shift. See condition A, E, F clutch delayed/soft/slipping apply.
REFER to: [A Clutch](#)
(307-01B Automatic
Transmission - 10-
Speed Automatic
Transmission - 10R80,
Diagnosis and Testing).
REFER to: [E Clutch](#)
(307-01B Automatic

	Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The C clutch may not be releasing properly. See condition C clutch always applied. REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• No 6-7 shift/harsh/soft/slipping	• The C clutch may be damaged or worn. See condition C clutch does not apply. REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The D, E, F clutch may be slipping during the shift. See condition D, E, F clutch delayed/soft/slipping apply. REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic

	Transmission - 10R80, Diagnosis and Testing). REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The A clutch may not be releasing properly. See condition A clutch always applied. REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• No 7-8 shift/harsh/soft/slipping	• CHECK B clutch for damage. REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The D, E, F clutch may be slipping during the shift. See condition D, E, F clutch delayed/soft/slipping apply. REFER to: D Clutch (307-01B Automatic

	Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The C clutch may not be releasing properly. See condition C clutch always applied. REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• No 8-9 shift/harsh/soft/slipping	• The C clutch may be damaged or worn. See condition C clutch does not apply. REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The B, E, F clutch may be slipping during the shift. See condition B,

E, F clutch delayed/
soft/slipping apply.
REFER to: [B Clutch](#)
(307-01B Automatic
Transmission - 10-
Speed Automatic
Transmission - 10R80,
Diagnosis and Testing).
REFER to: [E Clutch](#)
(307-01B Automatic
Transmission - 10-
Speed Automatic
Transmission - 10R80,
Diagnosis and Testing).
REFER to: [F Clutch](#)
(307-01B Automatic
Transmission - 10-
Speed Automatic
Transmission - 10R80,
Diagnosis and Testing).

- The D clutch may not
be releasing properly.
See condition D clutch
always applied.
REFER to: [D Clutch](#)
(307-01B Automatic
Transmission - 10-
Speed Automatic
Transmission - 10R80,
Diagnosis and Testing).

- No 9-10 shift/harsh/soft/slipping

- CHECK D clutch for damage.
REFER to: [D Clutch](#)
(307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

- The B, C, F clutch may be slipping during the shift. See condition B, C, F clutch delayed/soft/slipping apply.
REFER to: [B Clutch](#)
(307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
REFER to: [C Clutch](#)
(307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
REFER to: [F Clutch](#)
(307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

- The E clutch may not be releasing properly. See condition E clutch always applied.
REFER to: [E Clutch](#)
(307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80,

	Diagnosis and Testing).
• Only gears R, 1, 2, 3, 4, 5, 6 available • Only gears 7, 8, 9, 10 available	• The A clutch may not be releasing properly. See condition A clutch always applied. REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The A clutch assembly may be damaged or worn. See condition A clutch does not apply. REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• Only gears R, 8, 9, 10, M1, and M2 available • Only gears 1, 2, 3, 4, 5, 6, 7 available	• The B clutch may not be releasing properly. See condition Direct clutch always applied. REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The B clutch assembly may be damaged or worn. See condition Direct clutch does not apply. REFER to: B Clutch

	(307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• Only gears 2, 3, 4, 5, 7, 9, 10 available • Only gears R, 1, 6, 8 available	• The C clutch may not be releasing properly. See condition C clutch always applied. REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The C clutch assembly may be damaged or worn. See condition C clutch does not apply. REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• Only gears R, 3, 4, 6, 7, 8, 10 available • Only gears 1, 5, 9 available	• The F clutch may not be releasing properly. See condition Low reverse clutch always applied. REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The E clutch assembly

	may be damaged or worn. See condition E clutch does not apply. REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• Only gears 1, 3, 5, 6, 7, 8, 9, available • Only gears R, 2, 4, 10 available	• The E clutch may not be releasing properly. See condition E clutch always applied. REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The E clutch assembly may be damaged or worn. See condition E clutch does not apply.
• Only gears R, 4, 5, 6, 7, 8, 9, 10 available • Only gears 1, 2, 3 available	• The F clutch may not be releasing properly. See condition F clutch always applied. REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing). • The F clutch assembly may be damaged or worn. See condition F clutch does not apply.

		REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	• No engine braking in M1 or M2	• The B clutch assembly may be damaged or worn. See condition B clutch does not apply. REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• Torque converter operation concerns	• No apply	• CHECK for DTCs related to torque converter concerns. • INSPECT the torque converter hydraulic circuits and regulator valve for damage or wear. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul). REFER to: Torque Converter Clutch (TCC) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80,

		Diagnosis and Testing).
	Always applied (engine stalls)	- CHECK for DTCs related to torque converter concerns. - INSPECT the torque converter hydraulic circuits and regulator valve for damage or wear. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul). REFER to: Torque Converter Clutch (TCC) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	Cycling/shutter/chatter	- CHECK for DTCs related to torque converter concerns. - CHECK the transmission fluid level. REFER to: Transmission Fluid Level Check (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80,

		General Procedures). INSPECT the torque converter hydraulic circuits and regulator valve for damage or wear. REFER to: Torque Converter Clutch (TCC) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
Other concerns	Selector lever high effort	Selector lever cable routed wrong, binding or damaged. REFER to: Selector Lever Cable - 10-Speed Automatic Transmission - 10R80, Vehicles With: Column Shift (307-05 Automatic Transmission External Controls, Removal and Installation).

• No start TR indicates R when selector lever is in P	• Selector lever cable routed wrong, binding or damaged. REFER to: Selector Lever Cable - 10-Speed Automatic Transmission - 10R80, Vehicles With: Column Shift (307-05 Automatic Transmission External Controls, Removal and Installation).
• External leaks	• Damaged or worn seals. REFER to: Leakage Inspection (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
• Noise	• Engine drive accessories, suspension, CV joints, REFER to: Noise, Vibration and Harshness (NVH) (100-04 Noise, Vibration and Harshness, Description and Operation).

• Vibration	• Engine drive accessories, suspension, CV joints, transmission fluid cooler tubes, REFER to: Noise, Vibration and Harshness (NVH) (100-04 Noise, Vibration and Harshness, Description and Operation).
• No park range	• INSPECT the selector lever cable for correct adjustment. REFER to: Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Column Shift (307-05 Automatic Transmission External Controls, General Procedures).
	• INSPECT the manual control lever for damage, wear or correct installation. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

		• INSPECT the park pawl, park pawl actuator, for damage or wear. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	• Overheating	• Transmission fluid cooling system damaged. REFER to: Transmission Cooling (307-02 Transmission Cooling, Diagnosis and Testing).

Diagnostic Trouble Code (DTC) Charts and Pinpoint Tests - 2.7L EcoBoost (238kW/324PS)

Principles of Operation

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom.
REFER to: [Diagnosis By Symptom](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically OFF. Check for an open, short to ground or the transmission connector disconnected. The PCM disables power to the transmission solenoids when certain transmission DTCs are set.

Solenoid Operation Chart

Selector Lever Position	PCM Commanded Gear	SSA (1, 2, 3, 4, 5, 6, M1, M2, R)	SSB (2, 8, 9, 10, M1, M2, R)	SSC (2, 3, 4, 5, 7, 9, 10, M2)	SSD (2, 3, 4, 6, 7, 8, 10, M2, R)	SSE (1, 3, 5, 6, 7, 8, 9, M1)	SSF (4, 5, 6, 7, 8, 9, 10, R)	TCC Solenoid
P	P	On	On	Off	On	Off	Off	Off
R	R	On	On	Off	On	Off	On	Off
N	N	On	On	Off	On	Off	Off	Off
D	1	On	Off	Off	On ^a	On	Off	Off
	2	On	Off	On	On	Off	Off	On/Off
	3	On	Off	On	On	On	Off	On/Off
	4	On	Off	On	On	Off	On	On/Off
	5	On	Off	On	Off	On	On	On/Off
	6	On	Off	Off	On	On	On	On/Off
	7	Off	Off	On	On	On	On	On/Off
	8	Off	On	Off	On	On	On	On/Off
	9	Off	On	On	Off	On	On	On/Off
	10	Off	On	On	On	Off	On	On/Off
M1	1	On	On	Off	On ^a	On	Off	Off
M2	2	On	On	On	On	Off	Off	Off

- On to reduce frictional losses from a released clutch, but does not contribute to power flow.

DTC Chart: PCM

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

DTC Chart

DTC	Description	Warning Light/DTC Type	Action
P0602	Powertrain Control Module Programming Error	MIL/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P0603	Internal Control Module Keep Alive Memory (KAM) Error	MIL/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P0604	Internal Control Module Random Access Memory (RAM) Error	MIL, Wrench/Initialization	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P0605	Internal Control Module Read Only Memory (ROM) Error	MIL/Initialization	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P0607	Control Module Performance	MIL/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

P060A	Internal Control Module Monitoring Processor Performance	MIL, Wrench/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P060B	Internal Control Module A/D Processing Performance	MIL, Wrench	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P060C	Internal Control Module Main Processor Performance	MIL, Wrench	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P060D	Internal Control Module Accelerator Pedal Position Performance	MIL, Wrench	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P060F	Internal Control Module Engine Coolant Temperature Performance	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P0610	Control Module Vehicle Options Error	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

P061A	Internal Control Module Torque Performance	None/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P061B	Internal Control Module Torque Calculation Performance	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P061C	Internal Control Module Engine RPM Performance	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P061D	Internal Control Module Engine Air Mass Performance	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P061E	Internal Control Module Brake Signal Performance	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P062B	Internal Control Module Fuel Injector Control Performance	None/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

P062C	Internal Control Module Vehicle Speed Performance	None/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P0630	VIN Not Programmed or Incompatible - ECM/PCM	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P064F	Unauthorized Software/ Calibration Detected	MIL, Wrench/ Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P0657	Actuator Supply Voltage "A" Circuit Open	MIL, Wrench/ Continuous	If the power circuit to the transmission solenoids is interrupted then all solenoids are failed electrically off. CHECK for an open, short to ground or the transmission connector disconnected. REPAIR as required. CLEAR the DTC. GO to Pinpoint Test A
P068A	ECM/PCM Power Relay De- Energized - Too Early	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P06B8	Internal Control Module Non-Volatile Random Access Memory (NVRAM) Error	MIL/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

P0702	Transmission Control System Electrical	Wrench/Continuous	INSPECT the PCM power and ground circuits for opens or short to ground. INSPECT the PCM connector for damaged or pushed-out terminals, corrosion or loose wires. CLEAR the DTC. RERUN the KOEO and KOER self-test. If DTC P0702 returns, REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
P0706	Transmission Range Sensor "A" Circuit Range/Performance	Wrench/KOEO, Continuous	The TR sensor outputs a duty cycle indicating manual lever position. This DTC sets when the frequency is greater or less than the expected duty cycle by 25Hz or more. Engine may not crank. CLEAR the DTC. If DTC P0706 returns, GO to Pinpoint Test C
P0707	Transmission Range Sensor "A" Circuit Low	Wrench/KOEO, Continuous	Engine may not crank, CLEAR the DTC. If DTC P0707 returns, GO to Pinpoint Test C
P0708	Transmission Range Sensor "A" Circuit High	Wrench/KOEO, Continuous	Engine may not crank, CLEAR the DTC. If DTC P0708 returns, GO to Pinpoint Test C
P0709	Transmission Range Sensor "A" Circuit Intermittent	Wrench/Continuous	The TR sensor outputs a duty cycle indicating manual lever position. This DTC sets when the duty cycle is within range but is in the dead band between the design position, and an in-range but invalid duty cycle. GO to Pinpoint Test C
P0710	Transmission Fluid Temperature Sensor "A" Circuit	Wrench/Continuous	CLEAR the DTC. If DTC P0710 returns, GO to Pinpoint Test B

P0711	Transmission Fluid Temperature Sensor "A" Circuit Range/Performance	MIL/Continuous	CLEAR the DTC. Road test the vehicle at least 5 minutes. If DTC P0711 returns, GO to Pinpoint Test B
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low	MIL/KOEO, Continuous	DTC P0710 may set. CLEAR the DTC. If DTC P0712 returns, GO to Pinpoint Test B
P0713	Transmission Fluid Temperature Sensor "A" Circuit High	MIL/KOEO, Continuous	DTC P0710 may set. CLEAR the DTC. If DTC P0713 returns, GO to Pinpoint Test B
P0715	TSS Sensor "A" Circuit	MIL/KOEO, Continuous	CLEAR DTC. If DTC P0715 returns during KOEO, GO to Pinpoint Test D
P0716	TSS Sensor "A" Circuit Range/Performance	MIL/Continuous	The PCM detected TSS sensor drop out, noise spike, or TSS not corresponding to other speed sensor inputs for current gear. REPAIR all clutch faults first. INSPECT TSS sensor for proper mounting. INSPECT TSS tone wheel (part of No. 2 planetary carrier) for damage.
P0717	TSS Sensor "A" Circuit No Signal	Wrench/Continuous	P0717 illuminates the wrench light in conjunction with P0715, P07BF, and/or P07C0. Service the more specific DTC first. GO to Pinpoint Test D
P0718	TSS Sensor "A" Circuit Intermittent	MIL/Continuous	The PCM detected TSS sensor fault, but the fault did not last long enough for the PCM to set a more specific TSS sensor DTC. Inspect TSS sensor wiring and connectors for damage.
P0720	Output Shaft Speed Sensor Circuit	MIL/KOEO, Continuous	CLEAR the DTC. If DTC P0720 returns during KOEO, GO to Pinpoint Test D

P0721	Output Shaft Speed Sensor Circuit Range/Performance	MIL/Continuous	The PCM detected OSS sensor drop out, noise spike, or OSS sensor not corresponding to other speed sensor inputs for current gear. REPAIR all clutch faults first. INSPECT OSS sensor for proper mounting. INSPECT OSS sensor tone wheel (part of planetary carrier No. 4 output shaft) for damage.
P0722	Output Shaft Speed Sensor Circuit No Signal	Wrench/Continuous	DTC P0722 illuminates the wrench light in conjunction with P0720, P077C, and/or P077D. Service the more specific DTC first. GO to Pinpoint Test D
P0723	Output Shaft Speed Sensor Circuit Intermittent	MIL/Continuous	The PCM detected OSS sensor fault, but the fault did not last long enough for the PCM to set a more specific OSS sensor DTC. Inspect OSS sensor wiring and connectors for damage.
P0729	Gear 6 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio errors either in or while shifting to 6th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0731	Gear 1 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 1st gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0732	Gear 2 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 2nd gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0733	Gear 3 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 3rd gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0734	Gear 4 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio errors either in or while shifting to 4th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0735	Gear 5 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio errors either in or while shifting to 5th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0736	Reverse Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to Reverse. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0740	Torque Converter Clutch Solenoid Circuit/Open	Wrench/KOEO, Continuous	CLEAR DTC. If DTC P0740 returns during KOER, GO to Pinpoint Test G
P0741	Torque Converter Clutch Solenoid Circuit Performance/Stuck Off	Wrench/Continuous	DTC P0741 is a non-electrical failure that caused the TCC to fail to apply. For TCC Does Not Apply Symptom, REFER to: Torque Converter Clutch (TCC) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0743	Torque Converter Clutch Solenoid Circuit Electrical	Wrench/KOEO, Continuous	DTC P0743 illuminates the wrench light in conjunction with P0740, P2769, and/or P2770. Service the more specific DTC first. GO to Pinpoint Test G
P0748	Pressure Control Solenoid Electrical	Wrench/KOEO, Continuous	DTC P0748 illuminates the wrench light in conjunction with P0960, P0962, and/or P0963. Service the more specific DTC first. GO to Pinpoint Test G
P0751	Shift Solenoid "A" Performance/Stuck Off	MIL/KOEO, Continuous	DTC P0751 is a non-electrical failure indicating the A clutch failed to apply. For A clutch Does Not Apply symptom, REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0752	Shift Solenoid "A" Stuck On	MIL/Continuous	DTC P0752 is a non-electrical failure indicating the A clutch stayed applied when SSA was de-energized. For A clutch Always Applied symptom, REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0753	Shift Solenoid "A" Electrical	Wrench/KOEO, Continuous	DTC P0753 illuminates the wrench light in conjunction with P0973, P0974, and/or P097A. Service the more specific DTC first. GO to Pinpoint Test A
P0754	Shift Solenoid "A" Intermittent	MIL/Continuous	The PCM detected a SSA fault, but the fault did not last long enough for the PCM to set a more specific SSA DTC. Inspect SSA wiring and connectors for damage.
P0756	Shift Solenoid "B" Performance/Stuck Off	MIL/Continuous	DTC P0756 is a non-electrical failure indicating the B clutch failed to apply. For B clutch Does Not Apply symptom, REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0757	Shift Solenoid "B" Stuck On	MIL/Continuous	DTC P0757 is a non-electrical failure indicating B clutch stayed applied when SSB was de-energized. For B clutch Always Applied symptom, REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0758	Shift Solenoid "B" Electrical	Wrench, KOEO, Continuous	DTC P0758 illuminates the wrench light in conjunction with P0976, P0977, and/or P097B. Service the more specific DTC first. GO to Pinpoint Test A

P0759	Shift Solenoid "B" Intermittent	MIL/Continuous	The PCM detected SSB fault, but the fault did not last long enough for the PCM to set a more specific SSB DTC. Inspect SSB wiring and connectors for damage.
P0761	Shift Solenoid "C" Performance/Stuck Off	MIL/Continuous	DTC P0761 is a non-electrical failure indicating the C clutch failed to apply. For C clutch Does Not Apply symptom, REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0762	Shift Solenoid "C" Stuck On	MIL/Continuous	DTC P0762 is a non-electrical failure indicating the C clutch stayed applied when SSC was de-energized. For C clutch Always Applied symptom, REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0763	Shift Solenoid "C" Electrical	Wrench, KOEO, Continuous	DTC P0763 illuminates the wrench light in conjunction with P0779, P097C, and/or P0980. Service the more specific DTC first. GO to Pinpoint Test A
P0764	Shift Solenoid "C" Intermittent	MIL/Continuous	The PCM detected SSC fault, but the fault did not last long enough for the PCM to set a more specific SSC DTC. Inspect SSC wiring and connectors for damage.
P0766	Shift Solenoid "D" Performance/Stuck Off	MIL/Continuous	DTC P0761 is a non-electrical failure indicating D clutch failed to apply. For D clutch Does Not Apply symptom, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0767	Shift Solenoid "D" Stuck On	MIL/Continuous	DTC P0757 is a non-electrical failure indicating the D clutch stayed applied when SSD was de-energized. For D clutch Always Applied symptom, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0768	Shift Solenoid "D" Electrical	Wrench, KOEO, Continuous	DTC P0768 illuminates the wrench light in conjunction with P097D, P0982, P0982 illuminates the Wrench light. Service the more specific DTC first. GO to Pinpoint Test A
P0769	Shift Solenoid "D" Intermittent	MIL/Continuous	The PCM detected SSD fault, but the fault did not last long enough for the PCM to set a more specific SSD DTC. Inspect SSD wiring and connectors for damage.
P076F	Gear 7 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 7th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0771	Shift Solenoid "E" Performance/Stuck Off	MIL/Continuous	DTC P0761 is a non-electrical failure indicating the E clutch failed to apply. For E clutch Does Not Apply symptom, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0772	Shift Solenoid "E" Stuck On	MIL/Continuous	DTC P0772 is a non-electrical failure indicating the E clutch stayed applied when SSE was de-energized. For E clutch Always Applied symptom, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0773	Shift Solenoid "E" Electrical	Wrench/Continuous	DTC P0773 illuminates the wrench light in conjunction with P097E, P0985, P0986. Service the more specific DTC first. GO to Pinpoint Test A
P0774	Shift Solenoid "E" Intermittent	MIL/Continuous	The PCM detected SSE fault, but the fault did not last long enough for the PCM to set a more specific SSE DTC. Inspect SSE wiring and connectors for damage.
P077D	Output Shaft Speed Sensor Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test D
P0791	Intermediate Shaft Speed Sensor "A" Circuit	MIL/Continuous	GO to Pinpoint Test D
P0792	Intermediate Shaft Speed Sensor "A" Circuit Range/Performance	MIL/Continuous	GO to Pinpoint Test D
P0793	Intermediate Shaft Speed Sensor "A" Circuit No Signal	Wrench	GO to Pinpoint Test D
P0794	Intermediate Shaft Speed Sensor "A" Circuit Intermittent	MIL/Continuous	GO to Pinpoint Test D

P07A9	Transmission Friction Element "D" Stuck On	None/Continuous	The PCM detected that D clutch failed to release multiple times and determined the SSD is not stuck on. For D clutch Always Applied symptom, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07AB	Transmission Friction Element "E" Stuck On	None/Continuous	The PCM detected that E clutch failed to release multiple times and determined the SSE is not stuck on. For E clutch Always Applied symptom, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07AD	Transmission Friction Element "F" Stuck On	None/Continuous	The PCM detected that F clutch failed to release multiple times and determined the SSF is not stuck on. For F clutch Always Applied symptom, REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07C0	TSS Sensor "A" Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test D
P07C6	Intermediate Shaft Speed Sensor "A" Circuit High	MIL/Continuous	GO to Pinpoint Test D
P07C8	Intermediate Shaft Speed Sensor "B" Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test D

P07D9	Gear 8 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 8th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07F6	Gear 9 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 9th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07F7	Gear 10 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 10th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0868	Transmission Fluid Pressure Low	Wrench/Continuous	CLEAR the DTC. Road test vehicle, if DTC P0868 returns, or if DTCs P0751, P0756, P0761, P0766, P0771 or P2707 are set, TEST for low pump pressure or fluid contamination. PERFORM the line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0882	TCM Power Input Signal Low	MIL/KOEO, Continuous	INSPECT the PCM power and ground circuits for opens or short to ground. INSPECT the PCM connector for damaged or pushed-out terminals, corrosion or loose wires. CLEAR the DTC. If DTC P0882 returns, REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
P0883	TCM Power Input Signal High	MIL/KOEO, Continuous	CLEAR the DTC. If DTC P0883 returns, REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
P0884	TCM Power Input Signal Intermittent	MIL/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P0960	Pressure Control Solenoid Control Circuit/Open	MIL/KOEO, Continuous	The LPC solenoid failed to max pressure indicating wiring or connector issues, or a solenoid electrical issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test G
P0961	Pressure Control Solenoid Control Circuit Range/Performance	MIL/Continuous	The LPC solenoid failed to max pressure indicating wiring or connector issues, or a solenoid electrical issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test G

P0962	Pressure Control Solenoid Control Circuit Low	MIL/KOEO, Continuous	The LPC solenoid failed to max pressure indicating wiring or connector issues, or a solenoid electrical issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test G
P0963	Pressure Control Solenoid Control Circuit High	MIL/KOEO, Continuous	The LPC solenoid failed to high current which is maximum pressure indicating short to ground, wiring or solenoid issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test G
P0973	Shift Solenoid "A" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSA electrical. Since SSA shorted to ground causes SSA to be failed to high current (maximum pressure since SSA is directly proportional). A clutch is failed on. GO to Pinpoint Test A
P0974	Shift Solenoid "A" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSA electrical. Since SSA shorted to power causes SSA to be failed to low current (minimum pressure since SSA is directly proportional). A clutch is failed off. GO to Pinpoint Test A
P0976	Shift Solenoid "B" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSB electrical. Since SSB shorted to ground causes SSB to be failed to high current (maximum pressure since SSB is directly proportional). B clutch is failed on. GO to Pinpoint Test A

P0977	Shift Solenoid "B" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSB electrical. Since SSB shorted to power causes SSB to be failed to low current (minimum pressure since SSB is directly proportional). B clutch is failed off. GO to Pinpoint Test A
P0979	Shift Solenoid "C" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSC electrical. Since SSC shorted to ground causes SSC to be failed to high current (maximum pressure since SSC is directly proportional). C clutch is failed on. GO to Pinpoint Test A
P097A	Shift Solenoid "A" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSA electrical. Since SSA shorted to power causes SSA to be failed to low current (minimum pressure since SSA is directly proportional). A clutch is failed off. GO to Pinpoint Test A
P097B	Shift Solenoid "B" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates an open circuit in the SSB electrical. Since SSB shorted to power causes SSB to be failed to low current (minimum pressure since SSB is directly proportional). B clutch is failed off. GO to Pinpoint Test A
P097C	Shift Solenoid "C" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSC electrical. Since SSC shorted to power causes SSC to be failed to low current (minimum pressure since SSC is directly proportional). C clutch is failed off. GO to Pinpoint Test A

P097D	Shift Solenoid "D" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSD electrical. Since SSD shorted to power causes SSD to be failed to low current (minimum pressure since SSD is directly proportional). D clutch is failed off. GO to Pinpoint Test A
P097E	Shift Solenoid "E" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSE electrical. Since SSE shorted to power causes SSE to be failed to low current (minimum pressure since SSE is directly proportional). E clutch is failed off. GO to Pinpoint Test A
P097F	Shift Solenoid "F" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSF electrical. Since SSF shorted to power causes SSF to be failed to low current (minimum pressure since SSF is directly proportional). F clutch is failed off. GO to Pinpoint Test A
P0980	Shift Solenoid "C" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSC electrical. Since SSC shorted to power causes SSC to be failed to low current (minimum pressure since SSC is directly proportional). C clutch is failed off. GO to Pinpoint Test A
P0982	Shift Solenoid "D" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSD electrical. Since SSD shorted to ground causes SSD to be failed to high current (maximum pressure since SSD is directly proportional). D clutch is failed on. GO to Pinpoint Test A

P0983	Shift Solenoid "D" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSD electrical. Since SSD shorted to power causes SSD to be failed to low current (minimum pressure since SSD is directly proportional). D clutch is failed off. GO to Pinpoint Test A
P0985	Shift Solenoid "E" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSE electrical. Since SSE shorted to ground causes SSE to be failed to high current (maximum pressure since SSE is directly proportional). E clutch is failed on. GO to Pinpoint Test A
P0986	Shift Solenoid "E" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSE electrical. Since SSE shorted to power causes SSE to be failed to low current (minimum pressure since SSE is directly proportional). E clutch is failed off. GO to Pinpoint Test A
P0998	Shift Solenoid "F" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSF electrical. Since SSF shorted to ground causes SSF to be failed to high current (maximum pressure since SSE is directly proportional). F clutch is failed on. GO to Pinpoint Test A
P0999	Shift Solenoid "F" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSF electrical. Since SSF shorted to power causes SSF to be failed to low current (minimum pressure since SSF is directly proportional). E clutch is failed off. GO to Pinpoint Test A

P0B0D	Electric Transmission Fluid Pump Motor Control Module	None/Continuous	CLEAR the DTC. If the DTC returns, INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
P0C27	Electric Transmission Fluid Pump Motor Current Low	None/Continuous	This DTC applies to auto-start-stop vehicles only. This DTC sets when the PCM detects low current (10% to 15% duty cycle). Auto-Start-Stop unavailable and the engine will only stop when the operator turns the ignition off. The engine may restart unexpectedly when the vehicle is stopped. CLEAR the DTC. If the DTC returns, GO to Pinpoint Test F
P0C28	Electric Transmission Fluid Pump Motor Current Low	None/Continuous	GO to Pinpoint Test F
P0C29	Electric Transmission Fluid Pump Motor Current High	None/Continuous	GO to Pinpoint Test F
P0C2A	Electric Transmission Fluid Pump Motor Stalled	None/Continuous	GO to Pinpoint Test E
P0C2C	Electric Transmission Fluid Pump Control Module Feedback Signal Range/Performance	Wrench/Continuous	GO to Pinpoint Test E
P0C2D	Electric Transmission Fluid Pump Control Module Feedback Signal Low	Wrench/Continuous	GO to Pinpoint Test E
P0C2E	Electric Transmission Fluid Pump Control Module Feedback Signal High	Wrench/Continuous	GO to Pinpoint Test E

P1001	The KOER Not Able to Complete, KOER Aborted	None/KOER	RETRIEVE and RECORD all DTCs. REPAIR any self-test or CMDTCs first. CLEAR the DTC. RERUN the KOER self-test. If the DTC returns, REPROGRAM the PCM to the latest software. RERUN the KOER self-test. If the DTC returns, INSTALL a new PCM REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). After installing the new PCM PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P1397	System Voltage Out Of Self Test Range	None/KOEO	INSPECT the PCM power and ground circuits for opens or short to ground. INSPECT the PCM connector for damaged or pushed-out terminals, corrosion or loose wires. CLEAR the DTC. RUN the KOEO self-test. If DTC P1397 returns, REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
P1501	Vehicle Speed Sensor Out Of Self Test Range	None/KOEO	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

P160A	Control Module Vehicle Options Reconfiguration Error	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P162D	Internal Control Module Cruise Control Performance	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P162E	Internal Control Module PTO Control Performance	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P1636	Inductive Signature Chip Communication Error	MIL/KOEO, Continuous	CLEAR the DTC. If DTC P1636 returns, INSTALL a new . PCM. REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). After installing the new PCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

P1639	Vehicle ID Block Corrupted Not Programmed	KOEO, KOER, Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P163E	Transmission Control Module Programming Error	MIL/KOEO, Continuous	CLEAR the DTC. REPROGRAM the original PCM with the latest software. If DTC P163E returns, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). After installing the new PCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P163F	Transmission ID Block Corrupted, Not Programmed	MIL/KOEO, Continuous	CLEAR the DTC. REPROGRAM the original PCM with the latest software. If DTC P163F returns, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). After installing the new PCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General

			Procedures).
P164C	Internal control Module Start Stop Performance	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P1674	Control Module Software Corrupted	MIL, Wrench/KOEO, Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P1705	Transmission Range Circuit Not Indicating Park/Neutral During Self Test	None/KOEO	CLEAR the DTC. RERUN the KOEO and KOER self-test. If DTC P1705 returns, GO to Pinpoint Test C
P1711	Transmission Fluid Temperature Sensor Out Of Self Test Range	None/KOEO	CLEAR the DTC and RERUN the KOEO and KOER self-test. IF the DTC returns, GO to Pinpoint Test B
P1744	Torque Converter Clutch Solenoid Circuit Performance	Wrench/Continuous	DTC P1744 is a non-electrical DTC. CLEAR the DTC. If DTC P1744 returns, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P175A	Transmission Fluid Over Temperature Condition - Electric Transmission Fluid Pump Disabled	None/Continuous	The temperature sensor in the electric transmission fluid pump detected an overheat condition. CLEAR the DTC and road test the vehicle. If the DTC returns, INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

P1783	Transmission Over Temperature Condition	Wrench/Continuous	CLEAR the DTC. If DTC P1783 returns, determine if this DTC was set in conjunction with any TFT sensor circuit DTCs and RESOLVE them first, otherwise REFER to: Transmission Cooling (307-02 Transmission Cooling) .
P1A02	Transmission One Way Clutch Performance	Wrench/Continuous	This DTC sets when the PCM detects 3 failures of the one-way clutch to lock in 1st or 2nd gear allowing sun gear 1 to rotate backwards. CLEAR the DTC, road test the vehicle. If DTC P1A02 returns, it may indicate a one way clutch failure. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
P2531	Ignition Switch Run Position Circuit Low	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P2532	Ignition Switch Run Position Circuit High	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P264F	Engine Serial Number Not Programmed Or Incompatible	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P2669	Actuator Supply Voltage "B" Circuit/Open	MIL/Continuous	GO to Pinpoint Test A

P26C3	Internal Control Module Transmission Range Sensor Performance	MIL, Wrench/KOEO, Continuous	CLEAR the DTC. If DTC P26C3 returns, TR sensor. REFER to: Transmission Range (TR) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
P26C4	Internal Control Module Transmission Range Sensor Performance	None	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
P2700	Transmission Friction Element "A" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P0751 (A clutch stuck off) and P0752 (A clutch stuck on), service the more specific DTC first. See DTCs P0751 and P0752 for potential causes. If P0751 and P0752 are not set refer to the associated symptoms, REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2701	Transmission Friction Element "B" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P0756 (B clutch stuck off) and P0757 (B clutch stuck on), service the more specific DTC first. See DTCs P0756 and P0757 for potential causes. If these DTCs are not set refer to the associated symptoms, REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P2702	Transmission Friction Element "C" Apply Time Range/Performance	Wrench/Continuous	This DTC set with either P0761 (C clutch stuck off) and P0762 (C clutch stuck on) - service the more specific DTC first (if present). See P0761 and P0762 for potential causes first. If these DTCs are not set refer to the associated symptoms, REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2703	Transmission Friction Element "D" Apply Time Range/Performance	Wrench/Continuous	This DTC set with either P0766 (D clutch stuck off) and P0767 (D clutch stuck on) service the more specific DTC first (if present). See P0766 and P0767 for potential causes first. If these DTCs are not set, refer to the associated symptoms, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2704	Transmission Friction Element "E" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P0771 (E clutch stuck off) and P0772 (E clutch stuck on) service the more specific DTC first (if present). See P0771 and P0772 for potential causes. If these DTCs are not set, refer to the associated symptoms, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P2705	Transmission Friction Element "F" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P2707 (clutch F stuck off) and P2708 (clutch F stuck on), service the more specific DTC first. See DTCs P2707 and P2708 for potential causes. If these DTCs are not set, refer to the associated symptoms, REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2707	Shift Solenoid "F" Performance/Stuck Off	MIL/Continuous	F clutch stuck off due to a non-electrical fault. Multiple attempts to apply F clutch failed. GO to Pinpoint Test A
P2708	Shift Solenoid "F" Stuck On	MIL/Continuous	F clutch stuck on due to a non-electrical fault. Multiple attempts to apply F clutch failed. GO to Pinpoint Test A
P2709	Shift Solenoid "F" Electrical	MIL/KOEO, Continuous	SSF (controls F clutch) VFS circuit failure non-MIL "sister" DTCs of P097F, P0998, P0999 used to illuminate the Wrench Light. If one of the more specific circuit codes is set, follow repair procedures for that code. GO to Pinpoint Test A
P2710	Shift Solenoid "F" Intermittent	MIL/Continuous	The PCM detected SSF fault, but the fault did not last long enough for the PCM to set a more specific SSF DTC. Inspect SSF wiring and connectors for damage.
P2745	Intermediate Shaft Speed Sensor "B" Circuit	MIL/KOEO, Continuous	An open circuit fault was detected by the PCM smart driver. GO to Pinpoint Test D
P2746	Intermediate Shaft Speed Sensor "B" Circuit Range/Performance	MIL/Continuous	GO to Pinpoint Test D

P2747	Intermediate Shaft Speed Sensor "B" Circuit No Signal	Wrench/Continuous	GO to Pinpoint Test D
P2748	Intermediate Shaft Speed Sensor "B" Circuit Intermittent	MIL/Continuous	GO to Pinpoint Test D
P2758	Torque Converter Clutch Pressure Control Solenoid Stuck On	MIL/Continuous	TCC stuck on when commanded off due to non-electrical failure. CLEAR the DTC. If DTC P2758 returns, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2760	Torque Converter Clutch Pressure Control Solenoid Intermittent	MIL/Continuous	The PCM detected TCC fault, but the fault did not last long enough for the PCM to set a more specific TCC DTC. Inspect TCC solenoid wiring and connectors for damage.
P2769	Torque Converter Clutch Circuit Low	MIL/Continuous	This DTC indicates a short to ground in the TCC electrical. Since TCC shorted to ground causes TCC to be failed to high current (maximum pressure since TCC is directly proportional). TCC is failed on. GO to Pinpoint Test G
P2770	Torque Converter Clutch Circuit High	MIL/Continuous	This DTC indicates a short to power in the TCC electrical. Since TCC shorted to power causes TCC to be failed to low current (minimum pressure since TCC is directly proportional). TCC is failed off. CLEAR the DTC. If DTC P2783 returns, INSPECT TCC control valve for sticking. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

P2783	Torque Converter Temperature Too High	None/Continuous	The TCC control valve is stuck in a position that provides no flow when the TCC is commanded off. The TCC pumps down when commanded off, causing loss of torque multiplication through the TCC.
P2796	Electric Transmission Fluid Pump Control Circuit	None/Continuous	This DTC sets when the transmission electric fluid pump reports to the PCM that it is not receiving a PWM from the PCM. CLEAR the DTC. If the DTC returns, GO to Pinpoint Test E
P27B4	Internal Control Module Transmission Gear Direction Control Performance	None/Continuous	May be caused by clutch faults that cause R in forward range or a forward gear in R, or a speed sensor error, CLEAR the DTC. If DTC P27B4 returns, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P27B5	Internal Control Module Transmission Gear Ratio Control Performance	None/Continuous	CLEAR the DTC. If DTC P27B5 returns or if any TR DTCs are set RESOLVE them first. If DTC P27B5 returns, PCM. REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

P27B6	Internal Control Module Transmission Speed Sensor Performance	MIL, Wrench/ Continuous	CLEAR the DTC. Road test the vehicle. If any speed sensor DTCs are set, RESOLVE them first. If DTC P27B6 returns, PCM. REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P2801	Transmission Range Sensor "B" Circuit Range/ Performance	MIL/KOEO, Continuous	GO to Pinpoint Test C
P2802	Transmission Range Sensor "B" Circuit Low	MIL/KOEO, Continuous	GO to Pinpoint Test C
P2803	Transmission Range Sensor "B" Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test C
P2804	Transmission Range Sensor "B" Circuit Intermittent	Wrench/KOEO, Continuous	GO to Pinpoint Test C
P2805	Transmission Range Sensor "A"/"B" Correlation	MIL/KOEO, Continuous	GO to Pinpoint Test C
U0028	Vehicle Communication Bus "A"	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

U0037	Vehicle Communication Bus "B"	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
U0073	Control Module Communication Bus "A" Off	MIL/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
U0074	Control Module Communication Bus "B" Off	MIL/Continuous	REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

Pinpoint Tests

Power is routed through the transmission solenoid power control (inside the PCM) to all transmission solenoids. If the power circuit to the transmission solenoids or the transmission solenoid power control fails open, all solenoids are failed electrically off. Check for an open, short to ground or the transmission connector disconnected. The transmission solenoid power control disables power to the transmission solenoids when certain transmission DTCs are set.

- Carry out KOEO and KOER procedures.
- Retrieve and record all DTCs.
- Repair all non-transmission DTCs first.
- Repair all transmission DTCs second.
- Clear all CMDTCs and attempt to repeat them.
- Repair all CMDTCs.
- If only pass codes are obtained,
REFER to: [Diagnosis By Symptom](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

Transmission Control Solenoids

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically off. Check for an open, short to ground or the transmission connector disconnected. The 10R80 utilizes 6 shift (A through F) solenoids that are linear force solenoids. Unlike previous shift solenoids they are mechanical in nature meaning no transmission fluid passes through them. CIDASs use an armature pin assembly that moves a control valve in the main control valve body to control and apply hydraulic fluid pressure. Each clutch (A through F) has a corresponding shift solenoid (A through F) that is directly proportional in that zero current equals zero pressure and maximum current equals maximum pressure. Since there is no pressure with zero current, none of the clutch packs are able to engage if the power is interrupted to the shift solenoids .

PINPOINT TEST A : TRANSMISSION CONTROL SOLENOIDS

A1 CHECK THE SOLENOID POWER CIRCUIT FOR VOLTAGE	
NOTE: <i>Read and record all DTCs.</i>	
• Ignition OFF. • Disconnect: Transmission Vehicle Harness C168A. • Ignition ON.	
Is the voltage greater than 11 volts?	
Yes	GO to A4
No	GO to A2
A2 CHECK THE SOLENOID POWER CIRCUIT FOR AN OPEN	

- Ignition OFF.
- Disconnect: PCM C1232T
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms?

Yes	GO to A3
No	REPAIR transmission vehicle harness circuit for an open.

A3 CHECK THE SOLENOID POWER CIRCUIT FOR A SHORT TO GROUND

•

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
C1232T-2	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	REPAIR the circuit.

A4 CHECK SOLENOID CONTROL CIRCUITS FOR AN OPEN

- Ignition OFF.
- Disconnect: PCM C1232T
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to A5
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

A5 CHECK SOLENOID CONTROL CIRCUITS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms on the suspect circuit?

Yes	GO to A6
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

A6 CHECK SOLENOID CONTROL CIRCUITS FOR A SHORT TO POWER

Is any voltage detected?

Yes	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.
No	GO to A7

A7 CHECK MAIN CONTROL WIRING HARNESS SOLENOID POWER CIRCUIT FOR AN OPEN CIRCUIT

- Drain the transmission fluid and remove the transmission fluid pan.
REFER to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Disconnect Shift Solenoid Connectors (A through F).
- Disconnect Main Control Wiring Harness C177.
- Measure resistance of the suspect solenoid power circuit of the main control wiring harness, using the table below:

Positive Lead	Measurement / Action	Negative Lead
C177-5	Ω	SSA C1843-1
C177-5		SSB C1844-1
C177-5		SSC C1845-1
C177-5		SSD C1846-1
C177-5		SSE C1847-1

C177-5		SSF C1848-1

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to A9
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A8 CHECK MAIN CONTROL WIRING HARNESS SOLENOID POWER CIRCUIT FOR A SHORT TO GROUND

- INSPECT main control wiring harness for chafes or bare wires.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C177-5	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to A9
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A9 CHECK MAIN CONTROL WIRING HARNESS SOLENOID CONTROL CIRCUIT FOR AN OPEN CIRCUIT

- Measure resistance of the suspect solenoid control circuit of the main control wiring harness, using the table below:

Positive Lead	Measurement / Action	Negative Lead
C177-8	Ω	SSA C1843-2
C177-9		SSB C1844-2
C177-10		SSC C1845-2
C177-11		SSD C1846-2
C177-3		SSE C1847-2
C177-4		SSF C1848-2

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to A11
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A10 CHECK MAIN CONTROL WIRING HARNESS SOLENOID CONTROL CIRCUIT FOR A SHORT TO GROUND

- Disconnect Shift Solenoid Connectors (A through F) (if not disconnected already).
- Measure:

Positive Lead	Measurement / Action	Negative Lead
SSA C1843-2	Ω	Ground
SSB C1844-2		Ground
SSC C1845-2		Ground
SSD C1846-2		Ground
SSE C1847-2		Ground

SSF C1848-2		Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to A11
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A11 CHECK SOLENOID RESISTANCE

- Disconnect the suspect solenoid connector and remove the suspect shift solenoid.
REFER to: [Shift Solenoids \(SS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Measure and record the resistance of the suspected solenoid.

Is the shift solenoid resistance between 4.8 and 5.4 ohms?

Yes	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new solenoid for the solenoid that failed the resistance check. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

The TFT sensor is a temperature dependent resistor that is in contact with transmission fluid in the transmission sump area. The PCM monitors the voltage across the TFT sensor, which changes as transmission fluid temperature varies. The PCM uses the TFT sensor signal as an input for its strategy for shifting and TCC operation. The PCM also uses the TFT sensor signal for transmission fault detection and diagnostics.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires and missing or damaged seals
- TFT sensor
- Transmission internal wiring harness frame
- PCM

PINPOINT TEST B : TFT (TRANSMISSION FLUID TEMPERATURE) SENSOR

B1 CHECK TFT INPUT SIGNAL	
• Ignition OFF. • Disconnect: Transmission Vehicle Harness C168A. • Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals. • Connect the diagnostic tool. • Ignition ON. • Enter the following mode on the diagnostic scan tool: Datalogger. Monitor the following TFT PIDs, TFT and TFTV.	
Does the TFT PID display -40°C (-40°F) and the TFTV PID display 4.96 to 5.10 volts?	
Yes	GO to B2
No	REPAIR the circuit.

B2 CHECK TFT SIGNAL INPUT CIRCUIT FOR VOLTAGE

Is the voltage between 4.8 and 5.1 volts?

Yes	GO to B3
No	INSPECT and REPAIR the open circuit. If an open circuit is not found, INSTALL a new PCM, REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

B3 CHECK TFT SIGNAL RETURN CIRCUIT

Does the TFT PID display 190°-195°C (374°-383°F) and the TFTV PID display 0 volts?

Yes	GO to B4
No	INSPECT and REPAIR the open circuit. If an open circuit is not found, INSTALL a new PCM, REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

B4 CHECK INTERNAL WIRING HARNESS FOR AN OPEN

- Ignition OFF.
- Disconnect TFT Sensor C1842.
- Disconnect TR Sensor C167.

Are the resistances less than 3 ohms?

Yes	GO to B5
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

B5 CHECK INTERNAL WIRING HARNESS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	INSPECT and CLEAN the TFT sensor for metallic contamination. INSTALL a new TFT sensor. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). CLEAR the DTCs.
No	GO to B6

B6 CHECK TFT SENSOR RESISTANCE

- Connect TFT sensor C1842.

Does the temperature to resistance specification match?

Yes	To diagnose an overheating concern, REFER to: Transmission Cooling (307-02 Transmission Cooling, Diagnosis and Testing).
No	INSTALL a new TFT. REFER to: Transmission Fluid Temperature (TFT) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

TR Sensor

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

The TR sensor is comprised of a dual set of TR sensors. The manual shifter engages and disengages Park and the shifter position is detected by reading TR sensors A and B. There is no manual valve, the PCM provides forward or reverse based on the dual TR sensor inputs. The 10R80 transmission uses dual PWM output (at 125 Hz) TR sensors where: TR sensor A increases as the shifter is moved from Park to Sport and TR sensor B decreases as the shifter is moved from Park to Sport, together the sum of the two signals should add up to 100%. The 10R80 transmission mechanical shifter variant is range by wire with mechanical Park. The dual TR sensor's signals determine customer selected range (P, R, N, D, S). PIDs, TR_A_DC and TR_B_DC may be utilized to monitor the TR sensor duty cycles.

Typical TR Sensors PWM Output

	Transmission Range Sensor A		Transmission Range Sensor B	
Gear	Min	Max	Min	Max
P	8.00	18.96	81.04	92.00

R	35.50	47.90	52.10	64.50
N	51.75	61.75	38.25	48.25
D	67.45	77.45	22.55	32.55
Sport	81.12	92.00	8.00	18.88

PINPOINT TEST C : TR SENSOR

C1 VERIFY DTCS

NOTE: Read and record all DTCs.

- Ignition OFF.
- Select PARK.
- Connect the diagnostic tool.
- Carry out the KOEO then the KOER test.

Are TR sensor DTCs present?

Yes	GO to C2
No	If no DTCs are present, and to diagnose any symptoms that may be present, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

C2 CHECK TR SENSOR ELECTRICAL OPERATION

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: TR PID: TR_A_DC and TR_B_DC.
- Move the selector lever into each range and stop.
- Observe the PIDs: TR_A_DC and TR_B_DC while wiggling the harness or driving the vehicle.
- Compare the duty cycles shown by the PIDs TR_A_DC and TR_B_DC to the selector lever position duty cycle, using the following chart.

Typical TR Sensor(s) PWM Output

Gear	Transmission Range Sensor A		Transmission Range Sensor B	
	Min	Max	Min	Max
P	8.00	18.96	81.04	92.00
R	35.50	47.90	52.10	64.50
N	51.75	61.75	38.25	48.25
D	67.45	77.45	22.55	32.55
Sport	81.12	92.00	8.00	18.88

Are the TR_A_DC and TR_B_DC duty cycles within range?

Yes	The problem is not in the TR sensor. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
No	GO to C3

C3 CHECK TR SENSOR CIRCUITS FOR POWER

- Ignition OFF.
- Disconnect: Transmission Vehicle Harness C168A.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Are the voltages approximately 5 volts?

Yes	GO to C4
No	GO to C5

C4 CHECK TR SENSOR VOLTAGE CIRCUIT FOR POWER

- Ignition OFF.
- Disconnect: Transmission Vehicle Harness C168A.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Is the voltage approximately 9 volts?

Yes	GO to C7
No	GO to C5

C5 CHECK TR SENSOR VOLTAGE CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	GO to C6
No	REPAIR the circuit.

C6 CHECK TR SENSOR VOLTAGE CIRCUIT FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new PCM, REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	REPAIR the circuit.

C7 CHECK TR SENSOR GROUND CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	INSTALL a new TR sensor. REFER to: Transmission Range (TR) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	REPAIR the circuit.

C8 CHECK TR SENSOR TRP1, TRP2, CIRCUITS FOR POWER

- Drain the transmission fluid and remove the transmission fluid pan.
REFER to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Connect Transmission Vehicle Harness C168A.
- Disconnect TR sensor C167.
- Ignition ON.

Are the voltages approximately 5 volts?

Yes	GO to C9
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

C9 CHECK TR SENSOR VREF CIRCUIT FOR POWER

- Connect Transmission Vehicle Harness C168A.
- Disconnect TR sensor C167.
- Ignition ON.

Is the voltage approximately 9 volts?

Yes	GO to C10
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

C10 CHECK TRANSMISSION INTERNAL WIRING HARNESS FOR AN OPEN CIRCUIT

- Ignition OFF.

Are the resistances less than 3 ohms?

Yes	INSTALL a new TR sensor. REFER to: Transmission Range (TR) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

OSS, TSS Sensor, ISSA and ISSB

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation TSS Sensor

The TSS sensor is a Hall-effect type sensor that provides a signal to the PCM that changes in frequency as the rotating speed of the planetary carrier No. 2 varies. The PCM compares the TSS sensor signal with the engine speed information to determine the amount of slip occurring in the torque converter. The PCM also compares the TSS sensor signal with the OSS sensor signal to determine the gear ratio provided by the planetary carrier No. 4. The PCM uses the TSS sensor signal as an input for its strategies for shifts and TCC operation. The PCM also uses the TSS sensor signal for transmission fault detection and diagnostics.

Normal Operation OSS Sensor

The OSS sensor is a Hall-effect type sensor that provides a signal to the PCM that changes in frequency as the rotating speed of the rear planetary carrier No. 4 varies. The PCM also compares the OSS sensor signal with the TSS sensor signal to determine the gear ratio provided by the rear planetary gearset. The PCM uses the OSS sensor signal as an input for its strategies for shifts and TCC operation. The PCM also uses the OSS sensor signal for transmission fault detection and diagnostics.

Normal Operation Intermediate Speed Sensors A and B

The Intermediate Speed Sensors A (ISSA) and B (ISSB) are Hall-effect type sensors that provide a signal to the PCM that changes in frequency as the rotating speed of the component being monitored changes. ISSA monitors the speed and rotational direction of ring gear 1 and ISSB monitors the speed and rotational direction of planetary carrier-1/ring gear 4. The Intermediate speed sensors are used to monitor clutch states for transmission fault detection and diagnostics.

TSS Sensor DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0715	TSS Sensor Circuit	This DTC sets if the PCM detects an open or short to ground in the TSS sensor circuitry.
P0716	TSS Sensor Circuit Range/Performance	This DTC sets if the PCM detects too large of a sensor air gap, a TSS sensor fault or an undetected clutch fault.
P0717	TSS Sensor Circuit No Signal	This DTC sets relationally if the DTCs P0715, P07BF, P07C0 are set, RESOLVE these DTCs first.
P0718	TSS Sensor Circuit Intermittent	This DTC sets if the PCM detects an intermittent circuit fault in the TSS circuit.
P07BF	ITSS Sensor Circuit Low	This DTC sets if the PCM detects an open or short to ground in the TSS sensor circuitry.
P07C0	TSS Sensor Circuit High	This DTC sets if the PCM detects an open circuit in the TSS sensor circuitry.

Intermediate Sensor A (ISSA) DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0791	Intermediate Shaft Speed Sensor "A" Circuit	This DTC sets if the PCM detects an open or short to ground in the ISSA sensor circuitry.

P07C6	Intermediate Shaft Speed Sensor "A" Circuit High	This DTC sets relationally if the DTCs P0715, P07BF, P07C0 are set, RESOLVE these DTCs first.
P0792	Intermediate Shaft Speed Sensor "A" Circuit Range/Performance	This DTC sets if the PCM detects an intermittent circuit fault in the ISSA sensor circuit.
P0793	Intermediate Shaft Speed Sensor "A" Circuit No Signal	This DTC sets if the PCM detects an open or short to ground in the ISSA sensor circuitry.
P0794	Intermediate Shaft Speed Sensor "A" Circuit Intermittent	This DTC sets if the PCM detects an open circuit in the ISSA sensor circuitry.

Intermediate Sensor B (ISSB) DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P2745	Intermediate Shaft Speed Sensor "B" Circuit	This DTC sets if the PCM detects an open or short to ground in the ISSB sensor circuitry.
P2746	Intermediate Shaft Speed Sensor "B" Circuit Range/Performance	This DTC sets if the PCM detects an intermittent circuit fault in the ISSB sensor circuit..
P2747	Intermediate Shaft Speed Sensor "B" Circuit No Signal	This DTC sets if the PCM detects an open or short to ground in the ISSB sensor circuitry.
P2748	Intermediate Shaft Speed Sensor "B" Circuit Intermittent	This DTC sets if the PCM detects an open circuit in the ISSB sensor circuitry.

OSS Sensor DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions

P0720	OSS Sensor Circuit	This DTC sets if the PCM detects an open or short to ground in the OSS sensor circuitry.
P0721	OSS Sensor Circuit Range Performance	This DTC sets if the PCM detects too large of a sensor air gap, a TSS sensor fault or an undetected clutch fault.
P0722	OSS Sensor Circuit No Signal	This DTC sets relationally if the DTCs P0720, P077C or P077D are set, RESOLVE these DTCs first.
P0793	OSS Sensor "A" Circuit No Signal	This DTC sets if the PCM detects an open or short to ground in the OSS sensor circuitry.
P077D	OSS Sensor Circuit High	This DTC sets relationally if the DTCs P0720, P0721, P0793 are set, RESOLVE these DTCs first.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires or ground and missing or damaged seals
- TSS sensor
- OSS sensor
- Intermediate Speed Sensor A (ISSA)
- Intermediate Speed Sensor B (ISSB)

PINPOINT TEST D : OSS (OUTPUT SHAFT SPEED) , TSS (TURBINE SHAFT SPEED) SENSORS, INTERMEDIATE SPEED SENSORS A AND B

D1 CHECK SENSOR POWER CIRCUIT FOR POWER

- Ignition OFF.
- Disconnect: Transmission Vehicle Harness C168A
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Is the voltage on the suspect circuit 8.8 to 9.2 volts?

Yes	GO to D5
No	GO to D2

D2 CHECK THE SENSOR POWER CIRCUIT FOR A SHORT TO GROUND

- Disconnect: PCM C1232T.
- Ignition OFF.

Is the resistance on the suspect circuit greater than 10,000 ohms?

Yes	GO to D3
No	INSPECT and REPAIR transmission vehicle harness sensor power circuit for a short to ground.

D3 CHECK THE SENSOR POWER CIRCUIT FOR AN OPEN

- Ignition ON.

Is the resistance on the suspect circuit less than 3 ohms?

Yes	INSTALL a new PCM, REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	REPAIR the circuit.

D4 CHECK THE SENSOR SIGNAL CIRCUIT FOR A SHORT TO POWER

- Ignition OFF.
- Disconnect: PCM C1232T.
- Disconnect: Transmission Vehicle Harness C168A (If not already disconnected).
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to D5

D5 CHECK THE SENSOR RETURN CIRCUIT FOR AN OPEN

- Ignition OFF.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to D6
No	REPAIR the transmission vehicle harness signal return circuit for an open.

D6 CHECK THE SENSOR RETURN CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.

Is the resistance greater than 10,000 ohms?

Yes	GO to D7
No	REPAIR the circuit.

D7 CHECK THE SENSOR RETURN INTERNAL HARNESS CIRCUITS FOR A SHORT TO POWER

- Disconnect for OSS sensor C1107.
- Disconnect for TSS sensor C3106.
- Disconnect for ISSA sensor C1836.
- Disconnect for ISSB sensor C1837.
- Ignition ON.

Is any voltage detected on the suspect circuit?

Yes	GO to D8
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

D8 CHECK THE SENSOR INTERNAL HARNESS POWER CIRCUITS FOR AN OPEN

- Disconnect Suspect sensor connector .
- Ignition ON.

Is the resistance greater than 10,000 ohms?

Yes	GO to D9
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

D9 CHECK THE SENSOR INTERNAL HARNESS CIRCUITS FOR A SHORT TO GROUND

- Ignition ON.

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new sensor as necessary. REFER to: Output Shaft Speed (OSS) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Turbine Shaft Speed (TSS) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Intermediate Speed Sensor A (ISSA) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Intermediate Speed Sensor B (ISSB) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

DTCS P0C2A, P0C2C, P0C2D, P0C2E, P2796

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation and Fault Conditions

The electric transmission fluid pump keeps the transmission engaged when the engine is stopped and the transmission is in drive. The electric transmission fluid pump has an internal microprocessor and communicates with the PCM over a PWM circuit with a frequency of 150 Hz with a duty cycle range of 10% to 90%.

DTC	Duty Cycle Range	Condition
P0C2D	Less than 10%	Out of range Low
P0C27	10% to 15%	Pump current too Low, Speed OK
P0C28	20% to 25%	Pump Current Too High, Speed OK
P175A	30% to 34%	Pump Over Temperature
P0C2A	35% to 40%	Pump Stalled
NONE	44% to 50%	Normal Value Of Signal
P0B0D	55% to 60%	Pump Over Speed – current OK
P0B0D	65% to 70%	Pump Under Speed – current OK
P0C29	75% to 80%	Both Current and Speed out of range
P2796	85% to 90%	No Command received from Control Module
P0C2E	Greater than 90%	Duty Cycle Out of range HI - undefined
P0C2C	Any other value (between)	Invalid duty cycle or invalid frequency. This could include no signal.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0B0D	Electric Transmission Fluid Pump Motor Control Module	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz and a valid duty cycle was detected (55% to 60% or 65% to 70%). The electric transmission fluid pump has detected a pump over or under speed condition. The current flow through the pump was within specification.
P0C27	Electric Transmission Fluid Pump Motor Control Module	Possible causes are loss of pump prime or low transmission fluid level. This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (10% to 15% duty cycle).
P0C28	Electric Transmission Fluid Pump Motor Current Low	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (20% to 25% duty cycle).
P0C29	Electric Transmission Fluid Pump Motor Current High	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a high current is detected.
P0C2A	Electric Transmission Fluid Pump Motor Stalled	This DTC sets if the PCM commands the electric transmission fluid pump motor on and does not detect a corresponding increase in pump speed, indicating a stalled pump motor.
P0C2C	Electric Transmission Fluid Pump Control Module Feedback Signal Range/ Performance	This DTC sets if the E-Pump frequency is between 125 and 175Hz but has an invalid duty cycle or the frequency is outside of the 125-175Hz range. This can be caused by a loss of power to the E-Pump.
P0C2D	Electric Transmission Fluid Pump Control Module Feedback Signal Low	This DTC sets if the duty cycle is less than 10%.
P0C2E	Electric Transmission Fluid Pump Control Module Feedback Signal High	This DTC sets if the duty cycle is greater than 90%.
P175A	Transmission Fluid Over Temperature Condition - Electric Transmission Fluid Pump Disabled	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but an over temperature condition is detected (30% to 34% duty cycle). This DTC can be caused by high transmission fluid temperatures

P2796	Electric Transmission Fluid Pump Control Circuit	This DTC sets when the electric transmission fluid pump reports to the PCM that it is not receiving a PWM from the PCM.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires or ground and missing or damaged seals
- BJB fuse 98 (15A)
- Electric transmission fluid pump
- PCM

PINPOINT TEST E : DTCS P0C2A, P0C2C, P0C2D, P0C2E, P2796

E1 RETRIEVE AND RECORD ALL DTCS	
• Using the diagnostic scan tool, retrieve all DTCs.	
Are DTCs P0C2A, P0C2C, P0C2D, P0C2E, P2796 present?	
Yes	For DTC P2796, GO to E7 For all other DTCs, GO to E2
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or terminal issues.
E2 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP POWER CIRCUITS	

- Ignition OFF.
- Disconnect Transmission Vehicle Harness C168A.
- Ignition ON.

Is the voltage greater than 11 volts?

Yes	GO to E3
No	VERIFY the BJB 98 (15A) is OK. If the fuse is OK, REPAIR the suspect circuit for an open. If the fuse is not OK, REFER to the Wiring Diagrams manual to identify the cause of the affected circuit shorted to ground.

E3 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP GROUND CIRCUIT FOR AN OPEN

- **NOTE:** *Confirm that the ground eyelet is clean and tightly secured to the ground point.*

Is the resistance less than 3 ohms?

Yes	For DTC P0C2A, GO to Pinpoint Test F For all other DTCs, GO to E4
No	REPAIR the circuit

E4 CHECK ELECTRIC TRANSMISSION FLUID PUMP FEEDBACK / MONITOR CIRCUIT FOR OPEN

- Ignition OFF.
- Disconnect PCM C1232T.
- Ignition ON.

Is the resistance less than 3 ohms?

Yes	GO to E5
No	REPAIR the circuit.

E5 CHECK ELECTRIC TRANSMISSION FLUID PUMP FEEDBACK / MONITOR CIRCUIT FOR SHORT TO GROUND

- Ignition OFF.

Is the resistance greater than 10,000 ohms?

Yes	GO to E6
No	REPAIR the circuit

E6 CHECK ELECTRIC TRANSMISSION FLUID PUMP FEEDBACK / MONITOR CIRCUIT FOR SHORT TO POWER

- Ignition ON.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E7

E7 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND CIRCUIT FOR SHORT TO POWER

- Ignition OFF.
- Disconnect PCM C1232T (If not already disconnected) .
- Disconnect Transmission Harness Connector C168A.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E8

E8 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND CIRCUIT FOR OPEN

Is the resistance less than 3 ohms?

Yes	GO to E9
No	REPAIR the circuit

E9 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP VEHICLE WIRING HARNESS COMMAND CIRCUITS FOR AN OPEN

Is the resistance greater than 10,000 ohms?

Yes	GO to E10
No	REPAIR the circuit

E10 CHECK ELECTRIC TRANSMISSION FLUID PUMP TRANSMISSION VEHICLE HARNESS FEEDBACK / MONITOR CIRCUIT FOR SHORT TO POWER

- Ignition ON.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E11

E11 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND/MONITOR CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect PCM C1232T (If not already disconnected) .

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E12

E12 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP INTERNAL WIRING HARNESS POWER CIRCUIT FOR AN OPEN

- REMOVE the transmission pan.
REFER to: [Transmission Fluid Drain and Refill](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
- Ignition ON.

Are the resistances less than 3 ohms?

Yes	GO to E13
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E13 CHECK THE TRANSMISSION INTERNAL WIRING HARNESS GROUND CIRCUIT

- Ignition OFF.

Is the resistance less than 3 ohms?

Yes	GO to E14
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E14 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP INTERNAL WIRING HARNESS CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect Transmission Vehicle Harness C168A (If not already disconnected) .

Is the resistance greater than 10,000 ohms?

Yes	GO to E15
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E15 CHECK TRANSMISSION INTERNAL WIRING HARNESS FLUID PUMP CIRCUITS FOR AN OPEN

- Ignition OFF.
- Disconnect Transmission Vehicle Harness C168A (If not already disconnected) .

Are the resistances less than 3 ohms?

Yes	GO to E16
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E16 CHECK THE TRANSMISSION FLUID PUMP DUTY CYCLE OPERATION

- Connect PCM C1232T.
- Connect Transmission Vehicle Harness C168A.
- Connect Electric Transmission Fluid Pump C1792.
- Connect the diagnostic tool.
- Ignition ON.
- Using a diagnostic scan tool, COMMAND the transmission fluid pump ON using, TRANS_PMP_CMD and set to a duty cycle of 70%.
- MONITOR the PIDs, TRANS_PMP_MEAS.

Does TRANS_PMP_MEAS quickly return to 44% to 50% after the command percentage changes?

Yes	The electric transmission fluid pump is operating correctly at this time.
No	INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

DTCs P0B0D, P0C27, P0C28, P0C29, P0C2A, P175A

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation and Fault Conditions

The electric transmission fluid pump keeps the transmission fluid circulating during extended drive times without engine charging. The electric transmission fluid pump has an internal microprocessor and communicates with the C1232E over a PWM circuit with a frequency of 150 Hz with a duty cycle range of 10% to 90%. If the transmission fluid level is low or overfilled or there are any restrictions in the transmission lines, hoses (if vehicle is equipped with external lines or hoses) or cooler it may affect the electric transmission fluid pump operation.

DTC	Duty Cycle Range	Condition
P0C2D	Less than 10%	Out of range Low
P0C27	10% to 15%	Pump current too Low, Speed OK
P0C28	20% to 25%	Pump Current Too High, Speed OK
P175A	30% to 34%	Pump Over Temperature
P0C2A	35% to 40%	Pump Stalled
NONE	44% to 50%	Normal Value Of Signal
P0B0D	55% to 60%	Pump Over Speed – current OK
P0B0D	65% to 70%	Pump Under Speed – current OK
P0C29	75% to 80%	Both Current and Speed out of range
P2796	85% to 90%	No Command received from Control Module
P0C2E	Greater than 90%	Duty Cycle Out of range HI - undefined
P0C2C	Any other value (between)	Invalid duty cycle or invalid frequency. This could include no signal.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0B0D	Electric Transmission Fluid Pump Motor Control Module	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz and a valid duty cycle was detected (55% to 60% or 65% to 70%). The electric transmission fluid pump has detected a pump over or under speed condition. The current flow through the pump was within specification.
P0C27	Electric Transmission Fluid Pump Motor Control Module	Possible causes are loss of pump prime or low transmission fluid level. This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (10% to 15% duty cycle).
P0C28	Electric Transmission Fluid Pump Motor Current Low	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (20% to 25% duty cycle).
P0C29	Electric Transmission Fluid Pump Motor Current High	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a high current is detected.
P0C2A	Electric Transmission Fluid Pump Motor Stalled	This DTC sets if the PCM commands the electric transmission fluid pump motor on and does not detect a corresponding increase in pump speed, indicating a stalled pump motor.
P0C2C	Electric Transmission Fluid Pump Control Module Feedback Signal Range/Performance	This DTC sets if the E-Pump frequency is between 125 and 175Hz but has an invalid duty cycle or the frequency is outside of the 125-175Hz range. This can be caused by a loss of power to the E-Pump.
P0C2D	Electric Transmission Fluid Pump Control Module Feedback Signal Low	This DTC sets if the duty cycle is less than 10%.
P0C2E	Electric Transmission Fluid Pump Control Module Feedback Signal High	This DTC sets if the duty cycle is greater than 90%.

P175A	Transmission Fluid Over Temperature Condition - Electric Transmission Fluid Pump Disabled	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but an over temperature condition is detected (30% to 34% duty cycle). This DTC can be caused by high transmission fluid temperatures
P2796	Electric Transmission Fluid Pump Control Circuit	This DTC sets when the electric transmission fluid pump reports to the PCM that it is not receiving a PWM from the PCM.

PINPOINT TEST F : DTCS P0B0D, P0C27, P0C28,P0C29, P0C2A, P175A

F1 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP POWER CIRCUITS

- Ignition OFF.
- Disconnect Transmission Harness Connector C168A.
- Ignition ON.

Is the voltage greater than 11 volts?

Yes	GO to F2
No	VERIFY the BJB fuse 98 (15A) is OK. If fuses are OK, REPAIR the affected circuit for an open. If fuses are not OK, REFER to the Wiring Diagrams manual to identify the cause of the affected circuit shorted to ground.

F2 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP GROUND CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	GO to F3
No	REPAIR the circuit

F3 CHECK THE TRANSMISSION FLUID LEVEL

- Ignition OFF.
- Check the transmission fluid level.
REFER to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Is the transmission fluid level correct?

Yes	GO to F4
No	CORRECT the transmission fluid to the proper level.

F4 CHECK THE ELECTRIC SUMP SEALS

- Ignition OFF.
- Drain the transmission fluid and remove the transmission pan.
REFER to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Remove the electric transmission fluid pump and sump and inspect the seals.

Are the electric transmission fluid pump seals OK?

Yes	INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL new seals on the electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

When the electrical connector or solenoid is disconnected, inspect the connector for terminal condition, corrosion and contamination and the connector seal for damage. Also inspect the connector seal for damage. Clean, repair or install new components as required. If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically off. Check for an open, short to ground or the transmission connector disconnected. The TCC is controlled by a directly proportional solenoid. Like the shift solenoids the TCC solenoid is controlled by a “smart driver” capable of detecting open, short to ground and short to power faults. In the event of an open circuit or short to power fault the TCC circuit is failed open. The TCC and LPC solenoids share a high side driver. Anytime power is removed the transmission defaults to MAX line pressure with open TCC. LPC is controlled by an inversely proportional solenoid (0 current = max pressure, max current = min line pressure). The LPC solenoid is controlled by a “smart driver” capable of detecting open, short to ground or short to power faults.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires and missing or damaged seals
- TCC and LPC solenoid(s)
- Main control wiring harness
- Transmission internal wiring harness
- PCM

PINPOINT TEST G : TCC, LPC SOLENOIDS

G1 CHECK THE SOLENOID POWER CIRCUIT TSPC2 FOR VOLTAGE	
• Ignition OFF. • Disconnect: Transmission Harness C168A. • Ignition ON.	
Is the maximum recorded voltage greater than 11 volts?	
Yes	GO to G4
No	GO to G2

G2 CHECK THE SOLENOID POWER CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect: PCM C1232T.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms?

Yes	GO to G3
No	REPAIR the transmission vehicle harness circuit for an open. CLEAR the DTCs. If DTC P0657 returns, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

G3 CHECK THE SOLENOID POWER CIRCUIT FOR SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	GO to G4
No	REPAIR the transmission vehicle harness circuit short to ground.

G4 CHECK VEHICLE HARNESS SOLENOID CONTROL CIRCUITS FOR AN OPEN

- Ignition OFF.
- Disconnect: PCM C1232T
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to G5
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

G5 CHECK VEHICLE HARNESS SOLENOID CONTROL CIRCUITS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms on the suspect circuit?

Yes	GO to G6
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

G6 CHECK SOLENOID CONTROL CIRCUITS FOR A SHORT TO POWER

Is any voltage detected on the suspect circuit?

Yes	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.
No	GO to G7

G7 CHECK MAIN CONTROL WIRING HARNESS FOR AN OPEN CIRCUIT

Are the resistances less than 3 ohms?

Yes	GO to G9
No	INSTALL a new main control wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

G8 CHECK MAIN CONTROL WIRING HARNESS FOR A SHORT TO GROUND

Are the resistances greater than 10,000 ohms?

Yes	GO to G9
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

G9 CHECK SOLENOID RESISTANCE

- Measure and record the resistance of the suspected solenoid.
REFER to: [Shift Solenoids \(SS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
Compare the recorded value with the chart below:

Solenoid	Ohms
LPC solenoid	4.6 to 5.2
TCC solenoid	4.6 to 5.2

Is the solenoid resistance within specification?

Yes	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new solenoid for the solenoid that failed the resistance check. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Diagnostic Trouble Code (DTC) Charts and Pinpoint Tests - 5.0L 32V Ti-VCT

Principles of Operation

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom.
REFER to: [Diagnosis By Symptom](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically OFF. Check for an open, short to ground or the transmission connector disconnected. The PCM disables power to the transmission solenoids when certain transmission DTCs are set.

Solenoid Operation Chart

Selector Lever Position	PCM Commanded Gear	SSA (1, 2, 3, 4, 5, 6, M1, M2, R)	SSB (2, 8, 9, 10, M1, M2, R)	SSC (2, 3, 4, 5, 7, 9, 10, M2)	SSD (2, 3, 4, 6, 7, 8, 10, M2, R)	SSE (1, 3, 5, 6, 7, 8, 9, M1)	SSF (4, 5, 6, 7, 8, 9, 10, R)	TCC Solenoid
P	P	On	On	Off	On	Off	Off	Off
R	R	On	On	Off	On	Off	On	Off
N	N	On	On	Off	On	Off	Off	Off
D	1	On	Off	Off	On ^a	On	Off	Off
	2	On	Off	On	On	Off	Off	On/Off
	3	On	Off	On	On	On	Off	On/Off
	4	On	Off	On	On	Off	On	On/Off
	5	On	Off	On	Off	On	On	On/Off
	6	On	Off	Off	On	On	On	On/Off
	7	Off	Off	On	On	On	On	On/Off
	8	Off	On	Off	On	On	On	On/Off
	9	Off	On	On	Off	On	On	On/Off
	10	Off	On	On	On	Off	On	On/Off
M1	1	On	On	Off	On ^a	On	Off	Off
M2	2	On	On	On	On	Off	Off	Off

- On to reduce frictional losses from a released clutch, but does not contribute to power flow.

DTC Chart: PCM

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

DTC Chart

DTC	Description	Warning Light/DTC Type	Action
P0602	Powertrain Control Module Programming Error	MIL/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P0603	Internal Control Module Keep Alive Memory (KAM) Error	MIL/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P0604	Internal Control Module Random Access Memory (RAM) Error	MIL, Wrench/Initialization	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P0605	Internal Control Module Read Only Memory (ROM) Error	MIL/Initialization	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P0607	Control Module Performance	MIL/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P060A	Internal Control Module Monitoring Processor Performance	MIL, Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P060B	Internal Control Module A/D Processing Performance	MIL, Wrench	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).

P060C	Internal Control Module Main Processor Performance	MIL, Wrench	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P060D	Internal Control Module Accelerator Pedal Position Performance	MIL, Wrench	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P060F	Internal Control Module Engine Coolant Temperature Performance	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P0610	Control Module Vehicle Options Error	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P061A	Internal Control Module Torque Performance	None/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P061B	Internal Control Module Torque Calculation Performance	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P061C	Internal Control Module Engine RPM Performance	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).

P061D	Internal Control Module Engine Air Mass Performance	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P061E	Internal Control Module Brake Signal Performance	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P062B	Internal Control Module Fuel Injector Control Performance	None/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P062C	Internal Control Module Vehicle Speed Performance	None/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P0630	VIN Not Programmed or Incompatible - ECM/PCM	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P064F	Unauthorized Software/Calibration Detected	MIL, Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).

P0657	Actuator Supply Voltage "A" Circuit Open	MIL, Wrench/Continuous	If the power circuit to the transmission solenoids is interrupted then all solenoids are failed electrically off. CHECK for an open, short to ground or the transmission connector disconnected. REPAIR as required. CLEAR the DTC. GO to Pinpoint Test A
P068A	ECM/PCM Power Relay De-Energized - Too Early	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P06B8	Internal Control Module Non-Volatile Random Access Memory (NVRAM) Error	MIL/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P0702	Transmission Control System Electrical	Wrench/Continuous	INSPECT the PCM power and ground circuits for opens or short to ground. INSPECT the PCM connector for damaged or pushed-out terminals, corrosion or loose wires. CLEAR the DTC. RERUN the KOEO and KOER self-test. If DTC P0702 returns, REFER to: Charging System - 3.3L Duratec - V6/5.0L 32V Ti-VCT (414-00 Charging System - General Information, Diagnosis and Testing).

P0706	Transmission Range Sensor "A" Circuit Range/Performance	Wrench/KOEO, Continuous	The TR sensor outputs a duty cycle indicating manual lever position. This DTC sets when the frequency is greater or less than the expected duty cycle by 25Hz or more. Engine may not crank. CLEAR the DTC. If DTC P0706 returns, GO to Pinpoint Test C
P0707	Transmission Range Sensor "A" Circuit Low	Wrench/KOEO, Continuous	Engine may not crank, CLEAR the DTC. If DTC P0707 returns, GO to Pinpoint Test C
P0708	Transmission Range Sensor "A" Circuit High	Wrench/KOEO, Continuous	Engine may not crank, CLEAR the DTC. If DTC P0708 returns, GO to Pinpoint Test C
P0709	Transmission Range Sensor "A" Circuit Intermittent	Wrench/Continuous	The TR sensor outputs a duty cycle indicating manual lever position. This DTC sets when the duty cycle is within range but is in the dead band between the design position, and an in-range but invalid duty cycle. GO to Pinpoint Test C
P0710	Transmission Fluid Temperature Sensor "A" Circuit	Wrench/Continuous	CLEAR the DTC. If DTC P0710 returns, GO to Pinpoint Test B
P0711	Transmission Fluid Temperature Sensor "A" Circuit Range/Performance	MIL/Continuous	CLEAR the DTC. Road test the vehicle at least 5 minutes. If DTC P0711 returns, GO to Pinpoint Test B
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low	MIL/KOEO, Continuous	DTC P0710 may set. CLEAR the DTC. If DTC P0712 returns, GO to Pinpoint Test B

P0713	Transmission Fluid Temperature Sensor "A" Circuit High	MIL/KOEO, Continuous	DTC P0710 may set. CLEAR the DTC. If DTC P0713 returns, GO to Pinpoint Test B
P0715	TSS Sensor "A" Circuit	MIL/KOEO, Continuous	CLEAR DTC. If DTC P0715 returns during KOEO, GO to Pinpoint Test D
P0716	TSS Sensor "A" Circuit Range/Performance	MIL/Continuous	The PCM detected TSS sensor drop out, noise spike, or TSS not corresponding to other speed sensor inputs for current gear. REPAIR all clutch faults first. INSPECT TSS sensor for proper mounting. INSPECT TSS tone wheel (part of No. 2 planetary carrier) for damage.
P0717	TSS Sensor "A" Circuit No Signal	Wrench/Continuous	P0717 illuminates the wrench light in conjunction with P0715, P07BF, and/or P07C0. Service the more specific DTC first. GO to Pinpoint Test D
P0718	TSS Sensor "A" Circuit Intermittent	MIL/Continuous	The PCM detected TSS fault, but the fault did not last long enough for the PCM to set a more specific TSS DTC. Inspect TSS wiring and connectors for damage.
P0720	Output Shaft Speed Sensor Circuit	MIL/KOEO, Continuous	CLEAR the DTC. If DTC P0720 returns during KOEO, GO to Pinpoint Test D
P0721	Output Shaft Speed Sensor Circuit Range/Performance	MIL/Continuous	The PCM detected OSS sensor drop out, noise spike, or OSS not corresponding to other speed sensor inputs for current gear. REPAIR all clutch faults first. INSPECT OSS sensor for proper mounting. INSPECT OSS sensor tone wheel (part of planetary carrier No. 4 output shaft) for damage.

P0722	Output Shaft Speed Sensor Circuit No Signal	Wrench/Continuous	DTC P0722 illuminates the wrench light in conjunction with P0720, P077C, and/or P077D. Service the more specific DTC first. GO to Pinpoint Test D
P0723	Output Shaft Speed Sensor Circuit Intermittent	MIL/Continuous	The PCM detected OSS sensor fault, but the fault did not last long enough for the PCM to set a more specific OSS sensor DTC. Inspect OSS sensor wiring and connectors for damage.
P0729	Gear 6 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 6th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0731	Gear 1 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to first gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0732	Gear 2 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 2nd gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0733	Gear 3 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 3rd gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0734	Gear 4 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 4th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0735	Gear 5 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 5th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0736	Reverse Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to Reverse. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0740	Torque Converter Clutch Solenoid Circuit/Open	Wrench/KOEO, Continuous	CLEAR DTC. If DTC P0740 returns during KOER, GO to Pinpoint Test G
P0741	Torque Converter Clutch Solenoid Circuit Performance/Stuck Off	Wrench/Continuous	DTC P0741 is a non-electrical failure that caused the TCC to fail to apply. For TCC Does Not Apply Symptom, REFER to: Torque Converter Clutch (TCC) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0743	Torque Converter Clutch Solenoid Circuit Electrical	Wrench/KOEO, Continuous	DTC P0743 illuminates the wrench light in conjunction with P0740, P2769, and/or P2770. Service the more specific DTC first. GO to Pinpoint Test G
P0748	Pressure Control Solenoid Electrical	Wrench/KOEO, Continuous	DTC P0748 illuminates the wrench light in conjunction with P0960, P0962, and/or P0963. Service the more specific DTC first. GO to Pinpoint Test G
P0751	Shift Solenoid "A" Performance/ Stuck Off	MIL/KOEO, Continuous	DTC P0751 is a non-electrical failure indicating the A clutch failed to apply. For A clutch Does Not Apply symptom, REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0752	Shift Solenoid "A" Stuck On	MIL/Continuous	DTC P0752 is a non-electrical failure indicating A clutch stayed applied when SSA was de-energized. For A clutch Always Applied symptom, REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0753	Shift Solenoid "A" Electrical	Wrench/KOEO, Continuous	DTC P0753 illuminates the wrench light in conjunction with P0973, P0974, and/or P097A. Service the more specific DTC first. GO to Pinpoint Test A

P0754	Shift Solenoid "A" Intermittent	MIL/Continuous	The PCM detected a SSA fault, but the fault did not last long enough for the PCM to set a more specific SSA DTC. Inspect SSA wiring and connectors for damage.
P0756	Shift Solenoid "B" Performance/ Stuck Off	MIL/Continuous	DTC P0756 is a non-electrical failure indicating the B clutch failed to apply. For B clutch Does Not Apply symptom, REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0757	Shift Solenoid "B" Stuck On	MIL/Continuous	DTC P0757 is a non-electrical failure indicating the B clutch stayed applied when SSB was de-energized. For B clutch Always Applied symptom, REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0758	Shift Solenoid "B" Electrical	Wrench, KOEO, Continuous	DTC P0758 illuminates the wrench light in conjunction with P0976, P0977, and/or P097B. Service the more specific DTC first. GO to Pinpoint Test A
P0759	Shift Solenoid "B" Intermittent	MIL/Continuous	The PCM detected SSB fault, but the fault did not last long enough for the PCM to set a more specific SSB DTC. Inspect SSB wiring and connectors for damage.

P0761	Shift Solenoid "C" Performance/ Stuck Off	MIL/Continuous	DTC P0761 is a non-electrical failure indicating the C clutch failed to apply. For C clutch Does Not Apply symptom, REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0762	Shift Solenoid "C" Stuck On	MIL/Continuous	DTC P0762 is a non-electrical failure indicating the C clutch stayed applied when SSC was de-energized. For C clutch Always Applied symptom, REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0763	Shift Solenoid "C" Electrical	Wrench, KOEO, Continuous	DTC P0763 illuminates the wrench light in conjunction with P0779, P097C, and/or P0980. Service the more specific DTC first. GO to Pinpoint Test A
P0764	Shift Solenoid "C" Intermittent	MIL/Continuous	The PCM detected SSC fault, but the fault did not last long enough for the PCM to set a more specific SSC DTC. Inspect SSC wiring and connectors for damage.
P0766	Shift Solenoid "D" Performance/ Stuck Off	MIL/Continuous	DTC P0761 is a non-electrical failure indicating the D clutch failed to apply. For D clutch Does Not Apply symptom, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0767	Shift Solenoid "D" Stuck On	MIL/Continuous	DTC P0757 is a non-electrical failure indicating the D clutch stayed applied when SSD was de-energized. For D clutch Always Applied symptom, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0768	Shift Solenoid "D" Electrical	Wrench, KOEO, Continuous	DTC P0768 illuminates the wrench light in conjunction with P097D, P0982, P0982. Service the more specific DTC first. GO to Pinpoint Test A
P0769	Shift Solenoid "D" Intermittent	MIL/Continuous	The PCM detected SSD fault, but the fault did not last long enough for the PCM to set a more specific SSD DTC. Inspect SSD wiring and connectors for damage.
P076F	Gear 7 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 7th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0771	Shift Solenoid "E" Performance/ Stuck Off	MIL/Continuous	DTC P0761 is a non-electrical failure indicating the E clutch failed to apply. For E clutch Does Not Apply symptom, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0772	Shift Solenoid "E" Stuck On	MIL/Continuous	DTC P0772 is a non-electrical failure indicating the E clutch stayed applied when SSE was de-energized. For E clutch Always Applied symptom, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0773	Shift Solenoid "E" Electrical	Wrench/Continuous	DTC P0773 illuminates the wrench light in conjunction with P097E, P0985, P0986. Service the more specific DTC first. GO to Pinpoint Test A
P0774	Shift Solenoid "E" Intermittent	MIL/Continuous	The PCM detected SSE fault, but the fault did not last long enough for the PCM to set a more specific SSE DTC. Inspect SSE wiring and connectors for damage.
P077D	Output Shaft Speed Sensor Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test D
P0791	Intermediate Shaft Speed Sensor "A" Circuit	MIL/Continuous	GO to Pinpoint Test D
P0792	Intermediate Shaft Speed Sensor "A" Circuit Range/ Performance	MIL/Continuous	GO to Pinpoint Test D
P0793	Intermediate Shaft Speed Sensor "A" Circuit No Signal	Wrench	GO to Pinpoint Test D

P0794	Intermediate Shaft Speed Sensor "A" Circuit Intermittent	MIL/Continuous	GO to Pinpoint Test D
P07A9	Transmission Friction Element "D" Stuck On	None/Continuous	The PCM detected that D clutch failed to release multiple times and determined the SSD is not stuck on. For D clutch Always Applied symptom, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07AB	Transmission Friction Element "E" Stuck On	None/Continuous	The PCM detected that E clutch failed to release multiple times and determined the SSE is not stuck on. For E clutch Always Applied symptom, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07AD	Transmission Friction Element "F" Stuck On	None/Continuous	The PCM detected that F clutch failed to release multiple times and determined the SSF is not stuck on. For F clutch Always Applied symptom, REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07C0	TSS Sensor "A" Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test D
P07C6	Intermediate Shaft Speed Sensor "A" Circuit High	MIL/Continuous	GO to Pinpoint Test D

P07C8	Intermediate Shaft Speed Sensor "B" Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test D
P07D9	Gear 8 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 8th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07F6	Gear 9 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 9th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07F7	Gear 10 Incorrect Ratio	Wrench/Continuous	The PCM detected multiple ratio error either in or while shifting to 10th gear. The ratio error did not last long enough for the PCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0868	Transmission Fluid Pressure Low	Wrench/Continuous	CLEAR the DTC. Road test vehicle, if DTC P0868 returns, If DTCs P0751, P0756, P0761, P0766, P0771 or P2707 are set, TEST for low pump pressure or fluid contamination. PERFORM the line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0882	TCM Power Input Signal Low	MIL/KOEO, Continuous	INSPECT the PCM power and ground circuits for opens or short to ground. INSPECT the PCM connector for damaged or pushed-out terminals, corrosion or loose wires. CLEAR the DTC. If DTC P0882 returns, REFER to: Charging System - 3.3L Duratec - V6/5.0L 32V Ti-VCT (414-00 Charging System - General Information, Diagnosis and Testing).
P0883	TCM Power Input Signal High	MIL/KOEO, Continuous	CLEAR the DTC. If DTC P0883 returns, REFER to: Charging System - 3.3L Duratec - V6/5.0L 32V Ti-VCT (414-00 Charging System - General Information, Diagnosis and Testing).
P0884	TCM Power Input Signal Intermittent	MIL/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).

P0960	Pressure Control Solenoid Control Circuit/Open	MIL/KOEO, Continuous	The LPC solenoid failed to max pressure indicating wiring or connector issues, or a solenoid electrical issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test G
P0961	Pressure Control Solenoid Control Circuit Range/Performance	MIL/Continuous	The LPC solenoid failed to max pressure indicating wiring or connector issues, or a solenoid electrical issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test G
P0962	Pressure Control Solenoid Control Circuit Low	MIL/KOEO, Continuous	The LPC solenoid failed to max pressure indicating wiring or connector issues, or a solenoid electrical issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test G
P0963	Pressure Control Solenoid Control Circuit High	MIL/KOEO, Continuous	The LPC solenoid failed to high current which is maximum pressure indicating short to ground, wiring or solenoid issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test G
P0973	Shift Solenoid "A" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSA electrical. Since SSA shorted to ground causes SSA to be failed to high current (maximum pressure since SSA is directly proportional). A clutch is failed on. GO to Pinpoint Test A

P0974	Shift Solenoid "A" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSA electrical. Since SSA shorted to power causes SSA to be failed to low current (minimum pressure since SSA is directly proportional). A clutch is failed off. GO to Pinpoint Test A
P0976	Shift Solenoid "B" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSB electrical. Since SSB shorted to ground causes SSB to be failed to high current (maximum pressure since SSB is directly proportional). B clutch is failed on. GO to Pinpoint Test A
P0977	Shift Solenoid "B" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSB electrical. Since SSB shorted to power causes SSB to be failed to low current (minimum pressure since SSB is directly proportional). B clutch is failed off. GO to Pinpoint Test A
P0979	Shift Solenoid "C" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSC electrical. Since SSC shorted to ground causes SSC to be failed to high current (maximum pressure since SSC is directly proportional). C clutch is failed on. GO to Pinpoint Test A

P097A	Shift Solenoid "A" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSA electrical. Since SSA shorted to power causes SSA to be failed to low current (minimum pressure since SSA is directly proportional). A clutch is failed off. GO to Pinpoint Test A
P097B	Shift Solenoid "B" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates an open circuit in the SSB electrical. Since SSB shorted to power causes SSB to be failed to low current (minimum pressure since SSB is directly proportional). B clutch is failed off. GO to Pinpoint Test A
P097C	Shift Solenoid "C" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSC electrical. Since SSC shorted to power causes SSC to be failed to low current (minimum pressure since SSC is directly proportional). C clutch is failed off. GO to Pinpoint Test A
P097D	Shift Solenoid "D" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSD electrical. Since SSD shorted to power causes SSD to be failed to low current (minimum pressure since SSD is directly proportional). D clutch is failed off. GO to Pinpoint Test A

P097E	Shift Solenoid "E" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSE electrical. Since SSE shorted to power causes SSE to be failed to low current (minimum pressure since SSE is directly proportional). E clutch is failed off. GO to Pinpoint Test A
P097F	Shift Solenoid "F" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSF electrical. Since SSF shorted to power causes SSF to be failed to low current (minimum pressure since SSF is directly proportional). F clutch is failed off. GO to Pinpoint Test A
P0980	Shift Solenoid "C" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSC electrical. Since SSC shorted to power causes SSC to be failed to low current (minimum pressure since SSC is directly proportional). C clutch is failed off. GO to Pinpoint Test A
P0982	Shift Solenoid "D" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSD electrical. Since SSD shorted to ground causes SSD to be failed to high current (maximum pressure since SSD is directly proportional). D clutch is failed on. GO to Pinpoint Test A

P0983	Shift Solenoid "D" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSD electrical. Since SSD shorted to power causes SSD to be failed to low current (minimum pressure since SSD is directly proportional). D clutch is failed off. GO to Pinpoint Test A
P0985	Shift Solenoid "E" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSE electrical. Since SSE shorted to ground causes SSE to be failed to high current (maximum pressure since SSE is directly proportional). E clutch is failed on. GO to Pinpoint Test A
P0986	Shift Solenoid "E" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSE electrical. Since SSE shorted to power causes SSE to be failed to low current (minimum pressure since SSE is directly proportional). E clutch is failed off. GO to Pinpoint Test A
P0998	Shift Solenoid "F" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSF electrical. Since SSF shorted to ground causes SSF to be failed to high current (maximum pressure since SSE is directly proportional). F clutch is failed on. GO to Pinpoint Test A

P0999	Shift Solenoid "F" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSF electrical. Since SSF shorted to power causes SSF to be failed to low current (minimum pressure since SSF is directly proportional). E clutch is failed off. GO to Pinpoint Test A
P0B0D	Electric Transmission Fluid Pump Motor Control Module	None/Continuous	CLEAR the DTC. If the DTC returns, INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
P0C27	Electric Transmission Fluid Pump Motor Current Low	None/Continuous	This DTC applies to auto-start-stop vehicles only. This DTC sets when the PCM detects low current (10% to 15% duty cycle). Auto-Start-Stop unavailable and the engine will only stop when the operator turns the ignition off. The engine may restart unexpectedly when the vehicle is stopped. CLEAR the DTC. If the DTC returns, GO to Pinpoint Test F
P0C28	Electric Transmission Fluid Pump Motor Current Low	None/Continuous	GO to Pinpoint Test F
P0C29	Electric Transmission Fluid Pump Motor Current High	None/Continuous	GO to Pinpoint Test F
P0C2A	Electric Transmission Fluid Pump Motor Stalled	None/Continuous	GO to Pinpoint Test F

P0C2C	Electric Transmission Fluid Pump Control Module Feedback Signal Range/Performance	Wrench/Continuous	GO to Pinpoint Test E
P0C2D	Electric Transmission Fluid Pump Control Module Feedback Signal Low	Wrench/Continuous	GO to Pinpoint Test E
P0C2E	Electric Transmission Fluid Pump Control Module Feedback Signal High	Wrench/Continuous	GO to Pinpoint Test E
P1001	The KOER Not Able to Complete, KOER Aborted	None/KOER	RETRIEVE and RECORD all DTCs. REPAIR any self-test or CMDTCs first. CLEAR the DTC. RERUN the KOER self-test. If the DTC returns, REPROGRAM the PCM to the latest software. RERUN the KOER self-test. If the DTC returns, INSTALL a new PCM REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). After installing the new PCM PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

P1397	System Voltage Out Of Self Test Range	None/KOEO	INSPECT the PCM power and ground circuits for opens or short to ground. INSPECT the PCM connector for damaged or pushed-out terminals, corrosion or loose wires. CLEAR the DTC. RUN the KOEO self-test. If DTC P1397 returns, REFER to: Charging System - 3.3L Duratec - V6/5.0L 32V Ti-VCT (414-00 Charging System - General Information, Diagnosis and Testing).
P1501	Vehicle Speed Sensor Out Of Self Test Range	None/KOEO	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P160A	Control Module Vehicle Options Reconfiguration Error	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P162D	Internal Control Module Cruise Control Performance	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P162E	Internal Control Module PTO Control Performance	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).

P1636	Inductive Signature Chip Communication Error	MIL/KOEO, Continuous	CLEAR the DTC. If DTC P1636 returns, INSTALL a new . PCM. REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). After installing the new PCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P1639	Vehicle ID Block Corrupted Not Programmed	KOEO, KOER, Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P163E	Transmission Control Module Programming Error	MIL/KOEO, Continuous	CLEAR the DTC. REPROGRAM the original PCM with the latest software. If DTC P163E returns, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). After installing the new PCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B

			Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P163F	Transmission ID Block Corrupted, Not Programmed	MIL/KOEO, Continuous	CLEAR the DTC. REPROGRAM the original PCM with the latest software. If DTC P163F returns, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). After installing the new PCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P164C	Internal control Module Start Stop Performance	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P1674	Control Module Software Corrupted	MIL, Wrench/KOEO, Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P1705	Transmission Range Circuit Not Indicating Park/Neutral During Self Test	None/KOEO	CLEAR the DTC. RERUN the KOEO and KOER self-test. If DTC P1705 returns, GO to Pinpoint Test C

P1711	Transmission Fluid Temperature Sensor Out Of Self Test Range	None/KOEO	CLEAR the DTC and RERUN the KOEO and KOER self-test. If the DTC returns, GO to Pinpoint Test B
P1744	Torque Converter Clutch Solenoid Circuit Performance	Wrench/Continuous	DTC P1744 is a non-electrical DTC. CLEAR the DTC. If DTC P1744 returns, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P175A	Transmission Fluid Over Temperature Condition - Electric Transmission Fluid Pump Disabled	None/Continuous	GO to Pinpoint Test F
P1783	Transmission Over Temperature Condition	Wrench/Continuous	CLEAR the DTC. If DTC P1783 returns, determine if this DTC was set in conjunction with any TFT sensor circuit DTCs and RESOLVE them first, otherwise REFER to: Transmission Cooling (307-02 Transmission Cooling) .
P1A02	Transmission One Way Clutch Performance	Wrench/Continuous	This DTC sets when the PCM detects 3 failures of the one-way clutch to lock in 1st or 2nd gear allowing sun gear 1 to rotate backwards. CLEAR the DTC, road test the vehicle. If DTC P1A02 returns, it may indicate a one way clutch failure. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

P2531	Ignition Switch Run Position Circuit Low	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P2532	Ignition Switch Run Position Circuit High	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P264F	Engine Serial Number Not Programmed Or Incompatible	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
P2669	Actuator Supply Voltage "B" Circuit/Open	MIL/Continuous	GO to Pinpoint Test A
P26C3	Internal Control Module Transmission Range Sensor Performance	MIL, Wrench/KOEO, Continuous	CLEAR the DTC. If DTC P26C3 returns, TR sensor. REFER to: Transmission Range (TR) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
P26C4	Internal Control Module Transmission Range Sensor Performance	None	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).

P2700	Transmission Friction Element "A" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P0751 (A clutch stuck off) and P0752 (A clutch stuck on), service the more specific DTC first. See DTCs P0751 and P0752 for potential causes. If P0751 and P0752 are not set refer to the associated symptoms, REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2701	Transmission Friction Element "B" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P0756 (B clutch stuck off) and P0757 (B clutch stuck on), service the more specific DTC first. See DTCs P0756 and P0757 for potential causes, if these DTCs are not set refer to the associated symptoms, REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2702	Transmission Friction Element "C" Apply Time Range/Performance	Wrench/Continuous	This DTC set with either P0761 (C clutch stuck off) and P0762 (C clutch stuck on) - service the more specific DTC first (if present). See P0761 and P0762 for potential causes first. If these DTCs are not set refer to the associated symptoms, REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P2703	Transmission Friction Element "D" Apply Time Range/Performance	Wrench/Continuous	This DTC set with either P0766 (D clutch stuck off) and P0767 (D clutch stuck on) service the more specific DTC first (if present). See P0766 and P0767 for potential causes first. If these DTCs are not set, refer to the associated symptoms, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2704	Transmission Friction Element "E" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P0771 (E clutch stuck off) and P0772 (E clutch stuck on) service the more specific DTC first (if present). See P0771 and P0772 for potential causes. If these DTCs are not set, refer to the associated symptoms, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2705	Transmission Friction Element "F" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P2707 (F clutch stuck off) and P2708 (F clutch stuck on), service the more specific DTC first. See DTCs P2707 and P2708 for potential causes. If these DTCs are not set, refer to the associated symptoms, REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P2707	Shift Solenoid "F" Performance/ Stuck Off	MIL/Continuous	F clutch stuck off due to a non-electrical fault. Multiple attempts to apply F clutch failed. GO to Pinpoint Test A
P2708	Shift Solenoid "F" Stuck On	MIL/Continuous	F clutch stuck on due to a non-electrical fault. Multiple attempts to apply F clutch failed. GO to Pinpoint Test A
P2709	Shift Solenoid "F" Electrical	MIL/KOEO, Continuous	SSF (controls F clutch) VFS circuit failure non-MIL "sister" DTCs of P097F, P0998, P0999 used to illuminate the Wrench Light. If one of the more specific circuit codes is set, follow repair procedures for that code. GO to Pinpoint Test A
P2710	Shift Solenoid "F" Intermittent	MIL/Continuous	The PCM detected SSF fault, but the fault did not last long enough for the PCM to set a more specific SSF DTC. Inspect SSF wiring and connectors for damage.
P2745	Intermediate Shaft Speed Sensor "B" Circuit	MIL/KOEO, Continuous	An open circuit fault was detected by the PCM smart driver. GO to Pinpoint Test D
P2746	Intermediate Shaft Speed Sensor "B" Circuit Range/ Performance	MIL/Continuous	GO to Pinpoint Test D
P2747	Intermediate Shaft Speed Sensor "B" Circuit No Signal	Wrench/Continuous	GO to Pinpoint Test D
P2748	Intermediate Shaft Speed Sensor "B" Circuit Intermittent	MIL/Continuous	GO to Pinpoint Test D

P2758	Torque Converter Clutch Pressure Control Solenoid Stuck On	MIL/Continuous	TCC stuck on when commanded off due to non-electrical failure. CLEAR the DTC. If DTC P2758 returns, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2760	Torque Converter Clutch Pressure Control Solenoid Intermittent	MIL/Continuous	The PCM detected TCC fault, but the fault did not last long enough for the PCM to set a more specific TCC DTC. Inspect TCC solenoid wiring and connectors for damage.
P2769	Torque Converter Clutch Circuit Low	MIL/Continuous	This DTC indicates a short to ground in the TCC electrical. Since TCC shorted to ground causes TCC to be failed to high current (maximum pressure since TCC is directly proportional). TCC is failed on. GO to Pinpoint Test G
P2770	Torque Converter Clutch Circuit High	MIL/Continuous	This DTC indicates a short to power in the TCC electrical. Since TCC shorted to power causes TCC to be failed to low current (minimum pressure since TCC is directly proportional). TCC is failed off. CLEAR the DTC. If DTC P2783 returns, INSPECT TCC control valve for sticking. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

P2783	Torque Converter Temperature Too High	None/Continuous	The TCC control valve is stuck in a position that provides no flow when the TCC is commanded off. The TCC pumps down when commanded off, causing loss of torque multiplication through the TCC.
P2796	Electric Transmission Fluid Pump Control Circuit	None/Continuous	This DTC sets when the transmission auxiliary fluid pump reports to the PCM that it is not receiving a PWM from the PCM. CLEAR the DTC. If the DTC returns, GO to Pinpoint Test E
P27B4	Internal Control Module Transmission Gear Ratio Control Performance	None/Continuous	May be caused by clutch faults that cause reverse in forward range or a forward gear in reverse, or a speed sensor error, CLEAR the DTC. If DTC P27B4 returns, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P27B5	Internal Control Module Transmission Gear Select Performance	None/Continuous	CLEAR the DTC. If DTC P27B5 returns, if any TR DTCs are set RESOLVE them first. If DTC P27B5 returns, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure.

			REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P27B6	Internal Control Module Transmission Speed Sensor Performance	MIL, Wrench/Continuous	CLEAR the DTC. Road test the vehicle. If any speed sensor DTCs are set, RESOLVE them first. If DTC P27B6 returns, PCM. REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P2801	Transmission Range Sensor "B" Circuit Range/Performance	MIL/KOEO, Continuous	GO to Pinpoint Test C
P2802	Transmission Range Sensor "B" Circuit Low	MIL/KOEO, Continuous	GO to Pinpoint Test C
P2803	Transmission Range Sensor "B" Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test C
P2804	Transmission Range Sensor "B" Circuit Intermittent	Wrench/KOEO, Continuous	GO to Pinpoint Test C
P2805	Transmission Range Sensor "A"/"B" Correlation	MIL/KOEO, Continuous	GO to Pinpoint Test C

U0028	Vehicle Communication Bus "A"	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
U0037	Vehicle Communication Bus "B"	Wrench/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
U0073	Control Module Communication Bus "A" Off	MIL/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
U0074	Control Module Communication Bus "B" Off	MIL/Continuous	REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).

Pinpoint Tests

Power is routed through the transmission solenoid power control (inside the PCM) to all transmission solenoids. If the power circuit to the transmission solenoids or the transmission solenoid power control fails open, all solenoids are failed electrically off. Check for an open, short to ground or the transmission connector disconnected. The transmission solenoid power control disables power to the transmission solenoids when certain transmission DTCs are set.

- Carry out KOEO and KOER procedures.
- Retrieve and record all DTCs.
- Repair all non-transmission DTCs first.
- Repair all transmission DTCs second.
- Clear all CMDTCs and attempt to repeat them.
- Repair all CMDTCs.
- If only pass codes are obtained,

REFER to: [Diagnosis By Symptom](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

Transmission Control Solenoids

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically off. Check for an open, short to ground or the transmission connector disconnected. The 10R80 utilizes 6 shift (A through F) solenoids that are linear force solenoids. Unlike previous shift solenoids they are mechanical in nature meaning no transmission fluid passes through them. CIDASs use an armature pin assembly that moves a control valve in the main control valve body to control and apply hydraulic fluid pressure. Each clutch (A through F) has a corresponding shift solenoid (A through F) that is directly proportional in that zero current equals zero pressure and maximum current equals maximum pressure. Since there is no pressure with zero current, none of the clutch packs are able to engage if the power is interrupted to the shift solenoids .

PINPOINT TEST A : TRANSMISSION CONTROL SOLENOIDS

A1 CHECK THE SOLENOID POWER CIRCUIT FOR VOLTAGE	
NOTE: <i>Read and record all DTCs.</i>	
• Ignition OFF. • Disconnect: Transmission Vehicle Harness C168A. • Ignition ON.	
Is the maximum recorded voltage greater than 11 volts?	
Yes	GO to A4
No	GO to A2
A2 CHECK THE SOLENOID POWER CIRCUIT FOR AN OPEN	

- Ignition OFF.
- Disconnect: PCM C1381T
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms?

Yes	GO to A3
No	REPAIR transmission vehicle harness circuit for an open.

A3 CHECK THE SOLENOID POWER CIRCUIT FOR A SHORT TO GROUND

-

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
C1381T-2	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new PCM, REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	REPAIR the circuit.

A4 CHECK SOLENOID CONTROL CIRCUITS FOR AN OPEN

- Ignition OFF.
- Disconnect: PCM C1381T
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to A5
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

A5 CHECK SOLENOID CONTROL CIRCUITS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms on the suspect circuit?

Yes	GO to A6
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

A6 CHECK SOLENOID CONTROL CIRCUITS FOR A SHORT TO POWER

Is any voltage detected?

Yes	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.
No	GO to A7

A7 CHECK MAIN CONTROL WIRING HARNESS SOLENOID POWER CIRCUIT FOR AN OPEN CIRCUIT

- Drain the transmission fluid and remove the transmission fluid pan.
REFER to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Disconnect Shift Solenoid Connectors (A through F).
- Disconnect Main Control Wiring Harness C177.
- Measure resistance of the suspect solenoid power circuit of the main control wiring harness, using the table below:

Positive Lead	Measurement / Action	Negative Lead
C177-5	Ω	SSA C1843-1
C177-5		SSB C1844-1
C177-5		SSC C1845-1
C177-5		SSD C1846-1
C177-5		SSE C1847-1

C177-5		SSF C1848-1

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to A9
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A8 CHECK MAIN CONTROL WIRING HARNESS SOLENOID POWER CIRCUIT FOR A SHORT TO GROUND

- INSPECT main control wiring harness for chafes or bare wires.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C177-5	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to A9
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A9 CHECK MAIN CONTROL WIRING HARNESS SOLENOID CONTROL CIRCUIT FOR AN OPEN CIRCUIT

- Measure resistance of the suspect solenoid control circuit of the main control wiring harness, using the table below:

Positive Lead	Measurement / Action	Negative Lead
C177-8	Ω	SSA C1843-2
C177-9		SSB C1844-2
C177-10		SSC C1845-2
C177-11		SSD C1846-2
C177-3		SSE C1847-2
C177-4		SSF C1848-2

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to A11
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A10 CHECK MAIN CONTROL WIRING HARNESS SOLENOID CONTROL CIRCUIT FOR A SHORT TO GROUND

- Disconnect Shift Solenoid Connectors (A through F) (If not disconnected already).
- Measure:

Positive Lead	Measurement / Action	Negative Lead
SSA C1843-2	Ω	Ground
SSB C1844-2		Ground
SSC C1845-2		Ground
SSD C1846-2		Ground
SSE C1847-2		Ground

SSF C1848-2		Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to A11
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A11 CHECK SOLENOID RESISTANCE

- Disconnect the suspect solenoid connector and remove the suspect shift solenoid.
REFER to: [Shift Solenoids \(SS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Measure and record the resistance of the suspected solenoid.

Is the shift solenoid resistance between 4.8 and 5.4 ohms?

Yes	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new solenoid for the solenoid that failed the resistance check. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

The TFT sensor is a temperature dependent resistor that is in contact with transmission fluid in the transmission sump area. The PCM monitors the voltage across the TFT sensor, which changes as transmission fluid temperature varies. The PCM uses the TFT sensor signal as an input for its strategy for shifting and TCC operation. The PCM also uses the TFT sensor signal for transmission fault detection and diagnostics.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires and missing or damaged seals
- TFT sensor
- Transmission internal wiring harness frame
- PCM

PINPOINT TEST B : TFT (TRANSMISSION FLUID TEMPERATURE) SENSOR

B1 CHECK TFT INPUT SIGNAL	
• Ignition OFF. • Disconnect: Transmission Vehicle Harness C168A. • Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals. • Connect the diagnostic tool. • Ignition ON. • Enter the following mode on the diagnostic scan tool: Datalogger. Monitor the following TFT PIDs, TFT and TFTV.	
Does the TFT PID display -40°C (-40°F) and the TFTV PID display 4.96 to 5.10 volts?	
Yes	GO to B2
No	REPAIR the circuit.

B2 CHECK TFT SIGNAL INPUT CIRCUIT FOR VOLTAGE

Is the voltage between 4.8 and 5.1 volts?

Yes	GO to B3
No	INSPECT and REPAIR the open circuit. If an open circuit is not found, INSTALL a new PCM, REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

B3 CHECK TFT SIGNAL RETURN CIRCUIT

Does the TFT PID display 190°-195°C (374°-383°F) and the TFTV PID display 0 volts?

Yes	GO to B4
No	INSPECT and REPAIR the open circuit. If an open circuit is not found, INSTALL a new PCM, REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

B4 CHECK INTERNAL WIRING HARNESS FOR AN OPEN

- Ignition OFF.
- Disconnect TFT Sensor C1842.
- Disconnect TR Sensor C167.

Are the resistances less than 3 ohms?

Yes	GO to B5
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

B5 CHECK INTERNAL WIRING HARNESS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	INSPECT and CLEAN the TFT sensor for metallic contamination. INSTALL a new TFT sensor. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). CLEAR the DTCs.
No	GO to B6

B6 CHECK TFT SENSOR RESISTANCE

- Connect TFT sensor C1842.

Does the temperature to resistance specification match?

Yes	To diagnose an overheating concern, REFER to: Transmission Cooling (307-02 Transmission Cooling, Diagnosis and Testing).
No	INSTALL a new TFT. REFER to: Transmission Fluid Temperature (TFT) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

TR Sensor

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

The TR sensor is comprised of a dual set of TR sensors. The manual shifter engages and disengages Park and the shifter position is detected by reading TR sensors A and B. There is no manual valve, the PCM provides forward or reverse based on the dual TR sensor inputs. The 10R80 transmission uses dual PWM output (at 125 Hz) TR sensors where: TR sensor A increases as the shifter is moved from Park to Sport and TR sensor B decreases as the shifter is moved from Park to Sport, together the sum of the two signals should add up to 100%. The 10R80 transmission mechanical shifter variant is range by wire with mechanical Park. The dual TR sensor's signals determine customer selected range (P, R, N, D, S). PIDs, TR_A_DC and TR_B_DC may be utilized to monitor the TR sensor duty cycles.

Typical TR Sensors PWM Output

	Transmission Range Sensor A		Transmission Range Sensor B	
Gear	Min	Max	Min	Max
P	8.00	18.96	81.04	92.00

R	35.50	47.90	52.10	64.50
N	51.75	61.75	38.25	48.25
D	67.45	77.45	22.55	32.55
Sport	81.12	92.00	8.00	18.88

PINPOINT TEST C : TR SENSOR

C1 VERIFY DTCS

NOTE: Read and record all DTCs.

- Ignition OFF.
- Select PARK.
- Connect the diagnostic tool.
- Carry out the KOEO then the KOER test.

Are TR sensor DTCs present?

Yes	GO to C2
No	If no DTCs are present, and to diagnose any symptoms that may be present, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

C2 CHECK TR SENSOR ELECTRICAL OPERATION

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: TR PID: TR_A_DC and TR_B_DC.
- Move the selector lever into each range and stop.
- Observe the PIDs: TR_A_DC and TR_B_DC while wiggling the harness or driving the vehicle.
- Compare the duty cycles shown by the PIDs TR_A_DC and TR_B_DC to the selector lever position duty cycle, using the following chart.

Typical TR Sensor(s) PWM Output

Gear	Transmission Range Sensor A		Transmission Range Sensor B	
	Min	Max	Min	Max
P	8.00	18.96	81.04	92.00
R	35.50	47.90	52.10	64.50
N	51.75	61.75	38.25	48.25
D	67.45	77.45	22.55	32.55
Sport	81.12	92.00	8.00	18.88

Are the TR_A_DC and TR_B_DC duty cycles within range?

Yes	The problem is not in the TR sensor. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
No	GO to C3

C3 CHECK TR SENSOR CIRCUITS FOR POWER

- Ignition OFF.
- Disconnect: Transmission Vehicle Harness C168A.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Are the voltages approximately 5 volts?

Yes	GO to C4
No	GO to C5

C4 CHECK TR SENSOR VOLTAGE CIRCUIT FOR POWER

- Ignition OFF.
- Disconnect: Transmission Vehicle Harness C168A.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Is the voltage approximately 9 volts?

Yes	GO to C7
No	GO to C5

C5 CHECK TR SENSOR VOLTAGE CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	GO to C6
No	REPAIR the circuit.

C6 CHECK TR SENSOR VOLTAGE CIRCUIT FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new PCM, REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	REPAIR the circuit.

C7 CHECK TR SENSOR GROUND CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	INSTALL a new TR sensor. REFER to: Transmission Range (TR) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	REPAIR the circuit.

C8 CHECK TR SENSOR TRP1, TRP2, CIRCUITS FOR POWER

- Drain the transmission fluid and remove the transmission fluid pan.
REFER to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Connect Transmission Vehicle Harness C168A.
- Disconnect TR sensor C167.
- Ignition ON.

Are the voltages approximately 5 volts?

Yes	GO to C9
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

C9 CHECK TR SENSOR VREF CIRCUIT FOR POWER

- Connect Transmission Vehicle Harness C168A.
- Disconnect TR sensor C167.
- Ignition ON.

Is the voltage approximately 9 volts?

Yes	GO to C10
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

C10 CHECK TRANSMISSION INTERNAL WIRING HARNESS FOR AN OPEN CIRCUIT

- Ignition OFF.

Are the resistances less than 3 ohms?

Yes	INSTALL a new TR sensor. REFER to: Transmission Range (TR) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

OSS, TSS Sensor, ISSA and ISSB

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation TSS Sensor

The TSS sensor is a Hall-effect type sensor that provides a signal to the PCM that changes in frequency as the rotating speed of the planetary carrier No. 2 varies. The PCM compares the TSS sensor signal with the engine speed information to determine the amount of slip occurring in the torque converter. The PCM also compares the TSS sensor signal with the OSS sensor signal to determine the gear ratio provided by the planetary carrier No. 4. The PCM uses the TSS sensor signal as an input for its strategies for shifts and TCC operation. The PCM also uses the TSS sensor signal for transmission fault detection and diagnostics.

Normal Operation OSS Sensor

The OSS sensor is a Hall-effect type sensor that provides a signal to the PCM that changes in frequency as the rotating speed of the rear planetary carrier No. 4 varies. The PCM also compares the OSS sensor signal with the TSS sensor signal to determine the gear ratio provided by the rear planetary gearset. The PCM uses the OSS sensor signal as an input for its strategies for shifts and TCC operation. The PCM also uses the OSS sensor signal for transmission fault detection and diagnostics.

Normal Operation Intermediate Speed Sensors A and B

The Intermediate Speed Sensors A (ISSA) and B (ISSB) are Hall-effect type sensors that provide a signal to the PCM that changes in frequency as the rotating speed of the component being monitored changes. ISSA monitors the speed and rotational direction of ring gear 1 and ISSB monitors the speed and rotational direction of planetary carrier-1/ring gear 4. The Intermediate speed sensors are used to monitor clutch states for transmission fault detection and diagnostics.

TSS Sensor DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0715	TSS Sensor Circuit	This DTC sets if the PCM detects an open or short to ground in the TSS sensor circuitry.
P0716	TSS Sensor Circuit Range/Performance	This DTC sets if the PCM detects too large of a sensor air gap, a TSS sensor fault or an undetected clutch fault.
P0717	TSS Sensor Circuit No Signal	This DTC sets relationally if the DTCs P0715, P07BF, P07C0 are set, RESOLVE these DTCs first.
P0718	TSS Sensor Circuit Intermittent	This DTC sets if the PCM detects an intermittent circuit fault in the TSS circuit.
P07BF	ITSS Sensor Circuit Low	This DTC sets if the PCM detects an open or short to ground in the TSS sensor circuitry.
P07C0	TSS Sensor Circuit High	This DTC sets if the PCM detects an open circuit in the TSS sensor circuitry.

Intermediate Sensor A (ISSA) DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0791	Intermediate Shaft Speed Sensor "A" Circuit	This DTC sets if the PCM detects an open or short to ground in the ISSA sensor circuitry.

P07C6	Intermediate Shaft Speed Sensor "A" Circuit High	This DTC sets relationally if the DTCs P0715, P07BF, P07C0 are set, RESOLVE these DTCs first.
P0792	Intermediate Shaft Speed Sensor "A" Circuit Range/Performance	This DTC sets if the PCM detects an intermittent circuit fault in the ISSA sensor circuit.
P0793	Intermediate Shaft Speed Sensor "A" Circuit No Signal	This DTC sets if the PCM detects an open or short to ground in the ISSA sensor circuitry.
P0794	Intermediate Shaft Speed Sensor "A" Circuit Intermittent	This DTC sets if the PCM detects an open circuit in the ISSA sensor circuitry.

Intermediate Sensor B (ISSB) DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P2745	Intermediate Shaft Speed Sensor "B" Circuit	This DTC sets if the PCM detects an open or short to ground in the ISSB sensor circuitry.
P2746	Intermediate Shaft Speed Sensor "B" Circuit Range/Performance	This DTC sets if the PCM detects an intermittent circuit fault in the ISSB sensor circuit..
P2747	Intermediate Shaft Speed Sensor "B" Circuit No Signal	This DTC sets if the PCM detects an open or short to ground in the ISSB sensor circuitry.
P2748	Intermediate Shaft Speed Sensor "B" Circuit Intermittent	This DTC sets if the PCM detects an open circuit in the ISSB sensor circuitry.

OSS Sensor DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions

P0720	OSS Sensor Circuit	This DTC sets if the PCM detects an open or short to ground in the OSS sensor circuitry.
P0721	OSS Sensor Circuit Range Performance	This DTC sets if the PCM detects too large of a sensor air gap, a TSS sensor fault or an undetected clutch fault.
P0722	OSS Sensor Circuit No Signal	This DTC sets relationally if the DTCs P0720, P077C or P077D are set, RESOLVE these DTCs first.
P0793	OSS Sensor "A" Circuit No Signal	This DTC sets if the PCM detects an open or short to ground in the OSS sensor circuitry.
P077D	OSS Sensor Circuit High	This DTC sets relationally if the DTCs P0720, P0721, P0793 are set, RESOLVE these DTCs first.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires or ground and missing or damaged seals
- TSS sensor
- OSS sensor
- Intermediate Speed Sensor A (ISSA)
- Intermediate Speed Sensor B (ISSB)

PINPOINT TEST D : OSS (OUTPUT SHAFT SPEED) , TSS (TURBINE SHAFT SPEED) SENSORS, INTERMEDIATE SPEED SENSORS A AND B

D1 CHECK SENSOR POWER CIRCUIT FOR POWER

- Ignition OFF.
- Disconnect: Transmission Vehicle Harness C168A
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Is the voltage on the suspect circuit 8.8 to 9.2 volts?

Yes	GO to D5
No	GO to D2

D2 CHECK THE SENSOR POWER CIRCUIT FOR A SHORT TO GROUND

- Disconnect: PCM C1381T.
- Ignition OFF.

Is the resistance on the suspect circuit greater than 10,000 ohms?

Yes	GO to D3
No	INSPECT and REPAIR transmission vehicle harness sensor power circuit for a short to ground.

D3 CHECK THE SENSOR POWER CIRCUIT FOR AN OPEN

- Ignition ON.

Is the resistance on the suspect circuit less than 3 ohms?

Yes	INSTALL a new PCM, REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	REPAIR the circuit.

D4 CHECK THE SENSOR SIGNAL CIRCUIT FOR A SHORT TO POWER

- Ignition OFF.
- Disconnect: PCM C1381T.
- Disconnect: Transmission Vehicle Harness C168A (If not already disconnected).
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to D5

D5 CHECK THE SENSOR RETURN CIRCUIT FOR AN OPEN

- Ignition OFF.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to D6
No	REPAIR the transmission vehicle harness signal return circuit for an open.

D6 CHECK THE SENSOR RETURN CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.

Is the resistance greater than 10,000 ohms?

Yes	GO to D7
No	REPAIR the circuit.

D7 CHECK THE SENSOR RETURN INTERNAL HARNESS CIRCUITS FOR A SHORT TO POWER

- Disconnect for OSS sensor C1107.
- Disconnect for TSS sensor C3106.
- Disconnect for ISSA sensor C1836.
- Disconnect for ISSB sensor C1837.
- Ignition ON.

Is any voltage detected on the suspect circuit?

Yes	GO to D8
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

D8 CHECK THE SENSOR INTERNAL HARNESS POWER CIRCUITS FOR AN OPEN

- Disconnect Suspect Sensor Connector .
- Ignition ON.

Is the resistance greater than 10,000 ohms?

Yes	GO to D9
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

D9 CHECK THE SENSOR INTERNAL HARNESS CIRCUITS FOR A SHORT TO GROUND

- Ignition ON.

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new sensor as necessary. REFER to: Output Shaft Speed (OSS) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Turbine Shaft Speed (TSS) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Intermediate Speed Sensor A (ISSA) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Intermediate Speed Sensor B (ISSB) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

DTCS P0C2A, P0C2C, P0C2D, P0C2E, P2796

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation and Fault Conditions

The electric transmission fluid pump keeps the transmission engaged when the engine is stopped and the transmission is in drive. The electric transmission fluid pump has an internal microprocessor and communicates with the PCM over a PWM circuit with a frequency of 150 Hz with a duty cycle range of 10% to 90%.

DTC	Duty Cycle Range	Condition
P0C2D	Less than 10%	Out of range Low
P0C27	10% to 15%	Pump current too Low, Speed OK
P0C28	20% to 25%	Pump Current Too High, Speed OK
P175A	30% to 34%	Pump Over Temperature
P0C2A	35% to 40%	Pump Stalled
NONE	44% to 50%	Normal Value Of Signal
P0B0D	55% to 60%	Pump Over Speed – current OK
P0B0D	65% to 70%	Pump Under Speed – current OK
P0C29	75% to 80%	Both Current and Speed out of range
P2796	85% to 90%	No Command received from Control Module
P0C2E	Greater than 90%	Duty Cycle Out of range HI - undefined
P0C2C	Any other value (between)	Invalid duty cycle or invalid frequency. This could include no signal.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0B0D	Electric Transmission Fluid Pump Motor Control Module	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz and a valid duty cycle was detected (55% to 60% or 65% to 70%). The electric transmission fluid pump has detected a pump over or under speed condition. The current flow through the pump was within specification.
P0C27	Electric Transmission Fluid Pump Motor Control Module	Possible causes are loss of pump prime or low transmission fluid level. This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (10% to 15% duty cycle).
P0C28	Electric Transmission Fluid Pump Motor Current Low	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (20% to 25% duty cycle).
P0C29	Electric Transmission Fluid Pump Motor Current High	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a high current is detected.
P0C2A	Electric Transmission Fluid Pump Motor Stalled	This DTC sets if the PCM commands the electric transmission fluid pump motor on and does not detect a corresponding increase in pump speed, indicating a stalled pump motor.
P0C2C	Electric Transmission Fluid Pump Control Module Feedback Signal Range/ Performance	This DTC sets if the E-Pump frequency is between 125 and 175Hz but has an invalid duty cycle or the frequency is outside of the 125-175Hz range. This can be caused by a loss of power to the E-Pump.
P0C2D	Electric Transmission Fluid Pump Control Module Feedback Signal Low	This DTC sets if the duty cycle is less than 10%.
P0C2E	Electric Transmission Fluid Pump Control Module Feedback Signal High	This DTC sets if the duty cycle is greater than 90%.
P175A	Transmission Fluid Over Temperature Condition - Electric Transmission Fluid Pump Disabled	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but an over temperature condition is detected (30% to 34% duty cycle). This DTC can be caused by high transmission fluid temperatures

P2796	Electric Transmission Fluid Pump Control Circuit	This DTC sets when the transmission auxiliary oil pump reports to the PCM that it is not receiving a PWM from the PCM.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires or ground and missing or damaged seals
- BJB fuse 98 (15A)
- Electric transmission fluid pump
- PCM

PINPOINT TEST E : DTCS P0C2A, P0C2C, P0C2D, P0C2E, P2796

E1 RETRIEVE AND RECORD ALL DTCS

- Using the diagnostic scan tool, retrieve all DTCS.

Are DTCS P0C2A:00, P0C2C:00, P0C2D:00, P0C2E:00, P2796:00 present?

Yes	For DTC P2796, GO to E7 For all other DTCS, GO to E2
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or terminal issues.

E2 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP POWER CIRCUITS

- Ignition OFF.
- Disconnect Transmission Vehicle Harness C168A.
- Ignition ON.

Is the voltage greater than 11 volts?

Yes	GO to E3
No	VERIFY the BJB 98 (15A) is OK. If the fuse is OK, REPAIR the suspect circuit for an open. If the fuse is not OK, REFER to the Wiring Diagrams manual to identify the cause of the affected circuit shorted to ground.

E3 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP GROUND CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	For DTC P0C2A:00, GO to Pinpoint Test F For all other DTCs, GO to E4
No	REPAIR the circuit

E4 CHECK ELECTRIC TRANSMISSION FLUID PUMP FEEDBACK MONITOR CIRCUIT FOR OPEN

- Ignition OFF.
- Disconnect PCM C1381T.
- Ignition ON.

Is the resistance less than 3 ohms?

Yes	GO to E5
No	REPAIR the circuit.

E5 CHECK ELECTRIC TRANSMISSION FLUID PUMP FEEDBACK / MONITOR CIRCUIT FOR SHORT TO GROUND

- Ignition OFF.

Is the resistance greater than 10,000 ohms?

Yes	GO to E6
No	REPAIR the circuit

E6 CHECK ELECTRIC TRANSMISSION FLUID PUMP FEEDBACK / MONITOR CIRCUIT FOR SHORT TO POWER

- Ignition ON.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E7

E7 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND CIRCUIT FOR SHORT TO POWER

- Ignition OFF.
- Disconnect PCM C1381T (If not already disconnected) .
- Disconnect Transmission Harness Connector C168A.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E8

E8 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND CIRCUIT FOR OPEN

Is the resistance less than 3 ohms?

Yes	GO to E9
No	REPAIR the circuit

E9 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP VEHICLE WIRING HARNESS COMMAND CIRCUITS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	GO to E10
No	REPAIR the circuit

E10 CHECK ELECTRIC TRANSMISSION FLUID PUMP TRANSMISSION VEHICLE HARNESS FEEDBACK / MONITOR CIRCUIT FOR SHORT TO POWER

- Ignition ON.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E11

E11 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND CIRCUIT FOR SHORT TO GROUND

- Ignition OFF.
- Disconnect PCM C1381T (If not already disconnected) .
- Disconnect Transmission Harness Connector C168A.

Is the resistance greater than 10,000 ohms?

Yes	GO to E12
No	REPAIR the circuit.

E12 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP INTERNAL WIRING HARNESS POWER CIRCUIT FOR AN OPEN

- REMOVE the transmission pan.
REFER to: [Transmission Fluid Drain and Refill](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
- Ignition ON.

Are the resistances less than 3 ohms?

Yes	GO to E13

No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E13 CHECK THE TRANSMISSION INTERNAL WIRING HARNESS GROUND CIRCUIT

- Ignition OFF.

Is the resistance less than 3 ohms?

Yes	GO to E14
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E14 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP INTERNAL WIRING HARNESS POWER CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect Transmission Vehicle Harness C168A (If not already disconnected) .

Is the resistance greater than 10,000 ohms?

Yes	GO to E15
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E15 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND CIRCUIT FOR AN OPEN CIRCUIT

- Ignition OFF.
- Disconnect Transmission Vehicle Harness C168A (If not already disconnected) .

Are the resistances less than 3 ohms?

Yes	GO to E16
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E16 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP DUTY CYCLE OPERATION

- Connect PCM C1381T.
- Connect Transmission Vehicle Harness C168A.
- Connect Electric Transmission Fluid Pump C1792.
- Connect the diagnostic tool.
- Ignition ON.
- Using a diagnostic scan tool, COMMAND the electric transmission fluid pump ON using, TRANS_PMP_CMD and set to a duty cycle of 70%.
- MONITOR the PIDs, TRANS_PMP_MEAS.

Does TRANS_PMP_MEAS quickly return to 44% to 50% after the command percentage changes?

Yes	The electric transmission fluid pump is operating correctly at this time.

No	INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

DTCs P0B0D, P0C27, P0C28, P0C29, P0C2A, P175A

Refer to Wiring Diagrams Cell 29 for schematic and connector information.

Normal Operation and Fault Conditions

The electric transmission fluid pump keeps the transmission fluid circulating during extended drive times without engine charging. The electric transmission fluid pump has an internal microprocessor and communicates with the C1232E over a PWM circuit with a frequency of 150 Hz with a duty cycle range of 10% to 90%. If the transmission fluid level is low or overfilled or there are any restrictions in the transmission lines, hoses (if vehicle is equipped with external lines or hoses) or cooler it may affect the transmission fluid pump operation.

DTC	Duty Cycle Range	Condition
P0C2D	Less than 10%	Out of range Low
P0C27	10% to 15%	Pump current too Low, Speed OK
P0C28	20% to 25%	Pump Current Too High, Speed OK
P175A	30% to 34%	Pump Over Temperature
P0C2A	35% to 40%	Pump Stalled
NONE	44% to 50%	Normal Value Of Signal
P0B0D	55% to 60%	Pump Over Speed – current OK
P0B0D	65% to 70%	Pump Under Speed – current OK
P0C29	75% to 80%	Both Current and Speed out of range
P2796	85% to 90%	No Command received from Control Module
P0C2E	Greater than 90%	Duty Cycle Out of range HI - undefined

P0C2C	Any other value (between)	Invalid duty cycle or invalid frequency. This could include no signal.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0B0D	Electric Transmission Fluid Pump Motor Control Module	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz and a valid duty cycle was detected (55% to 60% or 65% to 70%). The electric transmission fluid pump has detected a pump over or under speed condition. The current flow through the pump was within specification.
P0C27	Electric Transmission Fluid Pump Motor Control Module	Possible causes are loss of pump prime or low transmission fluid level. This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (10% to 15% duty cycle).
P0C28	Electric Transmission Fluid Pump Motor Current Low	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (20% to 25% duty cycle).
P0C29	Electric Transmission Fluid Pump Motor Current High	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a high current is detected.
P0C2A	Electric Transmission Fluid Pump Motor Stalled	This DTC sets if the PCM commands the electric transmission fluid pump motor on and does not detect a corresponding increase in pump speed, indicating a stalled pump motor.
P0C2C	Electric Transmission Fluid Pump Control Module Feedback Signal Range/Performance	This DTC sets if the E-Pump frequency is between 125 and 175Hz but has an invalid duty cycle or the frequency is outside of the 125-175Hz range. This can be caused by a loss of power to the E-Pump.

P0C2D	Electric Transmission Fluid Pump Control Module Feedback Signal Low	This DTC sets if the duty cycle is less than 10%.
P0C2E	Electric Transmission Fluid Pump Control Module Feedback Signal High	This DTC sets if the duty cycle is greater than 90%.
P175A	Transmission Fluid Over Temperature Condition - Electric Transmission Fluid Pump Disabled	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but an over temperature condition is detected (30% to 34% duty cycle). This DTC can be caused by high transmission fluid temperatures
P2796	Electric Transmission Fluid Pump Control Circuit	This DTC sets when the electric transmission fluid pump reports to the PCM that it is not receiving a PWM from the PCM.

PINPOINT TEST F : DTCS P0B0D, P0C27, P0C28,P0C29, P0C2A, P175A

F1 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP POWER CIRCUITS

- Ignition OFF.
- Disconnect Transmission Harness Connector C168A.
- Ignition ON.

Is the voltage greater than 11 volts?

Yes	GO to F2
No	VERIFY the BJB fuse 98 (15A) is OK. If the fuse is OK, REPAIR the affected circuit for an open. If the fuse is not OK, REFER to the Wiring Diagrams manual to identify the cause of the affected circuit shorted to ground.

F2 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP GROUND CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	GO to F3
No	REPAIR the circuit.

F3 CHECK THE TRANSMISSION FLUID LEVEL

- Ignition OFF.
- CHECK the transmission fluid level.
REFER to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Is the transmission fluid level correct?

Yes	GO to F4
No	CORRECT the transmission fluid to the proper level.

F4 CHECK THE AUXILIARY PUMP SUMP SEALS

- Ignition OFF.
- DRAIN the transmission fluid and REMOVE the transmission pan.
REFER to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- REMOVE the transmission fluid pump and sump and inspect the seals.

Are the transmission fluid pump seals OK?

Yes	INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

No	INSTALL new seals on the electric transmission fluid pump REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

TCC, LPC Solenoids

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

When the electrical connector or solenoid is disconnected, inspect the connector for terminal condition, corrosion and contamination and the connector seal for damage. Also inspect the connector seal for damage. Clean, repair or install new components as required. If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically off. Check for an open, short to ground or the transmission connector disconnected. The TCC is controlled by a directly proportional solenoid. Like the shift solenoids the TCC solenoid is controlled by a “smart driver” capable of detecting open, short to ground and short to power faults. In the event of an open circuit or short to power fault the TCC circuit is failed open. The TCC and LPC solenoids share a high side driver. Anytime power is removed the transmission defaults to MAX line pressure with open TCC. LPC is controlled by an inversely proportional solenoid (0 current = max pressure, max current = min line pressure). The LPC solenoid is controlled by a “smart driver” capable of detecting open, short to ground or short to power faults.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires and missing or damaged seals
- TCC and LPC solenoid(s)
- Main control wiring harness
- Transmission internal wiring harness
- PCM

PINPOINT TEST G : TCC, LPC SOLENOIDS

G1 CHECK THE SOLENOID POWER CIRCUIT TSPC2 FOR VOLTAGE

- Ignition OFF.
- Disconnect: Transmission Harness C168A.
- Ignition ON.

Is the maximum recorded voltage greater than 11 volts?

Yes	GO to G4
No	GO to G2

G2 CHECK THE SOLENOID POWER CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect: PCM C1381T.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms?

Yes	GO to G3
No	REPAIR the transmission vehicle harness circuit for an open. CLEAR the DTCs. If DTC P0657 returns, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). PROGRAM the PCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

G3 CHECK THE SOLENOID POWER CIRCUIT FOR SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	GO to G4
No	REPAIR the transmission vehicle harness circuit short to ground.

G4 CHECK VEHICLE HARNESS SOLENOID CONTROL CIRCUITS FOR AN OPEN

- Ignition OFF.
- Disconnect: PCM C1381T
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to G5
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

G5 CHECK VEHICLE HARNESS SOLENOID CONTROL CIRCUITS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms on the suspect circuit?

Yes	GO to G6
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

G6 CHECK SOLENOID CONTROL CIRCUITS FOR A SHORT TO POWER

Is any voltage detected on the suspect circuit?

Yes	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

No	GO to G7

G7 CHECK MAIN CONTROL WIRING HARNESS FOR AN OPEN CIRCUIT

Are the resistances less than 3 ohms?

Yes	GO to G9

No	INSTALL a new main control wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

G8 CHECK MAIN CONTROL WIRING HARNESS FOR A SHORT TO GROUND

Are the resistances greater than 10,000 ohms?

Yes	GO to G9

No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

G9 CHECK SOLENOID RESISTANCE

- Measure and record the resistance of the suspected solenoid.
REFER to: [Shift Solenoids \(SS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
Compare the recorded value with the chart below:

Solenoid	Ohms
LPC solenoid	4.6 to 5.2
TCC solenoid	4.6 to 5.2

Is the solenoid resistance within specification?

Yes	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new solenoid for the solenoid that failed the resistance check. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Diagnostic Trouble Code (DTC) Charts and Pinpoint Tests - 3.5L EcoBoost (272kW/370PS)

Principles of Operation

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom.
REFER to: [Diagnosis By Symptom](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically OFF. Check for an open, short to ground or the transmission connector disconnected. The TCM disables power to the transmission solenoids when certain transmission DTCs are set.

Solenoid Operation Chart

Selector Lever Position	TCM Commanded Gear	SSA (1, 2, 3, 4, 5, 6, M1, M2, R)	SSB (2, 8, 9, 10, M1, M2, R)	SSC (2, 3, 4, 5, 7, 9, 10, M2)	SSD (2, 3, 4, 6, 7, 8, 10, M2, R)	SSE (1, 3, 5, 6, 7, 8, 9, M1)	SSF (4, 5, 6, 7, 8, 9, 10, R)	TCC Solenoid
P	P	On	On	Off	On	Off	Off	Off
R	R	On	On	Off	On	Off	On	Off
N	N	On	On	Off	On	Off	Off	Off
D	1	On	Off	Off	On ^a	On	Off	Off
	2	On	Off	On	On	Off	Off	On/Off
	3	On	Off	On	On	On	Off	On/Off
	4	On	Off	On	On	Off	On	On/Off
	5	On	Off	On	Off	On	On	On/Off
	6	On	Off	Off	On	On	On	On/Off
	7	Off	Off	On	On	On	On	On/Off
	8	Off	On	Off	On	On	On	On/Off
	9	Off	On	On	Off	On	On	On/Off
	10	Off	On	On	On	Off	On	On/Off
M1	1	On	On	Off	On ^a	On	Off	Off
M2	2	On	On	On	On	Off	Off	Off

- On to reduce frictional losses from a released clutch, but does not contribute to power flow.

DTC Chart: TCM

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

DTC Chart

DTC	Description	Warning Light/DTC Type	Action
P0603	Internal Control Module Keep Alive Memory (KAM) Error	MIL/Continuous	REPROGRAM the TCM to the latest calibration. CLEAR the DTCs. If DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P0604	Internal Control Module Random Access Memory (RAM) Error	MIL, Wrench/Initialization	REPROGRAM the original TCM to the latest calibration. CLEAR the DTCs. If DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P0605	Internal Control Module Read Only Memory (ROM) Error	MIL/Initialization	REPROGRAM the original TCM to the latest calibration. CLEAR the DTCs. If DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General

			Procedures).
P0607	Control Module Performance	MIL/Continuous	REPROGRAM the original TCM to the latest calibration. CLEAR the DTCs. If DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P060A	Internal Control Module Monitoring Processor Performance	MIL, Wrench/Continuous	REPROGRAM the original TCM to the latest calibration. CLEAR the DTCs. If DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P060B	Internal Control Module A/D Processing Performance	MIL, Wrench	REPROGRAM the original TCM to the latest calibration. CLEAR the DTCs. If DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

P060C	Internal Control Module Main Processor Performance	MIL, Wrench	REPROGRAM the original TCM to the latest calibration. CLEAR the DTCs. If DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P061A	Internal Control Module Torque Performance	None/Continuous	REPROGRAM the original TCM to the latest calibration. CLEAR the DTCs. If DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P062C	Internal Control Module Vehicle Speed Performance	None/Continuous	OSS and ABS vehicle speeds do not match. Resolve all ABS DTCs first. REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing). Verify correct axle ratio installed in vehicle.

P064F	Unauthorized Software/ Calibration Detected	MIL, Wrench/ Continuous	REPROGRAM the original TCM to the latest calibration. CLEAR the DTCs. If DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P0657	Actuator Supply Voltage "A" Circuit Open	MIL, Wrench/ Continuous	If the power circuit to the transmission solenoids is interrupted then all solenoids are failed electrically off. CHECK for an open, short to ground or the transmission connector disconnected. REPAIR as required. CLEAR the DTC. GO to Pinpoint Test A
P068A	ECM/PCM Power Relay De-Energized - Too Early	Wrench/Continuous	CHECK connections to the TCM. TEST battery and charging system. REFER to: Battery (414-01 Battery, Mounting and Cables, Diagnosis and Testing). REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).

P06B8	Internal Control Module Non-Volatile Random Access Memory (NVRAM) Error	MIL/Continuous	REPROGRAM the original TCM to the latest calibration. CLEAR the DTCs. If the DTCs return, INSTALL a new TCM. After installing the new TCM, PROGRAM it with the latest calibration and PERFORM the Solenoid Body Strategy Data Download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P0702	Transmission Control System Electrical	Wrench/Continuous	INSPECT the PCM power and ground circuits for opens or short to ground. INSPECT the PCM connector for damaged or pushed-out terminals, corrosion or loose wires. CLEAR the DTC. RERUN the KOEO and KOER self-test. If DTC P0702 returns, REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
P0706	Transmission Range Sensor "A" Circuit Range/Performance	Wrench/KOEO, Continuous	The TR sensor outputs a duty cycle indicating manual lever position. This DTC sets when the frequency is greater or less than the expected frequency by 25Hz or more. Engine may not crank. CLEAR the DTC. If DTC P0706 returns, GO to Pinpoint Test C
P0707	Transmission Range Sensor "A" Circuit Low	Wrench/KOEO, Continuous	Engine may not crank, CLEAR the DTC. If DTC P0707 returns, GO to Pinpoint Test C

P0708	Transmission Range Sensor "A" Circuit High	Wrench/KOEO, Continuous	Engine may not crank, CLEAR the DTC. If DTC P0708 returns, GO to Pinpoint Test C
P0709	Transmission Range Sensor "A" Circuit Intermittent	Wrench/Continuous	The TR sensor outputs a duty cycle indicating manual lever position. This DTC sets when the duty cycle is within range but is in the dead band between the design position, and an in-range but invalid duty cycle. GO to Pinpoint Test C
P0710	Transmission Fluid Temperature Sensor "A" Circuit	Wrench/Continuous	CLEAR the DTC. If DTC P0710 returns, GO to Pinpoint Test B
P0711	Transmission Fluid Temperature Sensor "A" Circuit Range/Performance	MIL/Continuous	CLEAR the DTC. Road test the vehicle at least 5 minutes. If DTC P0711 returns, GO to Pinpoint Test B
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low	MIL/KOEO, Continuous	DTC P0710 may set. CLEAR the DTC. If DTC P0712 returns, GO to Pinpoint Test B
P0713	Transmission Fluid Temperature Sensor "A" Circuit High	MIL/KOEO, Continuous	DTC P0710 may set. CLEAR the DTC. If DTC P0713 returns, GO to Pinpoint Test B
P0715	TSS Sensor Circuit	MIL/KOEO, Continuous	CLEAR DTC. If DTC P0715 returns during KOEO, GO to Pinpoint Test D
P0716	TSS Sensor Circuit Range/Performance	MIL/Continuous	The TCM detected TSS sensor drop out, noise spike, or TSS speed not corresponding to other speed sensor inputs for current gear. REPAIR all clutch faults first. INSPECT TSS sensor for proper mounting. INSPECT TSS tone wheel (part of No. 2 carrier) for damage.
P0717	TSS Sensor Circuit No Signal	Wrench/Continuous	P0717 is used to illuminate the wrench light in conjunction with P0715, P07BF, and/or P07C0. Service the more specific DTC first. GO to Pinpoint Test D

P0718	TSS Sensor Circuit Intermittent	MIL/Continuous	The TCM detected TSS fault, but the fault did not last long enough for the TCM to set a more specific TSS DTC. Inspect TSS wiring and connectors for damage.
P0720	Output Shaft Speed Sensor Circuit	MIL/KOEO, Continuous	CLEAR the DTC. If DTC P0720 returns during KOEO, GO to Pinpoint Test D
P0721	Output Shaft Speed Sensor Circuit Range/Performance	MIL/Continuous	The TCM detected OSS sensor drop out, noise spike, or OSS speed not corresponding to other speed sensor inputs for current gear. REPAIR all clutch faults first. INSPECT OSS sensor for proper mounting. INSPECT OSS sensor tone wheel (part of No. 4 carrier/output shaft) for damage.
P0722	Output Shaft Speed Sensor Circuit No Signal	Wrench/Continuous	DTC P0722 is used to illuminate the wrench light in conjunction with P0720, P077C, and/or P077D. Service the more specific DTC first. GO to Pinpoint Test D
P0723	Output Shaft Speed Sensor Circuit Intermittent	MIL/Continuous	The TCM detected OSS sensor fault, but the fault did not last long enough for the TCM to set a more specific OSS sensor DTC. Inspect OSS sensor wiring and connectors for damage.
P0729	Gear 6 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 6th gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0731	Gear 1 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 1st gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0732	Gear 2 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 2nd gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0733	Gear 3 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 3rd gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0734	Gear 4 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 4th gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0735	Gear 5 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 5th gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0736	Reverse Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to Reverse. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0740	Torque Converter Clutch Solenoid Circuit/Open	Wrench/KOEO, Continuous	CLEAR DTC. If DTC P0740 returns during KOER, GO to Pinpoint Test L
P0741	Torque Converter Clutch Solenoid Circuit Performance/Stuck Off	Wrench/Continuous	DTC P0741 is a non-electrical failure that caused the TCC to fail to apply. For TCC Does Not Apply Symptom, REFER to: Torque Converter Clutch (TCC) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0743	Torque Converter Clutch Solenoid Circuit Electrical	Wrench/KOEO, Continuous	DTC P0743 is used to illuminate the wrench light in conjunction with P0740, P2769, and/or P2770. Service the more specific DTC first. GO to Pinpoint Test A
P0748	Pressure Control Solenoid Electrical	Wrench/KOEO, Continuous	DTC P0748 is used to illuminate the wrench light in conjunction with P0960, P0962, and/or P0963. Service the more specific DTC first. GO to Pinpoint Test L

P0751	Shift Solenoid "A" Performance/Stuck Off	MIL/KOEO, Continuous	DTC P0751 is a non-electrical failure indicating A Clutch failed to apply. For A Clutch Does Not Apply symptom, REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0752	Shift Solenoid "A" Stuck On	MIL/Continuous	DTC P0752 is a non-electrical failure indicating A Clutch stayed applied when SSA was de-energized. For A Clutch Always Applied symptom, REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0753	Shift Solenoid "A" Electrical	Wrench/KOEO, Continuous	DTC P0753 is used to illuminate the wrench light in conjunction with P0973, P0974, and/or P097A. Service the more specific DTC first. GO to Pinpoint Test A
P0754	Shift Solenoid "A" Intermittent	MIL/Continuous	The TCM detected a SSA fault, but the fault did not last long enough for the TCM to set a more specific SSA DTC. Inspect SSA wiring and connectors for damage.
P0756	Shift Solenoid "B" Performance/Stuck Off	MIL/Continuous	DTC P0756 is a non-electrical failure indicating B Clutch failed to apply. For B Clutch Does Not Apply symptom, REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0757	Shift Solenoid "B" Stuck On	MIL/Continuous	DTC P0757 is a non-electrical failure indicating B Clutch stayed applied when SSB was de-energized. For B Clutch Always Applied symptom, REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0758	Shift Solenoid "B" Electrical	Wrench, KOEO, Continuous	P0758 is used to illuminate the wrench light in conjunction with P0976, P0977, and/or P097B. Service the more specific DTC first. GO to Pinpoint Test A
P0759	Shift Solenoid "B" Intermittent	MIL/Continuous	The TCM detected SSB fault, but the fault did not last long enough for the TCM to set a more specific SSB DTC. Inspect SSB wiring and connectors for damage.
P0761	Shift Solenoid "C" Performance/Stuck Off	MIL/Continuous	DTC P0761 is a non-electrical failure indicating C Clutch failed to apply. For C Clutch Does Not Apply symptom, REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0762	Shift Solenoid "C" Stuck On	MIL/Continuous	DTC P0762 is a non-electrical failure indicating C Clutch stayed applied when SSC was de-energized. For C Clutch Always Applied symptom, REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0763	Shift Solenoid "C" Electrical	Wrench, KOEO, Continuous	DTC P0763 is used to illuminate the wrench light in conjunction with P0779, P097C, and/or P0980. Service the more specific DTC first. GO to Pinpoint Test A

P0764	Shift Solenoid "C" Intermittent	MIL/Continuous	The TCM detected SSC fault, but the fault did not last long enough for the TCM to set a more specific SSC DTC. Inspect SSC wiring and connectors for damage.
P0766	Shift Solenoid "D" Performance/Stuck Off	MIL/Continuous	DTC P0761 is a non-electrical failure indicating D Clutch failed to apply. For D Clutch Does Not Apply symptom, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0767	Shift Solenoid "D" Stuck On	MIL/Continuous	DTC P0757 is a non-electrical failure indicating D Clutch stayed applied when SSD was de-energized. For D Clutch Always Applied symptom, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0768	Shift Solenoid "D" Electrical	Wrench, KOEO, Continuous	DTC P0768 is used to illuminate the wrench light in conjunction with P097D, P0982, P0982 is used to illuminate the Wrench light. Service the more specific DTC first. GO to Pinpoint Test A
P0769	Shift Solenoid "D" Intermittent	MIL/Continuous	The TCM detected SSD fault, but the fault did not last long enough for the TCM to set a more specific SSD DTC. Inspect SSD wiring and connectors for damage.

P076F	Gear 7 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 7th gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0771	Shift Solenoid "E" Performance/Stuck Off	MIL/Continuous	DTC P0761 is a non-electrical failure indicating E Clutch failed to apply. For E Clutch Does Not Apply symptom, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0772	Shift Solenoid "E" Stuck On	MIL/Continuous	DTC P0772 is a non-electrical failure indicating E Clutch stayed applied when SSE was de-energized. For E Clutch Always Applied symptom, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0773	Shift Solenoid "E" Electrical	Wrench/Continuous	DTC P0773 is used to illuminate the wrench light in conjunction with P097E, P0985, P0986 is used to illuminate the Wrench light. Service the more specific DTC first. GO to Pinpoint Test A
P0774	Shift Solenoid "E" Intermittent	MIL/Continuous	The TCM detected SSE fault, but the fault did not last long enough for the TCM to set a more specific SSE DTC. Inspect SSE wiring and connectors for damage.
P077D	Output Shaft Sensor Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test D

P0791	Intermediate Shaft Speed Sensor "A" Circuit	MIL/Continuous	GO to Pinpoint Test D
P0792	Intermediate Shaft Speed Sensor "A" Circuit Range/Performance	MIL/Continuous	GO to Pinpoint Test D
P0793	Intermediate Shaft Speed Sensor "A" Circuit No Signal	Wrench	GO to Pinpoint Test D
P0794	Intermediate Shaft Speed Sensor "A" Circuit Intermittent	MIL/Continuous	GO to Pinpoint Test D
P07A9	Transmission Friction Element "D" Stuck On	None/Continuous	The TCM detected that D clutch failed to release multiple times and determined the SSD is not stuck on. For D Clutch Always Applied symptom, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07AB	Transmission Friction Element "E" Stuck On	None/Continuous	The TCM detected that E clutch failed to release multiple times and determined the SSE is not stuck on. For E Clutch Always Applied symptom, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07AD	Transmission Friction Element "F" Stuck On	None/Continuous	The TCM detected that F clutch failed to release multiple times and determined the SSF is not stuck on. For F Clutch Always Applied symptom, REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P07C0	TSS Sensor Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test D
P07C6	Intermediate Shaft Speed Sensor "A" Circuit High	MIL/Continuous	GO to Pinpoint Test D
P07C8	Intermediate Shaft Speed Sensor "B" Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test D
P07D9	Gear 8 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 8th gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07F6	Gear 9 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 9th gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P07F7	Gear 10 Incorrect Ratio	Wrench/Continuous	The TCM detected multiple ratio errors either in or while shifting to 10th gear. The ratio errors did not last long enough for the TCM to isolate the fault to a specific clutch. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P0868	Transmission Fluid Pressure Low	Wrench/Continuous	CLEAR the DTC. Road test vehicle, if DTC P0868 returns, If DTCs P0751, P0756, P0761, P0766, P0771 or P2707 are set, TEST for low pump pressure or fluid contamination. PERFORM the line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P0882	TCM Power Input Signal Low	MIL/KOEO, Continuous	INSPECT the PCM power and ground circuits for opens or short to ground. INSPECT the PCM connector for damaged or pushed-out terminals, corrosion or loose wires. CLEAR the DTC. If DTC P0882 returns, REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
P0883	TCM Power Input Signal High	MIL/KOEO, Continuous	CLEAR the DTC. If DTC P0883 returns, REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
P0884	TCM Power Input Signal Intermittent	MIL/Continuous	CLEAR the DTC. If DTC P0883 returns, REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).

P0960	Pressure Control Solenoid Control Circuit/Open	MIL/KOEO, Continuous	The LPC solenoid failed to max pressure indicating wiring or connector issues, or a solenoid electrical issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test LGO to Pinpoint Test L
P0961	Pressure Control Solenoid Control Circuit Range/Performance	MIL/Continuous	The LPC solenoid failed to max pressure indicating wiring or connector issues, or a solenoid electrical issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test LGO to Pinpoint Test L
P0962	Pressure Control Solenoid Control Circuit Low	MIL/KOEO, Continuous	The LPC solenoid failed to max pressure indicating wiring or connector issues, or a solenoid electrical issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test LGO to Pinpoint Test L
P0963	Pressure Control Solenoid Control Circuit High	MIL/KOEO, Continuous	The LPC solenoid failed to high current which is maximum pressure indicating short to ground, wiring or solenoid issue. INSPECT the LPC solenoid wiring, connectors and pins. GO to Pinpoint Test L
P0973	Shift Solenoid "A" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSA electrical. Since SSA shorted to ground causes SSA to be failed to high current (maximum pressure since SSA is directly proportional). A Clutch is failed on. GO to Pinpoint Test A

P0974	Shift Solenoid "A" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSA electrical. Since SSA shorted to power causes SSA to be failed to low current (minimum pressure since SSA is directly proportional). A Clutch is failed off. GO to Pinpoint Test A
P0976	Shift Solenoid "B" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSB electrical. Since SSB shorted to ground causes SSB to be failed to high current (maximum pressure since SSB is directly proportional). B Clutch is failed on. GO to Pinpoint Test A
P0977	Shift Solenoid "B" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSB electrical. Since SSB shorted to power causes SSB to be failed to low current (minimum pressure since SSB is directly proportional). B Clutch is failed off. GO to Pinpoint Test A
P0979	Shift Solenoid "C" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSC electrical. Since SSC shorted to ground causes SSC to be failed to high current (maximum pressure since SSC is directly proportional). C Clutch is failed on. GO to Pinpoint Test A
P097A	Shift Solenoid "A" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSA electrical. Since SSA shorted to power causes SSA to be failed to low current (minimum pressure since SSA is directly proportional). A Clutch is failed off. GO to Pinpoint Test A

P097B	Shift Solenoid "B" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates an open circuit in the SSB electrical. Since SSB shorted to power causes SSB to be failed to low current (minimum pressure since SSB is directly proportional). B Clutch is failed off. GO to Pinpoint Test A
P097C	Shift Solenoid "C" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSC electrical. Since SSC shorted to power causes SSC to be failed to low current (minimum pressure since SSC is directly proportional). C Clutch is failed off. GO to Pinpoint Test A
P097D	Shift Solenoid "D" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSD electrical. Since SSD shorted to power causes SSD to be failed to low current (minimum pressure since SSD is directly proportional). D Clutch is failed off. GO to Pinpoint Test A
P097E	Shift Solenoid "E" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSE electrical. Since SSE shorted to power causes SSE to be failed to low current (minimum pressure since SSE is directly proportional). E Clutch is failed off. GO to Pinpoint Test A
P097F	Shift Solenoid "F" Control Circuit/Open	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSF electrical. Since SSF shorted to power causes SSF to be failed to low current (minimum pressure since SSF is directly proportional). F Clutch is failed off. GO to Pinpoint Test A

P0980	Shift Solenoid "C" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSC electrical. Since SSC shorted to power causes SSC to be failed to low current (minimum pressure since SSC is directly proportional). C Clutch is failed off. GO to Pinpoint Test A
P0982	Shift Solenoid "D" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSD electrical. Since SSD shorted to ground causes SSD to be failed to high current (maximum pressure since SSD is directly proportional). D Clutch is failed on. GO to Pinpoint Test A
P0983	Shift Solenoid "D" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSD electrical. Since SSD shorted to power causes SSD to be failed to low current (minimum pressure since SSD is directly proportional). D Clutch is failed off. GO to Pinpoint Test A
P0985	Shift Solenoid "E" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSE electrical. Since SSE shorted to ground causes SSE to be failed to high current (maximum pressure since SSE is directly proportional). E Clutch is failed on. GO to Pinpoint Test A
P0986	Shift Solenoid "E" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSE electrical. Since SSE shorted to power causes SSE to be failed to low current (minimum pressure since SSE is directly proportional). E Clutch is failed off. GO to Pinpoint Test A

P0998	Shift Solenoid "F" Control Circuit Low	MIL/KOEO, Continuous	This DTC indicates a short to ground in the SSF electrical. Since SSF shorted to ground causes SSF to be failed to high current (maximum pressure since SSE is directly proportional). F Clutch is failed on. GO to Pinpoint Test A
P0999	Shift Solenoid "F" Control Circuit High	MIL/KOEO, Continuous	This DTC indicates a short to power in the SSF electrical. Since SSF shorted to power causes SSF to be failed to low current (minimum pressure since SSF is directly proportional). E Clutch is failed off. GO to Pinpoint Test A
P0B0D	Electric Transmission Fluid Pump Motor Control Module	None/Continuous	CLEAR the DTC. If the DTC returns, INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
P0C27	Electric Transmission Fluid Pump Motor Current Low	None/Continuous	This DTC applies to auto-start-stop vehicles only. This DTC sets when the PCM detects low current (10% to 15% duty cycle). Auto-Start-Stop unavailable and the engine will only stop when the operator turns the ignition off. The engine may restart unexpectedly when the vehicle is stopped. CLEAR the DTC. If the DTC returns, GO to Pinpoint Test F
P0C28	Electric Transmission Fluid Pump Motor Current Low	None/Continuous	GO to Pinpoint Test F
P0C29	Electric Transmission Fluid Pump Motor Current High	None/Continuous	GO to Pinpoint Test F
P0C2A	Electric Transmission Fluid Pump Motor Stalled	None/Continuous	GO to Pinpoint Test F

P0C2C	Electric Transmission Fluid Pump Control Module Feedback Signal Range/Performance	Wrench/Continuous	GO to Pinpoint Test E
P0C2D	Electric Transmission Fluid Pump Control Module Feedback Signal Low	Wrench/Continuous	GO to Pinpoint Test E
P0C2E	Electric Transmission Fluid Pump Control Module Feedback Signal High	Wrench/Continuous	GO to Pinpoint Test E
P1001	The KOER Not Able to Complete, KOER Aborted	None/KOER	RETRIEVE and RECORD all DTCs. REPAIR any self-test or CMDTCs first. CLEAR the DTC. RERUN the KOER self-test. If the DTC returns, REPROGRAM the PCM to the latest software. RERUN the KOER self-test. If the DTC returns, INSTALL a new TCM REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). After installing the new TCM PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

P1397	System Voltage Out Of Self Test Range	None/KOEO	INSPECT the PCM power and ground circuits for opens or short to ground. INSPECT the TCM connector for damaged or pushed-out terminals, corrosion or loose wires. CLEAR the DTC. RUN the KOEO self-test. If DTC P1397 returns, REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
P1501	Vehicle Speed Sensor Out Of Self Test Range	None/KOEO	Vehicle speed not at 0.0 mph (km/h) during the KOEO self-test. CLEAR the DTC and RERUN the KOEO self-test. If DTC P1501 returns, REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
P160A	Control Module Vehicle Options Reconfiguration Error	Wrench/Continuous	CHECK the vehicle service history for recent service actions related to this module. This DTC sets due to incomplete or incorrect PMI procedures. INSTALL As-Built data from Professional Technician Society (PTS) following scan tool instructions under Module Programming As-Built.

P1636	Inductive Signature Chip Communication Error	MIL/KOEO, Continuous	CLEAR the DTC. If DTC P1636 returns, INSTALL a new . TCM After installing the new TCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P163E	Transmission Control Module Programming Error	MIL/KOEO, Continuous	CLEAR the DTC. REPROGRAM the original TCM with the latest software. If DTC P163E returns, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). After installing the new TCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

P163F	Transmission ID Block Corrupted, Not Programmed	MIL/KOEO, Continuous	CLEAR the DTC. REPROGRAM the original TCM with the latest software. If DTC P163F returns, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). After installing the new TCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P1674	Control Module Software Corrupted	MIL, Wrench/KOEO, Continuous	CLEAR the DTC. REPROGRAM the original TCM with the latest software. If DTC P163F returns, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). After installing the new TCM, PROGRAM it with the latest software and PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

P1705	Transmission Range Circuit Not Indicating Park/Neutral During Self Test	None/KOEO	CLEAR the DTC. RERUN the KOEO and KOER self-test. If DTC P1705 returns, GO to Pinpoint Test C
P1711	Transmission Fluid Temperature Sensor Out Of Self Test Range	None/KOEO	CLEAR the DTC and RERUN the KOEO and KOER self-test.
P1744	Torque Converter Clutch Solenoid Circuit Performance	Wrench/Continuous	DTC P1744 is a non-electrical DTC. CLEAR the DTC. If DTC P1744 returns, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P175A	Transmission Fluid Over Temperature Condition - Electric Transmission Fluid Pump Disabled	None/Continuous	GO to Pinpoint Test F
P1783	Transmission Over Temperature Condition	Wrench/Continuous	CLEAR the DTC. If DTC P1783 returns, determine if this DTC was set in conjunction with any transmission fluid temperature sensor circuit DTCs and RESOLVE them first, otherwise REFER to: Transmission Cooling (307-02 Transmission Cooling) .
P1A02	Transmission One Way Clutch Performance	Wrench/Continuous	This DTC sets when the TCM detects 3 failures of the one-way clutch to lock in 1st or 2nd gear allowing sun gear 1 to rotate backwards. CLEAR the DTC, road test the vehicle. If DTC P1A02 returns, it may indicate a one way clutch failure. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

P2531	Ignition Switch Run Position Circuit Low	Wrench/Continuous	CLEAR the DTC. If DTC P2531 returns, it may indicate a communication issue between the BCM and the TCM. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
P2532	Ignition Switch Run Position Circuit High	Wrench/Continuous	CLEAR the DTC. If DTC P2532 returns, it may indicate a communication issue between the BCM and the TCM. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
P2669	Actuator Supply Voltage "B" Circuit/Open	MIL/Continuous	GO to Pinpoint Test A
P26C3	Internal Control Module Transmission Range Sensor Performance	MIL, Wrench/KOEO, Continuous	CLEAR the DTC. If DTC P26C3 returns, INSTALL a new TR sensor. REFER to: Transmission Range (TR) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
P2700	Transmission Friction Element "A" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P0751 (Clutch A stuck off) and P0752 (Clutch A stuck on), service the more specific DTC. See DTCs P0751 and P0752 for potential causes. If P0751 and P0752 are not set refer to the associated symptoms, REFER to: A Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P2701	Transmission Friction Element "B" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P0756 (Clutch B stuck off) and P0757 (Clutch B stuck on), service the more specific DTC first. See DTCs P0756 and P0757 for potential causes, if these DTCs are not set refer to the associated symptoms, REFER to: B Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2702	Transmission Friction Element "C" Apply Time Range/Performance	Wrench/Continuous	This DTC set with either P0761 (Clutch C stuck off) and P0762 (Clutch C stuck on) - service the more specific DTC 1st (if present). See P0761 and P0762 for potential causes first. If these DTCs are not set refer to the associated symptoms, REFER to: C Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2703	Transmission Friction Element "D" Apply Time Range/Performance	Wrench/Continuous	This DTC set with either P0766 (Clutch D stuck off) and P0767 (Clutch D stuck on) service the more specific DTC 1st (if present). See P0766 and P0767 for potential causes first. If these DTCs are not set, refer to the associated symptoms, REFER to: D Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P2704	Transmission Friction Element "E" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P0771 (E Clutch stuck off) and P0772 (E Clutch stuck on) service the more specific DTC first (if present). See P0771 and P0772 for potential causes. If these DTCs are not set, refer to the associated symptoms, REFER to: E Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2705	Transmission Friction Element "F" Apply Time Range/Performance	Wrench/Continuous	This DTC sets with either P2707 (Clutch F stuck off) and P2708 (Clutch F stuck on), service the more specific DTC first. See DTCs P2707 and P2708 for potential causes. If these DTCs are not set, refer to the associated symptoms, REFER to: F Clutch (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2707	Shift Solenoid "F" Performance/Stuck Off	MIL/Continuous	F clutch stuck off due to a non-electrical fault. Multiple attempts to apply F failed. GO to Pinpoint Test A
P2708	Shift Solenoid "F" Stuck On	MIL/Continuous	F clutch stuck on due to a non-electrical fault. Multiple attempts to apply F clutch failed. GO to Pinpoint Test A
P2709	Shift Solenoid "F" Electrical	MIL/KOEO, Continuous	SSF (controls F clutch) VFS circuit failure non-MIL "sister" DTCs of P097F, P0998, P0999 used to illuminate the Wrench Light. If one of the more specific circuit codes is set, follow repair procedures for that code. GO to Pinpoint Test A

P2710	Shift Solenoid "F" Intermittent	MIL/Continuous	The TCM detected SSF fault, but the fault did not last long enough for the TCM to set a more specific SSF DTC. Inspect SSF wiring and connectors for damage.
P2745	Intermediate Shaft Speed Sensor "B" Circuit	MIL/KOEO, Continuous	An open circuit fault was detected by the TCM smart driver. GO to Pinpoint Test A
P2746	Intermediate Shaft Speed Sensor "B" Circuit Range/ Performance	MIL/Continuous	GO to Pinpoint Test D
P2747	Intermediate Shaft Speed Sensor "B" Circuit No Signal	Wrench/Continuous	GO to Pinpoint Test D
P2748	Intermediate Shaft Speed Sensor "B" Circuit Intermittent	MIL/Continuous	GO to Pinpoint Test D
P2758	Torque Converter Clutch Pressure Control Solenoid Stuck On	MIL/Continuous	TCC stuck on when commanded off due to non-electrical failure. CLEAR the DTC. If DTC P2758 returns, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
P2760	Torque Converter Clutch Pressure Control Solenoid Intermittent	MIL/Continuous	The TCM detected TCC fault, but the fault did not last long enough for the TCM to set a more specific TCC DTC. Inspect TCC solenoid wiring and connectors for damage.
P2769	Torque Converter Clutch Circuit Low	MIL/Continuous	This DTC indicates a short to ground in the TCC electrical. Since TCC shorted to ground causes TCC to be failed to high current (maximum pressure since TCC is directly proportional). TCC is failed on. GO to Pinpoint Test L

P2770	Torque Converter Clutch Circuit High	MIL/Continuous	This DTC indicates a short to power in the TCC electrical. Since TCC shorted to power causes TCC to be failed to low current (minimum pressure since TCC is directly proportional). TCC is failed off. CLEAR the DTC. If DTC P2783 returns, INSPECT TCC control valve for sticking. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
P2783	Torque Converter Temperature Too High	None/Continuous	The TCC control valve is stuck in a position that provides no flow when the TCC is commanded off. TCC pumps down when commanded off, causing loss of torque multiplication through the TCC.
P2796	Electric Transmission Fluid Pump Control Circuit	None/Continuous	This DTC sets when the electric transmission fluid pump reports to the TCM that it is not receiving a PWM from the TCM. CLEAR the DTC. If the DTC returns, GO to Pinpoint Test E
P27B4	Internal Control Module Transmission Gear Ratio Control Performance	None/Continuous	May be caused by clutch faults that cause R in forward range or a forward gear in R, or a speed sensor error, CLEAR the DTC. If DTC P27B4 returns, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

P27B5	Internal Control Module Transmission Gear Select Performance	None/Continuous	CLEAR the DTC. If DTC P27B5 returns, if any TR DTCs are set RESOLVE them first. If DTC P27B5 returns, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
P27B6	Internal Control Module Transmission Speed Sensor Performance	MIL, Wrench/ Continuous	CLEAR the DTC. Road test the vehicle, if any speed sensor DTCs are set, RESOLVE them first. If DTC P27B6 returns, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

P2801	Transmission Range Sensor "B" Circuit Range/Performance	MIL/KOEO, Continuous	GO to Pinpoint Test C
P2802	Transmission Range Sensor "B" Circuit Low	MIL/KOEO, Continuous	GO to Pinpoint Test C
P2803	Transmission Range Sensor "B" Circuit High	MIL/KOEO, Continuous	GO to Pinpoint Test C
P2804	Transmission Range Sensor "B" Circuit Intermittent	Wrench/KOEO, Continuous	GO to Pinpoint Test C
P2805	Transmission Range Sensor "A"/"B" Correlation	MIL/KOEO, Continuous	GO to Pinpoint Test C
U0028	Vehicle Communication Bus "A"	Wrench/Continuous	A CAN fault was present at a point in time. The fault is not currently present since the module is communicating with the diagnostic scan tool. CLEAR the DTC. REPEAT the network test with the diagnostic scan tool. VERIFY the integrity of the connectors and wiring. Refer to Wiring Diagrams Cell 14 for schematic and connector information.
U0037	Vehicle Communication Bus "B"	Wrench/Continuous	A CAN fault was present at a point in time. The fault is not currently present since the module is communicating with the diagnostic scan tool. CLEAR the DTC. REPEAT the network test with the diagnostic scan tool. VERIFY the integrity of the connectors and wiring. Refer to Wiring Diagrams Cell 14 for schematic and connector information.

U0073	Control Module Communication Bus "A" Off	MIL/Continuous	A CAN fault was present at a point in time. The fault is not currently present since the module is communicating with the diagnostic scan tool. CLEAR the DTC. REPEAT the network test with the diagnostic scan tool. VERIFY the integrity of the connectors and wiring. Refer to Wiring Diagrams Cell 14 for schematic and connector information.
U0074	Control Module Communication Bus "B" Off	MIL/Continuous	A CAN fault was present at a point in time. The fault is not currently present since the module is communicating with the diagnostic scan tool. CLEAR the DTC. REPEAT the network test with the diagnostic scan tool. VERIFY the integrity of the connectors and wiring. Refer to Wiring Diagrams Cell 14 for schematic and connector information.
U0100	Lost Communication With ECM / PCM "A"	MIL/Continuous	GO to Pinpoint Test G
U0121	Lost Communication With Anti-Lock Brake System (ABS) Control Module	None/Continuous	GO to Pinpoint Test H
U0140	Lost Communication With Body Control Module	None/Continuous	GO to Pinpoint Test I
U0146	Lost Communication With Gateway "A"	None/Continuous	GO to Pinpoint Test K
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	None/Continuous	GO to Pinpoint Test J

U0401	Invalid Data Received from ECM/PCM "A"	MIL/Continuous	This DTC sets when the TCM receives invalid network data from the PCM for the engine speed and vehicle speed input. RETRIEVE and REPAIR all non-network DTCs in the PCM and other modules on the network. For the correct navigation of all DTCs, REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules) .
U0415	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module	Wrench/Continuous	This DTC sets when the TCM receives invalid data from the ABS module. DETERMINE which module (TCM or ABS module) has been replaced. CARRY OUT the PMI (when the original module is not available) for the module in question. REFER to: Module Configuration (418-01 Module Configuration) .
U0422	Invalid Data Received from Body Control Module	None/Continuous	This DTC sets when the TCM receives invalid BCM data such as global time, engine off time. RETRIEVE and REPAIR all non-network DTCs in the BCM. For the correct navigation of all DTCs, REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules) .
U2100	Initial configuration Not Complete	Wrench/Continuous	CHECK the vehicle service history for recent service actions related to this module. This DTC sets due to incomplete or incorrect PMI procedures. INSTALL As-Built data from Professional Technician Society (PTS) following scan tool instructions under Module Programming As-Built.

U2101	Control Module Configuration Incompatible	None/Continuous	CHECK the vehicle service history for recent service actions related to this module. This DTC sets due to incomplete or incorrect PMI procedures. INSTALL As-Built data from Professional Technician Society (PTS) following scan tool instructions under Module Programming As-Built.
U2200	Control Module Configuration Memory Corrupt	MIL/Continuous	CHECK the vehicle service history for recent service actions related to this module. This DTC sets due to incomplete or incorrect PMI procedures. INSTALL As-Built data from Professional Technician Society (PTS) following scan tool instructions under Module Programming As-Built.

Pinpoint Tests

Power is routed through the transmission solenoid power control (inside the TCM) to all transmission solenoids. If the power circuit to the transmission solenoids or the transmission solenoid power control fails open, all solenoids are failed electrically off. Check for an open, short to ground or the transmission connector disconnected. The transmission solenoid power control disables power to the transmission solenoids when certain transmission DTCs are set.

- Carry out KOEO and KOER procedures.
- Retrieve and record all DTCs.
- Repair all non-transmission DTCs first.
- Repair all transmission DTCs second.
- Clear all CMDTCs and attempt to repeat them.
- Repair all CMDTCs.
- If only pass codes are obtained,
REFER to: [Diagnosis By Symptom](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

Transmission Control Solenoids

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically off. Check for an open, short to ground or the transmission connector disconnected. The 10R80 utilizes 6 shift (A through F) solenoids that are linear force solenoids. Unlike previous shift solenoids they are mechanical in nature meaning no transmission fluid passes through them. CIDASs use an armature pin assembly that moves a control valve in the main control valve body to control and apply hydraulic fluid pressure. Each clutch (A through F) has a corresponding shift solenoid (A through F) that is directly proportional in that zero current equals zero pressure and maximum current equals maximum pressure. Since there is no pressure with zero current, none of the clutch packs are able to engage if the power is interrupted to the shift solenoids .

PINPOINT TEST A : TRANSMISSION CONTROL SOLENOIDS

A1 CHECK THE SOLENOID POWER CIRCUIT FOR VOLTAGE	
NOTE: <i>Read and record all DTCs.</i>	
• Ignition OFF. • Disconnect: Transmission Vehicle Harness C168A. • Ignition ON.	
Is the maximum recorded voltage greater than 11 volts?	
Yes	GO to A4
No	GO to A2
A2 CHECK THE SOLENOID POWER CIRCUIT FOR AN OPEN	

- Ignition OFF.
- Disconnect: TCM C1822
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms?

Yes	GO to A3
No	REPAIR transmission vehicle harness circuit for an open.

A3 CHECK THE SOLENOID POWER CIRCUIT FOR A SHORT TO GROUND

•

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
C1822-47	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new TCM, REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	REPAIR the circuit.

A4 CHECK SOLENOID CONTROL CIRCUITS FOR AN OPEN

- Ignition OFF.
- Disconnect: TCM C1822
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to A5
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

A5 CHECK SOLENOID CONTROL CIRCUITS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms on the suspect circuit?

Yes	GO to A6
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

A6 CHECK SOLENOID CONTROL CIRCUITS FOR A SHORT TO POWER

Is any voltage detected?

Yes	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.
No	GO to A7

A7 CHECK MAIN CONTROL WIRING HARNESS SOLENOID POWER CIRCUIT FOR AN OPEN CIRCUIT

- Drain the transmission fluid and remove the transmission fluid pan.
REFER to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01A Automatic Transmission - 6-Speed Automatic Transmission - 6R80, Removal and Installation).
REFER to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Disconnect Shift Solenoid Connectors (A through F).
- Disconnect Main Control Wiring Harness C177.
- Measure resistance of the suspect solenoid power circuit of the main control wiring harness, using the table below:

Positive Lead	Measurement / Action	Negative Lead
C177-5	Ω	SSA C1843-1
C177-5		SSB C1844-1
C177-5		SSC C1845-1
C177-5		SSD C1846-1
C177-5		SSE C1847-1

C177-5		SSF C1848-1

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to A9
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A8 CHECK MAIN CONTROL WIRING HARNESS SOLENOID POWER CIRCUIT FOR A SHORT TO GROUND

- INSPECT main control wiring harness for chafes or bare wires.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C177-5	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to A9
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A9 CHECK MAIN CONTROL WIRING HARNESS SOLENOID CONTROL CIRCUIT FOR AN OPEN CIRCUIT

- Measure resistance of the suspect solenoid control circuit of the main control wiring harness, using the table below:

Positive Lead	Measurement / Action	Negative Lead
C177-8	Ω	SSA C1843-2
C177-9		SSB C1844-2
C177-10		SSC C1845-2
C177-11		SSD C1846-2
C177-3		SSE C1847-2
C177-4		SSF C1848-2

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to A11
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A10 CHECK MAIN CONTROL WIRING HARNESS SOLENOID CONTROL CIRCUIT FOR A SHORT TO GROUND

- Disconnect Shift Solenoid Connectors (A_F) (If not disconnected already).
- Measure:

Positive Lead	Measurement / Action	Negative Lead
SSA C1843-2	Ω	Ground
SSB C1844-2		Ground
SSC C1845-2		Ground
SSD C1846-2		Ground
SSE C1847-2		Ground

SSF C1848-2		Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to A11
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A11 CHECK SOLENOID RESISTANCE

- Disconnect the suspect solenoid connector and remove the suspect shift solenoid.
REFER to: [Shift Solenoids \(SS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Measure and record the resistance of the suspected solenoid.

Is the shift solenoid resistance between 4.8 and 5.4 ohms?

Yes	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new solenoid for the solenoid that failed the resistance check. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

The TFT sensor is a temperature dependent resistor that is in contact with transmission fluid in the transmission sump area. The TCM monitors the voltage across the TFT sensor, which changes as transmission fluid temperature varies. The TCM uses the TFT sensor signal as an input for its strategy for shifting and TCC operation. The TCM also uses the TFT sensor signal for transmission fault detection and diagnostics.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires and missing or damaged seals
- TFT sensor
- Transmission internal wiring harness frame
- TCM

PINPOINT TEST B : TFT (TRANSMISSION FLUID TEMPERATURE) SENSOR

B1 CHECK TFT INPUT SIGNAL	
• Ignition OFF. • Disconnect: Transmission Vehicle Harness C168A. • Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals. • Connect the diagnostic tool. • Ignition ON. • Enter the following mode on the diagnostic scan tool: Datalogger. Monitor the following TFT PIDs, TFT and TFTV.	
Does the TFT PID display -40°C (-40°F) and the TFTV PID display 4.96 to 5.10 volts?	
Yes	GO to B2
No	REPAIR the circuit.

B2 CHECK TFT SIGNAL INPUT CIRCUIT FOR VOLTAGE

Is the voltage between 4.8 and 5.1 volts?

Yes	GO to B3
No	INSPECT and REPAIR the open circuit. If an open circuit is not found, INSTALL a new TCM, REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

B3 CHECK TFT SIGNAL RETURN CIRCUIT

Does the TFT PID display 190°-195°C (374°-383°F) and the TFTV PID display 0 volts?

Yes	GO to B4
No	INSPECT and REPAIR the transmission vehicle harness signal return circuit for an open. If an open circuit is not found, INSTALL a new TCM, REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

B4 CHECK INTERNAL WIRING HARNESS FOR AN OPEN

- Ignition OFF.
- Disconnect TFT Sensor C1842.
- Disconnect TR Sensor C167.

Are the resistances less than 3 ohms?

Yes	GO to B5
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

B5 CHECK INTERNAL WIRING HARNESS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	INSPECT and CLEAN the TFT sensor for metallic contamination. INSTALL a new TFT sensor. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). CLEAR the DTCs.
No	GO to B6

B6 CHECK TFT SENSOR RESISTANCE

- Connect TFT sensor C1842.

Does the temperature to resistance specification match?

Yes	To diagnose an overheating concern, REFER to: Transmission Cooling (307-02 Transmission Cooling) .
No	INSTALL a new TFT. REFER to: Transmission Fluid Temperature (TFT) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

TR Sensor

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

The TR sensor is comprised of a dual set of TR sensors. The manual shifter engages and disengages Park and the shifter position is detected by reading TR sensors A and B. There is no manual valve, the TCM provides forward or reverse based on the dual TR sensor inputs. The 10R80 transmission uses dual PWM output (at 125 Hz) TR sensors where: TR sensor A increases as the shifter is moved from Park to Sport and TR sensor B decreases as the shifter is moved from Park to Sport, together the sum of the two signals should add up to 100%. The 10R80 transmission mechanical shifter variant is range by wire with mechanical Park. The dual TR sensor's signals determine customer selected range (P, R, N, D, S). PIDs, TR_A_DC and TR_B_DC may be utilized to monitor the TR sensor duty cycles.

Typical TR Sensors PWM Output

	Transmission Range Sensor A		Transmission Range Sensor B	
Gear	Min	Max	Min	Max
P	8.00	18.96	81.04	92.00
R	35.50	47.90	52.10	64.50

N	51.75	61.75	38.25	48.25
D	67.45	77.45	22.55	32.55
Sport	81.12	92.00	8.00	18.88

PINPOINT TEST C : TR SENSOR

C1 VERIFY DTCS

NOTE: Read and record all DTCs.

- Ignition OFF.
- Select PARK.
- Connect the diagnostic tool.
- Carry out the KOEO then the KOER test.

Are TR sensor DTCs present?

Yes	GO to C2
No	If no DTCs are present, and to diagnose any symptoms that may be present, REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

C2 CHECK TR SENSOR ELECTRICAL OPERATION

- Ignition ON.
- Enter the following diagnostic mode on the scan tool: TR PID: TR_A_DC and TR_B_DC.
- Move the selector lever into each range and stop.
- Observe the PIDs: TR_A_DC and TR_B_DC while wiggling the harness or driving the vehicle.
- Compare the duty cycles shown by the PIDs TR_A_DC and TR_B_DC to the selector lever position duty cycle, using the following chart.

Typical TR Sensor(s) PWM Output

Gear	Transmission Range Sensor A		Transmission Range Sensor B	
	Min	Max	Min	Max
P	8.00	18.96	81.04	92.00
R	35.50	47.90	52.10	64.50
N	51.75	61.75	38.25	48.25
D	67.45	77.45	22.55	32.55
Sport	81.12	92.00	8.00	18.88

Are the TR_A_DC and TR_B_DC duty cycles within range?

Yes	The problem is not in the TR sensor. REFER to: Diagnosis By Symptom (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
No	GO to C3

C3 CHECK TR SENSOR CIRCUITS FOR POWER

- Ignition OFF.
- Disconnect: Transmission Vehicle Harness C168A.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Are the voltages approximately 5 volts?

Yes	GO to C4
No	GO to C5

C4 CHECK TR SENSOR VOLTAGE CIRCUIT FOR POWER

- Ignition OFF.
- Disconnect: Transmission Vehicle Harness C168A.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Is the voltage approximately 9 volts?

Yes	GO to C7
No	GO to C5

C5 CHECK TR SENSOR VOLTAGE CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	GO to C6
No	REPAIR the circuit.

C6 CHECK TR SENSOR VOLTAGE CIRCUIT FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	REPAIR the circuit.

C7 CHECK TR SENSOR GROUND CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	INSTALL a new TR sensor. REFER to: Transmission Range (TR) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	REPAIR the circuit.

C8 CHECK TR SENSOR TRP1, TRP2, CIRCUITS FOR POWER

- Drain the transmission fluid and remove the transmission fluid pan.
REFER to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
REFER to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- Connect Transmission Vehicle Harness C168A.
- Disconnect TR sensor C167.
- Ignition ON.

Are the voltages approximately 5 volts?

Yes	GO to C9
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

C9 CHECK TR SENSOR VREF CIRCUIT FOR POWER

- Connect Transmission Vehicle Harness C168A.
- Disconnect TR sensor C167.
- Ignition ON.

Is the voltage approximately 9 volts?

Yes	GO to C10
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

C10 CHECK TRANSMISSION INTERNAL WIRING HARNESS FOR AN OPEN CIRCUIT

- Ignition OFF.

Are the resistances less than 3 ohms?

Yes	INSTALL a new TR sensor. REFER to: Transmission Range (TR) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

OSS Sensor, TSS Sensor, ISSA Sensor and ISSB Sensor

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation TSS Sensor

The TSS sensor is a Hall-effect type sensor that provides a signal to the TCM that changes in frequency as the rotating speed of the planetary carrier No. 2 varies. The TCM compares the TSS sensor signal with the engine speed information to determine the amount of slip occurring in the torque converter. The TCM also compares the TSS sensor signal with the OSS sensor signal to determine the gear ratio provided by the planetary carrier No. 4. The TCM uses the TSS sensor signal as an input for its strategies for shifts and TCC operation. The TCM also uses the TSS sensor signal for transmission fault detection and diagnostics.

Normal Operation OSS Sensor

The OSS sensor is a Hall-effect type sensor that provides a signal to the TCM that changes in frequency as the rotating speed of the rear planetary carrier No. 4 varies. The TCM also compares the OSS sensor signal with the TSS sensor signal to determine the gear ratio provided by the rear planetary gearset. The TCM uses the OSS sensor signal as an input for its strategies for shifts and TCC operation. The TCM also uses the OSS sensor signal for transmission fault detection and diagnostics.

Normal Operation Intermediate Speed Sensors A and B

The Intermediate Speed Sensors A (ISSA) and B (ISSB) are Hall-effect type sensors that provide a signal to the TCM that changes in frequency as the rotating speed of the component being monitored changes. ISSA monitors the speed and rotational direction of ring gear 1 and ISSB monitors the speed and rotational direction of planetary carrier-1/ring gear 4. The Intermediate speed sensors are used to monitor clutch states for transmission fault detection and diagnostics.

TSS Sensor DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0715	TSS Sensor Circuit	This DTC sets if the TCM detects an open or short to ground in the TSS sensor circuitry.
P0716	TSS Sensor Circuit Range/Performance	This DTC sets if the TCM detects too large of a sensor air gap, a TSS sensor fault or an undetected clutch fault.
P0717	TSS Sensor Circuit No Signal	This DTC sets relationally if the DTCs P0715, P07BF, P07C0 are set, RESOLVE these DTCs first.
P0718	TSS Sensor Circuit Intermittent	This DTC sets if the TCM detects an intermittent circuit fault in the TSS circuit.
P07BF	ITSS Sensor Circuit Low	This DTC sets if the TCM detects an open or short to ground in the TSS sensor circuitry.
P07C0	TSS Sensor Circuit High	This DTC sets if the TCM detects an open circuit in the TSS sensor circuitry.

Intermediate Sensor A (ISSA) DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0791	Intermediate Shaft Speed Sensor "A" Circuit	This DTC sets if the TCM detects an open or short to ground in the ISSA sensor circuitry.

P07C6	Intermediate Shaft Speed Sensor "A" Circuit High	This DTC sets relationally if the DTCs P0715, P07BF, P07C0 are set, RESOLVE these DTCs first.
P0792	Intermediate Shaft Speed Sensor "A" Circuit Range/Performance	This DTC sets if the TCM detects an intermittent circuit fault in the ISSA sensor circuit.
P0793	Intermediate Shaft Speed Sensor "A" Circuit No Signal	This DTC sets if the TCM detects an open or short to ground in the ISSA sensor circuitry.
P0794	Intermediate Shaft Speed Sensor "A" Circuit Intermittent	This DTC sets if the TCM detects an open circuit in the ISSA sensor circuitry.

Intermediate Sensor B (ISSB) DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P2745	Intermediate Shaft Speed Sensor "B" Circuit	This DTC sets if the TCM detects an open or short to ground in the ISSB sensor circuitry.
P2746	Intermediate Shaft Speed Sensor "B" Circuit Range/Performance	This DTC sets if the TCM detects an intermittent circuit fault in the ISSB sensor circuit..
P2747	Intermediate Shaft Speed Sensor "B" Circuit No Signal	This DTC sets if the TCM detects an open or short to ground in the ISSB sensor circuitry.
P2748	Intermediate Shaft Speed Sensor "B" Circuit Intermittent	This DTC sets if the TCM detects an open circuit in the ISSB sensor circuitry.

OSS Sensor DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions

P0720	OSS Sensor Circuit	This DTC sets if the TCM detects an open or short to ground in the OSS sensor circuitry.
P0721	OSS Sensor Circuit Range Performance	This DTC sets if the TCM detects too large of a sensor air gap, a TSS sensor fault or an undetected clutch fault.
P0722	OSS Sensor Circuit No Signal	This DTC sets relationally if the DTCs P0720, P077C or P077D are set, RESOLVE these DTCs first.
P0793	OSS Sensor "A" Circuit No Signal	This DTC sets if the TCM detects an open or short to ground in the OSS sensor circuitry.
P077D	OSS Sensor Circuit High	This DTC sets relationally if the DTCs P0720, P0721, P0793 are set, RESOLVE these DTCs first.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires or ground and missing or damaged seals
- TSS sensor
- OSS sensor
- Intermediate Speed Sensor A (ISSA)
- Intermediate Speed Sensor B (ISSB)

PINPOINT TEST D : OSS (OUTPUT SHAFT SPEED) SENSOR, TSS (TURBINE SHAFT SPEED) SENSOR, ISSA SENSOR AND ISSB SENSOR

D1 CHECK SENSOR POWER CIRCUIT FOR POWER

- Ignition OFF.
- Disconnect: Transmission Vehicle Harness C168A
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Is the voltage on the suspect circuit 8.0 to 9.2 volts?

Yes	GO to D5
No	GO to D2

D2 CHECK THE SENSOR POWER CIRCUIT FOR A SHORT TO GROUND

- Disconnect: TCM C1822.
- Ignition OFF.

Is the resistance on the suspect circuit greater than 10,000 ohms?

Yes	GO to D3
No	INSPECT and REPAIR transmission vehicle harness sensor power circuit for a short to ground.

D3 CHECK THE SENSOR POWER CIRCUIT FOR AN OPEN

- Ignition ON.

Is the resistance on the suspect circuit less than 3 ohms?

Yes	INSTALL a new TCM, REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	REPAIR the circuit.

D4 CHECK THE SENSOR SIGNAL CIRCUIT FOR A SHORT TO POWER

- Ignition OFF.
- Disconnect: TCM C1822.
- Disconnect: Transmission Vehicle Harness C168A (If not already disconnected).
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.
- Ignition ON.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to D5

D5 CHECK THE SENSOR RETURN CIRCUIT FOR AN OPEN

- Ignition OFF.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to D6
No	REPAIR the transmission vehicle harness signal return circuit for an open.

D6 CHECK THE SENSOR RETURN CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.

Is the resistance greater than 10,000 ohms?

Yes	GO to D7
No	REPAIR the circuit.

D7 CHECK THE SENSOR RETURN INTERNAL HARNESS CIRCUITS FOR A SHORT TO POWER

- Disconnect for OSS sensor C1107.
- Disconnect for TSS sensor C3106.
- Disconnect for ISSA sensor C1836.
- Disconnect for ISSB sensor C1837.
- Ignition ON.

Is any voltage detected on the suspect circuit?

Yes	REPAIR the circuit.
No	GO to D8

D8 CHECK THE SENSOR INTERNAL HARNESS POWER CIRCUITS FOR AN OPEN

- Disconnect Suspect Sensor Connector .
- Ignition ON.

Is the resistance less than 3 ohms?

Yes	GO to D9
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

D9 CHECK THE SENSOR INTERNAL HARNESS CIRCUITS FOR A SHORT TO GROUND

- Ignition ON.

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new sensor as necessary. REFER to: Output Shaft Speed (OSS) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Turbine Shaft Speed (TSS) Sensor (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Intermediate Speed Sensor A (ISSA) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Intermediate Speed Sensor B (ISSB) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

DTCS P0B0D P0C27, P0C28, P0C29, P0C2A, P175A, P0C2D

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation and Fault Conditions

The electric transmission fluid pump keeps the transmission engaged when the engine is stopped and the transmission is in drive. The electric transmission fluid pump has an internal microprocessor and communicates with the PCM over a PWM circuit with a frequency of 150 Hz with a duty cycle range of 10% to 90%.

DTC	Duty Cycle Range	Description
P0C2D	Less than 10%	Out of range Low
P0C27	10% to 15%	Pump current too Low, Speed OK
P0C28	20% to 25%	Pump Current Too High, Speed OK
P175A	30% to 34%	Pump Over Temperature
P0C2A	35% to 40%	Pump Stalled
NONE	44% to 50%	EVERYTHING IS OK – NORMAL VALUE OF SIGNAL
P0B0D	55% to 60%	Pump Over Speed – current OK
P0B0D	65% to 70%	Pump Under Speed – current OK
P0C29	75% to 80%	Both Current and Speed out of range
P2796	85% to 90%	No Command received from Control Module
P0C2E	Greater than 90%	Duty Cycle Out of range HI - undefined
P0C2C	Any other value (between)	Invalid duty cycle or invalid frequency. This could include no signal.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0B0D	Electric Transmission Fluid Pump Motor Control Module	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz and a valid duty cycle was detected (55% to 60% or 65% to 70%). The Electric Transmission Fluid Pump has detected a pump over or under speed condition. The current flow through the pump was within specification.
P0C27	Electric Transmission Fluid Pump Motor Control Module	Possible causes are loss of pump prime or low transmission fluid level. This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (10% to 15% duty cycle).
P0C28	Electric Transmission Fluid Pump Motor Current Low	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (20% to 25% duty cycle).
P0C29	Electric Transmission Fluid Pump Motor Current High	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a high current is detected.
P0C2A	Electric Transmission Fluid Pump Motor Stalled	This DTC sets if the PCM commands the electric transmission fluid pump motor on and does not detect a corresponding increase in pump speed, indicating a stalled pump motor.
P0C2C	Electric Transmission Fluid Pump Control Module Feedback Signal Range/ Performance	This DTC sets if the E-Pump frequency is between 125 and 175Hz but has an invalid duty cycle or the frequency is outside of the 125-175Hz range. This can be caused by a loss of power to the E-Pump.
P0C2D	Electric Transmission Fluid Pump Control Module Feedback Signal Low	This DTC sets if the duty cycle is less than 10%.
P0C2E	Electric Transmission Fluid Pump Control Module Feedback Signal High	This DTC sets if the duty cycle is greater than 90%.
P175A	Transmission Fluid Over Temperature Condition - Electric Transmission Fluid Pump Disabled	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but an over temperature condition is detected (30% to 34% duty cycle). This DTC can be caused by high transmission fluid temperatures

P2796	Electric Transmission Fluid Pump Control Circuit	This DTC sets when the electric transmission oil pump reports to the TCM that it is not receiving a PWM from the TCM.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires or ground and missing or damaged seals
- BJB fuse 111 (15A)
- Electric transmission fluid pump
- TCM

PINPOINT TEST E : DTCS P0B0D P0C27, P0C28, P0C29, P0C2A, P175A, P0C2D

E1 RETRIEVE AND RECORD ALL DTCS	
• Using the diagnostic scan tool, retrieve all DTCs.	
Are DTCs P0C2A, P0C2C, P0C2D, P0C2E, P2796 present?	
Yes	For DTC P2796, GO to E7 For all other DTCs, GO to E2
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or terminal issues.
E2 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP POWER CIRCUITS	

- Ignition OFF.
- Disconnect Transmission Vehicle Harness C168A.
- Ignition ON.

Is the voltage greater than 11 volts?

Yes	GO to E3
No	VERIFY the BJB 111 (15A) is OK. If the fuse is OK, REPAIR the suspect circuit for an open. If the fuse is not OK, REFER to the Wiring Diagrams manual to identify the cause of the affected circuit shorted to ground.

E3 CHECK THE ELECTRIC TRANSMISSION PUMP GROUND CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	For DTC P0C2A, GO to Pinpoint Test F For all other DTCs, GO to E4
No	REPAIR the circuit

E4 CHECK ELECTRIC TRANSMISSION PUMP FEEDBACK MONITOR CIRCUIT FOR OPEN

- Ignition OFF.
- Disconnect TCM C1822.
- Ignition ON.

Is the resistance less than 3 ohms?

Yes	GO to E5
No	REPAIR the circuit.

E5 CHECK ELECTRIC TRANSMISSION FLUID PUMP FEEDBACK MONITOR CIRCUIT FOR SHORT TO GROUND

- Ignition OFF.

Is the resistance greater than 10,000 ohms?

Yes	GO to E6
No	REPAIR the circuit

E6 CHECK ELECTRIC TRANSMISSION FLUID PUMP FEEDBACK / MONITOR CIRCUIT FOR SHORT TO POWER

- Ignition ON.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E7

E7 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND CIRCUIT FOR SHORT TO POWER

- Ignition OFF.
- Disconnect TCM C1822 (If not already disconnected) .
- Disconnect Transmission Harness Connector C168A.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E8

E8 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND CIRCUIT FOR OPEN

Is the resistance less than 3 ohms?

Yes	GO to E9
No	REPAIR the circuit

E9 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP VEHICLE WIRING HARNESS COMMAND CIRCUITS FOR AN OPEN

Is the resistance greater than 10,000 ohms?

Yes	GO to E10
No	REPAIR the circuit

E10 CHECK ELECTRIC TRANSMISSION FLUID PUMP VEHICLE HARNESS FEEDBACK MONITOR CIRCUIT FOR SHORT TO POWER

- Ignition ON.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E11

E11 CHECK ELECTRIC TRANSMISSION FLUID PUMP COMMAND CIRCUIT FOR SHORT TO GROUND

- Ignition OFF.
- Disconnect TCM C1822 (If not already disconnected) .
- Disconnect Transmission Harness Connector C168A.

Is any voltage detected?

Yes	REPAIR the circuit.
No	GO to E12

E12 CHECK TRANSMISSION INTERNAL WIRING HARNESS ELECTRIC TRANSMISSION FLUID PUMP POWER CIRCUIT FOR AN OPEN

- REMOVE the transmission pan.
REFER to: Transmission Fluid Drain and Refill (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) .
- Ignition ON.

Are the resistances less than 3 ohms?

Yes	GO to E13

No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E13 CHECK THE TRANSMISSION INTERNAL WIRING HARNESS GROUND CIRCUIT

- Ignition OFF.

Is the resistance less than 3 ohms?

Yes	GO to E14
No	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E14 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP DUTY CYCLE OPERATION

- Connect TCM C1822.
- Connect Transmission Vehicle Harness C168A.
- Connect Electric Transmission Fluid Pump C1792.
- Connect the diagnostic tool.
- Ignition ON.
- Using a diagnostic scan tool, COMMAND the electric transmission fluid pump ON using, TRANS_PMP_CMD and set to a duty cycle of 70%.
- MONITOR the PIDs, TRANS_PMP_MEAS.

Does TRANS_PMP_MEAS quickly return to 44% to 50% after the command percentage

changes?

Yes	The electric transmission fluid pump is operating correctly at this time.
No	INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

DTCs P0B0D, P0C27, P0C28, P0C29, P0C2A, P175A

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation and Fault Conditions

The electric transmission fluid pump keeps the transmission fluid circulating during extended drive times without engine charging. The electric transmission fluid pump has an internal microprocessor and communicates with the C1232E over a PWM circuit with a frequency of 150 Hz with a duty cycle range of 10% to 90%. If the transmission fluid level is low or overfilled or there are any restrictions in the transmission lines, hoses (if vehicle is equipped with external lines or hoses) or cooler it may affect the transmission fluid pump operation.

DTC	Duty Cycle Range	Condition
P0C2D	Less than 10%	Out of range Low
P0C27	10% to 15%	Pump current too Low, Speed OK
P0C28	20% to 25%	Pump Current Too High, Speed OK
P175A	30% to 34%	Pump Over Temperature
P0C2A	35% to 40%	Pump Stalled
NONE	44% to 50%	EVERYTHING IS OK – NORMAL VALUE OF SIGNAL
P0B0D	55% to 60%	Pump Over Speed – current OK
P0B0D	65% to 70%	Pump Under Speed – current OK
P0C29	75% to 80%	Both Current and Speed out of range

P2796	85% to 90%	No Command received from Control Module
P0C2E	Greater than 90%	Duty Cycle Out of range HI - undefined
P0C2C	Any other value (between)	Invalid duty cycle or invalid frequency. This could include no signal.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0B0D	Electric Transmission Fluid Pump Motor Control Module	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz and a valid duty cycle was detected (55% to 60% or 65% to 70%). The transmission fluid pump has detected a pump over or under speed condition. The current flow through the pump was within specification.
P0C27	Electric Transmission Fluid Pump Motor Control Module	Possible causes are loss of pump prime or low transmission fluid level. This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (10% to 15% duty cycle).
P0C28	Electric Transmission Fluid Pump Motor Current Low	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a low current is detected (20% to 25% duty cycle).
P0C29	Electric Transmission Fluid Pump Motor Current High	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but a high current is detected.
P0C2A	Electric Transmission Fluid Pump Motor Stalled	This DTC sets if the PCM commands the electric transmission fluid pump motor on and does not detect a corresponding increase in pump speed, indicating a stalled pump motor.

P0C2C	Electric Transmission Fluid Pump Control Module Feedback Signal Range/Performance	This DTC sets if the E-Pump frequency is between 125 and 175Hz but has an invalid duty cycle or the frequency is outside of the 125-175Hz range. This can be caused by a loss of power to the E-Pump.
P0C2D	Electric Transmission Fluid Pump Control Module Feedback Signal Low	This DTC sets if the duty cycle is less than 10%.
P0C2E	Electric Transmission Fluid Pump Control Module Feedback Signal High	This DTC sets if the duty cycle is greater than 90%.
P175A	Transmission Fluid Over Temperature Condition - Electric Transmission Fluid Pump Disabled	This DTC sets if the E-pump communication is OK. The frequency is between 130 Hz and 170 Hz but an over temperature condition is detected (30% to 34% duty cycle). This DTC can be caused by high transmission fluid temperatures
P2796	Electric Transmission Fluid Pump Control Circuit	This DTC sets when the electric transmission oil pump reports to the TCM that it is not receiving a PWM from the TCM.

PINPOINT TEST F : DTCS P0B0D, P0C27, P0C28, P0C29, P0C2A, P175A

F1 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP POWER CIRCUITS

- Ignition OFF.
- Disconnect Transmission Harness Connector C168A.
- Ignition ON.

Is the voltage greater than 11 volts?

Yes	GO to F2
No	VERIFY the BJB fuse 111 (15A) is OK. If the fuse is OK, REPAIR the affected circuit for an open. If the fuse is not OK, REFER to the Wiring Diagrams manual to identify the cause of the affected circuit shorted to ground.

F2 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP GROUND CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	GO to F3
No	REPAIR the circuit

F3 CHECK THE TRANSMISSION FLUID LEVEL

- Ignition OFF.
- CHECK the transmission fluid level.

Is the transmission fluid level correct?

Yes	GO to F4
No	CORRECT the transmission fluid to the proper level.

F4 CHECK THE ELECTRIC TRANSMISSION FLUID PUMP SUMP SEALS

- Ignition OFF.
- DRAIN the transmission fluid and REMOVE the transmission pan.
REFER to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
REFER to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
- REMOVE the transmission fluid pump and sump and inspect the seals.

Are the transmission fluid pump seals OK?

Yes	INSTALL a new electric transmission fluid pump. REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL new seals on the electric transmission fluid pump REFER to: Transmission Fluid Auxiliary Pump (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

U0100

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

The TCM sets one or more of the DTC U0100 when it has not received messages for more than 5 seconds from the PCM. Other modules that require data from the PCM all set communication DTCs and may also exhibit system function concerns.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0100	Lost Communication With ECM/PCM "A"	Sets in continuous memory in the TCM if powertrain data messages received from the PCM over the HS-CAN are missing for longer than 5 seconds.

Possible Sources

- Communication concern
- Battery voltage concern
- PCM
- TCM

PINPOINT TEST G : U0100

G1 VERIFY THE SCAN TOOL COMMUNICATES WITH THE PCM (POWERTRAIN CONTROL MODULE)

- Ignition ON.
- Connect a diagnostic scan tool.
- Check that a vehicle session can be established using a diagnostic scan tool.

Can a vehicle session be established?

Yes	GO to G2
No	REFER to: Communications Network (418-00 Module Communications Network) .

G2 CHECK THE TCM (TRANSMISSION CONTROL MODULE) CONTINUOUS MEMORY DTC (DIAGNOSTIC TROUBLE CODE) S

- Using a diagnostic scan tool, perform the TCM self-test.
- Clear the DTCs.
- Wait 10 seconds.
- Repeat the TCM self-test.

Is DTCs U0100 retrieved again?

Yes	GO to G3
No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

G3 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S FROM THE PCM (POWERTRAIN CONTROL MODULE) KOEO (KEY ON, ENGINE OFF) SELF-TEST

- Using a diagnostic scan tool, perform the PCM KOEO self-test.

Are any DTCs recorded?

Yes	REFER to: Electronic Engine Controls (303-14C Electronic Engine Controls - 3.5L EcoBoost (272kW/370PS), Diagnosis and Testing).
No	GO to G4

G4 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S FROM THE TCM (TRANSMISSION CONTROL MODULE) SELF-TEST

- Using a diagnostic scan tool, perform the TCM self-test.

Is DTC P1397 recorded?

Yes	REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
No	GO to G5

G5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0100 SET IN OTHER MODULES

- Using a diagnostic scan tool, clear all DTCs.
- Ignition OFF.
- Ignition ON.
- Wait 10 seconds.
- Using a diagnostic scan tool, perform the continuous memory self-test.
- Retrieve the CMDTCs from all modules.

Is DTC U0100 set in other modules on the network?

Yes	GO to G6
No	GO to G7

G6 CHECK FOR CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all PCM connectors.
- Repair:
 - corrosion (install new connector or terminals - clean module pins)
 - damaged or bent pins - install new terminals/pins
 - pushed-out pins - install new pins as necessary
- Reconnect the PCM connectors. Make sure they seat and latch correctly.
- Operate the system and verify the concern is still present

Is the concern still present?

Yes	CHECK OASIS for any applicable TSBs. If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no TSBs address this concern, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14C Electronic Engine Controls - 3.5L EcoBoost (272kW/370PS), Removal and Installation). PROGRAM the PCM with the latest calibration level.
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

G7 CHECK FOR CORRECT TCM (TRANSMISSION CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect the TCM connector.
- Repair:
 - corrosion (install new connector or terminals - clean module pins)
 - damaged or bent pins - install new terminals/pins
 - pushed-out pins - install new pins as necessary
- Reconnect the TCM connector. Make sure it seats and latches correctly.
- Operate the system and verify the concern is still present

Is the concern still present?

Yes	CHECK OASIS for any applicable TSBs. If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no TSBs address this concern, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

U0121

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

The TCM sets the DTC U0121 when key messages such as wheel speed, brake pressure or torque are not received for longer than 5 seconds. This loss of key messages degrades the transmission functionality. Other modules that require data from the ABS module all set communication DTCs and may also exhibit system function concerns.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0121	Lost Communication With Anti-Lock Brake System (ABS) Control Module	Sets in continuous memory in the TCM if ABS data messages received from the ABS module over the HS-CAN are missing for longer than 5 seconds.

Possible Sources

- Communication concern
- Battery voltage concern
- ABS module
- TCM

PINPOINT TEST H : U0121

H1 VERIFY THE SCAN TOOL COMMUNICATES WITH THE ABS (ANTI-LOCK BRAKE SYSTEM)

- Ignition ON.
- Connect a diagnostic scan tool.
- Check that a vehicle session can be established using a diagnostic scan tool.

Can a vehicle session be established?

Yes	GO to H2
No	REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

H2 CHECK THE TCM (TRANSMISSION CONTROL MODULE) CMDTC (CONTINUOUS MEMORY DIAGNOSTIC TROUBLE CODE) S

- Using a diagnostic scan tool, perform the TCM self-test.
- Clear the DTCs.
- Wait 10 seconds.
- Repeat the TCM self-test.

Is DTC U0121 retrieved again?

Yes	GO to H3
No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

H3 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S FROM THE ABS (ANTI-LOCK BRAKE SYSTEM) MODULE SELF-TEST

- Using a diagnostic scan tool, perform the ABS module self-test.

Are any DTCs recorded?

Yes	REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
No	GO to H4

H4 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S FROM THE TCM (TRANSMISSION CONTROL MODULE) SELF-TEST

- Using a diagnostic scan tool, perform the TCM self-test.

Is DTC P1397 recorded?

Yes	REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
No	GO to H5

H5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0121 SET IN OTHER MODULES

- Using a diagnostic scan tool, clear all DTCs.
- Ignition OFF.
- Ignition ON.
- Wait 10 seconds.
- Using a diagnostic scan tool, perform the continuous memory self-test.
- Retrieve the CMDTCs from all modules.

Is DTC U0121 set in other modules on the network?

Yes	GO to H6
No	GO to H7

H6 CHECK FOR CORRECT ABS (ANTI-LOCK BRAKE SYSTEM) MODULE OPERATION

- Ignition OFF.
- Disconnect and inspect the ABS module connector.
- Repair:
 - corrosion (install new connector or terminals - clean module pins)
 - damaged or bent pins - install new terminals/pins
 - pushed-out pins - install new pins as necessary
- Reconnect the ABS module connector. Make sure it seat and latches correctly.
- Operate the system and verify the concern is still present

Is the concern still present?

Yes	CHECK OASIS for any applicable TSBs. If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no TSBs address this concern,
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

H7 CHECK FOR CORRECT TCM (TRANSMISSION CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect the TCM connector.
- Repair:
 - corrosion (install new connector or terminals - clean module pins)
 - damaged or bent pins - install new terminals/pins
 - pushed-out pins - install new pins as necessary
- Reconnect the TCM connector. Make sure it seats and latches correctly.
- Operate the system and verify the concern is still present

Is the concern still present?

Yes	CHECK OASIS for any applicable TSBs. If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no TSBs address this concern, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

U0140

Refer to Wiring Diagrams Cell 14 for schematic and connector information.

Normal Operation

The TCM sets the DTCs U0140 when key messages are not received for longer than 5 seconds. Other modules that require data from the BCM all set communication DTCs and may also exhibit system function concerns.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0140	Lost Communication With Body Control Module	Sets in continuous memory in the TCM if BCM data messages such as tire size, axle ratio, global real time, engine off time received from the BCM over the HS-CAN are missing for longer than 2 seconds.

Possible Sources

- Communication concern
- Battery voltage concern
- BCM
- TCM

PINPOINT TEST I : U0140

I1 VERIFY THE SCAN TOOL COMMUNICATES WITH THE BODY CONTROL MODULE

- Ignition ON.
- Connect a diagnostic scan tool.
- Check that a vehicle session can be established using a diagnostic scan tool.

Can a vehicle session be established?

Yes	GO to I2
No	REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

I2 CHECK THE TCM (TRANSMISSION CONTROL MODULE) CMDTC (CONTINUOUS MEMORY DIAGNOSTIC TROUBLE CODE) S

- Using a diagnostic scan tool, perform the TCM self-test.
- Clear the DTCs.
- Wait 10 seconds.
- Repeat the TCM self-test.

Are DTCs U0140 retrieved again?

Yes	GO to I3
No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

I3 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S FROM THE BCM (BODY CONTROL MODULE) SELF-TEST

- Using a diagnostic scan tool, perform the BCM module self-test.

Are any DTCs recorded?

Yes	REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules) .
No	GO to I4

I4 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S) FROM THE TCM (TRANSMISSION CONTROL MODULE) SELF-TEST

- Using a diagnostic scan tool, perform the TCM self-test.

Is DTC P1397 recorded?

Yes	REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
No	GO to I5

I5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0140 SET IN OTHER MODULES

- Using a diagnostic scan tool, clear all DTCs.
- Ignition OFF.
- Ignition ON.
- Wait 10 seconds.
- Using a diagnostic scan tool, perform the continuous memory self-test.
- Retrieve the CMDTCs from all modules.

Are DTC U0140 set in other modules on the network?

Yes	GO to I6
No	GO to I7

I6 CHECK FOR CORRECT BODY CONTROL MODULE (BCM) OPERATION

- Ignition OFF.
- Disconnect and inspect all BCM connectors.
- Repair:
 - corrosion (install new connector or terminals - clean module pins)
 - damaged or bent pins - install new terminals/pins
 - pushed-out pins - install new pins as necessary
- Reconnect the BCM connectors. Make sure they seat and latch correctly.
- Operate the system and verify the concern is still present

Is the concern still present?

Yes	CHECK OASIS for any applicable TSBs. If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no TSBs address this concern,
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

I7 CHECK FOR CORRECT TCM (TRANSMISSION CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect the TCM connector.
- Repair:
 - corrosion (install new connector or terminals - clean module pins)
 - damaged or bent pins - install new terminals/pins
 - pushed-out pins - install new pins as necessary
- Reconnect the TCM connector. Make sure it seats and latches correctly.
- Operate the system and verify the concern is still present

Is the concern still present?

Yes	CHECK OASIS for any applicable TSBs. If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no TSBs address this concern, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

U0155

Refer to Wiring Diagrams Cell 14 for schematic and connector information.

Normal Operation

The TCM sets the DTCs U0155 when key messages are not received for longer than 5 seconds. Other modules that require data from the IPC all set communication DTCs and may also exhibit system function concerns.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	Sets in continuous memory in the TCM if IPC data messages received from the IPC over the HS-CAN are missing for longer than 2 seconds.

Possible Sources

- Communication concern
- Battery voltage concern
- IPC
- TCM

PINPOINT TEST J : U0155

J1 VERIFY THE SCAN TOOL COMMUNICATES WITH THE INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

- Ignition ON.
- Connect a diagnostic scan tool.
- Check that a vehicle session can be established using a diagnostic scan tool.

Can a vehicle session be established?

Yes	GO to J2
No	REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

J2 CHECK THE TCM (TRANSMISSION CONTROL MODULE) CMDTC (CONTINUOUS MEMORY DIAGNOSTIC TROUBLE CODE) S

- Using a diagnostic scan tool, perform the TCM self-test.
- Clear the DTCs.
- Wait 10 seconds.
- Repeat the TCM self-test.

Is DTC U0155 retrieved again?

Yes	GO to J3

No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

J3 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S FROM THE IPC (INSTRUMENT PANEL CLUSTER) MODULE SELF-TEST

- Using a diagnostic scan tool, perform the IPC module self-test.

Are any DTCs recorded?

Yes	REFER to: Instrumentation, Message Center and Warning Chimes (413-01 Instrumentation, Message Center and Warning Chimes, Diagnosis and Testing).
No	GO to J4

J4 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S FROM THE TCM (TRANSMISSION CONTROL MODULE) SELF-TEST

- Using a diagnostic scan tool, perform the TCM self-test.

Is DTC P1397 recorded?

Yes	REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).
No	GO to J5

J5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0155 SET IN OTHER MODULES

- Using a diagnostic scan tool, clear all DTCs.
- Ignition OFF.
- Ignition ON.
- Wait 10 seconds.
- Using a diagnostic scan tool, perform the continuous memory self-test.
- Retrieve the CMDTCs from all modules.

Is DTC U0155 set in other modules on the network?

Yes	GO to J6
No	GO to J7

J6 CHECK FOR CORRECT INSTRUMENT PANEL CONTROL OPERATION

- Ignition OFF.
- Disconnect and inspect the IPC connector.
- Repair:
 - corrosion (install new connector or terminals - clean module pins)
 - damaged or bent pins - install new terminals/pins
 - pushed-out pins - install new pins as necessary
- Reconnect the IPC connector. Make sure it seats and latches correctly.
- Operate the system and verify the concern is still present

Is the concern still present?

Yes	CHECK OASIS for any applicable TSBs. If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no TSBs address this concern, INSTALL a IPC. REFER to: Instrument Panel Cluster (IPC) (413-01 Instrumentation, Message Center and Warning Chimes, Removal and Installation).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

J7 CHECK FOR CORRECT TCM (TRANSMISSION CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect the TCM connector.
- Repair:
 - corrosion (install new connector or terminals - clean module pins)
 - damaged or bent pins - install new terminals/pins
 - pushed-out pins - install new pins as necessary
- Reconnect the TCM connector. Make sure it seats and latches correctly.
- Operate the system and verify the concern is still present

Is the concern still present?

Yes	CHECK OASIS for any applicable TSBs. If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no TSBs address this concern, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

U0146:00

Normal Operations and Fault Conditions

The TCM communicates with the GWM over the CAN. If the TCM does not receive messages from the GWM, features such as the keyless entry can be inoperative.

RTM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0146:00	Lost Communication With Gateway "A": No Sub Type Information	Sets when the TCM detects data messages are missing from the GWM over the CAN.

Possible Causes

- Network communication concern
- TCM
- GWM

PINPOINT TEST K : U0146:00

K1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify there is an observable symptom present.

Is an observable symptom present?

Yes	GO to K2
No	The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

K2 CHECK THE COMMUNICATION NETWORK

- Using a diagnostic scan tool, perform a network test.

Does the GWM pass the network test?

Yes	GO to K3
No	REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

K3 CHECK FOR CHARGING SYSTEM RELATED DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, retrieve all Continuous Memory Diagnostic Trouble Codes (CMDTCs).

Are any battery voltage related Diagnostic Trouble Codes (DTCs) retrieved?

Yes	DIAGNOSE the charging system. Refer to the appropriate section in Group 303 for the procedure.
No	GO to K4

K4 RECHECK THE TCM (TRANSMISSION CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during PMI or the PMI may not have been performed.*

- Using a diagnostic scan tool, clear the Diagnostic Trouble Codes (DTCs) and repeat the TCM self-test.

Is DTC U0146:00 still present?

Yes	GO to K5
No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

K5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0146 SET IN OTHER MODULES

- Using a diagnostic scan tool, clear all Diagnostic Trouble Codes (DTCs).
- Ignition OFF.
- Ignition ON.
- Wait 30 seconds.
- Using a diagnostic scan tool, retrieve the Continuous Memory Diagnostic Trouble Codes (CMDTCs) from all modules.

Is DTC U0140 set in other modules?

Yes	INSTALL a new GWM. REFER to: Gateway Module A (GWM) (418-00 Module Communications Network, Removal and Installation).

No

REFER to: [Transmission Control Module \(TCM\) - 3.0L Power Stroke Diesel/3.5L EcoBoost \(272kW/370PS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure.
REFER to: [Transmission Strategy Download](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

TCC, LPC Solenoids

Refer to Wiring Diagrams Cell 30 for schematic and connector information.

Normal Operation

When the electrical connector or solenoid is disconnected, inspect the connector for terminal condition, corrosion and contamination and the connector seal for damage. Also inspect the connector seal for damage. Clean, repair or install new components as required. If the power circuit to the transmission solenoids fails open, then all solenoids are failed electrically off. Check for an open, short to ground or the transmission connector disconnected. The TCC is controlled by a directly proportional solenoid. Like the shift solenoids the TCC solenoid is controlled by a “smart driver” capable of detecting open, short to ground and short to power faults. In the event of an open circuit or short to power fault the TCC circuit is failed open. The TCC and LPC solenoids share a high side driver. Anytime power is removed the transmission defaults to MAX line pressure with open TCC. LPC is controlled by an inversely proportional solenoid (0 current = max pressure, max current = min line pressure). The LPC solenoid is controlled by a “smart driver” capable of detecting open, short to ground or short to power faults.

Possible Sources

- Connectors damaged or pushed-out terminals, corrosion, loose wires and missing or damaged seals
- TCC and LPC solenoid(s)
- Main control wiring harness
- Transmission internal wiring harness
- TCM

PINPOINT TEST L : TCC, LPC SOLENOIDS

L1 CHECK THE SOLENOID POWER CIRCUIT TSPC2 FOR VOLTAGE

- Ignition OFF.
- Disconnect: Transmission Harness C168A.
- Ignition ON.

Is the maximum recorded voltage greater than 11 volts?

Yes	GO to L4
No	GO to L2

L2 CHECK THE SOLENOID POWER CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect: TCM C1822.
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms?

Yes	GO to L3
No	REPAIR the transmission vehicle harness circuit for an open. CLEAR the DTCs. If DTC P0657 returns, INSTALL a new TCM. REFER to: Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PROGRAM the TCM with the latest calibration level. PERFORM the Solenoid Body Strategy Data Download procedure. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

L3 CHECK THE SOLENOID POWER CIRCUIT FOR SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	GO to L4
No	REPAIR transmission vehicle harness circuit short to ground.

L4 CHECK VEHICLE HARNESS SOLENOID CONTROL CIRCUITS FOR AN OPEN

- Ignition OFF.
- Disconnect: TCM C1822
- Inspect the connector for damaged or pushed out terminals, corrosion, loose wires and missing or damaged seals.

Is the resistance less than 3 ohms on the suspect circuit?

Yes	GO to L5
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

L5 CHECK VEHICLE HARNESS SOLENOID CONTROL CIRCUITS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms on the suspect circuit?

Yes	GO to L6
No	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.

L6 CHECK SOLENOID CONTROL CIRCUITS FOR A SHORT TO POWER

Is any voltage detected on the suspect circuit?

Yes	REPAIR the transmission vehicle harness circuit. CLEAR the DTCs.
No	GO to L7

L7 CHECK MAIN CONTROL WIRING HARNESS FOR AN OPEN CIRCUIT

Are the resistances less than 3 ohms?

Yes	GO to L9
No	INSTALL a new main control wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

L8 CHECK MAIN CONTROL WIRING HARNESS FOR A SHORT TO GROUND

Are the resistances greater than 10,000 ohms?

Yes	GO to L9
No	INSTALL a new main control wiring harness. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

L9 CHECK SOLENOID RESISTANCE

- Measure and record the resistance of the suspected solenoid.
REFER to: [Shift Solenoids \(SS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
Compare the recorded value with the chart below:

Solenoid	Ohms
LPC solenoid	4.6 to 5.2
TCC solenoid	4.6 to 5.2

Is the solenoid resistance within specification?

Yes	INSTALL a new transmission internal wiring harness. REFER to: Transmission Internal Wiring Harness (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
No	INSTALL a new solenoid for the solenoid that failed the resistance check. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Road Testing Vehicle

Shift Point Road Test

NOTE: Always drive the vehicle in a safe manner according to driving conditions and obey all traffic laws.

Upshift Gear Sequence

At times the 10-speed transmission may **skip** gears when the vehicle starts from a complete stop. This is **normal** and desired **behavior**.

At part pedal when acceleration is brisk, single step upshifts would result in very frequent shift events (very short time in gear). Double step upshifts results when a longer time is spent in gear.

However, at light pedal or road load, single step upshifts **will** occur. The small 10-speed gear steps allow the engine speed to drop to lower values than it would in the 6-speed transmission; providing for the best fuel economy. In contrast, when the 10-speed transmission is at heavy or max pedal, the small steps keep the engine closer to the horsepower peak for best performance.

Downshift Gear Sequence

At times the 10-speed transmission may **skip** gears when the vehicle down shifts to a complete stop. This is **normal** and desired **behavior**.

The same **skip** shift strategy that is used for the upshift may be applied during down shift.

Most performance based automatic transmission DTCs require the fault to be detected multiple times before setting a DTC. In many instances the faults must be detected consecutively a predetermined number of times (up to five). Performing the shift point road test as detailed below increases the likelihood that a DTC sets if a fault is present in the system.

Shift Point Road Test

1. Bring engine and transmission up to normal operating temperature.
2. Operate the vehicle with the selector lever in the D position.
3. From a stop, accelerate the vehicle to 80 km/h (50 mph) with the shifts occurring at approximately 2000 rpm. Stay in 10th gear for 30 seconds or until the TCC applies. Repeat this two times.
4. From a stop, accelerate the vehicle to 80 km/h (50 mph) with the shifts occurring at approximately 3000 rpm. Stay in 10th gear for 30 seconds or until the TCC applies. Repeat this two times.
5. If the transmission fails to upshift/downshift,
REFER to: [Diagnosis By Symptom](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).

Shift Speed Chart

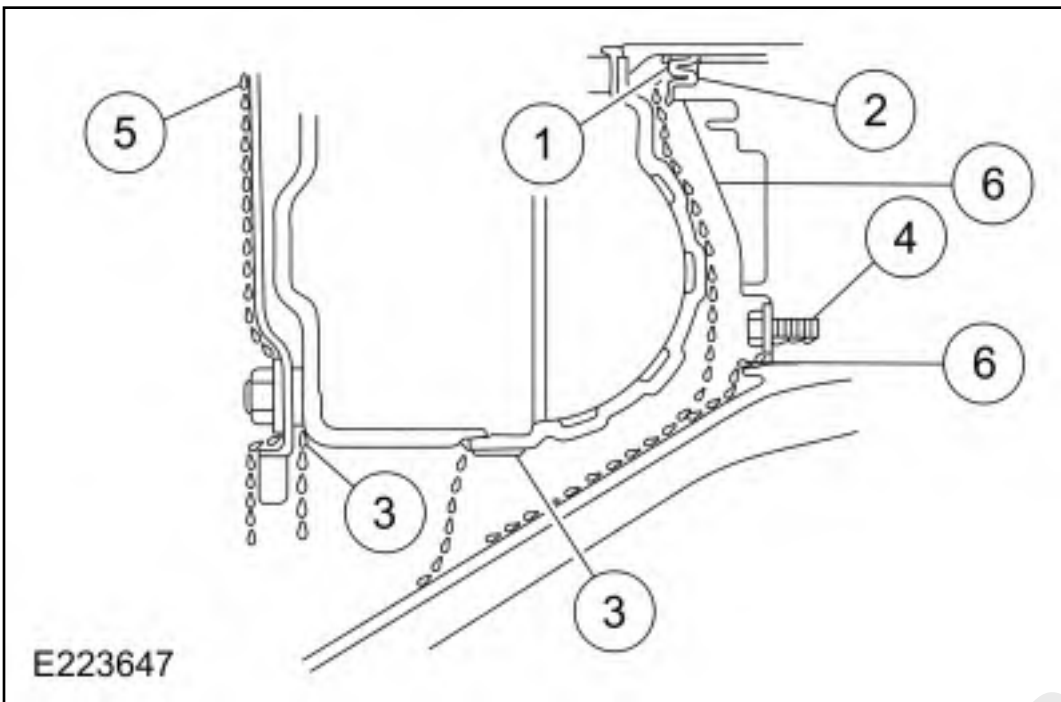
Shift	Speed
1-2	15 mph (24 km/h)
2-3	20 mph (32 km/h)
3-4	27 mph (43 km/h)
4-5	32 mph (51 km/h)
5-6	37 mph (60 km/h)
6-7	42 mph (68 km/h)
7-8	48 mph (77 km/h)
8-9	52 mph (84 km/h)
9-10	60 mph (97 km/h)

Leakage Inspection

Leak Check Test

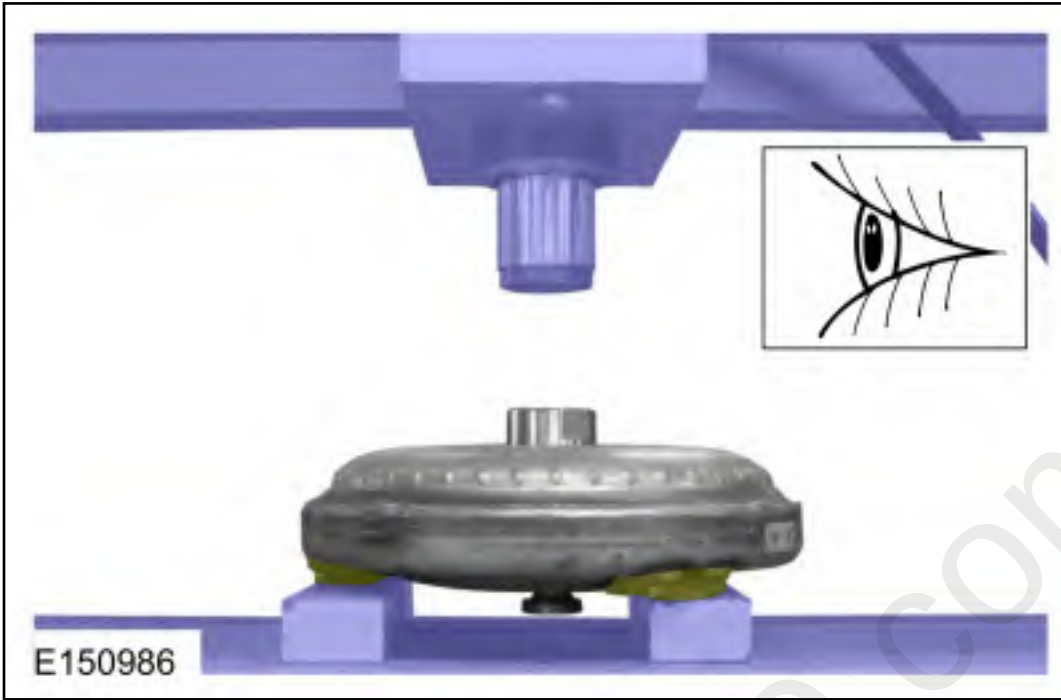
1. With the vehicle in NEUTRAL, position the vehicle on a hoist.
REFER to: Jacking and Lifting (100-02) .
2. Inspect the gasket and sealing areas for evidence of leakage.
3. Trace the transmission fluid leak to the highest point.
4. Clean area of suspected leak.
5. Lower vehicle.
6. Remove the transmission fluid fill plug or fluid level indicator.
7. Add leak detection dye to the transmission fluid. Use 1 fl oz (30 ml) of dye solution for every 4 qt (3.8 L) of transmission fluid.
8. With the transmission fluid at normal operating temperature, road test the vehicle for at least 1 mile with at least 1 application of the TCC.
9. With the vehicle in NEUTRAL, position the vehicle on a hoist.
REFER to: Jacking and Lifting (100-02) .
10. If the source of the leak is obvious, repair as required.
11. After the repair, clean the affected area.

Leakage From Torque Converter Housing

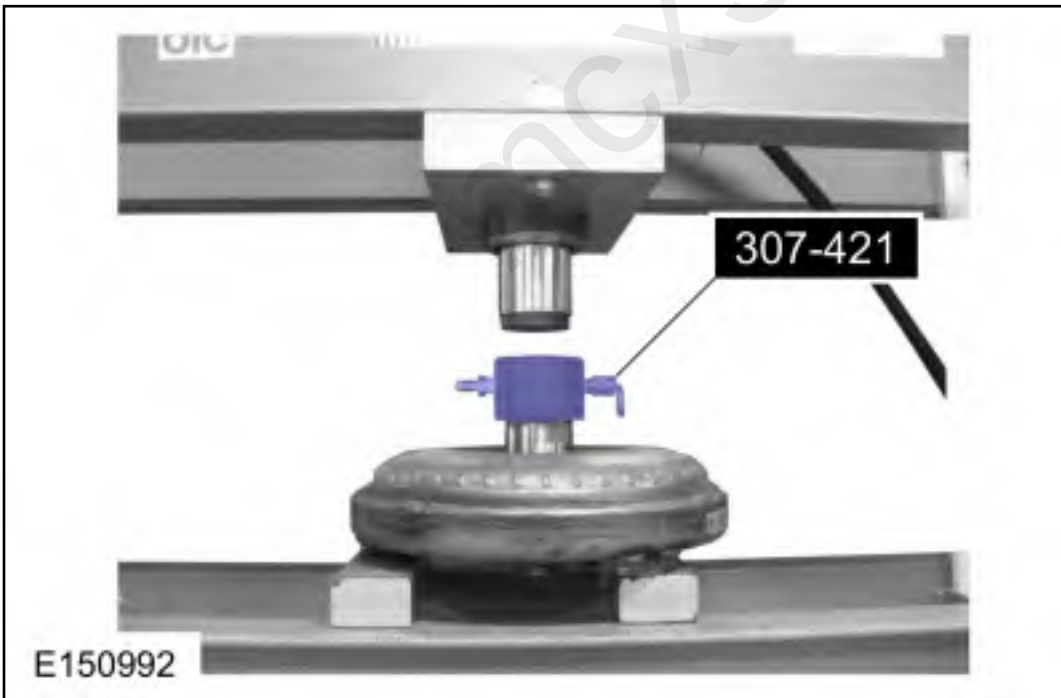


12. Leaks from the torque converter housing can originate from several locations. The paths which the transmission fluid takes to reach the bottom of the torque converter housing is shown in the illustration. The following 6 steps correspond with the numbers in the illustration.
 1. Transmission fluid leaking by the converter hub seal lip will tend to move along the drive hub and onto the back of the torque converter. Except in the case of a total seal failure, transmission fluid leakage by the lip of the seal will be deposited on the inside of the torque converter housing only, near the outside diameter of the housing.
 2. Transmission fluid leakage by the outside diameter of the torque converter impeller hub seal and the case will follow the same path that leaks by the inside diameter of the converter hub seal follow.
 3. Transmission fluid leakage from the converter cover weld or the converter-to-flexplate stud weld will appear at outside diameter of torque converter on the back face of the flexplate and in the converter housing only near the flexplate. If a converter-to-flexplate lug, lug weld or converter cover weld leak is suspected, remove the converter and pressure check.
 4. Transmission fluid leakage from the bolts inside the converter housing will flow down the back of the torque converter housing. Leakage may be from loose or missing bolts.
 5. Engine oil leaks from the rear main oil.
 6. Transmission fluid leak from front support cover and seal assembly.
13. Remove the torque converter.
14. Using a black light, observe the torque converter housing. Inspect for evidence of dye from the pump bolts, front support cover and seal assembly, and torque converter hub seal. Repair as required.

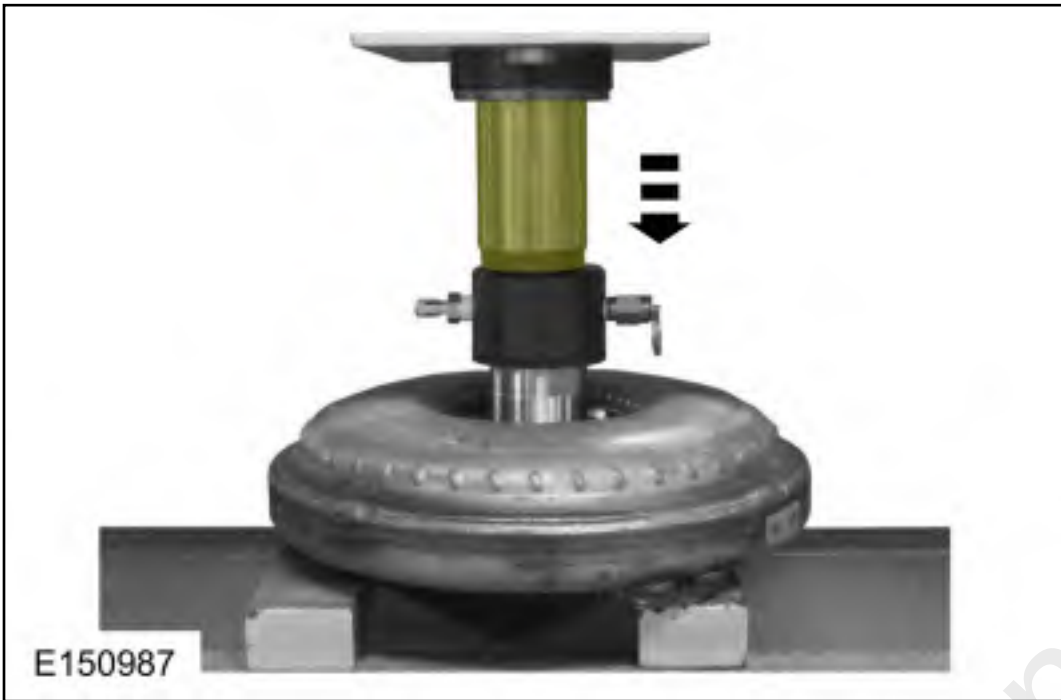
15. If the source of the leak is not evident, continue with this procedure to leak test the torque converter.
16. Place the torque converter in an arbor press. Support the torque converter on the mounting pads.



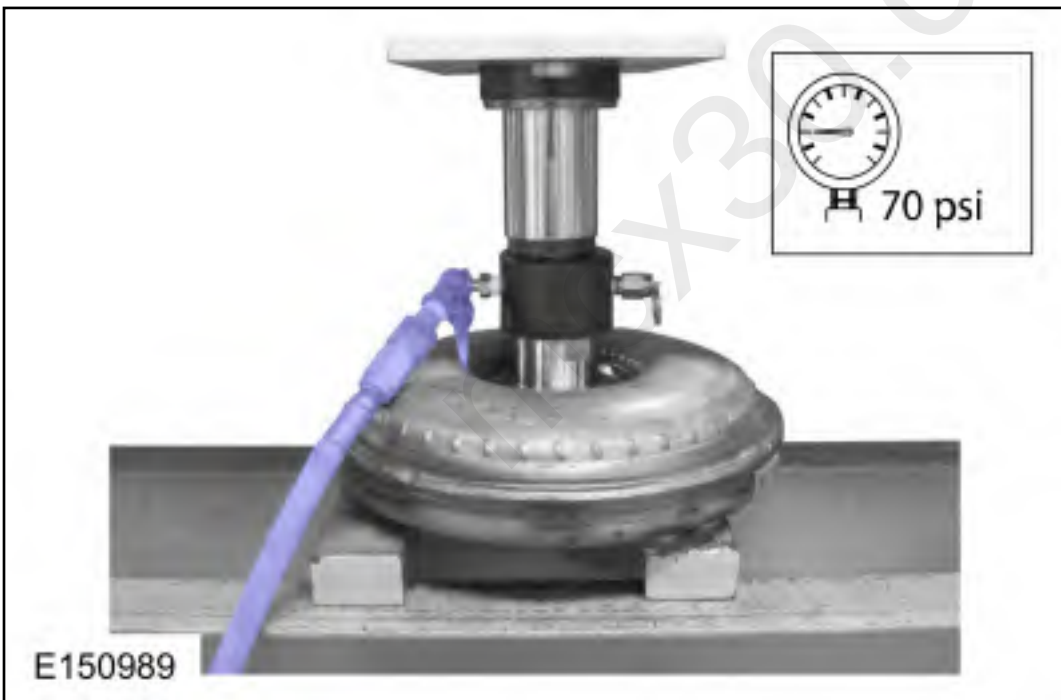
17. Install the torque converter leak tester (307-421) into the torque converter hub.



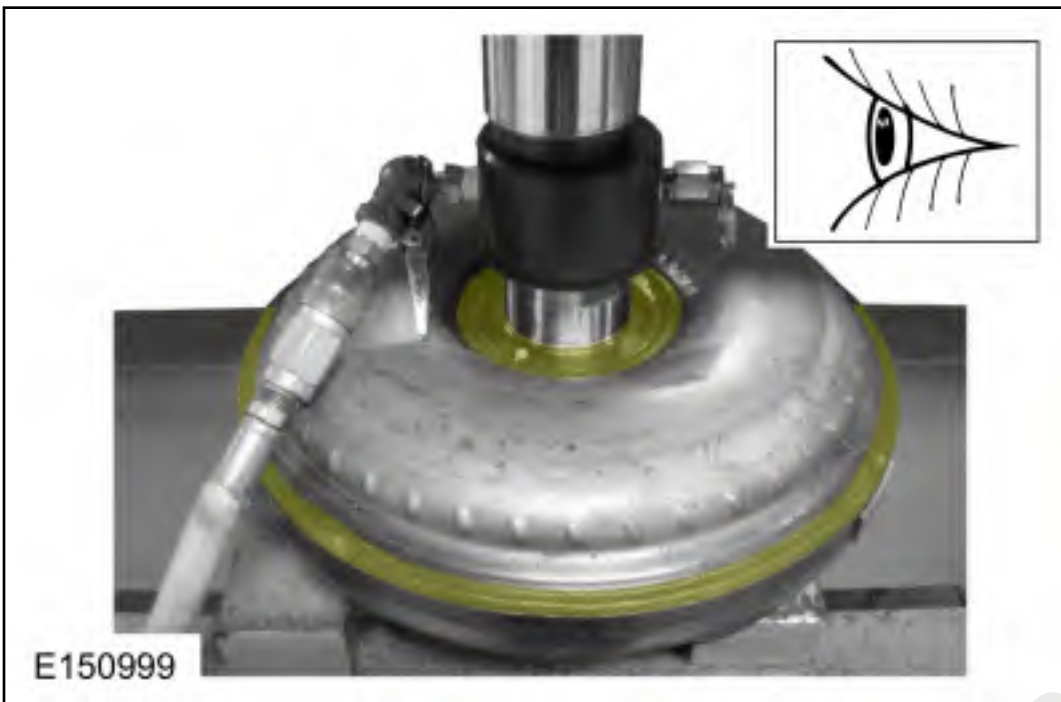
18. Secure the press. Apply enough force from the press to seal the torque converter leak tester (307-421) into the torque converter hub.



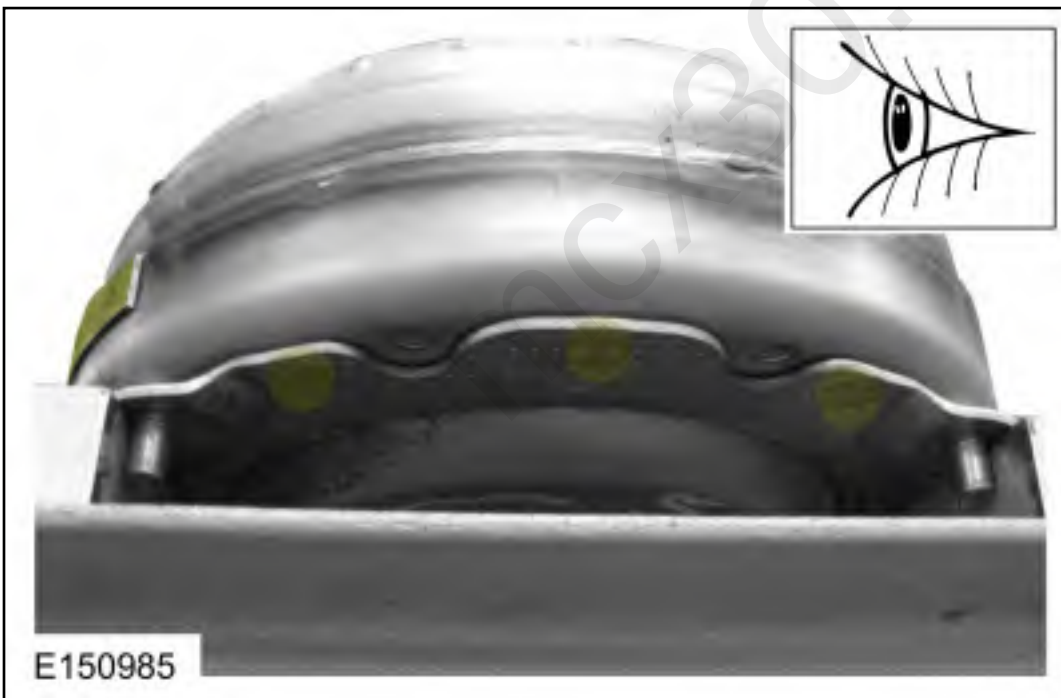
19. Connect a compressed air supply to the torque converter leak tester (307-421).



20. Inspect for leaks at the torque converter hub weld and seams with air pressure applied to the valve. A soap bubble solution can be applied around those areas to aid in the diagnosis. If any leaks are present, install a new torque converter.



21. Inspect for leaks at the stud or mounting pad and balance weight welds. A soap bubble solution can be applied around those areas to aid in the diagnosis. If any leaks are present, install a new torque converter.



22. After leaks are repaired, clean the remaining transmission fluid dye from serviced areas.

A Clutch

Symptom Chart

A Clutch Assembly

A Clutch

For A clutch operation,
REFER to: [A Clutch](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80,
Description and Operation).

A Clutch

Condition	Possible Sources	Action
A clutch does not apply	SSA is mechanically stuck OFF	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A Clutch regulator valve stuck OFF	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
A CL CONTR, hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
A clutch hub	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
A clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

	A clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
A clutch always applied	SSA mechanically stuck	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	A Clutch regulator valve or CL A latch valve stuck ON	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	A CL CONTR, hydraulic circuit cross leaks	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

	A clutch hub, clutch and planetary carrier, No. 4 ring gear	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	A clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	A clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
A clutch delayed/soft/slipping apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	Low line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSA mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

A Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
A CL CONTR, hydraulic circuits blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
A clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
A clutch piston seals	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

A clutch harsh apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	High line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSA mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
A Clutch regulator valve sticking		DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
A CL CONTR hydraulic circuit blocked/leaking		DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

	A clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/ blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	A clutch piston return springs	DISASSEMBLE and INSPECT the transmission passages for debris/ blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

C Clutch

Symptom Chart

C Clutch

For C clutch operation,
REFER to: [C Clutch](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80,
Description and Operation).

C Clutch

Condition	Possible Sources	Action
C clutch does not apply	SSC is mechanically stuck OFF	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	C Clutch regulator valve stuck OFF	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission

	Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
C CL CONTR, hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
C clutch hub	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
C clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
C clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

C clutch always applied	SSC mechanically stuck	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	C Clutch regulator valve or CL C latch valve stuck ON	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	C CL CONTR, hydraulic circuit cross leaks	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	C clutch hub, clutch and planetary carrier, No.4 ring gear	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

	C clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	C clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
C clutch delayed/soft/slipping apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	Low line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSC mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

C Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the transmission strategy download. REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
C CL CONTR, hydraulic circuits blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
C clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
C clutch piston seals	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

C clutch harsh apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	High line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSC mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	C Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

C CL CONTR hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
C clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
C clutch piston return springs	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

D Clutch

Symptom Chart

D Clutch

For D clutch operation,
REFER to: [D Clutch](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80,
Description and Operation).

D Clutch

Condition	Possible Sources	Action
D clutch does not apply	SSD is mechanically stuck OFF	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	D Clutch regulator valve stuck OFF	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission

	Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
D CL CONTR, hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
D clutch hub	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
D clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
D clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

D clutch always applied	SSD mechanically stuck	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	D Clutch regulator valve or CL D latch valve stuck ON	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	D CL CONTR, hydraulic circuit cross leaks	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	D clutch hub, clutch and planetary carrier, No.4 ring gear	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

	D clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	D clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
D clutch delayed/soft/slipping apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	Low line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSD mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

D Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
Gain control valve stuck in default position.	DISASSEMBLE, CLEAN and INSPECT the valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
D CL CONTR, D CL-FB2 hydraulic circuits blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

	D clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/ blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	D clutch piston seals	DISASSEMBLE and INSPECT the transmission passages for debris/ blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
D clutch harsh apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	High line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSD mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

D Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
Gain control valve stuck in applied position	DISASSEMBLE, CLEAN and INSPECT the valve. If bore or valve is damaged, INSTALL a new main control valve body. PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
D CL CONTR, D CL-FB2 hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

	D clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	D clutch piston return springs	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

E Clutch

Symptom Chart

E Clutch

For E clutch operation,
REFER to: [E Clutch](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80,
Description and Operation).

E Clutch

Condition	Possible Sources	Action
E clutch does not apply	SSE is mechanically stuck OFF	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	E Clutch regulator valve stuck OFF	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission

	Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
E CL CONTR, hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
E clutch hub	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
E clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
E clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

E clutch always applied	SSE mechanically stuck	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	E Clutch regulator valve or CL E latch valve stuck ON	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	E CL CONTR, hydraulic circuit cross leaks	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	E clutch hub, clutch and planetary carrier, No. 4 ring gear	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

	E clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	E clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
E clutch delayed/soft/slipping apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	Low line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSE mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
Gain control valve stuck in default position.	DISASSEMBLE, CLEAN and INSPECT the valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
E CL CONTR, E CL-FB2 hydraulic circuits blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

	E clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/ blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	E clutch piston seals	DISASSEMBLE and INSPECT the transmission passages for debris/ blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
E clutch harsh apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	High line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSE mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

E Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged or worn, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
Gain control valve stuck in applied position	DISASSEMBLE, CLEAN and INSPECT the valve. If bore or valve is damaged, INSTALL a new main control valve body. PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
E CL CONTR, E CL-FB2 hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General

		Procedures).
	E clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/ blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	E clutch piston return springs	DISASSEMBLE and INSPECT the transmission passages for debris/ blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

F Clutch

Principles of Operation

Symptom Chart

F Clutch

For F clutch operation,
REFER to: [F Clutch](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80,
Description and Operation).

F Clutch

Condition	Possible Sources	Action
F clutch does not apply	SSF is mechanically stuck OFF	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

F Clutch regulator valve stuck OFF	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
F CL CONTR, hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
F clutch hub	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
F clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

	F clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
F clutch always applied	SSF mechanically stuck	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	F Clutch regulator valve or CL F latch valve stuck ON	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	F CL CONTR, hydraulic circuit cross leaks	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

	F clutch hub, clutch and planetary carrier, No.4 ring gear	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	F clutch friction plates	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	F clutch piston seals	INSPECT components wear and damage. CLEAN and/or INSTALL new components necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
F clutch delayed/soft/slipping apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
	Low line pressure	PERFORM the line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSF mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

F Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
F CL CONTR, hydraulic circuits blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
F clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
F clutch piston seals	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

F clutch harsh apply	Incorrect transmission strategy programmed into PCM/ TCM.	PERFORM the Transmission Strategy Download, REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
	High line pressure	PERFORM line pressure test. REFER to: Special Testing Procedures (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Diagnosis and Testing).
	SSF mechanically sticking	INSTALL a new solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	F Clutch regulator valve sticking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

F CL CONTR hydraulic circuit blocked/leaking	DISASSEMBLE and INSPECT the main control valve body and separator plate passages for debris/blockage. CLEAN as necessary. REFER to: Main Control Valve Body (307-01) . REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
F clutch friction plates	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
F clutch piston return springs	DISASSEMBLE and INSPECT the transmission passages for debris/blockage. CLEAN as necessary. REFER to: Transmission (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

Low One-Way Clutch Assembly

Low One Way Clutch

For low one way clutch operation,
REFER to: [Low One-Way Clutch Assembly](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Description and Operation).

NOTICE: Do not clean with water or with water-based solvents. Damage to the component may occur.

Remove and inspect the low one way clutch for cracks and damaged splines. The splined section should lock in the direction of the number 1 arrow and rotate freely and smoothly when rotated in the direction of the number 2 arrow. Check for burned or excessively worn surfaces. If any damage is found or the clutch does not rotate or lock, install a new low one-way clutch and front support and race assembly.



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Parameter Identification (PID) Chart

Diagnostic PID Chart

PID Acronym	PID Name	Description
APP	APP sensor	APP
APP1	APP sensor 1	APP 1
AST	Time Since Start	Time (in seconds) since the vehicle was started
CLRDIST	Distance since DTC cleared	Distance driven since PCM DTCs were cleared
ECT TCM	ECT TCM	Engine coolant temperature data provided to the TCM
ENGLOAD	Engine Load	Engine load calculated by PCM
ETC_ACT	Electronic Throttle Control Actual	Electronic Throttle Control Actual calculated by PCM
FOOT_BRAKE	Foot Brake - Foot brake state used by strategy	Foot brake state used by strategy calculated by PCM
GEAR_CMD	Gear Commanded by Module	PCM commanded transmission gear
GEAR_ENGAGED	Transmission Gear Engaged	Transmission Gear Engaged
GEAR_OSC#	Gear Commanded by Output State Control	Output state control commanded gear
ISS_A_QF	Transmission Input Shaft Speed Sensor -A- Quality Factor	Transmission Input Shaft Speed Sensor -A- Quality Factor
ISS_A_RAW	Intermediate Speed -A- Raw	Intermediate Speed -A- Raw
ISS_B_RAW	Intermediate Shaft Speed -B- Raw	Intermediate Shaft Speed -B- Raw

ISS_B_QF	Transmission Input Shaft Speed Sensor -B- Quality Factor	Transmission Input Shaft Speed Sensor -B- Quality Factor
LINEDSD#	Line Pressure Control Desired	Commanded line pressure
MIL_DIS	The distance travelled since the (MIL) was activated	The distance travelled since the MIL was activated
OSS_QF	Transmission Output Shaft Speed Sensor Quality Factor	Fault status for the OSS sensor
OSS_RAW	Output Shaft Speed - Raw	Actual speed of the OSS sensor (rpm)
PCA	Pressure Control Solenoid A	LPC
PCA AMP#	Pressure Control Solenoid A	LPC
PCA_F	Pressure Control Solenoid A Status	LPC
PWRT_FUNCMON_A	Powertrain Secondary Monitor/ Performance Fault A	Powertrain Secondary Monitor/ Performance Fault A
PWRT_FUNCMON_B	Powertrain Secondary Monitor/ Performance Fault A	Powertrain Secondary Monitor/ Performance Fault A
REALTIME	Total time (ECU) has been active	ECU Time running
RPM_TCM	Engine Revolutions Per Minute	Engine rpm input to TCM
SHFT_DROP	Shift RPM Drop in Input Shaft Speed Below Expected	Shift rpm drop in input shaft speed below expected
SHFT_FLRE	Shift RPM Rise in Input Shaft Speed Above Expected	Shift rpm rise in input shaft speed above expected
SHFT_ID	Shift Identification of Shift (PID)s Lag, Time, Flare and Drop	Shift identification of shift PIDs lag, time, flare and drop
SHFT_LAG	Shift Time Elapsed From 10% to 90% of Complete	Actual time during shift between 10% and 90% complete
SHFT_TIME	Shift Time Elapsed From Commanded to 10% Complete	Shift time 0% to 10% complete
SNOWPLW_CFG	Snowplow as configured in the (PCM).	Snowplow as configured in the (PCM).
SS_ABS_TC_IN	(Stop-Start) Antilock Brake And Traction Control Summary	(Stop-Start) Antilock Brake And Traction Control Summary

SS_CONTROL_STATE	(Stop-Start) Main Control State Machine	(Stop-Start) Main Control State Machine
SS_CTRL_CRANK_CMD	(Stop-Start) Main Control Crank Command And Hardware Feedback	(Stop-Start) Main Control Crank Command And Hardware Feedback
SS_HUMAN_INPUT	(Stop-Start) Monitor Human Input Summary Including Accelerator, Brake, Clutch, Shift Input, Or Cruise Control	(Stop-Start) Monitor Human Input Summary Including Accelerator, Brake, Clutch, Shift Input, Or Cruise Control
SS_MON_STATE_TIMER	(Stop-Start) Monitor State Machine Transition Timer	(Stop-Start) Monitor State Machine Transition Timer
SS_MONITOR_STATE	(Stop-Start) Monitor State Machine	(Stop-Start) Monitor State Machine
SS_SHIFTER_IN	(Stop-Start) Shift Lever Position Input	(Stop-Start) Vehicle Speed and Powertrain Shaft Speeds Summary
SS_SPEED_INPUT	(Stop-Start) Vehicle Speed and Powertrain Shaft Speeds Summary	(Stop-Start) Vehicle Speed and Powertrain Shaft Speeds Summary
SS_STRTR_HEAT	(Start-Stop) Starter Motor Heat State	(Start-Stop) Starter Motor Heat State
SSPCA	Shift Solenoid Pressure Control A	Commanded pressure for the Shift Solenoid Pressure Control A (SSPCA)/CB1234
SSA_AMP #	Shift Solenoid Pressure Control A	Commanded current for the Shift Solenoid Pressure Control A (SSPCA)/CB1234
SSPCA_F	(SSPCA) Status	Fault status for the Shift Solenoid Pressure Control A (SSPCA)/CB1234
SSPCB	Shift Solenoid Pressure Control B	Commanded pressure for the Shift Solenoid Pressure Control B (SSPCB)/C35R
SSB_AMP	Shift Solenoid Pressure Control B	Commanded current for the Shift Solenoid Pressure Control B (SSPCB)/C35R
SSPCB_F	(SSPCB) Status	Fault status for the Shift Solenoid Pressure Control B (SSPCB)/C35R

SSPCC	Shift Solenoid Pressure Control C	Commanded pressure for the Shift Solenoid Pressure Control C (SSPCC)/CB26
SSC_AMP	Shift Solenoid Pressure Control C	Commanded current for the Shift Solenoid Pressure Control C (SSPCC)/CB26
SSPCC_F	(SSPCC) Status	Fault status for the Shift Solenoid Pressure Control C (SSPCC)/CB26
SSPCD	Shift Solenoid Pressure Control D	Commanded pressure for the Shift Solenoid Pressure Control D (SSPCD)/CBLR, C456
SSD_AMP	Shift Solenoid Pressure Control D	Commanded current for the Shift Solenoid Pressure Control D (SSPCD)/CBLR, C456
SSPCD_F	(SSPCD) Status	Fault status for the Shift Solenoid Pressure Control D (SSPCD)/CBLR, C456
SSPCE	Shift Solenoid Pressure Control E	Commanded pressure for the Shift Solenoid Pressure Control E (SSPCE)/CBLR, C456
SSE_AMP	Shift Solenoid Pressure Control E	Commanded current for the Shift Solenoid Pressure Control E (SSPCE)/CBLR, C456
SSPCE_F	(SSPCE) Status	Fault status for the Shift Solenoid Pressure Control E (SSPCE)/CBLR, C456
SST_D	SelectShift™ Transmission - Down Switch Input	SelectShift™ transmission-down switch input
SST_U	SelectShift™ Transmission - Up Switch Input	SelectShift™ transmission-up switch input
TCC AMP	Converter Pressure Control	Commanded current for the TCC
TC_SLIPACT	Torque Converter Slip Actual	Actual difference between engine speed and turbine speed, measured in rpm

TC_SLIPDSD	Torque Converter Slip Desired	PCM commanded difference between engine speed and turbine speed, measured in rpm
TCC	Torque Converter Clutch Solenoid	Commanded pressure for the TCC
TCC_F	Torque Converter Clutch Pressure Control Fault	Fault status for the TCC
TCC_OSC	Output State Control of Torque Converter	Output state control commanded pressure to the TCC
TCC_RAT	Torque Slip Ratio	Actual speed ratio of torque converter (1.0 = fully engaged)
TCS_DEPRES	Transmission Control Switch Pressed	TCS status
TCS_STATE	Transmission Control Switch Requested State	TCS status
TFT	Transmission Fluid Temperature	TFT
TFT_F	Transmission Fluid Temperature Status	Fault status for TFT sensor
TFTV	Transmission Fluid Temperature	TFT voltage
TR	Transmission Range	TR
TR_CRANK	Transmission Range Input Allowing Engine Start	TR
TR_F	Transmission Range Status	Fault status for TR sensor
TRAN_RAT	Gear Ratio Measured	Actual transmission gear ratio
TRANS_VOLT_A	Transmission Supply Voltage Control State	Transmission supply voltage
TRO_N_F	Neutral Output Status	Transmission neutral output status
TRO_P_F	Park Output Status	Transmission park output status
TSS_F	Turbine Shaft Speed Reliable	Fault status of the TSS sensor (rpm)
TSS_SRC	Unfiltered Turbine Shaft Speed	Actual speed of the TSS sensor (rpm)
VPWR_PCM	Module supply voltage	PCM supply voltage
VSS	Vehicle Speed	Vehicle Speed

VSS_HR	Vehicle Speed High Resolution	Vehicle Speed High Resolution
WARMUPS	Number Of Warm-ups Since (DTCs) Cleared	Number Of Warm-ups Since (DTCs) Cleared counter

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Torque Converter Clutch (TCC)

Torque Converter Clutch (TCC)

For torque converter operation,
REFER to: [Torque Converter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Description and Operation).

Condition	Possible Sources	Action
TCC does not apply	TCC solenoid mechanically stuck OFF	INSTALL a new TCC solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	TCC Regulator Valve stuck OFF	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	CONV FD, MDA-TCC, APPLY, REL hydraulic circuit blocked or leaking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

	TCC friction material worn or damaged	INSTALL a new TCC. REFER to: Transmission - 2.7L EcoBoost (238kW/324PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	TCC solenoid dampner missing or damaged.	DISASSEMBLE, CLEAN and INSPECT the TCC solenoid dampner. If dampner is missing or damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	Converter feed blow-off valve missing.	DISASSEMBLE, CLEAN and INSPECT the converter feed blow-off valve, if missing INSTALL a new main control. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
TCC always applied/ stalls vehicle	TCC solenoid mechanically stuck ON, TCC regulator valve spring broken or spring stuck in the compressed position.	INSTALL a new TCC solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation). TCC solenoid mechanically stuck OFF REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures). If TCC regulator valve spring is broken, stuck or missing, INSTALL a new main control. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul). REFER to: Main Control Valve Body

		(307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	TCC Regulator Valve stuck ON	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	TCC friction material worn or damaged	INSTALL a new TCC. REFER to: Transmission - 2.7L EcoBoost (238kW/324PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
	CONV FD, MDA-TCC, APPLY, REL hydraulic circuit blocked or leaking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul). REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
TCC cycles, shudders or chatters	Incorrect transmission strategy programmed into the TCM	PERFORM the Transmission Strategy Download, REFER to: Transmission Strategy Download (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

TCC solenoid mechanically sticking	INSTALL a new TCC solenoid. REFER to: Shift Solenoids (SS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
TCC Regulator Valve stuck ON	DISASSEMBLE, CLEAN and INSPECT the regulator valve. If bore or valve is damaged, INSTALL a new main control valve body. REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
CONV FD, MDA-TCC, APPLY, REL hydraulic circuit blocked or leaking	DISASSEMBLE, CLEAN and INSPECT the valves. If bore or valve is damaged, INSTALL a new main control.REFER to: Main Control Valve Body (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
TCC friction material worn or damaged	INSTALL a new TCC. REFER to: Transmission - 2.7L EcoBoost (238kW/324PS) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Adaptive Learning Drive Cycle

Activation

NOTE: Perform the adaptive learning drive cycle on a level road surface.

1. Record then clear the DTCs (Diagnostic Trouble Codes).
2. Drive the vehicle until the engine and transmission reach normal operating temperature.
3. Accelerate from a stop with light throttle (15%) ensuring that upshifts 1st through 8th occur at engine speeds between 1300-1600 rpm.
4. Continue to accelerate (may apply slightly more throttle after 7-8 upshift at 32-38 mph (51-61 km/h) until you achieve 55 mph (88 km/h) and the 8-9 and 9-10 shifts complete.
5. Brake very gently to a complete stop and hold foot on brake for five (5) seconds.
6. Shift the transmission to Neutral. Wait 1 second.
7. Shift the transmission to Reverse. Wait 2 seconds.
8. Shift the transmission to Neutral. Wait 1 second.
9. Shift the transmission to Drive. Wait 2 seconds.
10. Repeat Steps 3 through 9 six additional times.

Transmission Identification

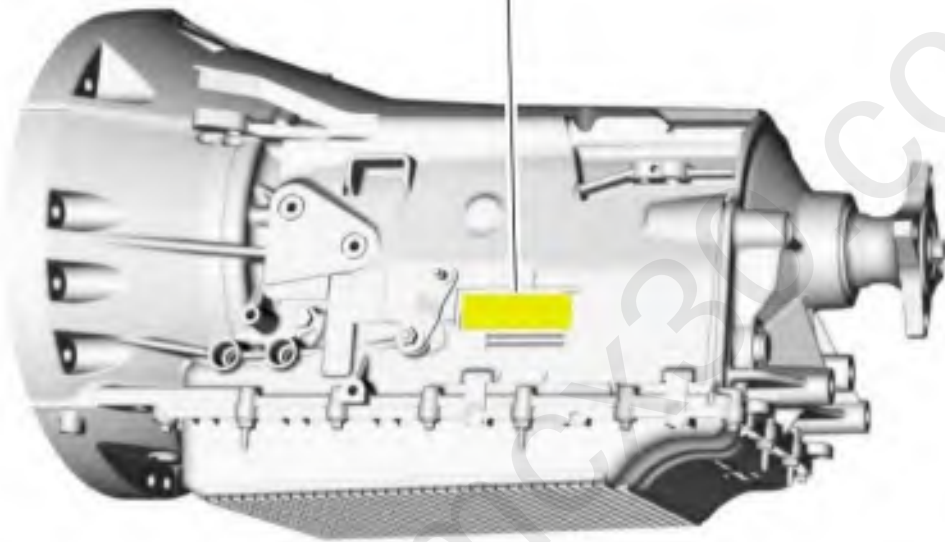
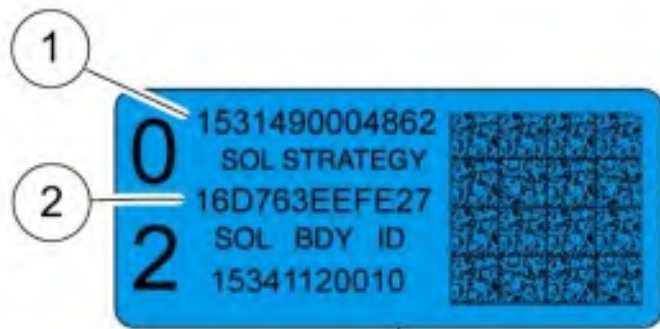
Check

1. Using the scan tool, select Powertrain, Transmission and Transmission Characterization / Solenoid IDN from the toolbox icon and follow the instructions displayed on the scan tool. The Transmission Characterization / Solenoid IDN screen displays solenoid body identification information:
 - Solenoid body identification is a 12-digit number
 - Solenoid body strategy is a 13-digit number. If the solenoid body strategy field is blank, the module contains a partial transmission solenoid body strategy. This is due to a corrupt or missing file at the time the programmable parameters were completed.
2. **NOTE:** *The 13-digit solenoid body strategy number consists of only numbers. Letters are not used.*

Compare the solenoid body identification and strategy to the solenoid body identification tag located on the left side of the transmission case.

NOTE:

- **Original Solenoid Body Service Tag**
 1. 13 - digit solenoid body strategy
 2. 12 - digit solenoid body identification



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4. If the solenoid body identification and strategy displayed on the scan tool match the solenoid body identification tag or replacement tag, then the solenoid body identification and strategy are correct for this transmission and a solenoid body strategy data download is not required. If the solenoid body identification tag or replacement tag is missing or damaged so it is not readable or does not match the identification or strategy displayed on the scan tool, remove the transmission fluid pan and filter and locate the 13-digit solenoid body strategy etched on the main control casting.

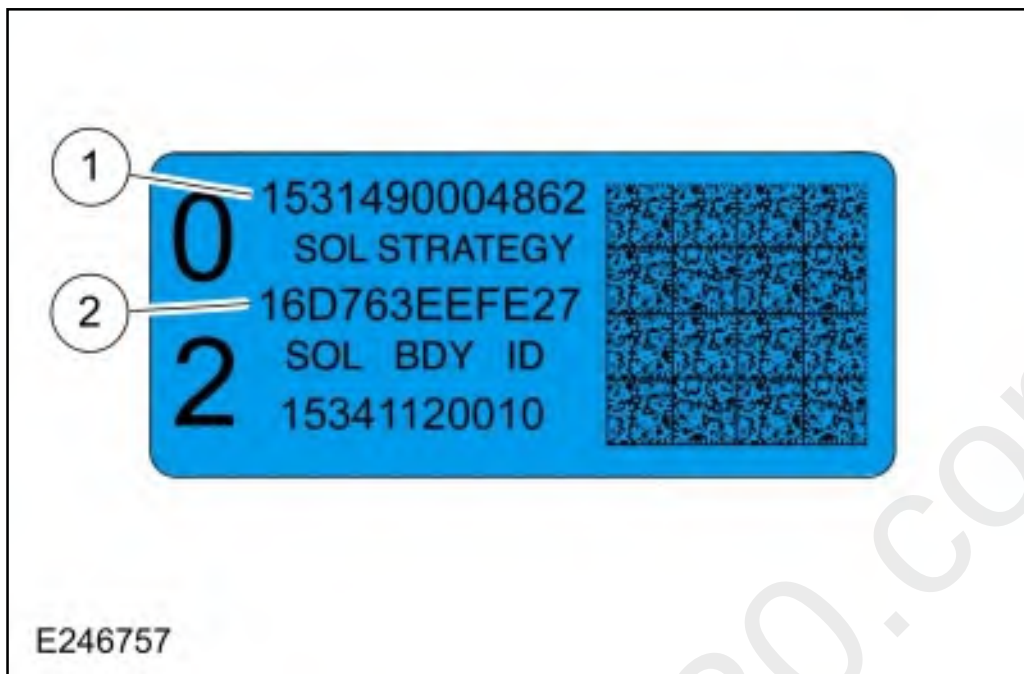
Refer to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

NOTE:

- ***Replacement Solenoid Body Service Tag***

1. 13 - digit solenoid body strategy
2. 12 - digit solenoid body identification



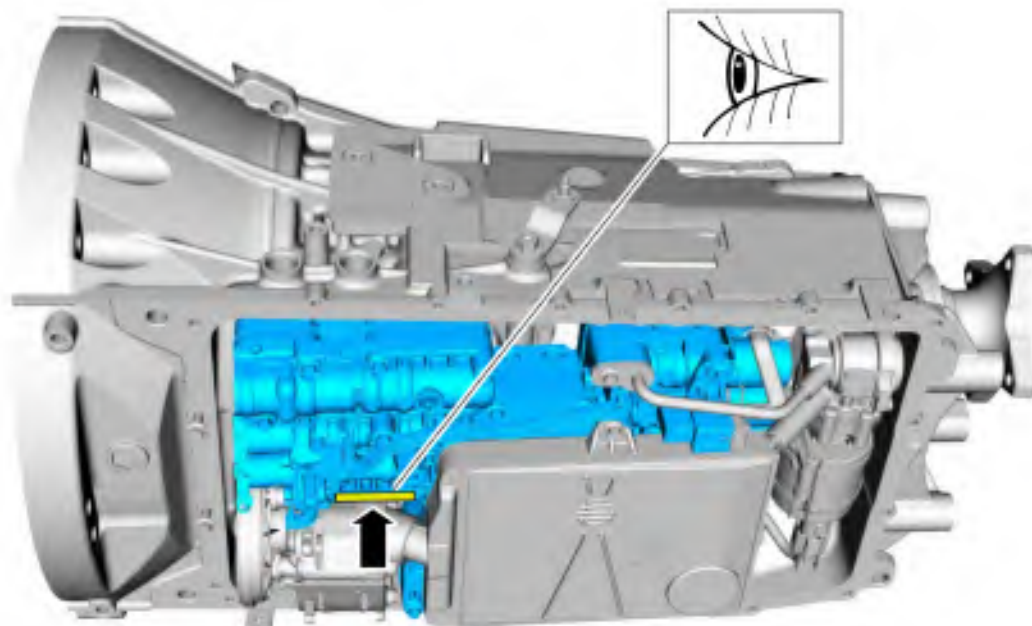
NOTE:

- ***Main Control Solenoid Body Strategy***

6. **NOTICE:** The 13-digit solenoid body strategy number displayed on the scan tool must match the solenoid body strategy number etched on the main control. If the numbers do not match, damage to the transmission or driveability concerns can occur.

NOTICE: If the new main control was not supplied with a replacement solenoid strategy identification tag, **DO NOT INSTALL** the main control as all required programming information is missing.

Compare the solenoid body strategy identification etched on the main control to the solenoid strategy identification tag on the transmission case. If the solenoid body strategy identification etched on the main control does not match the solenoid strategy identification tag then a solenoid body strategy data download is required. If the solenoid body strategy etched on the main control does match the solenoid strategy identification tag on the transmission case but does not match the solenoid body identification and strategy displayed on the scan tool, then a solenoid body strategy data download is also required.



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Transmission Fluid Exchange

Special Tool(s) / General Equipment

Fluid Exchanger

Materials

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

Activation

NOTICE: Use transmission fluid specific for this transmission. Do not use any supplemental transmission fluid additives or cleaning agents. The use of these products can cause internal transmission components to fail, which will affect the operation of the transmission.

1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. Connect the Fluid Exchanger to the transmission fluid cooler tube after the transmission fluid cooler on the return tube. This helps remove any foreign material trapped in the transmission fluid coolers.
Use the General Equipment: Fluid Exchanger
3. Perform the transmission fluid exchange using the Fluid Exchanger.
 - Follow the manufacturer's instructions included with the machine.
Use the General Equipment: Fluid Exchanger

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

- Refer here for current material specs

[Material](#)

4. Once the transmission fluid exchange is completed, disconnect the Fluid Exchanger. Reconnect any disconnected transmission fluid cooler tubes.

Use the General Equipment: Fluid Exchanger

5. Check the transmission fluid level.

Refer to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Transmission Fluid Level Check

Inspection

NOTICE: The vehicle should not be driven if the transmission fluid level is low. Internal failure could result.

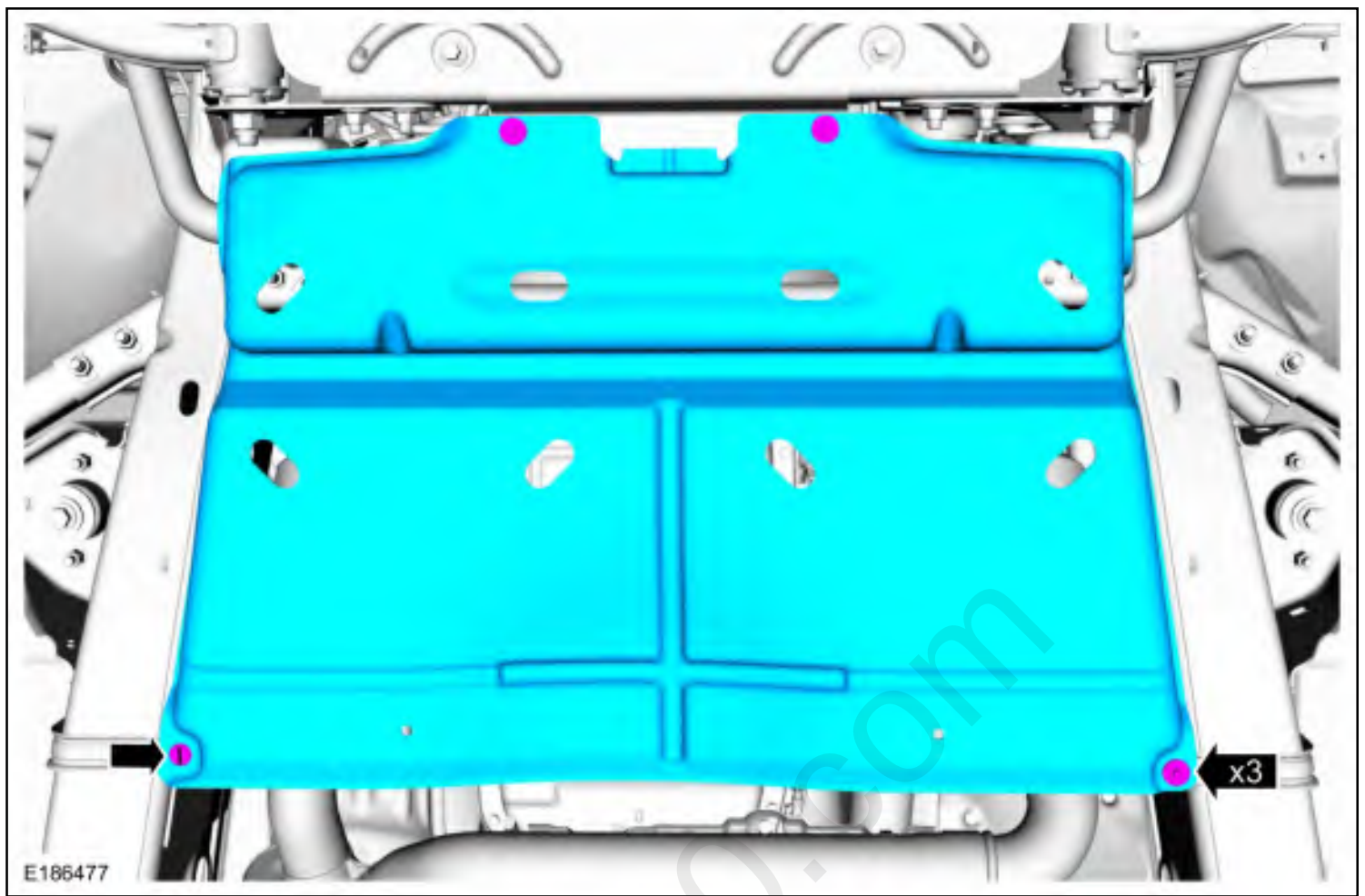
NOTE: If the vehicle has been operated for an extended period at high highway speeds, in city traffic, during hot weather or while pulling a trailer, the transmission fluid must cool down to obtain an accurate reading.

NOTE: Do not overfill the transmission. The transmission fluid level must be at the center of the "B" area on the transmission fluid level indicator.

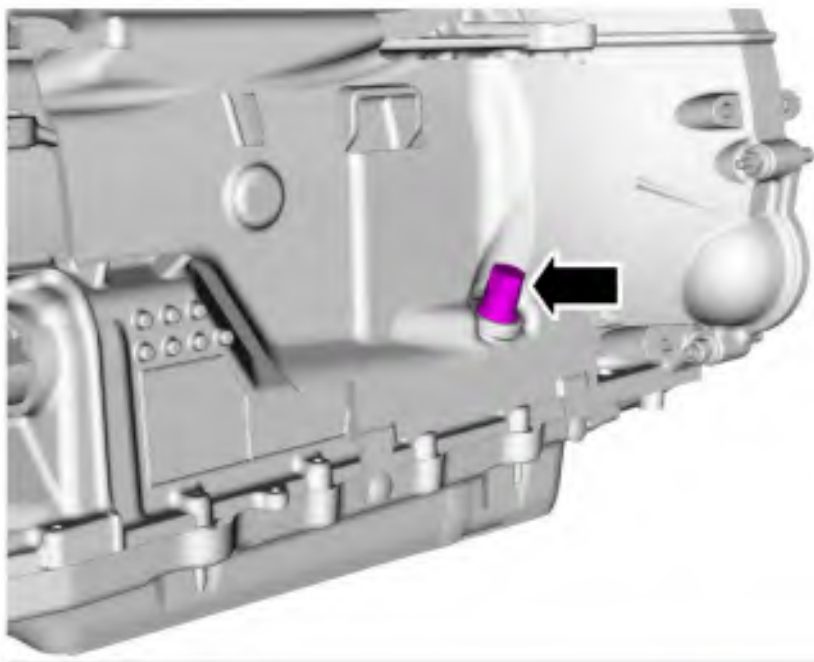
NOTE: If a new transmission fluid cooler or new fluid cooler tubes have been installed, drive the vehicle to warm the transmission fluid to 96°C-101°C (206°F-215°F) in order to purge the air from the transmission fluid cooling system.

1. Connect the diagnostic scan tool and position the vehicle on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. With the engine running, place the transmission selector in each gear position, holding approximately 5 seconds in each position. Place the transmission selector in PARK.
3. **NOTICE:** Support the engine rear undershield while the fasteners are being removed and installed. Do not support the engine rear undershield by any less than the total number of fasteners at any time.

Holding the shield in its correct position, remove the fasteners and the engine rear undershield.



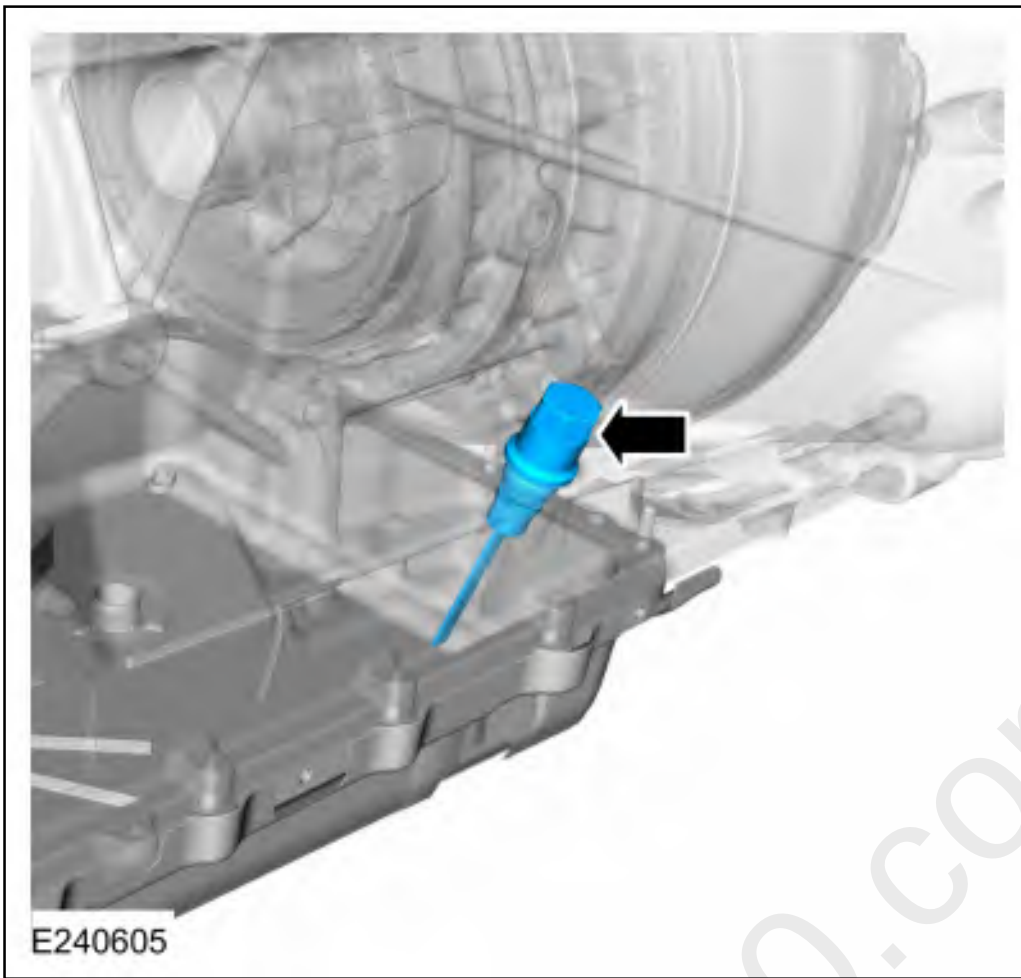
4. Remove the transmission fluid fill plug and remove the transmission fluid level indicator from the plug.



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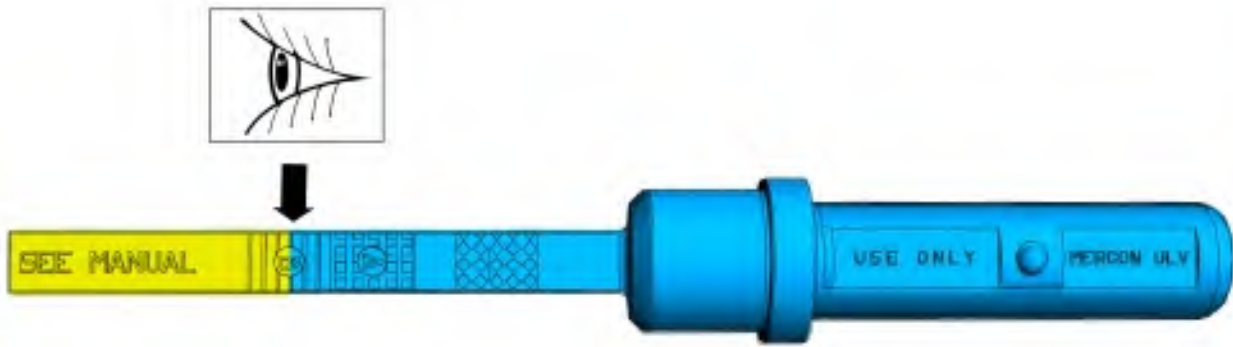


5. Check the transmission fluid level using the transmission fluid level indicator.



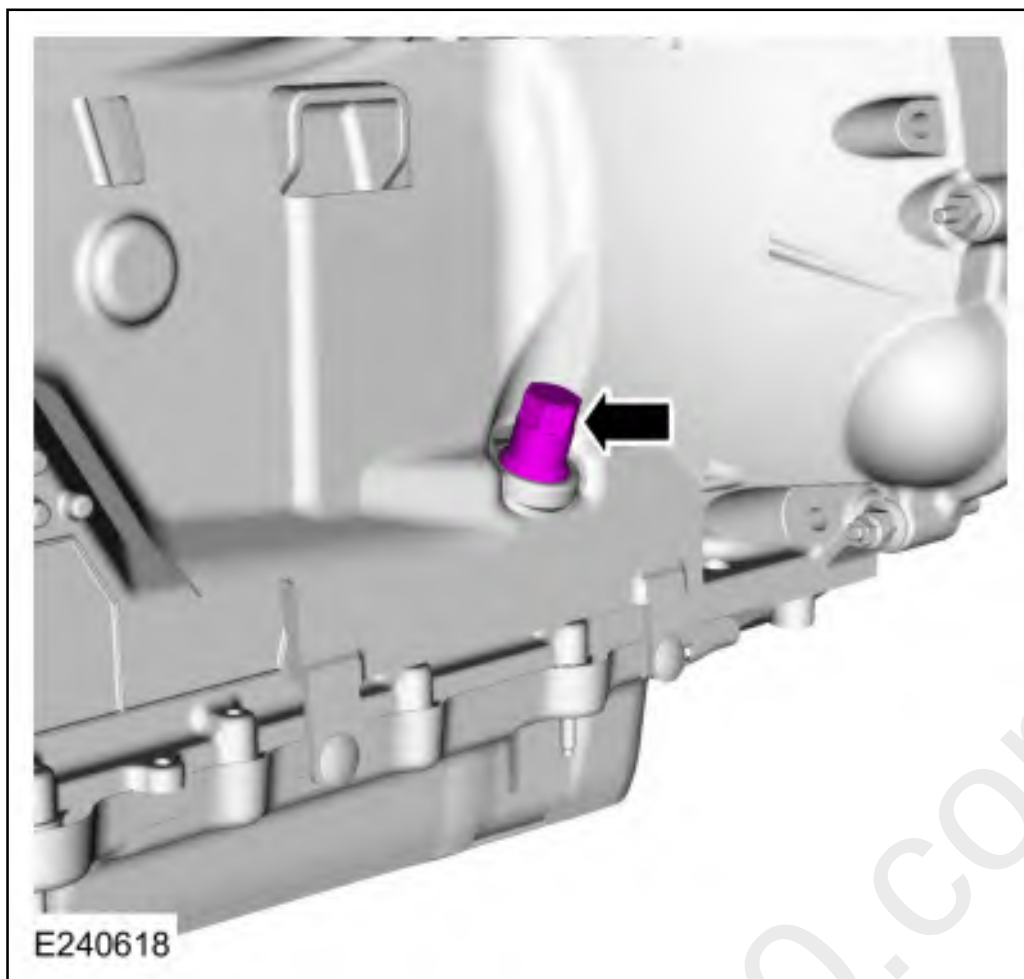
6. **NOTE:** The transmission fluid level indicator has 2 areas for the fluid level, A and B as shown. The different areas are for different vehicle models. Use the area “B” when checking the transmission fluid level. The correct transmission fluid level is at the center of the “B” area on the transmission fluid level indicator.

Using the scan tool verify the transmission fluid temperature is between 96°C - 101°C (206°F - 215°F). The transmission fluid level must be at the center of the “B” area on the transmission fluid level indicator.



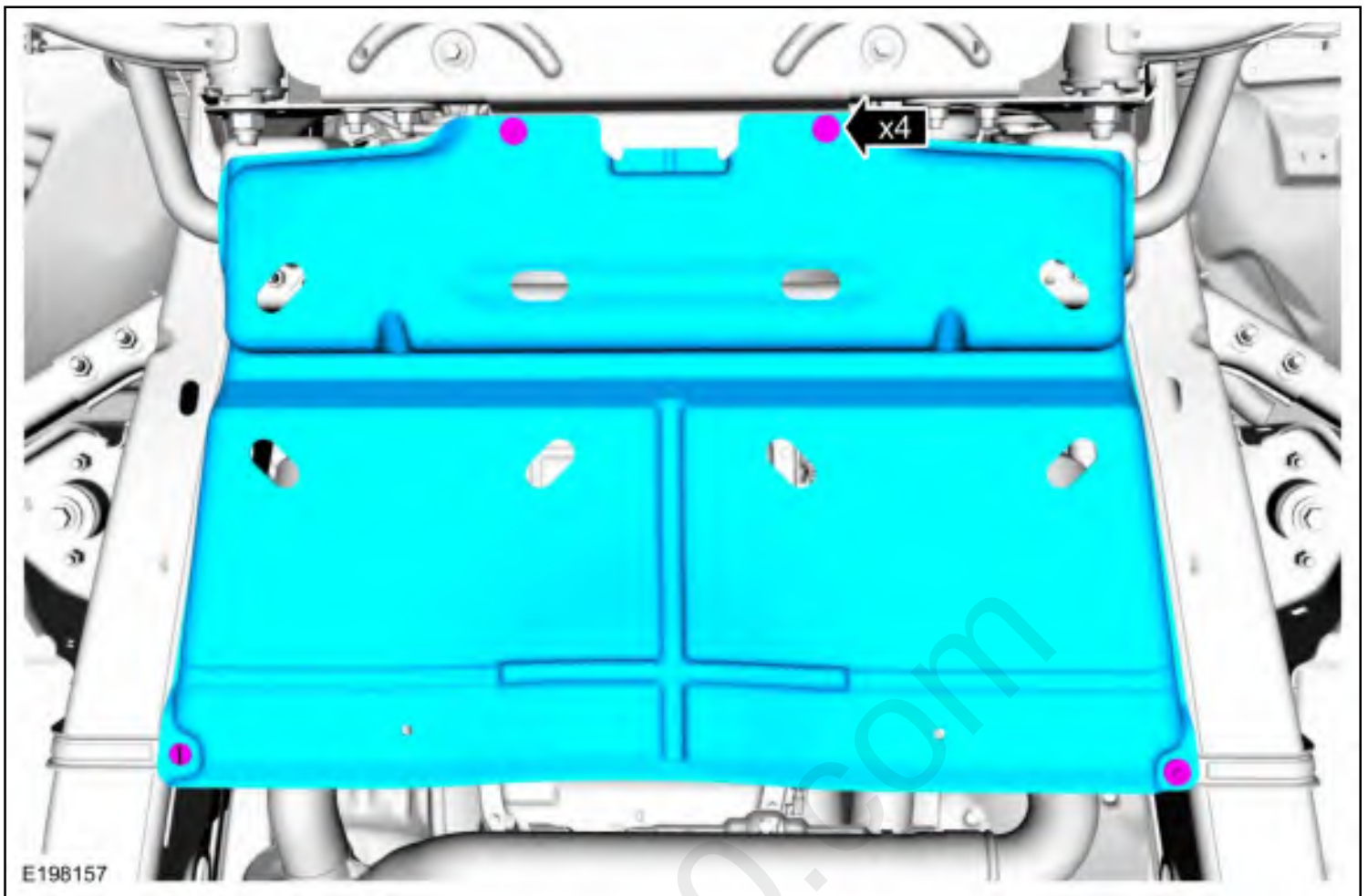
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7. If the transmission fluid is not at the correct level, follow the steps for adding or removing transmission fluid.
Refer to: [Transmission Fluid Drain and Refill](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
8. Install the transmission fluid fill plug.
Torque: 52 lb.ft (70 Nm)



9. **NOTICE:** Support the engine rear undershield while the fasteners are being removed and installed. Do not support the engine rear undershield by any less than the total number of fasteners at any time.

- If equipped.
Install the transmission housing cover and attach the retainer.
- Install the bolts.
Torque: 71 lb.in (8 Nm)



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Transmission Strategy Download

Activation

1. If a new main control was installed, record the 12-digit solenoid body identification and 13-digit solenoid body strategy from the replacement solenoid body tag provided with the main control service kit. Place the replacement tag over the existing identification tag.
 - 13 - digit solenoid body strategy
 - 12 - digit solenoid body identification



2. Using the scan tool, select module Programming and Programmable Parameters under the toolbox icon and select transmission. Follow the instructions displayed on the scan tool. There are fields to enter the solenoid body 12-digit identification and 13-digit strategy recorded from the solenoid body.
3. Compare the transmission strategy label to the codes displayed on the scan tool. The codes displayed on the scan tool should match the label. If not, select the update option on the tool.

Once the update option is selected the tool will ask the user what best describes the repair operation that was performed on the transmission. The scan tool will only allow the user to select 1 of the five options. Once the selection is made, the user can enter the transmission code from the label into the entry box.

4. **NOTICE: If the solenoid body information is not correct, transmission damage or driveability concerns can occur.**

NOTICE: It is critical that only 13-digit strategy be entered into the scan tool. Entering the 12-digit solenoid body identification will result in partial file download to the module. The 12-digit solenoid body identification option should only be used when directed by engineering in a case where a full 13-digit strategy cannot be obtained.

Enter the solenoid body 13-digit strategy. The scan tool verifies the numbers entered are valid and displays a message if the information is not valid. The scan tool will check to verify the file is present on the scan tool. If the file is present, the technician may proceed with downloading the file to the module. If the file is NOT present, the scan tool will prompt the user for permission to retrieve the file from the Professional Technician Society (PTS) server. Internet access will be required to download the file from the server to the scan tool.

5. Follow the instructions on the network to download the strategy file to the scan tool.
6. Follow the instructions displayed on the scan tool.
7. The scan tool automatically downloads the strategy file. The scan tool displays a message when it is finished downloading the data that states that the file was downloaded successfully.
8. **NOTICE: If a drive cycle is not completed, erratic shifts and driveability concerns may occur.**

Road test the vehicle following the Adaptive Learning Drive Cycle.

Refer to: [Adaptive Learning Drive Cycle](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Transmission Fluid Drain and Refill

Special Tool(s) / General Equipment

Fluid Suction Gun

Materials

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

Draining

- NOTE:** The transmission fluid pan must be removed to drain the transmission fluid. Follow the steps in the Transmission Fluid Pan, Gasket and Filter procedure to remove and install the transmission fluid pan. It is not necessary to remove the transmission fluid filter to drain the transmission fluid.

Remove the transmission fluid pan to drain the transmission fluid.

Refer to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Filling

NOTICE: This procedure contains the air purge steps required to purge air from the transmission fluid cooling system. This procedure is NOT intended for use with the Transmission Fluid Level Check.

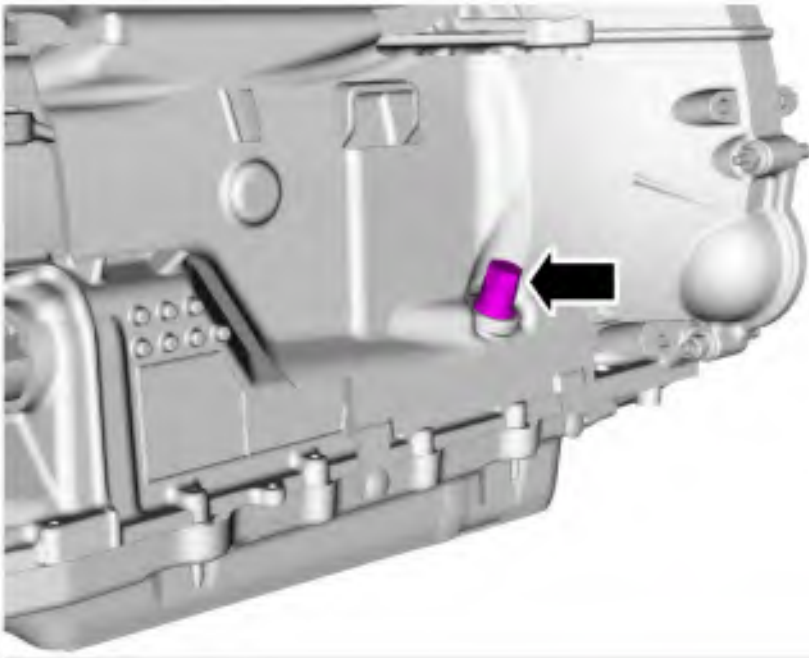
NOTICE: The vehicle should not be driven if the transmission fluid level is low or internal failure could result.

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

NOTE: Check the transmission fluid level if the transmission starts to slip, shifts slowly or shows signs of transmission fluid leaking.

NOTE: Here is an overview of the Transmission Fluid Refill procedure.

- Adding 3.3L (3.5 qt) of transmission fluid is an initial fill enabling the engine to be started.
 - Filling the transmission to the transmission fluid level indicator area below the crosshatch mark allows the vehicle to be driven.
 - The vehicle should be driven to allow the transmission fluid temperature to reach 96°C - 101°C (206°F - 215°F) in order to purge the air from the transmission fluid cooling system.
 - Fill the transmission fluid to the fill range on the transmission fluid level indicator at the normal operating range 96°C - 101°C (206°F - 215°F).
1. Remove the transmission fluid fill plug and remove the transmission fluid level indicator from the plug.



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2. **NOTE:** The transmission will need 3.3L (3.5 qt) of transmission fluid added to the transmission as an initial fill if:

- a new main control has been installed.
- the transmission fluid pan or transmission fluid filter have been removed.

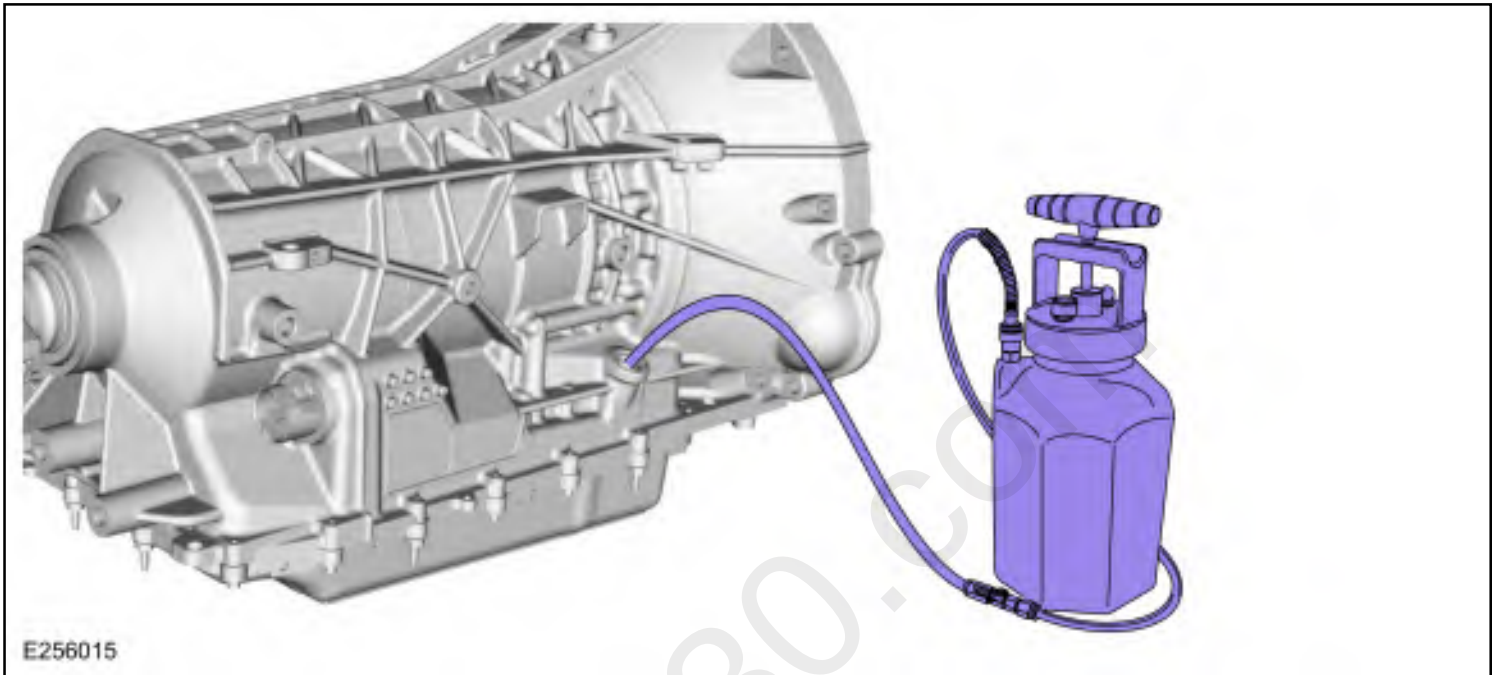
NOTE: The transmission will need 11.35L (12 qt) of transmission fluid added to the transmission as an initial fill if the transmission has been overhauled.

NOTE: The use of a pressurized fluid dispenser with 8-12 qt capacity such as the Mityvac MITMV6412 is recommended for this procedure.

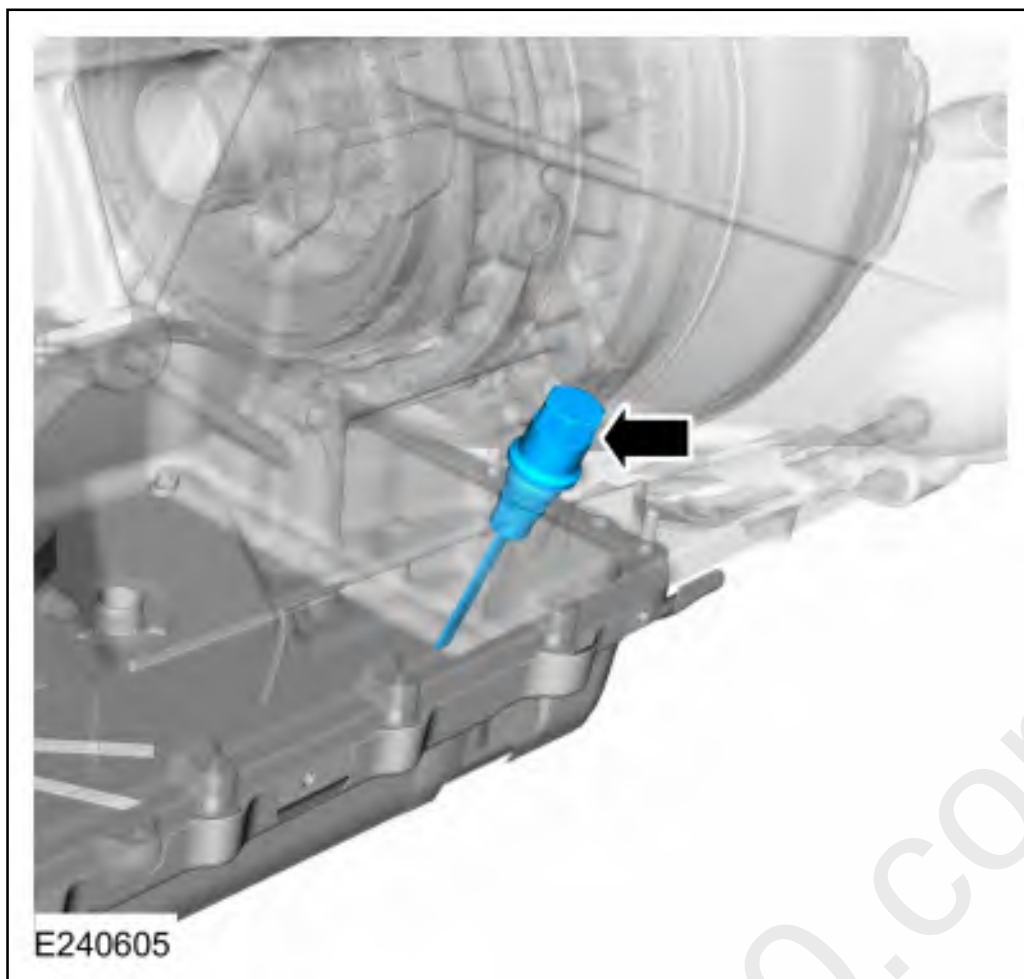
Using the fluid dispenser, add transmission fluid to the transmission through the transmission fluid fill hole.

- General Equipment: Universal Fluid Dispenser

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

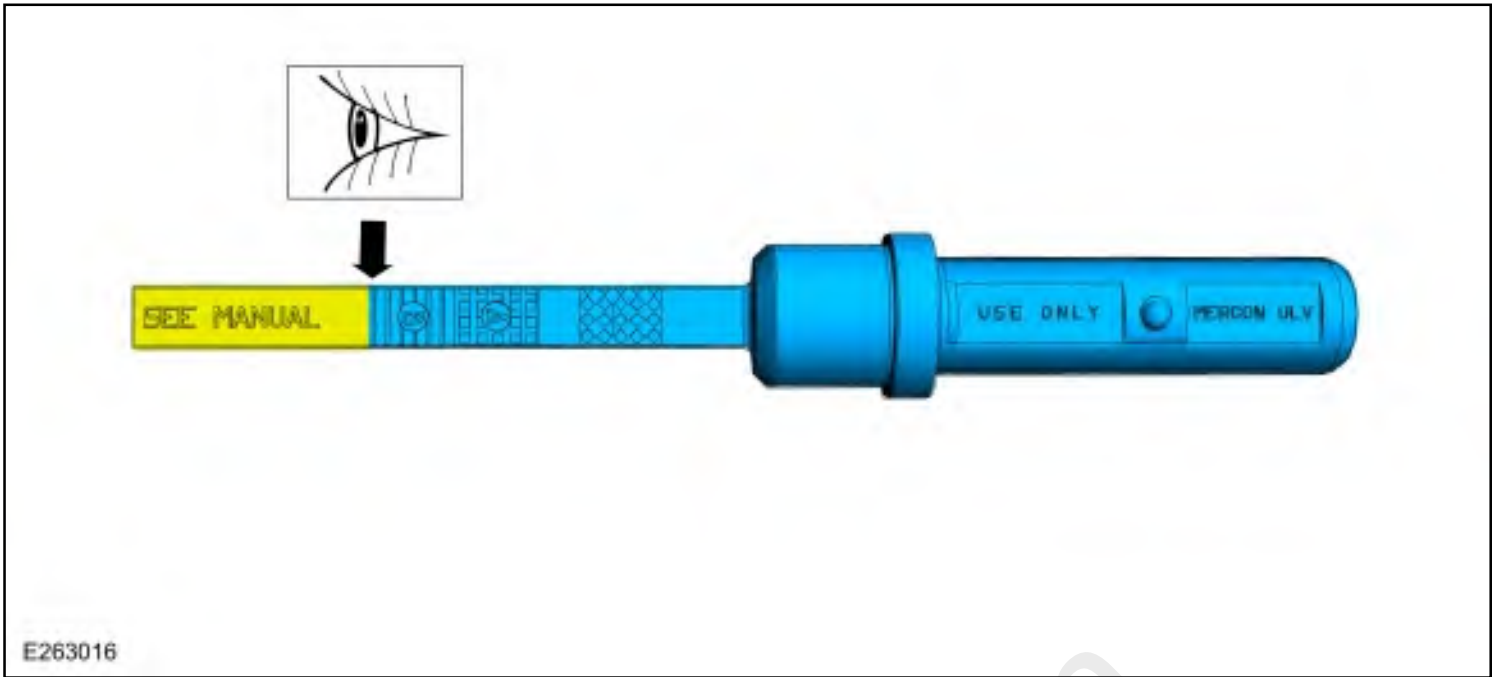


1. Connect the diagnostic scan tool and monitor the transmission fluid temperature.
 2. Start the engine.
 3. Place the selector in each gear position, holding approximately 5 seconds in each position. Place the selector in PARK, with the engine at idle (600-750 rpm).
- Check the transmission fluid level using the transmission fluid level indicator.

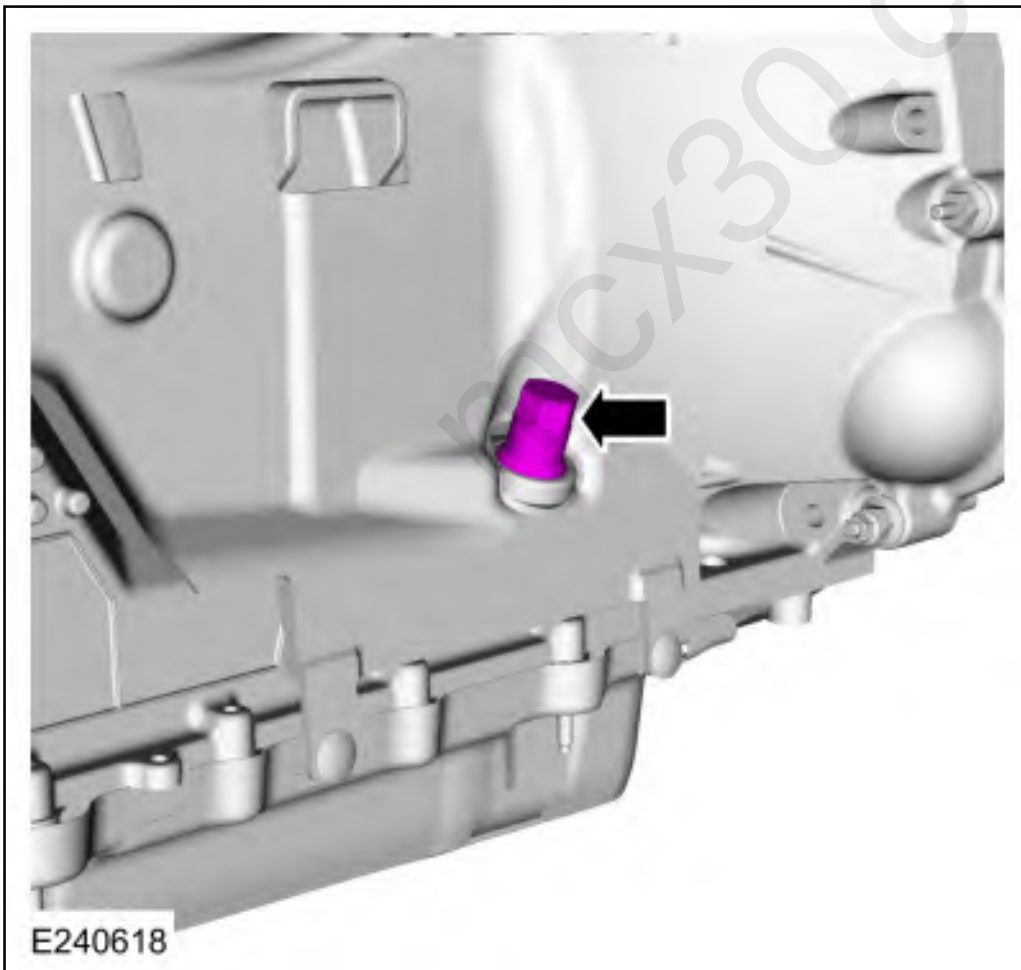


4. **NOTICE:** The vehicle is safe to drive with a cold transmission fluid temperature if the transmission fluid level is in the transmission fluid level indicator area below area “B” as shown. Failure to add transmission fluid to this level can result in damage to the transmission.

Add transmission fluid to the area on the transmission fluid level indicator below the area “B”.



5. Install the transmission fluid fill plug.
Torque: 52 lb.ft (70 Nm)

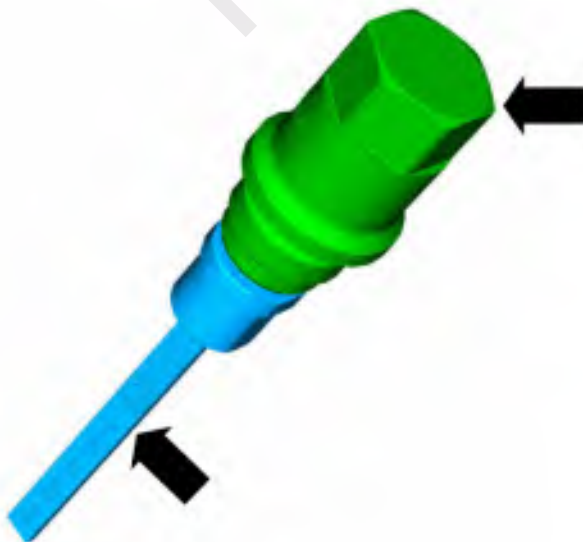
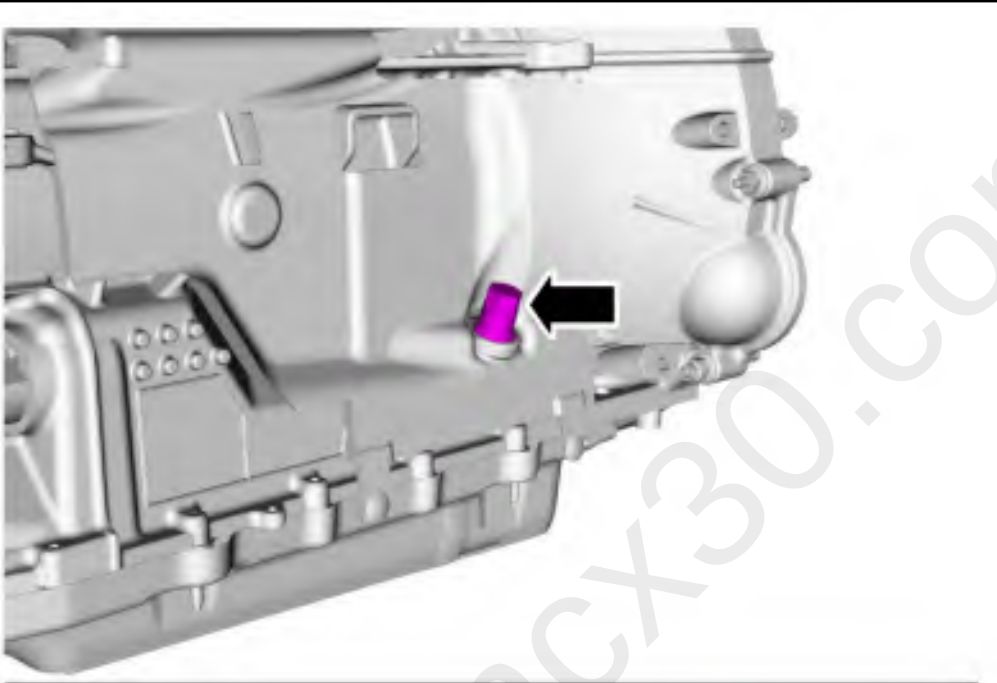


6. **NOTE:** Always drive the vehicle in a safe manner according to driving conditions and obey all traffic

laws.

Drive the vehicle. While driving the vehicle, use the scan tool to verify the transmission fluid has reached a temperature of 96°C - 101°C (206°F - 215°F). This circulates the transmission fluid through the torque converter and the transmission fluid cooling system, eliminating any trapped air in the transmission fluid cooling system. With the engine idling (600-750 rpm) in PARK, verify the transmission fluid temperature is between 96°C - 101°C (206°F - 215°F) and lift the vehicle on a hoist. Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).

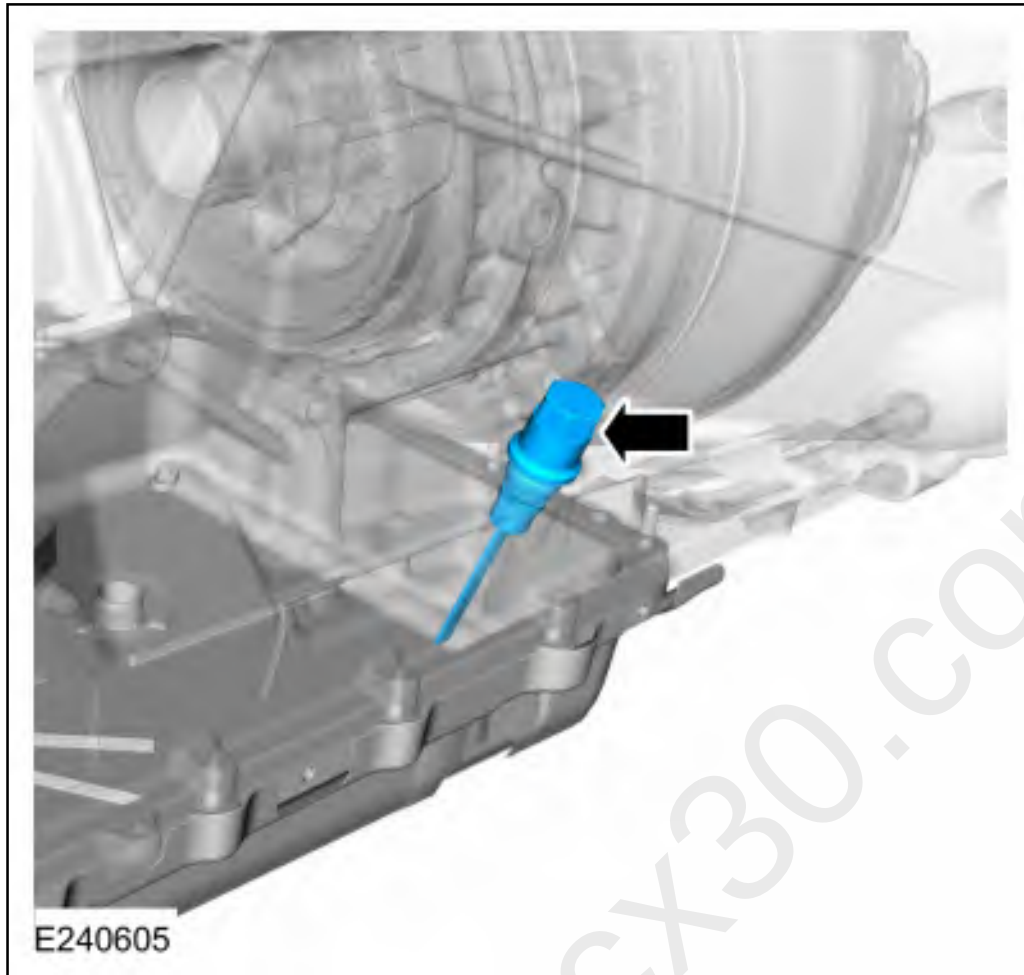
7. Remove the transmission fluid fill plug and remove the transmission fluid level indicator from the plug.



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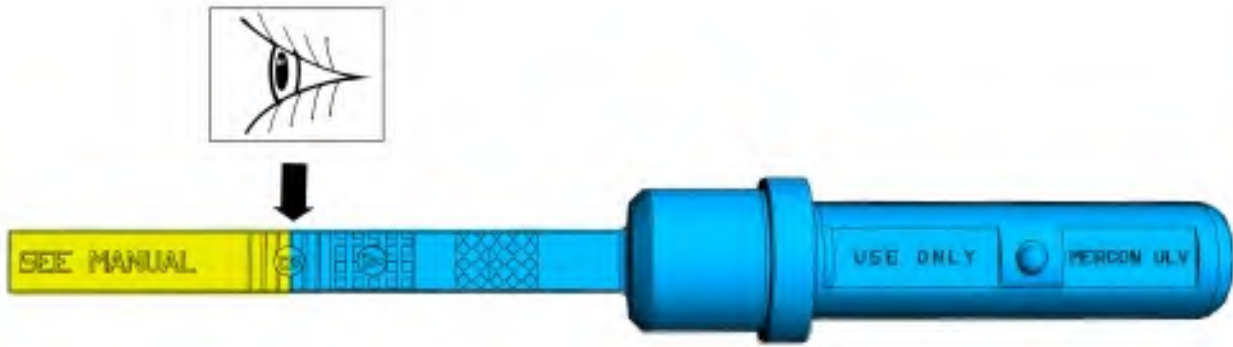


8. Check the transmission fluid level using the transmission fluid level indicator.



9. **NOTE:** The transmission fluid level indicator has 2 areas for the fluid level, A and B as shown. The different areas are for different vehicle models. Use the area “B” when checking the transmission fluid level. The correct transmission fluid level is at the center of the “B” area on the transmission fluid level indicator.

Using the scan tool verify the transmission fluid temperature is between 96°C - 101°C (206°F - 215°F). The transmission fluid level must be at the center of the “B” area on the transmission fluid level indicator.

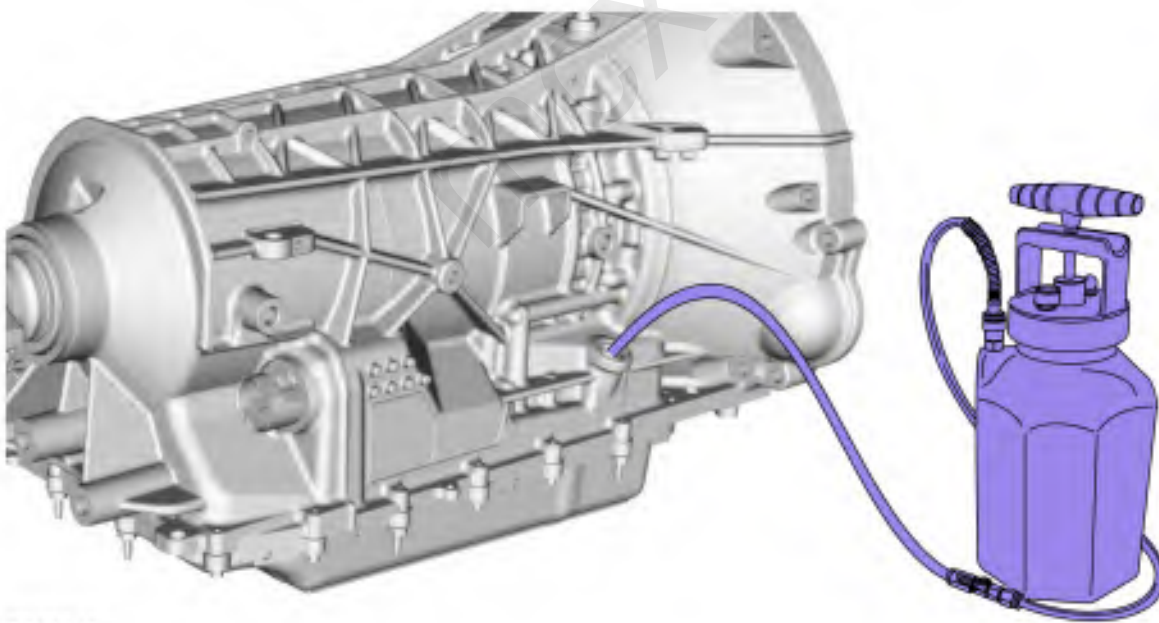


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10. **NOTE:** *The use of a pressurized fluid dispenser with 8-12 qt capacity such as the Mityvac MITMV6412 is recommended for this procedure.*

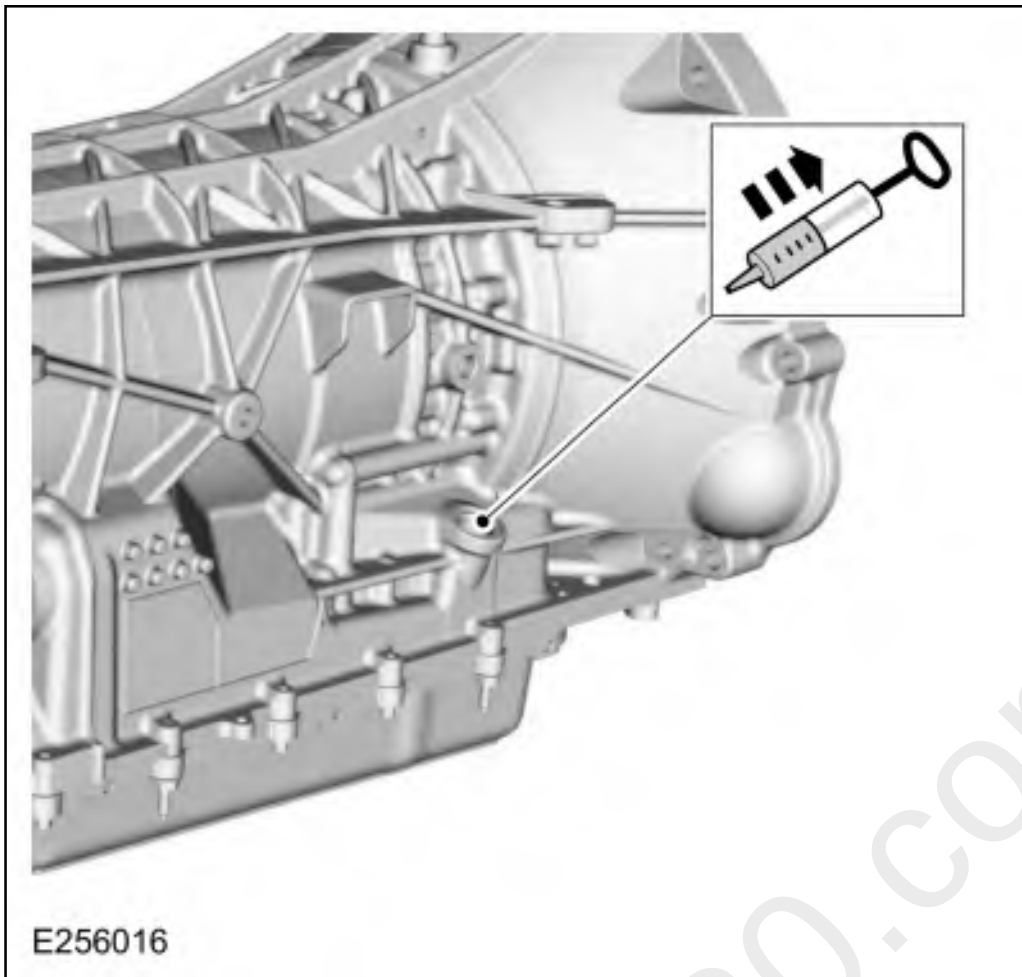
If the transmission fluid level is low, add transmission fluid using the fluid dispenser.

- General Equipment: Universal Fluid Dispenser
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (MERCON® ULV) (WSS-M2C949-A)

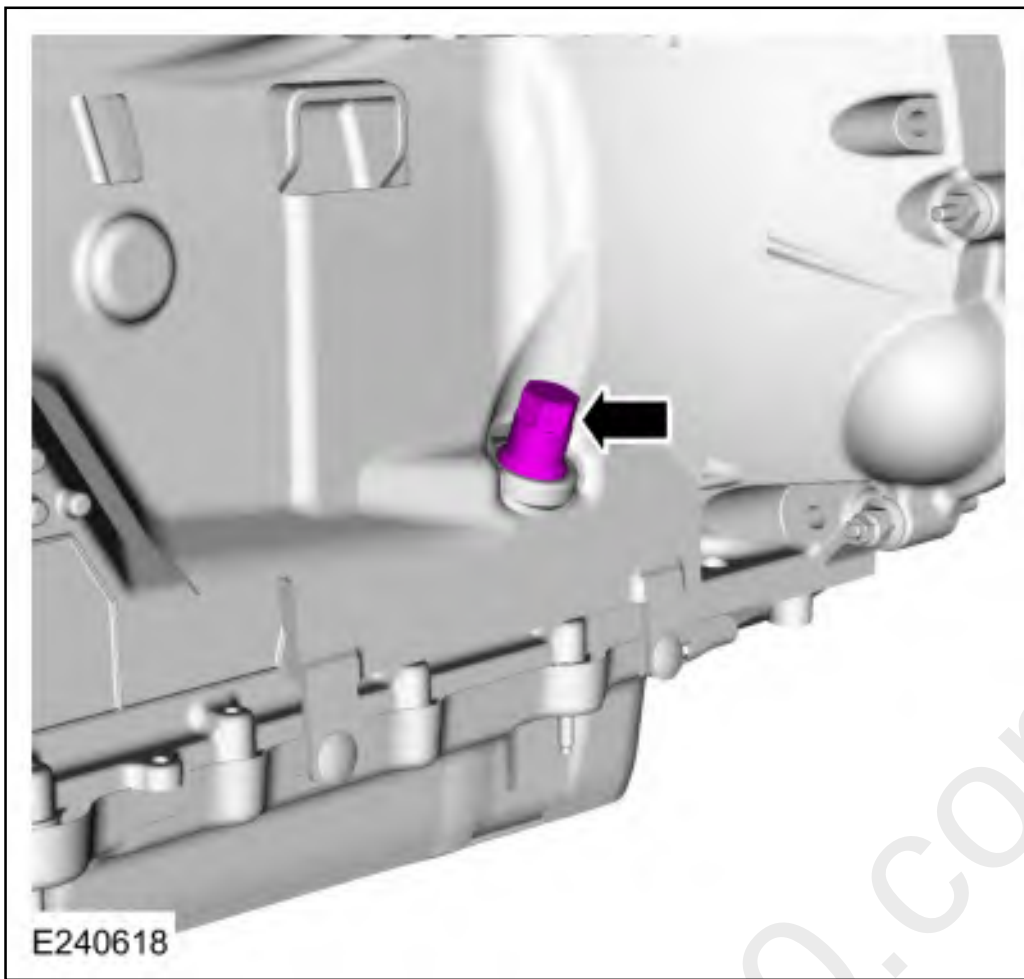


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11. If the transmission fluid is overfilled, remove the transmission fluid with a fluid suction gun. Use the General Equipment: Fluid Suction Gun



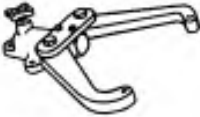
12. Install the transmission fluid fill plug.
Torque: 52 lb.ft (70 Nm)

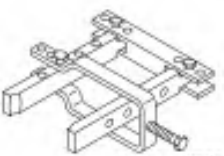
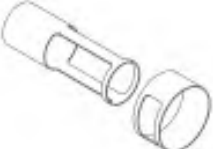


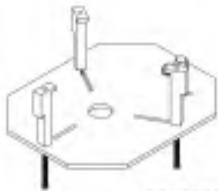
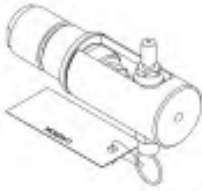
Transmission

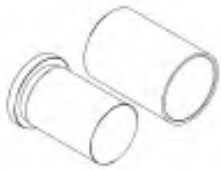
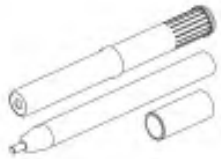
Base Part Number: Base Part Number: 7000

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
 E142010	307-091 Handle, Torque Converter TKIT-2009TC-F

 17069	307-309 Remover, Torque Converter Seal TKIT-1994-FH TKIT-1994-FMH/FLMH TKIT-1994-LMH/MH
 307-346	307-346 (T97T-7902-A) Retainer, Torque Converter TKIT-1997-F/FLM/LT TKIT-1998-LM (NavigatoR)
 E270042	307-458 Socket, Output Shaft Locknut TKIT-2003N-F
 E270043	307-549 Installer, Shift Shaft Fluid Seal TKIT-2005D1-F1
 E216419	307-584 2-6 Spring Compressor TKIT-2006UF-FLM TKIT-2006UF-ROW
 E216420	307-589 Overdrive clutch and balance piston service set TKIT-2006UF-FLM TKIT-2006UF-ROW
 E270044	307-651 Bracket, Pump Remover/Installer
 E270045	307-653 Sizer, Input Shaft Teflon Seal

 E270046	307-660 Installer, Front Pump Seal TKIT-2009C-F TKIT-2009C-ROW
 E270047	307-661 Gauge, End Play TKIT-2009C-F TKIT-2009C-ROW
 E270048	307-662 Gauge, Clutch Pack Endplay TKIT-2009C-F TKIT-2009C-ROW
 E239703	307-691 Tester, Torque Converter Leak
 E233333	307-732 Tool Kit, Torque Converter Flusher
 E234902	307-733 Compressor, Clutch Piston
 E234903	307-734 Tool, OWC Alignment

 E234908	307-736 Installer, Pump Drive Gear Bearing
 E234909	307-737 Press Tool, Oil Pump Drive Idler Gear
 E234921	307-741 Spring Compressor, F Clutch
 E234924	307-743 Remover, Pump Drive Gear
 E234932	307-746 Remover, Transmission Wiring Harness Connector
 E248128	307-747 Installer/ Sizer , Input Shaft Solid Sealing Rings; Large
 E248129	307-748 Installer/Sizer, Input Shaft Solid Sealing Rings; Small

	307-749 Installer/Sizer, R2-S3 Shaft Solid Seal
	307-750 Installer, Converter Seal
Hydraulic Press	
Punch	
Magnet	

Materials

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

All vehicles

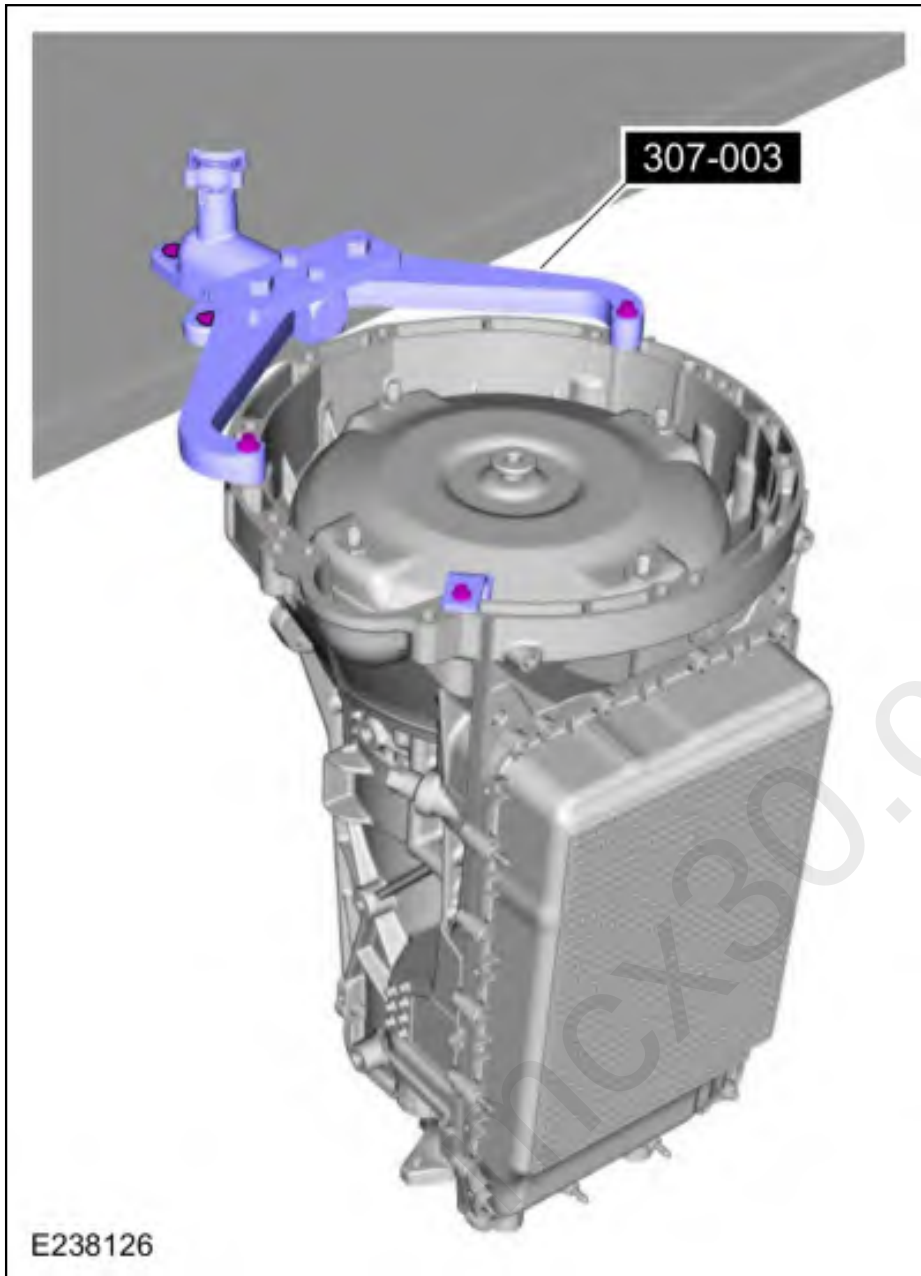
- The following components are discarded during disassembly and must be replaced:

Description	Part Number
Gasket and oil seal kit	7153
Transmission fluid auxiliary pump tube seal	7J135
Output shaft flange bolt (RWD only)	7N134
Output shaft nut (RWD only)	7085
Manual control shaft-to-TR sensor roll pin	7G100
Front support assembly bolts	7N134
D clutch balance dam	7D343
E clutch piston	7A262

- For information on component views and base part numbers.

Refer to: [Transmission Description](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Description and Operation).

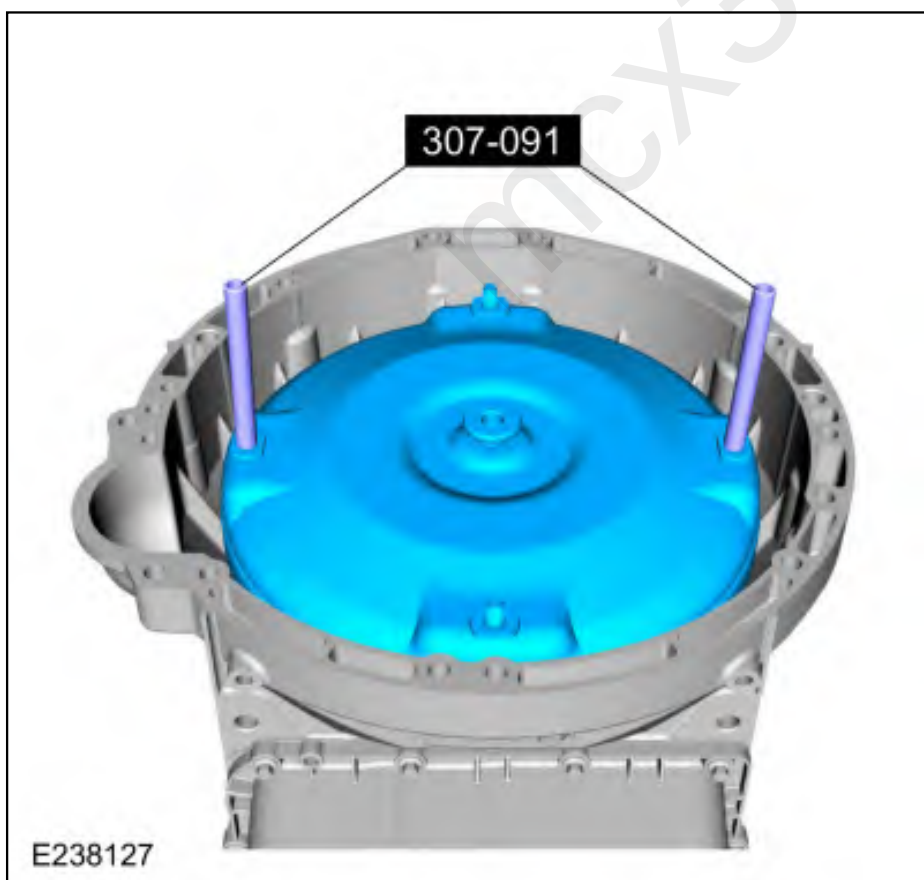
3. Using the special tool, install the transmission on a bench.
Use Special Service Tool: 307-003 (T57L-500-B) Holding Fixture, Transmission.



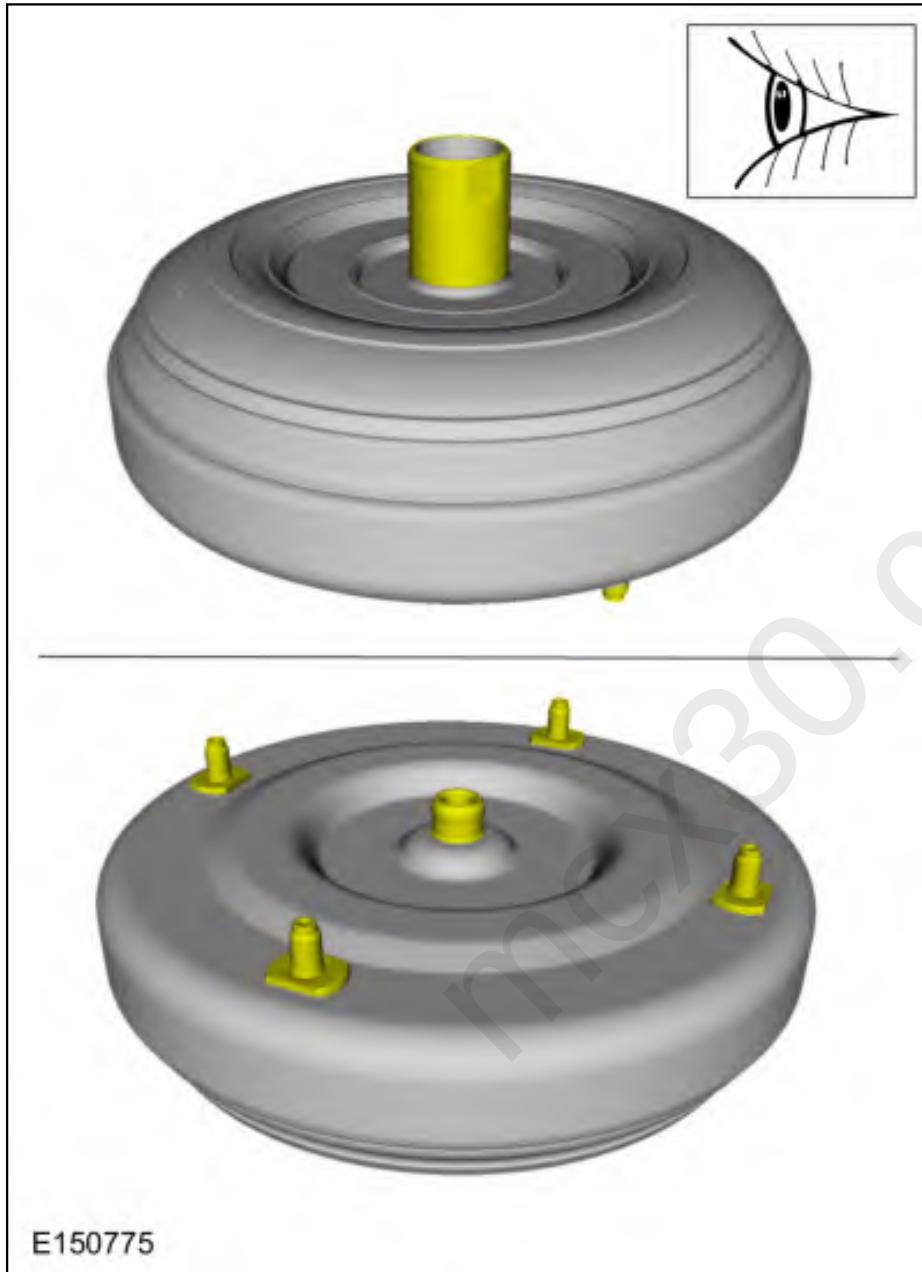
4. Remove the special tool.
Use Special Service Tool: 307-346 (T97T-7902-A) Retainer, Torque Converter.



5. Using the special tool, remove the torque converter.
Use Special Service Tool: 307-091 Handle, Torque Converter.



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.

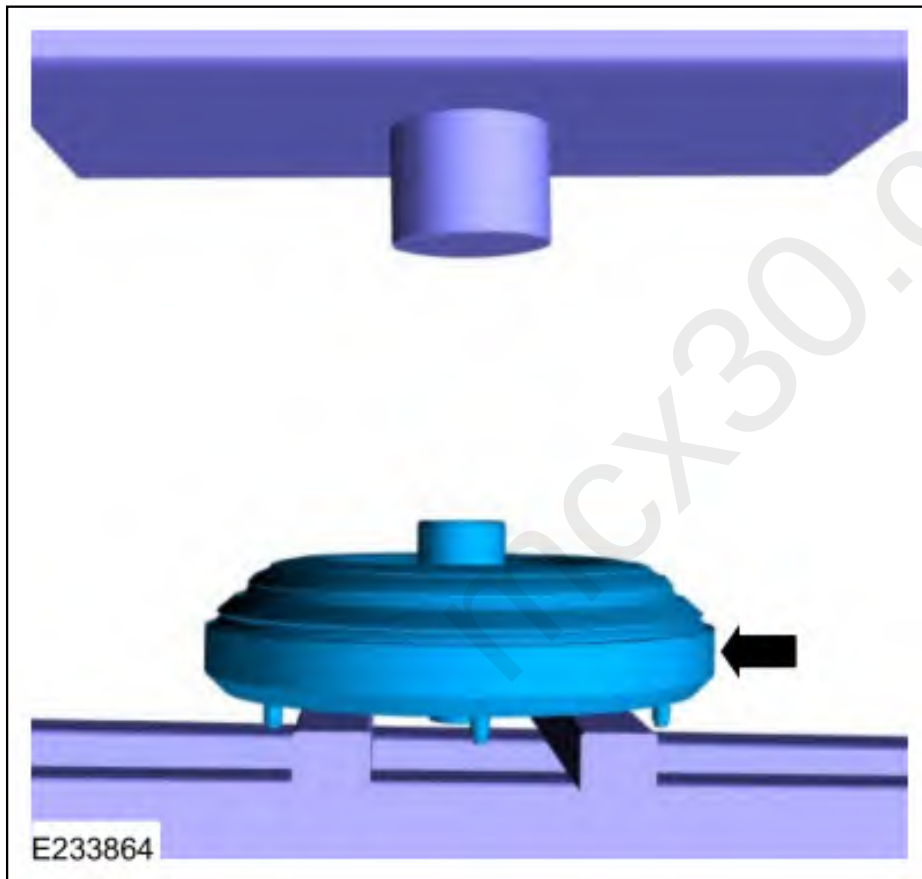


Flush The Torque Converter With The Transmission Cooling System Heated Flusher

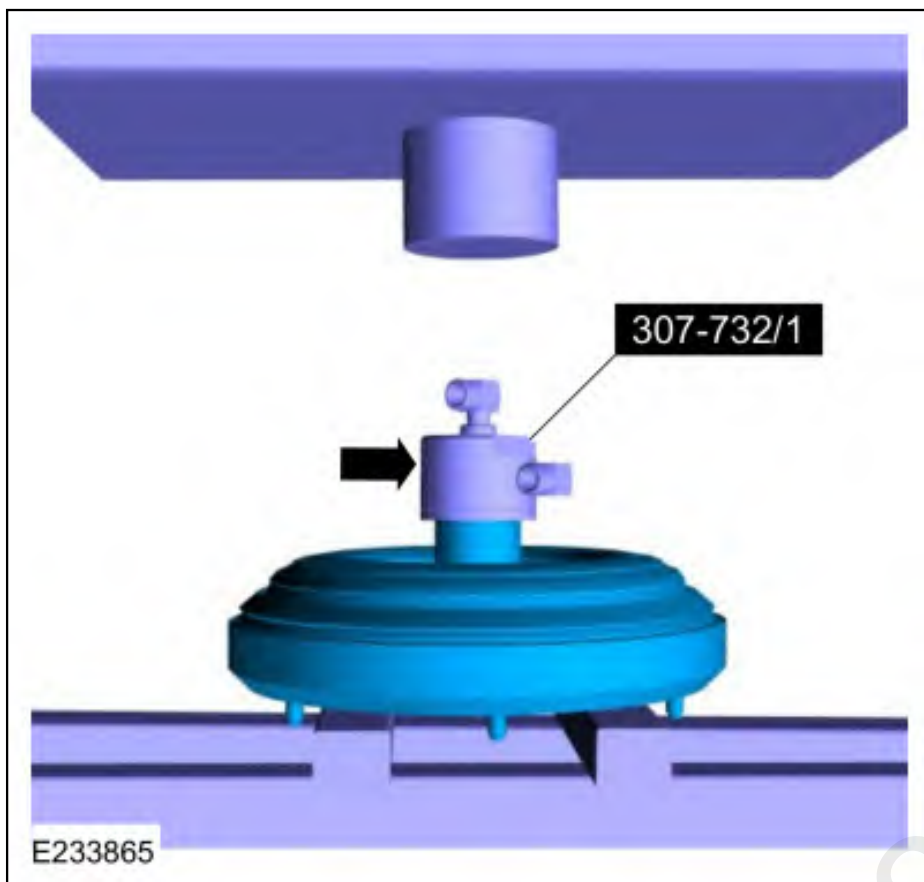
7. **NOTE:** Use transmission fluid specified for this transmission. Do not use any supplemental transmission fluid additives or cleaning agents. The use of these products could cause internal transmission components to fail, which will affect the operation of the transmission.

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:**

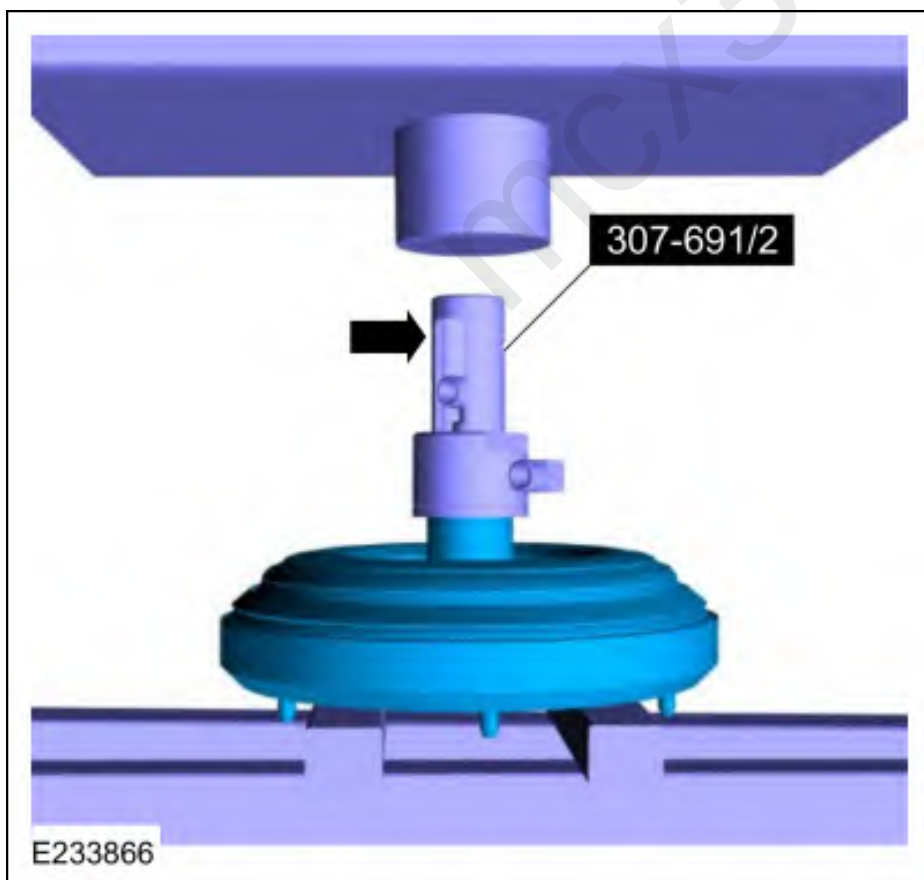
- Maintain the transmission fluid at 140°F or above
 - Pulsate the transmission fluid during cleaning
 - Have a GPM flow meter
 - Have a filter with a rating of 100 micron or less
 - Have air purge capability before and after flushing
8. If equipment meeting the specifications above is not available, 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 60°C (140°F) before using.
 11. Place the torque converter in an arbor press. Support the torque converter on the mounting pads.



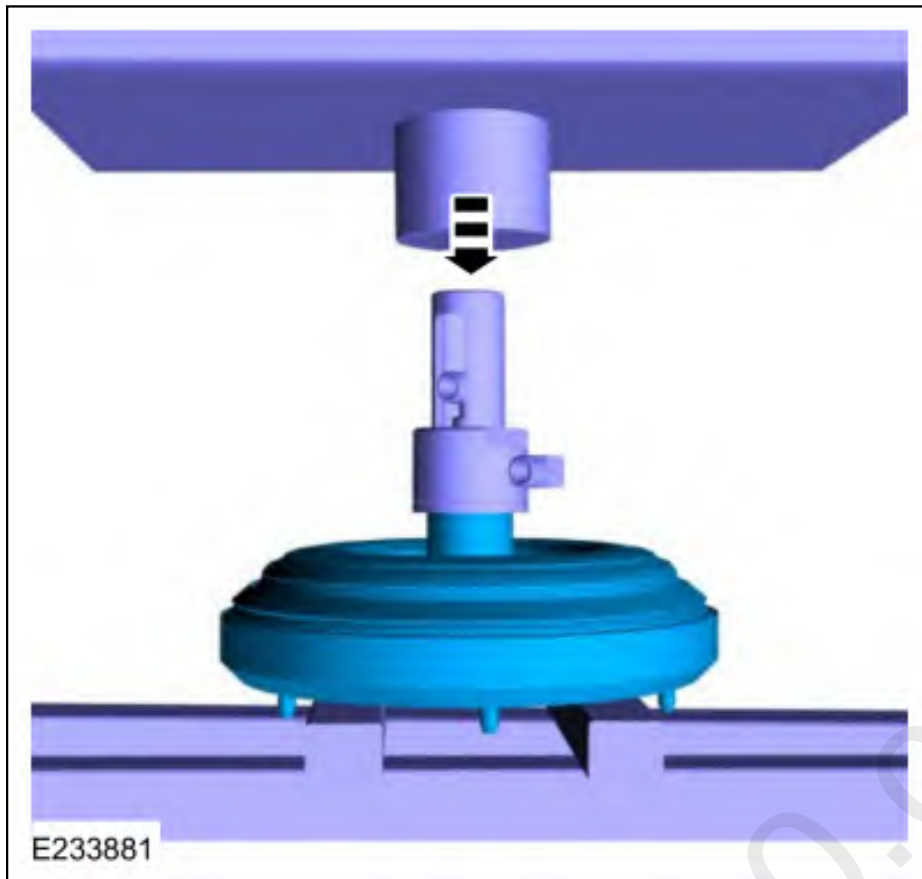
12. Using the special tools, assemble the correct turbine shaft simulator to the torque converter flush main hub and place it on the torque converter hub.
Use Special Service Tool: 307-732 Tool Kit, Torque Converter Flusher.



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



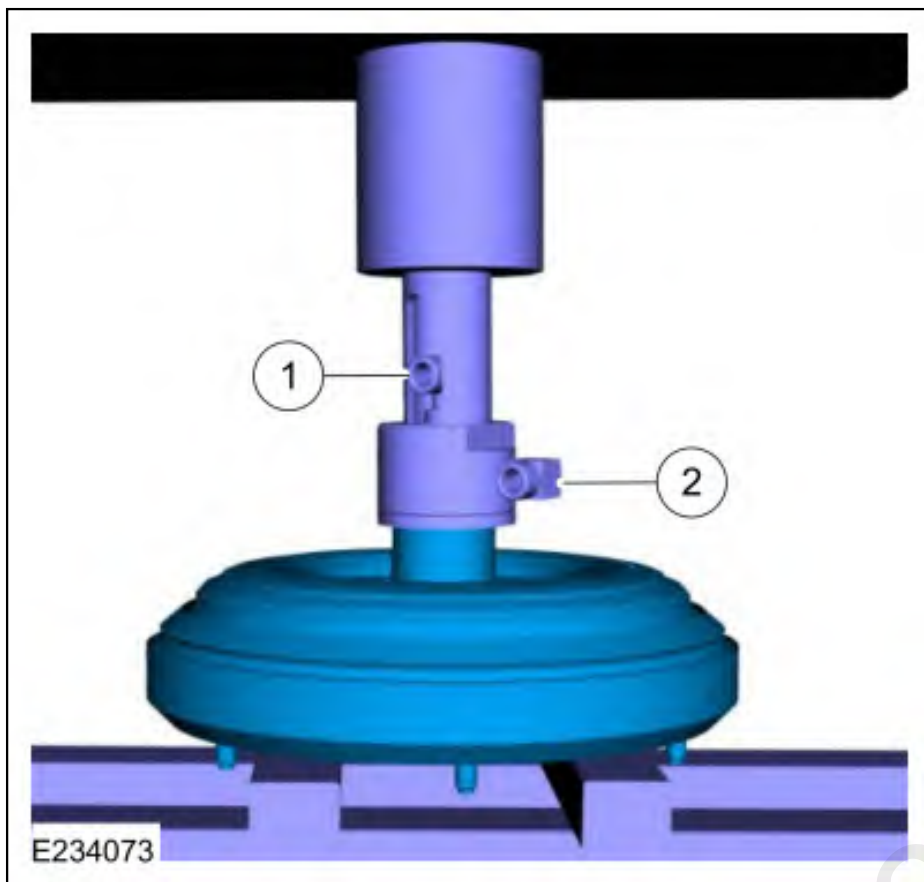
14. Apply enough force from the press to seal the torque converter flush main hub to the torque converter hub.



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.

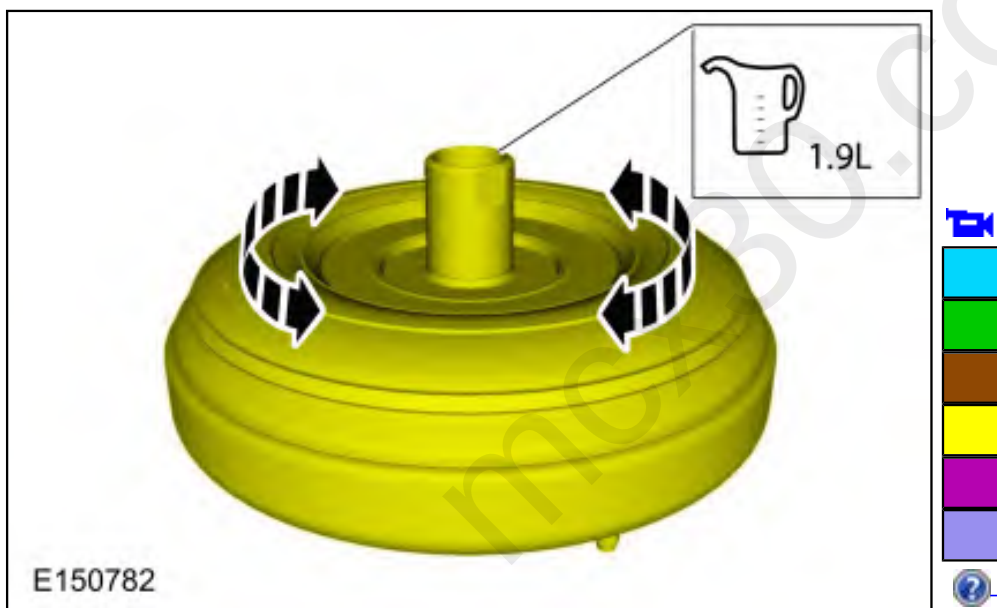
21. Disconnect the hoses and remove the special tools.

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-QULV (MERCON® ULV) (WSS-M2C949-A)



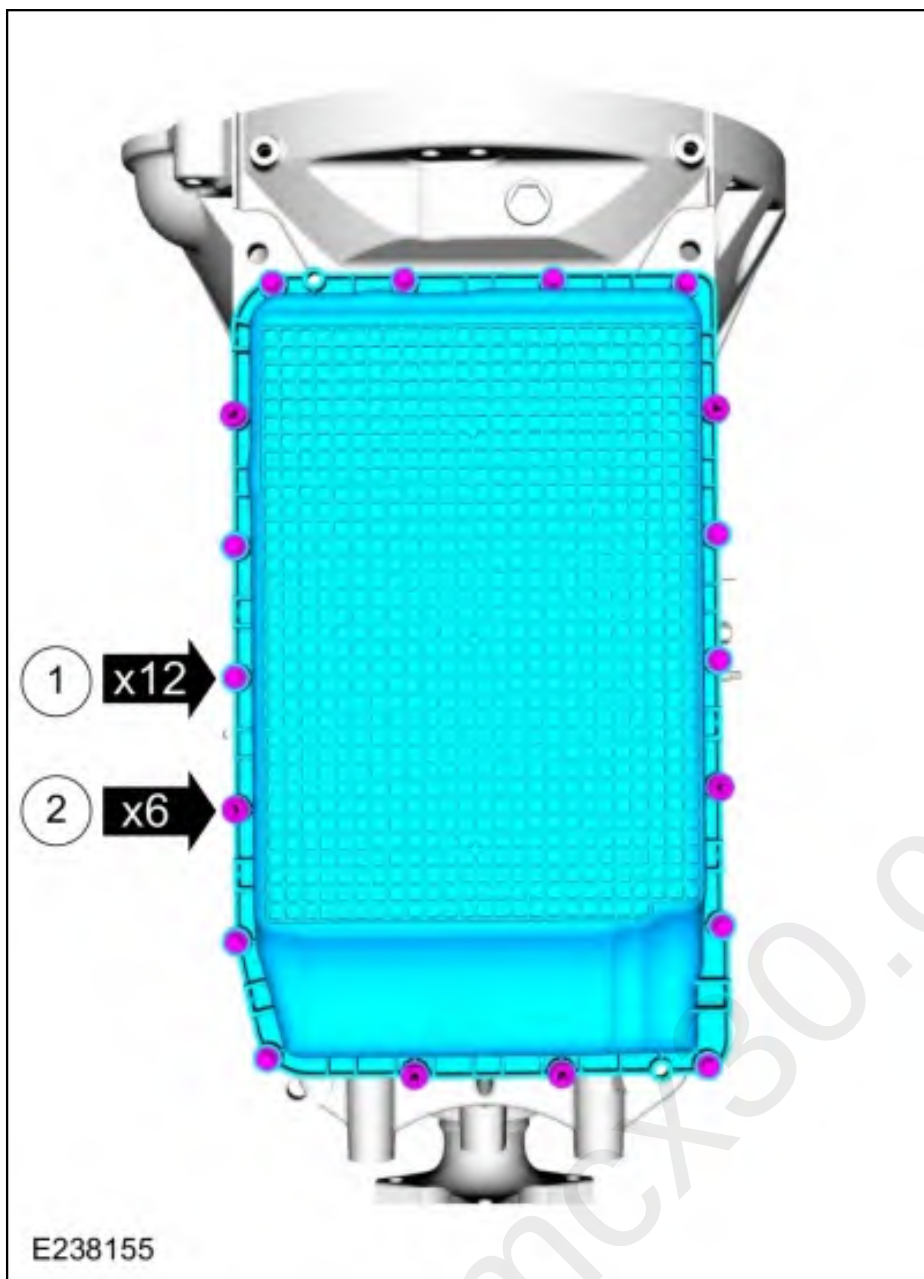
26. Thoroughly drain the transmission fluid.

All vehicles

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

Remove the bolts and studbolts and the transmission fluid pan.

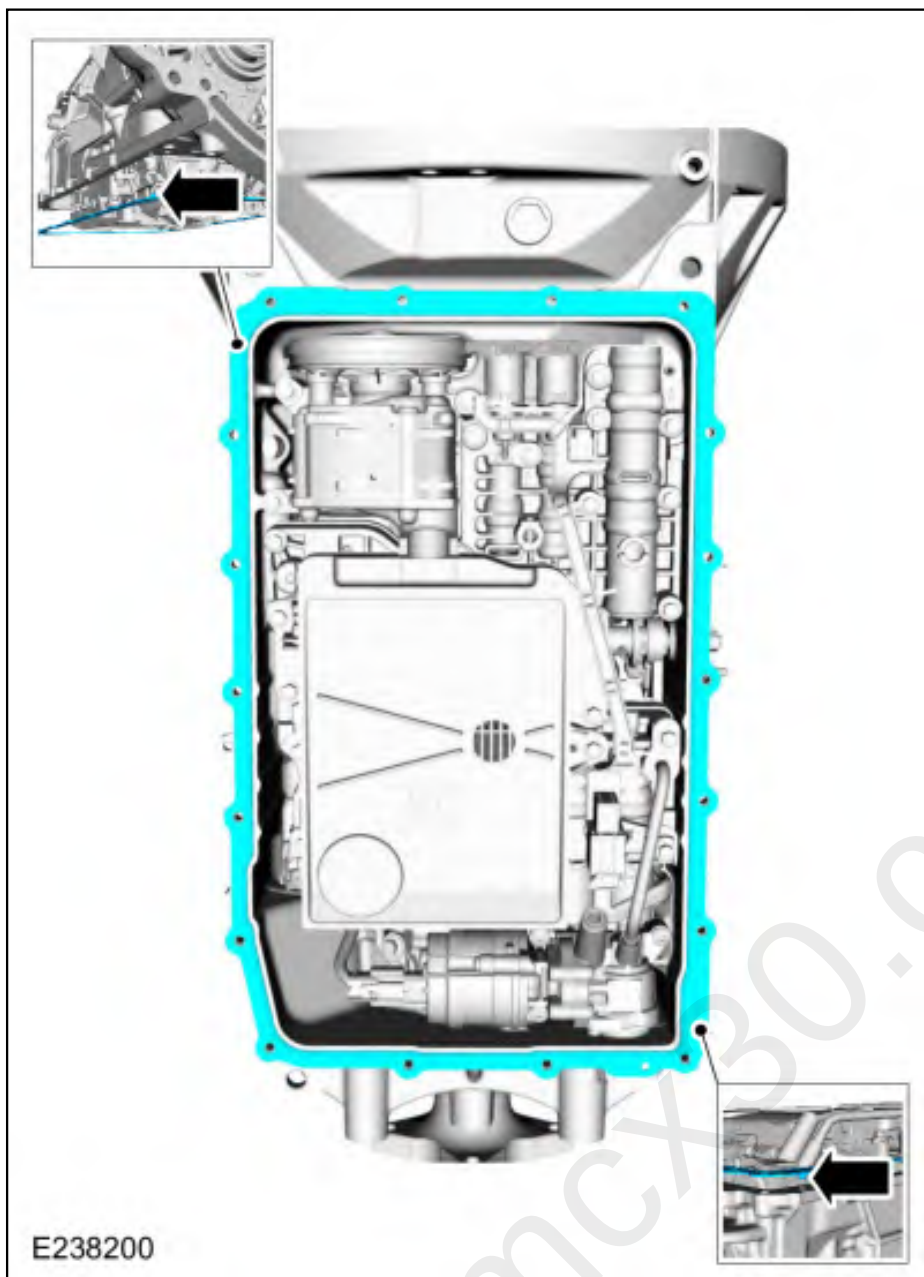
1. Bolts
2. Studbolts



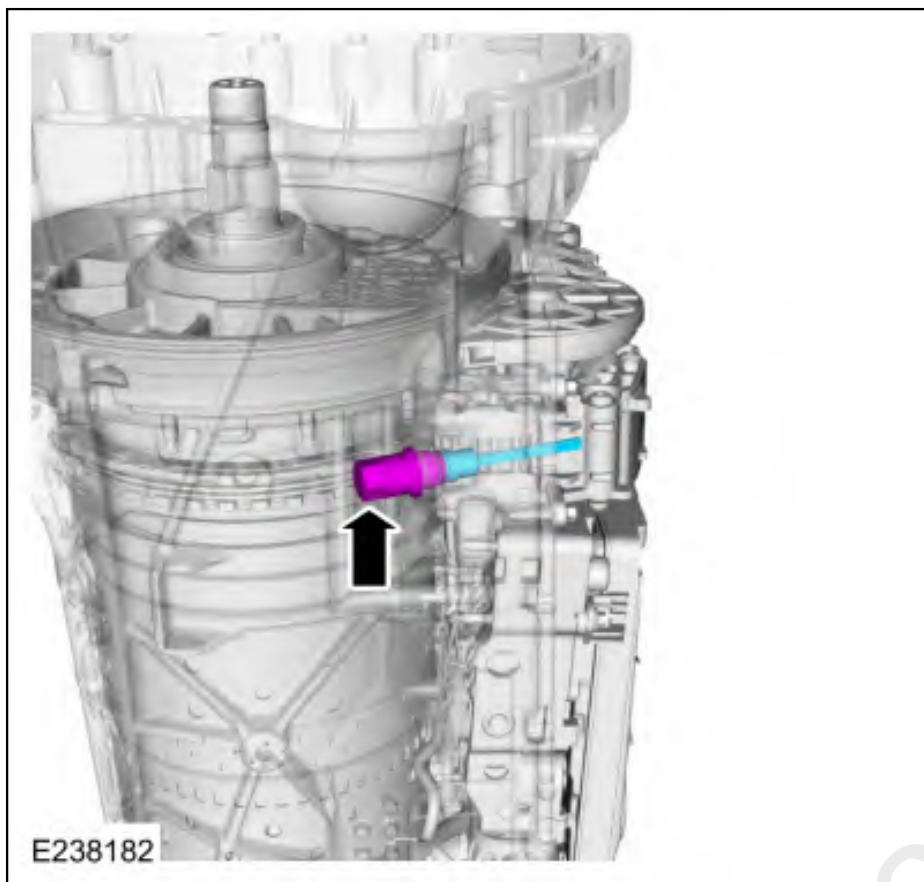
28. **NOTE:** *The transmission fluid pan gasket can be reused if not damaged.*

NOTE: *Note the location of the alignment tabs.*

Remove the transmission fluid pan gasket.



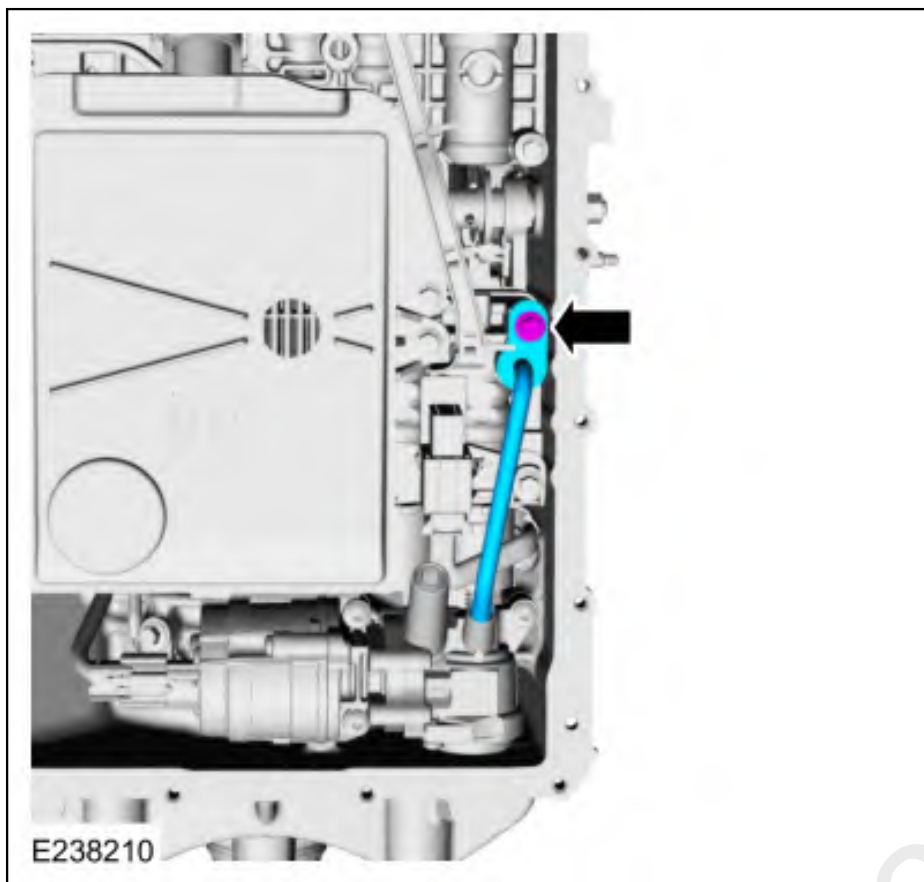
29. Remove the transmission fluid level indicator and plug assembly.



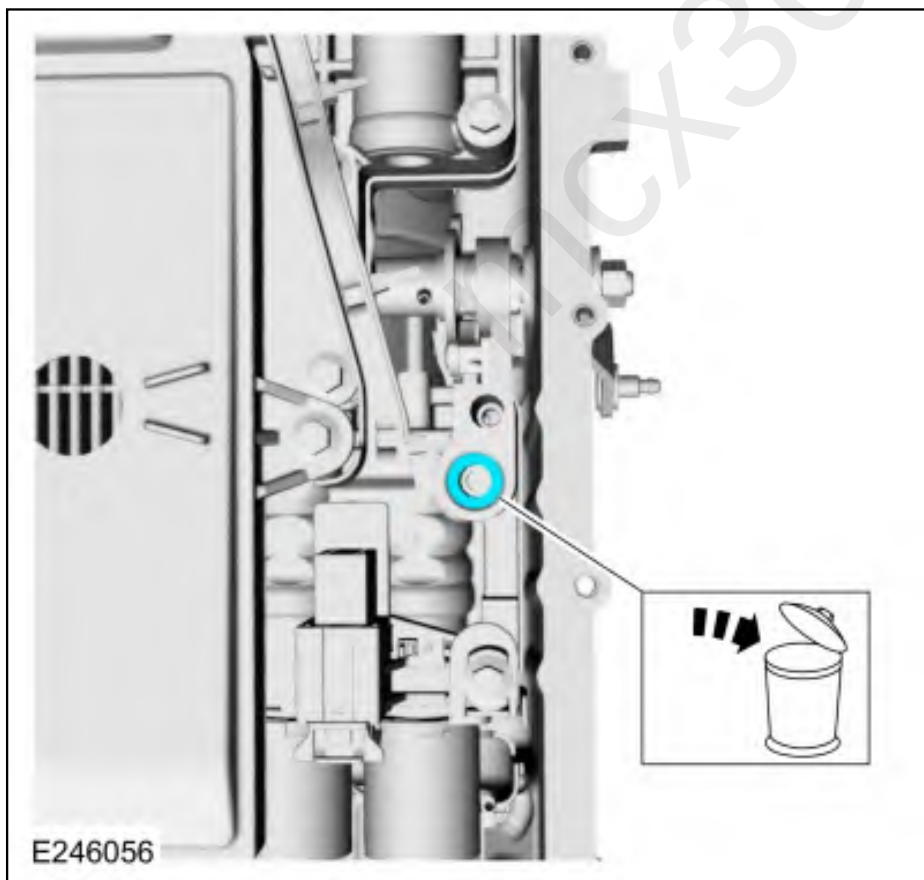
mcx30.com

Auto-Start-Stop vehicles

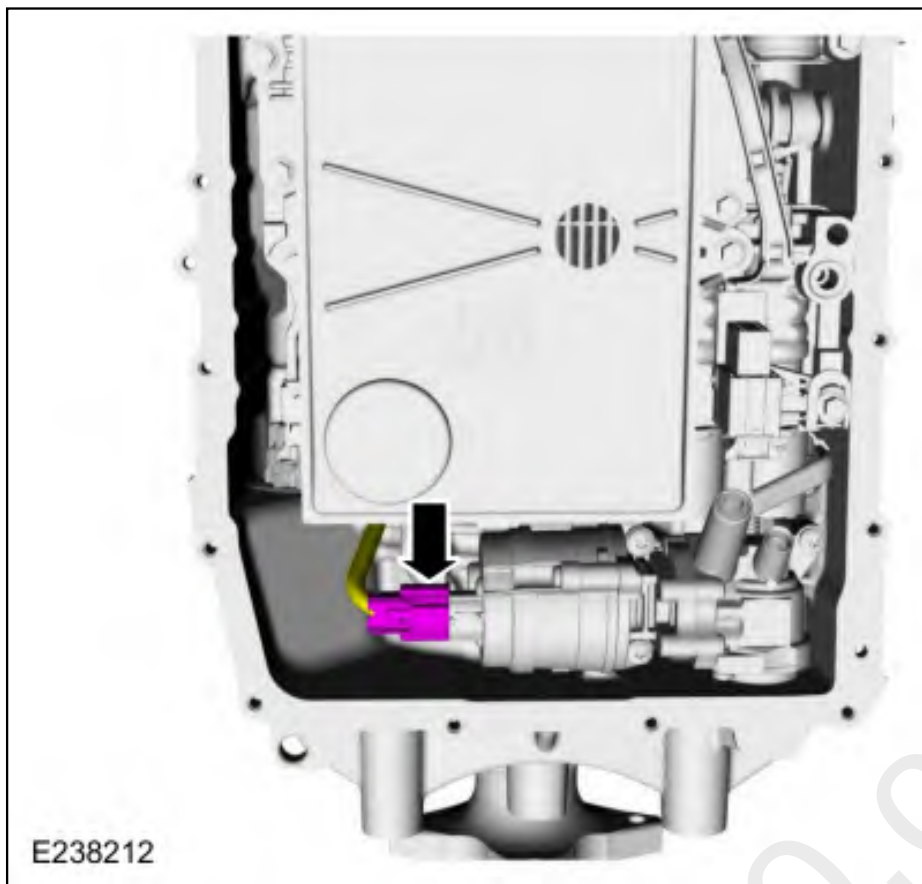
30. Remove the bolt and the transmission fluid auxiliary pump tube.



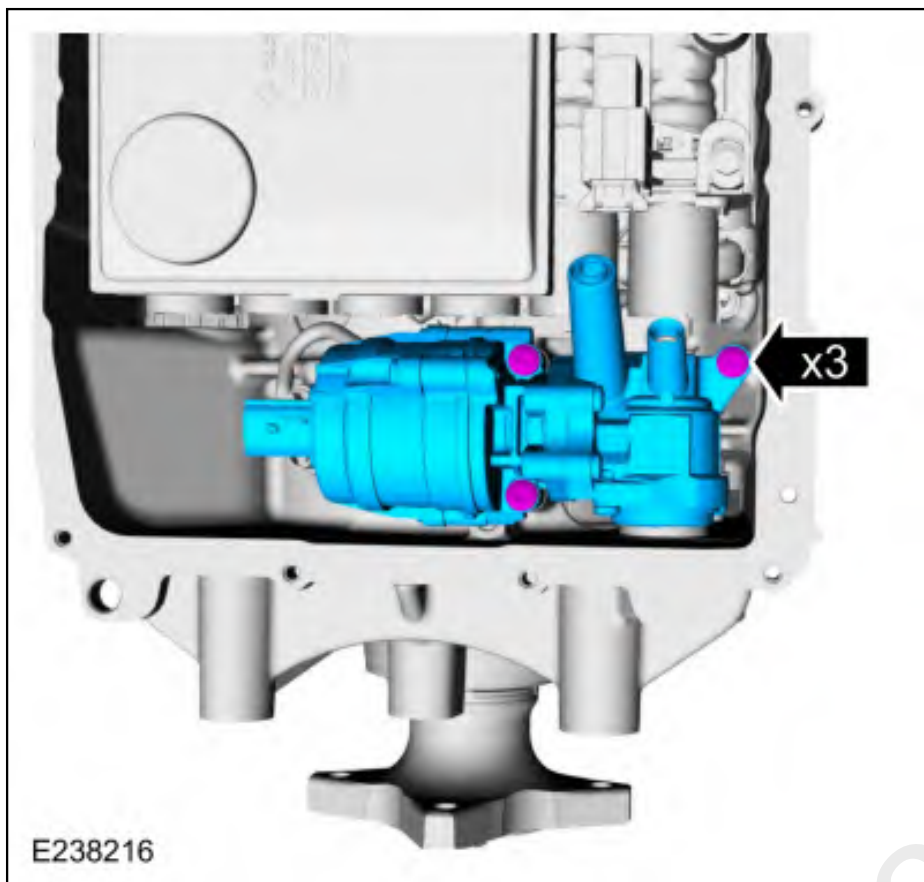
31. Remove and discard the transmission fluid auxiliary pump tube seal (7J135).



32. Disconnect the transmission fluid auxiliary pump electrical connector.



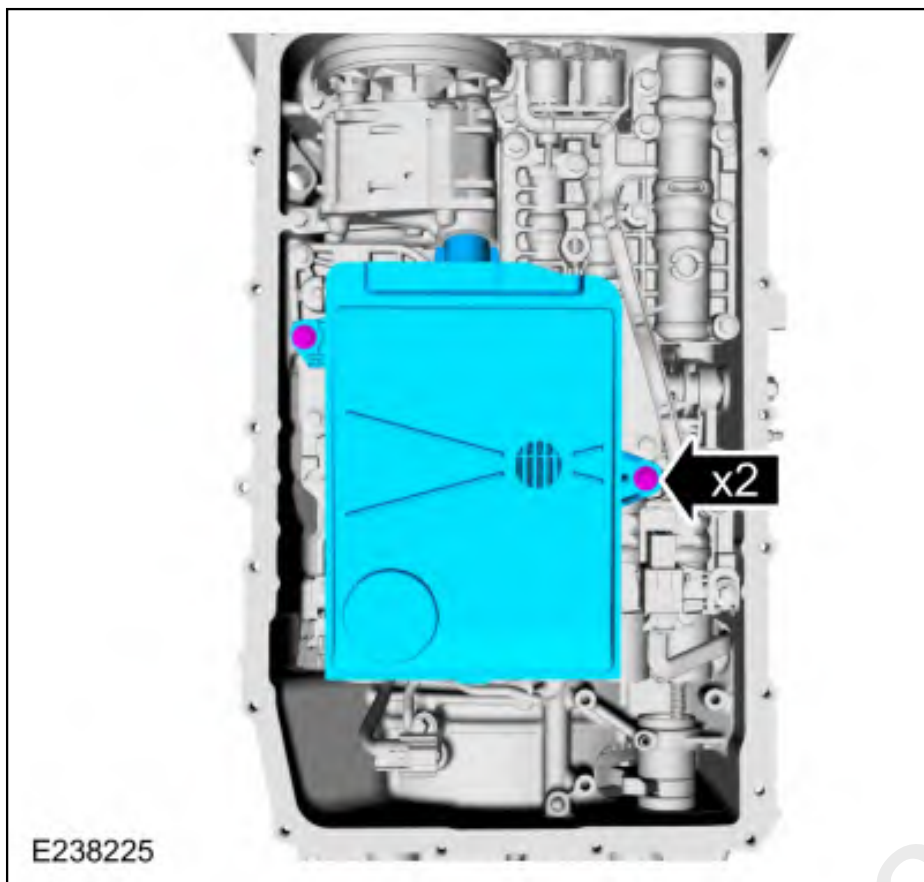
33. Remove the bolts and the transmission fluid auxiliary pump.



All vehicles

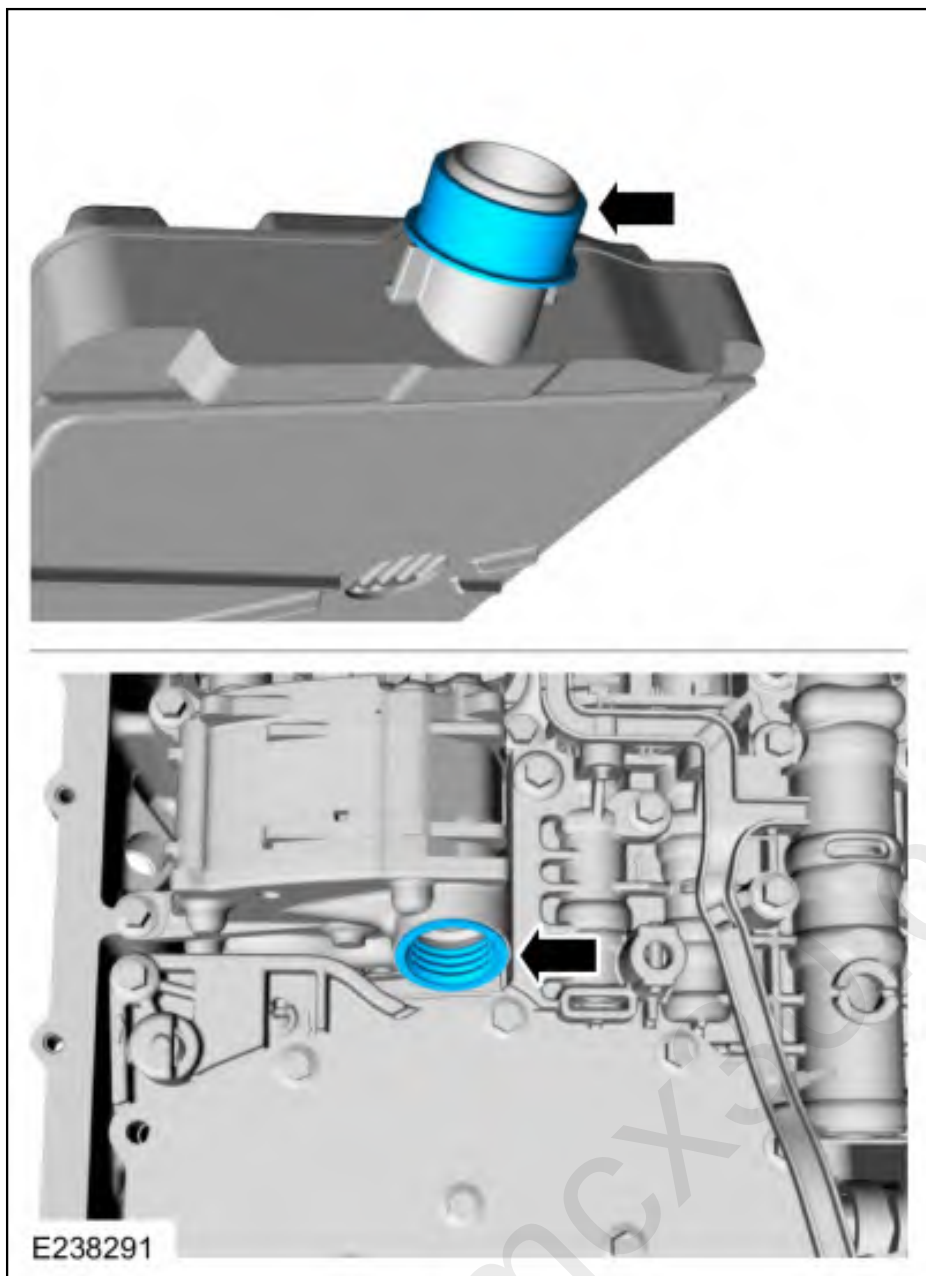
34. **NOTE:** *The transmission fluid filter may be reused if no excessive contamination is indicated.*

Remove the bolts and the transmission fluid filter.

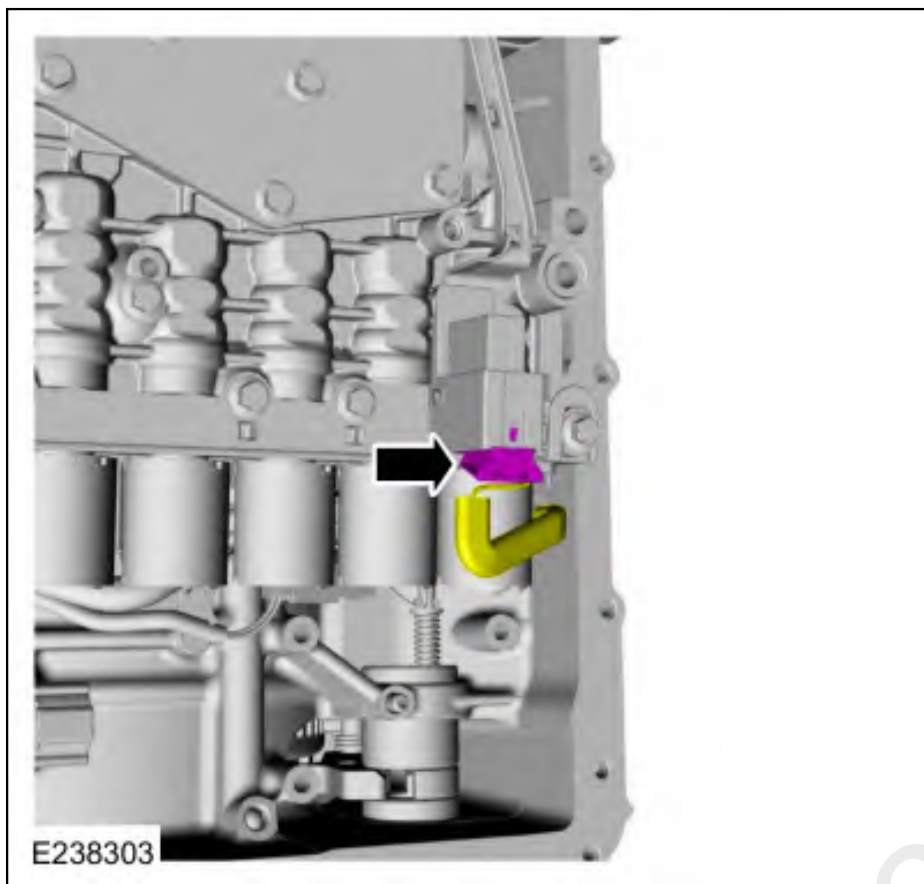


35. **NOTE:** *The transmission fluid filter seal will either come off with the transmission fluid filter or it will be stuck in the pump.*

Remove the transmission fluid filter seal.

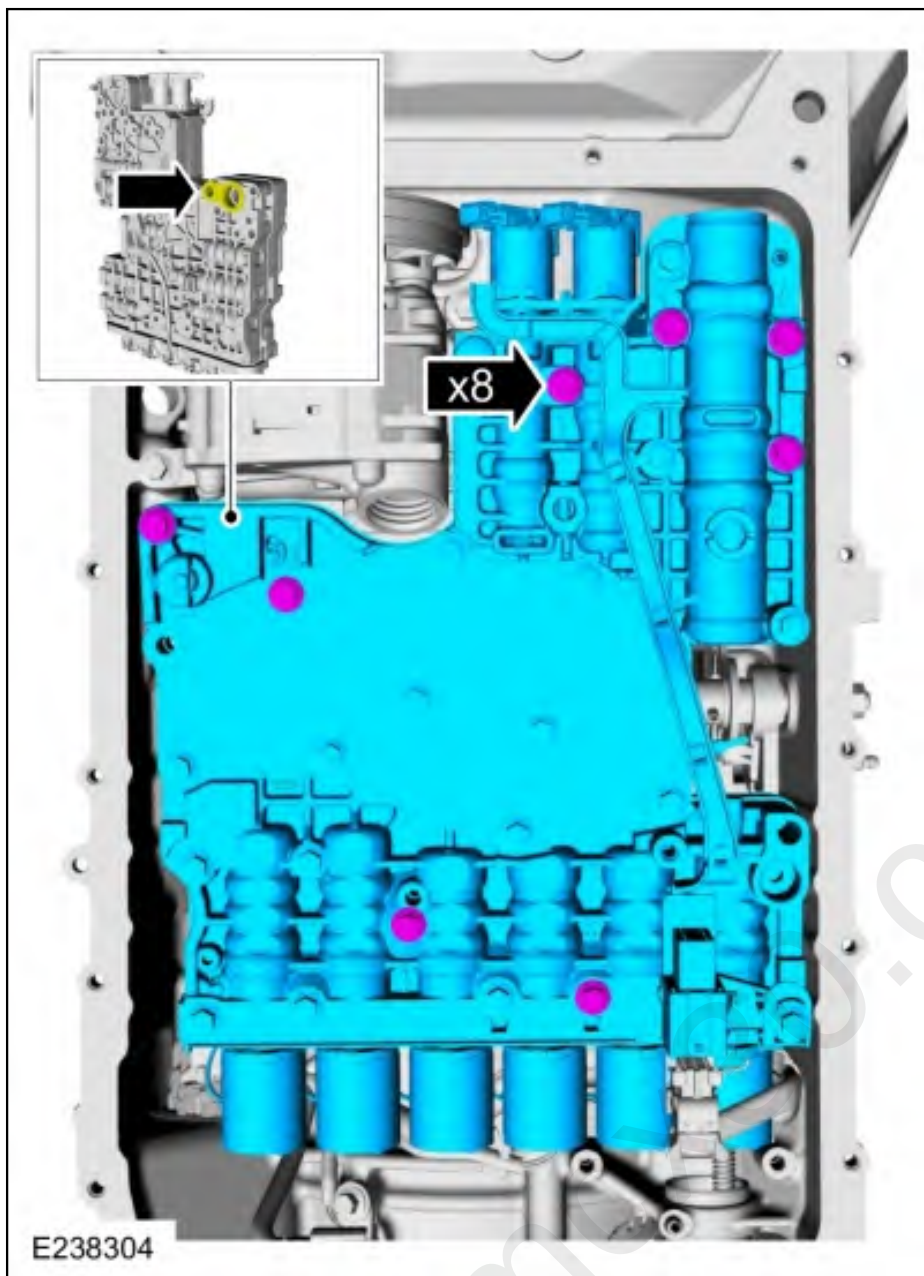


36. Disconnect the main control main electrical connector.



37. **NOTE:** Check to see if the main control-to-transmission fluid pump seal is attached to the main control.

Remove the bolts and the main control assembly.



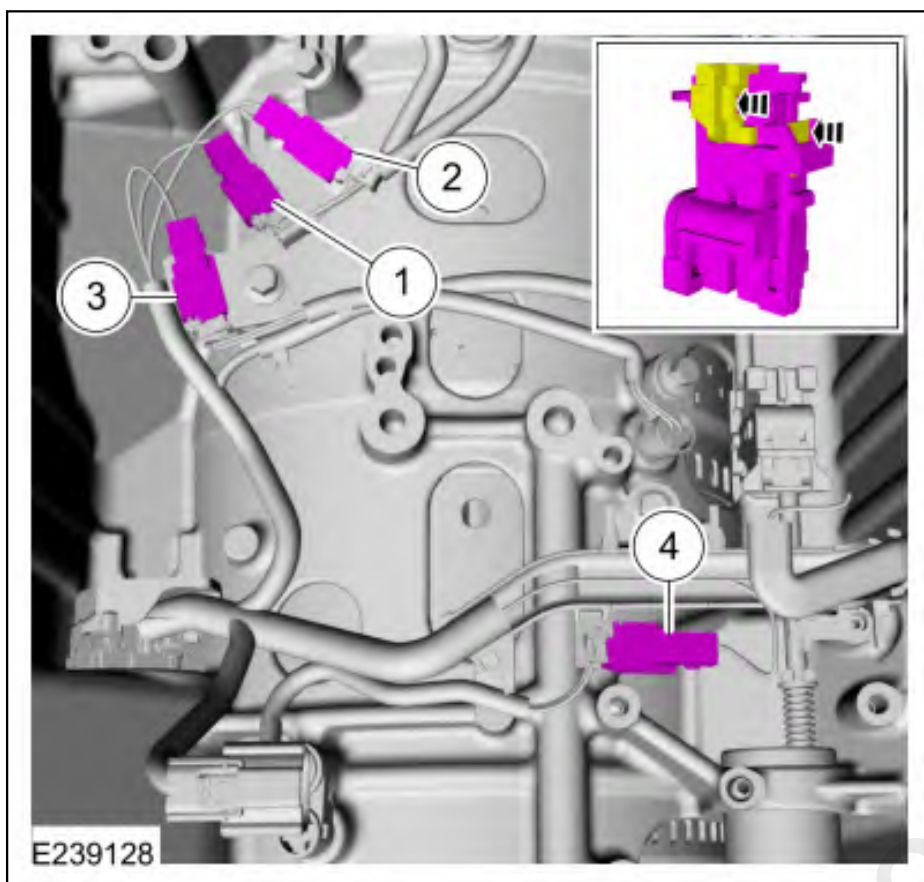
38. Clean and inspect the main control for damage.

Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

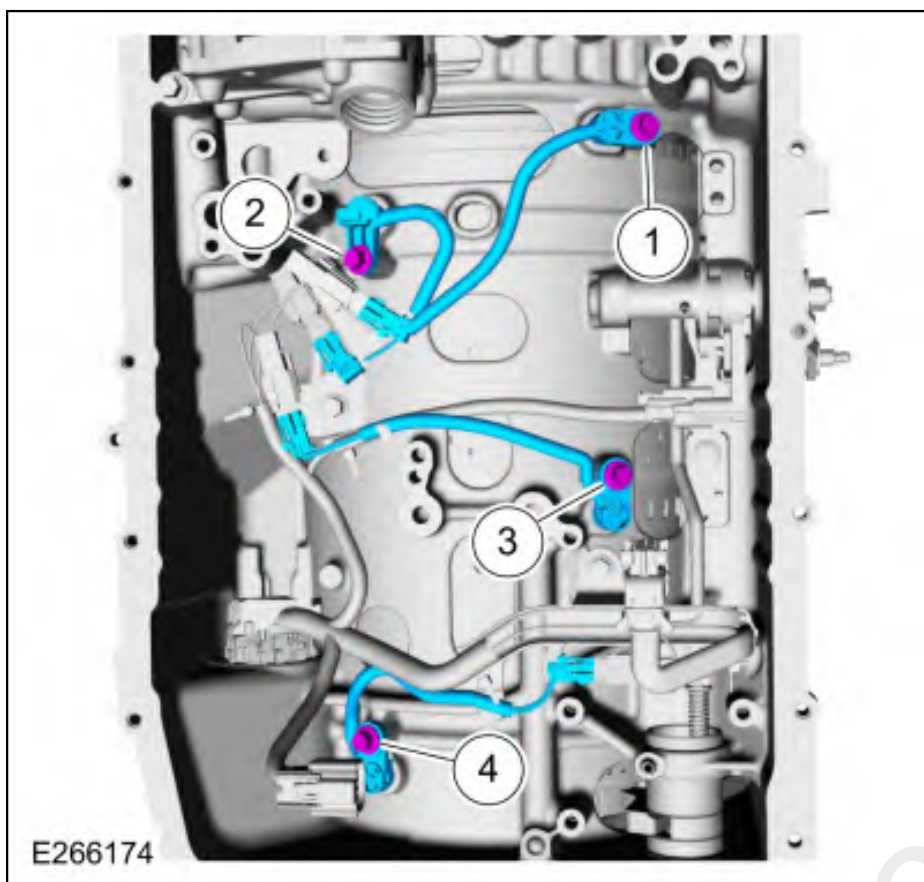
39. Unlock and disconnect the speed sensors.

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

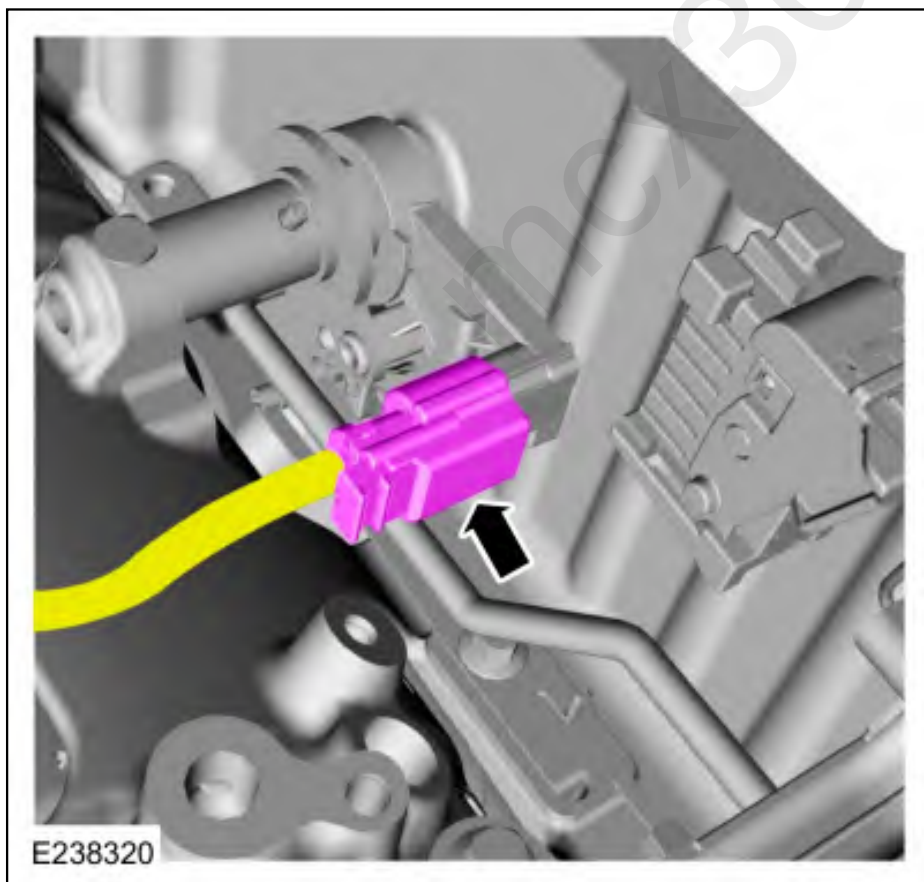


40. Remove the speed sensors.

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



41. Disconnect the TR sensor electrical connector.



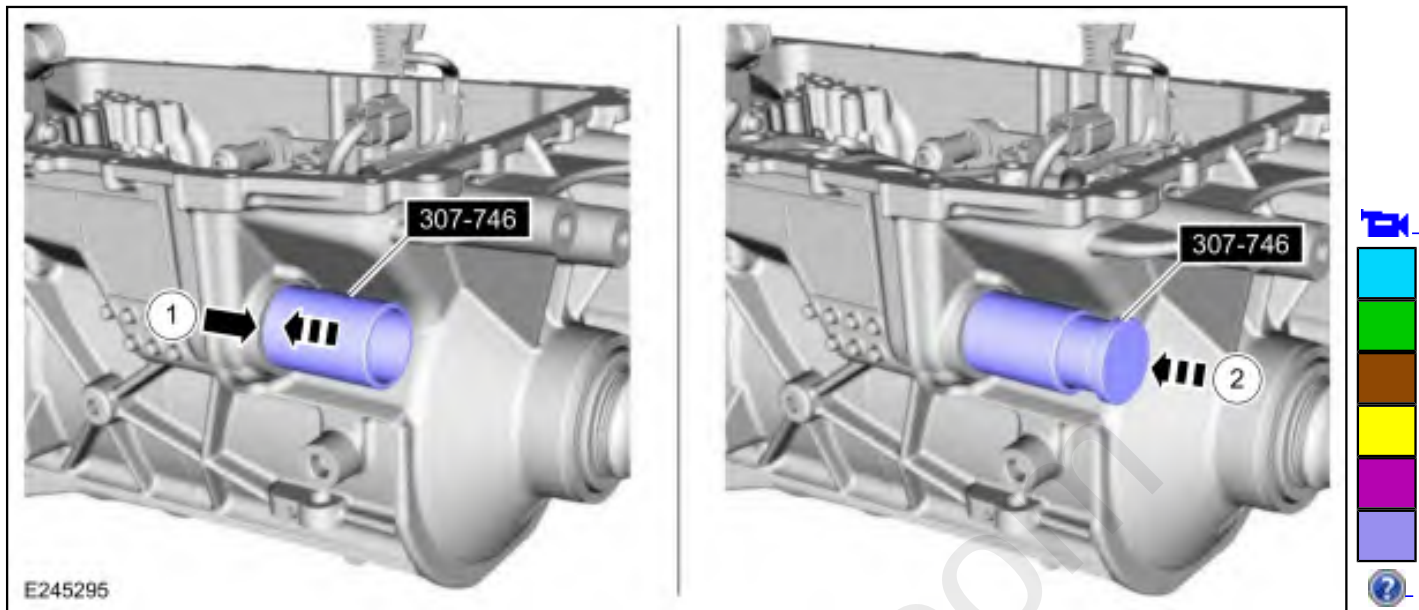
42.

Using the special tool, disconnect the transmission internal wiring harness connector from the transmission case.

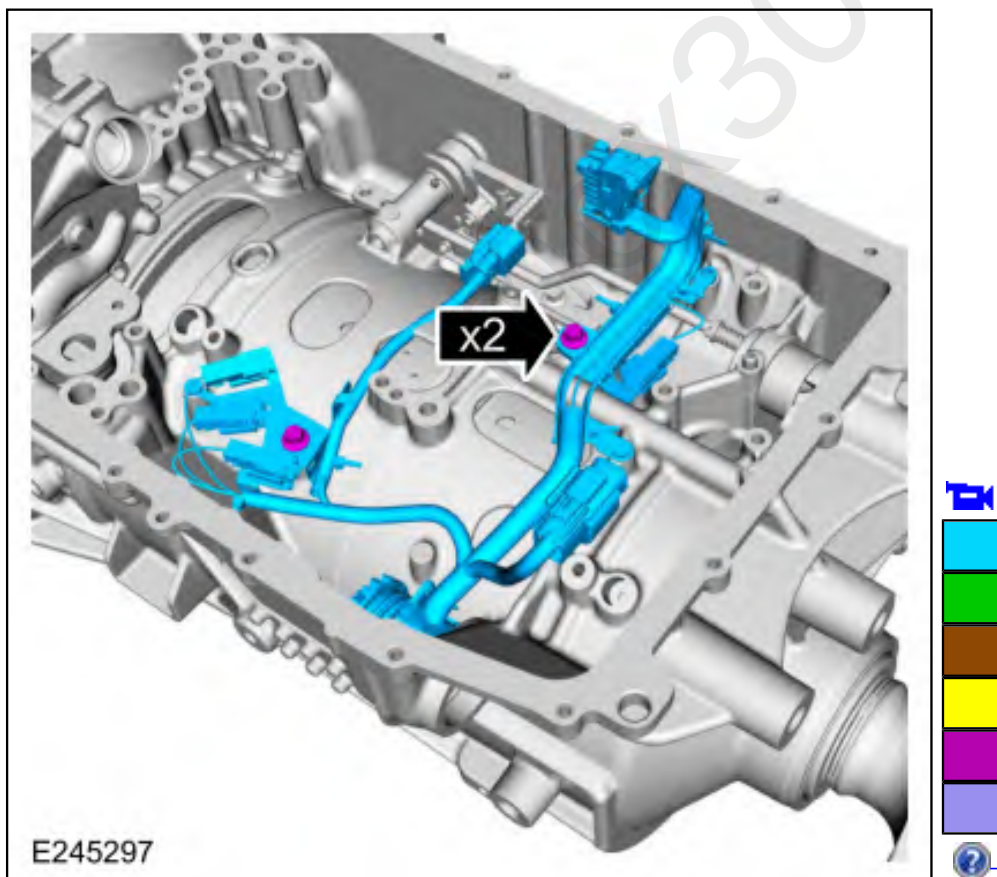
1. Slide the special tool over the connector flush with the transmission case.

Use Special Service Tool: 307-746 Remover, Transmission Wiring Harness Connector.

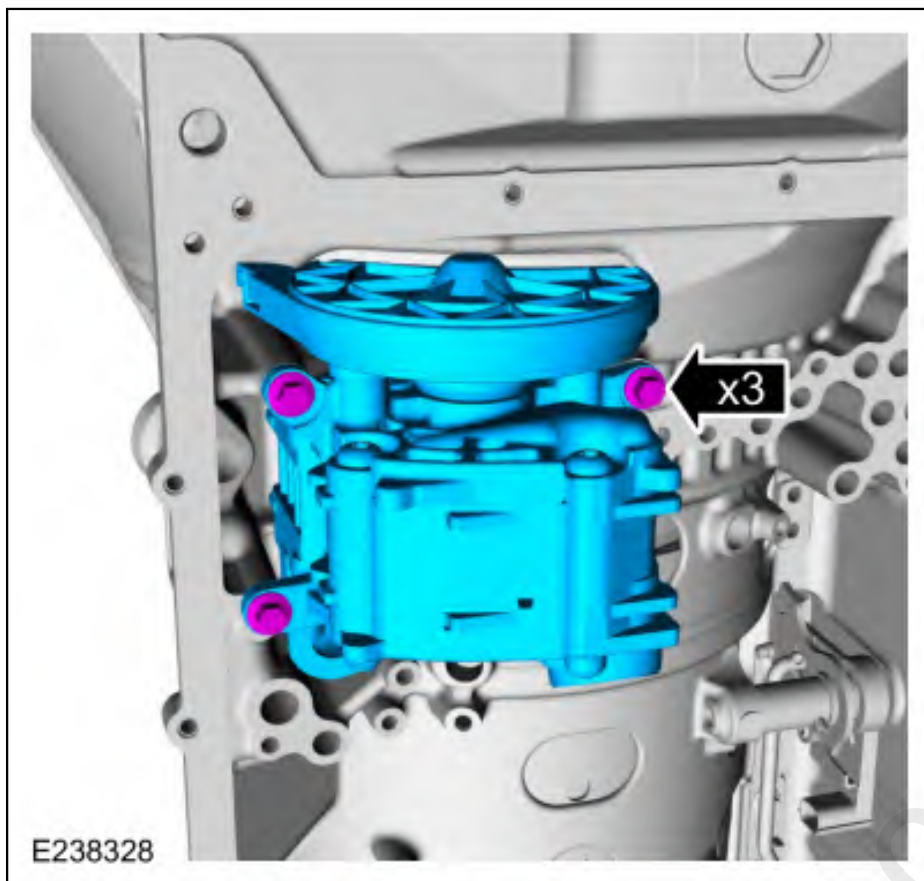
2. Use the special tool to push the connector through the case.



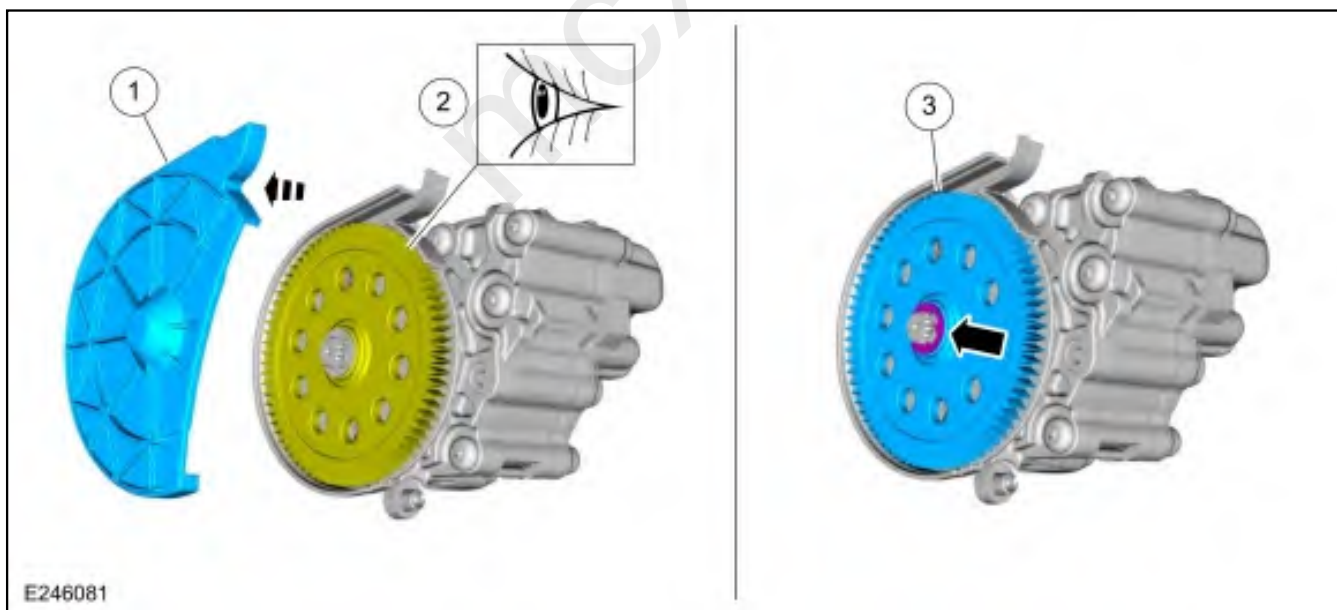
43. Remove the bolts and the transmission internal wiring harness.



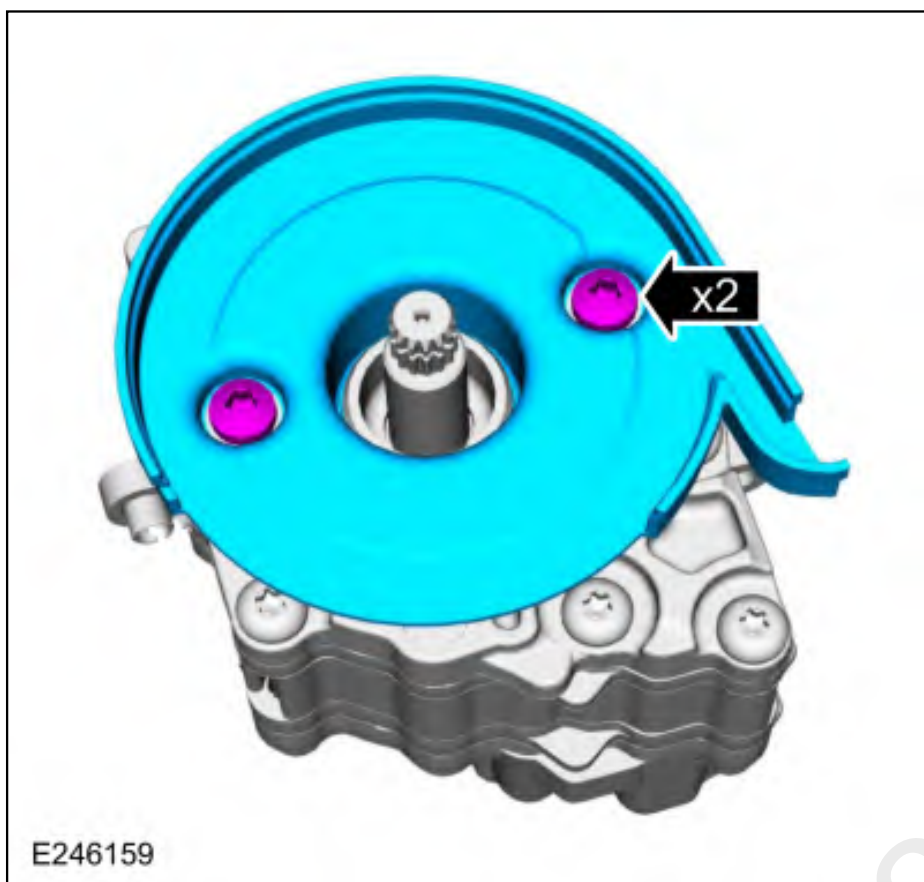
44. Remove the bolts and the transmission fluid pump.



1. Remove the transmission fluid pump driven gear outer cover.
2. Clean and inspect the transmission fluid pump driven gear.
3. If replacing the transmission fluid pump driven gear or transmission fluid pump driven gear inner cover, remove the retaining ring and the transmission fluid pump driven gear.

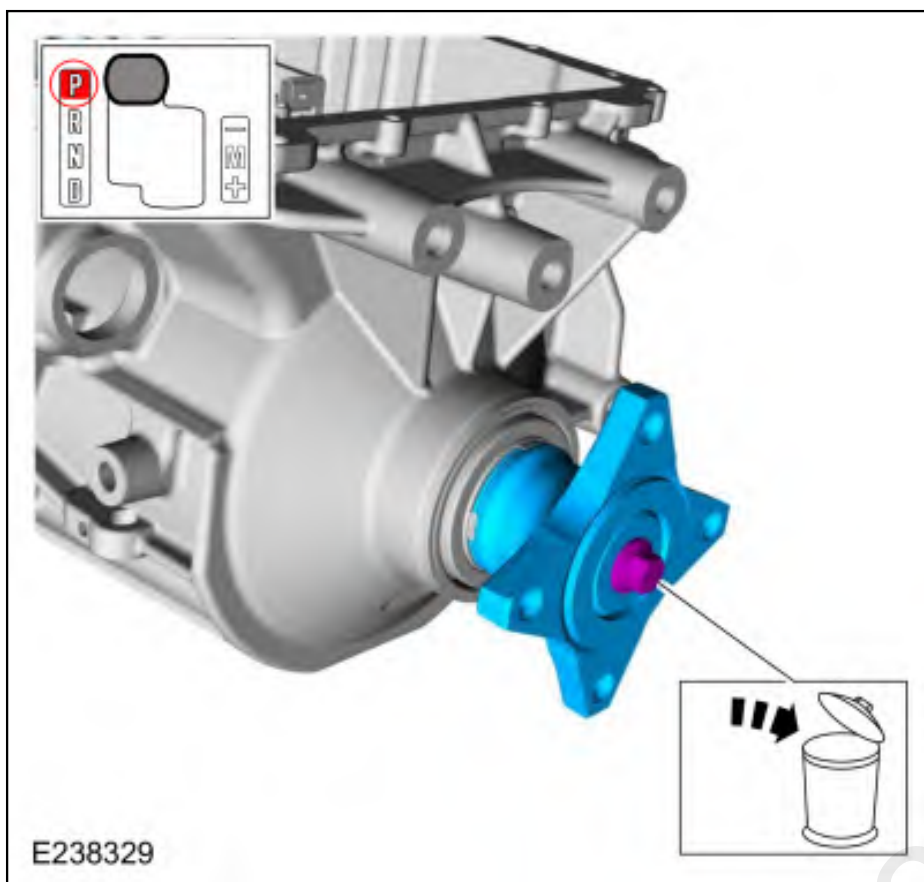


46. If necessary, remove the bolts and the transmission fluid pump driven gear inner cover.

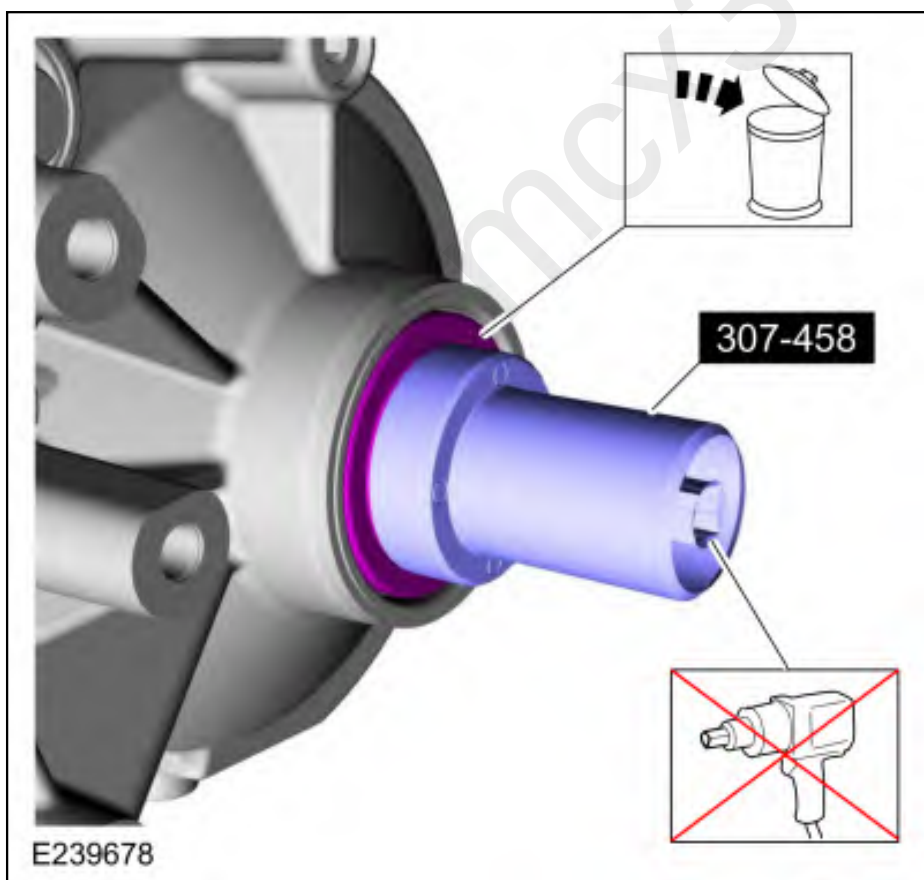


Rear Wheel Drive (RWD) vehicles

47. Rotate the manual control lever to P. Remove and discard the output shaft flange bolt (7N134). Remove the output shaft flange and anti-ting ring assembly.

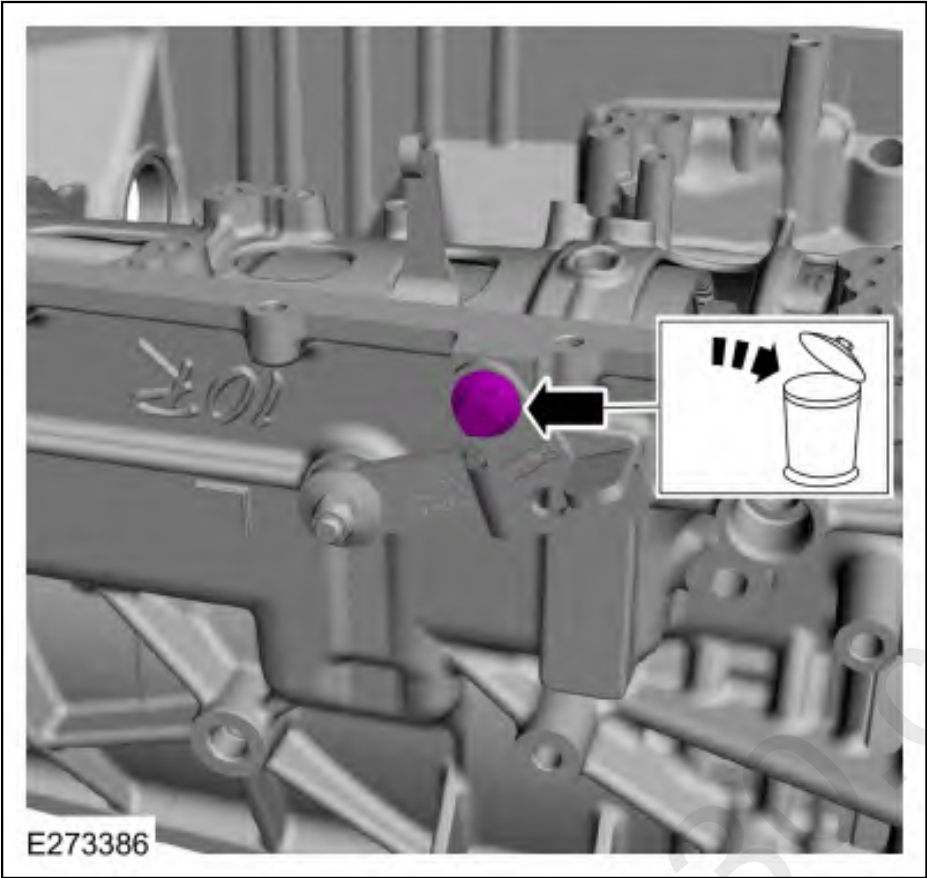


48. Using the special tool, remove and discard the output shaft nut (7085).
Use Special Service Tool: 307-458 Socket, Output Shaft Locknut.

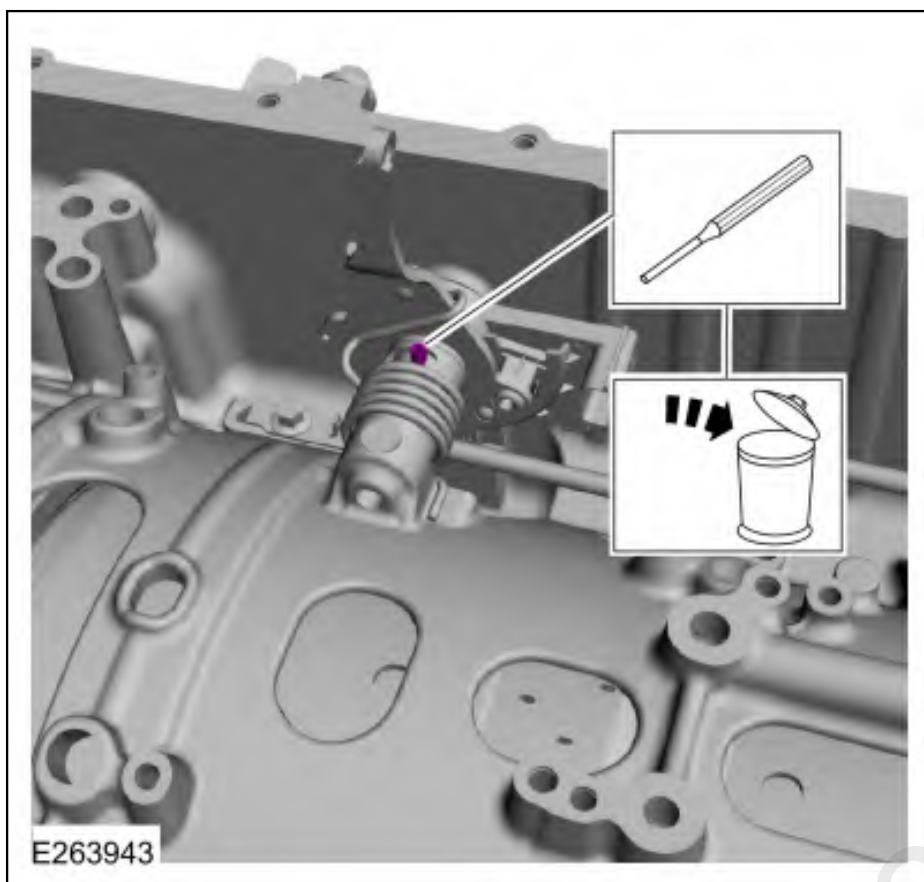


Vehicles with Rotary Gear Shift Knob / Gear Shift Buttons

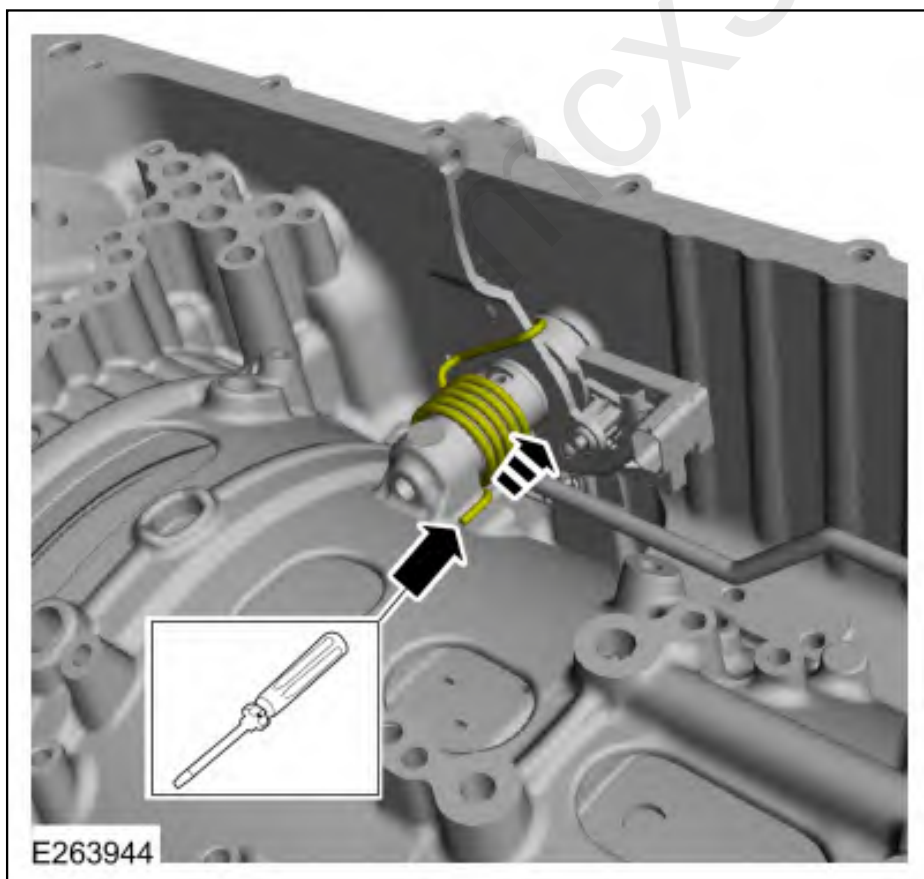
49. Remove and discard the park override lever bolt (7P219).



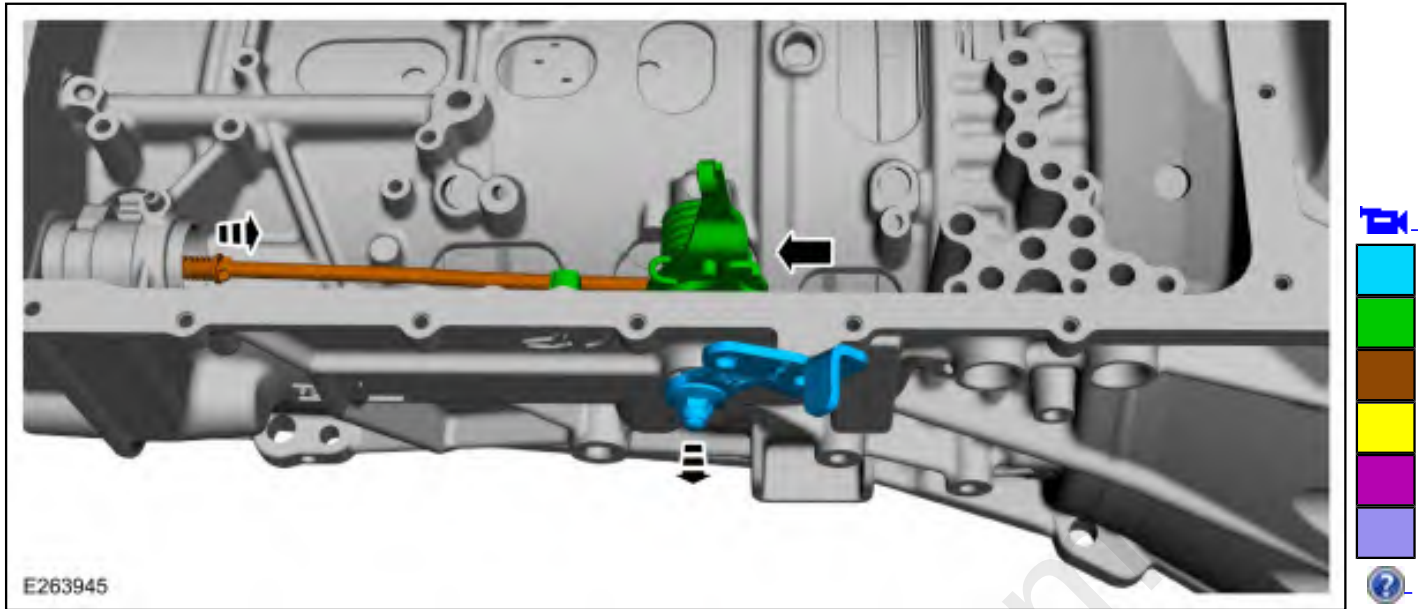
50. Using a punch, remove and discard the manual shaft-to-TR sensor roll pin (7G100).
Use the General Equipment: Punch



- 51.
- Release the tension from the park return spring.
- Slide the end of the park return spring off the transmission case.

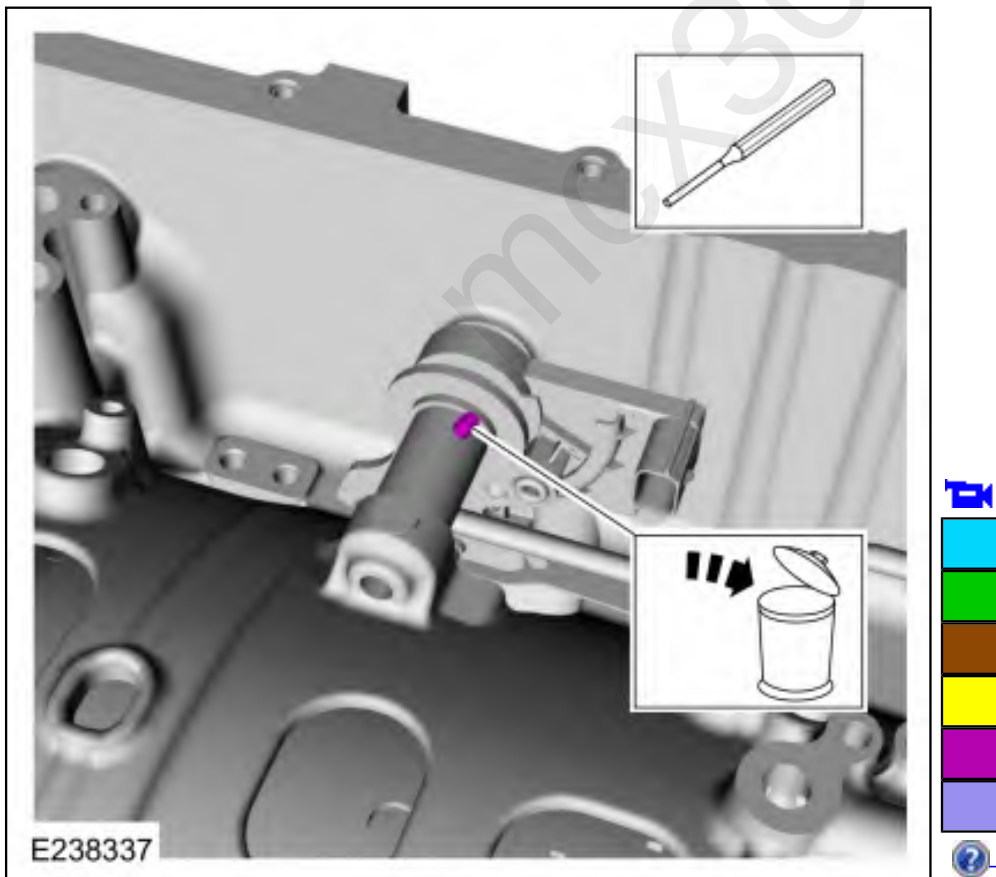


52. Remove the manual shaft and park override lever, the TR sensor and the park pawl actuator rod.

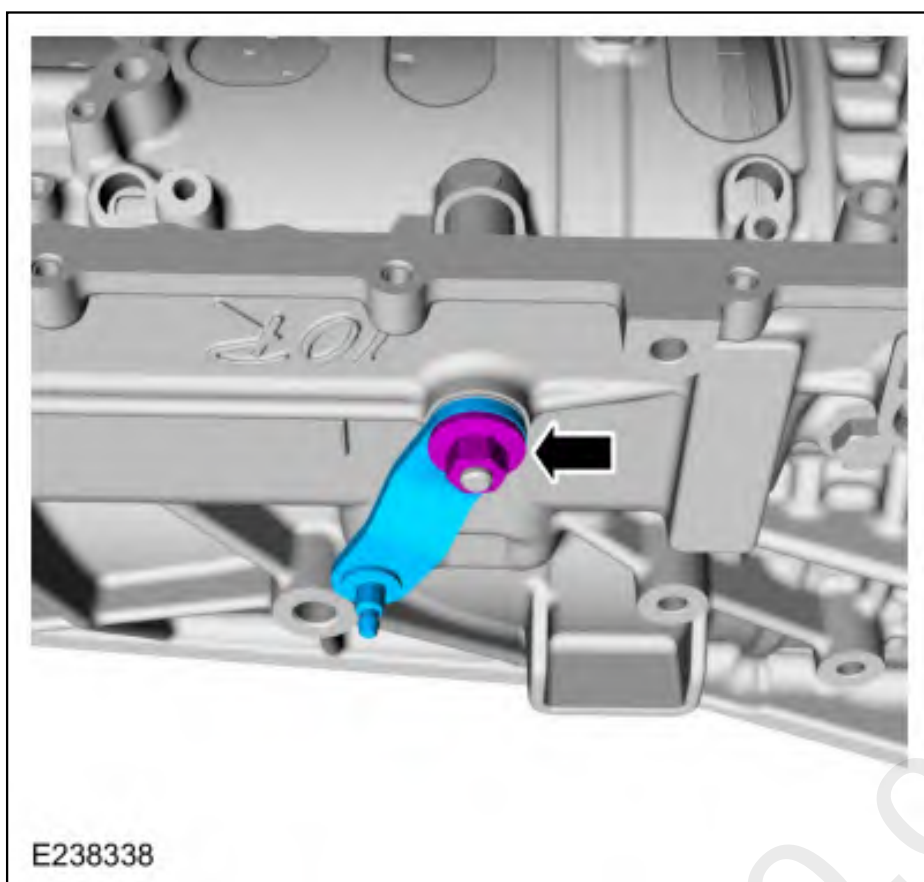


Vehicles with Manual Control Lever

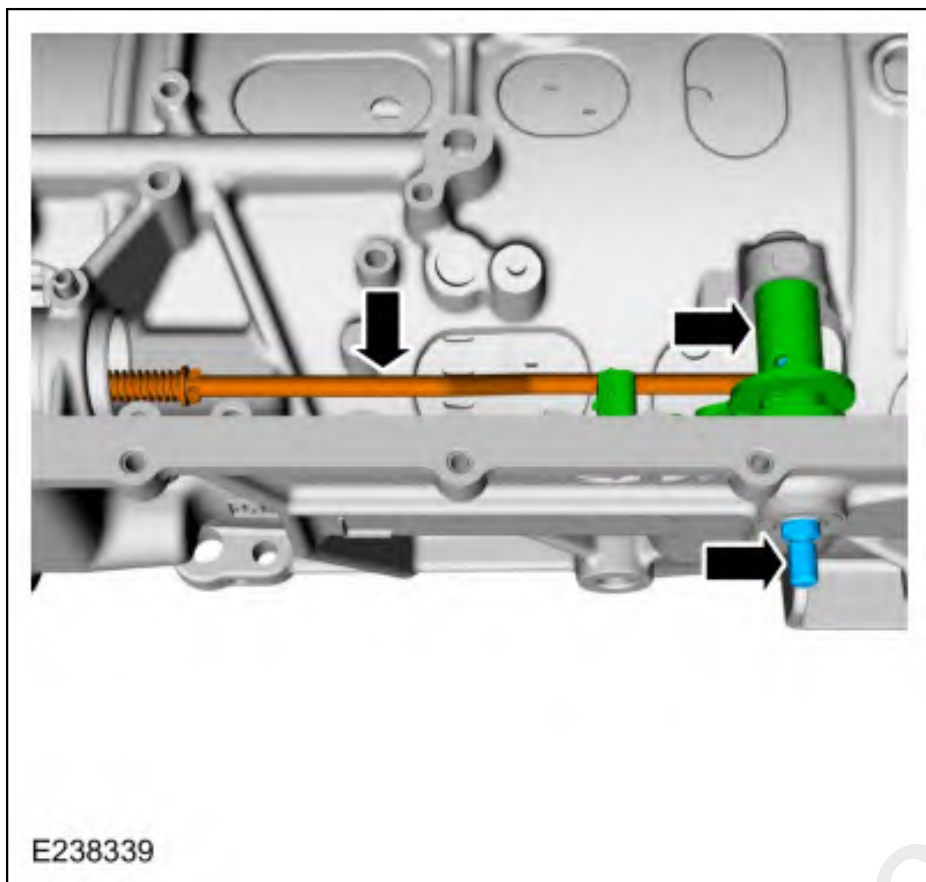
53. Remove and discard the manual control shaft-to-TR sensor roll pin (7G100).
Use the General Equipment: Punch



54. Remove the nut and the manual control lever.

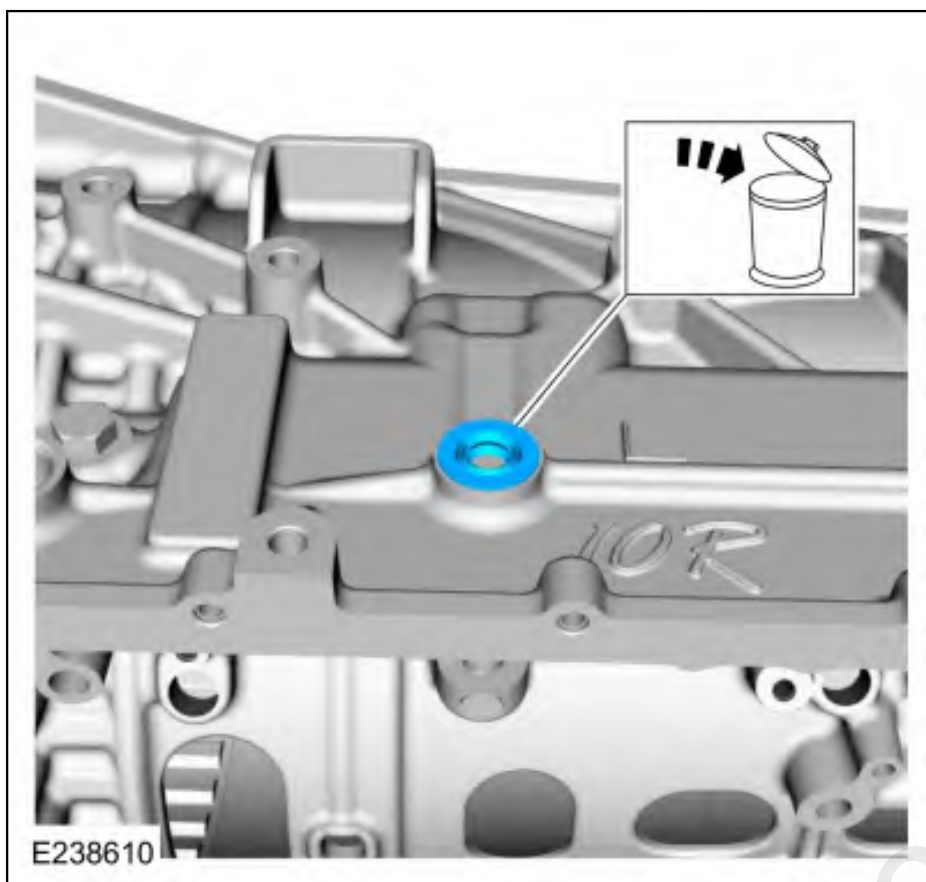


55. Remove the manual control shaft, the TR sensor and the park pawl actuator rod.

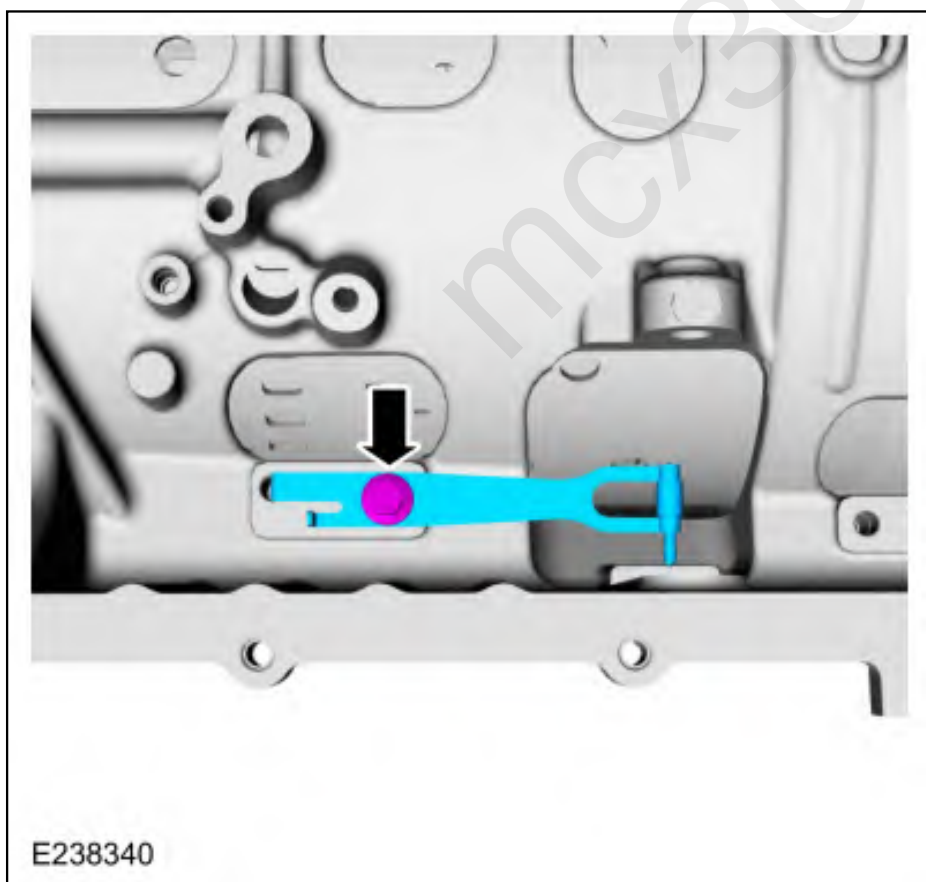


All vehicles

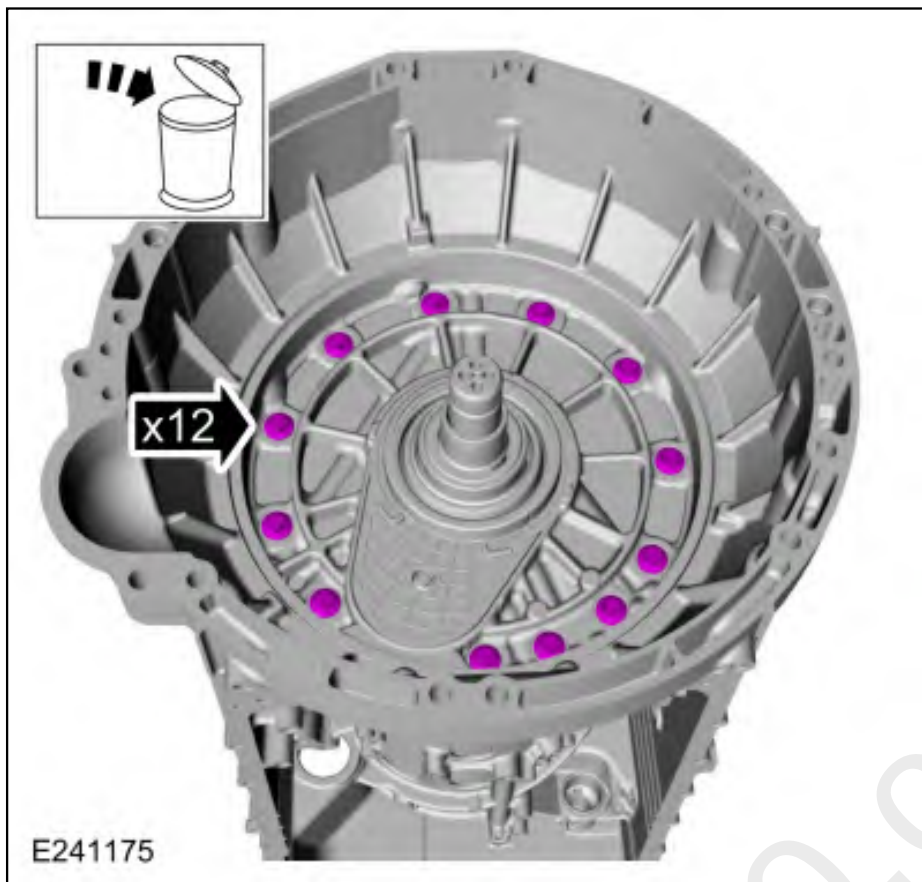
- 56. Remove and discard the manual control shaft seal (7F337).



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

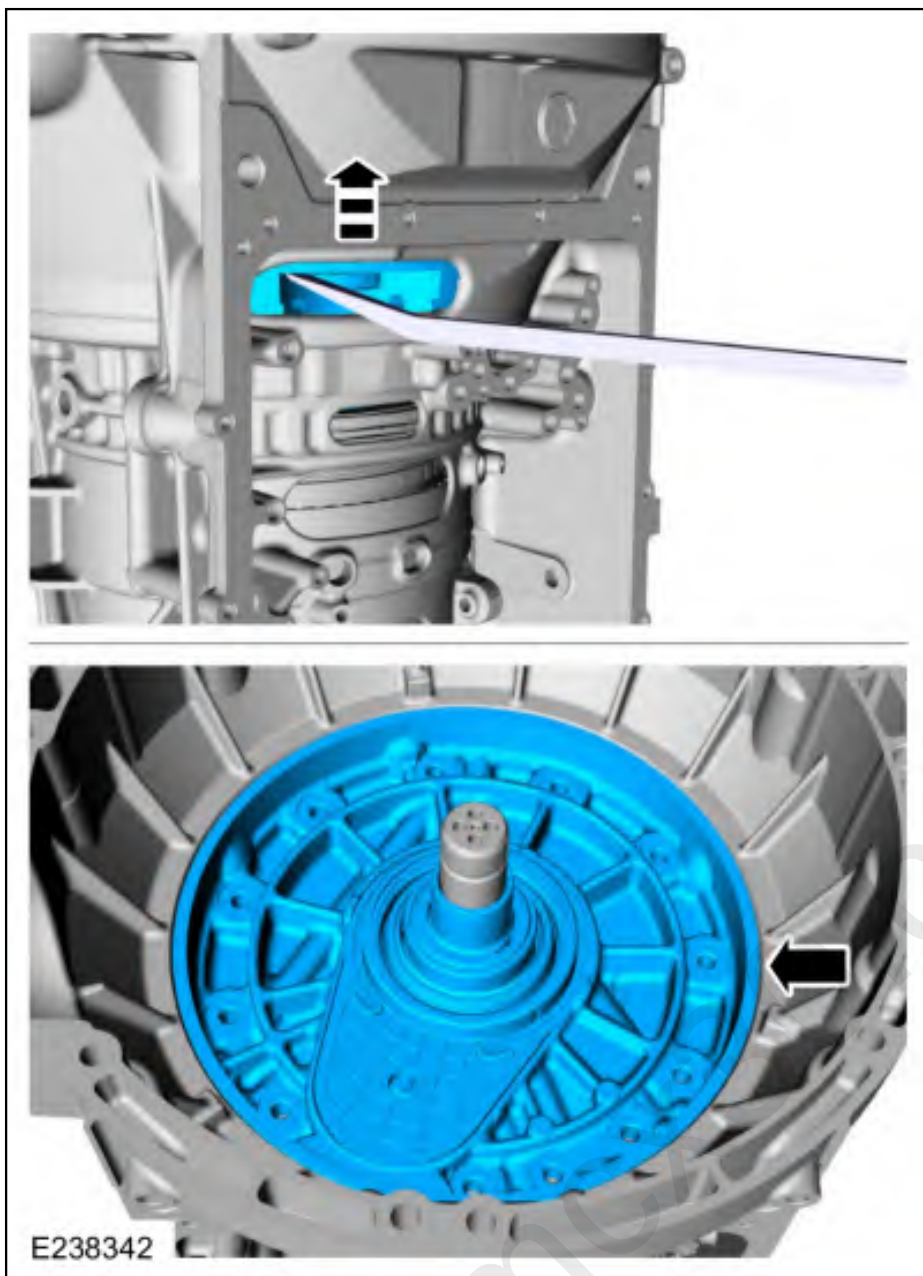


58. Rotate the transmission to a vertical position. Remove and discard the front support assembly bolts (7N134).

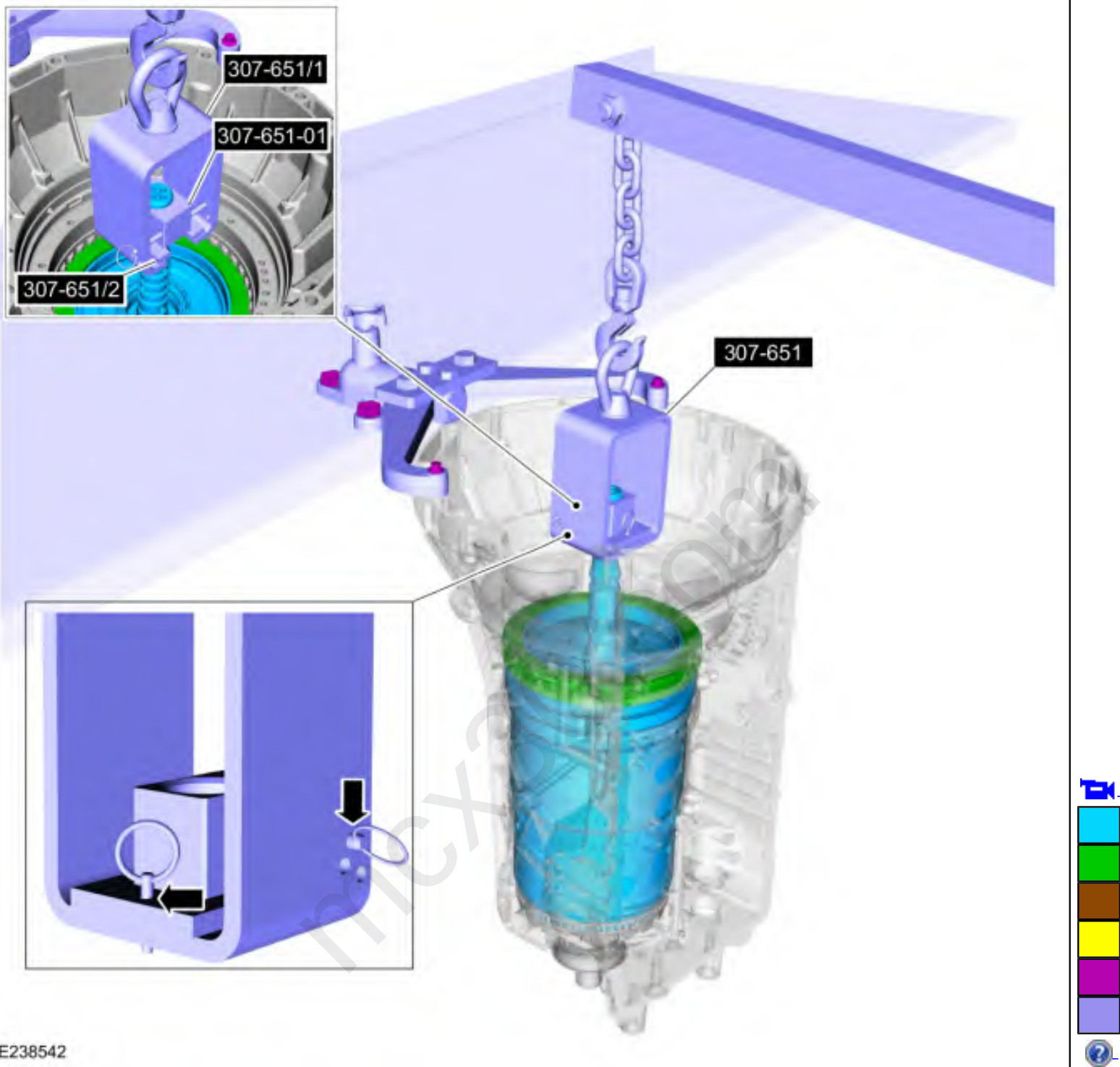


59. **NOTICE:** Be careful not to contact the transmission fluid pump drive gear, or damage to the gear can occur.

Using a prybar, pry the front support assembly out of the transmission case and remove the front support assembly.



60. Using the special tool and a floor crane, remove the clutch and planetary assembly.
Use Special Service Tool: 307-651 Bracket, Pump Remover/Installer.



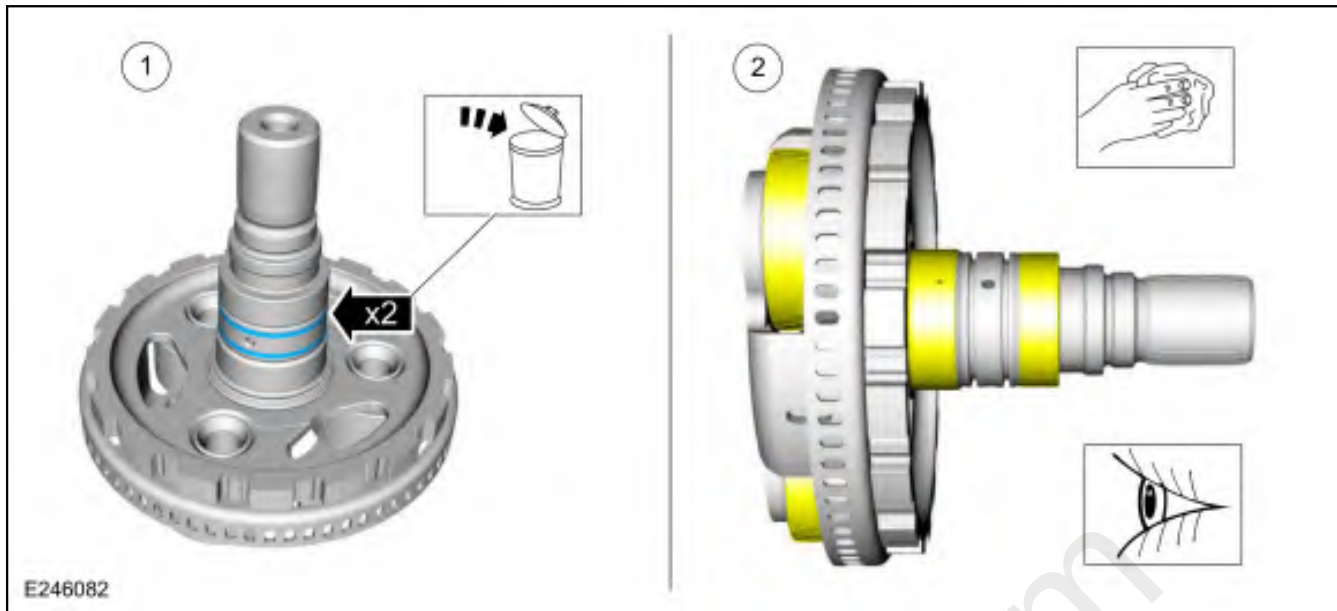
61. Remove the (T9) thrust bearing.



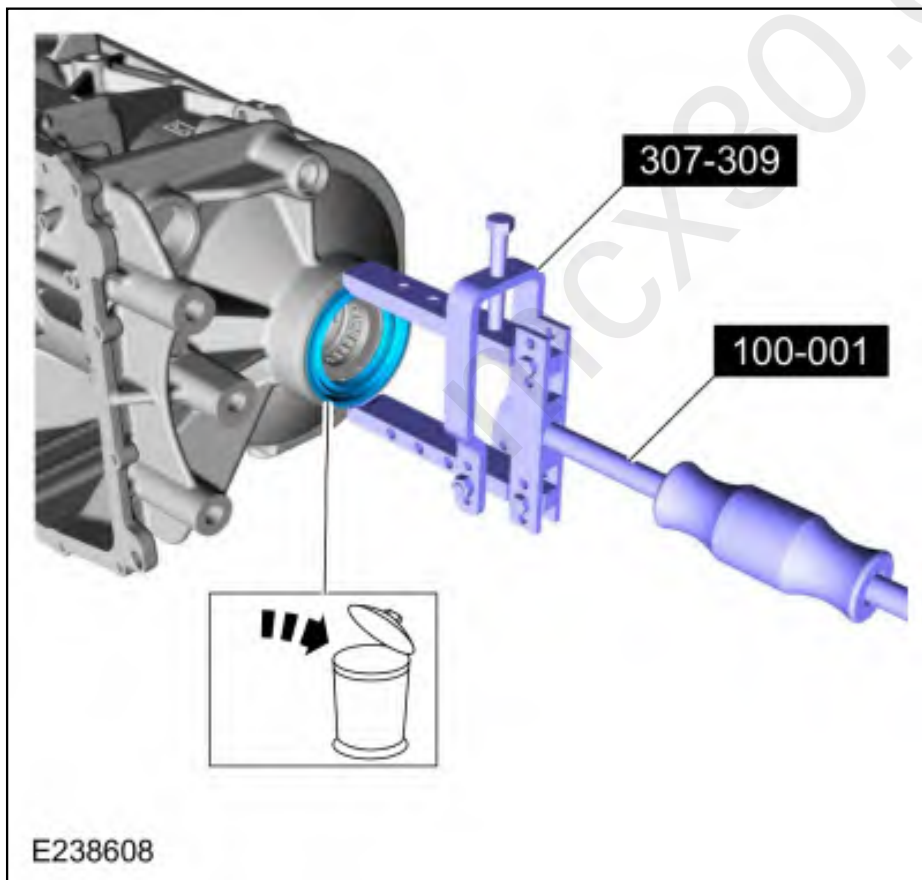
62. Remove the output shaft and planetary carrier No. 4 assembly.



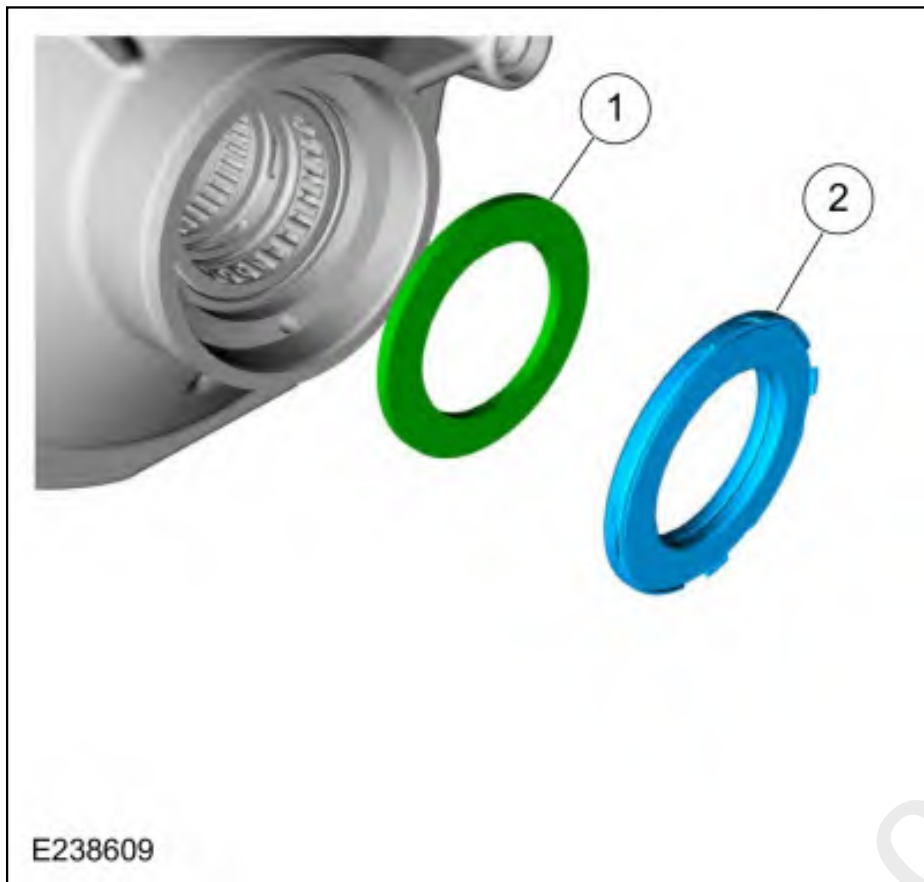
1. Remove and discard the output shaft seals.
2. Clean and inspect the output shaft and planetary carrier No. 4 assembly.



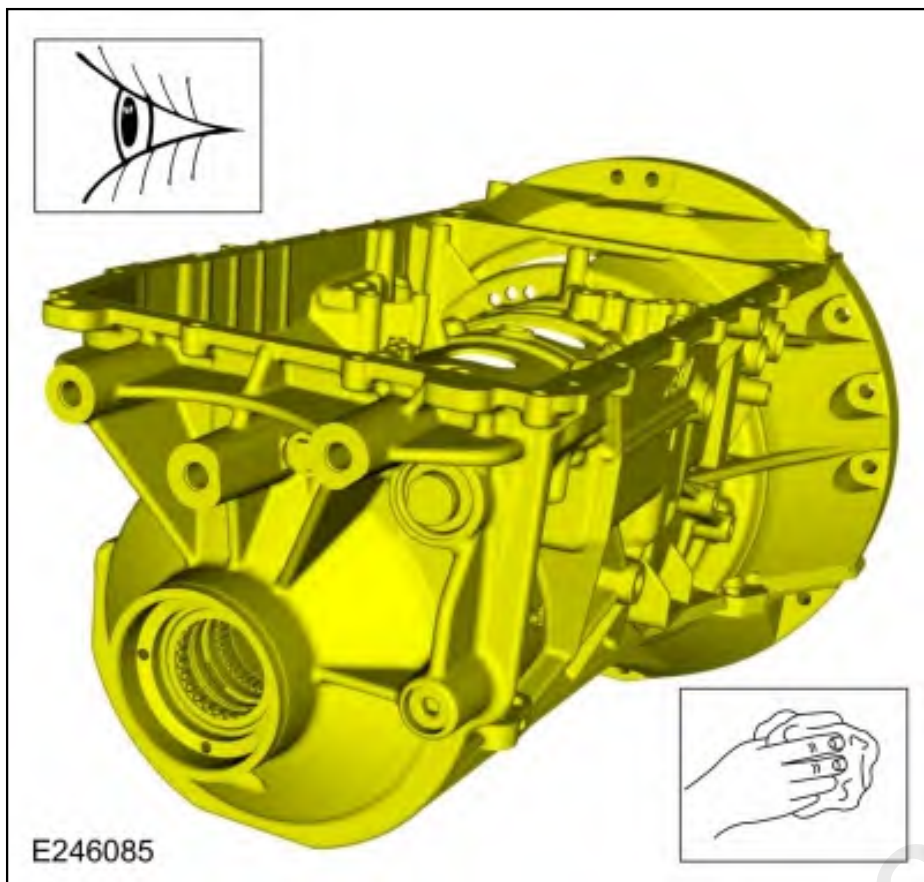
64. Using the special tools, remove and discard the output shaft seal (7052).
 Use Special Service Tool: 100-001 (T50T-100-A) Slide Hammer, , 307-309 Remover, Torque Converter Seal.



65. If equipped, remove the (T11) thrust bearing and the thrust washer.
1. Thrust washer
 2. Thrust bearing (T11)

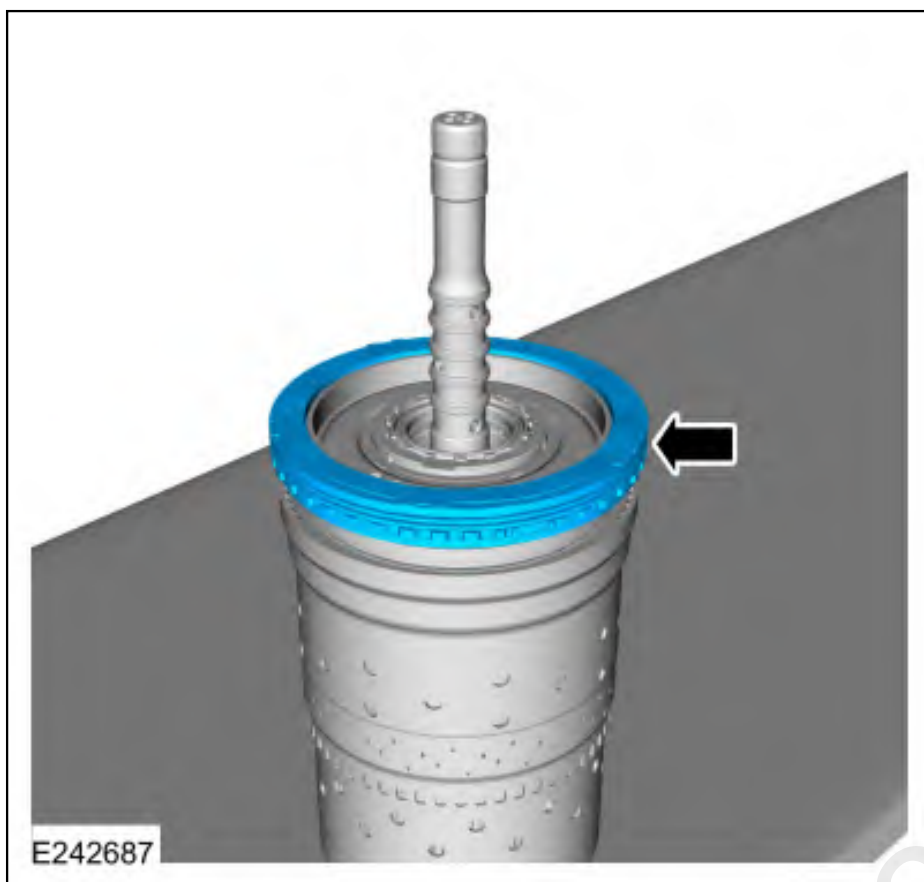


66. Clean and inspect the transmission case and bearings. Check for leaks from plugs and park pawl actuator rod sleeve. Repair or replace as necessary.
Refer to: [Transmission Case](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Disassembly).

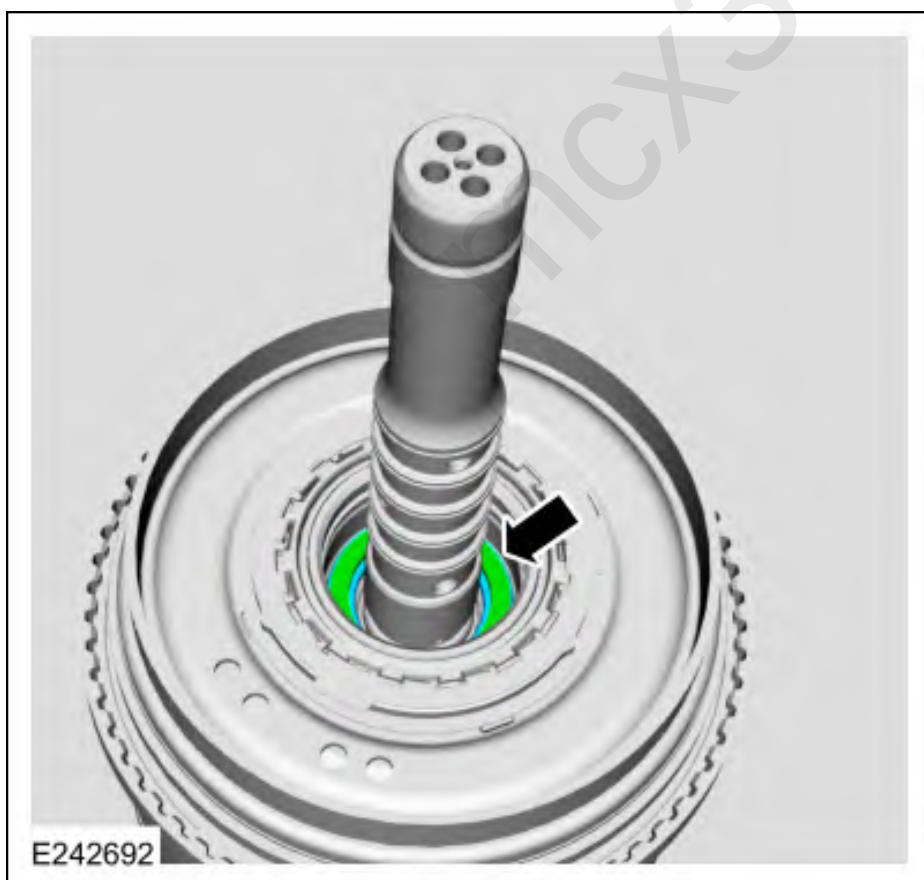


67. **NOTICE:** If replacing A clutch separating springs, all separating springs must be replaced as a matching set or damage can occur.

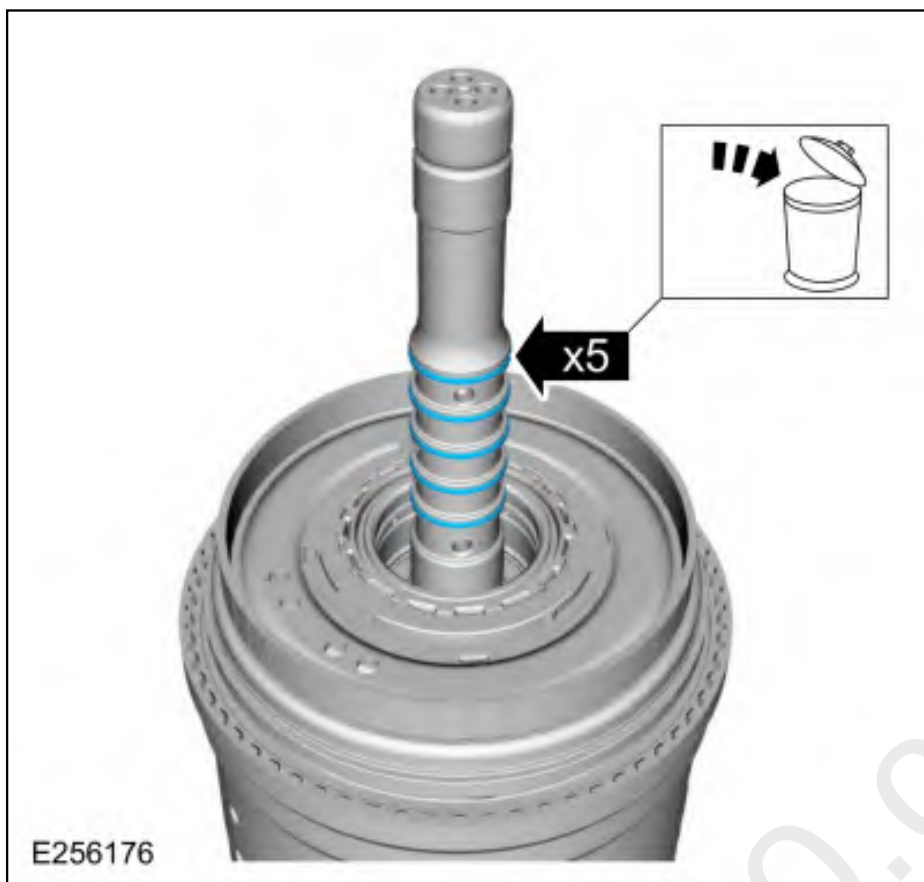
Remove the A clutch assembly. Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged replace as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



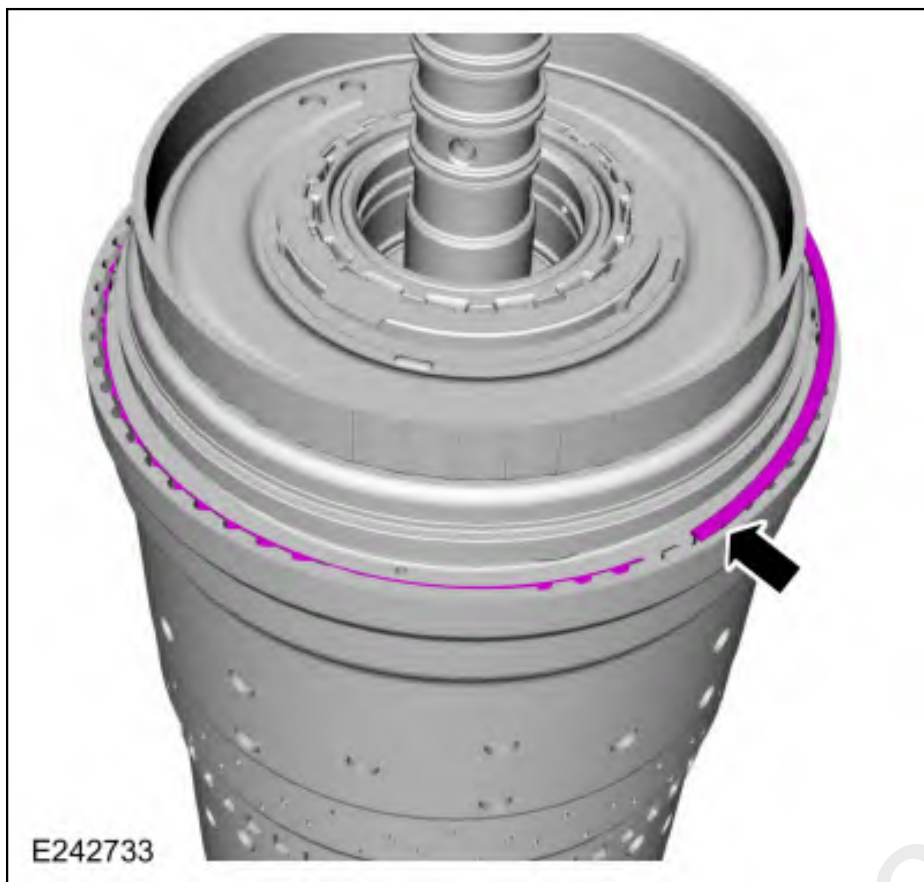
68. Using a magnet, remove the selective shim and the (T3) thrust bearing.
 Use the General Equipment: Magnet



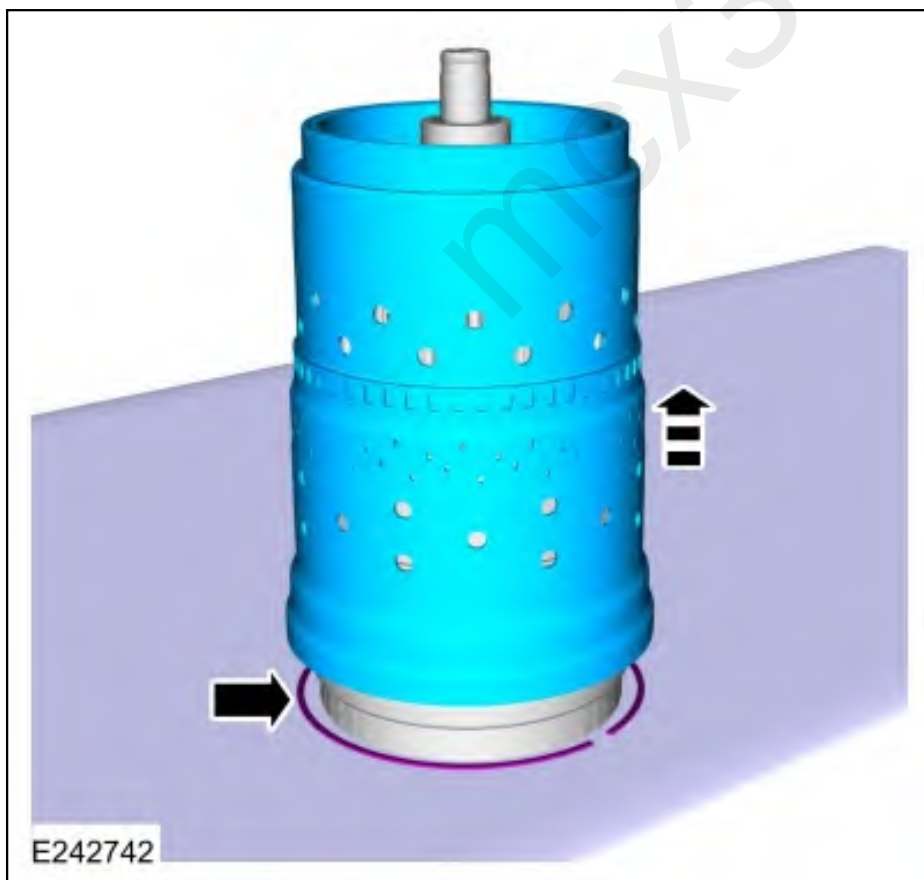
69. Remove and discard the input shaft front Teflon® seals.



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



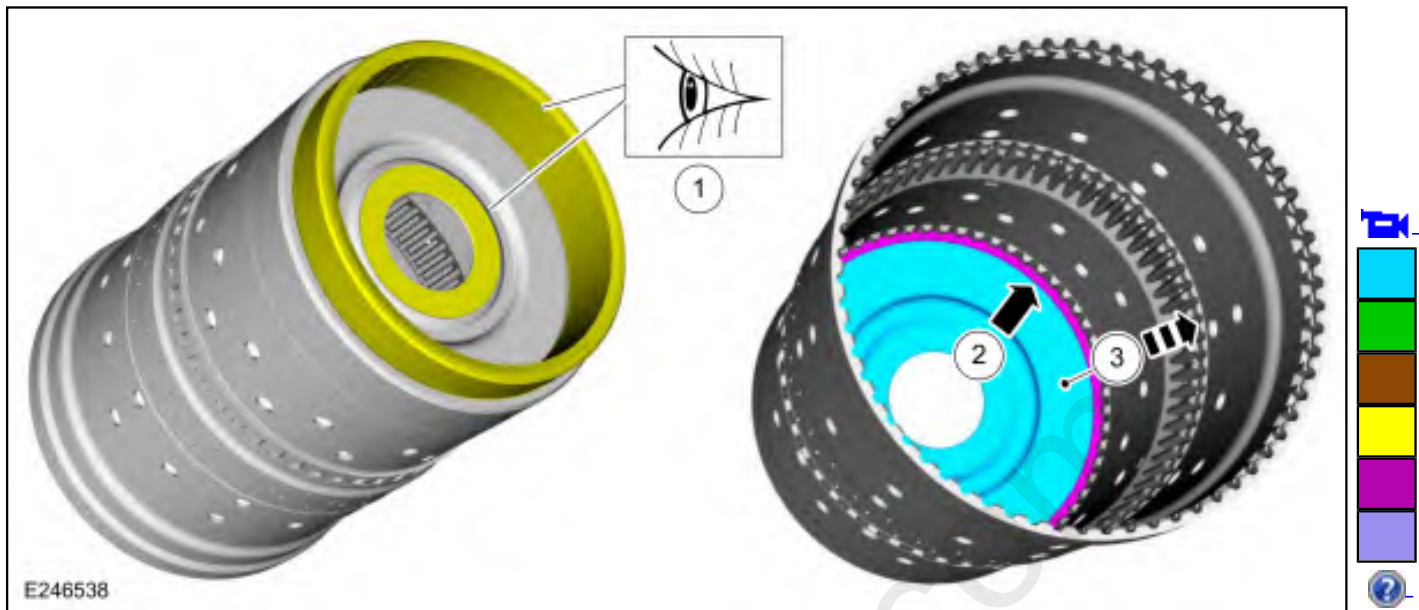
71. Flip the clutch and planetary assembly over with the input shaft through a hole in the bench. Remove the No. 1 planetary carrier snap ring and remove the clutch and planetary container cylinder.



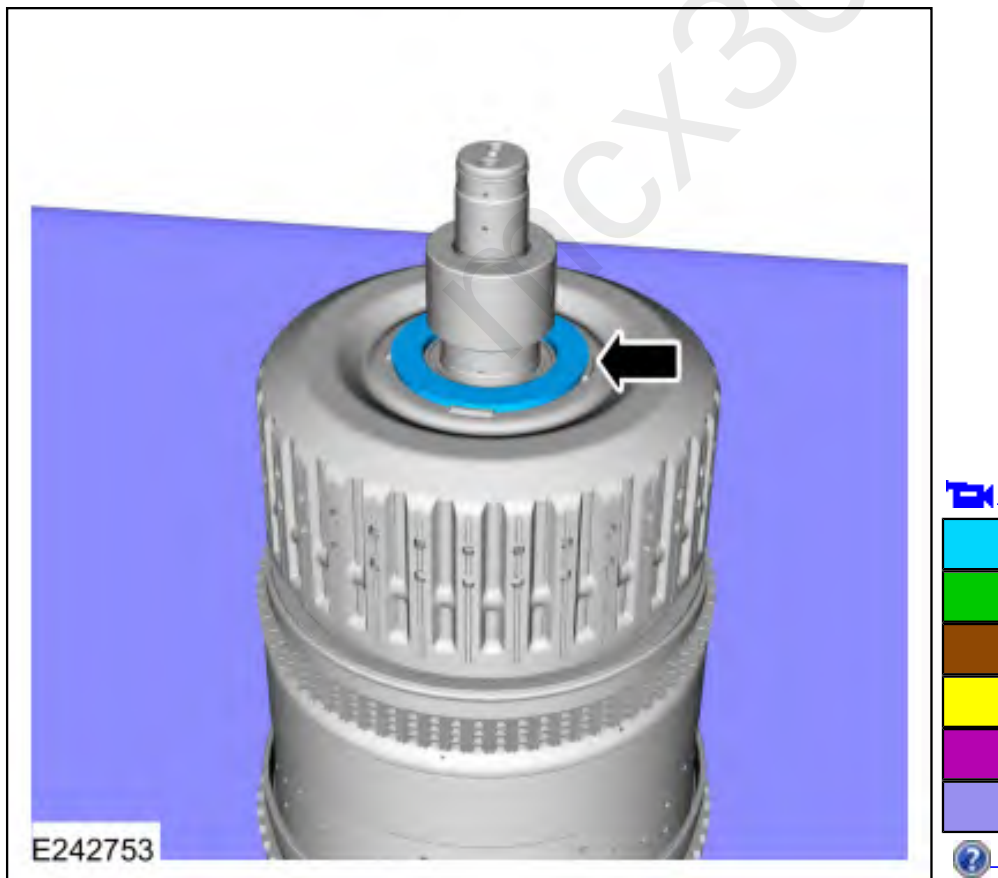
1. Inspect the No. 4 ring gear.
2. **NOTE:** Remove the ring gear when replacement is necessary.

If necessary, remove the ring gear snap ring.

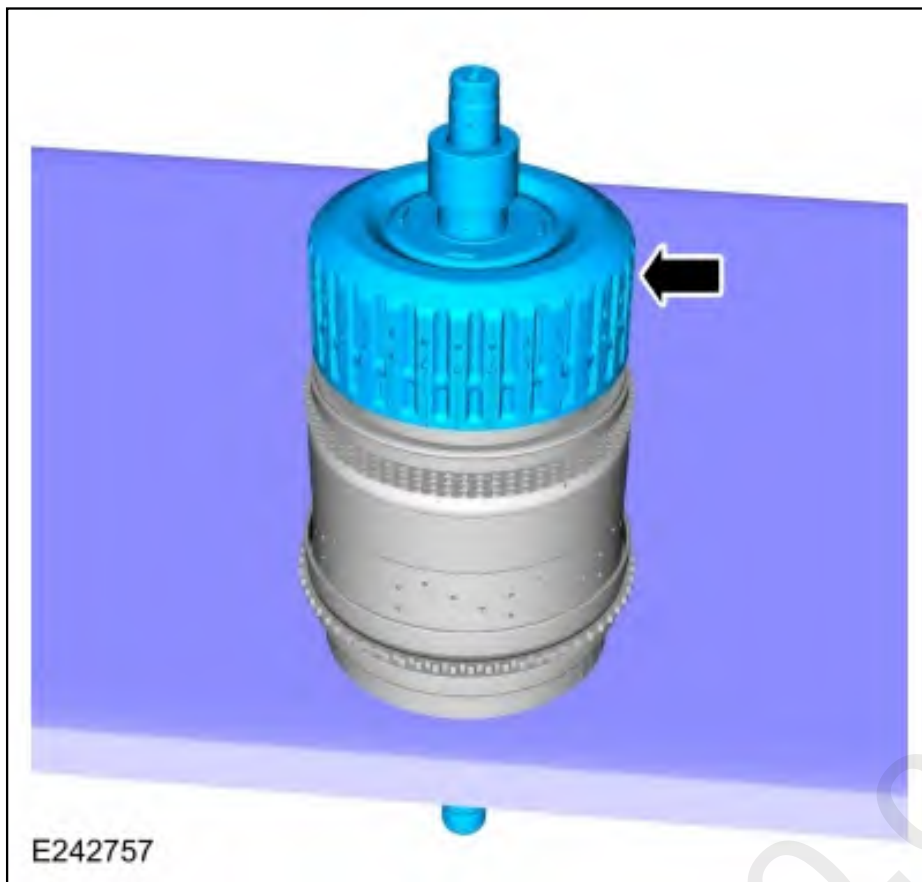
3. If necessary, remove the ring gear from the inside of the clutch and planetary container cylinder.



73. Remove the (T8) thrust bearing.



74. Remove the E clutch and input shaft assembly.



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



E242759



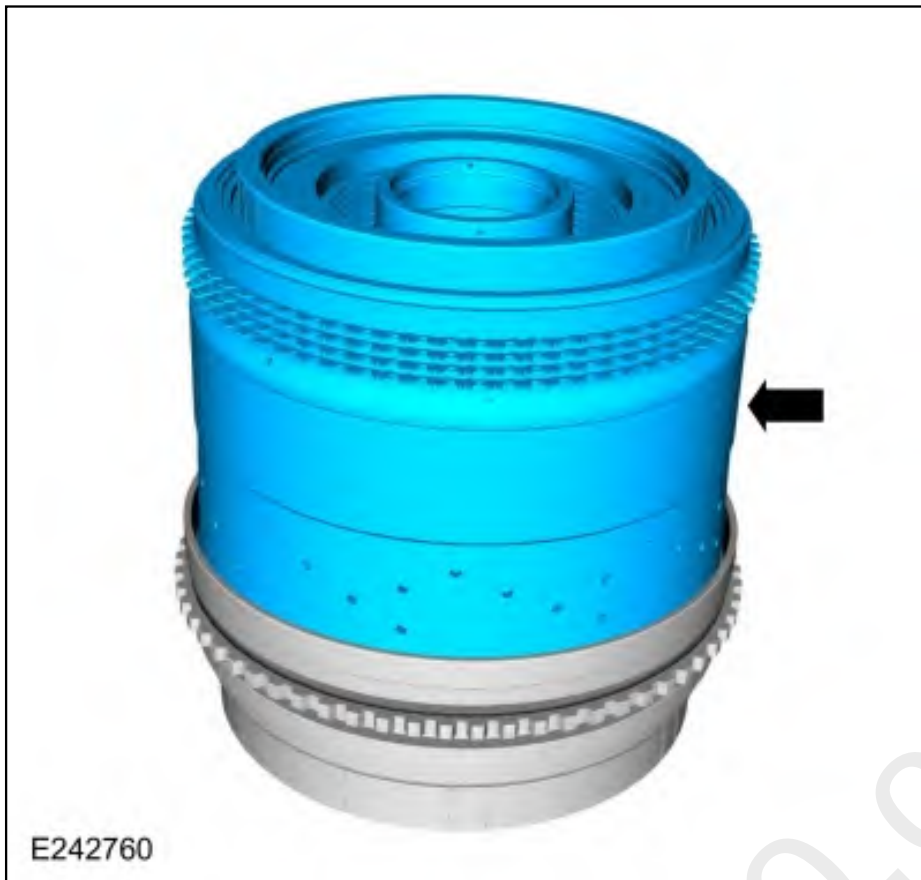
76. Inspect the No. 3 planetary carrier and the No. 3 sun gear.



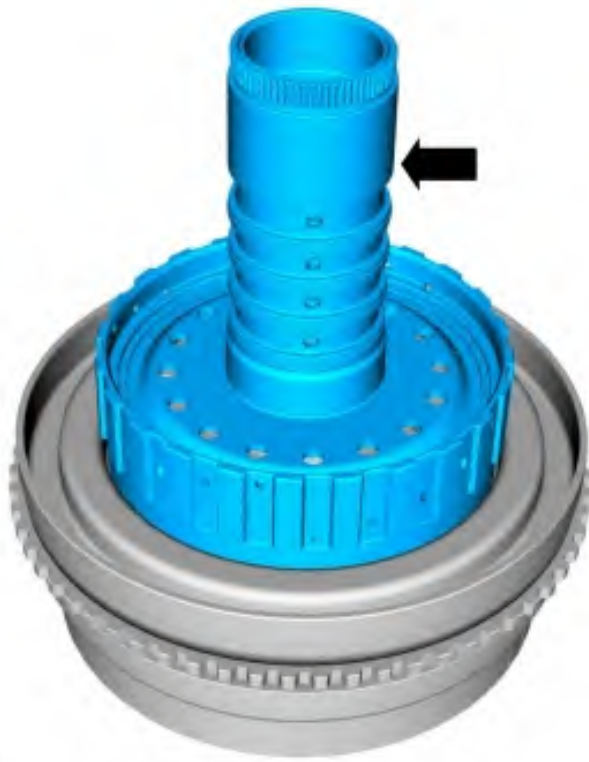
E246176



77. Remove the CDF clutch and planetary carrier assembly.



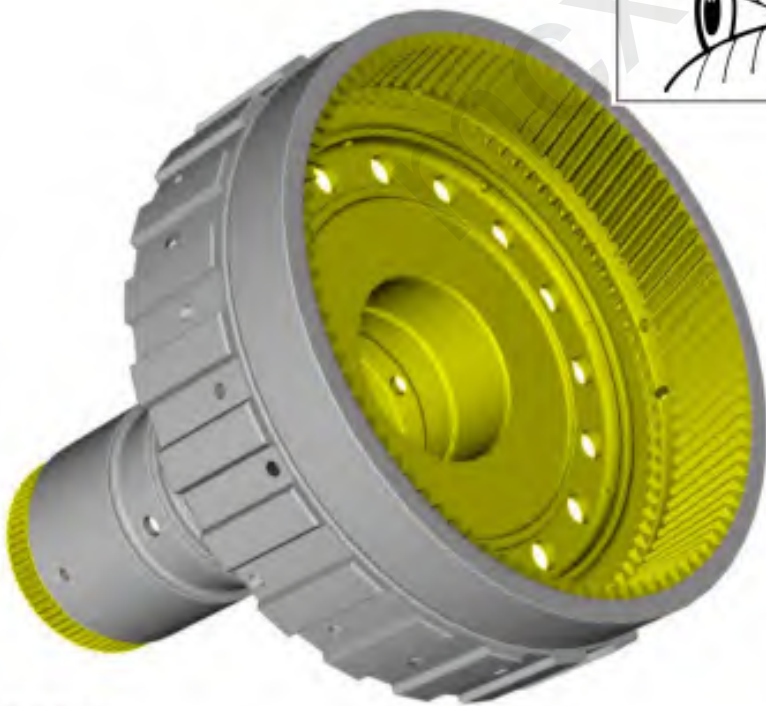
78. Remove the No. 3 sun gear shaft and No. 2 ring gear assembly.



E242761



79. Inspect the No. 3 sun gear shaft and No. 2 ring gear assembly.



E246177



80. Remove the (T5) thrust bearing.



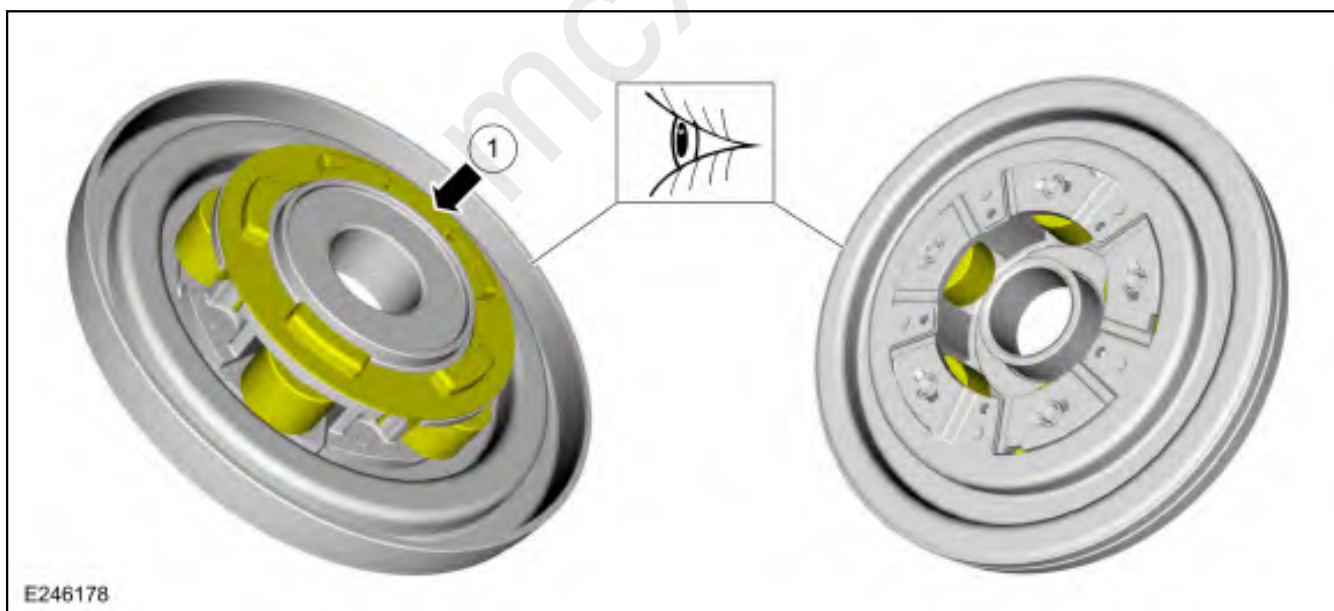
81. Remove the No. 2 planetary carrier.



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

Inspect the No. 2 planetary carrier and the fluid collector.

1. If the fluid collector is broken remove and discard (7H578).



83. If necessary, install the new the fluid collector.



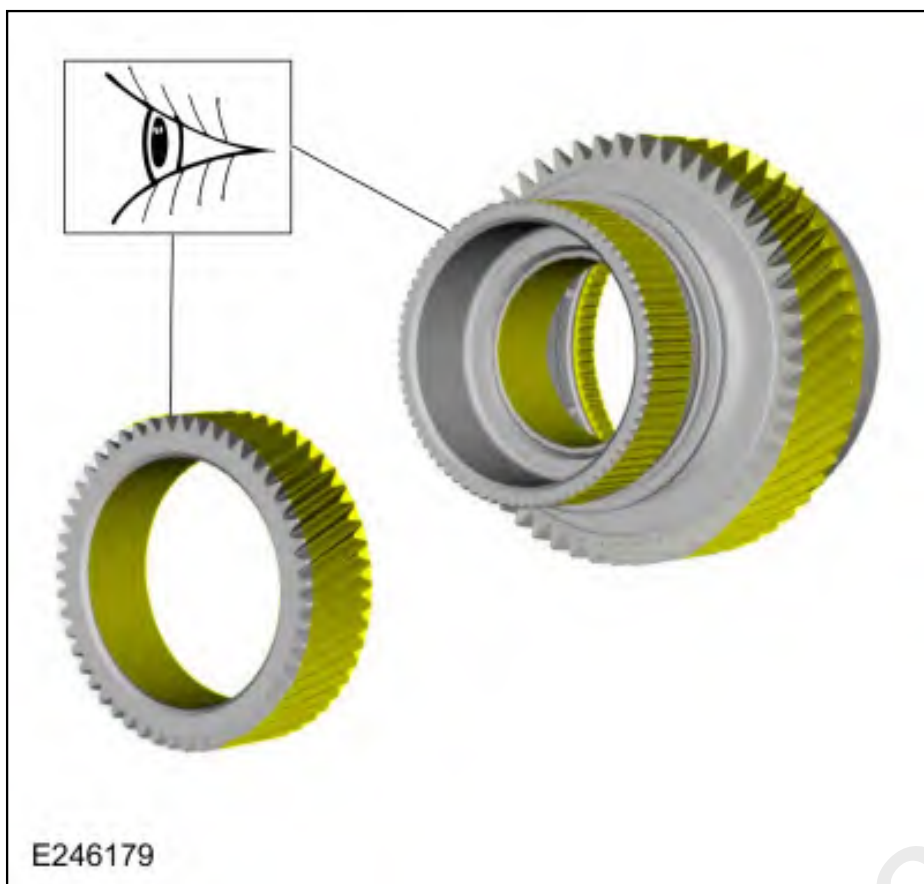
84. Remove the No. 2 sun gear.



85. Remove the No. 1 sun gear.



86. Inspect the No. 1 and No. 2 sun gears.



87. Gently pry up on the 3 tabs and remove the No. 1 bearing support locking ring.



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



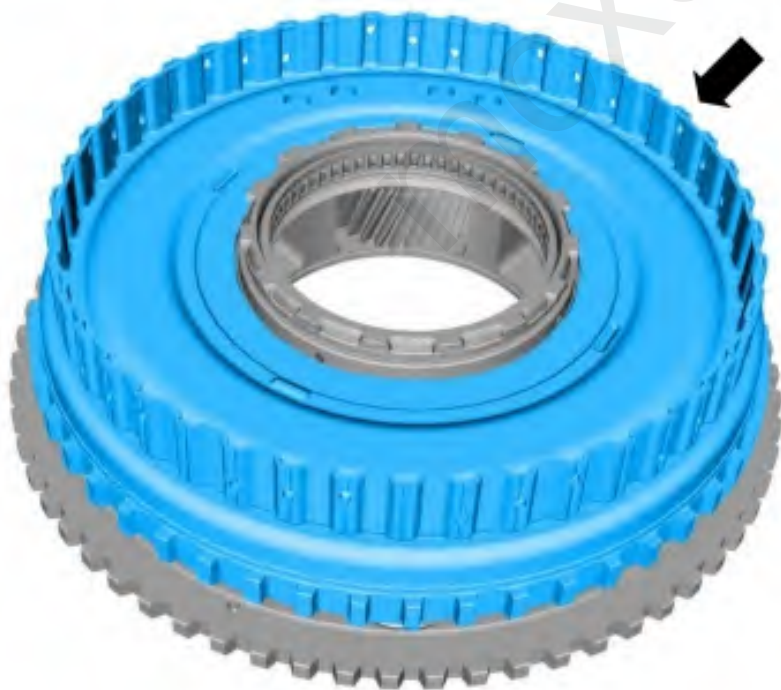
89. Remove the No. 1 ring gear bearing.



E243131



90. Remove the No. 1 ring gear.



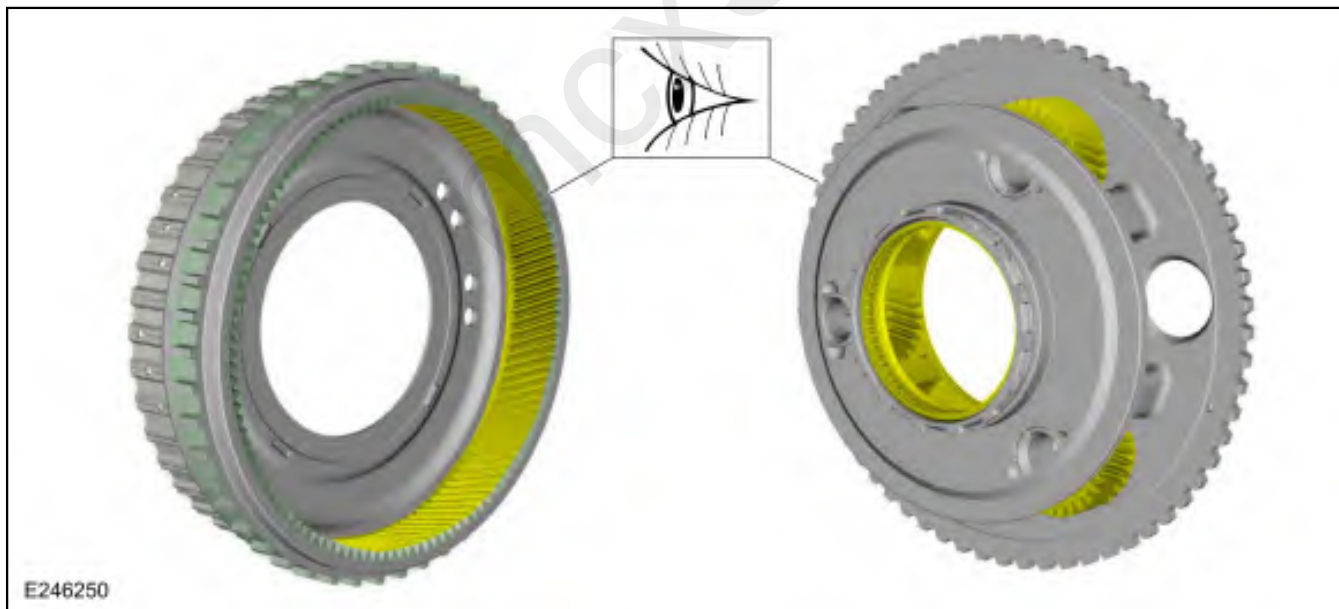
E243137



91. Remove the ring gear No 1 bearing.



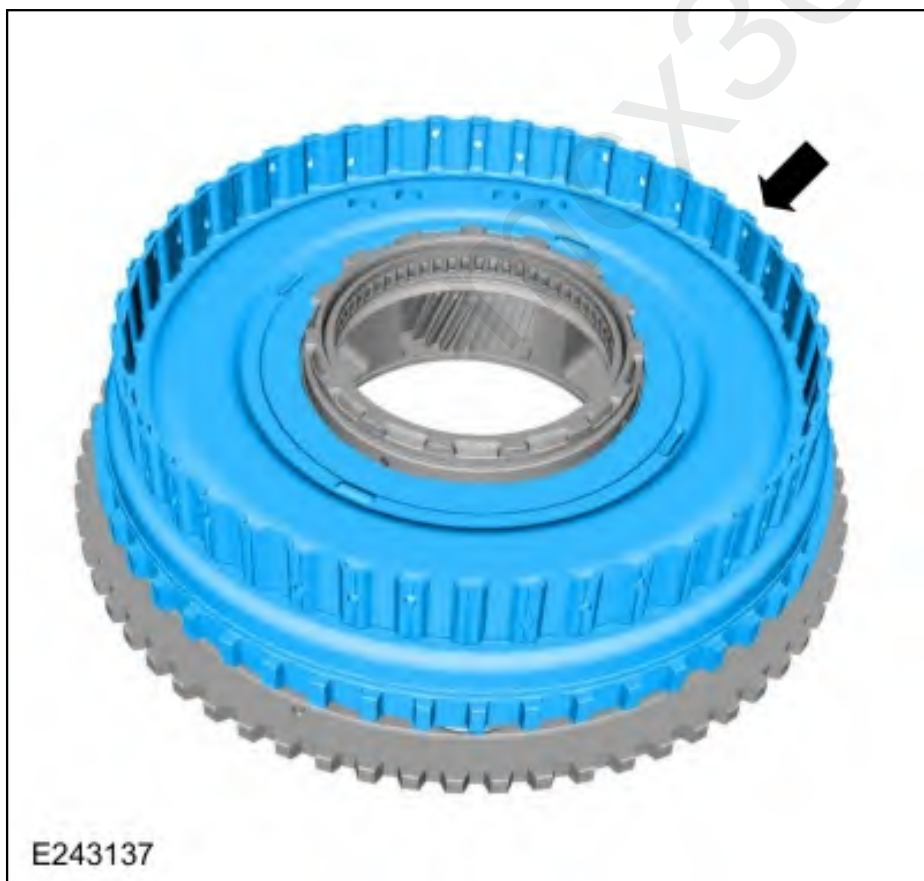
92. Inspect the No. 1 ring gear and the No. 1 planetary carrier.



93. Install the ring gear No. 1 bearing.



94. Install the No. 1 ring gear.



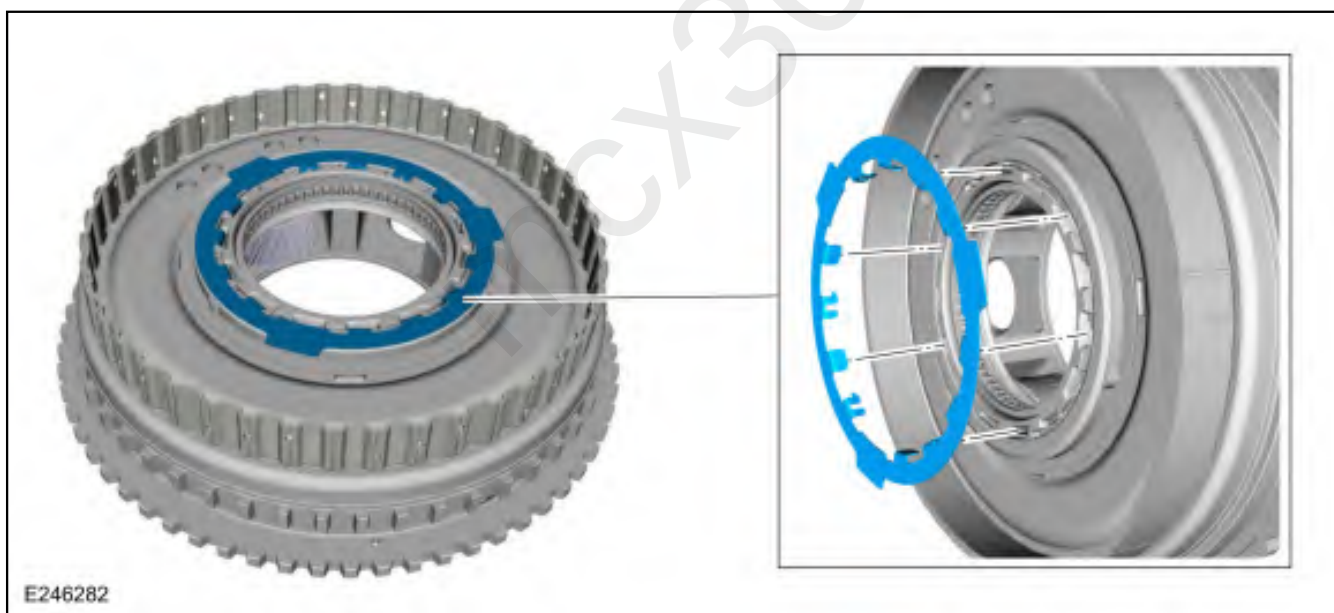
95. Install the No. 1 ring gear bearing.



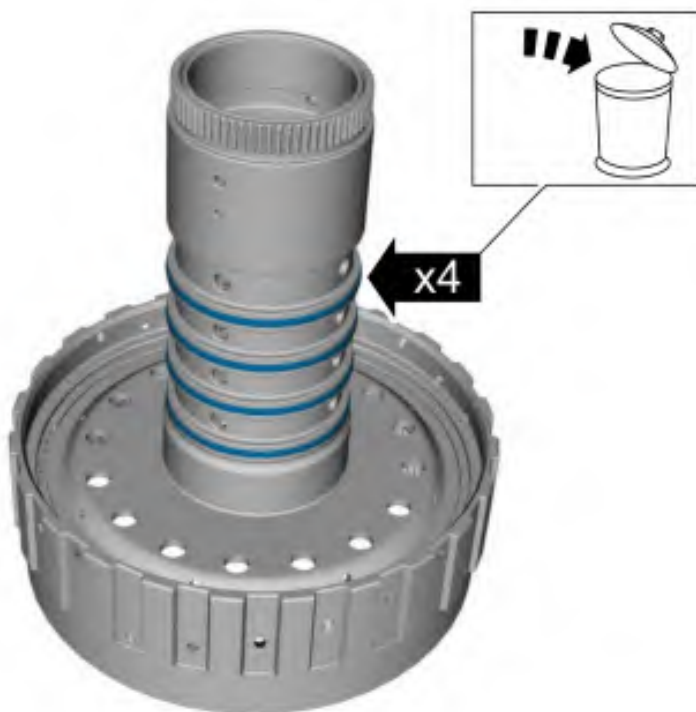
96. Install the ring gear No. 1 bearing support and rotate it counter clockwise to lock it.



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



98. Remove and discard the sun gear No. 3 shaft Teflon® seals.

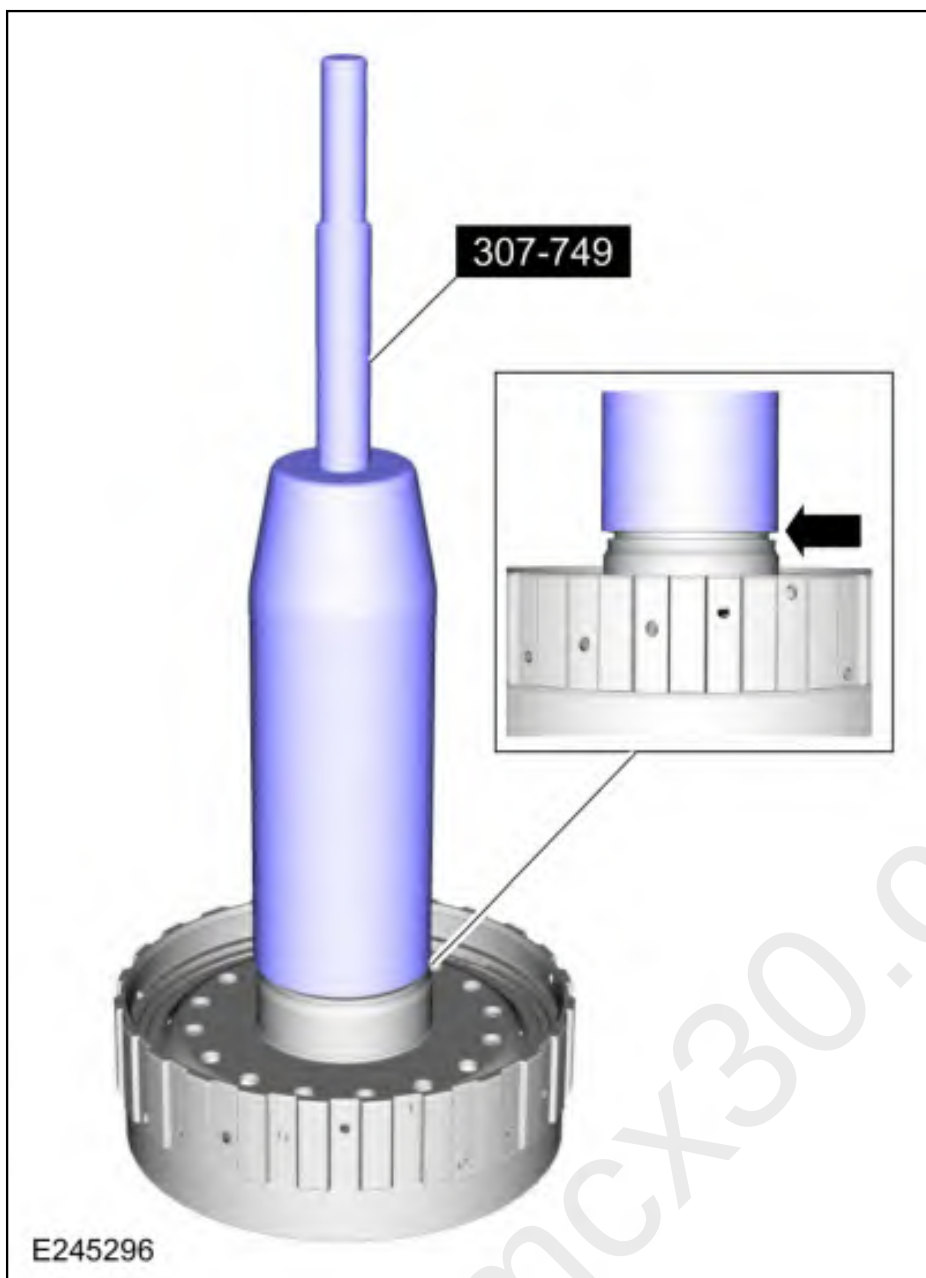


E256177

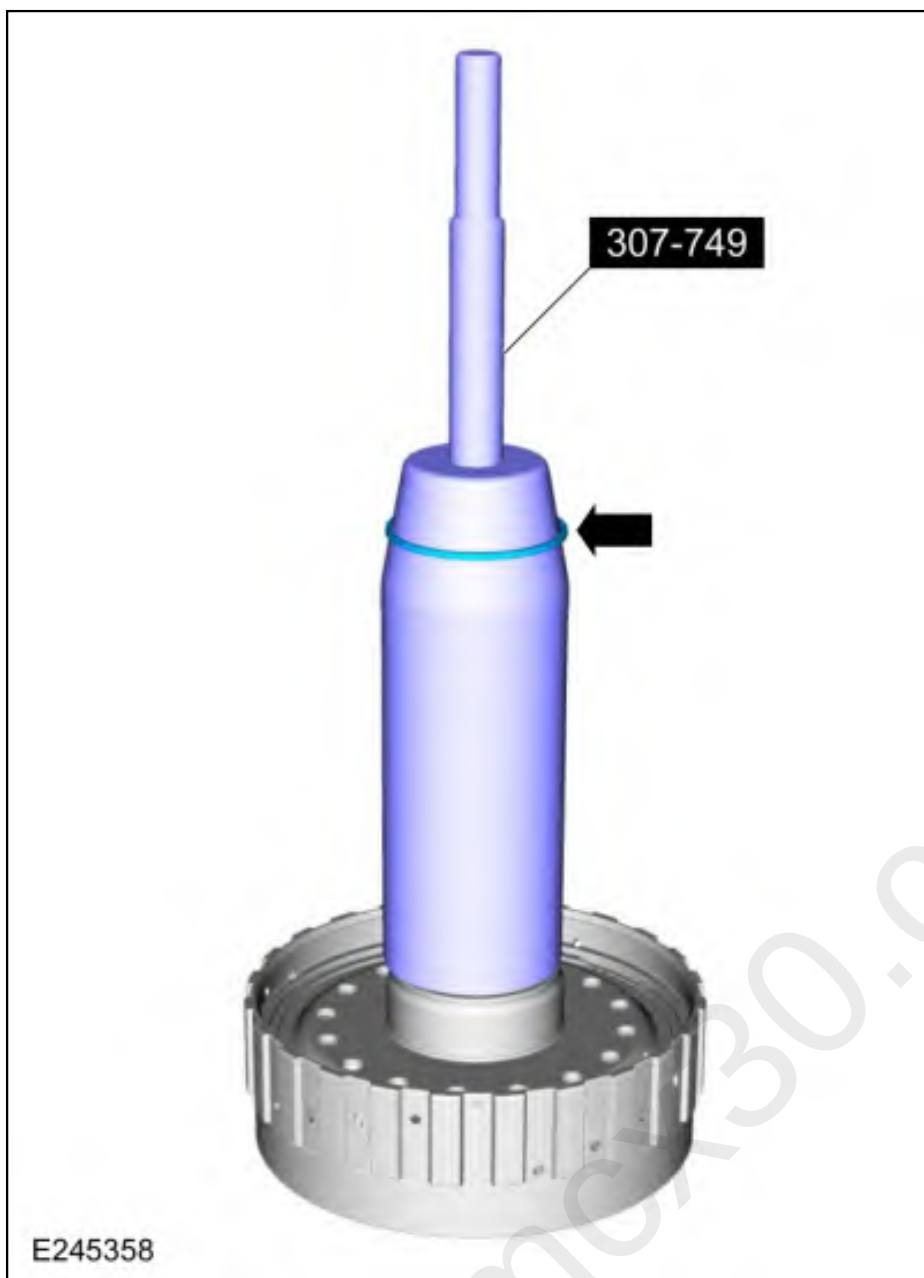


99. Install the special tool and adjust the special tool to align the bottom edge of the tool with the top edge of the bottom Teflon® seal groove.

Use Special Service Tool: 307-749 Installer/Sizer, R2-S3 Shaft Solid Seal.



100. Install a new Teflon® seal on the special tool.
Use Special Service Tool: 307-749 Installer/Sizer, R2-S3 Shaft Solid Seal.



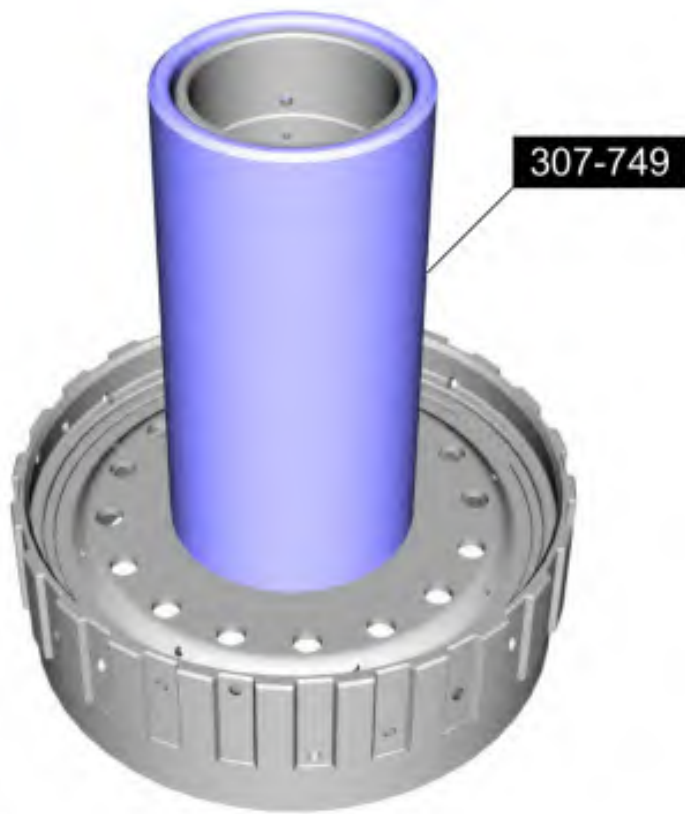
101. Using the top half of the special tool, slide the Teflon® seal into the groove. Remove the special tools and repeat the steps for the other 3 Teflon® seals.

Use Special Service Tool: 307-749 Installer/Sizer, R2-S3 Shaft Solid Seal.

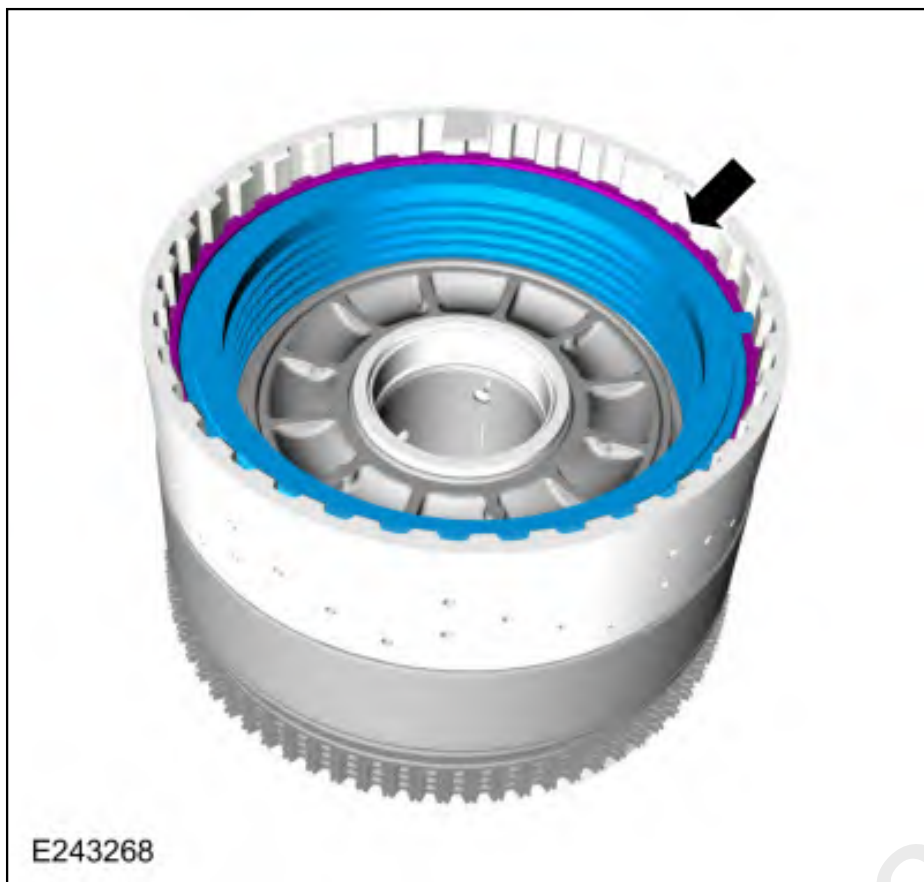


102. Install the special tool to size the 4 Teflon® seals. Allow the special tool to stay on the No 3 sun gear shaft for 5 minutes prior to final assembly.

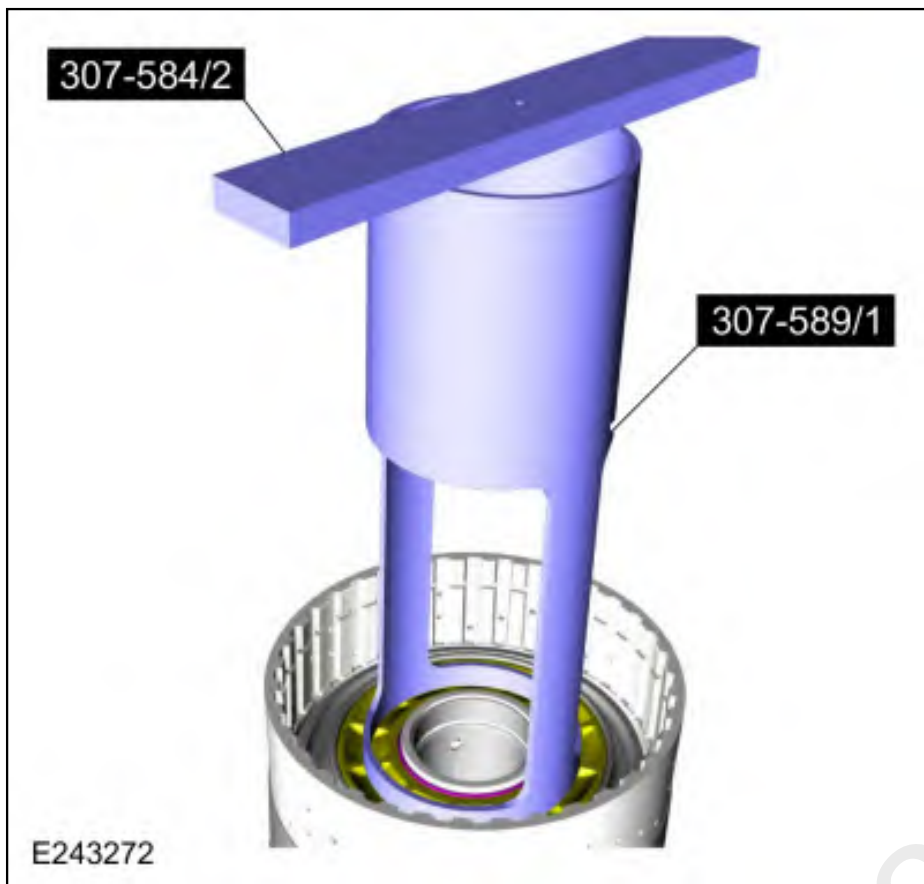
Use Special Service Tool: 307-749 Installer/Sizer, R2-S3 Shaft Solid Seal.



103. 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 replace as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



104. 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



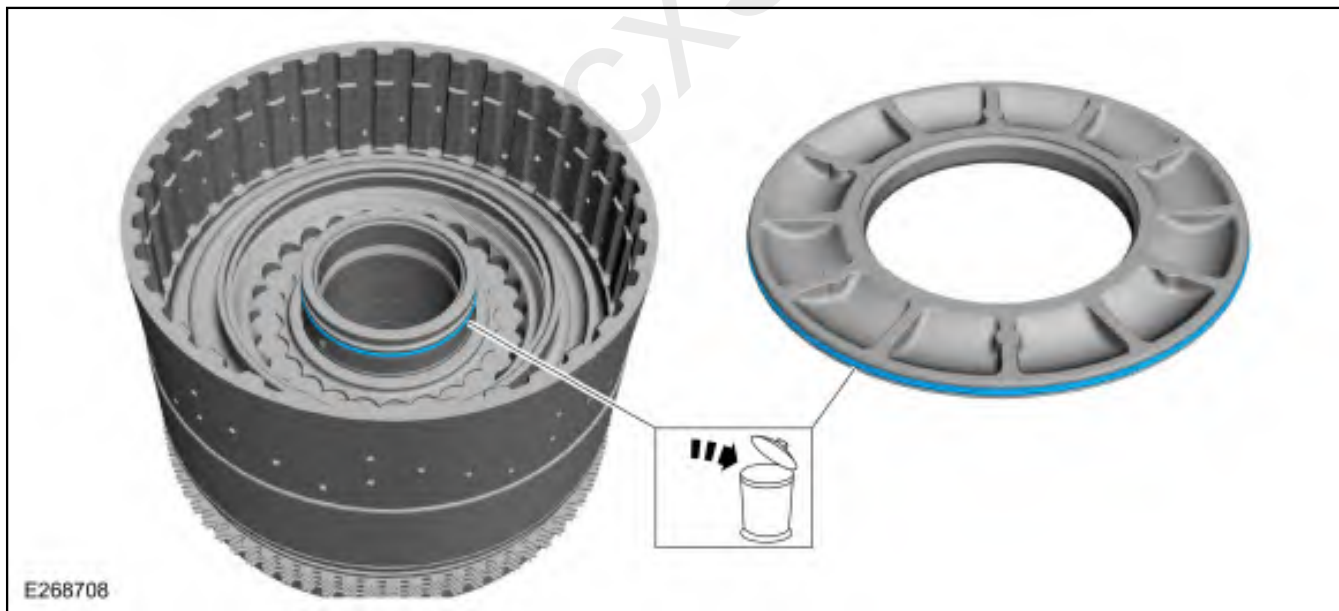
105. Remove the C clutch balance dam.



106. Remove the C clutch piston return spring.



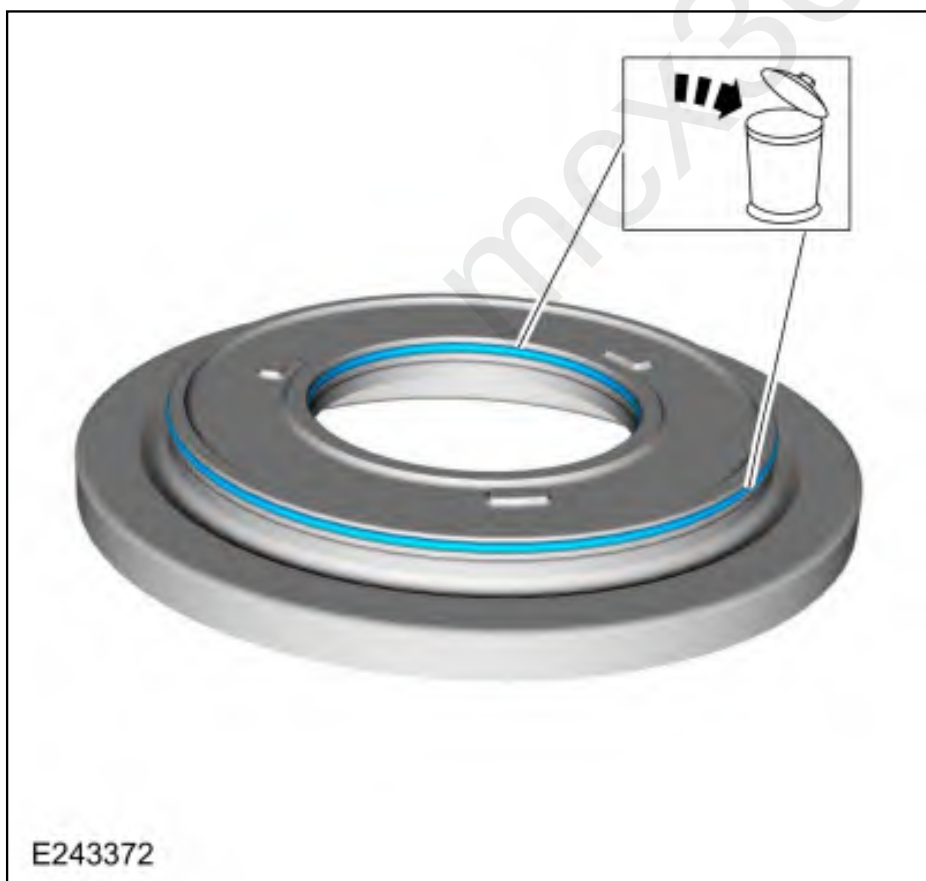
107. Remove and discard the C clutch balance dam inner and outer seals (7F234) and (7C000).



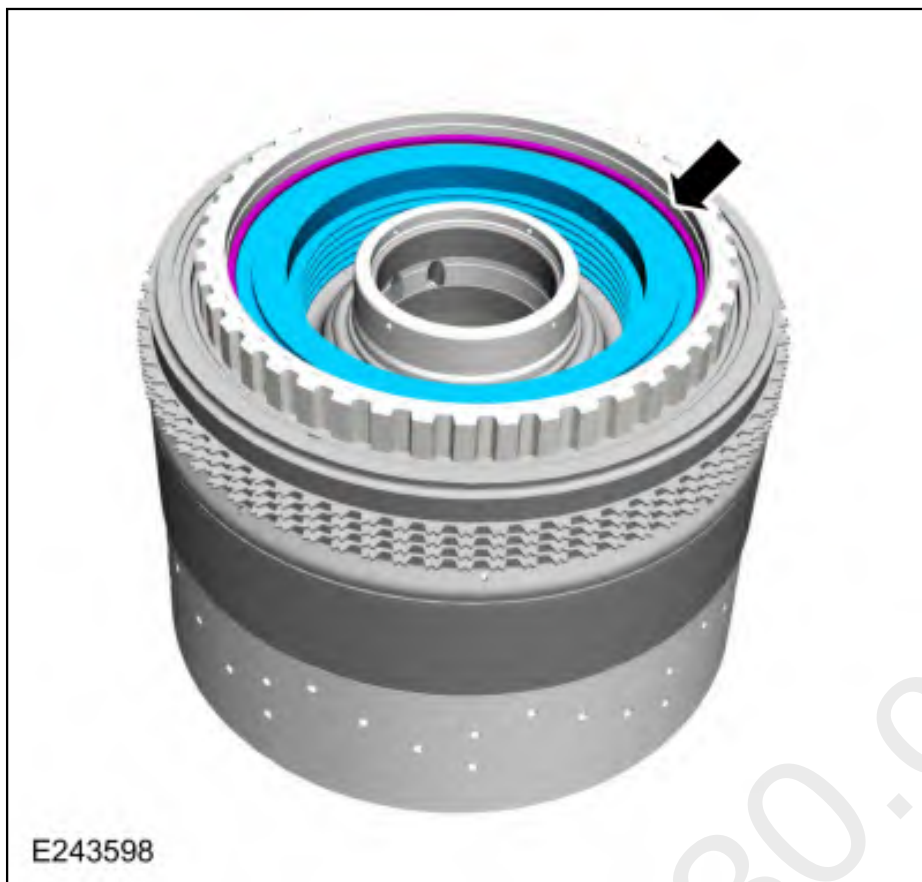
108. Remove the C clutch piston. Use compressed air into one oil passage hole while plugging the hole on the opposite side.



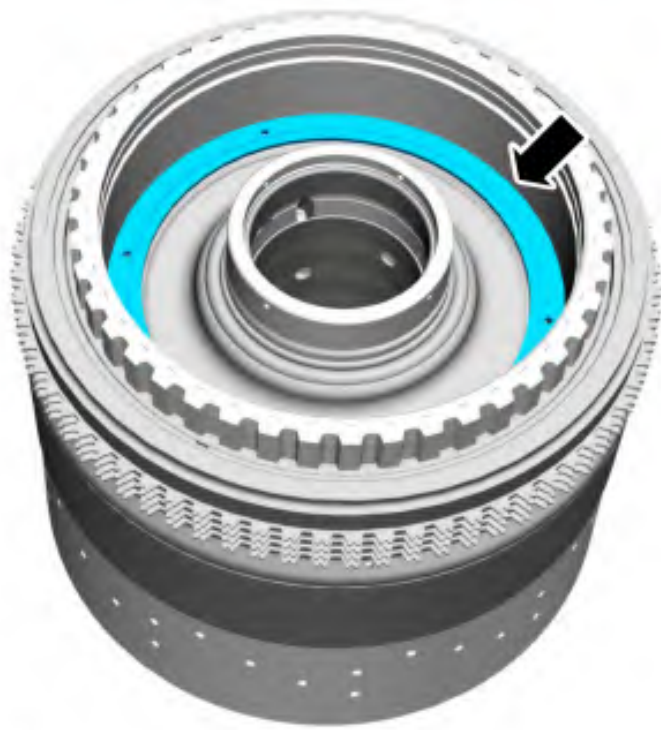
109. Remove and discard the C clutch piston inner and outer seals (7G444) and (7C000).



110. 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 replace as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



111. Remove the D clutch apply ring.



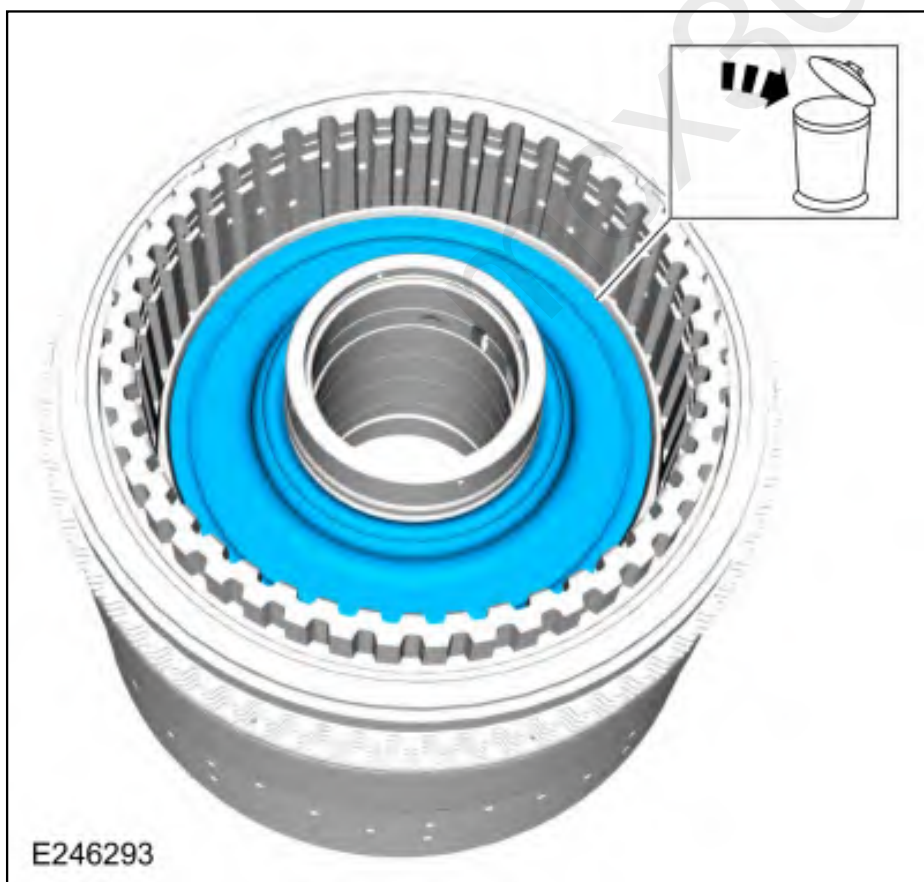
E243666



112. 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



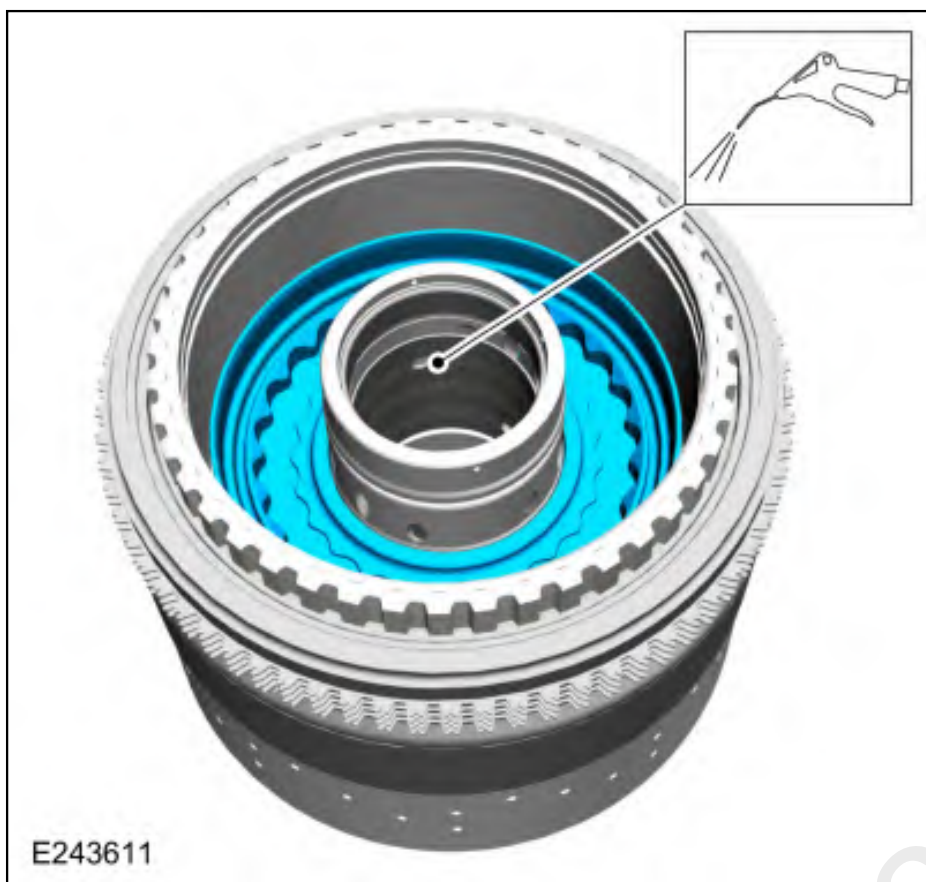
113. Remove and discard the balance dam (7D343).



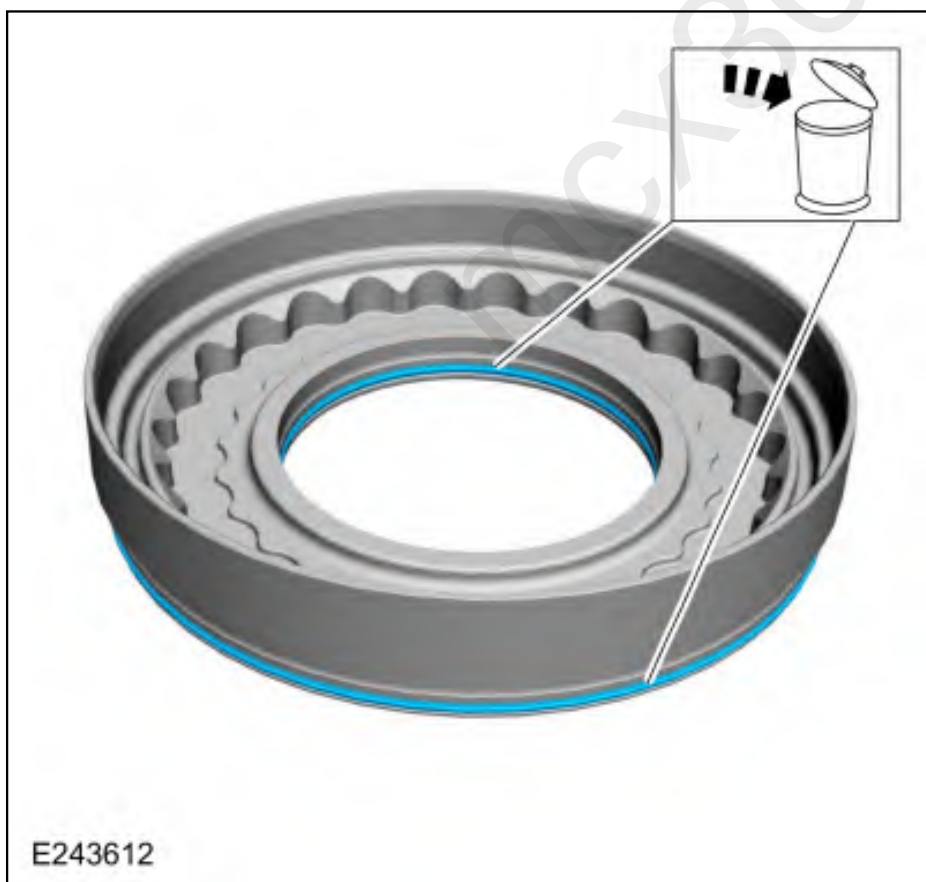
114. Remove the D clutch piston return spring.



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

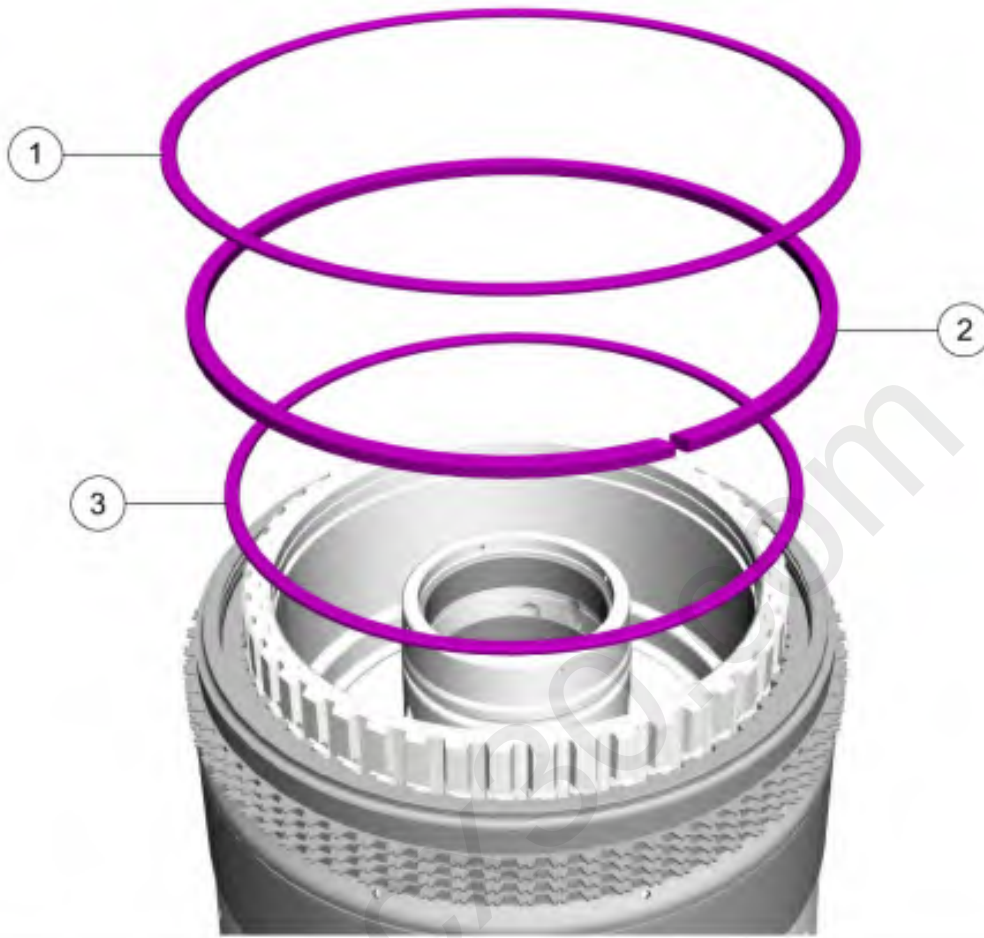


116. Remove and discard the D clutch piston inner and outer seals (7G444) and (7G445).



117. Remove the F clutch keeper snap ring, F clutch snap ring keeper and the F clutch snap ring.

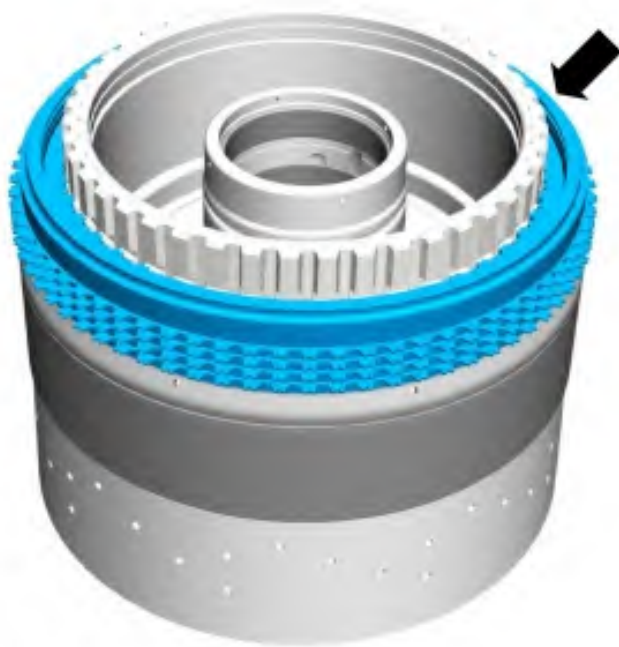
1. F clutch keeper snap ring
2. F clutch snap ring keeper
3. F clutch snap ring



E243760

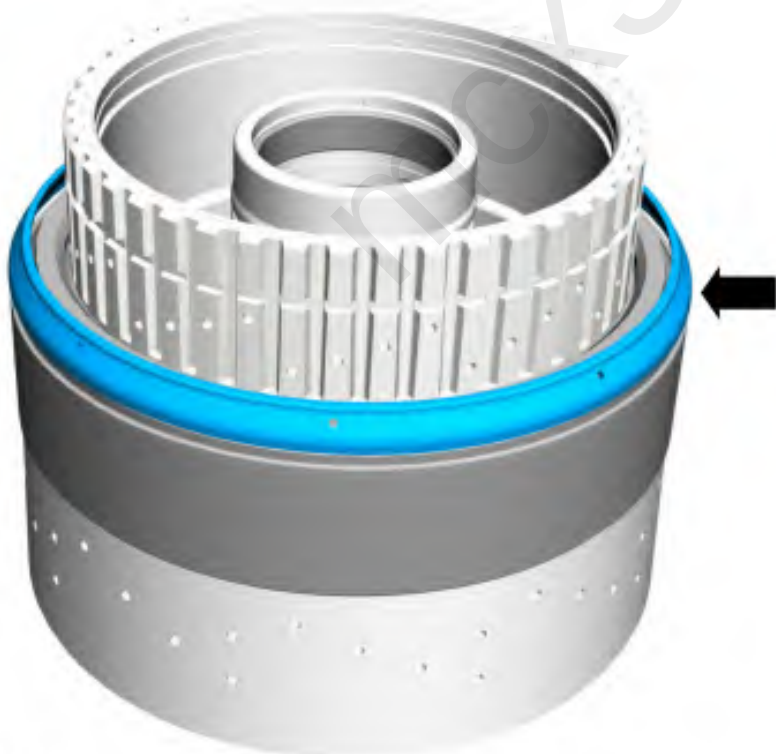
118. Remove the F clutch assembly. Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged replace as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.





E243762

119. Remove the F clutch apply ring.



E243763

120. 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



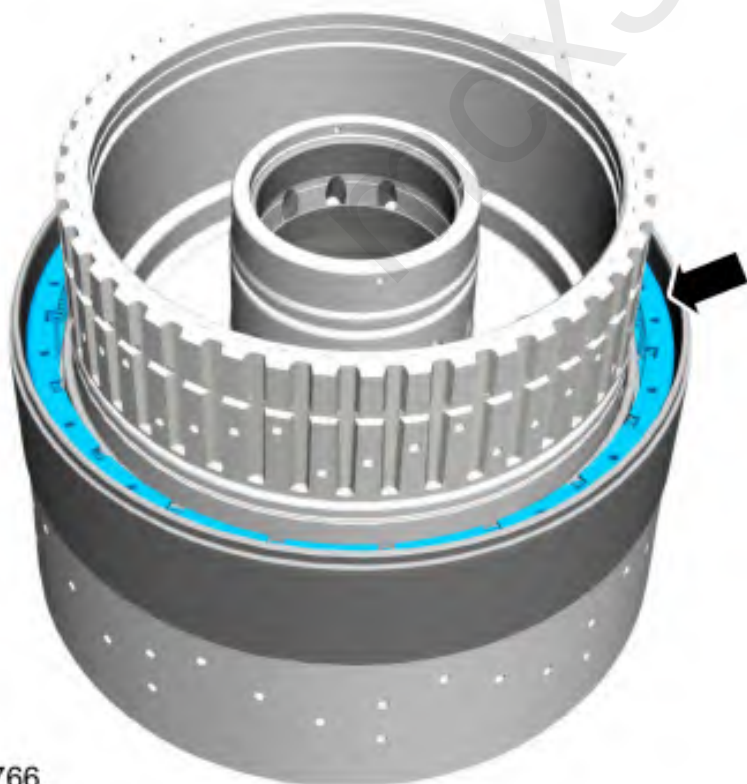
121. Remove and discard the F clutch balance dam outer seal (7A590).



E243770



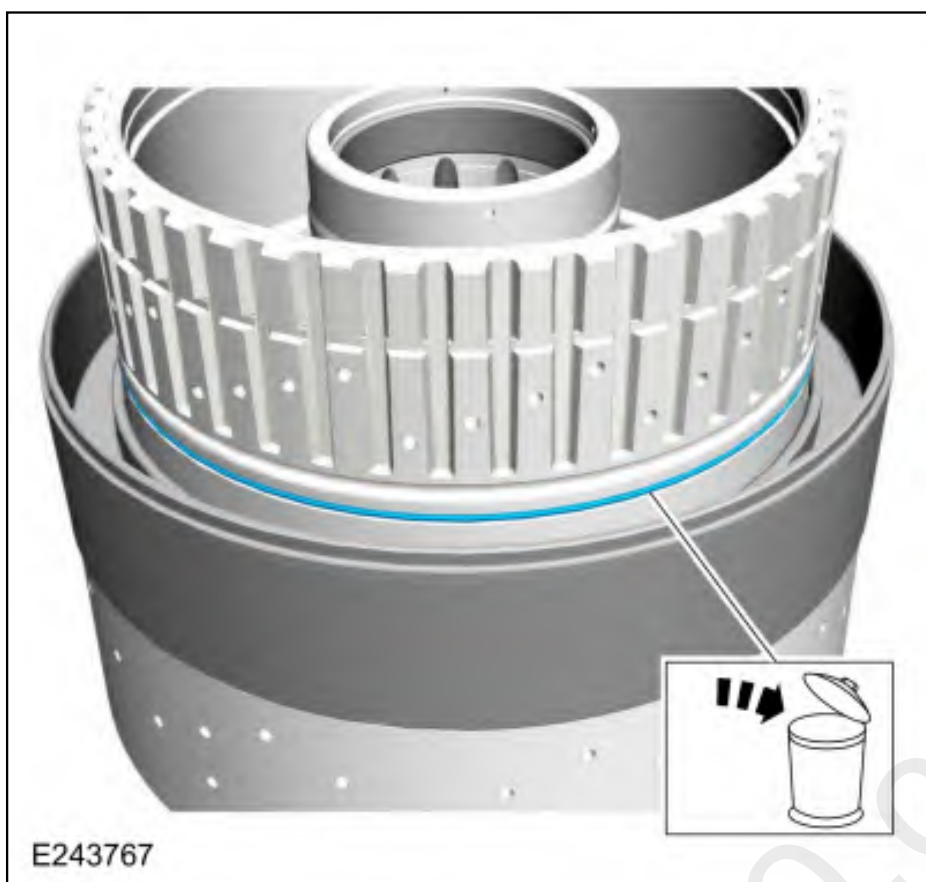
122. Remove the F clutch piston return spring.



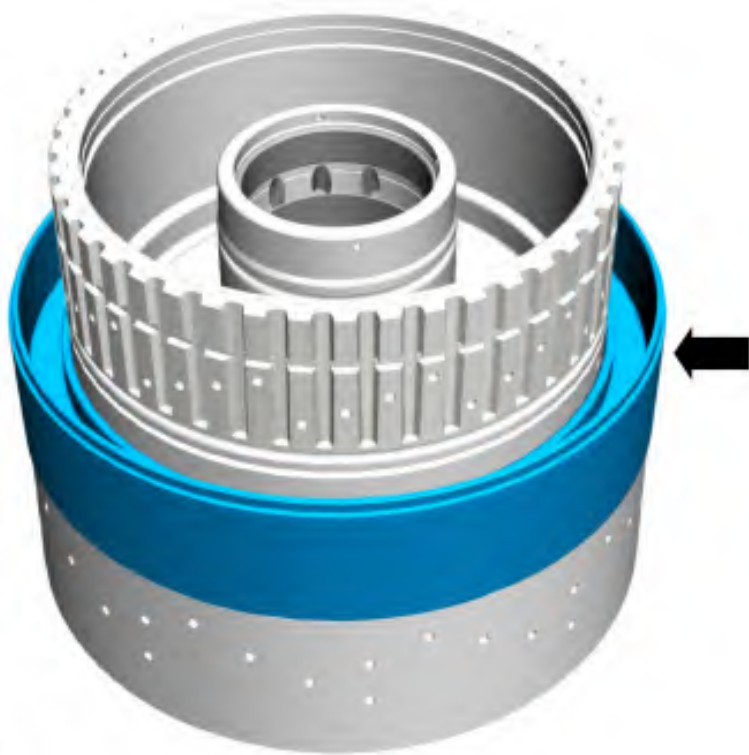
E243766



123. Remove and discard the F clutch balance dam inner seal (7A590-B).



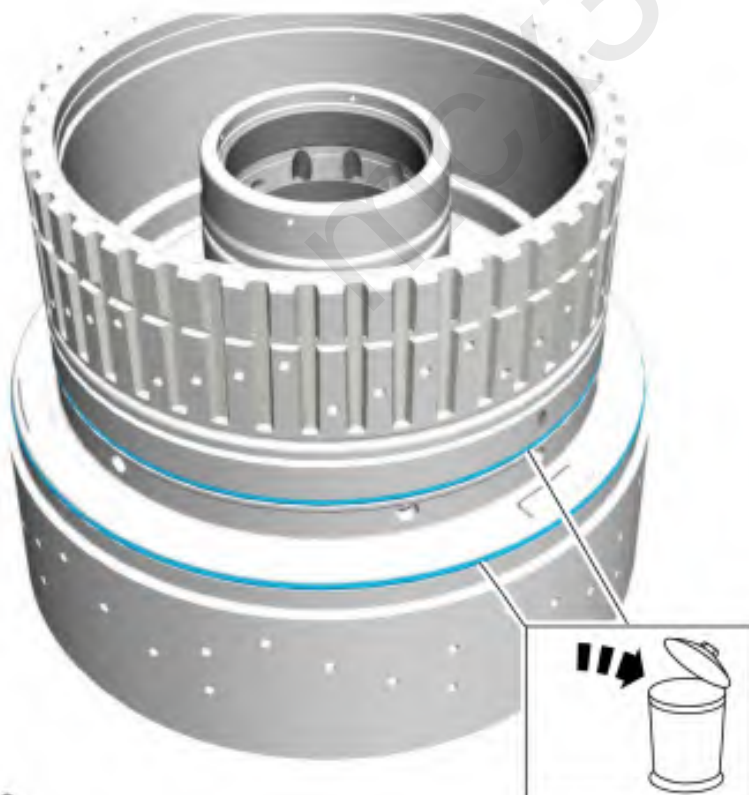
124. Remove the F clutch piston.



E243768



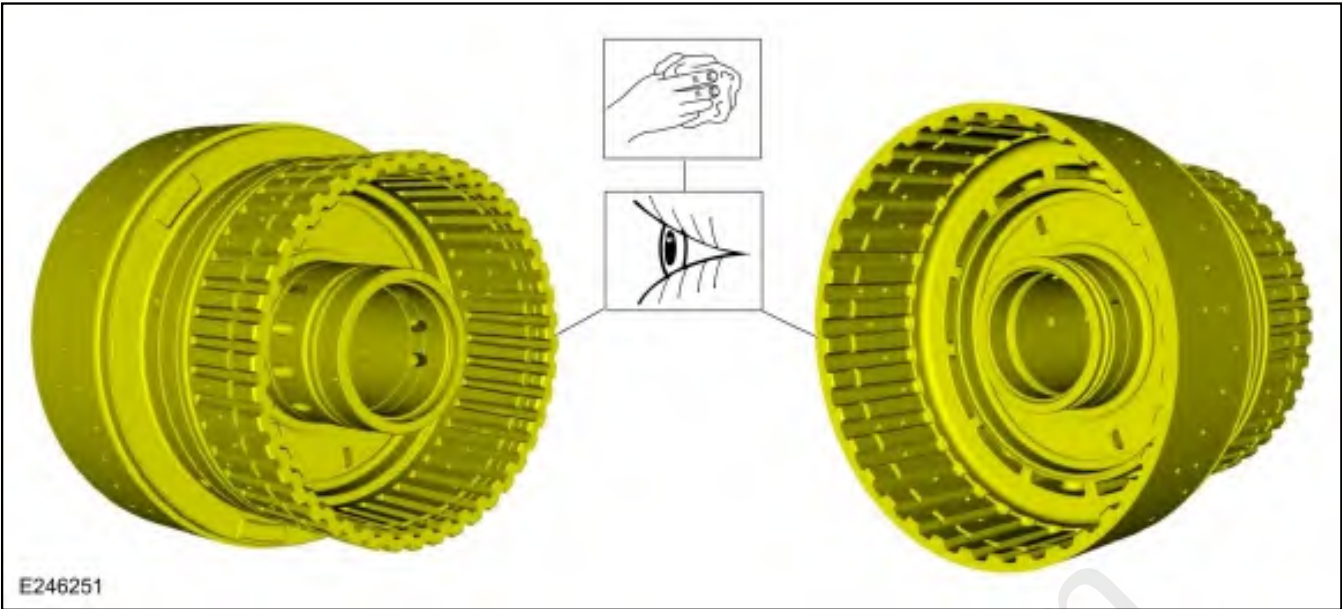
125. Remove and discard the F clutch piston seals (7A590-A) and (7A590-B).



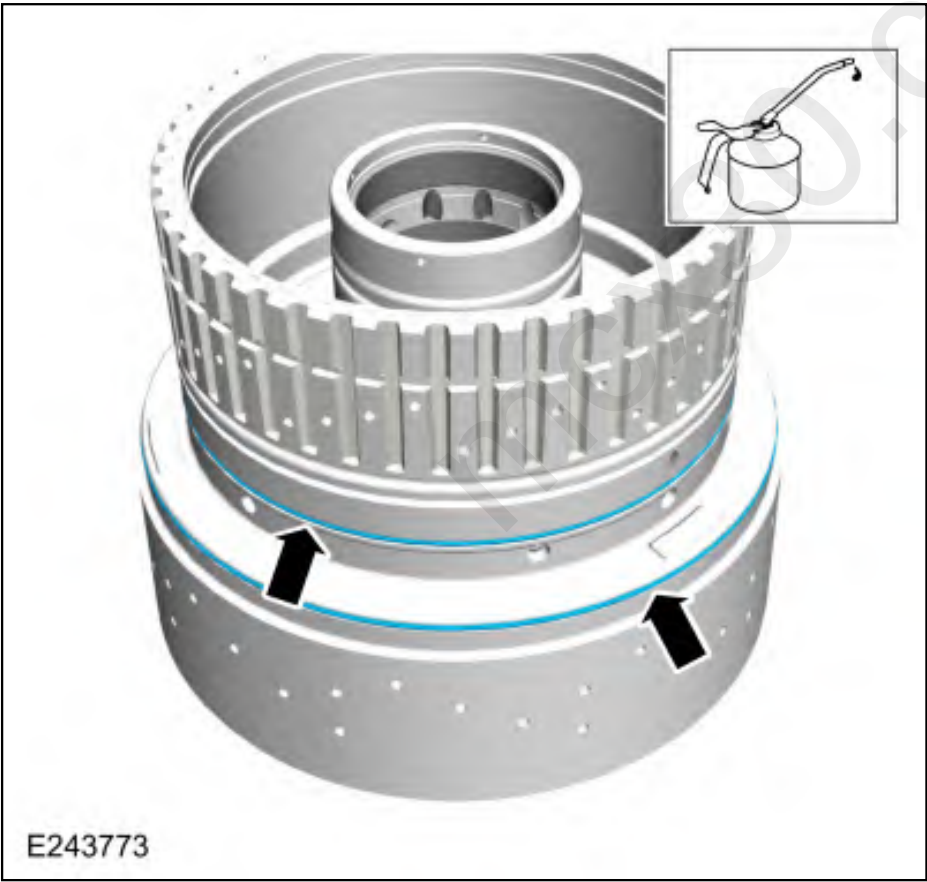
E243769



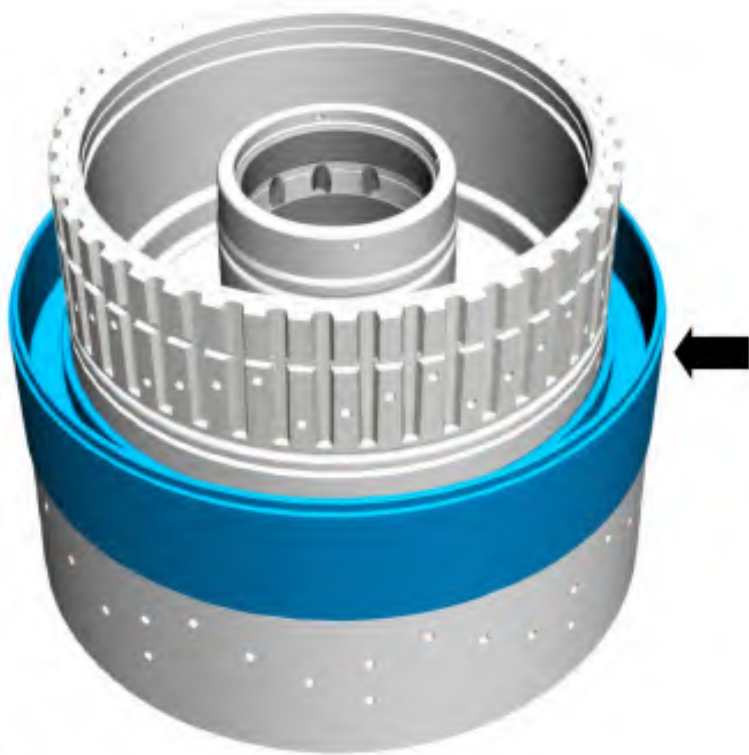
126. Clean and inspect the CDF clutch cylinder.



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



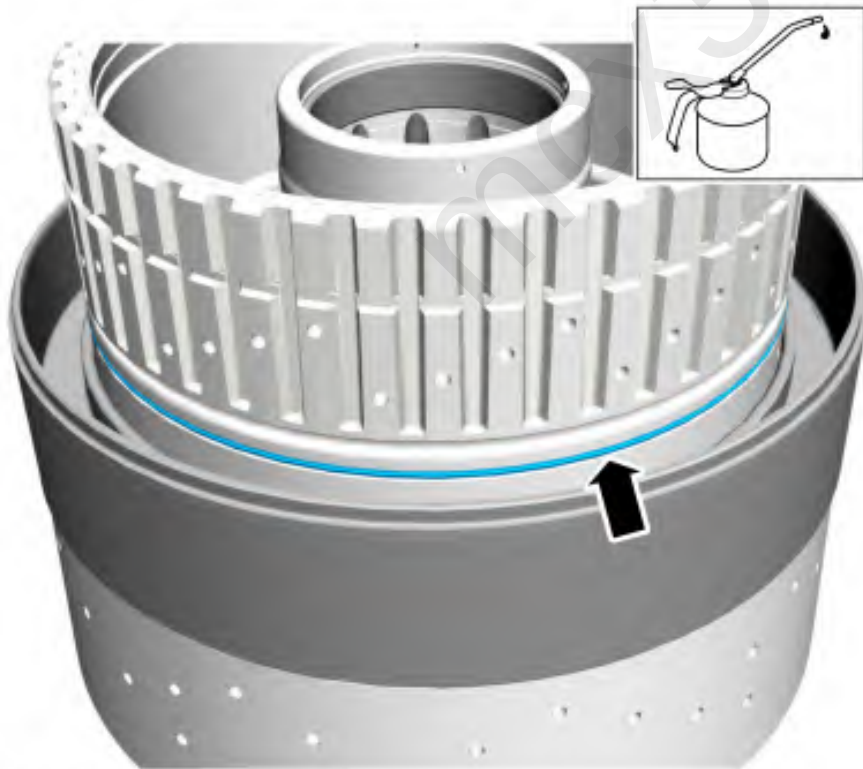
128. Install the F clutch piston.



E243768



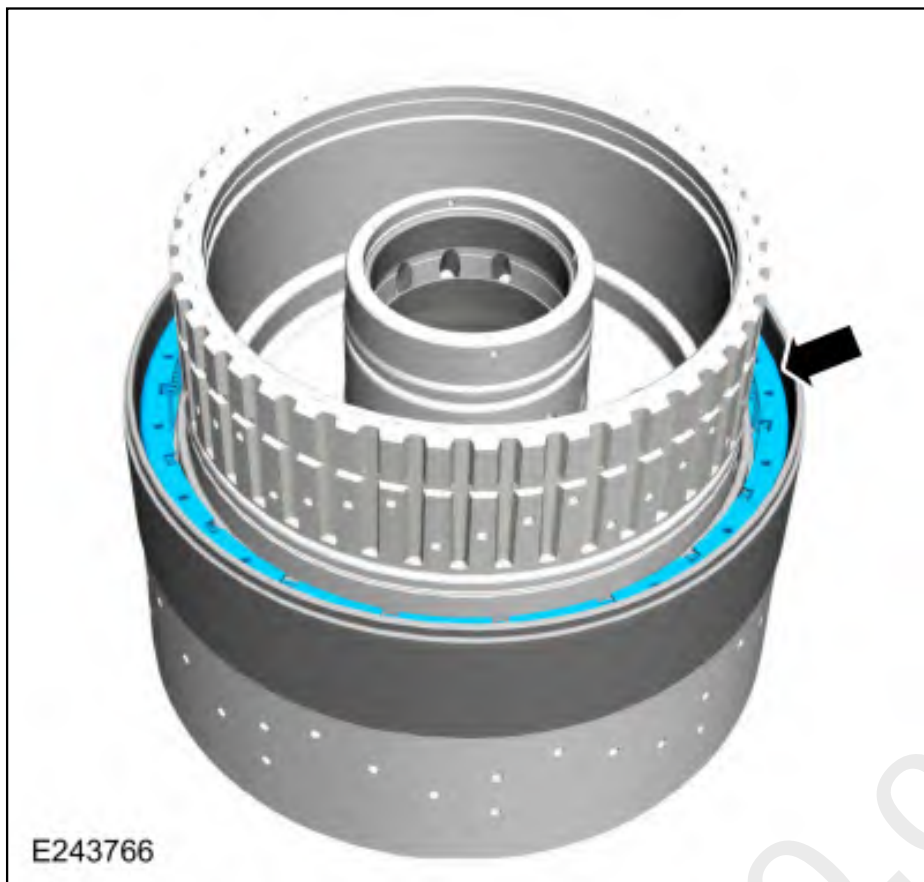
129. Install the new F clutch balance dam inner seal. Lubricate the seal with petroleum jelly.



E243774



130. Install the F clutch piston return spring.

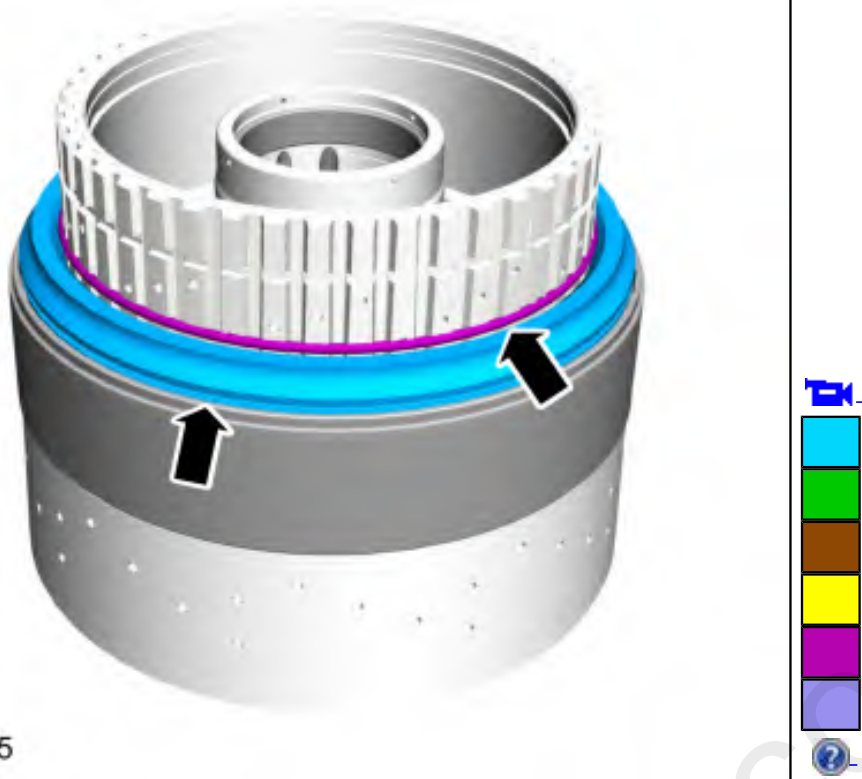


131. Install the new F clutch balance dam outer seal. Lubricate the seal with petroleum jelly.

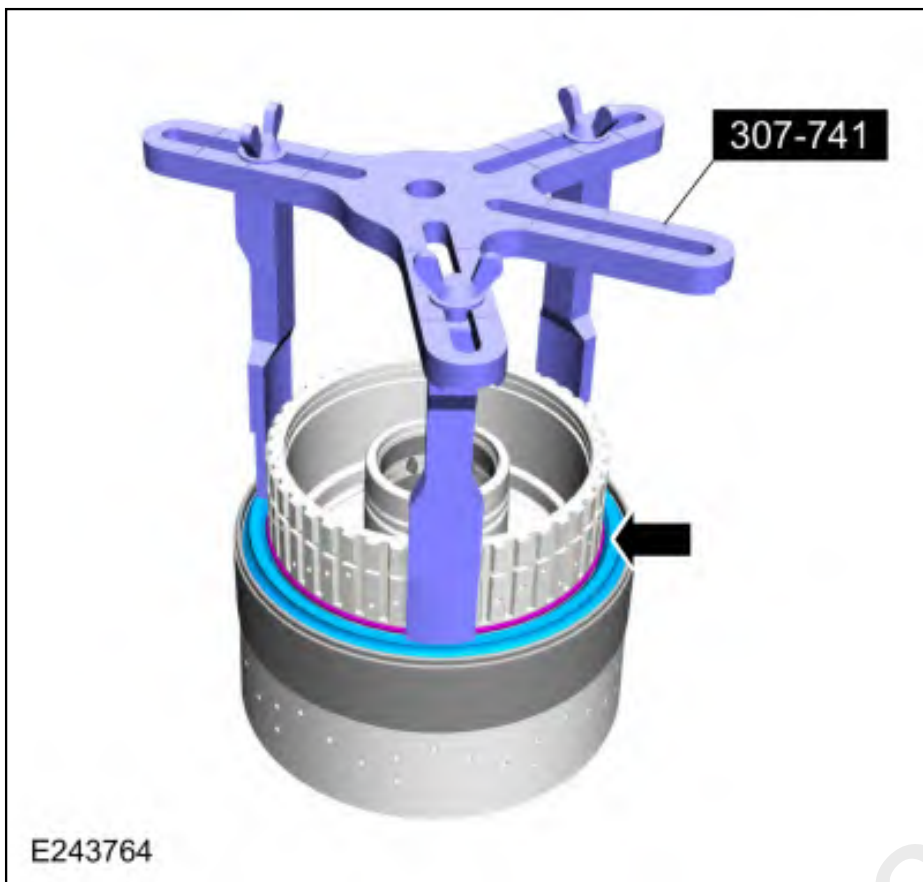


132. **NOTE:** *The F clutch balance dam retainer will not be in the groove at this time.*

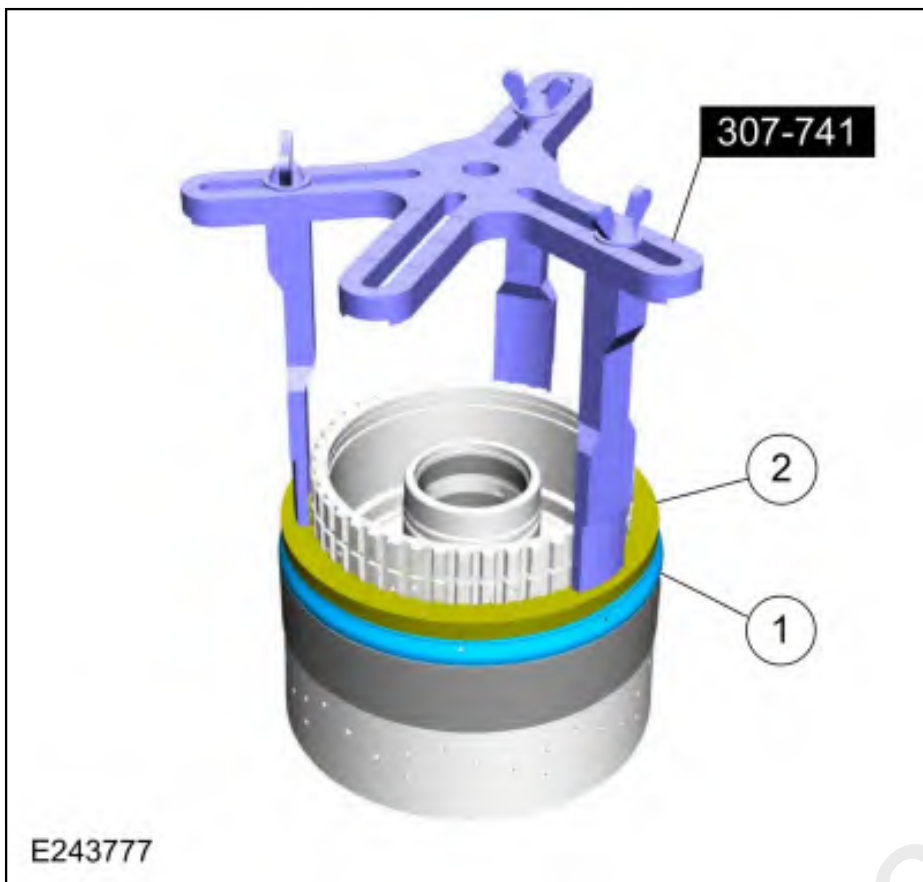
Install the F clutch balance dam and retainer on the CDF clutch cylinder.



133. 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



1. Position the F clutch apply ring onto the F clutch piston.
2. Position the F clutch pressure plate upside-down onto the apply ring. Using the special tools and a press, press the apply ring onto the F clutch piston.
Use Special Service Tool: 307-741 Spring Compressor, F Clutch.
Use the General Equipment: Hydraulic Press



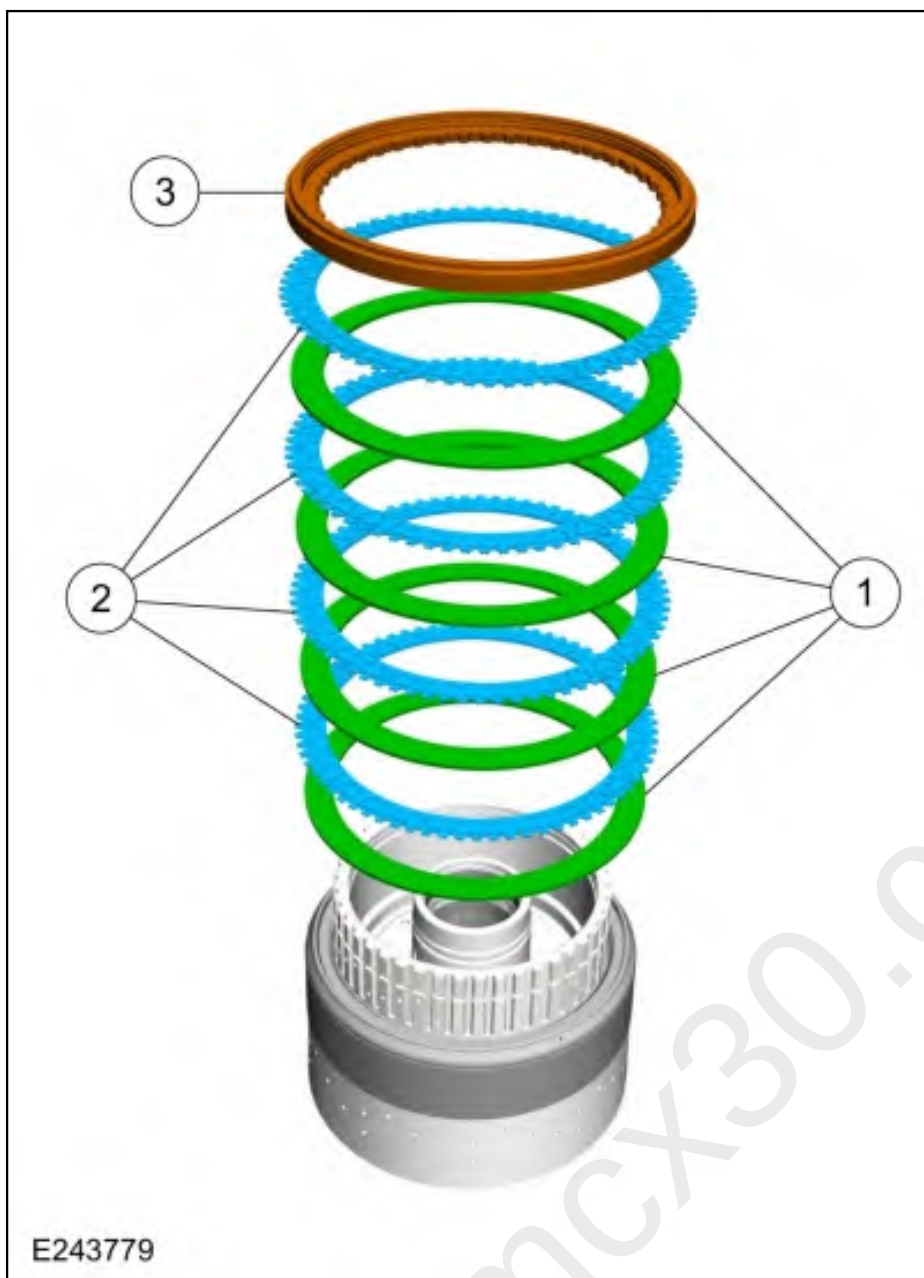
135. **NOTE:** Clutch plate quantity is model dependant based on engine displacement.

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

1. Steel plates
2. Friction plates

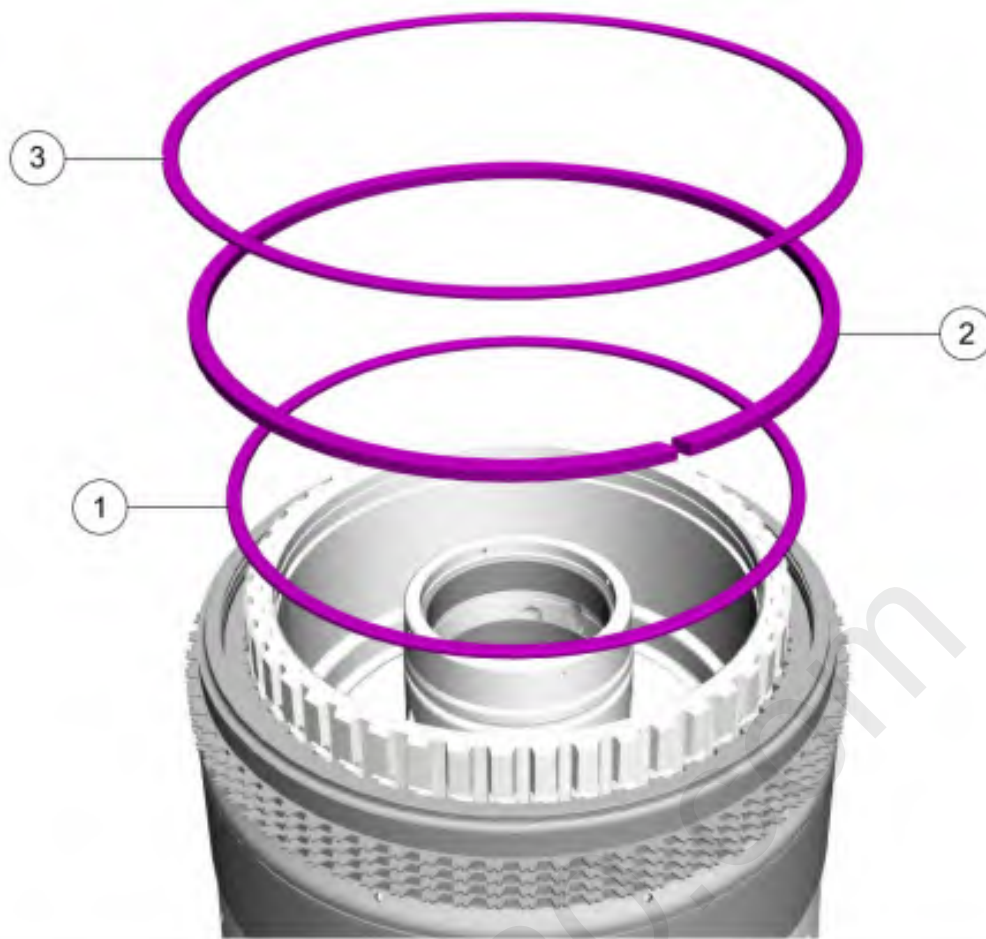
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (MERCON® ULV) (WSS-M2C949-A)

3. Pressure plate



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

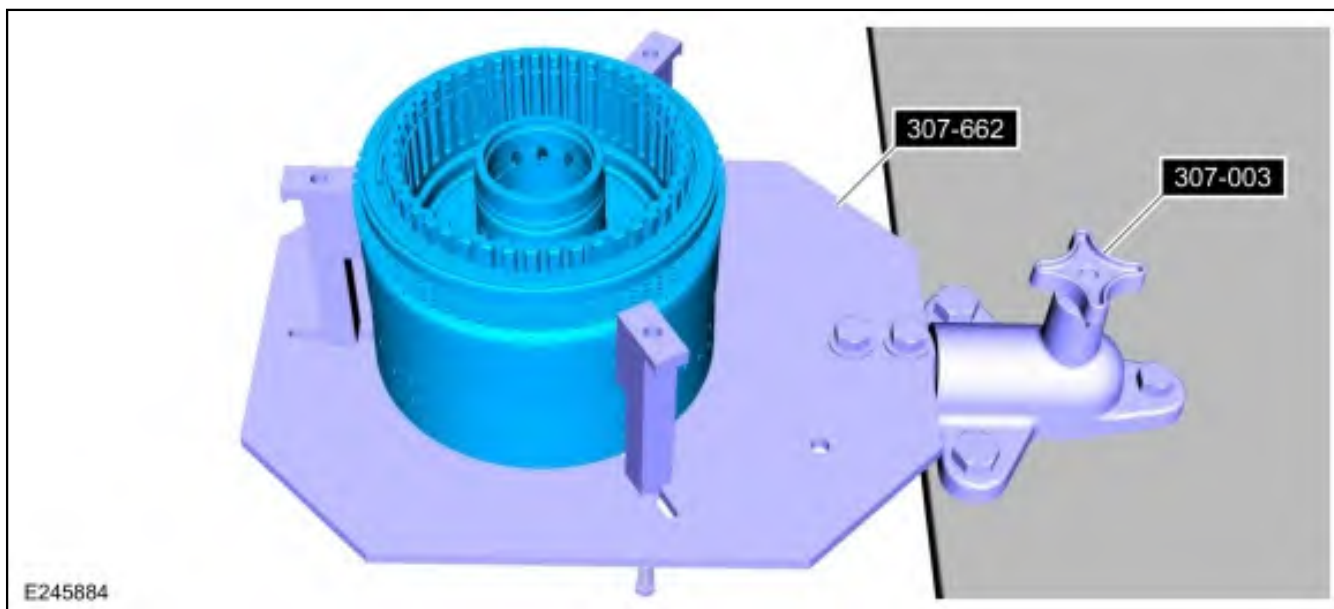
1. F clutch snap ring
2. F clutch snap ring keeper
3. F clutch keeper snap ring



E243780

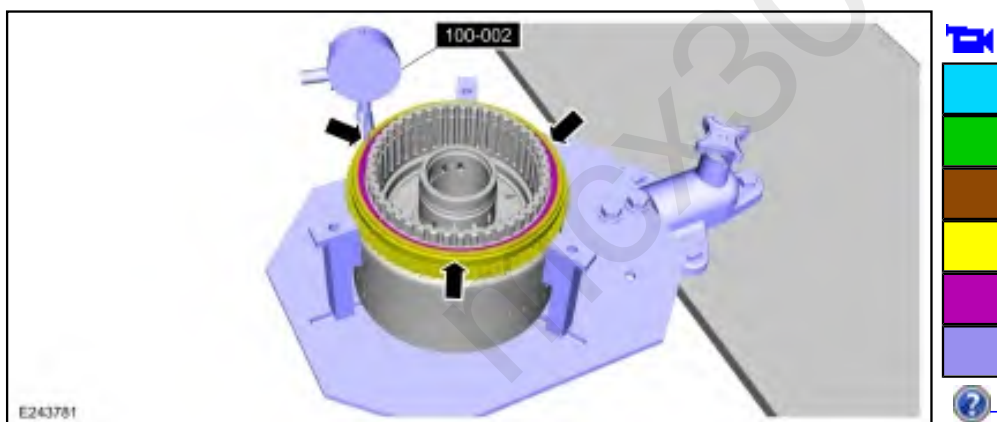
137. Assemble the special tools and position the CDF cylinder with the F clutch facing up.
Use Special Service Tool: 307-662 Gauge, Clutch Pack Endplay. , 307-003 (T57L-500-B) Holding Fixture, Transmission.



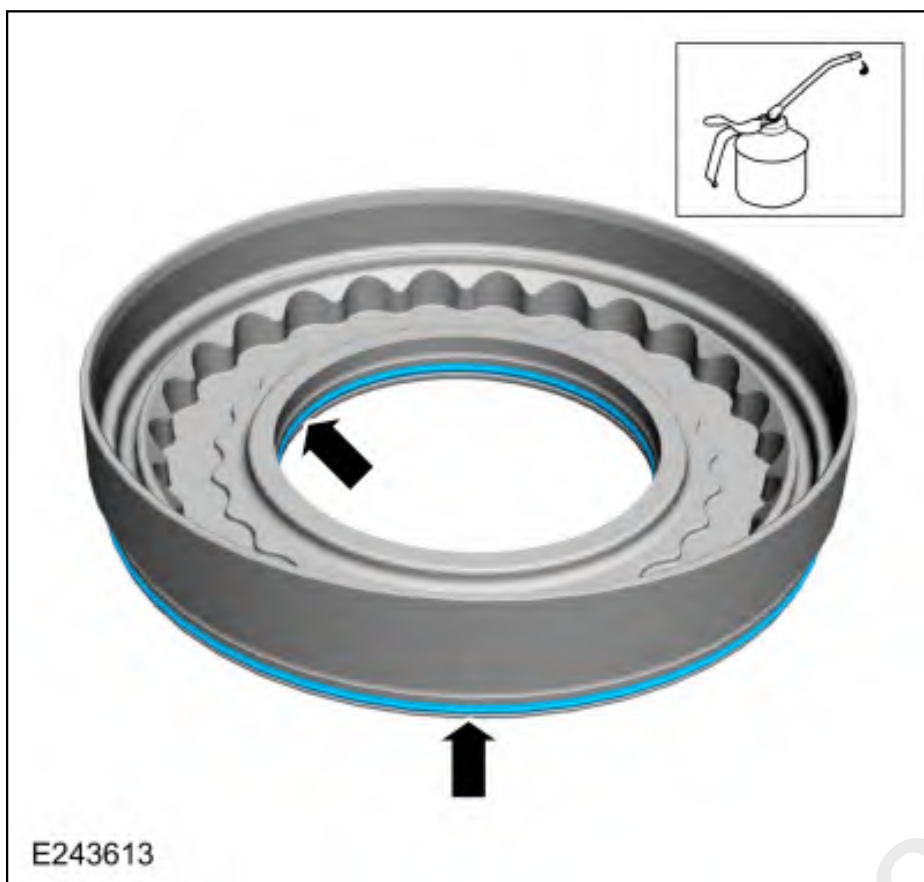


138. Using the special tool, measure the F clutch clearance. Position the plunger so it rests on the top surface of the pressure plate. Zero the dial indicator. Pull up on the pressure plate and measure and record the clutch clearance in 3 different places. Average the 3 recorded clutch clearance measurements 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 - 10-Speed Automatic Transmission - 10R80, Specifications).

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



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



140. Install the D clutch piston.



141. Install the D clutch piston return spring.



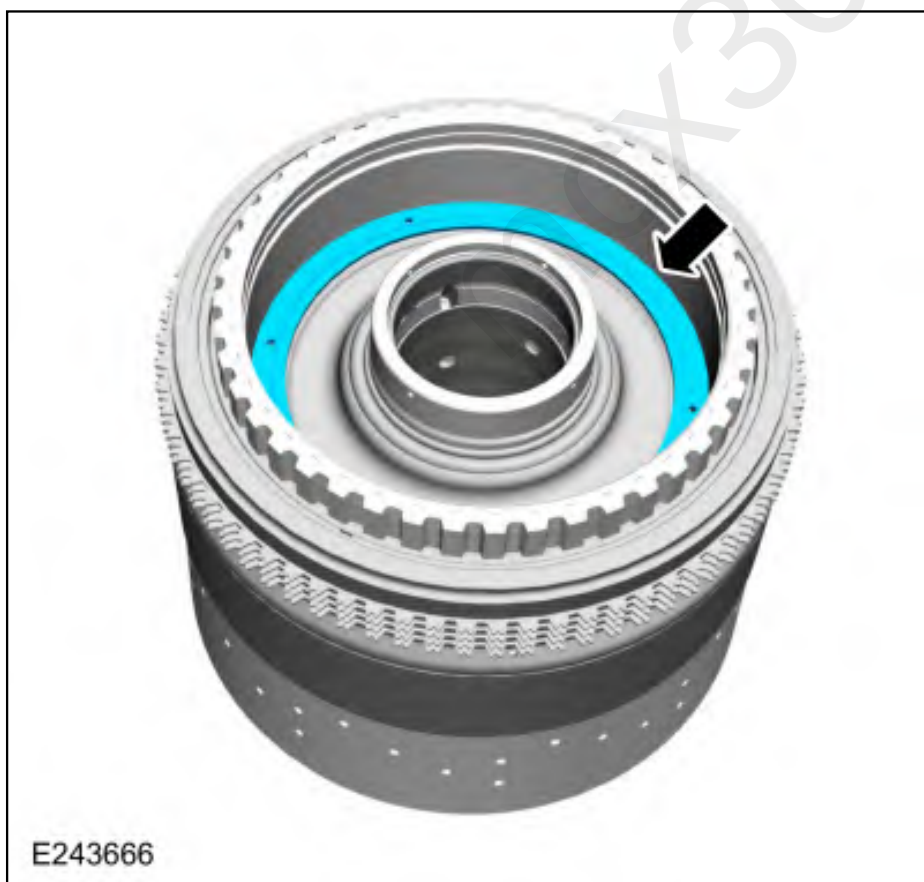
142. Lubricate the new D clutch balance dam seals with petroleum jelly.



143. 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



144. Install the D clutch apply ring.



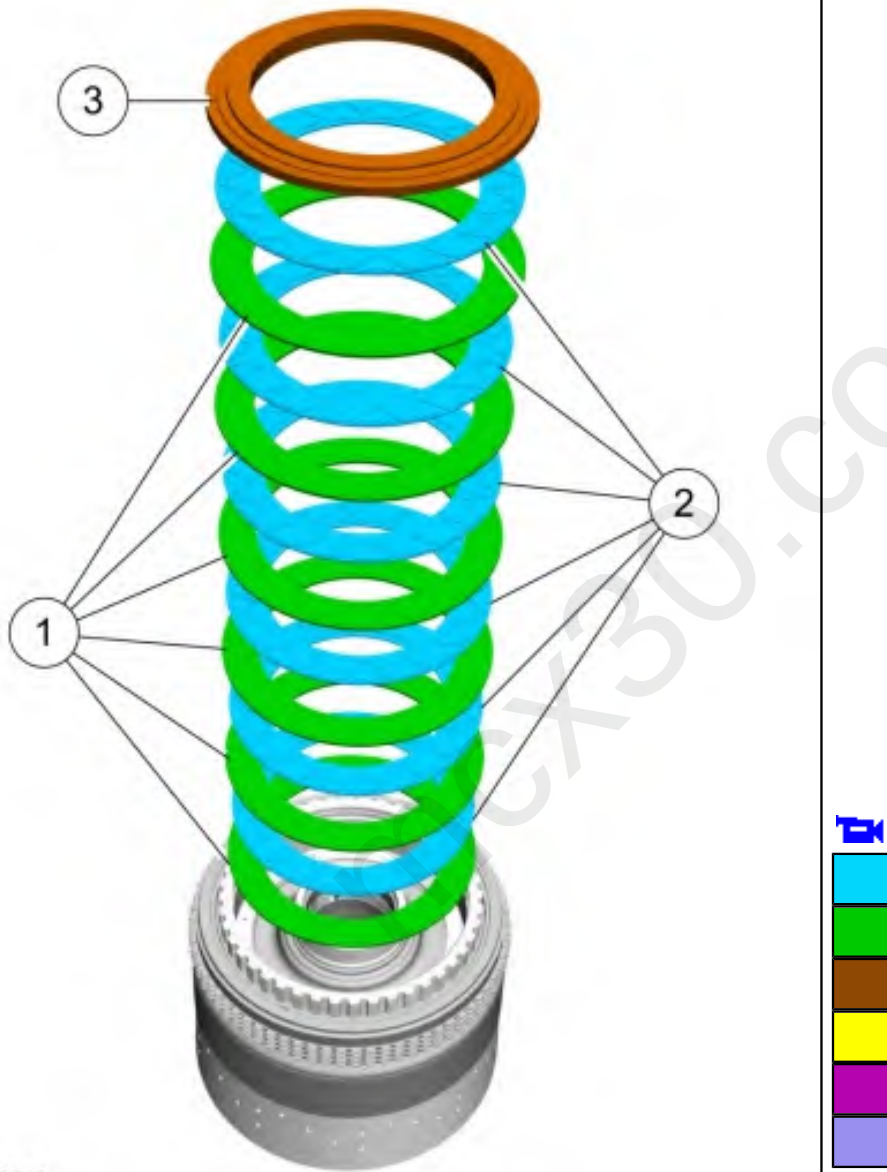
145. **NOTE:** Clutch plate quantity is model dependant based on engine displacement.

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 (MERCON® ULV) (WSS-M2C949-A)

3. Pressure plate



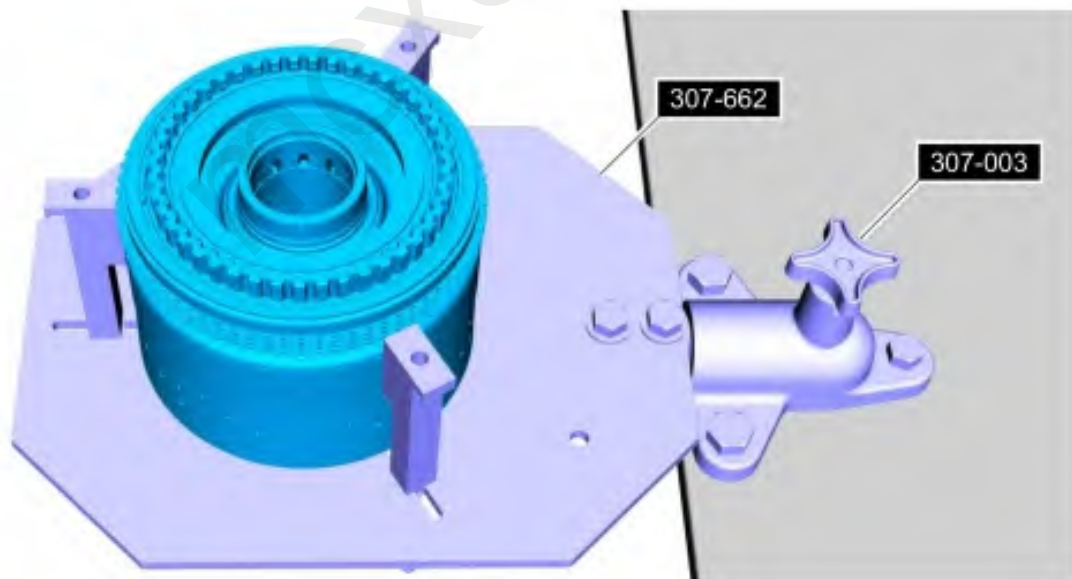
E243667

146. Install the D clutch snap ring.



E243672

147. 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.

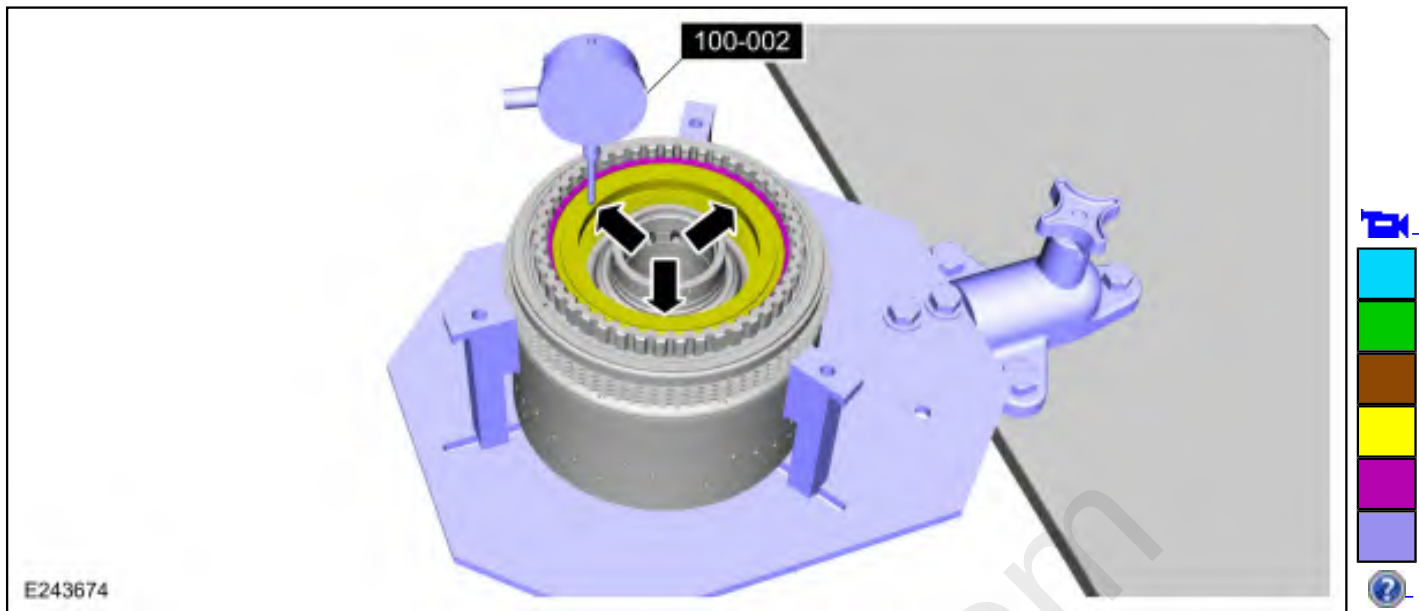


E245882

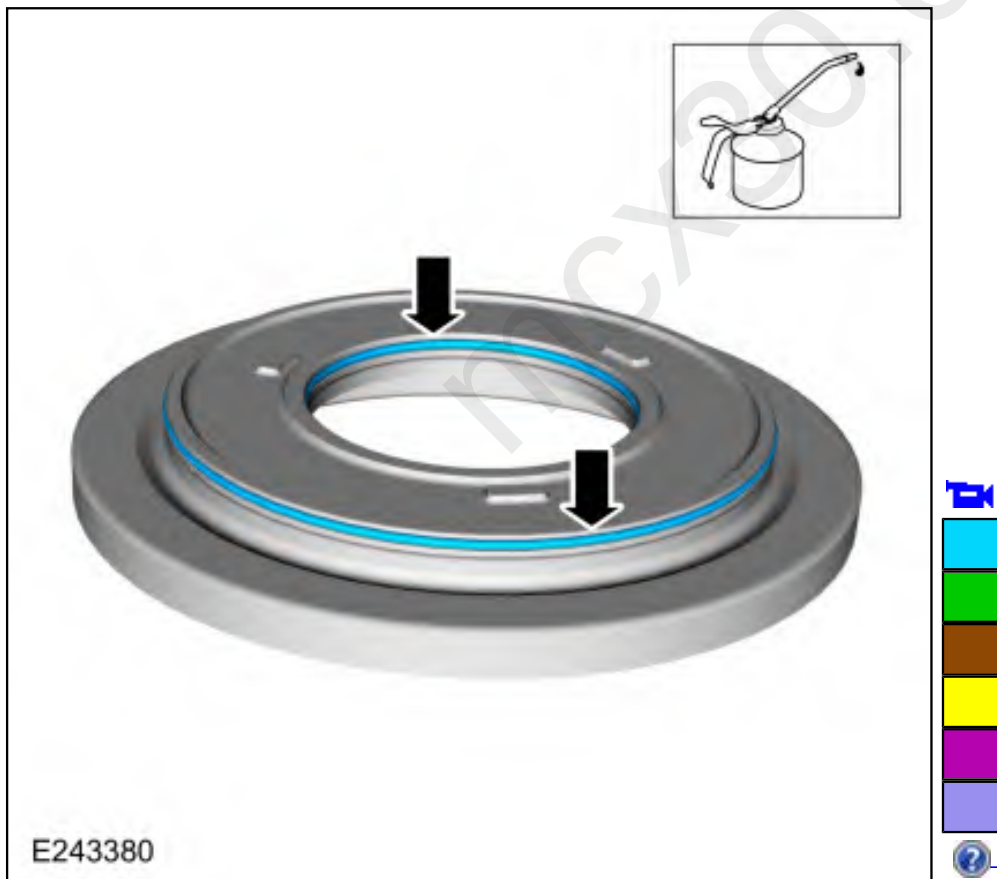
148. Using the special tool, measure the D clutch clearance. Position the plunger so it rests on the top surface of the pressure plate. Zero the dial indicator. Pull up on the pressure plate and measure and record the clutch clearance in 3 different places. Average the 3 recorded clutch clearance measurements 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 - 10-Speed Automatic Transmission - 10R80, Specifications).

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



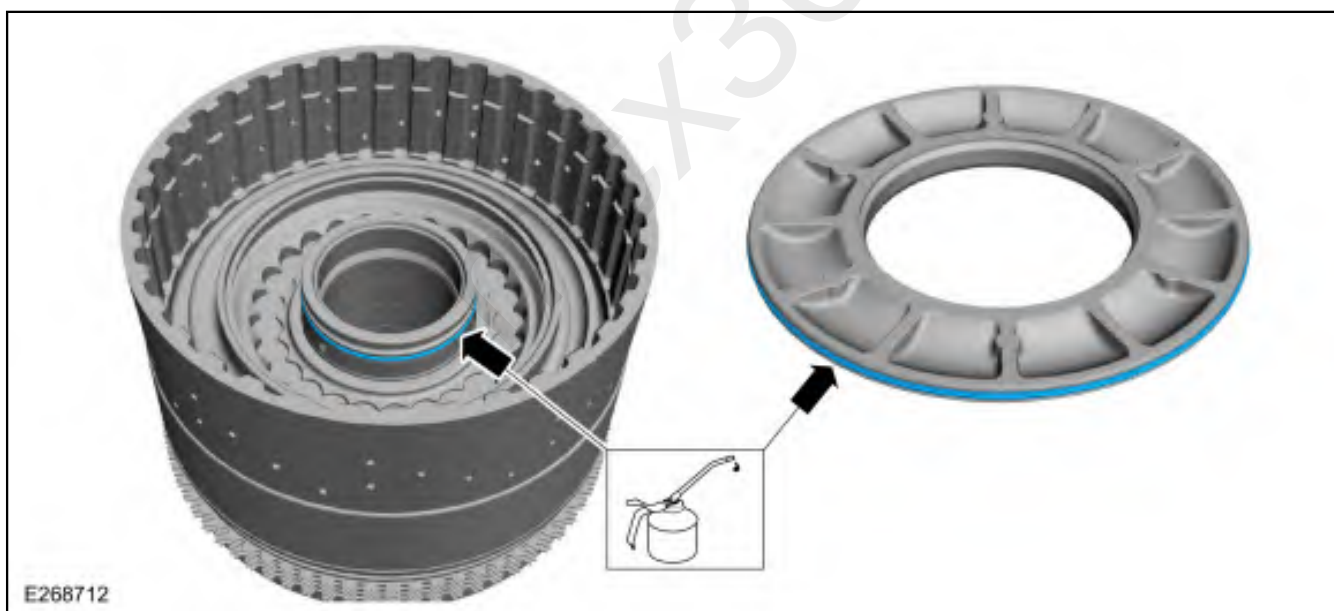
149. Install the new C clutch piston inner and outer seals. Lubricate the seals with petroleum jelly.



150. Install the C clutch piston.



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



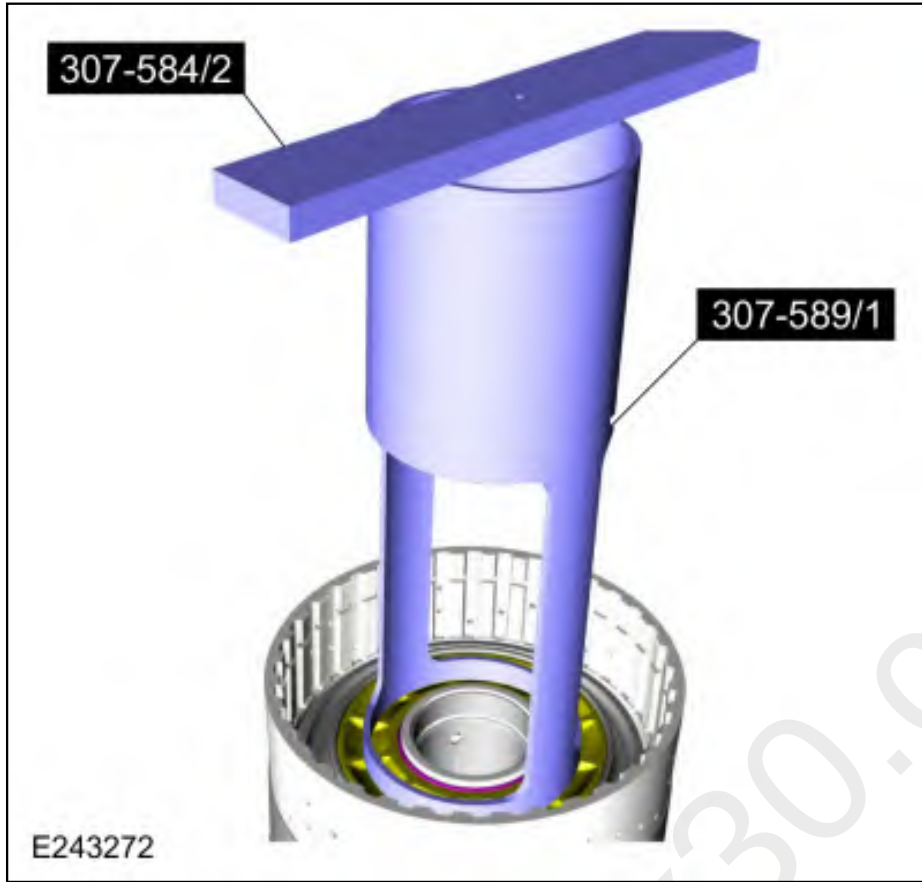
152. Install the C clutch piston return spring.



153. Install the C clutch balance dam.



154. 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



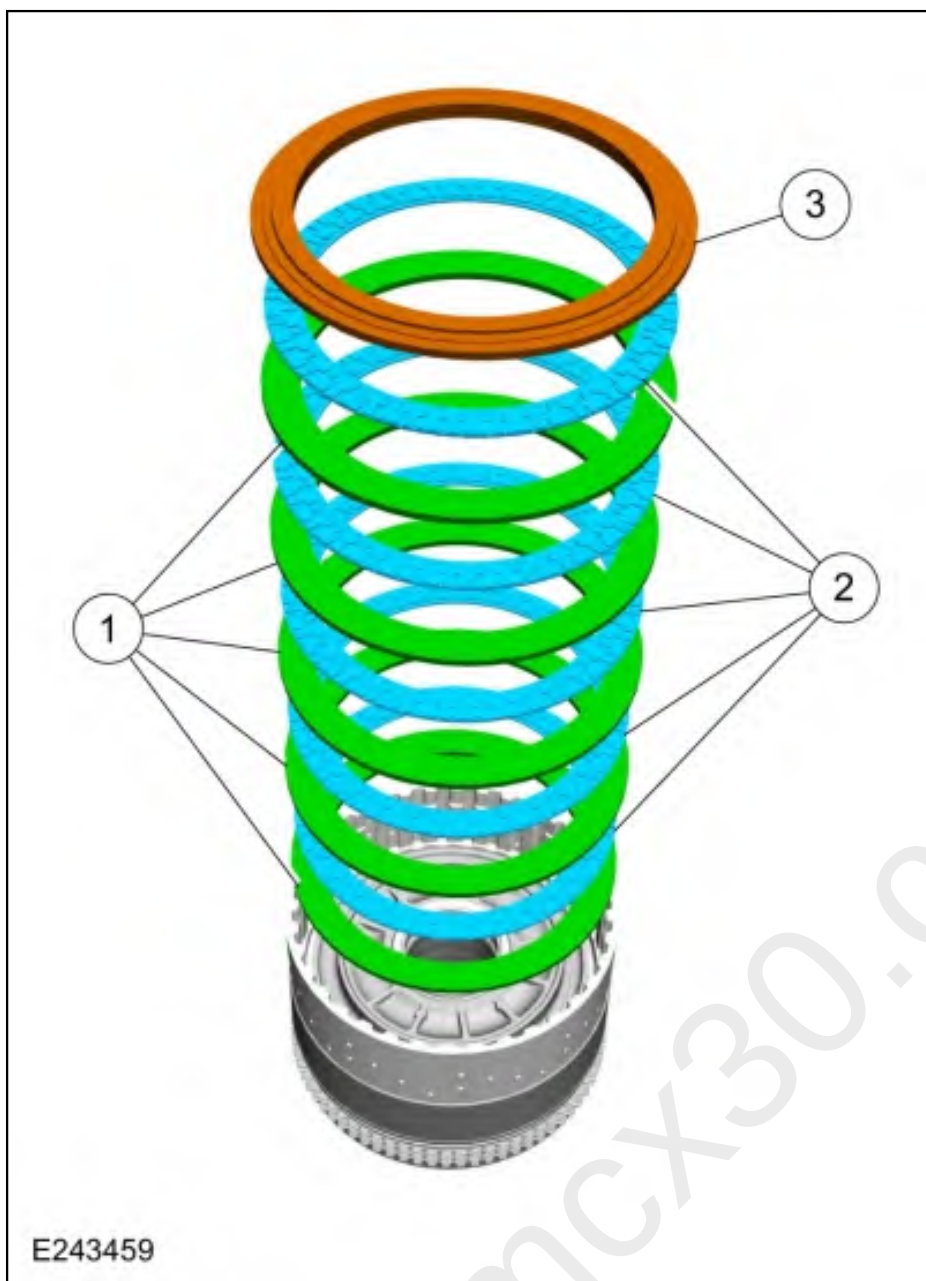
155. **NOTE:** Clutch plate quantity is model dependant based on engine displacement.

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

1. Steel plates
2. Friction plates

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

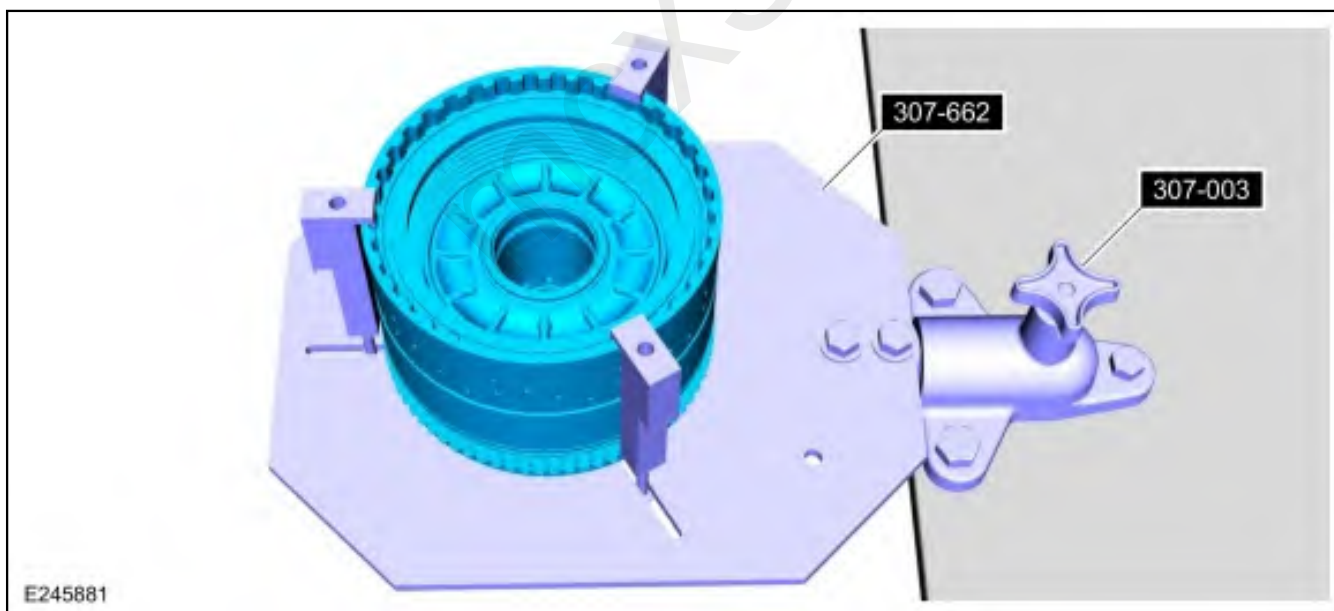
3. Pressure plate



156. Install the C clutch snap ring.



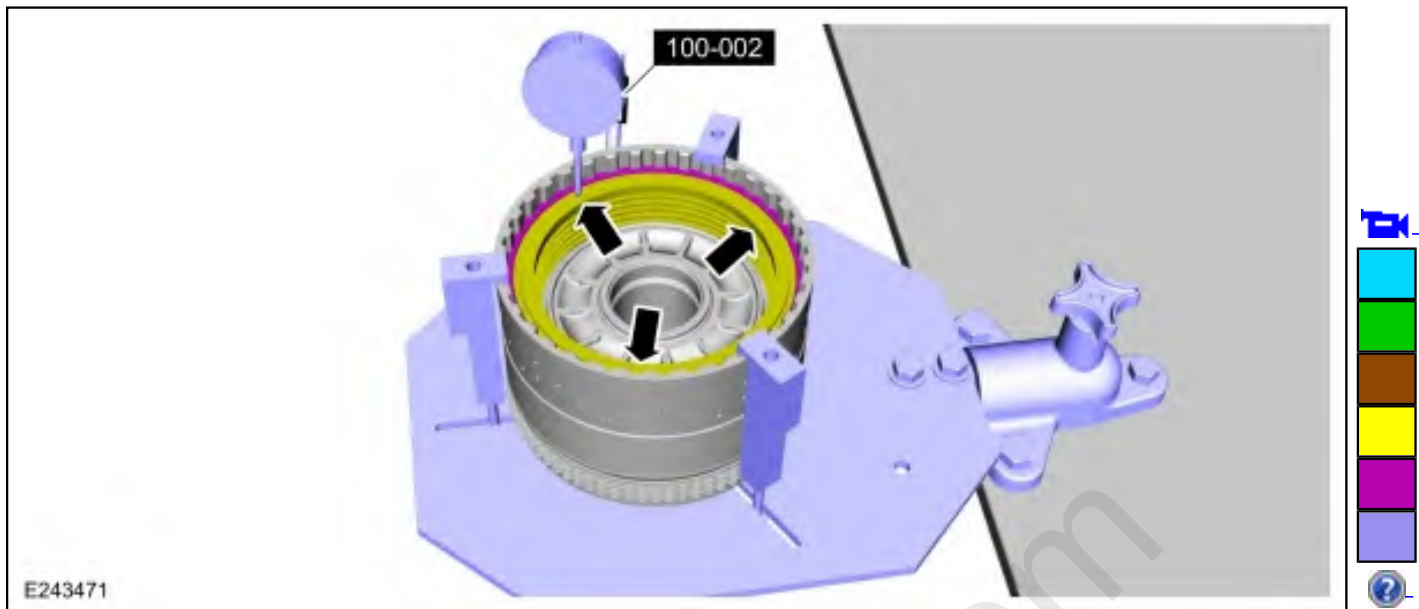
157. Assemble the special tools and position the CDF cylinder with the C clutch facing up.
 Use Special Service Tool: 307-662 Gauge, Clutch Pack Endplay. , 307-003 (T57L-500-B) Holding Fixture, Transmission.



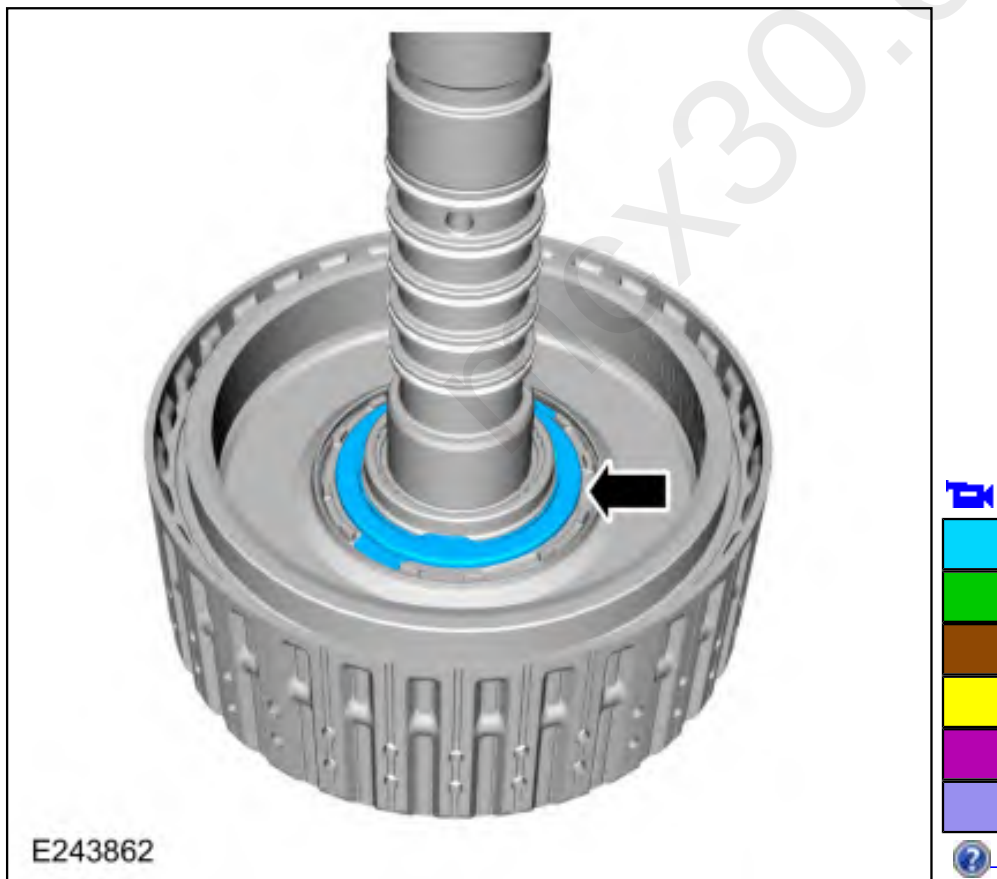
158. Using the special tool, measure the C clutch clearance. Position the plunger so it rests on the top surface of the pressure plate. Zero the dial indicator. Pull up on the pressure plate and measure and record the clutch clearance in 3 different places. Average the 3 recorded clutch clearance measurements 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 - 10-Speed Automatic Transmission - 10R80, Specifications).

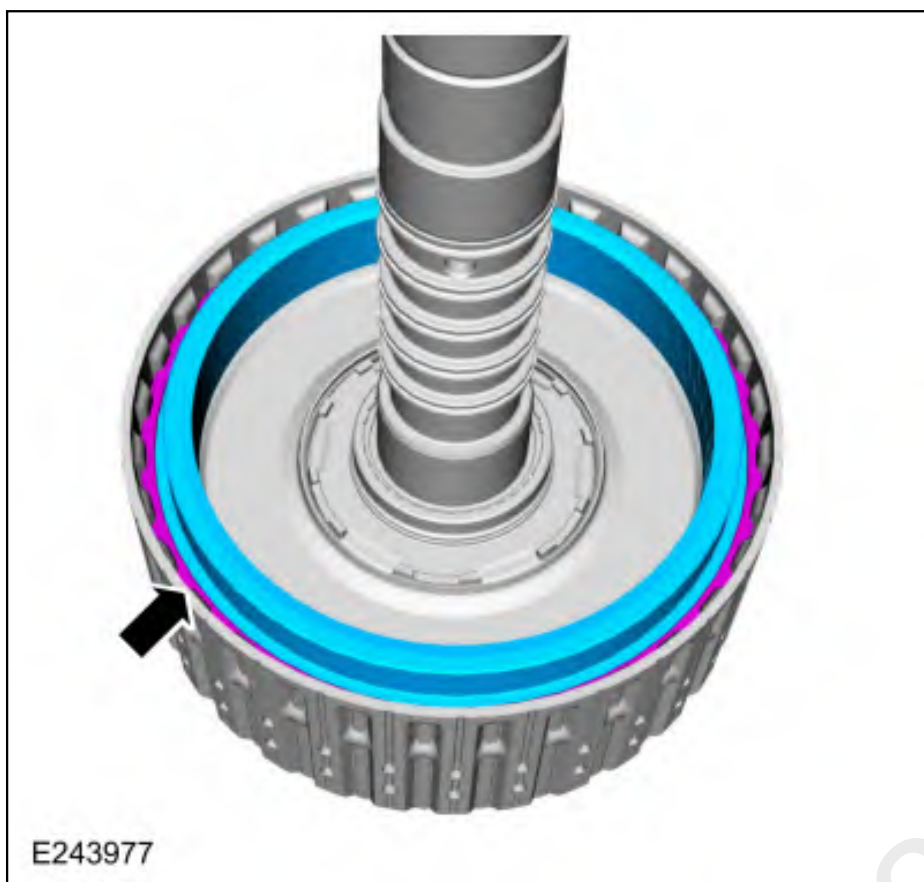
Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



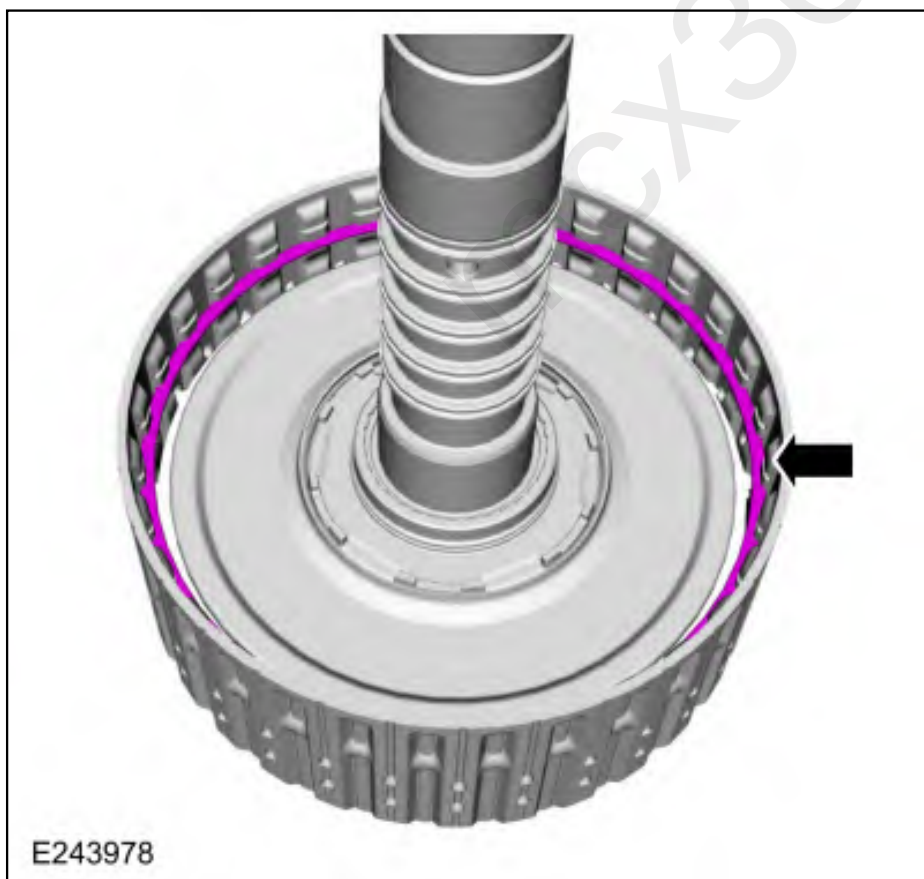
159. Remove the (T6) thrust bearing.



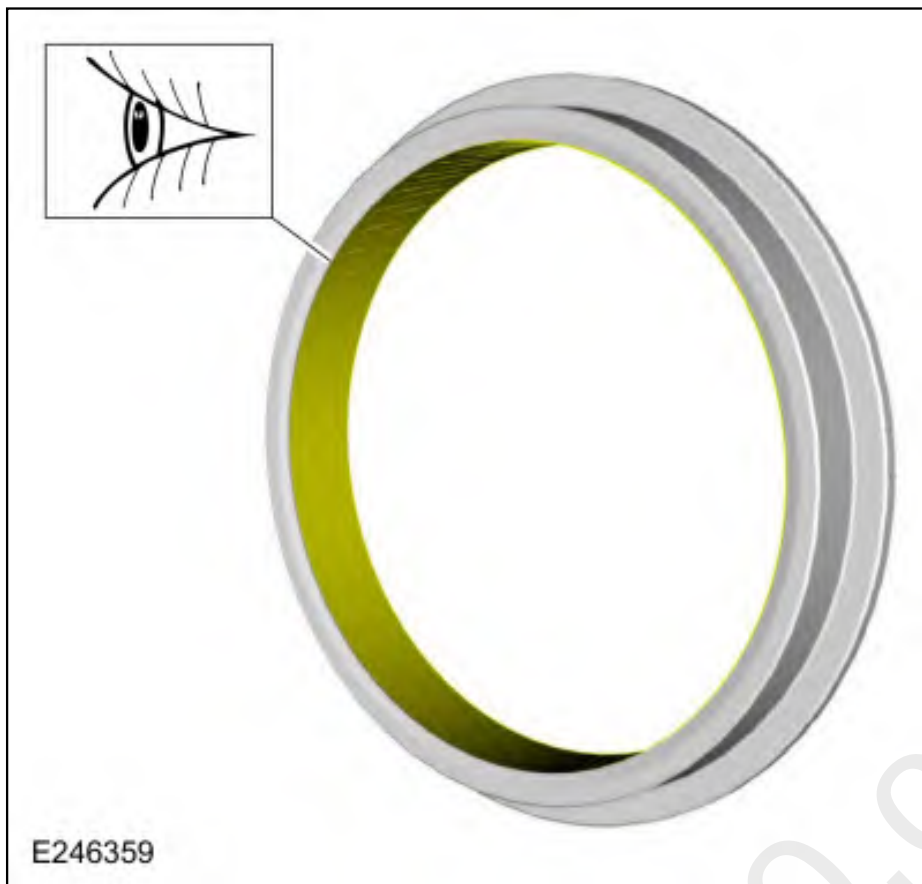
160. Remove the snap ring and the No. 3 ring gear.



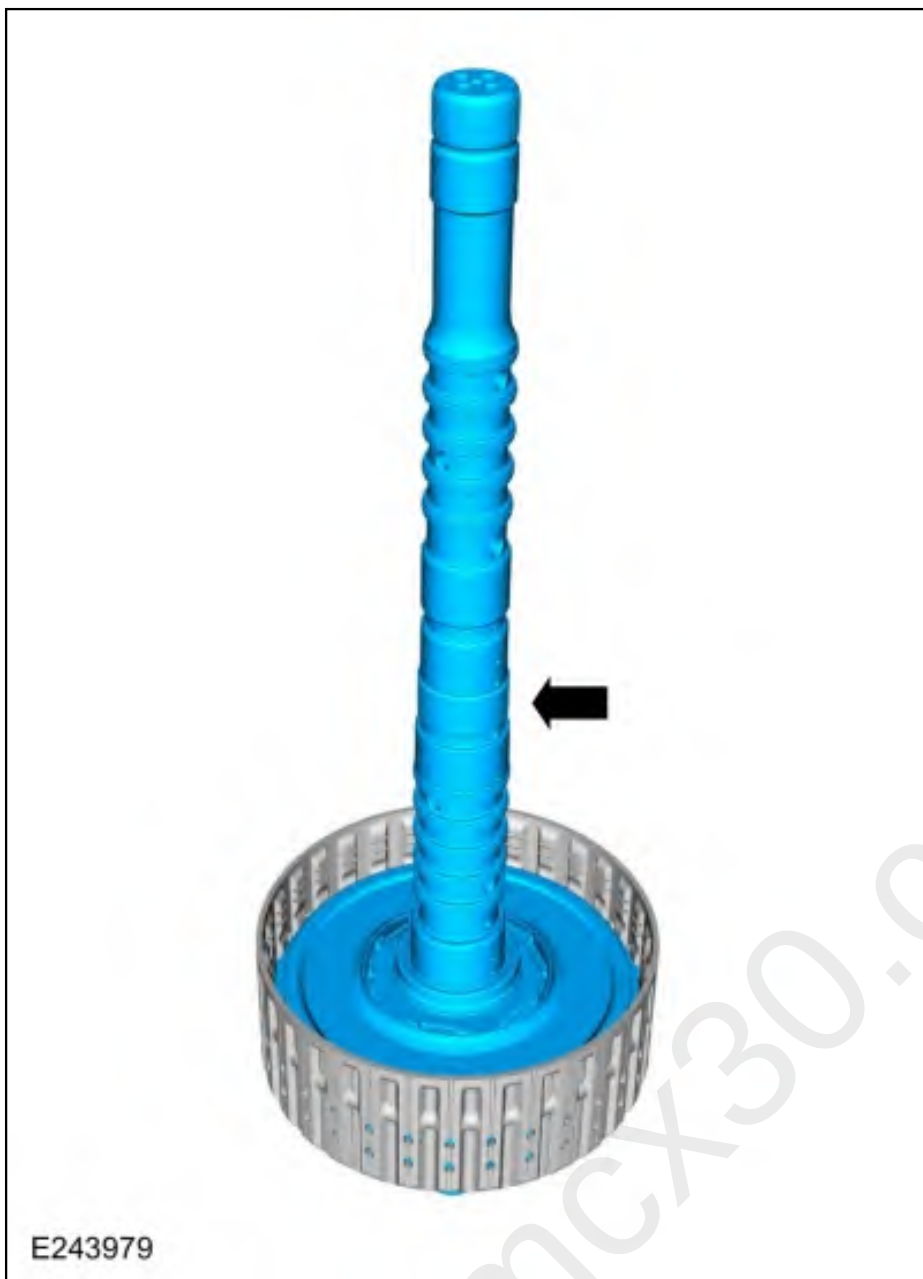
161. Remove the rear No. 3 ring gear snap ring.



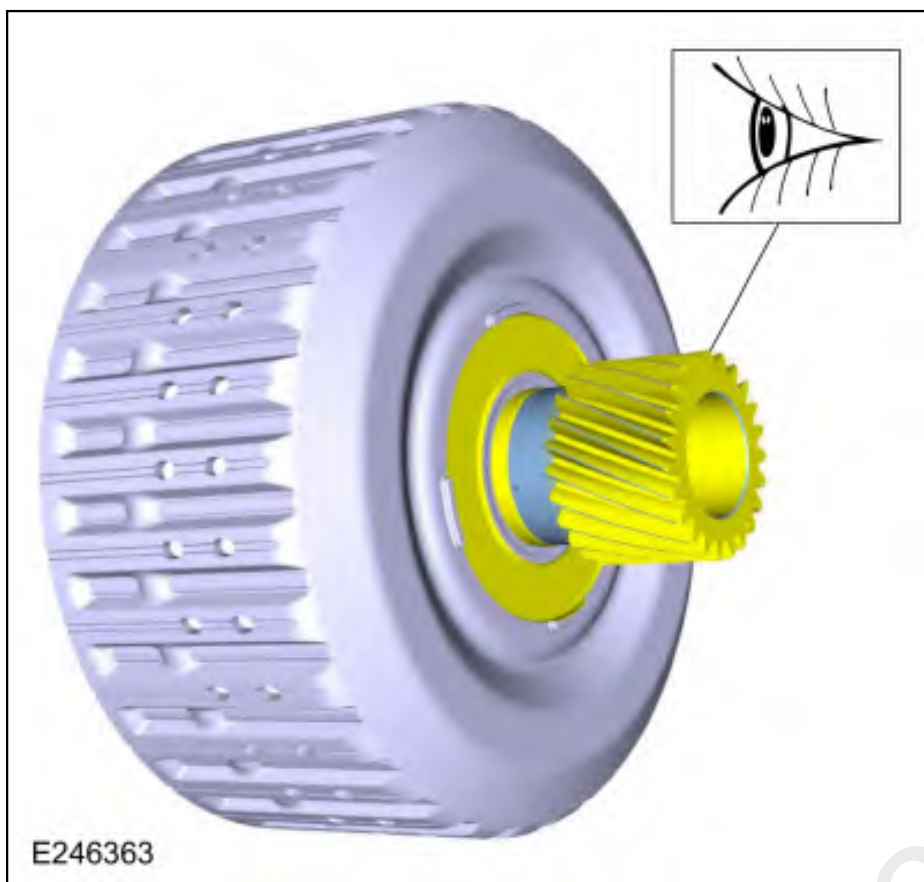
162. Inspect the No. 3 ring gear.



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



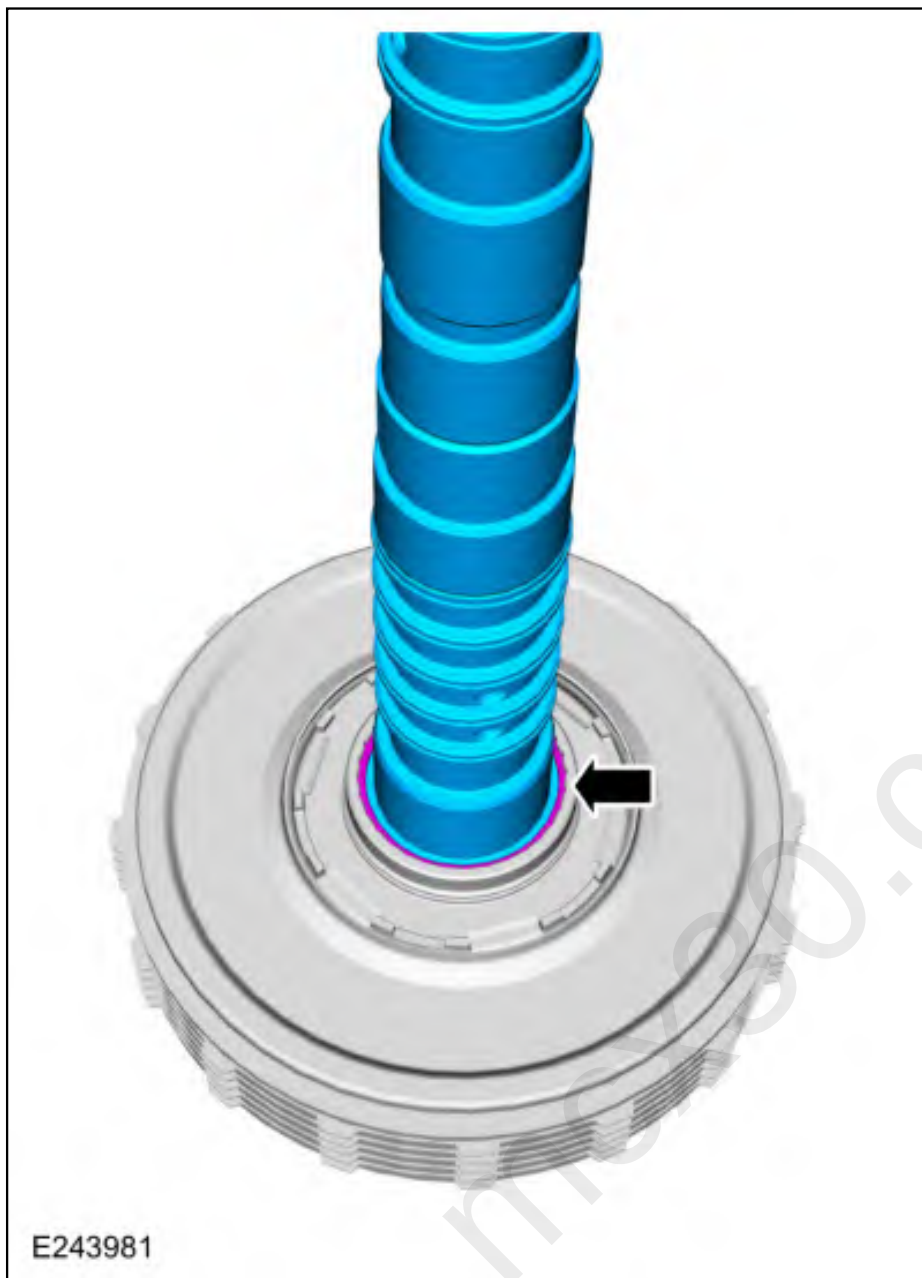
164. Inspect the No. 4 shell and sun gear.



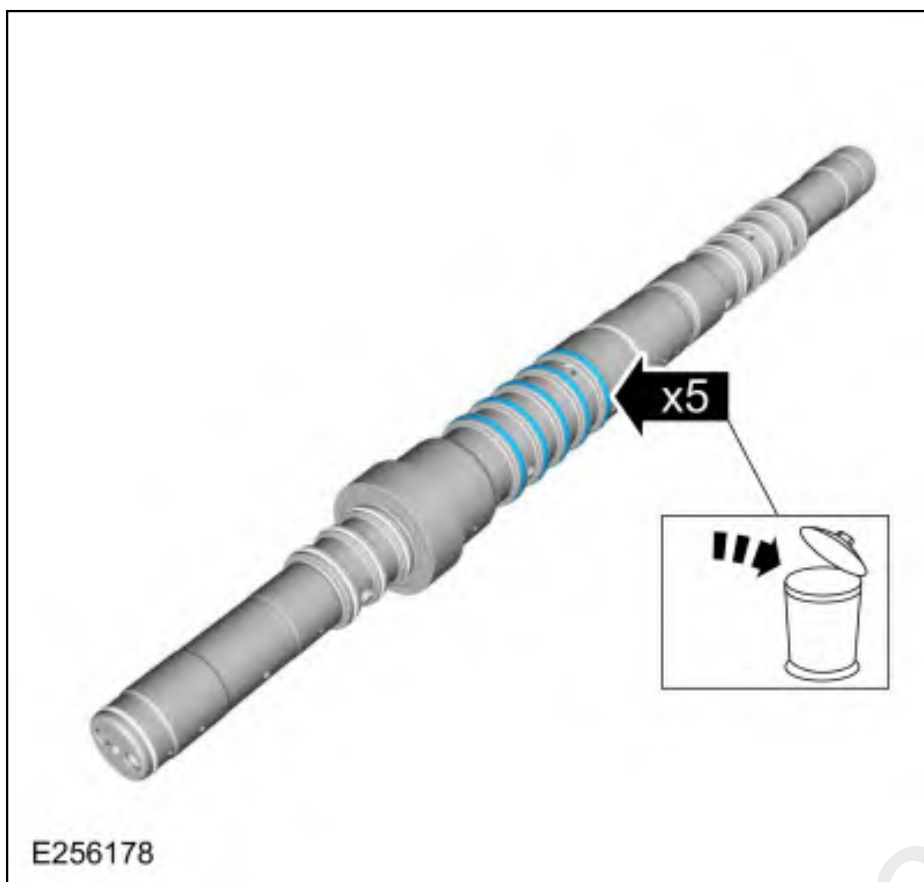
165. Remove the (T7) thrust bearing.



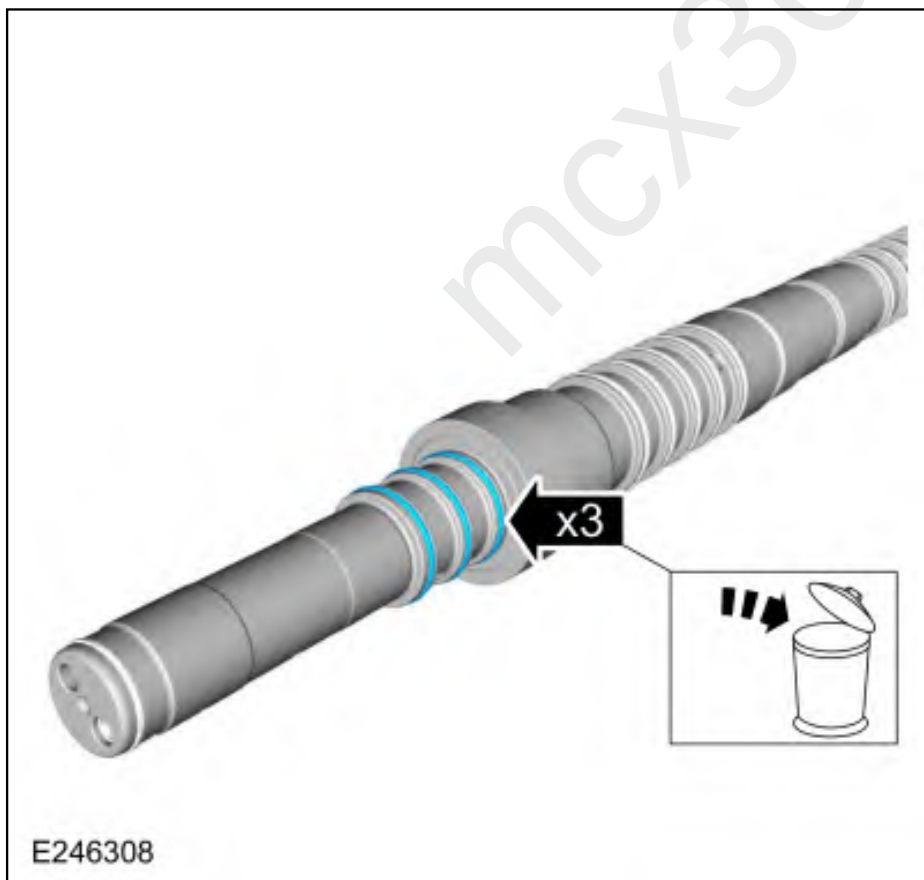
166. Remove the snap ring and remove the input shaft from the E clutch assembly.



167. Remove and discard the input shaft-to-sun gear No. 3 shaft Teflon® seals.



168. Remove and discard the input shaft D-ring seals (7G242).



169. Remove and discard the input shaft Teflon® seal (7G091).



170. Clean and inspect the input shaft.

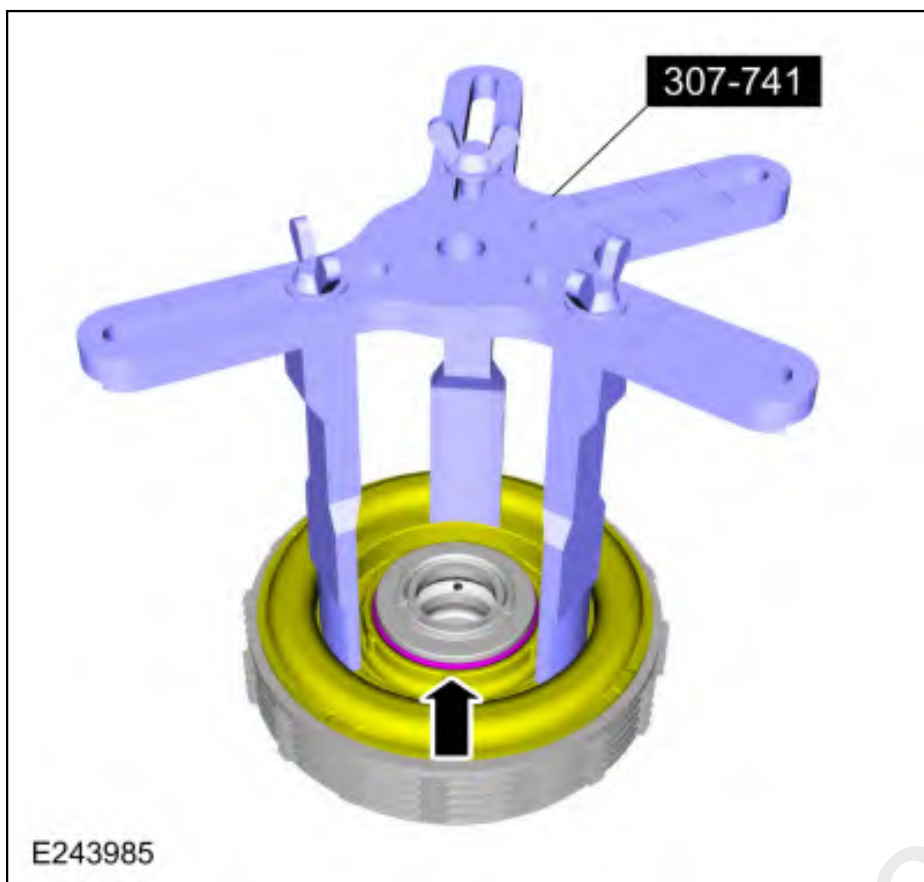


171. **NOTICE: Do not compress the balance dam too far or damage to the E clutch hub can occur. Only compress the E clutch hub far enough to remove the retainer.**

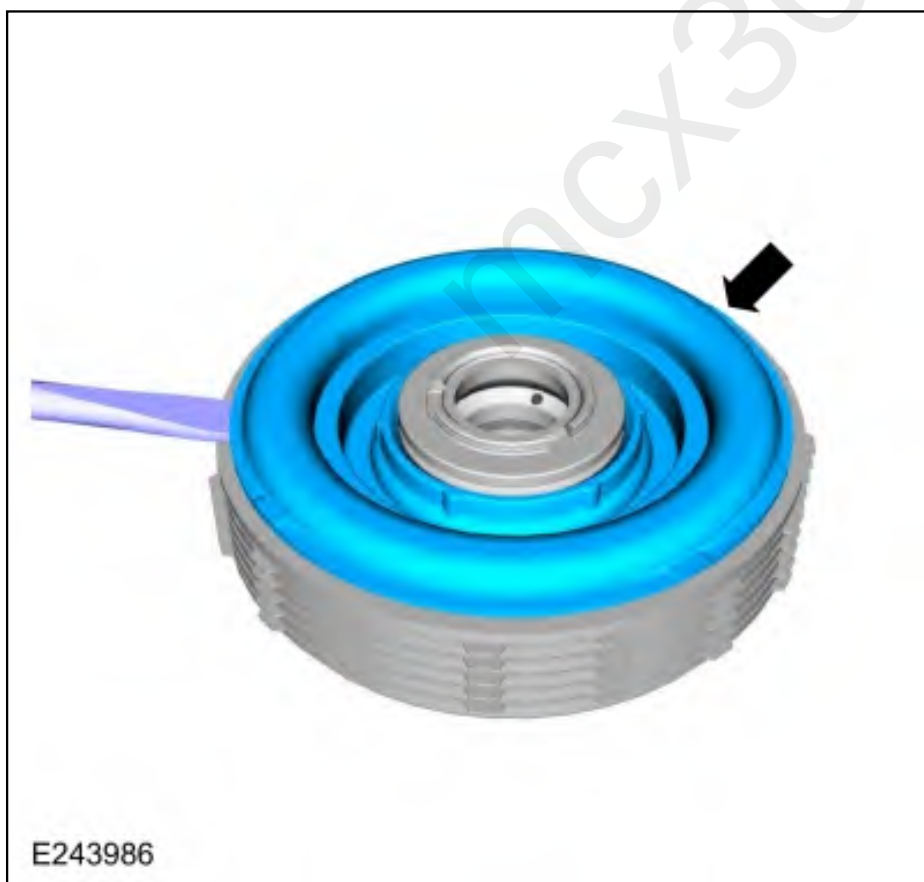
Using the special tool and a press, compress the E clutch balance dam and remove the retainer.

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

Use the General Equipment: Hydraulic Press

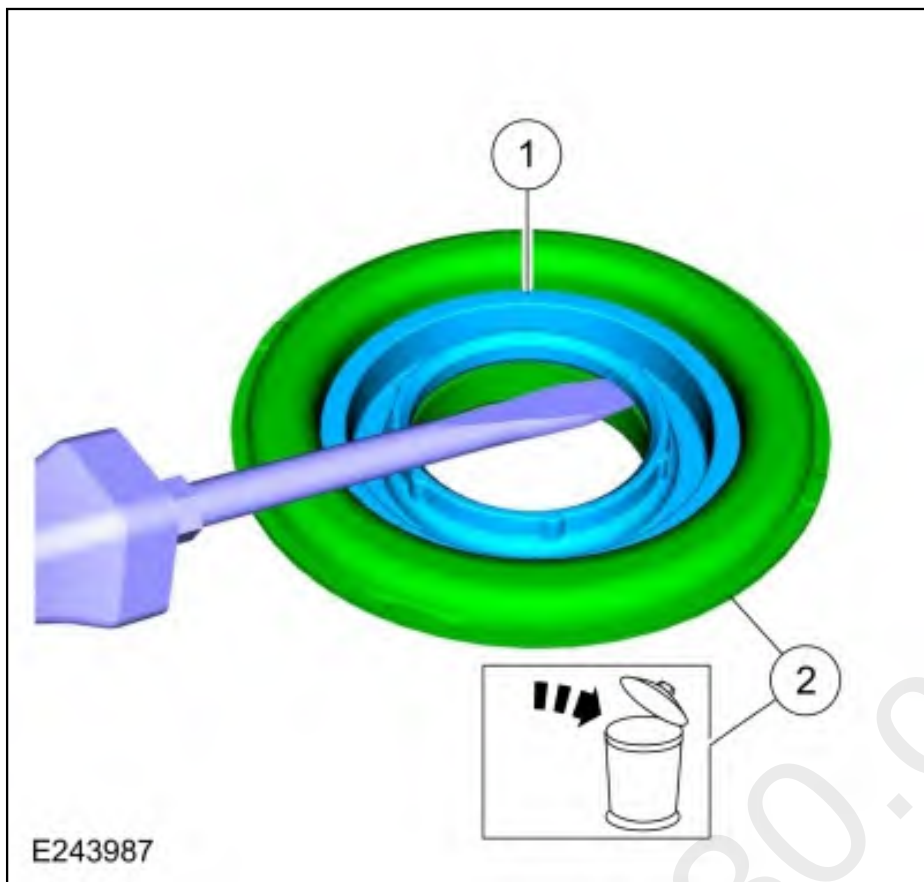


172. Pry the E clutch piston and balance dam upward and remove the piston and balance dam from the E clutch hub.

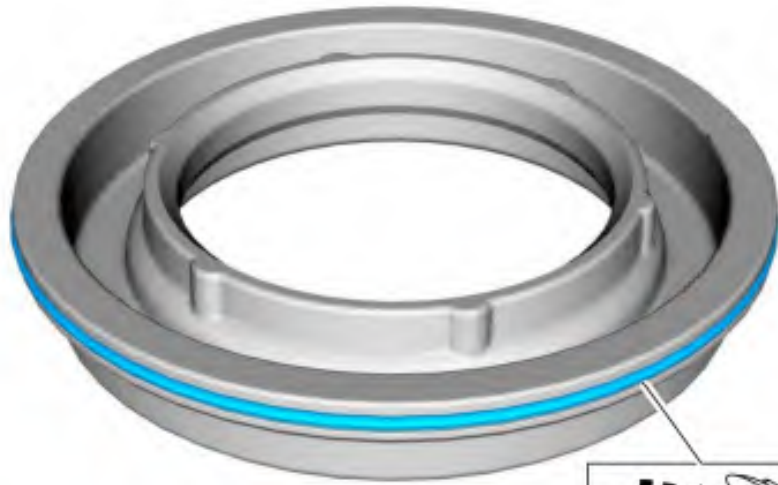


173. Remove the E clutch balance dam and discard the E clutch piston (7A262).

1. E clutch balance dam
2. E clutch piston



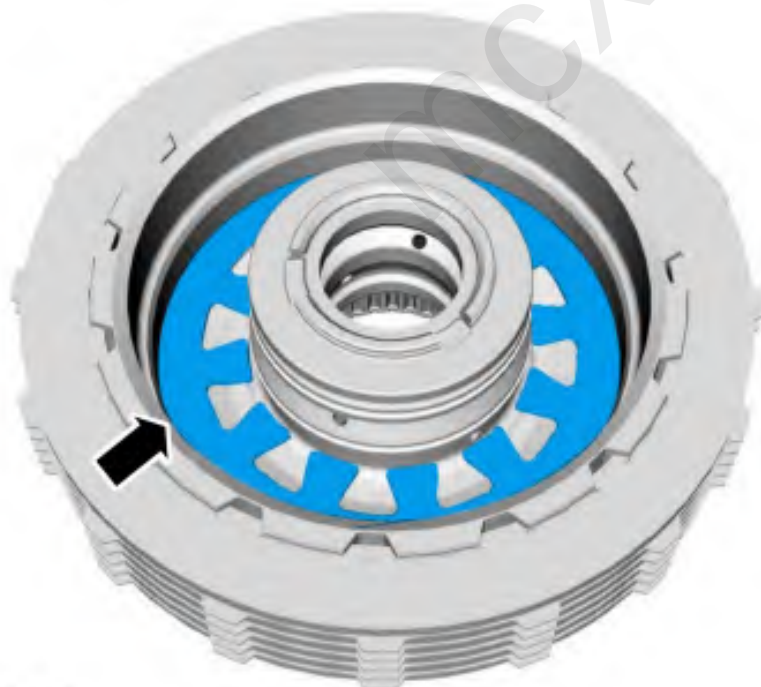
174. Remove and discard the E clutch balance dam outer seal (7F227).



E243988



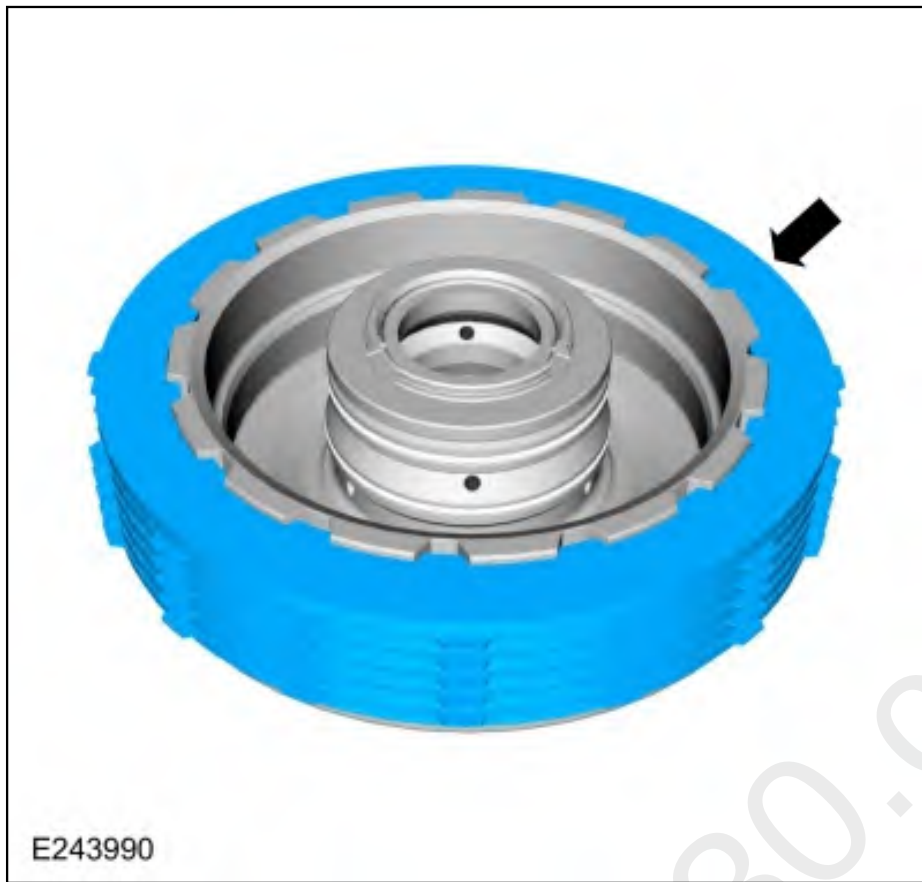
175. Remove the E clutch piston return spring.



E243989



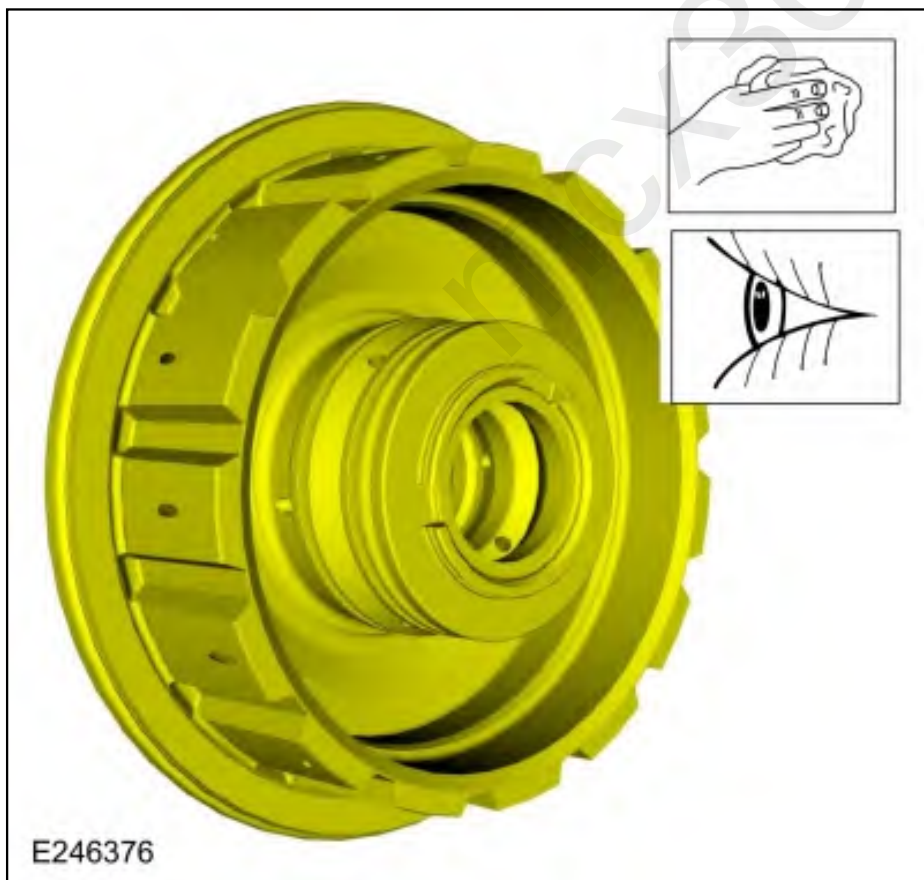
176. Remove the E clutch assembly. Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged replace as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



177. Remove and discard the E clutch piston and balance dam inner seals (7G242).



178. Clean and inspect the E clutch hub.



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



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

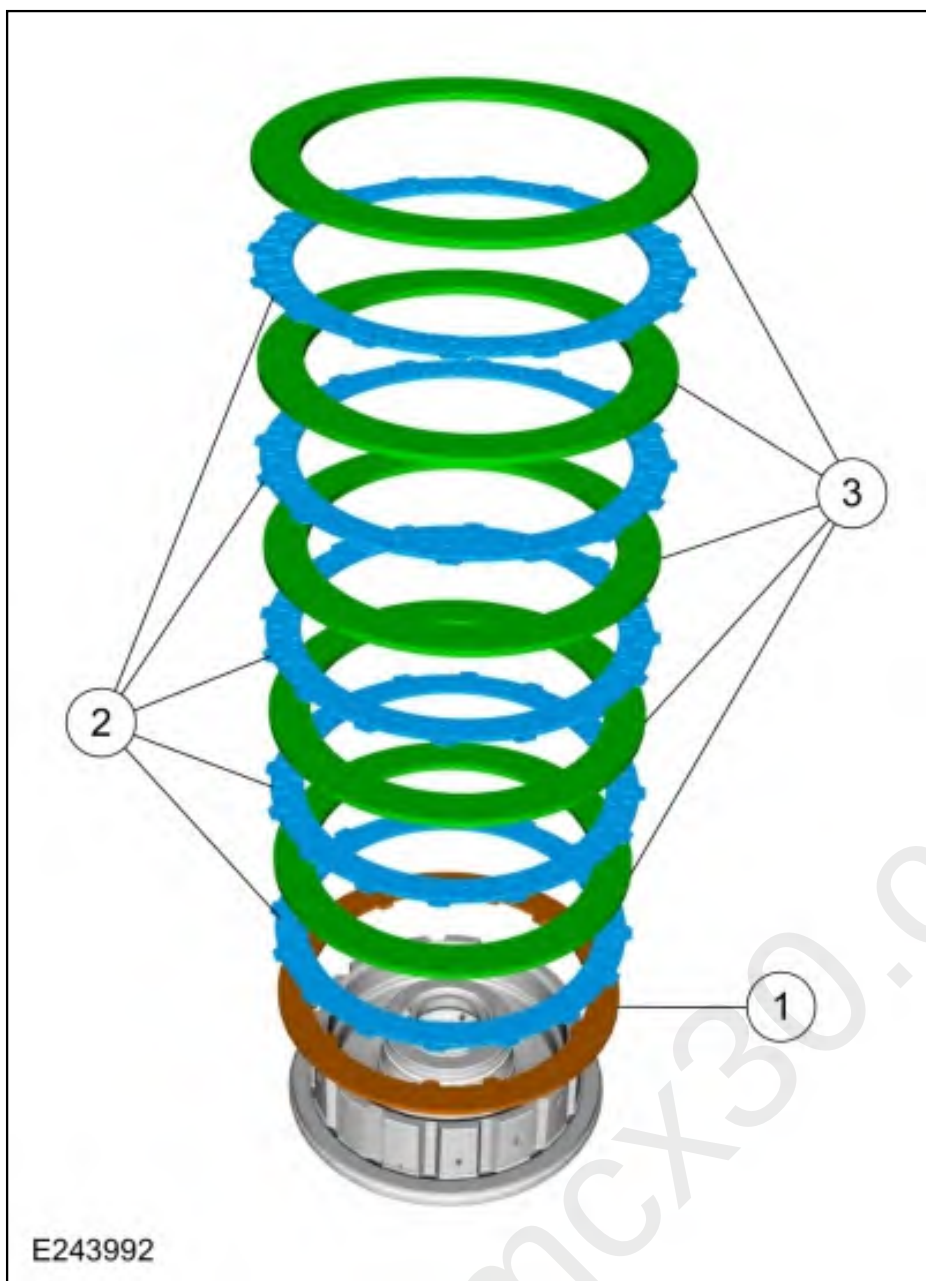
Soak the E clutch plates in clean transmission fluid. Install the E clutch assembly.

1. Pressure plate
2. Friction plates

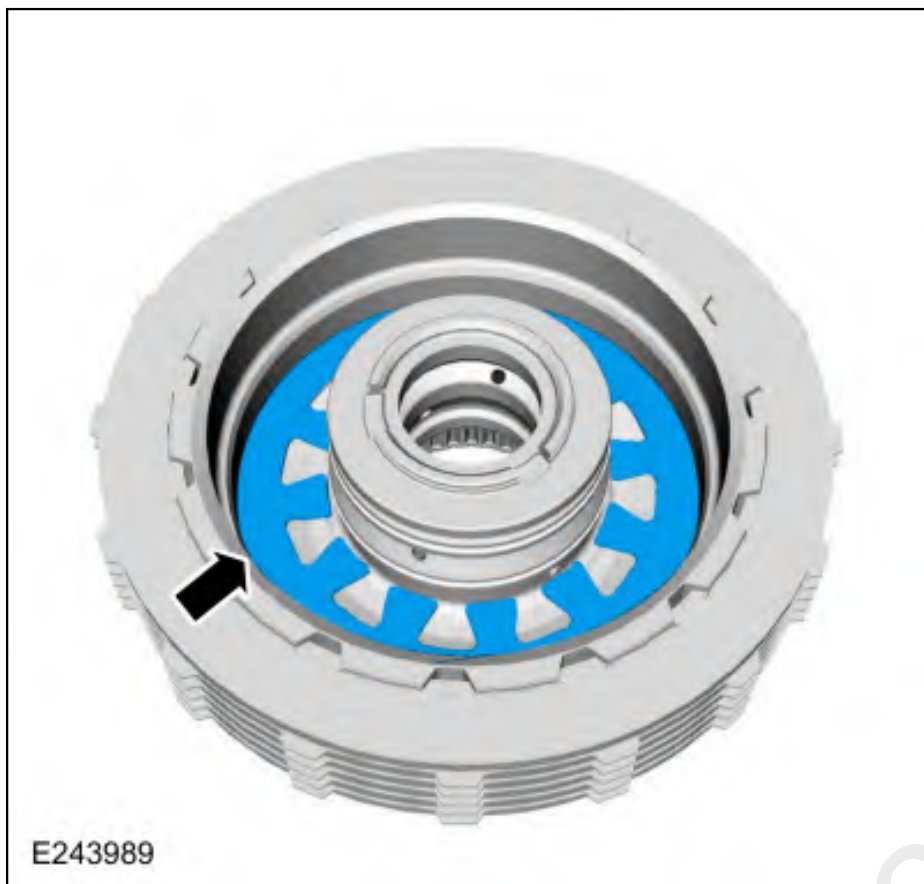
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (MERCON® ULV) (WSS-M2C949-A)

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

Steel plates



181. Install the E clutch piston return spring.

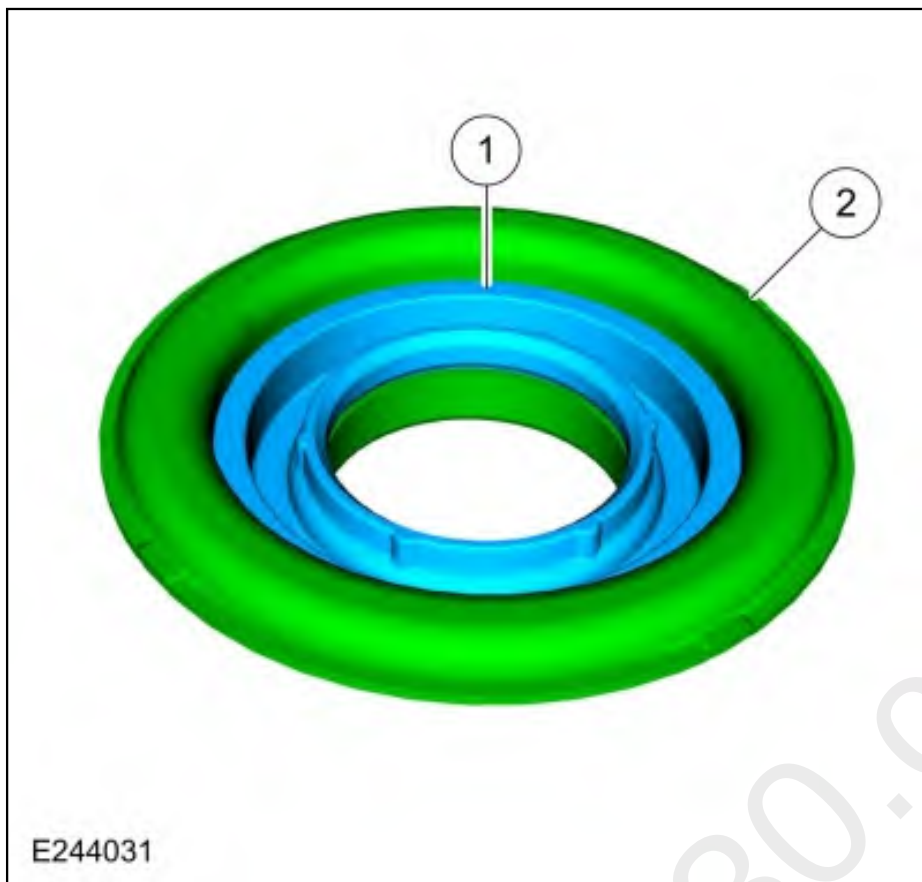


182. Install a new E clutch balance dam outer seal. Lubricate the seal with petroleum jelly.

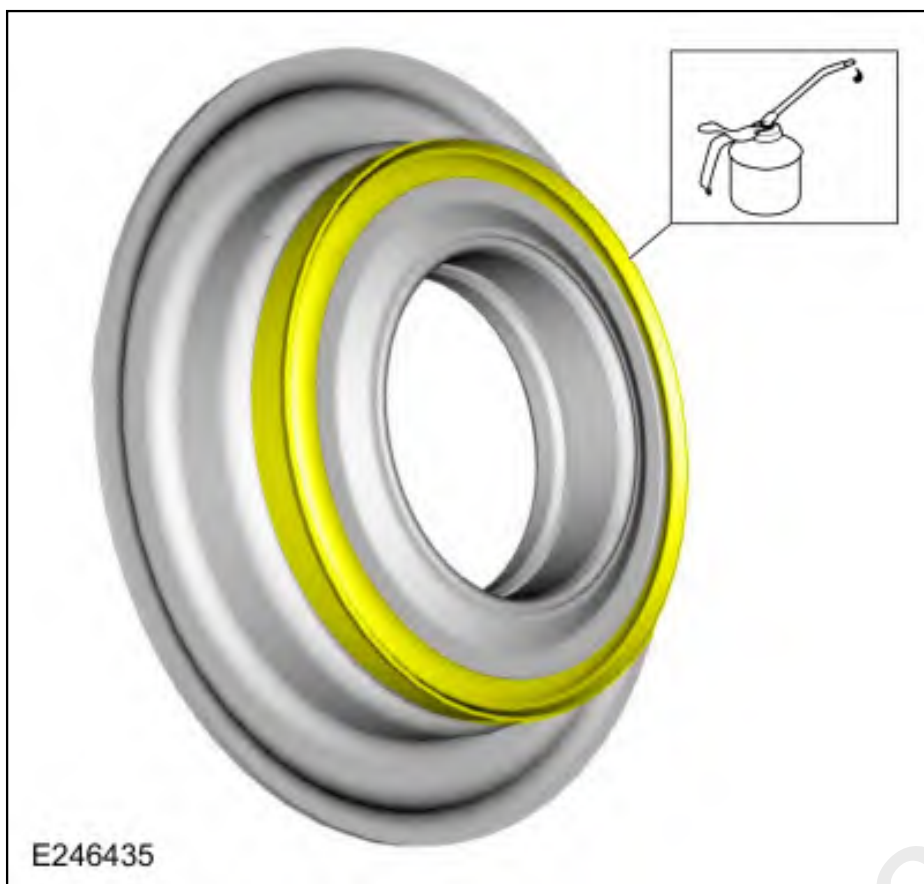


183. Install the E clutch balance dam in the new E clutch piston.

1. E clutch balance dam
2. E clutch piston



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



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

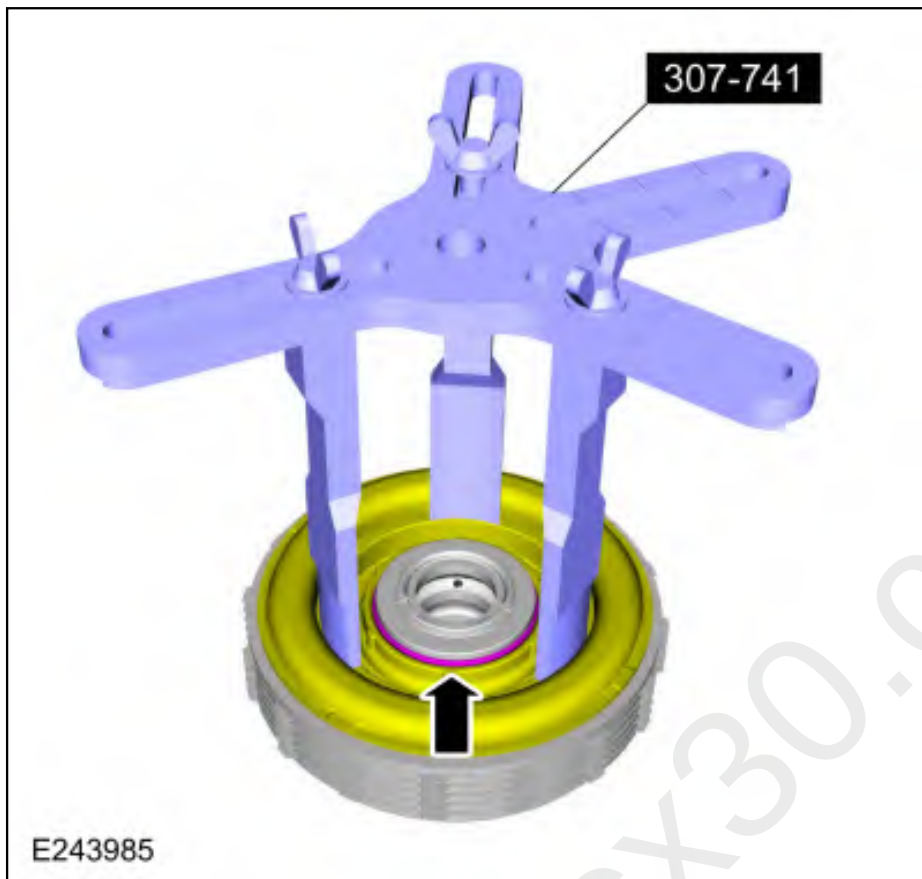


186. **NOTICE: Do not compress the balance dam too far or damage to the E clutch hub can occur. Only compress the E clutch hub far enough to install the retainer.**

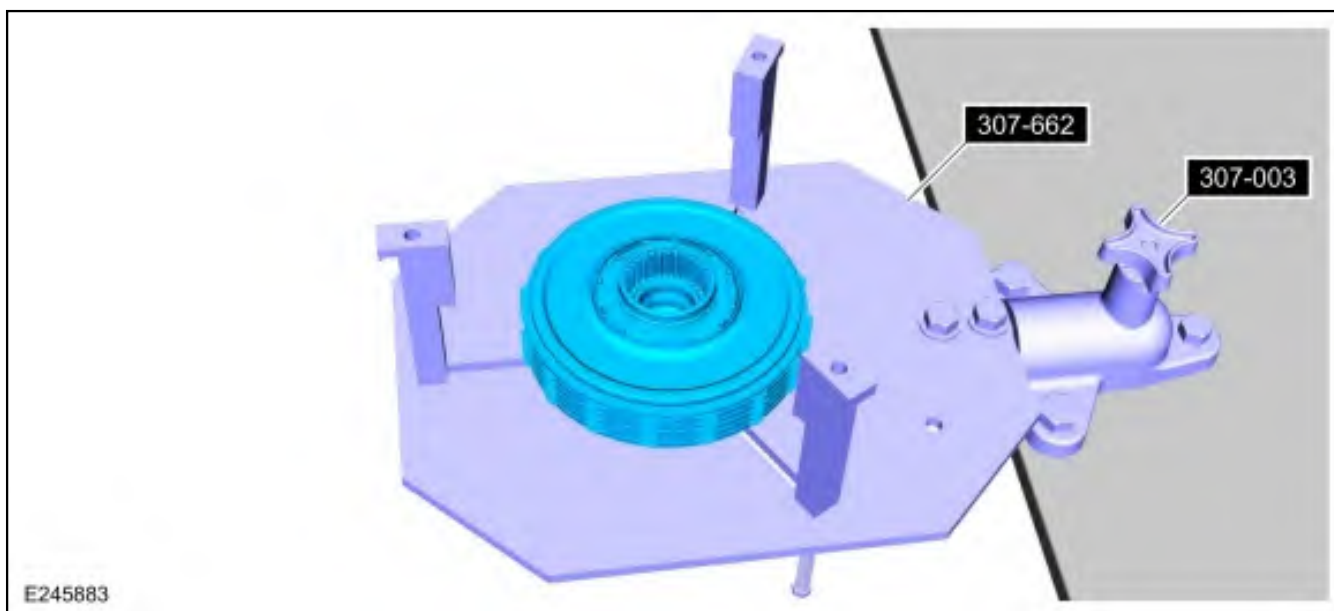
Using the special tool and a press, compress the E clutch balance dam and install the retainer.

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

Use the General Equipment: Hydraulic Press



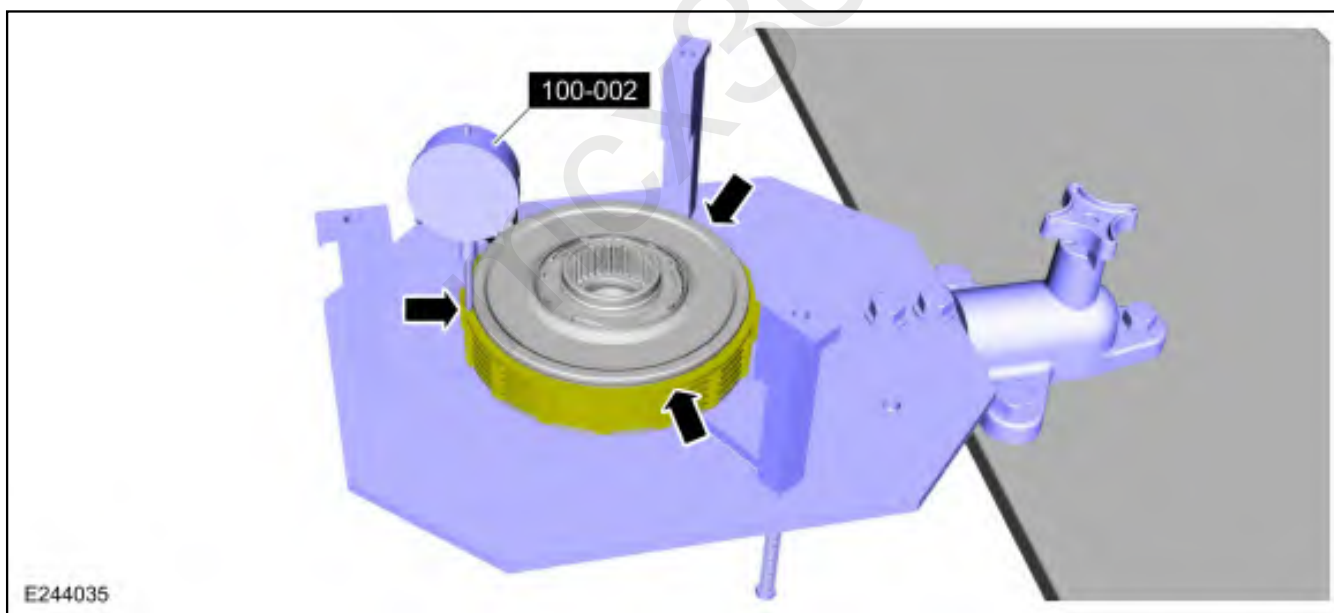
187. Assemble the special tools and position the E clutch assembly on the special tool.
Use Special Service Tool: 307-662 Gauge, Clutch Pack Endplay. , 307-003 (T57L-500-B) Holding Fixture, Transmission.



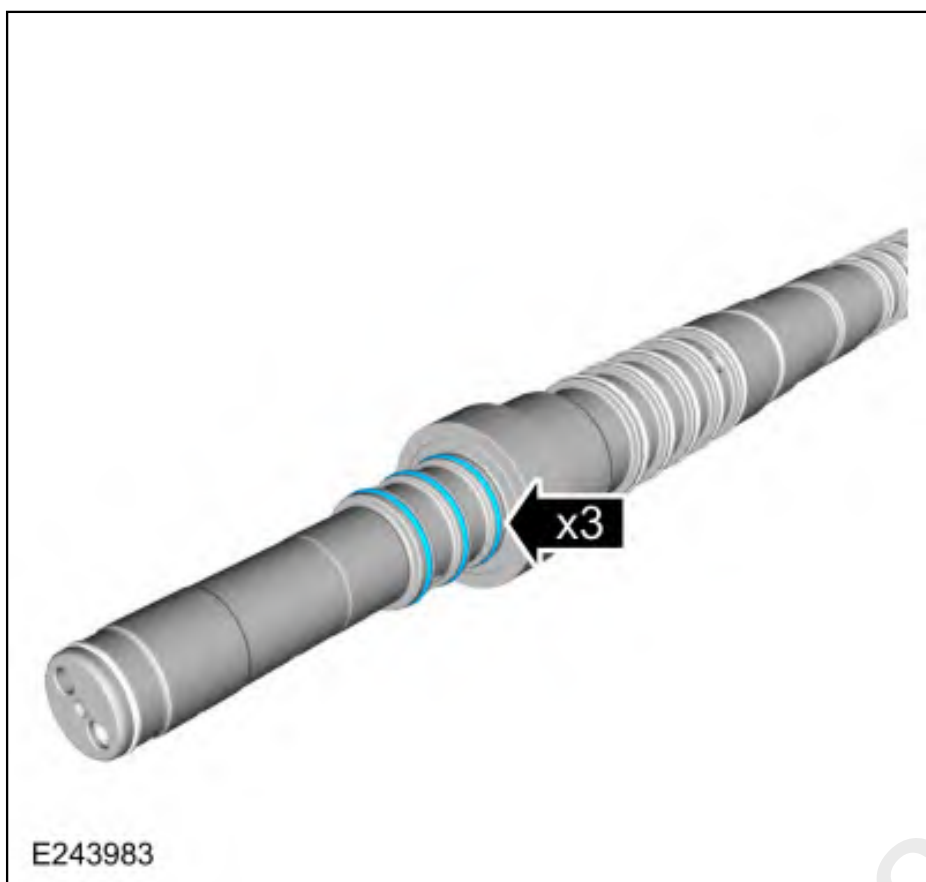
188. Using the special tool, measure the E clutch clearance. Position the plunger so it rests on the top surface of the pressure plate. Zero the dial indicator. Pull up on the pressure plate and measure and record the clutch clearance in 3 different places. Average the 3 recorded clutch clearance measurements 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 - 10-Speed Automatic Transmission - 10R80, Specifications).

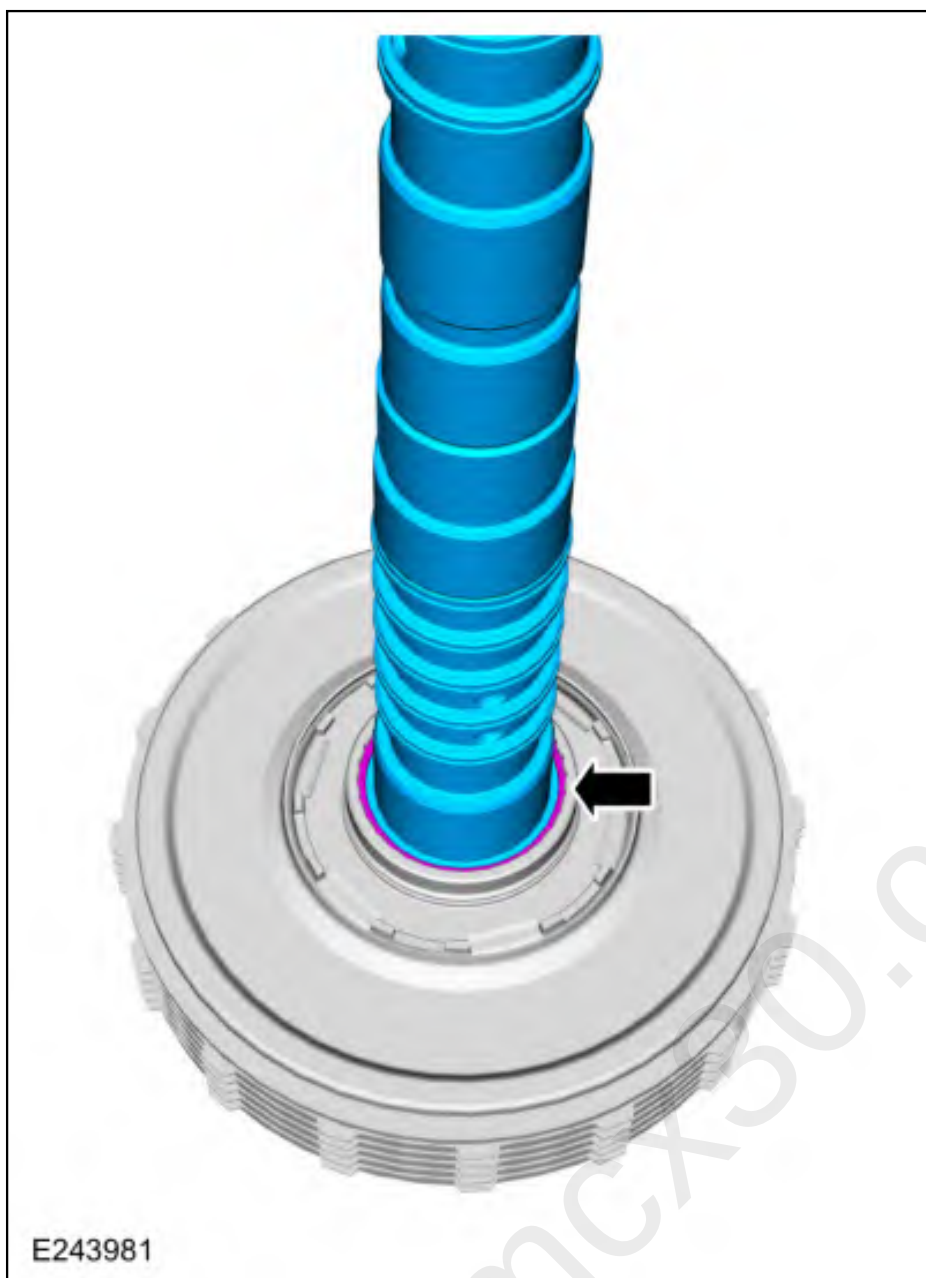
Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



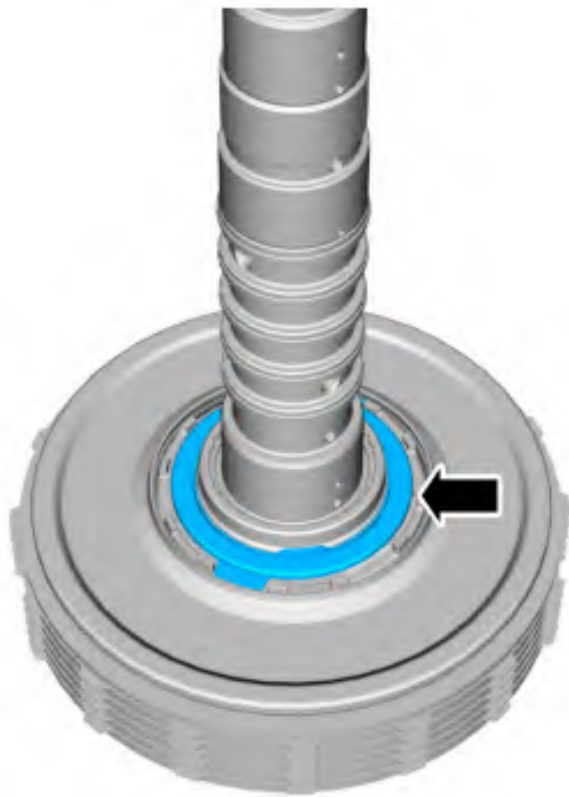
189. Install the new input shaft D-ring seals.



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



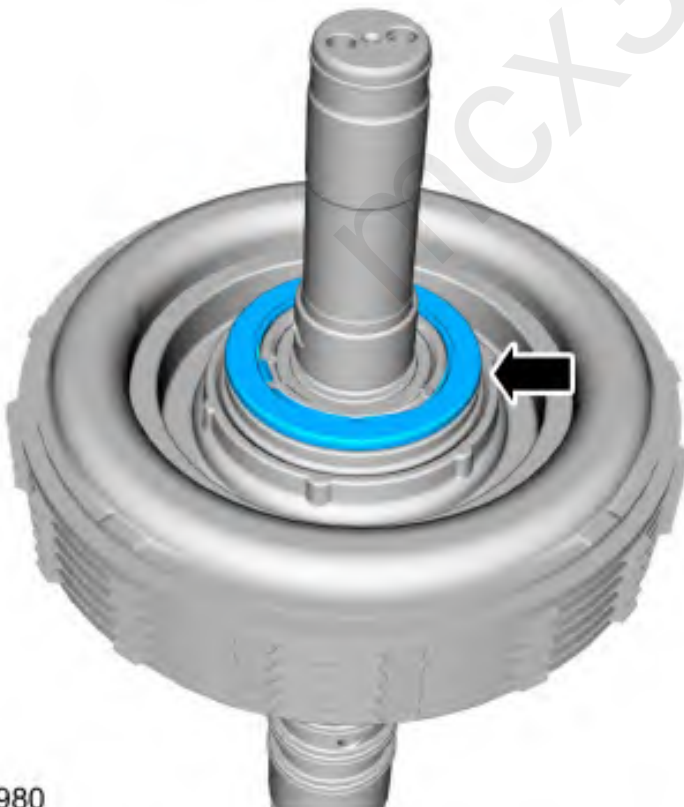
191. Install the (T6) thrust bearing onto the E clutch with the tab locators down. Snap the bearing into place.



E244036



192. Install the (T7) thrust bearing onto the E clutch with the tab locators up. Snap the bearing into place.



E243980

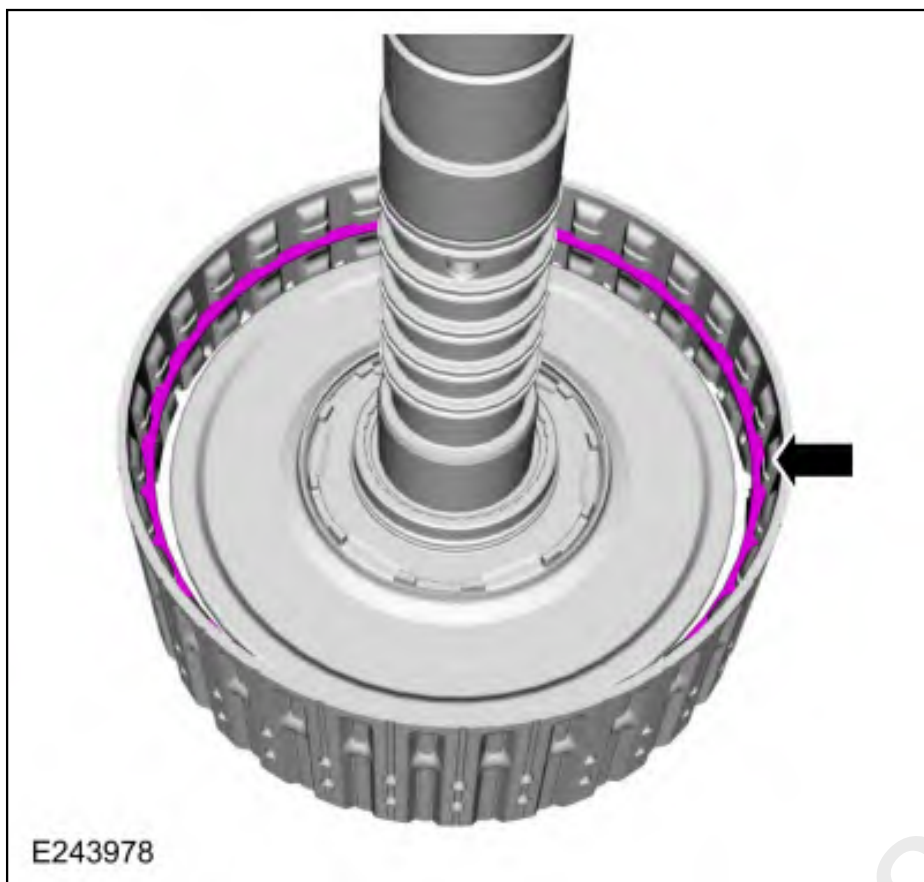


193. **NOTE:** *Align the outer splines on the friction plates.*

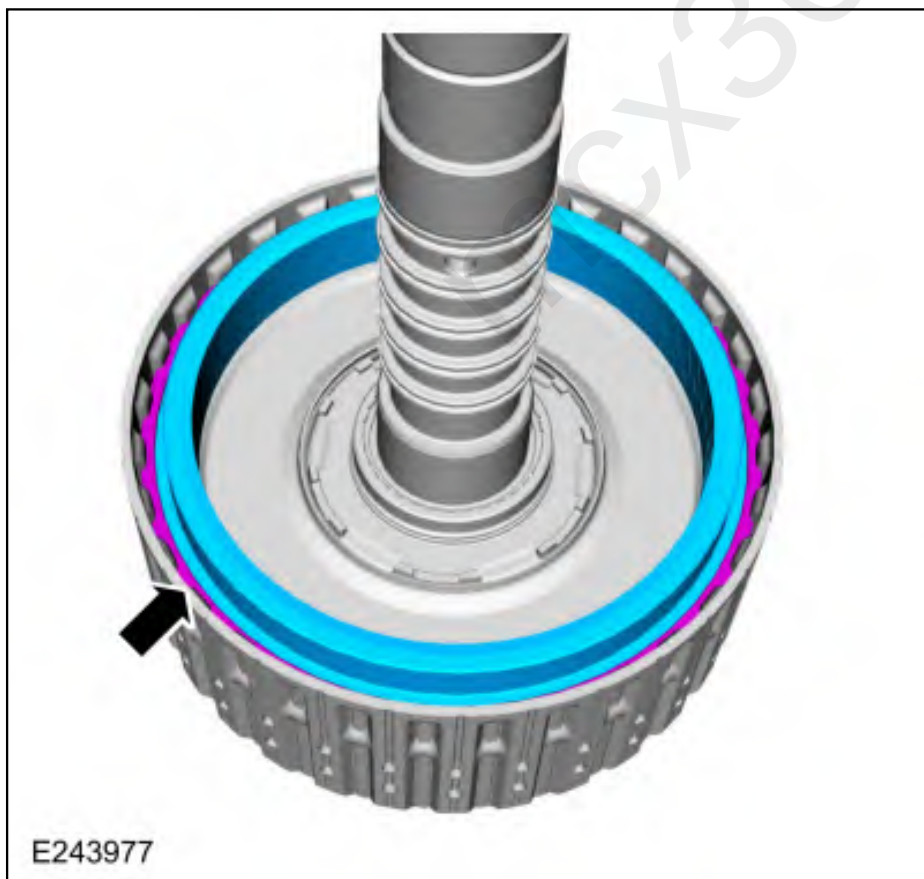
Install the input shaft and the E clutch into the No. 4 shell and sun gear.



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

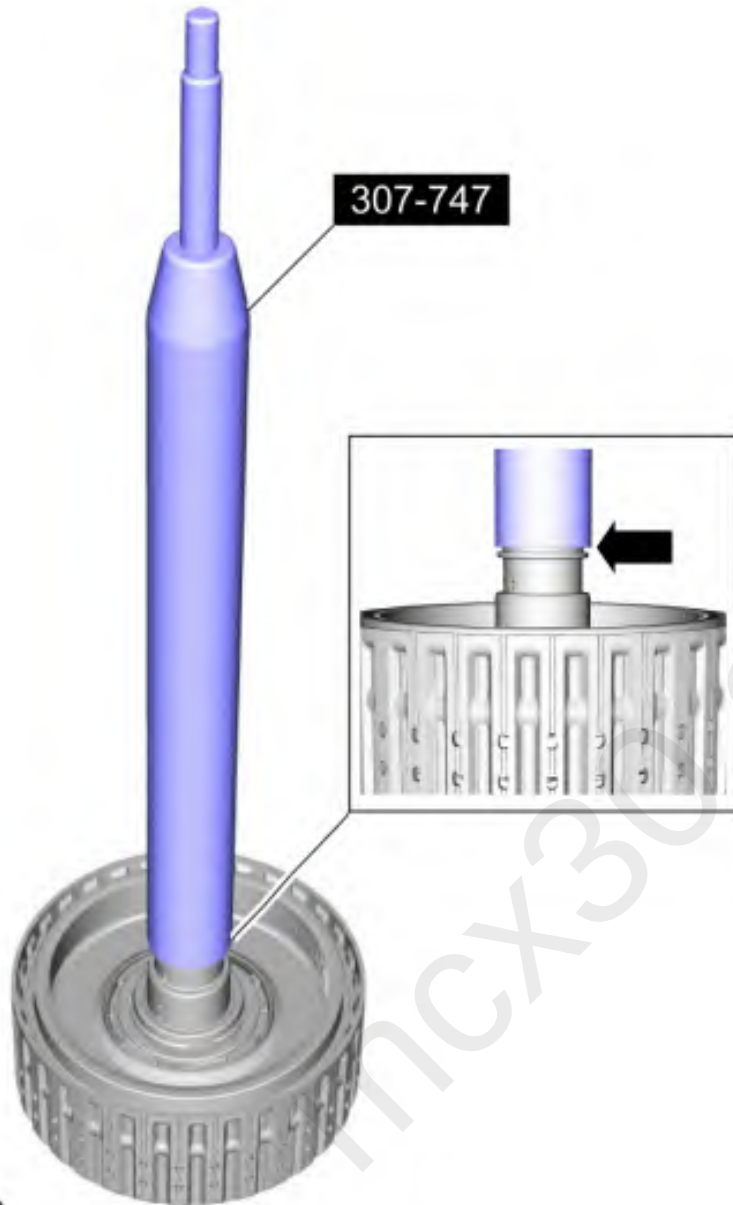


195. Install the No. 3 ring gear and the snap ring. Align the snap ring gap 180° from the bottom snap ring gap.



196. Install the 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: 307-747 Installer/ Sizer , Input Shaft Solid Sealing Rings; Large.

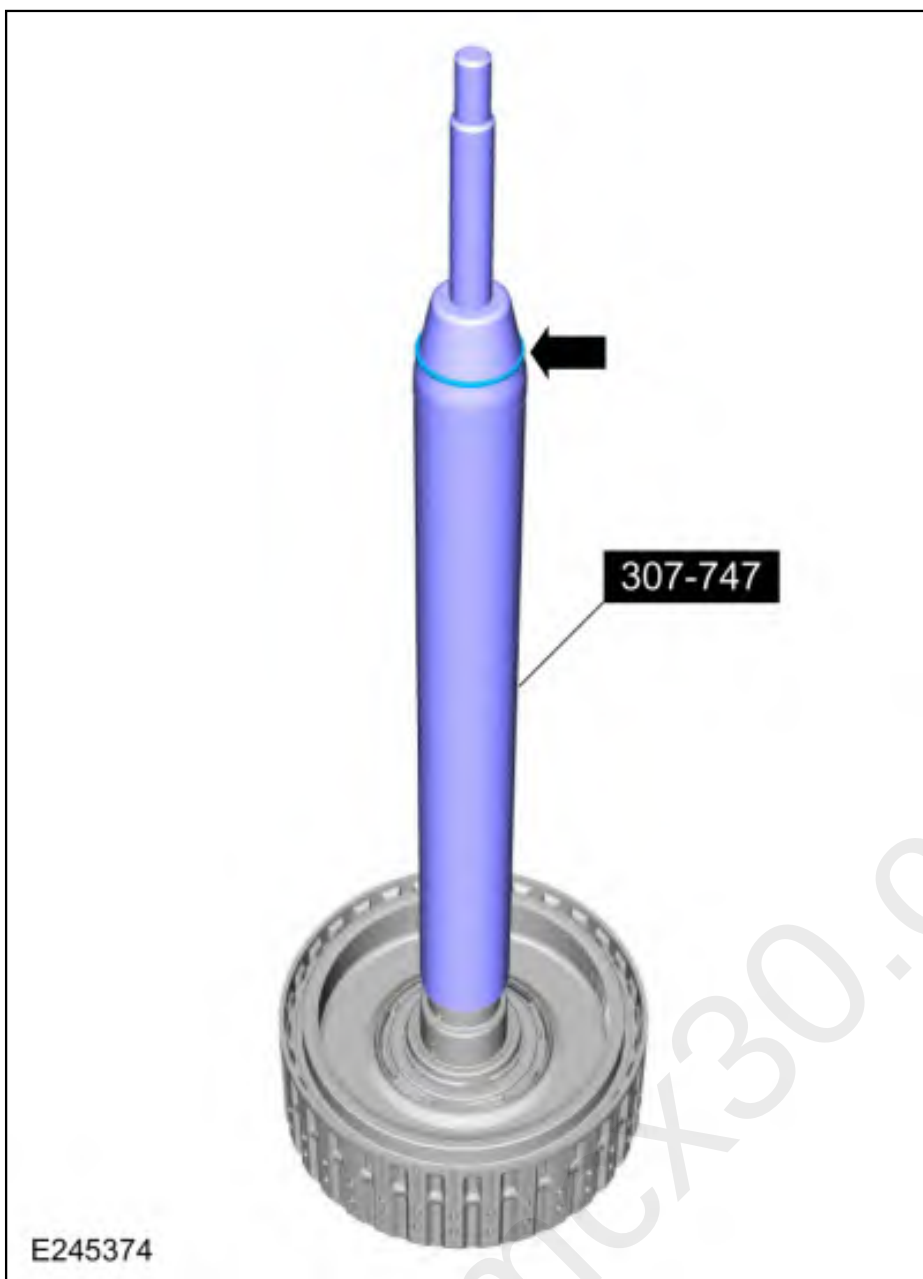


E245373



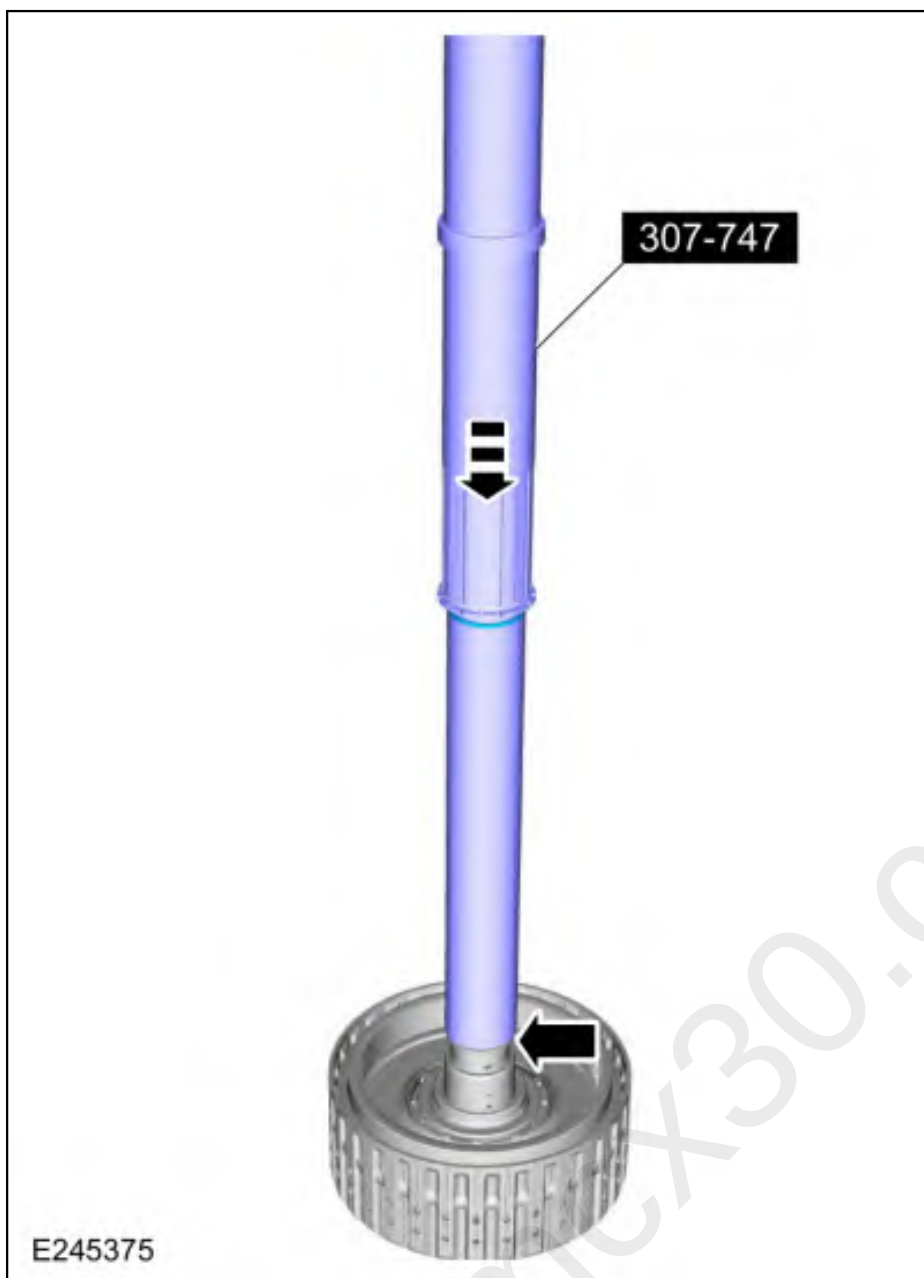
197. Install a new Teflon® seal on the special tool.

Use Special Service Tool: 307-747 Installer/ Sizer , Input Shaft Solid Sealing Rings; Large.



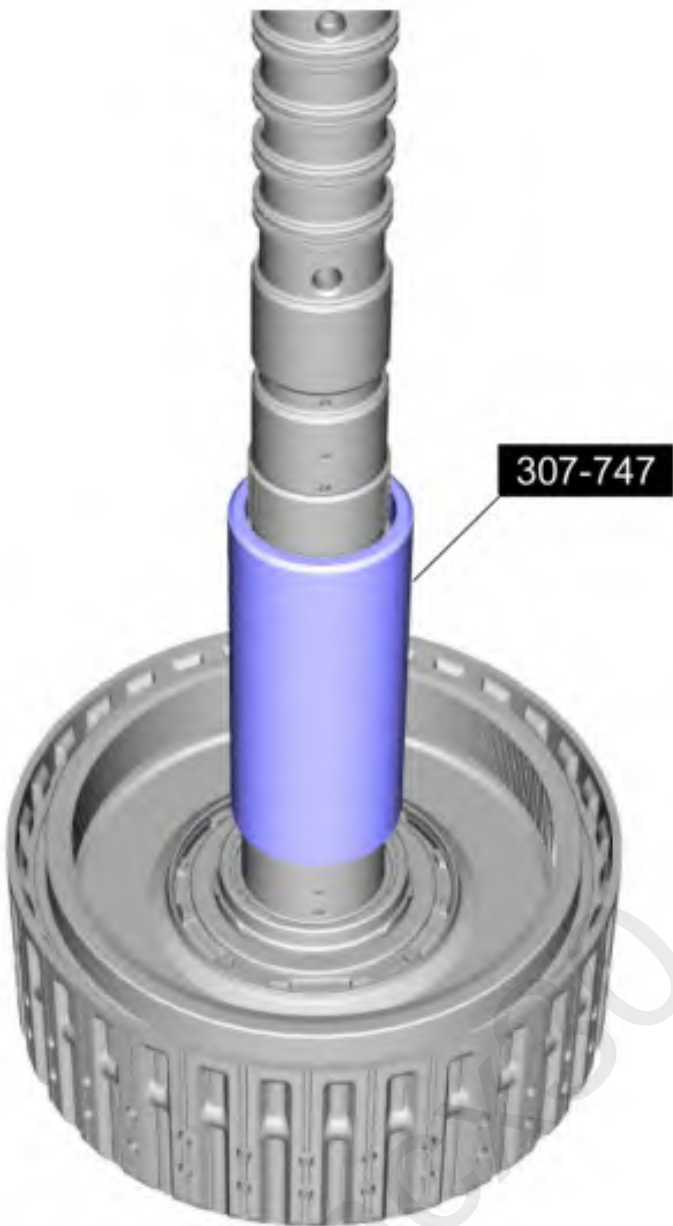
198. Using the top half of the special tool, slide the Teflon® seal into the groove. Remove the special tools and repeat the steps for the other 4 Teflon® seals.

Use Special Service Tool: 307-747 Installer/ Sizer , Input Shaft Solid Sealing Rings; Large.



199. Install the special tool to size the 5 Teflon® seals. Allow the special tool to stay on the input shaft for 5 minutes prior to final assembly.

Use Special Service Tool: 307-747 Installer/ Sizer , Input Shaft Solid Sealing Rings; Large.



200. Install the No. 1 sun gear in the No. 1 planetary carrier.



E242812



201. Install the No. 2 sun gear.



E242765



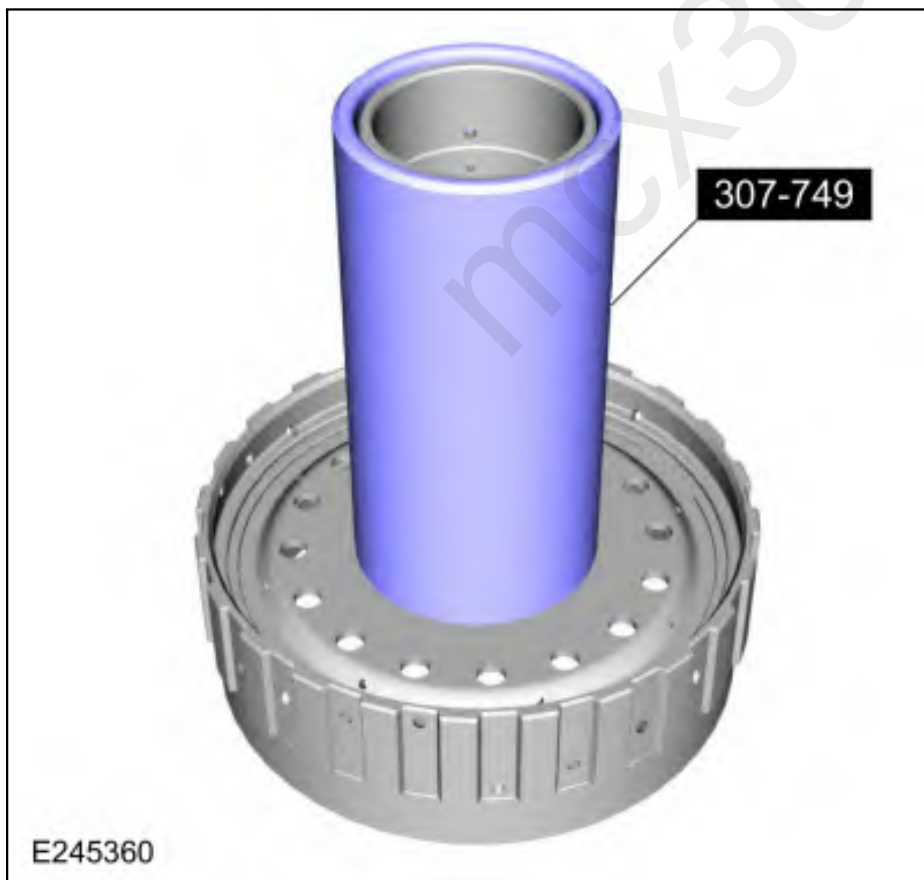
202. Install the No. 2 planetary carrier.



203. Install the (T5) bearing.



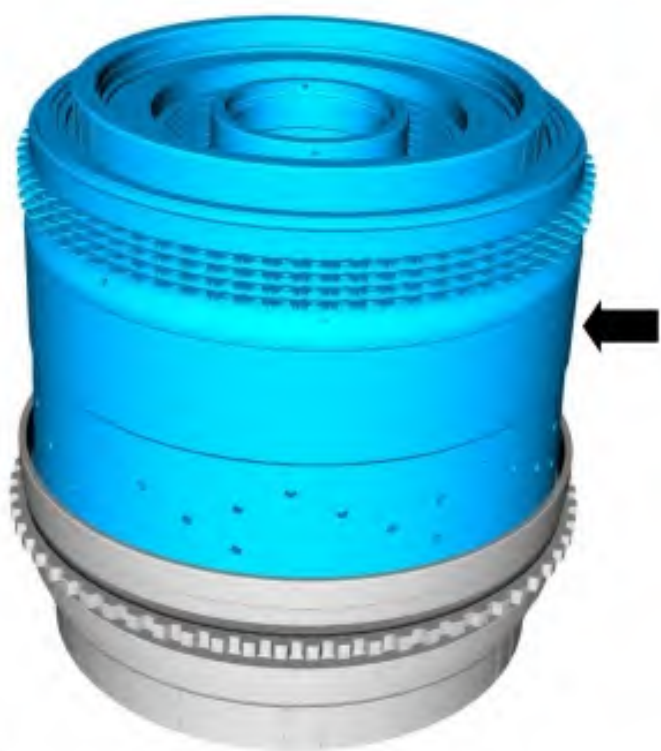
204. Remove Special Service Tool: 307-749 Installer/Sizer, R2-S3 Shaft Solid Seal.



205. Install the No. 3 sun gear shaft into the CDF clutch and planetary carrier assembly.



206. While holding the sun gear No. 3 shaft, flip the CDF module over and install it on to the No. 2 planetary carrier.



E242760

207. Install the No. 3 planetary carrier.

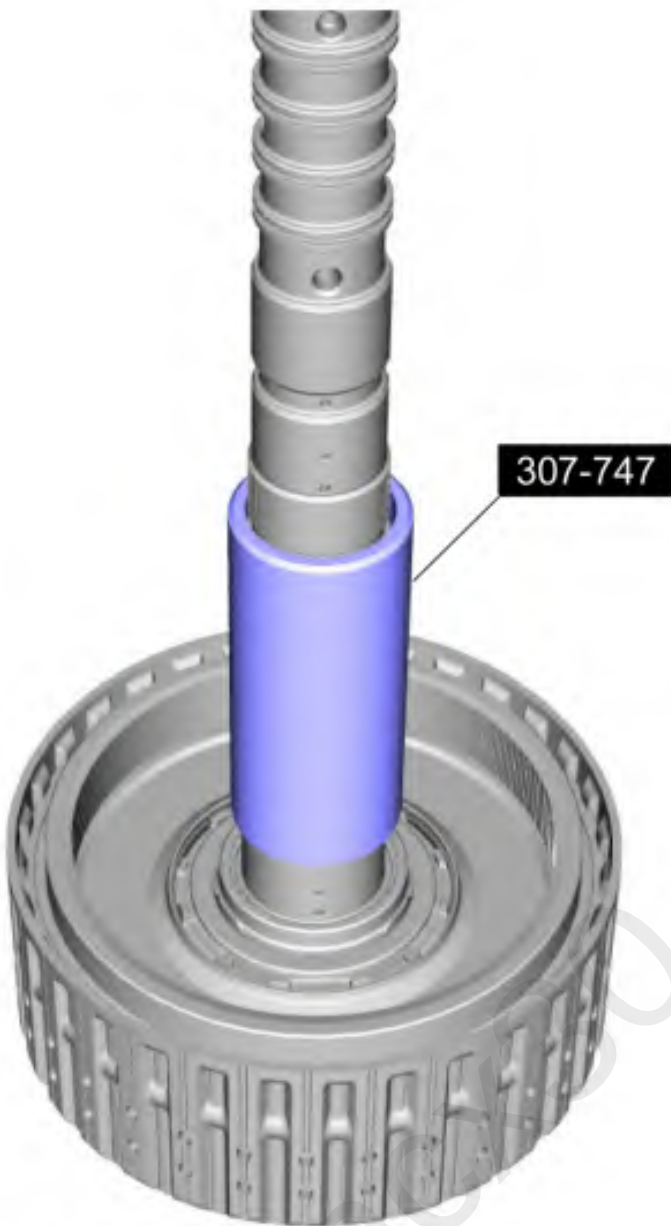


E242840

208. Install the No. 3 sun gear.



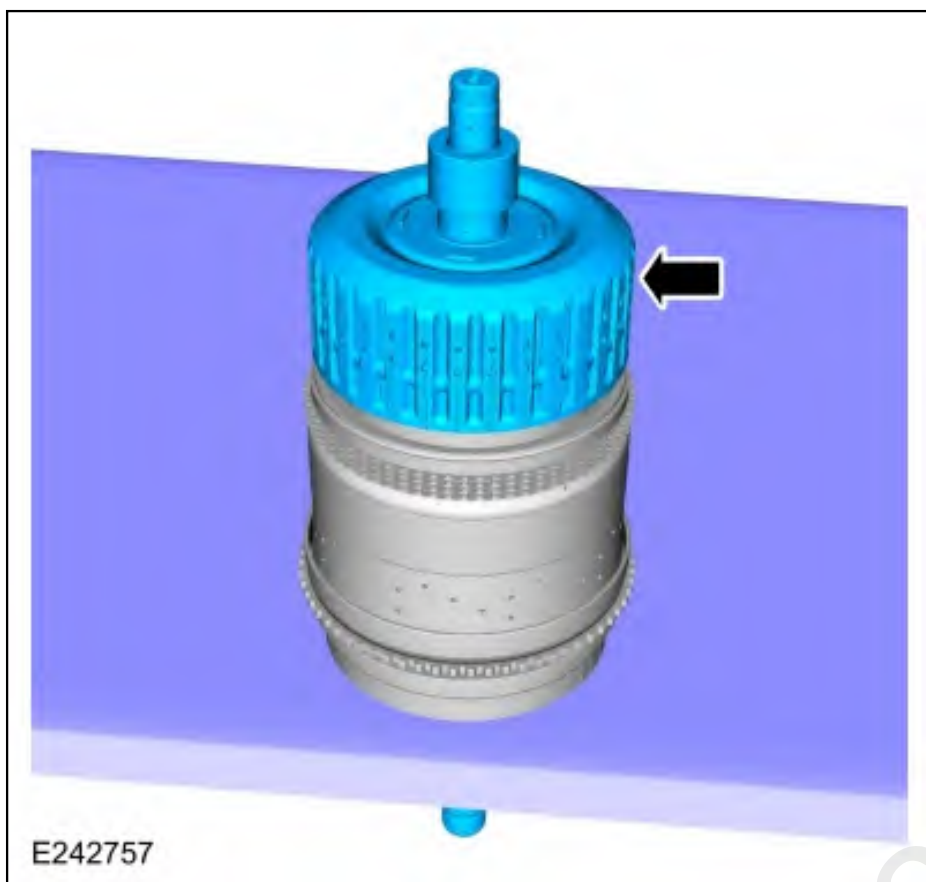
209. Remove Special Service Tool: 307-747 Installer/ Sizer , Input Shaft Solid Sealing Rings; Large.



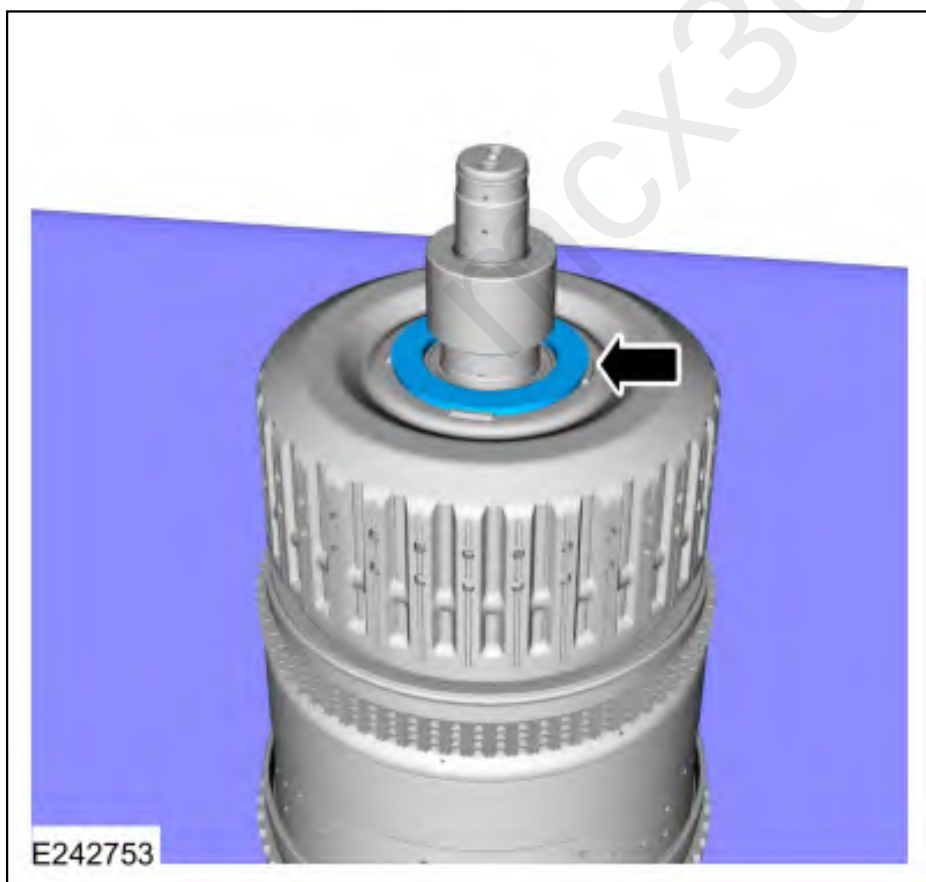
E245376



210. Install the E clutch and input shaft assembly.



211. Install the (T8) thrust bearing.



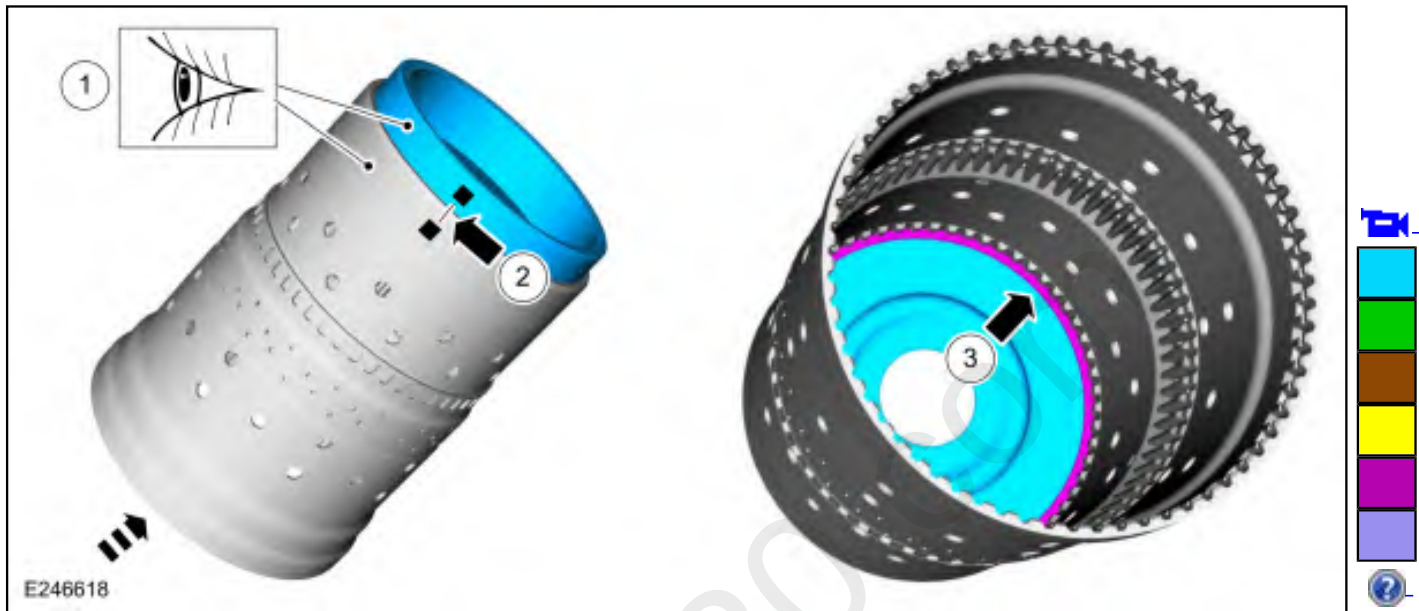
1. **NOTE:** *Some early build transmissions are not equipped with lazer applied ink marks.*

If the No. 4 ring gear was removed, inspect the ring gear and the clutch and planetary container cylinder for lazer 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.



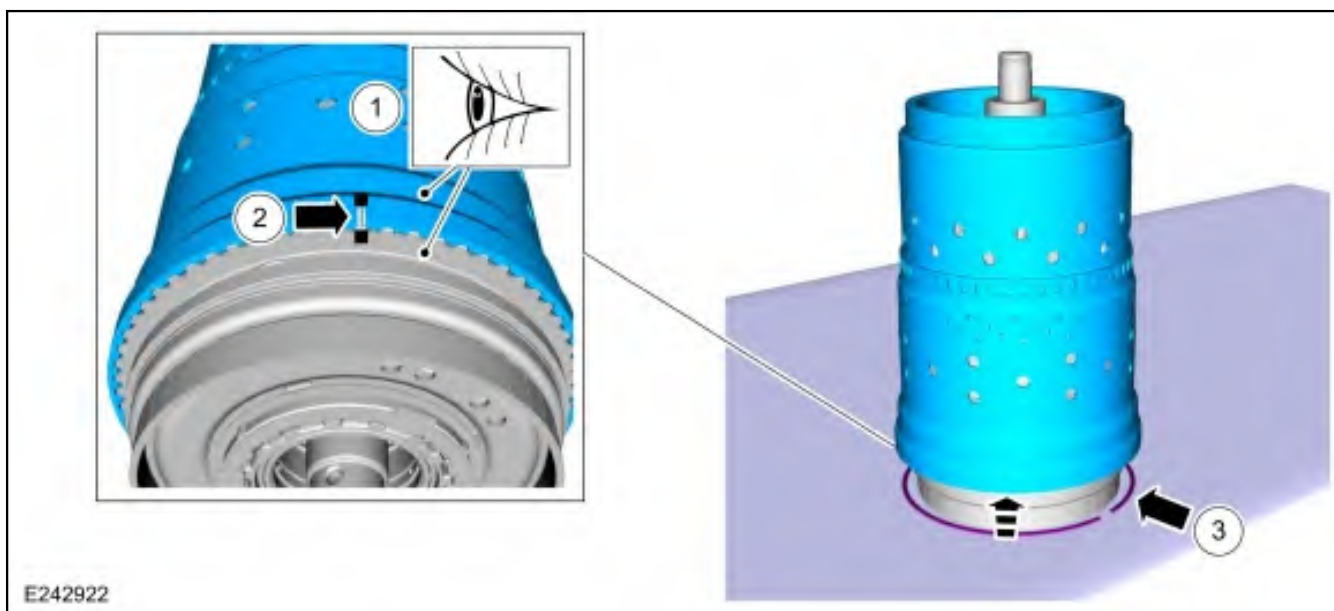
1. **NOTE:** *Some early build transmissions are not equipped with lazer applied ink marks.*

Inspect the No. 1 planetary carrier and the clutch and planetary container cylinder for lazer applied ink marks.

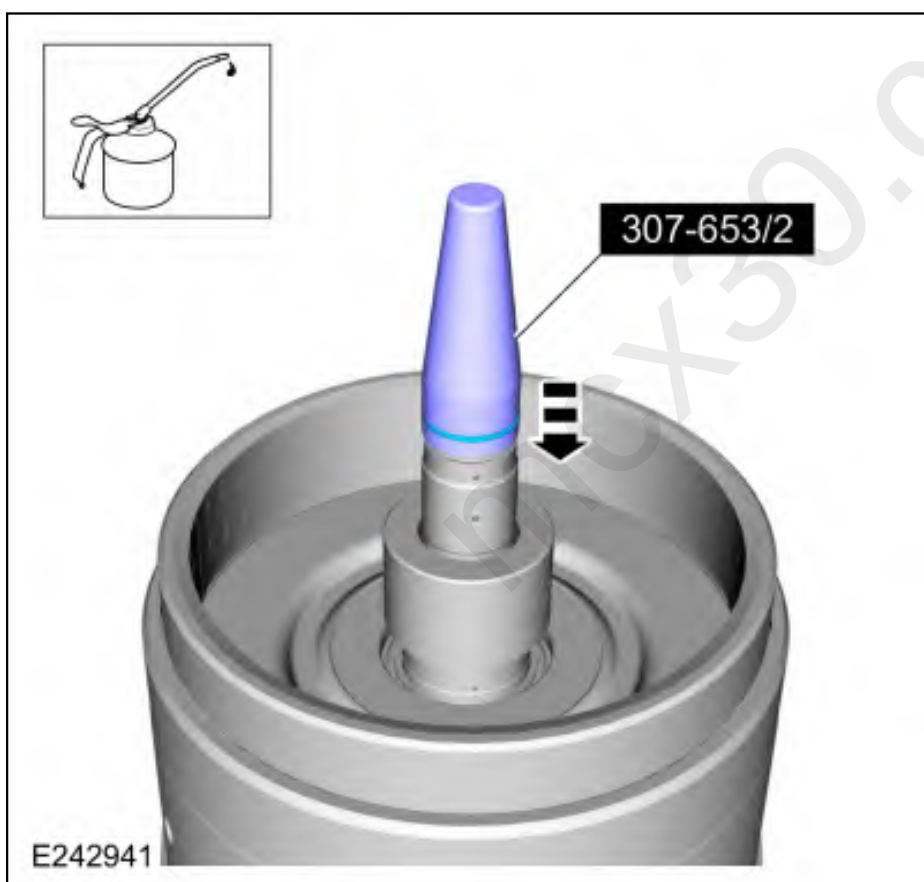
2. **NOTICE:** **If ink marks are present the marks must be aligned or a transmission vibration can occur.**

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.

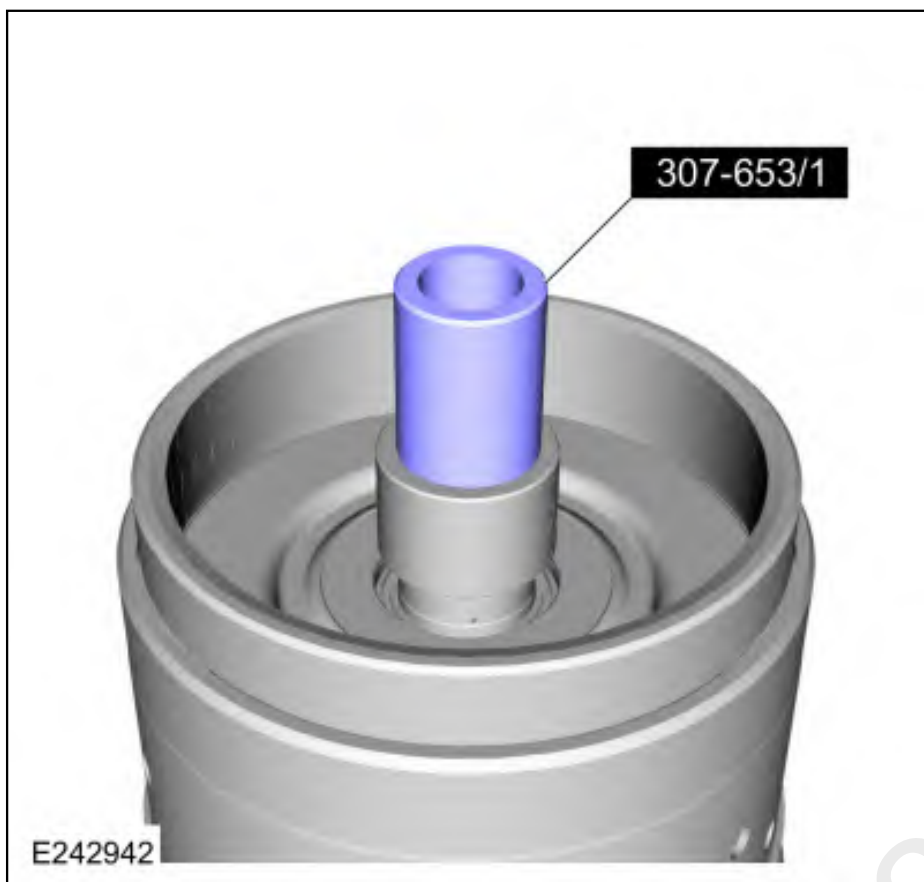
3. Install the No. 1 planetary carrier snap ring. Make sure the snap ring is seated.



214. Using the special tool, install a new Teflon® seal in the groove on the input shaft.
Use Special Service Tool: 307-653 Sizer, Input Shaft Teflon Seal.

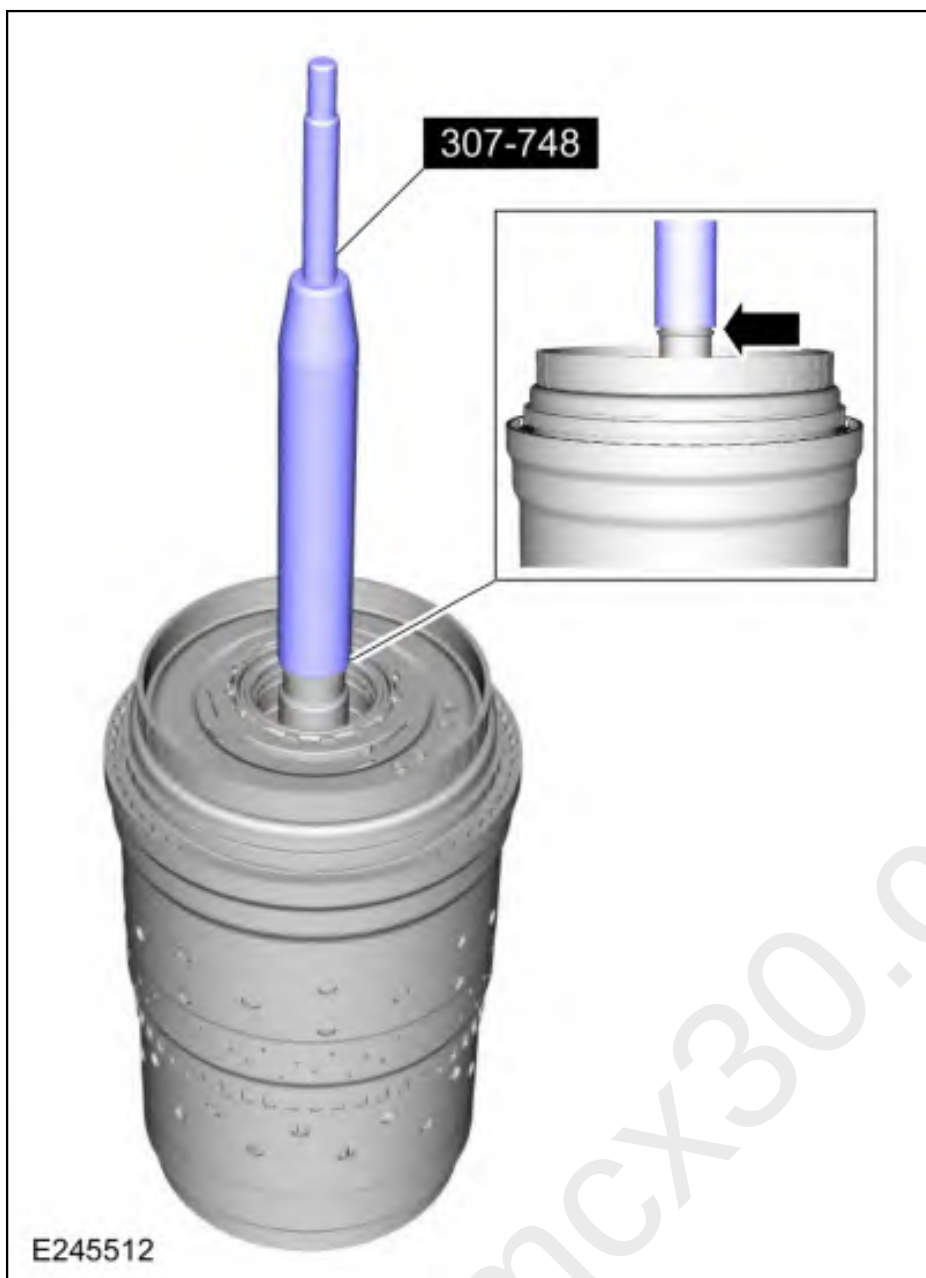


215. Using the special tool, size the Teflon® seal. Allow the special tool to stay on the input shaft for 5 minutes prior to final assembly.
Use Special Service Tool: 307-653 Sizer, Input Shaft Teflon Seal.



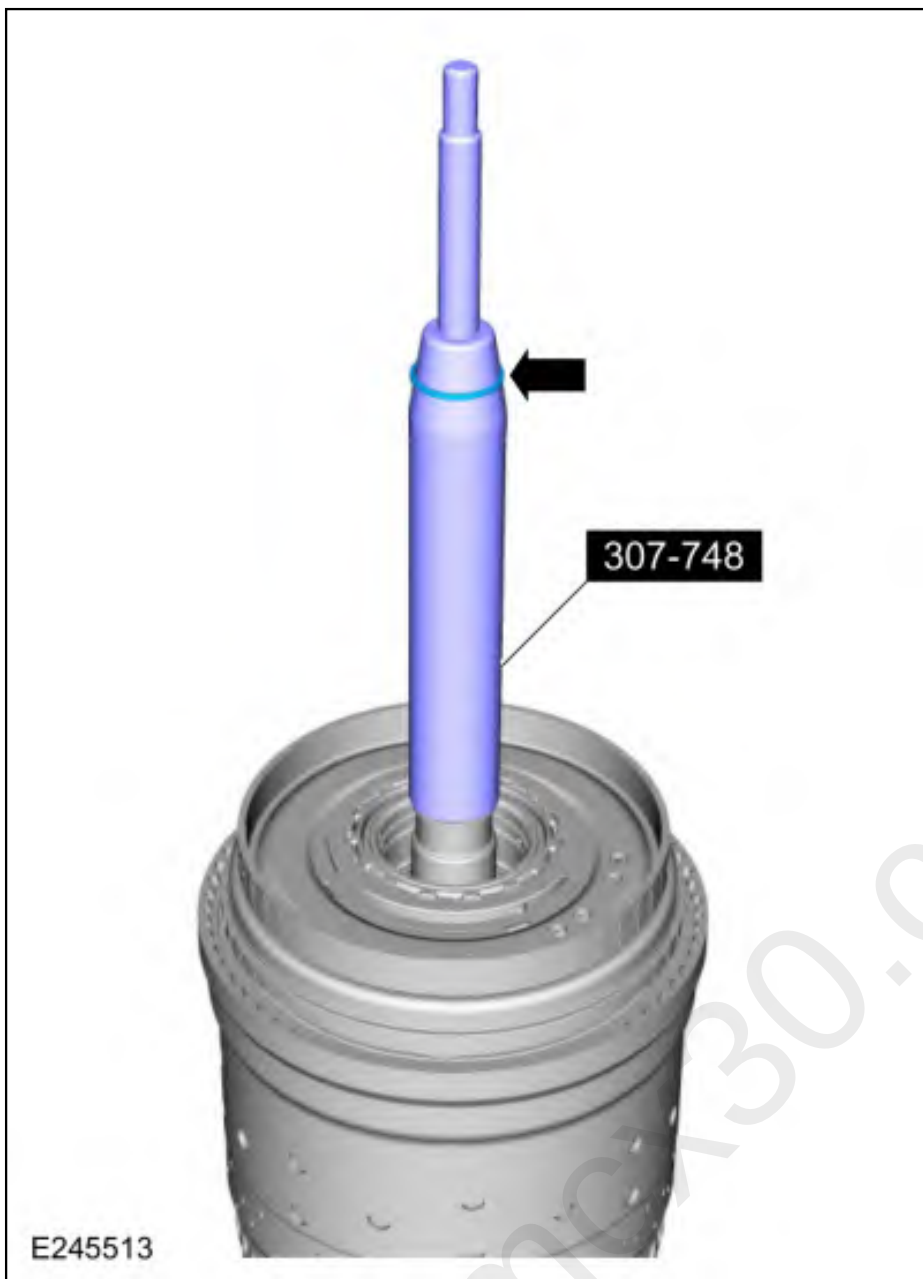
216. Install the special tool and adjust the special tool to align the bottom edge of the tool with the top edge of the bottom Teflon® seal groove.

Use Special Service Tool: 307-748 Installer/Sizer, Input Shaft Solid Sealing Rings; Small.



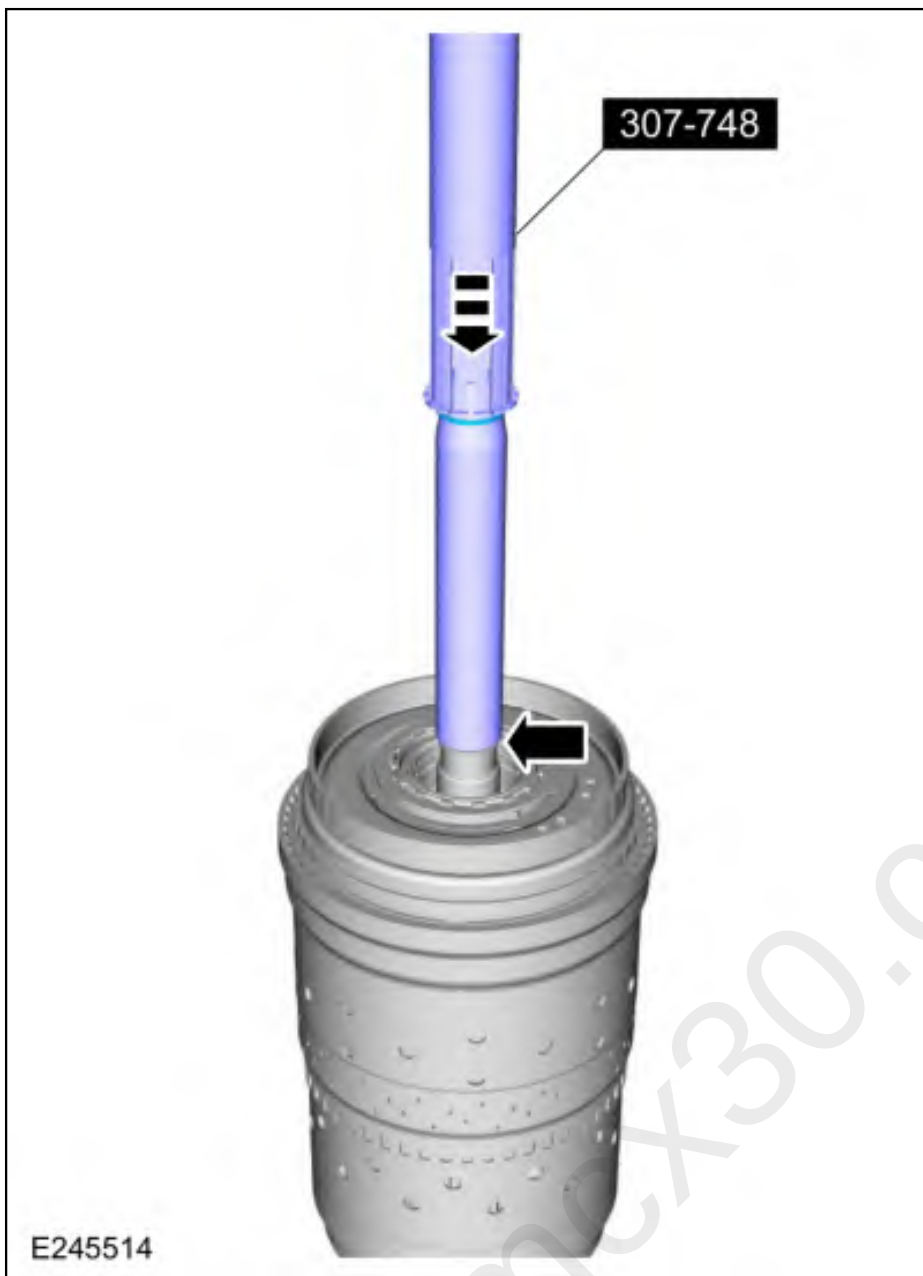
217. Install a new Teflon® seal on the special tool.

Use Special Service Tool: 307-748 Installer/Sizer, Input Shaft Solid Sealing Rings; Small.



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 4 Teflon® seals.

Use Special Service Tool: 307-748 Installer/Sizer, Input Shaft Solid Sealing Rings; Small.

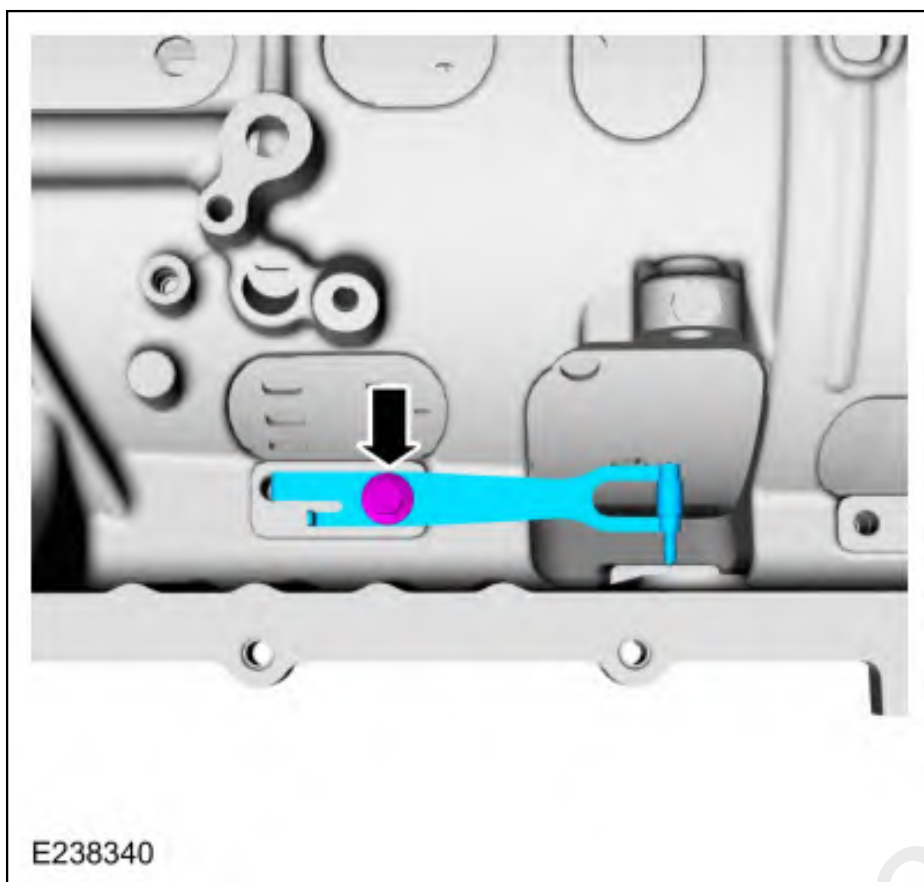


219. Install the special tool to size the 5 Teflon® seals. Allow the special tool to stay on the input shaft for 5 minutes prior to final assembly.

Use Special Service Tool: 307-748 Installer/Sizer, Input Shaft Solid Sealing Rings; Small.

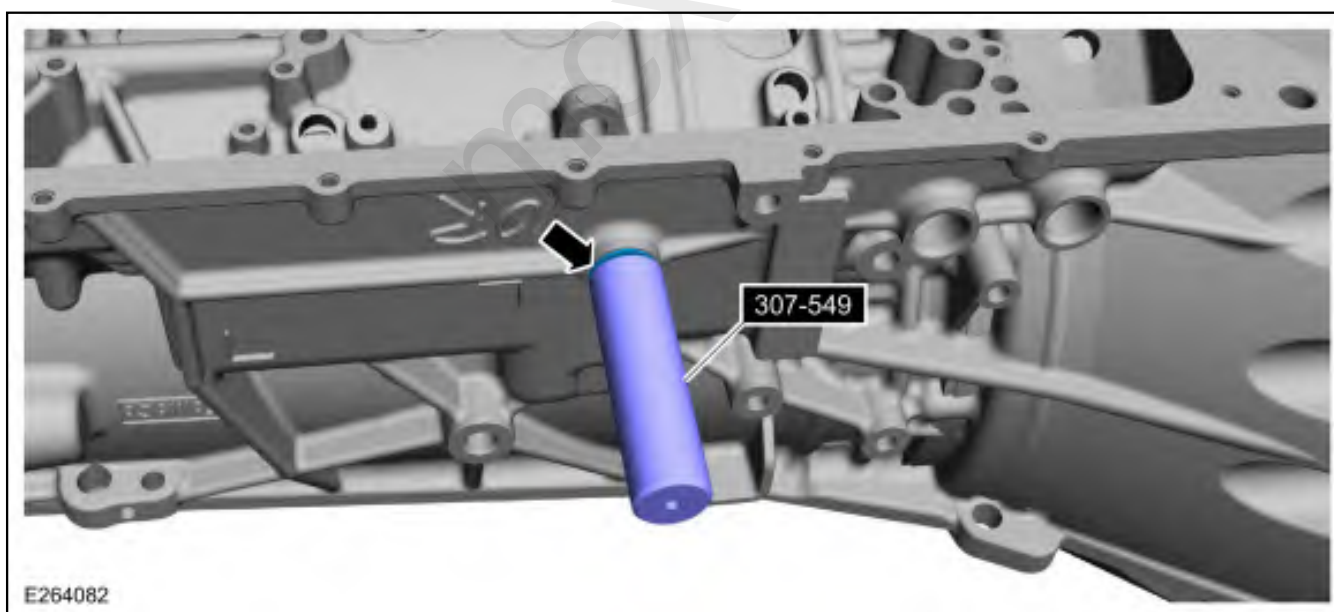


220. Install the TR sensor detent spring and loosely install the bolt.

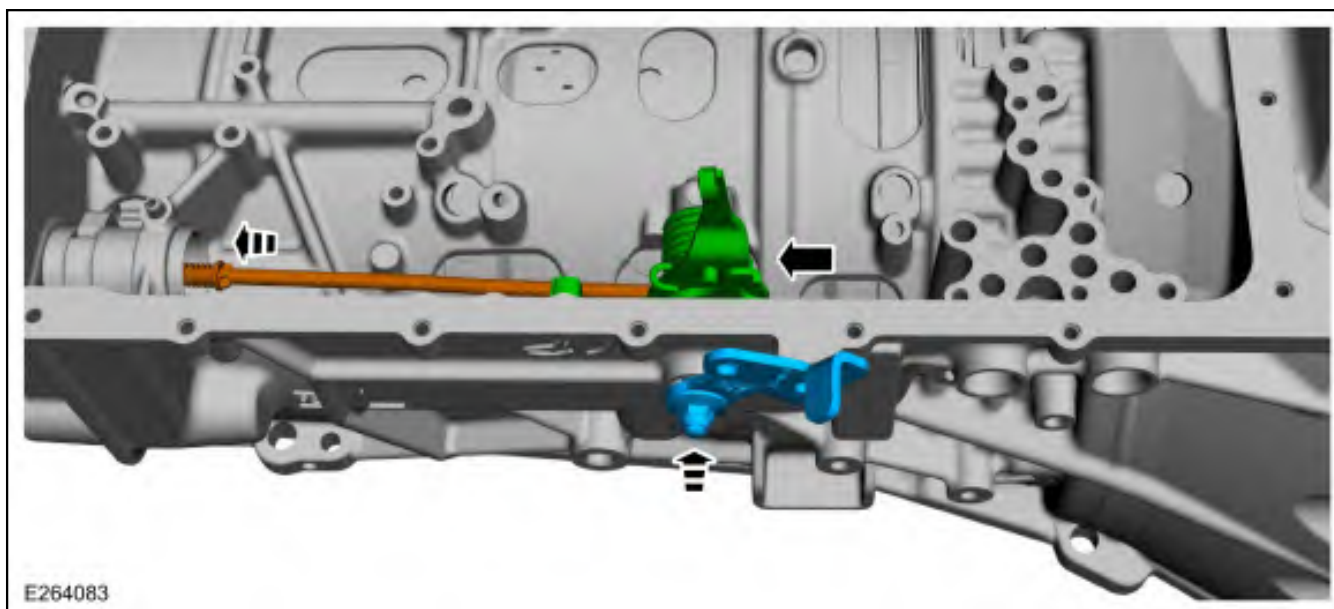


Vehicles with Rotary Gear Shift Knob / Gear Shift Buttons

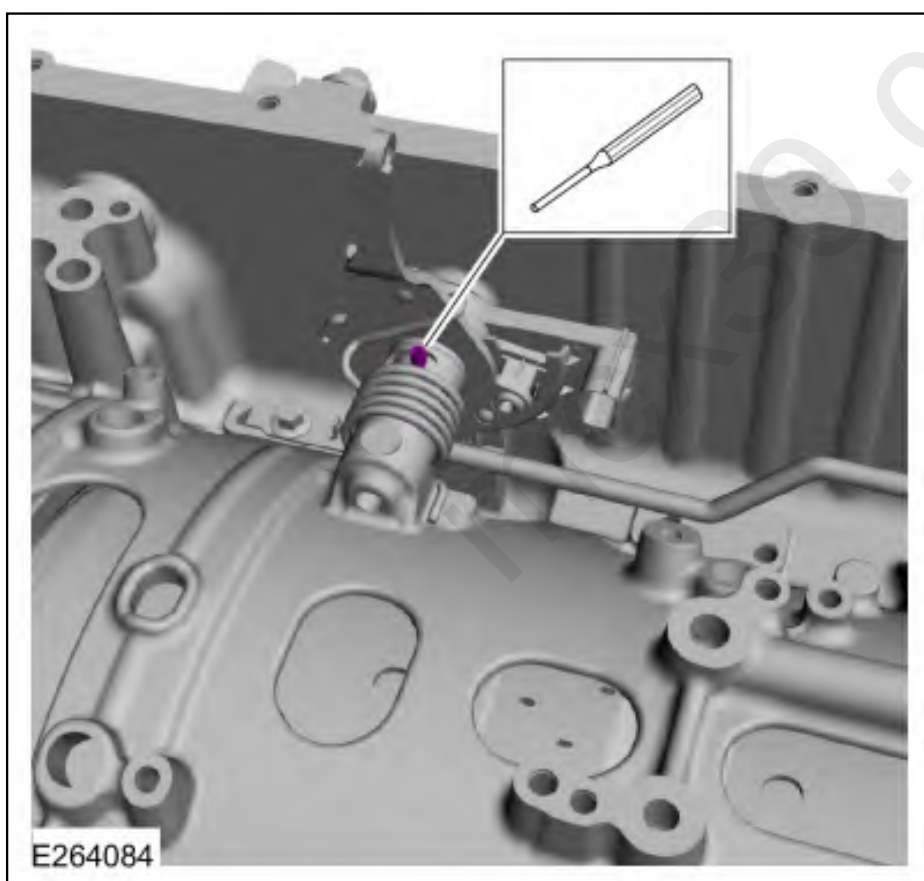
221. Using the special tool install the new manual shaft seal in the transmission case.
Use Special Service Tool: 307-549 Installer, Shift Shaft Fluid Seal.



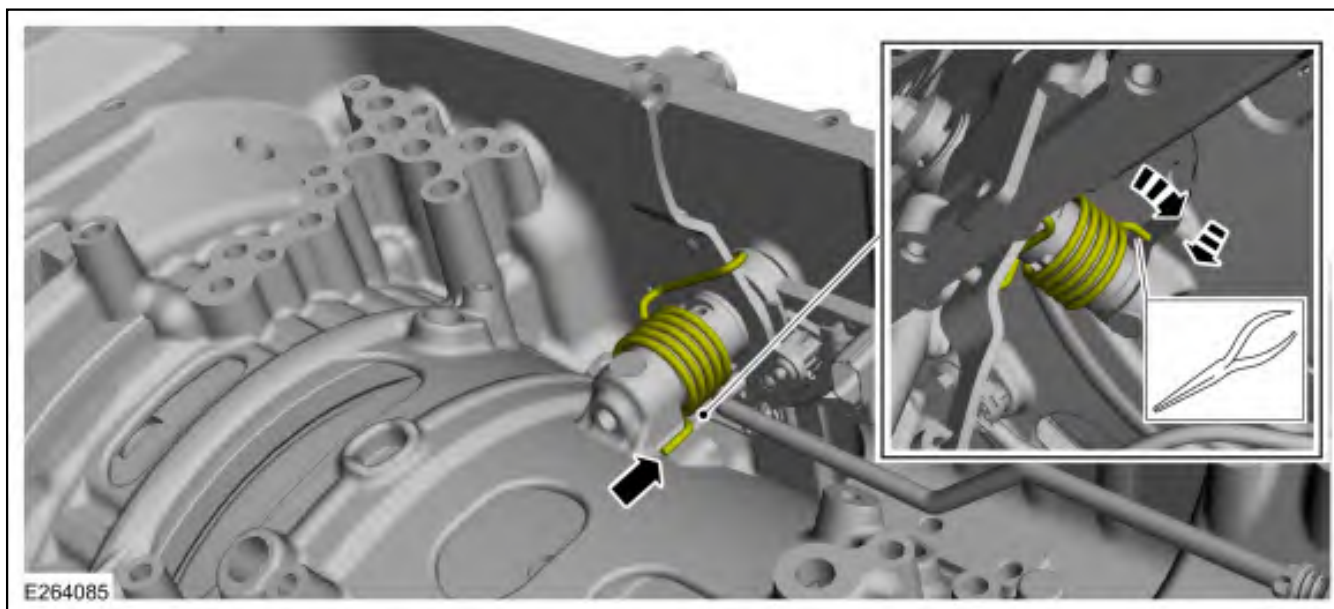
222. Slide the manual shaft and park override lever into the TR sensor.



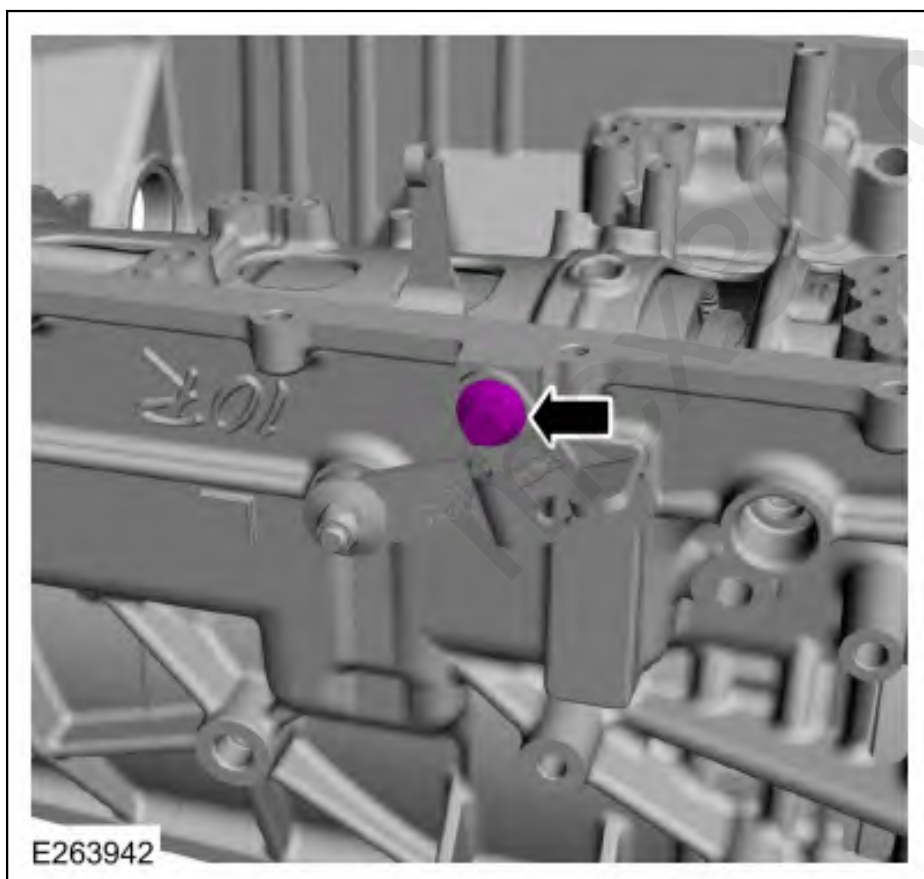
223. Install the new manual shaft-to-TR sensor roll pin (7G100).
Use the General Equipment: Punch



224. Slide the end of the park return spring onto the transmission case.

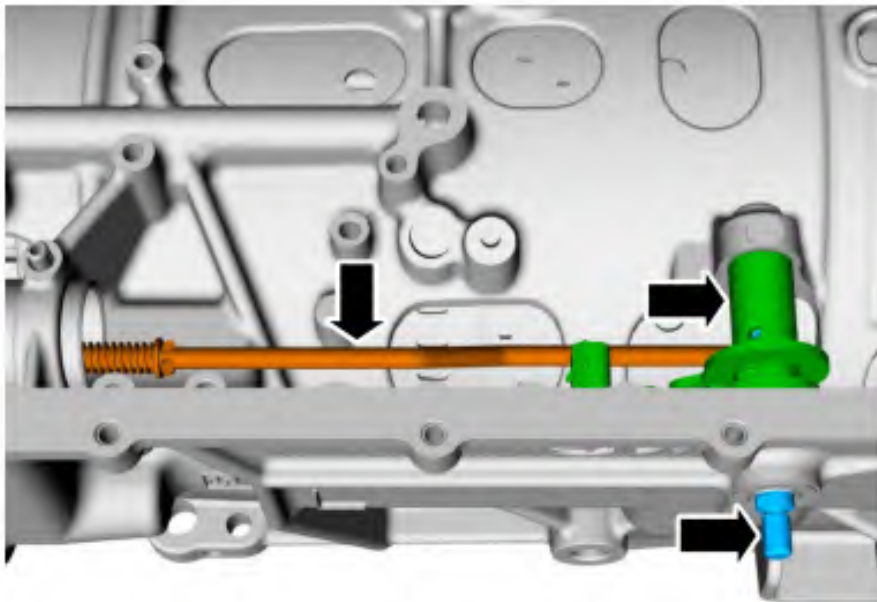


225. Install a new park override lever bolt.
Torque: 177 lb.in (20 Nm)



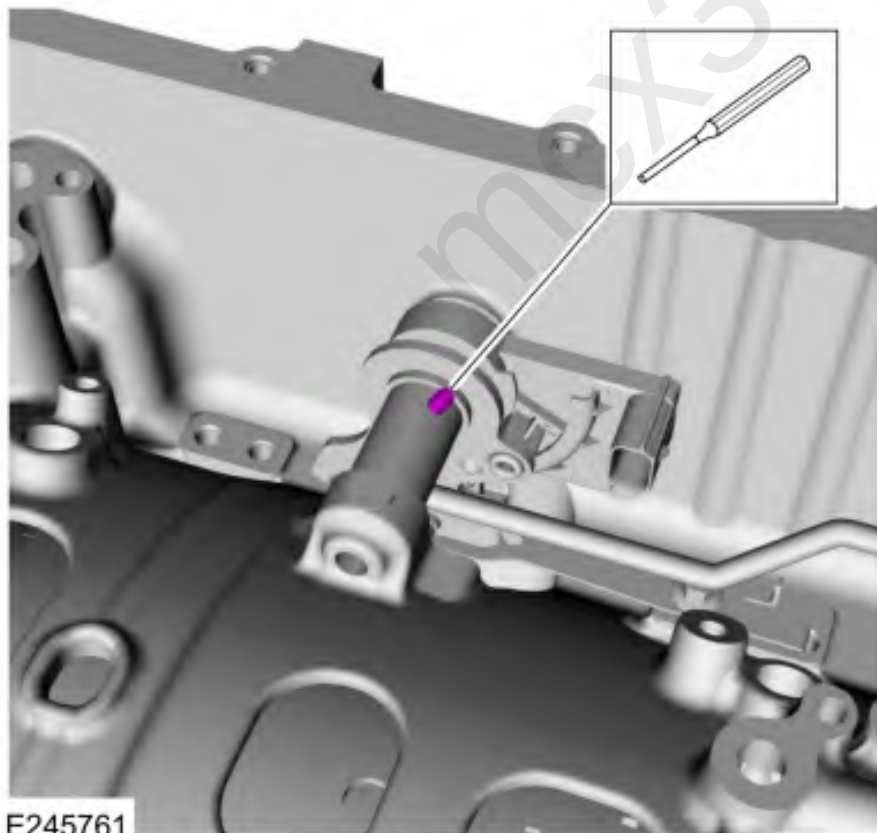
Vehicles with Manual Control Lever

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



E238339

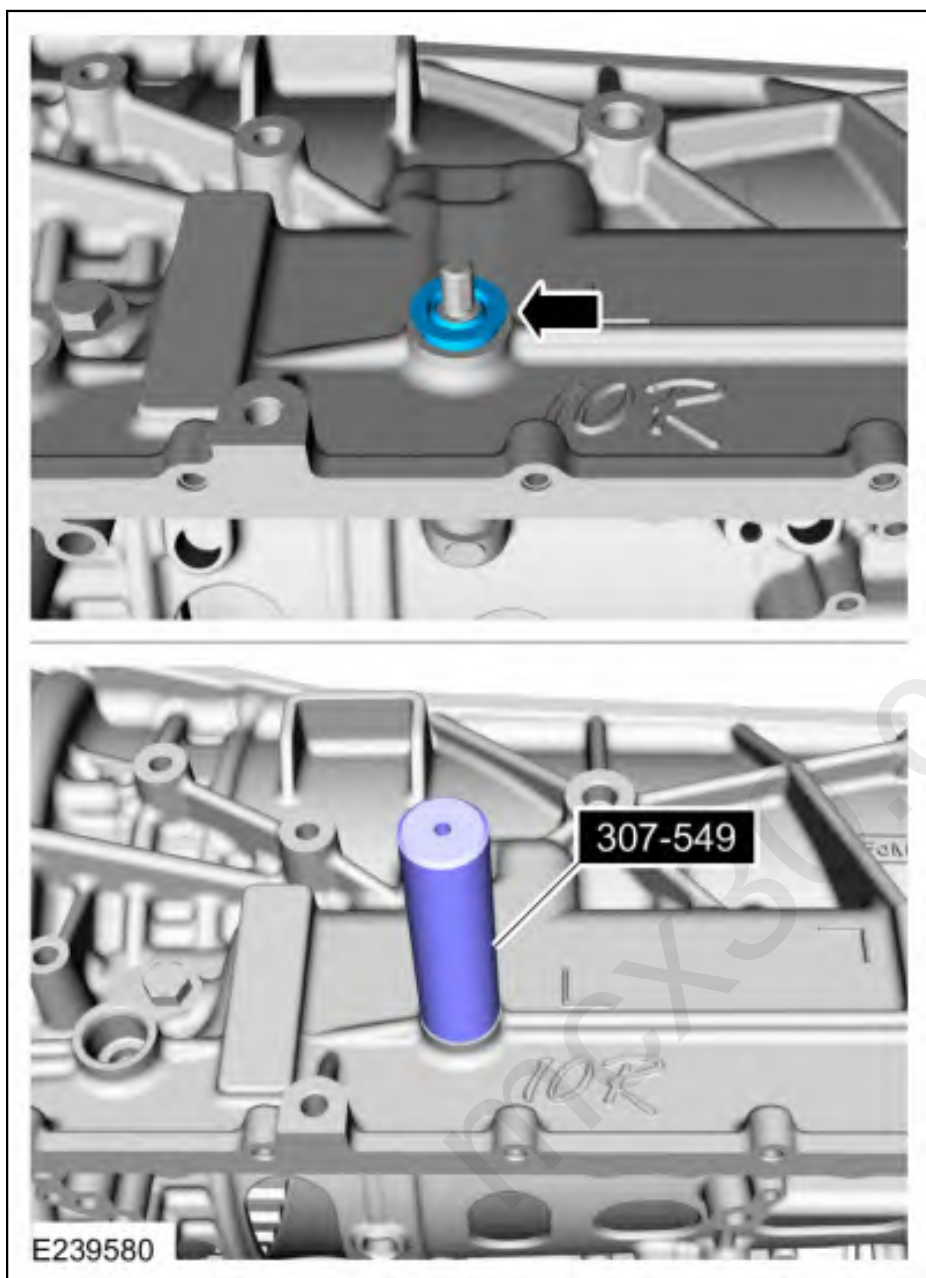
227. Install the new manual control shaft-to-TR sensor roll pin.



E245761

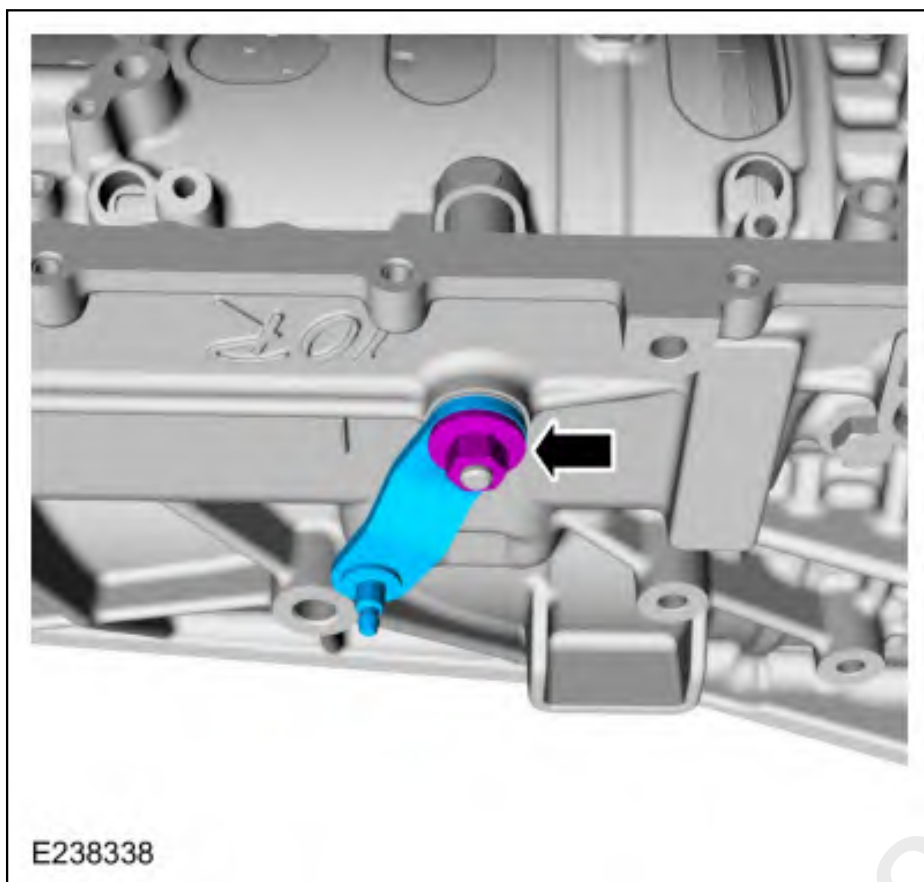
228. Install the manual shaft seal on the manual shaft. Using the special tool install the manual shaft seal in the transmission case.

Use Special Service Tool: 307-549 Installer, Shift Shaft Fluid Seal.



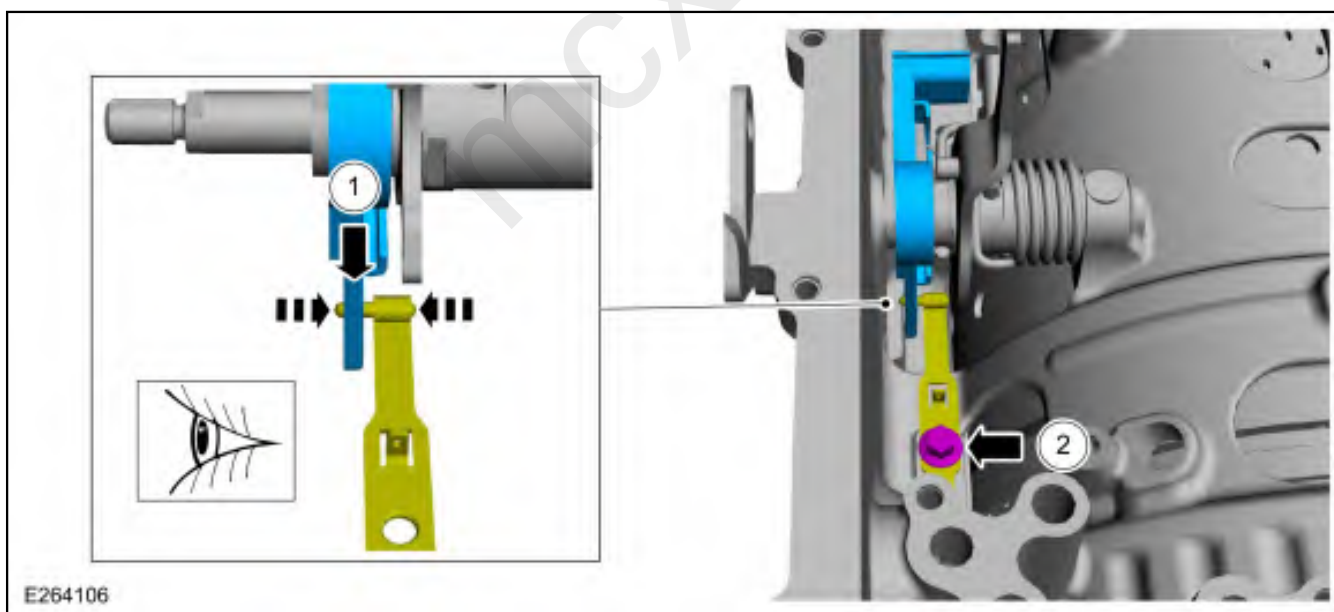
229. Install the selector lever and the nut.

Torque: 177 lb.in (20 Nm)



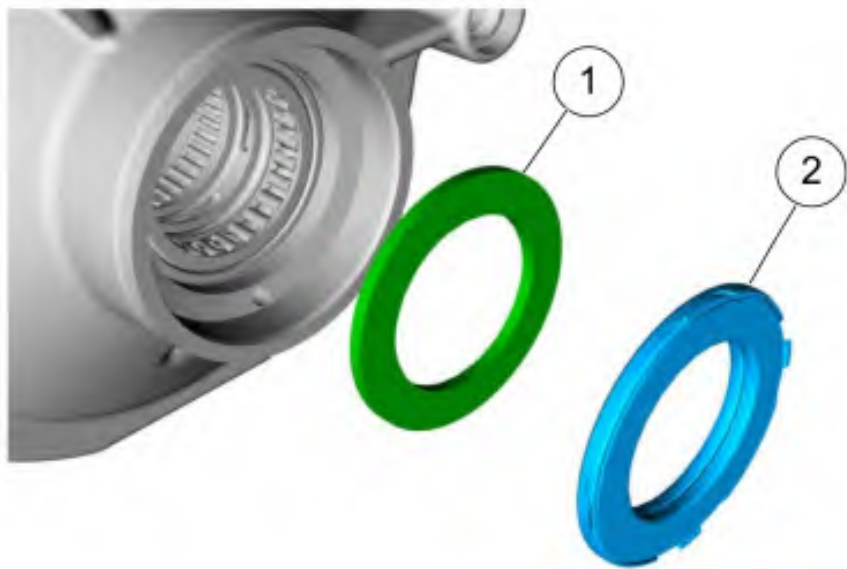
All vehicles

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



231. If equipped, install the (T11) thrust bearing and thrust washer.

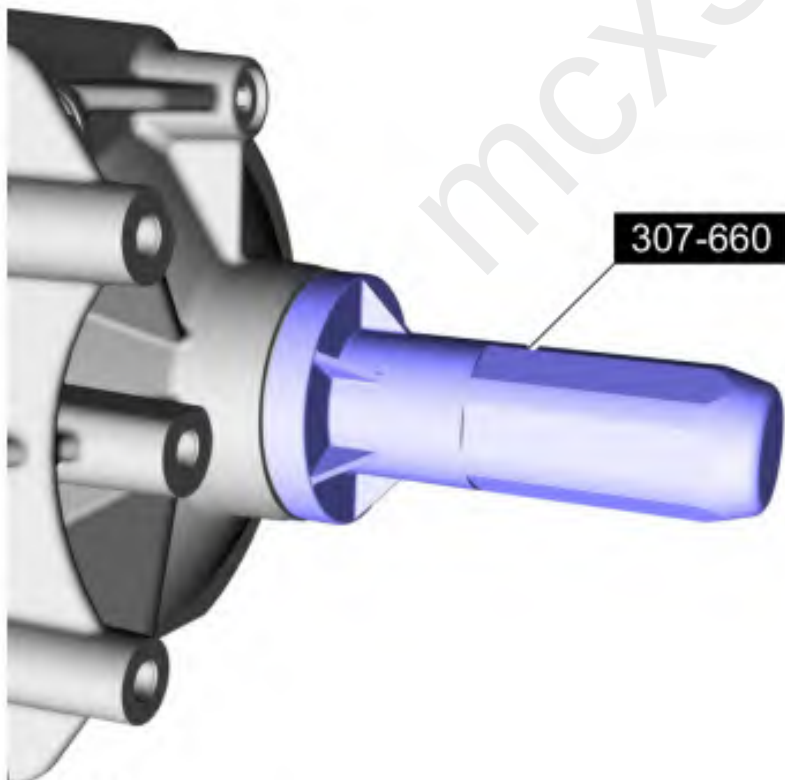
1. Thrust washer
2. Thrust bearing (T11)



E238609



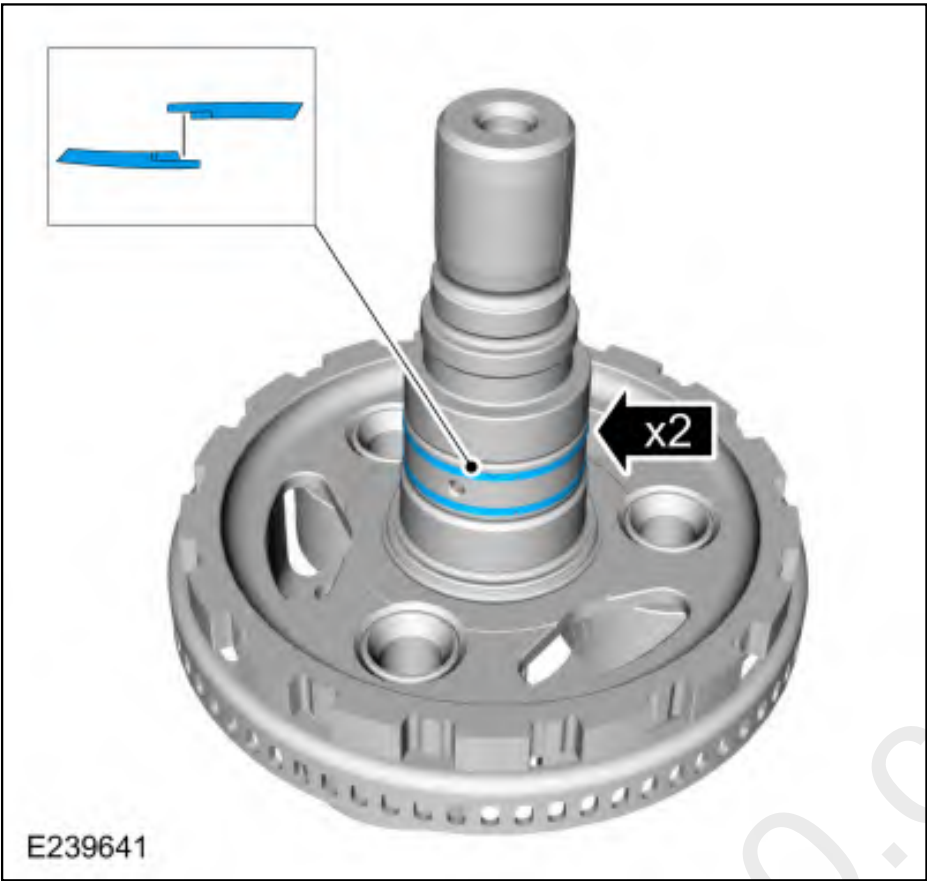
232. Using the special tool, install the output shaft seal.
Use Special Service Tool: 307-660 Installer, Front Pump Seal.



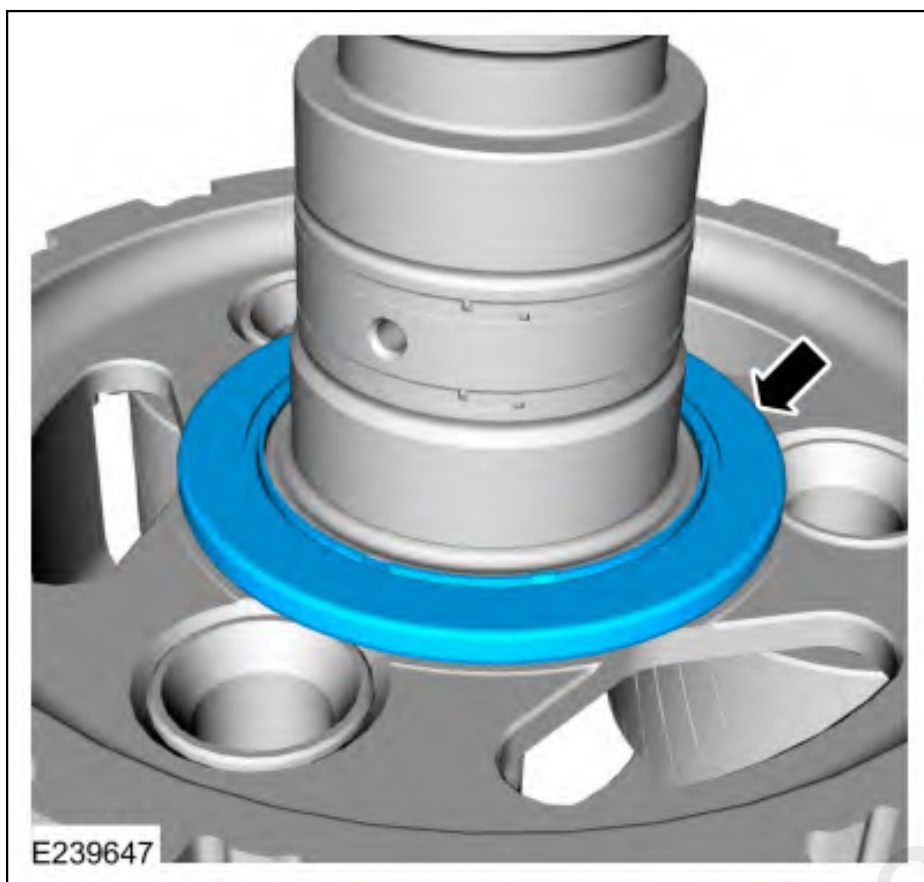
E239616



233. Install new seals on the output shaft.



234. Install the (T10) thrust bearing on the output shaft.

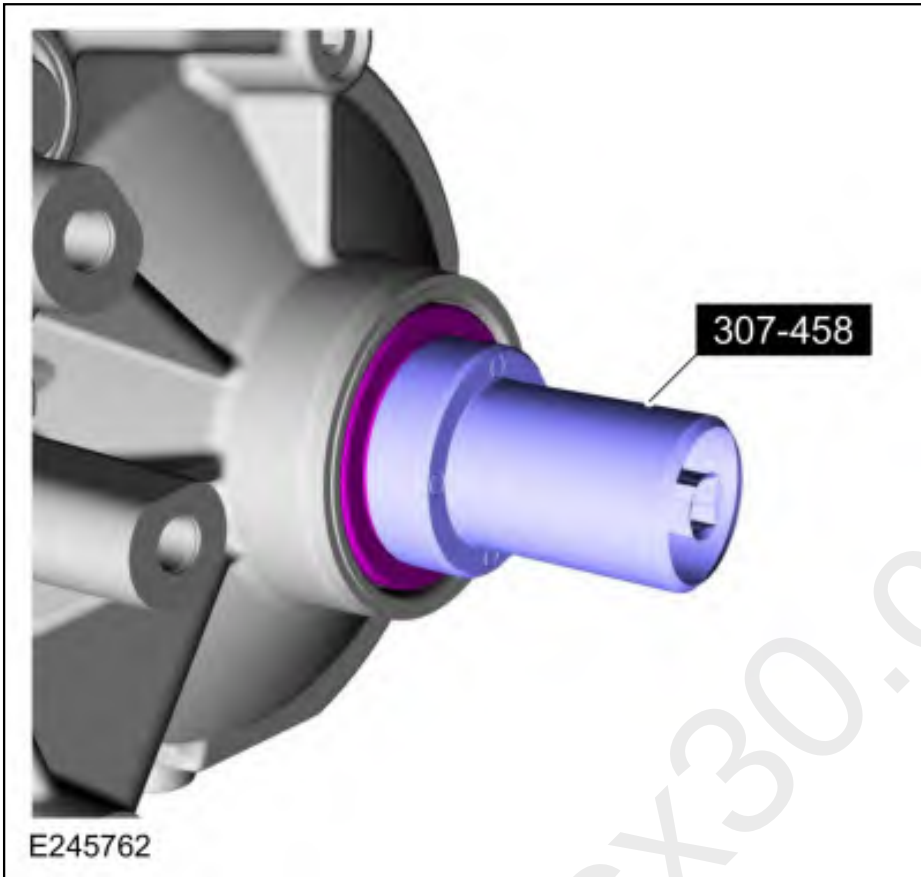


235. Rotate the manual lever to N. Install the output shaft and planetary carrier assembly No. 4.



Rear Wheel Drive (RWD) vehicles

236. Rotate the manual lever to P. Using the special tool, install the new output shaft nut. Hold the output shaft and planetary carrier assembly No. 4 to the back of the transmission case while tightening.
Use Special Service Tool: 307-458 Socket, Output Shaft Locknut.
Torque: 148 lb.ft (200 Nm)



1. **NOTE:** *Some early build transmissions are not equipped with lazer applied ink marks.*

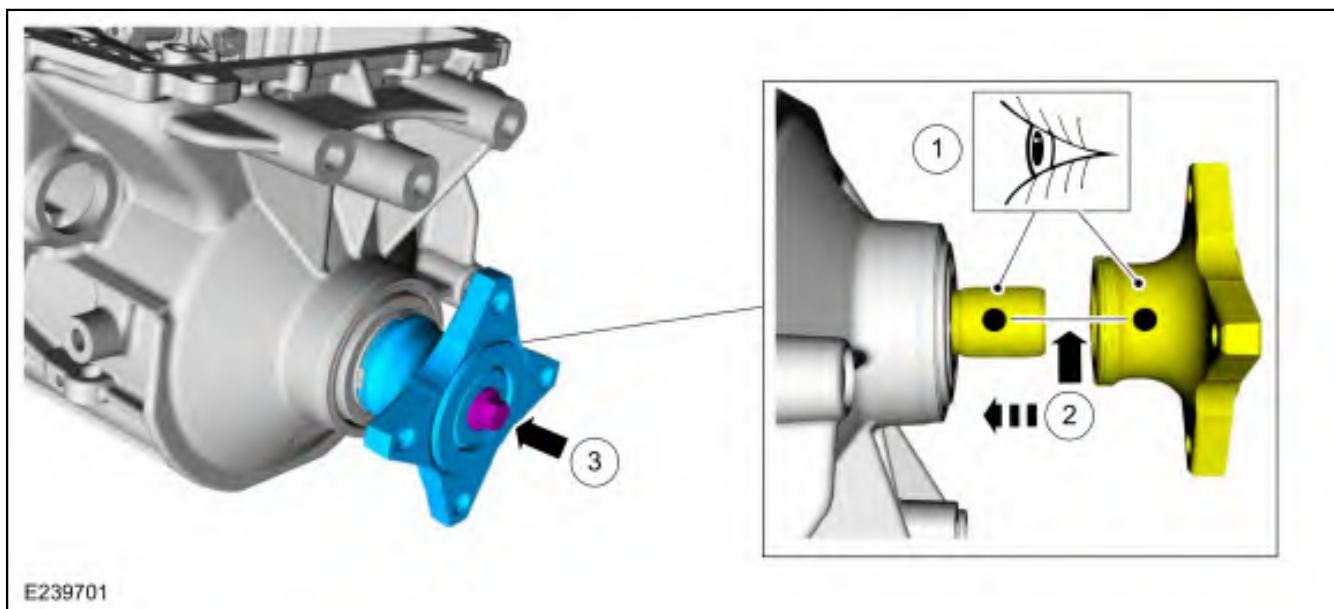
Inspect the output shaft and the output shaft flange for lazer applied ink marks.

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 output shaft flange on the output shaft.

3. Install a new output shaft flange bolt.

Torque: 81 lb.ft (110 Nm)



All vehicles

238. Install the (T9) thrust bearing.



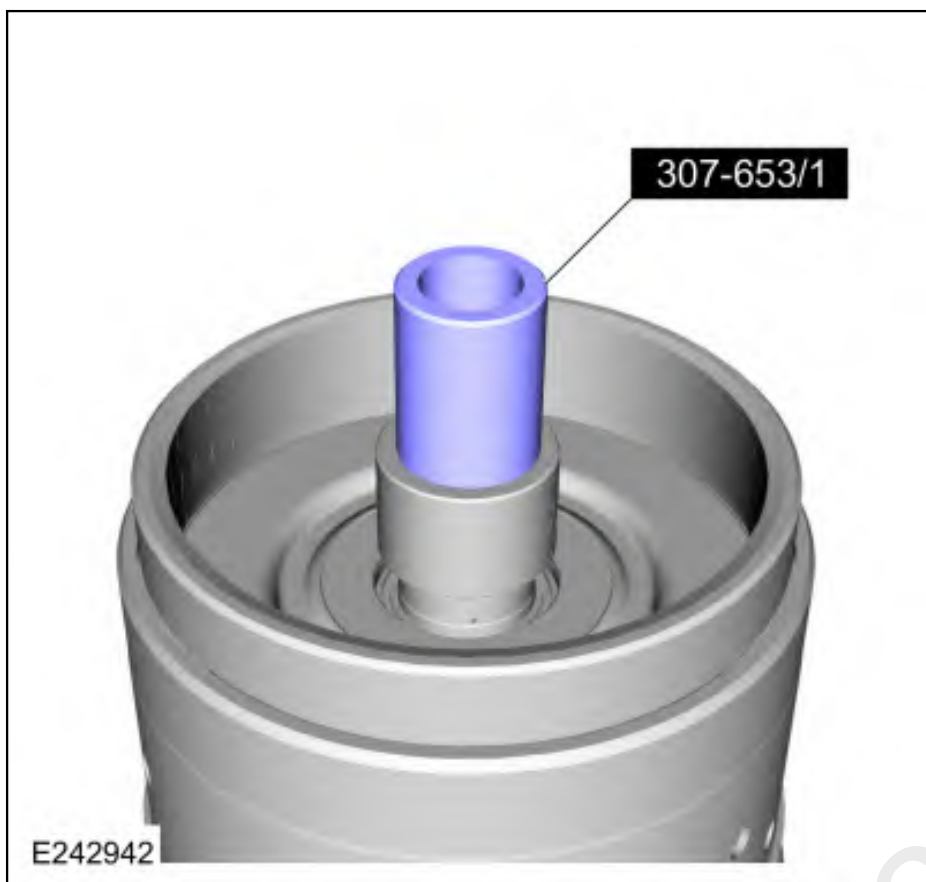
239. Lubricate the output shaft bushing with petroleum jelly.



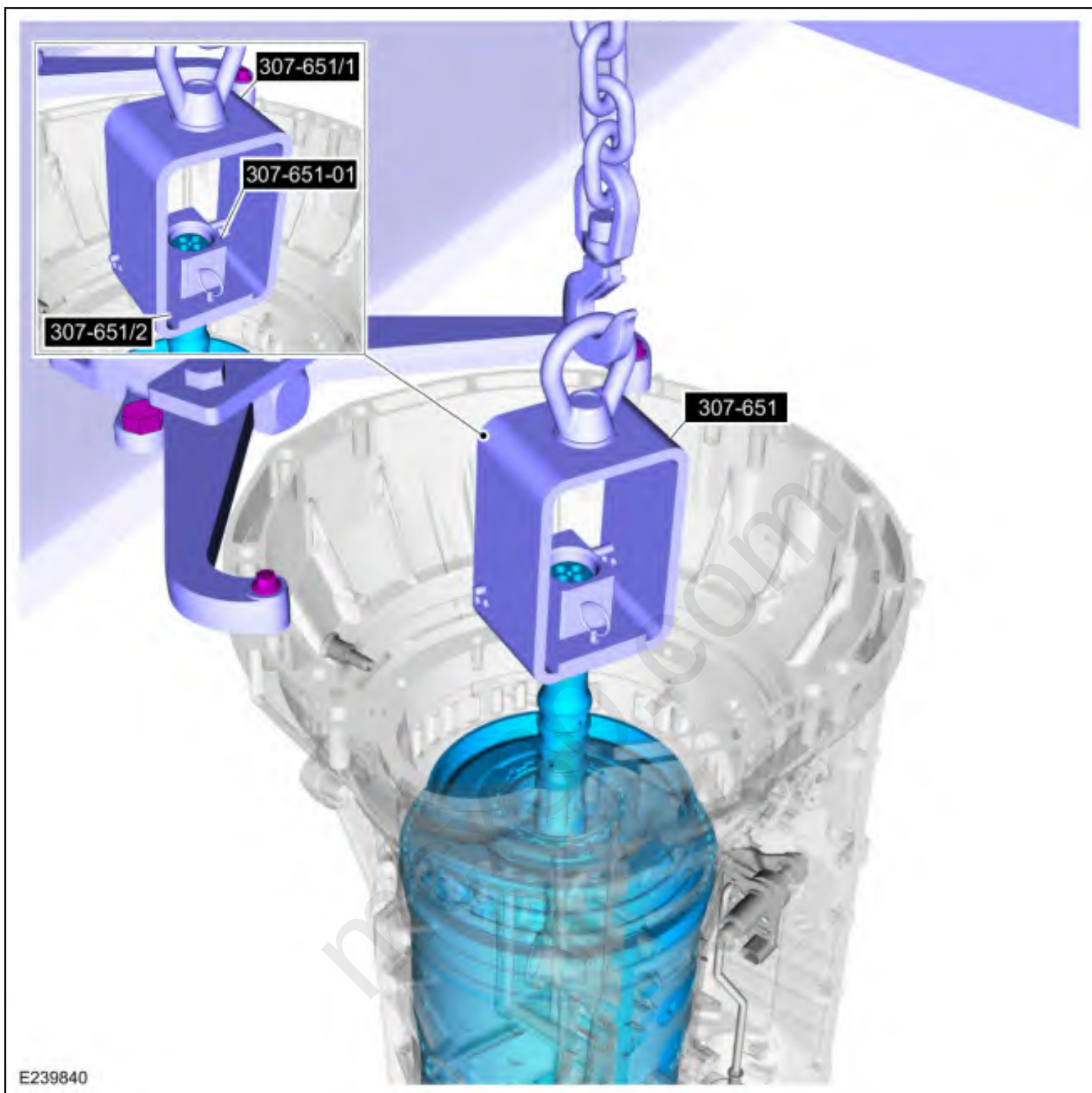
240. Remove Special Service Tool: 307-748 Installer/Sizer, Input Shaft Solid Sealing Rings; Small.



241. Remove Special Service Tool: 307-653 Sizer, Input Shaft Teflon Seal.



242. Using a the special tools and a floor crane, install the clutch and planetary assembly.
Use Special Service Tool: 307-651 Bracket, Pump Remover/Installer.



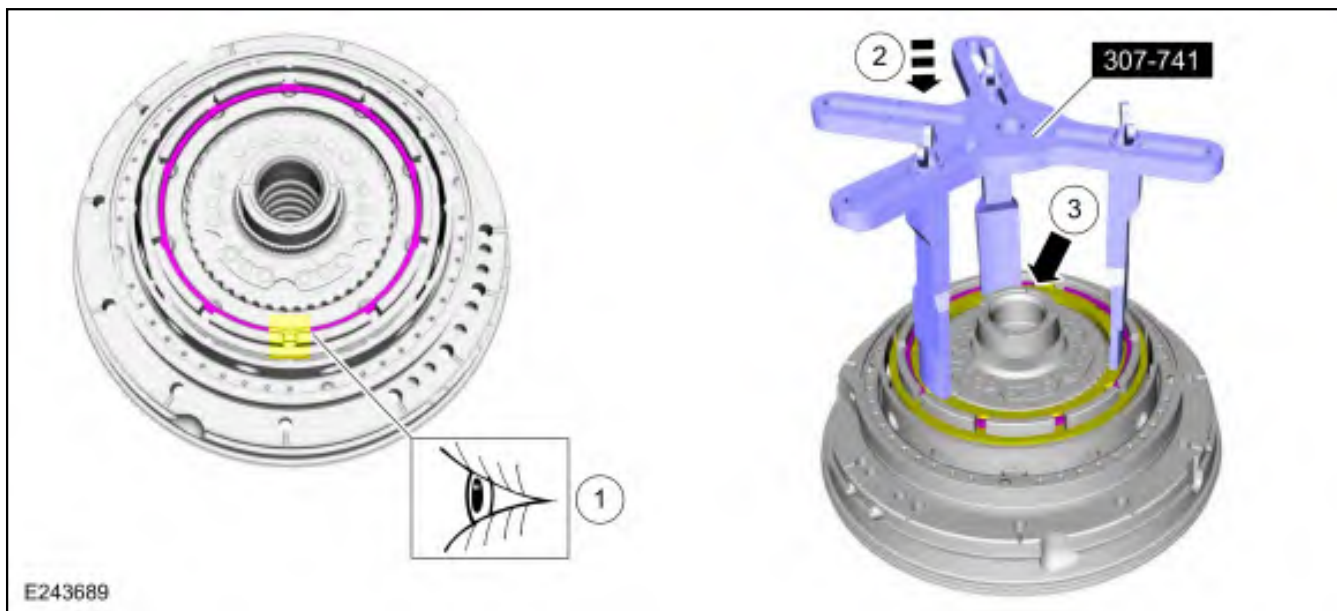
243.

Using the special tool, remove the B clutch snap ring.

1. **NOTE:** *The B clutch snap ring ends are positioned in the opening of the B clutch pressure plate that does not have a half-moon indent.*

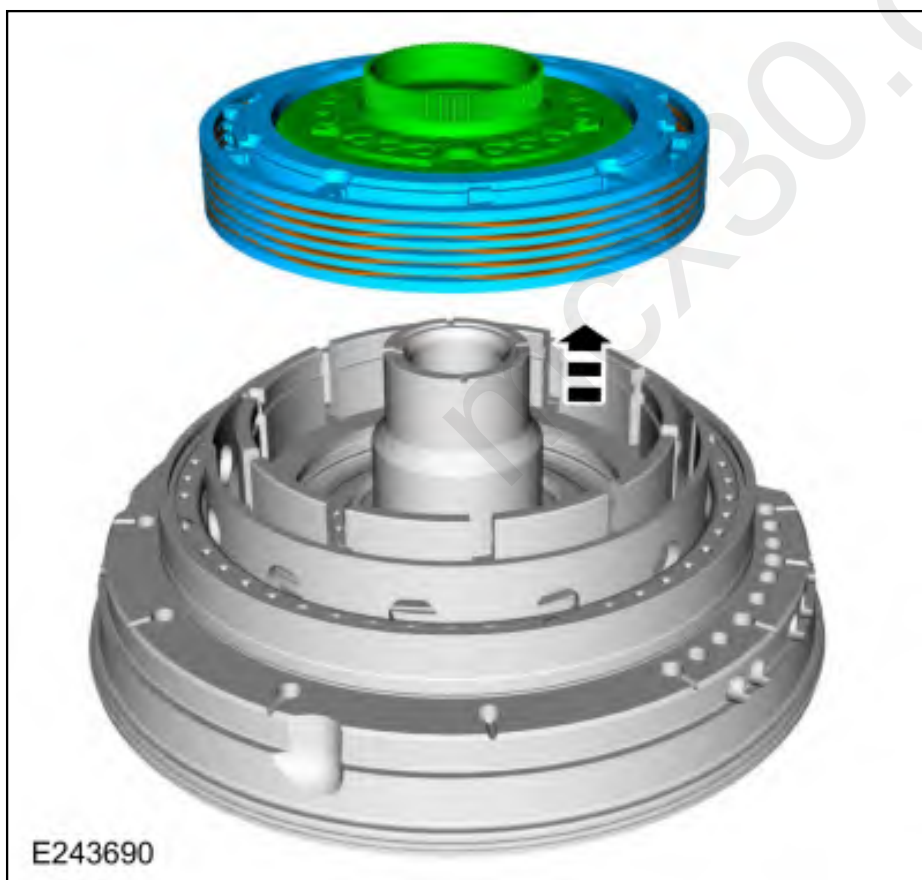
Note the position of the B clutch snap ring ends for assembly.

2. Using the special tools and a press, compress the B clutch assembly.
Use Special Service Tool: 307-741 Spring Compressor, F Clutch.
Use the General Equipment: Hydraulic Press
3. Remove the B clutch snap ring.



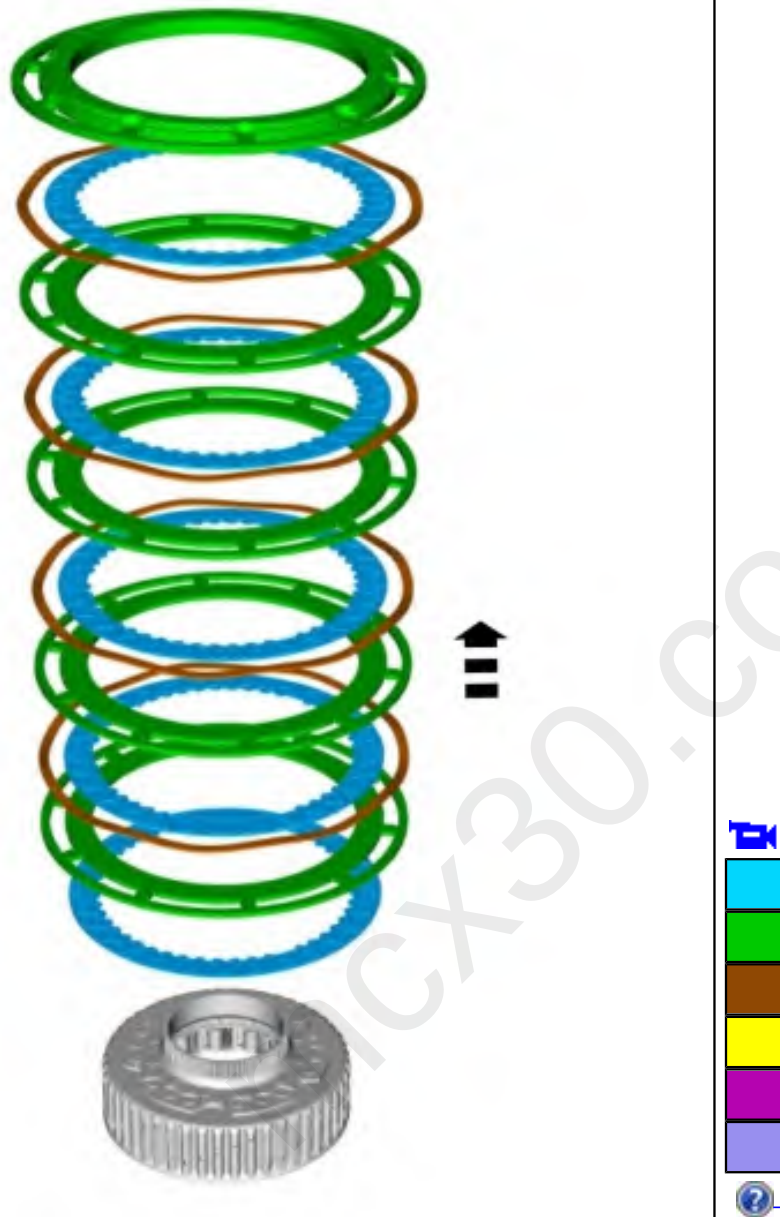
244. **NOTICE:** Remove the One-Way Clutch (OWC) and B clutch assembly gently, as the One-Way Clutch (OWC) rollers and springs could become dislodged.

Gently remove the One-Way Clutch (OWC) and B clutch assembly.



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

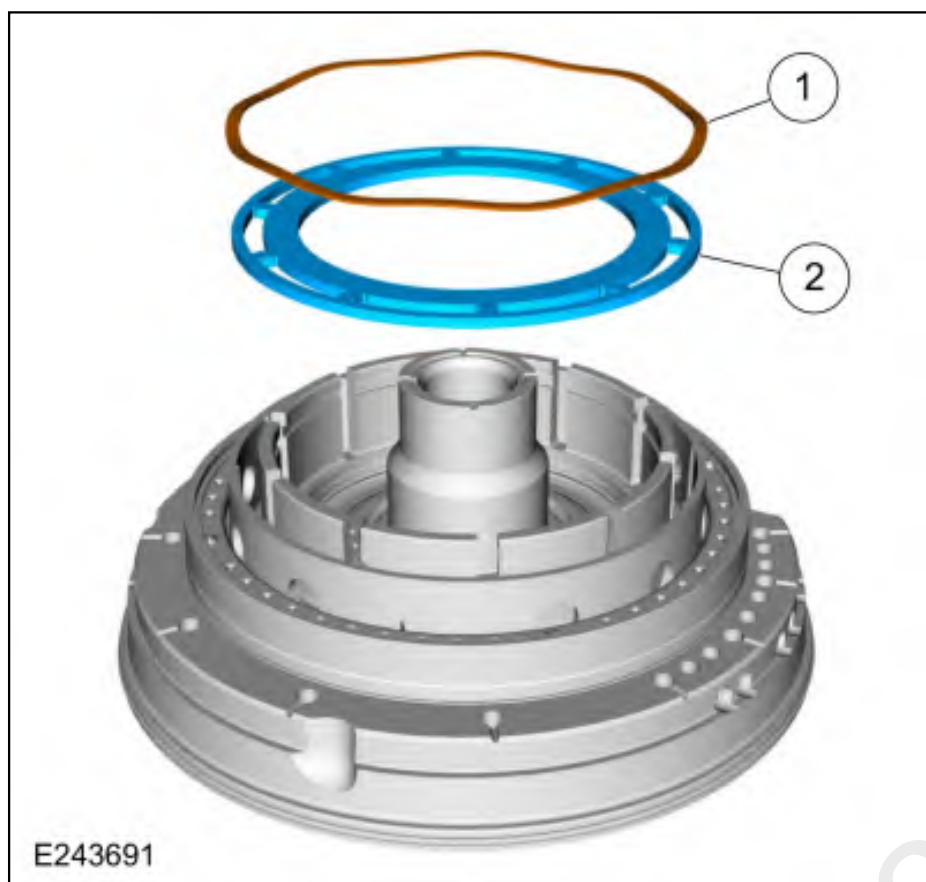
Remove the B clutch assembly from the One-Way Clutch (OWC). Inspect the clutch plates for excessive wear or damage. If the clutch plates are excessively worn or damaged replace as necessary. If the clutch plates are not excessively worn or damaged, they can be reused.



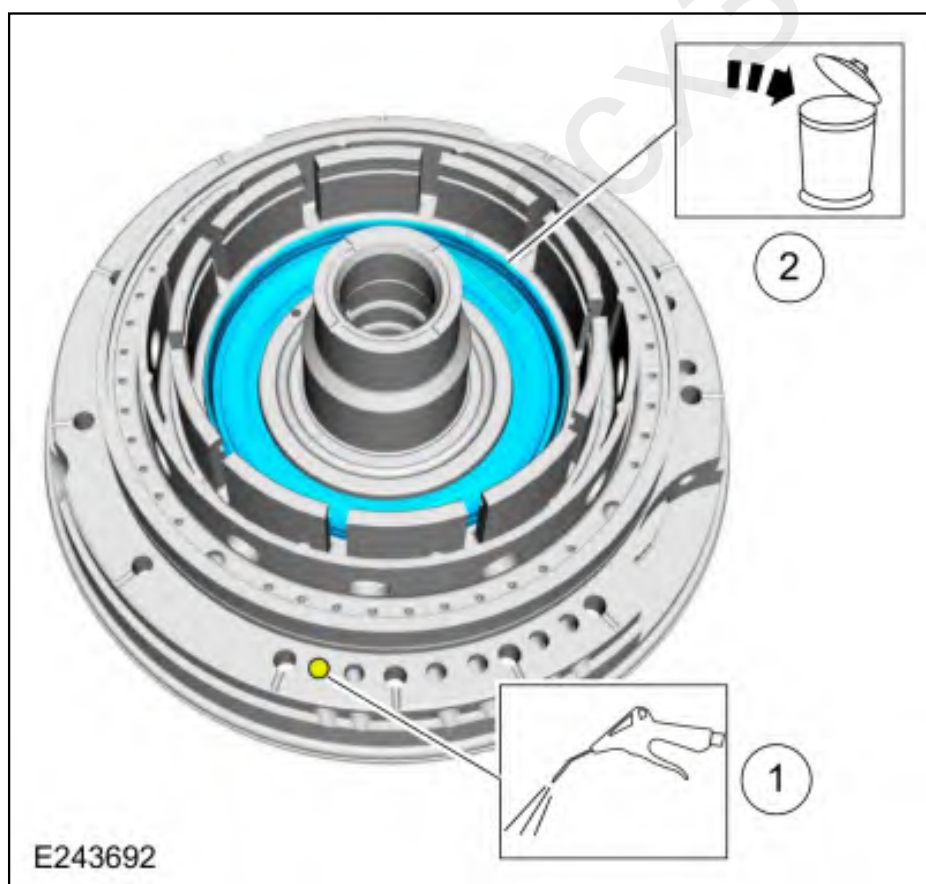
246.

Remove the B clutch apply plate and the one remaining B clutch separating spring.

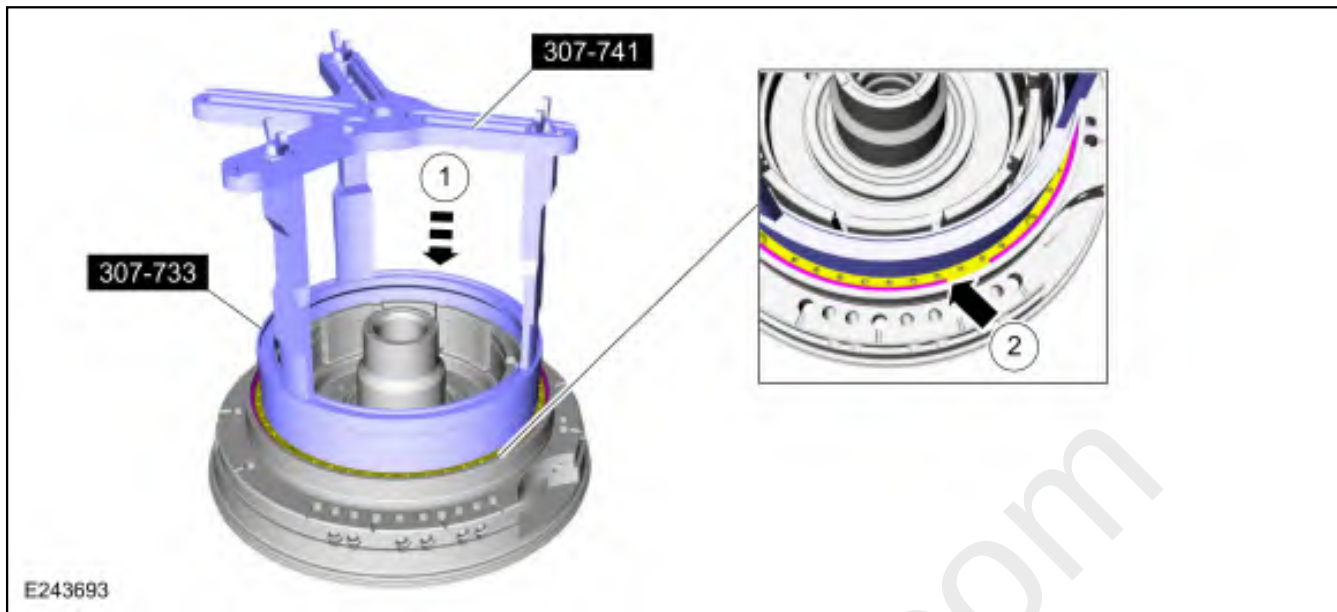
1. B clutch separating spring
2. B clutch apply plate



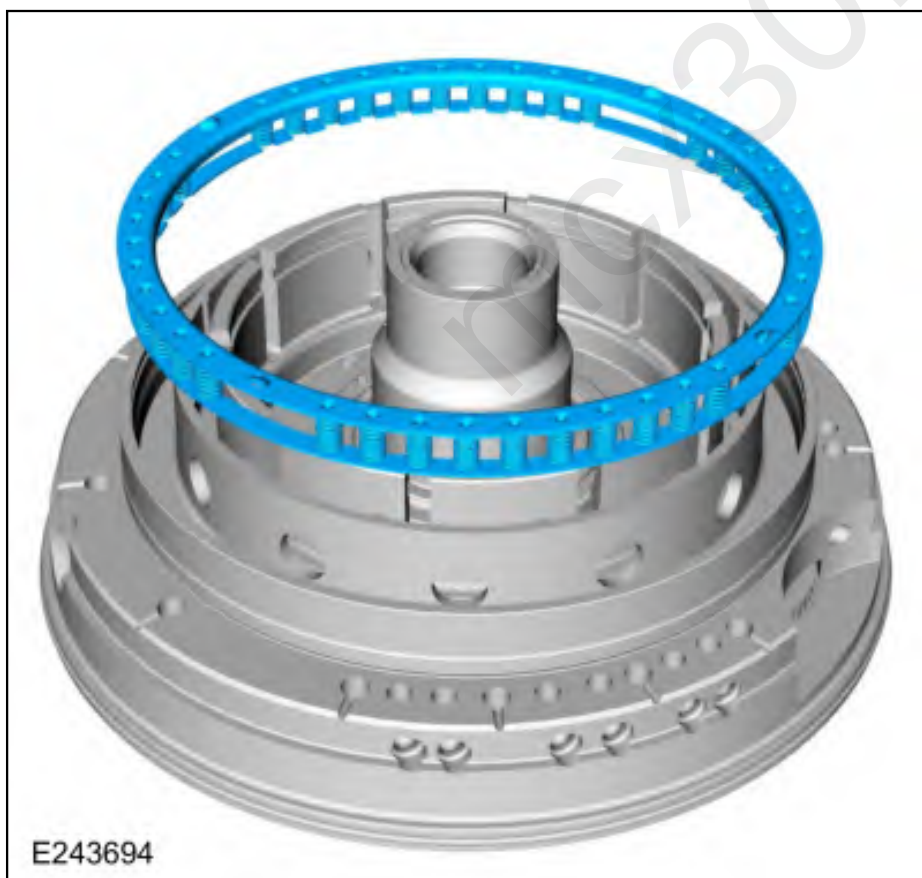
1. Use compressed air into the oil passage hole.
2. Remove and discard the B clutch piston (7G418).



1. Using the special tools and a press, compress the A clutch piston return spring.
Use Special Service Tool: 307-741 Spring Compressor, F Clutch. , 307-733 Compressor, Clutch Piston.
Use the General Equipment: Hydraulic Press
2. Remove the A clutch piston return spring snap ring.



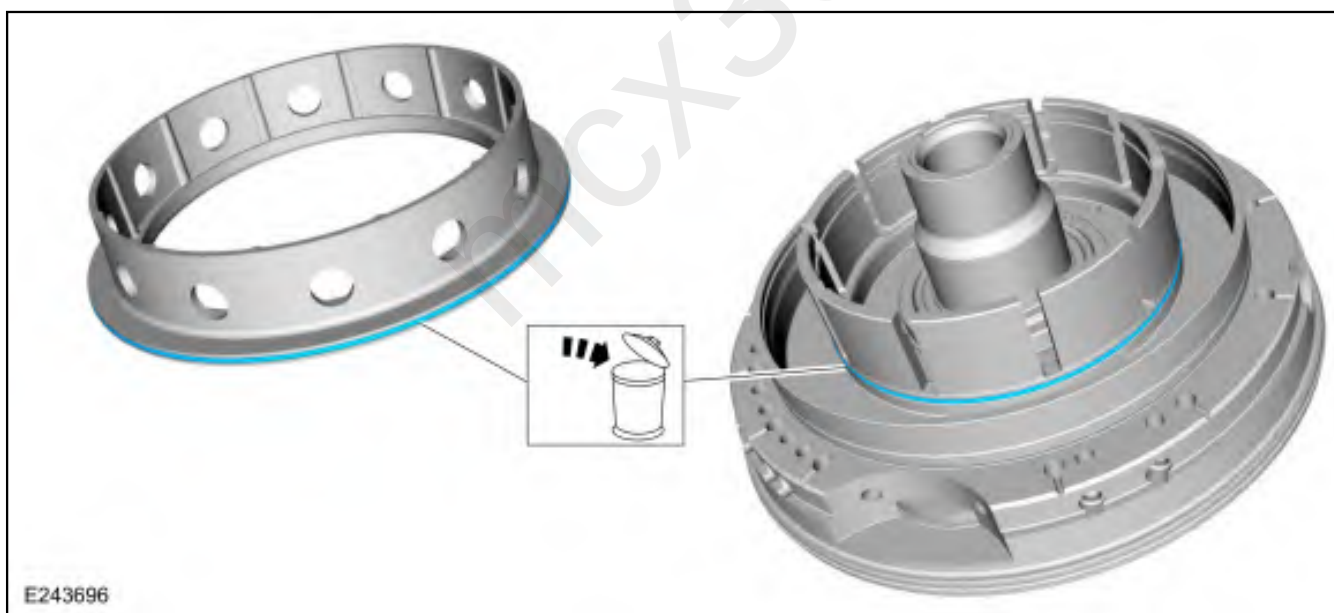
249. Remove the A clutch piston return spring.



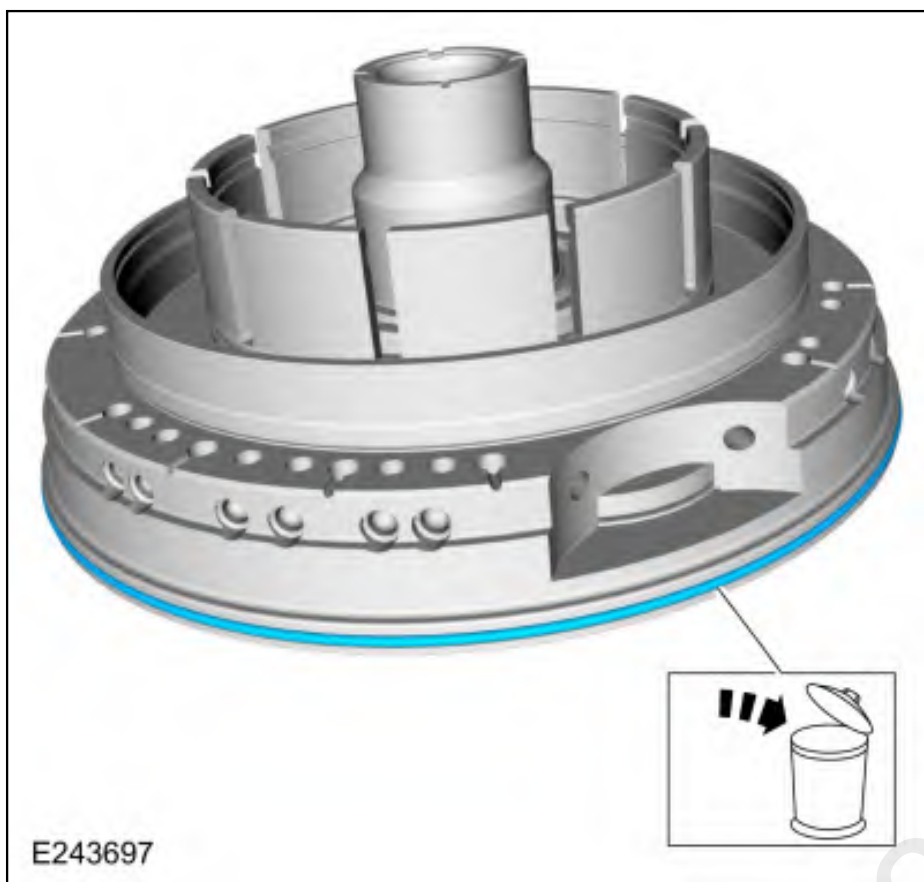
250. Use compressed air into the oil passage hole and remove the A clutch piston.



251. Remove and discard the A clutch piston outer seal (7F224) and the A clutch piston inner seal (7F225).

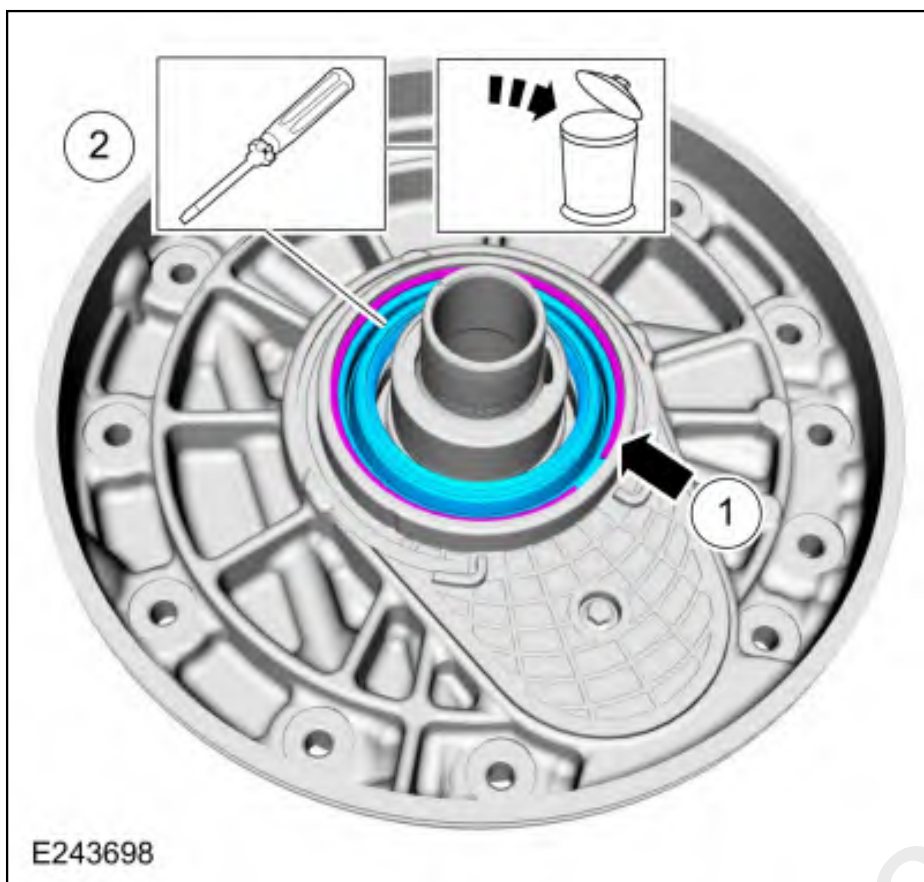


252. Remove and discard the front support-to-case seal (7B031).



1. Remove the torque converter hub seal snap ring.
2. **NOTE:** When removing the torque converter hub seal use care not to scratch the front support cover sealing surface.

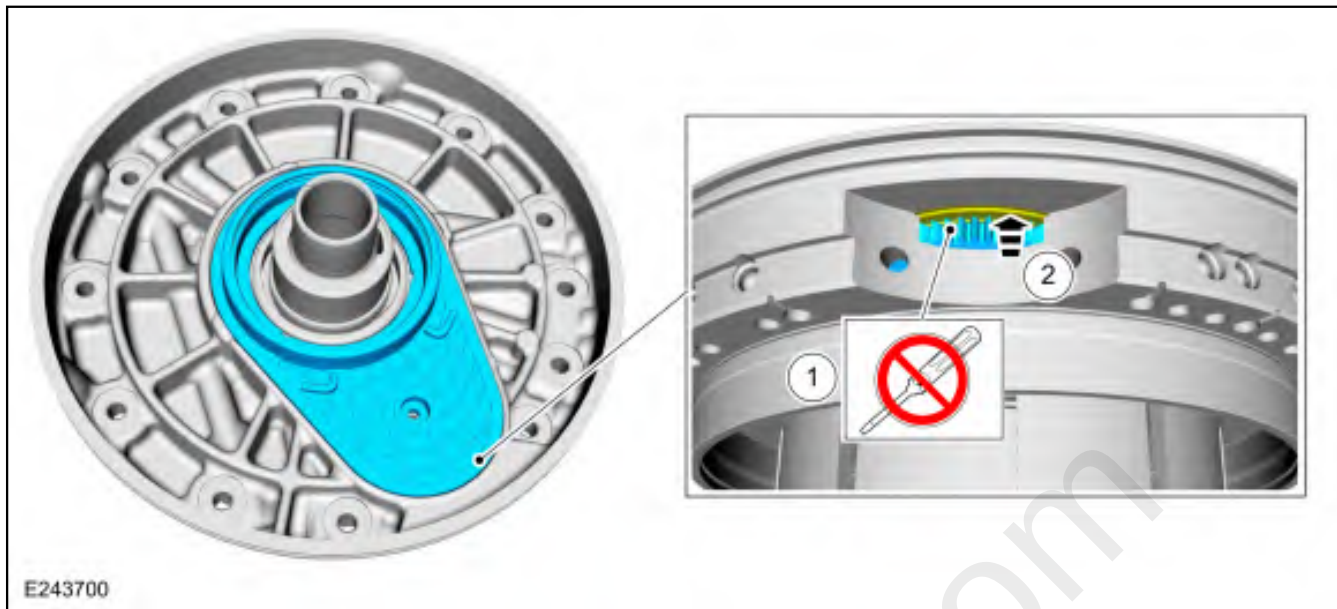
Remove and discard the torque converter hub seal (7A248).



254. Remove the front support cover bolt and the front support cover snap ring.



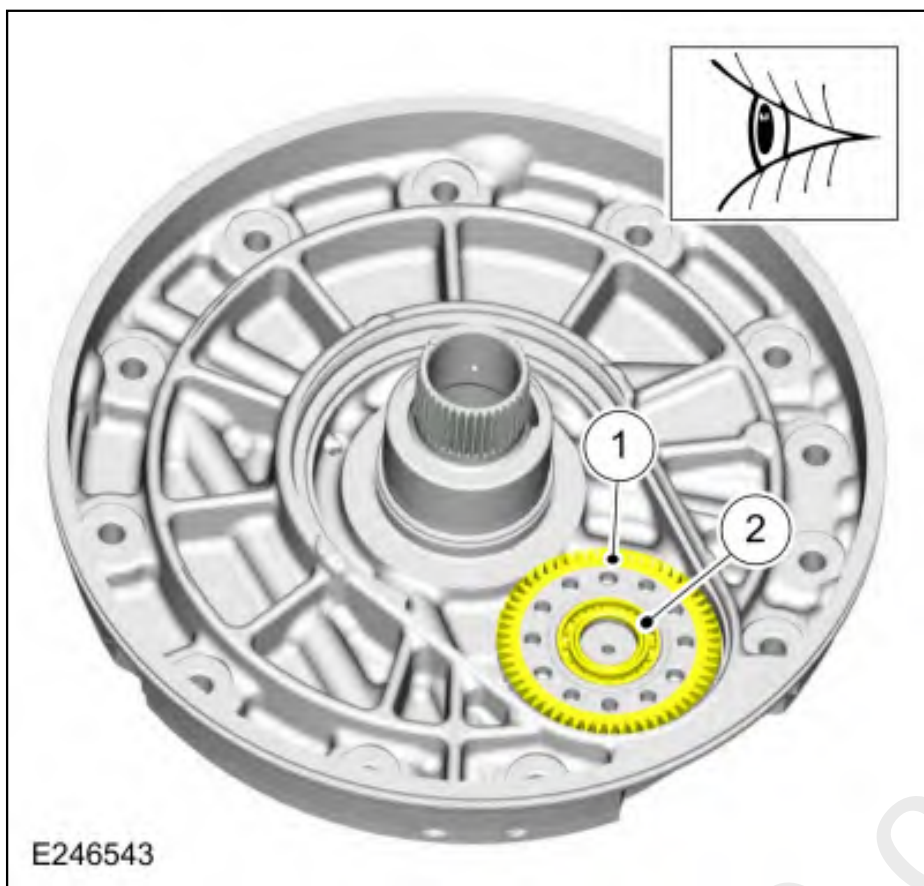
1. **NOTICE: Do not pry on the transmission fluid pump drive gear to remove the front support cover or damage to the transmission fluid pump drive gear can occur.**
2. Push up on the back of the front support cover and remove the front support cover from the front support.



256. Remove the transmission fluid pump drive gear.

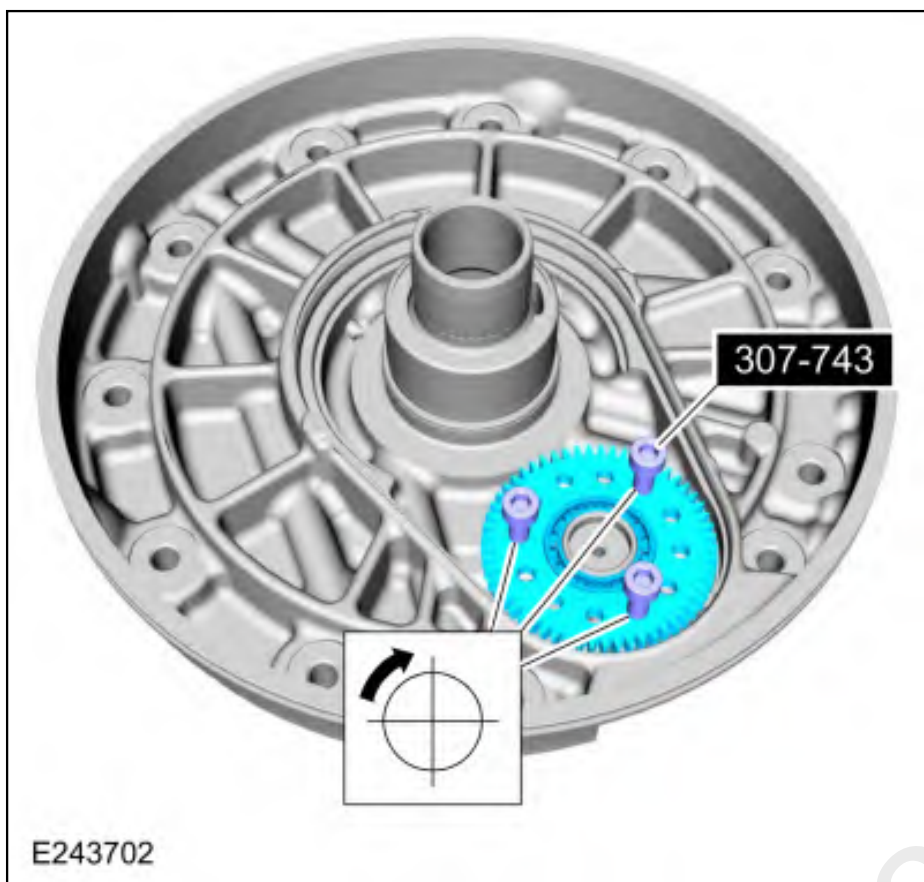


1. Inspect the transmission fluid pump idler gear for damage.
2. Make sure the transmission fluid pump idler gear bearing spins freely and has no excessive end play.

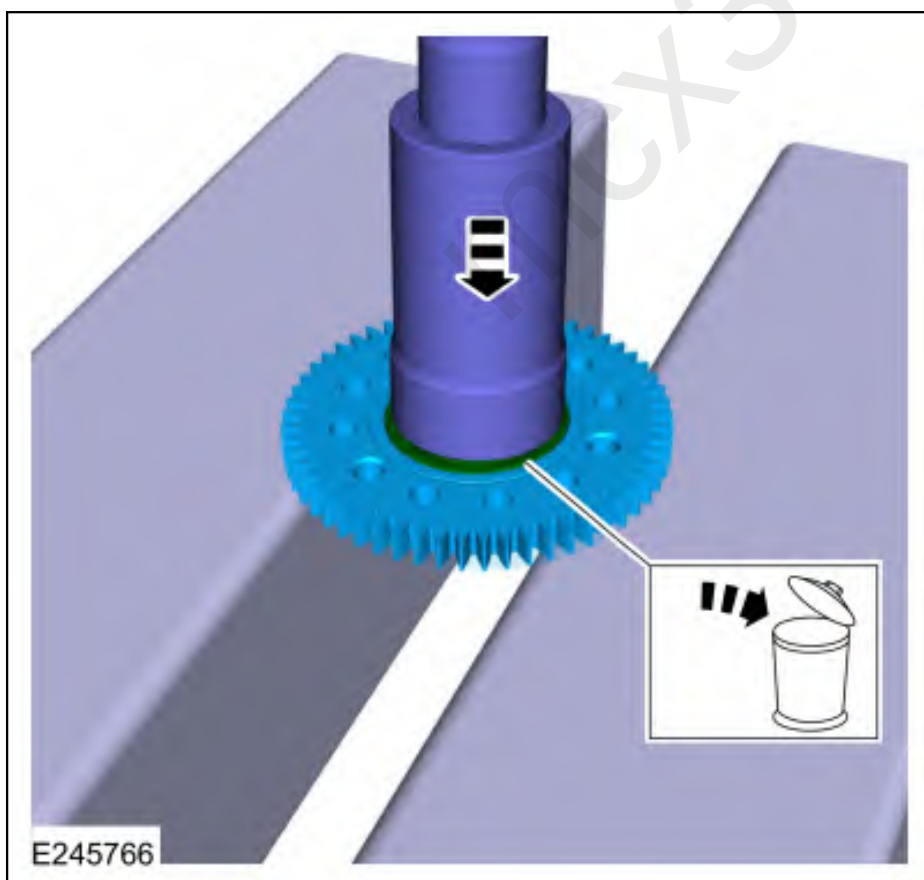


258. **NOTE:** *Tighten the special tools evenly to remove the transmission fluid pump idler gear.*

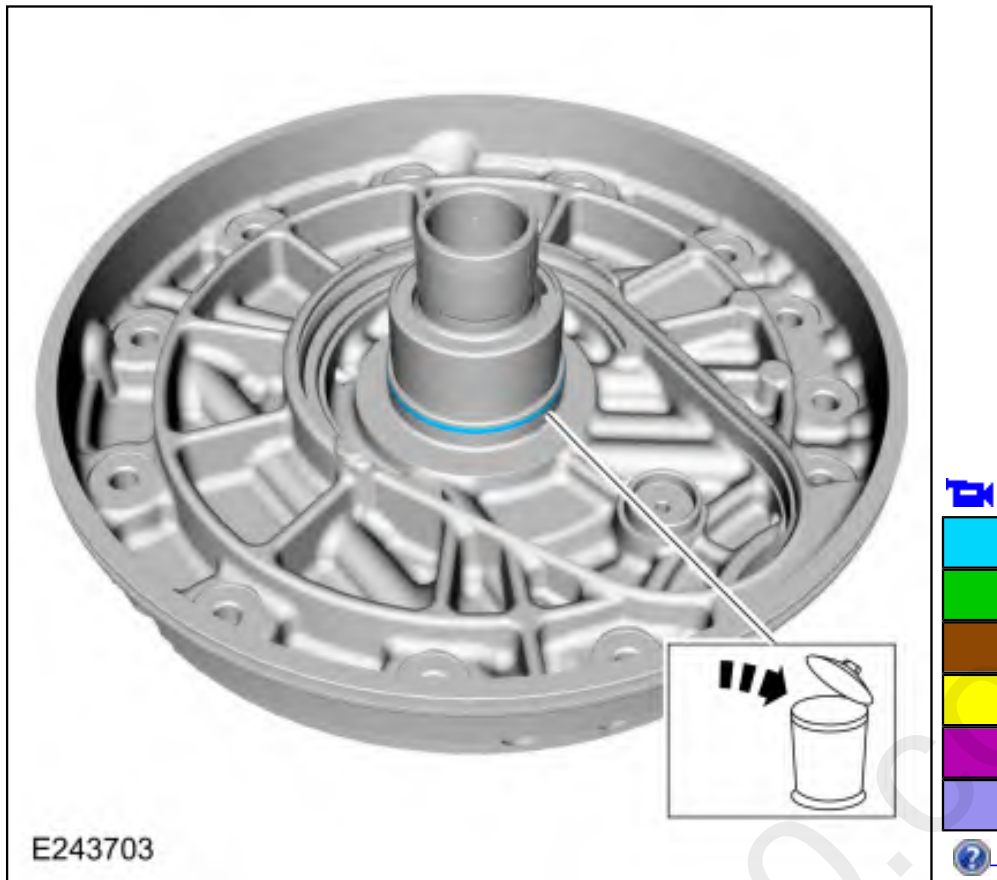
If necessary, use the special tools, to remove the transmission fluid pump idler gear and bearing.
Use Special Service Tool: 307-743 Remover, Pump Drive Gear.



259. Using a press, to remove and discard the transmission fluid pump idler gear bearing (7Z426).
Use the General Equipment: Hydraulic Press



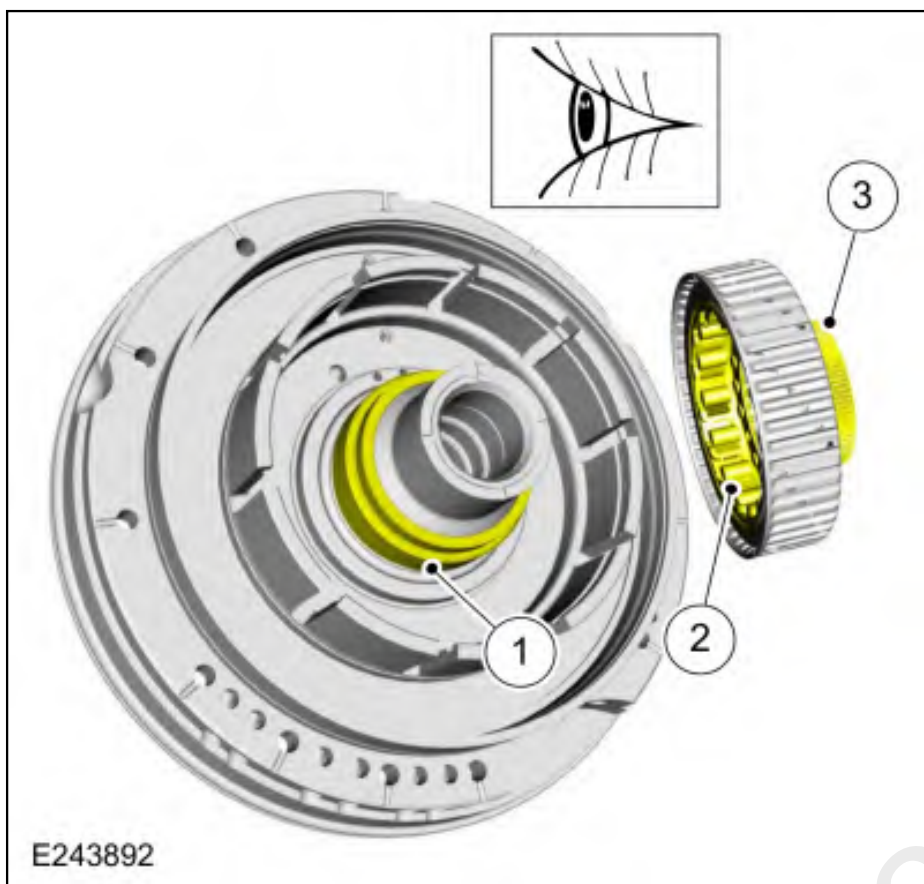
260. Remove and discard the stator support seal (7G090).



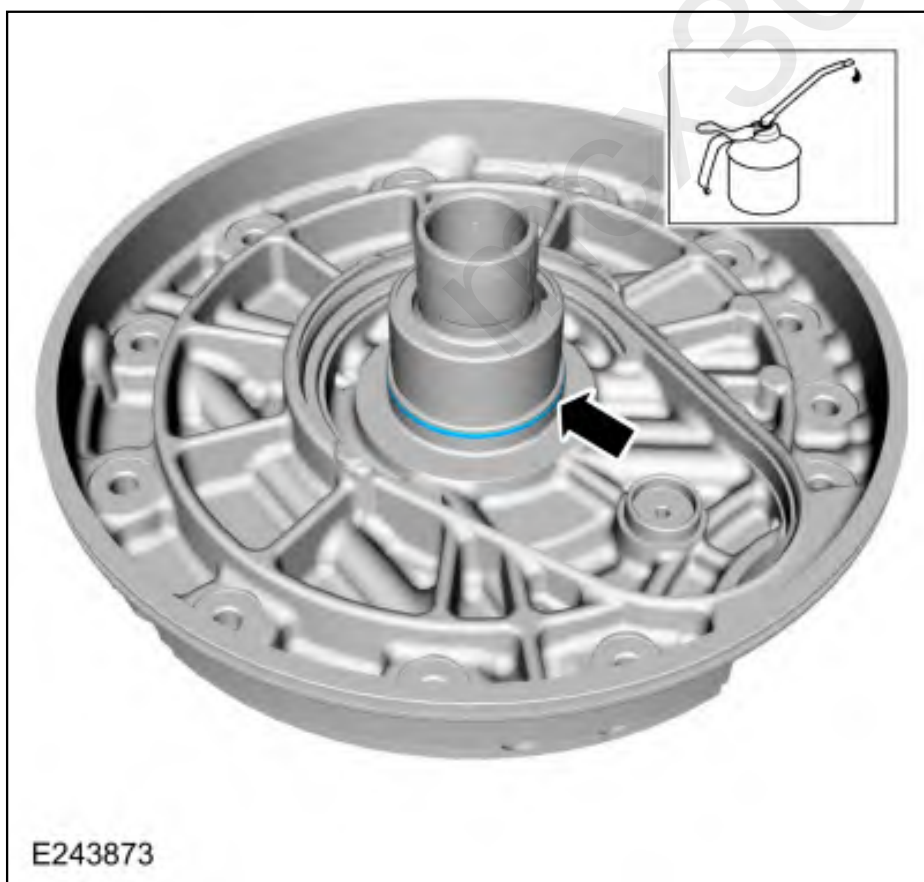
261. **NOTE:** *If the One-Way Clutch (OWC) needs to be replaced the front support must be replaced.*

Clean and inspect the components for damage or excessive wear.

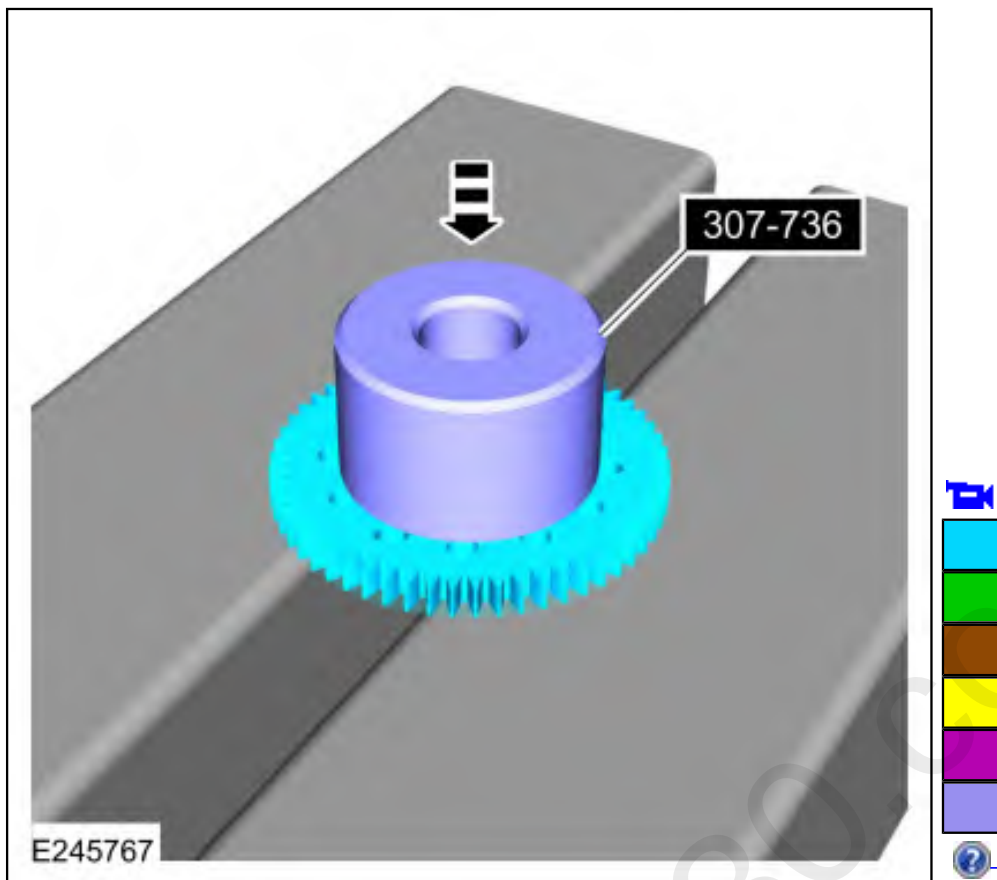
1. One-Way Clutch (OWC) inner race
2. One-Way Clutch (OWC) rollers
3. Gear splines



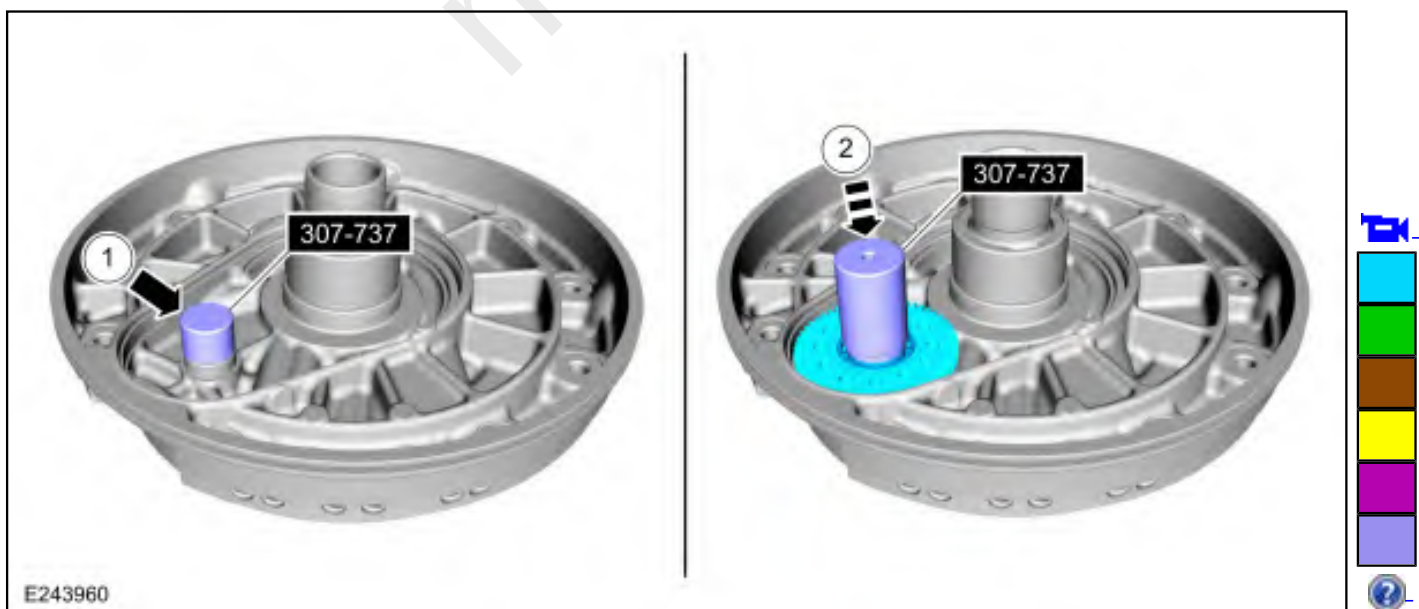
262. Install the new stator support seal on the front support. Lubricate the stator support seal with petroleum jelly.



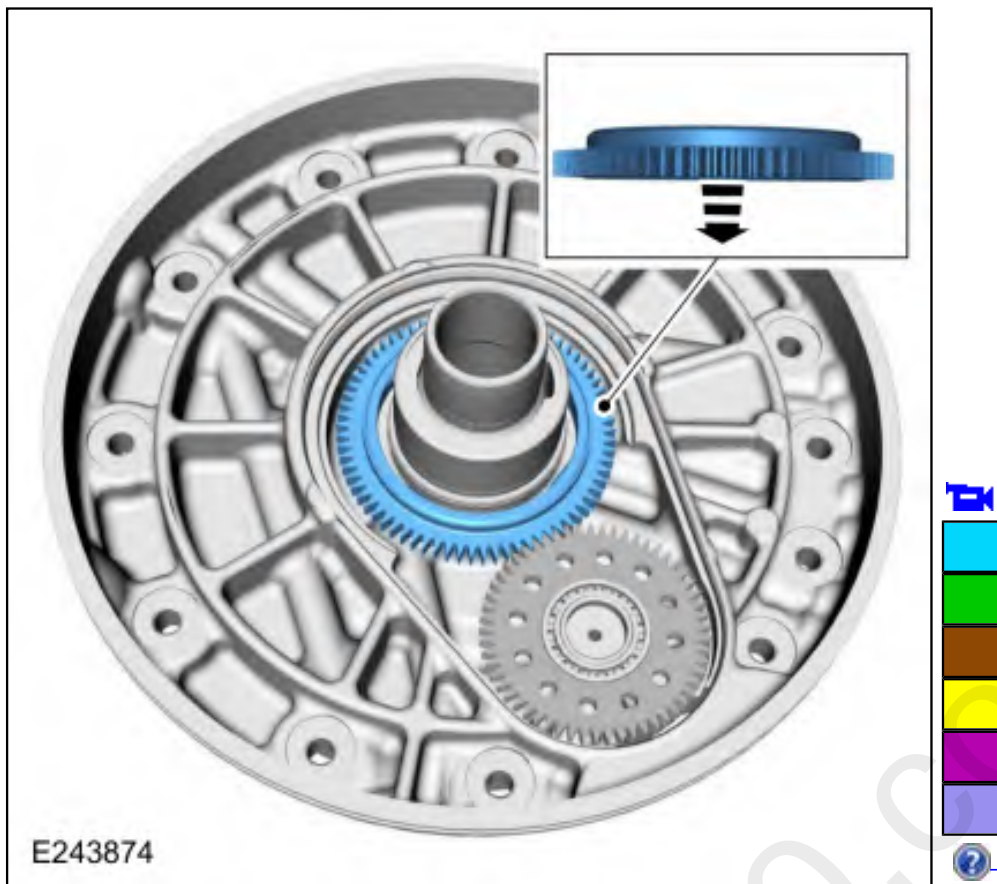
263. If removed, using the special tool and a press, install the new transmission fluid pump idler gear bearing.
Use Special Service Tool: 307-736 Installer, Pump Drive Gear Bearing.
Use the General Equipment: Hydraulic Press



1. Position the special tool on the front support.
Use Special Service Tool: 307-737 Press Tool, Oil Pump Drive Idler Gear.
2. Using the special tools and a press, install the transmission fluid pump idler gear and bearing.
Use the General Equipment: Hydraulic Press



265. Install the transmission fluid pump drive gear with the flat side down.



266. Install the front support cover by pressing down evenly by hand.

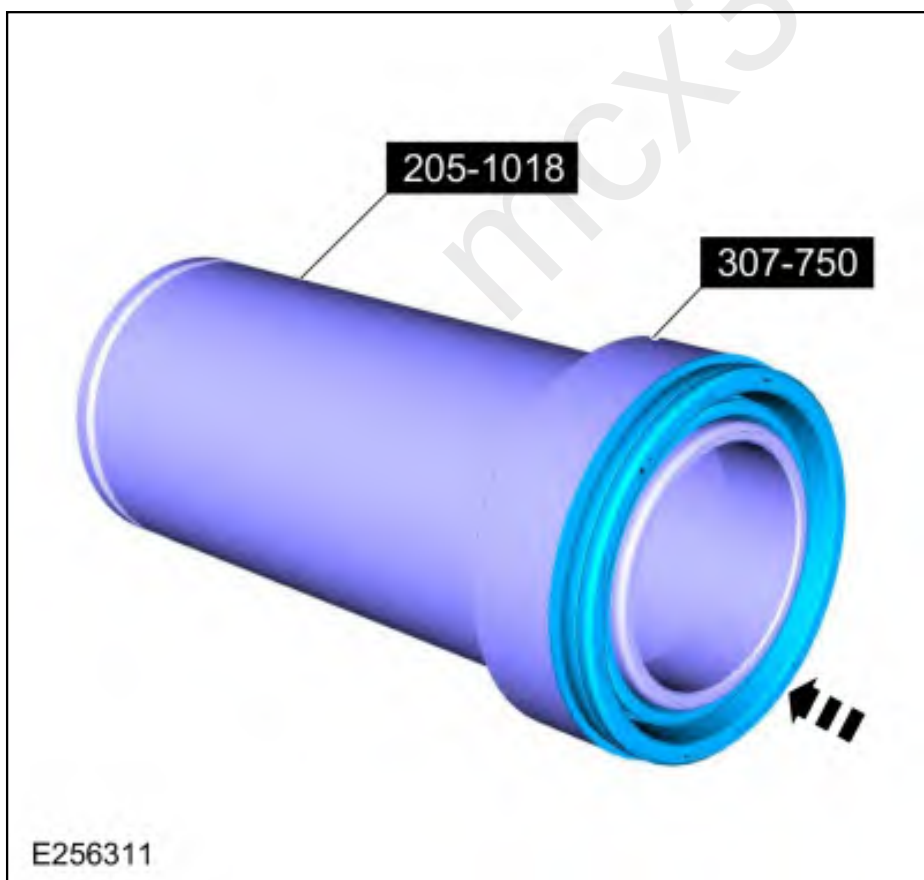


267. **NOTE:** The front support cover snap ring ends are located in the cover alignment features.

Install the front support cover bolt and the front support cover snap ring.
Torque: 62 lb.in (7 Nm)

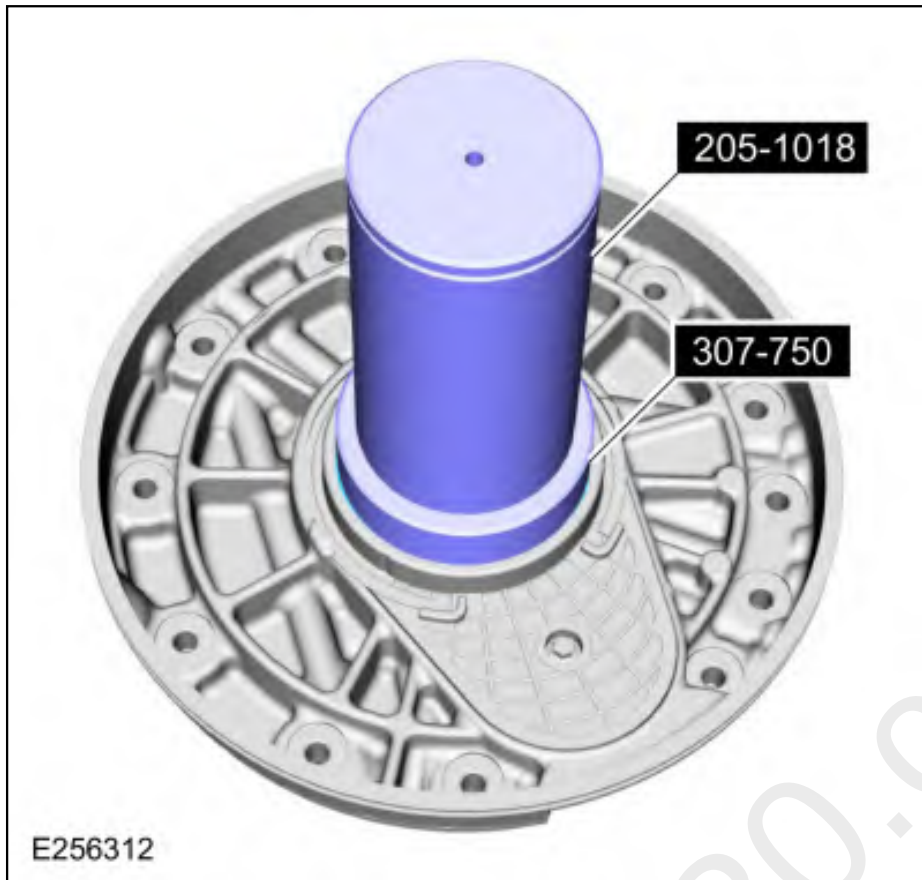


268. Install the new torque converter hub seal on the special tools.
Use Special Service Tool: 307-750 Installer, Converter Seal. , 205-1018 Installation Tube.



269. Using the special tools, install the new torque converter hub seal.

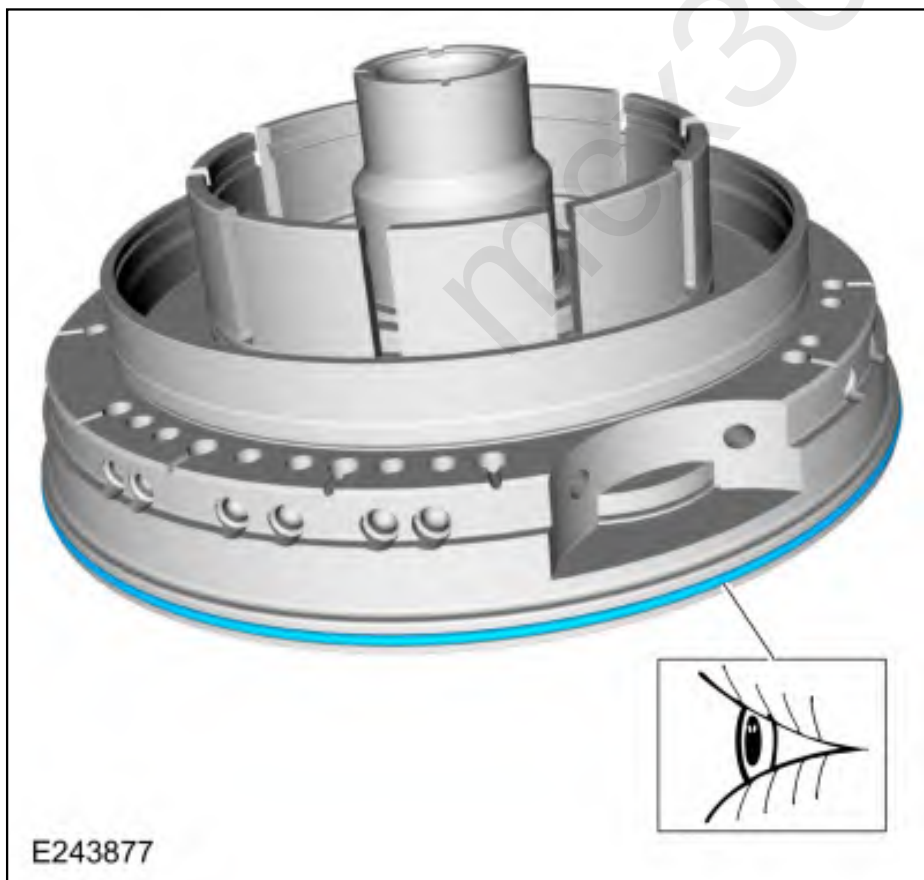
Use Special Service Tool: 307-750 Installer, Converter Seal. , 205-1018 Installation Tube.



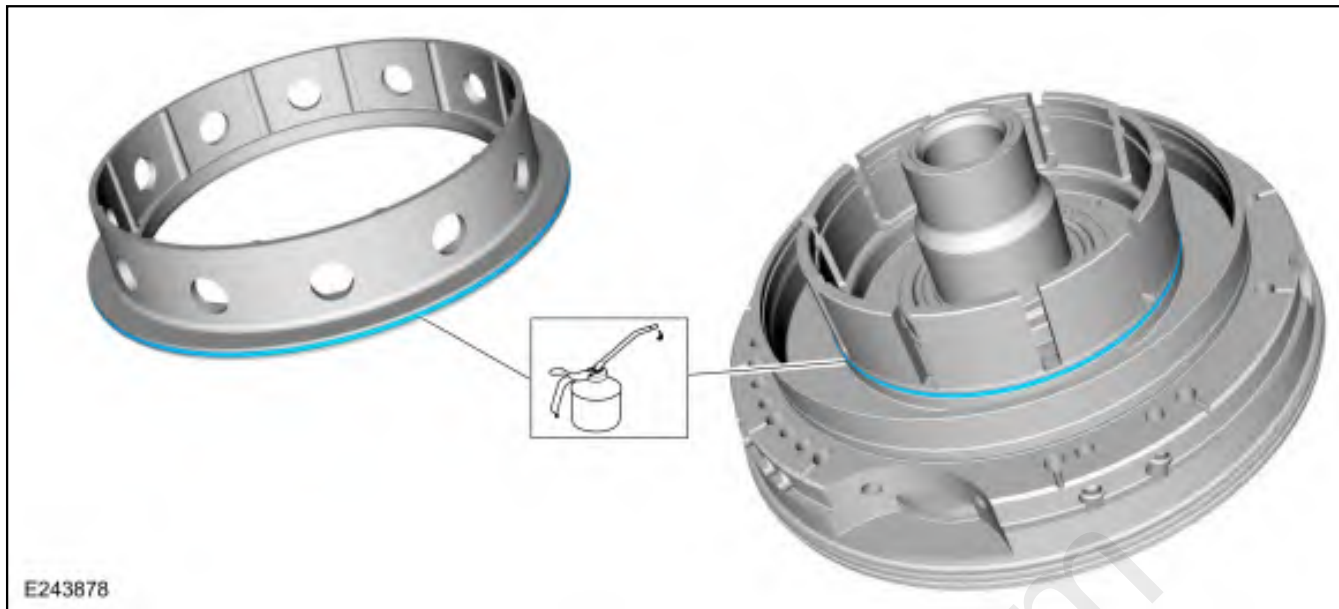
270. Install the torque converter hub seal snap ring.



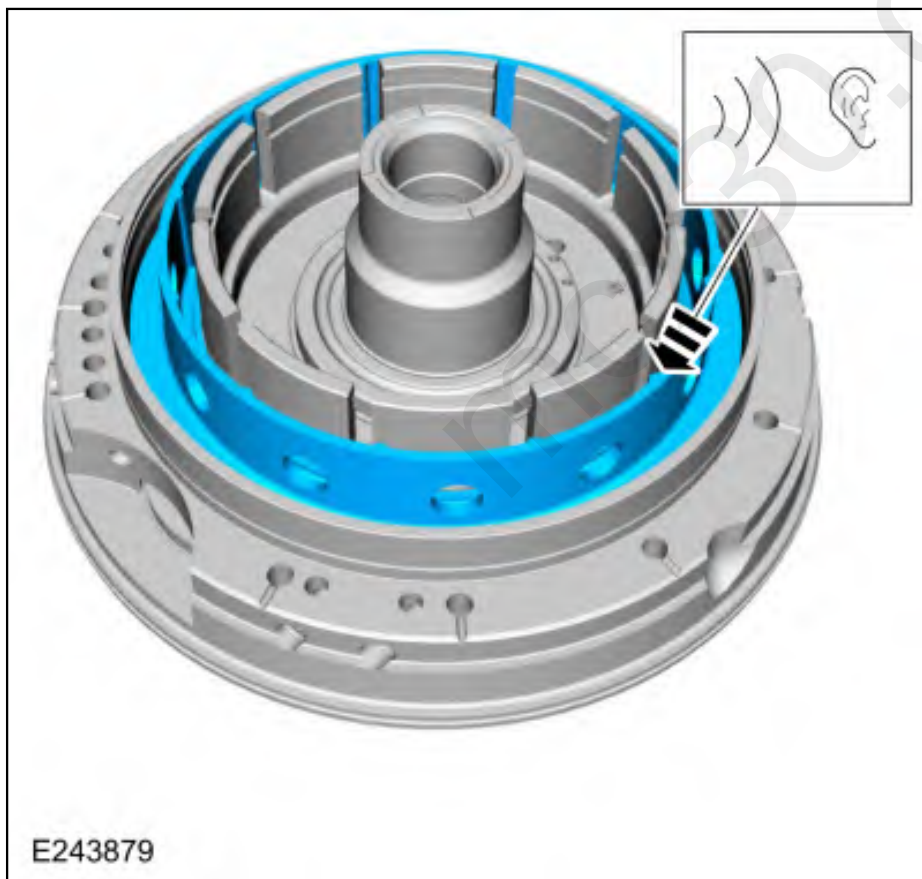
271. Install the new front support-to-case seal with the seal color visible from the outside.



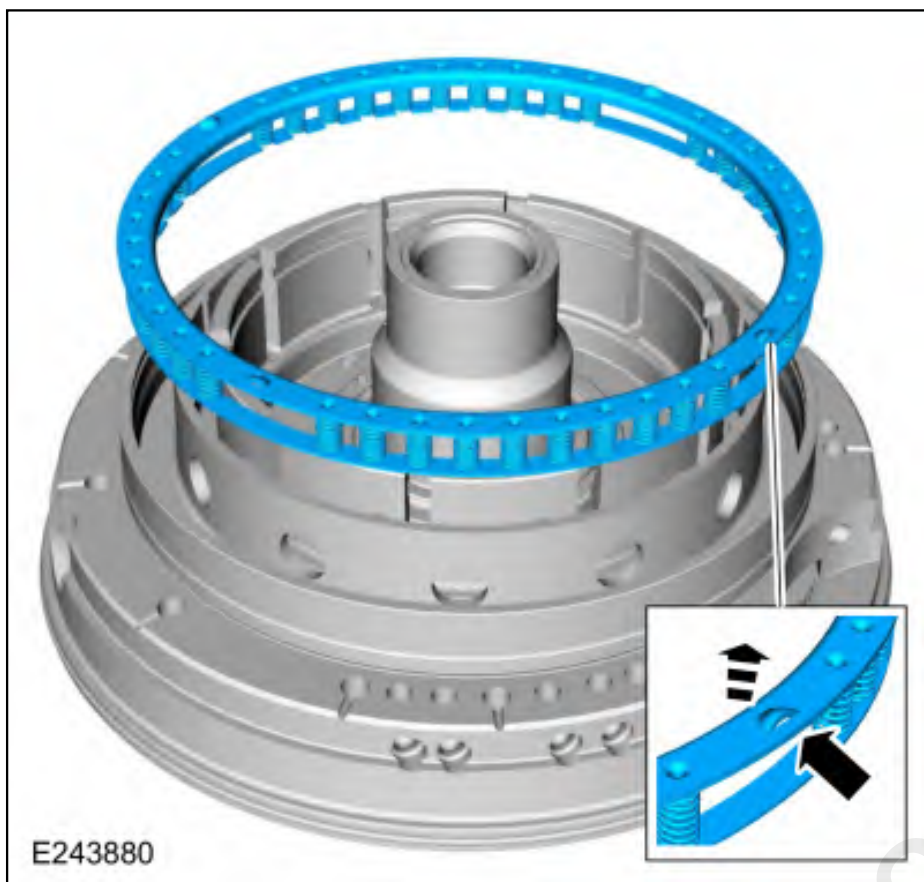
272. Install the new A clutch piston outer seal and the new A clutch piston inner seal. Lubricate the A clutch piston seals with petroleum jelly.



273. Install the A clutch piston by pushing down on the piston until an audible click is heard.



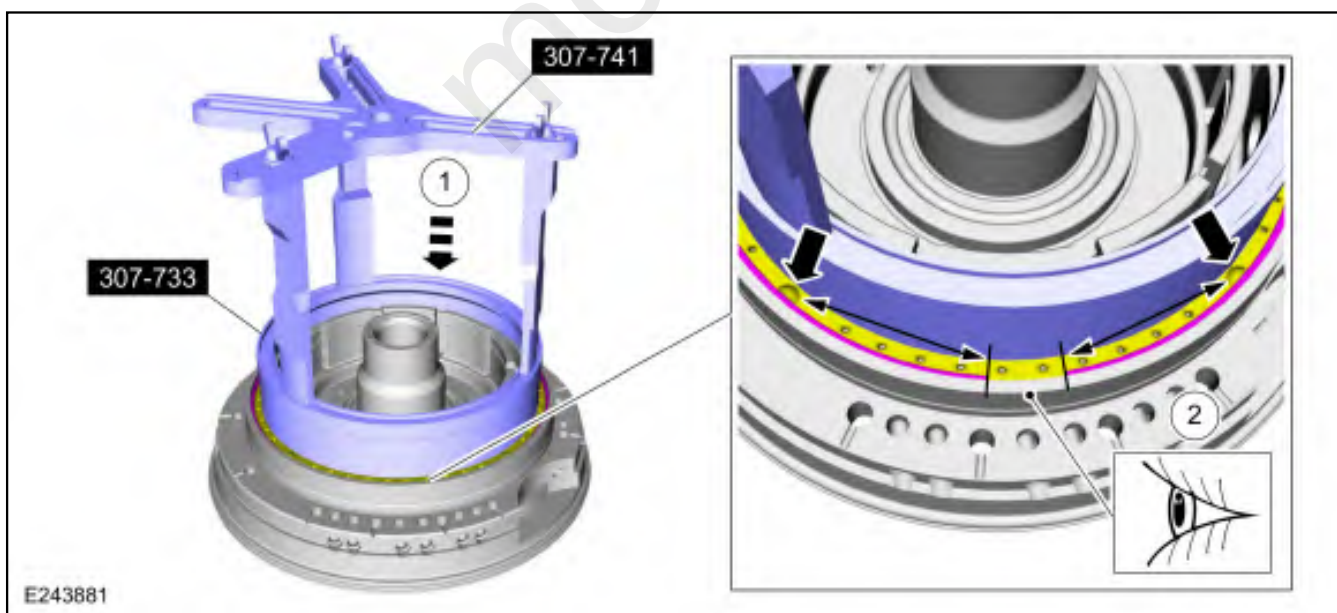
274. Install the A clutch piston return spring with the retaining tabs facing upward.



E243880

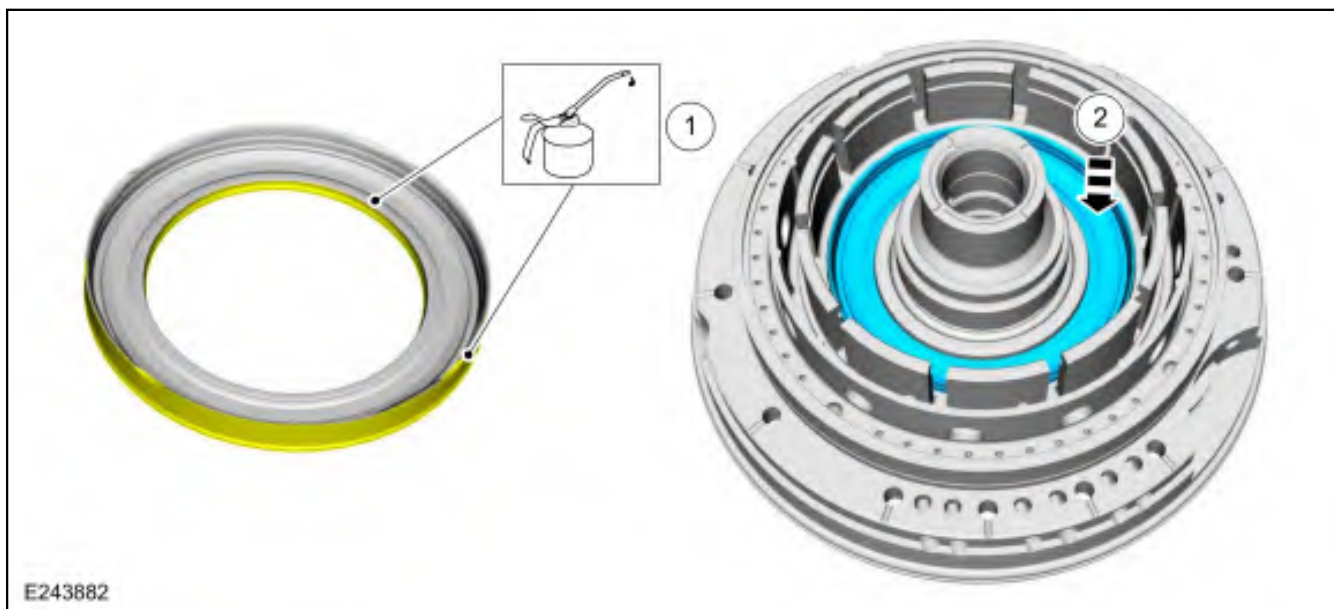
1. Using the special tools and a press, compress the A clutch piston return spring.
Use Special Service Tool: 307-741 Spring Compressor, F Clutch. , 307-733 Compressor, Clutch Piston.
Use the General Equipment: Hydraulic Press
2. **NOTE:** Be sure snap ring ends are not located on the A clutch piston return spring retaining tabs.

Install the A clutch piston return spring snap ring ends in the center of the return spring retaining tabs.

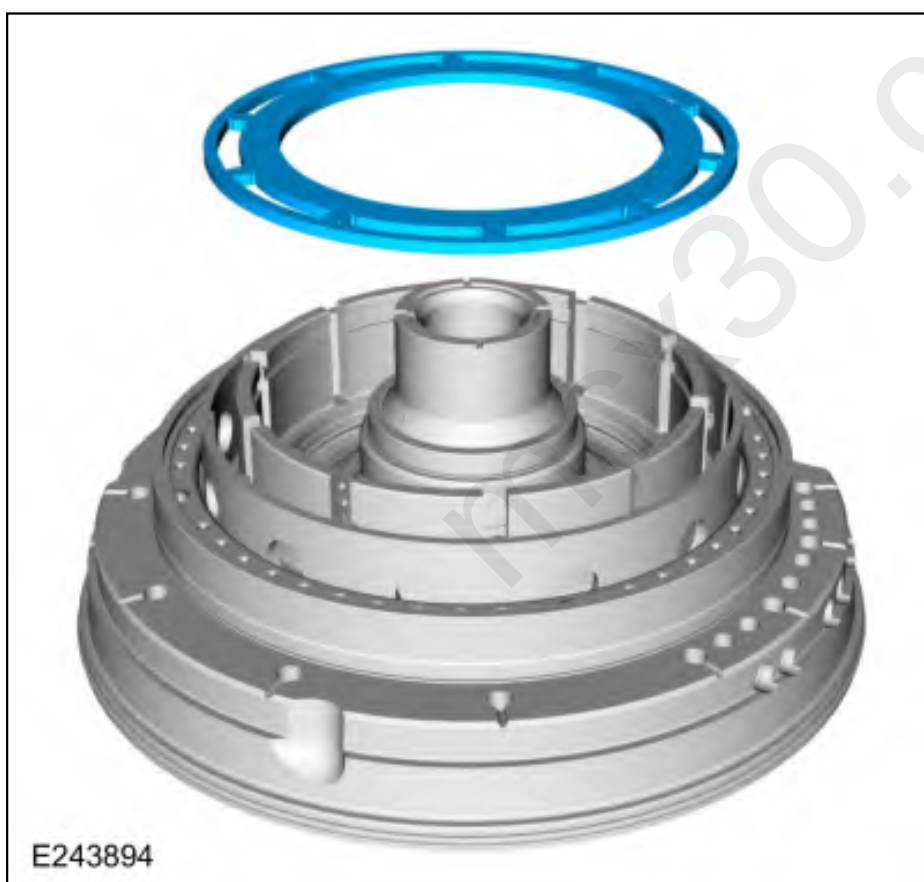


E243881

1. Lubricate the B clutch piston seals with petroleum jelly.
2. Install the new B clutch piston.

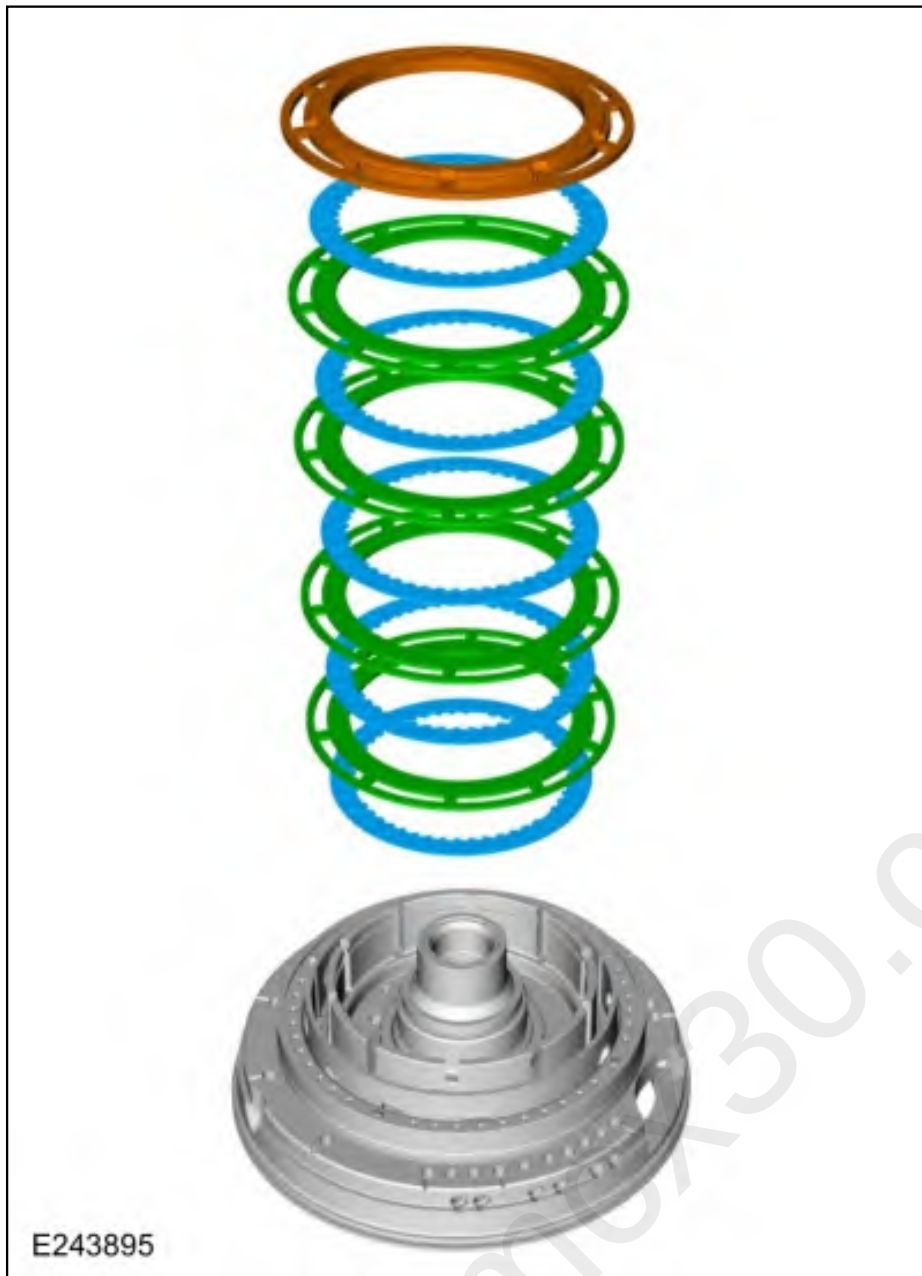


277. Install the B clutch apply plate.

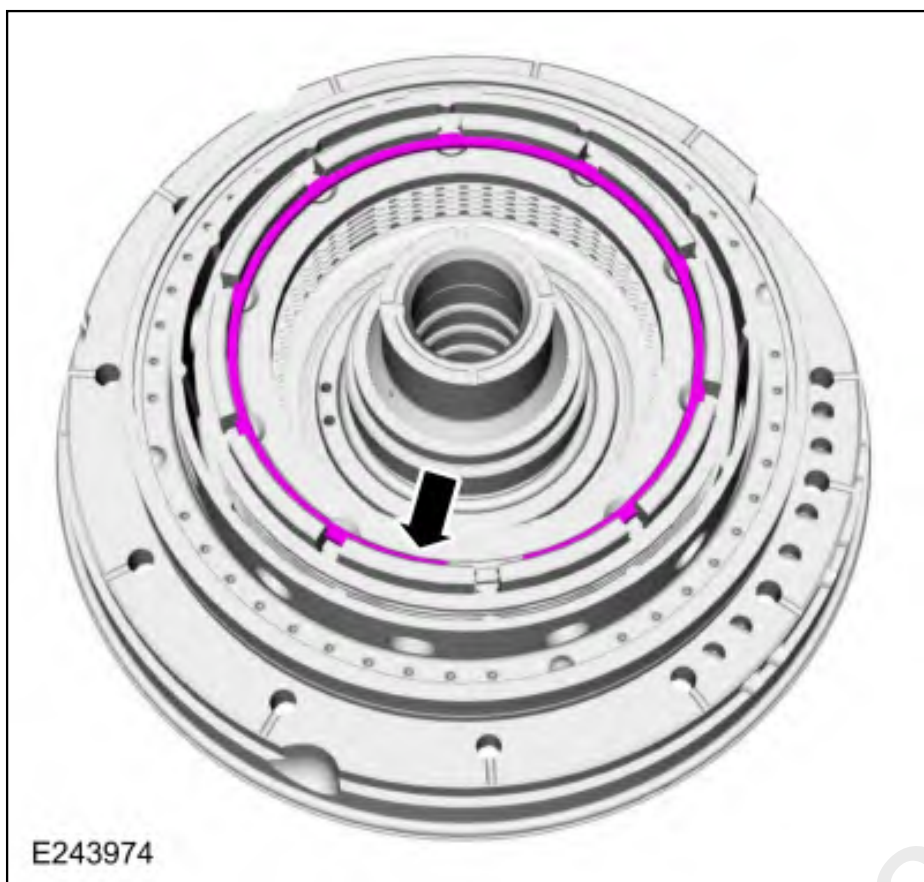


278. **NOTE:** The B clutch separating springs are not installed when measuring the B clutch clearance.

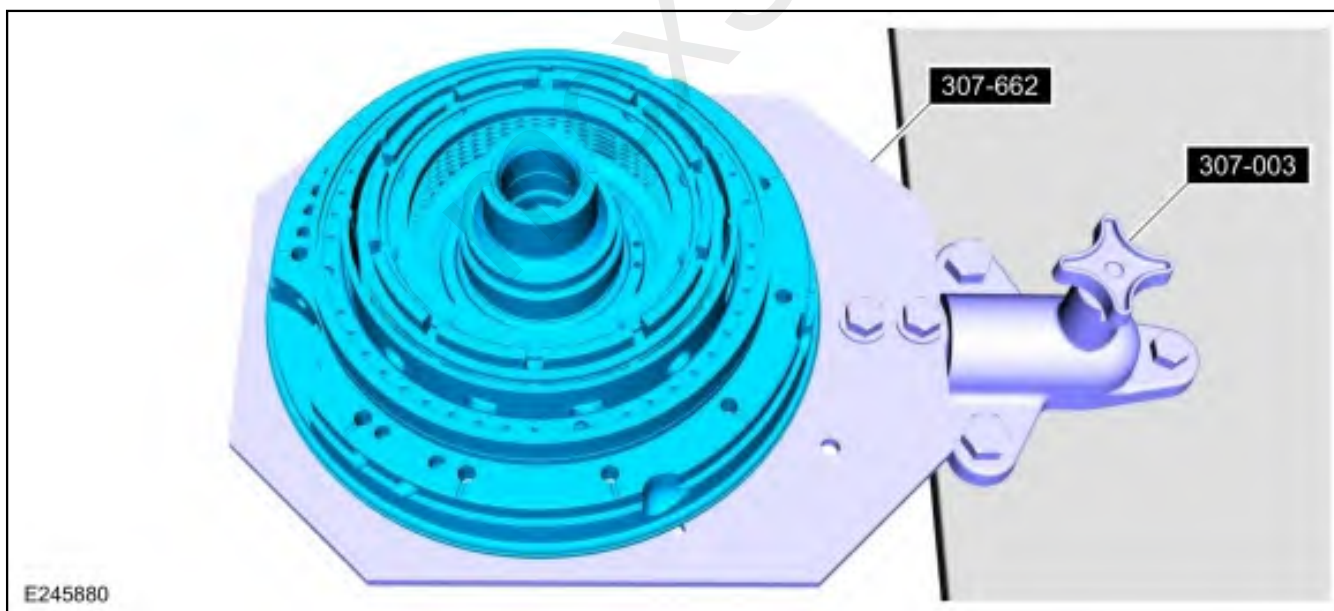
Temporarily install the B clutch friction plates, B clutch steel plates and the B clutch pressure plate to measure the B clutch clearance.



279. Install the B clutch snap ring.



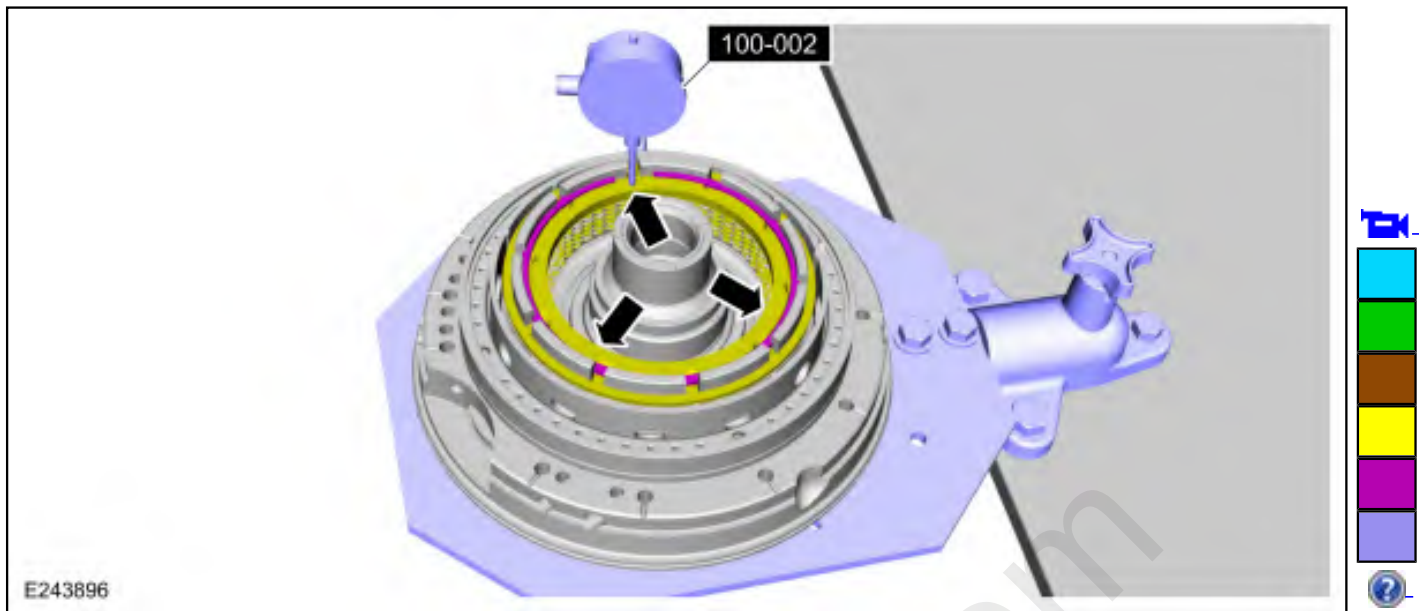
280. Assemble the special tools and position the front support assembly on the special tool.
 Use Special Service Tool: 307-662 Gauge, Clutch Pack Endplay. , 307-003 (T57L-500-B) Holding Fixture, Transmission.



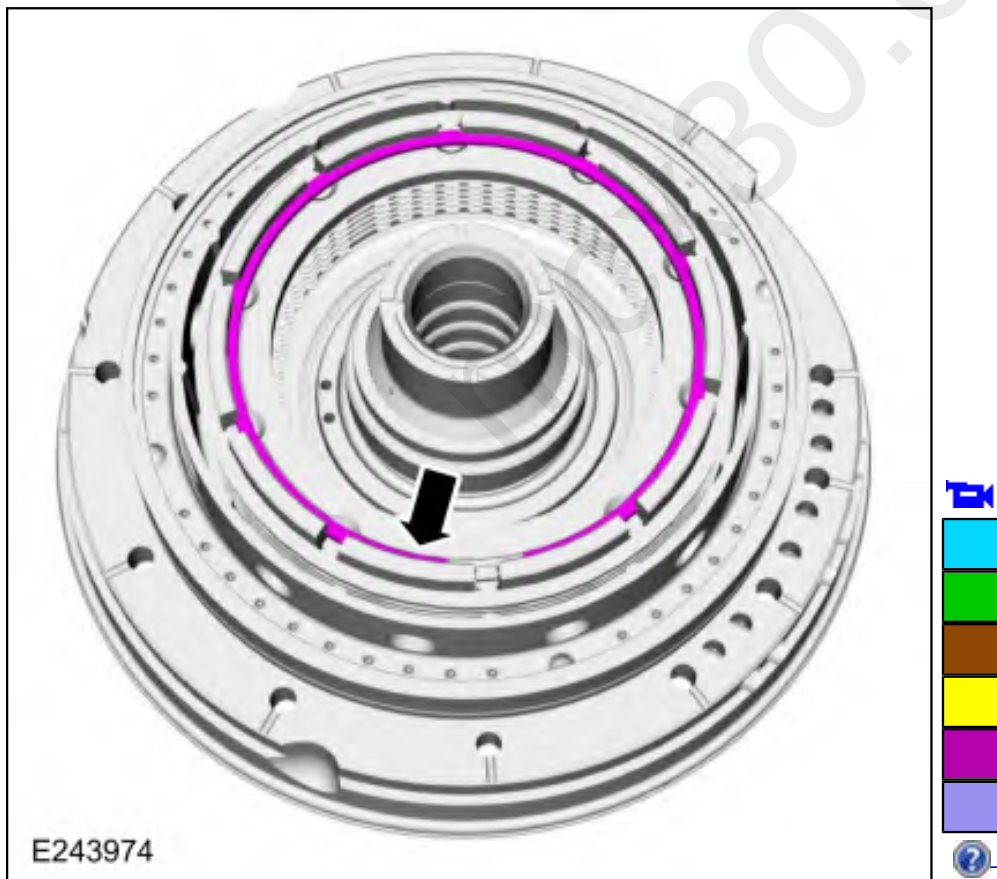
281. Using the special tool, measure the B clutch clearance. Position the plunger so it rests on the top surface of the pressure plate. Gently push down on the pressure plate to zero the dial indicator. Pull up on the pressure plate and measure and record the clutch clearance in 3 different places. Average 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 B clutch snap ring.

Refer to: [Specifications](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Specifications).

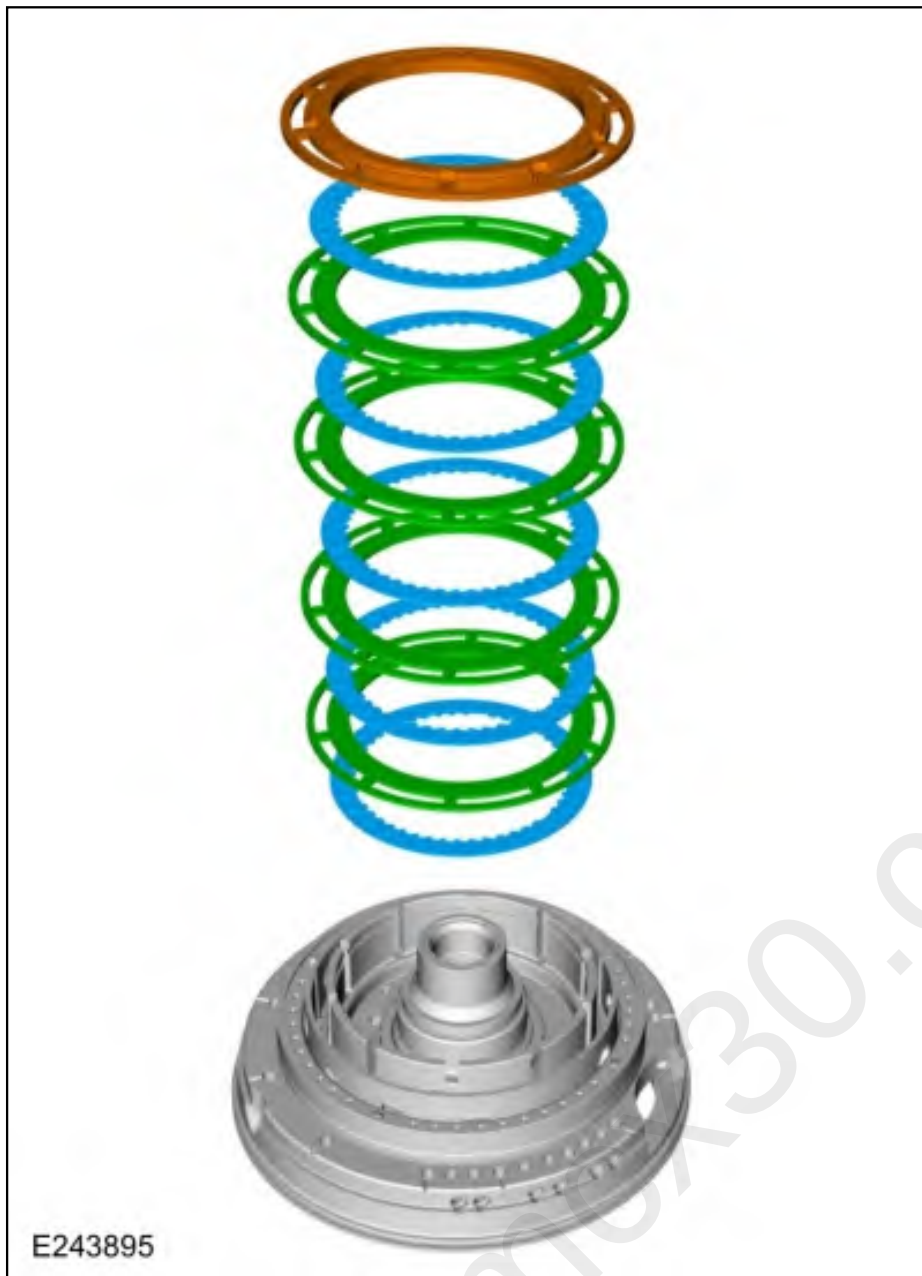
Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



282. Remove the B clutch snap ring.

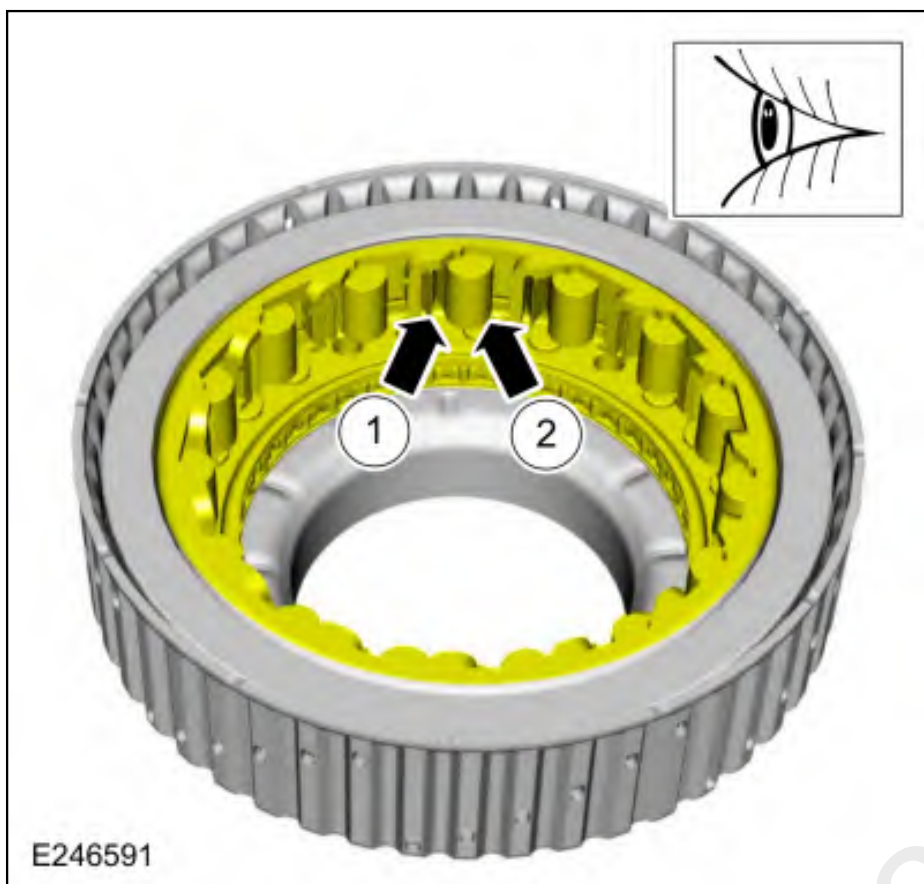


283. Remove the B clutch assembly.



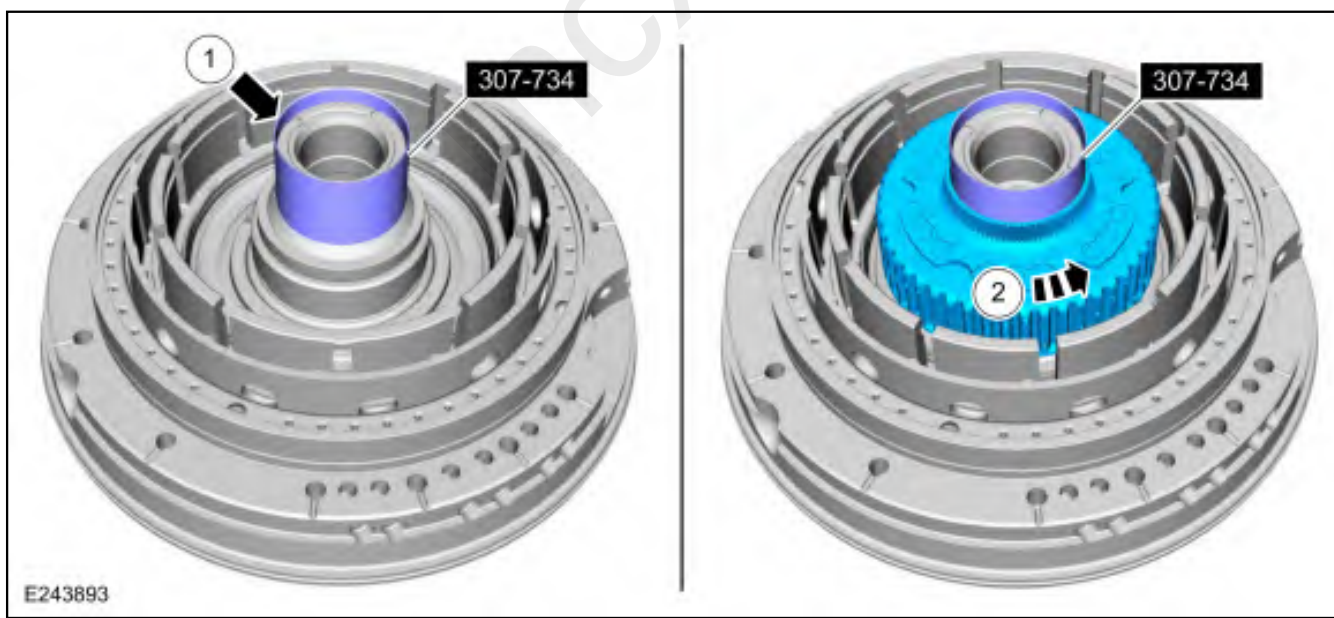
284. Verify that all the One-Way Clutch (OWC) rollers and springs are seated.

1. Springs
2. Rollers



285. **NOTE:** The One-Way Clutch (OWC) hub should rotate counter-clockwise freely when installed correctly.

1. Position the special tool on the front support.
Use Special Service Tool: 307-734 Tool, OWC Alignment.
2. With a counter-clockwise rotation gently install the One-Way Clutch (OWC) onto the front support.



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

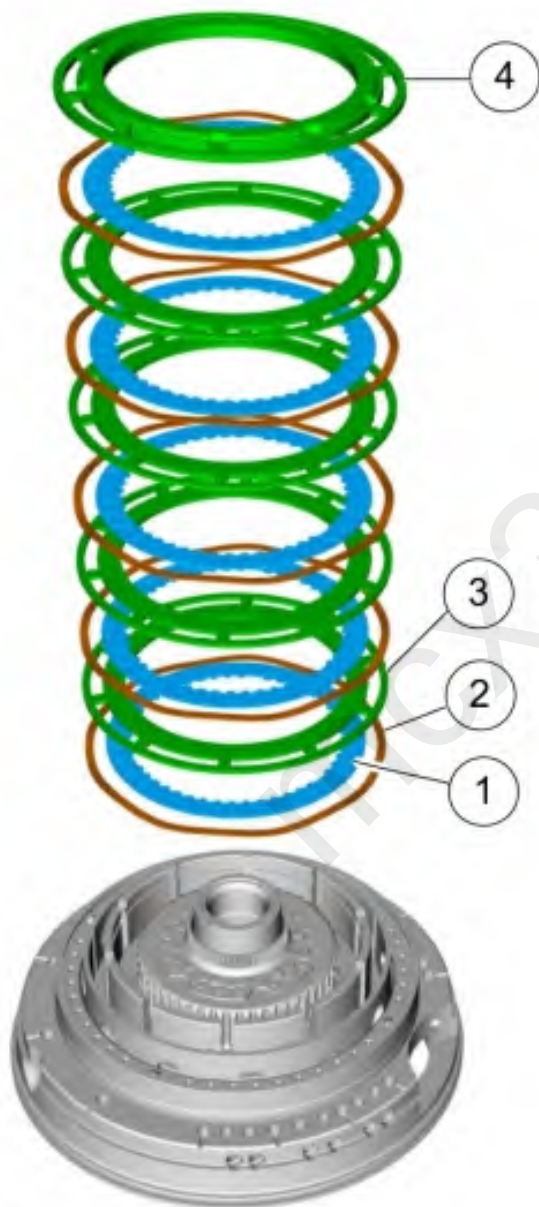
NOTE: Clutch plate quantity is model dependant based on engine displacement.

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 (MERCON® ULV) (WSS-M2C949-A)

2. B clutch separating springs
3. B clutch steel plates
4. B clutch pressure plate



E243975

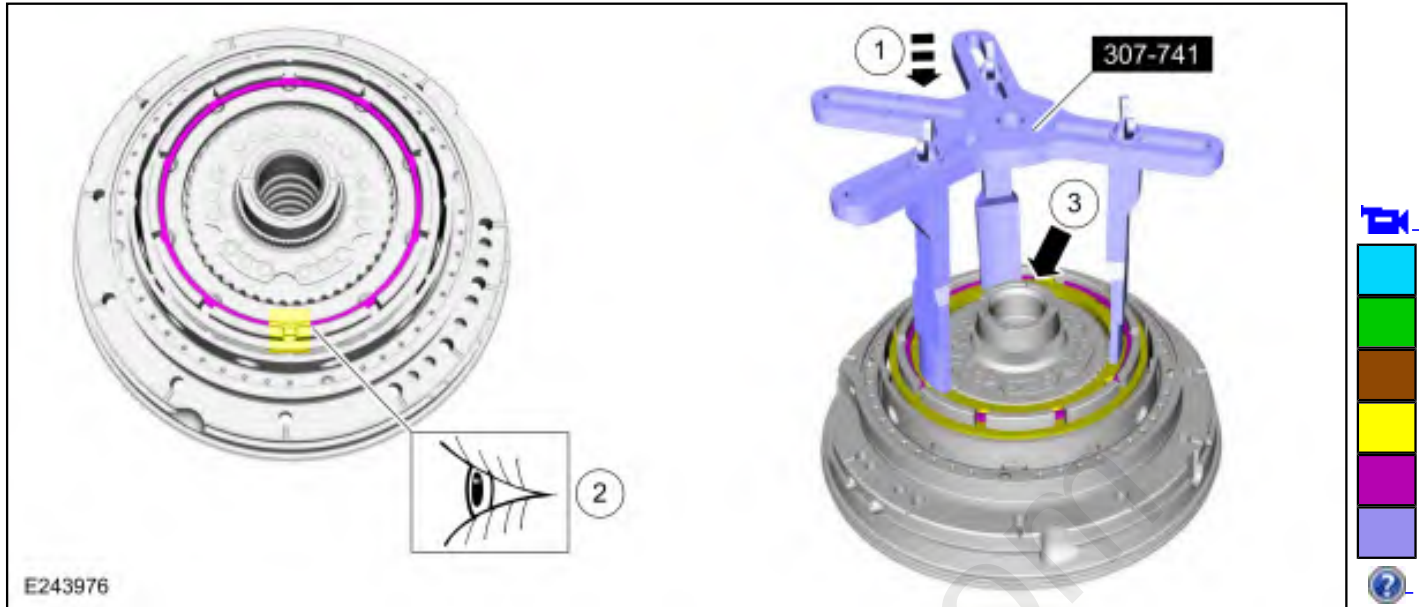
287.

Using the special tool, remove the B clutch snap ring.

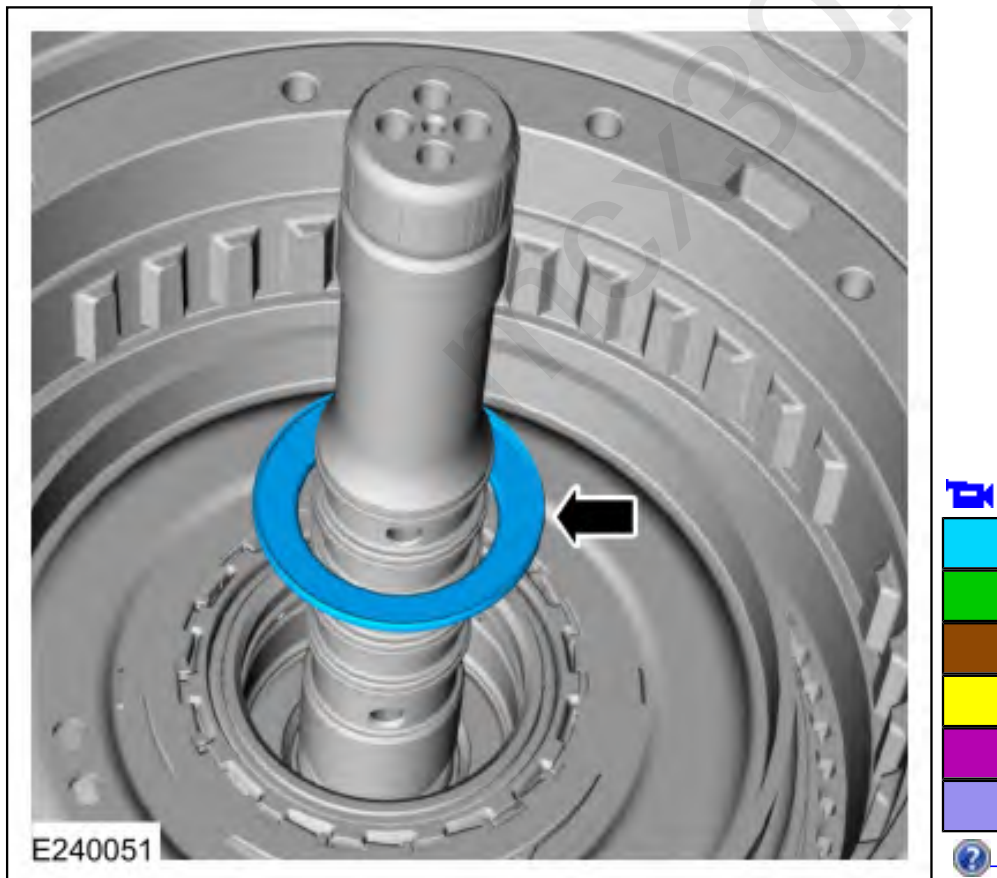
1. Using the special tools and a press, compress the B clutch assembly.
Use Special Service Tool: 307-741 Spring Compressor, F Clutch.

Use the General Equipment: Hydraulic Press

2. **NOTE:** The B clutch snap ring ends are positioned in the opening of the B clutch pressure plate that does not have a half-moon indent.
3. Install the B clutch snap ring in the correct location.

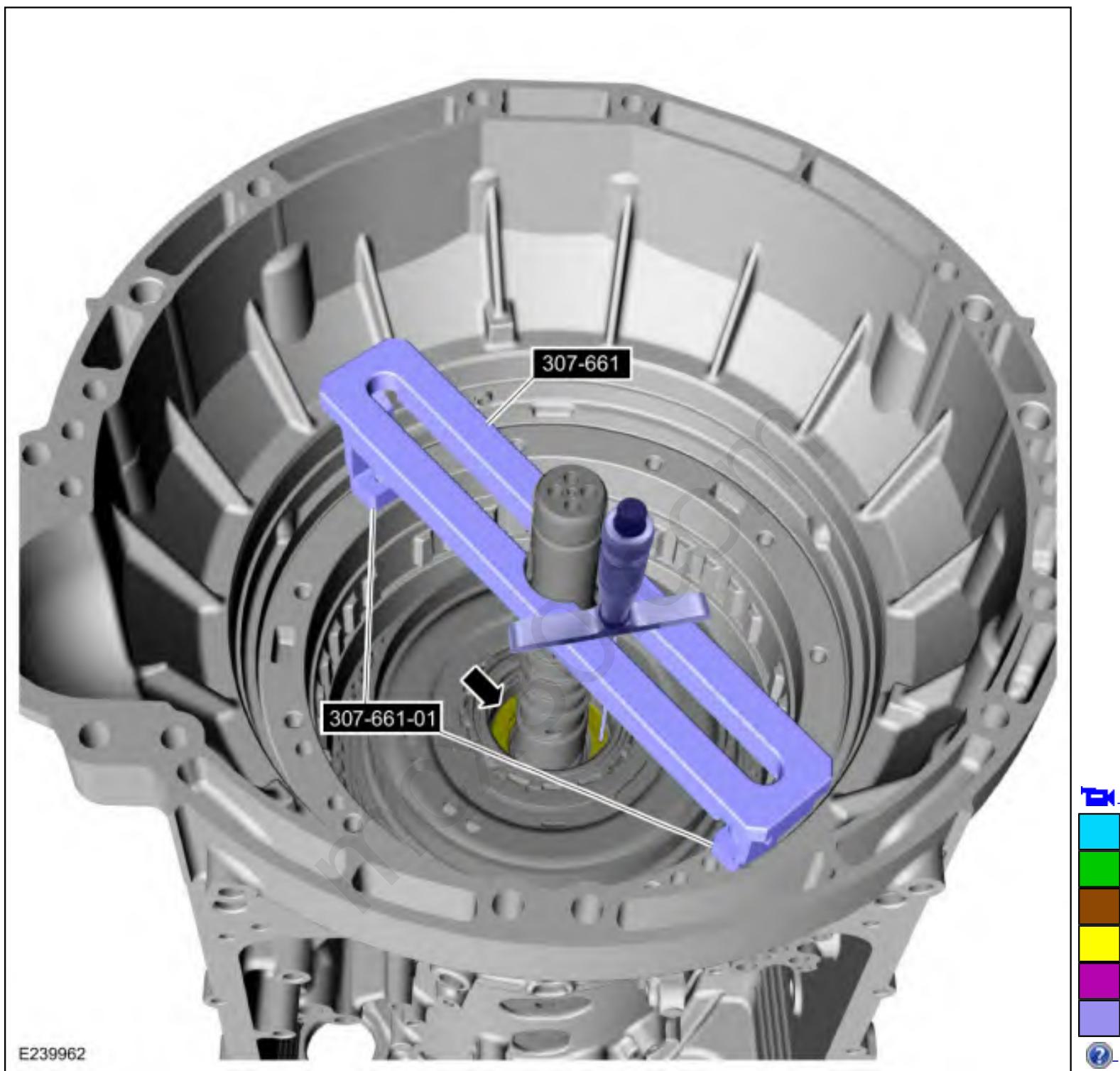


288. Install the (T3) thrust bearing.

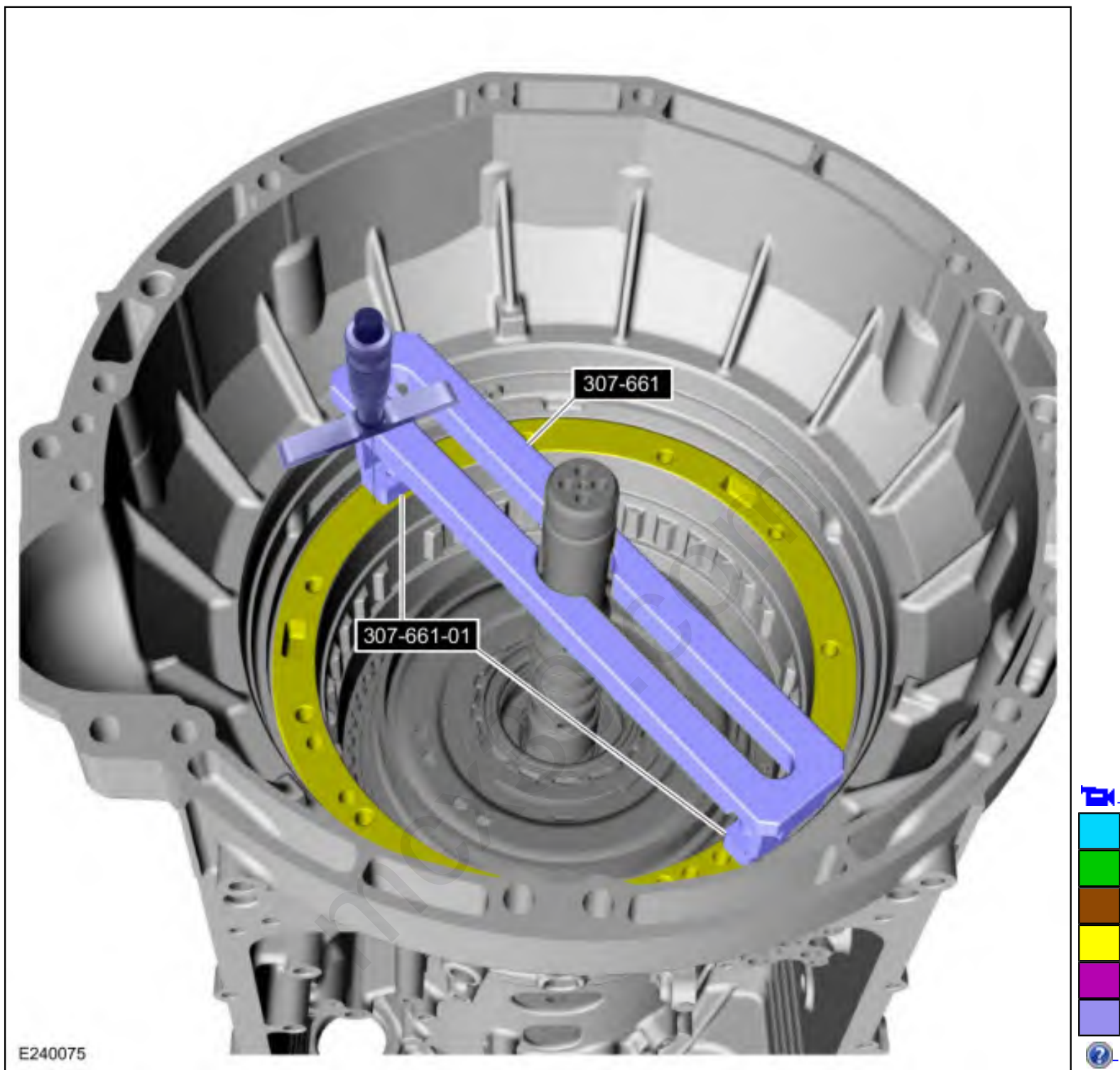


289. Using the special tools and a depth gauge, measure the distance from the top of the special tool to top of the (T3) thrust bearing in 2 different places. Average the measurements. Record this as measurement A.

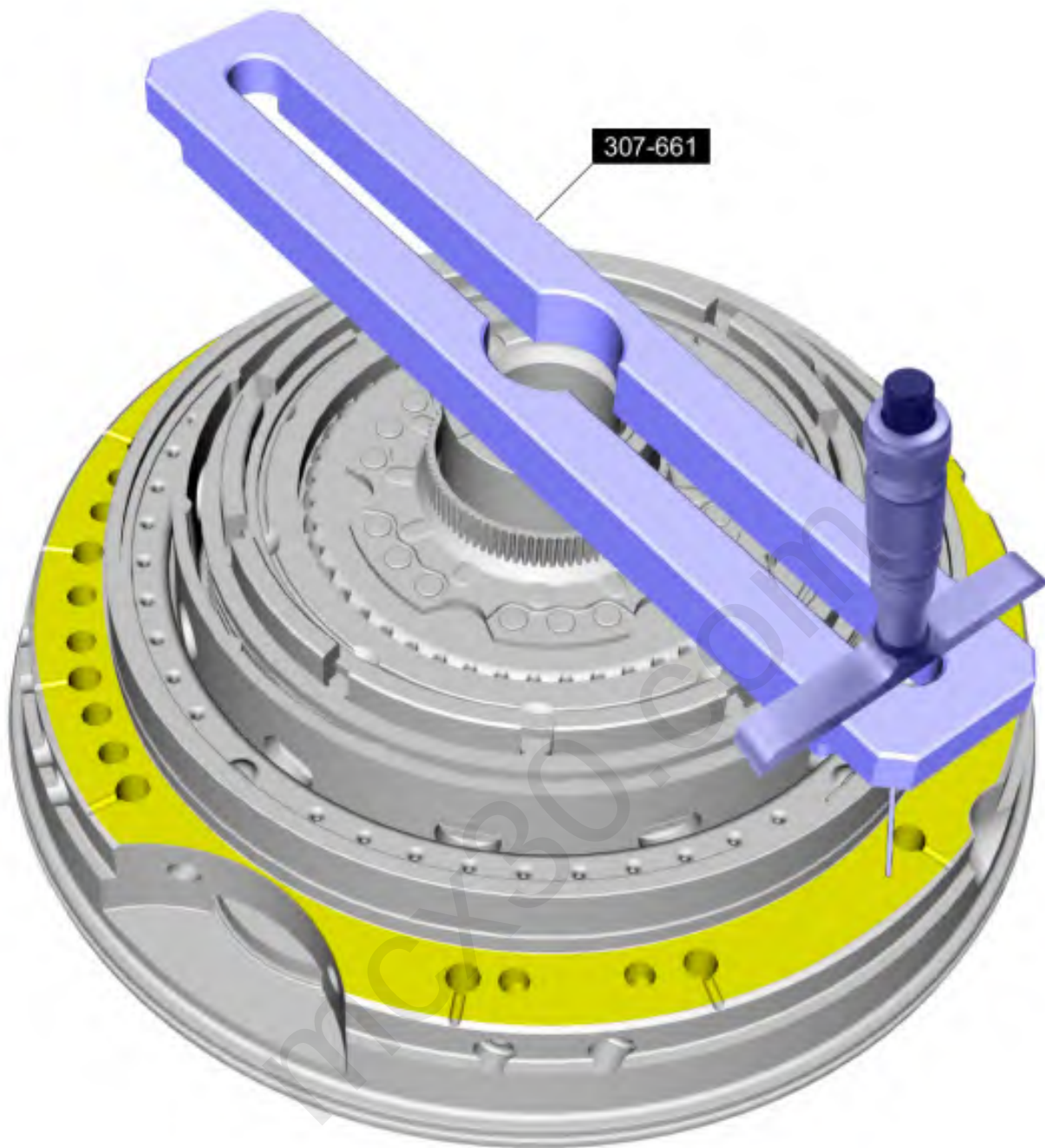
Use Special Service Tool: 307-661 Gauge, End Play.



290. Using the special tools and a depth gauge, measure the distance from the top of the special tool to front support mating surface in 2 different places. Average the measurements. Record this as measurement B.
Use Special Service Tool: 307-661 Gauge, End Play.

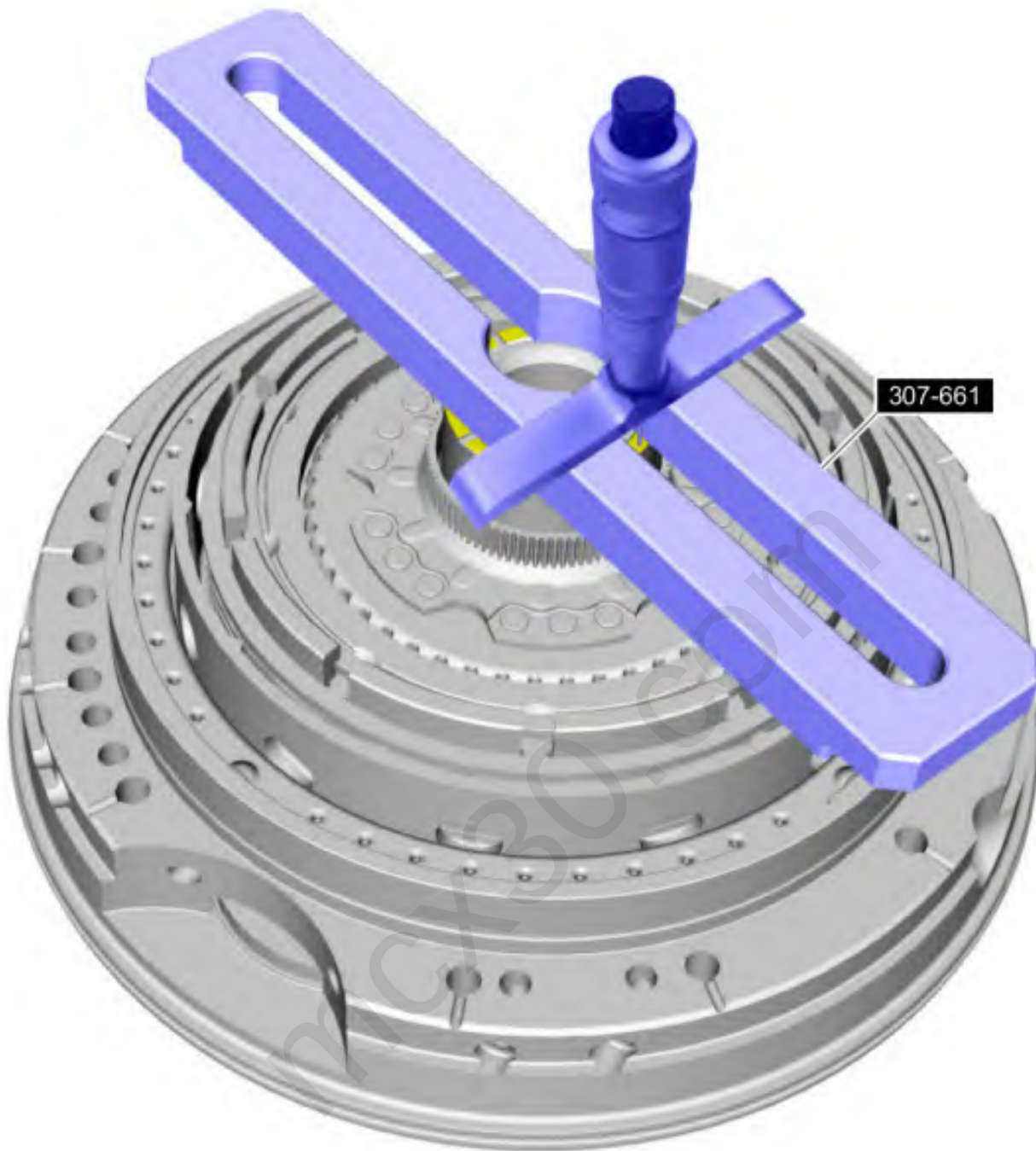


291. Using the special tool and a depth gauge, measure the distance from the top of the special tool to the transmission deck mating surface in 2 different places. Average the measurements. Record this measurement as measurement D. Use Special Service Tool: 307-661 Gauge, End Play.



E240034

292. Using the special tool and a depth gauge, measure the distance from the top of the special tool to (T3) thrust bearing surface in 2 different places. Average the measurements. Record this as measurement E.
Use Special Service Tool: 307-661 Gauge, End Play.



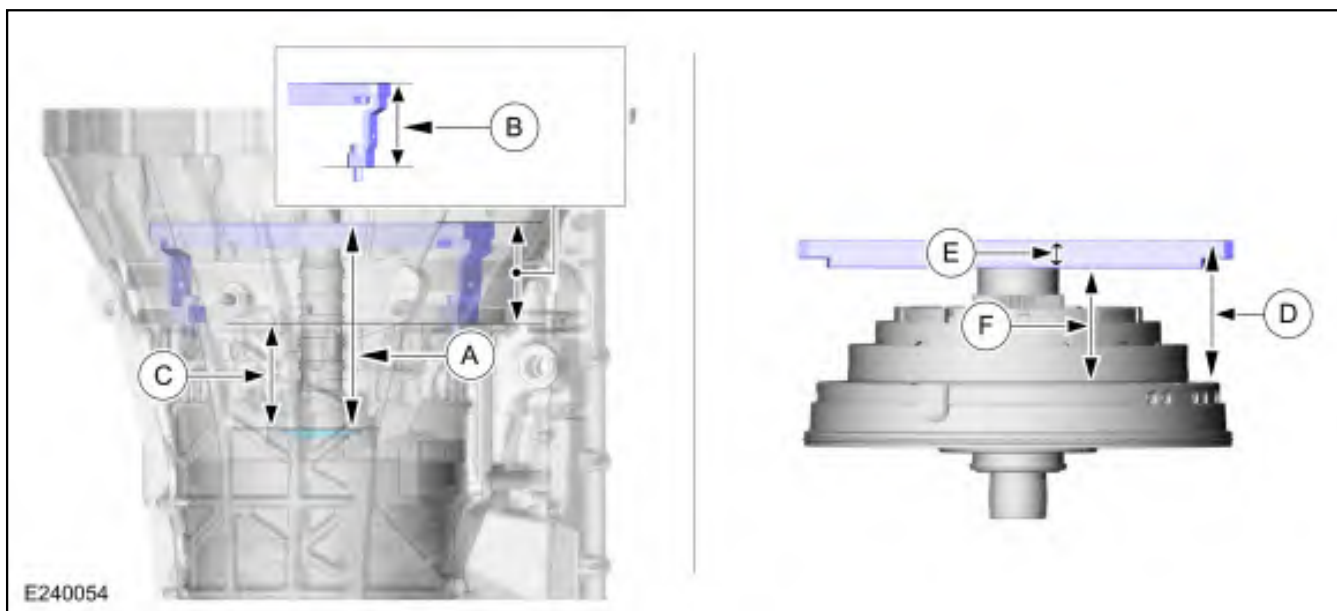
E240076



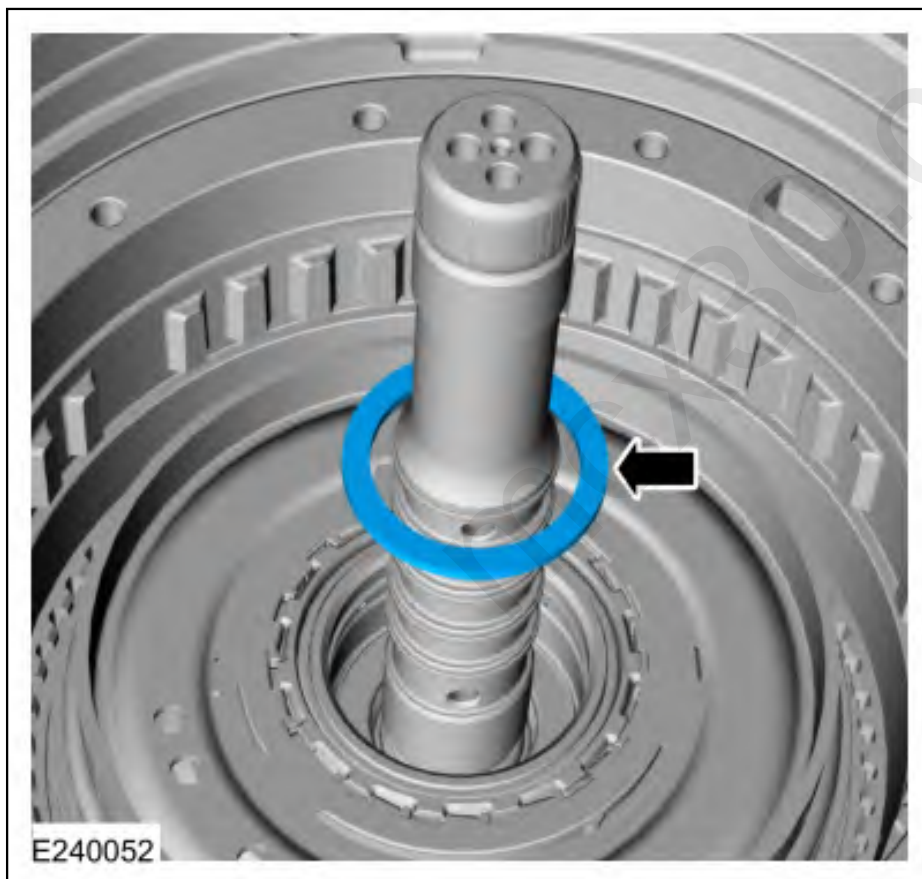
293. **NOTE:** Recorded measurements B and E are included to compensate for the difference in height of the special tool.

Calculate the correct shim thickness. Subtract measurement B from measurement A and record this as measurement C. Subtract measurement E from measurement D and record this as measurement F. Subtract measurement F from measurement C 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.

Refer to: [Specifications](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Specifications).

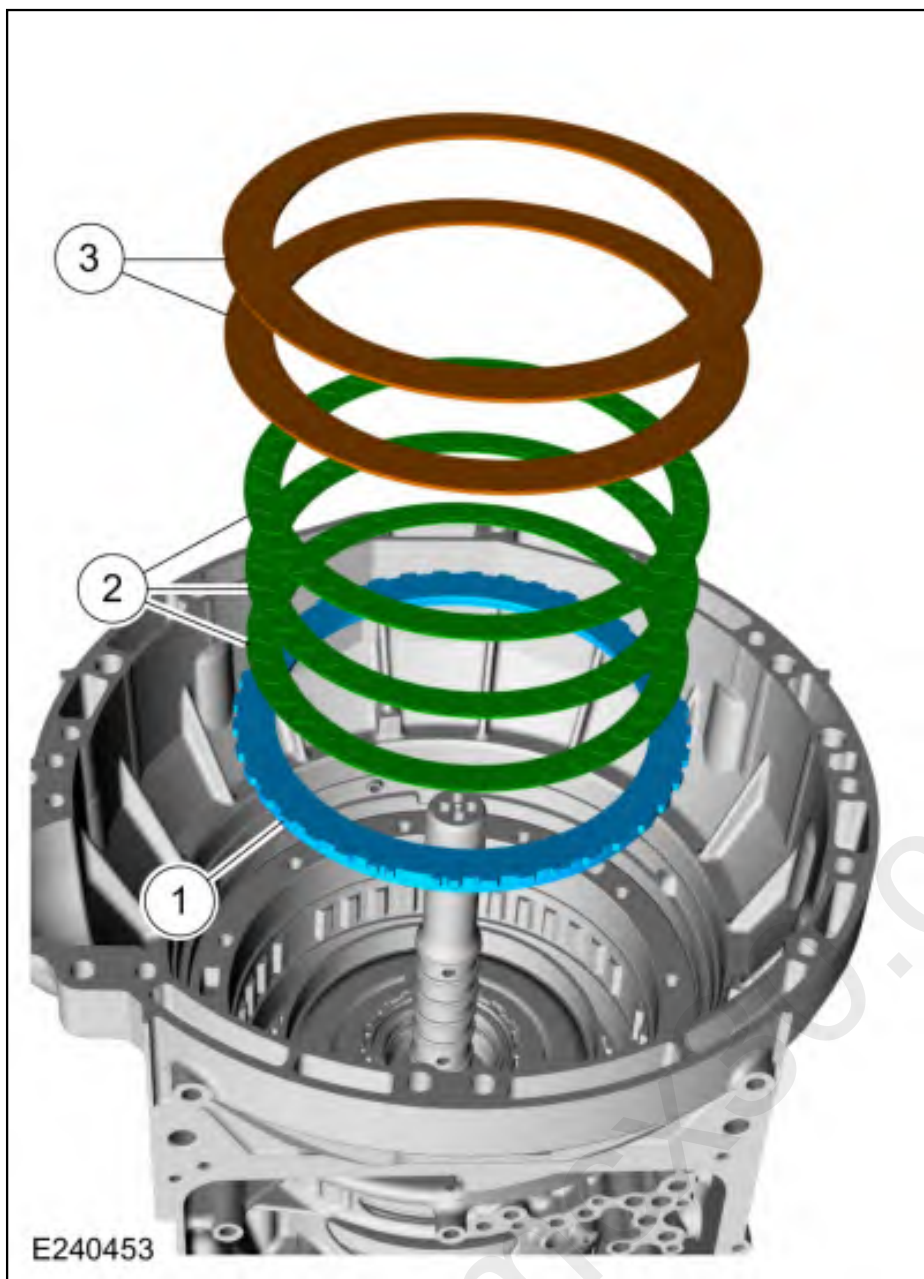


294. Install the selective shim.

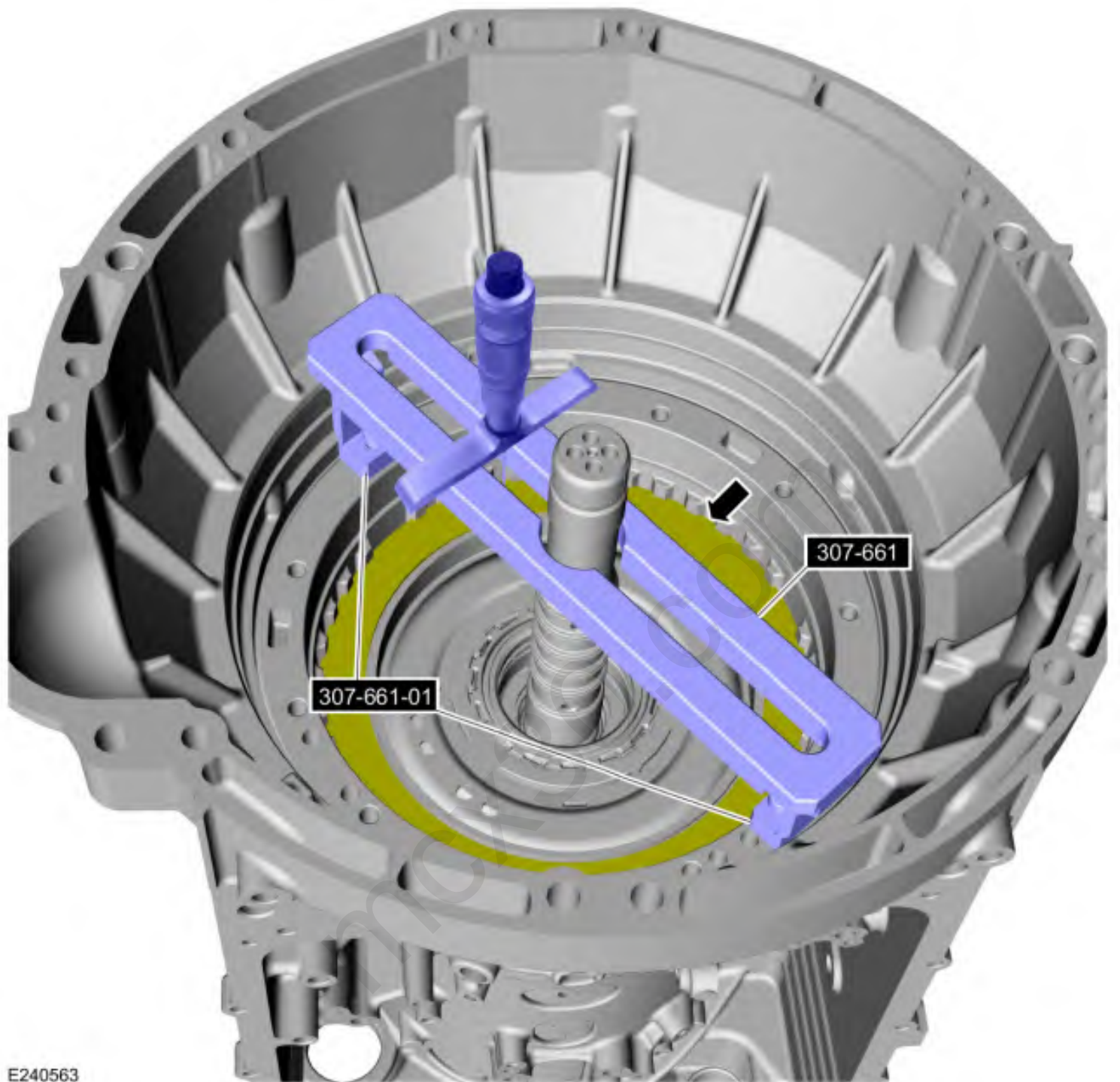


295. Temporarily install the A clutch into the transmission out of order to measure the A clutch clearance.

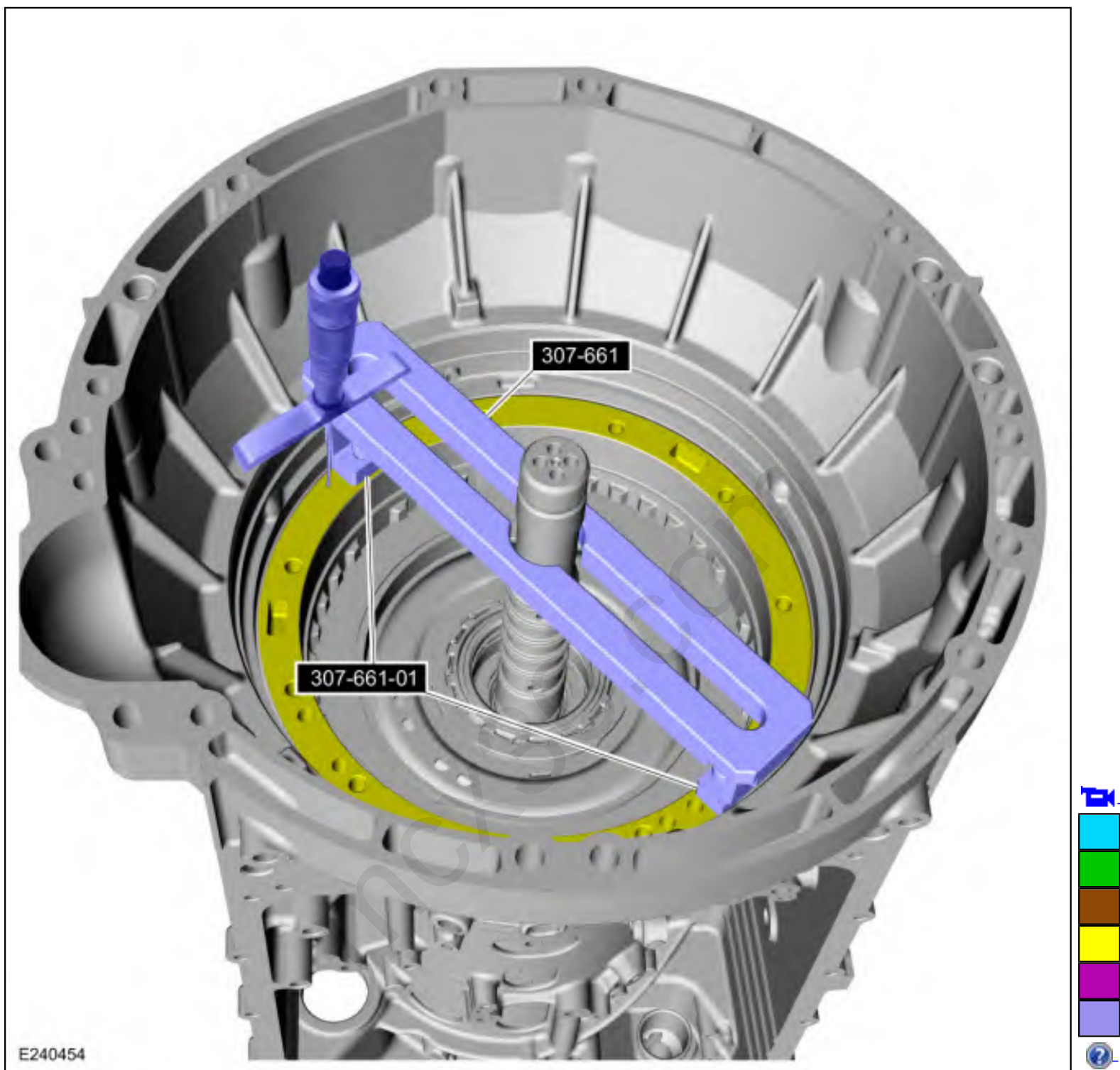
1. Install the pressure plate.
2. Install the friction plates.
3. Install the steel plates.



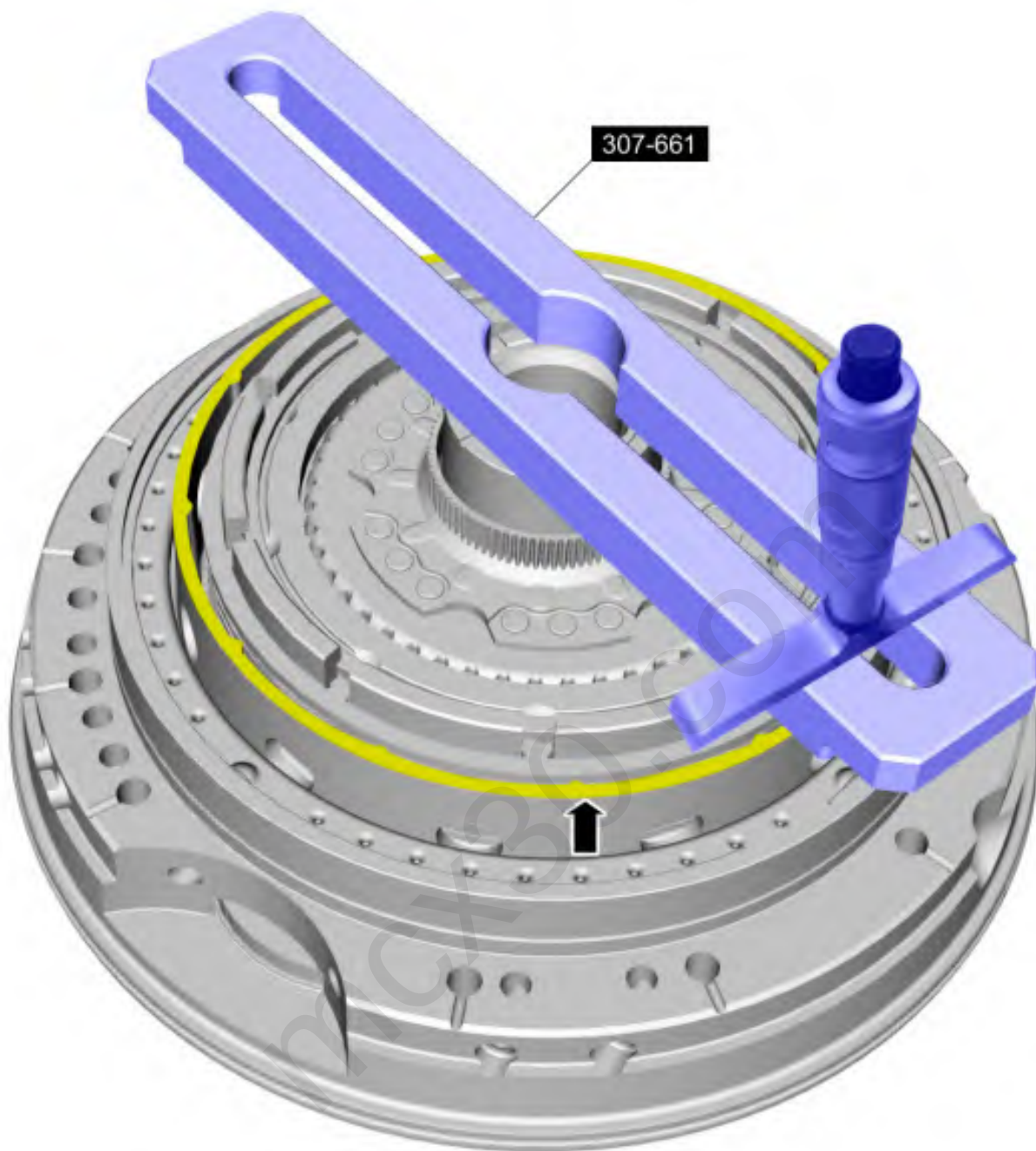
296. Using the special tools and a depth gauge, measure the distance from the top of the special tool to top of the A clutch in 3 different places. Average the measurements. Record this as measurement A.
Use Special Service Tool: 307-661 Gauge, End Play.



297. Using the special tools and a depth gauge, measure the distance from the top of the special tool to front support mating surface in 2 different places. Average the measurements. Record this as measurement B.
Use Special Service Tool: 307-661 Gauge, End Play.



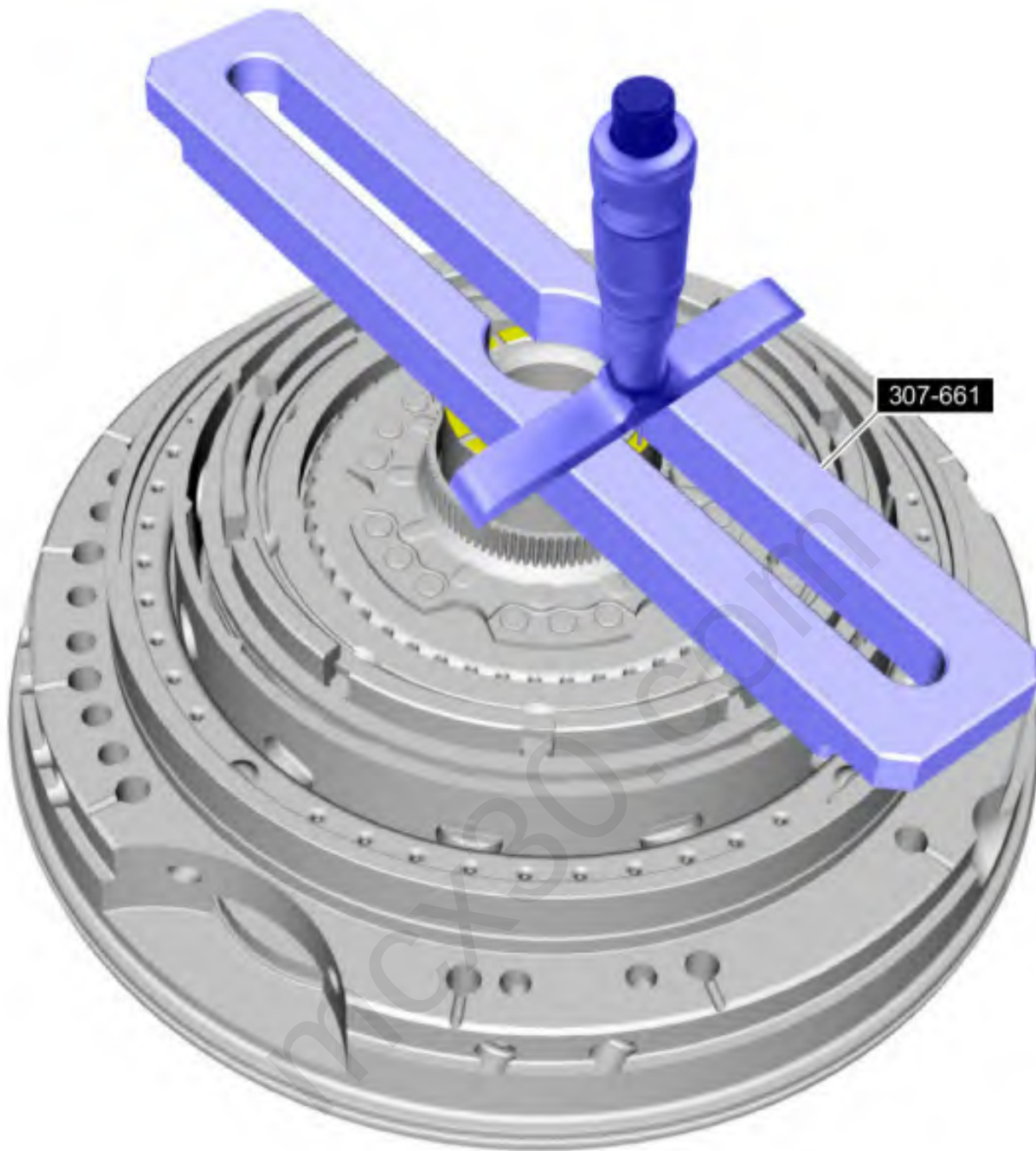
298. Using the special tool and a depth gauge, measure the distance from the top of the special tool to the A clutch piston surface in 3 different places. Average the measurements. Record this measurement as measurement D. Use Special Service Tool: 307-661 Gauge, End Play.



E240412



299. Using a the special tool and a depth gauge, measure the distance from the top of the special tool to (T3) thrust bearing surface in 2 different places. Average the measurements. Record this as measurement E.
Use Special Service Tool: 307-661 Gauge, End Play.



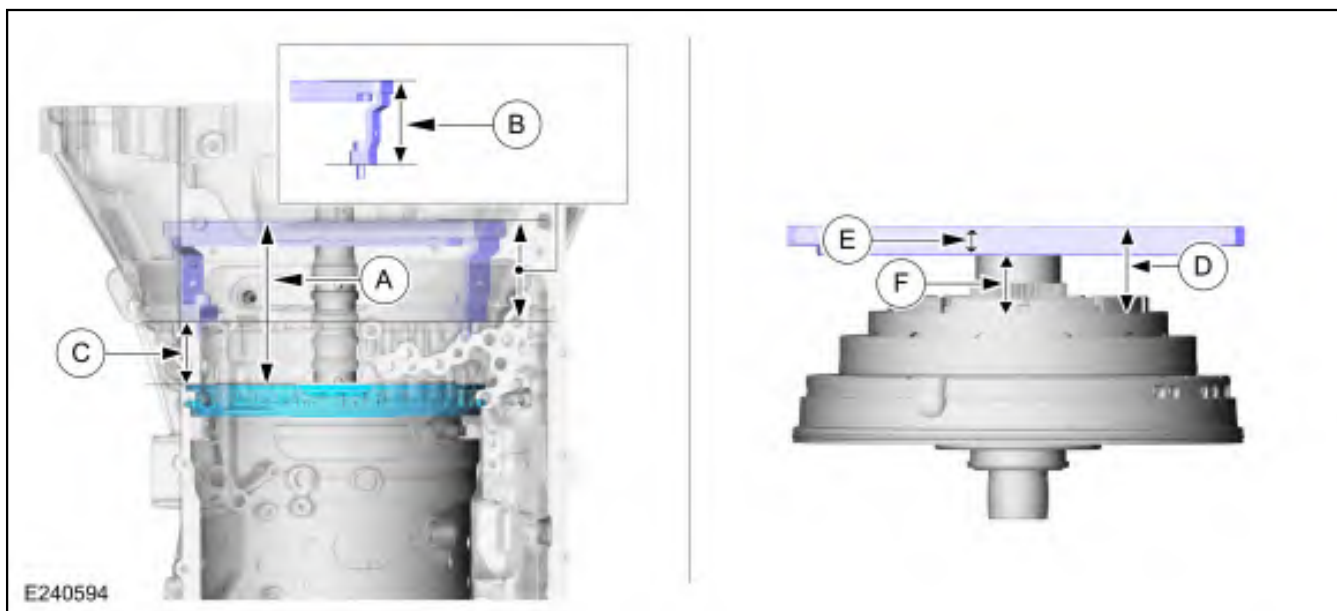
E240076



300. **NOTE:** Recorded measurements B and E are included to compensate for the difference in height of the special tool.

Calculate the correct apply plate thickness. Subtract measurement B from measurement A and record this as measurement C. Subtract measurement E from measurement D and record this as measurement F. Subtract measurement F from measurement C to get the A clutch clearance specification. Using the A Clutch Selective Apply Plate Chart in specifications, select the correct apply plate.

Refer to: [Specifications](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Specifications).



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

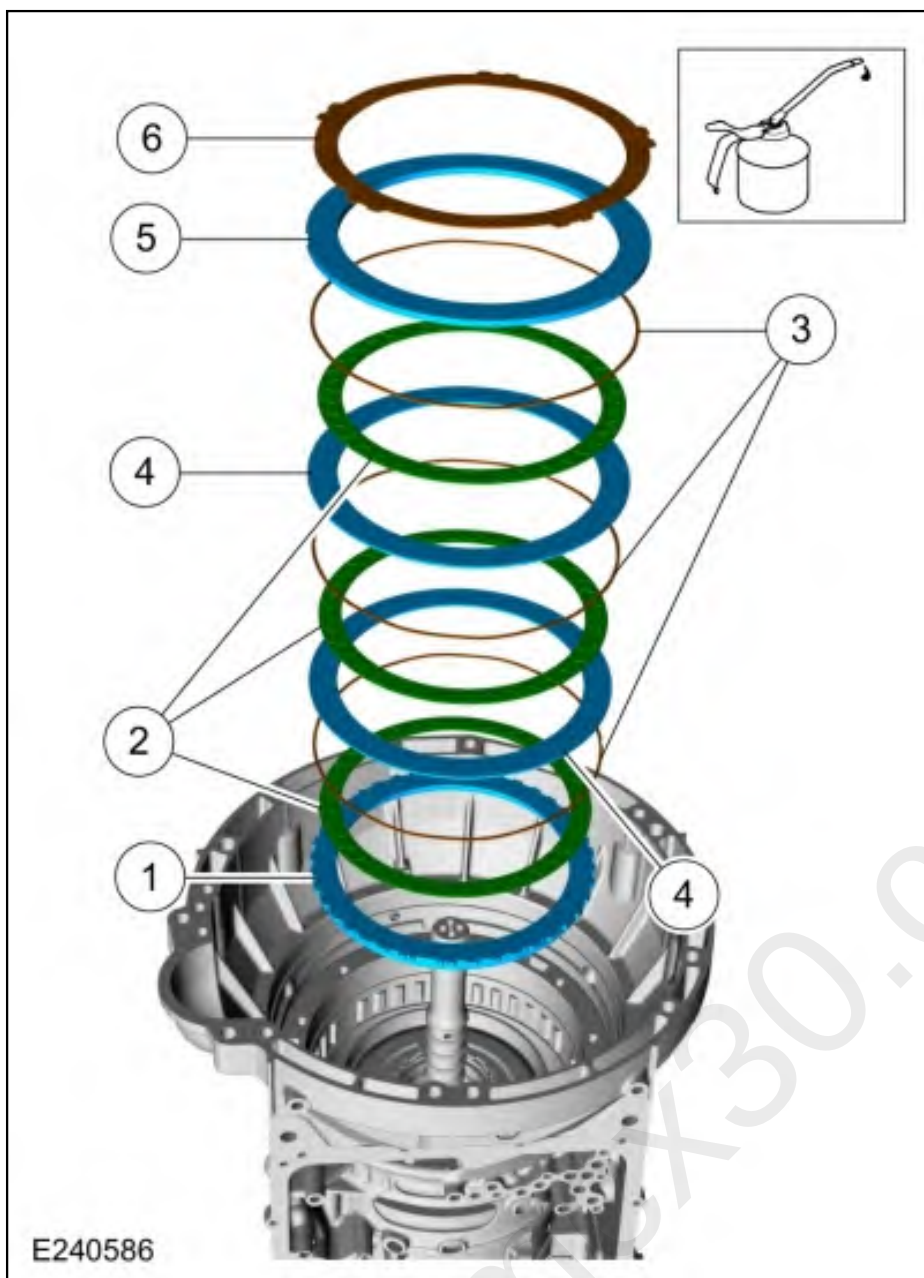
NOTE: Clutch plate quantity is model dependant based on engine displacement.

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

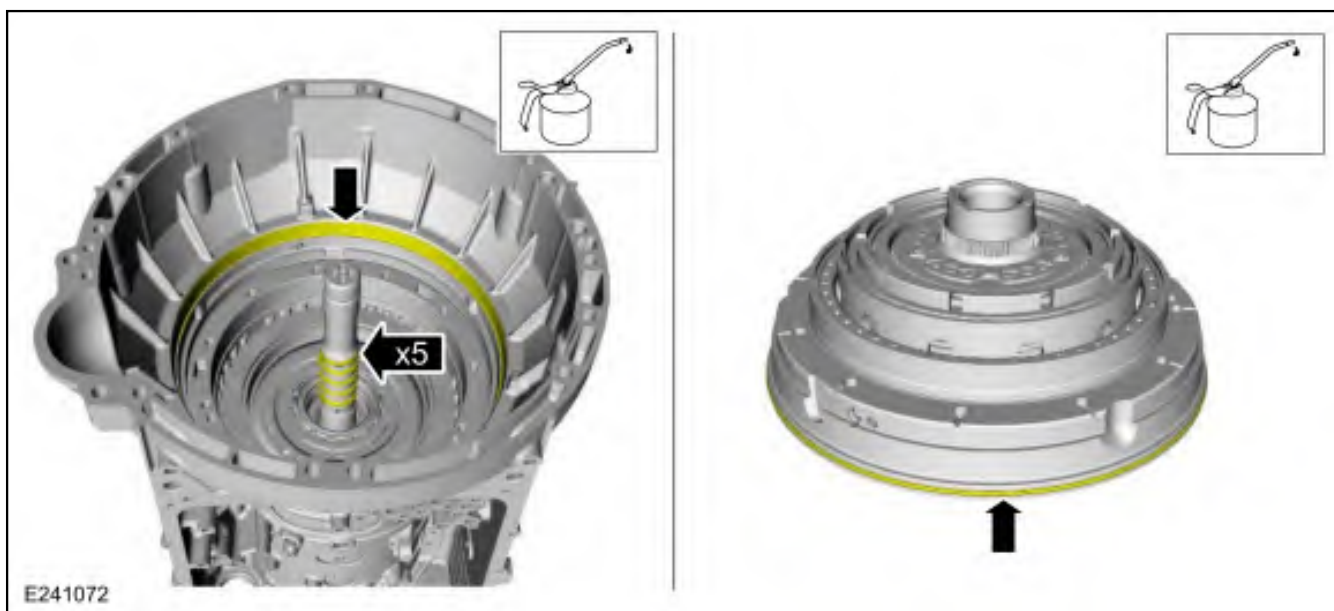
1. Pressure plate
2. Friction plates

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

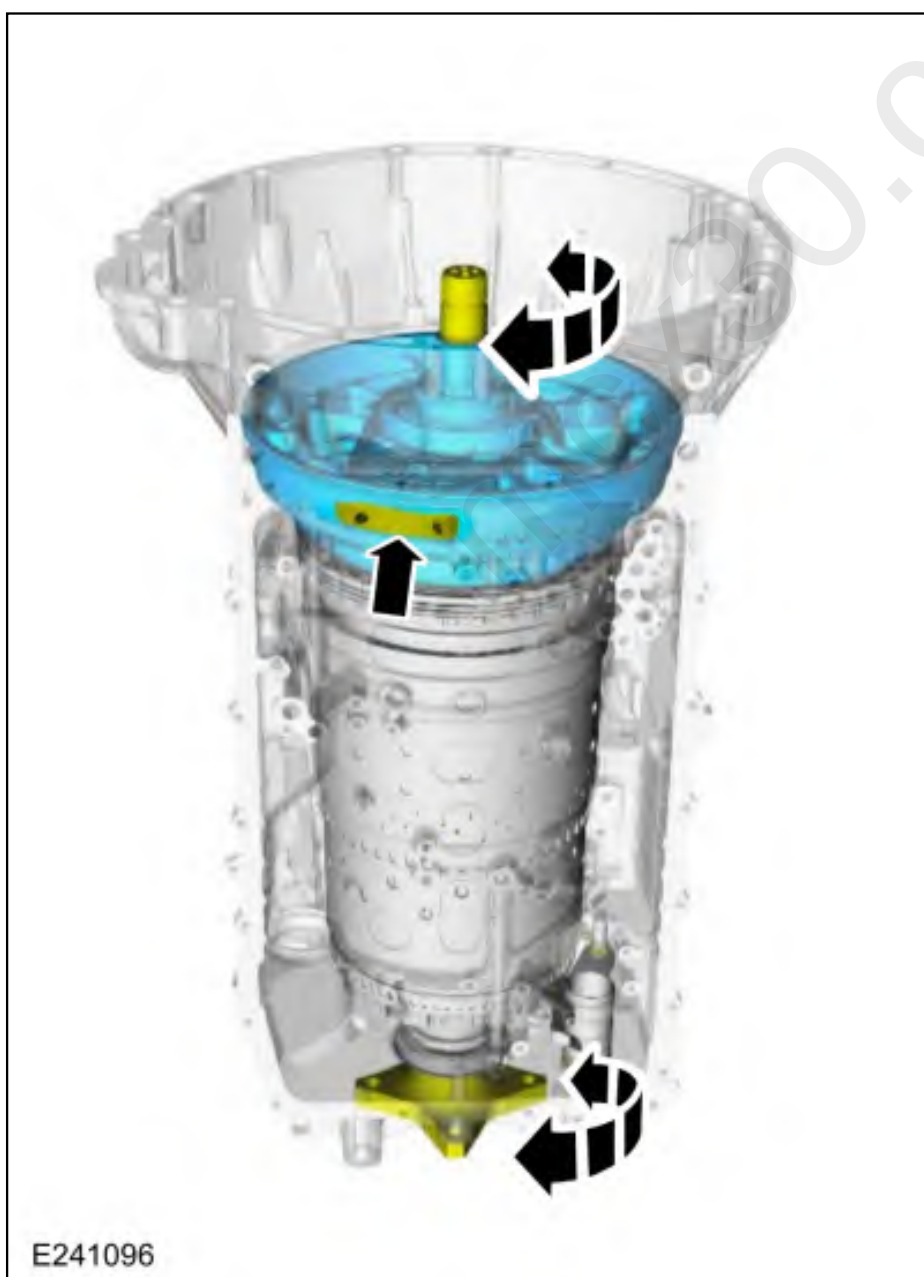
3. Separator springs
4. Steel plates
5. Apply plate
6. Wave spring



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



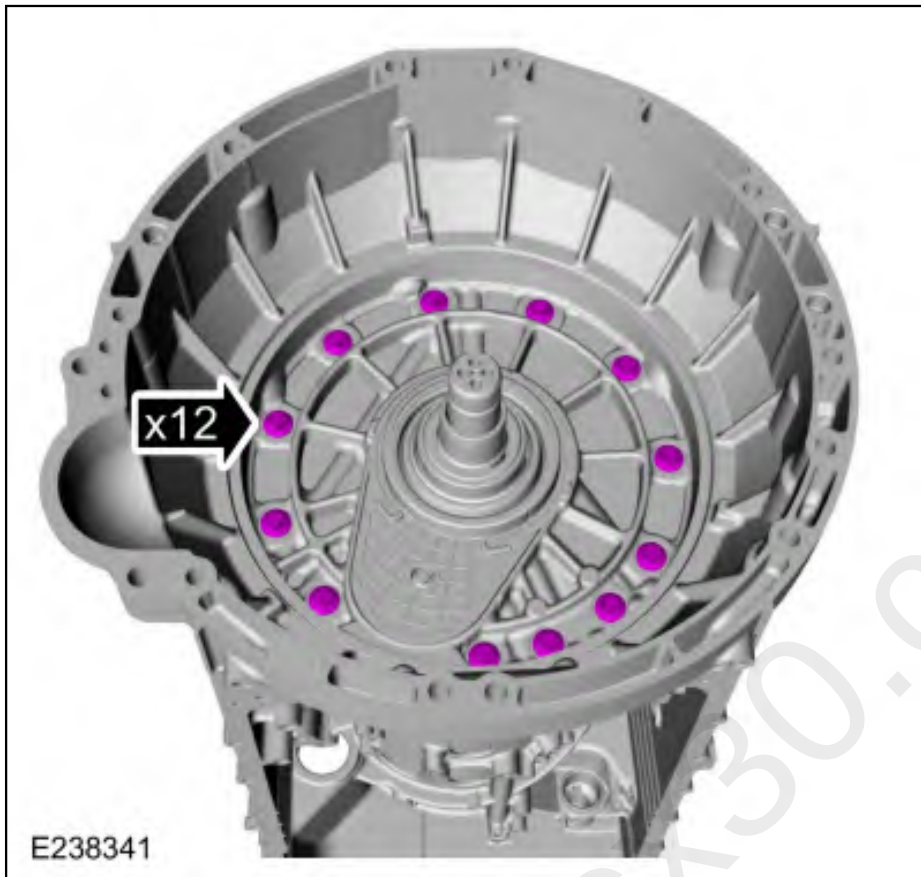
303. Install the front support into the transmission case. Align the pump gear to the pump drive gear pocket area. Rotate the input and output shafts to align the one-way clutch splines with the No. 1 sun gear.



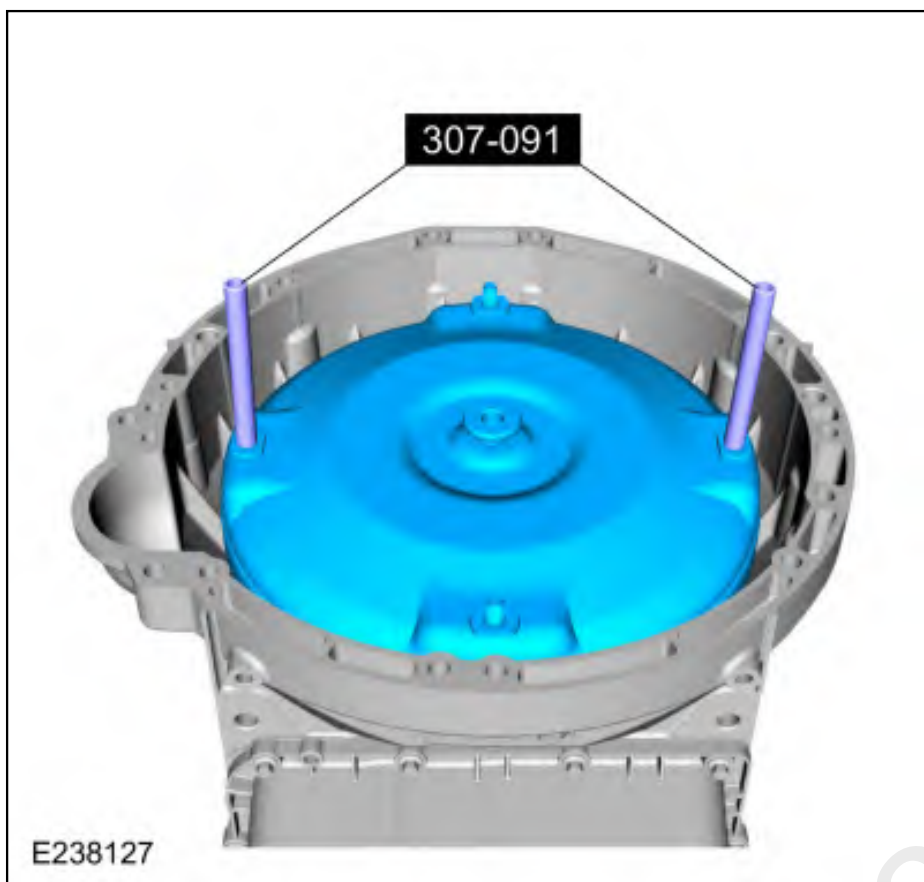
E241096



304. Install the new front support bolts. Tighten the bolts in a crisscross pattern.
Torque: 20 lb.ft (27 Nm)



305. Using the special tool, install the torque converter.
Use Special Service Tool: 307-091 Handle, Torque Converter.

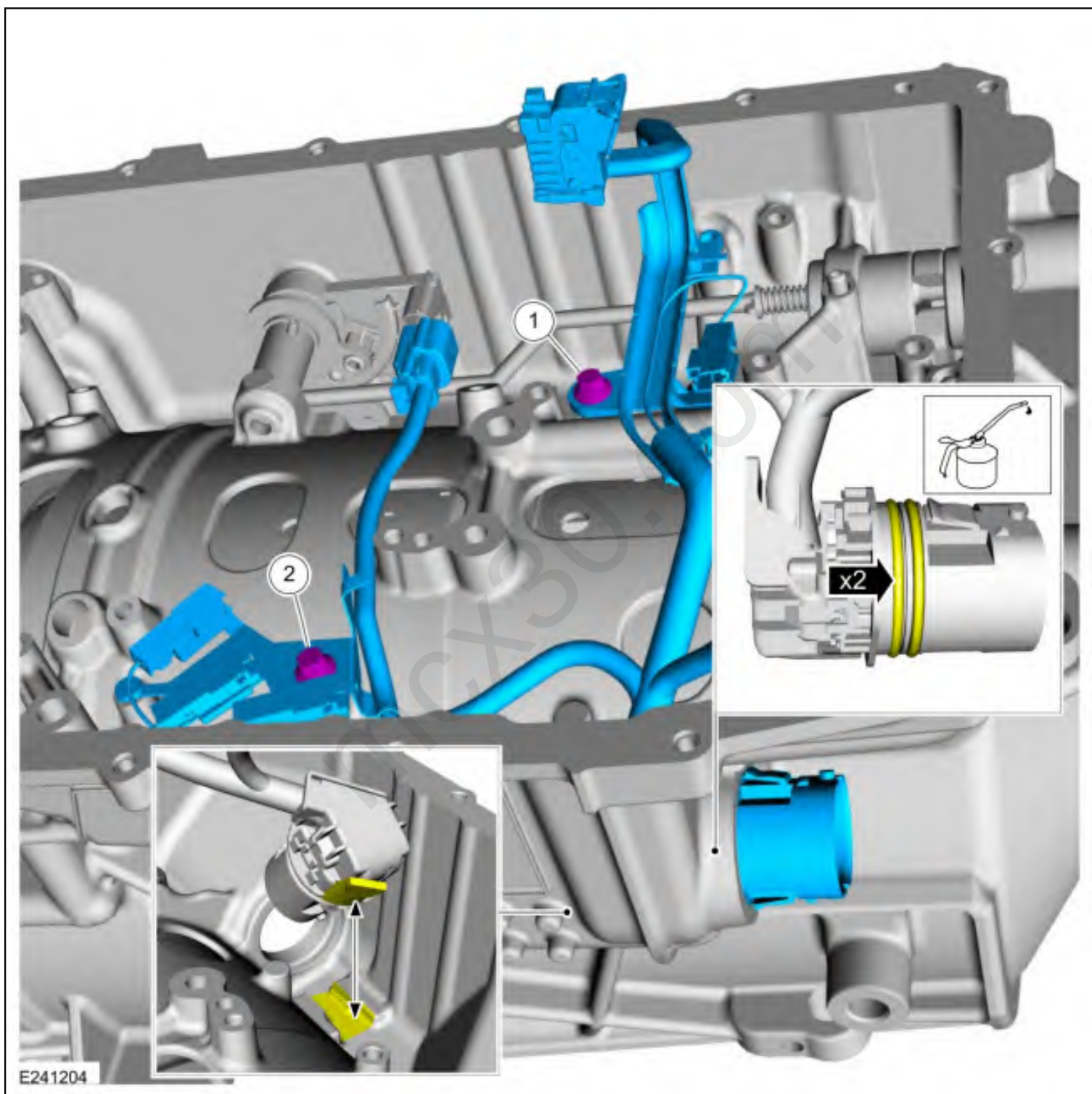


306. Install the special tool to hold the torque converter.
Use Special Service Tool: 307-346 (T97T-7902-A) Retainer, Torque Converter.

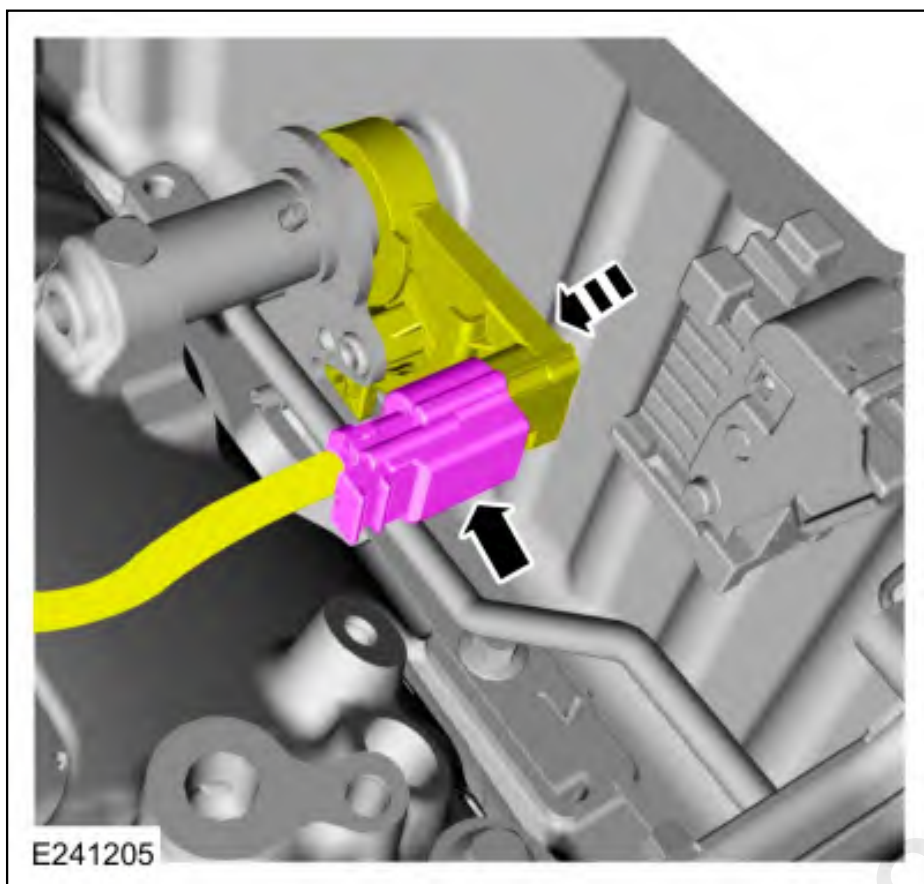


307. Install the wiring harness. Lubricate the O-ring seals with petroleum jelly. Align the tab on the electrical connector with the indentation in the transmission case and install the main electrical connector in the transmission case. Align the wiring harness and install the bolts.

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

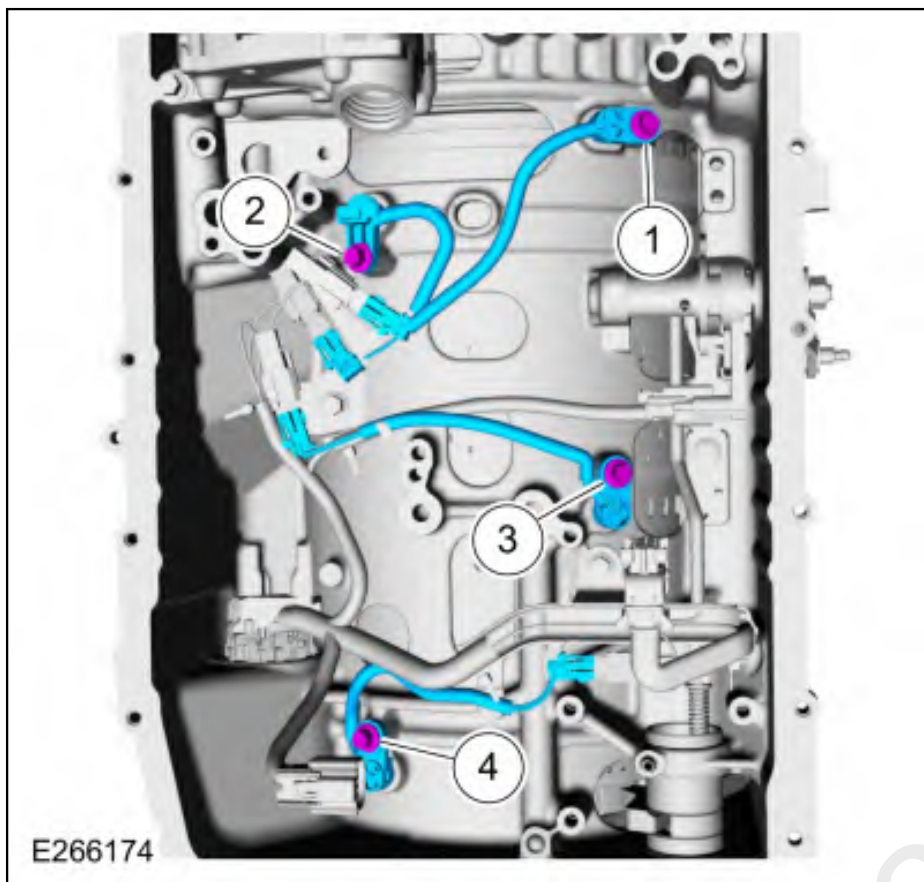


308. Support the opposite side of the TR sensor and connect the electrical connector.



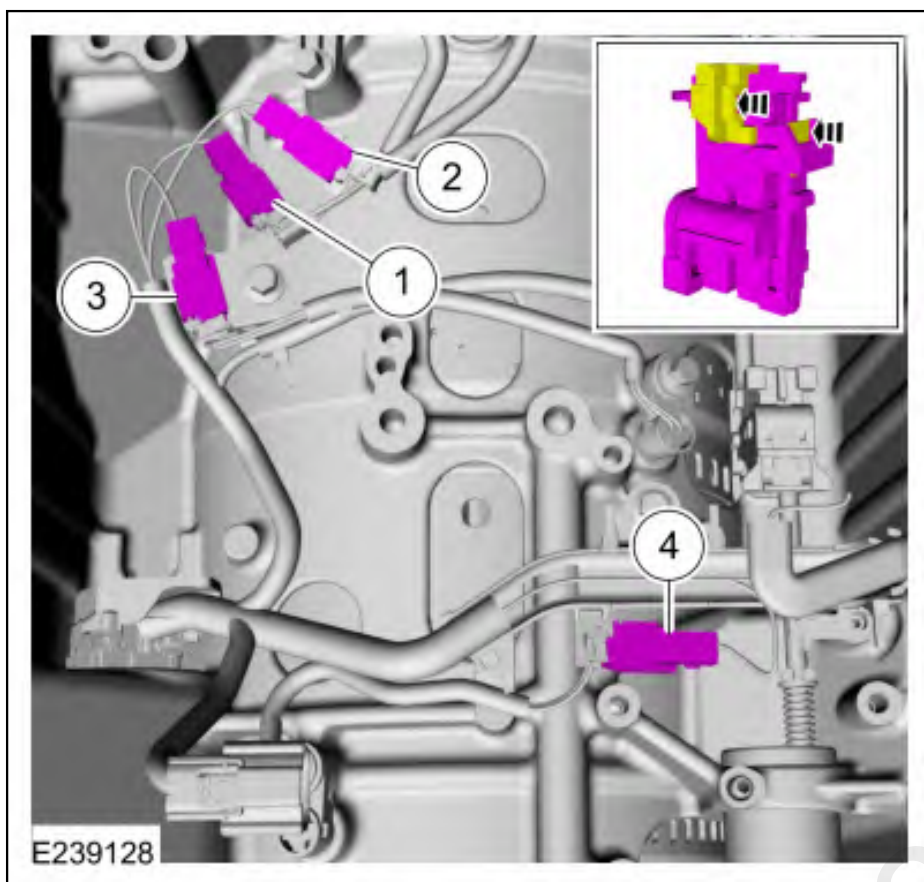
309. Install the speed sensors.

1. Intermediate Speed Sensor A (ISSA)
2. TSS sensor
3. Intermediate Speed Sensor B (ISSB)
4. OSS sensor
 - *Torque:* 62 lb.in (7 Nm)

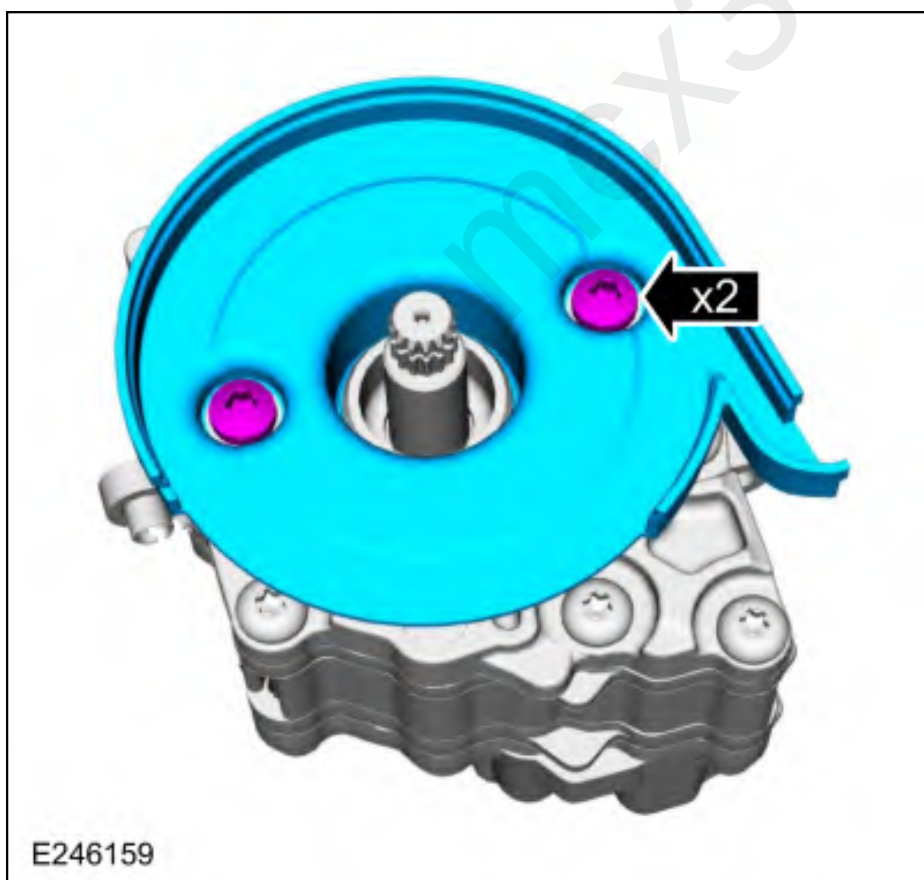


310. Connect and lock the speed sensors.

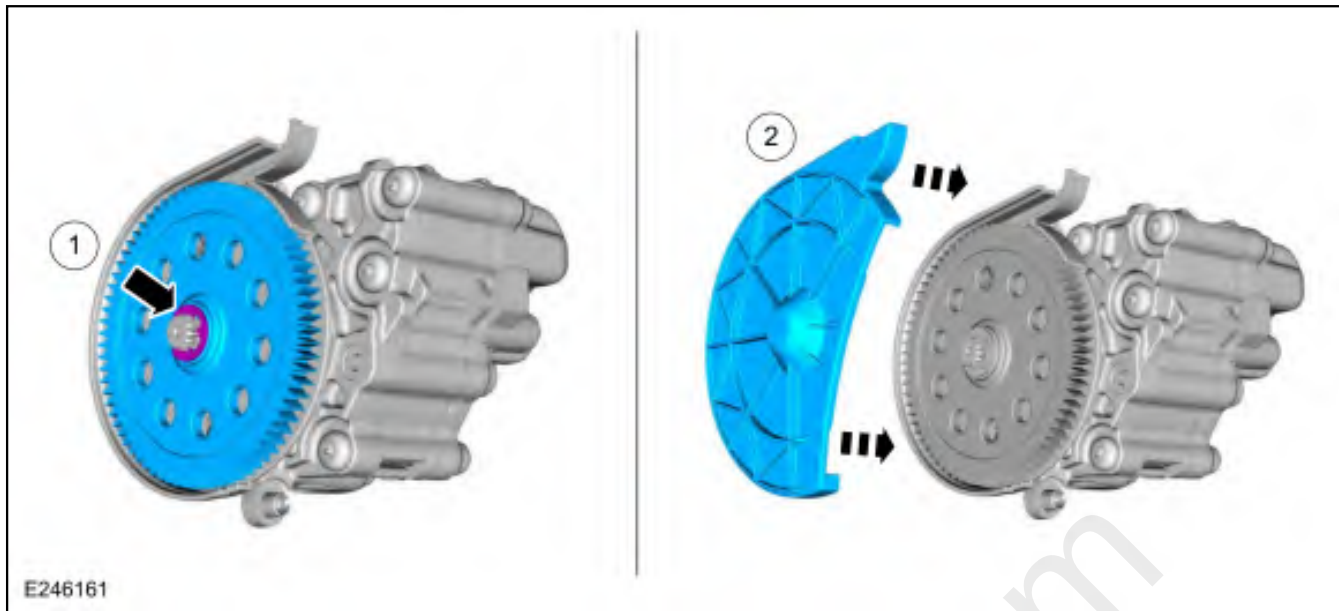
1. Intermediate Speed Sensor A (ISSA)
2. TSS sensor
3. Intermediate Speed Sensor B (ISSB)
4. OSS sensor



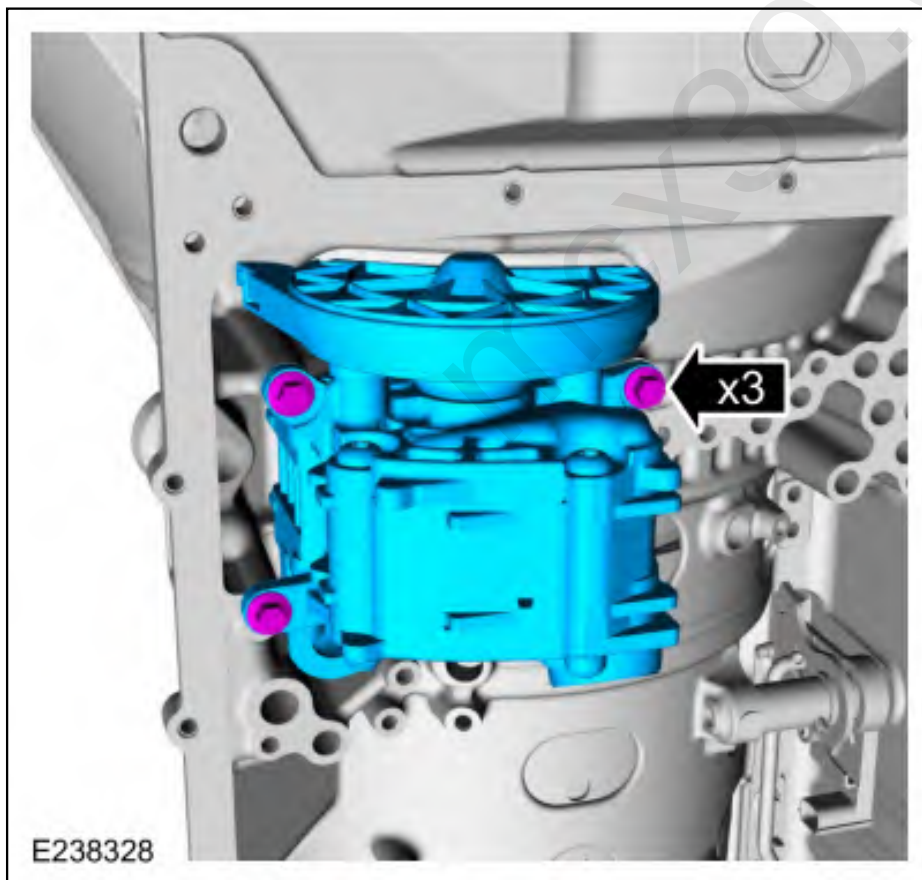
311. If removed, install the transmission fluid pump driven gear inner cover and the bolts.
Torque: 115 lb.in (13 Nm)



1. If removed, install the transmission fluid pump driven gear and the retaining ring.
2. Install the transmission fluid pump driven gear outer cover.



313. Install the transmission fluid pump and the bolts.
Torque: 71 lb.in (8 Nm)



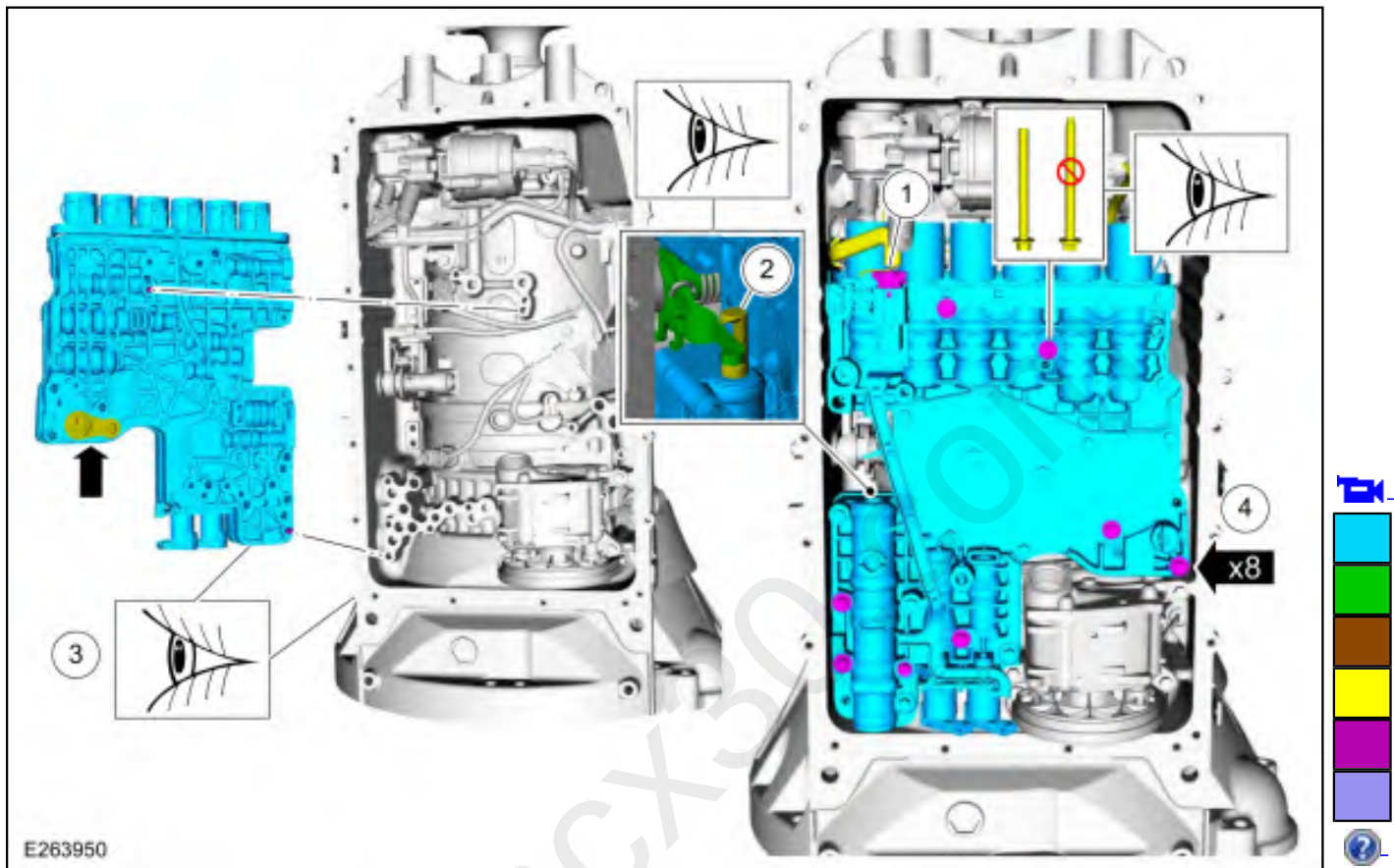
314. **NOTICE:** Do not install a 71 mm length bolt in the location shown or the transmission clutch and planetary container will be damaged and result in transmission failure.

Loosely install the main control valve body.

1. **NOTE:** *Be sure the main control-to-case seal is attached to the main control.*

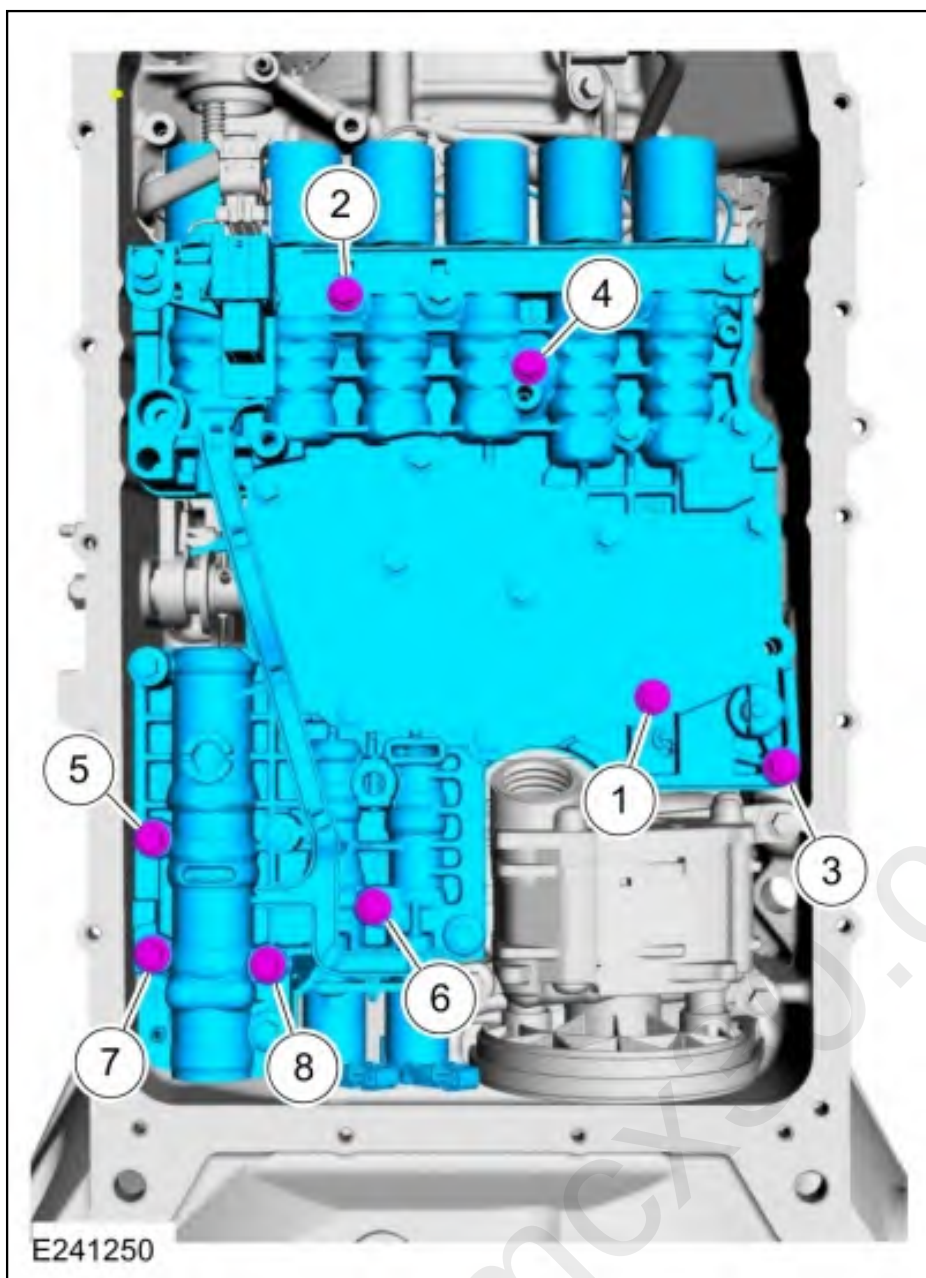
Connect the internal wiring harness electrical connector while installing the main control valve body.

2. If equipped with a park pawl lock valve, align the TR sensor with the park pawl lock valve.
3. Align the guide pins on the main control valve body with the alignment holes in the transmission case.
4. Loosely install the 68 mm length main control-to-transmission case bolts.

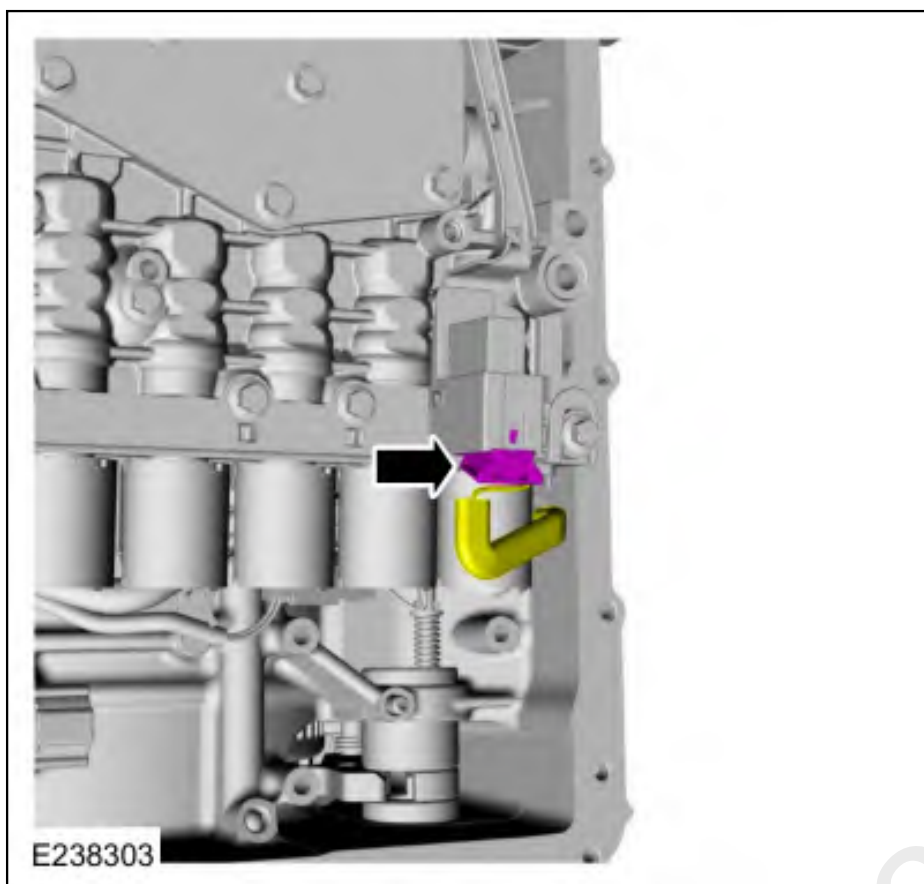


315. Tighten the bolts in the sequence shown.

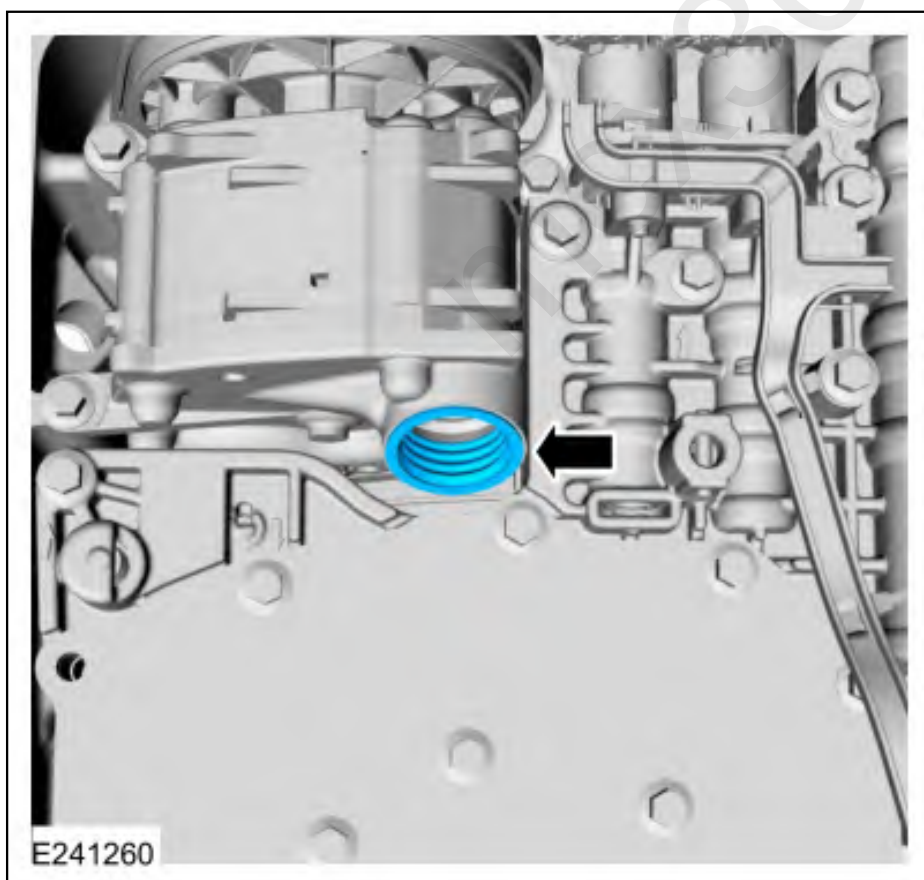
Torque: 89 lb.in (10 Nm)



316. Lock the main control main electrical connector.



317. Install the filter seal in the pump.

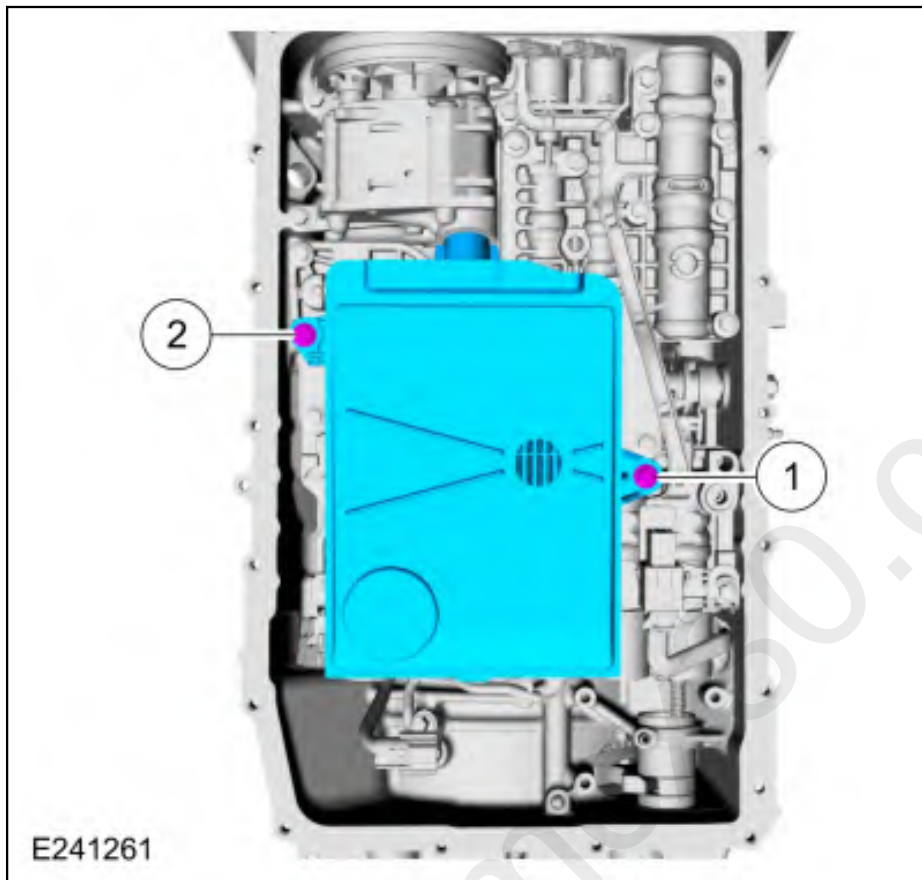


318. **NOTICE:** If the bolts are installed in the wrong locations, transmission damage will occur.

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

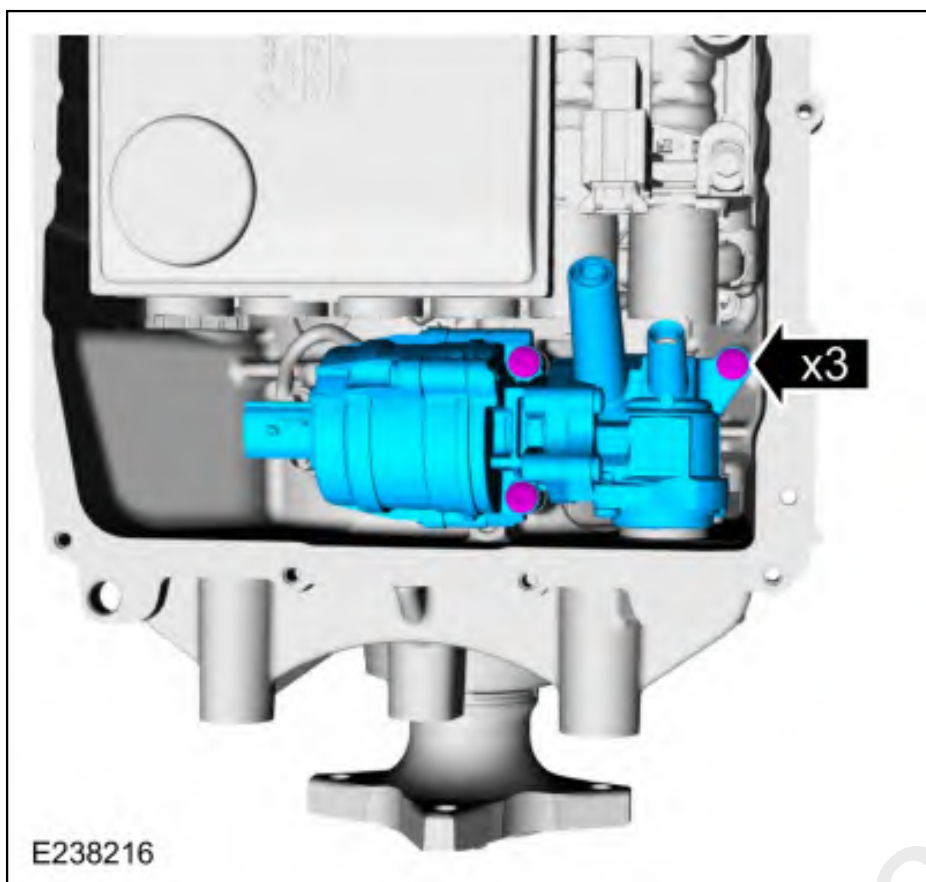
Install the filter and the bolts in the correct locations.

1. Short bolt
 2. Long bolt
- Torque: 93 lb.in (10.5 Nm)

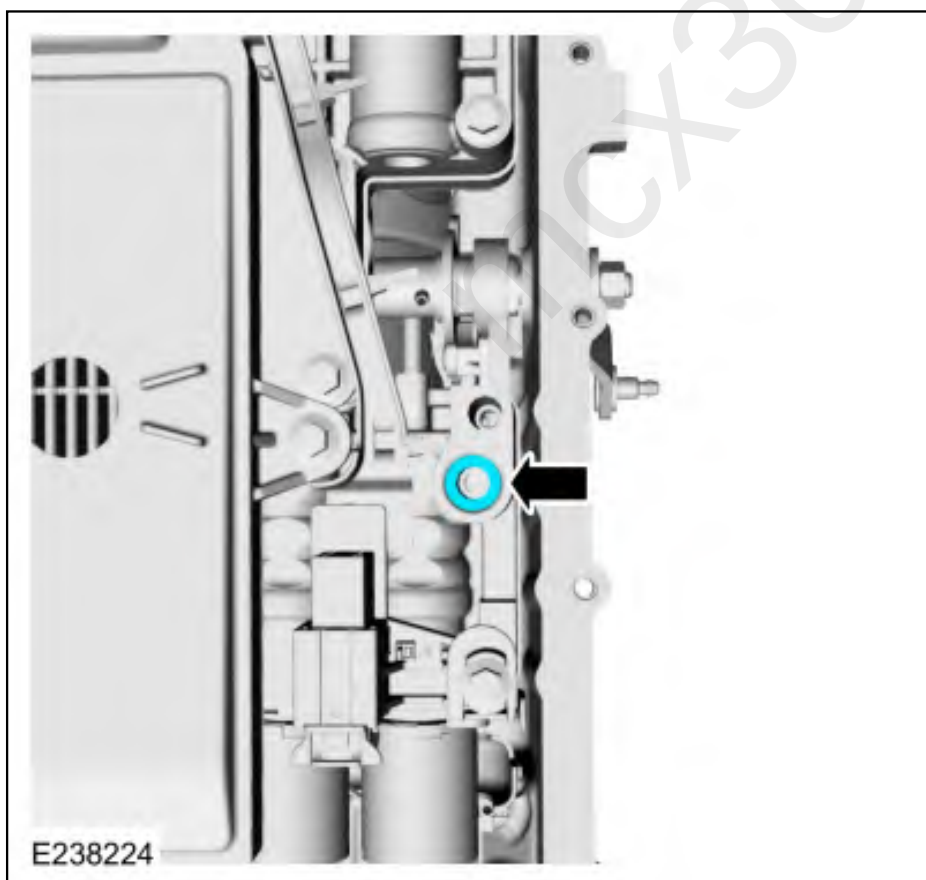


Auto-Start-Stop vehicles

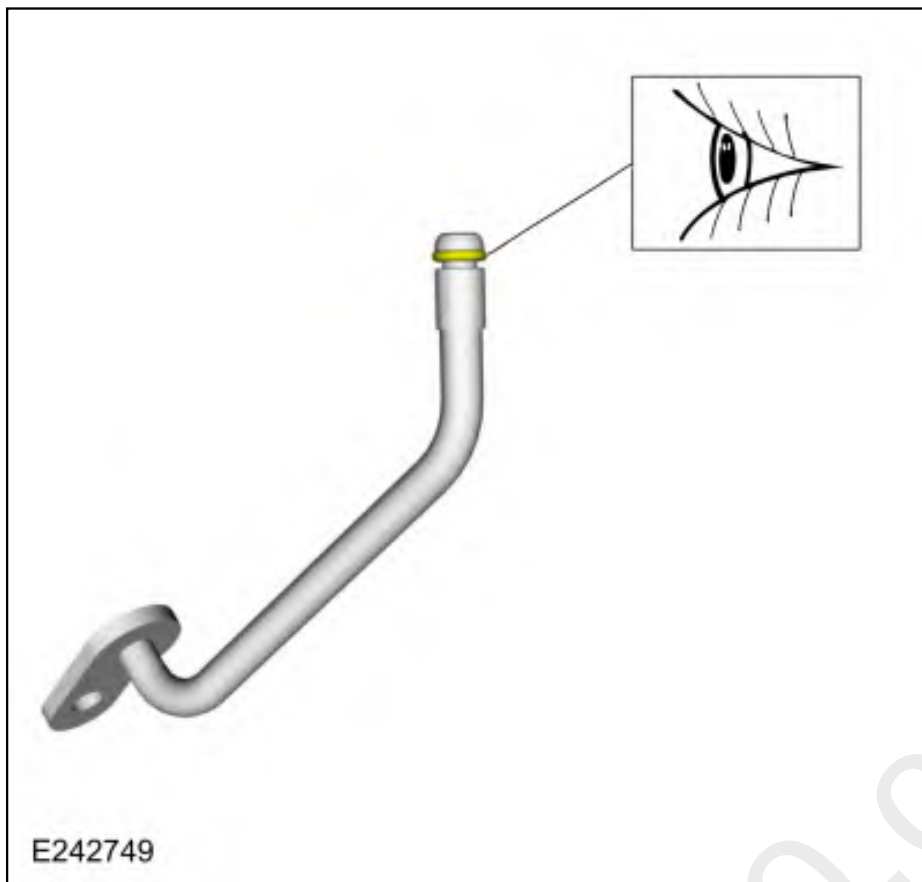
319. Install the transmission fluid auxiliary pump and loosely install the bolts.



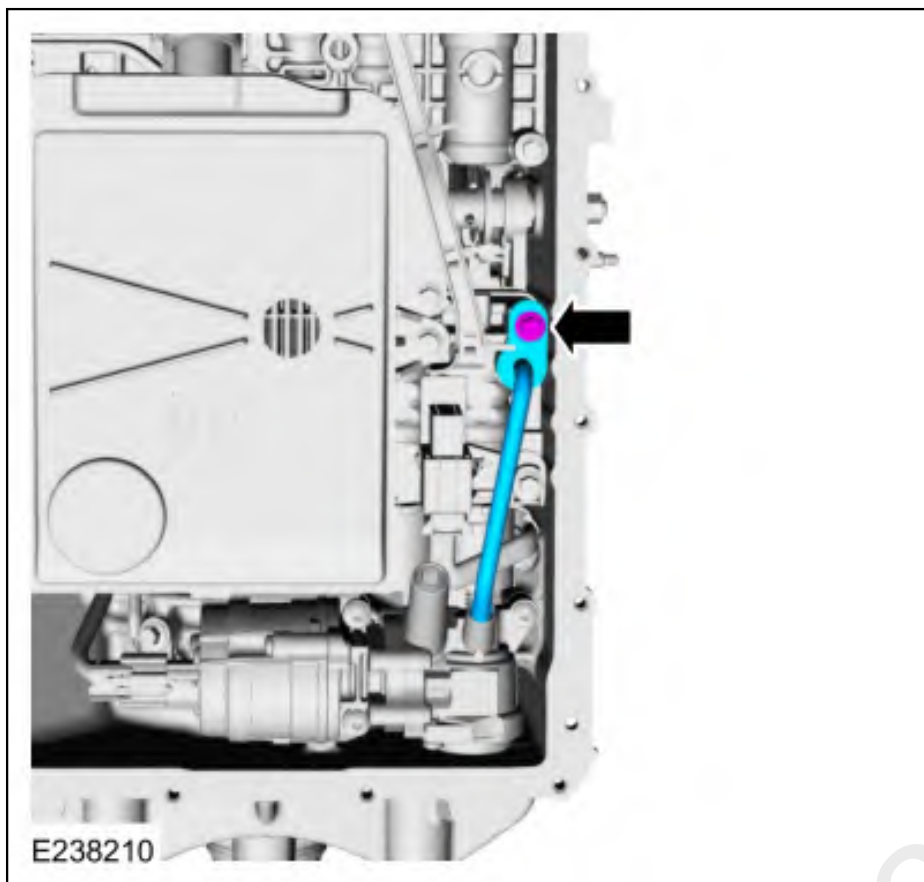
320. Install the new transmission fluid auxiliary pump tube seal.



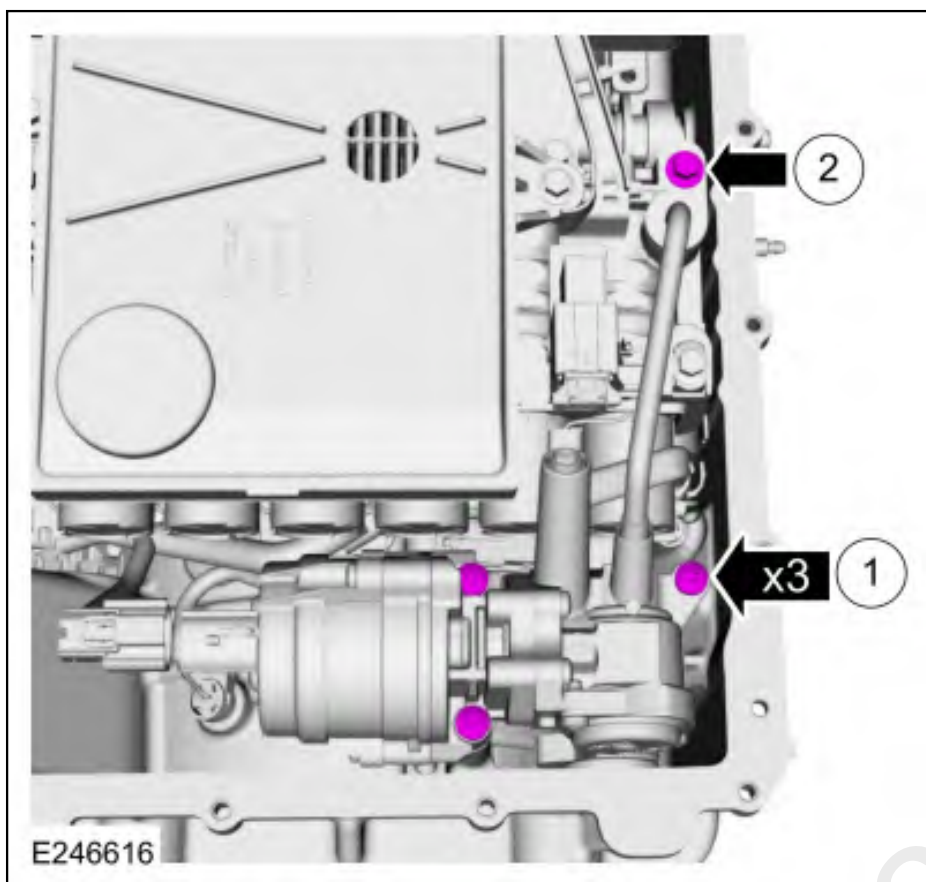
321. Inspect the transmission fluid auxiliary pump tube O-ring.



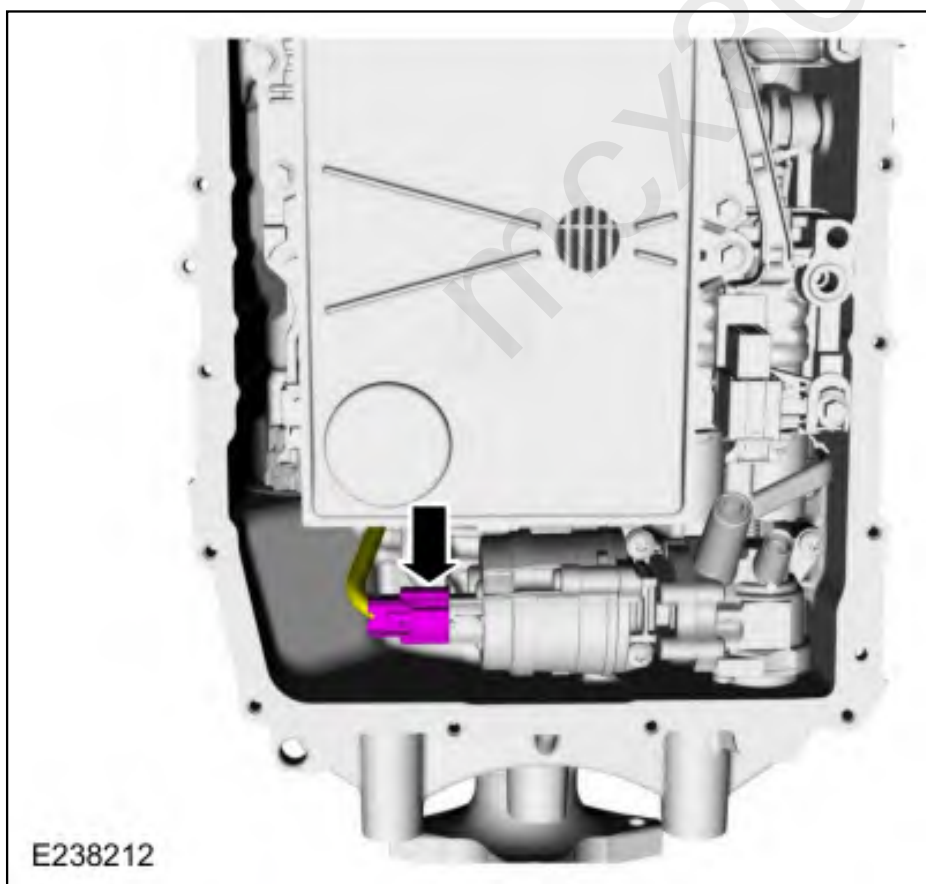
322. Install the transmission fluid auxiliary pump tube and loosely install the bolt.



1. Transmission fluid auxiliary pump bolts
Torque: 97 lb.in (11 Nm)
2. Transmission fluid auxiliary pump tube bolt
Torque: 106 lb.in (12 Nm)

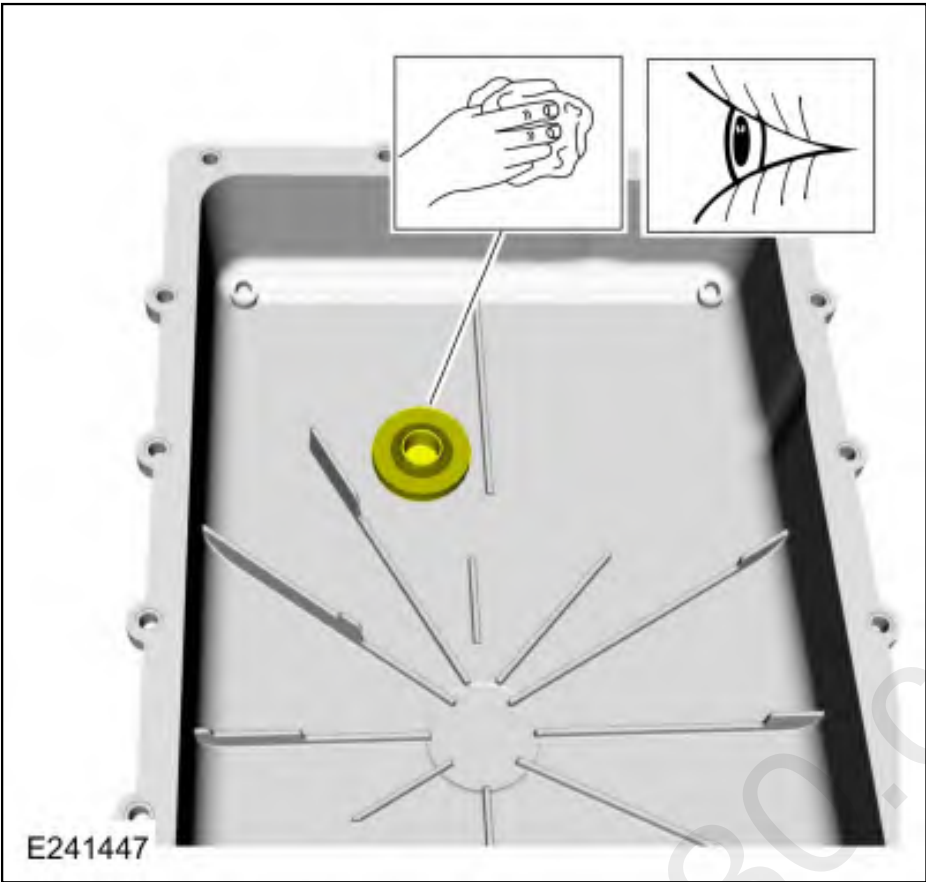


324. Connect the transmission fluid auxiliary pump electrical connector.



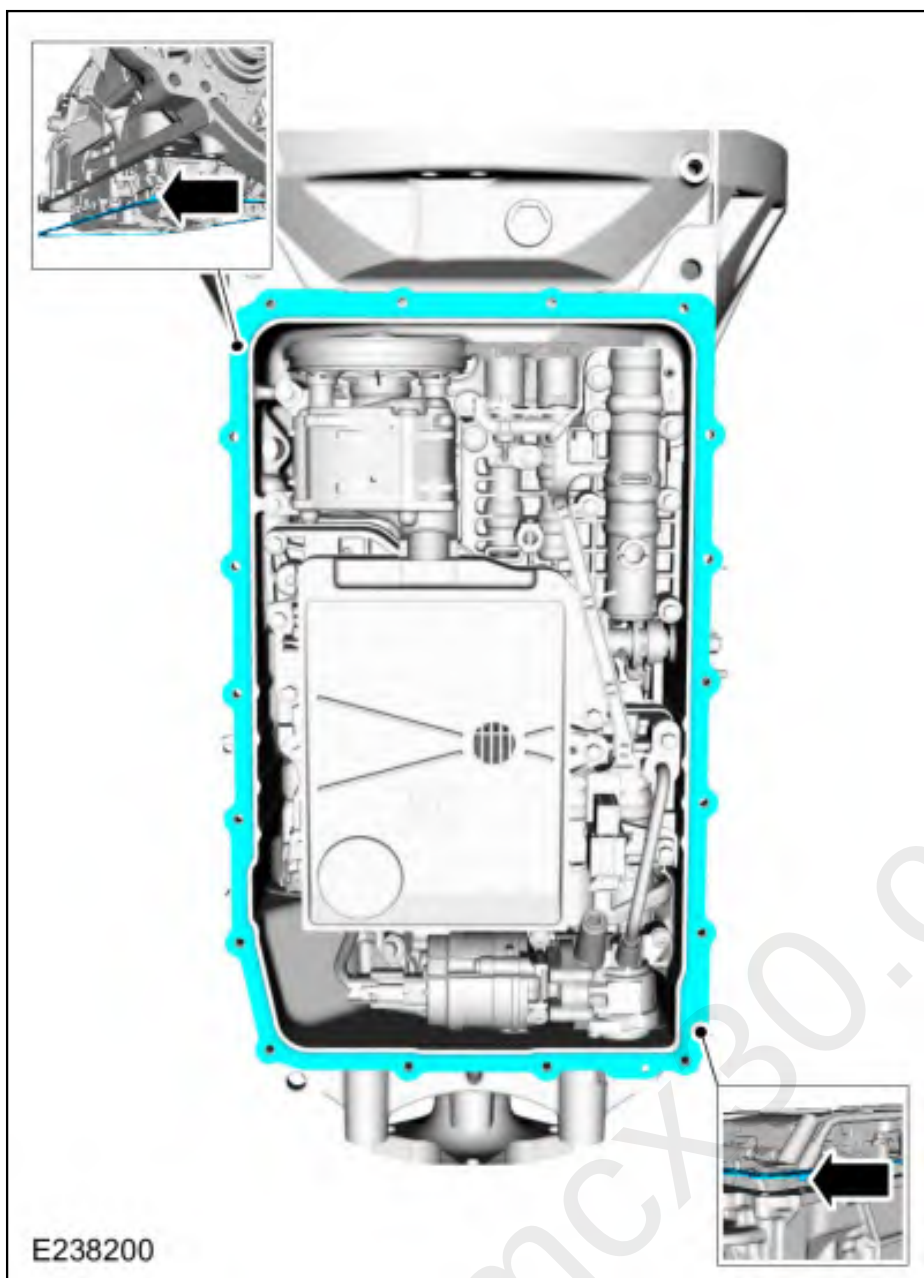
All vehicles

325. Clean and inspect the magnet and the retainer.



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

Align the tabs in the noted location and install the transmission fluid pan gasket.



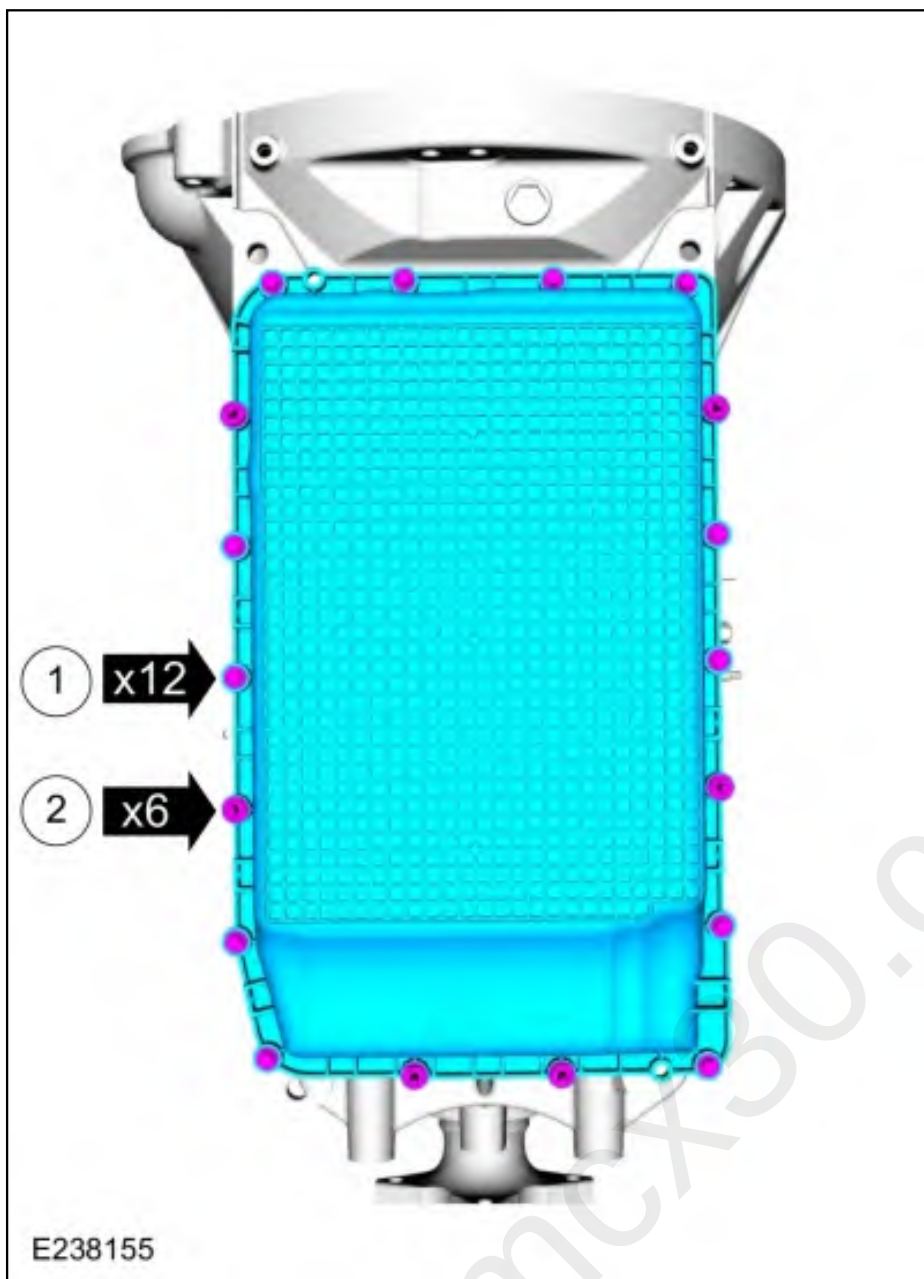
327. Install the transmission fluid pan and tighten the bolts in a crisscross pattern.

1. Bolts

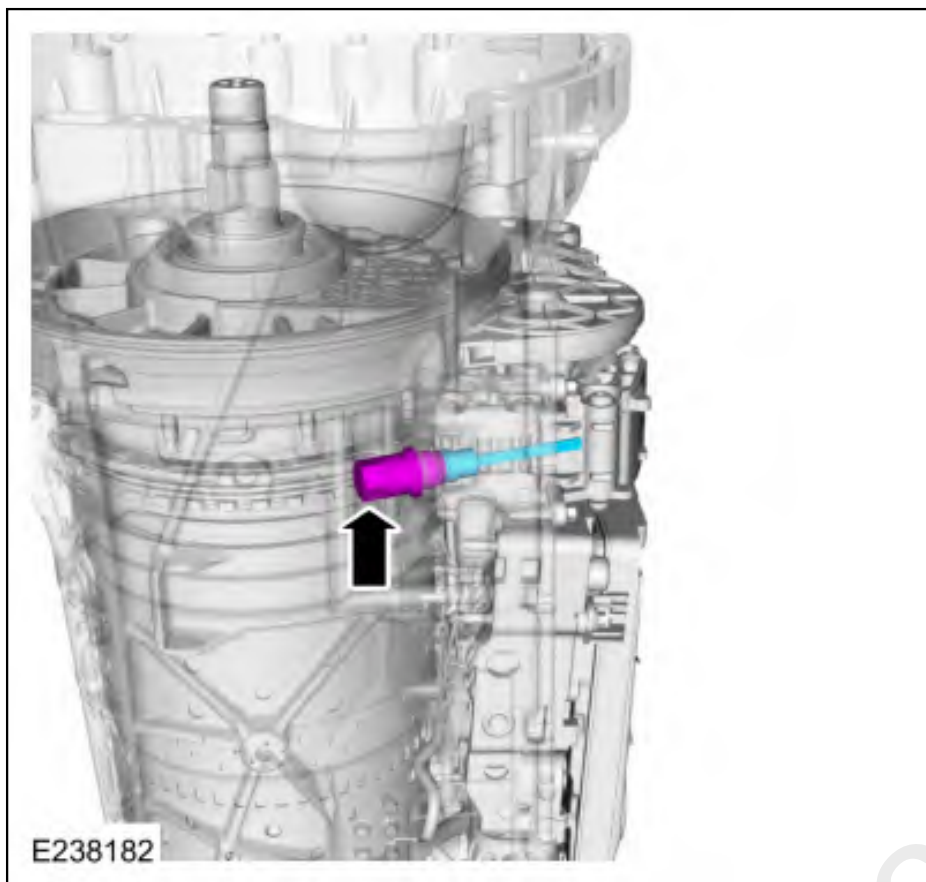
Torque: 89 lb.in (10 Nm)

2. Studbolts

Torque: 106 lb.in (12 Nm)



328. Install the transmission fluid level indicator.
Torque: 52 lb.ft (70 Nm)



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Main Control Valve Body

Base Part Number: Base Part Number: 7A100

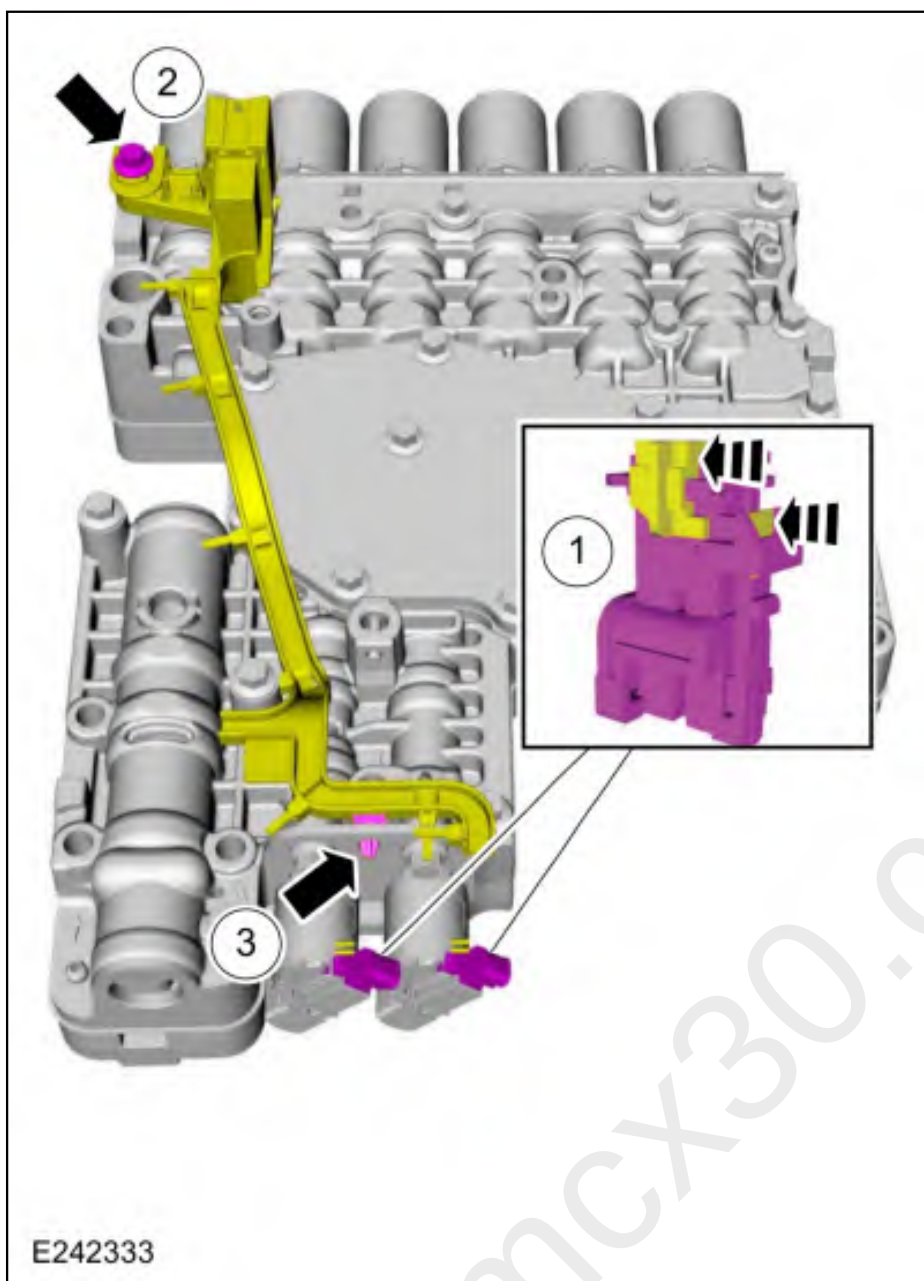
Special Tool(s) / General Equipment

	307-299 Alignment Pins, Valve Body TKIT-1994-F TKIT-1994-FLM/FM TKIT-1994-LMH/MH2

Materials

Name	Specification
Motorcraft® MERCON® ULV Automatic Transmission Fluid XT-12-ULV	WSS-M2C494-A

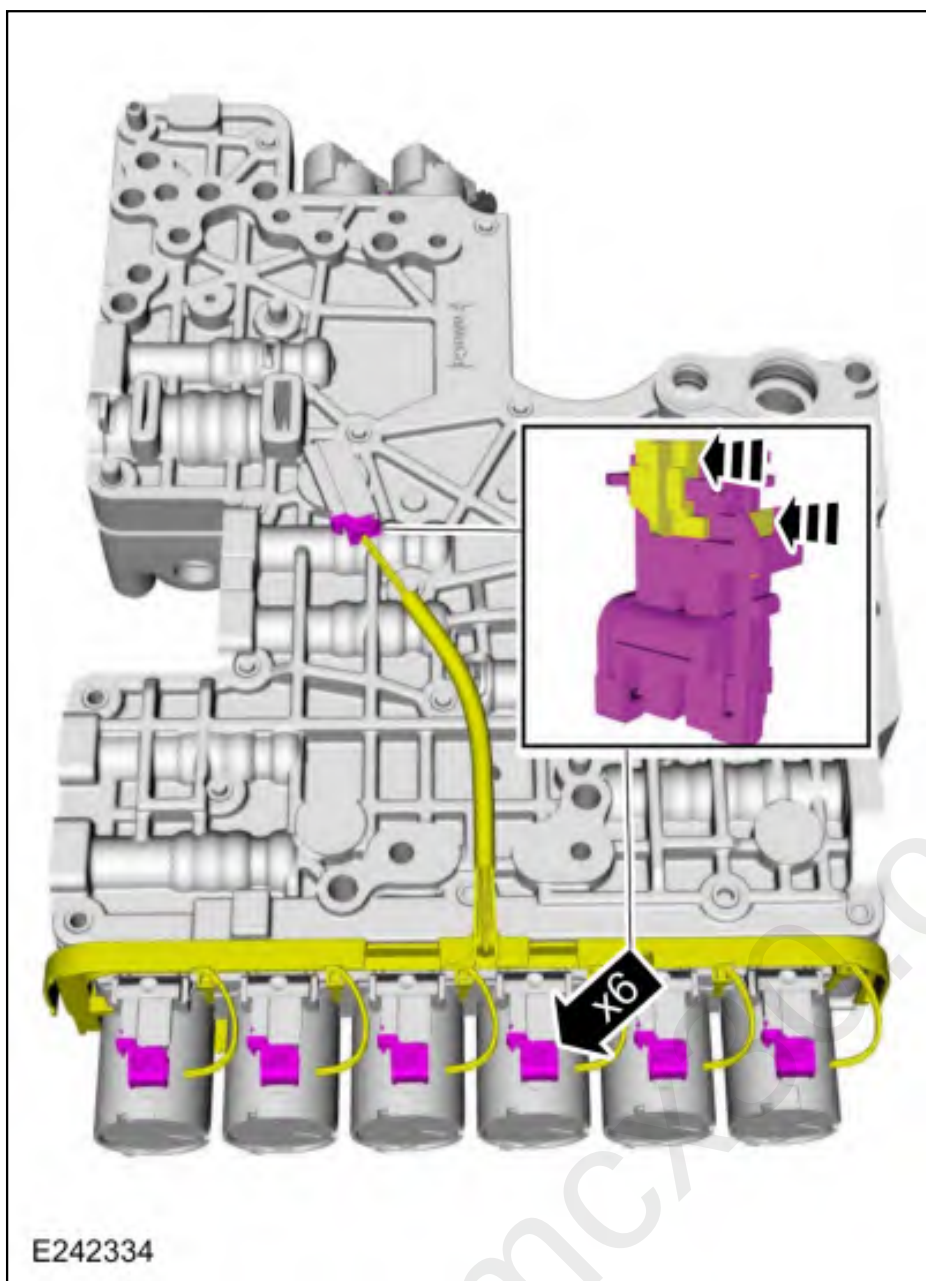
1. For solenoid and valve identification.
Refer to: Main Control Valve Body (307-01 Automatic Transmission - 10-Speed Automatic Transmission - 10R80) .
2. Disconnect the internal wiring harness.
 1. Slide the plastic lock to the unlock position. While pressing the plastic tab, disconnect the electrical connector.
 2. Remove internal wiring harness retaining bolt.
 3. Disconnect the internal wiring harness retainer.



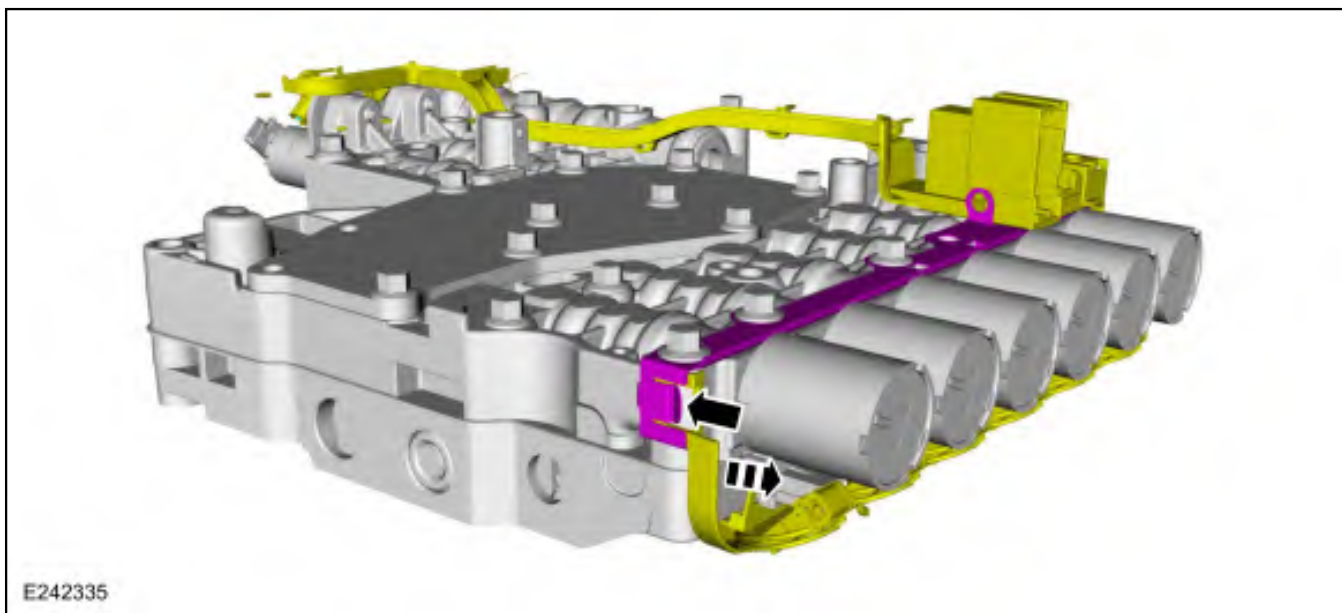
3.

Disconnect the internal wiring harness electrical connectors.

- Slide the plastic lock to the unlock position. While pressing the plastic tab, disconnect the electrical connector.



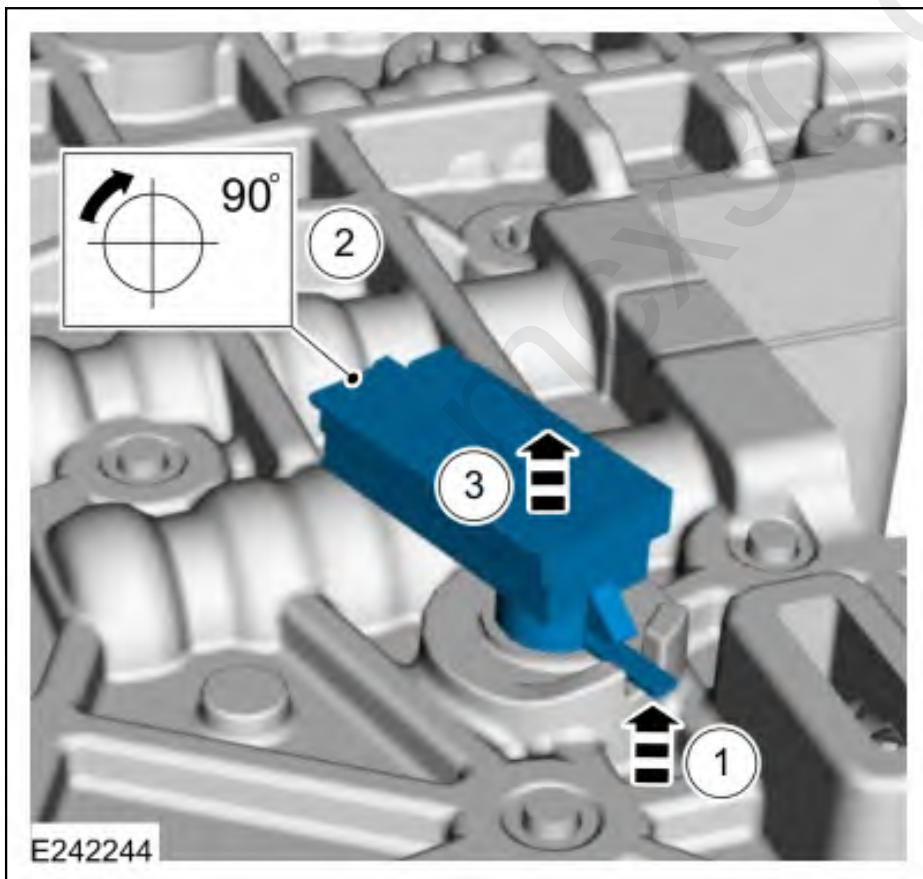
4. Release the retainer and remove the internal wiring harness assembly.



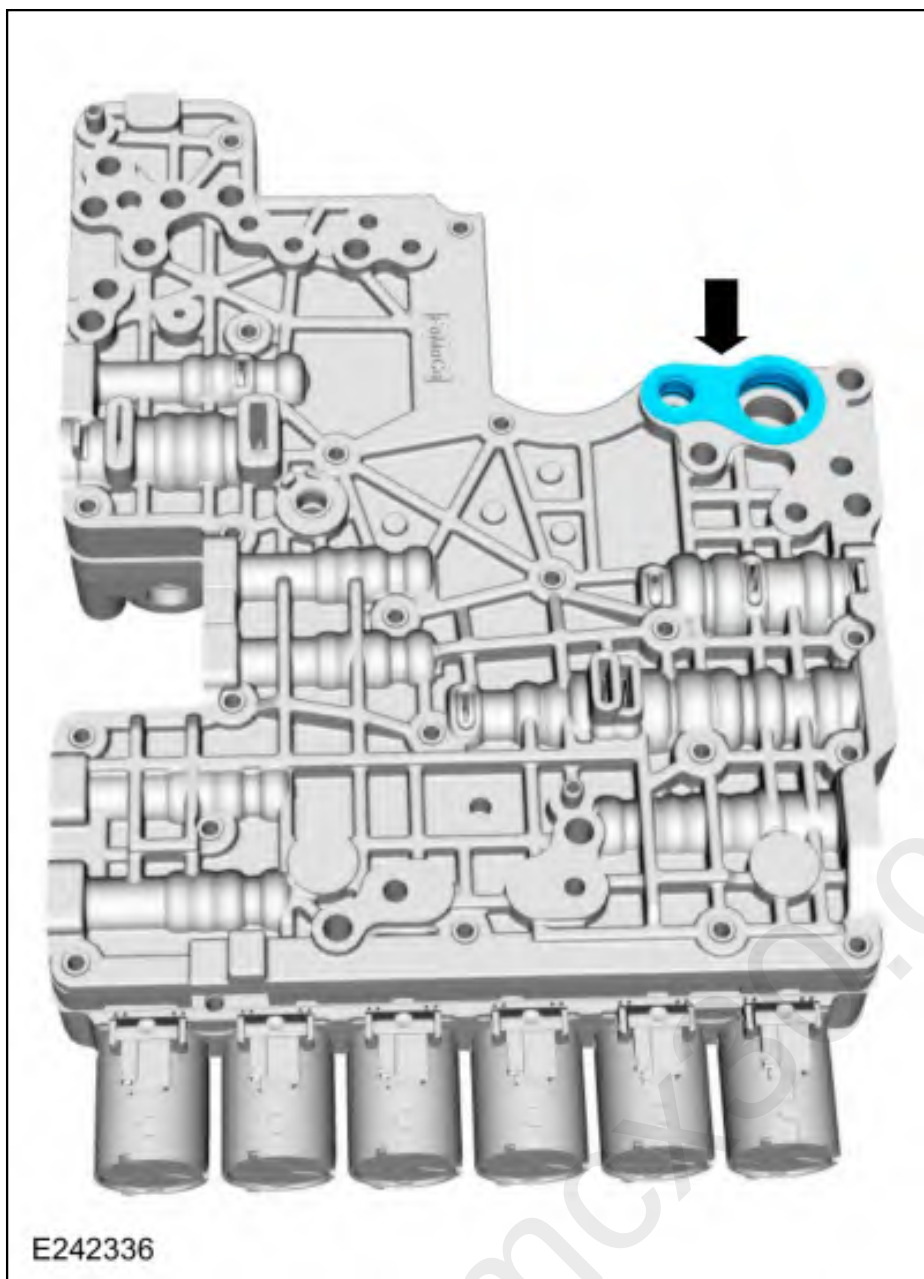
5.

Remove the TFT sensor.

1. Lift plastic tab.
2. Rotate the TFT sensor clockwise.
3. Remove the TFT sensor.

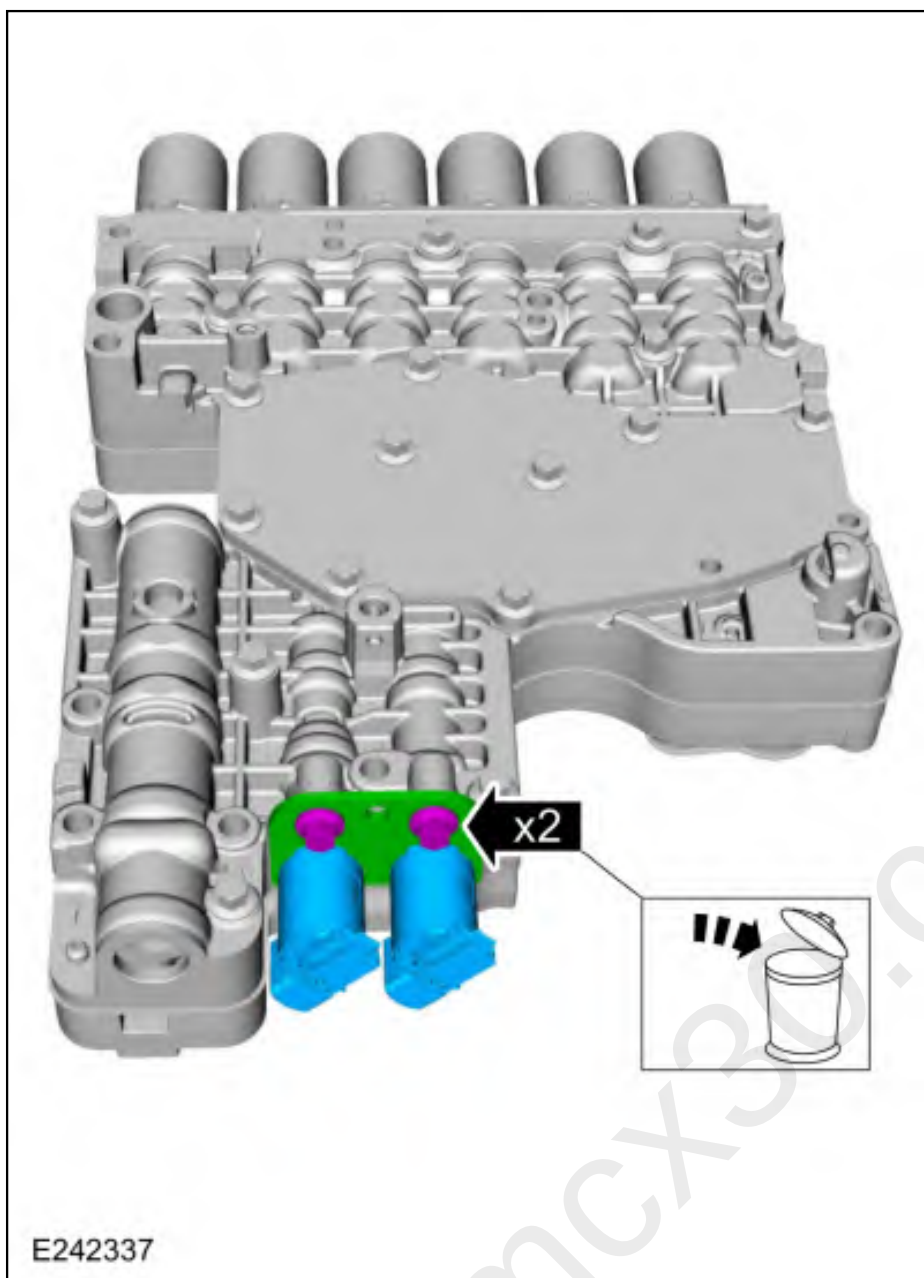


6. Remove the main control assembly to transmission fluid pump seal.

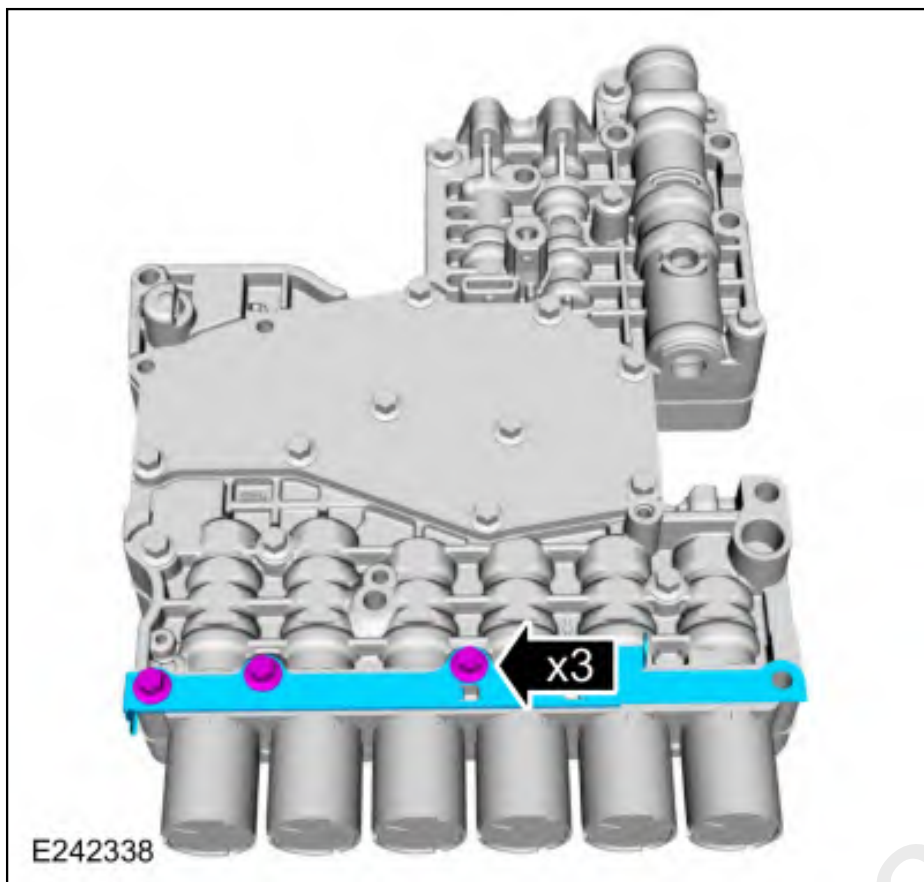


7. **NOTE:** *The orientation of the solenoids before removal.*

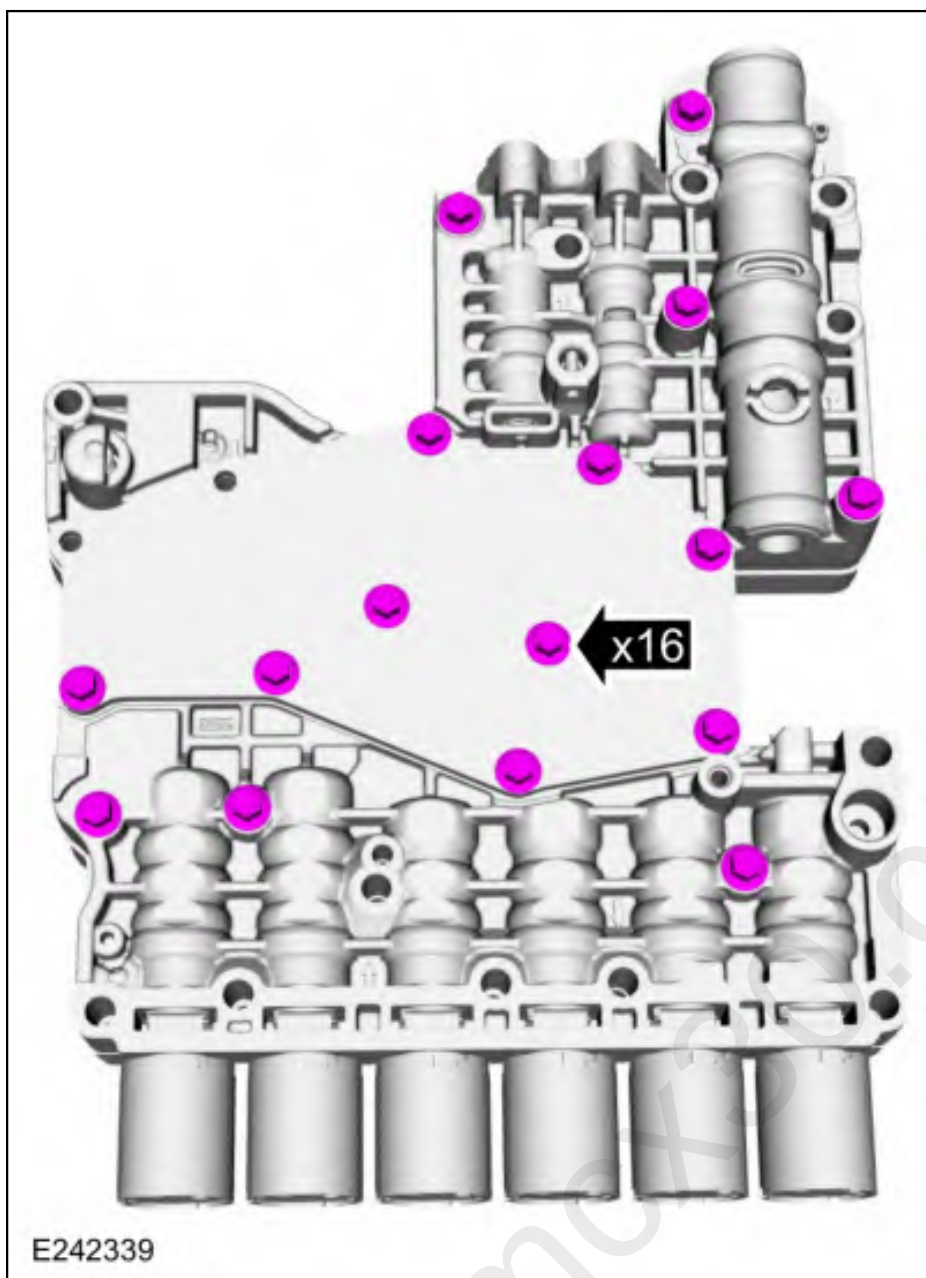
Remove and discard the bolts. Remove the solenoid retaining plate, TCC solenoid and the LPC solenoid.



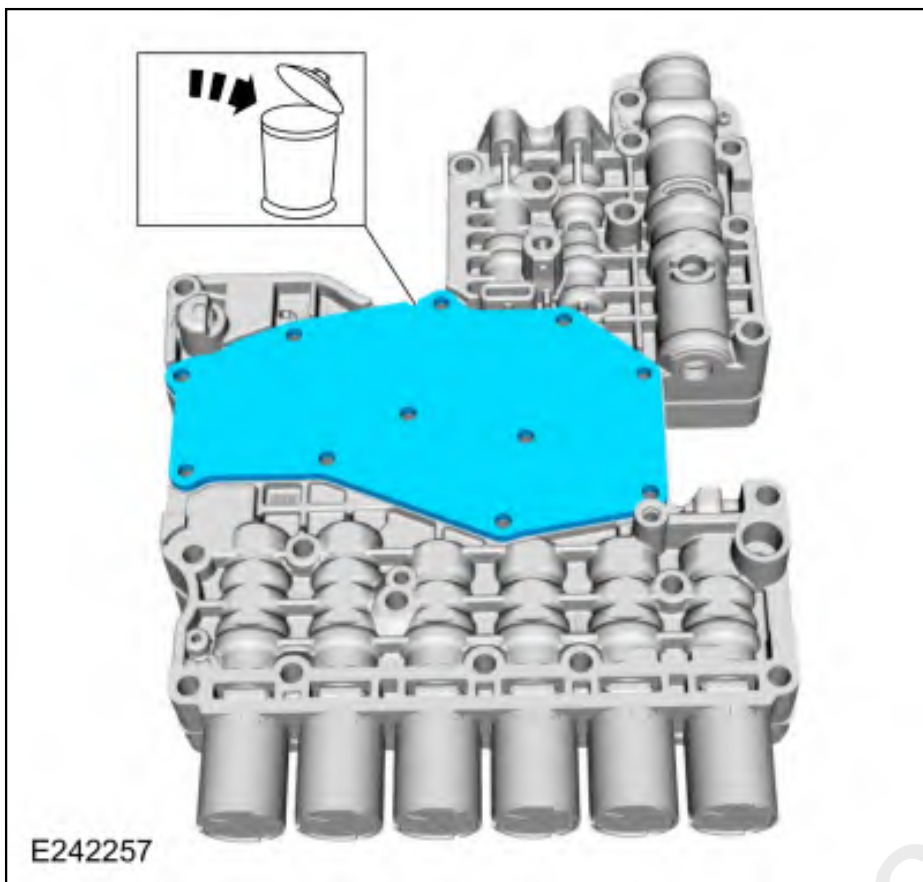
8. Remove bolts and the shift solenoid retaining plate.



9. Remove the valve body bolts.

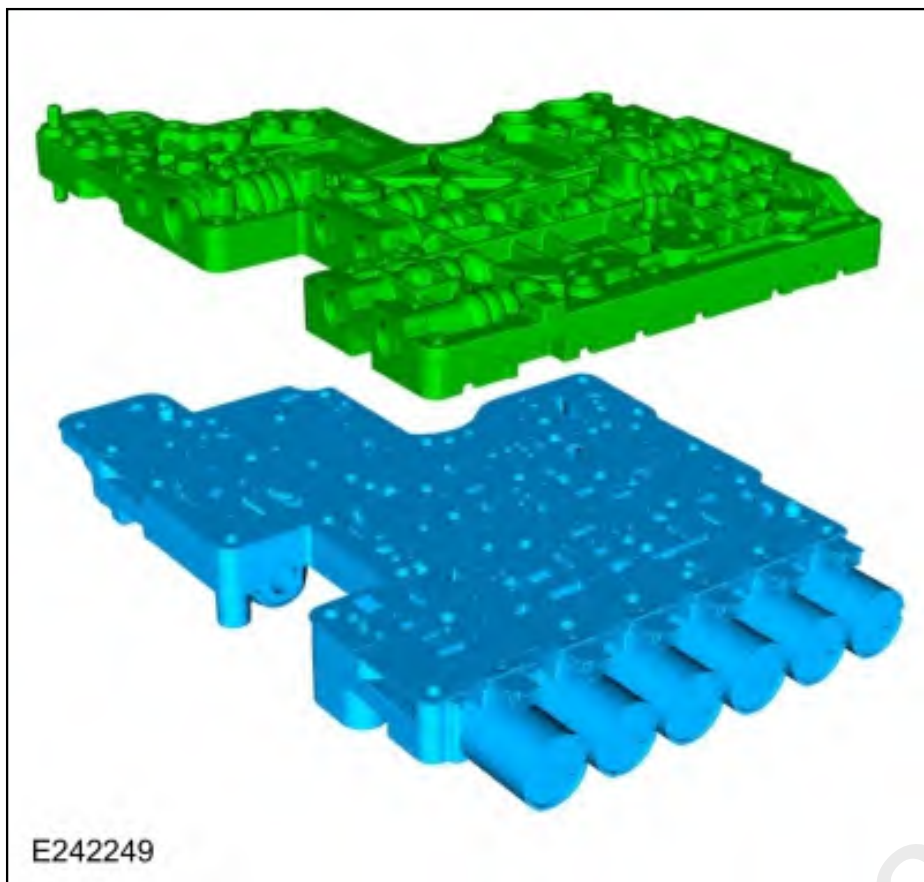


10. Remove and discard the valve channel plate.



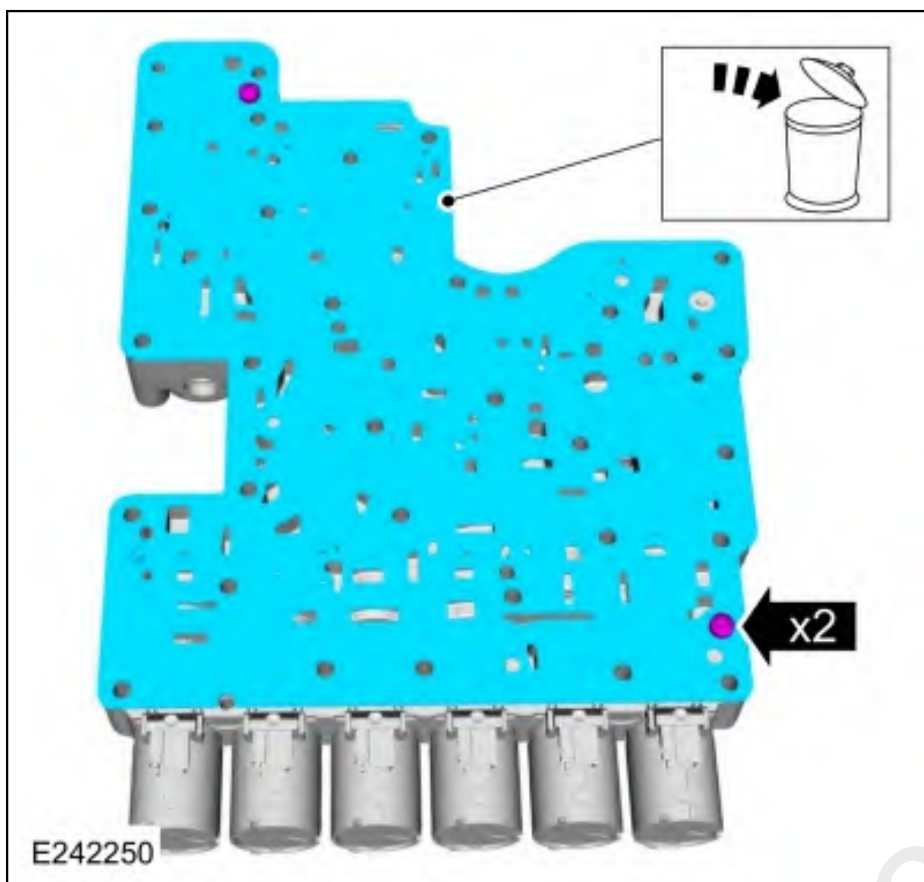
11. **NOTICE:** Many components and surfaces in the main control valve body are precision machined. Use care when handling the upper and lower valve body or damage can occur to the machined surfaces.

Separate the upper valve body from the lower valve body.



Lower Valve Body

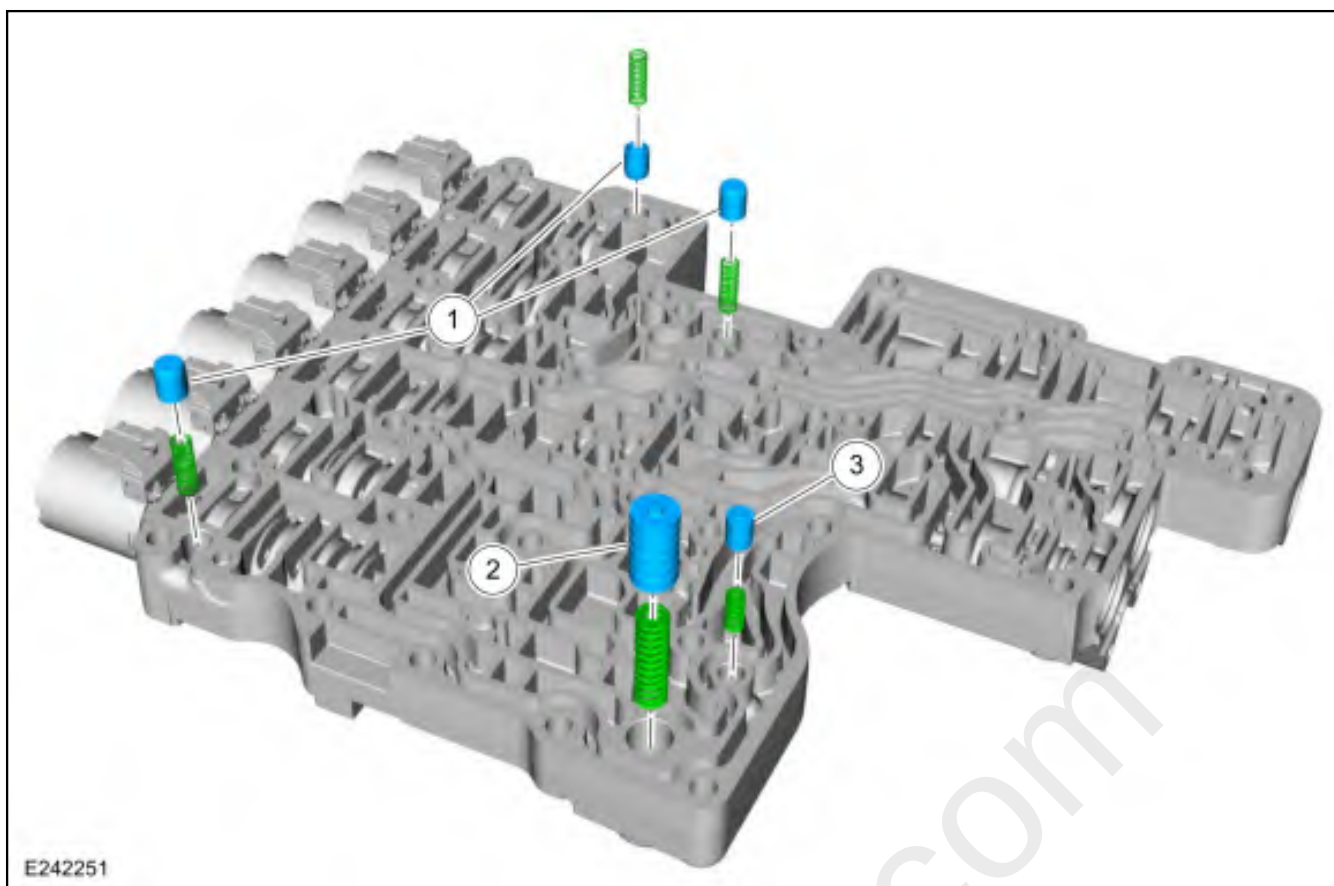
- 12. Remove bolts and discard the valve body separator plate.



13. **NOTE:** *The orientation of the valves and springs.*

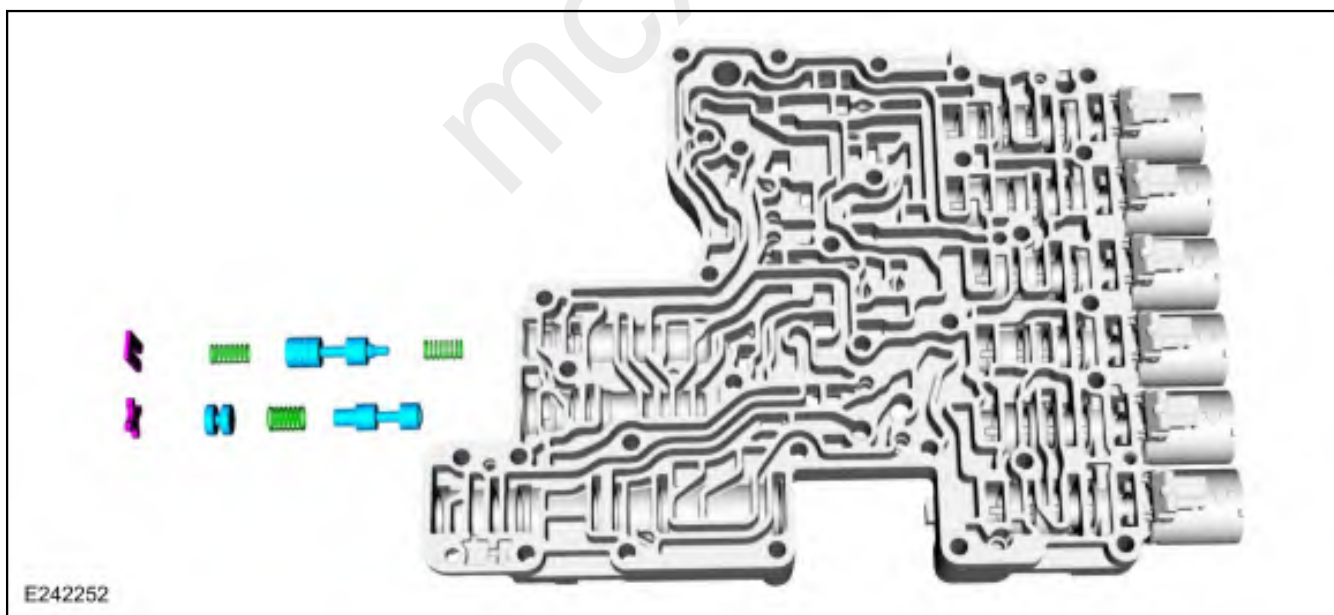
Remove the following items:

1. Check valve assemblies
2. LPC damper assembly
3. TCC damper assembly



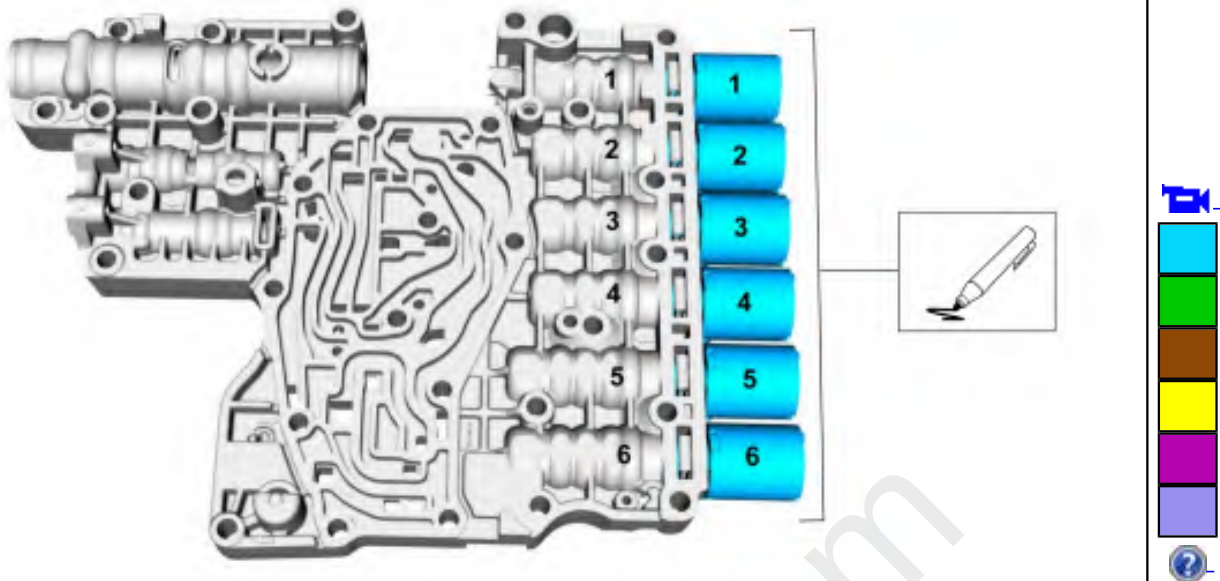
14. **NOTICE:** Note the location of the retaining clips, caps, valves and valve springs for assembly. Failure to install the components in the correct location will result in harsh/soft or no shifts or damage to the transmission.

Remove the retaining clips, cap, valves and valve springs from each bore of the valve body assembly.



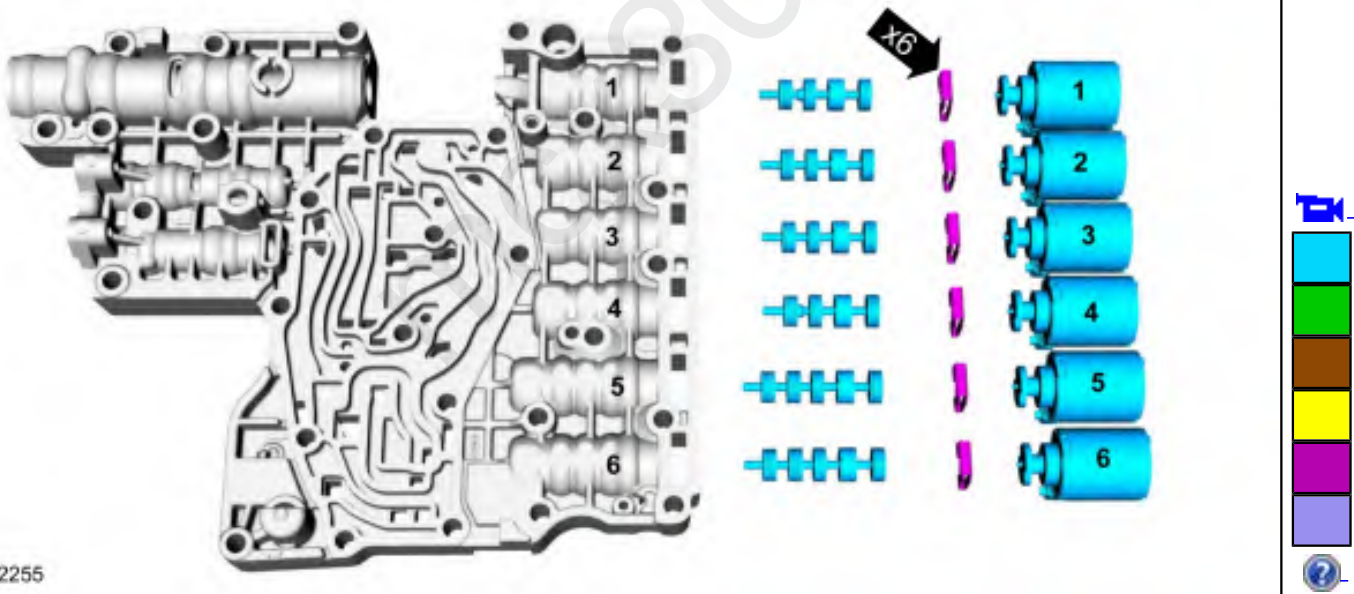
15. **NOTICE:** Solenoids and clutch control valves may visually appear the same but they are calibrated from the factory and are not all the same. Use care not to assemble the main control assembly incorrectly. Incorrect solenoid and clutch control valve installation results in poor transmission shift quality.

Number the solenoids 1 through 6 and number the main control solenoid ports 1 through 6 to correspond to the solenoids.



16. **NOTE:** Note the location of the clutch control valves and solenoids for assembly.

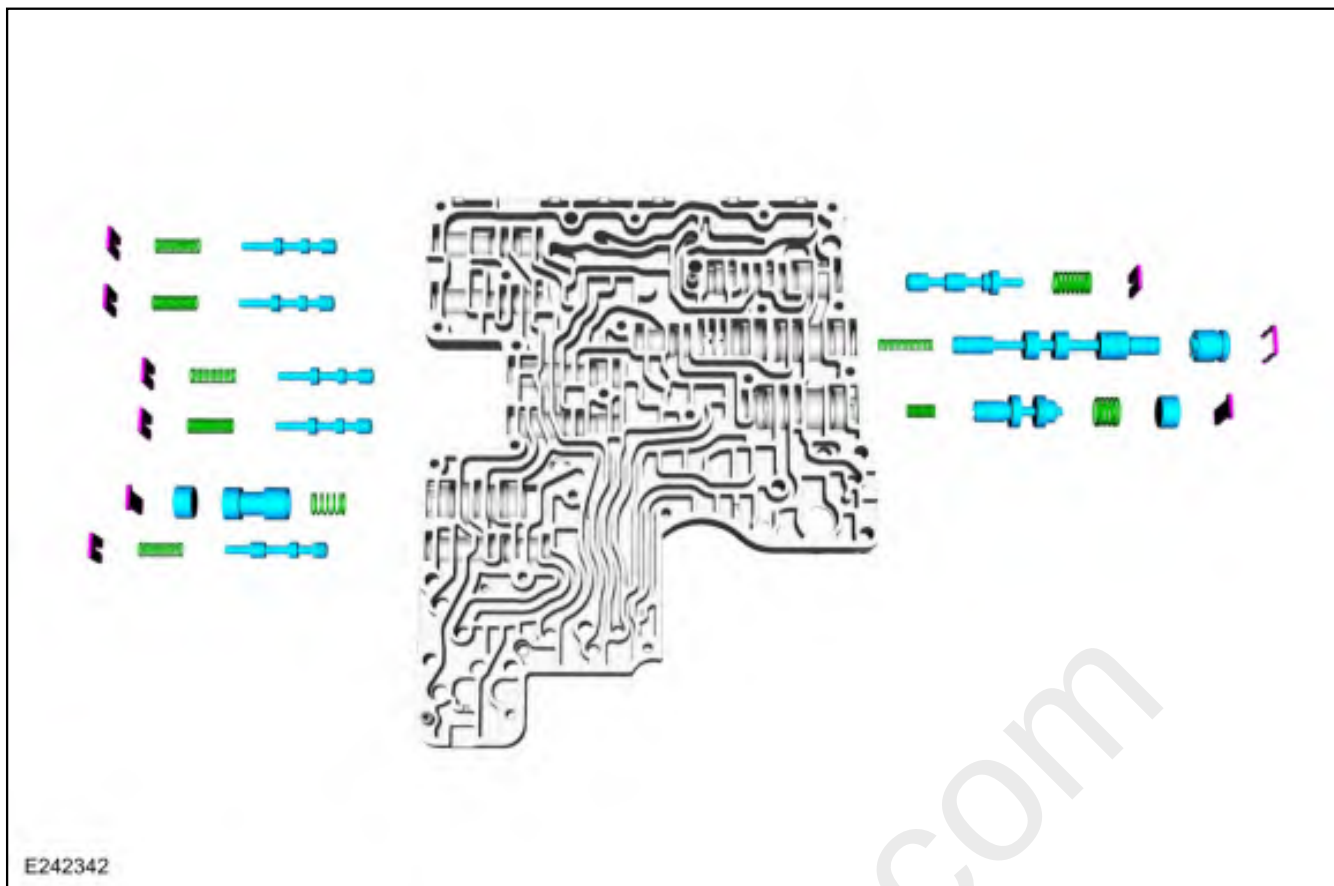
Remove the shift solenoid retainers, shift solenoids, and clutch control valves.



Upper Valve Body

17. **NOTICE:** Note the location of the retaining clips, caps, valves and valve springs for assembly. Failure to install the components in the correct location will result in harsh/soft or no shifts or damage to the transmission.

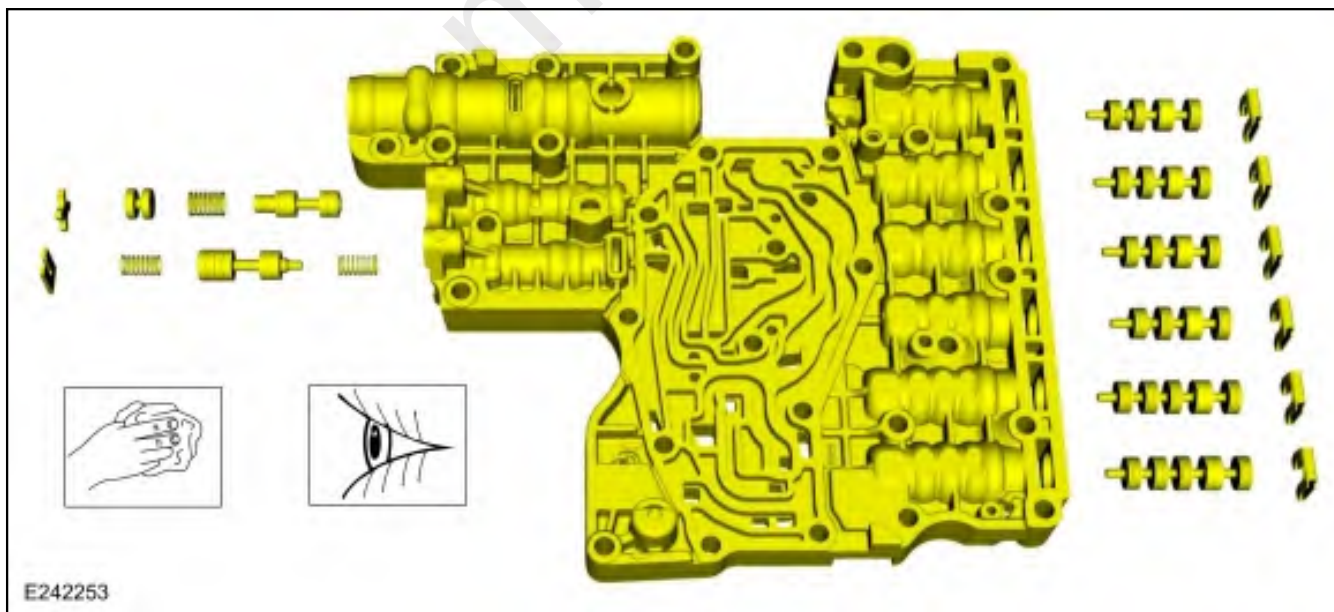
Remove the retaining clips, cap, valves and valve springs from each bore of the valve body assembly.



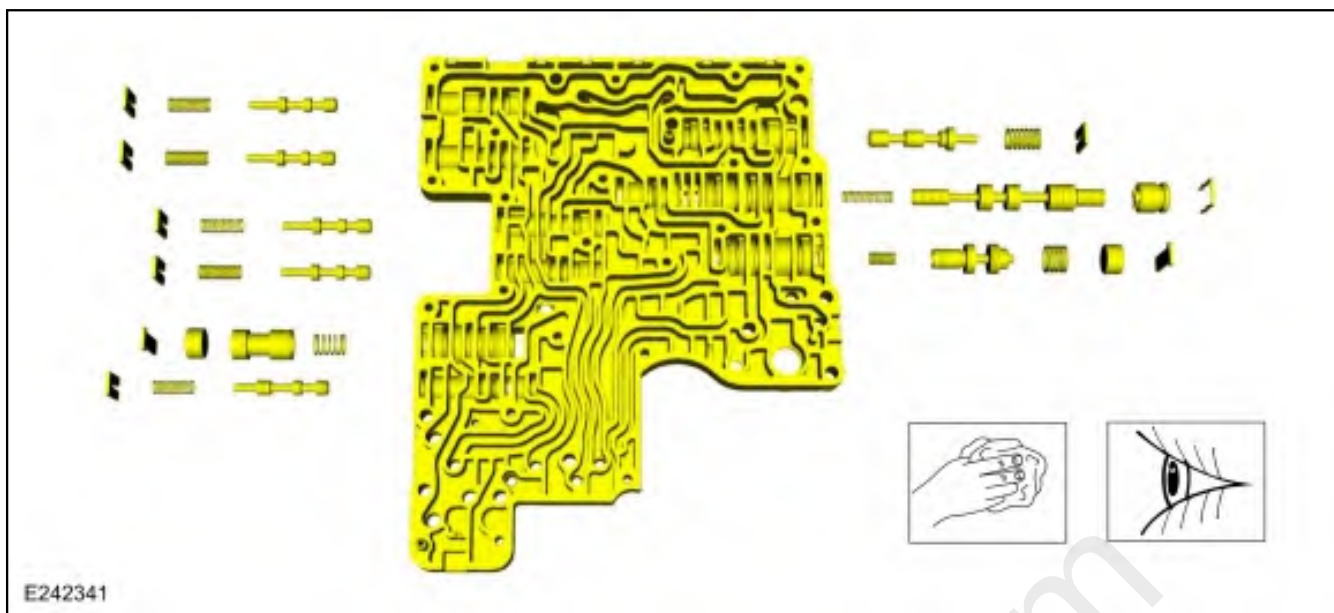
Upper and Lower Valve Body

18. **NOTICE:** Many components and surfaces in the main control valve body are precision machined. Use care when cleaning the lower valve body or damage can occur to the machined surfaces.

Clean and inspect the lower valve body for damage. Inspect the passages and valves for damage and clean any excessive debris. Install a new component if necessary.



19. Clean and inspect the upper valve body for damage. Inspect the passages and valves for damage and clean any excessive debris. Install a new component if necessary.



Upper Valve Body

20. **NOTICE:** Failure to install the components in the correct location will result in harsh/soft or no shifts or damage to the transmission.

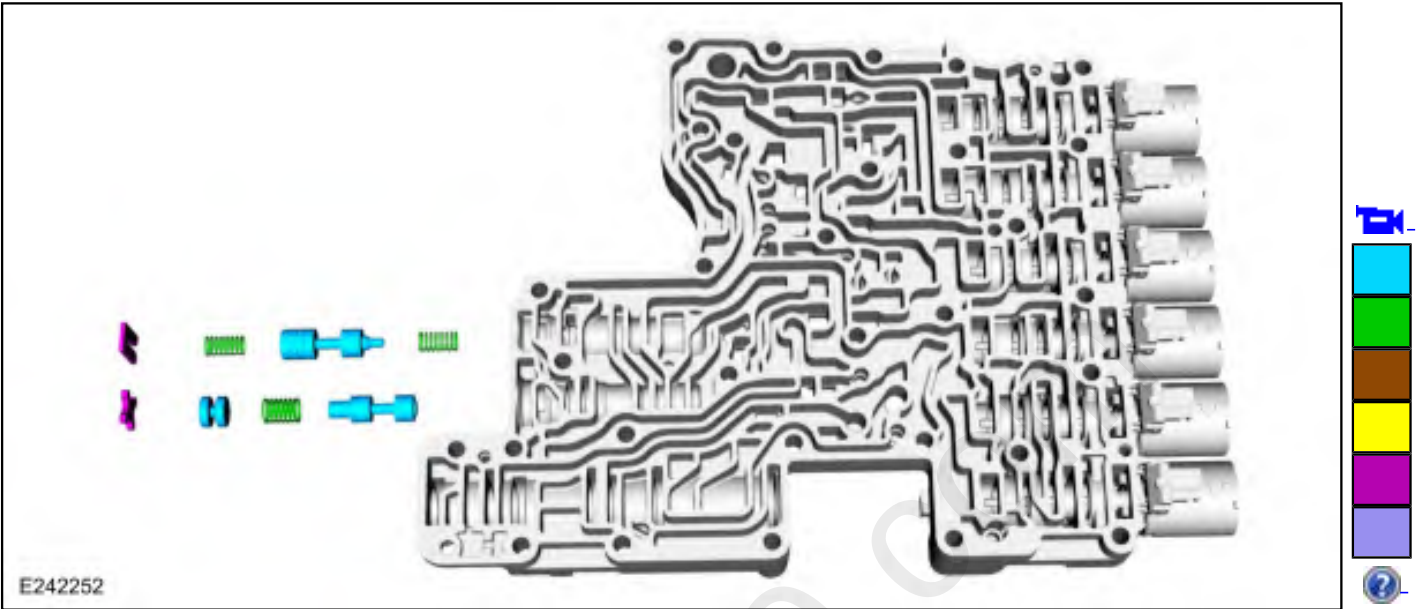
Install the valves, valve springs, caps and the retaining clips into the correct valve body valve bore.



Lower Valve Body

21. **NOTICE:** Failure to install the components in the correct location will result in harsh/soft or no shifts or damage to the transmission.

Install the valves, valve springs, cap and the retaining clips into the correct valve body valve bore.



22. **NOTICE:** Solenoids are calibrated from the factory and are not all the same. To replace a solenoid, match the band number with the original solenoid or harsh shifts or damage to the transmission can occur.

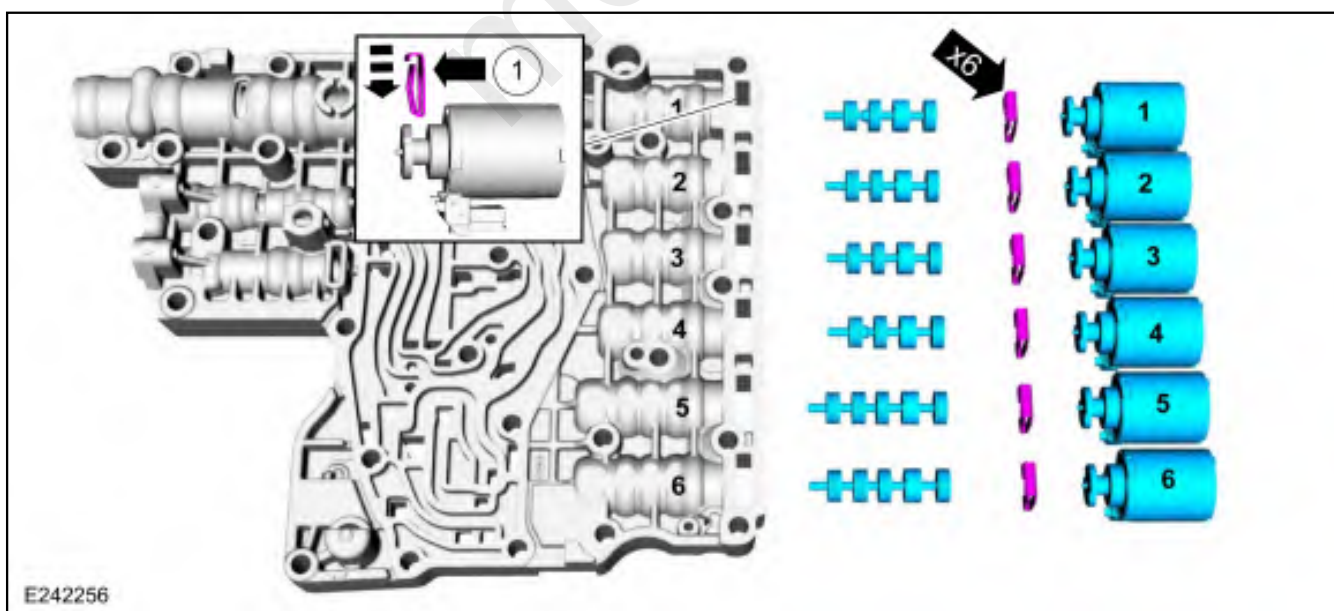
If new solenoids are needed, identify the solenoid band number.



23. **NOTICE:** Failure to install the components in the correct location will result in harsh/soft or no shifts or damage to the transmission.

Install the clutch control valves, and the shift solenoids in the corresponding marked location. Install the shift solenoid retainers with the flat side towards the solenoids.

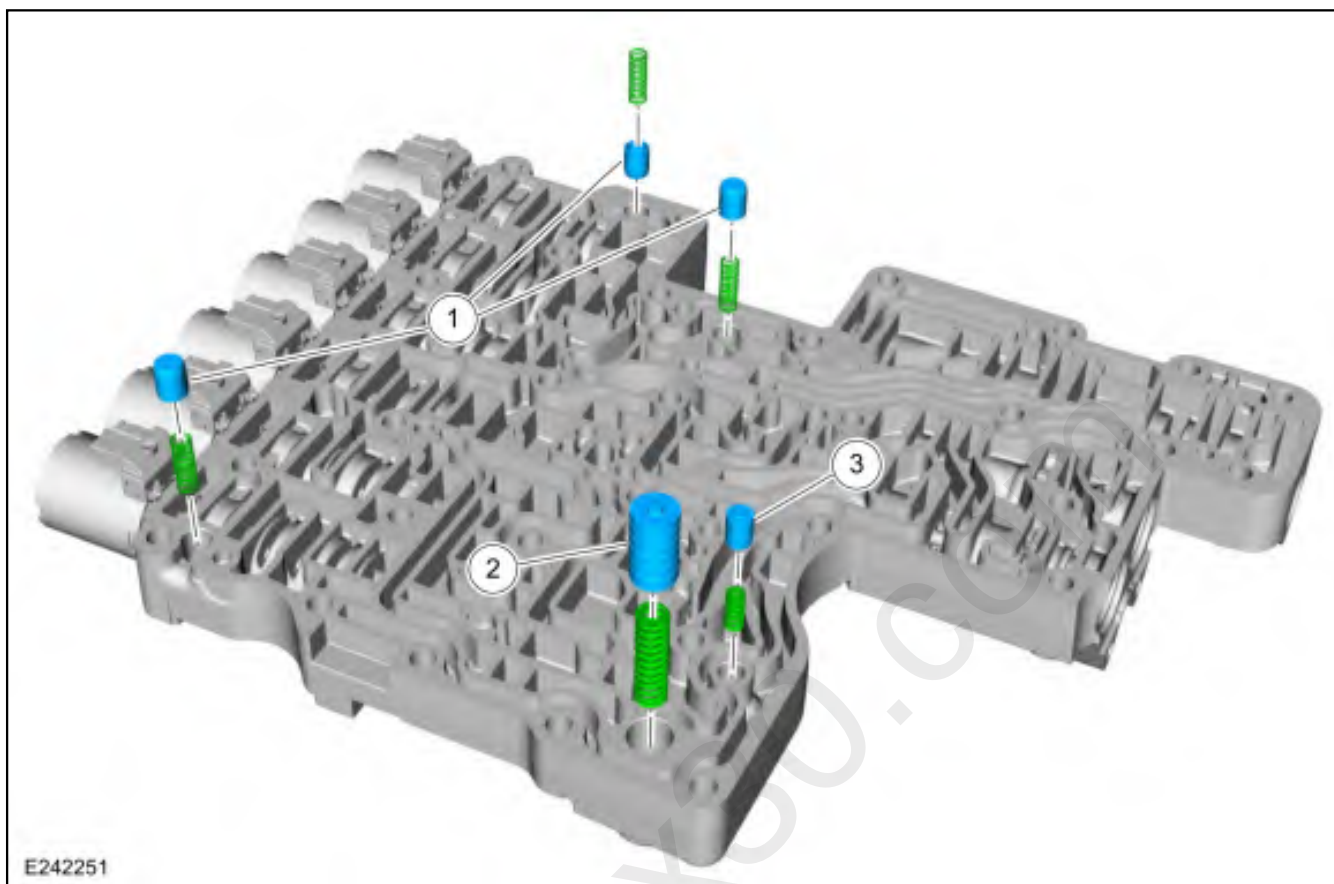
1. Retainer flat side



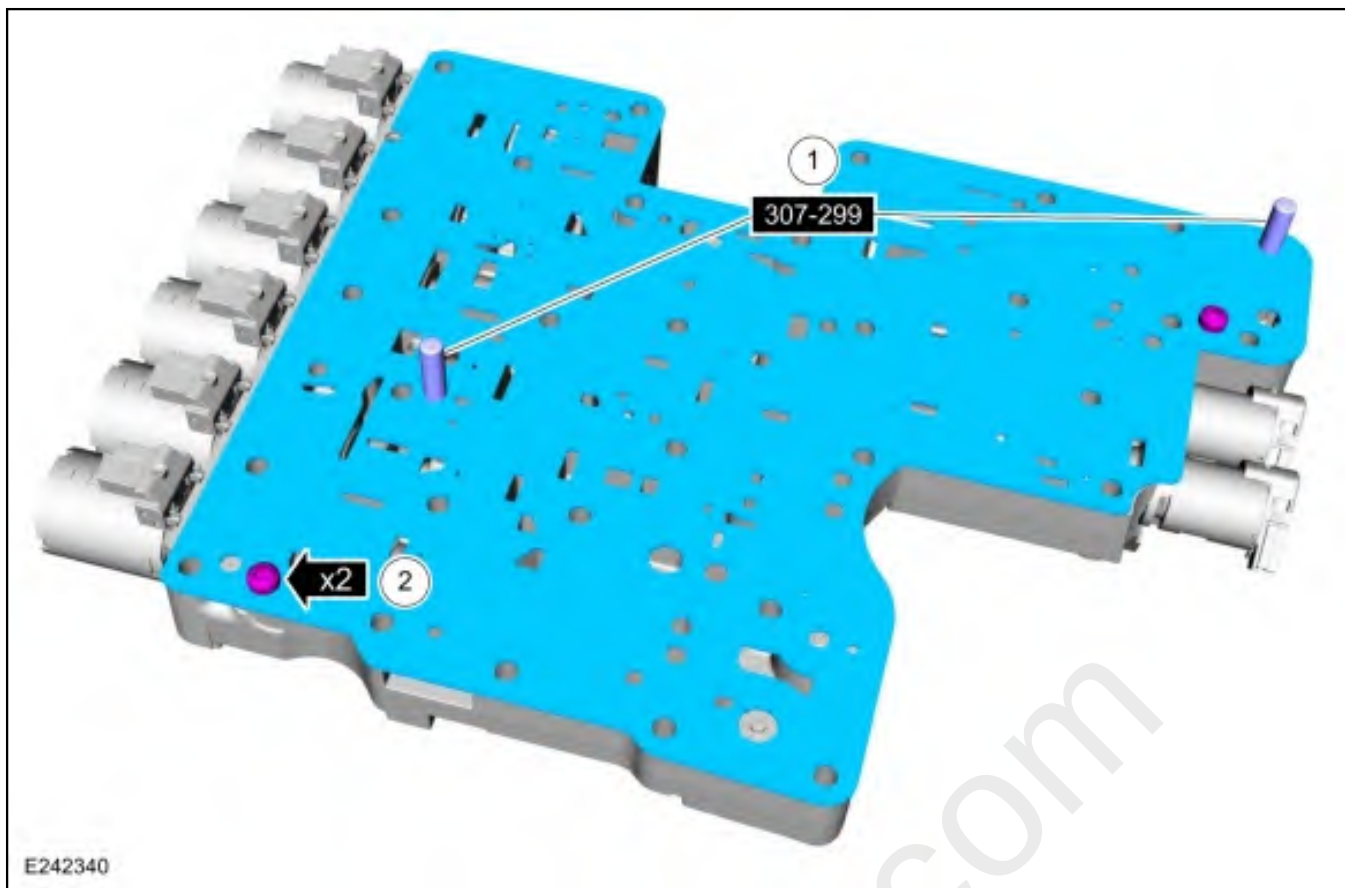
24. **NOTE:** The orientation of the valves and springs.

Install the following items:

1. Check valve assemblies
2. LPC damper assembly
3. TCC damper assembly

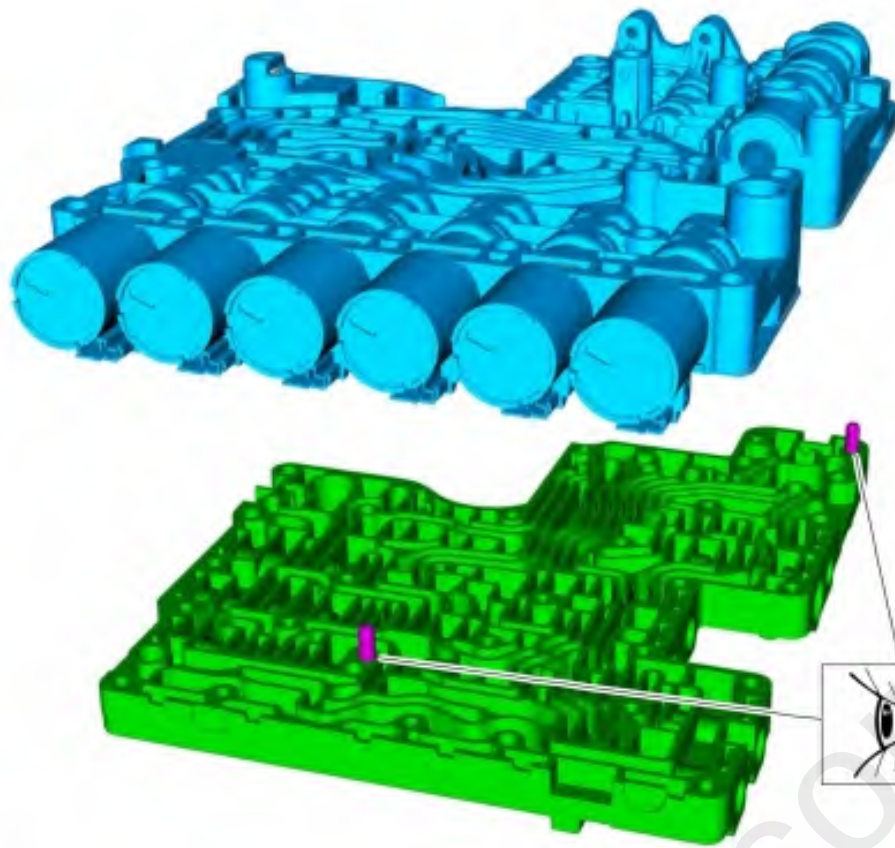


25. Using the special tools align the new valve body spacer plate onto the lower valve body and install the bolts.
Use Special Service Tool: 307-299 Alignment Pins, Valve Body.
Torque: 71 lb.in (8 Nm)

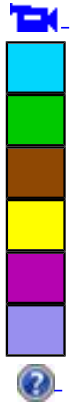


Upper and Lower Valve Body

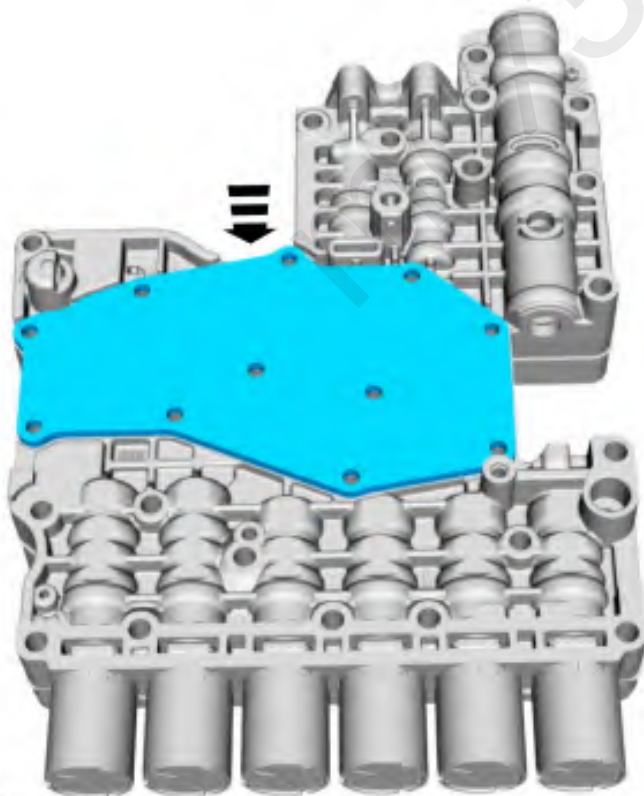
26. Align the guide pins on the upper valve body with the alignment holes in the lower valve body.



E243032



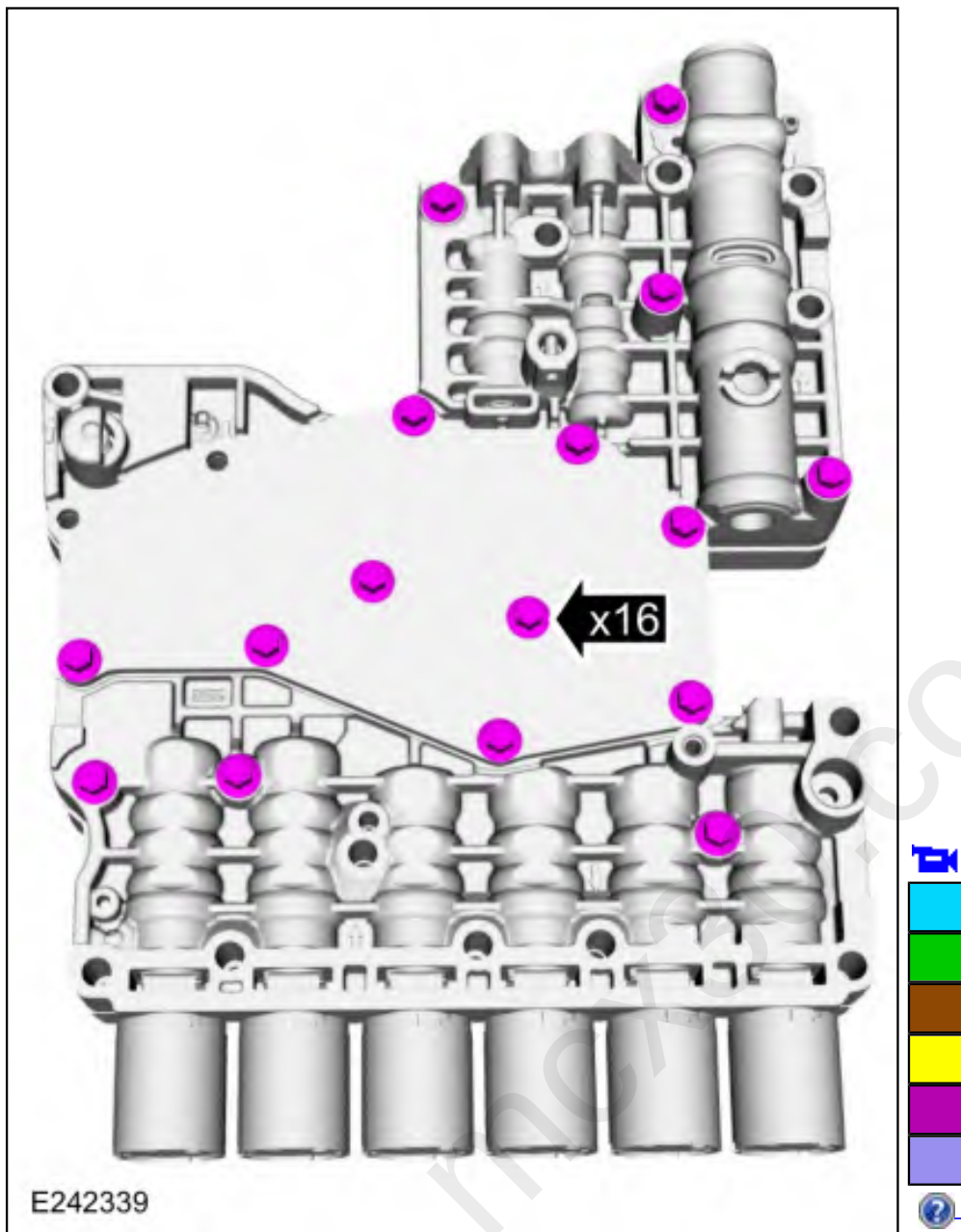
27. Install the new valve body channel plate.



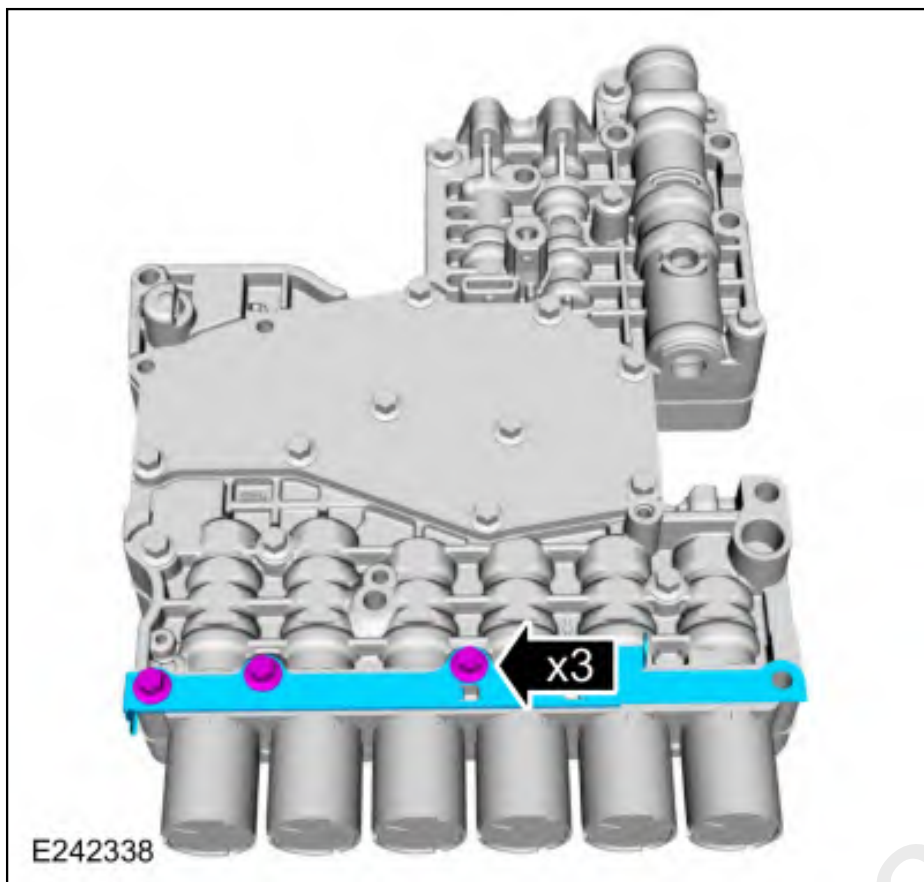
E242258



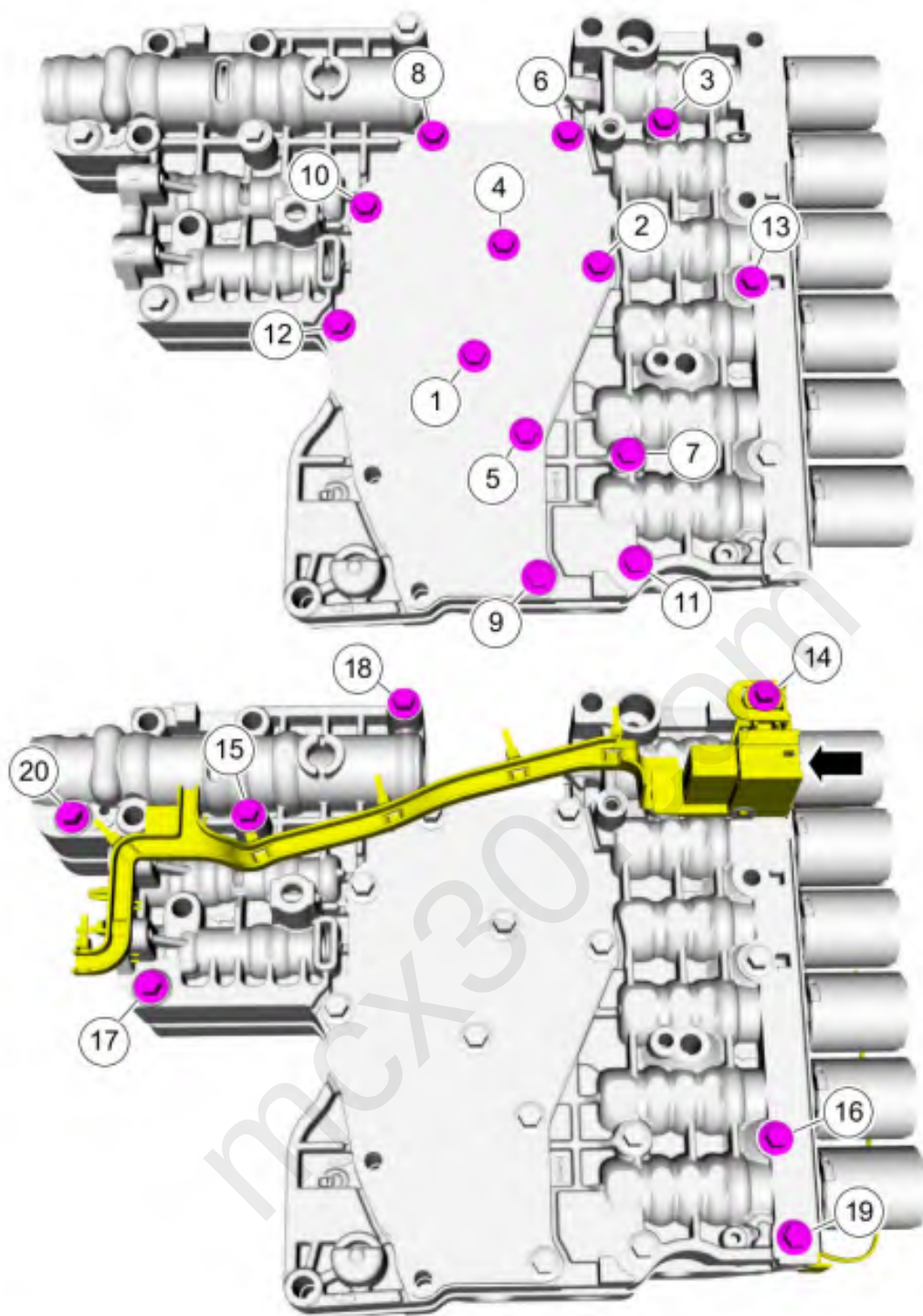
28. Loosely install the valve body bolts.



29. Install the shift solenoid retaining plate and loosely install the bolts.



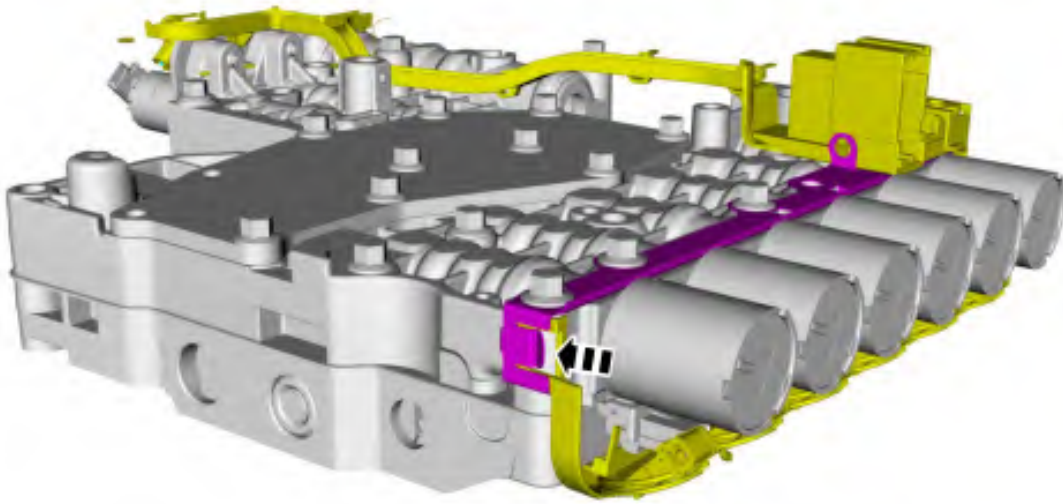
30. Tighten the bolts in the sequence shown.
Torque: 106 lb.in (12 Nm)



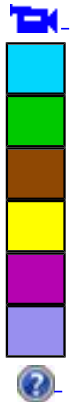
E242508

31. Push the internal wiring harness into the retainer.





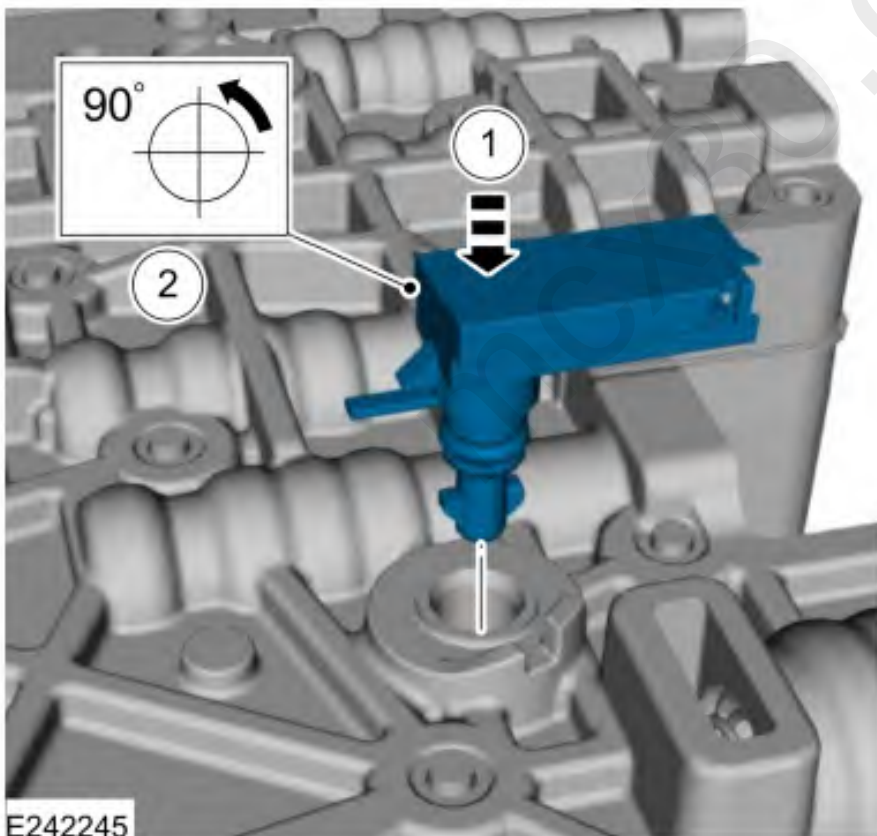
E242509



32.

Install the TFT sensor.

1. Position the TFT sensor in the main control valve body.
2. Rotate the TFT sensor counter clockwise until the plastic tab locks into place.



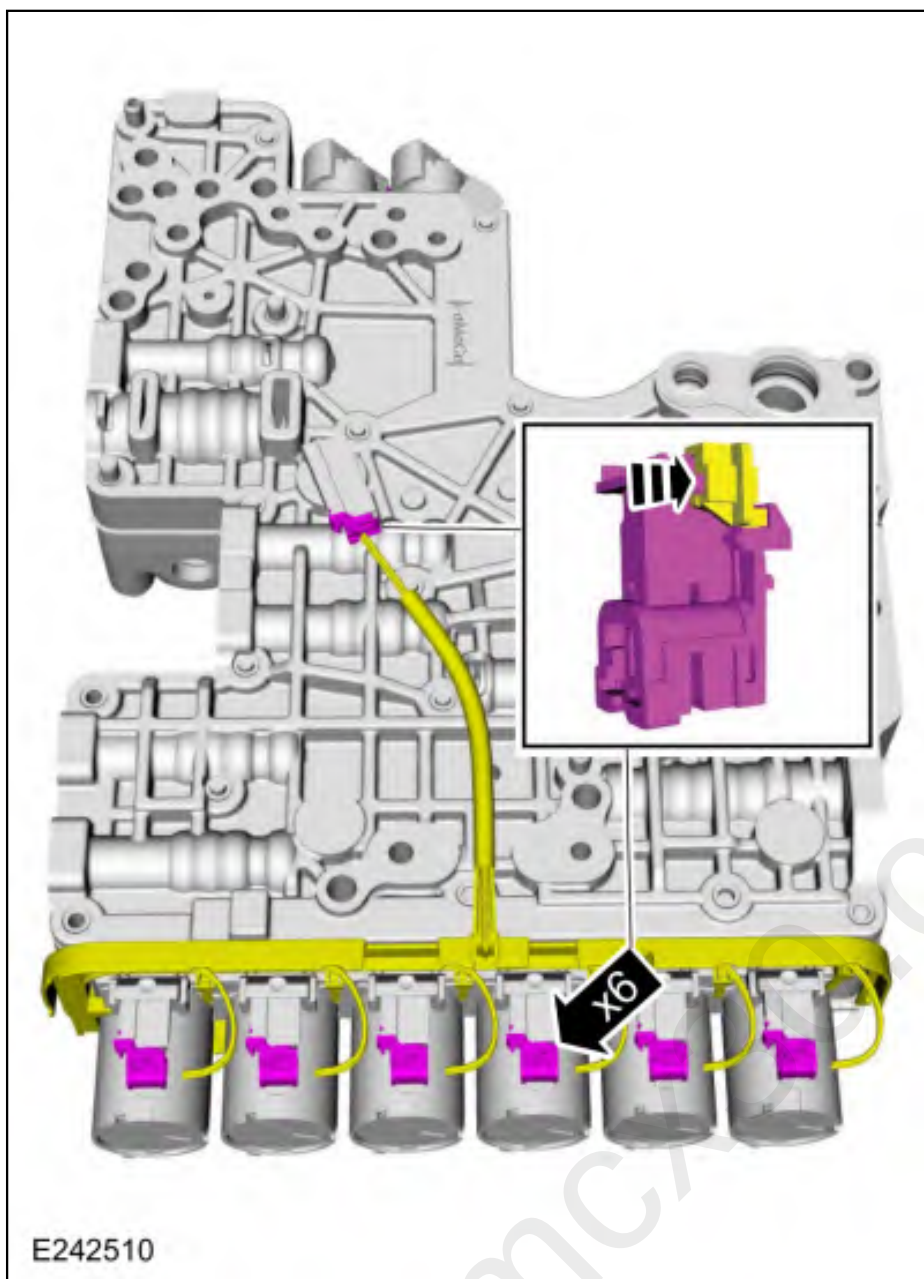
E242245



33.

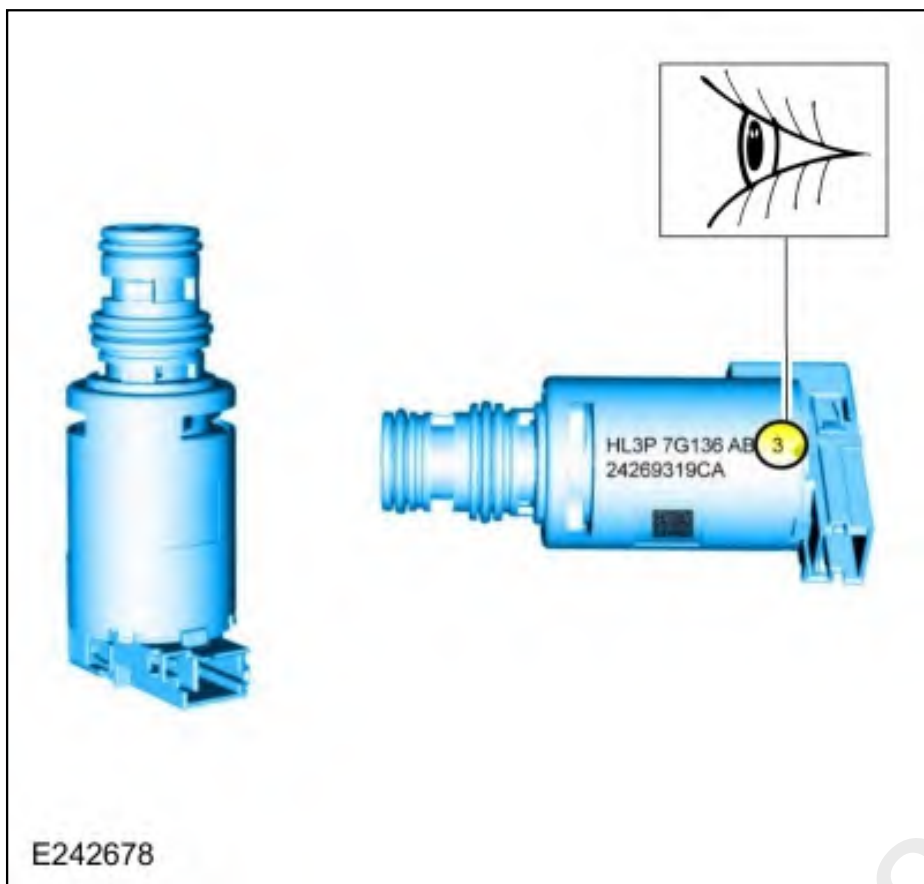
Connect the internal wiring harness electrical connectors.

- Slide the plastic lock to the locked position.



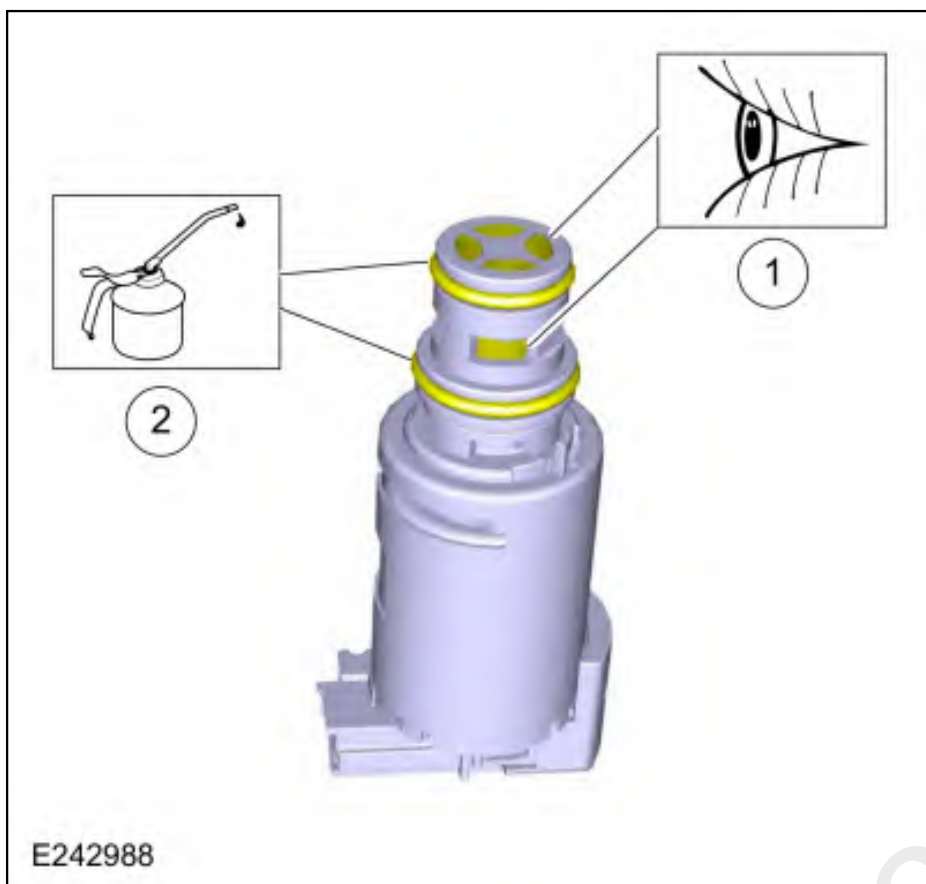
34. **NOTICE:** Solenoids are calibrated from the factory and are not all the same. To replace a solenoid, match the replacement solenoid type (normally high/normally low) and the band number with the original solenoid or harsh shifts or damage to the transmission can occur.

If new solenoids are needed, identify which type (normally high/normally low) of solenoid it is and the solenoid band number.

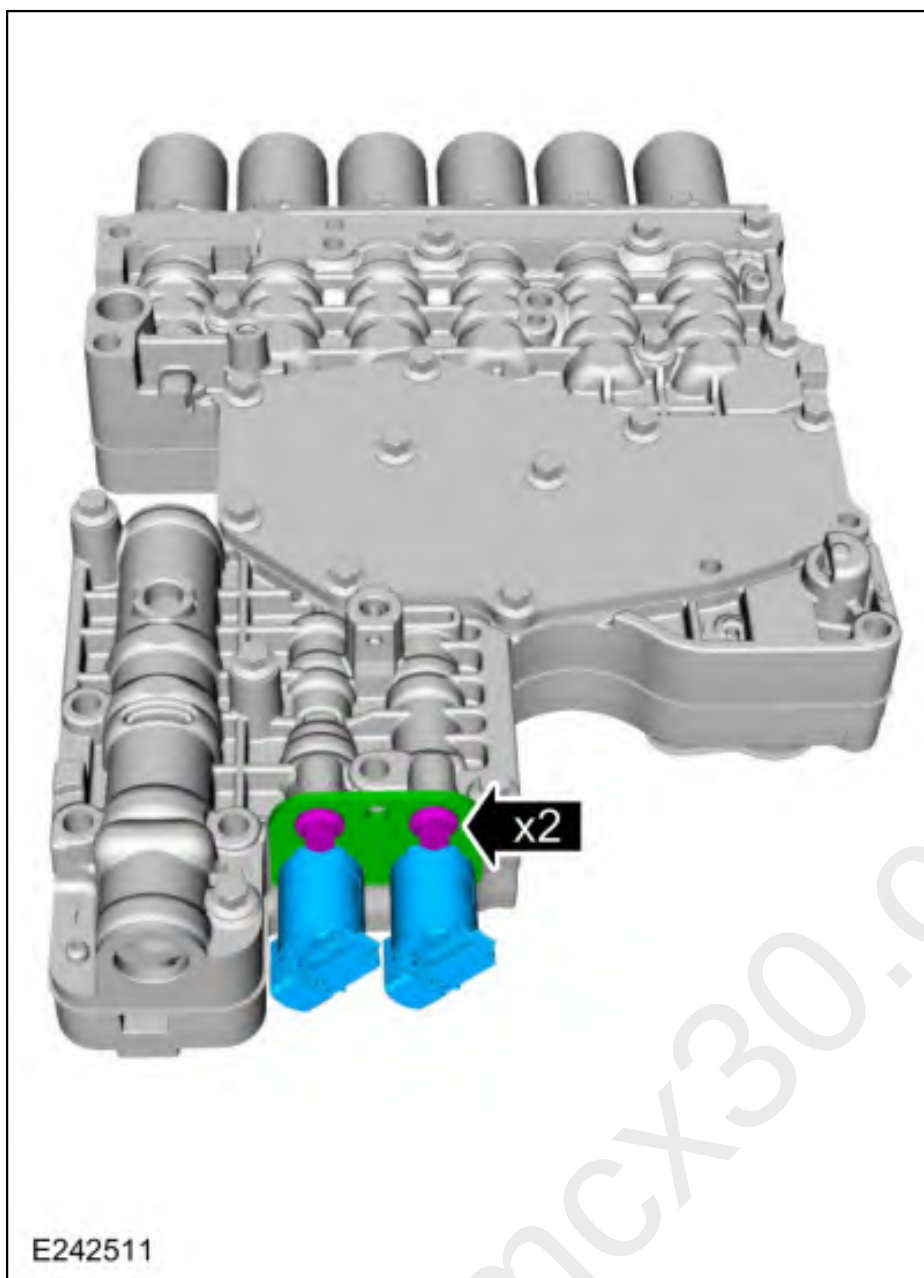


1. Inspect the solenoid screens for debris that may restrict fluid flow
2. Lubricate the solenoid O-ring seals.

Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-ULV (WSS-M2C494-A)



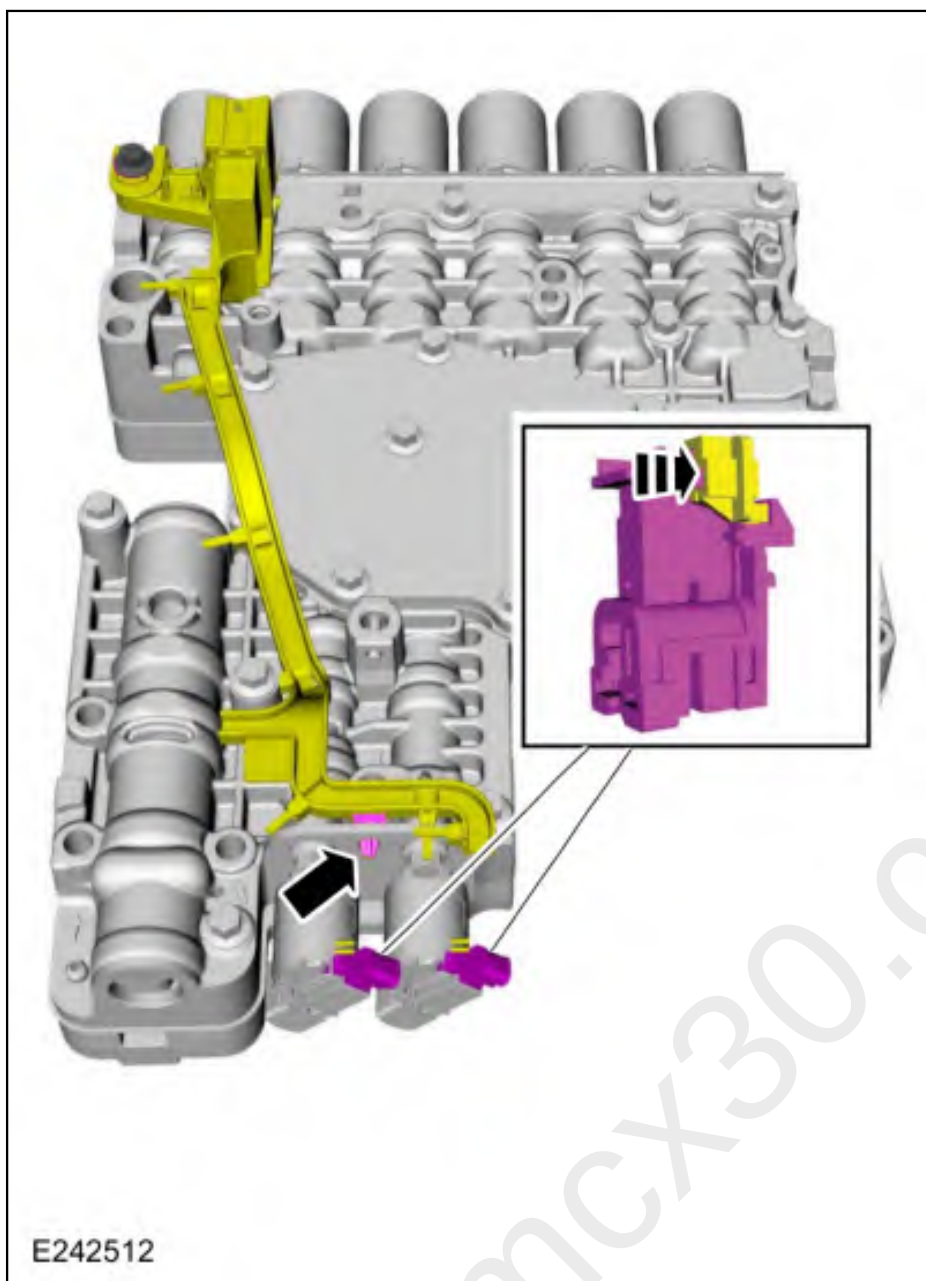
36. Install the TCC solenoid, LPC solenoid, solenoid retaining plate and the new bolts.
Torque: 80 lb.in (9 Nm)



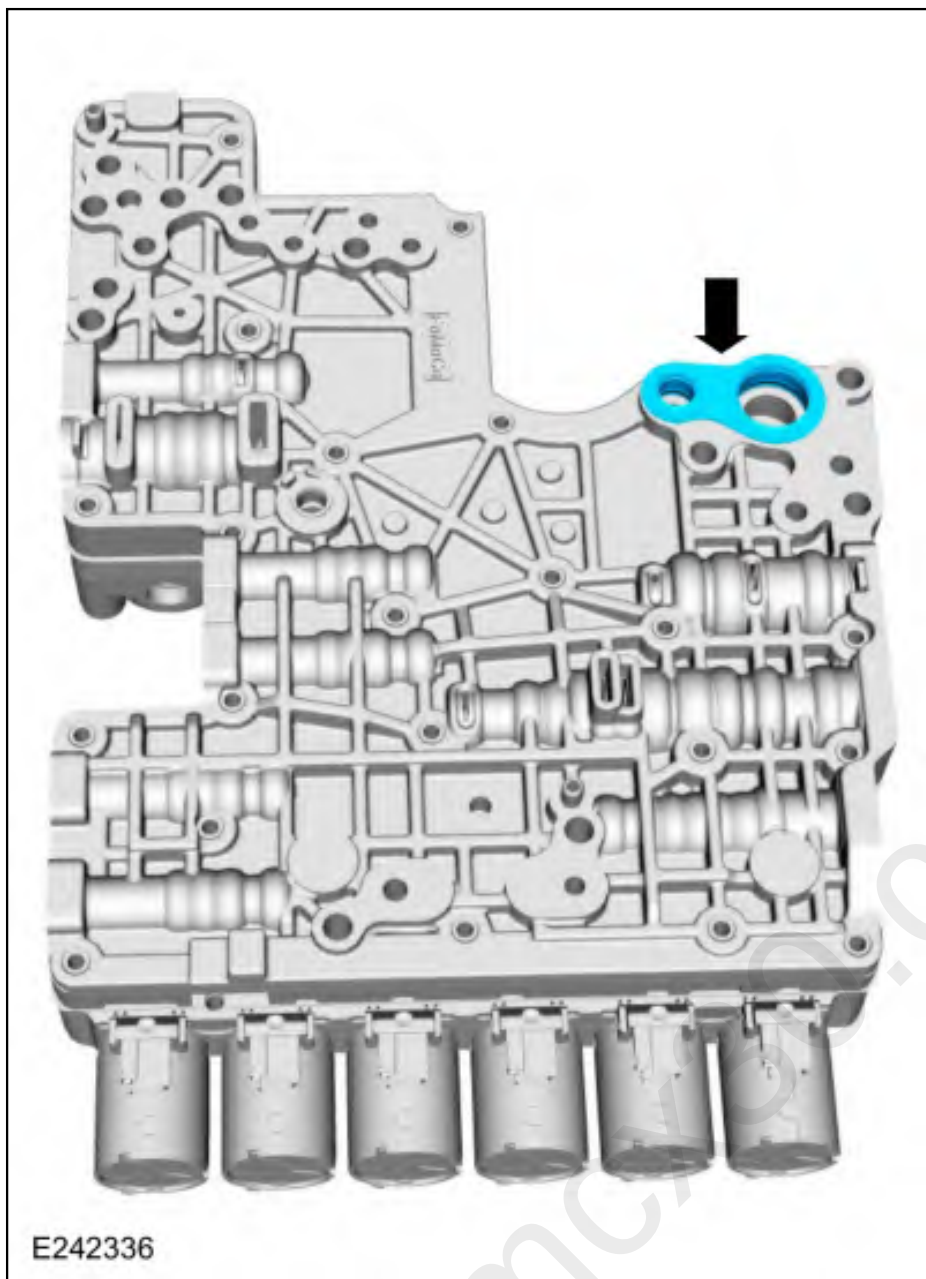
37.

Connect the internal wiring harness.

1. Slide the plastic lock to the locked position.
2. Connect the internal wiring harness retainer.



38. Install the main control assembly to transmission fluid pump seal.

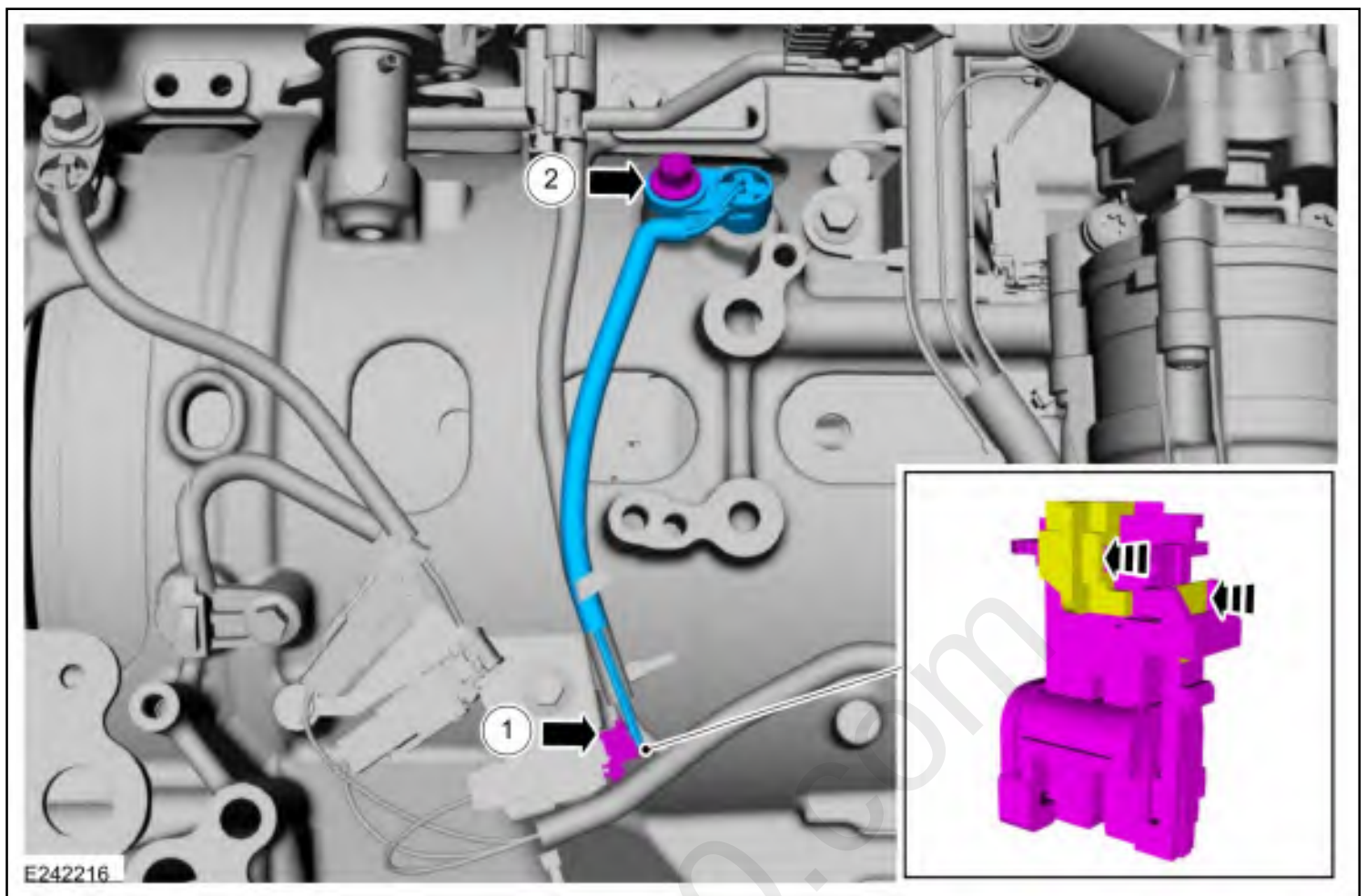


Intermediate Speed Sensor B (ISSB)

Base Part Number: Base Part Number: 7H103

Removal

1. Remove the main control valve body.
Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
2. Remove the intermediate speed sensor B.
 1. Slide the plastic lock to the unlocked position. While pressing the plastic tab, disconnect the electrical connector.
 2. Remove the bolt and the intermediate speed sensor B.



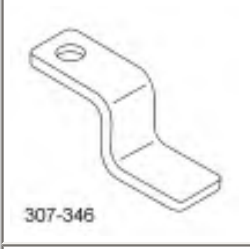
Installation

1. Install the intermediate speed sensor B.
 1. Install the intermediate speed sensor B bolt.
Torque: 62 lb.in (7 Nm)
 2. Connect the electrical connector. Slide the plastic lock to the locked position.

Transmission - 2.7L EcoBoost (238kW/324PS)

Base Part Number: Base Part Number: 7000

Special Tool(s) / General Equipment

	307-346 (T97T-7902-A) Retainer, Torque Converter TKIT-1997-F/FLM/LT TKIT-1998-LM (NavigatoR)
Transmission Jack	

Materials

Name	Specification
Motorcraft® Multi-Purpose Grease Spray XL-5-A	ESB-M1C93-B
Motorcraft® MERCON® ULV Automatic Transmission Fluid XT-12-QULV	MERCON® ULV WSS-M2C949-A

Removal

1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. Remove the following items:
 1. Remove the starter motor assembly.
Refer to: [Starter Motor](#) (303-06A Starting System - 2.7L EcoBoost (238kW/324PS), Removal and Installation).
 2. Remove the transmission fluid cooler.
Refer to: [Transmission Fluid Cooler - 2.7L EcoBoost \(238kW/324PS\)/3.5L EcoBoost \(272kW/370PS\)/5.0L 32V Ti-VCT](#) (307-02 Transmission Cooling, Removal and Installation).
 3. Remove the rear driveshaft assembly.
Refer to: [Rear Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

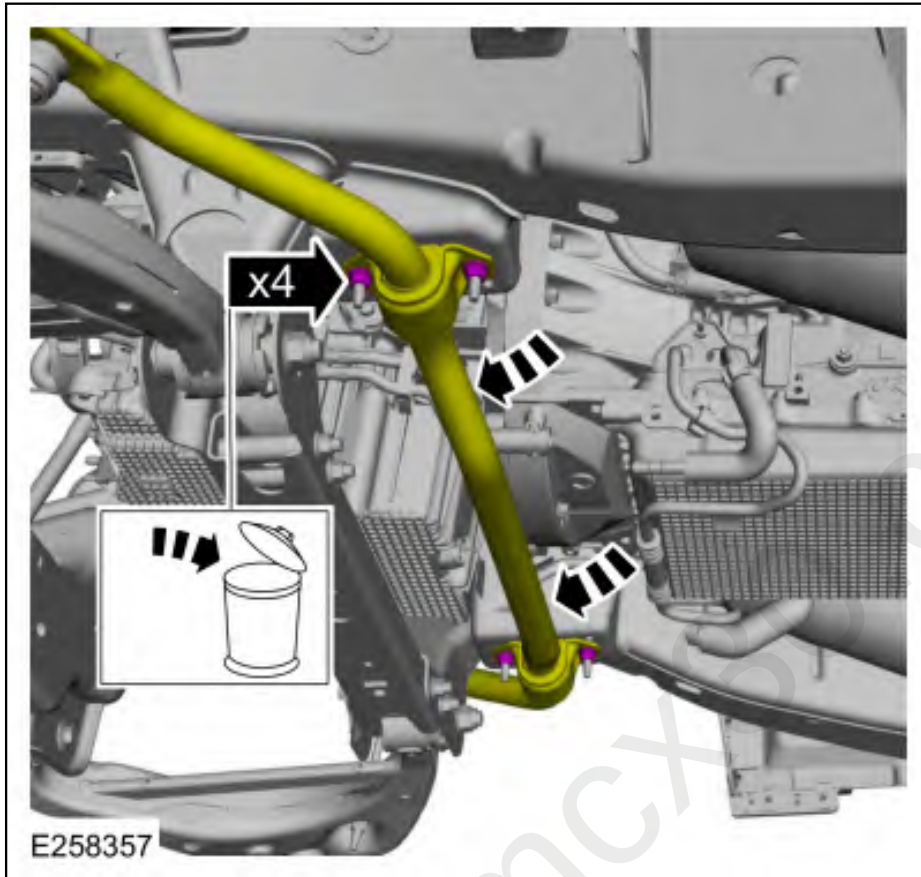
Four-Wheel Drive (4WD) vehicles

3. Remove the front driveshaft assembly.

Refer to: [Front Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

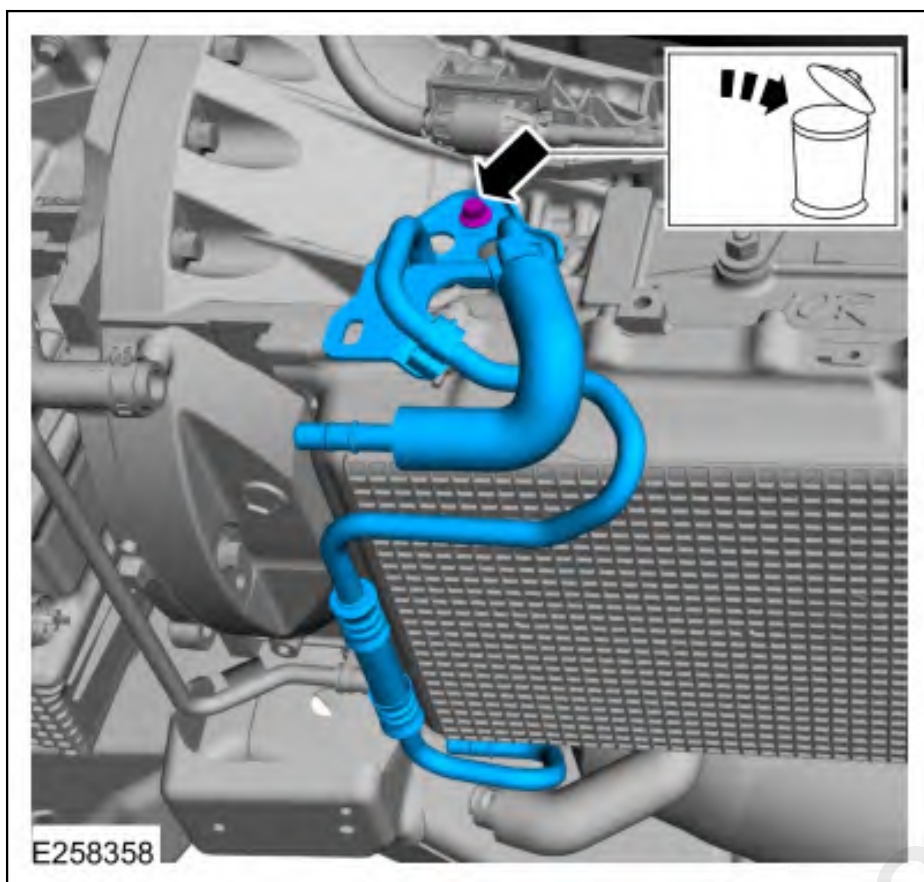
Rear Wheel Drive (RWD) vehicles

4. Remove and discard the stabilizer bar bracket nuts and allow the stabilizer bar to swing downward.

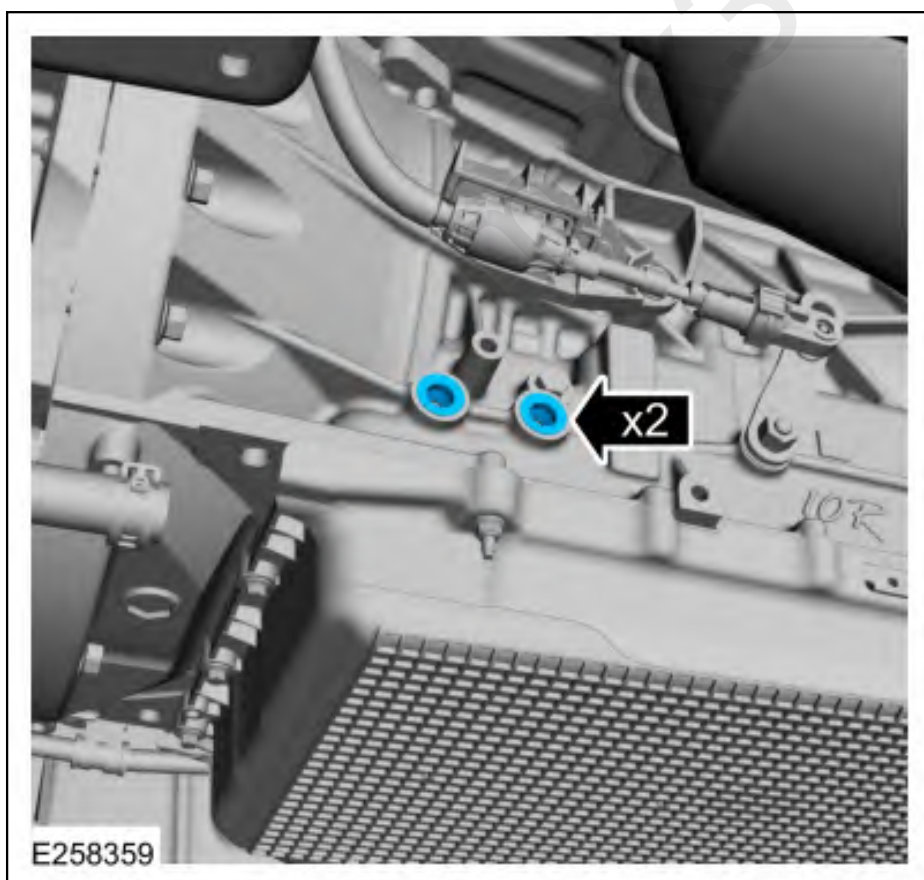


All vehicles

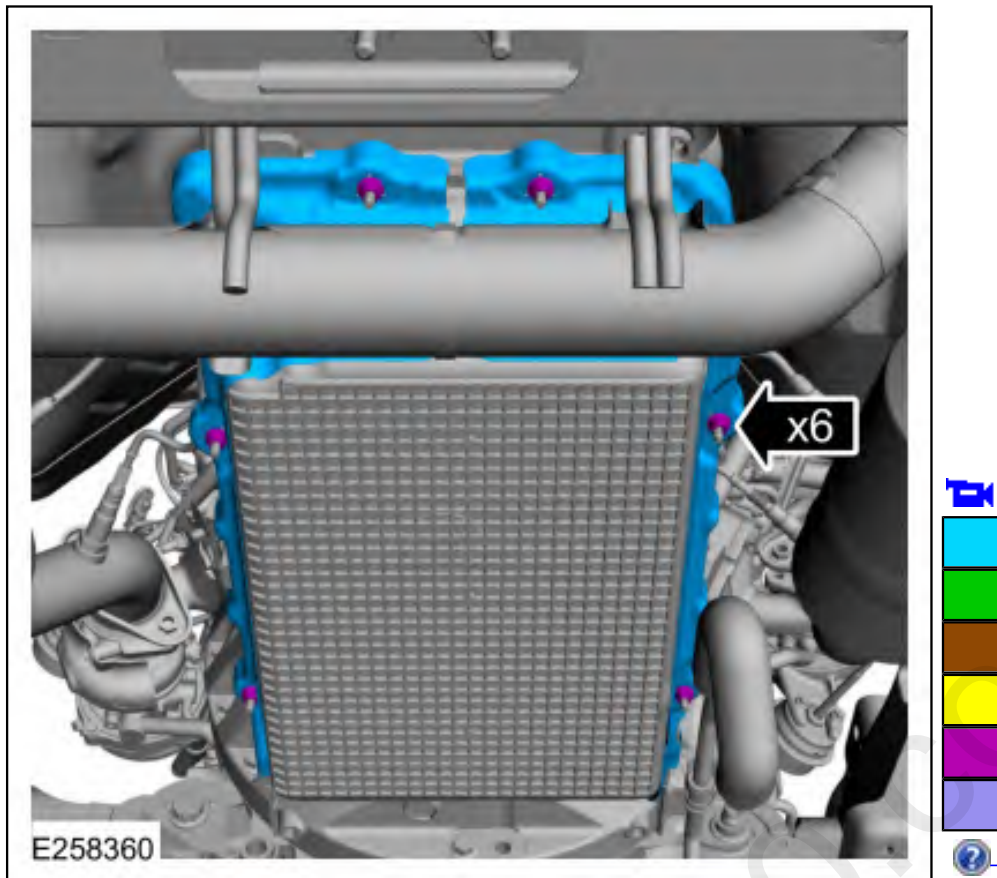
5. Remove and discard the bolt and remove the transmission fluid cooler tubes.



6. If the transmission fluid cooler tube seals or backing rings are stuck in the transmission case, remove the seals and backing rings.



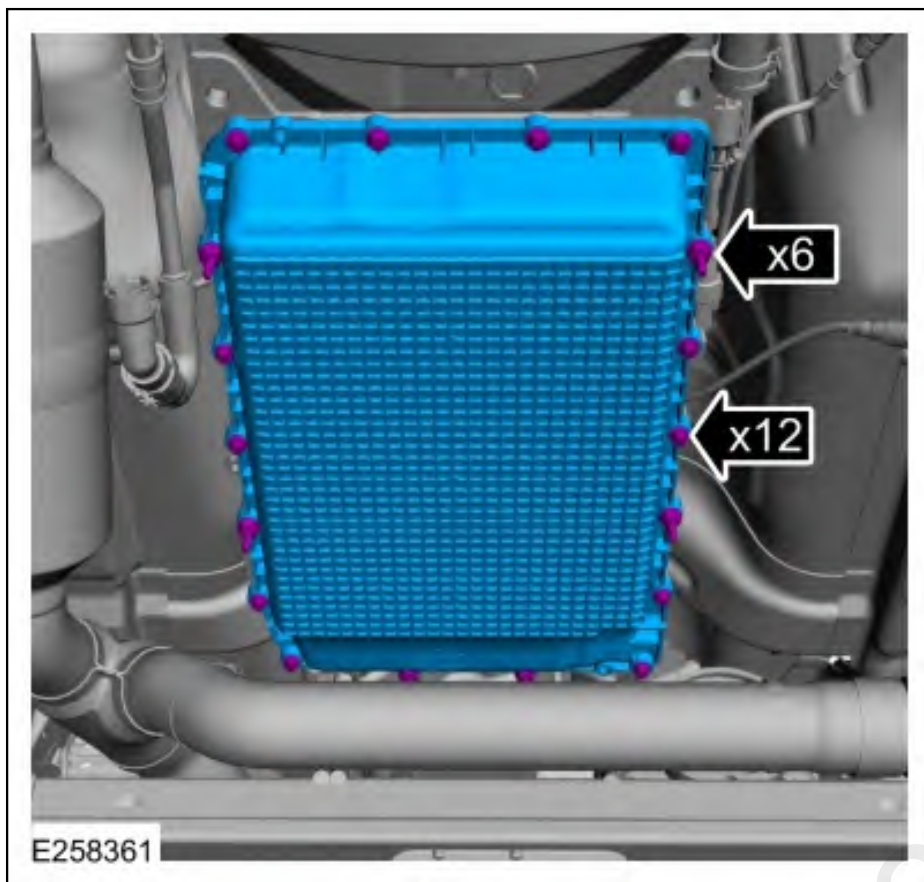
7. Remove the retainers and heatshield.



8. **NOTE:** *If transmission disassembly or installation of a new transmission is necessary, drain the transmission fluid.*

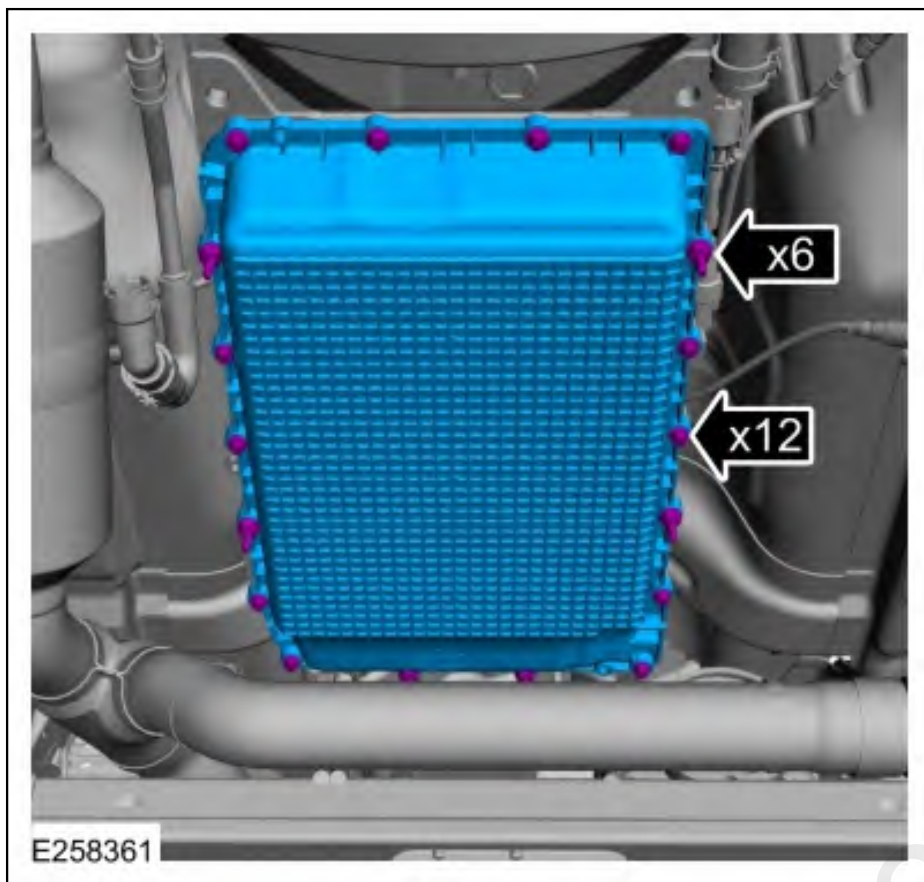
NOTE: *Note the location of the bolts and studbolts for assembly.*

Remove the bolts, studbolts and the transmission fluid pan.



9. **NOTE:** *It is not necessary to torque transmission fluid pan bolts at this time.*

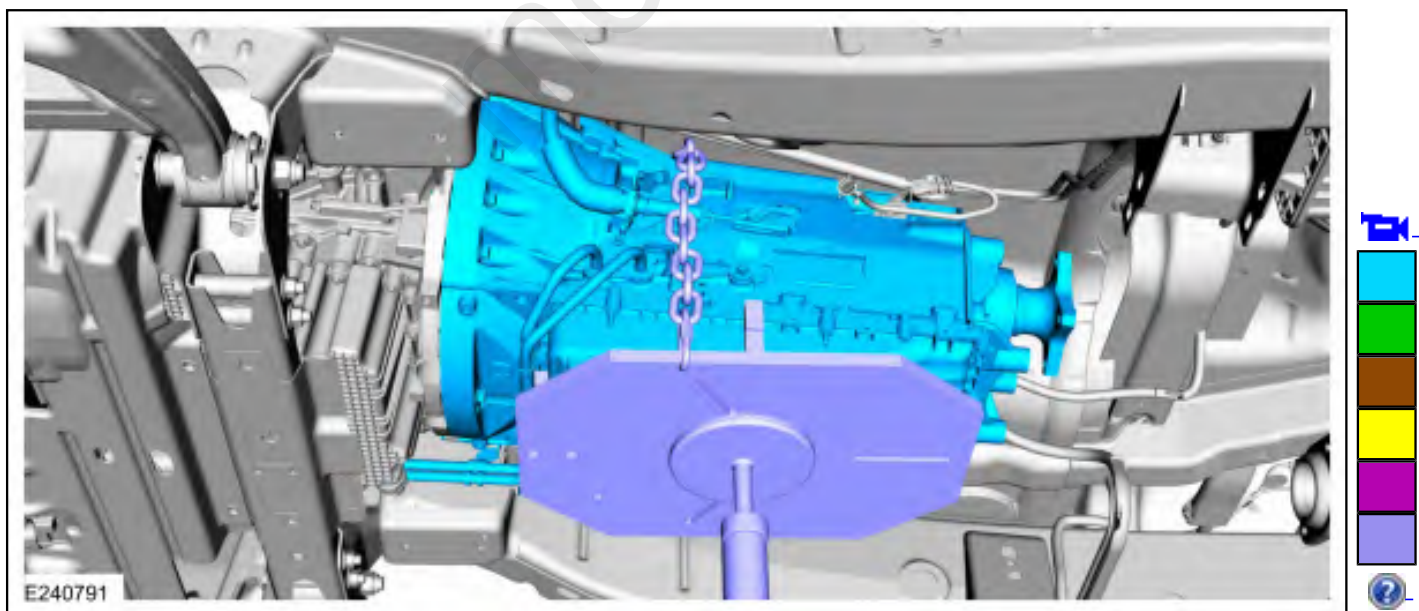
Install the transmission fluid pan and the bolts.



10. **NOTICE:** Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

Using a high-lift transmission jack, support the transmission.
Use the General Equipment: Transmission Jack



11. Remove the LH catalytic converter.

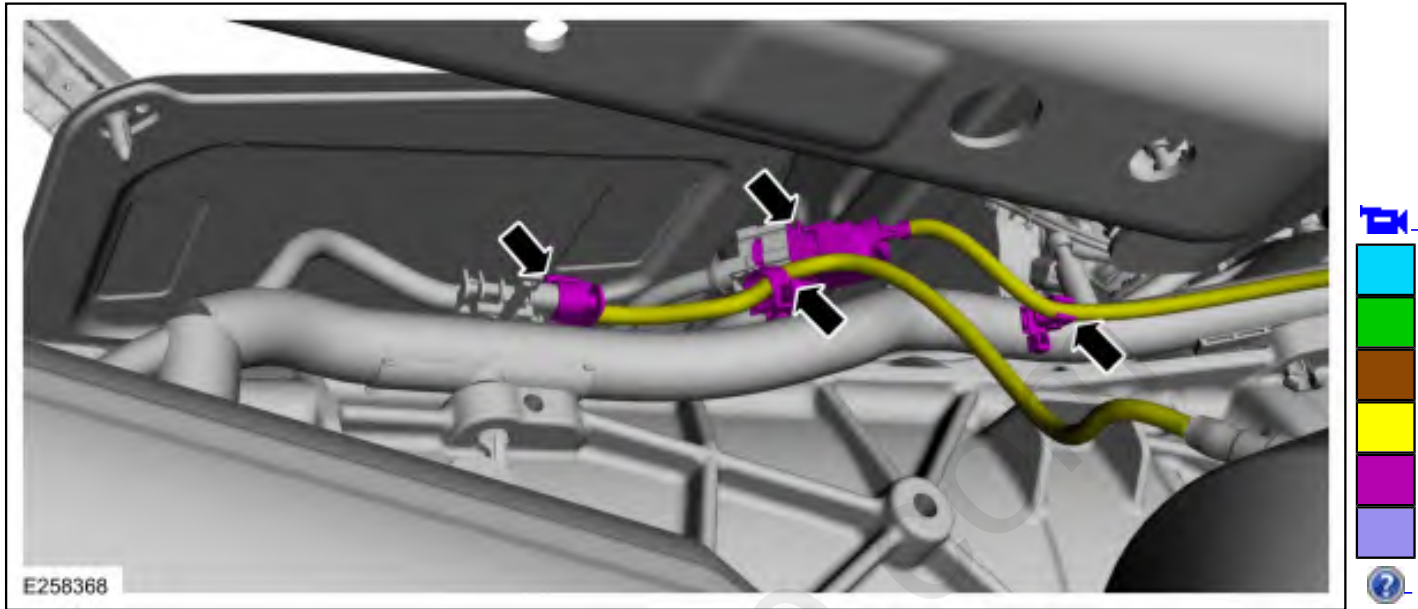
Refer to: [Catalytic Converter LH](#) (309-00A Exhaust System - 2.7L EcoBoost (238kW/324PS), Removal and

Installation).

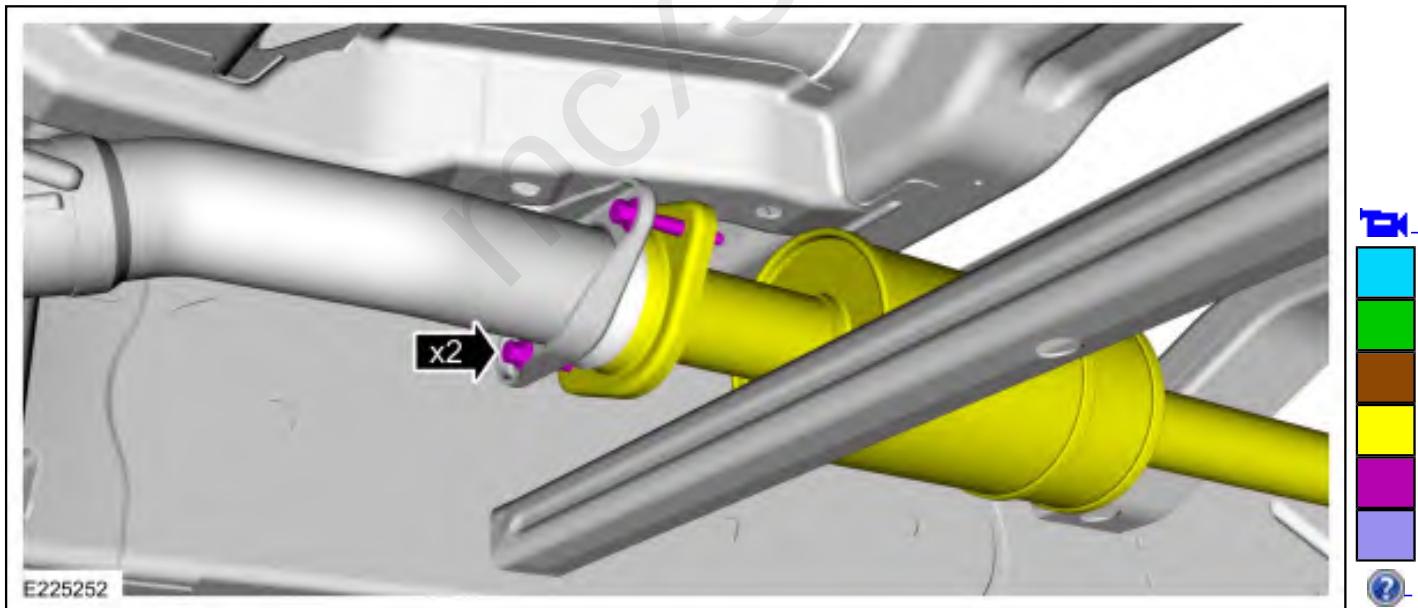
12. Remove the transmission support insulator.

Refer to: [Transmission Support Insulator](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

13. Disconnect the RH catalyst monitor sensor and the RH HO2S electrical connectors.

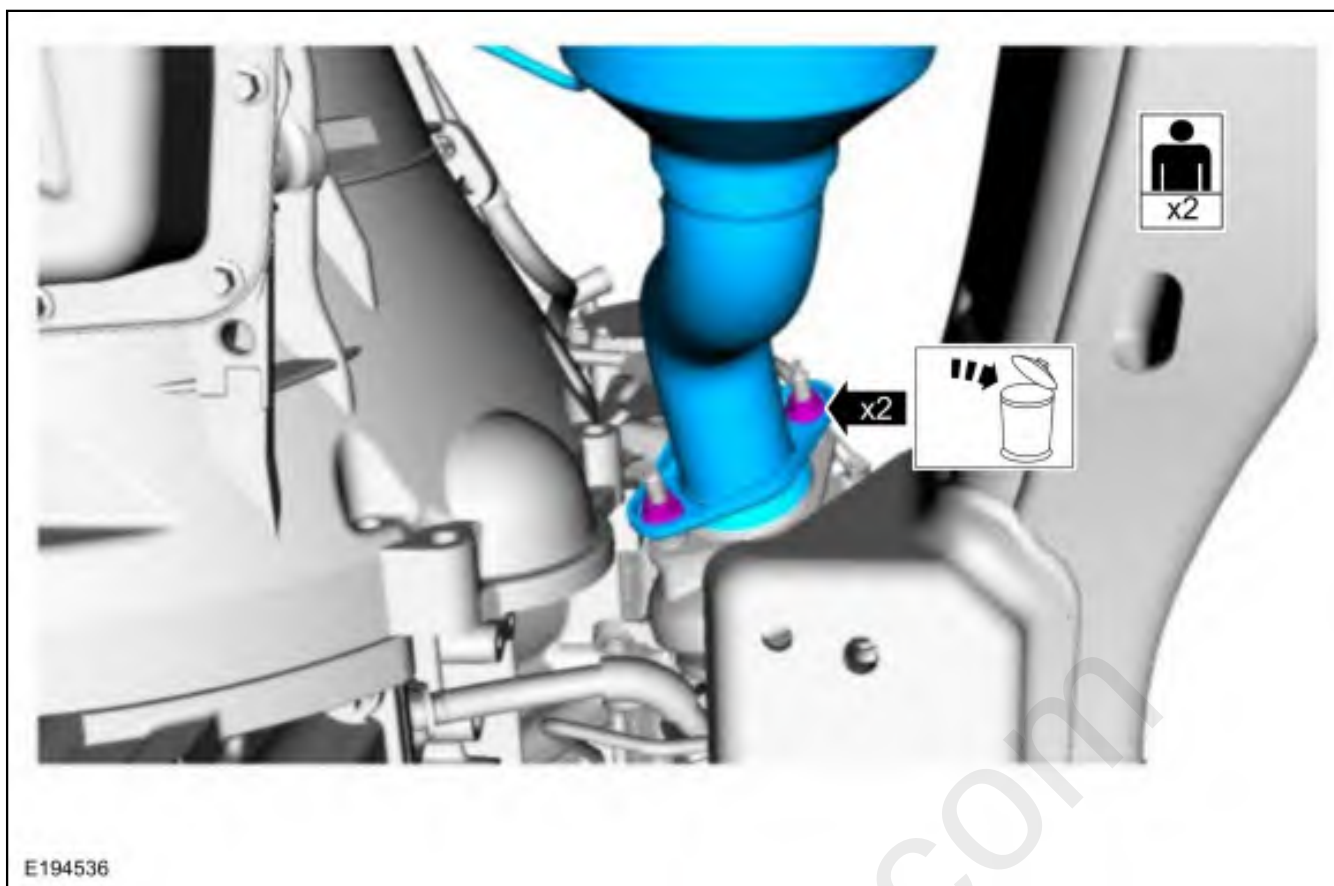


14. Remove the bolts from the catalytic converter flange to the muffler inlet pipe.



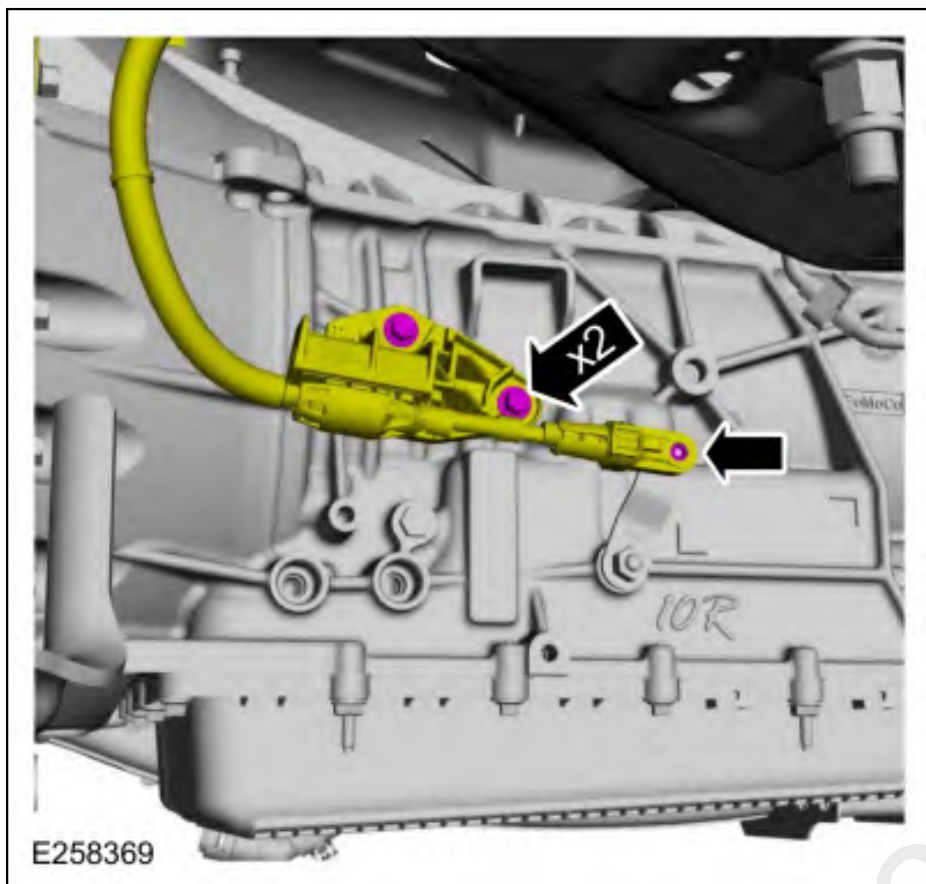
15. **NOTE:** Clean all exhaust connections before reassembly.

Remove and discard the catalytic converter nuts and remove the catalytic converter. Discard the gasket.



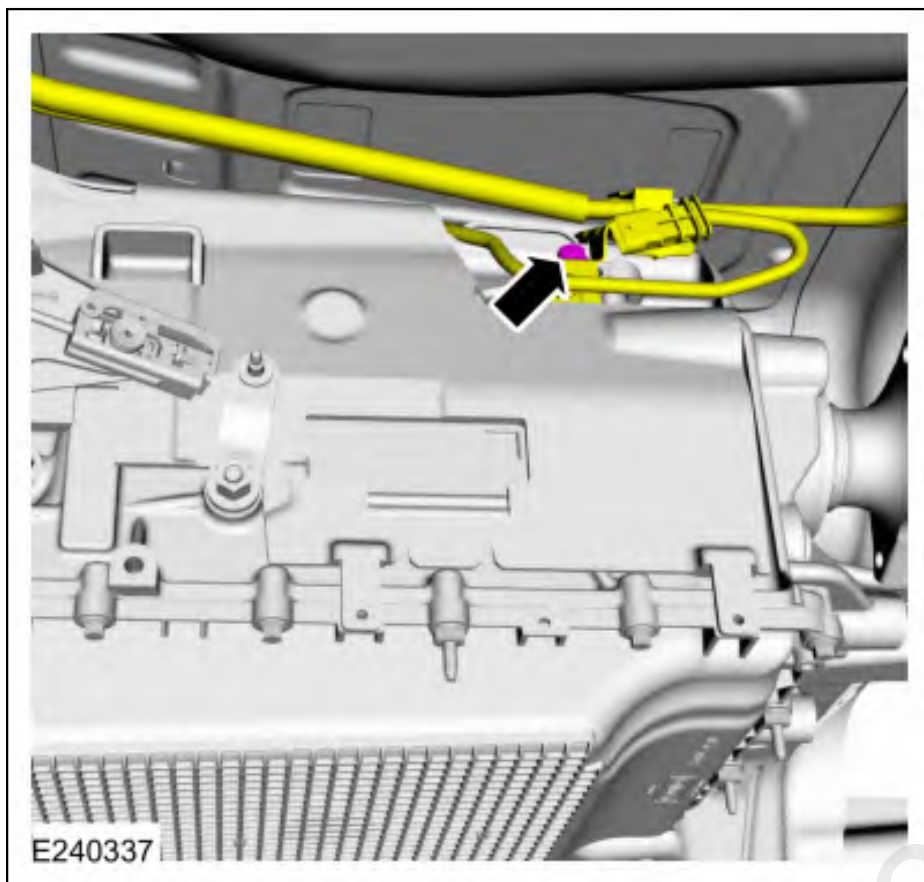
16. **NOTICE:** To prevent selector lever cable damage, do not apply force to the selector lever cable between the manual control lever and the selector lever cable bracket.

Remove the bolts, disconnect the selector lever cable and position aside.



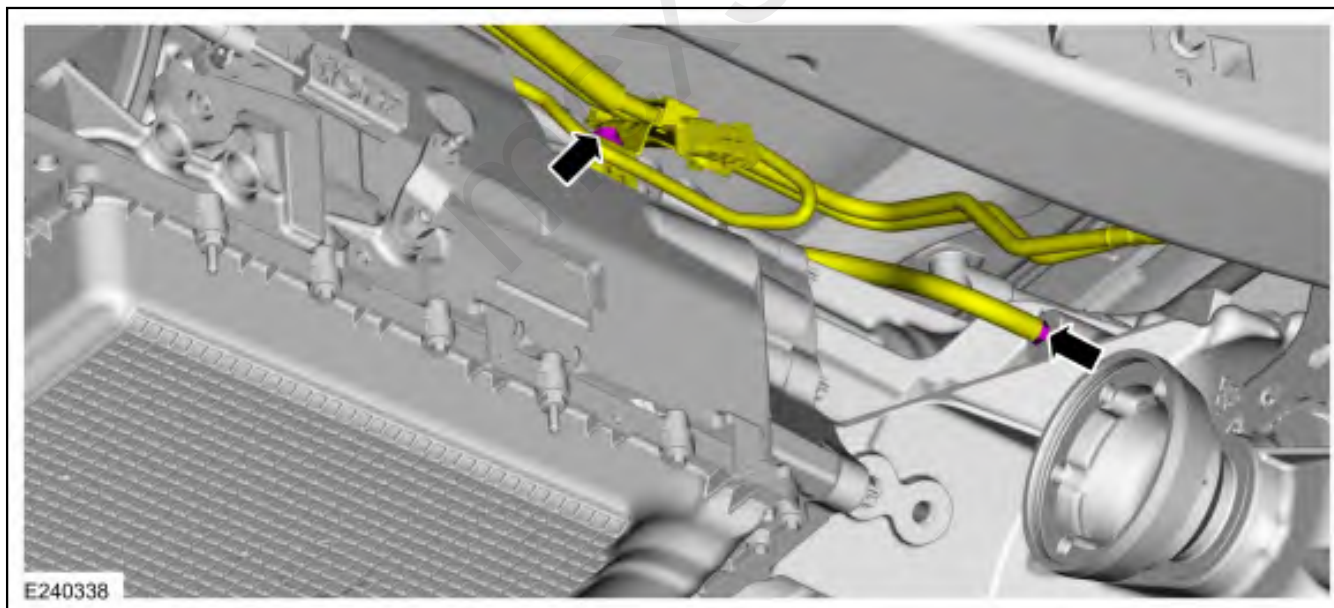
Rear Wheel Drive (RWD) vehicles

- 17. Remove the fuel line bracket bolt.

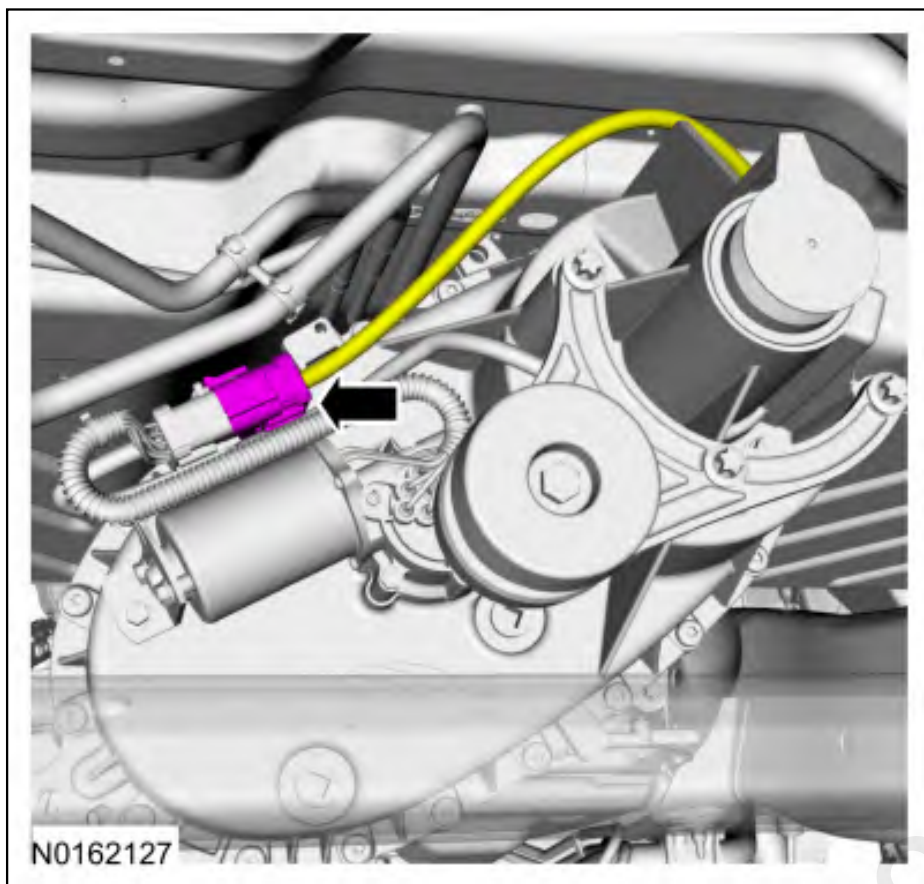


Four-Wheel Drive (4WD) vehicles

18. Remove the fuel line bracket bolt and disconnect the transfer case vent tube.



19. Disconnect the transfer case electrical connector.

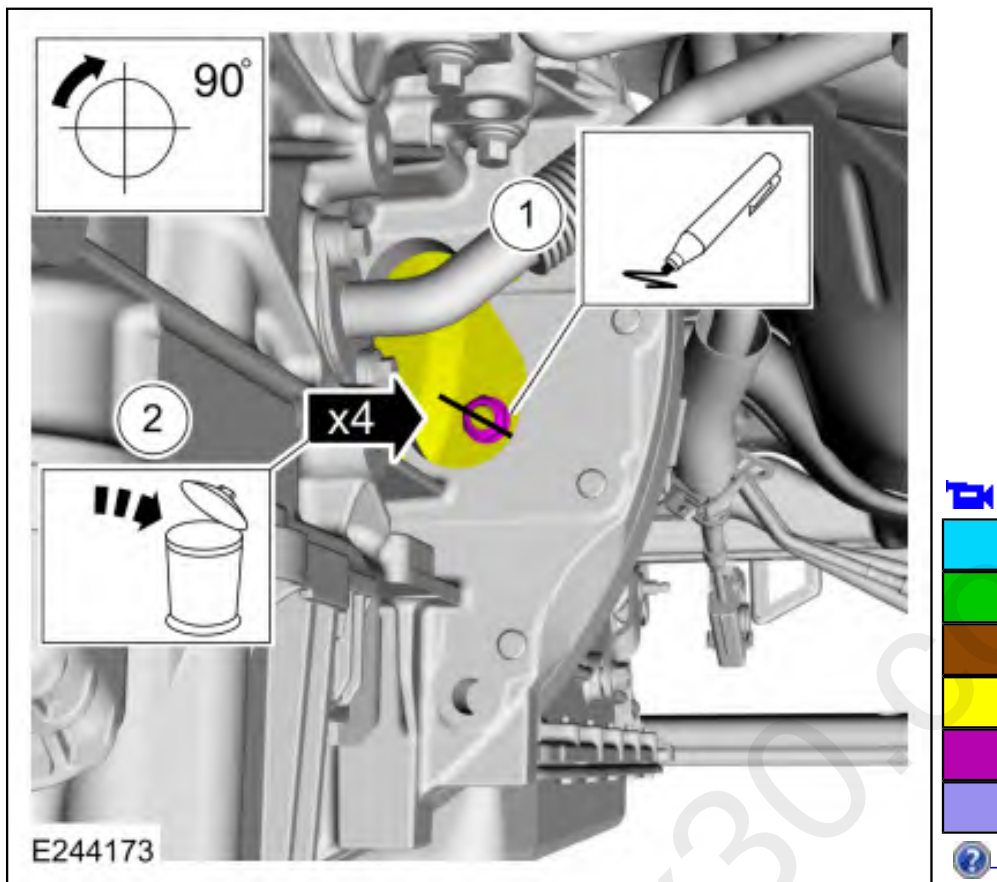


All vehicles

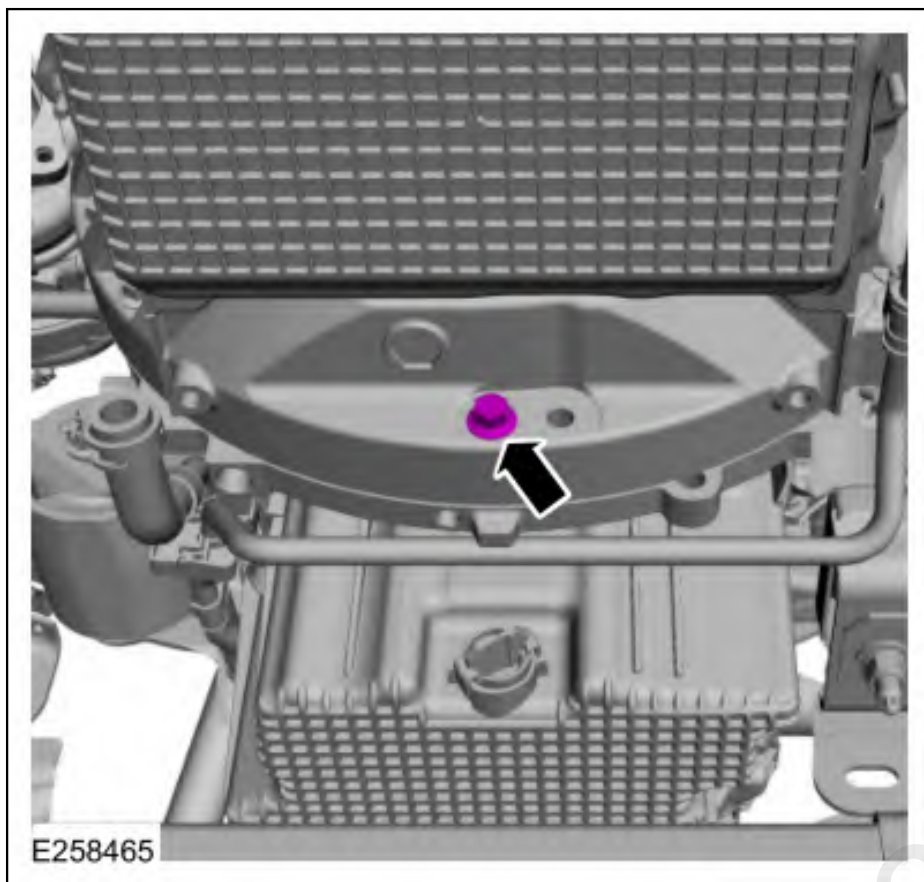
20. **NOTICE: Do not pull on the wire harness to disconnect the electrical connector or damage to the electrical connector will occur.**
1. Slide the lock tab up and disconnect the transmission electrical connector.
 2. Pull the transmission electrical connector out to disconnect.
 3. Detach the retainers from the transmission and position the wiring harness aside.

22. **NOTE:** Using the crankshaft pulley bolt, turn the engine clockwise.

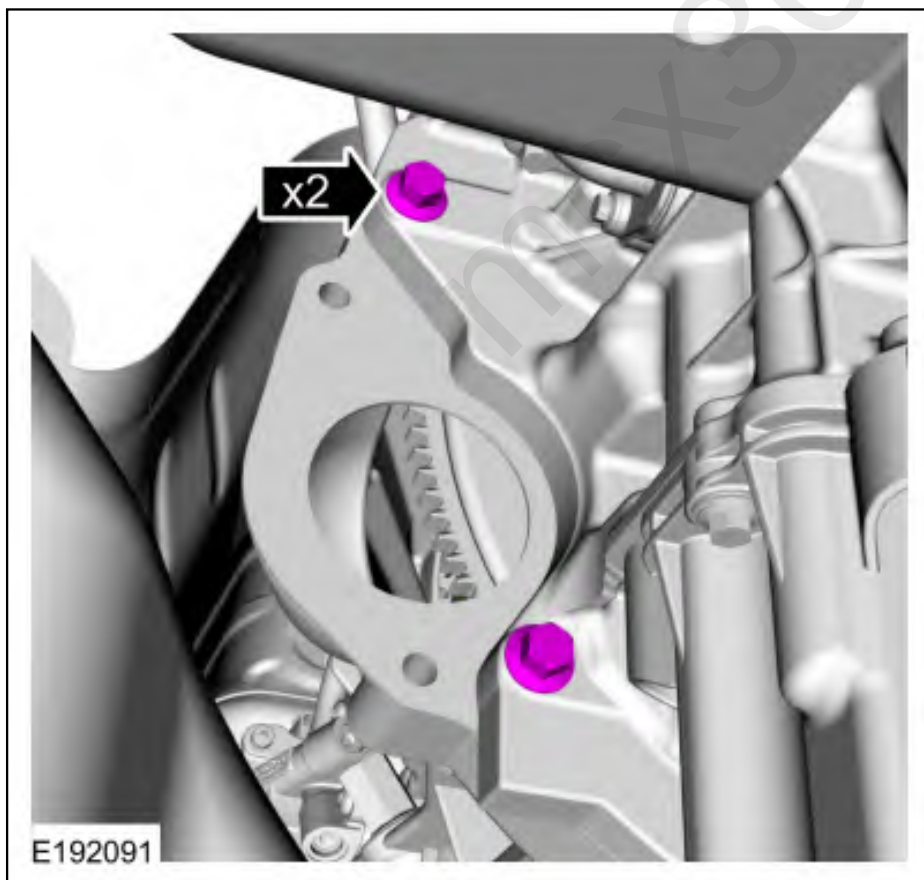
1. Index mark one stud and the flexplate for assembly reference.
2. Remove and discard the torque converter nuts.



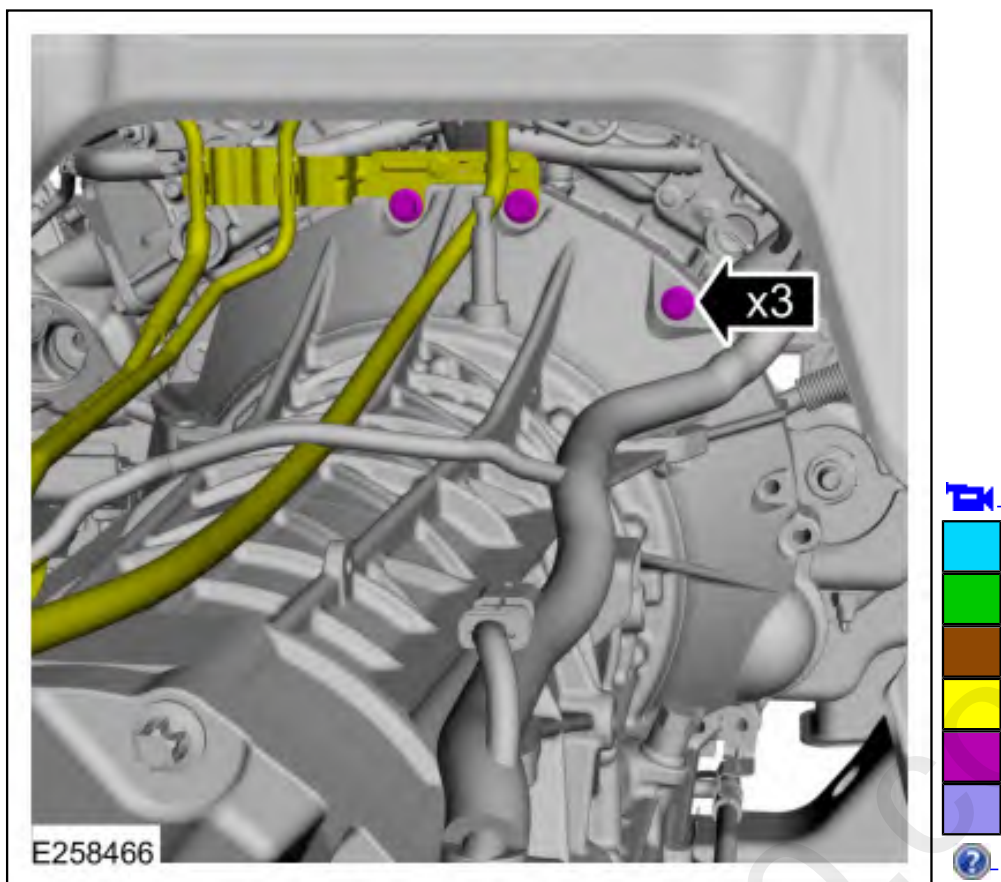
23. Remove the lower bellhousing bolt.



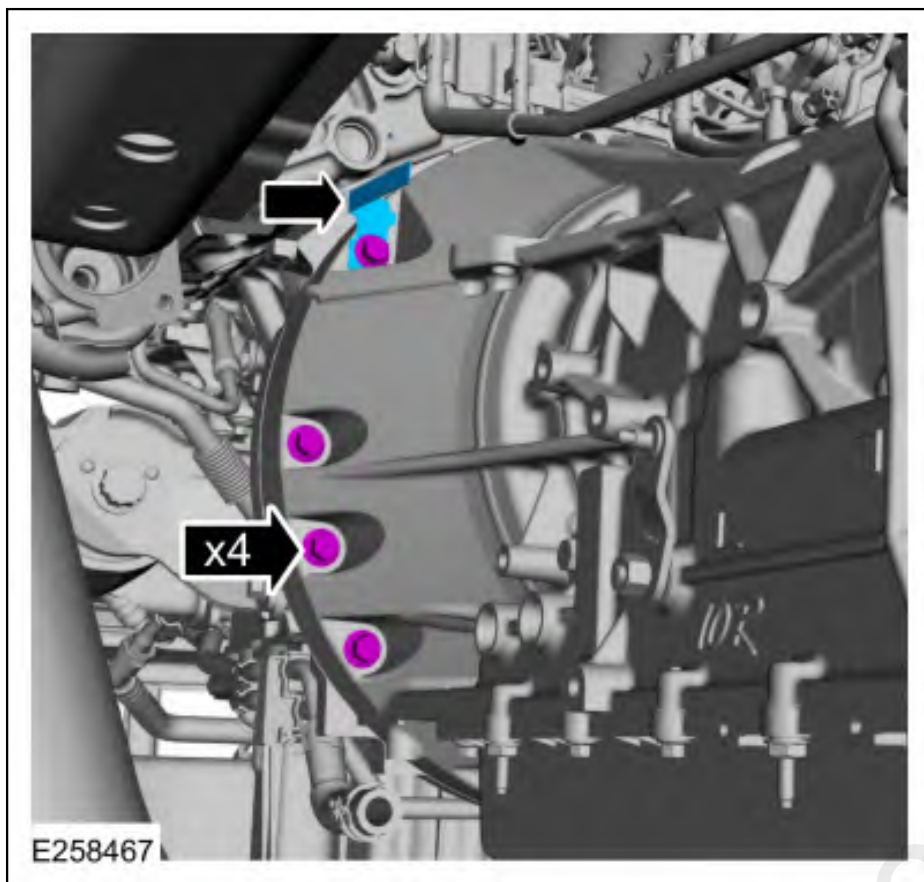
24. Remove the RH side bellhousing bolts.



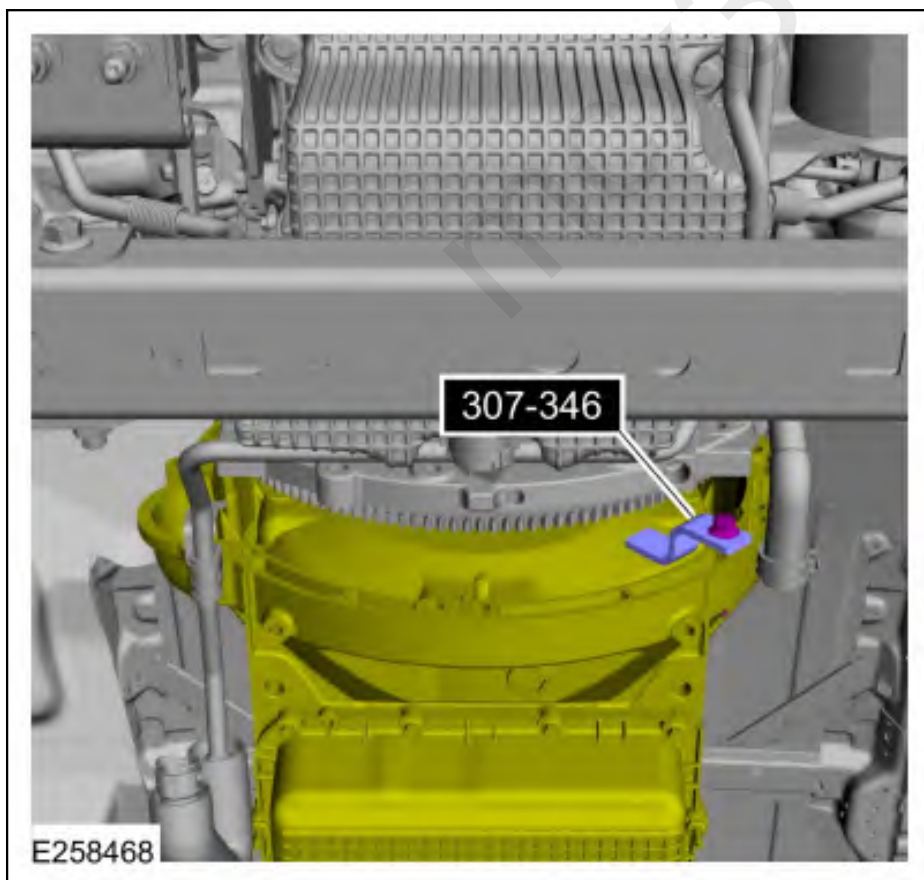
25. Remove the top bellhousing bolts and position aside the bracket.



26. Remove the LH bellhousing bolts and the selector lever cable bracket.

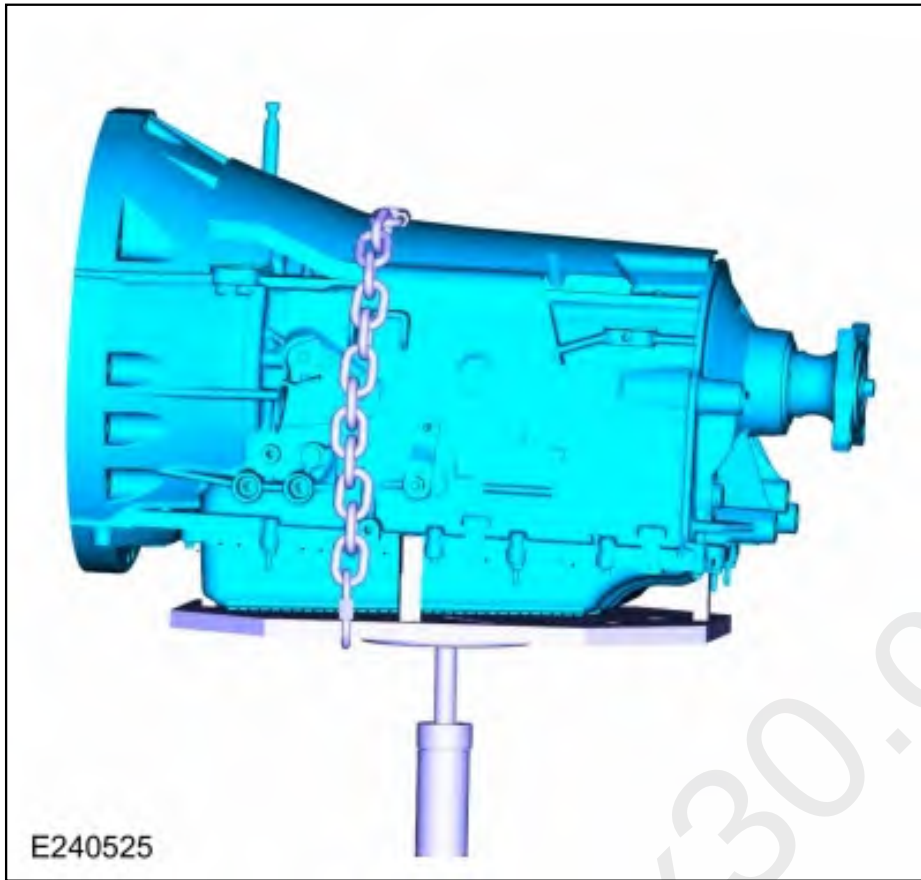


27. Slide the transmission back enough to install the special tool.
 Use Special Service Tool: 307-346 (T97T-7902-A) Retainer, Torque Converter.



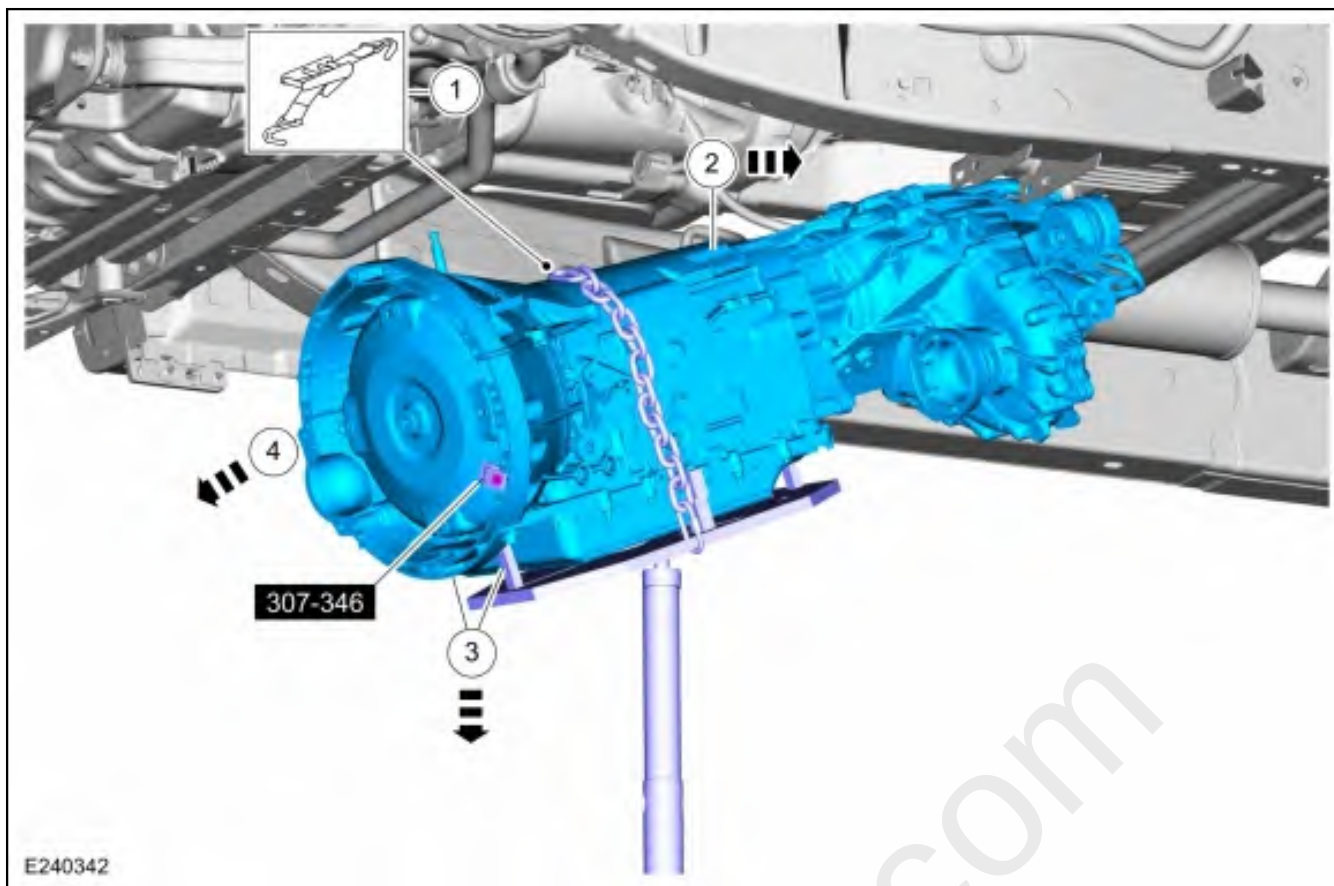
Rear Wheel Drive (RWD) vehicles

28. Using the high-lift transmission jack, remove the transmission from the vehicle.
Use the General Equipment: Transmission Jack

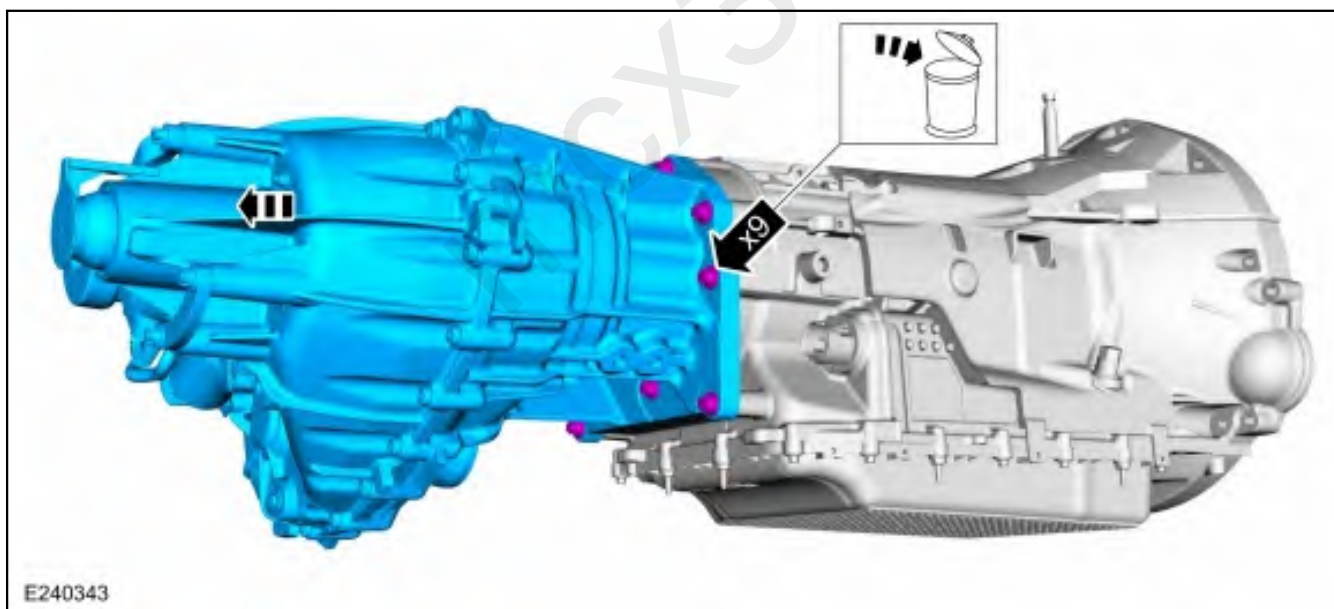


Four-Wheel Drive (4WD) vehicles

1. Make sure the transmission is securely fastened to the transmission jack.
2. Slide the transmission towards the rear of the vehicle.
3. Tilt the front of the transmission down.
4. Remove the transmission from the vehicle.



30. If the transmission is to be overhauled or if installing a new or re-manufactured transmission, remove and discard the bolts and separate the transfer case from the transmission.



All vehicles

31. **NOTICE: Failure to clean the transmission fluid cooler tubes can result in transmission failure.**

If the transmission is to be overhauled or if installing a new or re-manufactured transmission, carry out the transmission fluid cooler backflushing and cleaning procedure.

Refer to: [Transmission Fluid Cooler - Backflushing and Cleaning - 2.7L EcoBoost \(238kW/324PS\)/3.0L Power Stroke Diesel/3.5L EcoBoost \(272kW/370PS\)/5.0L 32V Ti-VCT](#) (307-02 Transmission Cooling, General Procedures).

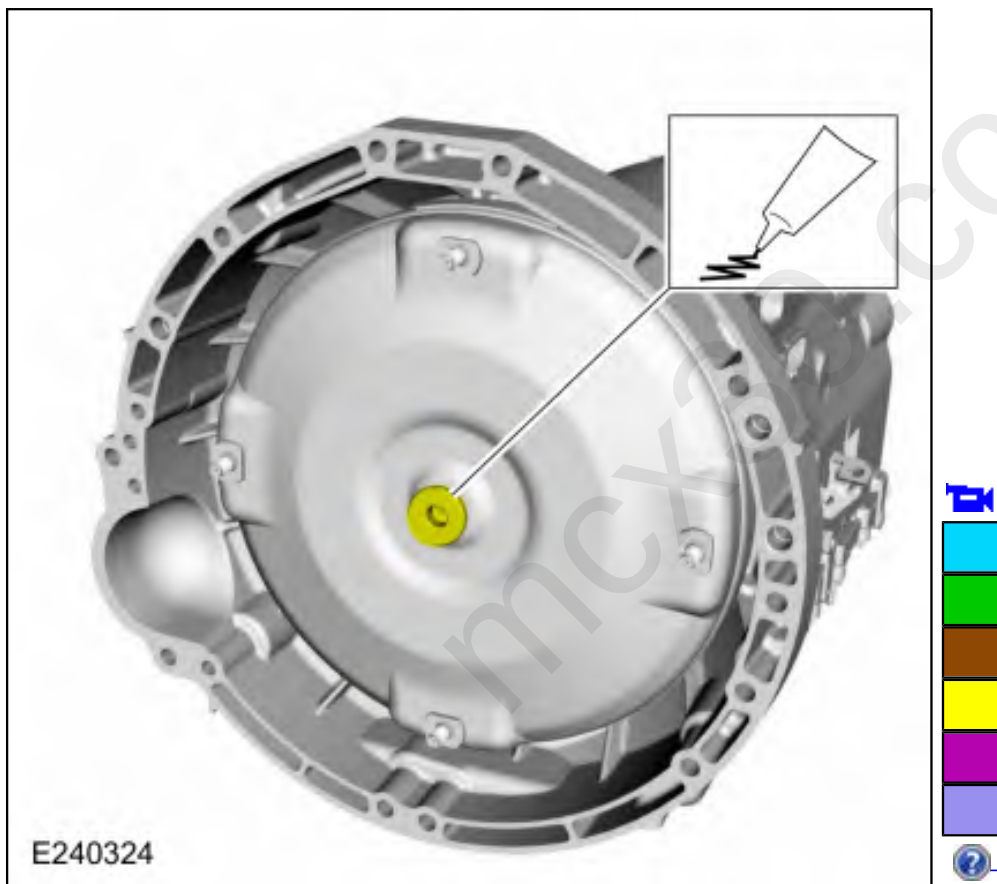
Installation

NOTE: Prior to installing a new transmission or an overhauled transmission with a new main control, record the solenoid strategy identification tag. If a new main control was installed, install the replacement solenoid body tag over the original identification tag.

1. **NOTICE:** Prior to installation of the transmission, lubricate the torque converter pilot hub or damage to the torque converter or the engine crankshaft can occur.

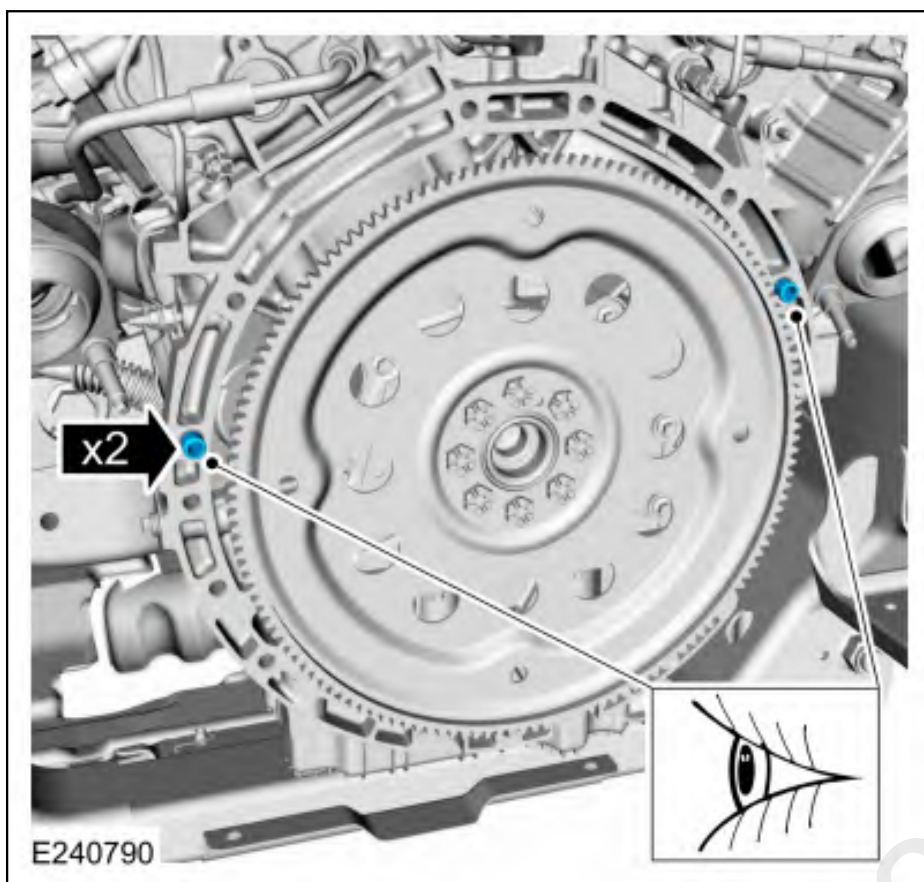
Lubricate the torque converter pilot hub with multi-purpose grease.

Material: Motorcraft® Multi-Purpose Grease Spray / XL-5-A (ESB-M1C93-B)

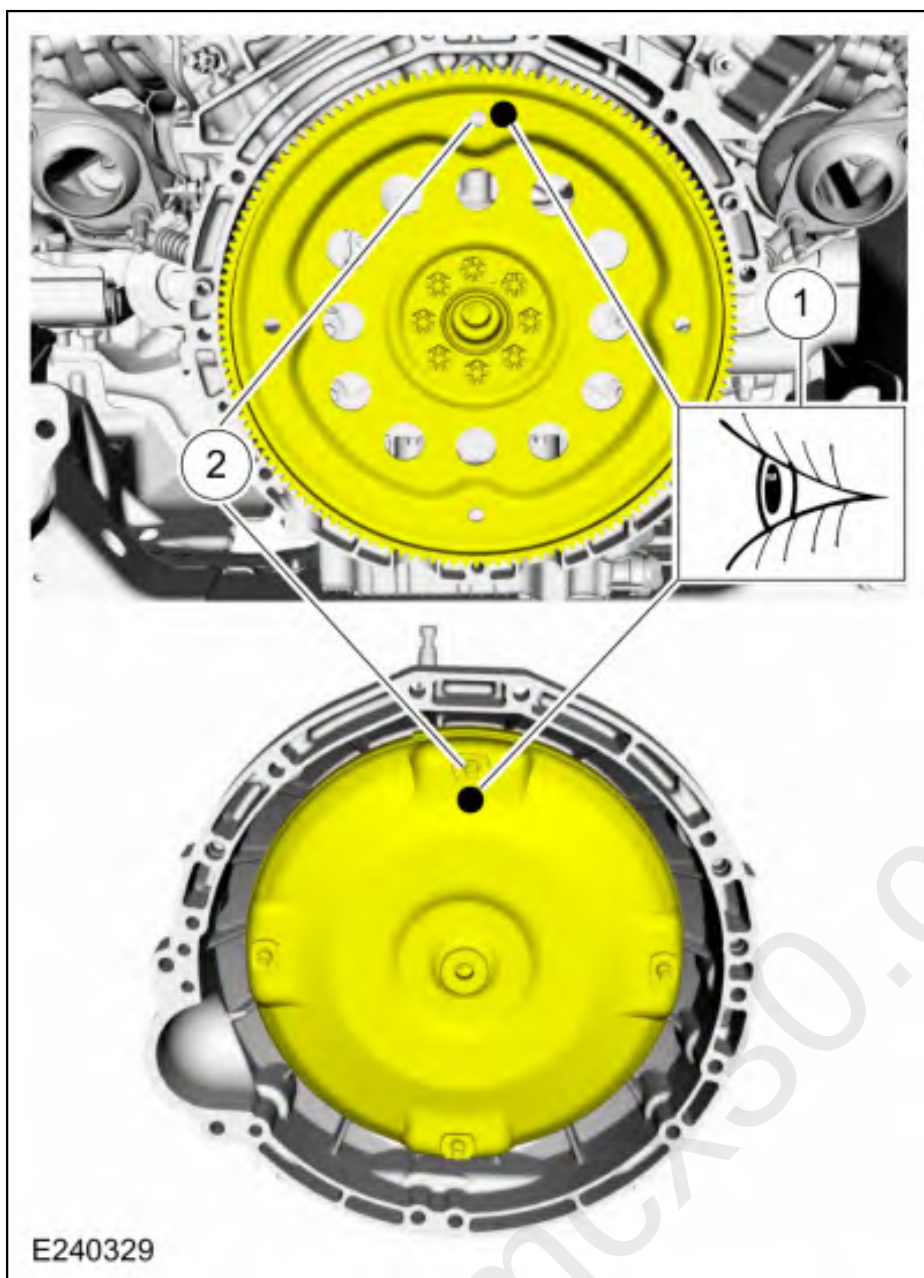


2. **NOTICE:** If the transmission is not positioned on the dowel pins, damage to the transmission may occur.

If the dowel pins were pulled out of the engine block during removal, install new dowel pins in the engine block.

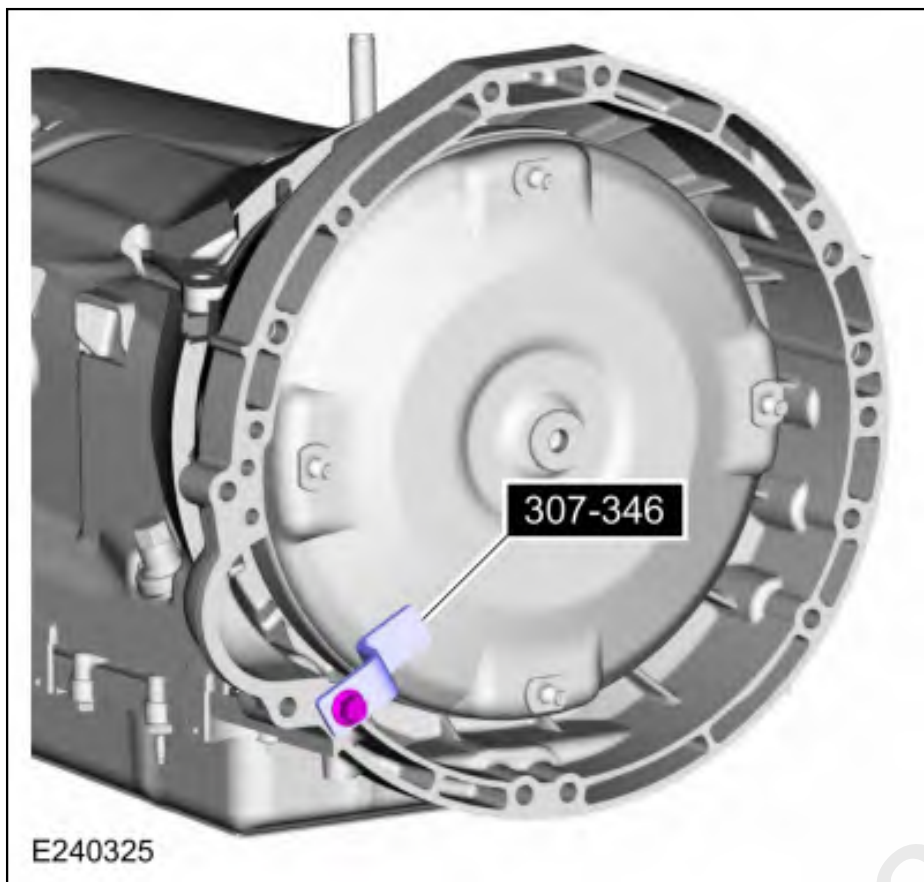


1. Inspect the torque converter stud and flexplate for paint marks.
2. Align the torque converter stud and flexplate hole near the paint marks to the 12 o'clock position.



4. Install the special tool.

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



5. **NOTE:** *If transmission is being replaced, remove the transmission fluid fill plug and verify that the transmission is filled with transmission fluid.*

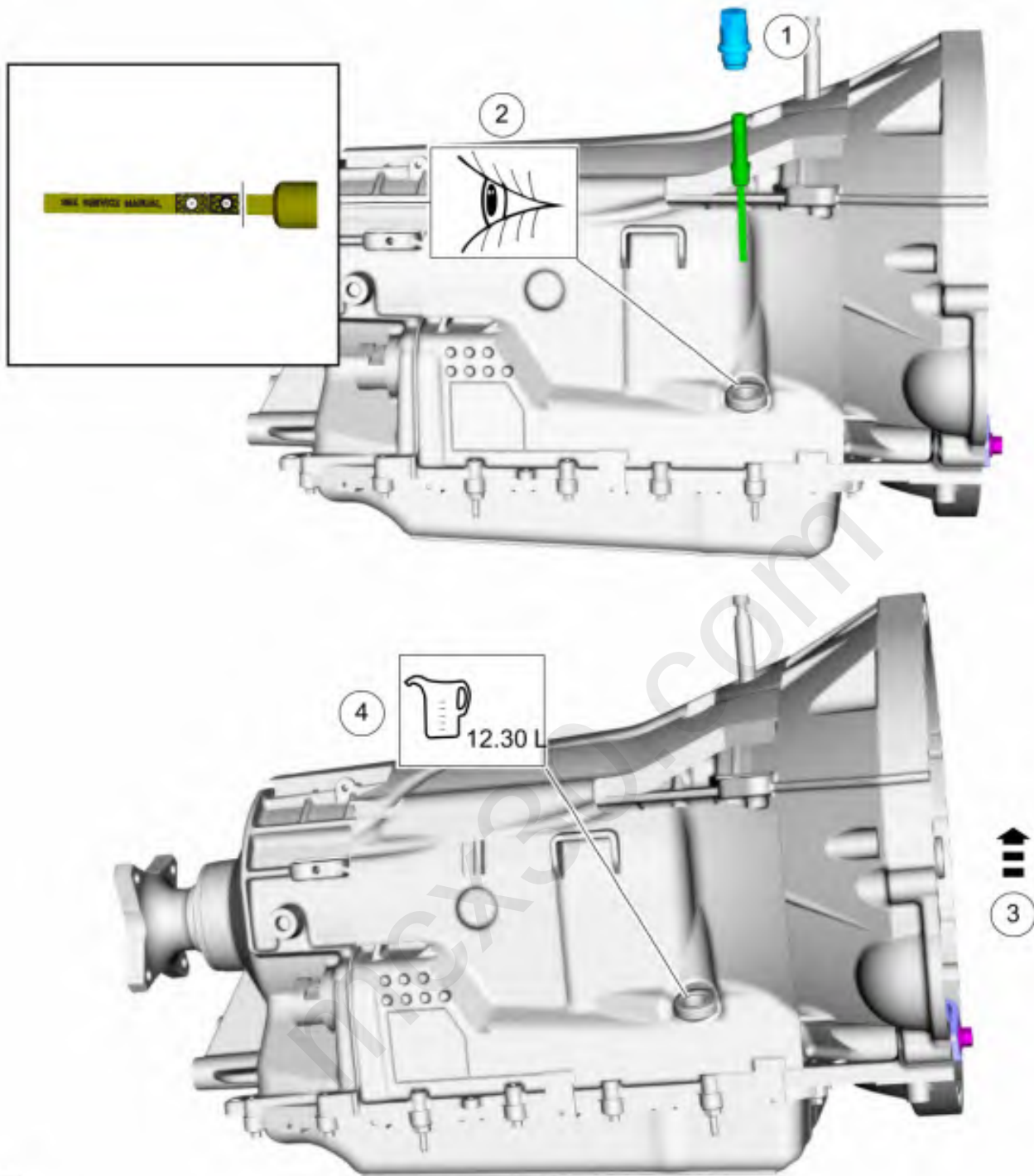
NOTE: *If transmission was disassembled, add transmission fluid to the transmission.*

NOTE: *Rear Wheel Drive (RWD) shown, Four-Wheel Drive (4WD) similar.*

1. Remove the transmission fluid fill plug transmission fluid level indicator assembly.
2. Verify transmission is filled with transmission fluid.
3. Slightly tilt the transmission rearward.
4. If the transmission was disassembled, add 12.30L (13 qt) of transmission fluid to the transmission through the transmission fluid fill hole.

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

- Loosely install the transmission fluid fill plug when finished.



E240330

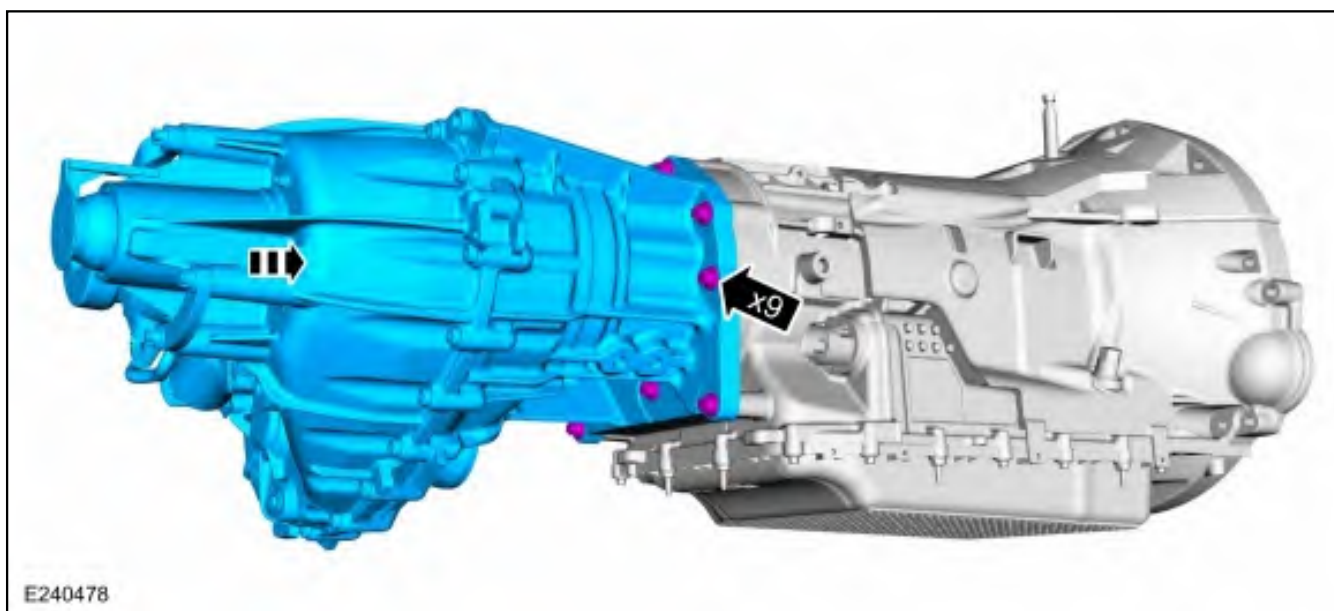
Four-Wheel Drive (4WD) vehicles

6.

If removed, install the transfer case and the new bolts.

- Tighten the bolts evenly in a star pattern.

Torque: 150 lb.in (17 Nm)

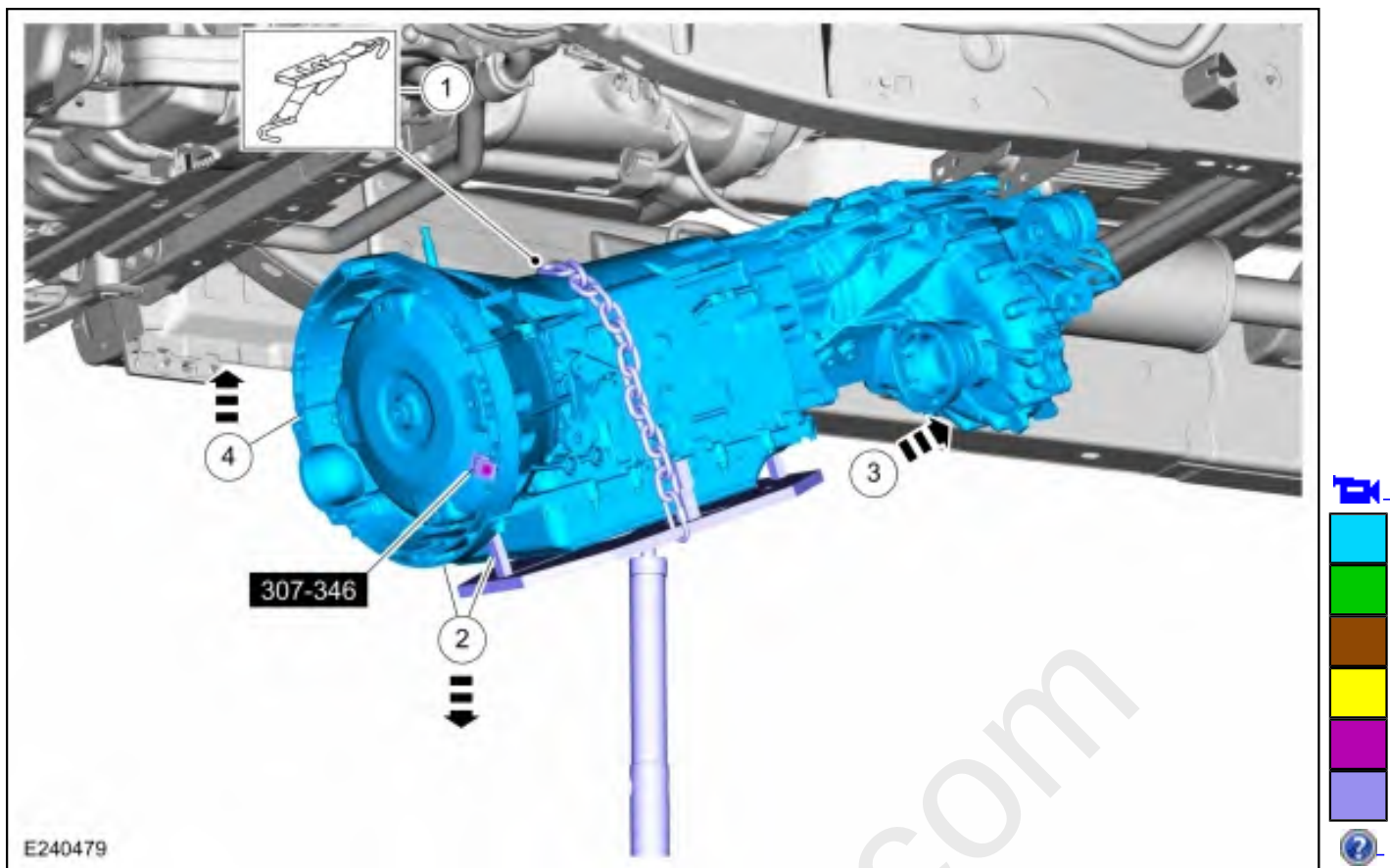


7. NOTICE: Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

Using a high-lift transmission jack, support the transmission.

1. Make sure the transmission is securely fastened to the transmission jack.
Use the General Equipment: Transmission Jack
2. Tilt the front of the transmission down.
3. Slide the transmission towards the rear of the vehicle.
4. Raise the front of the transmission into a horizontal position.

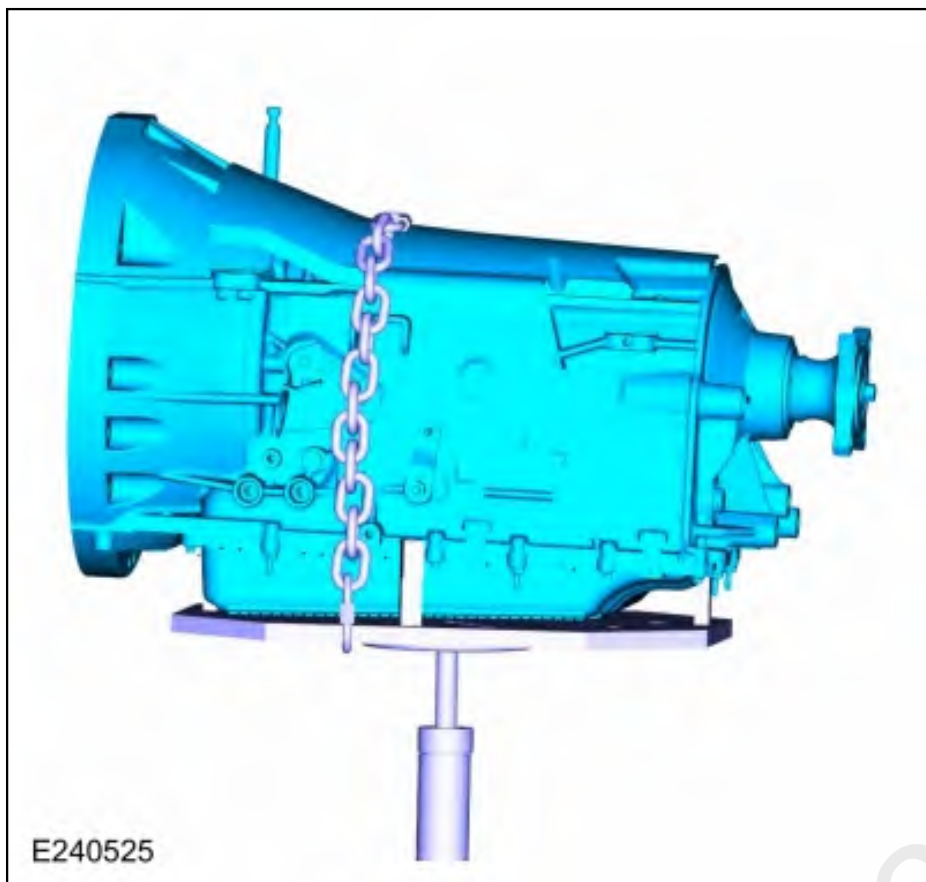


Rear Wheel Drive (RWD) vehicles

8. **NOTICE:** Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

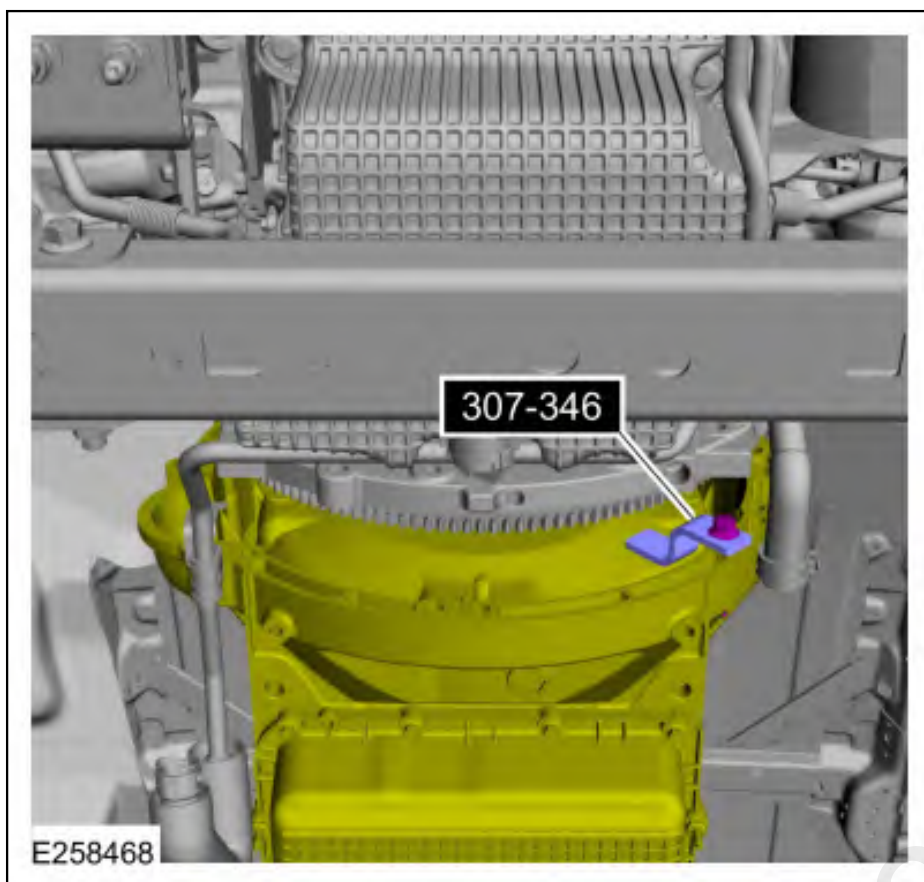
Using a high-lift transmission jack, position the transmission in the vehicle.
Use the General Equipment: Transmission Jack



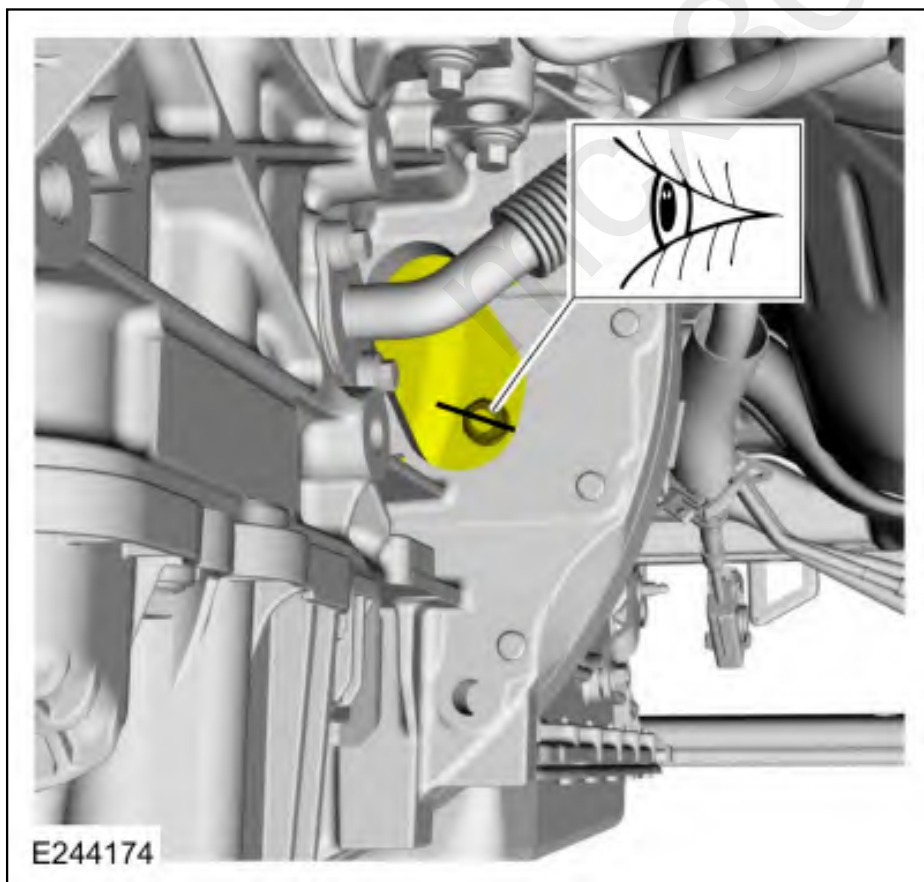
All vehicles

9. Remove the special tool.

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



10. Align the index-mark made during removal.

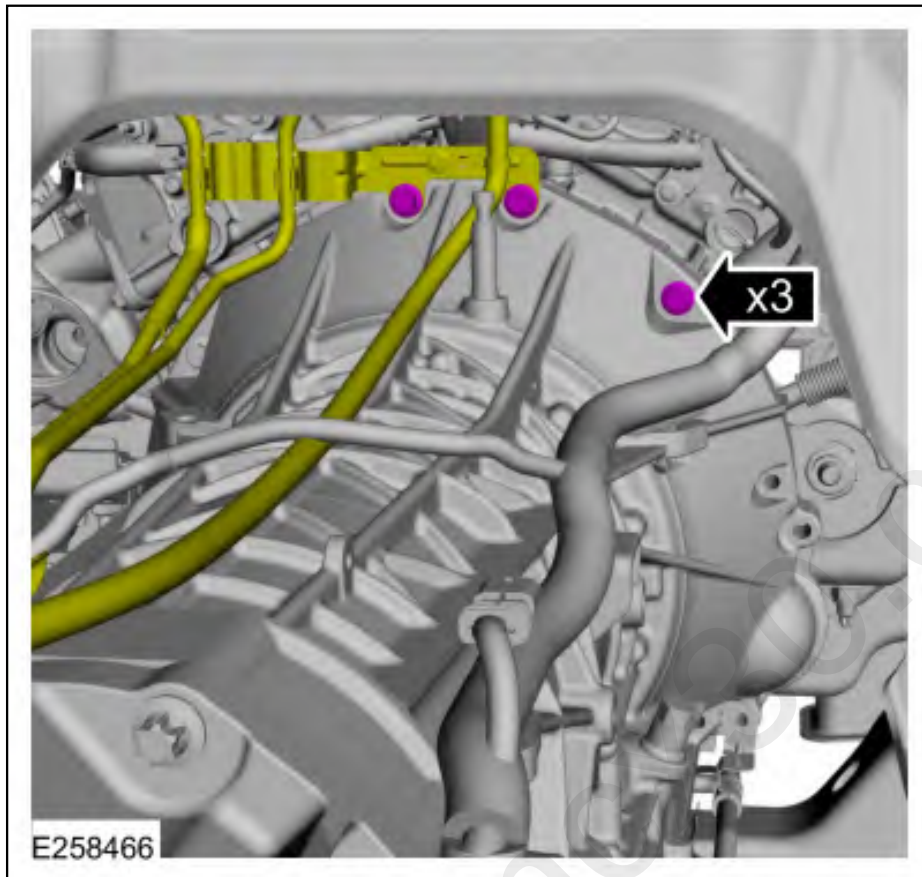


11. **NOTE:** Make sure the torque converter is fully seated in the transmission before aligning the transmission to the engine.

NOTE: With the transmission in a horizontal position, move it toward the engine and position it on the dowel pins.

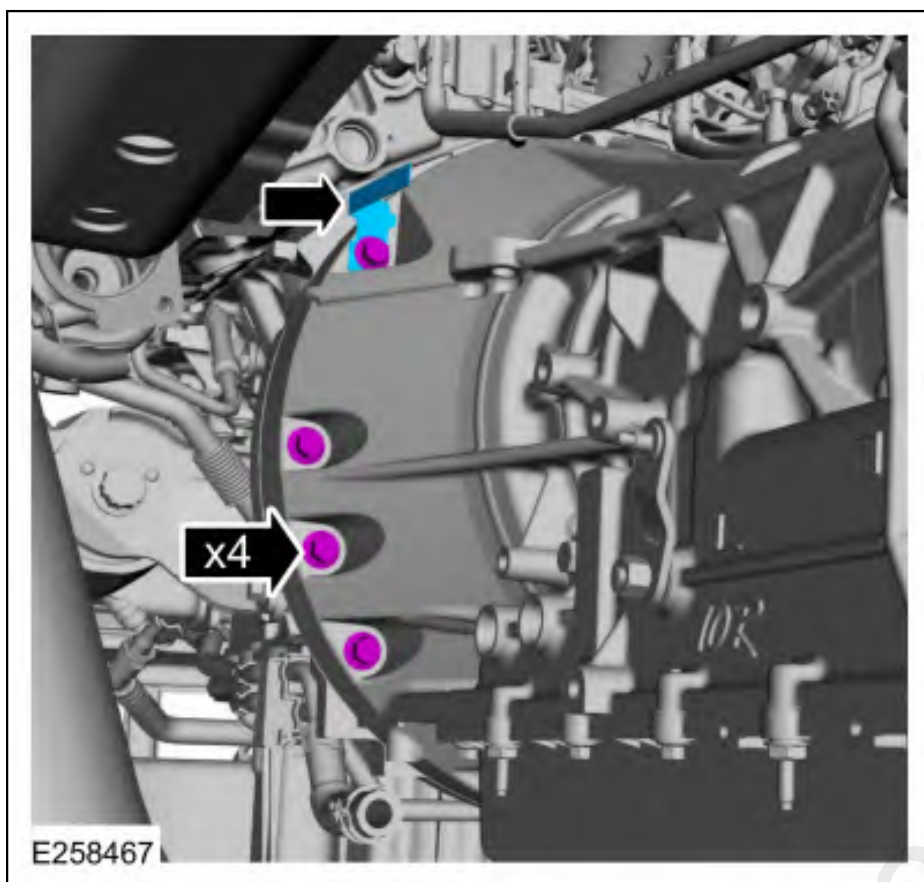
Position the bracket and install the top bellhousing bolts.

Torque: 35 lb.ft (48 Nm)

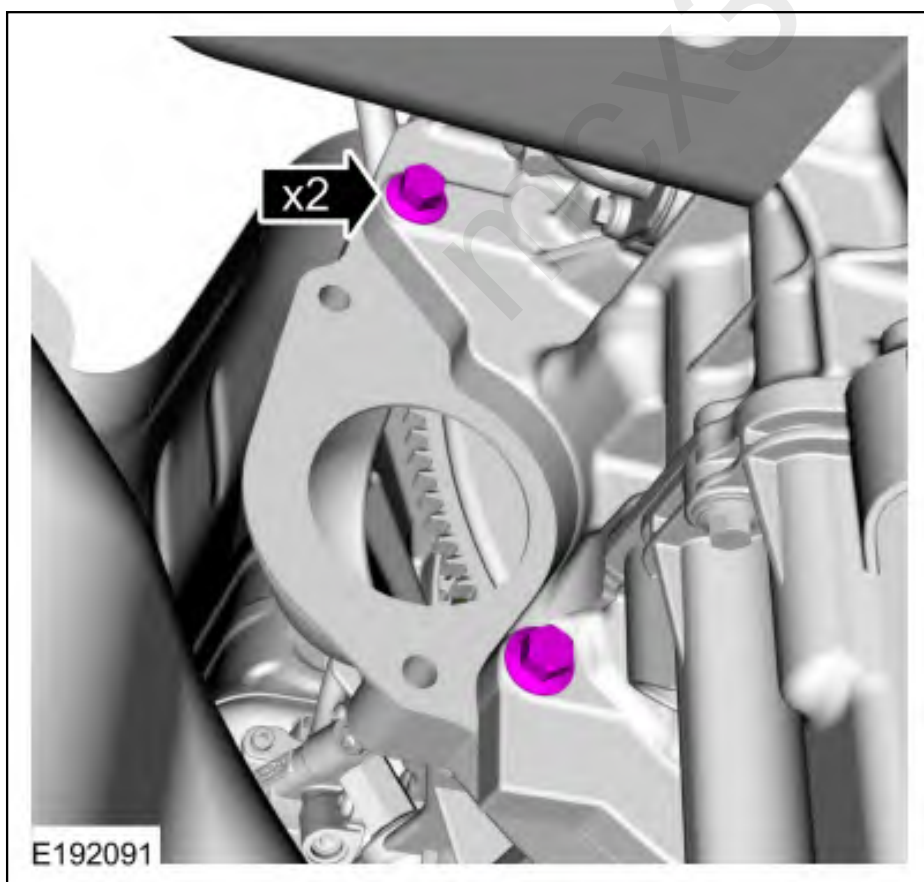


12. Install the selector lever cable bracket and the LH bellhousing bolts.

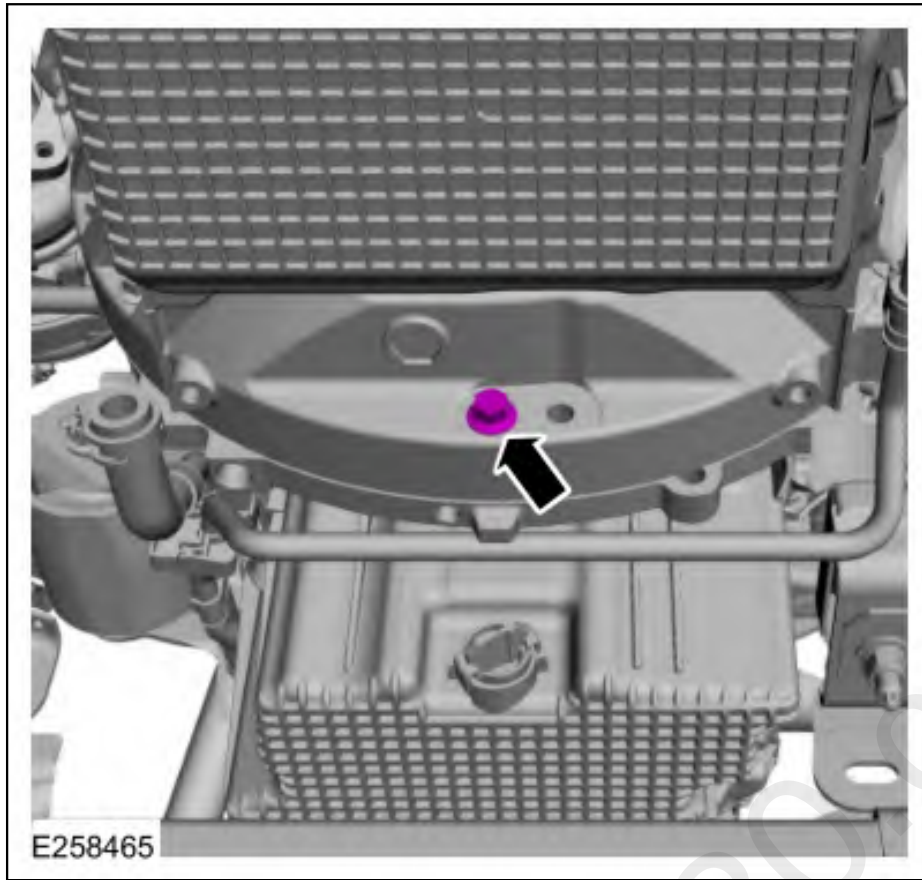
Torque: 35 lb.ft (48 Nm)



13. Install the RH bellhousing bolts.
Torque: 35 lb.ft (48 Nm)

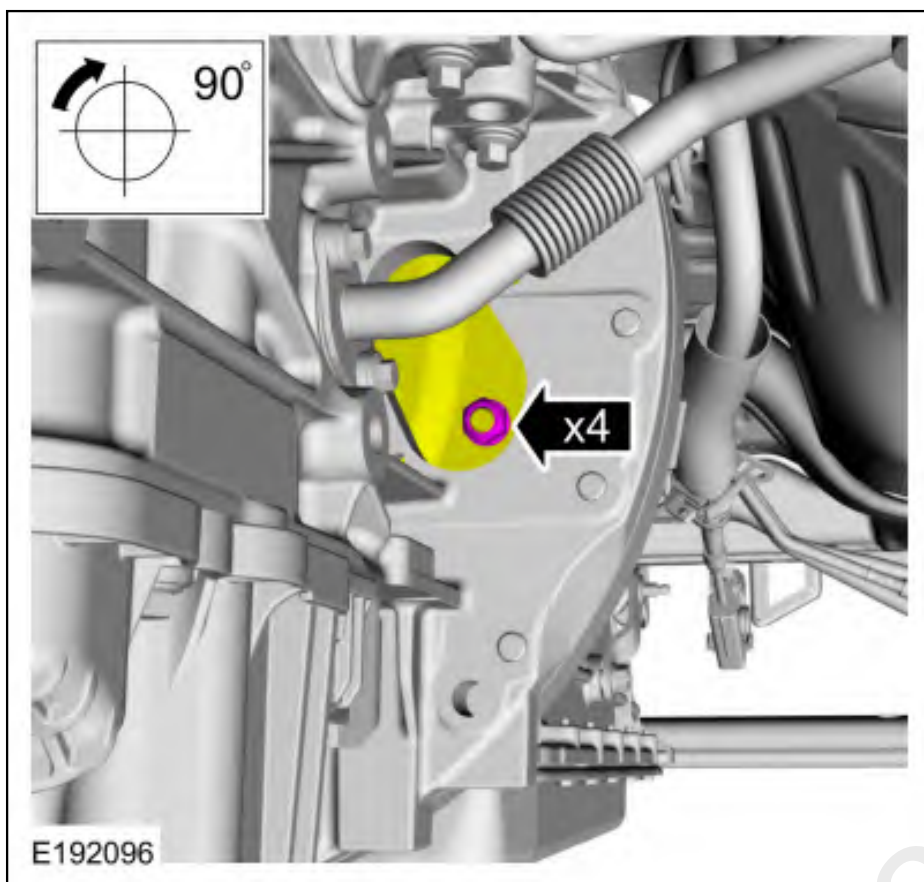


14. Install the lower bellhousing bolt.
Torque: 35 lb.ft (48 Nm)

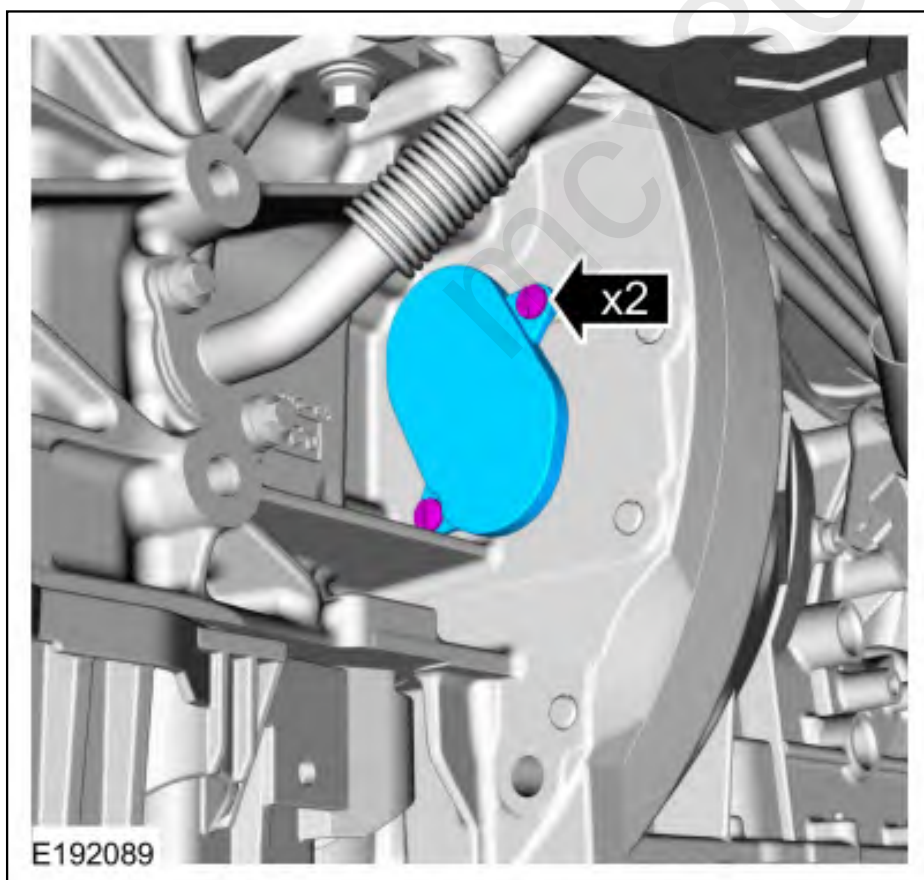


15. **NOTE:** *Using the crankshaft pulley bolt, turn the engine clockwise.*

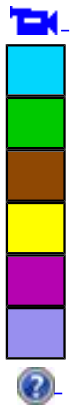
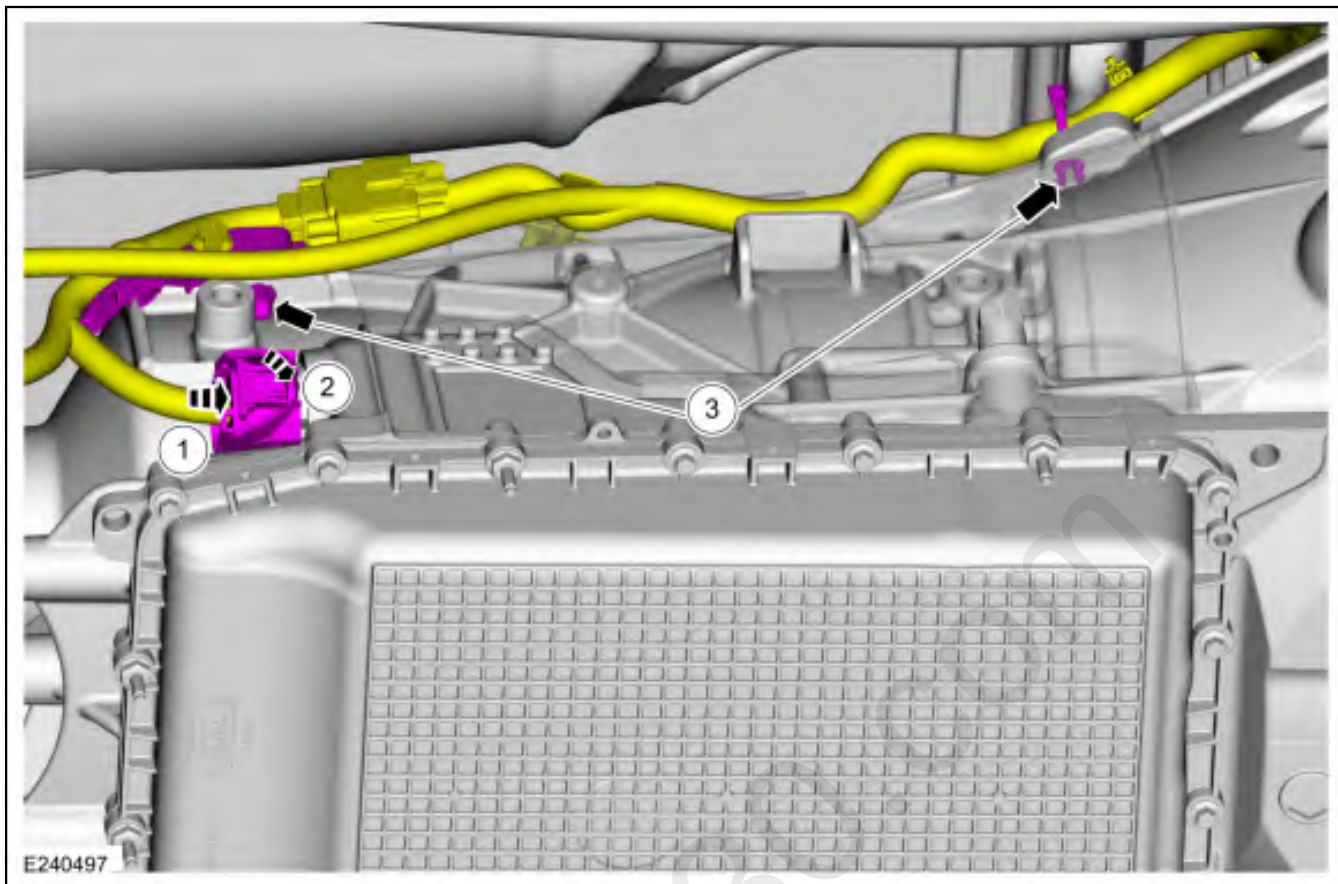
Install the new torque converter nuts.
Torque: 30 lb.ft (40 Nm)



16. Install the access cover and the pin-type retainers.

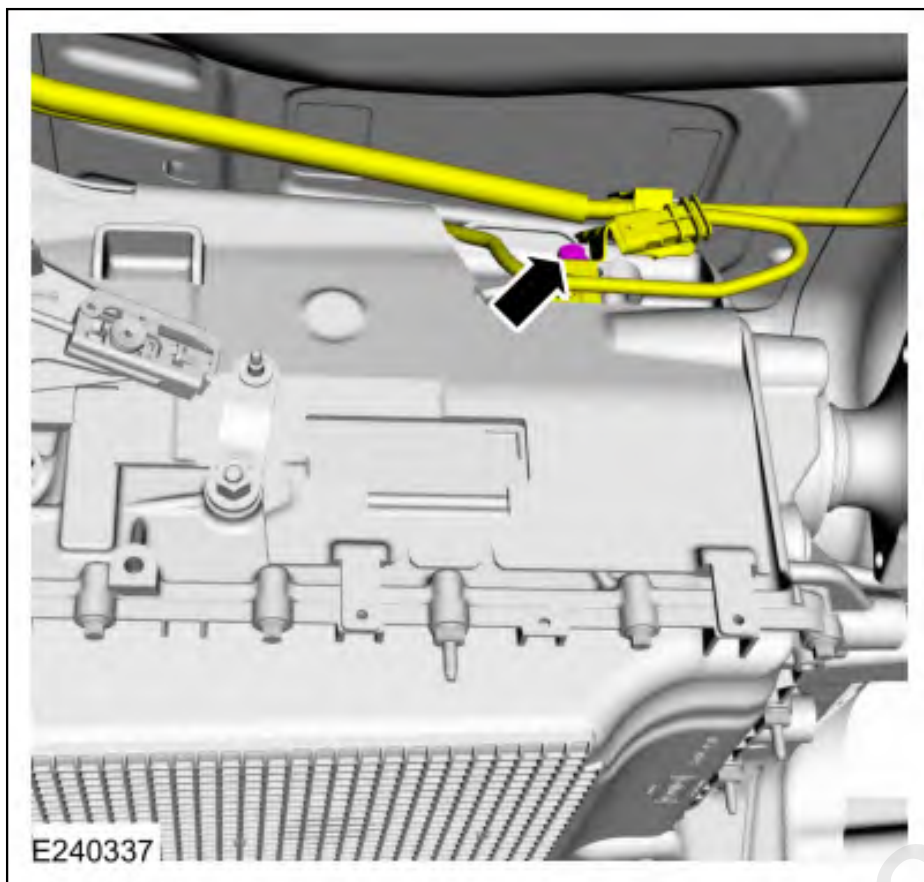


1. Push the transmission electrical connector in.
2. Lock the tab to connect the transmission electrical connector.
3. Attach the wiring harness retainers in the transmission.



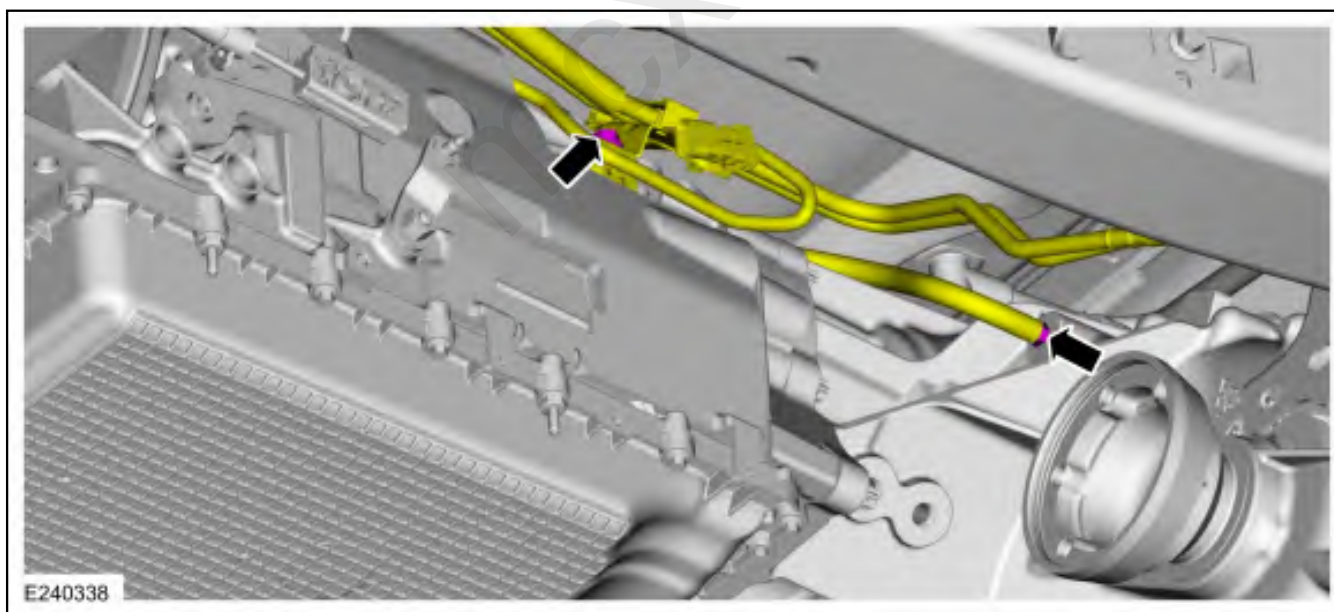
Rear Wheel Drive (RWD) vehicles

18. Position the fuel line bracket and install the bolt.
Torque: 26 lb.ft (35 Nm)

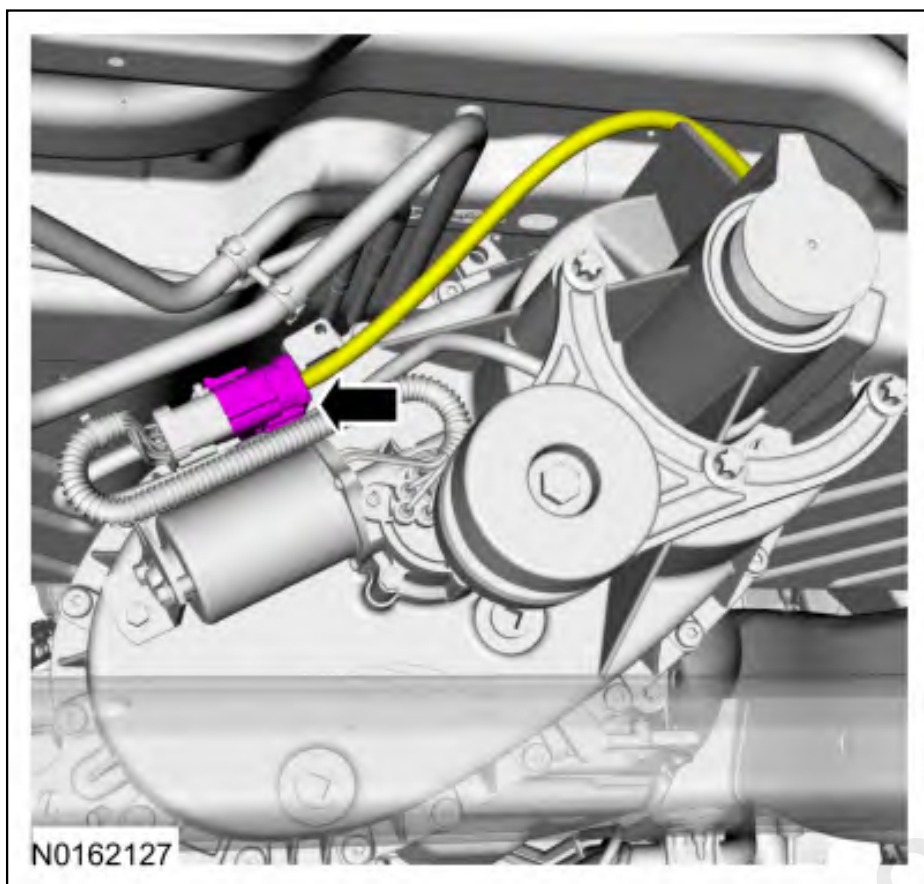


Four-Wheel Drive (4WD) vehicles

19. Position the fuel line bracket and install the bolt. Connect the transfer case vent tube.
Torque: 26 lb.ft (35 Nm)



20. Connect the transfer case electrical connector.



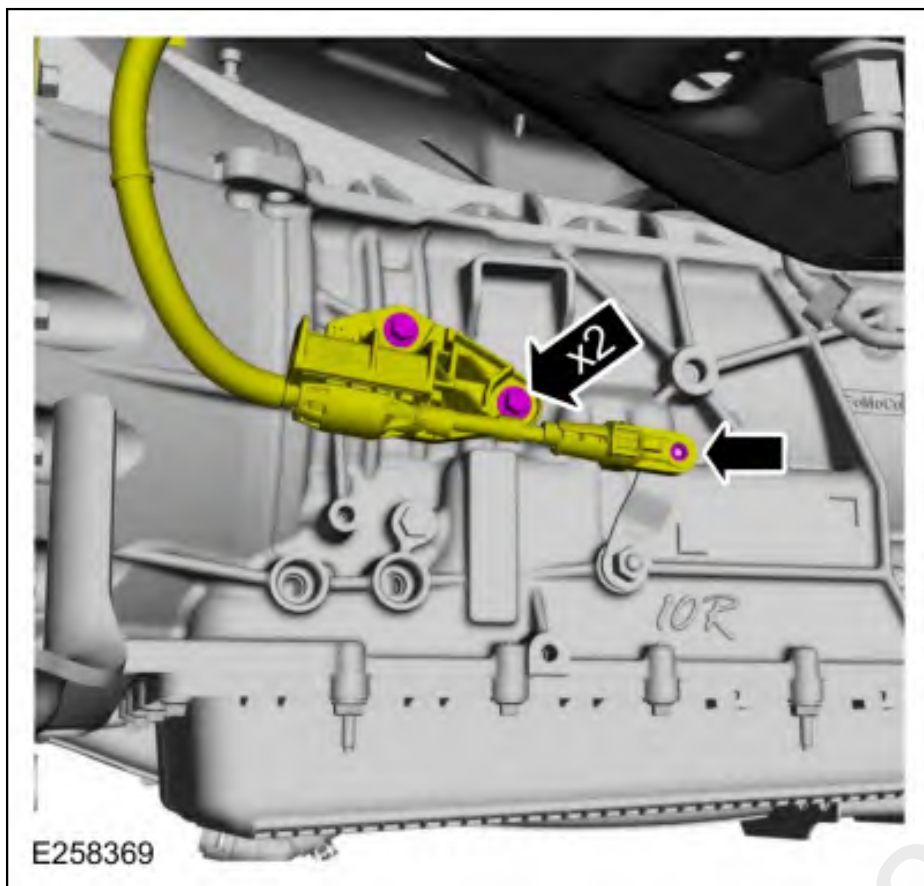
All vehicles

21. **NOTE:** When installing the selector lever cable end, make sure that the selector lever cable end is correctly installed onto the manual control lever. Pull back on the selector lever cable to make sure the selector lever cable end is securely installed onto the manual control lever.

Apply pressure to the selector lever cable end while connecting it to the manual control lever to make sure the selector lever has not moved out of the DRIVE position.

Install the selector lever cable bolts and connect the selector lever cable to the manual control lever.

Torque: 30 lb.ft (40 Nm)

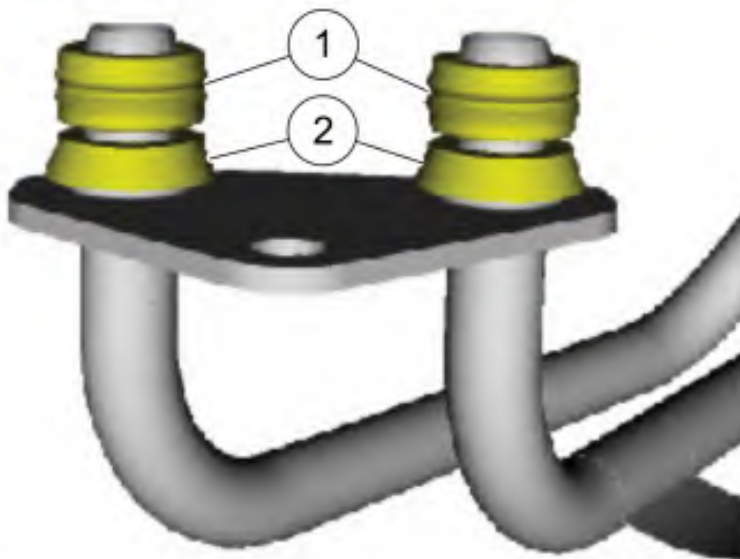


22. **NOTE:** *Inspect the transmission fluid tube backing rings and seals are not stuck in the case.*

Inspect the transmission fluid tube backing rings and seals for damage and install new backing rings or seals if necessary.

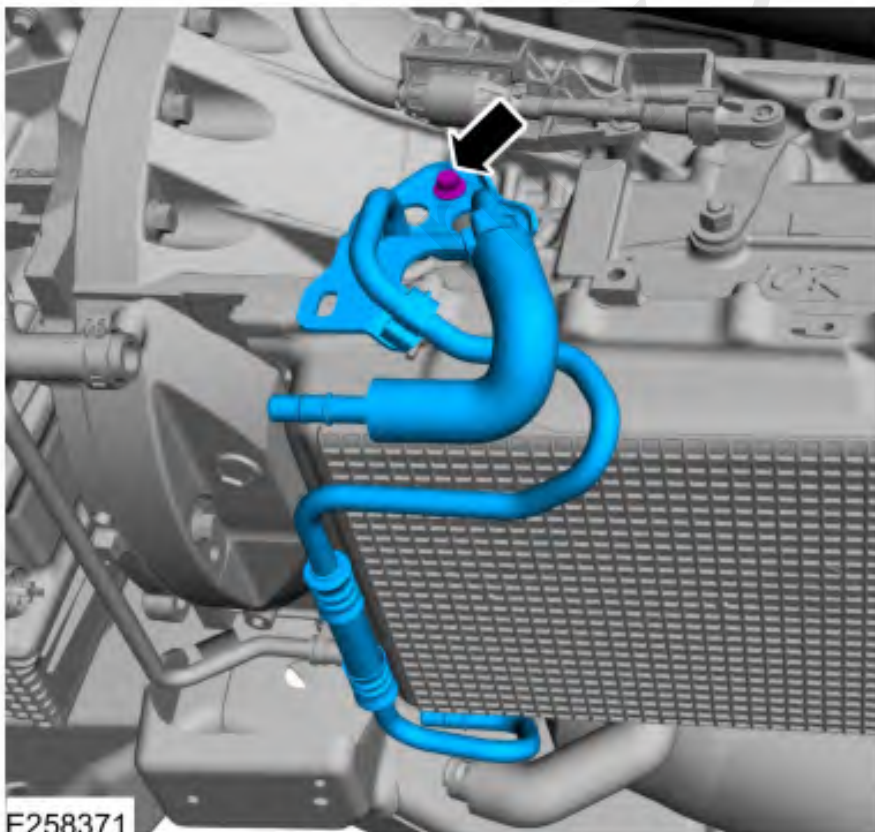
1. Seal (7D285)
2. Backing ring (7J324)

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



E238497

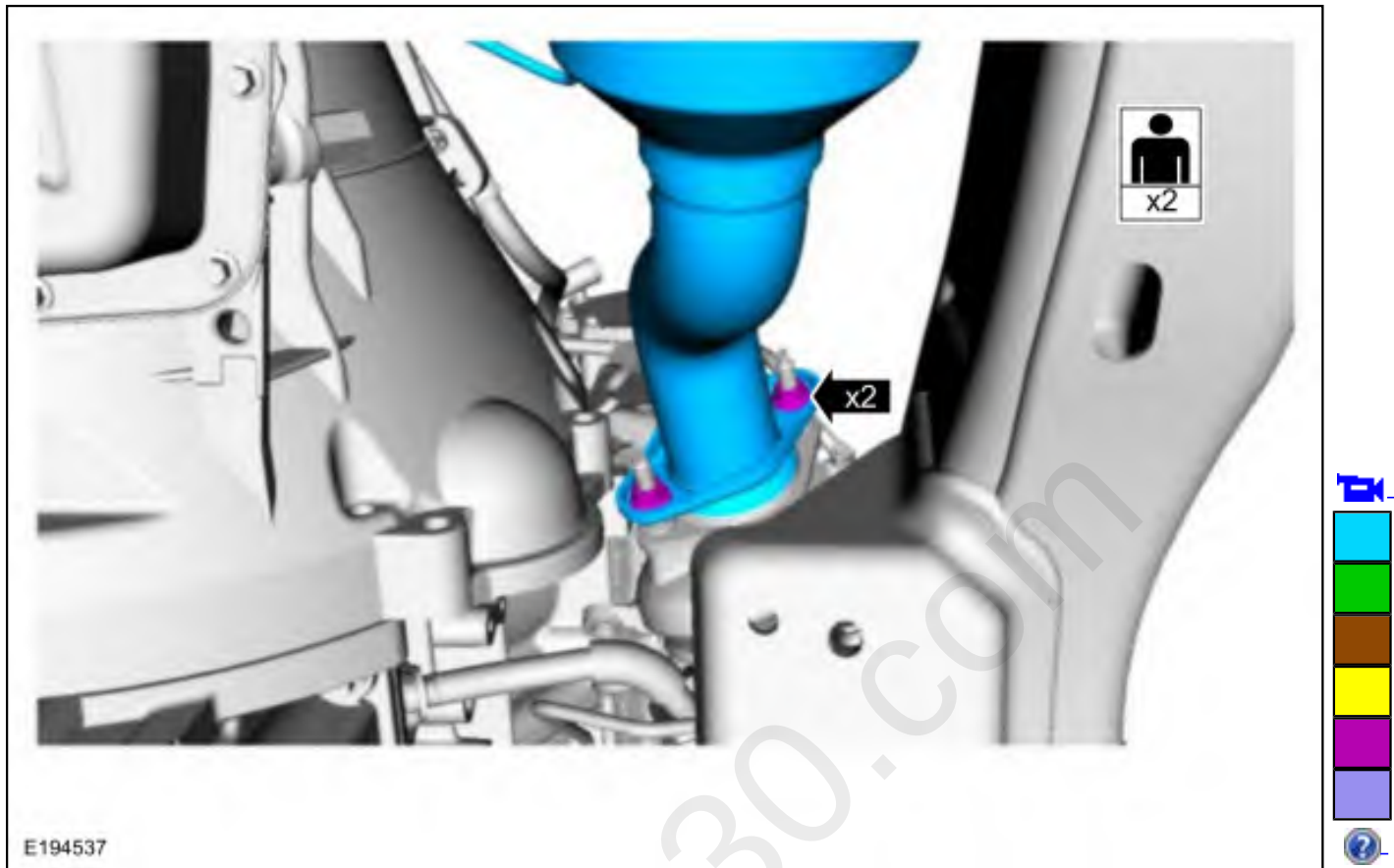
23. Install the transmission fluid cooler tubes and the new transmission fluid cooler tube bracket bolt.
Torque: 22 lb.ft (30 Nm)



E258371

24. **NOTE:** Loosely install the new RH catalytic converter nuts. Do not tighten at this time.

Position the RH catalytic converter in the vehicle. Loosely install the new RH catalytic converter nuts.



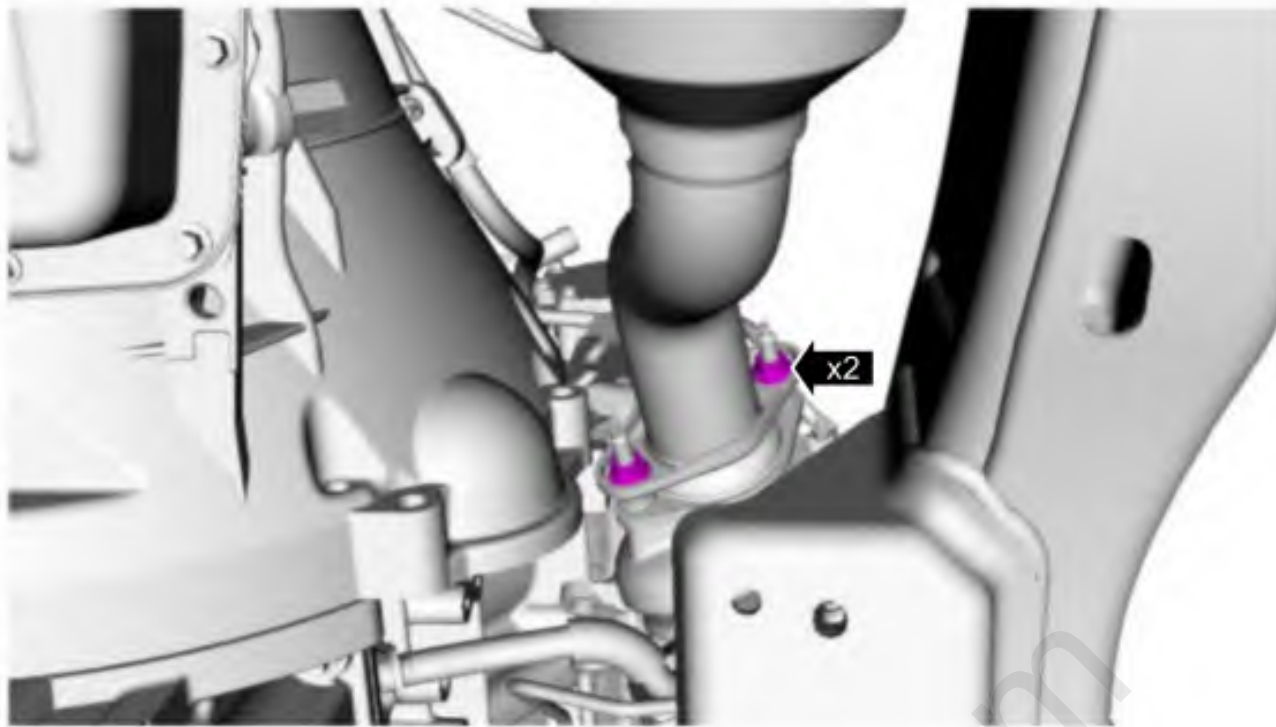
25. Install the transmission support insulator.

Refer to: [Transmission Support Insulator](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

26. **NOTE:** Evenly tighten the catalytic converter nuts.

Tighten the RH catalytic converter nuts.

Torque: 30 lb.ft (40 Nm)



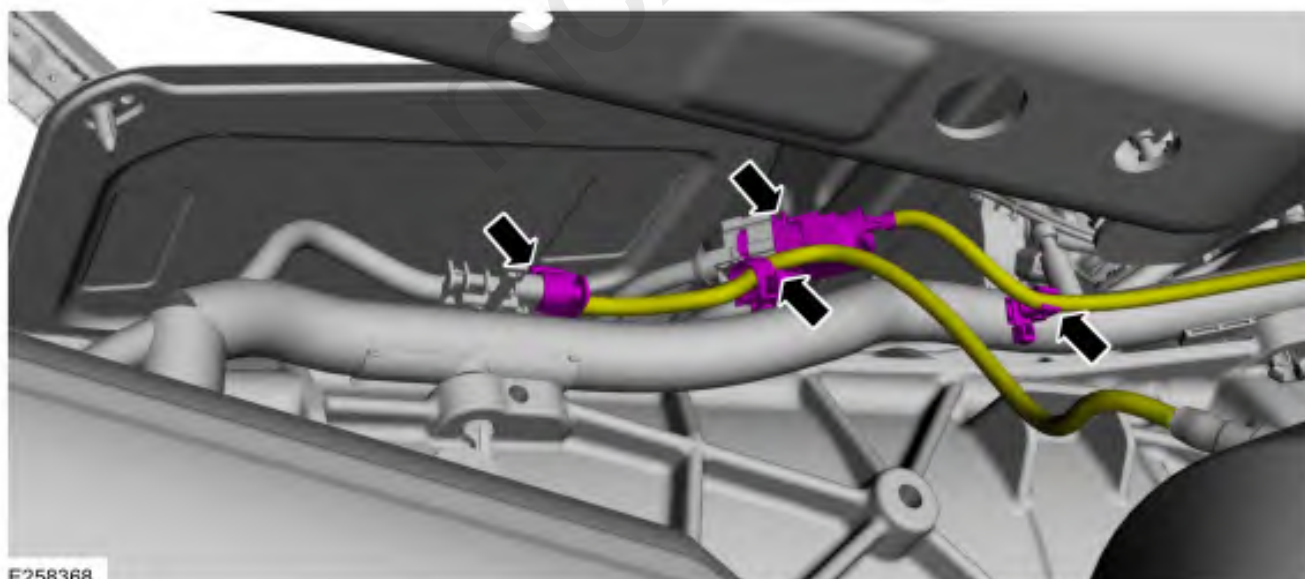
E225882



27. Install the LH catalytic converter.

Refer to: [Catalytic Converter LH](#) (309-00A Exhaust System - 2.7L EcoBoost (238kW/324PS), Removal and Installation).

28. Connect the RH catalyst monitor sensor and the RH HO2S electrical connectors.

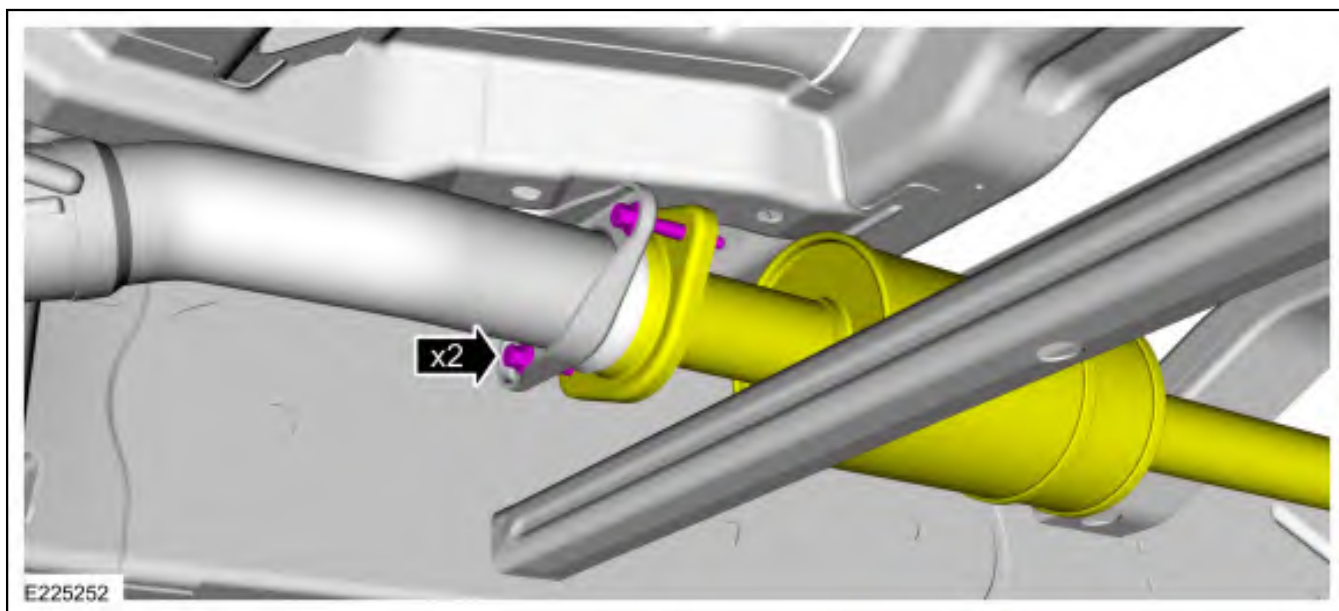


E258368

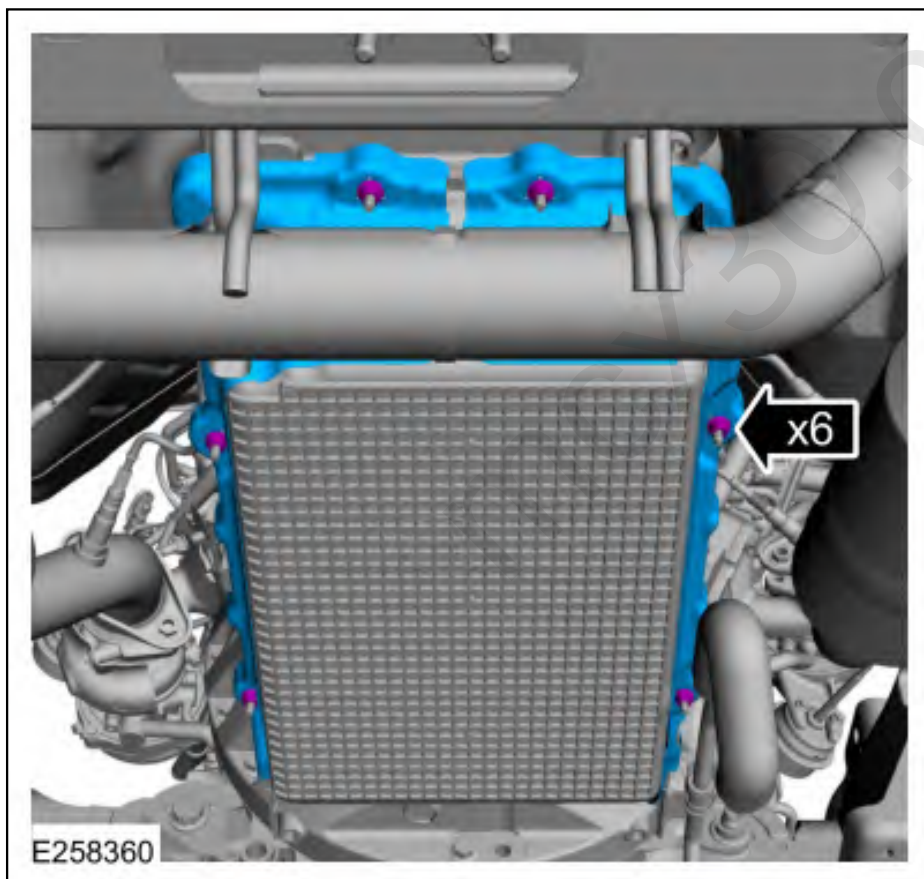


29. Install the catalytic converter flange to the muffler inlet pipe bolts.

Torque: 30 lb.ft (40 Nm)



30. Install the retainers and heatshield.
Torque: 80 lb.in (9 Nm)



31. Install the rear driveshaft assembly.
 Refer to: [Rear Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

Four-Wheel Drive (4WD) vehicles

32. Install the front driveshaft assembly.

Refer to: [Front Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

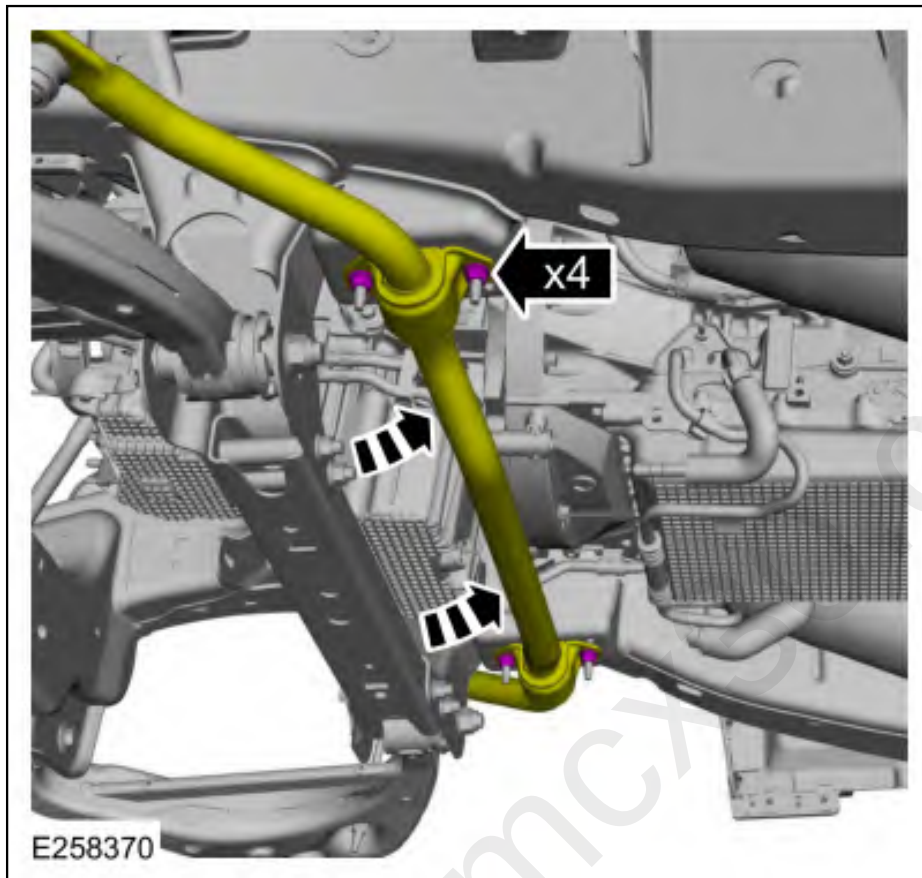
33. Check the transfer case fluid level.

Refer to: [Transfer Case Draining and Filling](#) (308-07B Transfer Case, General Procedures).

Rear Wheel Drive (RWD) vehicles

34. Install the new stabilizer bar bracket nuts.

Torque: 41 lb.ft (55 Nm)



All vehicles

35. Install the transmission fluid cooler.

Refer to: [Transmission Fluid Cooler - 2.7L EcoBoost \(238kW/324PS\)/3.5L EcoBoost \(272kW/370PS\)/5.0L 32V Ti-VCT](#) (307-02 Transmission Cooling, Removal and Installation).

36. **NOTE:** *If equipped with a underbody splash shield, do not install the splash shield at this time.*

Install the starter motor assembly.

Refer to: [Starter Motor](#) (303-06A Starting System - 2.7L EcoBoost (238kW/324PS), Removal and Installation).

37. Connect the battery ground cable.

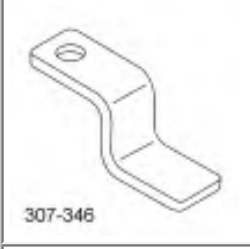
Refer to: [Battery Disconnect and Connect](#) (414-01 Battery, Mounting and Cables, General Procedures).

38. Verify that the selector lever cable is correctly adjusted.
Refer to: [Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Column Shift](#) (307-05 Automatic Transmission External Controls, General Procedures).
Refer to: [Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Floor Shift](#) (307-05 Automatic Transmission External Controls, General Procedures).
39. After completing the repairs, perform the Misfire Monitor Neutral Profile Correction procedure using a diagnostic scan tool.
40. If a new transmission or a new main control was installed, the solenoid body strategy must be updated.
Refer to: [Transmission Strategy Download](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
41. If the transmission was overhauled, the adaptive drive cycle must be updated.
Refer to: [Adaptive Learning Drive Cycle](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
42. While driving the vehicle, use the scan tool to verify that the TFT has reached a temperature of 96.7°C-102°C (206°F-215°F). This will circulate the transmission fluid through the torque converter and the transmission fluid cooling system, eliminating any trapped air in the transmission fluid cooling system.
43. Check the transmission fluid level
Refer to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Transmission - 3.5L EcoBoost (272kW/370PS)

Base Part Number: Base Part Number: 7000

Special Tool(s) / General Equipment

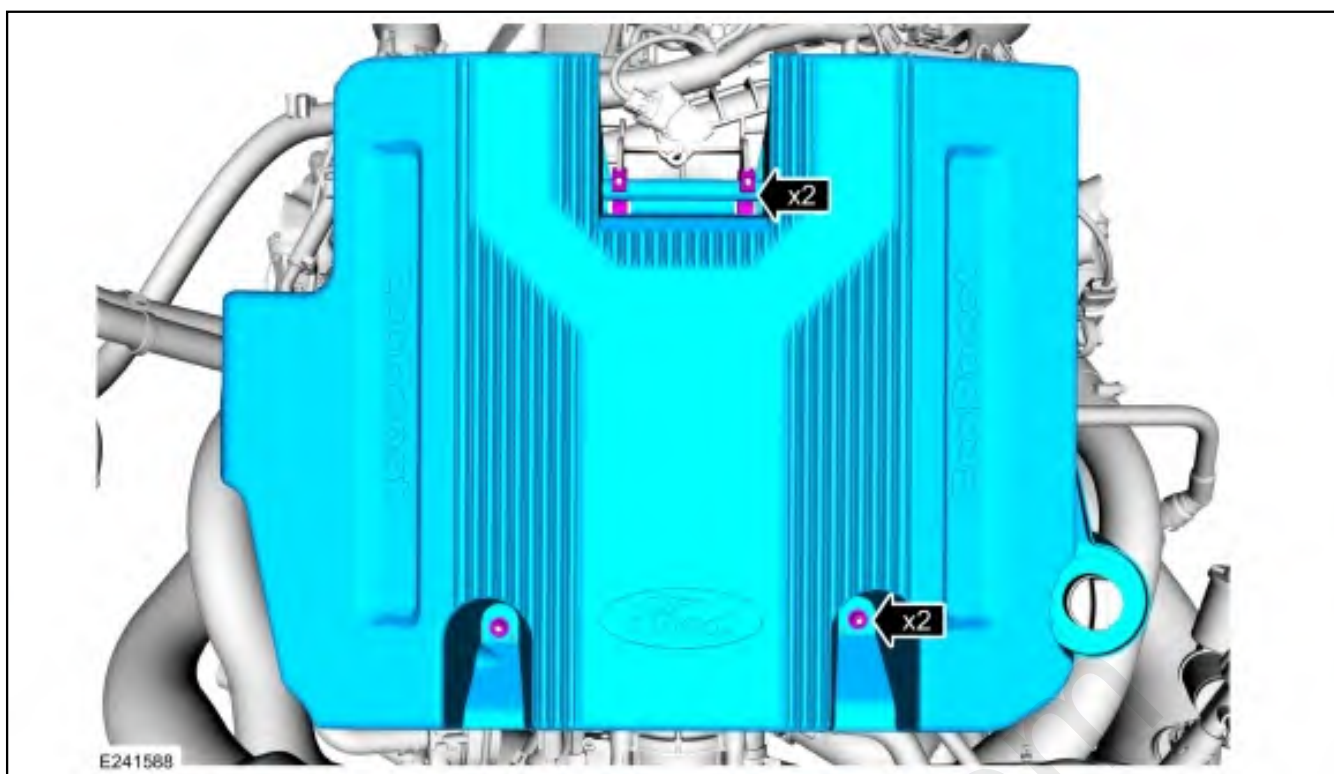
	307-346 (T97T-7902-A) Retainer, Torque Converter TKIT-1997-F/FLM/LT TKIT-1998-LM (NavigatoR)
Transmission Jack	

Materials

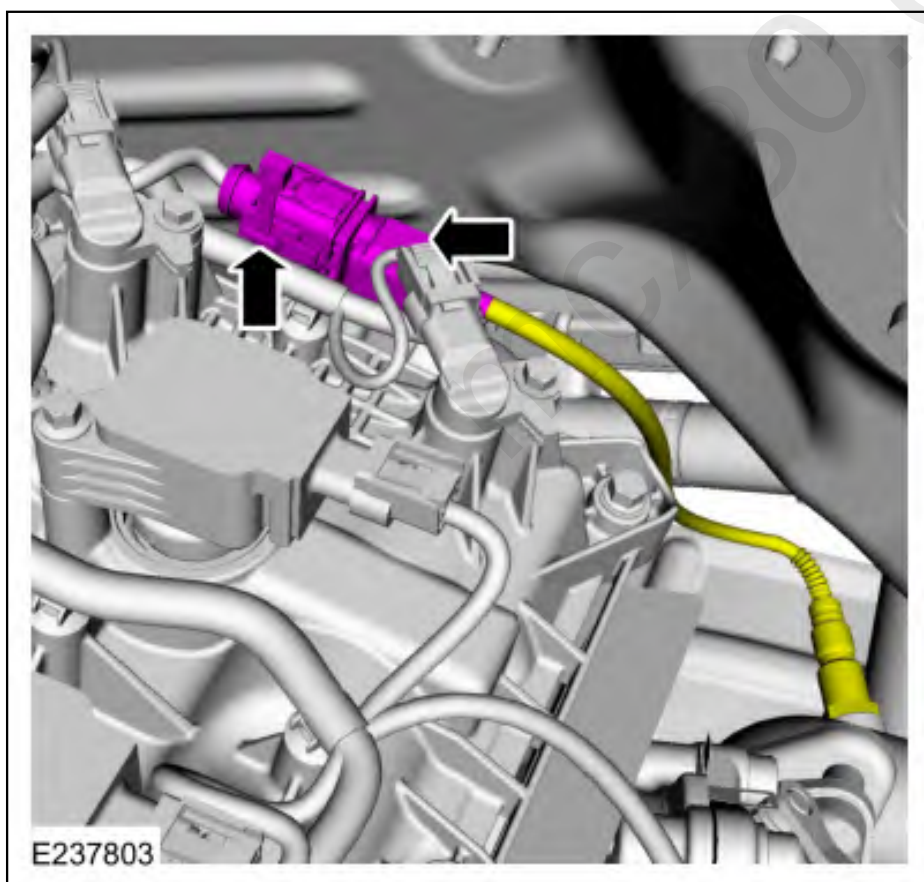
Name	Specification
Motorcraft® Multi-Purpose Grease Spray XL-5-A	ESB-M1C93-B
Motorcraft® MERCON® ULV Automatic Transmission Fluid XT-12-QULV	MERCON® ULV WSS-M2C949-A

Removal

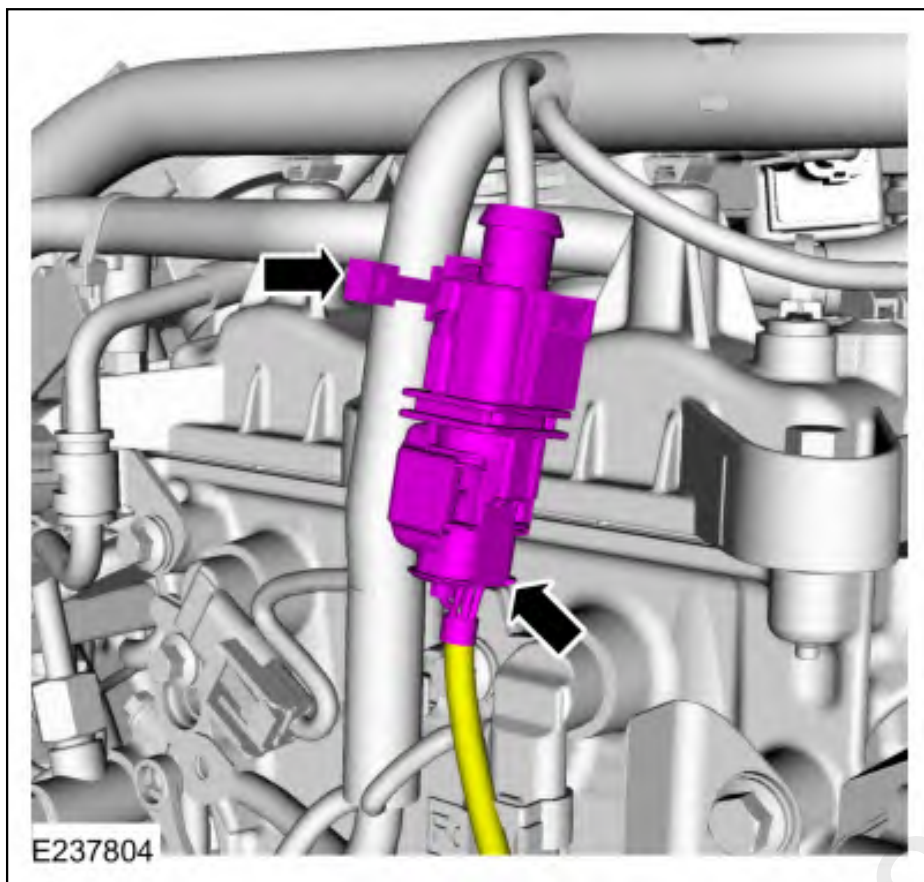
1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. Remove the engine appearance cover retainers, release the engine appearance cover from the rear retainers and remove the engine appearance cover.



3. Disconnect the LH HO2S electrical connector.



4. Disconnect the RH HO2S electrical connector and the harness retainer.



5. Remove the following items:

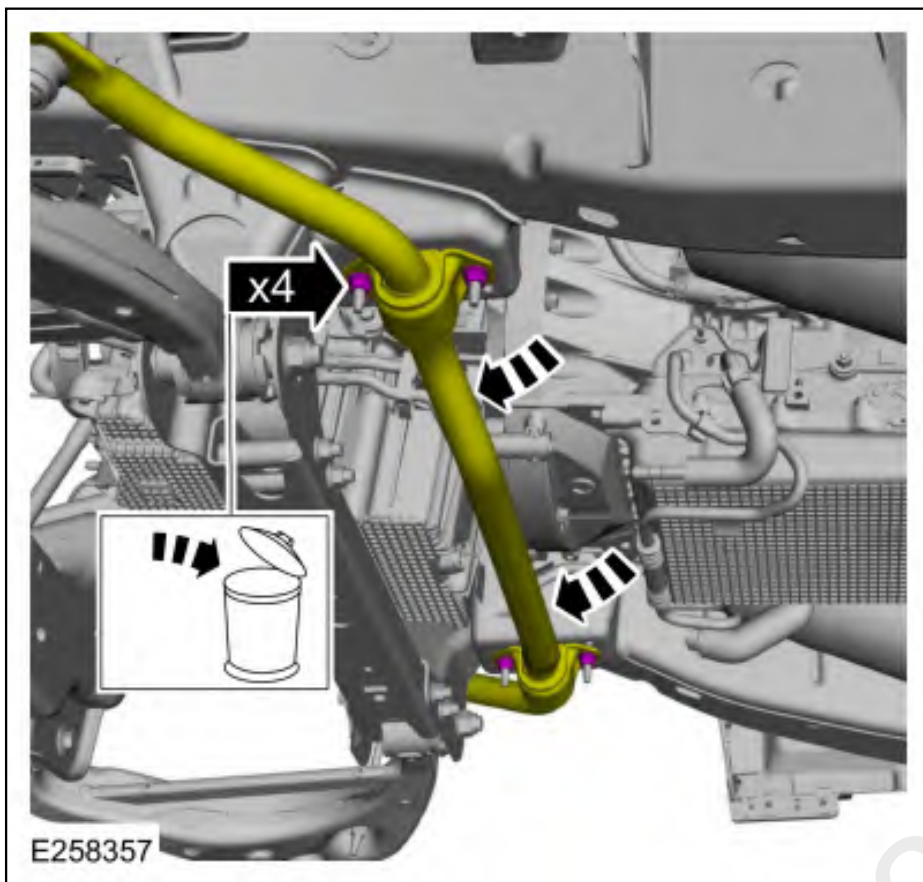
1. Remove the starter motor assembly.
Refer to: [Starter Motor](#) (303-06C Starting System - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
2. Remove the transmission fluid cooler.
Refer to: Transmission Fluid Cooler (307-02 Transmission Cooling) .
3. Remove the rear driveshaft assembly.
Refer to: Rear Driveshaft (205-01 Driveshaft) .

Four-Wheel Drive (4WD) vehicles

6. Remove the front driveshaft assembly.
Refer to: [Front Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

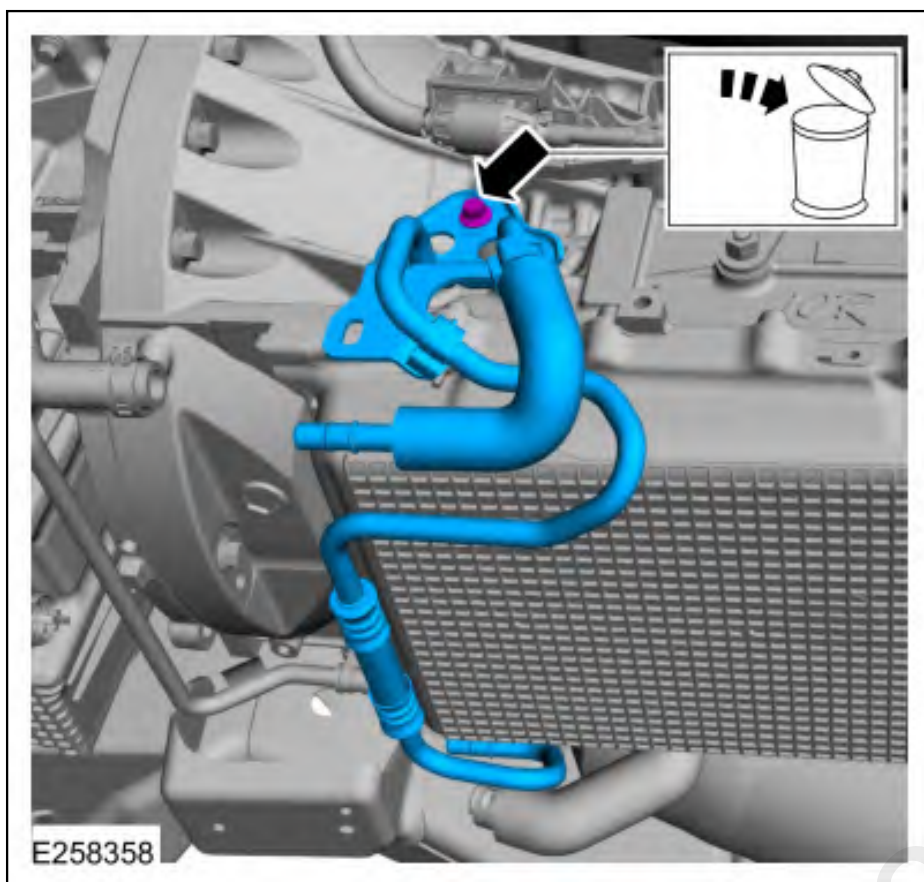
Rear Wheel Drive (RWD) vehicles

7. Remove and discard the stabilizer bar bracket nuts and allow the stabilizer bar to swing downward.

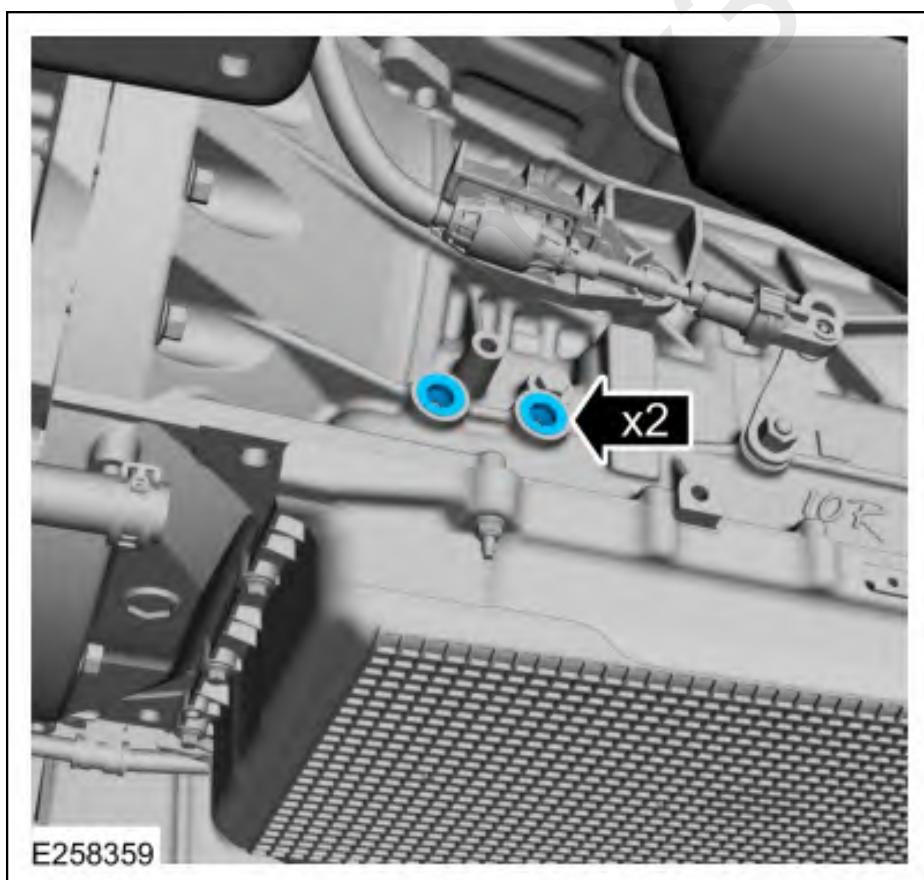


All vehicles

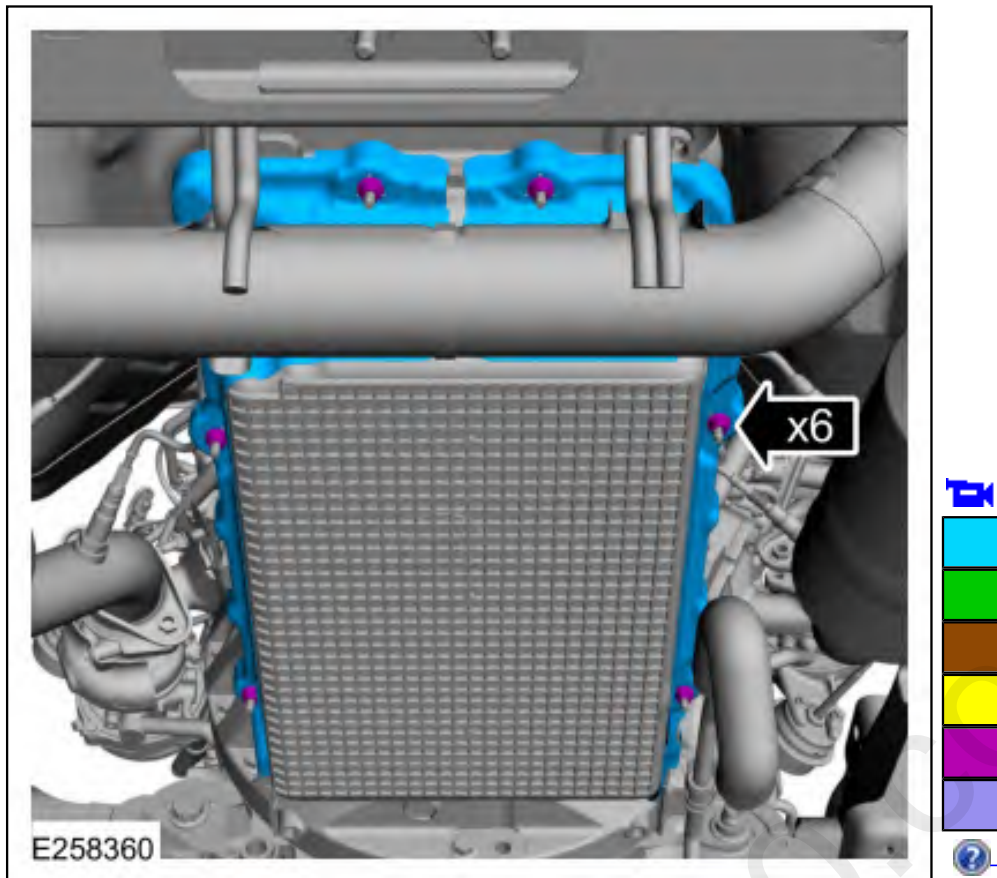
8. Remove and discard the bolt and remove the transmission fluid cooler tubes.



9. If the transmission fluid cooler tube seals or backing rings are stuck in the transmission case, remove the seals and backing rings.



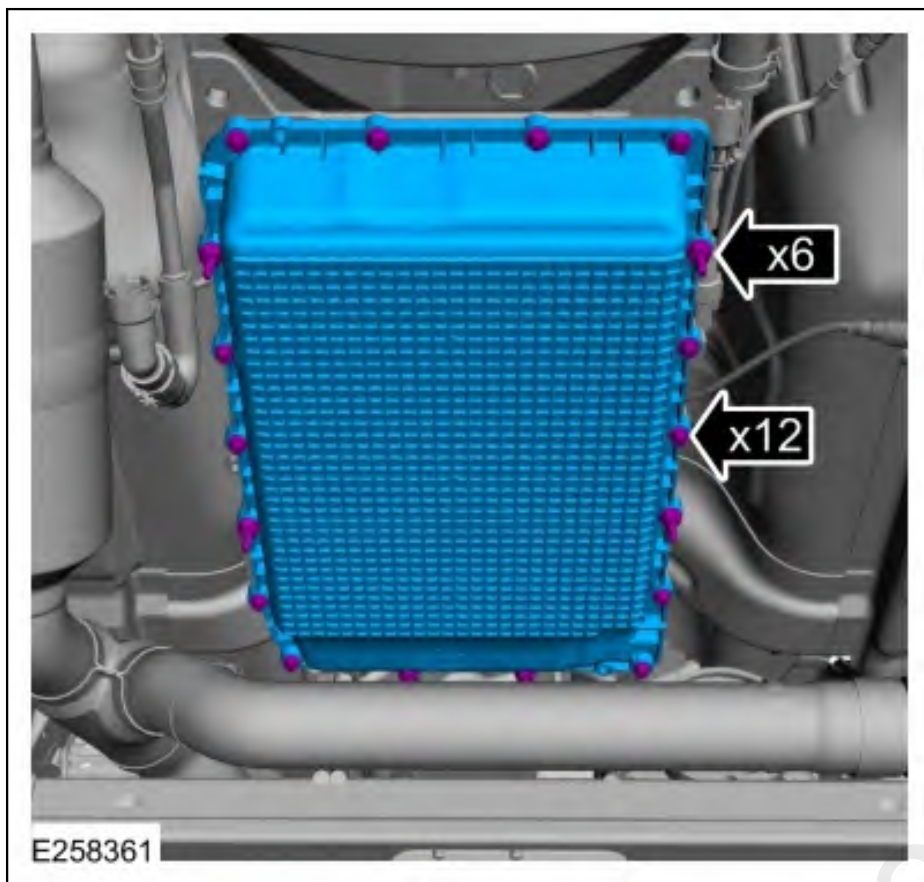
10. Remove the retainers and heatshield.



11. **NOTE:** *If transmission disassembly or installation of a new transmission is necessary, drain the transmission fluid.*

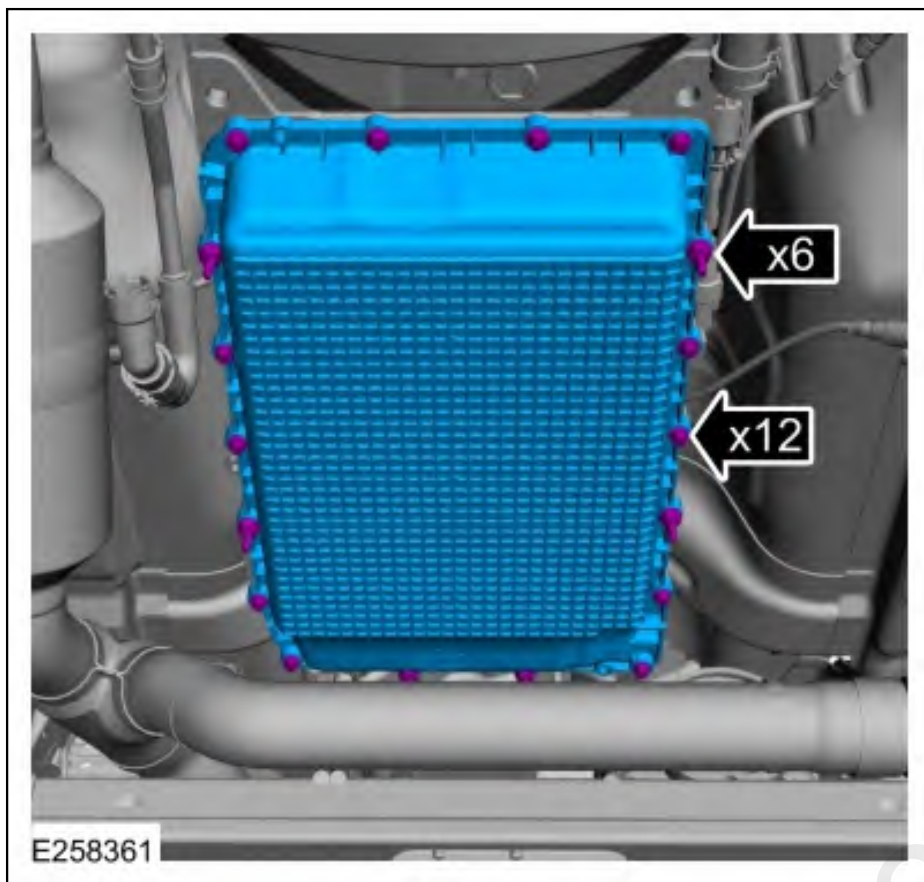
NOTE: *Note the location of the bolts and studbolts for assembly.*

Remove the bolts and the transmission fluid pan.



12. **NOTE:** *It is not necessary to torque transmission fluid pan bolts at this time.*

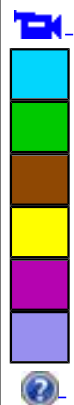
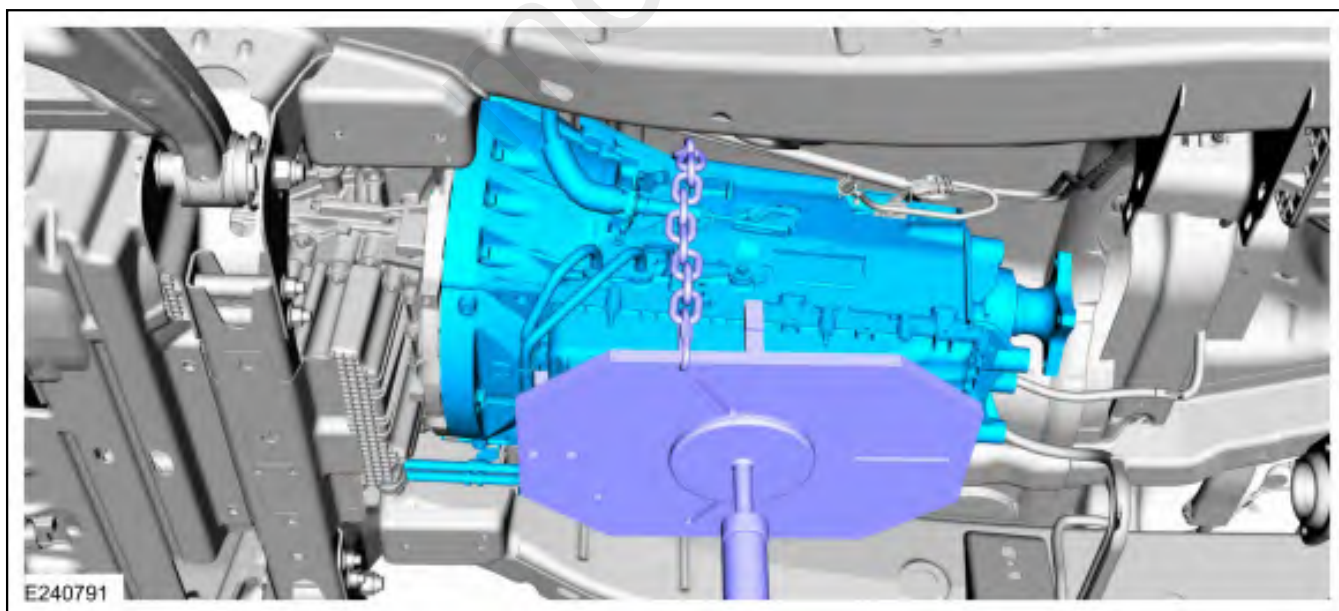
Install the transmission fluid pan and the bolts.



13. **NOTICE:** Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

Using a high-lift transmission jack, support the transmission.
Use the General Equipment: Transmission Jack



14. Remove the LH catalytic converter.

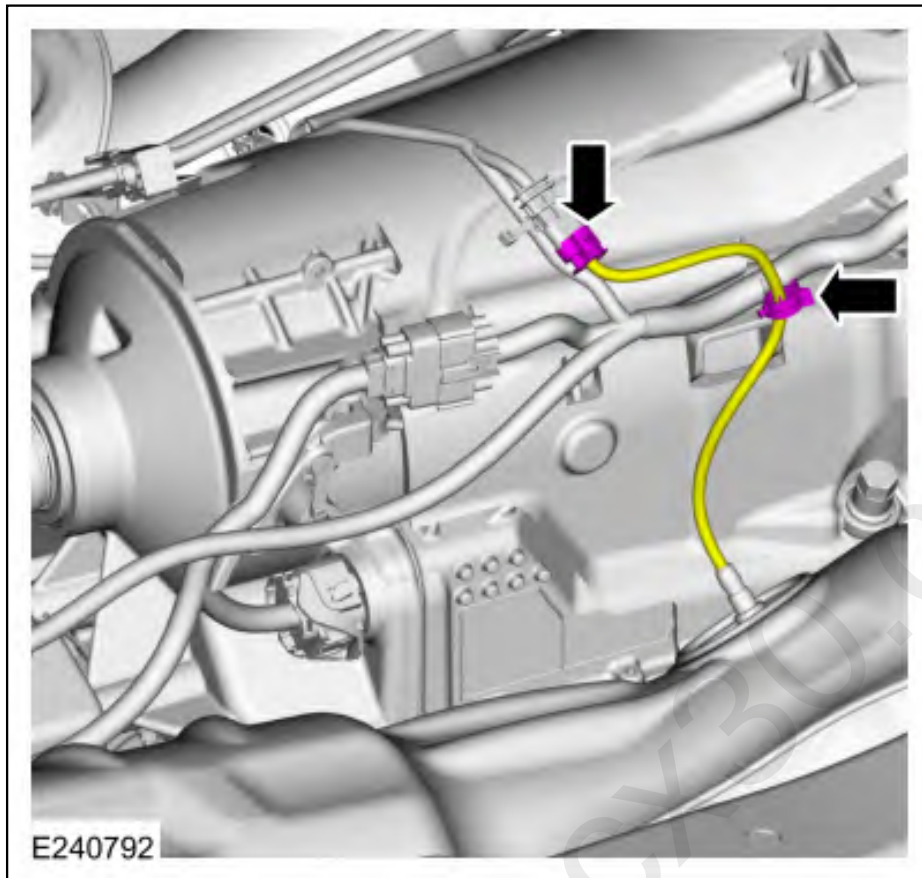
Refer to: [Catalytic Converter LH](#) (309-00C Exhaust System - 3.5L EcoBoost (272kW/370PS), Removal and

Installation).

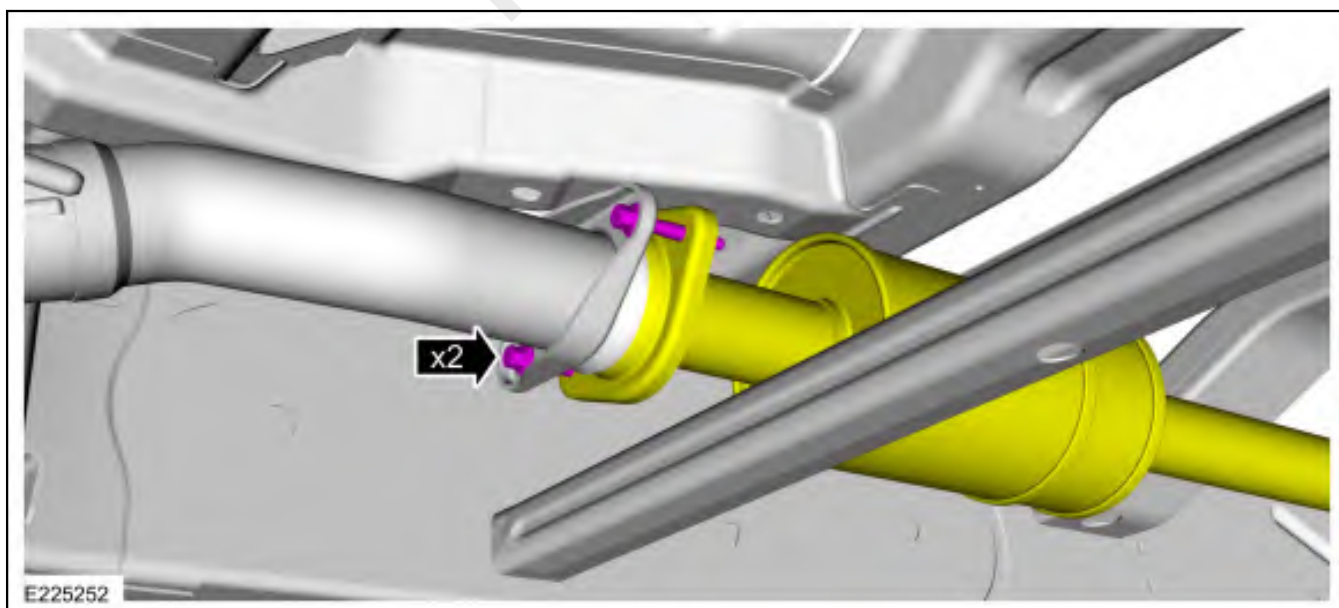
15. Remove the transmission support insulator.

Refer to: [Transmission Support Insulator](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

16. Disconnect the catalyst monitor sensor electrical connector.

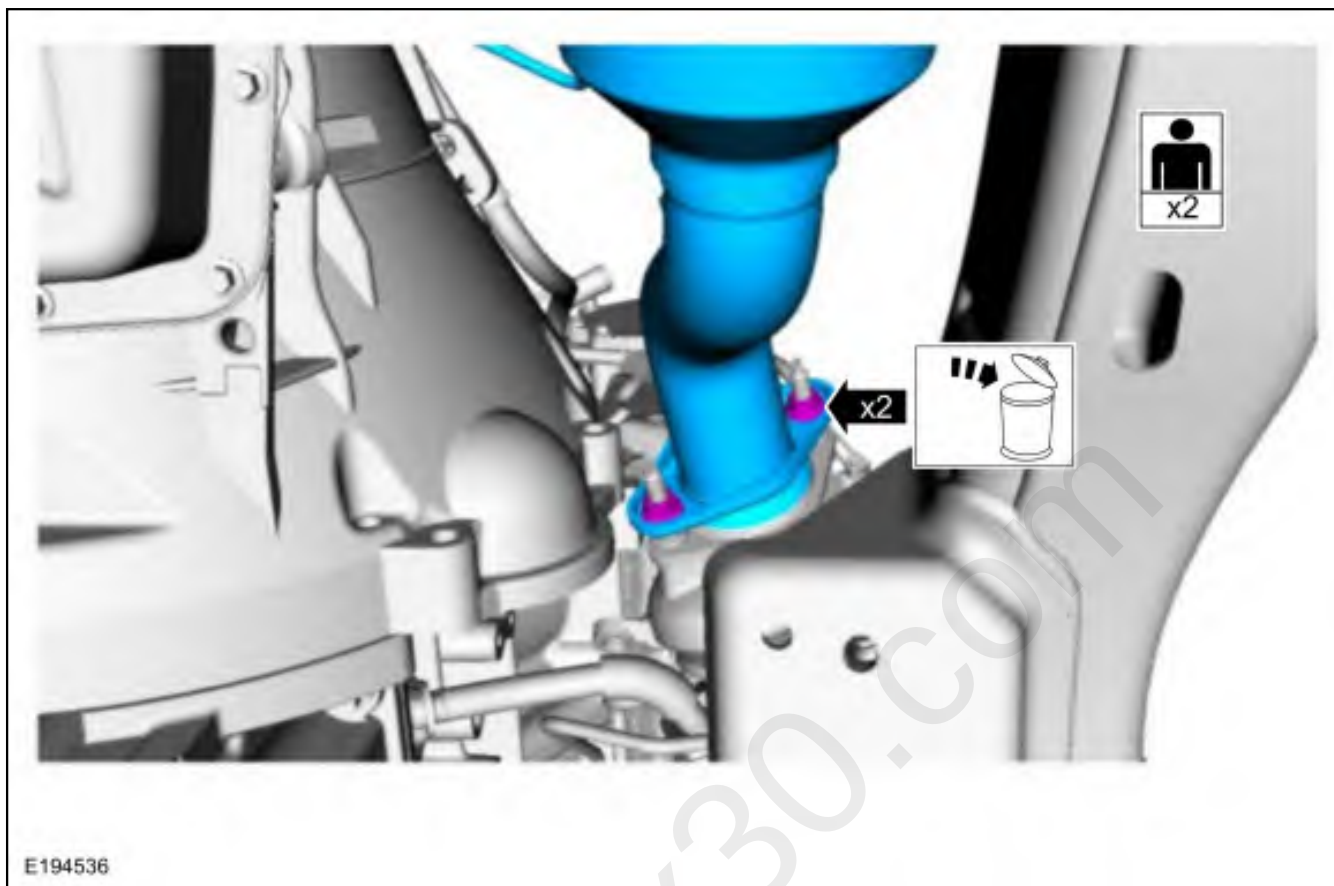


17. Remove the bolts from the catalytic converter flange to the muffler inlet pipe.



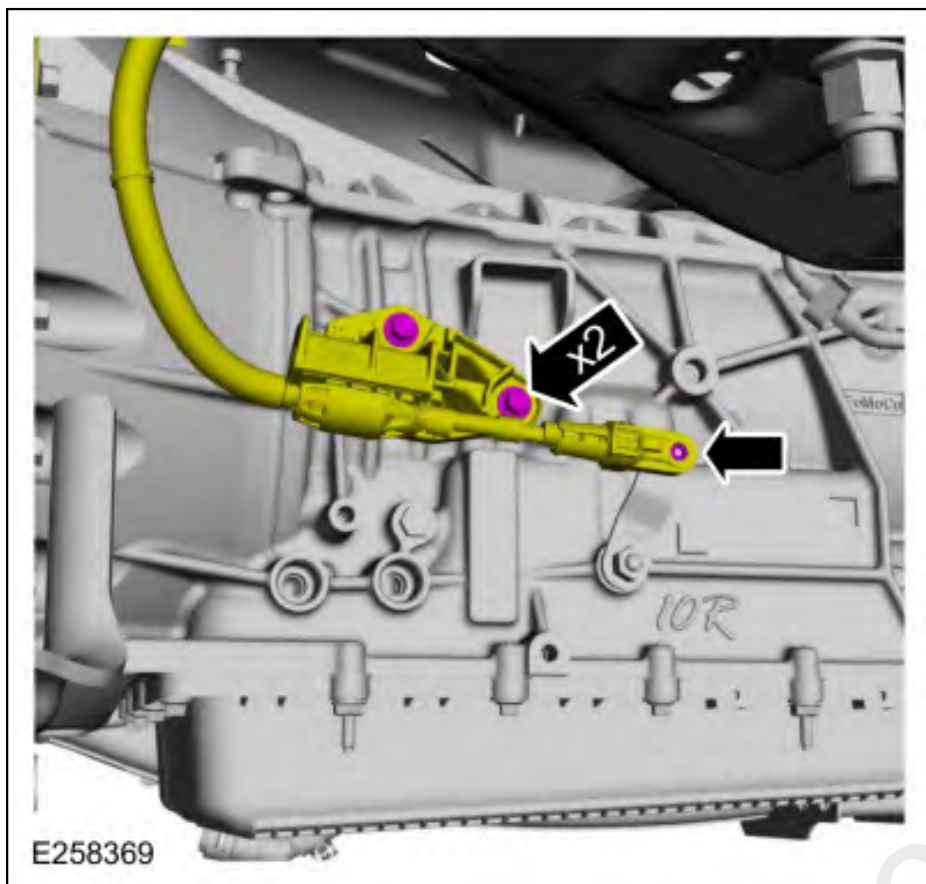
18. **NOTE:** Clean all exhaust connections before reassembly.

Remove and discard the catalytic converter nuts and remove the catalytic converter. Discard the gasket.



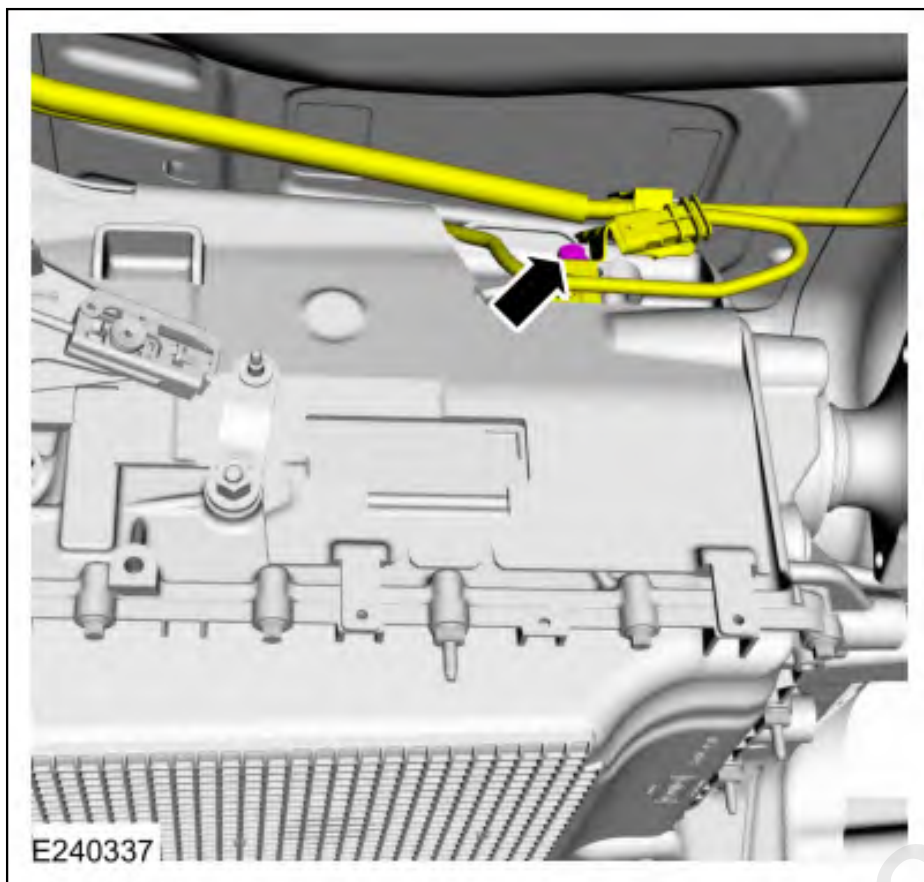
19. **NOTICE:** To prevent selector lever cable damage, do not apply force to the selector lever cable between the manual control lever and the selector lever cable bracket.

Remove the bolts, disconnect the selector lever cable and position aside.



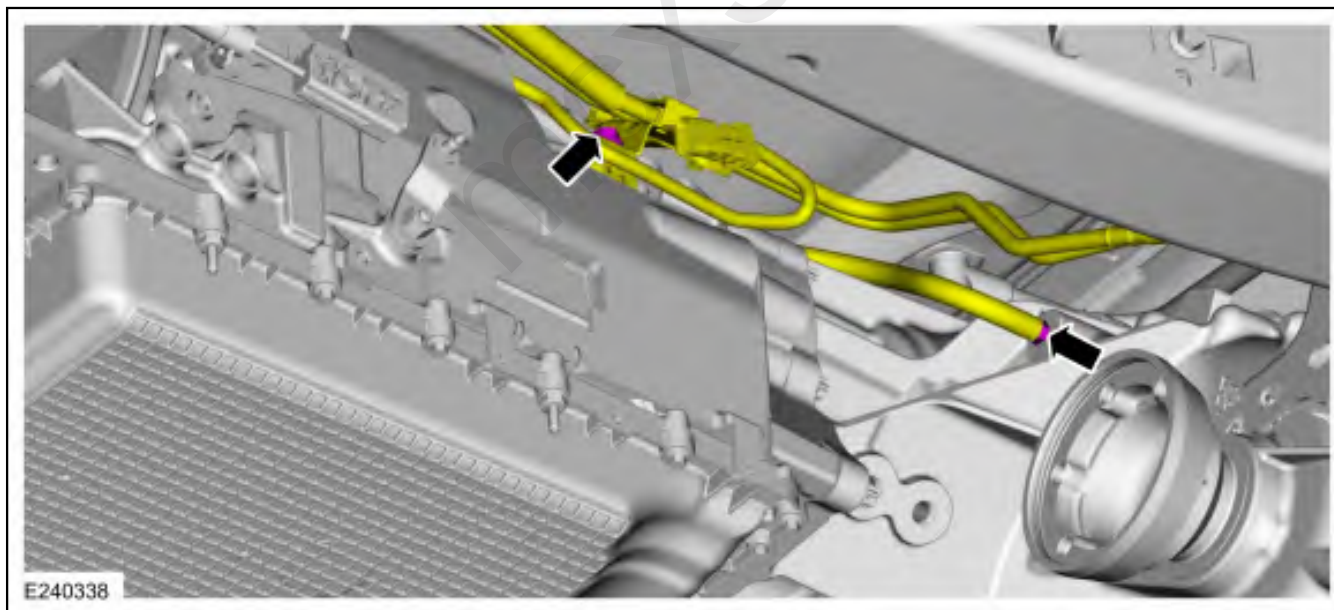
Rear Wheel Drive (RWD) vehicles

- 20. Remove the fuel line bracket bolt.

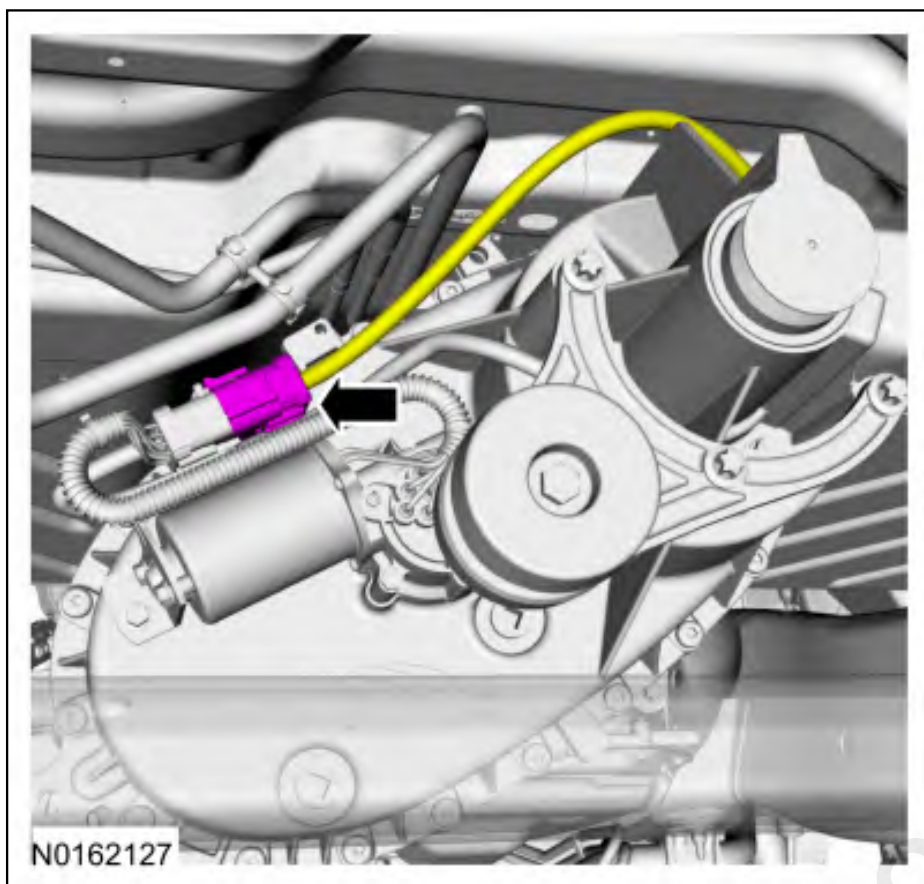


Four-Wheel Drive (4WD) vehicles

21. Remove the fuel line bracket bolt and disconnect the transfer case vent tube.



22. Disconnect the transfer case electrical connector.

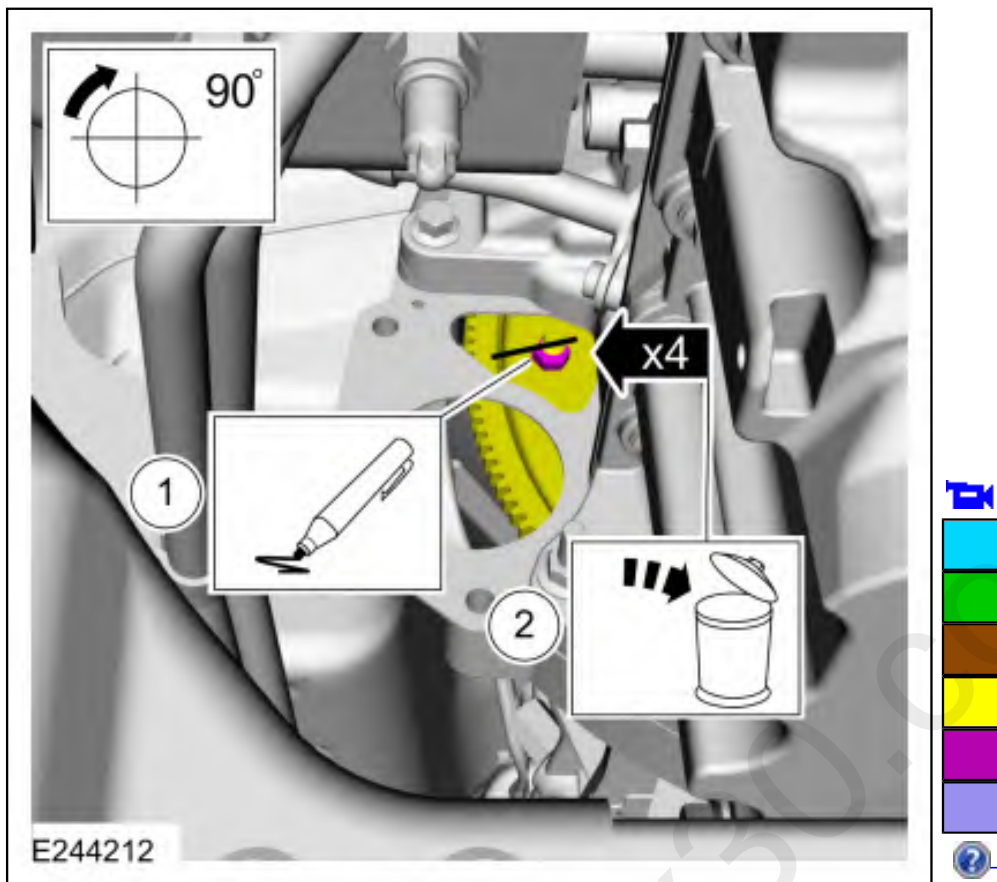


All vehicles

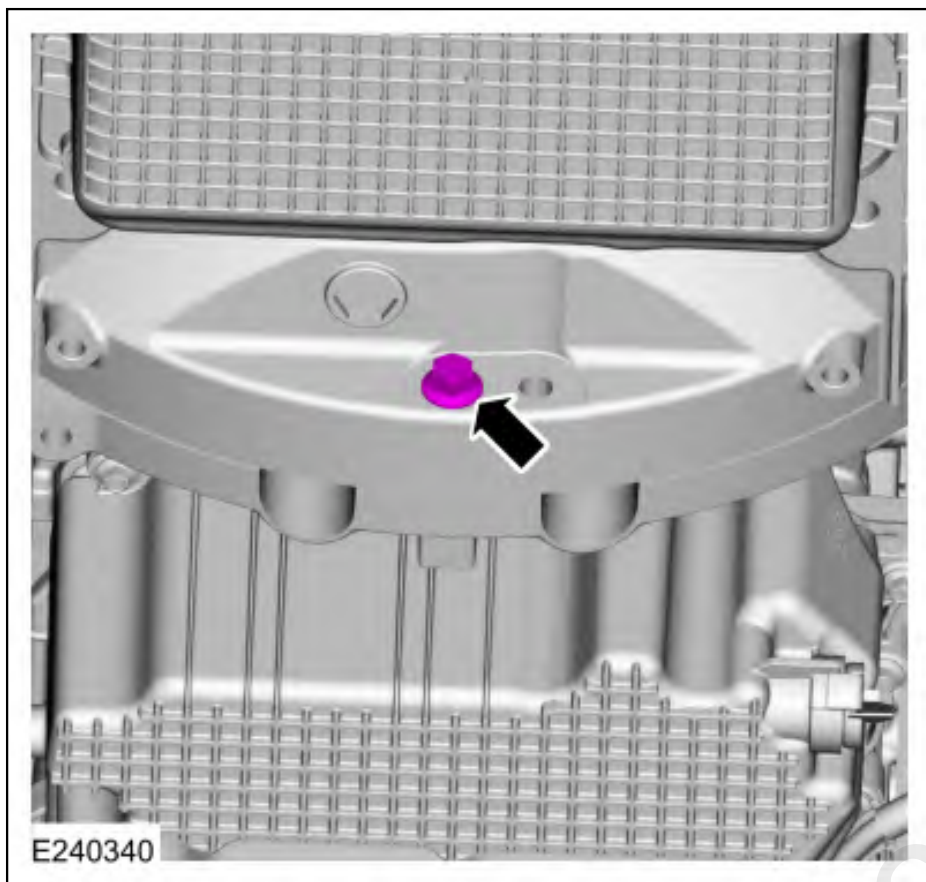
23. **NOTICE: Do not pull on the wire harness to disconnect the electrical connector or damage to the electrical connector will occur.**
1. Slide the lock tab up and disconnect the transmission electrical connector.
 2. Pull the transmission electrical connector out to disconnect.
 3. Detach the retainers from the transmission and position the wiring harness aside.

25. **NOTE:** Using the crankshaft pulley bolt, turn the engine clockwise.

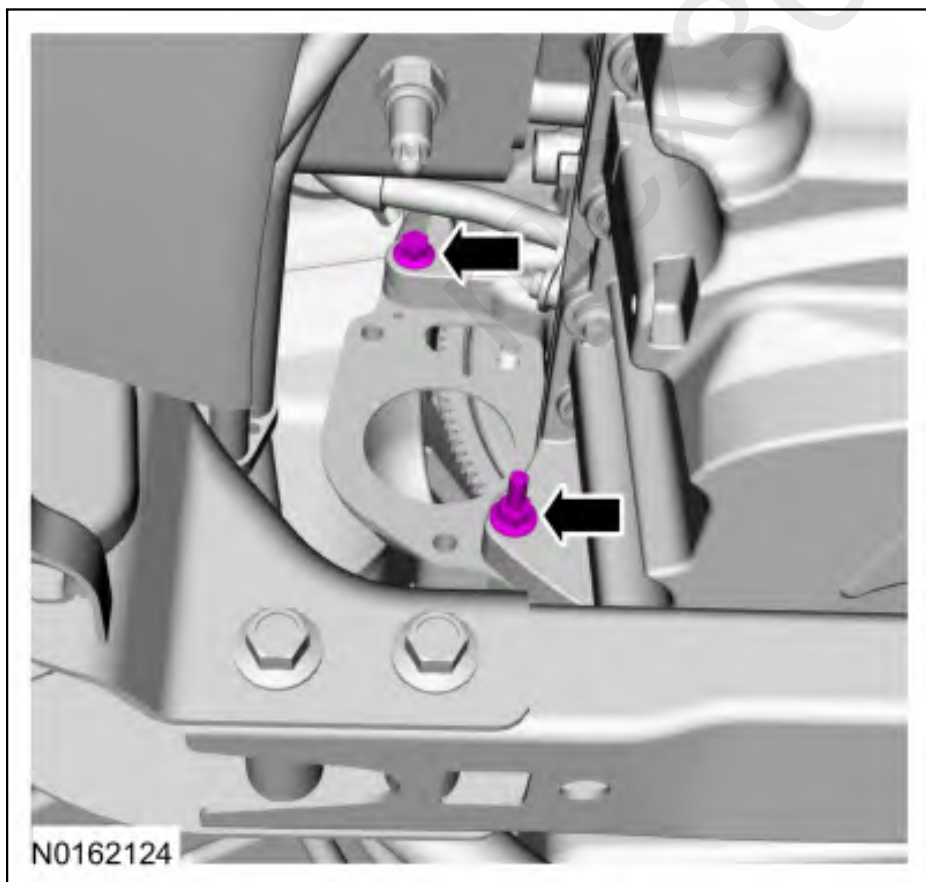
1. Index mark one stud and the flexplate for assembly reference.
2. Remove and discard the torque converter nuts.



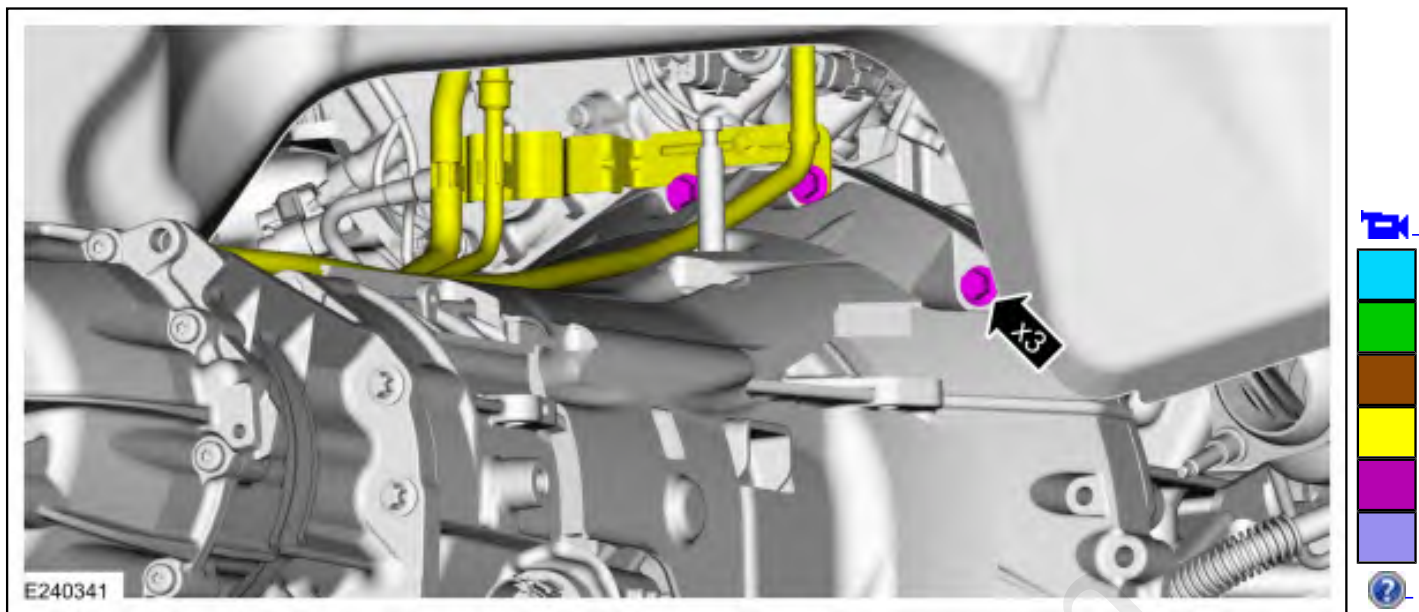
26. Remove the lower bellhousing bolt.



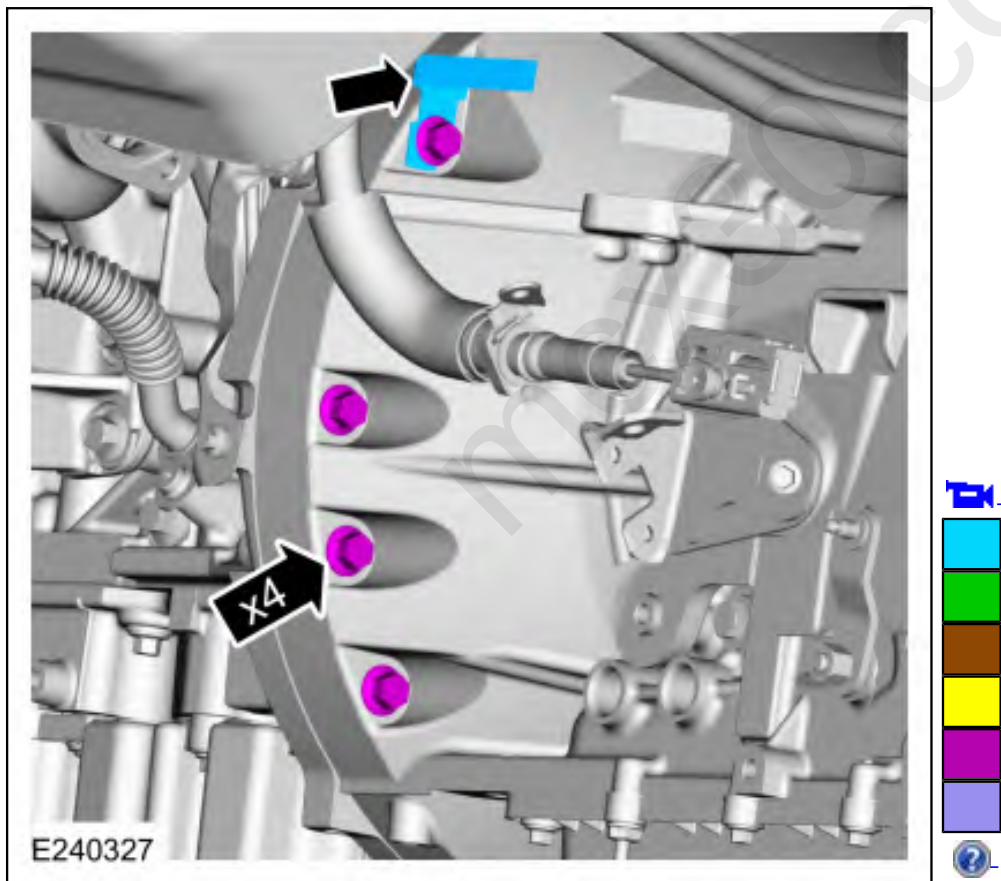
27. Remove the RH side bellhousing bolts.



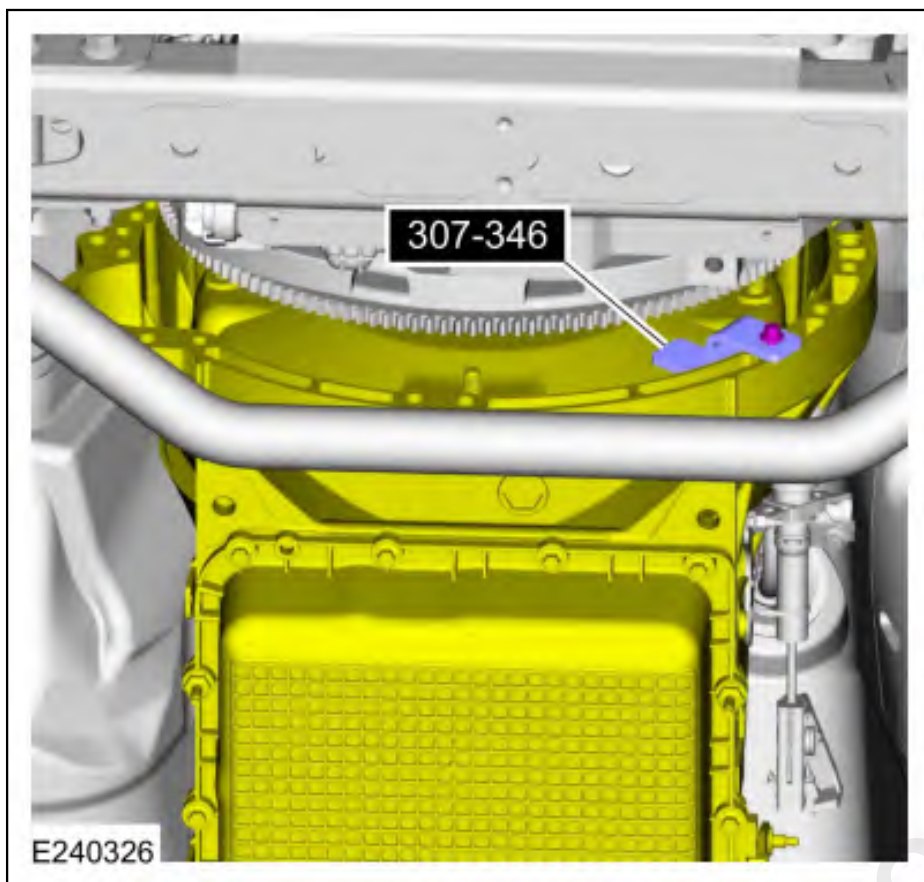
28. Remove the top bellhousing bolts and position aside the bracket.



29. Remove the LH bellhousing bolts and the selector lever cable bracket.

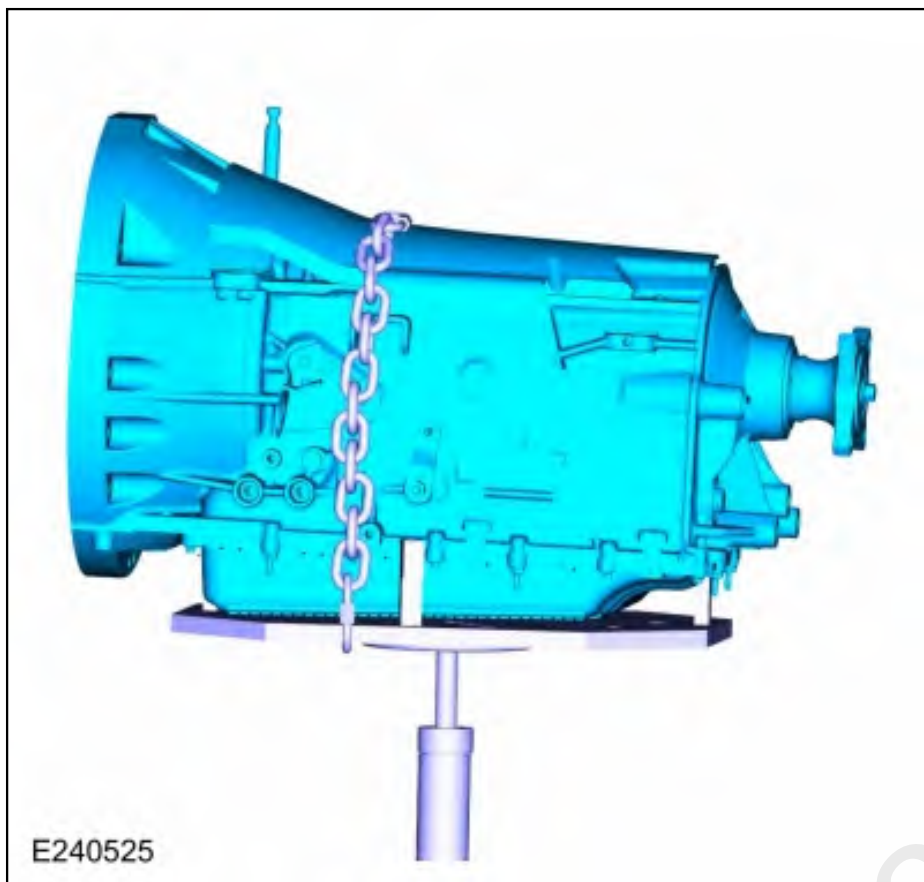


30. Slide the transmission back enough to install the special tool.
Use Special Service Tool: 307-346 (T97T-7902-A) Retainer, Torque Converter.



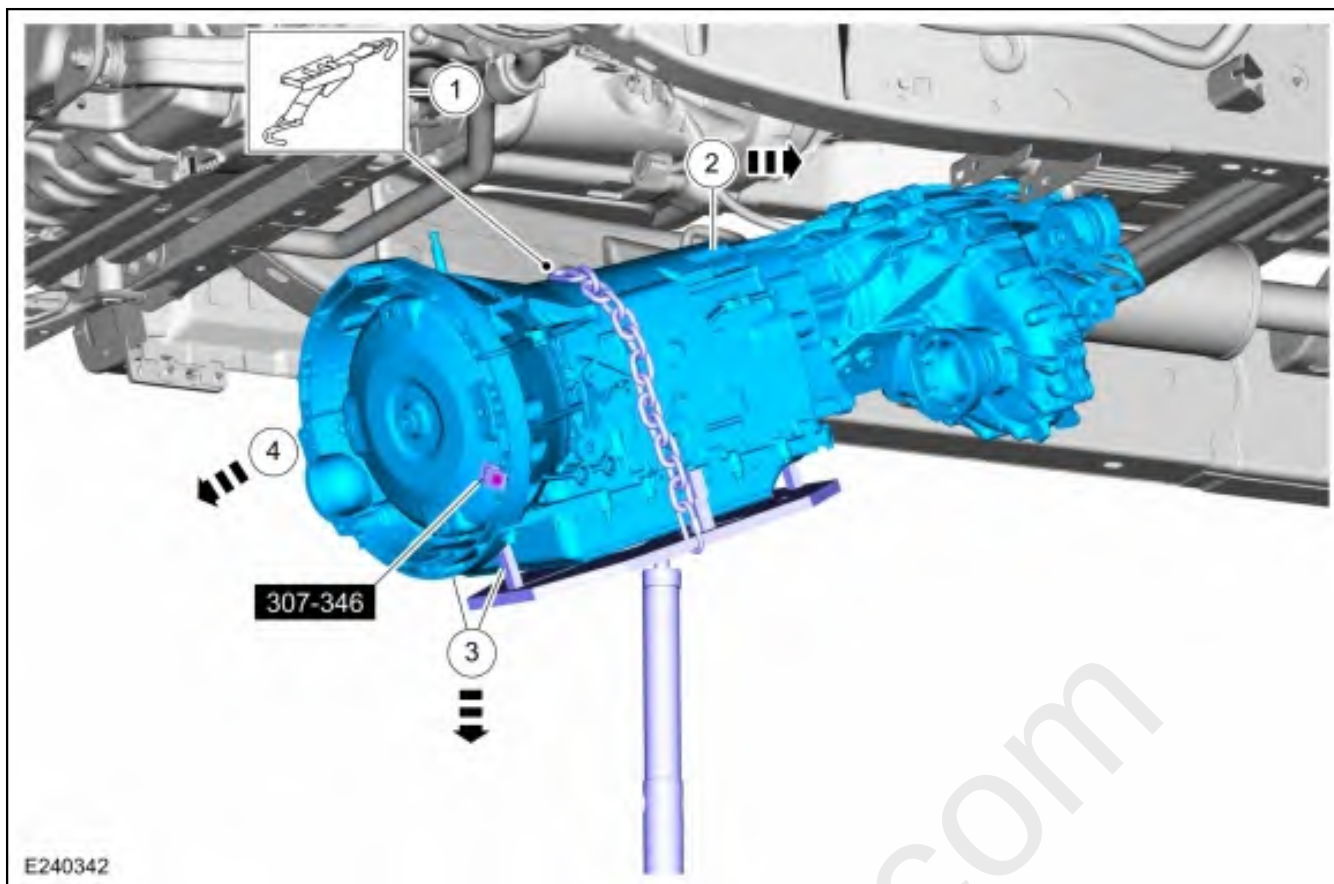
Rear Wheel Drive (RWD) vehicles

31. Using the high-lift transmission jack, remove the transmission from the vehicle.
Use the General Equipment: Transmission Jack

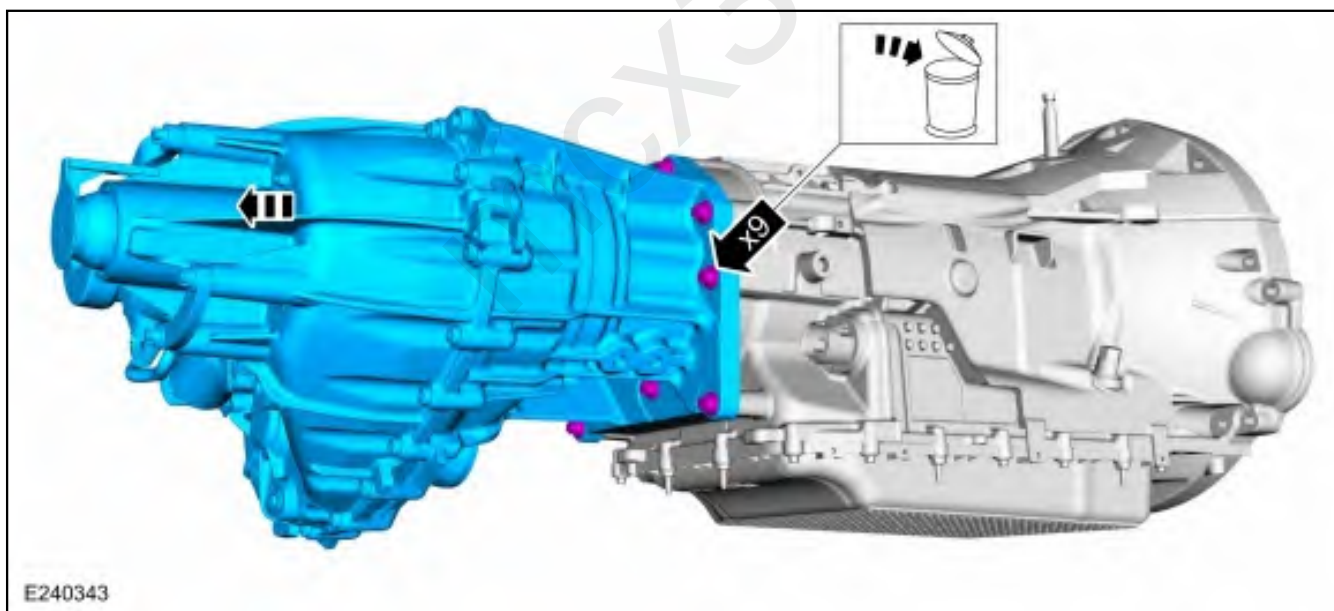


Four-Wheel Drive (4WD) vehicles

1. Make sure the transmission is securely fastened to the transmission jack.
2. Slide the transmission towards the rear of the vehicle.
3. Tilt the front of the transmission down.
4. Remove the transmission from the vehicle.



33. If the transmission is to be overhauled or if installing a new or re-manufactured transmission, remove and discard the bolts and separate the transfer case from the transmission.



All vehicles

34. **NOTICE: Failure to clean the transmission fluid cooler tubes can result in transmission failure.**

If the transmission is to be overhauled or if installing a new or re-manufactured transmission, carry out the transmission fluid cooler backflushing and cleaning procedure.

Refer to: [Transmission Fluid Cooler - Backflushing and Cleaning - 2.7L EcoBoost \(238kW/324PS\)/3.0L Power Stroke Diesel/3.5L EcoBoost \(272kW/370PS\)/5.0L 32V Ti-VCT](#) (307-02 Transmission Cooling, General Procedures).

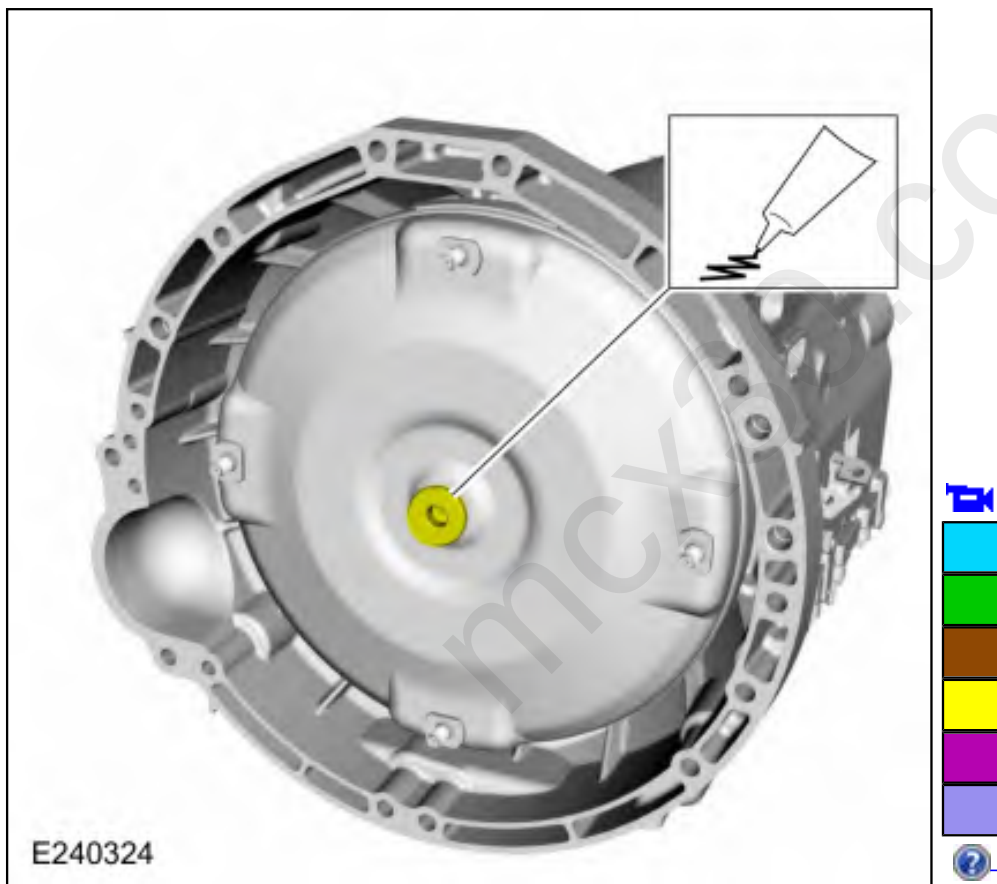
Installation

NOTE: Prior to installing a new transmission or an overhauled transmission with a new main control, record the solenoid strategy identification tag. If a new main control was installed, install the replacement solenoid body tag over the original identification tag.

1. **NOTICE:** Prior to installation of the transmission, lubricate the torque converter pilot hub or damage to the torque converter or the engine crankshaft can occur.

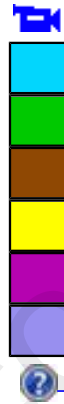
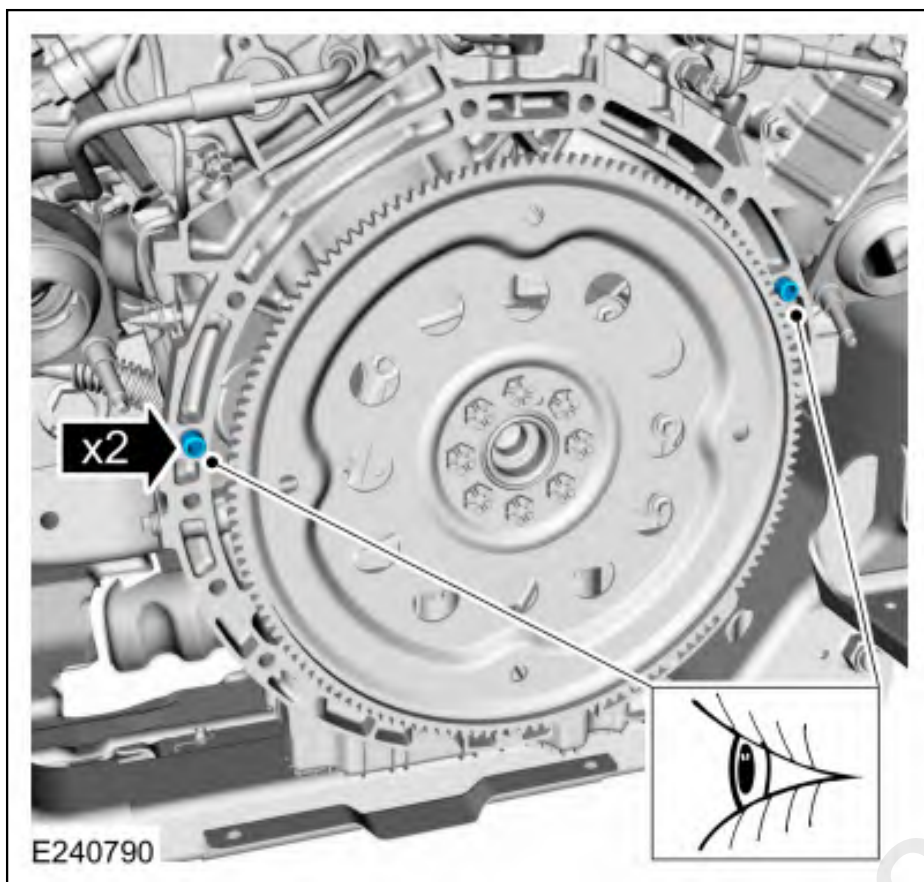
Lubricate the torque converter pilot hub with multi-purpose grease.

Material: Motorcraft® Multi-Purpose Grease Spray / XL-5-A (ESB-M1C93-B)

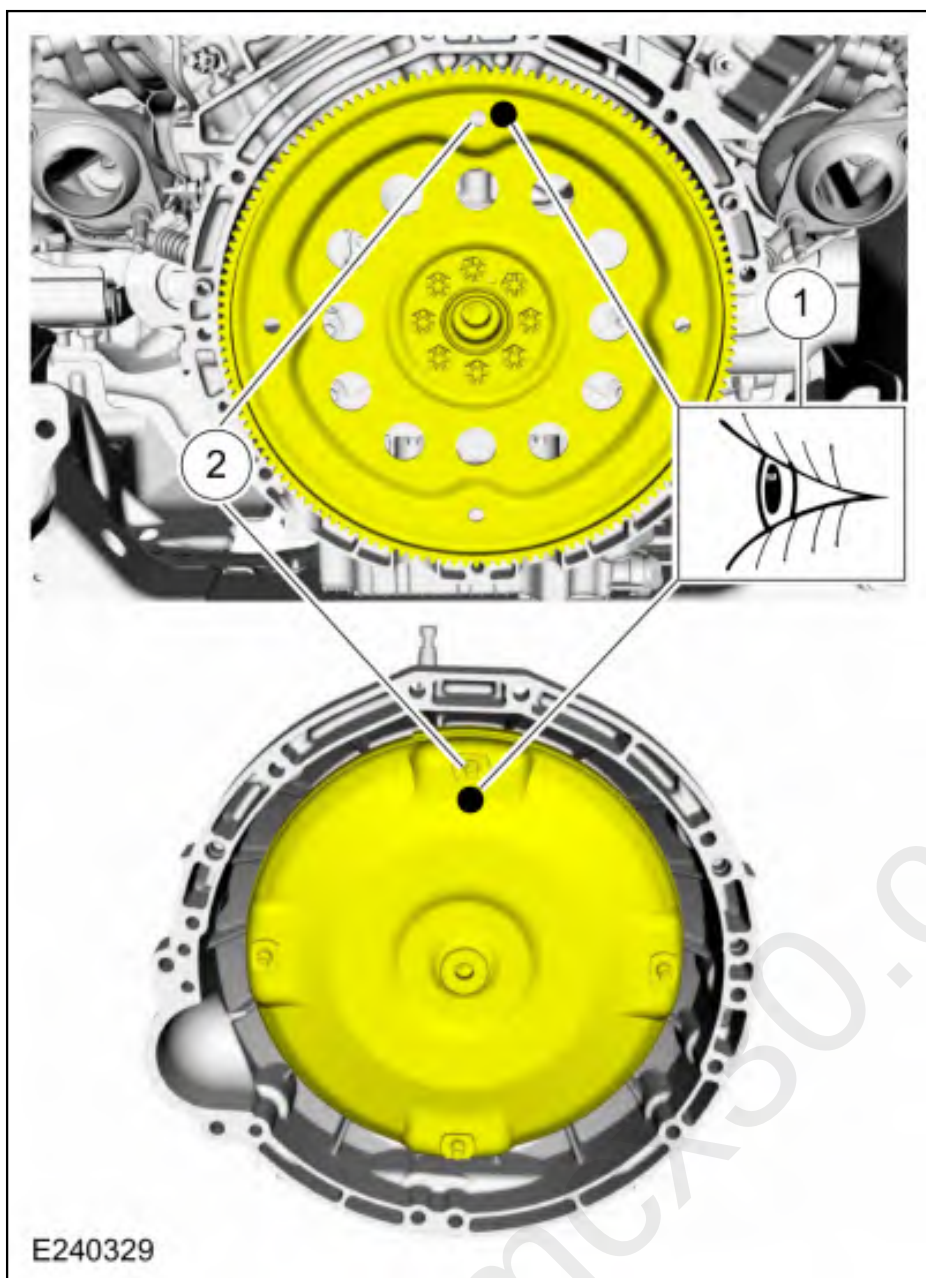


2. **NOTICE:** If the transmission is not positioned on the dowel pins, damage to the transmission may occur.

If the dowel pins were pulled out of the engine block during removal, install new dowel pins in the engine block.

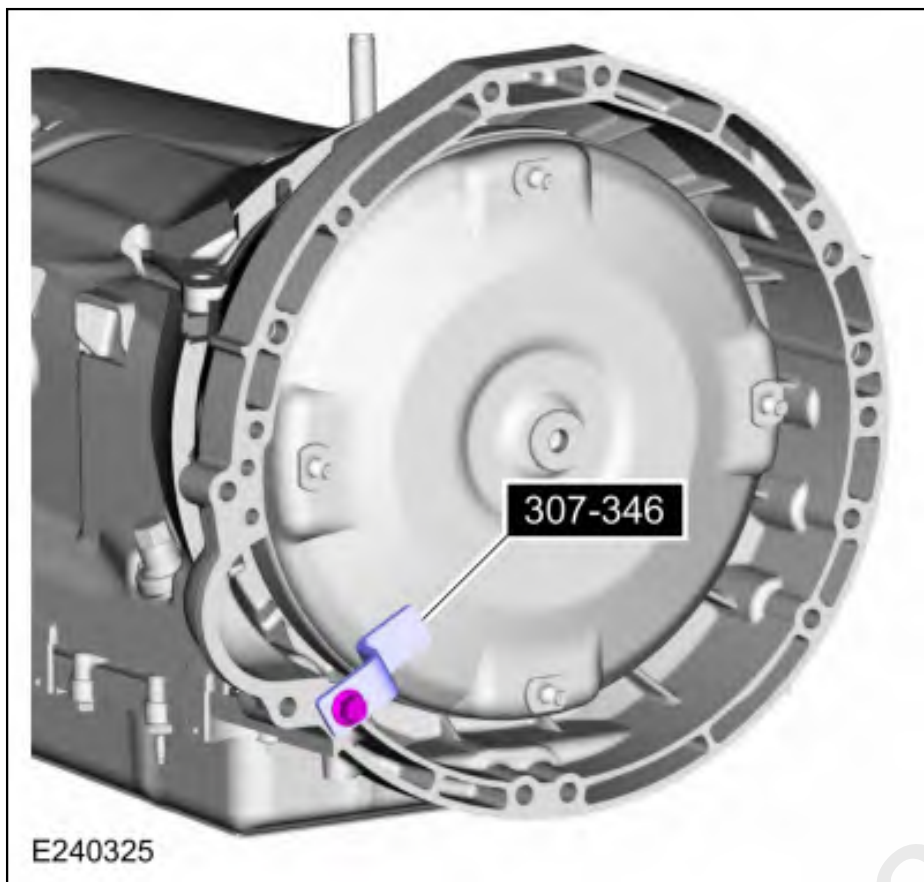


1. Inspect the torque converter stud and flexplate for paint marks.
2. Align the torque converter stud and flexplate hole near the paint marks to the 12 o'clock position.



4. Install the special tool.

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

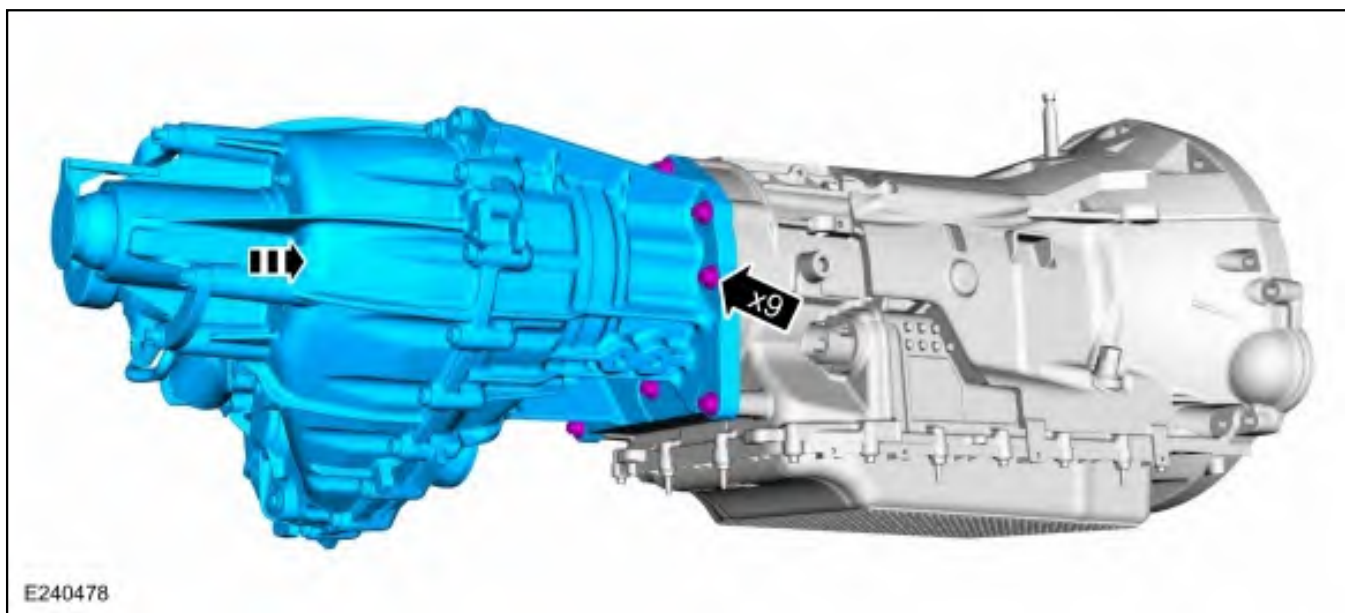


5. **NOTE:** *If transmission is being replaced, remove the transmission fluid fill plug and verify that the transmission is filled with transmission fluid.*

NOTE: *If transmission was disassembled, add transmission fluid to the transmission.*

NOTE: *Rear Wheel Drive (RWD) shown, Four-Wheel Drive (4WD) similar.*

1. Remove the transmission fluid fill plug transmission fluid level indicator assembly.
2. Verify transmission is filled with transmission fluid.
3. Slightly tilt the transmission rearward.
4. If the transmission was disassembled, add 12.30L (13 qt) of transmission fluid to the transmission through the transmission fluid fill hole.
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (MERCON® ULV) (WSS-M2C949-A)
 - Loosely install the transmission fluid plug when finished.

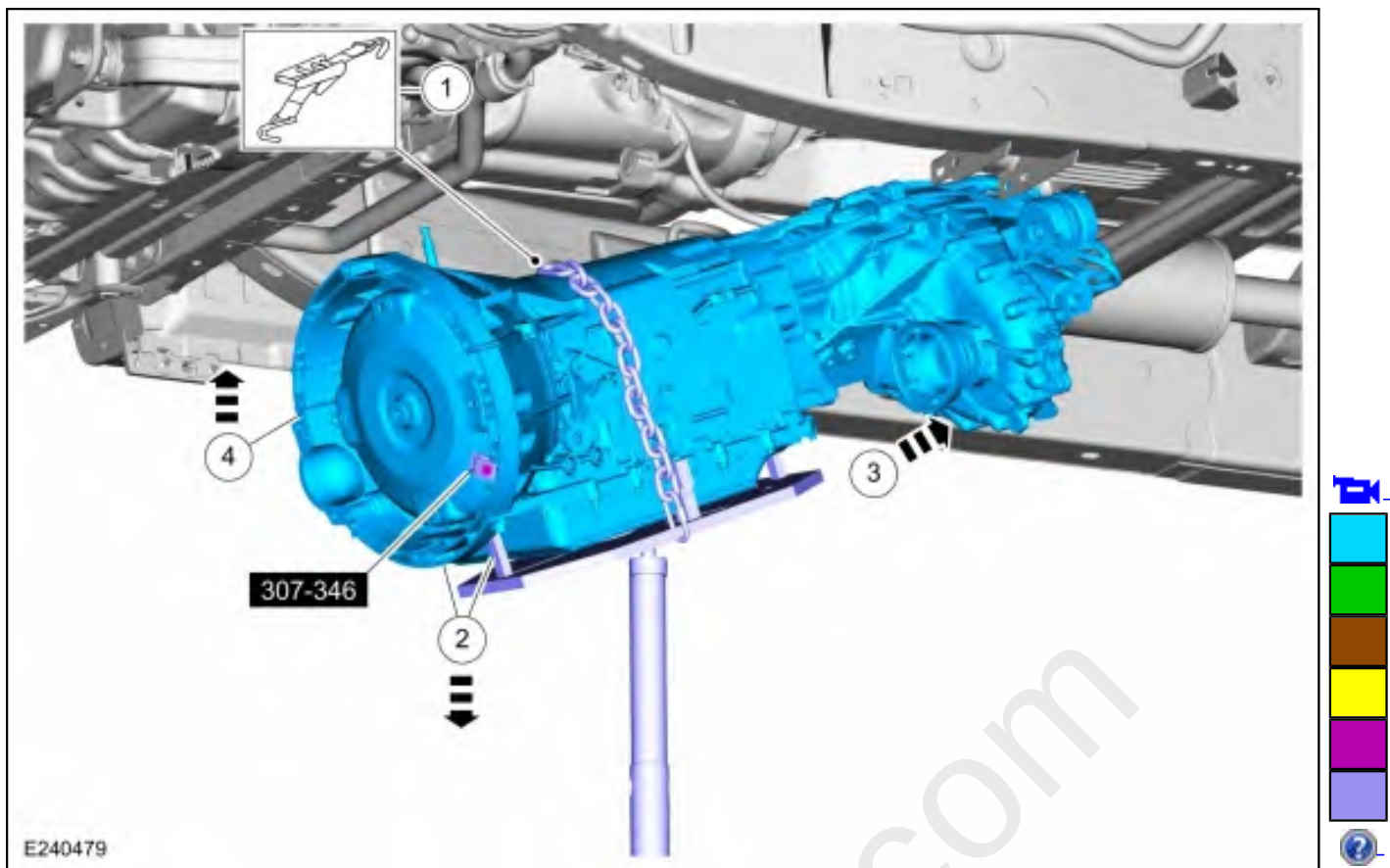


7. NOTICE: Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

Using a high-lift transmission jack, support the transmission.

1. Make sure the transmission is securely fastened to the transmission jack.
Use the General Equipment: Transmission Jack
2. Tilt the front of the transmission down.
3. Slide the transmission towards the rear of the vehicle.
4. Raise the front of the transmission into a horizontal position.



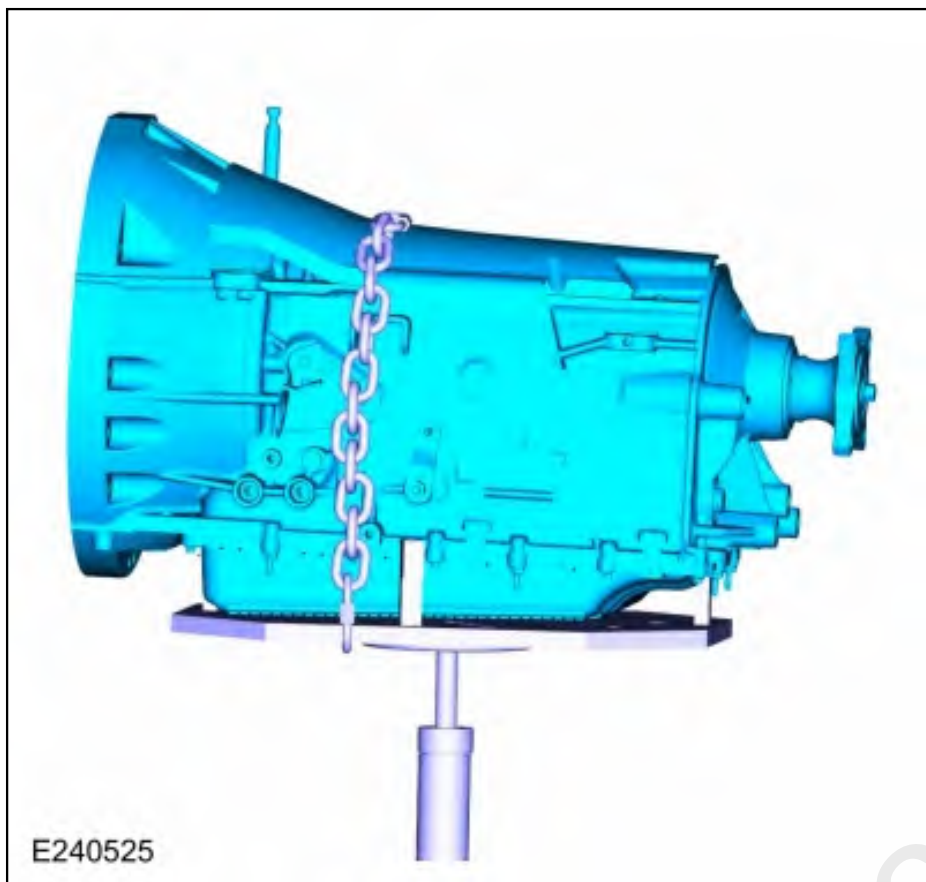
Rear Wheel Drive (RWD) vehicles

8. **NOTICE:** Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

Using a high-lift transmission jack, position the transmission in the vehicle.

Use the General Equipment: Transmission Jack

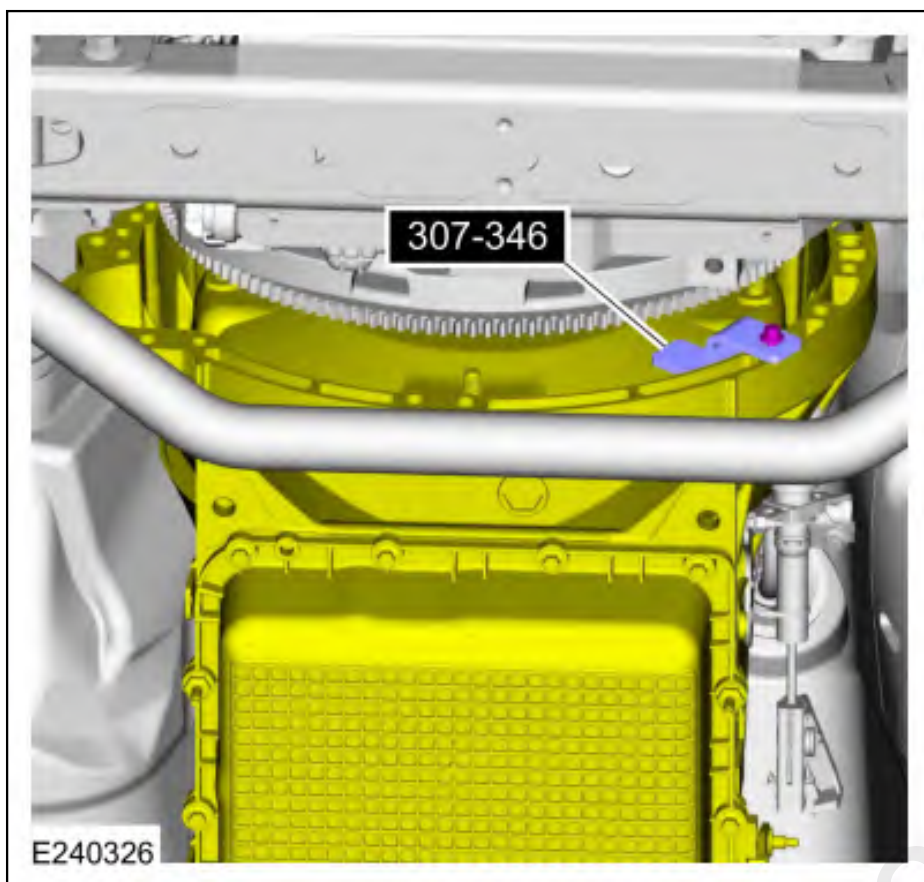


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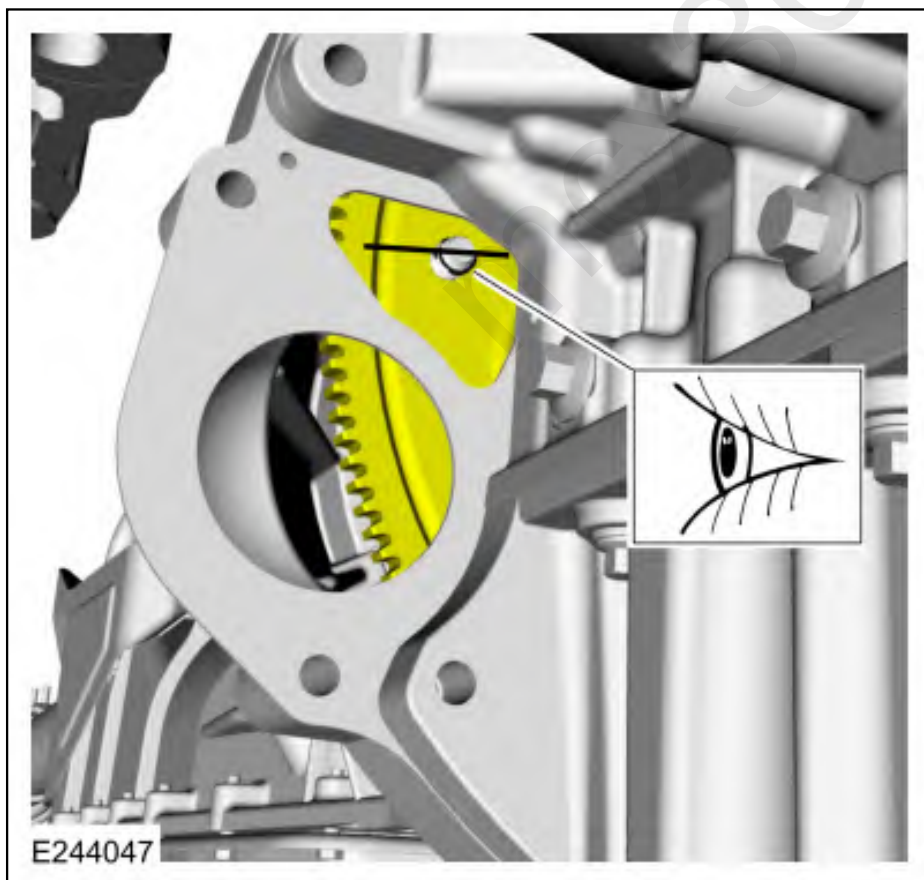
All vehicles

9. Remove the special tool.

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



10. Align the index-mark made during removal.

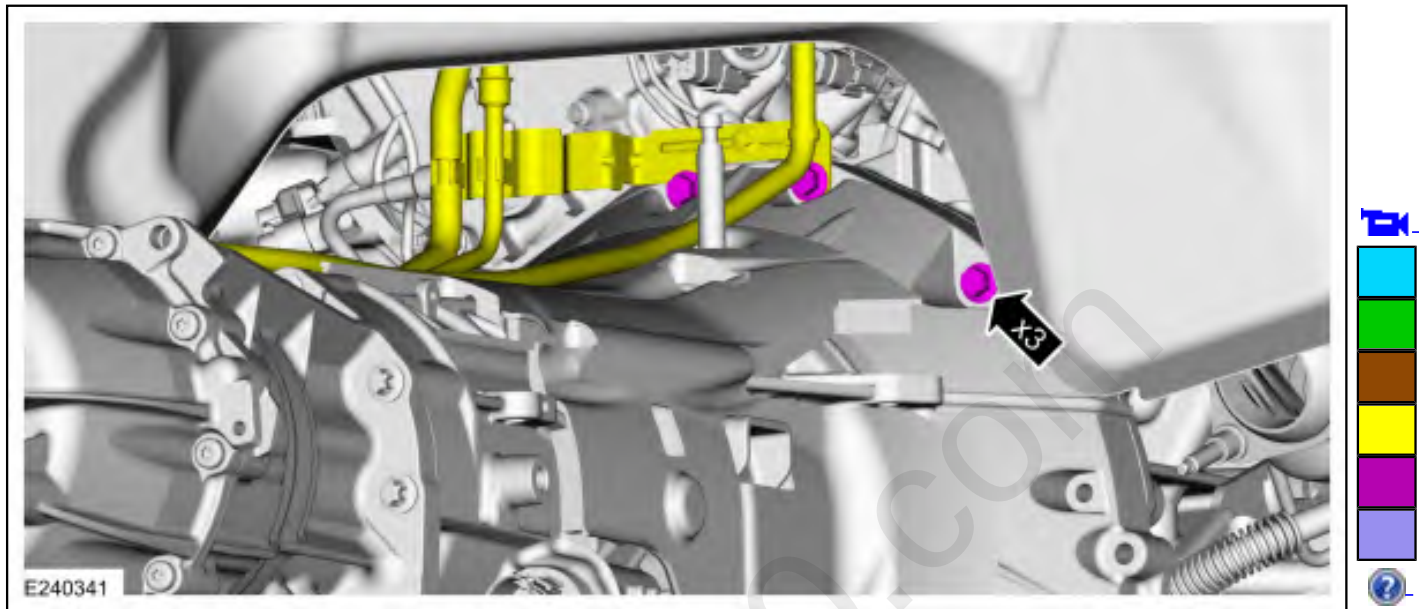


11. **NOTE:** Make sure the torque converter is fully seated in the transmission before aligning the transmission to the engine.

NOTE: With the transmission in a horizontal position, move it toward the engine and position it on the dowel pins.

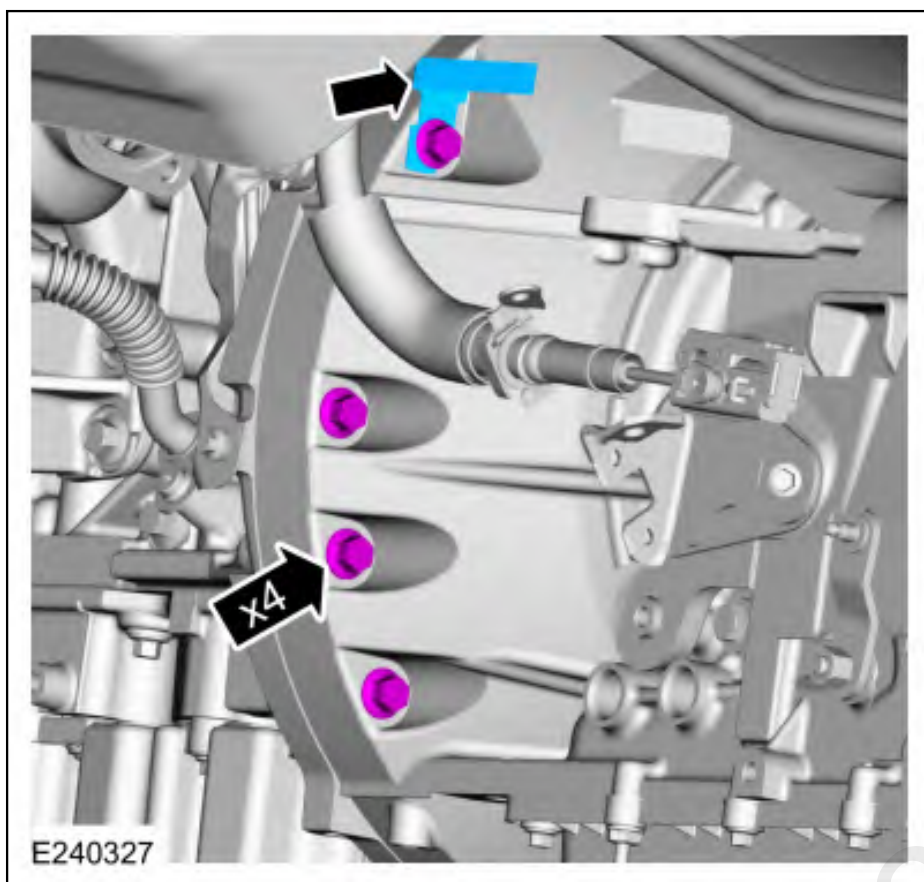
Position the bracket and install the top bellhousing bolts.

Torque: 35 lb.ft (48 Nm)

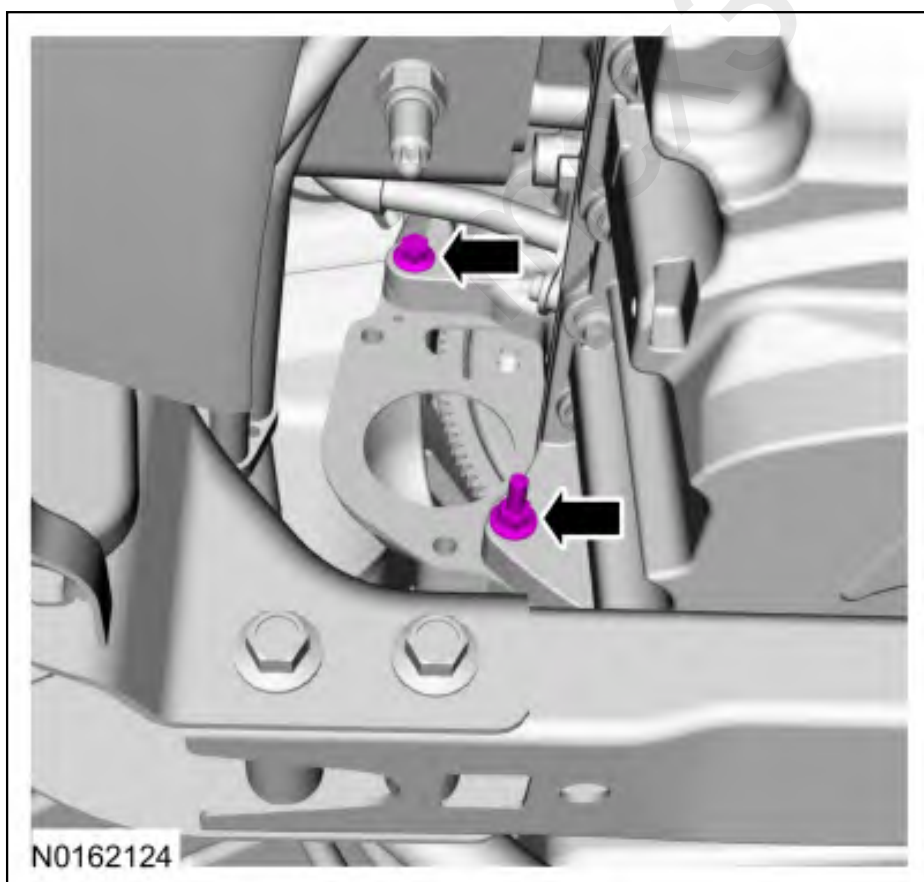


12. Install the selector lever cable bracket and the LH bellhousing bolts.

Torque: 35 lb.ft (48 Nm)

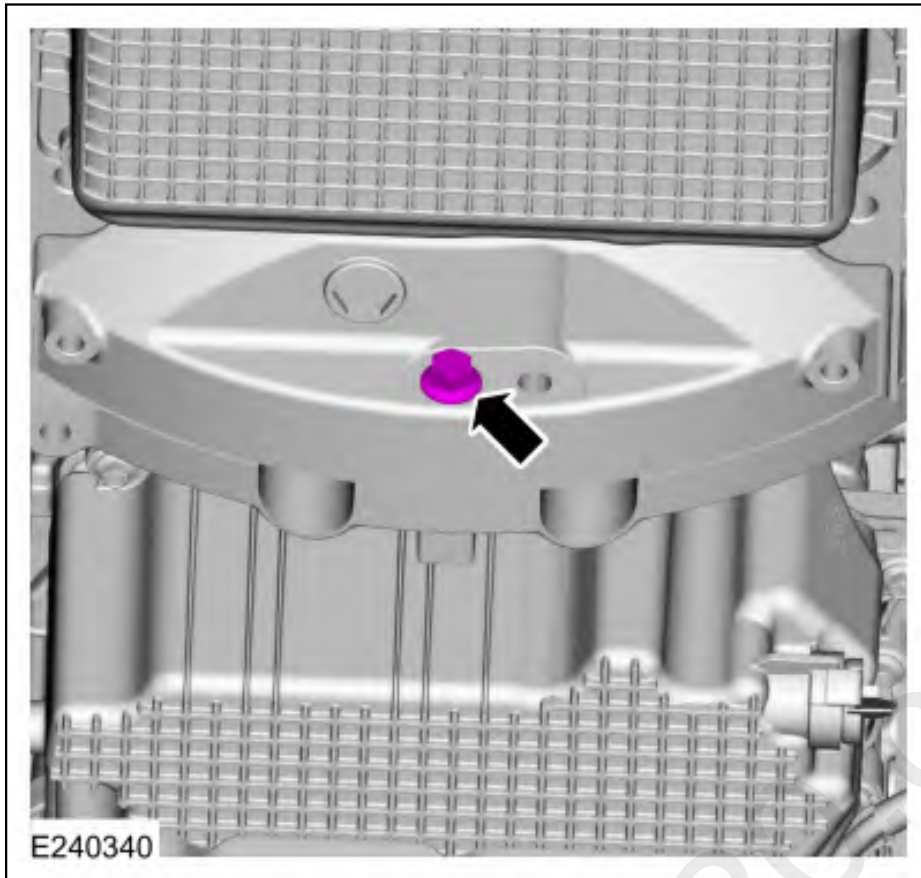


13. Install the RH bellhousing bolts.
Torque: 35 lb.ft (48 Nm)



14. Install the lower bellhousing bolt.

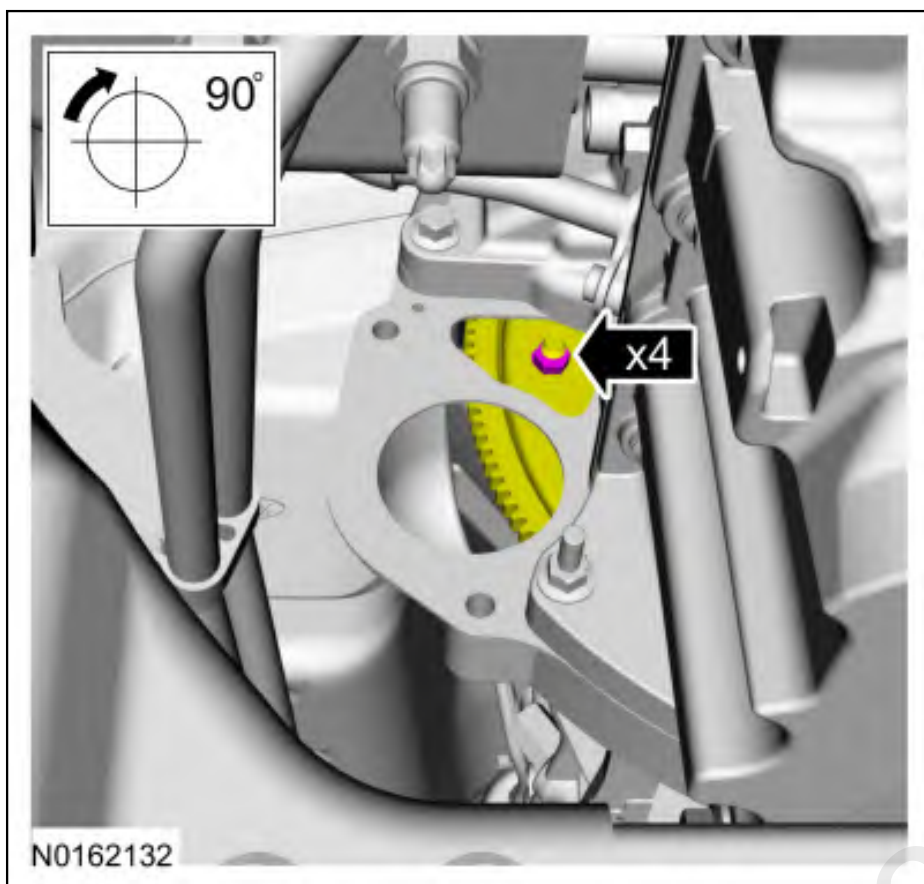
Torque: 35 lb.ft (48 Nm)



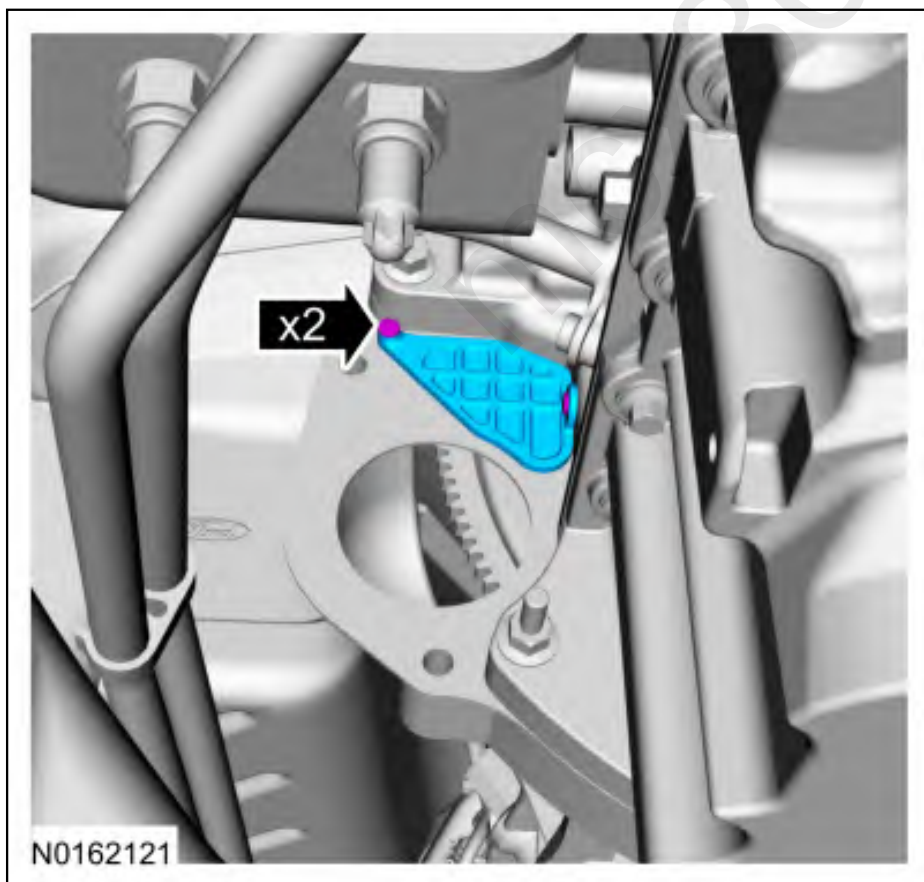
15. **NOTE:** *Using the crankshaft pulley bolt, turn the engine clockwise.*

Install the new torque converter nuts.

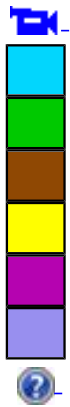
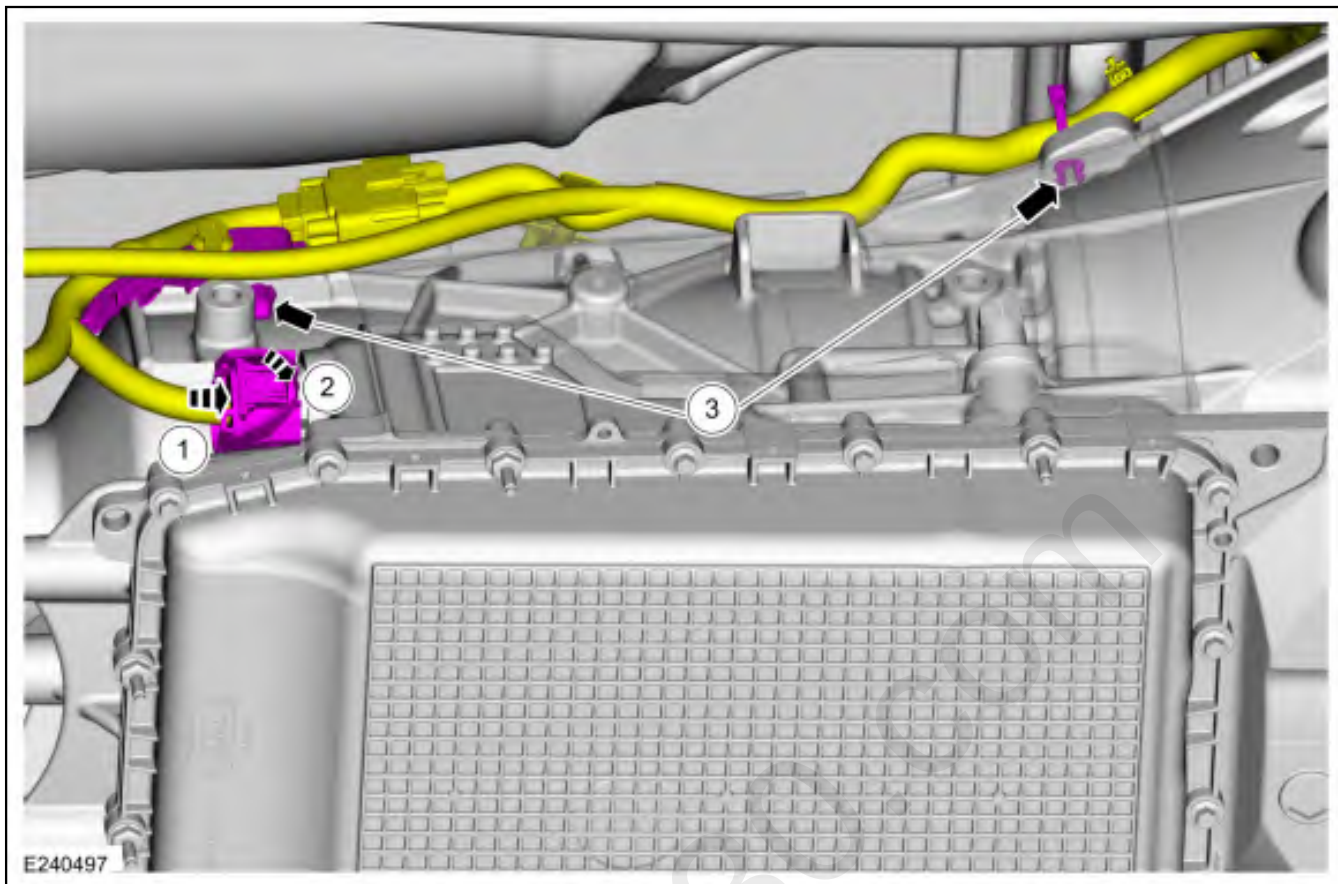
Torque: 30 lb.ft (40 Nm)



16. Install the access cover and the pin-type retainers.

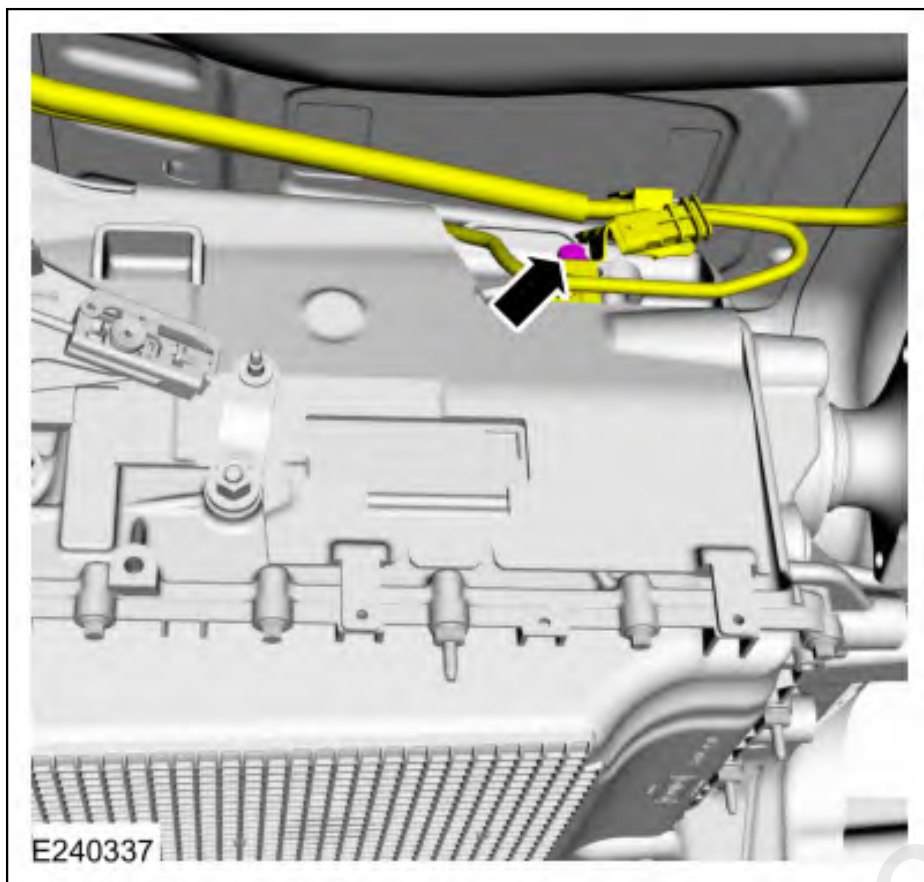


1. Push the transmission electrical connector in.
2. Lock the tab to connect the transmission electrical connector.
3. Attach the wiring harness retainers in the transmission.



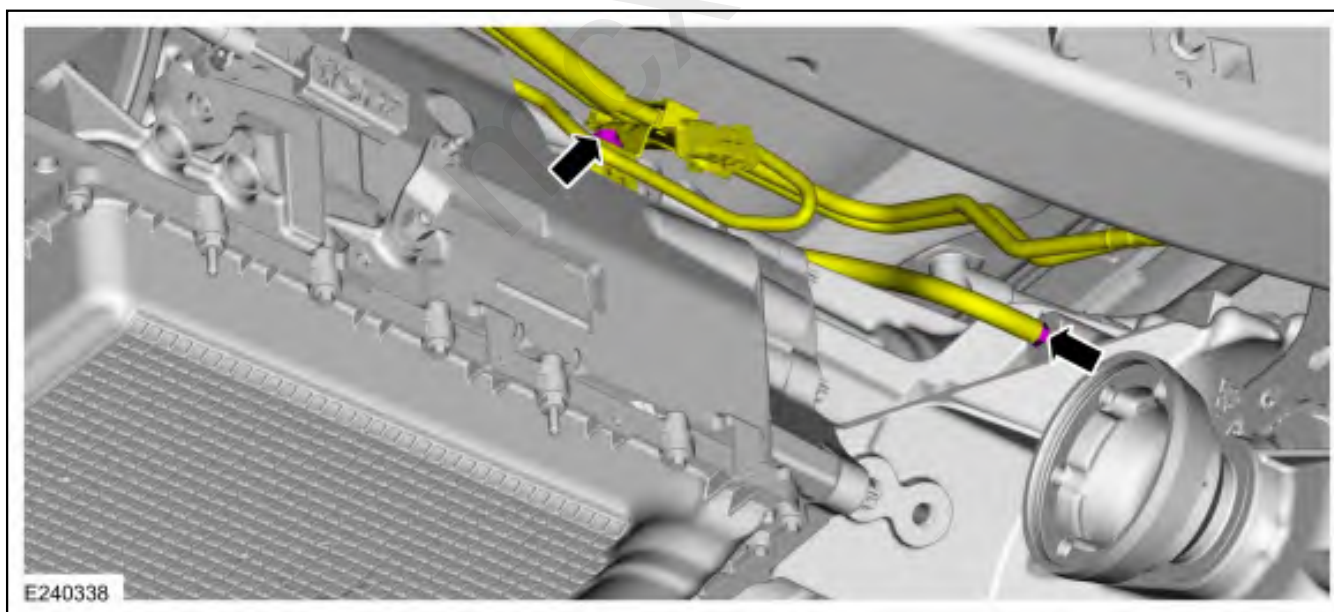
Rear Wheel Drive (RWD) vehicles

18. Position the fuel line bracket and install the bolt.
Torque: 26 lb.ft (35 Nm)

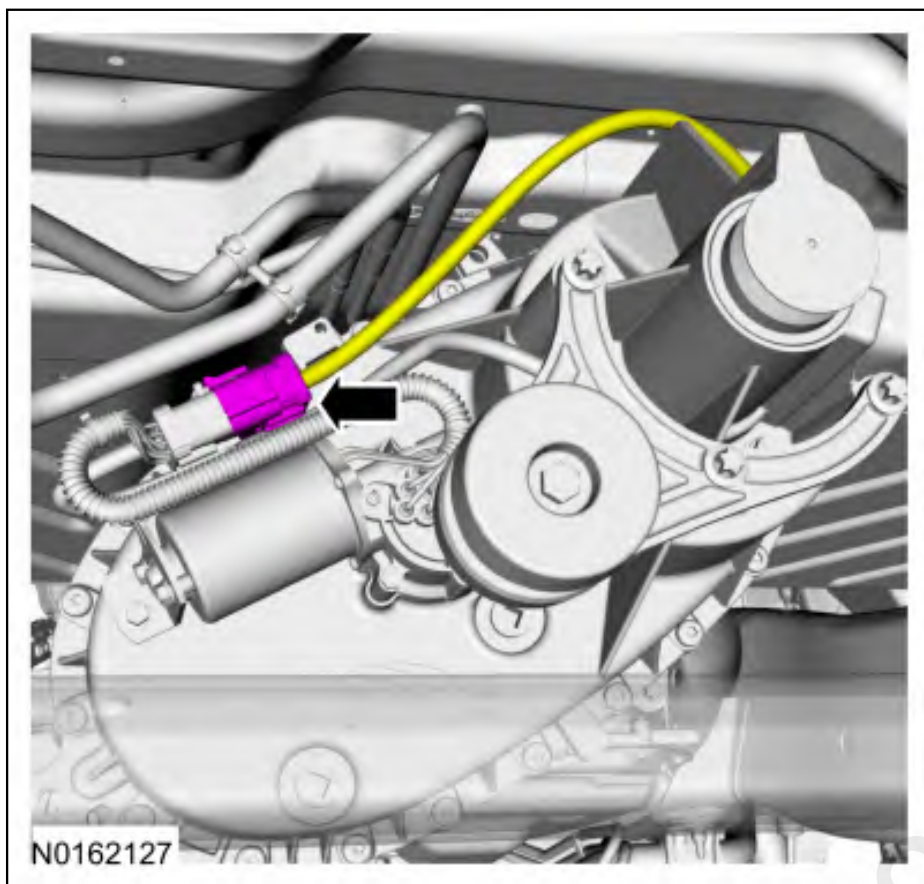


Four-Wheel Drive (4WD) vehicles

19. Position the fuel line bracket and install the bolt. Connect the transfer case vent tube.
Torque: 26 lb.ft (35 Nm)



20. Connect the transfer case electrical connector.

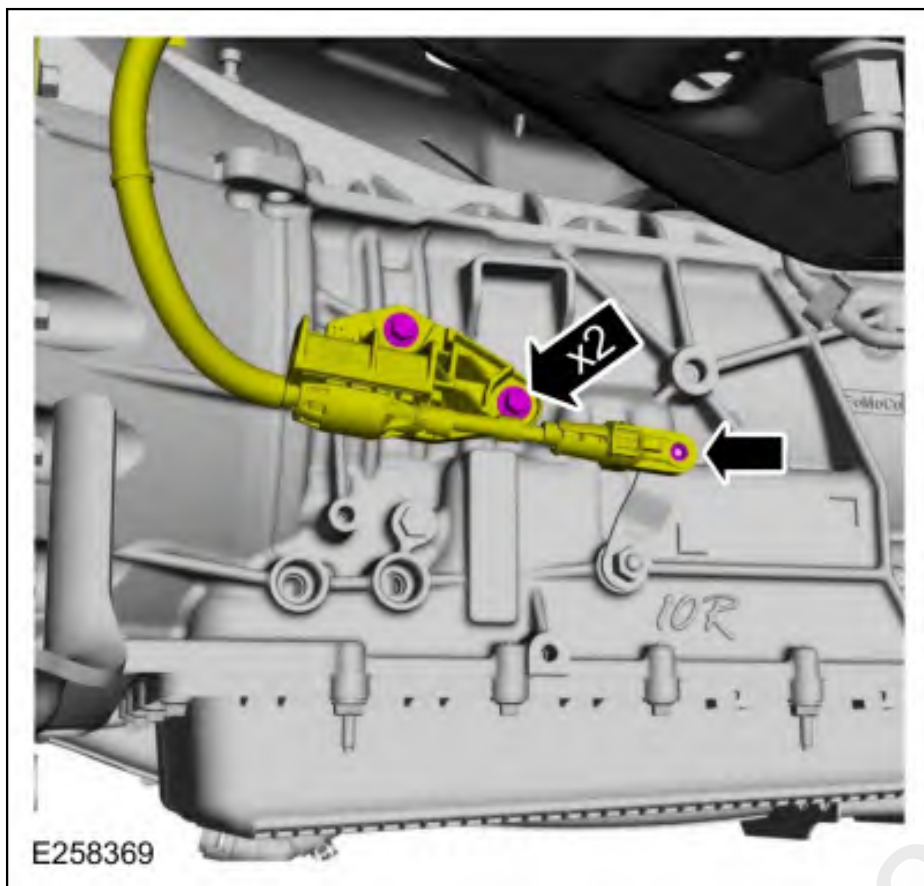


All vehicles

21. **NOTE:** When installing the selector lever cable end, make sure that the selector lever cable end is correctly installed onto the manual control lever. Pull back on the selector lever cable to make sure the selector lever cable end is securely installed onto the manual control lever.

Apply pressure to the selector lever cable end while connecting it to the manual control lever to make sure the selector lever has not moved out of the DRIVE position.

Install the selector lever cable bolts and connect the selector lever cable to the manual control lever.
Torque: 30 lb.ft (40 Nm)

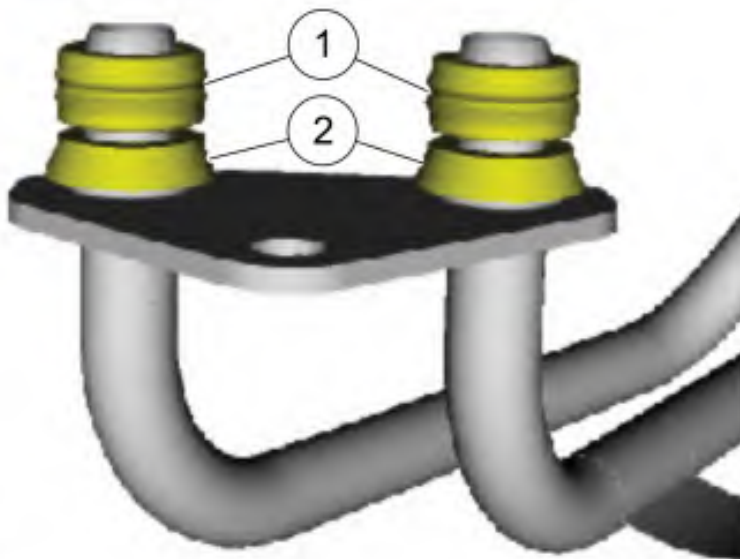


22. **NOTE:** *Inspect the transmission fluid tube backing rings and seals are not stuck in the case.*

Inspect the transmission fluid tube backing rings and seals for damage and install new backing rings or seals if necessary.

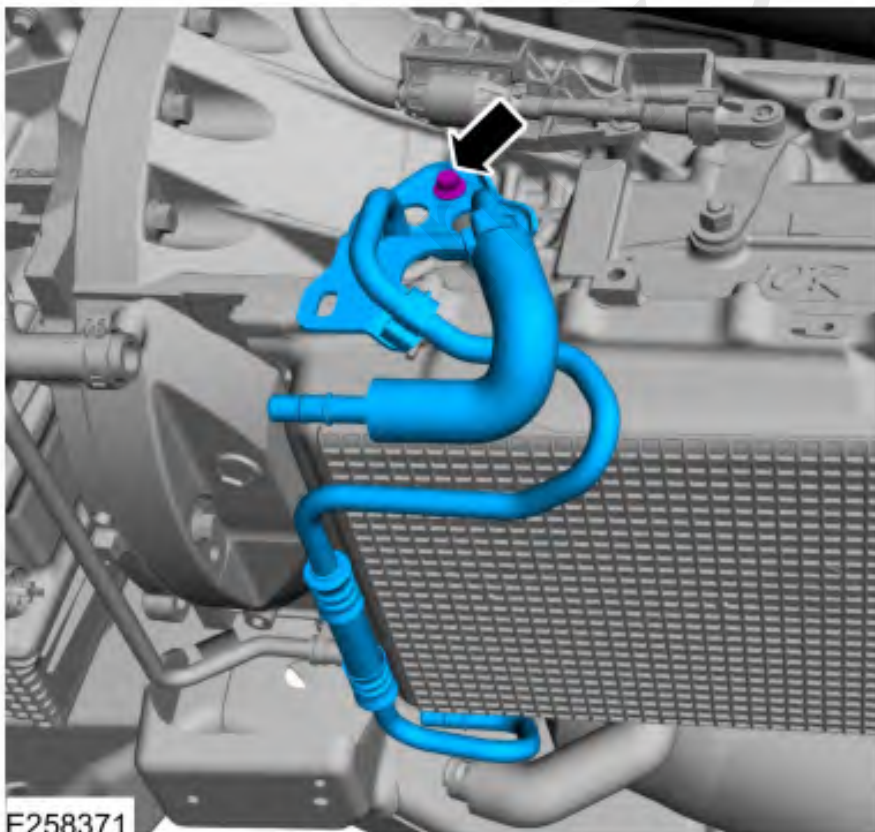
1. Seal (7D285)
2. Backing ring (7J324)

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



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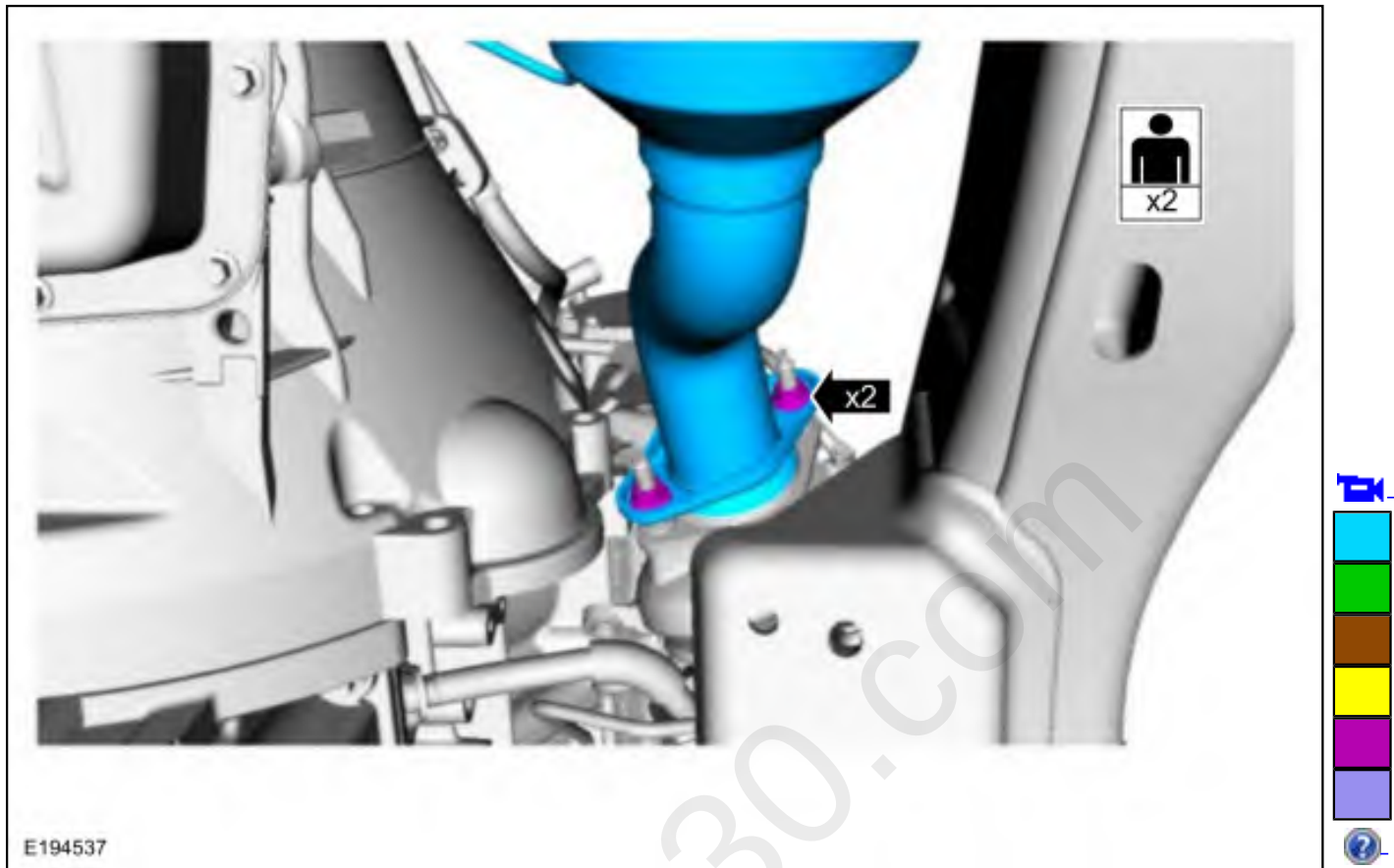
23. Install the transmission fluid cooler tubes and the new transmission fluid cooler tube bracket bolt.
Torque: 22 lb.ft (30 Nm)



E258371

24. **NOTE:** Loosely install the new RH catalytic converter nuts. Do not tighten at this time.

Position the RH catalytic converter in the vehicle. Loosely install the new RH catalytic converter nuts.

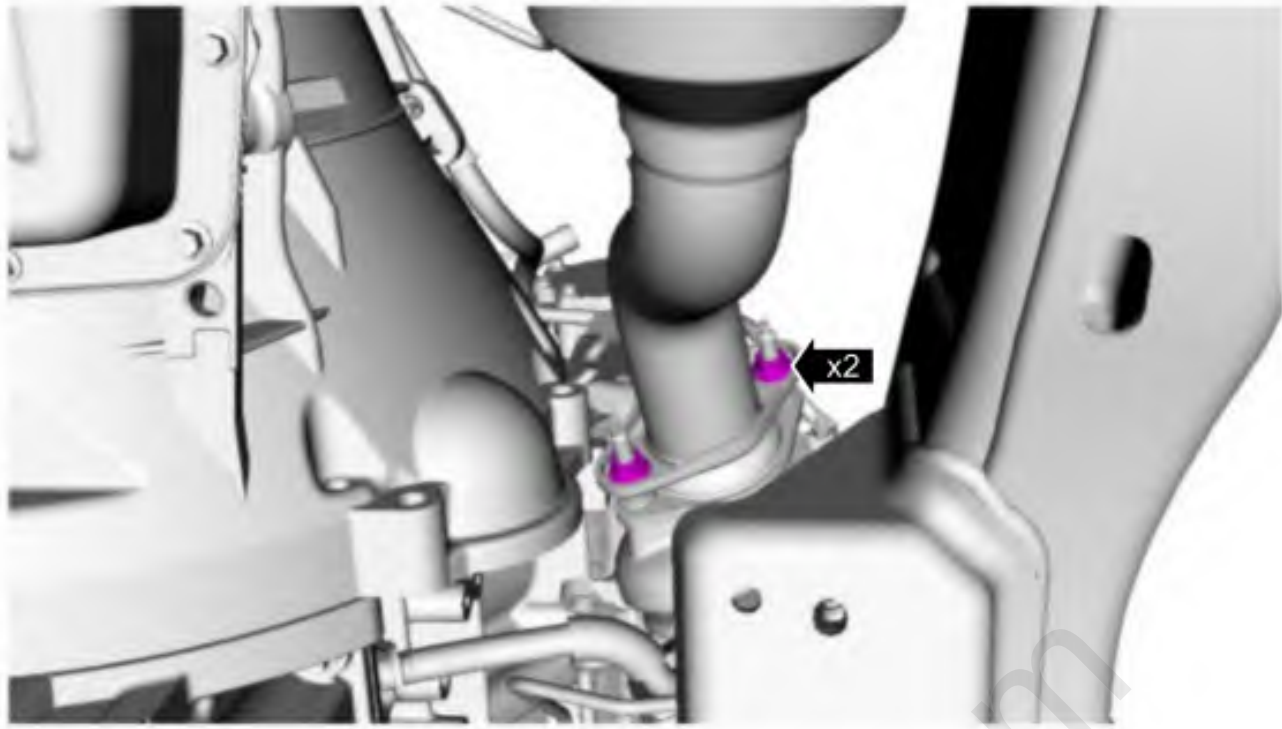


25. Install the transmission support insulator.
Refer to: [Transmission Support Insulator](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

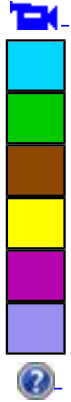
26. **NOTE:** Evenly tighten the catalytic converter nuts.

Tighten the RH catalytic converter nuts.

Torque: 30 lb.ft (40 Nm)



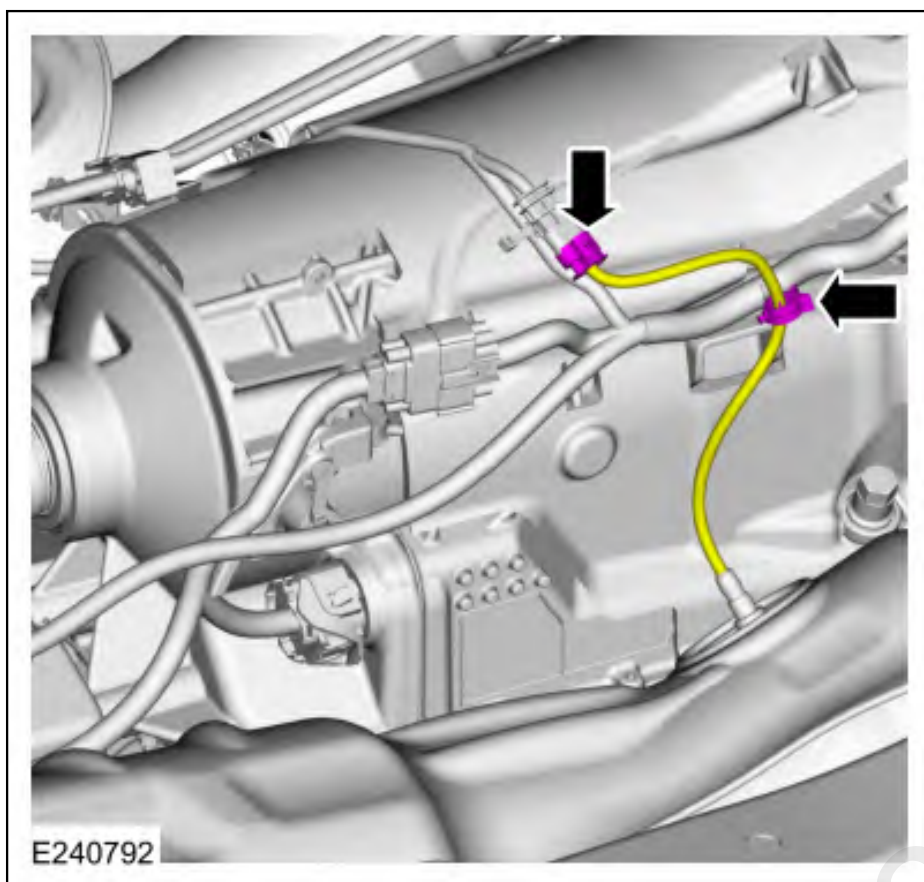
E225882



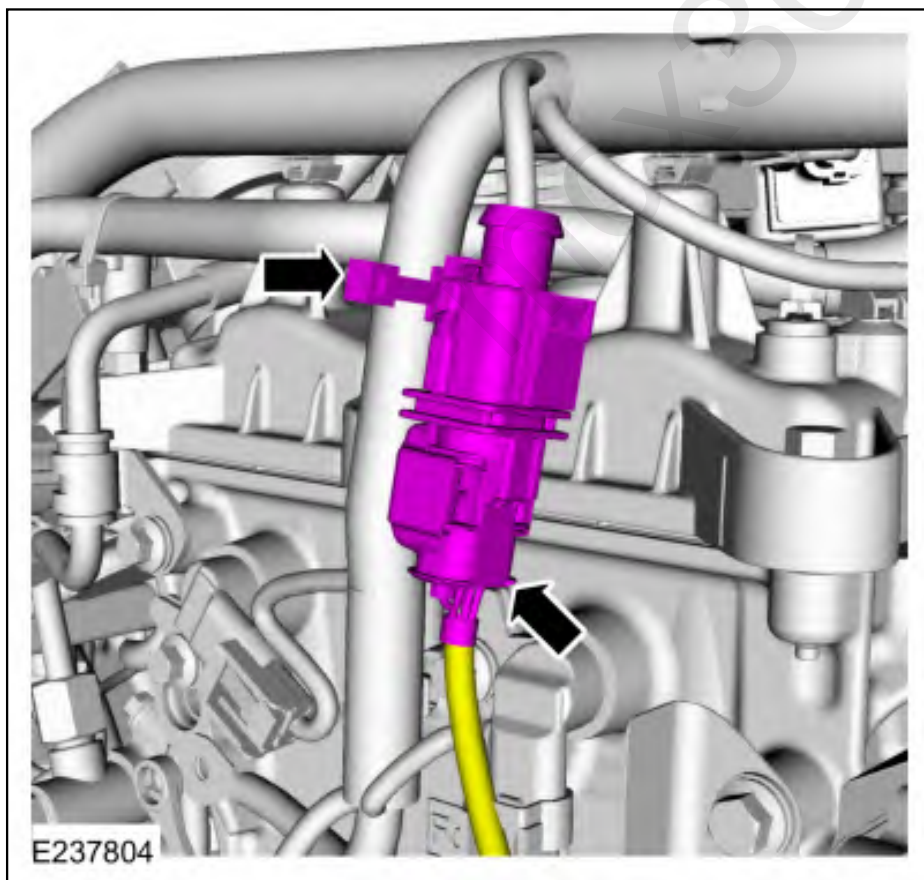
27. Install the LH catalytic converter.

Refer to: [Catalytic Converter LH](#) (309-00C Exhaust System - 3.5L EcoBoost (272kW/370PS), Removal and Installation).

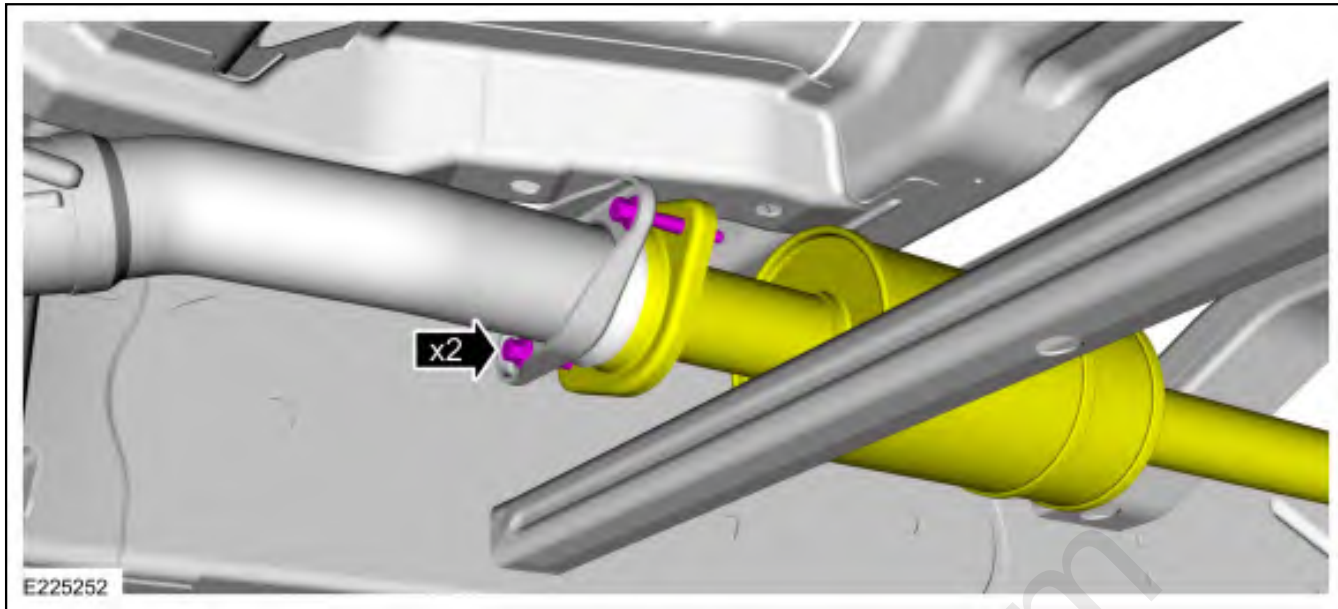
28. Connect the catalyst monitor sensor electrical connector and the harness retainer.



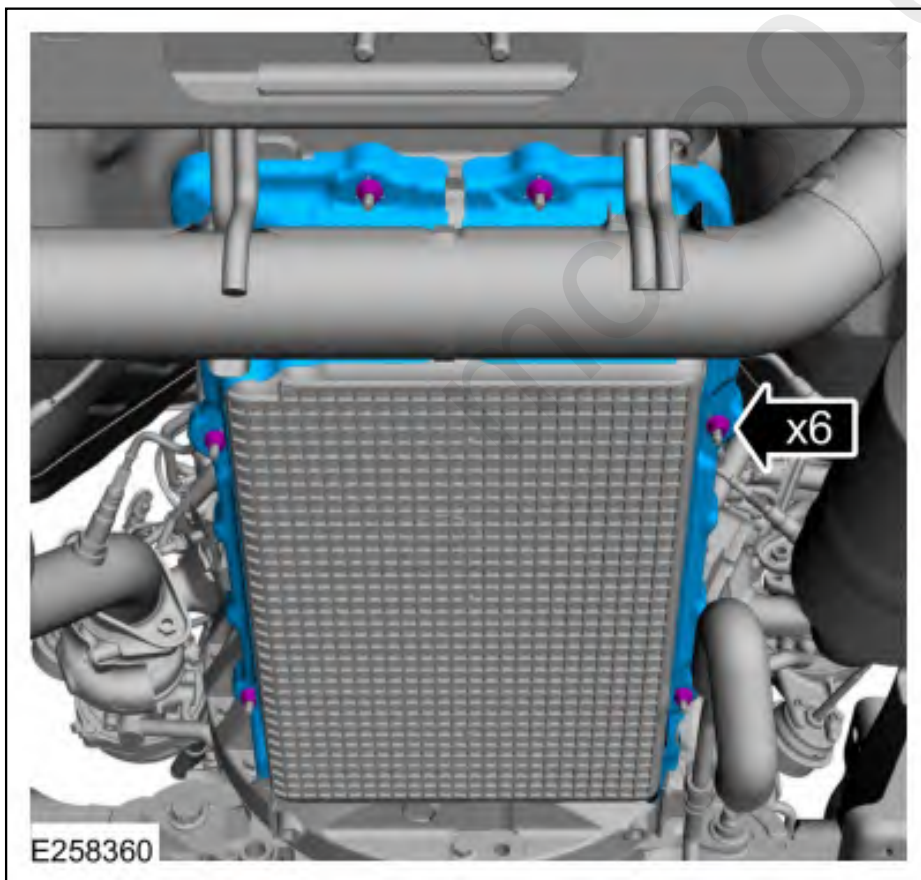
29. Connect the RH HO2S electrical connector and the harness retainer.



30. Install the catalytic converter flange to the muffler inlet pipe bolts.
Torque: 30 lb.ft (40 Nm)



31. Install the retainers and heatshield.
Torque: 80 lb.in (9 Nm)



32. Install the rear driveshaft assembly.
Refer to: Rear Driveshaft (205-01 Driveshaft) .

Four-Wheel Drive (4WD) vehicles

33. Install the front driveshaft assembly.

Refer to: [Front Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

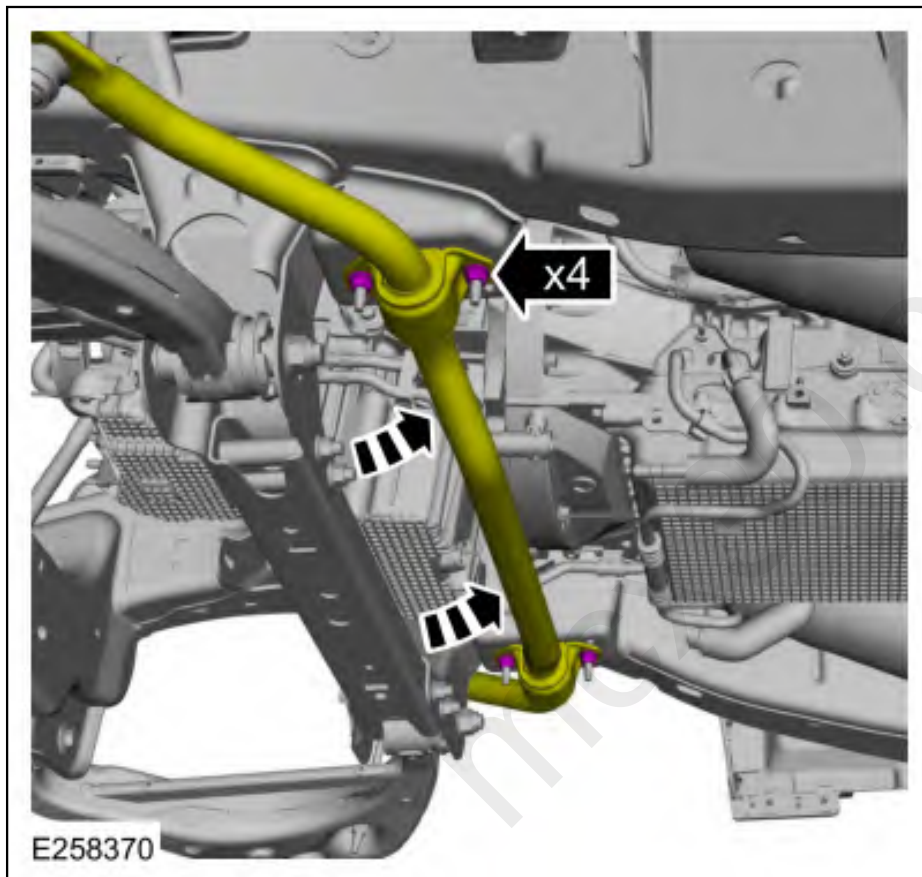
34. Check the transfer case fluid level.

Refer to: [Transfer Case Draining and Filling](#) (308-07B Transfer Case, General Procedures).

Rear Wheel Drive (RWD) vehicles

35. Install the new stabilizer bar bracket nuts.

Torque: 41 lb.ft (55 Nm)



All vehicles

36. Install the transmission fluid cooler.

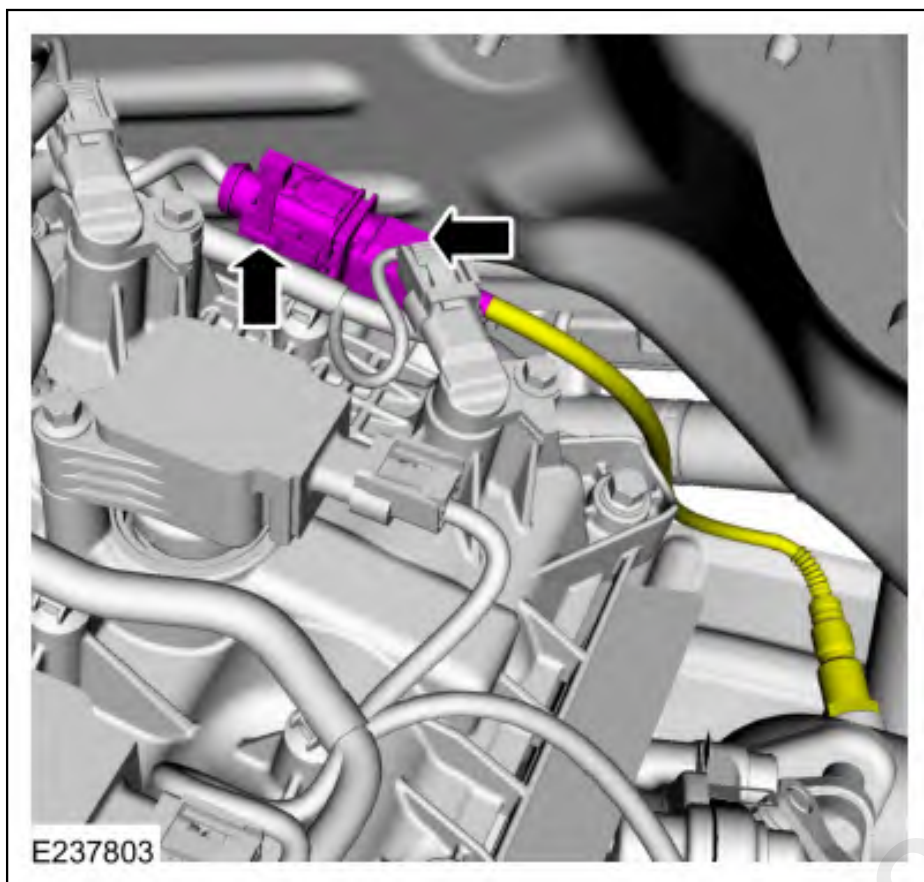
Refer to: Transmission Fluid Cooler (307-02 Transmission Cooling) .

37. **NOTE:** *If equipped with a underbody splash shield, do not install the splash shield at this time.*

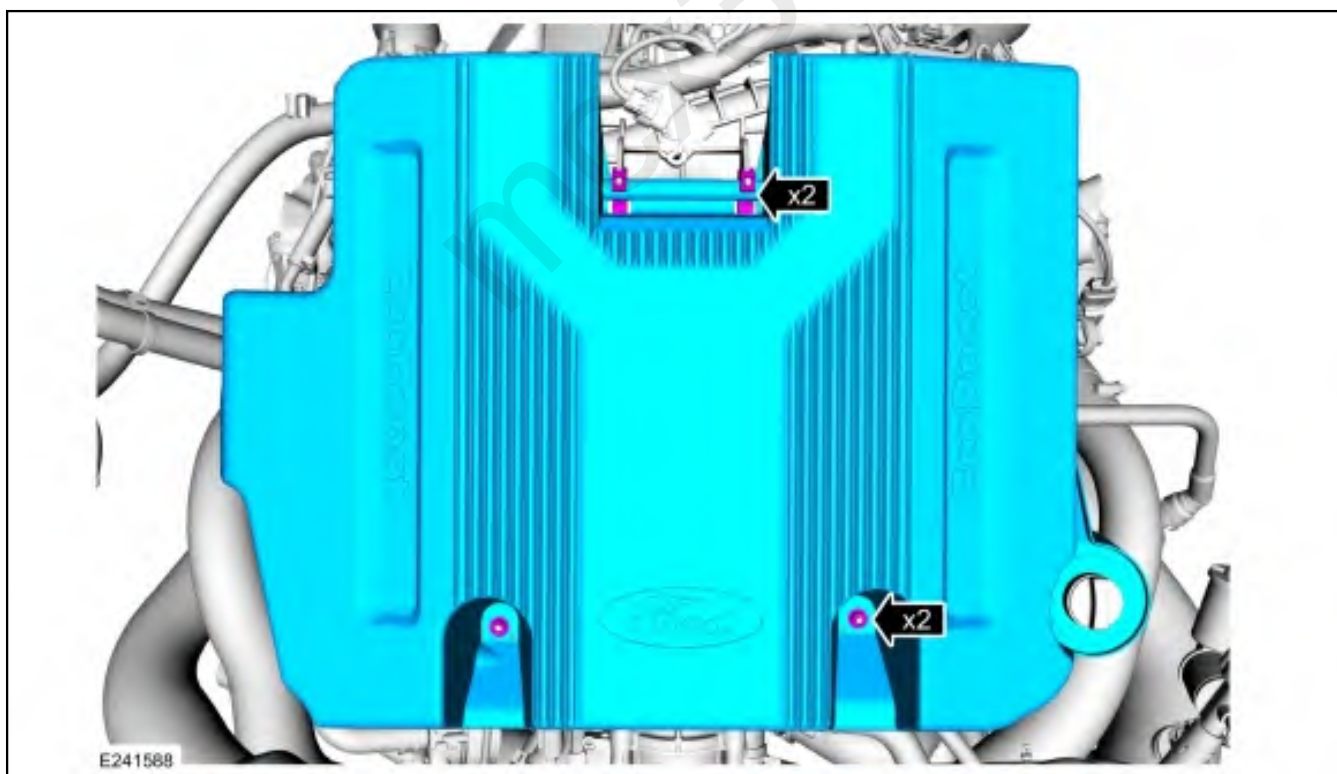
Install the starter motor assembly.

Refer to: [Starter Motor](#) (303-06C Starting System - 3.5L EcoBoost (272kW/370PS), Removal and Installation).

38. Connect the LH HO2S electrical connector.



39. Install the engine appearance cover and the nuts.
Torque: 80 lb.in (9 Nm)



40. Connect the battery ground cable.
 Refer to: [Battery Disconnect and Connect](#) (414-01 Battery, Mounting and Cables, General Procedures).

41. Verify that the selector lever cable is correctly adjusted.
Refer to: [Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Column Shift](#) (307-05 Automatic Transmission External Controls, General Procedures).
Refer to: [Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Floor Shift](#) (307-05 Automatic Transmission External Controls, General Procedures).
42. After completing the repairs, perform the Misfire Monitor Neutral Profile Correction procedure using a diagnostic scan tool.
43. If a new transmission or a new main control was installed, the solenoid body strategy must be updated.
Refer to: [Transmission Strategy Download](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
44. If the transmission was overhauled, the adaptive drive cycle must be updated.
Refer to: [Adaptive Learning Drive Cycle](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
45. While driving the vehicle, use the scan tool to verify that the TFT has reached a temperature of 96.7°C-102°C (206°F-215°F). This will circulate the transmission fluid through the torque converter and the transmission fluid cooling system, eliminating any trapped air in the transmission fluid cooling system.
46. Check the transmission fluid level
Refer to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Transmission - 5.0L 32V Ti-VCT

Base Part Number: Base Part Number: 7000

Special Tool(s) / General Equipment

	307-346 (T97T-7902-A) Retainer, Torque Converter TKIT-1997-F/FLM/LT TKIT-1998-LM (NavigatoR)
Transmission Jack	

Materials

Name	Specification
Motorcraft® Multi-Purpose Grease Spray XL-5-A	ESB-M1C93-B
Motorcraft® MERCON® ULV Automatic Transmission Fluid XT-12-QULV	MERCON® ULV WSS-M2C949-A

Removal

1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. Remove the following items:
 1. Remove the starter motor assembly.
Refer to: [Starter Motor](#) (303-06D Starting System - 5.0L 32V Ti-VCT, Removal and Installation).
 2. Remove the transmission fluid cooler.
Refer to: [Transmission Fluid Cooler - 2.7L EcoBoost \(238kW/324PS\)/3.5L EcoBoost \(272kW/370PS\)/5.0L 32V Ti-VCT](#) (307-02 Transmission Cooling, Removal and Installation).
 3. Remove the rear driveshaft assembly.
Refer to: [Rear Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

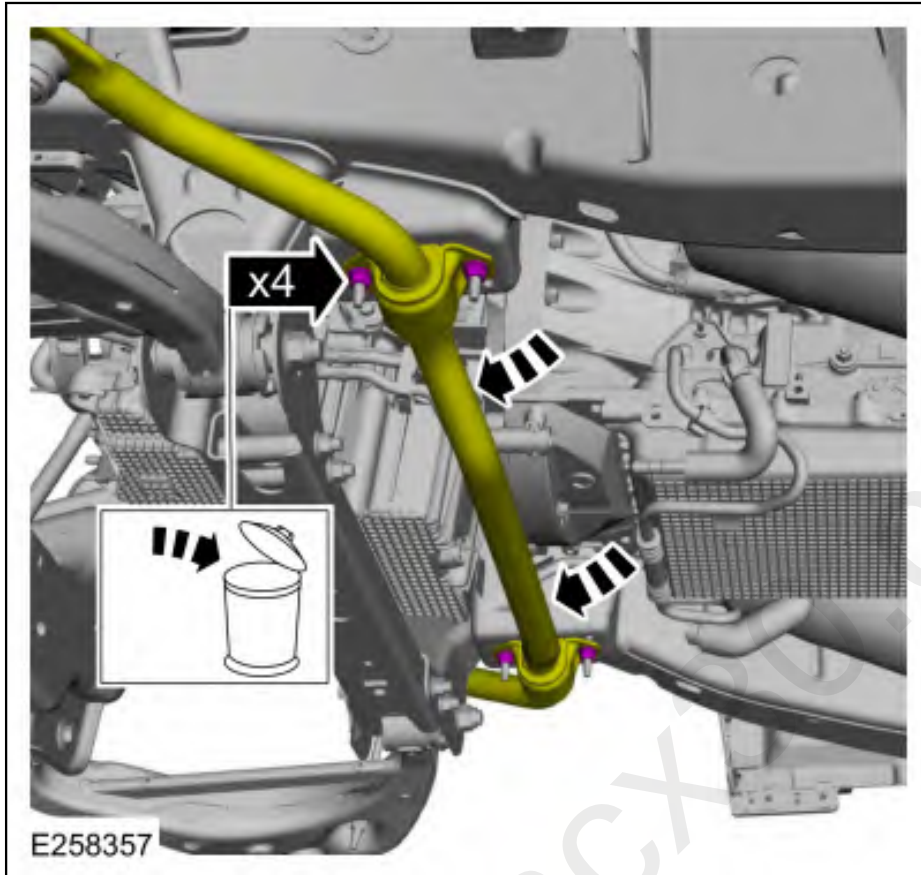
Four-Wheel Drive (4WD) vehicles

3. Remove the front driveshaft assembly.

Refer to: [Front Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

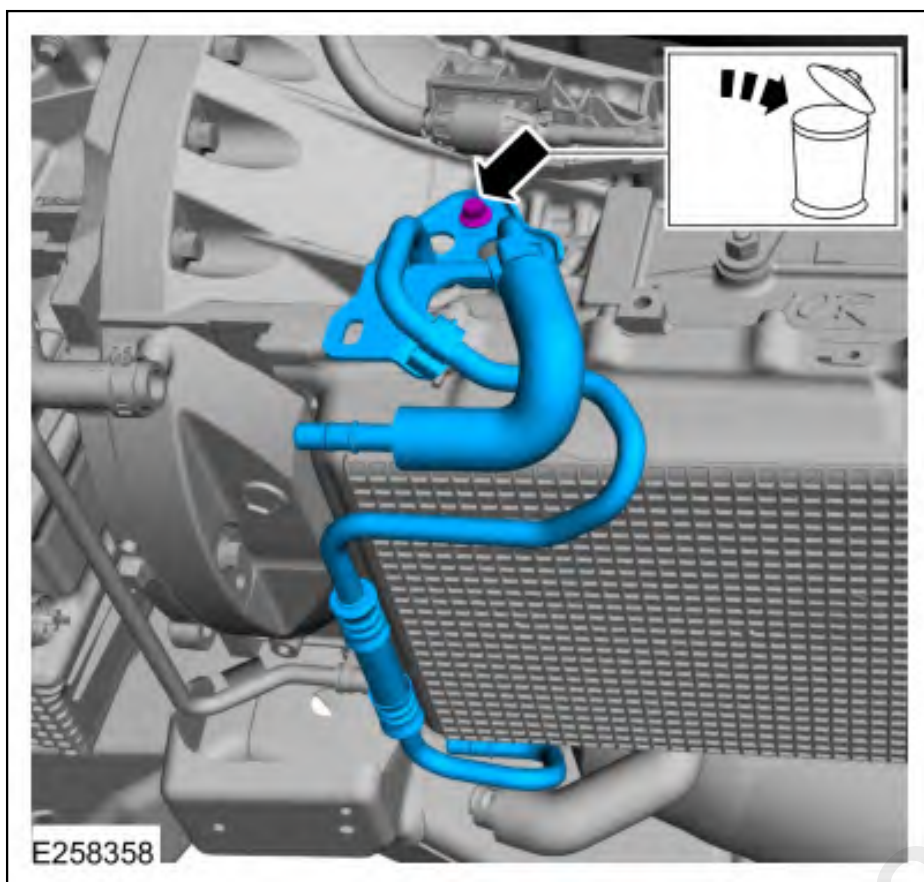
Rear Wheel Drive (RWD) vehicles

4. Remove and discard the stabilizer bar bracket nuts and allow the stabilizer bar to swing downward.

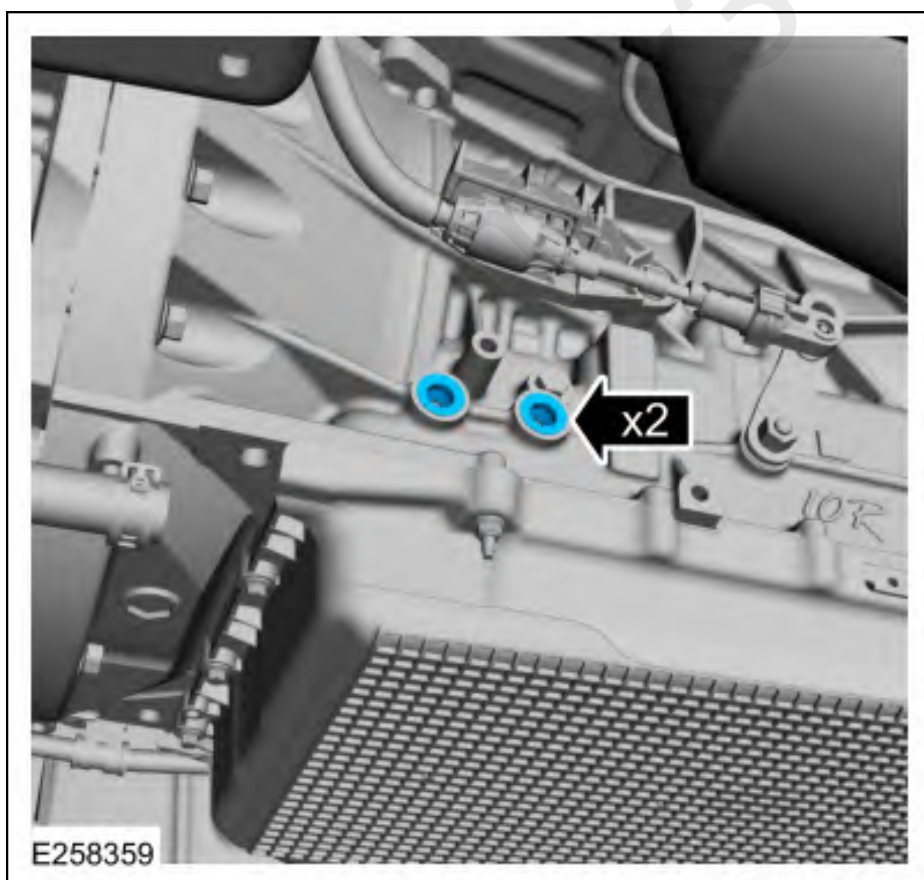


All vehicles

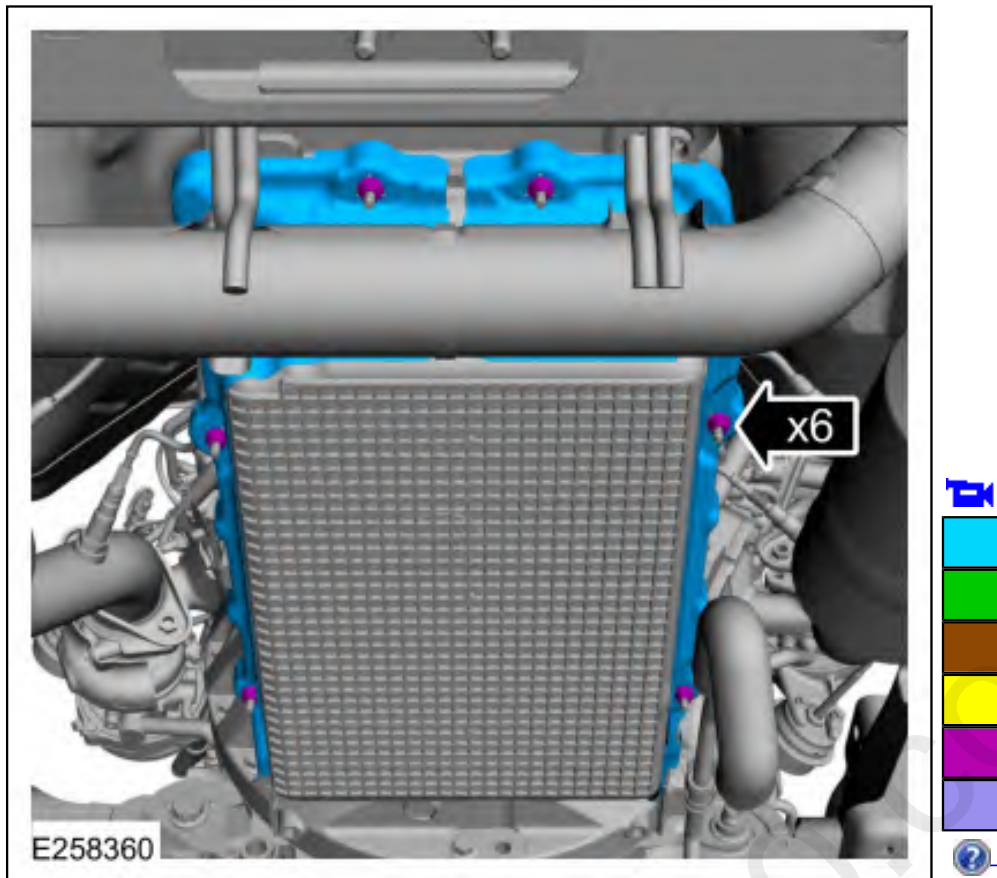
5. Remove and discard the bolt and remove the transmission fluid cooler tubes.



6. If the transmission fluid cooler tube seals or backing rings are stuck in the transmission case, remove the seals and backing rings.



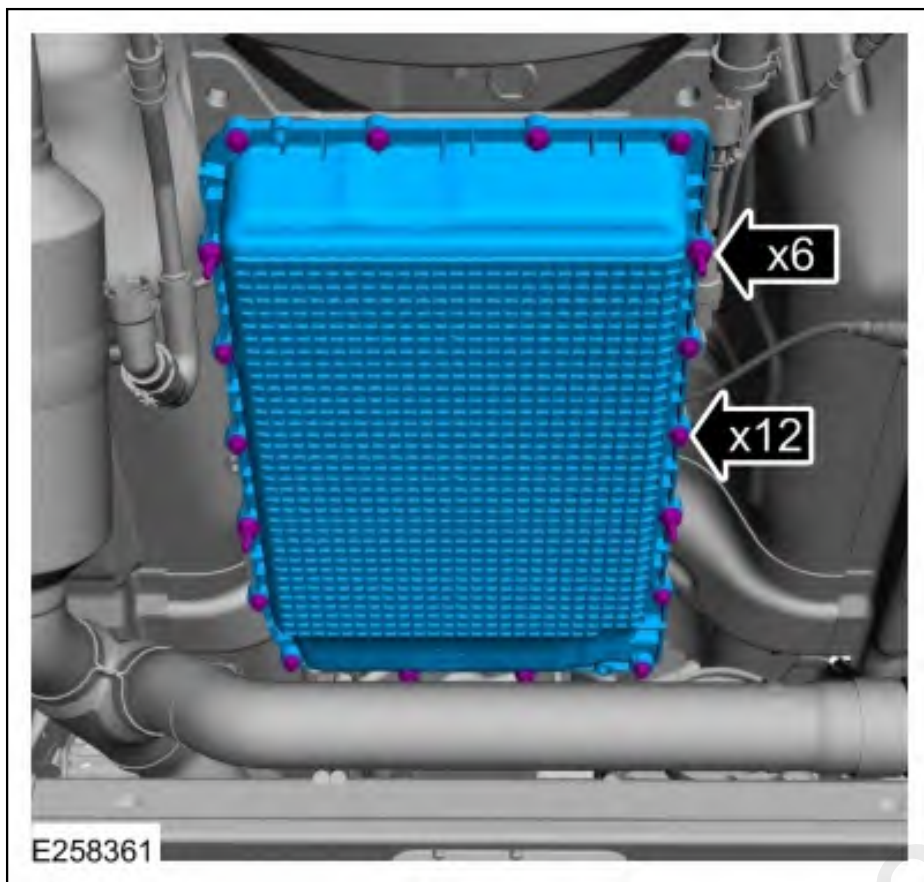
7. Remove the retainers and heatshield.



8. **NOTE:** *If transmission disassembly or installation of a new transmission is necessary, drain the transmission fluid.*

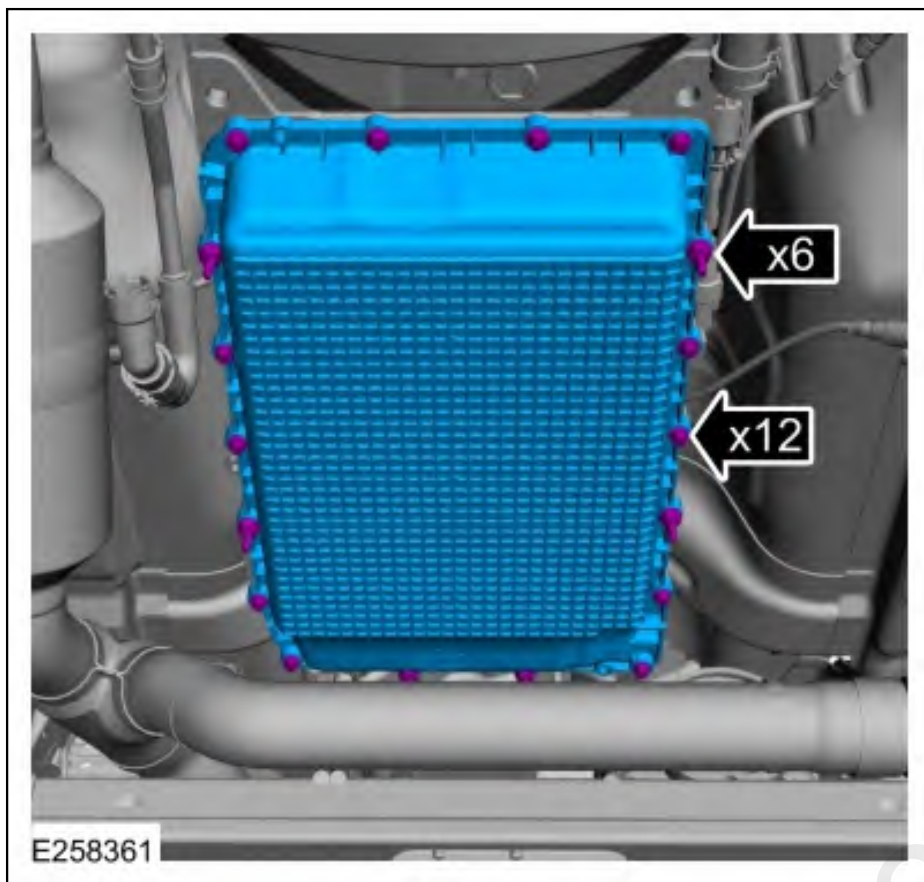
NOTE: *Note the location of the bolts and studbolts for assembly.*

Remove the bolts, studbolts and the transmission fluid pan.



9. **NOTE:** *It is not necessary to torque transmission fluid pan bolts at this time.*

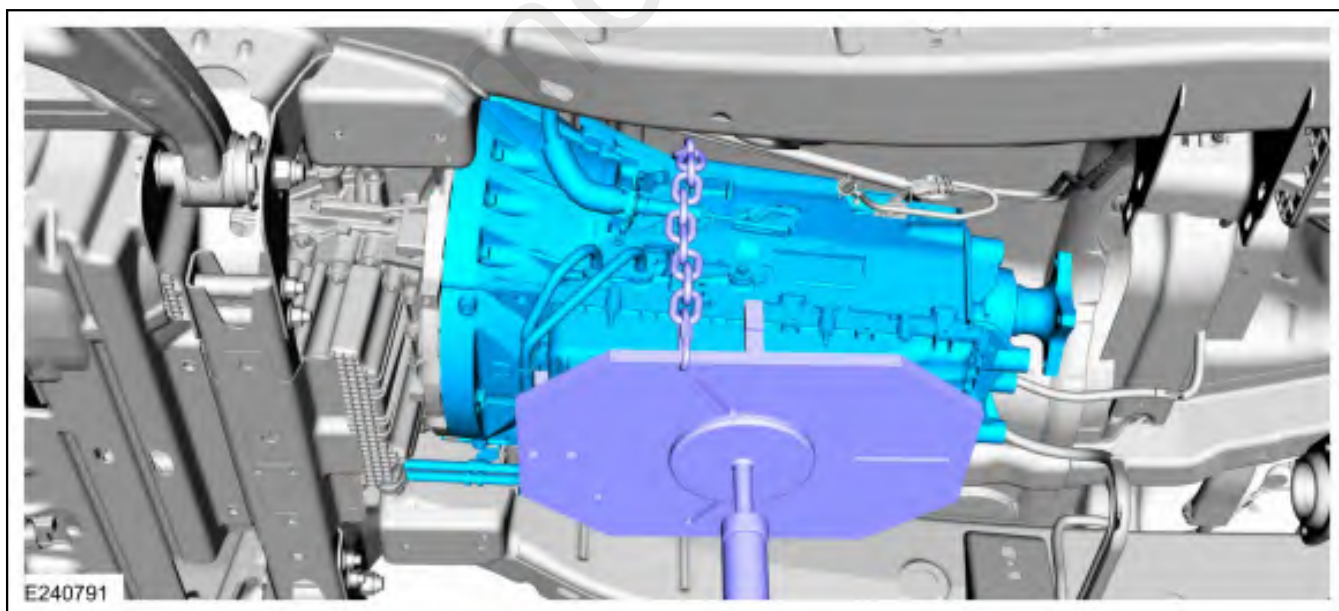
Install the transmission fluid pan and the bolts.



10. **NOTICE:** Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

Using a high-lift transmission jack, support the transmission.
Use the General Equipment: Transmission Jack



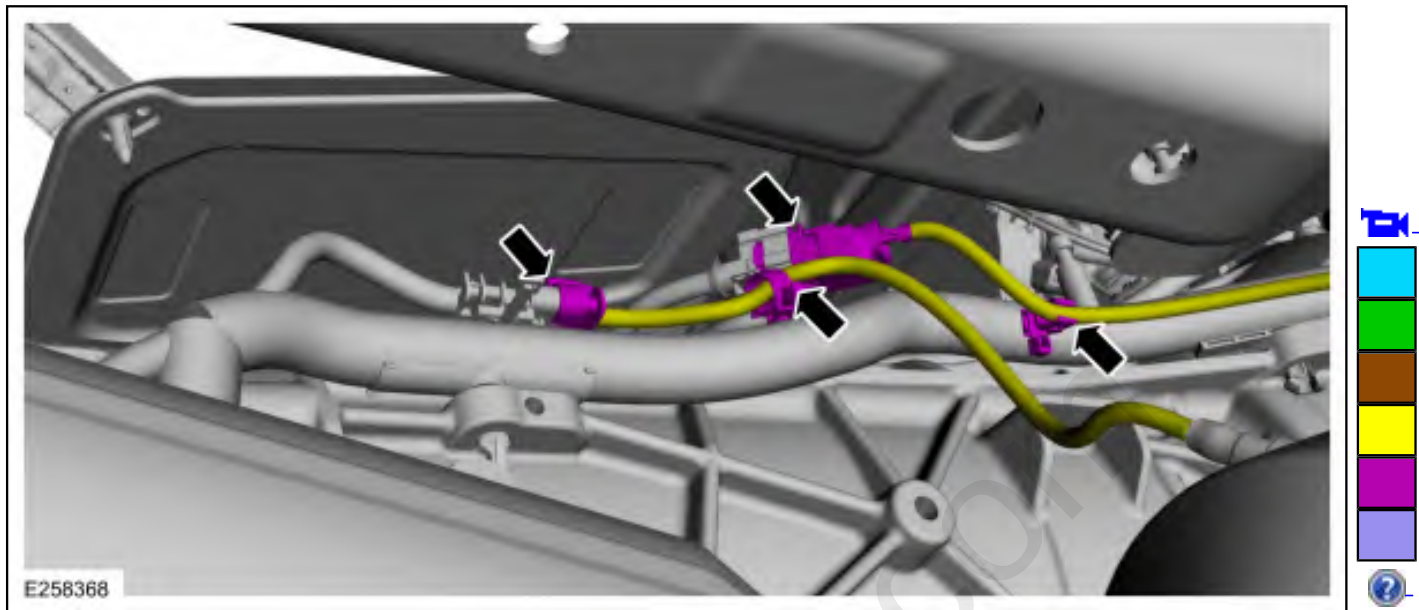
11. Remove the LH catalytic converter.

Refer to: [Catalytic Converter LH](#) (309-00D Exhaust System - 5.0L 32V Ti-VCT, Removal and Installation).

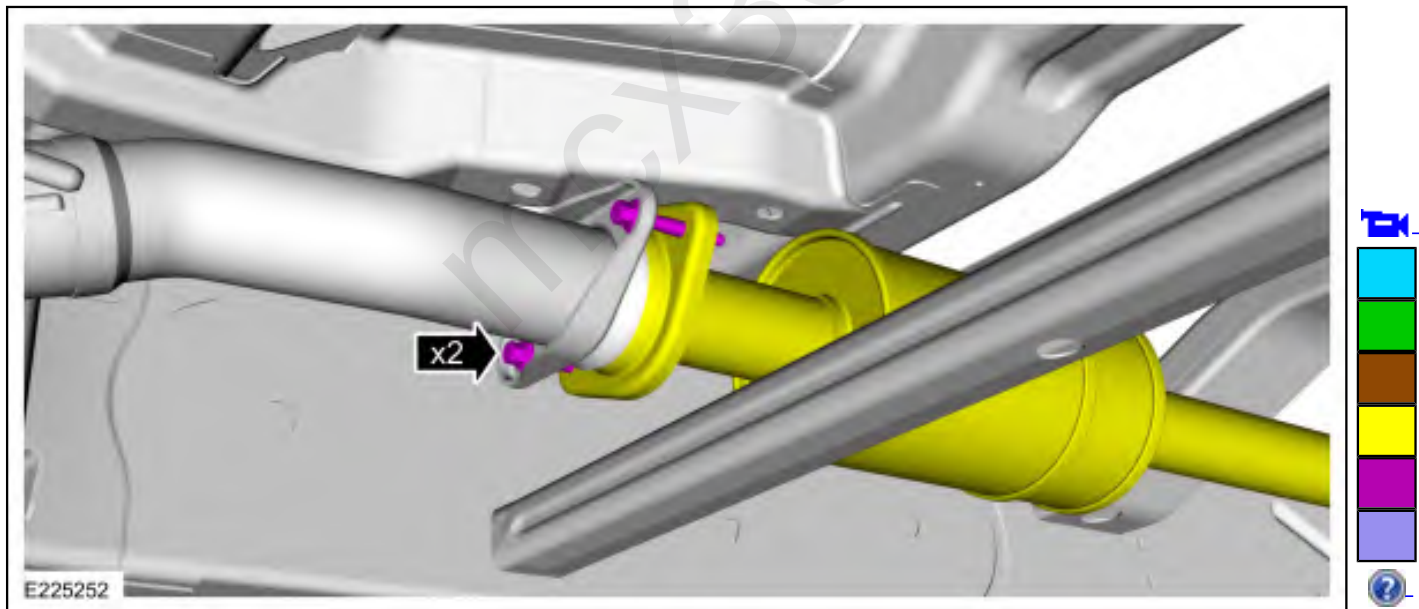
12. Remove the transmission support insulator.

Refer to: [Transmission Support Insulator](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

13. Disconnect the RH catalyst monitor sensor and the RH HO2S electrical connectors.

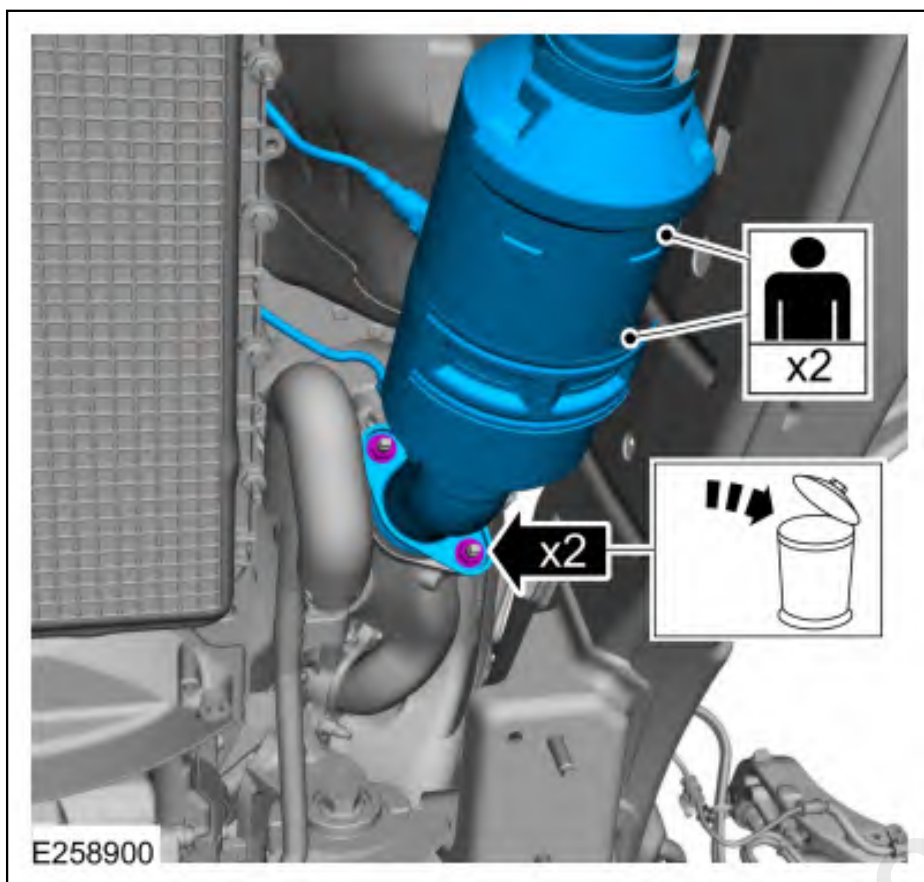


14. Remove the bolts from the catalytic converter flange to the muffler inlet pipe.

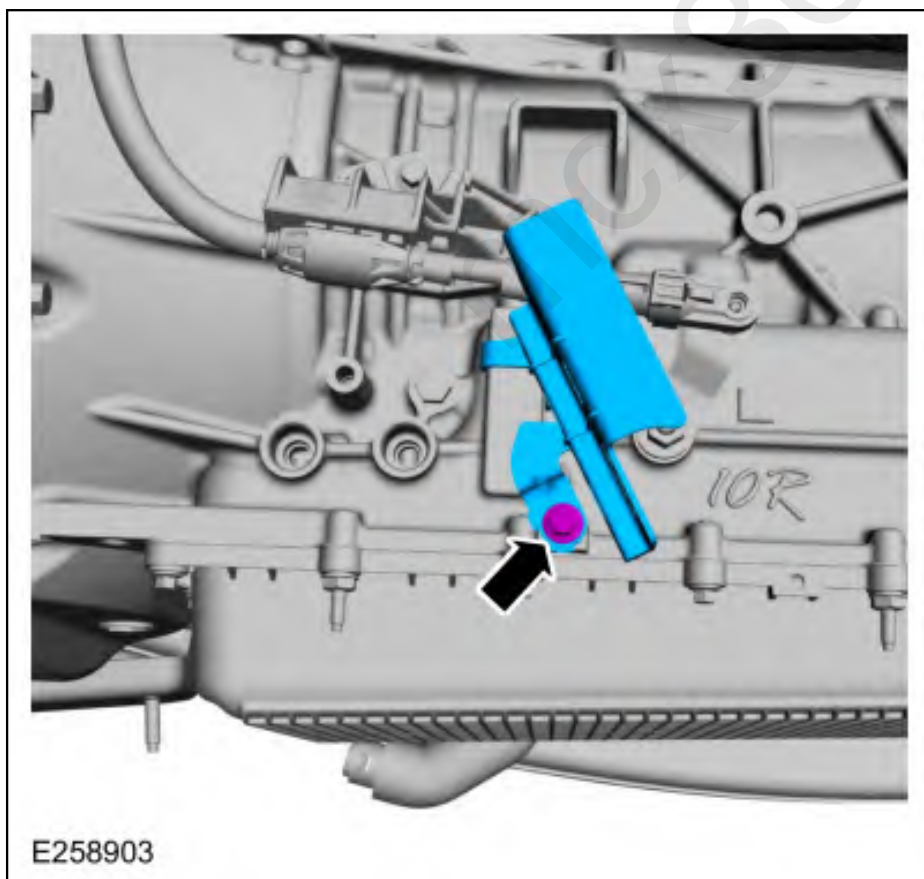


15. **NOTE:** Clean all exhaust connections before reassembly.

Remove and discard the catalytic converter nuts and remove the catalytic converter. Discard the gasket.

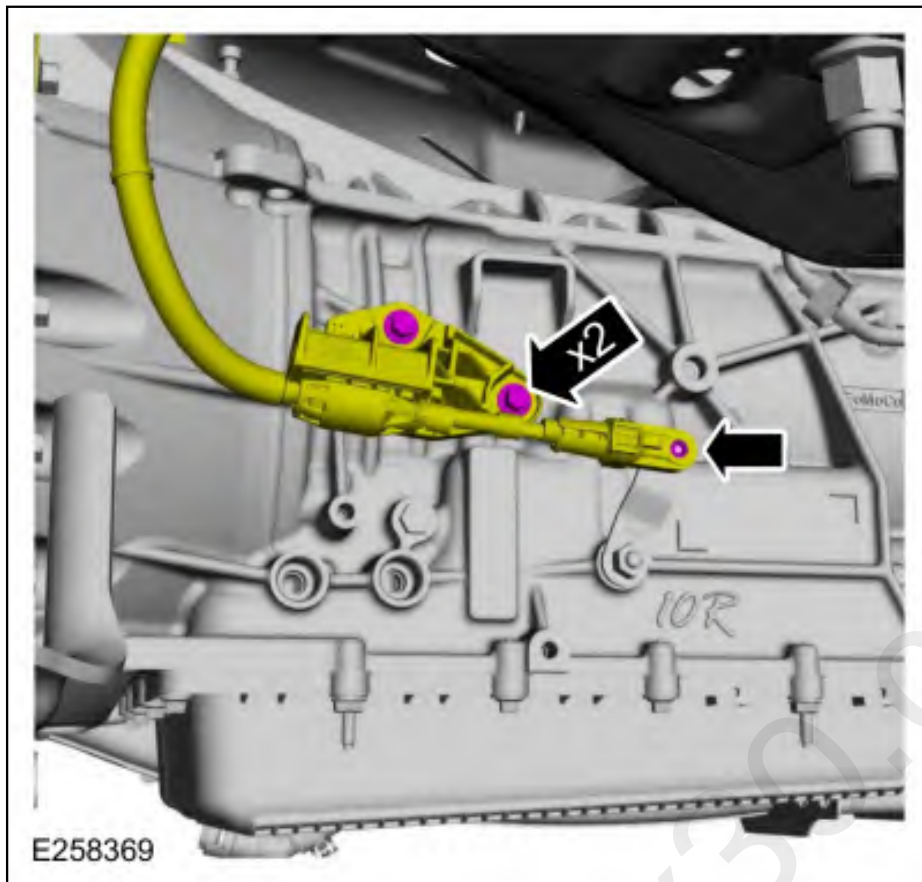


16. If equipped, remove the bolt and the selector lever cable splash shield.



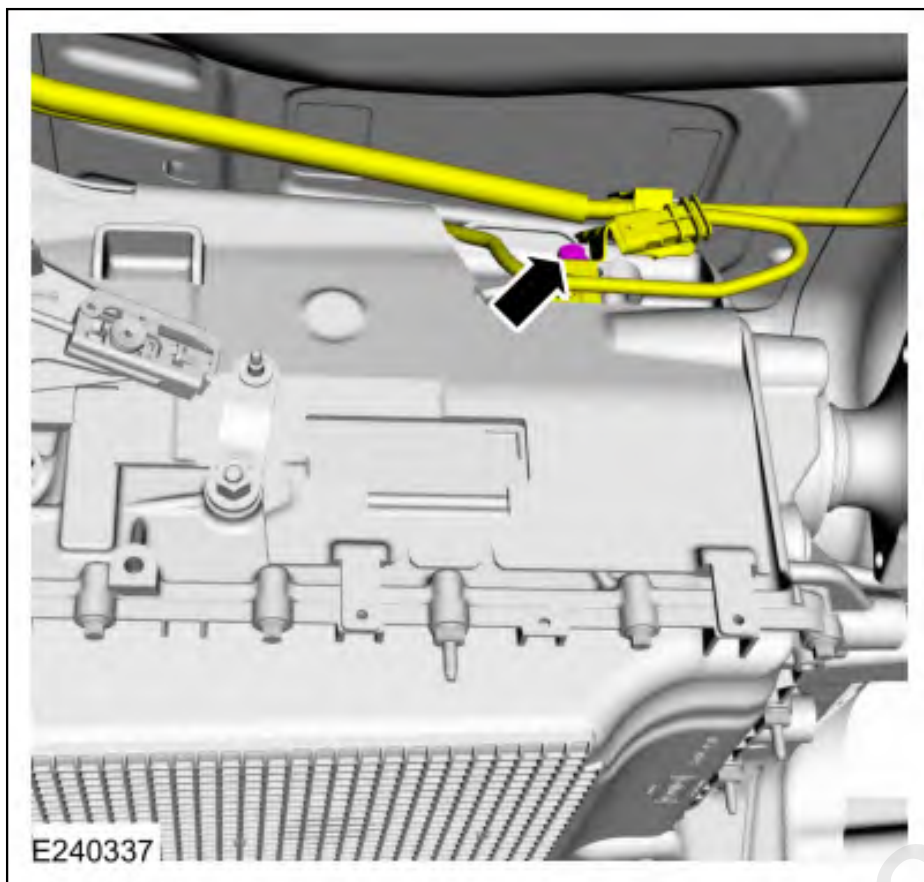
17. **NOTICE:** To prevent selector lever cable damage, do not apply force to the selector lever cable between the manual control lever and the selector lever cable bracket.

Remove the bolts, disconnect the selector lever cable and position aside.



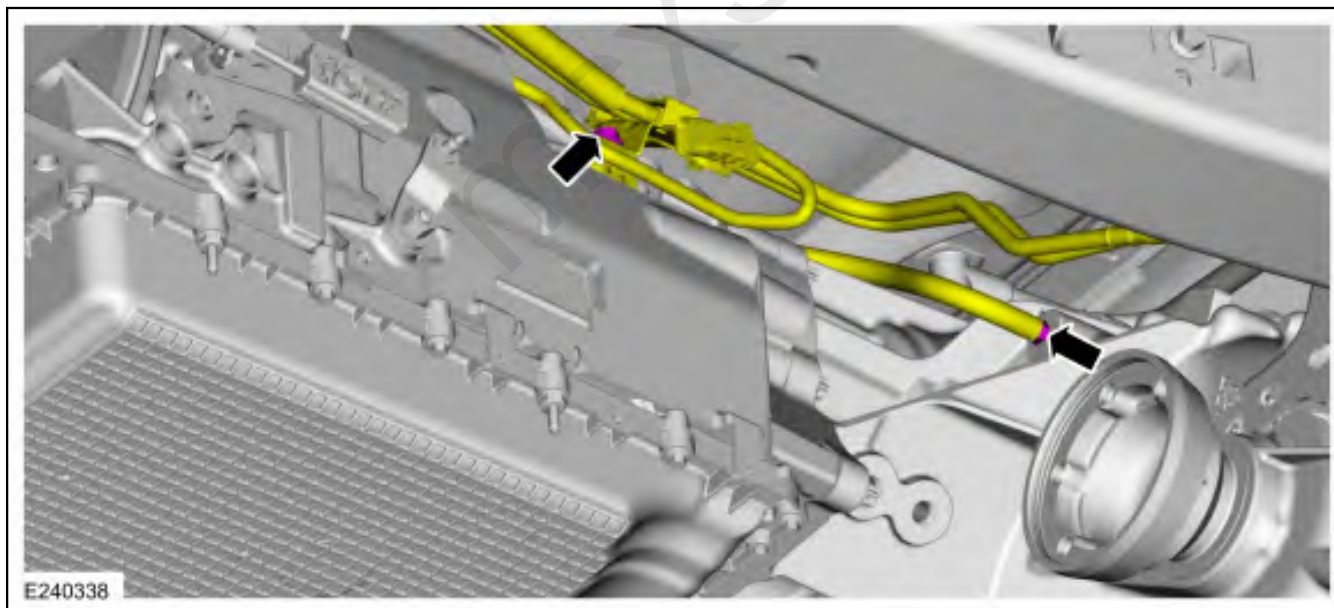
Rear Wheel Drive (RWD) vehicles

18. Remove the fuel line bracket bolt.

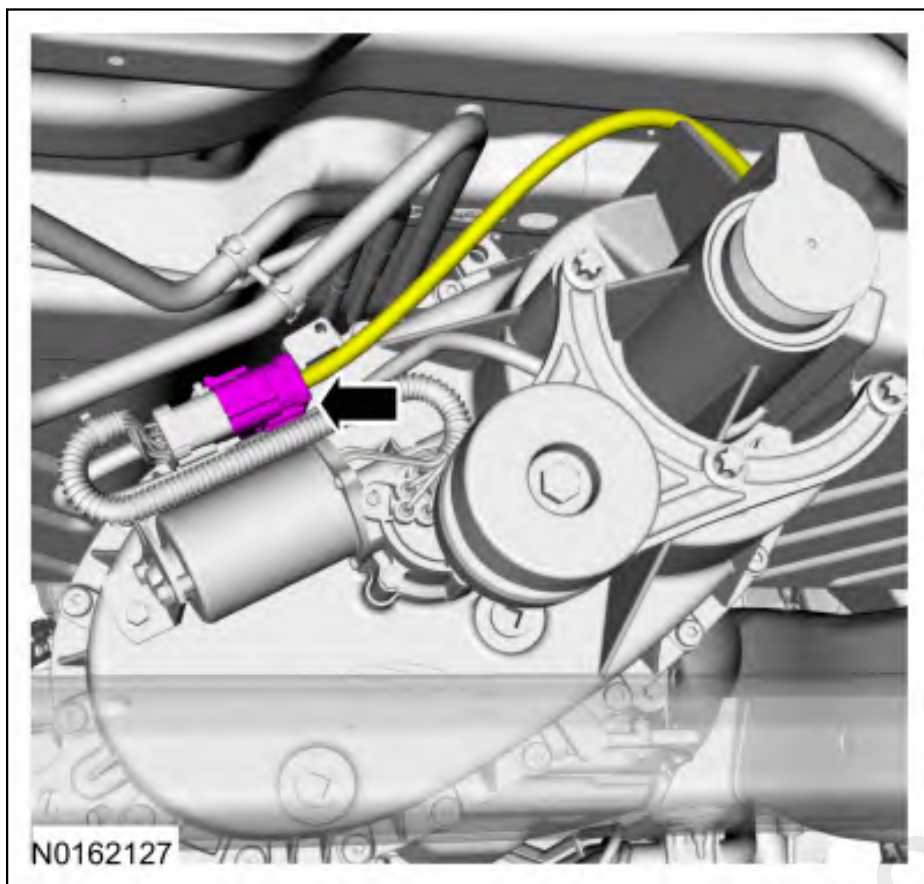


Four-Wheel Drive (4WD) vehicles

19. Remove the fuel line bracket bolt and disconnect the transfer case vent tube.



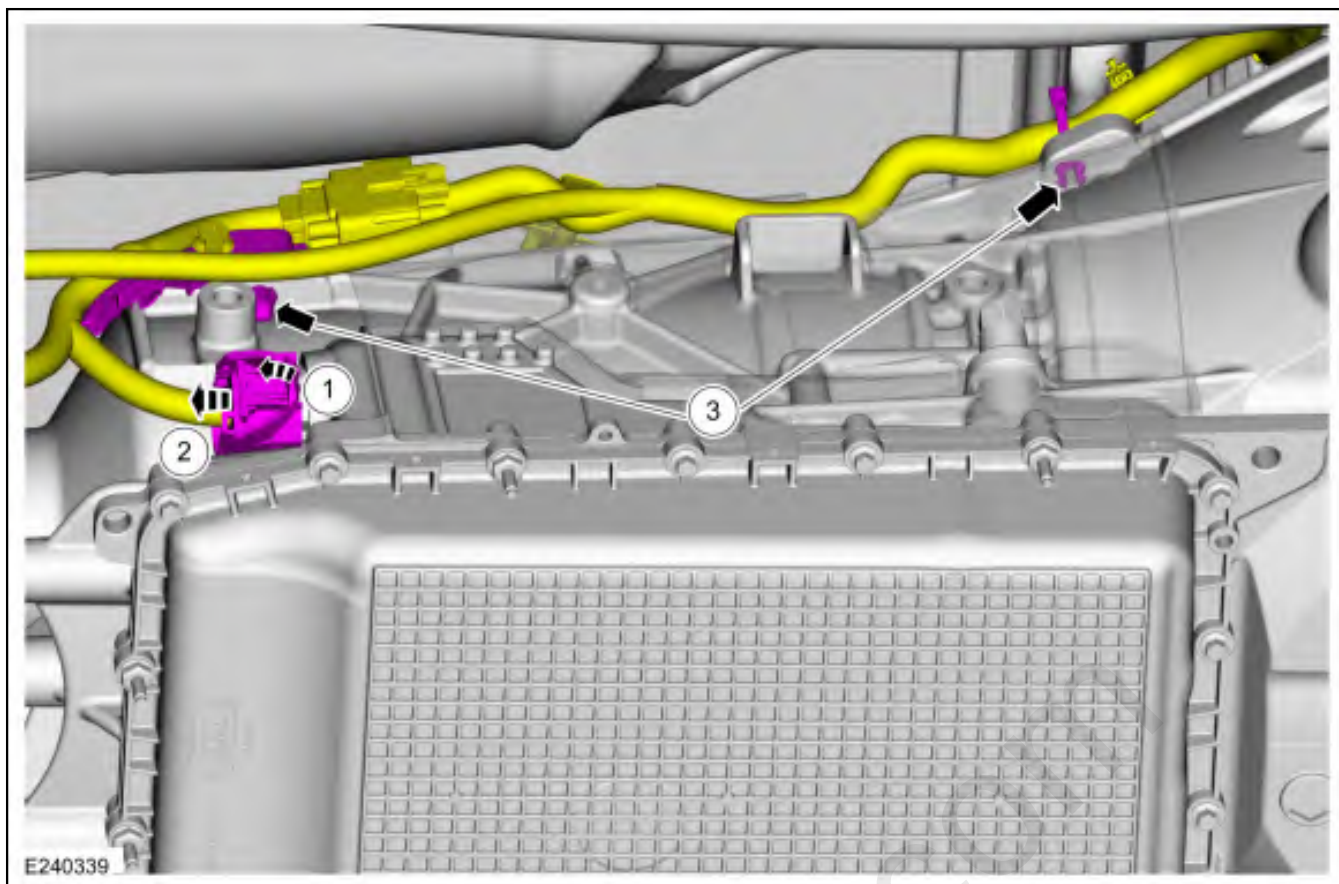
20. Disconnect the transfer case electrical connector.



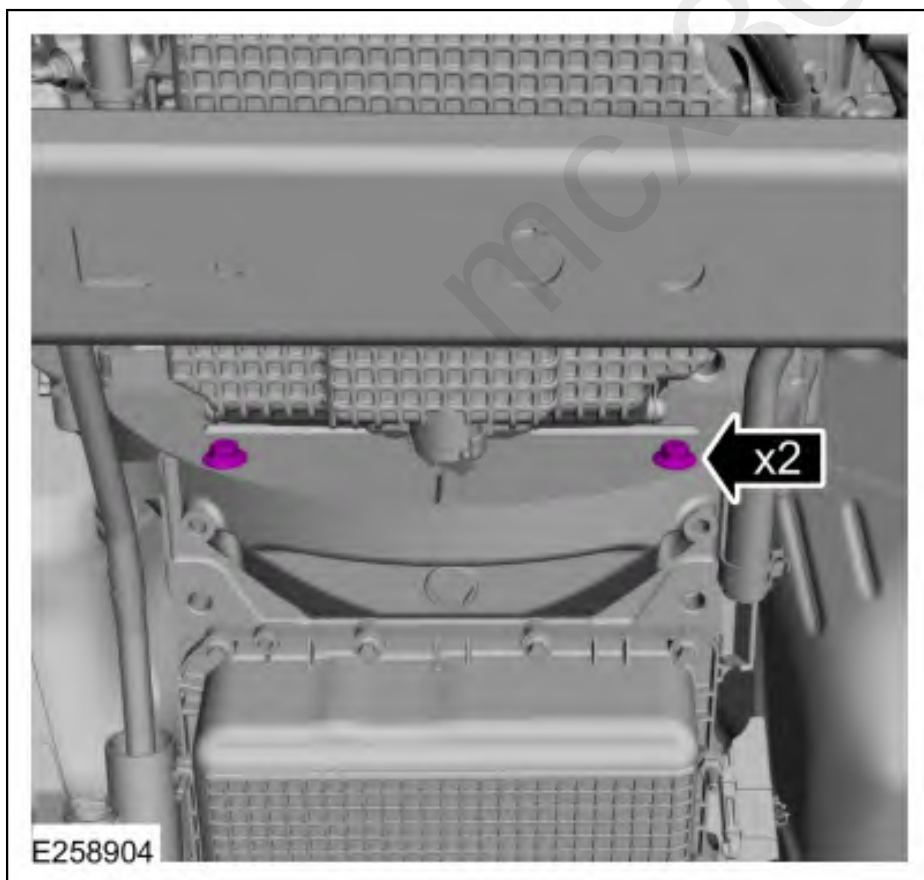
All vehicles

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

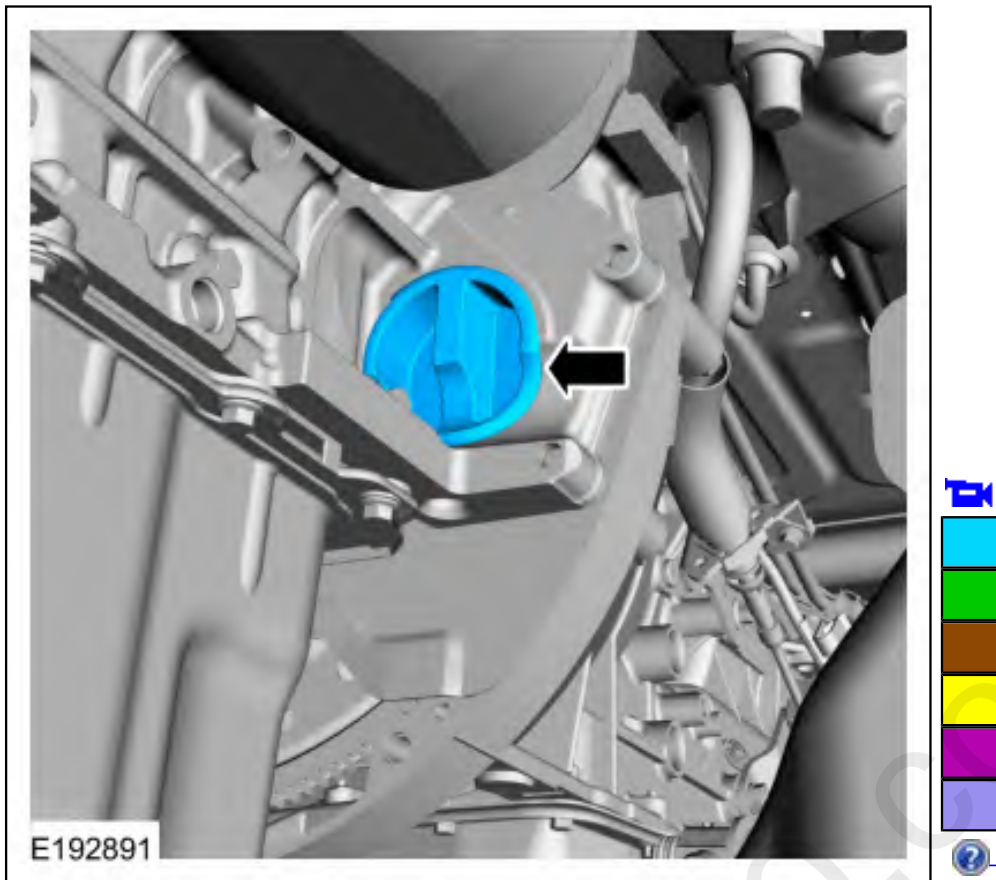
1. Slide the lock tab up and disconnect the transmission electrical connector.
2. Pull the transmission electrical connector out to disconnect.
3. Detach the retainers from the transmission and position the wiring harness aside.



22. Remove the lower bellhousing bolts.

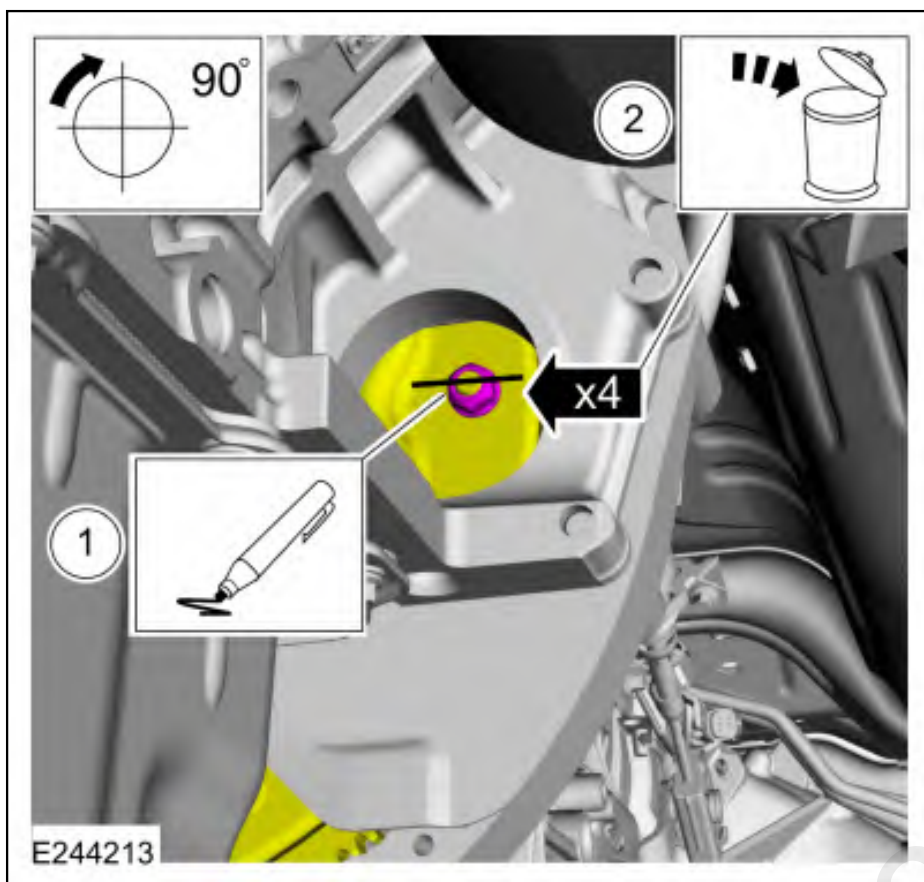


23. Remove the rubber torque converter nut access cover.

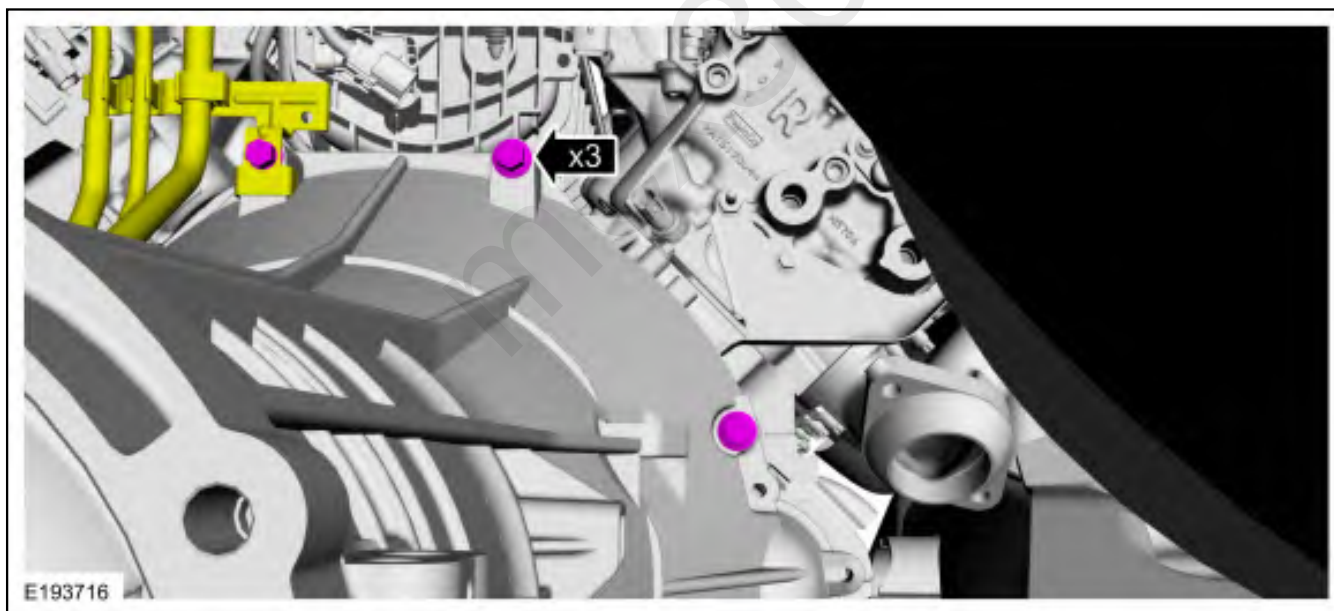


24. **NOTE:** Using the crankshaft pulley bolt, turn the engine clockwise.

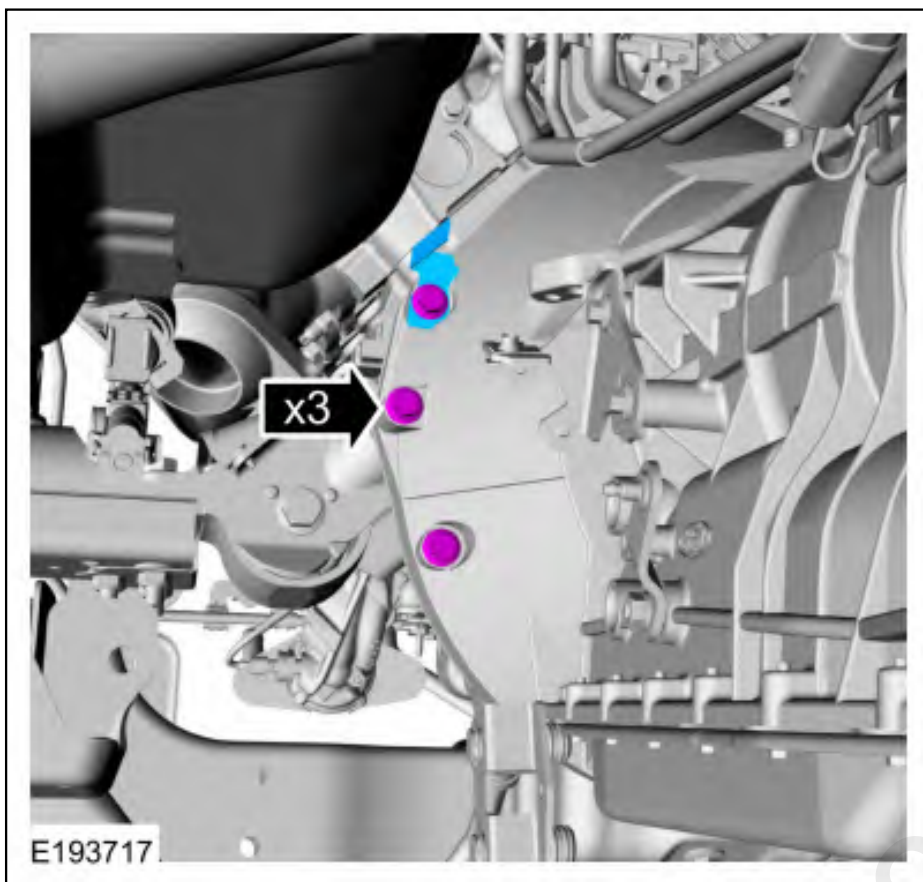
1. Index mark one stud and the flexplate for assembly reference.
2. Remove and discard the torque converter nuts.



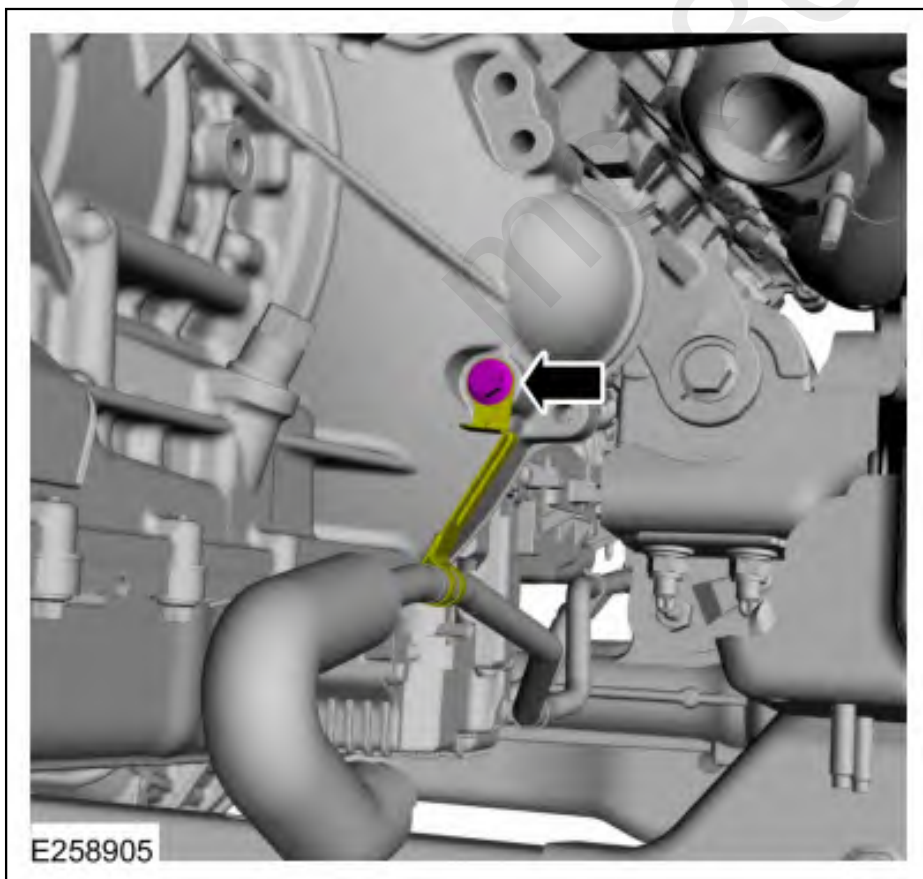
25. Remove the top bellhousing bolts and position aside the bracket.



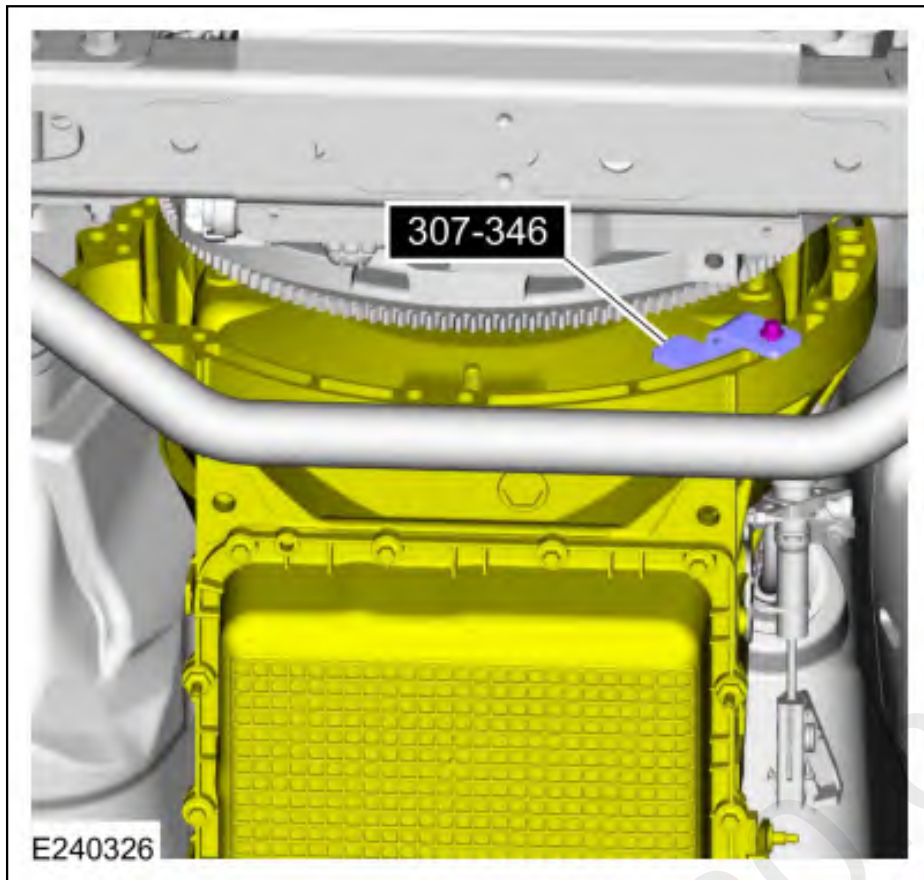
26. Remove the LH bellhousing bolts and the selector lever cable bracket.



27. Remove the RH side bellhousing bolt.

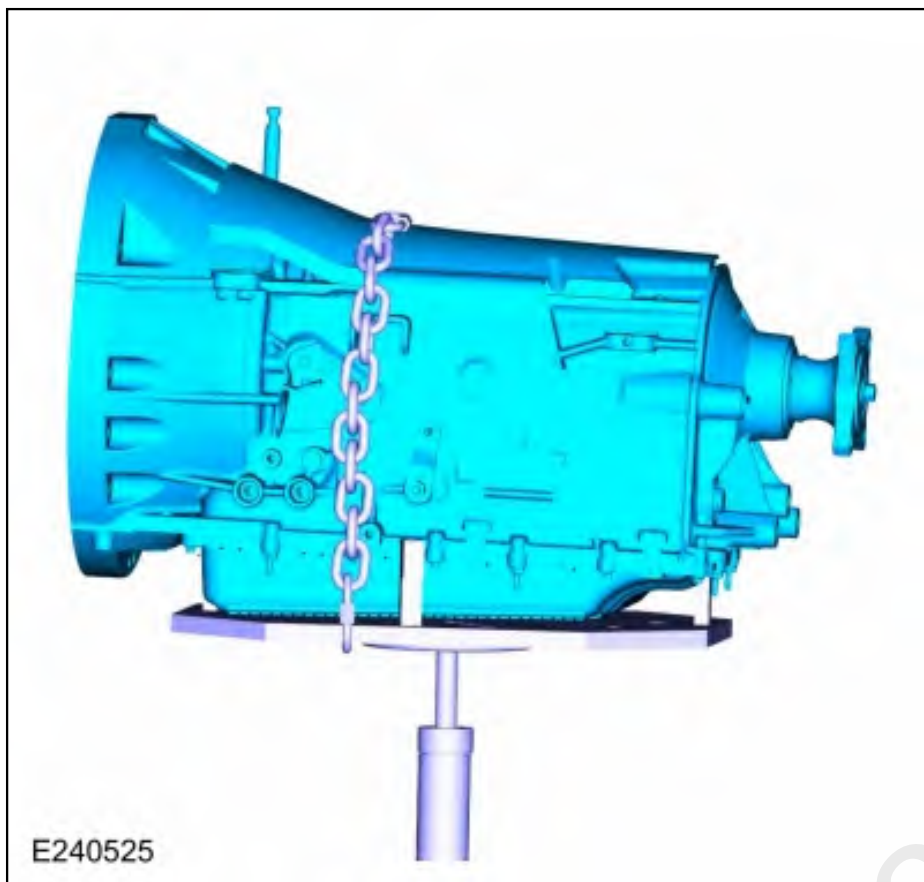


28. Slide the transmission back enough to install the special tool.
Use Special Service Tool: 307-346 (T97T-7902-A) Retainer, Torque Converter.



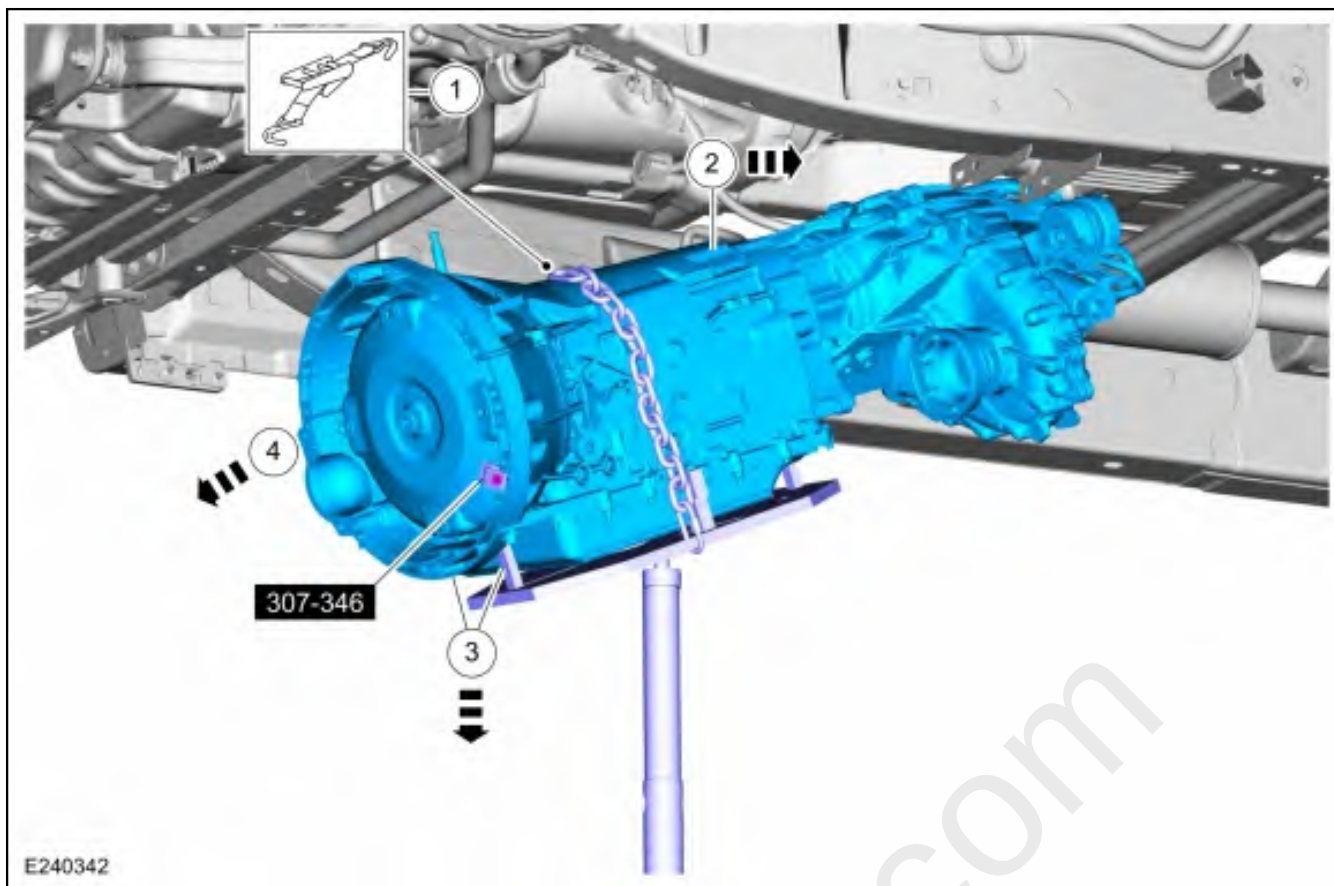
Rear Wheel Drive (RWD) vehicles

29. Using the high-lift transmission jack, remove the transmission from the vehicle.
Use the General Equipment: Transmission Jack

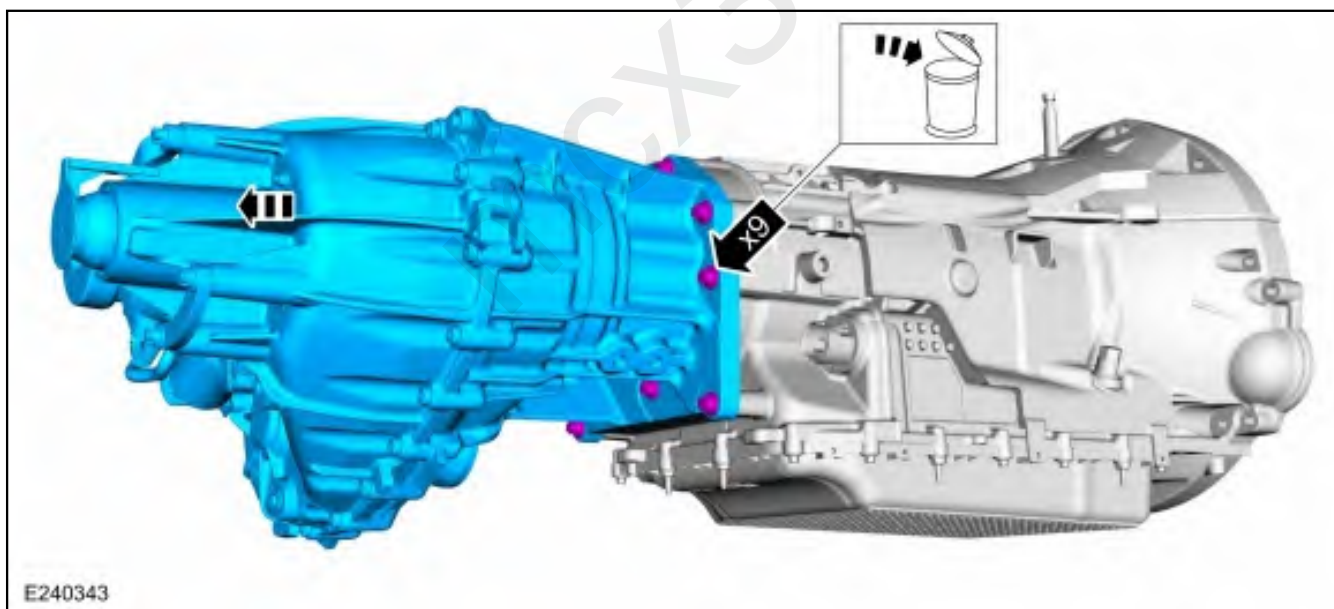


Four-Wheel Drive (4WD) vehicles

1. Make sure the transmission is securely fastened to the transmission jack.
2. Slide the transmission towards the rear of the vehicle.
3. Tilt the front of the transmission down.
4. Remove the transmission from the vehicle.



31. If the transmission is to be overhauled or if installing a new or re-manufactured transmission, remove and discard the bolts and separate the transfer case from the transmission.



All vehicles

32. **NOTICE: Failure to clean the transmission fluid cooler tubes can result in transmission failure.**

If the transmission is to be overhauled or if installing a new or re-manufactured transmission, carry out the transmission fluid cooler backflushing and cleaning procedure.

Refer to: [Transmission Fluid Cooler - Backflushing and Cleaning - 2.7L EcoBoost \(238kW/324PS\)/3.0L Power Stroke Diesel/3.5L EcoBoost \(272kW/370PS\)/5.0L 32V Ti-VCT](#) (307-02 Transmission Cooling, General Procedures).

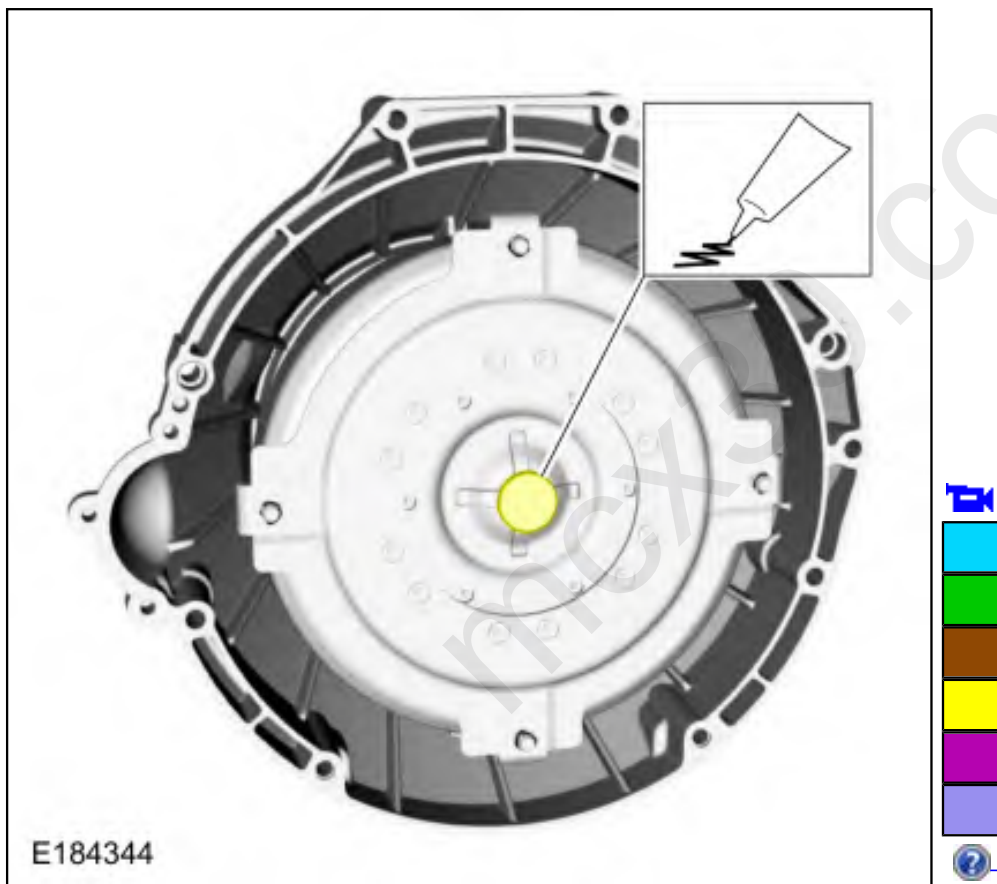
Installation

NOTE: Prior to installing a new transmission or an overhauled transmission with a new main control, record the solenoid strategy identification tag. If a new main control was installed, install the replacement solenoid body tag over the original identification tag.

1. **NOTICE:** Prior to installation of the transmission, lubricate the torque converter pilot hub or damage to the torque converter or the engine crankshaft can occur.

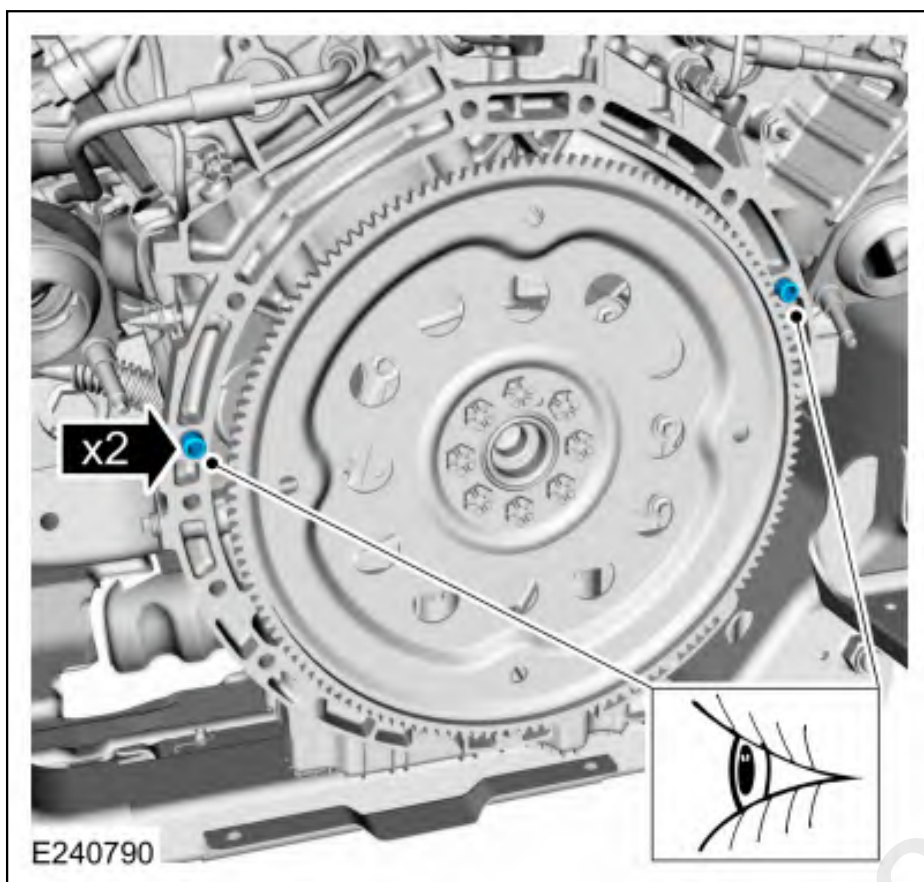
Lubricate the torque converter pilot hub with multi-purpose grease.

Material: Motorcraft® Multi-Purpose Grease Spray / XL-5-A (ESB-M1C93-B)

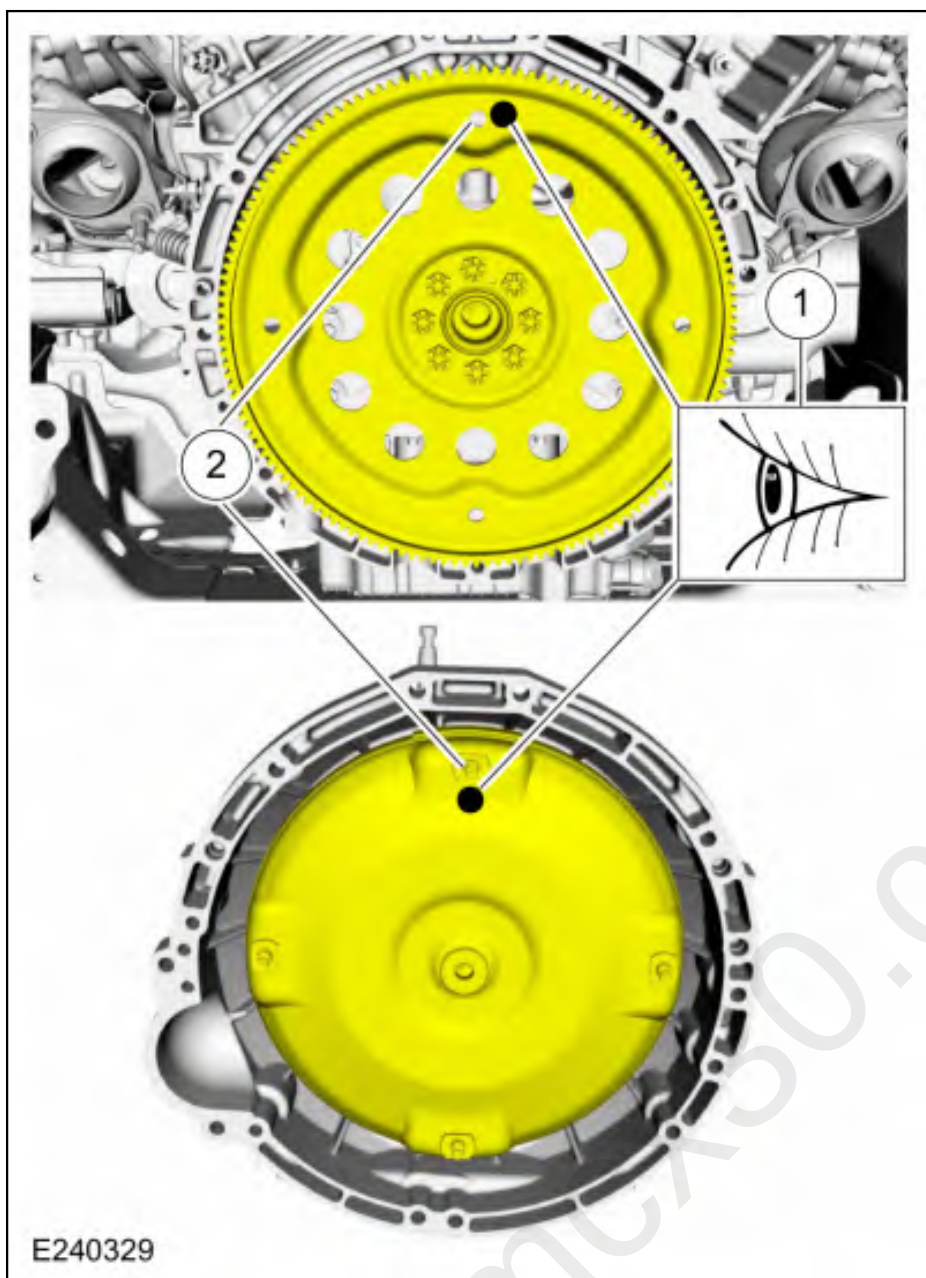


2. **NOTICE:** If the transmission is not positioned on the dowel pins, damage to the transmission may occur.

If the dowel pins were pulled out of the engine block during removal, install new dowel pins in the engine block.

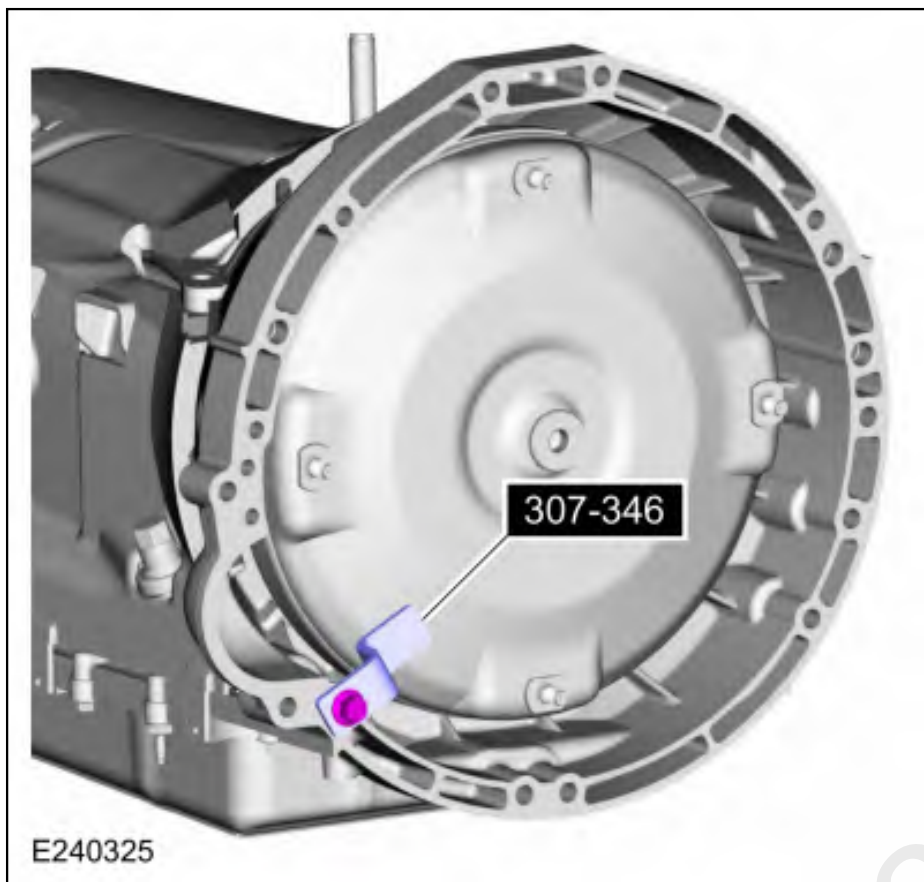


1. Inspect the torque converter stud and flexplate for paint marks.
2. Align the torque converter stud and flexplate hole near the paint marks to the 12 o'clock position.



4. Install the special tool.

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



5. **NOTE:** *If transmission is being replaced, remove the transmission fluid fill plug and verify that the transmission is filled with transmission fluid.*

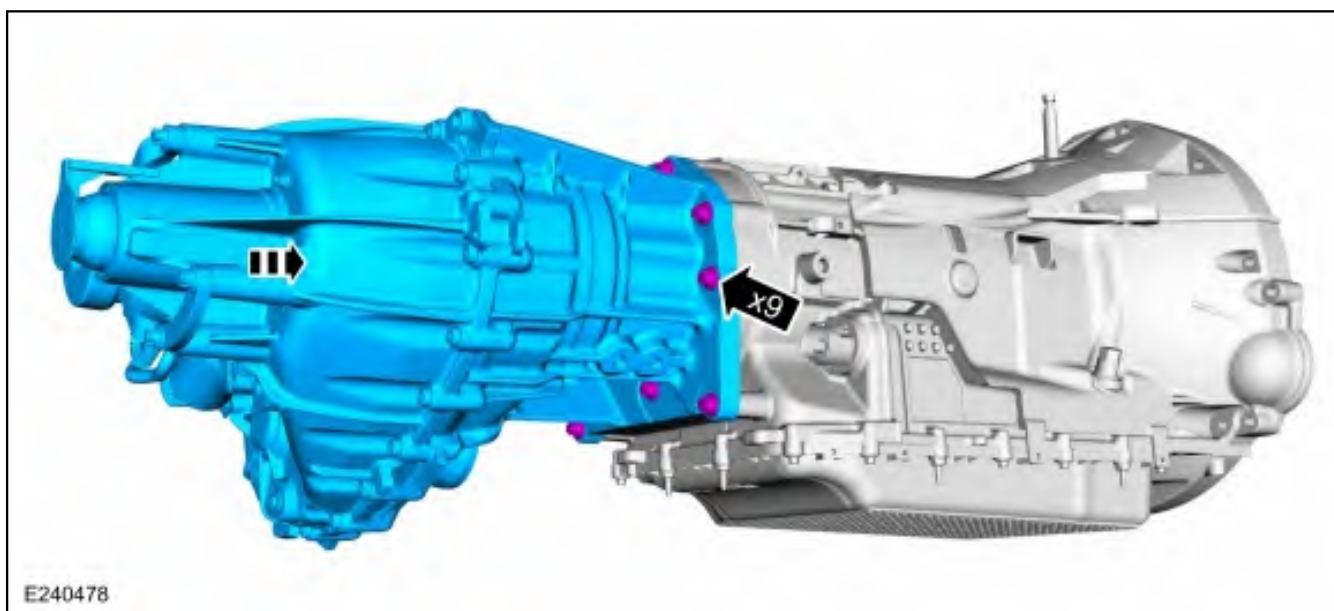
NOTE: *If transmission was disassembled, add transmission fluid to the transmission.*

NOTE: *Rear Wheel Drive (RWD) shown, Four-Wheel Drive (4WD) similar.*

1. Remove the transmission fluid fill plug transmission fluid level indicator assembly.
2. Verify transmission is filled with transmission fluid.
3. Slightly tilt the transmission rearward.
4. If the transmission was disassembled, add 12.30L (13 qt) of transmission fluid to the transmission through the transmission fluid fill hole.

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

- Loosely install the transmission fluid fill plug when finished.

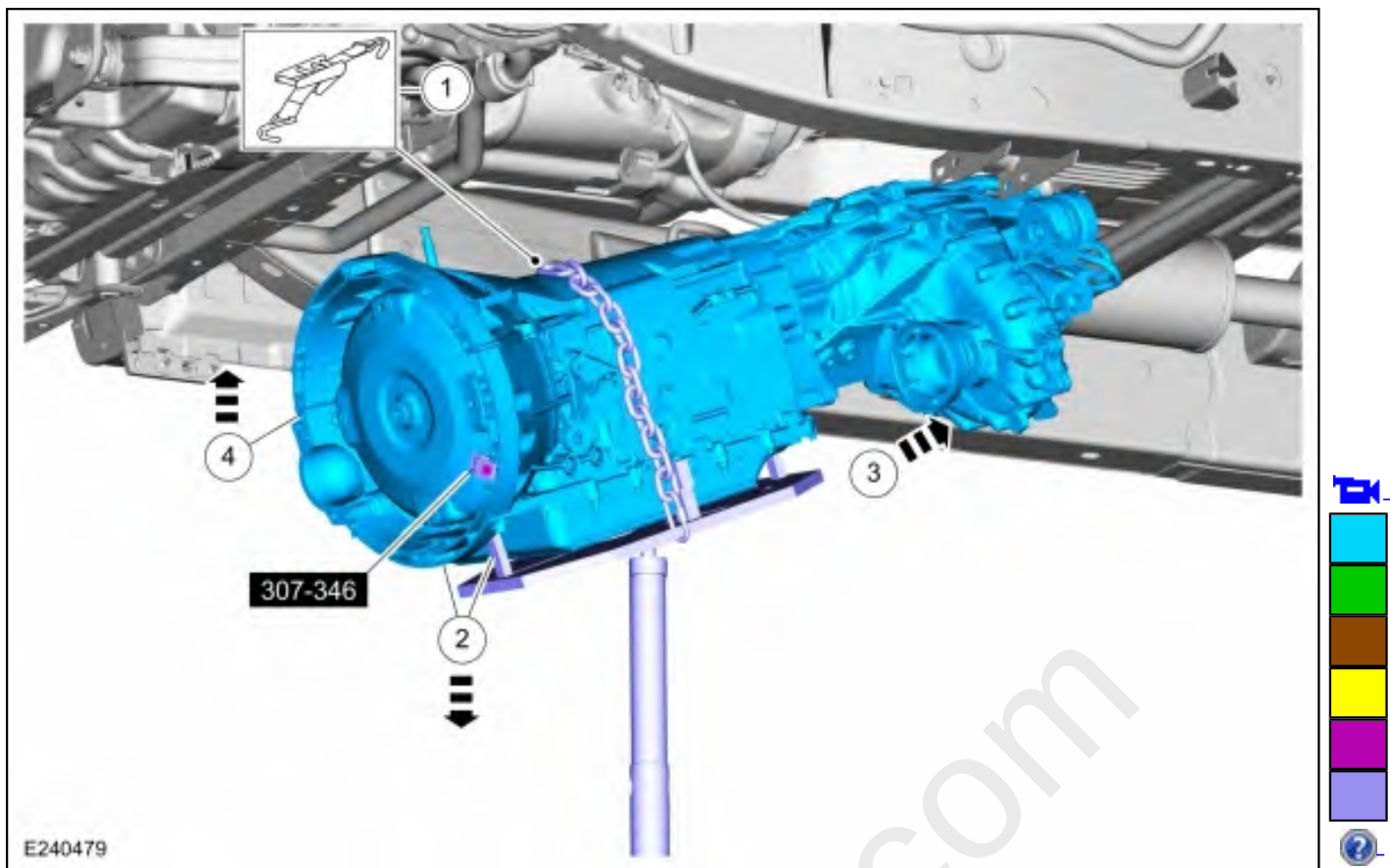


7. NOTICE: Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

Using a high-lift transmission jack, support the transmission.

1. Make sure the transmission is securely fastened to the transmission jack.
Use the General Equipment: Transmission Jack
2. Tilt the front of the transmission down.
3. Slide the transmission towards the rear of the vehicle.
4. Raise the front of the transmission into a horizontal position.

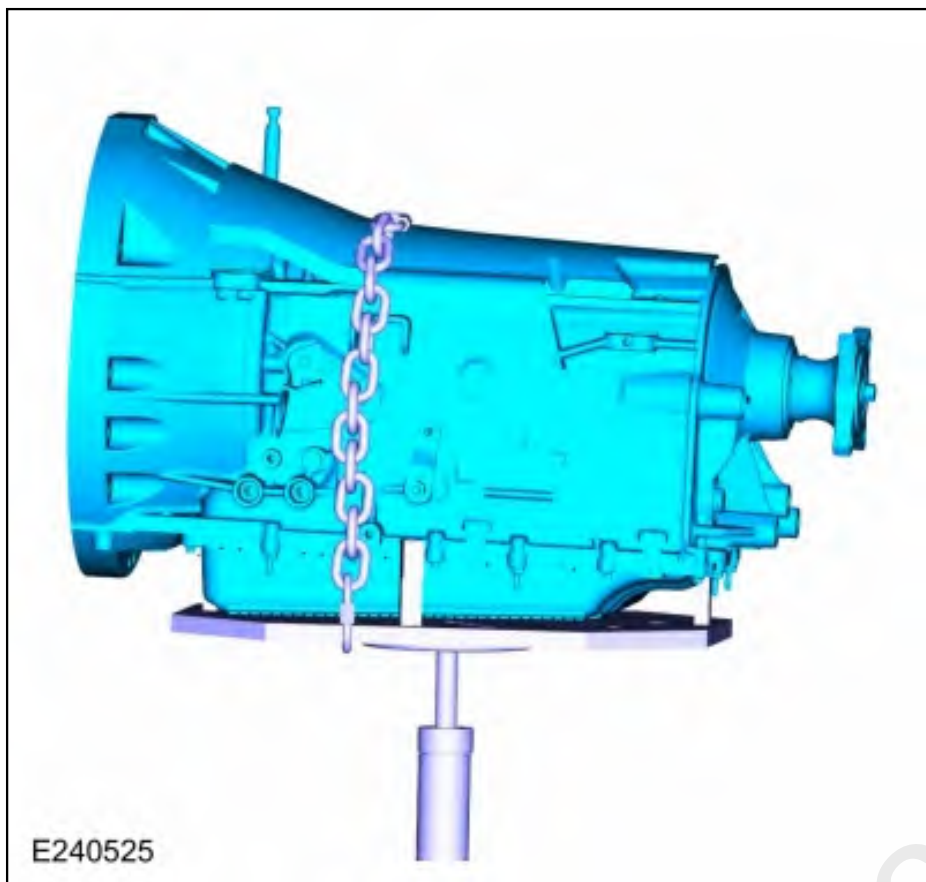


Rear Wheel Drive (RWD) vehicles

8. **NOTICE:** Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

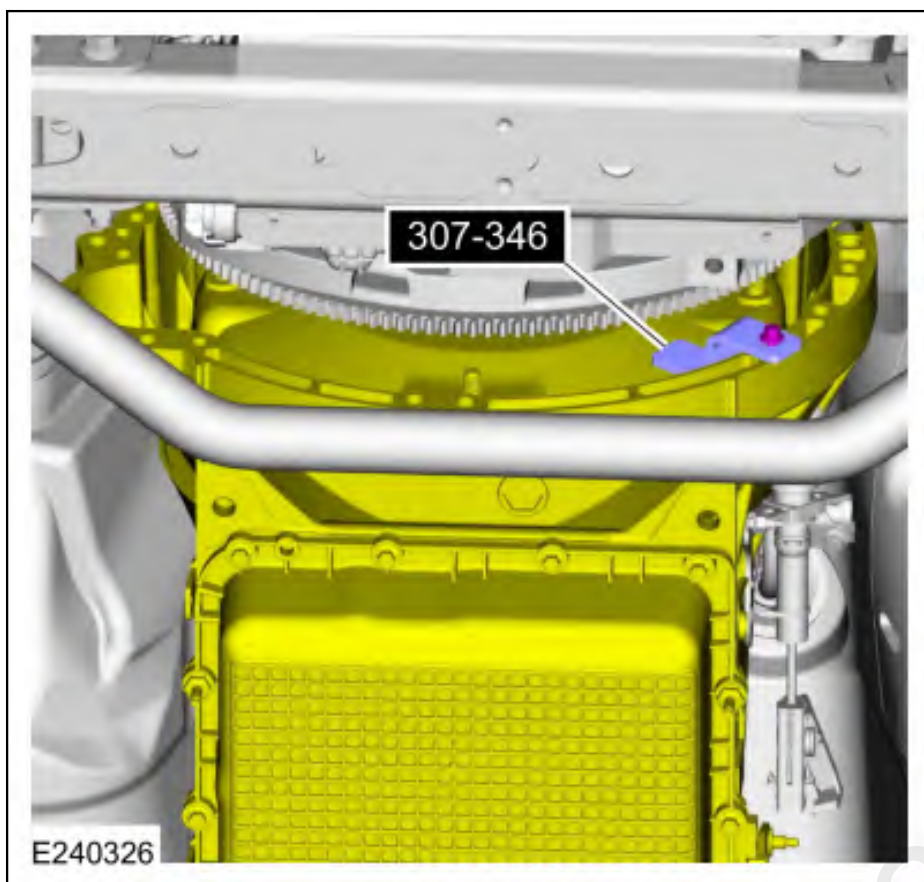
Using a high-lift transmission jack, position the transmission in the vehicle.
Use the General Equipment: Transmission Jack



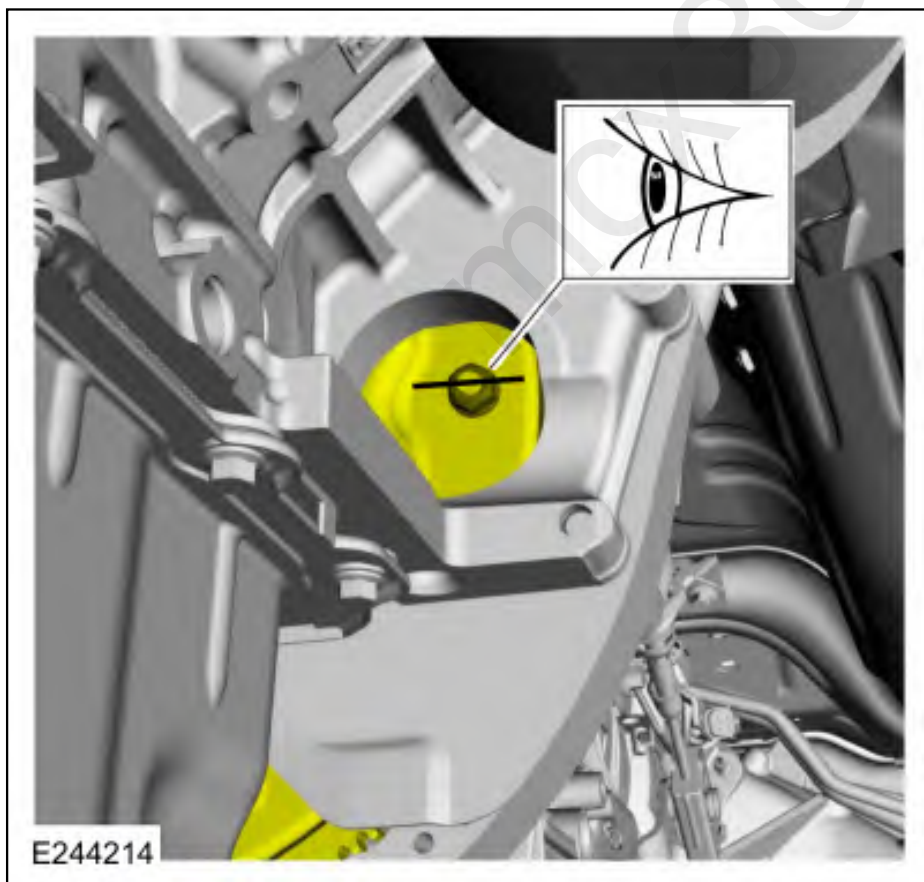
All vehicles

9. Remove the special tool.

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



10. Align the index-mark made during removal.

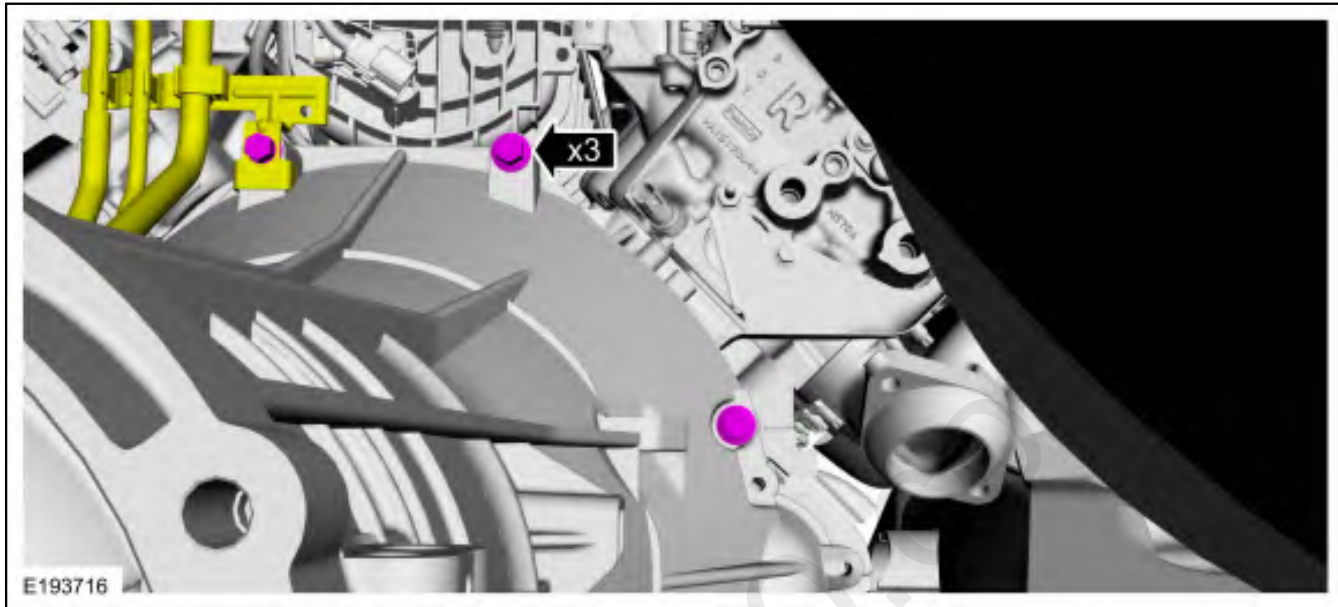


11. **NOTE:** Make sure the torque converter is fully seated in the transmission before aligning the transmission to the engine.

NOTE: With the transmission in a horizontal position, move it toward the engine and position it on the dowel pins.

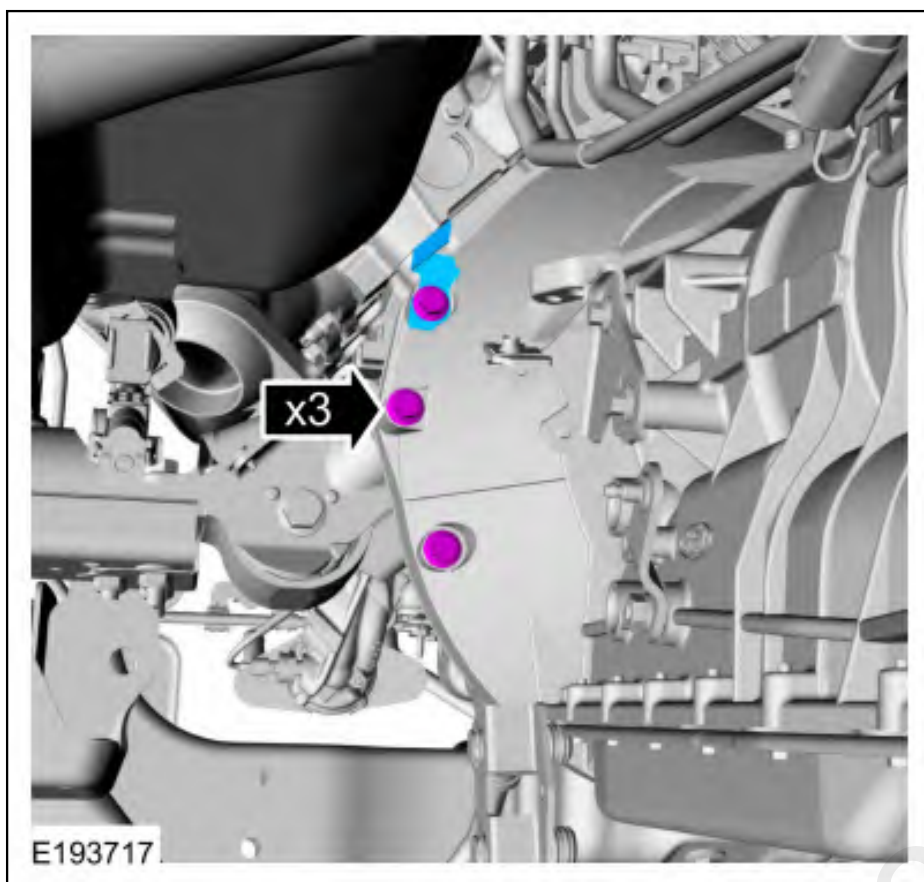
Position the bracket and install the top bellhousing bolts.

Torque: 35 lb.ft (48 Nm)

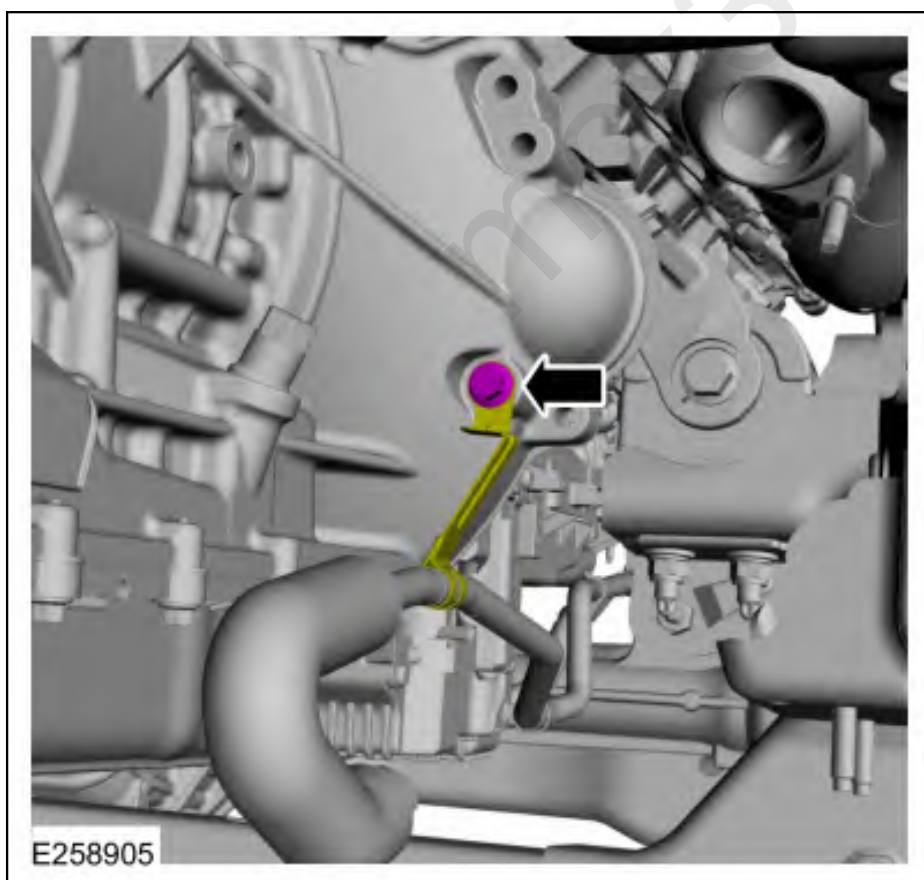


12. Install the selector lever cable bracket and the LH bellhousing bolts.

Torque: 35 lb.ft (48 Nm)



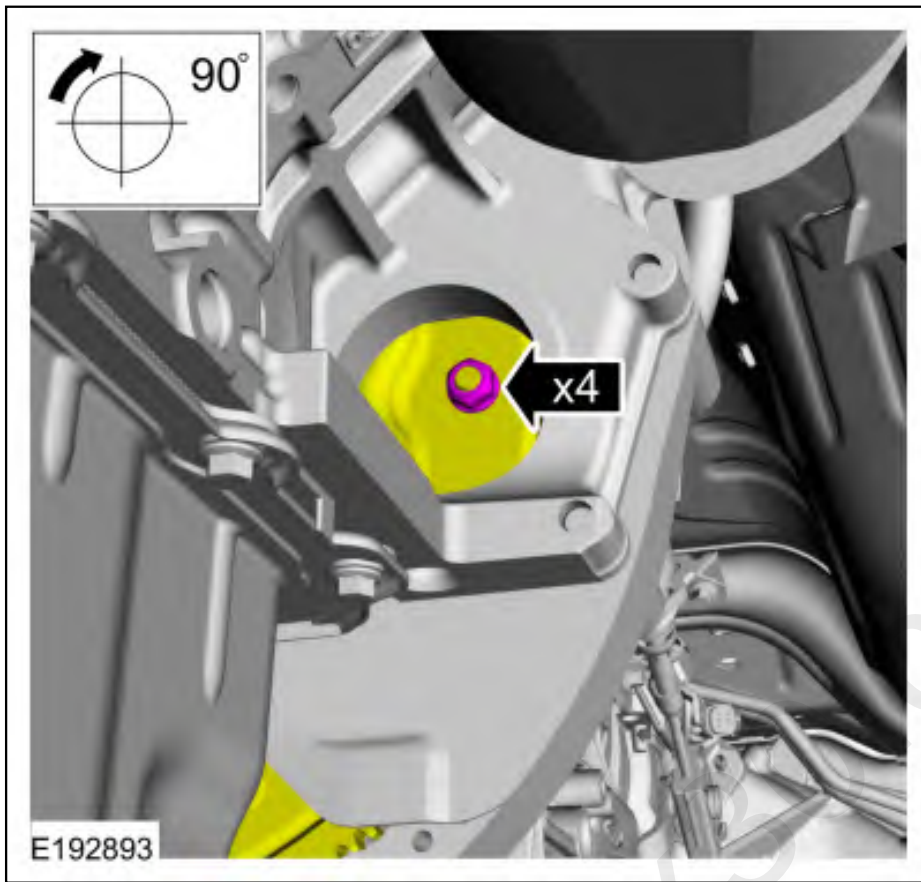
13. Install the RH bellhousing bolt.
Torque: 35 lb.ft (48 Nm)



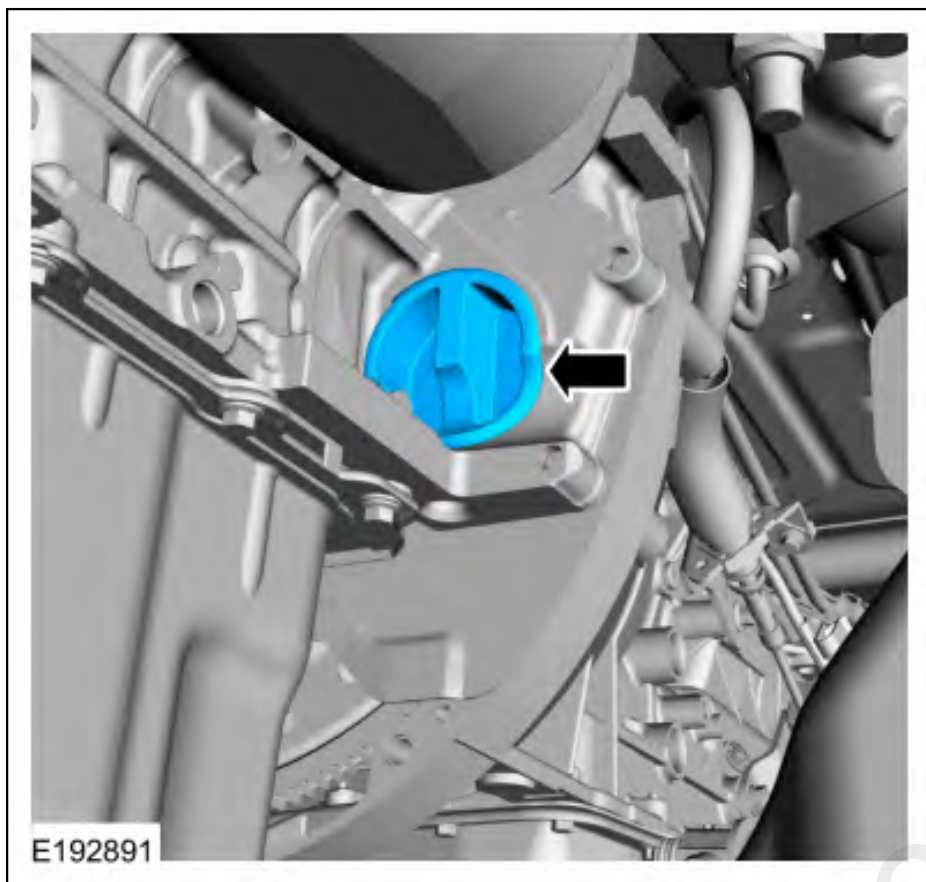
14. **NOTE:** Using the crankshaft pulley bolt, turn the engine clockwise.

Install the new torque converter nuts.

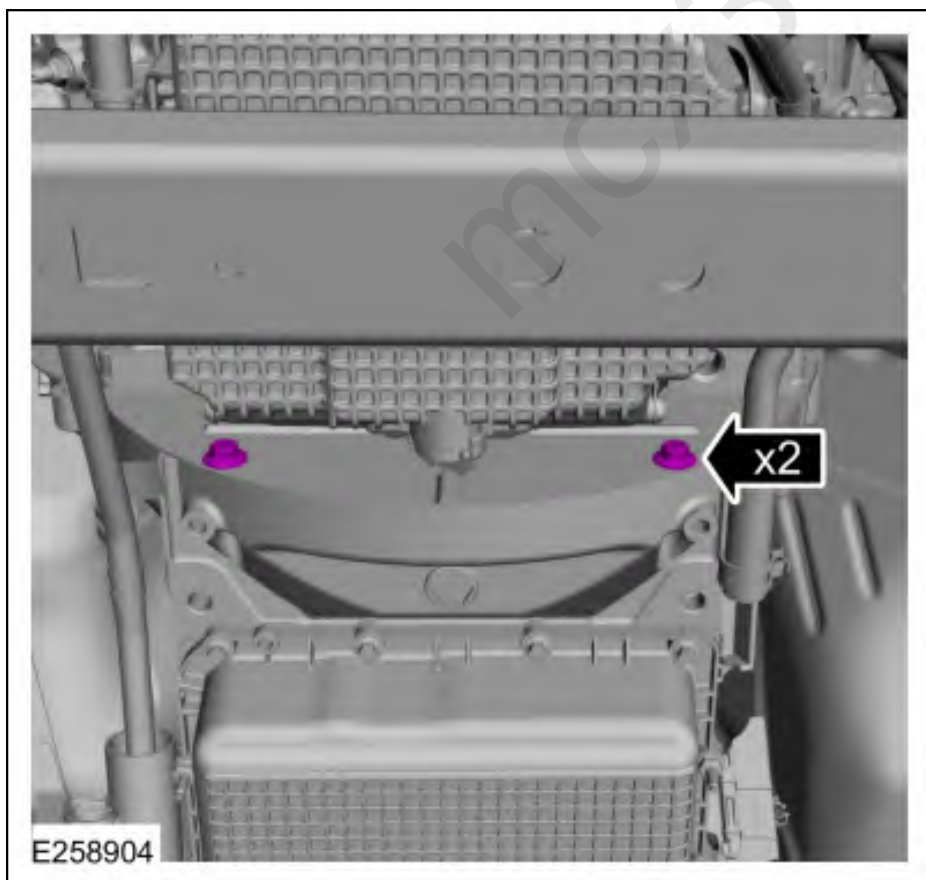
Torque: 30 lb.ft (40 Nm)



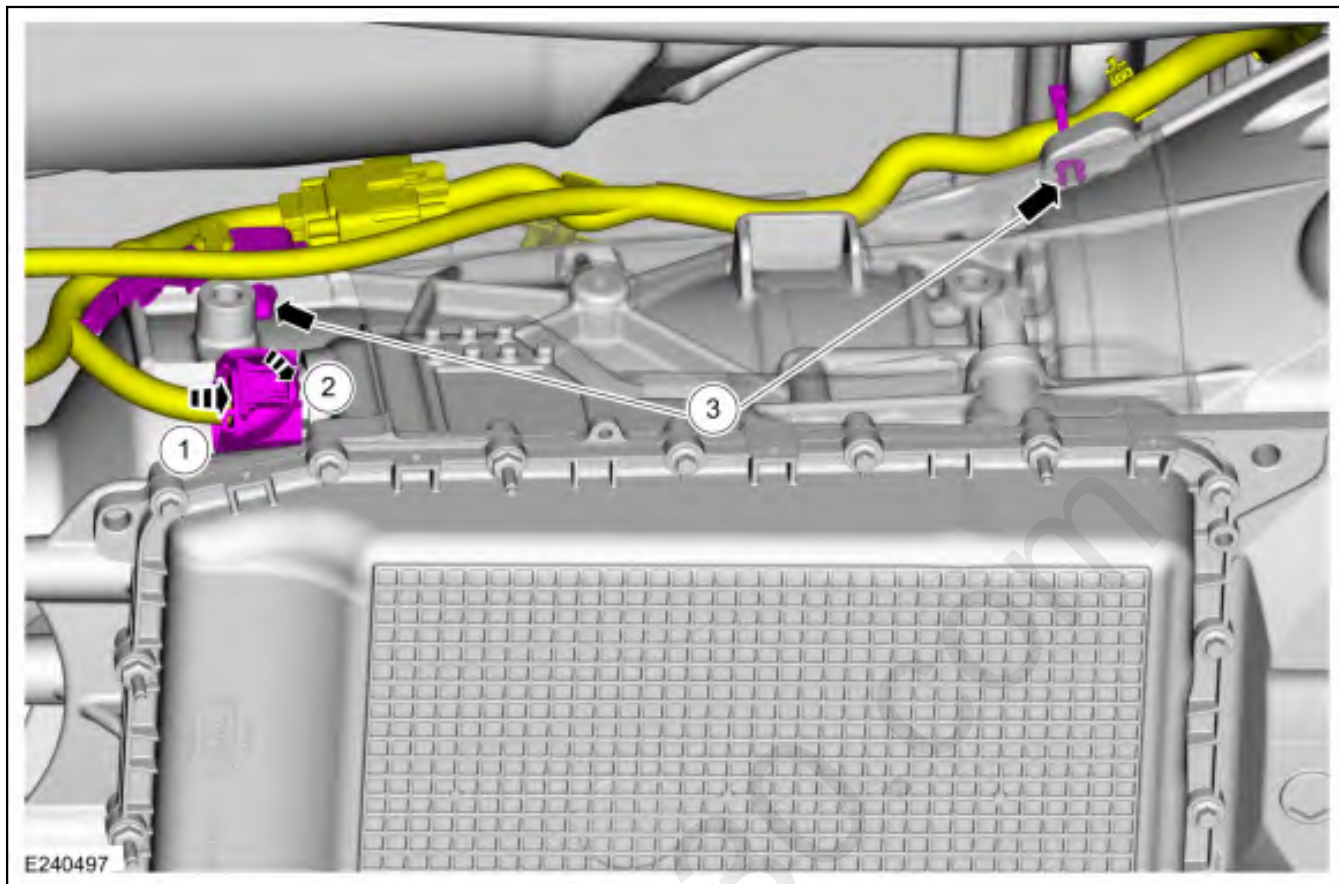
15. Install the rubber torque converter nut access cover.



16. Install the lower bellhousing bolts.
Torque: 26 lb.ft (35 Nm)

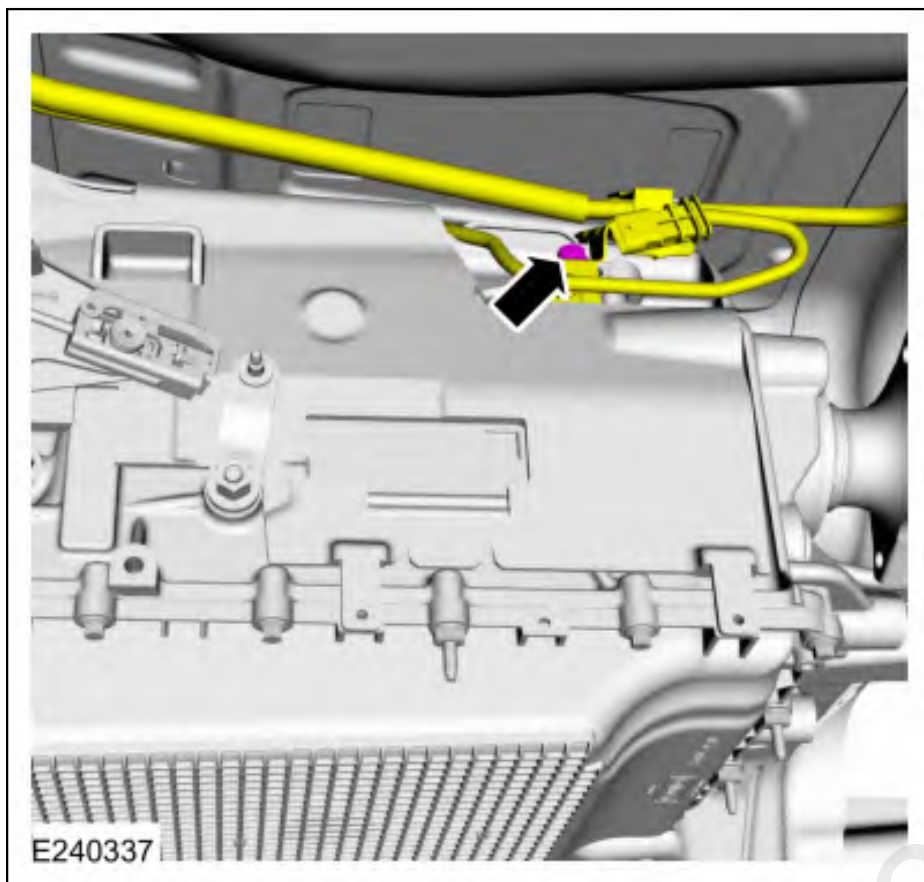


1. Push the transmission electrical connector in.
2. Lock the tab to connect the transmission electrical connector.
3. Attach the wiring harness retainers in the transmission.



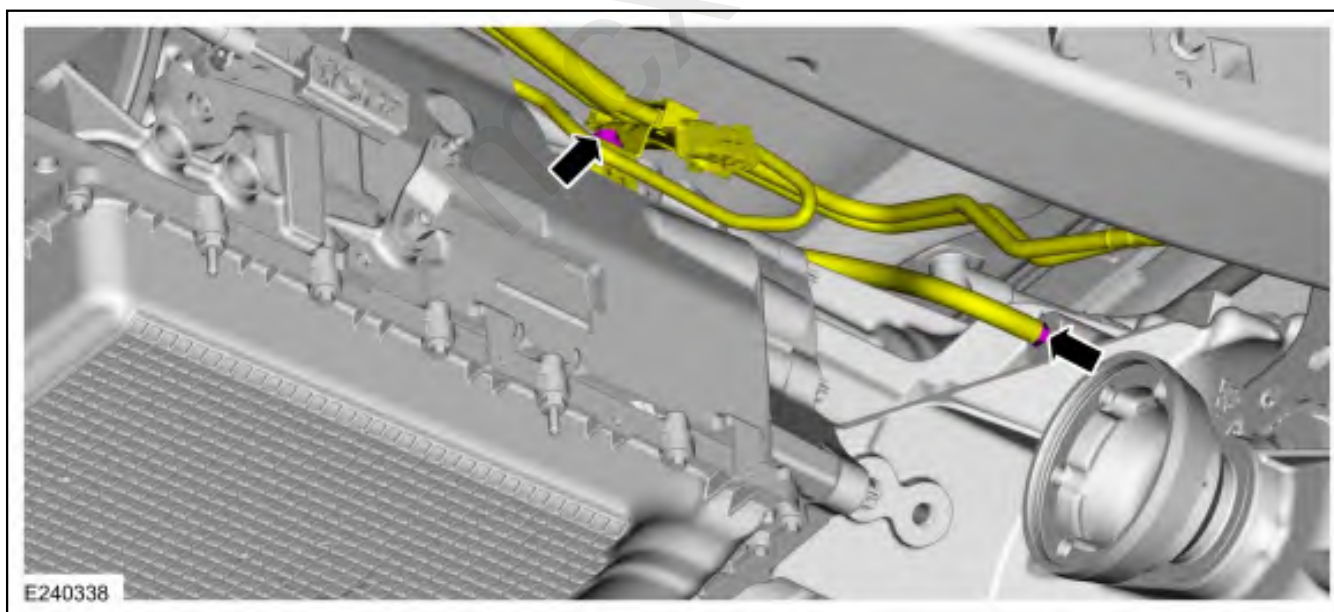
Rear Wheel Drive (RWD) vehicles

18. Position the fuel line bracket and install the bolt.
Torque: 26 lb.ft (35 Nm)

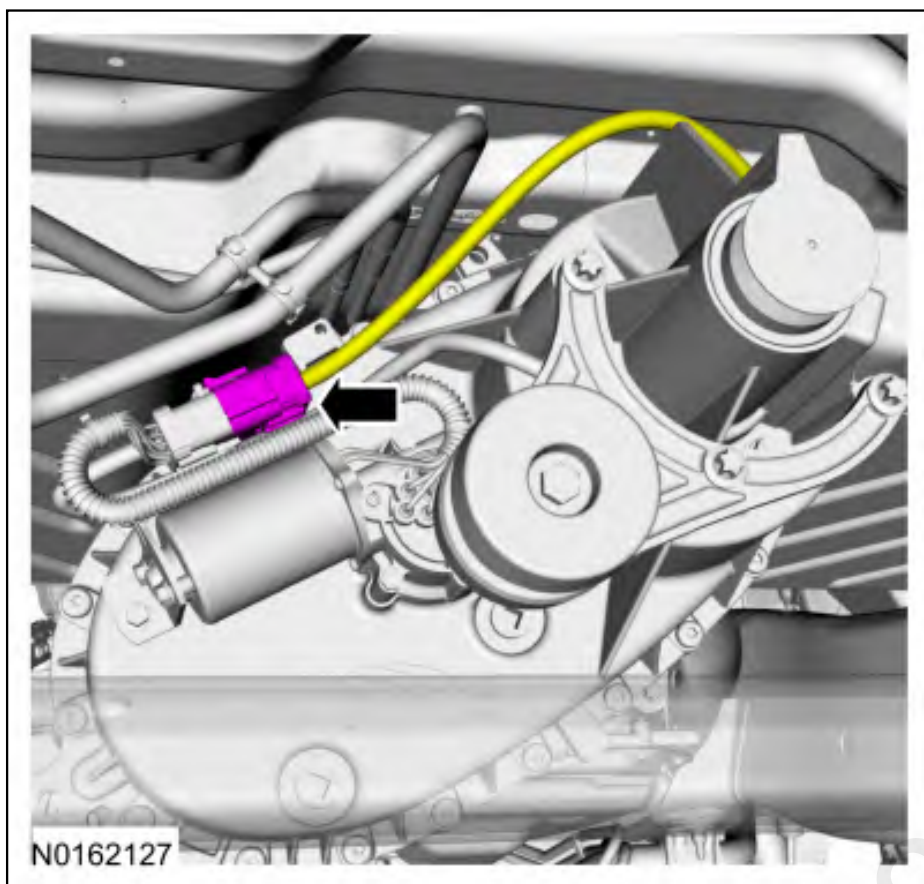


Four-Wheel Drive (4WD) vehicles

19. Position the fuel line bracket and install the bolt. Connect the transfer case vent tube.
Torque: 26 lb.ft (35 Nm)



20. Connect the transfer case electrical connector.



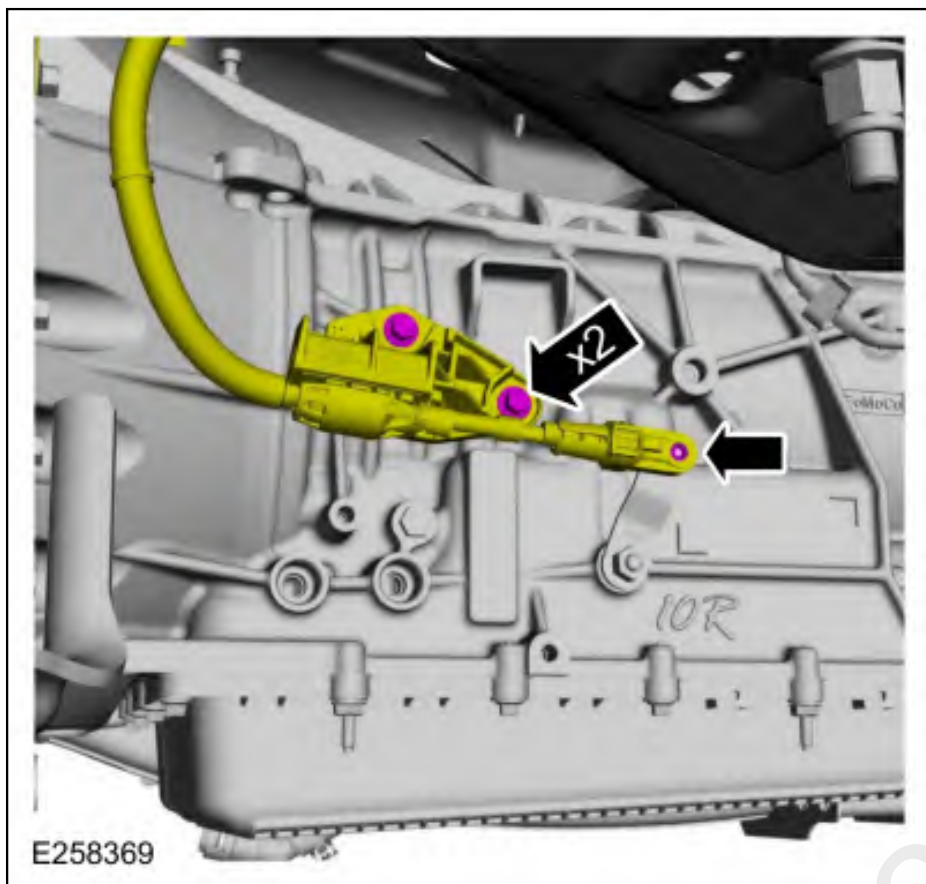
All vehicles

21. **NOTE:** When installing the selector lever cable end, make sure that the selector lever cable end is correctly installed onto the manual control lever. Pull back on the selector lever cable to make sure the selector lever cable end is securely installed onto the manual control lever.

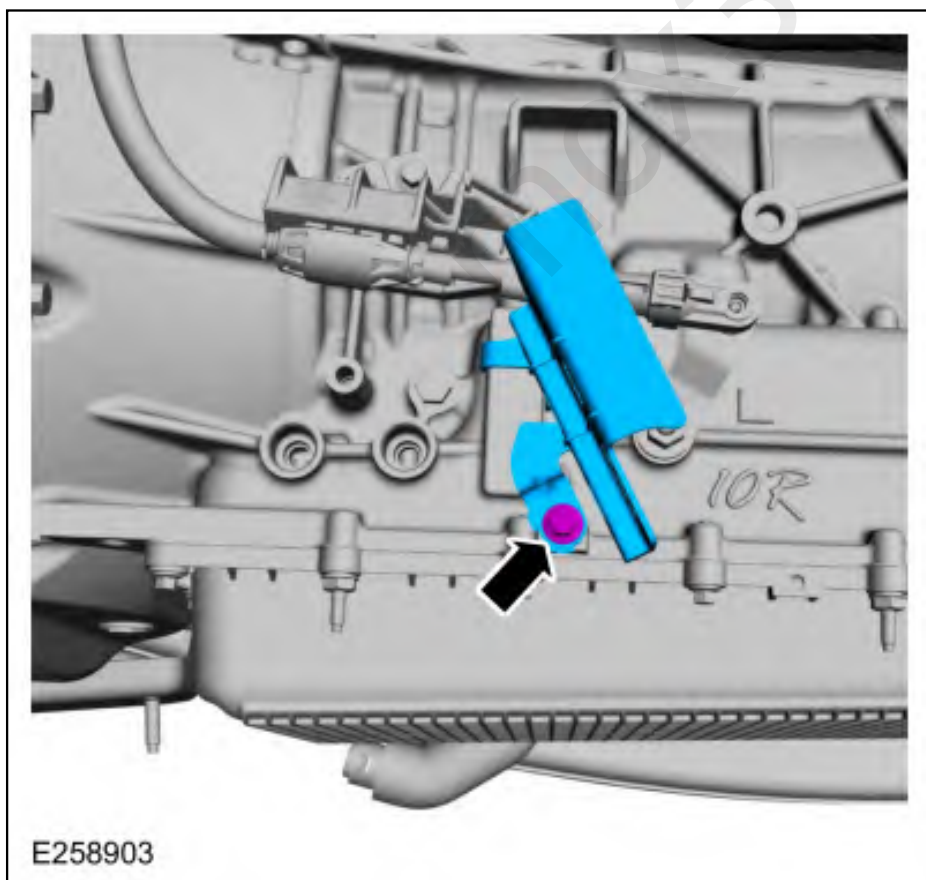
Apply pressure to the selector lever cable end while connecting it to the manual control lever to make sure the selector lever has not moved out of the DRIVE position.

Install the selector lever cable bolts and connect the selector lever cable to the manual control lever.

Torque: 30 lb.ft (40 Nm)



22. If equipped, install the selector lever cable splash shield and the bolt.
Torque: 22 lb.ft (30 Nm)



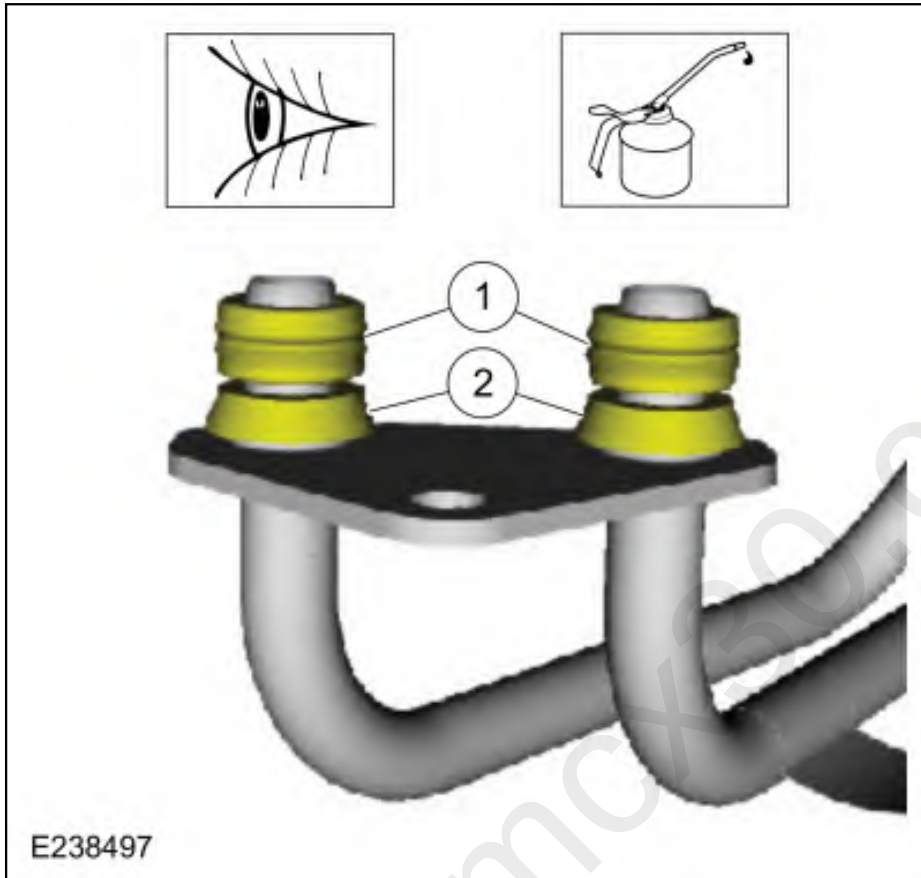
23. **NOTE:** *Inspect the transmission fluid tube backing rings and seals are not stuck in the case.*

Inspect the transmission fluid tube backing rings and seals for damage and install new backing rings or seals if necessary.

- Seal (7D285)

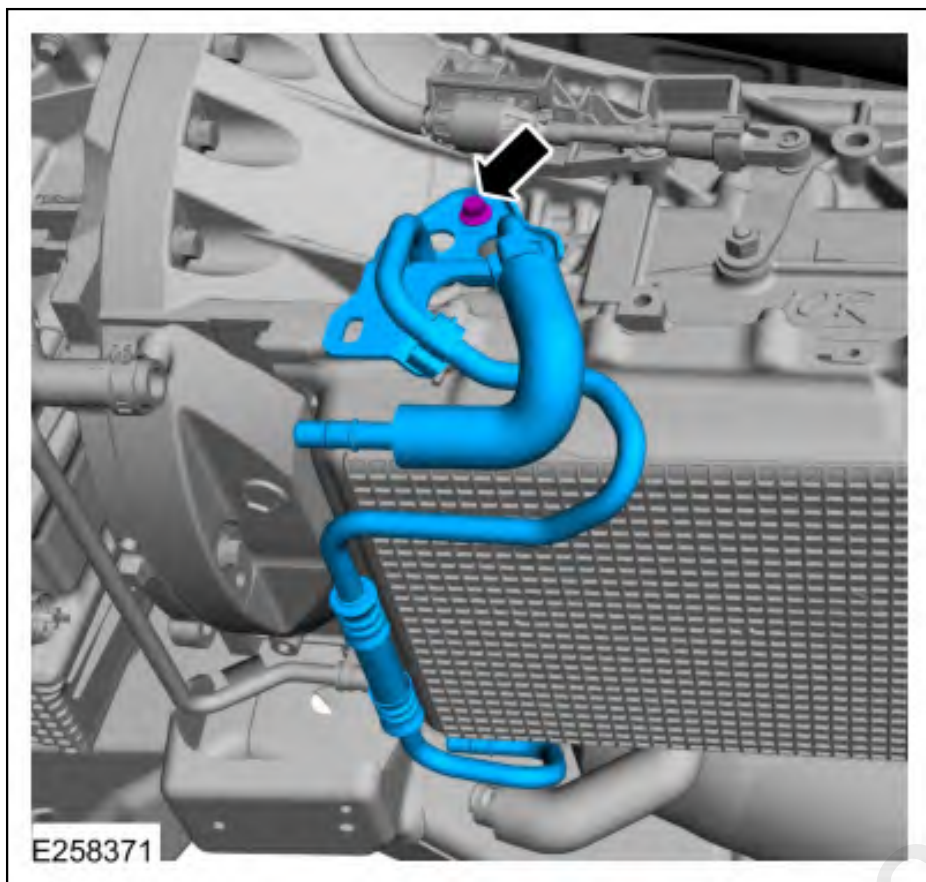
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (MERCON® ULV) (WSS-M2C949-A)

- Backing ring (7J324)



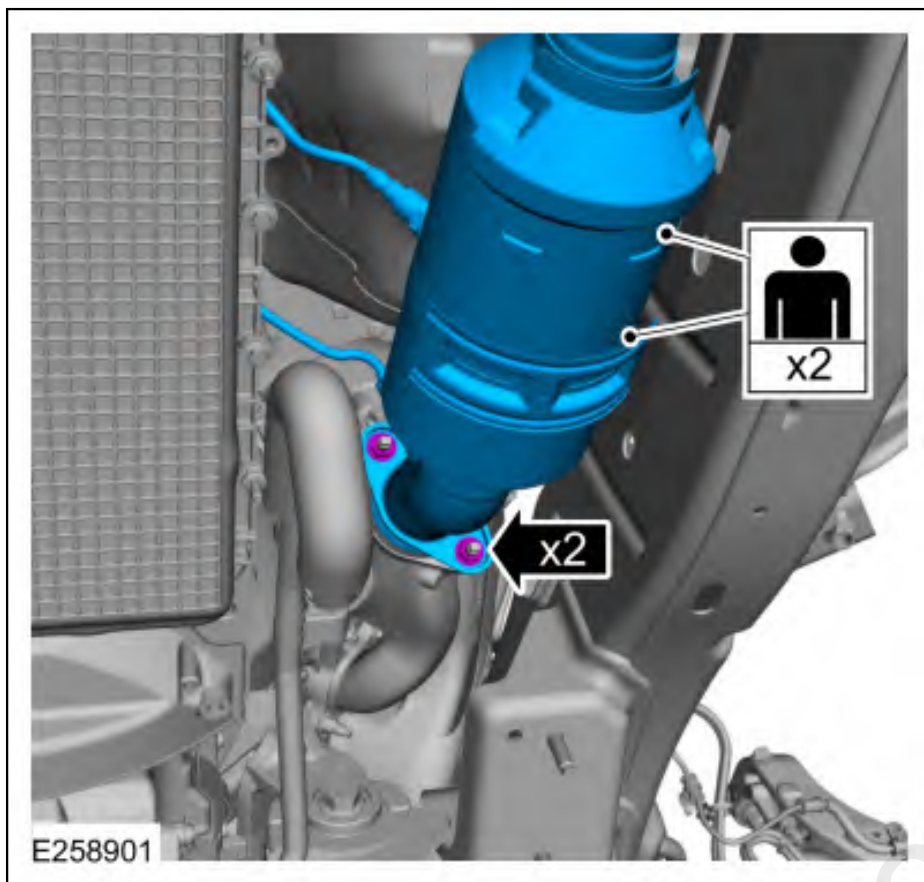
24. Install the transmission fluid cooler tubes and the new transmission fluid cooler tube bracket bolt.

Torque: 22 lb.ft (30 Nm)



25. **NOTE:** Loosely install the new RH catalytic converter nuts. Do not tighten at this time.

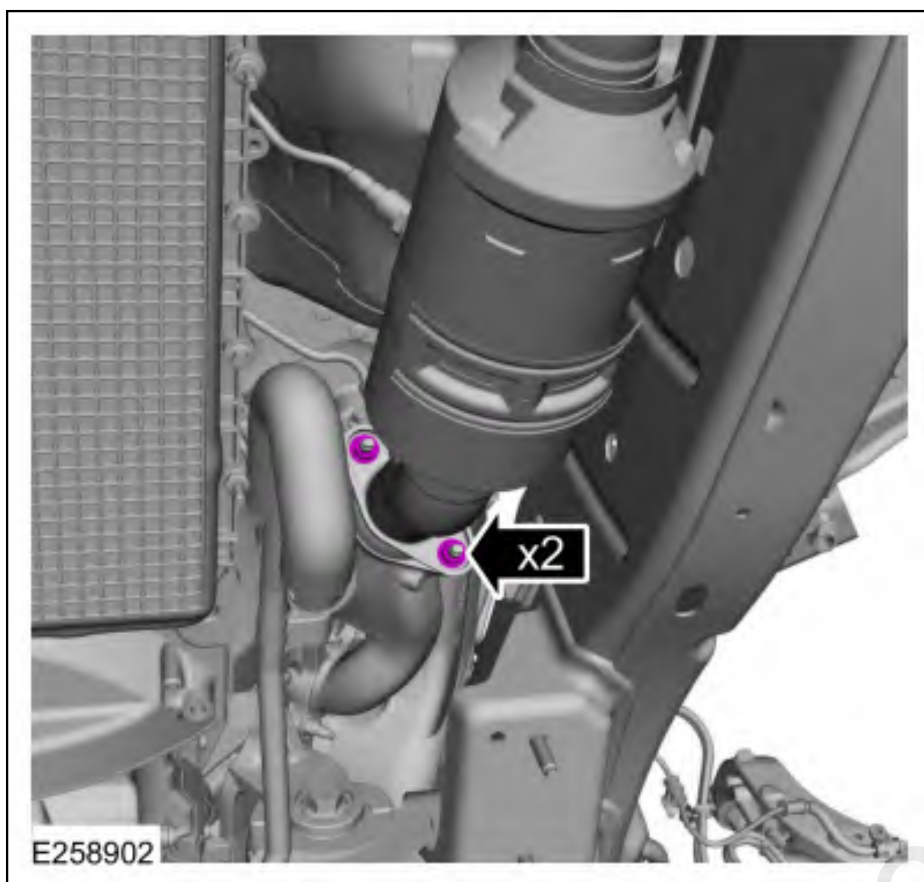
Position the RH catalytic converter in the vehicle. Loosely install the new RH catalytic converter nuts.



26. Install the transmission support insulator.
Refer to: [Transmission Support Insulator](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

27. **NOTE:** *Evenly tighten the catalytic converter nuts.*

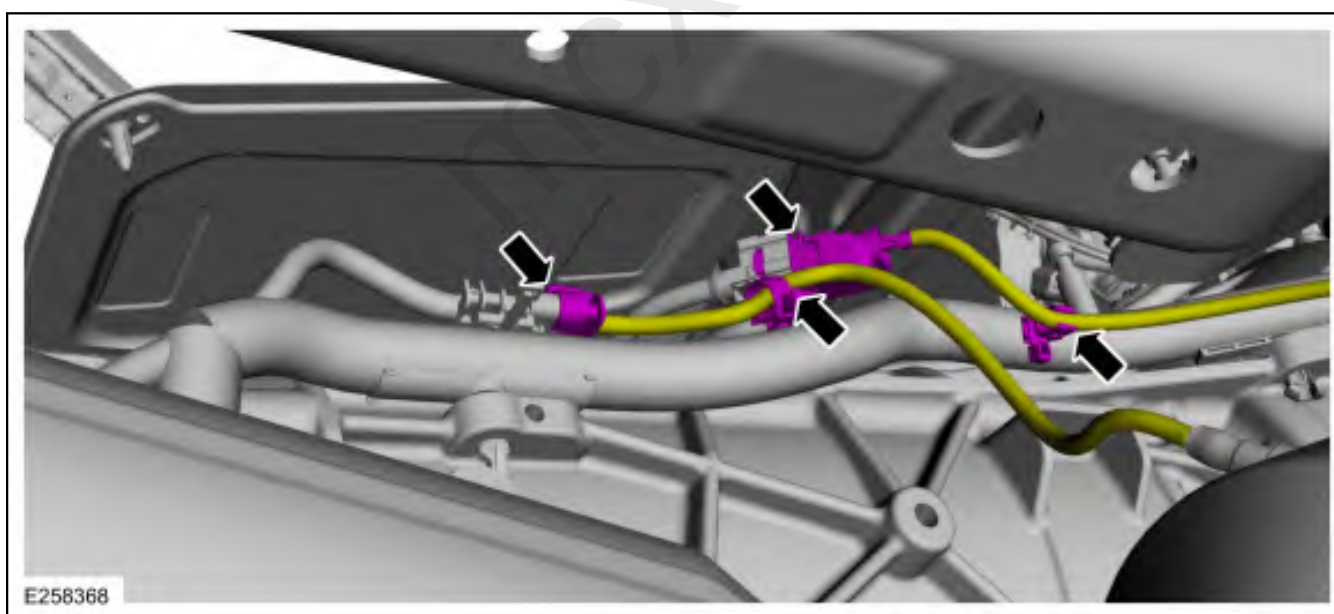
Tighten the RH catalytic converter nuts.
Torque: 30 lb.ft (40 Nm)



28. Install the LH catalytic converter.

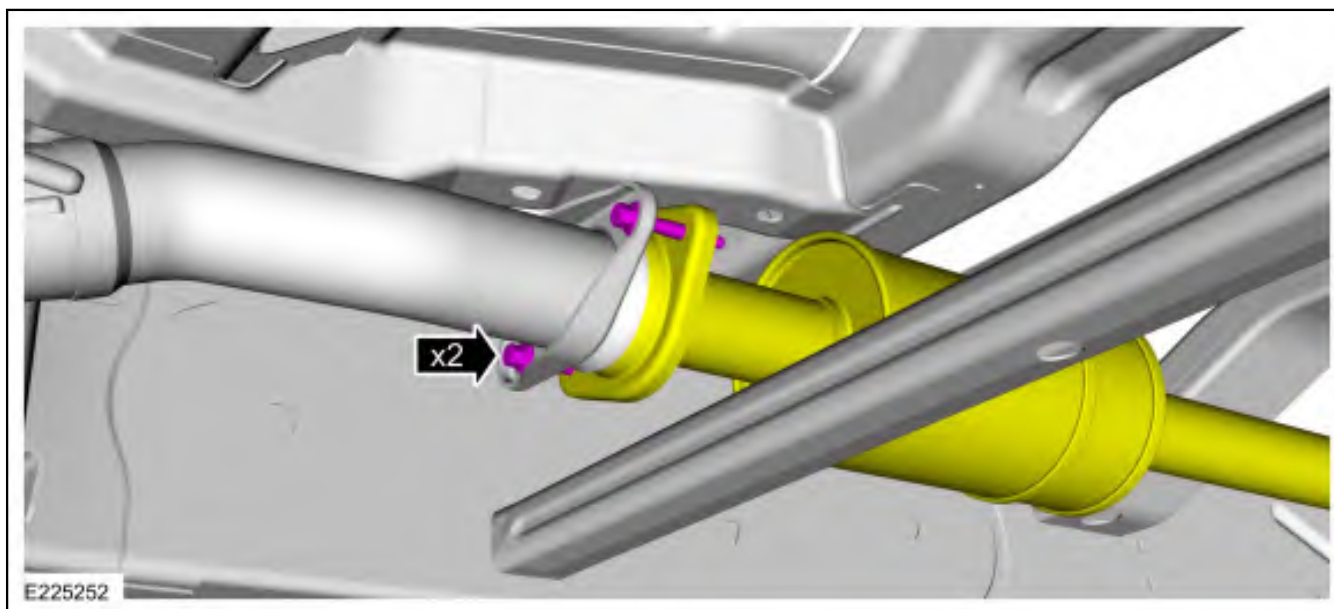
Refer to: [Catalytic Converter LH](#) (309-00D Exhaust System - 5.0L 32V Ti-VCT, Removal and Installation).

29. Connect the RH catalyst monitor sensor and the RH HO2S electrical connectors.

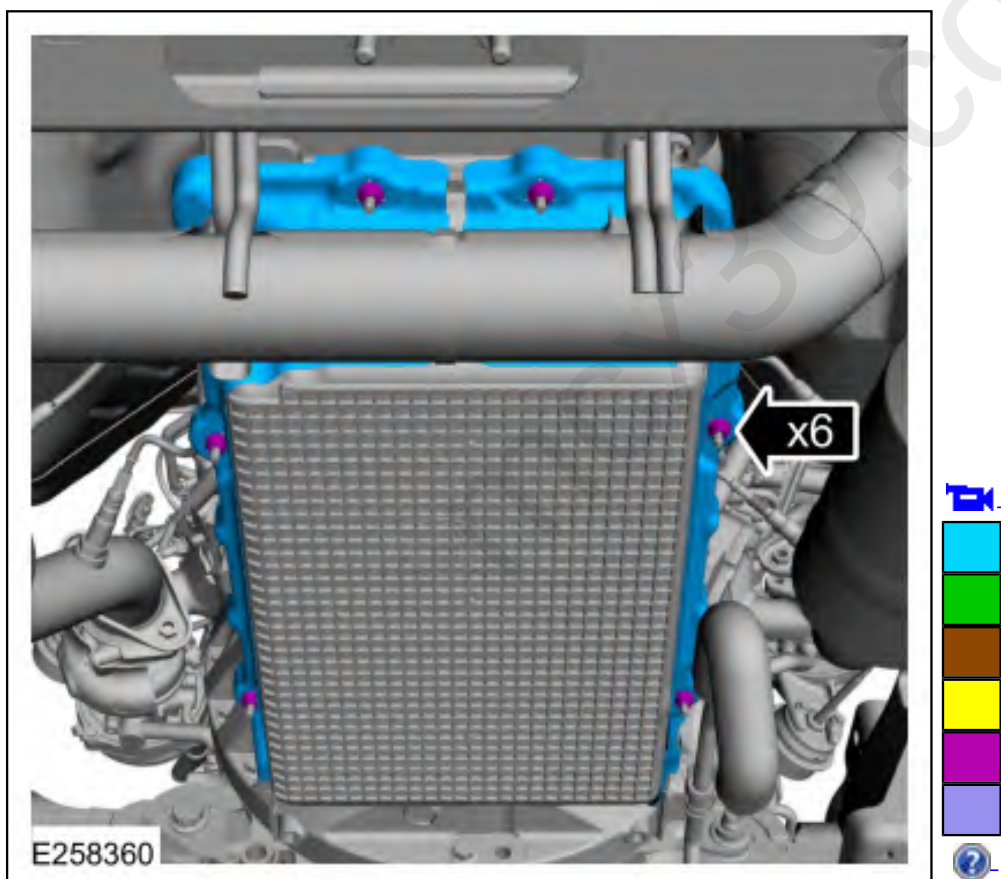


30. Install the catalytic converter flange to the muffler inlet pipe bolts.

Torque: 30 lb.ft (40 Nm)



31. Install the retainers and heatshield.
Torque: 80 lb.in (9 Nm)



32. Install the rear driveshaft assembly.
 Refer to: [Rear Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

Four-Wheel Drive (4WD) vehicles

33. Install the front driveshaft assembly.

Refer to: [Front Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

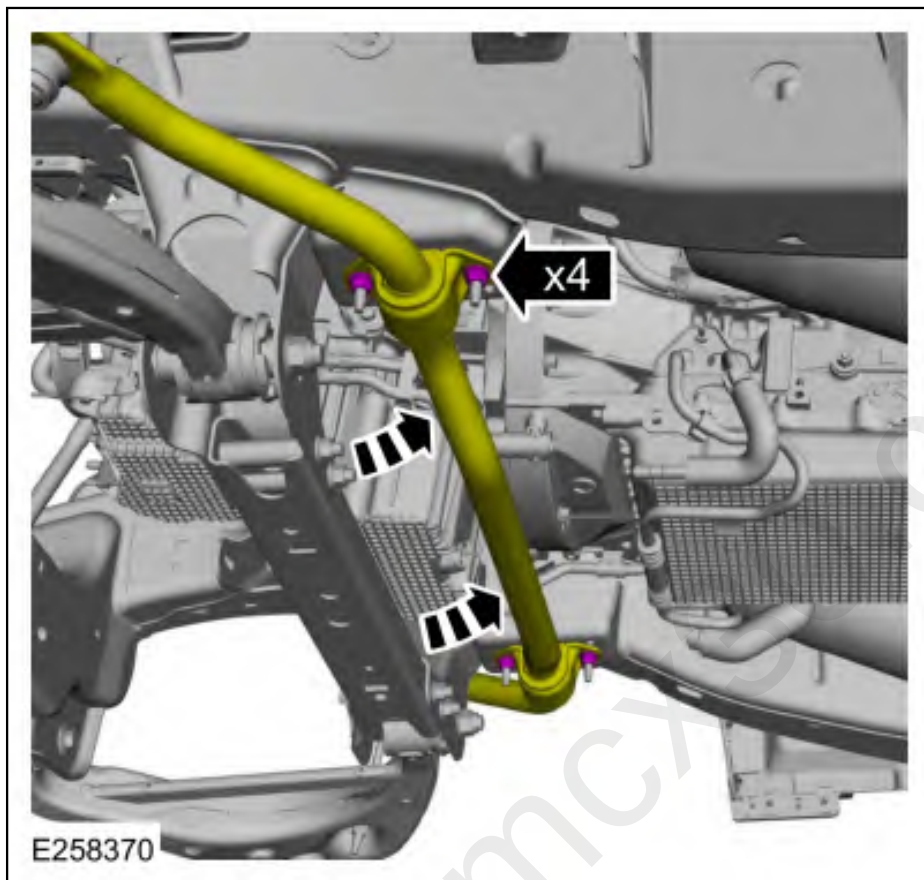
34. Check the transfer case fluid level.

Refer to: [Transfer Case Draining and Filling](#) (308-07B Transfer Case, General Procedures).

Rear Wheel Drive (RWD) vehicles

35. Install the new stabilizer bar bracket nuts.

Torque: 41 lb.ft (55 Nm)



All vehicles

36. Install the transmission fluid cooler.

Refer to: [Transmission Fluid Cooler - 2.7L EcoBoost \(238kW/324PS\)/3.5L EcoBoost \(272kW/370PS\)/5.0L 32V Ti-VCT](#) (307-02 Transmission Cooling, Removal and Installation).

37. **NOTE:** *If equipped with a underbody splash shield, do not install the splash shield at this time.*

Install the starter motor assembly.

Refer to: [Starter Motor](#) (303-06D Starting System - 5.0L 32V Ti-VCT, Removal and Installation).

38. Connect the battery ground cable.

Refer to: [Battery Disconnect and Connect](#) (414-01 Battery, Mounting and Cables, General Procedures).

39. Verify that the selector lever cable is correctly adjusted.
Refer to: [Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Column Shift](#) (307-05 Automatic Transmission External Controls, General Procedures).
Refer to: [Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Floor Shift](#) (307-05 Automatic Transmission External Controls, General Procedures).
40. After completing the repairs, perform the Misfire Monitor Neutral Profile Correction procedure using a diagnostic scan tool.
41. If a new transmission or a new main control was installed, the solenoid body strategy must be updated.
Refer to: [Transmission Strategy Download](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
42. If the transmission was overhauled, the adaptive drive cycle must be updated.
Refer to: [Adaptive Learning Drive Cycle](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
43. While driving the vehicle, use the scan tool to verify that the TFT has reached a temperature of 96.7°C-102°C (206°F-215°F). This will circulate the transmission fluid through the torque converter and the transmission fluid cooling system, eliminating any trapped air in the transmission fluid cooling system.
44. Check the transmission fluid level
Refer to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Transmission - Raptor

Base Part Number: Base Part Number: 7000

Special Tool(s) / General Equipment

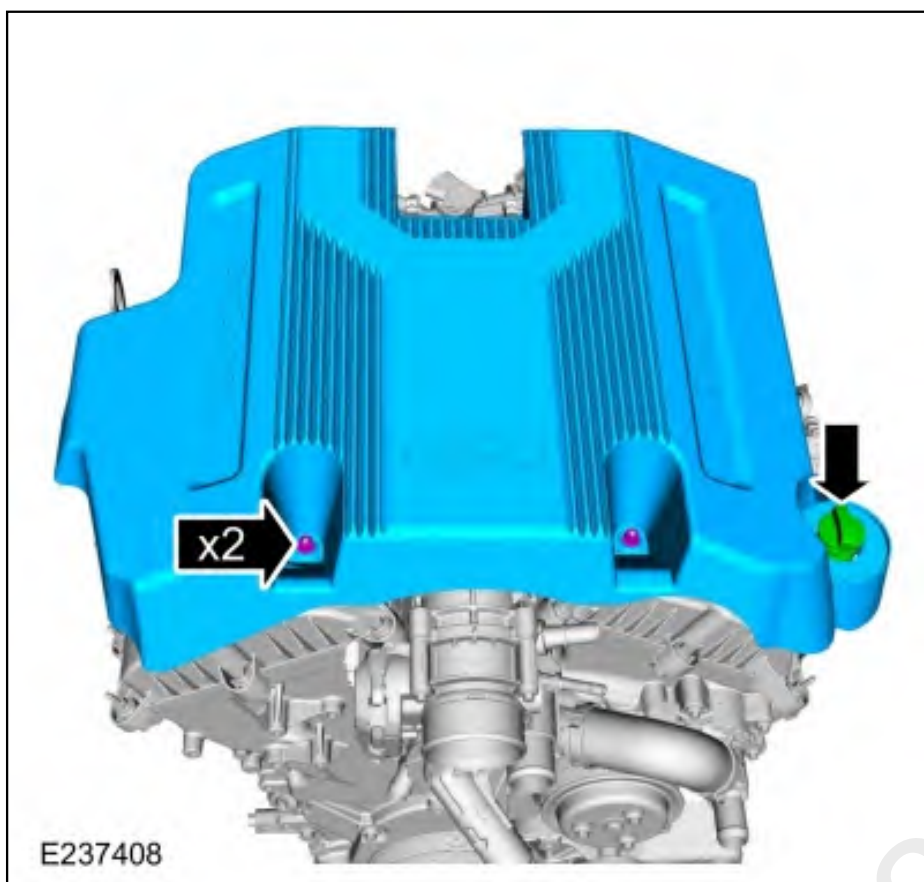
	307-346 (T97T-7902-A) Retainer, Torque Converter TKIT-1997-F/FLM/LT TKIT-1998-LM (NavigatoR)
Transmission Jack	

Materials

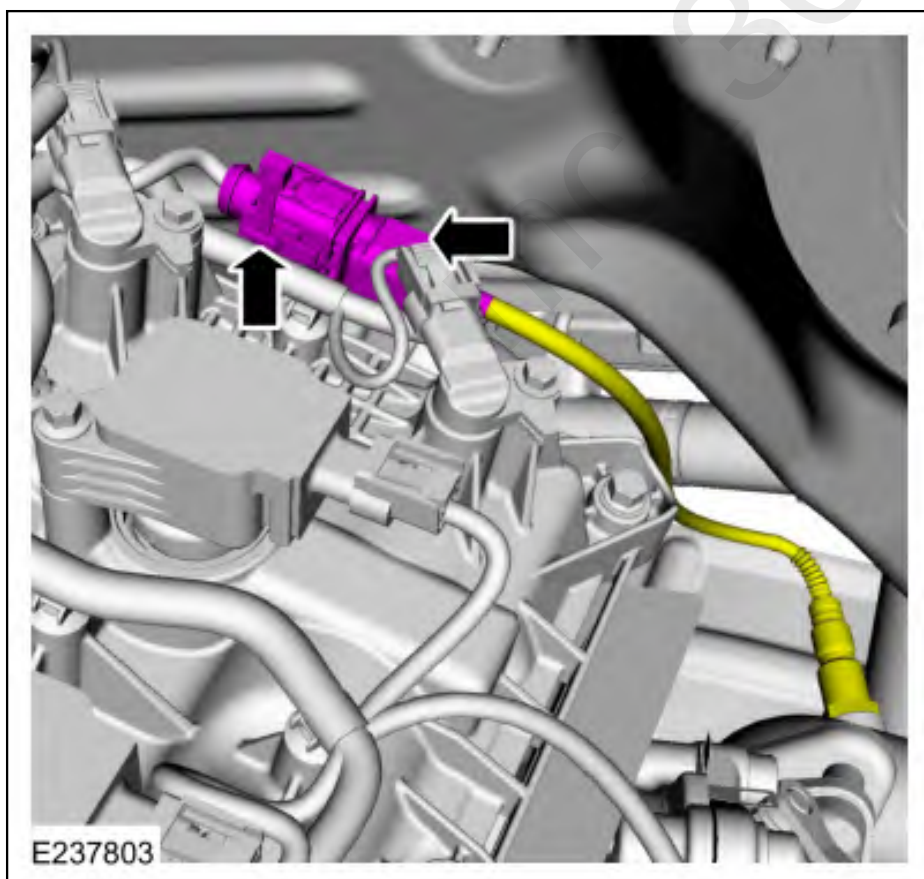
Name	Specification
Motorcraft® Multi-Purpose Grease Spray XL-5-A	ESB-M1C93-B
Motorcraft® MERCON® ULV Automatic Transmission Fluid XT-12-QULV	MERCON® ULV WSS-M2C949-A

Removal

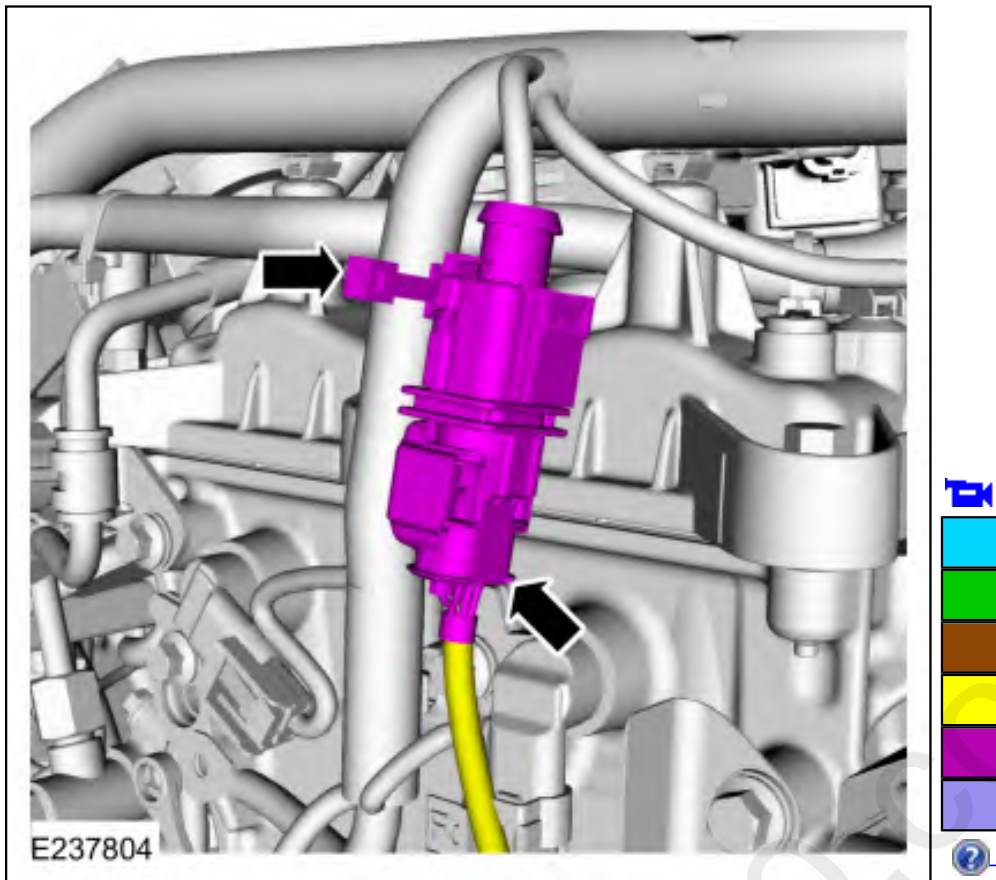
1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. Remove the nuts and the engine appearance cover.



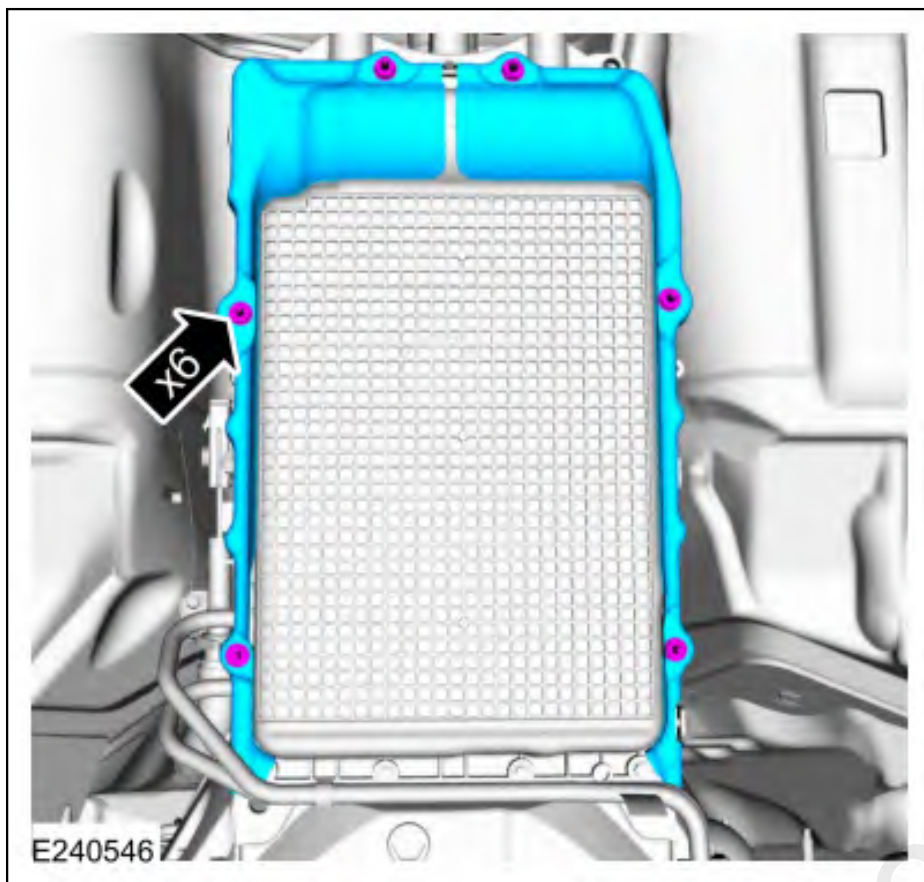
3. Disconnect the LH HO2S electrical connector.



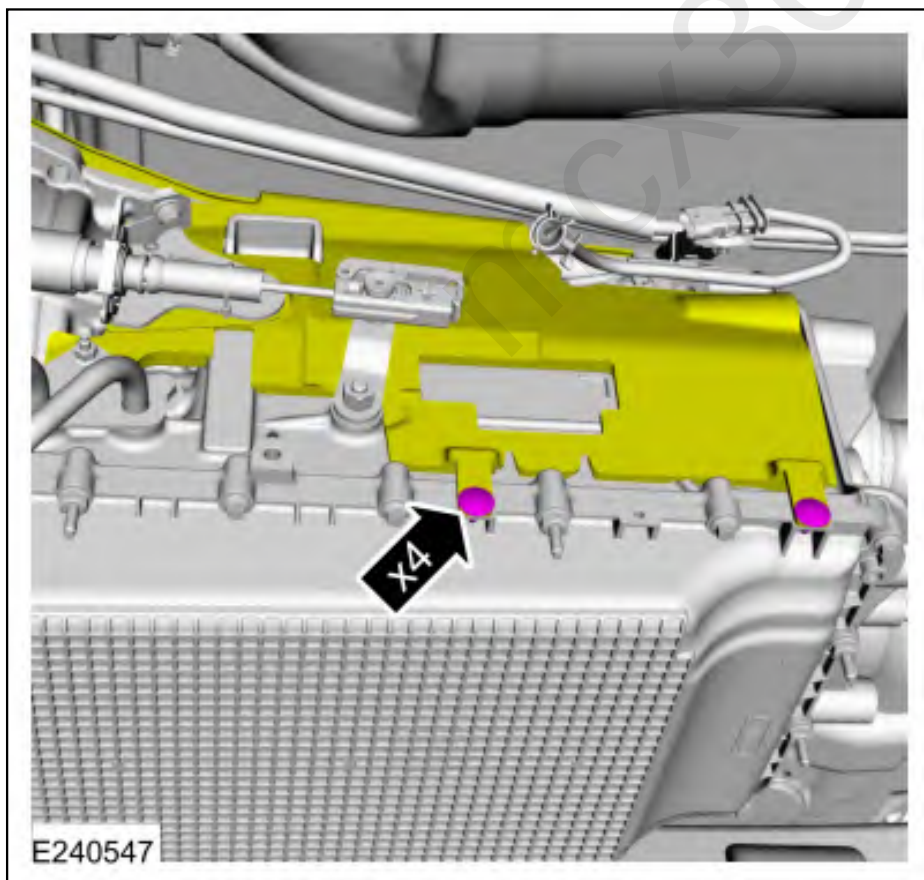
4. Disconnect the RH HO2S electrical connector and the harness retainer.



5. Remove the starter motor assembly.
Refer to: [Starter Motor](#) (303-06C Starting System - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
6. Remove the rear driveshaft assembly.
Refer to: [Rear Driveshaft](#) (205-01 Driveshaft, Removal and Installation).
7. Remove the front driveshaft assembly.
Refer to: [Front Driveshaft](#) (205-01 Driveshaft, Removal and Installation).
8. Remove the retainers and heatshield.



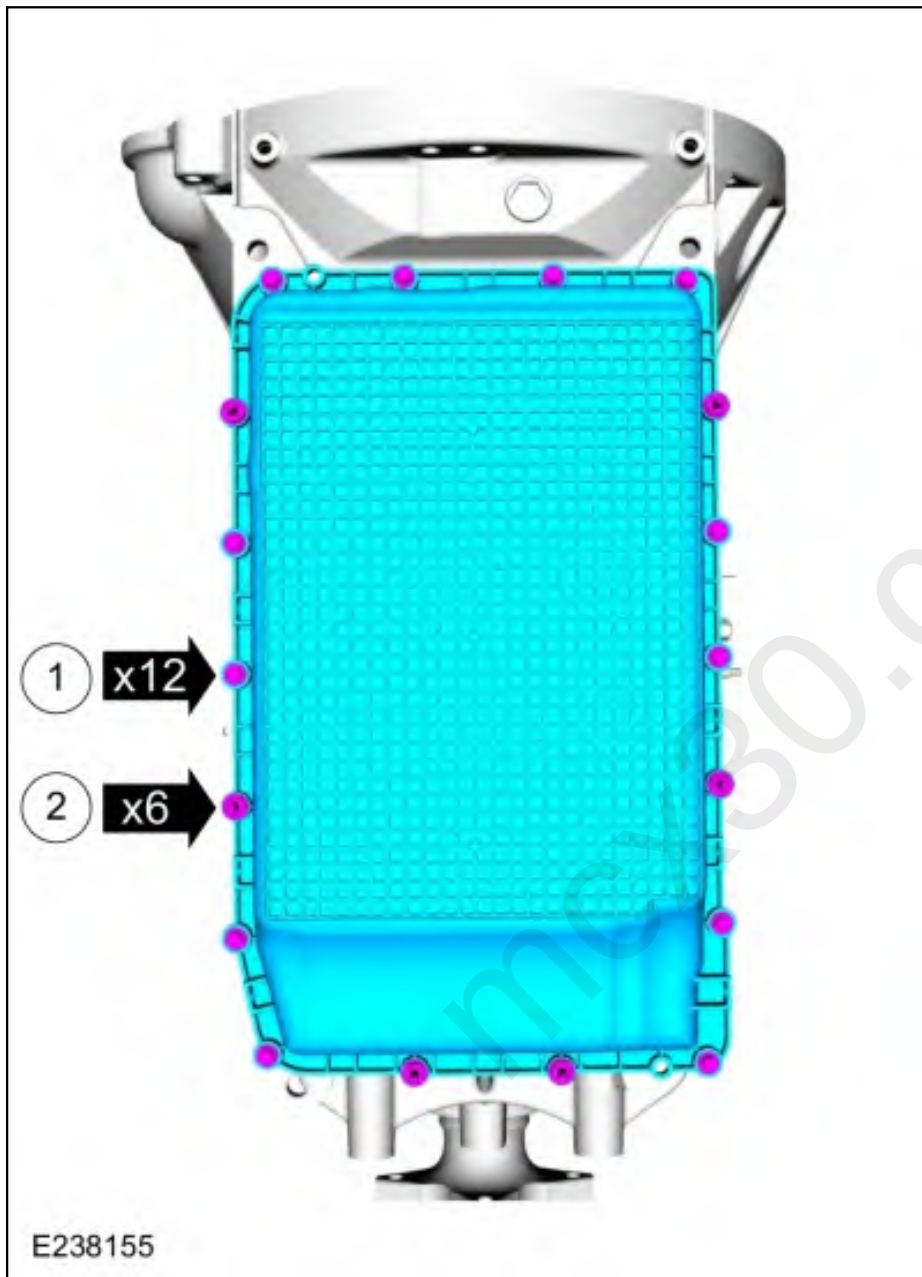
9. Remove the retainers and position aside the NVH cover.



10. **NOTE:** *If transmission disassembly or installation of a new transmission is necessary, drain the transmission fluid.*

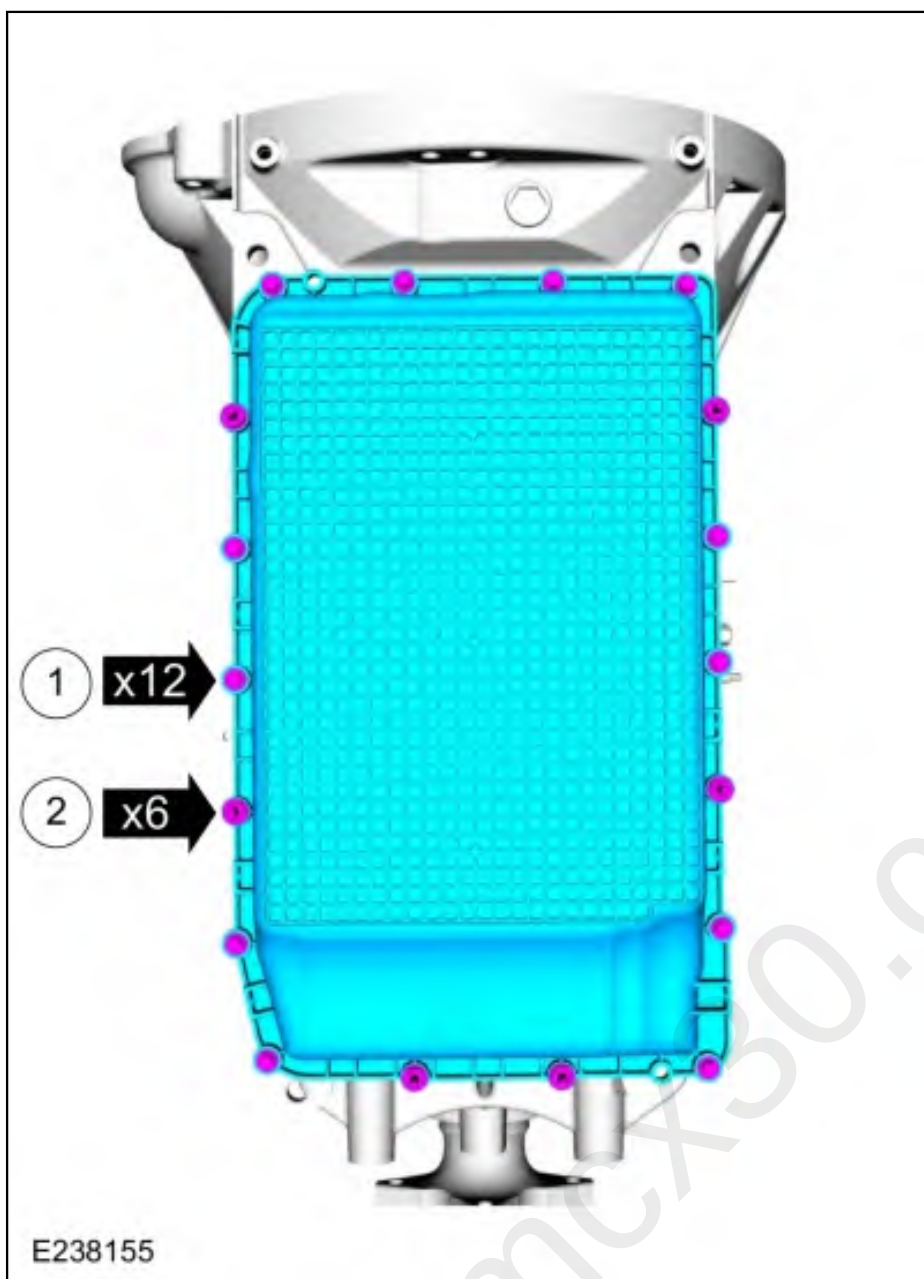
NOTE: *Note the location of the bolts and studbolts for assembly.*

Remove the bolts and the transmission fluid pan.



11. **NOTE:** *It is not necessary to torque transmission fluid pan bolts at this time.*

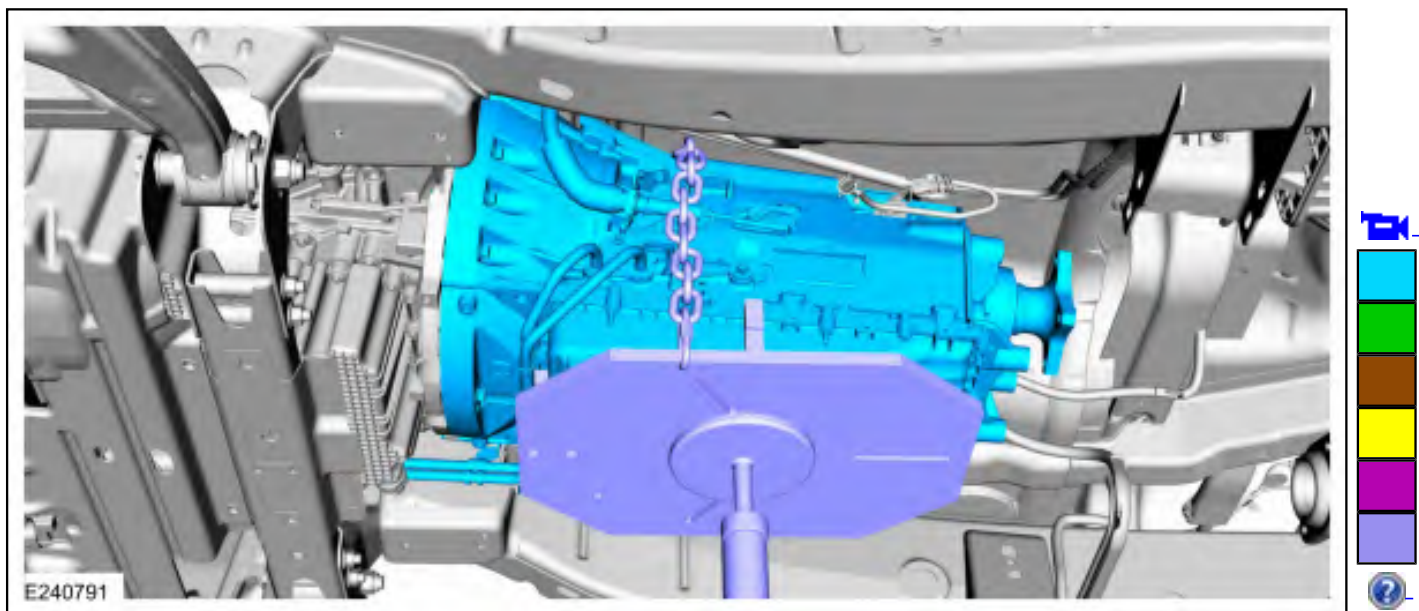
Install the transmission fluid pan and the bolts.



12. **NOTICE:** Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

Using a high-lift transmission jack, support the transmission.
Use the General Equipment: Transmission Jack



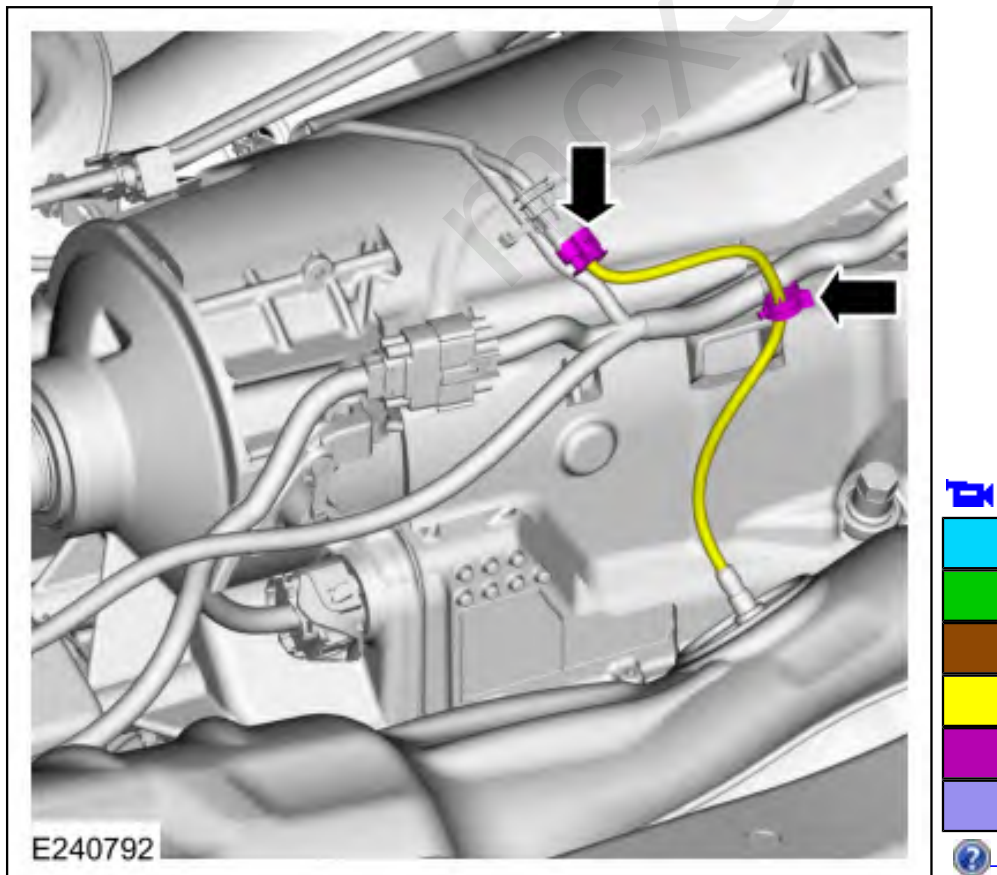
13. Remove the LH catalytic converter.

Refer to: [Catalytic Converter LH - Raptor](#) (309-00C Exhaust System - 3.5L EcoBoost (272kW/370PS), Removal and Installation).

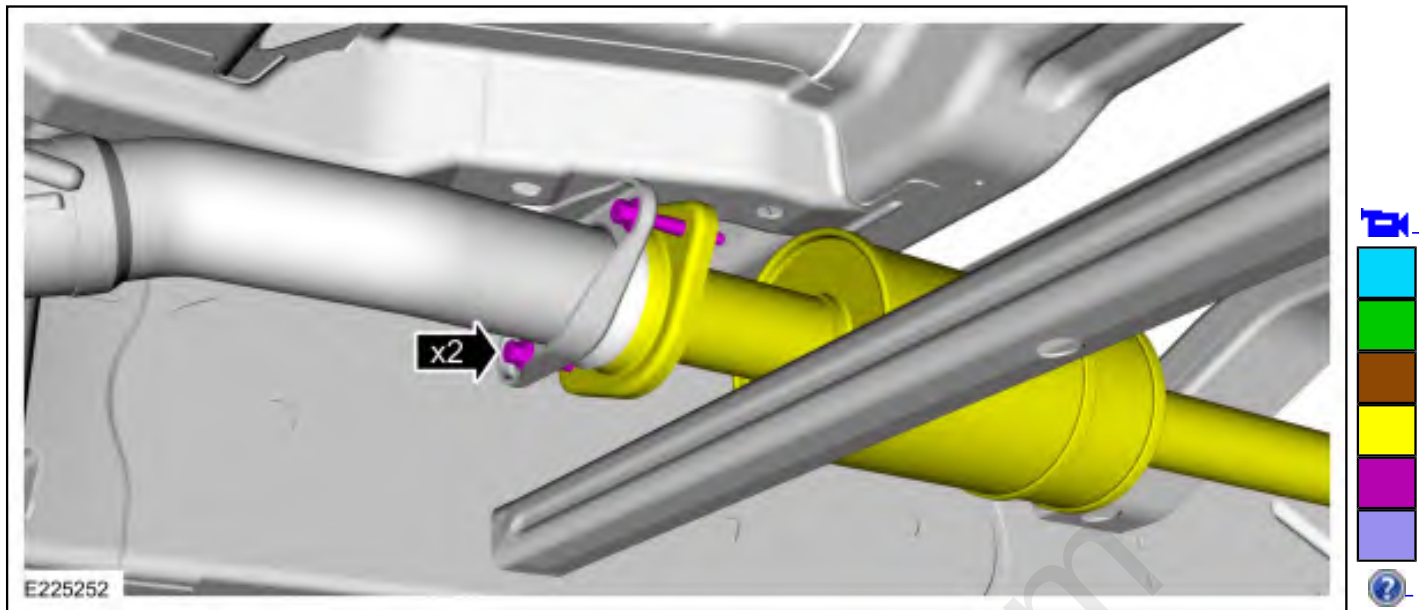
14. Remove the transmission support insulator.

Refer to: [Transmission Support Insulator](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

15. Disconnect the catalyst monitor sensor electrical connector.

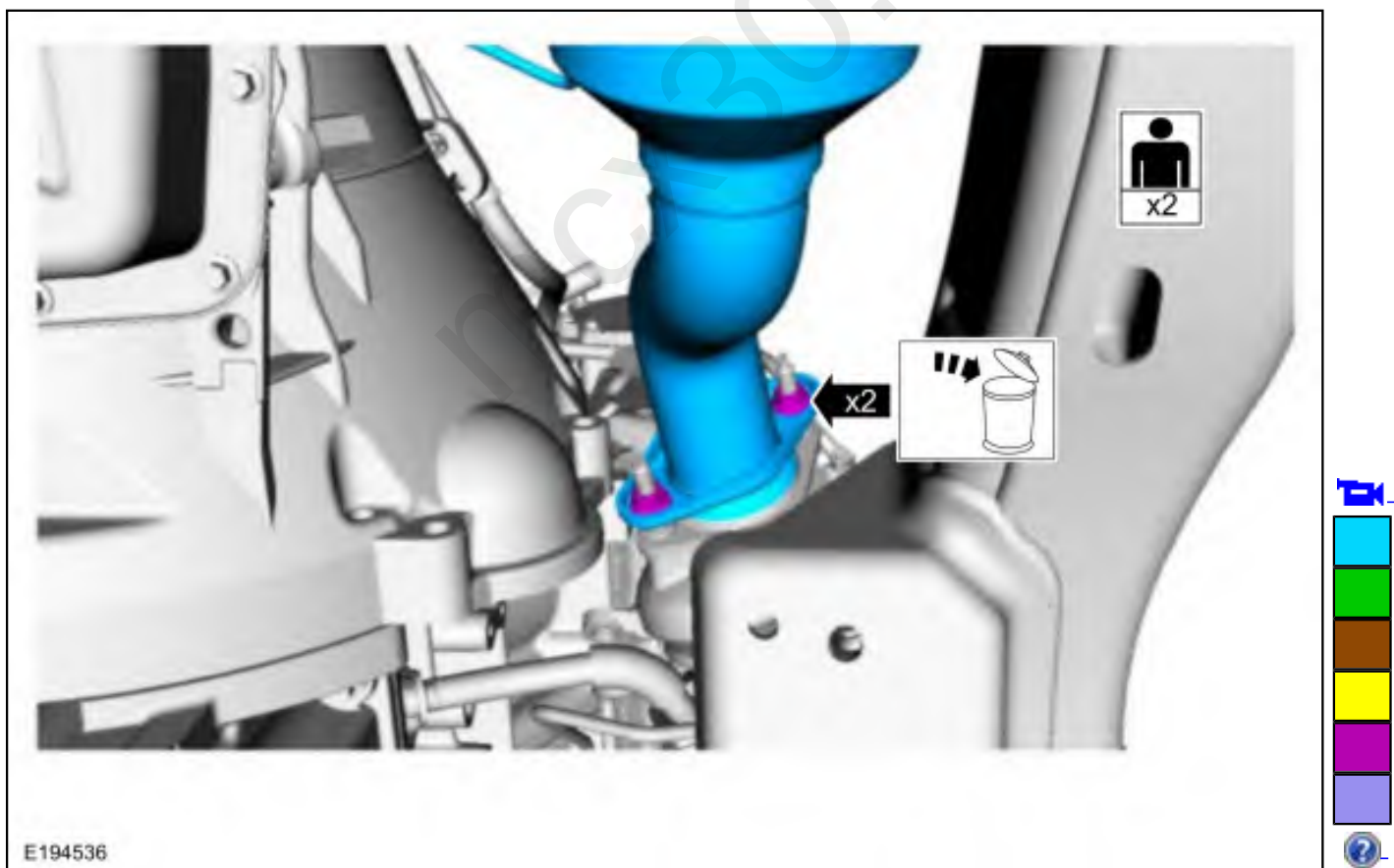


16. Remove the bolts from the catalytic converter flange to the muffler inlet pipe.

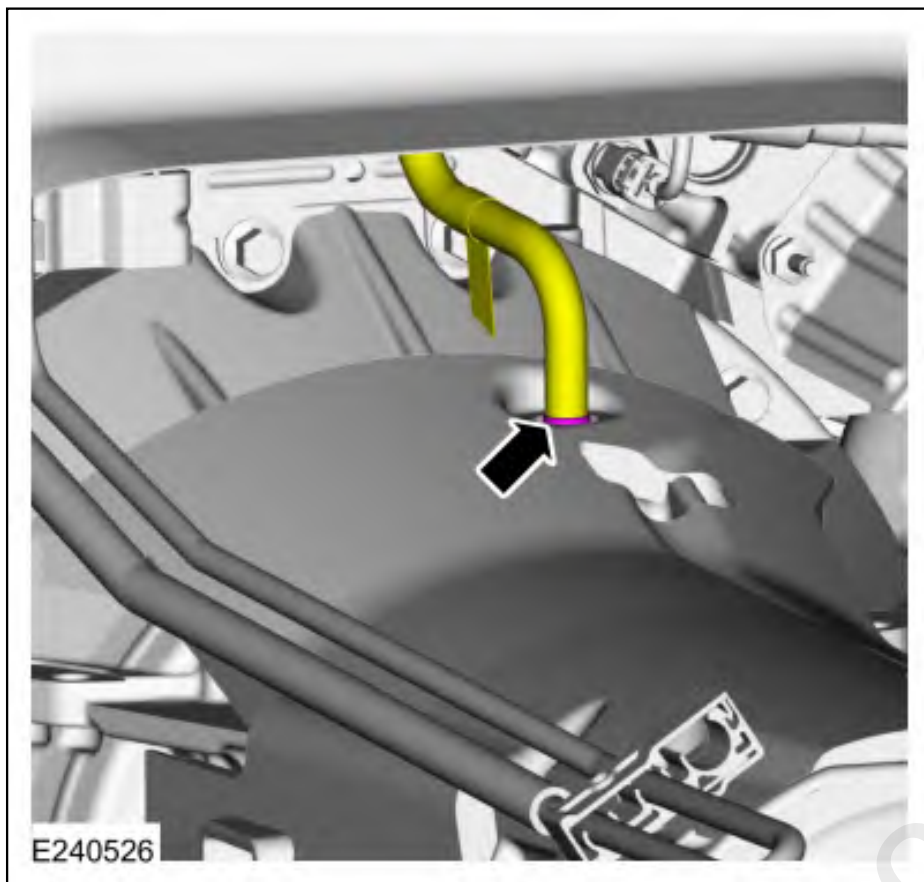


17. **NOTE:** Clean all exhaust connections before reassembly.

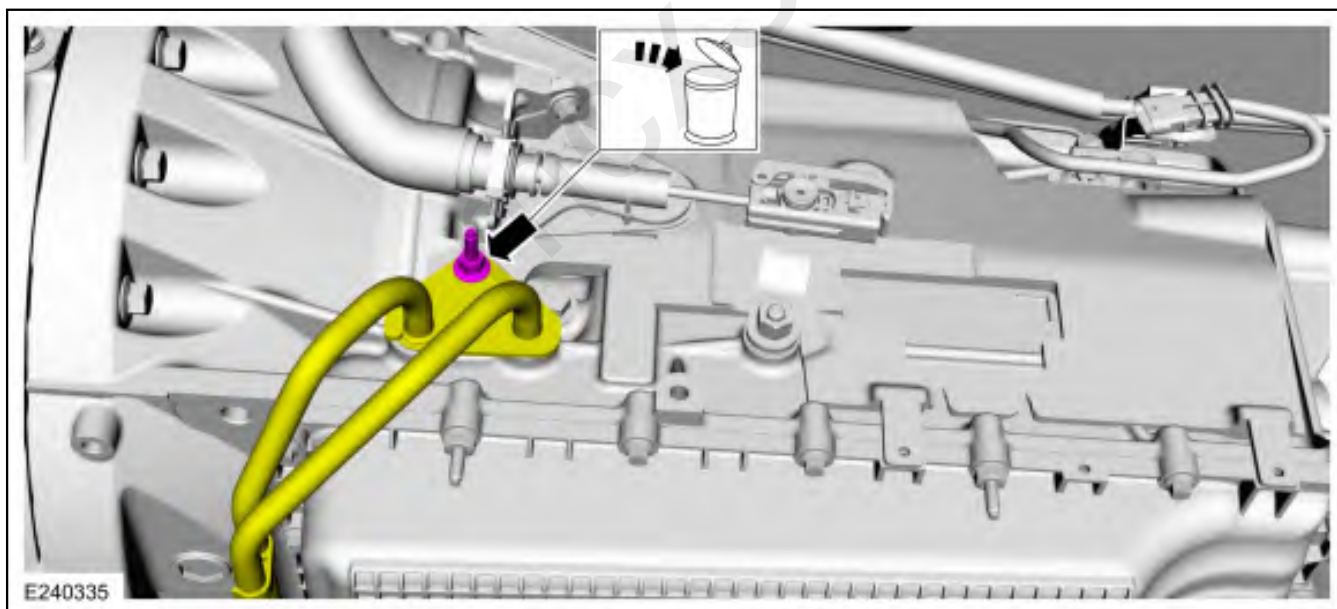
Remove and discard the catalytic converter nuts and remove the catalytic converter. Discard the gasket.



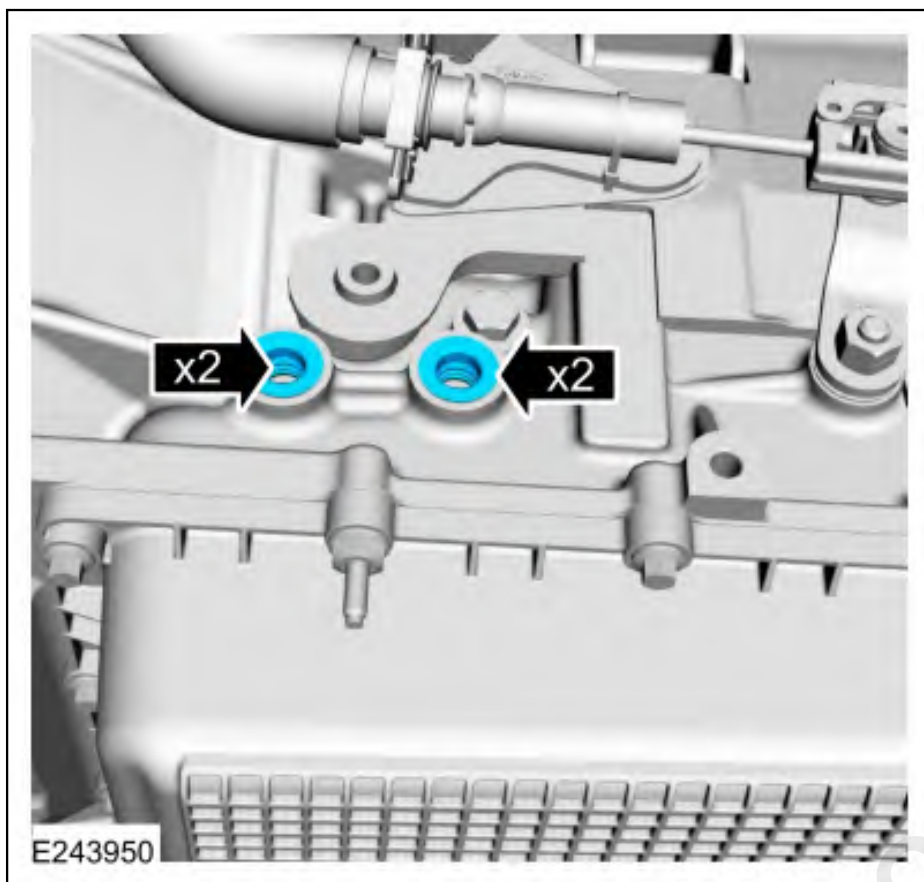
18. Disconnect the transmission vent tube.



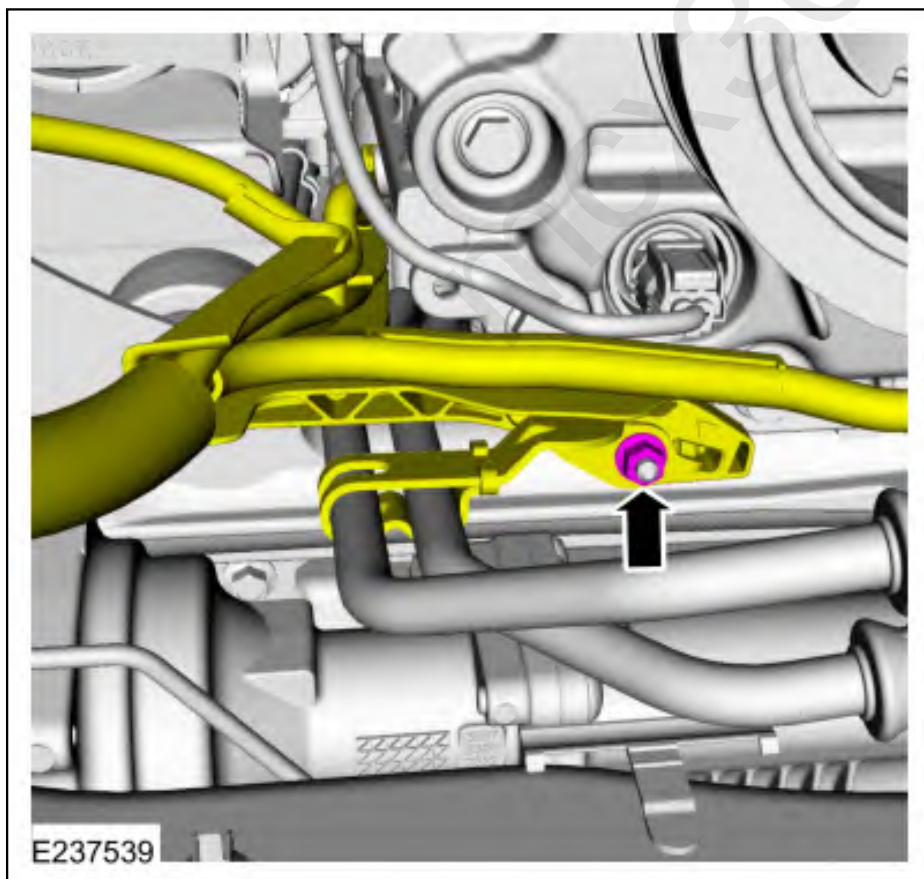
19. Remove and discard the transmission fluid cooler tube bracket studbolt and position aside the transmission fluid cooler tubes.



20. Inspect the transmission to be sure the transmission fluid tube seals and backing rings were removed with the transmission fluid tubes and are not stuck in the transmission. If the transmission fluid tube seals or backing rings are stuck in the transmission, remove the seals and backing rings.

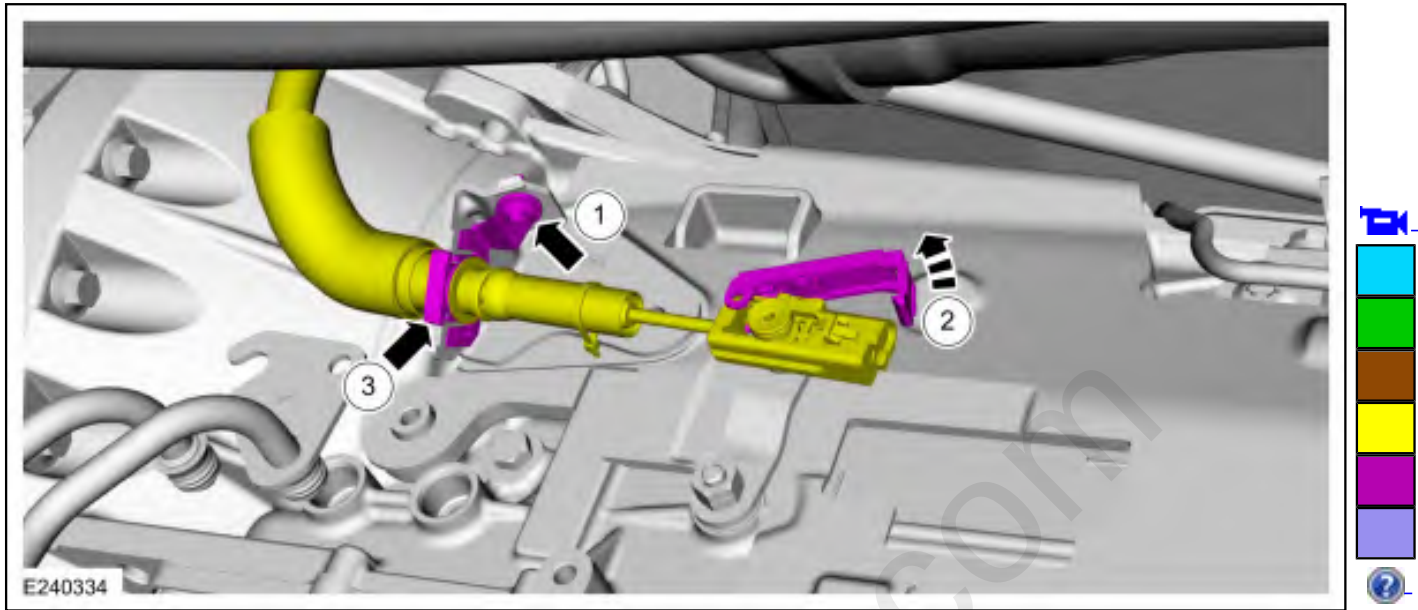


21. Remove the nut and position the transmission cooler tube bracket and wiring harness aside.

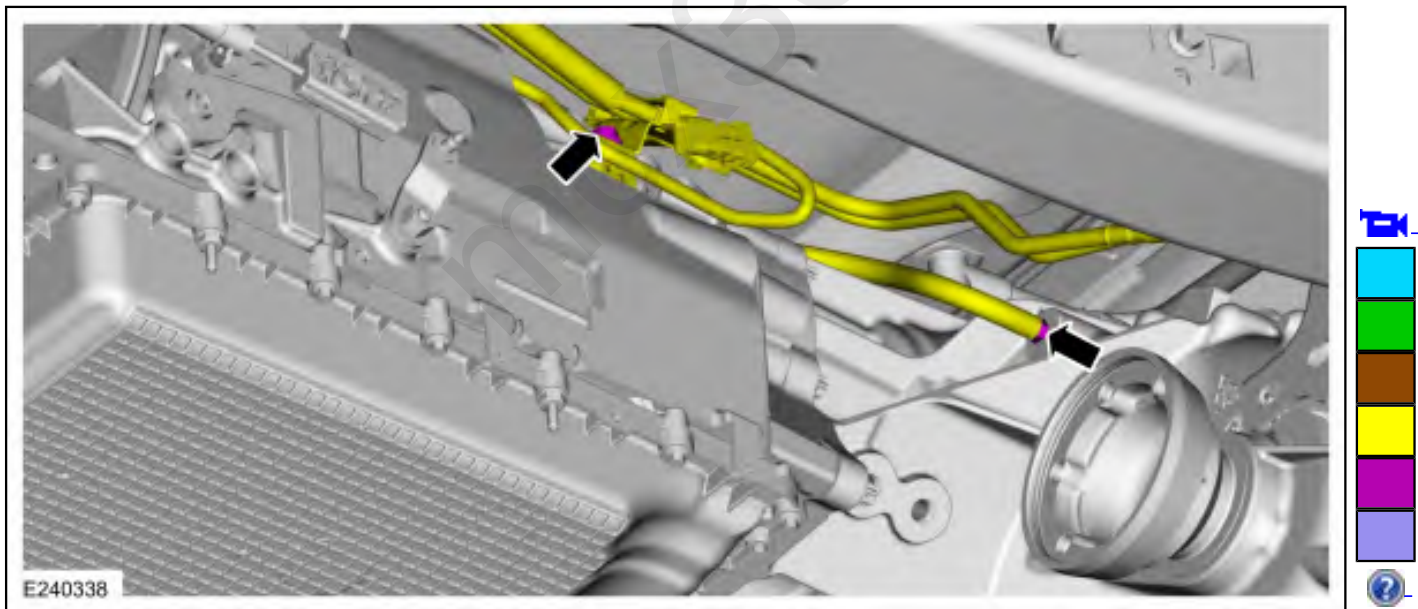


22. **NOTICE:** To prevent selector lever cable damage, do not apply force to the selector lever cable between the manual control lever and the selector lever cable bracket.

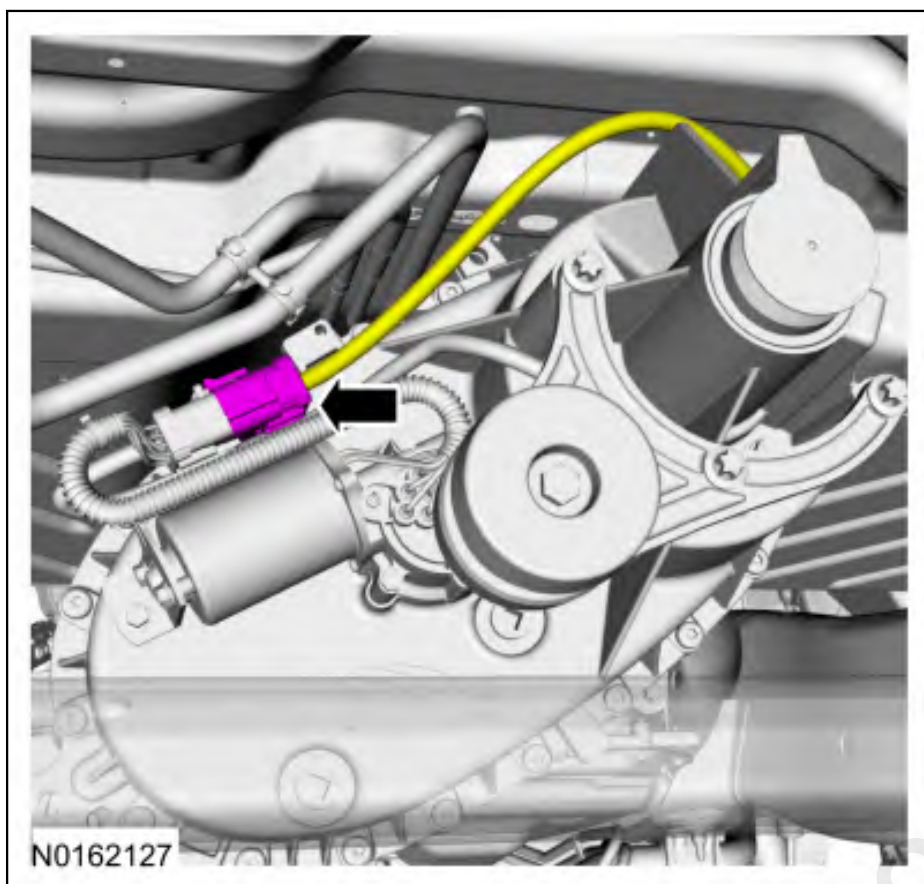
1. Remove the selector lever cable bolt.
2. Move the locking tab up and disconnect the selector lever cable end from the manual control lever.
3. Disconnect the selector lever cable from the bracket and position aside.



23. Remove the fuel line bracket bolt and disconnect the transfer case vent tube.

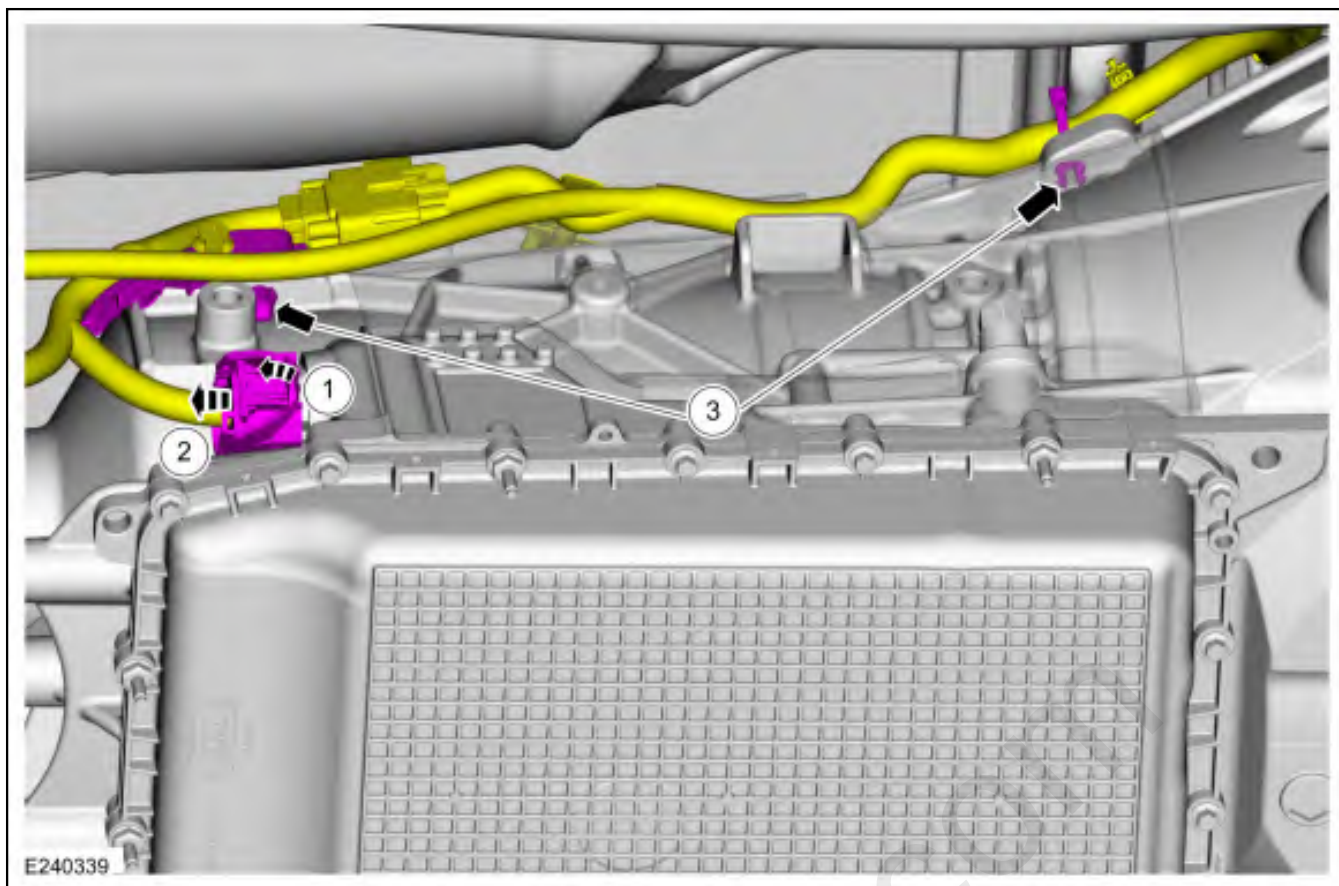


24. Disconnect the transfer case electrical connector.

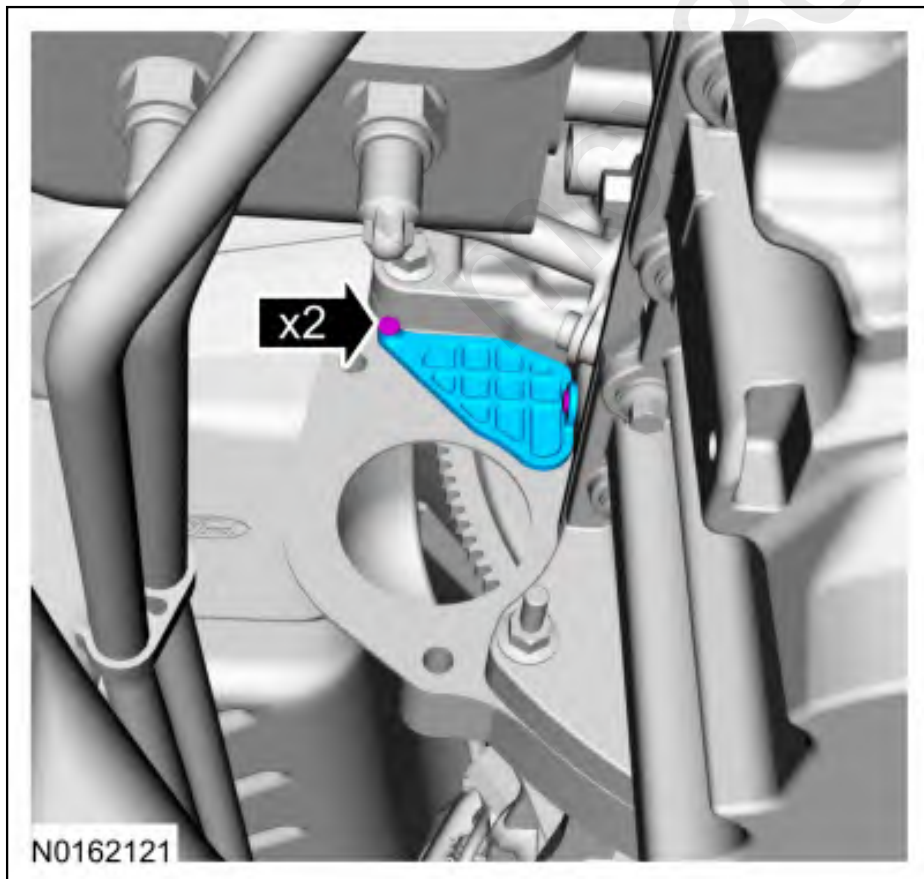


25. **NOTICE: Do not pull on the wire harness to disconnect the electrical connector or damage to the electrical connector will occur.**

1. Slide the lock tab up and disconnect the transmission electrical connector.
2. Pull the transmission electrical connector out to disconnect.
3. Detach the retainers from the transmission and position the wiring harness aside.

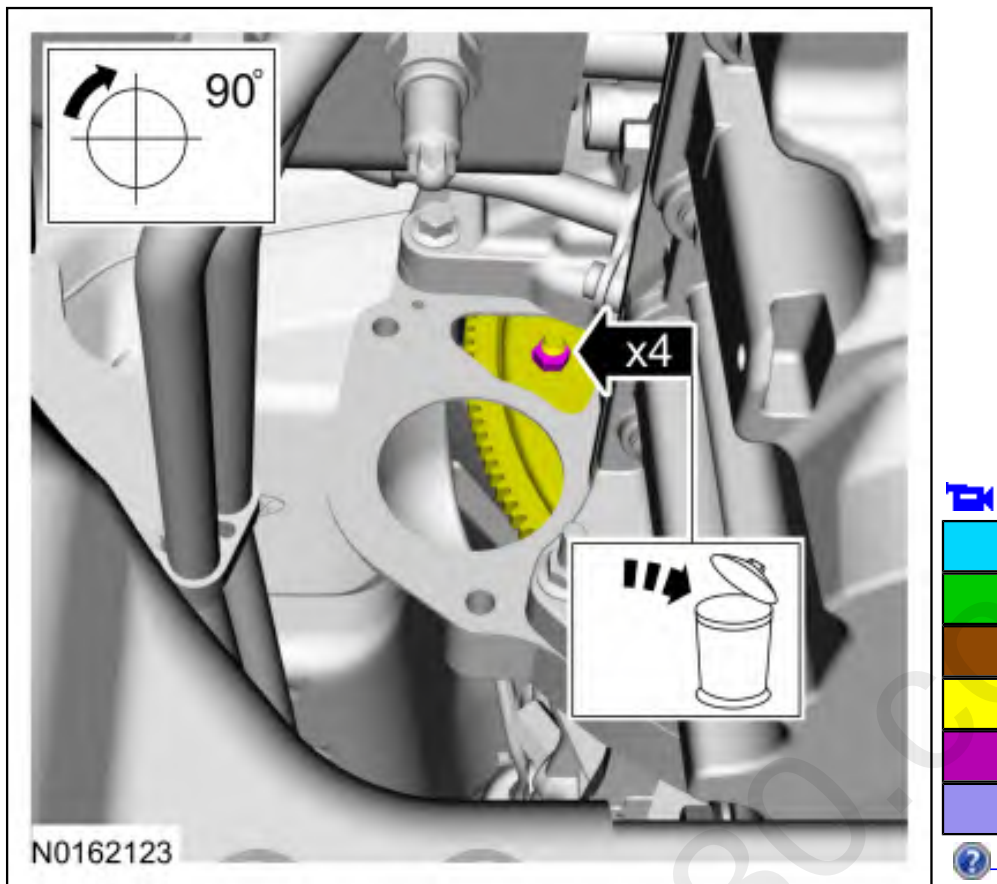


26. Remove the pin-type retainers and the access cover.

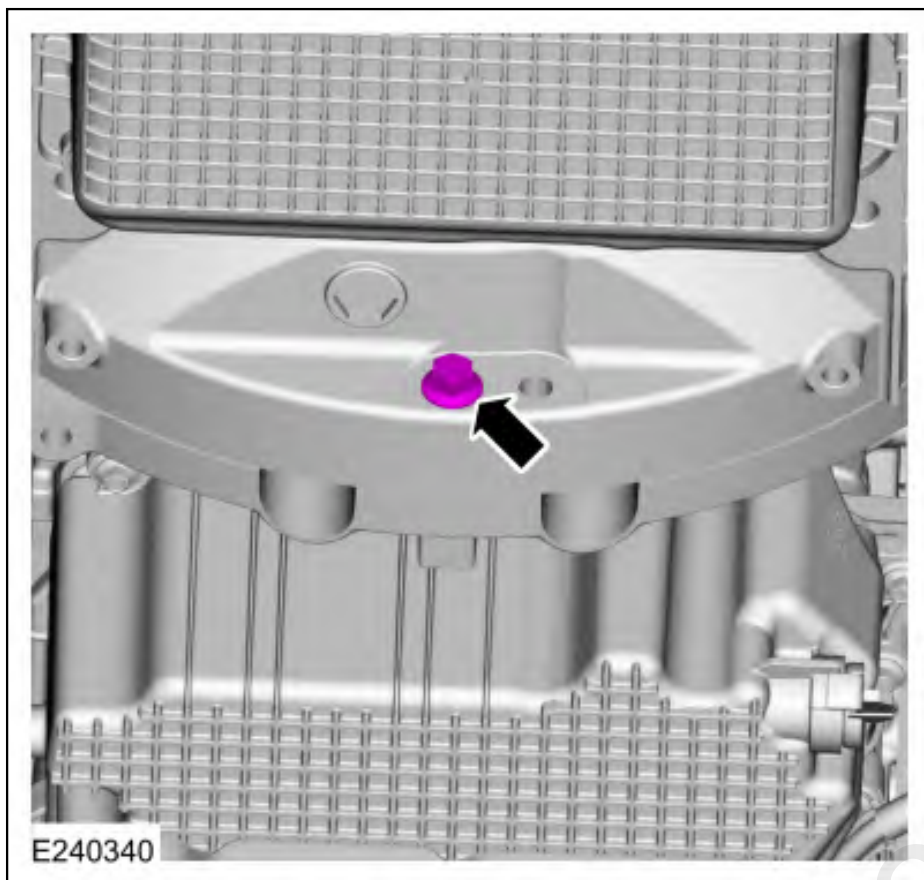


27. **NOTE:** Using the crankshaft pulley bolt, turn the engine clockwise.

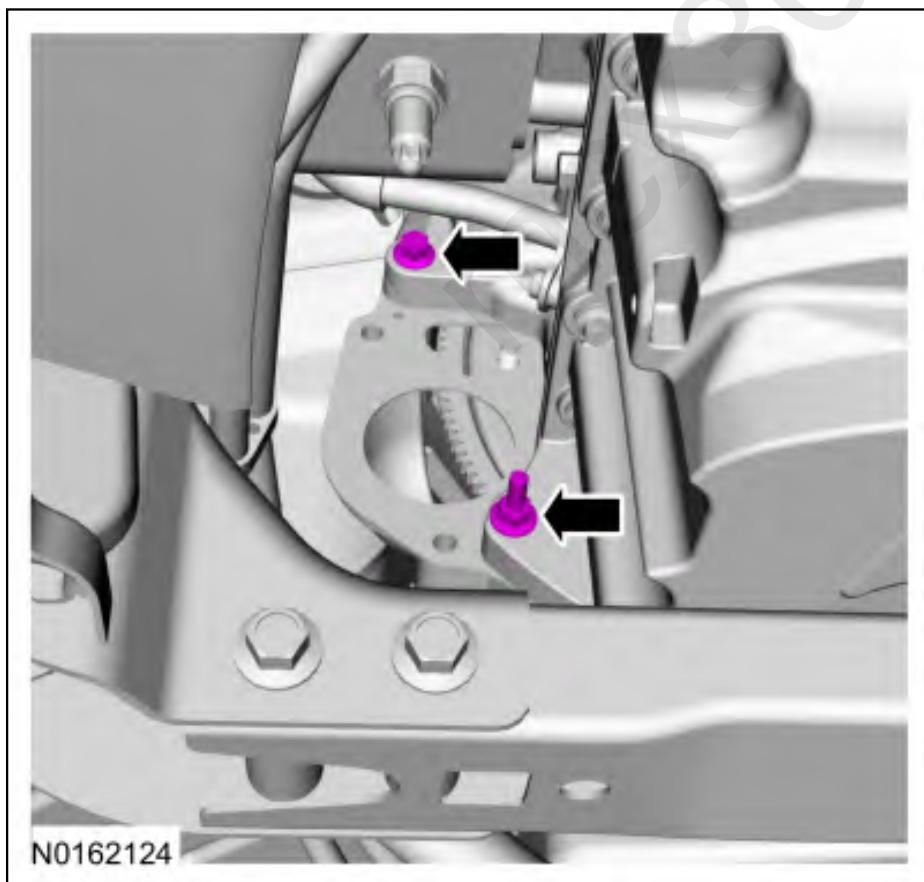
Remove and discard the torque converter nuts.



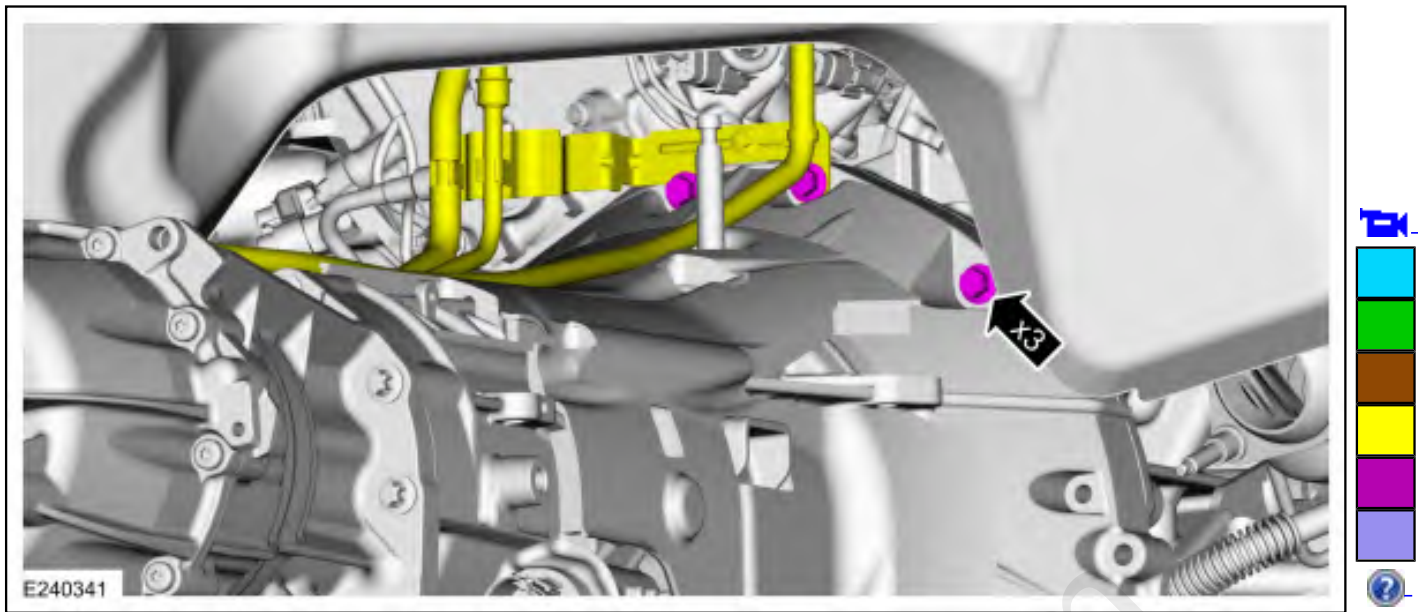
28. Remove the lower bellhousing bolt.



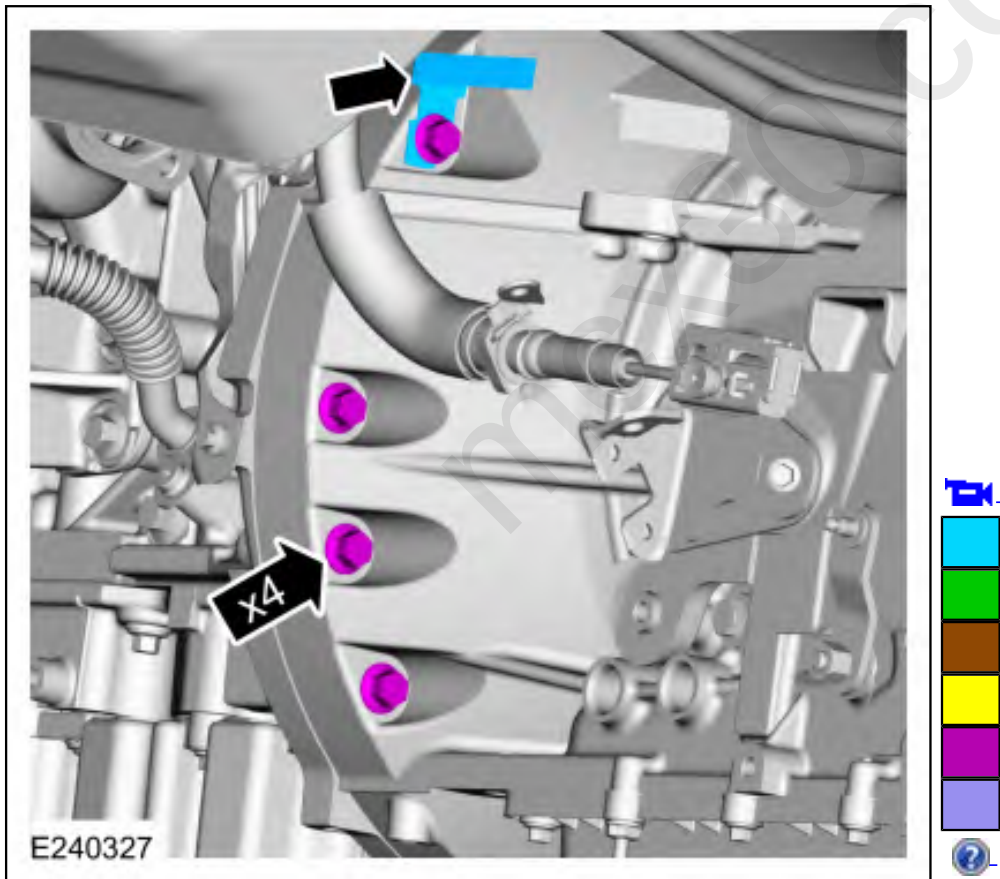
29. Remove the RH side bellhousing bolts.



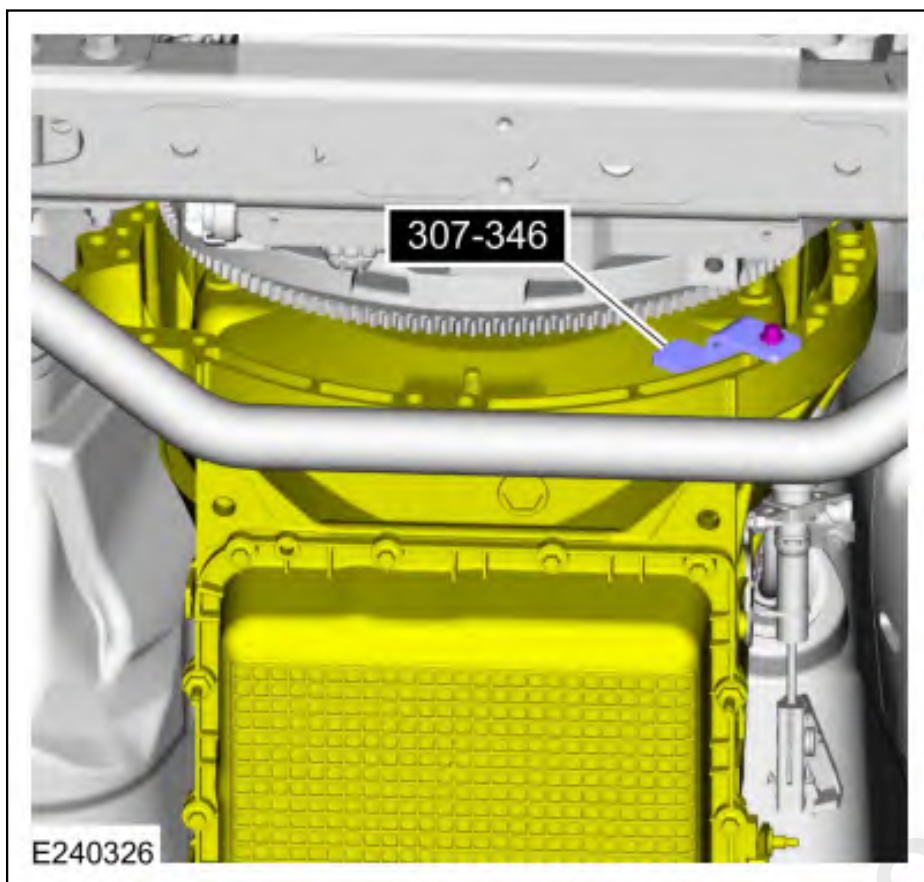
30. Remove the top bellhousing bolts and position aside the bracket.



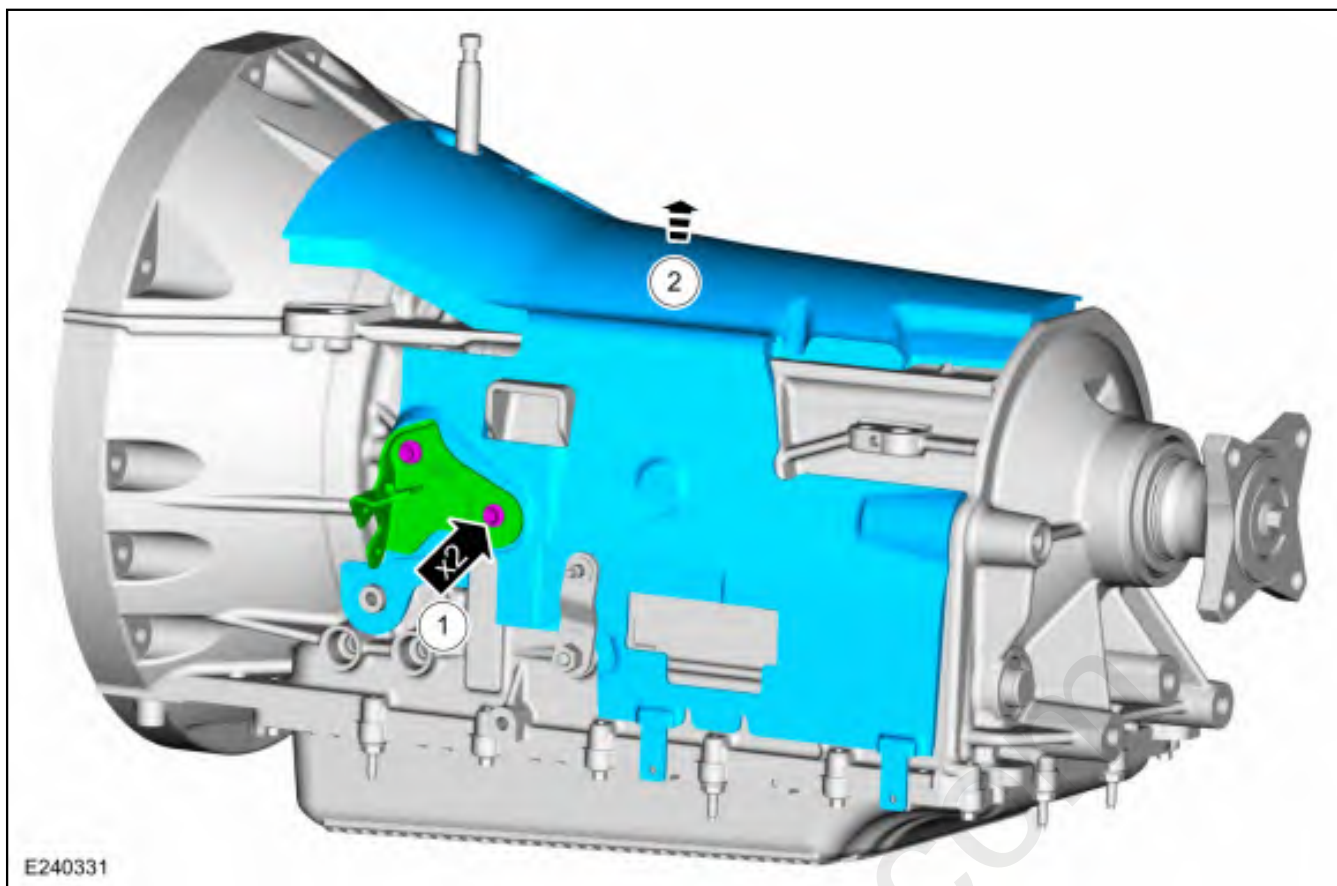
31. Remove the LH bellhousing bolts and the selector lever cable bracket.



32. Slide the transmission back enough to install the special tool.
Use Special Service Tool: 307-346 (T97T-7902-A) Retainer, Torque Converter.



1. Make sure the transmission is securely fastened to the transmission jack.
2. Slide the transmission towards the rear of the vehicle.
3. Tilt the front of the transmission down.
4. Remove the transmission from the vehicle.



36. **NOTICE:** Failure to clean the transmission fluid cooler tubes can result in transmission failure.

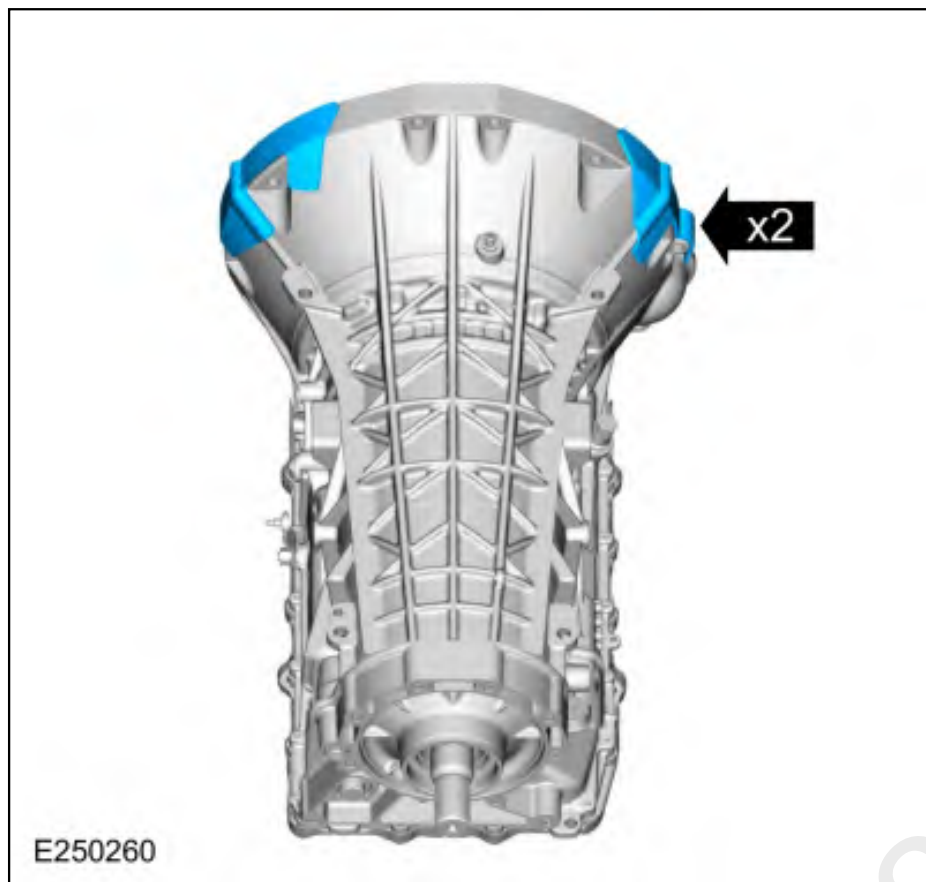
If the transmission is to be overhauled or if installing a new or re-manufactured transmission, carry out the transmission fluid cooler backflushing and cleaning procedure.

Refer to: [Transmission Fluid Cooler - Backflushing and Cleaning - 3.3L Duratec - V6, Raptor](#) (307-02 Transmission Cooling, General Procedures).

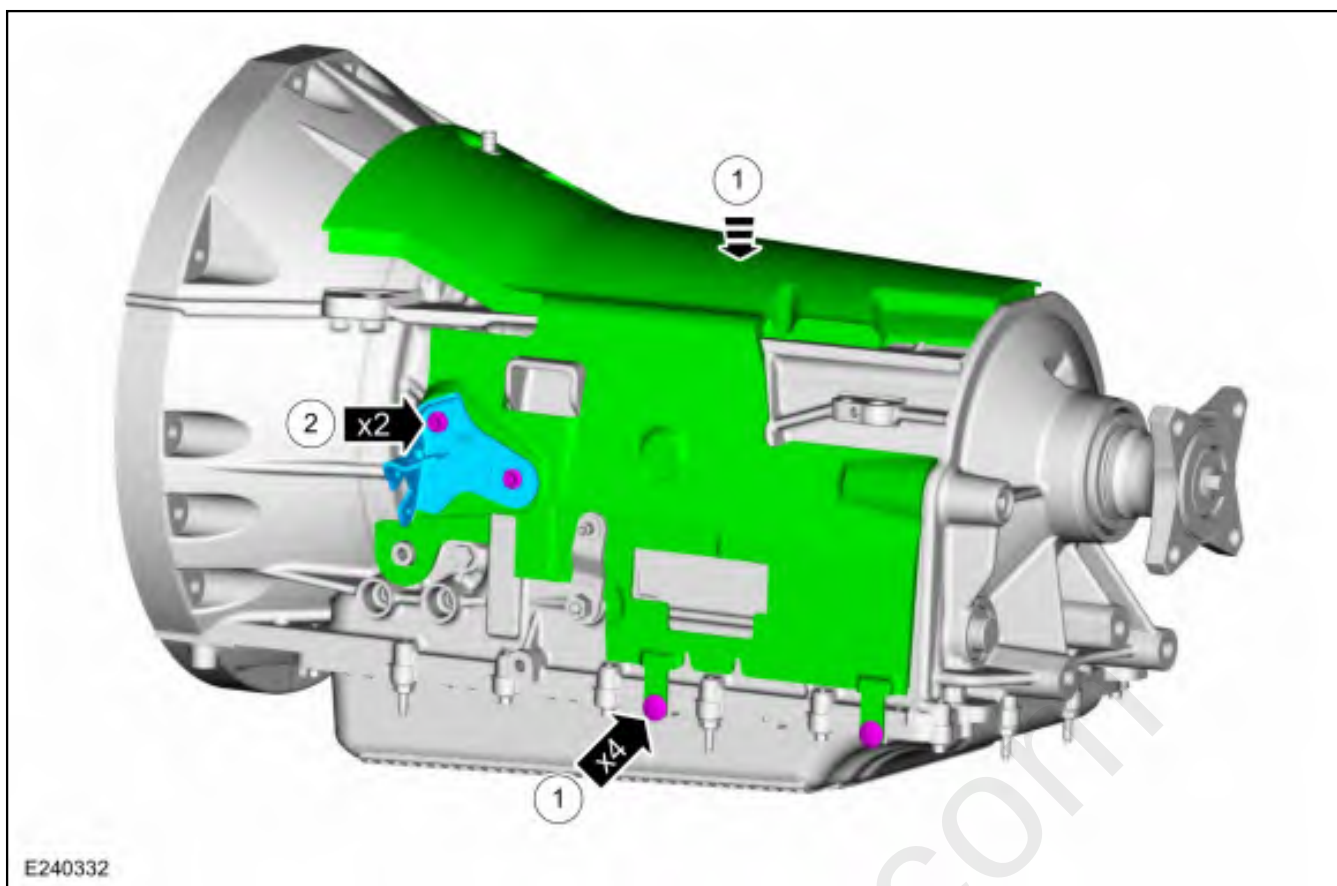
Installation

NOTE: Prior to installing a new transmission or an overhauled transmission with a new main control, record the solenoid strategy identification tag. If a new main control was installed, install the replacement solenoid body tag over the original identification tag.

1. If installing a new or re-manufactured transmission, install the new stick on heat shields to the bellhousing.



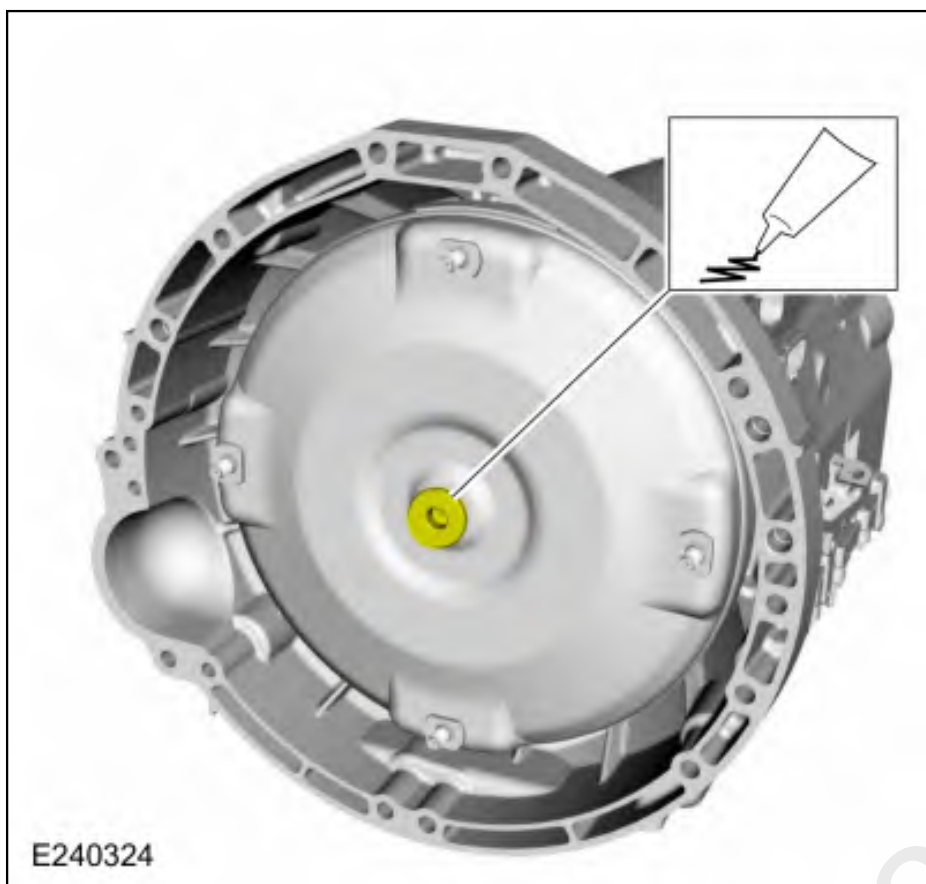
1. If removed, install the NVH cover and push pins.
 2. Install the new bolts and the shift cable bracket.
- Torque: 22 lb.ft (30 Nm)*



3. **NOTICE:** Prior to installation of the transmission, lubricate the torque converter pilot hub or damage to the torque converter or the engine crankshaft can occur.

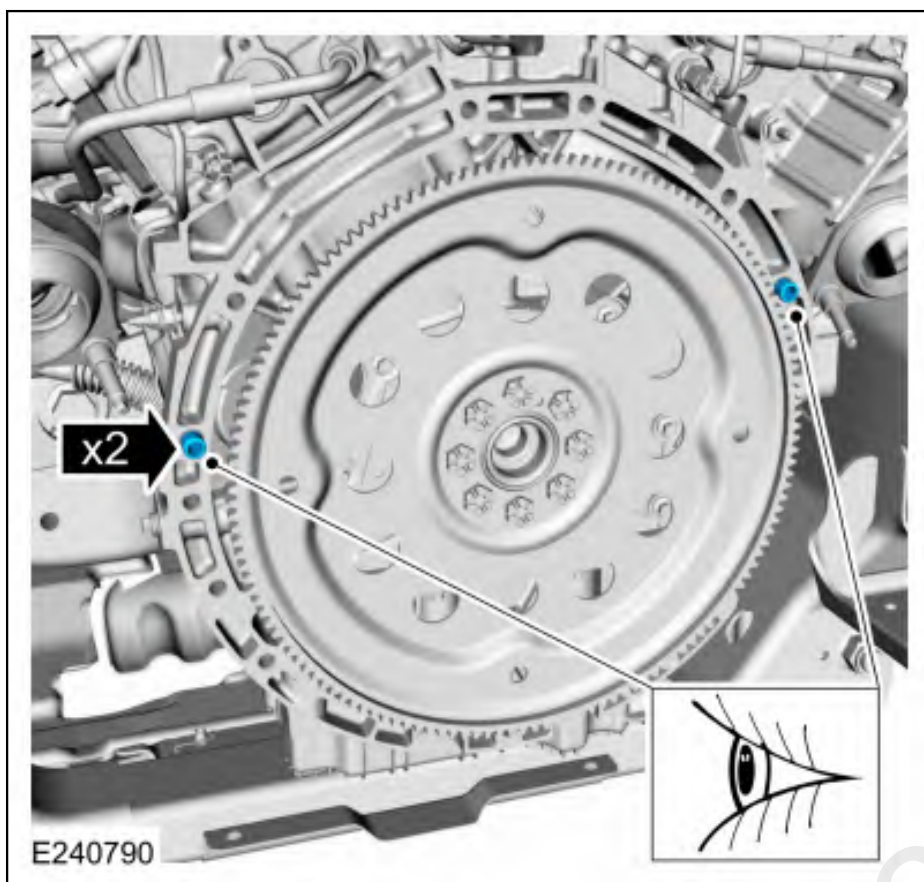
Lubricate the torque converter pilot hub with multi-purpose grease.

Material: Motorcraft® Multi-Purpose Grease Spray / XL-5-A (ESB-M1C93-B)

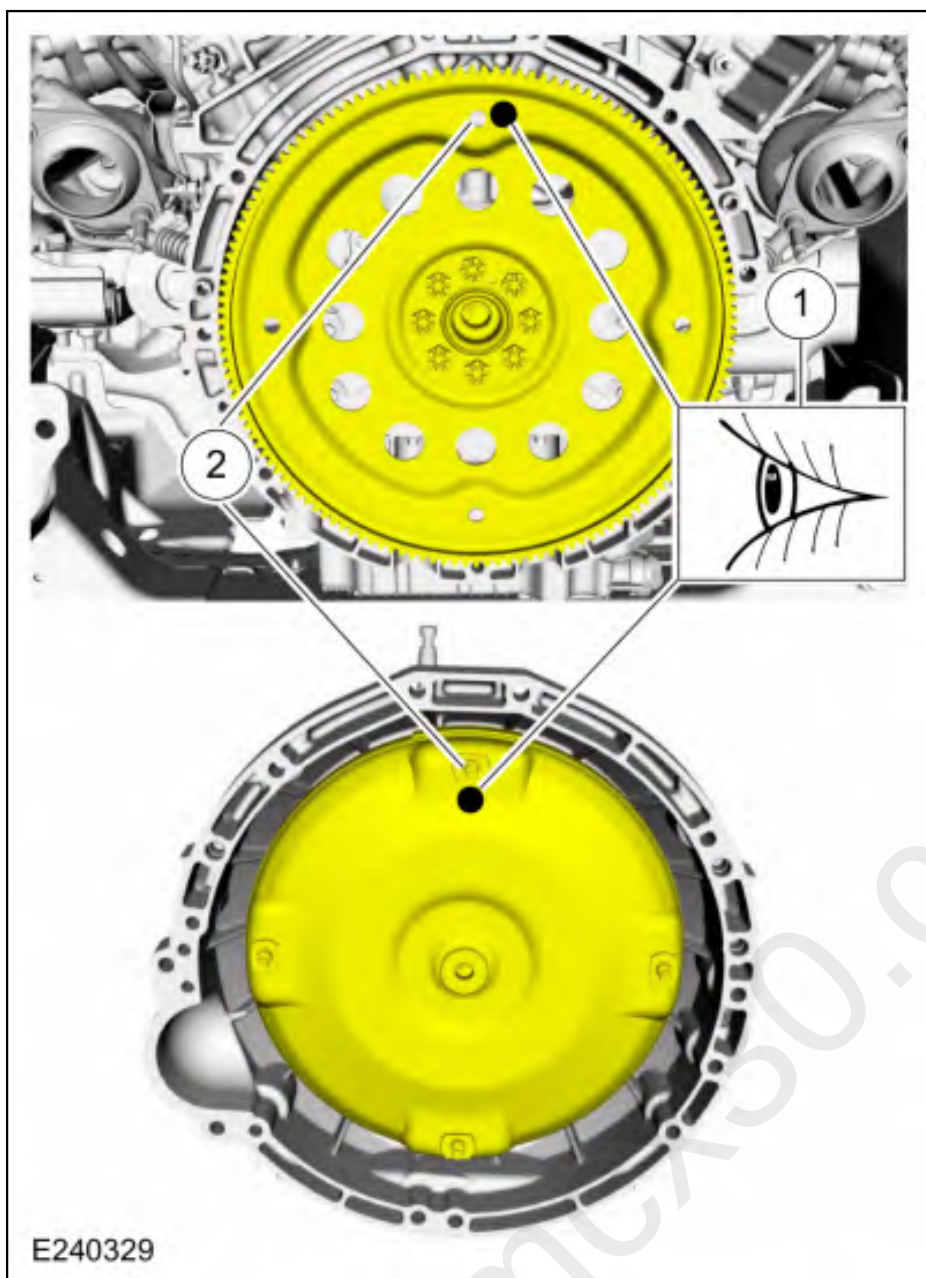


4. **NOTICE:** If the transmission is not positioned on the dowel pins, damage to the transmission may occur.

If the dowel pins were pulled out of the engine block during removal, install new dowel pins in the engine block.

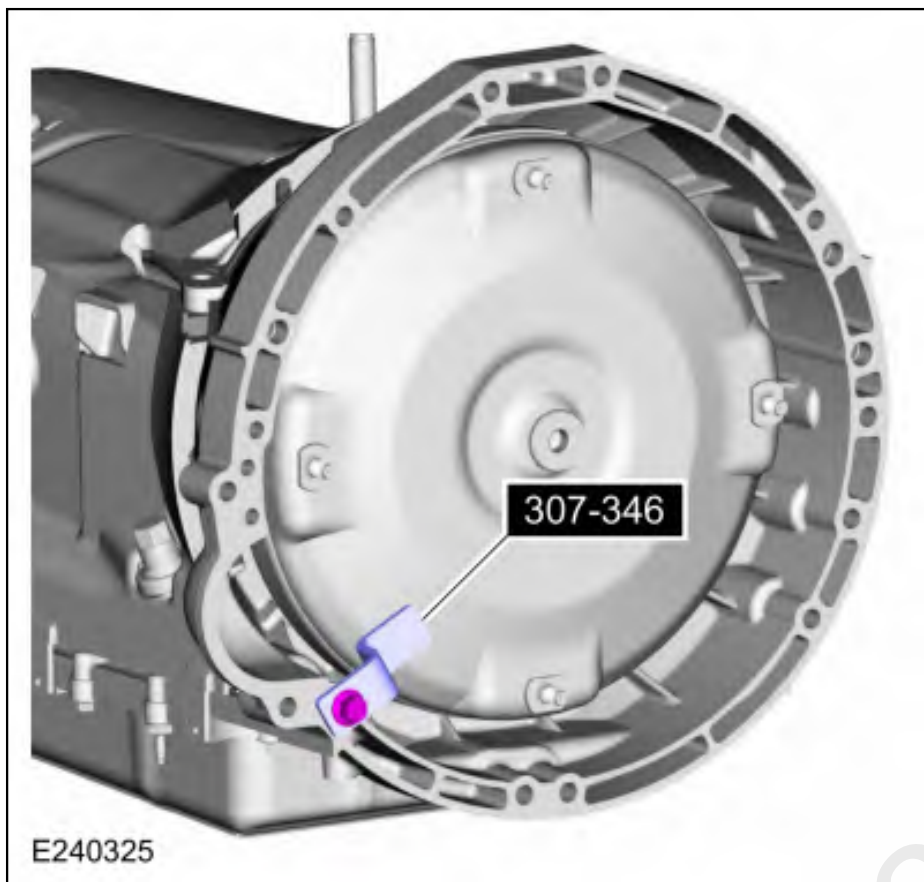


1. Inspect the torque converter stud and flexplate for paint marks.
2. Align the torque converter stud and flexplate hole near the paint marks to the 12 o'clock position.



6. Install the special tool.

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



7. **NOTE:** If transmission is being replaced, remove the transmission fluid fill plug and verify that the transmission is filled with transmission fluid.

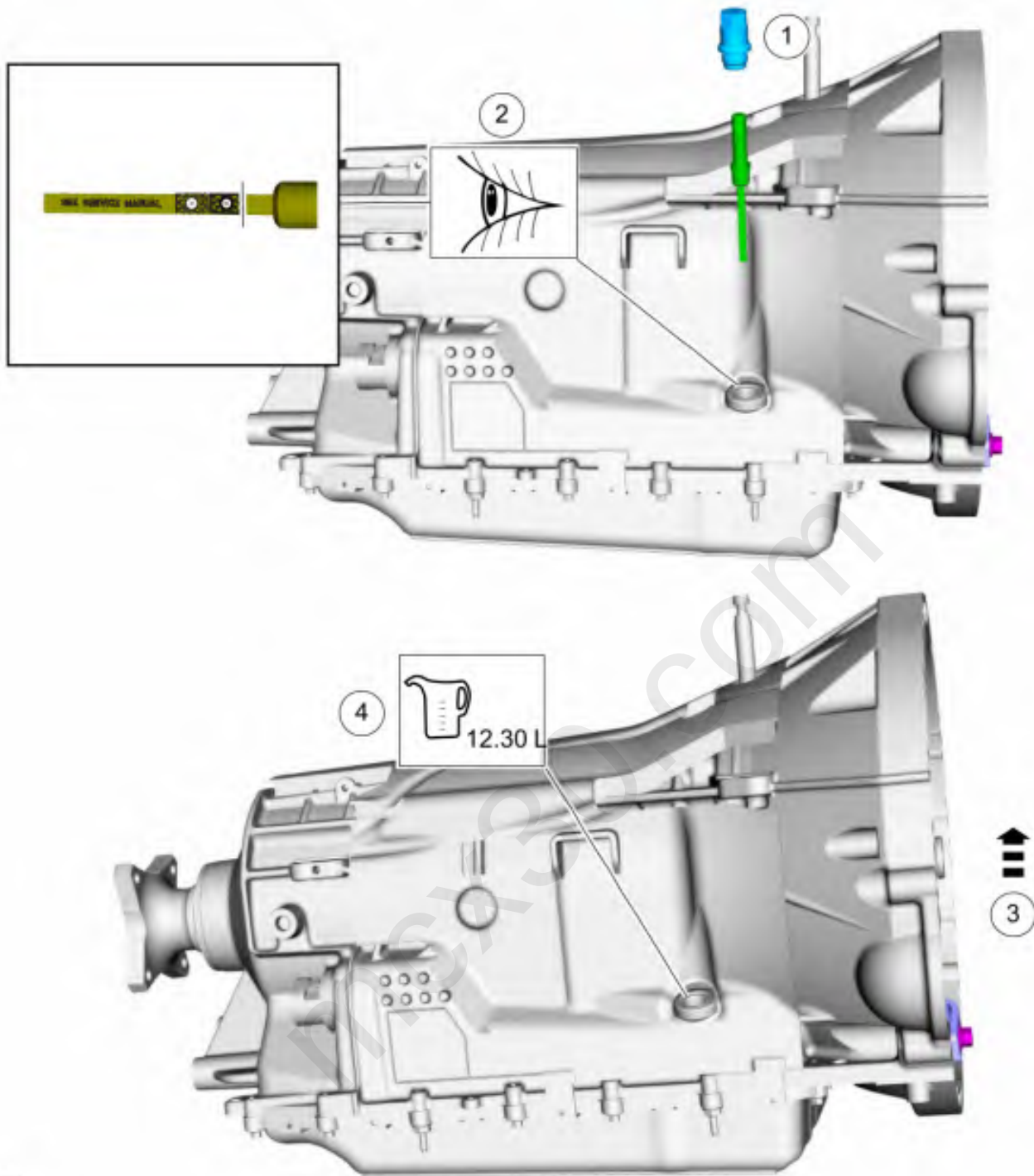
NOTE: If transmission was disassembled, add transmission fluid to the transmission.

NOTE: Rear Wheel Drive (RWD) shown, Four-Wheel Drive (4WD) similar.

1. Remove the transmission fluid fill plug transmission fluid level indicator assembly.
2. Verify transmission is filled with transmission fluid.
3. Slightly tilt the transmission rearward.
4. If the transmission was disassembled, add 12.30L (13 qt) of transmission fluid to the transmission through the transmission fluid fill hole.

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

- Loosely install the transmission fluid fill plug when finished.



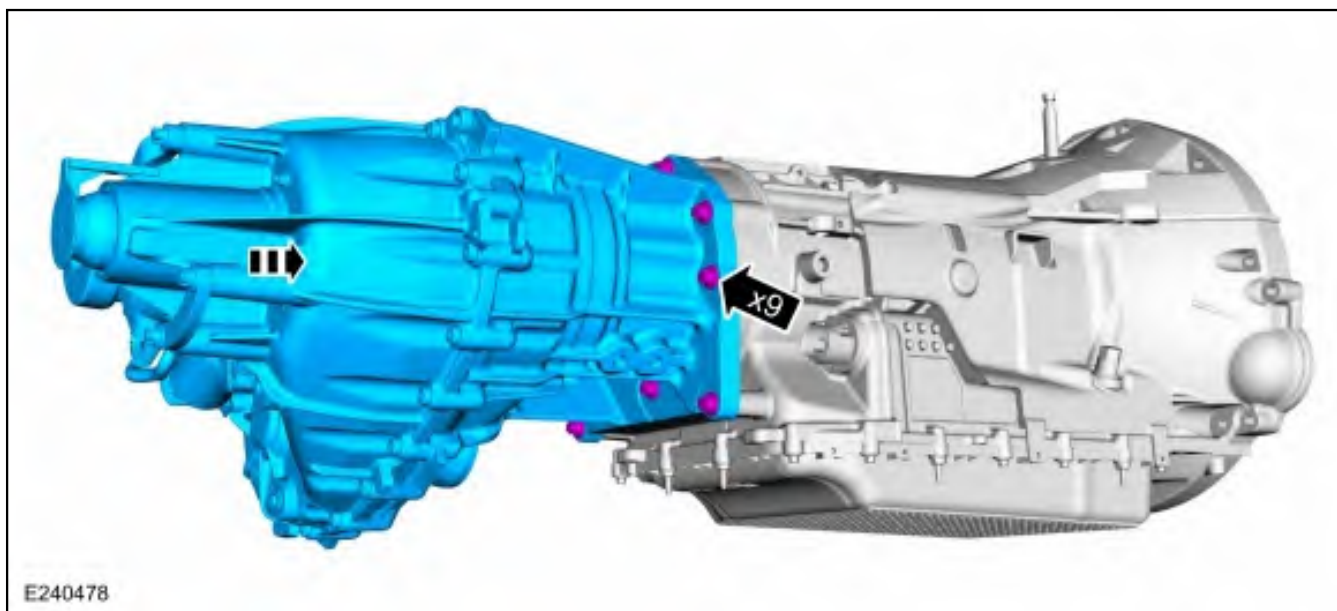
E240330

8.

If removed, install the transfer case and the new bolts.

- Tighten the bolts evenly in a star pattern.

Torque: 150 lb.in (17 Nm)

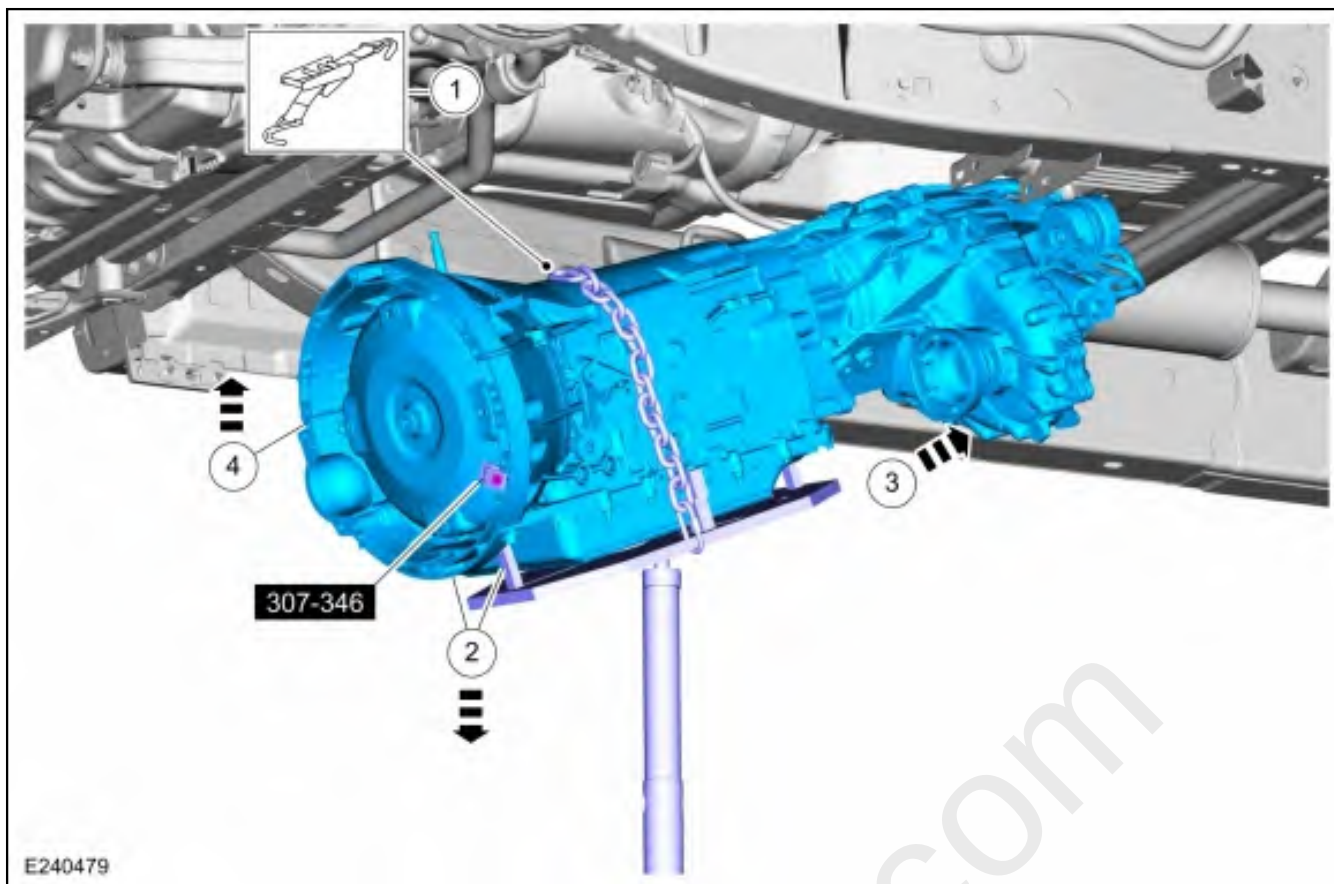


9. **NOTICE:** Secure the transmission to the transmission jack with a safety strap.

NOTE: Make sure the transmission jack makes contact on the outer ribs of the transmission fluid pan.

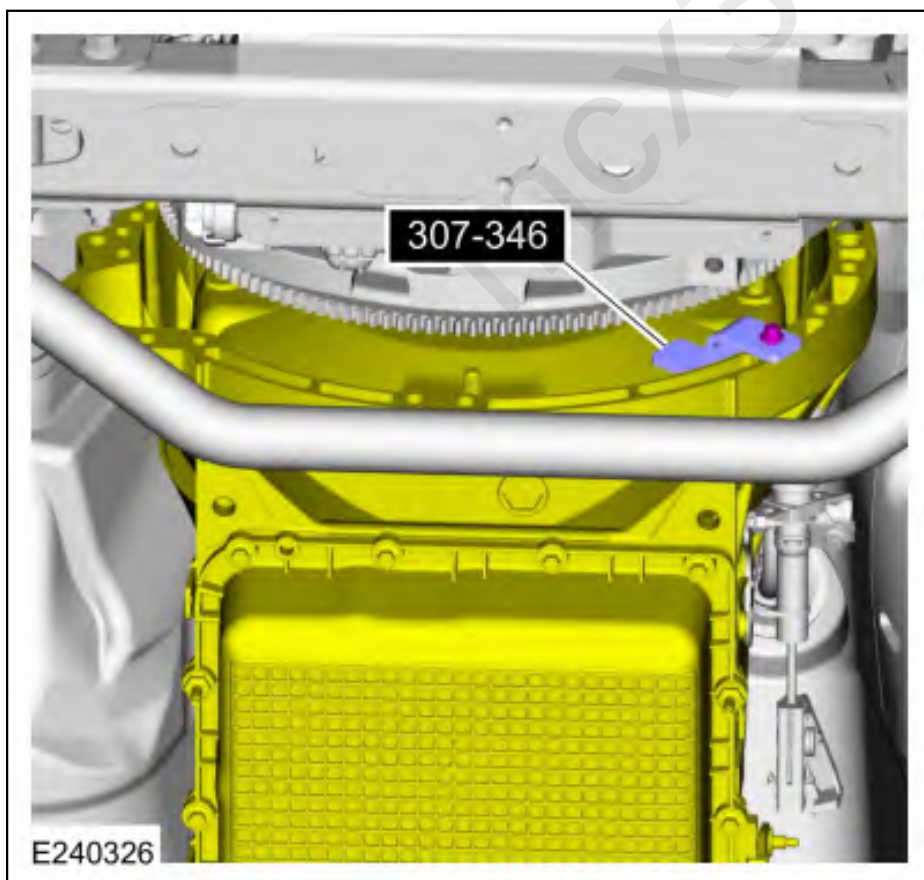
Using a high-lift transmission jack, support the transmission.

1. Make sure the transmission is securely fastened to the transmission jack.
Use the General Equipment: Transmission Jack
2. Tilt the front of the transmission down.
3. Slide the transmission towards the rear of the vehicle.
4. Raise the front of the transmission into a horizontal position.



10. Remove the special tool.

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

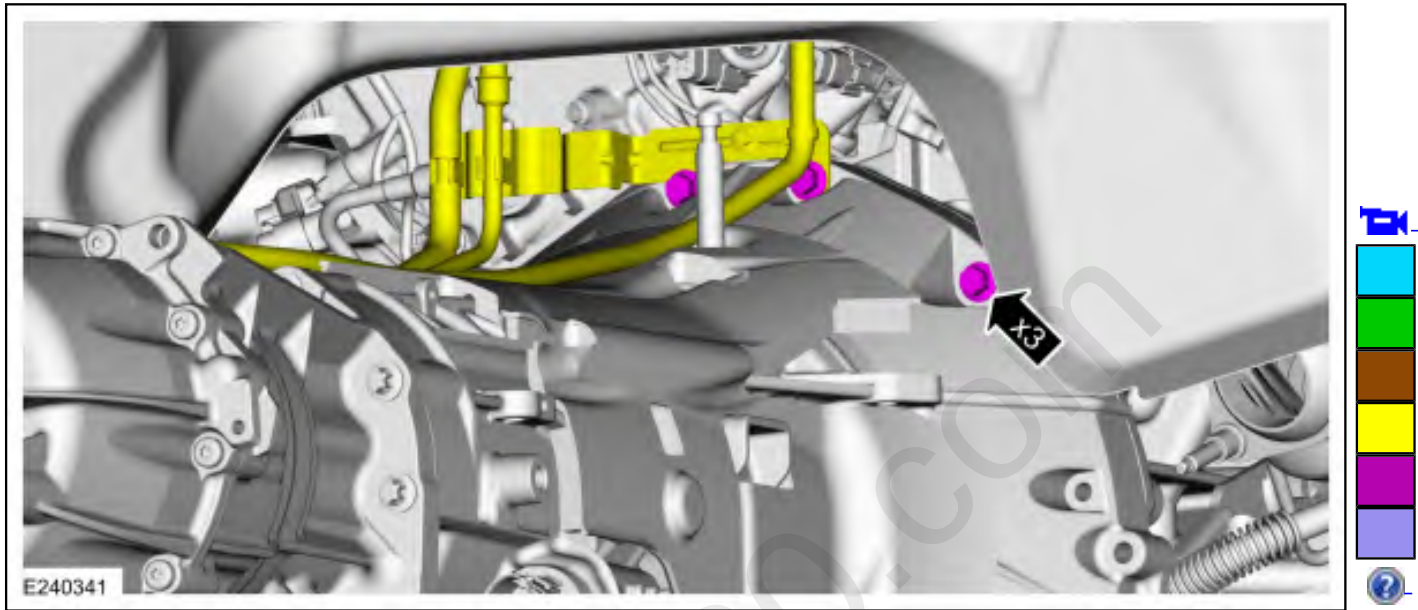


11. **NOTE:** Make sure the torque converter is fully seated in the transmission before aligning the transmission to the engine.

NOTE: With the transmission in a horizontal position, move it toward the engine and position it on the dowel pins.

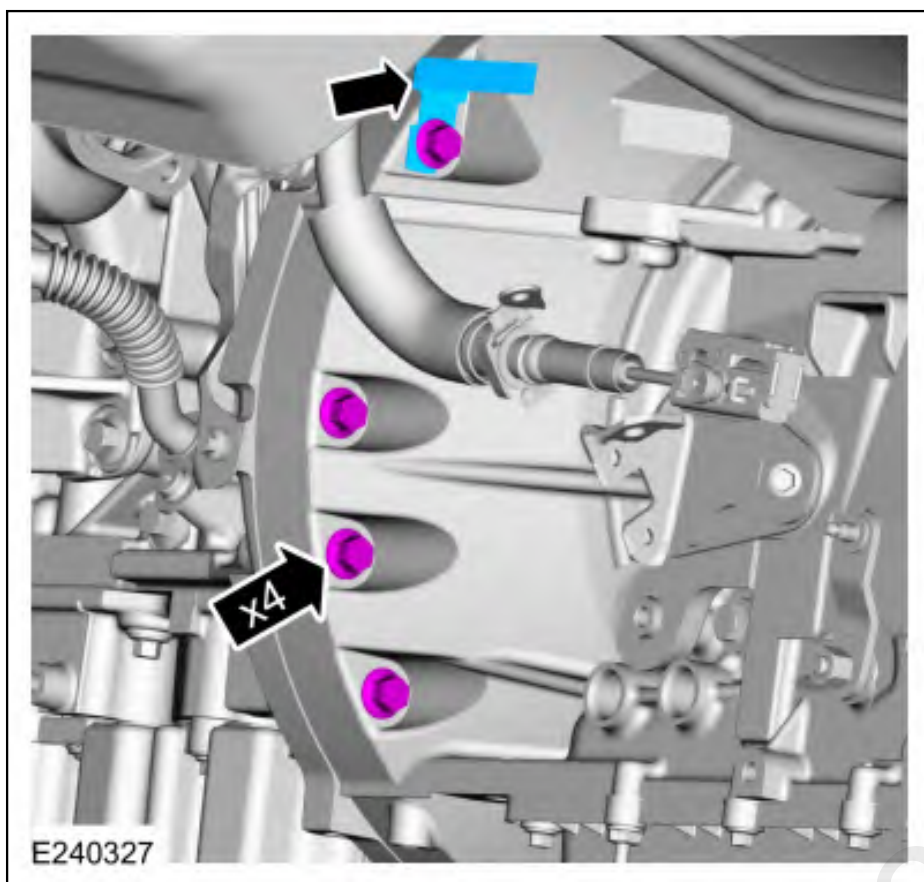
Position the bracket and install the top bellhousing bolts.

Torque: 35 lb.ft (48 Nm)

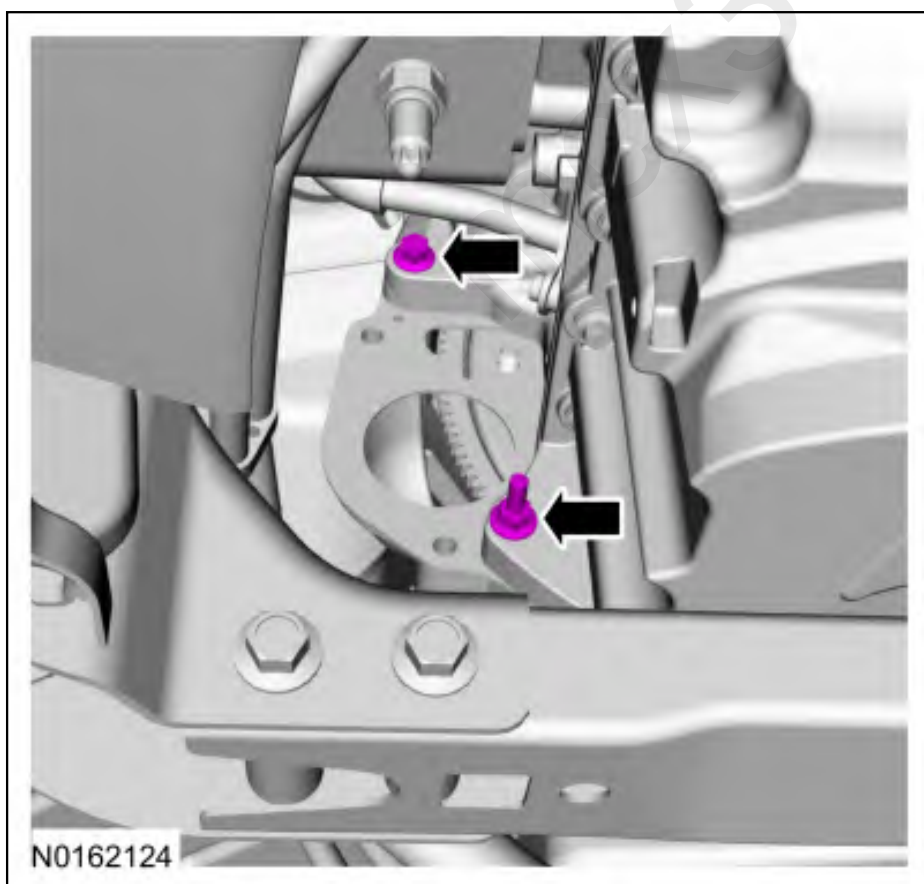


12. Install the selector lever cable bracket and the LH bellhousing bolts.

Torque: 35 lb.ft (48 Nm)

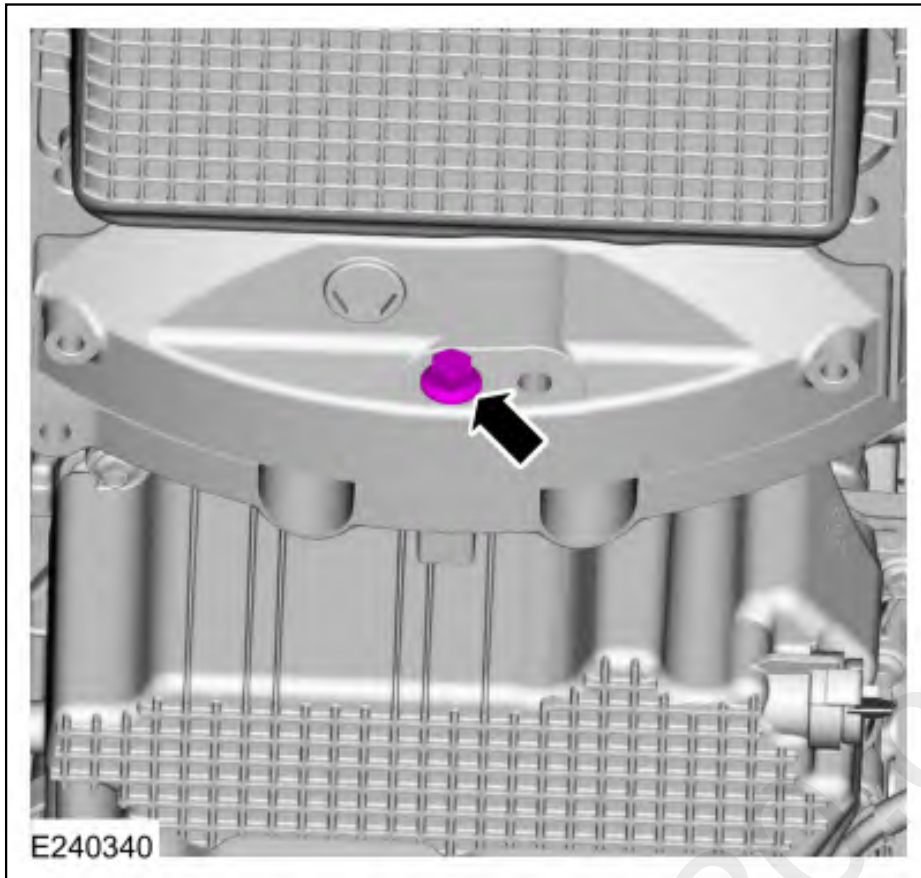


13. Install the RH bellhousing bolts.
Torque: 35 lb.ft (48 Nm)



14. Install the lower bellhousing bolt.

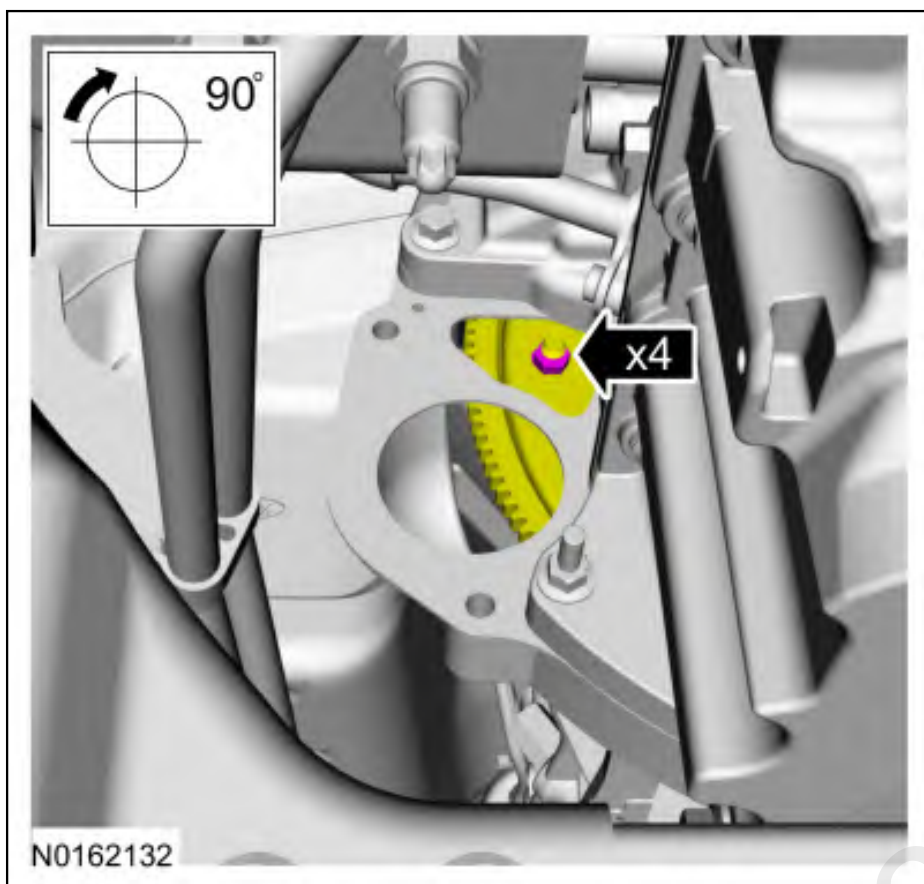
Torque: 35 lb.ft (48 Nm)



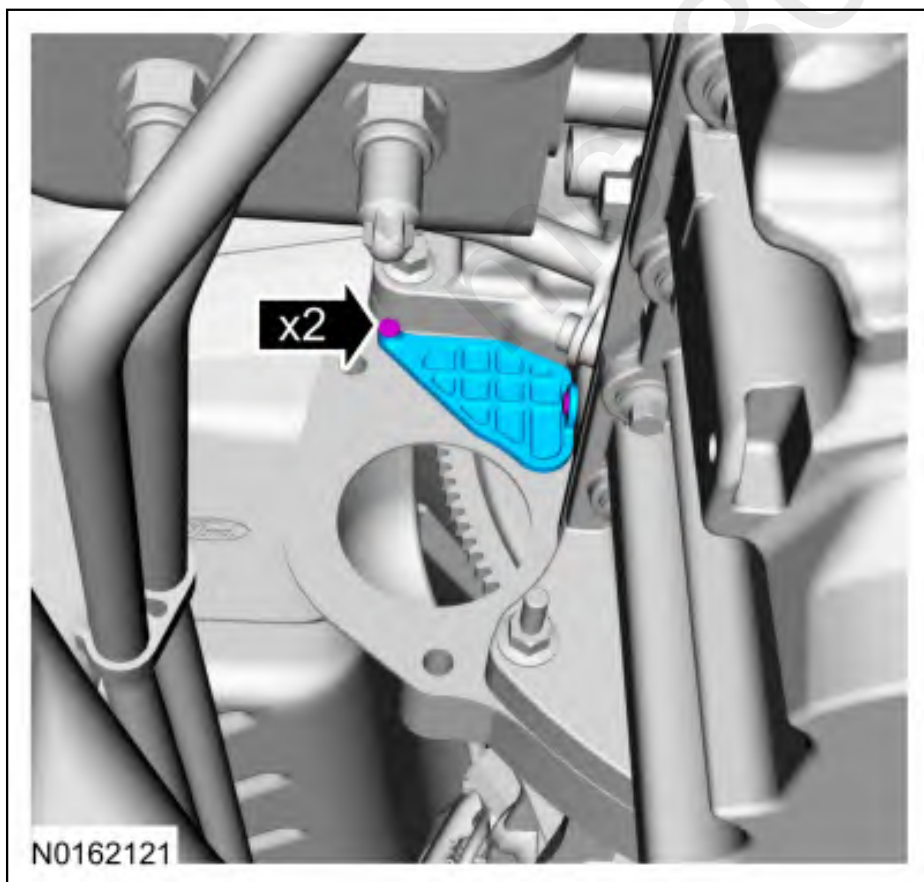
15. **NOTE:** *Using the crankshaft pulley bolt, turn the engine clockwise.*

Install the new torque converter nuts.

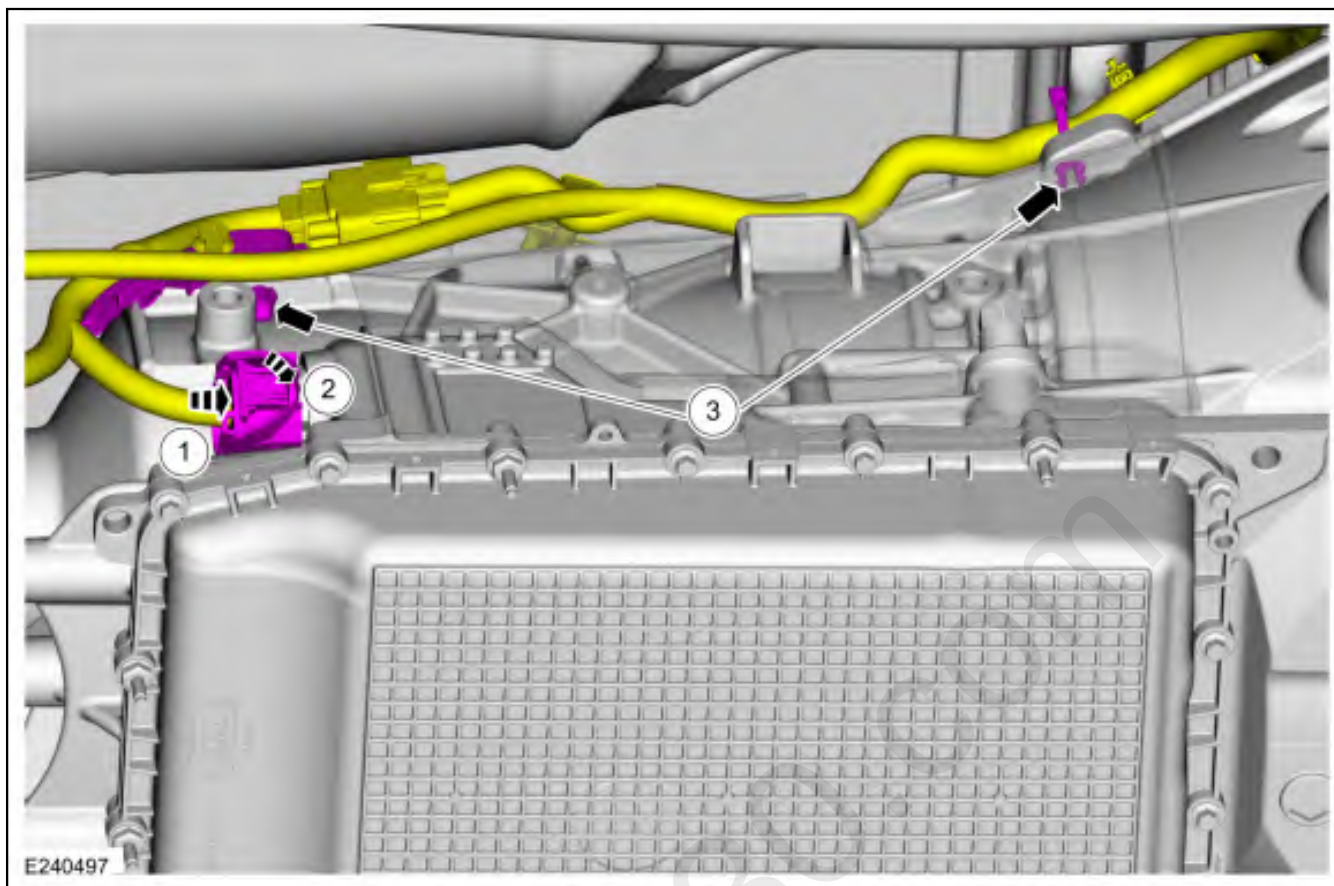
Torque: 30 lb.ft (40 Nm)



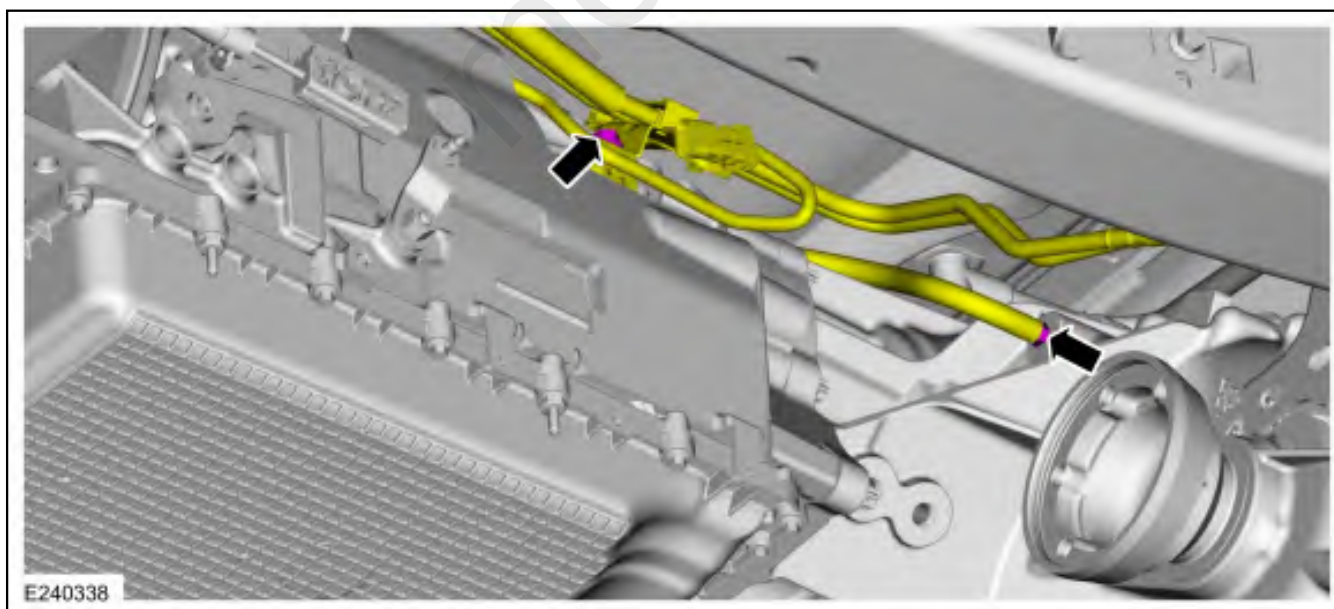
16. Install the access cover and the pin-type retainers.



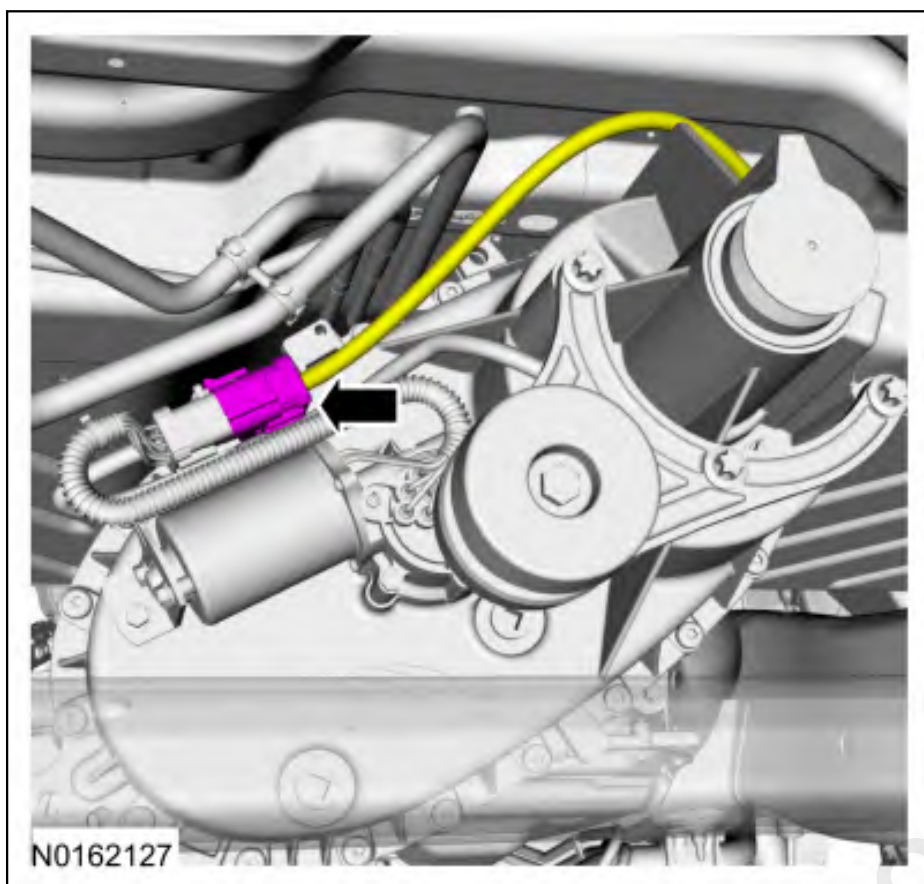
1. Push the transmission electrical connector in.
2. Lock the tab to connect the transmission electrical connector.
3. Attach the wiring harness retainers in the transmission.



18. Position the fuel line bracket and install the bolt. Connect the transfer case vent tube.
Torque: 26 lb.ft (35 Nm)



19. Connect the transfer case electrical connector.



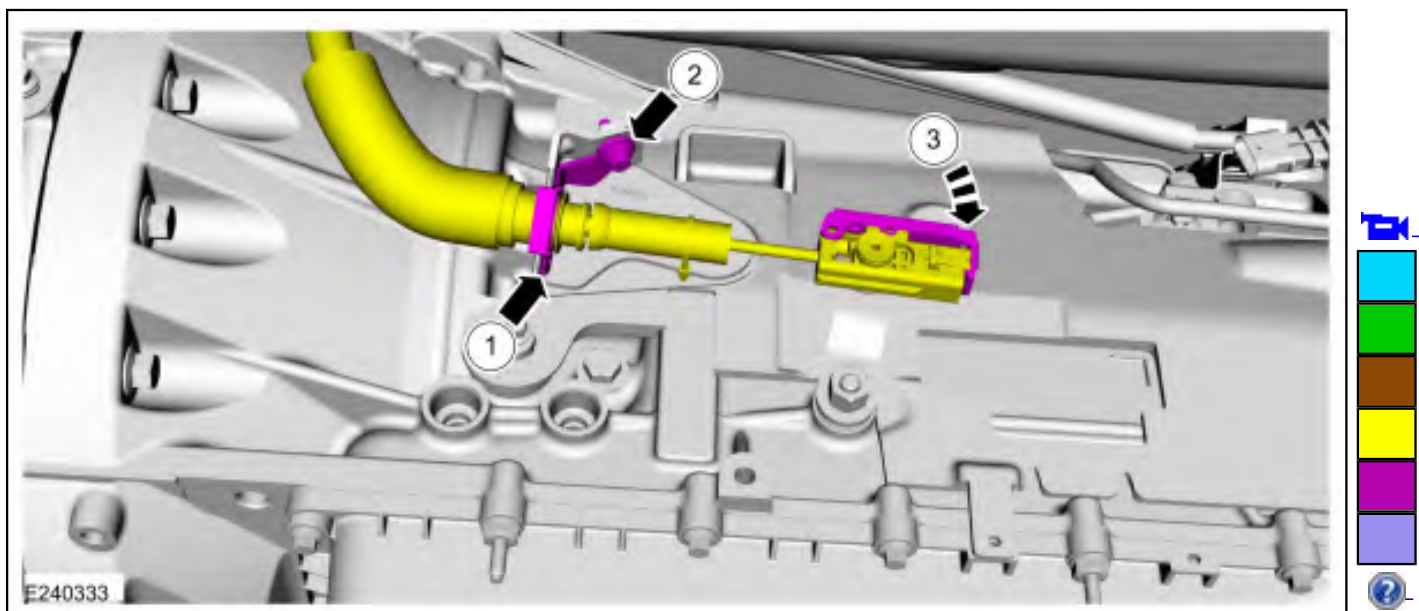
20. **NOTE:** When installing the selector lever cable end, make sure that the selector lever cable end is correctly installed onto the manual control lever. Pull back on the selector lever cable to make sure the selector lever cable end is securely installed onto the manual control lever.

NOTE: Apply pressure to the selector lever cable end while connecting it to the manual control lever to make sure the selector lever has not moved out of the *DRIVE* position.

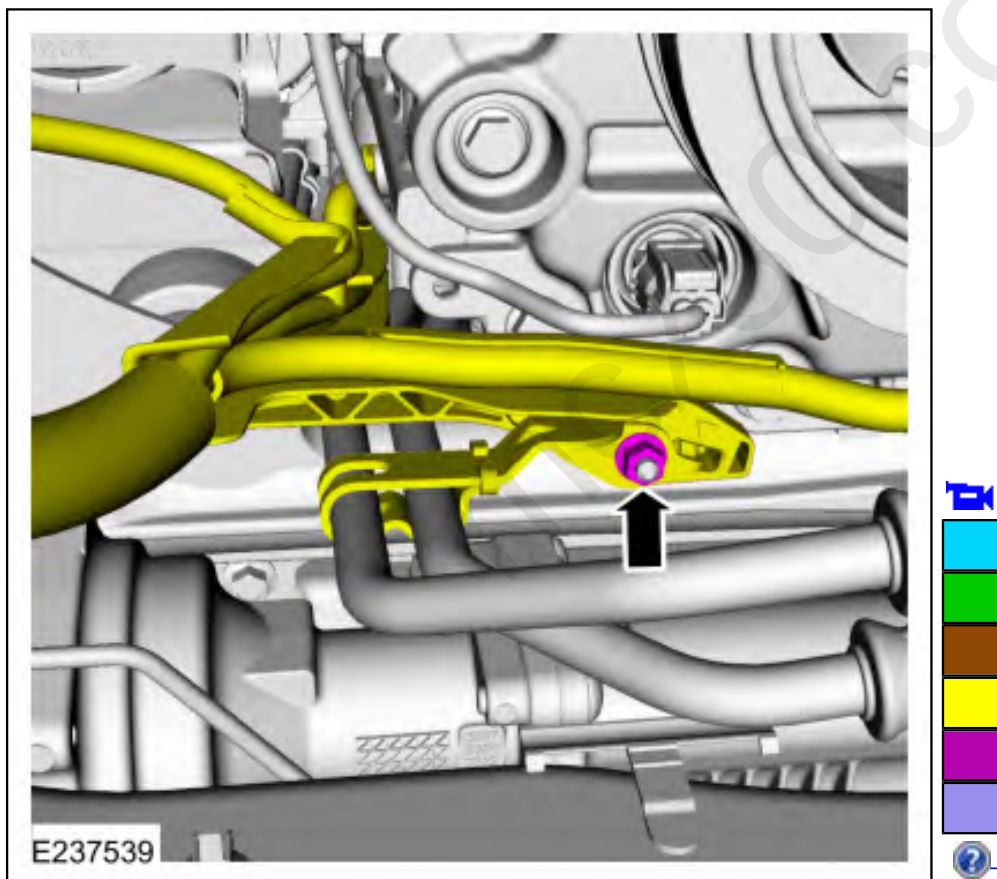
Connect the selector lever cable to the manual control lever.

1. Connect the selector lever cable to the bracket.
2. Install the selector lever cable bolt.
Torque: 62 lb.in (7 Nm)
3. **NOTE:** Listen for a audible click when sliding the locking tab down.

Connect the selector lever cable end to the manual control lever and slide the locking tab down.



21. Position the wiring harness and transmission cooler tube bracket and install the nut.
Torque: 106 lb.in (12 Nm)



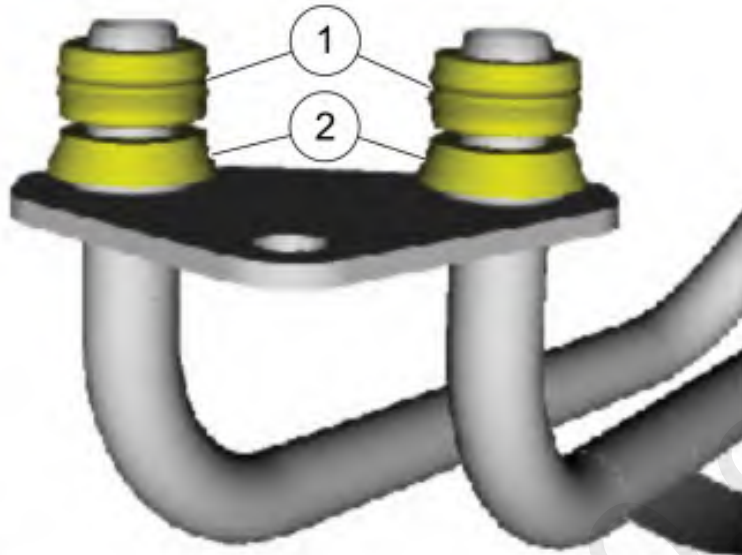
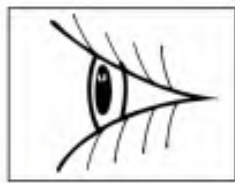
22. **NOTE:** *Inspect the transmission fluid tube backing rings and seals are not stuck in the case.*

Inspect the transmission fluid tube backing rings and seals for damage and install new backing rings or seals if necessary.

- Seal (7D285)

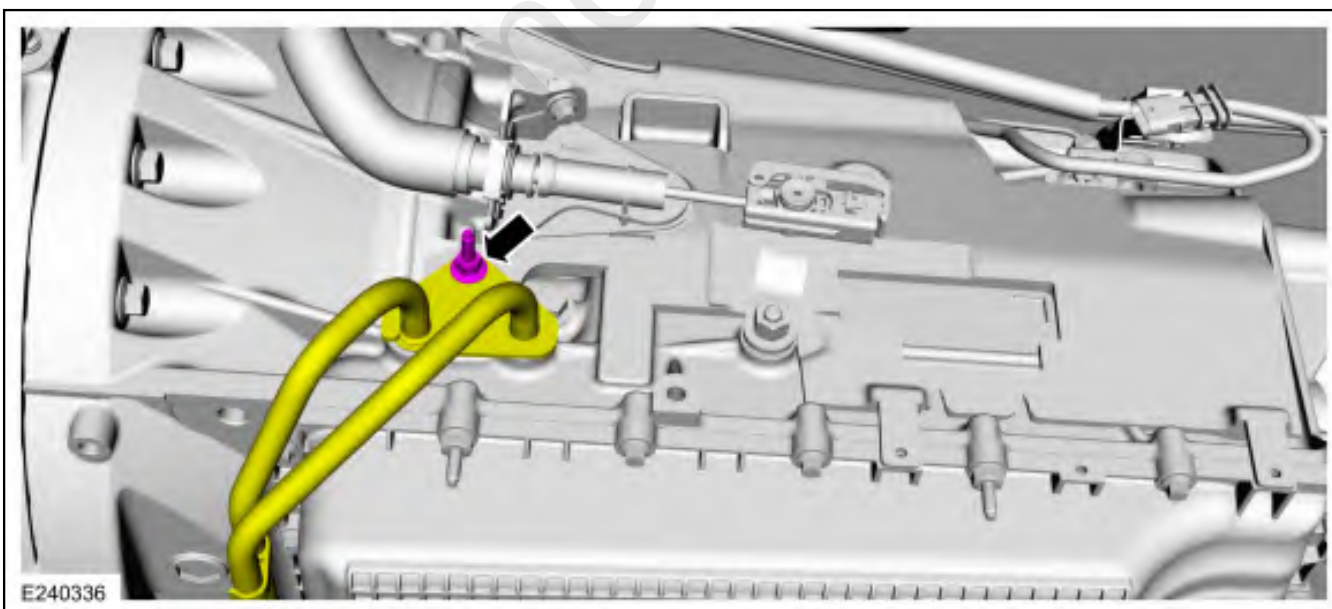
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-QULV (MERCON® ULV) (WSS-M2C949-A)

- Backing ring (7J324)



E238497

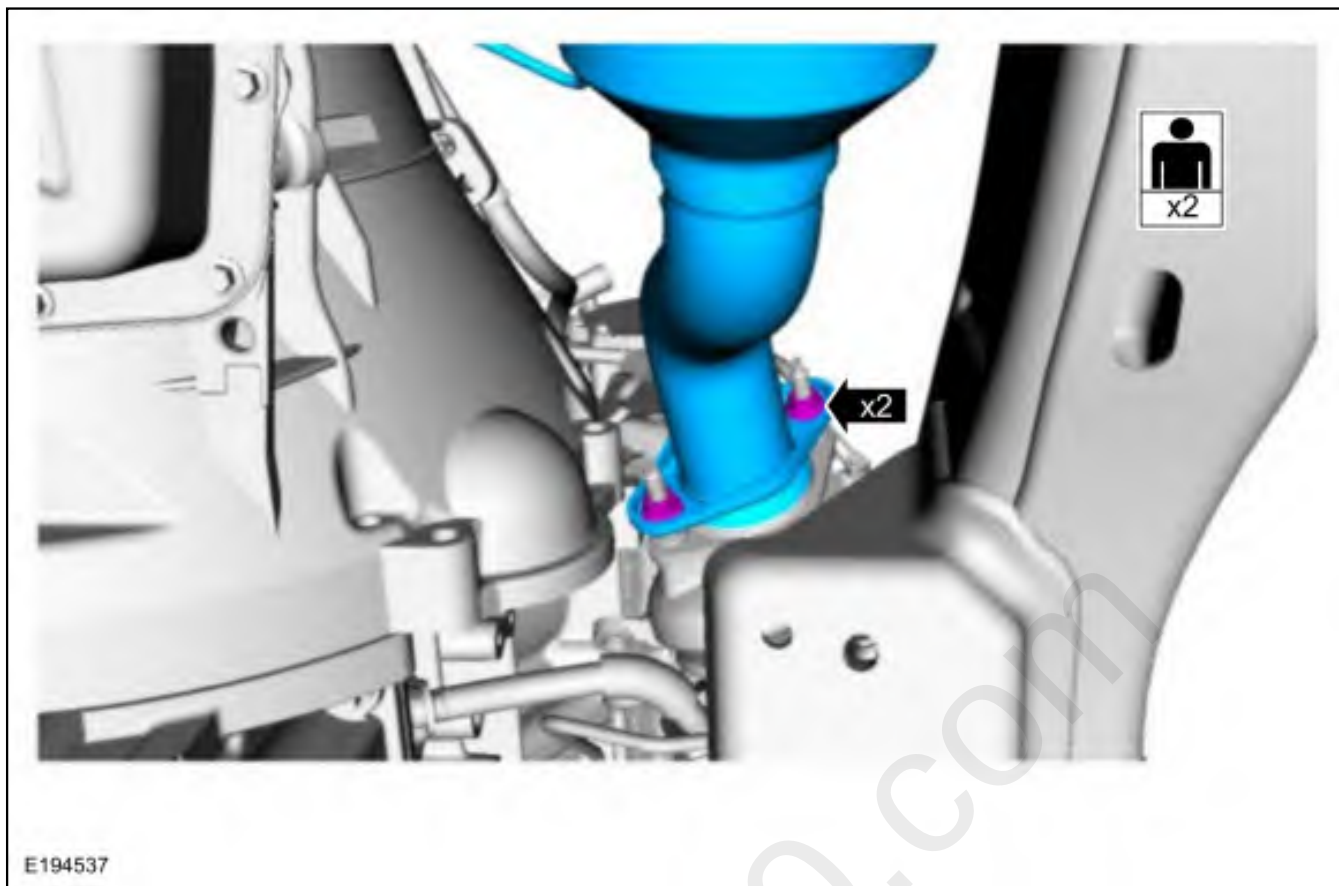
23. Install the transmission fluid cooler tubes and the new transmission fluid cooler tube bracket studbolt.
Torque: 22 lb.ft (30 Nm)



E240336

24. **NOTE:** Loosely install the new RH catalytic converter nuts. Do not tighten at this time.

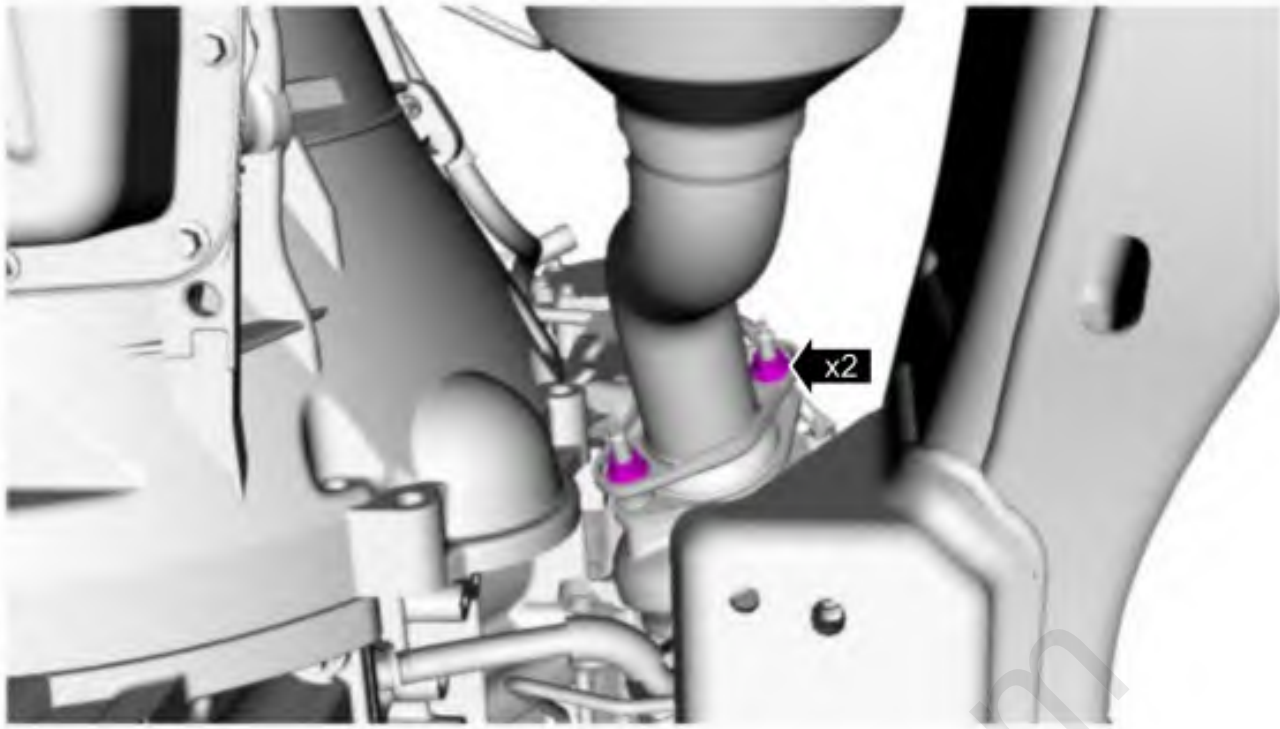
Position the RH catalytic converter in the vehicle. Loosely install the new RH catalytic converter nuts.



25. Install the transmission support insulator.
Refer to: [Transmission Support Insulator](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

26. **NOTE:** *Evenly tighten the catalytic converter nuts.*

Tighten the RH catalytic converter nuts.
Torque: 30 lb.ft (40 Nm)

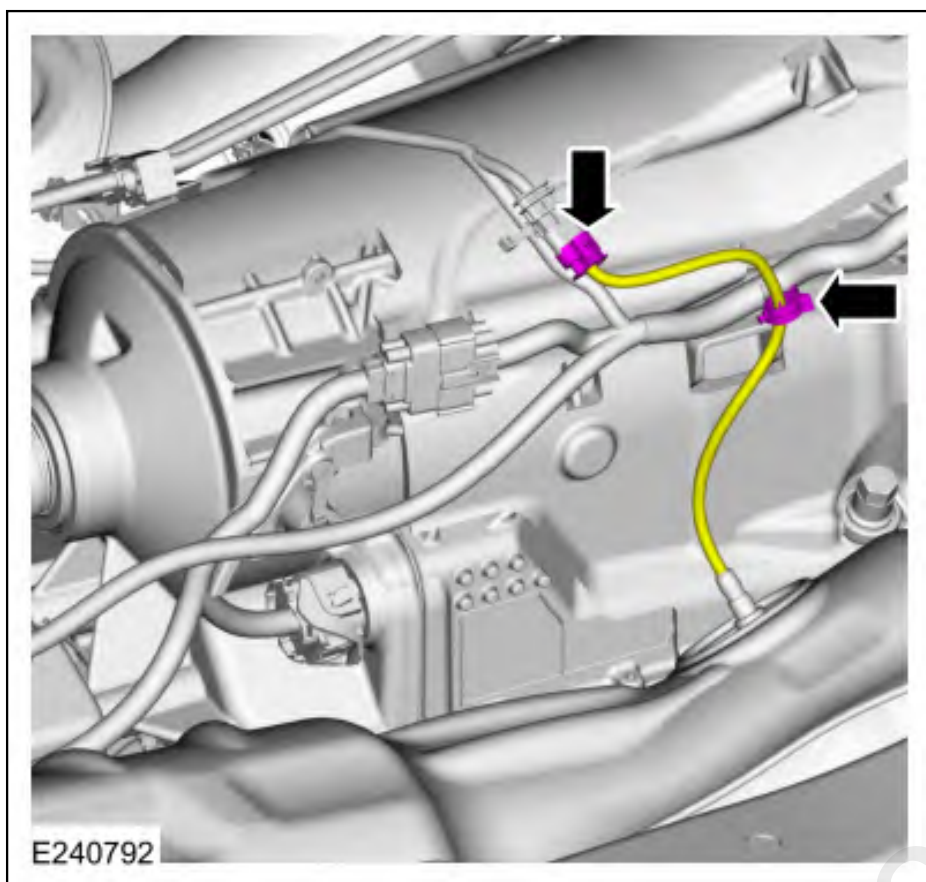


E225882

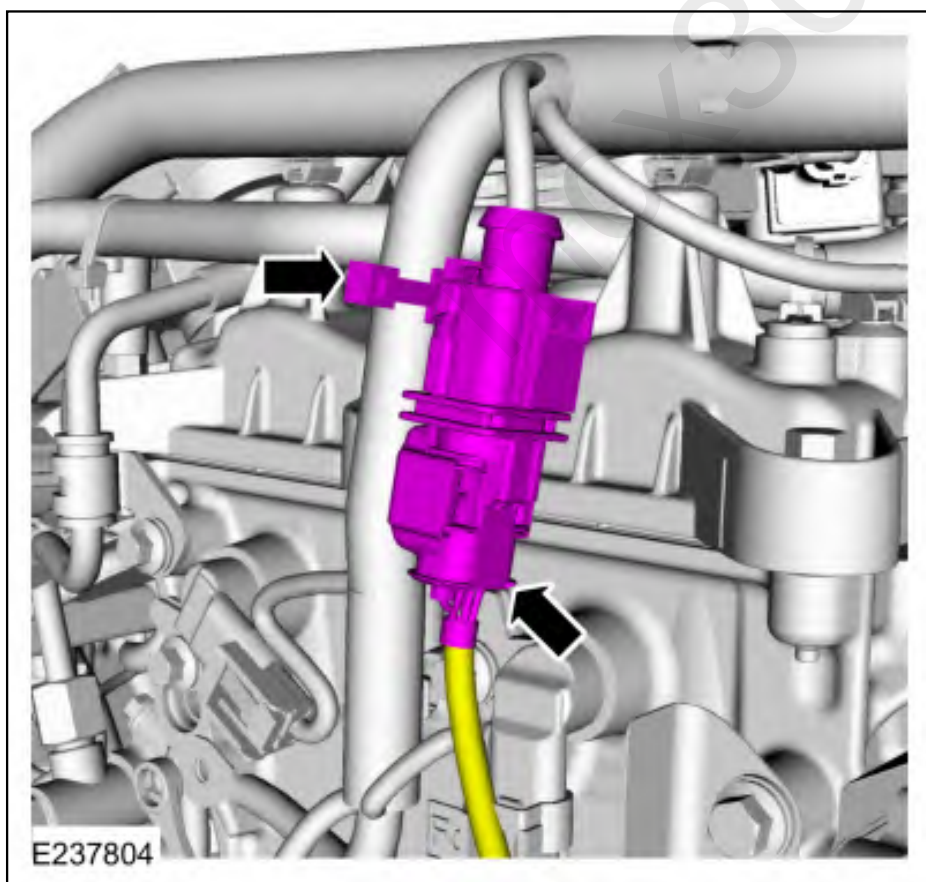
27. Install the LH catalytic converter.

Refer to: [Catalytic Converter LH - Raptor](#) (309-00C Exhaust System - 3.5L EcoBoost (272kW/370PS), Removal and Installation).

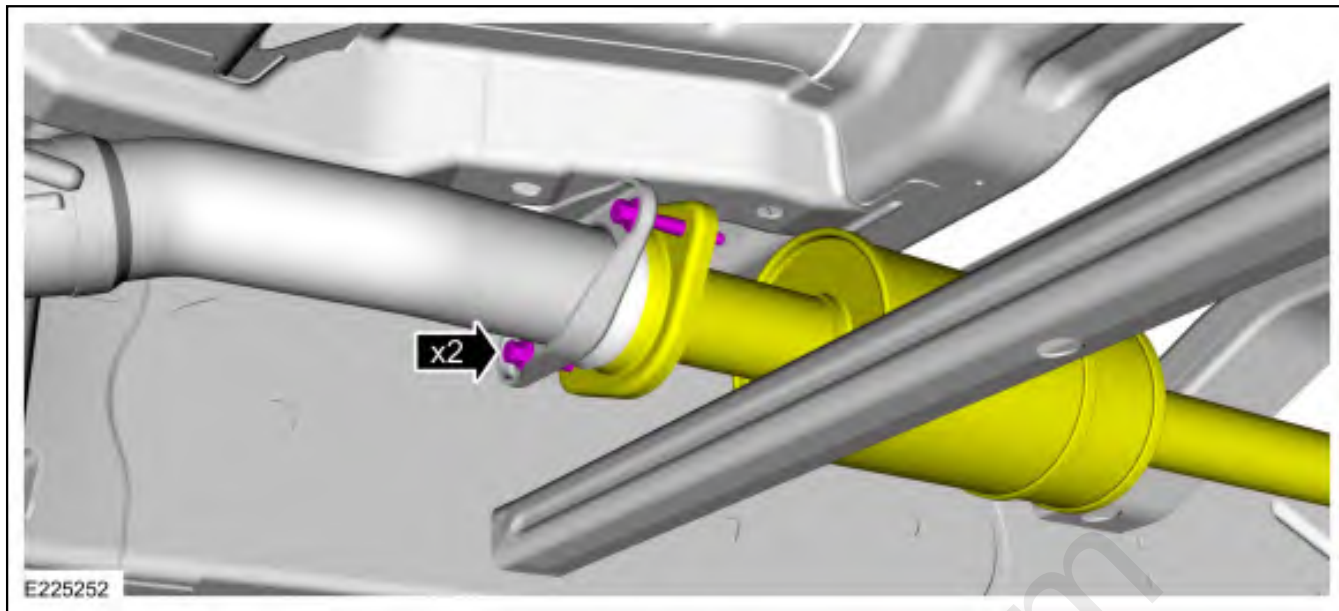
28. Connect the catalyst monitor sensor electrical connector and the harness retainer.



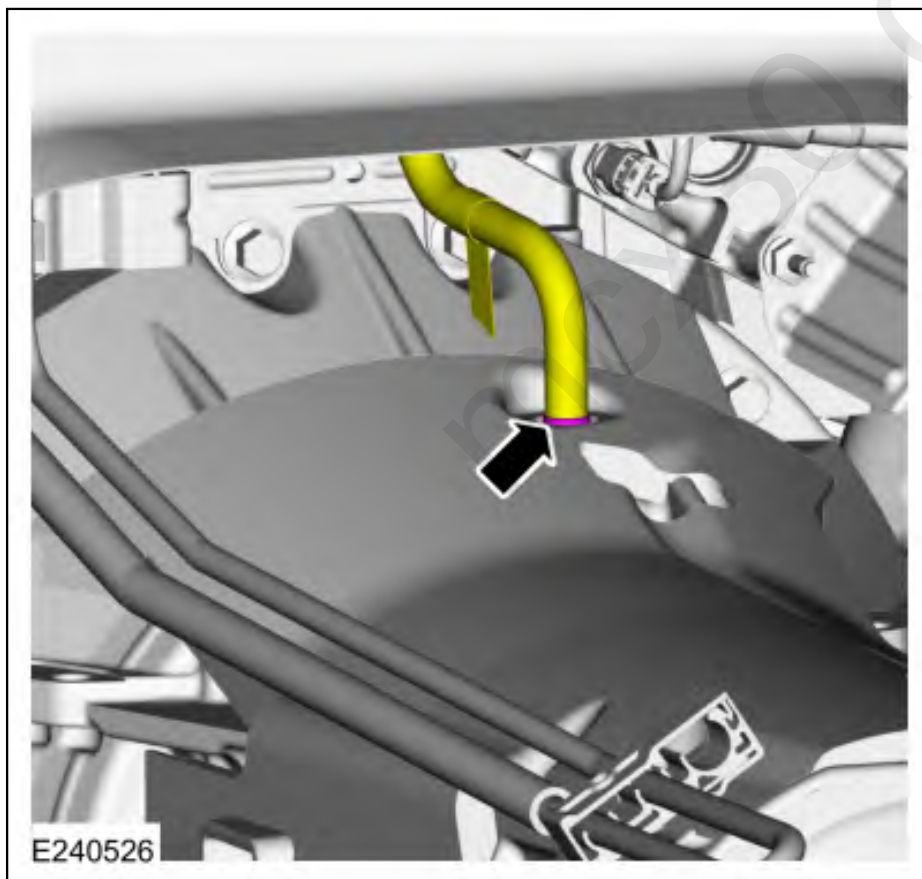
29. Connect the RH HO2S electrical connector and the harness retainer.



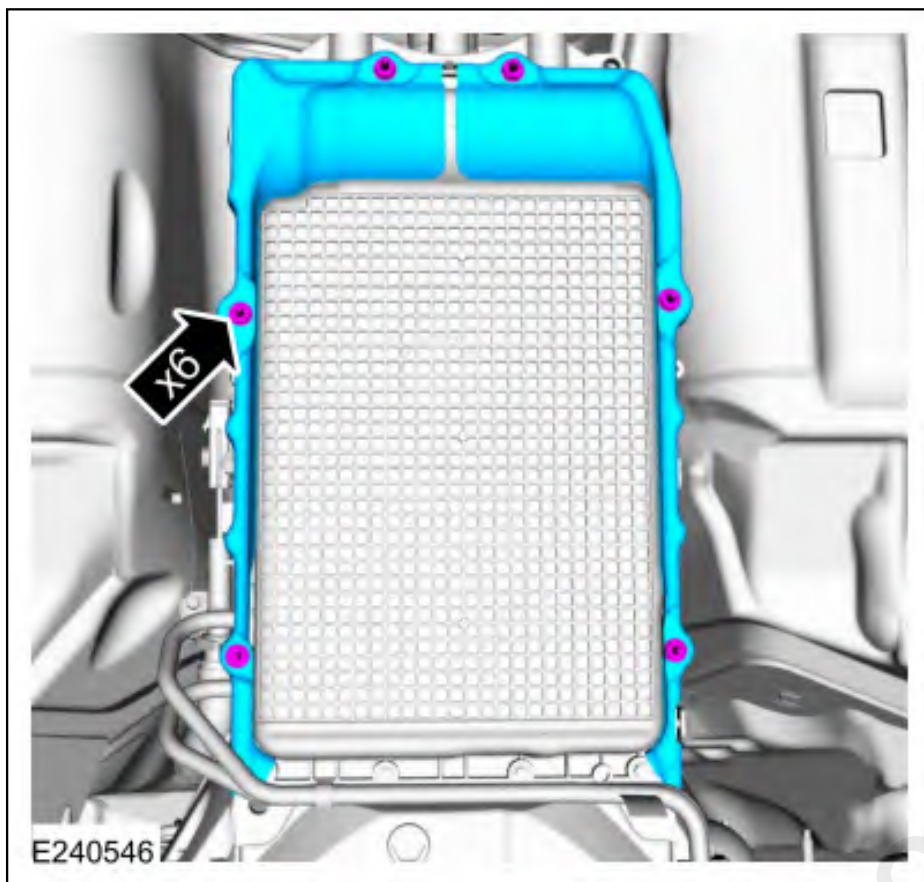
30. Install the catalytic converter flange to the muffler inlet pipe bolts.
Torque: 30 lb.ft (40 Nm)



31. Connect the transmission vent tube.



32. Install the retainers and heatshield.
Torque: 80 lb.in (9 Nm)

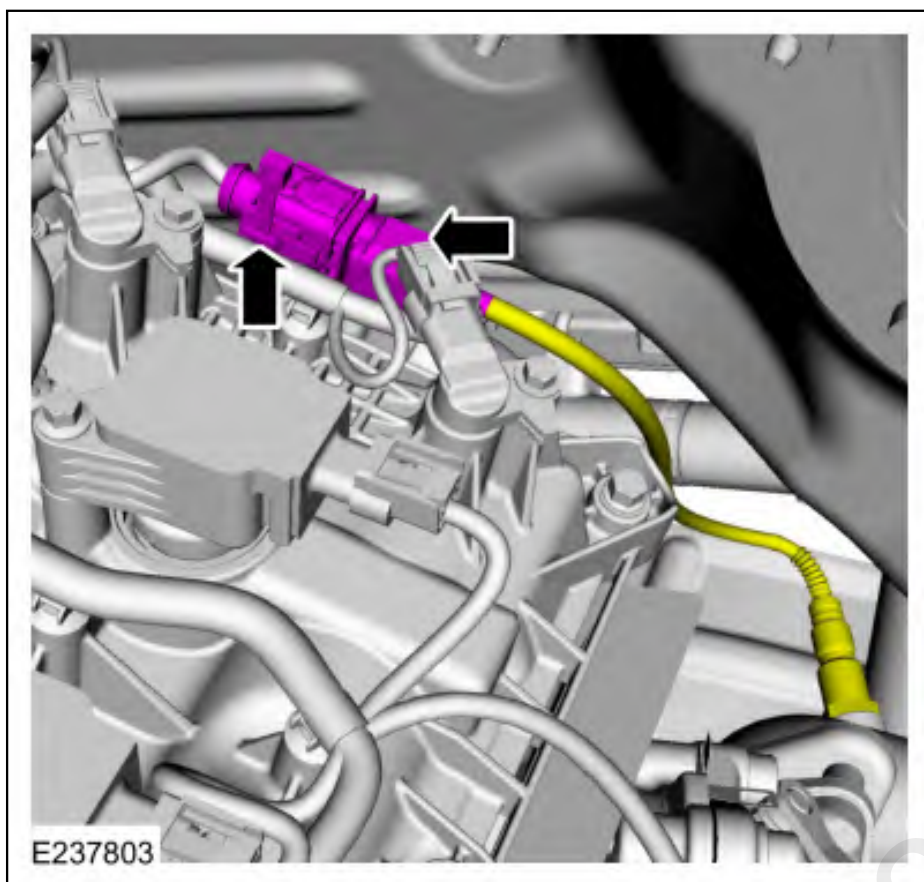


33. Install the rear driveshaft assembly.
Refer to: [Rear Driveshaft](#) (205-01 Driveshaft, Removal and Installation).
34. Install the front driveshaft assembly.
Refer to: [Front Driveshaft](#) (205-01 Driveshaft, Removal and Installation).
35. Check the transfer case fluid level.
Refer to: [Transfer Case Draining and Filling](#) (308-07B Transfer Case, General Procedures).
36. **NOTE:** *If equipped with a underbody splash shield, do not install the splash shield at this time.*

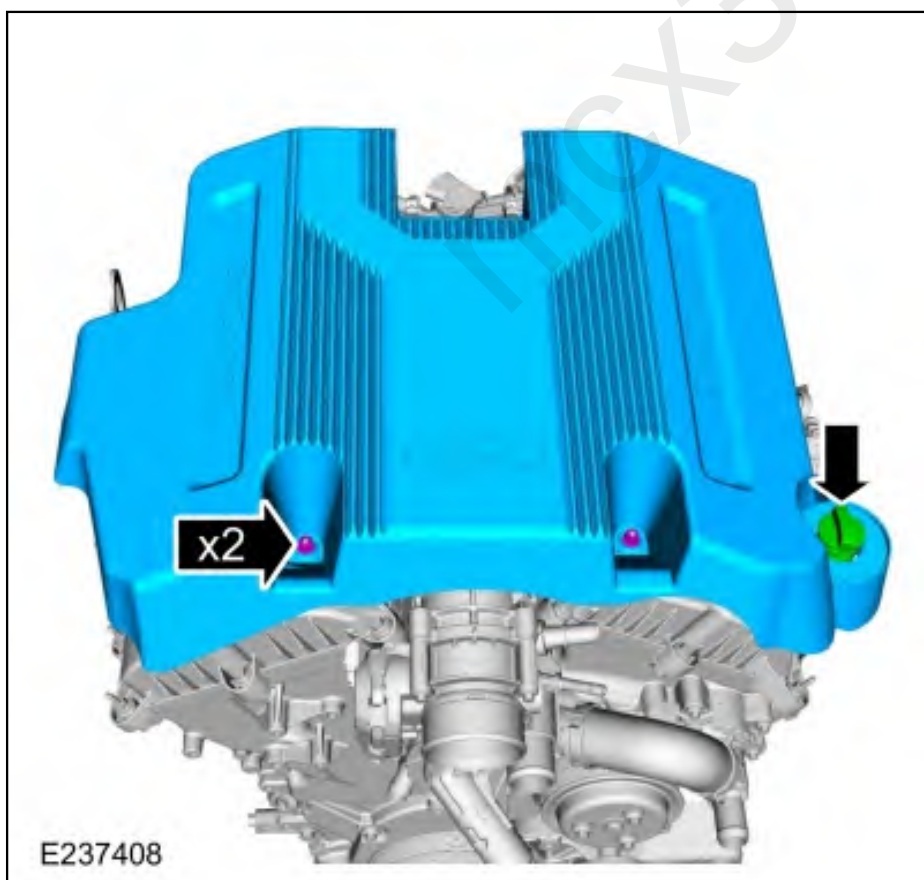
Install the starter motor assembly.

Refer to: [Starter Motor](#) (303-06C Starting System - 3.5L EcoBoost (272kW/370PS), Removal and Installation).

37. Connect the LH HO2S electrical connector.



38. Install the engine appearance cover and the nuts.
Torque: 80 lb.in (9 Nm)



39. Connect the battery ground cable.
Refer to: [Battery Disconnect and Connect](#) (414-01 Battery, Mounting and Cables, General Procedures).
40. Verify that the selector lever cable is correctly adjusted.
Refer to: [Selector Lever Cable Adjustment - Raptor](#) (307-05 Automatic Transmission External Controls, General Procedures).
41. After completing the repairs, perform the Misfire Monitor Neutral Profile Correction procedure using a diagnostic scan tool.
42. If a new transmission or a new main control was installed, the solenoid body strategy must be updated.
Refer to: [Transmission Strategy Download](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
43. If the transmission was overhauled, the adaptive drive cycle must be updated.
Refer to: [Adaptive Learning Drive Cycle](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).
44. While driving the vehicle, use the scan tool to verify that the TFT has reached a temperature of 96.7°C-102°C (206°F-215°F). This will circulate the transmission fluid through the torque converter and the transmission fluid cooling system, eliminating any trapped air in the transmission fluid cooling system.
45. Check the transmission fluid level.
Refer to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Selector Shaft Seal

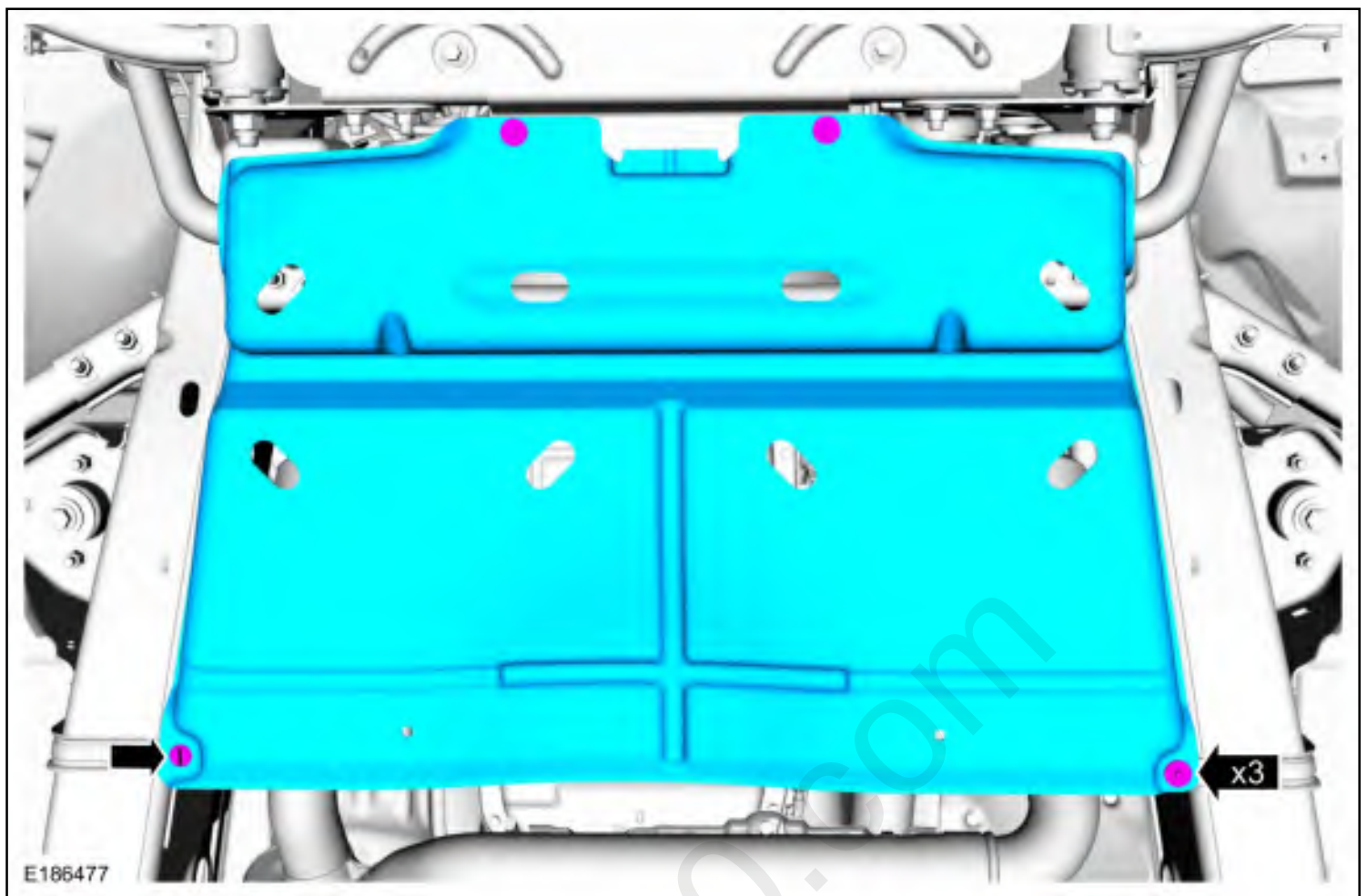
Base Part Number: Base Part Number: 7F337

Special Tool(s) / General Equipment

 E270043	307-549 Installer, Shift Shaft Fluid Seal TKIT-2005D1-F1

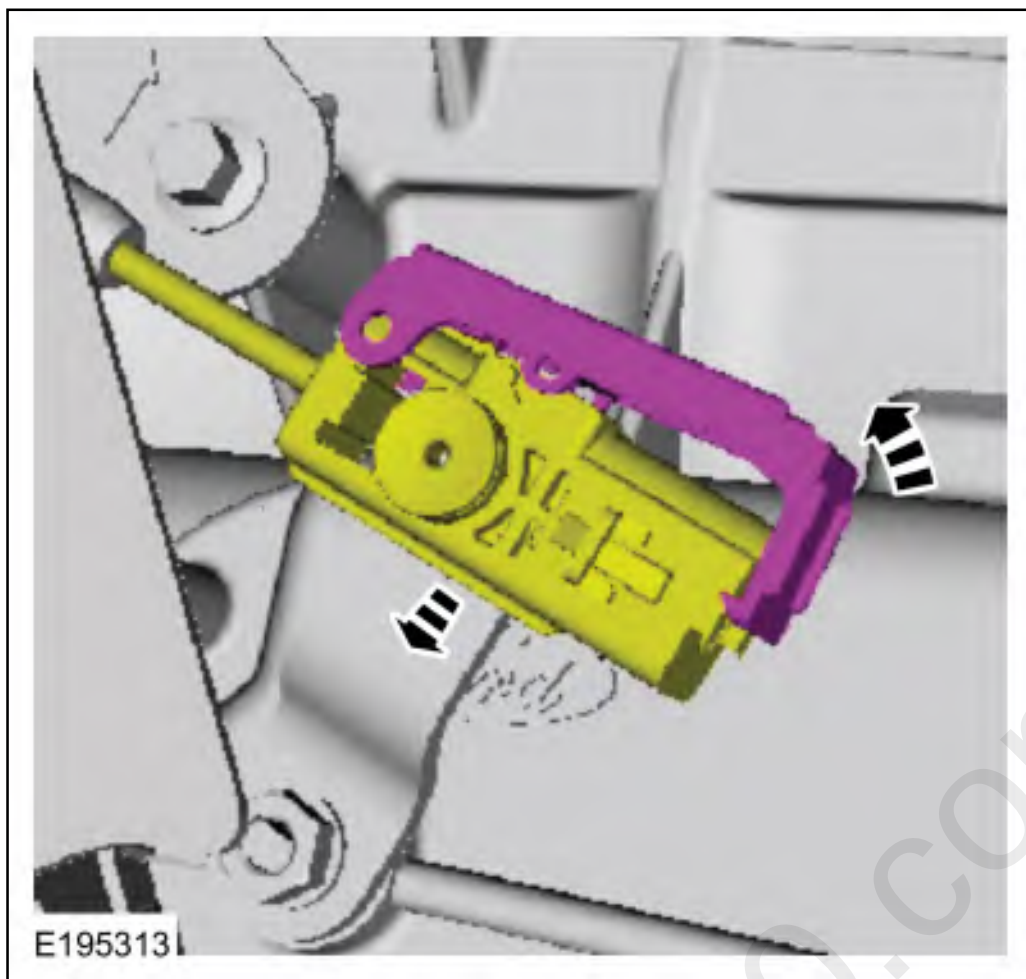
Removal

1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. If equipped, release the retainers and remove the splash shield.

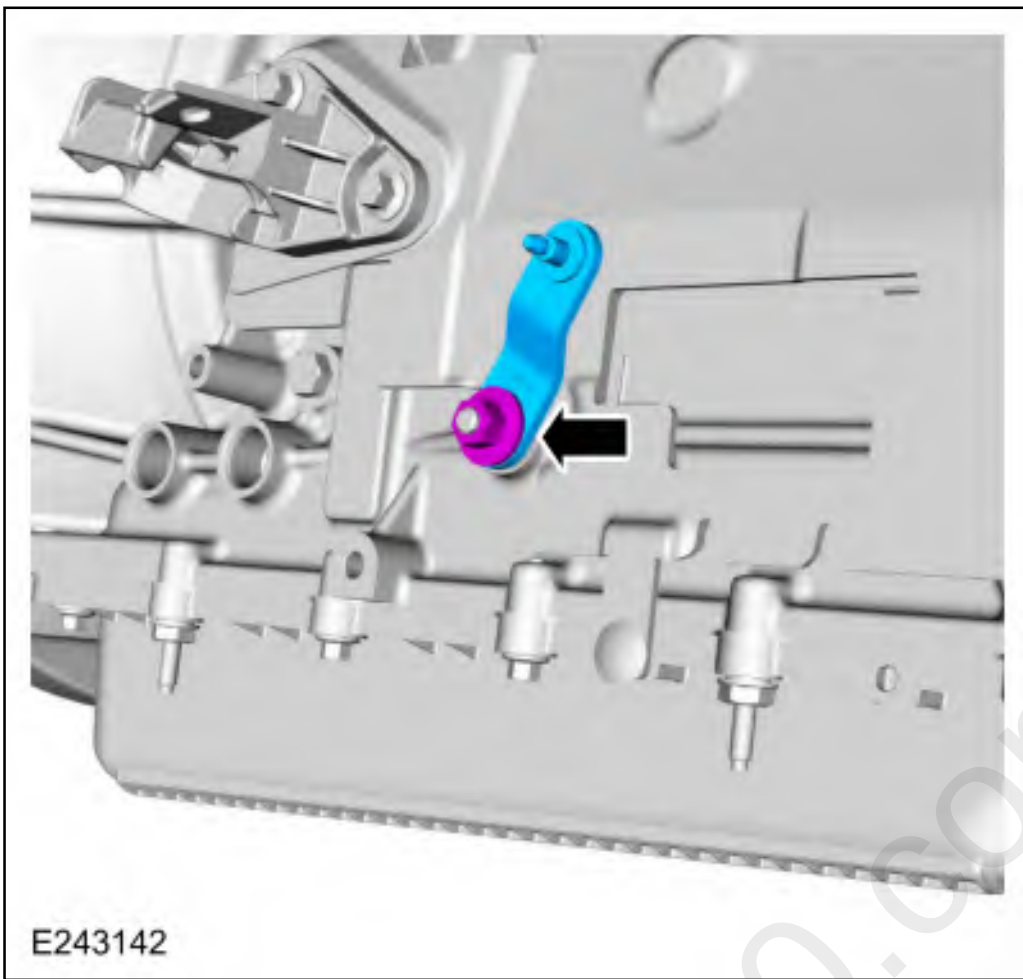


3. **NOTICE:** To prevent selector lever cable damage, do not apply force to the selector lever cable between the manual control lever and the selector lever cable bracket.

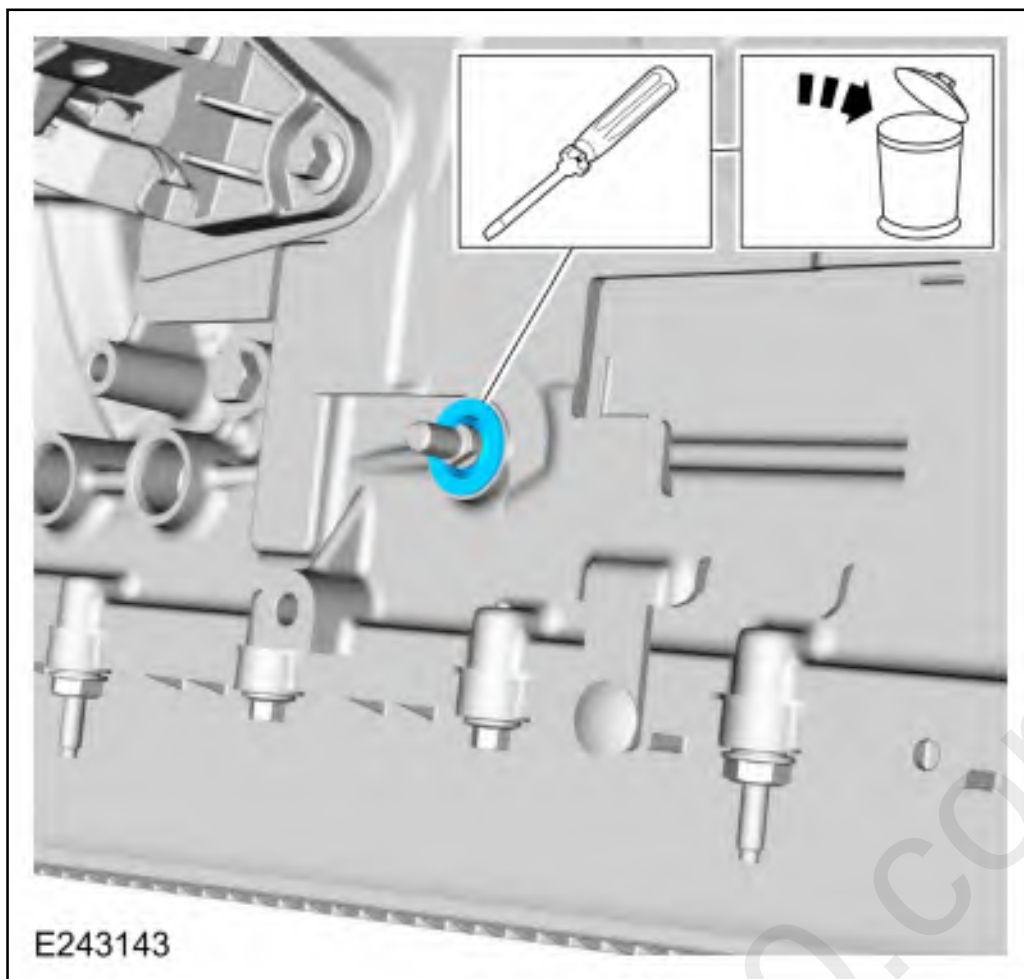
Rotate the cable adjuster lock upward and disconnect the selector lever cable from the manual control lever.



4. Remove the nut and the manual control lever.

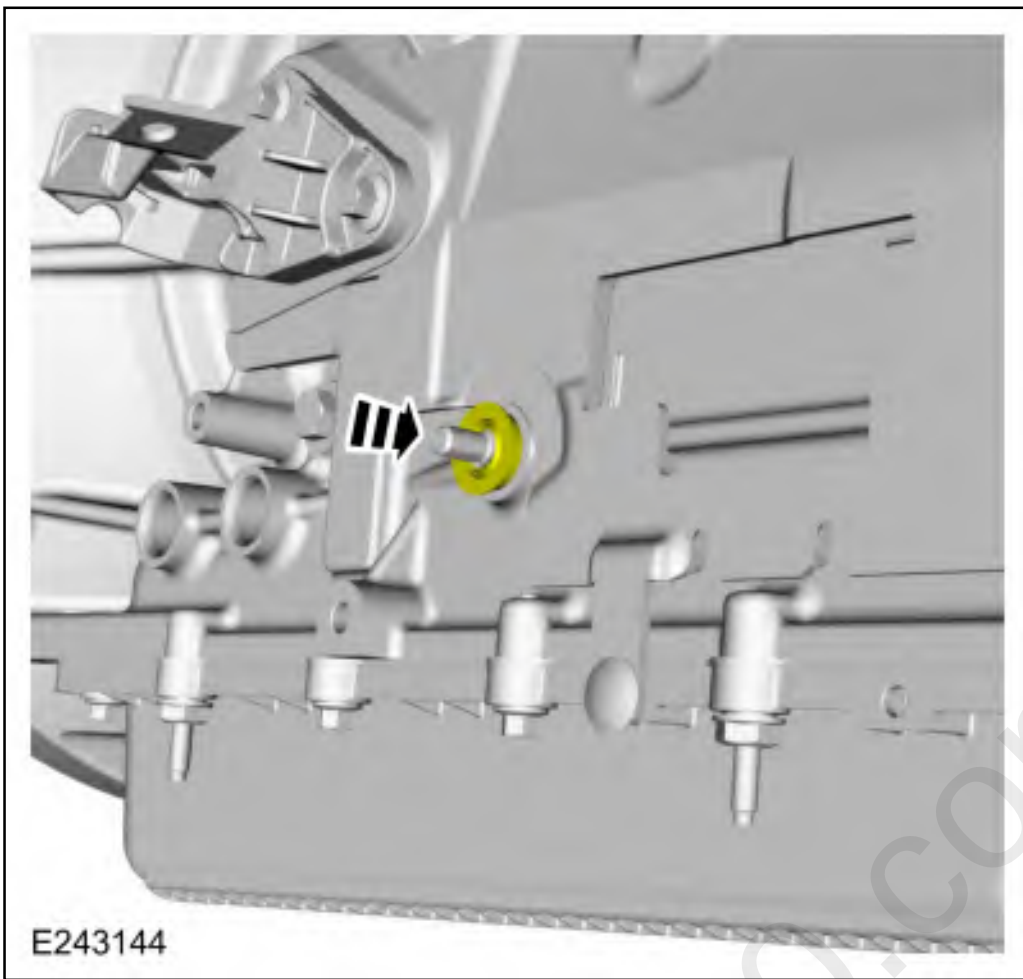


5. Remove and discard the selector shaft seal (7F337).

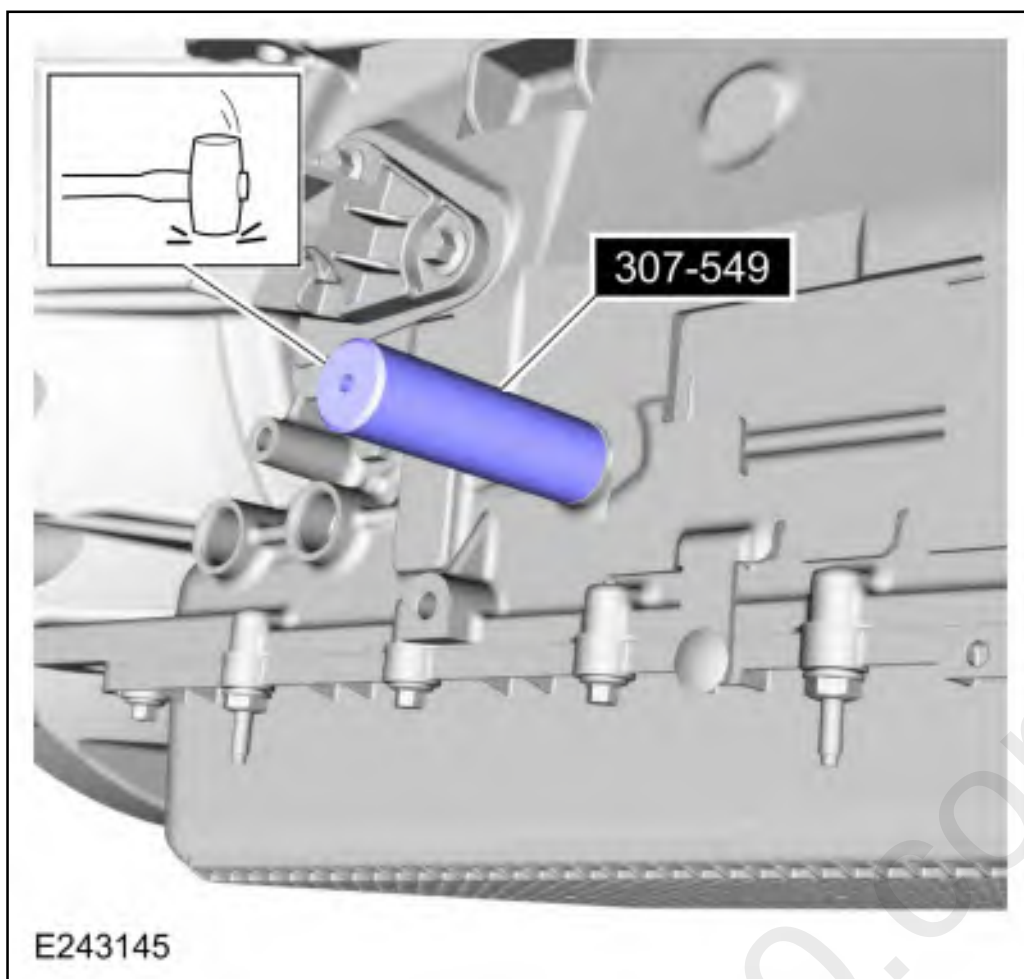


Installation

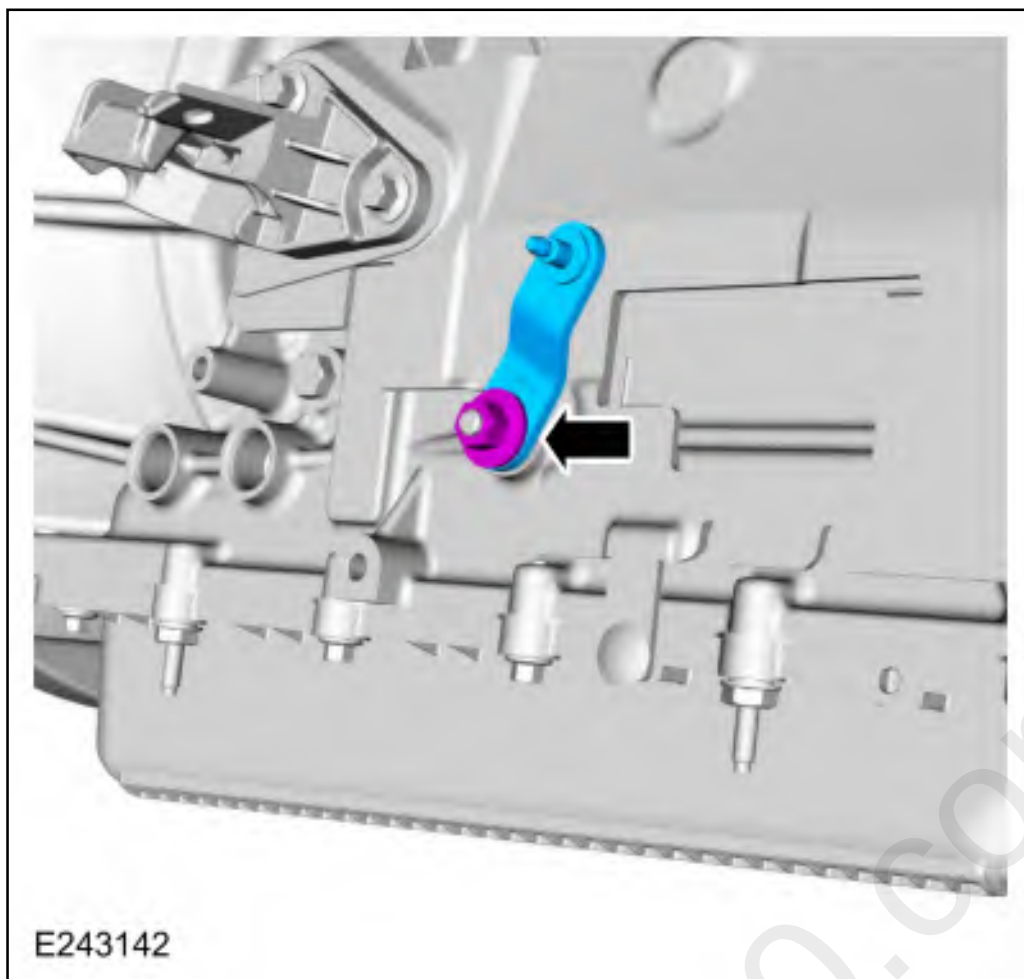
1. Slide the selector shaft seal onto the manual shaft.



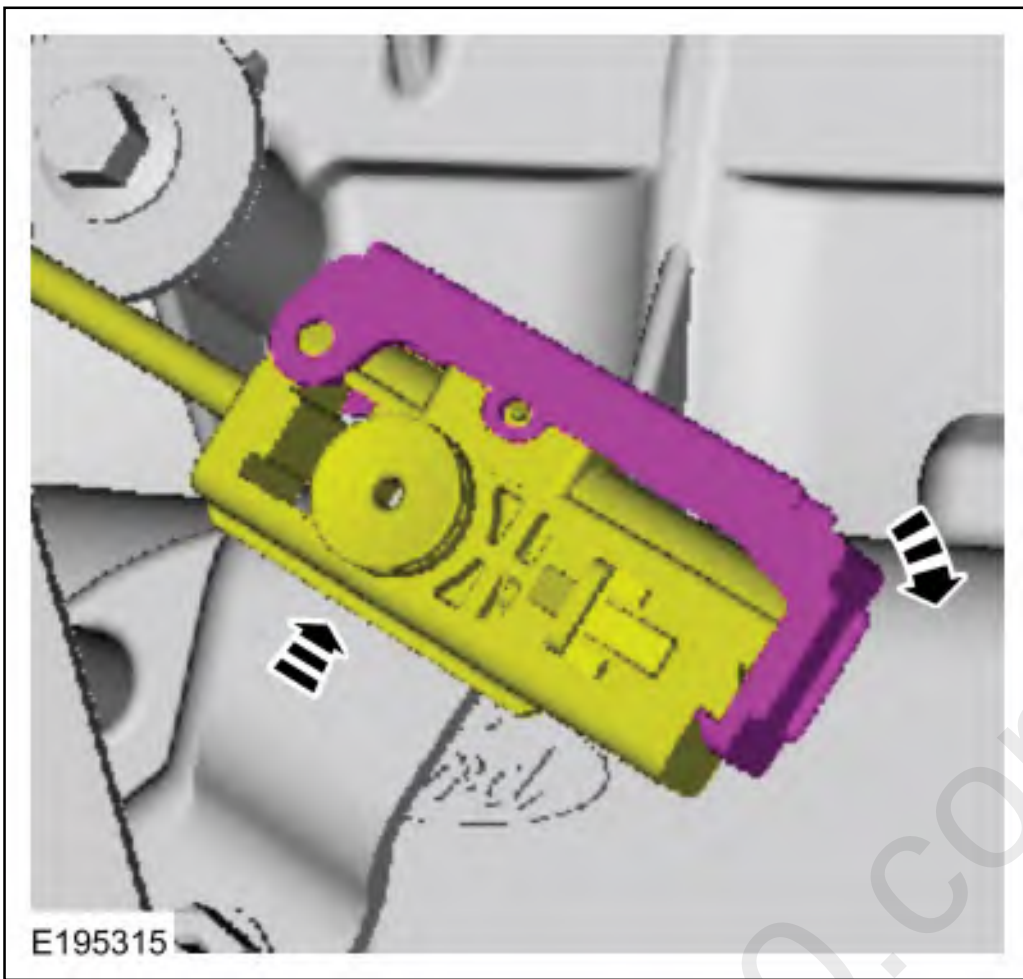
2. Using the special tool, install the selector shaft seal.
Use Special Service Tool: 307-549 Installer, Shift Shaft Fluid Seal.



3. Install the manual control lever and nut.
Torque: 177 lb.in (20 Nm)



4. Connect the selector lever cable onto the manual control lever and move the cable adjuster lock down.
 - Listen for the audible click, then push back on the cable adjuster lock to verify it is locked.
 - Pull back on the selector lever cable to verify it is installed correctly to the manual lever.



5. Adjust the selector lever cable.

Refer to: Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Column Shift (307-05 Automatic Transmission External Controls) .

Refer to: Selector Lever Cable Adjustment - 10-Speed Automatic Transmission - 10R80, Vehicles With: Floor Shift (307-05 Automatic Transmission External Controls) .

Transmission Fluid Temperature (TFT) Sensor

Removal

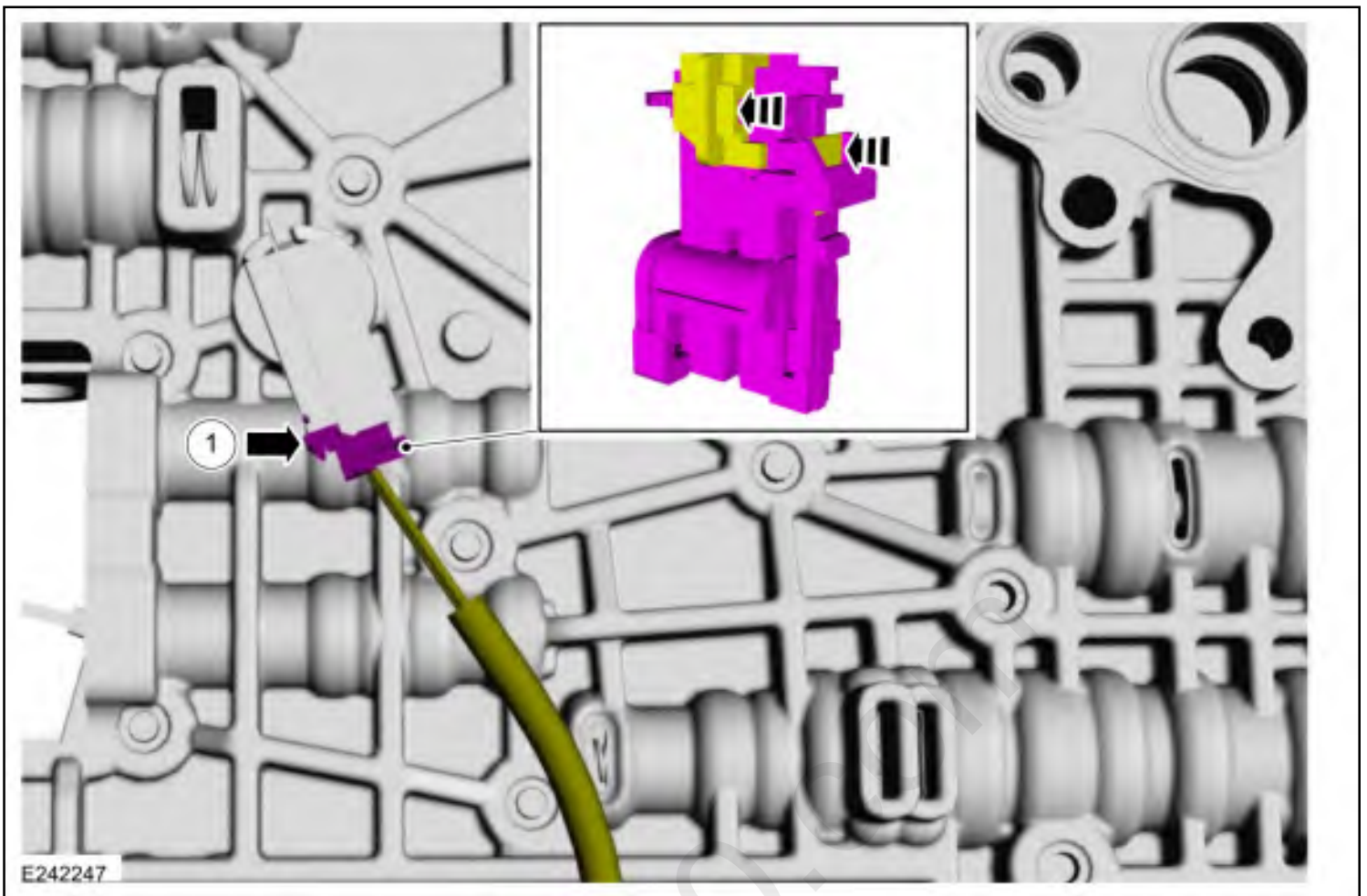
1. Remove the main control valve body.

Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: Main Control Valve Body (307-01) .

2. Disconnect the TFT sensor.

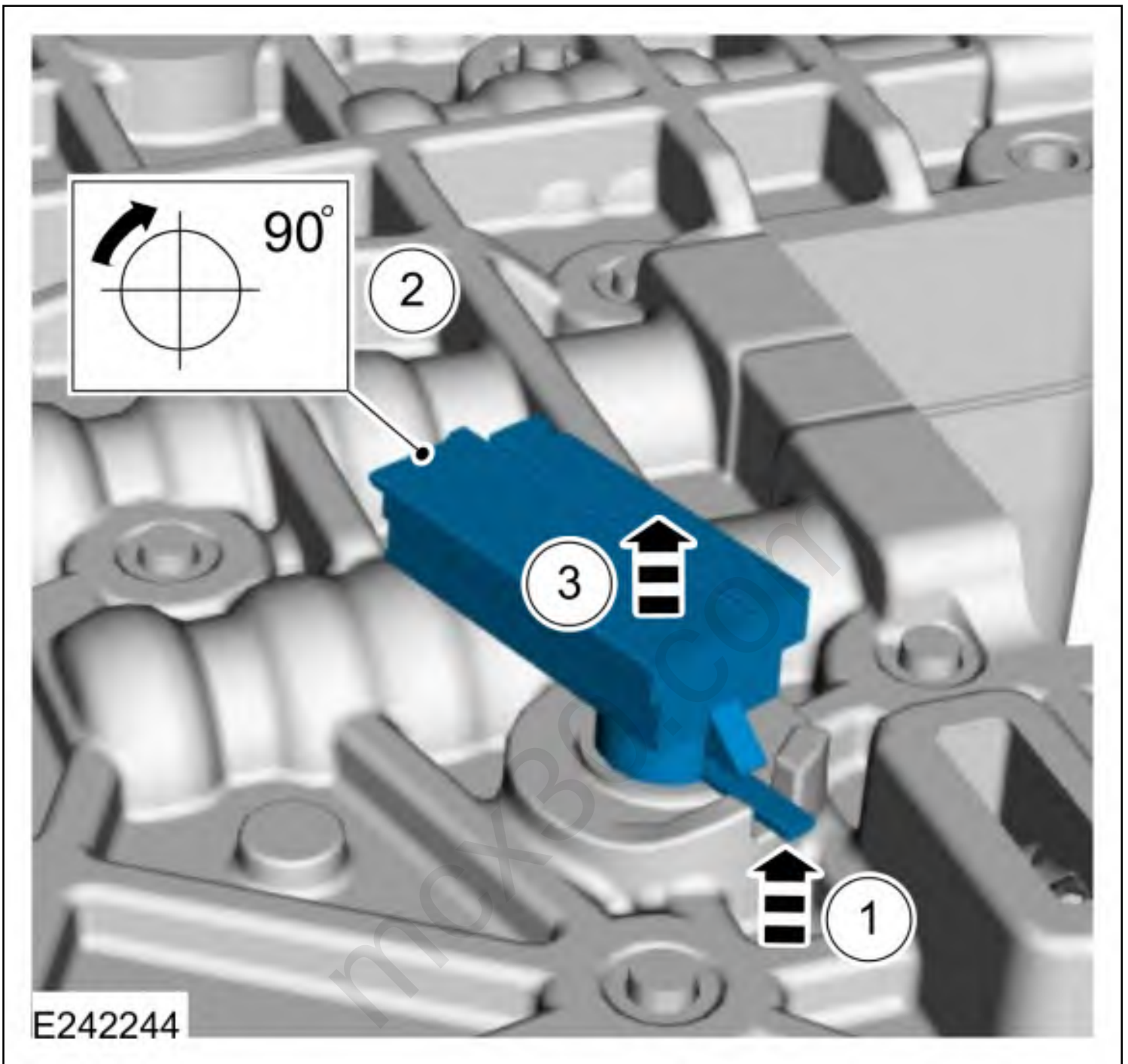
1. Slide the plastic lock to the unlocked position. While pressing the plastic tab, disconnect the electrical connector.



3.

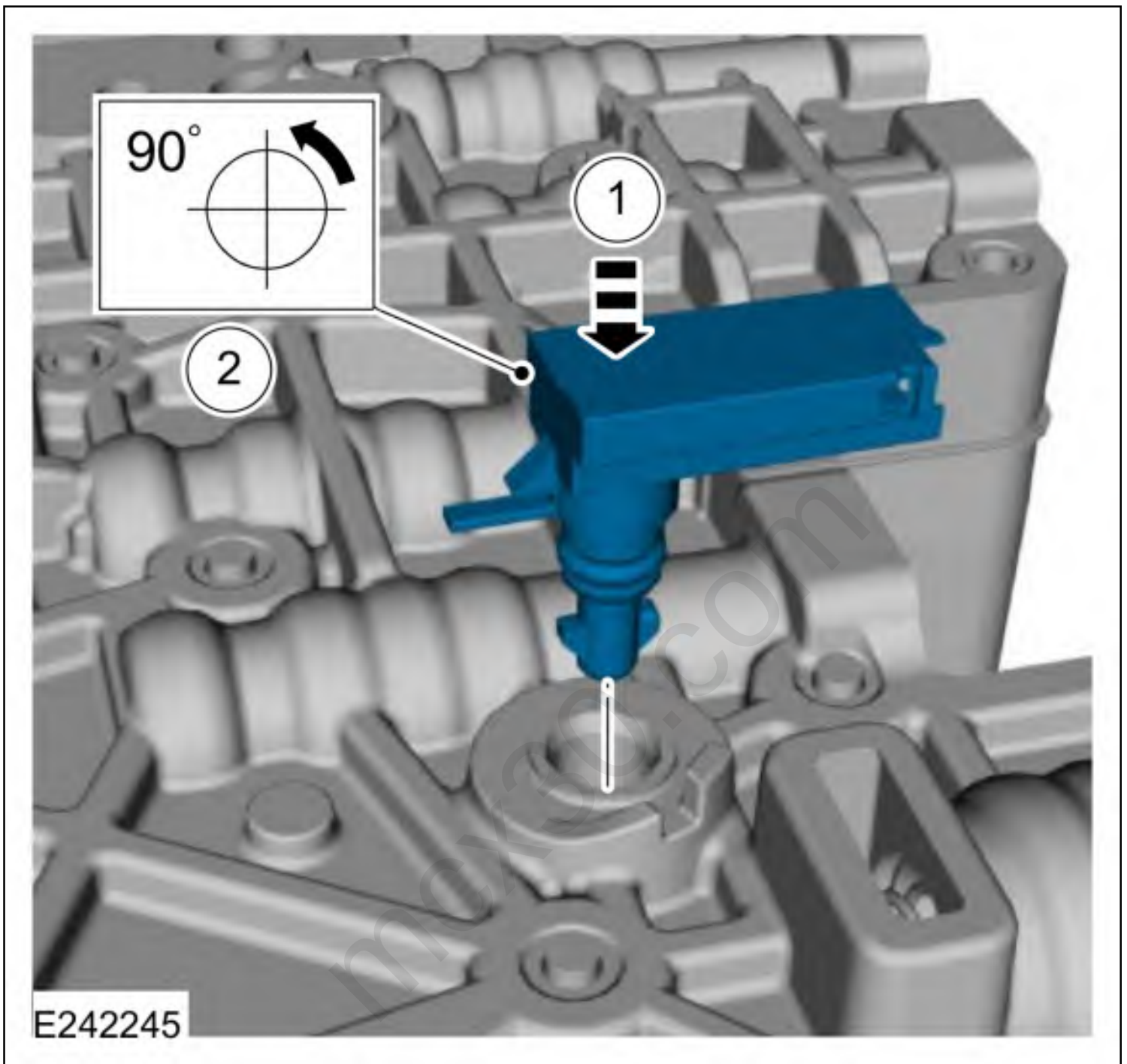
Remove the TFT sensor.

1. Lift plastic tab.
2. Rotate the TFT sensor clockwise.
3. Remove the TFT sensor.

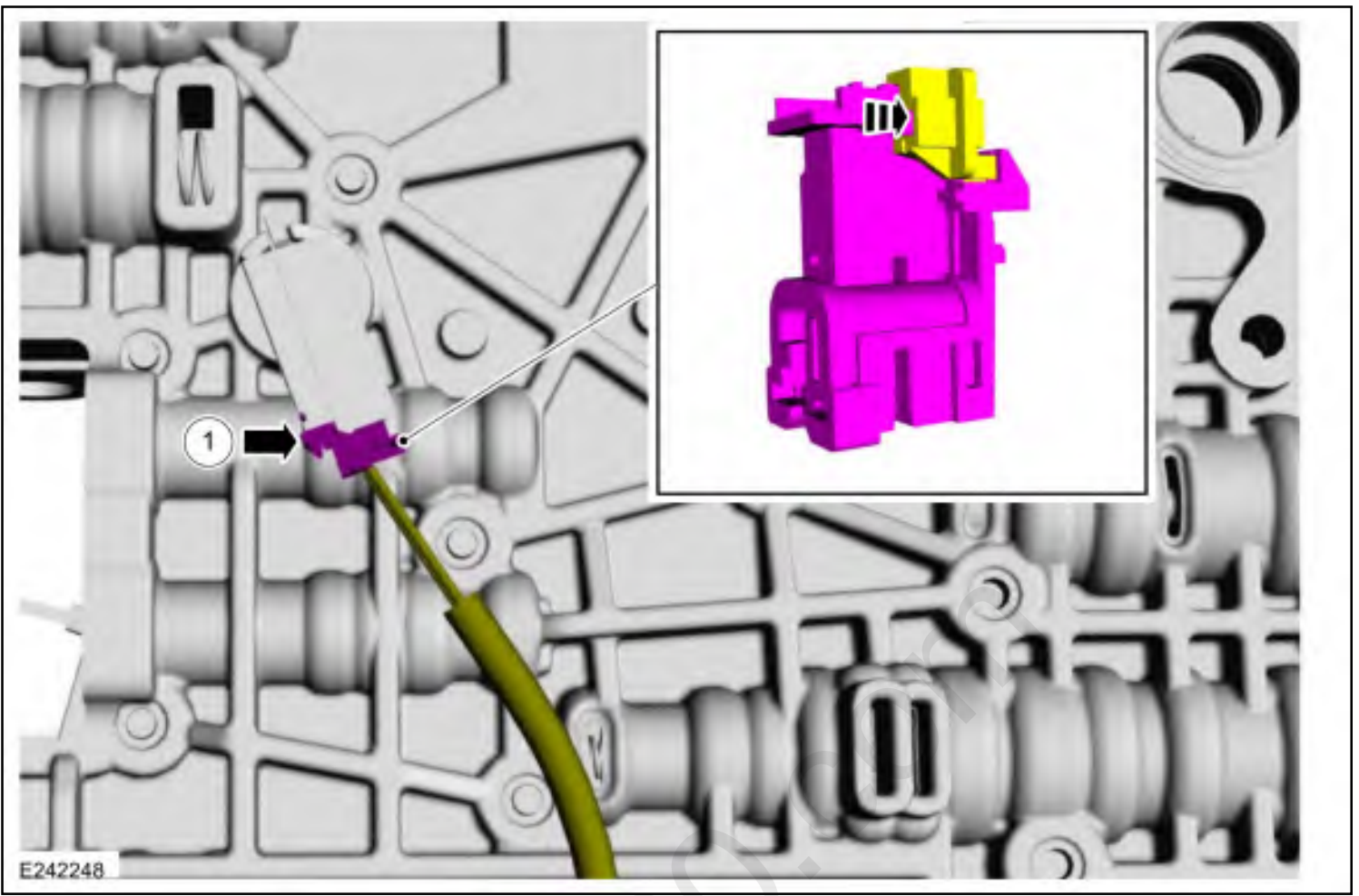


Installation

1.
Install the TFT sensor.
 1. Position the TFT sensor in the main control valve body.
 2. Rotate the TFT sensor counter clockwise until the plastic tab locks into place.



2. Connect the TFT sensor.
 1. Slide the plastic lock to the locked position.



3. Install the main control valve body.

Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: Main Control Valve Body (307-01) .

Shift Solenoids (SS)

Materials

Name	Specification
Motorcraft® MERCON® ULV Automatic Transmission Fluid XT-12-ULV	WSS-M2C494-A

Removal

All Solenoids

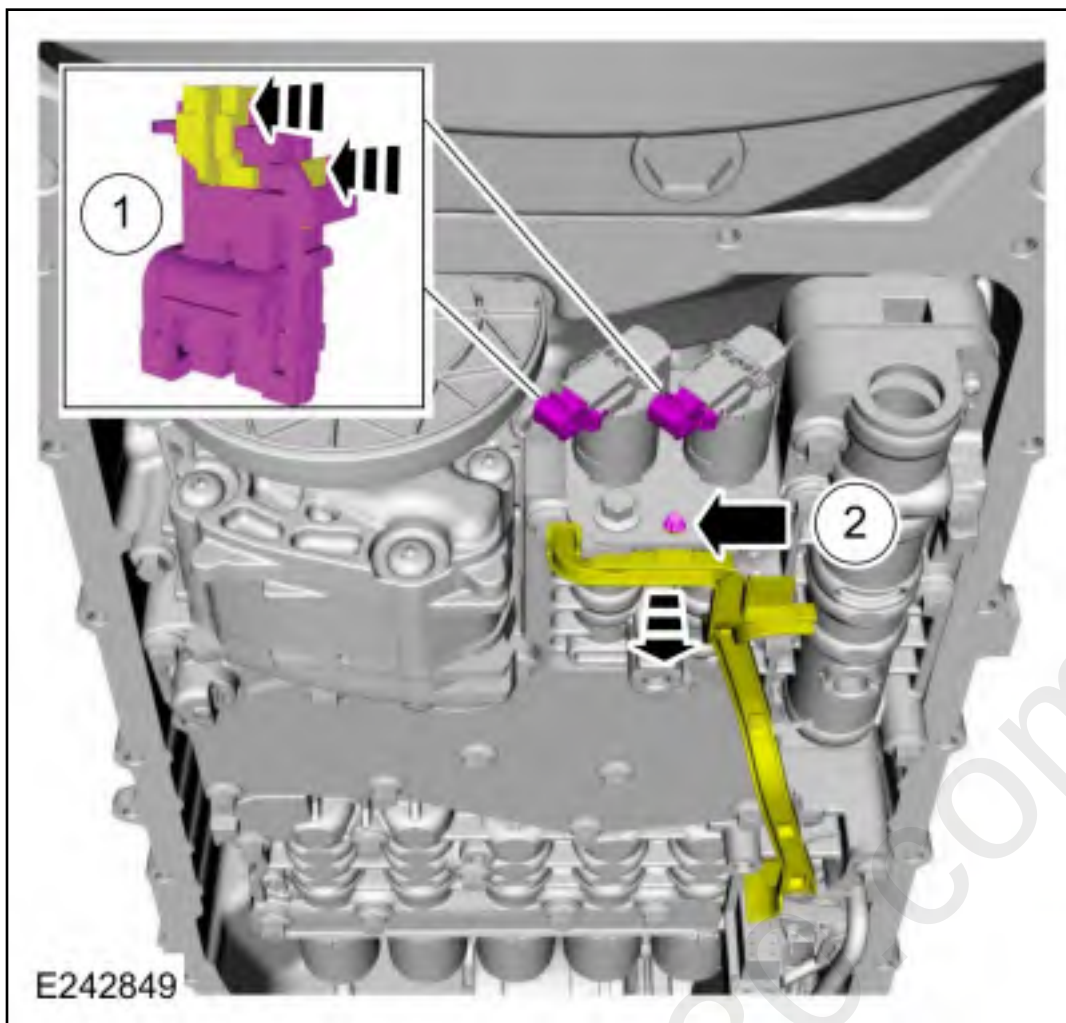
1. Remove the transmission fluid pan gasket and filter.

Refer to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

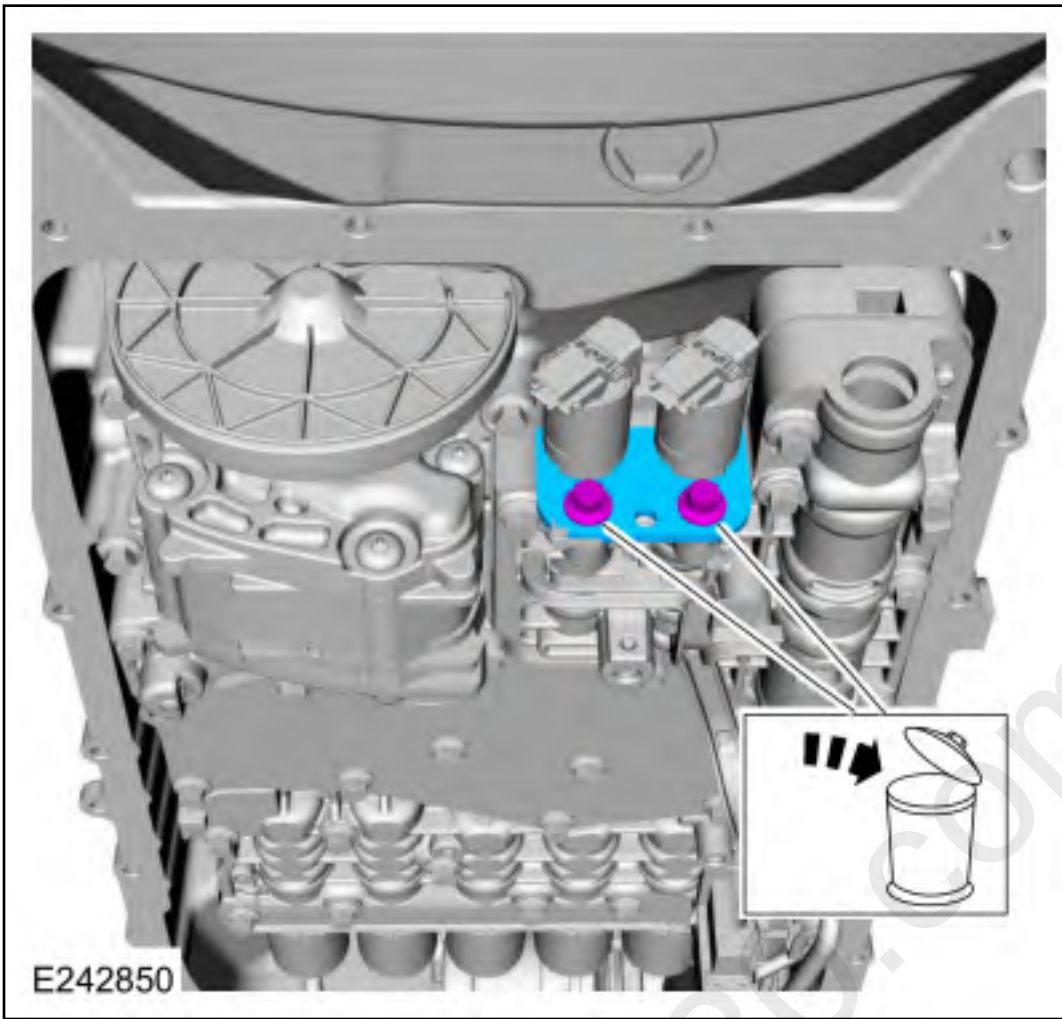
Refer to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

LPC (line pressure control) and TCC (torque converter clutch) Solenoids

1. Slide the plastic lock to the unlock position. While pressing the plastic tab, disconnect the electrical connector.
2. Disconnect the internal wiring harness retainer.



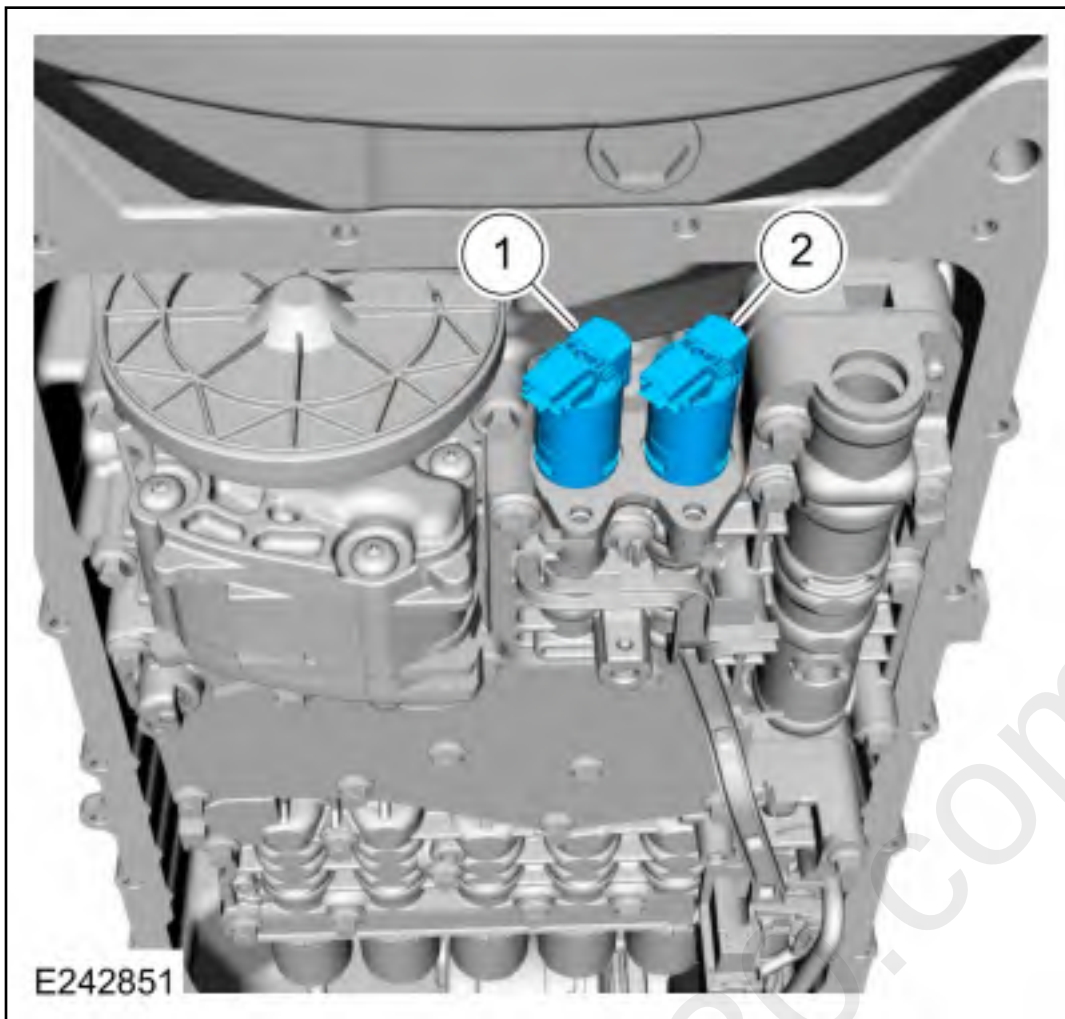
3. Remove and discard the bolts and remove the solenoid retaining plate.



4.

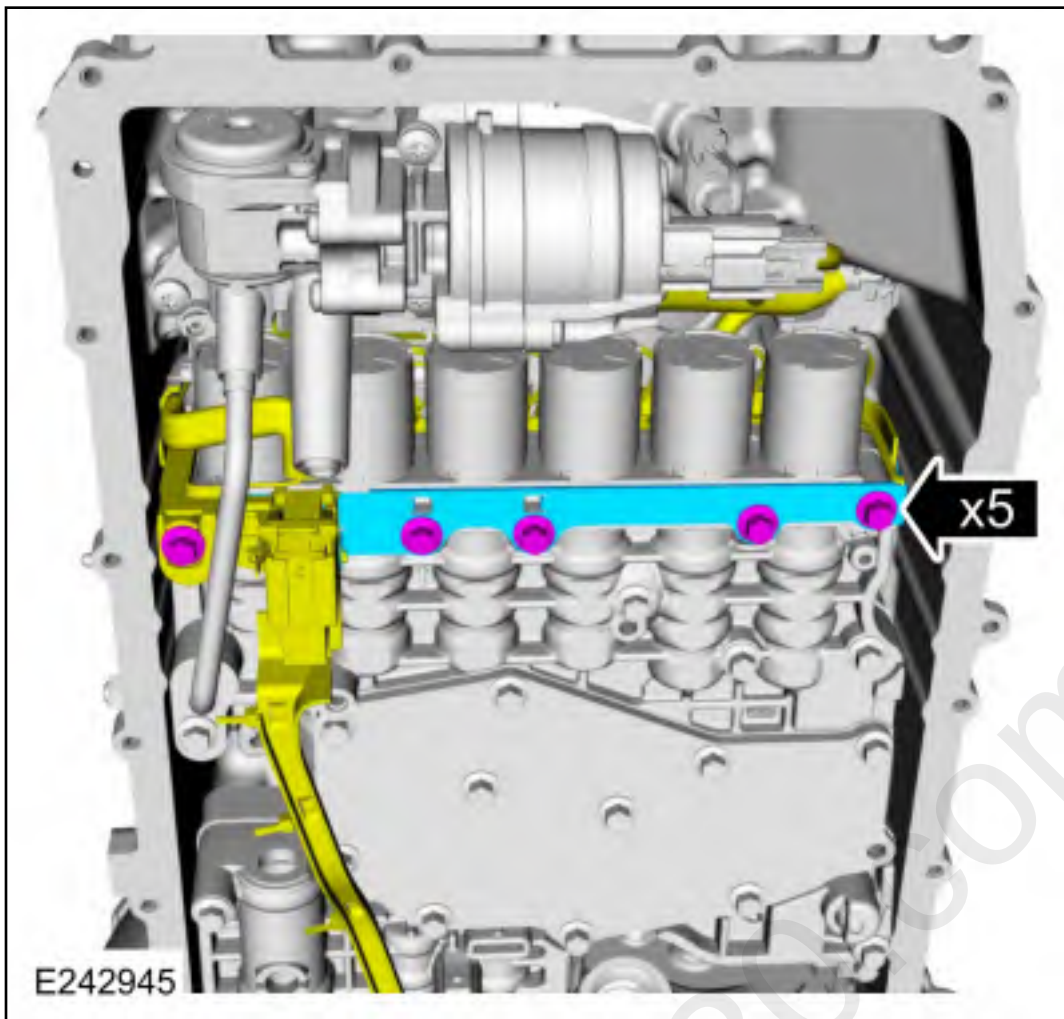
Remove the solenoid(s) from the main control valve body.

1. LPC solenoid (7G383)
2. TCC solenoid (7G136)

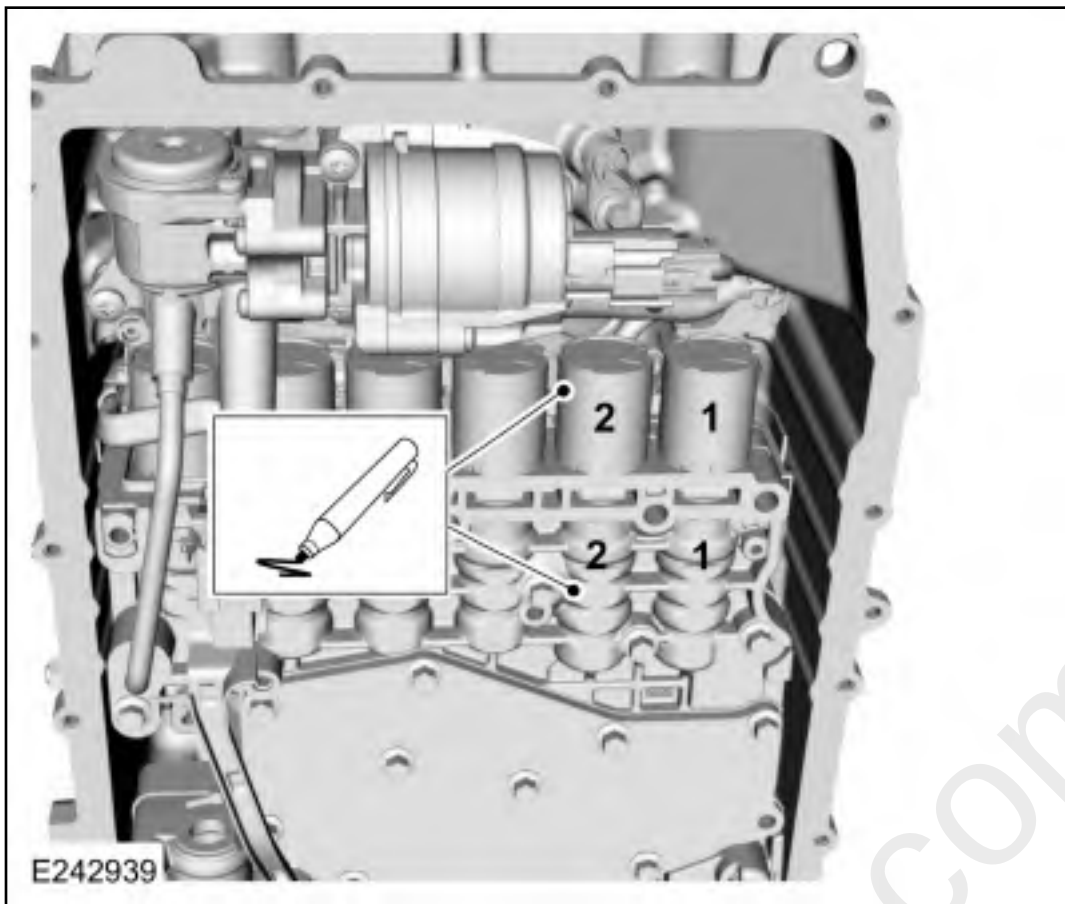


Solenoids D and E

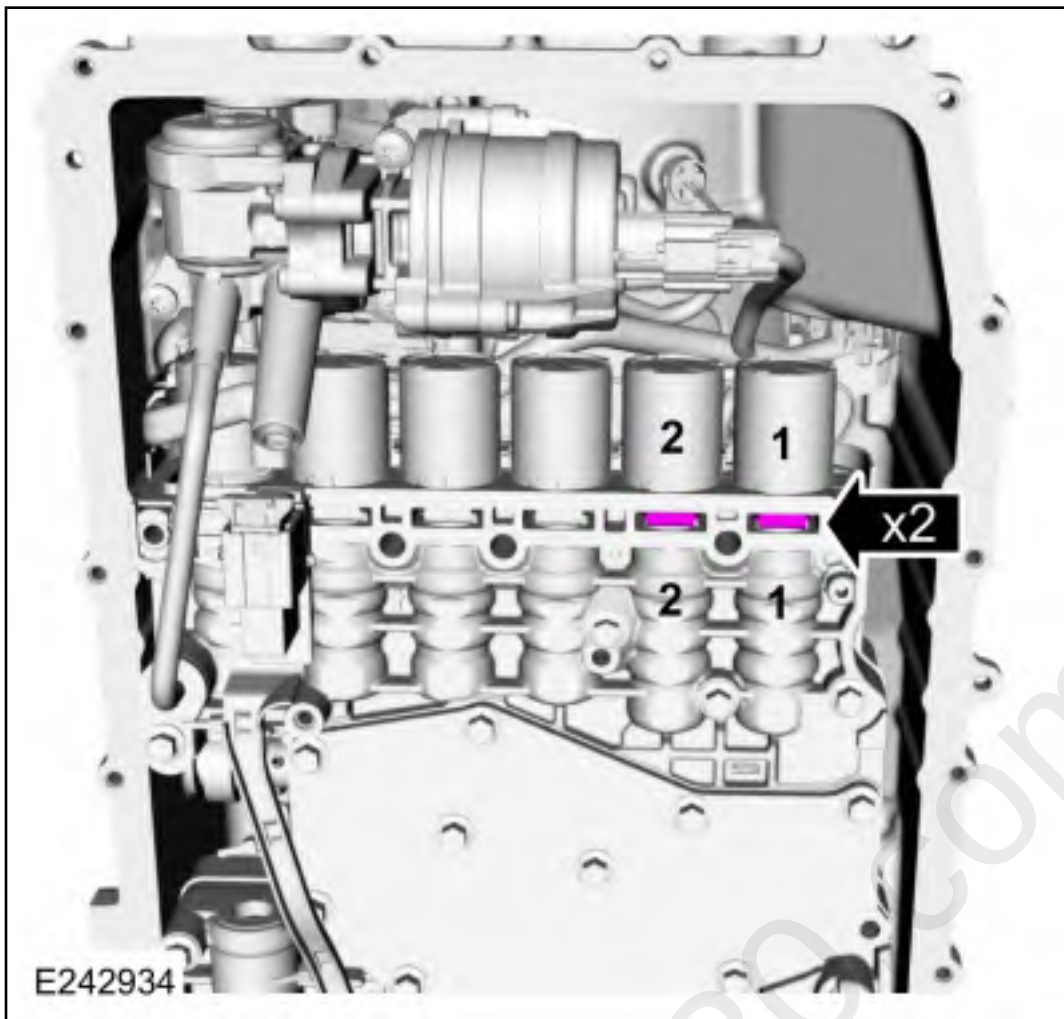
5. Remove the bolts and the shift solenoid retaining plate.



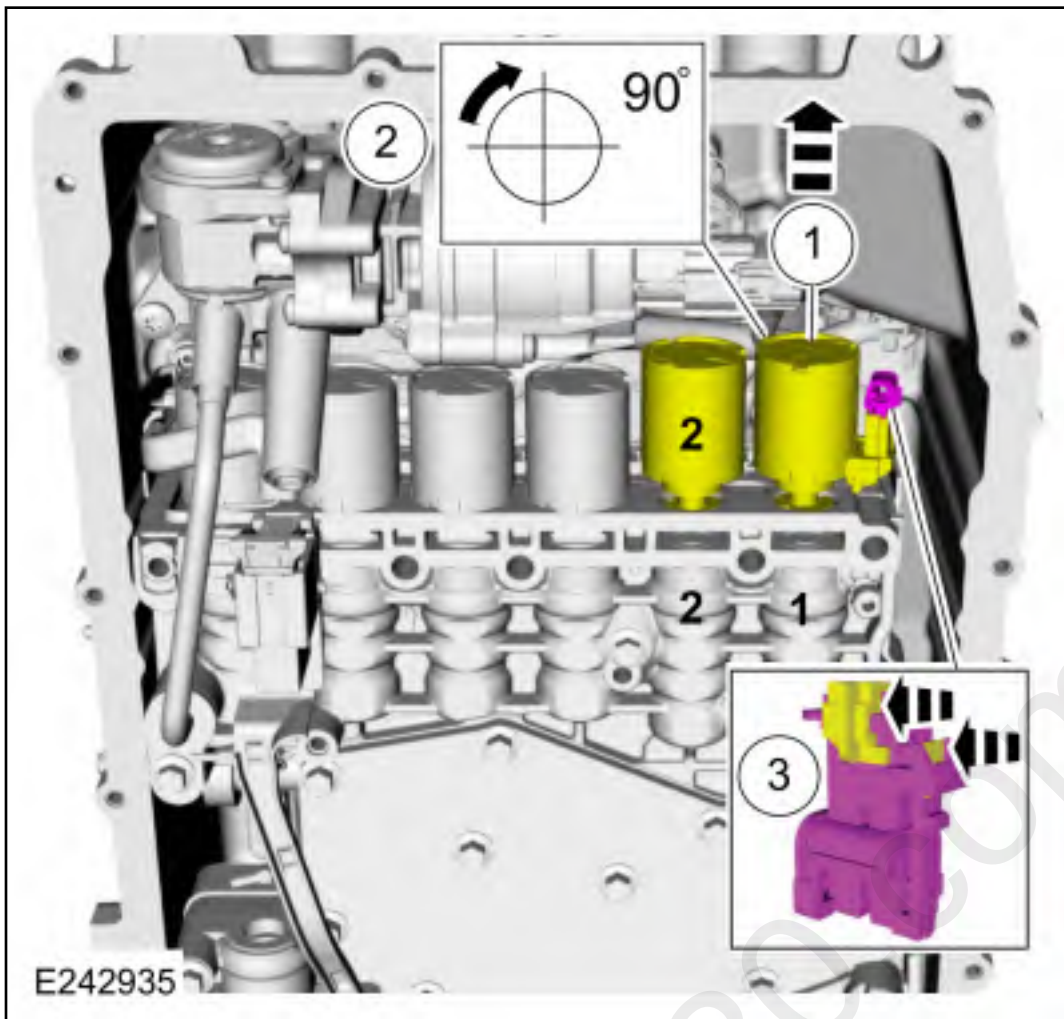
6. If replacing more than one solenoid, number the solenoids and number the main control valve body solenoid ports to correspond to the solenoid.



7. Remove the shift solenoid retainer(s).



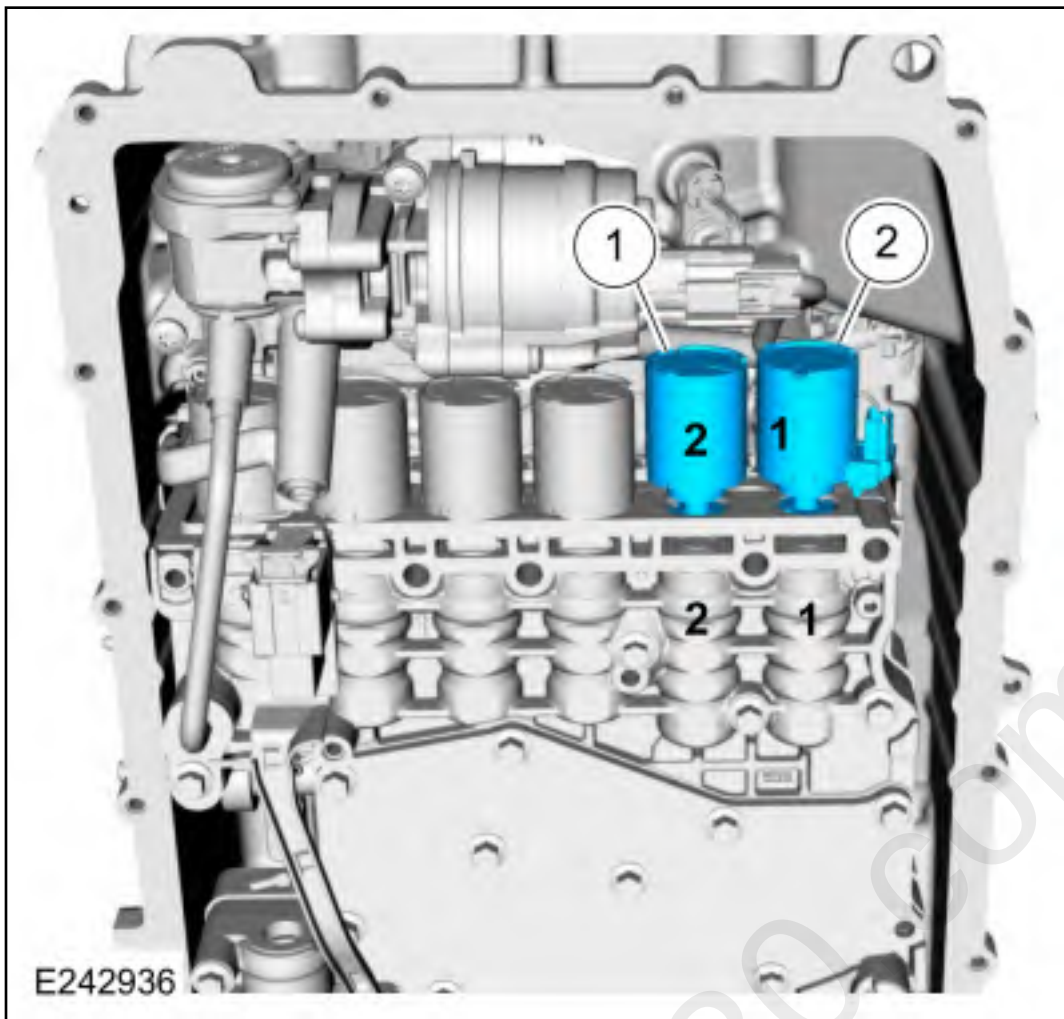
1. Slide the solenoid(s) out of the main control valve body bore.
2. Rotate the solenoid(s) in a clockwise direction.
3. Slide the plastic lock to the unlock position. While pressing the plastic tab, disconnect the electrical connector.



9.

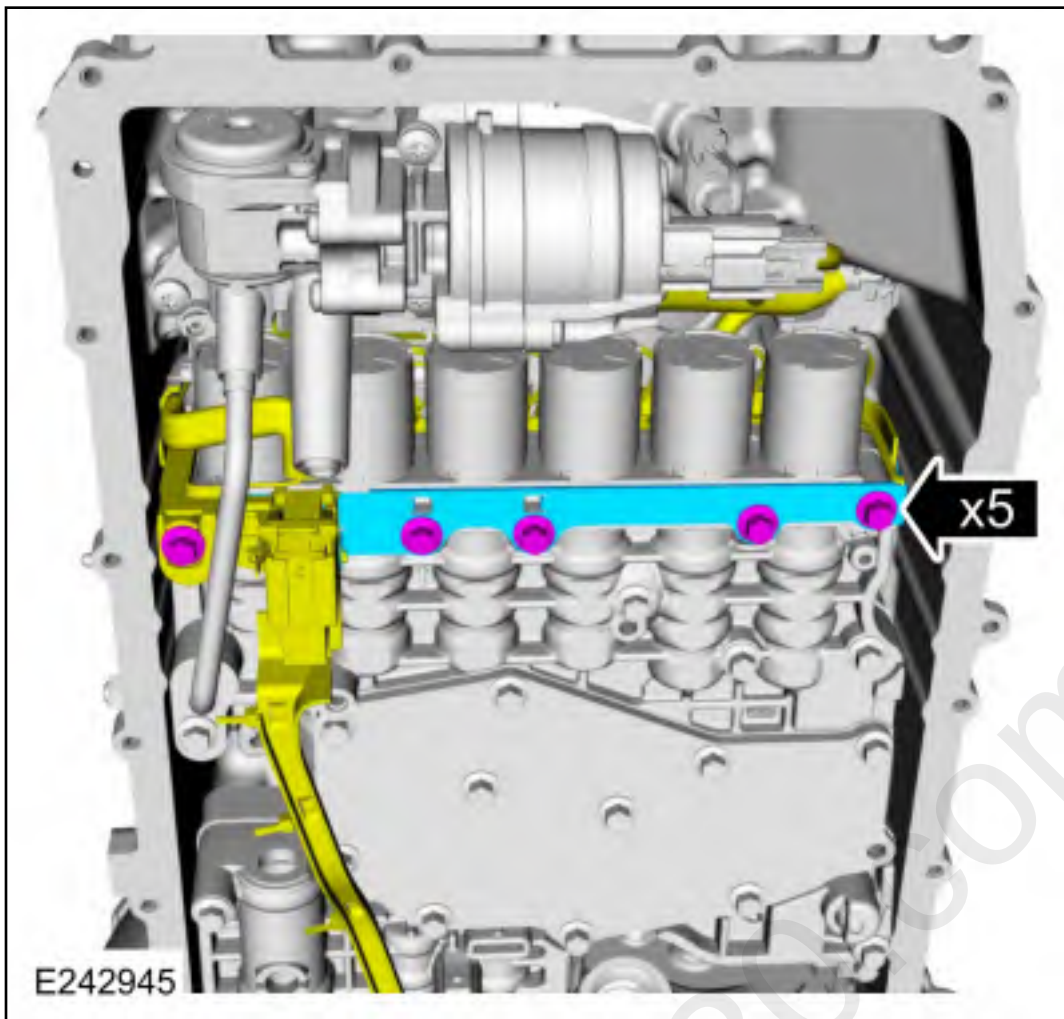
Remove the solenoid(s) from the main control valve body.

1. SSE (7J136)
2. SSD (7J136)

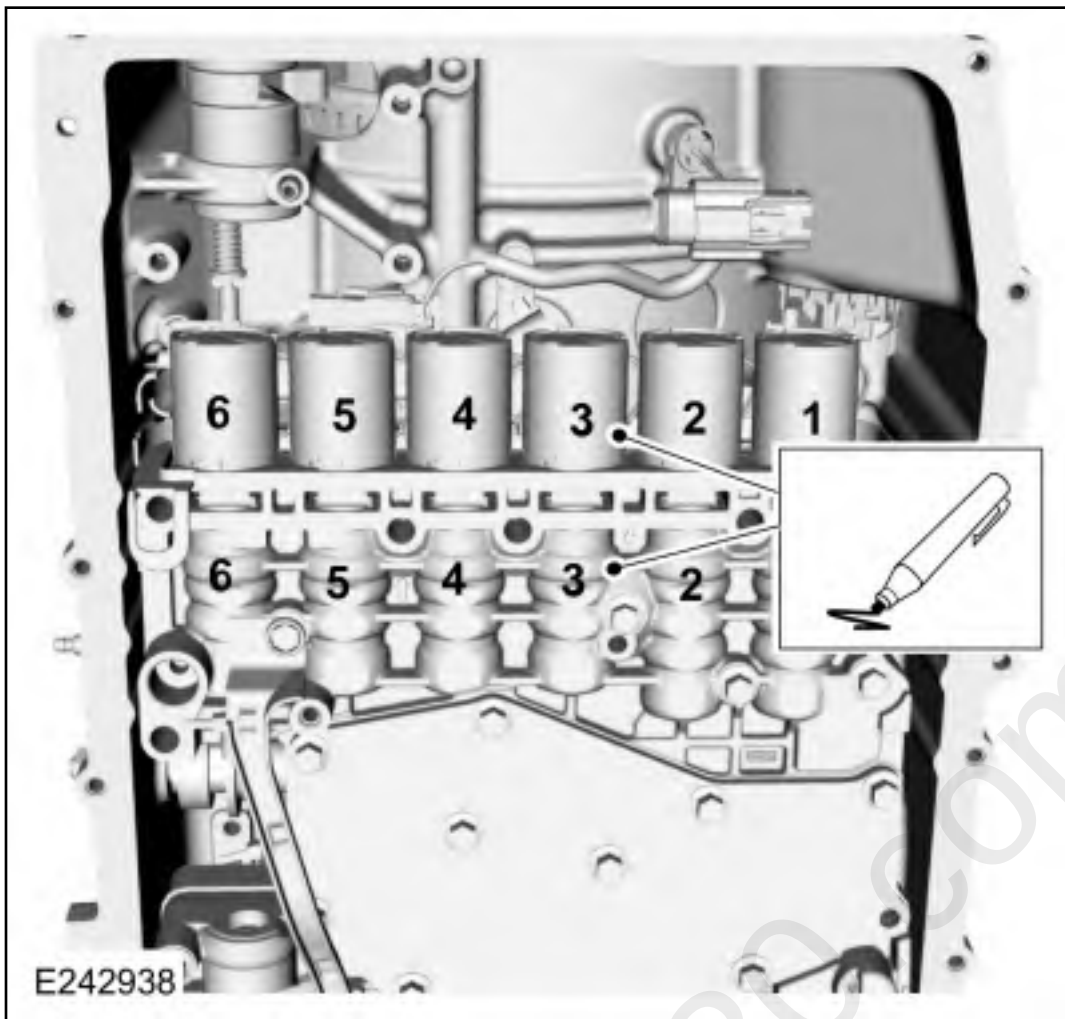


Solenoids A, B, C, and F

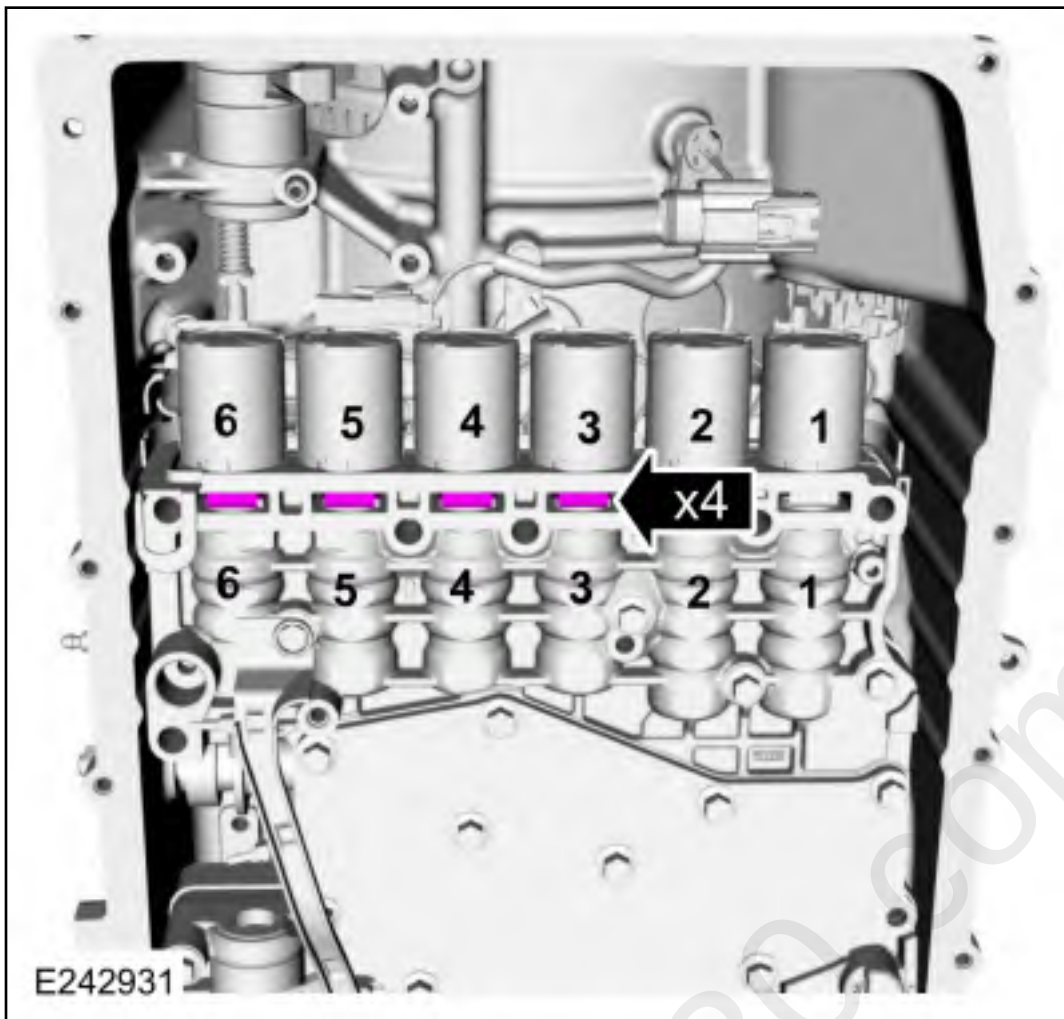
10. Remove the bolts and the shift solenoid retaining plate.



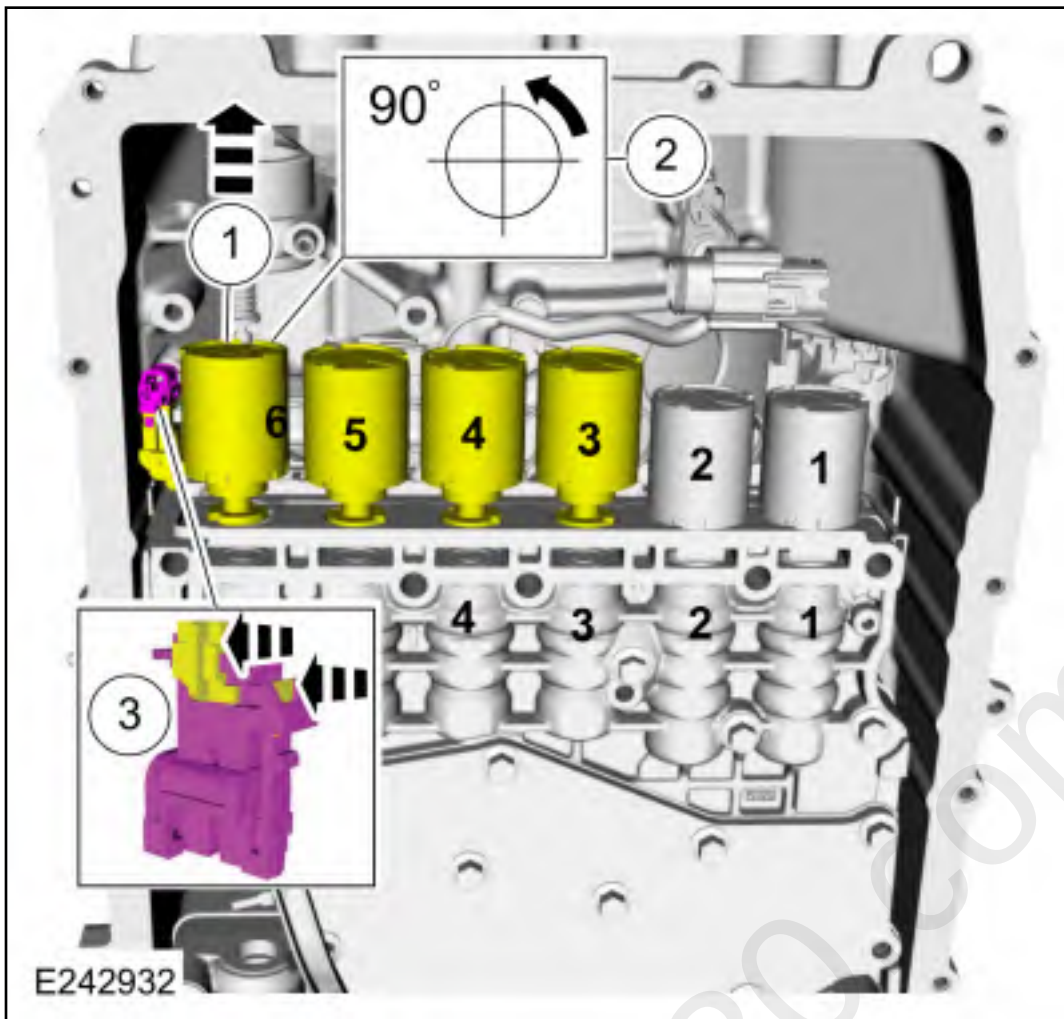
11. Remove the transmission fluid auxiliary pump.
Refer to: [Transmission Fluid Auxiliary Pump](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
12. If replacing more than one solenoid, number the solenoids and number the main control valve body solenoid ports to correspond to the solenoid.



13. Remove the shift solenoid retainer(s).



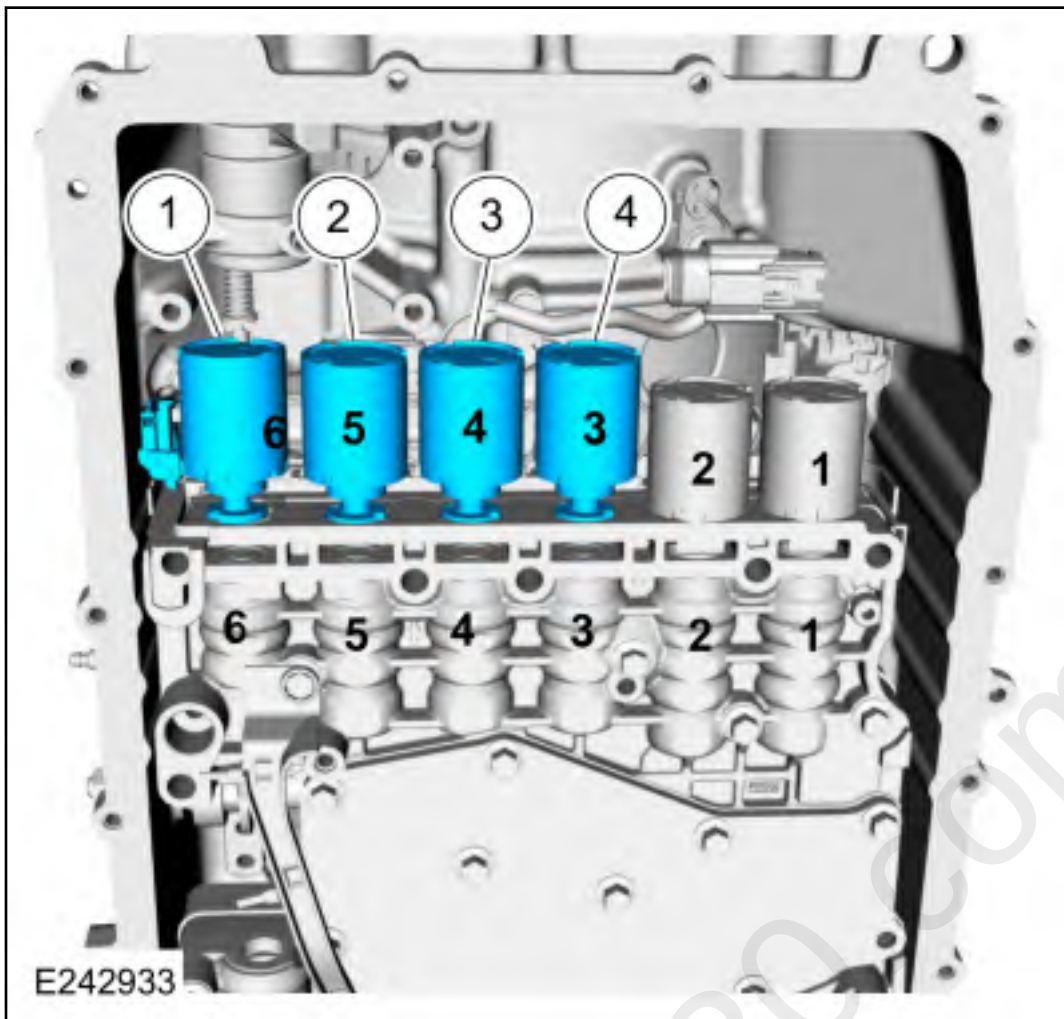
1. Slide the solenoid(s) out of the main control valve body bore.
2. Rotate the solenoid(s) in a counter-clockwise direction.
3. Slide the plastic lock to the unlock position. While pressing the plastic tab, disconnect the electrical connector.



15.

Remove the solenoid(s) from the main control valve body.

1. SSA (7J136)
2. SSF (7J136)
3. SSC (7J136)
4. SSB (7J136)



Installation

Solenoids A, B, C, and F

1. **NOTICE:** Solenoids are calibrated from the factory and are not all the same. To replace a solenoid, match the band number with the original solenoid or harsh shifts or damage to the transmission can occur.

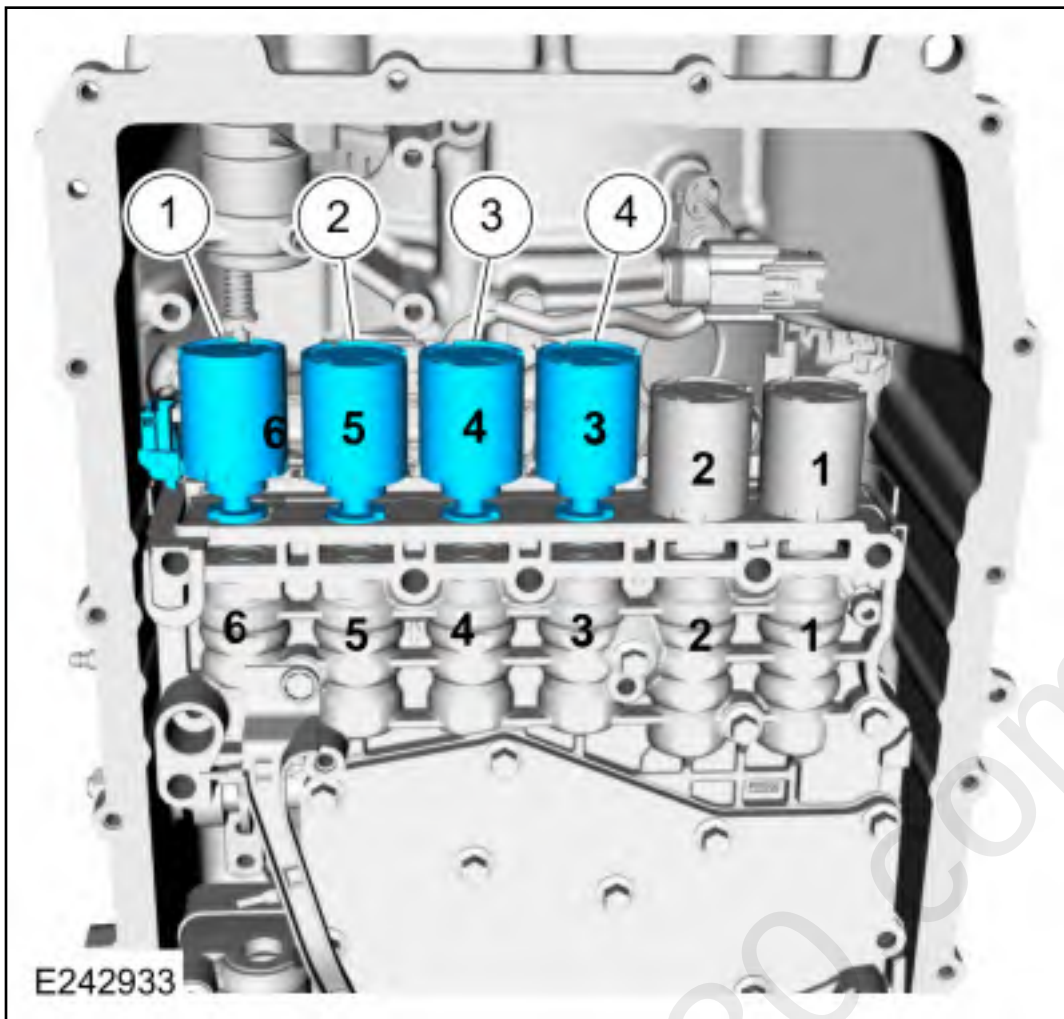
If new solenoids are needed, identify the solenoid band number.



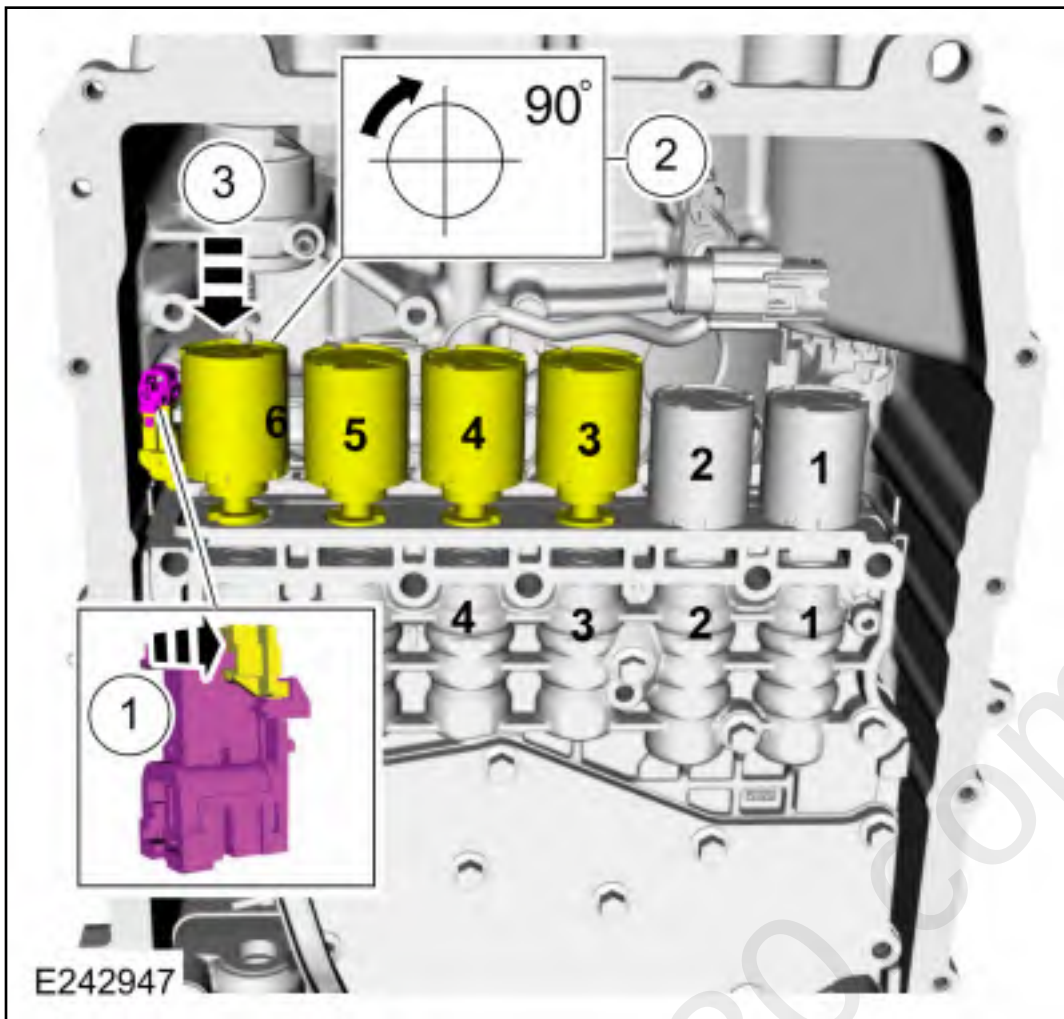
2.

Install the solenoid(s) in the main control valve body in the correct port(s) as marked during removal.

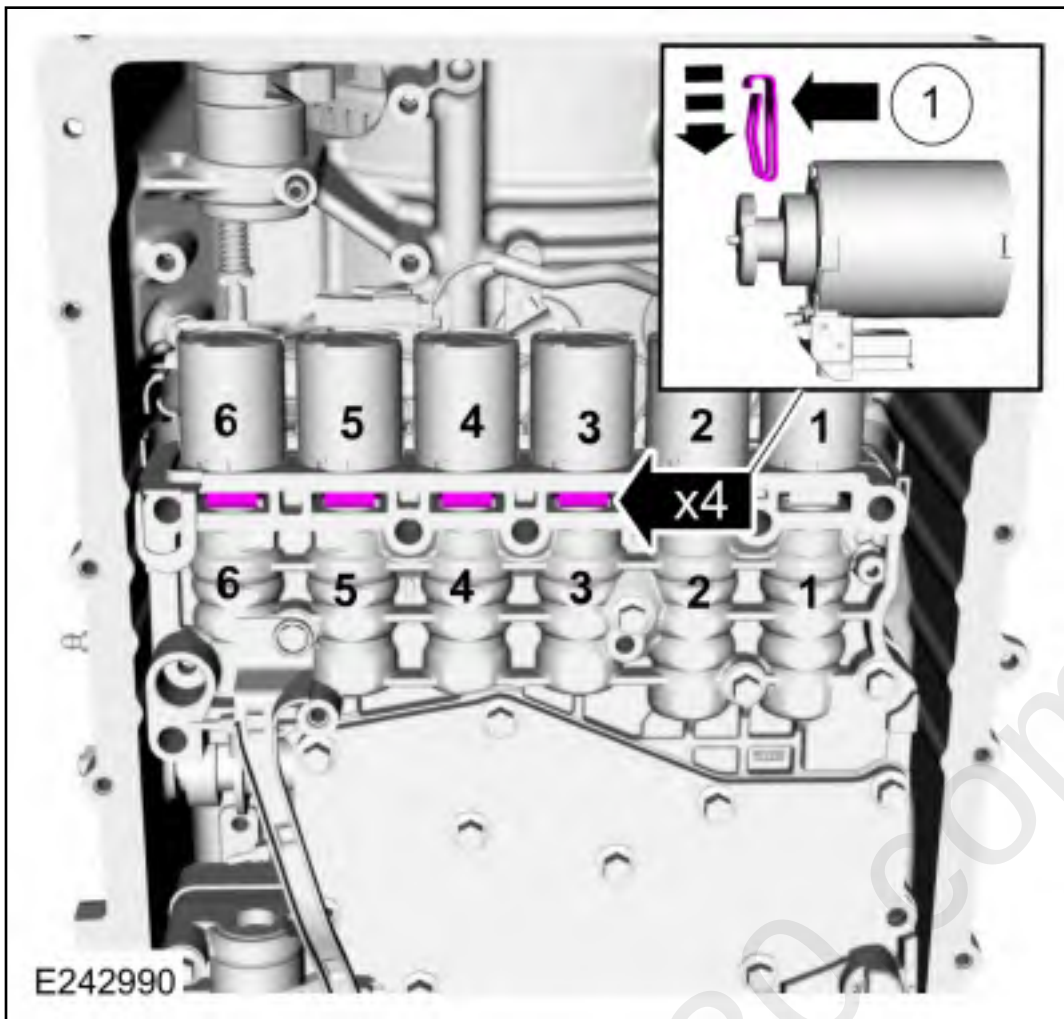
1. SSA (7J136)
2. SSF (7J136)
3. SSC (7J136)
4. SSB (7J136)



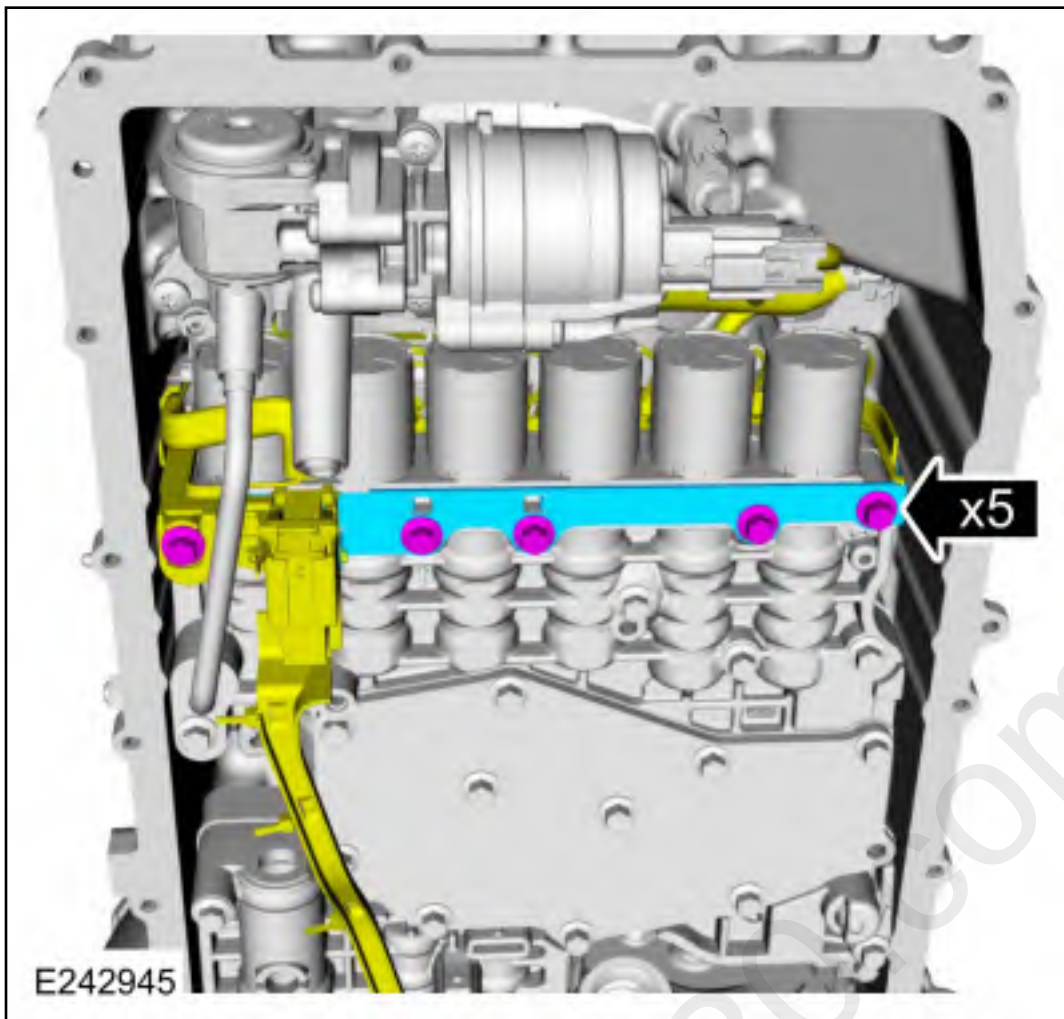
1. Connect the electrical connectors and slide the plastic lock to the locked position.
2. Rotate the solenoid(s) in a clockwise direction.
3. Slide the solenoid(s) into the main control valve body bore.



4. Install the shift solenoid retainer(s) with the flat side towards the solenoids.
 1. Retainer flat side



5. Install the transmission fluid auxiliary pump.
Refer to: [Transmission Fluid Auxiliary Pump](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
6. Install and the shift solenoid retaining plate and the bolts.
Torque: 106 lb.in (12 Nm)



Solenoids D and E

7. **NOTICE:** Solenoids are calibrated from the factory and are not all the same. To replace a solenoid, match the band number with the original solenoid or harsh shifts or damage to the transmission can occur.

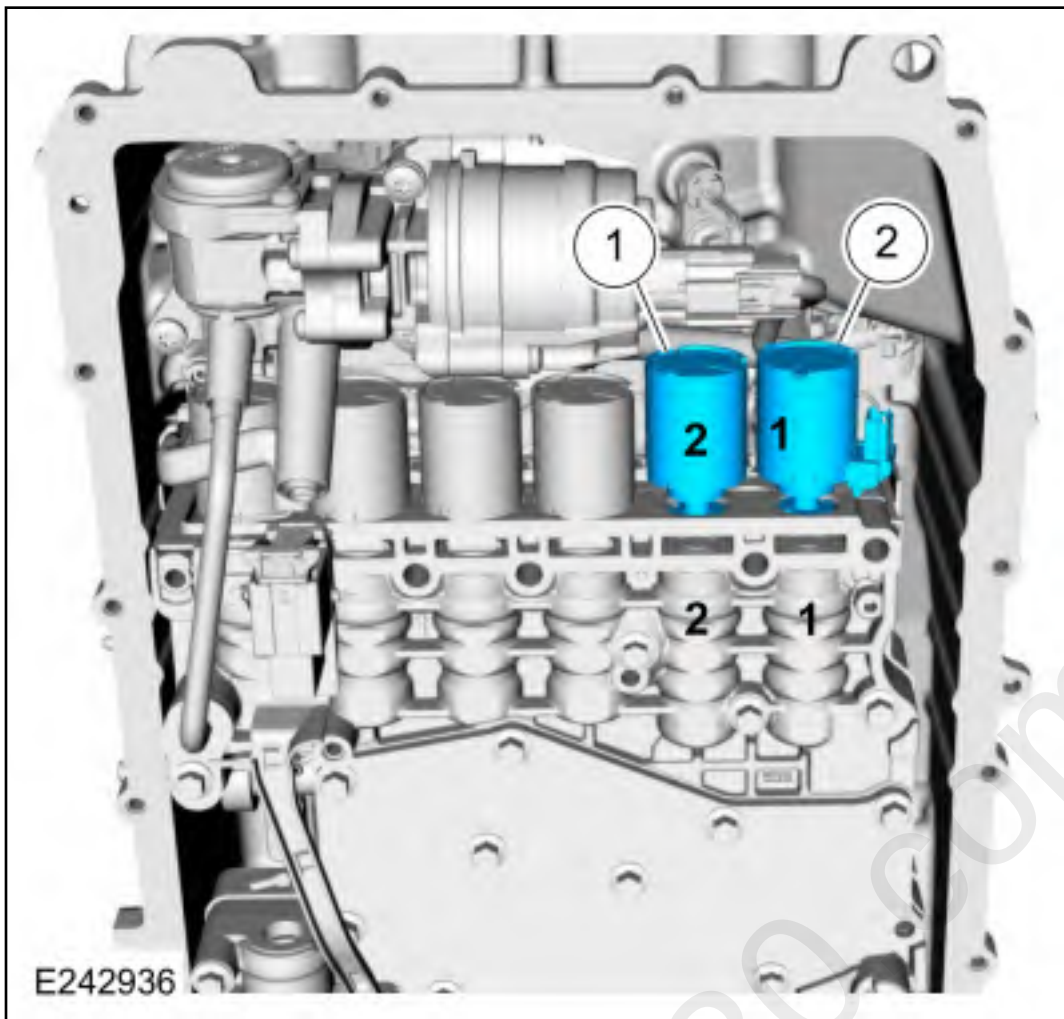
If new solenoids are needed, identify the solenoid band number.



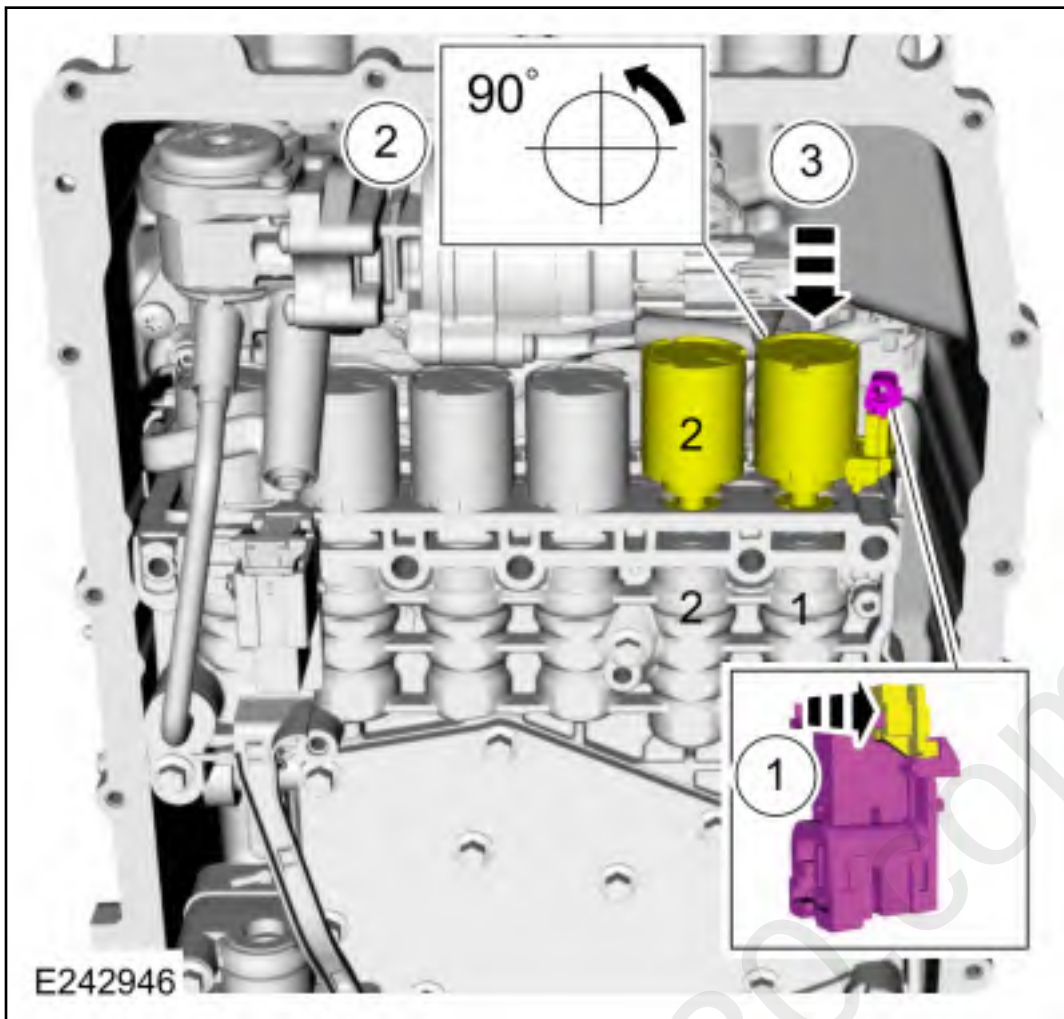
8.

Install the solenoid(s) in the main control valve body in the correct port(s) as marked during removal.

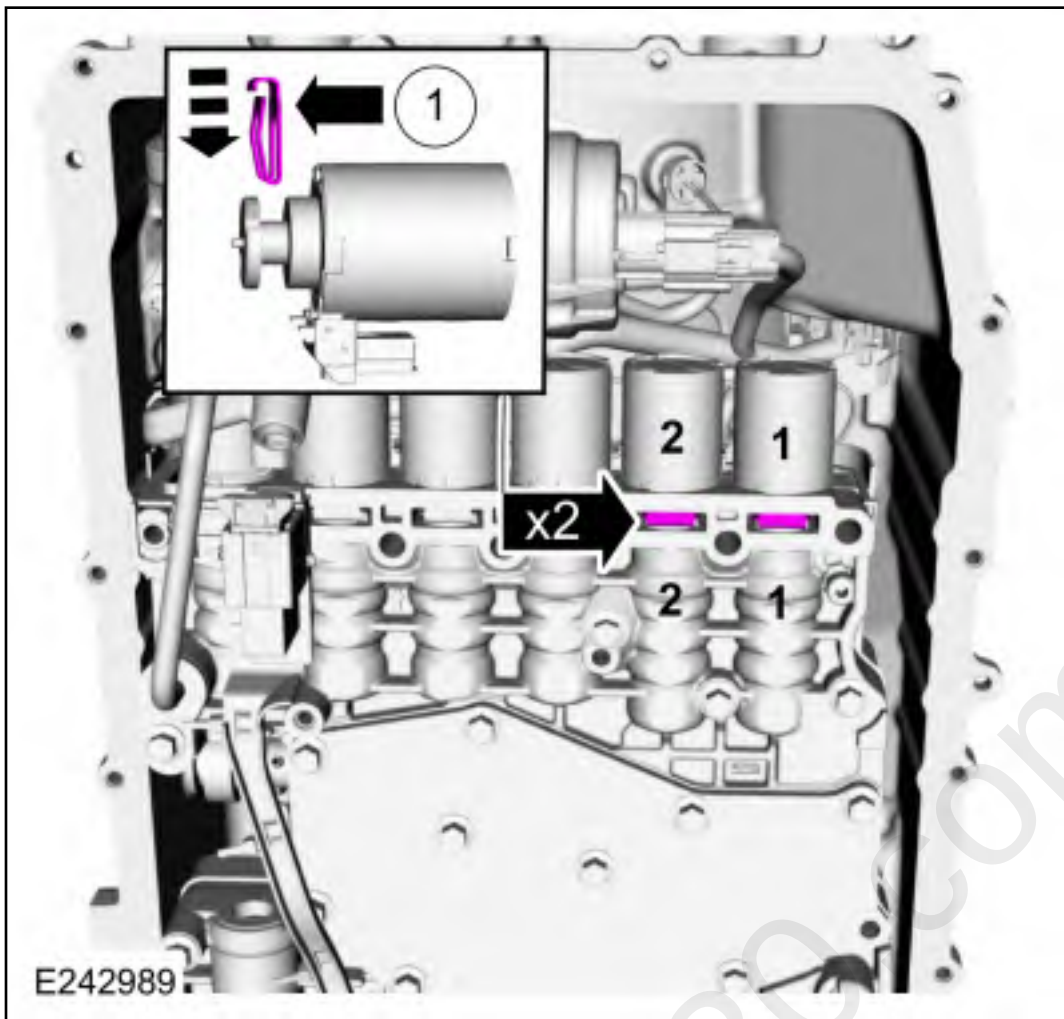
1. SSE (7J136)
2. SSD (7J136)



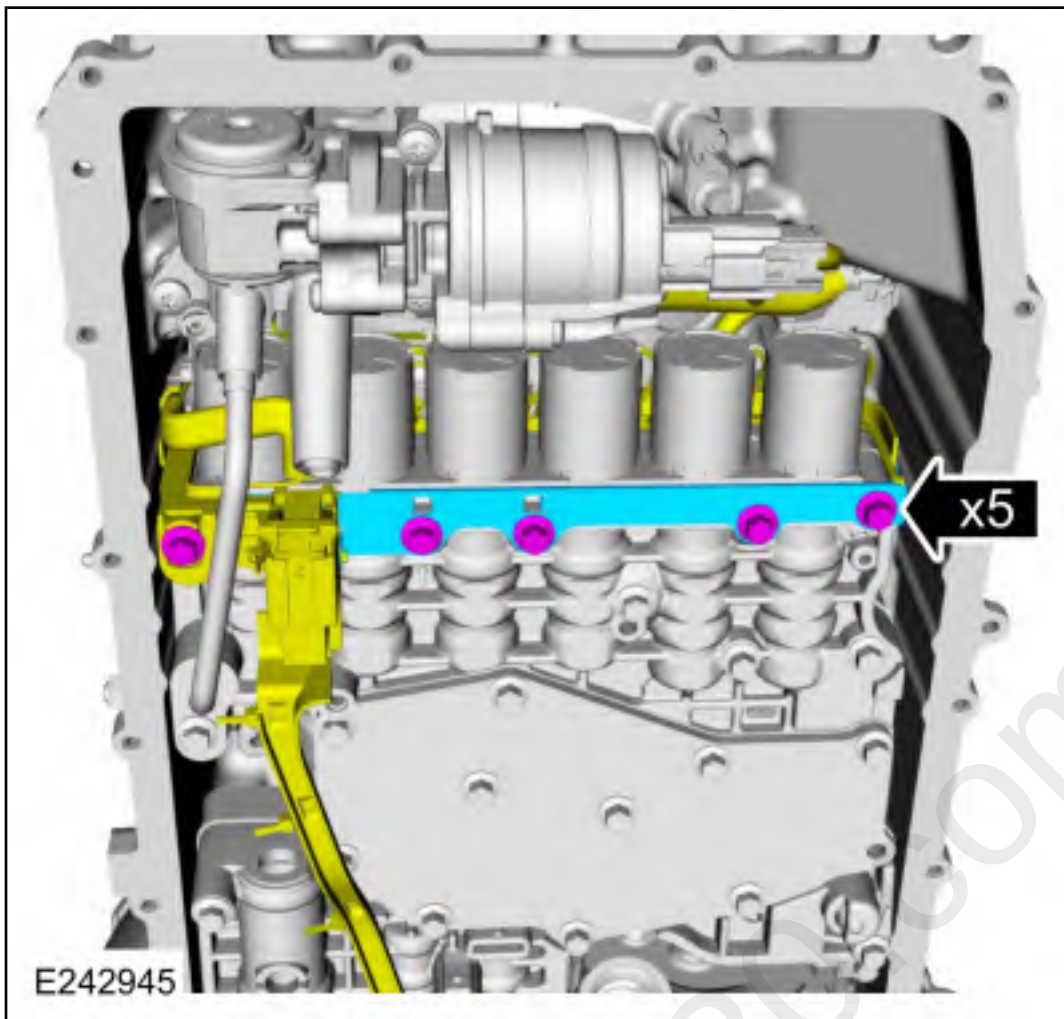
1. Connect the electrical connectors and slide the plastic lock to the locked position.
2. Rotate the solenoid(s) in a counter-clockwise direction.
3. Slide the solenoid(s) into the main control valve body bore.



10. Install the shift solenoid retainer(s) with the flat side towards the solenoids.
 1. Retainer flat side



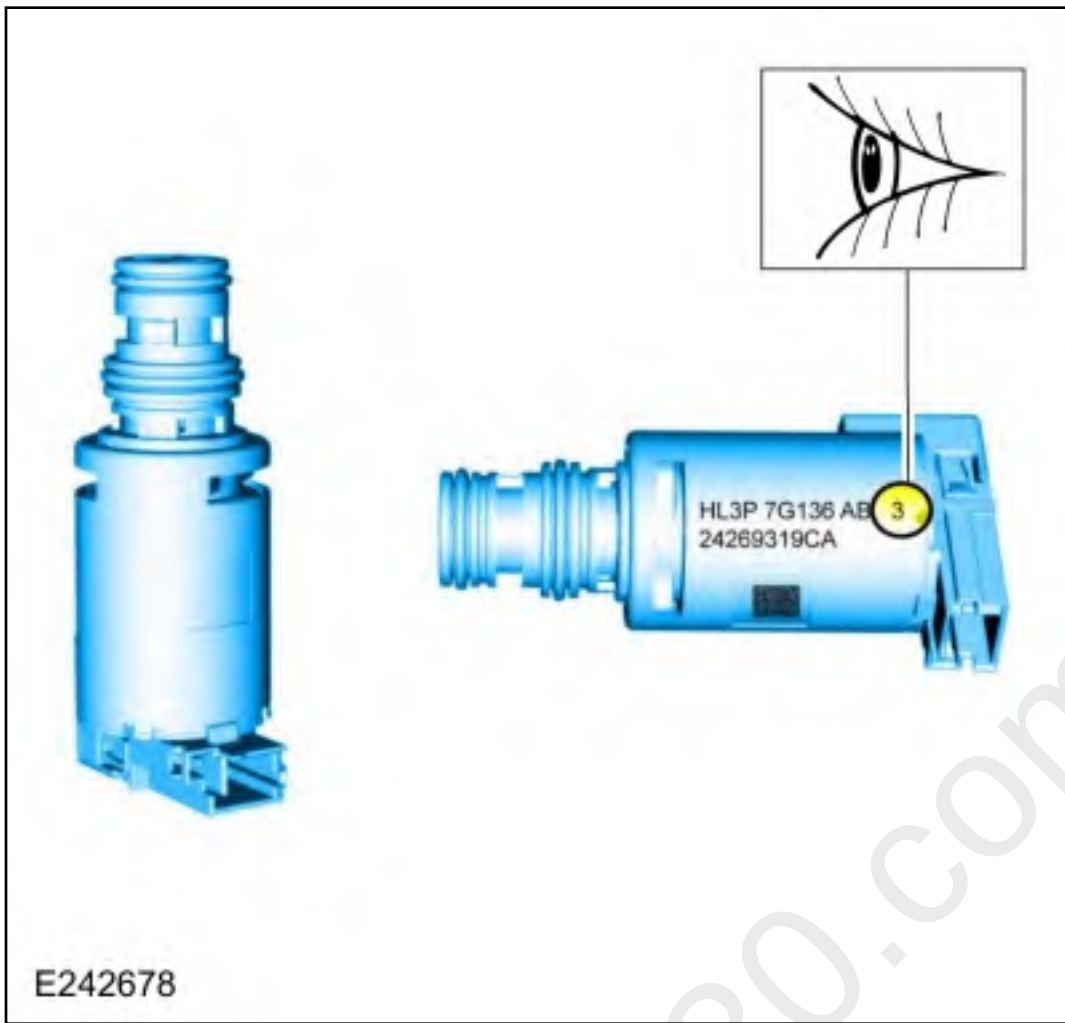
11. Install and the shift solenoid retaining plate and the bolts.
Torque: 106 lb.in (12 Nm)



LPC (line pressure control) and TCC (torque converter clutch) Solenoids

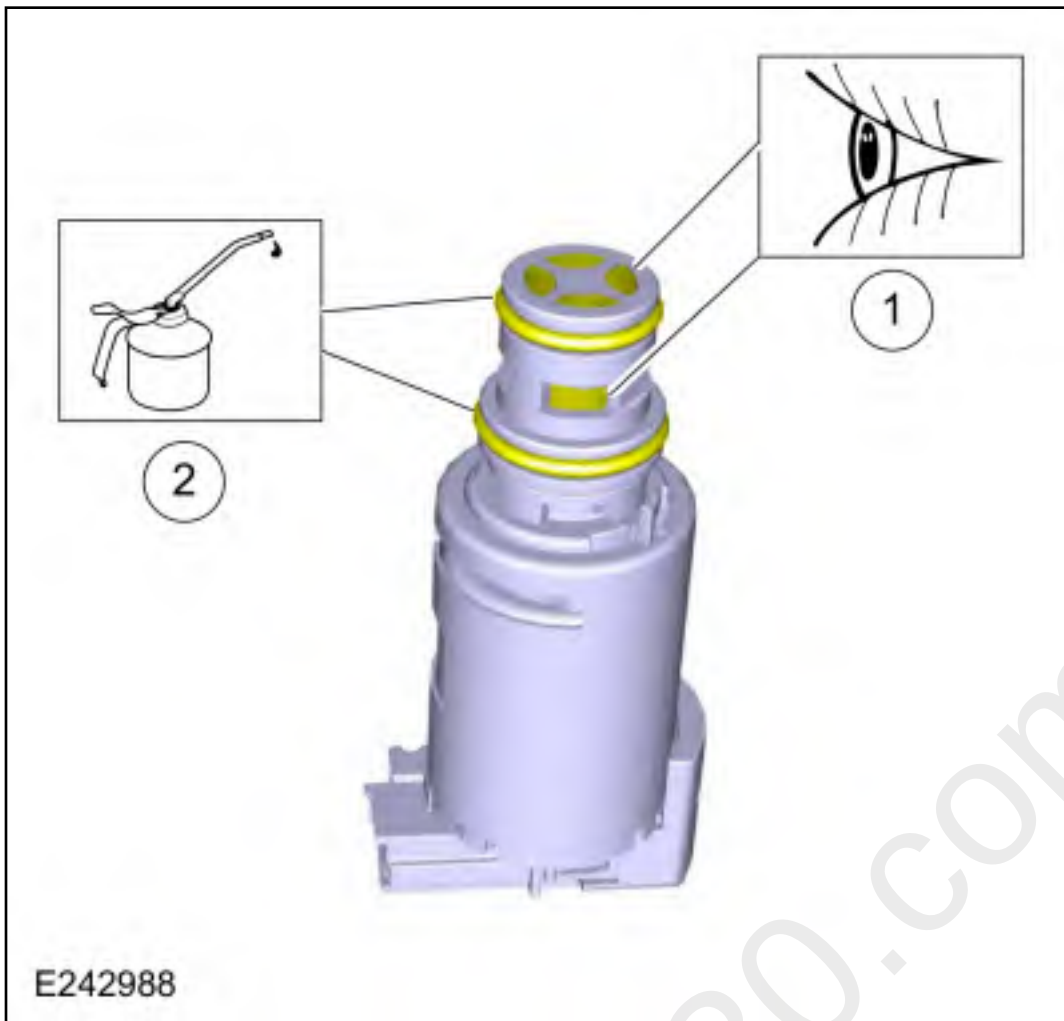
12. **NOTICE:** Solenoids are calibrated from the factory and are not all the same. To replace a solenoid, match the replacement solenoid type (normally high/normally low) and the band number with the original solenoid or harsh shifts or damage to the transmission can occur.

If new solenoids are needed, identify which type (normally high/normally low) of solenoid it is and the solenoid band number.



1. Inspect the solenoid screens for debris that may restrict fluid flow.
2. Lubricate the solenoid O-ring seals.

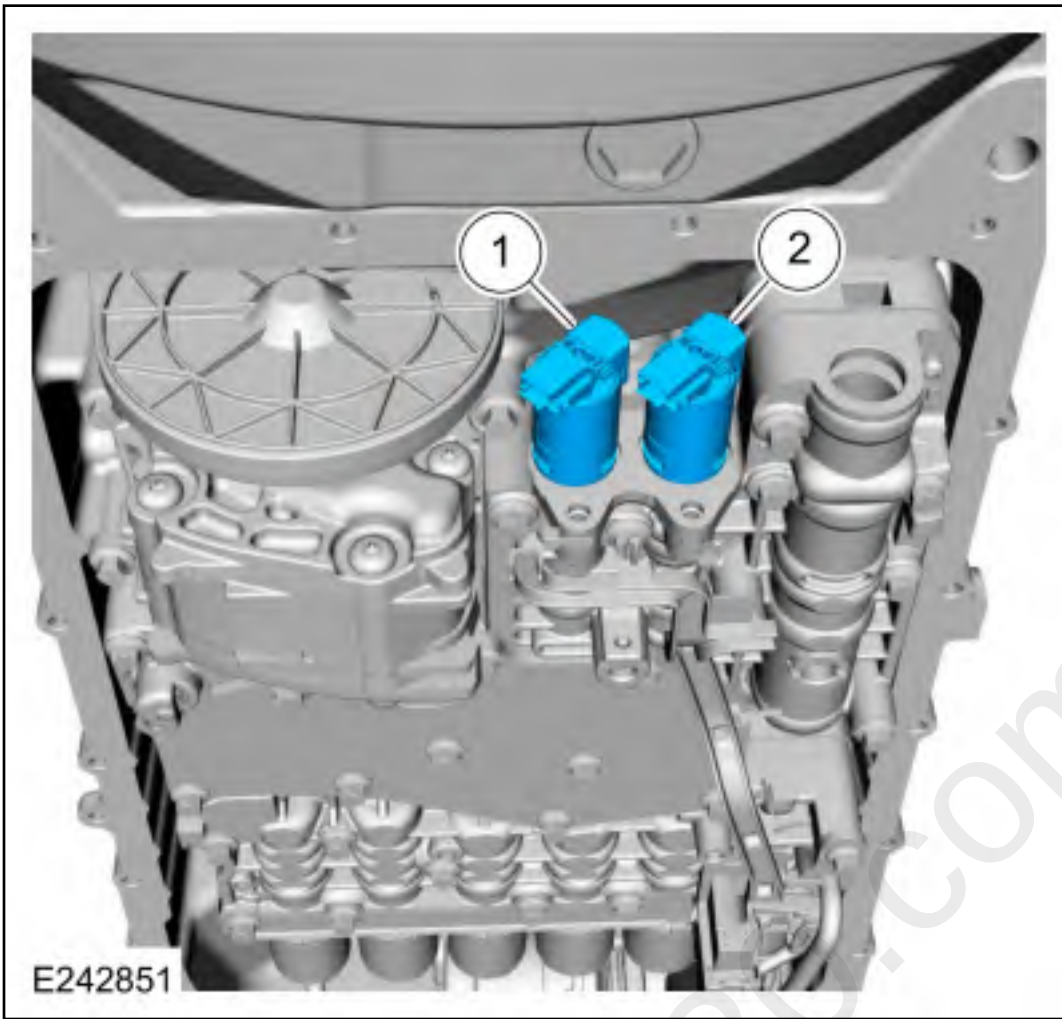
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-ULV (WSS-M2C494-A)



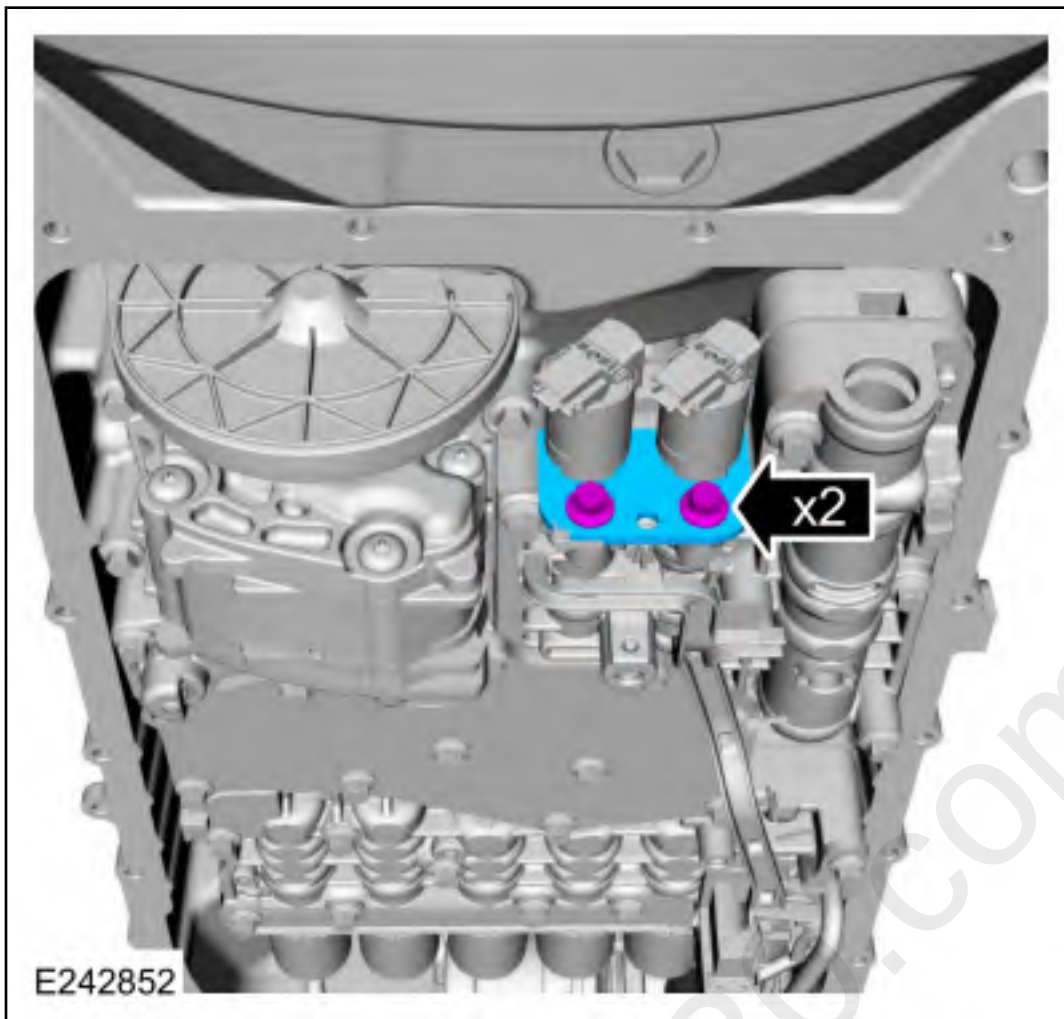
14.

Install the solenoid(s) in the main control valve body.

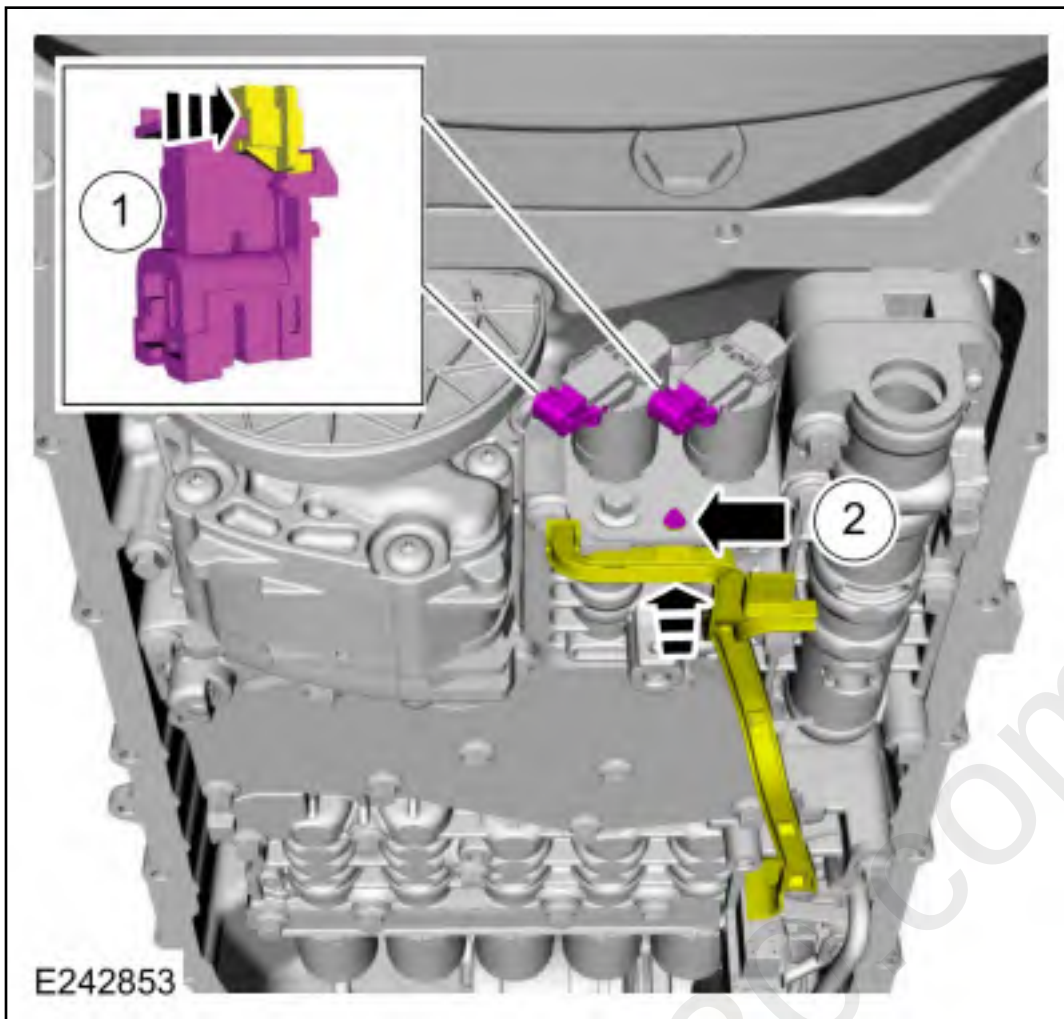
1. LPC solenoid (7G383)
2. TCC solenoid (7G136)



15. Install the solenoid retaining plate and the new bolts.
Torque: 80 lb.in (9 Nm)



1. Connect the electrical connectors and slide the plastic lock to the locked position.
2. Connect the internal wiring harness retainer.



All Solenoids

17. Install the transmission fluid pan gasket and filter.

Refer to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Transmission Support Insulator

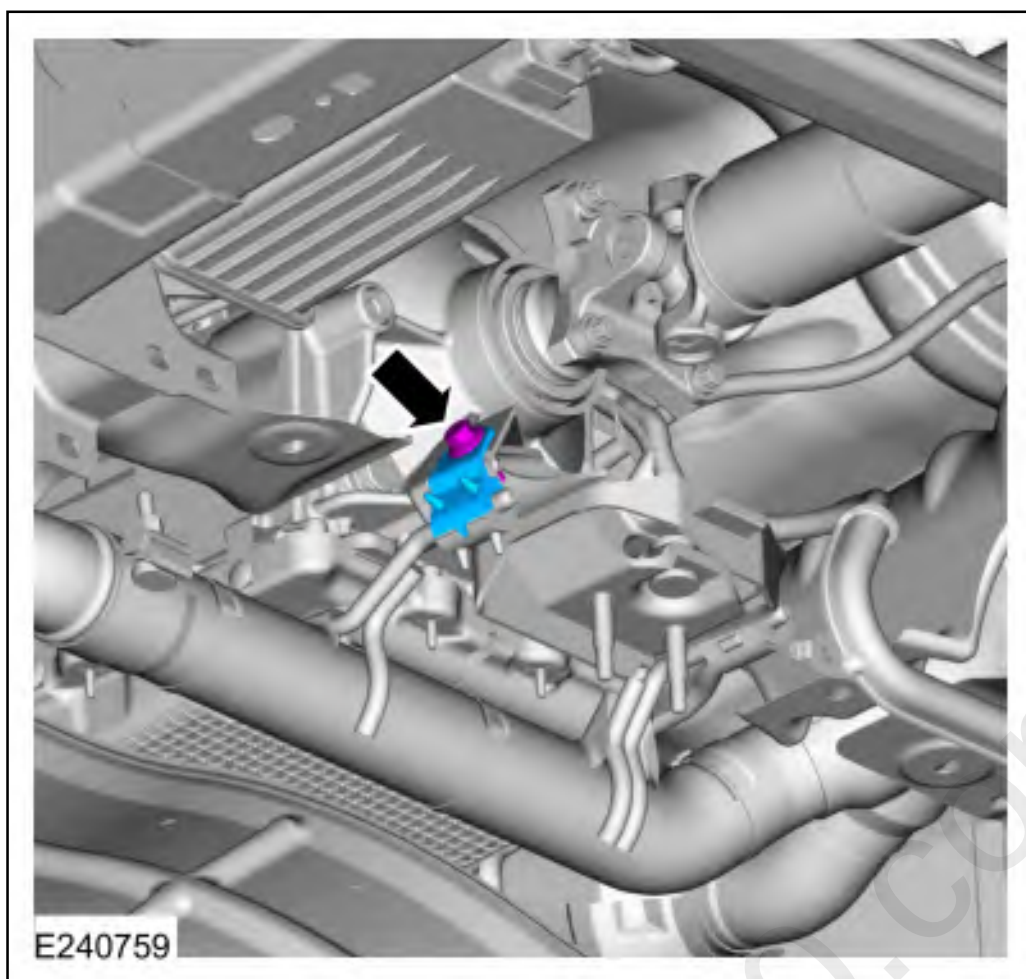
Base Part Number: Base Part Number: 7M121

Removal

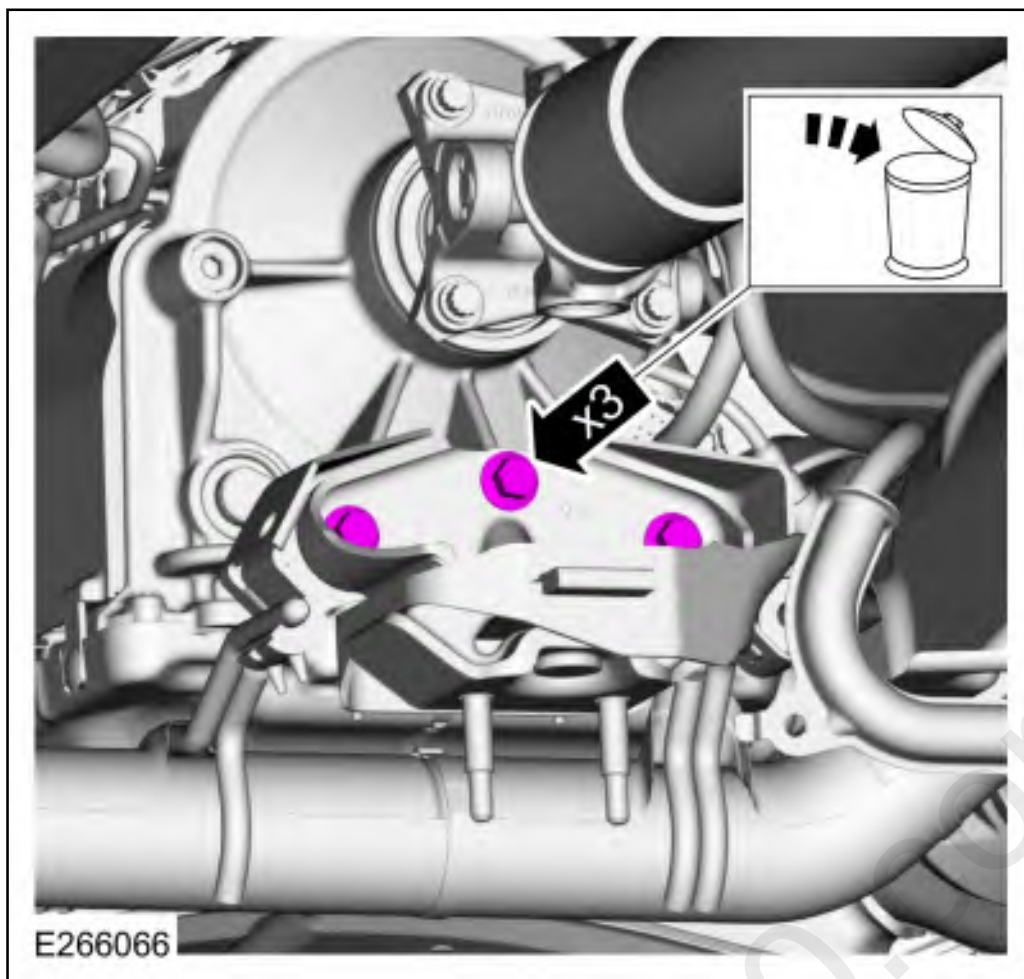
1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. Remove the transmission support crossmember.
Refer to: Transmission Support Crossmember (502-02 Full Frame and Body Mounting) .

Rear Wheel Drive (RWD) vehicles

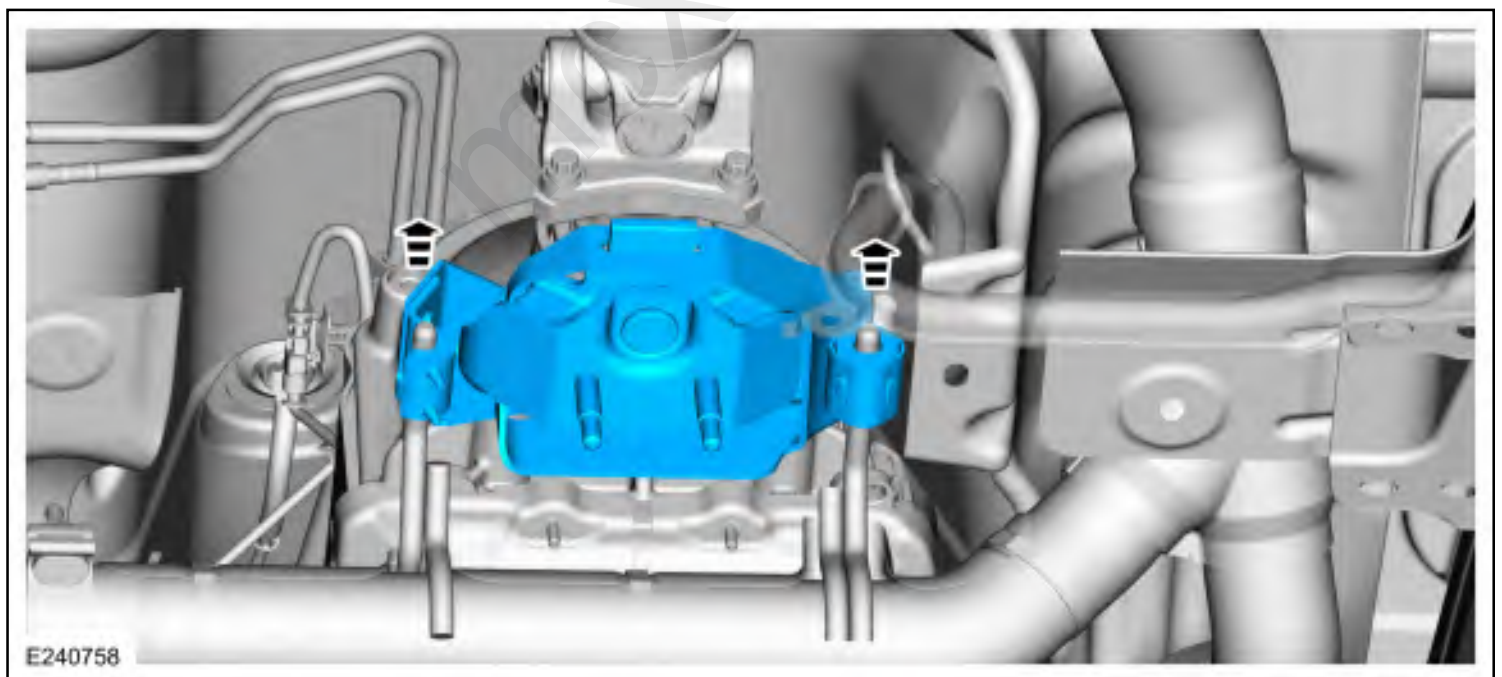
3. Remove the bolt and the LH isolator cap.



4. Remove and discard the transmission support insulator bolts and washers.

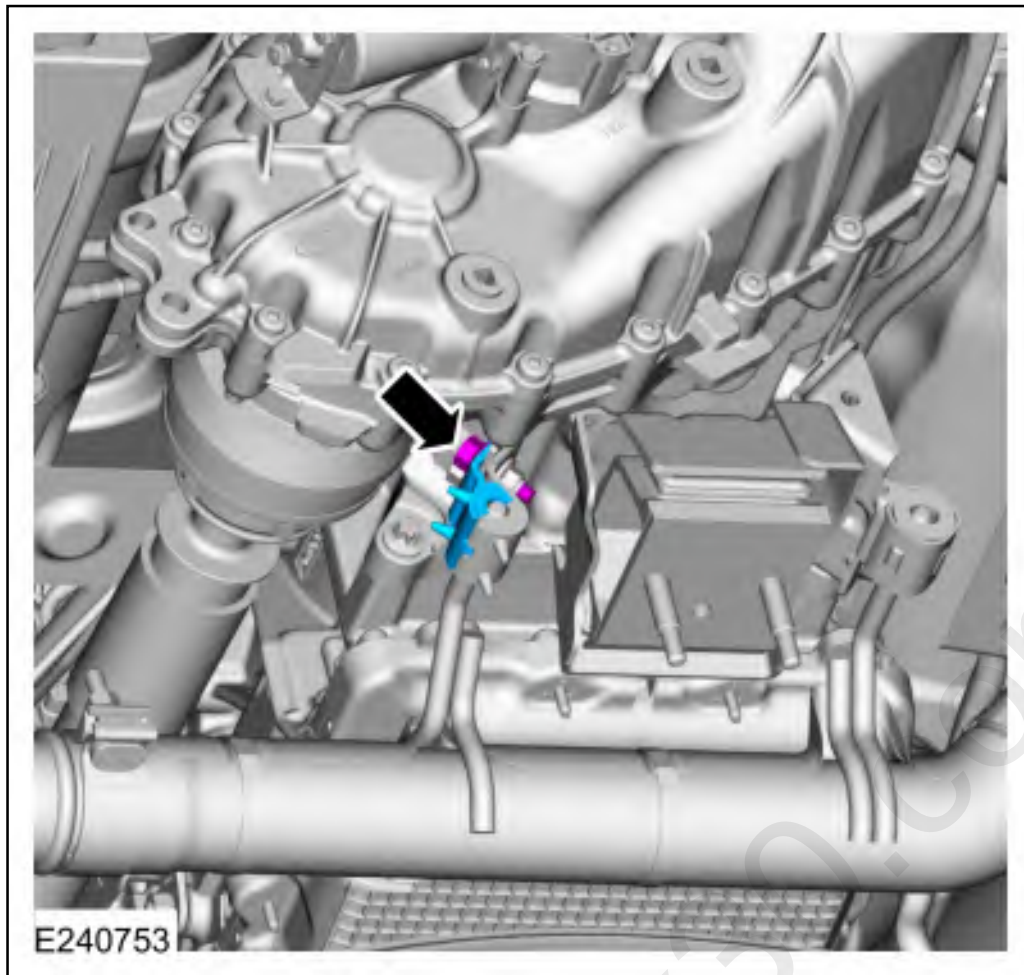


5. Remove the transmission support insulator.

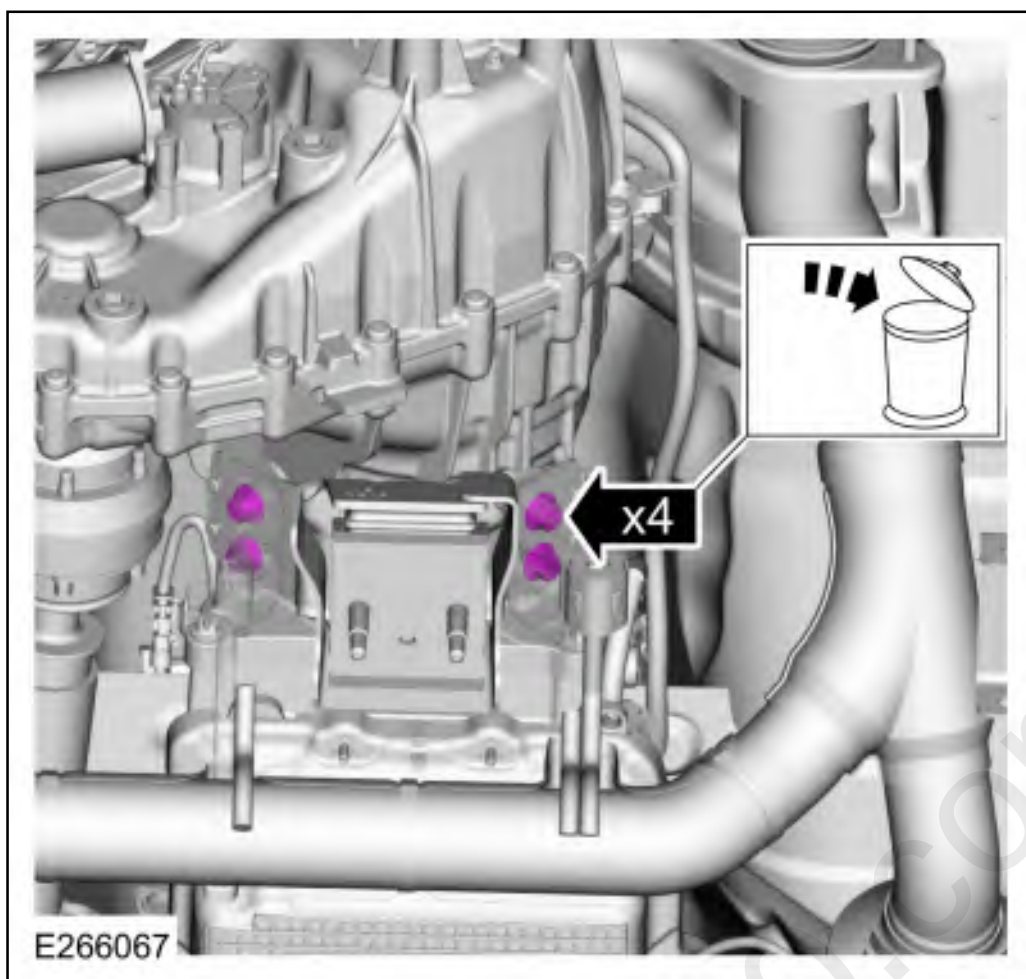


Four-Wheel Drive (4WD) vehicles

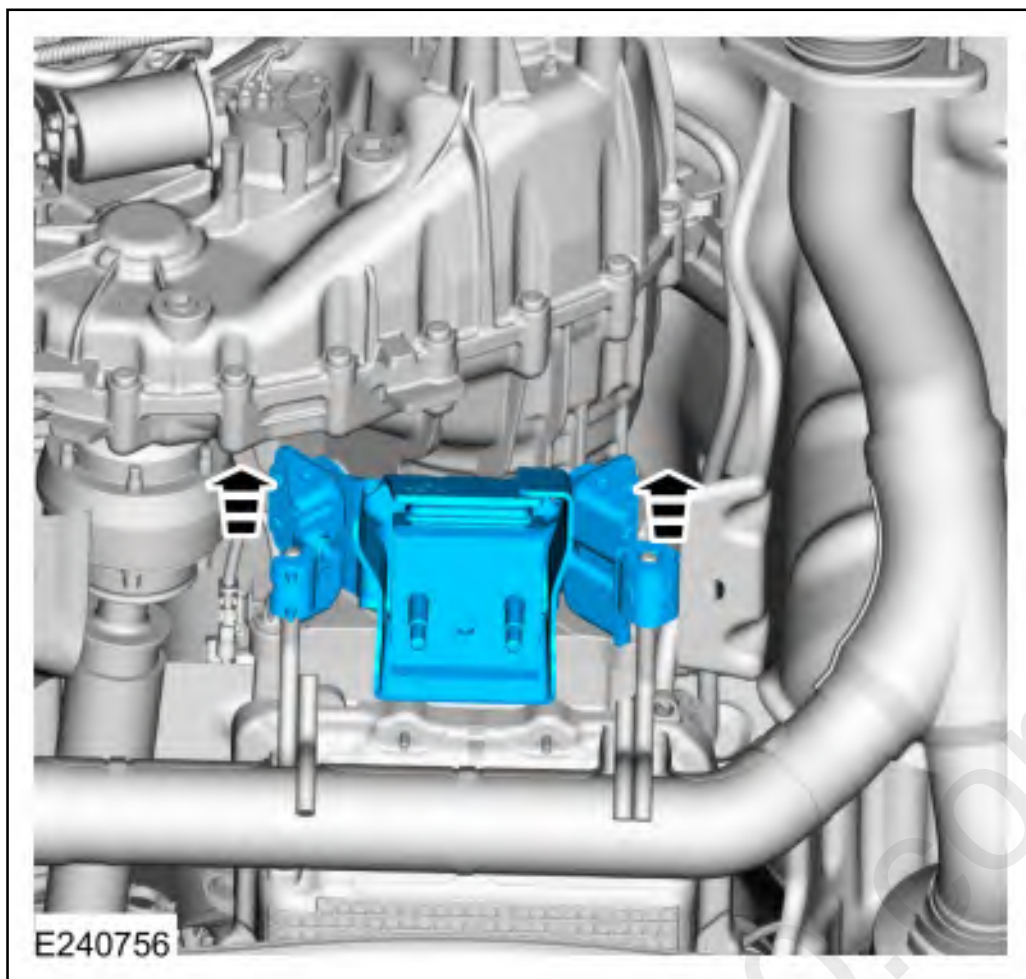
6. Remove the bolt and the LH isolator cap.



7. Remove and discard the transmission support insulator bolts.



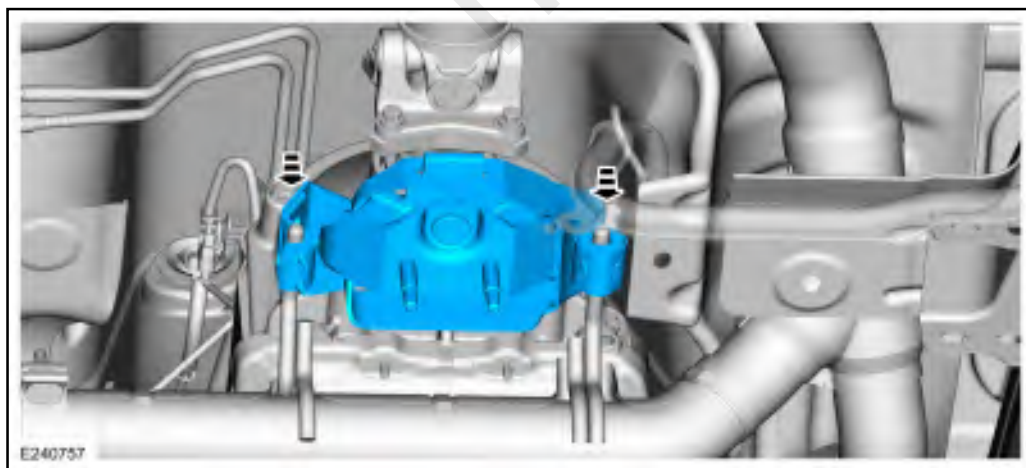
8. Remove the transmission support insulator.



Installation

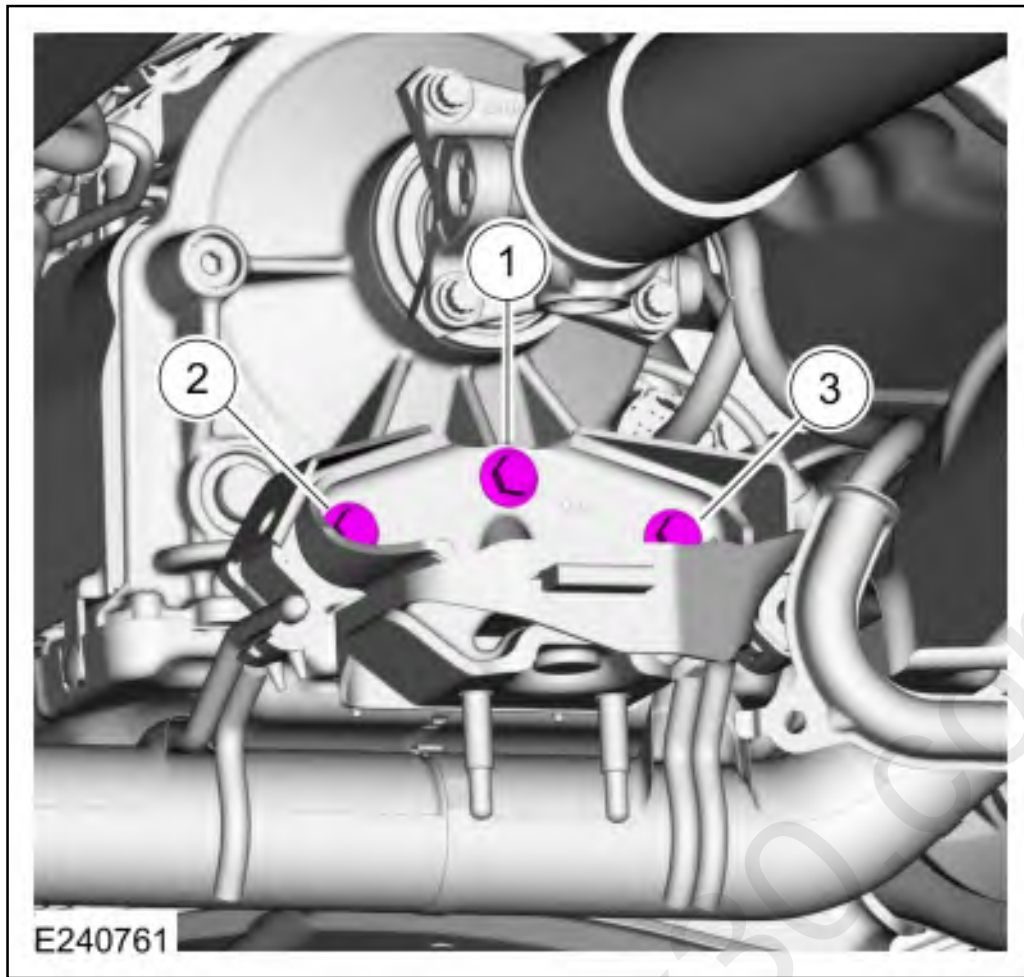
Rear Wheel Drive (RWD) vehicles

1. Install the transmission support insulator.

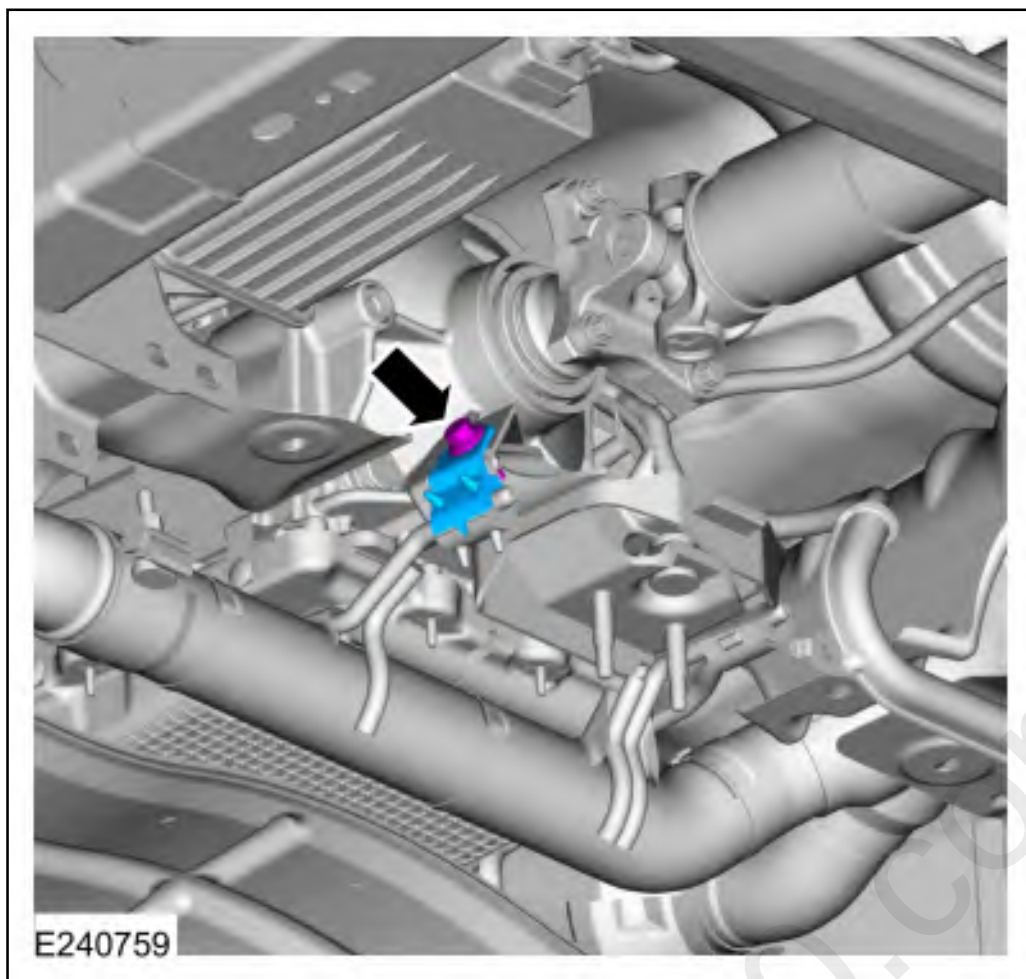


- Loosely install the new transmission support insulator bolts.
- Tighten the transmission support insulator bolts in the sequence shown.

Torque: 66 lb.ft (90 Nm)

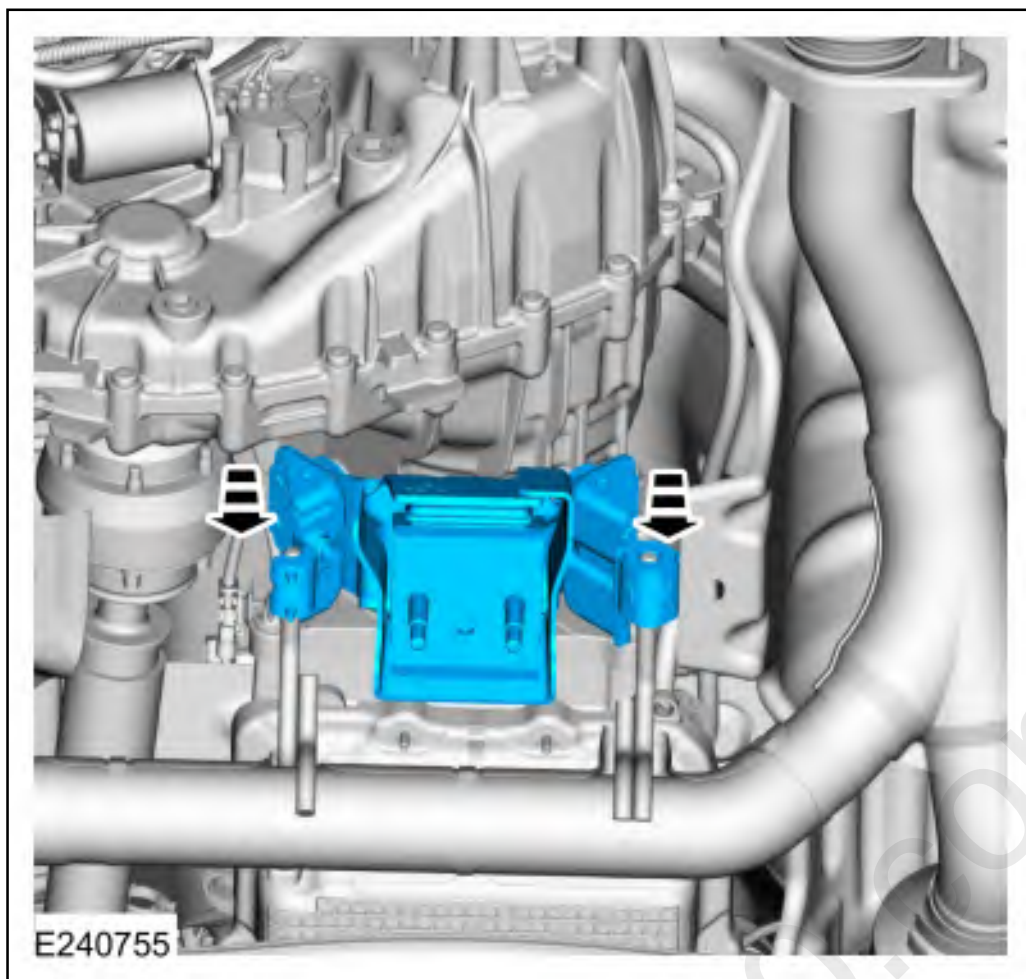


3. Install the LH isolator cap and the bolt.
Torque: 41 lb.ft (55 Nm)

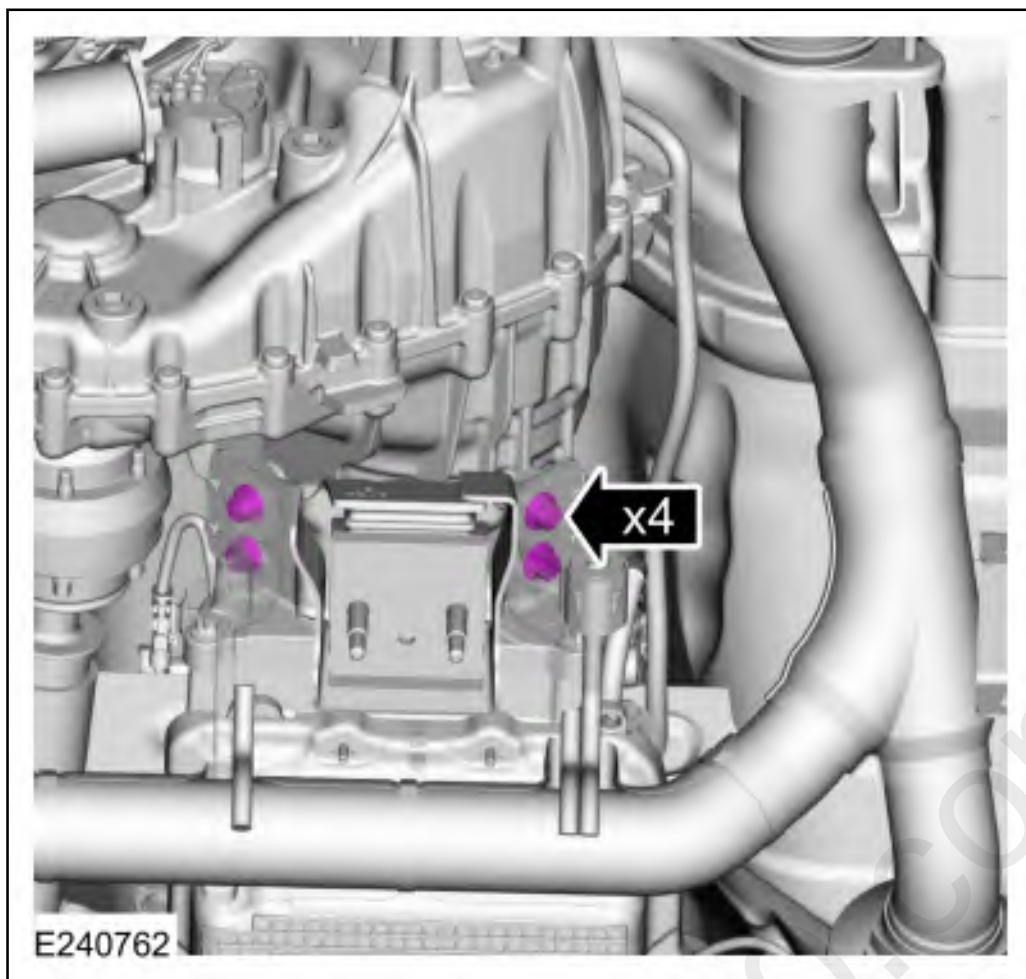


Four-Wheel Drive (4WD) vehicles

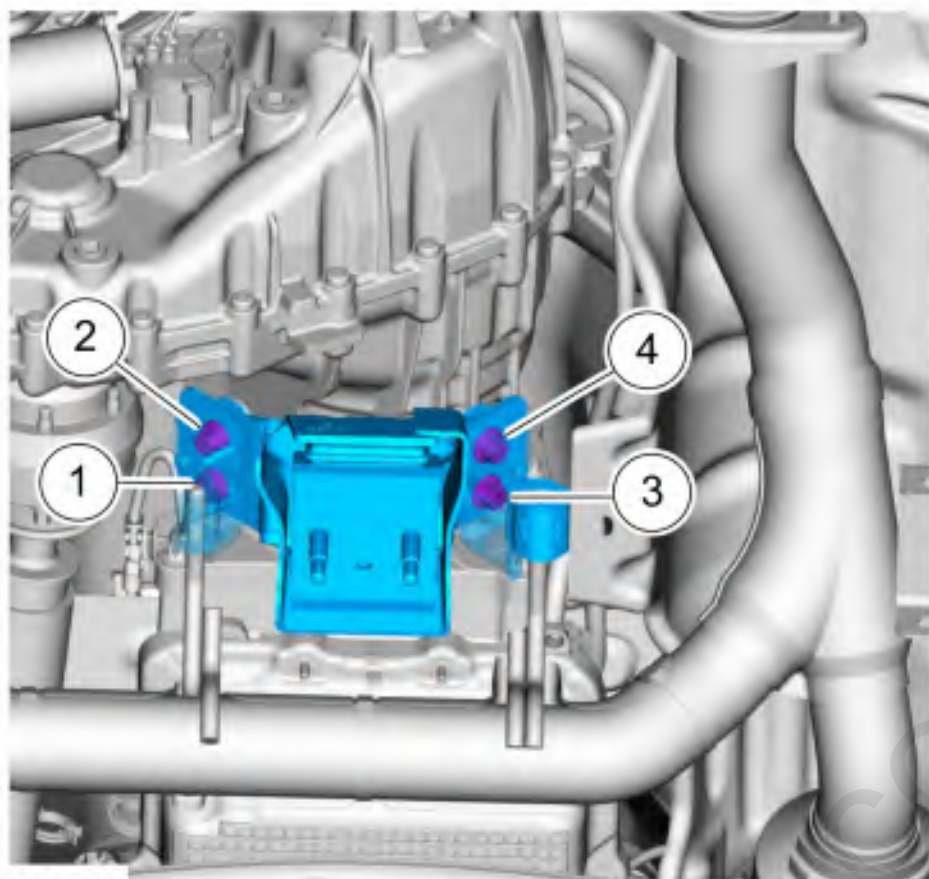
4. Install the transmission support insulator.



5. Loosely install the new transmission support insulator bolts.



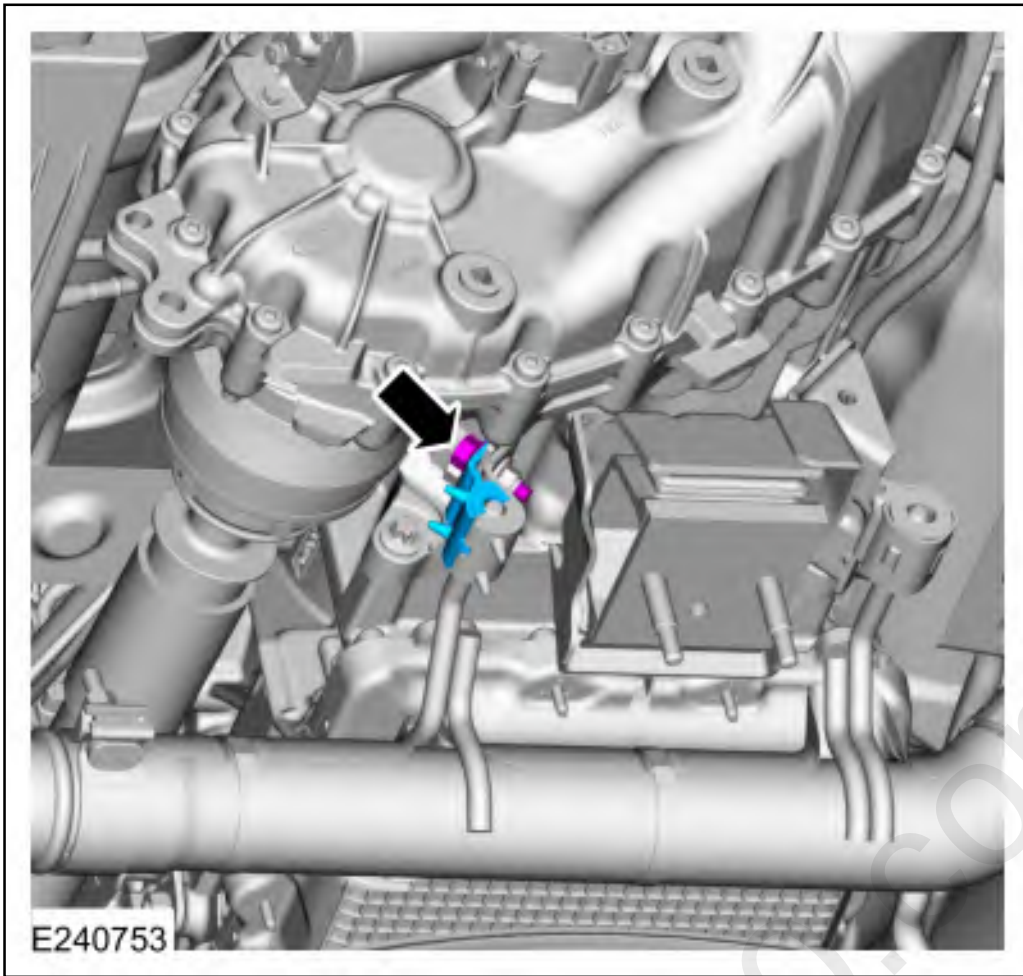
6. Tighten the transmission support insulator bolts in the sequence shown.
Torque: 76 lb.ft (103 Nm)



E240613



7. Install the LH isolator cap and the bolt.
Torque: 41 lb.ft (55 Nm)



All vehicles

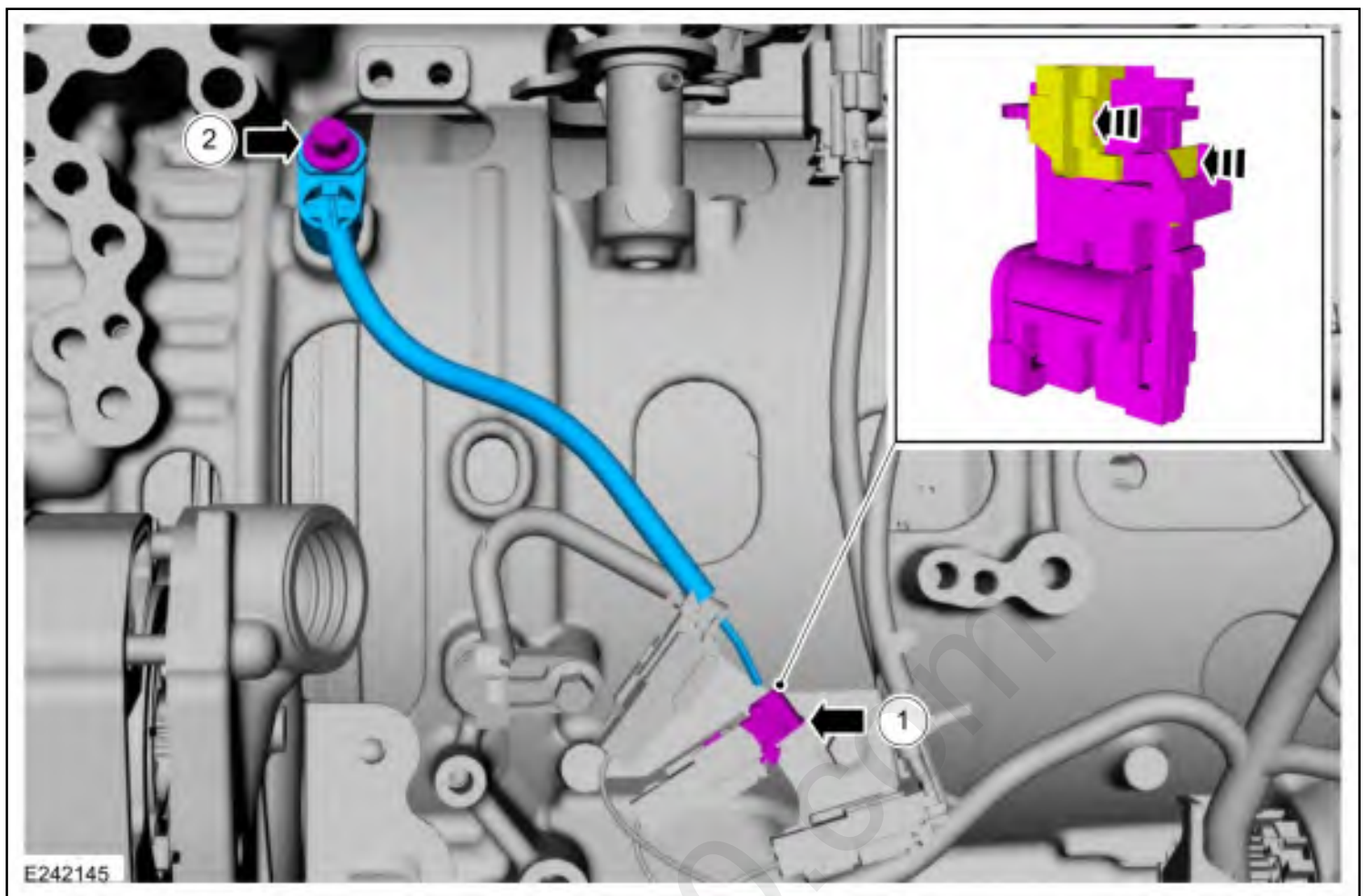
8. Install the transmission support crossmember.
Refer to: Transmission Support Crossmember (502-02 Full Frame and Body Mounting) .

Intermediate Speed Sensor A (ISSA)

Base Part Number: Base Part Number: 7M183

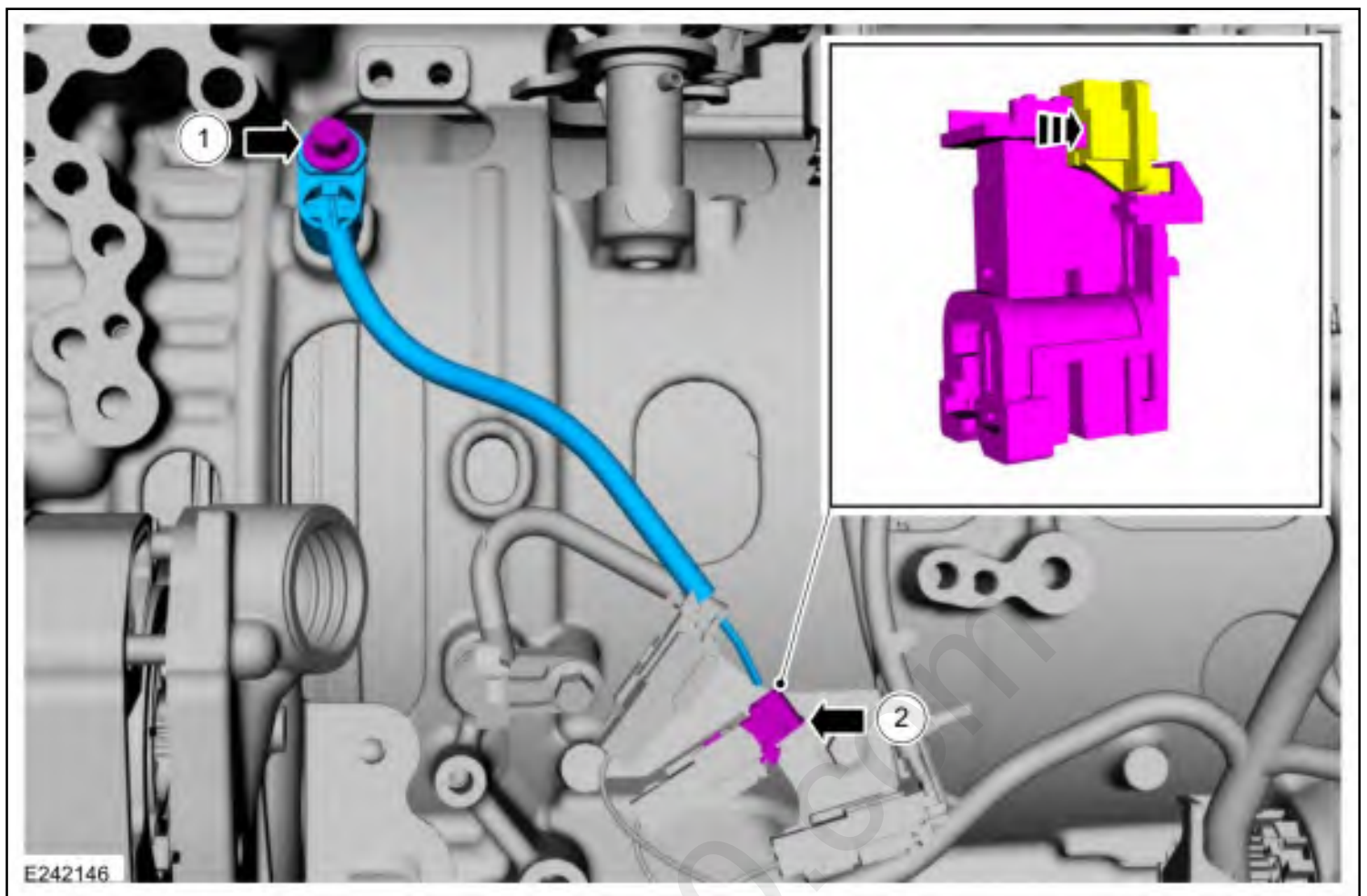
Removal

1. Remove the main control valve body.
Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
2. Remove the intermediate speed sensor A.
 1. Slide the plastic lock to the unlocked position. While pressing the plastic tab, disconnect the electrical connector.
 2. Remove the bolt and the intermediate speed sensor A.



Installation

1. Install the intermediate speed sensor A.
 1. Install the intermediate speed sensor A bolt.
Torque: 62 lb.in (7 Nm)
 2. Connect the electrical connector. Slide the plastic lock to the locked position.



2. Install the main control valve body.
Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

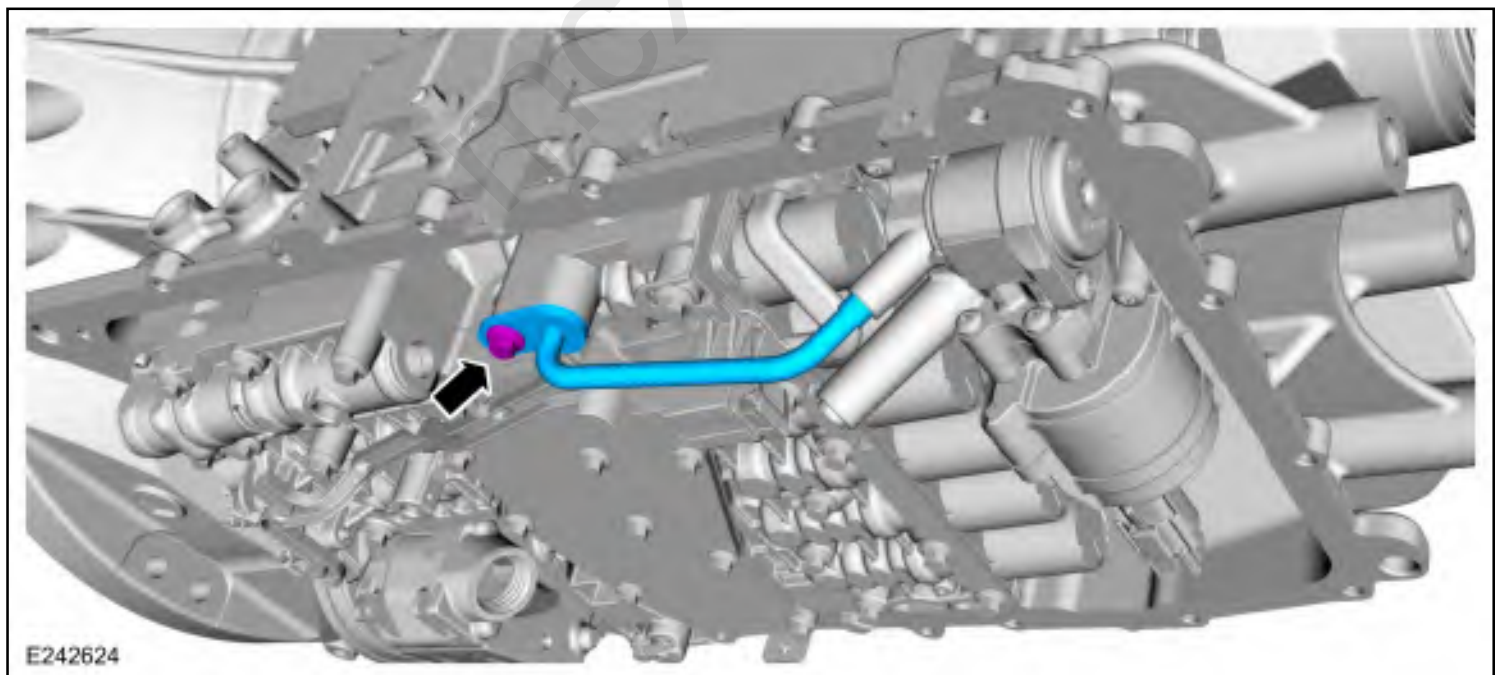
Main Control Valve Body

Base Part Number: Base Part Number: 7A100

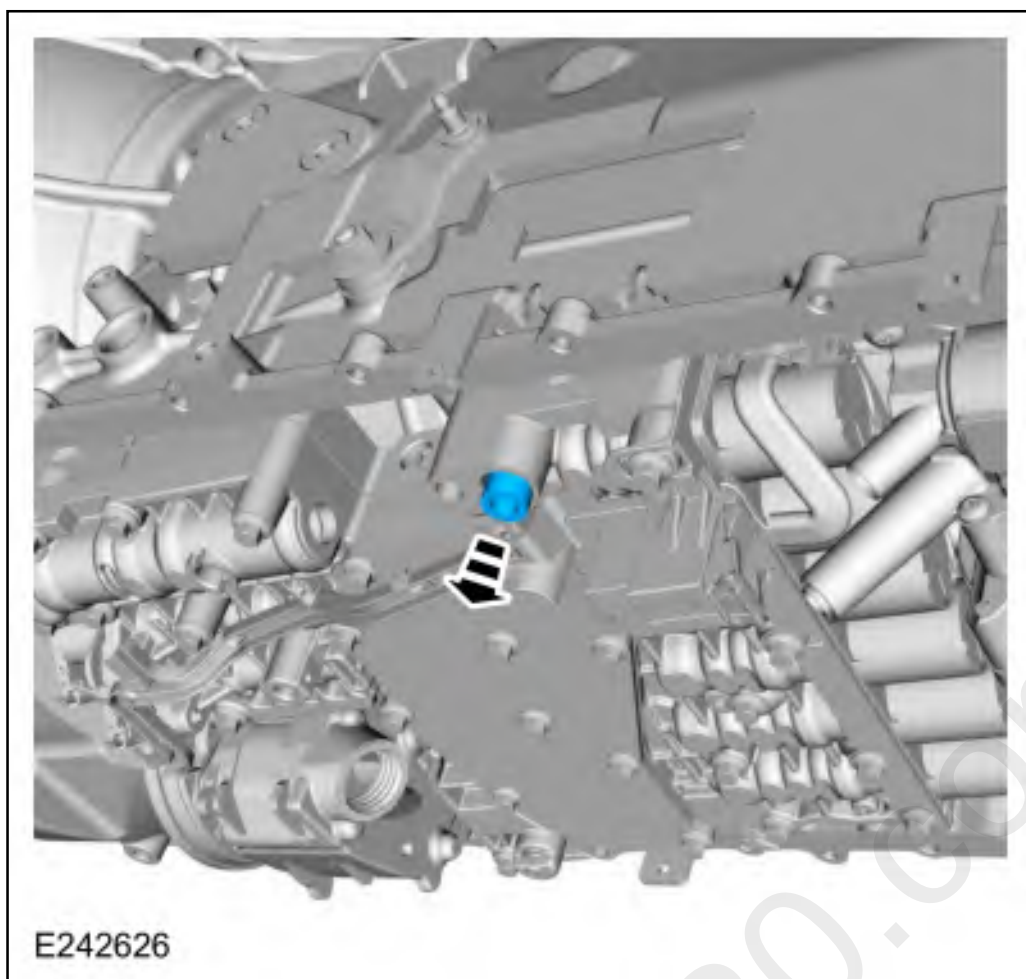
Removal

NOTE: The Solenoid Body Strategy Data Download procedure must be performed if a new main control valve body is installed.

1. Remove the transmission fluid pan gasket and filter.
Refer to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
Refer to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
2. Remove the bolt and the transmission fluid auxiliary pump tube.

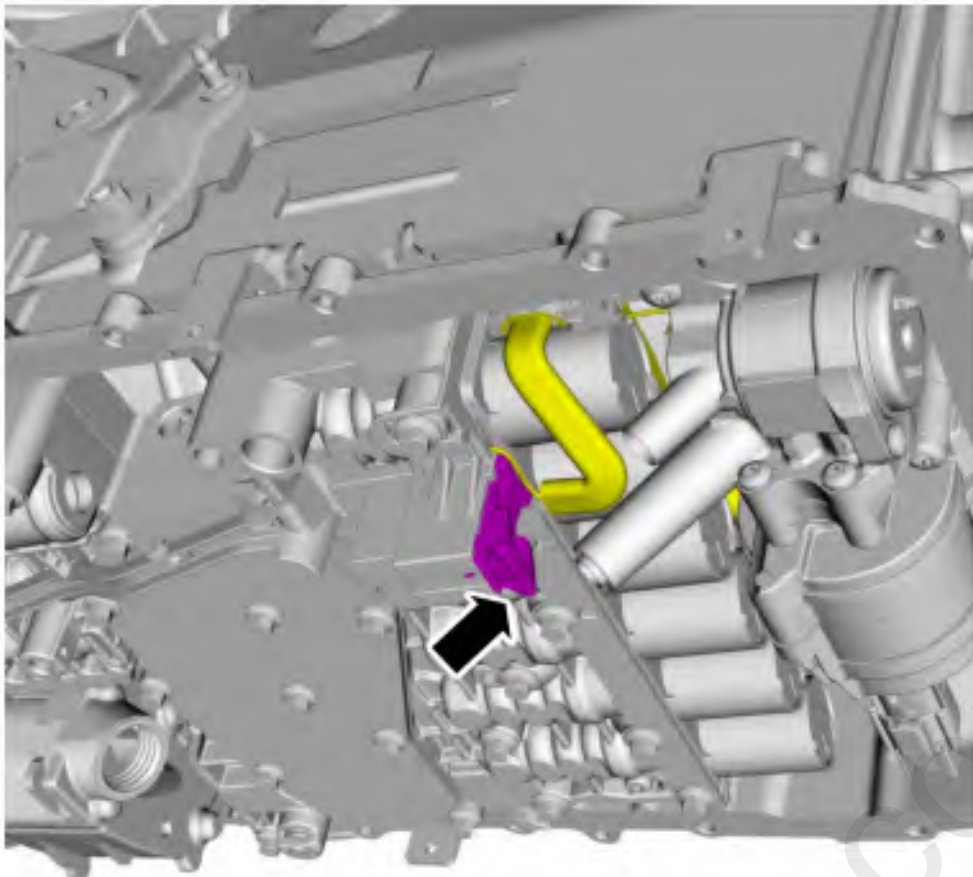


3. Remove the transmission fluid auxiliary pump tube seal.



4. **NOTE:** *The internal wiring harness electrical connector can not be fully disconnected until lowering the main control valve body.*

Unlock the internal wiring harness electrical connector.



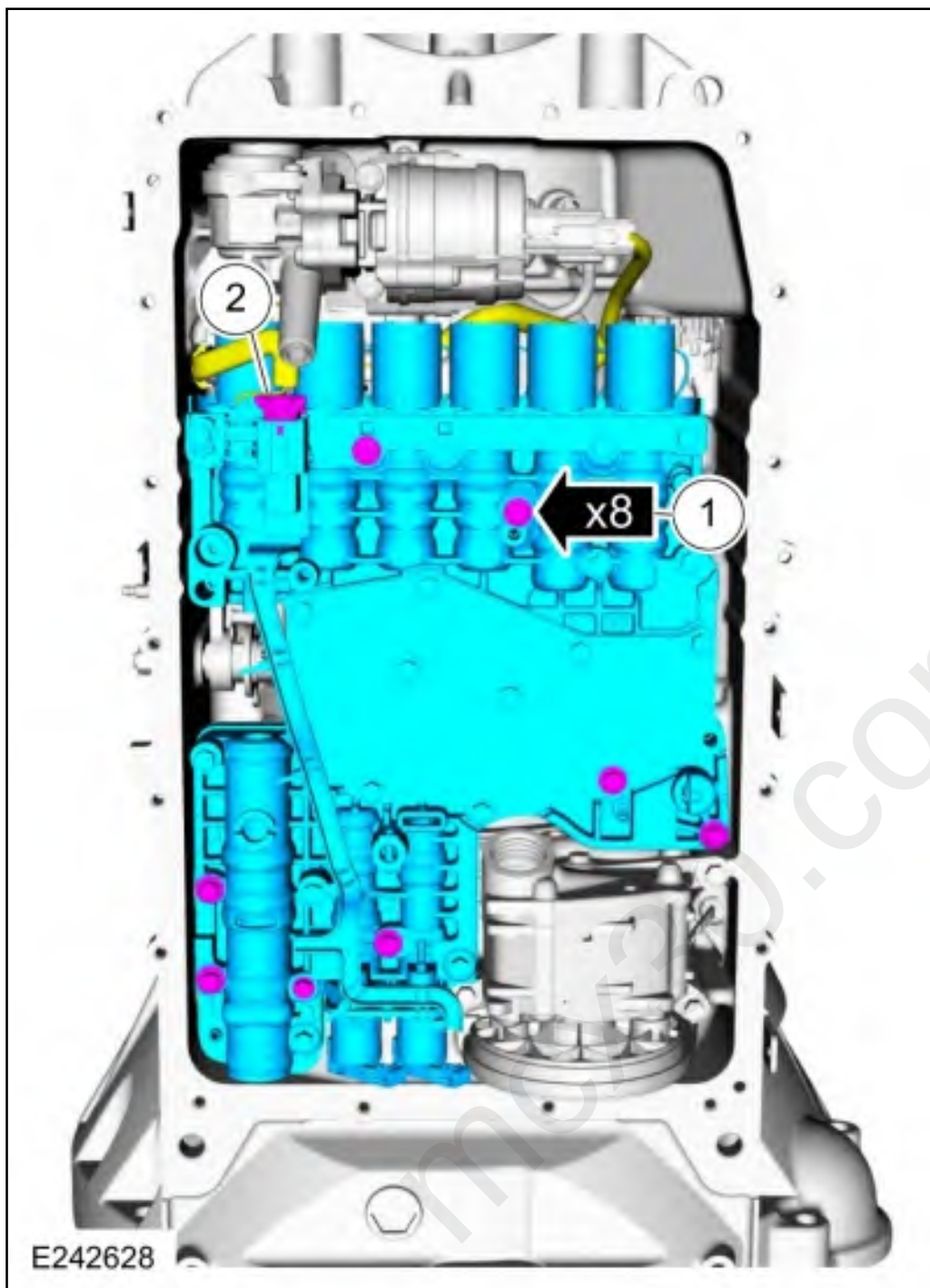
E242627



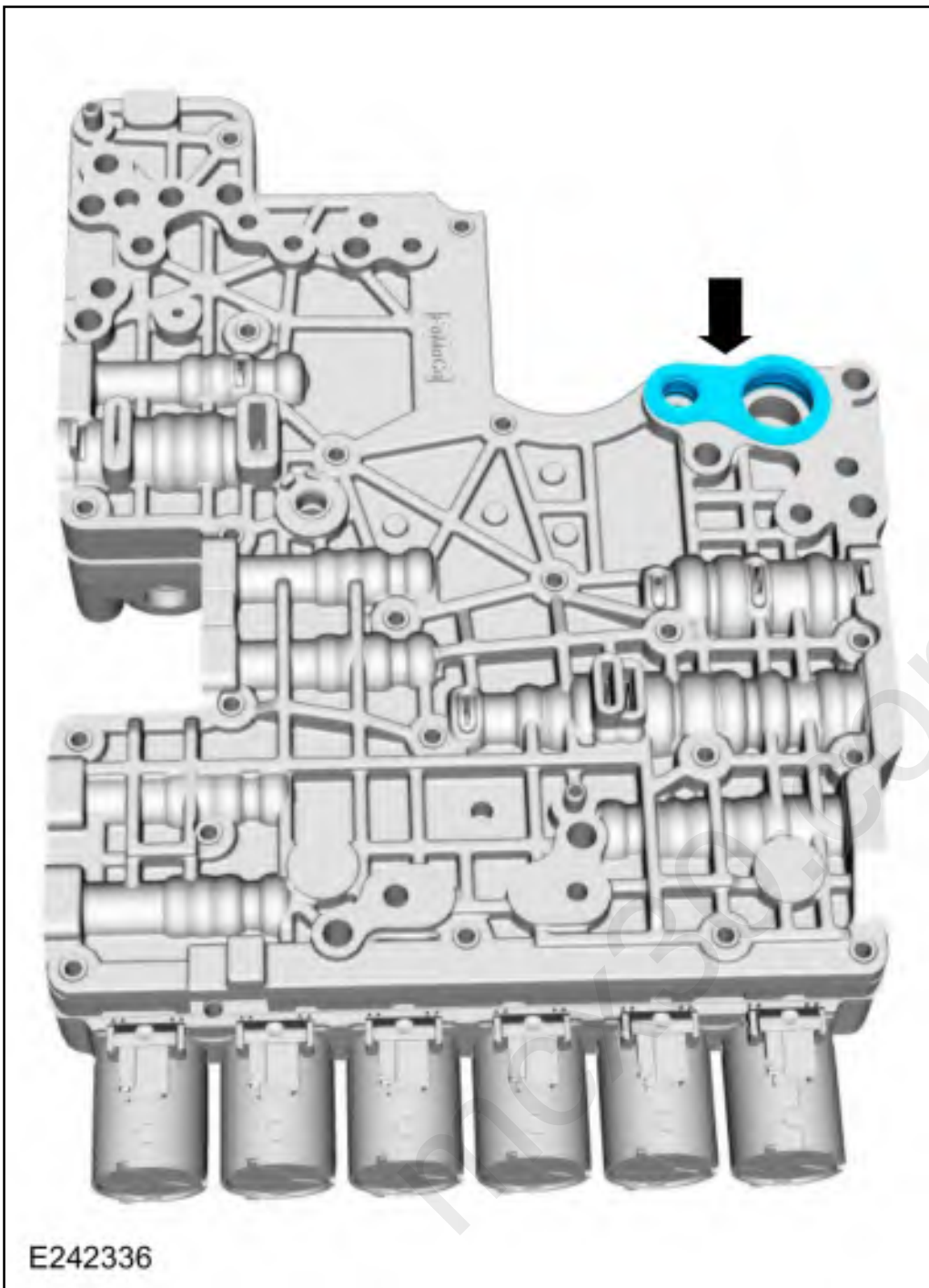
5.

Remove the main control valve body.

1. While supporting the main control valve body, remove the main control-to-transmission case bolts.
2. Disconnect the internal wiring harness electrical connector while removing the main control valve body.

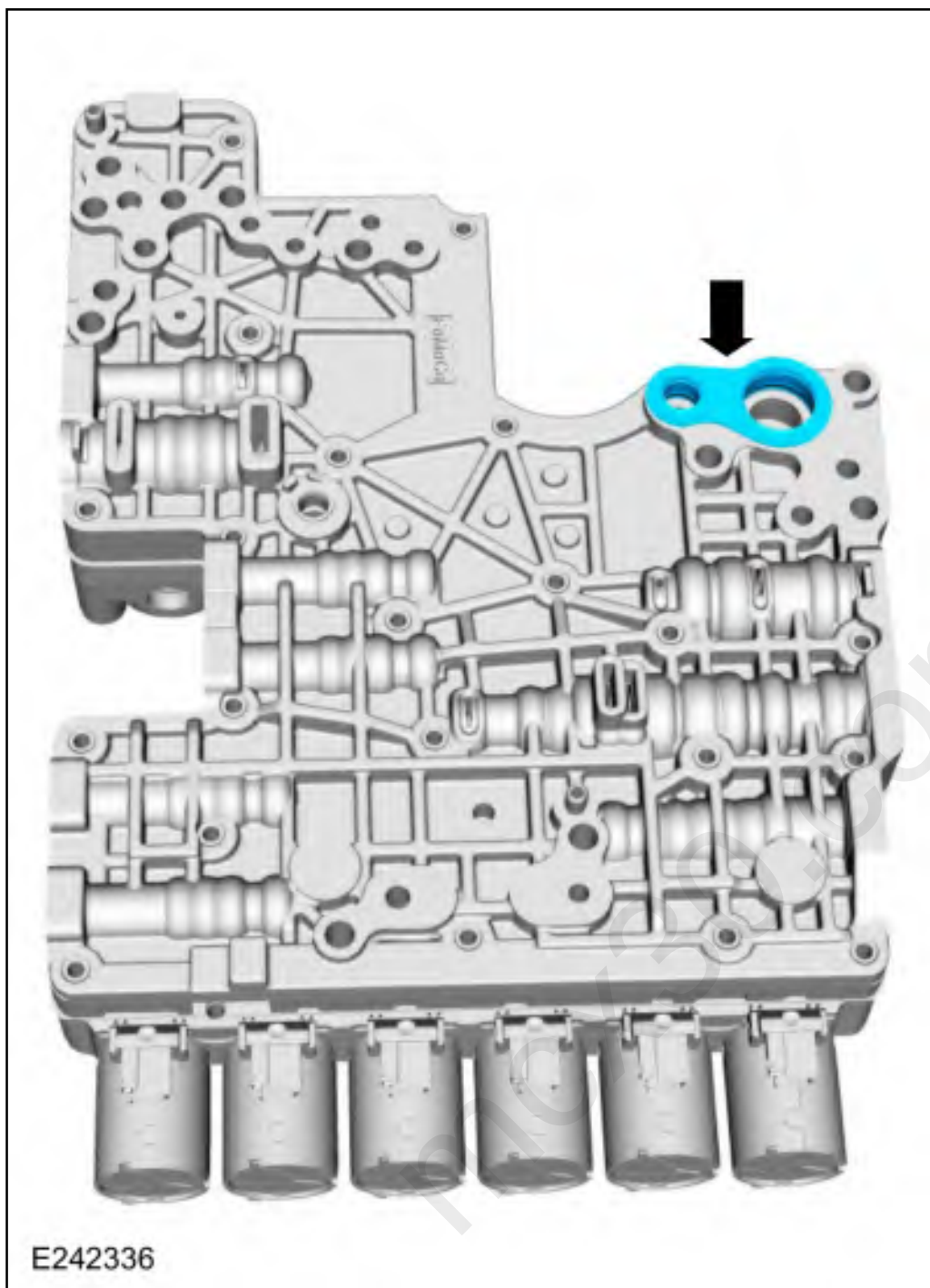


6. Remove the main control assembly to transmission fluid pump seal.



Installation

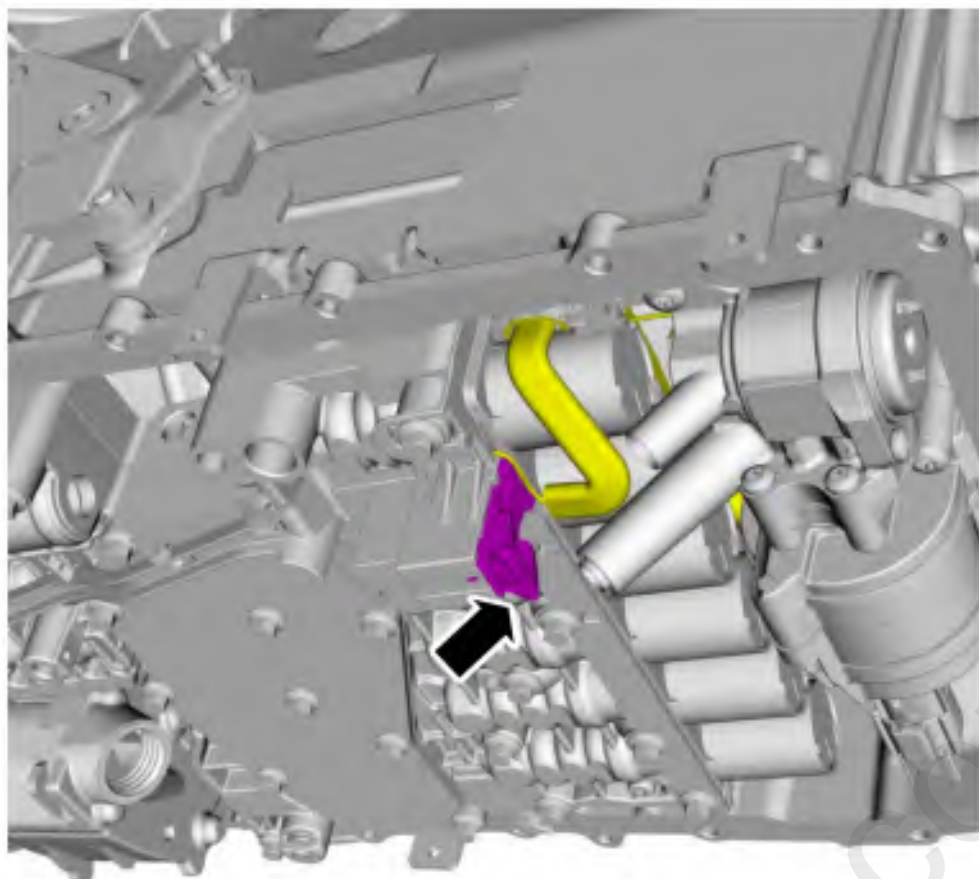
- 1. Install the main control assembly to transmission fluid pump seal.



2. **NOTICE: Do not install a 71 mm length bolt in the location shown or the transmission clutch and planetary container will be damaged and result in transmission failure.**

Loosely install the main control valve body.

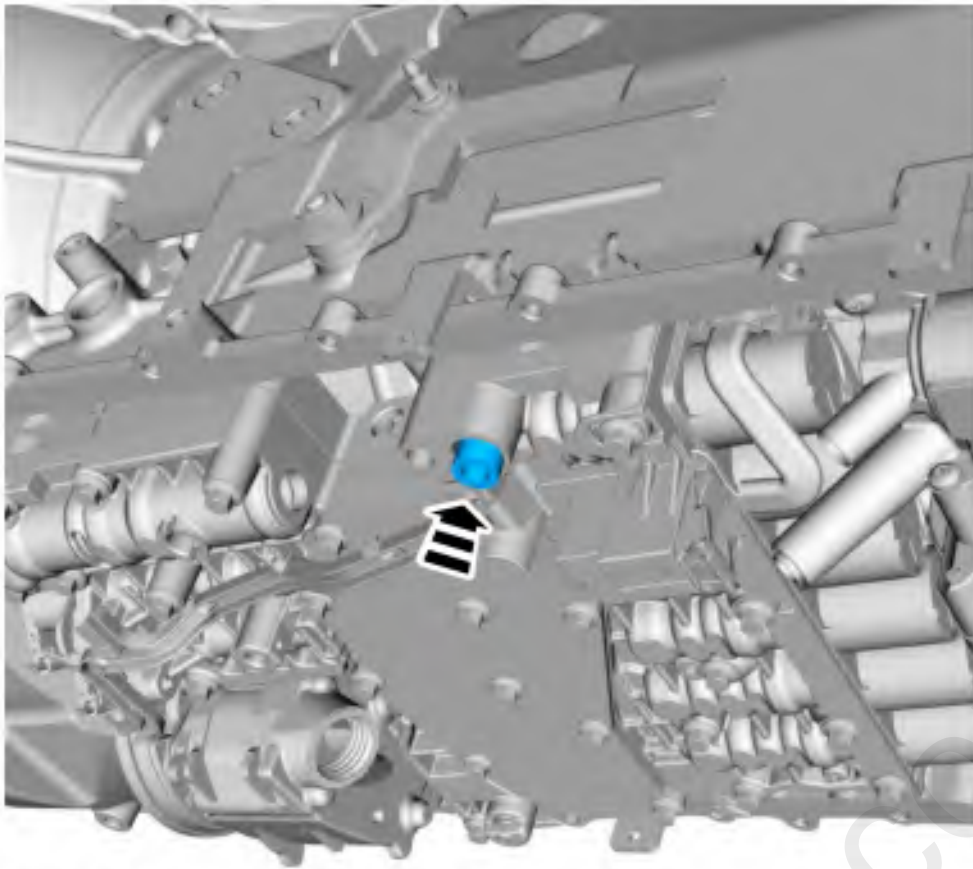
1. Align the guide pins on the main control valve body with the alignment holes in the transmission case.
2. Connect the internal wiring harness electrical connector while installing the main control valve body.
3. Loosely install the 68 mm length main control-to-transmission case bolts.



E242627



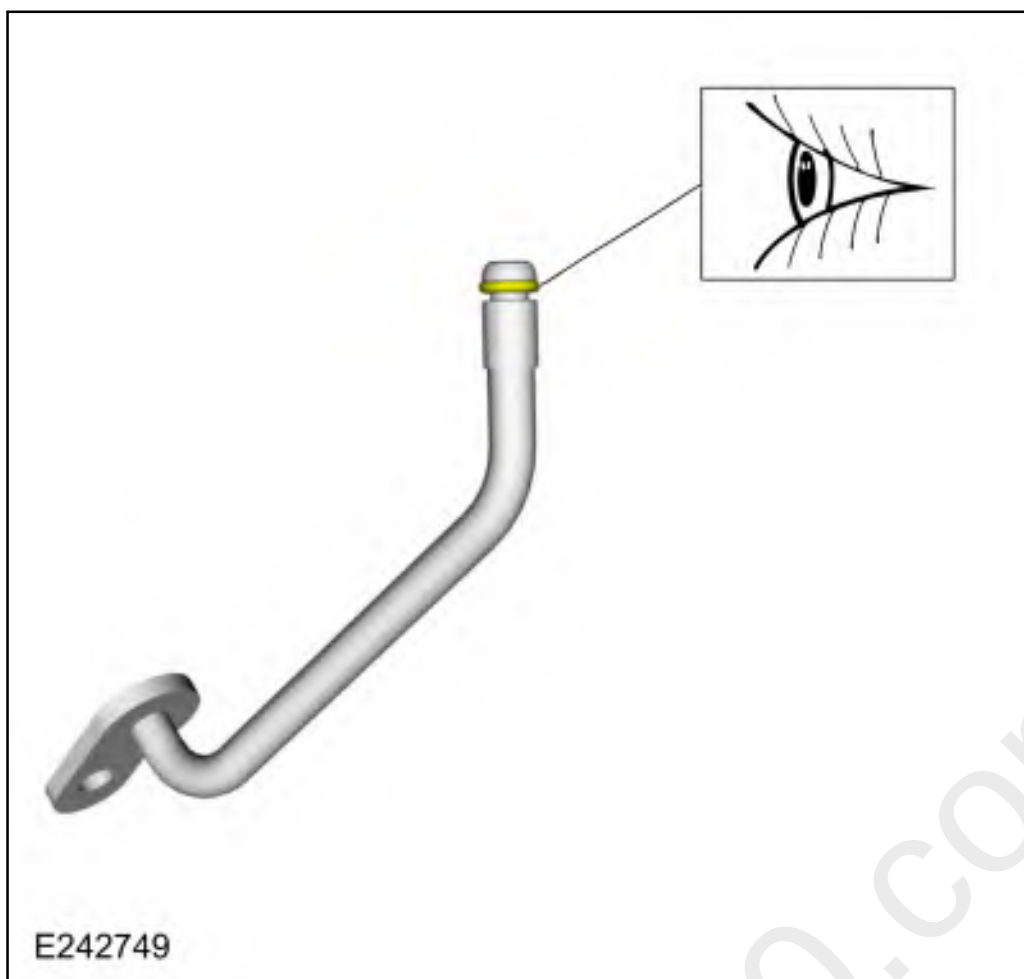
4. Install the transmission fluid auxiliary pump tube seal.



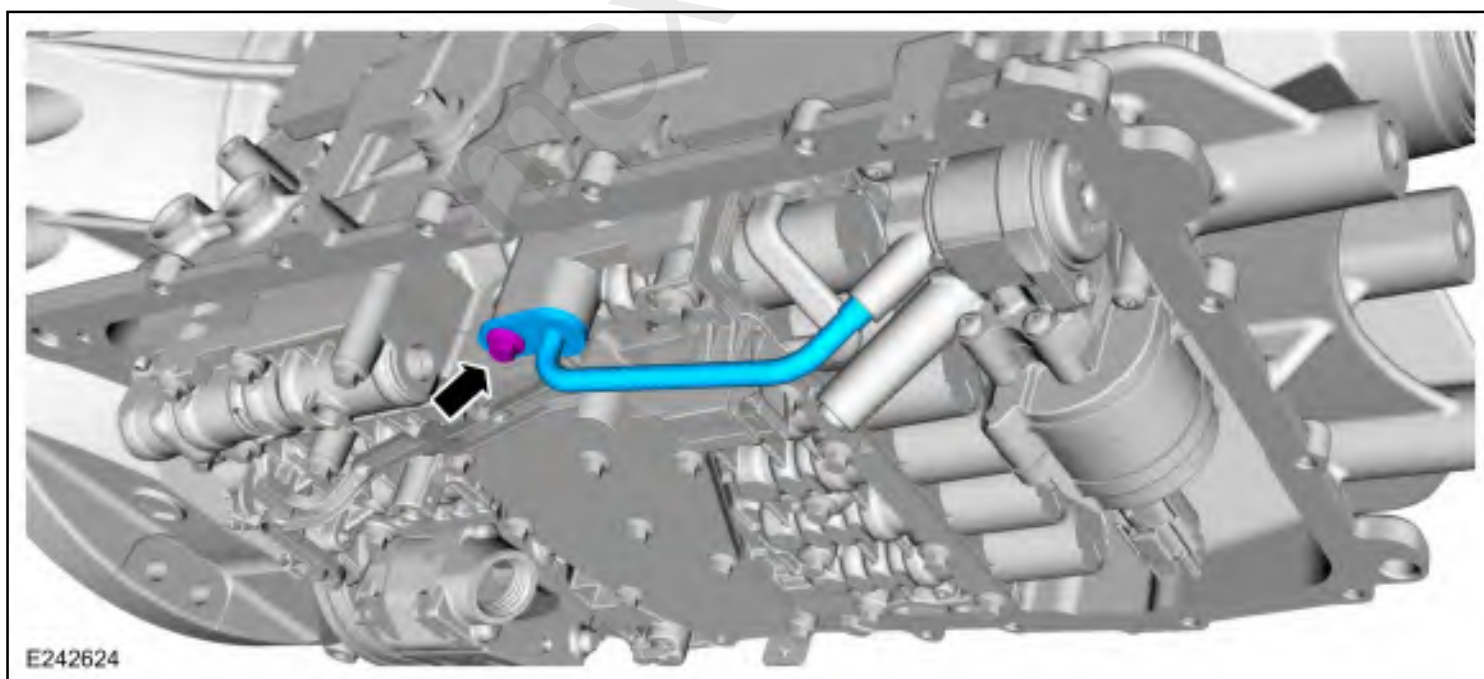
E242747



5. Inspect the transmission fluid auxiliary pump tube O-ring.

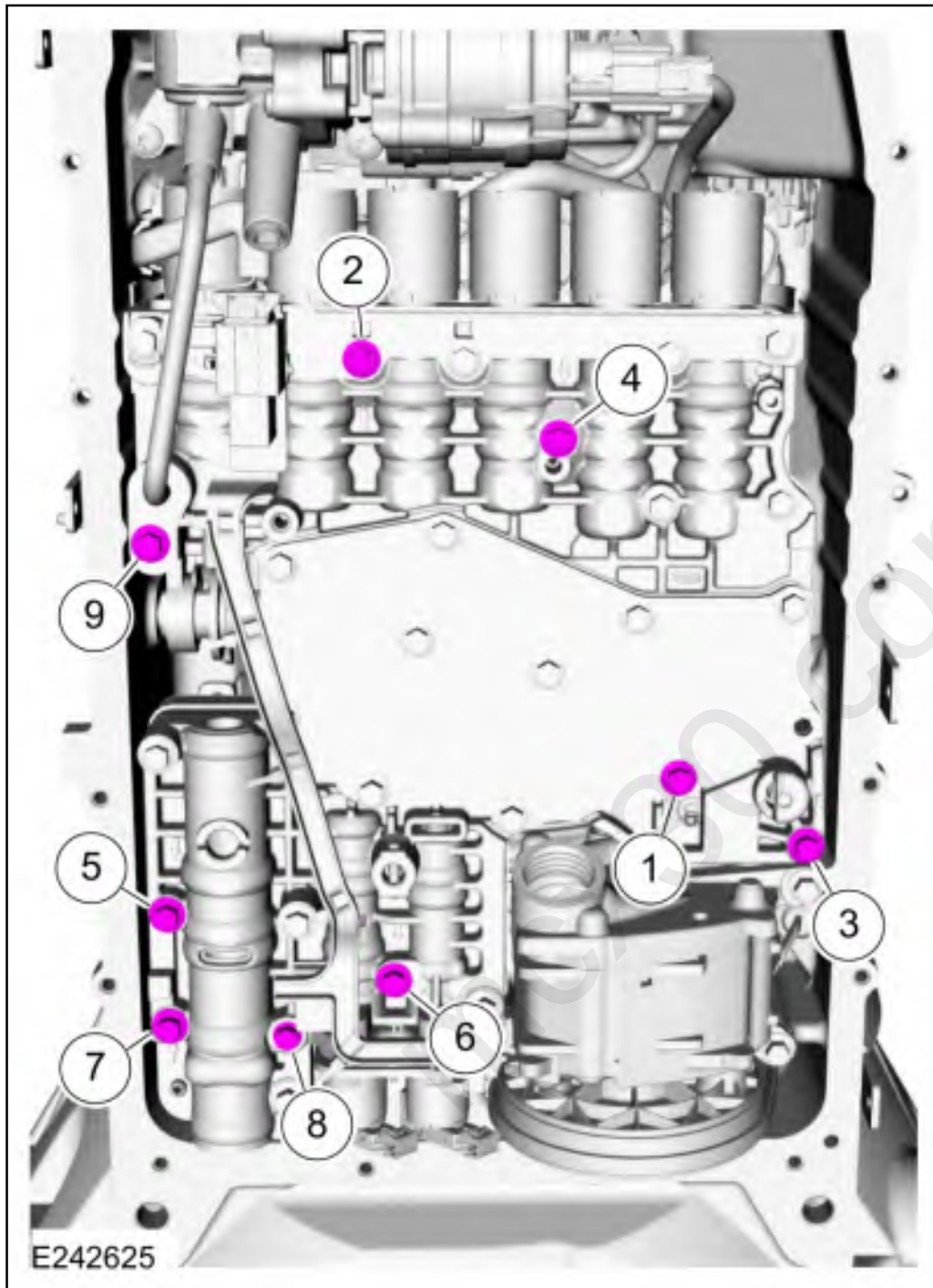


6. Install the transmission fluid auxiliary pump tube and loosely install the bolt.



1. Tighten the bolts No. 1-8 in the sequence shown.
Torque: 89 lb.in (10 Nm)

2. Tighten bolt No. 9
Torque: 106 lb.in (12 Nm)



8. Install the transmission fluid pan gasket and filter.
Refer to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
Refer to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
9. **NOTE:** *The solenoid body strategy data file and solenoid body identification must be updated*

anytime a new main control valve body is installed. A new main control valve body service tag must be installed over the current main control valve body service tag on the transmission case.

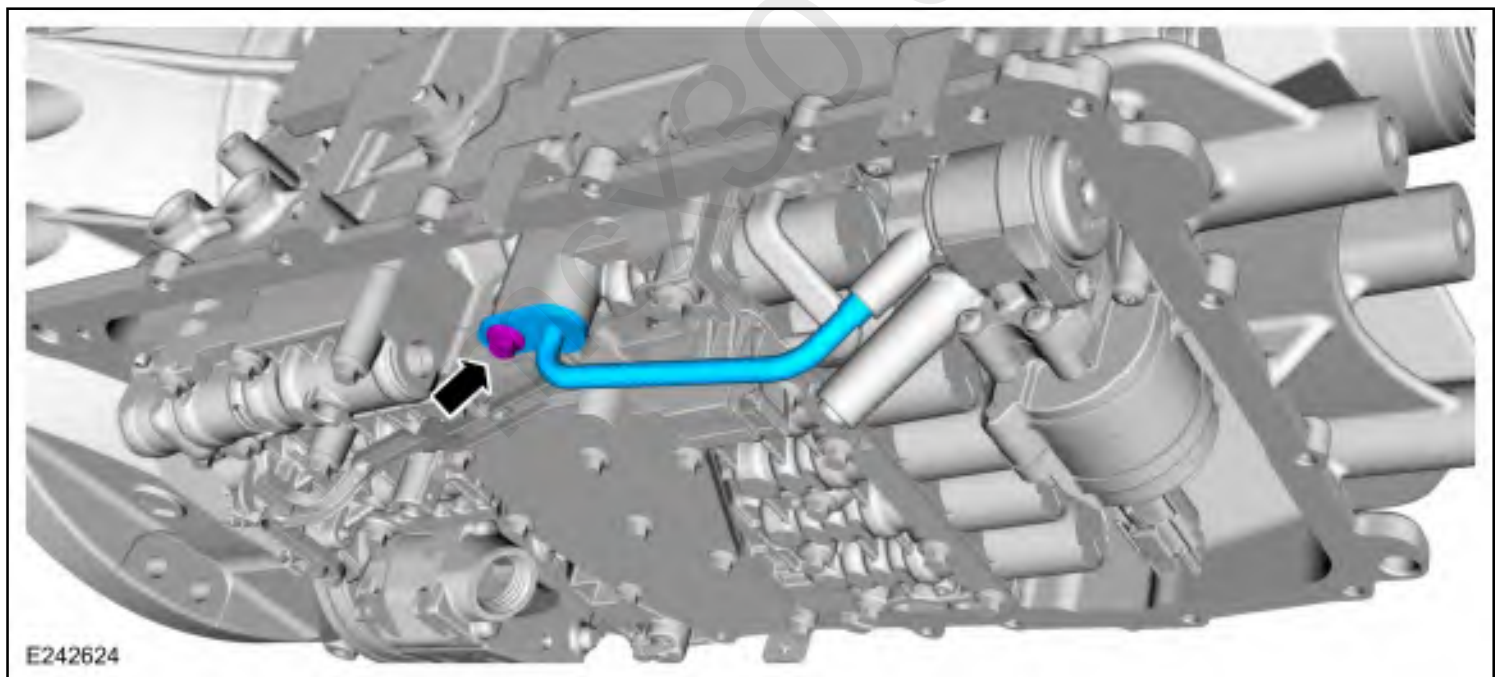
If a new main control valve body was installed, download a new transmission strategy.

Refer to: [Transmission Strategy Download](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

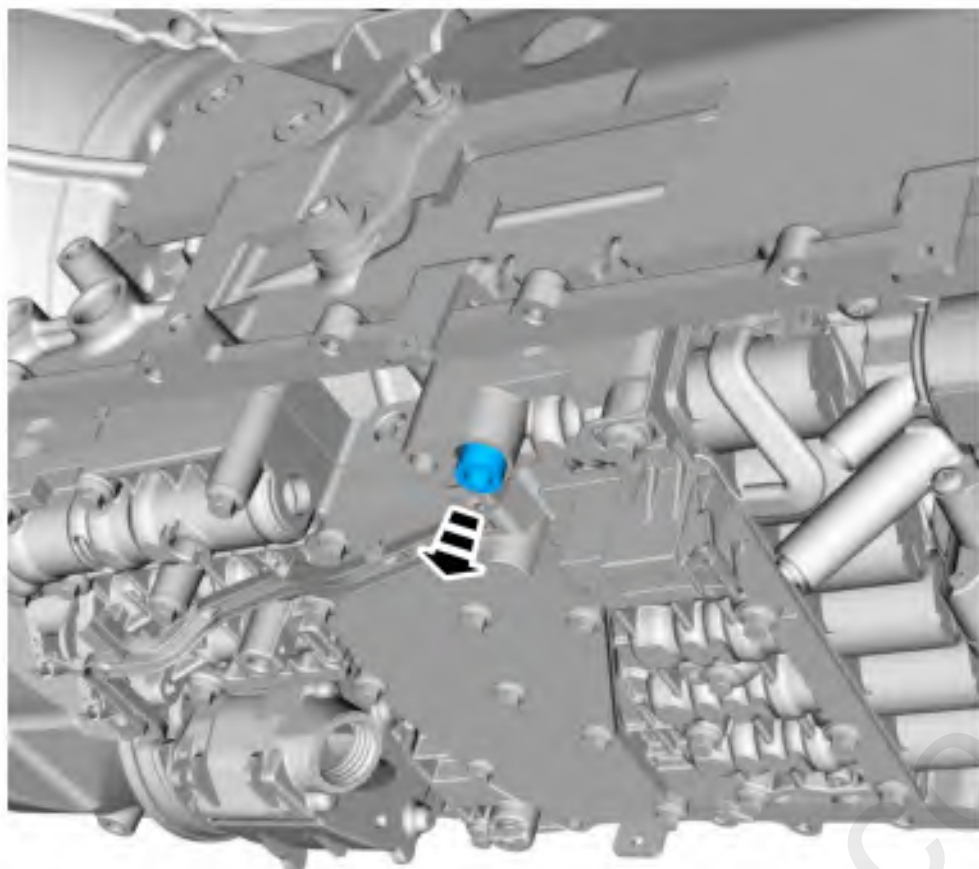
Transmission Fluid Auxiliary Pump

Removal

1. Remove the transmission fluid pan, gasket and filter.
Refer to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
Refer to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
2. Remove the bolt and the transmission fluid auxiliary pump tube.



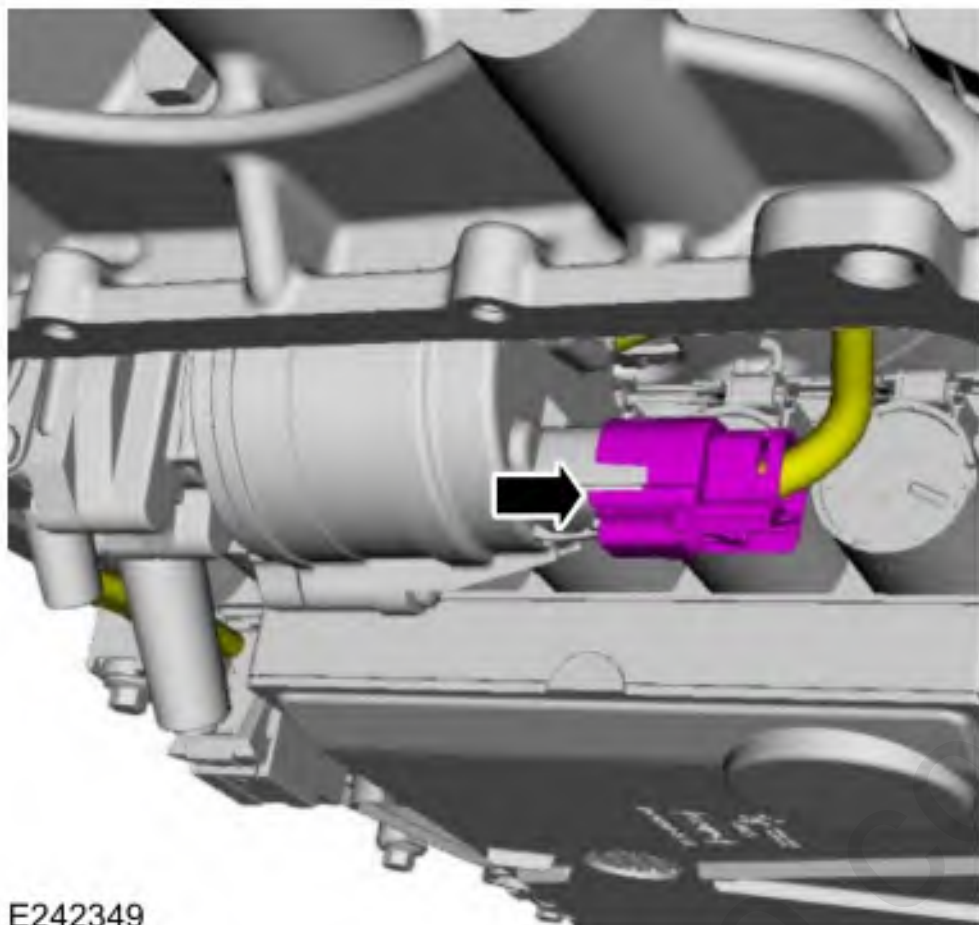
3. Remove the transmission fluid auxiliary pump tube seal.



E242626



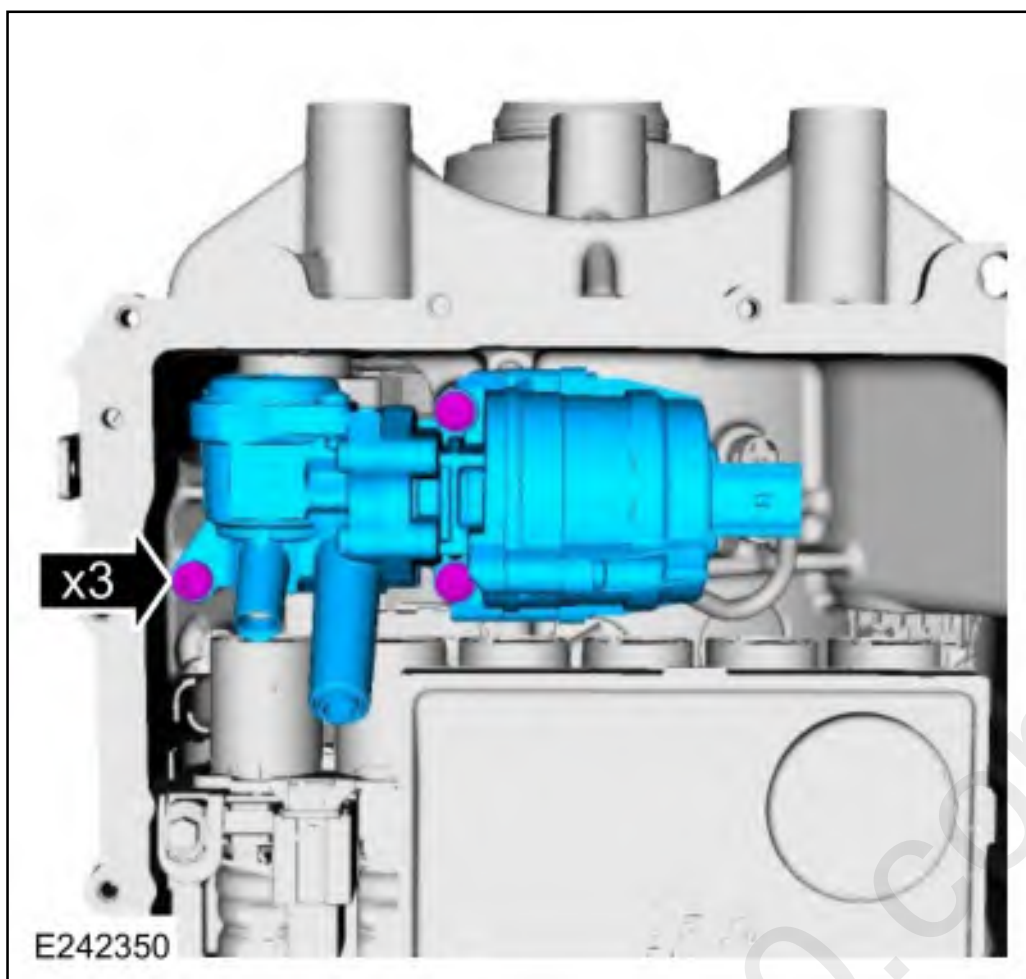
4. Disconnect the transmission fluid auxiliary pump.



E242349

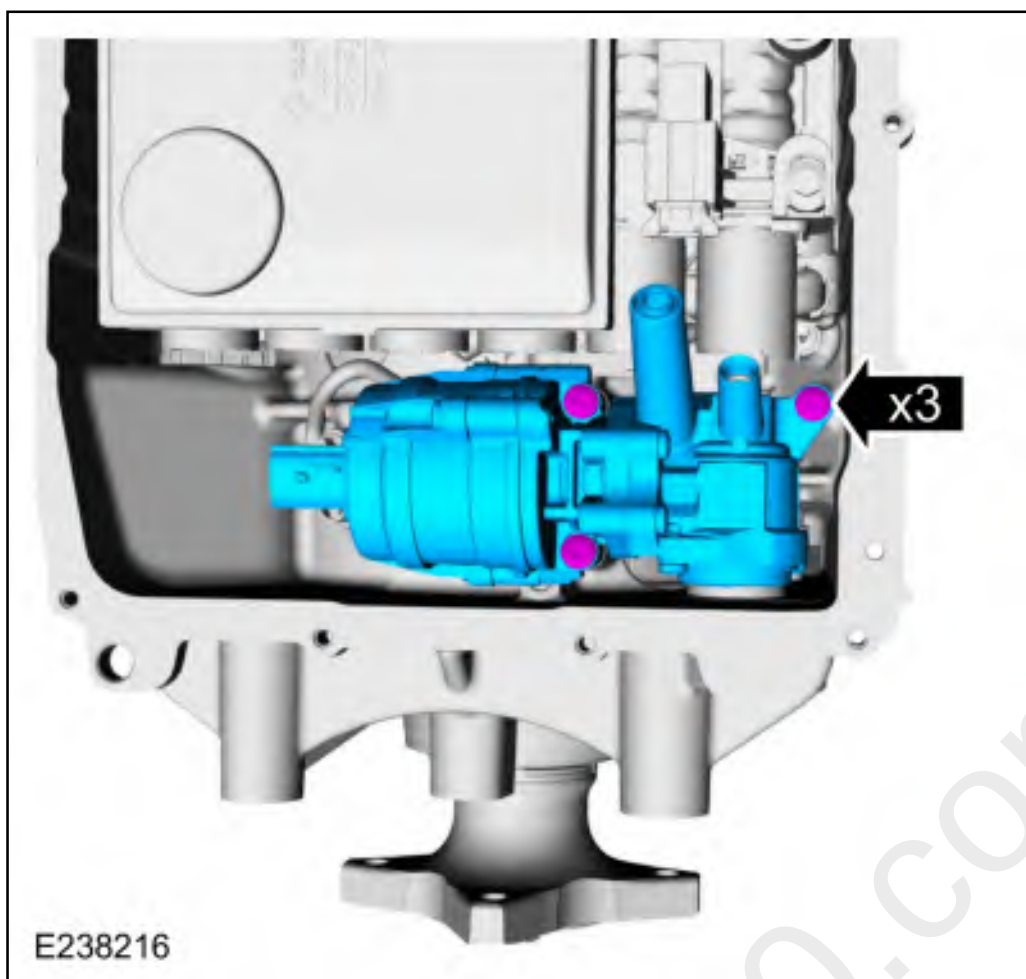


5. Remove the bolts and the transmission fluid auxiliary pump.

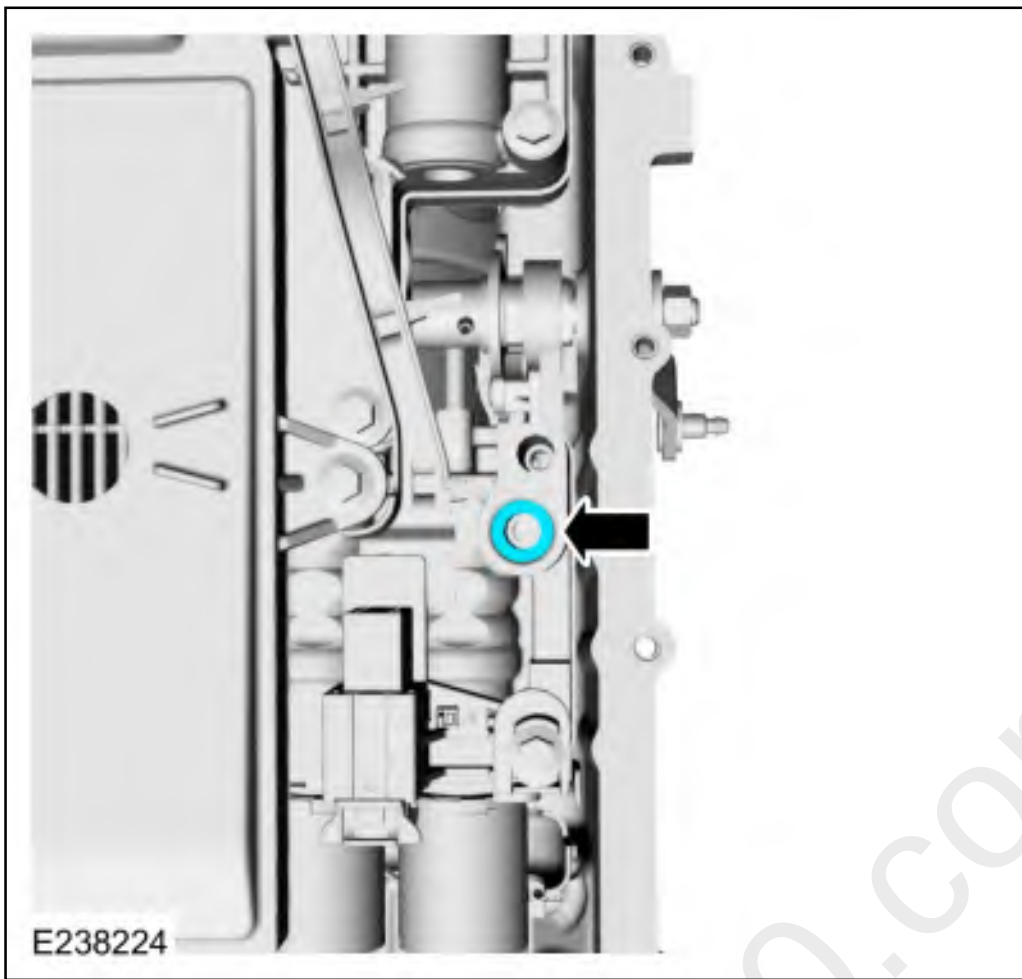


Installation

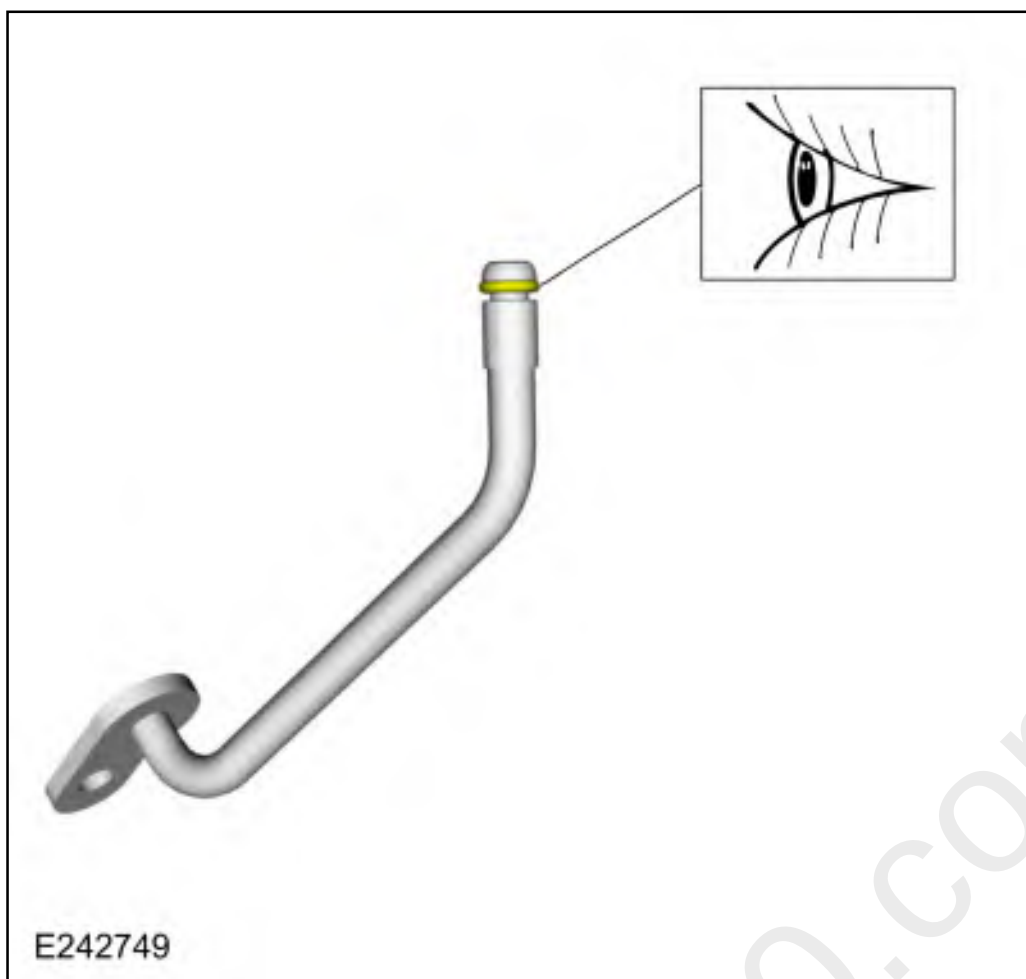
1. Install the transmission fluid auxiliary pump and loosely install the bolts.



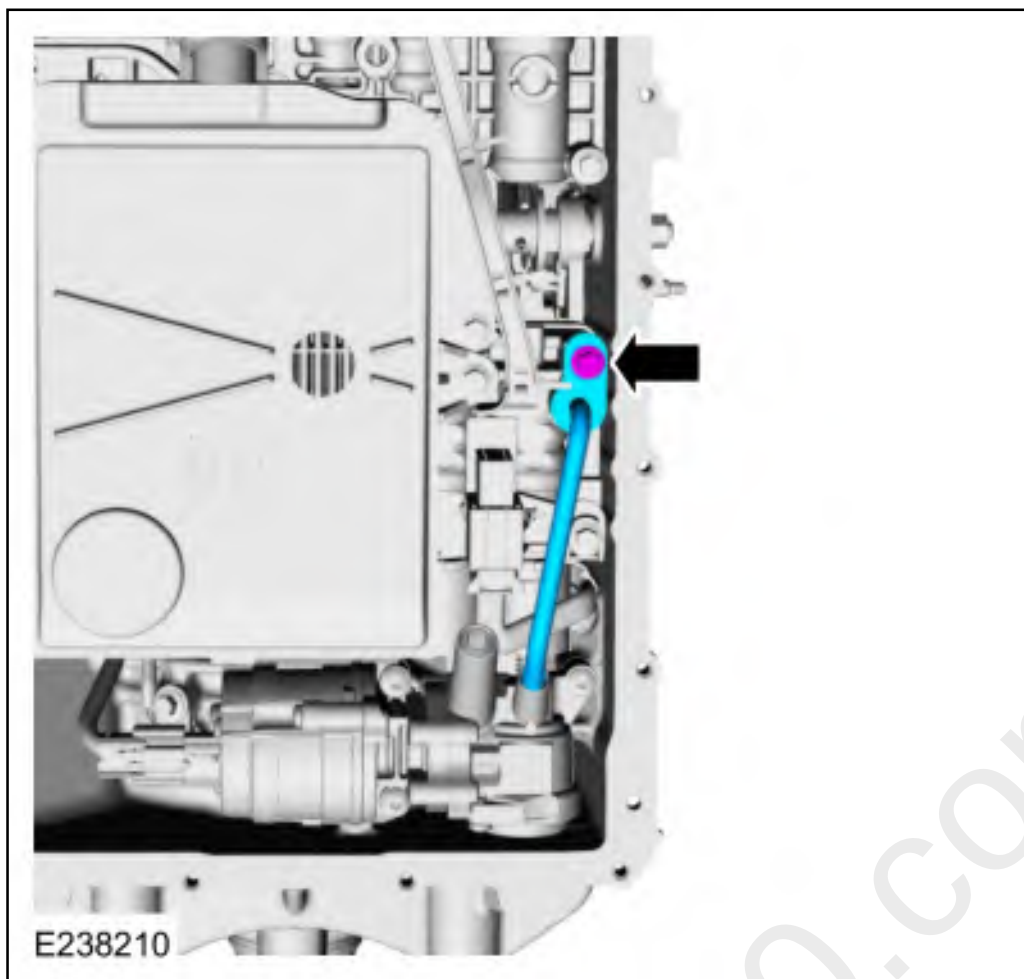
2. Install the transmission fluid auxiliary pump tube seal.



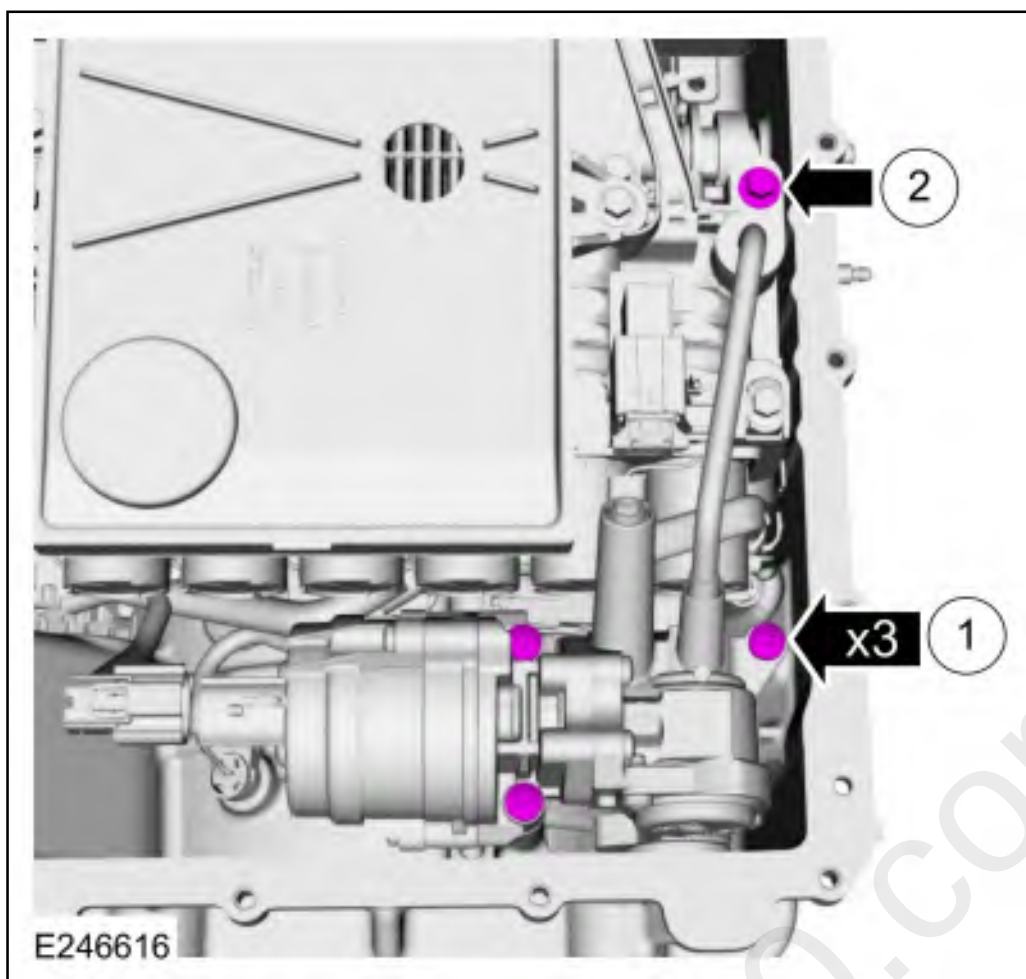
3. Inspect the transmission fluid auxiliary pump tube O-ring.



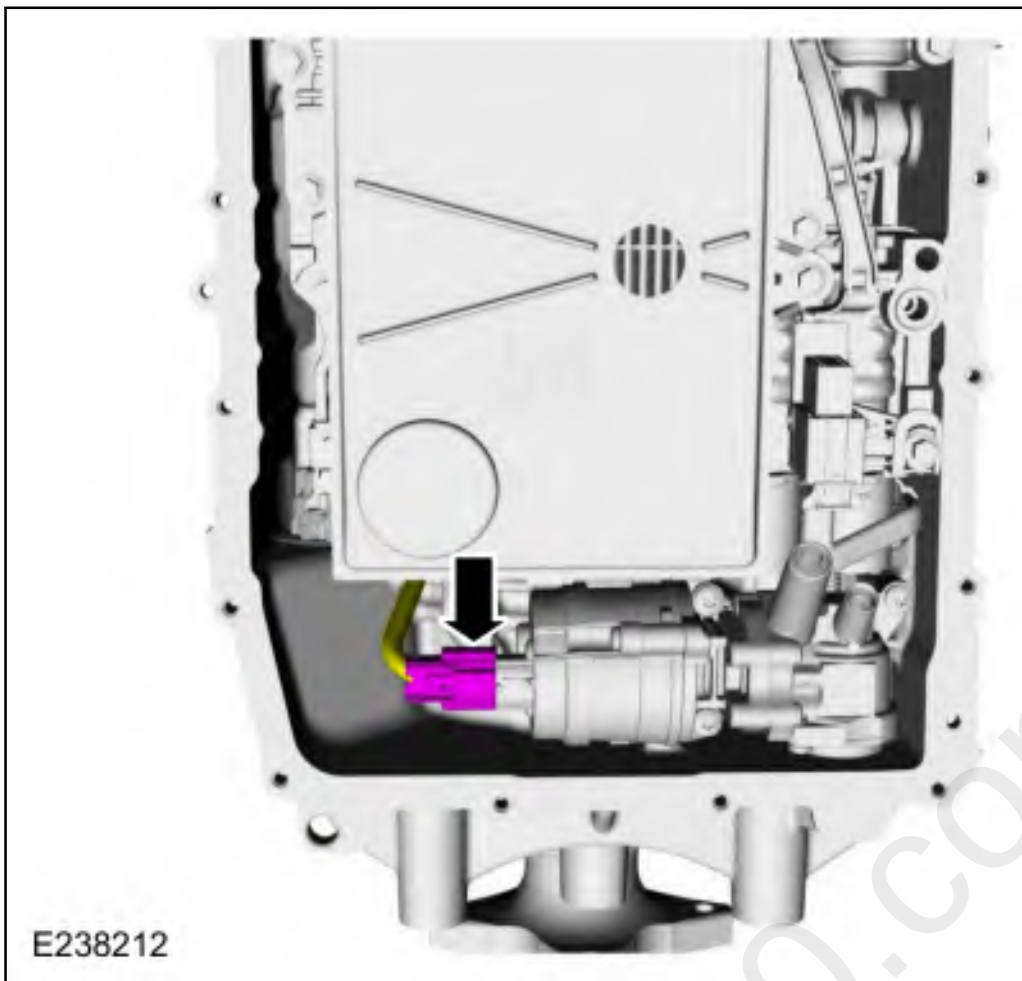
4. Install the transmission fluid auxiliary pump tube and loosely install the bolt.



1. Transmission fluid auxiliary pump bolts
Torque: 97 lb.in (11 Nm)
2. Transmission fluid auxiliary pump tube bolt
Torque: 106 lb.in (12 Nm)



6. Connect the transmission fluid auxiliary pump electrical connector.



7. Install the transmission fluid pan, gasket and filter.

Refer to: [Transmission Fluid Pan, Gasket and Filter - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: [Transmission Fluid Pan, Gasket and Filter](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Transmission Control Module (TCM) - 3.0L Power Stroke Diesel/3.5L EcoBoost (272kW/370PS)

Removal

NOTE: *The TCM is located on the RH frame rail.*

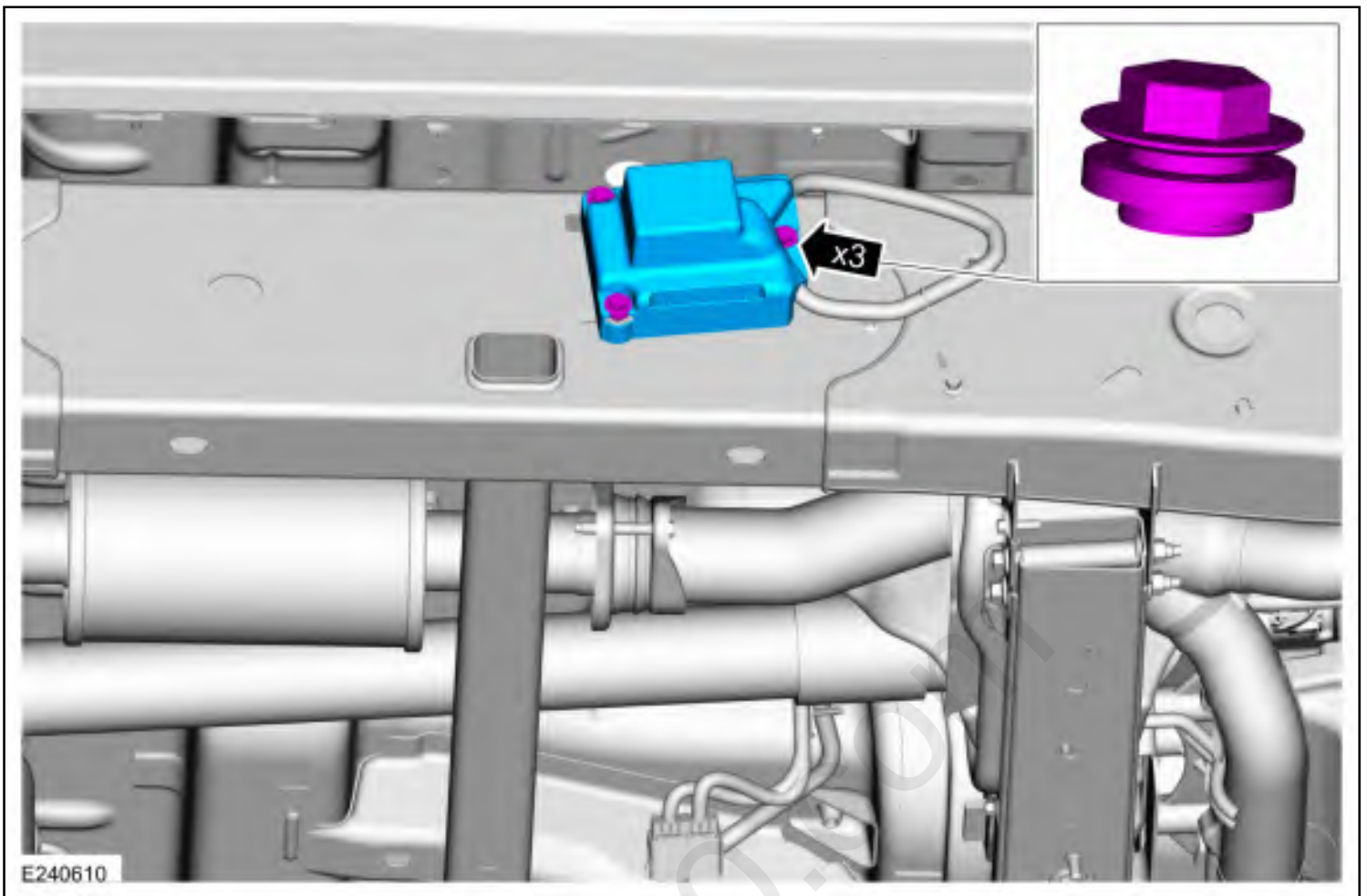
1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).

2. **NOTE:** *This step is only necessary when installing a new component.*

Download the module information to the diagnostic tool using the PMI routine.

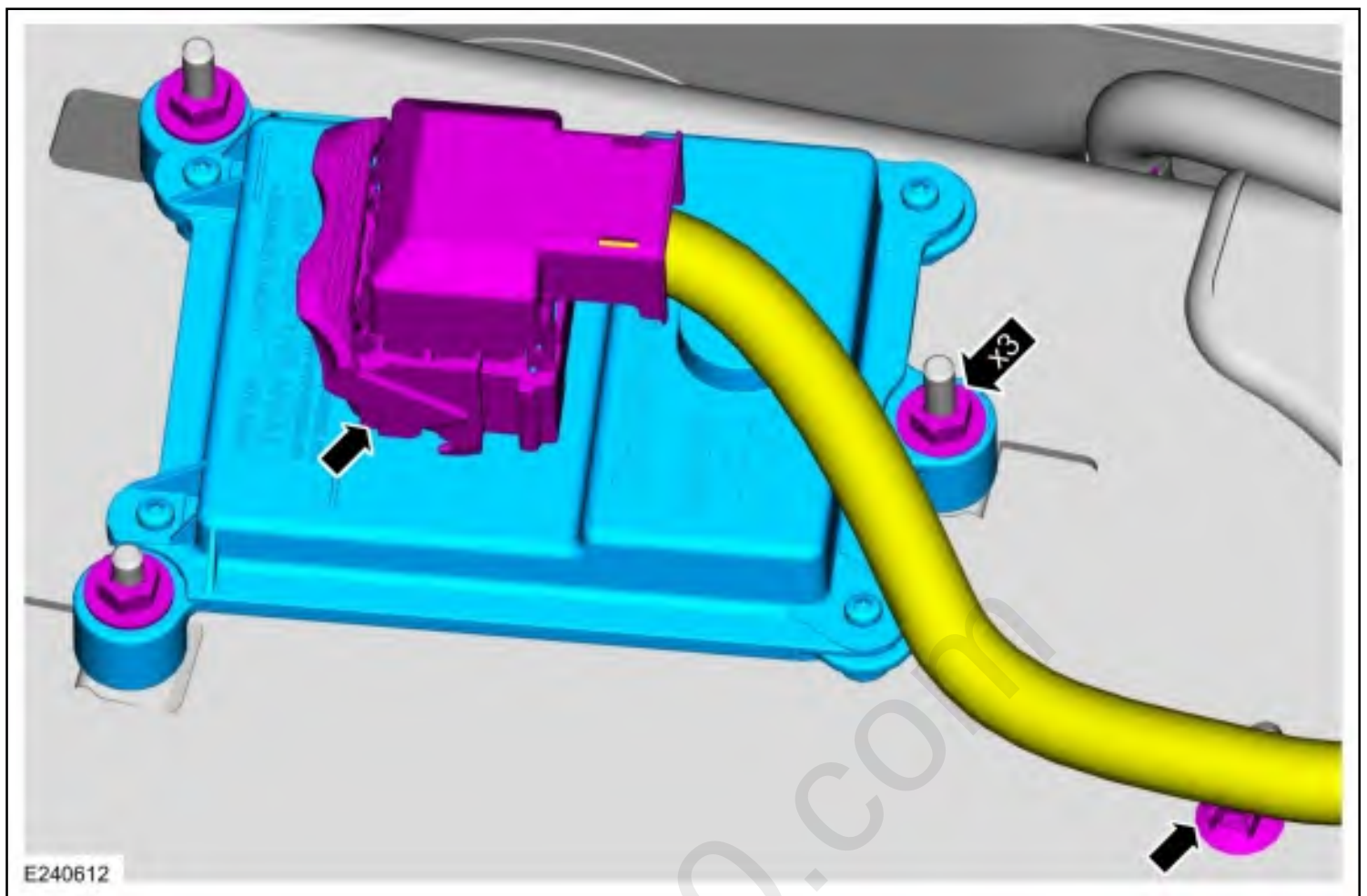
Refer to: [Module Programming](#) (418-01 Module Configuration, General Procedures).

3. Remove the retainers and the TCM shield.



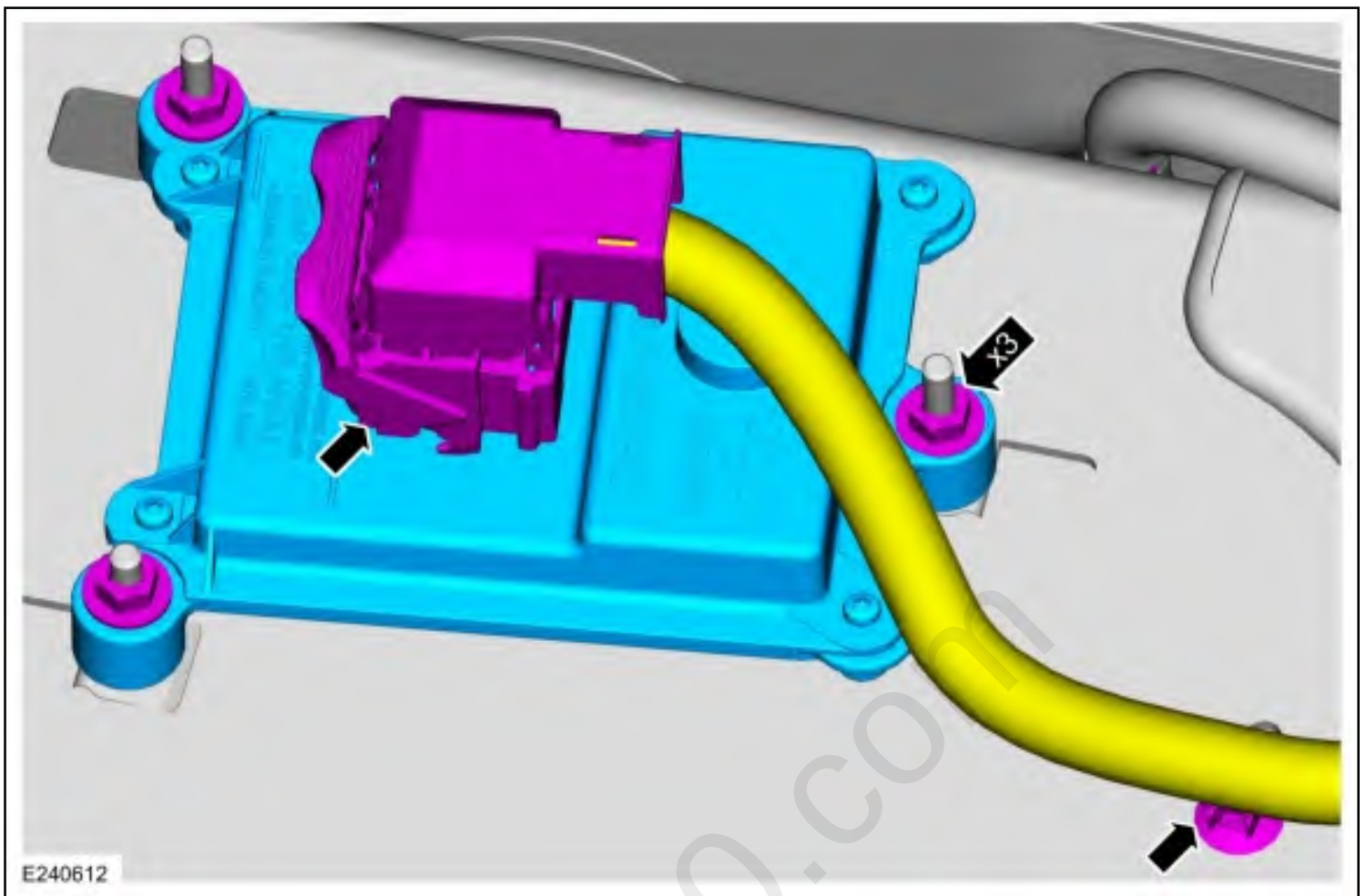
4. **NOTICE: Keep the TCM electrical connector straight when connecting it or damage the connector terminals can occur.**

- Slide the lock tab up and disconnect the TCM electrical connector.
- Detach the TCM wiring harness retainer and position aside
- Remove the nuts and the TCM.

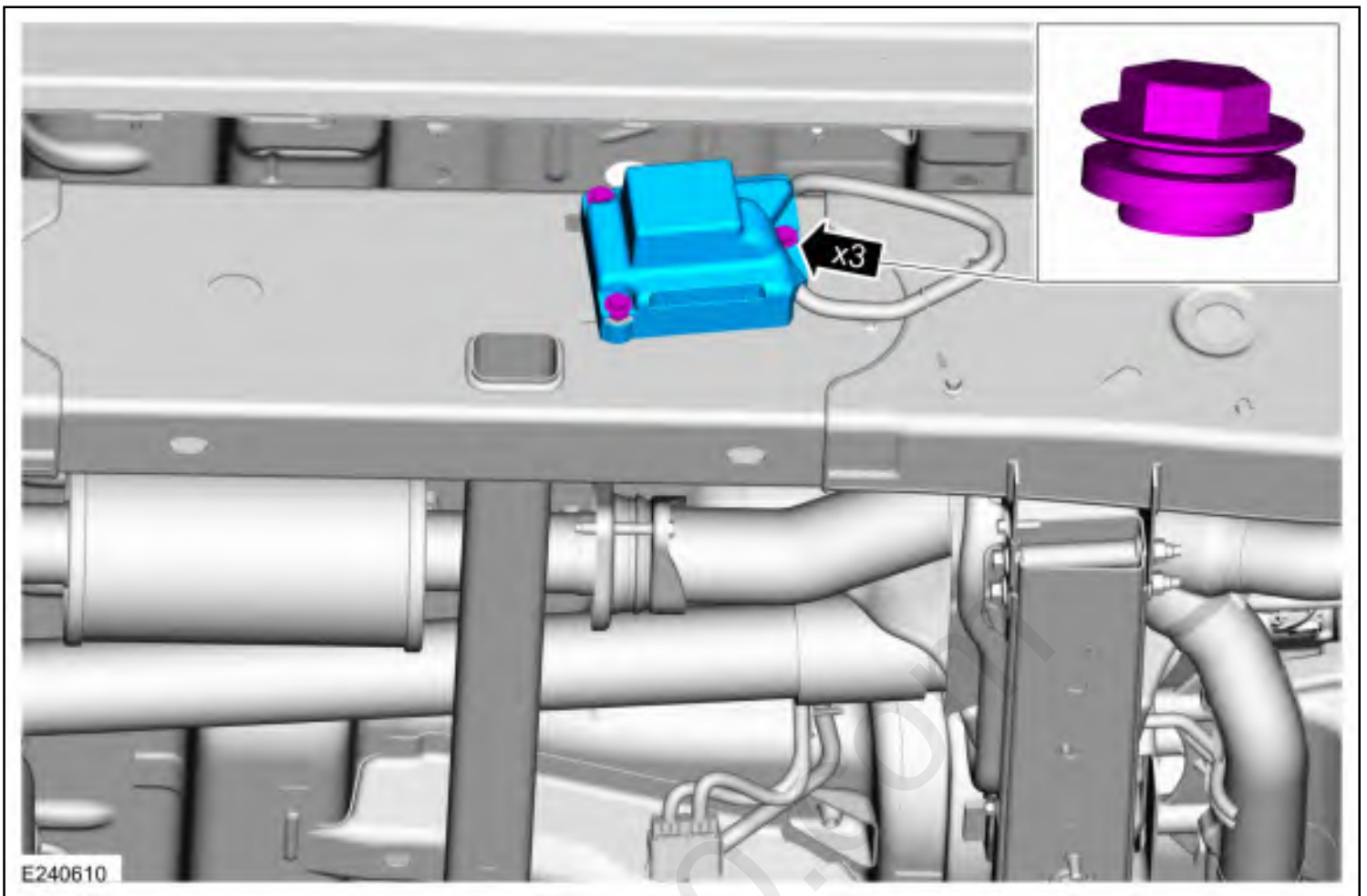


Installation

1. **NOTICE:** Keep the TCM electrical connector straight when connecting it or damage the connector terminals can occur.
 - Position the TCM in place and install the nuts.
Torque: 80 lb.in (9 Nm)
 - Connect the TCM electrical connector and slide the lock tab in to lock the connector.
 - Attach the TCM wiring harness retainer.



2. Install the TCM shield and retainers.



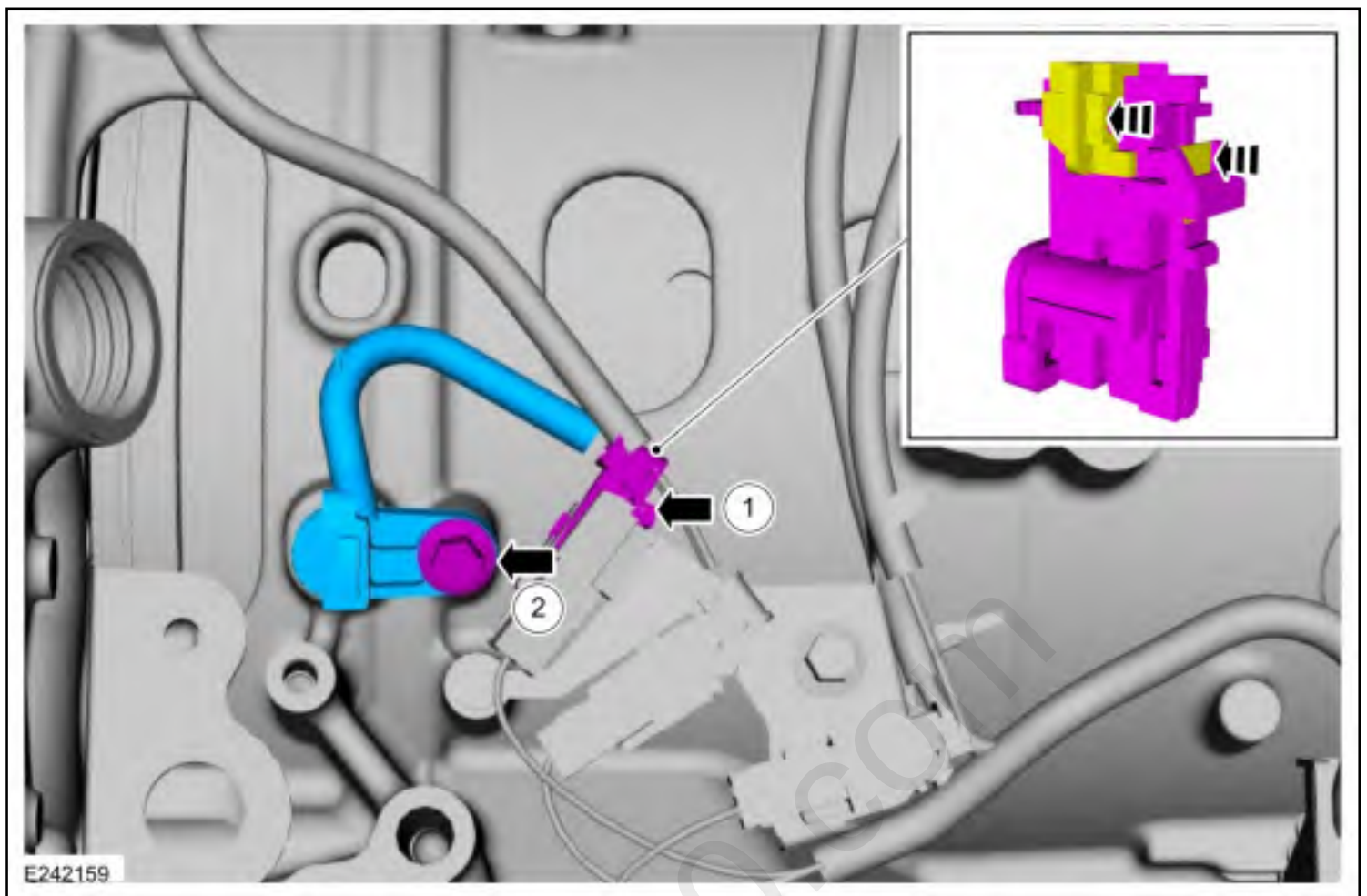
3. Restore the module configuration. Carry out the module configuration restore steps of the PMI procedure.
Refer to: [Module Programming](#) (418-01 Module Configuration, General Procedures).
4. Using the scan tool, download the solenoid body strategy.
Refer to: [Transmission Strategy Download](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Turbine Shaft Speed (TSS) Sensor

Base Part Number: Base Part Number: 7M101

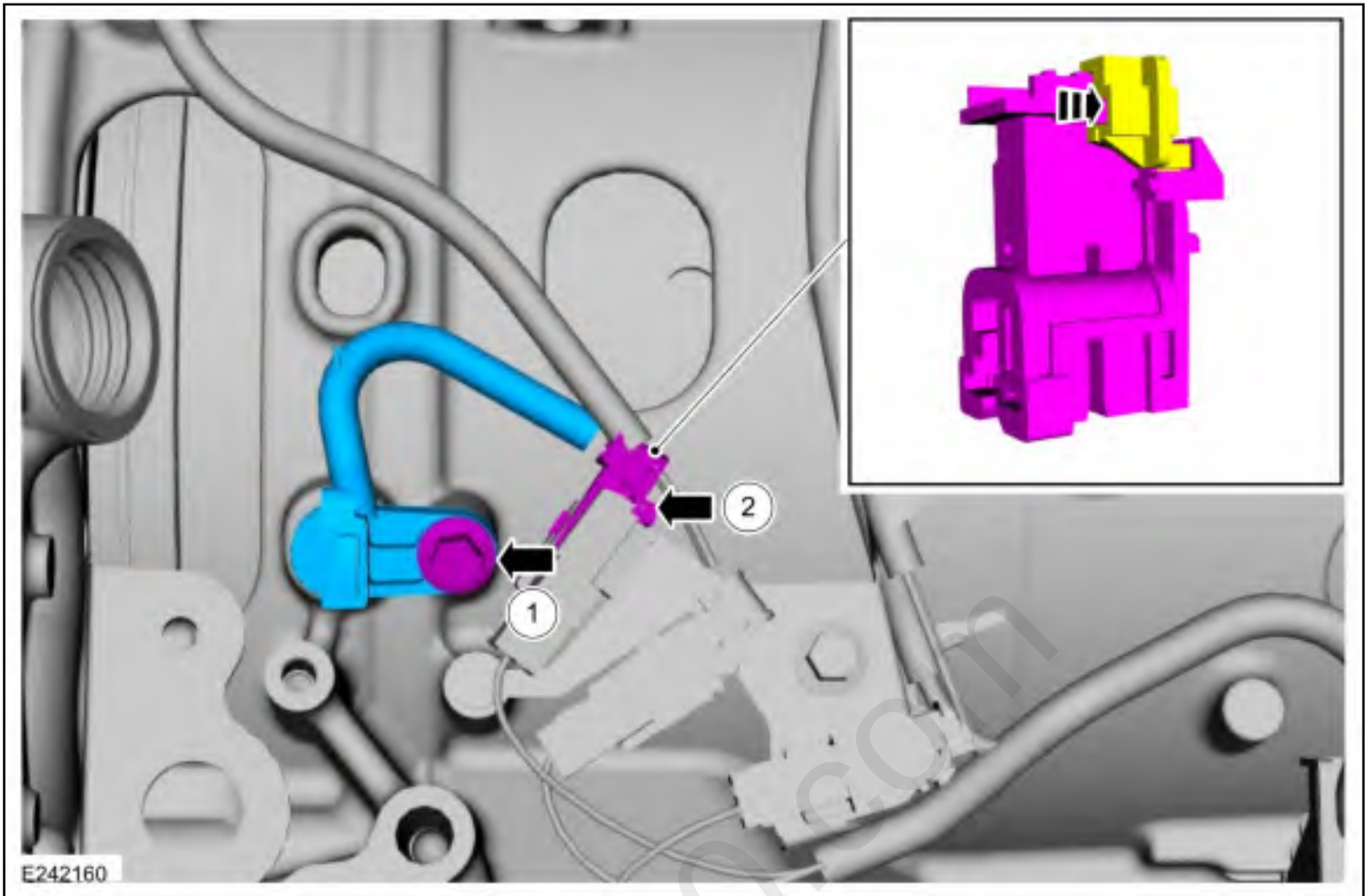
Removal

1. Remove the main control valve body.
Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
Refer to: Main Control Valve Body (307-01) .
2. Remove the TSS sensor.
 1. Slide the plastic lock to the unlocked position. While pressing the plastic tab, disconnect the electrical connector.
 2. Remove the bolt and the TSS sensor.



Installation

1. Install the TSS sensor.
 1. Install the TSS sensor bolt.
Torque: 62 lb.in (7 Nm)
 2. Connect the electrical connector. Slide the plastic lock to the locked position.



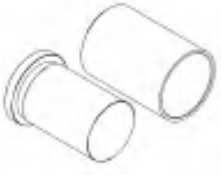
2. Install the main control valve body.

Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: Main Control Valve Body (307-01) .

Transmission Internal Wiring Harness

Special Tool(s) / General Equipment

 E234932	307-746 Remover, Transmission Wiring Harness Connector

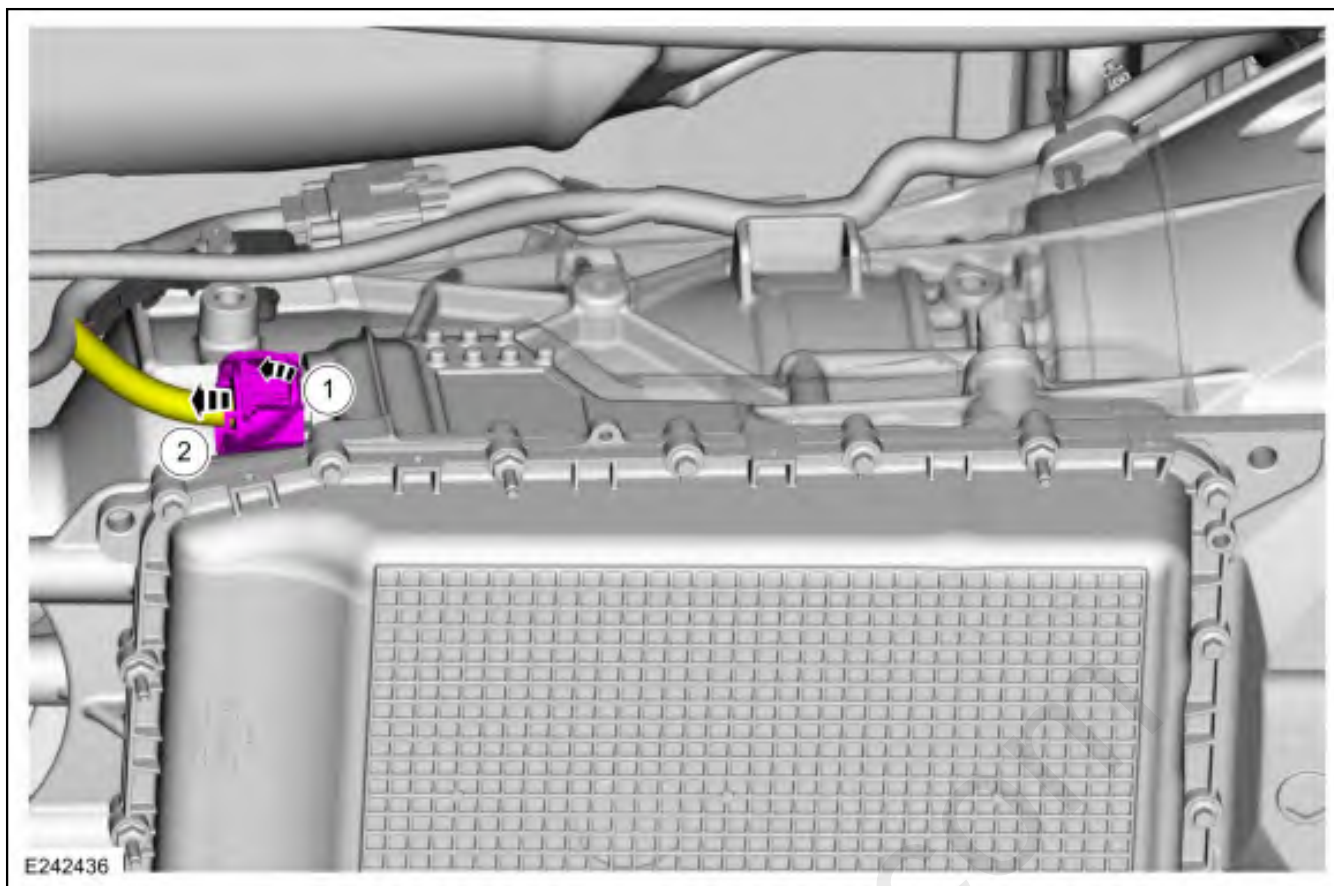
Removal

1. Remove the main control valve body.

Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: Main Control Valve Body (307-01) .

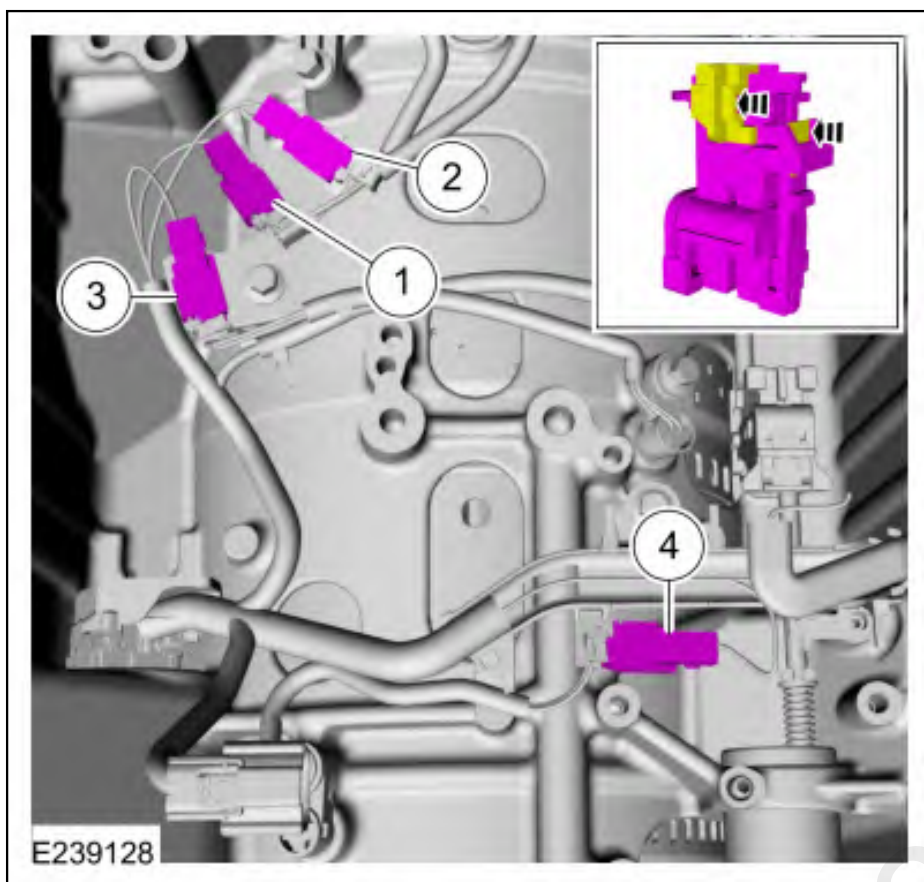
1. Slide the lock tab up and disconnect the transmission electrical connector.
2. Pull the transmission electrical connector out to disconnect.



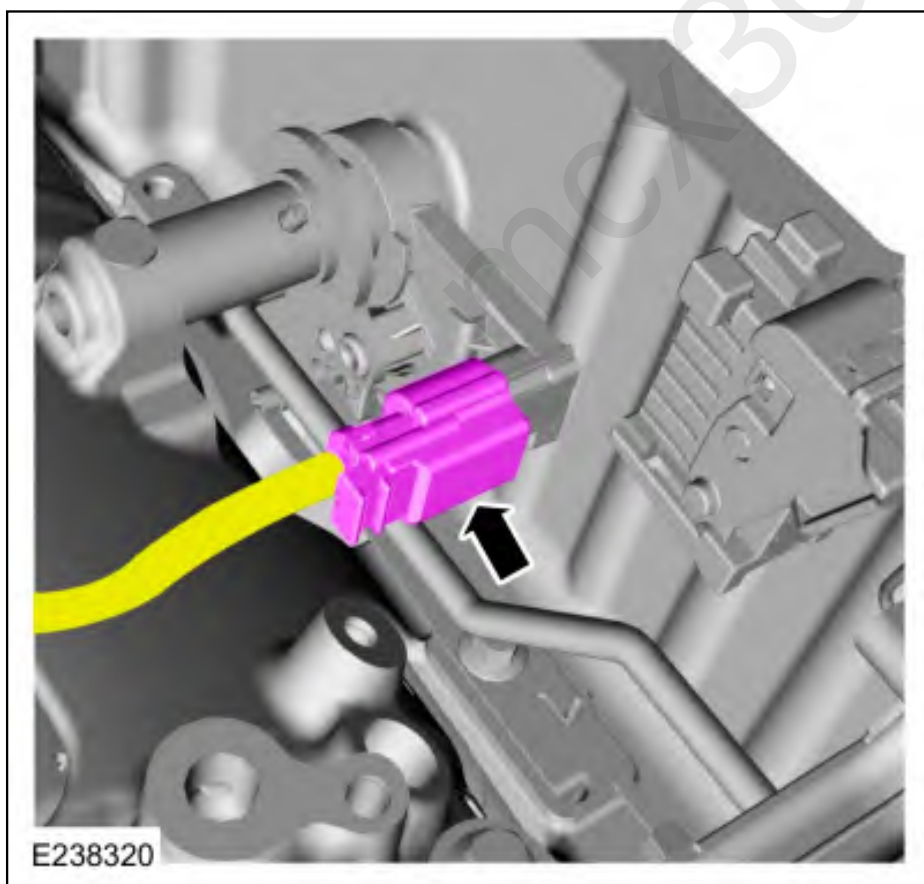
3. **NOTE:** To disconnect the electrical connectors, slide the plastic lock to the unlocked position. While pressing the plastic tab, disconnect the electrical connector.

Unlock and disconnect the speed sensors.

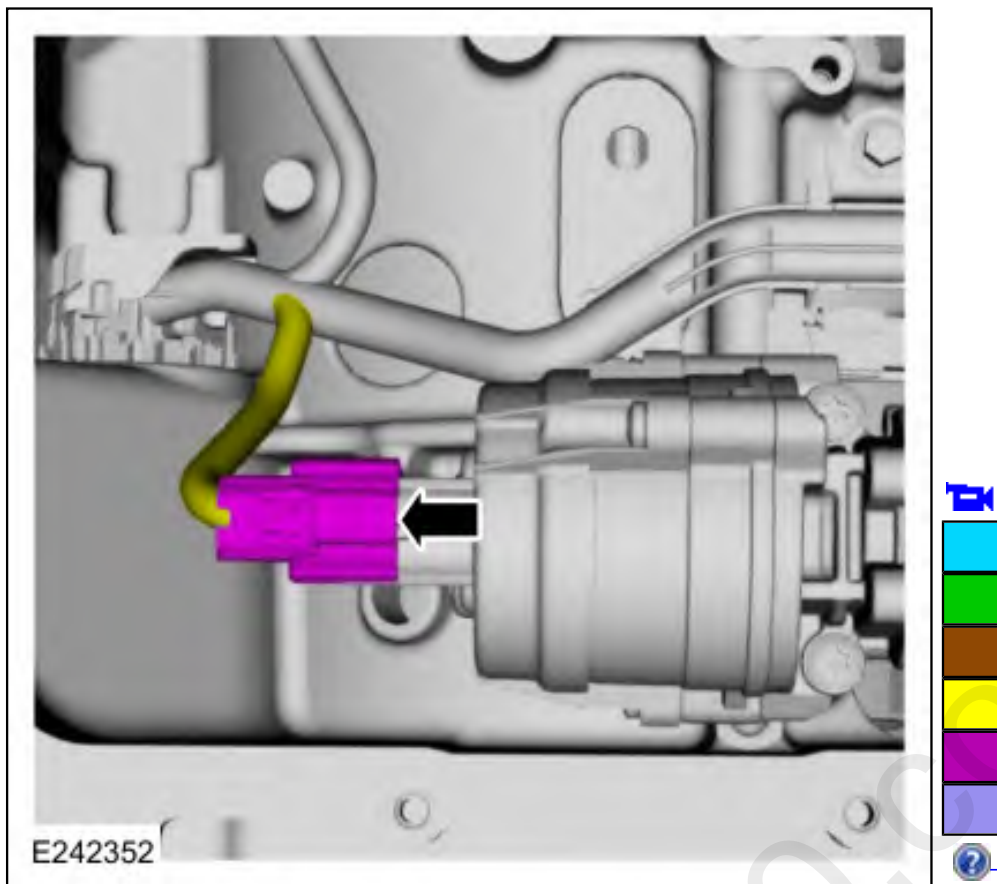
1. TSS sensor
2. Intermediate speed A sensor
3. Intermediate speed B sensor
4. OSS sensor



4. Disconnect the TR sensor electrical connector.



5. Disconnect the transmission fluid auxiliary pump electrical connector.



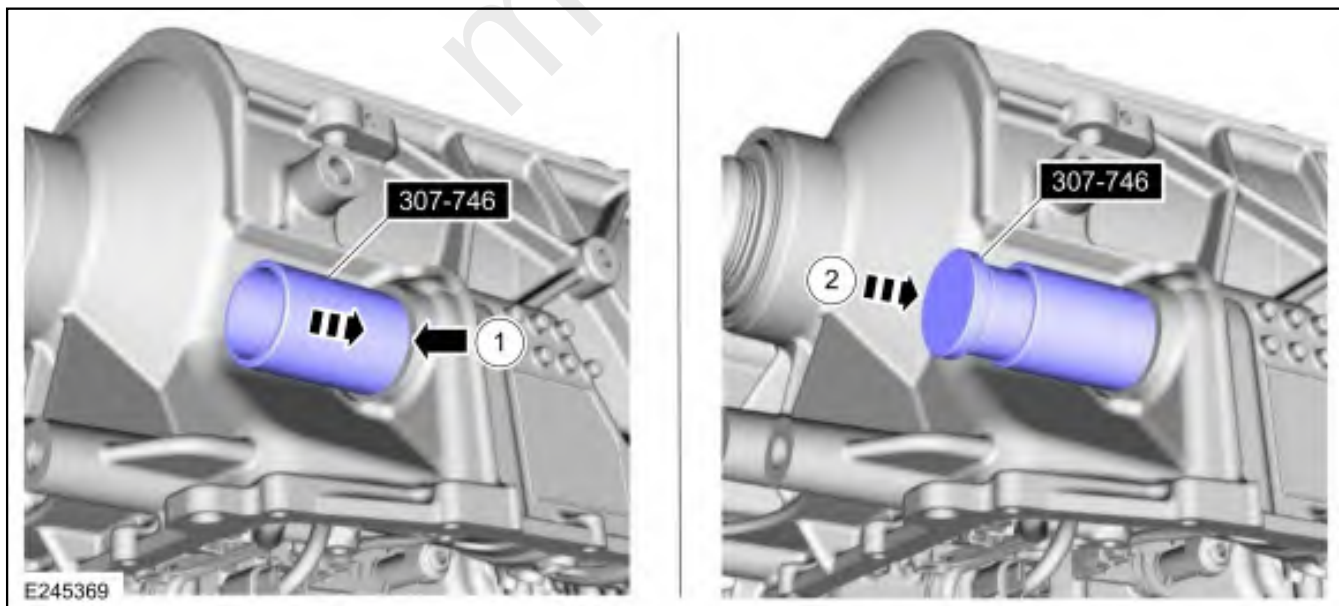
6.

Using the special tool, disconnect the transmission internal wiring harness connector from the transmission case.

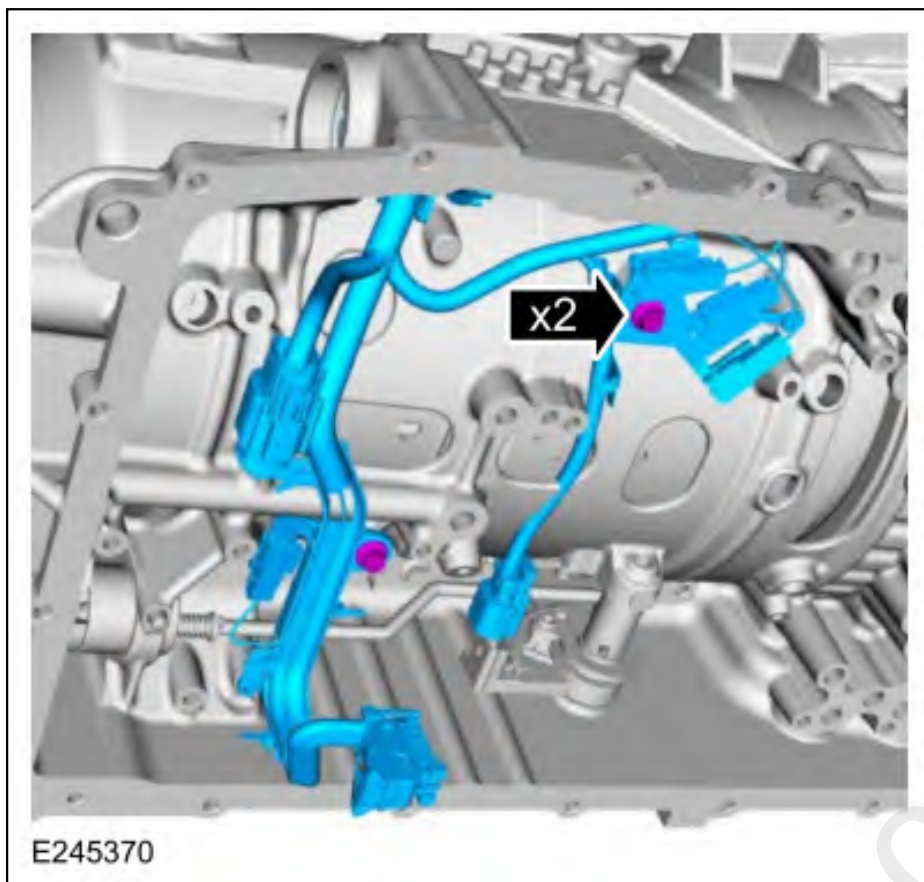
1. Slide the special tool over the connector flush with the transmission case.

Use Special Service Tool: 307-746 Remover, Transmission Wiring Harness Connector.

2. Use the special tool to push the connector through the case.

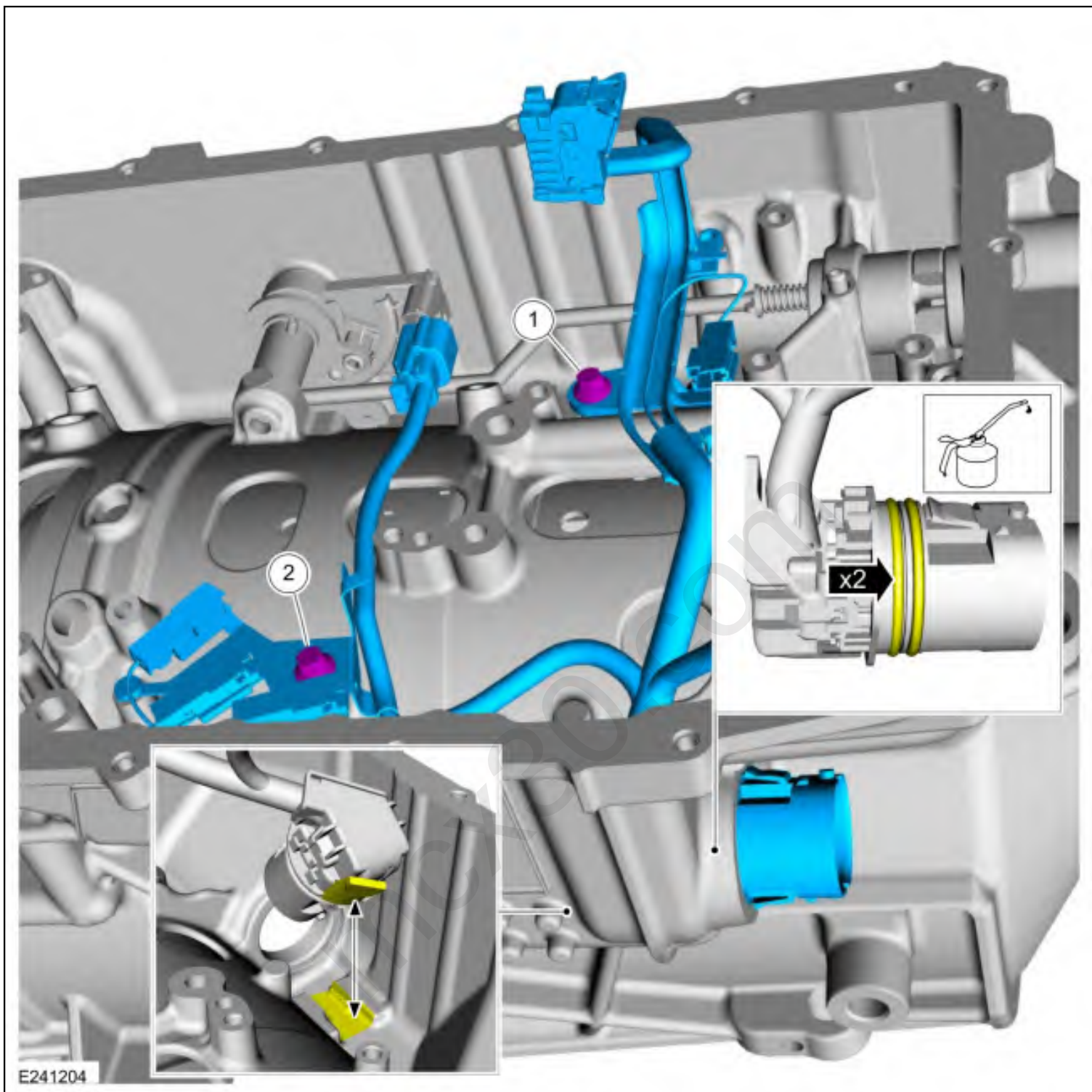


7. Remove the bolts and the transmission internal wiring harness.

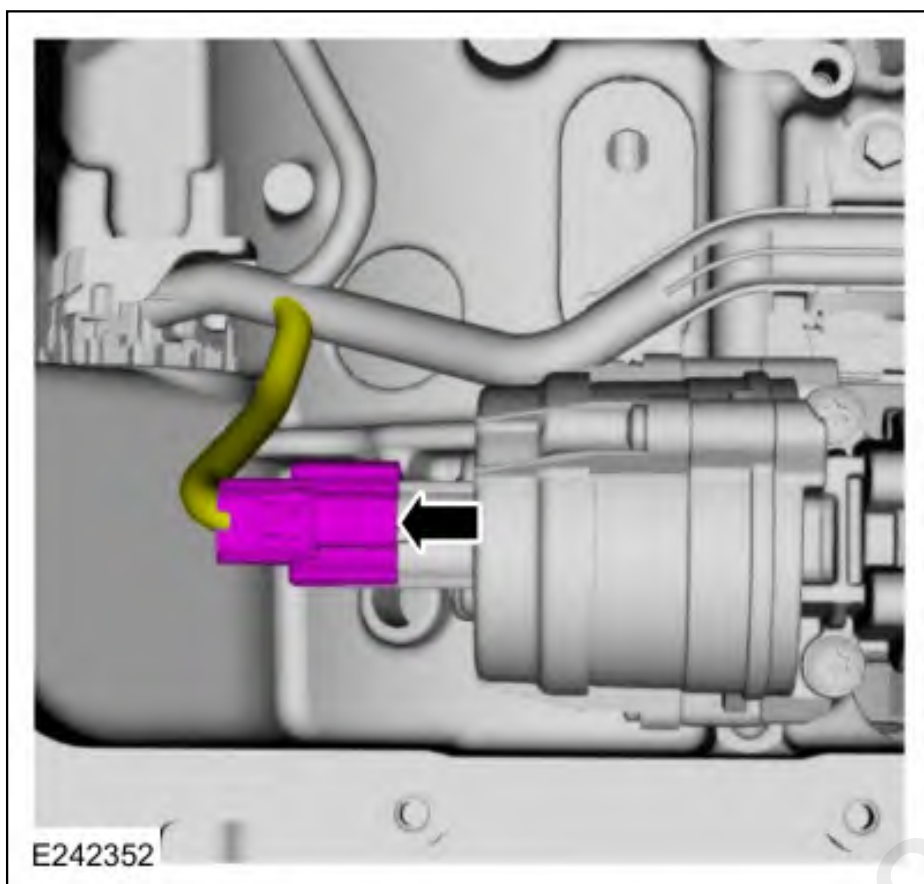


Installation

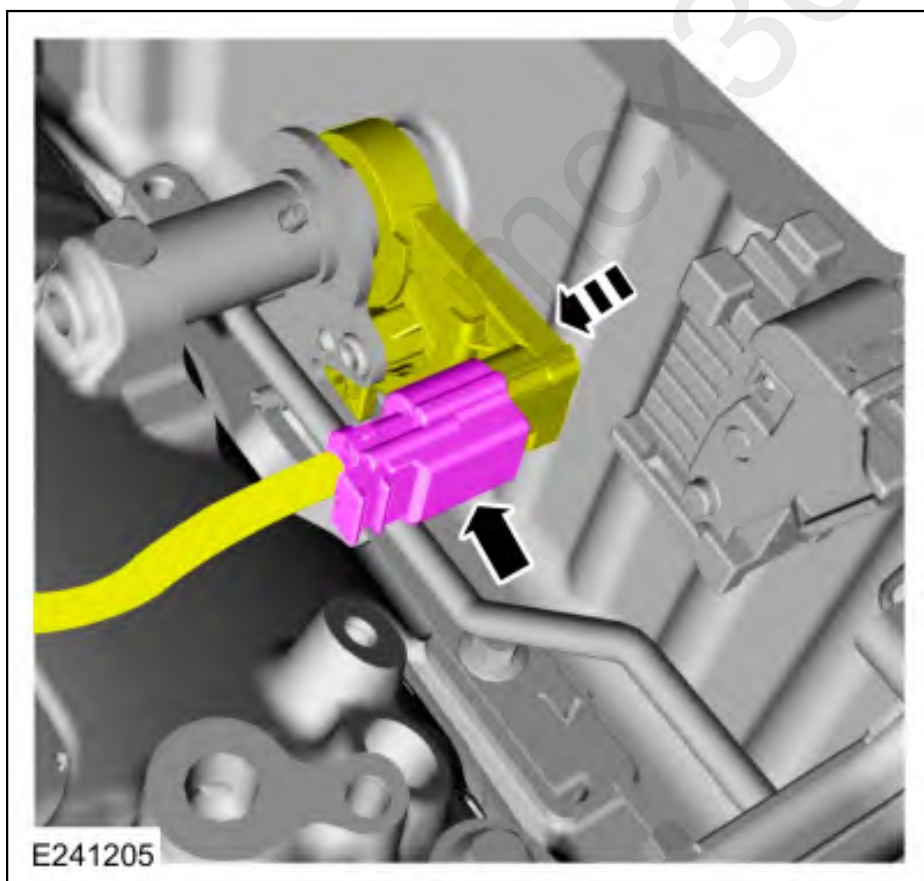
1. Install the wiring harness. Lubricate the O-ring seals with petroleum jelly. Align the tab on the electrical connector with the indentation in the transmission case and install the main electrical connector in the transmission case. Align the wiring harness and install the bolts.
 1. *Torque:* 97 lb.in (11 Nm)
 2. *Torque:* 106 lb.in (12 Nm)



2. Connect the transmission fluid auxiliary pump electrical connector.



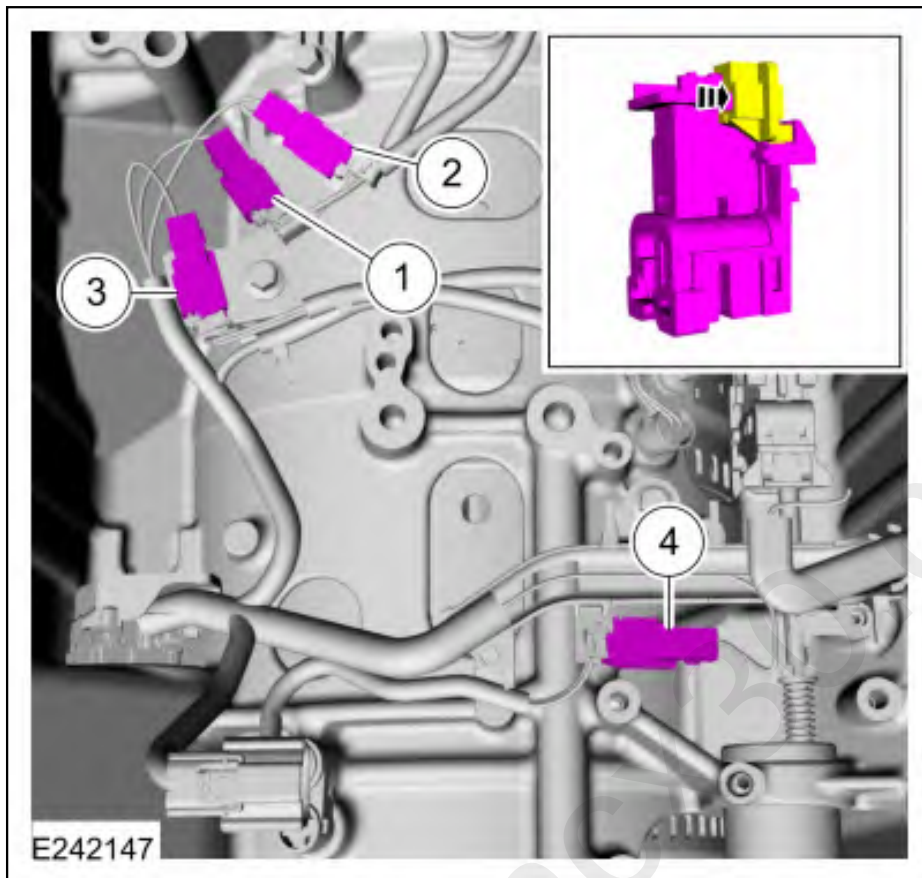
3. Support the opposite side of the TR sensor and connect the electrical connector.



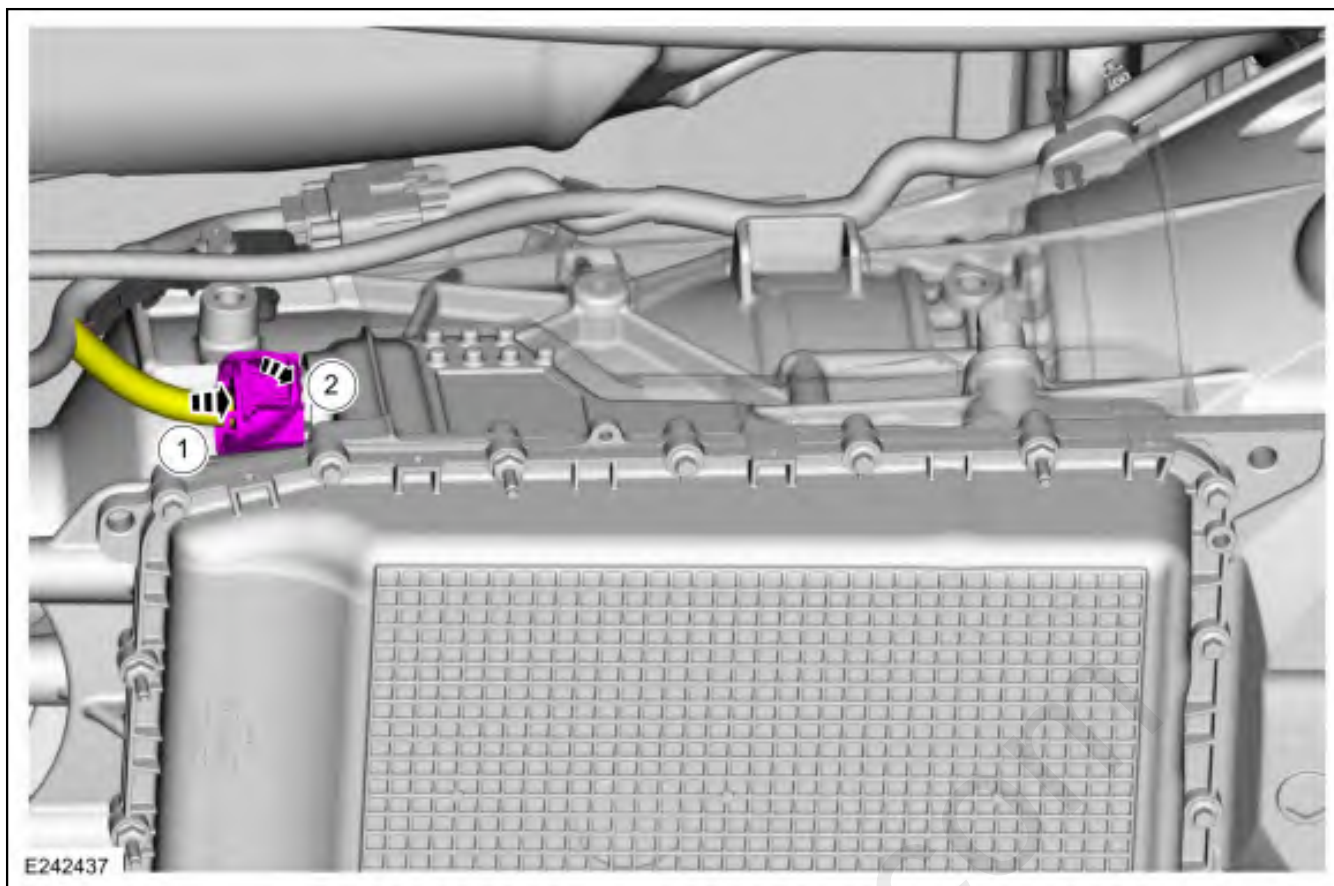
4. **NOTE:** After connecting the electrical connectors, slide the plastic lock to the locked position.

Connect and lock the speed sensors.

1. TSS sensor
2. Intermediate speed A sensor
3. Intermediate speed B sensor
4. OSS sensor



1. Push the transmission electrical connector in.
2. Lock the tab to connect the transmission electrical connector.



6. Install the main control valve body.

Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: Main Control Valve Body (307-01) .

Transmission Range (TR) Sensor

Base Part Number: Base Part Number: 7F293

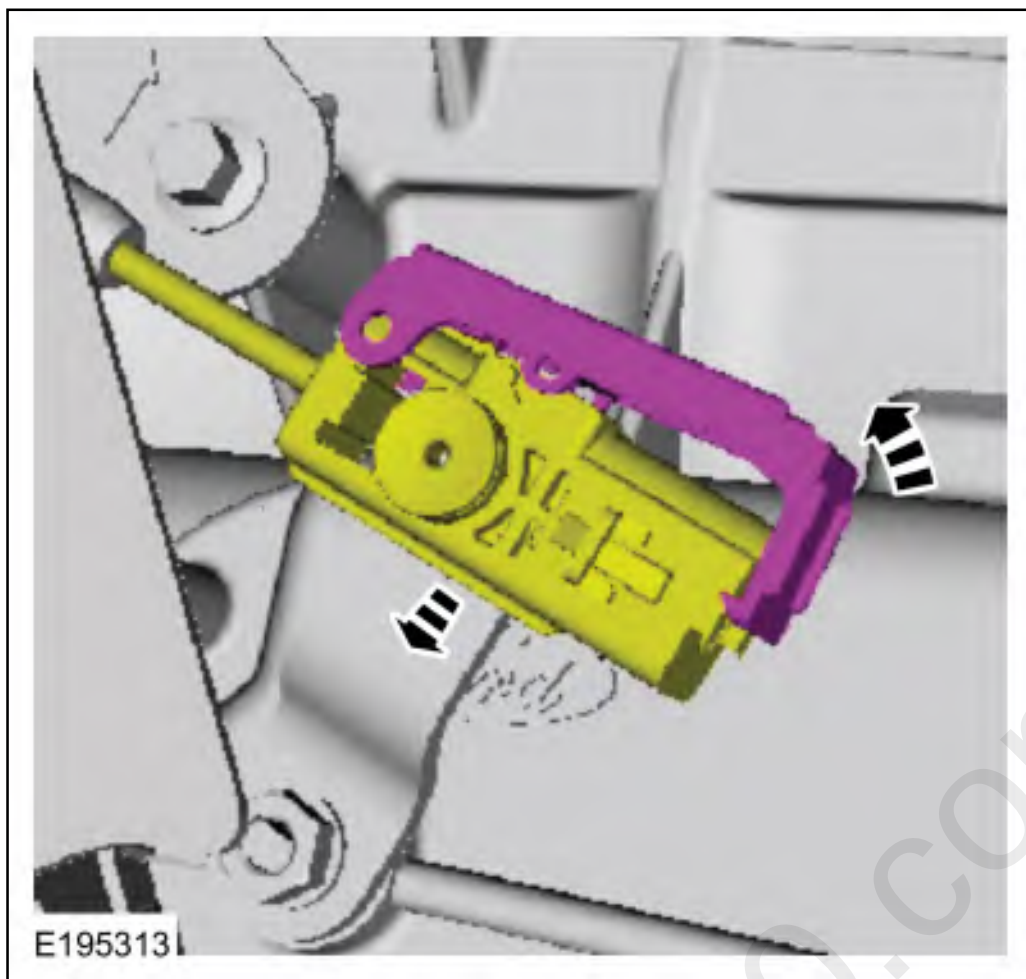
Special Tool(s) / General Equipment

Punch

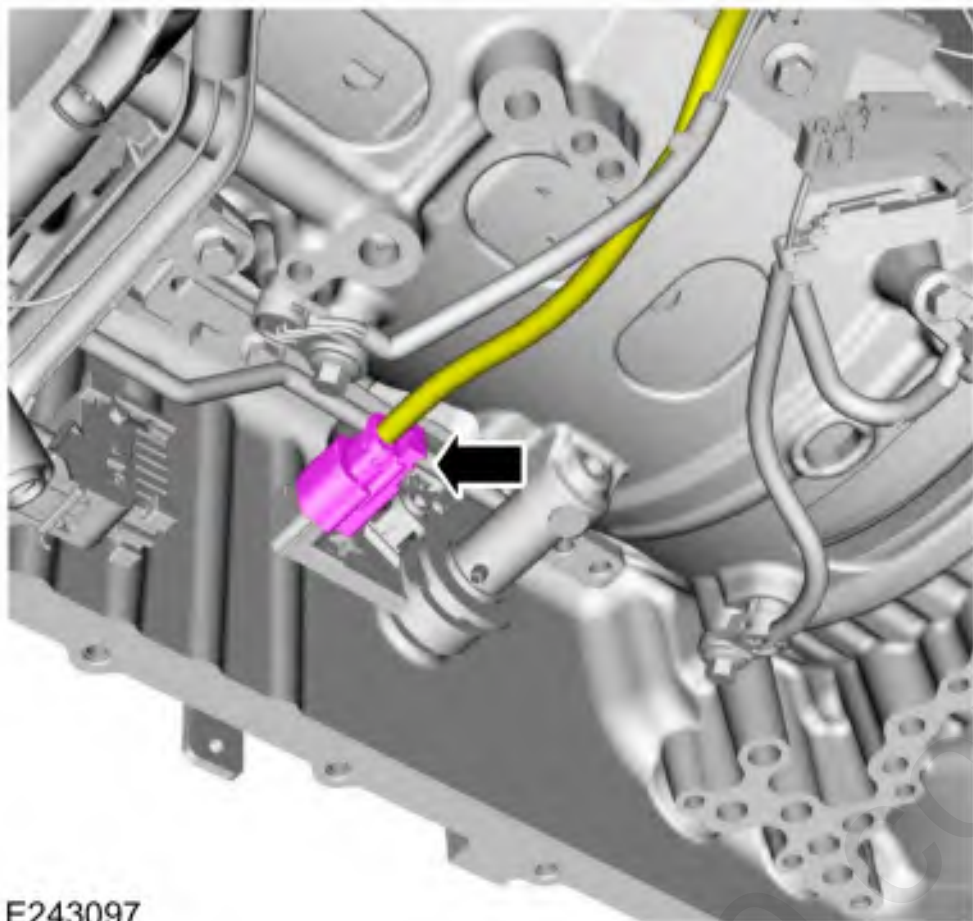
Removal

1. Remove the main control valve body.
Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).
2. **NOTICE: To prevent selector lever cable damage, do not apply force to the selector lever cable between the manual control lever and the selector lever cable bracket.**

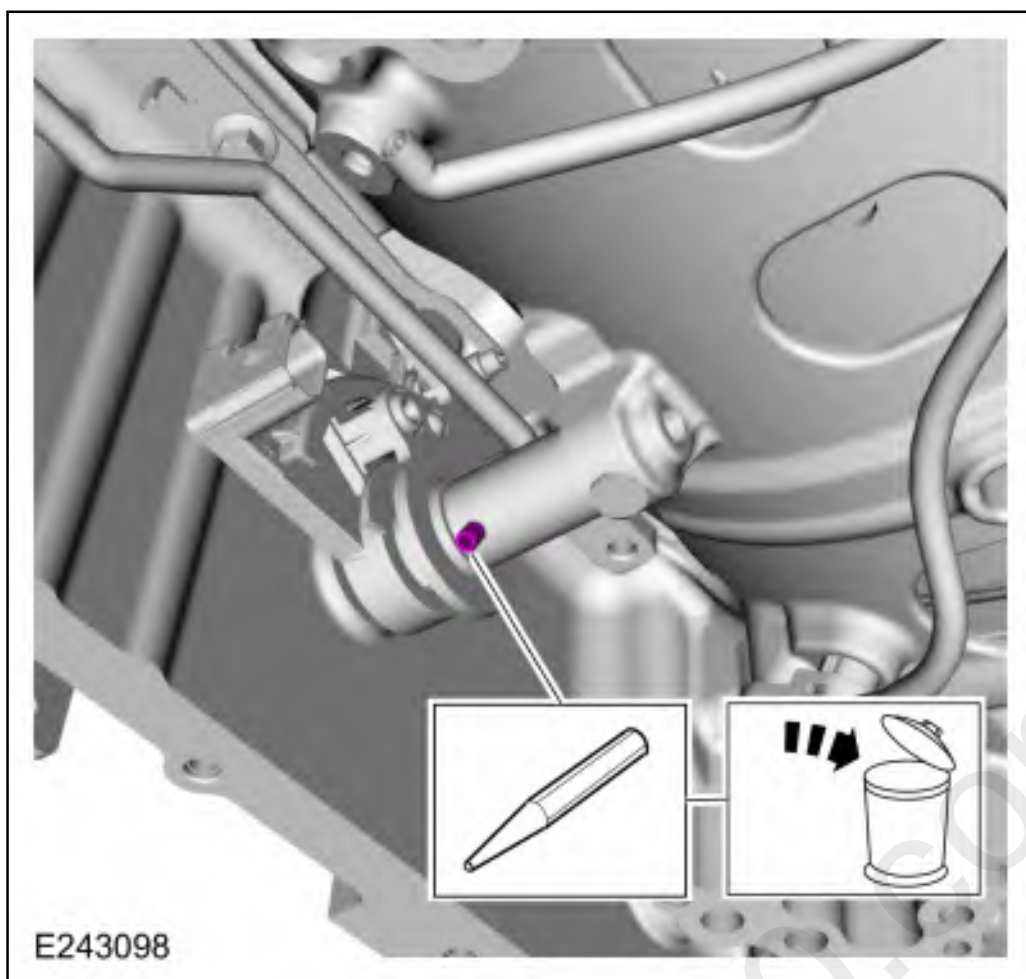
Rotate the cable adjuster lock upward and disconnect the selector lever cable from the manual control lever.



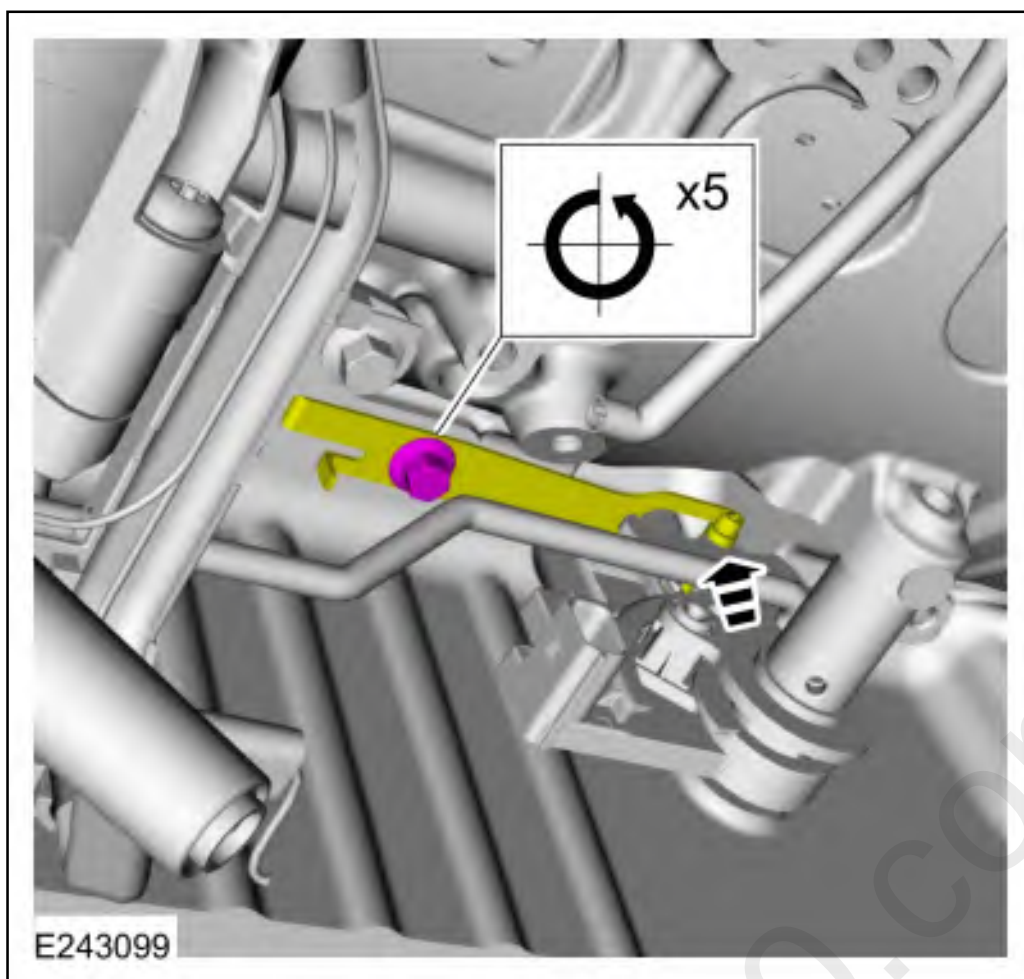
3. Disconnect the TR sensor electrical connector and position the transmission wiring harness aside.



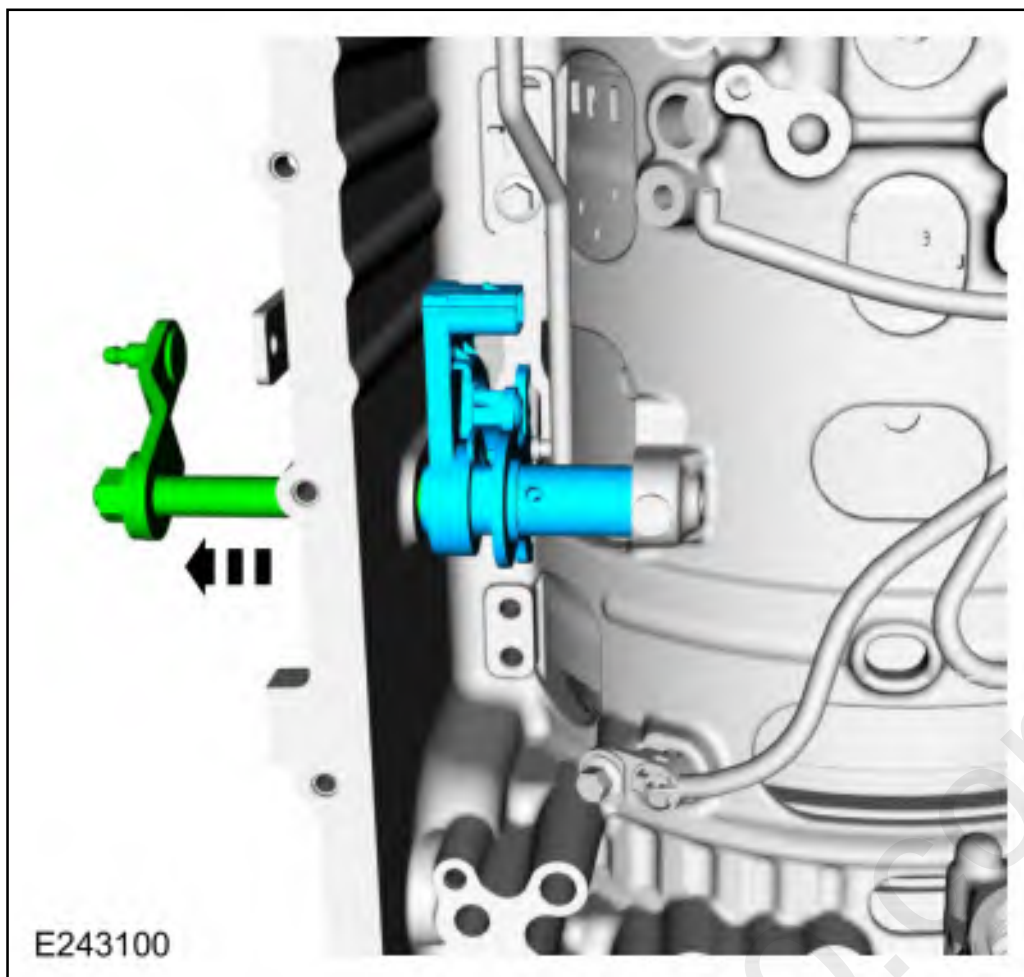
4. Using a punch, remove and discard the manual shaft-to-TR sensor roll pin (7G100).
Use the General Equipment: Punch



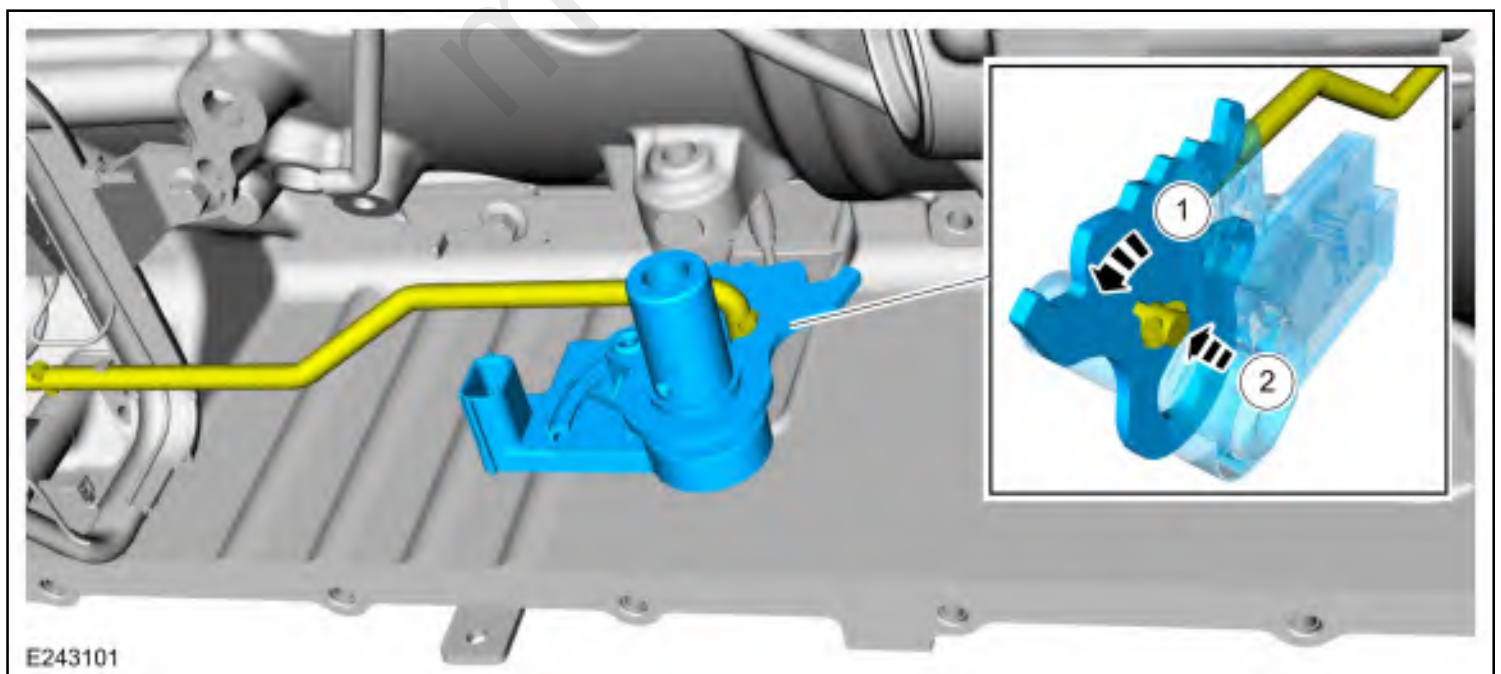
5. Loosen the detent spring bolt and the detent spring enough to remove the tension from the TR sensor.



6. Remove the manual shaft and selector lever from the TR sensor.

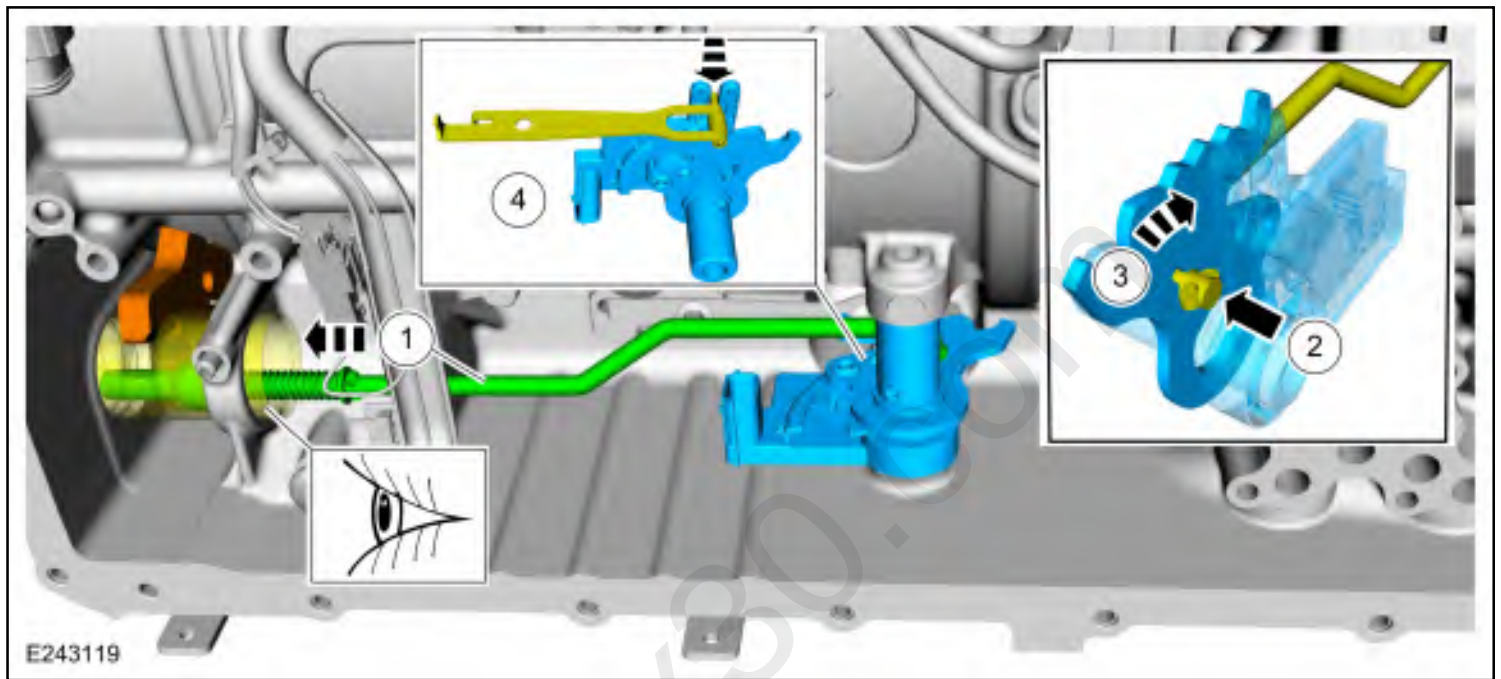


7. Remove the TR sensor (7H557).
 1. Rotate the TR sensor.
 2. Disconnect the park pawl actuator rod and remove the TR sensor.

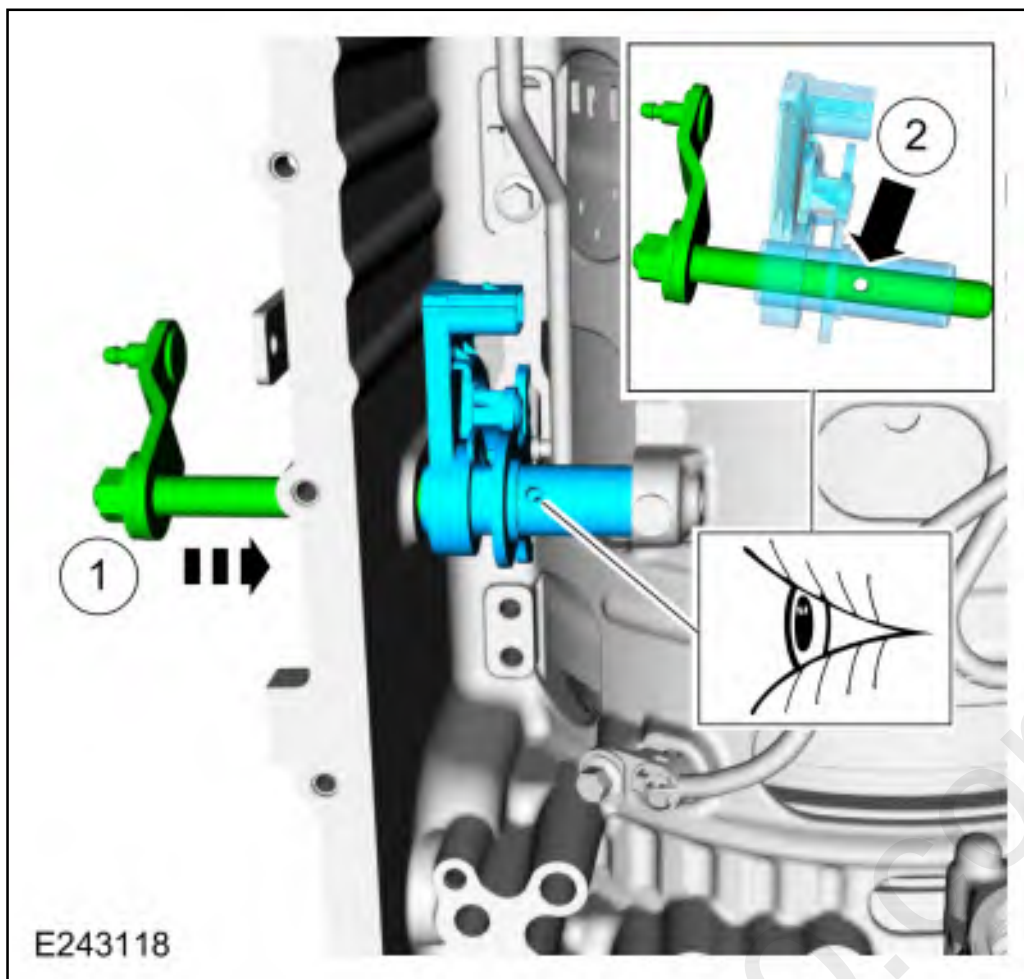


Installation

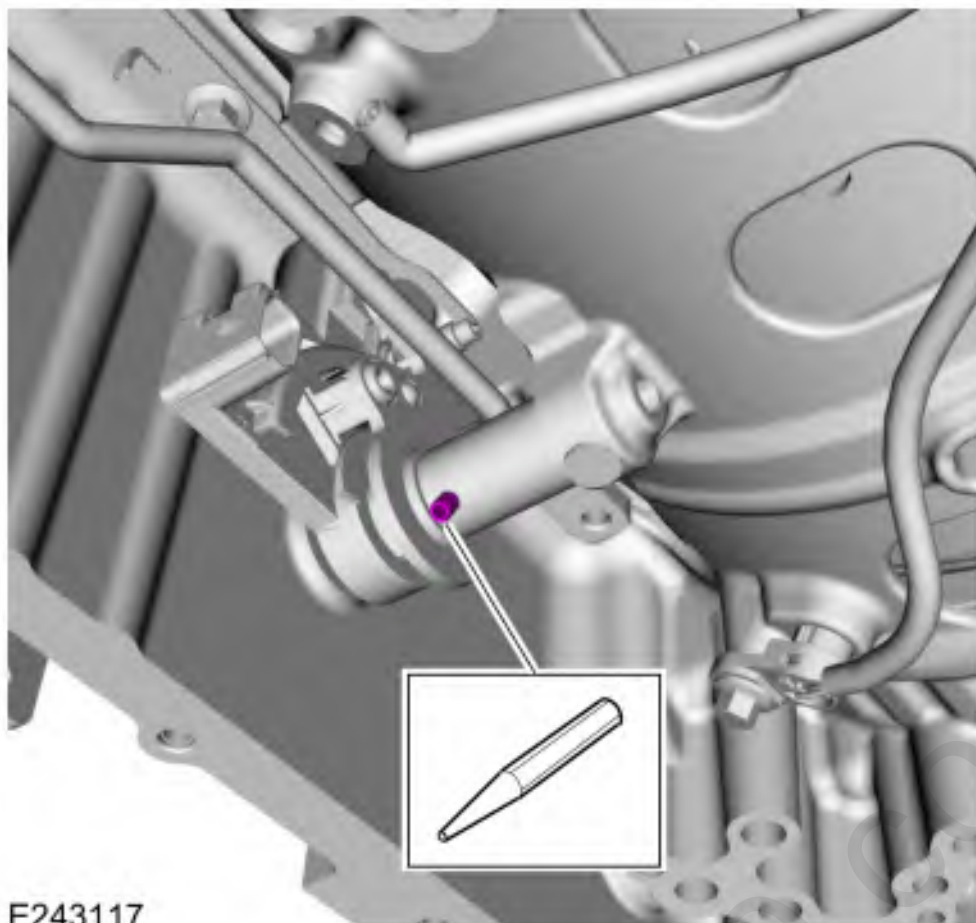
1.
Install the TR sensor (7H557).
 1. Position the park pawl actuator rod into the park pawl sleeve.
 2. Connect the park pawl actuator rod to the TR sensor.
 3. Rotate the TR sensor.
 4. Align the TR sensor to the detent spring.



1. Slide the manual shaft and selector lever into the TR sensor.
2. Align the TR sensor roll pin hole.



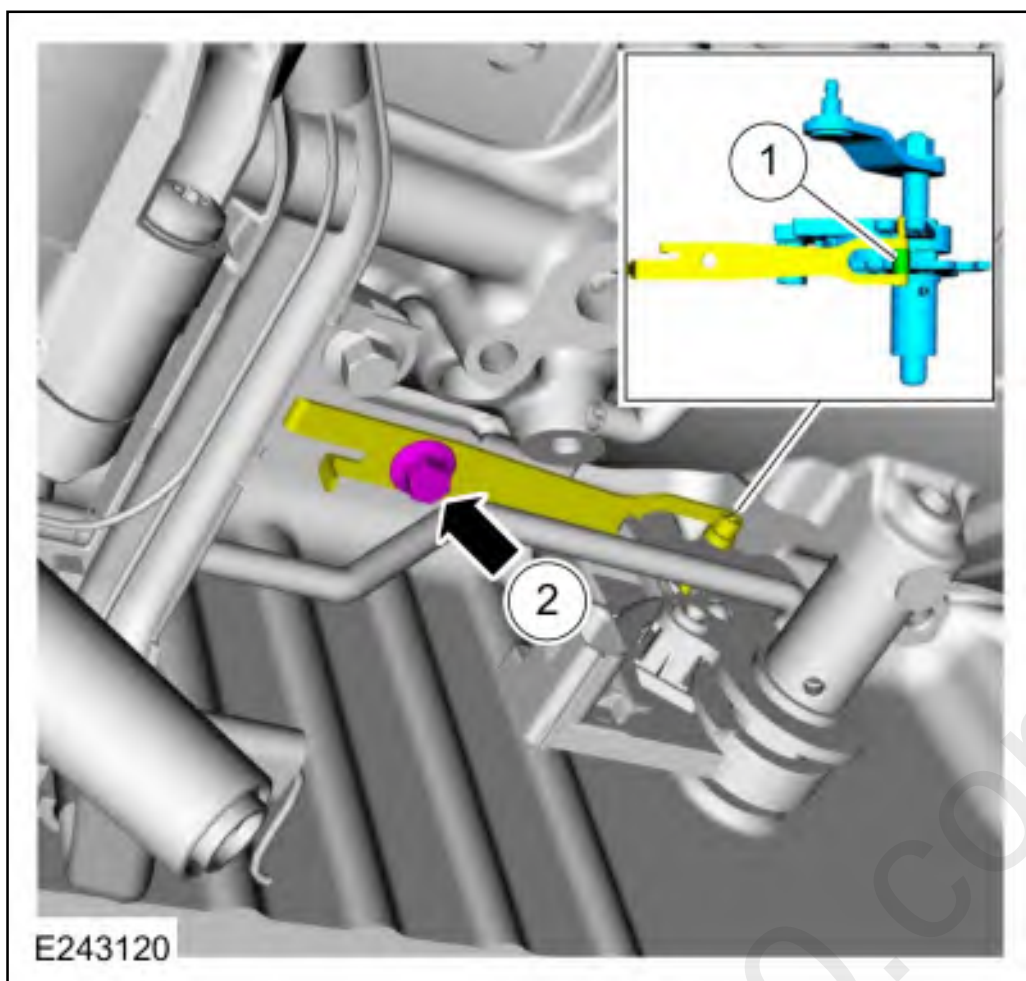
3. Using a punch, install the new manual shaft-to-TR sensor roll pin (7G100).
Use the General Equipment: Punch



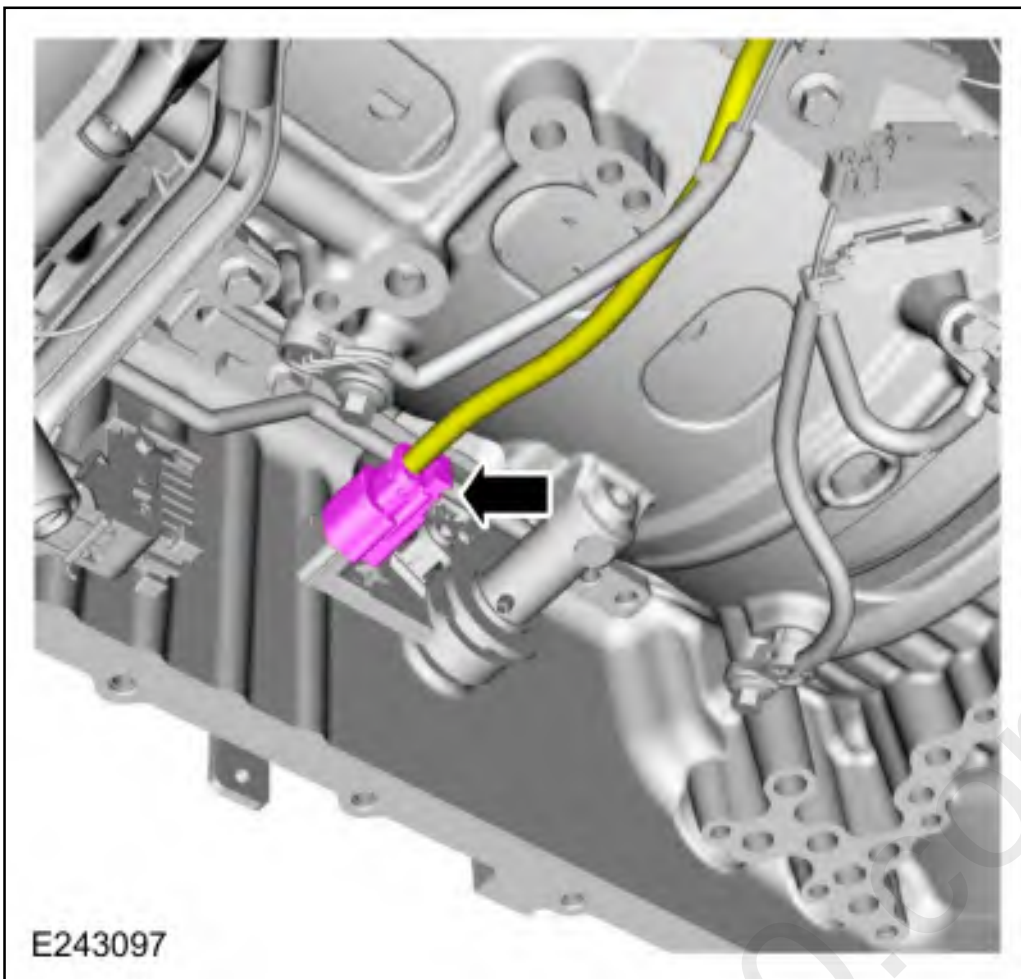
E243117



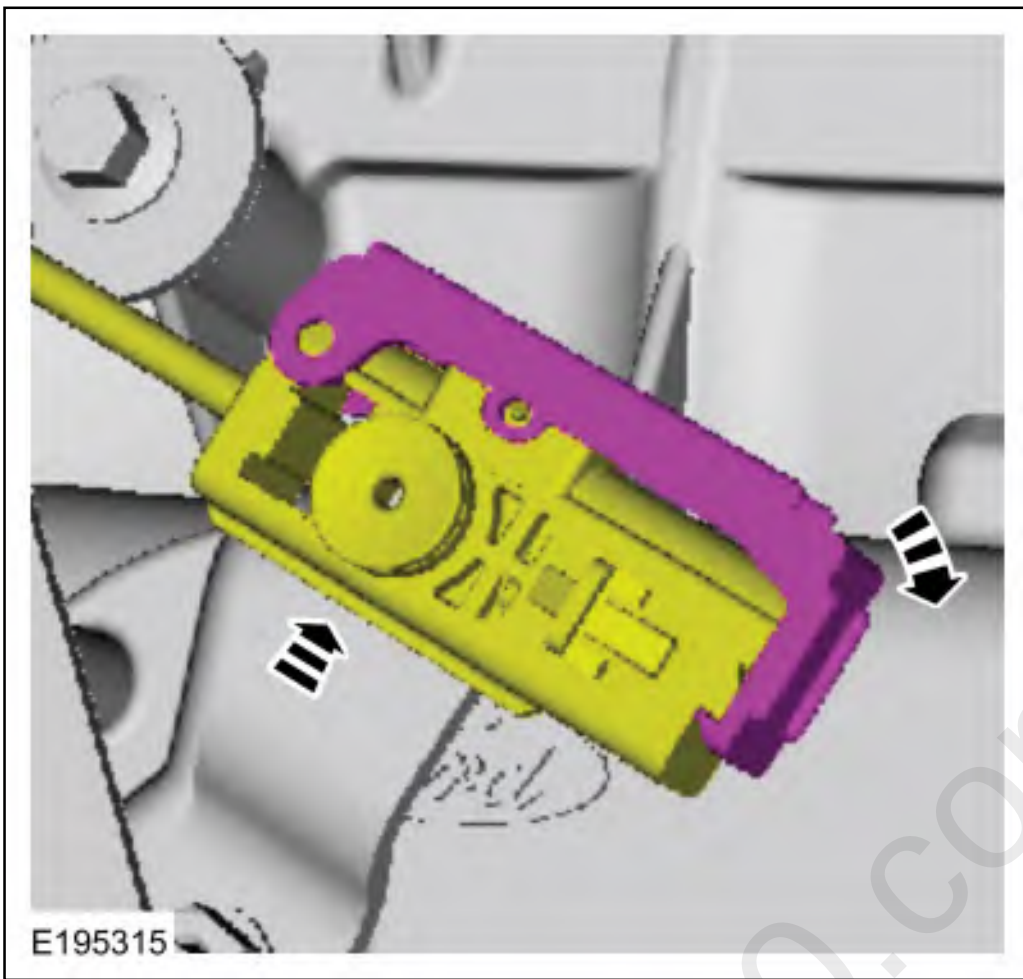
1. Align the detent spring in the center of the TR sensor.
2. *Torque:* 97 lb.in (11 Nm)



5. Connect the TR sensor electrical connector.



6. Connect the selector lever cable onto the manual control lever and move the cable adjuster lock down.
 - Listen for the audible click, then push back on the cable adjuster lock to verify it is locked.
 - Pull back on the selector lever cable to verify it is installed correctly to the manual lever.



7. Install the main control valve body.

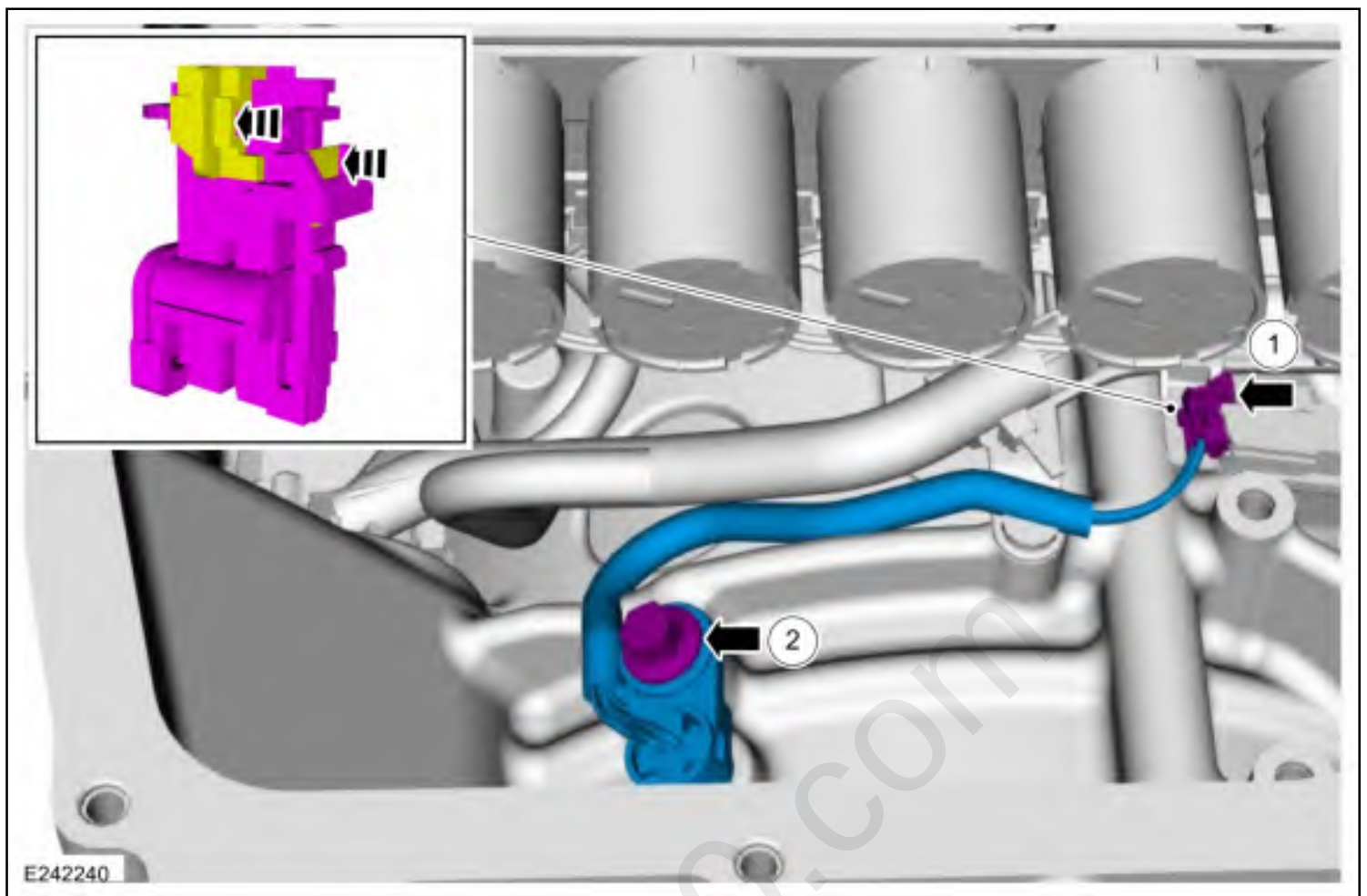
Refer to: [Main Control Valve Body](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Overhaul).

Output Shaft Speed (OSS) Sensor

Base Part Number: Base Part Number: 7H103

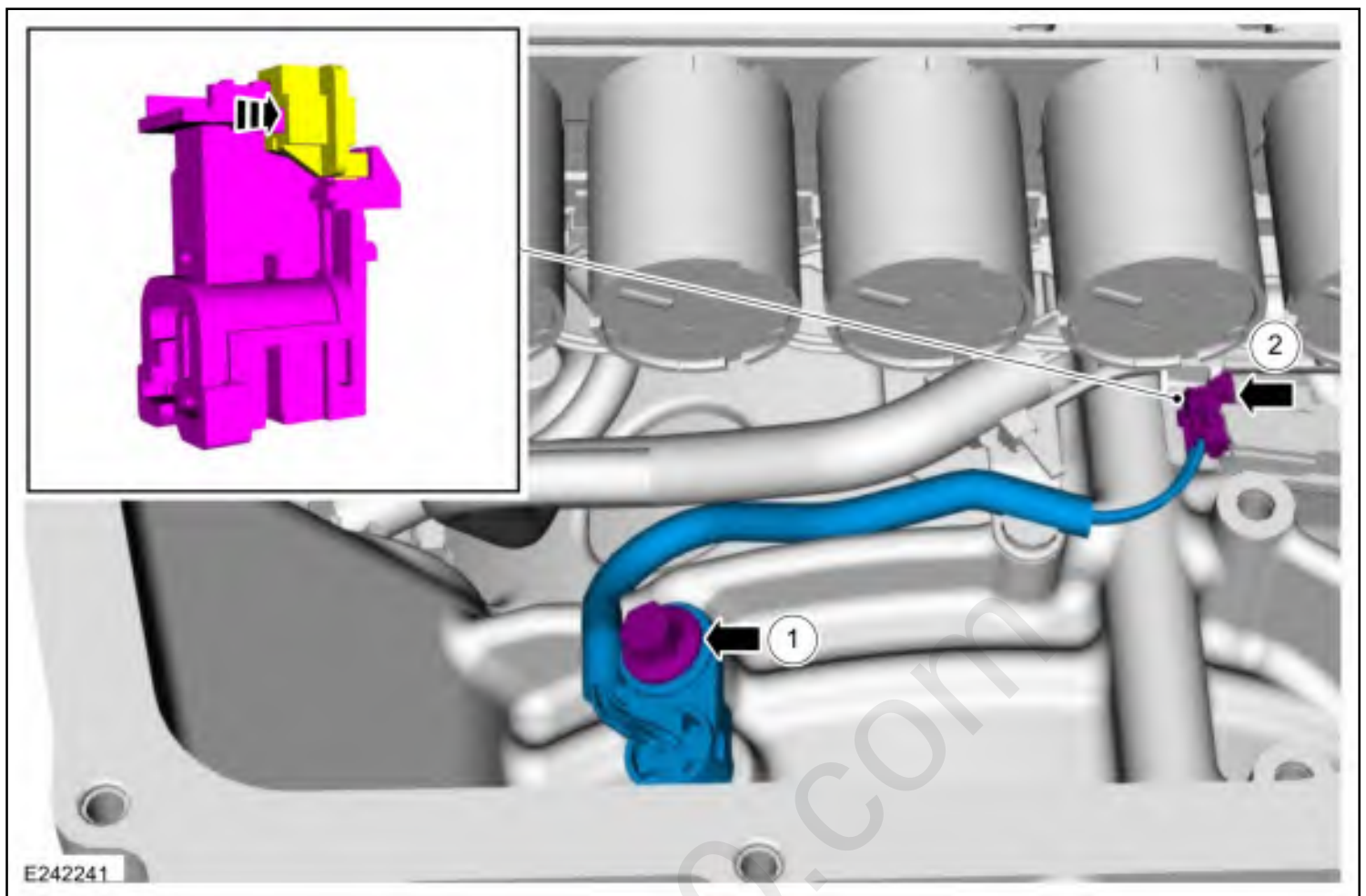
Removal

1. Remove the transmission fluid auxiliary pump.
Refer to: [Transmission Fluid Auxiliary Pump](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).
2. Remove the OSS sensor.
 1. Slide the plastic lock to the unlocked position. While pressing the plastic tab, disconnect the electrical connector.
 2. Remove the bolt and the OSS sensor.



Installation

1. Install the OSS sensor.
 1. Install the OSS sensor bolt.
Torque: 62 lb.in (7 Nm)
 2. Connect the electrical connector. Slide the plastic lock to the locked position.



2. Install the transmission fluid auxiliary pump.

Refer to: [Transmission Fluid Auxiliary Pump](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

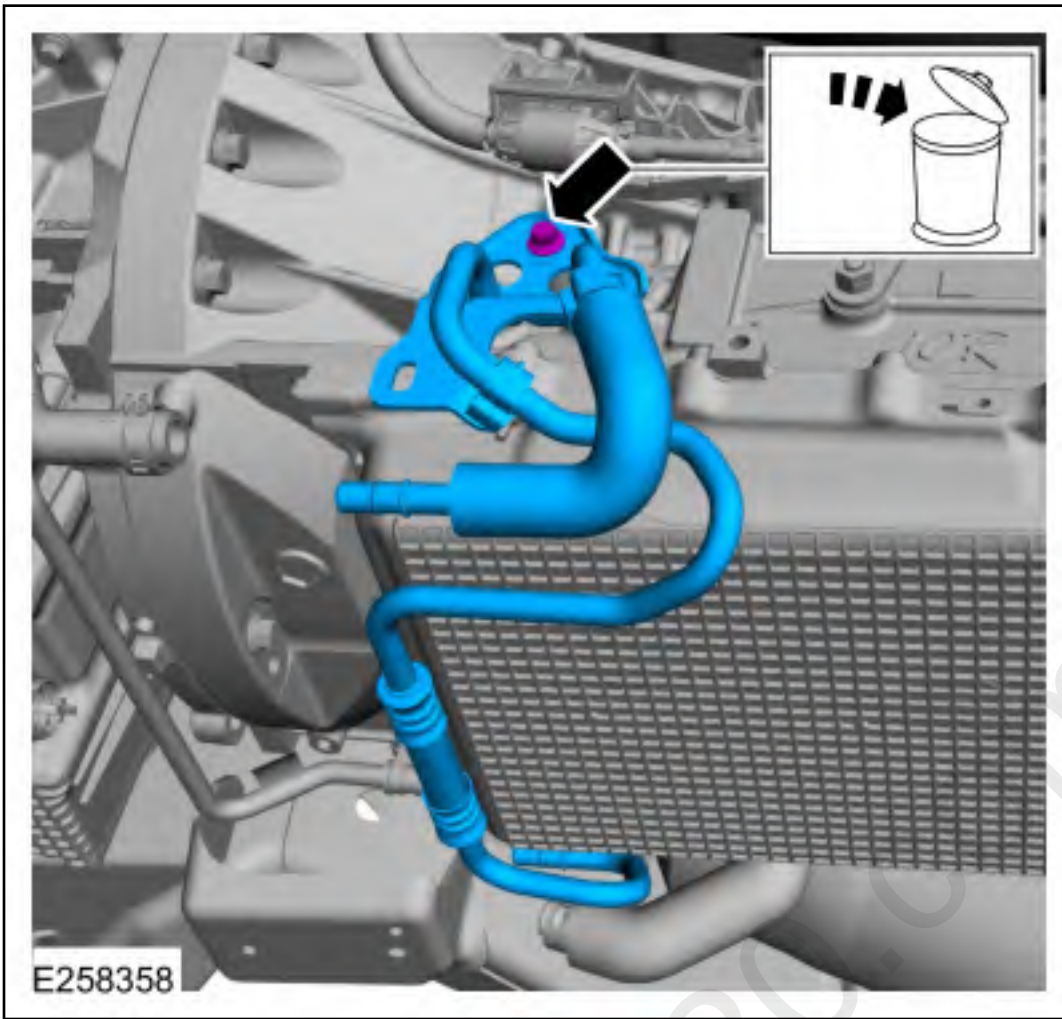
Transmission Fluid Pan, Gasket and Filter

Materials

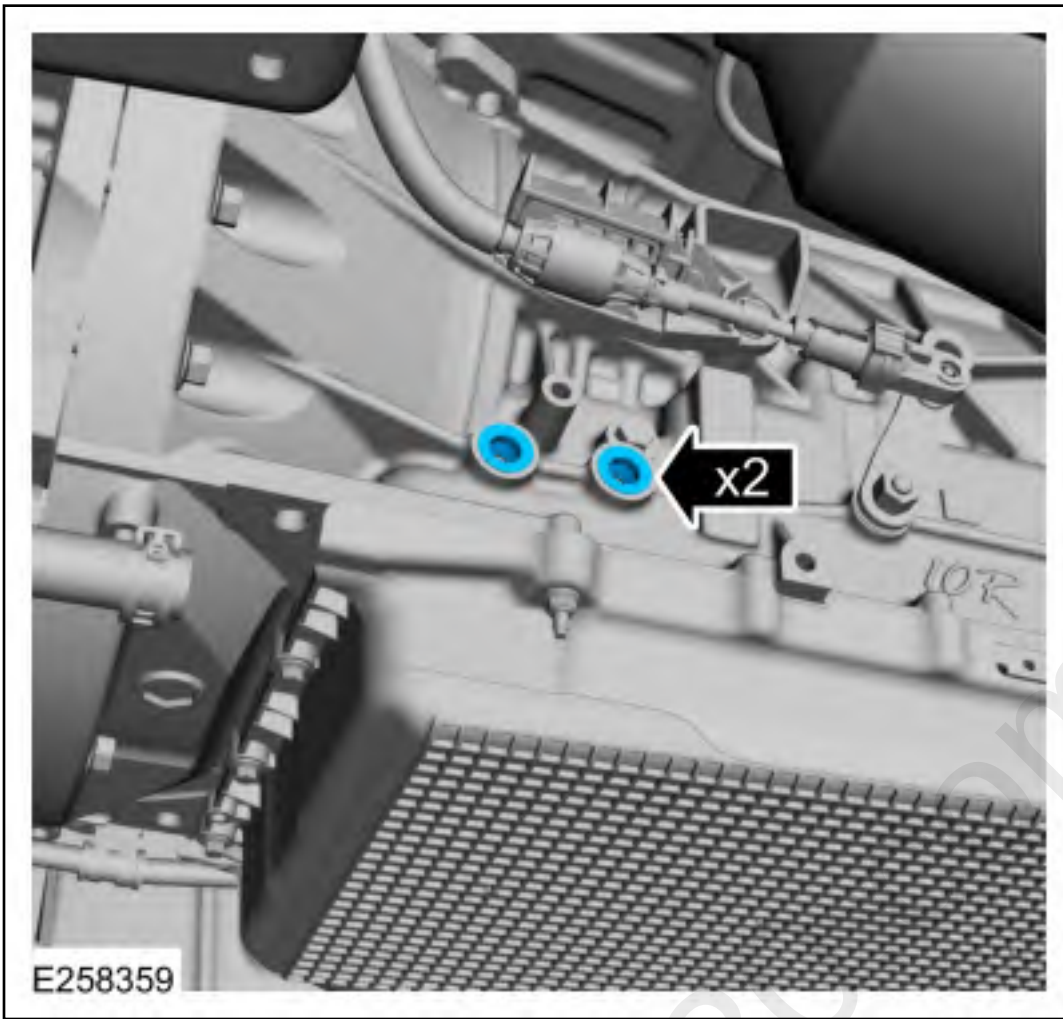
Name	Specification
Motorcraft® MERCON® ULV Automatic Transmission Fluid XT-12-ULV	WSS-M2C494-A

Removal

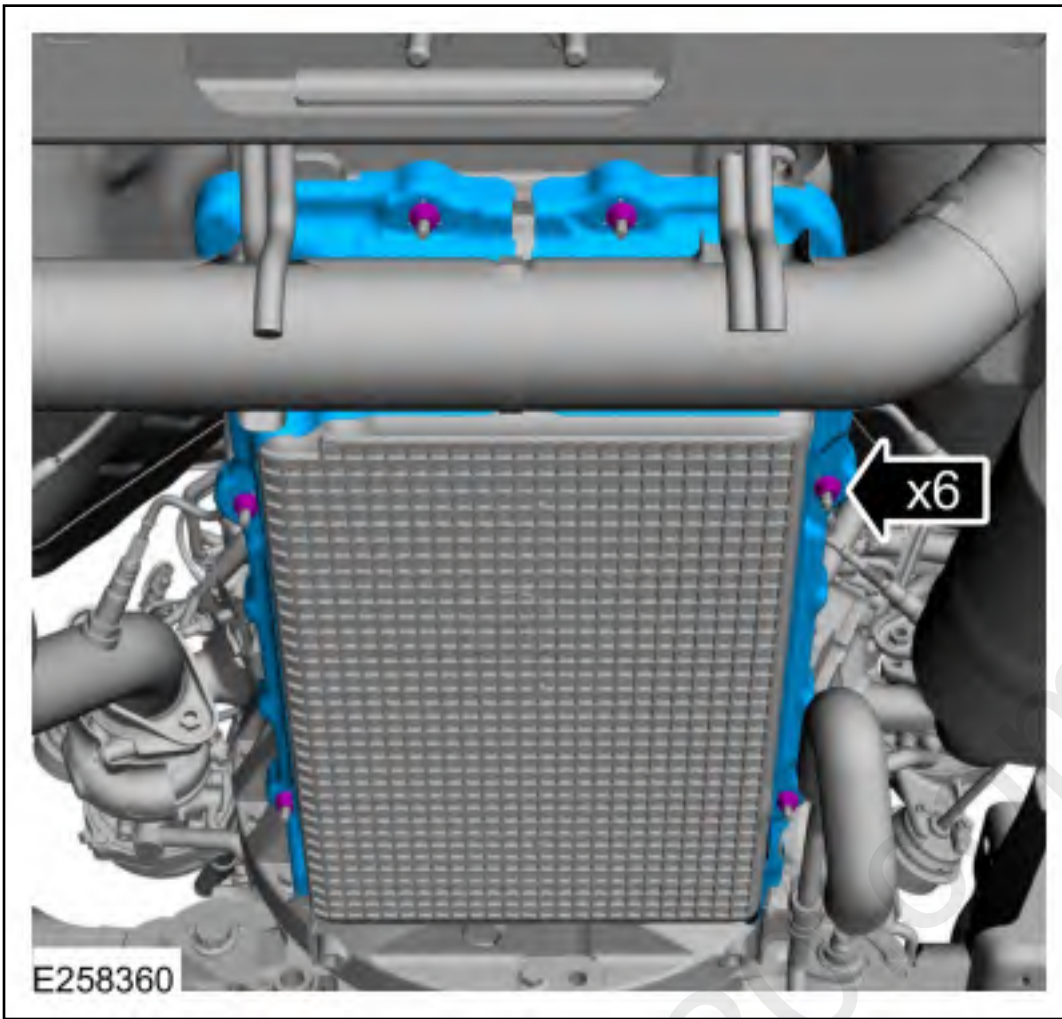
1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. Remove the transmission fluid cooler.
Refer to: [Transmission Fluid Cooler - 2.7L EcoBoost \(238kW/324PS\)/3.5L EcoBoost \(272kW/370PS\)/5.0L 32V Ti-VCT](#) (307-02 Transmission Cooling, Removal and Installation).
3. Remove and discard the bolt and remove the transmission fluid cooler tubes.



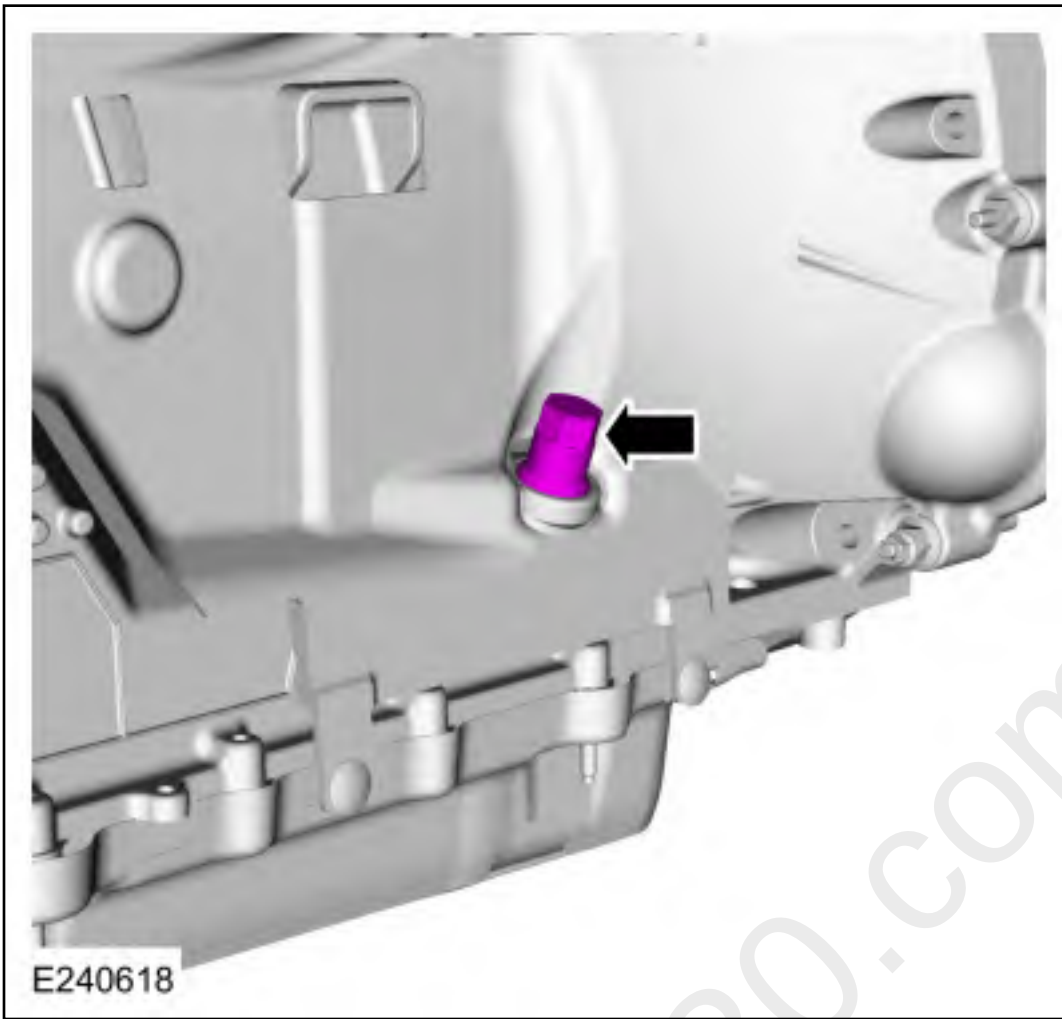
4. If the transmission fluid cooler tube seals or backing rings are stuck in the transmission case, remove the seals and backing rings.



5. Remove the retainers and heatshield.

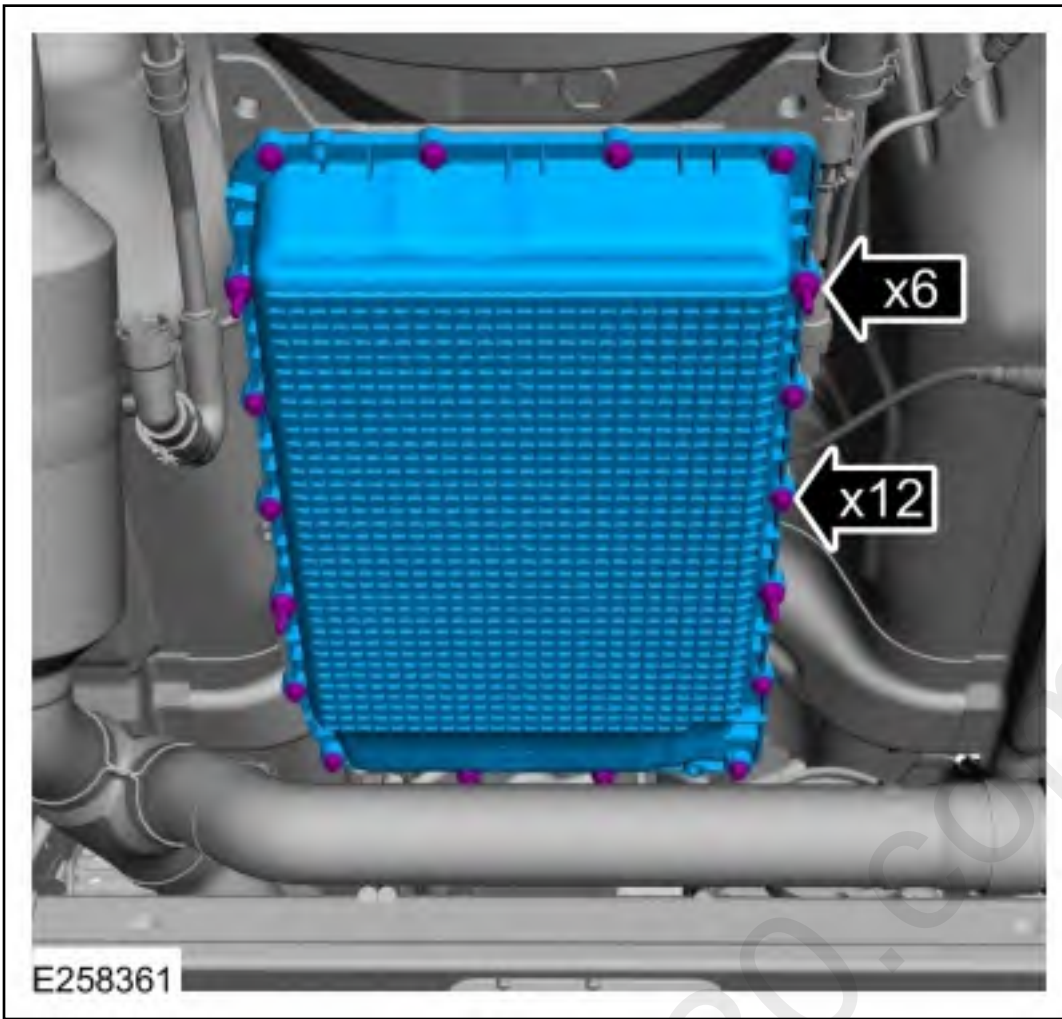


6. Remove the transmission fluid fill plug transmission fluid level indicator assembly.



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

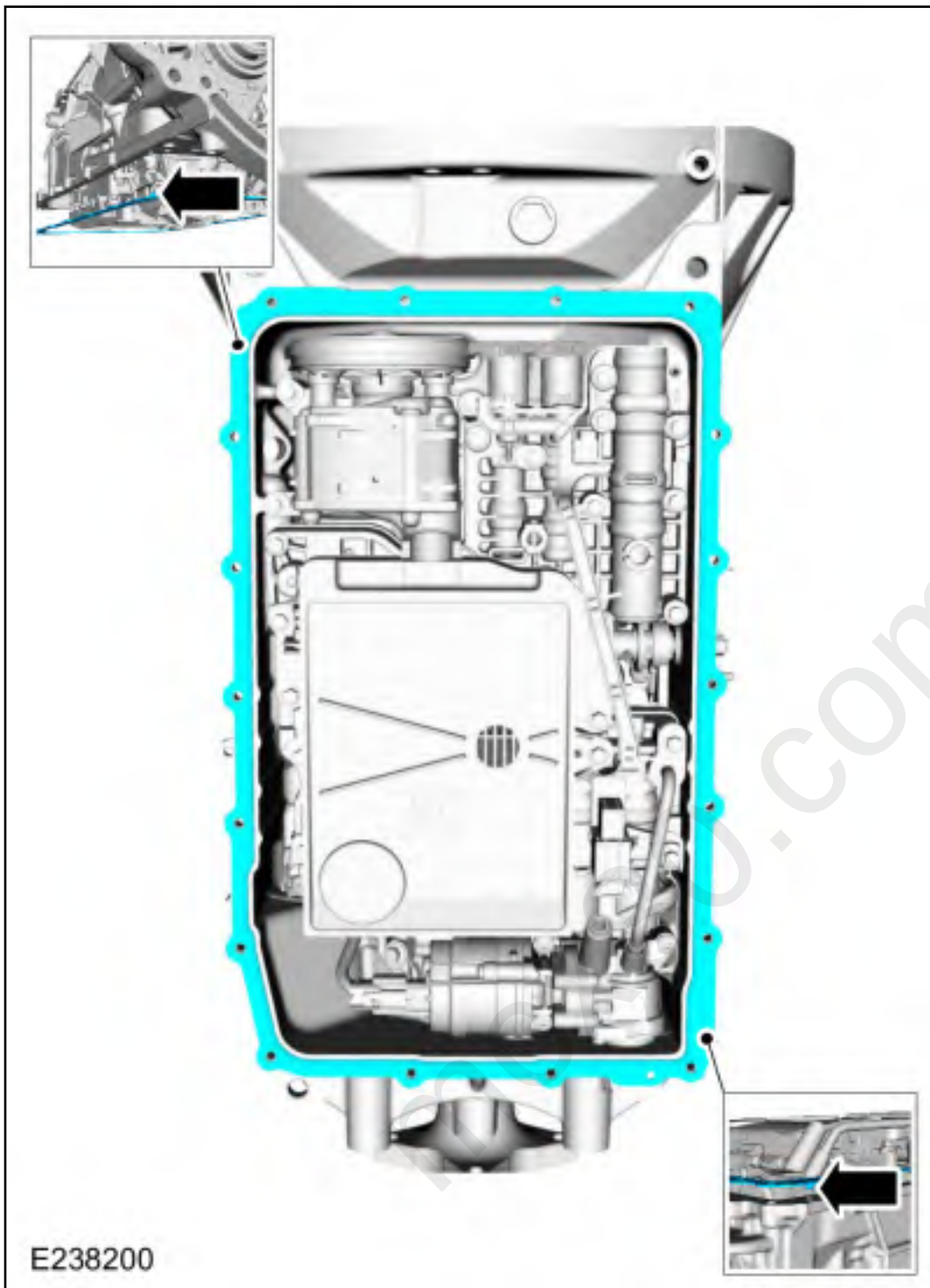
Remove the transmission fluid pan bolts and the transmission fluid pan and allow the transmission fluid to drain.



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

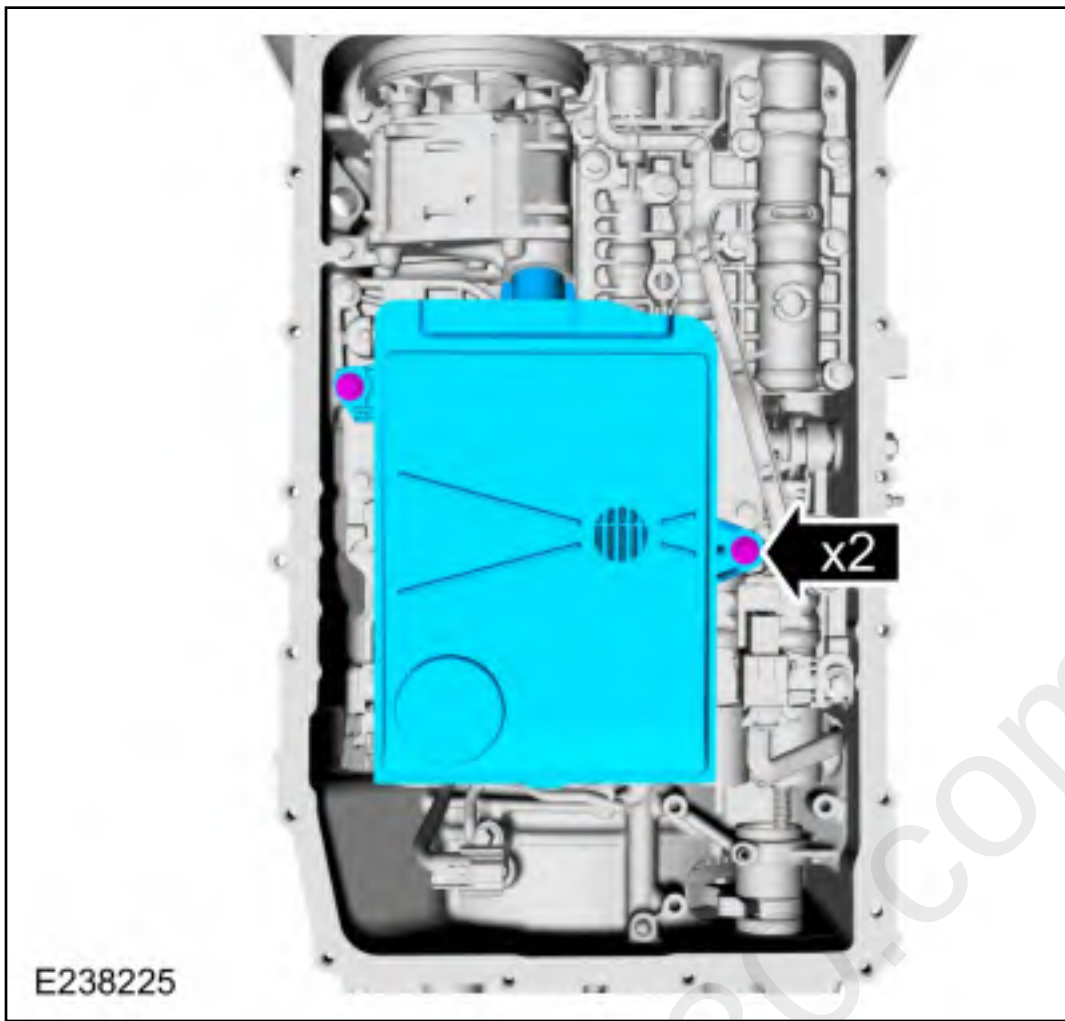
NOTE: *Note the location of the alignment tabs.*

Remove the transmission fluid pan gasket.



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

Remove the bolts and the transmission fluid filter.



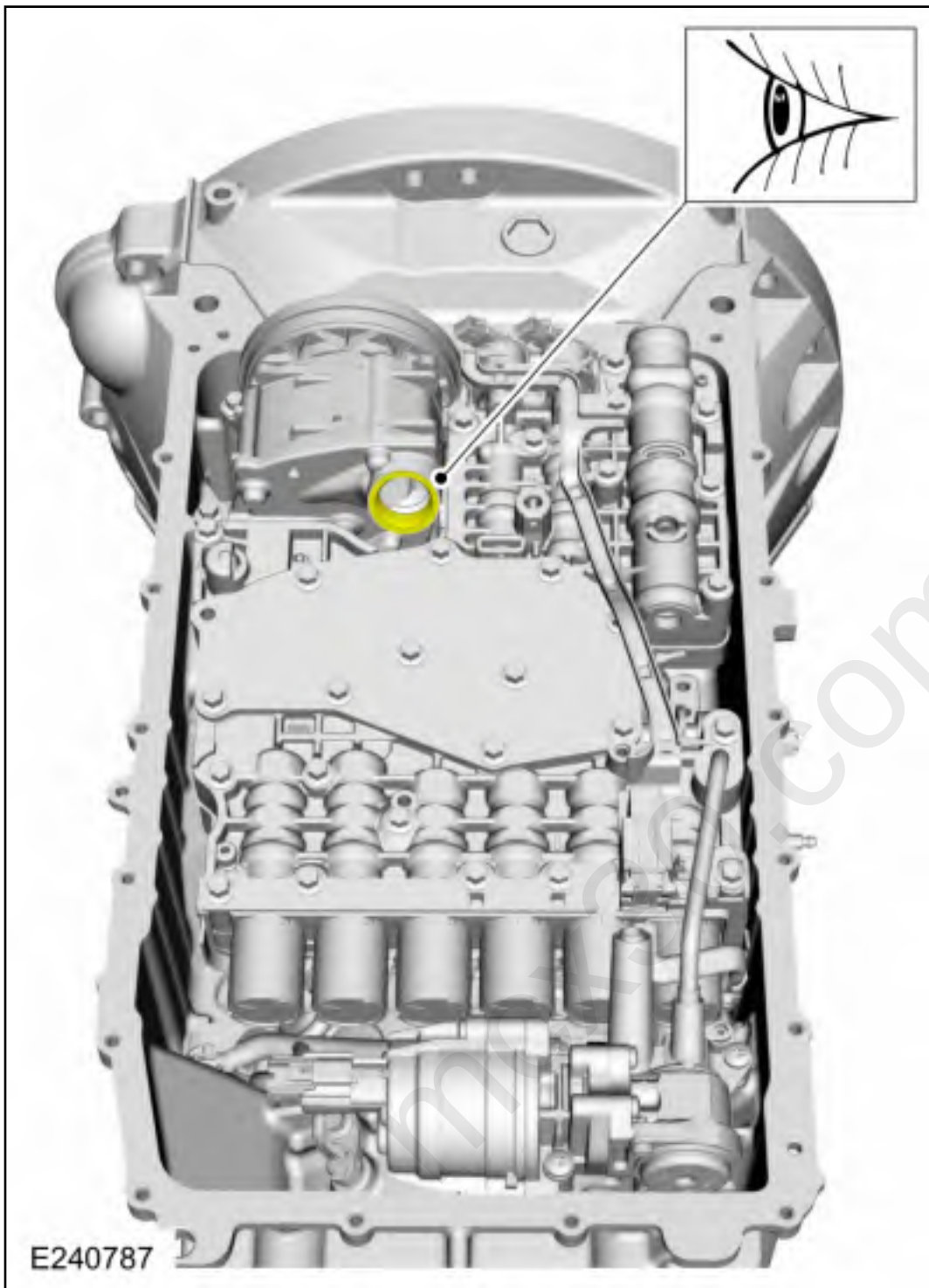
10. Clean and inspect the transmission fluid pan and magnet.



Installation

1. **NOTE:** *If the transmission is being repaired for a contamination-related failure, install a new transmission fluid filter and seal assembly. The transmission fluid filter may be reused if no excessive contamination is indicated.*

Inspect the transmission fluid filter seal. If necessary, replace the transmission fluid filter seal.



2. Lubricate the transmission fluid filter seal with automatic transmission fluid.
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-ULV (WSS-M2C494-A)

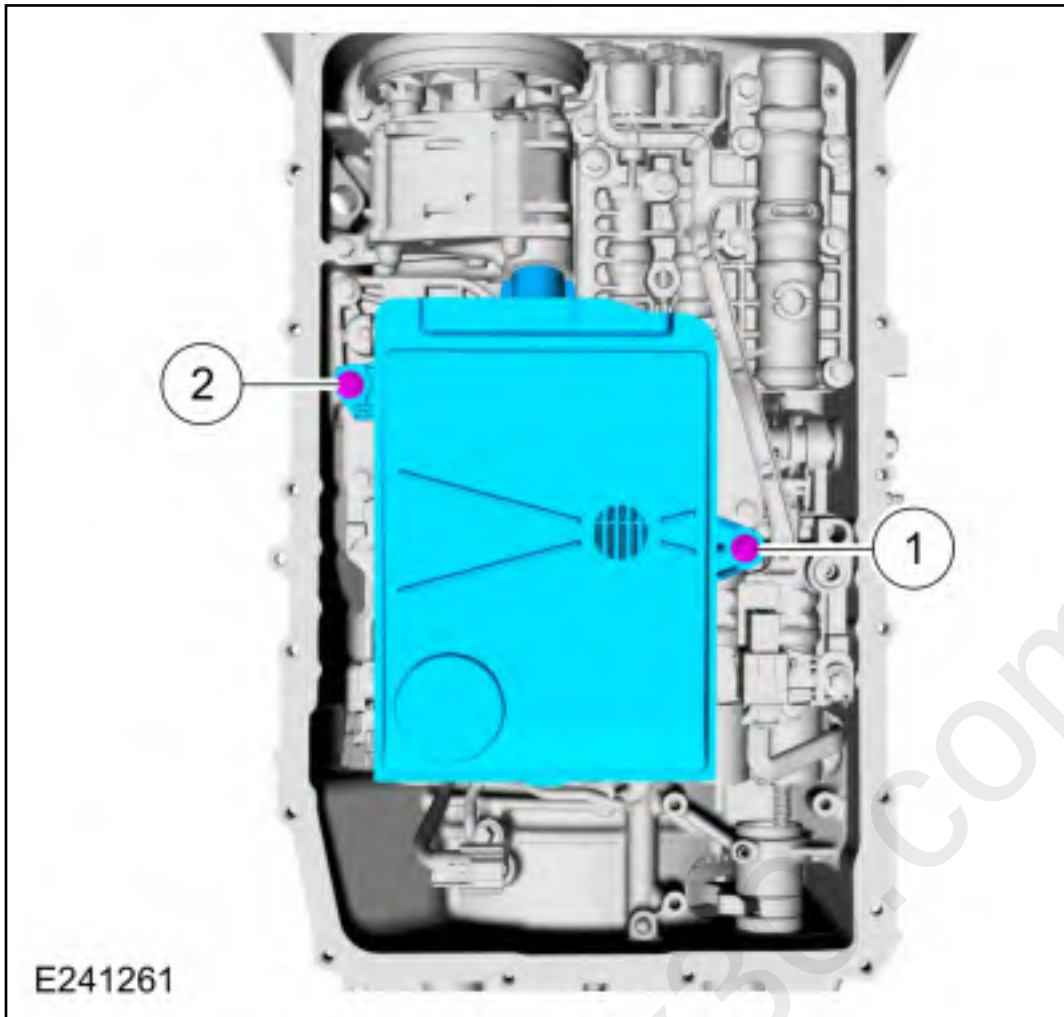


3. **NOTICE:** If the bolts are installed in the wrong locations, transmission damage will occur.

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

Install the filter and the bolts in the correct locations.

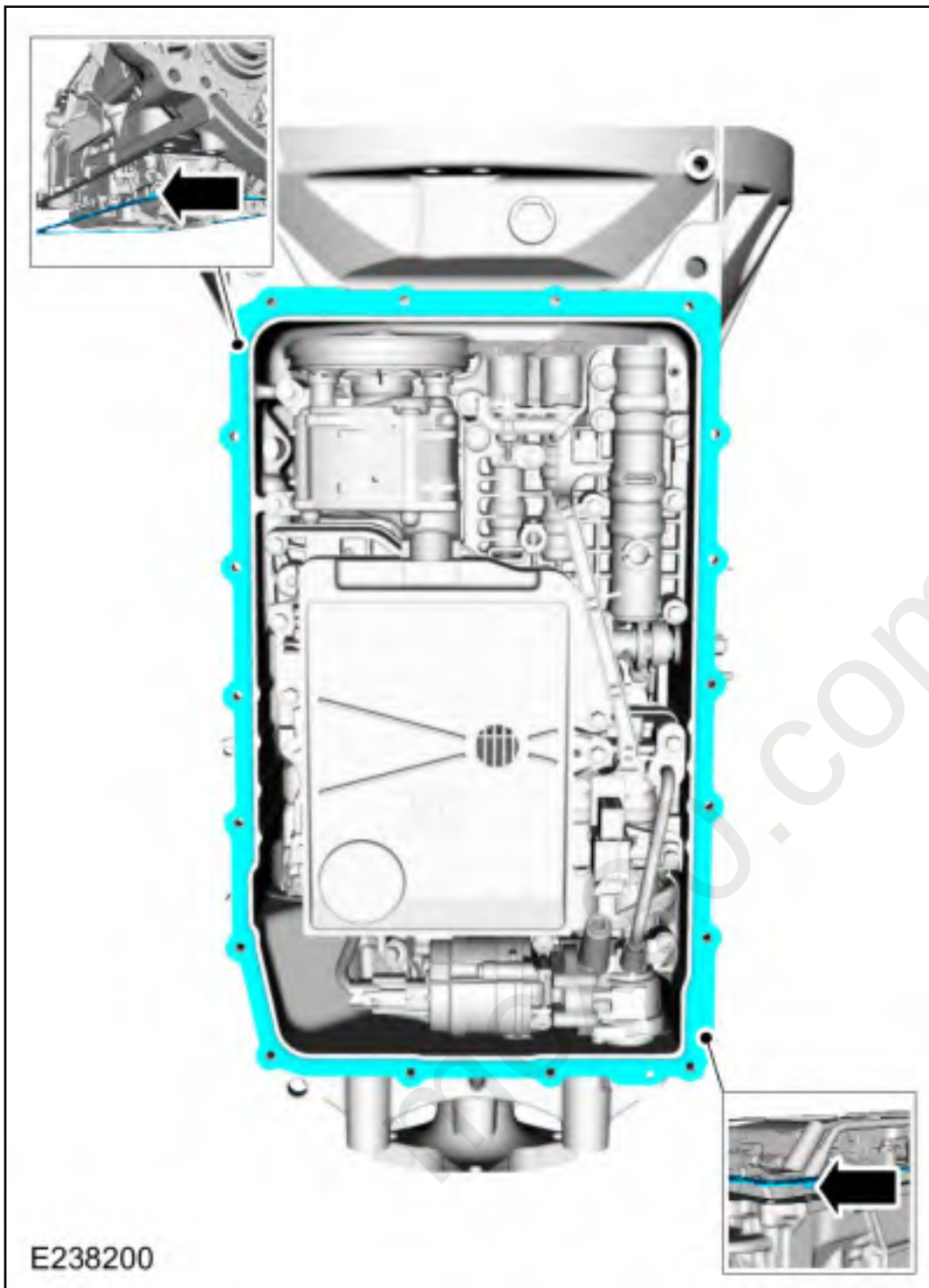
1. Short bolt
2. Long bolt
- Torque: 93 lb.in (10.5 Nm)



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

NOTE: *Align the transmission fluid pan gasket tabs in the correct locations.*

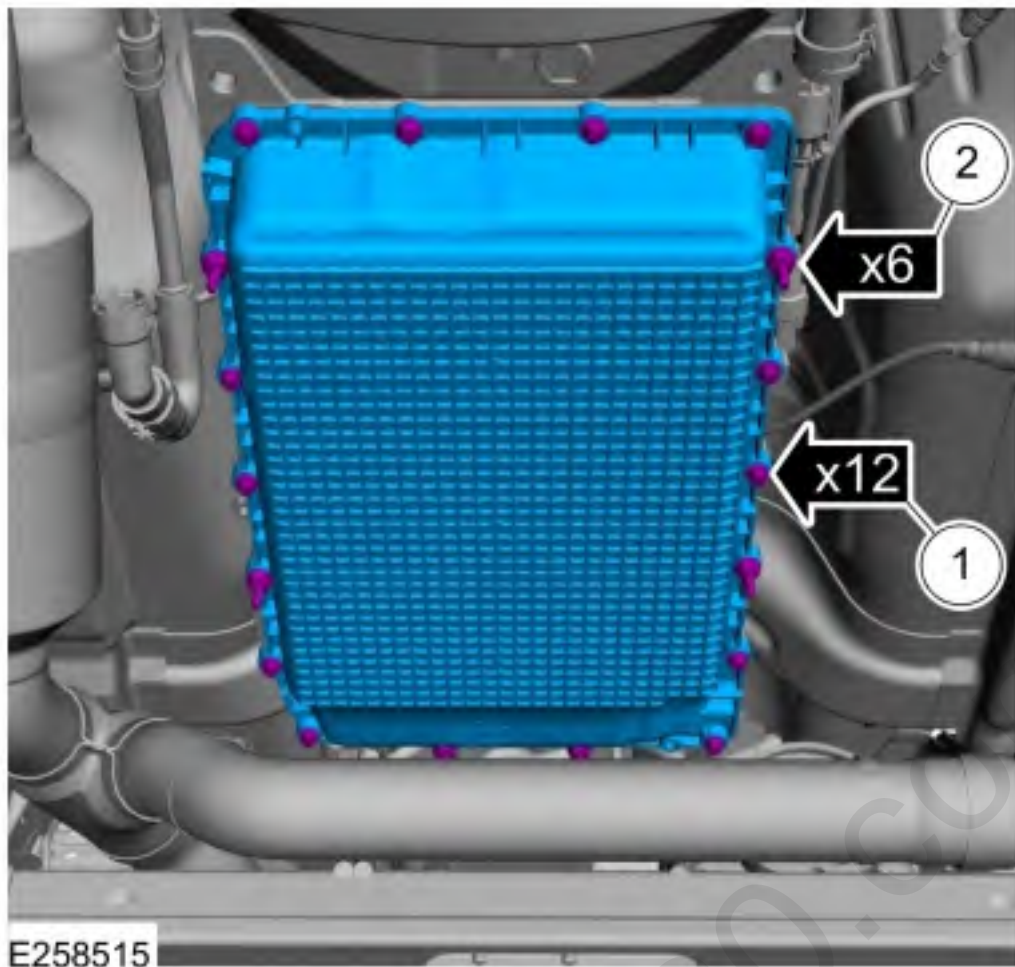
Install a new transmission fluid pan gasket if required.



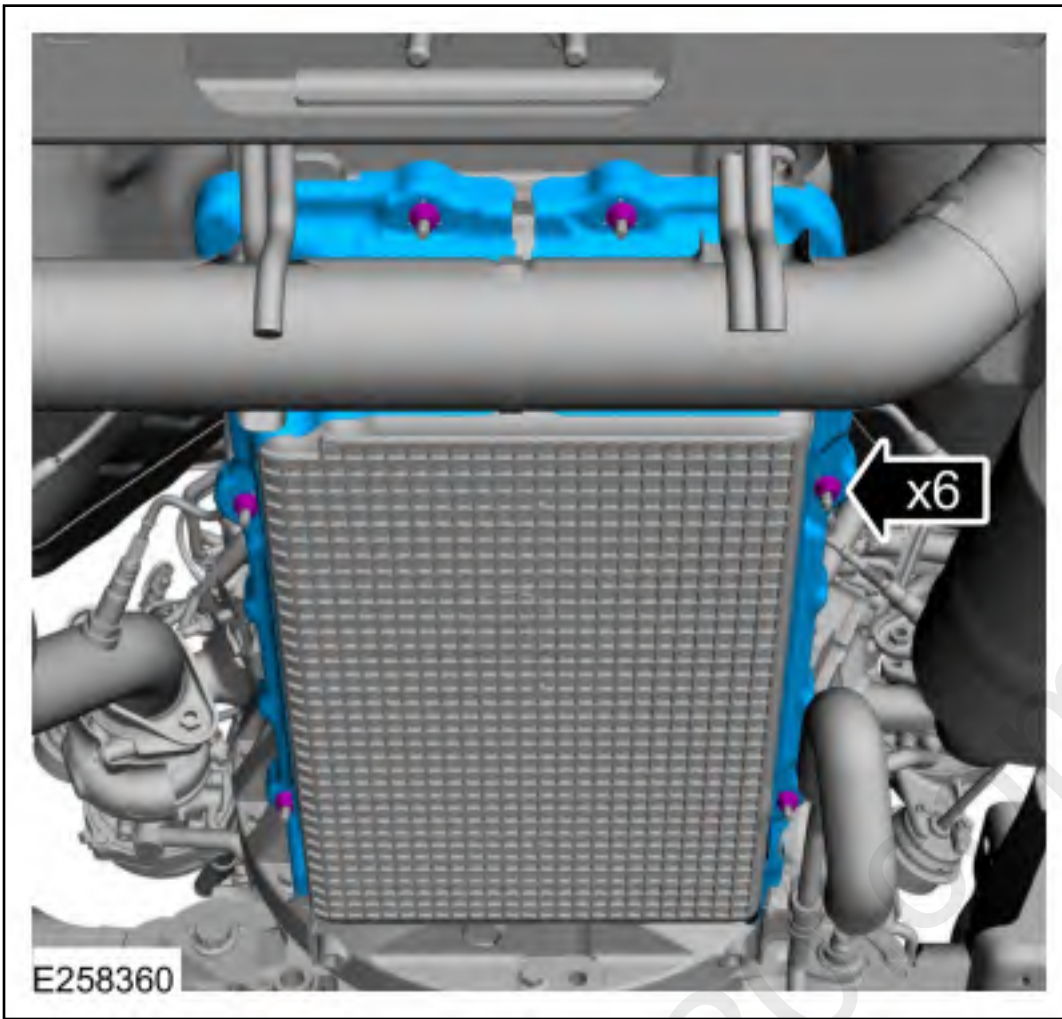
5. **NOTE:** *Install the bolts and studbolts in the correct locations noted during removal.*

Install the transmission fluid pan and tighten the bolts in a crisscross pattern.

1. Bolts
Torque: 89 lb.in (10 Nm)
2. Studbolts
Torque: 106 lb.in (12 Nm)



6. Install the heatshield and retainers.
Torque: 80 lb.in (9 Nm)

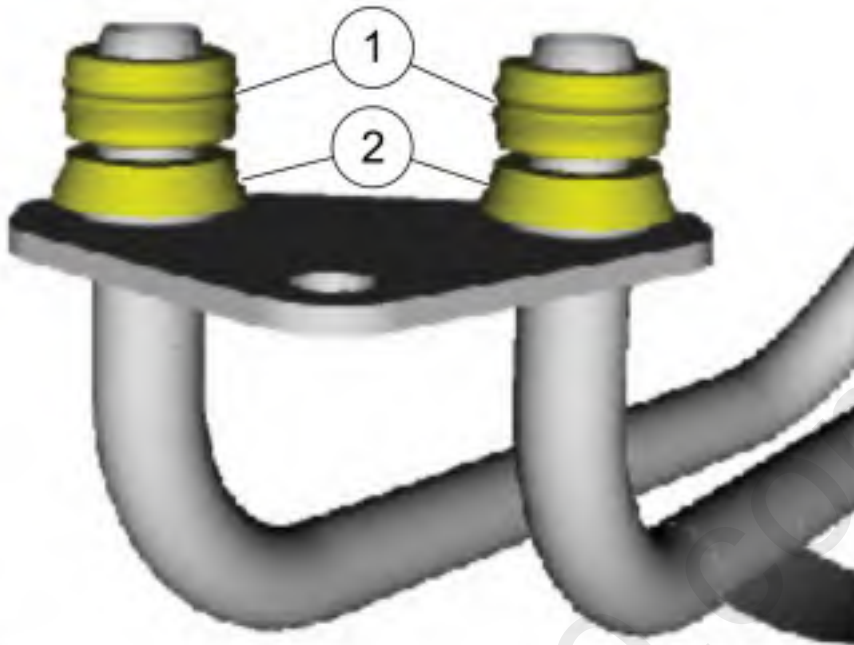


7. **NOTE:** *Inspect the transmission fluid tube backing rings and seals are not stuck in the case.*

Inspect the transmission fluid tube backing rings and seals for damage and install new backing rings or seals if necessary.

1. Seal (7D285)
2. Backing ring (7J324)

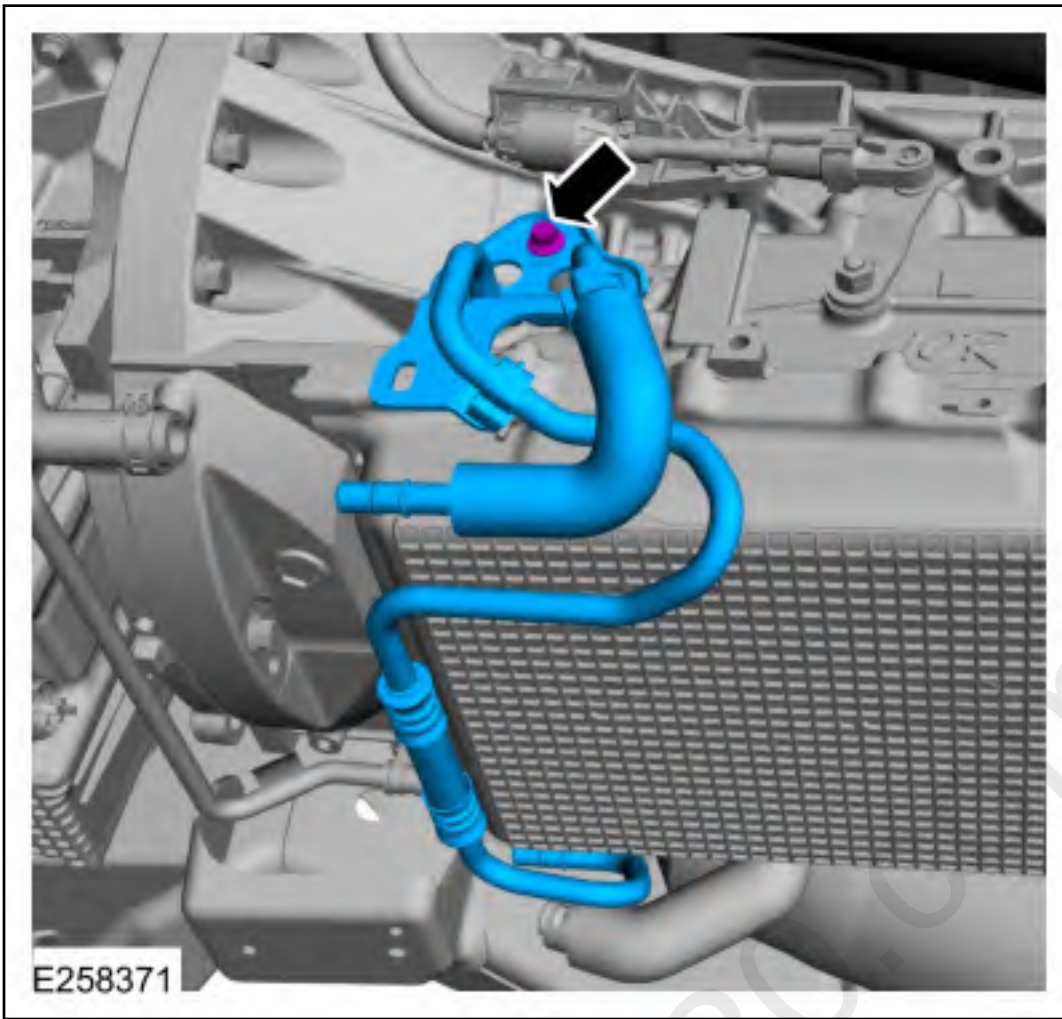
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-ULV (WSS-M2C494-A)



E238497



8. Install the transmission fluid cooler tubes and the new transmission fluid cooler tube bracket bolt.
Torque: 22 lb.ft (30 Nm)



9. Install the transmission fluid cooler.

Refer to: [Transmission Fluid Cooler - 2.7L EcoBoost \(238kW/324PS\)/3.5L EcoBoost \(272kW/370PS\)/5.0L 32V Ti-VCT](#) (307-02 Transmission Cooling, Removal and Installation).

10. Fill and check the transmission fluid.

Refer to: [Transmission Fluid Drain and Refill](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

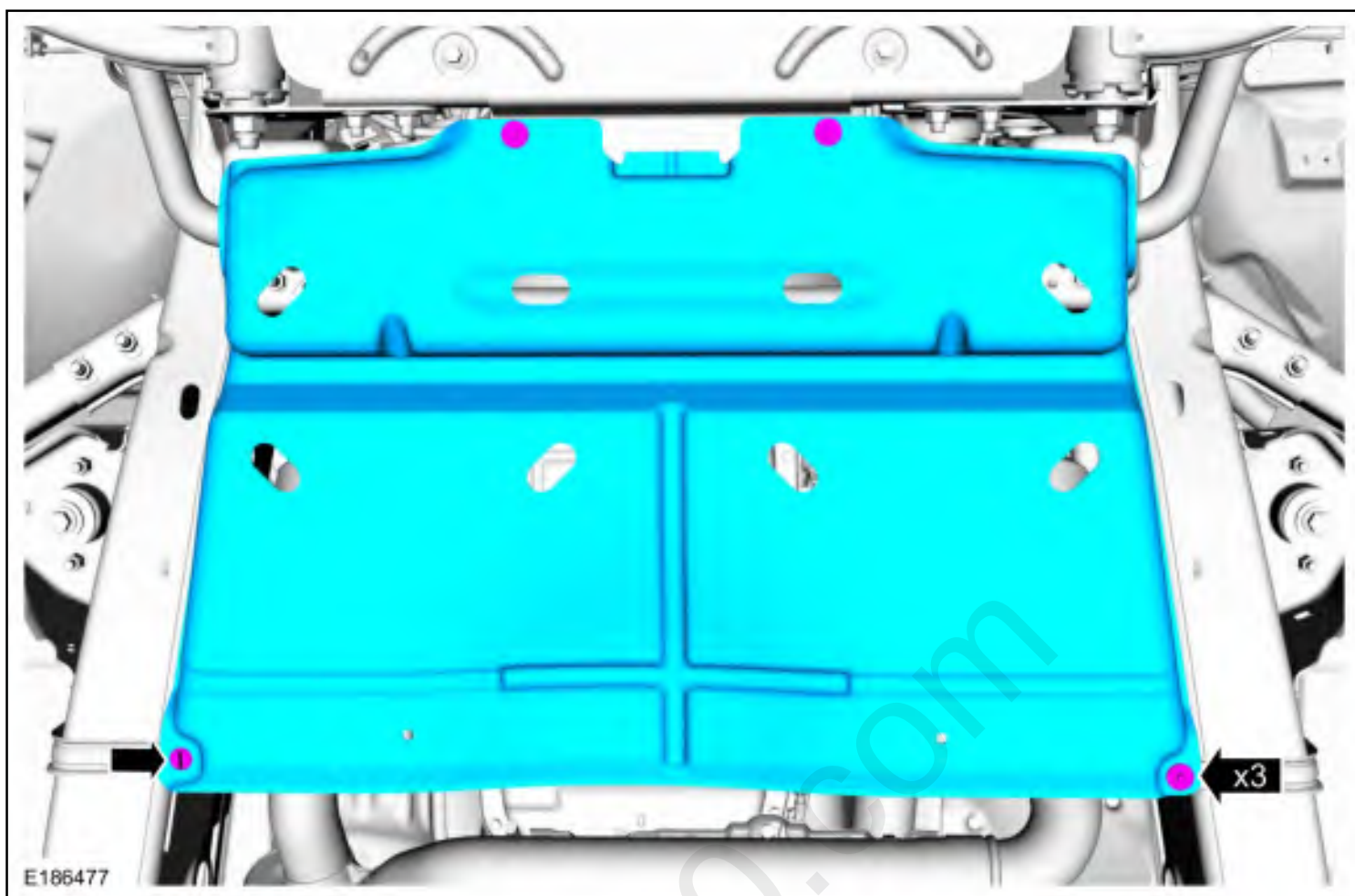
Transmission Fluid Pan, Gasket and Filter - Raptor

Materials

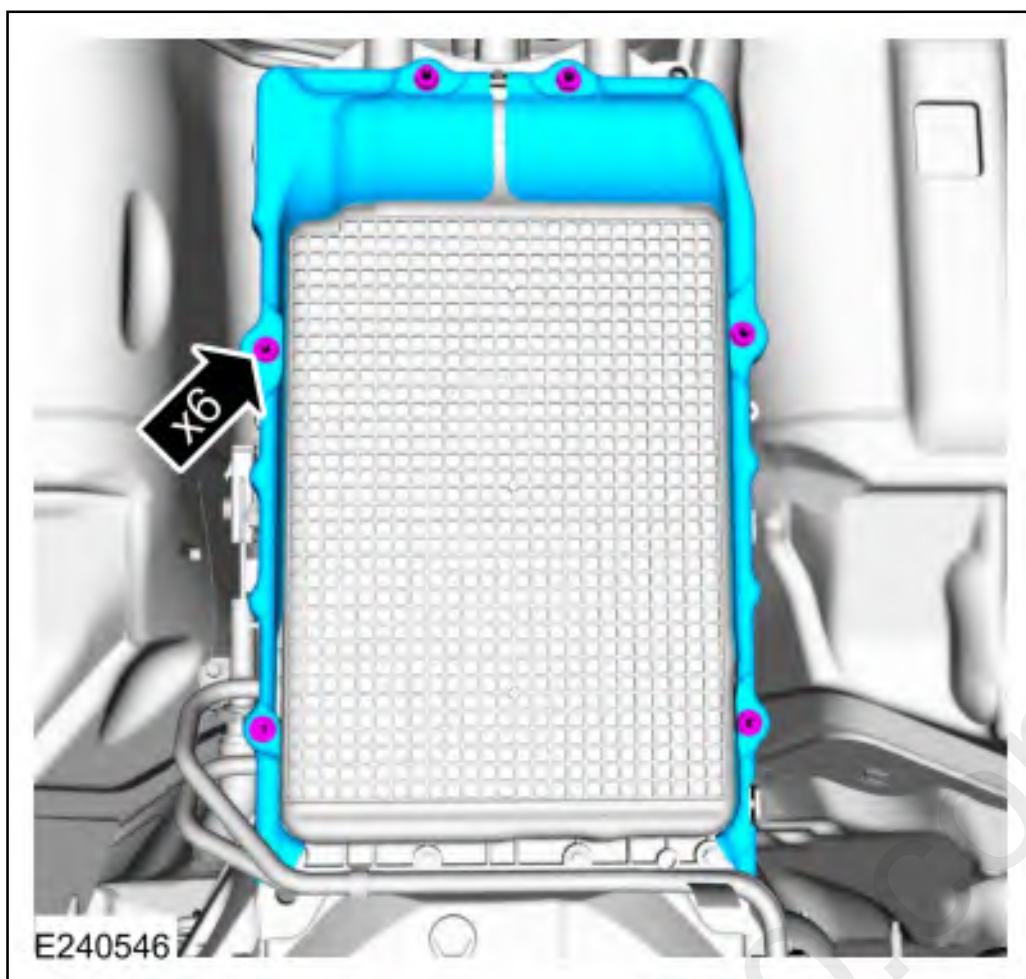
Name	Specification
Motorcraft® MERCON® ULV Automatic Transmission Fluid XT-12-ULV	WSS-M2C494-A

Removal

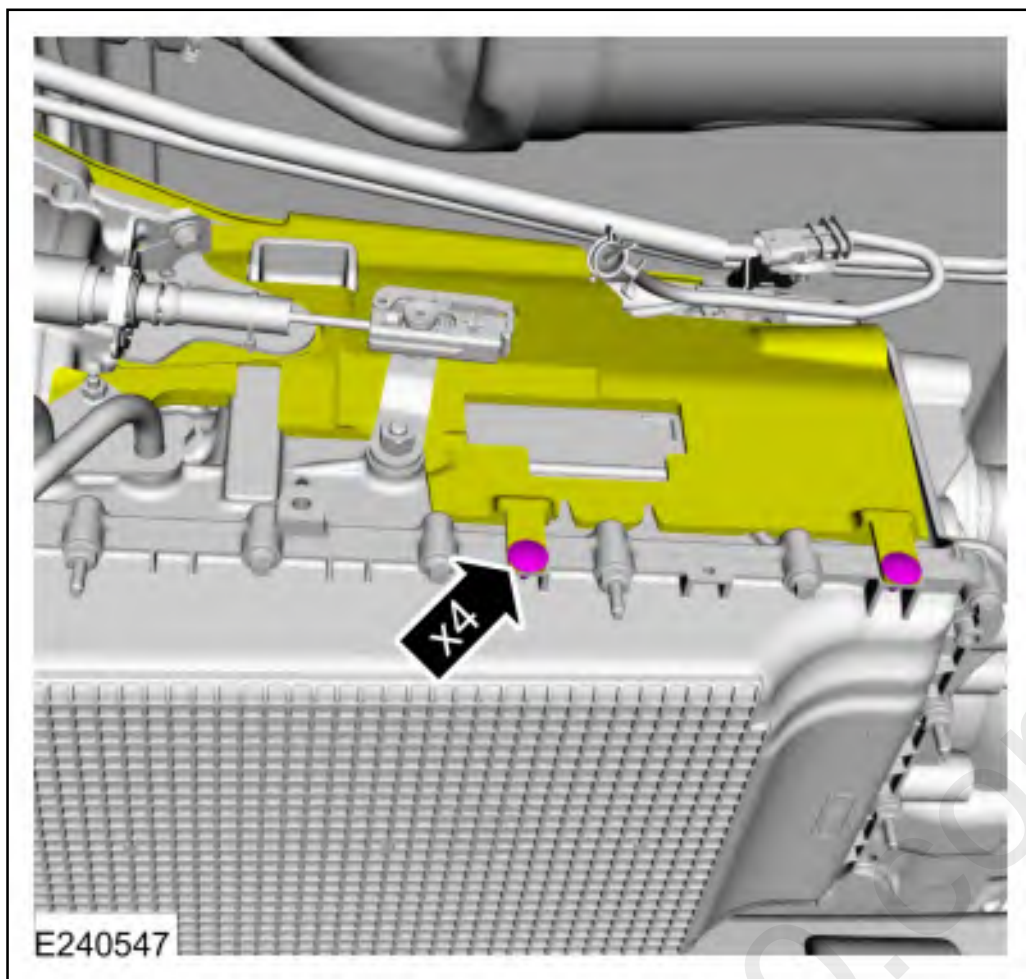
1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. If equipped, release the retainers and remove the splash shield.



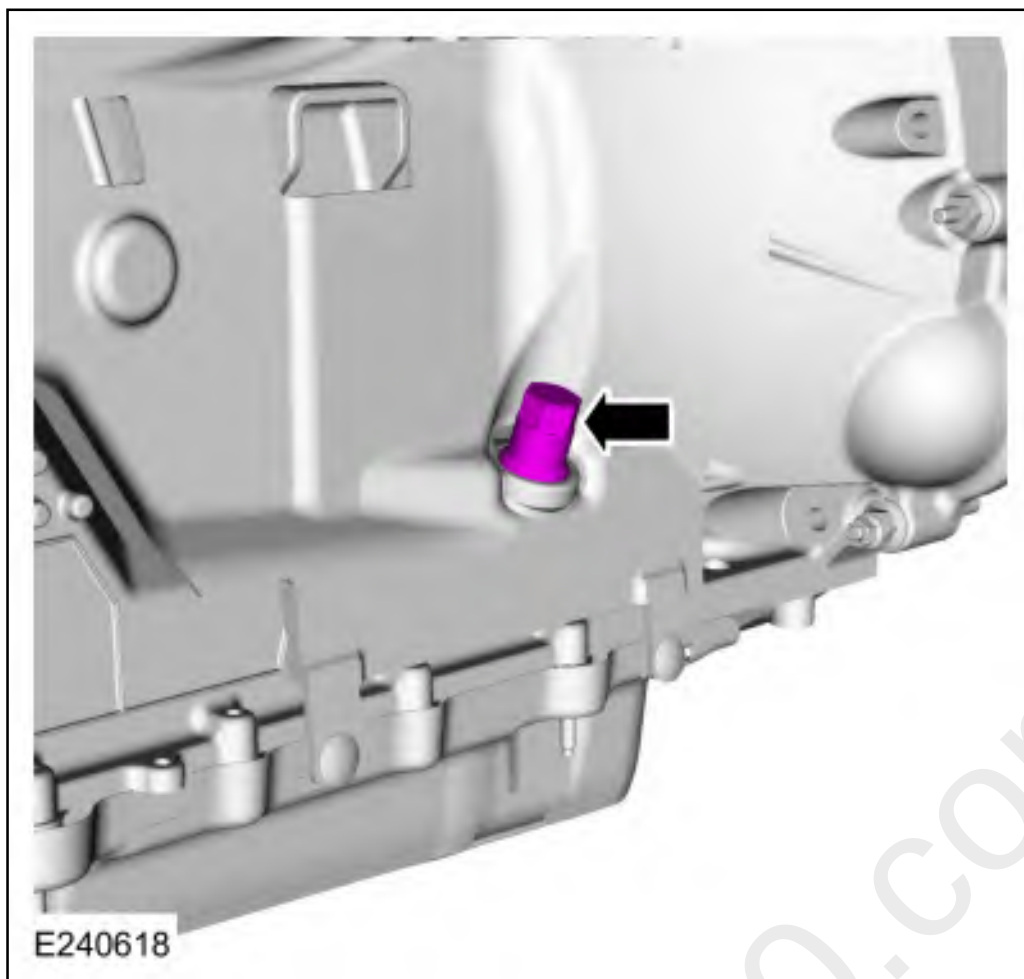
3. Remove the retainers and heatshield.



4. Remove the retainers and position aside the NVH cover.



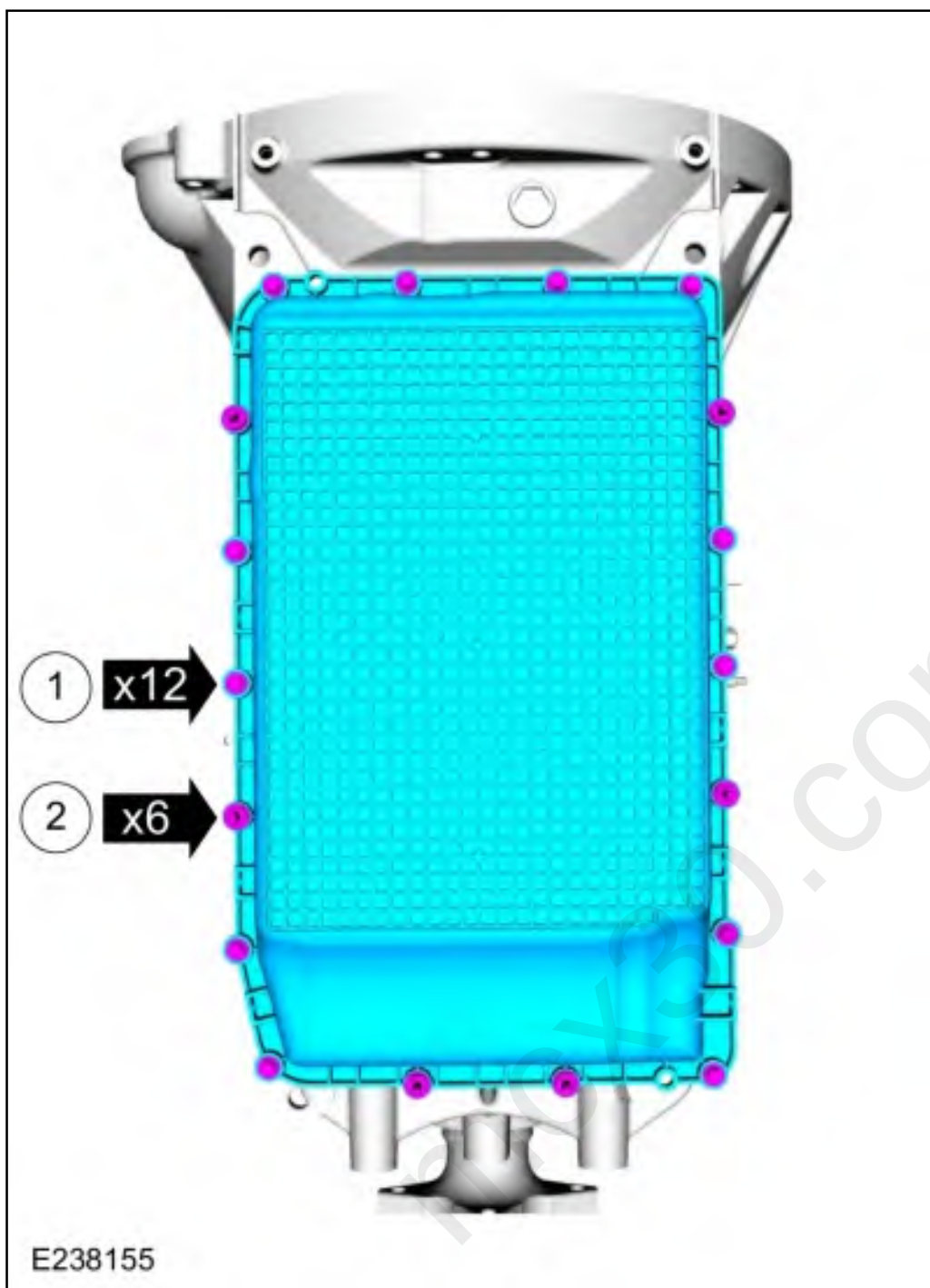
5. Remove the transmission fluid fill plug transmission fluid level indicator assembly.



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

Remove the transmission fluid pan bolts and the transmission fluid pan and allow the transmission fluid to drain.

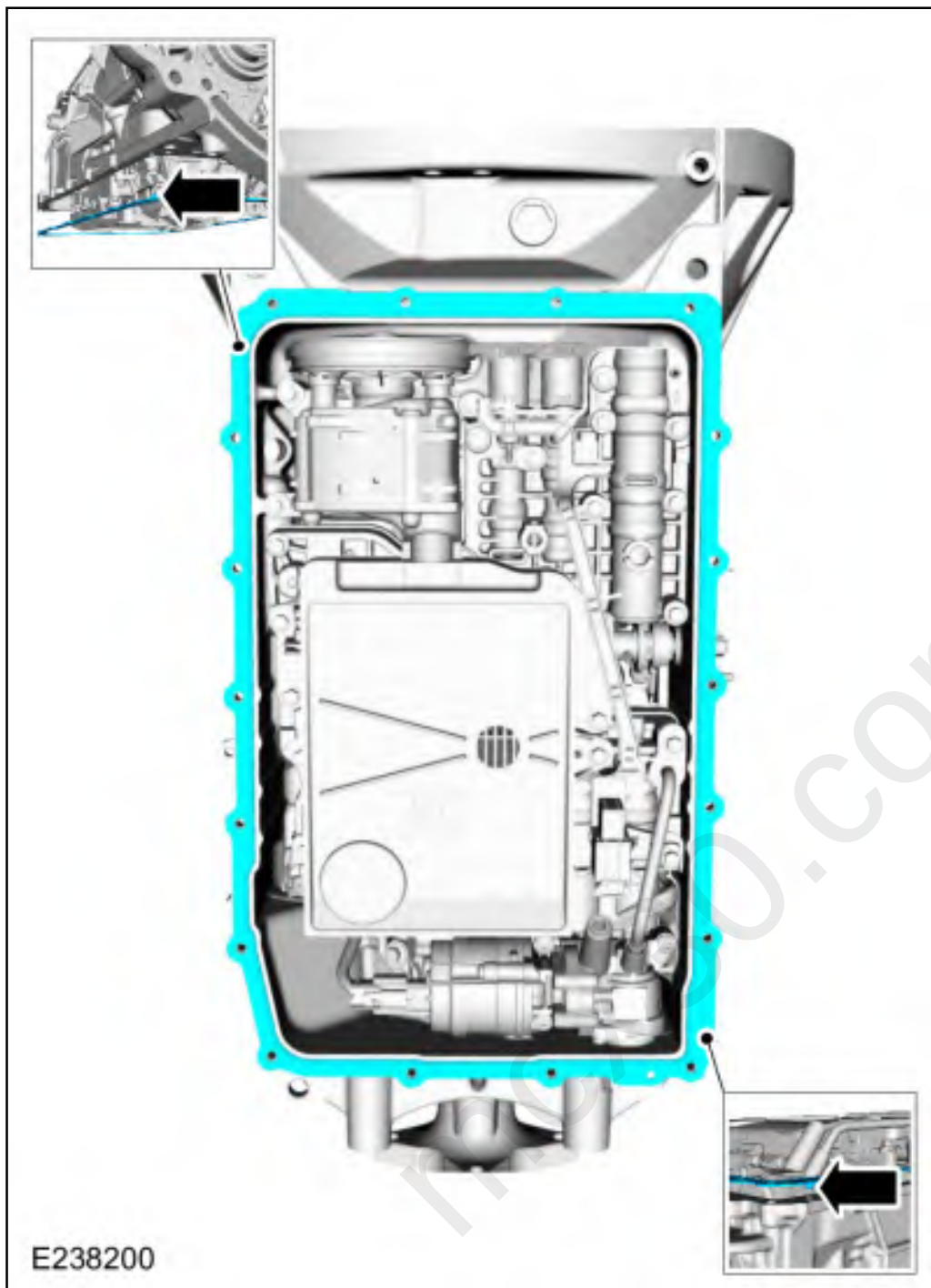
1. Bolts
2. Studbolts



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

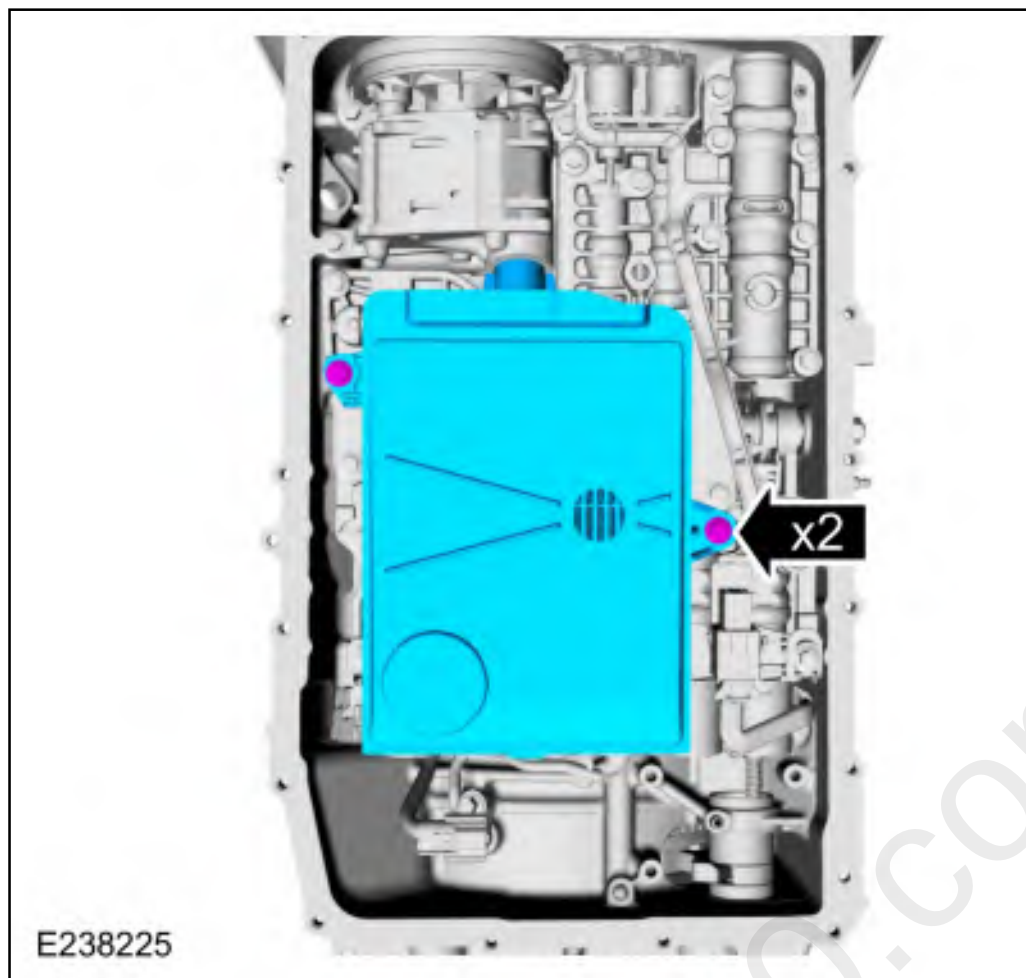
NOTE: *Note the location of the alignment tabs.*

Remove the transmission fluid pan gasket.



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

Remove the bolts and the transmission fluid filter.



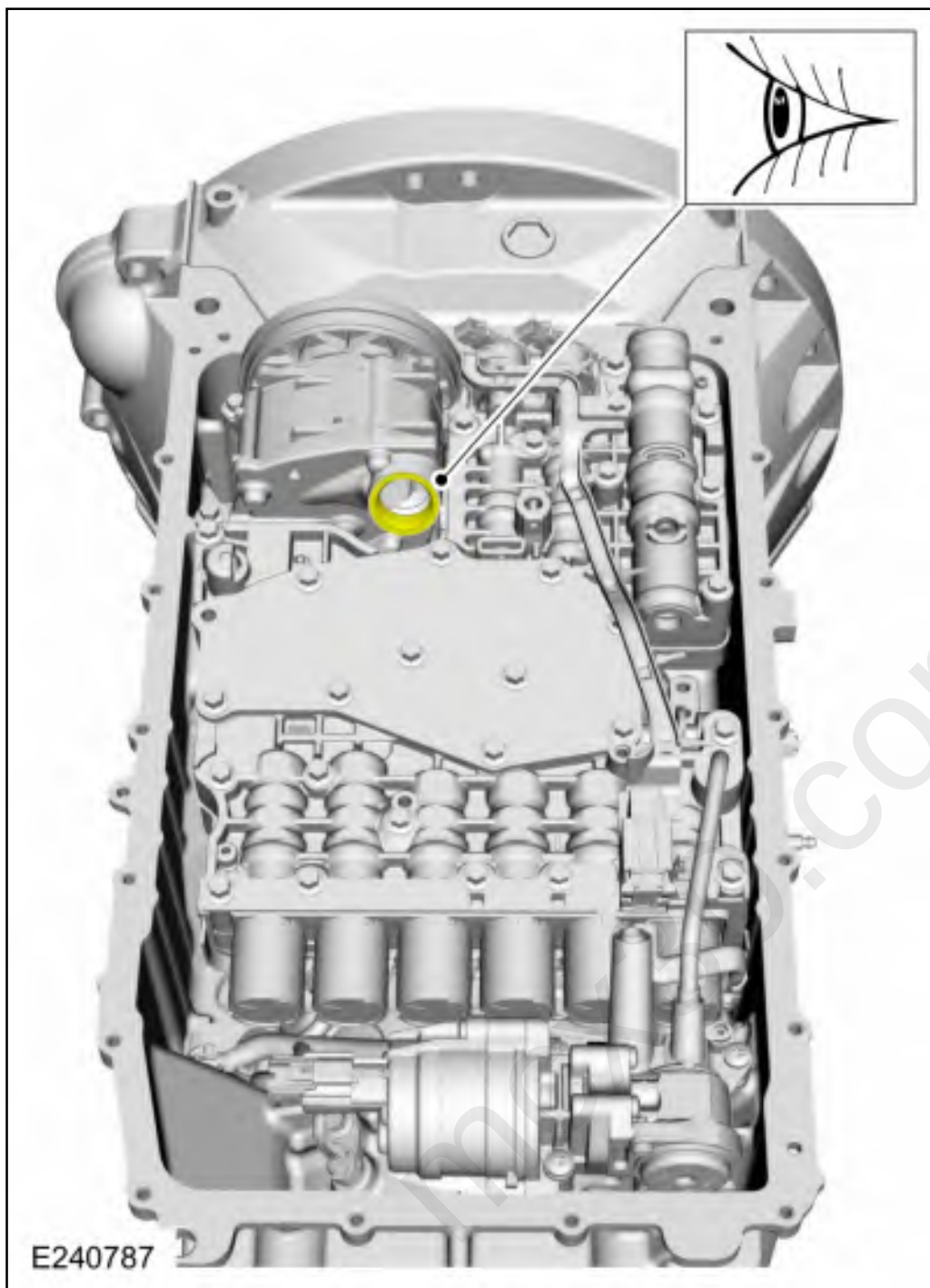
9. Clean and inspect the transmission fluid pan and magnet.



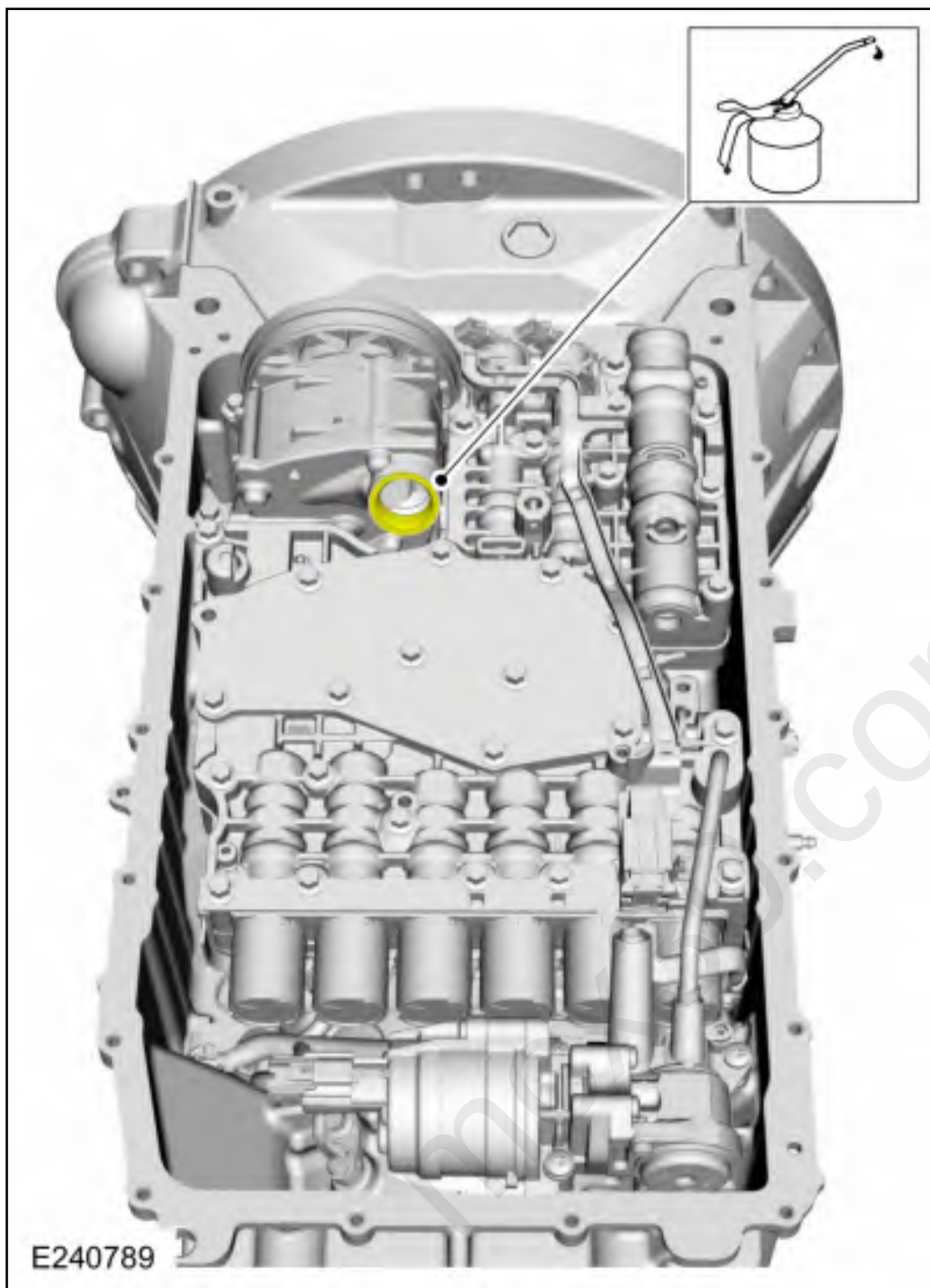
Installation

1. **NOTE:** *If the transmission is being repaired for a contamination-related failure, install a new transmission fluid filter and seal assembly. The transmission fluid filter may be reused if no excessive contamination is indicated.*

Inspect the transmission fluid filter seal. If necessary, replace the transmission fluid filter seal.



2. Lubricate the transmission fluid filter seal with automatic transmission fluid.
Material: Motorcraft® MERCON® ULV Automatic Transmission Fluid / XT-12-ULV (WSS-M2C494-A)

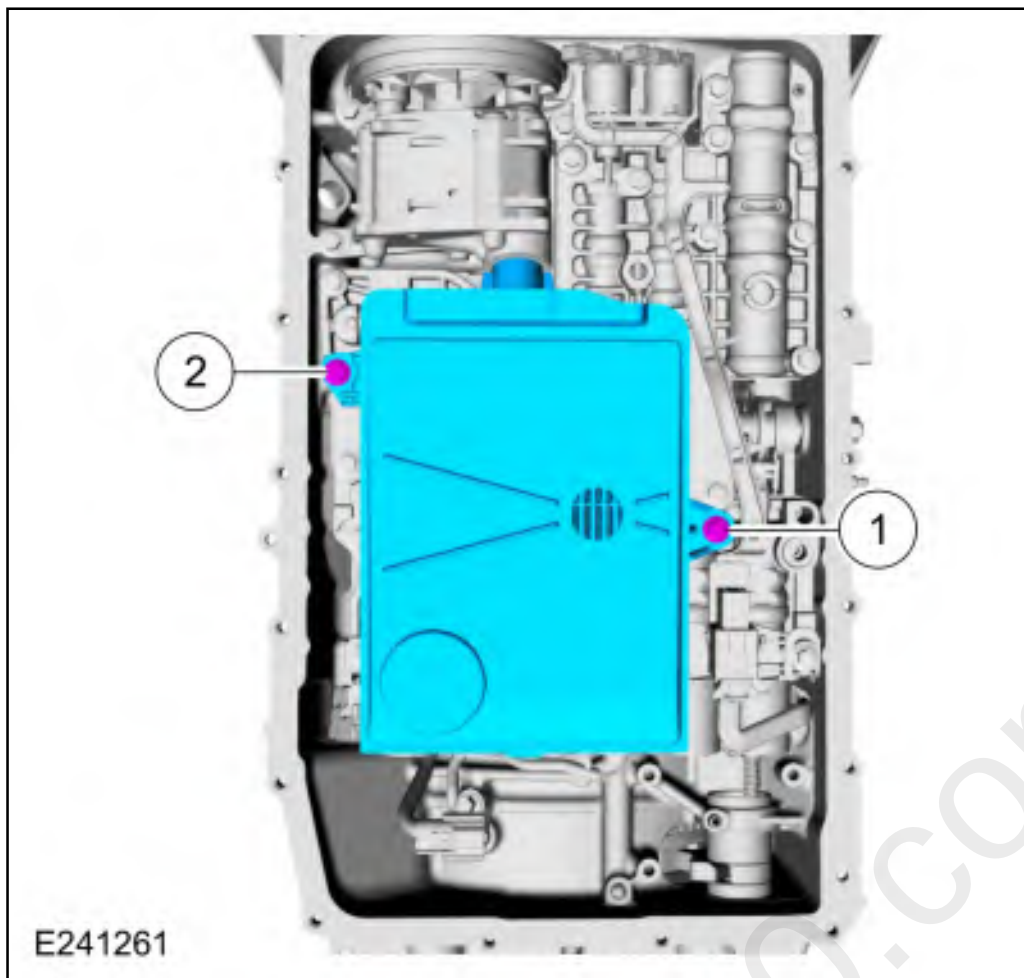


3. **NOTICE:** If the bolts are installed in the wrong locations, transmission damage will occur.

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

Install the filter and the bolts in the correct locations.

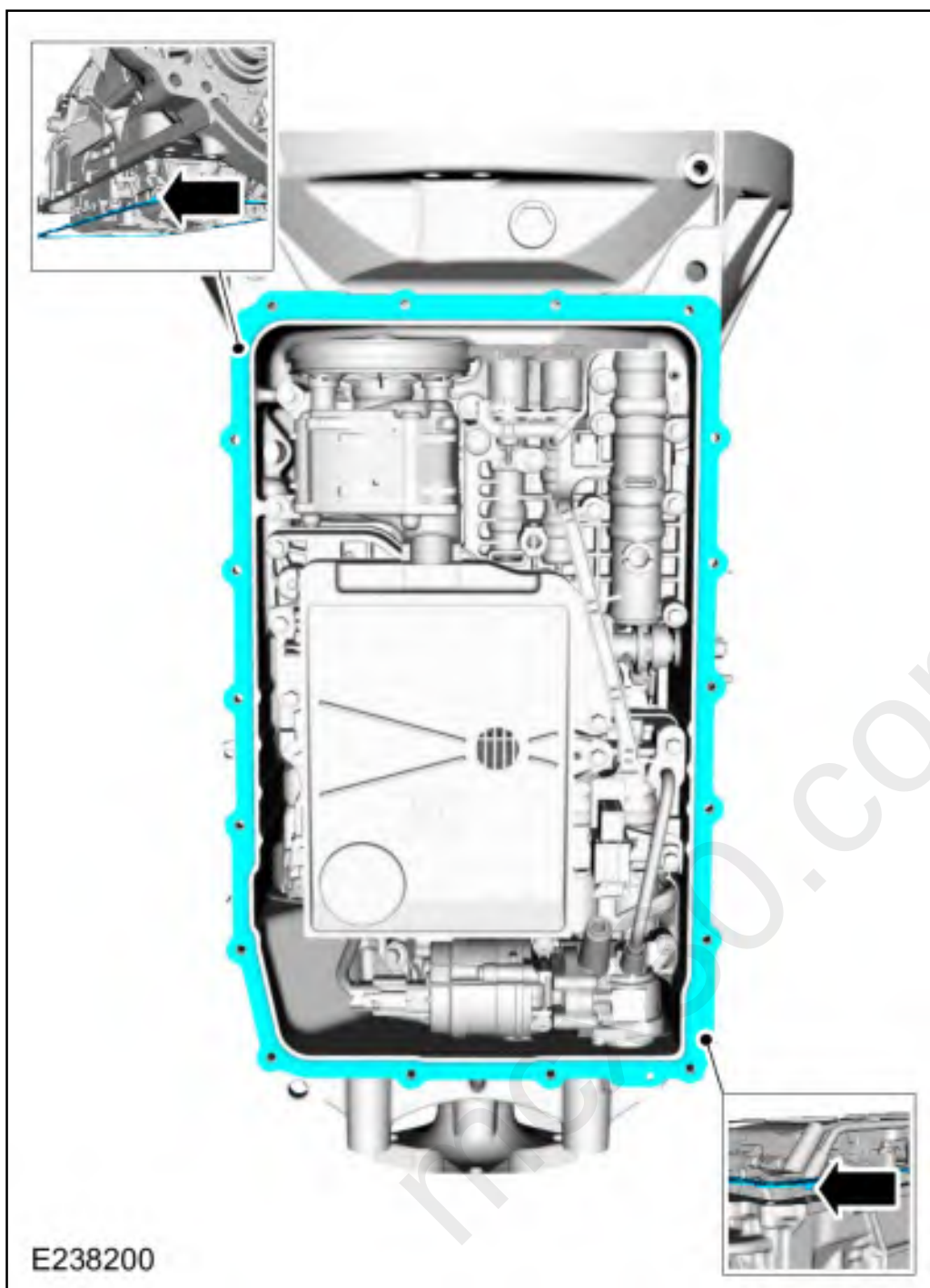
1. Short bolt
2. Long bolt
 - *Torque:* 93 lb.in (10.5 Nm)



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

NOTE: *Align the transmission fluid pan gasket tabs in the correct locations.*

Install a new transmission fluid pan gasket if required.



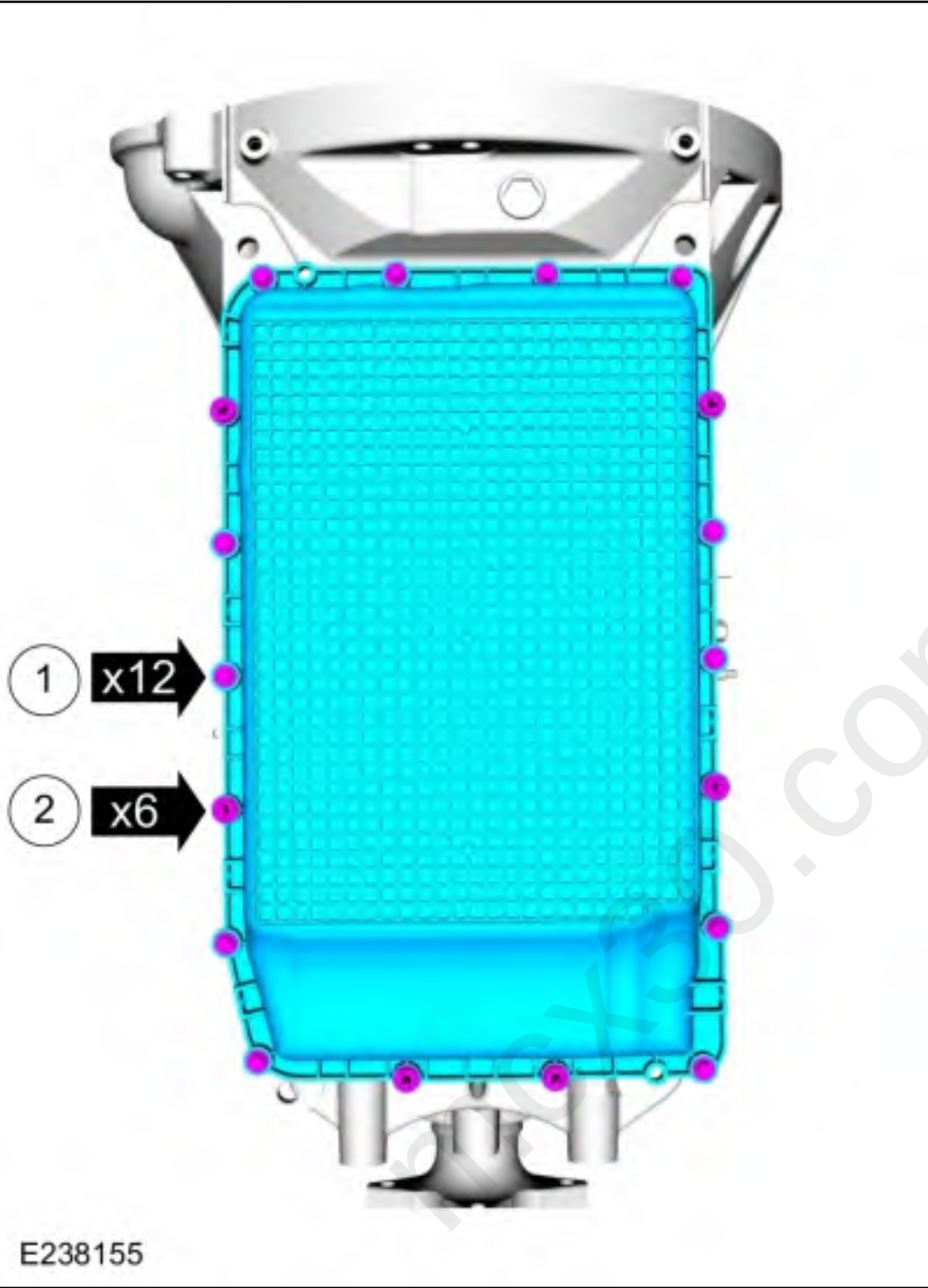
5. Install the transmission fluid pan and tighten the bolts in a crisscross pattern.

1. Bolts

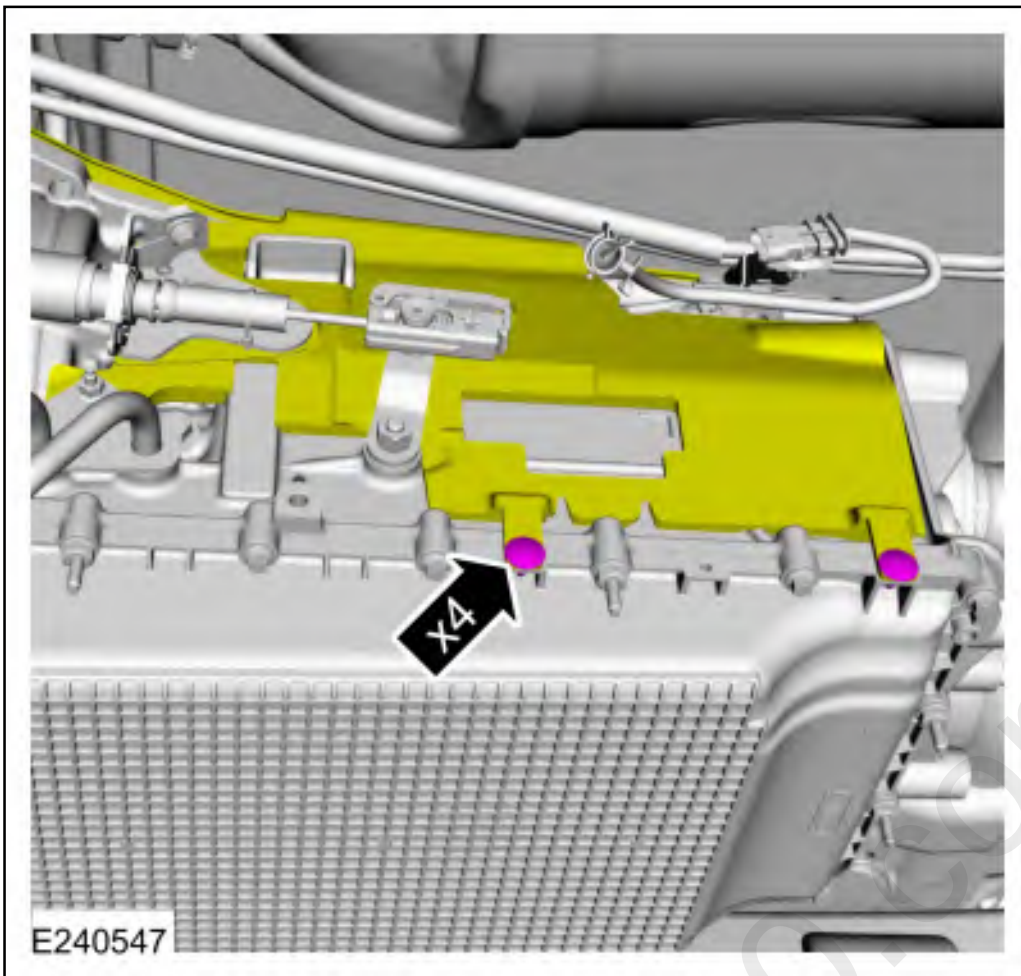
Torque: 89 lb.in (10 Nm)

2. Studbolts

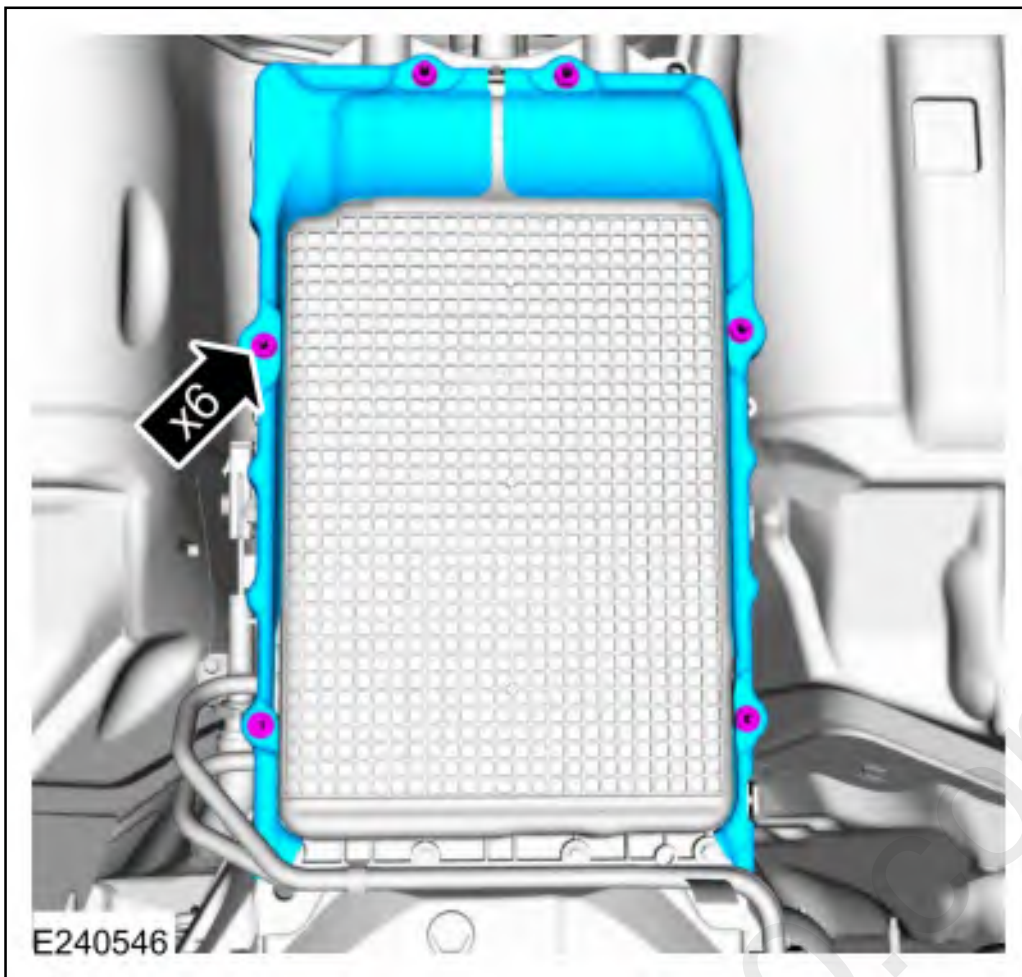
Torque: 106 lb.in (12 Nm)



6. Install the NVH cover and the retainers.



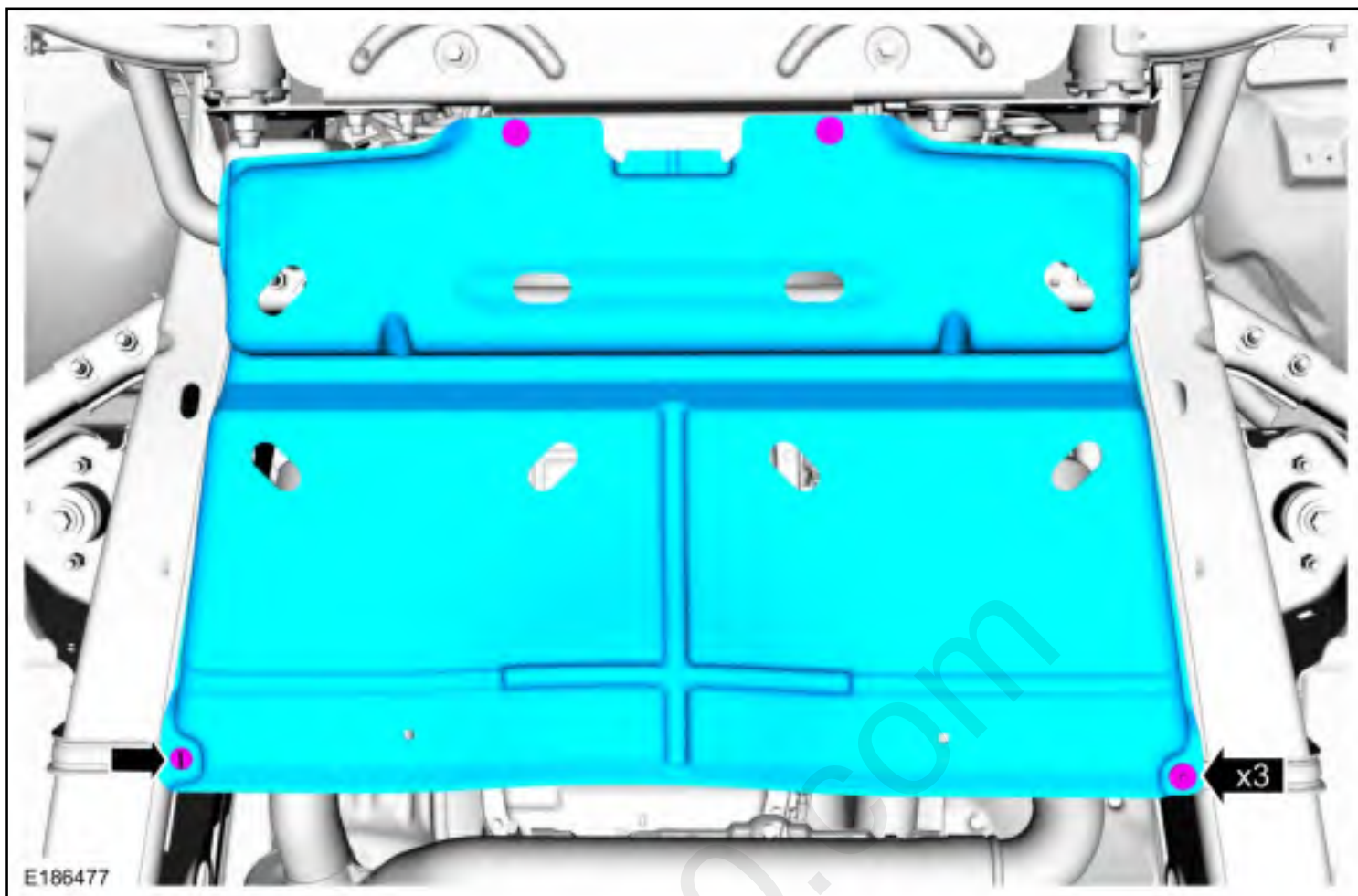
7. Install the heatshield and retainers.
Torque: 80 lb.in (9 Nm)



8. Fill and check the transmission fluid.

Refer to: [Transmission Fluid Drain and Refill](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

9. Install the splash shield and the retainers.

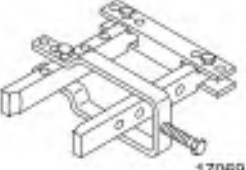


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Output Shaft Seal

Base Part Number: Base Part Number: 7B215

Special Tool(s) / General Equipment

 E129694	100-001 (T50T-100-A) Slide Hammer
 17069	307-309 Remover, Torque Converter Seal TKIT-1994-FH TKIT-1994-FMH/FLMH TKIT-1994-LMH/MH
 E270042	307-458 Socket, Output Shaft Locknut TKIT-2003N-F
 E270046	307-660 Installer, Front Pump Seal TKIT-2009C-F TKIT-2009C-ROW

Removal

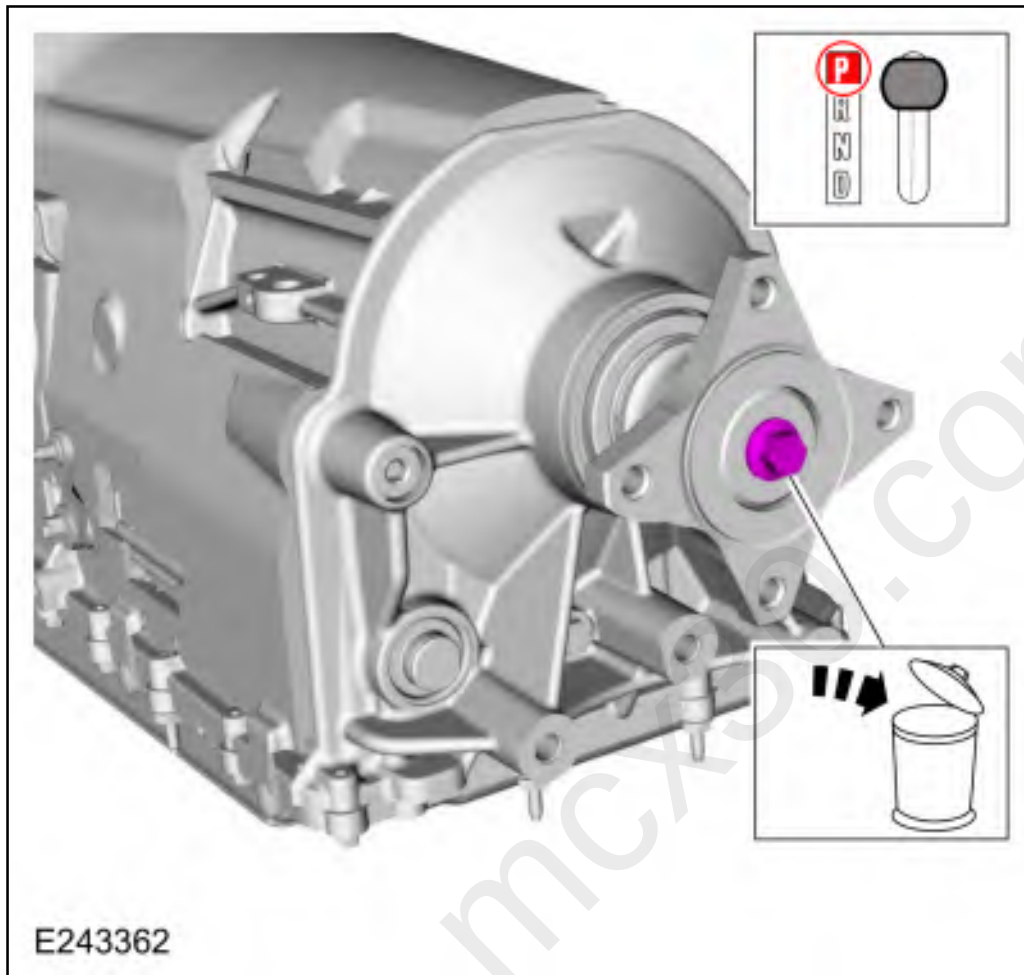
1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).

Rear Wheel Drive (RWD) vehicles

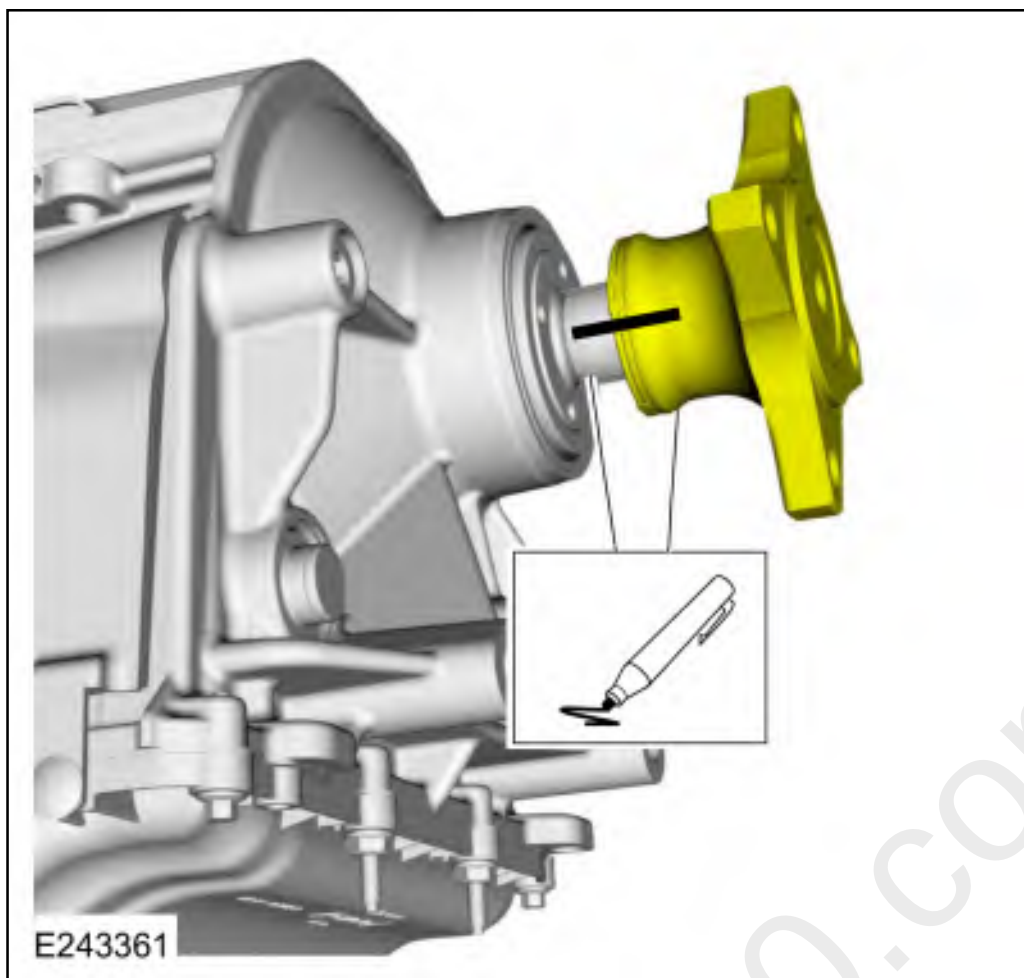
2. Remove the rear driveshaft assembly.

Refer to: [Rear Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

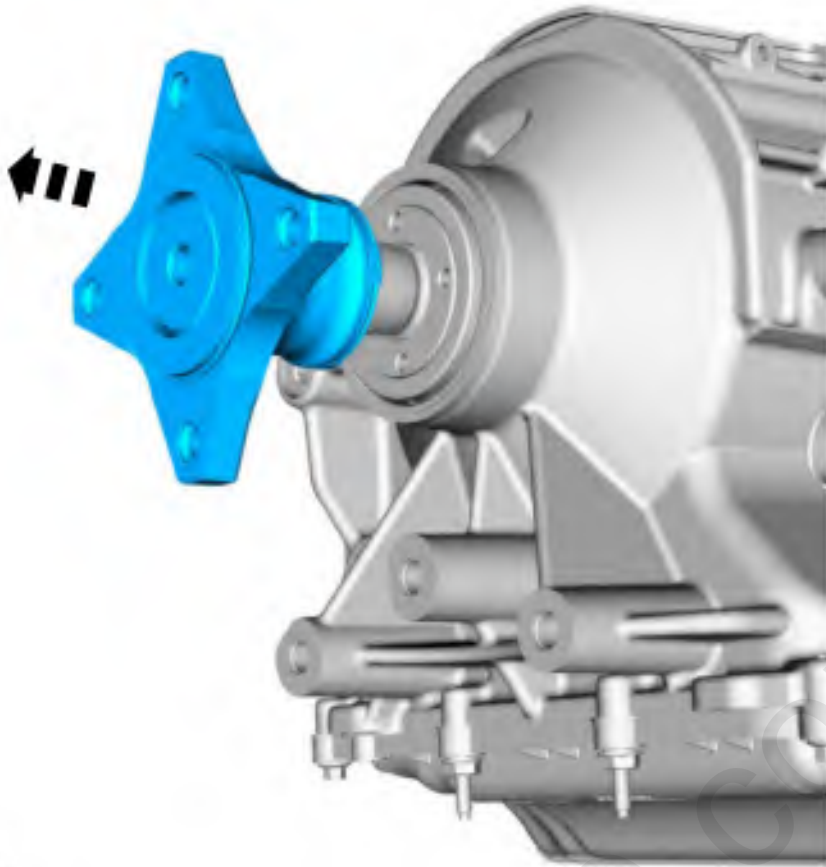
3. Remove and discard the output shaft flange bolt (7N134).



4. Slide the output shaft flange back to index mark the output shaft to the flange.

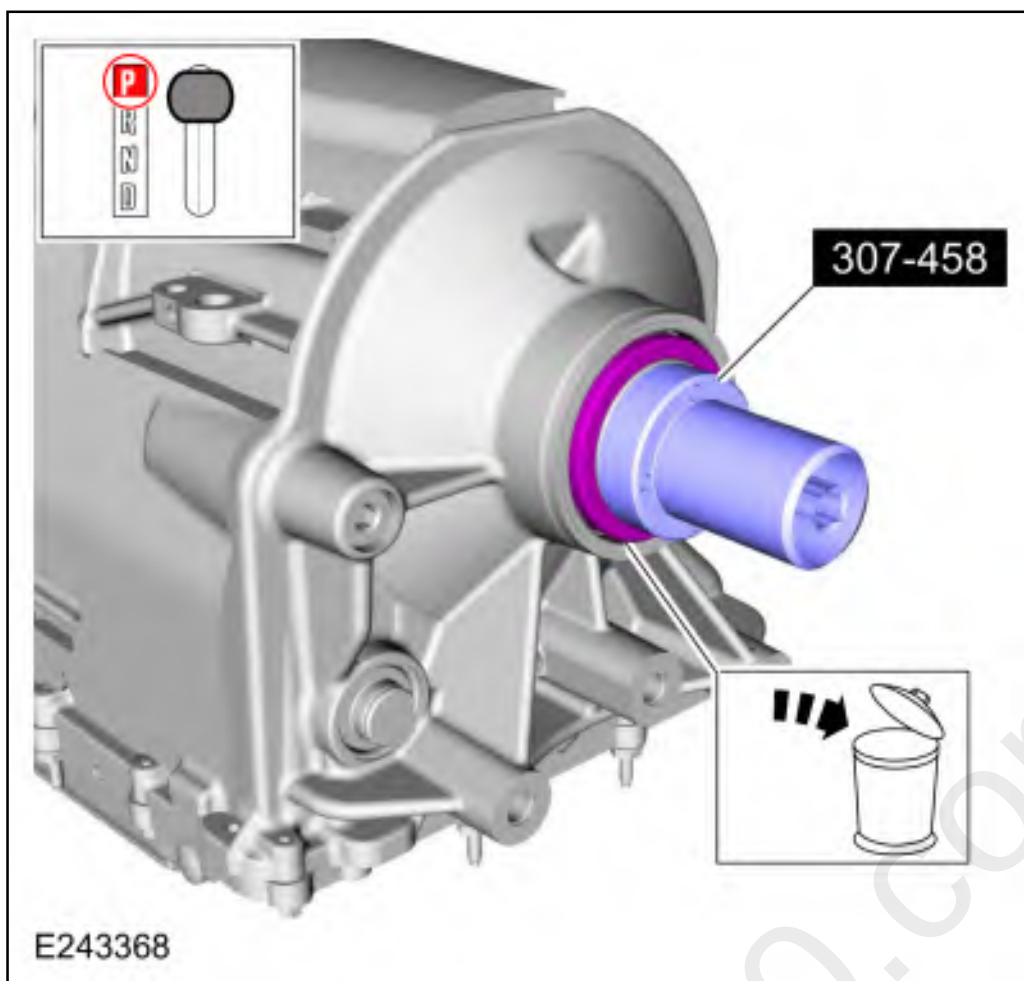


5. Remove the output shaft flange.



E243363

6. Using the special tool, remove and discard the output shaft nut (7085).
Use Special Service Tool: 307-458 Socket, Output Shaft Locknut.

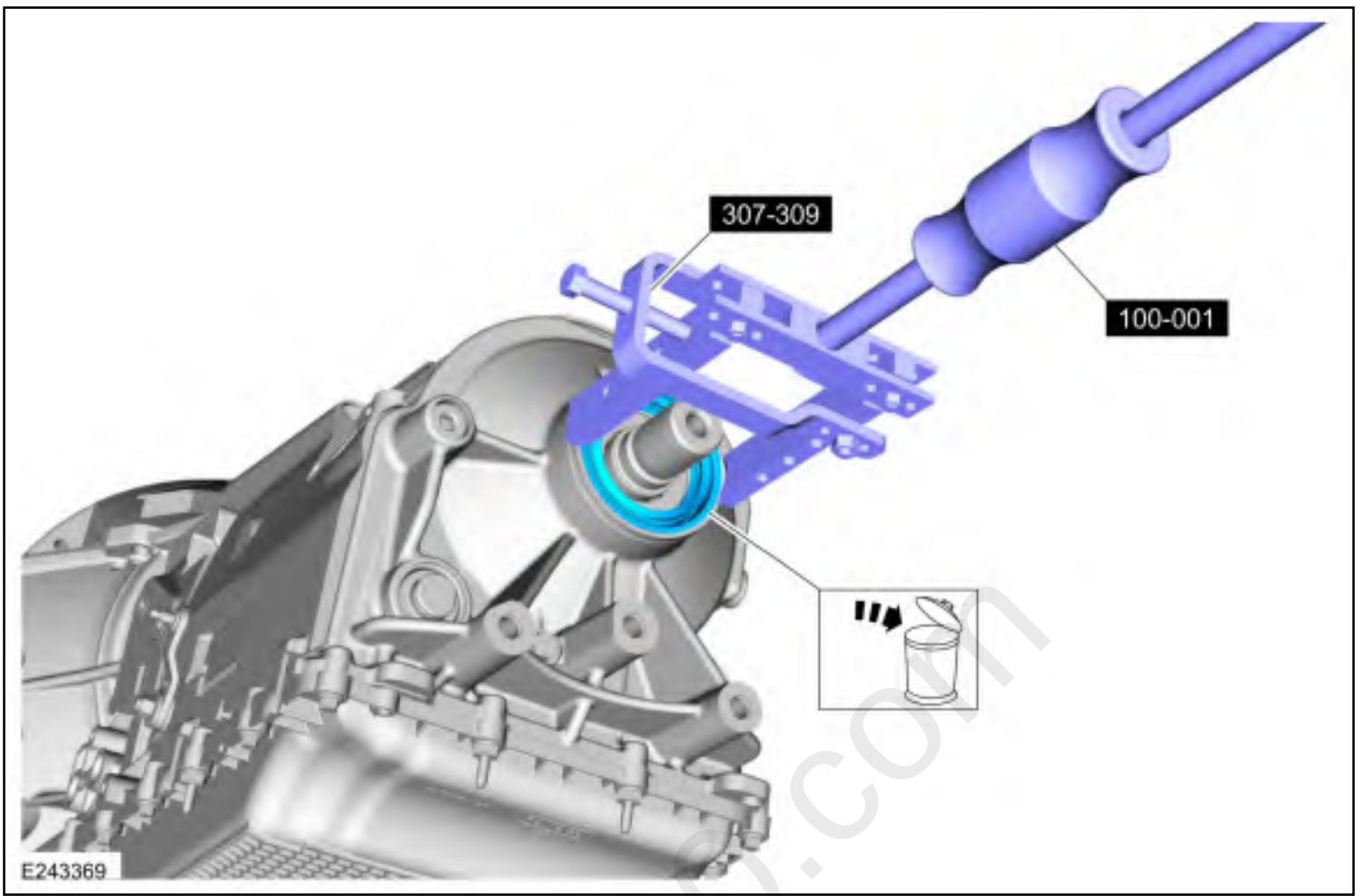


Four-Wheel Drive (4WD) vehicles

7. Remove the transfer case assembly.
Refer to: [Transfer Case](#) (308-07B Transfer Case, Removal).

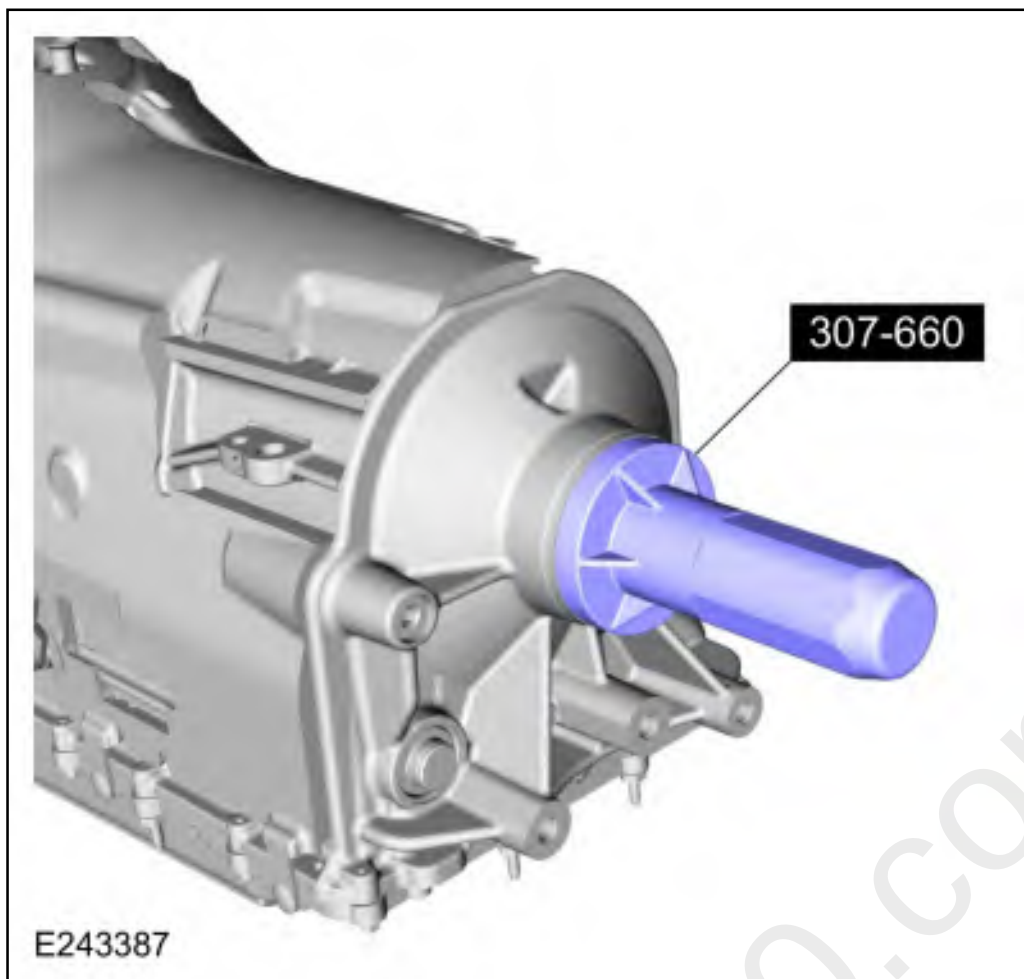
All vehicles

8. Using the special tools, remove and discard the output shaft seal (7052).
Use Special Service Tool: 307-309 Remover, Torque Converter Seal. , 100-001 (T50T-100-A) Slide Hammer.



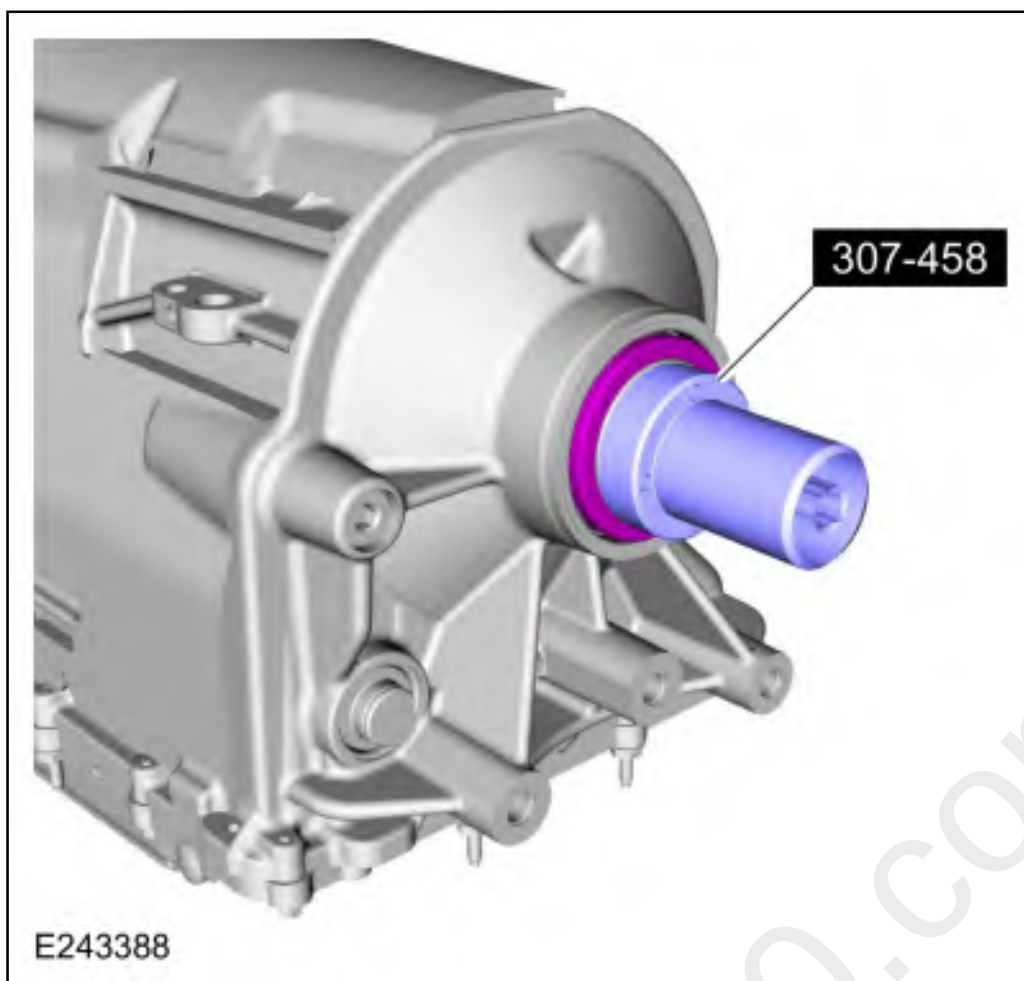
Installation

1. Using the special tool, install the new output shaft seal.
Use Special Service Tool: 307-660 Installer, Front Pump Seal.

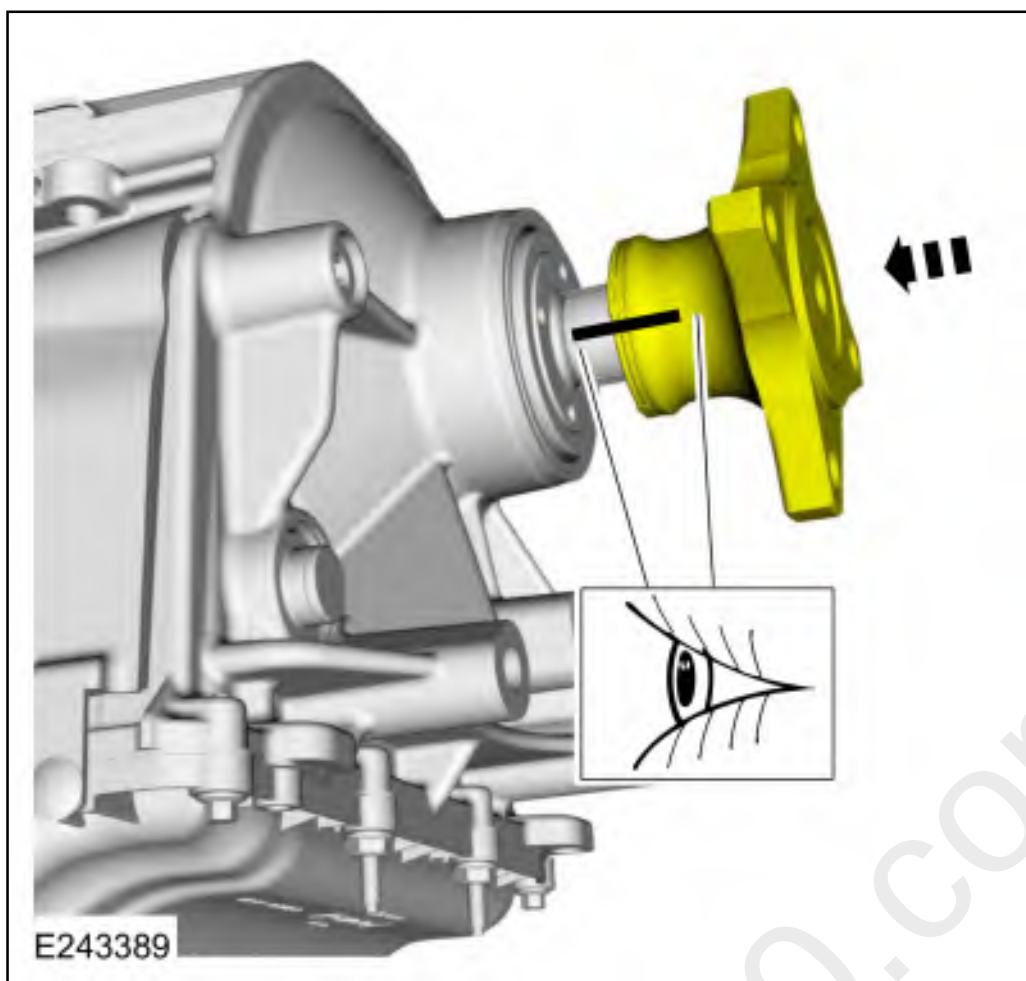


Rear Wheel Drive (RWD) vehicles

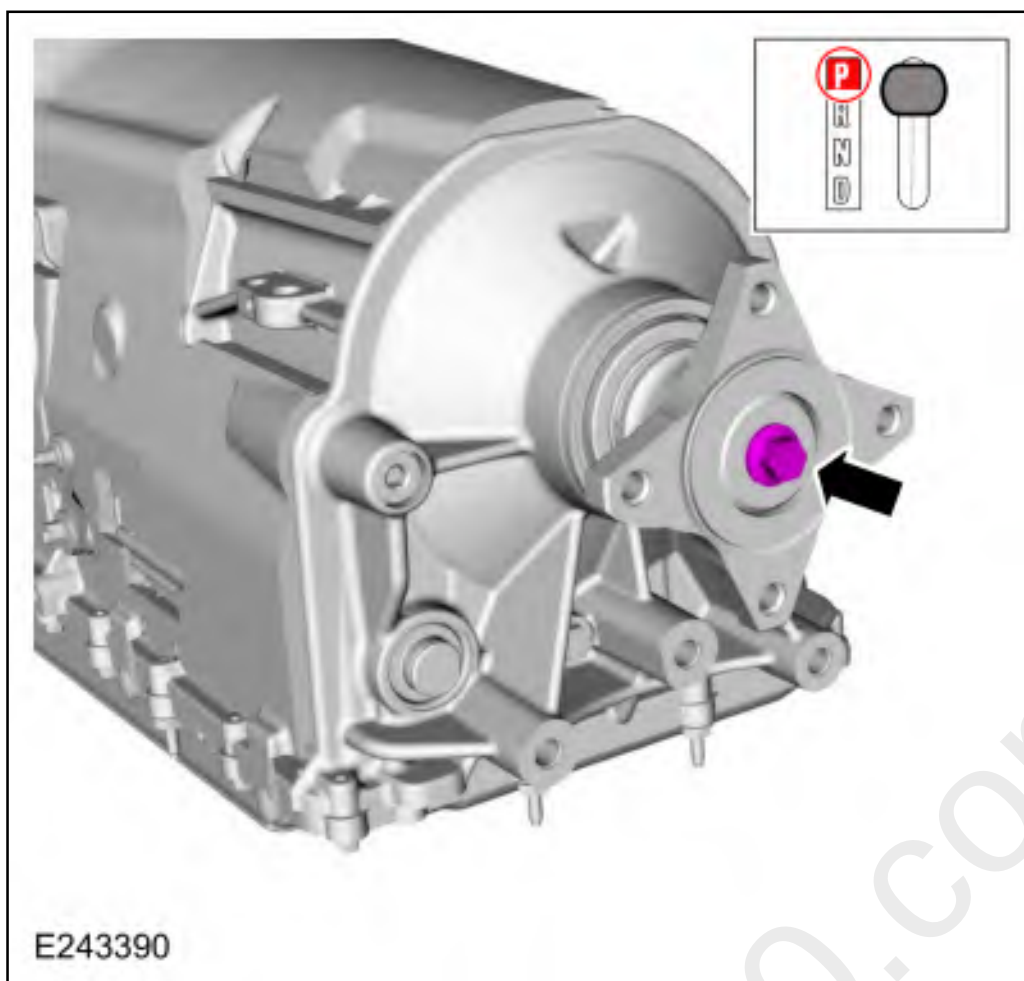
2. Using the special tool, install the new output shaft nut.
Use Special Service Tool: 307-458 Socket, Output Shaft Locknut.
Torque: 148 lb.ft (200 Nm)



3. Align the index marks on the output shaft and the output shaft flange made during removal.



4. Install the new output shaft flange bolt.
Torque: 81 lb.ft (110 Nm)



5. Install the rear driveshaft assembly.

Refer to: [Rear Driveshaft](#) (205-01 Driveshaft, Removal and Installation).

Four-Wheel Drive (4WD) vehicles

6. Install the transfer case assembly.

Refer to: [Transfer Case](#) (308-07B Transfer Case, Installation).

All vehicles

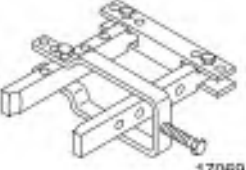
7. Check the transmission fluid level.

Refer to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Output Shaft Seal - Raptor

Base Part Number: Base Part Number: 7B215

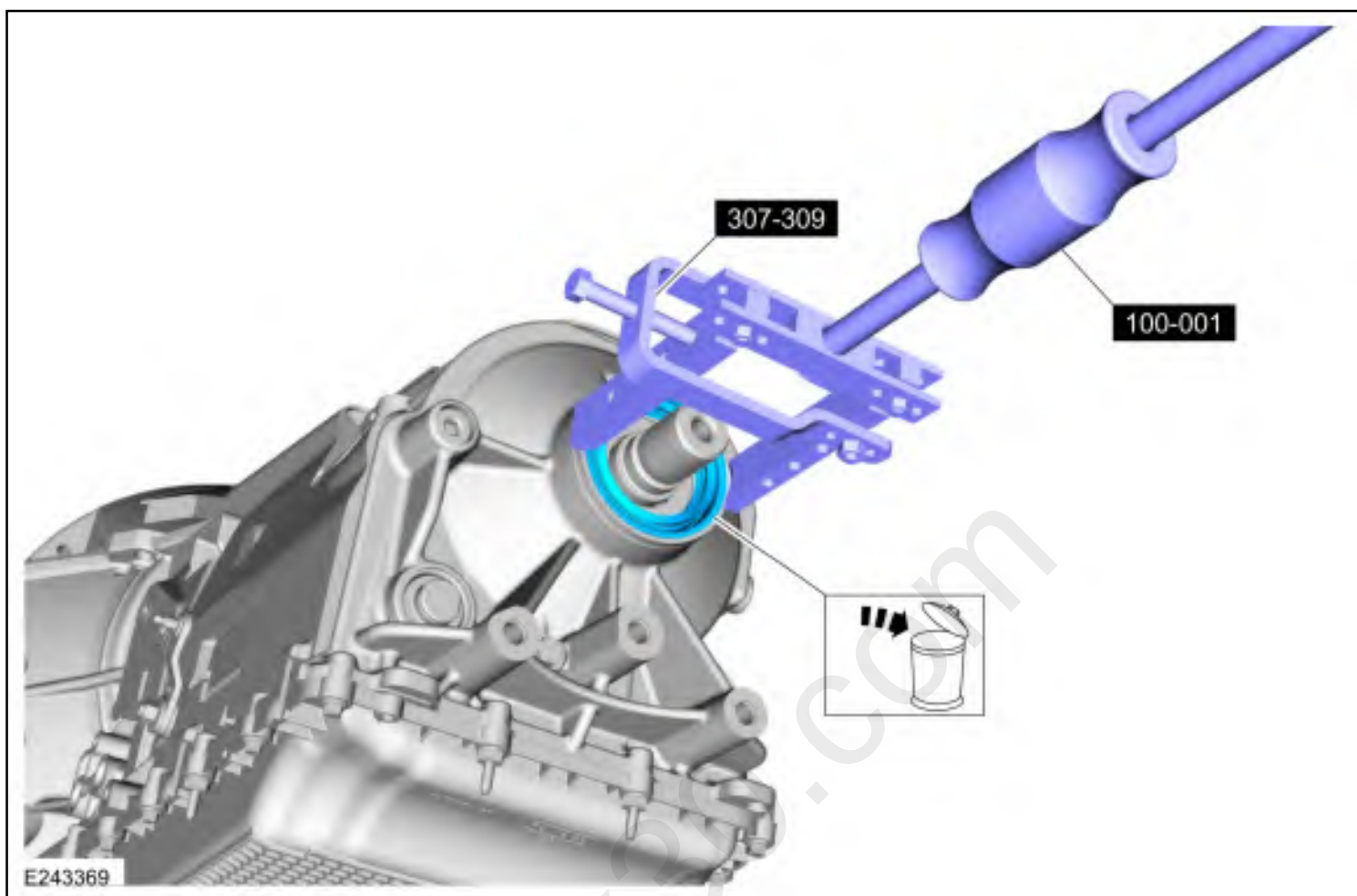
Special Tool(s) / General Equipment

 E129694	100-001 (T50T-100-A) Slide Hammer
 17069	307-309 Remover, Torque Converter Seal TKIT-1994-FH TKIT-1994-FMH/FLMH TKIT-1994-LMH/MH
 E270046	307-660 Installer, Front Pump Seal TKIT-2009C-F TKIT-2009C-ROW

Removal

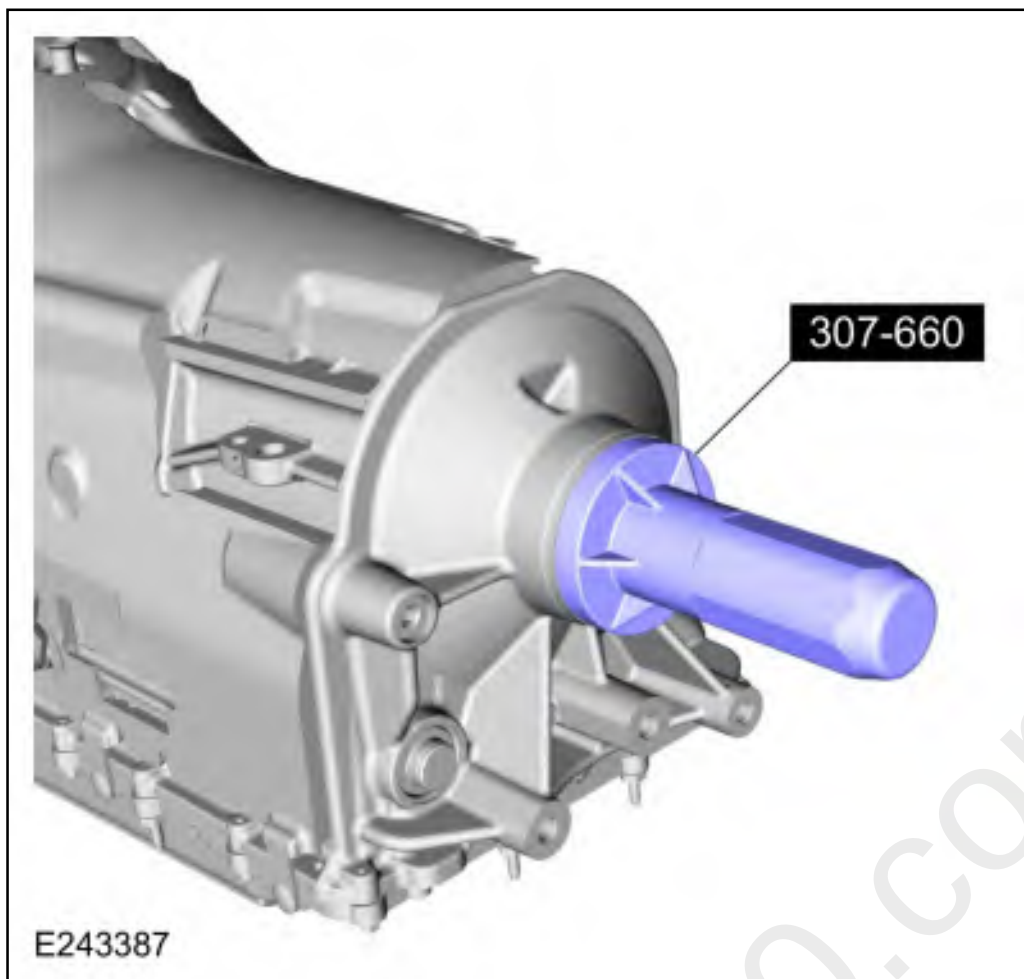
1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).
2. Remove the transfer case assembly.
Refer to: [Transfer Case](#) (308-07B Transfer Case, Removal).
3. Using the special tools, remove and discard the output shaft seal (7052).
Use Special Service Tool: 307-309 Remover, Torque Converter Seal. , 100-001 (T50T-100-A) Slide

Hammer.



Installation

1. Using the special tool, install the new output shaft seal.
Use Special Service Tool: 307-660 Installer, Front Pump Seal.



2. Install the transfer case assembly.
Refer to: [Transfer Case](#) (308-07B Transfer Case, Installation).
3. Check the transmission fluid level.
Refer to: [Transmission Fluid Level Check](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, General Procedures).

Transmission

Base Part Number: Base Part Number: 7000

1. To remove the transmission assembly.

Refer to: [Transmission - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: [Transmission - 2.7L EcoBoost \(238kW/324PS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: [Transmission - 3.5L EcoBoost \(272kW/370PS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: [Transmission - 5.0L 32V Ti-VCT](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Transmission

Base Part Number: Base Part Number: 7000

1. To install the transmission assembly.

Refer to: [Transmission - Raptor](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: [Transmission - 2.7L EcoBoost \(238kW/324PS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

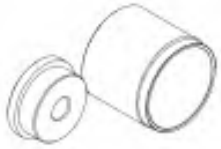
Refer to: [Transmission - 3.5L EcoBoost \(272kW/370PS\)](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

Refer to: [Transmission - 5.0L 32V Ti-VCT](#) (307-01B Automatic Transmission - 10-Speed Automatic Transmission - 10R80, Removal and Installation).

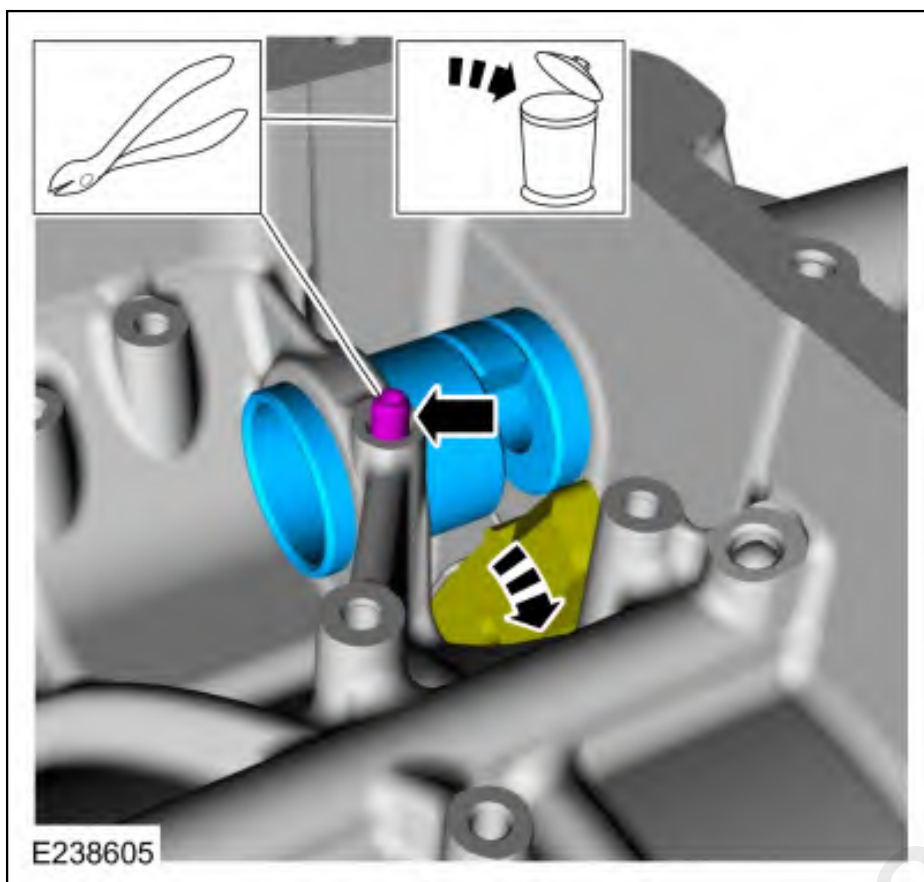
Transmission Case

Base Part Number: Base Part Number: 7005

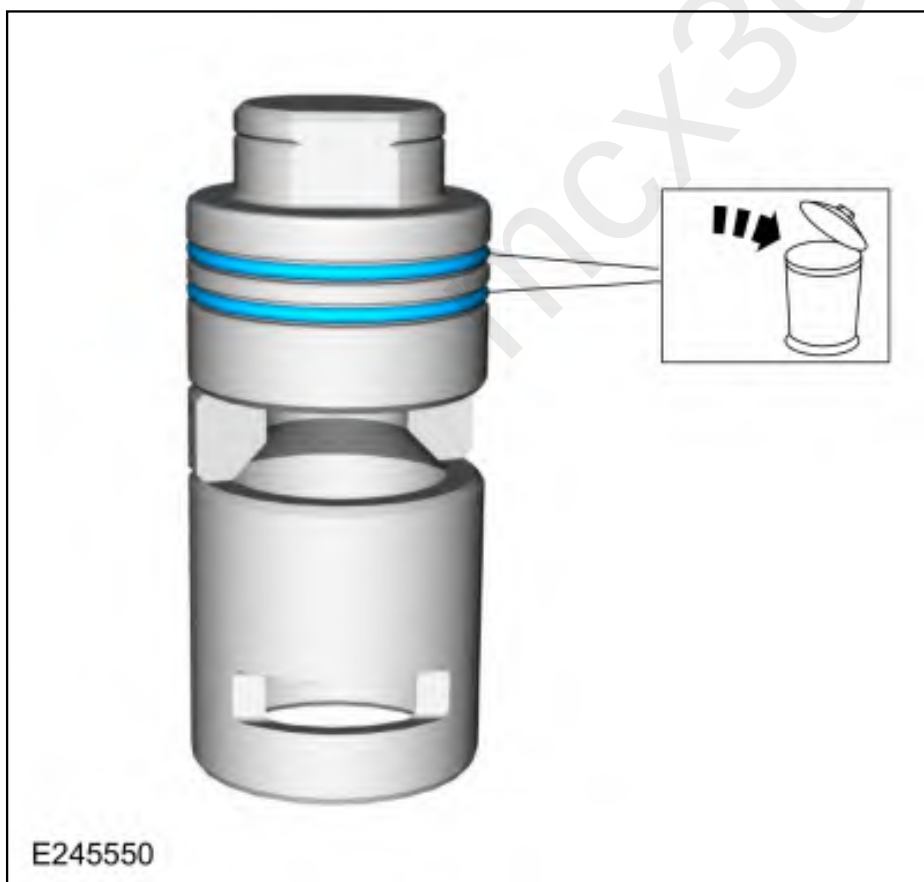
Special Tool(s) / General Equipment

 E131850	204-594 Forcing screw
 E234930	307-744 Remover, Output Shaft Bearing

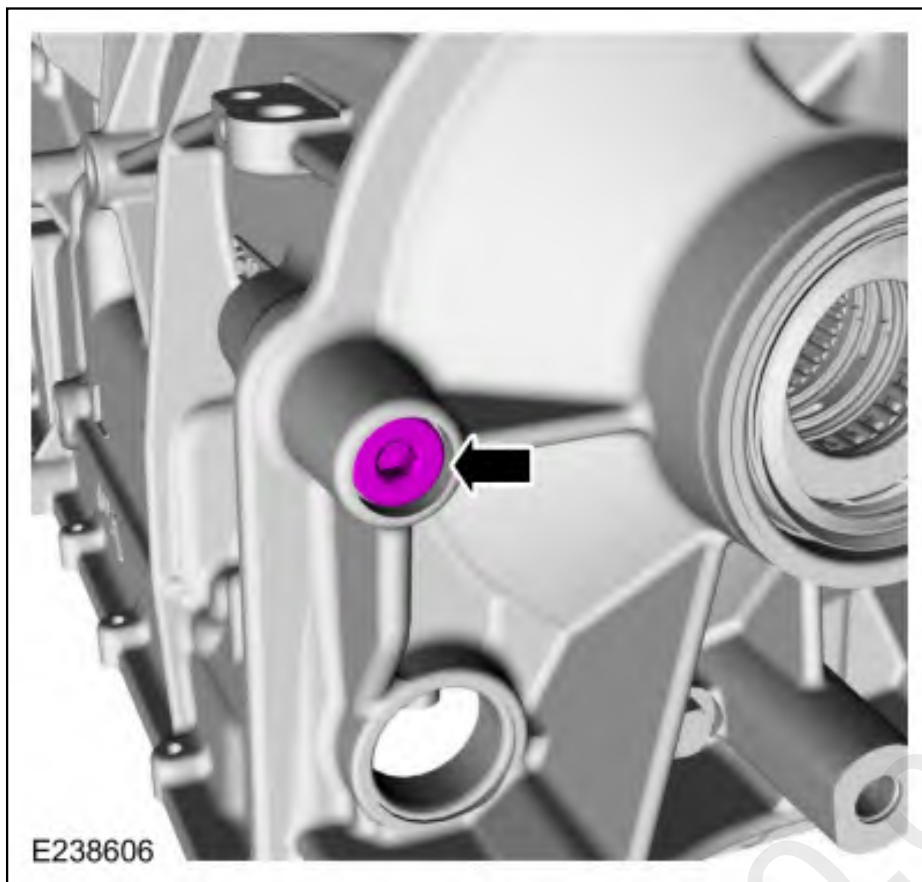
1. Remove and discard the park pawl actuator rod sleeve roll pin (W717404), move the park pawl out of the park pawl actuator rod sleeve and remove the park pawl actuator rod sleeve.



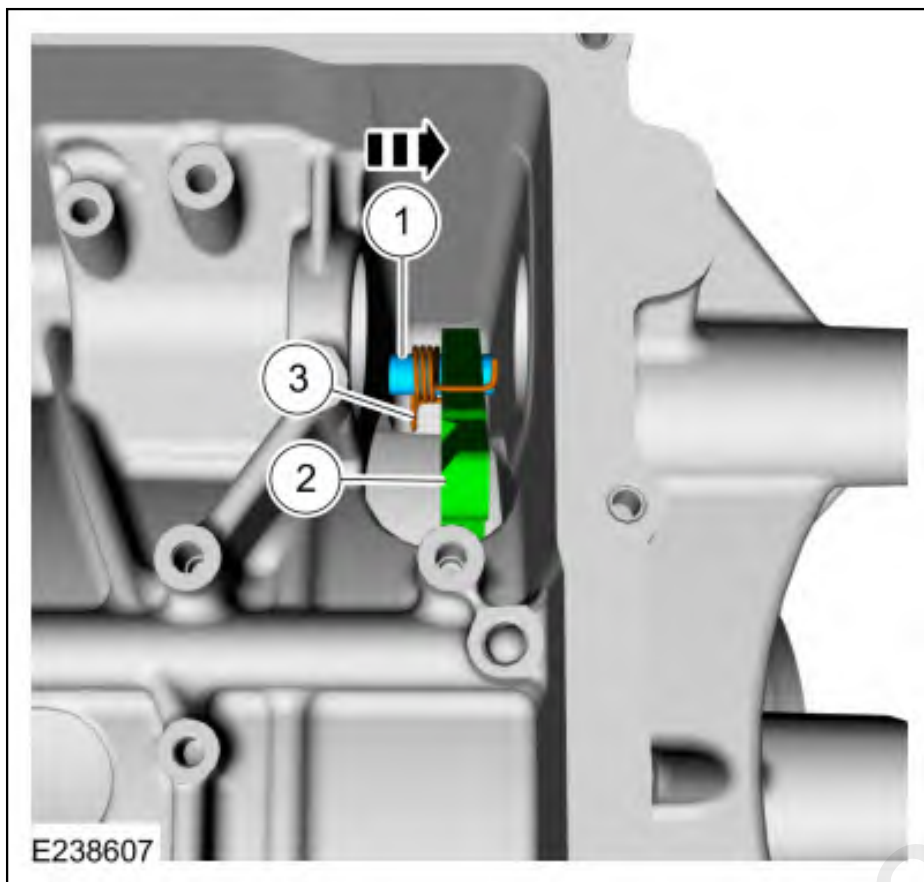
2. Remove and discard the park pawl actuator rod sleeve seals (2D330).



3. Remove the park pawl shaft plug.



1. Disconnect the park pawl return spring to remove tension from the park pawl shaft and remove the park pawl shaft.
2. Remove the park pawl.
3. Remove the park pawl return spring.



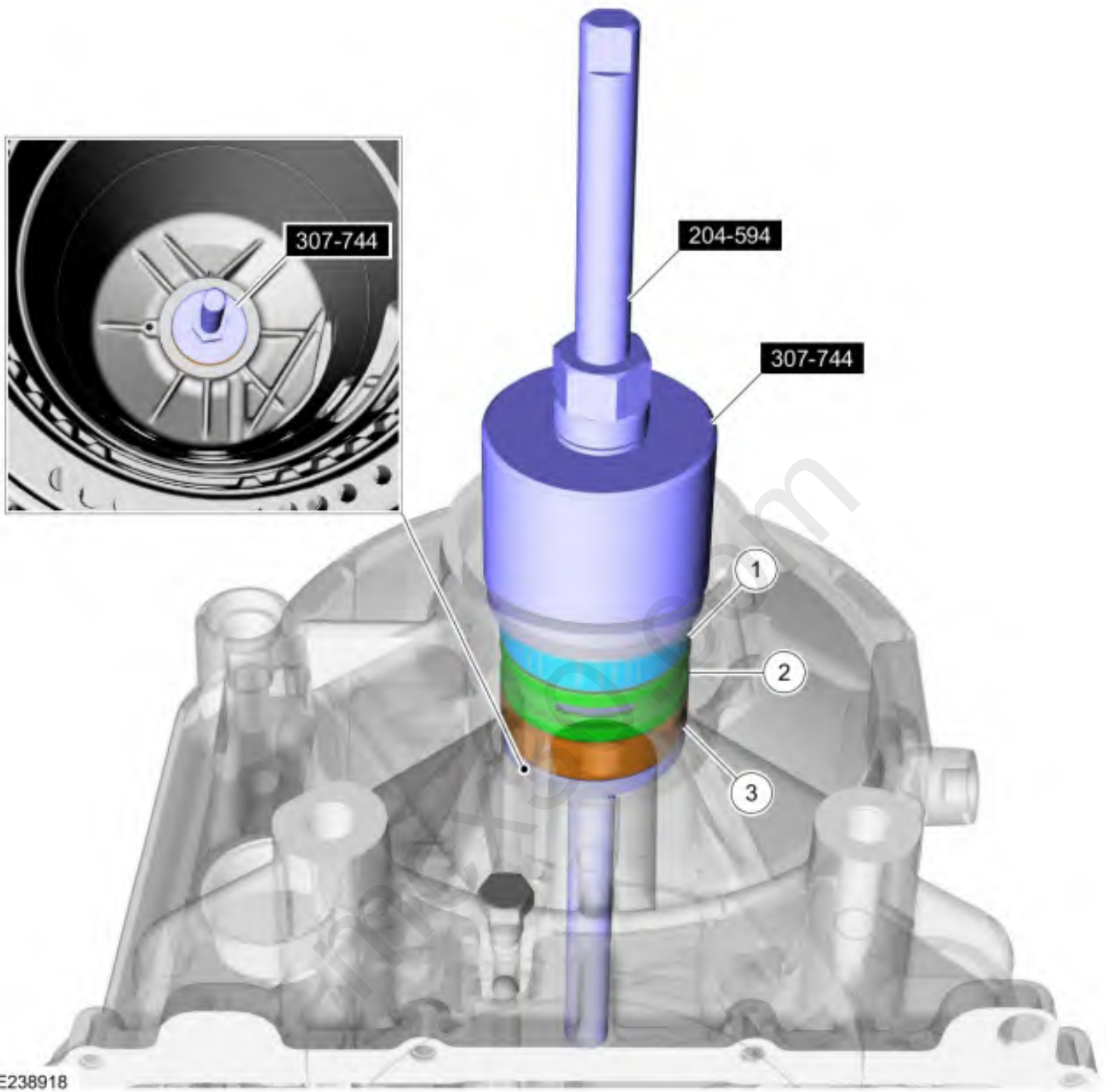
5. Using the special tools, remove the bearings and the fluid passage sleeve.

1. Outer output shaft bearing

Use Special Service Tool: 204-594 Forcing screw. , 307-744 Remover, Output Shaft Bearing.

2. Fluid passage sleeve

3. Inner output shaft bearing



Transmission Case

Base Part Number: Base Part Number: 7005

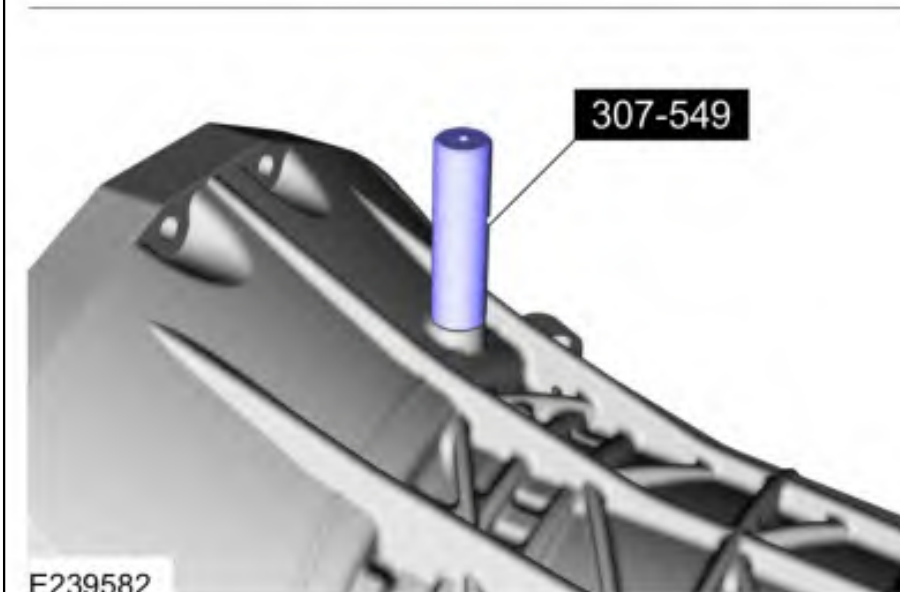
Special Tool(s) / General Equipment

 E131850	204-594 Forcing screw
 E270043	307-549 Installer, Shift Shaft Fluid Seal TKIT-2005D1-F1
 E234910	307-648 Remover/Installer, Rear Bearing TKIT-2009C-F TKIT-2009C-ROW
 E234910	307-738 Installer, R2 Bearing
 E234911	307-739 Installer, R3 Bearing

 E234912	307-740 Installer, Dog Bone
 E234931	307-745 Installer, Park Sleeve Roll Pin

1. **NOTE:** *This step is only necessary if the transmission case is being replaced. A new transmission case will not come with a vent tube.*

Using the special tool, install the vent tube in the transmission case.
Use Special Service Tool: 307-549 Installer, Shift Shaft Fluid Seal.

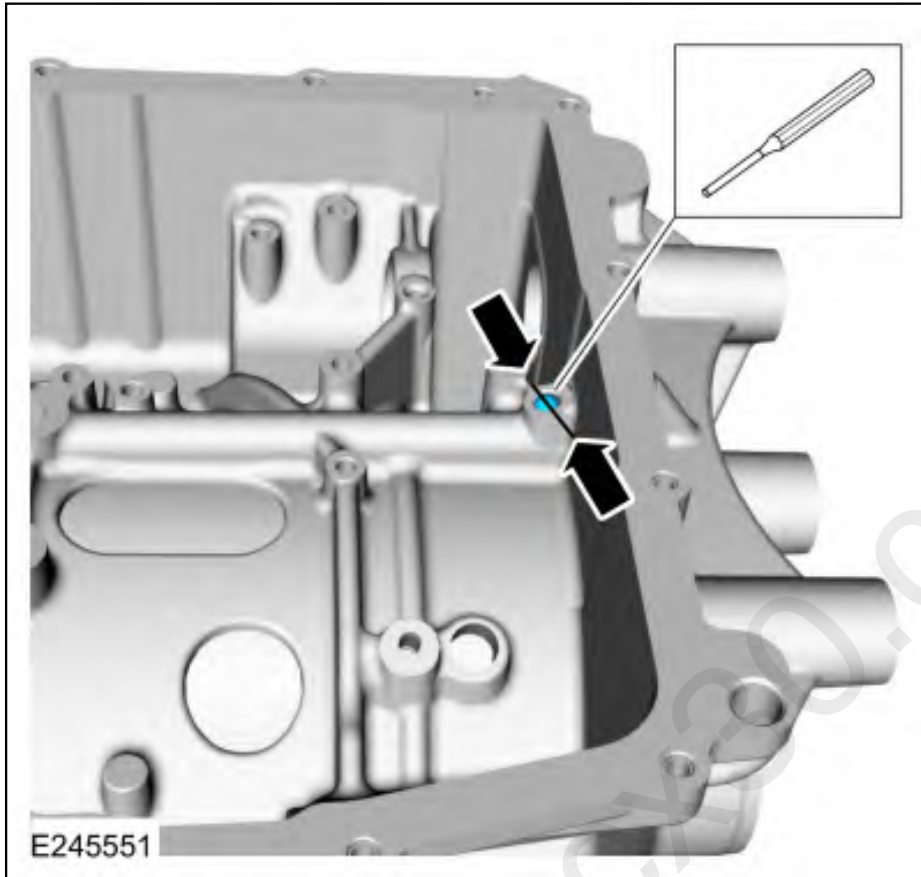


E239582



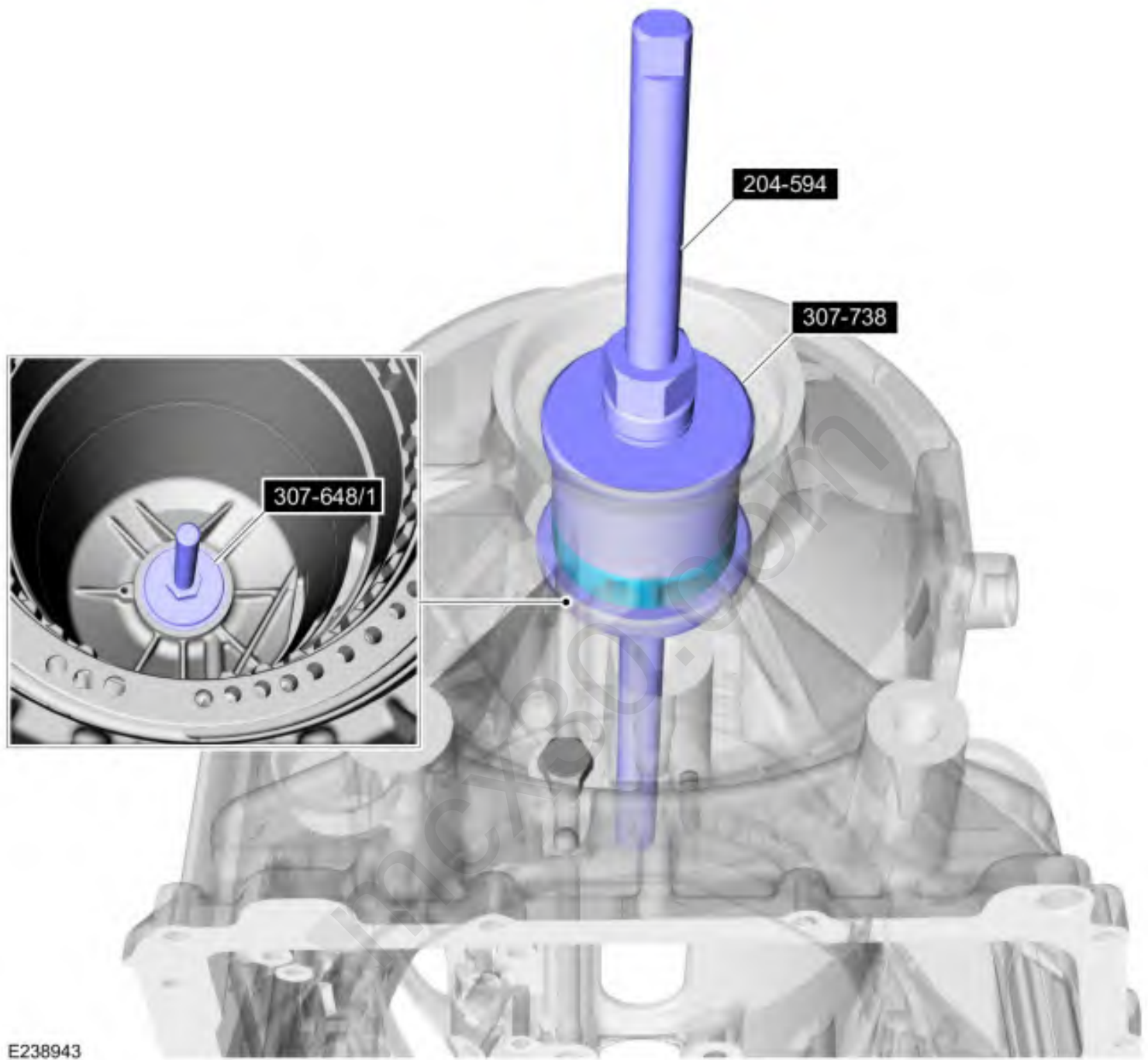
2. **NOTE:** *This step is only necessary if the transmission case is being replaced.*

Using a brass punch, install the ball plug (7E195) flush with the transmission case surface.



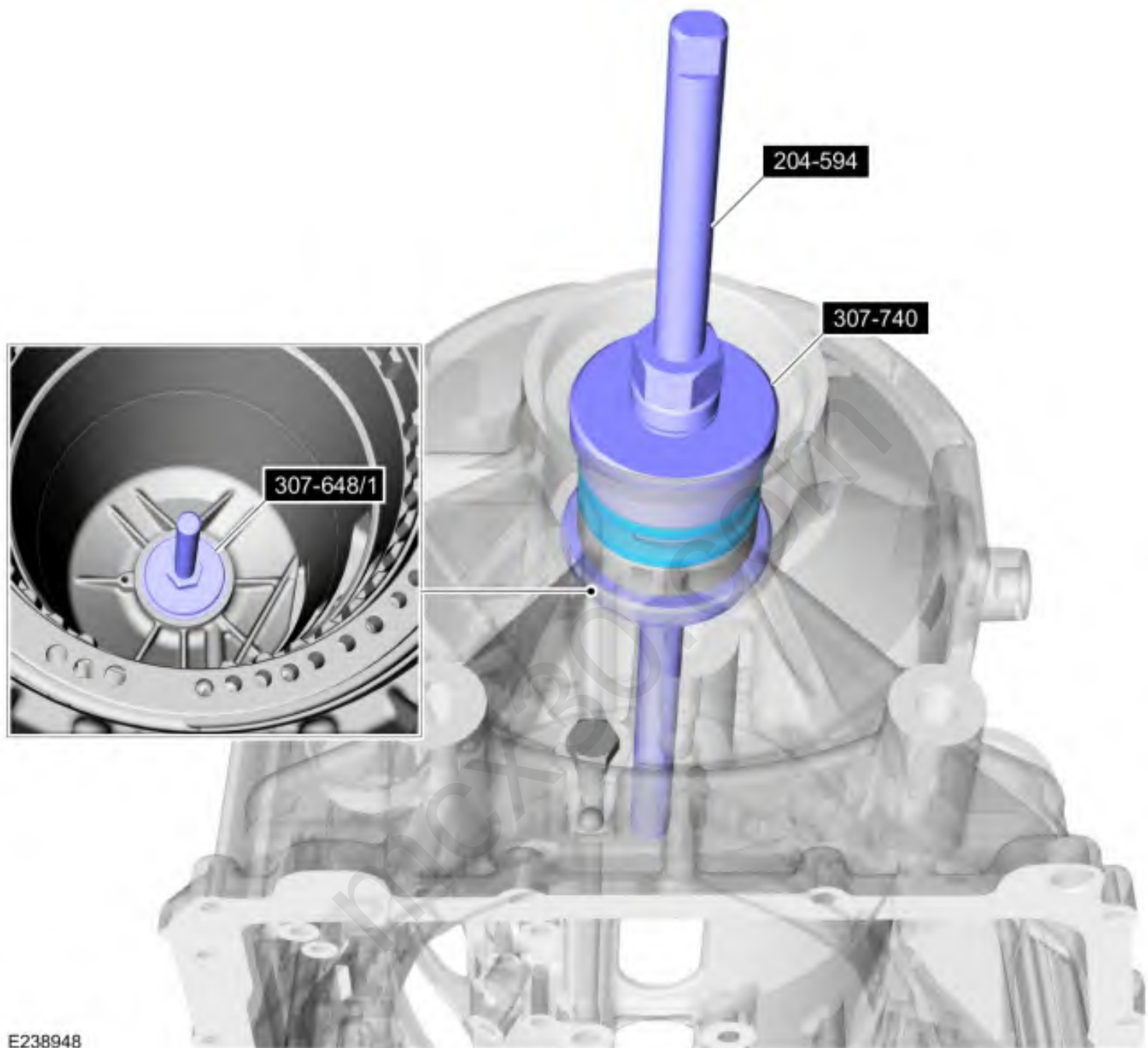
3. Using the special tools, install the inner output shaft bearing.

Use Special Service Tool: 204-594 Forcing screw. , 307-648 Remover/Installer, Rear Bearing. , 307-738 Installer, R2 Bearing.

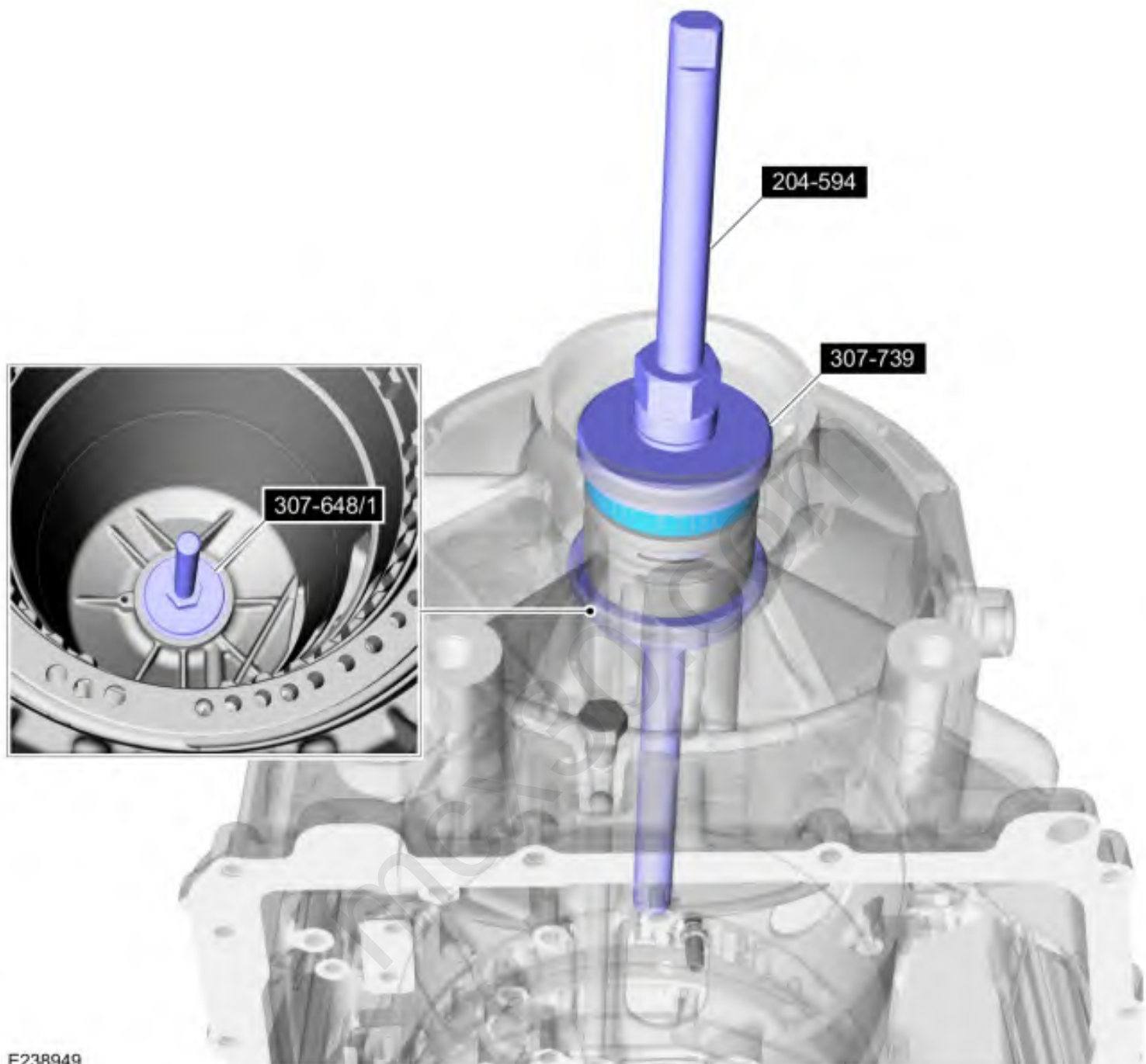


4. Using the special tools, install the fluid passage sleeve.

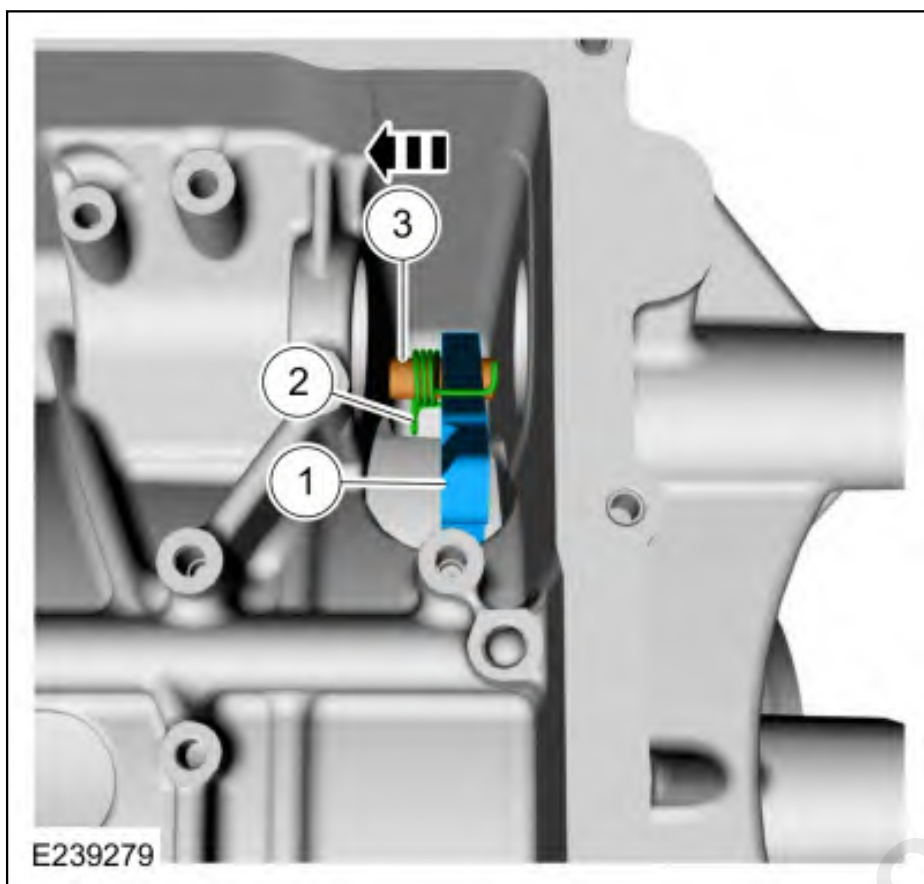
Use Special Service Tool: 204-594 Forcing screw. , 307-648 Remover/Installer, Rear Bearing. , 307-740 Installer, Dog Bone.



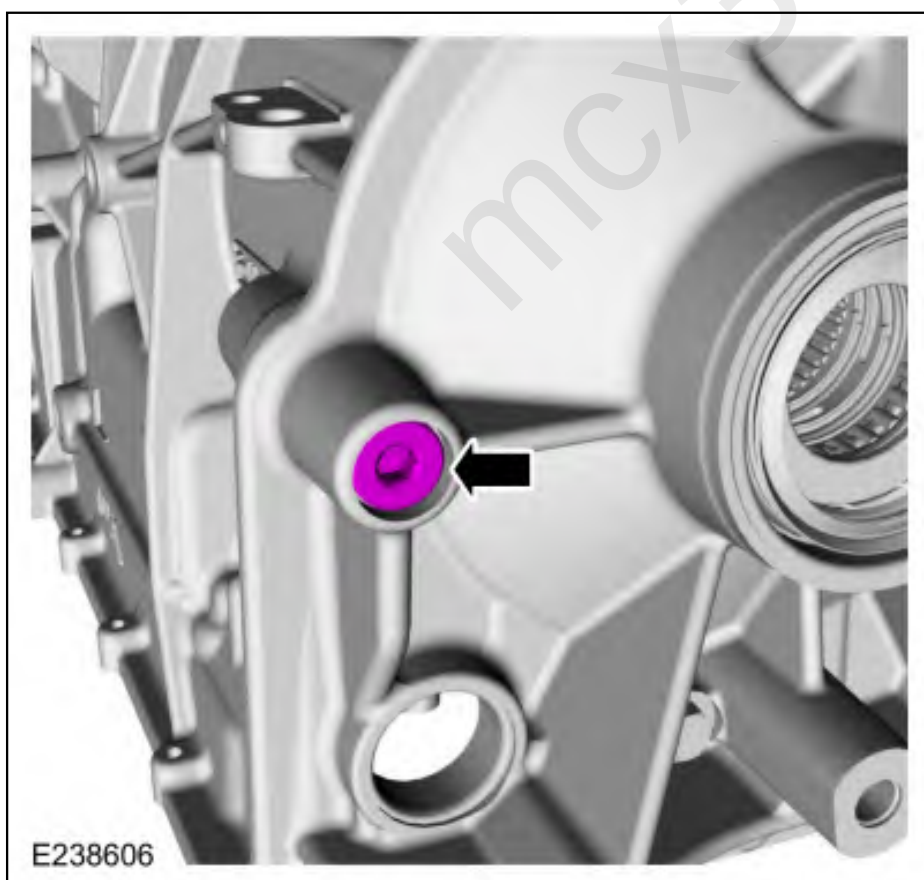
5. Using the special tools, install the outer output shaft bearing.
Use Special Service Tool: 204-594 Forcing screw. , 307-648 Remover/Installer, Rear Bearing. , 307-739 Installer, R3 Bearing.



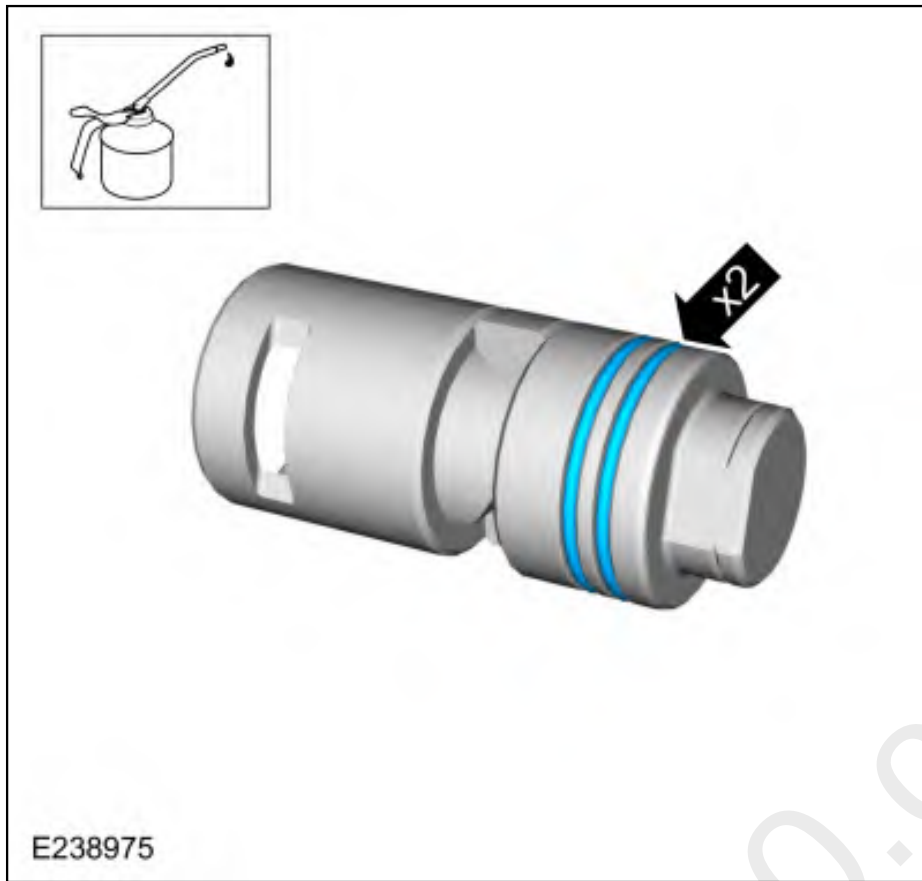
1. Install the park pawl.
2. Install the park pawl return spring.
3. Install the park pawl shaft.



7. Install the park pawl shaft plug.
Torque: 17 lb.ft (23 Nm)



8. Install new park pawl actuator rod sleeve seals and lubricate them with petroleum jelly.



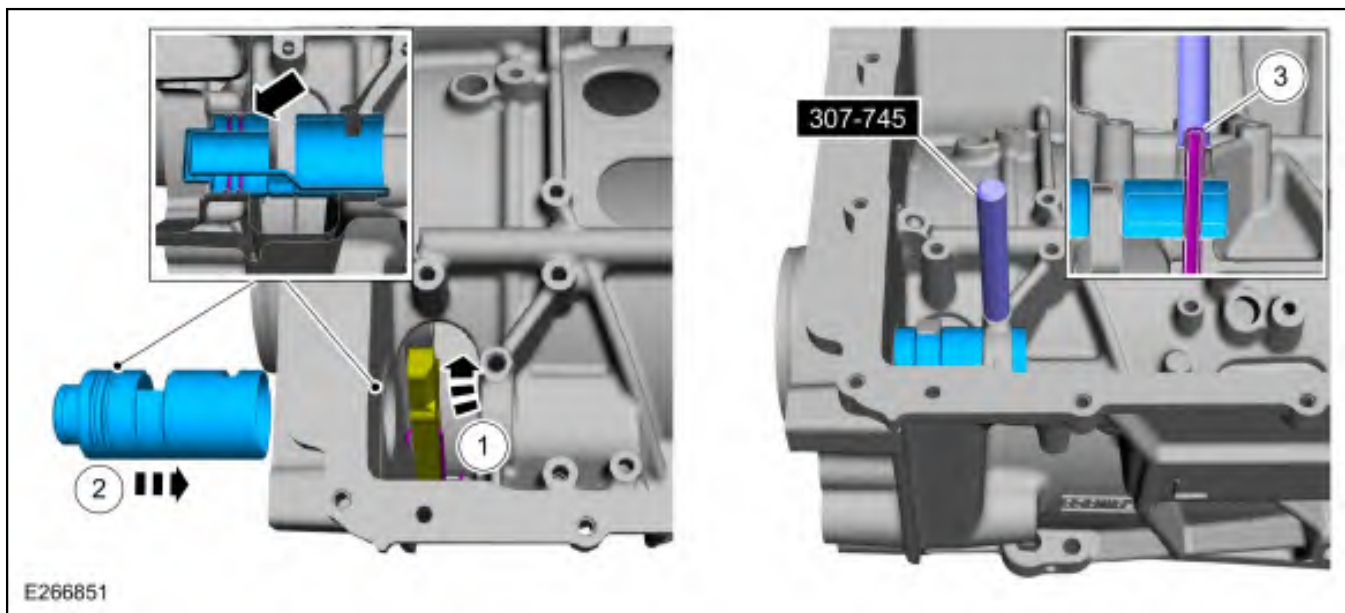
1. Position the park pawl towards the inside of the transmission case.
2. **NOTICE: Do not slide the park pawl actuator rod sleeve to far into the transmission case or the inner seal will be damaged.**

Slide the park pawl actuator rod sleeve into the transmission case.

3. **NOTE:** *Align the roll pin seam to the inside of the transmission.*

Using the special tool install the roll pin to the correct depth.

Use Special Service Tool: 307-745 Installer, Park Sleeve Roll Pin.



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