TECHNICAL SERVICE BULLETIN **25-2126**
Harsh/Delayed Engagement And/Or Harsh/Delayed Shift 31 March 2025

This bulletin supersedes 25-2018. Reason for update: update the Part List and Service Procedure

Model:

Ford 2017-2020 F-150	Transmission/Transaxle: 10R80
2018-2020 Mustang	Transmission/Transaxle: 10R80

Markets: North American markets only

Issue: Some of the vehicles listed in the Model statement above may exhibit at least one of the following conditions:

- Harsh engagement
- Delayed engagement
- Harsh shift
- Delayed shift
- Illuminated MIL with DTCs P0751, P0752, P0756, P0757, P0761, P0762, P0766, P0767, P0771, P0772, P2700, P2701, P2702, P2703, P2704, P2705, P2707, P2708, P0729, P0731, P0732, P0733, P0734, P0735, P0736, P076F, P07D9, P07F6 and/or P07F7 stored in the PCM or TCM.

This may be due to axial movement of the CDF clutch cylinder sleeve causing hydraulic circuit leaks.

NOTE: If internal transmission service is required to address a concern detected with the CDF clutch cylinder following this article, technicians should carefully inspect and replace other transmission components and flush transmission fluid cooler only as necessary as needed to ensure proper function. Add a new line to the repair order to document any additional repairs needed. M-time can be claimed on the additional repair line to cover labor. Refer to Warranty and Policy Manual for additional information. A thorough understanding of transmission description and operation will assist the technician with proper diagnosis, inspection, and successful repair of the customer concern.

NOTE: The Pressure Vacuum Transducer (PVT) Kit (Rotunda 164-R9833) and VCMM Transmission Extension Kit (Rotunda 164-R9534) recommended to perform this article are no longer included with the VCMM Advanced Kit (Rotunda 164-R9823) since July 2023. Supply of the PVT Kit (Rotunda 164-R9833) and VCMM Transmission Extension Kit (Rotunda 164-R9534) have been sold out. Ford has confirmed a high percentage (80%) of Dealers have this equipment available. Alternatively, Ford has tested suitable transmission fluid pressure gauges and developed procedures which reliably enable the capability to perform this article. Refer to Table 1 in the Service Procedure. In addition, VCMM Universal Probe Tip Adapter (Rotunda 164-R9834, or equivalent) is needed to perform this article. The Probe Tip Adapters are included in VCMM Advanced Kit (Rotunda 164-R9823).

Action: For vehicles that meet all of the criteria in the Issue and Model statements, follow the Service Procedure to verify hydraulic circuit leakage and if instructed replace the CDF clutch cylinder and the clutch and planetary container cylinder.

Parts - CDF Cylinder Replacement

Service Part Number	Claim Quantity	Package Order Quantity	Number in Package	Description
HL3Z-7A248-A	1	1	1	Torque Converter Seal
JL3Z-7N134-A	12	12	1	Front Support Bolts
HL3Z-7A248-G	1	1	1	Front Support To Case Seal
HL3Z-7G091-F	5	5	1	Input Shaft Seals (F2)
HL3Z-7B399-C	4	4	1	Sun Gear No. 3 Shaft Seals (F7)
HL3Z-7C099-A	1	1	1	C Clutch Balance Dam Inner Seal
HL3Z-7A548-B	2	2	1	C Clutch Balance Dam And Piston Outer Seal
HL3Z-7D404-A	2	2	1	C Clutch Piston Inner Seal
HL3Z-7A262-C	1	1	1	D Clutch Balance Dam
HL3Z-7D403-A	1	1	1	D Clutch Piston Outer Seal
HL3Z-7A548-G	2	2	1	F Clutch Balance Dam And Piston Outer Seal
HL3Z-7A548-A	2	2	1	F Clutch Balance Dam And Piston Inner Seal
HL3Z-7G091-G	5	5	1	Input Shaft To Sun Gear No. 3 Shaft Seals (F8)
HL3Z-7G091-C	1	1	1	Input Shaft Seal (F9)
JL3Z-7H351-B	1	1	1	CDF Cylinder (5.0L Mustang, all F-150)
JR3Z-7H351-B	1	1	1	CDF Cylinder (2.3LMustang)
PC3Z-7B177-A	1	1	1	Clutch And Planetary Container Cylinder

Parts - CDF Cylinder Replacement - Parts To Inspect And Replace Only If Necessary

Service Part Number	Claim Quantity	Package Order Quantity	Number in Package	Description
HL3Z-7A191-B	Only If Necessary (1 Possible)	Only If Necessary (1 Possible)	1	Fluid Pan Gasket
HL3Z-7A098-A	Only If Necessary (1 Possible)	Only If Necessary (1 Possible)	1	Fluid Filter
7T4Z-7Z302-A	Only If Necessary (1 Possible)	Only If Necessary (1 Possible)	1	Transmission Fluid Filter Seal
HL3Z-7J227-A	Only If Necessary (1 Possible)	Only If Necessary (1 Possible)	1	Auxiliary Pump Tube O-ring (If Equipped)
HL3Z-7B066-AB	Only If Necessary (1 Possible)	Only If Necessary (1 Possible)	1	A Pressure Plate
HL3Z-7B164-E	Only If Necessary (3 Possible)	Only If Necessary (3 Possible)	1	A Clutch Friction Plates
HL3Z-7F220-A	Only If Necessary (2 Possible)	Only If Necessary (2 Possible)	1	A Clutch Steel Plates
HL3Z-7B442-F	Only If Necessary (2.3L Mustang Has 4 Possible, All Others Have 5 Possible)	Only If Necessary (2.3L Mustang Has 4 Possible, All Others Have 5 Possible)	1	C Clutch Steel Plates
HL3Z-7B164-A	Only If Necessary (2.3L Mustang Has 4 Possible, All Others Have 5 Possible)	Only If Necessary (2.3L Mustang Has 4 Possible, All Others Have 5 Possible)	1	C Clutch Friction Plates

ML3Z-7B477-A	Only If Necessary (1 Possible)	Only If Necessary (1 Possible)	1	C Clutch Pressure Plate
HL3Z-7B442-D	Only If Necessary (2.3L Mustang Has 5 Possible, All Others Have 6 Possible)	Only If Necessary (2.3L Mustang Has 5 Possible, All Others Have 6 Possible)	1	D Clutch Steel Plates
HL3Z-7B164-C	Only If Necessary (2.3L Mustang Has 5 Possible, All Others Have 6 Possible)	Only If Necessary (2.3L Mustang Has 5 Possible, All Others Have 6 Possible)	1	D Clutch Friction Plates
HL3Z-7B066-E	Only If Necessary (1 Possible)	Only If Necessary (1 Possible)	1	D Clutch Pressure Plate
HL3Z-7B164-G	Only If Necessary (2.3L Mustang Has 3 Possible, All Others Have 4 Possible)	Only If Necessary (2.3L Mustang Has 3 Possible, All Others Have 4 Possible)	1	F Clutch Steel Plates
HL3Z-7B164-D	Only If Necessary (2.3L Mustang Has 3 Possible, All Others Have 4 Possible)	Only If Necessary (2.3L Mustang Has 3 Possible, All Others Have 4 Possible)	1	F Clutch Friction Plates
HL3Z-7B066-A	Only If Necessary (1 Possible)	Only If Necessary (1 Possible)	1	F Clutch Pressure Plate

Parts - All Vehicles - CDF Cylinder Replacement - Select One Of The Following If Needed

Service Part Number	Claim Quantity	Package Order Quantity	Number in Package	Description
HL3Z-7B066-AA	Only If Necessary	Only If Necessary	1	A Clutch Apply Plate 4.1 - 4.3 mm Selective
HL3Z-7B066-Z	Only If Necessary	Only If Necessary	1	A Clutch Apply Plate 4.4 - 4.6 mm Selective
HL3Z-7B066-Y	Only If Necessary	Only If Necessary	1	A Clutch Apply Plate 4.7 - 4.9 mm Selective
HL3Z-7B066-X	Only If Necessary	Only If Necessary	1	A Clutch Apply Plate 5.0 - 5.2 mm Selective
HL3Z-7B066-W	Only If Necessary	Only If Necessary	1	A Clutch Apply Plate 5.3 - 5.5 mm Selective
HL3Z-7H032-C	Only If Necessary	Only If Necessary	1	T-3 Bearing (Replace If T-3 Shim Is Replaced)
HL3Z-7A527-Q	Only If Necessary	Only If Necessary	1	T-3 Shim 3.05-3.15 mm Selective
HL3Z-7A527-P	Only If Necessary	Only If Necessary	1	T-3 Shim 3.2-3.3 mm Selective
HL3Z-7A527-R	Only If Necessary	Only If Necessary	1	T-3 Shim 3.35-3.45 mm Selective
HL3Z-7A527-K	Only If Necessary	Only If Necessary	1	T-3 Shim 3.5-3.6 mm Selective
HL3Z-7A527-L	Only If Necessary	Only If Necessary	1	T-3 Shim 3.65-3.75 mm Selective
HL3Z-7A527-M	Only If Necessary	Only If Necessary	1	T-3 Shim 3.8-3.9 mm Selective
HL3Z-7A527-S	Only If Necessary	Only If Necessary	1	T-3 Shim 3.95-4.05 mm Selective
HL3Z-7A527-T	Only If Necessary	Only If Necessary	1	T-3 Shim 4.1-4.2 mm Selective
HL3Z-7A527-N	Only If Necessary	Only If Necessary	1	T-3 Shim 4.25-4.35 mm Selective
HL3Z-7D483-A	Only If Necessary	Only If Necessary	1	D Clutch Snap Ring 1.8 mm Selective
HL3Z-7D483-B	Only If Necessary	Only If Necessary	1	D Clutch Snap Ring 2.0 mm Selective
HL3Z-7D483-C	Only If Necessary	Only If Necessary	1	D Clutch Snap Ring 2.2 mm Selective
HL3Z-7D483-D	Only If Necessary	Only If Necessary	1	D Clutch Snap Ring 2.4 mm Selective
HL3Z-7D483-E	Only If Necessary	Only If Necessary	1	D Clutch Snap Ring 2.6 mm Selective
HL3Z-7D483-F	Only If Necessary	Only If Necessary	1	D Clutch Snap Ring 2.8 mm Selective
HL3Z-7C122-A	Only If Necessary	Only If Necessary	1	C Clutch Snap Ring 1.5 mm Selective
HL3Z-7C122-B	Only If Necessary	Only If Necessary	1	C Clutch Snap Ring 1.7 mm Selective
HL3Z-7C122-C	Only If Necessary	Only If Necessary	1	C Clutch Snap Ring 1.9 mm Selective
HL3Z-7C122-D	Only If Necessary	Only If Necessary	1	C Clutch Snap Ring 2.1 mm Selective
HL3Z-7C122-E	Only If Necessary	Only If Necessary	1	C Clutch Snap Ring 2.3 mm Selective
HL3Z-7C122-F	Only If Necessary	Only If Necessary	1	C Clutch Snap Ring 2.5 mm Selective
HL3Z-7H365-C	Only If Necessary	Only If Necessary	1	F Clutch Snap Ring 1.5 mm Selective
HL3Z-7H365-D	Only If Necessary	Only If Necessary	1	F Clutch Snap Ring 1.7 mm Selective
HL3Z-7H365-E	Only If Necessary	Only If Necessary	1	F Clutch Snap Ring 1.9 mm Selective
HL3Z-7H365-F	Only If Necessary	Only If Necessary	1	F Clutch Snap Ring 2.1 mm Selective
HL3Z-7H365-G	Only If Necessary	Only If Necessary	1	F Clutch Snap Ring 2.3 mm Selective

Parts - F-150 Transmission Removal And Installation

Service Part Number	Claim Quantity	Package Order Quantity	Number in Package	Description	Note
7L1Z-4B496-C	2	2	1	CV Joint-To-Pinion Flange Cup Bolts And Retaining Straps (4WD)	
7L1Z-4B496-D	3	3	1	CV Joint-To-Transfer case Flange Cup Bolts And Retaining Straps (4WD)	
FL3Z-6775-D	1	1	1	Self-Adhesive Heat Shield	
HL3Z-5G221-B	1	1	1	Left Stick On Bellhousing Heat Shield (Raptor)	
HL3Z-5G221-C	1	1	1	Right Stick On Bellhousing Heat Shield (Raptor)	
N800594-S100	4 Or 8 (Flange Dependent)	1 Or 2	4	Driveshaft Flange To Flange Bolts	
W520113-S440	4	1	4	Stabilizer Bar Bracket Nuts	
W520114-S440	4	1	4	Transmission Support Crossmember Nuts	
W520514-S440	4	4	1	Left And Right Catalytic Converter Nuts (All Gas)	
W709771-S440	2	2	1	Transmission Mount Nuts	
W711140-S901	Gas Requires 3, Diesel Requires 4	3 For Gas, 4 For Diesel	1	Transmission Insulator Bolts And Washers (RWD)	
W714418-S439	4	1	4	Transmission Support Crossmember Bolts	
W715131-S442	1	1	4	Transmission Fluid Cooler Tube Bolt (2018-2020 F-150 Excluding Raptor)	

W715618-S437	2.7L/3.3L/3.5L/5.0L Require 4 Pieces, 3.0L Require 6 Pieces	1 For Gas, 2 For 3.0L Diesel	4	Torque Converter Nuts	
W715798-S442	1	1	4	Transmission Fluid Cooler Tube Bracket Stud Bolt (2017 F-150 And 2017-2020 Raptor)	
W716375-S900	9	2	5	Transfer Case Bolts (4WD)	
W718353-S900	4	1	4	Transmission Insulator Bolts (4WD Gas)	
W718926-S900	4	1	4	Transmission Insulator Bolts (4WD 3.0L Diesel)	
W715579-S439	2	1	4	Driveshaft Center Bearing Bolt (If Equipped With Two Piece Driveshaft)	
TA-24-B	As Needed	As Needed		Motorcraft® Thread Sealant With PTFE (4WD)	
VC-13DL-G	As Needed	As Needed		Motorcraft® Yellow Prediluted Antifreeze/Coolant (All Markets Except Canada)	
CVC-13DL-G	As Needed	As Needed		Motorcraft® Yellow Prediluted Antifreeze/Coolant (Canada Only)	
XG-1-E1	As Needed	As Needed		Motorcraft® Premium Long-Life Grease	
XL-5-A	As Needed	As Needed		Motorcraft® Multi-Purpose Grease Spray	
XT-10-QLVC	As Needed	As Needed		Motorcraft® MERCON® LV Automatic Transmission Fluid (All Markets Except Canada) (4WD)	Transfer Case
CXT-10-LV6	As Needed	As Needed		Motorcraft® MERCON® LV Automatic Transmission Fluid (Canada Only) (4WD)	Transfer Case
XT-12-QULV	As Needed	As Needed		Motorcraft® MERCON® ULV Automatic Transmission Fluid	

Parts - F-150 Transmission Removal And Installation - Parts To Inspect And Replace Only If Necessary

Service Part Number	Claim Quantity	Package Order Quantity	Number in Package	Description
4W9Z-6397-A	Only If Necessary (2 Possible)	Only If Necessary (2 Possible)	1	Engine Block Dowel Pins (3.0L)
5L7Z-7D285-A	Only If Necessary (2 Possible)	Only If Necessary (1 Possible)	2	Transmission Fluid Cooler Tube Seals
5L7Z-7J324-A	Only If Necessary (2 Possible)	Only If Necessary (1 Possible)	2	Transmission Fluid Cooler Tube Backing Rings
W701228-S300	Only If Necessary (2 Possible)	Only If Necessary (1 Possible)	4	Engine Block Dowel Pins (5.0L)
W718758-S300	Only If Necessary (2 Possible)	Only If Necessary (1 Possible)	4	Engine Block Dowel Pins (2.7L/3.3L/3.5L)

Parts - Mustang Transmission Removal And Installation

Service Part Number	Claim Quantity	Package Order Quantity	Number in Package	Description
BR3Z-5B266-A	1	1	1	Exhaust Gasket (5.0L)
W705443-S900	2	1	4	Catalytic Converter Flange Nuts (5.0L)
W710726-S437	2	1	4	Selector Lever Cable Bolts
W715131-S437	1	1	4	Transmission Fluid Cooler Tube Bolt
W715618-S437	5.0L Requires 4 Pieces, 2.3L Requires 6 Pieces	1 For 5.0L, 2 For 2.3L	4	Torque Converter Nuts
FR3Z-4B496-B	3	3	1	Driveshaft To Pinion Flange Bolts
W719298-S439	3	1	4	Driveshaft To Transmission Flange Bolts (If Equipped) (2.3L Mustang)
N800594-S101	4	1	4	Driveshaft To Transmission Flange Bolts (If Equipped) (5.0L Mustang)
W500545-S439	3	1	4	Driveshaft To Transmission Flange Bolts
W717822-S439	2	1	4	Driveshaft Center Bearing Bolts (If Equipped)
TA-25-B	As Needed	As Needed		Motorcraft® Threadlock and Sealer (Convertible)
XL-1	As Needed	As Needed		Motorcraft® Penetrating and Lock Lubricant
XL-2	As Needed	As Needed		Motorcraft® High Temperature Nickel Anti-Seize Lubricant
XL-5-A	As Needed	As Needed		Motorcraft® Multi-Purpose Grease Spray
XT-12-QULV	As Needed	As Needed		Motorcraft® MERCON® ULV Automatic Transmission Fluid

Parts - Mustang Transmission Removal And Installation - Parts To Inspect And Replace Only If Necessary

Service Part Number	Claim Quantity	Package Order Quantity	Number in Package	Description
5L7Z-7D285-A	Only If Necessary (2 Possible)	Only If Necessary (1 Possible)	2	Transmission Fluid Cooler Tube Seals
5L7Z-7J324-A	Only If Necessary (2 Possible)	Only If Necessary (1 Possible)	2	Transmission Fluid Cooler Tube Backing Rings
JR3Z-4782-B	Only If Necessary (1 Possible)	Only If Necessary (1 Possible)	1	Flex Coupling Driveshaft

Service part numbers and "number in package" quantity may change after publication, thus also affecting the "package order quantity". Refer to the parts catalog for the latest information.

Claim Quantity refers to the total number of individual pieces required to repair the vehicle.

Package Order Quantity refers to the amount of the service part number package(s) required to repair the vehicle.

Number In Package refers to the number of individual pieces included in a service part number package.

As Needed indicates the part is necessary but amount of the part may vary and/or is not a whole number. Parts can be billed out as non-whole numbers, including less than 1.

Only If Necessary indicates the part is not mandatory. Refer to the Service Procedure to determine the inspection/inclusion criteria.

Labor Times

Description	Operation No.	Time
2017-2020 F-150 4X2/4X4: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Pass) (Do Not Use With Any Other Labor Operations)	252126A	1.0 Hrs.
2017-2020 F-150 4X2 2.7L: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126B	11.9 Hrs.

2017-2020 F-150 4X2 3.5L: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126C	11.8 Hrs.
2017-2020 F-150 4X2 5.0L: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126D	11.7 Hrs.
2018-2020 F-150 4X2 3.0L Diesel: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126E	10.5 Hrs.
2017-2020 F-150 4X4 2.7L: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126F	13.2 Hrs.
2017-2020 F-150 4X4 3.5L: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126G	13.1 Hrs.
2017-2020 F-150 4X4 Raptor: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126H	12.9 Hrs.
2017-2020 F-150 4X4 5.0L: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126J	13.0 Hrs.
2018-2020 F-150 4X4 3.0L Diesel: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126K	11.5 Hrs.
2018-2020 Mustang: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Pass) (Do Not Use With Any Other Labor Operations)	252126L	0.8 Hrs.
2018-2020 Mustang 2.3L Coupe: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126M	10.8 Hrs.
2018-2020 Mustang 2.3L Convertible: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126N	11.2 Hrs.
2018-2020 Mustang 5.0L Coupe: Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126P	11.7 Hrs.
2018-2020 Mustang: 5.0L Convertible Follow The Service Procedure To Verify Hydraulic Circuit Leakage (Fail) Replace The CDF Clutch Cylinder (Do Not Use With Any Other Labor Operations)	252126Q	12.1 Hrs.

Repair/Claim Coding

Causal Part:	7H351
Condition Code:	42

Service Procedure

How to back probe (Ranger shown, others similar)

1. Is a VCMM PVT available?

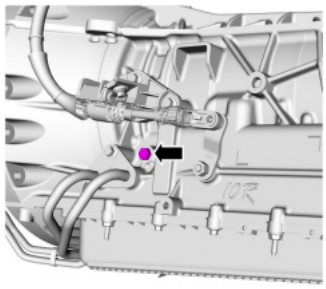
(1). Yes - proceed to "Diagnostic Procedure A - VCMM PVT Is Available"

(2). No - proceed to "Diagnostic Procedure B - No VCMM PVT Available"

Diagnostic Procedure A - VCMM PVT Is Available

1. Install the VCMM PVT to the transmission line pressure port. (Figure 1)

Figure 1



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NOTE: The line pressure port is an M10X1.0 thread. Do not use a National Pipe Thread (NPT) fitting when installing pressure reading equipment. If an NPT fitting is used, damage to the transmission case will occur.

NOTE: The transmission extension hose kit requires a 1/4 in. Joint Industry Council (JIC) male adapter.

NOTE: All NPT fittings must be assembled with polytetrafluoroethylene (PTFE) tape or paste to prevent leaks

- VCMM Transmission Extension Kit
- Locally obtain the necessary adapter fittings to connect the VCMM pressure transducer to the transmission line pressure port (Figure 2)

Figure 2

Item	Description
1	M10X1.0 male to 1/8 in. FNPT female
2	1/8 in. NPT male to 1/4 in. JIC male
3	Extension hose

2. Prepare the transmission LPC solenoid circuit CET50 to be back probed at either the TCM/ PCM connector or at the transmission electrical connector by removing the connector cover. Access to the LPC solenoid circuit CET50, WH-OG wire is required in a later step. Refer to Wiring, Cell 030 Transmission Controls - 10R80 and the video link at the start of the Service Procedure in this bulletin.

NOTE: Back probing the LPC solenoid circuit will set a DTC and illuminate the powertrain malfunction (wrench) indicator.

3. Using the latest software level of the IDS scan tool and VCMM, start a session. Verify the pressure units are set to PSI on the Change Settings screen and select the following PIDs.

- LINE DSD #
- PVT (PRESS)
- RPM # (RPM)
- SSA_AMP# (CUR)
- SSB_AMP # (CUR)
- SSC_AMP # (CUR)
- SSD_AMP # (CUR)
- SSE_AMP # (CUR)
- SSF _AMP # (CUR) (If Available)
- TFT (TEMP)

4. Does the vehicle exhibit harsh/delayed engagement and/or harsh/delayed shift symptoms only when TFT is at 49°C (120°F) or below?

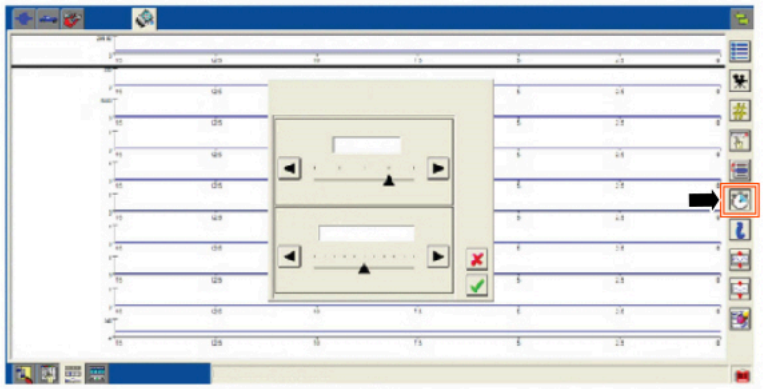
(1). Yes - perform Step 5 while TFT is at or below 49°C (120°F).

(2). No - perform Step 5 while TFT is at or above 50°C (122°F).

5. Start the engine, select the Data Logger tab, verify TFT is at the appropriate temperature range identified in Step 4.

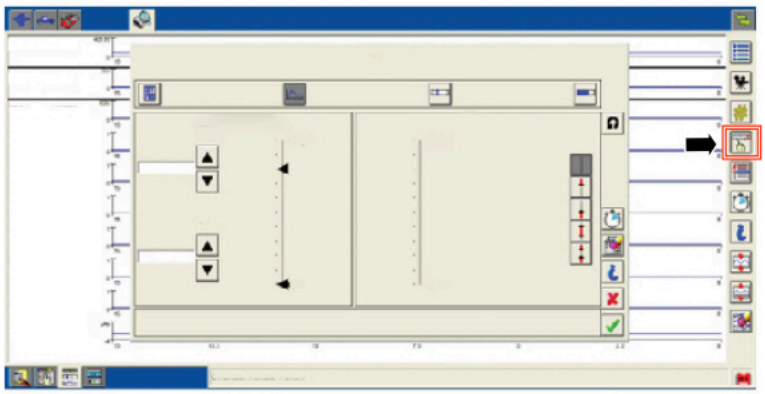
(1). In the Data Logger screen, select the Recording Time button, set Capture Buffer Setup timings to duration = 60, Pre/Post Trigger = 30s. (Figure 3) Highlight the PVT PID to set up PVT parameters by pressing Plot Format Limits and Range button to enter PVT-psi parameters (Figure 4) set parameters to Low = 0 and High = ~320 PSI.

Figure 3



E446024

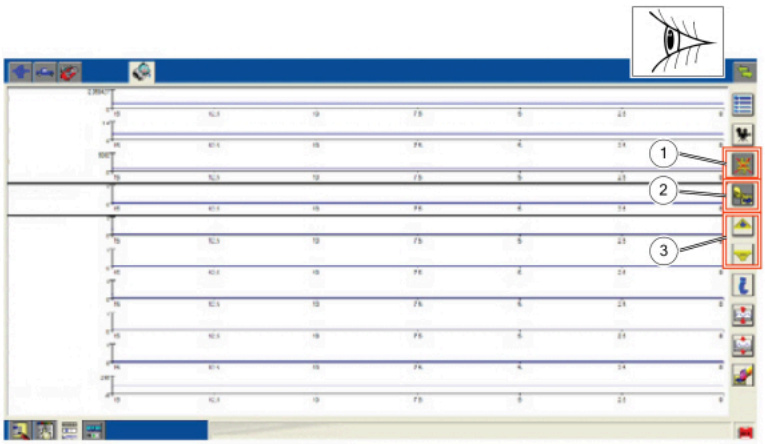
Figure 4



E446025

(2). For each step below, highlight the PID to enable the PID. Press the OSC disable button (Figure 5, Callout 1), then select finger press button (Figure 5, Callout 2) and control the PID using up and down arrow buttons (Figure 5, Callout 3).

Figure 5



E446026

Item	Description
1	OSC disable button
2	Finger press button
3	Up and down arrows

(3). Command SSA_AMP #/SSB_AMP #/SSC_AMP #/SSD_AMP #/SSE_AMP #/SSF_AMP # to 0mA.

(4). With the engine at idle speed, ground the LPC circuit to elevate line pressure using a VCMM Universal Probe Tip Adapter (Rotunda 164-R9834, or equivalent) along with a suitable multimeter lead wire and probe (Figure 6) to back probe and ground the LPC solenoid circuit CET50. (Figure 7) Once line pressure has elevated and stabilized, the ground probe is no longer needed to maintain elevated line pressure.

Figure 6

Item	Description
1	VCMM universal probe adapter
2	Multimeter lead wire
3	Multimeter lead wire probe

Figure 7

NOTE: Figure 7 shows back probing a PCM connector, other connectors are similar.

NOTE: Actual line pressure reading is expected to be less than commanded line pressure.

(5). Highlight SSA_AMP# PID.

(6). Begin recording.

(7). Wait 1 second.

(8). Command SSA_AMP # to 1.0A (ten quick up arrow clicks).

(9). Wait 2 seconds.

(10). Command SSA_AMP # to 0mA (ten quick down arrow clicks).

(11). Wait for the recording to complete.

(12). Highlight SSC_AMP# PID.

(13). Begin recording again.

(14). Wait 1 second.

(15). Command SSC_AMP # to 1.0A (ten quick up arrow clicks).

(16). Wait 2 seconds.

(17). Command SSC_AMP # off to 0mA (ten quick down arrow clicks).

(18). Wait for the recording to complete.

(19). Test is complete. Release control of all parameters then turn ignition off.

(20). Remove back probe from LPC solenoid circuit connector and reinstall the connector cover.

(21). Turn ignition on (KOEO) and clear all CMDTC.

(22). Turn ignition off.

6. Select the Data Logger tab.

7. Select the Playback Display sub-tab.

8. Select the Menu button, then select save recording group. (Figure 8)

Figure 8

9. Name the recording group.

10. Enter the Playback mode Lower Right File Manager button.

11. Select the file when SSA was commanded.

12. Highlight PVT Pressure > press the Expand Signal View button 3 clicks. (Figure 9). Unhighlight PVT Pressure > press the magnifying glass with + button 2 clicks. (Figure 10)

Figure 9

Figure 10

13. Download the CDF calculator tool.

NOTE: The calculator is an ".exe" file type. Make sure the computer firewall is set to allow this type of file to download.

(1). Click here to download the CDF calculator tool in English.

(2). Click here to download the CDF calculator tool in Spanish.

(3). Click here to download the CDF calculator tool in French.

14. Take a measurement when SSA_AMP = 0.00mA PVT Pressure at any valley (Figure 11) and enter the value into CDF calculator Pre Ramp Valley field. Take a measurement when SSA_AMP = 0.00mA of PVT Pressure at any peak (Figure 12) and enter the value into the CDF calculator Pre Ramp Peak field.

Figure 11

Figure 12

15. Adjust the recording cursor until SSA_AMP = 1.00mA and then continue 1 additional second.

(1). Take a measurement of PVT Pressure at any valley (Figure 13) and enter the value into the CDF calculator Applied A Valley field.

Figure 13

(2). Take a measurement of PVT Pressure at any peak (Figure 14) and enter the value into the CDF calculator Applied A Peak field.

Figure 14

16. Select the file manager button and select the file when SSC was commanded.

17. Repeat Step 12.

18. Adjust recording cursor until SSC_AMP = 1.00mA and then continue 1 additional second.

(1). Take a measurement of PVT Pressure at any valley (Figure 15) and enter the value into the CDF calculator Applied C Valley field.

Figure 15

(2). Take a measurement of PVT Pressure at any peak (Figure 16) and enter the value into the CDF calculator Applied C Peak field.

Figure 16

19. Refer to the CDF calculator results. Does the “A-clutch Leakage Rate %” field display green?

(1). Yes - proceed to Step 20.

(2). No (field displays red) - this article does not apply. Refer to WSM, Section 307-01 > Diagnosis and Testing > A Clutch.

20. Does the “C-Clutch vs A-Clutch %” field display green?

(1). Yes - this article does not apply. Refer to WSM, Section 307-01 for normal diagnostics.

(2). No (field displays red) - proceed to "Repair Procedure" in this article.

Diagnostic Procedure B - No VCMM PVT Available

1. Install a suitable transmission fluid pressure gauge, that measures at least 300PSI (2000kPa) with vibration dampening, to the line pressure port. (Figure 1). Refer to Table 1.

NOTE: The line pressure port is an M10X1.0 thread. Do not use a National Pipe Thread (NPT) fitting when installing pressure reading equipment. If an NPT fitting is used, damage to the transmission case will occur.

NOTE: All NPT fittings must be assembled with polytetrafluoroethylene (PTFE) tape or paste to prevent leaks.

Table 1- Ford tested suitable transmission fluid pressure gauges

Description	Source	Part Number
Ashcroft 0-300PSI Vibration Dampened	Grainger	351009SW02LXLL300
Lang Instruments Model 5TUL8 (requires piston-type pressure gauge snubber)	• Rotunda RTTP • Grainger	• Gauge: STATU16A • Snubber: 5TUL8
Snap-On 0-500PSI Gauge and Boot	Snap-On	EEPV5-500G
Waekon Digital Pressure Gauge	Rotunda RTTP	WAE48165
Pressure Pro PC 5000	Rotunda RTTP	300-WAE48365

2. Prepare the transmission LPC solenoid circuit CET50 WH-OG wire to be back probed at either the TCM/ PCM connector or at the transmission electrical connector by removing the connector cover. Access to the LPC solenoid circuit CET50, WH-OG wire is required in a later step. Refer to Wiring, Cell 030 Transmission Controls - 10R80 and the video link at the start of the Service Procedure in this bulletin.

NOTE: Back probing the LPC solenoid circuit will set a DTC and illuminate the powertrain malfunction (wrench) indicator.

3. Using the latest software level of the IDS scan tool and VCMM, start a session. Verify the pressure units are set to PSI on the Change Settings screen and select the following PIDs.

- LINE DSD #
- PVT (PRESS)
- RPM # (RPM)
- SSA_AMP# (CUR)
- SSB_AMP # (CUR)
- SSC_AMP # (CUR)
- SSD_AMP # (CUR)
- SSE_AMP # (CUR)
- SSF _AMP # (CUR) (If Available)
- TFT (TEMP)

4. Does the vehicle exhibit harsh/delayed engagement and/or harsh/delayed shift symptoms only when TFT is at 49°C (120°F) or below?

(1). Yes - perform Step 5 while TFT is at or below 49°C (120°F).

(2). No - perform Step 5 while TFT is at or above 50°C (122°F).

5. Start the engine, select the Data Logger tab, verify TFT is at the appropriate temperature range identified in Step 4.

(1). For each step below, highlight the PID to enable the PID. Press the OSC disable button (Figure 5, Callout 1), then select finger press button (Figure 5, Callout 2) and control the PID using up and down arrow buttons (Figure 5, Callout 3).

(2). With the engine at idle speed, ground the LPC circuit to elevate line pressure using a VCMM Universal Probe Tip Adapter (Rotunda 164-R9834, or equivalent) along with a suitable multimeter lead wire and probe (Figure 6) to back probe and ground the LPC solenoid circuit CET50. (Figure 7) Once line pressure has elevated and stabilized, the ground probe is no longer needed to maintain elevated line pressure.

NOTE: Figure 7 shows back probing a PCM connector, other connectors are similar.

NOTE: Actual line pressure reading is expected to be less than commanded line pressure.

(3). Record the pressure value observed on the gauge as Pre Ramp.

(4). Command SSA_AMP # to 1.0A (ten quick up arrow clicks).

(5). Record the pressure value observed on the gauge as Applied A.

(6). Command SSA_AMP # to 0mA (ten quick down arrow clicks).

(7). Command SSC_AMP # to 1.0A (ten quick up arrow clicks).

(8). Record the pressure value observed on the gauge as Applied C.

(9). Command SSC_AMP # PID off to 0mA (ten quick down arrow clicks).

(10). Test is complete. Release control of all parameters then turn ignition off.

(11). Remove back probe from LPC solenoid circuit connector and reinstall the connector cover.

(12). Turn ignition on (KOEO) and clear all CMDTCs.

(13). Turn ignition off.

6. Download the CDF calculator tool.

NOTE: The calculator is an ".exe" file type. Make sure the computer firewall is set to allow this type of file to download.

(1). Click here to download the CDF calculator tool in English.

(2). Click here to download the CDF calculator tool in Spanish.

(3). Click here to download the CDF calculator tool in French.

7. Enter the value recorded as Pre Ramp into the CDF calculator for both fields Pre Ramp Valley and Pre Ramp Peak.

8. Enter the value recorded as Applied A into the CDF calculator for both fields Applied A Valley and Applied A Peak.

9. Enter the value recorded as Applied C into the CDF calculator for both fields Applied C Valley and Applied C Peak.

10. Refer to the CDF calculator results. Does the “A-clutch Leakage Rate %” field display green?

(1). Yes - proceed to Step 11.

(2). No (field displays red) - this article does not apply. Refer to WSM, Section 307-01 > Diagnosis and Testing > A Clutch.

11. Does the “C-Clutch vs A-Clutch %” field display green?

(1). Yes - this article does not apply. Refer to WSM, Section 307-01 for normal diagnostics.

(2). No (field displays red) - proceed to "Repair Procedure" in this article.

Repair Procedure

1. Remove the transmission and mount the transmission to the bench. Refer to WSM, Section 307-01.

2. Disassemble the transmission. Perform only the necessary steps to remove the clutch and planetary assembly from the transmission case. Refer to WSM, Section 307-01.

(1). It is only necessary to remove the torque converter, transmission fluid pan and gasket, transmission fluid auxiliary pump (if equipped), fluid filter and main control valve body assembly, all 4 speed sensors (intermediate speed sensor A [ISSA], intermediate speed sensor B [ISSB], TSS and OSS), transmission fluid pump, front support assembly and the clutch and planetary assembly. Refer to WSM, Section 307-01.

3. Disassemble the clutch and planetary assembly. Perform only the necessary steps to remove the clutch and planetary container cylinder, the CDF clutch cylinder and the No. 3 sun gear shaft and No. 2 ring gear assembly from the clutch and planetary assembly. Refer to WSM, Section 307-01.

(1). It is only necessary to remove the A clutch assembly, the selective shim and T3 thrust bearing, remove and discard the 5-input shaft front seals.

(2). Remove the No. 1 planetary carrier snap ring, clutch and planetary container cylinder, the No. 4 ring gear snap ring and the No. 4 ring gear from the clutch and planetary container cylinder. Discard the clutch and planetary container cylinder. Refer to WSM, Section 307-01.

(3). Remove the E clutch and input shaft assembly, the No. 3 planetary carrier and No. 3 sun gear, the No. 3 sun gear shaft and No. 2 ring gear assembly. Refer to WSM, Section 307-01.

4. Remove and discard the sun gear No. 3 shaft seals. Install the 4 new sun gear No. 3 shaft seals. Refer to WSM, Section 307-01.

5. Disassemble the C, D and F clutch assemblies from the CDF cylinder. Discard the CDF cylinder. Refer to WSM, Section 307-01.

6. Assemble the C, D and F clutch assemblies into the new CDF clutch cylinder. Refer to WSM, Section 307-01.

7. Perform the C, D and F clutch pack endplay measurements for proper clearance. Refer to WSM, Section 307-01.

8. Remove and discard the input shaft-to-sun gear No. 3 shaft seals. Install the 5 new input shaft-to-sun gear No. 3 shaft seals. Refer to WSM, Section 307-01.

9. Remove and discard the input shaft seal. Install the new input shaft seal. Refer to WSM, Section 307-01.

10. Install the 5 new input shaft front seals. Refer to WSM, Section 307-01.

11. Install the No. 4 ring gear and snap ring into a new clutch and planetary container cylinder.

12. To reassemble the clutch and planetary assembly, reverse the disassembly procedure. Refer to WSM, Section 307-01.

13. Perform the T3 thrust bearing measurement to set transmission front end clearance. Refer to WSM, Section 307-01.

14. Reassemble the transmission. Refer to WSM, Section 307-01.

15. Install the transmission. Refer to WSM, Section 307-01.

16. Perform an adaptive learning drive cycle. Refer to WSM, Section 307-01.

NOTE: Advise the customer that this vehicle is equipped with an adaptive transmission shift strategy which allows the vehicle's computer to learn the transmission's unique parameters and improve shift quality. When the adaptive strategy is reset, the computer will begin a relearning process. This relearning process may result in firmer than normal upshifts and downshifts for several days.

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