

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 M 5 (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

Item	Specification
FNR5 Transaxle Weight	82 kg (180 lb)

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 = 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

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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 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

	Primary Gearset				Secondary Gearset	

Gear/ Engaged Clutch	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

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

Engine	RPM
All	2,200-2,700

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
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 procedure in this section.

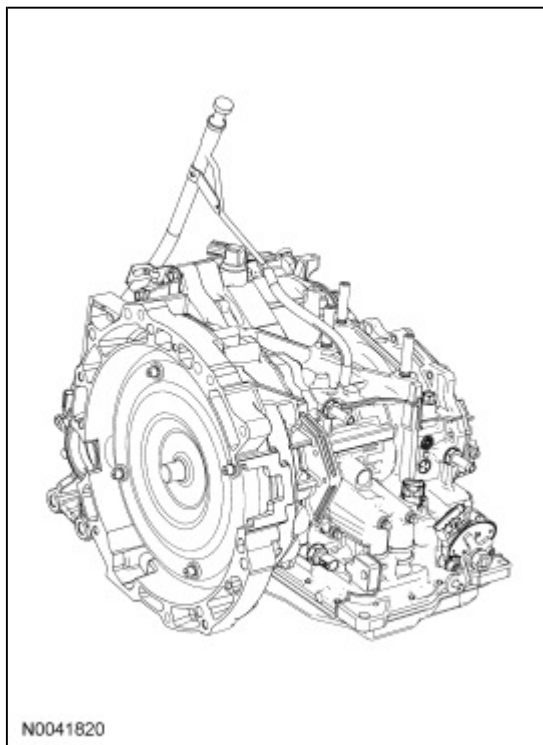
Transaxle Description

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



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.

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.

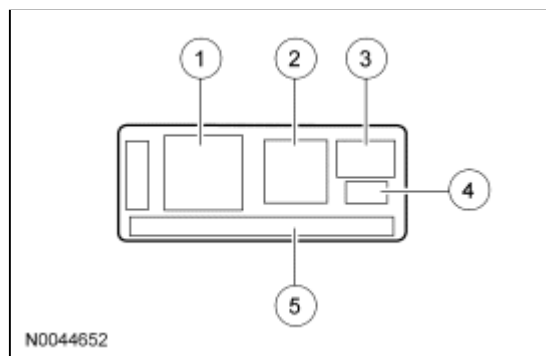
A hydraulic emergency operating program maintains limited operation in the event of failure of important electrical components.

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

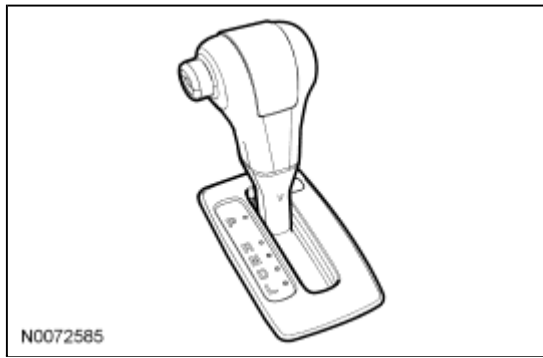
When servicing the automatic transaxle, refer to the identification tag located on the case.



Item	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.



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

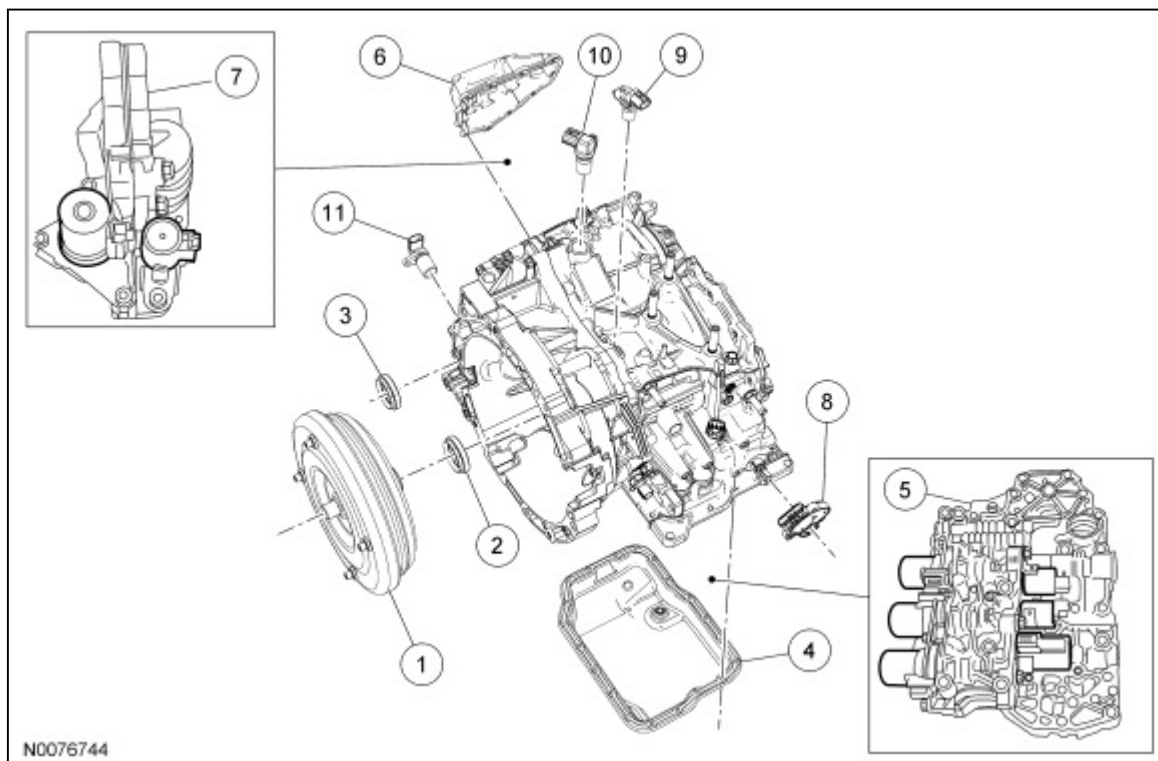
In selector lever position D, the transmission control allows all the gears to be selected.

Selector Lever Position L

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

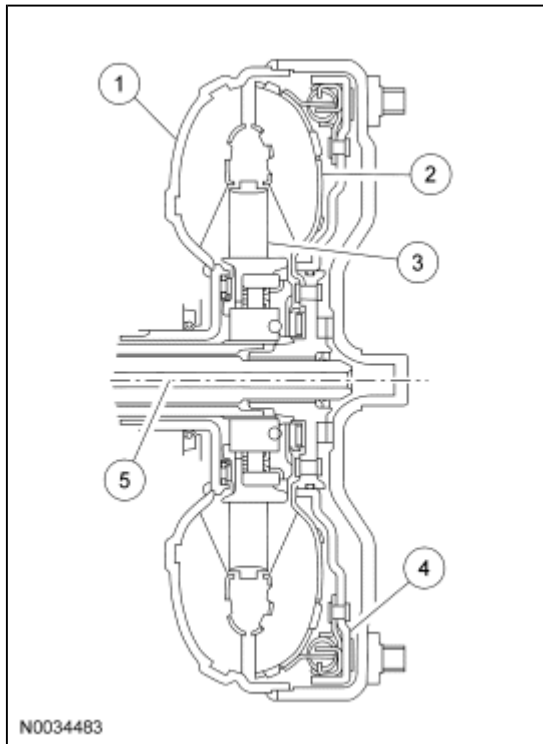
If the selector lever is moved to position L at an excessive vehicle speed for 1st gear, the transmission control only allows the downshift to take place when the corresponding vehicle speed has been reached.

FNR5 Transaxle



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

Torque Converter and Torque Converter Lock-Up Clutch



Item	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.

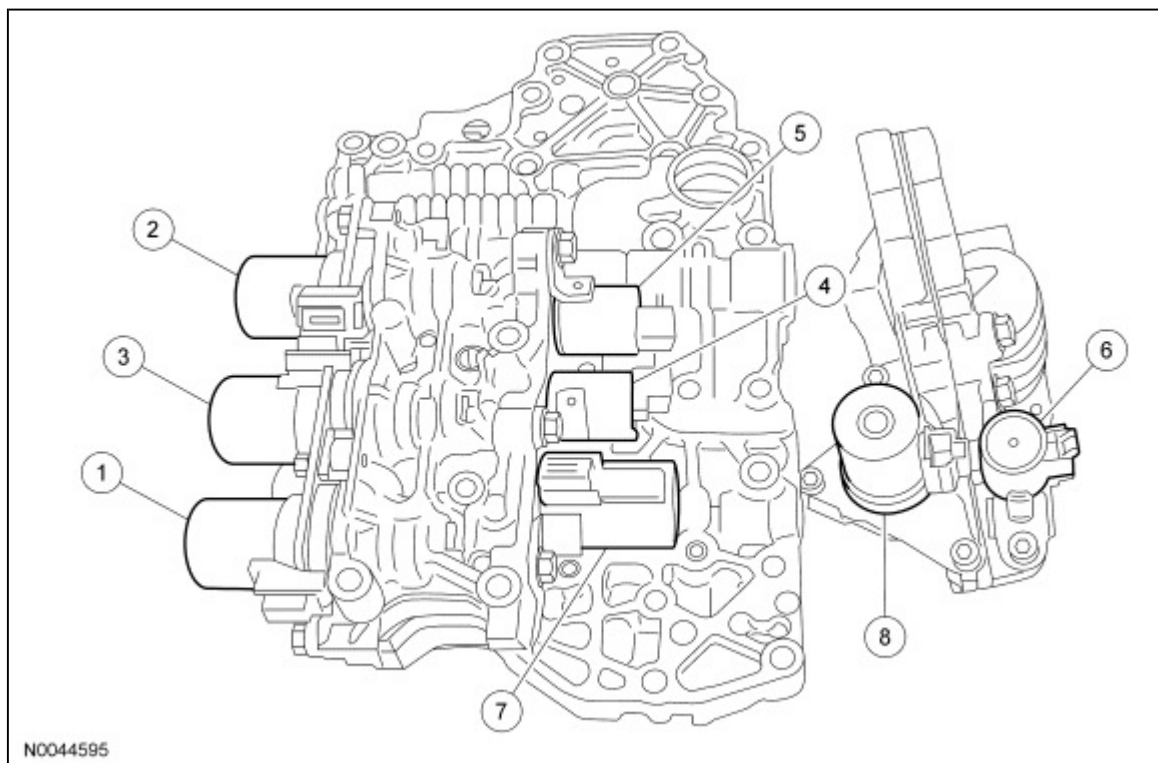
The stator boosts the torque to the input shaft (approximately 85% difference in speed between the impeller and the turbine).

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.

Valve Body



Item	Description
1	Shift Solenoid A (SSA) Pulse-Width Modulation (PWM)
2	Shift Solenoid B (SSB) <u>PWM</u>
3	Shift Solenoid C (SSC) <u>PWM</u>
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 (SSA), 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.

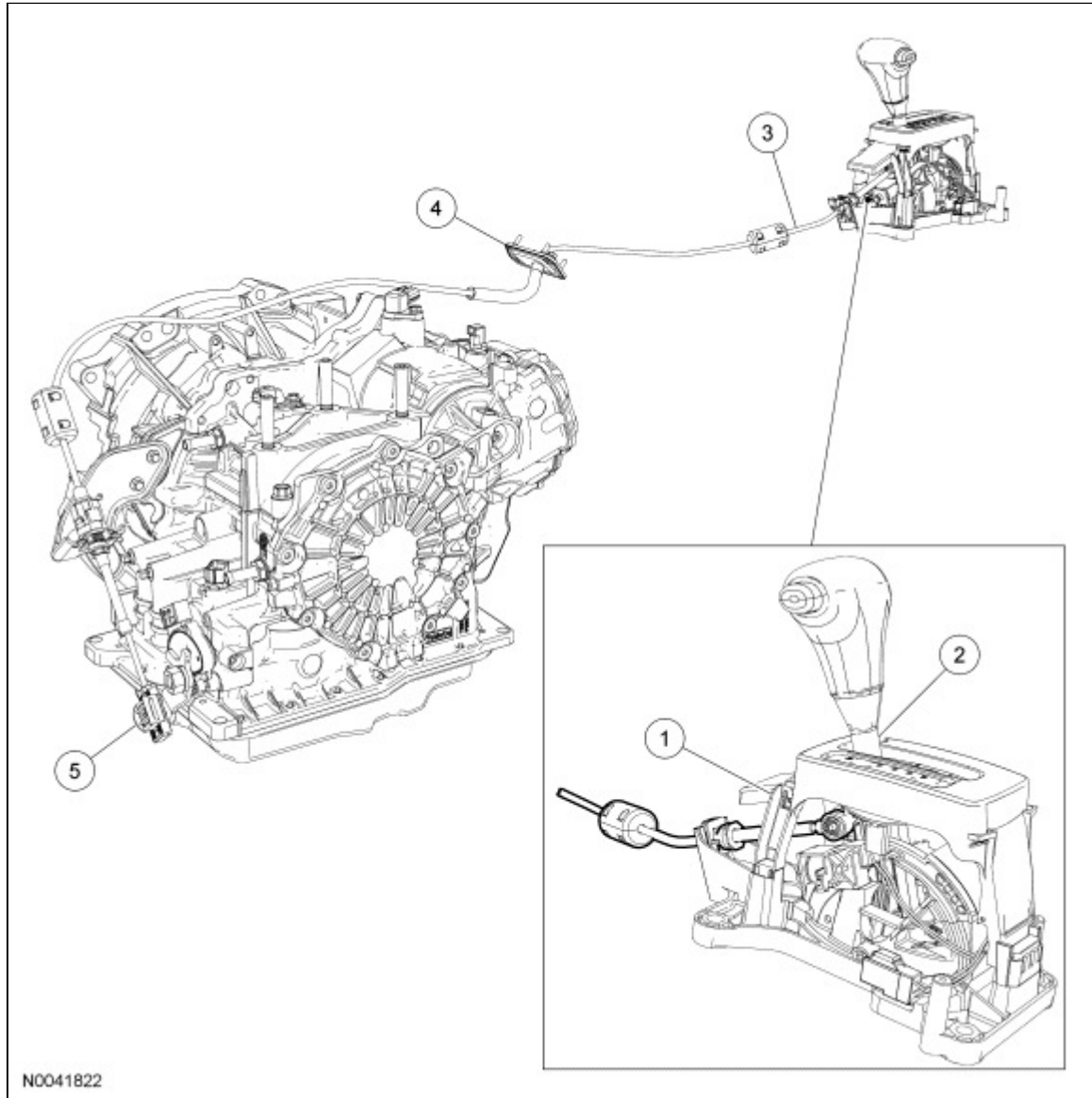
One-Way Clutch (OWC) No. 1

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.

External Selector Lever Mechanism



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

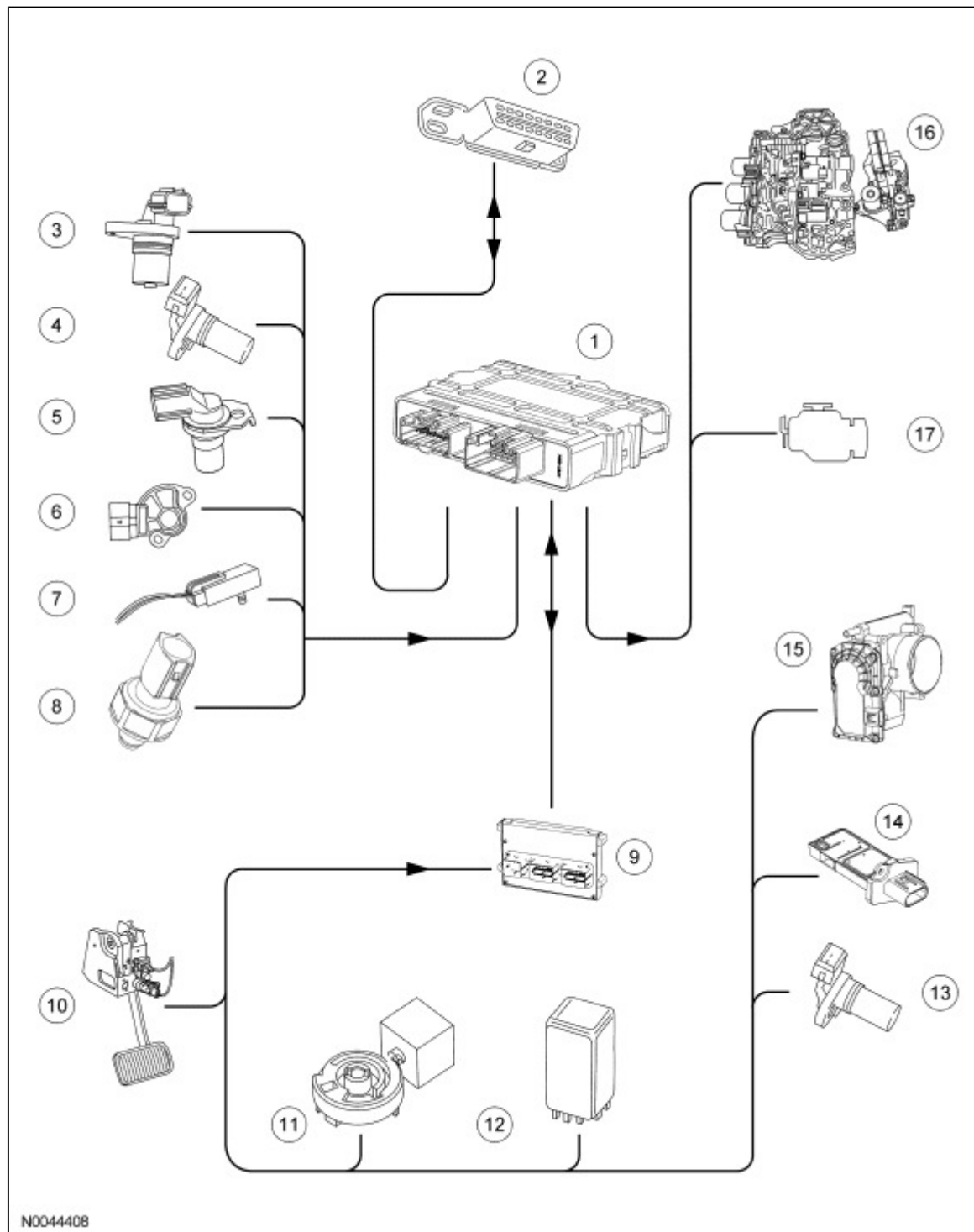
The transmission end of the selector lever cable is attached to a ball on the manual control lever.

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.

Overview Transmission Control

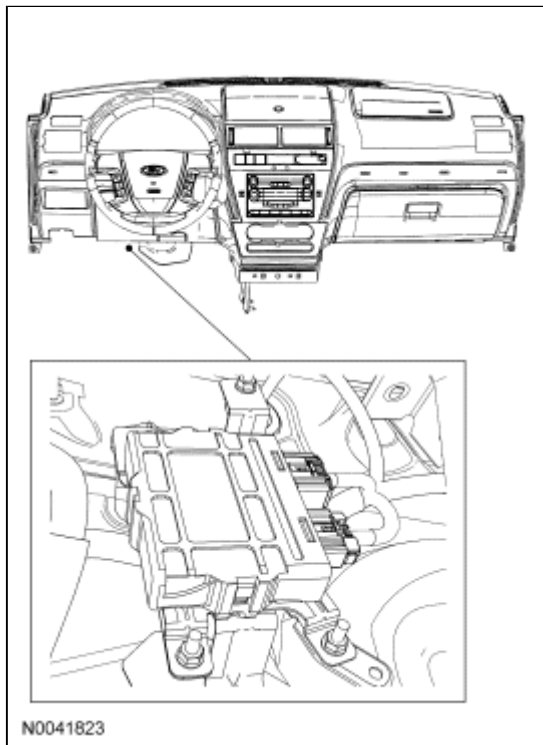


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Item	Part Number	Description
1	—	Transmission Control Module (TCM)
2	—	Data Link Connector (DLC)
3	7H103	Output Shaft Speed (OSS) sensor
4	7H103	Intermediate shaft speed sensor

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)

Transmission Control Module (TCM)



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 of 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.

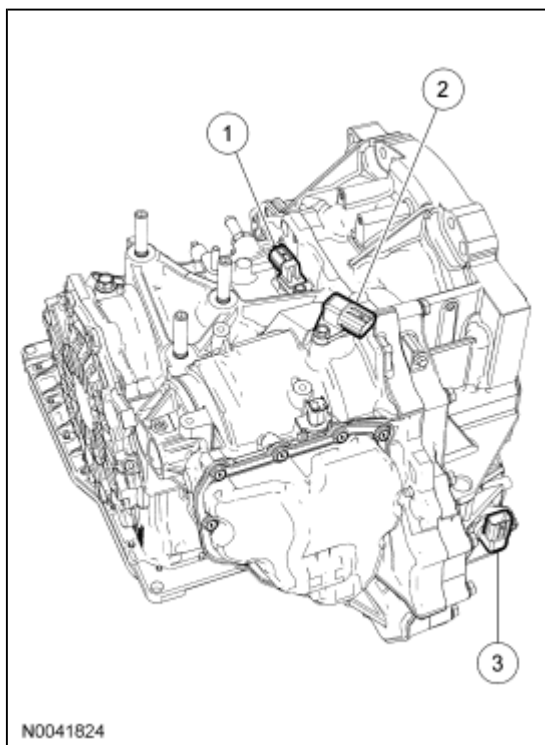
The [CKP](#) sensor is an inductive sensor which provides the PCM with information about the engine speed and position of the crankshaft.

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.

Output Shaft Speed (OSS), Intermediate Shaft Speed and Turbine Shaft Speed (TSS) Sensors



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.

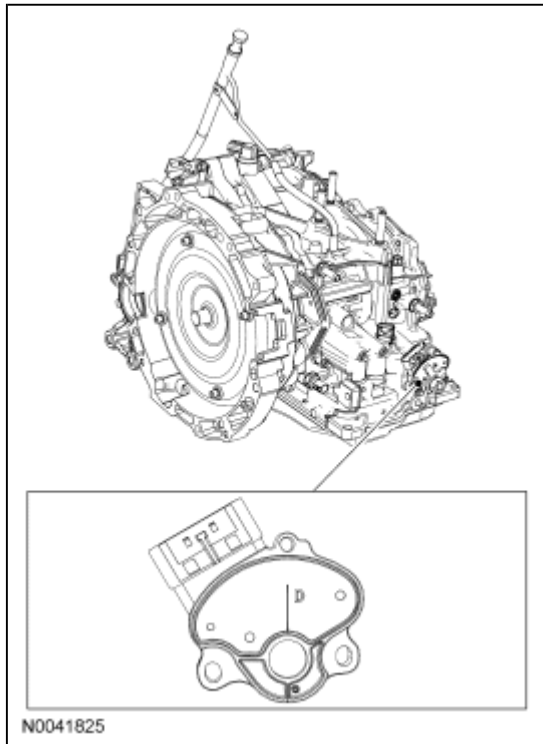
The OSS sensor is an inductive sensor which detects the vehicle speed by means of a rotor on the differential.

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.

Transmission Range (TR) Sensor



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

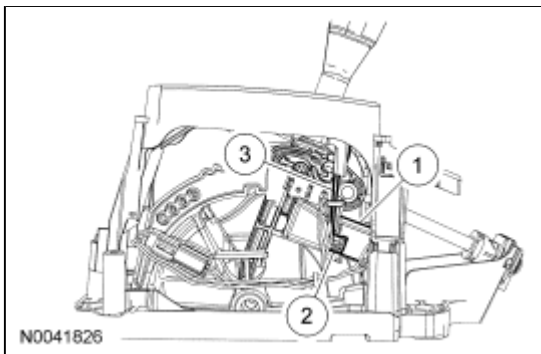
The Transmission Fluid Temperature (TFT) sensor is located on the internal wiring harness to the solenoid valves in the transmission fluid pan.

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.

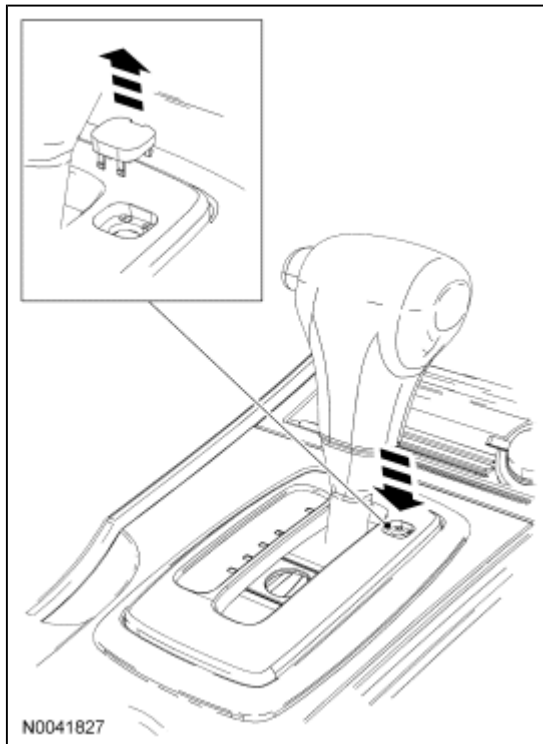
Brake Shift Interlock Actuator (BSIA)



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

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.

Substitute Function



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

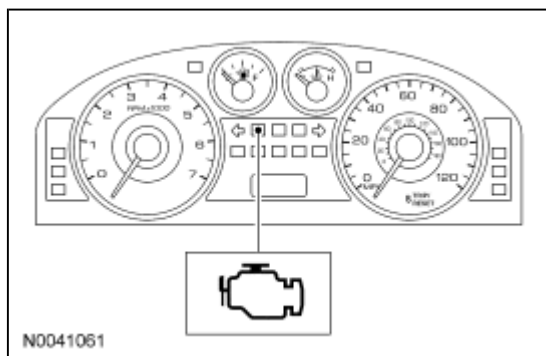
The solenoid is incorporated in the ignition lock. In selector lever position P the ground connection to the solenoid is cut. The locking pin does not engage in the ignition lock.

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.



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 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:

- Powertrain Control/Emissions Diagnosis (PC/ED) manual
- 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 Tool(s)

 <p>ST2834-A</p>	<p>Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool</p>
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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.
- 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	<ul style="list-style-type: none"> • REPAIR all hard DTCs. FOLLOW the pinpoint tests. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual first, then this Workshop Manual.
	No	<ul style="list-style-type: none"> • REFER to Diagnosis By Symptom in this section, then GO to Step 5.
2) Are any continuous test memory codes present?	Yes	<ul style="list-style-type: none"> • CLEAR codes and CARRY OUT drive cycle test.
	No	<ul style="list-style-type: none"> • GO to Step 4.
3) Did the continuous test memory codes reappear?	Yes	<ul style="list-style-type: none"> • REPAIR all continuous test memory codes. FOLLOW the pinpoint tests. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual then the transaxle reference manual, then this Workshop Manual, then GO to Step 4.
	No	<ul style="list-style-type: none"> • GO to Step 4.
4) Is the concern repaired?	Yes	<ul style="list-style-type: none"> • CARRY OUT the self test to verify that no DTCs are present. CLEAR memory codes. RETURN vehicle to customer.
	No	<ul style="list-style-type: none"> • REFER to Diagnosis By Symptom in this section.
5) Are there any electrical concerns?	Yes	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	Yes	<ul style="list-style-type: none"> • REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual, intermittent fault diagnosis section and use the scan tool to diagnose cause of concern in the processor, vehicle harness or external inputs

installed?	No	<p>(sensors or switches).</p> <ul style="list-style-type: none"> ● REFER to the hydraulic and mechanical routine to diagnose the concern, then GO to Step 7.
7) Is the concern repaired?	Yes	<ul style="list-style-type: none"> ● CARRY OUT the self test to verify that no DTCs are present. CLEAR memory codes. RETURN the vehicle to the customer.
	No	<ul style="list-style-type: none"> ● 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 M 5 (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 section 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

NOTICE: 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.

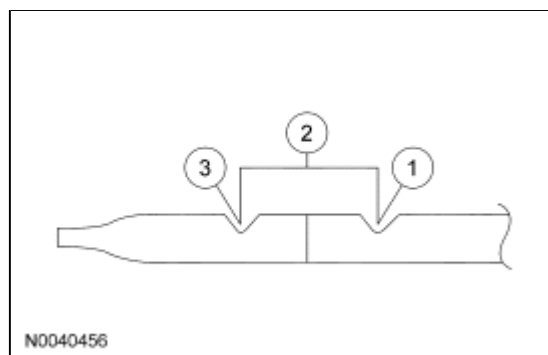
NOTE: Transmission fluid expands when warmed. To obtain an accurate transmission fluid level check, drive the vehicle until normal operating temperature is reached, approximately 32 km (20 mi).

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.



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

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

NOTICE: 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 Specification in this section.

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.
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](#) in this section.

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	1-2	5-21 km/h	3-13 mph
PID TP	2-3	16-32 km/h	10-20 mph
20%	3-4	32-48 km/h	20-30 mph
	4-5	48-64 km/h	30-40 mph
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 Tool(s)

 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
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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 in this section.
4. Carry out Diagnostic Procedures.
 - Run On-Board Diagnostic (OBD); refer to [OBD](#) with Scan Tool in this section.
 - 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](#) in this section.
 - Carry out the Stall Speed Test. Refer to [Special Testing Procedures](#) in this section.
 - Carry out the Diagnosis by Symptom Index. Refer to [Diagnosis By Symptom](#) in this section.
 - 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 in this section. Check for DTCs. Refer to [Diagnostic Trouble Code \(DTC\) Charts](#) in this section.
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](#) in this section.
 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](#) in this section. Repair as necessary. If the vehicle does not stall in D position. Refer to [Diagnosis By Symptom](#) in this section.
-

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](#) in this section.
- Correct selector lever linkage adjustments; refer to [Section 307-05](#).

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 [Section 307-05](#) 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 Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis and testing of the PCM.

Diagnostics

Special Tool(s)

 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
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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 Powertrain Control/Emissions Diagnosis (PC/ED) manual.

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 Powertrain Control/Emissions Diagnosis (PC/ED) manual.

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
APP	Accelerator Pedal Position (APP) switch status	Percentage
APP1	Accelerator Pedal Position (APP) sensor 1	Percentage
AST	Time since start	Time
BARO	Barometric pressure	pressure (psi)
BOO TCM	Brake Pedal Position (BPP) switch status	On/Off
CLRDIST	Distance traveled since DTCs were cleared	Distance
DRIVECNT	Valid drive counter	Number (1-X)
DTC TCM	Number of codes	Number (1-X)
ECT TCM	Engine Coolant Temperature (ECT)	Temperature
ENGLOAD	Engine load	Percentage
GEAR	Commanded transaxle gear	1, 2, 3, 4 or 5
GEAR_MAX	Highest allowed gear for current vehicle speed	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
HITEMP_CNT	Number of times in high temperature mode	Number
HITEMP_DIST	Distance traveled since last high temperature mode	Distance
HRSH_SHFT	Commanded firm shift	ON/OFF
ISS_F	Intermediate shaft speed fault status	Fault/No Fault
ISS_SRC	Intermediate shaft speed sensor rpm	rpm
MIL_DIS	Distance traveled with the <u>MIL</u> light on	Distance
OSS	Output Shaft Speed (OSS) sensor signal	rpm
OSS_F	<u>OSS</u> fault status	Fault/No fault
OSS_SRC	Unfiltered <u>OSS</u>	rpm
PCA	Commanded Pressure Control Solenoid A (PCA) solenoid pressure	Pressure
PCA AMP	<u>PCA</u> solenoid	Amperes
PCA_F	<u>PCA</u> fault status	Fault/No Fault
PCB	Commanded Pressure Control Solenoid B (PCB) solenoid pressure	Percentage
PCB_F	<u>PCB</u> solenoid fault status	Fault/No Fault

RPM TCM	Engine rpm	rpm
RPM TCM	Engine speed	rpm
SSD	Commanded Shift Solenoid D (SSD) state	ON/OFF
SSD_F	SSD fault status	Fault/No Fault
SSE	Commanded Shift Solenoid E (SSE) state	ON/OFF
SSE_F	SSE fault status	Fault/No Fault
SSF	Commanded Shift Solenoid F (SSF) state	ON/OFF
SSF_F	SSF fault status	Fault/No Fault
SSPCA	Shift Solenoid Pressure Control A (SSPCA) command	Percentage
SSPCA_F	SSPCA fault status	Fault/No Fault
SSPCB	Shift Solenoid Pressure Control B (SSPCB) command	Percentage
SSPCB_F	SSPCB fault status	Fault/No Fault
SSPCC	Shift Solenoid Pressure Control C (SSPCC) command	Percentage
SSPCC_F	SSPCC fault status	Fault/No Fault
TCC	Torque Converter Clutch (TCC) state	Percentage
TCC_OSC	TCC solenoid commanded state	Lock/Unlock
TCC_RAT	Torque converter slip ratio	Percentage
TC_SLIPACT	Difference between engine rpm and turbine shaft rpm (actual torque converter slip)	rpm
TC_SLIPDSD	Desired torque converter slip	rpm
TFT	Transmission Fluid Temperature (TFT) sensor signal (°F)	Degrees
TFT_F	TFT sensor fault status	Fault/No Fault
TORQUE	Net engine torque	Nm
TP	Throttle Position (TP)	Percentage
TR	Transmission Range (TR)	P, R, N, D, L
TRANS_F	Transmission system fault Malfunction Indicator Lamp (MIL) illumination	Fault/No Fault
TRAN_RAT	Transmission gear ratio	Ratio
TR_F	Transmission Range (TR) fault status	Fault/No Fault
TR_V	TR	Voltage
TSS	Turbine Shaft Speed (TSS) sensor rpm	rpm
TSS_F	TSS sensor fault status	Fault/No Fault
TSS_SRC	Unfiltered TSS	RPM
VPWR TCM	Transmission Control Module (TCM) supplied voltage	Voltage
VSS	Vehicle speed	MPH
WARMUPS	Number of times the vehicle has reached operating temperature since the DTCs were cleared	Number

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.
5. **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](#).

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](#) in this section for information on condition and symptoms. This chart will be helpful in referring to the correct manual(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 Powertrain Control/Emissions Diagnosis (PC/ED) manual 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 Powertrain Control/Emissions Diagnosis (PC/ED) manual.

NOTE: If a concern still exists after electrical diagnosis, refer to [Diagnosis By Symptom](#) in this section.

If DTCs appear while carrying out the on-board diagnostics, refer to [Diagnostic Trouble Code \(DTC\) Charts](#) in this section 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	<u>TR</u> circuit failure.	<u>TR</u> 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 <u>TR</u> sensor.	Increase in control pressure (harsh shifts). Defaults to D for an invalid position. Malfunction Indicator Lamp (MIL) on.	GO to Pinpoint Test C.
P0707	<u>TR</u> Sensor	<u>TR</u> circuit low input.	<u>TR</u> circuits, indicating an invalid pattern in TR_D. Condition caused by a short to ground in P, R, N, D or L range positions. This DTC can be set by an incorrectly adjusted <u>TR</u> sensor.	Increase in control pressure (harsh shifts). Defaults to D for an invalid position. <u>MIL</u> on.	GO to Pinpoint Test C.
P0708	<u>TR</u> Sensor	<u>TR</u> circuit high input.	<u>TR</u> 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 <u>TR</u> sensor.	Increase in control pressure (harsh shifts). Defaults to D for an invalid position. <u>MIL</u> on.	GO to Pinpoint Test C.
P0711	Transmission Fluid Temperature (TFT)	<u>TFT</u> sensor circuit malfunction.	Incorrect voltage drop across <u>TFT</u> sensor.	Possible firm shift feel.	GO to Pinpoint Test B.
P0712	<u>TFT</u>	157°C (315°F) indicated <u>TFT</u> sensor circuit grounded.	Voltage drop across <u>TFT</u> sensor too low for scale set for temperature 157°C (315°F).	Possible firm shift feel.	GO to Pinpoint Test B.
P0713	<u>TFT</u>	-40°C (-40°F) indicated <u>TFT</u> sensor circuit open.	Voltage drop across <u>TFT</u> sensor too high for scale set temperature -40°C (-40°F).	Possible firm shift feel.	GO to Pinpoint Test B.
P0715	Turbine Shaft Speed (TSS)	Insufficient input from <u>TSS</u> sensor.	Transmission Control Module (TCM) detected a loss of <u>TSS</u> signal	Harsh shifts, no Torque Converter Clutch (TCC) activation and harsh engagement.	GO to Pinpoint Test G.

			during operation.		
P0720	Output Shaft Speed (OSS)	Insufficient input from <u>OSS</u> sensor.	<u>TCM</u> detected a loss of <u>OSS</u> signal during operation.	Harsh shift, possible abnormal shift schedule.	GO to Pinpoint Test F.
P0731	Shift Solenoid A (SSA), Shift Solenoid B (SSB), Shift Solenoid C (SSC), Shift Solenoid D (SSD), Shift Solenoid E (SSE), Shift Solenoid F (SSF) or Internal Parts	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 be higher or lower than expected.	REFER to Solenoid On/Off Charts. GO to Pinpoint Test A.
P0732	<u>SSA</u> , <u>SSB</u> , <u>SSC</u> , <u>SSD</u> , <u>SSE</u> , <u>SSF</u> 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 Pinpoint Test A.
P0733	<u>SSA</u> , <u>SSB</u> , <u>SSC</u> , <u>SSD</u> , <u>SSE</u> , <u>SSF</u> 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 Pinpoint Test A.
P0734	<u>SSA</u> , <u>SSB</u> , <u>SSC</u> , <u>SSD</u> , <u>SSE</u> , <u>SSF</u> 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 Pinpoint Test A.
P0735	<u>SSA</u> , <u>SSB</u> , <u>SSC</u> , <u>SSD</u> , <u>SSE</u> , <u>SSF</u> or Internal Parts	5th gear error.	No 5th 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 Pinpoint Test A.
P0741	<u>ICC</u>	<u>ICC</u> circuit	The <u>TCM</u> picked up	<u>ICC</u> slippage/erratic or	REFER to Diagnosis

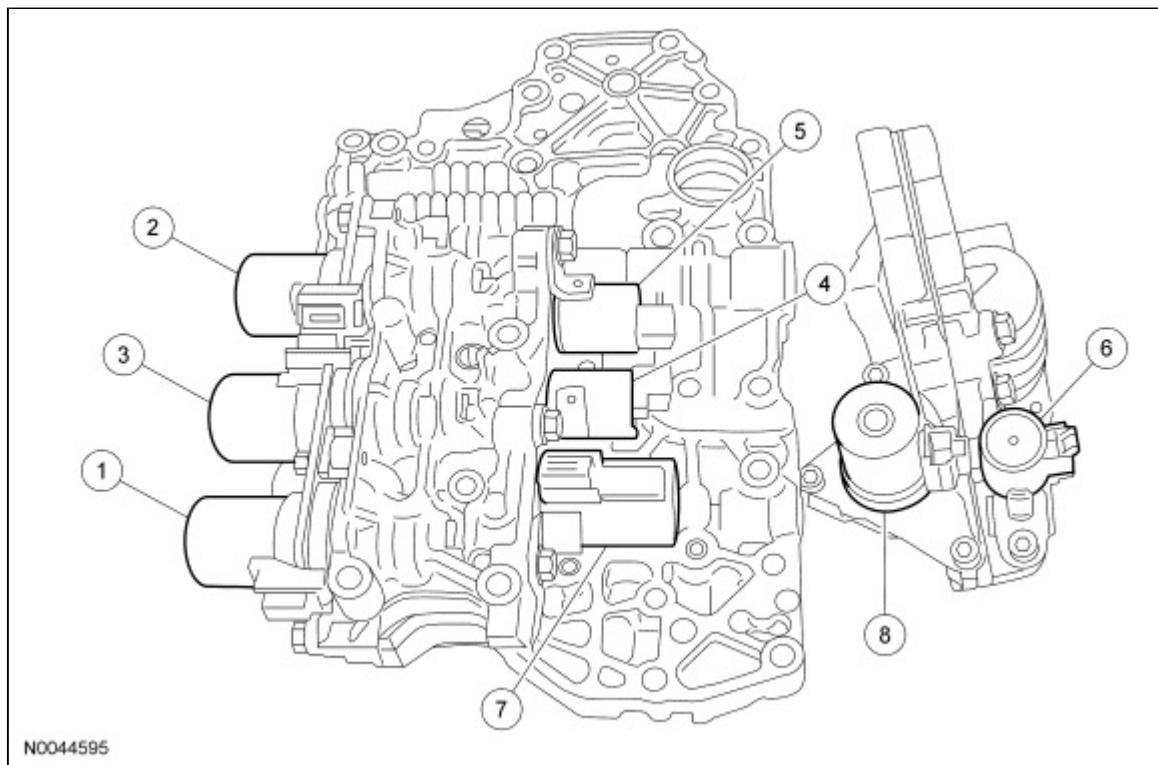
		performance error or stuck off.	an excessive amount of <u>TCC</u> slippage during normal vehicle operation or no engagement.	no <u>TCC</u> operation.	By Symptom .
P0742	<u>TCC</u>	<u>TCC</u> malfunction detected, stuck on.	The <u>TCM</u> picked up <u>TCC</u> engagement during normal vehicle operation.	<u>TCC</u> detected as engaged.	REFER to Diagnosis By Symptom .
P0744	<u>TCC</u>	<u>TCC</u> intermittent malfunction detected.	The <u>TCM</u> picked up <u>TCC</u> slippage during normal vehicle operation.	<u>TCC</u> slippage/erratic.	REFER to Diagnosis By Symptom .
P0745	Pressure Control Solenoid A (PCA) solenoid	<u>PCA</u> circuit failure.	Voltage through <u>PCA</u> solenoid is checked. Error is noted if tolerance is exceeded.	Open circuit causes maximum transmission line pressure, harsh engagement and shifts.	GO to Pinpoint Test D .
P0751	Shift Solenoid A (SSA)	<u>SSA</u> functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present, <u>MIL</u> on.	REFER to Diagnosis By Symptom .
P0752	<u>SSA</u>	<u>SSA</u> functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present, <u>MIL</u> on.	REFER to Diagnosis By Symptom .
P0753	<u>SSA</u>	<u>SSA</u> solenoid circuit failure.	Shift Solenoid Pressure Control A (SSPCA) circuit failed to provide voltage drop across solenoid. Circuit open or shorted or <u>TCM</u> driver failure during On-Board Diagnostic (OBD).	No reverse gear (short) or no 4th gear (open). <u>MIL</u> off.	GO to Pinpoint Test A .
P0756	Shift Solenoid B (SSB)	<u>SSB</u> functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present. No converter clutch apply in 3rd and 4th gears.	REFER to Diagnosis By Symptom .
P0757	<u>SSB</u>	<u>SSB</u> 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 Diagnosis By Symptom .
P0758	<u>SSB</u>	<u>SSB</u> solenoid circuit failure.	<u>SSB</u> circuit fails to provide voltage drop across solenoid. Circuit open or shorted or <u>TCM</u> driver failure during <u>OBD</u> .	Not all gears present. No converter clutch apply in 3rd and 4th gears. <u>MIL</u> off.	GO to Pinpoint Test A .
P0761	Shift Solenoid C (SSC)	<u>SSC</u> functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to Pinpoint Test A .
P0762	<u>SSC</u>	<u>SSC</u> functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to Pinpoint Test A .
P0763	<u>SSC</u>	<u>SSC</u> solenoid circuit failure.	Shift Solenoid Pressure Control C (SSPCC) circuit fails	Not all gears present. <u>MIL</u> off.	GO to Pinpoint Test A .

			to provide voltage drop across solenoid. Circuit open or shorted or <u>TCM</u> driver failure during <u>OBD</u> .		
P0766	<u>SSD</u>	<u>SSD</u> functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to Pinpoint Test A.
P0767	<u>SSD</u>	<u>SSD</u> functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to Pinpoint Test A.
P0768	<u>SSD</u>	<u>SSD</u> solenoid circuit failure.	<u>SSD</u> circuit fails to provide voltage drop across solenoid. Circuit open, shorted or <u>TCM</u> driver circuit failure during <u>OBD</u> .	Not all gears present. <u>MIL</u> off.	GO to Pinpoint Test A.
P0771	<u>SSE</u>	<u>SSE</u> functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to Pinpoint Test A.
P0772	<u>SSE</u>	<u>SSE</u> functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to Pinpoint Test A.
P0773	<u>SSE</u>	<u>SSE</u> solenoid circuit failure.	<u>SSE</u> circuit failed to provide voltage drop across solenoid. Circuit open. Shorted or <u>TCM</u> driver circuit failed during <u>OBD</u> .	Not all gears present. <u>MIL</u> off.	GO to Pinpoint Test A.
P0777	Pressure Control Solenoid B (PCB) solenoid	<u>PCB</u> solenoid stuck on.	Mechanical or hydraulic failure of <u>PCB</u> .	Harsh engagement and shifts.	GO to Pinpoint Test E.
P0778	<u>PCB</u>	<u>PCB</u> solenoid circuit failure.	<u>PCB</u> circuit failed to provide voltage drop across solenoid. Circuit open or shorted or <u>TCM</u> driver failure during on-board diagnostic.	Harsh engagement and shifts.	GO to Pinpoint Test E.
P0791	Intermediate Shaft Speed Sensor	Insufficient input from intermediate shaft speed sensor.	<u>TCM</u> detected a loss of intermediate shaft speed signal during operation.	Harsh shift, possible abnormal shift schedule.	GO to Pinpoint Test E.
P0841	Transmission Fluid Pressure Switch	Transmission fluid pressure switch circuit failure open or shorted.	<u>TCM</u> has detected a loss of transaxle fluid pressure.	Harsh shifts, possible abnormal shift schedule.	GO to Pinpoint Test H.
P0882	<u>TCM</u>	<u>TCM</u> input power circuit voltage low.	<u>TCM</u> has detected a loss of voltage.	<u>MIL</u> on.	For early build vehicles, GO to Pinpoint Test I. For late build vehicles, GO to Pinpoint Test J.

P0894	Internal Parts	Transaxle component slipping.	Transaxle can not engage forward clutch.	<u>MIL</u> on.	REFER to Diagnosis By Symptom .
P1783	<u>TFT</u>	Transmission overtemp condition indicated.	Transmission fluid temperature exceeded 135°C (275°F).	Increase in control pressure.	GO to Pinpoint Test B .
P2707	<u>SSF</u>	<u>SSF</u> functional failure (stuck off).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to Pinpoint Test A .
P2708	<u>SSF</u>	<u>SSF</u> functional failure (stuck on).	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present, <u>MIL</u> off.	GO to Pinpoint Test A .
P2709	<u>SSF</u>	<u>SSF</u> solenoid circuit failure.	<u>SSF</u> circuit fails to provide voltage drop across solenoid. Circuit open. Shorted or <u>TCM</u> driver circuit failed during <u>OBD</u> .	Not all gears present, <u>MIL</u> off.	GO to Pinpoint Test A .
P0604	<u>TCM</u>	Internal <u>TCM</u> error.	<u>TCM</u> Random Access Memory (RAM) error.	<u>MIL</u> on.	INSTALL a new <u>TCM</u> .
P0605	<u>TCM</u>	Internal <u>TCM</u> error.	<u>TCM</u> Read-Only Memory (ROM) error.	<u>MIL</u> on.	INSTALL a new <u>TCM</u> .
U0073	Controller Area Network (CAN)	<u>TCM</u> communication bus off.	No bus signal received from <u>TCM</u> .	Possible firm shift feel.	REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual.
U0100	<u>CAN</u>	Lost communication with PCM.	Bus signal not received from PCM.	Possible firm shift feel.	REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual.

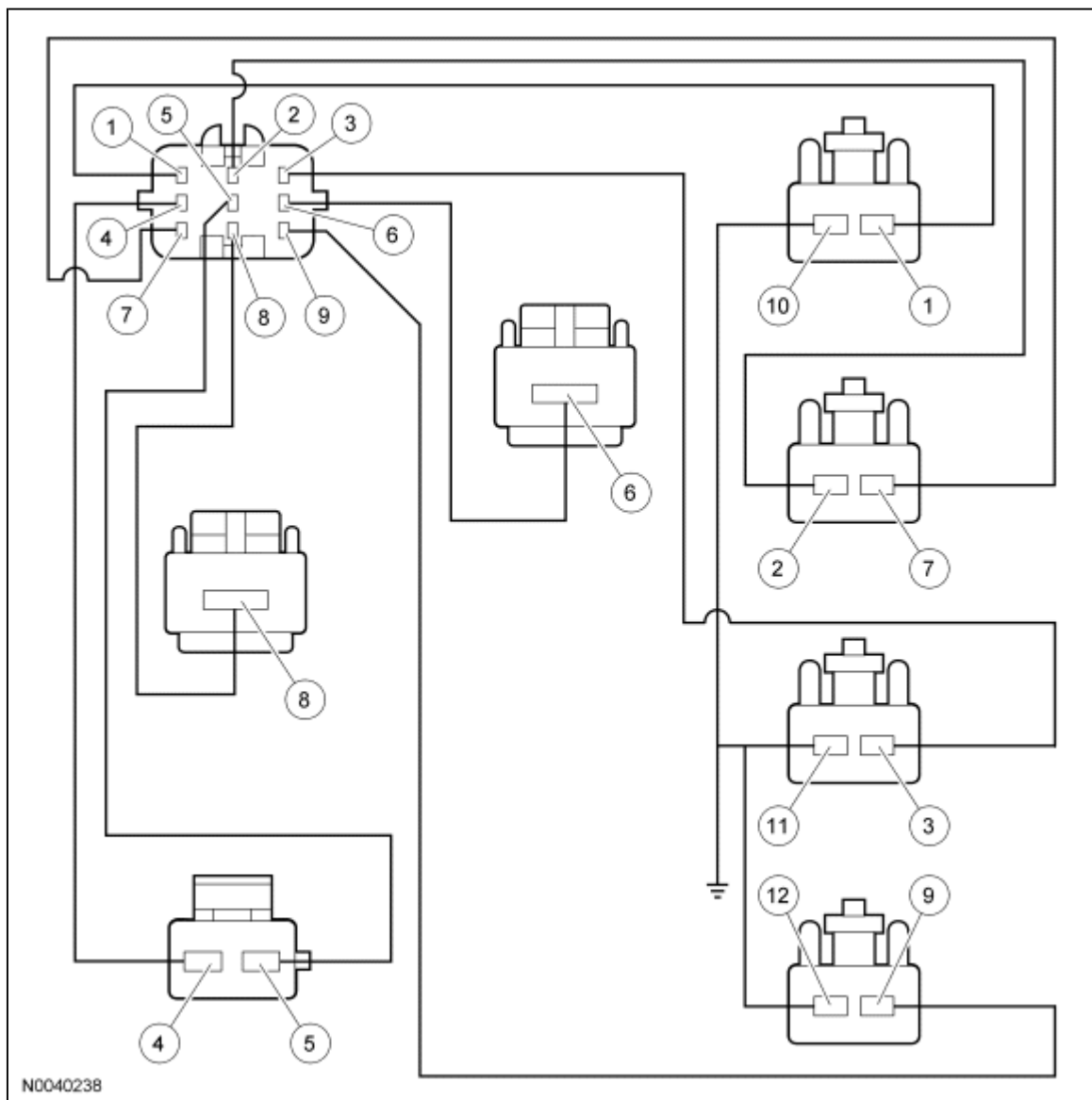
Transaxle Connector Layouts

Transaxle Solenoid Location



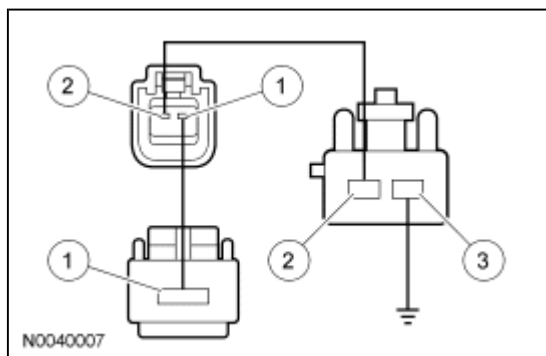
Item	Description
1	Shift Solenoid A (SSA)
2	Shift Solenoid B (SSB)
3	Shift Solenoid C (SSC)
4	Shift Solenoid D (SSD)
5	Shift Solenoid E (SSE)
6	Shift Solenoid F (SSF)
7	Pressure Control Solenoid A (PCA)
8	Pressure Control Solenoid B (PCB)

Transaxle Main Valve Body Internal Harness C1534



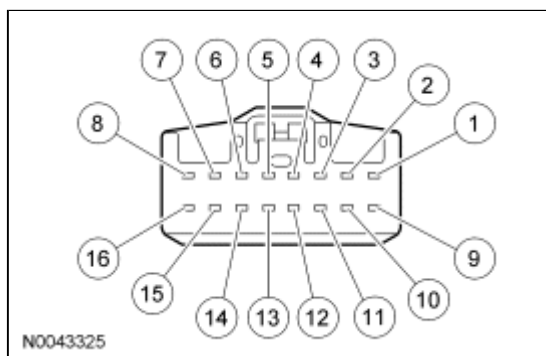
Pin	Circuit Function	Connector Color
1	Shift Solenoid Pressure Control C (SSPCC)	Green
2	Pressure Control Solenoid A (PCA)	Black
3	Shift Solenoid Pressure Control A (SSPCA)	White
4	Transmission Fluid Temperature (TFT) SIGRTN	Black
5	<u>TFT</u>	Black
6	Shift Solenoid D (SSD)	White
7	<u>PCA</u>	Black
8	Shift Solenoid E (SSE)	Black
9	Shift Solenoid B (SSB)	Blue
10	Shift Solenoid C (SSC) GROUND	Green
11	Shift Solenoid A (SSA) GROUND	White
12	Shift Solenoid B (SSB) GROUND	Blue

Transaxle 5th Gear Valve Body Internal Harness Connectors



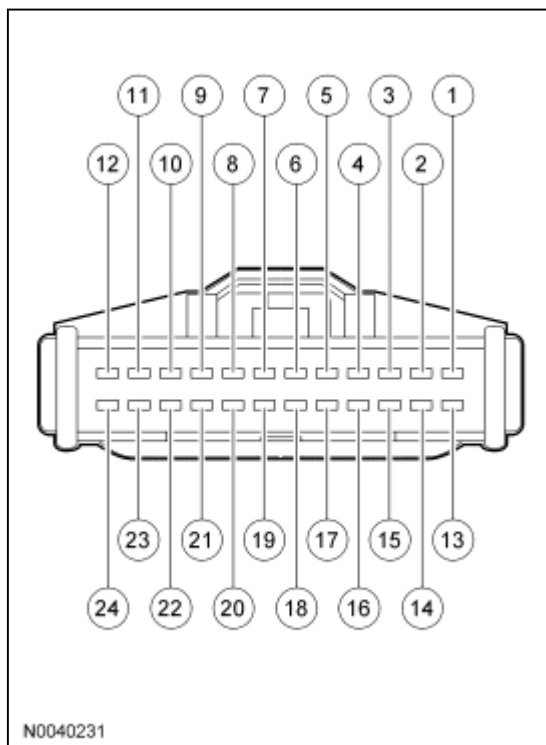
Pin	Circuit Function	Connector Color
1	Shift Solenoid F (SSF)	Black
2	Pressure Control Solenoid B (PCB)	Black
3	<u>PCB</u> Ground	Black

Transmission Control Module (TCM) C2352A



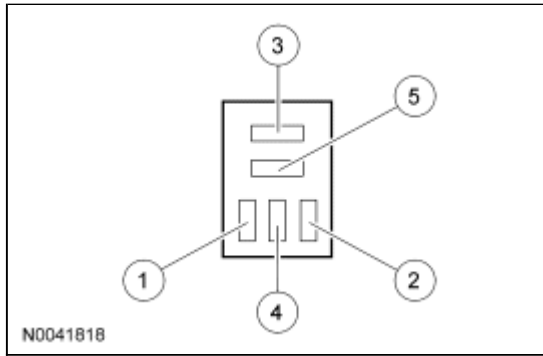
Pin Number	Circuit Function
1	Ground
2	VPWR
3	VPWR
4	—
5	Pressure Control Solenoid A (PCA)-
6	<u>PCA</u> +
7	Shift Solenoid Pressure Control C (SSPCC)
8	Shift Solenoid Pressure Control A (SSPCA)
9	Ground
10	VPWR
11	—
12	Shift Solenoid F (SSF)
13	Shift Solenoid E (SSE)
14	Shift Solenoid D (SSD)
15	Pressure Control Solenoid B (PCB)
16	Shift Solenoid Pressure Control B (SSPCB)

Transmission Control Module (TCM) C2352B



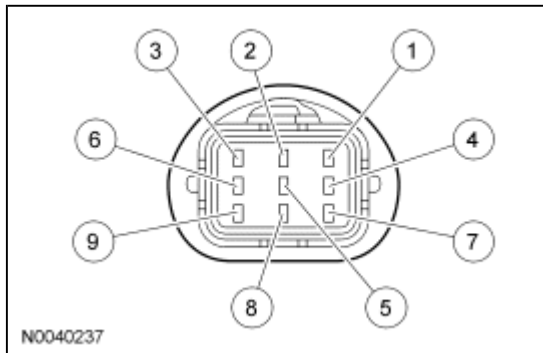
Pin Number	Circuit Function
1	Controller Area Network (CAN)+
2	—
3	—
4	—
5	Transmission Fluid Temperature (TFT)/ Transmission Range (TR) signal return
6	<u>TFT</u>
7	Turbine Shaft Speed (TSS) signal return
8	<u>TSS</u> signal
9	—
10	—
11	—
12	—
13	<u>CAN -</u>
14	—
15	—
16	Transmission Control Module (TCM) relay ground
17	Output Shaft Speed (OSS) signal
18	—
19	Intermediate shaft speed signal
20	Transmission fluid pressure signal
21	<u>TR</u> sensor
22	—
23	—
24	—

Transmission Control Module (TCM) Relay (Power Distribution Box (PDB) Side)



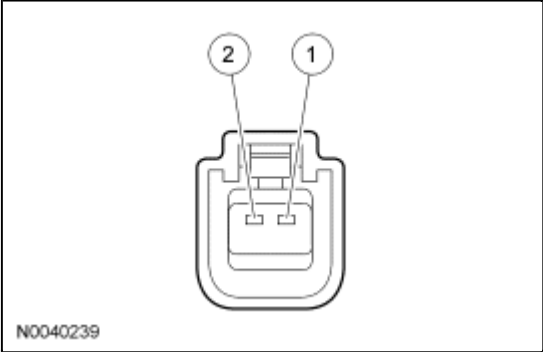
Pin Number	Circuit Function
1	Coil voltage
2	Ground
3	Voltage supplied at all times (overload protected)
4	Empty
5	Transmission Control Module (TCM) relay, output

Transaxle Main Valve Body Vehicle Harness C1534



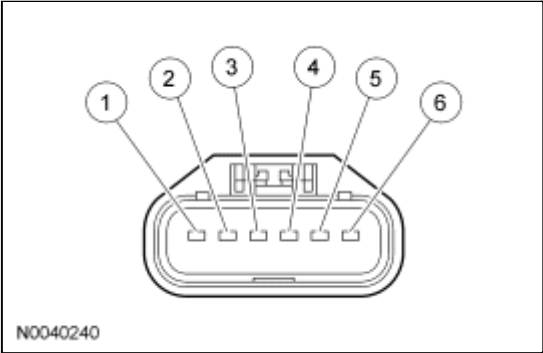
Pin Number	Circuit Function
1	Shift Solenoid Pressure Control C (SSPCC)
2	Pressure Control Solenoid A (PCA)+
3	Shift Solenoid Pressure Control A (SSPCA)
4	Transmission Fluid Temperature (TFT) signal return
5	<u>TFT</u>
6	Shift Solenoid D (SSD)
7	<u>PCA</u> -
8	Shift Solenoid E (SSE)
9	Shift Solenoid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

Transaxle 5th Gear Valve Body Vehicle Harness C1535



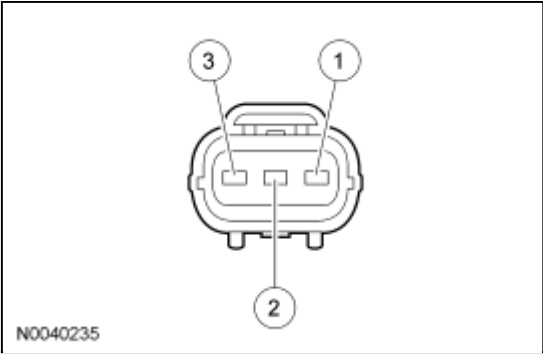
Pin Number	Circuit Function
1	Shift Solenoid F (SSF)
2	Pressure Control Solenoid B (PCB)

Transmission Range (TR) Sensor Vehicle Harness C1537



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

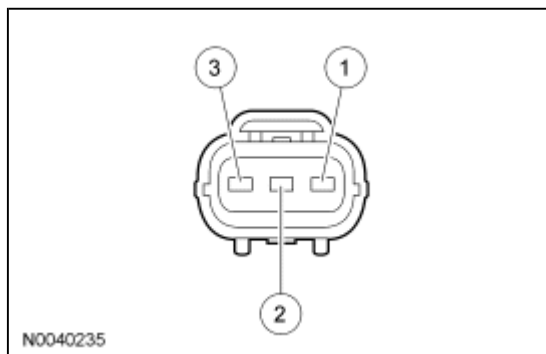
Output Shaft Speed (OSS) Sensor Vehicle Harness C193



Pin Number	Circuit Function

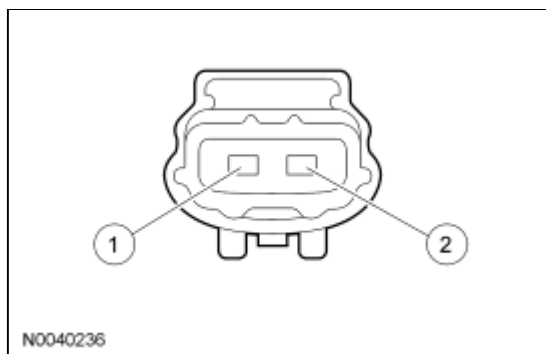
1	Ground
2	Output Shaft Speed (OSS) sensor signal
3	VPWR

Intermediate Shaft Speed Sensor Vehicle Harness C1088



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

Turbine Shaft Speed (TSS) Sensor Vehicle Harness C143






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

Special Tool(s)

 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.

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

With a on/off solenoid, OFF = No Hydraulic Flow.

With a PWM solenoid, OFF = Full Hydraulic Flow.

With a PWM solenoid, OFF = Full Hydraulic Flow.

PCA and PCB PWM solenoid percentage varies through all gears.

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 Powertrain Control/Emissions Diagnosis (PC/ED) manual.

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](#) in this section for information on condition and symptoms. This chart will be helpful in referring to the correct manual(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 Powertrain Control/Emissions Diagnosis (PC/ED) manual will aid in diagnosing non-transaxle electronic components.

Pinpoint Tests

Refer to Wiring Diagrams Cell [30](#) 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](#) in this section.

NOTE: Refer to the Transaxle 5th Gear Valve Body Vehicle Harness Connector illustration [Transaxle Connector Layouts](#) in this section.

Test Step	Result / Action to Take
A1 ELECTRONIC DIAGNOSTICS SETUP	
<ul style="list-style-type: none">• Ignition OFF.• 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 scan tool.• Ignition ON.	<p>Yes REMAIN in DataLogger Mode. GO to A2.</p> <p>No REPEAT procedure to enter DataLogger Mode. If vehicle did not enter DataLogger Mode,</p>

<ul style="list-style-type: none">Enter the following diagnostic mode on the scan tool: DataLogger.Does vehicle enter DataLogger Mode?	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis of PCM.												
A2 WIGGLE TEST													
<ul style="list-style-type: none">Remain in DataLogger Mode.Select the following PIDs to be monitored:<ul style="list-style-type: none">SSPCASSPCBSSPCCSSDSSESSFStart 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													
<ul style="list-style-type: none">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													
<ul style="list-style-type: none">Select GEAR PID for Shift Solenoids, pre-qualifications for GEAR in Drive Mode are listed prior to these pinpoint tests in this section.Select TCC PID for Torque Converter Clutch (TCC), pre-qualifications for TCC in Drive Mode are listed prior to these pinpoint tests in this section.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													
<ul style="list-style-type: none">Ignition OFF.Disconnect: Transaxle Main Valve Body Vehicle Harness C1534.Disconnect: Transaxle 5th Gear Valve Body Vehicle Harness C1535.Ignition ON.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: <table border="1"><thead><tr><th>Transaxle Main Valve Body Vehicle Harness C1534 and Transaxle 5th Gear Valve Body Vehicle Harness C1535</th><th>Shift Solenoid</th><th>Ground</th></tr></thead><tbody><tr><td>C1534-3, circuit VET13 (GY/BU)</td><td>Shift Solenoid Pressure Control A (SSPCA)</td><td>Ground</td></tr><tr><td>C1534-9, circuit VET14 (VT/GN)</td><td>Shift Solenoid Pressure Control B (SSPCB)</td><td>Ground</td></tr><tr><td>C1534-1, circuit VET15 (YE/GY)</td><td>Shift Solenoid Pressure Control C (SSPCC)</td><td>Ground</td></tr></tbody></table>	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 (SSPCC)	Ground	Yes GO to A7 . No GO to A6 .
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 (SSPCC)	Ground											

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)	<u>SSF</u>	Ground

- Is the voltage greater than 10 volts?

A6 CHECK FOR SHORTS TO GROUND

- Ignition OFF.
- 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)	<u>SSPCA</u>	Ground
C1534-9, circuit VET14 (VT/GN)	<u>SSPCB</u>	Ground
C1534-1, circuit VET15 (YE/GY)	<u>SSPCC</u>	Ground
C1534-6, circuit CET18 (GY/YE)	<u>SSD</u>	Ground
C1534-8, circuit CET19 (VT/GY)	<u>SSE</u>	Ground
C1535-1, CET44 (BU/BN)	<u>SSF</u>	Ground

- Are the resistances greater than 10,000 ohms?

A7 CHECK FOR SHORT TO BATTERY VOLTAGE

- Disconnect: Transmission Control Module (TCM) C2352a.
- Ignition ON.
- 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)	<u>SSPCA</u>	Ground
C1534-9, circuit VET14 (VT/GN)	<u>SSPCB</u>	Ground
C1534-1, circuit VET15 (YE/GY)	<u>SSPCC</u>	Ground
C1534-6, circuit CET18 (GY/YE)	<u>SSD</u>	Ground
C1534-8, circuit CET19 (VT/GY)	<u>SSE</u>	Ground
C1535-1, circuit CET44 (BU/BN)	<u>SSF</u>	Ground

- Is any voltage present?

A8 CHECK FOR OPENS

- Ignition OFF.
- 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:

--	--	--

Yes

GO to [A8](#).

No

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

Yes

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

No

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

Yes

GO to [A9](#).

No

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

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?

A9 ELECTRICAL SIGNAL CHECK

- Connect: **TCM C2352A**.
- Ignition ON.
- Enter the following diagnostic mode on the scan 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
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?

A10 CHECK SOLENOID RESISTANCE

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

--	--

Yes
GO to [A10](#).

No
INSTALL a new **TCM**. TEST the system for normal operation.

Yes
If **SSPCA**, **SSPCB** or **SSPCC** solenoid is suspected, GO to [A11](#).
If **SSD**, **SSE** or **SSF** solenoid is suspected, GO to [A12](#).

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

- Are the resistances within specification?

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

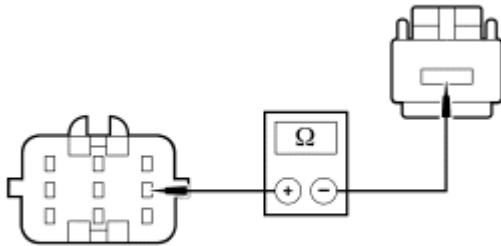
INSTALL a new SSPCA, SSPCB or SSPCC solenoid. TEST the system for normal operation.

No

GO to [A12](#).

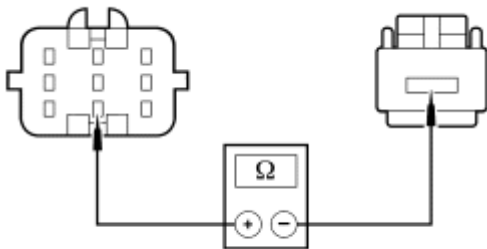
A12 CHECK THE TRANSAXLE MAIN VALVE BODY INTERNAL HARNESS FOR AN OPEN

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



N0083607

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



N0083608

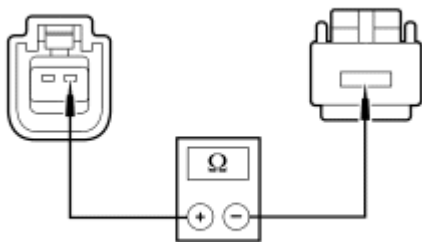
- Measure the resistance between transaxle 5th gear valve body internal harness C1535-1 and suspected solenoid

Yes

GO to [A13](#).

No

INSTALL a new transaxle main valve body internal harness. TEST the system for normal operation.

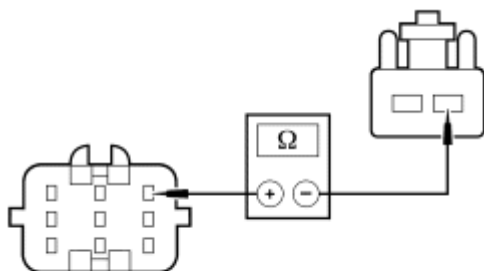


N0083609

- Are the resistances less than 5 ohms?

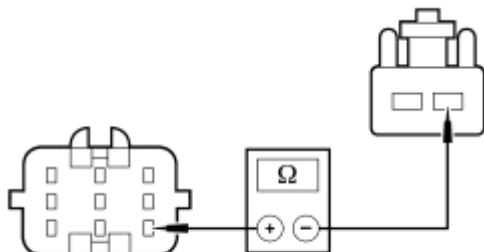
A13 CHECK THE TRANSAXLE INTERNAL HARNESS FOR AN OPEN

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



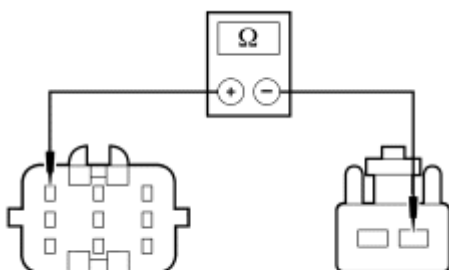
N0083610

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



N0083611

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



N0083612

- Are the resistances less than 5 ohms?

Yes

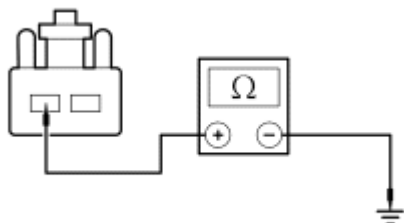
GO to [A14](#).

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

- 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.



TIE0018556

- 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.

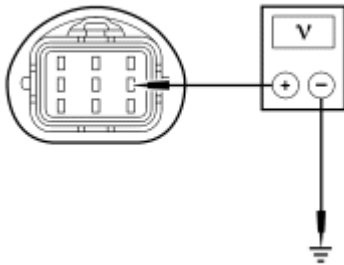
PINPOINT TEST B: **TFT** SENSOR

NOTE: Refer to the Transaxle Main Valve Body Vehicle Harness Connector illustration [Transaxle Connector Layouts](#) in this section.

Test Step	Result / Action to Take
B1 ELECTRONIC DIAGNOSTIC SETUP	
<ul style="list-style-type: none"> • Ignition OFF. • 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 scan tool. • Ignition ON. • Enter the following diagnostic mode on the scan tool: DataLogger Mode. • Select the following PIDs: TFT and TFTV to monitor. • Does the vehicle enter DataLogger Mode? 	<p>Yes REMAIN in DataLogger Mode. GO to B2.</p> <p>No REPEAT procedure to enter DataLogger Mode. If vehicle did not enter DataLogger Mode, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis of PCM.</p>
B2 WARM-UP/COOL-DOWN CYCLE VERIFICATION	
<ul style="list-style-type: none"> • 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? 	<p>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 in this section 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.</p> <p>No GO to B3.</p>

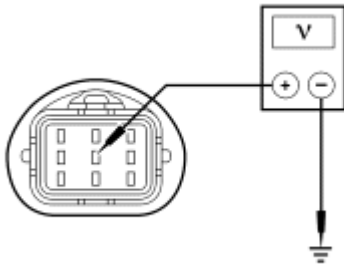
B3 CHECK THE **TCM** AND TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS FOR POWER

- Ignition OFF.
- Disconnect: Transaxle Main Valve Body Vehicle Harness C1534.
- Visually inspect all wires and connectors for damage.
- Ignition ON.
- Measure the voltage between transaxle main valve body vehicle harness C1534-4, circuit VET28 (GY/VT), harness side and ground.



N0083613

- Measure the voltage between transaxle main valve body vehicle harness C1534-5, circuit VET27 (BN/YE), harness side and ground.



N0083614

- 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

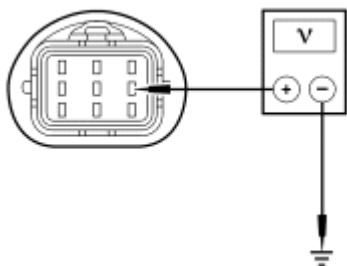
- Ignition OFF.
- Disconnect: Transmission Control Module (TCM) C2352b.
- Visually inspect all wires and connectors for damage.
- Ignition ON.
- Measure the voltage between transaxle main valve body vehicle harness C1534-4, circuit VET28 (GY/VT), harness side and ground.

Yes

REPAIR the circuit for a short to power. TEST the system for normal operation.

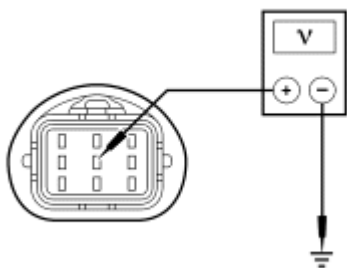
No

INSTALL a new **TCM**. TEST the system for normal operation.



N0083613

- Measure the voltage between transaxle main valve body vehicle harness C1534-5, circuit VET27 (BN/YE), harness side and ground.

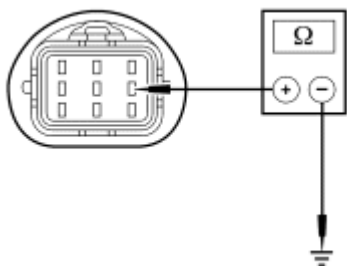


N0083614

- Is the voltage greater than 10 volts?

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

- Ignition OFF.
- Connect: TCM C2352B.
- Visually inspect all wires and connectors for damage.
- Measure the resistance between transaxle main valve body vehicle harness C1534-4, circuit VET28 (GY/VT), harness side and ground.

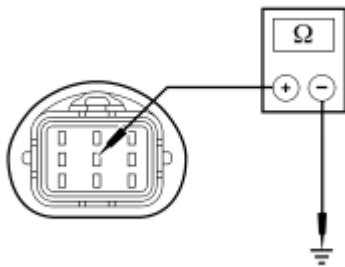


N0083615

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

Yes
GO to [B7](#).

No
GO to [B6](#).

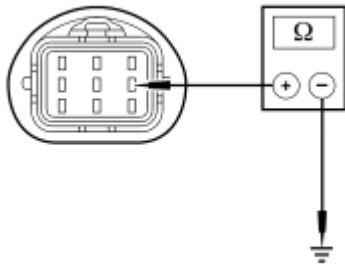


N0083616

- Are the resistances greater than 10,000 ohms?

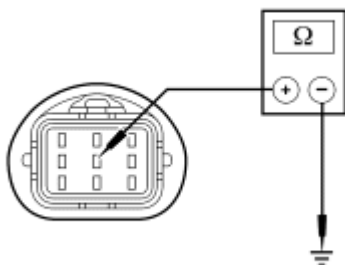
B6 CHECK THE TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS C1534 FOR A SHORT TO GROUND

- Disconnect: [TCM](#) C2352B.
- Visually inspect all wires and connectors for damage.
- Measure the resistance between transaxle main valve body vehicle harness C1534-4, circuit VET28 (GY/VT), harness side and ground.



N0083615

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



N0083616

- Are the resistances greater than 10,000 ohms?

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

- 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).

Yes

INSTALL a new [TCM](#). TEST the system for normal operation.

No

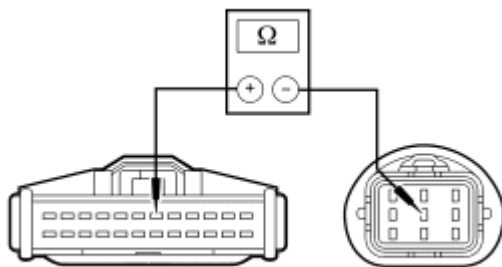
REPAIR the circuit for a short to ground. TEST the system for normal operation.

Yes

GO to [B8](#).

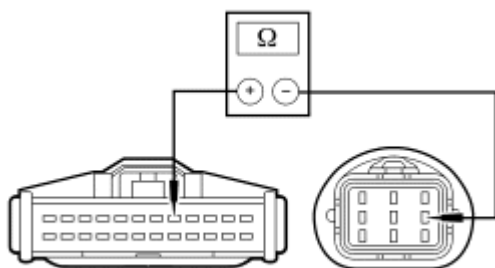
No

REPAIR the circuit. TEST the system for normal operation.



N0053697

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

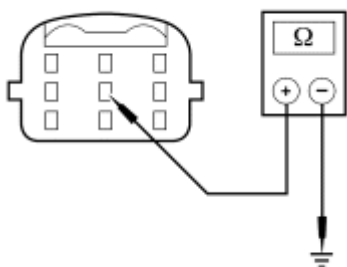


N0053698

- Are the resistances less than 5 ohms?

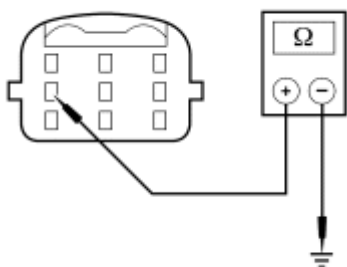
B8 CHECK THE TRANSAXLE MAIN VALVE BODY INTERNAL HARNESS FOR A SHORT TO GROUND

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



N0083617

- Measure the resistance between transaxle main valve body internal harness C1534-4 and ground.



N0083618

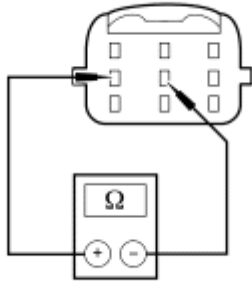
- Are the resistances greater than 10,000 ohms?

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

- Measure the resistance between transaxle main valve body internal harness C1534-5 and C1534-4.



N0053699

- 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.

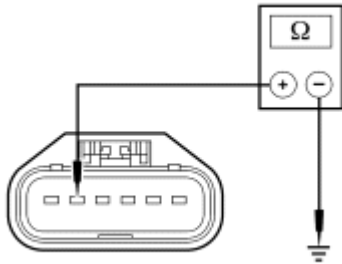
PINPOINT TEST C: **TR** SENSOR

NOTE: Refer to the Transmission Range (TR) Sensor Connector illustration [Transaxle Connector Layouts](#) in this section.

NOTE: Refer to the Transmission Range (TR) Sensor Diagnosis Chart [Transaxle Connector Layouts](#) in this section.

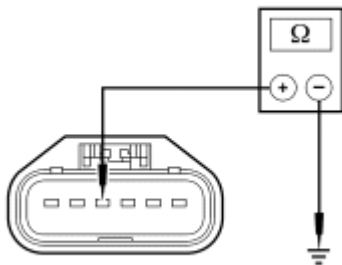
Test Step	Result / Action to Take
C1 VERIFY TR SENSOR ALIGNMENT	
<ul style="list-style-type: none"> • Verify the Transmission Range (TR) sensor alignment. • Is the TR sensor correctly aligned? 	<p>Yes GO to C2.</p> <p>No ADJUST the TR sensor. REFER to Transmission Range (TR) Sensor Adjustment in this section. TEST the system for normal operation.</p>
C2 VERIFY THE SELECTOR LEVER CABLE/LINKAGE ADJUSTMENT	
<ul style="list-style-type: none"> • Verify that the selector lever cable/linkage is correctly adjusted. Refer to Section 307-05. • Is the selector lever cable/linkage correctly adjusted? 	<p>Yes GO to C3.</p> <p>No ADJUST the selector lever cable/linkage. REFER to Section 307-05. TEST the system for normal operation.</p>
C3 CHECK THE TR SENSOR CIRCUITRY FOR A SHORT TO GROUND	

- Ignition OFF.
- Disconnect: **TR** Sensor C1537.
- Disconnect: Transmission Control Module (TCM) C2352B.
- Measure the resistance between **TR** sensor C1537-2, circuit VET28 (GY/VT) and ground.



N0083619

- Measure the resistance between C1537-3, circuit CET37 (BN/WH) and ground.

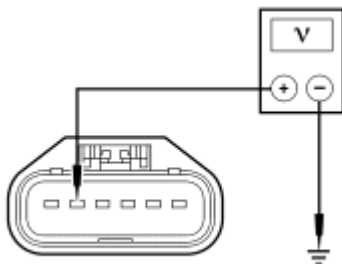


N0083620

- Is the resistance greater than 10,000 ohms?

C4 CHECK THE **TR** SENSOR CIRCUITRY FOR A SHORT TO POWER

- Disconnect: Transaxle C1534.
- Ignition ON.
- Measure the voltage between **TR** sensor C1537-2, circuit VET28 (GY/VT) and ground.



N0083625

- Measure the voltage between **TR** sensor C1537-3, circuit CET37 (BN/WH) and ground.

Yes

GO to [C4](#).

No

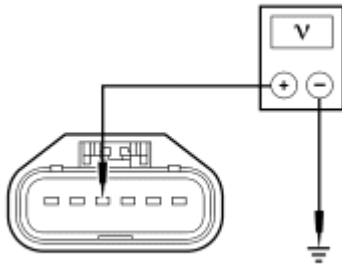
REPAIR the circuit in question for an open. TEST the system for normal operation.

Yes

REPAIR the circuit in question for a short to power. TEST the system for normal operation.

No

GO to [C5](#).

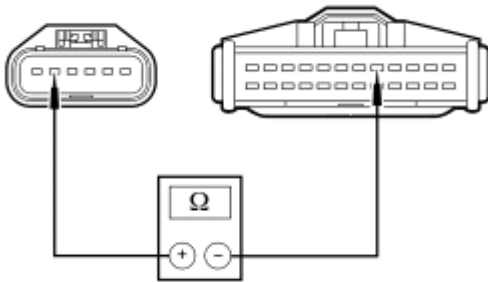


N0083626

- Is the voltage greater than 10 volts?

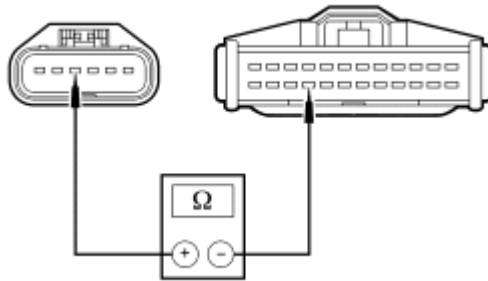
C5 CHECK THE **TR** SENSOR CIRCUITRY FOR AN OPEN

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



N0053700

- Measure the resistance between **TR** sensor C1537-3, circuit CET37 (BN/WH) and **TCM** C2352B-21, circuit CET37 (BN/WH).



N0053701

- Are the resistances less than 5 ohms?

C6 CHECK THE **TR** SENSOR RESISTANCE

- 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

Yes

GO to [C6](#).

No

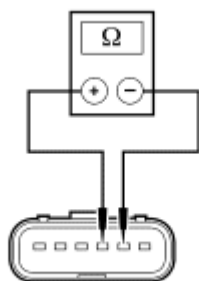
REPAIR the circuit in question. TEST the system for normal operation.

Yes

INSTALL a new **TCM**. TEST the system for normal operation.

No

INSTALL a new **TR** sensor. REFER to [Transmission Range \(TR\) Sensor](#) in this section. TEST the system for normal operation.



N0072355

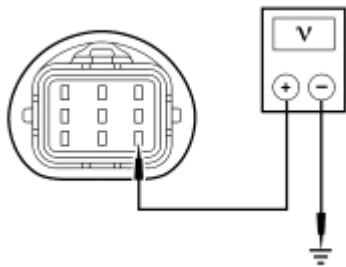
- Are the resistances within the expected values?

PINPOINT TEST D: ELECTRONIC **PCA**

NOTE: Refer to the Transaxle Main Valve Body Vehicle Harness Connector illustration [Transaxle Connector Layouts](#) in this section.

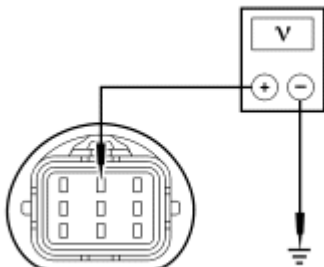
NOTE: Read and record all DTCs. All Transmission Range (TR) sensor and Output Shaft Speed (OSS) DTCs must be repaired before entering output state control.

Test Step	Result / Action to Take
D1 ELECTRONIC DIAGNOSTICS SETUP	
<ul style="list-style-type: none"> • Ignition OFF. • 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 scan tool. • Start vehicle • Enter the following diagnostic mode on the scan tool: DataLogger Mode. • Does the vehicle enter the DataLogger Mode? 	<p>Yes REMAIN in DataLogger Mode. GO to D2.</p> <p>No REPEAT procedure to ENTER DataLogger Mode. If vehicle did not enter output state control, REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis of Transmission Control Module (TCM).</p>
D2 SOLENOID FUNCTIONAL TEST	
<ul style="list-style-type: none"> • 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? 	<p>Yes CLEAR DTCs. TEST the system for normal operation.</p> <p>No GO to D3.</p>
D3 CHECK THE TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS AND PCM FOR A SHORT TO POWER	
<ul style="list-style-type: none"> • Ignition OFF. • Disconnect: Transaxle C1534. • Visually inspect all wires and connectors for damage. • Ignition ON. • Measure the voltage between transaxle main valve body vehicle harness C1534-7, circuit CET42 (GN/VT) and ground. 	<p>Yes GO to D4.</p> <p>No GO to D5.</p>



N0083627

- Measure the voltage between transaxle main valve body vehicle harness C1534-2, circuit CET43 (GY) and ground.

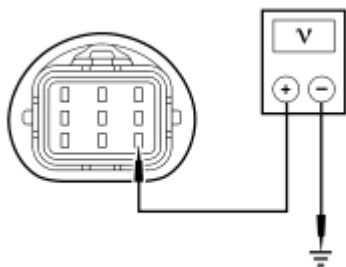


N0083628

- Is the voltage greater than 10 volts?

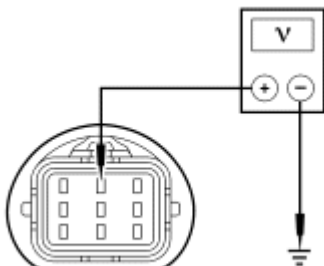
D4 CHECK THE TRANSAXLE MAIN VALVE BODY VEHICLE HARNESS FOR A SHORT TO POWER

- Ignition OFF.
- Disconnect: **TCM** C2352B.
- Ignition ON.
- Measure the voltage between transaxle main valve body vehicle harness C1534-7, circuit CET42 (GN/VT) and ground.



N0083627

- Measure the voltage between transaxle main valve body vehicle harness C1534-2, circuit CET43 (GY) and ground.



N0083628

Yes

REPAIR the circuit for a short to power. TEST the system for normal operation.

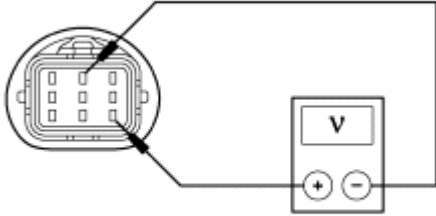
No

INSTALL a new **TCM**. TEST the system for normal operation.

- Is the voltage greater than 10 volts?

D5 CHECK THE ELECTRICAL SIGNAL

- 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).



E0011602

- START vehicle.
- Activate solenoids (ON and OFF) while monitoring the voltage reading.
- Enter the following diagnostic mode on the scan tool:
DataLogger Mode.
- Select PCA PID.
- Select a value 50-150 psi.
- Select another value 50-150 psi.
- **Does the voltage change?**

Yes

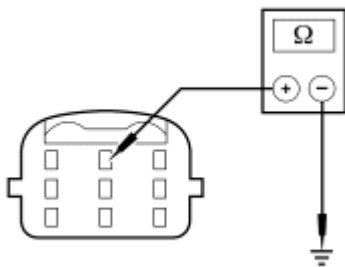
GO to [D6](#).

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

- Ignition OFF.
- Disconnect: Pressure Control Solenoid A (PCA) Solenoid Electrical Connector.
- Measure the resistance between transaxle main valve body internal harness C1534-2 (component side, transaxle internal harness), and ground.



N0083629

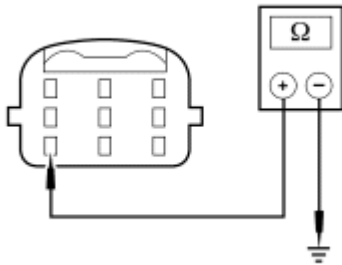
- Measure the resistance between transaxle main valve body internal harness C1534-7 (component side, transaxle internal harness), and ground.

Yes

GO to [D7](#).

No

INSTALL a new transaxle main valve body internal harness. TEST the system for normal operation.

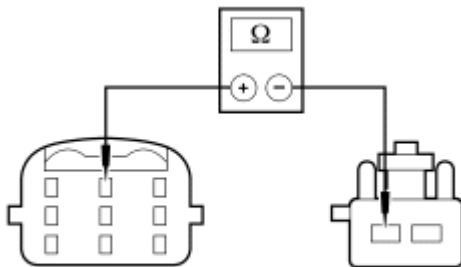


N0083630

- Are the resistances greater than 10,000 ohms?

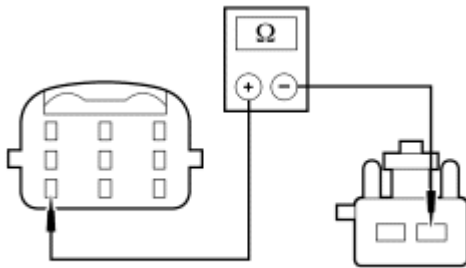
D7 CHECK THE TRANSAXLE MAIN VALVE BODY INTERNAL HARNESS FOR AN OPEN

- 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.



N0083632

- 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.



N0083631

- Are the resistances less than 5 ohms?

D8 CHECK SOLENOID RESISTANCE AT THE SOLENOID

- 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.

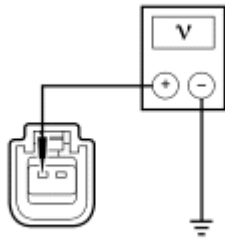
No
INSTALL a new [PCA](#) solenoid. TEST the system for normal operation.

PINPOINT TEST E: ELECTRONIC [PCB](#)

NOTE: Refer to the Transaxle 5th Gear Valve Body Vehicle Harness Connector illustration [Transaxle Connector Layouts](#) in this section.

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.

Test Step	Result / Action to Take
E1 ELECTRONIC DIAGNOSTICS SETUP	
<ul style="list-style-type: none">• Ignition OFF.• 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 scan tool.• Start the engine.• Enter the following diagnostic mode on the scan tool: DataLogger Mode.• Does the vehicle enter the DataLogger Mode?	<p>Yes REMAIN in DataLogger Mode. GO to E2.</p> <p>No REPEAT procedure to ENTER DataLogger Mode. If vehicle did not enter DataLogger Mode, REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis of Transmission Control Module (TCM).</p>
E2 SOLENOID FUNCTIONAL TEST	
<ul style="list-style-type: none">• 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?	<p>Yes CLEAR DTCs. TEST the system for normal operation.</p> <p>No GO to E3.</p>
E3 CHECK THE TRANSAXLE 5TH GEAR VALVE BODY VEHICLE HARNESS AND TCM FOR A SHORT TO POWER	
<ul style="list-style-type: none">• Ignition OFF.• Disconnect: Transaxle 5th Gear Valve Body Vehicle Harness C1535.• Visually inspect all wires and connectors for damage.• Ignition ON.• Measure the voltage between transaxle 5th gear valve body vehicle harness C1535-2, circuit CET45 (YE/BU) and ground.	<p>Yes GO to E4.</p> <p>No GO to E5.</p>

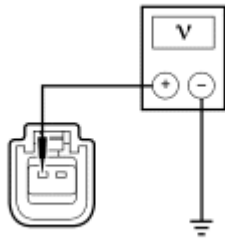


N0040006

- Is the voltage greater than 10 volts?

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

- Ignition OFF.
- Disconnect: **TCM** C2352A.
- Ignition ON.
- Measure the voltage between transaxle 5th gear valve body vehicle harness C1535-2, circuit CET45 (YE/BU) and ground.

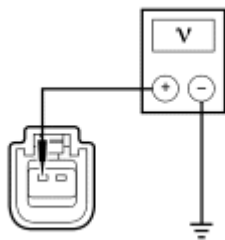


N0040006

- Is the voltage greater than 10 volts?

E5 CHECK THE ELECTRICAL SIGNAL

- Measure the voltage between transaxle 5th gear valve body vehicle harness C1535-2, circuit CET45 (YE/BU) and ground.



N0040006

- Enter the following diagnostic mode on the scan 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?

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

- Ignition OFF.
- Disconnect: Pressure Control Solenoid B (PCB) Solenoid

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.

Yes

GO to [E6](#).

No

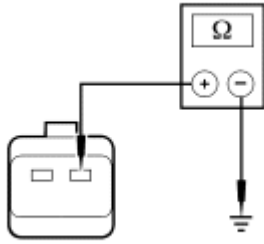
CHECK for open or short circuit in harness or **TCM**.

Yes

GO to [E7](#).

Electrical Connector.

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



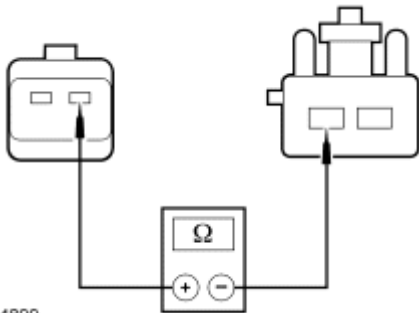
N0072357

- Is the resistance greater than 10,000 ohms?

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

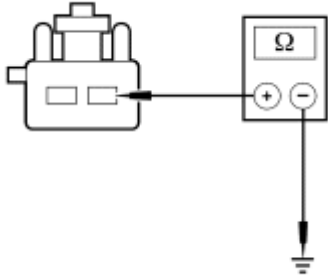
E7 CHECK THE TRANSAXLE INTERNAL HARNESS FOR AN OPEN

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



N0084899

- Measure the resistance between ground and **PCB** component connector pin 3.



N0083634

- 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

- 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

Yes

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

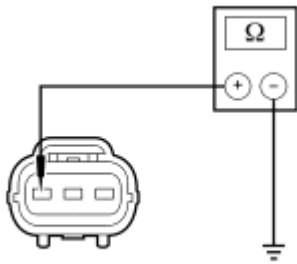
REFER to [Diagnosis By Symptom](#) for diagnosis of pressure concerns. TEST the system for normal operation.

No
INSTALL a new [PCB](#) solenoid. TEST the system for normal operation.

PINPOINT TEST F: INTERMEDIATE SHAFT SPEED SENSOR AND [OSS](#) SENSOR

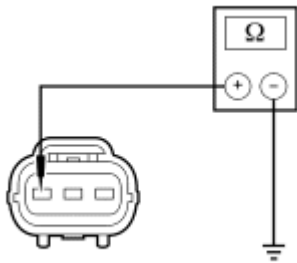
NOTE: Refer to the Intermediate Shaft Speed Sensor and Output Shaft Speed (OSS) Sensor Connector illustrations [Transaxle Connector Layouts](#) in this section.

Test Step	Result / Action to Take
F1 ELECTRONIC DIAGNOSTICS SETUP	
<ul style="list-style-type: none"> • 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 scan tool. • Start the engine. • Enter the following diagnostic mode on the scan tool: DataLogger Mode. • Select the intermediate shaft speed or OSS sensor PID. • Does vehicle enter DataLogger Mode? 	<p>Yes REMAIN in DataLogger Mode. GO to F2.</p> <p>No REPEAT procedure to ENTER DataLogger Mode. If vehicle did not enter DataLogger Mode, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis of Transmission Control Module (TCM).</p>
F2 DRIVE CYCLE TEST	
<ul style="list-style-type: none"> • 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? 	<p>Yes GO to F3.</p> <p>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.</p>
F3 DRIVE CYCLE TEST ERRATIC	
<ul style="list-style-type: none"> • 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)? 	<p>Yes If the sensor signal is erratic, INSPECT for intermittent concern in the harness, sensor or connector. GO to F4.</p> <p>No CLEAR all DTCs. RERUN On-Board Diagnostic (OBD).</p>
F4 CHECK THE SENSOR BATTERY SUPPLY CIRCUIT FOR A SHORT TO GROUND	
<ul style="list-style-type: none"> • Ignition OFF. • Disconnect: Intermediate Shaft Speed Sensor C1088. • Disconnect: OSS Sensor C193. • Disconnect: TCM C2352a. • For intermediate shaft speed sensor, measure the resistance between sensor C1088-3, circuit CE613 (WH/VT) and ground. 	<p>Yes GO to F5.</p> <p>No REPAIR the circuit for a short to ground. TEST the system for normal operation.</p>



N0040225

- For **OSS**, measure the resistance between **OSS** sensor C193-3, circuit CE613 (WH/VT) and ground.

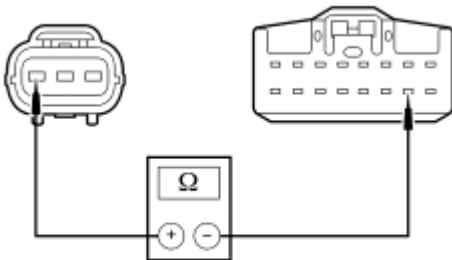


N0040225

- Is the resistance greater than 10,000 ohms?

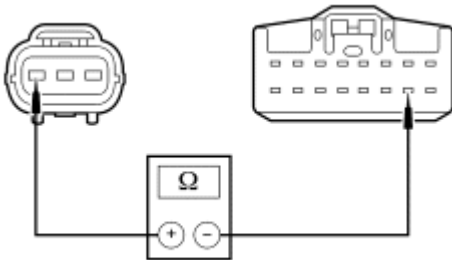
F5 CHECK THE SENSOR BATTERY SUPPLY CIRCUIT FOR AN OPEN

- 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

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



N0040224

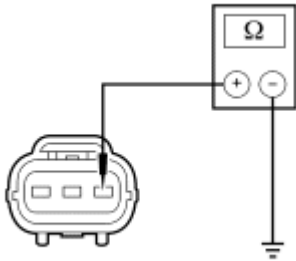
Yes
GO to [F6](#).

No
REPAIR the circuit for an open. TEST the system for normal operation.

- Is the resistance less than 5 ohms?

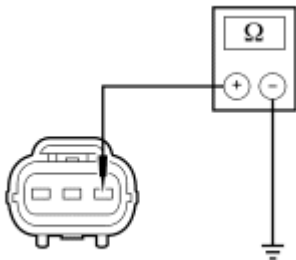
F6 CHECK THE GROUND CIRCUIT FOR AN OPEN

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



N0040226

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

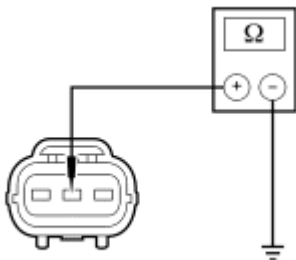


N0040226

- Is the resistance less than 5 ohms?

F7 CHECK THE SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND

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



N0040227

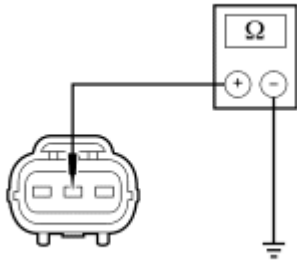
- For intermediate shaft speed sensor, measure the resistance between intermediate shaft speed sensor C1088-2, circuit VE822 (YE/BU) and ground.

Yes
GO to [F7](#).

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

Yes
GO to [F8](#).

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

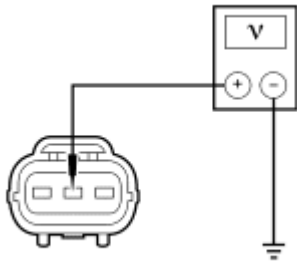


N0040227

- Is the resistance greater than 10,000 ohms?

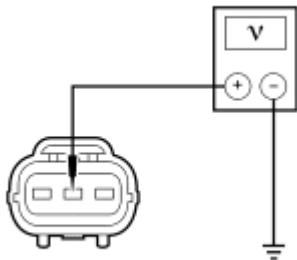
F8 CHECK THE SENSOR SIGNAL CIRCUIT FOR A SHORT TO POWER

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



N0040228

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



N0040228

- Is the voltage greater than 10 volts?

F9 CHECK THE SENSOR SIGNAL CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect: **TCM** C2352b.
- For the **OSS** sensor, measure the resistance between **OSS** C193-2, circuit VET26 (BN/GN) and **TCM** C2352B-17, circuit VET26 (BN/GN).

Yes

REPAIR the circuit for a short to power. TEST the system for normal operation.

No

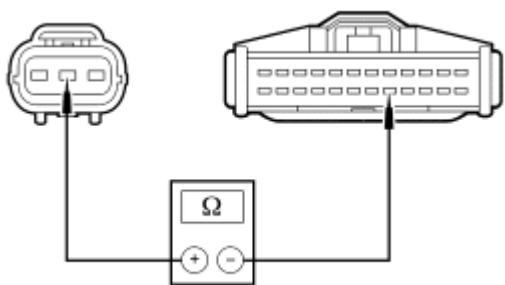
GO to [F9](#).

Yes

GO to [F10](#).

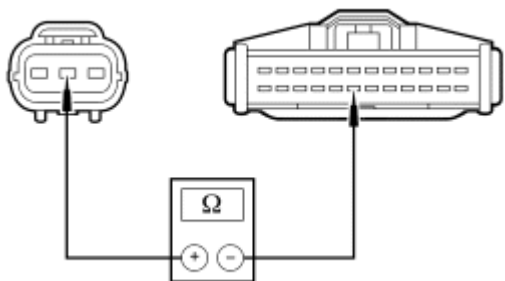
No

REPAIR the circuit for an open. TEST the system for normal operation.



N0053703

- 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).

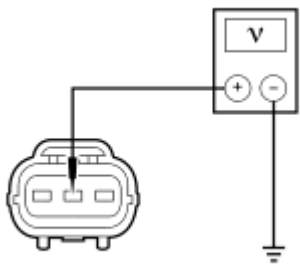


N0053702

- Are the resistances less than 5 ohms?

F10 CHECK FOR VOLTAGE AT THE SENSOR

- Connect: **TCM** C2352A.
- Connect: **TCM** C2352B.
- Ignition ON.
- Measure the voltage between **OSS** sensor C193-2, circuit VET26 (BN/GN) and ground.



N0040228

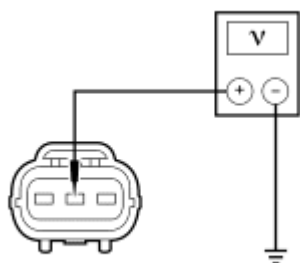
- Measure the voltage between intermediate shaft speed sensor C1088-2, circuit VE822 (YE/BU) and ground.

Yes

INSTALL a new sensor. TEST the system for normal operation.

No

INSTALL a new **TCM**. TEST the system for normal operation.



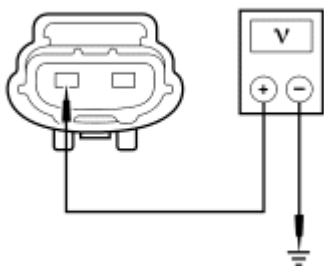
N0040228

- Is the voltage approximately 5 volts?

PINPOINT TEST G: **TSS** SENSOR

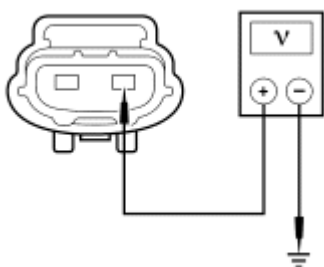
NOTE: Refer to the Turbine Shaft Speed (TSS) Sensor Connector illustrations [Transaxle Connector Layouts](#) in this section.

Test Step	Result / Action to Take
G1 ELECTRONIC DIAGNOSTICS SETUP	
<ul style="list-style-type: none"> • 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 scan tool. • Start the engine. • Enter the following diagnostic mode on the scan tool: DataLogger Mode. • Select TSS PID. • Does vehicle enter DataLogger Mode? 	<p>Yes REMAIN in DataLogger Mode. GO to G2.</p> <p>No REPEAT procedure to enter DataLogger Mode. If vehicle did not enter DataLogger Mode, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis of the Transmission Control Module (TCM).</p>
G2 DRIVE CYCLE TEST	
<ul style="list-style-type: none"> • 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? 	<p>Yes GO to G3.</p> <p>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.</p>
G3 DRIVE CYCLE TEST ERRATIC	
<ul style="list-style-type: none"> • 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)? 	<p>Yes If the sensor signal is erratic, INSPECT for intermittent concern in the harness, sensor or connector. GO to G4.</p> <p>No CLEAR all DTCs. Rerun On-Board Diagnostic (OBD).</p>
G4 CHECK THE TCM AND HARNESS FOR POWER	
<ul style="list-style-type: none"> • Ignition OFF. • Disconnect: Turbine Shaft Speed (TSS) Sensor C143. • Ignition ON. • Measure the voltage between TSS sensor C143-1, circuit VET33 (WH/OG) and ground. 	<p>Yes GO to G5.</p> <p>No GO to G6.</p>



N0083635

- Measure the voltage between **TSS** sensor C143-2, circuit RET33 (WH/VT) and ground.

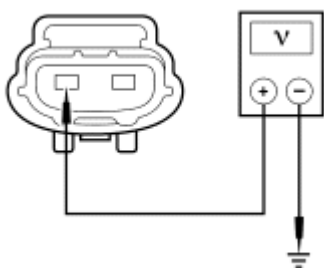


N0083636

- Is any voltage present?

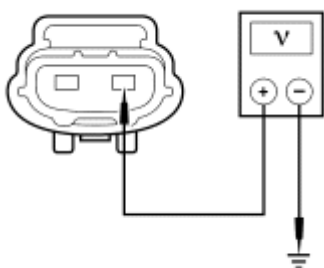
G5 CHECK THE HARNESS FOR A SHORT TO POWER

- Ignition OFF.
- Disconnect: **TCM** C2352B.
- Ignition ON.
- Measure the voltage between **TSS** sensor C143-1, circuit VET33 (WH/OG) and ground.



N0083635

- Measure the voltage between **TSS** sensor C143-2, circuit RET33 (WH/VT) and ground.



N0083636

- Is the voltage greater than 10 volts?

Yes

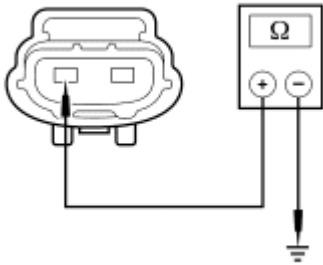
REPAIR the circuit for a short to power.
TEST the system for normal operation.

No

INSTALL a new **TCM**. TEST the system for normal operation.

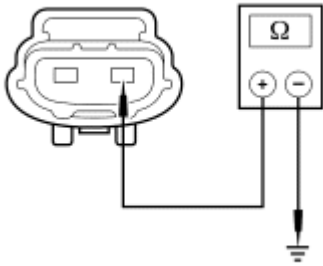
G6 CHECK THE **TCM** AND HARNESS FOR GROUND

- Ignition OFF.
- Connect: **TCM** C2352B.
- Measure the resistance between **TSS** sensor C143-1, circuit VET33 (WH/OG) and ground.



N0083638

- Measure the resistance between **TSS** sensor C143-2, circuit RET33 (WH/VT) and ground.

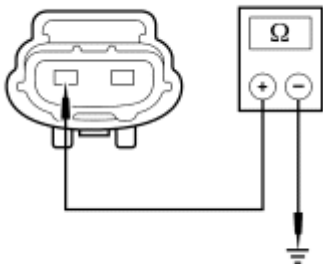


N0083637

- Are the resistances greater than 10,000 ohms?

G7 CHECK THE HARNESS FOR A SHORT TO GROUND

- Disconnect: **TCM** C2352B.
- Measure the resistance between **TSS** sensor C143-1, circuit VET33 (WH/OG) and ground.



N0083638

- Measure the resistance between **TSS** sensor C143-2, circuit RET33 (WH/VT) and ground.

Yes

GO to [G8](#).

No

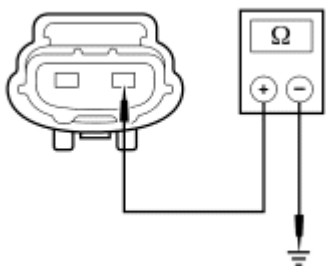
GO to [G7](#).

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.

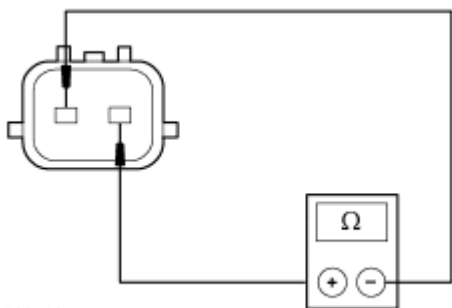


N0083637

- Are the resistances greater than 10,000 ohms?

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.
- 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)



E0011599

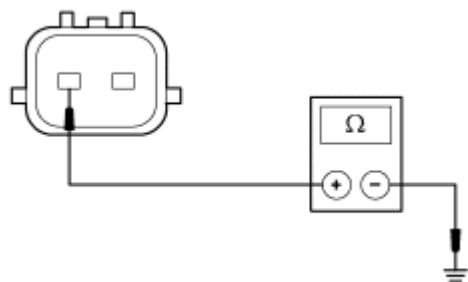
- Are the resistances within specification?

Yes
GO to [G9](#).

No
INSTALL a new sensor. TEST the system for normal operation.

G9 CHECK THE SENSOR FOR A SHORT TO GROUND

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



E0011600

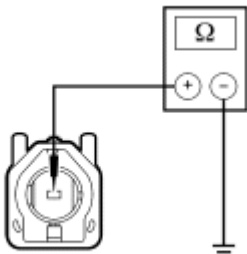
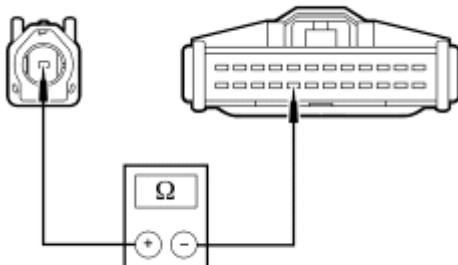
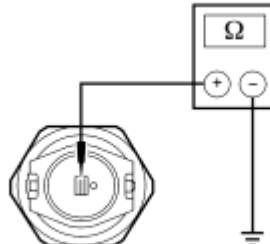
- Is the resistance greater than 10,000 ohms?

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

Test Step	Result / Action to Take
H1 CHECK THE HARNESS FOR A SHORT TO GROUND	

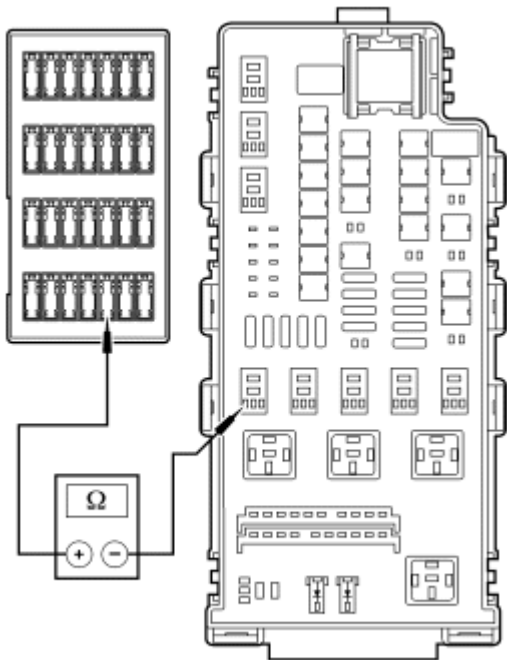
<ul style="list-style-type: none"> • Ignition OFF. • Disconnect: Transmission Control Module (TCM) C2352B. • Disconnect: Transmission Fluid Pressure Switch C1536. • Measure the resistance between transmission fluid pressure switch connector C1536, circuit CET46 (YE/GN) and ground.  <p>N0040232</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? 	<p>Yes GO to H2.</p> <p>No REPAIR circuit CET46 (YE/GN) for a short to ground. TEST the system for normal operation.</p>
<p>H2 CHECK THE HARNESS FOR AN OPEN</p> <ul style="list-style-type: none"> • Measure the resistance between transmission fluid pressure switch C1536, circuit CET46 (YE/GN) and TCM C2352B-20, circuit CET46 (YE/GN).  <p>N0040233</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? 	<p>Yes GO to H3.</p> <p>No REPAIR circuit CET46 (YE/GN) for an open. TEST the system for normal operation.</p>
<p>H3 CHECK THE INTERNAL HARNESS FOR A SHORT TO GROUND</p> <ul style="list-style-type: none"> • Connect: TCM C2352B. • Start the engine. • Measure the resistance between transmission fluid pressure switch and ground.  <p>N0040234</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? 	<p>Yes INSTALL a new TCM. TEST the system for normal operation.</p> <p>No INSTALL a new transmission fluid pressure switch. TEST the system for normal operation.</p>

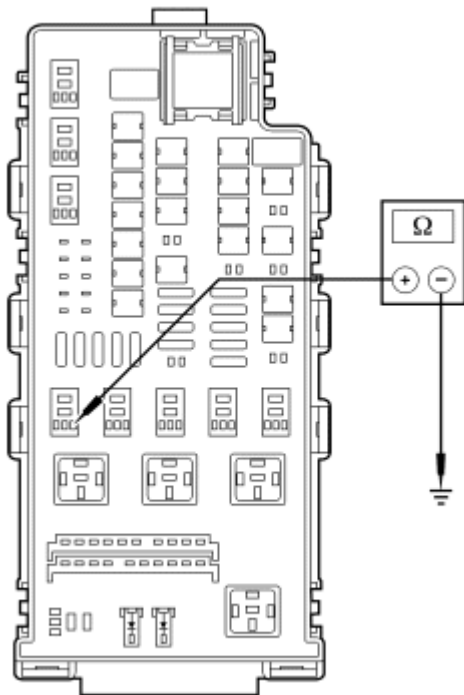
PINPOINT TEST I: [TCM](#) — EARLY BUILD

NOTE: Refer to the Transmission Control Module (TCM) Connector illustration [Transaxle Connector Layouts](#) in this

section.

NOTE: Refer to the Transmission Control Module (TCM) Relay Connector illustration [Transaxle Connector Layouts](#) in this section.

Test Step	Result / Action to Take
I1 CHECK <u>SJB</u> FUSE 26 (7.5A) <ul style="list-style-type: none">Ignition OFF.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 <ul style="list-style-type: none">Disconnect: <u>SJB</u> Fuse 26 (7.5A).Disconnect: Transmission Control Module (TCM) Relay.Measure the resistance between the output side of <u>SJB</u> fuse 26 (7.5A) and <u>TCM</u> relay pin 1, circuit CBP18 (GY/OG).  <p>N0095595</p> <ul style="list-style-type: none">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 <ul style="list-style-type: none">Measure the resistance between <u>TCM</u> relay pin 2, circuit RE406 (GY/VT) and ground.	Yes GO to I6 . No GO to I4 .

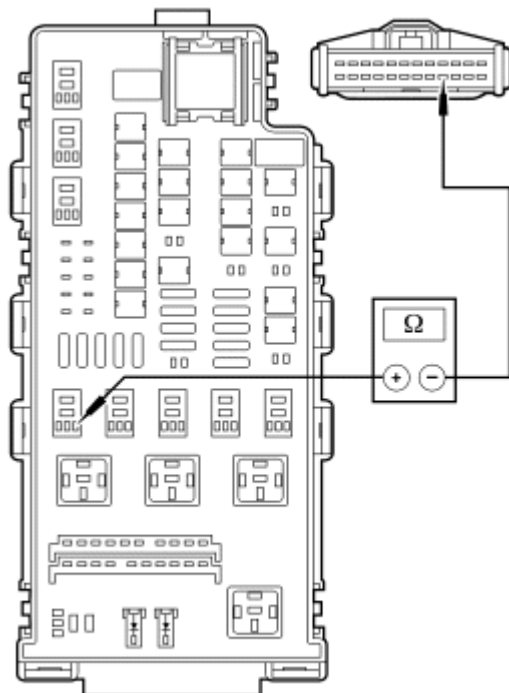


N0095599

- Is the resistance less than 5 ohms?

I4 CHECK THE **TCM** GROUND CIRCUIT

- Disconnect: **TCM** C2352b.
- Measure the resistance between **TCM** relay pin 2, circuit RE406 (GY/VT) and **TCM** C2353b-16, circuit RE406 (GY/VT).



N0095594

- Is the resistance less than 5 ohms?

I5 CHECK THE **TCM** GROUND SUPPLY CIRCUIT FOR AN OPEN

- Disconnect: **TCM** C2352a.
- Measure the resistance between **TCM** C2352a-1, circuit GD120 (BK/GN) and ground.

Yes

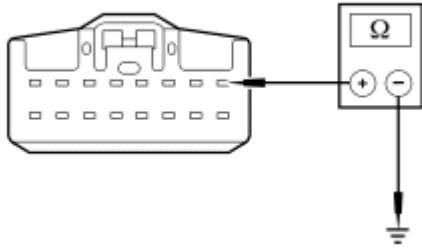
GO to [I5](#).

No

REPAIR circuit RE406 (GY/VT) for an open. TEST the system for normal operation.

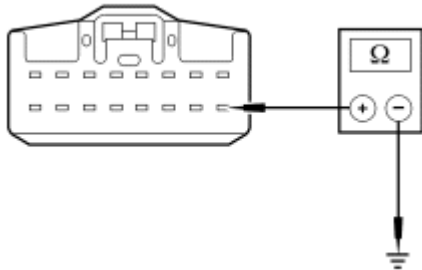
Yes

INSTALL a new **TCM**. TEST the system for normal operation.



N0083640

- Measure the resistance between C2352a-9, circuit GD120 (BK/GN) and ground.



N0083639

- Is the resistance less than 5 ohms?

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 [18](#).

No

GO to [17](#).

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

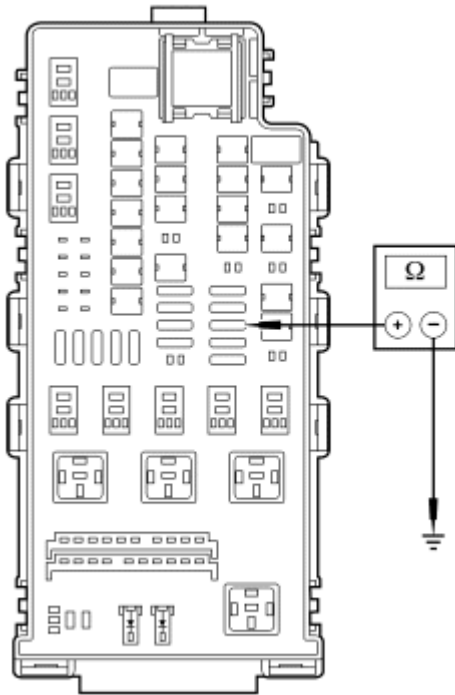
- Disconnect: **BJB** Fuse 16 (15A).
- Measure the resistance between the output side of **BJB** fuse 16 (15A), circuit SBB16 (VT/RD) and ground.

Yes

GO to [19](#).

No

REPAIR circuit SBB16 (VT/RD) for a short to ground. TEST the system for normal operation.

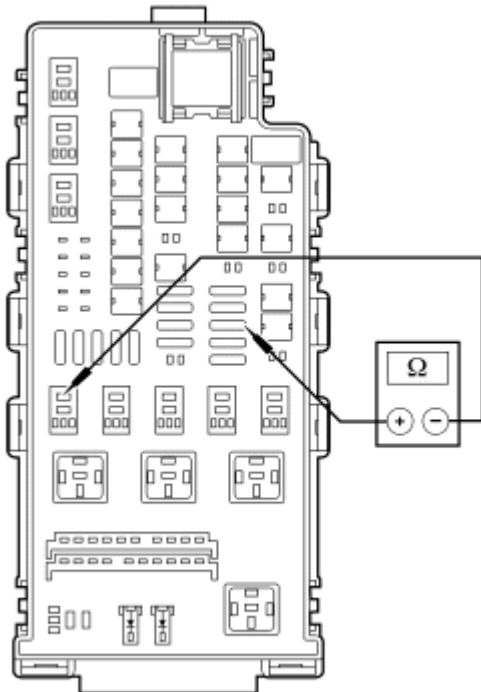


N0095596

- Is the resistance greater than 10,000 ohms?

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

- Measure the resistance between the output side of **BJB** fuse 16 (15A), and **TCM** relay pin 3, circuit SBB16 (VT/RD).



N0095597

- Is the resistance less than 5 ohms?

I9 CHECK THE **TCM** POWER CIRCUIT FOR A SHORT TO GROUND

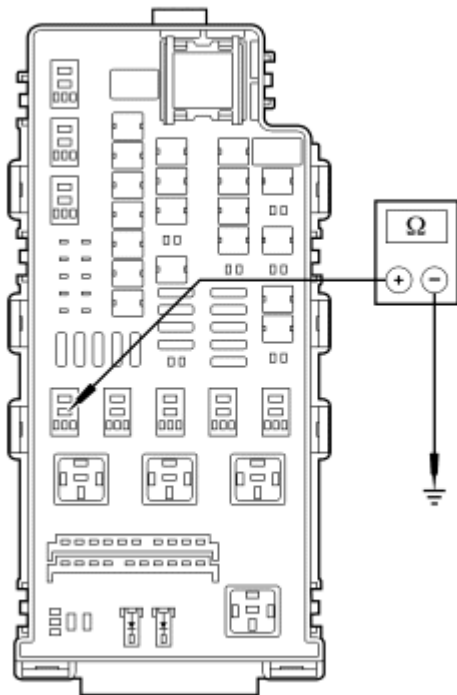
- Disconnect: **TCM** C2352a.
- Measure the resistance between **TCM** relay pin 5, circuit CE613 (VT/BK) and ground.

Yes
GO to [I10](#).

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

Yes
INSTALL a new **TCM**. TEST the system for normal operation.

No



N0095598

- Is the resistance greater than 10,000 ohms?

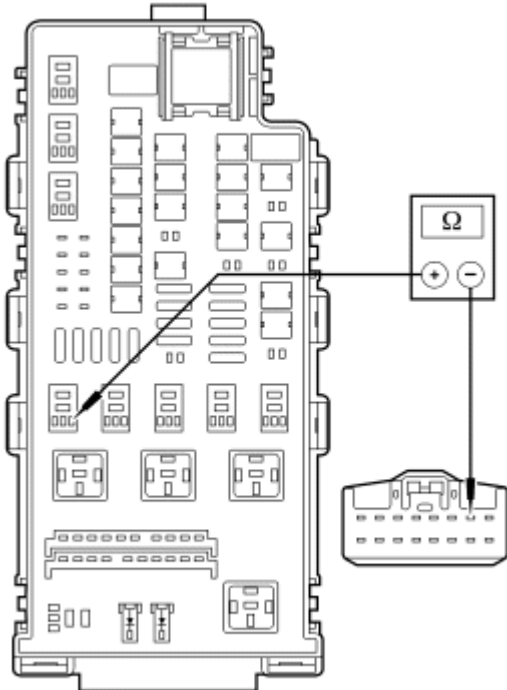
REPAIR circuit CE613 (VT/BK).
TEST the system for normal operation.

I10 CHECK THE **TCM** POWER SUPPLY FOR AN OPEN CIRCUIT

- Measure the resistance between **TCM** relay pin 2 and **TCM** C2352a-2, circuit CE613 (WH/VT) .

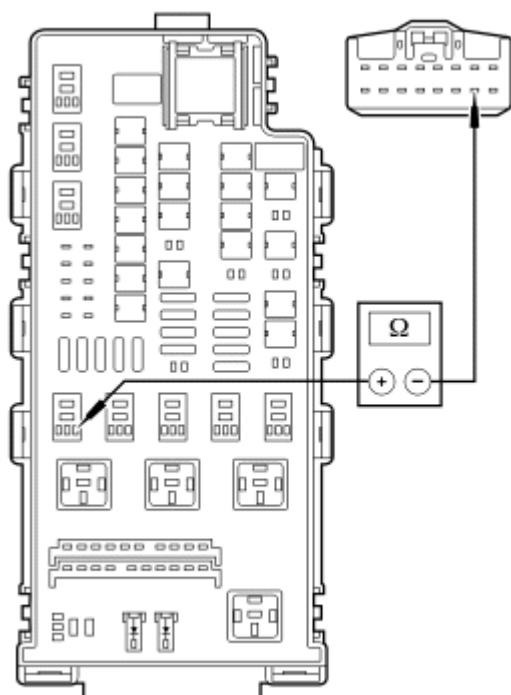
Yes
GO to [I11](#).

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



N0095600

- Measure the resistance between **TCM** relay pin 2 and C2352a-10, circuit CE613 (WH/VT).

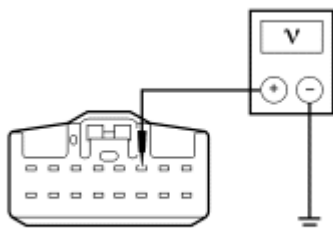


N0095601

- Is the resistance less than 5 ohms?

I11 CHECK FOR POWER FROM THE **SJB**

- Ignition ON.
- Measure the voltage between **TCM** C2352a-3 and ground.



N0040454

- 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.

PINPOINT TEST J: **TCM** — LATE BUILD

NOTE: Refer to the Transmission Control Module (TCM) Connector illustration [Transaxle Connector Layouts](#) in this section.

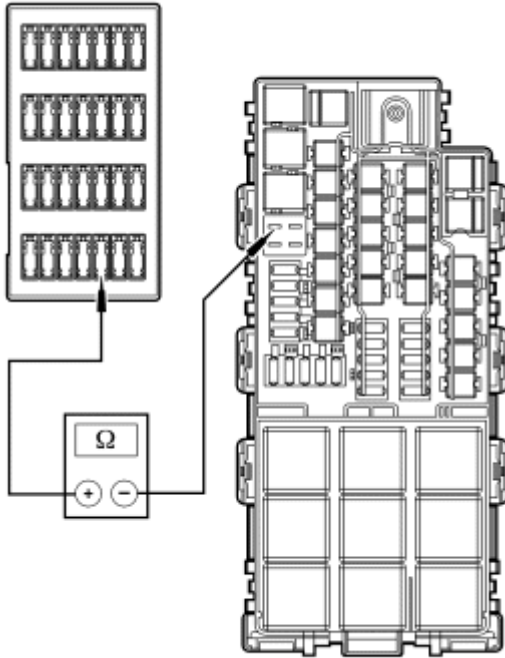
NOTE: Refer to the Transmission Control Module (TCM) Relay Connector illustration [Transaxle Connector Layouts](#) in this section.

Test Step	Result / Action to Take
J1 CHECK SJB Fuse 26 (7.5A)	
<ul style="list-style-type: none"> • Ignition OFF. • Check fuse: Smart Junction Box (SJB) Fuse 26 (7.5A). • Is the resistance less than 5 ohms? 	<p>Yes GO to J2.</p> <p>No REPAIR circuit CBP18 (GY/OG) for</p>

a short to ground. TEST the system for normal operation.

J2 CHECK CIRCUIT CBP18 (GY/OG) FOR AN OPEN

- Disconnect: **SJB** Fuse 26 (7.5A).
- Disconnect: Transmission Control Module (TCM) Relay.
- Measure the resistance between the output side of **SJB** fuse 26 (7.5A) and **TCM** relay pin 86, circuit CBP18 (GY/OG).



N0072394

- Is the resistance less than 5 ohms?

J3 CHECK RE406 (GY/VT) FOR AN OPEN

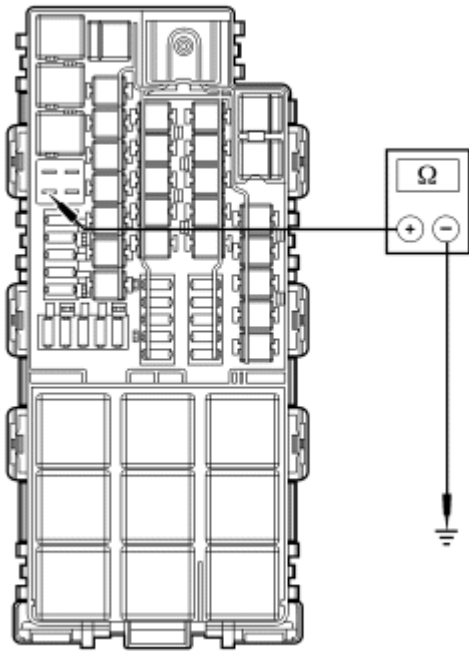
- Measure the resistance between **TCM** relay pin 85, circuit RE406 (GY/VT) and ground.

Yes
GO to [J3](#).

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

Yes
GO to [J6](#).

No
GO to [J4](#).

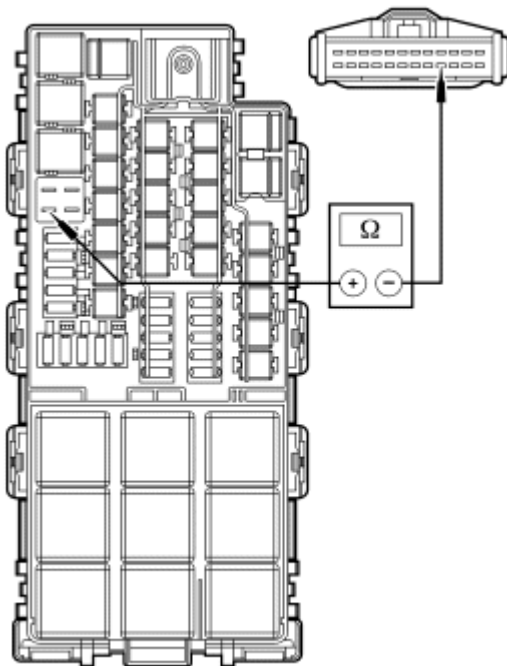


N0072399

- Is the resistance less than 5 ohms?

J4 CHECK THE **TCM** GROUND CIRCUIT

- Disconnect: **TCM** C2352B.
- Measure the resistance between **TCM** relay pin 85, circuit RE406 (GY/VT) and **TCM** C2353B-16, circuit RE406 (GY/VT).



N0095562

- Is the resistance less than 5 ohms?

J5 CHECK THE **TCM** GROUND SUPPLY CIRCUIT FOR AN OPEN

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

Yes

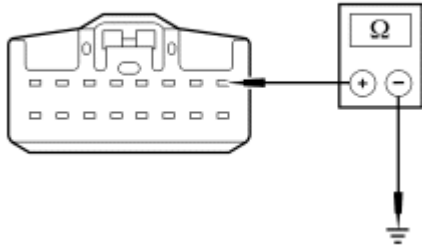
GO to [J5](#).

No

REPAIR circuit RE406 (GY/VT) for an open. TEST the system for normal operation.

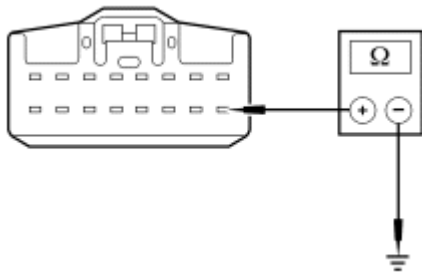
Yes

INSTALL a new **TCM**. TEST the system for normal operation.



N0083640

- Measure the resistance between C2352A-9, circuit GD120 (BK/GN) and ground.



N0083639

- Is the resistance less than 5 ohms?

No

REPAIR circuit GD120 (BK/GN) for an open. TEST the system for normal operation.

J6 CHECK **BJB** Fuse 16 (15A)

- Check fuse: Battery Junction Box (BJB) Fuse 16 (15A).
- Is the resistance less than 5 ohms?

Yes

GO to [J8](#).

No

GO to [J7](#).

J7 CHECK CIRCUIT SBB16 (VT/RD) FOR A SHORT TO GROUND

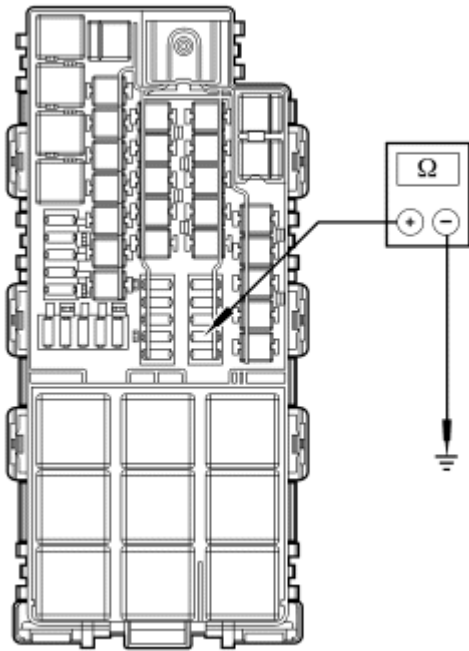
- Disconnect: **BJB** Fuse 16 (15A).
- Measure the resistance between the output side of **BJB** fuse 16 (15A), circuit SBB16 (VT/RD) and ground.

Yes

GO to [J9](#).

No

REPAIR circuit SBB16 (VT/RD) for a short to ground. TEST the system for normal operation.

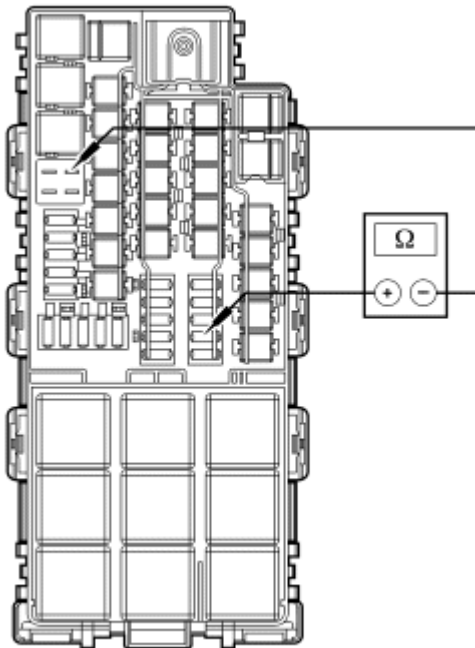


N0072397

- Is the resistance greater than 10,000 ohms?

J8 CHECK CIRCUIT SBB16 (VT/RD) FOR AN OPEN

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



N0072398

- Is the resistance less than 5 ohms?

J9 CHECK THE **TCM** POWER CIRCUIT FOR A SHORT TO GROUND

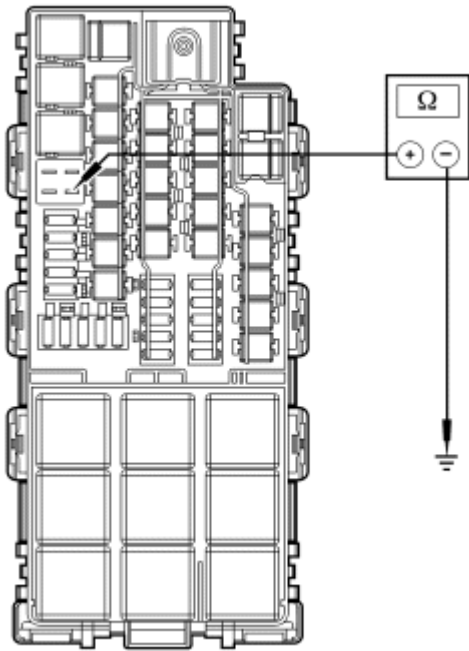
- Disconnect: **TCM** C2352A.
- Measure the resistance between **TCM** relay pin 87, circuit CE613 (VT/BK) and ground.

Yes
GO to [J10](#).

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

Yes
INSTALL a new **TCM**. TEST the system for normal operation.

No



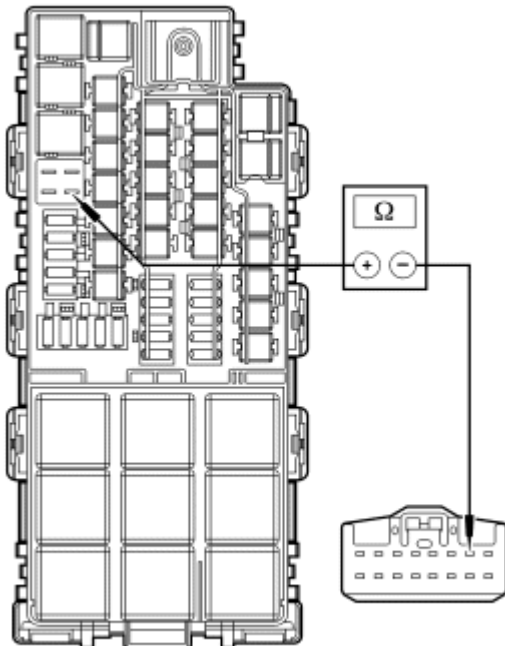
N0072395

- Is the resistance greater than 10,000 ohms?

REPAIR circuit CE613 (VT/BK).
TEST the system for normal operation.

J10 CHECK THE **TCM** POWER SUPPLY FOR AN OPEN CIRCUIT

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

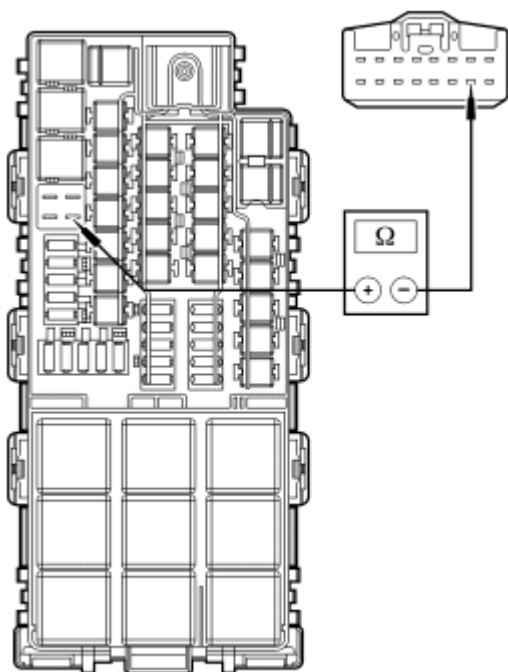


N0095563

- Measure the resistance between **TCM** relay pin 87 and C2352A-10, circuit CE613 (WH/VT).

Yes
GO to [J11](#).

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

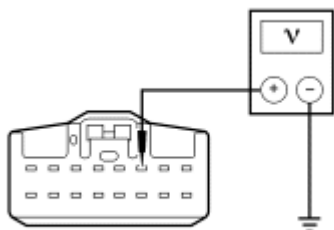


N0095564

- Is the resistance less than 5 ohms?

J11 CHECK FOR POWER FROM THE **SJB**

- Ignition ON.
- Measure the voltage between **TCM** C2352A-3 and ground.



N0040454

- Is the voltage greater than 10 volts?

Yes


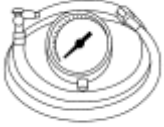

INSTALL a new **TCM**. TEST the system for normal operation.

No

REPAIR circuit SBP07 (WH/RD). TEST the system for normal operation.

Special Testing Procedures

Special Tool(s)

 ST2755A	Air Test Plate and Gasket 307-412
 ST1565-A	Transmission Fluid Pressure Gauge 307-004 (T57L-77820-A)
 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 M 5 (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 Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis and testing of the engine idle speed.

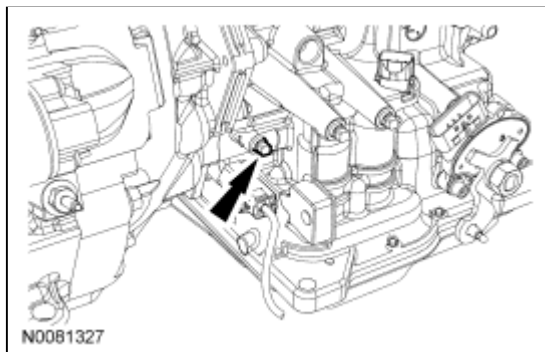
Line Pressure Test

NOTICE: 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.

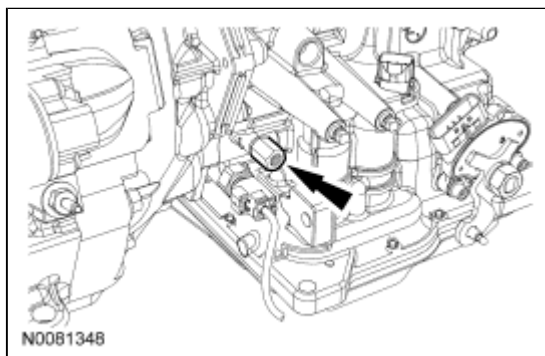
NOTE: Certain sensor failures may cause high line pressure as a result of failure mode effect management actions. Make sure that self-test and electrical repairs have been carried out, or test results may be incorrect.

This test verifies that the line pressure is within specifications.

1. Remove the line pressure port plug.



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).



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.
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

NOTICE: 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.
2. **NOTICE:** 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.

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

NOTICE: 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.

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

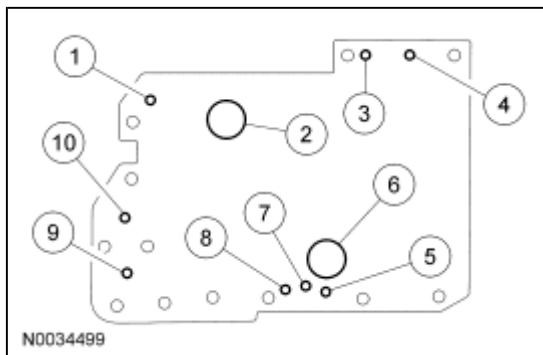
3. If stall speeds were too high, refer to the following Stall Speed Diagnosis Chart. If stall speeds were too low, first check the engine idle speed. If engine idle is OK, remove torque converter and check the torque converter [OWC](#) for slippage.

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

Transaxle Air Pressure Test Plate



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

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.

NOTICE: 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 Nm (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 Tool(s)

 ST1300-A	100W/12 Volt DC UV Lamp 164-R0751 or equivalent
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Material

Item	Specification
Dye-Lite® ATF/Power Steering Fluid Leak Detection Dye 164-R3701 (Rotunda)	—
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda M 5 (ATF- M V)

NOTICE: 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 in this section. Refer to [Section 307-02](#).

The transmission fluid cooler can be further checked for leaks. Refer to [Section 307-02](#).

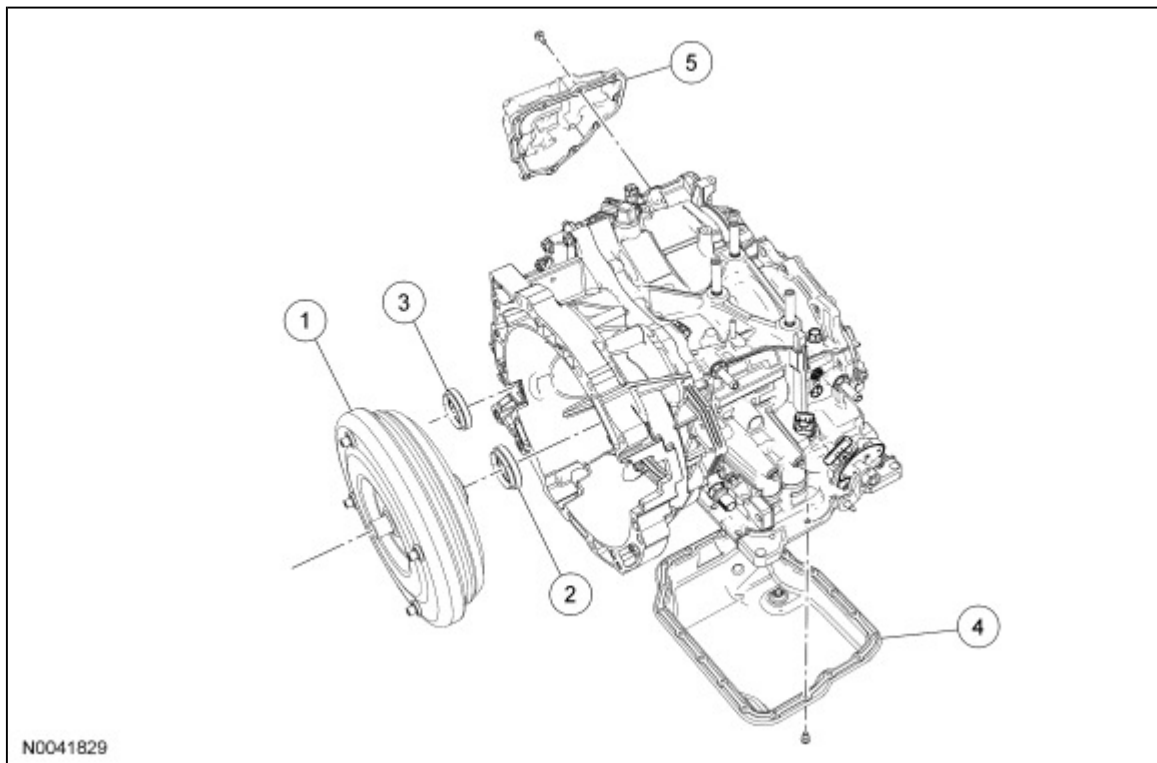
If leakage is found at the Transmission Range (TR) manual control lever, install a new seal.

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

External Sealing

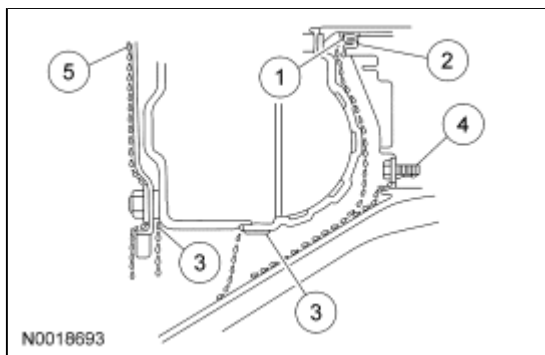


N0041829

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.



N0018693

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

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 [Section 100-02](#) 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

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

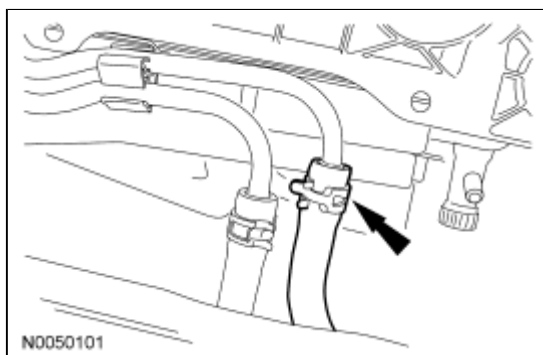
NOTE: Cleaning and backflushing the transmission fluid cooling system along with normal cleaning and inspection procedures as outlined in this section during disassembly and reassembly will keep contamination from reentering the transaxle and causing a repeat repair.

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.

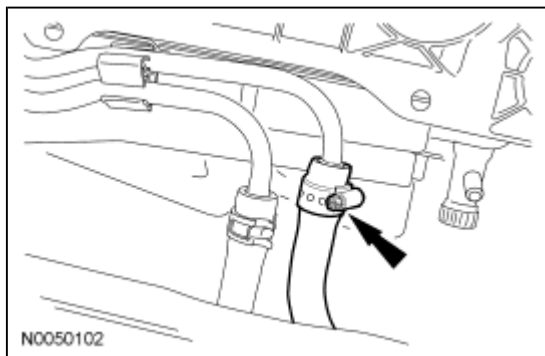
Transmission Fluid Cooler Flow Test

NOTE: The selector lever linkage adjustment, transmission fluid level and line pressure must be within specification before carrying out this test. Refer to [Section 307-05](#) for selector lever linkage adjustment procedure. For transmission fluid level checking procedures, refer to [Preliminary Inspection](#) in this section. For transaxle line pressure testing, refer to [Special Testing Procedures](#) in this section.

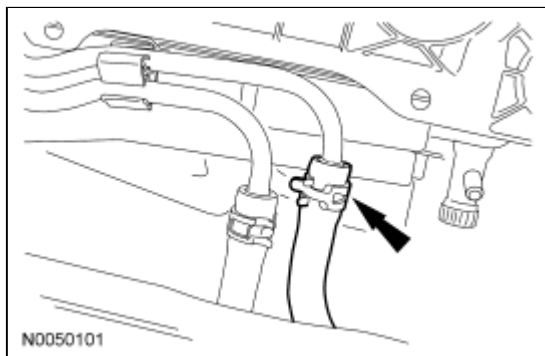
1. Check the transmission fluid level and fill as necessary.
2. Remove the transmission fluid level indicator from the transmission filler tube and install the funnel in the transmission filler tube.
3. With the vehicle in NEUTRAL, position it on a hoist. Refer to [Section 100-02](#). Inspect the transmission 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.



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.



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.




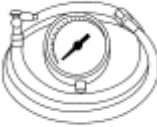

9. If flow is not adequate, stop the engine. Disconnect the hose from the transmission fluid cooler return tube and connect it to the converter-out line. If flow is now liberal, install a new transmission fluid cooler. Refer to [Section 307-02](#).
10. Check the transmission fluid level and adjust as required.

Transmission Fluid Cooler Tube Replacement

Refer to [Section 307-02](#).

Diagnosis By Symptom

Special Tool(s)

 ST1137-A	73III Automotive Meter 105-R0057 or equivalent
 ST1565-A	Transmission Fluid Pressure Gauge 307-004 (T57L-77820-A)
 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.
4. **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.

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
• 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
• 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 (SSA) (off = low).	• Carry out On-Board Diagnostic (OBD) tests.
	• GO to Pinpoint Test A , GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	• 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 in this section.
• Transmission fluid condition.	• Carry out the Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
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.
• 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 (SSA), Shift Solenoid B (SSB) and Shift Solenoid C (SSC).	• Carry out On-Board Diagnostic (OBD) tests.
	• GO to Pinpoint Test A GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	• Repair as required. Clear the DTCs, road test and rerun OBD test.
301B — 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 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.	• 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 Planetary Assembly	
• Planetary damaged.	• Inspect for damage. Repair as necessary.
Low One-Way Clutch (OWC)	

<ul style="list-style-type: none"> Worn, damaged or assembled incorrectly. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
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Engagement Concern: No Reverse

Possible Component	Reference/Action
202 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harness, Shift Solenoid A (SSA), Shift Solenoid B (SSB) and Shift Solenoid C (SSC). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
302 — HYDRAULIC/MECHANICAL ROUTINE	
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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.
Low/Reverse Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Reverse Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Engagement Concern: Harsh Reverse

Possible Component	Reference/Action
203 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harness, Shift Solenoid B (SSB). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.

303 — HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures	
<ul style="list-style-type: none"> High pressures. 	<ul style="list-style-type: none"> Check pressure at line tap. Carry out the Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specification.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Reverse Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return spring damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Engagement Concern: Harsh Forward

Possible Component	Reference/Action
204A — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harness and Shift Solenoid A (SSA). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
304A — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High pressures. 	<ul style="list-style-type: none"> Check pressure at line tap. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.

<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Engagement Concern: Harsh Forward (Manual 1st Gear)

Possible Component	Reference/Action
204B — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harness, Turbine Shaft Speed (TSS) sensor. 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test G, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harness, Shift Solenoid B (SSB), Pressure Control Solenoid A (PCA). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
305 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.

<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Engagement Concern: Delayed/Soft Forward

Possible Component	Reference/Action
206 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harness, Shift Solenoid A (SSA), Pressure Control Solenoid A (PCA). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
306 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Engagement Concerns: No Forward and No Reverse

Possible Component	Reference/Action
207 — ELECTRICAL ROUTINE	
Powertrain Control System	

<ul style="list-style-type: none"> Transmission Control Module (TCM) and vehicle wiring harnesses (no electrical activity equals 3rd gear default). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests. GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
307 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> Transmission fluid condition. 	<ul style="list-style-type: none"> Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Selector Lever Cable/Transmission Range (TR) Sensor	
<ul style="list-style-type: none"> Cable system or TR sensor damaged, misaligned. 	<ul style="list-style-type: none"> Inspect and repair as required. For selector lever cable information, refer to Section 307-05. For TR sensor information, refer to Transmission Range (TR) Sensor in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Damaged flexplate or adapter plate. 	<ul style="list-style-type: none"> Inspect for damage. Carry out Torque Converter checks, refer to Torque Converter Contamination Inspection in this section. Repair as necessary.
<ul style="list-style-type: none"> Damaged impeller hub. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Damaged turbine hub. 	
Turbine Shaft	
<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Pump assembly	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Gasket damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Porosity, cross leaks, plugged hole. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Rear Planetary Assembly	
<ul style="list-style-type: none"> Planetary damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Forward Planetary Assembly	
<ul style="list-style-type: none"> Planetary damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Final drive gearset and differential	
<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.

Low One-Way Clutch (OWC)	
<ul style="list-style-type: none"> Worn, damaged or assembled incorrectly. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Engagement Concerns: Harsh Forward and Reverse

Possible Component	Reference/Action
208 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor, Shift Solenoid A (SSA) and Shift Solenoid B (SSB). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
308 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> Transmission fluid condition. 	<ul style="list-style-type: none"> Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> High pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Reverse and Low/Reverse Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

- One-Way Clutch (OWC).

- Inspect for damage. Repair as necessary.

Engagement Concerns: Delayed/Soft Forward and Reverse

Possible Component	Reference/Action
209 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor Shift Solenoid Pressure Control A (SSPCA) and Shift Solenoid Pressure Control B (SSPCB). 	<ul style="list-style-type: none"> • Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> • GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> • Repair as required. Clear the DTCs, road test and rerun OBD test.
309 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect transmission fluid level. 	<ul style="list-style-type: none"> • Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> • Transmission fluid condition. 	<ul style="list-style-type: none"> • Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> • High pressures. 	<ul style="list-style-type: none"> • Check pressure at line tap.
	<ul style="list-style-type: none"> • Carry out Line Pressure Test. Refer Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Separator plate damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Contamination. 	<ul style="list-style-type: none"> • Disassemble and clean.
<ul style="list-style-type: none"> • Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Gasket damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Porosity, cross leaks, plugged hole. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.

Shift Concerns: Some/All Shifts Missing (Automatic Mode Only)

Possible Component	Reference/Action
210 — ELECTRICAL ROUTINE	

Powertrain Control System	
<ul style="list-style-type: none"> 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 (SSA), 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). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test C, GO to Pinpoint Test D, GO to Pinpoint Test F, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
310 — HYDRAULIC/MECHANICAL ROUTINE	
Some Shifts Missing ONLY	
	<ul style="list-style-type: none"> If only some of the shifts are missing, determine which shift(s) is missing.
	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> Transmission fluid condition. 	<ul style="list-style-type: none"> Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Selector Lever Cable/ TR Sensor	
<ul style="list-style-type: none"> Selector lever cable system or TR sensor damaged, misaligned. 	<ul style="list-style-type: none"> Inspect and repair as required. For selector lever cable information, refer to Section 307-05. For TR sensor information, refer to Transmission Range (TR) Sensor in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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. 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 (SSA), 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).	• Carry out On-Board Diagnostic (OBD) tests.
	• GO to Pinpoint Test A , GO to Pinpoint Test G , GO to Pinpoint Test F , GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).

	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
311 — HYDRAULIC/MECHANICAL ROUTINE	
Some Shifts Early/Late ONLY	
	<ul style="list-style-type: none"> If only some of the shifts are early/late, determine which shift(s) is early/late. Refer to the following routine(s) for further Early/Late Shift Concerns: <ul style="list-style-type: none"> Soft/Slipping 1-2 Shift, Routine 226/326 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	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> Transmission fluid condition. 	<ul style="list-style-type: none"> Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Servo retaining ring damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Servo worn or damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Not adjusted correctly. 	<ul style="list-style-type: none"> Adjust correctly.
<ul style="list-style-type: none"> Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concerns: Timing Concerns — Erratic/Hunting

Possible Component	Reference/Action
212 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Output Shaft Speed (OSS) sensor, Intake Air Temperature (IAT) sensor. 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests. Refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis and testing of the TCM and IAT sensor.

	<ul style="list-style-type: none"> • GO to Pinpoint Test F, GO to Pinpoint Test G, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles). Repair as required. Clear the DTCs, road test and rerun OBD test.
312 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect transmission fluid level. 	<ul style="list-style-type: none"> • Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> • Transmission fluid condition. 	<ul style="list-style-type: none"> • Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Main Control	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Separator plate damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Contamination. 	<ul style="list-style-type: none"> • Disassemble and clean.
<ul style="list-style-type: none"> • Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • For further diagnosis of timing issues, refer to Reference/Actions. 	<ul style="list-style-type: none"> • 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 224/334 ■ 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	
<ul style="list-style-type: none"> • 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 (SSA), 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. 	<ul style="list-style-type: none"> • Carry out On-Board Diagnostic (OBD) tests. Refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis and testing of the IAT sensor.

	<ul style="list-style-type: none"> • GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test D, GO to Pinpoint Test E, GO to Pinpoint Test F, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles). • Repair as required. Clear the DTCs, road test and rerun OBD test.
313 — HYDRAULIC/MECHANICAL ROUTINE	
Some Shifts Soft/Slipping ONLY	
	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ■ 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	
<ul style="list-style-type: none"> • Incorrect transmission fluid level. 	<ul style="list-style-type: none"> • Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> • Transmission fluid condition. 	<ul style="list-style-type: none"> • Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> • High/Low Pressures. 	<ul style="list-style-type: none"> • Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Separator plate damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Contamination. 	<ul style="list-style-type: none"> • Disassemble and clean.
<ul style="list-style-type: none"> • Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Gasket damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.

<ul style="list-style-type: none"> • Porosity, cross leaks, plugged hole. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
Intermediate Servo	
<ul style="list-style-type: none"> • Servo retaining ring damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
Intermediate Band	
<ul style="list-style-type: none"> • Band damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Servo worn or damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Not adjusted correctly. 	<ul style="list-style-type: none"> • Adjust correctly.
<ul style="list-style-type: none"> • Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
<ul style="list-style-type: none"> • Seals, piston damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Check balance dam. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Friction elements damaged or worn. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Return springs damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
Forward Clutch Assembly	
<ul style="list-style-type: none"> • Seals, piston damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Check balance dam. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Friction elements damaged or worn. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Return springs damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
Case	
<ul style="list-style-type: none"> • Damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.

Shift Concerns: Feel — Harsh

Possible Component	Reference/Action
214 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • 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 (SSA), 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). 	<ul style="list-style-type: none"> • Carry out On-Board Diagnostic (OBD) tests. Refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis and testing of the IAT, sensor.
	<ul style="list-style-type: none"> • GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test D, GO to Pinpoint Test E, GO to Pinpoint Test F, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> • Repair as required. Clear the DTCs, road test and rerun OBD test.
314 — HYDRAULIC/MECHANICAL ROUTINE	
Some Shifts Harsh ONLY	
	<ul style="list-style-type: none"> • If only some of the shifts are harsh, determine which shift(s) is harsh.

	<ul style="list-style-type: none"> Refer to the following routine(s) for further Harsh Shift Concerns: <ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> High/Low Pressures. 	<ul style="list-style-type: none"> Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Servo	
<ul style="list-style-type: none"> Servo retaining ring damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Servo worn or damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Not adjusted correctly. 	<ul style="list-style-type: none"> Adjust correctly.
<ul style="list-style-type: none"> Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Forward Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Final Drive Gears and Differential	

<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Case	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Damaged. 	

Shift Concerns: No 1st Gear in Drive, Engages in a Higher Gear

Possible Component	Reference/Action
215 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor and Shift Solenoid A (SSA). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test C, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
315 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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)	
<ul style="list-style-type: none"> Worn, damaged or assembled incorrectly. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concerns: No 1st Gear in Manual LOW

Possible Component	Reference/Action
216 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM) and vehicle wiring harnesses. 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests. GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
316 — HYDRAULIC/MECHANICAL ROUTINE	

Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Friction plates. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return spring. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
OD Planetary Assembly	
<ul style="list-style-type: none"> Planetary damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.

Shift Concerns: No Manual 2nd Gear

Possible Component	Reference/Action
217 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses and Shift Solenoid B (SSB). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
317 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Servo retaining ring damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Servo worn or damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Not adjusted correctly. 	<ul style="list-style-type: none"> Adjust correctly.
<ul style="list-style-type: none"> Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Low/Direct One-Way Clutch (OWC)	
<ul style="list-style-type: none"> Worn, damaged or assembled incorrectly. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: No 1-2 Shift

Possible Component	Reference/Action
220 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> 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). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests. Refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis and testing of the Intake Air Temperature (IAT) sensor.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test C, GO to Pinpoint Test E, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
320 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> 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.
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. 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 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.
	• GO to Pinpoint Test A , GO to Pinpoint Test C , GO to Pinpoint Test E , GO to Pinpoint Test F , GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	• 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 Special Testing Procedures in this section.
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.
Servo	
• Seals.	• 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.

<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: No 3-4 Shift

Possible Component	Reference/Action
222 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor, Shift Solenoid A (SSA) and Shift Solenoid D (SSD). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test C, GO to Pinpoint Test E, GO to Pinpoint Test F, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
322 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Servo	
<ul style="list-style-type: none"> Band. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: No 4-3 Shift

Possible Component	Reference/Action
223 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor, Shift Solenoid D (SSD) and Shift Solenoid A (SSA). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test C, GO to Pinpoint Test E, GO to Pinpoint Test F, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
323 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Servo	
<ul style="list-style-type: none"> Seal. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: No 3-2 Shift

Possible Component	Reference/Action
224 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor and Shift Solenoid C (SSC). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test C, GO to Pinpoint Test E, GO to Pinpoint Test F, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).

	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun On-Board Diagnostic (OBD) test.
324 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Servo worn or damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Not adjusted correctly. 	<ul style="list-style-type: none"> Adjust correctly.
<ul style="list-style-type: none"> Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: No 2-1 Shift

Possible Component	Reference/Action
225 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor and Shift Solenoid D (SSD). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test C, GO to Pinpoint Test E, GO to Pinpoint Test F, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test
325 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.

	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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)	
<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: Soft/Slipping 1-2

Possible Component	Reference/Action
226 — ELECTRICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Output Shaft Speed (OSS) sensor and Shift Solenoid B (SSB). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test G, GO to Pinpoint Test H, GO to Pinpoint Test F, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
326 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> Transmission fluid condition. 	<ul style="list-style-type: none"> Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Servo worn or damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Not adjusted correctly. 	<ul style="list-style-type: none"> Adjust correctly.
<ul style="list-style-type: none"> Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: Soft/Slipping 2-3

Possible Component	Reference/Action
227 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Turbine Shaft Speed (TSS) sensor, Transmission Fluid Temperature (TFT) sensor and Shift Solenoid C (SSC). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test G, GO to Pinpoint Test H, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
327 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Servo worn or damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Not adjusted correctly. 	<ul style="list-style-type: none"> Adjust correctly.
<ul style="list-style-type: none"> Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> 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.

Shift Concern: Soft/Slipping 3-4

Possible Component	Reference/Action
228 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Transmission Control Module (TCM), Shift Solenoid A (SSA), Shift Solenoid D (SSD), vehicle wiring harnesses and Transmission Fluid Temperature (TFT) sensor.	• Carry out On-Board Diagnostic (OBD) tests.
	• GO to Pinpoint Test A , GO to Pinpoint Test B , GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	• 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 Special Testing Procedures in this section.
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.
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.
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 4-3

Possible Component	Reference/Action
229 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), Shift Solenoid A (SSA), Shift Solenoid D (SSD), vehicle wiring harnesses and Transmission Fluid Temperature (TFT) sensor. 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
329 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section. Follow pressure diagnosis and repair as required.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Servo	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: Soft/Slipping 3-2

Possible Component	Reference/Action
230 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), Shift Solenoid C (SSC), vehicle wiring harnesses and Transmission Fluid Temperature (TFT) sensor. 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).

	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
330 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Servo worn or damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Not adjusted correctly. 	<ul style="list-style-type: none"> Adjust correctly.
<ul style="list-style-type: none"> Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: Soft/Slipping 2-1

Possible Component	Reference/Action
231 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test G, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles). Repair as required. Clear the DTCs, road test and rerun OBD test.
331 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.

<ul style="list-style-type: none"> • Separator plate damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Contamination. 	<ul style="list-style-type: none"> • Disassemble and clean.
<ul style="list-style-type: none"> • Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> • Band damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Servo worn or damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Not adjusted correctly. 	<ul style="list-style-type: none"> • Adjust correctly.
<ul style="list-style-type: none"> • Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.

Shift Concern: Harsh 1-2 Shift

Possible Component	Reference/Action
232 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • 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). 	<ul style="list-style-type: none"> • Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> • GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test G, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> • Repair as required. Clear the DTCs, road test and rerun OBD test.
332 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> • High/Low pressures. 	<ul style="list-style-type: none"> • Check pressure at line tap.
	<ul style="list-style-type: none"> • Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Separator plate damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Contamination. 	<ul style="list-style-type: none"> • Disassemble and clean.
<ul style="list-style-type: none"> • Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> • 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: 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).	• Carry out On-Board Diagnostic (OBD) tests.
	• GO to Pinpoint Test A , GO to Pinpoint Test B , GO to Pinpoint Test C , GO to Pinpoint Test G , GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	• Repair as required. Clear the DTCs, road test and rerun OBD test.
333 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
• High/Low pressures.	• Check pressure at line tap.
	• Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
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.
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.
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: Harsh 3-4 Shift

Possible Component	Reference/Action
234 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> 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). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
334 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section. Follow pressure diagnosis and repair as required.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Forward Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Shift Concern: Harsh 4-3 Shift

Possible Component	Reference/Action
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235 — ELECTRICAL ROUTINE

Powertrain Control System	
<ul style="list-style-type: none">Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor, Shift Solenoid A (SSA) and Shift Solenoid D (SSD).	<ul style="list-style-type: none">Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none">GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none">Repair as required. Clear the DTCs, road test and rerun OBD test.

335 — HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures	
<ul style="list-style-type: none">High/Low pressures.	<ul style="list-style-type: none">Check pressure at line tap.
	<ul style="list-style-type: none">Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none">Bolts not tightened to specification.	<ul style="list-style-type: none">Tighten to specifications.
<ul style="list-style-type: none">Separator plate damaged.	<ul style="list-style-type: none">Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none">Contamination.	<ul style="list-style-type: none">Disassemble and clean.
<ul style="list-style-type: none">Valves/springs damaged, misassembled, missing, stuck or bore damaged.	<ul style="list-style-type: none">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	
<ul style="list-style-type: none">Seals, piston damaged.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.
<ul style="list-style-type: none">Check balance dam.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.
<ul style="list-style-type: none">Friction elements damaged or worn.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.
<ul style="list-style-type: none">Return springs damaged.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.
Servo	
<ul style="list-style-type: none">Seals (piston and cover) damaged.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none">Band damaged.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.
<ul style="list-style-type: none">Servo worn or damaged.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.
<ul style="list-style-type: none">Not adjusted correctly.	<ul style="list-style-type: none">Adjust correctly.
<ul style="list-style-type: none">Anchor bolt damaged or worn.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.

Shift Concern: Harsh 3-2 Shift

Possible Component	Reference/Action
236 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none">Transmission Control Module (TCM), vehicle wiring harnesses, Turbine Shaft Speed (TSS)	<ul style="list-style-type: none">Carry out On-Board Diagnostic (OBD) tests.

sensor, Transmission Range (TR) sensor, Transmission Fluid Temperature (TFT) sensor and Shift Solenoid C (SSC).	
	<ul style="list-style-type: none"> • GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test G, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> • Repair as required. Clear the DTCs, road test and rerun OBD test.
336 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> • High/Low pressures. 	<ul style="list-style-type: none"> • Check pressure at line tap.
	<ul style="list-style-type: none"> • Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Separator plate damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Contamination. 	<ul style="list-style-type: none"> • Disassemble and clean.
<ul style="list-style-type: none"> • Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> • Band damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Servo worn or damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Not adjusted correctly. 	<ul style="list-style-type: none"> • Adjust correctly.
<ul style="list-style-type: none"> • Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
<ul style="list-style-type: none"> • Seals, piston damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Check balance dam. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Friction elements damaged or worn. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Return springs damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.

Shift Concern: Harsh 2-1 Shift

Possible Component	Reference/Action
237 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • 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). 	<ul style="list-style-type: none"> • Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> • GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test E,

	GO to Pinpoint Test G , GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
337 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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)	
<ul style="list-style-type: none"> Worn, damaged or assembled incorrectly. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Servo	
<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Servo worn or damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Not adjusted correctly. 	<ul style="list-style-type: none"> Adjust correctly.
<ul style="list-style-type: none"> Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Torque Converter Clutch Operation Concerns: Does Not Apply

Possible Component	Reference/Action
240 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Fluid Temperature (TFT) sensor, Shift Solenoid A (SSA) and Shift Solenoid E (SSE). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles). Repair as required. Clear the DTCs, road test and rerun OBD test.
340 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	

<ul style="list-style-type: none"> • High/Low pressures. 	<ul style="list-style-type: none"> • Check pressure at line tap. • Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Separator plate damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Contamination. 	<ul style="list-style-type: none"> • Disassemble and clean.
<ul style="list-style-type: none"> • Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Gasket damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Porosity, cross leaks, plugged hole. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
Torque Converter Assembly	
<ul style="list-style-type: none"> • Torque converter internal failure preventing engagement, piston application. 	<ul style="list-style-type: none"> • Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to Torque Converter Contamination Inspection in this section. • 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	
<ul style="list-style-type: none"> • Transmission Control Module (TCM), vehicle wiring harnesses, Shift Solenoid A (SSA) and Shift Solenoid E (SSE). 	<ul style="list-style-type: none"> • Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> • GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles). • Repair as required. Clear the DTCs, road test and rerun OBD test.
341 — HYDRAULIC/MECHANICAL ROUTINE	
Main Control	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Separator plate damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Contamination. 	<ul style="list-style-type: none"> • Disassemble and clean.
<ul style="list-style-type: none"> • Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Torque converter internal failure preventing engagement, piston application. 	<ul style="list-style-type: none"> • Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to Torque Converter Contamination Inspection in this section.

	<ul style="list-style-type: none"> If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter.
Low One-Way Clutch (OWC)	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Worn, damaged or assembled incorrectly. 	

Torque Converter Clutch Concerns: Cycling/Shudder/Chatter

Possible Component	Reference/Action
242 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Shift Solenoid Pressure Control A (SSPCA) and Shift Solenoid E (SSE). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
342 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Transmission fluid condition. 	<ul style="list-style-type: none"> Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> Transmission fluid contaminated. 	<ul style="list-style-type: none"> If contaminated, locate source of contamination. If burnt, inspect mechanical bands and clutches. Repair as necessary.
<ul style="list-style-type: none"> Dirty transmission fluid. 	<ul style="list-style-type: none"> Change the transmission fluid. Carry out drain and refill. Refer to Transmission Fluid Drain and Refill in this section. Carry out transmission fluid cooler cleaning, refer to Transmission Fluid Cooler — Backflushing and Cleaning in this section.
<ul style="list-style-type: none"> Contaminated torque converter. 	<ul style="list-style-type: none"> Clean torque converter, carry out torque flushing. Refer to Torque Converter Contamination Inspection as listed in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Torque converter internal failure preventing engagement, piston application. 	<ul style="list-style-type: none"> Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to procedures in this section. If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter.

Other Concerns: Shift Lever Efforts High

Possible Component	Reference/Action

251 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Range (TR) sensor. 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test C, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
351 — HYDRAULIC/MECHANICAL ROUTINE	
Selector Lever Cable/ TR Sensor	
<ul style="list-style-type: none"> Selector lever cable system or TR sensor damaged, misaligned. 	<ul style="list-style-type: none"> Inspect and repair as required. For selector lever cable information. Refer to Section 307-05.
	<ul style="list-style-type: none"> Inspect and repair as required. For TR information, refer to Transmission Range (TR) Sensor in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
Case	
<ul style="list-style-type: none"> Manual control lever assembly damage, manual valve inner lever pin bent, manual valve inner lever damaged, spring rod damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Manual valve lever shaft retaining pin damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.

Other Concerns: External Leaks

Possible Component	Reference/Action
252 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Output Shaft Speed (OSS) sensor, Turbine Shaft Speed (TSS) sensor, Transmission Range (TR) sensor and transmission wiring harness. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
Case	
<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Seal/Gaskets	
<ul style="list-style-type: none"> Leakage at gaskets and seals. 	<ul style="list-style-type: none"> Check for fluid leaks in the torque converter area. Refer to Leakage Inspection in this section for potential leak locations.
	<ul style="list-style-type: none"> 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 procedures in this section. Repair as necessary.

Other Concerns: Poor Vehicle Performance

Possible Component	Reference/Action
253 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> 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 (SSA), 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). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test D, GO to Pinpoint Test E, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
353 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
Input Shaft	
<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Forward Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Torque Converter Assembly	
<ul style="list-style-type: none"> Torque converter One-Way Clutch (OWC) slipping. 	<ul style="list-style-type: none"> Carry out Torque Converter Contamination Inspection checks in this section.
	<ul style="list-style-type: none"> If the One-Way Clutch (OWC) fails the check, install a new or remanufactured torque converter.
<ul style="list-style-type: none"> Incorrect torque converter used in rebuild. 	<ul style="list-style-type: none"> Inspect for correct torque converter assembly. If not correct, install the correct torque converter for this application.

Other Concerns: Noise/Vibration — Forward or Reverse

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 [Section 100-04](#). 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 [Section 100-04](#) for the next likely system and continue diagnosis.

Possible Component	Reference/Action
254 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Shift Solenoid A (SSA), 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). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test D, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
354 — HYDRAULIC/MECHANICAL ROUTINE	
Pump Assembly	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Gasket damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Porosity, cross leaks, plugged hole. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Flex Plate or Adapter Plate	
<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Loose flexplate nuts. 	<ul style="list-style-type: none"> Tighten the nuts to specification.
<ul style="list-style-type: none"> Adapter plate not aligned correctly. 	<ul style="list-style-type: none"> Remove the transaxle. Align the adapter plate.
One-Way Clutch (OWC)	
<ul style="list-style-type: none"> Damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. Install new components as necessary.
Friction Elements	
<ul style="list-style-type: none"> Damaged, burnt or worn. 	<ul style="list-style-type: none"> Inspect for damage. Install new components as necessary.
<ul style="list-style-type: none"> Excessive clutch pack clearance. 	<ul style="list-style-type: none"> Check the clutch pack clearance. Install new clutches as necessary.
Planetary Gear Set	
<ul style="list-style-type: none"> Damaged or worn thrust bearings. 	<ul style="list-style-type: none"> Inspect for damage. Install new components as necessary.
<ul style="list-style-type: none"> Damaged or worn planetary or sun gear. 	<ul style="list-style-type: none"> Inspect for damage. Install new components as necessary.
Incorrect Transmission Fluid Level	
<ul style="list-style-type: none"> Transmission fluid level low/overfilled. 	<ul style="list-style-type: none"> Check the transmission fluid level. Adjust the transmission fluid level as necessary. Refer to Preliminary Inspection in this section.

Transmission Fluid Filter	
<ul style="list-style-type: none"> Transmission fluid filter blocked. 	<ul style="list-style-type: none"> Inspect the transmission fluid filter. Install a new transmission fluid filter if necessary. Refer to Transmission Fluid Pan in this section.
Torque Converter	
<ul style="list-style-type: none"> Worn or damaged torque converter. 	<ul style="list-style-type: none"> Refer to Torque Converter Diagnosis.
Transaxle Support Insulator	
<ul style="list-style-type: none"> Worn or damaged transaxle support insulator. 	<ul style="list-style-type: none"> Inspect the transaxle support insulator for damage. Install new as necessary.
Differential Ring and Pinion	
<ul style="list-style-type: none"> Differential ring and pinion gears damaged. 	<ul style="list-style-type: none"> Inspect the differential ring and pinion gears for damage. Install new as necessary.
<ul style="list-style-type: none"> Differential ring and pinion gear bearings damaged. 	<ul style="list-style-type: none"> Inspect the differential ring and pinion gear bearings for damage. Install new as necessary.
Main Control Assembly	
<ul style="list-style-type: none"> Incorrect line pressure. 	<ul style="list-style-type: none"> Check the line pressure. Refer to Special Testing Procedures.
<ul style="list-style-type: none"> Worn or damaged solenoids or valves. 	<ul style="list-style-type: none"> Clean and inspect the main control assembly for damage. Install new as necessary.
Transmission Fluid Filler Tube	
<ul style="list-style-type: none"> Transmission fluid filler tube grounded out. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses and Transmission Range (TR) sensor. 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test C, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
355 — HYDRAULIC/MECHANICAL ROUTINE	
Selector Lever Cable/ TR Sensor	
<ul style="list-style-type: none"> Selector lever cable system or TR sensor damaged, misaligned. 	<ul style="list-style-type: none"> Inspect and repair as required. For selector lever cable information, refer to Section 307-05.
	<ul style="list-style-type: none"> Inspect and repair as required. For TR sensor information, refer to Transmission Range (TR) Sensor in this section.
Flex Plate or Adapter Plate	
<ul style="list-style-type: none"> Damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Selector Lever Cable or TR sensor damaged, misaligned. 	<ul style="list-style-type: none"> Inspect and repair as required. For selector lever cable information, refer to Section 307-05. Inspect and repair as required. For TR sensor information, refer to Transmission Range (TR) Sensor in this section.
Case	
<ul style="list-style-type: none"> Manual control lever assembly damage, manual valve inner lever pin bent, manual valve inner lever damaged, spring rod damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Manual valve lever shaft retaining pin damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Park System	
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> External linkages/brackets damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.

Other Concerns: Overheating

Possible Component	Reference/Action
257 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses, Transmission Fluid Temperature (TFT) sensor and Shift Solenoid E (SSE). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Repair as required. Clear the DTCs, road test and rerun OBD test.
357 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap. Carry out Line Pressure Test.

	Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Separator plate damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Contamination. 	<ul style="list-style-type: none"> • Disassemble and clean.
<ul style="list-style-type: none"> • Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Bolts not tightened to specification. 	<ul style="list-style-type: none"> • Tighten to specifications.
<ul style="list-style-type: none"> • Gasket damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Porosity, cross leaks, plugged hole. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
Case	
<ul style="list-style-type: none"> • Case vent damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
Torque Converter Assembly	
<ul style="list-style-type: none"> • Torque converter internal failure preventing engagement, piston application. 	<ul style="list-style-type: none"> • Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to Torque Converter Contamination Inspection in this section. If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter.
Other	
<ul style="list-style-type: none"> • Restriction in the transmission fluid cooling system. 	<ul style="list-style-type: none"> • Refer to Section 307-02 for information and diagnosis of cooling issues.
<ul style="list-style-type: none"> • Excessive trailer tow load. 	<ul style="list-style-type: none"> • Refer to specifications on trailer towing.
<ul style="list-style-type: none"> • Poor engine driveability 	<ul style="list-style-type: none"> • Check engine driveability. Refer to Section 303-00.

Other Concerns: No Engine Braking in Manual 1

Possible Component	Reference/Action
259 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • Transmission Control Module (TCM), vehicle wiring harnesses and Shift Solenoid B (SSB). 	<ul style="list-style-type: none"> • Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> • GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> • Repair as required. Clear the DTCs, road test and rerun OBD test.
359 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect transmission fluid level. 	<ul style="list-style-type: none"> • Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> • High/Low pressures. 	<ul style="list-style-type: none"> • Check pressure at line tap. Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
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.
Low/Reverse 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 spring damaged.	• 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.	• Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
• Transmission fluid condition.	• Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
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.
Case	
• Case vent damaged.	• Inspect for damage. If damaged, repair as necessary.
Other	
• Transaxle overheating.	• Refer to Routine 257/357 in this section.

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 (SSA).	• Carry out On-Board Diagnostic (OBD) tests.
	• GO to Pinpoint Test A , GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	• Repair as required. Clear the DTCs, road test and rerun OBD test.
363 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	

<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> Transmission fluid condition. 	<ul style="list-style-type: none"> Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Main Control	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Separator plate damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Contamination. 	<ul style="list-style-type: none"> Disassemble and clean.
<ul style="list-style-type: none"> Valves/springs damaged, misassembled, missing, stuck or bore damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Gasket damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Porosity, cross leaks, plugged hole. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Low One-Way Clutch (OWC)	
<ul style="list-style-type: none"> Worn, damaged or assembled incorrectly. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

Other Concerns: Slips/Chatters in 2nd Gear

Possible Component	Reference/Action
264 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> Transmission Control Module (TCM), vehicle wiring harnesses and Shift Solenoid B (SSB). 	<ul style="list-style-type: none"> Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> GO to Pinpoint Test A, GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> Clear the DTCs, road test and rerun OBD test.
364 — HYDRAULIC/MECHANICAL ROUTINE	
Transmission Fluid	

<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> Transmission fluid condition. 	<ul style="list-style-type: none"> Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Pump Assembly	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.
<ul style="list-style-type: none"> Gasket damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Porosity, cross leaks, plugged hole. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Servo	
<ul style="list-style-type: none"> Seals (piston and cover) damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Band	
<ul style="list-style-type: none"> Band damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Servo worn or damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Not adjusted correctly. 	<ul style="list-style-type: none"> Adjust correctly.
<ul style="list-style-type: none"> Anchor bolt damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
OD Planetary Assembly	
<ul style="list-style-type: none"> Planetary damaged. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly	
<ul style="list-style-type: none"> Seals, piston damaged. 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> Check balance dam. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Friction elements damaged or worn. 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Return springs damaged. 	<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Incorrect transmission fluid level. 	<ul style="list-style-type: none"> Adjust transmission fluid to correct level. Refer to Preliminary Inspection in this section.
<ul style="list-style-type: none"> Transmission fluid condition. 	<ul style="list-style-type: none"> Carry out Transmission Fluid Condition Check. Refer to Preliminary Inspection in this section.
Incorrect Pressures	
<ul style="list-style-type: none"> High/Low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap.
	<ul style="list-style-type: none"> Carry out Line Pressure Test. Refer to Special Testing Procedures in this section.
Pump Assembly	
<ul style="list-style-type: none"> Bolts not tightened to specification. 	<ul style="list-style-type: none"> Tighten to specifications.

<ul style="list-style-type: none"> • Gasket damaged. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Porosity, cross leaks, plugged hole. 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly	
<ul style="list-style-type: none"> • Seals, piston damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Check balance dam. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Friction elements damaged or worn. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Return springs damaged. 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.

Other Concerns: No Engine Braking in All Gears

Possible Component	Reference/Action
283 — ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • Transmission Control Module (TCM), vehicle wiring harnesses and Shift Solenoid B (SSB). 	<ul style="list-style-type: none"> • Carry out On-Board Diagnostic (OBD) tests.
	<ul style="list-style-type: none"> • GO to Pinpoint Test A , GO to Pinpoint Test I (for early build vehicles) and GO to Pinpoint Test J (for late build vehicles).
	<ul style="list-style-type: none"> • Repair as required. Clear the DTCs, road test and rerun OBD test.
383 — HYDRAULIC/MECHANICAL ROUTINE	
No Hydraulic/Mechanical concerns.	

Transmission Fluid Cooler — Backflushing and Cleaning

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda M 5 (ATF-M V)

NOTICE: 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.

NOTICE: 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.

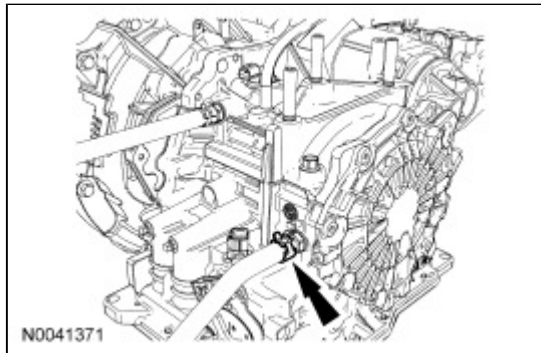
1. Carry out backflushing with a suitable torque converter/fluid cooler cleaner. Test equipment to make sure that a vigorous fluid flow is present before proceeding. Install a new system filter if flow is weak or contaminated.
2. To aid in attaching the cleaner to the transmission fluid cooler tube, 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 M 5 (ATF-M V)

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).
2. Disconnect the transmission fluid cooler return hose from the transaxle.

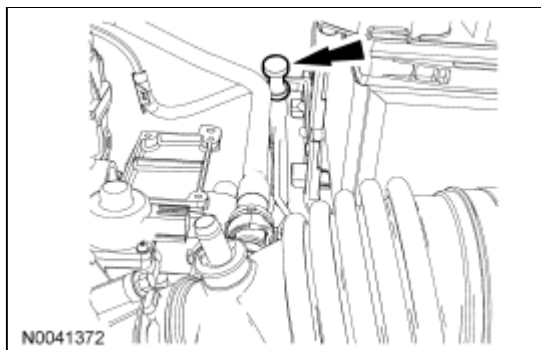


3. Insert the return hose into a calibrated 10L (10.5 qt) container.
4. **NOTICE:** To prevent damage to the transaxle, do not run the engine above idle.

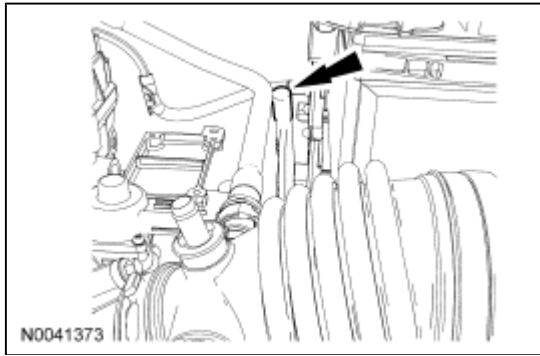
NOTE: If the fluid return rate is less than 0.95L (1 qt) in 30 seconds, or if the return hose pulsates, check for restrictions at the pump, transmission fluid cooler or transmission fluid cooler lines.

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.



7. Add 3L (3.17 qt) of transmission fluid to the transaxle.



8. **NOTICE:** To prevent damage to the transaxle, do not run the engine above idle.

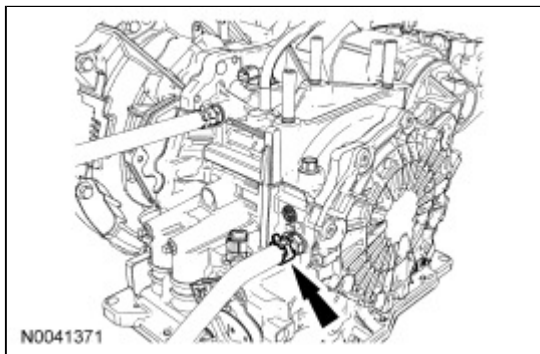
NOTE: If the transmission fluid return rate is less than 0.95L (1 qt) in 30 seconds, or if the return hose pulsates, check for restrictions at the pump, transmission fluid cooler or transmission fluid cooler lines.

Run the engine at idle and pump out 3L (3.17 qt) of transmission fluid.

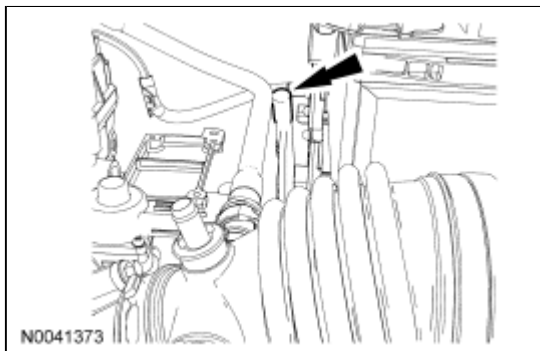
9. Switch OFF the engine.
10. Add 3L (3.17 qt) of transmission fluid to the transaxle.
11. **NOTICE:** To prevent damage to the transaxle, do not run the engine above idle.

Run the engine at idle and pump out 3L (3.17 qt) of transmission fluid.

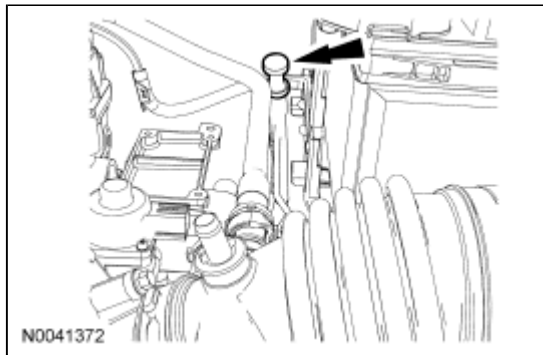
12. Switch OFF the engine.
13. Raise the vehicle.
14. Connect the transmission fluid cooler return hose to the transaxle.



15. Add 3L (3.17 qt) of transmission fluid to the transaxle.



16. Install the transmission fluid level indicator in the transmission fluid level indicator tube.



17. **NOTICE:** To prevent damage to the transaxle, do not run the engine above idle.

Run the engine.

18. Check the transmission fluid level and fill if necessary.
-

Torque Converter Contamination Inspection

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda M 5 (ATF-M V)


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.
 - The torque converter stud or studs, impeller hub or bushing are damaged.
 - The torque converter exhibits external discoloration (due to overheating).
 - There is evidence of transmission assembly or fluid contamination due to the following transmission or converter failure modes.
 - Major metallic failure
 - Multiple clutch plates or band failures
 - Sufficient component wear which results in metallic contamination
 - Water or antifreeze contamination
2. If none of the above conditions are present, continue with the following fluid inspection.
3. Pour a small amount of transmission fluid from the torque converter onto an absorbent white tissue or through a paper filter.
4. Examine the fluid for contaminants, color and smell. The fluid must be free of contaminants, red in color and not have a burnt smell.
5. **NOTICE: Do not use water-based cleaners or mineral spirits to clean or flush the torque converter or transmission damage will occur.**

If the fluid passed inspection:

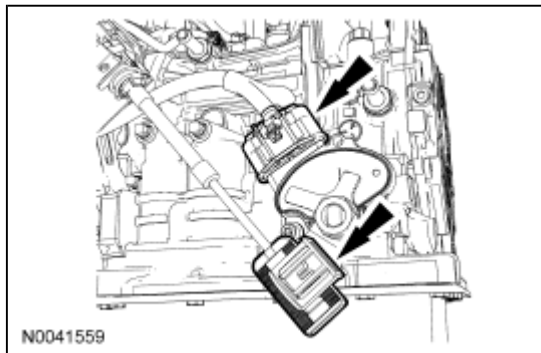
- drain the remaining fluid from the torque converter.
 - using only the recommended transmission fluid, add 1.9L (2 qt) of clean fluid into the converter and agitate by hand.
 - thoroughly drain the fluid.
-

Transmission Range (TR) Sensor Adjustment

Special Tool(s)

 ST2962-A	Alignment Tool, Transmission Range Sensor 307-571
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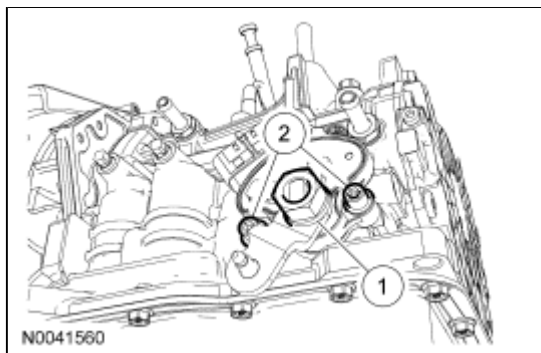
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).
2. Disconnect the Transmission Range (TR) sensor electrical connector and the selector lever cable end.



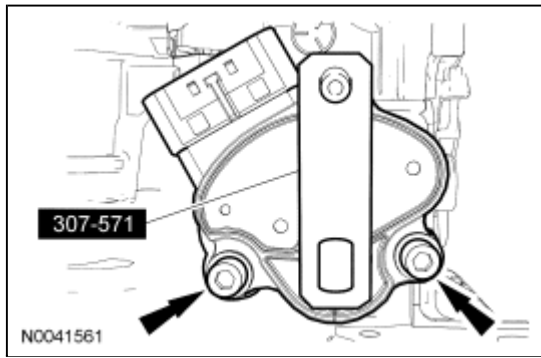
3. **NOTICE:** Failure to hold the selector lever, while loosening or tightening the manual control lever, will transmit rotational torque to the Transmission Range (TR) sensor causing internal damage.

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.



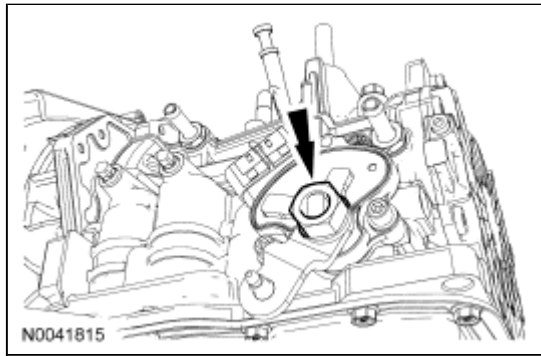
4. Using the Transmission Range Sensor Alignment Tool, align the **TR** sensor and tighten the bolts.
 - Tighten to 10 Nm (89 lb-in).



5. **NOTICE:** 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.

Install the manual control lever.

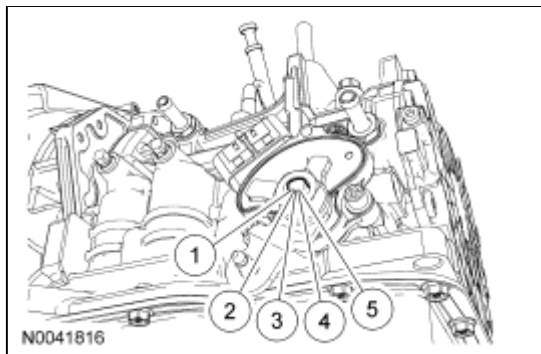
- Tighten to 22 Nm (16 lb-ft).



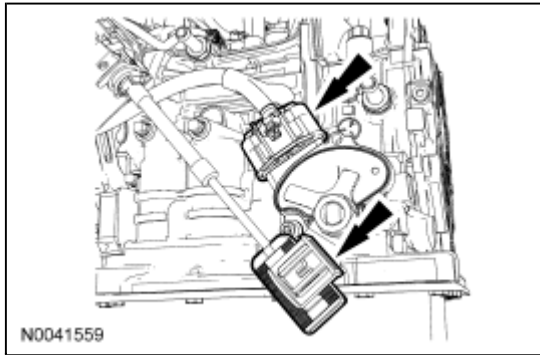
6. **NOTE:** Check to make sure the manual control lever is in position "2" (same as "D" position).

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)
- When in position D, the marks on the manual control lever line up with the marks on the **TR** sensor.



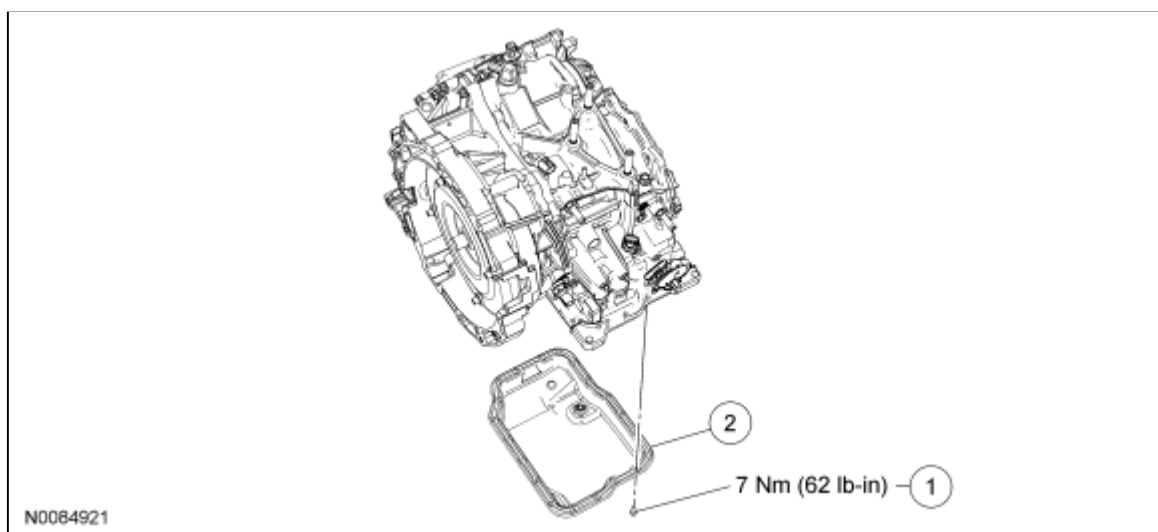
7. Connect the selector lever cable and the **TR** sensor electrical connector.



Transmission Fluid Pan

Material

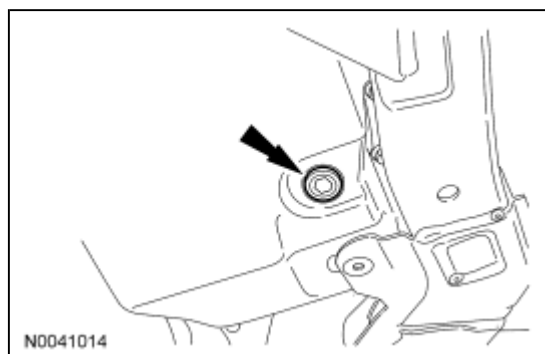
Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda M 5 (ATF-M V)
Motorcraft® Metal Surface Prep ZC-31-A	—
Ultra Silicone Sealant TA-29	—



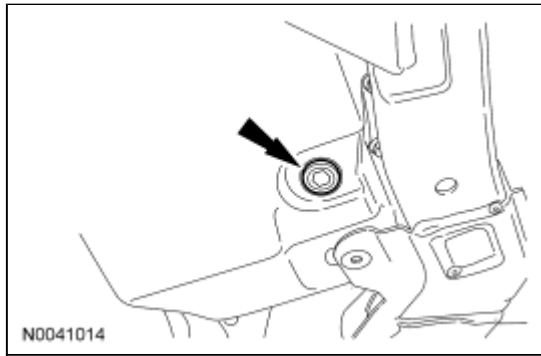
Item	Part Number	Description
1	—	Transmission fluid pan bolt
2	7A194	Transmission fluid pan

Removal

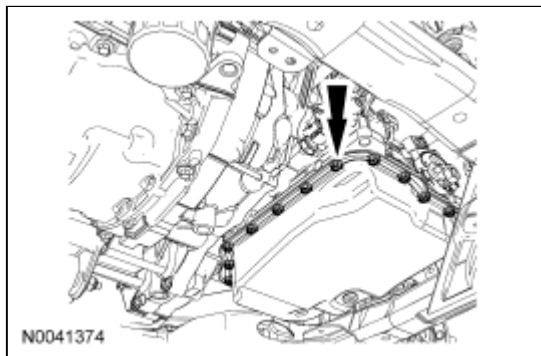
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).
2. Remove the drain plug and allow the transmission fluid to drain.



3. Install the drain plug.
 - Tighten to 29 Nm (21 lb-ft).



4. Remove the transmission fluid pan.
 - Remove the bolts.
 - Using a suitable tool, separate the bead of sealer.

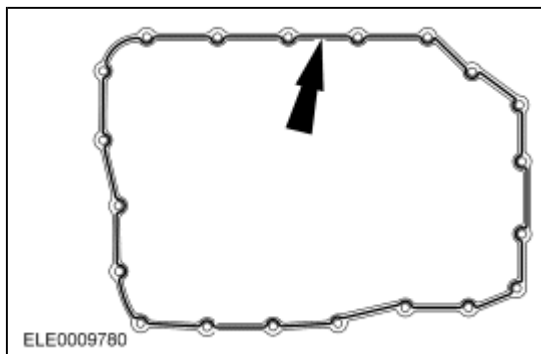


5. Clean the silicone from the transmission fluid pan and transaxle case surfaces thoroughly with metal surface cleaner.

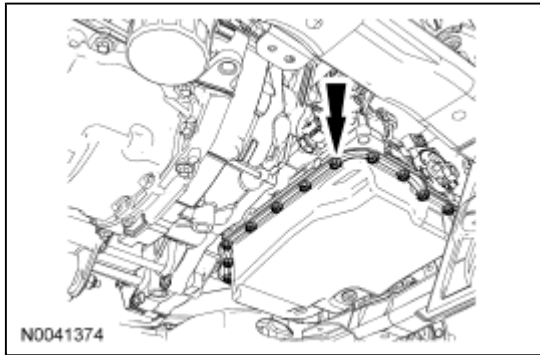
Installation

1. **NOTE:** Do not use more than the specified amount of sealer on the pan or internal transaxle damage could occur.

Apply a 1.5 mm (0.059 in) thick bead of sealer to the transaxle on the transmission fluid pan sealing surface.



2. Install the transmission fluid pan.
 - Tighten to 7 Nm (62 lb-in).

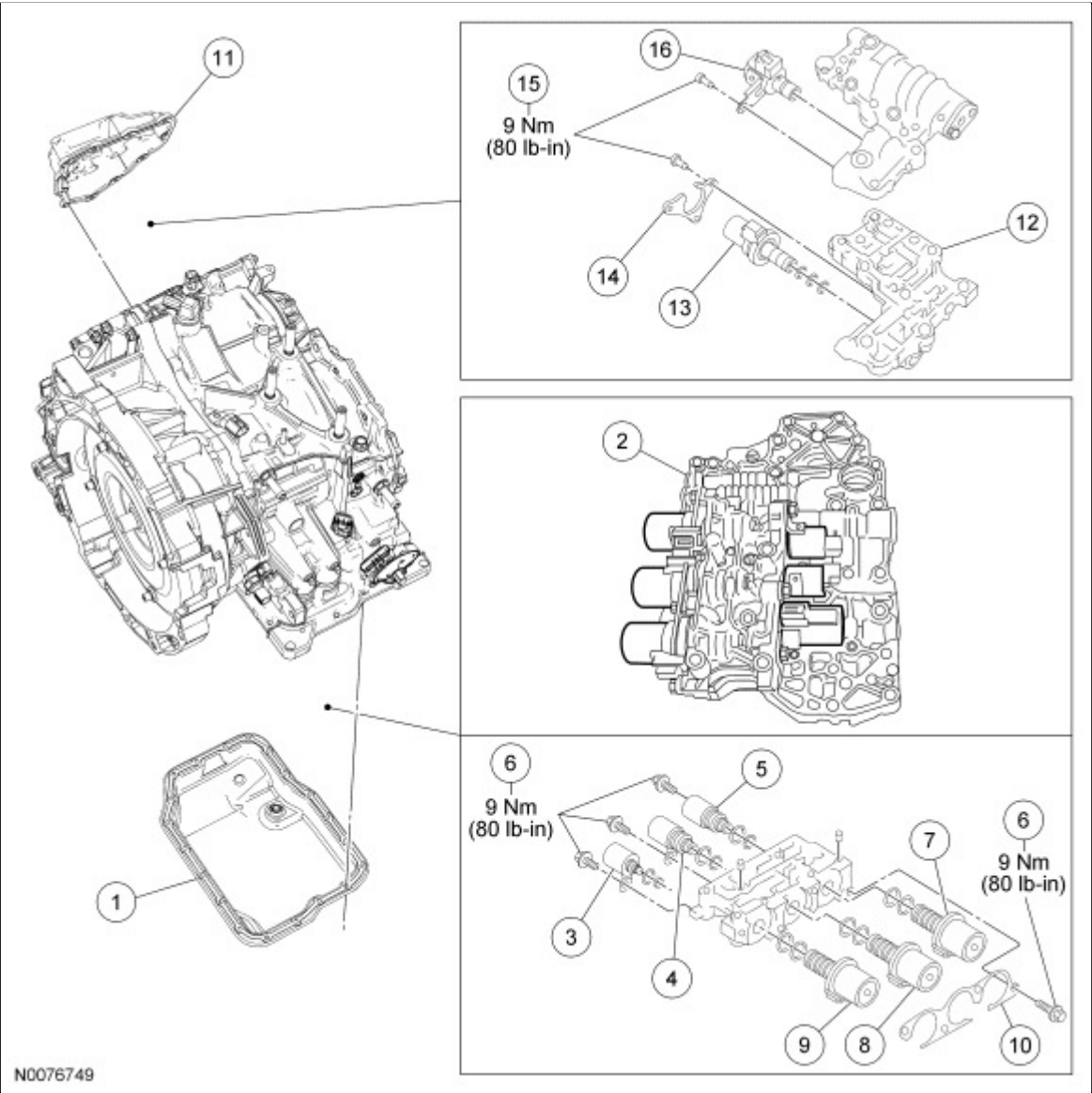


3. Fill the transaxle with clean transmission fluid.
-

Main Control

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda M 5 (ATF-M V)
Motorcraft® Metal Surface Prep ZC-31-A	—
Ultra Silicone Sealant TA-29	—



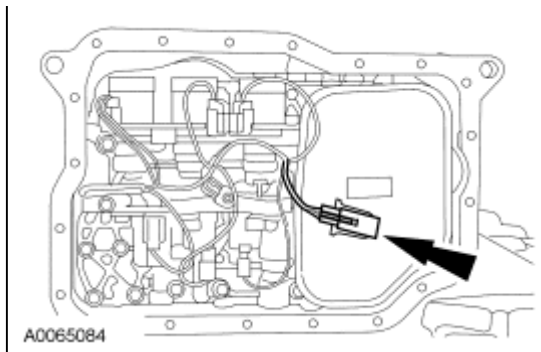
Item	Part Number	Description
1	7A194	Transmission fluid pan

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 (SSA)
10	—	Solenoid retaining bracket
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)

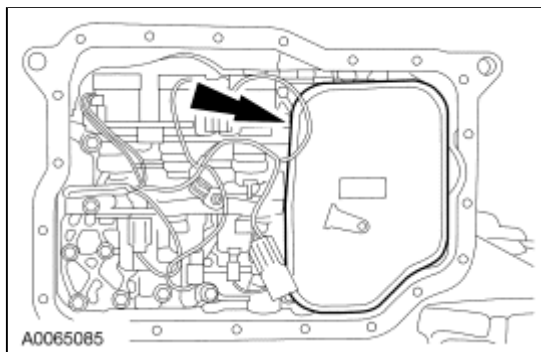
Removal

Main control

1. Remove the transmission fluid pan. For additional information, refer to [Transmission Fluid Pan](#) in this section.
2. Disconnect the Transmission Fluid Temperature (TFT) sensor electrical connector.



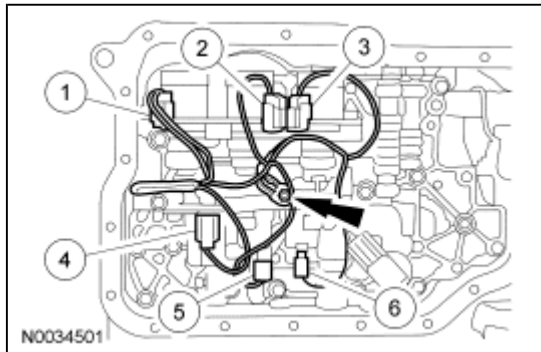
3. Remove the transmission fluid filter.



4. **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.

Remove the ground wire bolt. Disconnect the electrical connectors and remove the main control wiring harness.

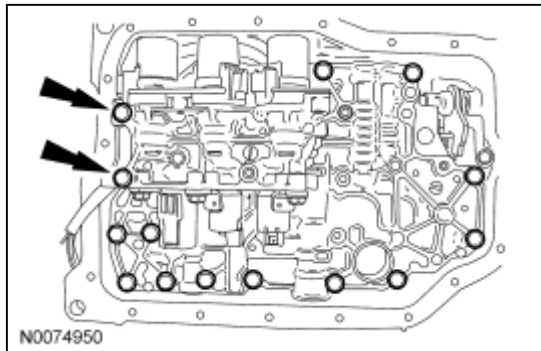
1. Shift Solenoid A (SSA), wire color (BU/GN).
2. Shift Solenoid B (SSB), wire color (BK/GN).
3. Shift Solenoid C (SSC), wire color (BU/BN).
4. Pressure Control Solenoid A (PCA), wire color (BU/OG).
5. Shift Solenoid D (SSD), wire color (WH).
6. Shift Solenoid E (SSE), wire color (RD).



5. **NOTICE:** 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.

Remove the 14 main control valve body bolts and remove the main control valve body and solenoids as an assembly.

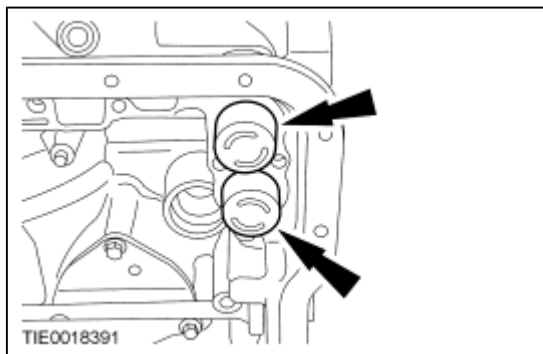


6. **NOTE:** Each accumulator is equipped with 2 springs. All 4 springs are different sizes.

NOTE: Note the size and location of the accumulator springs to aid assembly.

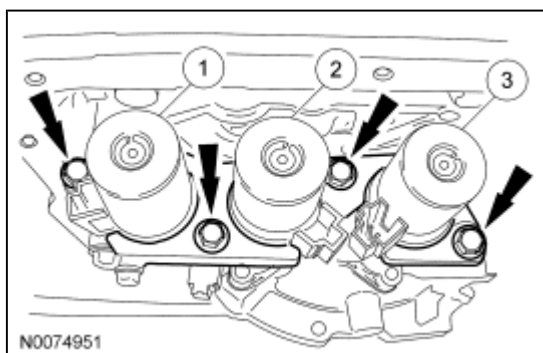
NOTE: Note the shape of each piston and the piston bore from which the piston was removed. The shape and size will vary depending on application. The piston must be installed in its correct bore during assembly.

Remove the accumulator pistons and springs.



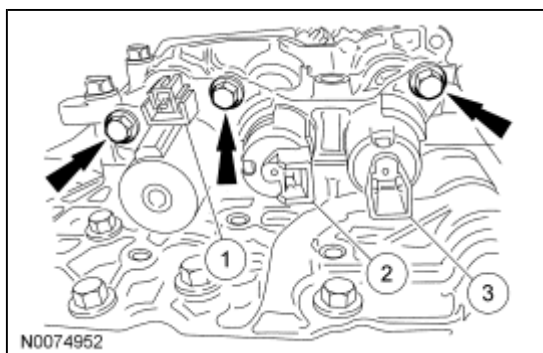
Shift solenoids A, B, C, D, E and Pressure Control Solenoid A (PCA)

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 (SSA)
2	7G484	Shift Solenoid B (SSB)
3	7G484	Shift Solenoid C (SSC)

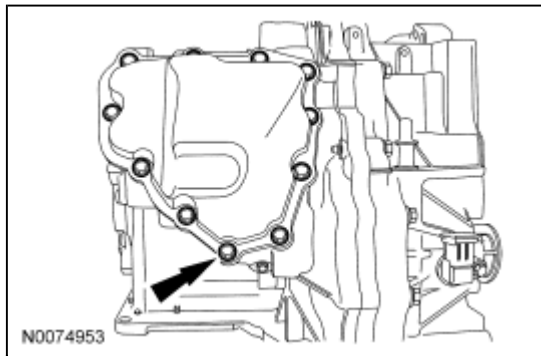
8. Remove the bolts and remove affected solenoid.



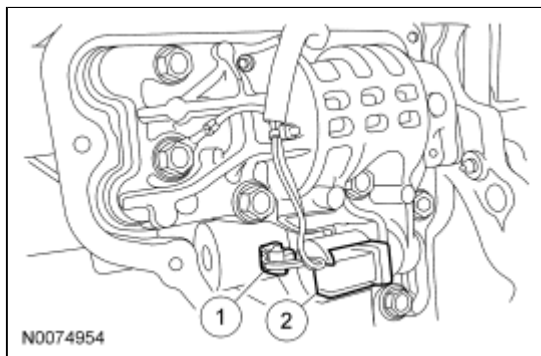
Item	Part Number	Description
1	7G383	Pressure Control Solenoid A (PCA)
2	7H148	Shift Solenoid D (SSD)
3	7H148	Shift Solenoid E (SSE)

Shift Solenoid F (SSF) and Pressure Control Solenoid B (PCB)

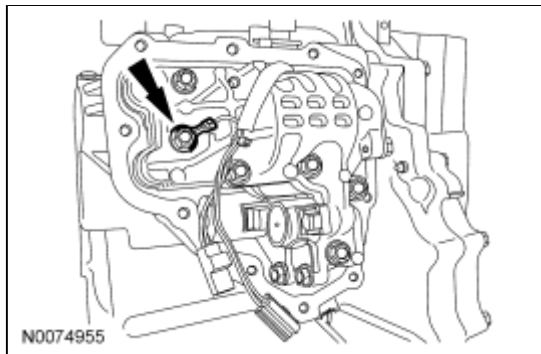
9. Remove the battery tray. For additional information, refer to [Section 414-01](#).
10. Remove the 11 solenoid body cover bolts and remove the solenoid body cover.
 - Using a suitable tool, separate the bead of sealer.



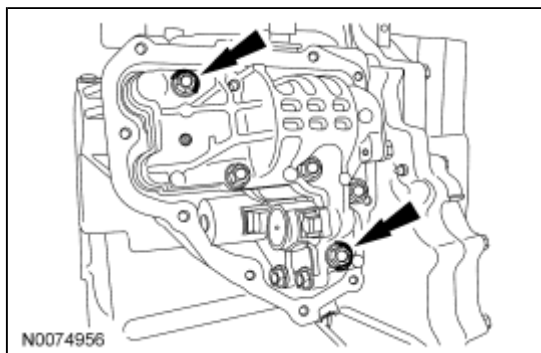
11. Clean the silicone from the solenoid body side cover and transaxle case surfaces thoroughly with metal surface prep.
12. Disconnect the electrical connectors.
 1. Disconnect the electrical connector for the Pressure Control Solenoid B (PCB).
 2. Disconnect the electrical connector for the Shift Solenoid F (SSF).



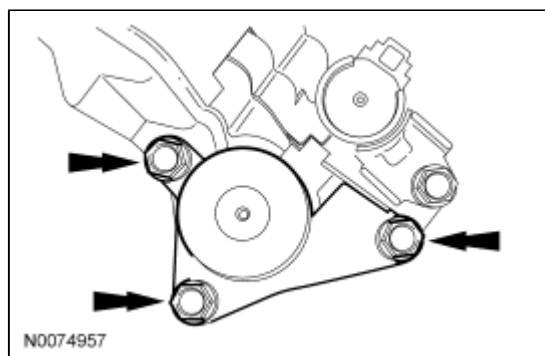
13. Remove the bolt and the ground wire.



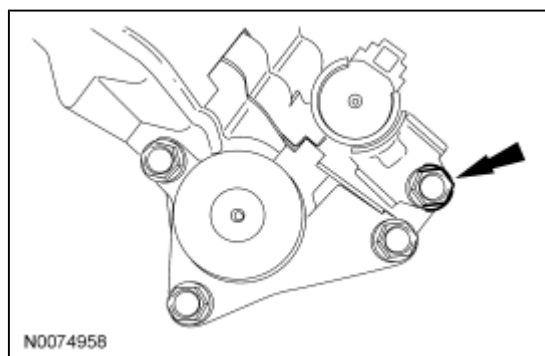
14. Remove the 2 bolts and the solenoid body assembly.



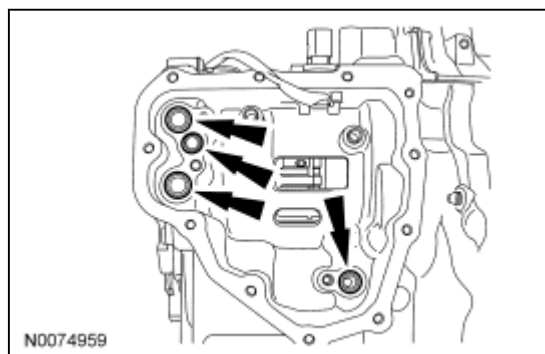
15. Remove the bolts, bracket and the [PCB](#).



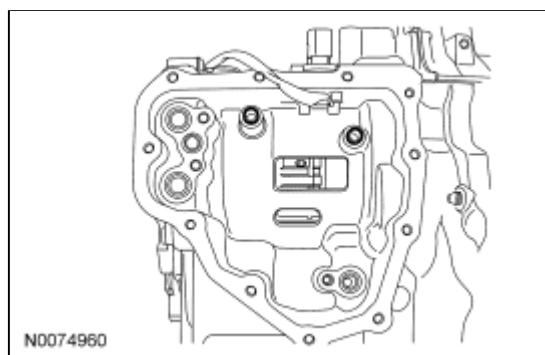
16. Remove the bolt and the [SSF](#).



17. Inspect the O-ring seals for damage, install new O-rings as required.



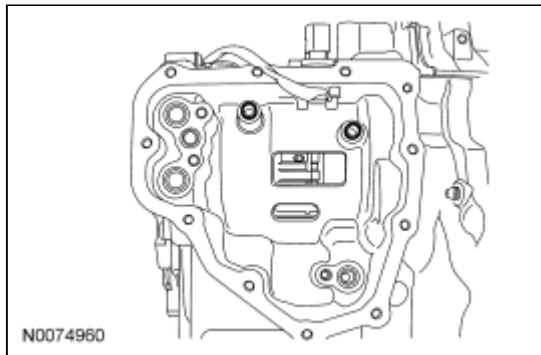
18. Inspect the guide pins for damage, install new guide pins as required.



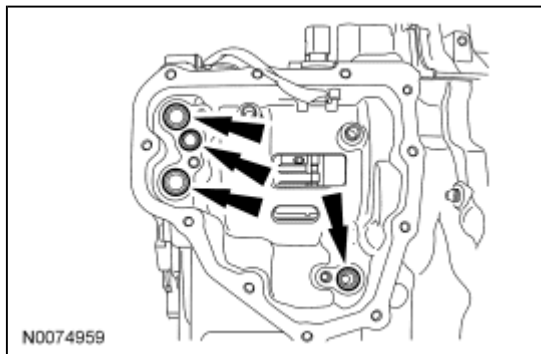
Installation

[SSF](#) and [PCB](#)

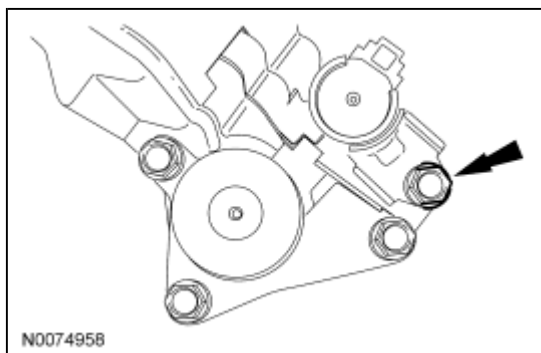
1. Prior to installing the solenoid body make sure that the guide pins are in place.



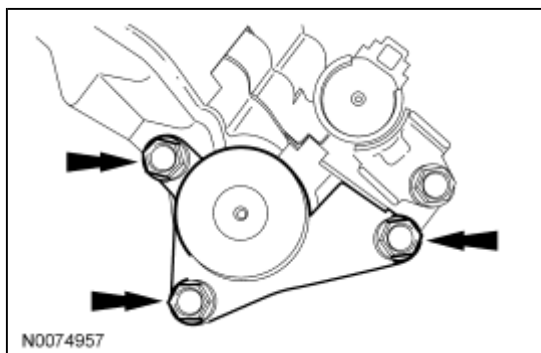
2. Prior to installing the solenoid body make sure that the O-ring seals are in place.



3. Install the [SSF](#) and install the bolt.
 - Tighten to 9 Nm (80 lb-in).

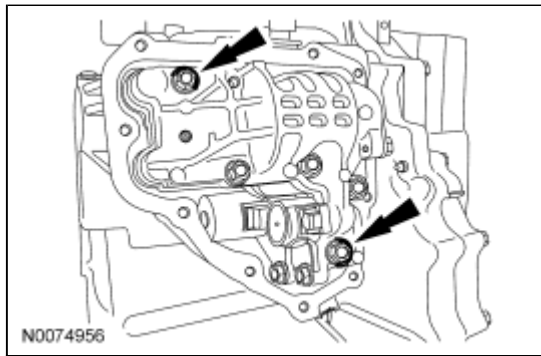


4. Install the [PCB](#), bracket and bolts.
 - Tighten to 9 Nm (80 lb-in).



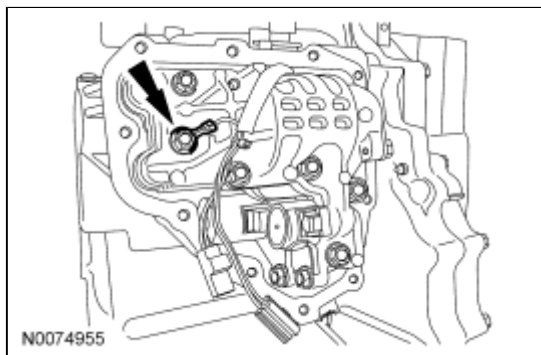
5. Install the solenoid body assembly and the 2 bolts.

- Tighten to 9 Nm (80 lb-in).



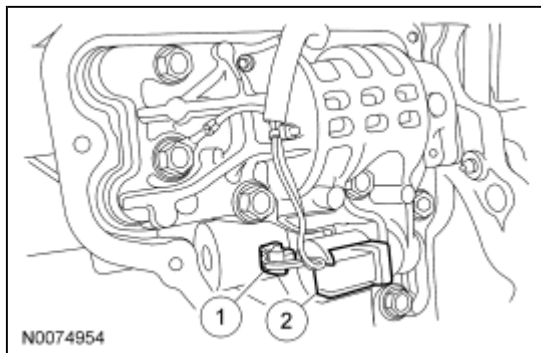
6. Install the ground wire and the bolt.

- Tighten to 9 Nm (80 lb-in).



7. Connect the electrical connectors.

1. Connect the electrical connector for the PCB.
2. Connect the electrical connector for the SSF.

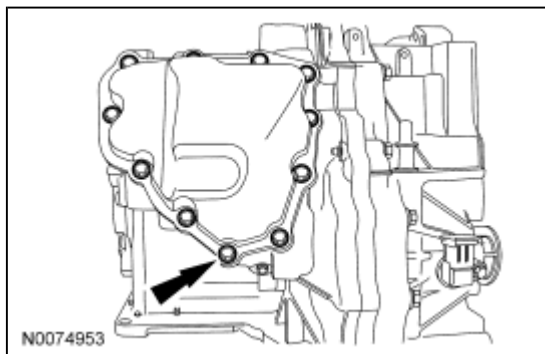


8. **NOTE:** Do not use more than the specified amount of sealer on the side cover pan or internal transaxle damage could occur.

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).

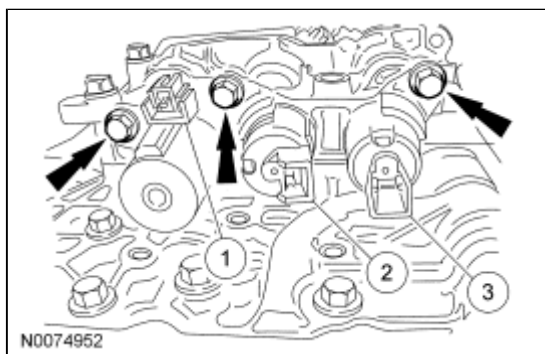


10. Install the battery tray. For additional information, refer to [Section 414-01](#).

Shift solenoids A, B, C, D, E and **PCA**

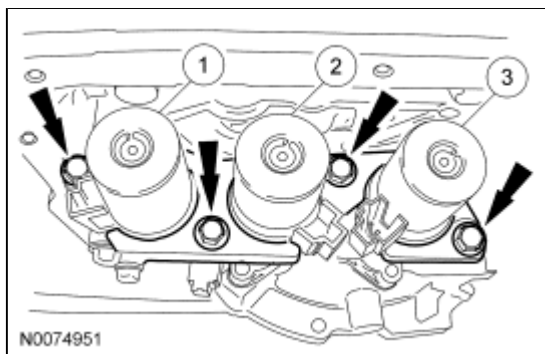
11. Install the affected solenoid and the bolts.
- Tighten to 9 Nm (80 lb-in).

Item	Part Number	Description
1	7G383	Pressure Control Solenoid A (PCA)
2	7H148	Shift Solenoid D (SSD)
3	7H148	Shift Solenoid E (SSE)



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 (SSA)
2	7H448	Shift Solenoid B (SSB)
3	7H448	Shift Solenoid C (SSC)



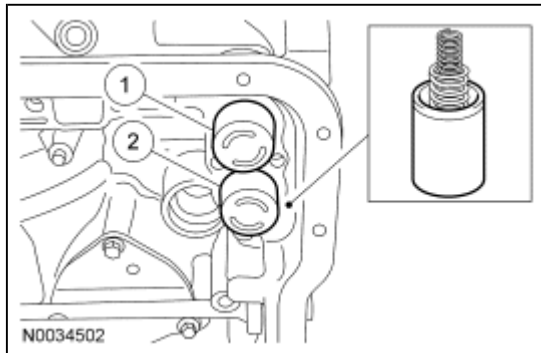
Main control

13. **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.

Install the accumulator pistons and springs.

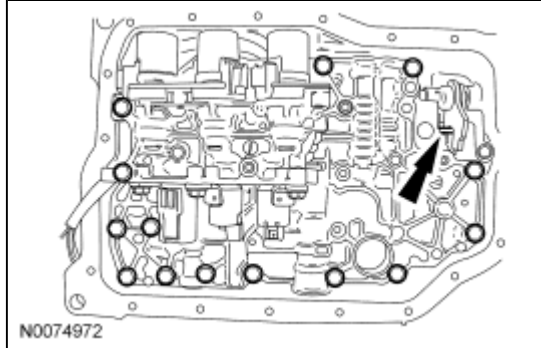
1. Accumulator 1 and 2.
2. Accumulator N and D.



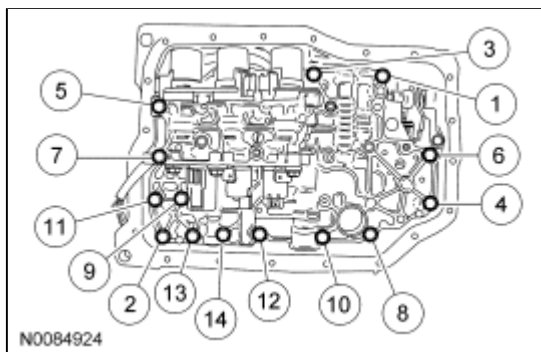
14. **NOTE:** Make sure that the manual valve is in the manual control valve shift lever.

NOTE: Do not fully tighten the main control valve bolts at this stage.

Install the main control valve body and loosely install the bolts.



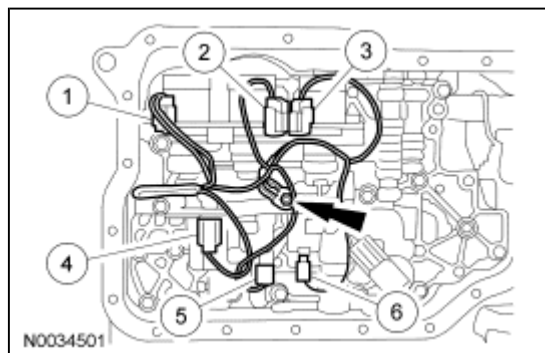
15. Tighten the main control valve body retaining bolts.
- Tighten the bolts in the sequence shown.
 - Tighten to 9 Nm (80 lb-in).



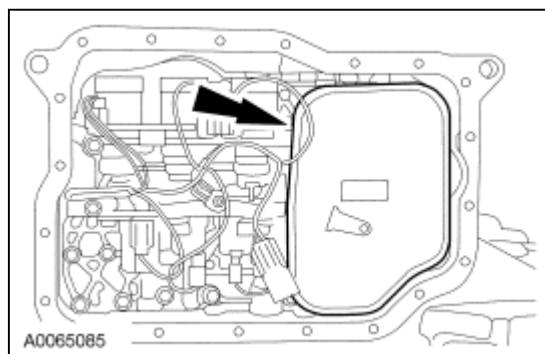
16. **NOTE:** It is necessary to connect the electrical connectors in the same positions as noted in disassembly. Connector color letters are cast into the solenoid body.

Install the main control valve wiring harness, connect the electrical connectors and install the ground wire bolt.

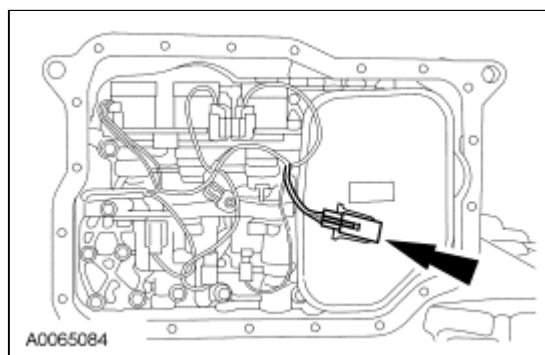
1. **SSA**, wire color (BU/GN).
 2. **SSB**, wire color (BK/GN).
 3. **SSC**, wire color (BU/BN).
 4. **PCA**, wire color (BU/OG).
 5. **SSD**, wire color (WH).
 6. **SSE**, wire color (RD).
- Tighten to 10 Nm (89 lb-in).



17. Install the transmission fluid filter.



18. Connect the **TFT** sensor electrical connector.



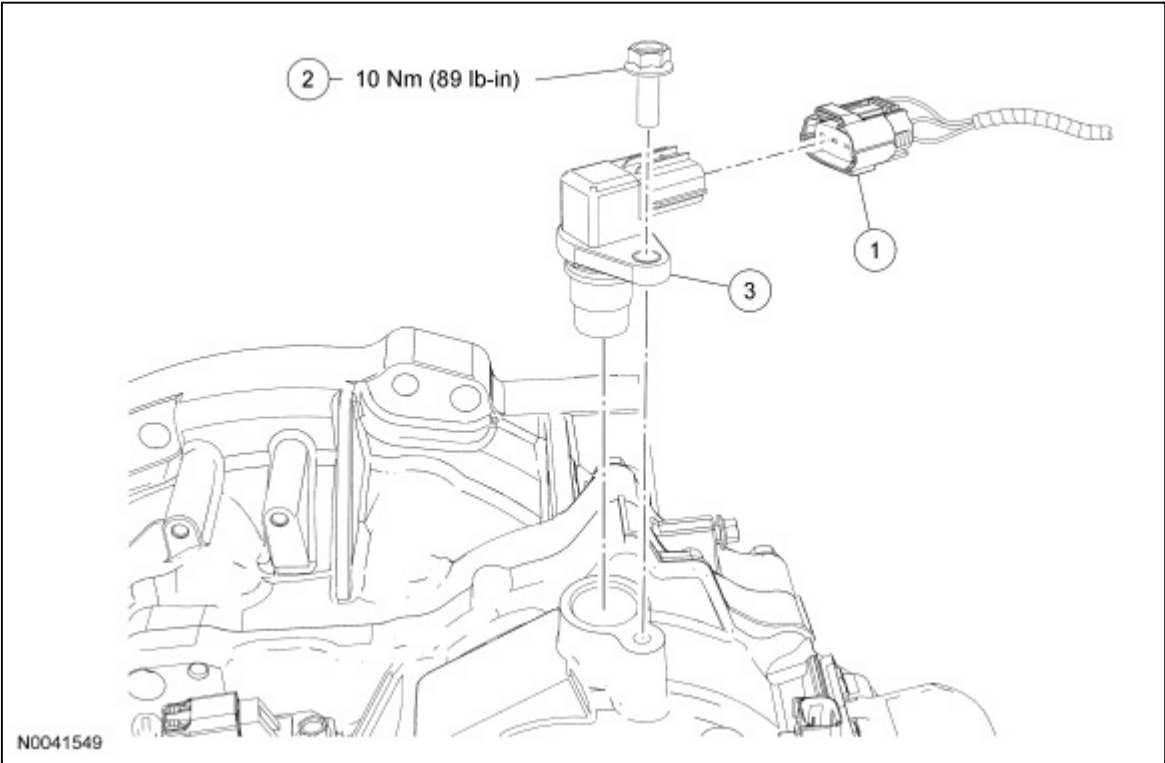
19. Install the transmission fluid pan. For additional information, refer to [Transmission Fluid Pan](#) in this section.
-

Intermediate Shaft Speed Sensor

Material

Item	Specification
Thread Sealant with PTFE TA-24	WSK-M2G350-A2

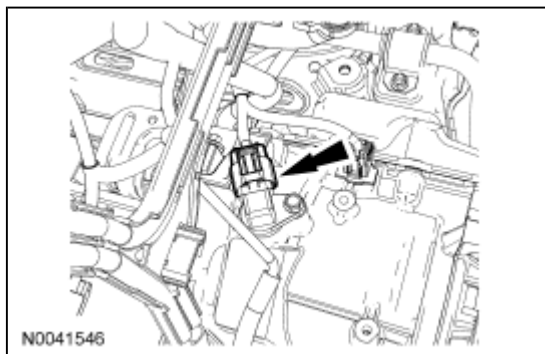
Intermediate Shaft Speed Sensor



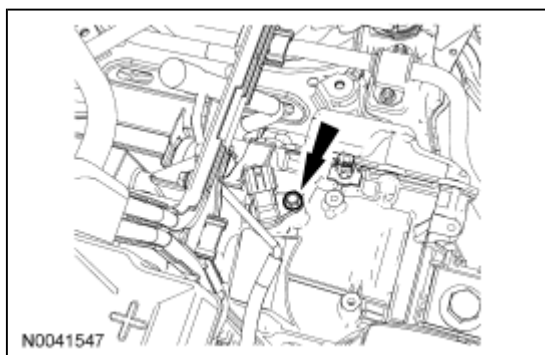
Item	Part Number	Description
1	14A464	Intermediate shaft speed sensor electrical connector
2	S997840616	Bolt
3	7H103	Intermediate shaft speed sensor

Removal

1. Disconnect the intermediate shaft speed sensor electrical connector.



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.



Installation

1. **NOTE:** Apply a light coat of petroleum jelly to the O-ring seal before installation.

NOTE: Apply thread sealant to the bolt.

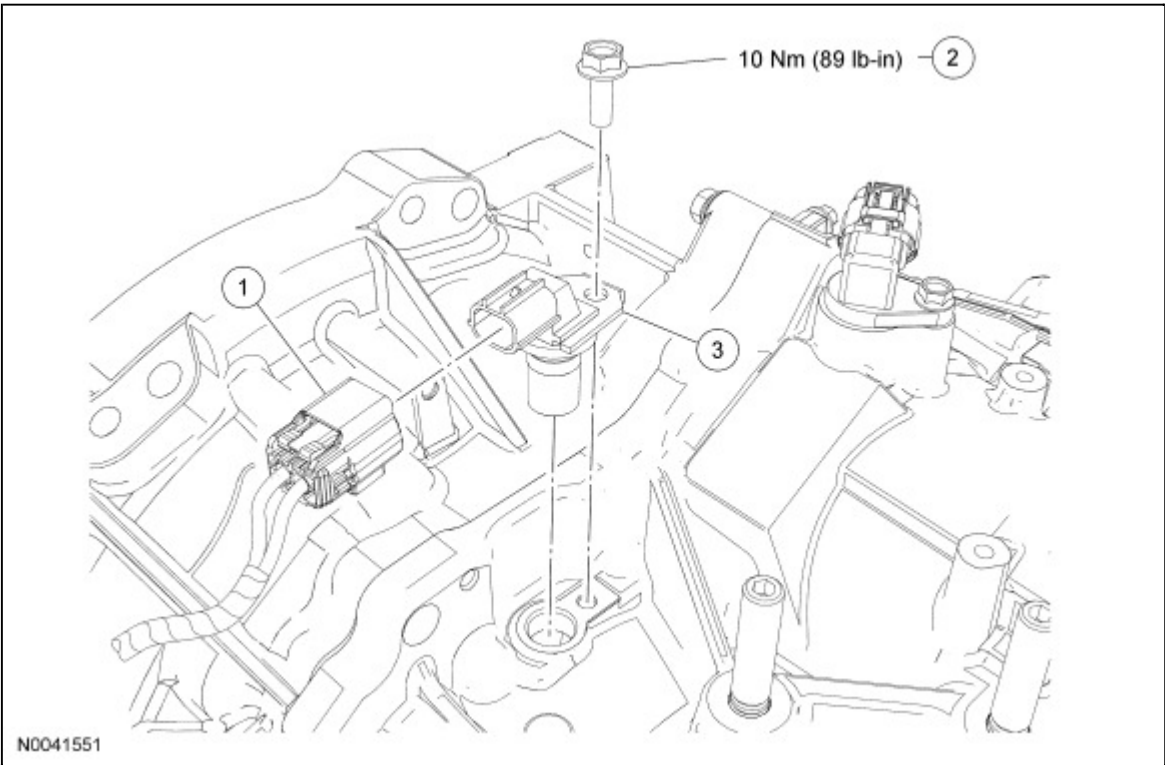
To install, reverse the removal procedure.

Turbine Shaft Speed (TSS) Sensor

Material

Item	Specification
Thread Sealant with PTFE TA-24	WSK-M2G350-A2

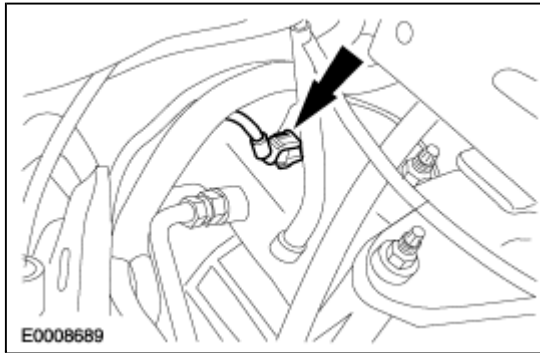
Turbine Shaft Speed (TSS) Sensor



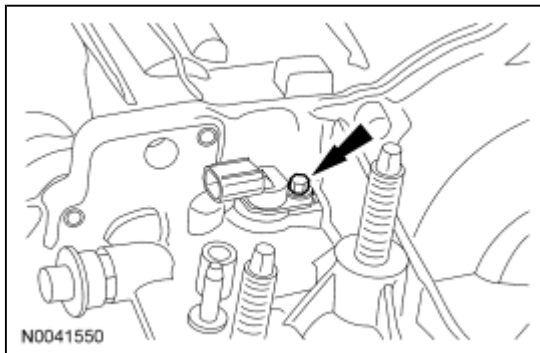
Item	Part Number	Description
1	14A464	Turbine Shaft Speed (TSS) sensor electrical connector
2	S997840616	TSS sensor bolt
3	7M101	TSS sensor

Removal

1. Disconnect the Turbine Shaft Speed (TSS) sensor electrical connector.



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.



Installation

1. **NOTE:** Apply a light coat of petroleum jelly to the O-ring seal before installation.

NOTE: Apply thread sealant to the bolt.

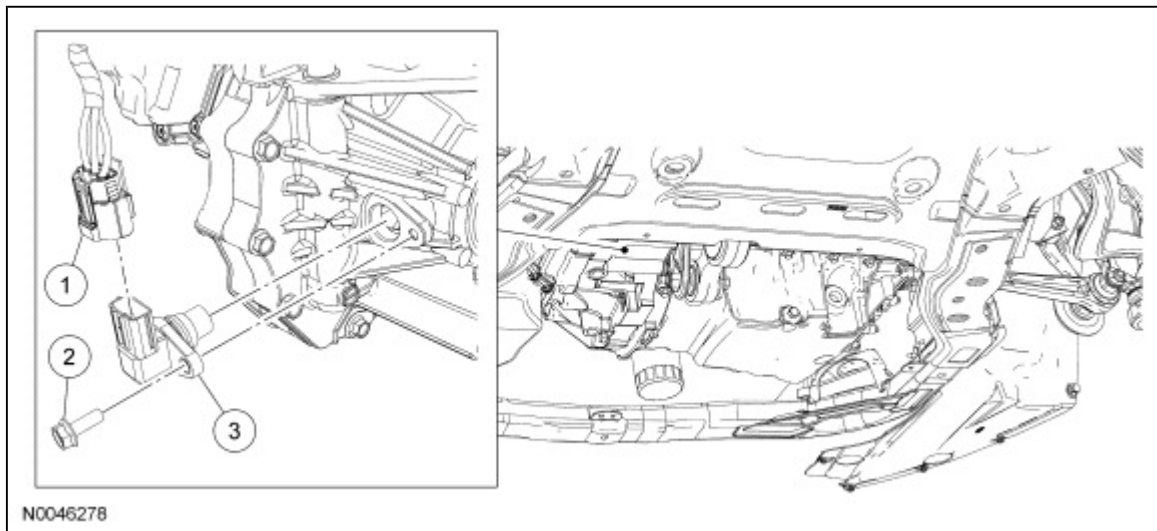
To install, reverse the removal procedure.

Output Shaft Speed (OSS) Sensor

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda M 5 (ATF-M V)

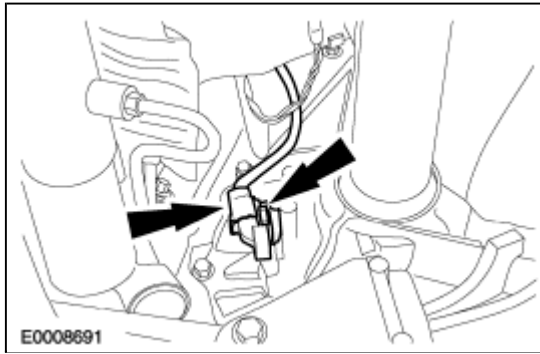
Output Shaft Speed (OSS) Sensor



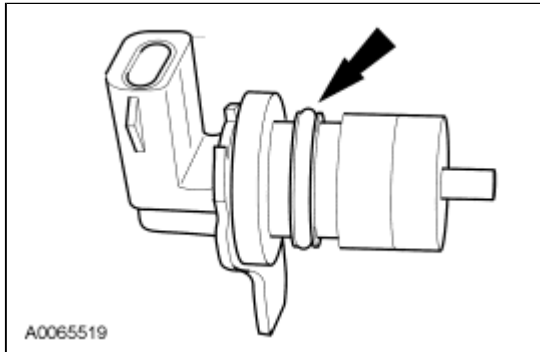
Item	Part Number	Description
1	14A464	Output Shaft Speed (OSS) sensor electrical connector
2	S997840616	OSS bolt
3	7H103	OSS sensor

Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).
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.



4. Inspect the OSS O-ring seal for nicks or cuts, install a new OSS O-ring if necessary.

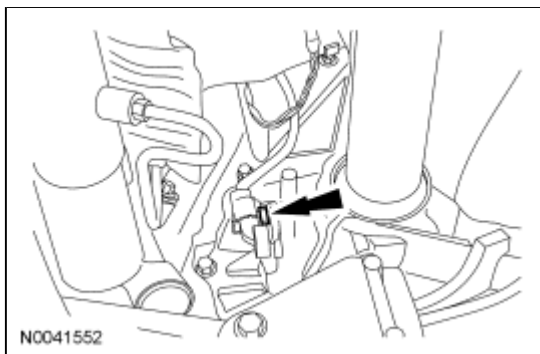


Installation

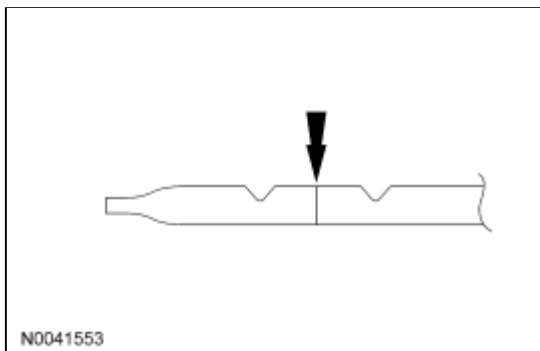
1. **NOTE:** Apply a light coat of petroleum jelly to the O-ring before installation.

Install the OSS sensor.

- Tighten the OSS sensor bolt to 10 Nm (89 lb-in).
- Connect the OSS electrical connector.



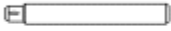

2. Check the transmission fluid level and add transmission fluid as necessary.



3. Start the engine and move the selector lever through all gear positions.

Halfshaft Seal — LH

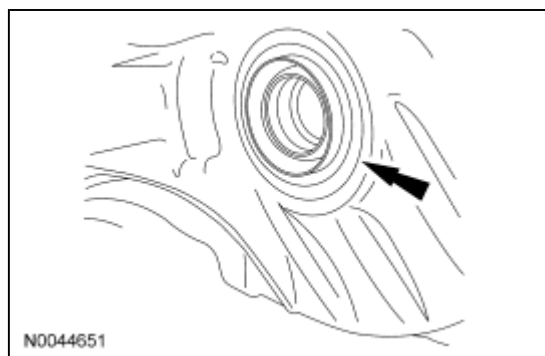
Special Tool(s)

 ST1255-A	Handle 205-153 (T80T-4000-W)
 ST2961-A	Installer, Output Shaft Seal 307-572

Removal

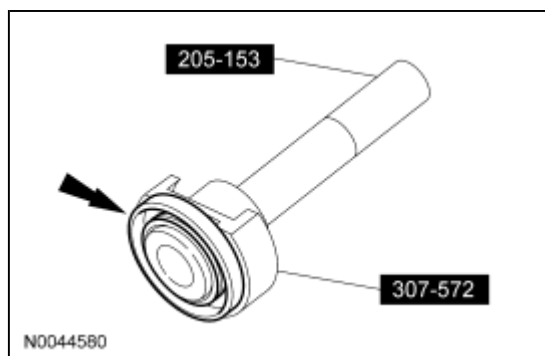
1. Remove the LH halfshaft. For additional information, refer to [Section 205-04](#).
2. **NOTICE:** Be careful not to damage the case while removing the seal.

Using a suitable tool, remove the LH differential fluid seal.

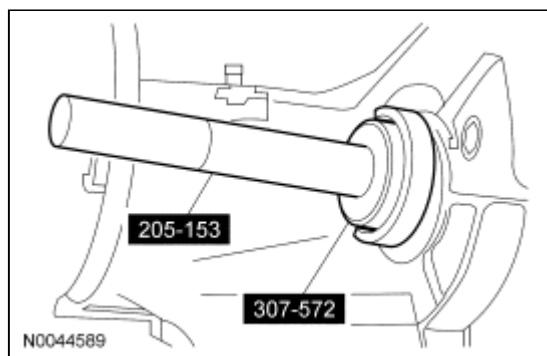


Installation

1. Position the new differential fluid seal on the Output Shaft Seal Installer and Handle.



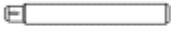

2. Using the Output Shaft Seal Installer and Handle, install the halfshaft seal.



3. Install the LH halfshaft. For additional information, refer to [Section 205-04](#).
-

Halfshaft Seal — RH

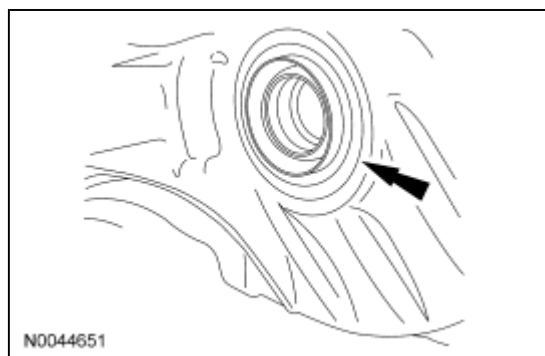
Special Tool(s)

 ST1255-A	Handle 205-153 (T80T-4000-W)
 ST2961-A	Installer, Output Shaft Seal 307-572

Removal

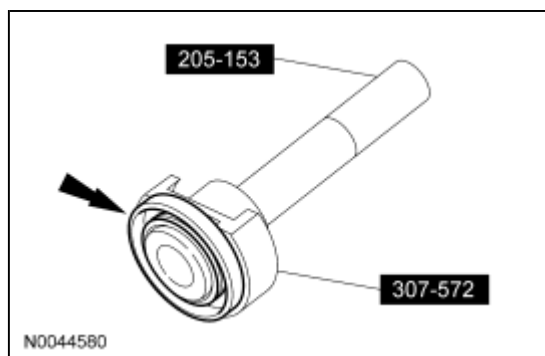
1. Remove the RH halfshaft. For additional information, refer to [Section 205-04](#).
2. **NOTICE:** Be careful not to damage the case while removing the seal.

Using a suitable tool, remove the RH differential fluid seal.

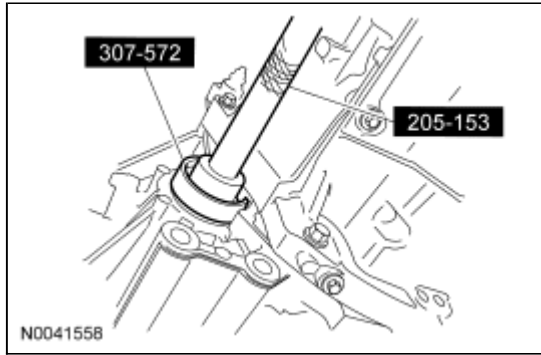


Installation

1. Position the new differential fluid seal on the Output Shaft Seal Installer and Handle.




2. Using the Output Shaft Seal Installer and Handle, install the halfshaft seal.



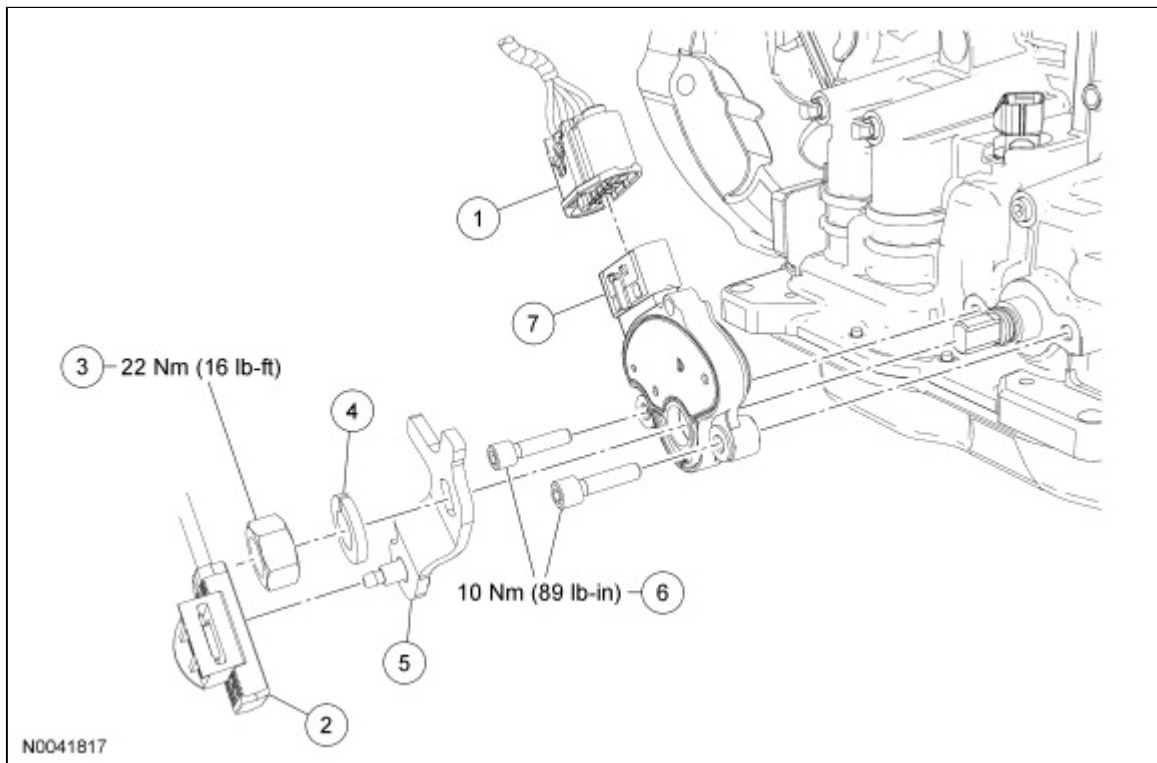
3. Install the RH halfshaft. For additional information, refer to [Section 205-04](#).
-

Transmission Range (TR) Sensor

Special Tool(s)

 <p>ST2962-A</p>	<p>Alignment Tool, Transmission Range Sensor 307-571</p>
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Transmission Range (TR) Sensor

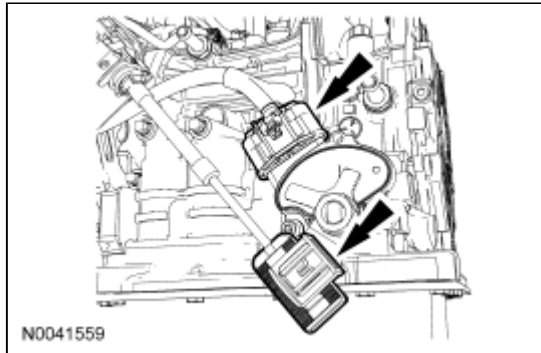


Item	Part Number	Description
1	14A464	Transmission Range (TR) sensor electrical connector
2	7E395	Selector lever cable
3	S999211400	Manual control lever nut
4	—	Lock washer
5	7A256	Manual control lever
6	W500015-S309	TR sensor bolts (2 required)
7	7F293	TR sensor

Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).

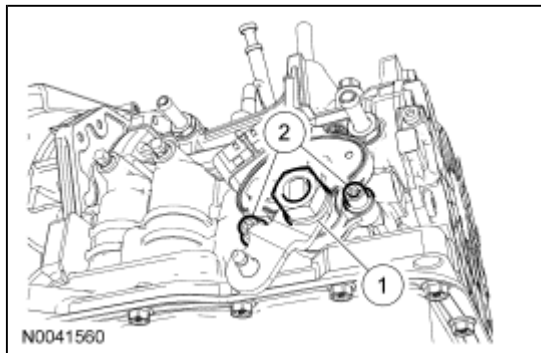
2. Disconnect the Transmission Range (TR) sensor electrical connector and the selector lever cable end.



3. **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.

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.

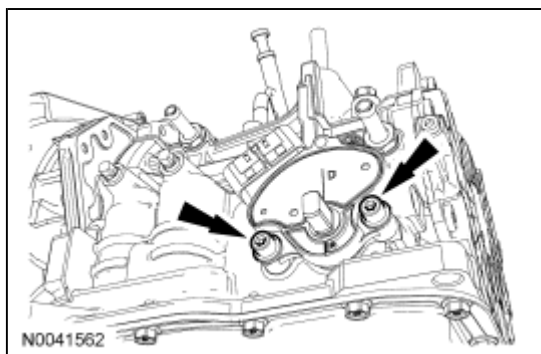


Installation

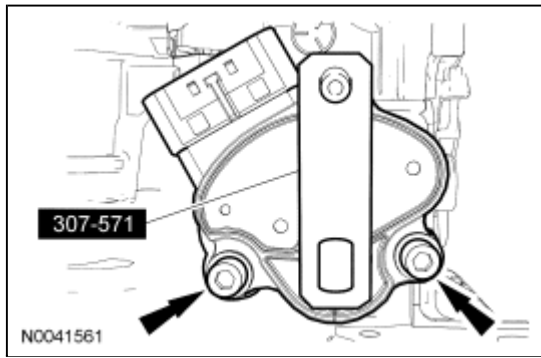
1. **NOTICE:** Failure to hold the manual control lever, while loosening or tightening the manual control lever nut, will transmit rotational torque to the Transmission Range (TR) switch causing internal damage.

NOTE: Do not fully tighten the **TR** bolts at this time.

Install the **TR** sensor and loosely install the bolts (the automatic transaxle is removed for clarity).



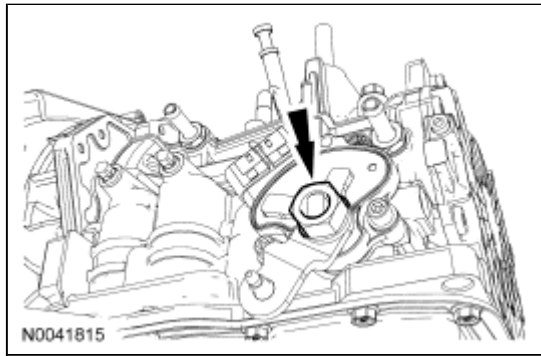
2. Using the Transmission Range Sensor Alignment Tool, align the **TR** sensor and tighten the bolts.
 - Tighten to 10 Nm (89 lb-in).



3. **NOTICE:** 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.

Install the manual control lever.

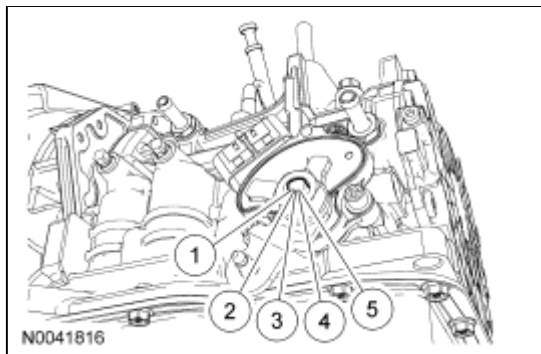
- Tighten to 22 Nm (16 lb-ft).



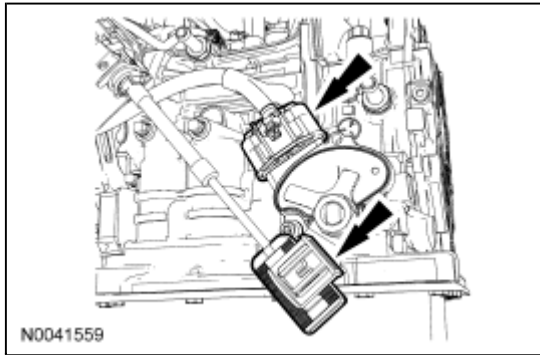
4. **NOTE:** Check to make sure the manual control lever is in position "2" (same as "D" position).

Adjust the manual control lever to **TR** sensor D position.

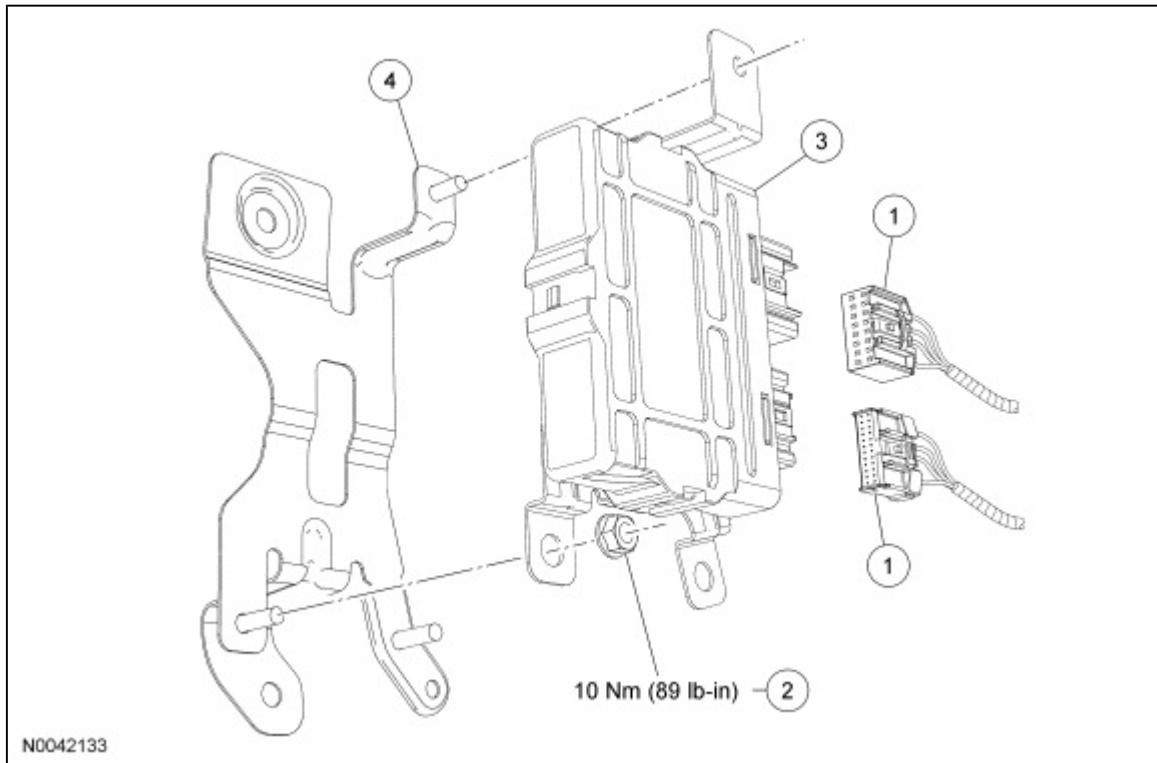
1. L (LOW)
 2. D (DRIVE)
 3. N (NEUTRAL)
 4. R (REVERSE)
 5. P (PARK)
- When in position D, the marks on the manual control lever line up with the marks on the **TR** sensor.



5. Connect the selector lever cable and the **TR** sensor electrical connector.



Transmission Control Module (TCM)

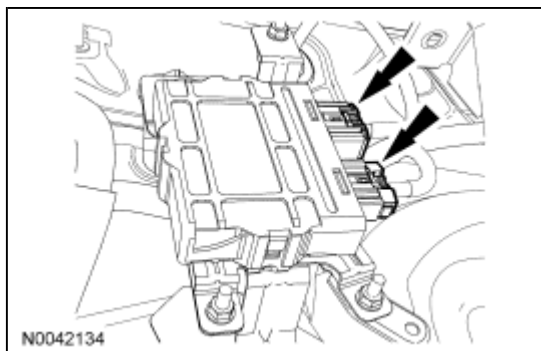


Item	Part Number	Description
1	14489	Transmission Control Module (TCM) electrical connectors
2	3M51	Nut
3	72369	TCM
4	—	TCM mounting bracket

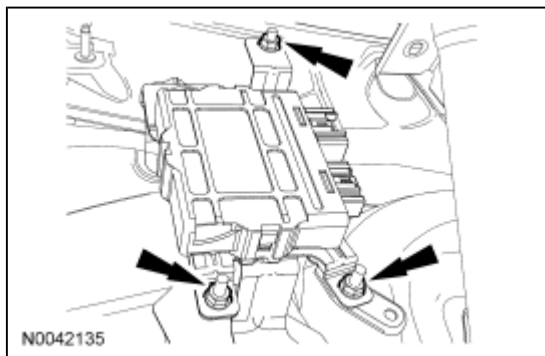
Removal

1. **NOTE:** The Transmission Control Module (TCM) is located under the LH side of the instrument panel.

Disconnect the 2 electrical connectors.



2. Remove the 3 nuts and remove the [TCM](#).
 - To install, tighten to 10 Nm (89 lb-in).

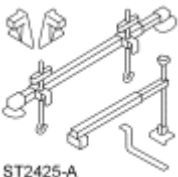


Installation

1. To install, reverse the removal procedure.
-

Transaxle Support Insulator

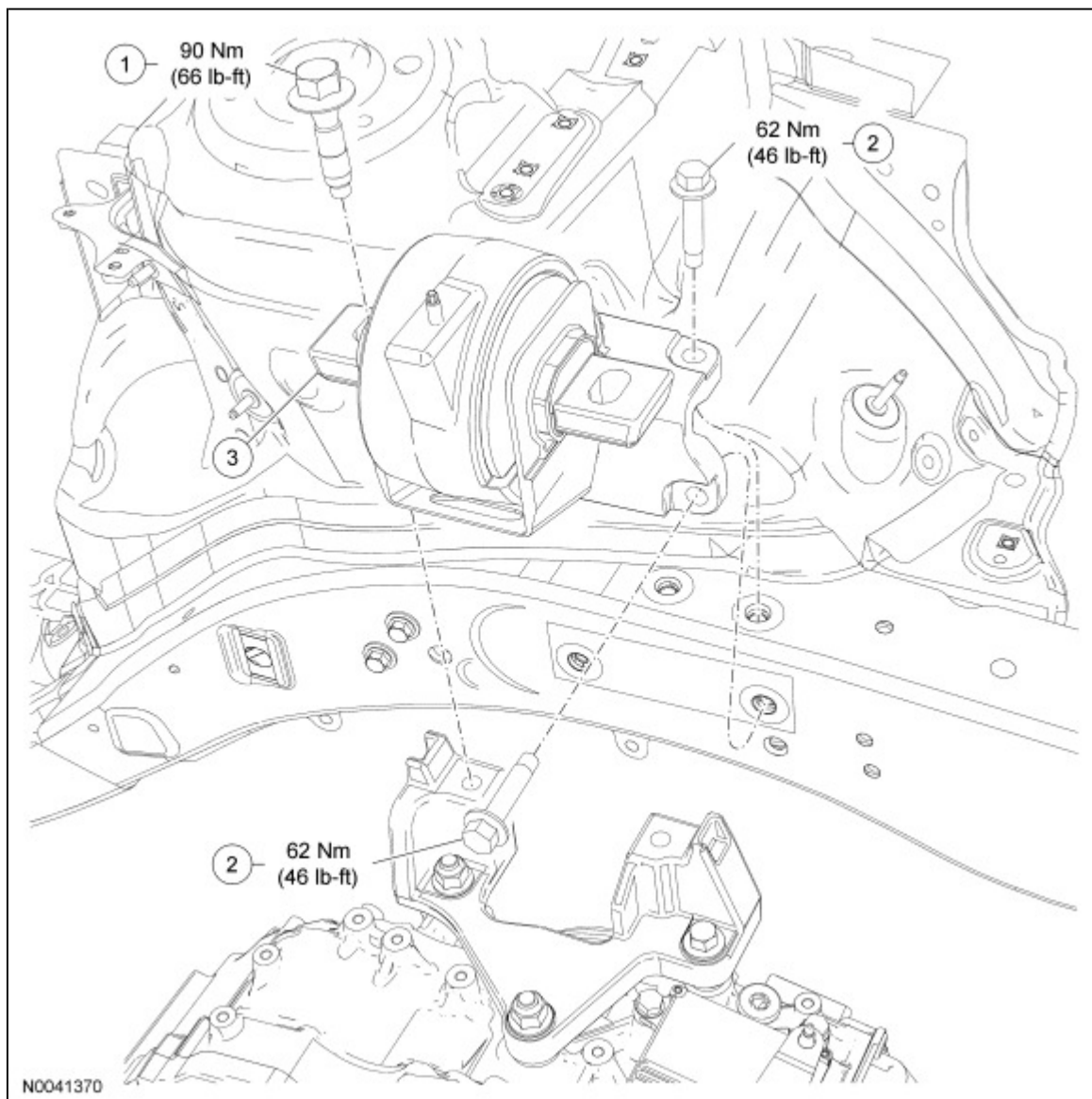
Special Tool(s)

 ST2425-A	Support Bar, Engine 303-F072
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Material

Item	Specification
Threadlock and Sealer TA-25	WSK-M2G351-A5

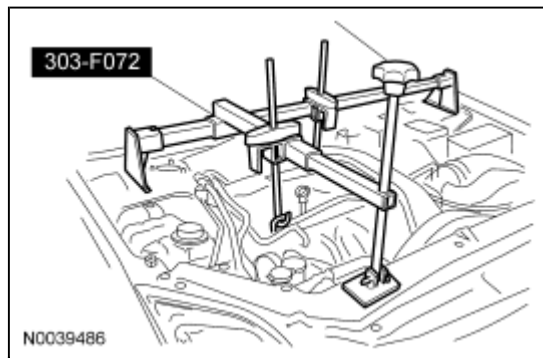
Transaxle Support Insulator



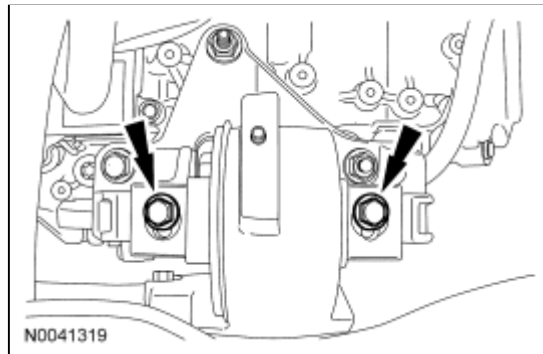
Item	Part Number	Description
1	W711724	Transaxle support insulator bracket bolt (2 required)
2	W709234	Transaxle support insulator frame bolts (4 required)
3	6F020	Transaxle insulator

Removal

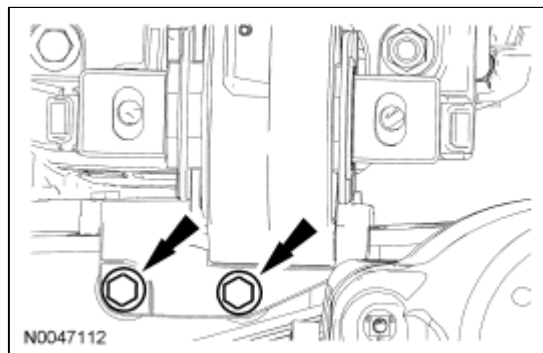
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).
2. Remove the battery and battery tray. For additional information, refer to [Section 414-01](#).
3. Using the Engine Support Bar, support the engine.



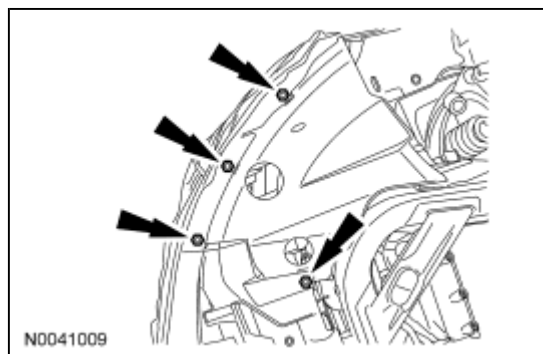
4. Remove the transaxle support insulator bracket bolts.



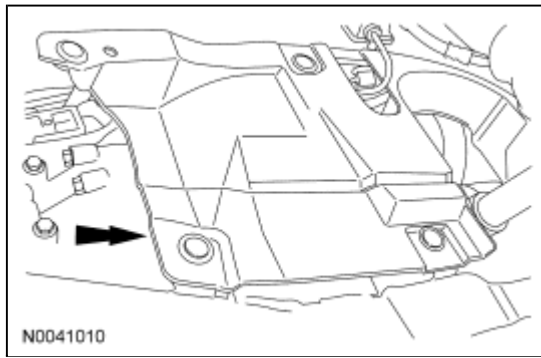
5. Remove the transaxle support insulator frame bolts.



6. Remove the 4 screws and position the LH fender splash shield aside.



7. Remove the 6 pin-type retainers and the LH front structure-to-subframe splash shield.



8. Remove the transaxle support insulator frame bolts and remove the insulator.

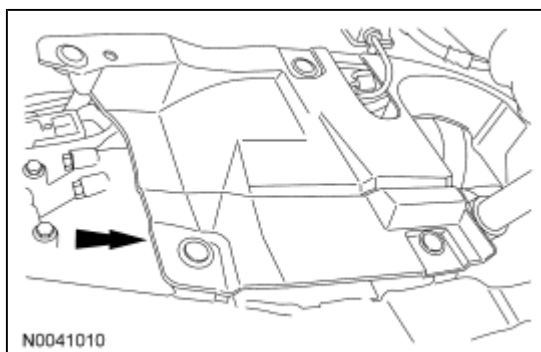


Installation

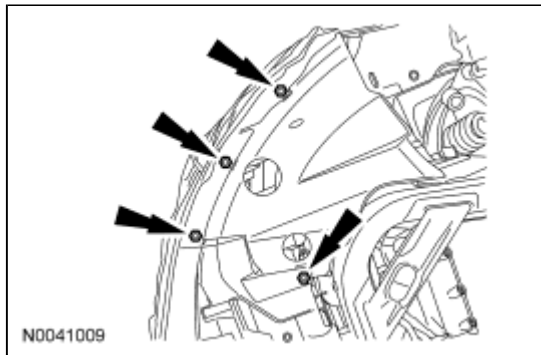
1. Clean the transaxle support insulator frame bolts using a wire brush and apply new threadlock to the threads.
2. Position the transaxle support insulator in place and install the transaxle support insulator frame bolts.
 - Tighten to 62 Nm (46 lb-ft).



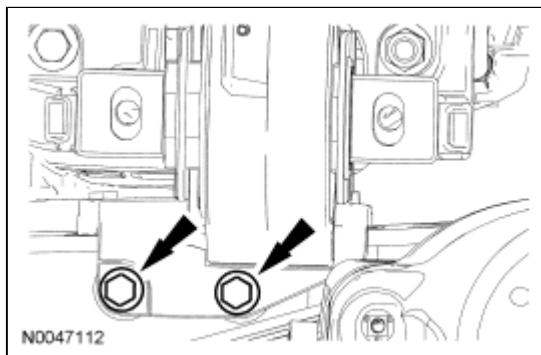
3. Position the LH front structure-to-subframe splash shield in place and install the 6 pin-type retainers.



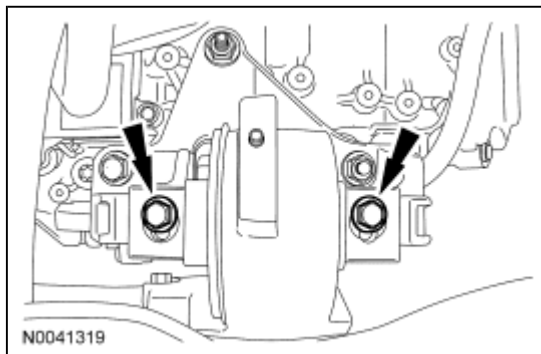
4. Position the LH splash shield in place and install the 4 screws.



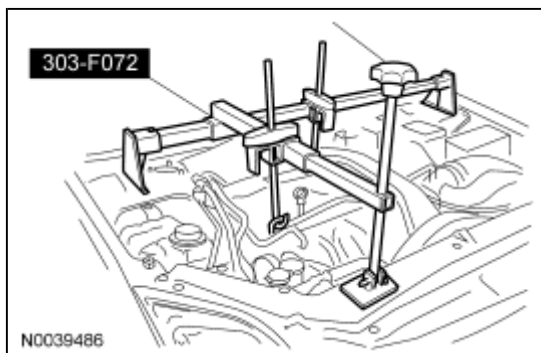
5. Install the 2 upper transaxle support insulator frame bolts.
- Tighten to 62 Nm (46 lb-ft).



6. Install the 2 transaxle support insulator bracket bolts.
- Tighten to 90 Nm (66 lb-ft).




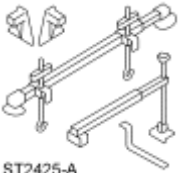
7. Remove the Engine Support Bar.



8. Install the battery and battery tray. For additional information, refer to [Section 414-01](#).

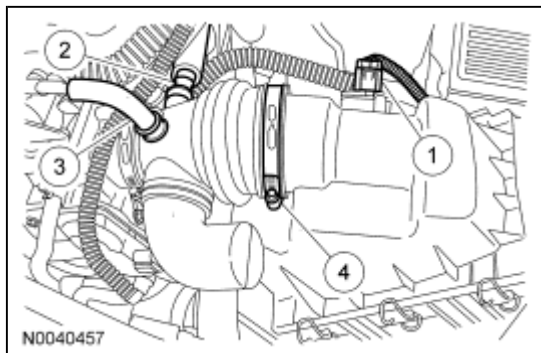
Transaxle

Special Tool(s)

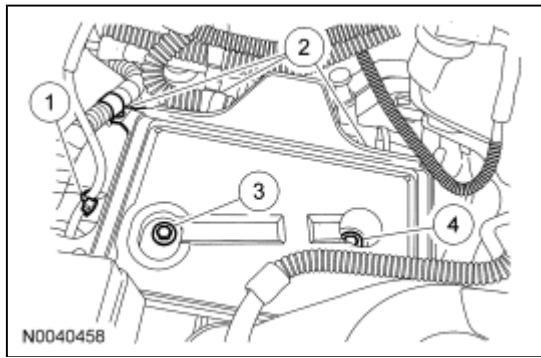
 ST1636-A	Retainer, Torque Converter 307-566
 ST2425-A	Support Bar, Engine 303-F072

Removal

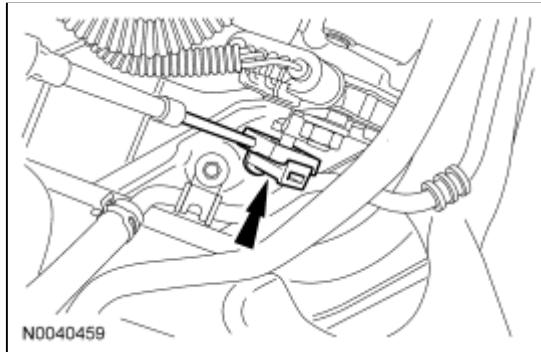
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).
2. Remove the Air Cleaner (ACL) assembly.
 1. Disconnect the Mass Air Flow (MAF) sensor electrical connector.
 2. Disconnect the engine breather.
 3. Disconnect the brake booster vacuum hose.
 4. Loosen the clamp and remove the [ACL](#) assembly.



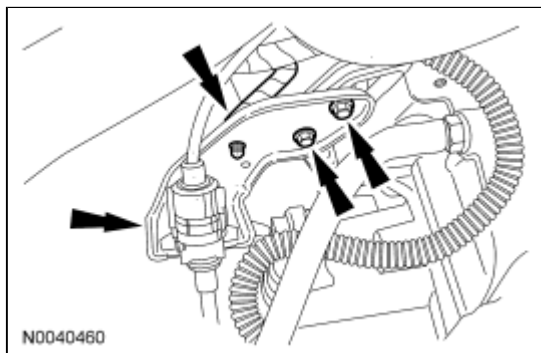
3. Remove the battery. For additional information, refer to [Section 414-01](#).
4. Remove the battery tray.
 1. Disconnect the positive battery cable fastener from the battery tray.
 2. Disconnect the 3 wiring harness retainers.
 3. Remove the battery tray nut.
 4. Remove the battery tray bolt and remove the battery tray.



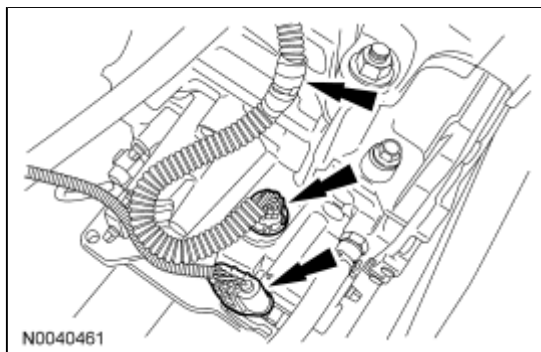
5. Disconnect the selector lever cable end from the manual control lever.



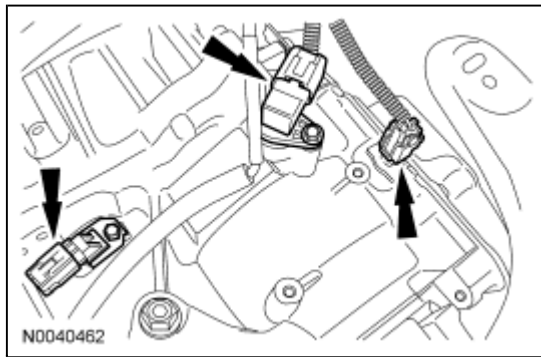
6. Remove the 2 bolts, disconnect the harness and position the selector lever cable and bracket aside.



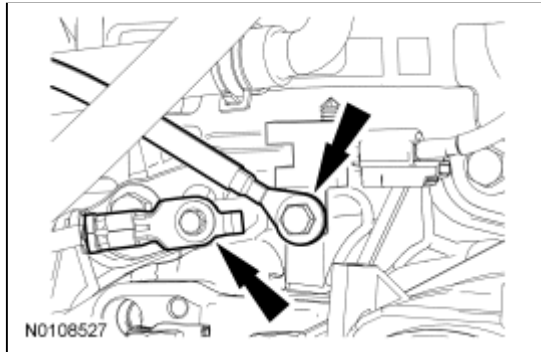
7. Disconnect the Transmission Range (TR) sensor electrical connector, transmission main valve body electrical connector, and disconnect the harness retainer from the transaxle and position the harness aside.



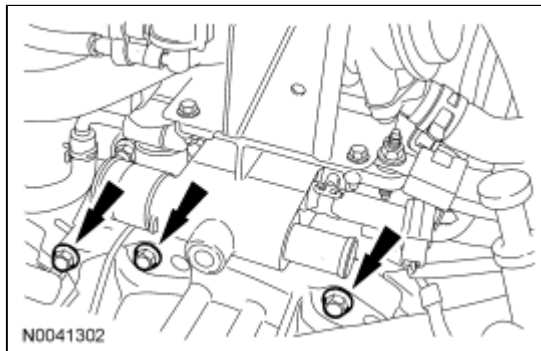
8. Disconnect the Turbine Shaft Speed (TSS) sensor, intermediate shaft speed sensor and 5th gear valve body electrical connector and position the harness aside.



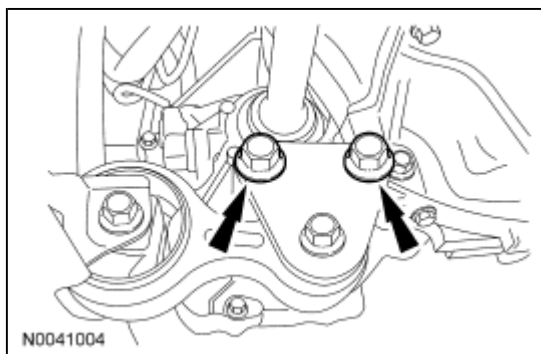
9. Remove the 2 ground straps.



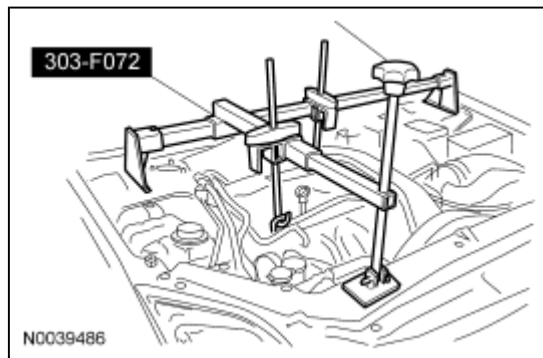
10. Remove the 3 top bellhousing bolts.



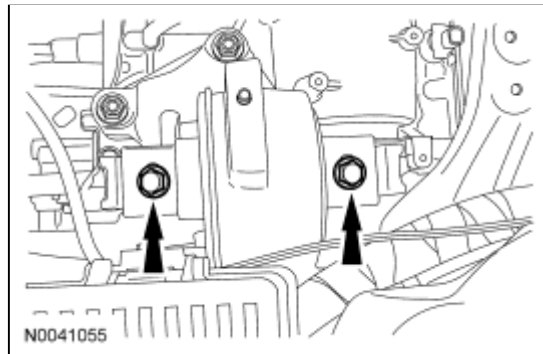
11. Remove the 2 roll restrictor bracket bolts.



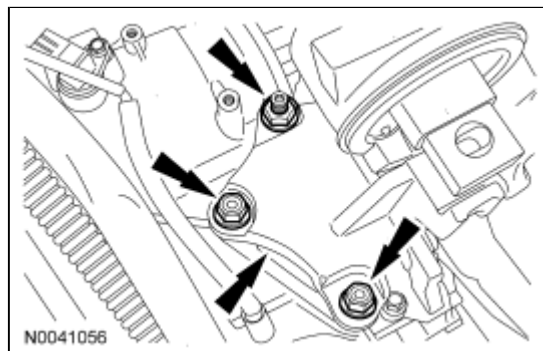
12. Install the Engine Support Bar.



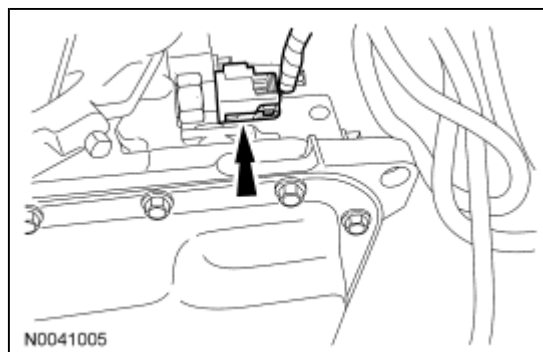
13. Remove the 2 transaxle support insulator bracket bolts and lower the transaxle.



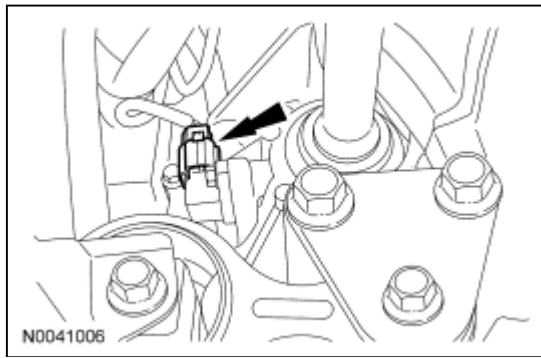
14. Remove the 3 nuts and remove the transaxle support insulator bracket.



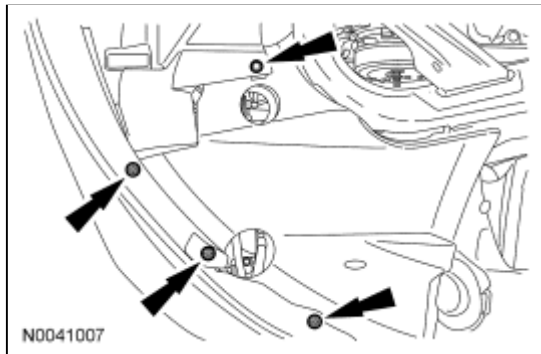
15. Disconnect the pressure switch electrical connector.



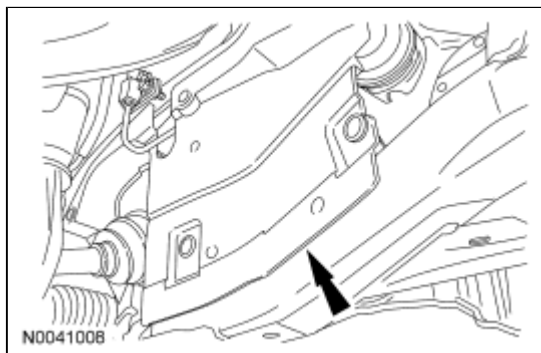
16. Disconnect the Output Shaft Speed (OSS) sensor electrical connector.



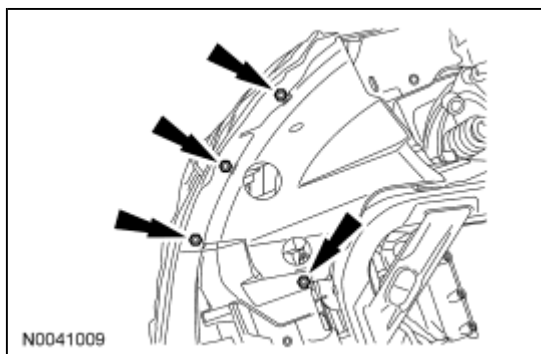
17. Remove the 4 screws and position the RH fender splash shield aside.



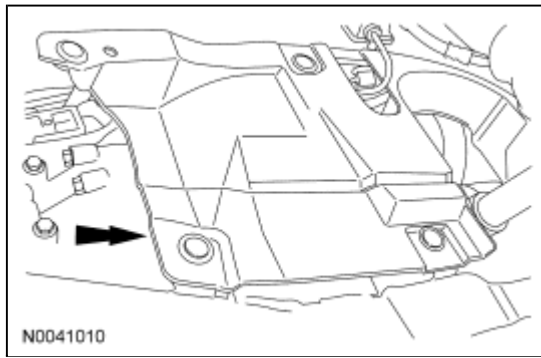
18. Remove the 6 pin-type retainers and the RH front structure-to-subframe splash shield.



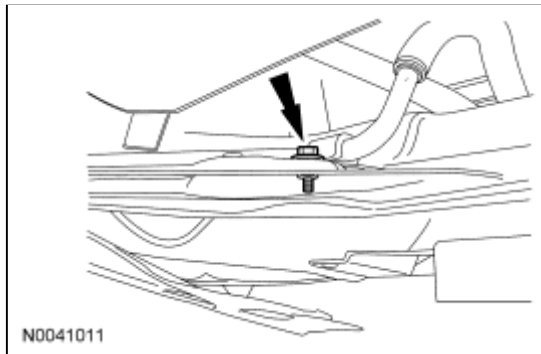
19. Remove the 4 screws and position the LH fender splash shield aside.



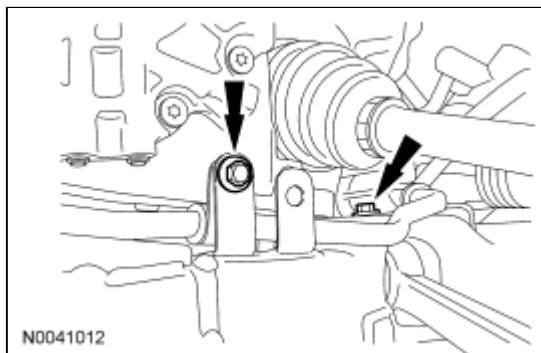
20. Remove the 6 pin-type retainers and the LH front structure-to-subframe splash shield.



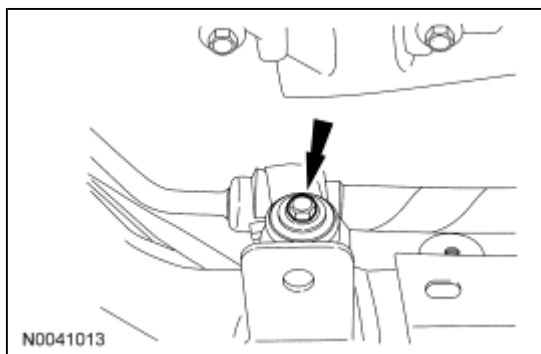
21. Remove the LH front power steering bracket bolt.



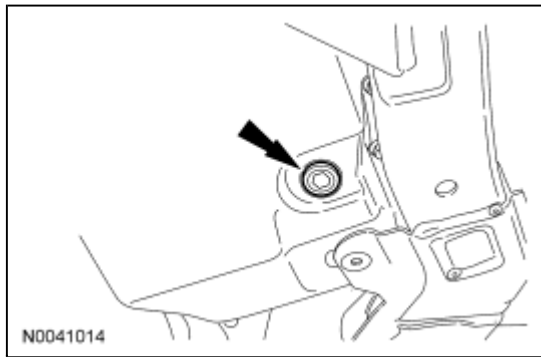
22. Remove the 2 LH power steering tube bracket bolts.



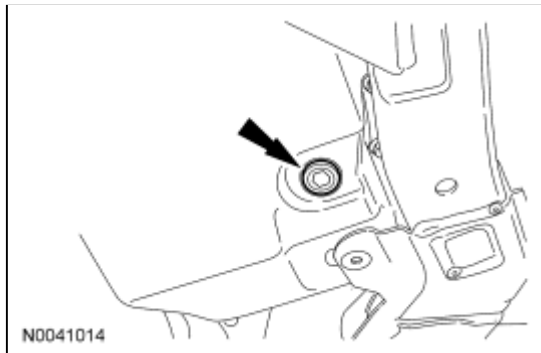
23. Remove the RH power steering tube bracket bolt.



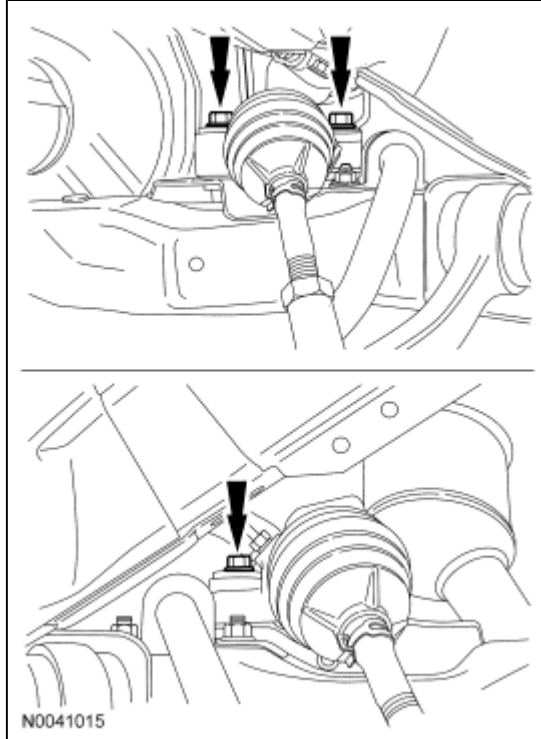
24. **NOTE:** If installation of a new transaxle is necessary, the transmission fluid will need to be drained.
Remove the transmission fluid pan drain plug and allow the transmission fluid to drain.



25. Install the transmission fluid drain plug.
- Tighten to 29 Nm (21 lb-ft).

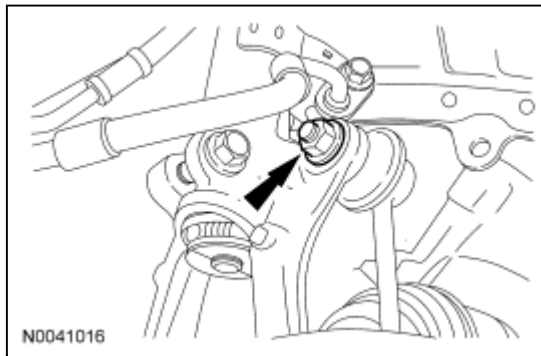


26. Remove the 2 LH bolts and the RH bolt and position the steering gear aside using mechanic's wire.



27. **NOTE:** LH shown, RH similar.

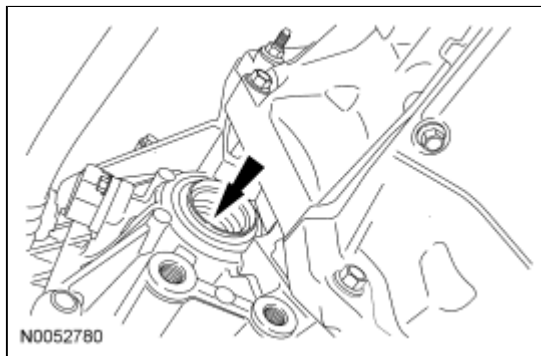
Remove the nuts and disconnect the sway bar links from the front struts.



28. Remove the RH halfshaft. For additional information, refer to [Section 205-04](#).

29. **NOTICE:** Failure to hold the differential side gears can allow the side gears to rotate and fall out of the differential carrier.

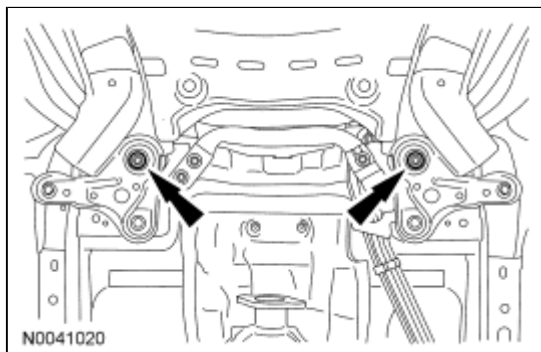
Insert a suitable tool into the RH side of the differential to hold the differential side gears in place.



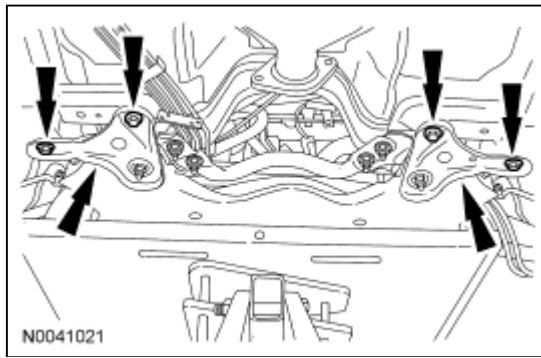
30. Remove the LH halfshaft. For additional information, refer to [Section 205-04](#).

31. Support the subframe with a suitable powertrain lift.

32. Remove the 2 rear subframe nuts.

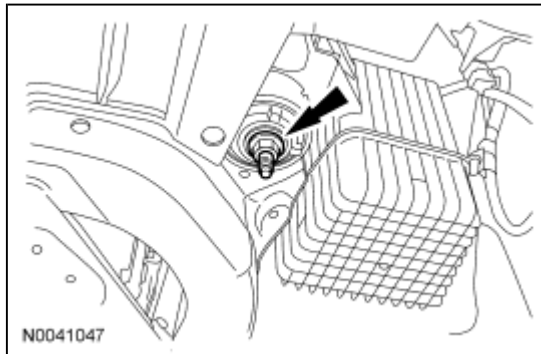


33. Remove the 4 bolts and the subframe support brackets.



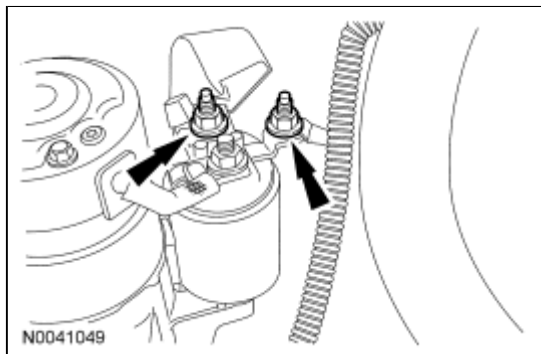
34. **NOTE:** LH shown, RH similar.

Remove front subframe nuts.

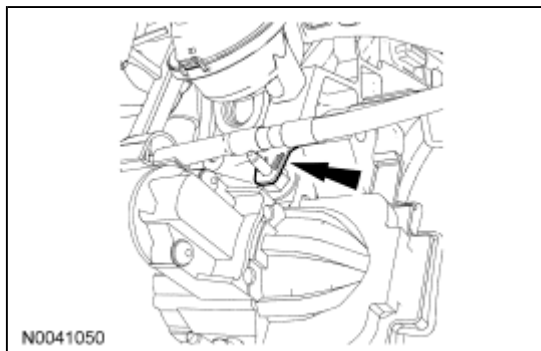


35. Lower the subframe and remove it from the vehicle.

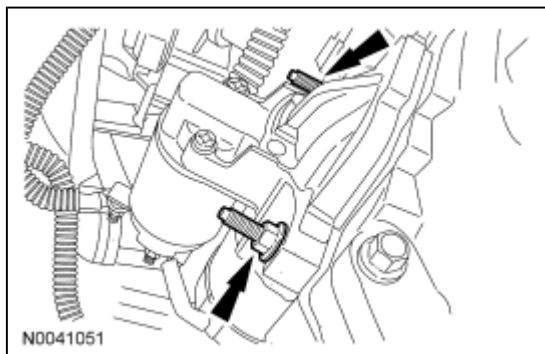
36. Position the boot aside and remove the starter electrical connectors.



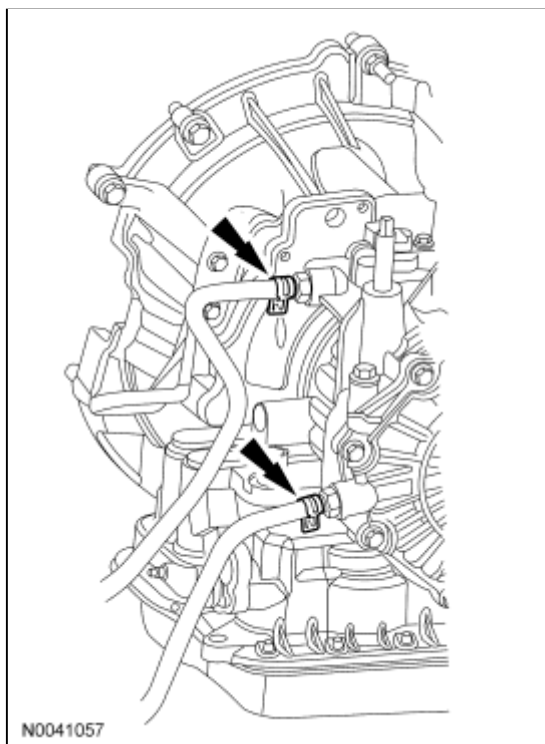
37. Remove the wiring harness retainer from the starter stud.



38. Remove the 2 stud bolts and the starter.



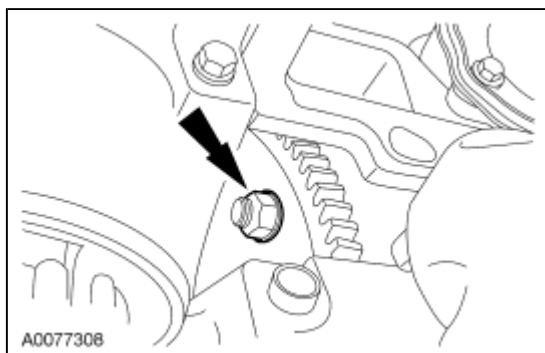
39. Disconnect the transmission fluid cooler hoses from the transaxle.



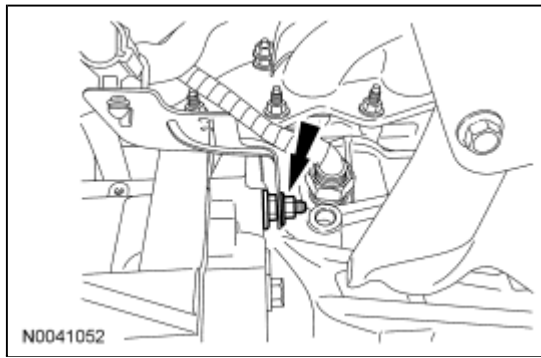
40. **NOTICE:** Only rotate the engine in a clockwise direction or engine damage will occur.

NOTE: Mark one stud and the flexplate for assembly reference.

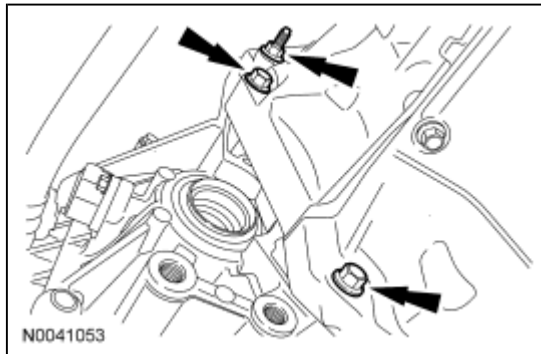
Remove and discard the 4 torque converter nuts.



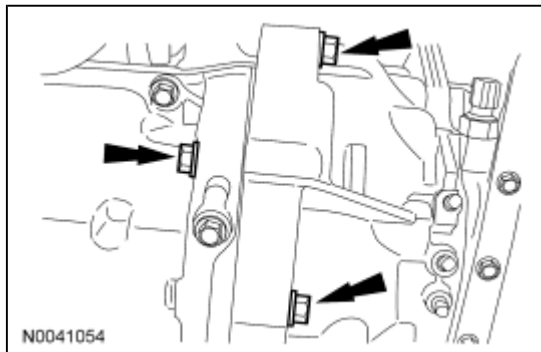
41. Remove the nut and the bracket from the torque converter housing stud bolt.



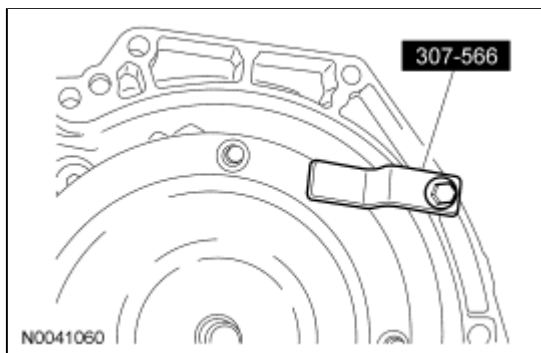
42. Support the transaxle with a suitable transmission jack.
43. Remove the 3 rear torque converter housing bolts.



44. Remove the 3 front torque converter housing bolts.



45. Separate the transaxle from the engine and install the Torque Converter Retainer.



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](#) in this section.

Torque Converter Hub Seal

Special Tool(s)

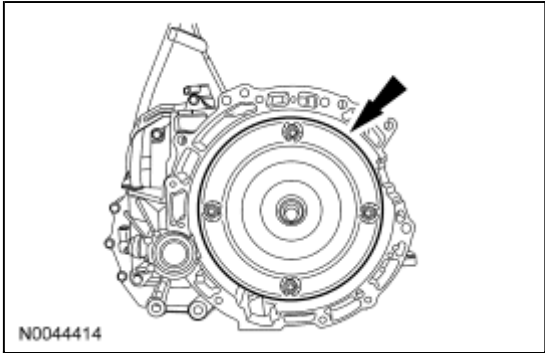
 15058	Installer, Drive Pinion Oil Seal 205-115 (15058)
 ST2924-A	Remover, Input Shaft Oil Seal 308-375
 ST1187-A	Slide Hammer 307-005 (T59L100-B)

Material

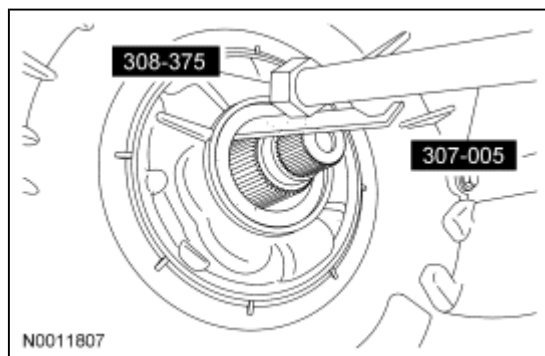
Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda M 5 (ATF-M V)

Disassembly

1. Remove the transaxle. For additional information, refer to [Transaxle](#) in this section.
2. Remove the torque converter.

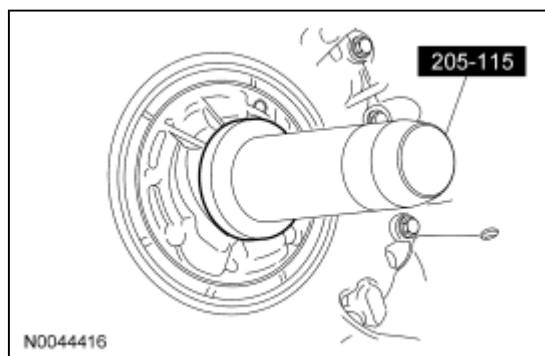


3. Using the Input Shaft Oil Seal Remover and Slide Hammer, remove the torque converter hub seal.

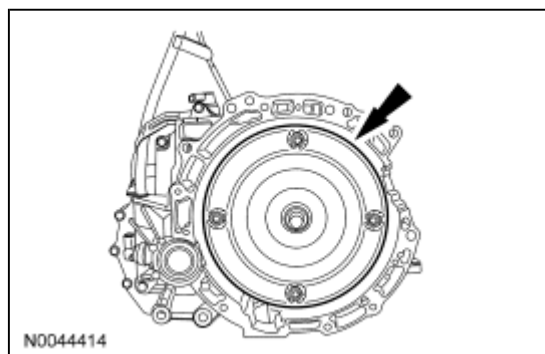


Assembly

1. Using the Drive Pinion Oil Seal Installer, install the torque converter hub seal.



2. Install the torque converter.



3. Install the transaxle. For additional information, refer to [Transaxle](#) in this section.
-

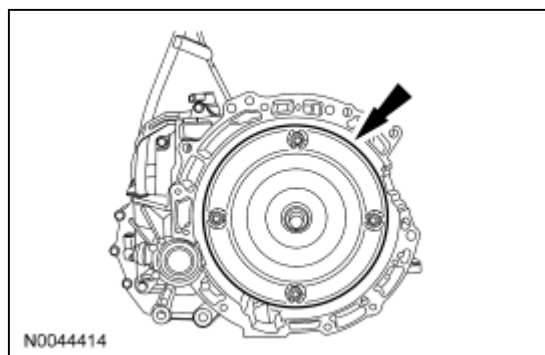
Torque Converter

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda M 5 (ATF-M V)

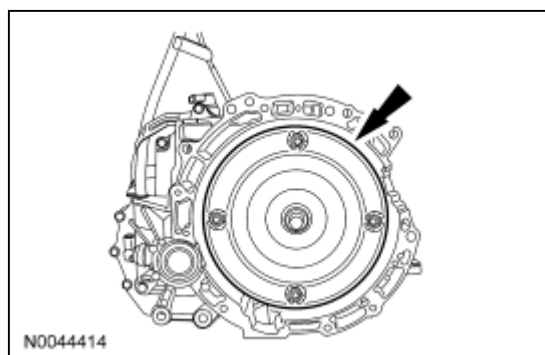
Disassembly

1. Remove the transaxle. For additional information, refer to [Transaxle](#) in this section.
2. Remove the torque converter.



Assembly


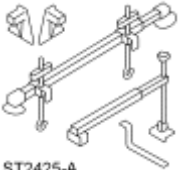
1. Install the torque converter.



2. Install the transaxle. For additional information, refer to [Transaxle](#) in this section.

Transaxle

Special Tool(s)

 ST1636-A	Retainer, Torque Converter 307-566
 ST2425-A	Support Bar, Engine 303-F072

Material

Item	Specification
FNR5 Automatic Transmission Fluid XT-9-QMM5	Mazda M 5 (ATF-M V)
Multi-Purpose Grease XG-4 and/or XL-5	ESB-M1C93-B

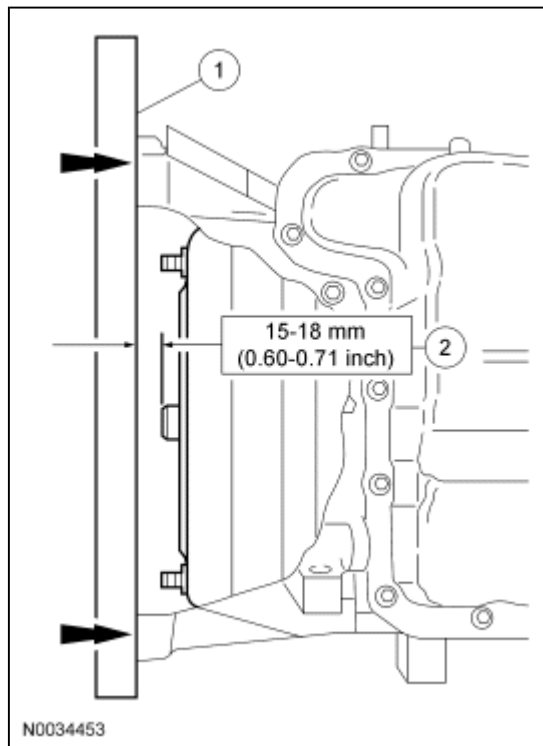
Installation

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](#) in this section.

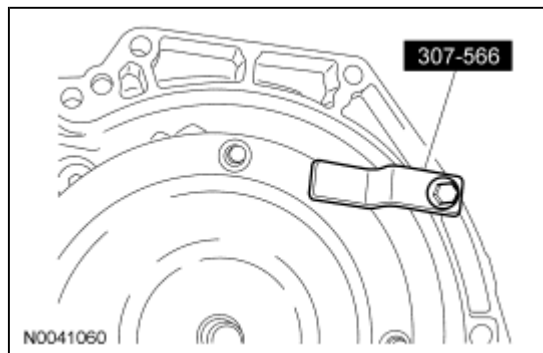
1. Make sure that the torque converter is installed correctly.
2. **NOTE:** Lubricate the torque converter pilot hub with multi-purpose grease.

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.



3. Using a transmission jack, secure the transaxle using a safety strap.
4. Remove the Torque Converter Retainer.



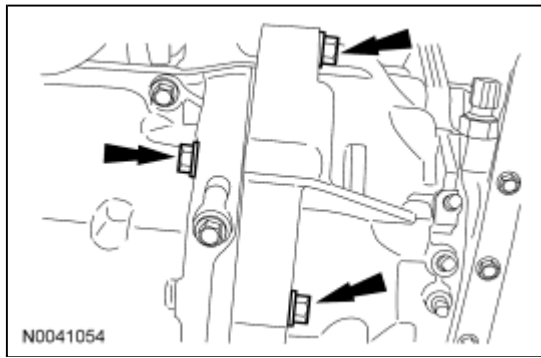
5. **NOTE:** Make sure that the dowel pins are installed in the engine block prior to installing the transaxle.

Move the transaxle into position.

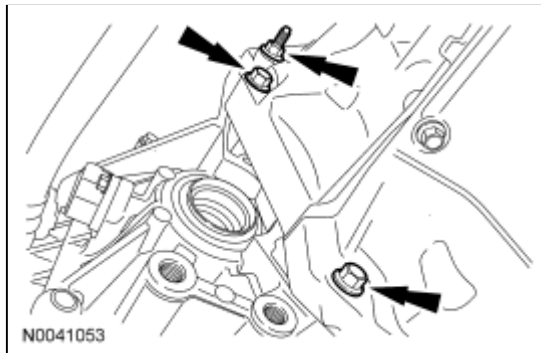
6. **NOTE:** Note the location of the different length bolts.

Install the 3 front torque converter housing bolts.

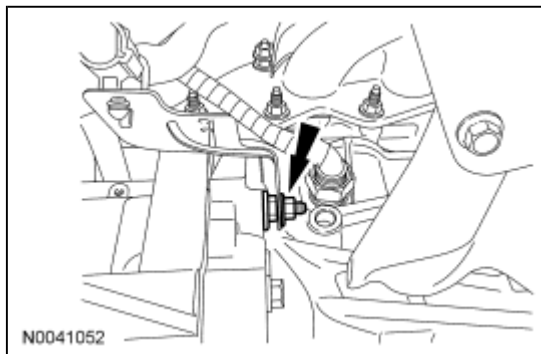
- Tighten to 47 Nm (35 lb-ft).



7. Install the 3 rear torque converter housing bolts.
 - Tighten to 47 Nm (35 lb-ft).



8. Remove the transmission jack.
9. Install the bracket and the nut on the torque converter housing studbolt.
 - Tighten to 25 Nm (18 lb-ft).

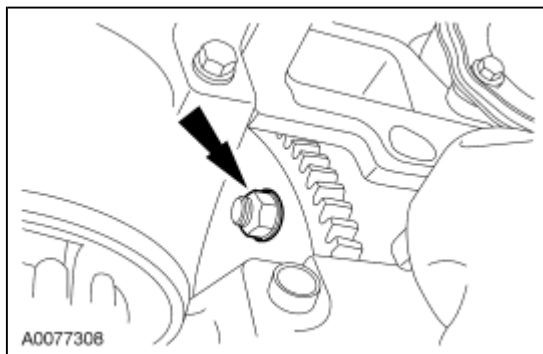


10. **NOTICE:** Rotate the engine in a clockwise direction only or engine damage will occur.

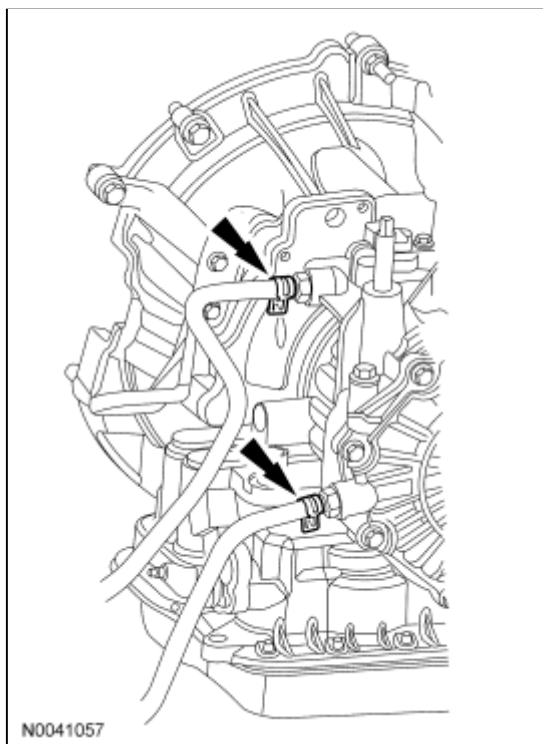
NOTE: Install new self-locking nuts only.

Install new torque converter nuts.

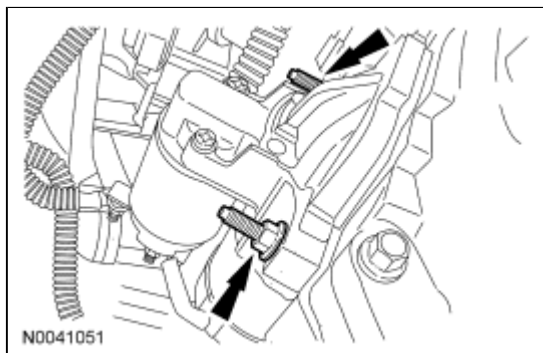
- Tighten to 37 Nm (27 lb-ft).



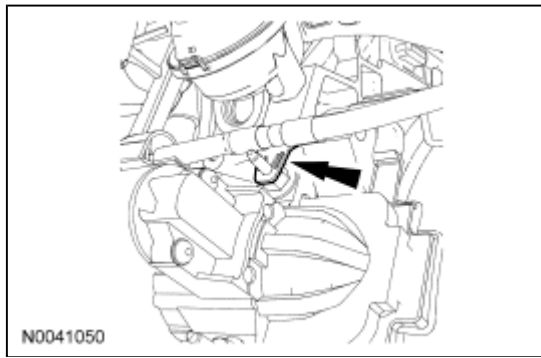
11. Connect the transmission fluid cooler hoses to the transaxle.



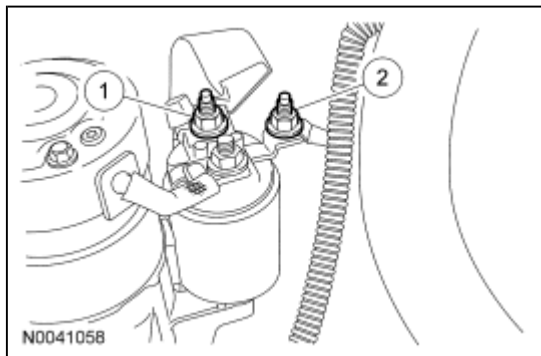
12. Position the starter in place and install the 2 bolts.
 - Tighten to 35 Nm (26 lb-ft).



13. Install the wiring harness fastener on the starter stud.



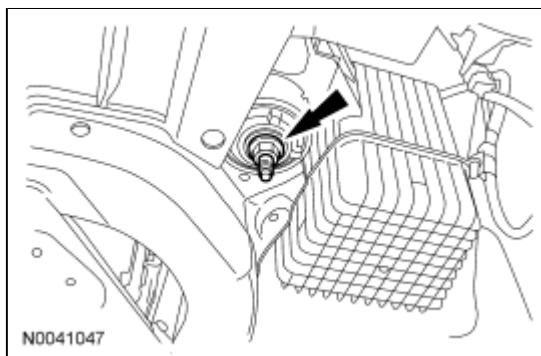
14. Install the starter electrical connectors and install the boot back into position.
 1. Tighten to 12 Nm (106 lb-in).
 2. Tighten to 5 Nm (44 lb-in).



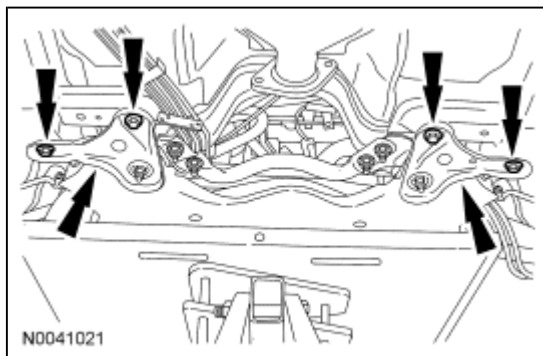
15. Position the subframe in place using a suitable powertrain lift.
16. **NOTE:** LH shown, RH similar.

Install the front subframe nuts.

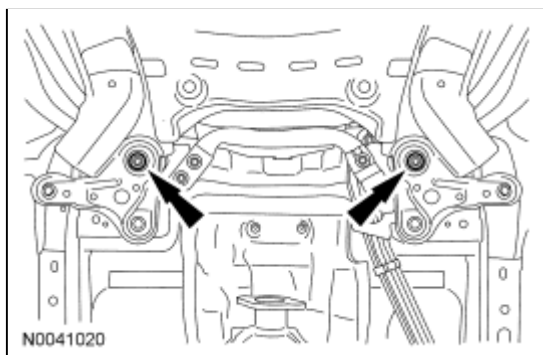
- Tighten to 150 Nm (111 lb-ft).



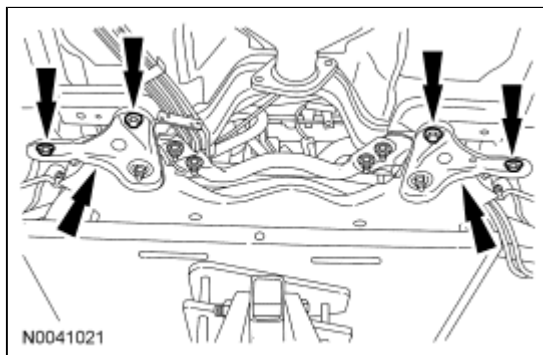
17. Position the subframe support brackets in place and loosely install the bolts.



18. Install the rear subframe nuts.
 - Tighten to 150 Nm (111 lb-ft).



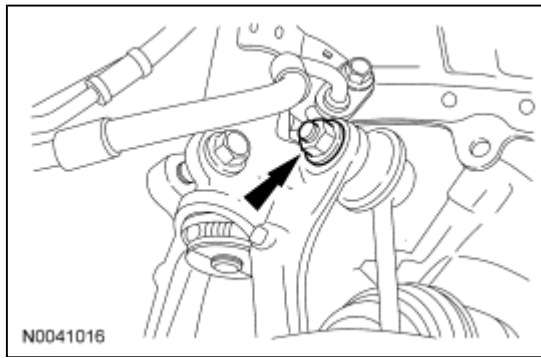
19. Tighten the subframe support bracket bolts.
 - Tighten to 103 Nm (76 lb-ft).



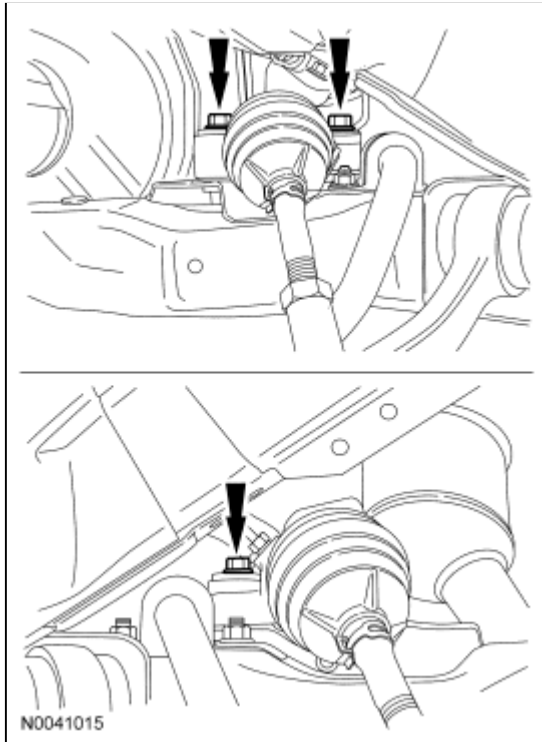
20. Install the LH halfshaft. For additional information, refer to [Section 205-04](#).
21. Install the RH halfshaft. For additional information, refer to [Section 205-04](#).
22. **NOTE:** LH shown, RH similar.

Install the sway bar links and nuts to the front struts.

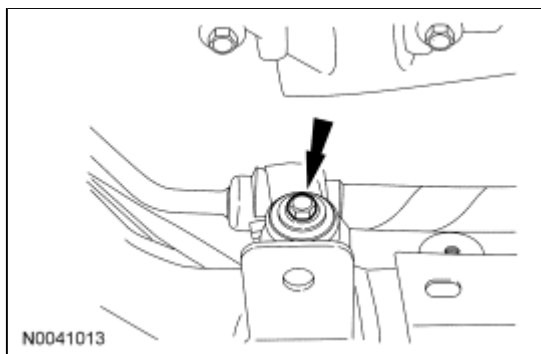
- Tighten to 40 Nm (30 lb-ft).



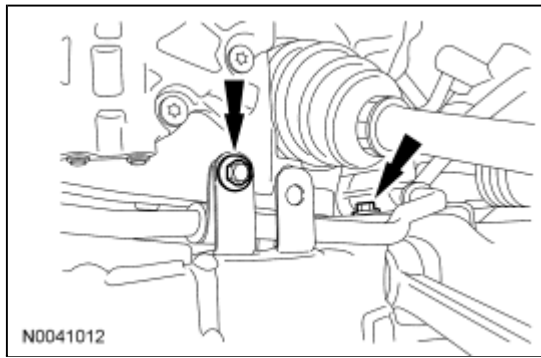
23. Position the steering gear in place and install the 2 LH and RH bolts.
- Tighten to 107 Nm (79 lb-ft).



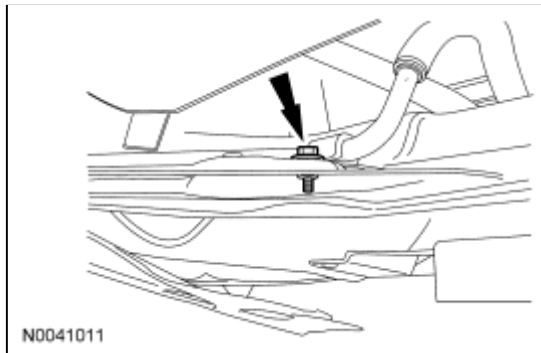
24. Install the RH power steering tube bracket bolt.
- Tighten to 9 Nm (80 lb-in).



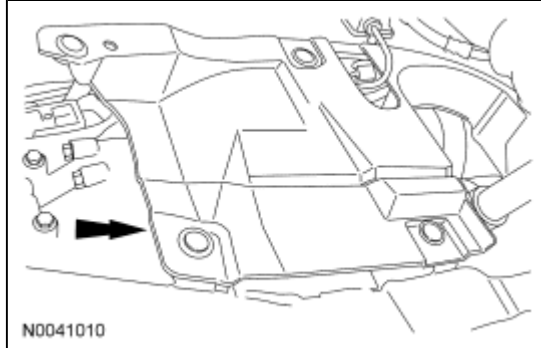
25. Install the 2 LH power steering tube bracket bolts.
- Tighten to 9 Nm (80 lb-in).



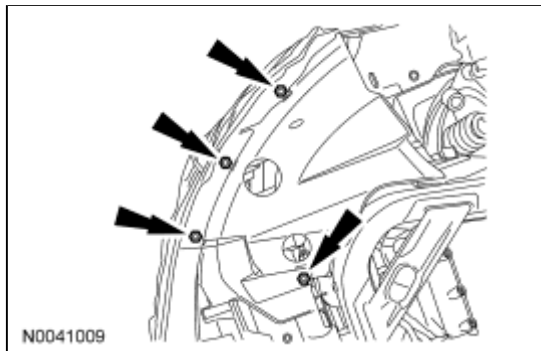
26. Install the LH power steering tube bracket bolt.
- Tighten to 9 Nm (80 lb-in).



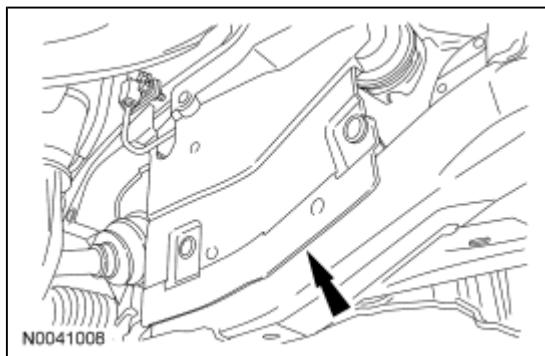
27. Position the LH front structure-to-subframe splash shield in place and install the 6 pin-type retainers.



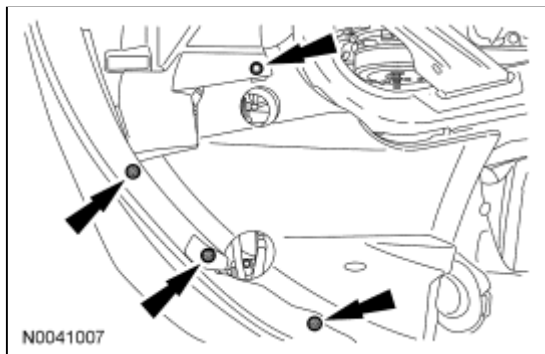
28. Position the LH splash shield in place and install the 4 screws.



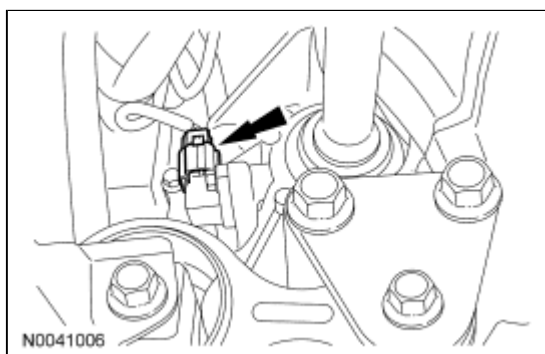
29. Position the RH front structure-to-subframe splash shield in place and install the 6 pin-type retainers.



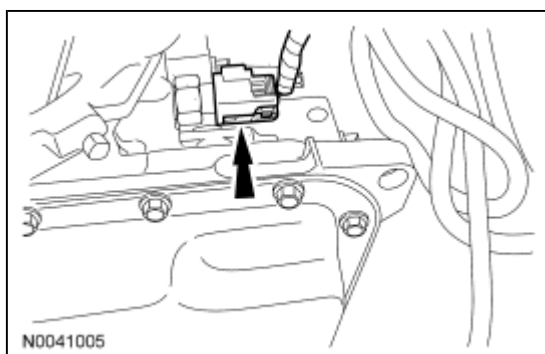
30. Position the RH splash shield in place and install the 4 screws.



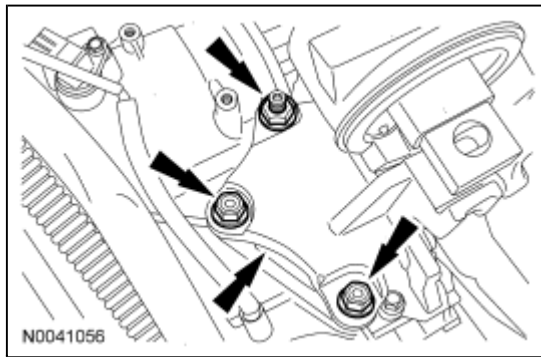
31. Connect the Output Shaft Speed (OSS) sensor electrical connector.



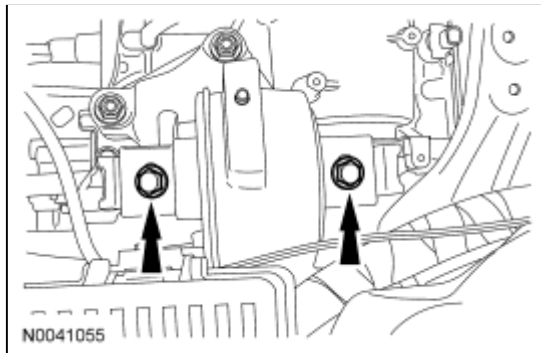
32. Connect the pressure switch electrical connector.



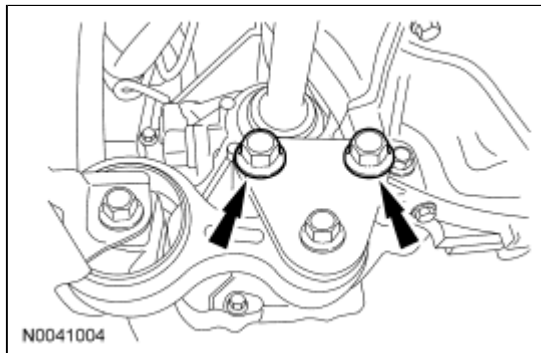
33. Position the transaxle support insulator bracket in place and install the 3 nuts.
- Tighten to 80 Nm (59 lb-ft).



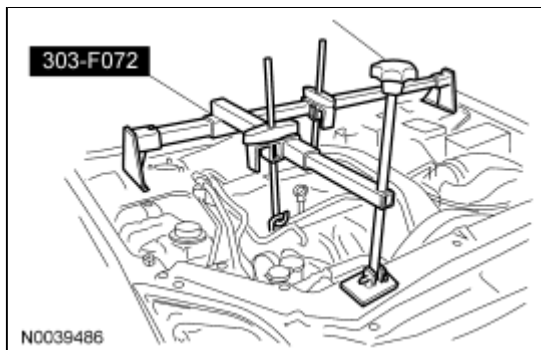
34. Raise the transaxle using the Engine Support Bar and install the 2 transaxle support insulator bracket bolts.
- Tighten to 62 Nm (46 lb-ft).



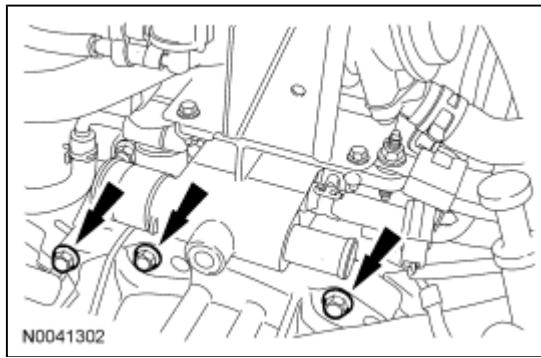
35. Install the 2 roll restrictor bracket bolts.
- Tighten to 90 Nm (66 lb-ft).



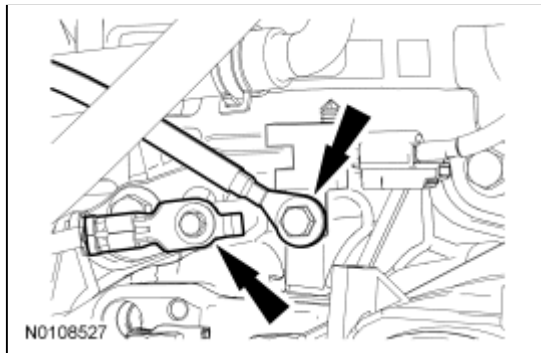
36. Remove the Engine Support Bar.



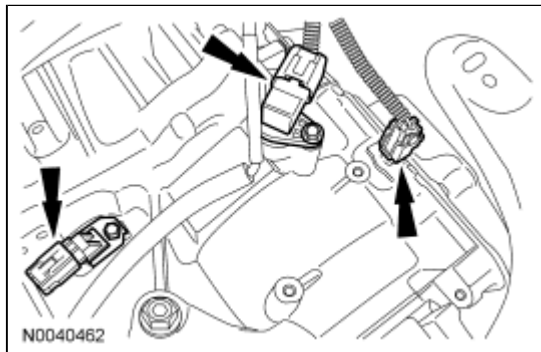
37. Install the 3 top torque converter housing bolts.
- Tighten to 47 Nm (35 lb-ft).



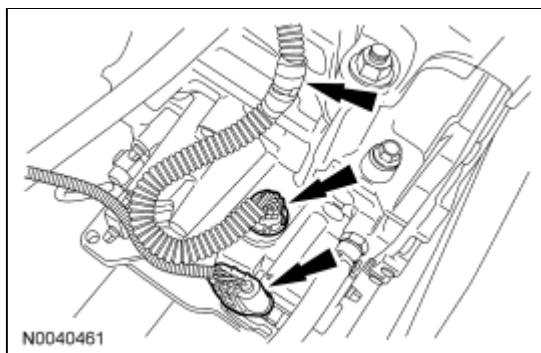
38. Install the 2 ground straps.
- Tighten to 25 Nm (18 lb-ft).



39. Connect the Turbine Shaft Speed (TSS) sensor, intermediate shaft speed sensor and the 5th gear valve body electrical connectors.

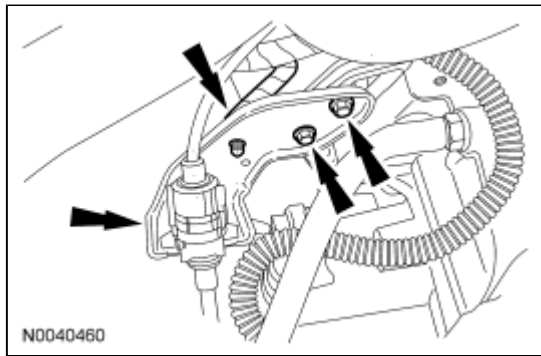


40. Connect the main valve body and the Transmission Range (TR) sensor electrical connectors and connect the wiring harness to the transmission.

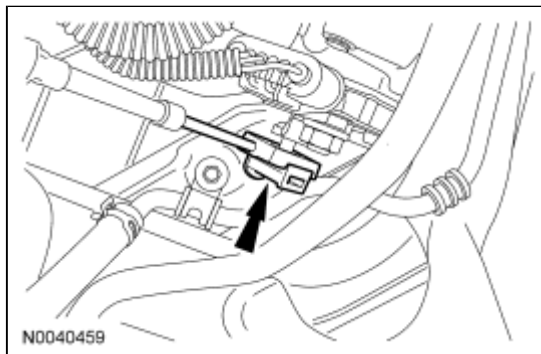


41. Position the selector lever cable and bracket in place, and connect the electrical harness fastener and install the 2 bolts.

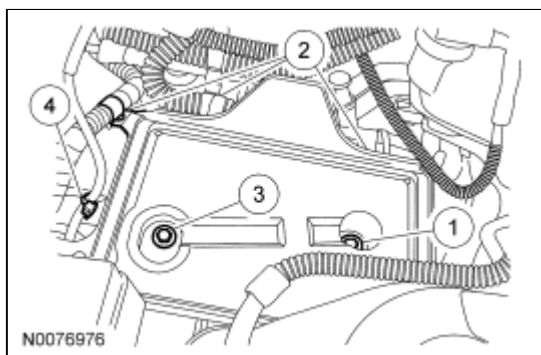
- Tighten to 20 Nm (177 lb-in).



42. Connect the selector lever cable end to the manual control lever.



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.



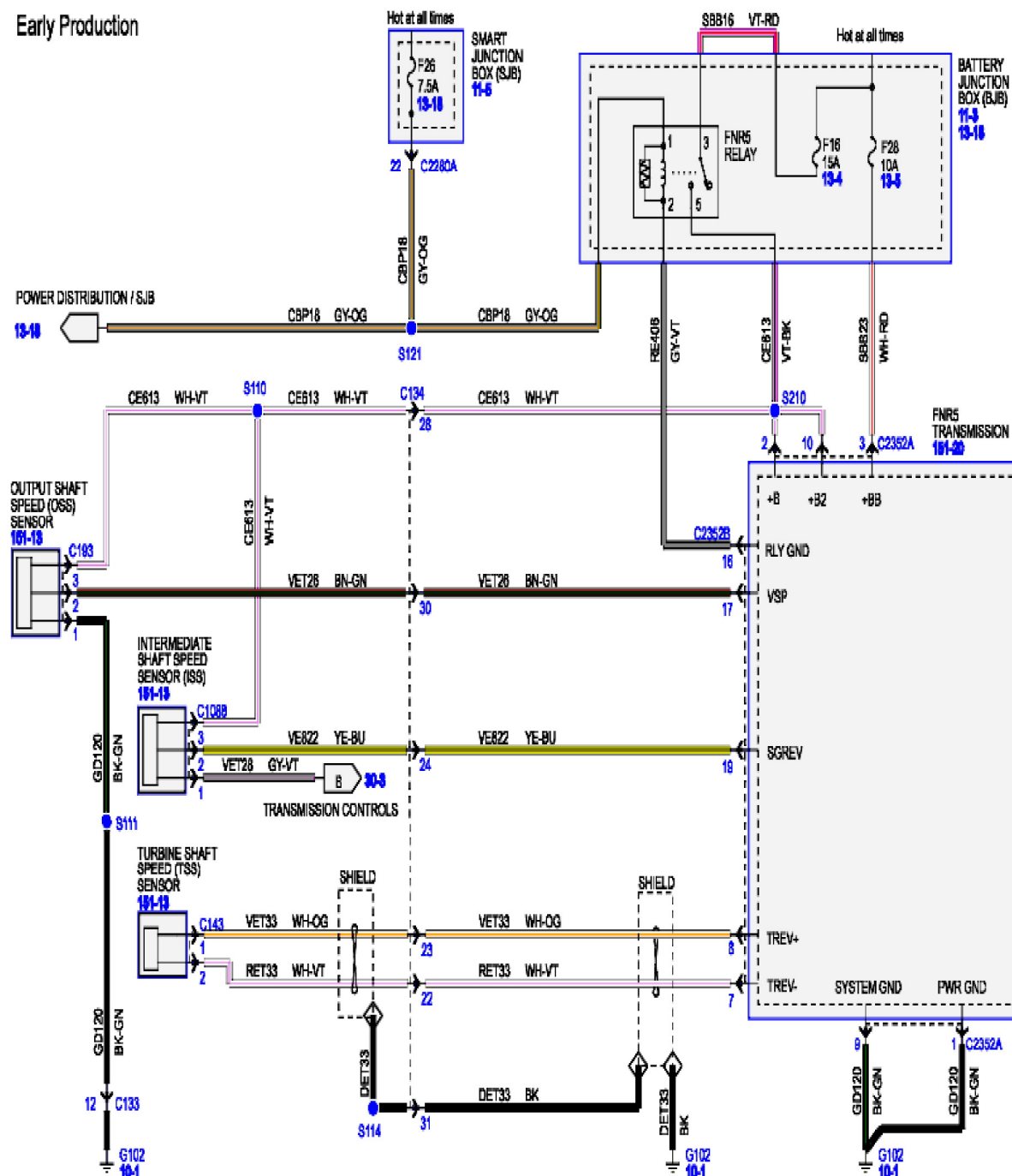
44. **NOTE:** When the battery has been disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven to relearn the strategy.

Install the battery. For additional information, refer to [Section 414-01](#).

45. Fill the transaxle with clean transmission fluid.



Early Production





Late Production

