

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

2008 TRANSMISSIONS**Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ****SPECIFICATIONS****MATERIAL****Material**

Item	Specification	Fill Capacity
Dye-Lite® ATF/Power Steering Fluid Leak Detection Dye 164-R3701 (Rotunda)	-	-
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)	6.7L (7 qt)
Motorcraft Metal Surface Prep ZC-31-A	-	-
Multi-Purpose Grease XG-4 and/or XL-5	ESB-M1C93-B	-
Threadlock and Sealer TA-25	WSK-M2G351-A5	-
Thread Sealant with PTFE TA-24	WSK-M2G350-A2	-
Ultra Silicone Sealant TA-29	-	-

GENERAL SPECIFICATIONS**GENERAL SPECIFICATIONS**

Item	Specification
FNR5 Transaxle Weight	82 kg (180 lb)

SOLENOID OPERATION CHART - CONVERTER ENGAGED**SOLENOID OPERATION CHART - CONVERTER ENGAGED**

Selector Lever Position	TCM Commanded D Gear	Main Valve Body					5th Gear Valve Body
		SSPCA PWM	SSPCB PWM	SSPCC PWM	SSD (ON/OFF)	SSE (ON/OFF)	SSF (ON/OFF)
D	3	On	Off	Off	Off	On	On
	4	On	Off	Off	On	On	On
	5	On	Off	Off	On	On	Off
With an on/off solenoid, OFF =							

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

No Hydraulic Flow.
With a Pulse-Width Modulation (PWM) solenoid, OFF = Full Hydraulic Flow.
Pressure Control Solenoid A (PCA) and Pressure Control Solenoid B (PCB) PWM solenoid percentage varies through all gears.

SOLENOID OPERATION CHART - CONVERTER DISENGAGED**SOLENOID OPERATION CHART - CONVERTER DISENGAGED**

Selector Lever Position	Transmission Control Module (TCM) Commanded D Gear	Main Valve Body					5th Gear Valve Body
		Shift Solenoid Pressure Control A (SSPCA) Pulse-Width Modulation (PWM)	Shift Solenoid Pressure Control B (SSPCB) PWM	Shift Solenoid Pressure Control C (SSPCC) PWM	Shift Solenoid D (SSD) (ON/OFF)	Shift Solenoid E (SSE) (ON/OFF)	Shift Solenoid F (SSF) (ON/OFF)
P/N	P/N	Off	Off	Off	On	Off	On
R	R	Off	Off	Off	Off	Off	On
	L	Off	Off	On	On	On	On
D	1	Off	On	On	Off	Off	On
	2	Off	Off	On	Off	Off	On
	3	Off	Off	Off	Off	Off	On
	4	On	Off	Off	On	Off	On
	5	Off	Off	Off	On	Off	Off
With an on/off solenoid, OFF = No Hydraulic Flow. With a Pulse-Width							

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Modulation
(PWM)
solenoid,
OFF = Full
Hydraulic
Flow.
Pressure
Control
Solenoid A
(PCA) and
Pressure
Control
Solenoid B
(PCB) PWM
solenoid
percentage
varies
through all
gears.

One Way Clutch Chart

Gear Engaged Clutch	One-Way Clutch (OWC) No. 1	OWC No. 2
L1	X ^a	X ^b
L2		X ^b
L3		X ^b
L4		X ^b
L4 ^c		X ^b
L5		
D1	X ^a	X ^b
D2		X ^b
D3		X ^b
D4		X ^b
D5		

^a Transmits the torque only when driving

^b Operating

^c Torque converter clutch (TCC) on

REFERENCE: BAND/CLUTCH APPLICATION CHART

REFERENCE: BAND/CLUTCH APPLICATION CHART

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Gear/ Engaged Clutch	Primary Gearset					Secondary Gearset	
	Forward Clutch	Reverse Clutch	2-4 Brake Band	3rd/4th Clutch	Low/ Reverse Clutch	Direct Clutch	Reaction Clutch
Reverse		X			X		X
L1	X				X		X
L2	X		X				X
L3	X			X			X
L4			X	X			X
L5			X	X		X	
D1	X				X/NE		X
D2	X		X				X
D3	X			X			X
D4			X	X			X
D5			X	X		X	
X = Applied NE = No Effect							

LINE PRESSURE CHART

LINE PRESSURE CHART

Range	Idle (kPa)	Idle (psi)	Stall (kPa)	Stall (psi)
P, N	345-450	50-65	-	-
R	450-585	65-85	1,930-2,310	280-335
D, L	345-450	50-65	1,240-1,450	180-210

STALL SPEED CHART

STALL SPEED CHART

Engine	RPM
All	2,200-2,700

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Battery tray bolt	9	-	80
Battery tray nut	9	-	80
Ground strap bolt	25	18	-
Intermediate shaft speed sensor bolt	10	-	89
Line pressure port plug	8	-	71
Line pressure switch	13	-	115

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Main control valve body ^a	-	-	-
Main control valve body wiring harness ground wire	9	-	80
Manual control lever nut	22	16	-
Output Shaft Speed (OSS) sensor bolt	10	-	89
Pipe thread adapter	12	-	106
Power steering tube bracket bolts	9	-	80
Roll restrictor bracket bolts	90	66	-
Selector lever cable bracket bolts	20	-	177
Shift solenoid wiring harness ground wire bolt	9	-	80
Shift solenoids	9	-	80
Shift solenoids brackets	9	-	80
Solenoid body cover bolts	7	-	62
Starter B+ cable	12	-	106
Starter bolts	35	26	-
Starter solenoid terminal	5	-	44
Steering gear	107	79	-
Subframe nuts	150	111	-
Subframe support bracket bolts	103	76	-
Sway bar links	40	30	-
Torque converter housing bolts	47	35	-
Torque converter housing bracket nut	25	18	-
Torque converter nuts	37	27	-
Transmission Control Module (TCM) nuts	10	-	89
Transmission fluid pan drain plug	29	21	-
Transmission fluid pan bolts	7	-	62
Transmission Range (TR) sensor bolts	10	-	89
Transmission test plate bolts	10	-	89
Transaxle side cover bolts	7	-	62
Transaxle support insulator bracket bolts	62	46	-
Transaxle support insulator bracket bolts	90	66	-
Transaxle support insulator bracket nut	80	59	-
Transaxle support insulator frame bolts	62	46	-
Turbine Shaft Speed (TSS) sensor bolt	10	-	89

^a Specific tightening sequence is required. See the appropriate procedure.

DESCRIPTION AND OPERATION

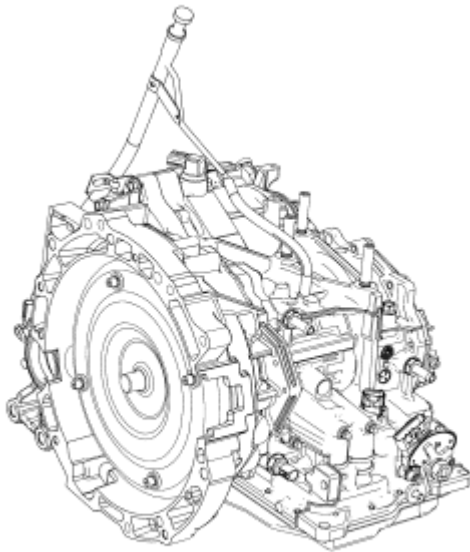
TRANSAXLE DESCRIPTION

The automatic transmission used in the vehicle is a new development.

It is a fully automatic, electronically controlled 5-speed transmission designed for Front Wheel Drive (FWD) vehicles.

Its abbreviated designation FNR5 means:

- FN - front-wheel drive
- R - Model designation
- 5 - 5-speed transmission



N0041820

Fig. 1: Identifying Transaxle
Courtesy of FORD MOTOR CO.

The individual ratios are achieved through 2 planetary gear sets, connected one behind the other.

The individual components of the planetary gear sets are driven or held by means of 3 multi-plate clutches, a multi-plate brake, a brake band and a roller one-way clutch.

The torque is transmitted to the final drive assembly through an intermediate gear stage.

FNR5 Automatic Transmission Fluid is the transmission fluid specified for the FNR5 transaxle. The transmission fluid is changed as directed by the Scheduled Maintenance Guide that is supplied with the vehicle.

The selector lever gives the driver a choice of P, R, N, D and L.

The default gear for this transaxle is 3rd gear.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

To minimize fuel consumption, the torque converter lock up clutch is closed by the Transmission Control Module (TCM) in 3rd, 4th and 5th gears depending on the throttle position and vehicle speed.

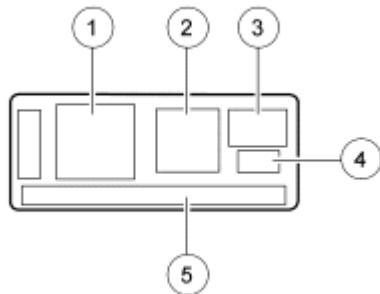
The transmission has electronic synchronous shift control, which guarantees extremely smooth gear shifting over the entire life of the transmission.

A hydraulic emergency operating program maintains limited operation in the event of failure of important electrical components.

The transmission can be tested using a scan tool through the Data Link Connector (DLC) in the passenger compartment.

Gear Ratio (Typical shown, ratios are model dependent)	
1st	3.61:1
2nd	1.92:1
3rd	1.28:1
4th	0.93:1
5th	0.69:1
Reverse	3.40:1

Identification Tags - When servicing the automatic transaxle, refer to the identification tag located on the case.

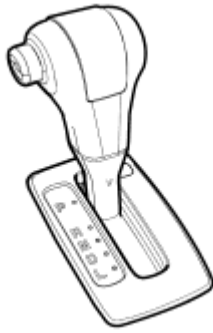


N0044652

Fig. 2: Identification Tags
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	-	Tag code
2	-	Bar code
3	-	Destination
4	-	Date of issue
5	-	Serial/model number

Range Selection - The transaxle range selector has 5 positions: P, R, N, D and L.



N0072585

Fig. 3: Identifying Range Selection
Courtesy of FORD MOTOR CO.

Selector Lever Position P - In selector lever position P, no gear is selected. The parking pawl is engaged manually by the selector lever cable and the manual control lever.

For safety reasons, always apply the parking brake whenever the vehicle is parked.

Selector Lever Position R - In selector lever position R, reverse gear is selected. REVERSE allows the vehicle to be operated in a rearward direction, at a reduced gear ratio.

Selector Lever Position N - In selector lever position N, no gear is selected. The driveline is not locked, so the wheels are free to rotate.

The vehicle may be started in NEUTRAL.

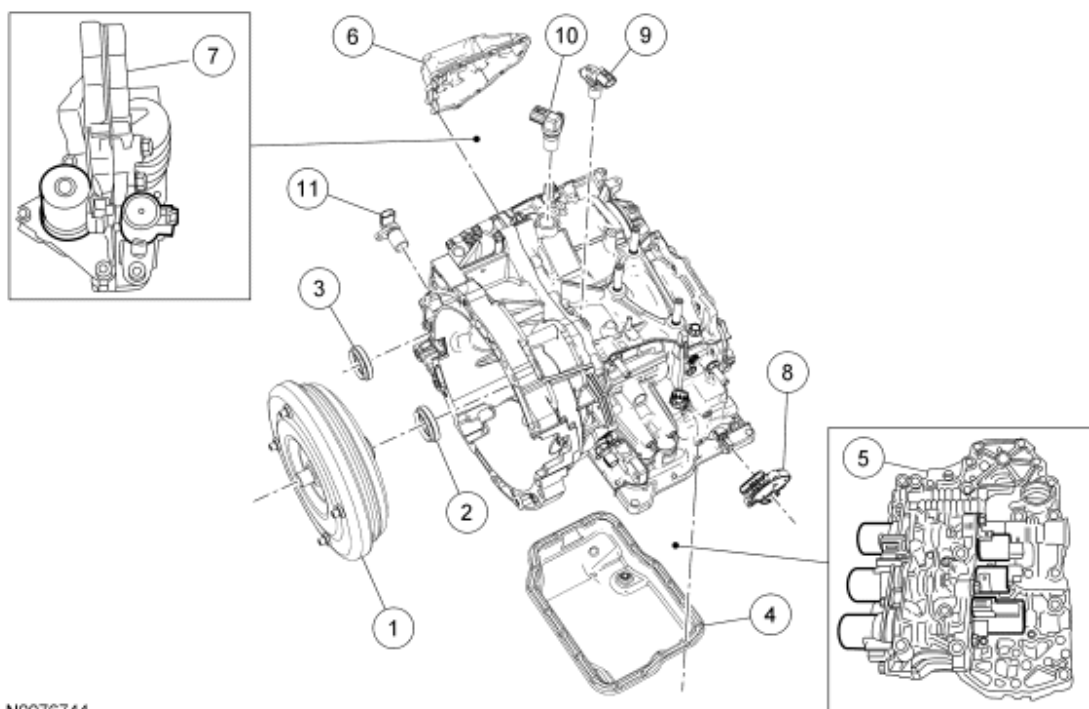
Selector Lever Position D - In selector lever position D, the transmission control allows all the gears to be selected.

Selector Lever Position L - In selector lever position L, the transaxle provides more engine braking when the accelerator pedal is released than in D.

If the selector lever is moved to position L at an excessive vehicle speed for 1st gear, the transmission control only allows the downshift to take place when the corresponding vehicle speed has been reached.

2008 Ford Fusion S

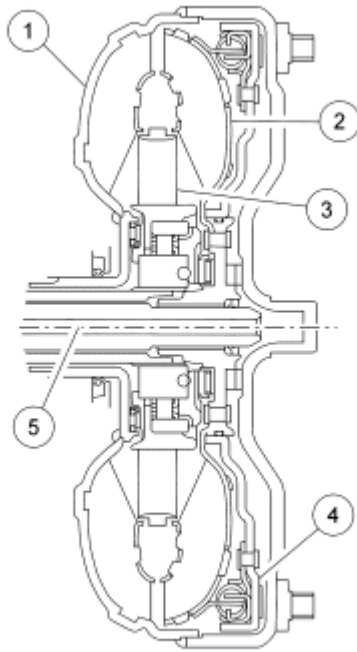
2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ



N0076744

Fig. 4: FNR5 Transaxle
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	7902	Converter assembly
2	7A248	Seal - fluid pump
3	1177	Seal assembly - differential
4	7A194	Pan - transmission fluid
5	-	Main control valve body
6	7G004	Cover - solenoid body
7	-	Solenoid body
8	7F293	Transmission Range (TR) sensor
9	7M101	Turbine Shaft Speed (TSS) sensor
10	7H103	Intermediate shaft speed sensor
11	7H103	Output Shaft Speed (OSS) sensor



N0034483

Fig. 5: Torque Converter and Torque Converter Lock-Up Clutch
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	-	Converter housing and impeller
2	-	Turbine
3	-	Stator
4	-	Torque converter lock up clutch
5	-	Transmission input shaft

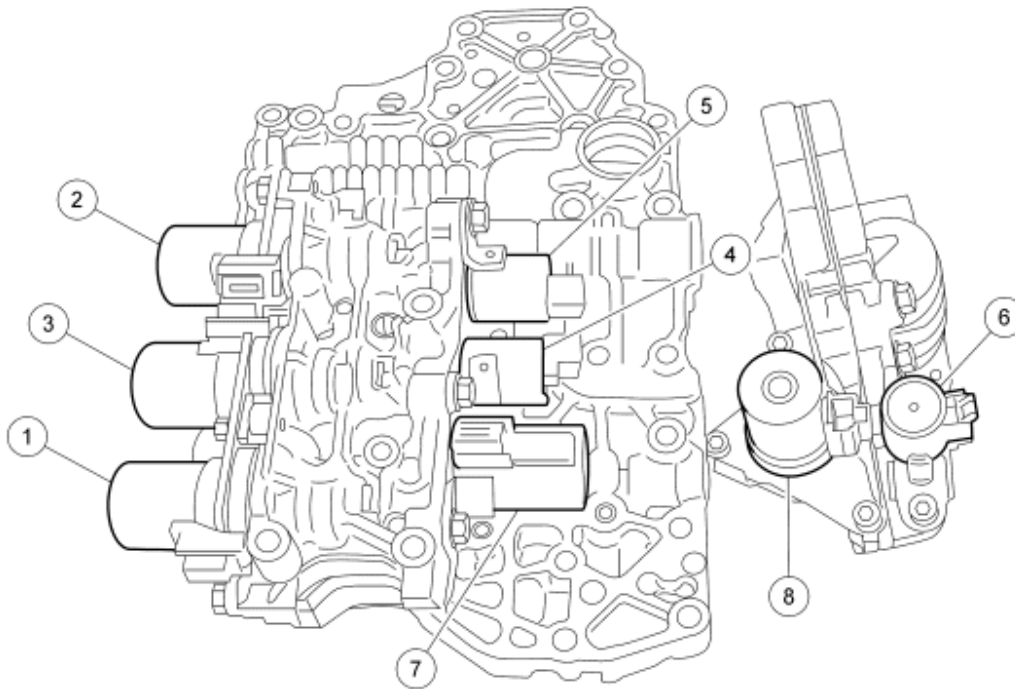
The torque converter transmits engine torque hydraulically to the transmission input shaft.

The stator boosts the torque to the input shaft (approximately 85% difference in speed between the impeller and the turbine).

The stator is made of synthetic resin to reduce weight.

To increase the efficiency of the automatic transmission, the torque converter has an apply clutch. When the Torque Converter Clutch (TCC) is applied, the torque is transmitted directly from the crankshaft through the torque converter housing to the transmission input shaft.

The TCC is applied hydraulically by the TCM by means of the solenoid valves in the valve body in 3rd, 4th and 5th gears. Apply is dependent on the throttle position, vehicle speed and manual selector lever position.



N0044595

Fig. 6: Valve Body
Courtesy of FORD MOTOR CO.

Item	Description
1	Shift Solenoid A (SEA) Pulse-Width Modulation (PWM)
2	Shift Solenoid B (SSB) PWM
3	Shift Solenoid C (SSC) PWM
4	Shift Solenoid D (SSD) (On/Off)
5	Shift Solenoid E (SSE) (On/Off)
6	Shift Solenoid F (SSF) (On/Off)
7	Pressure Control Solenoid A (PCA)
8	Pressure Control Solenoid B (PCB)

The valve body contains 8 solenoid valves:

- three PWM solenoid valves.
- three shift solenoid (on/off) valves.
- two main regulating valve pressure control solenoids.

The individual clutches and bands are supplied pressure from the PWM solenoid valves and the shift solenoid (on/off) valves and thus the gears are shifted.

The PWM solenoid valves allow direct actuation of the clutches and bands to make sure of extremely smooth shifting through precise pressure regulation.

The shift solenoid (on/off) valves switch the hydraulic path to the clutches and bands, reducing the number of required modulating valves.

The main regulating valve (Variable Force Solenoid (VFS)) makes sure that sufficient hydraulic pressure is available in all operating conditions.

Pulse-Width Modulation (PWM) Solenoid Valves - PWM solenoid valves control the pressure to the bands and clutches.

Shift Solenoid (On/Off) Valves - The shift solenoid (on/off) valves switch the different transmission fluid passages in the valve body to direct the pressure to the individual clutches and bands.

The shift solenoid valves are needed for direct actuation of the individual clutches and bands.

Main Regulating Valves - The main regulating valve (pressure control solenoids) control the required main line pressure for the individual transmission ranges.

The main line pressure is controlled dependent on the current engine load.

Shift Solenoids, Shift Solenoid A (SEA), Shift Solenoid B (SSB) and Shift Solenoid C (SSC) Pulse-Width Modulation (PWM) - The PWM type shift solenoids adjust the amount of output pressure according to the signal from the TCM and controls the pressure of each clutch.

With no electrical current supplied to the solenoids, the supply port (line pressure) in the solenoid opens and is engaged with the output port (clutch pressure). As a result, hydraulic pressure is supplied to the hydraulic passage for the clutch pressure.

With electrical current supplied to the solenoids, the supply port (line pressure) in the solenoid closes and the output port (clutch pressure) and the drain port are engaged to drain the clutch pressure.

Shift Solenoids, Shift Solenoid D (SSD), Shift Solenoid E (SSE) and Shift Solenoid F (SSF) On/Off Solenoids - OFF: With no electrical current supplied to the solenoids, the output port and the drain port are engaged in the solenoid and the output pressure is drained.

ON: With electrical current supplied to the solenoids, the output port and the supply port are engaged in the solenoid and the output pressures become equivalent to the solenoid reducing pressure.

Pressure Control Solenoid A (PCA) - The PCA has a high stability in hydraulic pressure that has been adopted for the line pressure control.

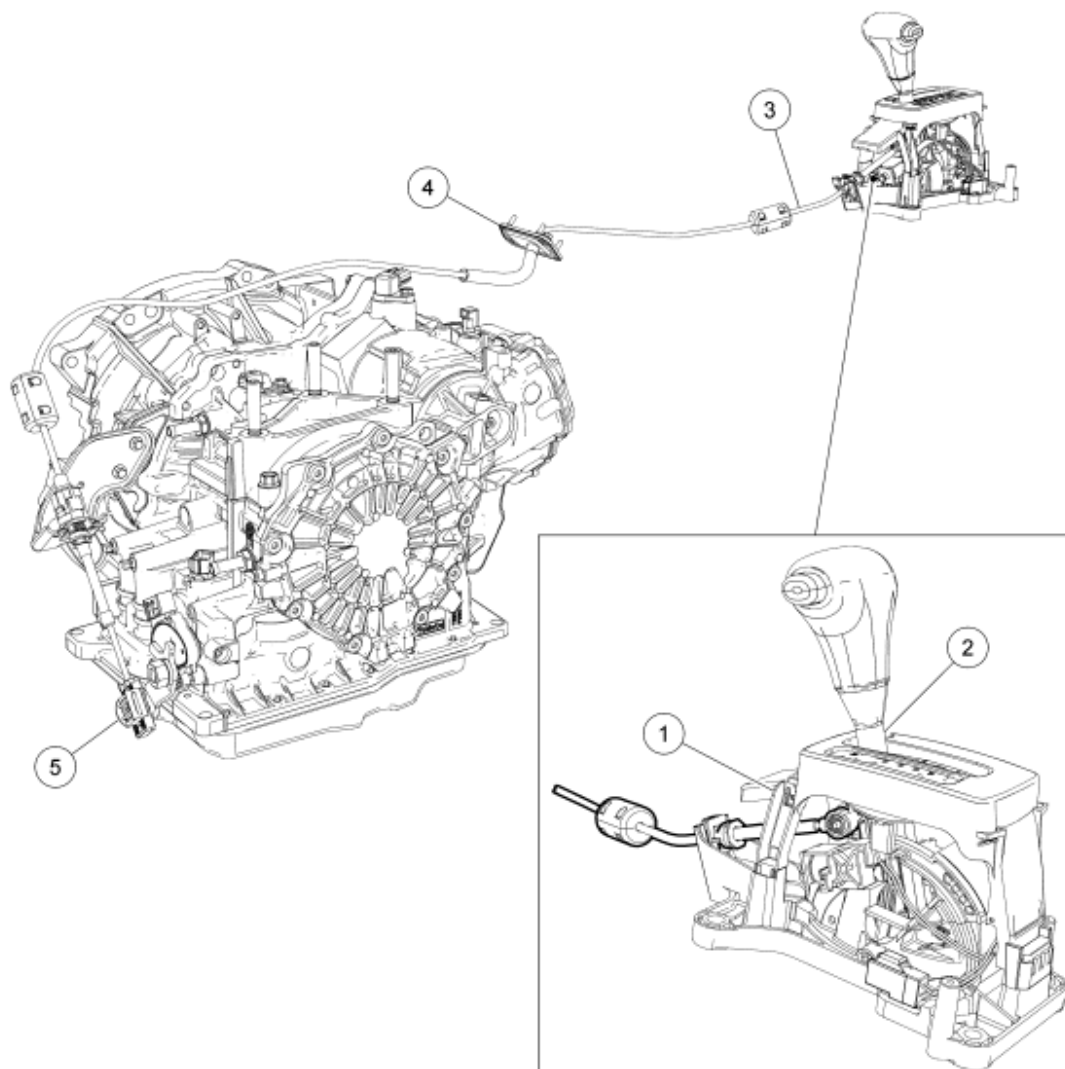
Because the pressure control solenoid controls the hydraulic pressure according to the electrical current value, the degree of freedom in control increases. The controllability is maintained even under aeration and pressure variation can be reduced.

By changing the electrical current value (0-1 amp) inside the solenoid, the PCA adjusts the hold power of the hold pressure valve, controlling the pressure to the prescribed hydraulic pressure.

Pressure Control Solenoid B (PCB) - The on/off type shift solenoid adjusts the amount of output pressure according to the signal from the TCM and controls the pressure of each clutch.

One-Way Clutch (OWC) No. 1 - The One-Way Clutch (OWC) outer race rotates clockwise freely, but the sprags rise to lock the rotation when the outer race tries to rotate counterclockwise. The OWC locks the counterclockwise rotation of the front internal gear and also locks the counterclockwise revolution of the rear planetary via the rear planetary carrier.

One-Way Clutch (OWC) No. 2 - The OWC outer race rotates counterclockwise freely, however the roller moves to the right and locks the rotation when it tries to rotate clockwise. The OWC locks the clockwise rotation of the direct clutch and also locks the clockwise rotation of the secondary sun gear via the direct clutch.



N0041822

Fig. 7: External Selector Lever Mechanism
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
------	-------------	-------------

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

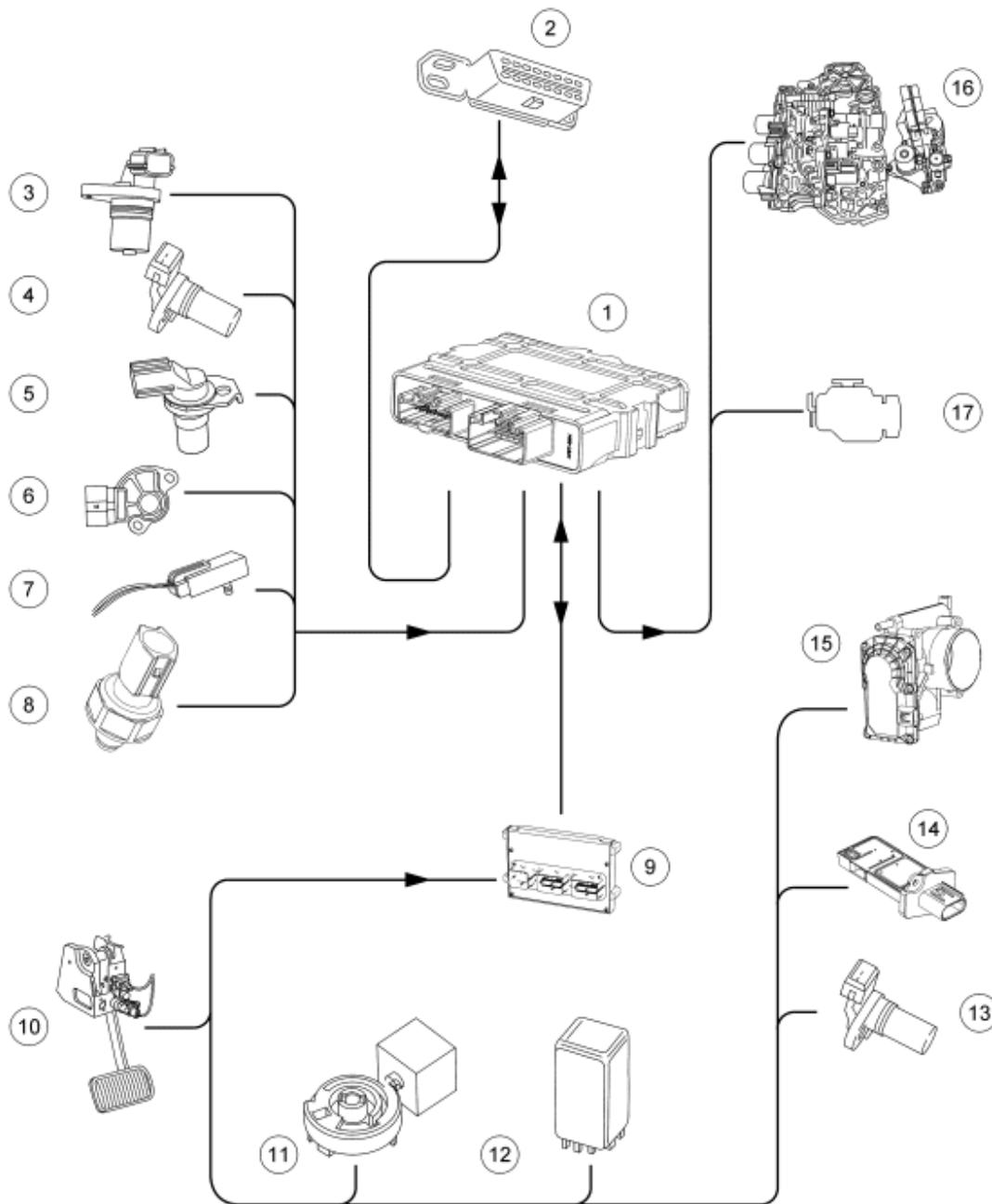
1	-	Selector lever assembly
2	-	Selector lever
3	-	Selector lever cable
4	-	Lead-through
5	-	Selector lever cable end

The transmission end of the selector lever cable is attached to a ball on the manual control lever.

The cable abutments are secured to the transmission housing, and then to the bracket of the manual control lever.

The adjuster for the selector lever cable is located at the transmission side of the cable.

At the selector lever end, the cable is clipped onto a ball.



N0044408

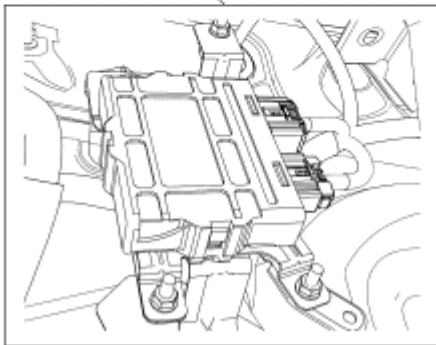
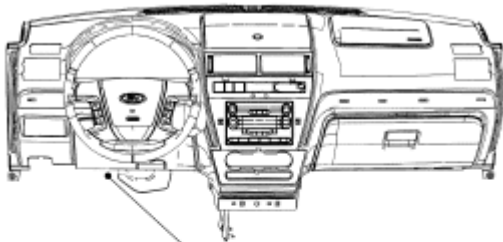
Fig. 8: Overview Transmission Control
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	-	Transmission Control Module (TCM)
2	-	Data Link Connector (DLC)
3	7H103	Output Shaft Speed (OSS) sensor

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

4	7H103	Intermediate shaft speed sensor
5	7M101	Turbine Shaft Speed (TSS) sensor
6	7F293	Transmission Range (TR) sensor
7	-	Transmission Fluid Temperature (TFT) sensor
8	-	Transmission fluid pressure switch
9	12A650	PCM
10	13480	Brake Pedal Position (BPP) switch
11	-	Ignition key lock solenoid
12	-	A/C relay
13	6C315	Crankshaft Position (CKP) sensor
14	12B579	Mass Air Flow (MAF) and Intake Air Temperature (IAT) sensors
15	9B989	Throttle Position (TP) sensor
16	-	Solenoid valves in the valve body
17	-	Powertrain warning indicator in Instrument Cluster (IC)



N0041823

Fig. 9: Transmission Control Module (TCM)
Courtesy of FORD MOTOR CO.

The TCM is located under the instrument panel on the LH side.

On vehicles with automatic transaxles, the TCM controls the transaxle. In this case, a module with 16- and 24-pin connectors is used.

The TCM evaluates the incoming signals from the individual sensors and actuates the solenoid valves in the valve body of the transaxle directly according to the operating state.

Diagnostic checks can be carried out on the transmission through the DLC above the Central Junction Box (CJB).

Emergency Operating Program - If correct shifting can no longer be guaranteed due to failure of certain signals, the TCM changes to an emergency operating program.

The driver is informed of the operation of the emergency operating program by the illumination of the powertrain warning indicator in the Instrument Cluster (IC).

Continued motoring is guaranteed in the following limited conditions:

- Maximum main line pressure
- 3rd gear in selector lever positions D, 2 and 1 without the TCC
- REVERSE gear in selector lever position R

Electronic Synchronous Shift Control

Control of Shift Operations

During a shift operation, certain elements are released while others are actuated. Ideally, this process takes place simultaneously (synchronously) to avoid jerky shifting.

The time for the shift operation should remain within the time limits provided.

When the shift operation is controlled conventionally, the pressure buildup and reduction at the shift elements are set and defined for ideal conditions (synchronous shifting).

As there is no way of influencing the control in the event of different levels of wear in the shift elements, when the transaxle has been used for a fairly high mileage it is possible that the pressure buildup and reduction may no longer be synchronous.

The result or premature pressure reduction at the element to be switched OFF is an unwanted rise in the Turbine Shaft Speed (TSS) as the element to be switched ON cannot transmit the input torque.

The result of delayed pressure reduction at the element to be switched OFF is an unwanted decrease in the TSS as both shift elements transmit the input torque. In the process, the torque is transmitted to the transmission housing through internal locking.

In both cases, a jerk will be felt during the shift operation.

In addition, wear in the shift elements leads to a lengthening of the shift operation. Therefore, shifting takes longer when the transaxle has accumulated a higher mileage.

Control of Shift Operations With Electronic Synchronous Shift Control

In the automatic transaxle, electronic synchronous shift control is used.

Electronic synchronous shift control monitors the shift operations and is able to adapt to the wear in the shift elements over the life of the transaxle.

This is possible since the shift elements are actuated by modulating valves.

The system monitors the shift time whether the shift operation is synchronous.

If the TCM detects a deviation from the stored values for the shift time and synchronization of the shift operation, the pressure buildup or reduction is adapted accordingly.

Throttle Position (TP) Sensor

The Throttle Position (TP) sensor is located on the Throttle Body (TB).

It supplies information to the PCM about the position of the throttle plate. The TCM receives the signal from the PCM.

It also detects the speed of actuation of the throttle plate.

The TCM uses the signals for the following functions, among other things:

- to determine the shift timing.
- to control the main line pressure.
- to control the TCC.
- for kickdown.

In case of absence of the TP signal, the engine control uses the signals of the Mass Air Flow (MAF) and Intake Air Temperature (IAT) sensors as a substitute signal. The main line pressure is increased and hard shifts may occur.

Mass Air Flow (MAF) and Intake Air Temperature (IAT) Sensor

The Mass Air Flow (MAF) sensor is located between the air cleaner housing and the air intake hose leading to the throttle housing.

The Intake Air Temperature (IAT) sensor is incorporated in the housing of the MAF sensor.

The MAF sensor, in conjunction with the IAT sensor, provides the PCM with the primary load signal.

The TCM receives the signals from the PCM and uses them for the following functions, among other things:

- to control the shift operations.
- to control the main line pressure.

If the MAF sensor fails, the signal of the TP sensor is used as a substitute.

Crankshaft Position (CKP) Sensor

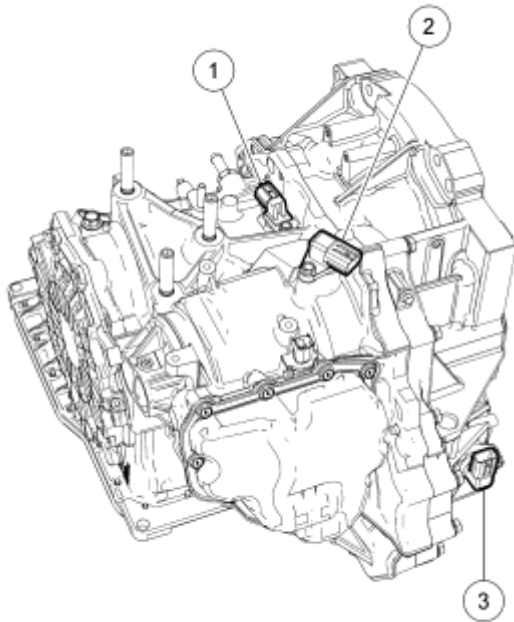
The Crankshaft Position (CKP) sensor is located on the engine/transmission flange.

The CKP sensor is an inductive sensor which provides the PCM with information about the engine speed and position of the crankshaft.

The TCM receives the signals from the PCM and uses them for the following functions among other things:

- to control the TCC.
- to check the torque converter slip.
- to control the main line pressure.

No substitute signal is available for the CKP sensor. If the signal is not present, the engine stops.



N0041824

Fig. 10: Output Shaft Speed (OSS), Intermediate Shaft Speed and Turbine Shaft Speed (TSS) Sensors
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	7M101	Turbine Shaft Speed (TSS) sensor
2	7H103	Intermediate shaft speed sensor
3	7H103	Output Shaft Speed (OSS) sensor

Turbine Shaft Speed (TSS) Sensor

The Turbine Shaft Speed (TSS) sensor is located on the transaxle housing over the input shaft.

The TSS sensor is an inductive sensor which senses the speed of rotation of the input shaft.

The signal is used for the following functions:

- to control the shift operations.
- to control the TCC.
- to check the torque converter slip.

If the TSS sensor fails, the signal of the Output Shaft Speed (OSS) sensor is used as a substitute signal.

Intermediate Shaft Speed Sensor

The intermediate shaft speed sensor is located on the transaxle housing over the intermediate shaft.

The intermediate shaft speed sensor is an inductive sensor which senses the speed of rotation of the intermediate shaft.

The signal is used for the following functions:

- to determine the shift timing.
- to control the shift operations.
- to control the TCC.

If the intermediate shaft speed sensor fails, the signals of the OSS and TSS sensors are used as a substitute signal.

Output Shaft Speed (OSS) Sensor

The OSS sensor is located in the transaxle housing above the rotor in the differential.

The OSS sensor is an inductive sensor which detects the vehicle speed by means of a rotor on the differential.

The signal is used for the following functions among other things:

- to determine the shift timing,
- to supply the vehicle speed input signal for the TCM.

If the OSS sensor fails, the signal of the TSS sensor is used as a substitute signal.

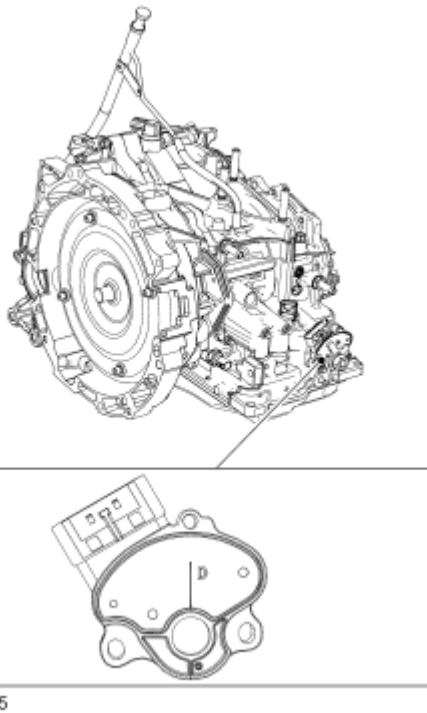


Fig. 11: Transmission Range (TR) Sensor
Courtesy of FORD MOTOR CO.

The Transmission Range (TR) sensor is located on the manual control lever shaft on the transaxle housing.

When the manual control lever shaft is moved by means of the selector lever cable, an engagement pin in the inner ring of the TR sensor moves through the different positions. The signals are transmitted to the TCM, the reversing lamps and the starter inhibitor relay.

NOTE: **Correct operation of the TR sensor is only guaranteed when the manual selector lever cable is adjusted correctly.**

The signals of the TR sensor are used for the following functions:

- to recognize the selector lever position.
- to actuate the starter inhibitor relay.
- to actuate the reversing lamps.

No substitute signal is available for the TR sensor.

If the connection is cut, the vehicle cannot be started.

Brake Pedal Position (BPP) Switch

The Brake Pedal Position (BPP) switch is mounted on the brake pedal bracket.

It switches the stoplights on and tells the PCM when the brakes are applied.

The signal of the Brake Pedal Position (BPP) switch is received by the TCM from the PCM and used for the following functions:

- to release the TCC when the brake pedal is depressed.
- to switch off the selector lever shift lock when the brake pedal is depressed in P.

No substitute signal is available for the BPP switch.

If the connection to the BPP switch is cut, the selector lever cannot be moved out of P.

Transmission Fluid Temperature (TFT) Sensor

The Transmission Fluid Temperature (TFT) sensor is located on the internal wiring harness to the solenoid valves in the transmission fluid pan.

It is a resistor and measures the transmission fluid temperature.

The TFT is used by the TCM for the following functions:

- applying the TCC is not permitted until the transmission fluid reaches a certain temperature.
- engagement of 4th gear is prevented in extreme sub-zero temperatures until the normal operating temperature is reached.
- if the transmission fluid temperature is excessive, a pre-set fixed shift curve is selected and the TCC is closed in 2, 3, 4 and 5; of the transmission warning indicator is activated. No substitute signal is available for the TFT sensor.

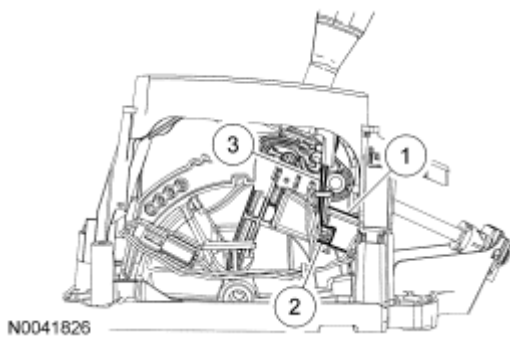


Fig. 12: Brake Shift Interlock Actuator (BSIA)
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	-	Brake Shift Interlock Actuator (BSIA)
2	-	Locking pin
3	-	Manual release mechanism

When the ignition is switched ON, the selector lever Brake Shift Interlock Actuator (BSIA) is actuated by depressing the brake (signal from the BPP switch). This retracts the locking pin so that the selector lever can be moved out of position P.

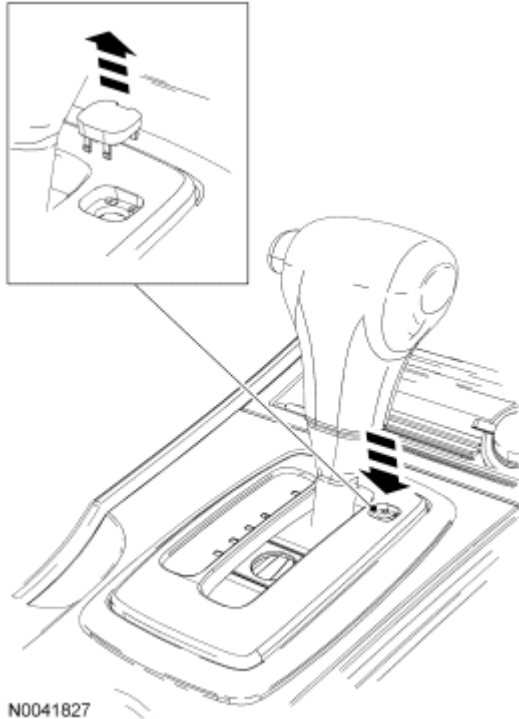


Fig. 13: Substitute Function
Courtesy of FORD MOTOR CO.

If the brake pedal should fail due to malfunction, manual unlocking is possible.

For this, the cover of the release mechanism must be removed and a suitable object (ignition key) pressed into the opening until the selector lever can be moved out of position P.

NOTE: If P is selected again, the selector lever is locked again.

A/C

If the PCM registers a kickdown signal (Wide Open Throttle (WOT), throttle plate opened 95%), the A/C is switched OFF for a maximum of 15 seconds.

Starter Inhibitor Relay

The relay prevents the engine starting in manual selector lever positions R, D and L.

The relay obtains the information about the position of the selector lever directly from the TR sensor.

Ignition Key Lock Solenoid

The solenoid is incorporated in the ignition lock. In selector lever position P the ground connection to the solenoid is cut. The locking pin does not engage in the ignition lock.

In all the other selector lever positions, the ground connection to the solenoid is closed and the locking pin engages in the ignition lock.

When the manual selector lever is not in position P, removal of the ignition key is prevented.

Powertrain Warning Indicator

The powertrain warning indicator is located in the instrument cluster and is colored orange.

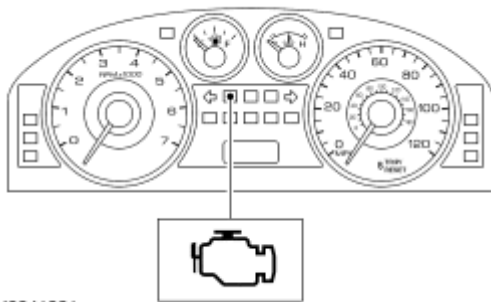


Fig. 14: Identifying Powertrain Warning Indicator
Courtesy of FORD MOTOR CO.

This indicator lights to tell the driver that the transmission control has switched to the emergency operating program or that the transmission fluid temperature is too high.

DIAGNOSTIC TESTS

DIAGNOSTIC STRATEGY

NOTE: **Do not take any shortcuts or assume that critical checks or adjustments have already been made.**

Troubleshooting an electronically controlled automatic transaxle is simplified by using the proven method of diagnosis. One of the most important things to remember is that there is a definite procedure to follow.

Follow the procedures as written to avoid missing critical components or steps.

To correctly diagnose a concern, have the following publications available:

- **Introduction - Gasoline Engines** article
- TSBs
- Wiring Diagram

These publications provide the necessary information when diagnosing transaxle concerns.

Use the Diagnostic Flow Chart as a guide and follow the steps as indicated.

Preliminary Inspection

- Know and understand the customers concern.
- Verify the concern by operating the vehicle.
- Check the transmission fluid level and condition.
- Check for non-factory add-on items.
- Check the selector lever linkage for correct adjustment.
- Check TSBs regarding the concern.


Diagnostics

- Carry out On-Board Diagnostic (OBD) procedures Key ON Engine OFF (KOEO) and Key ON Engine Running (KOER).
- Record all DTCs.
- Repair all non-transaxle codes first.
- Repair all transaxle codes second.
- Erase all continuous codes and attempt to repeat them.
- Repair all continuous codes.
- If only pass codes are obtained, proceed to **Diagnosis By Symptom** for further information and diagnosis.

Follow the diagnostic sequence to diagnose and repair the concern the first time.

DIAGNOSTIC FLOW CHART

Special Tools

Illustration	Tool Name	Tool Number
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool	

Prior to carrying out the flow test, the following items should be checked:

- Know and understand the customer concerns.
- Verify the concern by operating the vehicle.
- Check the transmission fluid level and condition.
- Check for non-factory add-on items.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

- Check the selector lever linkage for correct adjustment.
- Check TSBs regarding the concerns.
- Carry out quick test both Key ON Engine OFF (KOEO) and Key ON Engine Running (KOER).
- Record all DTC codes.

DIAGNOSTIC FLOW CHART

Test	Result	Action
1) Did you record any DTCs?	Yes	REPAIR all hard DTCs. FOLLOW the pinpoint tests. REFER to the <u>Introduction - Gasoline Engines</u> article first, then this Workshop article.
	No	REFER to <u>Diagnosis By Symptom</u> , then Go to Step 5.
2) Are any continuous test memory codes present?	Yes	CLEAR codes and CARRY OUT drive cycle test.
	No	Go to Step 4.
3) Did the continuous test memory codes reappear?	Yes	REPAIR all continuous test memory codes. FOLLOW the pinpoint tests. REFER to the <u>Introduction - Gasoline Engines</u> article then the transaxle reference article, then this Workshop article, then Go to Step 4.
	No	Go to Step 4.
4) Is the concern repaired?	Yes	CARRY OUT the self test to verify that no DTCs are present. CLEAR memory codes. RETURN vehicle to customer.
	No	REFER to <u>Diagnosis By Symptom</u> .
5) Are there any electrical concerns?	Yes	INSTALL the scan tool and carry out Key ON Engine OFF (KOEO) and Key ON Engine Running (KOER) Test, then Go to Step 6.
	No	REFER to the hydraulic and mechanical routine to diagnose and repair the concern, then Go to Step 7.
6) Was the transaxle concern corrected when the scan tool was installed?	Yes	REFER to the <u>Introduction - Gasoline Engines</u> article, intermittent fault diagnosis part and use the scan tool to diagnose cause of concern in the processor, vehicle harness or external inputs (sensors or switches).
	No	REFER to the hydraulic and mechanical routine to diagnose the concern, then Go to Step 7.
7) Is the concern repaired?	Yes	CARRY OUT the self test to verify that no DTCs are present. CLEAR memory codes. RETURN the vehicle to the customer.
	No	Concern should have been repaired. GO back through the Diagnostic Flow Chart and REVIEW other components that may have contributed to the concern. CHECK and DIAGNOSE those components. GET assistance from other sources.

PRELIMINARY INSPECTION**Material**

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)

The following items must be checked prior to beginning the diagnostic procedures:

Know and Understand the Concern

In order to correctly diagnose a concern, first understand the customer concern or condition. Customer contact may be necessary in order to begin to verify the concern. Understand the conditions as to when the concern occurs, for example:

- Hot or cold vehicle temperature
- Hot or cold ambient temperature
- Vehicle driving conditions
- Vehicle loaded/unloaded

After understanding when and how the concern occurs, proceed to verify the concern.

Verification of Condition

This part provides information that must be used in both determining the actual cause of customer concerns and executing the appropriate procedures.

The following procedures must be used when verifying customer concerns for the engine.

Determine Customer Concern

NOTE: **Some transaxle conditions can cause engine concerns. The Turbine Shaft Speed (TSS) not disengaging will stall the engine.**

Determine customer concerns relative to vehicle use and dependent driving conditions, paying attention to the following items:

- Hot or cold vehicle operating temperature
- Hot or cold ambient temperatures
- Type of terrain
- Vehicle loaded/unloaded
- City/highway driving
- Upshift
- Downshift

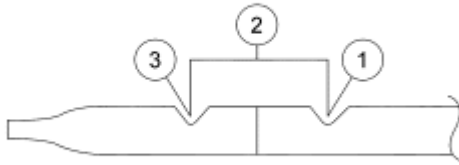
- Coasting
- Engagement
- Noise/vibration - check for dependencies, either RPM dependent, vehicle speed dependent, shift dependent, gear dependent, range dependent or temperature dependent

Check Transmission Fluid Level

- NOTE:** The vehicle should not be driven if the transmission fluid level is below the bottom line on the transmission fluid level indicator and the ambient temperature is above 10°C (50°F) or damage may occur.
- NOTE:** Transmission fluid expands when warmed. To obtain an accurate transmission fluid level check, drive the vehicle until normal operating temperature is reached, approximately 32 km (20 mi).
- NOTE:** If the vehicle has been operated for an extended period at high speeds, in city traffic during hot weather or while pulling a trailer, the vehicle should be turned OFF for approximately 30 minutes to allow the transmission fluid to cool before checking.
- NOTE:** Incorrect transmission fluid level may affect the transaxle operation and could result in transaxle damage.

Under normal conditions, there is no requirement to check the transmission fluid level. However, if the transaxle is not functioning correctly (the transaxle may slip, shift slowly or there may be some sign of fluid leakage), the transmission fluid level should be checked.

1. Drive the vehicle 32 km (20 mi) or until the vehicle reaches normal operating temperature.
2. Park the vehicle on a level surface and engage the parking brake.
3. With one foot on the brake, start the engine and move the selector lever through all the gear ranges. Allow sufficient time for each gear to engage.
4. Place the selector lever in PARK and leave the engine running.
5. Remove the transmission fluid level indicator and wipe it clean with a lint free cloth.
6. Install the transmission fluid level indicator, making sure that it is fully seated in the filler tube.
7. Remove the transmission fluid level indicator. The transmission fluid should be within the designated areas.



N0040456

Fig. 15: Transmission Fluid Level Indicator
 Courtesy of FORD MOTOR CO.

Item	Description
1	Maximum transmission fluid level
2	Normal operating transmission fluid level range 65°C (149°F)
3	Minimum transmission fluid level

High Transmission Fluid Level

A transmission fluid level that is too high may cause the transmission fluid to become aerated due to the churning action of the rotating internal parts. This will cause erratic control pressure, foaming, loss of transmission fluid from the vent tube and possible transaxle damage. If an overfill reading is indicated, adjust the transmission fluid to the correct level.

Low Transmission Fluid Level

A low transmission fluid level could result in poor transaxle engagement, slipping or damage. This could also indicate a leak in one of the transaxle seals or gaskets.

Adding Transmission Fluid

NOTE: The use of any other type of transmission fluid than specified may result in transaxle damage.

If transmission fluid needs to be added, add transmission fluid in 0.25L (1/2 pt) increments through the transmission fluid filler tube. Do not overfill the transmission fluid. For transmission fluid type, refer to **SPECIFICATIONS**.

Check The Transmission Fluid Condition

1. Check the transmission fluid level.
2. Observe the color and the odor. The color under normal circumstances should be reddish, not brown or black.
3. Allow the transmission fluid to drip onto a facial tissue and examine the stain.
4. If evidence of solid material is found, the transmission fluid pan should be removed for further inspection.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

5. If transmission fluid contamination or transaxle failure is confirmed by the sediment in the bottom of the transmission fluid pan, the transaxle must be disassembled and completely cleaned.
6. Carry out diagnostic checks and adjustments. Refer to **Diagnosis By Symptom**.

Water in Transmission Fluid

To correctly repair an automatic transaxle that has had water or coolant introduced into the system, only install a new transaxle for the units that cannot be disassembled and cleaned. Prior to installing the transaxle, the transmission fluid cooler(s), transmission fluid cooler tubes and transmission fluid cooler hoses need to be flushed and cleaned.

ROAD TESTING VEHICLE

NOTE: Always drive the vehicle in a safe manner according to driving conditions and obey all traffic laws.

The Shift Point Road Test and Torque Converter Operations Test provide diagnostic information on transaxle shift controls and torque converter operation.

SHIFT POINT ROAD TEST

This test verifies that the shift control system is operating correctly.

1. Bring engine and transaxle up to normal operating temperature.
2. Operate the vehicle with the selector lever in the D position.
3. Apply minimum throttle and observe the speeds at which upshift occurs and torque converter engages. Refer to the following Shift Speeds Chart for the appropriate final drive ratio.
4. Press the accelerator pedal to the floor, Wide Open Throttle (WOT). The transaxle should shift from 3rd to 2nd, or 3rd to 1st, depending on vehicle speed, and Torque Converter Clutch (TCC) should release.
5. With vehicle speed above 48 km/h (30 mph), move the transaxle range selector lever from D position to 1st position and release the accelerator pedal. The transaxle should immediately downshift to 2nd gear. When vehicle speed drops below 32 km/h (20 mph), the transaxle should downshift into 1st gear.
6. If transaxle fails to upshift/downshift or TCC does not apply/release, refer to **Diagnosis By Symptom** for possible causes.

SHIFT SPEEDS CHART

Throttle Position	Shift	Final Drive Ratio 3.86:1	
Closed	5-4	55-38 km/h	34-24 mph
	4-3	32-16 km/h	20-10 mph
	3-1	18-2 km/h	11-1 mph
Minimum Monitor PID TP 20%	1-2	5-21 km/h	3-13 mph
	2-3	16-32 km/h	10-20 mph
	3-4	32-48 km/h	20-30 mph
	4-5	48-64 km/h	30-40 mph

2008 Ford Fusion S


2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Wide Open	1-2	40-56 km/h	25-35 mph
	2-3	89-105 km/h	55-65 mph
	3-4	129-145 km/h	80-90 mph
	4-5 ^a	-	-

^a Speed limited to 177 km/h (110 mph). WOT 4-5 shift will not occur.

TORQUE CONVERTER DIAGNOSIS

Special Tools

Illustration	Tool Name	Tool Number
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool	

Prior to installing a new torque converter, all diagnostic procedures must be followed. This is to prevent the unnecessary installation of new or remanufactured torque converters. Only after a complete diagnostic evaluation can the decision be made to install a new torque converter.

Begin with the normal diagnostic procedures as follows:

1. Preliminary Inspection.
2. Know and Understand the Customer Concern.
3. Verify the Concern - Carry out the Torque Converter Operations Test; refer to **Torque Converter Operations Test**.
4. Carry out Diagnostic Procedures.
 - Run On-Board Diagnostic (OBD); refer to **On-Board Diagnostic (OBD) with Scan Tool**.
 - Repair all non-transaxle related DTCs first.
 - Repair all transaxle DTCs.
 - Rerun OBD to verify repair.
 - Carry out the Line Pressure Test. Refer to **Special Testing Procedures**.
 - Carry out the Stall Speed Test. Refer to **Special Testing Procedures**.
 - Carry out the Diagnosis by Symptom Index. Refer to **Diagnosis By Symptom**.
 - Use the index to locate the appropriate routine that best describes the symptom(s). The routine will list all possible components that may cause or contribute to the symptom. Check each component listed; diagnose and repair as necessary before installing a new or remanufactured torque converter.

Torque Converter Operations Test

This test verifies that the Torque Converter Clutch (TCC) control system and the torque converter are operating

correctly.

1. Carry out the Self Test. Refer to **On-Board Diagnostic (OBD) with Scan Tool**. Check for DTCs. Refer to **Diagnostic Trouble Code (DTC) Charts**.
2. Connect a scan tool.
3. Bring the engine to normal operating temperature by driving the vehicle at highway speeds for approximately 15 minutes in D position.
4. After normal operating temperature is reached, maintain a constant vehicle speed of about 80 km/h (50 mph) and tap the brake pedal with the left foot.
5. The engine RPM should increase when brake pedal is tapped, and decrease about 5 seconds after pedal is released. If this does not occur, see Torque Converter Clutch (TCC) Operation Concerns. Refer to **Diagnosis By Symptom**.
6. If the vehicle stalls in D at idle with vehicle at a stop, move the position selector lever to L position. If the vehicle stalls, refer to Torque Converter Clutch (TCC) Operation Concerns in the **Diagnosis By Symptom**. Repair as necessary. If the vehicle does not stall in D position. Refer to **Diagnosis By Symptom**.

VISUAL INSPECTION

This inspection will identify modifications or additions to the vehicle operating system that may affect diagnosis. Inspect the vehicle for non-Ford factory add-on devices such as:

- Electronic add-on items:
 - A/C
 - generator (alternator)
 - engine turbo
 - cellular telephone
 - cruise control
 - CB radio
 - linear booster
 - backup alarm signal
 - computer
- Vehicle modification:

These items, if not installed correctly, will affect the Transmission Control Module (TCM) or transaxle function. Pay particular attention to add-on wiring splices in the TCM harness or transaxle wiring harness, abnormal tire size or axle ratio changes.

- Leaks; refer to **Leakage Inspection**.
- Correct selector lever linkage adjustments; refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** article.

Selector Lever Linkage Check

Check selector lever linkage adjustment by matching the detents in the selector lever with those in the transaxle. If they match, the error is in the indicator. Do not adjust the selector lever linkage.

Hydraulic leakage at the manual control valve can cause delay in engagements and slipping while operating if the selector lever linkage is not correctly adjusted; refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** article for selector lever linkage adjustment.

Check TSBs


Refer to all TSBs which pertain to the transaxle concern and follow the procedure as outlined.

Carry Out On-Board Diagnostic (OBD) (Key ON Engine OFF (KOEO), Key ON Engine Running (KOER))

After a road test, with the vehicle warm and before disconnecting any connectors, carry out the Quick Test using diagnostic tool. Refer to the **Introduction - Gasoline Engines** article for diagnosis and testing of the PCM.

DIAGNOSTICS

Special Tools

Illustration	Tool Name	Tool Number
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool	

Diagnosing an electronically controlled automatic transaxle is simplified using the following procedures. It is important to remember that there is a definite procedure to follow. Do not take shortcuts or assume that critical checks or adjustments have already been made. Follow the procedures as written to avoid missing critical components or steps. By following the diagnostic sequence, the technician will be able to diagnose and repair the concern the first time.

On-Board Diagnostic (OBD) with Scan Tool

NOTE: For detailed instruction and other diagnostic methods using the scan tool, refer to the tester and the **Introduction - Gasoline Engines** article.

These quick tests should be used to diagnose the Transmission Control Module (TCM) and should be carried out in order.

- Self Test -Key ON Engine OFF (KOEO)
- Self Test -Key ON Engine Running (KOER)
- Special Test Mode, based on the system selected
- Clearing DTCs

- On-Board Diagnostic (OBD) II Drive Cycle
- Other Scan Tool Features

For further information on other diagnostic testing features using the scan tool, refer to the **Introduction - Gasoline Engines** article.

DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART

Using Output State Control and Accessing PIDs

To confirm that the output state control value was sent by the scan tool and the PCM has accepted the output state control substitution, a corresponding PID for each output state control parameter must be monitored. Additional PIDs should be monitored to help the technician adequately diagnose the transmission.

PID	PID Description	Units
BPP (scan tool actually says BOO)	Brake Pedal Position (BPP) switch status	On/Off
GEAR	Commanded transmission gear	1, 2, 3, 4 or 5
GEAR_OSC	PID used to command gear changes during output state control Testing	1, 2, 3, 4 or 5
ISS	Intermediate Shaft Speed sensor RPM.	RPM
OSS	Output Shaft Speed (OSS) sensor signal	RPM
PCA	Pressure Control Solenoid A (PCA) solenoid	Pressure
PCA AMP	PCA solenoid	Amperes
PCB	Pressure Control Solenoid B (PCB) solenoid	Pressure
PCC	Pressure Control Solenoid C (PCC) solenoid	Pressure
RPM	Engine speed (revolutions per minute)	RPM
SSD	Shift Solenoid D (SSD) command	On/Off
SSE	Shift Solenoid E (SSE) command	On/Off
SSPCA	Shift Solenoid Pressure Control A (SSPCA) command	On/Off
SSPCB	Shift Solenoid Pressure Control B (SSPCB) command	On/Off
SSPCC	Shift Solenoid Pressure Control C (SSPCC) command	On/Off
TCC	Torque Converter Clutch (TCC) solenoid commanded duty cycle	Percent
TCC_OSC	PID used to command TCC changes	Percent

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	during output state control Testing	
TCCRAT	Torque converter speed ratio (engine RPM vs turbine shaft RPM)	Ratio
TC_SLIPACT	Torque converter slip ratio (actual)	Ratio
TFT	Transmission Fluid Temperature (TFT) sensor signal (°F)	Degrees
TFTV	TFT sensor voltage	volts
TR	Transmission Range (TR)	P, R, N, D, L
TRAN_RAT	Transmission Gear Ratio	Ratio
TSS	Turbine Shaft Speed (TSS) sensor RPM.	RPM

TRANSAXLE DRIVE CYCLE TEST

NOTE: Always drive the vehicle in a safe manner according to driving conditions and obey all traffic laws.

NOTE: The Transaxle Drive Cycle Test must be followed exactly. Transaxle failure must occur 4 times consecutively for shift error DTC to be set, and 5 times consecutively for continuous Torque Converter Clutch (TCC) code to set.

NOTE: When carrying out the Transaxle Drive Cycle Test, refer to the Solenoid Application Chart for correct solenoid operation.

After carrying out the Self Test, use the Transaxle Drive Cycle Test for checking continuous codes.

1. Record and then erase Self Test codes.
2. Warm engine to normal operating temperature.
3. Make sure transmission fluid level is correct.
4. With selector lever in D position, moderately accelerate from stop to 80 km/h (50 mph). This allows the transaxle to shift into 5th gear. Hold speed and throttle open steady for a minimum of 15 seconds.

NOTE: Pressure Control Solenoid A (PCA), Electronic Pressure Control (EPC) and Variable Force Solenoid (VFS) all refer to the solenoids. PCA is preferred for this transmission because the scan tool displays PCA.

5. With transaxle in 5th gear and maintaining steady speed and throttle opening, lightly apply and release brake to operate stop lamps. Then hold speed and throttle steady for a minimum of 5 seconds.
6. Brake to a stop and remain stopped for a minimum of 20 seconds.
7. Repeat Steps 4 through 6 at least 5 times.
8. Carry out Self Test and record continuous DTCs.

After On-Board Diagnostic (OBD)

NOTE: The vehicle wiring harness, PCM and non-transaxle sensors may affect transaxle operations. Repair these concerns first.

After the On-Board Diagnostic (OBD) procedures are completed, repair all DTCs.

Begin with non-transaxle related DTCs, then repair any transaxle related DTCs. Refer to **Diagnostic Trouble Code (DTC) Charts** for information on condition and symptoms. This chart will be helpful in referring to the correct article(s) and aids in diagnosing internal transaxle concerns and external non-transaxle inputs. The pinpoint tests are used in diagnosing transaxle electrical concerns. Make sure that the vehicle wiring harness and the PCM are diagnosed as well. The **Introduction - Gasoline Engines** article will aid in diagnosing non-transaxle electronic components.

Before Pinpoint Tests

NOTE: Before entering pinpoint tests, check the transaxle, vehicle, Transmission Control Module (TCM) and PCM wiring harnesses for correct connections, bent or broken pins, corrosion, loose wires, correct routing, correct seals and their condition. Check the PCM, sensors and actuators for damage. Refer to the **Introduction - Gasoline Engines** article.

NOTE: If a concern still exists after electrical diagnosis, refer to **Diagnosis By Symptom**.

If DTCs appear while carrying out the on-board diagnostics, refer to **Diagnostic Trouble Code (DTC) Charts** for the appropriate repair procedure. Prior to entering pinpoint tests, refer to any TSBs for transaxle concerns.

DIAGNOSTIC TROUBLE CODE (DTC) CHARTS

DTC CHART

Five-Digit DTC	Component	Description	Condition	Symptom	Action
P0706	Transmission Range (TR) Sensor	TR circuit failure.	TR circuits, indicating an invalid pattern in TR_D. Condition caused by a short to ground or an open in P, R, N, D or L range positions. This DTC can be set by an incorrectly adjusted TR sensor.	Increase in control pressure (harsh shifts). Defaults to D for an invalid position. Malfunction Indicator Lamp (MIL) on.	Go to <u>Pinpoint Test C</u> .
P0707	TR Sensor	TR circuit low input.	TR circuits, indicating an invalid pattern in TR_D. Condition caused by a short to ground in P, R, N, D or	Increase in control pressure (harsh shifts). Defaults to D for an invalid position. MIL on.	Go to <u>Pinpoint Test C</u> .

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

			L range positions. This DTC can be set by an incorrectly adjusted TR sensor.		
P0708	TR Sensor	TR circuit high input.	TR circuits, indicating an invalid pattern in TR_D. Condition caused by an open in P, R, N, D or L range positions. This DTC can be set by an incorrectly adjusted TR sensor.	Increase in control pressure (harsh shifts). Defaults to D for an invalid position. MIL on.	Go to <u>Pinpoint Test C.</u>
P0711	Transmission Fluid Temperature (TFT)	TFT sensor circuit malfunction.	Incorrect voltage drop across TFT sensor.	Possible firm shift feel.	Go to <u>Pinpoint Test B.</u>
P0712	TFT	157°C (315°F) indicated TFT sensor circuit grounded.	Voltage drop across TFT sensor too low for scale set for temperature 157°C (315°F).	Possible firm shift feel.	Go to <u>Pinpoint Test B.</u>
P0713	TFT	-40°C (-40°F) indicated TFT sensor circuit open.	Voltage drop across TFT sensor too high for scale set temperature -40°C (-40°F).	Possible firm shift feel.	Go to <u>Pinpoint Test B.</u>
P0715	Turbine Shaft Speed (TSS)	Insufficient input from TSS sensor.	Transmission Control Module (TCM) detected a loss of TSS signal during operation.	Harsh shifts, no Torque Converter Clutch (TCC) activation and harsh engagement.	Go to <u>Pinpoint Test G.</u>
P0720	Output Shaft Speed (OSS)	Insufficient input from OSS sensor.	TCM detected a loss of OSS signal during operation.	Harsh shift, possible abnormal shift schedule.	Go to <u>Pinpoint Test F.</u>
P0731	Shift Solenoid A (SEA), Shift Solenoid B (SSB), Shift Solenoid C (SSC), Shift Solenoid D (SSD), Shift Solenoid E (SSE), Shift Solenoid F (SSF) or	1st gear error.	No 1st gear.	Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material). Engine RPM could	REFER to Solenoid On/Off Charts. Go to <u>Pinpoint Test A.</u>

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	Internal Parts			be higher or lower than expected.	
P0732	SEA, SSB, SSC, SSD, SSE, SSF or Internal Parts	2nd gear error.	No 2nd gear.	Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material). Engine RPM could be higher or lower than expected.	REFER to Solenoid On/Off Charts. Go to <u>Pinpoint Test A.</u>
P0733	SEA, SSB, SSC, SSD, SSE, SSF or Internal Parts	3rd gear error.	No 3rd gear.	Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material). Engine RPM could be higher or lower than expected.	REFER to Solenoid On/Off Charts. Go to <u>Pinpoint Test A.</u>
P0734	SEA, SSB, SSC, SSD, SSE, SSF or Internal Parts	4th gear error.	No 4th gear.	Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material). Engine RPM could be higher or lower than expected.	REFER to Solenoid On/Off Charts. Go to <u>Pinpoint Test A.</u>
P0735	SEA, SSB, SSC, SSD, SSE, SSF or	5th gear error.	No 5th gear.	Incorrect gear selection depending on failure or mode	REFER to Solenoid On/Off Charts.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	Internal Parts			and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material). Engine RPM could be higher or lower than expected.	Go to <u>Pinpoint Test A.</u>
P0741	TCC	TCC circuit performance error or stuck off.	The TCM picked up an excessive amount of TCC slippage during normal vehicle operation or no engagement.	TCC slippage/erratic or no TCC operation.	REFER to <u>Diagnosis By Symptom.</u>
P0742	TCC	TCC malfunction detected, stuck on.	The TCM picked up TCC engagement during normal vehicle operation.	TCC detected as engaged.	REFER to <u>Diagnosis By Symptom.</u>
P0744	TCC	TCC intermittent malfunction detected.	The TCM picked up TCC slippage during normal vehicle operation.	TCC slippage/erratic.	REFER to <u>Diagnosis By Symptom.</u>
P0745	Pressure Control Solenoid A (PCA) solenoid	PCA circuit failure.	Voltage through PCA solenoid is checked. Error is noted if tolerance is exceeded.	Open circuit causes maximum transmission line pressure, harsh engagement and shifts.	Go to <u>Pinpoint Test D.</u>
P0751	Shift Solenoid A (SEA)	SEA functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present, MIL on.	REFER to <u>Diagnosis By Symptom.</u>
P0752	SEA	SEA functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present, MIL on.	REFER to <u>Diagnosis By Symptom.</u>
P0753	SEA	SEA solenoid circuit failure.	Shift Solenoid Pressure Control A (SSPCA) circuit failed to provide voltage drop across solenoid. Circuit open or shorted or TCM driver failure during On-Board Diagnostic (OBD).	No reverse gear (short) or no 4th gear (open). MIL off.	Go to <u>Pinpoint Test A.</u>
P0756	Shift Solenoid	SSB functional	Mechanical or	Not all gears present.	REFER to

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	B (SSB)	failure (stuck off).	hydraulic failure of the shift solenoid.	No converter clutch apply in 3rd and 4th gears.	<u>Diagnosis By Symptom.</u>
P0757	SSB	SSB functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present. No converter clutch apply in 3rd and 4th gears.	REFER to <u>Diagnosis By Symptom.</u>
P0758	SSB	SSB solenoid circuit failure.	SSB circuit fails to provide voltage drop across solenoid. Circuit open or shorted or TCM driver failure during OBD.	Not all gears present. No converter clutch apply in 3rd and 4th gears. MIL off.	Go to <u>Pinpoint Test A.</u>
P0761	Shift Solenoid C (SSC)	SSC functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	Go to <u>Pinpoint Test A.</u>
P0762	SSC	SSC functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	Go to <u>Pinpoint Test A.</u>
P0763	SSC	SSC solenoid circuit failure.	Shift Solenoid Pressure Control C (SSPCC) circuit fails to provide voltage drop across solenoid. Circuit open or shorted or TCM driver failure during OBD.	Not all gears present. MIL off.	Go to <u>Pinpoint Test A.</u>
P0766	SSD	SSD functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	Go to <u>Pinpoint Test A.</u>
P0767	SSD	SSD functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	Go to <u>Pinpoint Test A.</u>
P0768	SSD	SSD solenoid circuit failure.	SSD circuit fails to provide voltage drop across solenoid. Circuit open, shorted or TCM driver circuit failure during OBD.	Not all gears present. MIL off.	Go to <u>Pinpoint Test A.</u>
P0771	SSE	SSE functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	Go to <u>Pinpoint Test A.</u>
P0772	SSE	SSE functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	Go to <u>Pinpoint Test A.</u>
P0773	SSE	SSE solenoid	SSE circuit failed to	Not all gears present.	Go to <u>Pinpoint</u>

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

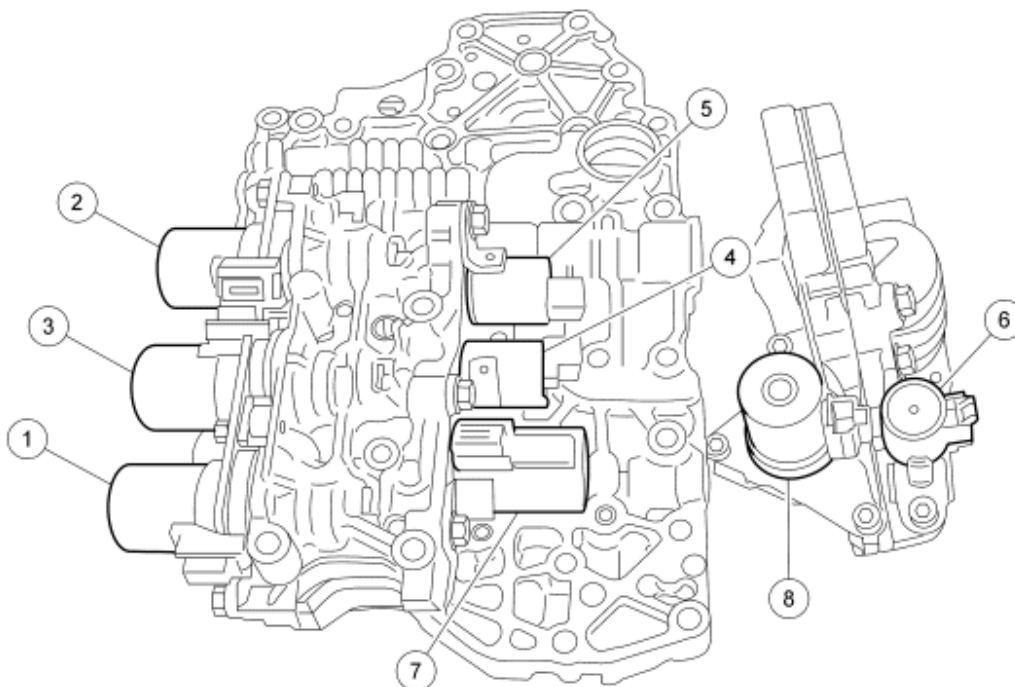
		circuit failure.	provide voltage drop across solenoid. Circuit open. Shorted or TCM driver circuit failed during OBD.	MIL off.	<u>Test A.</u>
P0777	Pressure Control Solenoid B (PCB) solenoid	PCB solenoid stuck on.	Mechanical or hydraulic failure of PCB.	Harsh engagement and shifts.	Go to <u>Pinpoint Test E.</u>
P0778	PCB	PCB solenoid circuit failure.	PCB circuit failed to provide voltage drop across solenoid. Circuit open or shorted or TCM driver failure during on-board diagnostic.	Harsh engagement and shifts.	Go to <u>Pinpoint Test E.</u>
P0791	Intermediate Shaft Speed Sensor	Insufficient input from intermediate shaft speed sensor.	TCM detected a loss of intermediate shaft speed signal during operation.	Harsh shift, possible abnormal shift schedule.	Go to <u>Pinpoint Test F.</u>
P0841	Transmission Fluid Pressure Switch	Transmission fluid pressure switch circuit failure open or shorted.	TCM has detected a loss of transaxle fluid pressure.	Harsh shifts, possible abnormal shift schedule.	Go to <u>Pinpoint Test H.</u>
P0882	TCM	TCM input power circuit voltage low.	TCM has detected a loss of voltage.	MIL on.	Go to <u>Pinpoint Test I.</u>
P0894	Internal Parts	Transaxle component slipping.	Transaxle can not engage forward clutch.	MIL on.	REFER to <u>Diagnosis By Symptom.</u>
P1783	TFT	Transmission overtemp condition indicated.	Transmission fluid temperature exceeded 135°C (275°F).	Increase in control pressure.	Go to <u>Pinpoint Test B.</u>
P2707	SSF	SSF functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	Go to <u>Pinpoint Test A.</u>
P2708	SSF	SSF functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present, MIL off.	Go to <u>Pinpoint Test A.</u>
P2709	SSF	SSF solenoid circuit failure.	SSF circuit fails to provide voltage drop across solenoid. Circuit open. Shorted or TCM	Not all gears present, MIL off.	Go to <u>Pinpoint Test A.</u>

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

			driver circuit failed during OBD.		
P0604	TCM	Internal TCM error.	TCM Random Access Memory (RAM) error.	MIL on.	INSTALL a new TCM.
P0605	TCM	Internal TCM error.	TCM Read-Only Memory (ROM) error.	MIL on.	INSTALL a new TCM.
U0073	Controller Area Network (CAN)	TCM communication bus off.	No bus signal received from TCM.	Possible firm shift feel.	REFER to <u>Introduction - Gasoline Engines</u> article.
U0100	CAN	Lost communication with PCM.	Bus signal not received from PCM.	Possible firm shift feel.	REFER to <u>Introduction - Gasoline Engines</u> article.

TRANSAXLE CONNECTOR LAYOUTS



N0044595

Fig. 16: Transaxle Solenoid Location
Courtesy of FORD MOTOR CO.

Item	Description
1	Shift Solenoid A (SEA)
2	Shift Solenoid B (SSB)
3	Shift Solenoid C (SSC)
4	Shift Solenoid D (SSD)

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

5	Shift Solenoid E (SSE)
6	Shift Solenoid F (SSF)
7	Pressure Control Solenoid A (PCA)
8	Pressure Control Solenoid B (PCB)

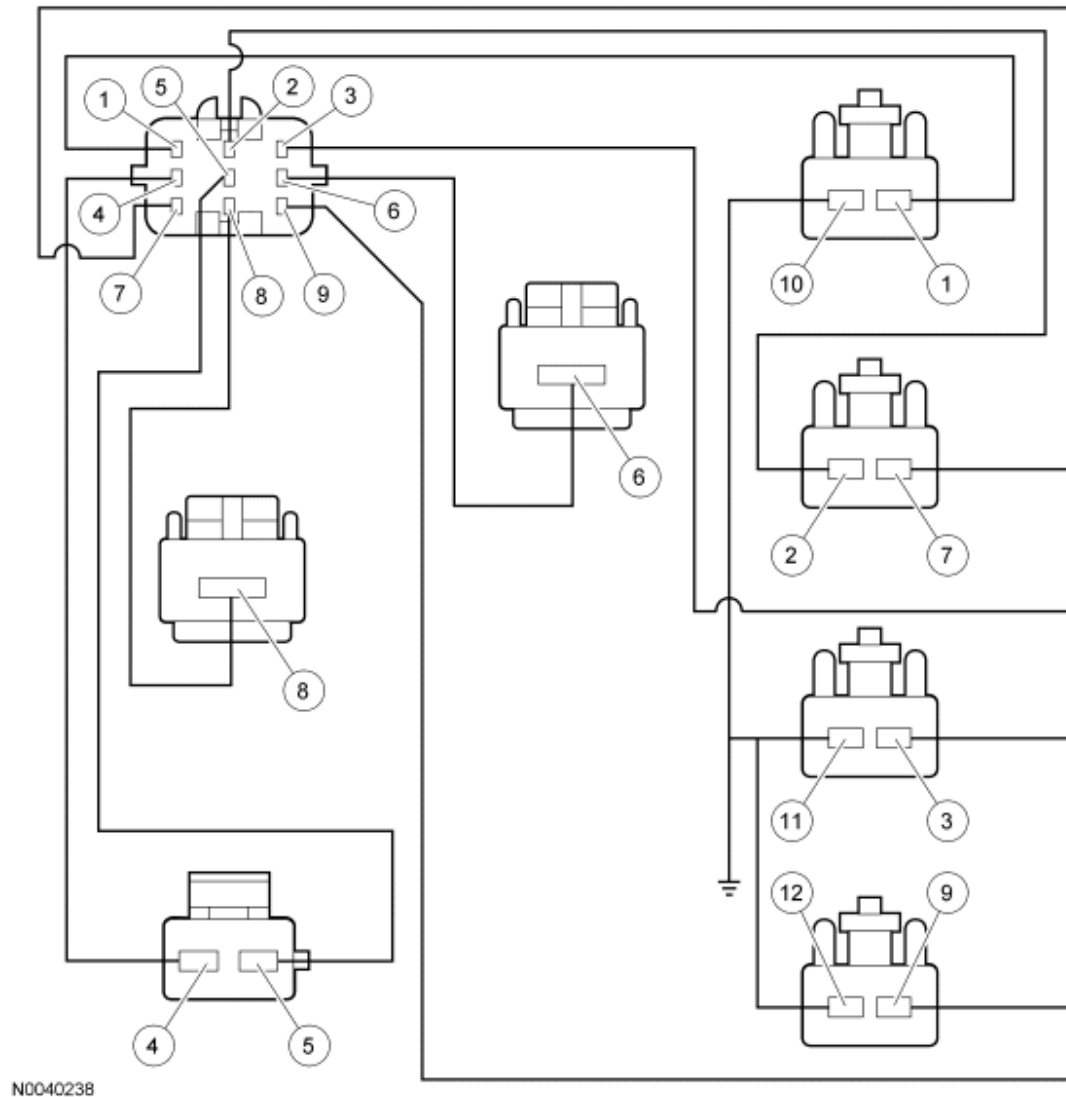


Fig. 17: Transaxle Main Valve Body Internal Harness C1534
Courtesy of FORD MOTOR CO.

Pin	Circuit Function	Connector Color
1	Shift Solenoid Pressure Control C (SSPCC)	Green
2	Pressure Control Solenoid A (PCA)	Black
3	Shift Solenoid Pressure Control A (SSPCA)	White
4	Transmission Fluid Temperature (TFT) SIGRTN	Black
5	TFT	Black

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

6	Shift Solenoid D (SSD)	White
7	PCA	Black
8	Shift Solenoid E (SSE)	Black
9	Shift Solenoid B (SSB)	Blue
10	Shift Solenoid C (SSC) GROUND	Green
11	Shift Solenoid A (SEA) GROUND	White
12	Shift Solenoid B (SSB) GROUND	Blue

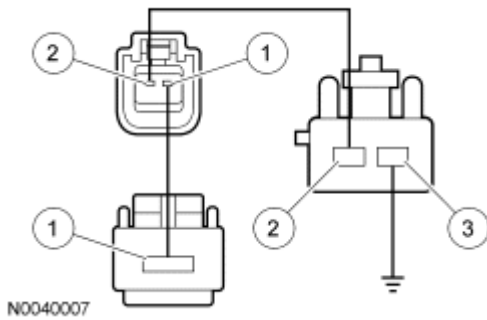


Fig. 18: Transaxle 5th Gear Valve Body Internal Harness Connectors
Courtesy of FORD MOTOR CO.

Pin	Circuit Function	Connector Color
1	Shift Solenoid F (SSF)	Black
2	Pressure Control Solenoid B (PCB)	Black
3	PCB Ground	Black

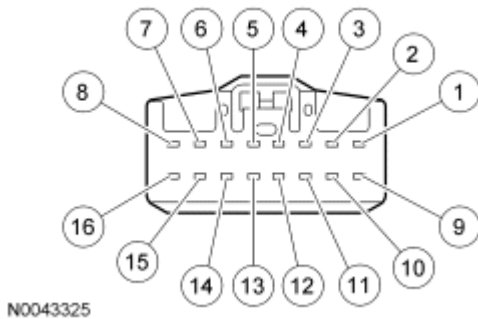


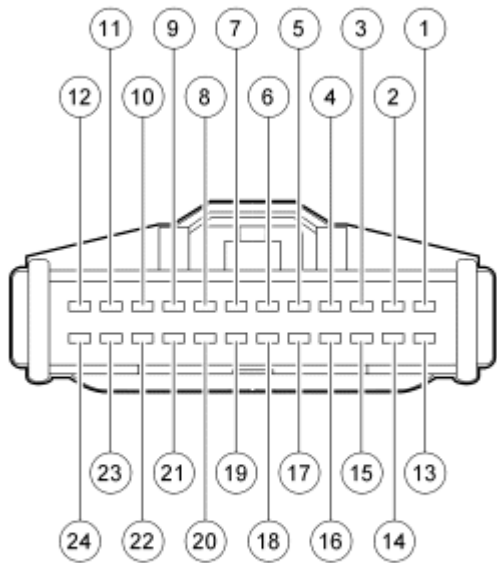
Fig. 19: Transmission Control Module (TCM) C2352A
Courtesy of FORD MOTOR CO.

Pin Number	Circuit Function
1	Ground
2	VPWR
3	VPWR
4	-
5	Pressure Control Solenoid A (PCA)-

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

6	PCA+
7	Shift Solenoid Pressure Control C (SSPCC)
8	Shift Solenoid Pressure Control A (SSPCA)
9	Ground
10	VPWR
11	-
12	Shift Solenoid F (SSF)
13	Shift Solenoid E (SSE)
14	Shift Solenoid D (SSD)
15	Pressure Control Solenoid B (PCB)
16	Shift Solenoid Pressure Control B (SSPCB)



N0040231

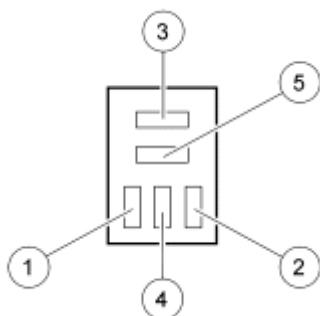
Fig. 20: Transmission Control Module (TCM) C2352B
Courtesy of FORD MOTOR CO.

Pin Number	Circuit Function
1	Controller Area Network (CAN)+
2	-
3	-
4	-
5	Transmission Fluid Temperature (TFT)/ Transmission Range (TR) signal return
6	TFT
7	Turbine Shaft Speed (TSS) signal return

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

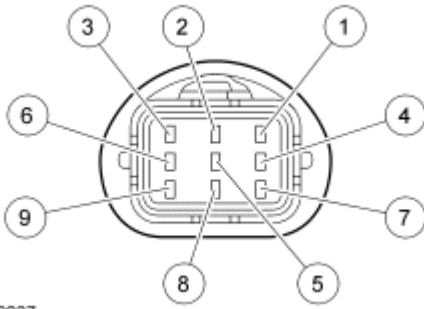
8	TSS signal
9	-
10	-
11	-
12	-
13	CAN-
14	-
15	-
16	Transmission Control Module (TCM) relay ground
17	Output Shaft Speed (OSS) signal
18	-
19	Intermediate shaft speed signal
20	Transmission fluid pressure signal
21	TR sensor
22	-
23	-
24	-



N0041818

Fig. 21: Transmission Control Module (TCM) Relay (Power Distribution Box (PDB) Side)
Courtesy of FORD MOTOR CO.

Pin Number	Circuit Function
1	Coil voltage
2	Ground
3	Voltage supplied at all times (overload protected)
4	Empty
5	Transmission Control Module (TCM) relay, output



N0040237

Fig. 22: Transaxle Main Valve Body Vehicle Harness C1534
Courtesy of FORD MOTOR CO.

Pin Number	Circuit Function
1	Shift Solenoid Pressure Control C (SSPCC)
2	Pressure Control Solenoid A (PCA)+
3	Shift Solenoid Pressure Control A (SSPCA)
4	Transmission Fluid Temperature (TFT) signal return
5	TFT
6	Shift Solenoid D (SSD)
7	PCA-
8	Shift Solenoid E (SSE)
9	Shift Solenoid Pressure Control B (SSPCB)



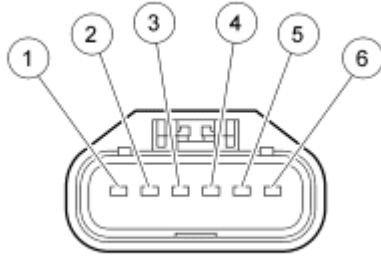
N0040239

Fig. 23: Transaxle 5th Gear Valve Body Vehicle Harness C1535
Courtesy of FORD MOTOR CO.

Pin Number	Circuit Function
1	Shift Solenoid F (SSF)
2	Pressure Control Solenoid B (PCB)

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ



N0040240

Fig. 24: Transmission Range (TR) Sensor Vehicle Harness C1537
Courtesy of FORD MOTOR CO.

Pin Number	Circuit Function
1	Ground
2	Transmission Range (TR) sensor return
3	TR sensor
4	Empty
5	Empty
6	Park/neutral signal



N0040235

Fig. 25: Output Shaft Speed (OSS) Sensor Vehicle Harness C193
Courtesy of FORD MOTOR CO.

Pin Number	Circuit Function
1	Ground
2	Output Shaft Speed (OSS) sensor signal
3	VPWR

2008 Ford Fusion S

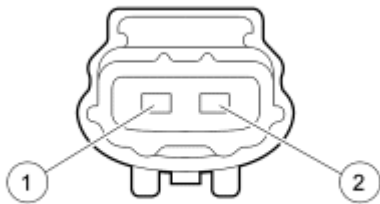
2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ



N0040235

Fig. 26: Intermediate Shaft Speed Sensor Vehicle Harness C1088
Courtesy of FORD MOTOR CO.

Pin Number	Circuit Function
1	Ground
2	Intermediate shaft speed sensor signal return
3	VPWR



N0040236

Fig. 27: Turbine Shaft Speed (TSS) Sensor Vehicle Harness C143
Courtesy of FORD MOTOR CO.

Pin Number	Circuit Function
1	Turbine Shaft Speed (TSS)
2	Signal return

TRANSMISSION RANGE (TR) SENSOR DIAGNOSIS CHART


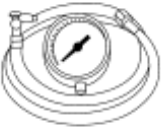

Selector Position	TR Sensor Pins Component Side	Expected Value
Park/Neutral	1 and 6	Less than 5 ohms
Park	2 and 3	3,370-5,230 ohms
Reverse	2 and 3	1,250-1,750 ohms
Neutral	2 and 3	630-870 ohms
Drive	2 and 3	330-450 ohms
Low	2 and 3	150-250 ohms

PINPOINT TESTS - OSC EQUIPPED VEHICLE

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Special Tools

Illustration	Tool Name	Tool Number
 ST1137-A	73 III Automotive Meter	105-R0057 or equivalent
 ST1565-A	Transmission Fluid Pressure Gauge Assembly	307-004 (T57L-77820-A)
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool	

Any time an electrical connector or solenoid body is disconnected, inspect the connector for terminal condition, corrosion and contamination. Also inspect the connector seal for damage. Clean, repair or install new as necessary.

Shift Solenoid Pre-Diagnosis

Use the following solenoid operation chart when carrying out Pinpoint Test A.

SOLENOID OPERATION CHART - CONVERTER ENGAGED

Selector Lever Position	TCM Commanded D Gear	Main Valve Body					5th Gear Valve Body
		SSPCA PWM	SSPCB PWM	SSPCC PWM	SSD (ON/OFF)	SSE (ON/OFF)	SSF (ON/OFF)
D	3	On	Off	Off	Off	On	On
	4	On	Off	Off	On	On	On
	5	On	Off	Off	On	On	Off
With a on/off solenoid, OFF = No Hydraulic Flow. With a Pulse-Width Modulation (PWM) solenoid, OFF = Full Hydraulic Flow.							

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Pressure Control Solenoid A (PCA) and Pressure Control Solenoid B (PCB) PWM solenoid percentage varies through all gears.

SOLENOID OPERATION CHART - CONVERTER DISENGAGED

Selector Lever Position	TCM Commanded D Gear	Main Valve Body					5th Gear Valve Body
		SSPCA PWM	SSPCB PWM	SSPCC PWM	SSD (ON/OFF)	SSE (ON/OFF)	SSF (ON/OFF)
P/N	P/N	Off	Off	Off	On	Off	On
R	R	Off	Off	Off	Off	Off	On
	L	Off	Off	On	On	On	On
D	1	Off	On	On	Off	Off	On
	2	Off	Off	On	Off	Off	On
	3	Off	Off	Off	Off	Off	On
	4	On	Off	Off	On	Off	On
	5	Off	Off	Off	On	Off	Off
<p>With a on/off solenoid, OFF = No Hydraulic Flow.</p> <p>With a PWM solenoid, OFF = Full Hydraulic Flow.</p> <p>With a PWM solenoid, OFF = Full Hydraulic Flow.</p> <p>PCA and PCB PWM solenoid percentage varies through all gears.</p>							

GEAR in Drive Mode

Drive Mode for GEAR operates only when:

- Output Shaft Speed (OSS) and Transmission Range (TR) sensor are operational.
- No OSS and TR sensor DTCs set.
- Engine ON.
- Torque Converter Clutch (TCC) is OFF (TCC cannot be engaged).
- Selector lever is in D.
- Vehicle speed is above 3 km/h (2 mph).

Torque Converter Clutch (TCC) in Drive Mode

The Drive Mode allows the technician to turn the TCC off and on.

Drive Mode for TCC OFF operates only when:

- OSS and TR sensors are operational.
- No OSS and TR sensor DTCs are set.
- Engine is ON.
- Selector lever is in D.
- Vehicle speed is above 32 km/h (20 mph).

Drive Mode for TCC ON operates ONLY when:

- OSS and TR sensors are operational.
- No OSS and TR sensor DTCs are set.
- Engine is ON.
- Selector lever is in D.
- Vehicle speed is above 32 km/h (20 mph).
- Transaxle in 2nd gear or higher.
- Transmission Fluid Temperature (TFT) is between 16°C-135°C (60°F-275°F).
- Brake is not applied below 32 km/h (20 mph).
- Steady vehicle speed is maintained.

Before Pinpoint Tests

NOTE: **Read and record all DTCs.**

NOTE: **Before entering pinpoint tests, check the transaxle, vehicle, TCM and PCM wiring harnesses for correct connections, bent or broken pins, corrosion, loose wires, correct routing, correct seals and their condition. Check the PCM, sensors and actuators for damage. Refer to the Introduction - Gasoline Engines**

article.

After the On-Board Diagnostic (OBD) procedures are completed, repair all DTCs.

Begin with non-transaxle related DTCs, then repair any transaxle-related DTCs. Refer to **Diagnostic Trouble Code (DTC) Charts** for information on condition and symptoms. This chart will be helpful in referring to the correct article(s) and aids in diagnosing internal transaxle concerns and external non-transaxle inputs. The pinpoint tests are used in diagnosing transaxle electrical concerns. Make sure that the vehicle wiring harness and the PCM are diagnosed as well. The **Introduction - Gasoline Engines** article will aid in diagnosing non-transaxle electronic components.

Pinpoint Tests

Refer to **SYSTEM WIRING DIAGRAMS** article for Fusion, **SYSTEM WIRING DIAGRAMS** article for Milan or **SYSTEM WIRING DIAGRAMS** article for MKZ for schematic and connector information.

PINPOINT TEST A: SHIFT AND TCC SOLENOIDS (ONLY)

NOTE: Refer to the Transaxle Main Valve Body Vehicle Harness Connector illustration **Transaxle Connector Layouts**.

NOTE: Refer to the Transaxle 5th Gear Valve Body Vehicle Harness Connector illustration **Transaxle Connector Layouts**.

A1 ELECTRONIC DIAGNOSTICS SETUP

- Key in OFF position.
- Select PARK.
- Make sure the transaxle main valve body vehicle harness C1534 and transaxle 5th gear valve body vehicle harness C1535 are fully seated, terminals are fully engaged in connector and in good condition before proceeding.
- Connect the diagnostic tool.
- Key in ON position.
- Enter the following diagnostic mode on the diagnostic tool: DataLogger
- **Does vehicle enter DataLogger Mode?**
YES : REMAIN in DataLogger Mode. Go to A2.
NO : REPEAT procedure to enter DataLogger Mode. If vehicle did not enter DataLogger Mode, REFER to the **Introduction - Gasoline Engines** article for diagnosis of PCM.

A2 WIGGLE TEST

- Remain in DataLogger Mode.
- Select the following PIDs to be monitored:
 - SSPCA
 - SSPCB
 - SSPCC

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

- SSD
- SSE
- SSF
- Start vehicle.
- Wiggle all wiring and connectors to the transaxle. Monitor the Solenoid State for changes.
- **Does the suspect solenoid(s) fault state change?**
YES : REPAIR the circuit. TEST the system for normal operation.
NO : Go to A3.

A3 CHECK SOLENOID FUNCTION

- Turn each solenoid ON and OFF.
- **Does the solenoid turn ON and OFF when commanded and can solenoid activation be heard?**
YES : Go to A4.
NO : Go to A5.

A4 GEAR IN DRIVE MODE OR TCC IN DRIVE MODE

- Select GEAR PID for Shift Solenoids, pre-qualifications for GEAR in Drive Mode are listed prior to these **Pinpoint Tests**.
- Select TCC PID for Torque Converter Clutch (TCC), pre-qualifications for TCC in Drive Mode are listed prior to these **Pinpoint Tests**.
- Turn vehicle OFF.
- **Does the transaxle upshift and downshift or torque converter engage/disengage when commanded?**
YES : CLEAR all DTCs. ROAD TEST to verify if concern is still present. If concern is still present, REFER to **Diagnosis By Symptom** to diagnose shift or torque converter concern.
NO : Go to A5.

A5 CHECK FOR BATTERY VOLTAGE

- Disconnect: Transaxle Main Valve Body Vehicle Harness C1534
- Disconnect: Transaxle 5th Gear Valve Body Vehicle Harness C1535
- Key in ON position.
- Visually inspect all wires and connectors for damage.
- Measure the voltage between transaxle main valve body vehicle harness C1534 and transaxle 5th gear valve body vehicle harness C1535 , harness side, and ground using the following chart:

Transaxle Main Valve Body Vehicle Harness C1534 and Transaxle 5th Gear Valve Body Vehicle Harness C1535	Shift Solenoid	Ground
C1534-3, circuit VET13 (GY/BU)	Shift Solenoid Pressure Control A (SSPCA)	Ground
C1534-9, circuit VET14 (VT/GN)	Shift Solenoid Pressure Control B (SSPCB)	Ground
C1534-1, circuit VET15 (YE/GY)	Shift Solenoid Pressure Control C	Ground

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	(SSPCC)	
C1534-6, circuit CET18 (GY/YE)	Shift Solenoid D (SSD)	Ground
C1534-8, circuit CET19 (VT/GY)	Shift Solenoid E (SSE)	Ground
C1535-1, CET44 (BU/BN)	SSF	Ground

- **Is the voltage greater than 10 volts?**

YES : Go to A7.

NO : Go to A6.

A6 CHECK FOR SHORTS TO GROUND

- Key in OFF position.
- Measure the resistance between transaxle main valve body vehicle harness C1534 and transaxle 5th gear valve body vehicle harness C1535, harness side and ground using the following chart:

Transaxle Main Valve Body Vehicle Harness C1534 and Transaxle 5th Gear Valve Body Vehicle Harness C1535	Shift Solenoid	Ground
C1534-3, circuit VET13 (GY/BU)	SSPCA	Ground
C1534-9, circuit VET14 (VT/GN)	SSPCB	Ground
C1534-1, circuit VET15 (YE/GY)	SSPCC	Ground
C1534-6, circuit CET18 (GY/YE)	SSD	Ground
C1534-8, circuit CET19 (VT/GY)	SSE	Ground
C1535-1, CET44 (BU/BN)	SSF	Ground

- **Are the resistances greater than 10,000 ohms?**

YES : Go to A8.

NO : REPAIR the circuit in question. TEST the system for normal operation.

A7 CHECK FOR SHORT TO BATTERY VOLTAGE

- Disconnect: Transmission Control Module (TCM) C2352a
- Key in ON position.
- Measure the voltage between transaxle main valve body vehicle harness C1534 and transaxle 5th gear valve body vehicle harness C1535, harness side and ground using the following chart:

Transaxle Main Valve Body Vehicle Harness C1534 and Transaxle 5th Gear Valve Body Vehicle Harness C1535	Shift Solenoid	Ground
C1534-3, circuit VET13 (GY/BU)	SSPCA	Ground
C1534-9, circuit VET14 (VT/GN)	SSPCB	Ground
C1534-1, circuit VET15 (YE/GY)	SSPCC	Ground
C1534-6, circuit CET18 (GY/YE)	SSD	Ground
C1534-8, circuit CET19 (VT/GY)	SSE	Ground
C1535-1, circuit CET44 (BU/BN)	SSF	Ground

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

- **Is any voltage present?**

YES : REPAIR the circuit in question. TEST the system for normal operation.

NO : INSTALL a new TCM. TEST the system for normal operation.

A8 CHECK FOR OPENS

- Disconnect: TCM C2352A
- Measure the resistance between transaxle main valve body vehicle harness C1534 and transaxle 5th gear valve body vehicle harness C1535, harness side, and TCM C2352A, harness side, for the suspected solenoid using the following chart:

Transaxle Main Valve Body Vehicle Harness C1534 and Transaxle 5th Gear Valve Body Vehicle Harness C1535	Shift Solenoid	TCM C2352A
C1534-3, circuit VET13 (GY/BU)	SSPCA	C2352A-8, circuit VET13 (GY/BU)
C1534-9, circuit VET14 (VT/GN)	SSPCB	C2352A-16, circuit VET14 (VT/GN)
C1534-1, circuit VET15 (YE/GY)	SSPCC	C2352A-7, circuit VET15 (YE/GY)
C1534-6, circuit CET18 (GY/YE)	SSD	C2352A-14, circuit CET18 (GY/YE)
C1534-8, circuit CET19 (VT/GY)	SSE	C2352A-13, circuit CET19 (VT/GY)
C1535-1, CET44 (BU/BN)	SSF	C2352A-12, circuit CET44 (BU/BN)

- **Are the resistances less than 5 ohms?**

YES : Go to A9.

NO : REPAIR the circuit in question. TEST the system for normal operation.

A9 ELECTRICAL SIGNAL CHECK

- Connect: TCM C2352A
- Enter the following diagnostic mode on the diagnostic tool: DataLogger Mode
- Select PID SSPCA, SSPCB, SSPCC, SSD, SSE or SSF.
- Start vehicle.
- Measure the voltage between transaxle main valve body vehicle harness C1534 and transaxle 5th gear valve body vehicle harness C1535, harness side, and ground for the suspected solenoid while cycling the solenoid ON and OFF for the suspected solenoid using the following chart:

Transaxle Main Valve Body Vehicle Harness C1534 and Transaxle 5th Gear Valve Body Vehicle Harness C1535	Shift Solenoid	Ground
C1534-3, circuit VET13 (GY/BU)	SSPCA	Ground
C1534-9, circuit VET14 (VT/GN)	SSPCB	Ground

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

C1534-1, circuit VET15 (YE/GY)	SSPCC	Ground
C1534-6, circuit CET18 (GY/YE)	SSD	Ground
C1534-8, circuit CET19 (VT/GY)	SSE	Ground
C1535-1, CET44 (BU/BN)	SSF	Ground

- **Does the voltage change?**

YES : Go to A10.

NO : INSTALL a new TCM. TEST the system for normal operation.

A10 CHECK SOLENOID RESISTANCE

- Measure the resistance between the suspected shift solenoid, component side, and the solenoid body using the following chart:

Shift Solenoid	Resistance value
SSPCA pin 3	1.0-4.2 ohms
SSPCB pin 9	1.0-4.2 ohms
SSPCC pin 1	1.0-4.2 ohms
SSD pin 6	10.9-26.2 ohms
SSE pin 8	10.9-26.2 ohms
SSF pin 1	10.9-26.2 ohms

- **Are the resistances within specification?**

YES : If SSPCA, SSPCB or SSPCC solenoid is suspected, go to A11 .

If SSD, SSE or SSF solenoid is suspected, go to A12 .

NO : INSTALL a new SSPCA, SSPCB, SSPCC, SSD, SSE or SSF solenoid. TEST the system for normal operation.

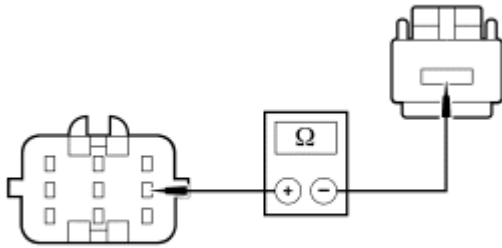
A11 CHECK SSPCA, SSPCB, SSPCC SOLENOID FOR A SHORT TO GROUND

- Measure the resistance between suspected solenoid pin on the transaxle main valve body internal harness, component side, and solenoid body.
- **Is the resistance less than 5 ohms?**

YES : INSTALL a new SSPCA, SSPCB or SSPCC solenoid. TEST the system for normal operation.

NO : Go to A12.

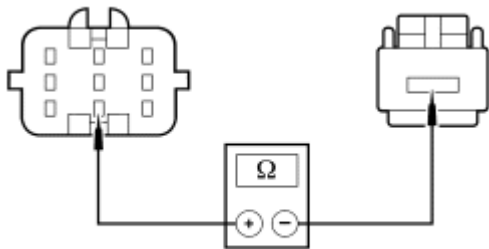
A12 CHECK THE TRANSAXLE MAIN VALVE BODY INTERNAL HARNESS FOR AN OPEN



N0083607

Fig. 28: Measuring Resistance Between Transaxle Main Valve Body Internal Harness C1534-6, Circuit CET18 (GY/YE)
Courtesy of FORD MOTOR CO.

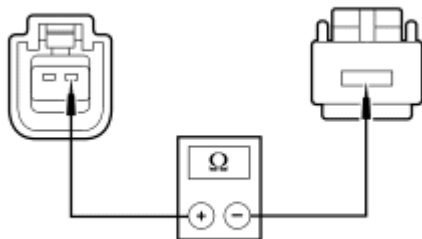
- Measure the resistance between transaxle main valve body internal harness C1534-6, circuit CET18 (GY/YE) and suspected solenoid.



N0083608

Fig. 29: Measuring Resistance Between Transaxle Main Valve Body Internal Harness C1534-8, Circuit CET18 (GY/YE)
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness C1534-8, circuit CET18 (GY/YE) and suspected solenoid.



N0083609

Fig. 30: Measuring Resistance Between Transaxle 5th Gear Valve Body Internal Harness C1535-1
Courtesy of FORD MOTOR CO.

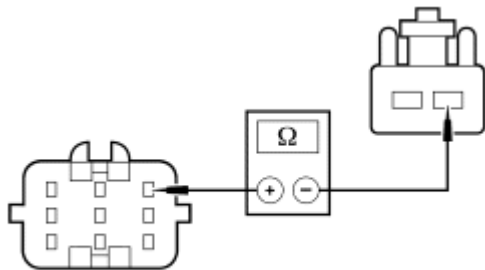
- Measure the resistance between transaxle 5th gear valve body internal harness C1535-1 and suspected solenoid

- **Are the resistances less than 5 ohms?**

YES : Go to A13.

NO : INSTALL a new transaxle main valve body internal harness. TEST the system for normal operation.

A13 CHECK THE TRANSAXLE INTERNAL HARNESS FOR AN OPEN

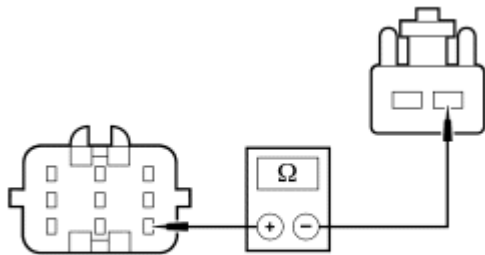


N0083610

Fig. 31: Measuring Resistance Between Transaxle Main Valve Body Internal Harness C1534-3, Circuit VET13 (GY/BU)

Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness C1534-3, circuit VET13 (GY/BU) and SSPCA transaxle internal harness connector.

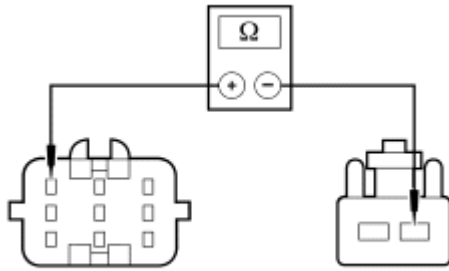


N0083611

Fig. 32: Measuring Resistance Between Transaxle Main Valve Body Internal Harness C1534-9, Circuit VET13 (GY/BU)

Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness C1534-9, circuit VET13 (GY/BU) and SSPCB transaxle internal harness connector.



N0083612

Fig. 33: Measuring Resistance Between Transaxle Main Valve Body Internal Harness C1534-1, Circuit VET13 (GY/BU)
Courtesy of FORD MOTOR CO.

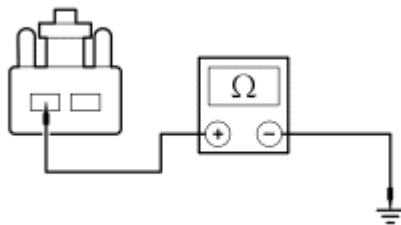
- Measure the resistance between transaxle main valve body internal harness C1534-1, circuit VET13 (GY/BU) and SSPCB transaxle internal harness connector.

- **Are the resistances less than 5 ohms?**

YES : Go to A14.

NO : INSTALL a new transaxle main valve body internal harness. TEST the system for normal operation.

A14 CHECK THE TRANSAXLE MAIN VALVE BODY INTERNAL HARNESS GROUND CIRCUIT



TIE0018556

Fig. 34: Checking Transaxle Main Valve Body Internal Harness Ground Circuit
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness C1534 ground eye hook as follows:
 - SSPCA - Between transaxle internal harness solenoid connector and ground eye hook.
 - SSPCB - Between transaxle internal harness solenoid connector and ground eye hook.
 - SSPCC - Between transaxle internal harness solenoid connector and ground eye hook.

- **Are the resistances less than 5 ohms?**

YES : INSTALL a new TCM. TEST the system for normal operation.

NO : INSTALL a new transaxle main valve body internal harness. TEST the system for normal operation.

PINPOINT TEST B: TFT SENSOR

NOTE: Refer to the Transaxle Main Valve Body Vehicle Harness Connector illustration Transaxle Connector Layouts.

B1 ELECTRONIC DIAGNOSTIC SETUP

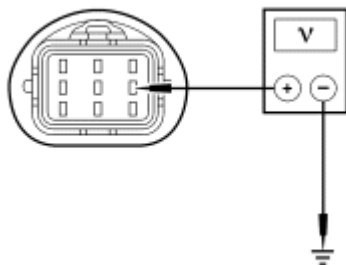
- Key in OFF position.
- Select PARK.
- Check to make sure the transaxle main valve body vehicle harness C1534 is fully seated, terminals are fully engaged in connector and in good condition before proceeding.
- Connect the diagnostic tool.
- Key in ON position.
- Enter the following diagnostic mode on the diagnostic tool: DataLogger Mode
- Select the following PIDs: TFT and TFTV to monitor.
- **Does the vehicle enter DataLogger Mode?**
YES : REMAIN in DataLogger Mode. Go to B2 .
NO : REPEAT procedure to enter DataLogger Mode. If vehicle did not enter DataLogger Mode, REFER to the Introduction - Gasoline Engines article for diagnosis of PCM.

B2 WARM-UP/COOL-DOWN CYCLE VERIFICATION

- While monitoring the TFT PID, carry out the following test: If transaxle is cold, run transaxle to warm it up. If transaxle is warm, allow transaxle to cool down.
- **Does the TFT PID increase as the transaxle is warmed up or decrease as the transaxle is cooled or does the TFT or TFTV PID drop in and out of range?**
YES : If the TFT PID increase as the transaxle is warmed or decrease as the transaxle is cooled, CLEAR all DTCs. ROAD TEST to verify if concern is still present. If concern is still present, REFER to Diagnosis By Symptom to diagnose transaxle overheating. If the TFT drops in and out of range, INSPECT for intermittent concern in the internal/external harness, sensor or connector.
NO : Go to B3.

B3 CHECK THE TCM AND TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS FOR POWER

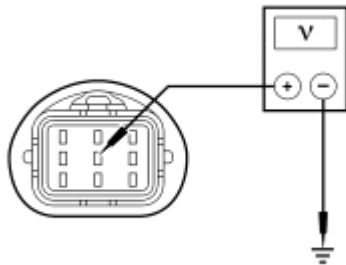
- Disconnect: Transaxle Main Valve Body Vehicle Harness C1534
- Visually inspect all wires and connectors for damage.



N0083613

Fig. 35: Measuring Voltage Between Transaxle Main Valve Body Vehicle Harness C1534-4, Circuit VET28 (GY/VT)
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle main valve body vehicle harness C1534-4, circuit VET28 (GY/VT), harness side and ground.



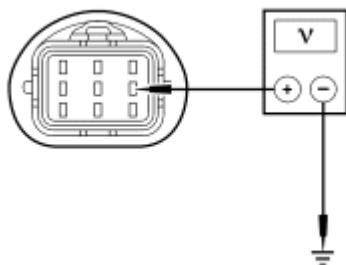
N0083614

Fig. 36: Measuring Voltage Between Transaxle Main Valve Body Vehicle Harness C1534-5, Circuit VET27 (BN/YE)
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle main valve body vehicle harness C1534-5, circuit VET27 (BN/YE), harness side and ground.
- **Is the voltage greater than 10 volts?**
YES : Go to B4.
NO : Go to B5.

B4 CHECK THE TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS C1534 FOR A SHORT TO POWER

- Disconnect: Transmission Control Module (TCM) C2352b
- Visually inspect all wires and connectors for damage.

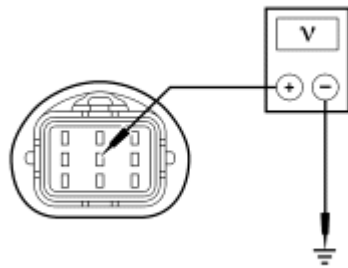


N0083613

Fig. 37: Measuring Voltage Between Transaxle Main Valve Body Vehicle Harness C1534-4, Circuit VET28 (GY/VT)
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle main valve body vehicle harness C1534-4, circuit VET28

(GY/VT), harness side and ground.



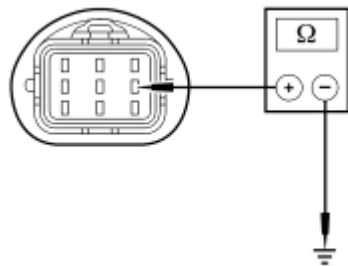
N0083614

Fig. 38: Measuring Voltage Between Transaxle Main Valve Body Vehicle Harness C1534-5, Circuit VET27 (BN/YE)
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle main valve body vehicle harness C1534-5, circuit VET27 (BN/YE), harness side and ground.
- **Is the voltage greater than 10 volts?**
YES : REPAIR the circuit for a short to power. TEST the system for normal operation.
NO : INSTALL a new TCM. TEST the system for normal operation.

B5 CHECK THE TCM AND TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS FOR GROUND

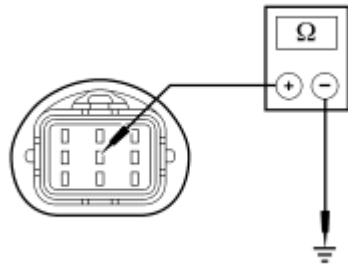
- Connect: TCM C2352B
- Visually inspect all wires and connectors for damage.



N0083615

Fig. 39: Measuring Resistance Between Transaxle Main Valve Body Vehicle Harness C1534-4, Circuit VET28 (GY/VT)
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body vehicle harness C1534-4, circuit VET28 (GY/VT), harness side and ground.



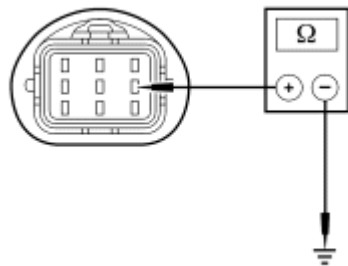
N0083616

Fig. 40: Measuring Resistance Between Transaxle Main Valve Body Vehicle Harness C1534-5, Circuit VET27 (BN/YE)
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body vehicle harness C1534-5, circuit VET27 (BN/YE), harness side and ground.
- **Are the resistances greater than 10,000 ohms?**
YES : Go to B7.
NO : Go to B6.

B6 CHECK THE TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS C1534 FOR A SHORT TO GROUND

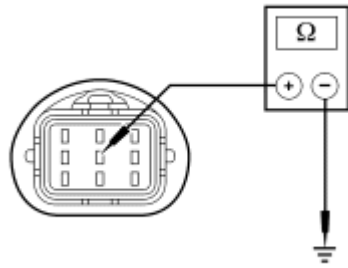
- Disconnect: TCM C2352B
- Visually inspect all wires and connectors for damage.



N0083615

Fig. 41: Measuring Resistance Between Transaxle Main Valve Body Vehicle Harness C1534-4, Circuit VET28 (GY/VT)
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body vehicle harness C1534-4, circuit VET28 (GY/VT), harness side and ground.

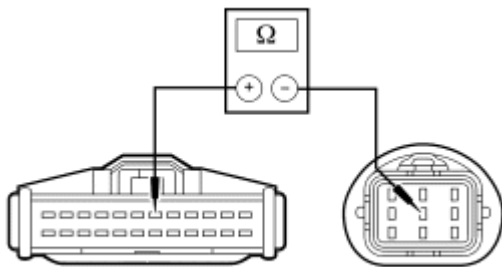


N0083616

Fig. 42: Measuring Resistance Between Transaxle Main Valve Body Vehicle Harness C1534-5, Circuit VET27 (BN/YE)
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body vehicle harness C1534-5, circuit VET27 (BN/YE), harness side and ground.
- **Are the resistances greater than 10,000 ohms?**
YES : INSTALL a new TCM. TEST the system for normal operation.
NO : REPAIR the circuit for a short to ground. TEST the system for normal operation.

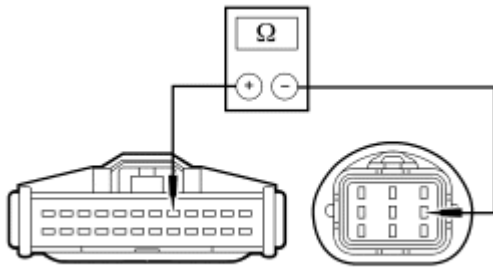
B7 CHECK THE TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS C1534 FOR AN OPEN



N0053697

Fig. 43: Checking Vehicle Harness For An Open (1 Of 2)
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body vehicle harness C1534-5, circuit VET27 (BN/YE), harness side and TCM C2352B-6, circuit VET27 (BN/YE).



N0053698

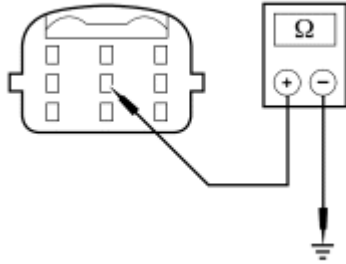
Fig. 44: Checking Vehicle Harness For An Open (2 Of 2)
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body vehicle harness C1534-4, circuit VET28 (GY/VT), and TCM C2352B-5, circuit VET28 (GY/VT).
- **Are the resistances less than 5 ohms?**

YES : Go to B8.

NO : REPAIR the circuit. TEST the system for normal operation.

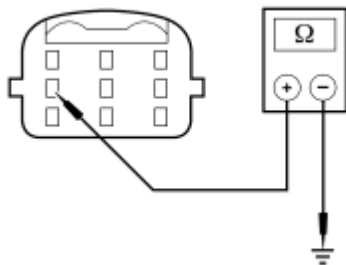
B8 CHECK THE TRANSAXLE MAIN VALVE BODY INTERNAL HARNESS FOR A SHORT TO GROUND



N0083617

Fig. 45: Measuring Resistance Between Transaxle Main Valve Body Internal Harness C1534-5 & Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness C1534-5 and ground.



N0083618

Fig. 46: Measuring Resistance Between Transaxle Main Valve Body Internal Harness C1534-4 & Ground

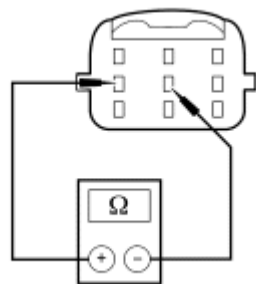
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness C1534-4 and ground.
- **Are the resistances greater than 10,000 ohms?**

YES : Go to B9.

NO : INSTALL a new transaxle main valve body internal harness. TEST the system for normal operation.

B9 CHECK RESISTANCE OF THE TFT SENSOR



N0053699

Fig. 47: Checking Resistance Of TFT Sensor

Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness C1534-5 and C1534-4.
- Record the resistance.
- Resistance should be approximately in the following ranges:

- -20°C (-4°F) - 236K-317K ohms
- 0°C (32°F) - 83.2K-107K ohms
- 20°C (68°F) - 33.5K-41.2K ohms
- 40°C (104°F) - 14.6K-17.6K ohms
- 60°C (140°F) - 7.08K-8.01K ohms
- 80°C (176°F) - 3.61K-4.06K ohms
- 100°C (212°F) - 1.96K-2.20K ohms
- 120°C (248°F) - 1.13K-1.25K ohms
- 130°C (266°F) - 0.87K-0.96K ohms

- **Are the resistances in the range?**

YES : REFER to **Diagnosis By Symptom** to diagnose an overheating concern.

NO : INSTALL a new transaxle internal harness. TEST the system for normal operation.

PINPOINT TEST C: TR SENSOR

NOTE: Refer to the Transmission Range (TR) Sensor Connector illustration **Transaxle**

Connector Layouts.

NOTE: Refer to the Transmission Range (TR) Sensor Diagnosis Chart Transaxle Connector Layouts.

C1 VERIFY TR SENSOR ALIGNMENT

- Verify the Transmission Range (TR) sensor alignment.
- **Is the TR sensor correctly aligned?**

YES : Go to C2.

NO : ADJUST the TR sensor. REFER to Transmission Range (TR) Sensor Adjustment. TEST the system for normal operation.

C2 VERIFY THE SELECTOR LEVER CABLE/LINKAGE ADJUSTMENT

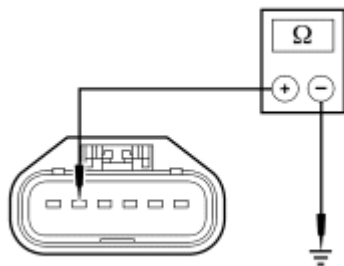
- Verify that the selector lever cable/linkage is correctly adjusted. Refer to AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS article.
- **Is the selector lever cable/linkage correctly adjusted?**

YES : Go to C3.

NO : ADJUST the selector lever cable/linkage. REFER to AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS article. TEST the system for normal operation.

C3 CHECK THE TR SENSOR CIRCUITRY FOR A SHORT TO GROUND

- Key in OFF position.
- Disconnect: TR Sensor C1537
- Disconnect: Transmission Control Module (TCM) C2352B

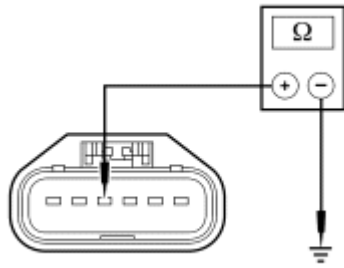


N0083619

Fig. 48: Measuring Resistance Between TR Sensor C1537-2, Circuit VET28 (GY/VT) & Ground

Courtesy of FORD MOTOR CO.

- Measure the resistance between TR sensor C1537-2, circuit VET28 (GY/VT) and ground.



N0083620

Fig. 49: Measuring Resistance Between C1537-3, Circuit CET37 (BN/WH) & Ground
Courtesy of FORD MOTOR CO.

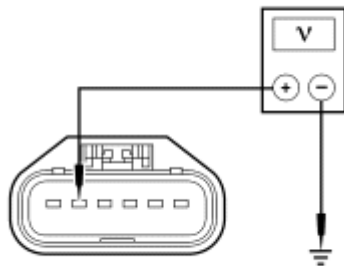
- Measure the resistance between C1537-3, circuit CET37 (BN/WH) and ground.
- **Is the resistance greater than 10,000 ohms?**

YES : Go to C4.

NO : REPAIR the circuit in question for an open. TEST the system for normal operation.

C4 CHECK THE TR SENSOR CIRCUITRY FOR A SHORT TO POWER

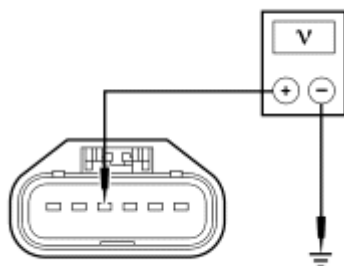
- Disconnect: Transaxle C1534



N0083625

Fig. 50: Measuring Voltage Between TR Sensor C1537-2, Circuit VET28 (GY/VT) & Ground
Courtesy of FORD MOTOR CO.

- Measure the voltage between TR sensor C1537-2, circuit VET28 (GY/VT) and ground.



N0083626

Fig. 51: Measuring Voltage Between TR Sensor C1537-3, Circuit CET37 (BN/WH) & Ground
Courtesy of FORD MOTOR CO.

- Measure the voltage between TR sensor C1537-3, circuit CET37 (BN/WH) and ground.
- **Is the voltage greater than 10 volts?**
YES : REPAIR the circuit in question for a short to power. TEST the system for normal operation.
NO : Go to C5.

C5 CHECK THE TR SENSOR CIRCUITRY FOR AN OPEN

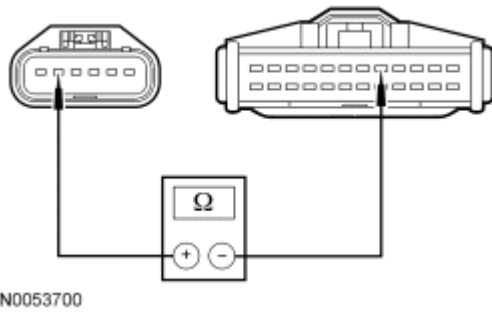


Fig. 52: Checking TR Sensor Circuitry For An Open (1 Of 2)
 Courtesy of FORD MOTOR CO.

- Measure the resistance between TR sensor C1537-2, circuit VET28 (GY/VT) and TCM C2352B-5, circuit VET28 (GY/VT).

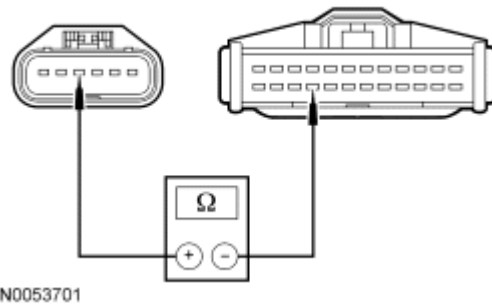
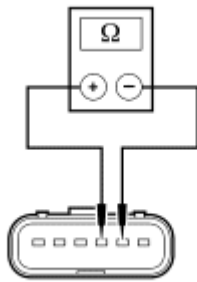


Fig. 53: Checking TR Sensor Circuitry For An Open (2 Of 2)
 Courtesy of FORD MOTOR CO.

- Measure the resistance between TR sensor C1537-3, circuit CET37 (BN/WH) and TCM C2352B-21, circuit CET37 (BN/WH).
- **Are the resistances less than 5 ohms?**
YES : Go to C6.
NO : REPAIR the circuit in question. TEST the system for normal operation.

C6 CHECK THE TR SENSOR RESISTANCE



N0072355

Fig. 54: Checking TR Sensor Resistance
Courtesy of FORD MOTOR CO.

- Measure the resistance between TR sensor pins 2 and 3 component side, while shifting the transmission manual control lever as follows:
 - PARK position, 3,370-5,230 ohms
 - REVERSE position, 1,250-1,750 ohms
 - NEUTRAL position, 630-870 ohms
 - DRIVE position, 330-450 ohms
 - LOW position, 150-250 ohms

- **Are the resistances within the expected values?**

YES : INSTALL a new TCM. TEST the system for normal operation.

NO : INSTALL a new TR sensor. REFER to Transmission Range (TR) Sensor. TEST the system for normal operation.

PINPOINT TEST D: ELECTRONIC PCA

NOTE: Refer to the Transaxle Main Valve Body Vehicle Harness Connector illustration Transaxle Connector Layouts.

NOTE: Read and record all DTCs. All Transmission Range (TR) sensor and Output Shaft Speed (OSS) DTCs must be repaired before entering output state control.

D1 ELECTRONIC DIAGNOSTICS SETUP

- Key in OFF position.
- Select PARK.
- Check to make sure transaxle main valve body vehicle harness C1534 is fully seated, terminals are fully engaged in the connector and in good condition before proceeding.
- Install the Transmission Fluid Pressure Gauge into the line tap.
- Connect the diagnostic tool.
- Start vehicle
- Enter the following diagnostic mode on the diagnostic tool: DataLogger Mode
- **Does the vehicle enter the DataLogger Mode?**

YES : REMAIN in DataLogger Mode. Go to D2 .

NO : REPEAT procedure to ENTER DataLogger Mode. If vehicle did not enter output state control, REFER to **Introduction - Gasoline Engines** article for diagnosis of Transmission Control Module (TCM).

D2 SOLENOID FUNCTIONAL TEST

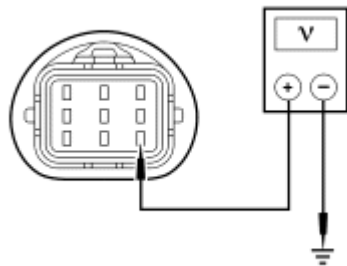
- Monitor the Transmission Fluid Pressure Gauge.
- Select PCA PID.
- Increase engine speed above 1,500 RPM.
- Change psi value.
- Monitor the Transmission Fluid Pressure Gauge and the commanded pressure.
- Select another value 50-150 psi.
- **Does the pressure reading match the commanded pressure?**

YES : CLEAR DTCs. TEST the system for normal operation.

NO : Go to D3.

D3 CHECK THE TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS AND PCM FOR A SHORT TO POWER

- Key in OFF position.
- Disconnect: Transaxle C1534
- Visually inspect all wires and connectors for damage.
- Key in ON position.

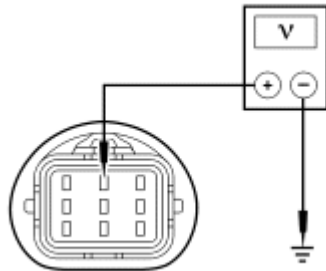


N0083627

Fig. 55: Measuring Voltage Between Transaxle Main Valve Body Vehicle Harness C1534-7, Circuit CET42 (GN/VT)

Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle main valve body vehicle harness C1534-7, circuit CET42 (GN/VT) and ground.



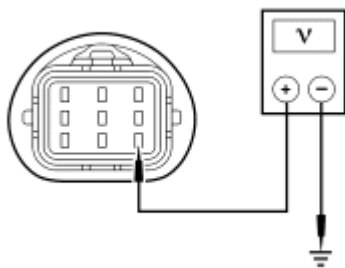
N0083628

Fig. 56: Measuring Voltage Between Transaxle Main Valve Body Vehicle Harness C1534-2, Circuit CET43 (GY)
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle main valve body vehicle harness C1534-2, circuit CET43 (GY) and ground.
- **Is the voltage greater than 10 volts?**
YES : Go to D4.
NO : Go to D5.

D4 CHECK THE TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS FOR A SHORT TO POWER

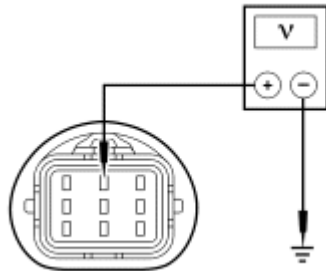
- Key in OFF position.
- Disconnect: TCM C2352B
- Key in ON position.



N0083627

Fig. 57: Measuring Voltage Between Transaxle Main Valve Body Vehicle Harness C1534-7, Circuit CET42 (GN/VT)
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle main valve body vehicle harness C1534-7, circuit CET42 (GN/VT) and ground.

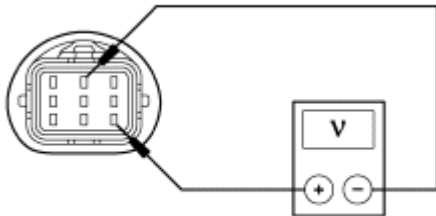


N0083628

Fig. 58: Measuring Voltage Between Transaxle Main Valve Body Vehicle Harness C1534-2, Circuit CET43 (GY)
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle main valve body vehicle harness C1534-2, circuit CET43 (GY) and ground.
- **Is the voltage greater than 10 volts?**
YES : REPAIR the circuit for a short to power. TEST the system for normal operation.
NO : INSTALL a new TCM. TEST the system for normal operation.

D5 CHECK THE ELECTRICAL SIGNAL



E0011602

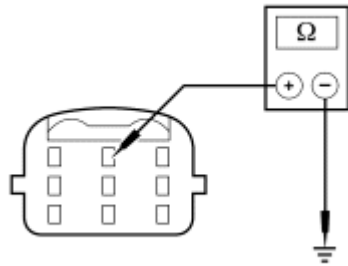
Fig. 59: Measuring Voltage
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle main valve body vehicle harness C1534-7, circuit CET42 (GN/VT) and transaxle vehicle harness C1534-2, circuit CET43 (GY).
- START vehicle.
- Activate solenoids (ON and OFF) while monitoring the voltage reading.
- Enter the following diagnostic mode on the diagnostic tool: DataLogger Mode
- Select PCA PID.
- Select a value 50-150 psi.
- Select another value 50-150 psi.
- **Does the voltage change?**
YES : Go to D6.

NO : CHECK for open or short circuit in harness or TCM.

D6 CHECK THE TRANSAXLE MAIN VALVE BODY INTERNAL HARNESS FOR A SHORT TO GROUND

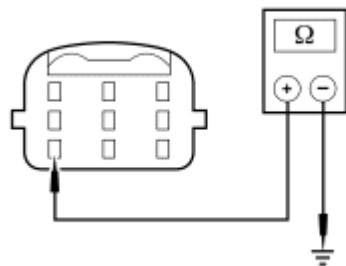
- Key in OFF position.
- Disconnect: Pressure Control Solenoid A (PCA) Solenoid Electrical Connector



N0083629

Fig. 60: Measuring Resistance Between Transaxle Main Valve Body Internal Harness C1534-2
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness C1534-2 (component side, transaxle internal harness), and ground.



N0083630

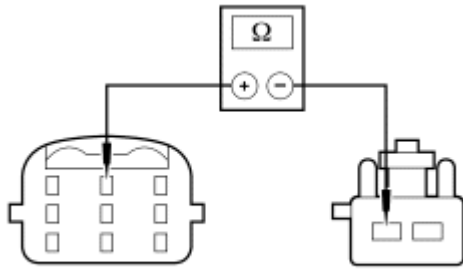
Fig. 61: Measuring Resistance Between Transaxle Main Valve Body Internal Harness C1534-7
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness C1534-7 (component side, transaxle internal harness), and ground.
- **Are the resistances greater than 10,000 ohms?**

YES : Go to D7.

NO : INSTALL a new transaxle main valve body internal harness. TEST the system for normal operation.

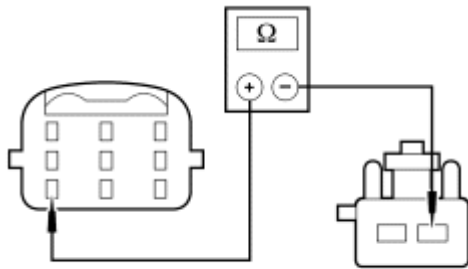
D7 CHECK THE TRANSAXLE MAIN VALVE BODY INTERNAL HARNESS FOR AN OPEN



N0083632

Fig. 62: Measuring Resistance Between Transaxle Main Valve Body Internal Harness PCA Connector Pin 2
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness PCA connector pin 2 (component side, transaxle internal harness), and transaxle main valve body internal harness C1534-2.



N0083631

Fig. 63: Measuring Resistance Between Transaxle Main Valve Body Internal Harness PCA Connector Pin 7
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle main valve body internal harness PCA connector pin 7 (component side, transaxle internal harness), and transaxle main valve body internal harness C1534-7.
- **Are the resistances less than 5 ohms?**
YES : Go to D8.
NO : INSTALL a new transaxle main valve body internal harness. TEST the system for normal operation.

D8 CHECK SOLENOID RESISTANCE AT THE SOLENOID

- Key in OFF position.
- Measure and record the resistance between PCA solenoid pins.
- **Is the resistance between 2.4 and 7.3 ohms?**
YES : Go to D9.
NO : INSTALL a new PCA solenoid. TEST the system for normal operation.

D9 CHECK THE SOLENOID FOR A SHORT TO GROUND

- Measure and record the resistance between the PCA solenoid and the solenoid body.
- **Is the resistance greater than 10,000 ohms?**

YES : REFER to **Diagnosis By Symptom** for diagnosis of pressure concerns. TEST the system for normal operation.

NO : INSTALL a new PCA solenoid. TEST the system for normal operation.

PINPOINT TEST E: ELECTRONIC PCB

NOTE: Refer to the Transaxle 5th Gear Valve Body Vehicle Harness Connector illustration **Transaxle Connector Layouts**.

NOTE: Read and record all DTCs. All Transmission Range (TR) sensor and Output Shaft Speed (OSS) DTCs must be repaired before entering output state control.

E1 ELECTRONIC DIAGNOSTICS SETUP

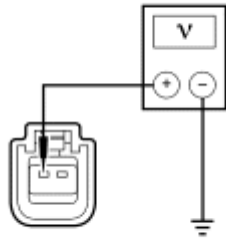
- Key in OFF position.
- Select PARK.
- Check to make sure the transaxle main valve body vehicle harness C1534 is fully seated, terminals are fully engaged in the connector and in good condition before proceeding.
- Install the Transmission Fluid Pressure Gauge into the line tap.
- Connect the diagnostic tool.
- Key in START position.
- Enter the following diagnostic mode on the diagnostic tool: DataLogger Mode
- **Does the vehicle enter the DataLogger Mode?**
YES : REMAIN in DataLogger Mode. Go to E2 .
NO : REPEAT procedure to ENTER DataLogger Mode. If vehicle did not enter DataLogger Mode, REFER to **Introduction - Gasoline Engines** article for diagnosis of Transmission Control Module (TCM).

E2 SOLENOID FUNCTIONAL TEST

- Select PCB PID.
- Increase engine speed above 1,500 RPM.
- Select value: 50, 70, 90, 110, 130 or 150 psi.
- Monitor the Transmission Fluid Pressure Gauge and commanded pressure.
- Select another value 50-150 psi.
- **Does the pressure reading match the commanded pressure?**
YES : CLEAR DTCs. TEST the system for normal operation.
NO : Go to E3.

E3 CHECK THE TRANSAXLE 5TH GEAR VALVE BODY VEHICLE HARNESS AND TCM FOR A SHORT TO POWER

- Key in OFF position.
- Disconnect: Transaxle 5th Gear Valve Body Vehicle Harness C1535
- Visually inspect all wires and connectors for damage.
- Key in ON position.



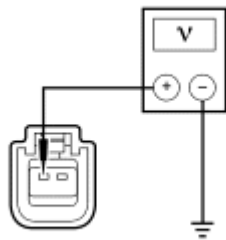
N0040006

Fig. 64: Checking Electrical Signal
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle 5th gear valve body vehicle harness C1535-2, circuit CET45 (YE/BU) and ground.
- **Is the voltage greater than 10 volts?**
YES : Go to E4.
NO : Go to E5.

E4 CHECK THE TRANSAXLE 5TH GEAR VALVE BODY VEHICLE HARNESS C1535 FOR A SHORT TO POWER

- Key in OFF position.
- Disconnect: TCM C2352A
- Key in ON position.



N0040006

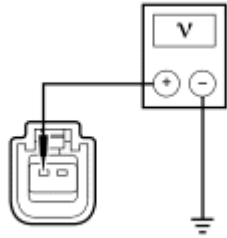
Fig. 65: Checking Electrical Signal
Courtesy of FORD MOTOR CO.

- Measure the voltage between transaxle 5th gear valve body vehicle harness C1535-2, circuit CET45 (YE/BU) and ground.
- **Is the voltage greater than 10 volts?**

YES : REPAIR circuit CET45 (YE/BU) for a short to power. TEST the system for normal operation.

NO : INSTALL a new TCM. TEST the system for normal operation.

E5 CHECK THE ELECTRICAL SIGNAL



N0040006

Fig. 66: Checking Electrical Signal
Courtesy of FORD MOTOR CO.

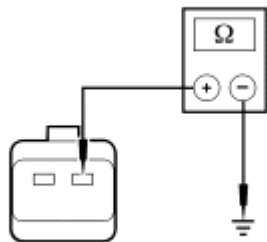
- Measure the voltage between transaxle 5th gear valve body vehicle harness C1535-2, circuit CET45 (YE/BU) and ground.
- Enter the following diagnostic mode on the diagnostic tool: DataLogger Mode
- Select PCB PID.
- Monitor the voltage reading.
- Select a value 50-150 psi.
- Select another value 50-150 psi.
- **Does the voltage change?**

YES : Go to E6.

NO : CHECK for open or short circuit in harness or TCM.

E6 CHECK THE PCB TRANSAXLE INTERNAL HARNESS FOR A SHORT TO GROUND

- Key in OFF position.
- Disconnect: Pressure Control Solenoid B (PCB) Solenoid Electrical Connector



N0072357

Fig. 67: Checking Transaxle Internal Harness For A Short To Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle 5th gear valve body vehicle harness C1535-2, (component side, transaxle internal harness), and ground.

- **Is the resistance greater than 10,000 ohms?**

YES : Go to E7.

NO : INSTALL a new transaxle internal harness. TEST the system for normal operation.

E7 CHECK THE TRANSAXLE INTERNAL HARNESS FOR AN OPEN

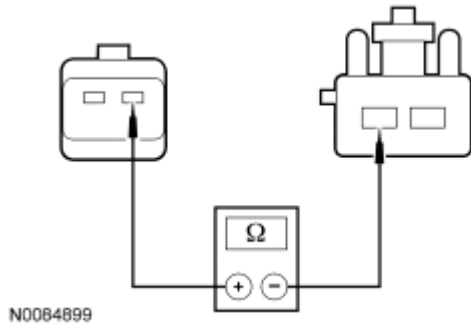


Fig. 68: Measuring Resistance Between Transaxle C1535-2 & PCB Component Side
Courtesy of FORD MOTOR CO.

- Measure the resistance between transaxle C1535-2, and PCB component side transaxle 5th gear valve body internal harness pin 2.

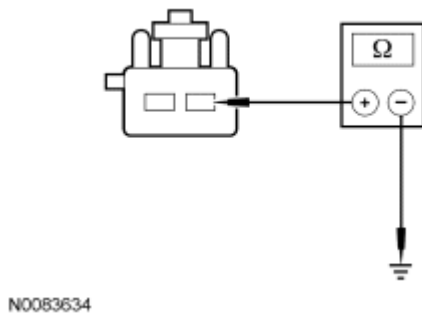


Fig. 69: Measuring Resistance Between Ground & PCB Component Connector Pin 3
Courtesy of FORD MOTOR CO.

- Measure the resistance between ground and PCB component connector pin 3.
- **Are the resistances less than 5 ohms?**

YES : Go to E8.

NO : INSTALL a new transaxle internal harness. TEST the system for normal operation.

E8 CHECK SOLENOID RESISTANCE AT THE SOLENOID

- Key in OFF position.
- Measure and record the resistance between PCB solenoid pins.
- **Is the resistance between 2.4 and 7.3 ohms?**

YES : Go to E9.

NO : INSTALL a new PCB solenoid. TEST the system for normal operation.

E9 CHECK THE SOLENOID FOR A SHORT TO GROUND

- Measure and record the resistance between the PCB solenoid and the solenoid body.
- **Is the resistance greater than 10,000 ohms?**

YES : REFER to **Diagnosis By Symptom** for diagnosis of pressure concerns. TEST the system for normal operation.

NO : INSTALL a new PCB solenoid. TEST the system for normal operation.

PINPOINT TEST F: INTERMEDIATE SHAFT SPEED SENSOR AND OSS SENSOR

NOTE: **Refer to the Intermediate Shaft Speed Sensor and Output Shaft Speed (OSS) Sensor Connector illustrations Transaxle Connector Layouts.**

F1 ELECTRONIC DIAGNOSTICS SETUP

- Check to make sure the transaxle harness connectors are fully seated, terminals are fully engaged in connector and in good condition before proceeding.
- Connect the diagnostic tool.
- Key in ON position.
- Enter the following diagnostic mode on the diagnostic tool: DataLogger Mode
- Select the intermediate shaft speed or OSS sensor PID.
- **Does vehicle enter DataLogger Mode?**

YES : REMAIN in DataLogger Mode. Go to F2 .

NO : REPEAT procedure to ENTER DataLogger Mode. If vehicle did not enter DataLogger Mode, REFER to the **Introduction - Gasoline Engines** article for diagnosis of Transmission Control Module (TCM).

F2 DRIVE CYCLE TEST

- While monitoring the appropriate sensor PID, drive the vehicle so that the transaxle upshifts and downshifts through all gears.
- **Does the intermediate shaft speed or OSS sensor PID increase and decrease with engine and vehicle speed?**

YES : Go to F3.

NO : If the intermediate shaft speed or OSS sensor PID does not increase and decrease with engine and vehicle speed, INSPECT for open or short in vehicle harness, sensor, a TCM concern, or internal hardware concern. Go to F4 .

F3 DRIVE CYCLE TEST ERRATIC

- While monitoring the appropriate sensor PID, drive the vehicle so that the transaxle upshifts and downshifts through all gears.
- **Is the intermediate shaft speed or OSS sensor PID signal erratic (drop to zero or near zero and return to normal operation)?**

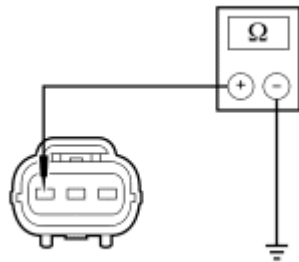
YES : If the sensor signal is erratic, INSPECT for intermittent concern in the harness, sensor or

connector. Go to F4 .

NO : CLEAR all DTCs. RERUN On-Board Diagnostic (OBD).

F4 CHECK THE SENSOR BATTERY SUPPLY CIRCUIT FOR A SHORT TO GROUND

- Key in OFF position.
- Disconnect: Intermediate Shaft Speed Sensor C1088
- Disconnect: OSS Sensor C193
- Disconnect: TCM C2352a

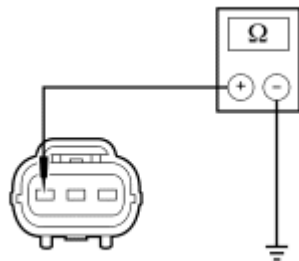


N0040225

Fig. 70: Checking Sensor Battery Supply Circuit For A Short To Ground (Intermediate Shaft Speed Sensor)

Courtesy of FORD MOTOR CO.

- For intermediate shaft speed sensor, measure the resistance between sensor C1088-3, circuit CE613 (WH/VT) and ground.



N0040225

Fig. 71: Checking Sensor Battery Supply Circuit For A Short To Ground (OSS Sensor)

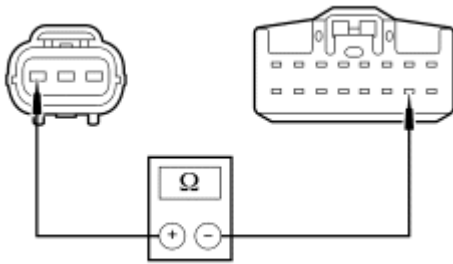
Courtesy of FORD MOTOR CO.

- For OSS, measure the resistance between OSS sensor C193-3, circuit CE613 (WH/VT) and ground.
- **Is the resistance greater than 10,000 ohms?**

YES : Go to F5.

NO : REPAIR the circuit for a short to ground. TEST the system for normal operation.

F5 CHECK THE SENSOR BATTERY SUPPLY CIRCUIT FOR AN OPEN

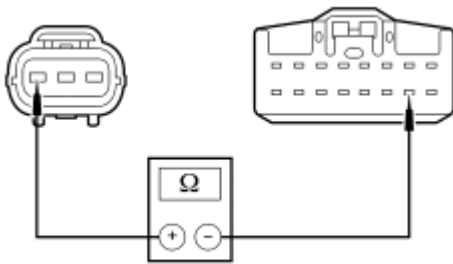


N0040224

Fig. 72: Checking Sensor Battery Supply Circuit For An Open (Intermediate Shaft Speed Sensor)

Courtesy of FORD MOTOR CO.

- For intermediate shaft speed sensor, measure the resistance between intermediate shaft speed sensor C1088-3, circuit CE613 (WH/VT) and the TCM C2352A-10, circuit CE613 (WH/VT).



N0040224

Fig. 73: Checking Sensor Battery Supply Circuit For An Open (OSS Sensor)

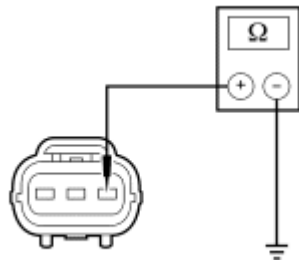
Courtesy of FORD MOTOR CO.

- For the OSS sensor, measure the resistance between OSS sensor C193-3, circuit CE613 (WH/VT) and TCM C2352A-10, circuit CE613 (WH/VT).
- **Is the resistance less than 5 ohms?**

YES : Go to F6.

NO : REPAIR the circuit for an open. TEST the system for normal operation.

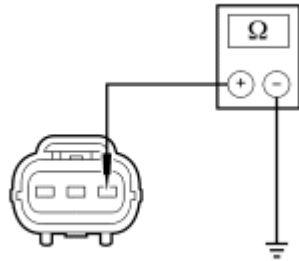
F6 CHECK THE GROUND CIRCUIT FOR AN OPEN



N0040226

Fig. 74: Measuring Resistance Between OSS Sensor C193-1, Circuit GD120 (BK/GN) & Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between OSS sensor C193-1, circuit GD120 (BK/GN) and ground.



N0040226

Fig. 75: Measuring Resistance Between Intermediate Shaft Speed Sensor C1088-1, Circuit VET28 (GY/VT) & Ground
Courtesy of FORD MOTOR CO.

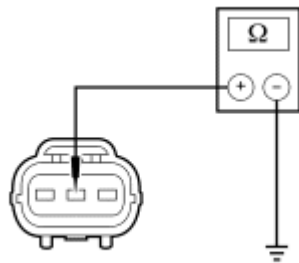
- Measure the resistance between intermediate shaft speed sensor C1088-1, circuit VET28 (GY/VT) and ground.

- **Is the resistance less than 5 ohms?**

YES : Go to F7.

NO : REPAIR the sensor ground circuit for an open. TEST the system for normal operation.

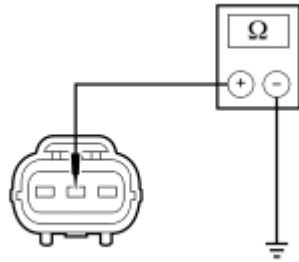
F7 CHECK THE SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND



N0040227

Fig. 76: Checking Sensor Signal Circuit For A Short To Ground (OSS Sensor)
Courtesy of FORD MOTOR CO.

- For OSS sensor, measure the resistance between OSS sensor C193-2, circuit VET26 (BN/GN) and ground.



N0040227

Fig. 77: Checking Sensor Signal Circuit For A Short To Ground (Intermediate Shaft Speed Sensor)

Courtesy of FORD MOTOR CO.

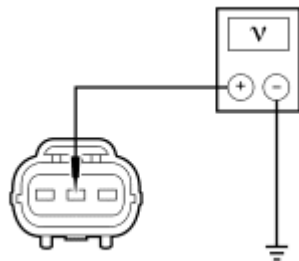
- For intermediate shaft speed sensor, measure the resistance between intermediate shaft speed sensor C1088-2, circuit VE822 (YE/BU) and ground.

- **Is the resistance greater than 10,000 ohms?**

YES : Go to F8.

NO : REPAIR the circuit for a short to ground. TEST the system for normal operation.

F8 CHECK THE SENSOR SIGNAL CIRCUIT FOR A SHORT TO POWER

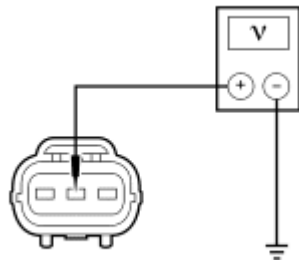


N0040228

Fig. 78: Checking Sensor Signal Circuit For A Short To Power (OSS Sensor)

Courtesy of FORD MOTOR CO.

- For OSS sensor, measure the voltage between OSS sensor C193-2, circuit VET26 (BN/GN) and ground.



N0040228

Fig. 79: Checking Sensor Signal Circuit For A Short To Power (Intermediate Shaft Speed Sensor)

Courtesy of FORD MOTOR CO.

- For intermediate shaft speed sensor, measure the voltage between intermediate shaft speed sensor C1088-2, circuit VE822 (YE/BU) and ground.
- **Is the voltage greater than 10 volts?**
YES : REPAIR the circuit for a short to power. TEST the system for normal operation.
NO : Go to F9.

F9 CHECK THE SENSOR SIGNAL CIRCUIT FOR AN OPEN

- Disconnect: TCM C2352b

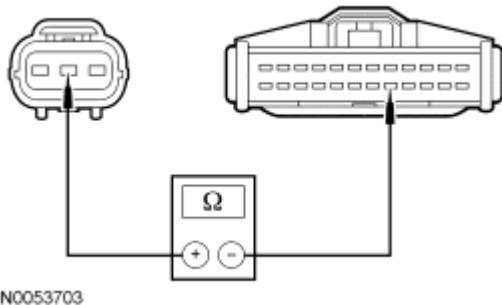


Fig. 80: Checking Sensor Signal Circuit For An Open - OSS

Courtesy of FORD MOTOR CO.

- For the OSS sensor, measure the resistance between OSS C193-2, circuit VET26 (BN/GN) and TCM C2352B-17, circuit VET26 (BN/GN).

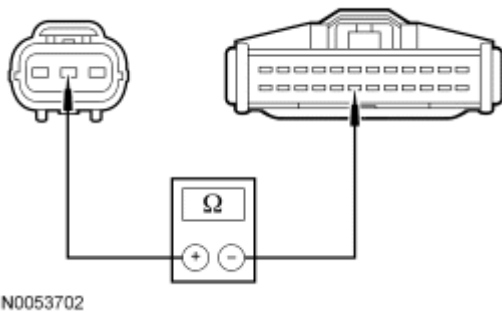


Fig. 81: Checking Sensor Signal Circuit For An Open - Intermediate Shaft Speed Sensor

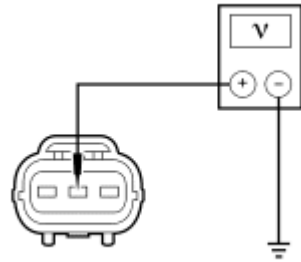
Courtesy of FORD MOTOR CO.

- For the intermediate shaft speed sensor, measure the resistance between intermediate shaft speed sensor C1088-2, circuit VE822 (YE/BU) component side and TCM C2352B-19, circuit VE822 (YE/BU).
- **Are the resistances less than 5 ohms?**
YES : Go to F10.

NO : REPAIR the circuit for an open. TEST the system for normal operation.

F10 CHECK FOR VOLTAGE AT THE SENSOR

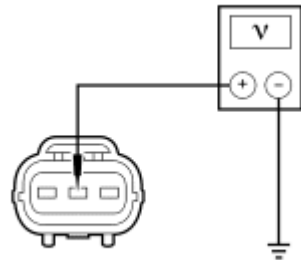
- Connect: TCM C2352A
- Connect: TCM C2352B
- Key in ON position.



N0040228

Fig. 82: Measuring Voltage Between OSS Sensor C193-2, Circuit VET26 (BN/GN) & Ground
Courtesy of FORD MOTOR CO.

- Measure the voltage between OSS sensor C193-2, circuit VET26 (BN/GN) and ground.



N0040228

Fig. 83: Measuring Voltage Between Intermediate Shaft Speed Sensor C1088-2, Circuit VE822 (YE/BU) & Ground
Courtesy of FORD MOTOR CO.

- Measure the voltage between intermediate shaft speed sensor C1088-2, circuit VE822 (YE/BU) and ground.
- **Is the voltage approximately 5 volts?**
YES : INSTALL a new sensor. TEST the system for normal operation.
NO : INSTALL a new TCM. TEST the system for normal operation.

PINPOINT TEST G: TSS SENSOR

NOTE: Refer to the Turbine Shaft Speed (TSS) Sensor Connector illustrations
Transaxle Connector Layouts.

G1 ELECTRONIC DIAGNOSTICS SETUP

- Check to make sure the transaxle harness connectors are fully seated, terminals are fully engaged in connector and in good condition before proceeding.
- Connect the diagnostic tool.
- Key in ON position.
- Enter the following diagnostic mode on the diagnostic tool: DataLogger Mode
- Select TSS PID.

• Does vehicle enter DataLogger Mode?

YES : REMAIN in DataLogger Mode. Go to G2 .

NO : REPEAT procedure to enter DataLogger Mode. If vehicle did not enter DataLogger Mode, REFER to the **Introduction - Gasoline Engines** article for diagnosis of the Transmission Control Module (TCM).

G2 DRIVE CYCLE TEST

- While monitoring the TSS sensor PID, drive the vehicle so that the transaxle upshifts and downshifts through all gears.

• Does the TSS PID speed increase and decrease with engine and vehicle speed?

YES : Go to G3.

NO : If the TSS PID speed does not increase and decrease with engine and vehicle speed, INSPECT for open or short in vehicle harness, sensor, a TCM concern, or internal hardware concern. Go to G4 .

G3 DRIVE CYCLE TEST ERRATIC

- While monitoring the TSS sensor PID, drive the vehicle so that the transaxle upshifts and downshifts through all gears.

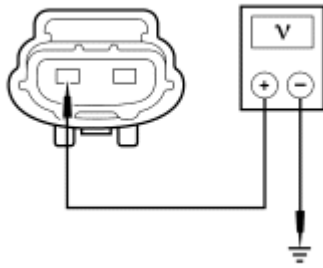
• Is the TSS PID speed signal erratic (drop to zero or near zero and return to normal operation)?

YES : If the sensor signal is erratic, INSPECT for intermittent concern in the harness, sensor or connector. Go to G4 .

NO : CLEAR all DTCs. Rerun On-Board Diagnostic (OBD).

G4 CHECK THE TCM AND HARNESS FOR POWER

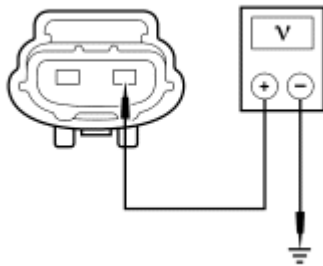
- Key in OFF position.
- Disconnect: Turbine Shaft Speed (TSS) Sensor C143
- Key in ON position.



N0083635

Fig. 84: Measuring Voltage Between TSS Sensor C143-1, Circuit VET33 (WH/OG) & Ground
 Courtesy of FORD MOTOR CO.

- Measure the voltage between TSS sensor C143-1, circuit VET33 (WH/OG) and ground.



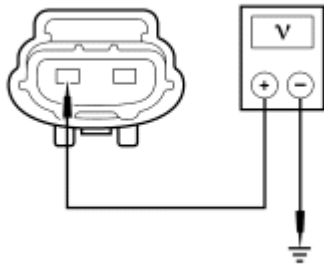
N0083636

Fig. 85: Measuring Voltage Between TSS Sensor C143-2, Circuit RET33 (WH/VT) & Ground
 Courtesy of FORD MOTOR CO.

- Measure the voltage between TSS sensor C143-2, circuit RET33 (WH/VT) and ground.
- **Is any voltage present?**
 YES : Go to G5.
 NO : Go to G6.

G5 CHECK THE HARNESS FOR A SHORT TO POWER

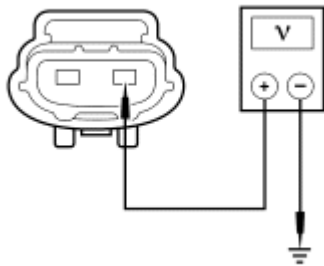
- Key in OFF position.
- Disconnect: TCM C2352B
- Key in ON position.



N0083635

Fig. 86: Measuring Voltage Between TSS Sensor C143-1, Circuit VET33 (WH/OG) & Ground
 Courtesy of FORD MOTOR CO.

- Measure the voltage between TSS sensor C143-1, circuit VET33 (WH/OG) and ground.



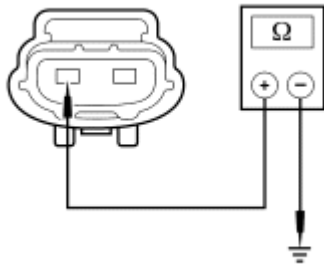
N0083636

Fig. 87: Measuring Voltage Between TSS Sensor C143-2, Circuit RET33 (WH/VT) & Ground
 Courtesy of FORD MOTOR CO.

- Measure the voltage between TSS sensor C143-2, circuit RET33 (WH/VT) and ground.
- **Is the voltage greater than 10 volts?**
 YES : REPAIR the circuit for a short to power. TEST the system for normal operation.
 NO : INSTALL a new TCM. TEST the system for normal operation.

G6 CHECK THE TCM AND HARNESS FOR GROUND

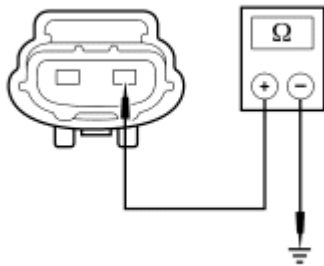
- Key in OFF position.
- Connect: TCM C2352B



N0083638

Fig. 88: Measuring Resistance Between TSS Sensor C143-1, Circuit VET33 (WH/OG) & Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between TSS sensor C143-1, circuit VET33 (WH/OG) and ground.



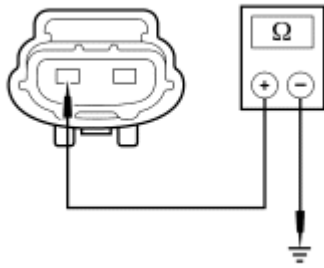
N0083637

Fig. 89: Measuring Resistance Between TSS Sensor C143-2, Circuit RET33 (WH/VT) & Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between TSS sensor C143-2, circuit RET33 (WH/VT) and ground.
- **Are the resistances greater than 10,000 ohms?**
YES : Go to G8.
NO : Go to G7.

G7 CHECK THE HARNESS FOR A SHORT TO GROUND

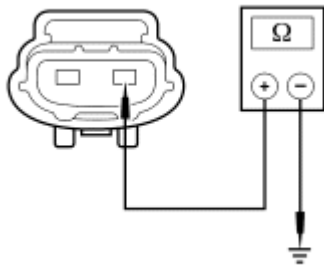
- Key in OFF position.
- Disconnect: TCM C2352B



N0083638

Fig. 90: Measuring Resistance Between TSS Sensor C143-1, Circuit VET33 (WH/OG) & Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between TSS sensor C143-1, circuit VET33 (WH/OG) and ground.



N0083637

Fig. 91: Measuring Resistance Between TSS Sensor C143-2, Circuit RET33 (WH/VT) & Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between TSS sensor C143-2, circuit RET33 (WH/VT) and ground.
- **Are the resistances greater than 10,000 ohms?**
YES : INSTALL a new TCM. TEST the system for normal operation.
NO : REPAIR the circuit for a short to ground. TEST the system for normal operation.

G8 CHECK THE RESISTANCE OF THE TSS SENSOR

- Measure the resistance between TSS sensor C143 pin 1, component side and TSS sensor C143 pin 2, component side.

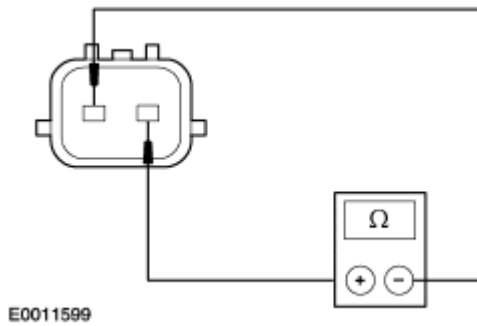


Fig. 92: Measuring Resistance Of TSS Sensor
Courtesy of FORD MOTOR CO.

- Record the resistance. Resistance should be as follows:
 - 273-333 ohms at -20°C (-4°F)
 - 330-390 ohms at 21°C (70°F)
 - 487-601 ohms at 160°C (302°F)
- **Are the resistances within specification?**
 YES : Go to G9.
 NO : INSTALL a new sensor. TEST the system for normal operation.

G9 CHECK THE SENSOR FOR A SHORT TO GROUND

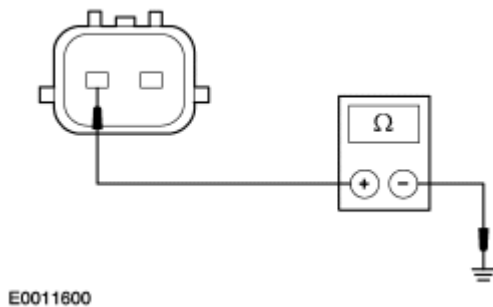


Fig. 93: Checking Sensor For A Short To Ground
Courtesy of FORD MOTOR CO.

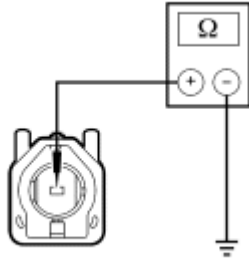
- Measure the resistance between TSS sensor C143 pin 1, component side and ground.
- **Is the resistance greater than 10,000 ohms?**
 YES : INSTALL a new TSS sensor. TEST the system for normal operation.
 NO : REFER to **Diagnosis By Symptom** for diagnosis of shift or torque converter concerns.

PINPOINT TEST H: TRANSAXLE FLUID PRESSURE SWITCH

H1 CHECK THE HARNESS FOR A SHORT TO GROUND

- Key in OFF position.

- Disconnect: Transmission Control Module (TCM) C2352B
- Disconnect: Transmission Fluid Pressure Switch C1536

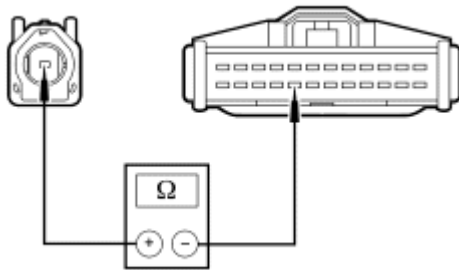


N0040232

Fig. 94: Checking Harness For Short To Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between transmission fluid pressure switch connector C1536, circuit CET46 (YE/GN) and ground.
- **Is the resistance greater than 10,000 ohms?**
YES : Go to H2.
NO : REPAIR circuit CET46 (YE/GN) for a short to ground. TEST the system for normal operation.

H2 CHECK THE HARNESS FOR AN OPEN



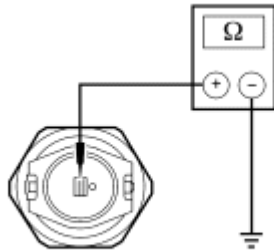
N0040233

Fig. 95: Checking Harness For Open
Courtesy of FORD MOTOR CO.

- Measure the resistance between transmission fluid pressure switch C1536, circuit CET46 (YE/GN) and TCM C2352B-20, circuit CET46 (YE/GN).
- **Is the resistance less than 5 ohms?**
YES : Go to H3.
NO : REPAIR circuit CET46 (YE/GN) for an open. TEST the system for normal operation.

H3 CHECK THE INTERNAL HARNESS FOR A SHORT TO GROUND

- Connect: TCM C2352B
- Key in START position.



N0040234

Fig. 96: Checking Internal Harness For A Short To Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between transmission fluid pressure switch and ground.
- **Is the resistance less than 5 ohms?**
YES : INSTALL a new TCM. TEST the system for normal operation.
NO : INSTALL a new transmission fluid pressure switch. TEST the system for normal operation.

PINPOINT TEST I: TCM

NOTE: Refer to the Transmission Control Module (TCM) Connector illustration Transaxle Connector Layouts.

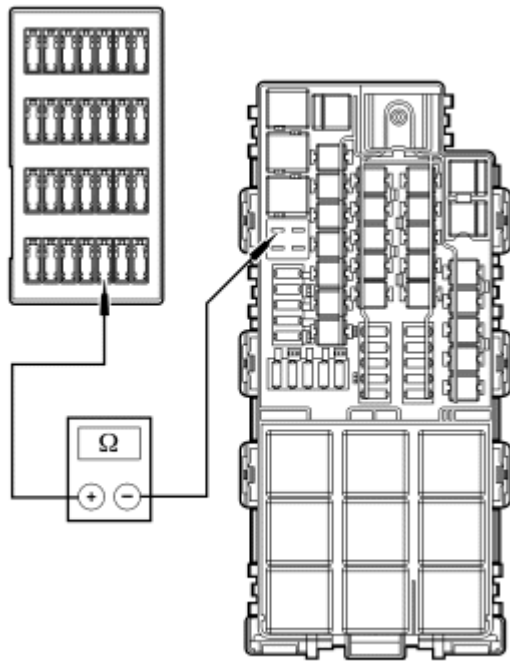
NOTE: Refer to the Transmission Control Module (TCM) Relay Connector illustration Transaxle Connector Layouts.

I1 CHECK SJB Fuse 26 (7.5A)

- Key in OFF position.
- Check fuse: Smart Junction Box (SJB) Fuse 26 (7.5A)
- **Is the resistance less than 5 ohms?**
YES : Go to I2.
NO : REPAIR circuit CBP18 (GY/OG) for a short to ground. TEST the system for normal operation.

I2 CHECK CIRCUIT CBP18 (GY/OG) FOR AN OPEN

- Disconnect: SJB Fuse 26 (7.5A)
- Disconnect: Transmission Control Module (TCM) Relay



N0072394

Fig. 97: Checking Circuit CBP18 (GY/OG) For An Open
Courtesy of FORD MOTOR CO.

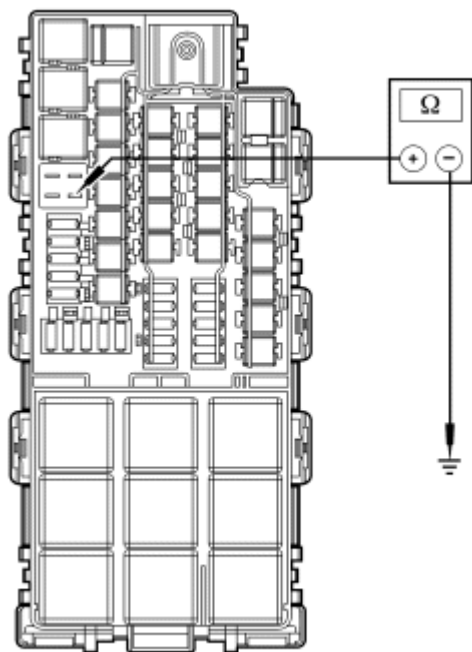
- Measure the resistance between the output side of SJB fuse 26 (7.5A) and TCM relay pin 86, circuit CBP18 (GY/OG).

- **Is the resistance less than 5 ohms?**

YES : Go to I3.

NO : REPAIR circuit CBP18 (GY/OG) for an open. TEST the system for normal operation.

I3 CHECK RE406 (GY/VT) FOR AN OPEN



N0072395

Fig. 98: Checking RE406 (GY/VT) For An Open
Courtesy of FORD MOTOR CO.

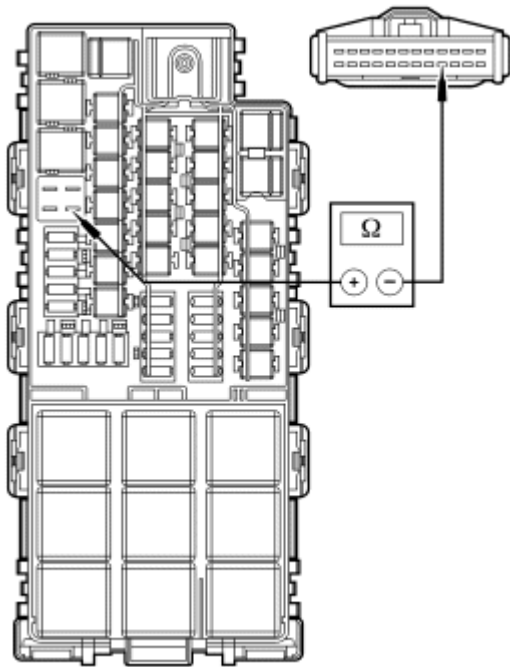
- Measure the resistance between TCM relay pin 85, circuit RE406 (GY/VT) and ground.
- **Is the resistance less than 5 ohms?**

YES : Go to I6.

NO : Go to I4.

I4 CHECK THE TCM GROUND CIRCUIT

- Disconnect: TCM C2352B



N0072396

Fig. 99: Checking TCM Ground Circuit
Courtesy of FORD MOTOR CO.

- Measure the resistance between TCM relay pin 85, circuit RE406 (GY/VT) and TCM C2353B-16, circuit RE406 (GY/VT).

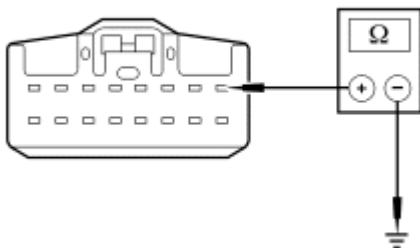
- **Is the resistance less than 5 ohms?**

YES : Go to I5.

NO : REPAIR circuit RE406 (GY/VT) for an open. TEST the system for normal operation.

I5 CHECK THE TCM GROUND SUPPLY CIRCUIT FOR AN OPEN

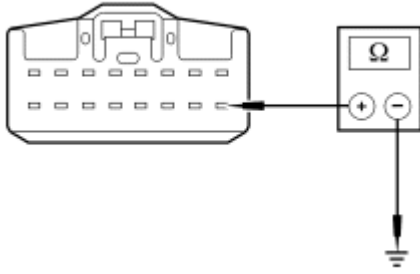
- Disconnect: TCM C2352A



N0083640

Fig. 100: Measuring Resistance Between TCM C2352A-1, Circuit GD120 (BK/GN) & Ground
Courtesy of FORD MOTOR CO.

- Measure the resistance between TCM C2352A-1, circuit GD120 (BK/GN) and ground.



N0083639

Fig. 101: Measuring Resistance Between C2352A-9, Circuit GD120 (BK/GN) & Ground
Courtesy of FORD MOTOR CO.

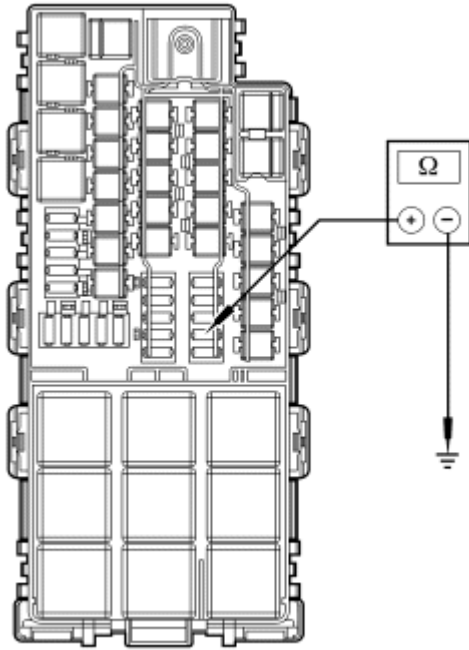
- Measure the resistance between C2352A-9, circuit GD120 (BK/GN) and ground.
- **Is the resistance less than 5 ohms?**
YES : INSTALL a new TCM. TEST the system for normal operation.
NO : REPAIR circuit GD120 (BK/GN) for an open. TEST the system for normal operation.

I6 CHECK BJB Fuse 16 (15A)

- Check fuse: Battery Junction Box (BJB) Fuse 16 (15A)
- **Is the resistance less than 5 ohms?**
YES : Go to I8.
NO : Go to I7.

I7 CHECK CIRCUIT SBB16 (VT/RD) FOR A SHORT TO GROUND

- Disconnect: BJB Fuse 16 (15A)



N0072397

Fig. 102: Checking Circuit SBB16 (VT/RD) For A Short To Ground
Courtesy of FORD MOTOR CO.

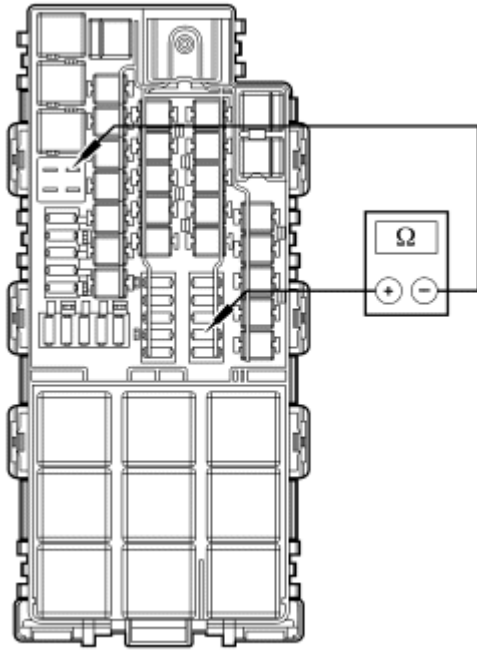
- Measure the resistance between the output side of BJB fuse 16 (15A), circuit SBB16 (VT/RD) and ground.

- **Is the resistance greater than 10,000 ohms?**

YES : Go to I9.

NO : REPAIR circuit SBB16 (VT/RD) for a short to ground. TEST the system for normal operation.

I8 CHECK CIRCUIT SBB16 (VT/RD) FOR AN OPEN



N0072398

Fig. 103: Checking Circuit SBB16 (VT/RD) For An Open
Courtesy of FORD MOTOR CO.

- Measure the resistance between the output side of BJB fuse 16 (15A), and TCM relay pin 30, circuit SBB16 (VT/RD).

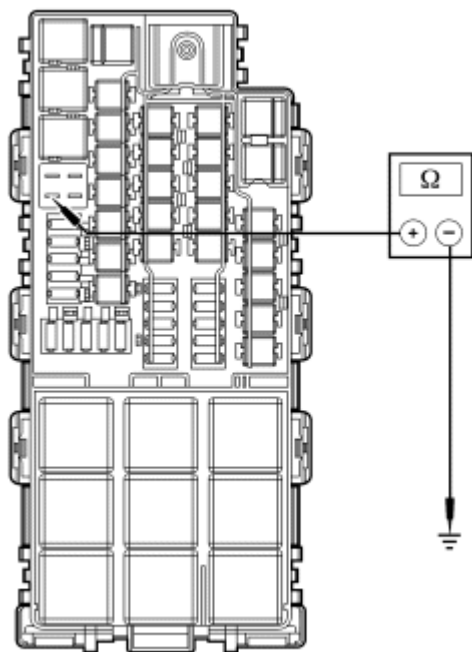
- **Is the resistance less than 5 ohms?**

YES : Go to I10.

NO : REPAIR circuit SBB16 (VT/RD) for an open. TEST the system for normal operation.

I9 CHECK THE TCM POWER CIRCUIT FOR A SHORT TO GROUND

- Disconnect: TCM C2352A

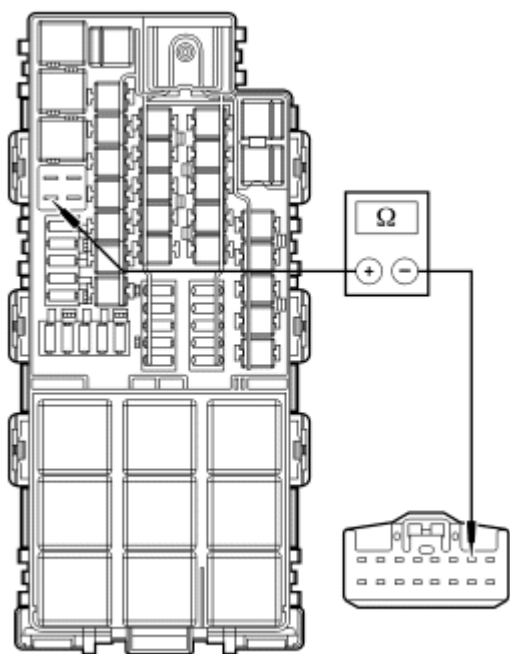


N0072399

Fig. 104: Checking TCM Power Circuit For A Short To Ground
 Courtesy of FORD MOTOR CO.

- Measure the resistance between TCM relay pin 87, circuit CE613 (VT/BK) and ground.
- **Is the resistance greater than 10,000 ohms?**
 YES : INSTALL a new TCM. TEST the system for normal operation.
 NO : REPAIR circuit CE613 (VT/BK). TEST the system for normal operation.

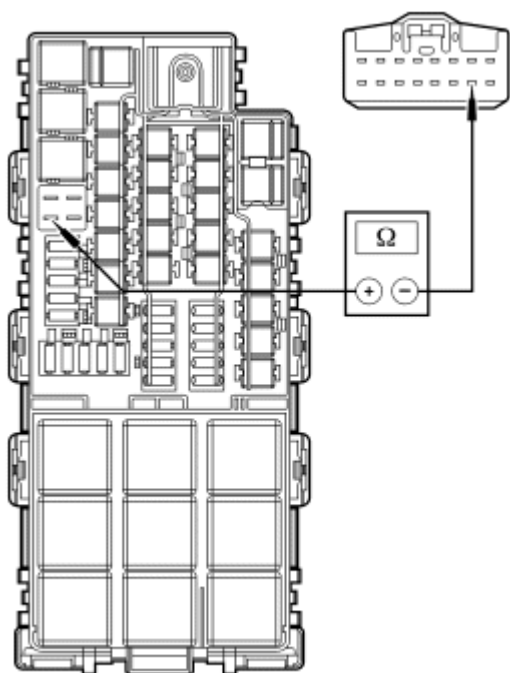
I10 CHECK THE TCM POWER SUPPLY FOR AN OPEN CIRCUIT



N0083641

Fig. 105: Measuring Resistance Between TCM Relay Pin 87 & TCM C2352A-2, Circuit CE613 (WH/VT)
 Courtesy of FORD MOTOR CO.

- Measure the resistance between TCM relay pin 87 and TCM C2352A-2, circuit CE613 (WH/VT).



N0083642

Fig. 106: Measuring Resistance Between TCM Relay Pin 87 & C2352A-10, Circuit CE613 (WH/VT)

Courtesy of FORD MOTOR CO.

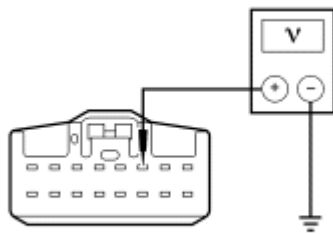
- Measure the resistance between TCM relay pin 87 and C2352A-10, circuit CE613 (WH/VT).
- **Is the resistance less than 5 ohms?**

YES : Go to I11.

NO : REPAIR circuit CE613 (WH/VT) for an open. TEST the system for normal operation.

I11 CHECK FOR POWER FROM THE SJB

- Key in ON position.



N0040454

Fig. 107: Checking Power From Smart Junction Box (SJB)


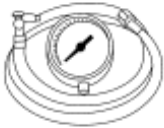
Courtesy of FORD MOTOR CO.

- Measure the voltage between TCM C2352A-3 and ground.
- **Is the voltage greater than 10 volts?**

YES : INSTALL a new TCM. TEST the system for normal operation.

NO : REPAIR circuit SBP07 (WH/RD). TEST the system for normal operation.

SPECIAL TESTING PROCEDURES**Special Tools**

Illustration	Tool Name	Tool Number
 ST2755A	Air Test Plate and Gasket	307-412
 ST1565-A	Transmission Fluid Pressure Gauge	307-004 (T57L-77820-A)

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ



ST2834-A

Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

Material

Item	Specification
Dye-Lite® ATF/Power Steering Fluid Leak Detection Dye 164-R3701 (Rotunda)	-
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)

The special tests are designed to aid the technician in diagnosing the hydraulic and mechanical portion of the transaxle.

Engine Idle Speed Check

Refer to the **Introduction - Gasoline Engines** article for diagnosis and testing of the engine idle speed.

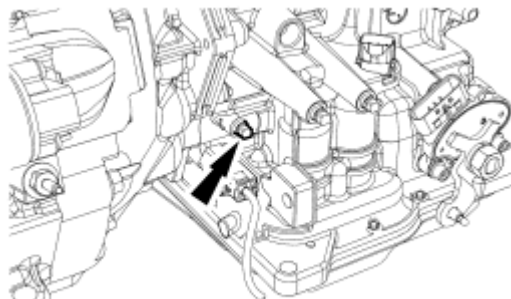
Line Pressure Test

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

NOTE: Certain sensor failures may cause high line pressure as a result of failure mode effect management actions. Make sure that self-test and electrical repairs have been carried out, or test results may be incorrect.

This test verifies that the line pressure is within specifications.

1. Remove the line pressure port plug.



N0081327

Fig. 108: Locating Line Pressure Port Plug
Courtesy of FORD MOTOR CO.

2. Install a 1/8 x 28-to-1/8 x 28 pipe thread adapter into the line pressure tap.
 - Tighten to 12 Nm (106 lb-in).

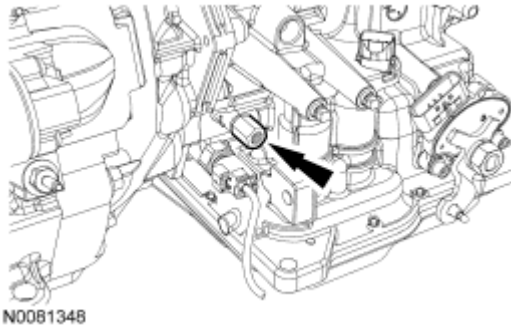


Fig. 109: Locating Line Pressure Tap
Courtesy of FORD MOTOR CO.

3. Connect the Transmission Fluid Pressure Gauge to the adapter.
4. Start engine and check line pressures. Refer to the following Line Pressure Chart to determine if line pressure is within specifications.
5. If line pressure is not within specification, refer to Line Pressure Diagnosis Chart for line pressure concern causes.
6. When line pressure testing is complete, remove adapter and install line pressure port plug.
 - Tighten to 8 Nm (71 lb-in).

LINE PRESSURE CHART

Range	Idle		Stall	
P, N	345-450 kPa	50-65 psi	-	-
R	450-585 kPa	65-85 psi	1,930-2,310 kPa	280-335 psi
D, L	345-450 kPa	50-65 psi	1,240-1,450 kPa	180-210 psi

LINE PRESSURE DIAGNOSIS CHART

Test Results	Possible Source
Low pressure in all ranges	Worn pump.
Low pressure in all ranges	Transmission fluid leaking from pump, main control valve body or transaxle case.
Low pressure in all ranges	Pressure control solenoid inoperative.
Low pressure in all ranges	Solenoid regulating valve sticking.
Low pressure in D, L only	Transmission fluid leaking from forward clutch hydraulic circuit.
Low pressure in L	Transmission fluid leaking from intermediate/overdrive band hydraulic circuit.
Low pressure in L, R only	Transmission fluid leaking from low/reverse clutch hydraulic circuit.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Low in R only	Transmission fluid leaking from reverse clutch hydraulic circuit.
High pressure in all ranges	Pressure control solenoid inoperative or open wire harness.
High pressure in all ranges	Pressure regulator valve sticking.
High pressure in all ranges	Transmission Control Module (TCM) inoperative.

Stall Speed Test

This test checks operation of the following items:

- Torque Converter Clutch (TCC)
- Forward clutch
- Low One-Way Clutch (OWC) assembly
- Engine performance

NOTE: Always carry out the Line Pressure Test procedures prior to carrying out the Stall Speed Test. If line pressure is low at stall, do not carry out the Stall Speed Test or further transaxle damage will occur.

NOTE: The Stall Speed Test should be carried out with the engine and transaxle at normal operating temperatures.

1. Connect a scan tool.

NOTE: After testing each of the following ranges D, L and R, move the selector lever to NEUTRAL and run the engine at 1,000 RPM for about 15 seconds to allow the torque converter to cool before testing the next range or damage may occur.

NOTE: Do not maintain Wide Open Throttle (WOT) in any range for more than 5 seconds or damage may occur.

NOTE: If the engine RPM recorded by the tachometer exceeds maximum specified RPM, release the accelerator pedal immediately. Clutch or band slippage is indicated and further damage may occur.

NOTE: Prolonged use of this procedure may set DTC P0712, P1783. After carrying out Stall Speed Test, run On-Board Diagnostic (OBD) Test and clear DTCs from memory.

2. Press accelerator pedal to floor Wide Open Throttle (WOT) in each range. Record RPM reached in each range. Stall speeds should be as follows:

STALL SPEED CHART

Engine	RPM
--------	-----

All	2,200- 2,700
-----	-----------------

- If stall speeds were too high, refer to the following Stall Speed Diagnosis Chart. If stall speeds were too low, first check the engine idle speed. If engine idle is OK, remove torque converter and check the torque converter OWC for slippage.

STALL SPEED DIAGNOSIS CHART

Selector Lever Position	Possible Cause
Above specification in D and L	Forward clutch slipping.
Above specification in L	Intermediate/overdrive band slipping.
Above specification in L and R	Low/reverse clutch slipping.
Above specification in R	Reverse clutch slipping.
Above specification in R	Carry out road test to determine whether problem is in low/reverse clutch.
Above specification in R	Low/reverse clutch is defective.

Air Pressure Tests

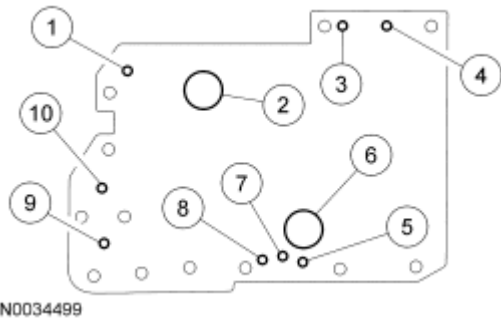


Fig. 110: Transaxle Air Pressure Test Plate
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	-	Servo release
2	-	Servo apply
3	-	Direct clutch apply
4	-	Reverse clutch apply
5	-	Torque converter bypass
6	-	Low/reverse clutch
7	-	Torque converter charge
8	-	Forward clutch apply
9	-	Servo accumulator apply
10	-	Forward servo accumulator apply

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

A no-drive condition can exist even with correct transmission fluid pressure because of inoperative clutches or bands. An erratic shift can be located through a series of checks by substituting air pressure for transmission fluid pressure to determine the location of the failure.

Follow the procedure to determine the location of the inoperative clutch or band by introducing air pressure into the various test plate passages.

NOTE: Use only dry, regulated 300 kPa (44 psi) maximum air pressure or damage may occur to the transaxle.

Apply air to the appropriate passage(s). A dull thud should be felt or heard or movement could be observed when the component applies. There should be no hissing sound when the component is fully applied.


1. Drain transmission fluid and remove the transmission fluid pan.
2. Remove the main control valve body.
3. Install the transmission test plate and gasket. Use the transmission fluid pan bolts to hold the test plate down. Tighten the bolts to 10 N.m (89 lb-in).
4. Apply air to the appropriate clutch port (refer to the diagram). A dull thud may be heard or movement felt when the component is applied or released. If clutch seals or check balls are leaking, a hissing sound may be heard.

If test results indicate that the servos do not operate, disassemble, clean and inspect them to locate the source of the concern.

If air pressure applied to the clutch passages fails to operate a clutch, or operates another clutch simultaneously, disassemble and use air pressure to check the transmission fluid passages in the center support and clutches to detect obstructions.

LEAKAGE INSPECTION

Special Tools

Illustration	Tool Name	Tool Number
 ST1300-A	100W/12 Volt DC UV Lamp	164-R0751 or equivalent

Material

Item	Specification
Dye-Lite® ATF/Power Steering Fluid Leak Detection Dye 164-R3701 (Rotunda)	-
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)

NOTE: Do not try to stop the transmission fluid leak by increasing the torque beyond specifications. This may cause damage to the case threads.

Check the transmission fluid filler tube at the transaxle case. If leakage is found here, install a new plug.

Check transmission fluid cooler tubes and fittings between the transaxle and the transmission fluid cooler for looseness, wear or damage. If leakage cannot be stopped by tightening a transmission fluid tube nut, install new parts.

If the leak continues, install a new transmission fluid cooler tube fitting and tighten to specification. The same procedure should be followed for transmission fluid leaks between the transmission fluid cooler and the transmission fluid cooler tube fittings. Refer to **TRANSAXLE/TRANSMISSION COOLING** article.

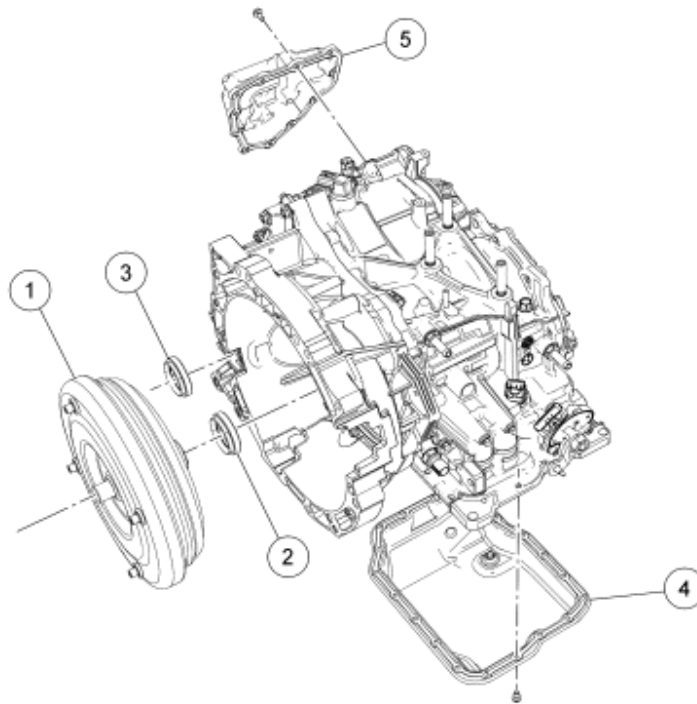
The transmission fluid cooler can be further checked for leaks. Refer to **TRANSAXLE/TRANSMISSION COOLING** article.

If leakage is found at the Transmission Range (TR) manual control lever, install a new seal.

If leakage is found at the transaxle harness connector, install a new O-ring.

The transaxle has the following parts to prevent external fluid leakage:

- Sealer
- Lip-type seals
- O-ring seals
- Seal rings
- Seal grommets
- Thread sealant
- Transmission fluid pan



N0041829

Fig. 111: External Sealing
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	-	Torque converter
2	7A248	Seal - pump fluid
3	1177	Seal assembly - differential (2 required)
4	7A194	Pan - transmission fluid (sealant-to-case)
5	7G004	Cover - 5th gear valve body

Transmission Fluid Leakage in Torque Converter Area

In diagnosing and correcting transmission fluid leaks in the pump support and gear and torque converter area, use the following procedures to locate the exact cause of the leakage. Leakage between the transaxle and engine, as evidenced by fluid around the torque converter housing, may have several sources. By careful observation it is possible, in many instances, to pinpoint the source of leakage before removing the transaxle from the vehicle. The paths which the fluid takes to reach the bottom of the torque converter housing are shown in the illustration. The 5 steps following correspond with the numbers in the illustration.

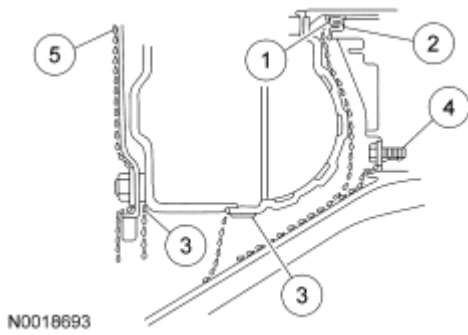


Fig. 112: Identifying Torque Converter Fluid Leakage Area
Courtesy of FORD MOTOR CO.

1. Transmission fluid leaking by the pump seal lip will tend to move along the impeller hub and onto the back of the impeller housing. 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. Transmission fluid from the vent assembly may move along the impeller hub and onto the back of the impeller housing. Transmission fluid from a converter hub weld leak will move along a path on the inside of the converter housing.
2. Transmission fluid leakage by the outside diameter of the pump seal and pump body will follow the same path that leaks by the inside diameter of the pump seal follow. Transmission fluid from a converter hub weld leak will move along a path on the inside of the converter housing.
3. Transmission fluid that leaks by a pump-to-case screw or pump gasket will be deposited on the inside of the torque converter housing only. Transmission fluid will not be deposited on the back of the torque converter.
4. Transmission fluid leakage from the converter drain plug, (model-dependent) converter seal weld or converter-to-flexplate stud weld will appear at the outside diameter of the torque converter on the back face of the flexplate, and in the converter housing only near the flexplate. Transmission fluid leaks from the torque converter will leave a ring of transmission fluid around the inside of the torque converter housing.

NOTE: **White facial tissue paper may aid in determining the color (red is transmission fluid) and source of the leaking transmission fluid.**

5. Engine oil leaks are sometimes incorrectly diagnosed as transaxle pump gasket leaks. The following areas of possible leakage should also be checked to determine if engine oil leakage is causing the concern.
 - a. Leakage at the valve cover gasket may allow oil to flow over the torque converter housing or seep down between the torque converter housing and cylinder block causing oil to be present in or at the bottom of the torque converter housing.
 - b. Oil galley plug leaks will allow oil to flow down the rear face of the cylinder block to the bottom of the torque converter housing.
 - c. Leakage at the crankshaft rear oil seal will work back to the flexplate, and then into the torque converter housing.

Leak Check Test

1. Original factory fill transmission fluid is dyed red to aid in determining if leakage is from the engine or transaxle. The red color should assist in pinpointing the leak.
2. Clean off any fluid from the top and bottom of the torque converter housing of the case, and the rear face of the engine and oil pan. Clean the torque converter area by washing with a suitable nonflammable solvent and blow dry with compressed air.
3. Wash out the torque converter housing, and the front of the flexplate. The torque converter housing may be washed out using cleaning solvent and a squirt-type oil can. Blow all washed areas dry with compressed air.
4. Start and run the engine until the transaxle reaches its normal operating temperature. Observe the back of the cylinder block and the top of the torque converter housing for evidence of fluid leakage. With the vehicle in NEUTRAL, position it on a hoist. Refer to **JACKING AND LIFTING** article and run the engine at fast idle, then at engine idle, occasionally shifting to the D and R positions to increase pressure within the transaxle. Observe the front of the flexplate, back of the cylinder block (in as far as possible), and inside the torque converter housing and front of the case.

Leak Check Test With Black Light

Dye-Lite® ATF/Power Steering Fluid Leak Detection Dye 164-R3701 or equivalent (specifically formulated for ATF) is used to detect a transmission fluid leak.

1. Add Automatic Transmission/Power Steering Dye to the transmission fluid. Use one 30.0 mL (1oz) of dye solution for every 3.8L (4 qt) of transmission fluid.
2. Start and run the engine until the transaxle reaches its normal operating temperature. Observe the back of the cylinder block and top of the torque converter housing for evidence of fluid leakage. Raise the vehicle on a hoist and run the engine at fast idle, then at engine idle, occasionally shifting to the DRIVE and REVERSE ranges to increase pressure within the transaxle. Observe the front of the flexplate, back of the cylinder block (in as far as possible), and inside the torque converter housing and front of the case. Continue running the engine until fluid leakage is evident and the probable source of leakage can be determined.

TRANSMISSION FLUID COOLER

NOTE: Whenever the transaxle has been disassembled to install new parts, clean and backflush the transaxle fluid cooler, or damage may occur.

NOTE: Cleaning and backflushing the transmission fluid cooling system along with normal cleaning and inspection procedures as outlined during disassembly and reassembly will keep contamination from reentering the transaxle and causing a repeat repair.

When internal wear or damage has occurred in the transaxle, metal particles, clutch plate material or band material may have been carried into the torque converter and transmission fluid cooler. These contaminants are a major cause of recurring transaxle troubles and must be removed from the system before the transaxle is put back in use.

Transmission Fluid Cooler Flow Test

NOTE: The selector lever linkage adjustment, transmission fluid level and line pressure must be within specification before carrying out this test. Refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** article for selector lever linkage adjustment procedure. For transmission fluid level checking procedures, refer to **Preliminary Inspection**. For transaxle line pressure testing, refer to **Special Testing Procedures**.

1. Check the transmission fluid level and fill as necessary.
2. Remove the transmission fluid level indicator from the transmission filler tube and install the funnel in the transmission filler tube.
3. With the vehicle in NEUTRAL, position it on a hoist. Refer to **JACKING AND LIFTING** article. Inspect the transmission fluid cooler tubes for damage. Install new transmission fluid cooler tubes as needed.
4. Disconnect the transmission fluid cooler return hose from the transmission fluid cooler return tube.

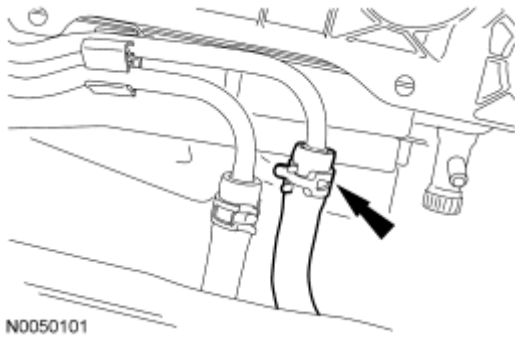


Fig. 113: Locating Cooler Return Hose Clamp
Courtesy of FORD MOTOR CO.

5. Plug the transmission fluid cooler return hose to avoid transmission fluid loss.
6. Connect one end of a hose to the transmission fluid cooler return tube and route the other end of the hose up to a point where it can be inserted into the funnel at the transmission fluid filler tube.

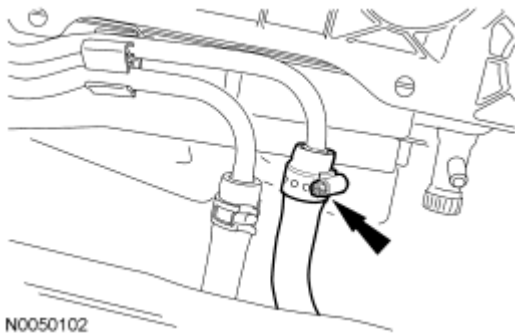


Fig. 114: Locating Cooler Return Hose Clamp
Courtesy of FORD MOTOR CO.

7. Start the engine and run at idle with the transaxle in NEUTRAL range until the transmission fluid is

warm. Temperature is important to the flow rate measurement.

- Once transmission fluid flow no longer has air bubbles in it, remove the rubber hose from the funnel and insert it into a liter container.
 - As soon as 0.95L (1 qt) is dispensed into the container, install the hose into the funnel.
 - One quart of transmission fluid should flow through the cooling system in approximately 17-21 seconds.
8. Once adequate flow is determined, shut off the engine, remove the extension hose and reassemble the transmission fluid cooler tube with the constant tension clamp.

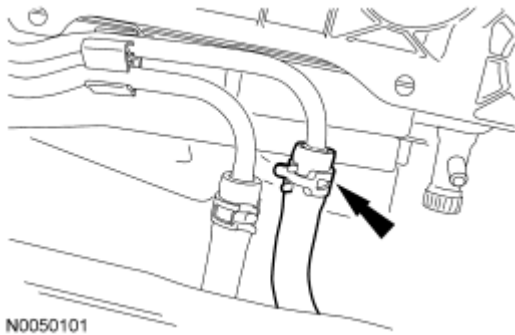


Fig. 115: Locating Cooler Return Hose Clamp
Courtesy of FORD MOTOR CO.



9. If flow is not adequate, stop the engine. Disconnect the hose from the transmission fluid cooler return tube and connect it to the converter-out line. If flow is now liberal, install a new transmission fluid cooler. Refer to **TRANSAXLE/TRANSMISSION COOLING** article.
10. Check the transmission fluid level and adjust as required.

Transmission Fluid Cooler Tube Replacement

Refer to **TRANSAXLE/TRANSMISSION COOLING** article.

DIAGNOSIS BY SYMPTOM

Special Tools

Illustration	Tool Name	Tool Number
 ST1137-A	73III Automotive Meter	105-R0057 or equivalent
 ST1565-A	Transmission Fluid Pressure Gauge	307-004 (T57L-77820-A)

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ



ST2834-A

Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

The Diagnosis by Symptom Index gives the technician diagnostic information, direction and suggest possible components, using a symptom as a starting point.

The Diagnosis by Symptom Index is divided into 2 categories: Electrical Routines, indicated by 200 series numbers, and Hydraulic/Mechanical Routines, indicated by 300 series numbers. The Electrical Routines list the possible electrical components that could cause or contribute to the symptom described. The Hydraulic/Mechanical Routines list the possible hydraulic or mechanical components that could cause or contribute to the symptom described.

Diagnosis by Symptom Index Directions

1. Using the Symptom Index, select the Concern/Symptom that best describes the condition.
2. Refer to the routine indicated in the Diagnosis by Symptom Index.
3. Always begin diagnosis of a symptom with:
 - preliminary inspections.
 - verifications of condition.
 - checking the transmission fluid level.

NOTE: Not all concerns and conditions with electrical components will set a DTC. Be aware that the components listed may still be the cause. Verify correct function of these components prior to proceeding to the Hydraulic/Mechanical Routine listed.

4. Begin with the Electrical Routine, if indicated. Follow the reference or action statements. Always carry out the On-Board Diagnostic (OBD) tests as necessary. Never skip steps. If the concern is still present after electrical diagnosis, then proceed to the Hydraulic/Mechanical Routine listed.
5. The Hydraulic/Mechanical Routines list possible hydraulic or mechanical components that could cause the concern. These components are listed in the removal sequence and by most probable cause. All components listed must be inspected to make sure of correct repair.

Diagnosis by Symptom Index

FNR5 TRANSAXLE

Component	Routines	
	Electrical ^a	Hydraulic/ Mechanical
Engagement Concerns		
No forward in D only	201A	301A
No forward only (all positions)	201B	301B

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

No reverse	202	302
Harsh reverse	203	303
Harsh forward	204A	304A
Harsh forward (manual 1st gear)	204B	304B
Delayed/soft reverse	205	305
Delayed/soft forward	206	306
No forward and no reverse	207	307
Harsh forward and reverse	208	308
Delayed/soft forward and reverse	209	309
Shift Concerns		
Some/all shifts missing (automatic mode only)	210	310
Timing concerns - early/late	211	311
Timing concerns - erratic/hunting	212	312
Feel concerns - soft/slipping	213	313
Feel concerns - harsh	214	314
No 1st gear in drive, engages in a higher gear	215	315
No 1st gear in manual low	216	316
No manual 2nd gear	217	317
No 1-2 Shift	220	320
No 2-3 Shift	221	321
No 3-4 Shift	222	322
No 4-3 Shift	223	323
No 3-2 Shift	224	324
No 2-1 Shift	225	325
Soft/Slipping 1-2	226	326
Soft/Slipping 2-3	227	327
Soft/Slipping 3-4	228	328
Soft/Slipping 4-3	229	329
Soft/Slipping 3-2	230	330
Soft/Slipping 2-1	231	331
Harsh 1-2 Shift	232	332
Harsh 2-3 Shift	233	333
Harsh 3-4 Shift	234	334
Harsh 4-3 Shift	235	335
Harsh 3-2 Shift	236	336
Harsh 2-1 Shift	237	337
Torque Converter Clutch (TCC) Operation Concerns		
Does not apply	240	340
Always applied/stalls vehicle	241	341
Cycling/shudder/chatter	242	342
Other Concerns		
Selector lever efforts high	251	351

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

External leaks	252	352
Vehicle driveability concerns	253	353
Noise/vibration - forward or reverse	254	354
Engine will not crank	255	355
No park range	256	356
Overheating	257	357
No engine braking in manual low	259	359
Fluid venting or foaming	261	361
Slips/chatters in manual 1st gear	263	363
Slips/chatters in manual 2nd gear	264	364
Slips/chatters in 3rd gear	282	382
No engine braking in all gears	283	383

^a Carry out electrical routines first.

Diagnostic Routines

ENGAGEMENT CONCERN: NO FORWARD IN D ONLY

Possible Component	Reference/Action
201A - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harness, Shift Solenoid A (SEA) (off = low).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM. Go to Pinpoint Test A . Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
301A - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
Incorrect transmission fluid level.	Adjust transmission fluid to the correct level. Refer to Preliminary Inspection .
Transmission fluid condition.	Carry out the Transmission Fluid Condition Check. Refer to Preliminary Inspection .
Forward Clutch Assembly	
Seals, piston damaged.	Inspect for damage. Repair as necessary.
Check balance dam.	Inspect for damage. Repair as necessary.
Friction elements damaged or worn.	Inspect for damage. Repair as necessary.
Return springs damaged.	Inspect for damage. Repair as necessary.
Servo	
Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band	
Band damaged.	Inspect for damage. Repair as necessary.
Servo worn or damaged.	Inspect for damage. Repair as necessary.
Not adjusted correctly.	Adjust correctly.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary.
Case Damaged.	Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERN: NO FORWARD ONLY (ALL POSITIONS)

Possible Component	Reference/Action
201B - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harness, Shift Solenoid A (SEA), Shift Solenoid B (SSB) and Shift Solenoid C (SSC).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
301B - HYDRAULIC/MECHANICAL ROUTINE	
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing install new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Forward Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Forward Planetary Assembly Planetary damaged.	Inspect for damage. Repair as necessary.
Low One-Way Clutch (OWC) Worn, damaged or assembled incorrectly.	Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERN: NO REVERSE

Possible Component	Reference/Action
202 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harness, Shift Solenoid A (SEA), Shift Solenoid B (SSB) and Shift Solenoid C (SSC).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> .

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Repair as required. Clear the DTCs, road test and rerun OBD test.

302 - HYDRAULIC/MECHANICAL ROUTINE**Main Control**

Bolts not tightened to specification.
Separator plate damaged.
Contamination.

Tighten to specifications.
Inspect for damage. If damaged, repair as necessary.
Disassemble and clean.
If damaged or parts are missing, install new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Valves/springs damaged, misassembled, missing, stuck or bore damaged.

Low/Reverse Clutch Assembly

Seals, piston damaged.
Friction elements damaged or worn.
Return springs damaged.

Inspect for damage. Repair as necessary.
Inspect for damage. Repair as necessary.
Inspect for damage. Repair as necessary.

Reverse Clutch Assembly

Seals, piston damaged.
Check balance dam.
Friction elements damaged or worn.
Return springs damaged.

Inspect for damage. Repair as necessary.
Inspect for damage. Repair as necessary.
Inspect for damage. Repair as necessary.
Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERN: HARSH REVERSE

Possible Component	Reference/Action
203 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harness, Shift Solenoid B (SSB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM. Go to Pinpoint Test A . Repair as required. Clear the DTCs, road test and rerun OBD test.

303 - HYDRAULIC/MECHANICAL ROUTINE**Incorrect Pressures**

High pressures.

Check pressure at line tap.
Carry out the Line Pressure Test. Refer to **Special Testing Procedures**.

Main Control

Bolts not tightened to specification.
Separator plate damaged.
Contamination.

Tighten to specification.
Inspect for damage. If damaged, repair as necessary.
Disassemble and clean.

Valves/springs damaged, misassembled,

If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

missing, stuck or bore damaged.	remove the anodized finish and may result in further main control or transaxle damage.
Low/Reverse Clutch Assembly	
Seals, piston damaged.	Inspect for damage. Repair as necessary.
Friction elements damaged or worn.	Inspect for damage. Repair as necessary.
Return springs damaged.	Inspect for damage. Repair as necessary.
Reverse Clutch Assembly	
Seals, piston damaged.	Inspect for damage. Repair as necessary.
Check balance dam.	Inspect for damage. Repair as necessary.
Friction elements damaged or worn.	Inspect for damage. Repair as necessary.
Return spring damaged.	Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERN: HARSH FORWARD

Possible Component	Reference/Action
204A - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harness and Shift Solenoid A (SEA).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
304A - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
High pressures.	Check pressure at line tap. Refer to <u>Special Testing Procedures</u> .
Main Control	
Bolts not tightened to specification. Separator plate damaged. Contamination.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean.
Valves/springs damaged, misassembled, missing, stuck or damaged.	If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Forward Clutch Assembly	
Seals, piston damaged.	Inspect for damage. Repair as necessary.
Friction elements damaged or worn.	Inspect for damage. Repair as necessary.
Return springs damaged.	Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERN: HARSH FORWARD (MANUAL 1ST GEAR)

Possible Component	Reference/Action
204B - ELECTRICAL ROUTINE	
Powertrain Control System	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Transmission Control Module (TCM), vehicle wiring harness, Turbine Shaft Speed (TSS) sensor.

Carry out On-Board Diagnostic (OBD) tests. Refer to the **Introduction - Gasoline Engines** article for diagnosis and testing of the TCM.

Go to **Pinpoint Test G**.

Repair as required. Clear the DTCs, road test and rerun OBD test.

304B - HYDRAULIC/MECHANICAL ROUTINE**No Hydraulic/Mechanical Concerns.****ENGAGEMENT CONCERN: DELAYED/SOFT REVERSE ONLY**

Possible Component	Reference/Action
205 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harness, Shift Solenoid B (SSB), Pressure Control Solenoid A (PCA).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
305 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Main Control	
Bolts not tightened to specification. Separator plate damaged. Contamination.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean.
Valves/springs damaged, misassembled, missing, stuck or bore damaged.	If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Low/Reverse Clutch Assembly	
Seals, piston damaged.	Inspect for damage. Repair as necessary.
Friction elements damaged or worn.	Inspect for damage. Repair as necessary.
Return springs damaged.	Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERN: DELAYED/SOFT FORWARD

Possible Component	Reference/Action
206 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle	Carry out On-Board Diagnostic (OBD) tests. Refer to

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

wiring harness, Shift Solenoid A (SEA),
Pressure Control Solenoid A (PCA).

the **Introduction - Gasoline Engines** article for
diagnosis and testing of the TCM.

Go to **Pinpoint Test A**.

Repair as required. Clear the DTCs, road test and rerun
OBD test.

306 - HYDRAULIC/MECHANICAL ROUTINE**Incorrect Pressures**

Low pressures.

Check pressure at line tap.

Carry out Line Pressure Test. Refer to **Special Testing
Procedures**.

Main Control

Bolts not tightened to specification.
Separator plate damaged.
Contamination.

Tighten to specifications.

Inspect for damage. If damaged, repair as necessary.

Disassemble and clean.

If damaged or parts are missing, install a new main
control assembly. If misassembled, reassemble
correctly. DO NOT stone, file or sand valves. This will
remove the anodized finish and may result in further
main control or transaxle damage.

Valves/springs damaged, misassembled,
missing, stuck or bore damaged.

Forward Clutch Assembly

Seals, piston damaged.

Inspect for damage. Repair as necessary.

Friction elements damaged or worn.

Inspect for damage. Repair as necessary.

Return springs damaged.

Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERNS: NO FORWARD AND NO REVERSE

Possible Component	Reference/Action
207 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM) and vehicle wiring harnesses (no electrical activity equals 3rd gear default).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Repair as required. Clear the DTCs, road test and rerun OBD test.
307 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection</u> .
Transmission fluid condition.	Carry out Transmission Fluid Condition Check. Refer to <u>Preliminary Inspection</u> .
Selector Lever Cable/Transmission Range (TR) Sensor	
Cable system or TR sensor damaged,	Inspect and repair as required. For selector lever cable information, refer to <u>AUTOMATIC</u>

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

misaligned.	TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS article. For TR sensor information, refer to <u>Transmission Range (TR) Sensor</u> .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Torque Converter Damaged flexplate or adapter plate. Damaged impeller hub. Damaged turbine hub.	Inspect for damage. Carry out Torque Converter checks, refer to <u>Torque Converter Contamination Inspection</u> . Repair as necessary. Inspect for damage. Repair as necessary.
Turbine Shaft Damaged.	Inspect for damage. If damaged, repair as necessary.
Pump assembly Bolts not tightened to specification. Gasket damaged. Porosity, cross leaks, plugged hole.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Inspect for damage. Repair as necessary.
Rear Planetary Assembly Planetary damaged.	Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly Seals, piston damaged. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Forward Planetary Assembly Planetary damaged.	Inspect for damage. If damaged, repair as necessary.
Final drive gearset and differential Damaged.	Inspect for damage. If damaged, repair as necessary.
Low One-Way Clutch (OWC) Worn, damaged or assembled incorrectly.	Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERNS: HARSH FORWARD AND REVERSE

Possible Component	Reference/Action
208 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Transmission Fluid Temperature	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

(TFT) sensor, Shift Solenoid A (SEA) and Shift Solenoid B (SSB).	diagnosis and testing of the TCM. Go to Pinpoint Test A , go to Pinpoint Test B and Go to Pinpoint Test C . Repair as required. Clear the DTCs, road test and rerun OBD test.
308 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid Incorrect transmission fluid level. Transmission fluid condition.	Adjust transmission fluid to correct level. Refer to Preliminary Inspection . Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection .
Incorrect Pressures High pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Forward Clutch Assembly Seals, piston damaged. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Reverse and Low/Reverse Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged. One-Way Clutch (OWC).	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERNS: DELAYED/SOFT FORWARD AND REVERSE

Possible Component	Reference/Action
209 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor Shift Solenoid Pressure Control	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

<p>A (SSPCA) and Shift Solenoid Pressure Control B (SSPCB).</p>	<p>Go to Pinpoint Test A, go to Pinpoint Test B and Go to Pinpoint Test C. Repair as required. Clear the DTCs, road test and rerun OBD test.</p>
309 - HYDRAULIC/MECHANICAL ROUTINE	
<p>Transmission Fluid</p> <p>Incorrect transmission fluid level.</p> <p>Transmission fluid condition.</p>	<p>Adjust transmission fluid to correct level. Refer to Preliminary Inspection. Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection.</p>
<p>Incorrect Pressures</p> <p>High pressures.</p>	<p>Check pressure at line tap. Carry out Line Pressure Test. Refer Special Testing Procedures.</p>
<p>Main Control</p> <p>Bolts not tightened to specification. Separator plate damaged. Contamination.</p> <p>Valves/springs damaged, misassembled, missing, stuck or bore damaged.</p>	<p>Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.</p>
<p>Pump Assembly</p> <p>Bolts not tightened to specification. Gasket damaged. Porosity, cross leaks, plugged hole.</p>	<p>Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Inspect for damage. Repair as necessary.</p>

SHIFT CONCERNS: SOME/ALL SHIFTS MISSING (AUTOMATIC MODE ONLY)

Possible Component	Reference/Action
210 - ELECTRICAL ROUTINE	
<p>Powertrain Control System</p> <p>Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Intake Air Temperature (IAT) sensor, Output Shaft Speed (OSS) sensor input, Shift Solenoid A (SEA), Shift Solenoid B (SSB), Shift Solenoid C (SSC), Shift Solenoid D (SSD), Shift Solenoid E (SSE), Shift</p>	<p>Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM, IAT and OSS.</p>

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Solenoid F (SSF), Pressure Control Solenoid A (PCA) and Pressure Control Solenoid B (PCB).	Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test C</u> and Go to <u>Pinpoint Test D</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
310 - HYDRAULIC/MECHANICAL ROUTINE	
Some Shifts Missing ONLY	If only some of the shifts are missing, determine which shift(s) is missing. Refer to the following routine(s) for further No Shift Concerns: <ul style="list-style-type: none">• No 1-2 Shift, Routine 220/320• No 2-3 Shift, Routine 221/321• No 3-4 Shift, Routine 222/322• No 4-3 Shift, Routine 223/323• No 3-2 Shift, Routine 224/324• No 2-1 Shift, Routine 225/325
Transmission Fluid Incorrect transmission fluid level. Transmission fluid condition.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection</u> . Carry out Transmission Fluid Condition Check. Refer to <u>Preliminary Inspection</u> .
Selector Lever Cable/TR Sensor Selector lever cable system or TR sensor damaged, misaligned.	Inspect and repair as required. For selector lever cable information, refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> article. For TR sensor information, refer to <u>Transmission Range (TR) Sensor</u> .
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Pump Assembly Bolts not tightened to	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

specification.	Tighten to specifications.
Gasket damaged.	Inspect for damage. If damaged, repair as necessary.
Porosity, cross leaks, plugged hole.	Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
Seals, piston damaged.	Inspect for damage. Repair as necessary.
Check balance dam.	Inspect for damage. Repair as necessary.
Friction elements damaged or worn.	Inspect for damage. Repair as necessary.
Return springs damaged.	Inspect for damage. Repair as necessary.
Forward Clutch Assembly	
Seals, piston damaged.	Inspect for damage. Repair as necessary.
Check balance dam.	Inspect for damage. Repair as necessary.
Friction elements damaged or worn.	Inspect for damage. Repair as necessary.
Return springs damaged.	Inspect for damage. Repair as necessary.
One-Way Clutch (OWC)	
Worn, damaged or assembled incorrectly.	Inspect for damage. Repair as necessary.
Servo	
Servo retaining ring damaged.	Inspect for damage. Repair as necessary.

SHIFT CONCERNS: TIMING CONCERNS - EARLY/LATE

Possible Component	Reference/Action
211 - ELECTRICAL ROUTINE	
Powertrain Control System	
PCM, vehicle wiring harnesses, Output Shaft Speed (OSS) sensor, Turbine Shaft Speed (TSS) sensor, Shift Solenoid A (SEA), Shift Solenoid B (SSB), Shift Solenoid C (SSC), Shift Solenoid D (SSD), Shift Solenoid E (SSE), Shift Solenoid F (SSF) and Variable Force Solenoid (VFS).	<p>Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the Transmission Control Module (TCM) and OSS sensor.</p> <p>Go to Pinpoint Test A and Go to Pinpoint Test G. Repair as required. Clear the DTCs, road test and rerun OBD test.</p>
311 - HYDRAULIC/MECHANICAL ROUTINE	
Some Shifts Early/Late ONLY	
	<p>If only some of the shifts are early/late, determine which shift(s) is early/late.</p> <p>Refer to the following routine(s) for further Early/Late Shift Concerns:</p> <ul style="list-style-type: none"> ○ Soft/Slipping 1-2 Shift, Routine 226/326

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	<ul style="list-style-type: none"> ○ Soft/Slipping 2-3 Shift, Routine 227/327 ○ Soft/Slipping 3-4 Shift, Routine 228/328 ○ Soft/Slipping 4-3 Shift, Routine 229/329 ○ Soft/Slipping 3-2 Shift, Routine 230/330 ○ Soft/Slipping 2-1 Shift, Routine 231/331
Transmission Fluid	
Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection.</u>
Transmission fluid condition.	Carry out Transmission Fluid Condition Check. Refer to <u>Preliminary Inspection.</u>
Main Control	
Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo	
Servo retaining ring damaged.	Inspect for damage. Repair as necessary.
Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band	
Band damaged.	Inspect for damage. Repair as necessary.
Servo worn or damaged.	Inspect for damage. Repair as necessary.
Not adjusted correctly.	Adjust correctly.
Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary.

SHIFT CONCERNS: TIMING CONCERNS - ERRATIC/HUNTING

Possible Component	Reference/Action
212 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Output Shaft Speed (OSS) sensor, Intake Air Temperature (IAT) sensor.	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM, IAT and OSS sensor. Go to <u>Pinpoint Test G.</u> Repair as required. Clear the DTCs, road test and rerun OBD test.
312 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection.</u> Carry out Transmission Fluid Condition Check.

2008 Ford Fusion S
2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

2008 Ford Fusion S
2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Transmission fluid condition.	Refer to <u>Preliminary Inspection</u> .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Further Diagnosis For further diagnosis of timing issues, refer to Reference/Actions.	Refer to the following routine(s) for specific shift diagnosis: <ul style="list-style-type: none"> ○ No. 1-2 Shift, see Routine 220/330 ○ No. 2-3 Shift, see Routine 221/331 ○ No. 3-4 Shift, see Routine 222/332 ○ No. 4-3 Shift, see Routine 223/323 ○ No. 3-2 Shift, see Routine 224/324 ○ No. 2-1 Shift, see Routine 225/325 ○ Soft/Slip 1-2 Shift, see Routine 226/326 ○ Soft/Slip 2-3 Shift, see Routine 227/327 ○ Soft/Slip 3-4 Shift, see Routine 228/328 ○ Soft/Slip 4-3 Shift, see Routine 229/329 ○ Soft/Slip 3-2 Shift, see Routine 230/330 ○ Soft/Slip 2-1 Shift, see Routine 231/331 ○ Harsh 1-2 Shift, see Routine 232/332 ○ Harsh 2-3 Shift, see Routine 233/333 ○ Harsh 3-4 Shift, see Routine 234/334 ○ Harsh 4-3 Shift, see Routine 235/335 ○ Harsh 3-2 Shift, see Routine 236/336 ○ Harsh 2-1 Shift, see Routine 237/337

SHIFT CONCERNS: FEEL - SOFT/SLIPPING

Possible Component	Reference/Action
213 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Fluid	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Temperature (TFT) sensor, Intake Air Temperature (IAT) sensor, Output Shaft Speed (OSS) sensor input, Shift Solenoid A (SEA), Shift Solenoid B (SSB), Shift Solenoid C (SSC), Shift Solenoid D (SSD), Shift Solenoid E (SSE), Shift Solenoid F (SSF), Variable Force Solenoid (VFS), Pressure Control Solenoid A (PCA) and PCB.

Carry out On-Board Diagnostic (OBD) tests. Refer to the **Introduction - Gasoline Engines** article for diagnosis and testing of the TCM, IAT sensor and OSS.

Go to **Pinpoint Test A**, go to **Pinpoint Test B**, go to **Pinpoint Test D** and Go to **Pinpoint Test E**.

Repair as required. Clear the DTCs, road test and rerun OBD test.

313 - HYDRAULIC/MECHANICAL ROUTINE

Some Shifts Soft/Slipping ONLY

If only some of the shifts are soft/slipping, determine which shift(s) is soft/slipping.

Refer to the following routine(s) for further Soft/Slipping Shift Concerns:

- Soft/Slipping 1-2 Shift, see Routine 226/326
- Soft/Slipping 2-3 Shift, see Routine 227/327
- Soft/Slipping 3-4 Shift, see Routine 228/328
- Soft/Slipping 4-3 Shift, see Routine 229/329
- Soft/Slipping 3-2 Shift, see Routine 230/330
- Soft/Slipping 2-1 Shift, see Routine 231/331

Transmission Fluid

Incorrect transmission fluid level.

Adjust transmission fluid to correct level. Refer to **Preliminary Inspection**.

Transmission fluid condition.

Carry out Transmission Fluid Condition Check. Refer to **Preliminary Inspection**.

Incorrect Pressures

High/Low Pressures.

Check pressure at line tap. Carry out Line Pressure Test. Refer to **Special Testing Procedures**.

Main Control

Bolts not tightened to specification.
Separator plate damaged.
Contamination.

Tighten to specifications.

Inspect for damage. If damaged, repair as necessary.
Disassemble and clean.

Valves/springs damaged, misassembled, missing, stuck or bore damaged.

If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Fluid Pump Assembly

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Bolts not tightened to specification. Gasket damaged. Porosity, cross leaks, plugged hole.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Inspect for damage. Repair as necessary.
Intermediate Servo Servo retaining ring damaged. Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Intermediate Band Band damaged. Servo worn or damaged. Not adjusted correctly. Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Adjust correctly. Inspect for damage. Repair as necessary.
Direct Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Forward Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Case Damaged.	Inspect for damage. Repair as necessary.

SHIFT CONCERNS: FEEL - HARSH

Possible Component	Reference/Action
214 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Fluid Temperature (TFT) sensor, Intake Air Temperature (IAT) sensor, Output Shaft Speed (OSS) sensor input, Shift Solenoid A (SEA), Shift Solenoid B (SSB), Shift Solenoid C (SSC), Shift Solenoid D (SSD), Shift Solenoid E (SSE), Shift Solenoid F (SSF), Variable Force Solenoid (VFS), Pressure Control Solenoid A (PCA) and Pressure Control Solenoid B (PCB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM, IAT sensor and OSS. Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test B</u> , go to <u>Pinpoint Test C</u> , go to <u>Pinpoint Test D</u> and Go to <u>Pinpoint Test E</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

314 - HYDRAULIC/MECHANICAL ROUTINE**Some Shifts Harsh ONLY**

If only some of the shifts are harsh, determine which shift(s) is harsh.

Refer to the following routine(s) for further Harsh Shift Concerns:

- Harsh 1-2 Shift, see Routine 232/332
- Harsh 2-3 Shift, see Routine 233/333
- Harsh 3-4 Shift, see Routine 234/334
- Harsh 4-3 Shift, see Routine 235/335
- Harsh 3-2 Shift, see Routine 236/336
- Harsh 2-1 Shift, see Routine 237/337

Incorrect Pressures

High/Low Pressures.

Check pressure at line tap.

Carry out Line Pressure Test. Refer to **Special Testing Procedures**.

Main Control

Bolts not tightened to specification.
Separator plate damaged.
Contamination.

Tighten to specifications.

Inspect for damage. If damaged, repair as necessary.
Disassemble and clean.

Valves/springs damaged, misassembled,
missing, stuck or bore damaged.

If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Input Shaft

Damaged.

Inspect for damage. Repair as necessary.

Servo

Servo retaining ring damaged.
Seals (piston and cover) damaged.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Band

Band damaged.
Servo worn or damaged.
Not adjusted correctly.
Anchor bolt damaged or worn.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Adjust correctly.

Inspect for damage. Repair as necessary.

Forward Clutch Assembly

Seals, piston damaged.
Check balance dam.
Friction elements damaged or worn.
Return springs damaged.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Final Drive Gears and Differential

Damaged.

Inspect for damage. Repair as necessary.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Case

Damaged.

Inspect for damage. Repair as necessary.

SHIFT CONCERNS: NO 1ST GEAR IN DRIVE, ENGAGES IN A HIGHER GEAR

Possible Component	Reference/Action
215 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor and Shift Solenoid A (SEA).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM. Go to Pinpoint Test A and Go to Pinpoint Test C . Repair as required. Clear the DTCs, road test and rerun OBD test.
315 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Refer to the Band/Clutch Chart in specification to determine which gears are on. Follow the diagnostic routines to repair the missing gears.
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Low One-Way Clutch (OWC) Worn, damaged or assembled incorrectly.	Inspect for damage. Repair as necessary.

SHIFT CONCERNS: NO 1ST GEAR IN MANUAL LOW

Possible Component	Reference/Action
216 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM) and vehicle wiring harnesses.	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM. Repair as required. Clear the DTCs, road test and rerun OBD test.
316 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Refer to the Band/Clutch Chart in specification to

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	determine which gears are on. Follow the diagnostic routines to repair the missing gears.
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Low/Reverse Clutch Assembly Seals. Friction plates. Return spring.	Inspect for damage. If damaged, repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
OD Planetary Assembly Planetary damaged.	Inspect for damage. If damaged, repair as necessary.

SHIFT CONCERNS: NO MANUAL 2ND GEAR

Possible Component	Reference/Action
217 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses and Shift Solenoid B (SSB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM. Go to Pinpoint Test A . Repair as required. Clear the DTCs, road test and rerun OBD test.
317 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo Servo retaining ring damaged.	Inspect for damage. Repair as necessary.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band	
Band damaged.	Inspect for damage. Repair as necessary.
Servo worn or damaged.	Inspect for damage. Repair as necessary.
Not adjusted correctly.	Adjust correctly.
Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary.
Low/Direct One-Way Clutch (OWC)	
Worn, damaged or assembled incorrectly.	Inspect for damage. Repair as necessary.

SHIFT CONCERN: NO 1-2 SHIFT

Possible Component	Reference/Action
220 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Output Shaft Speed (OSS) sensor, Transmission Range (TR) sensor, Turbine Shaft Speed (TSS) sensor and Shift Solenoid B (SSB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM, Intake Air Temperature (IAT) sensor and OSS. Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test C</u> and Go to <u>Pinpoint Test E</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
320 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection</u> .
Incorrect Pressures	
High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Main Control	
Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo	
Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band	
Band damaged.	Inspect for damage. Repair as necessary.
Servo worn or damaged.	Inspect for damage. Repair as necessary.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Not adjusted correctly. Anchor bolt damaged or worn.	Adjust correctly. Inspect for damage. Repair as necessary.
OD Planetary Assembly Planetary damaged.	Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.

SHIFT CONCERN: NO 2-3 SHIFT

Possible Component	Reference/Action
221 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor, Shift Solenoid B (SSB) and Shift Solenoid C (SSC).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM and OSS. Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test C</u> and Go to <u>Pinpoint Test E</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
321 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo Seals.	Inspect for damage. Repair as necessary.
Forward Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Intermediate Clutch Assembly

Seals, piston damaged.	Inspect for damage. Repair as necessary.
Check balance dam.	Inspect for damage. Repair as necessary.
Friction elements damaged or worn.	Inspect for damage. Repair as necessary.
Return springs damaged.	Inspect for damage. Repair as necessary.

SHIFT CONCERN: NO 3-4 SHIFT

Possible Component	Reference/Action
222 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor, Shift Solenoid A (SEA) and Shift Solenoid D (SSD).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM and OSS. Go to Pinpoint Test A , go to Pinpoint Test C and Go to Pinpoint Test E . Repair as required. Clear the DTCs, road test and rerun OBD test.
322 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Forward Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Servo Band.	Inspect for damage. Repair as necessary.

SHIFT CONCERN: NO 4-3 SHIFT

Possible Component	Reference/Action
223 - ELECTRICAL ROUTINE	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Powertrain Control System

Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor, Shift Solenoid D (SSD) and Shift Solenoid A (SEA).

Carry out On-Board Diagnostic (OBD) tests. Refer to the **Introduction - Gasoline Engines** article for diagnosis and testing of the TCM and OSS.

Go to **Pinpoint Test A**, go to **Pinpoint Test C** and Go to **Pinpoint Test E**.

Repair as required. Clear the DTCs, road test and rerun OBD test.

323 - HYDRAULIC/MECHANICAL ROUTINE**Incorrect Pressures**

High/Low pressures.

Check pressure at line tap.

Carry out Line Pressure Test. Refer to **Special Testing Procedures**.

Main Control

Bolts not tightened to specification.
Separator plate damaged.
Contamination.

Tighten to specifications.

Inspect for damage. If damaged, repair as necessary.

Disassemble and clean.

Valves/springs damaged, misassembled, missing, stuck or bore damaged.

If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Forward Clutch Assembly

Seals, piston damaged.
Check balance dam.
Friction elements damaged or worn.
Return springs damaged.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Servo

Seal.

Inspect for damage. Repair as necessary.

SHIFT CONCERN: NO 3-2 SHIFT

Possible Component	Reference/Action
224 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor and Shift Solenoid C (SSC).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM and OSS. Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test C</u> and Go to <u>Pinpoint Test E</u> . Repair as required. Clear the DTCs, road test and rerun On-Board Diagnostic (OBD) test.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

324 - HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band Band damaged. Servo worn or damaged. Not adjusted correctly. Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Adjust correctly. Inspect for damage. Repair as necessary.
Direct Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.

SHIFT CONCERN: NO 2-1 SHIFT

Possible Component	Reference/Action
225 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor and Shift Solenoid D (SSD).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM and OSS. Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test C</u> and Go to <u>Pinpoint Test E</u> . Repair as required. Clear the DTCs, road test and rerun OBD test
325 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Main Control	
Bolts not tightened to specification. Separator plate damaged. Contamination.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
One-Way Clutch (OWC)	
Damaged.	Inspect for damage. Repair as necessary.
Band	
Damaged.	Inspect for damage. Repair as necessary.

SHIFT CONCERN: SOFT/SLIPPING 1-2

Possible Component	Reference/Action
226 - ELECTRICAL ROUTINE	
Incorrect Pressures	
Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor and Shift Solenoid B (SSB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM and OSS. Go to Pinpoint Test A , go to Pinpoint Test G and Go to Pinpoint Test H . Repair as required. Clear the DTCs, road test and rerun OBD test.
326 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to Preliminary Inspection .
Transmission fluid condition.	Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection .
Incorrect Pressures	
High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures .
Main Control	
Bolts not tightened to specification. Separator plate damaged. Contamination.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean.
Valves/springs damaged, misassembled, missing, stuck or bore damaged.	If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	main control or transaxle damage.
Servo	
Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band	
Band damaged.	Inspect for damage. Repair as necessary.
Servo worn or damaged.	Inspect for damage. Repair as necessary.
Not adjusted correctly.	Adjust correctly.
Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary.

SHIFT CONCERN: SOFT/SLIPPING 2-3

Possible Component	Reference/Action
227 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Turbine Shaft Speed (TSS) sensor, Transmission Fluid Temperature (TFT) sensor and Shift Solenoid C (SSC).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM. Go to Pinpoint Test A , go to Pinpoint Test G and Go to Pinpoint Test H . Repair as required. Clear the DTCs, road test and rerun OBD test.
327 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures .
Main Control	
Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo	
Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band	
Band damaged.	Inspect for damage. Repair as necessary.
Servo worn or damaged.	Inspect for damage. Repair as necessary.
Not adjusted correctly.	Adjust correctly.
Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
Seals, piston damaged.	Inspect for damage. Repair as necessary.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Check balance dam.	Inspect for damage. Repair as necessary.
Friction elements damaged or worn.	Inspect for damage. Repair as necessary.
Return springs damaged.	Inspect for damage. Repair as necessary.

SHIFT CONCERN: SOFT/SLIPPING 3-4

Possible Component	Reference/Action
228 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), Shift Solenoid A (SEA) , Shift Solenoid D (SSD), vehicle wiring harnesses and Transmission Fluid Temperature (TFT) sensor.	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> and Go to <u>Pinpoint Test B</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
328 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Forward Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Servo Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band Band damaged. Servo worn or damaged. Not adjusted correctly. Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Adjust correctly. Inspect for damage. Repair as necessary.

SHIFT CONCERN: SOFT/SLIPPING 4-3

Possible Component	Reference/Action
229 - ELECTRICAL ROUTINE	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Powertrain Control System

Transmission Control Module (TCM), Shift Solenoid A (SEA), Shift Solenoid D (SSD), vehicle wiring harnesses and Transmission Fluid Temperature (TFT) sensor.

Carry out On-Board Diagnostic (OBD) tests. Refer to the **Introduction - Gasoline Engines** article for diagnosis and testing of the TCM.

Go to **Pinpoint Test A** and Go to **Pinpoint Test B**.
Repair as required. Clear the DTCs, road test and rerun OBD test.

329 - HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures

High/Low pressures.

Check pressure at line tap.
Carry out Line Pressure Test. Refer to **Special Testing Procedures**. Follow pressure diagnosis and repair as required.

Main Control

Bolts not tightened to specification.
Separator plate damaged.
Contamination.

Valves/springs damaged, misassembled, missing, stuck or bore damaged.

Tighten to specifications.
Inspect for damage. If damaged, repair as necessary.
Disassemble and clean.
If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Forward Clutch Assembly

Seals, piston damaged.

Inspect for damage. Repair as necessary.

Check balance dam.
Friction elements damaged or worn.
Return springs damaged.

Inspect for damage. Repair as necessary.
Inspect for damage. Repair as necessary.
Inspect for damage. Repair as necessary.

Servo

Seals, piston damaged.

Inspect for damage. Repair as necessary.

SHIFT CONCERN: SOFT/SLIPPING 3-2

Possible Component	Reference/Action
230 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), Shift Solenoid C (SSC), vehicle wiring harnesses and Transmission Fluid Temperature (TFT) sensor.	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> and Go to <u>Pinpoint Test B</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
330 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band Band damaged. Servo worn or damaged. Not adjusted correctly. Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Adjust correctly. Inspect for damage. Repair as necessary.

SHIFT CONCERN: SOFT/SLIPPING 2-1

Possible Component	Reference/Action
231 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), Shift Solenoid B (SSB), Output Shaft Speed (OSS) sensor, Turbine Shaft Speed (TSS) sensor, Transmission Range (TR) sensor, vehicle wiring harnesses and Transmission Fluid Temperature (TFT) sensor.	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM and OSS. Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test B</u> , go to <u>Pinpoint Test C</u> and Go to <u>Pinpoint Test G</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
331 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Valves/springs damaged, misassembled, missing, stuck or bore damaged.	control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band Band damaged. Servo worn or damaged. Not adjusted correctly. Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Adjust correctly. Inspect for damage. Repair as necessary.

SHIFT CONCERN: HARSH 1-2 SHIFT

Possible Component	Reference/Action
232 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Turbine Shaft Speed (TSS) sensor, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor and Shift Solenoid B (SSB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM. Go to Pinpoint Test A , go to Pinpoint Test B , go to Pinpoint Test C and Go to Pinpoint Test G . Repair as required. Clear the DTCs, road test and rerun OBD test.
332 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band Band damaged. Servo worn or damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Not adjusted correctly.

Anchor bolt damaged or worn.

Adjust correctly.

Inspect for damage. Repair as necessary.

SHIFT CONCERN: HARSH 2-3 SHIFT

Possible Component	Reference/Action
233 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Turbine Shaft Speed (TSS) sensor, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor and Shift Solenoid C (SSC).	<p>Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM.</p> <p>Go to <u>Pinpoint Test A</u>, go to <u>Pinpoint Test B</u>, go to <u>Pinpoint Test C</u> and Go to <u>Pinpoint Test G</u>.</p> <p>Repair as required. Clear the DTCs, road test and rerun OBD test.</p>
333 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
High/Low pressures.	<p>Check pressure at line tap.</p> <p>Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u>.</p>
Main Control	
<p>Bolts not tightened to specification.</p> <p>Separator plate damaged.</p> <p>Contamination.</p> <p>Valves/springs damaged, misassembled, missing, stuck or bore damaged.</p>	<p>Tighten to specifications.</p> <p>Inspect for damage. If damaged, repair as necessary.</p> <p>Disassemble and clean.</p> <p>If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.</p>
Direct Clutch Assembly	
<p>Seals, piston damaged.</p> <p>Check balance dam.</p> <p>Friction elements damaged or worn.</p> <p>Return springs damaged.</p>	<p>Inspect for damage. Repair as necessary.</p> <p>Inspect for damage. Repair as necessary.</p> <p>Inspect for damage. Repair as necessary.</p> <p>Inspect for damage. Repair as necessary.</p>
Servo	
Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band	
<p>Band damaged.</p> <p>Servo worn or damaged.</p> <p>Not adjusted correctly.</p> <p>Anchor bolt damaged or worn.</p>	<p>Inspect for damage. Repair as necessary.</p> <p>Inspect for damage. Repair as necessary.</p> <p>Adjust correctly.</p> <p>Inspect for damage. Repair as necessary.</p>

SHIFT CONCERN: HARSH 3-4 SHIFT

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Possible Component	Reference/Action
234 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Turbine Shaft Speed (TSS) sensor, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor, Shift Solenoid D (SSD) and Shift Solenoid C (SSC).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test B</u> and Go to <u>Pinpoint Test C</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
334 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> . Follow pressure diagnosis and repair as required.
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Direct Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Forward Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.

SHIFT CONCERN: HARSH 4-3 SHIFT

Possible Component	Reference/Action
235 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

wiring harnesses, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor, Shift Solenoid A (SEA) and Shift Solenoid D (SSD).

Carry out On-Board Diagnostic (OBD) tests. Refer to the **Introduction - Gasoline Engines** article for diagnosis and testing of the TCM.

Go to **Pinpoint Test A**, go to **Pinpoint Test B** and Go to **Pinpoint Test C**.

Repair as required. Clear the DTCs, road test and rerun OBD test.

335 - HYDRAULIC/MECHANICAL ROUTINE**Incorrect Pressures**

High/Low pressures.

Check pressure at line tap.

Carry out Line Pressure Test. Refer to **Special Testing Procedures**.

Main Control

Bolts not tightened to specification.
Separator plate damaged.
Contamination.

Tighten to specifications.

Inspect for damage. If damaged, repair as necessary.

Disassemble and clean.

Valves/springs damaged, misassembled, missing, stuck or bore damaged.

If damaged or parts are missing, install a new main

control assembly. If misassembled, reassemble

correctly. DO NOT stone, file or sand valves. This will

remove the anodized finish and may result in further

main control or transaxle damage.

Forward Clutch Assembly

Seals, piston damaged.
Check balance dam.
Friction elements damaged or worn.
Return springs damaged.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Servo

Seals (piston and cover) damaged.

Inspect for damage. Repair as necessary.

Band

Band damaged.
Servo worn or damaged.
Not adjusted correctly.
Anchor bolt damaged or worn.

Inspect for damage. Repair as necessary.

Inspect for damage. Repair as necessary.

Adjust correctly.

Inspect for damage. Repair as necessary.

SHIFT CONCERN: HARSH 3-2 SHIFT

Possible Component	Reference/Action
236 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Turbine Shaft Speed (TSS) sensor, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor and Shift Solenoid C (SSC).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test B</u> , go to <u>Pinpoint Test C</u> and Go to <u>Pinpoint Test G</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
336 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures High/Low pressures. Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> . Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band Band damaged. Servo worn or damaged. Not adjusted correctly. Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Adjust correctly. Inspect for damage. Repair as necessary.
Direct Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.

SHIFT CONCERN: HARSH 2-1 SHIFT

Possible Component	Reference/Action
237 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Turbine Shaft Speed (TSS) sensor, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor, Variable Force Solenoid (VFS) and Shift Solenoid B (SSB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> , go to <u>Pinpoint Test B</u> , go to <u>Pinpoint Test C</u> , go to <u>Pinpoint Test E</u> and Go to <u>Pinpoint Test G</u> . Repair as required. Clear the DTCs, road test and rerun

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

	OBD test.
337 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures .
Main Control	
Bolts not tightened to specification. Separator plate damaged. Contamination.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
One-Way Clutch (OWC)	
Worn, damaged or assembled incorrectly.	Inspect for damage. Repair as necessary.
Servo	
Seals (piston and cover) damaged.	Inspect for damage. Repair as necessary.
Band	
Band damaged. Servo worn or damaged. Not adjusted correctly. Anchor bolt damaged or worn.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Adjust correctly. Inspect for damage. Repair as necessary.

TORQUE CONVERTER CLUTCH OPERATION CONCERNS: DOES NOT APPLY

Possible Component	Reference/Action
240 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Fluid Temperature (TFT) sensor, Shift Solenoid A (SEA) and Shift Solenoid E (SSE).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM. Go to Pinpoint Test A and Go to Pinpoint Test B . Repair as required. Clear the DTCs, road test and rerun OBD test.
340 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures .
Main Control	
Bolts not tightened to specification. Separator plate damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Contamination.	Disassemble and clean.
Valves/springs damaged, misassembled, missing, stuck or bore damaged.	If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Fluid Pump Assembly	
Bolts not tightened to specification.	Tighten to specifications.
Gasket damaged.	Inspect for damage. If damaged, repair as necessary.
Porosity, cross leaks, plugged hole.	Inspect for damage. If damaged, repair as necessary.
Torque Converter Assembly	
Torque converter internal failure preventing engagement, piston application.	Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to <u>Torque Converter Contamination Inspection</u> . If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter.

TORQUE CONVERTER OPERATION CONCERNS: ALWAYS APPLIED/STALLS VEHICLE

Possible Component	Reference/Action
241 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Shift Solenoid A (SEA) and Shift Solenoid E (SSE).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
341 - HYDRAULIC/MECHANICAL ROUTINE	
Main Control	
Bolts not tightened to specification.	Tighten to specifications.
Separator plate damaged.	Inspect for damage. If damaged, repair as necessary.
Contamination.	Disassemble and clean.
Valves/springs damaged, misassembled, missing, stuck or bore damaged.	If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Torque Converter Assembly	
Torque converter internal failure preventing engagement, piston application.	Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to <u>Torque Converter Contamination Inspection</u> . If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter.

Low One-Way Clutch (OWC)

Worn, damaged or assembled incorrectly.

Inspect for damage. Repair as necessary.

TORQUE CONVERTER CLUTCH CONCERNS: CYCLING/SHUDDER/CHATTER

Possible Component	Reference/Action
242 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses, Shift Solenoid Pressure Control A (SSPCA) and Shift Solenoid E (SSE).	<p>Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM.</p> <p>Go to <u>Pinpoint Test A</u>.</p> <p>Repair as required. Clear the DTCs, road test and rerun OBD test.</p>
342 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
Transmission fluid condition.	Carry out Transmission Fluid Condition Check. Refer to <u>Preliminary Inspection</u> .
Transmission fluid contaminated.	If contaminated, locate source of contamination. If burnt, inspect mechanical bands and clutches. Repair as necessary.
Dirty transmission fluid.	Change the transmission fluid. Carry out drain and refill. Refer to <u>Transmission Fluid Drain and Refill</u> .
Contaminated torque converter.	Carry out transmission fluid cooler cleaning, refer to <u>Transmission Fluid Cooler - Backflushing and Cleaning</u> . Clean torque converter, carry out torque flushing. Refer to <u>Torque Converter Contamination Inspection</u> as listed.
Main Control	
Bolts not tightened to specification.	Tighten to specifications.
Separator plate damaged.	Inspect for damage. If damaged, repair as necessary.
Contamination.	Disassemble and clean.
Valves/springs damaged, misassembled, missing, stuck or bore damaged.	If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Torque Converter Assembly	
Torque converter internal failure preventing engagement, piston application.	Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to appropriate procedures. If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

OTHER CONCERNS: SHIFT LEVER EFFORTS HIGH

Possible Component	Reference/Action
251 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Range (TR) sensor.	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the Transmission Control Module (TCM). Go to <u>Pinpoint Test C</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
351 - HYDRAULIC/MECHANICAL ROUTINE	
Selector Lever Cable/TR Sensor	
Selector lever cable system or TR sensor damaged, misaligned.	Inspect and repair as required. For selector lever cable information. Refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> article. Inspect and repair as required. For TR information, refer to <u>Transmission Range (TR) Sensor</u> .
Main Control	
Bolts not tightened to specification.	Tighten to specifications.
Case	
Manual control lever assembly damage, manual valve inner lever pin bent, manual valve inner lever damaged, spring rod damaged.	Inspect for damage. If damaged, repair as necessary.
Manual valve lever shaft retaining pin damaged.	Inspect for damage. If damaged, repair as necessary.

OTHER CONCERNS: EXTERNAL LEAKS

Possible Component	Reference/Action
252 - ELECTRICAL ROUTINE	
Powertrain Control System	
Output Shaft Speed (OSS) sensor, Turbine Shaft Speed (TSS) sensor, Transmission Range (TR) sensor and transmission wiring harness.	Inspect for leakage. If areas around sensor show signs of leakage, install a new sensor O-ring. If area behind TR sensor shows signs of leakage, install a new manual control lever shaft seal.
352 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection</u> .
Case	
Damaged.	Inspect for damage. If damaged, repair as necessary.

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Seal/Gaskets

Leakage at gaskets and seals.

Check for fluid leaks in the torque converter area. Refer to **Leakage Inspection** for potential leak locations.

Remove all traces of lubricant on exposed surfaces of the transaxle. Check the vent for free breathing. Operate the vehicle at normal temperatures and carry out **Leak Check Test**. Repair as necessary.

OTHER CONCERNS: POOR VEHICLE PERFORMANCE

Possible Component	Reference/Action
253 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Output Shaft Speed (OSS) sensor, Turbine Shaft Speed (TSS) sensor, Transmission Fluid Temperature (TFT) sensor, Transmission Range (TR) sensor, Shift Solenoid A (SEA), Shift Solenoid B (SSB), Shift Solenoid C (SSC), Shift Solenoid D (SSD), Shift Solenoid E (SSE), Shift Solenoid F (SSF), Pressure Control Solenoid A (PCA) and Pressure Control Solenoid B (PCB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the Introduction - Gasoline Engines article for diagnosis and testing of the TCM and OSS. Go to Pinpoint Test A , go to Pinpoint Test B , go to Pinpoint Test C and Go to Pinpoint Test D . Repair as required. Clear the DTCs, road test and rerun OBD test.
353 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to Preliminary Inspection .
Input Shaft Damaged.	Inspect for damage. Repair as necessary.
Forward Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.
Torque Converter Assembly Torque converter One-Way Clutch (OWC) slipping.	Carry out Torque Converter Contamination Inspection . If the One-Way Clutch (OWC) fails the check, install a new or remanufactured torque converter. Inspect for correct torque converter assembly. If not

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Incorrect torque converter used in rebuild.	correct, install the correct torque converter for this application.
---	---

NOTE: NVH symptoms should be identified using the diagnostic tools that are available. For a list of these tools, an explanation of their uses and a glossary of common terms, refer to **NOISE, VIBRATION AND HARSHNESS** article. Since it is possible any one of multiple systems may be the cause of a symptom, it may be necessary to use a process of elimination type of diagnostic approach to pinpoint the responsible system. If this is not the causal system for the symptom, refer back to **NOISE, VIBRATION AND HARSHNESS** article for the next likely system and continue diagnosis.

OTHER CONCERNS: NOISE/VIBRATION - FORWARD OR REVERSE

Possible Component	Reference/Action
254 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Shift Solenoid A (SEA), Shift Solenoid B (SSB), Shift Solenoid C (SSC), Shift Solenoid D (SSD), Shift Solenoid E (SSE), Shift Solenoid F (SSF), Pressure Control Solenoid A (PCA) and Pressure Control Solenoid B (PCB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> and Go to <u>Pinpoint Test D</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
354 - HYDRAULIC/MECHANICAL ROUTINE	
Pump Assembly Bolts not tightened to specification. Gasket damaged. Porosity, cross leaks, plugged hole.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Inspect for damage. If damaged, repair as necessary.
Flex Plate or Adapter Plate Damaged. Loose flexplate nuts. Adapter plate not aligned correctly.	Inspect for damage. Repair as necessary. Tighten the nuts to specification. Remove the transaxle. Align the adapter plate.
One-Way Clutch (OWC) Damaged or worn.	Inspect for damage. Install new components as necessary.
Friction Elements Damaged, burnt or worn. Excessive clutch pack clearance.	Inspect for damage. Install new components as necessary. Check the clutch pack clearance. Install new clutches as necessary.
Planetary Gear Set	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Damaged or worn thrust bearings.	Inspect for damage. Install new components as necessary.
Damaged or worn planetary or sun gear.	Inspect for damage. Install new components as necessary.
Incorrect Transmission Fluid Level	
Transmission fluid level low/overfilled.	Check the transmission fluid level. Adjust the transmission fluid level as necessary. Refer to <u>Preliminary Inspection</u> .
Transmission Fluid Filter	
Transmission fluid filter blocked.	Inspect the transmission fluid filter. Install a new transmission fluid filter if necessary. Refer to <u>Transmission Fluid Pan</u> .
Torque Converter	
Worn or damaged torque converter.	Refer to <u>Torque Converter Diagnosis</u> .
Transaxle Support Insulator	
Worn or damaged transaxle support insulator.	Inspect the transaxle support insulator for damage. Install new as necessary.
Differential Ring and Pinion	
Differential ring and pinion gears damaged.	Inspect the differential ring and pinion gears for damage. Install new as necessary.
Differential ring and pinion gear bearings damaged.	Inspect the differential ring and pinion gear bearings for damage. Install new as necessary.
Main Control Assembly	
Incorrect line pressure.	Check the line pressure. Refer to <u>Special Testing Procedures</u> .
Worn or damaged solenoids or valves.	Clean and inspect the main control assembly for damage. Install new as necessary.
Transmission Fluid Filler Tube	
Transmission fluid filler tube grounded out.	Inspect the transmission fluid filler tube for damage. Repair or install new as required.

OTHER CONCERNS: ENGINE WILL NOT CRANK

Possible Component	Reference/Action
255 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses and Transmission Range (TR) sensor.	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test C</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
355 - HYDRAULIC/MECHANICAL ROUTINE	
Selector Lever Cable/TR	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Sensor Selector lever cable system or TR sensor damaged, misaligned.	Inspect and repair as required. For selector lever cable information, refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> article. Inspect and repair as required. For TR sensor information, refer to <u>Transmission Range (TR) Sensor</u> .
Flex Plate or Adapter Plate Damaged.	Inspect for damage. Repair as necessary.

OTHER CONCERNS: NO PARK RANGE

Possible Component	Reference/Action
256 - ELECTRICAL ROUTINE	
Powertrain Control System	No electrical concerns.
356 - HYDRAULIC/MECHANICAL ROUTINE	
Selector Lever Cable/Transmission Range (TR) Sensor Selector Lever Cable or TR sensor damaged, misaligned.	Inspect and repair as required. For selector lever cable information, refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> article. Inspect and repair as required. For TR sensor information, refer to <u>Transmission Range (TR) Sensor</u> .
Case Manual control lever assembly damage, manual valve inner lever pin bent, manual valve inner lever damaged, spring rod damaged. Manual valve lever shaft retaining pin damaged.	Inspect for damage. If damaged, repair as necessary. Inspect for damage. If damaged, repair as necessary.
Park System Park gear, abutment, abutment plate, parking pawl return spring, park or guide plate, parking actuating rod, parking pawl shaft, manual lever detent spring damaged or misassembled. External linkages/brackets damaged.	Inspect for damage. If damaged, repair as necessary. Inspect for damage. If damaged, repair as necessary.

OTHER CONCERNS: OVERHEATING

Possible Component	Reference/Action
257 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Fluid	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction</u>

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Temperature (TFT) sensor and Shift Solenoid E (SSE).	- Gasoline Engines article for diagnosis and testing of the TCM. Go to Pinpoint Test A and Go to Pinpoint Test B . Repair as required. Clear the DTCs, road test and rerun OBD test.
357 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to Preliminary Inspection .
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures .
Main Control Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck or bore damaged.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Pump Assembly Bolts not tightened to specification. Gasket damaged. Porosity, cross leaks, plugged hole.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Inspect for damage. If damaged, repair as necessary.
Case Case vent damaged.	Inspect for damage. If damaged, repair as necessary.
Torque Converter Assembly Torque converter internal failure preventing engagement, piston application.	Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to Torque Converter Contamination Inspection . If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter.
Other Restriction in the transmission fluid cooling system. Excessive trailer tow load. Poor engine driveability	Refer to TRANSAXLE/TRANSMISSION COOLING article for information and diagnosis of cooling issues. Refer to specifications on trailer towing. Check engine driveability. Refer to ENGINE SYSTEM - GENERAL INFORMATION article.

OTHER CONCERNS: NO ENGINE BRAKING IN MANUAL 1

Possible Component	Reference/Action
259 - ELECTRICAL ROUTINE	
Powertrain Control System	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Transmission Control Module (TCM), vehicle wiring harnesses and Shift Solenoid B (SSB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
359 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection</u> .
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Pump Assembly Bolts not tightened to specification. Gasket damaged. Porosity, cross leaks, plugged hole.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Inspect for damage. If damaged, repair as necessary.
Low/Reverse Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return spring damaged.	Inspect for damage. Repair as necessary. Inspect for damage. If damaged, repair as necessary. Inspect for damage. If damaged, repair as necessary. Inspect for damage. If damaged, repair as necessary.

OTHER CONCERNS: FLUID VENTING OR FOAMING

Possible Component	Reference/Action
261 - ELECTRICAL ROUTINE	
Powertrain Control System No electrical concerns.	
361 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid Incorrect transmission fluid level. Transmission fluid condition.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection</u> . Carry out Transmission Fluid Condition Check. Refer to <u>Preliminary Inspection</u> .
Pump Assembly Bolts not tightened to specification. Gasket damaged. Porosity, cross leaks, plugged hole.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Inspect for damage. If damaged, repair as necessary.
Case Case vent damaged.	Inspect for damage. If damaged, repair as necessary.
Other Transaxle overheating.	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

OTHER CONCERNS: SLIPS/CHATTERS IN 1ST GEAR

Possible Component	Reference/Action
263 - ELECTRICAL ROUTINE	
Powertrain Control System	
Transmission Control Module (TCM), vehicle wiring harnesses and Shift Solenoid A (SEA).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
363 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection</u> .
Transmission fluid condition.	Carry out Transmission Fluid Condition Check. Refer to <u>Preliminary Inspection</u> .
Incorrect Pressures	
High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Main Control	
Bolts not tightened to specification. Separator plate damaged. Contamination.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean.
Valves/springs damaged, misassembled, missing, stuck or bore damaged.	If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Pump Assembly	
Bolts not tightened to specification.	Tighten to specifications.
Gasket damaged.	Inspect for damage. If damaged, repair as necessary.
Porosity, cross leaks, plugged hole.	Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly	
Seals, piston damaged.	Inspect for damage. Repair as necessary.
Check balance dam.	Inspect for damage. If damaged, repair as necessary.
Friction elements damaged or worn.	Inspect for damage. If damaged, repair as necessary.
Return springs damaged.	Inspect for damage. If damaged, repair as necessary.
Low One-Way Clutch (OWC)	
Worn, damaged or assembled incorrectly.	Inspect for damage. Repair as necessary.

OTHER CONCERNS: SLIPS/CHATTERS IN 2ND GEAR

Possible Component	Reference/Action
264 - ELECTRICAL ROUTINE	

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Powertrain Control SystemTransmission Control Module (TCM),
vehicle wiring harnesses and Shift
Solenoid B (SSB).Carry out On-Board Diagnostic (OBD) tests. Refer to the
Introduction - Gasoline Engines article for diagnosis and
testing of the TCM.Go to **Pinpoint Test A**.

Clear the DTCs, road test and rerun OBD test.

364 - HYDRAULIC/MECHANICAL ROUTINE**Transmission Fluid**

Incorrect transmission fluid level.

Adjust transmission fluid to correct level. Refer to
Preliminary Inspection.

Transmission fluid condition.

Carry out Transmission Fluid Condition Check. Refer to
Preliminary Inspection.**Incorrect Pressures**

High/Low pressures.

Check pressure at line tap.

Carry out Line Pressure Test. Refer to **Special Testing
Procedures**.**Pump Assembly**

Bolts not tightened to specification.

Tighten to specifications.

Gasket damaged.

Inspect for damage. If damaged, repair as necessary.

Porosity, cross leaks, plugged hole.

Inspect for damage. If damaged, repair as necessary.

Servo

Seals (piston and cover) damaged.

Inspect for damage. Repair as necessary.

Band

Band damaged.

Inspect for damage. Repair as necessary.

Servo worn or damaged.

Inspect for damage. If damaged, repair as necessary.

Not adjusted correctly.

Adjust correctly.

Anchor bolt damaged or worn.

Inspect for damage. If damaged, repair as necessary.

OD Planetary Assembly

Planetary damaged.

Inspect for damage. If damaged, repair as necessary.

Forward Clutch Assembly

Seals, piston damaged.

Inspect for damage. Repair as necessary.

Check balance dam.

Inspect for damage. If damaged, repair as necessary.

Friction elements damaged or worn.

Inspect for damage. If damaged, repair as necessary.

Return springs damaged.

Inspect for damage. If damaged, repair as necessary.

OTHER CONCERNS: SLIPS/CHATTERS IN 3RD GEAR

Possible Component	Reference/Action
282 - ELECTRICAL ROUTINE	
Powertrain Control System	No electrical concerns.
382 - HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
Incorrect transmission fluid level.	Adjust transmission fluid to correct level. Refer to <u>Preliminary Inspection</u> .

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

Transmission fluid condition.	Carry out Transmission Fluid Condition Check. Refer to <u>Preliminary Inspection</u> .
Incorrect Pressures High/Low pressures.	Check pressure at line tap. Carry out Line Pressure Test. Refer to <u>Special Testing Procedures</u> .
Pump Assembly Bolts not tightened to specification. Gasket damaged. Porosity, cross leaks, plugged hole.	Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly Seals, piston damaged. Check balance dam. Friction elements damaged or worn. Return springs damaged.	Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary. Inspect for damage. Repair as necessary.

OTHER CONCERNS: NO ENGINE BRAKING IN ALL GEARS

Possible Component	Reference/Action
283 - ELECTRICAL ROUTINE	
Powertrain Control System Transmission Control Module (TCM), vehicle wiring harnesses and Shift Solenoid B (SSB).	Carry out On-Board Diagnostic (OBD) tests. Refer to the <u>Introduction - Gasoline Engines</u> article for diagnosis and testing of the TCM. Go to <u>Pinpoint Test A</u> . Repair as required. Clear the DTCs, road test and rerun OBD test.
383 - HYDRAULIC/MECHANICAL ROUTINE	
No Hydraulic/Mechanical concerns.	

GENERAL PROCEDURES

TRANSMISSION FLUID COOLER - BACKFLUSHING AND CLEANING

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)

NOTE: The use of any transmission fluid other than what is recommended for this transaxle will cause transaxle damage. Refer to the transmission fluid specification for the correct transmission fluid.

NOTE: Do not use water-based cleaners, mineral spirits, brake cleaner or solvents that may contain acetone, xylene or heptane to clean and/or flush the transaxle assembly, transaxle components or the torque converter, transaxle damage will occur. Use only clean transmission fluid designated for this transaxle.

1. Carry out backflushing with a suitable torque converter/fluid cooler cleaner. Test equipment to make sure that a vigorous fluid flow is present before proceeding. Install a new system filter if flow is weak or contaminated.
2. To aid in attaching the cleaner to the transmission fluid cooler tube, connect 2 additional rubber hoses to the transaxle end of the transmission fluid cooler tube as follows:
 1. Connect the cleaner tank pressure tube to the transmission fluid cooler return tube.
 2. Connect a tank return hose to the transmission fluid cooler tube. Place the outlet end of this hose in the fluid tank reservoir.
3. Turn on fluid pump and allow the fluid to circulate a minimum of 5 minutes (cycling switch on and off will help dislodge contaminants in cooler system).
4. Switch off the fluid pump and disconnect the fluid pressure hose from the transmission fluid cooler return tube.
5. Use compressed air to blow out the cooler and tubes (blow air into the transaxle cooler return tube) until all fluid is removed.
6. Remove the rubber return hose from the remaining transmission fluid cooler tube.

TRANSMISSION FLUID DRAIN AND REFILL

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** article.
2. Disconnect the transmission fluid cooler return hose from the transaxle.

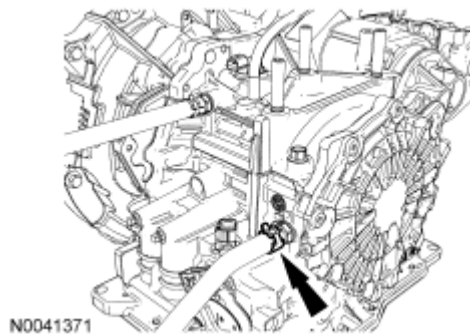


Fig. 116: Locating Transmission Fluid Cooler Return Hose
Courtesy of FORD MOTOR CO.

3. Insert the return hose into a calibrated 10L (10.5 qt) container.

NOTE: To prevent damage to the transaxle, do not run the engine above idle.

NOTE: If the fluid return rate is less than 0.95L (1 qt) in 30 seconds, or if the return hose pulsates, check for restrictions at the pump, transmission fluid cooler or transmission fluid cooler lines.

4. Run the engine at idle and pump out 3L (3.17 qt) of transmission fluid.
5. Switch OFF the engine.
6. Remove the transmission fluid level indicator from the transmission fluid level indicator tube.

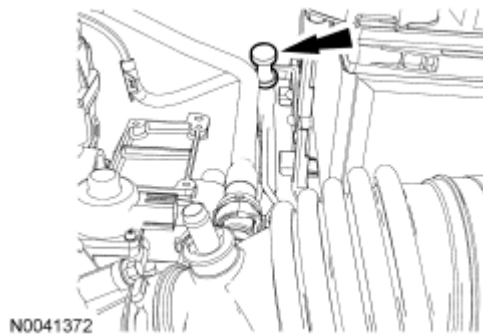


Fig. 117: Locating Fluid Level Indicator
Courtesy of FORD MOTOR CO.

7. Add 3L (3.17 qt) of transmission fluid to the transaxle.

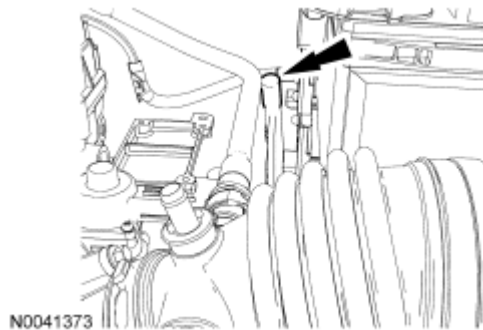


Fig. 118: Locating Fluid Level Indicator Tube
Courtesy of FORD MOTOR CO.

NOTE: To prevent damage to the transaxle, do not run the engine above idle.

NOTE: If the transmission fluid return rate is less than 0.95L (1 qt) in 30 seconds, or if the return hose pulsates, check for restrictions at the pump, transmission fluid cooler or transmission fluid cooler lines.

8. Run the engine at idle and pump out 3L (3.17 qt) of transmission fluid.
9. Switch OFF the engine.
10. Add 3L (3.17 qt) of transmission fluid to the transaxle.

NOTE: To prevent damage to the transaxle, do not run the engine above idle.

11. Run the engine at idle and pump out 3L (3.17 qt) of transmission fluid.
12. Switch OFF the engine.
13. Raise the vehicle.
14. Connect the transmission fluid cooler return hose to the transaxle.

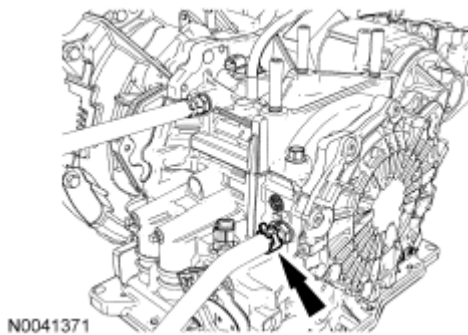


Fig. 119: Locating Transmission Fluid Cooler Return Hose
Courtesy of FORD MOTOR CO.

15. Add 3L (3.17 qt) of transmission fluid to the transaxle.

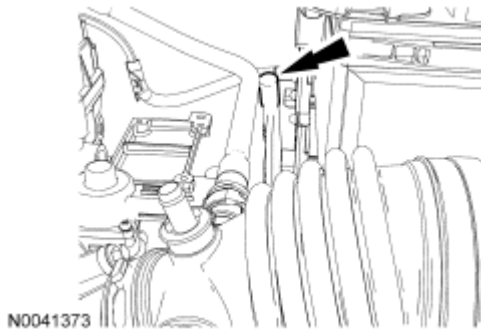


Fig. 120: Locating Fluid Level Indicator Tube
Courtesy of FORD MOTOR CO.

16. Install the transmission fluid level indicator in the transmission fluid level indicator tube.

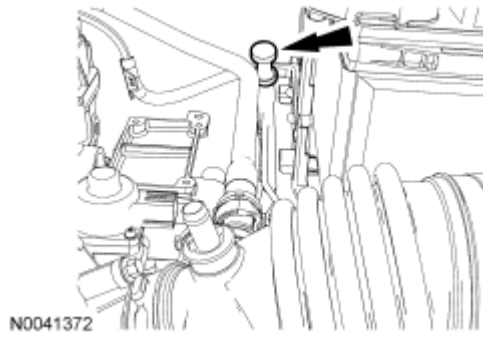


Fig. 121: Locating Fluid Level Indicator
 Courtesy of FORD MOTOR CO.

NOTE: To prevent damage to the transaxle, do not run the engine above idle.

17. Run the engine.
18. Check the transmission fluid level and fill if necessary.

TORQUE CONVERTER

1. A new or remanufactured torque converter must be installed if one or more of the following statements is true:
 - A torque converter malfunction has been determined based on complete diagnostic procedures.
 - Converter stud or studs, impeller hub or bushing are damaged.
 - Discoloration (due to overheating).
 - Evidence of transmission assembly or fluid contamination due to the following transmission or converter failure modes:
 - Major metallic failure.
 - Multiple clutches or clutch plate failures.
 - Sufficient component wear which results in metallic contamination.
 - Internal torque converter contamination present. For additional information refer to **Torque Converter Contamination Inspection**.

TORQUE CONVERTER CONTAMINATION INSPECTION

Material


Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)

NOTE: Do not use water-based cleaners or mineral spirits to clean or flush the torque converter or transaxle damage will occur. Use only clean transmission fluid designated for this transaxle.

1. If a new or remanufactured torque converter is not being installed, the following steps must be completed.
2. With the torque converter on a bench, pour a small amount of transmission fluid from the torque converter onto an absorbent white tissue or through a paper filter and examine the transmission fluid.
3. Observe the color and odor of the transmission fluid. The transmission fluid should be red, not brown or black. Odor may indicate an overheating condition such as clutch disc or band failure.
4. Examine the stain on the tissue for evidence of particles (spec of any kind). Examine the transmission fluid level indicator for signs of antifreeze (gum or varnish). If particles are present in the transmission fluid or there is evidence of engine coolant or water, a new torque converter must be installed.
5. If there are no particles or contamination present, drain the remainder of the transmission fluid from the torque converter.
6. Add 1.9L (2 qt) of clean transmission fluid into the converter and agitate by hand.
7. Thoroughly drain the transmission fluid.

TRANSMISSION RANGE (TR) SENSOR ADJUSTMENT

Special Tools

Illustration	Tool Name	Tool Number
 ST2962-A	Alignment Tool, Transmission Range Sensor	307-571

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** article.
2. Disconnect the Transmission Range (TR) sensor electrical connector and the selector lever cable end.

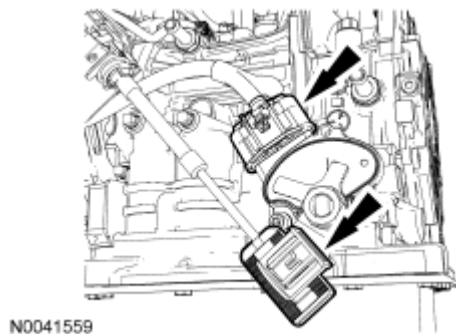


Fig. 122: Locating Transmission Range (TR) Sensor Electrical Connector And Selector Lever Cable End

Courtesy of FORD MOTOR CO.

NOTE: Failure to hold the selector lever, while loosening or tightening the manual control lever, will transmit rotational torque to the Transmission Range (TR) sensor causing internal damage.

3. Loosen the TR sensor (the automatic transaxle is shown removed for clarity).
 1. Remove the nut and the manual control lever.
 2. Loosen the TR sensor bolts.

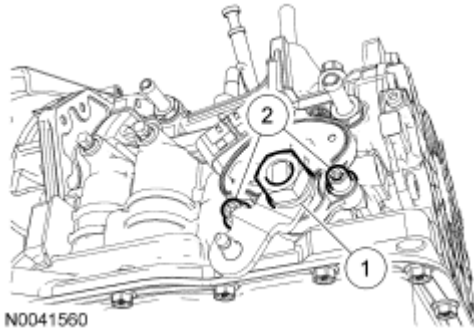


Fig. 123: Identifying Manual Control Lever Nut And TR Sensor Bolt
Courtesy of FORD MOTOR CO.

4. Using the Transmission Range Sensor Alignment Tool, align the TR sensor and tighten the bolts.
 - Tighten to 10 Nm (89 lb-in).

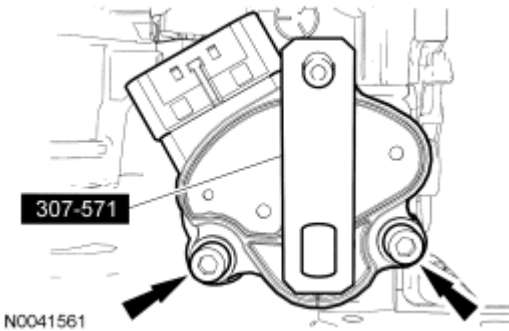


Fig. 124: Identifying Special Tool (307-571) And TR Sensor Bolts
Courtesy of FORD MOTOR CO.

NOTE: Do not use air tools on this nut. Hold the manual control lever while tightening the manual control lever nut, or damage to the manual control lever shaft or the Transmission Range (TR) sensor could occur.

5. Install the manual control lever.
 - Tighten to 22 Nm (16 lb-ft).

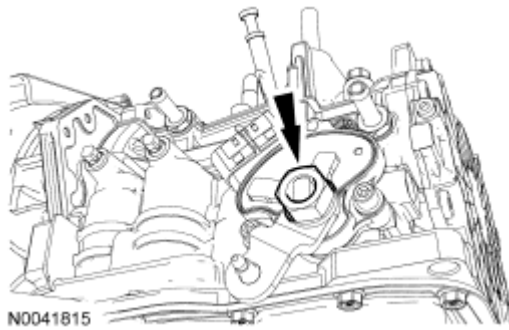


Fig. 125: Locating Manual Control Lever Nut
Courtesy of FORD MOTOR CO.

NOTE: Check to make sure the manual control lever is in position "2" (same as "D" position).

6. Adjust the manual control lever to TR sensor D position.
 1. L (LOW)
 2. D (DRIVE)
 3. N (NEUTRAL)
 4. R (REVERSE)
 5. P (PARK)
6. When in position D, the marks on the manual control lever line up with the marks on the TR sensor.

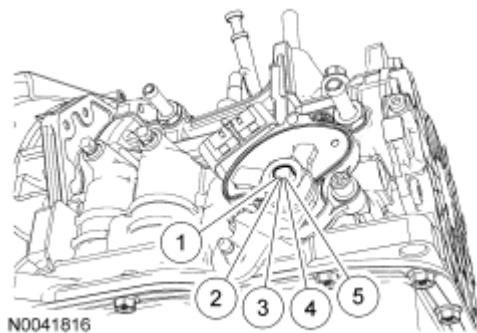


Fig. 126: Identifying Manual Control Lever Position Mark On TR Sensor
Courtesy of FORD MOTOR CO.

7. Connect the selector lever cable and the TR sensor electrical connector.

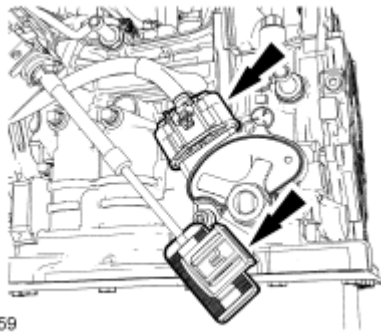


Fig. 127: Locating Transmission Range (TR) Sensor Electrical Connector And Selector Lever Cable End

Courtesy of FORD MOTOR CO.

IN-VEHICLE SERVICING

TRANSMISSION FLUID PAN

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)
Motorcraft Metal Surface Prep ZC-31-A	-
Ultra Silicone Sealant TA-29	-

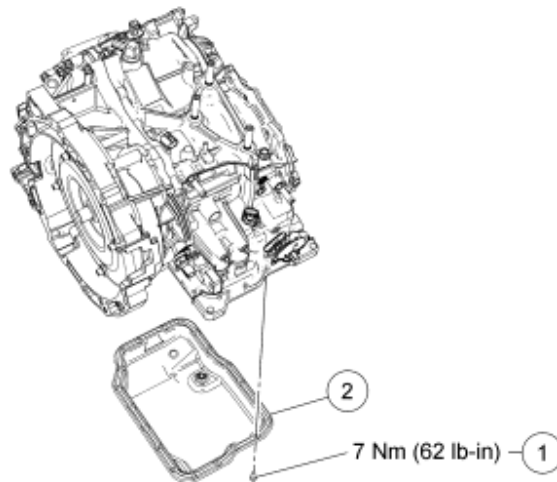


Fig. 128: Exploded View Of Transmission Fluid Pan With Torque Specification

Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	-	Transmission fluid pan bolt

REMOVAL

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** article.
2. Remove the drain plug and allow the transmission fluid to drain.

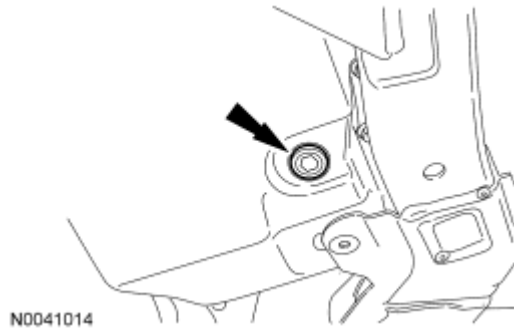


Fig. 129: Locating Transmission Fluid Pan Drain Plug
Courtesy of FORD MOTOR CO.

3. Install the drain plug.
 - Tighten to 29 Nm (21 lb-ft).

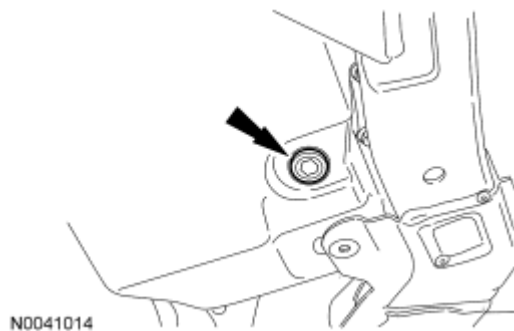


Fig. 130: Locating Transmission Fluid Pan Drain Plug
Courtesy of FORD MOTOR CO.

4. Remove the transmission fluid pan.
 - Remove the bolts.
 - Using a suitable tool, separate the bead of sealer.

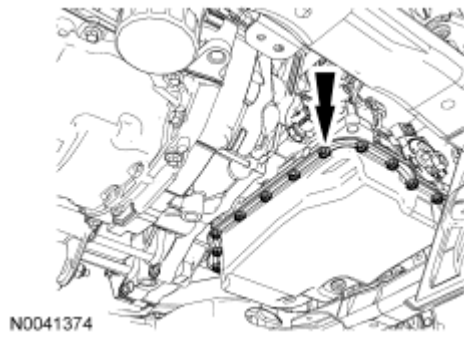


Fig. 131: Identifying Transaxle Fluid Pan Bolts
Courtesy of FORD MOTOR CO.

5. Clean the silicone from the transmission fluid pan and transaxle case surfaces thoroughly with metal surface cleaner.

INSTALLATION

NOTE: Do not use more than the specified amount of sealer on the pan or internal transaxle damage could occur.

1. Apply a 1.5 mm (0.059 in) thick bead of sealer to the transaxle on the transmission fluid pan sealing surface.

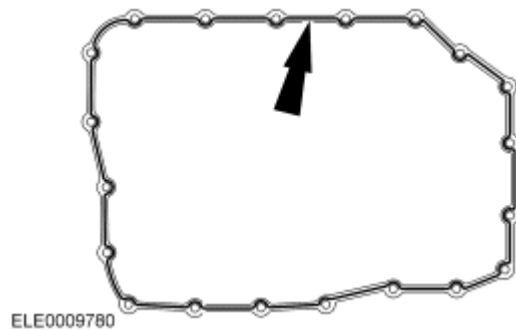


Fig. 132: Identifying Area For Applying Sealer To Transmission Fluid Pan
Courtesy of FORD MOTOR CO.

2. Install the transmission fluid pan.
 - Tighten to 7 Nm (62 lb-in).

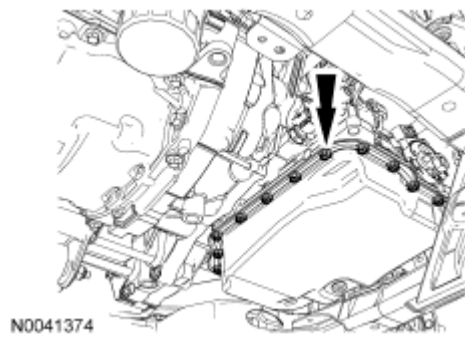


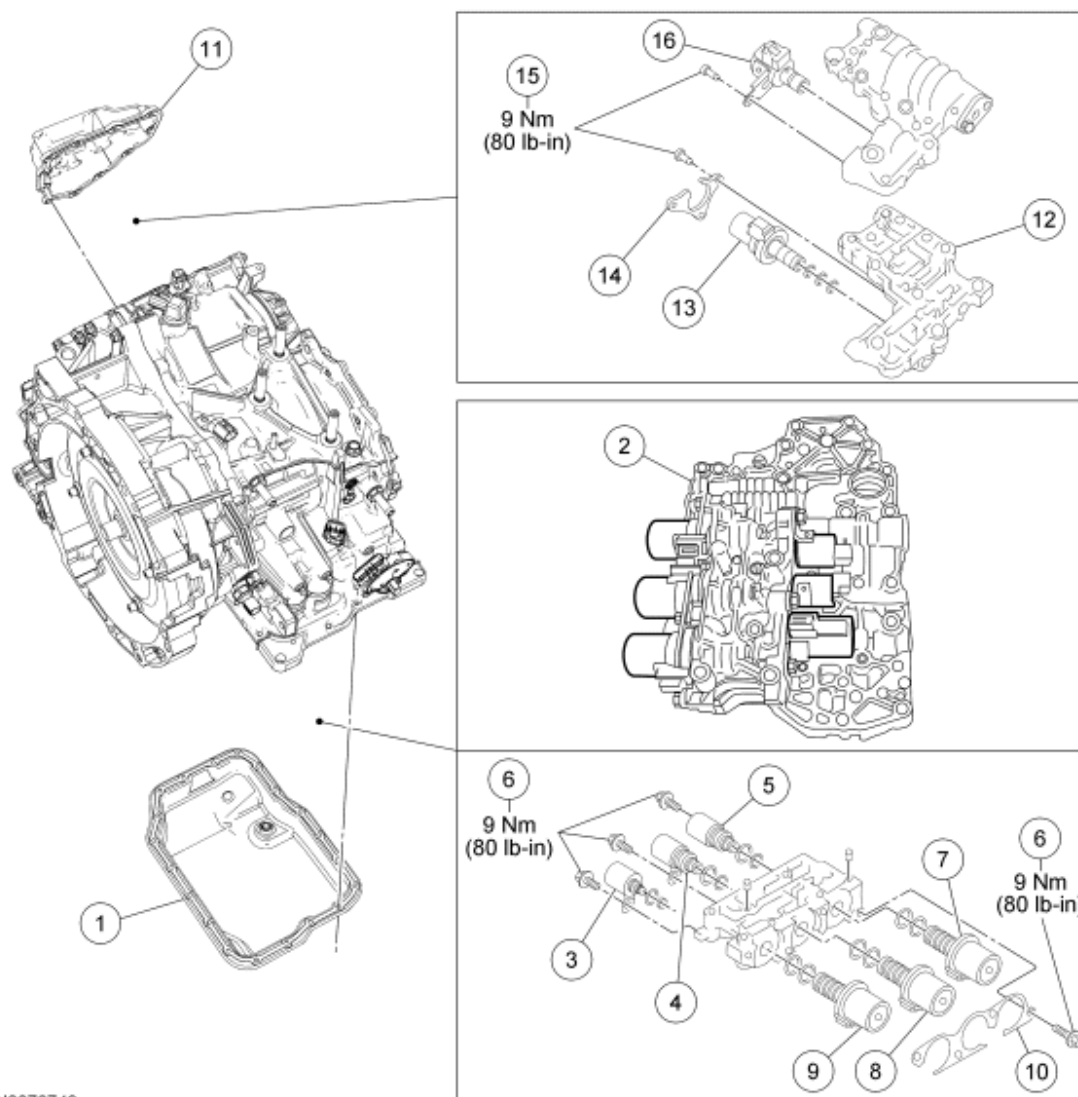
Fig. 133: Identifying Transaxle Fluid Pan Bolts
Courtesy of FORD MOTOR CO.

3. Fill the transaxle with clean transmission fluid.

MAIN CONTROL

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)
Motorcraft Metal Surface Prep ZC-31-A	-
Ultra Silicone Sealant TA-29	-



N0076749

Fig. 134: Exploded View Of Main Control With Torque Specifications
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	7A194	Transmission fluid pan
2	-	Main control valve body
3	7G383	Pressure Control Solenoid A (PCA)
4	7H148	Shift Solenoid D (SSD)
5	7H148	Shift Solenoid E (SSE)
6	-	Solenoid retaining bolts (7 required)
7	7H448	Shift Solenoid B (SSB)
8	7H448	Shift Solenoid C (SSC)
9	7G484	Shift Solenoid A (SEA)
10	-	Solenoid retaining bracket

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

11	7G004	Solenoid body cover
12	-	Solenoid body
13	7G383	Pressure Control Solenoid B (PCB)
14	-	Solenoid retaining bracket
15	-	Solenoid retaining bolts (2 required)
16	7H448	Shift Solenoid F (SSF)

REMOVAL

Main control

1. Remove the transmission fluid pan. For additional information, refer to **Transmission Fluid Pan**.
2. Disconnect the Transmission Fluid Temperature (TFT) sensor electrical connector.

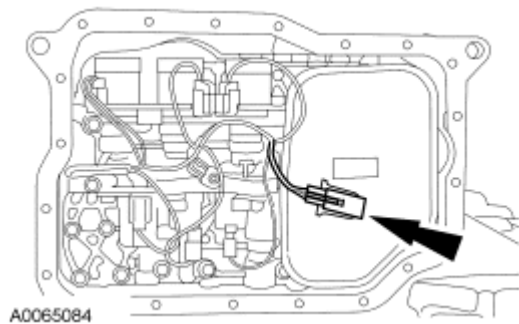


Fig. 135: Locating Transmission Fluid Temperature (TFT) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

3. Remove the transmission fluid filter.

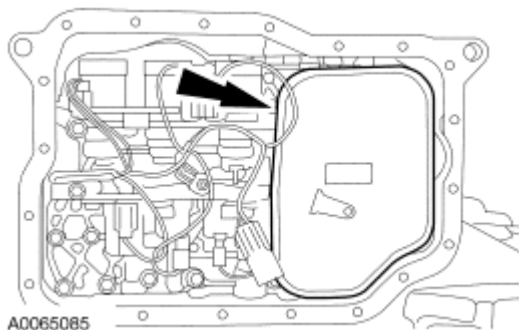


Fig. 136: Locating Fluid Filter
Courtesy of FORD MOTOR CO.

NOTE: It is necessary to note the location of the main control wire harness connectors so they can be connected in the same positions. Connector color letters are cast into the solenoid body.

4. Remove the ground wire bolt. Disconnect the electrical connectors and remove the main control wiring harness.
 1. Shift Solenoid A (SEA), wire color (BU/GN).
 2. Shift Solenoid B (SSB), wire color (BK/GN).
 3. Shift Solenoid C (SSC), wire color (BU/BN).
 4. Pressure Control Solenoid A (PCA), wire color (BU/OG).
 5. Shift Solenoid D (SSD), wire color (WH).
 6. Shift Solenoid E (SSE), wire color (RD).

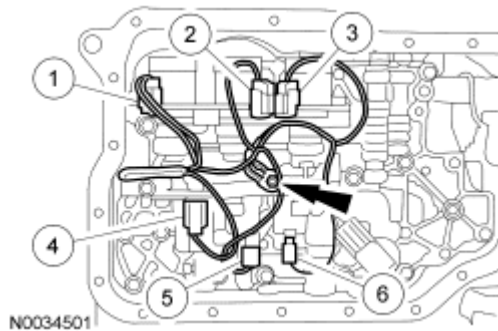


Fig. 137: Locating Ground Wire Bolt
Courtesy of FORD MOTOR CO.

NOTE: Note the 2 accumulators and springs may fall out of the case during the main control valve body removal.

NOTE: Note the locations of the 2 long bolts.

5. Remove the 14 main control valve body bolts and remove the main control valve body and solenoids as an assembly.

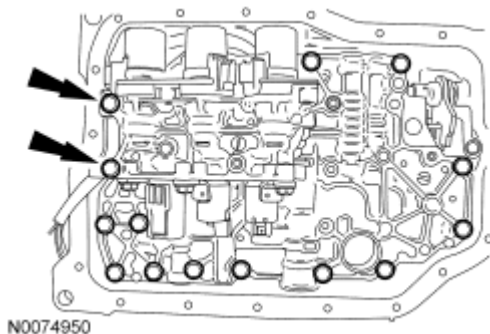


Fig. 138: Locating Main Control Valve Body Bolts
Courtesy of FORD MOTOR CO.

NOTE: Each accumulator is equipped with 2 springs. All 4 springs are different sizes.

NOTE: Note the size and location of the accumulator springs to aid assembly.

NOTE: Note the shape of each piston and the piston bore from which the piston was removed. The shape and size will vary depending on application. The piston must be installed in its correct bore during assembly.

6. Remove the accumulator pistons and springs.

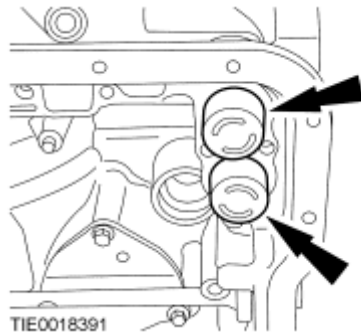


Fig. 139: Locating Accumulator Pistons And Springs
Courtesy of FORD MOTOR CO.

Shift solenoids A, B, C, D, E and Pressure Control Solenoid A (PCA)

7. Remove the 4 shift solenoid bracket bolts and remove the bracket. Remove the affected solenoid.

Item	Part Number	Description
1	7G484	Shift Solenoid A (SEA)
2	7G484	Shift Solenoid B (SSB)
3	7G484	Shift Solenoid C (SSC)

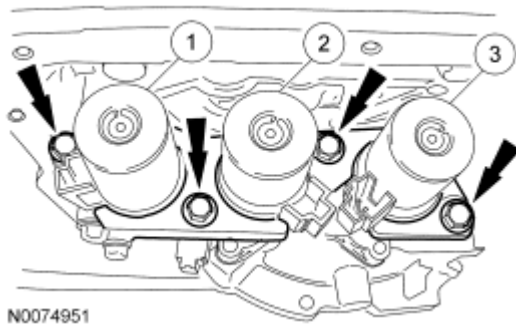


Fig. 140: Locating Shift Solenoid Bracket Bolts
Courtesy of FORD MOTOR CO.

8. Remove the bolts and remove affected solenoid.

Item	Part Number	Description
1	7G383	Pressure Control Solenoid A (PCA)
2	7H148	Shift Solenoid D (SSD)
3	7H148	Shift Solenoid E (SSE)

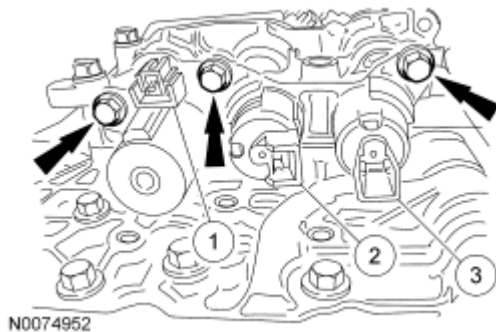


Fig. 141: Locating Affected Solenoid Bolts
Courtesy of FORD MOTOR CO.

Shift Solenoid F (SSF) and Pressure Control Solenoid B (PCB)

9. Remove the battery tray. For additional information, refer to **BATTERY, MOUNTING AND CABLES** article.
10. Remove the 11 solenoid body cover bolts and remove the solenoid body cover.
 - Using a suitable tool, separate the bead of sealer.

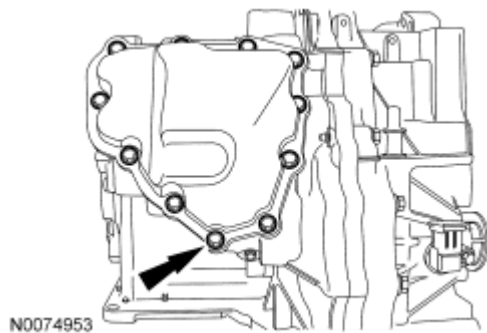


Fig. 142: Locating Side Cover Bolts
Courtesy of FORD MOTOR CO.

11. Clean the silicone from the solenoid body side cover and transaxle case surfaces thoroughly with metal

surface prep.

12. Disconnect the electrical connectors.
 1. Disconnect the electrical connector for the Pressure Control Solenoid B (PCB).
 2. Disconnect the electrical connector for the Shift Solenoid F (SSF).

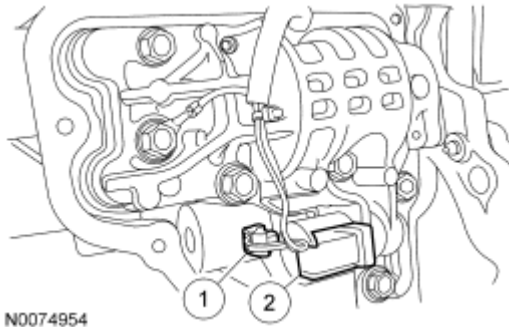


Fig. 143: Identifying Electrical Connector For Pressure Control Solenoid B (PCB) & Shift Solenoid F (SSF)

Courtesy of FORD MOTOR CO.

13. Remove the bolt and the ground wire.

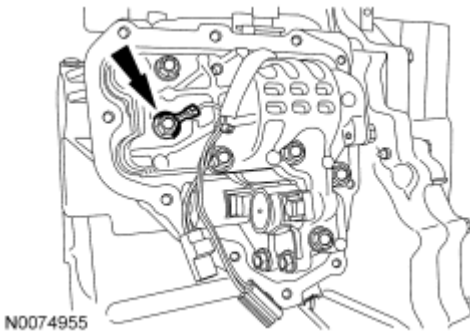


Fig. 144: Identifying Ground Wire Bolt

Courtesy of FORD MOTOR CO.

14. Remove the 2 bolts and the solenoid body assembly.

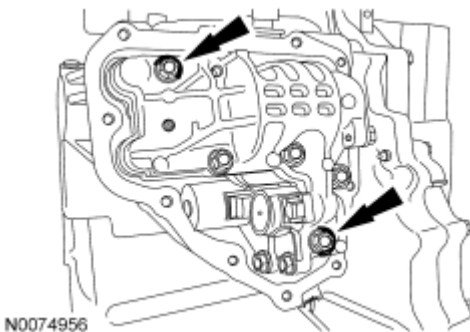


Fig. 145: Identifying Solenoid Body Assembly Bolts

Courtesy of FORD MOTOR CO.

15. Remove the bolts, bracket and the PCB.

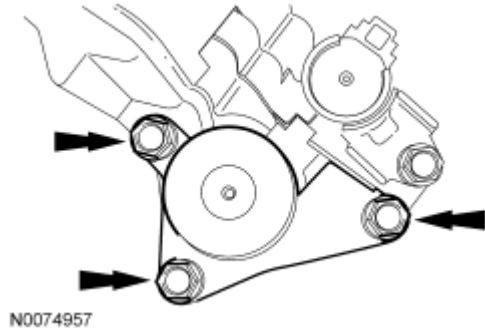


Fig. 146: Identifying , Bracket & PCB
Courtesy of FORD MOTOR CO.

16. Remove the bolt and the SSF.

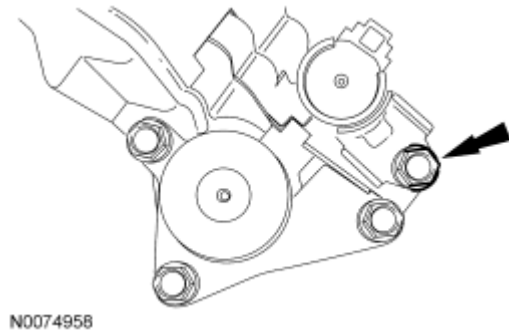


Fig. 147: Identifying Shift Solenoid F Bolt
Courtesy of FORD MOTOR CO.

17. Inspect the O-ring seals for damage, install new O-rings as required.

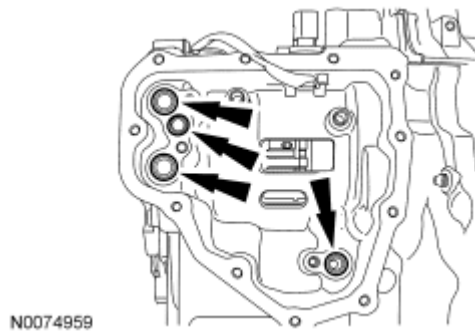


Fig. 148: Inspecting O-Ring Seals For Damage
Courtesy of FORD MOTOR CO.

18. Inspect the guide pins for damage, install new guide pins as required.

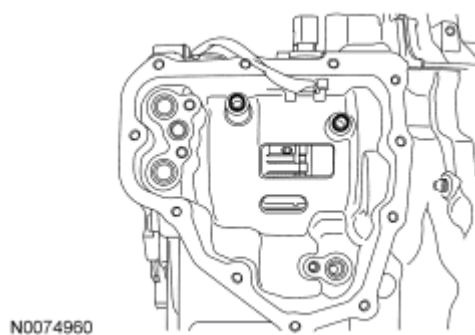


Fig. 149: Inspecting Guide Pins For Damage
Courtesy of FORD MOTOR CO.

INSTALLATION

SSF and PCB

1. Prior to installing the solenoid body make sure that the guide pins are in place.

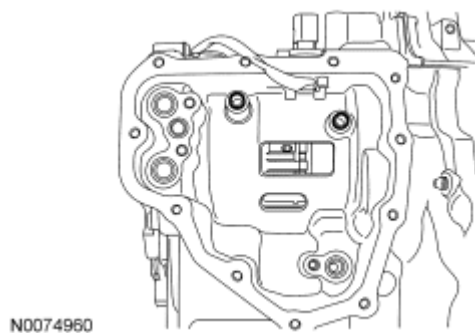


Fig. 150: Inspecting Guide Pins For Damage
Courtesy of FORD MOTOR CO.

2. Prior to installing the solenoid body make sure that the O-ring seals are in place.

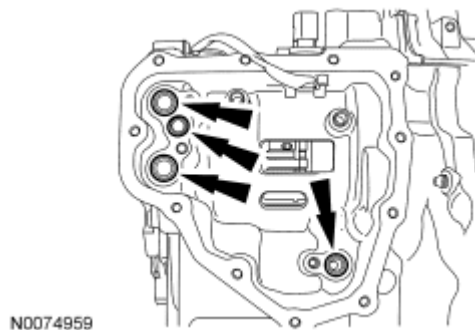
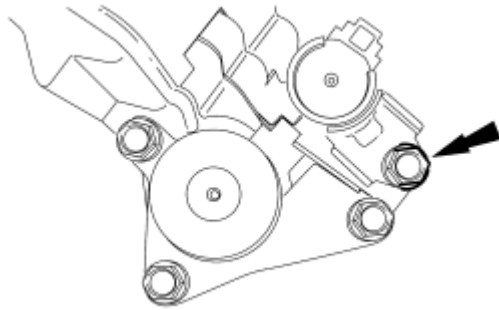


Fig. 151: Inspecting O-Ring Seals For Damage
Courtesy of FORD MOTOR CO.

3. Install the SSF and install the bolt.

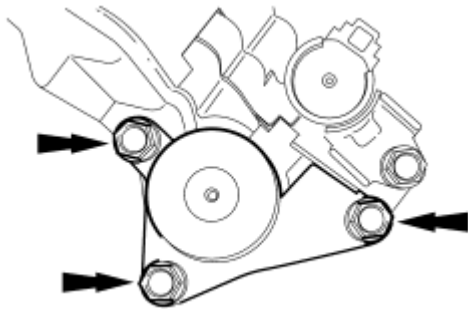
- Tighten to 9 Nm (80 lb-in).



N0074958

Fig. 152: Identifying Shift Solenoid F Bolt
Courtesy of FORD MOTOR CO.

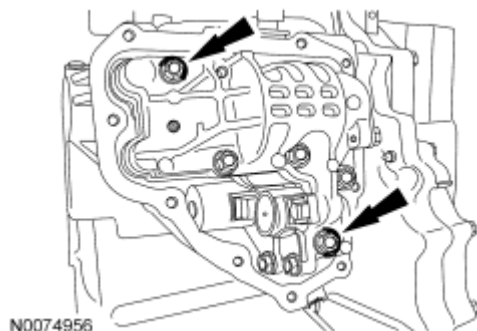
4. Install the PCB, bracket and bolts.
 - Tighten to 9 Nm (80 lb-in).



N0074957

Fig. 153: Identifying , Bracket & PCB
Courtesy of FORD MOTOR CO.

5. Install the solenoid body assembly and the 2 bolts.
 - Tighten to 9 Nm (80 lb-in).



N0074956

Fig. 154: Identifying Solenoid Body Assembly Bolts
Courtesy of FORD MOTOR CO.

6. Install the ground wire and the bolt.
 - Tighten to 9 Nm (80 lb-in).

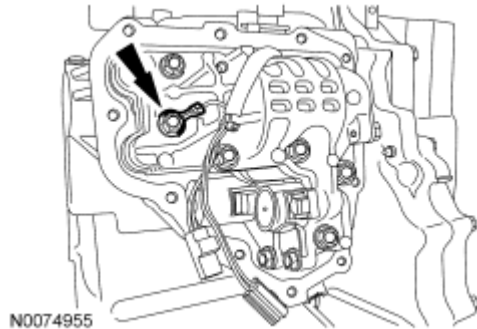


Fig. 155: Identifying Ground Wire Bolt
Courtesy of FORD MOTOR CO.

7. Connect the electrical connectors.
 1. Connect the electrical connector for the PCB.
 2. Connect the electrical connector for the SSF.

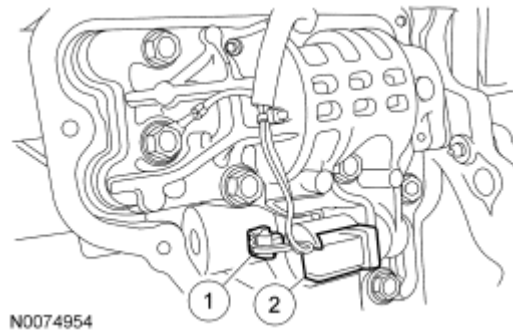


Fig. 156: Identifying Electrical Connector For Pressure Control Solenoid B (PCB) & Shift Solenoid F (SSF)
Courtesy of FORD MOTOR CO.

NOTE: Do not use more than the specified amount of sealer on the side cover pan or internal transaxle damage could occur.

8. Apply a 1.5 mm (0.059 in) thick bead of sealer to the transaxle on the side cover sealing surface.
9. Install the solenoid body cover and install the 11 bolts.
 - Tighten to 7 Nm (62 lb-in).

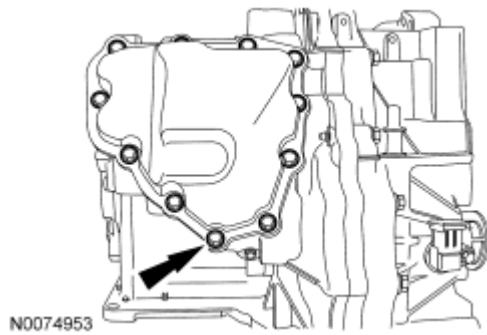


Fig. 157: Locating Side Cover Bolts
 Courtesy of FORD MOTOR CO.

10. Install the battery tray. For additional information, refer to **BATTERY, MOUNTING AND CABLES** article.

Shift solenoids A, B, C, D, E and PCA

11. Install the affected solenoid and the bolts.
 - Tighten to 9 Nm (80 lb-in).

Item	Part Number	Description
1	7G383	Pressure Control Solenoid A (PCA)
2	7H148	Shift Solenoid D (SSD)
3	7H148	Shift Solenoid E (SSE)

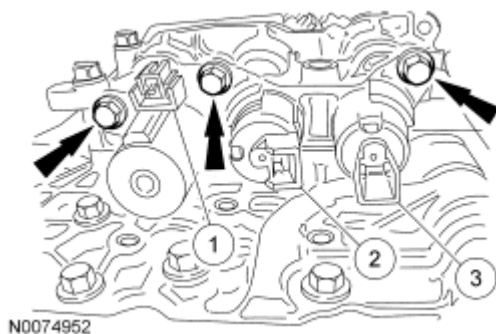


Fig. 158: Locating Affected Solenoid Bolts
 Courtesy of FORD MOTOR CO.

12. Install the affected solenoid, the bracket and the 4 shift solenoid bracket bolts.

- Tighten to 9 Nm (80 lb-in).

Item	Part Number	Description
1	7G484	Shift Solenoid A (SEA)
2	7H448	Shift Solenoid B (SSB)
3	7H448	Shift Solenoid C (SSC)

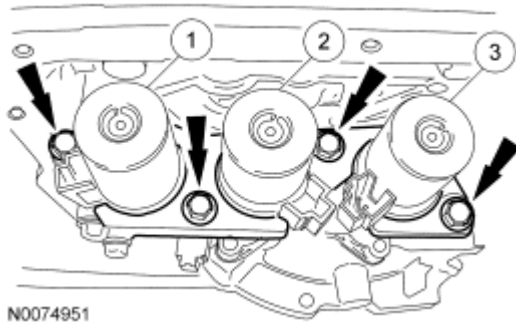


Fig. 159: Locating Shift Solenoid Bracket Bolts
Courtesy of FORD MOTOR CO.

Main control

NOTE: The thin longer springs are for the neutral and drive accumulator.

NOTE: Accumulator bore and pistons are matched by depth; some pistons may have steps. Install the pistons in the same bore as removed.

13. Install the accumulator pistons and springs.

1. Accumulator 1 and 2.
2. Accumulator N and D.

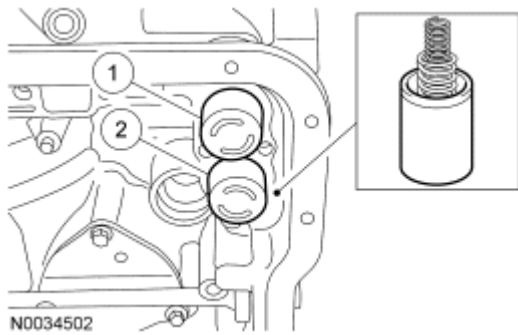


Fig. 160: Identifying Accumulator 1 And 2
Courtesy of FORD MOTOR CO.

NOTE: Make sure that the manual valve is in the manual control valve shift lever.

NOTE: Do not fully tighten the main control valve bolts at this stage.

14. Install the main control valve body and loosely install the bolts.

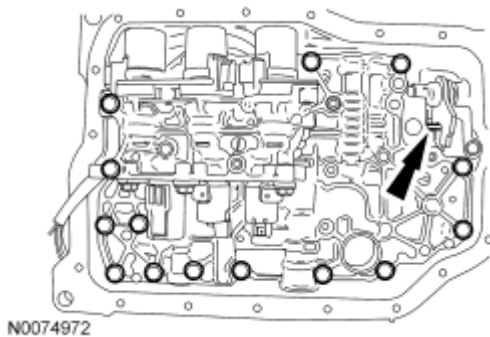


Fig. 161: Identifying Main Control Valve Body Bolts
Courtesy of FORD MOTOR CO.

15. Tighten the main control valve body retaining bolts.
 - Tighten the bolts in the sequence shown.
 - Tighten to 9 Nm (80 lb-in).

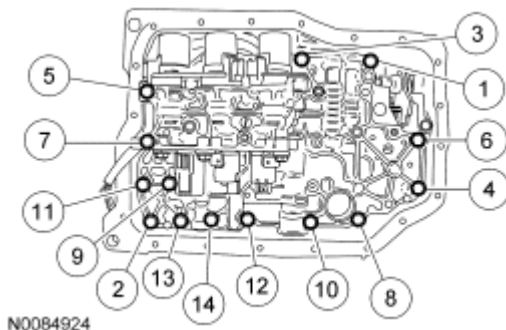


Fig. 162: Tightening Main Control Valve Body Retaining Bolts In Sequence

Courtesy of FORD MOTOR CO.

NOTE: It is necessary to connect the electrical connectors in the same positions as noted in disassembly. Connector color letters are cast into the solenoid body.

16. Install the main control valve wiring harness, connect the electrical connectors and install the ground wire bolt.
 1. SEA, wire color (BU/GN).
 2. SSB, wire color (BK/GN).
 3. SSC, wire color (BU/BN).
 4. PCA, wire color (BU/OG).
 5. SSD, wire color (WH).
 6. SSE, wire color (RD).
 7. Tighten to 10 Nm (89 lb-in).

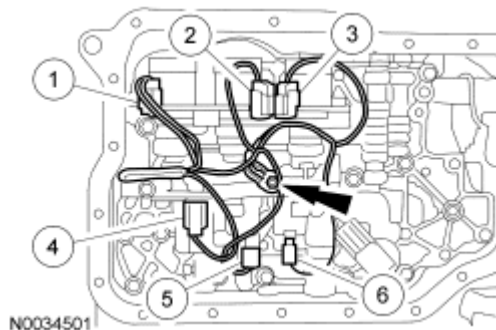


Fig. 163: Locating Ground Wire Bolt
Courtesy of FORD MOTOR CO.

17. Install the transmission fluid filter.

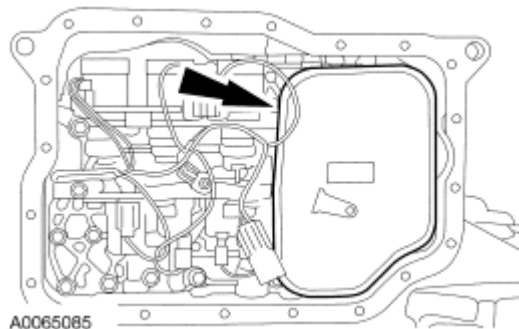


Fig. 164: Locating Fluid Filter
Courtesy of FORD MOTOR CO.

18. Connect the TFT sensor electrical connector.

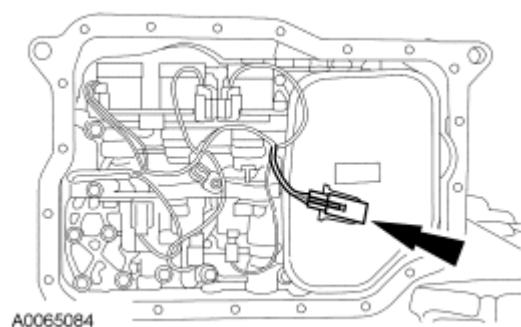


Fig. 165: Locating Transmission Fluid Temperature (TFT) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

19. Install the transmission fluid pan. For additional information, refer to [Transmission Fluid Pan](#).

INTERMEDIATE SHAFT SPEED SENSOR

Material

Item	Specification
Thread Sealant with PTFE TA-24	WSK-M2G350-A2

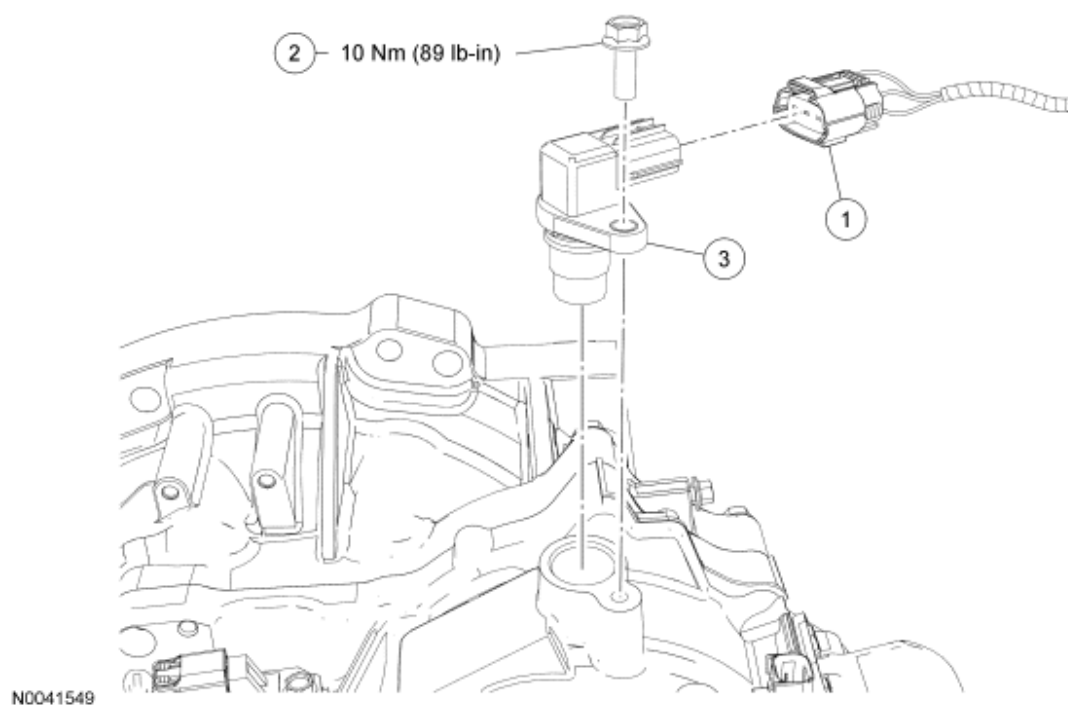


Fig. 166: Exploded View Of Intermediate Shaft Speed Sensor With Torque Specification
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
------	-------------	-------------

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

1	14A464	Intermediate shaft speed sensor electrical connector
2	S997840616	Bolt
3	7H103	Intermediate shaft speed sensor

REMOVAL

1. Disconnect the intermediate shaft speed sensor electrical connector.

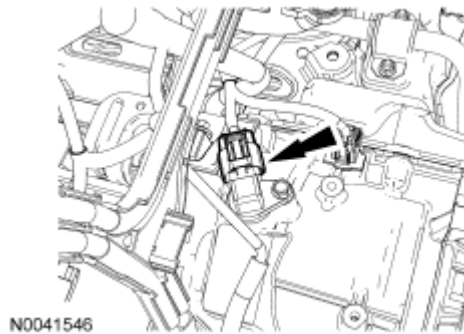


Fig. 167: Locating Intermediate Shaft Speed Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

2. Remove the bolt and the intermediate shaft speed sensor.
 - To install, tighten to 10 Nm (89 lb-in).
 - Check the sensor bore.
 - Check the O-ring seal for nicks or cuts and install a new O-ring if necessary.

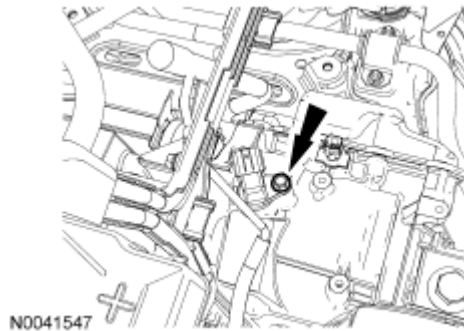


Fig. 168: Locating Intermediate Shaft Speed Sensor Bolt
Courtesy of FORD MOTOR CO.

INSTALLATION

NOTE: Apply a light coat of petroleum jelly to the O-ring seal before installation.

NOTE: Apply thread sealant to the bolt.

1. To install, reverse the removal procedure.

TURBINE SHAFT SPEED (TSS) SENSOR

Material

Item	Specification
Thread Sealant with PTFE TA-24	WSK-M2G350-A2

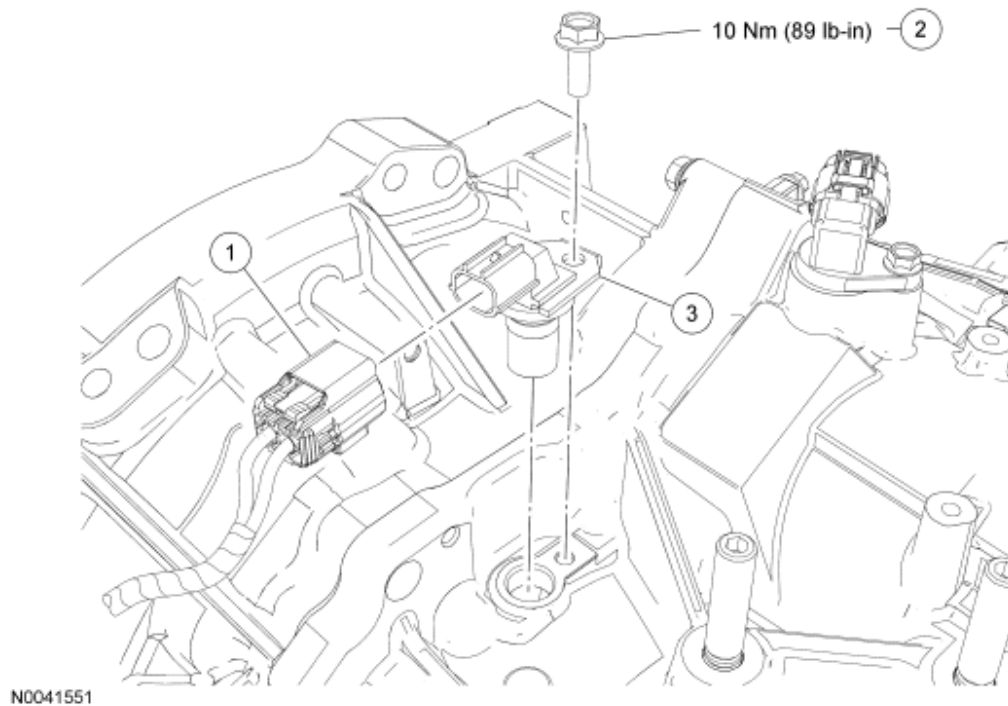


Fig. 169: Exploded View Of Turbine Shaft Speed (TSS) Sensor With Torque Specification
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	14A464	Turbine Shaft Speed (TSS) sensor electrical connector
2	S997840616	TSS sensor bolt
3	7M101	TSS sensor

REMOVAL

1. Disconnect the Turbine Shaft Speed (TSS) sensor electrical connector.

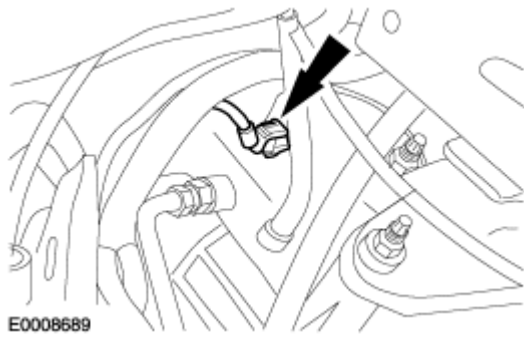


Fig. 170: Locating Turbine Shaft Speed (TSS) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

2. Remove the bolt and the TSS sensor.
 - To install, tighten to 10 Nm (89 lb-in).
 - Check the TSS sensor bore.
 - Check the O-ring seal for nicks or cuts and install a new O-ring if necessary.

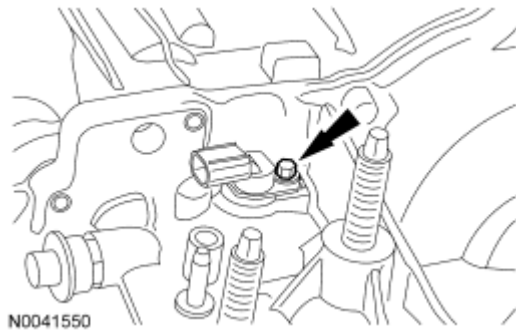


Fig. 171: Locating TSS Sensor Bolt
Courtesy of FORD MOTOR CO.

INSTALLATION

NOTE: Apply a light coat of petroleum jelly to the O-ring seal before installation.

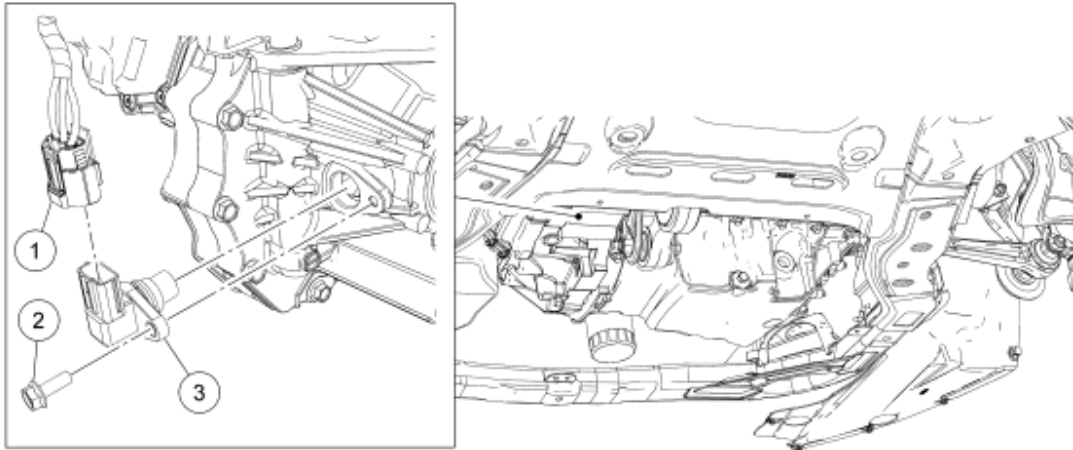
NOTE: Apply thread sealant to the bolt.

1. To install, reverse the removal procedure.

OUTPUT SHAFT SPEED (OSS) SENSOR

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)



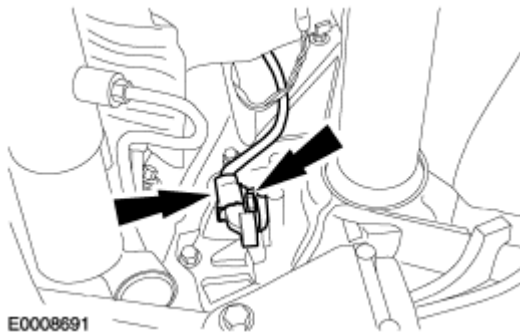
N0046278

Fig. 172: Exploded View Of Output Shaft Speed (OSS) Sensor
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	14A464	Output Shaft Speed (OSS) sensor electrical connector
2	S997840616	OSS bolt
3	7H103	OSS sensor

REMOVAL

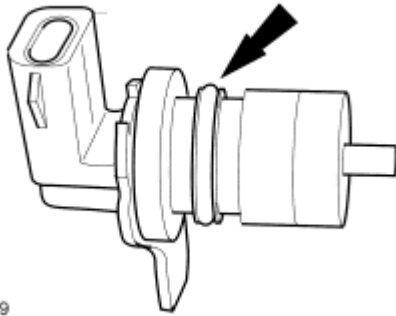
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** article.
2. Place a drain pan beneath the Output Shaft Speed (OSS) sensor.
3. Remove the OSS sensor.
 - Disconnect the OSS electrical connector.
 - Remove the OSS bolt.
 - Inspect the OSS bore.



E0008691

Fig. 173: Locating Electrical Connector
Courtesy of FORD MOTOR CO.

4. Inspect the OSS O-ring seal for nicks or cuts, install a new OSS O-ring if necessary.



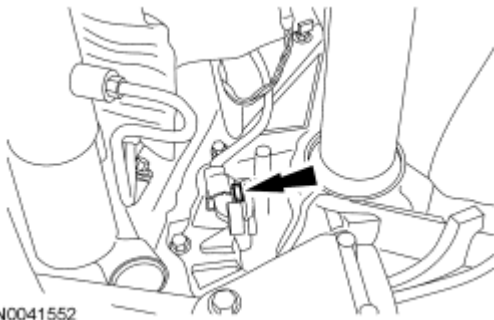
A0065519

Fig. 174: Inspecting O-Ring Seal For Nicks Or Cuts
Courtesy of FORD MOTOR CO.

INSTALLATION

NOTE: Apply a light coat of petroleum jelly to the O-ring before installation.

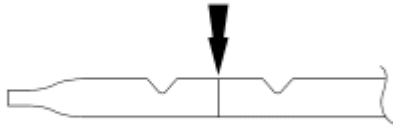
1. Install the OSS sensor.
 - Tighten the OSS sensor bolt to 10 Nm (89 lb-in).
 - Connect the OSS electrical connector.



N0041552

Fig. 175: Locating OSS Sensor
Courtesy of FORD MOTOR CO.

2. Check the transmission fluid level and add transmission fluid as necessary.





N0041553

Fig. 176: Locating Transmission Fluid Level
Courtesy of FORD MOTOR CO.

3. Start the engine and move the selector lever through all gear positions.

HALFSHAFT SEAL - LH

Special Tools

Illustration	Tool Name	Tool Number
 ST1255-A	Handle	205-153 (T80T-4000-W)
 ST2961-A	Installer, Output Shaft Seal	307-572

REMOVAL

1. Remove the LH halfshaft. For additional information, refer to **FRONT DRIVE HALFSHAFTS** article.

NOTE: Be careful not to damage the case while removing the seal.

2. Using a suitable tool, remove the LH differential fluid seal.

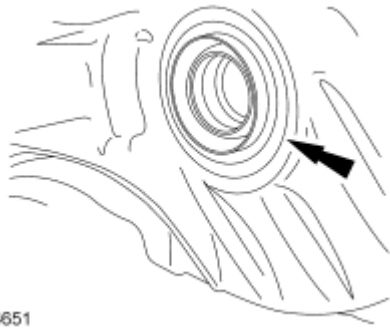


Fig. 177: Locating Differential Fluid Seal
Courtesy of FORD MOTOR CO.

INSTALLATION

1. Position the new differential fluid seal on the Output Shaft Seal Installer and Handle.

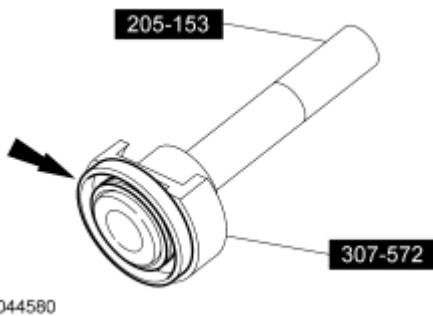


Fig. 178: Identifying Special Tools (205-153, 307-572) And Differential Fluid Seal
Courtesy of FORD MOTOR CO.

2. Using the Output Shaft Seal Installer and Handle, install the halfshaft seal.

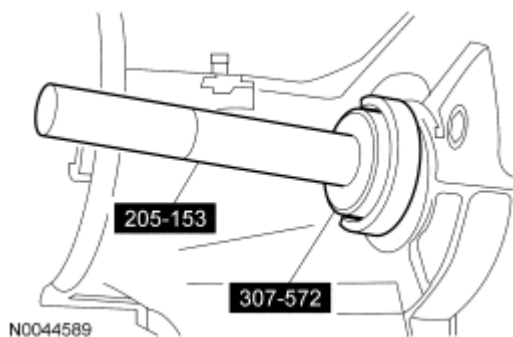




Fig. 179: Identifying Special Tool (205-153, 307-572) And Halfshaft Seal
Courtesy of FORD MOTOR CO.

3. Install the LH halfshaft. For additional information, refer to **FRONT DRIVE HALFSHAFTS** article.

HALFSHAFT SEAL - RH

Special Tools

Illustration	Tool Name	Tool Number
 ST1255-A	Handle	205-153 (T80T-4000-W)
 ST2961-A	Installer, Output Shaft Seal	307-572

REMOVAL

1. Remove the RH halfshaft. For additional information, refer to **FRONT DRIVE HALFSHAFTS** article.

NOTE: Be careful not to damage the case while removing the seal.

2. Using a suitable tool, remove the RH differential fluid seal.

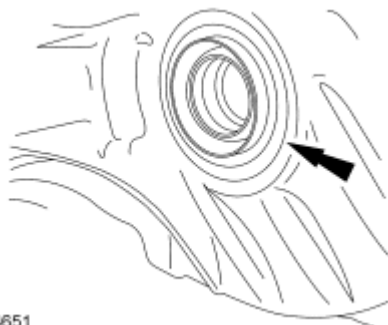
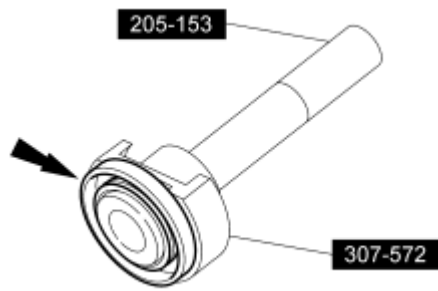


Fig. 180: Locating Differential Fluid Seal
 Courtesy of FORD MOTOR CO.

INSTALLATION

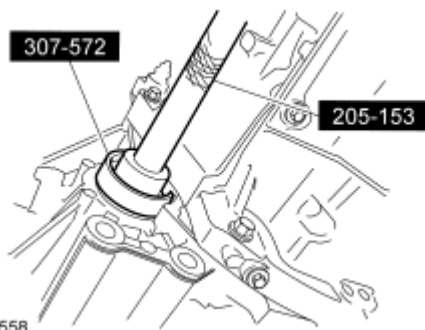
1. Position the new differential fluid seal on the Output Shaft Seal Installer and Handle.



N0044580

Fig. 181: Identifying Special Tools (205-153, 307-572) And Differential Fluid Seal
Courtesy of FORD MOTOR CO.

2. Using the Output Shaft Seal Installer and Handle, install the halfshaft seal.



N0041558

Fig. 182: Identifying Special Tool (205-153, 307-572) And Halfshaft Seal
Courtesy of FORD MOTOR CO.

3. Install the RH halfshaft. For additional information, refer to **FRONT DRIVE HALFSHAFTS** article.

TRANSMISSION RANGE (TR) SENSOR

Special Tools

Illustration	Tool Name	Tool Number
<p>ST2962-A</p>	Alignment Tool, Transmission Range Sensor	307-571

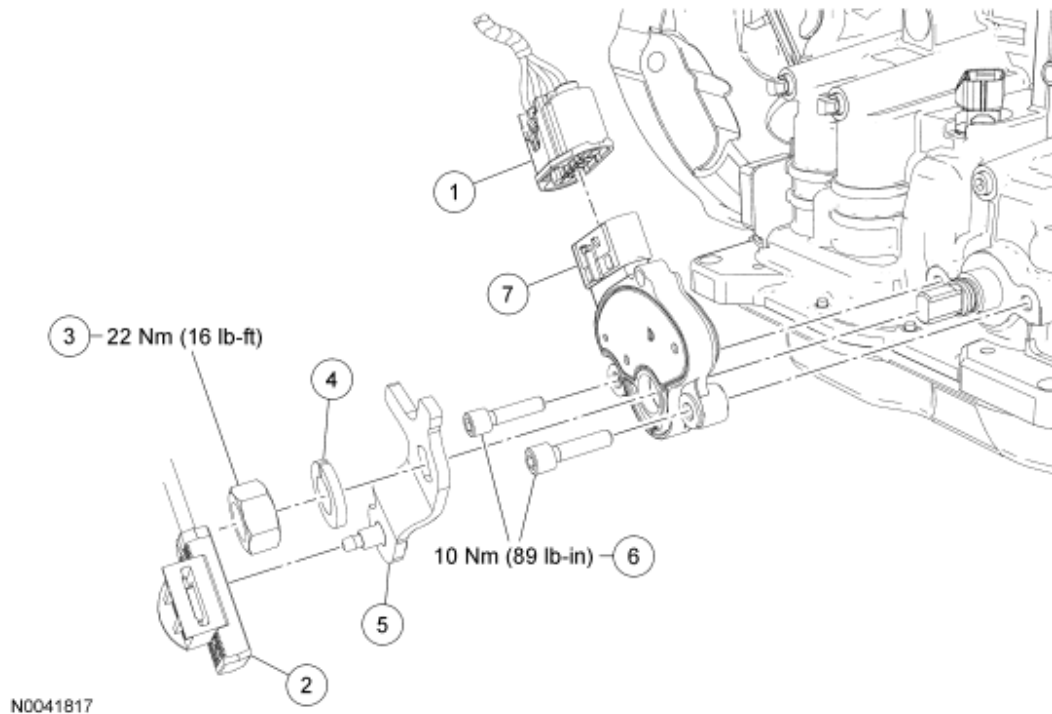


Fig. 183: Exploded View Of Transmission Range (TR) Sensor With Torque Specifications
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	14A464	Transmission Range (TR) sensor electrical connector
2	7E395	Selector lever cable
3	S999211400	Manual control lever nut
4	-	Lock washer
5	7A256	Manual control lever
6	W500015-S309	TR sensor bolts (2 required)
7	7F293	TR sensor

REMOVAL

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** article.
2. Disconnect the Transmission Range (TR) sensor electrical connector and the selector lever cable end.

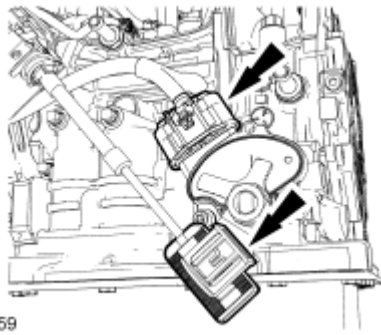


Fig. 184: Locating Transmission Range (TR) Sensor Electrical Connector And Selector Lever Cable End

Courtesy of FORD MOTOR CO.

NOTE: Failure to hold the manual control lever, while loosening or tightening the manual control lever, will transmit rotational torque to the TR switch causing internal damage.

3. Remove the TR sensor (the automatic transaxle is removed for clarity).
 1. Remove the nut and the manual control lever.
 2. Remove the bolts and the TR sensor.

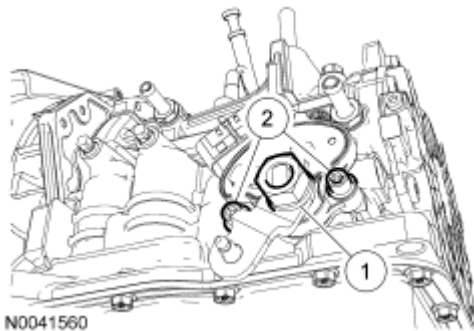


Fig. 185: Identifying Manual Control Lever Nut And TR Sensor Bolt

Courtesy of FORD MOTOR CO.

INSTALLATION

NOTE: Failure to hold the manual control lever, while loosening or tightening the manual control lever nut, will transmit rotational torque to the Transmission Range (TR) switch causing internal damage.

NOTE: Do not fully tighten the TR bolts at this time.

1. Install the TR sensor and loosely install the bolts (the automatic transaxle is removed for clarity).

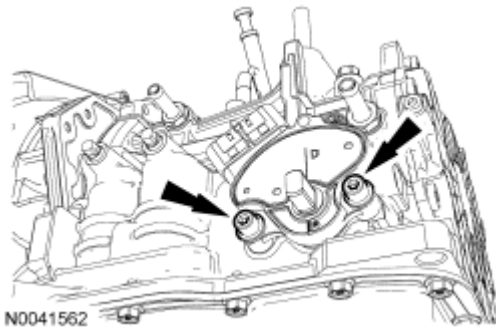


Fig. 186: Locating TR Sensor Bolts
Courtesy of FORD MOTOR CO.

2. Using the Transmission Range Sensor Alignment Tool, align the TR sensor and tighten the bolts.
 - Tighten to 10 Nm (89 lb-in).

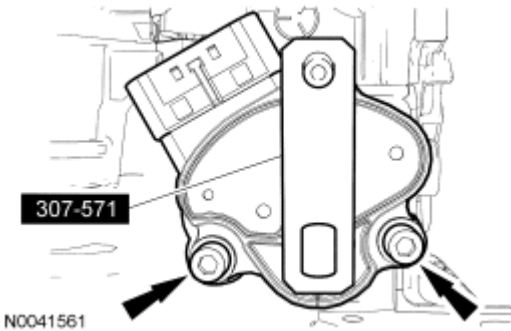


Fig. 187: Identifying Special Tool (307-571) And TR Sensor Bolts
Courtesy of FORD MOTOR CO.

NOTE: Do not use air tools on this nut. Hold the manual control lever while tightening the manual control lever nut, or damage to the manual control lever shaft or the Transmission Range (TR) sensor could occur.

3. Install the manual control lever.
 - Tighten to 22 Nm (16 lb-ft).

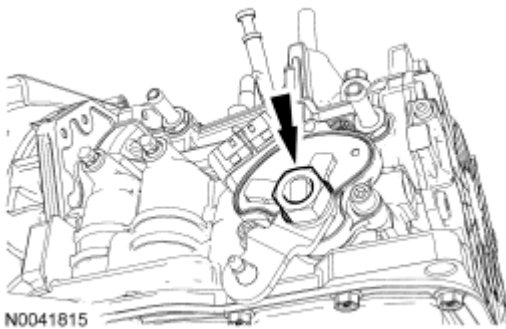


Fig. 188: Locating Manual Control Lever Nut

Courtesy of FORD MOTOR CO.

NOTE: Check to make sure the manual control lever is in position "2" (same as "D" position).

4. Adjust the manual control lever to TR sensor D position.
 1. L (LOW)
 2. D (DRIVE)
 3. N (NEUTRAL)
 4. R (REVERSE)
 5. P (PARK)
6. When in position D, the marks on the manual control lever line up with the marks on the TR sensor.

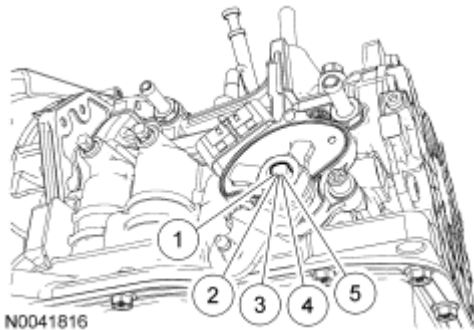


Fig. 189: Identifying Manual Control Lever Position Mark On TR Sensor
Courtesy of FORD MOTOR CO.

5. Connect the selector lever cable and the TR sensor electrical connector.

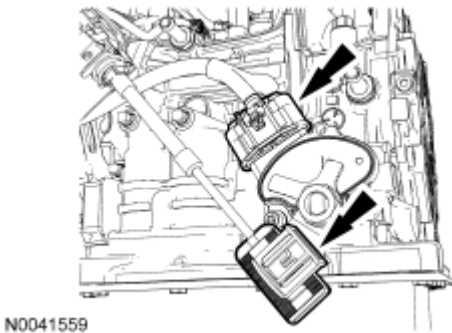
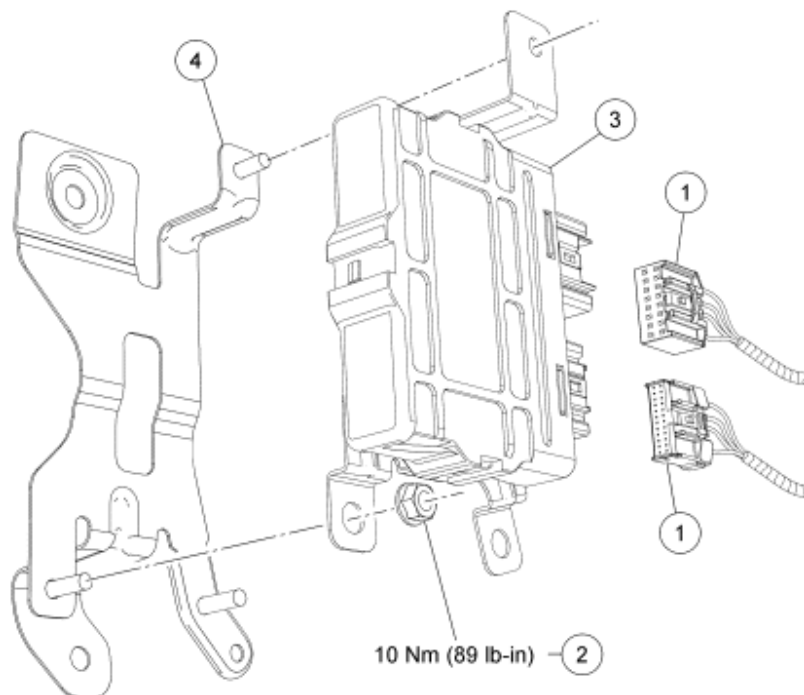


Fig. 190: Locating Transmission Range (TR) Sensor Electrical Connector And Selector Lever Cable End
Courtesy of FORD MOTOR CO.

TRANSMISSION CONTROL MODULE (TCM)



N0042133

Fig. 191: Exploded View Of Transmission Control Module (TCM) With Torque Specification
 Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	14489	Transmission Control Module (TCM) electrical connectors
2	3M51	Nut
3	72369	TCM
4	-	TCM mounting bracket

REMOVAL

NOTE: The Transmission Control Module (TCM) is located under the LH side of the instrument panel.

1. Disconnect the 2 electrical connectors.

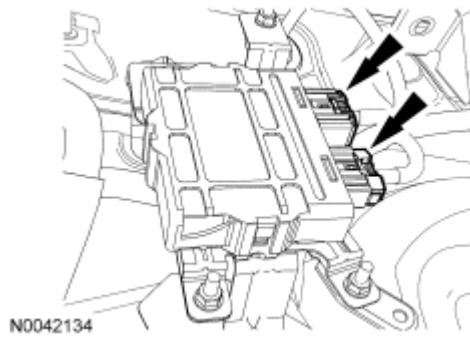


Fig. 192: Locating Transmission Control Module Electrical Connectors
Courtesy of FORD MOTOR CO.

2. Remove the 3 nuts and remove the TCM.
 - To install, tighten to 10 Nm (89 lb-in).

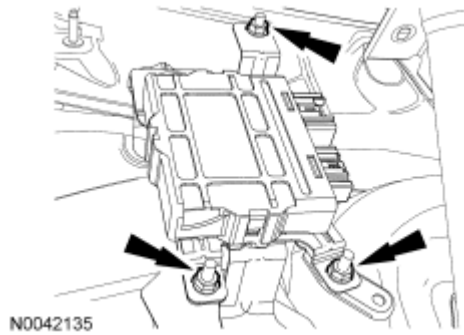


Fig. 193: Locating Transmission Control Module Nuts
Courtesy of FORD MOTOR CO.

INSTALLATION

1. To install, reverse the removal procedure.

TRANSAXLE SUPPORT INSULATOR

Special Tools

Illustration	Tool Name	Tool Number
<p>ST2425-A</p>	Support Bar, Engine	303-F072

Material

Item	Specification
Threadlock and Sealer	

TA-25

WSK-M2G351-A5

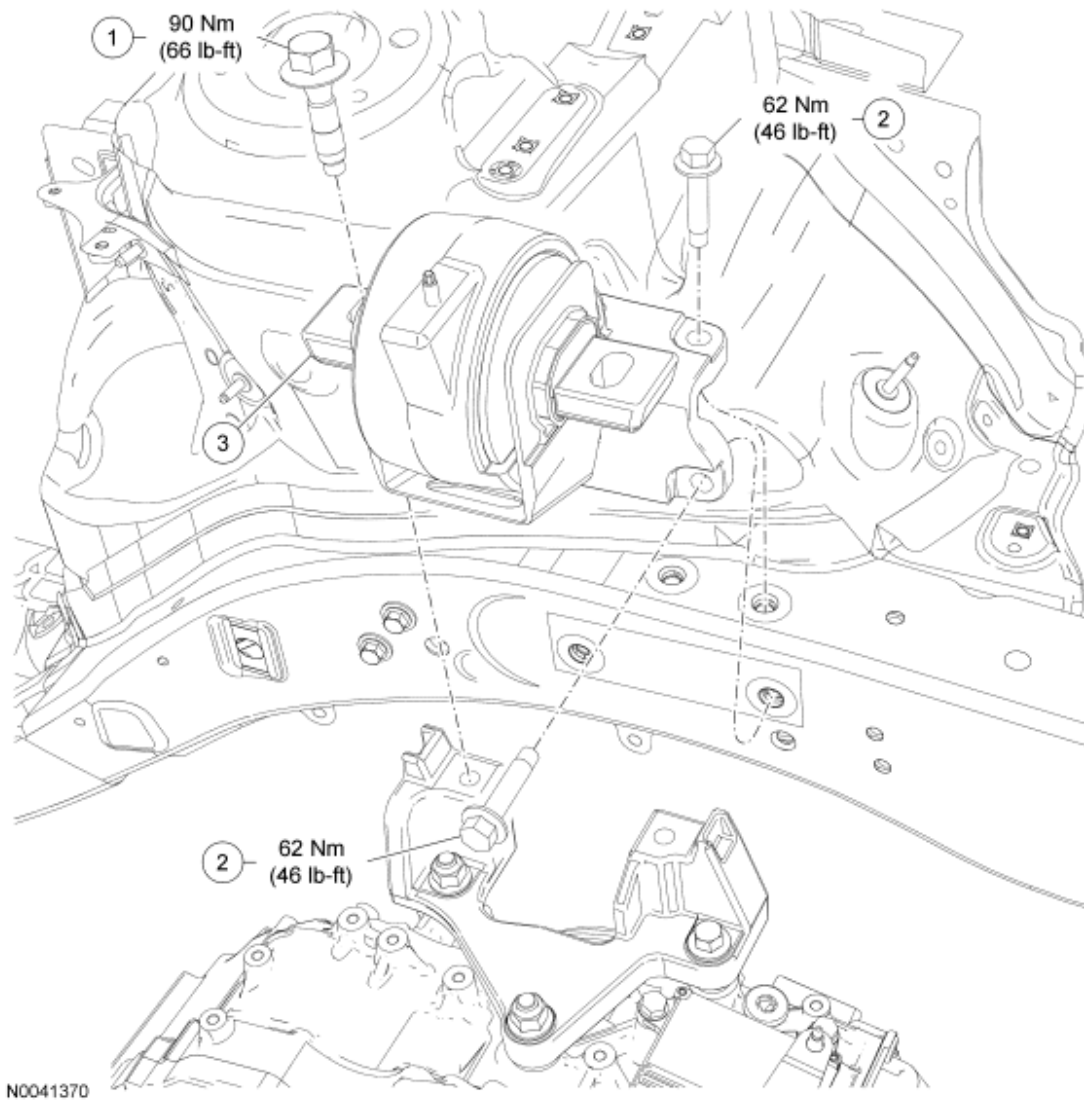


Fig. 194: Exploded View Of Transaxle Support Insulator With Torque Specifications
 Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	W711724	Transaxle support insulator bracket bolt (2 required)
2	W709234	Transaxle support insulator frame bolts (4 required)
3	6F020	Transaxle insulator

REMOVAL

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

AND LIFTING article.

2. Remove the battery and battery tray. For additional information, refer to **BATTERY, MOUNTING AND CABLES** article.
3. Using the Engine Support Bar, support the engine.

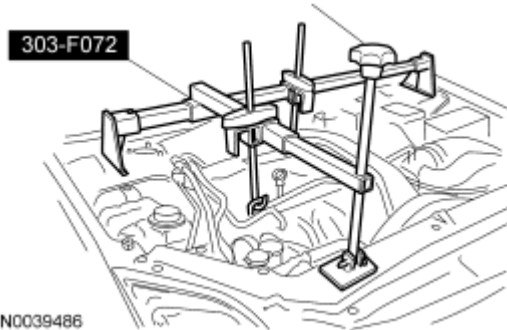


Fig. 195: Identifying Special Tool (303-F072)
Courtesy of FORD MOTOR CO.

4. Remove the transaxle support insulator bracket bolts.

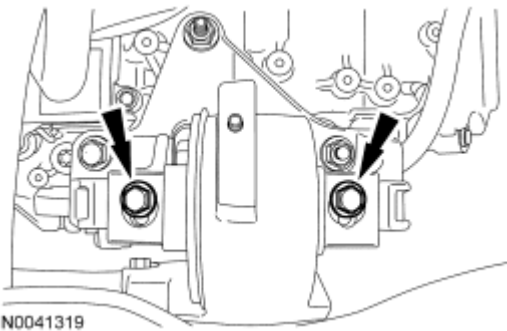


Fig. 196: Locating Transaxle Insulator Bolts
Courtesy of FORD MOTOR CO.

5. Remove the transaxle support insulator frame bolts.

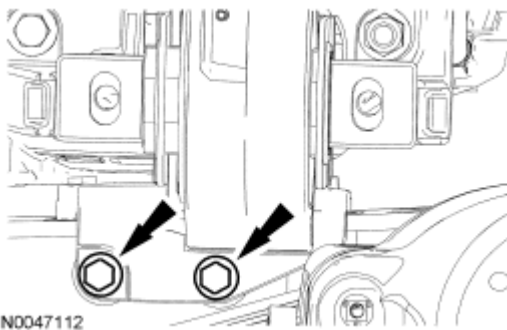


Fig. 197: Locating Upper Bolts On Rear Transaxle Insulator
Courtesy of FORD MOTOR CO.

6. Remove the 4 screws and position the LH fender splash shield aside.

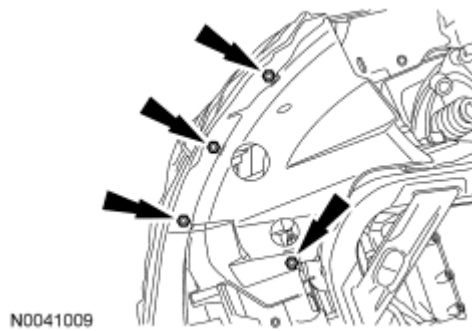


Fig. 198: Locating LH Fender Splash Shield Screws
Courtesy of FORD MOTOR CO.

7. Remove the 6 pin-type retainers and the LH front structure-to-subframe splash shield.

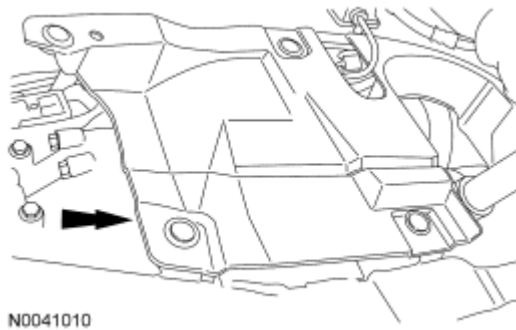


Fig. 199: Locating LH Front Structure-To-Subframe Splash Shield
Courtesy of FORD MOTOR CO.

8. Remove the transaxle support insulator frame bolts and remove the insulator.



Fig. 200: Locating Rear Transaxle Insulator Bolts
Courtesy of FORD MOTOR CO.

INSTALLATION

1. Clean the transaxle support insulator frame bolts using a wire brush and apply new threadlock to the

threads.

2. Position the transaxle support insulator in place and install the transaxle support insulator frame bolts.
 - Tighten to 62 Nm (46 lb-ft).



Fig. 201: Locating Rear Transaxle Insulator Bolts
Courtesy of FORD MOTOR CO.

3. Position the LH front structure-to-subframe splash shield in place and install the 6 pin-type retainers.

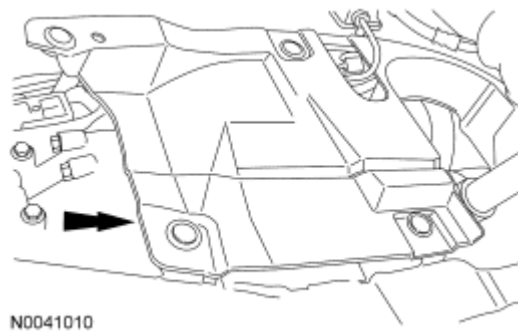


Fig. 202: Locating LH Front Structure-To-Subframe Splash Shield
Courtesy of FORD MOTOR CO.

4. Position the LH splash shield in place and install the 4 screws.

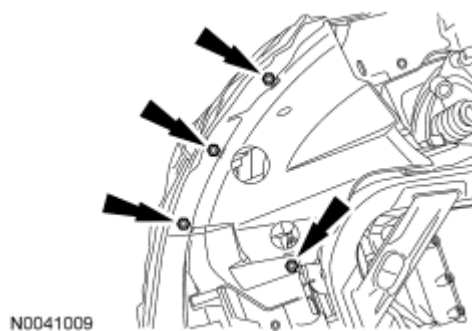


Fig. 203: Locating LH Fender Splash Shield Screws
Courtesy of FORD MOTOR CO.

5. Install the 2 upper transaxle support insulator frame bolts.
 - Tighten to 62 Nm (46 lb-ft).

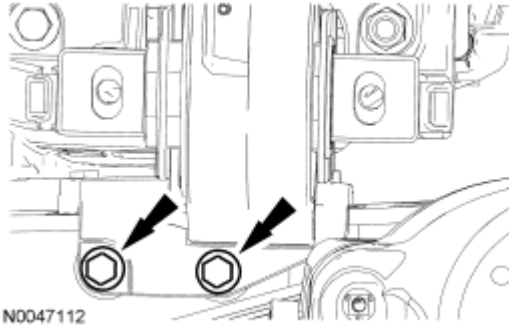


Fig. 204: Locating Upper Bolts On Rear Transaxle Insulator
Courtesy of FORD MOTOR CO.

6. Install the 2 transaxle support insulator bracket bolts.
 - Tighten to 90 Nm (66 lb-ft).

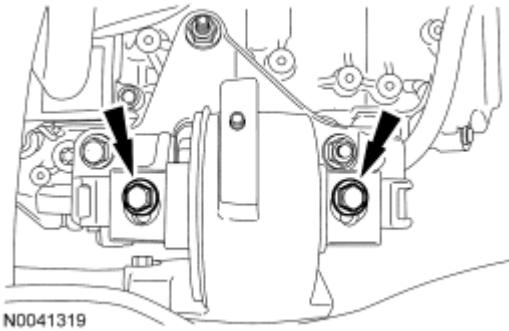


Fig. 205: Locating Transaxle Insulator Bolts
Courtesy of FORD MOTOR CO.

7. Remove the Engine Support Bar.

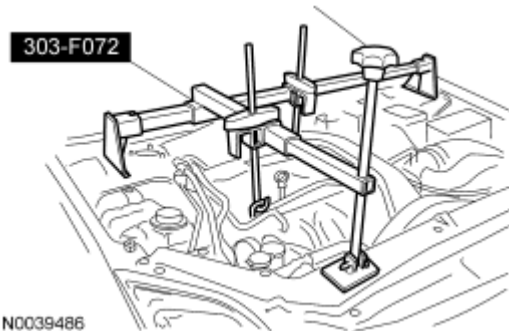



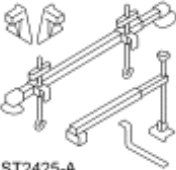
Fig. 206: Identifying Special Tool (303-F072)
Courtesy of FORD MOTOR CO.

8. Install the battery and battery tray. For additional information, refer to **BATTERY, MOUNTING AND CABLES** article.

REMOVAL

TRANSAXLE

Special Tools

Illustration	Tool Name	Tool Number
 ST1636-A	Retainer, Torque Converter	307-566
 ST2425-A	Support Bar, Engine	303-F072

REMOVAL

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** article.
2. Remove the Air Cleaner (ACL) assembly.
 1. Disconnect the Mass Air Flow (MAF) sensor electrical connector.
 2. Disconnect the engine breather.
 3. Disconnect the brake booster vacuum hose.
 4. Loosen the clamp and remove the ACL assembly.

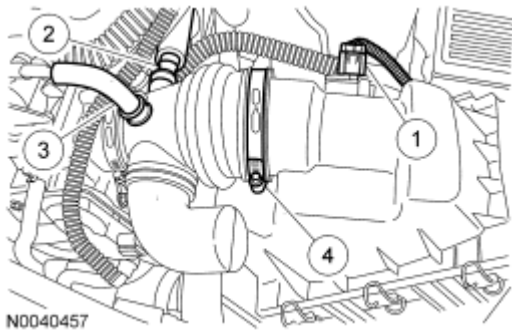


Fig. 207: Identifying Mass Air Flow Sensor Electrical Connector, Engine Breather, Brake Booster Vacuum Hose And Clamp
 Courtesy of FORD MOTOR CO.

3. Remove the battery. For additional information, refer to **BATTERY, MOUNTING AND CABLES** article.
4. Remove the battery tray.
 1. Disconnect the positive battery cable fastener from the battery tray.
 2. Disconnect the 3 wiring harness retainers.
 3. Remove the battery tray nut.
 4. Remove the battery tray bolt and remove the battery tray.

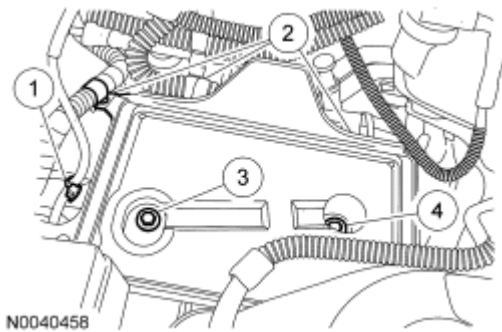


Fig. 208: Identifying Battery Tray Nut, Bolt, Positive Battery Cable Fastener And Wiring Harness Retainer

Courtesy of FORD MOTOR CO.

5. Disconnect the selector lever cable end from the manual control lever.

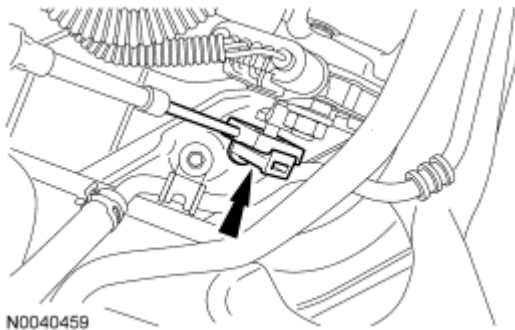


Fig. 209: Locating Selector Lever Cable End

Courtesy of FORD MOTOR CO.

6. Remove the 2 bolts, disconnect the harness and position the selector lever cable and bracket aside.

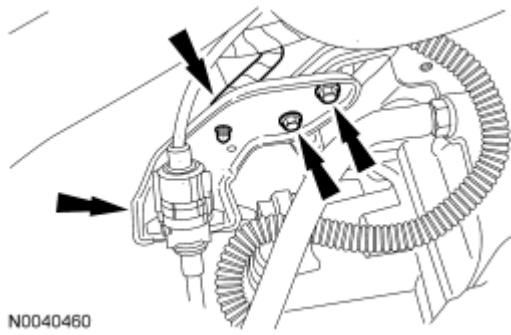


Fig. 210: Locating Selector Lever Cable, Bracket And Bolts
Courtesy of FORD MOTOR CO.

7. Disconnect the Transmission Range (TR) sensor electrical connector, transmission main valve body electrical connector, and disconnect the harness retainer from the transaxle and position the harness aside.

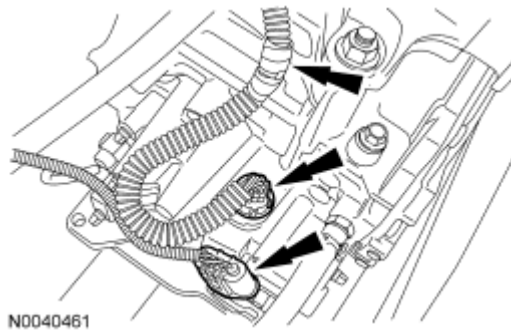


Fig. 211: Locating Transmission Range (TR) Sensor Electrical Connector, Transmission Main Valve Body Electrical Connector
Courtesy of FORD MOTOR CO.

8. Disconnect the Turbine Shaft Speed (TSS) sensor, intermediate shaft speed sensor and 5th gear valve body electrical connector and position the harness aside.

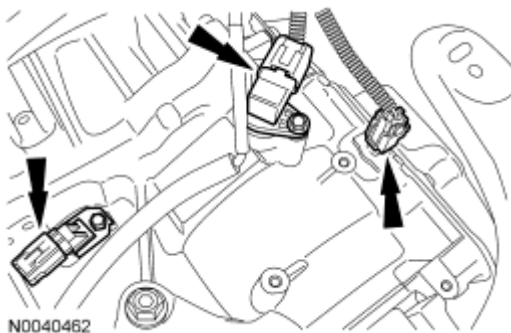


Fig. 212: Locating Turbine Shaft Speed (TSS) Sensor, Intermediate Shaft Speed Sensor And 5Th Gear Valve Body Electrical Connector
Courtesy of FORD MOTOR CO.

9. Remove the ground strap.



Fig. 213: Locating Ground Strap
Courtesy of FORD MOTOR CO.

10. Remove the 3 top bellhousing bolts.

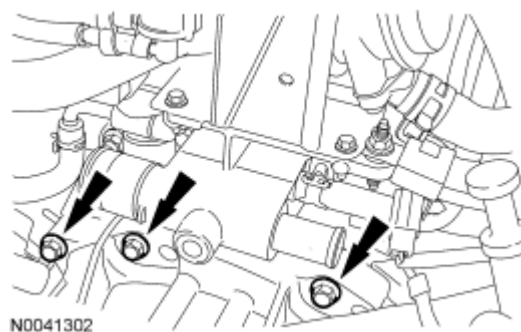


Fig. 214: Locating Top Bellhousing Bolts
Courtesy of FORD MOTOR CO.

11. Remove the 2 roll restrictor bracket bolts.

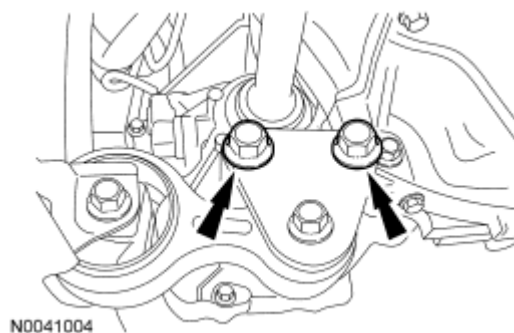


Fig. 215: Locating Roll Restrictor Bracket Bolts
Courtesy of FORD MOTOR CO.

12. Install the Engine Support Bar.

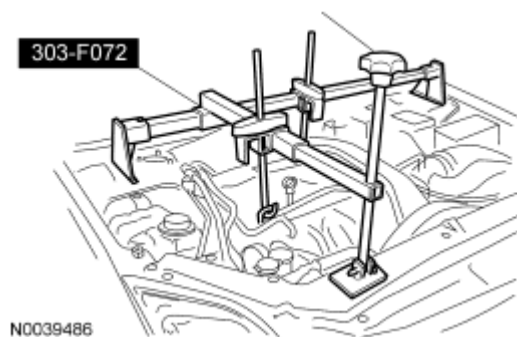


Fig. 216: Identifying Special Tool (303-F072)
Courtesy of FORD MOTOR CO.

13. Remove the 2 transaxle support insulator bracket bolts and lower the transaxle.

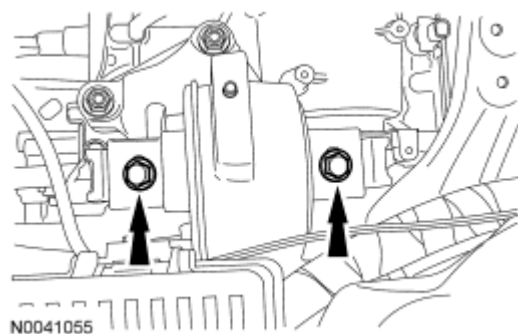


Fig. 217: Locating Transaxle Insulator Bolts
Courtesy of FORD MOTOR CO.

14. Remove the 3 nuts and remove the transaxle support insulator bracket.

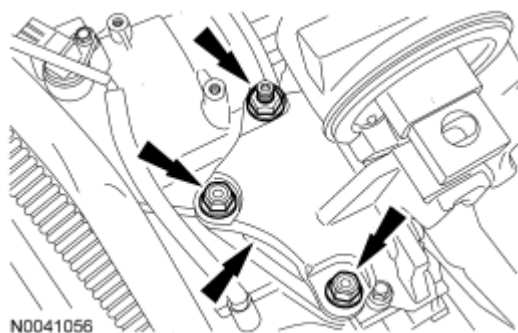


Fig. 218: Locating Transaxle Insulator Bracket And Nuts
Courtesy of FORD MOTOR CO.

15. Disconnect the pressure switch electrical connector.

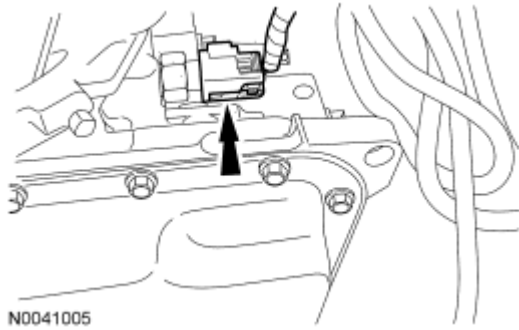


Fig. 219: Locating Pressure Switch Electrical Connector
Courtesy of FORD MOTOR CO.

16. Disconnect the Output Shaft Speed (OSS) sensor electrical connector.

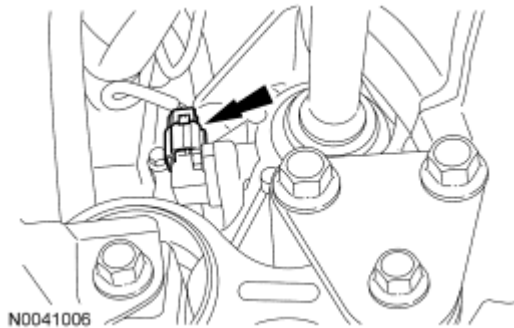


Fig. 220: Locating Output Shaft Speed (OSS) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

17. Remove the 4 screws and position the RH fender splash shield aside.

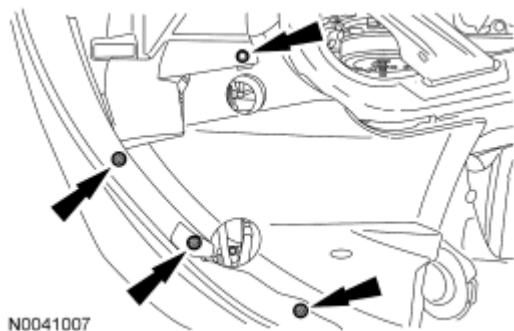


Fig. 221: Locating RH Fender Splash Shield Screws
Courtesy of FORD MOTOR CO.

18. Remove the 6 pin-type retainers and the RH front structure-to-subframe splash shield.

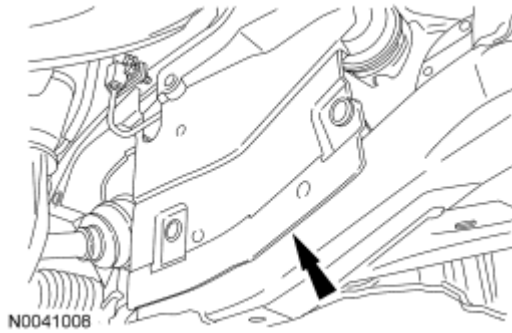


Fig. 222: Locating RH Front Structure-To-Subframe Splash Shield
Courtesy of FORD MOTOR CO.

19. Remove the 4 screws and position the LH fender splash shield aside.

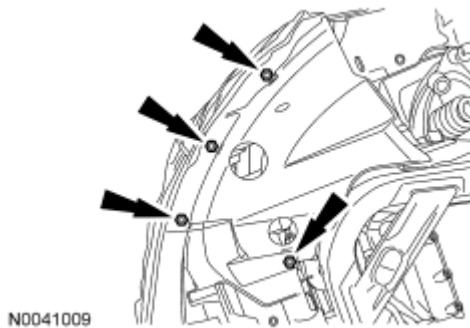


Fig. 223: Locating LH Fender Splash Shield Screws
Courtesy of FORD MOTOR CO.

20. Remove the 6 pin-type retainers and the LH front structure-to-subframe splash shield.

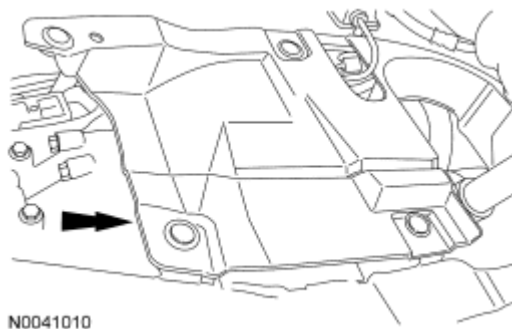
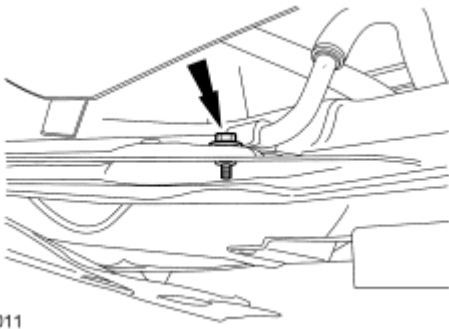


Fig. 224: Locating LH Front Structure-To-Subframe Splash Shield
Courtesy of FORD MOTOR CO.

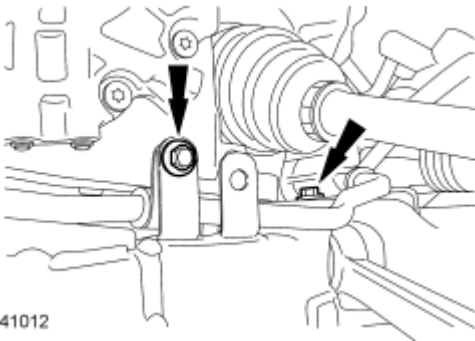
21. Remove the LH front power steering bracket bolt.



N0041011

Fig. 225: Locating LH Front Power Steering Bracket Bolt
Courtesy of FORD MOTOR CO.

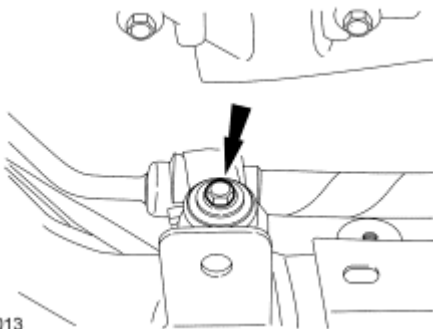
22. Remove the 2 LH power steering tube bracket bolts.



N0041012

Fig. 226: Locating LH Power Steering Tube Bracket Bolts
Courtesy of FORD MOTOR CO.

23. Remove the RH power steering tube bracket bolt.



N0041013

Fig. 227: Locating RH Power Steering Tube Bracket Bolt
Courtesy of FORD MOTOR CO.

NOTE: If installation of a new transaxle is necessary, the transmission fluid will need to be drained.

24. Remove the transmission fluid pan drain plug and allow the transmission fluid to drain.

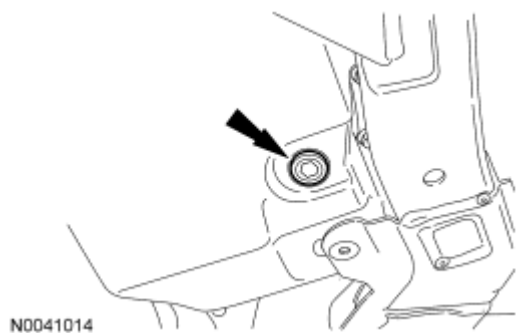


Fig. 228: Locating Transmission Fluid Pan Drain Plug
Courtesy of FORD MOTOR CO.

25. Install the transmission fluid drain plug.
- Tighten to 29 Nm (21 lb-ft).

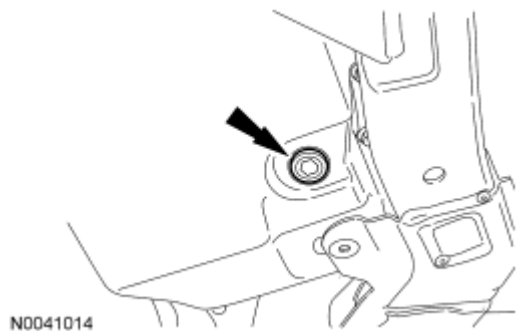


Fig. 229: Locating Transmission Fluid Pan Drain Plug
Courtesy of FORD MOTOR CO.

26. Remove the 2 LH bolts and the RH bolt and position the steering gear aside using mechanic's wire.

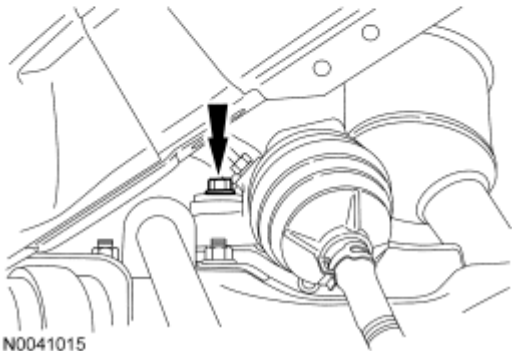
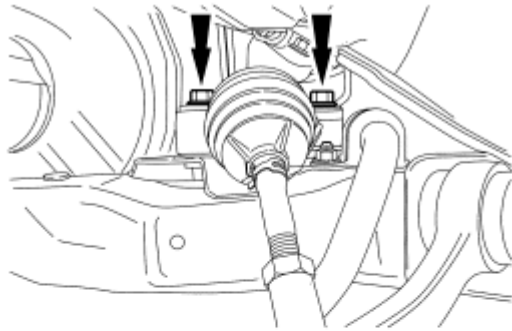


Fig. 230: Locating Steering Gear Bolts
Courtesy of FORD MOTOR CO.

NOTE: LH shown, RH similar.

27. Remove the nuts and disconnect the sway bar links from the front struts.

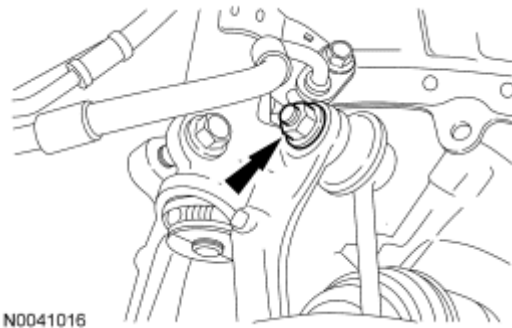


Fig. 231: Locating Sway Bar Links Nut
Courtesy of FORD MOTOR CO.

28. Remove the RH halfshaft. For additional information, refer to **FRONT DRIVE HALFSHAFTS** article.

NOTE: Failure to hold the differential side gears can allow the side gears to rotate and fall out of the differential carrier.

29. Insert a suitable tool into the RH side of the differential to hold the differential side gears in place.



Fig. 232: Locating Differential Side Gear Hole
Courtesy of FORD MOTOR CO.

30. Remove the LH halfshaft. For additional information, refer to **FRONT DRIVE HALFSHAFTS** article.
31. Support the subframe with a suitable powertrain lift.
32. Remove the 2 rear subframe nuts.

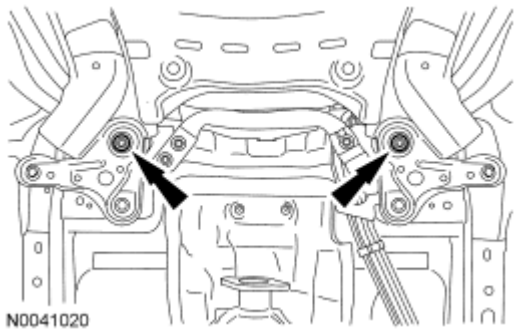


Fig. 233: Locating Rear Subframe Nuts
Courtesy of FORD MOTOR CO.

33. Remove the 4 bolts and the subframe support brackets.

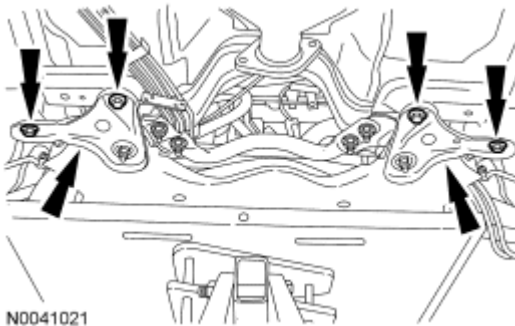


Fig. 234: Locating Subframe Support Brackets And Bolts
Courtesy of FORD MOTOR CO.

NOTE: LH shown, RH similar.

34. Remove front subframe nuts.

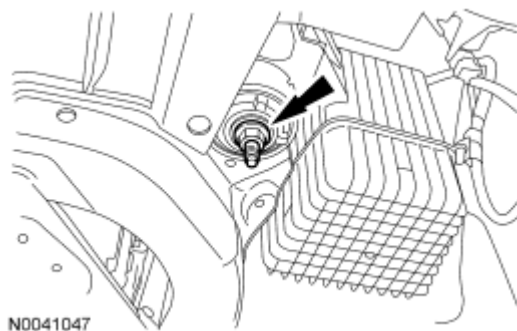


Fig. 235: Locating Front Subframe Nuts
Courtesy of FORD MOTOR CO.

35. Lower the subframe and remove it from the vehicle.
36. Position the boot aside and remove the starter electrical connectors.

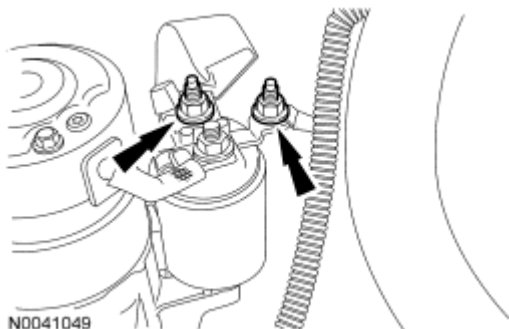


Fig. 236: Locating Starter Terminal Bolts
Courtesy of FORD MOTOR CO.

37. Remove the wiring harness retainer from the starter stud.

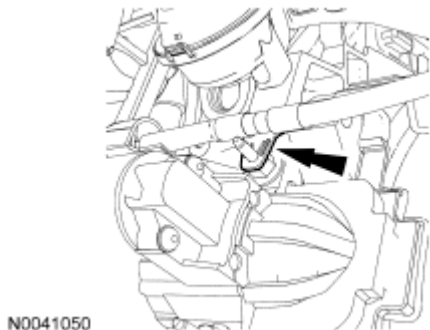


Fig. 237: Locating Wiring Harness Retainer
Courtesy of FORD MOTOR CO.

38. Remove the 2 stud bolts and the starter.

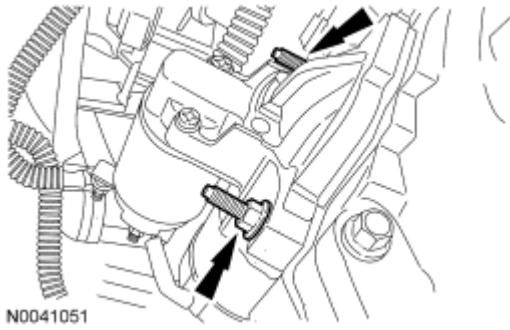


Fig. 238: Locating Starter Bolts
Courtesy of FORD MOTOR CO.

39. Disconnect the transmission fluid cooler hoses from the transaxle.

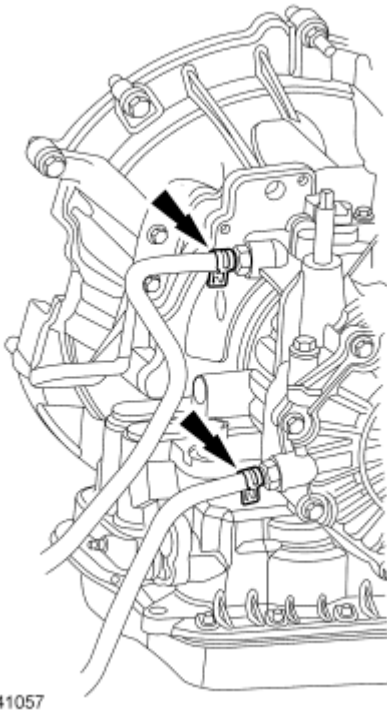


Fig. 239: Locating Transmission Fluid Cooler Hoses
Courtesy of FORD MOTOR CO.

NOTE: Only rotate the engine in a clockwise direction or engine damage will occur.

NOTE: Mark one stud and the flexplate for assembly reference.

40. Remove and discard the 4 torque converter nuts.

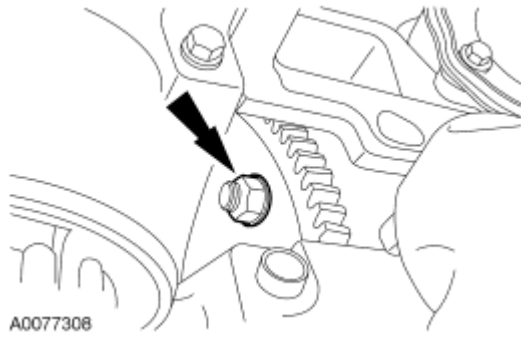


Fig. 240: Locating Torque Converter-To-Flexplate Nuts
Courtesy of FORD MOTOR CO.

41. Remove the nut and the bracket from the torque converter housing stud bolt.

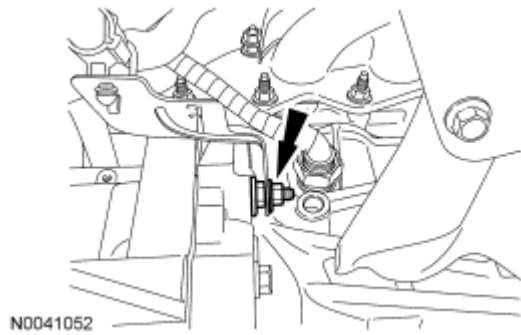


Fig. 241: Locating Torque Converter Housing Stud Bolt
Courtesy of FORD MOTOR CO.

42. Support the transaxle with a suitable transmission jack.
43. Remove the 3 rear torque converter housing bolts.

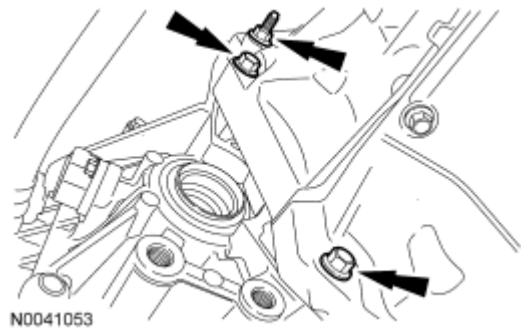


Fig. 242: Locating Back Torque Converter Housing Bolts
Courtesy of FORD MOTOR CO.

44. Remove the 3 front torque converter housing bolts.

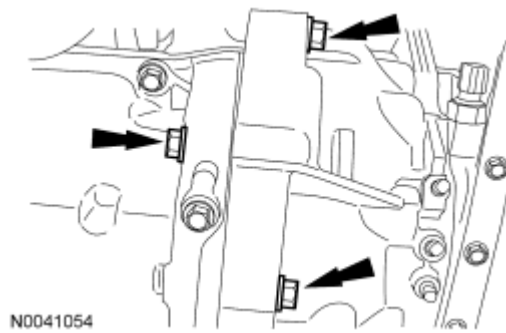


Fig. 243: Locating Front Torque Converter Housing Bolts
Courtesy of FORD MOTOR CO.

45. Separate the transaxle from the engine and install the Torque Converter Retainer.

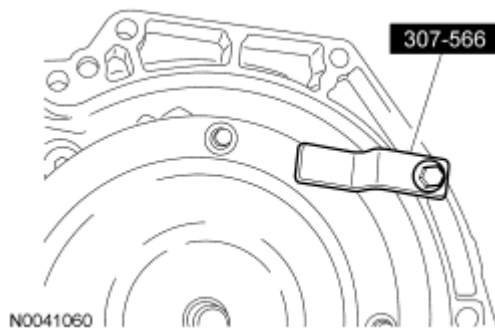


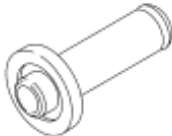
Fig. 244: Identifying Special Tool (307-566)
Courtesy of FORD MOTOR CO.

46. Remove the transaxle from the vehicle.
47. If installing a new transaxle, the transmission fluid cooler will need to be backflushed and cleaned. Carry out transmission fluid cooler backflushing and cleaning. For additional information, refer to **Transmission Fluid Cooler - Backflushing and Cleaning**.

DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES



TORQUE CONVERTER HUB SEAL

Special Tools

Illustration	Tool Name	Tool Number
	Installer, Drive Pinion Oil Seal	205-115 (15058)

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ

 ST2924-A	Remover, Input Shaft Oil Seal	308-375
 ST1187-A	Slide Hammer	307-005 (T59L100-B)

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)

DISASSEMBLY

1. Remove the transaxle. For additional information, refer to **Transaxle**.
2. Remove the torque converter.

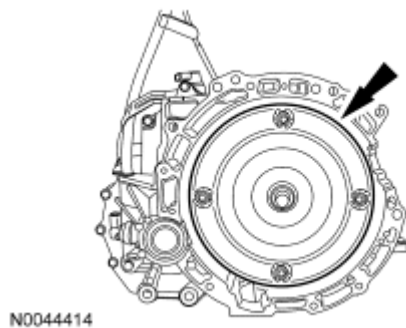


Fig. 245: Locating Torque Converter
Courtesy of FORD MOTOR CO.

3. Using the Input Shaft Oil Seal Remover and Slide Hammer, remove the torque converter hub seal.

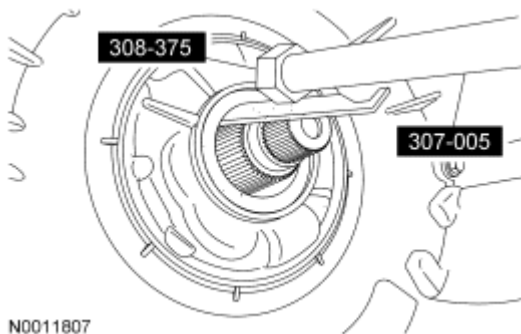


Fig. 246: Removing Torque Converter Hub Seal
Courtesy of FORD MOTOR CO.

ASSEMBLY

1. Using the Drive Pinion Oil Seal Installer, install the torque converter hub seal.

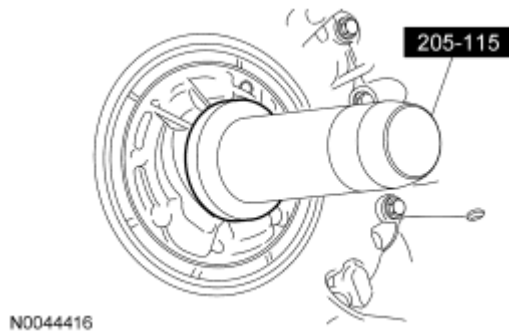


Fig. 247: Installing Torque Converter Hub Seal Using Special Tool (205-115)
Courtesy of FORD MOTOR CO.

2. Install the torque converter.

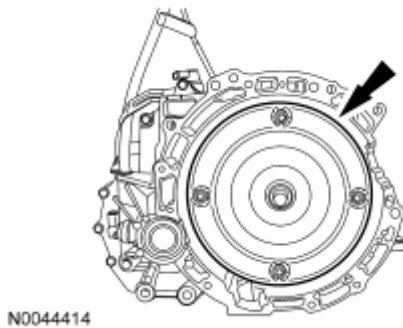


Fig. 248: Locating Torque Converter
Courtesy of FORD MOTOR CO.

3. Install the transaxle. For additional information, refer to **Transaxle**.

TORQUE CONVERTER

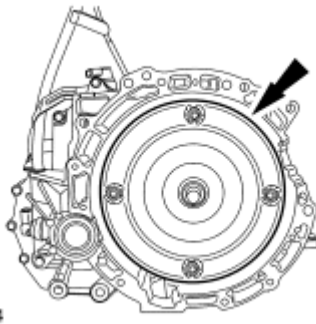
Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)

DISASSEMBLY

1. Remove the transaxle. For additional information, refer to **Transaxle**.

2. Remove the torque converter.

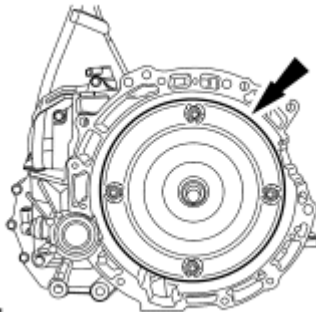


N0044414

Fig. 249: Locating Torque Converter
 Courtesy of FORD MOTOR CO.

ASSEMBLY

1. Install the torque converter.



N0044414


Fig. 250: Locating Torque Converter
 Courtesy of FORD MOTOR CO.

2. Install the transaxle. For additional information, refer to **Transaxle**.

INSTALLATION

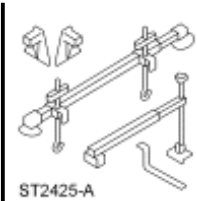
TRANSAXLE

Special Tools

Illustration	Tool Name	Tool Number
 ST1636-A	Retainer, Torque Converter	307-566

2008 Ford Fusion S

2008 TRANSMISSIONS Automatic Transaxle/Transmission - FNR5 - Fusion, Milan & MKZ



Support Bar, Engine

303-F072

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda MES MN 117C (ATF-M V)
Multi-Purpose Grease XG-4 and/or XL-5	ESB-M1C93-B

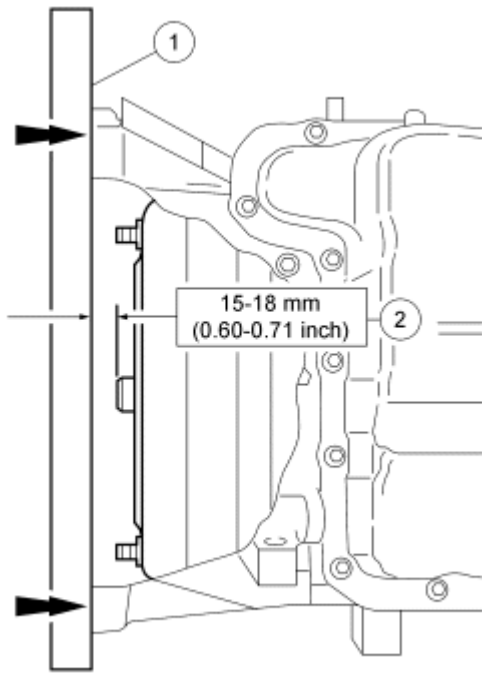
INSTALLATION

NOTE: If the transaxle was overhauled, or if installing a new transaxle and the transmission fluid cooler has not been flushed, flush the transmission fluid cooler at this time. For additional information, refer to Transmission Fluid Cooler - Backflushing and Cleaning.

1. Make sure that the torque converter is installed correctly.

NOTE: Lubricate the torque converter pilot hub with multi-purpose grease.

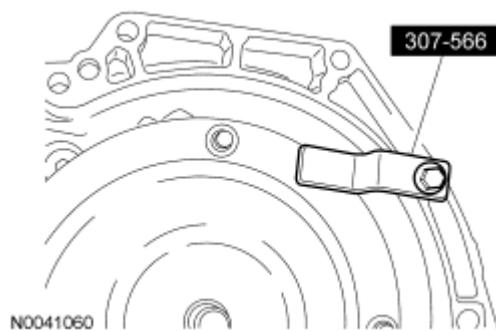
2. Check the installation depth of the torque converter.
 1. Lay a steel straightedge on the automatic transaxle flange.
 2. Check the installation depth between the transaxle flange and the torque converter centering spigot for the correct clearance.



N0034453

Fig. 251: Identifying Clearance Between Transaxle Flange And Torque Converter
Courtesy of FORD MOTOR CO.

3. Using a transmission jack, secure the transaxle using a safety strap.
4. Remove the Torque Converter Retainer.



N0041060

Fig. 252: Identifying Special Tool (307-566)
Courtesy of FORD MOTOR CO.

NOTE: Make sure that the dowel pins are installed in the engine block prior to installing the transaxle.

5. Move the transaxle into position.

NOTE: Note the location of the different length bolts.

6. Install the 3 front torque converter housing bolts.
 - Tighten to 47 Nm (35 lb-ft).

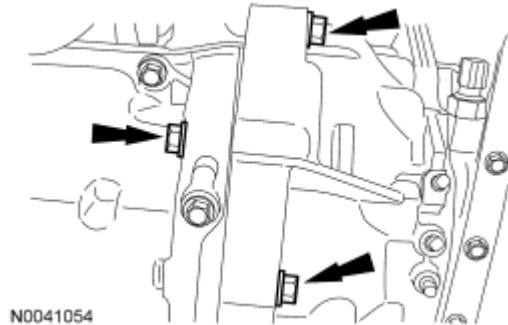


Fig. 253: Locating Front Torque Converter Housing Bolts
Courtesy of FORD MOTOR CO.

7. Install the 3 rear torque converter housing bolts.
 - Tighten to 47 Nm (35 lb-ft).



Fig. 254: Locating Back Torque Converter Housing Bolts
Courtesy of FORD MOTOR CO.

8. Remove the transmission jack.
9. Install the bracket and the nut on the torque converter housing stud bolt.
 - Tighten to 25 Nm (18 lb-ft).

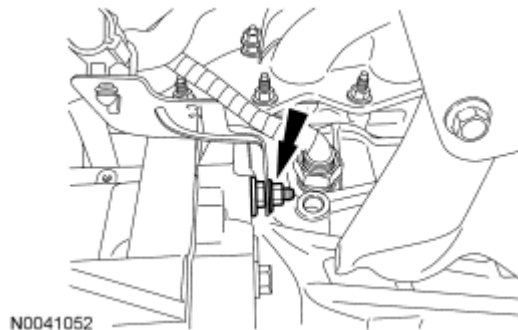


Fig. 255: Locating Torque Converter Housing Stud Bolt
Courtesy of FORD MOTOR CO.

NOTE: Rotate the engine in a clockwise direction only or engine damage will occur.

NOTE: Install new self-locking nuts only.

10. Install new torque converter nuts.
 - Tighten to 37 Nm (27 lb-ft).

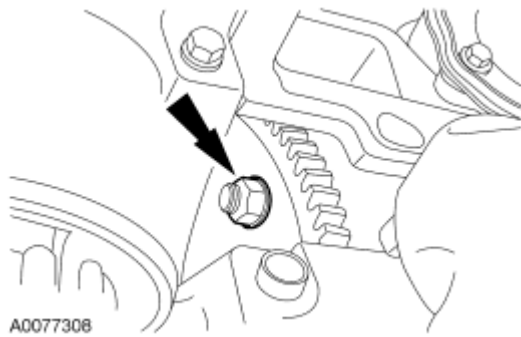


Fig. 256: Locating Torque Converter-To-Flexplate Nuts
Courtesy of FORD MOTOR CO.

11. Connect the transmission fluid cooler hoses to the transaxle.

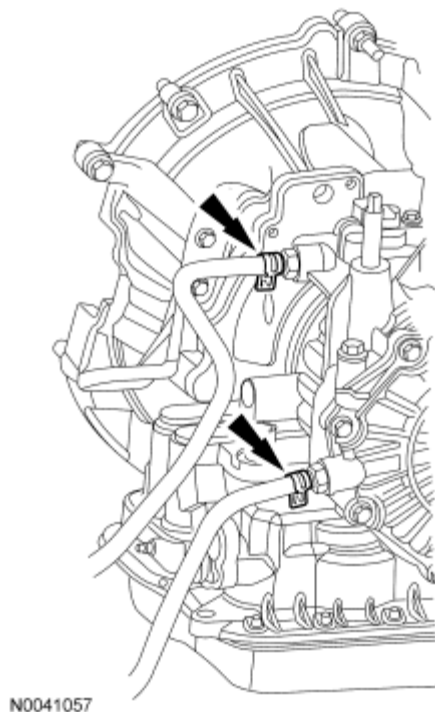


Fig. 257: Locating Transmission Fluid Cooler Hoses
Courtesy of FORD MOTOR CO.

12. Position the starter in place and install the 2 bolts.
 - Tighten to 35 Nm (26 lb-ft).

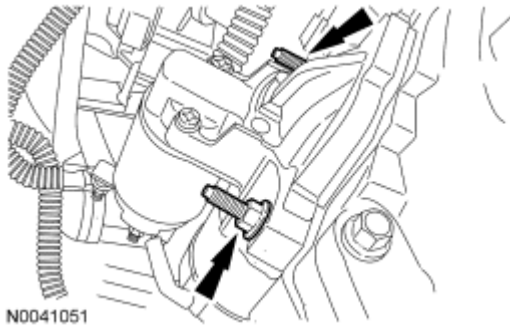


Fig. 258: Locating Starter Bolts
Courtesy of FORD MOTOR CO.

13. Install the wiring harness fastener on the starter stud.

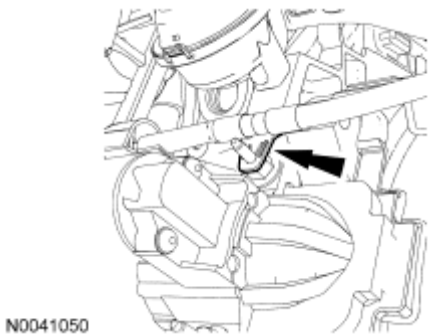


Fig. 259: Locating Wiring Harness Retainer
Courtesy of FORD MOTOR CO.

14. Install the starter electrical connectors and install the boot back into position.
 1. Tighten to 12 Nm (106 lb-in).
 2. Tighten to 5 Nm (44 lb-in).

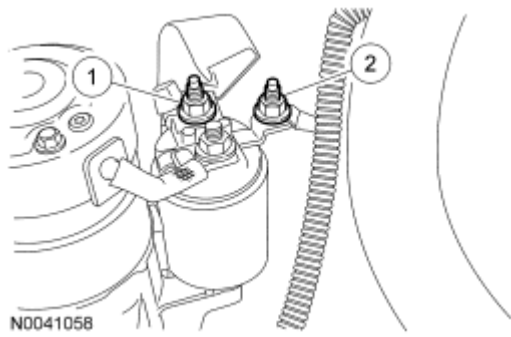


Fig. 260: Locating Starter Terminal Bolts
Courtesy of FORD MOTOR CO.

15. Position the subframe in place using a suitable powertrain lift.

NOTE: LH shown, RH similar.

16. Install the front subframe nuts.
 - Tighten to 150 Nm (111 lb-ft).

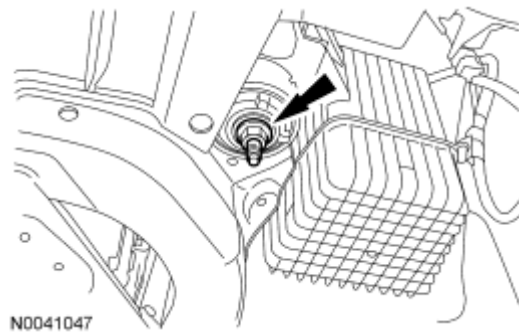


Fig. 261: Locating Front Subframe Nuts
Courtesy of FORD MOTOR CO.

17. Position the subframe support brackets in place and loosely install the bolts.

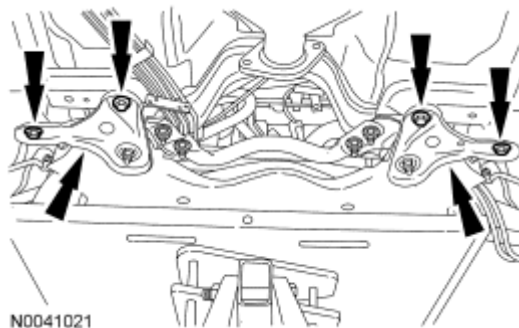


Fig. 262: Locating Subframe Support Brackets And Bolts
Courtesy of FORD MOTOR CO.

18. Install the rear subframe nuts.

- Tighten to 150 Nm (111 lb-ft).

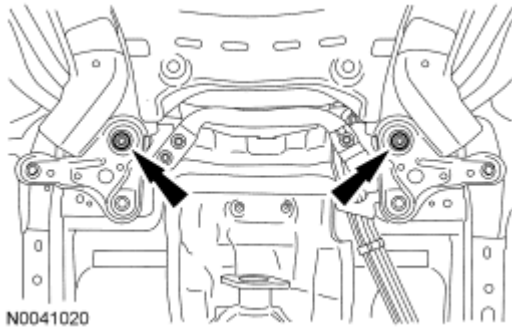


Fig. 263: Locating Rear Subframe Nuts
Courtesy of FORD MOTOR CO.

19. Tighten the subframe support bracket bolts.

- Tighten to 103 Nm (76 lb-ft).

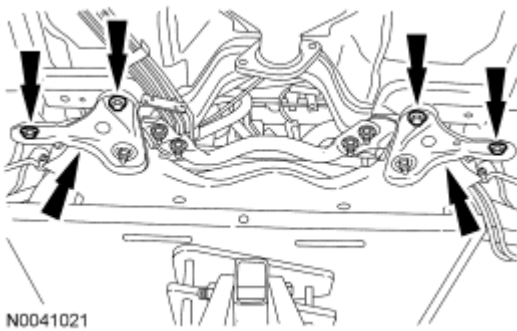


Fig. 264: Locating Subframe Support Brackets And Bolts
Courtesy of FORD MOTOR CO.

20. Install the LH halfshaft. For additional information, refer to **FRONT DRIVE HALFSHAFTS** article.

21. Install the RH halfshaft. For additional information, refer to **FRONT DRIVE HALFSHAFTS** article.

NOTE: LH shown, RH similar.

22. Install the sway bar links and nuts to the front struts.

- Tighten to 40 Nm (30 lb-ft).

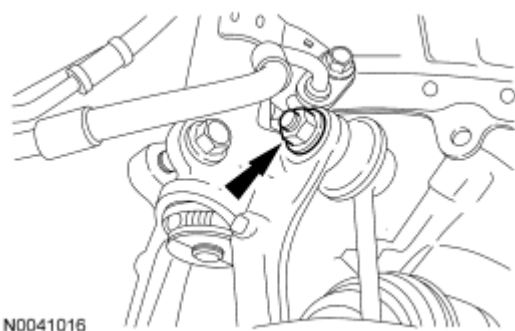


Fig. 265: Locating Sway Bar Links Nut
Courtesy of FORD MOTOR CO.

23. Position the steering gear in place and install the 2 LH and RH bolts.
 - Tighten to 107 Nm (79 lb-ft).

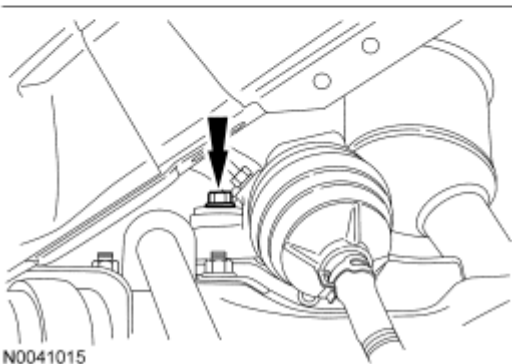
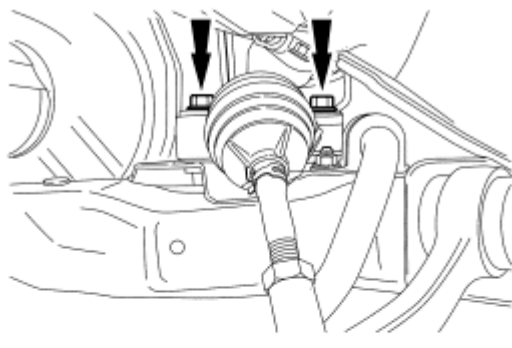


Fig. 266: Locating Steering Gear Bolts
Courtesy of FORD MOTOR CO.

24. Install the RH power steering tube bracket bolt.
 - Tighten to 9 Nm (80 lb-in).

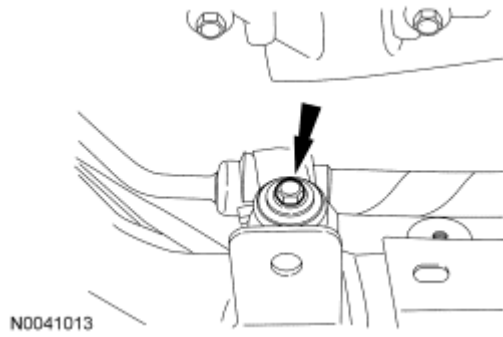


Fig. 267: Locating RH Power Steering Tube Bracket Bolt
Courtesy of FORD MOTOR CO.

25. Install the 2 LH power steering tube bracket bolts.
 - Tighten to 9 Nm (80 lb-in).

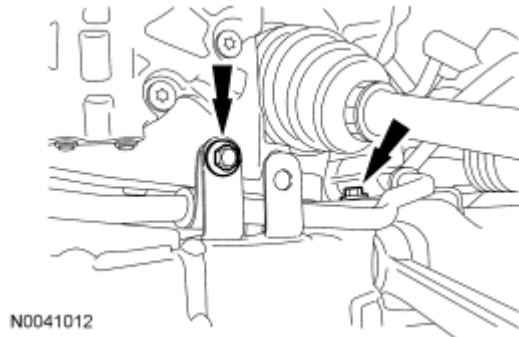


Fig. 268: Locating LH Power Steering Tube Bracket Bolts
Courtesy of FORD MOTOR CO.

26. Install the LH power steering tube bracket bolt.
 - Tighten to 9 Nm (80 lb-in).

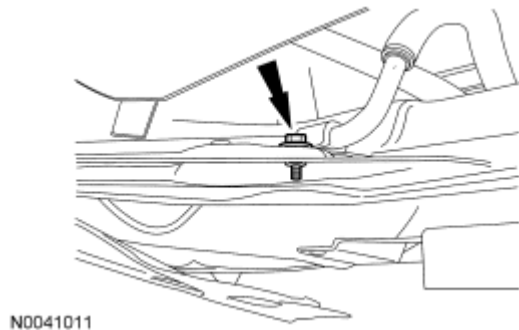
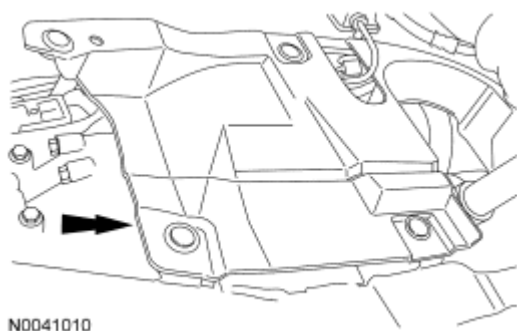


Fig. 269: Locating LH Front Power Steering Bracket Bolt
Courtesy of FORD MOTOR CO.

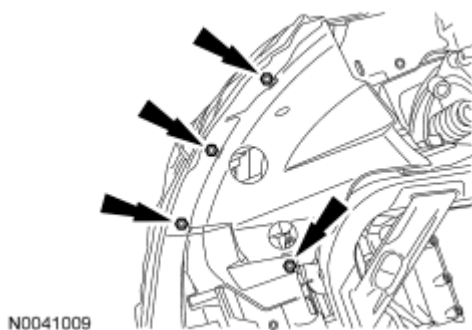
27. Position the LH front structure-to-subframe splash shield in place and install the 6 pin-type retainers.



N0041010

Fig. 270: Locating LH Front Structure-To-Subframe Splash Shield
Courtesy of FORD MOTOR CO.

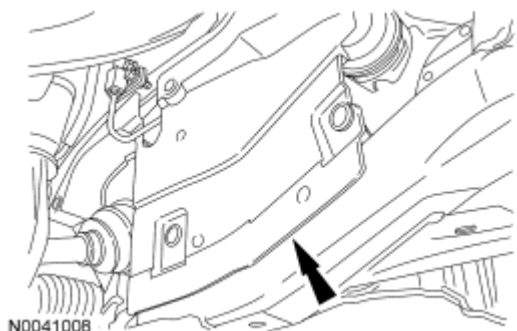
28. Position the LH splash shield in place and install the 4 screws.



N0041009

Fig. 271: Locating LH Fender Splash Shield Screws
Courtesy of FORD MOTOR CO.

29. Position the RH front structure-to-subframe splash shield in place and install the 6 pin-type retainers.



N0041008

Fig. 272: Locating RH Front Structure-To-Subframe Splash Shield
Courtesy of FORD MOTOR CO.

30. Position the RH splash shield in place and install the 4 screws.

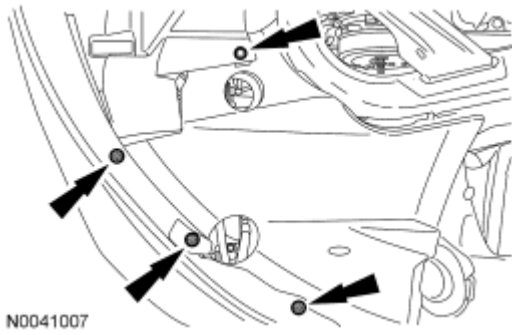


Fig. 273: Locating RH Fender Splash Shield Screws
Courtesy of FORD MOTOR CO.

31. Connect the Output Shaft Speed (OSS) sensor electrical connector.

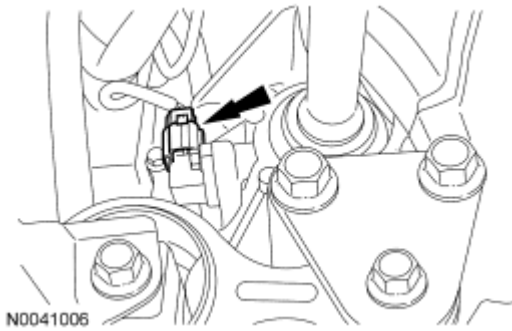


Fig. 274: Locating Output Shaft Speed (OSS) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

32. Connect the pressure switch electrical connector.

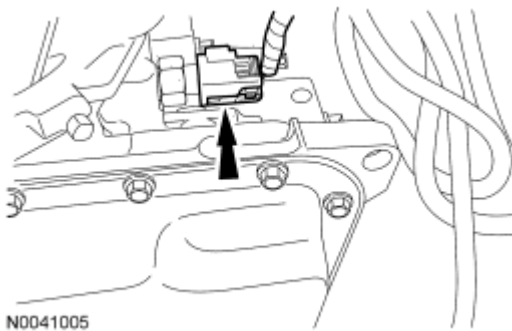


Fig. 275: Locating Pressure Switch Electrical Connector
Courtesy of FORD MOTOR CO.

33. Position the transaxle support insulator bracket in place and install the 3 nuts.
- Tighten to 80 Nm (59 lb-ft).

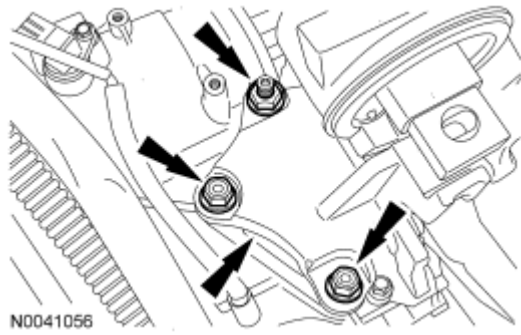


Fig. 276: Locating Transaxle Insulator Bracket And Nuts
Courtesy of FORD MOTOR CO.

34. Raise the transaxle using the Engine Support Bar and install the 2 transaxle support insulator bracket bolts.
- Tighten to 62 Nm (46 lb-ft).

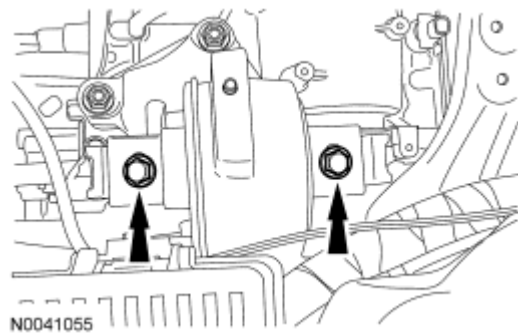


Fig. 277: Locating Transaxle Insulator Bolts
Courtesy of FORD MOTOR CO.

35. Install the 2 roll restrictor bracket bolts.
- Tighten to 90 Nm (66 lb-ft).

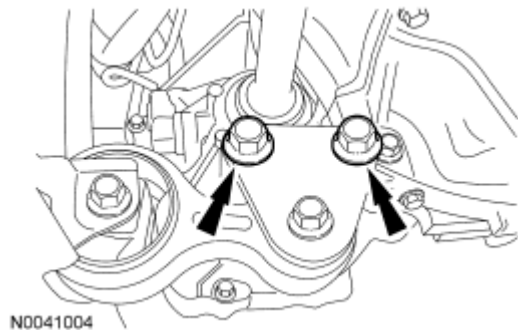


Fig. 278: Locating Roll Restrictor Bracket Bolts
Courtesy of FORD MOTOR CO.

36. Remove the Engine Support Bar.

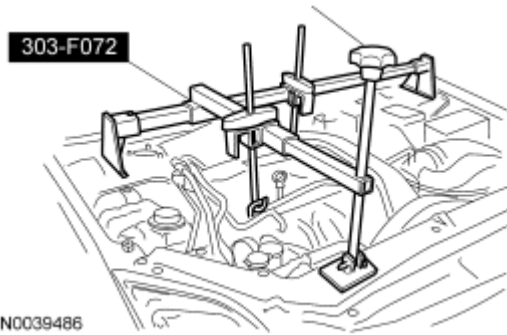


Fig. 279: Identifying Special Tool (303-F072)
Courtesy of FORD MOTOR CO.

37. Install the 3 top torque converter housing bolts.
- Tighten to 47 Nm (35 lb-ft).

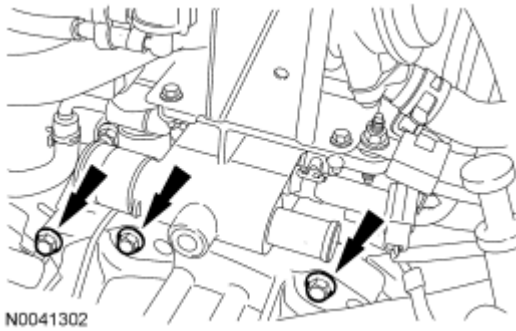


Fig. 280: Locating Top Bellhousing Bolts
Courtesy of FORD MOTOR CO.

38. Install the ground strap.
- Tighten to 25 Nm (18 lb-ft).



Fig. 281: Locating Ground Strap
Courtesy of FORD MOTOR CO.

39. Connect the Turbine Shaft Speed (TSS) sensor, intermediate shaft speed sensor and the 5th gear valve body electrical connectors.

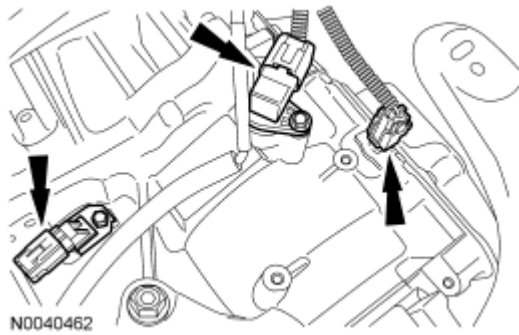


Fig. 282: Locating Turbine Shaft Speed (TSS) Sensor, Intermediate Shaft Speed Sensor And 5Th Gear Valve Body Electrical Connector
Courtesy of FORD MOTOR CO.

40. Connect the main valve body and the Transmission Range (TR) sensor electrical connectors and connect the wiring harness to the transmission.

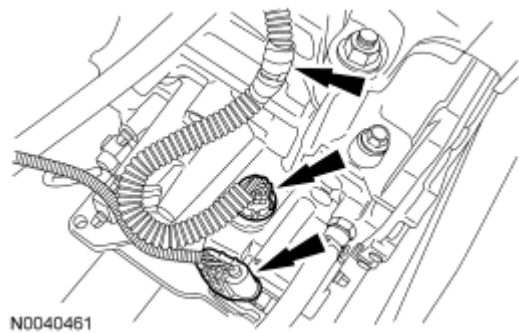


Fig. 283: Locating Transmission Range (TR) Sensor Electrical Connector, Transmission Main Valve Body Electrical Connector
Courtesy of FORD MOTOR CO.

41. Position the selector lever cable and bracket in place, and connect the electrical harness fastener and install the 2 bolts.
 - Tighten to 20 Nm (177 lb-in).

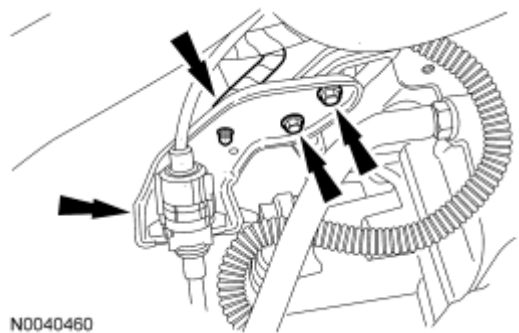


Fig. 284: Locating Selector Lever Cable, Bracket And Bolts
Courtesy of FORD MOTOR CO.

42. Connect the selector lever cable end to the manual control lever.

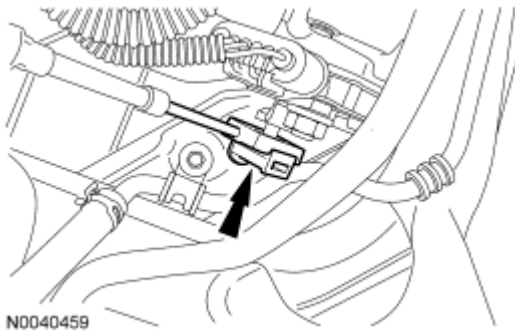


Fig. 285: Locating Selector Lever Cable End
Courtesy of FORD MOTOR CO.

43. Install the battery tray.
1. Position the battery tray in place and install the battery tray bolt.
 - Tighten to 9 Nm (80 lb-in).
 2. Connect the 3 wiring harness retainers.
 3. Install the battery tray nut.
 - Tighten to 9 Nm (80 lb-in).
 4. Connect the positive battery cable fastener to the battery tray.

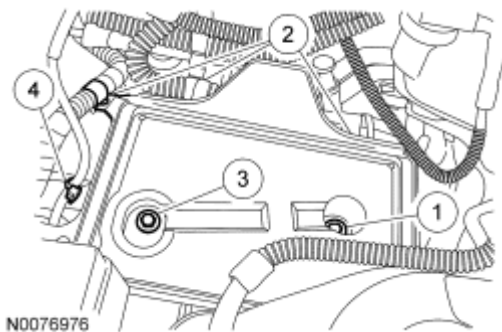


Fig. 286: Identifying Wiring Harness Retainers & Positive Battery Cable Fastener
Courtesy of FORD MOTOR CO.

NOTE: When the battery has been disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven to relearn the strategy.

44. Install the battery. For additional information, refer to **BATTERY, MOUNTING AND CABLES** article.
45. Fill the transaxle with clean transmission fluid.