Ford CFT 30 Introduction

Presented by:
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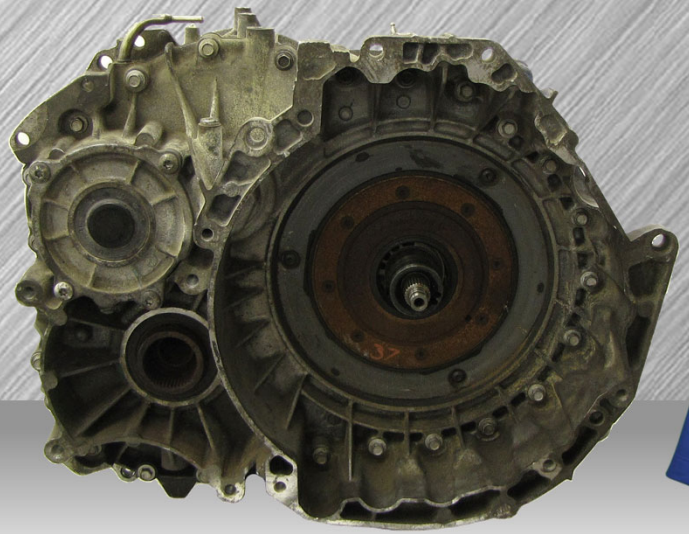

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Webinar Schedule

ATRA Webinar Schedule		Description
Jan 27/28	CFT 30	Rebuild
Feb 10/11	Lineartronic CVT	Introduction
Feb 24/25	ZF8HP	Introduction
March 10/11	DPS6	Introduction
March 24/25	Honda 6	Rebuild
April 7/8	8L90	Introduction
April 21/22	CFT30	Rebuild
May 5/6	948TE	Introduction
May 19/20	Lineartronic CVT	Rebuild
June 2/3	ZF8HP	Rebuild
June 23/24	6R140	Introduction
July 7/8	DPS6	Internal Operation
July 21/22	U660	Introduction and Rebuild
Aug 4/5	8L90	Internal
Aug 18/19	01J	Problems & Fixes
Sept 1/2	948TE	Internal
Sept 15/16	5R110W	Problems & Fixes
Sept 29/30	Lineartronic CVT	Problems & Fixes
Oct 13/14	6R140	Problems & Fixes


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CFT 30 Applications

2005 – 2007 Five Hundred

2005 – 2007 Freestyle

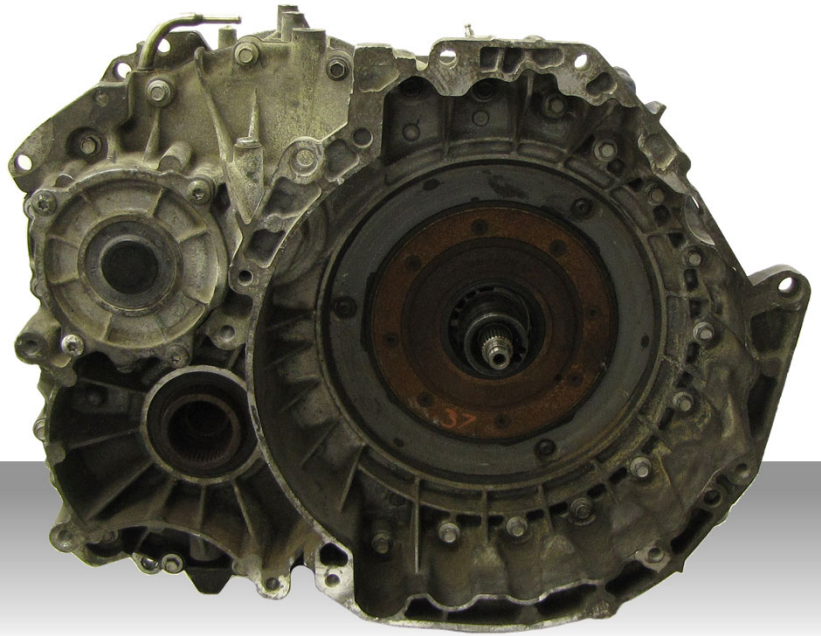
2006 – 2011 Mariner Hybrid

CFT 30 Applications

2009 – 2011
Milan
Hybrid

2005 – 2007
Montego

- **Uses Motorcraft CVT designed fluid**
- **No discreet gear shifts and no interruptions in power flow during accelerations**
- **Infinite number of gear ratios so the optimum engine operating point can be found**
- **Uses a drive chain not a belt**
- **A single planetary is used to change the rotation of the pulley assembly for forward and reverse driving ranges**
- **The TCM is internally mounted to the valve body (Mechatronic)**



Transaxle Electronic Control System

The following is a list of components that are incorporated within the mechatronic assembly:

- **Transmission Control Module (TCM)**
- **Transmission Fluid Temperature (TFT) Sensor**
- **Speed Sensors**
- **Turbine Shaft Sensor (TSS) and Primary Variator Speed Sensor**
- **Valve body**
- **Pressure Control Solenoids**
- **Pressure Sensors**

The output shaft speed (OSS) is part of the transaxle electronic control system but it is not part of the mechatronic assembly. The OSS sensor is bolted to the case and reads the differential gear.

Depowering the Hybrid

WARNING: **When servicing the high-voltage system, establish a buffer zone per the specified procedure. Failure to follow this instruction may result in serious personal injury or death.**

WARNING: **Depower the high-voltage traction battery (HVTB) before carrying out any removal or installation procedures affecting the high-voltage battery system. Failure to follow this instruction may result in serious personal injury or death.**

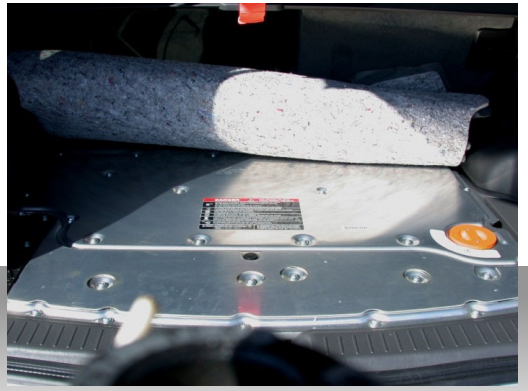
WARNING: **Wear high-voltage insulated safety gloves and a face shield when working around high-voltage batteries or cables. The high-voltage insulated safety gloves should be of appropriate safety and protection rating. Inspect the gloves before use and always wear them with the leather outer glove. Any hole in the rubber insulating glove is a potential entry point for high-voltage. Failure to follow these instructions may result in serious personal injury or death.**

CAUTION: **Place the service disconnect plug into the servicing shipping position while the high-voltage traction battery (HVTB) is being removed and/or while the high-voltage system is having repairs carried out. If the service disconnect plug is left out and placed in the bench or toolbox, dirt or other contaminants may enter the HVTB, which can cause damage.**

Depowering the Hybrid (continued)

WARNING: **Turn OFF the ignition switch for a minimum of 5 minutes before removing high-voltage cables. High-voltage cables and wiring are orange in color. The high-voltage traction battery voltage (HVTB) is 330 V DC. Failure to follow these instructions may result in serious personal injury or death.**

1. **Set up a buffer zone around the vehicle.**
2. **Remove the service disconnect plug**
   1. **Rotate the service disconnect plug from the lock position to the unlock position.**
   2. **Remove the service disconnect plug and place in the servicing shipping position.**
   3. **To connect, reverse the disconnect procedure.**



CFT 30 Trouble Code Chart

Five Digit DTC	Component	Description
C1222	Controller area network (CAN)	Wheel speed mismatch
P0218	Transmission fluid temperature (TFT)	ATF over temp
P0219	Engine	engine rpm of vehicle speed limit reached
P0562	TCM	TCM power input signal low
P0563	TCM	TCM power input signal high
P0604	TCM	TCM RAM error
P0605	TCM	TCM ROM error
P0613	TCM	EEPROM error
P0615	Starter relay circuit (start interlock)	Starter relay pin 10 short to power or ground
P0634	TCM	TCM internal temp too high
P0641	TCM	TCM module sensor voltage failed
P0657	Actuator supply voltage circuit A	Actuator supply voltage circuit A open
P0658	Actuator supply voltage circuit A	Actuator supply voltage circuit A low
P0659	Actuator supply voltage circuit A	Actuator supply voltage circuit A high
P0701	Trans control system	Trans control system
P0702	Transmission control electrical system	Transmission control electrical system error
P0705	Trans range sensor	TR sensor circuit A
P0710	TFT	TFT sensor A
P0711	TFT	TFT sensor A
P0714	TFT	TFT sensor A
P0715	Turbine speed sensor	TSS sensor circuit A
P0716	Turbine speed sensor	TSS sensor circuit A high
P0720	Output speed sensor	OSS sensor circuit
P0721	Output speed sensor	OSS sensor circuit
P0730	Gear ratio	Incorrect gear ratio

CFT 30 Trouble Code Chart		
Five Digit DTC	Component	Description
P0740	Torque converter clutch (TCC)	TCC solenoid circuit open
P0741	TCC	TCC solenoid circuitperformance or stuck off
P0742	TCC	TCC solenoid circuit stuck on
P0743	TCC	TCC solenoid circuit electrical
P0810	Clutch position control	Clutch position control error
P0811	Forward or reverse clutch	Excessive clutch slippage
P0840	Main pressure sensor	Trans main fluid pressure sensor A circuit pressure sensor A circuit
P0845	Secondary pulley pressure sensor	Secondary pulley fluid pressure sensor B circuit
P0868	Trans fluid pressure	Trans fluid pressure low
P0871	Trans secondary fluid pressure sensor	Trans secondary fluid pressure sensor circuit C
P0900	Clutch actuator	Clutch actuator solenoid open circuit
P0902	Clutch actuator	Clutch actuator circuit low
P0903	Clutch actuator	Clutch actuator circuit high
P0942	Hydraulic pressure unit	Stuck limp home mode value
P0960	Pressure control solenoid A (PCA)	PCA control circuit open
P0961	PCA	PCA out of range
P0962	PCA	PCA control circuit low
P0963	PCA	PCA control circuit high
P0964	Pressure control solenoid B (PCB)	PCB control circuit open
P0966	PCB	PCB control circuit low
P0967	PCB	PCB control circuit high
P0968	Pressure control solenoid C (PCC)	PCC control circuit open
P0970	PCC	PCC control circuit low
P0971	PCC	PCC control circuit high

CFT 30 Trouble Code Chart		
Five Digit DTC	Component	Description
P1710	TCM	TCM solenoid/internal ground circuit
P1935	Brake pedal position (BPP) switch/CAN ABS	BPP switch/sensor signal
P2544	PCM	Torque management request input signal A
P2637	CAN/PCM	Torque management feedback signal A
P2765	Primary pulley speed sensor A	No or incorrect signal from primary pulley speed sensor
P2766	Primary pulley speed sensor A	No or incorrect signal from primary pulley speed sensor
P186D	TCM/DEM	Set by all whee drive (AWD) failure concern. AWD clutch actuator stuck
U0001	CAN/TCM	High speed CAN communication bus
U0073	TCM	TCM communication error
U0100	CAN	Lost communication with ECM/PCM A
U0101	TCM/PCM	TCM communication error
U0121	CAN/ABS	Lost communication with ABS Module
U0301	Software Incompatible	Software incompatible with the PCM
U0401	PCM/TCM	Invalid data received from the PCM or engine components
U0415	CAN/ABS	Invalid data received from the ABS module

U0301 Software Incompatible with the PCM

The TCM is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and reflashed to the latest level calibration available.

Software is different than the vehicle configuration. No amount of driving to 'relearn' the electronic control system will resolve this issue! Engine driveability concerns. Will run rough and/or have low power. It's highly recommended to always Flash Reprogram all of the Ford CVT equipped vehicles after a major repair and/or after replacing the Mechatronic assembly to achieve the best driveability and longevity experience.

When diagnosing stored DTC's, always address the "P" DTC's before the "U" DTC's with the exception of DTC U0301.

DTC Diagnostics

P0871 Transmission Secondary Fluid Pressure Sensor and P0961 Pressure Control Solenoid Out of Range

Both of these codes are pressure sensitive codes.

The P0871 will set if the secondary pulley pressure is higher or lower than expected. This indicates a defect pressure sensor or a leakage in the hydraulic system.

The P0961 will set if main pressure is higher or lower than expected. This indicates a defective pressure sensor or a leakage in the hydraulic system.

First: Clear the codes and see if they return right away or the car needs to be driven.
If the codes return right away and DO NOT read correctly on the scan tool the Mechatronic will need to be replaced.
If the car must be driven and the DTC's are temperature sensitive check to make sure that the trans has the correct fluid. Using synthetic fluids or fluids other than the factory fill, can and will cause these types pf trouble codes to set.

Pressure Testing

Ford's CFT30 operating pressures will usually be in the range of 220-250 psi, but can exceed 1000 psi at times. Ford's CFT30 has no external pressure ports.

The only way to check the operating pressure of this CVT, is to monitor the main pressure sensor (PCA MES) and secondary pressure sensor (PCC MES) PIDS with a scan tool.

An internal fluid leak, incorrectly installed transmission fluid pan filter, cut/damaged mechatronic assembly feed tube O-rings or a transmission fluid pump leaking or not operating correctly can cause a difference in the pressure readings.

Always check the fluid pan filter for correct installation, the mechatronic assembly bolt torque for correct torque setting, O-rings and feed tubes for damage and leaks, and the fluid pump for correct operation prior to installing a new or the original mechatronic assembly.

If the feed tubes, O-rings or fluid pan filter are damaged or if the fluid pump is not operating correctly, install new components as required.

Recheck the pressures using the pinpoint test. If the pressure readings are still incorrect, install a new mechatronic assembly.

Pressure Testing (continued)

The Transmission Control Module (TCM) is integrated into the mechatronic assembly. If you're installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (re-flashed) to the latest level calibration available.

A1 Pressure Sensor diagnostics;

1. Key in the "OFF" position.

2. Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in connector and in good condition before proceeding.

3. Connect the scan tool.

4. Turn the Key to the "ON" position.

5. Enter the following diagnostic mode on the scan tool: PIDs: Main Pressure Sensor (PCA_MES) and Pulley 2 Pressure Sensor (PCC_MES).

Are the pressure sensor readings between 0-80 kPa (0-12 psi)?

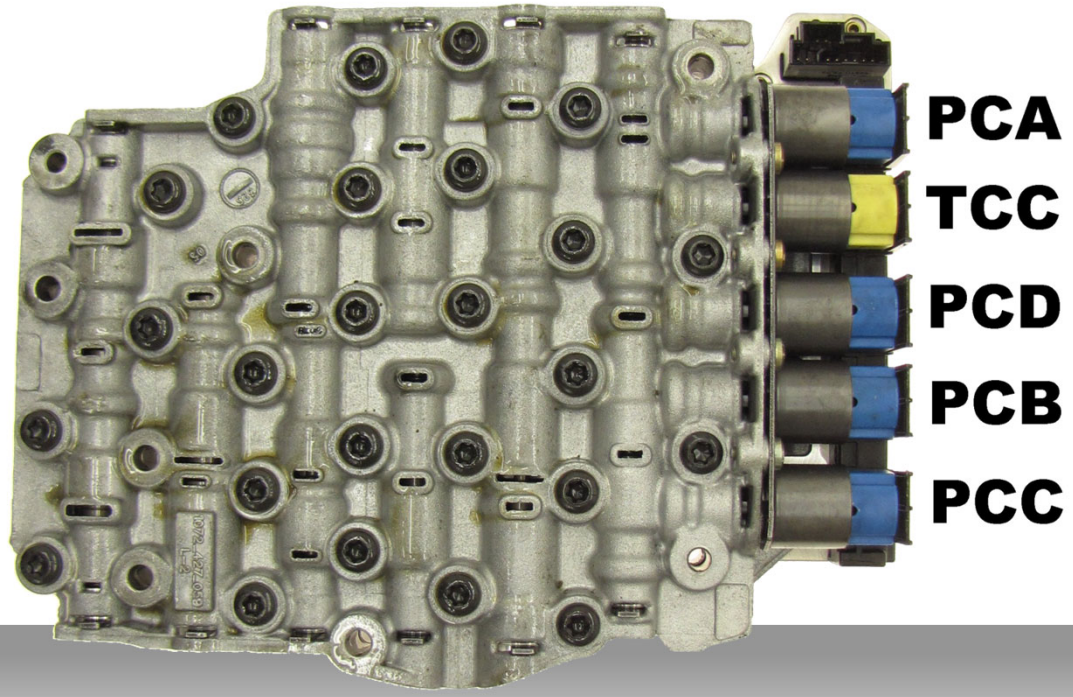
Yes: Pressure sensors are OK. Go to A2

No: Pressure sensors are faulty. INSTALL a new mechatronic assembly.

Solenoid Identification

The valve body has five solenoids: a main pressure control solenoid (PCA-A), torque converter clutch solenoid (TCC), primary pulley pressure solenoid (PCB), secondary pulley pressure solenoid (PCC), and forward and reverse clutch apply solenoid (PCD). All solenoids measure at 5.4 Ohms.

1. **PCA Mainline Pressure Solenoid**
2. **2. PCB Primary Variator Pressure**
3. **3. PCC Secondary Variator Pressure**
4. **4. PCD Forward and Reverse Clutch**
5. **5. TCC Application Pressure TCC**

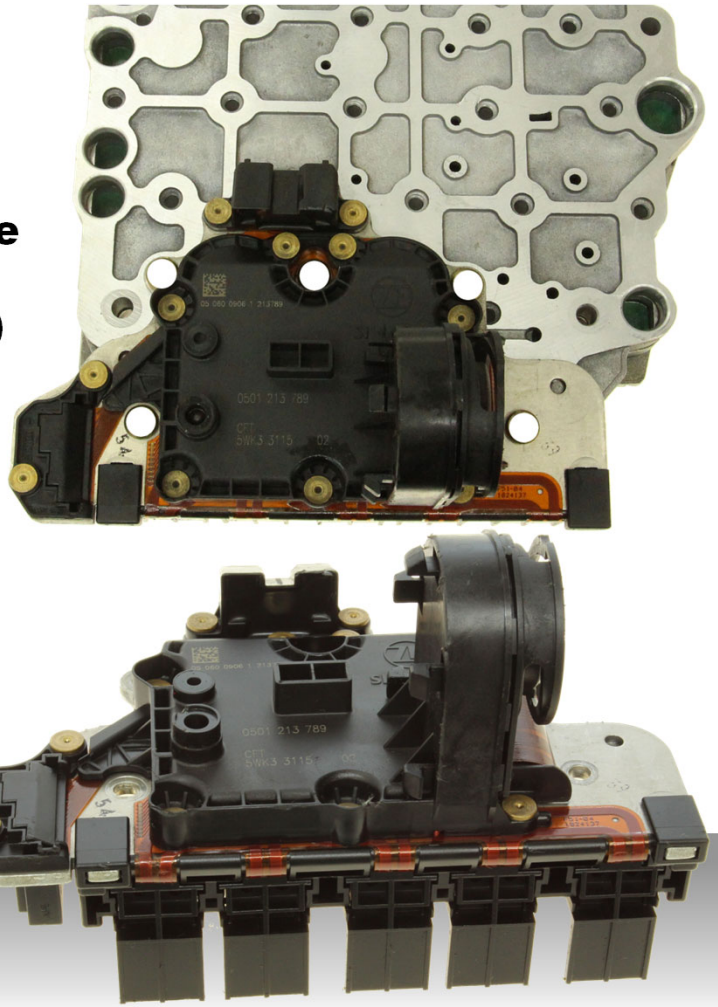


Solenoid Identification (continued)

Always remove the solenoids to inspect the solenoid screens. Replace if torn or damaged

Valve body identification

The TCM is mounted to the valve body (Mechatronic)



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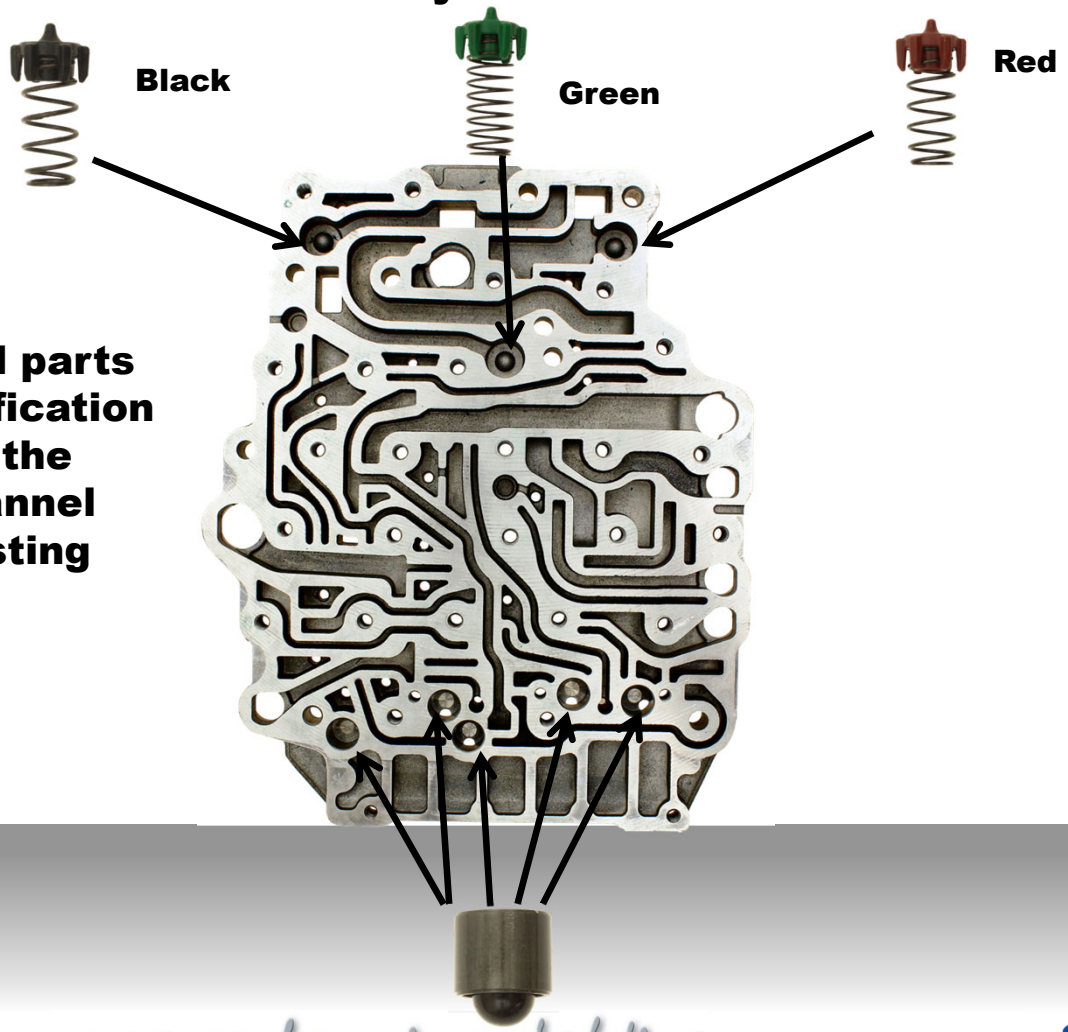
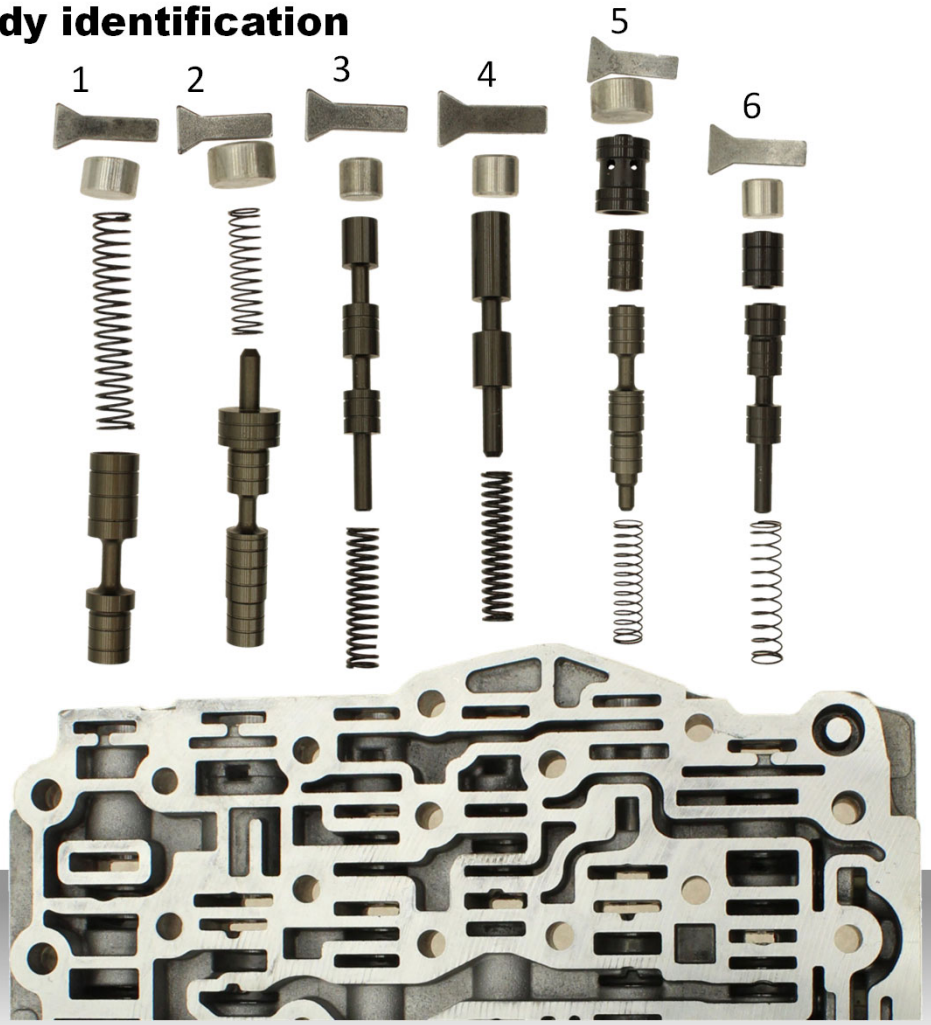
Valve body identification



Small parts identification in the channel casting

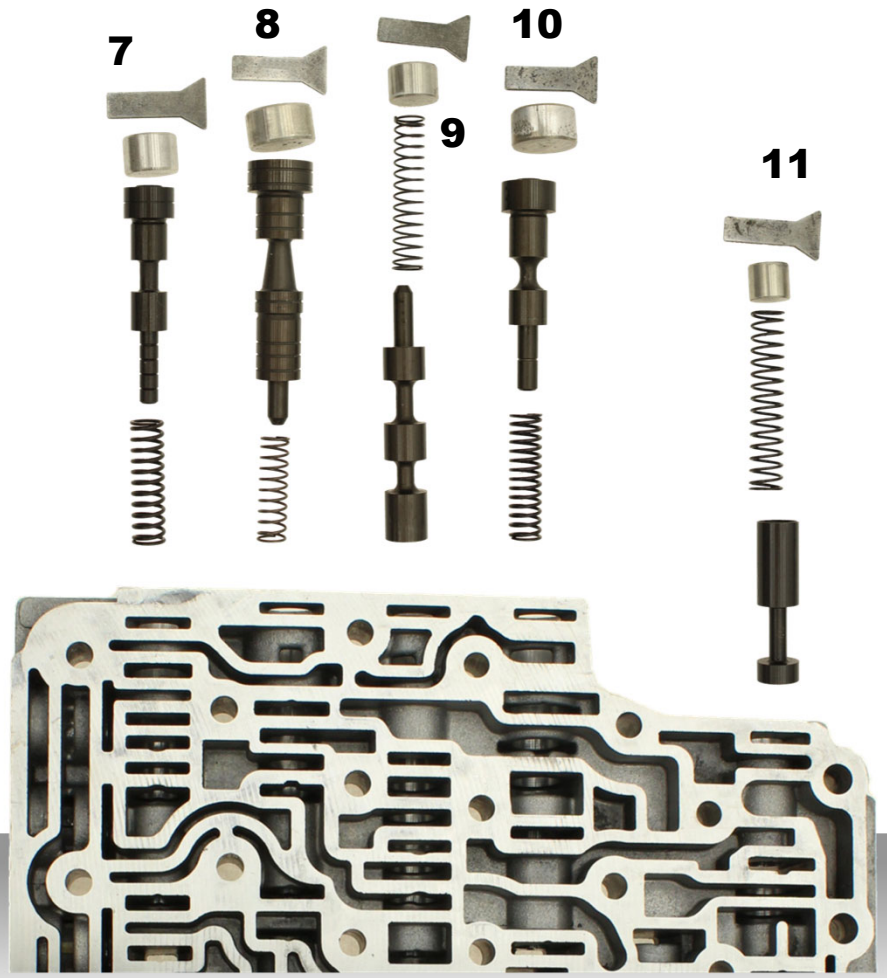
Valve body identification

CFT 30 Valve Identification	
1	Converter Safety Valve
2	Secondary Valve
3	Emergency Valve
4	Pressure Reducing Valve
5	Primary Valve
6	Clutch 1 Valve

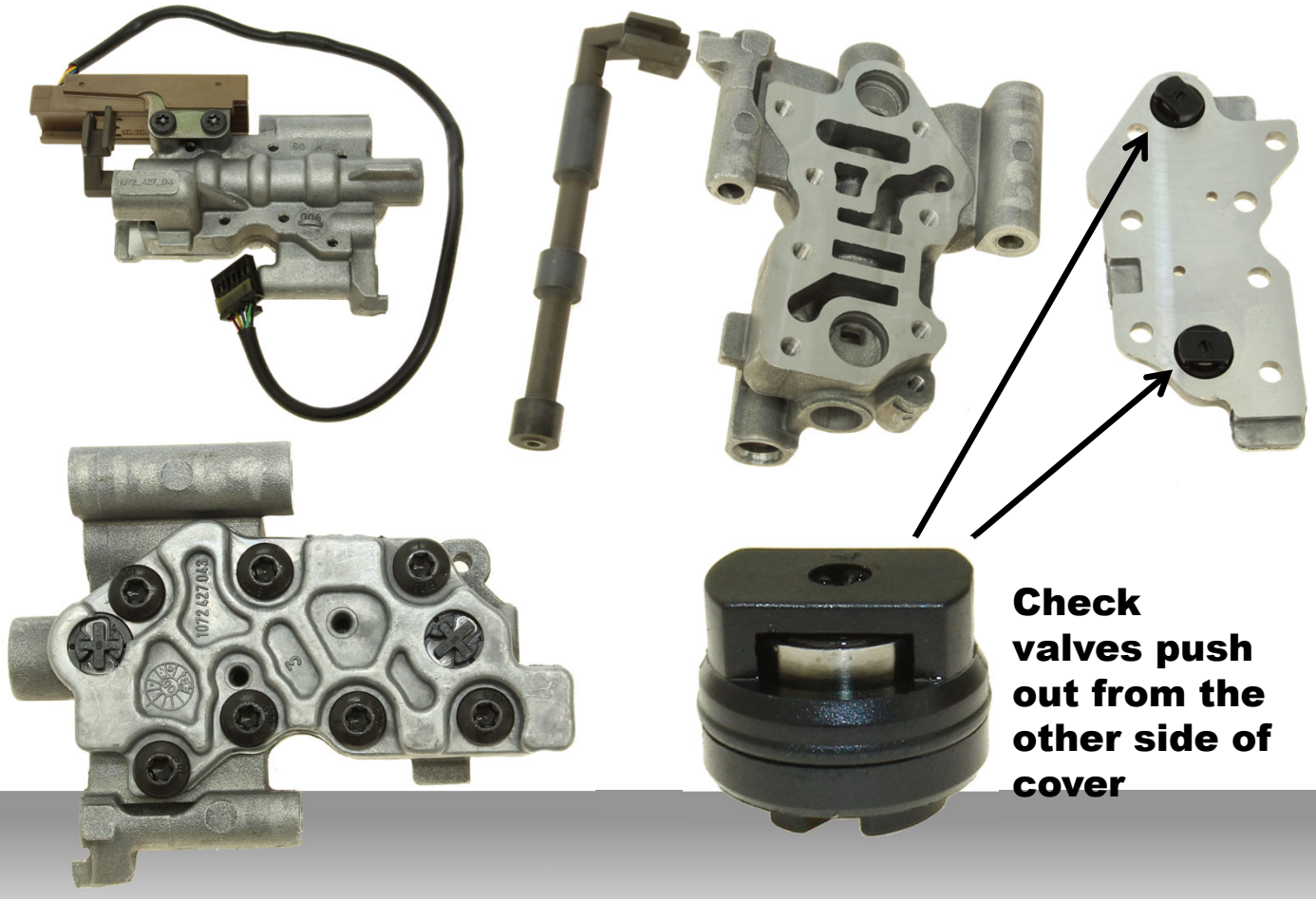


Valve body identification

CFT 30 Valve Identification	
7	Lube Valve
8	Main Pressure Valve
9	Converter Pressure Valve
10	Converter Clutch Valve
11	Clutch Valve



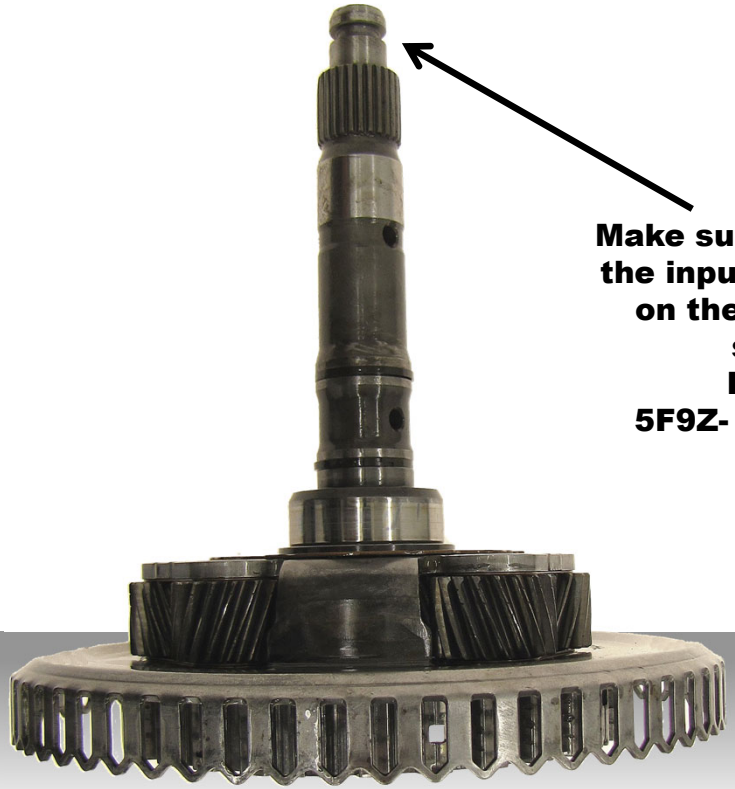
Manual Valve body identification



Check valves push out from the other side of cover

No TCC Operation

During the rebuild process you may not notice the input shaft O-ring is missing. The vehicle may have come in with a no torque converter clutch operation or a DTC related to the torque converter operation. Make sure to reinstall the input shaft O-ring on the end of the shaft.



Make sure to reinstall the input shaft O-ring on the end of the shaft.
Ford #
5F9Z- 7H4977-EA

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Noises While Driving

Use the following procedure to identify and repair specific CVT transmission noises. It's important to understand normal operating characteristics of the CVT, what type, location, and speeds of noise.

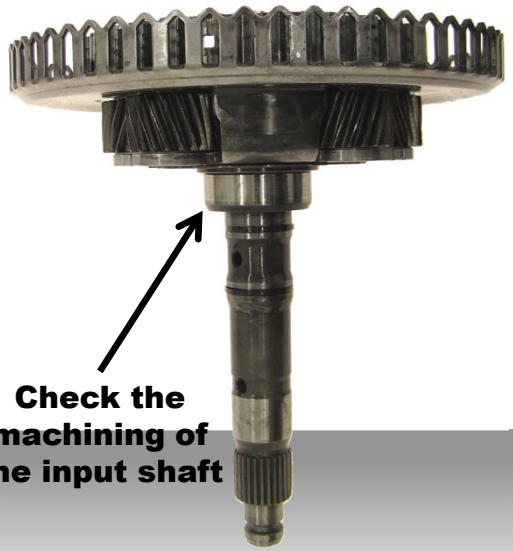
1. **For whine/thump/knock noise in park or neutral, go to Step 1.**
2. **For tick noise on deceleration from 20 MPH (32 Km/h) to a stop, go to Step 2.**
3. **For whine noise on deceleration, go to Step 3.**

Part Number	Part Name
7F9Z-7015-A	Input Shaft
5F9Z-7025-A	Bearing
5F9Z-7F465-AA	Diff Assy AWD
5F9Z-7F465-BA	Diff Assy FWD
5F9Z-4222-BA	Diff Bearing Race
5F9Z-4222-CA	Diff Bearing Race
7F9Z-7H348-A	Side Shaft Gear Assy 5.19
7F9Z-7H348-B	Side Shaft Gear Assy 5.54
5F9Z-7J309-AA	Dust Cap
5F9Z-7L280-CA	O-ring

Noises While Driving (continued)

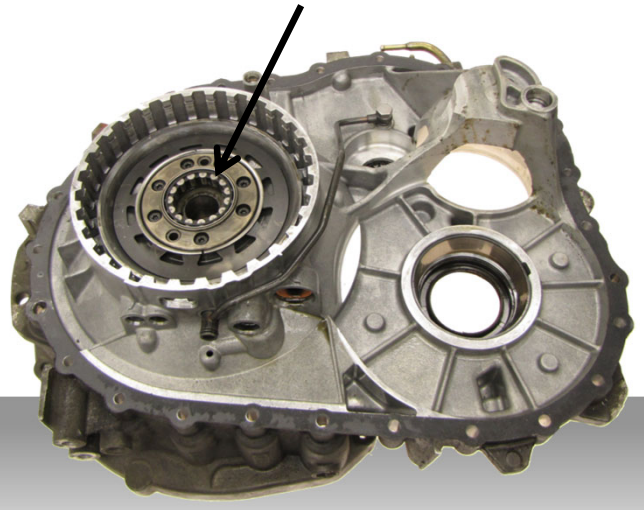
Step 1:

Whine / thump / knock in park and neutral with engine running that goes away when vehicle is put into drive. Noise may come back when vehicle starts to move. This may be caused by machining of the input shaft or flat spots on the roller bearing. For diagnosis first use chassis ears to pinpoint the noise to transaxle area. If the noise is from the transaxle, monitor Turbine Shaft Speed (TSS_SRC) PID using scan tool. If the noise goes away as TSS_SRC goes to 0, when vehicle is put in gear, replace input shaft and bearing.



Check the machining of the input shaft

Check for flat spots on the roller bearing



Noises While Driving (continued)

Step 2:

Tick noise on deceleration from 20 MPH (32 Km/h) to a stop. This may be caused by the differential ring gear. For front wheel drive (FWD), if the noise is isolated to the final drive area of the transmission, replace the differential assembly and transfer gear. If the vehicle is an all wheel drive (AWD), remove the power transfer unit (PTU) assembly, reinstall the halfshafts, disconnect the differential electronic module (DEM) and road test.

If the noise goes away, the condition is isolated to the AWD system (not CVT related). If the noise is still present, replace the transaxle differential and transfer gear and shim the differential assembly and set proper preload. All replacement differential assemblies are serviced with bearings installed. AWD differentials are serviced with the inner seal installed. Outer bearing races are not packaged with replacement differential/bearing assemblies and will also require replacement.

Noises While Driving (continued)

Step 3:
Gear whine during coast down or deceleration. This may be caused by the transfer gear assembly.
If noise follows the criteria below, replace the transfer gear.

- **noise from 42-35 MPH (68-56 Km/h) (loudest around 37 MPH (59 Km/h))**
- **noise from 32 -25 MPH (51-40Km/h) (loudest around 27 MPH (43 Km/h))**
- **noise from 11-16 MPH (18-26 Km/h) (loudest around 15 MPH (24 Km/h))**

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