

TRANSMISSION

Automatic Transmission - 6L50 (MYB) - Diagnostic Information and Procedures - Canyon, Colorado

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC P0601, P0603, P0604, OR P062F: CONTROL MODULE

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0601

Control Module Read Only Memory Performance

DTC P0603

Control Module Long Term Memory Reset

DTC P0604

Control Module Random Access Memory Performance

DTC P062F

Control Module Long Term Memory Performance

Circuit/System Description

This is an internal fault detection of the control solenoid valve assembly. This fault is carried out inside the Transmission Control Module and no external circuits are involved.

Conditions for Running the DTC

DTC P0601, P0603, P0604, or P062F is not set.

Conditions for Setting the DTC

P0601

- The read only memory has detected an incorrect program or calibration checksum error.
- This condition has been present 5 or more times within a 16 count time period.

P0603

- The TCM has detected a long term memory checksum error during power up.
- This DTC runs continuously.

P0604

M has detected a single word failure with the random access memory.

- This condition has been present 5 or more times within a 16 count time frame.

P062F

- The TCM has detected the non-volatile memory is incorrect during power-down.
- This DTC runs continuously.

Action Taken When the DTC Sets

P0601, P0603, P0604, and P062F

- The high side driver is turned Off.
- The TCC is turned Off.
- The TCM request maximum line pressure.
- The ECM reduces engine torque based on transmission input speed.
- Neutral idle is inhibited.
- Tap Up/Down is inhibited.
- Tow/Haul mode is inhibited.

Conditions for Clearing the DTC

DTCs P0601, P0603, P0604, and P062F are Type A DTCs.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**
- **INLINE HARNESS CONNECTOR END VIEWS - INDEX**

Description and Operation

Electronic Component Description

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Special Tools

DT-47825-10 Jumper Harness

regional tools, refer to [Special Tools](#).

Circuit/System Verification

1. Ignition OFF for one minute. Ignition ON.
2. Verify with a scan tool that DTC P0601, P0603, P0604, or P062F is not set.
 - **If any of the DTCs set**

Replace the Q8 Control Solenoid Valve Assembly.
 - **If none of the DTCs set**
3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
4. Verify the DTC does not set.
 - **If the DTC sets**

Replace the Q8 Control Solenoid Valve Assembly
 - **If the DTC does not set**
5. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0634: CONTROL MODULE OVERTEMPERATURE

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptor

DTC P0634

Control Module Overtemperature

Circuit/System Description

The transmission control module temperature sensor is located inside of the control solenoid valve assembly which has no serviceable parts. The Transmission Control Module monitors the Transmission Control Module sensor for over temperature protection.

Conditions for Running the DTC

- Ignition voltage is between 8.6-32 V.
- The TCM internal temperature is between 0-170°C (32-338°F) for 0.25 s.

Conditions for Setting the DTC

The internal temperature of the TCM is greater than 142Â°C (288Â°F) for 5 s.

Condition 2

- Ignition voltage is 18 V or greater for 2 s.
- The internal temperature of the TCM is 50Â°C (122Â°F) for 2 s.

Action Taken When the DTC Sets

- DTC P0634 is a Type A DTC.
- TCM disables TAP Up/Down shift operation.
- TCM enables torque management.
- TCM limits the transmission to Reverse and 4th or 5th gear operation.
- TCM inhibits manual shifting of forward gears.
- TCM commands maximum line pressure.
- TCM turns Off.

Conditions for Clearing the DTC

DTC P0634 is a Type A DTC.

Diagnostic Aids

During a road test, the TCM temperature should steadily increase to a normal operating temperature, then stabilize.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

Electronic Component Description

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Special Tools

Jumper Harness

For equivalent regional tools, refer to [Special Tools](#).

Circuit/System Verification

1. Verify the transmission fluid level and condition is correct. Refer to [Transmission Fluid Level and Condition Check](#).

- **If the transmission fluid level and condition is not correct**

Repair as necessary.

- **If the transmission fluid level and condition is correct**

2. Operate the vehicle until normal engine temperature is reached.
3. Verify with a scan tool the ECT Sensor parameter is less than 125Â°C (257Â°F).
 - *If greater than 125Â°C (257Â°F)*

Refer to [Symptoms - Engine Cooling](#).

- *If less than 125Â°C (257Â°F)*

4. Verify the scan tool Transmission Control Module Temperature is less than 142Â°C (287Â°F).
 - *If greater than 142Â°C (287Â°F)*

Inspect the transmission fluid lines for being misrouted, kinked, or damage. Repair or replace as necessary. If the transmission fluid lines are OK, replace the Q8 Control Solenoid Valve Assembly.

- *If less than 142Â°C (287Â°F)*

5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

6. Verify the DTC does not set.

- *If the DTC sets*

Replace the Q8 Control Solenoid Valve Assembly.

- *If the DTC does not set*

7. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for Control Solenoid Valve Assembly replacement, programming, and setup.

DTC P0658 OR P0659: ACTUATOR HIGH CONTROL

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

Actuator High Control Circuit Group 1 Low Voltage

DTC P0659

Actuator High Control Circuit Group 1 High Voltage

Circuit/System Description

The Transmission Control Module high side driver 1 is located inside of the control solenoid valve assembly which has no serviceable parts. The high side driver 1 provides power to the Transmission Control Module pressure control solenoids and shift solenoids. This fault is handled inside the Transmission Control Module and no external circuits are involved.

Conditions for Running the DTC

P0658

- Ignition voltage is between 8.6-32 V.
- High side driver 1 is On.
- DTC P0658 is not set.

P0659

- DTC P0659 is not set.
- Ignition switch transitions from OFF to ON position.

Conditions for Setting the DTC

P0658

The Transmission Control Module detects an internal open or short to ground on the high side driver 1 for 1 s.

P0659

The Transmission Control Module detects an internal short to voltage on the high side driver 1 circuit for 1 s after engine start.

Action Taken When the DTC Sets

P0658

- DTC P0658 is a Type A DTC.
- The TCM turns OFF high side driver.
- The TCM turns OFF all solenoids.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM commands the TCC OFF.
- The TCM inhibits the TAP Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM limits the transmission to Reverse and 5th gear.

DTC P0659 is a Type C DTC.

Conditions for Clearing the DTC

- DTC P0658 is a Type A DTC.
- DTC P0659 is a Type C DTC.

Diagnostic Aids

When DTC P0658 sets, the line pressure control solenoid, and pressure control solenoids 2 and 3, will default to maximum pressure. This results in maximum line pressure to the 3-5 reverse clutch, low/reverse clutch and the 4-5-6 clutch assemblies.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Transmission General Description](#)
- [Transmission Component and System Description](#)
- [Electronic Component Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

[Control Module References](#) for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

- running and the gear selector lever is in the park position.
2. Verify the scan tool High Side Driver 1 parameter displays ON.

- **If ON is not displayed**

Refer to Circuit/System Testing.

- **If ON is displayed**

3. Engine Running and the gear selector lever is in the park position.
4. Verify the scan tool parameters listed below do not display Malfunction.

- High Side Driver 1 Circuit High Voltage Test Status
- High Side Driver 1 Circuit Open Test Status
- High Side Driver 1 Circuit Low Voltage Test Status
- **If Malfunction is displayed**

Refer to Circuit/System Testing.

- **If Malfunction is not displayed**

5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.

- **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

7. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF, remove the Q8 Control Solenoid Valve Assembly. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Replacement](#).
2. Verify the Q8 Control Solenoid Valve Assembly is not contaminated with any debris. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).
 - **If contaminated**
Repair as necessary.
 - **If not contaminated**
3. Verify the resistance is within the specified range for each solenoid. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).
 - **If resistance is not within range**
Replace the Q8 Control Solenoid Valve Assembly.
 - **If resistance is within range**
4. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.
5. Connect **DT-47825-10** jumper harness between the vehicle wire harness electrical connector, and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.

ie scan tool parameters do not display Malfunction.

- High Side Driver 1 Circuit High Voltage Test Status
- High Side Driver 1 Circuit Open Test Status
- High Side Driver 1 Circuit Low Voltage Test Status
- **If Malfunction is displayed**

Replace the Q8 Control Solenoid Valve Assembly.

- **If Malfunction is not displayed**

7. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0667, P0668, OR P0669: CONTROL MODULE TEMPERATURE SENSOR

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0667

Control Module Temperature Sensor Performance

DTC P0668

Control Module Temperature Sensor Circuit Low Voltage

DTC P0669

Control Module Temperature Sensor Circuit High Voltage

Circuit/System Description

The Transmission Control Module temperature sensor is located inside of the control solenoid valve assembly which has no serviceable parts. The Transmission Control Module temperature sensor provides the temperature of the Transmission Control Module substrate. This temperature reading is used in various diagnostic routines in the Transmission Control Module software. This fault is handled inside the Transmission Control Module and no external circuits are involved.

Conditions for Running the DTC

DTC P0667

- DTC: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E,

P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, or P2730 is not set.

- Engine speed is 400-7, 500 RPM or greater for 5 s.
- Ignition voltage is between 8.6-32 V.
- Brake torque is not active.
- Engine torque signal is valid.
- Throttle position signal is valid.

DTC P0668

- Engine speed is 400-7, 500 RPM or greater for 5 s.
- Ignition voltage is between 8.6-32 V.

DTC P0669

- DTC P0716, P0717, P0722 or P0723 is not set.
- Engine speed is 400-7, 500 RPM or greater for 5 s.
- Ignition voltage is between 8.6-32 V.

Conditions for Setting the DTC

P0667

- The TCM detects a 20-50Â°C (36-90Â°F) or greater difference between the transmission fluid temperature and the TCM substrate temperature, which depends on the average of the transmission fluid temperature, TCM substrate temperature, and the TCM power up temperature.
- The TCM detects a 8-10Â°C (14-18Â°F) or greater difference between the TCM power up temperature and the TCM substrate temperature, which depends on the average of the transmission fluid temperature, the TCM substrate temperature, and the TCM power up temperature.
- The above conditions have to be met for 5 min.

P0668

The TCM internal temperature is -249Â°C (-416Â°F) or less for 1 min.

P0669

The TCM internal temperature is 249Â°C (480Â°F) or greater for 1 min.

Action Taken When the DTC Sets

- DTCs P0667, P0668, and P0669 are Type B DTCs.
- The TCM defaults to a calculated value for the substrate temperature based on the TCM power up temperature.

Conditions for Clearing the DTC

DTCs P0667, P0668, and P0669 are Type B DTCs.

Diagnostic Aids

During a road test, the TCM temperature should steadily increase to a normal operating temperature, and then stabilize.

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Electronic Component Description](#)
- [Transmission General Description](#)
- [Transmission Component and System Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Engine idling at normal operating temperature.
2. Verify the scan tool Transmission Control Module Temperature parameter is between -247 and +247°C (-412 and +477°F).
 - **If not between -247 and +247°C (-412 and +477°F)**
Replace the Q8 Control Solenoid Valve Assembly.
 - **If between -247 and +247°C (-412 and +477°F)**
3. Verify the scan tool Transmission Control Module temperature parameter increases greater than 2°C (3.5°F) after operating the vehicle at 64 km/h (40 mph) for 10 minutes.
 - **If the temperature does not increase greater than 2°C (3.5°F)**
Replace the Q8 Control Solenoid Valve Assembly.
 - **If the temperature does increase greater than 2°C (3.5°F)**
4. Verify the scan tool Transmission Control Module Temperature and the Transmission Fluid Temperature parameters are within 10°C (18°F) of each other.
 - **If the temperature is not within 10°C (18°F)**

replace the Q8 Control Solenoid Valve Assembly.

- **If the temperature is within 10Â°C (18Â°F)**

5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

6. Verify the DTC does not set.

- **If the DTC sets**

Replace the Q8 Control Solenoid Valve Assembly.

- **If the DTC does not set**

7. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P06AC, P06AD, OR P06AE: CONTROL MODULE POWER UP TEMPERATURE SENSOR

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P06AC

Control Module Power Up Temperature Sensor Performance

DTC P06AD

Control Module Power Up Temperature Sensor Circuit Low Voltage

DTC P06AE

Control Module Power Up Temperature Sensor Circuit High Voltage

Circuit/System Description

The Transmission Control Module power up temperature sensor is located inside of the control solenoid valve assembly which has no serviceable parts. The Transmission Control Module power up temperature sensor provides the temperature of the Transmission Control Module when the Transmission Control Module power is on. This temperature reading is used in various shifting and diagnostic routines and also to protect the control solenoid valve assembly and Transmission Control Module. This fault is handled inside the Transmission Control Module and no external circuits are involved.

Conditions for Running the DTC

P06AC

101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, or P2730 is not set.

- Engine speed is between 400-7, 500 RPM for 5 s.
- Ignition voltage is between 8.6-32 V.
- Brake torque is not active.
- Engine speed is valid.
- Throttle position is valid.
- Transmission input speed sensor signal is 200 RPM or less.
- Engine throttle position signal is 30 percent or greater.
- Vehicle speed is 8 km/h (5 mph) or less.

P06AD

- DTC P06AD, P0716, P0717, P0722 or P0723 is not set.
- Engine speed is between 400-7, 500 RPM for 5 s.
- Ignition voltage is between 8.6-32 V.

P06AE

- DTC P06AE is not set.
- Engine speed is 400 RPM or greater for 5 s.
- Ignition voltage is between 8.6-32 V.

Conditions for Setting the DTC

P06AC

- The TCM detects a 8-10°C (14-18°F) or greater difference between the TCM substrate temperature and TCM power up temperature, which depends on the average of transmission fluid temperature, TCM substrate temperature, and TCM power up temperature.
- The TCM detects a 20-50°C (36-90°F) or greater difference between the transmission fluid temperature and TCM power up temperature, which depends on the average of transmission fluid temperature, TCM substrate temperature, and TCM power up temperature.
- The above conditions have to be met for 5 min within a 6 min period.

P06AD

The TCM power up temperature is -59°C (-74°F) or less for 1 min.

P06AE

The TCM power up temperature is 164°C (327°F) or greater for 1 min.

Action Taken When the DTC Sets

- DTCs P06AC, P06AD, and P06AE are Type B DTCs.
- The TCM defaults the TCM power up temperature to the TCM substrate temperature with an offset value.

Conditions for Clearing the DTC

P06AD, and P06AE are Type B DTCs.

Diagnostic Aids

During a road test, the TCM Power-Up temperature should steadily increase to a normal operating temperature, and then stabilize.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**
- **INLINE HARNESS CONNECTOR END VIEWS - INDEX**

Description and Operation

Electronic Component Description

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to **Special Tools** .

Circuit/System Verification

1. Ignition ON, clear the DTCs with a scan tool.
2. Operate the vehicle at 64 km/h (40 mph) for 10 min.
3. Verify DTC P06AC, P06AD or P06AE is not set.
 - **If any of the DTCs set**

Replace the Q8 Control Solenoid Valve Assembly.
 - **If none of the DTCs set**

the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

5. Verify the DTC does not set.

- **If the DTC sets**

Replace the Q8 Control Solenoid Valve Assembly.

- **If the DTC does not set**

6. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0711-P0713: TRANSMISSION FLUID TEMPERATURE SENSOR

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0711

Transmission Fluid Temperature Sensor Performance

DTC P0712

Transmission Fluid Temperature Sensor Circuit Low Voltage

DTC P0713

Transmission Fluid Temperature Sensor Circuit High Voltage

Circuit/System Description

The transmission fluid temperature sensor is located inside of the Transmission Control Module assembly which has no serviceable parts. The transmission fluid temperature sensor provides transmission fluid temperature information to the Transmission Control Module. This fault is handled inside the Transmission Control Module and no external circuits are involved.

Conditions for Running the DTC

P0711

- DTCs: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, or P2730 is not set.
- Ignition voltage is between 8.6-32 V.

ine speed is 400-7, 500 RPM or greater for 5 s.

- The vehicle speed is 8 km/h (5 mph) or greater for 5 min.
- The accelerator pedal position signal is valid.
- The engine torque signal is valid.

P0712

- DTC P0712, P0716, P0717, P0722, or P0723 is not set.
- The engine speed is greater than 400-7, 500 RPM for 5 s.
- Ignition voltage is between 8.6-32 V.

P0713

- DTC P0713, P0716, P0717, P0722, or P0723 is not set.
- The engine speed is greater than 400-7, 500 RPM for 5 s.
- Ignition voltage is between 8.6-32 V.

Conditions for Setting the DTC

P0711

- The TCM detects a 20-50°C (36-90°F) or greater difference between the transmission fluid temperature and the TCM substrate temperature, which depends on the average of the transmission fluid temperature, the TCM substrate temperature, and the TCM power up temperature.
- The TCM detects a 20-50°C (36-90°F) or greater difference between the transmission fluid temperature and the power up temperature, which depends on the average of the transmission fluid temperature, the TCM substrate temperature, and the TCM power up temperature.
- The above conditions have to be met for 5 min within a 6 min time period.

P0712

The transmission fluid temperature is -74°C (-101°F) or less for 1 min.

P0713

The transmission fluid temperature is 174°C (345°F) or greater for 1 min.

Action Taken When the DTC Sets

- DTCs P0711, P0712, and P0713 are Type B DTCs.
- The TCM freezes transmission adaptive functions.
- The TCM allows the vehicle to operate in transmission protection mode.
- The TCM defaults to the TCM temperature with an offset.

Conditions for Clearing the DTC

DTCs P0711, P0712, and P0713 are Type B DTCs.

Diagnostic Aids

During a road test, the transmission fluid temperature should steadily increase to a normal operating temperature, and then stabilize.

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Electronic Component Description](#)
- [Transmission General Description](#)
- [Transmission Component and System Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825 Control Solenoid Test Plate

For equivalent regional tools, refer to [Special Tools](#).

Circuit/System Verification

1. Engine idling at normal operating temperature.
2. Verify the scan tool Transmission Fluid Temperature parameter is between -74 and +174°C (-101 and +345°F).
 - **If not between -74 and +174°C (-101 and +345°F)**
Replace the Q8 Control Solenoid Valve Assembly.
 - **If between -74 and +174°C (-101 and +345°F)**
3. Verify the scan tool Transmission Fluid Temperature parameter increases greater than 2°C (3.5°F) after operating the vehicle at 64 km/h (40 mph) for 10 minutes.
 - **If the temperature does not increase greater than 2°C (3.5°F)**
Replace the Q8 Control Solenoid Valve Assembly.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal
4. Verify the scan tool Transmission Fluid Temperature and the Transmission Control Module Temperature parameters are within 20Â°C (68Â°F) of each other.	the temperature does increase greater than 2Â°C (3.5Â°F)			

- If the temperatures are not within 20Â°C (68Â°F)

Replace the Q8 Control Solenoid Valve Assembly.

- If the temperatures are within 20Â°C (68Â°F)

5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

6. Verify the DTC does not set.

- If the DTC sets

Replace the Q8 Control Solenoid Valve Assembly.

- If the DTC does not set

7. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0716 OR P0717: INPUT SPEED SENSOR

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0716

Input Speed Sensor Performance

DTC P0717

Input Speed Sensor Circuit No Signal

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
8.3-9.3 V Reference	P0716, P0717	P0716, P0717	-	P0716
Signal	P0716, P0717	P0716, P0717	P0716, P0717	P0716

Typical Scan Tool Data

ISS Signal

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature	Short to Ground	Open	Short to Voltage
Parameter Normal Range: 450-7000 RPM			
8.3-9.3 V Reference	0 RPM	0 RPM	-
ISS Signal	0 RPM	0 RPM	0 RPM

ISS/OSS Supply Voltage

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Key ON, Engine OFF or Engine running, normal operating temperature			
Parameter Normal Range: OK			
8.3-9.3 V Reference	Out of Range	OK	Out of Range
Signal	OK	OK	OK

Circuit/System Description

The automatic transmission input and output speed sensor (ISS and OSS) assembly each are part of a single harness. The ISS is a hall-effect type sensor. The ISS/OSS mounts to the control valve upper body assembly. The ISS sensor end faces the splines on the 1-2-3-4 and 3-5-R clutch housing outside diameter surface. The sensor receives 8.3-9.3 volts on the ISS/OSS supply voltage circuit from the control solenoid valve assembly. As the 1-2-3-4 and 3-5-R clutch housing rotates, the sensor produces a signal frequency based on the splines on the clutch housing outside diameter surface. This signal is transmitted through the ISS signal circuit to the control solenoid valve assembly. The control solenoid valve assembly uses the ISS signal to determine line pressure, transmission shift patterns, torque converter clutch (TCC) slip speed and gear ratio.

Conditions for Running the DTC

P0716

- DTC P0101, P0102, P0103, P0121, P0122, P0123, P0717, P0752, P0753, or P0974 is not set.
- The engine speed is 400-7, 500 RPM or greater for 5 s.
- The engine torque signal is valid.
- Engine torque is between 0 N.m (0 lb ft) and 8191.88 N.m (6042.01 lb ft).
- Ignition voltage is between 8.6-32 V.
- The vehicle speed is greater than 10 km/h (6.21 mph).
- The throttle position signal must be valid.

P0717

- DTC P0101, P0102, P0103, P0722 or P0723 is not set.
- The engine speed is 400-7, 500 RPM or greater for 5 s.
- Ignition voltage is between 8.6-32 V.
- The engine torque signal is valid.
- The vehicle speed is greater than 16 km/h (10 mph).
- The engine torque is between 50 N.m (37 lb ft) and 8191.88 N.m (6042.01 lb ft).

Conditions for Setting the DTC

P0716

The TCM detects the transmission input speed sensor signal dropped greater than 900 RPM for 1 s.

ition 1

The TCM detects the transmission input shaft speed is less than 67 RPM for 5 s.

P0717 - Condition 2

The TCM detects that P0722 set and the transmission input speed is less than 653 RPM for 5 s.

Action Taken When the DTC Sets

P0716

- DTC P0716 is a Type A DTC.
- The high side driver is turned Off.
- The TCM commands TCC Off.
- The ECM reduces engine torque based on transmission input speed.
- The TCM inhibits Tap Up/Down.
- The TCM inhibits manual shifting of forward gears.
- The TCM inhibits Tow/Haul mode.

P0717

- DTC P0717 is a Type A DTC.
- The TCM inhibits shift adaptive functions.
- The TCM commands maximum line pressure.
- The ECM reduces engine torque based on transmission input speed.
- The TCM inhibits neutral idle.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM inhibits manual shifting of forward gears.
- The TCM commands neutral gear if the output speed sensor signal is 1, 500 RPM or greater.
- The TCM commands second gear if the output speed sensor signal is less than 1, 500 RPM.

Conditions for Clearing the DTC

DTC P0716 and P0717 are Type A DTCs.

Diagnostic Aids

Inspect the ISS/OSS, harness, connector, and control solenoid valve assembly for metallic debris and the 1-2-3-4 and 3-5-R clutch housing splines on the outside diameter surface for damage or misalignment. Proper torque of the ISS/OSS mounting bolt is critical to proper speed signal operation.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**

HARNESS CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Component Description

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

- **DT-47825-10** Jumper Harness
- **J-38522** Variable Signal Generator

For equivalent regional tools, refer to **Special Tools** .

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool ISS/OSS Supply Voltage parameter displays OK.
 - **If OK is not displayed**
Refer to Circuit/System Testing.
 - **If OK is displayed**
3. Engine idling in park position.
4. Verify the scan tool Transmission ISS parameter varies with engine RPM and does not drop out.
 - **If the Transmission ISS does not vary with engine speed or drops out**
Refer to Circuit/System Testing.
 - **If the Transmission ISS does vary with engine speed and does not drop out**
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**
Refer to Circuit/System Testing.
 - **If the DTC does not set**

Circuit/System Testing

1. Ignition Off, remove the Q8 Control Solenoid Valve Assembly.
2. Connect the **DT-47825-10** Jumper Harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector.
3. Disconnect the B14A/B14C Transmission Input and Output Speed Sensor harness connector X3 at the Q8 Control Solenoid Valve Assembly. Ignition ON.
4. Test for 8.3-9.3 V between the supply circuit terminal B at the Q8 Control Solenoid Valve Assembly.
 - **If not between 8.3-9.3 V**

Replace the Q8 Control Solenoid Valve Assembly.

- **If between 8.3-9.3 V**
5. Ignition Off, connect the red lead of the **J-38522** Variable Signal Generator to the signal circuit terminal A at the Q8 Control Solenoid Valve Assembly and ground at the transmission case.
 6. Set the **J-38522** Variable Signal Generator to the following specifications:
 - Signal Switch to 5 V
 - Frequency switch to 300
 - Duty cycle switch to the 50 or the Normal position
 7. Ignition On.
 8. Verify the scan tool Transmission ISS parameter is between 760-785 RPM.
 - **If not between 760-785 RPM**

Replace the Q8 Control Solenoid Valve Assembly.

 - **If between 760-785 RPM**
 9. Verify there is no damage or misalignment with the machined teeth on the 1-2-3-4 and 3-5 clutch housing.
 - **If the machined surfaces are damaged or misaligned**

Repair or replace as necessary.

 - **If the machined surfaces are not damaged or misaligned**
 10. Replace the B14A/B14C Transmission Input and Output Speed Sensor.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- Perform the [Input and Output Speed Sensor Replacement](#).
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup
- Perform the [Control Solenoid Valve and Transmission Control Module Assembly Input Shaft Speed/Output Shaft Speed Input Test](#).

DTC P0722 OR P0723: OUTPUT SPEED SENSOR

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
• Diagnostic Procedure Instructions	Provides an overview of each diagnostic category.			

DTC Descriptors

DTC P0722

Output Speed Sensor Circuit No Signal

DTC P0723

Output Speed Sensor Circuit Intermittent

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
8.3-9.3 V Reference	P0722, P0723	P0722, P0723	-	P0723
Signal	P0722, P0723	P0722, P0723	P0722, P0723	P0723

Typical Scan Tool Data

Output Speed Sensor (OSS) Signal

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 0-7000 RPM			
8.3-9.3 V Reference	0 RPM	0 RPM	0-7000 RPM
Signal	0 RPM	0 RPM	0 RPM

ISS/OSS Supply Voltage

Circuit	Open/High Resistance	Short to Voltage
Operating Conditions: Key ON, engine OFF or engine running Parameter Normal Range: OK		
8.3-9.3 V Reference	OK	Out of Range
Signal	Out of Range	-

Circuit/System Description

The automatic transmission input and output speed sensor (ISS and OSS) assembly each are part of a single harness. The OSS is a hall-effect type sensor. The ISS/OSS mounts to the control valve upper body assembly. The sensor end faces the output shaft housing machined slots. The sensor receives 8.3-9.3 volts on the ISS/OSS supply voltage circuit from the control solenoid valve assembly. As the output shaft rotates, the sensor produces a signal frequency based on the machined slots of the output shaft housing. This signal is transmitted through the OSS signal circuit to the control solenoid valve assembly. The control solenoid valve assembly uses the OSS signal to determine line pressure, transmission shift patterns, torque converter clutch (TCC) slip speed and gear ratio.

Conditions for Running the DTC

P0722

- DTC P0101, P0102, P0103, P0121, P0122, P0123, P0716, P0717, or P0723 is not set.
- Ignition voltage is between 8.6-32 V.
- The transmission fluid temperature is -40Â°C (-40Â°F) or greater.

ine speed is 400-7, 500 RPM or greater for 5 s.

- The engine torque signal is valid.
- The engine torque is 50 N.m (36.87 lb ft) or greater.
- Accelerator pedal position signal is valid.
- The throttle position signal is valid.
- The throttle position is 8 percent or greater.

P0723

- DTC P0101, P0102, P0103, P0121, P0122, P0123, P0973, P0974, P0976, or P0977 is not set.
- Ignition voltage is between 8.6-32 V.
- The engine speed is 400-7, 500 RPM for 5 s.
- Greater than 5 s since the last transmission upshift or downshift.
- The TCM must receive a valid torque signal from the ECM.
- Accelerator pedal position signal is valid.

Conditions for Setting the DTC

P0722

The transmission output speed is 35 RPM or less for 4.5 s.

P0723

- The transmission output speed is greater than 105 RPM.
- The TCM detects the transmission output speed dropped is greater than 650 RPM for 1.5 s.
- The transmission is in a forward drive gear.

Action Taken When the DTC Sets

P0722

- DTC P0722 is a Type A DTC.
- The TCM turns Off the TCC.
- The TCM commands maximum line pressure.
- The ECM reduces engine torque based on input speed.
- The TCM inhibits Tap up/Down function.
- The TCM inhibits manual shifting of all forward gears.
- The TCM commands neutral gear if the output speed sensor signal is 1, 350 RPM or greater.
- The TCM commands 2nd gear if the output speed sensor signal is less than 1, 350 RPM.

P0723

- DTC P0723 is a Type A DTC.
- The high side driver is turned OFF.
- The TCM inhibits TCC.
- The TCM commands maximum line pressure.
- The ECM reduces engine torque based on the signal from the input speed sensor signal.
- The TCM inhibits neutral idle.

M inhibits Tap up/Down function.

- The TCM inhibits manual shifting.

Conditions for Clearing the DIC/DTC

DTCs P0722 and P0723 are Type A DTCs.

Diagnostic Aids

Inspect the ISS/OSS, harness, connector and control solenoid valve assembly for metallic debris and output shaft housing machined slots for damage or misalignment. Proper torque of the ISS/OSS mounting bolt is critical to proper speed sensor operation.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

Electronic Component Description

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

[Control Module References](#) for scan tool information

Special Tools

- **DT-47825-10** Jumper Harness
- **J-38522** Variable Signal Generator

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool ISS/OSS Supply Voltage parameter displays OK.
 - **If OK is not displayed**

Refer to Circuit/System Testing.

- **If OK is displayed**

3. Road test the vehicle.

4. Verify the scan tool Transmission OSS parameter changes with vehicle speed and does not drop while operating the vehicle within 16-32 km/h (10-20 mph).

- **If the Transmission OSS does not vary with engine speed or drops out**

Refer to Circuit/System Testing.

- **If the Transmission OSS does vary with engine speed and does not drop out**

5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

6. Verify the DTC does not set.

- **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

7. All OK.

Circuit/System Testing

1. Ignition Off, remove the Q8 Control Solenoid Valve Assembly.

2. Connect the **DT-47825-10** Jumper Harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector.

3. Disconnect the B14A/B14C Transmission Input and Output Speed Sensor harness connector X3 at the Q8 Control Solenoid Valve Assembly. Ignition ON.

4. Test for 8.3-9.3 V between the supply circuit terminal B at the Q8 Control Solenoid Valve Assembly.

- **If not between 8.3-9.3 V**

Replace the Q8 Control Solenoid Valve Assembly

- **If between 8.3-9.3 V**

5. Ignition Off, connect the red lead of the **J-38522** Variable Signal Generator to the signal circuit terminal C at the Q8 Control Solenoid Valve Assembly and ground at the transmission case.

6. Set the **J-38522** Variable Signal Generator to the following specifications:

- Signal Switch to 5 V
- Frequency switch to 300
- Duty cycle switch to the 50 or the Normal position

7. Ignition On.

8. Verify the scan tool Transmission OSS parameter is between 495-505 RPM.

- **If not between 495-505 RPM**

Replace the Q8 Control Solenoid Valve Assembly.

- **If between 495-505 RPM**

9. Verify there is no damage or misalignment with the machined slots on the Output Shaft Assembly.

the machined slots are damaged or misaligned

Repair or replace as necessary.

- **If the machined slots are not damaged or misaligned**

10. Replace the B14A/B14C Transmission Input and Output Speed Sensor.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- Perform the [Input and Output Speed Sensor Replacement](#).
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.
- Perform the [Control Solenoid Valve and Transmission Control Module Assembly Input Shaft Speed/Output Shaft Speed Input Test](#).

DTC P0741 OR P0742: TORQUE CONVERTER CLUTCH (TCC) SYSTEM

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

NOTE: The DTCs listed below set due to a transmission hydraulic/mechanical condition. Perform the Circuit/System Verification and Circuit/System Testing to identify the cause.

DTC P0741

Torque Converter Clutch (TCC) System - Stuck Off - Transmission Hydraulic/Mechanical Performance

DTC P0742

Torque Converter Clutch (TCC) System - Stuck On - Transmission Hydraulic/Mechanical Performance

Circuit/System Description

The torque converter clutch (TCC) pressure control solenoid is part of the control solenoid valve assembly which has no serviceable parts. The TCC pressure control solenoid is a normally low pressure control solenoid. The TCC pressure control solenoid regulates transmission fluid to the TCC regulator valve in the lower valve body and the TCC control valve in the pump cover. When vehicle operating conditions are appropriate to apply the converter clutch, the Transmission Control Module will increase TCC pressure control current flow (duty cycle) to the TCC solenoid. The TCC pressure control solenoid directs fluid pressure to move the TCC control valve to the apply position, and moves the TCC regulator apply valve to the regulating position. The TCC regulator valve regulates TCC apply fluid pressure proportional to TCC solenoid pressure. When the TCC is fully applied, the engine is coupled directly to the transmission. TCC release is accomplished by the Transmission Control Module decreasing current flow to the TCC pressure control solenoid. This results in decreasing the apply pressure which allows the TCC control valve to move to the release position. The Transmission Control Module calculates torque converter slip speed based on engine speed and transmission input shaft speed.

Running the DTC

P0741

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, P0742, P2763, or P2764 is not set.
- Ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The transmission fluid temperature is -6.6 to $+130^{\circ}\text{C}$ ($+20$ to $+266^{\circ}\text{F}$).
- The accelerator pedal position signal is valid.
- The throttle position is greater than 8 percent.
- The TCM must receive a valid torque signal from the ECM.
- The engine torque is greater than 50 N.m (36 lb ft).
- The TCC is commanded ON and PWM duty cycle is greater than 60 percent for 5 s.
- The gear ratios listed below should be in range when the specific gear while the TCC is On:
 - The 2nd gear ratio is between 2.20-2.53.
 - The 3rd gear ratio is between 1.44-1.65.
 - The 4th gear ratio is between 1.07-1.23.
 - The 5th gear is between 0.79-0.91.
 - The 6th gear is between 0.62-0.72.

P0742

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, P0741, P2763, or P2764 is not set.
- DTC P0742 has not passed this key ON.
- Ignition voltage is between 8.6-32 V.
- The engine speed is 400-7, 500 RPM for 5 s.
- The transmission fluid temperature is -6.6 to $+130^{\circ}\text{C}$ ($+20$ to $+266^{\circ}\text{F}$).
- The accelerator pedal position signal is valid.
- The throttle position is greater than 8 percent.
- The TCM must receive a valid torque signal from the ECM.
- The engine torque is greater than 115 N.m (85 lb ft).
- The vehicle speed is greater than 16 km/h (10 mph).
- The gear ratio is between 0.62-1.63.
- The commanded gear is 2nd.
- The TCC is commanded OFF.

Conditions for Setting the DTC

P0741

- The TCC Pressure is greater than 750 Kpa (109 PSI) for 6 s.
- The TCM detects TCC slip greater than 130 RPM for 5 s when the TCC is commanded ON. This condition must occur 2 times.

- The TCM detects the TCC slip between -50 and +13 RPM for 6 s when the TCC is commanded OFF.
- The above condition must occur 2 times.

Action Taken When the DTC Sets

P0741

- DTC P0741 is a Type B DTC.
- The TCM inhibits TCC.
- The TCM inhibits high gear in hot mode.
- The TCM freezes transmission adaptive functions.

P0742

- DTC P0742 is a Type A DTC.
- The TCM disables neutral idle.
- The TCM enables high gear in hot mode.
- The TCM freezes transmission adaptive functions.

Conditions for Clearing the DIC/DTC

- DTC P0741 is a Type B DTC.
- DTC P0742 is a Type A DTC.

Diagnostic Aids

Before performing a road test, configure and setup the scan tool for snapshot mode. This will allow you to display, monitor, and verify multiple transmission data parameters at one time, after the road test.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Electronic Component Description](#)
- [Transmission Component and System Description](#)
- [Transmission General Description](#)
- [Park - Engine Running](#)
- [Reverse](#)
- [Neutral - Engine Running](#)
- [Drive Range, First Gear Engine Braking](#)
- [Drive Range, First Gear](#)

ange, Second Gear

- Drive Range, Third Gear
- Drive Range, Third Gear Default
- Drive Range, Fourth Gear
- Drive Range, Fifth Gear
- Drive Range, Fifth Gear Default
- Drive Range, Sixth Gear
- Fluid Passages

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825 Control Solenoid Test Plate

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

NOTE: If other DTCs are set, diagnose those DTCs first.

1. Engine idling in Park position, with parking brake applied and drive wheels chocked.
2. Verify the transmission fluid level and condition is correct. Refer to Transmission Fluid Level and Condition Check.

- If the transmission fluid level and condition is not correct

Repair as necessary.

- If the transmission fluid level and condition is correct

3. Ignition ON, clear the Transmission Control Module DTCs with a scan tool.

NOTE: During the road test, the Transmission Control Module must see 2 attempts at Torque Converter lockup.

4. Verify the transmission operation performs as indicated in the road test instructions and DTCs P0741 or P0742 did not set. Refer to Road Test.

- If DTC P0741 or P0742 set

Refer to Circuit/System Testing.

- If DTC P0741 or P0742 did not set

5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

6. Verify the DTC does not set.

- If the DTC sets

Refer to Circuit/System Testing.

- **If the DTC does not set**

7. All OK.

Circuit/System Testing

1. Verify the transmission line pressures are within the specified ranges. Refer to [Line Pressure Check](#).

- **If pressures are not within range**

Refer to [Fluid Pressure High or Low](#).

- **If pressures are within range**

2. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.

3. Verify a pressure change occurs for each solenoid when performing the solenoid test. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test](#).

- **If a pressure change does not occur**

Replace the Q8 Control Solenoid Valve Assembly.

- **If a pressure change does occur**

4. Verify the conditions listed below do not exist. Carefully inspect each component for that condition. Repair or replace as necessary.

P0741 or P0742 - A/Trans Fluid Pump cover Assembly (219)

- TCC Control Valve (227) stuck/sticking - debris, binding, damaged valve, or scored bore.
- Converter Feed Limit Valve (220) stuck/sticking - debris, binding, damaged valve, or scored bore.
- Pressure Regulator Valve (233) stuck/sticking - debris, binding, damaged valve, or scored bore.
- Turbine Shaft Bushings (218), (228) damaged or loose.
- Leak between stator/tower assembly and cover.

P0741 - 4-5-6 (w/Turbine Shaft) Housing Assembly (441)

TCC Turbine Shaft O-ring Seal (443) damaged or leaking.

P0741 - Torque Converter Assembly (1)

- TCC friction material debonded or excessively worn.
- One way stator clutch distressed.
- Internal leak - missing or damaged seal.
- Overheated due to lack of lubrication/cooler flow.

P0741 or P0742 - Lower Control Valve Body Assembly (351)

- TCC Regulator Apply Valve (355) stuck/sticking - debris, binding, damaged valve, or scored bore. Bore plug (328) undersized or leaking.
- Clutch Select Valve 2 (352) stuck/sticking - debris, binding, damaged valve, or scored bore.

P0741 or P0742 - Q8 Control Solenoid Valve Assembly (314)

TCM incorrectly reporting high OSS, causing early TCC apply or late TCC release.

Ins Input and Output Speed Sensor Assembly (303)

Incorrect, high, OSS signal, causing early TCC apply or late TCC release.

P0741 - Control Solenoid Valve Assembly (21)

A/Trans Fluid Pump Seal Assembly (18) damaged or leaking.

P0741 - Torque Converter Diagnosis

Refer to [No Torque Converter Clutch Apply](#).

P0742 - Torque Converter Diagnosis

Refer to [No Torque Converter Clutch Release](#).

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0751 OR P0752: SHIFT SOLENOID VALVE 1 PERFORMANCE

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptor

NOTE: The DTCs listed below set due to a transmission hydraulic/mechanical condition. Perform the **Circuit/System Verification and Circuit/System Testing** to identify the cause.

DTC P0751

Shift Solenoid Valve 1 Performance - Stuck Off - Transmission Hydraulic/Mechanical Performance

DTC P0752

Shift Solenoid Valve 1 Performance - Stuck On - Transmission Hydraulic/Mechanical Performance

Circuit/System Description

The shift solenoid 1 is part of the control solenoid valve assembly which has no serviceable parts. The control solenoid valve assembly is attached to the lower control valve body. The solenoid operates by the Transmission Control Module opening or closing the ground circuit. With the solenoid circuit grounded (solenoid on), the internal plunger and metering ball block the exhaust fluid creating signal fluid pressure. The signal fluid acts against the clutch select valve 2 to overcome the valve spring force moving it to the apply position, allowing the shift. The shift solenoid 1 is commanded ON in Park, Reverse, Neutral and Drive 1 Engine Braking, and commanded OFF in Drive 1-6 gear ranges.

Conditions for Running the DTC

101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.

- Ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The internal mode switch range is not PARK, NEUTRAL or REVERSE.
- High Side Driver is enabled.
- The transmission fluid temperature is -6.6°C (20.12°F).
- Accelerator pedal position signal is valid.
- The throttle position signal is valid.
- The output shaft speed is 0 RPM or greater.
- The TCM must receive a valid torque signal from the ECM.

Conditions for Setting the DTC

P0751

- 1st gear is commanded.
- TCM detects a gear ratio of 1.09-1.20.
- Gear slip is greater than 400 RPM for 2 s.
- The above conditions have to occur 8 times to set.

P0752

- 3rd gear is commanded.
- Transmission has achieved 1st or 2nd gear.
- Gear slip is 400 RPM for 1.5 s.
- TCM commands 4th gear if the above condition exist and detects a gear ratio of 3.82-4.22 for 1.5 s.
- The above conditions have to occur 5 times.

Action Taken When the DTC Sets

P0751

- DTC P0751 is a Type B DTC.
- TCM inhibits 1st gear.
- TCM inhibits neutral idle.

P0752

- DTC P0752 is a Type A DTC.
- TCM freezes transmission adaptive functions.
- TCM commands maximum line pressure.
- TCM inhibits Tap Up/Down function.
- TCM inhibits manual shifting of forward gears.
- TCM commands second gear if output is less than 1, 350 RPM, or neutral if output speed is 1, 350 RPM or greater.
- TCM inhibits neutral idle.

Clearing the DTC

- DTC P0751 is a Type B DTC.
- DTC P0752 is a Type A DTC.

Diagnostic Aids

Before performing a road test, configure and setup the scan tool for snapshot mode. This will allow you to display, monitor, and verify multiple transmission data parameters at one time, after the road test.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Electronic Component Description](#)
- [Transmission General Description](#)
- [Transmission Component and System Description](#)
- [Park - Engine Running](#)
- [Reverse](#)
- [Neutral - Engine Running](#)
- [Drive Range, First Gear Engine Braking](#)
- [Drive Range, First Gear](#)
- [Drive Range, Second Gear](#)
- [Drive Range, Third Gear](#)
- [Drive Range, Third Gear Default](#)
- [Drive Range, Fourth Gear](#)
- [Drive Range, Fifth Gear](#)
- [Drive Range, Fifth Gear Default](#)
- [Drive Range, Sixth Gear](#)
- [Fluid Passages](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

[Control Module References](#) for scan tool information

Special Tools

- **DT-47825** Control Solenoid Test Plate

Pressure Gauge

For equivalent regional tools, refer to [Special Tools](#).

Circuit/System Verification

NOTE: If other DTCs are set, diagnose those DTCs first.

1. Engine idling in Park position, with parking brake applied and drive wheels chocked.
2. Verify the transmission fluid level and condition is correct. Refer to [Transmission Fluid Level and Condition Check](#).
 - **If the transmission fluid level and condition is not correct**

Repair as necessary.
 - **If the transmission fluid level and condition is correct**
3. From a stop, accelerate to 72 km/h (45 mph) with the scan tool Calculated Throttle Position greater than 20 percent. Perform this test 8 times.
4. Verify DTC P0751 or P0752 did not set.
 - **If DTC P0751 or P0752 set**

Refer to Circuit/System Testing.
 - **If DTC P0751 or P0752 did not set**
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**

Refer to Circuit/System Testing.
 - **If the DTC does not set**
7. All OK.

Circuit/System Testing

1. Verify the transmission line pressures are within the specified ranges. Refer to [Line Pressure Check](#).
 - **If line pressures are not within range**

Refer to [Fluid Pressure High or Low](#).
 - **If line pressures are within range**
2. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.
3. Verify a pressure change occurs for each solenoid when performing the solenoid test. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test](#).
 - **If a pressure change does not occur for each solenoid**

Replace the Q8 Control Solenoid Valve Assembly.
 - **If a pressure change does occur for each solenoid**
4. Verify the mechanical conditions listed below do not exist. Carefully inspect each component for that condition. Repair or replace as necessary.

52 - Lower Control Valve Body

Clutch select valve 2 stuck - debris, sediment, binding or scored bore or valve damage.

P0751 - Lower Control Valve Body

Bore Plug - Clutch Select Valve 2, Leaking, undersized bore plug, or damaged.

P0751 - Upper Control Valve Body

- Check Ball #2 missing, damaged, or leaking.
- Check Ball #2 Seat damaged or leaking.

P0751 or P0752 - Q8 Control Solenoid Valve Assembly

Shift Solenoid 1:

- O-ring seals leaking.
- Control signal fluid supply leak - valve body filter plate assembly cracked or damaged gasket seal.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0756: SHIFT SOLENOID VALVE 2 PERFORMANCE

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptor

NOTE: The DTCs listed below set due to a transmission hydraulic/mechanical condition. Perform the **Circuit/System Verification and Circuit/System Testing** to identify the cause.

DTC P0756

Shift Solenoid Valve 2 Performance - Stuck Off - Transmission Hydraulic/Mechanical Performance

Circuit/System Description

The shift solenoid valve 2 is part of the control solenoid valve assembly which has no serviceable parts. The control solenoid valve assembly is attached to the lower control valve body. The solenoid operates by the Transmission Control Module opening or closing the ground circuit. With the solenoid circuit grounded (solenoid on), the internal plunger and metering ball block the exhaust fluid creating signal fluid pressure. The signal fluid acts against the clutch select valve 3 to overcome the valve spring force moving it to the apply position, allowing the shift. The shift solenoid 2 is commanded OFF in Reverse, and commanded ON in Park, Neutral, Drive 1 Engine Braking, and Drive 1-6 gear ranges.

Running the DTC

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.
- Ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- High Side Driver 1 is enabled.
- The Throttle Position signal voltage is valid.
- Throttle position is 0.5 percent or greater.
- Transmission fluid temperature is -6.6Â°C (20.12Â°F) or greater.
- The Transmission Output Speed is 67 RPM or greater.

Conditions for Setting the DTC

- Commanded gear is 1st locked.
- Transmission gearbox slip is 400 RPM for 10 s.
- The transmission commands 2nd gear if the above condition exists and detects a ratio of 2.72-3.01 for 1 s.
- The above condition has to occur 3 times.

Action Taken When the DTC Sets

- The TCM freezes the shift adapts function.
- The TCM commands maximum line pressure.
- The TCM inhibits neutral idle.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits Tow/Haul function.
- The TCM commands Neutral if the transmission output speed is 1, 350 RPM or greater.
- The TCM commands 2nd gear if the transmission output speed is less than 1, 350 RPM.

Conditions for Clearing the DTC

DTC P0756 is a Type A DTC.

Diagnostic Aids

Before performing a road test, configure and setup the scan tool for snapshot mode. This will allow you to display, monitor, and verify multiple transmission data parameters at one time, after the road test.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

nic Component Description

- Transmission Component and System Description
- Transmission General Description
- Park - Engine Running
- Reverse
- Neutral - Engine Running
- Drive Range, First Gear Engine Braking
- Drive Range, First Gear
- Drive Range, Second Gear
- Drive Range, Third Gear
- Drive Range, Third Gear Default
- Drive Range, Fourth Gear
- Drive Range, Fifth Gear
- Drive Range, Fifth Gear Default
- Drive Range, Sixth Gear
- Fluid Passages

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

- **DT-47825** Control Solenoid Test Plate
- **J 21867** Pressure Gauge

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

NOTE: If other DTCs are set, diagnose those DTCs first.

1. Engine idling in Park position, with parking brake applied and drive wheels chocked.
2. Verify the transmission fluid level and condition is correct. Refer to Transmission Fluid Level and Condition Check.

- **If the transmission fluid level and condition is not correct**

Repair as necessary.

- **If the transmission fluid level and condition is correct**

3. Ignition ON, clear the Transmission Control Module DTCs with a scan tool.

NOTE: During the road test, the Transmission Control Module has to see 3 attempts at a 1 through 6 gear shift change.

ie transmission operation performs as indicated in the road test instructions and DTC P0756 did not set. Refer to [Road Test](#).

- **If DTC P0756 is set**

Refer to Circuit/System Testing.

- **If DTC P0756 did not set**

5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

6. Verify the DTC does not set.

- **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

7. All OK.

Circuit/System Testing

1. Verify the transmission line pressures are within the specified ranges. Refer to [Line Pressure Check](#).

- **If pressures are not within range**

Refer to [Fluid Pressure High or Low](#).

- **If pressures are within range**

2. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.

3. Verify a pressure change occurs for each solenoid when performing the solenoid test. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test](#).

- **If a pressure change does not occur**

Replace the Q8 Control Solenoid Valve Assembly.

- **If a pressure change does occur**

4. Verify the conditions listed below do not exist. Carefully inspect each component for that condition. Repair or replace as necessary.

P0756 - Lower Control Valve Body (351)

Clutch select valve 3 stuck off - debris, sediment, binding or scored bore.

P0756 - Lower Control Valve Body (351)

Bore Plug - Clutch Select Valve 3 leaking, undersized bore plug, damaged.

P0756 - Upper Control Valve Body (304)

- Check Ball #3 missing, damaged, leaking.
- Check Ball #3 Spacer plate seat damaged, leaking.

P0756 - Q8 Control Solenoid Valve Assembly (314)

Shift Solenoid (SS) 2:

eals leaking.

- Control signal fluid supply leak - valve body filter plate assembly cracked or damaged gasket seal.

P0756 - 1-2-3-4 and 3-5-R Clutch Housing Assembly (51)

1-2-3-4 clutch backing plate retaining ring not seated, causing the piston to over travel and cut the 1-2-3-4 clutch piston seal.

P0756 - Fluid Pump Cover Assembly

Fluid pump cover vanes and fluid pump rotor broken.

P0756 - Low Clutch Sprag Assembly

Broken or incapable of holding torque.

P0756 - Pump Seal

Seal is cut, torn causing a leak due to pump speed and capacity.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0776 OR P0777: PRESSURE CONTROL SOLENOID VALVE 2

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

NOTE: The DTCs listed below set due to a transmission hydraulic/mechanical condition. Perform the Circuit/System Verification and Circuit/System Testing to identify the cause.

DTC P0776

Pressure Control Solenoid Valve 2 - Stuck Off - Transmission Hydraulic/Mechanical Performance

DTC P0777

Pressure Control Solenoid Valve 2 - Stuck On - Transmission Hydraulic/Mechanical Performance

Circuit/System Description

The clutch pressure control solenoid valve 2 is part of the control solenoid valve assembly, which has no serviceable parts. The pressure control solenoid valve 2 regulates transmission fluid pressure to the 3-5-Reverse clutch regulator valve which controls pressure to the 3-5-Reverse clutch. The Transmission Control Module calculates gear ratio based on the RPM signals from the input speed sensor (ISS) and the output speed sensor

Transmission Control Module compares the expected transmission gear ratio to the calculated gear ratio for each commanded gear.

Conditions for Running the DTC

P0776

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The transmission temperature is -6.6°C (20.12°F) or greater.
- The throttle position signal is valid.
- High side driver is enabled.
- The transmission output speed sensor is 67 RPM or greater or the accelerator pedal position sensor is 0.5 percent or greater.

P0777

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The transmission temperature is -6.6°C (20.12°F) or greater.
- The throttle position signal is valid.
- High side driver is enabled.
- The transmission output speed sensor is 67 RPM or greater or the accelerator pedal position sensor is 0.5 percent or greater.

Conditions for Setting the DTC

P0776

The Transmission Control Module has detected an incorrect gear ratio or neutral condition when the 3-5-R clutch is commanded ON. This condition must occur 3 times.

P0777

The Transmission Control Module has detected an incorrect gear ratio change when the 3-5-R clutch is commanded OFF during a shift or when 3rd gear ratio is detected in 1st gear. This condition must occur 3 times.

Action Taken When the DTC Sets

P0776

- DTC P0776 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tow/Haul mode.
- The TCM freezes transmission adaptive functions.

M inhibits TAP Up/Down function.

- The TCM inhibits Manual Up/Down Shift with the shift selector.
- The TCM inhibits auto grade braking.
- The TCM limits the transmission to 2nd gear if the output speed sensor signal is less than 1, 400 RPM. No upshift will occur.
- The TCM limits the transmission to 4th gear if the output speed sensor signal is 1, 400 RPM or greater.

P0777

- DTC P0777 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tow/Haul mode.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits Manual Up/Down Shift with the shift selector.
- The TCM limits the transmission to Reverse gear and 3rd gear operation.
- The TCM inhibits auto grade braking.

Conditions for Clearing the DIC/DTC

DTCs P0776 and P0777 are Type A DTCs.

Diagnostic Aids

Before performing a road test, configure and setup the scan tool for snapshot mode. This will allow you to display, monitor, and verify multiple transmission data parameters at one time, after the road test.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**
- **INLINE HARNESS CONNECTOR END VIEWS - INDEX**

Description and Operation

- **Electronic Component Description**
- **Transmission General Description**
- **Transmission Component and System Description**
- **Park - Engine Running**
- **Reverse**
- **Neutral - Engine Running**
- **Drive Range, First Gear Engine Braking**
- **Drive Range, First Gear**
- **Drive Range, Second Gear**
- **Drive Range, Third Gear**

ange, Third Gear Default

- Drive Range, Fourth Gear
- Drive Range, Fifth Gear
- Drive Range, Fifth Gear Default
- Drive Range, Sixth Gear
- Fluid Passages

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

- **DT-47825** Control Solenoid Test Plate
- **J 21867** Pressure Gauge

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

NOTE: If other DTCs are set, diagnose those DTCs first.

1. Engine idling in Park position, with parking brake applied and drive wheels chocked.
2. Verify the transmission fluid level and condition is correct. Refer to Transmission Fluid Level and Condition Check.
 - **If the transmission fluid level and condition is not correct**
Repair as necessary.
 - **If the transmission fluid level and condition is correct**
3. Ignition ON, clear the Transmission Control Module DTCs with a scan tool.
4. Verify the transmission operation performs as indicated in the road test instructions and DTCs P0776 or P0777 did not set. Refer to Road Test.
 - **If DTCs P0776 or P0777 are set**
Refer to Circuit/System Testing.
 - **If DTCs P0776 or P0777 did not set**
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**
Refer to Circuit/System Testing.
 - **If the DTC does not set**
7. All OK.

NOTE: You must perform the Circuit/System Verification first.

1. Verify the transmission line pressures are within the specified ranges. Refer to Line Pressure Check.

- If pressures are not within range

Refer to Fluid Pressure High or Low.

- If pressures are within range

2. Ignition OFF, remove the Q8 Control Solenoid Valve Assembly.

3. Verify a pressure change occurs for each solenoid when performing the solenoid test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test.

- If a pressure change does not occur

Replace the Q8 Control Solenoid Valve Assembly.

- If a pressure change does occur

4. Verify the conditions listed below do not exist. Carefully inspect each component for that condition. Repair or replace as necessary.

P0776 - Control Valve Upper Body Assembly (304)

3-5-R Regulator Valve (336) stuck/sticking - debris, binding, damaged valve, or scored bore.

P0776 or P0777 - Q8 Control Solenoid Valve Assembly (314)

- O-ring seals leaking.
- Valve body filter plate assembly cracked, blocked or damaged gasket seal.

P0776 or P0777 - Control Valve Upper Body Assembly (304)

- Actuator feed limit circuit supply fluid to solenoids restricted or not available, debris or sediment blockage.
- B-R-1/4-5-6 clutch regulator valve (327) not in the applied position - debris, binding, damaged valve, or scored bore.
- 4-5-6 clutch boost valve (329) not exhausting - debris, binding, damaged valve, or scored bore.

P0776 or P0777 - Torque Converter (w/Fluid Pump) Housing Assembly (2)

Fluid pump housing vanes/rotor/slide damaged/scored.

P0776 or P0777 - A/Trans Fluid Pump Cover Assembly (219)

Isolator valve (236) stuck/sticking - debris, binding, damaged valve, or scored bore.

P0776 - 1-2-3-4 and 3-5-R Clutch Housing Assembly (51)

3-5-R clutch backing plate retaining ring (400) not seated.

P0776 or P0777 - 1-2-3-4 and 3-5-R Clutch Housing Assembly (51)

1-2-3-4 clutch backing plate retaining ring (429) not seated, causing clutch pack/piston over travel.

P0776 - 4-5-6 Hub/ Shaft Assembly (58)

ift - broken hub weld.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0796 OR P0797: PRESSURE CONTROL SOLENOID VALVE 3

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

NOTE: The DTCs listed below set due to a transmission hydraulic/mechanical condition. Perform the [Circuit/System Verification](#) and [Circuit/System Testing](#) to identify the cause.

DTC P0796

Pressure Control Solenoid Valve 3 - Stuck Off - Transmission Hydraulic/Mechanical Performance

DTC P0797

Pressure Control Solenoid Valve 3 - Stuck On - Transmission Hydraulic/Mechanical Performance

Circuit/System Description

The clutch pressure control solenoid 3 is part of the control solenoid valve assembly, which has no serviceable parts. The Clutch Pressure Control Solenoid 3 regulates transmission fluid pressure to the CBR1/C 4-5-6 clutch regulator valve which controls pressure to the low/reverse clutch and the 4-5-6 clutch. The Transmission Control Module calculates gear ratio based on the RPM signals from the input speed sensor (ISS) and the output speed sensor (OSS). The Transmission Control Module compares the expected transmission gear ratio to the calculated gear ratio for each commanded gear.

Conditions for Running the DTC

P0796

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The transmission temperature is -6.6°C (20.12°F) or greater.
- The throttle position signal is valid.
- High side driver is enabled.
- The transmission output speed sensor signal is 67 RPM or greater or the accelerator pedal position sensor signal is 0.5 percent or greater.

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The transmission temperature is -6.6°C (20.12°F) or greater.
- The throttle position signal is valid.
- High side driver is enabled.
- The transmission output speed sensor signal is 67 RPM or greater or the accelerator pedal position sensor signal is 0.5 percent or greater.

Conditions for Setting the DTC

P0796

The Transmission Control Module has detected an incorrect gear ratio or neutral condition when the low and reverse clutch and the 4-5-6 clutch is commanded ON. This condition must occur 3 times.

P0797

The Transmission Control Module has detected an incorrect gear ratio change when the low and reverse clutch and the 4-5-6 clutch is commanded OFF during a shift or when 4th gear ratio is detected in 1st gear. This condition must occur 3 times.

Action Taken When the DTC Sets

P0796

- DTC P0796 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tow/Haul mode.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits Manual Up/Down Shift with the shift selector.
- The TCM limits the transmission to Reverse gear and 2nd gear operation.
- The TCM inhibits neutral idle.
- The TCM inhibits auto grade braking.
- The TCM limits the transmission to neutral gear if the output speed sensor signal is 1, 350 RPM or greater.
- The TCM limits the transmission to 2nd gear if the output speed sensor signal is less than 1, 350 RPM. No upshift will occur.

P0797

- DTC P0797 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tow/Haul mode.
- The TCM freezes transmission adaptive functions.
- The ECM/TCM enables torque management.

M inhibits TAP Up/Down function.

- The TCM inhibits Manual Up/Down Shift with the shift selector.
- The TCM limits the transmission to Reverse gear and 4th gear operation.

Conditions for Clearing the DIC/DTC

DTCs P0796 and P0797 are Type A DTCs.

Diagnostic Aids

Before performing a road test, configure and setup the scan tool for snapshot mode. This will allow you to display, monitor, and verify multiple transmission data parameters at one time, after the road test.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Electronic Component Description](#)
- [Transmission General Description](#)
- [Transmission Component and System Description](#)
- [Park - Engine Running](#)
- [Reverse](#)
- [Neutral - Engine Running](#)
- [Drive Range, First Gear Engine Braking](#)
- [Drive Range, First Gear](#)
- [Drive Range, Second Gear](#)
- [Drive Range, Third Gear](#)
- [Drive Range, Third Gear Default](#)
- [Drive Range, Fourth Gear](#)
- [Drive Range, Fifth Gear](#)
- [Drive Range, Fifth Gear Default](#)
- [Drive Range, Sixth Gear](#)
- [Fluid Passages](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

[Control Module References](#) for scan tool information

- **DT-47825** Control Solenoid Test Plate
- **J 21867** Pressure Gauge

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

NOTE: If other DTCs are set, diagnose those DTCs first.

1. Engine idling in Park position, with parking brake applied and drive wheels chocked.
2. Verify the transmission fluid level and condition is correct. Refer to [Transmission Fluid Level and Condition Check](#).
 - **If the transmission fluid level and condition is not correct**
Repair as necessary.
 - **If the transmission fluid level and condition is correct**
3. Ignition ON, clear the Transmission Control Module DTCs with a scan tool.
4. Verify the transmission operation performs as indicated in the road test instructions and DTCs P0796 or P0797 did not set. Refer to [Road Test](#).
 - **If DTC P0796 or P0797 set**
Refer to Circuit/System Testing.
 - **If DTC P0796 or P0797 did not set**
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**
Refer to Circuit/System Testing.
 - **If the DTC does not set**
7. All OK.

Circuit/System Testing

1. Verify the transmission line pressures are within the specified ranges. Refer to [Line Pressure Check](#).
 - **If pressures are not within range**
Refer to [Fluid Pressure High or Low](#).
 - **If pressures are within range**
2. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.
3. Verify a pressure change occurs for each solenoid when performing the solenoid test. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test](#).
 - **If a pressure change does not occur for each solenoid**
Replace the Q8 Control Solenoid Valve Assembly.

a pressure change does occur for each solenoid

4. Verify the conditions listed below do not exist. Carefully inspect each component for that condition. Repair or replace as necessary.

P0796 or P0797 - Control Valve Upper Body Assembly (304)

4-5-6 Regulator Valve (327) stuck/sticking - debris, binding, damaged valve, or scored bore.

P0796 - 4-5-6 Clutch Housing Assembly (441)

Turbine Shaft Seals (442) damaged or leaking.

P0796 or P0797 - Q8 Control Solenoid Valve Assembly (314)

- O-ring seals leaking.
- Valve body filter plate assembly cracked, blocked or damaged gasket seal.

P0796 or P0797 - Control Valve Lower Body Assembly (307)

Clutch select valve (352) stuck/ sticking - debris, binding, damaged valve, or scored bore.

P0796 - 4-5-6 Clutch Housing Assembly (441)

4-5-6 Clutch Piston Assembly (439) damaged/ leaking.

P0796 - Transmission Cooling/Lubrication

- Restriction/leak in OAC, oil to air, cooler/radiator.
- Restricted/leaking/kinked/damaged transmission oil cooler lines.
- Restriction/leak in transmission fluid pump assembly.

P0796 - Torque Converter (w/Fluid Pump) Housing Assembly (2)

- Fluid pump housing vanes/rotor/slide damaged/scored.
- Fluid pump or torque converter overstressed due to high temperature.

P0796 - 4-5-6 Hub/Shaft Assembly (58)

4-5-6 Hub/Shaft - broken hub weld.

P0796 - Automatic Transmission Fluid Filter Assembly (26)

Oil filter (26) or filter seal (25) loose or damaged.

P0796 - 1-2-3-4 and 3-5-R Clutch Housing Assembly (51)

1-2-3-4 Clutch Backing Plate Retaining Ring (429) not seated/oriented, causing clutch pack/piston over travel.

P0796 - Control (with body and valve) Valve Assembly (21)

Valve Body to Pump Transfer Seal Assembly (18) damaged/leaking.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
• Control Module References	for Ground	solenoid Valve assembly replacement, programming and setup.		

DTC P0815, P0816, P0826, OR P1876: UP AND DOWN SHIFT SWITCH

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0815

Upshift Switch Circuit

DTC P0816

Downshift Switch Circuit

DTC P0826

Up and Down Shift Switch Circuit

DTC P1876

Up and Down Shift Enable Switch Circuit Low Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P0815, P0816, P0826, P1876	P0815, P0816, P0826, P1876	P0815, P0816, P0826, P1876	-
Ground	P0826	P0826	P0826	-

Typical Scan Tool Data

Driver Shift Request

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Signal	Inactive	Inactive	Inactive
Ground	-	-	-

Circuit/System Description

The driver shift request, also known as the TAP Up/Downshift manual shift function, allows the driver to select the desired range of gears for current driving conditions. The driver shift request shift system is activated when the gear selector is in the manual position. The driver shift request system is deactivated in all other range positions. Pressing the plus (+) switch once will command the Body Control Module to signal the Transmission Control Module to upshift to the next high gear. Pressing the minus (-) switch once will command the Body Control Module to signal the Transmission Control Module to downshift to the next lowest or previous gear. The Transmission Control Module will not allow a downshift if the transmission is compromised by over-speeding. The automatic transmission manual shift switch is comprised of three different resistors values in series and two

Body Control Module supplies a 12 volt circuit to the automatic transmission manual shift switch. The signal circuit varies the voltage back to the Body Control Module depending on which switch is depressed.

Conditions for Running the DTC

P0815

- DTC P0816, P0826, P182E, P1876, P1877, P1915 or P1761 is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.

P0816

- DTC P0815, P0826, P182E, P1876, P1877, P1915 or P1761 is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.

P0826

- DTC P1761 is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.

P1876

- DTC U0100, P0815, P0816, P0826, P1761, P1825, P1877 or P1915 is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.

Conditions for Setting the DTC

P0815 - Condition 1

The TCM detects a stuck ON Tap Up switch for 1 s in Park or Neutral.

P0815 - Condition 2

The TCM detects a stuck ON Tap Up switch for 10 min in any forward gear.

P0816 - Condition 1

The TCM detects a stuck ON Tap Down switch for 1 s in Park or Neutral.

P0816 - Condition 2

The TCM detects a stuck ON Tap Down switch for 10 min in any forward gear.

P0826

The TCM detects an invalid voltage on the TAP up/down signal circuit for 1 min.

P1876

The TCM detects a TAP Enable Switch request 3 times when not in M (D6) range for 2 s.

When the DTC Sets

- DTCs P0815, P0816, P0826, and P1876 are Type C DTCs.
- The BCM disables TAP shift operation.

Conditions for Clearing the DTC

DTCs P0815, P0816, P0826, and P1876 are Type C DTCs.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Circuit/System Verification

1. Ignition ON.
2. Verify there are no other K9 Body Control Module, K71 Transmission Control Module or communication DTCs set.
 - **If a DTC is set**

Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) .
 - **If a DTC is not set**
3. Verify the scan tool K9 Body Control Module, automatic transmission manual shift switch parameter displays ON.
 - **If ON is not displayed**

Refer to Circuit/System Testing.
 - **If ON is displayed**
4. Verify the scan tool K9 Body Control Module, automatic transmission manual shift switch parameter displays UP when depressing the plus (+) switch on the S3 Transmission Shift Lever.

UP is not displayed

Refer to Circuit/System Testing.

- **If UP is displayed**

5. Verify the scan tool K9 Body Control Module, automatic transmission manual shift switch parameter displays Down when depressing the minus (-) switch on the S3 Transmission Shift Lever.

- **If Down is not displayed**

Refer to Circuit/System Testing.

- **If Down is displayed**

6. Verify the scan tool K71 Transmission Control Module, driver shift control mode parameter displays Inactive.

- **If Inactive is not displayed**

Refer to Circuit/System Testing.

- **If Inactive is displayed**

7. Verify the scan tool K71 Transmission Control Module, driver shift control mode parameter displays In Transition when depressing the plus (+) and minus (-) switches on the S3 Transmission Shift Lever.

- **If In Transition is not displayed**

Refer to Circuit/System Testing.

- **If In Transition is displayed**

8. Verify the scan tool K71 Transmission Control Module, driver shift request parameter displays Up Shift when depressing the plus (+) switch on the S3 Transmission Shift Lever.

- **If Up Shift is not displayed**

Refer to Circuit/System Testing.

- **If Up Shift is displayed**

9. Verify the scan tool K71 Transmission Control Module, driver shift request parameter displays Down Shift when depressing the minus (-) switch on the S3 Transmission Shift Lever.

- **If Down Shift is not displayed**

Refer to Circuit/System Testing.

- **If Down Shift is displayed**

10. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

11. Verify the DTC does not set.

- **If the DTC does set**

Refer to Circuit/System Testing.

- **If the DTC does not set**

12. All OK.

Circuit/System Testing

OFF and all vehicle systems OFF, disconnect the harness connector at the S3 Transmission Shift Lever. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 2 Ω between the ground circuit terminal 2 and ground.

- **If 5 Ω or greater**

1. Ignition OFF.

2. Test for less than 5 Ω in the ground circuit end to end.

- If greater than 2 Ω , repair the Open/High resistance in the circuit.
- If less than 2 Ω , repair the ground connection.

3. Ignition ON.

4. Test for 11-13 V between the signal circuit terminal 3 and ground.

- **If not between 11-13 V**

1. Ignition OFF, disconnect the connector at the K9 Body Control Module.

2. Test for infinite resistance between the signal circuit and ground.

- If less than infinite resistance, repair the short to ground in the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the signal circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

- **If between 11-13 V**

5. Ignition OFF.

6. Test for 6000-6300 Ω between terminal 2 and terminal 3 on the S3 Transmission Shift Lever connector.

- **If not within the specified range**

Replace the S3 Transmission Shift Lever.

- **If within the specified range**

7. Test for 450-750 Ω between terminal 2 and terminal 3 on the S3 Transmission Shift Lever connector, while depressing and holding the plus (+) switch.

- **If not within the specified range**

Replace the S3 Transmission Shift Lever.

- **If within the specified range**

8. Test for 1850-2150 Ω between terminal 2 and terminal 3 on the S3 Transmission Shift Lever connector, while depressing and holding the minus (-) switch.

- **If not within the specified range**

Replace the S3 Transmission Shift Lever.

- **If within the specified range**

9. Replace the K9 Body Control Module.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Replace the AT shift program switch. Refer to [Transmission Control Replacement](#).
- [Control Module References](#) for BCM replacement, programming, and setup

DR P0843: TRANSMISSION FLUID PRESSURE SWITCH 1

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0842

Transmission Fluid Pressure Switch 1 Circuit Low Voltage

DTC P0843

Transmission Fluid Pressure Switch 1 Circuit High Voltage

Circuit/System Description

The Transmission Fluid Pressure Switch 1 is part of the control solenoid valve assembly which has no serviceable parts. The Transmission Control Module supplies a signal circuit to the Transmission Fluid Pressure Switch 1. The Transmission Fluid Pressure Switch 1 has an internal case ground. Transmission Fluid Pressure Switch 1 is normally closed or LOW. When oil pressure is present at the Transmission Fluid Pressure Switch 1, the switch is open or HIGH. The normally high clutch pressure control (PC) solenoid 2 controls pressure to the 3-5 reverse clutch regulator valve. The Transmission Control Module monitors the Transmission Fluid Pressure Switch 1 to determine the position of the 3-5 reverse clutch regulator valve. When the 3-5 reverse clutch is commanded OFF, pressure is present on the Transmission Fluid Pressure Switch 1. When the 3-5 reverse clutch is commanded ON, the 3-5 reverse clutch regulator valve moves and pressure to the Transmission Fluid Pressure Switch 1 is exhausted through the 3-5 reverse clutch regulator valve.

Conditions for Running the DTC

P0842 or P0843

- DTC P0711, P0712, P0713, P0716, P0717, P0722, P0723, P0751, P0742, P0756, P0757, P0973, P0974, P0976, P0977, P1915, or P182E is not set.
- Ignition voltage is between 8.6-32 V.
- The transmission fluid temperature is -6.6°C (20.12°F).
- Engine speed is between 400-7, 500 RPM for 5 s.
- The high side driver is commanded ON.
- The engine speed is 550 RPM or greater in Drive 1-6 range.

Conditions for Setting the DTC

P0842

The Transmission Control Module detects that the Transmission Fluid Pressure Switch 1 signal voltage remains LOW after the 3-5-R clutch transitions from a HIGH pressure state to a LOW pressure state. The Transmission Control Module counts each incident. The DTC sets when 25 counts are accumulated.

P0843

Transmission Control Module detects that the Transmission Fluid Pressure Switch 1 signal voltage remains HIGH after the 3-5-R clutch transitions from a LOW pressure state to a HIGH pressure state. The Transmission Control Module counts each incident. The DTC sets when 24 counts are accumulated.

Action Taken When the DTC Sets

- DTCs P0842 and P0843 are Type C DTCs.
- The Transmission Control Module freezes transmission adaptive functions for the 3-5-Reverse clutch.

Conditions for Clearing the DTC

DTCs P0842 and P0843 are Type C DTCs.

Diagnostic Aids

A Transmission Fluid Pressure Switch may malfunction due to normal debris in the transmission fluid causing a Transmission Fluid Pressure Switch DTC to intermittently set. This type of condition should not be immediately noticeable to a customer, as the switch outputs are used for shift adaptive pressure and do not cause transmission symptoms unless the switch malfunctions continuously for an extended period of time.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**
- **INLINE HARNESS CONNECTOR END VIEWS - INDEX**

Description and Operation

- **Electronic Component Description**
- **Transmission General Description**
- **Transmission Component and System Description**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tool Reference

DT-47825-10 Jumper Harness

regional tools, refer to [Special Tools](#).

Circuit/System Verification

1. Engine idling in Park with parking brake applied, and drive wheels chocked.
2. Verify the scan tool Transmission Fluid Pressure Switch 1 parameter displays the correct values for each gear range while placing the gear select lever in Park, Reverse, and Neutral position. Refer to [Transmission Fluid Pressure Switch Logic](#) for the correct gear range states.
 - **If the correct states are not displayed**

Refer to Circuit/System Testing.
 - **If the correct states are displayed**
3. Place the gear select lever in Drive range.
4. Verify the scan tool Transmission Fluid Pressure Switch 1 parameter displays the correct states when allowing the transmission to shift from 1 through 6 gears. Refer to [Transmission Fluid Pressure Switch Logic](#) for the correct gear range states.
 - **If the correct states are not displayed**

Refer to Circuit/System Testing.
 - **If the correct states are displayed**
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**

Refer to Circuit/System Testing.
 - **If the DTC does not set**
7. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.
2. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.
3. Connect the **DT-47825-10** jumper harness between the vehicle wire harness electrical connector and the Q8 control solenoid valve assembly electrical connector. Ignition ON.
4. Verify the scan tool parameters listed below change states when gently pushing on each Transmission Fluid Pressure Switch with the eraser end of a pencil.
 - Transmission Fluid Pressure Switch 1
 - Transmission Fluid Pressure Switch 3
 - Transmission Fluid Pressure Switch 4
 - Transmission Fluid Pressure Switch 5
 - **If any parameter does not change**

Replace the Q8 Control Solenoid Valve Assembly.

all parameters change	Change to Ground	Open/High Resistance	Short to Voltage	Short to Voltage
5. Verify Channel plate, spacer plate, and filter plate do not have a restricted or blocked orifice. Repair or replace as necessary.	Short to Ground	Resistance	Short to Voltage	Performance

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Solenoid Valve and Transmission Control Module Assembly Replacement](#) .
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0850-P0852: PARK/NEUTRAL POSITION SWITCH

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0850

Park/Neutral Position Switch Circuit

DTC P0850 02

Park/Neutral Position Switch Circuit Short to Ground

DTC P0850 05

Park/Neutral Position Switch Circuit High Voltage/Open

DTC P0851

Park/Neutral Position Switch Circuit Low Voltage

DTC P0852

Park/Neutral Position Switch Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P0850/P0851	P0850/P0852	P0850/P0852	-

Typical Scan Tool Data

PNP Switch

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature, range selector in Park.			
Parameter Normal Range: 12 Volts = In-Gear, 0 Volts = Park/Neutral			

Bit	Short to Ground	Open/High Resistance	Short to Voltage
Signal	Park/Neutral	In-Gear	In-Gear

Circuit/System Description

The transmission manual shift shaft switch assembly, also known as the internal mode switch, is a sliding contact switch attached to the manual shift shaft inside the transmission case. The park/neutral position switch is integrated into the internal mode switch and connects to the Transmission Control Module lead-frame through a short wire harness. The circuit uses the Transmission Control Module as a pass-through connector only.

The Park/Neutral Signal is sent from the park/neutral switch directly to the Engine Control Module and is used for engine start enable.

Conditions for Running the DTC

- Ignition voltage is between 11-18 volts.
- Engine Speed is 1,000 RPM or greater.
- TP is 8 percent or greater.
- Engine torque is 75 N.m (55 lb ft) or greater.
- Vehicle speed is 10 km/h (6 mph) or greater.

Conditions for Setting the DTC

P0850 or P0851

The ECM detects the Park/Neutral switch signal equals 0 V, Low, when the IMS reports a Drive range.

P0852

The ECM detects the Park/Neutral switch signal equals 12 V, High, when the IMS reports a Park/Neutral range.

Action Taken When the DTC Sets

- DTC P0850, P0851, and P0852 are Type C DTCs.
- The ECM uses IMS Range for engine start-up.

Conditions for Clearing the DTC

DTC P0850, P0851, and P0852 are Type C DTCs.

Reference Information

Schematic Reference

- [Automatic Transmission Controls Schematics](#)
- [Engine Controls Schematics](#) for 3.6L (LY7)

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Transmission General Description](#)

ission Component and System Description

- Electronic Component Description

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

1. Verify the range selector cable is adjusted correctly. Refer to Range Selector Lever Cable Adjustment .
 - **If the cable adjustment is not OK**
Adjust, repair or replace as necessary.
 - **If the cable adjustment is OK**
2. Ignition ON.
3. Verify the scan tool Engine Control Module Park/Neutral Position Switch parameter displays Park/Neutral when in Park or Neutral and In-Gear when in Reverse or Drive Range.
 - **If Park/Neutral or In-Gear is not displayed**
Refer to Circuit/System Testing.
 - **If Park/Neutral or In-Gear is displayed**
4. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
5. Verify the DTC does not set.
 - **If the DTC sets**
Refer to Circuit/System Testing.
 - **If the DTC does not set**
6. All OK.

Circuit/System Testing

NOTE: You must perform Circuit/System Verification first.

1. Ignition OFF, disconnect the X1 harness connector at the Q8 Control Solenoid Valve Assembly on the automatic transmission.
2. Install the **DT-47825-10** jumper harness to the X1 vehicle harness connector.
3. Test for less than 5 Ω between the ground circuit terminal 5 at the **DT-47825-10** jumper harness and ground at the transmission case.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit from wire end to wire end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
4. Ignition ON.
5. Test for 11-13 V between the signal circuit terminal 3 at the **DT-47825-10** jumper harness and ground at the transmission case.
 - **If not between 11-13 V**
 1. Ignition OFF, disconnect the X1 harness connector at the K20 Engine Control Module.
 2. Test for infinite resistance between the Park/Neutral signal circuit terminal 3 at the **DT-47825-10** jumper harness and ground at the transmission case.
 - If less than infinite resistance, repair the short to ground in the signal circuit.
 - If infinite resistance.
 3. Test for less than 2 Ω in the Park/Neutral signal circuit wire end to wire end.
 - If 2 Ω or greater, repair the open/high resistance in the signal circuit.
 - If less than 2 Ω , replace the K20 Engine Control Module.
 - **If between 11-13 V**
6. Ignition OFF, disconnect the **DT-47825-10** jumper harness from the X1 vehicle harness connector.
7. Connect the **DT-47825-10** jumper harness to the Q8 Control Solenoid Valve Assembly harness connector at the transmission case.
8. Remove the transmission fluid pan.
9. Disconnect the B15 Transmission Internal Mode Switch electrical connector from the Q8 Control Solenoid Valve Assembly.
10. Test for less than 2 Ω between the ground circuit terminal 5 and terminal A at the B15 Transmission Internal Mode Switch connector on the Q8 Control Solenoid Valve Assembly.
 - **If 2 Ω or greater**

Replace the Q8 control solenoid valve assembly.
 - **If less than 2 Ω**
11. Ignition OFF.
12. Connect the **DT-47825-10** jumper harness to the X1 vehicle harness connector.
13. Ignition ON.
14. Test for 11-13 V between terminal F at the B15 Transmission Internal Mode Switch connector on the Q8 Control Solenoid Valve Assembly and ground at the transmission case.
 - **If not between 11-13 V**

Replace the Q8 control solenoid valve assembly.

between 11-13 V

15. Connect a 3 A fused jumper wire between terminal F at the B15 Transmission Internal Mode Switch on the Q8 Control Solenoid Valve Assembly and ground at the transmission case.
16. Verify the scan tool Engine Control Module Park/Neutral Position Switch parameter displays Park/Neutral.
 - **If Park/Neutral is not displayed**

Replace the K20 Engine Control Module.

- **If Park/Neutral is displayed**

17. Replace the B15 Transmission Internal Mode Switch.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly or ECM replacement, programming, and setup.

NOTE: If the IMS switch has been replaced, inspect the valve body detent spring to be sure it is centered over the detent lever. This prevents the detent spring from hitting the IMS switch.

- [Manual Shift Shaft Position Switch Replacement](#) for IMS replacement.

DTC P0872 OR P0873: TRANSMISSION FLUID PRESSURE SWITCH 3

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0872

Transmission Fluid Pressure Switch 3 Circuit Low Voltage

DTC P0873

Transmission Fluid Pressure Switch 3 Circuit High Voltage

Circuit/System Description

The Transmission Fluid Pressure Switch 3 is part of the control solenoid valve assembly which has no serviceable parts. The Transmission Control Module supplies a signal circuit to the Transmission Fluid Pressure Switch 3. The Transmission Fluid Pressure Switch 3 has an internal case ground. Transmission Fluid Pressure Switch 3 is normally closed or LOW. When oil pressure is present at the Transmission Fluid Pressure Switch 3, the switch is open or HIGH. The normally low clutch pressure control (PC) solenoid 4 controls pressure to the 2-6 clutch regulator valve. The Transmission Control Module monitors the Transmission Fluid Pressure Switch 3 to determine the position of the 2-6 clutch regulator valve. When the 2-6 clutch is commanded OFF, pressure is present on the Transmission Fluid Pressure Switch 3. When the 2-6 clutch is commanded ON, the 2-6 clutch regulator valve moves and pressure is exhausted through the 2-6 clutch regulator valve.

Running the DTC

P0872 or P0873

- DTC P0711, P0712, P0713, P0716, P0717, P0722, P0723, P0751, P0742, P0756, P0757, P0973, P0974, P0976, P0977, P1915, or P182E is not set.
- Ignition voltage is between 8.6-32 V.
- The transmission fluid temperature is -6.6°C (20.12°F).
- Engine speed is between 400-7, 500 RPM for 5 s.
- The high side driver is commanded ON.
- The engine speed is 550 RPM or greater in Drive 1-6 range.

Conditions for Setting the DTC

P0872

The Transmission Control Module detects that the Transmission Fluid Pressure Switch 3 signal voltage remains LOW after the 2-6 clutch transitions from a HIGH pressure state to a LOW pressure state. The Transmission Control Module counts each incident. The DTC sets when 10 counts are accumulated.

P0873

The Transmission Control Module detects that the Transmission Fluid Pressure Switch 3 signal voltage remains HIGH after the 2-6 clutch transitions from a LOW pressure state to a HIGH pressure state. The Transmission Control Module counts each incident. The DTC sets when 15 counts are accumulated.

Action Taken When the DTC Sets

- DTCs P0872 and P0873 are Type C DTCs.
- The Transmission Control Module freezes transmission adaptive functions for the 2-6 clutch.

Conditions for Clearing the DTC

DTCs P0872 and P0873 are Type C DTCs.

Diagnostic Aids

A Transmission Fluid Pressure Switch may malfunction due to normal debris in the transmission fluid causing a Transmission Fluid Pressure Switch DTC to intermittently set. This type of condition should not be immediately noticeable to a customer, as the switch outputs are used for shift adaptive pressure and do not cause transmission symptoms unless the switch malfunctions continuously for an extended period of time.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[nic Component Description](#)

- [Transmission General Description](#)
- [Transmission Component and System Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

[Powertrain Diagnostic Trouble Code \(DTC\) Type Definitions](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

1. Engine idling in Park with parking brake applied, and drive wheels chocked.
2. Verify the scan tool Transmission Fluid Pressure Switch 3 parameter displays the correct values for each gear range while placing the gear select lever in Park, Reverse, and Neutral position. Refer to [Transmission Fluid Pressure Switch Logic](#) for the correct gear range states.
 - **If the correct states are not displayed**
Refer to Circuit/System Testing.
 - **If the correct states are displayed**
3. Place the gear select lever in Drive range.
4. Verify the scan tool Transmission Fluid Pressure Switch 3 parameter displays the correct states when allowing the transmission to shift from 1 through 6 gears. Refer to [Transmission Fluid Pressure Switch Logic](#) for the correct gear range states.
 - **If the correct states are not displayed**
Refer to Circuit/System Testing.
 - **If the correct states are displayed**
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**
Refer to Circuit/System Testing.

the DTC does not set

7. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.
2. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.
3. Connect the **DT-47825-10** jumper harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.
4. Verify the scan tool parameters listed below change states when gently pushing on each Transmission Fluid Pressure Switch with the eraser end of a pencil.
 - Transmission Fluid Pressure Switch 1
 - Transmission Fluid Pressure Switch 3
 - Transmission Fluid Pressure Switch 4
 - Transmission Fluid Pressure Switch 5
 - **If any parameter does not change**

Replace the Q8 Control Solenoid Valve Assembly.

- **If all parameters change**
5. Verify the channel plate, spacer plate, and filter plate do not have a restricted or blocked orifice. Repair or replace as necessary.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Perform the Reset Transmission Adapts following all transmission related repairs.
- Control Solenoid Valve and Transmission Control Module Assembly Replacement .
- Control Module References for control solenoid valve assembly replacement, programming, and setup.

DTC P0877 OR P0878: TRANSMISSION FLUID PRESSURE SWITCH 4

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptors

DTC P0877

Transmission Fluid Pressure Switch 4 Circuit Low Voltage

DTC P0878

Transmission Fluid Pressure Switch 4 Circuit High Voltage

Circuit/System Description

Transmission Fluid Pressure Switch 4 is part of the control solenoid valve assembly which has no serviceable parts. The Transmission Control Module supplies a signal circuit to the Transmission Fluid Pressure Switch 4. The Transmission Fluid Pressure Switch 4 has an internal case ground. Transmission Fluid Pressure Switch 4 is normally closed or LOW. When oil pressure is present at the Transmission Fluid Pressure Switch 4, the switch is open or HIGH. The normally LOW pressure control solenoid 5 controls pressure to the 1-2-3-4 clutch regulator valve. The Transmission Control Module monitors the Transmission Fluid Pressure Switch 4 to determine the position of the 1-2-3-4 clutch regulator valve. When the 1-2-3-4 clutch is commanded OFF, pressure is present on the Transmission Fluid Pressure Switch 4. When the 1-2-3-4 clutch is commanded ON, the 1-2-3-4 clutch regulator valve moves and pressure to the Transmission Fluid Pressure Switch is exhausted through the 1-2-3-4 clutch regulator valve.

Conditions for Running the DTC

P0877 or P0878

- DTC P0711, P0712, P0713, P0716, P0717, P0722, P0723, P0751, P0742, P0756, P0757, P0973, P0974, P0976, P0977, P1915, or P182E is not set.
- Ignition voltage is between 8.6-32 V.
- The transmission fluid temperature is -6.6°C (20.12°F).
- Engine speed is between 400-7, 500 RPM for 5 s.
- The high side driver is commanded ON.
- The engine speed is 550 RPM or greater in Drive 1-6 range.

Conditions for Setting the DTC

P0877

The Transmission Control Module detects that the Transmission Fluid Pressure Switch 4 signal voltage remains LOW after the 1-2-3-4 clutch transitions from a HIGH pressure state to a LOW pressure state. The Transmission Control Module counts each incident. The DTC sets when 5 counts are accumulated.

P0878

The Transmission Control Module detects that the Transmission Fluid Pressure Switch 4 signal voltage remains HIGH after the 1-2-3-4 clutch transitions from a LOW pressure state to a HIGH pressure state. The Transmission Control Module counts each incident. The DTC sets when 6 counts are accumulated.

Action Taken When the DTC Sets

- DTCs P0877 and P0878 are Type C DTCs.
- The Transmission Control Module freezes transmission adaptive functions for the 1-2-3-4 clutch.

Conditions for Clearing the DTC

DTCs P0877 and P0878 are Type C DTCs.

Diagnostic Aids

A Transmission Fluid Pressure Switch may malfunction due to normal debris in the transmission fluid causing a Transmission Fluid Pressure Switch DTC to intermittently set. This type of condition should not be immediately noticeable to a customer, as the switch outputs are used for shift adaptive pressure and do not cause transmission symptoms unless the switch malfunctions continuously for an extended period of time.

Reference Information

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Electronic Component Description](#)
- [Transmission General Description](#)
- [Transmission Component and System Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

1. Engine idling in Park with parking brake applied, and drive wheels chocked.
2. Verify the scan tool Transmission Fluid Pressure Switch 4 parameter displays the correct values for each gear range while placing the gear select lever in Park, Reverse, and Neutral position. Refer to [Transmission Fluid Pressure Switch Logic](#) for the correct gear range states.
 - **If the correct states are not displayed**
Refer to Circuit/System Testing.
 - **If the correct states are displayed**
3. Place the gear select lever in Drive range.
4. Verify the scan tool Transmission Fluid Pressure Switch 4 parameter displays the correct states when allowing the transmission to shift from 1 through 6 gears. Refer to [Transmission Fluid Pressure Switch Logic](#) for the correct gear range states.
 - **If the correct states are not displayed**

Refer to Circuit/System Testing.

- **If the correct states are displayed**

5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

6. Verify the DTC does not set.

- **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

7. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.

2. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.

3. Connect the **DT-47825-10** jumper harness between the vehicle wire harness electrical connector, and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.

4. Verify the scan tool parameters listed below change states when gently pushing on each Transmission Fluid Pressure Switch with the eraser end of a pencil.

- Transmission Fluid Pressure Switch 1
- Transmission Fluid Pressure Switch 3
- Transmission Fluid Pressure Switch 4
- Transmission Fluid Pressure Switch 5
- **If any parameter does not change**

Replace the Q8 Control Solenoid Valve Assembly.

- **If all parameters change**

5. Verify the channel plate, spacer plate, and filter plate do not have a restricted or blocked orifice. Repair or replace as necessary.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- Perform the **Reset Transmission Adapts** following all transmission related repairs.
- **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
- **Control Module References** for control solenoid valve assembly replacement, programming, and setup.

DTC P0961-P0963: LINE PRESSURE CONTROL SOLENOID VALVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC P0961

Line Pressure Control Solenoid Valve Performance

DTC P0962

Line Pressure Control Solenoid Valve Control Circuit Low Voltage

DTC P0963

Line Pressure Control Solenoid Valve Control Circuit High Voltage

Circuit/System Description

The line pressure control solenoid is part of the control solenoid valve assembly which has no serviceable parts. The normally high line pressure control solenoid regulates and directs the pressure control solenoid oil pressure to the isolator/pressure regulator valve. Increasing pressure control solenoid line pressure increases transmission line pressure. The Transmission Control Module varies the current to the line pressure control solenoid through a low side driver. Decreasing the current to the line pressure control solenoid increases line pressure control solenoid oil pressure by closing OFF the solenoid exhaust port. Increasing the current to the line pressure control solenoid decreases line pressure control oil pressure by opening the solenoid exhaust port. Line pressure control solenoid power is supplied by the Transmission Control Module through a high side driver. The high side driver protects the circuit and components from excessive current flow. If excessive current flow is detected, the high side driver will turn OFF. When the fault is corrected the high side driver will reset.

Conditions for Running the DTC**P0961, P0962, or P0963**

- The engine speed is between 400-7, 500 RPM for 5 s.
- The ignition voltage is between 8.6-32 V.

Conditions for Setting the DTC**P0961**

The Transmission Control Module detects an internal electrical malfunction of the line pressure control solenoid where the measured line pressure control solenoid current does not equal the commanded line pressure control solenoid current for 5 s.

P0962

The Transmission Control Module detects a short to ground or an open/high resistance on the line pressure control solenoid control circuit for 2 s.

P0963

The Transmission Control Module detects a short to voltage on the line pressure control solenoid control circuit for 5 s.

Action Taken When the DTC Sets**P0961**

961 is a Type B DTC.

- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.

P0962

- DTC P0962 is a Type A DTC.
- The TCM turns the high side driver OFF.
- The TCM inhibits the torque converter clutch (TCC).
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits powertrain braking.
- The ECM/TCM request a reduction in engine torque based on input speed.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting or forward gears.
- The TCM inhibits auto grade braking.
- The TCM inhibits neutral idle.

P0963

- DTC P0963 is a Type B DTC.
- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.

Conditions for Clearing the DIC/DTC

- DTCs P0961 and P0963 are Type B DTCs.
- DTC P0962 is a Type A DTC.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**
- **INLINE HARNESS CONNECTOR END VIEWS - INDEX**

Description and Operation

- **Transmission General Description**
- **Transmission Component and System Description**
- **Electronic Component Description**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**

for Intermittent Conditions and Poor Connections

- Wiring Repairs

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

1. Engine running in Park position, parking brake applied, place the gear select lever in each gear position for 2-3 s. Return the gear select lever to the Park position.
2. Verify the scan tool parameters listed below do not display Malfunction:
 - Line Pressure Control Solenoid Valve Performance Test Status
 - Line Pressure Control Solenoid Valve Control Circuit High Voltage Test Status
 - Line Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status
 - **If Malfunction is displayed**

Refer to Circuit/System Testing.
 - **If Malfunction is not displayed**
3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
4. Verify the DTC does not set.
 - **If the DTC sets**

Refer to Circuit/System Testing.
 - **If the DTC does not set**
5. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF, remove the Q8 Control Solenoid Valve Assembly.
2. Verify the Q8 Control Solenoid Valve Assembly is not contaminated with any debris. Refer to Control Solenoid Valve and Transmission Control Module Assembly Inspection.
 - **If contaminated**

Clean as necessary.
 - **If not contaminated**

ie resistance is within the specified range for each solenoid. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).

- **If resistance is not within range**

Replace the Q8 Control Solenoid Valve Assembly.

- **If resistance is within range**

4. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.
5. Connect **DT-47825-10** jumper harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.
6. Verify the scan tool the parameters listed below do not display Malfunction:
 - Line Pressure Control Solenoid Valve Performance Test Status
 - Line Pressure Control Solenoid Valve Control Circuit High Voltage Test Status
 - Line Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status
 - **If Malfunction is displayed**

Replace the Q8 Control Solenoid Valve Assembly.

- **If Malfunction is not displayed**

7. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0965-P0967: PRESSURE CONTROL SOLENOID VALVE 2

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0965

Pressure Control Solenoid Valve 2 Performance

DTC P0966

Pressure Control Solenoid Valve 2 Control Circuit Low Voltage

DTC P0967

Pressure Control Solenoid Valve 2 Control Circuit High Voltage

Circuit/System Description

ontrol solenoid 2 is part of the control solenoid valve assembly which has no serviceable parts. The normally high pressure control solenoid 2 regulates and directs the pressure control solenoid 2 oil pressure to the 3-5 reverse clutch regulator valve and 3-5 reverse clutch boost valve. Increasing pressure control solenoid 2 pressure increases pressure to the 3-5 reverse clutch. The Transmission Control Module varies the current to the pressure control solenoid 2 through a low side driver. Decreasing the current to the pressure control solenoid 2 increases pressure control solenoid 2 oil pressure by closing OFF the solenoid exhaust port. Increasing the current to the pressure control solenoid 2 decreases pressure control solenoid 2 oil pressure by opening the solenoid exhaust port. Pressure control solenoid 2 power is supplied by the Transmission Control Module through a high side driver. The high side driver protects the circuit and components from excessive current flow. If excessive current flow is detected, the high side driver will turn OFF. When the fault is corrected, the high side driver will reset.

Conditions for Running the DTC

- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.

Conditions for Setting the DTC

P0965

The Transmission Control Module detects an internal electrical performance malfunction of the clutch pressure control solenoid 2 control circuit where the measured clutch pressure control solenoid 2 current does not equal the commanded clutch pressure control solenoid 2 current for 5 s.

P0966

The Transmission Control Module detects a short to ground on the clutch pressure control solenoid 2 control circuit for 1 s.

P0967

The Transmission Control Module detects an open or short to voltage on the clutch pressure control solenoid 2 control circuit, for 1 s.

Action Taken When the DTC Sets

P0965

- DTC P0965 is a Type C DTC.
- The TCM freezes transmission adaptive functions on the 3-5 Reverse clutch.

P0966

- DTC P0966 is a Type A DTC.
- The TCM turns OFF the high side driver.
- The TCM forces TCC OFF.
- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.
- The TCM enables Torque management.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM limits the transmission to Reverse and 3rd or 5th gear operation.

- DTC P0967 is a Type A DTC.
- The TCM limits the transmission to 3rd gear or reverse gear operation.
- The TCM forces TCC OFF.
- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.
- The TCM enables Torque management.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits manual shifting of forward gears.

Conditions for Clearing the DTC

- DTC P0965 is a Type C DTC.
- DTCs P0966 and P0967 are Type A DTCs.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**
- **INLINE HARNESS CONNECTOR END VIEWS - INDEX**

Description and Operation

- **Transmission General Description**
- **Transmission Component and System Description**
- **Electronic Component Description**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825-10 Jumper Harness

regional tools, refer to [Special Tools](#).

Circuit/System Verification

1. Operate the vehicle in drive range. Allow the vehicle to shift through all forward gear ranges.
2. Verify the scan tool parameters listed below do not display Malfunction

- Pressure Control Solenoid Valve 2 Performance Test Status
- Pressure Control Solenoid Valve 2 Control Circuit High Voltage Test Status
- Pressure Control Solenoid Valve 2 Control Circuit Low Voltage Test Status
- **If Malfunction is displayed**

Refer to Circuit/System Testing.

- **If Malfunction is not displayed**

3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

4. Verify the DTC does not set.

- **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

5. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF, remove the Q8 Control Solenoid Valve Assembly.

2. Verify the Q8 Control Solenoid Valve Assembly is not contaminated with any debris. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).

- **If contaminated**

Clean as necessary

- **If not contaminated**

3. Verify the resistance is within the specified range for each solenoid. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).

- **If resistance is not within range**

Replace the Q8 Control Solenoid Valve Assembly.

- **If resistance is within range**

4. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.

5. Connect **DT-47825-10** jumper harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.

6. Verify the scan tool parameters listed below do not display Malfunction:

- Pressure Control Solenoid Valve 2 Performance Test Status
- Pressure Control Solenoid Valve 2 Control Circuit High Voltage Test Status
- Pressure Control Solenoid Valve 2 Control Circuit Low Voltage Test Status

Malfunction is displayed

Replace the Q8 Control Solenoid Valve Assembly.

- **If Malfunction is not displayed**

7. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- Perform the **Reset Transmission Adapts** following all transmission related repairs.
- **Control Module References** for control solenoid valve assembly replacement, programming, and setup

DTC P0969-P0971: PRESSURE CONTROL SOLENOID VALVE 3

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC P0969

Pressure Control Solenoid Valve 3 Performance

DTC P0970

Pressure Control Solenoid Valve 3 Control Circuit Low Voltage

DTC P0971

Pressure Control Solenoid Valve 3 Control Circuit High Voltage

Circuit/System Description

The pressure control solenoid 3 is part of the control solenoid valve assembly which has no serviceable parts. The normally high pressure control solenoid 3 regulates and directs the pressure control solenoid 3 oil pressure to the 4-5-6 clutch regulator valve and 4-5-6 clutch boost valve. Increasing pressure control solenoid 3 oil pressure increases oil pressure to the 4-5-6 clutch assembly. The Transmission Control Module varies the current to the pressure control solenoid 3 through a low side driver. Decreasing the current to the pressure control solenoid 3 increases pressure control solenoid 3 oil pressure by closing OFF the solenoid exhaust port. Increasing the current to the pressure control solenoid 3 decreases pressure control solenoid 3 oil pressure by opening the solenoid exhaust port. Pressure control solenoid 3 power is supplied by the Transmission Control Module through a high side driver. The high side driver protects the circuit and components from excessive current flow. If excessive current flow is detected, the high side driver will turn OFF. When the fault is corrected the high side driver will reset.

Conditions for Running the DTC

- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.

Setting the DTC

P0969

The Transmission Control Module detects an internal electrical malfunction on the pressure control solenoid 3 control circuit where the measured pressure control solenoid 3 current does not equal the commanded clutch pressure control solenoid 3 current for 5 s.

P0970

The Transmission Control Module detects a short to ground on the pressure control solenoid 3 control circuit for 1 s.

P0971

The Transmission Control Module detects an open or short to voltage on the pressure control solenoid 3 control circuit for 1 s.

Action Taken When the DTC Sets

P0969

- DTC P0969 is a Type C DTCs.
- The TCM freezes transmission adaptive functions to the low and reverse clutch and 4-5-6 clutch.

P0970 and P0971

- DTC P0970 and P0971 are Type A DTCs.
- The TCM limits the transmission to Reverse and 3rd or 5th gear operation.
- The TCM turns the high side driver OFF.
- The TCM forces TCC OFF.
- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.
- The TCM enables Torque management.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits manual shifting of forward gears.

Conditions for Clearing the DTC

- DTC P0969 is a Type C DTCs.
- DTCs P0970 and P0971 are Type A DTCs.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

id Operation

- [Transmission General Description](#)
- [Transmission Component and System Description](#)
- [Electronic Component Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

[Powertrain Diagnostic Trouble Code \(DTC\) Type Definitions](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

1. Operate the vehicle in drive range. Allow the vehicle to shift through all forward gear ranges.
2. Verify the scan tool parameters listed below do not display Malfunction:
 - Pressure Control Solenoid Valve 3 Performance Test Status
 - Pressure Control Solenoid Valve 3 Control Circuit High Voltage Test Status
 - Pressure Control Solenoid Valve 3 Control Circuit Low Voltage Test Status
 - **If Malfunction is displayed**

Refer to Circuit/System Testing.
 - **If Malfunction is not displayed**
3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
4. Verify the DTC does not set.
 - **If the DTC sets**

Refer to Circuit/System Testing.
 - **If the DTC does not set**
5. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

OFF, remove the Q8 Control Solenoid Valve Assembly.

2. Verify the Q8 Control Solenoid Valve Assembly is not contaminated with any debris. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).

- **If contaminated**

Clean as necessary

- **If not contaminated**

3. Verify the resistance is within the specified range for each solenoid. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).

- **If resistance is not within range**

Replace the Q8 Control Solenoid Valve Assembly.

- **If resistance is within range**

4. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.

5. Connect **DT-47825-10** jumper harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.

6. Verify the scan tool parameters do not display Malfunction:

- Pressure Control Solenoid Valve 3 Performance Test Status
- Pressure Control Solenoid Valve 3 Control Circuit High Voltage Test Status
- Pressure Control Solenoid Valve 3 Control Circuit Low Voltage Test Status
- **If Malfunction is displayed**

Replace the Q8 Control Solenoid Valve Assembly.

- **If Malfunction is not displayed**

7. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0973 OR P0974: SHIFT SOLENOID VALVE 1

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0973

Shift Solenoid Valve 1 Control Circuit Low Voltage

DTC P0974

lenoid Valve 1 Control Circuit High Voltage

Circuit/System Description

The shift solenoid 1 is part of the control solenoid valve assembly which has no serviceable parts. The shift solenoid 1 is a normally closed ON/OFF solenoid and is controlled by the Transmission Control Module through a low side driver. When the shift solenoid 1 is energized, shift solenoid 1 fluid pressure is directed to the clutch select valve 2. Power to the shift solenoid 1 is supplied by the Transmission Control Module through a high side driver. The high side driver protects the circuit and components from excessive current flow. If excessive current flow is detected, the high side driver will turn OFF. When the fault is corrected, the high side driver will reset.

Conditions for Running the DTC

P0973 or P0974

- DTCs P0973 or P0974 is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.

Conditions for Setting the DTC

P0973

The control solenoid valve assembly detects an internal low voltage electrical malfunction of the shift solenoid 1 control circuit when the shift solenoid 1 is commanded OFF for 2 seconds.

P0974

The control solenoid valve assembly detects an internal high voltage electrical malfunction of the shift solenoid 1 control circuit when the shift solenoid 1 is commanded ON for 2 seconds.

Action Taken When the DTC Sets

P0973

- DTC P0973 is a Type A DTC.
- The TCM forces the torque converter clutch (TCC) OFF.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM enables Torque Management.
- The TCM inhibits TAP function.
- The TCM inhibits manual shifting of forward gears.
- The TCM inhibits Tow/Haul mode.
- The TCM inhibits neutral idle.
- The TCM commands neutral gear if the output speed sensor signal is 1350 RPM or greater.
- The TCM commands 2nd gear if the output speed sensor signal is less than 1350 RPM. No upshift allowed.

P0974

- DTC P0974 is a Type B DTC.
- The TCM inhibits 1st gear.
- The TCM inhibits neutral idle.

Clearing the DIC/DTC

- DTC P0973 is a Type A DTC.
- DTC P0974 is a Type B DTC.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**
- **INLINE HARNESS CONNECTOR END VIEWS - INDEX**

Description and Operation

- **Transmission General Description**
- **Transmission Component and System Description**
- **Electronic Component Description**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to **Special Tools** .

Circuit/System Verification

1. Engine Running, place the gear selector in Reverse for 5 seconds and then idle the vehicle in Park for 5 seconds.
2. Verify the scan tool parameters listed below do not display Malfunction:
 - Shift Solenoid Valve 1 Control Circuit High Voltage Test Status
 - Shift Solenoid Valve 1 Control Circuit Open Test Status
 - Shift Solenoid Valve 1 Control Circuit Low Voltage Test Status
 - **If Malfunction is displayed**

Refer to Circuit/System Testing.

- **If Malfunction is not displayed**

3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

4. Verify the DTC does not set.

- **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

5. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF, remove the Q8 Control Solenoid Valve Assembly.

2. Verify the Q8 Control Solenoid Valve Assembly is not contaminated with any debris. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).

- **If contaminated**

Clean as necessary.

- **If not contaminated**

3. Verify the resistance is within the specified range for each solenoid. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).

- **If resistance is not within range**

Replace the Q8 Control Solenoid Valve Assembly.

- **If resistance is within range**

4. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.

5. Connect **DT-47825-10** jumper harness between the vehicle wire harness electrical connector, and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.

6. Verify the scan tool parameters listed below do not display Malfunction:

- Shift Solenoid Valve 1 Control Circuit High Voltage Test Status
- Shift Solenoid Valve 1 Control Circuit Open Test Status
- Shift Solenoid Valve 1 Control Circuit Low Voltage Test Status
- **If Malfunction is displayed**

Replace the Q8 Control Solenoid Valve Assembly.

- **If Malfunction is not displayed**

7. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.

Replacing the TCM, perform the [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).

- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P0976 OR P0977: SHIFT SOLENOID VALVE 2

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P0976

Shift Solenoid Valve 2 Control Circuit Low Voltage

DTC P0977

Shift Solenoid Valve 2 Control Circuit High Voltage

Circuit/System Description

The shift solenoid 2 is part of the control solenoid valve assembly which has no serviceable parts. The shift solenoid 2 is a normally closed ON/OFF solenoid and is controlled by the Transmission Control Module through a low side driver. When the shift solenoid 2 is energized, shift solenoid 2 fluid pressure is directed to the clutch select valve 3. Power to the shift solenoid 2 is supplied by the Transmission Control Module through a high side driver. The high side driver protects the circuit and components from excessive current flow. If excessive current flow is detected, the high side driver will turn OFF. When the fault is corrected, the high side driver will reset.

Conditions for Running the DTC

P0976 or P0977

- DTCs P0976 or P0977 is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.

Conditions for Setting the DTC

P0976

The Transmission Control Module detects an internal low voltage electrical malfunction of the shift solenoid 2 control circuit when the shift solenoid 2 is commanded OFF for 2 seconds.

P0977

The Transmission Control Module detects an internal high voltage electrical malfunction of the shift solenoid 2 control circuit when the shift solenoid 2 is commanded ON for 2 seconds.

Action Taken When the DTC Sets

P0976

- DTC P0976 is a Type C DTC.

M freezes transmission adaptive functions.

P0977

- DTC P0977 is a Type A DTC.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM commands maximum line pressure.
- The TCM inhibits powertrain braking.
- The TCM inhibits neutral idle.
- The TCM inhibits auto grade braking.
- The TCM inhibits Tow/Haul function.
- The TCM commands neutral gear if the output speed sensor signal is 1,350 RPM or greater.
- The TCM commands 2nd gear if the output speed sensor signal is less than 1,350 RPM. No upshift allowed.

Conditions for Clearing the DIC/DTC

- DTC P0976 is a Type C DTC.
- DTC P0977 is a Type A DTC.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**
- **INLINE HARNESS CONNECTOR END VIEWS - INDEX**

Description and Operation

- **Transmission General Description**
- **Transmission Component and System Description**
- **Electronic Component Description**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

[File References](#) for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

1. Engine Running, place the gear selector in Reverse for 5 seconds and then idle the vehicle in Park for 5 seconds.
2. Verify the scan tool parameters listed below do not display Malfunction:
 - Shift Solenoid Valve 2 Control Circuit High Voltage Test Status
 - Shift Solenoid Valve 2 Control Circuit Open Test Status
 - Shift Solenoid Valve 2 Control Circuit Low Voltage Test Status
 - **If Malfunction is displayed**

Refer to Circuit/System Testing.
 - **If Malfunction is not displayed**
3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
4. Verify the DTC does not set.
 - **If the DTC sets**

Refer to Circuit/System Testing.
 - **If the DTC does not set**
5. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF, remove the Q8 Control Solenoid Valve Assembly.
2. Verify the Q8 Control Solenoid Valve Assembly is not contaminated with any debris. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).
 - **If contaminated**

Clean as necessary.
 - **If not contaminated**
3. Verify the resistance is within the specified range for each solenoid. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).
 - **If resistance is not within range**

Replace the Q8 Control Solenoid Valve Assembly.
 - **If resistance is within range**
4. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.

: **DT-47825-10** jumper harness between the vehicle wire harness electrical connector, and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.

6. Verify the scan tool parameters listed below do not display Malfunction:

- Shift Solenoid Valve 2 Control Circuit High Voltage Test Status
- Shift Solenoid Valve 2 Control Circuit Open Test Status
- Shift Solenoid Valve 2 Control Circuit Low Voltage Test Status
- **If Malfunction is displayed**

Replace the Q8 Control Solenoid Valve Assembly.

- **If Malfunction is not displayed**

7. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- Perform the **Reset Transmission Adapts** following all transmission related repairs.
- Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection**.
- **Control Module References** for control solenoid valve assembly replacement, programming, and setup.

DTC P0989 OR P0990: TRANSMISSION FLUID PRESSURE SWITCH 5

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC P0989

Transmission Fluid Pressure Switch 5 Circuit Low Voltage

DTC P0990

Transmission Fluid Pressure Switch 5 Circuit High Voltage

Circuit/System Description

The Transmission Fluid Pressure Switch 5 is part of the control solenoid valve assembly which has no serviceable parts. The Transmission Control Module supplies a signal circuit to the Transmission Fluid Pressure Switch 5. The Transmission Fluid Pressure Switch 5 has an internal case ground. Transmission Fluid Pressure Switch 5 is normally closed or LOW. When oil pressure is present at the Transmission Fluid Pressure Switch 5, the switch is open or HIGH. The normally high pressure control solenoid 3 controls pressure to the CBR1/4-5-6 clutch regular valve. The Transmission Control Module monitors the Transmission Fluid Pressure Switch 5 signal circuit to determine the position of the CBR1/4-5-6 clutch regulator valve. When the 4-5-6 clutch is commanded OFF, pressure is present on the Transmission Fluid Pressure Switch 5. When the 4-5-6 clutch is commanded ON, the CBR1/4-5-6 clutch regulator valve moves and pressure to the Transmission Fluid Pressure Switch 5 is exhausted through the CBR1/4-5-6 clutch regulator valve.

Conditions for Running the DTC

- DTC P0711, P0712, P0713, P0716, P0717, P0722, P0723, P0751, P0742, P0756, P0757, P0973, P0974, P0976, P0977, P1915, or P182E is not set.
- The ignition voltage is between 8.6-32 V.
- The transmission fluid is -6.6°C (20.12°F) or greater.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The high side driver is commanded ON.
- The engine speed is 550 RPM or greater in Drive 1-6 range.

Conditions for Setting the DTC

P0989

The Transmission Control Module detects that the Transmission Fluid Pressure Switch 5 signal voltage remains LOW after the 4-5-6 clutch transitions from a HIGH pressure state to a LOW pressure state. The Transmission Control Module counts each incident. The DTC sets when 18 counts are accumulated.

P0990

The Transmission Control Module detects that the Transmission Fluid Pressure Switch 5 signal voltage remains HIGH after the 4-5-6 clutch transitions from a LOW pressure state to a HIGH pressure state. The Transmission Control Module counts each incident. The DTC sets when 15 counts are accumulated.

Action Taken When the DTC Sets

- DTCs P0989 and P0990 are Type C DTCs.
- The Transmission Control Module freezes transmission adaptive functions for the 4-5-6 clutch.

Conditions for Clearing the DTC

DTCs P0989 and P0990 are Type C DTCs.

Diagnostic Aids

A Transmission Fluid Pressure Switch may malfunction due to normal debris in the transmission fluid causing a Transmission Fluid Pressure Switch DTC to intermittently set. This type of condition should not be immediately noticeable to a customer, as the switch outputs are used for shift adaptive pressure and do not cause transmission symptoms unless the switch malfunctions continuously for an extended period of time.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Electronic Component Description](#)

ission General Description

- Transmission Component and System Description

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

1. Engine idling in Park with parking brake applied, and drive wheels chocked.
2. Verify the scan tool Transmission Fluid Pressure Switch 5 parameter displays the correct values for each gear range while placing the gear select lever in Park, Reverse, and Neutral position. Refer to Transmission Fluid Pressure Switch Logic for the correct gear range states.
 - **If the correct states are not displayed**
Refer to Circuit/System Testing.
 - **If the correct states are displayed**
3. Place the gear select lever in Drive range.
4. Verify the scan tool Transmission Fluid Pressure Switch 5 parameter displays the correct states when allowing the transmission to shift from 1 through 6 gears. Refer to Transmission Fluid Pressure Switch Logic for the correct gear range states.
 - **If the correct states are not displayed**
Refer to Circuit/System Testing.
 - **If the correct states are displayed**
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**
Refer to Circuit/System Testing.
 - **If the DTC does not set**

Circuit/System Testing

NOTE: You must perform the **Circuit/System Verification** first.

1. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.
2. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.
3. Connect the **DT-47825-10** jumper harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.
4. Verify the scan tool parameters listed below change states when gently pushing on each Transmission Fluid Pressure Switch with the eraser end of a pencil.
 - Transmission Fluid Pressure Switch 1
 - Transmission Fluid Pressure Switch 3
 - Transmission Fluid Pressure Switch 4
 - Transmission Fluid Pressure Switch 5
 - **If any parameter does not change**

Replace the Q8 Control Solenoid Valve Assembly.

- **If all parameters change**
5. Verify the channel plate, spacer plate, and filter plate do not have a restricted or blocked orifice. Repair or replace as necessary.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- Perform the **Reset Transmission Adapts** following all transmission related repairs.
- **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
- **Control Module References** for control solenoid valve assembly replacement, programming, and setup.

DTC P1761: UP AND DOWN SHIFT SWITCH SIGNAL MESSAGE COUNTER INCORRECT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P1761

Up and Down Shift Switch Signal Message Counter Incorrect

Circuit/System Description

The driver shift request, also known as the TAP Up/Downshift manual shift function, allows the driver to select the desired range of gears for current driving conditions. The driver shift request shift system is activated when the gear selector is in the manual position. The driver shift request system is deactivated in all other range positions. When driver shift request is selected, a signal is sent to the Body Control Module and the also to the Transmission

le. Each time a signal is sent, an internal counter in the Body Control Module and Transmission Control Module increments. Both counters must have the same value. This code sets when the rolling count value of the Transmission Control Module does not match the same rolling count value sent from the Body Control Module.

Conditions for Running the DTC

The engine run time is greater than 5 s.

Conditions for Setting the DTC

The TCM detects an error in the rolling count value that does not match with the BCM.

Action Taken When the DTC Sets

- DTC P1761 is a Type C DTC.
- The TCM disables TAP Shift operation.

Conditions for Clearing the DTC

DTC P1761 is a Type C DTC.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Description and Operation

Electronic Component Description

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE:

- DTC P1761 is an informational DTC.
- Diagnose all other K9 Body Control Module DTCs prior to DTC P1761.

There are no other K9 Body Control Module or communication DTCs set.

- **If a DTC is set**

Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).

- **If a DTC is not set**

2. Complete the diagnosis by looking for a CAN fault. Refer to [Scan Tool Does Not Communicate with High Speed GMLAN Device](#).

- **If a CAN circuit fault is found**

Repair as necessary.

- **If a CAN circuit fault is not found**

3. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup

DTC P1762: TRANSMISSION MODE SWITCH SIGNAL MESSAGE COUNTER INCORRECT

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptor

DTC P1762

Transmission Mode Switch Signal Message Counter Incorrect

Circuit/System Description

The Body Control Module is constantly sending the Engine Control Module and Transmission Control Module serial data messages with information regarding transmission mode switch activation. The Transmission Control Module sets this code when it detects a discrepancy in the structure of the message causing the signal message integrity to be questioned.

Conditions for Running the DTC

- The engine speed is between 400-7, 500 RPM for 5 s.
- No other CAN errors are present.

Conditions for Setting the DTC

The TCM detects an error in the rolling count value that does not match with the BCM.

Action Taken When the DTC Sets

- DTC P1762 is a Type C DTC.

M inhibits TAP Shift operation.

Conditions for Clearing the DTC Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
---	-----------------	----------------------	------------------	--------------------

DTC P1762 is a Type B DTC.

Reference Information

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Circuit/System Verification

NOTE:

- DTC P1762 is an informational DTC.
- Diagnose all other K71 Transmission Control Module or K20 Engine Control Module DTCs prior to DTC P1762.

1. Verify there are no other K71 Transmission Control Module or K20 Engine Control Module DTCs set.

- If a DTC is set

Refer to Diagnostic Trouble Code (DTC) List - Vehicle .

- If a DTC is not set

2. Complete the diagnosis by looking for a CAN fault. Refer to Scan Tool Does Not Communicate with High Speed GMLAN Device .

- If a CAN circuit fault is found

Repair as necessary.

- If a CAN circuit fault is not found

3. All OK.

DTC P182E OR P1915: INTERNAL MODE SWITCH

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptors

DTC P182E

Internal Mode Switch Indicates - Invalid Range

DTC P1915

Internal Mode Switch Does Not Indicate Park/Neutral During Start

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Short to Signal
Signal A	P182E	P1915	P1915	P182E, P1915
Signal B	P1915	P182E	P182E	P182E, P1915
Signal C	P1915	P182E	P182E	P182E, P1915
Signal P	P182E	P1915	P1915	P182E, P1915
Ground	-	P182E	P182E	P182E, P1915

Typical Scan Tool Data

IMS A/B/C/P

Circuit	Short to Ground	Open	Short to Voltage
Operating Conditions: Ignition ON, range selector in Park			
Signal A	LOW	High	High
Signal B	LOW	High	High
Signal C	LOW	High	High
Signal P	LOW	High	High

Circuit/System Description

The manual shift detent lever with shaft position switch assembly or internal mode switch assembly is a sliding contact switch attached to the control valve body within the transmission. The 4 inputs to the Transmission Control Module from the switch indicate which position is selected by the transmission manual shaft. The input voltage at the Transmission Control Module is high when the switch is open and low when the switch is closed to ground. The state of each input is displayed on the scan tool. The input parameters represented are transmission range signal A, Signal B, signal C, and signal P.

The park/neutral position switch is integrated into the transmission internal mode switch. The circuit uses the Transmission Control Module as a pass-through connection only.

The park/neutral signal is sent from the park/neutral switch directly to the engine control module and is used only for engine start enable.

Conditions for Running the DTC

P182E

- DTCs: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E, P0716, P0717, P0722, P0723, P07C0, P07BF, P077C or P077D is not set.
- The engine speed is between 400-7, 500 RPM.
- The ignition voltage is between 8.6-32 V.
- Engine torque signal is valid.

P1915

- DTC P0722 or P0723 is not set.
- The transmission output shaft speed is less than 90 RPM.
- The ignition voltage is between 8.6-32 V.

Conditions for Setting the DTC

The IMS does not indicate a valid Park, Reverse, Neutral or Drive Range gear position for 7 seconds.

P1915

The manual shift shaft IMS switch assembly does not indicate Park or Neutral during the following sequence:

- The engine speed is less than 50 RPM for more than 1 second.
- The engine speed is 50-480 RPM for more than 1 second.
- The engine speed is greater than 525 RPM for more than 2 seconds.
- The transmission input shaft speed is 200 RPM or greater.

Action Taken When the DTC Sets

- DTCs P182E and P1915 are Type A DTCs.
- The TCM commands maximum line pressure.
- The TCM turns off the high side driver.
- The TCM freezes transmission adaptive functions.
- The TCM defaults the transmission to third gear if the current gear is 1st, 2nd, or 3rd; or fifth gear if the current gear is 4th, 5th, or 6th gear.
- The TCM inhibits TCC.
- The TCM inhibits Tap up and Tap down functions.

Conditions for Clearing the DTC

DTCs P182E and P1915 are Type A DTCs.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **COMPONENT CONNECTOR END VIEWS - INDEX**
- **INLINE HARNESS CONNECTOR END VIEWS - INDEX**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Description and Operation

- **Electronic Component Description**
- **Transmission General Description**
- **Transmission Component and System Description**

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify DTC P0850, P0851 or P0852 is set.

- **If any of the DTCs are set**

Refer to DTC P0850-P0852.

- **If none of the DTCs are set**

2. Verify the range selector cable is adjusted correctly. Refer to Range Selector Lever Cable Adjustment .

- **If the cable adjustment is not OK**

Adjust, repair or replace as necessary.

- **If the cable adjustment is OK**

3. Ignition ON.

4. Verify the scan tool parameter matches the Transmission Internal Mode Switch Logic table for each gear position. Refer to Transmission Internal Mode Switch Logic .

- **If the parameter does not match**

Refer to Circuit/System Testing.

- **If the parameter matches**

5. Verify the scan tool engine control module Park/Neutral Switch parameter displays Park/Neutral with the gear shift lever in Park or Neutral and In Gear when in Reverse or Drive.

- **If Park/Neutral or In Gear is not displayed**

Refer to Circuit/System Testing.

- **If Park/Neutral or In Gear is displayed**

6. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

7. Verify the DTC does not set.

- **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

8. All OK.

Circuit/System Testing

NOTE: You must perform Circuit/System Verification first.

OFF, remove the automatic transmission fluid pan. Refer to [Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement](#).

2. Disconnect the B15 Transmission Internal Mode Switch connector at the Q8 Control Solenoid Valve Assembly. Ignition ON.
3. Verify the scan tool transmission control module Internal Mode Switch A/B/C/P parameter displays High High High High.
 - **If High High High High is not displayed**
Replace the Q8 Control solenoid Valve Assembly.
 - **If High High High High is displayed**
4. Verify the scan tool Engine Control Module Park/Neutral Position Switch parameter displays In Gear.
 - **If In Gear is not displayed**
 1. Ignition OFF, disconnect the harness connector at the K20 Engine Control Module.
 2. Test for infinite resistance between the neutral start signal circuit and ground at the vehicle harness K20 Engine Control Module connector.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 Engine Control Module.
 - **If In Gear is displayed**
5. Install a 3 A fused jumper wire between the low reference circuit terminal A and each signal circuit listed below one at a time at the Q8 Control Solenoid Valve Assembly:
 - Signal A - terminal E
 - Signal B - terminal D
 - Signal C - terminal C
 - Signal P - terminal B
6. Verify the scan tool Transmission Control Module A/B/C/P displays 1 Low and 3 High when a signal circuit is grounded.
 - **If 1 Low and 3 High is not displayed**
Replace the Q8 control solenoid valve assembly.
 - **If 1 Low and 3 High is displayed**
7. Connect a 3 A fused jumper wire between Park/Neutral switch signal circuit terminal F and low reference circuit terminal A at the Q8 Control Solenoid Valve Assembly.
8. Verify the scan tool engine control module Park/Neutral Position Switch parameter displays Park/Neutral.
 - **If Park/Neutral is not displayed**
 1. Ignition OFF, disconnect the connector at the K20 Engine Control Module.
 2. Test for less than 2 Ω in the signal circuit wire end to wire end.
 - If 2 Ω or greater, repair the open/high resistance in the wire circuit.
 - If less than 2 Ω , replace the K20 Engine Control Module.
 - **If Park/Neutral is displayed**
9. Replace the B15 Transmission Internal Mode Switch.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.

DTC P1875: FOUR WHEEL DRIVE (4WD) LOW SWITCH (NQ6, NQ7)

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptor

DTC P1875

Four Wheel Drive (4WD) Low Switch

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Performance
5-Volt Reference	P1875 08	P1875 08	-	-
4WD Switch Signal	P1875 08	P1875 08	-	-

Circuit/System Description

The transfer case control module controls the 4WD low function. When the operator selects 4WD low, the transfer case control module commands the encoder motor to change ranges to 4WD low. The transfer case control module sends a message to the transmission control module that it is shifting to 4WD low. The transmission control module sends a message to the engine control module over high speed LAN notifying the engine control module that the output speed will be changing. The engine control module then compensates for transfer case gear reduction in the transmission output shaft speed (OSS) sensor signal. The engine control module uses the transmission OSS sensor signal to adjust shift points, line pressure and torque converter clutch scheduling.

The engine control module compares the reported transfer case ratio to the measured ratio of the transmission output speed sensor to the transfer case output shaft speed sensor ratio. If the transfer case ratio is not consistent with the position of the S77 transfer case shift control switch, a fault is set.

Conditions for Running the DTC

- No throttle position sensor DTCs P0121, P0122, P0123, P0222, P0223, P16A0, P16A1, P16A2 or P2135.
- No VSS DTCs P0502, P0503, P0722 or P0723.
- No cam or crank sensor DTCs.
- The system voltage is 9-16 volts.
- The engine speed is 1, 000-5, 500 RPM for at least 10 seconds.
- The vehicle speed is greater than 5 km/h (3 mph).
- The TP angle is greater than 3 percent.
- The gear range is not PARK, NEUTRAL or REVERSE.
- The TFT is -40 to +130Â°C (-40 to +266Â°F).
- Automatic transmissions require a valid input speed sensor.

Conditions for Setting the DTC

Transfer case control module calculated transfer case ratio is not consistent with the position of the transfer case shift control switch.

Condition 1

The transfer case shift control switch indicates 4WD HIGH and the transfer case control module calculated transfer case range indicates 4WD LOW, for 2 seconds.

OR

Condition 2

The transfer case shift control switch indicates 4WD LOW range and the transfer case control module calculated transfer case range indicates 4WD HIGH, for 2 seconds.

Action Taken When the DTC Sets

- DTC P1875 is a Type B DTC.
- The ECM commands a normal shift pattern, not a 4WD low shift pattern.

Conditions for Clearing the DTC

DTC P1875 is a Type B DTC.

Diagnostic Aids

A mechanical failure of the Transfer Case High/Low Wheel Drive Shift Fork could cause DTC P1875 to set.

- Small selector tangs can break off.
- Shift fork pads can wear or become damaged.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Transmission General Description

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Transmission Control Module Scan Tool Information

Special Tools

J 35616 GM-Approved Terminal Test Kit

Circuit/System Verification

1. Ignition ON, engine OFF.

NOTE: A malfunctioning wheel speed sensor could cause DTC P1875 to set.

2. Verify DTC C0035, C0040, C0045, or C0050 is not set.

- If any of the DTCs are set

Diagnose that DTC first. Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) for further diagnosis.

- If none of the DTCs are set

NOTE: A malfunctioning transmission output shaft speed sensor or transfer case rear output shaft speed sensor could cause DTC P1875 to set.

3. Verify DTC P0502, P0503, P0722, or P0723 is not set.

- If any of the DTCs are set

Diagnose that DTC first. Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) for further diagnosis.

- If none of the DTCs are set

4. Verify DTC P1875 is only set as a history DTC.

- If the DTC is set as current

Refer to Circuit/System Testing.

- If the DTC is set as history

NOTE: After inspection, apply Nyogel lubricant 760G to each connector terminal. Ensure each connector and CPA is correctly seated.

5. Visually inspect each connector terminal of the K69 transfer case control module connectors, the K71 transmission control module connectors and the K20 engine control module connectors for damage or corrosion. Repair as necessary.

6. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data. The DTC should not set.

- If the DTC sets

Refer to Circuit/System Testing.

- If the DTC does not set

7. All OK.

Testing

1. If any other DTCs are set, diagnose them first. Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).

NOTE: Excessive slip in the transmission or transfer case or faulty speed sensors can cause DTC P1875 to set.

2. Shift the vehicle into 2WD high or 4WD high.
3. Drive the vehicle.
4. With a scan tool, monitor the vehicle speed sensor parameter. It should vary with engine RPM.

- If the vehicle speed sensor parameter does not vary with engine RPM

Diagnose as if DTC P0502 or P0503 with RPO NQV was set. Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).

- If the vehicle speed sensor parameter varies with engine RPM

Diagnose as if DTC B2725 was set. Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for replacement, setup, and programming

DTC P2714 OR P2715: PRESSURE CONTROL SOLENOID VALVE 4

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

NOTE: The DTCs listed below set due to a transmission hydraulic/mechanical condition. Perform the Circuit/System Verification and Circuit/System Testing to identify the cause.

DTC P2714

Pressure Control Solenoid Valve 4 - Stuck Off - Transmission Hydraulic/Mechanical Performance

DTC P2715

Pressure Control Solenoid Valve 4 - Stuck On - Transmission Hydraulic/Mechanical Performance

Circuit/System Description

The clutch pressure control solenoid 4 is part of the control solenoid valve assembly, which has no serviceable parts. The Clutch Pressure Control Solenoid 4 regulates transmission fluid pressure to the 2-6 clutch regulator valve which controls pressure to the 2-6 clutch. The Transmission Control Module calculates gear ratio based on the RPM signals from the input speed sensor (ISS) and the output speed sensor (OSS). The Transmission Control Module compares the expected transmission gear ratio to the calculated gear ratio for each commanded gear.

Running the DTC

P2714

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The transmission temperature is -6.6°C (20.12°F) or greater.
- The throttle position signal is valid.
- High side driver is enabled.
- The transmission output speed sensor signal is 67 RPM or greater or the accelerator pedal position sensor signal is 0.5 percent or greater.

P2715

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The transmission temperature is -6.6°C (20.12°F) or greater.
- The throttle position signal is valid.
- High side driver is enabled.
- The transmission output speed sensor signal is 67 RPM or greater or the accelerator pedal position sensor signal is 0.5 percent or greater.

Conditions for Setting the DTC

P2714

The Transmission Control Module has detected an incorrect gear ratio or neutral condition when the 2-6 clutch is commanded ON. This condition must occur 3 times.

P2715

The Transmission Control Module has detected an incorrect gear ratio change when the 2-6 clutch is commanded OFF during a shift or when 2nd gear ratio is detected in 1st gear. This condition must occur 3 times.

Action Taken When the DTC Sets

P2714

- DTC P2714 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tow/Haul mode.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits Manual Up/Down Shift with the shift selector.
- The TCM inhibits powertrain braking.

- The TCM inhibits neutral idle.
- The TCM inhibits Tow/Haul mode.
- The TCM limits the transmission to Reverse gear and 3rd gear operation.

P2715

- DTC P2715 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tow/Haul mode.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits Manual Up/Down Shift with the shift selector.
- The TCM inhibits powertrain braking.
- The TCM inhibits neutral idle.
- The TCM inhibits Tow/Haul mode.
- The TCM limits the transmission to neutral gear if the output speed sensor signal is 1,350 RPM or greater.
- The TCM limits the transmission to 2nd gear if the output speed sensor signal is less than 1,350 RPM. No upshift will occur.

Conditions for Clearing the DIC/DTC

DTCs P2714 and P2715 are Type A DTCs.

Diagnostic Aids

Before performing a road test, configure and setup the scan tool for snapshot mode. This will allow you to display, monitor, and verify multiple transmission data parameters at one time, after the road test.

Reference Information

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Description and Operation

- [Electronic Component Description](#)
- [Transmission General Description](#)
- [Transmission Component and System Description](#)
- [Park - Engine Running](#)
- [Reverse](#)
- [Neutral - Engine Running](#)

Drive Range, First Gear Engine Braking

- Drive Range, First Gear
- Drive Range, Second Gear
- Drive Range, Third Gear
- Drive Range, Third Gear Default
- Drive Range, Fourth Gear
- Drive Range, Fifth Gear
- Drive Range, Fifth Gear Default
- Drive Range, Sixth Gear
- Fluid Passages

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

- **DT-47825** Control Solenoid Test Plate
- **DT-47825-10** Jumper Harness

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

NOTE: If other DTCs are set, diagnose those DTCs first.

1. Engine idling in Park position, with parking brake applied and drive wheels chocked.
2. Verify the transmission fluid level and condition is correct. Refer to Transmission Fluid Level and Condition Check.
 - **If the transmission fluid level and condition is not correct**
Repair as necessary.
 - **If the transmission fluid level and condition is correct**
3. Ignition ON, clear the TCM DTCs.
4. Verify the transmission operation performs as indicated in the road test instructions and DTCs P2714 or P2715 did not set. Refer to Road Test.
 - **If DTCs P2714 or P2715 are set**
Refer to Circuit/System Testing.
 - **If DTCs P2714 or P2715 did not set**
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

7. All OK.

Circuit/System Testing

1. Verify the transmission line pressures are within the specified ranges. Refer to [Line Pressure Check](#).

- **If pressures are not within range**

Refer to [Fluid Pressure High or Low](#).

- **If pressures are within range**

2. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.

3. Verify a pressure change occurs for all solenoids when performing the solenoid test. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test](#).

- **If a pressure change does not occur**

Replace the Q8 Control Solenoid Valve Assembly.

- **If a pressure change does occur**

4. Verify the conditions listed below do not exist. Carefully inspect each component for that condition. Repair or replace as necessary.

P2714 or P2715 - Control Valve Upper Body Assembly (304)

2-6 clutch regulator valve (334) stuck/sticky - debris, binding, damaged valve, or scored bore.

P2714 - Q8 Control Solenoid Valve Assembly (314)

Refer to document PIP 4304A. DTC P2714 may be set with DTC P0878.

P2714 or P2715 - Q8 Control Solenoid Valve Assembly (314)

- Control signal fluid supply leak-valve body filter plate assembly cracked or damage gasket seal.
- O-ring seals leaking.

P2714 or P2715 - Center (w/2-6 and Low/Rev Clutch) Support Assembly (67)

- 2-6 clutch return spring retaining ring (455) not seated in groove.
- 2-6 clutch piston assembly - seal damaged or leaking.
- 2-6 clutch plates (451-453) worn or damaged.
- Center support transfer seal assembly (20) incorrectly installed.

P2714 - 1-2-3-4 and 3-5-R Clutch Housing Assembly (51)

- 1-2-3-4 clutch backing plate retaining ring (429) not seated/oriented correctly.
- 1-2-3-4 clutch piston (414) - seals damaged or leaking.
- 1-2-3-4 clutch piston (414) - cracked or damaged.

P2714 - 4-5-6 (w/turbine shaft) Clutch Assembly (56)

- Turbine shaft fluid seal rings (442) damaged or leaking.

utch piston assembly (439) - seals damaged or leaking.

P2714 - A/Trans Fluid Pump Cover Assembly (219)

Pump tower seals (230) damaged or leaking.

P2714 - Torque Converter (w/fluid pump) Housing Assembly (2)

Fluid pump housing/vanes/rotor/slide damaged/scored.

P2714 - A/Trans Fluid Filter Assembly (26)

Oil filter (26) or filter seal (25) loose or damaged.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P2719-P2721: PRESSURE CONTROL SOLENOID 4

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC P2719

Pressure Control Solenoid 4 System Performance

DTC P2720

Pressure Control Solenoid 4 Control Circuit Low Voltage

DTC P2721

Pressure Control Solenoid 4 Control Circuit High Voltage

Circuit/System Description

The pressure control solenoid 4 is part of the control solenoid valve assembly which has no serviceable parts. The normally low pressure control solenoid 4 regulates and directs oil pressure to the 2-6 clutch regulator valve. Increasing pressure control solenoid 4 pressure increases pressure to the 2-6 clutch regulator valve. The Transmission Control Module varies the current to the pressure control solenoid 4 through a low side driver. Increasing the current to pressure control solenoid 4 increases oil pressure by closing OFF the solenoid exhaust port. Decreasing the current to pressure control solenoid 4 decreases oil pressure by opening the exhaust port. Pressure control solenoid 4 power is supplied by the Transmission Control Module through a high side driver. The high side driver protects the circuit and components from excessive current flow. If excessive current flow is detected, the high side driver will turn OFF. When the fault is corrected the high side driver will reset.

Conditions for Running the DTC

, or P2721

- DTC P2719, P2720, or P2721 is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The clutch PC solenoid 4 is commanded ON.

Conditions for Setting the DTC

P2719

The Transmission Control Module detects an internal electrical malfunction on the pressure control solenoid 4 control circuit where the measured pressure control solenoid 4 current does not equal the commanded pressure control solenoid 4 current for 5 s.

P2720

The Transmission Control Module detects a short to ground on the pressure control solenoid 4 control circuit for 1 s.

P2721

The Transmission Control Module detects an open or short to voltage on the pressure control solenoid 4 control circuit for 1 s.

Action Taken When the DTC Sets

P2719

- DTC P2719 is a Type C DTC.
- The TCM freezes transmission adaptive functions.

P2720

- DTC P2720 is a Type A DTC.
- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM inhibits engine braking.
- The TCM inhibits neutral idle.
- The TCM inhibits auto grade braking.
- The TCM inhibits Tow/Haul function.
- The TCM commands neutral gear when the output speed sensor signal is 1, 350 RPM or greater.
- The TCM commands second gear when the output speed sensor signal is less than 1, 350 RPM.

P2721

- DTC P2721 is a Type A DTC.
- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.

M inhibits TAP Up/Down function.

- The TCM inhibits manual shifting of forward gears.
- The TCM inhibits engine braking.
- The TCM inhibits neutral idle.
- The TCM inhibits auto grade braking.
- The TCM inhibits Tow/Haul function.
- The TCM commands 3rd gear.

Conditions for Clearing the DTC

- DTC P2719 is a Type C DTC.
- DTCs P2720 and P2721 are Type A DTCs.

Reference Information

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Transmission General Description](#)
- [Transmission Component and System Description](#)
- [Electronic Component Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

[Control Module References](#) for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

the vehicle in drive range. Allow the vehicle to shift through all forward gear ranges.

2. Verify the scan tool parameters listed below do not display Malfunction:

- Pressure Control Solenoid Valve 4 Performance Test Status
- Pressure Control Solenoid Valve 4 Control Circuit High Voltage Test Status
- Pressure Control Solenoid Valve 4 Control Circuit Low Voltage Test Status
- **If Malfunction is displayed**

Refer to Circuit/System Testing.

- **If Malfunction is not displayed**

3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.

4. Verify the DTC does not set.

- **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

5. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF, remove the Q8 Control Solenoid Valve Assembly.

2. Verify the Q8 Control Solenoid Valve Assembly is not contaminated with any debris. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Inspection.**

- **If contaminated**

Clean as necessary.

- **If not contaminated**

3. Verify the resistance is within the specified range for each solenoid. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Inspection.**

- **If resistance is not within range**

Replace the Q8 Control Solenoid Valve Assembly.

- **If resistance is within range**

4. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.

5. Connect **DT-47825-10** jumper harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.

6. Verify the scan tool parameters do not display Malfunction:

- Pressure Control Solenoid Valve 4 Performance Test Status
- Pressure Control Solenoid Valve 4 Control Circuit High Voltage Test Status
- Pressure Control Solenoid Valve 4 Control Circuit Low Voltage Test Status
- **If Malfunction is displayed**

Replace the Q8 Control Solenoid Valve Assembly.

Malfunction is not displayed

7. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P2723 OR P2724: PRESSURE CONTROL SOLENOID VALVE 5

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

NOTE: The DTCs listed below set due to a transmission hydraulic/mechanical condition. Perform the Circuit/System Verification and Circuit/System Testing to identify the cause.

DTC P2723

Pressure Control Solenoid Valve 5 - Stuck Off - Transmission Hydraulic/Mechanical Performance

DTC P2724

Pressure Control Solenoid Valve 5 - Stuck On - Transmission Hydraulic/Mechanical Performance

Circuit/System Description

The clutch pressure control solenoid 5 is part of the control solenoid valve assembly, which has no serviceable parts. The Clutch Pressure Control Solenoid 5 regulates transmission fluid pressure to the 1-2-3-4 clutch regulator valve which controls pressure to the 1-2-3-4 clutch. The Transmission Control Module calculates gear ratio based on the RPM signals from the input speed sensor (ISS) and the output speed sensor (OSS). The Transmission Control Module compares the expected transmission gear ratio to the calculated gear ratio for each commanded gear.

Conditions for Running the DTC

P2723

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The transmission temperature is -6.6Â°C (20.12Â°F) or greater.
- The throttle position signal is valid.
- High side driver is enabled.

mission output speed sensor signal is 67 RPM or greater or the accelerator pedal position sensor signal is 0.5 percent or greater.

P2724

- DTC P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0401, P042E, P0716, P0717, P0722, P0723, or P182E is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The transmission temperature is -6.6°C (20.12°F) or greater.
- The throttle position signal is valid.
- High side driver is enabled.
- The transmission output speed sensor signal is 67 RPM or greater or the accelerator pedal position sensor signal is 0.5 percent or greater.

Conditions for Setting the DTC

P2723

The Transmission Control Module has detected an incorrect gear ratio or neutral condition when the 1-2-3-4 clutch is commanded ON. This condition must occur 3 times.

P2724

The Transmission Control Module has detected an incorrect gear ratio change when the 1-2-3-4 clutch is commanded OFF during a shift. This condition must occur 3 times.

Action Taken When the DTC Sets

P2723

- DTC P2723 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tow/Haul mode.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits Manual Up/Down Shift with the shift selector.
- The TCM inhibits powertrain braking.
- The ECM/TCM request a reduced amount of engine torque based on transmission input speed.
- The TCM inhibits neutral idle.
- The TCM inhibits auto grade braking.
- The TCM limits the transmission to Reverse gear and 5th gear operation.

P2724

- DTC P2724 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits TAP Up/Down function.

M inhibits Manual Up/Down Shift with the shift selector.

- The TCM inhibits powertrain braking.
- The TCM inhibits neutral idle.
- The TCM inhibits auto grade braking.
- The TCM inhibits Tow/Haul function.
- The TCM limits the transmission to 4th gear if the output speed sensor signal is 1, 400 RPM or greater.
- The TCM limits the transmission to 2nd gear if the output speed sensor signal is less than 1, 400 RPM. No upshift will occur.

Conditions for Clearing the DIC/DTC

DTCs P2723 and P2724 are Type A DTCs.

Diagnostic Aids

Before performing a road test, configure and setup the scan tool for snapshot mode. This will allow you to display, monitor, and verify multiple transmission data parameters at one time, after the road test.

Reference Information

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Description and Operation

- [Electronic Component Description](#)
- [Transmission General Description](#)
- [Transmission Component and System Description](#)
- [Park - Engine Running](#)
- [Reverse](#)
- [Neutral - Engine Running](#)
- [Drive Range, First Gear Engine Braking](#)
- [Drive Range, First Gear](#)
- [Drive Range, Second Gear](#)
- [Drive Range, Third Gear](#)
- [Drive Range, Third Gear Default](#)
- [Drive Range, Fourth Gear](#)
- [Drive Range, Fifth Gear](#)
- [Drive Range, Fifth Gear Default](#)
- [Drive Range, Sixth Gear](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

- **DT-47825** Control Solenoid Test Plate
- **DT-47825-10** Jumper Harness

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

NOTE: If other DTCs are set, diagnose those DTCs first.

1. Engine idling in Park position, with parking brake applied and drive wheels chocked.
2. Verify the transmission fluid level and condition is correct. Refer to Transmission Fluid Level and Condition Check.
 - **If the transmission fluid level and condition is not correct**
Repair as necessary.
 - **If the transmission fluid level and condition is correct**
3. Ignition ON, clear the Transmission Control Module DTCs with a scan tool.
4. Verify the transmission operation performs as indicated in the road test instructions and DTCs P2723 or P2724 did not set. Refer to Road Test.
 - **If DTCs P2723 or P2724 are set**
Refer to Circuit/System Testing.
 - **If DTCs P2723 or P2724 did not set**
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**
Refer to Circuit/System Testing.
 - **If the DTC does not set**
7. All OK.

Circuit/System Testing

1. Verify the transmission line pressures are within the specified ranges. Refer to Line Pressure Check.
 - **If pressures are not within range**
Refer to Fluid Pressure High or Low.

pressures are within range

2. Ignition OFF. Remove the Q8 Control Solenoid Valve Assembly.

3. Verify a pressure change occurs for each solenoid when performing the solenoid test. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test.**

- **If a pressure change does not occur**

Replace the Q8 Control Solenoid Valve Assembly.

- **If a pressure does occur**

4. Verify the conditions listed below do not exist. Carefully inspect each component for that condition. Repair or replace as necessary.

P2723 or P2724 - Control Valve Upper Body Assembly (304)

1-2-3-4 Clutch Regulator Valve (337) stuck/sticking - debris, binding, damaged valve, or scored bore.

P2723 - Q8 Control Solenoid Valve Assembly (314)

Refer to document PIP 4304A. DTC P2723 may be set with DTC P0878.

P2723 or P2724 - Q8 Control Solenoid Valve Assembly (314)

- O-ring seal leaking.
- Valve body filter plate assembly cracked, blocked, or damaged gasket seal.

P2723 - Control Valve Upper Lower Assembly (351)

Clutch Select Valve 3 (352) stuck/sticking - debris, binding, damaged valve, or scored bore.

P2723 - A/Trans Fluid Pump Cover Assembly (219)

Pump Tower Seals (230) damaged/leaking.

P2723 - 1-2-3-4 and 3-5-R Clutch Housing Assembly (51)

- 1-2-3-4 Clutch Piston (414) cracked/damaged/leaking.
- Housing/hub weld cracked/leaking.
- 1-2-3-4 Clutch Backing Plate Retaining Ring (429) not seated/oriented, causing clutch pack/piston over travel.

P2723 - Control (with body and valve) Valve Assembly (21)

Valve Body to Pump Transfer Seal Assembly (19) damaged/leaking.

P2723 - Torque Converter (w/Fluid Pump) Housing Assembly (2)

- Fluid pump housing vanes/rotor/slide damaged/scored.
- Fluid pump or torque converter overstressed due to high temperatures.

P2723 - Automatic Transmission Fluid Filter Assembly (26)

Oil filter (26) or filter seal (25) loose or damaged.

Repair Instructions

Diagnostic Repair Verification after completing the repair.

- Perform the **Reset Transmission Adapts** following all transmission related repairs.
- **Control Module References** for control solenoid valve assembly replacement, programming, and setup.

DTC P2728-P2730: PRESSURE CONTROL (PC) SOLENOID VALVE 5

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC P2728

Pressure Control (PC) Solenoid Valve 5 Performance

DTC P2729

Pressure Control (PC) Solenoid Valve 5 Control Circuit Low Voltage

DTC P2730

Pressure Control (PC) Solenoid Valve 5 Control Circuit High Voltage

Circuit/System Description

The pressure control solenoid 5 is part of the control solenoid valve assembly which has no serviceable parts. The normally low pressure control solenoid 5 regulates and directs oil pressure to the 1-2-3-4 clutch regulator valve and 1-2-3-4 clutch boost valve. Increasing pressure control solenoid 5 pressure increases pressure to the 1-2-3-4 clutch. The Transmission Control Module varies the current to the pressure control solenoid 5 through a low side driver. Increasing the current to pressure control solenoid 5 increases oil pressure by closing OFF the solenoid exhaust port. Decreasing the current to pressure control solenoid 5 decreases oil pressure by opening the exhaust port. Pressure control solenoid 5 power is supplied by the Transmission Control Module through a high side driver. The high side driver protects the circuit and components from excessive current flow. If excessive current flow is detected, the high side driver will turn OFF. When the fault is corrected, the high side driver will reset.

Conditions for Running the DTC

P2728, P2729, or P2730

- DTCs P2728, P2729, or P2730 is not set.
- The ignition voltage is between 8.6-32 V.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The pressure control solenoid valve 5 is commanded ON.

Conditions for Setting the DTC

P2728

The Transmission Control Module detects an internal electrical performance malfunction of the clutch pressure control solenoid valve 5 control circuit where the measured clutch pressure control solenoid valve 5 current does not equal the commanded clutch pressure control solenoid valve 5 current for 5 s.

The Transmission Control Module detects a short to ground on the clutch pressure control solenoid valve 5 control circuit for 1 s.

P2730

The Transmission Control Module detects an open or short to voltage on the clutch pressure control solenoid valve 5 control circuit for 1 s.

Action Taken When the DTC Sets

P2728

- DTC P2728 is a Type C DTC.
- The TCM freezes transmission adaptive functions.

P2729

- DTC P2729 is a Type A DTC.
- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits engine braking.
- The TCM inhibits neutral idle.
- The TCM cancels Tow/Haul mode function.
- The TCM inhibits auto grade braking.
- The TCM commands neutral gear if output speed sensor signal is 1, 350 RPM or greater.
- The TCM commands 2nd gear if output speed sensor signal is less than 1, 350 RPM.

P2730

- DTC P2730 is a Type A DTC.
- The TCM forces TCC OFF.
- The TCM commands maximum line pressure.
- The TCM inhibits TAP Up/Down function.
- The TCM turns OFF the high side driver.
- The TCM inhibits engine braking.
- The ECM commands a reduction in engine torque based on input from the speed sensor.
- The TCM inhibits neutral idle.
- The TCM inhibits manual shifting.
- The TCM inhibits auto grade braking.
- The TCM inhibits Tow/Haul function.

Conditions for Clearing the DTC

- DTC P2728 is a Type C DTC.
- DTCs P2729 and P2730 are Type A DTCs.

Reference Information

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Transmission General Description](#)
- [Transmission Component and System Description](#)
- [Electronic Component Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

1. Operate the vehicle in drive range. Allow the transmission to shift through all forward gear ranges.
2. Verify the scan tool parameters listed below do not display Malfunction:
 - Pressure Control Solenoid Valve 5 Performance Test Status
 - Pressure Control Solenoid Valve 5 Control Circuit High Voltage Test Status
 - Pressure Control Solenoid Valve 5 Control Circuit Low Voltage Test Status
 - **If Malfunction is displayed**

Refer to Circuit/System Testing.

- **If Malfunction is not displayed**
3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
 4. Verify the DTC does not set.
 - **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

5. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF, remove the Q8 Control Solenoid Valve Assembly.
2. Verify the Q8 Control Solenoid Valve Assembly is not contaminated with any debris. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).
 - **If contaminated**
Clean as necessary.
 - **If not contaminated**
3. Verify the resistance is within the specified range for each solenoid. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Inspection](#).
 - **If resistance is not within range**
Replace the Q8 Control Solenoid Valve Assembly
 - **If resistance is within range**
4. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.
5. Connect **DT-47825-10** jumper harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.
6. Verify the scan tool parameters listed below do not display Malfunction:
 - Pressure Control Solenoid Valve 5 Performance Test Status
 - Pressure Control Solenoid Valve 5 Control Circuit High Voltage Test Status
 - Pressure Control Solenoid Valve 5 Control Circuit Low Voltage Test Status
 - **If Malfunction is displayed**
Replace the Q8 Control Solenoid Valve Assembly.
 - **If Malfunction is not displayed**
7. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- [Control Module References](#) for control solenoid valve assembly replacement, programming, and setup.

DTC P2762, P2763, OR P2764: TORQUE CONVERTER CLUTCH (TCC)

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.

Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptors

DTC P2762

Torque Converter Clutch (TCC) Pressure Control Solenoid Valve Performance

DTC P2763

Torque Converter Clutch (TCC) Pressure Control Solenoid Valve Control Circuit High Voltage

DTC P2764

Torque Converter Clutch (TCC) Pressure Control Solenoid Valve Control Circuit Low Voltage

Circuit/System Description

The torque converter clutch (TCC) pressure control solenoid is part of the control solenoid valve assembly which has no serviceable parts. The normally low TCC pressure control solenoid regulates oil pressure to the TCC regulator valve and TCC control valve. Increasing TCC pressure control solenoid oil pressure increases oil pressure to the torque converter to apply the clutch. The Transmission Control Module varies the current to the TCC pressure control solenoid through a low side driver. Increasing current to the TCC pressure control solenoid increase oil pressure by closing OFF the solenoid exhaust port. Decreasing current to the TCC pressure control solenoid decreases oil pressure by opening up the solenoid exhaust port. The TCC pressure control solenoid power is supplied by the Transmission Control Module through a high side driver. The high side driver protects the circuit and components from excessive current flow. If excessive current flow is detected, the high side driver will turn OFF. When the fault is corrected, the high side driver will reset.

Conditions for Running the DTC

P2762

- DTC P2762 is not set.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The ignition voltage is between 8.6-32 V.

P2763

- DTCs P2763, P0658, or P0659 is not set.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The ignition voltage is between 8.6-32 V.
- The high side driver is enabled.

P2764

- DTC P2764, P0658, or P0659 is not set.
- The engine speed is between 400-7, 500 RPM for 5 s.
- The ignition voltage is between 8.6-32 V.
- The high side driver is enabled.

Conditions for Setting the DTC

P2762

Transmission Control Module detects an internal electrical performance malfunction of the TCC pressure control solenoid control circuit where the measured TCC pressure control solenoid current does not equal the commanded TCC pressure control solenoid current for 5 s.

P2763

The Transmission Control Module detects an open/high resistance or short to voltage on the TCC pressure control solenoid control circuit for 5 s.

P2764

The Transmission Control Module detects a short to ground on the TCC pressure control solenoid control circuit for 1 min.

Action Taken When the DTC Sets

P2762

DTC P2762 is a Type C DTC.

P2763

- DTC P2763 is a Type B DTC.
- The TCM inhibits TCC.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM enables Torque management.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM inhibits 6th gear in hot mode operation.

P2764

- DTC P2764 is a Type A DTC.
- The TCM turns off the high side driver.
- The TCM inhibits TCC.
- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.
- The TCM inhibits TAP Up/Down function.
- The TCM inhibits Manual Up/Down Shift with the shift selector.
- The TCM inhibits neutral idle.
- The ECM reduces engine torque based on input speed.

Conditions for Clearing the DIC/DTC

- DTC P2762 is a Type C DTC.
- DTC P2763 is a Type B DTC.
- DTC P2764 is a Type A DTC.

Reference Information

Automatic Transmission Controls Schematics

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

Description and Operation

- [Transmission General Description](#)
- [Transmission Component and System Description](#)
- [Electronic Component Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

DT-47825-10 Jumper Harness

For equivalent regional tools, refer to [Special Tools](#) .

Circuit/System Verification

1. Operate the vehicle in drive range and ensure TCC is commanded ON for 1 minute.
2. Verify the scan tool parameters listed below do not display Malfunction:
 - TCC Pressure Control Solenoid Valve Performance Test Status
 - TCC Pressure Control Solenoid Valve Control Circuit High Voltage Test Status
 - TCC Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status
 - **If Malfunction is displayed**

Refer to Circuit/System Testing.

- **If Malfunction is not displayed**
3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observe from the Freeze Frame/Failure Records data.
 4. Verify the DTC does not set.
 - **If the DTC sets**

Refer to Circuit/System Testing.

- **If the DTC does not set**

5. All OK.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification first.

1. Ignition OFF, remove the Q8 Control Solenoid Valve Assembly.
2. Verify the Q8 Control Solenoid Valve Assembly is not contaminated with any debris. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Inspection.**
 - **If contaminated**

Clean as necessary.
 - **If not contaminated**
3. Verify the resistance is within the specified range for each solenoid. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Inspection.**
 - **If resistance is not within range**

Replace the Q8 Control Solenoid Valve Assembly.
 - **If resistance is within range**
4. Place the Q8 Control Solenoid Valve Assembly on a clean work surface near the transmission assembly.
5. Connect **DT-47825-10** jumper harness between the vehicle wire harness electrical connector and the Q8 Control Solenoid Valve Assembly electrical connector. Ignition ON.
6. Verify the scan tool parameters do not display Malfunction:
 - TCC Pressure Control Solenoid Valve Performance Test Status
 - TCC Pressure Control Solenoid Valve Control Circuit High Voltage Test Status
 - TCC Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status
 - **If Malfunction is displayed**

Replace the Q8 Control Solenoid Valve Assembly.
 - **If Malfunction is not displayed**
7. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- Perform the **Reset Transmission Adapts** following all transmission related repairs.
- **Control Module References** for control solenoid valve assembly replacement, programming, and setup.

DTC P2771: FOUR WHEEL DRIVE (4WD) LOW SWITCH (NQ6, NQ7)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.

Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptor

DTC P2771

Four Wheel Drive (4WD) Low Switch Circuit

Circuit/System Description

The four wheel drive (4WD) low circuit consists of the engine control module (ECM), a transfer case control module and the circuit wiring. The transfer case control module controls the 4WD low signal circuit. When the operator selects 4WD low, the transfer case control module grounds the signal circuit, and the 4WD low signal voltage on the circuit changes from ignition voltage to zero volts. The ECM then compensates for transfer case gear reduction in the transmission output shaft speed (OSS) sensor signal. The ECM uses the transmission OSS sensor signal to adjust shift points, line pressure and torque converter clutch (TCC) scheduling.

Conditions for Running the DTC

- No throttle position (TP) sensor DTCs P0122, or P0123.
- No OSS assembly DTCs P0722 or P0723.
- No cam or crank sensor DTCs.
- The system voltage is 9-18 volts.
- The engine speed is 1,000-5,500 RPM for at least 30 seconds.
- The vehicle speed is at least 40 km/h (25 mph).
- The TP angle is 5-40 percent.
- The gear range is not PARK, NEUTRAL or REVERSE.
- The TFT is -20 to +130Â°C (-4 to +266Â°F).

Conditions for Setting the DTC

Condition 1

- The 4WD low switch is not in 4WD low, open/12 volts.
- The Transfer Case Ratio is 2.64-2.9 for 2 seconds.
- Both conditions must be met twice.

Condition 2

- The 4WD low switch is in 4WD low.
- The Transfer Case Ratio is 0.8-1.75 for 2 seconds.

Action Taken When the DTC Sets

- DTC P2771 is a Type B DTC.
- The ECM commands a normal shift pattern, not a 4WD low shift pattern.

Conditions for Clearing the DTC

DTC P2771 is a Type B DTC.

Diagnostic Aids

ing speed sensor could cause DTC P2771 to set.

- Verify that the input speed sensor (ISS) and the OSS are functioning properly.
- In 3rd gear at approximately 64 km/h (40 mph), command TCC ON. If functioning properly the OSS will track ISS and the engine RPM. If not refer to DTC P0716 for the ISS and DTC P0723 for the OSS.
- If the speed sensors pass testing, refer to [Testing for Intermittent Conditions and Poor Connections](#) .

Reference Information

Schematic Reference

[Automatic Transmission Controls Schematics](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Transmission General Description](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

DTC Type Reference

[Powertrain Diagnostic Trouble Code \(DTC\) Type Definitions](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Special Tools

J 35616 GM-Approved Terminal Test Kit

Circuit/System Verification

NOTE: It may be necessary to drive the vehicle slightly forward to engage 4LO on the transfer case.

Verify the scan tool displays Disabled when you select 4HI and Enabled when you select 4LO.

Circuit/System Testing

1. Remove connector from the transfer case control module. With ignition ON and engine OFF, observe with the scan tool the 4WD Low parameter.
 - If the scan tool indicates Enabled, test the 4WD Low signal circuit for a short to ground.
2. Using the **J 35616** GM-approved terminal test kit, install a fused jumper between the 4WD low signal circuit and ground at the transfer case control module connector.

the scan tool 4WD Low parameter indicates Enabled when grounded, replace the transfer case control module.

3. Test the 4WD Low signal circuit for an open.

- Fix the open in the 4WD Low circuit.

4. Replace the ECM.

Component Testing

Verify the 4WD Low parameter on scan tool while cycling the 4WD Low switch.

Repair Instructions

- Perform the [Reset Transmission Adapts](#) following all transmission related repairs.
- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Control Module References](#) for Control Solenoid Valve Assembly replacement, programming, and setup.

SYMPTOMS - AUTOMATIC TRANSMISSION

Use the symptom tables only if the following conditions are met:

- IMPORTANT:
- Refer to [Diagnostic Starting Point - Vehicle](#) .
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
 - Review the system operation in order to familiarize yourself with the system functions. Refer to [Transmission General Description](#) , and [Transmission Component and System Description](#) .

Visual/Physical Inspection

Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to [Testing for Intermittent Conditions and Poor Connections](#) .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- Fluid Diagnosis
 - [Transmission Fluid Level and Condition Check](#)
 - [Fluid Pressure High or Low](#)
 - [Automatic Transmission Fluid Leaks](#)
 - [Fluid Leak Diagnosis](#)
- Noise and Vibration Diagnosis
 - [Whine/Growl Noise That Changes with Vehicle Speed](#)
 - [Whine/Growl Noise That Changes with Vehicle Speed](#)

noise in First or Reverse Gear

- Noise in First, Second, Third, Fourth, Fifth, or Reverse Gear
- Noise in First, Second, Sixth, or Reverse Gear
- Noise in Second or Sixth Gear
- Noise During 3-4 or 4-3 Shifts
- Noise in Fourth, Fifth, or Sixth Gear
- Vibration
- Flex Plate/Torque Converter Vibration Test
- Noise and Vibration Analysis
- Range Performance Diagnosis
 - No Park or Drive
 - No Drive in All Ranges
 - No Reverse Gear
- Shift Quality Feel Diagnosis
 - Harsh Garage Shift
 - Harsh, Soft, Delayed or Slipping First or Reverse Gear
 - Harsh, Soft, Delayed or Slipping 1-2-3-4 Shift
 - Harsh, Soft, Delayed or Slipping 4-5-6 Shift
 - Harsh, Soft, Delayed or Slipping Third, Fifth, or Reverse Gear
 - Harsh, Soft, Delayed or Slipping Second or Sixth Gear
- Shift Pattern
 - No First Gear
 - No First and Reverse Gears
 - No First, Second, Third, and Fourth Gear
 - No Second and Sixth Gear
 - No Fourth, Fifth, and Sixth Gear
 - No Third, Fifth, and Reverse Gear
- Torque Converter Diagnosis
 - Torque Converter Diagnosis
 - No Torque Converter Clutch Apply
 - No Torque Converter Clutch Release
- Symptom Not Found or No Symptom Detected
 - Transmission Fluid Level and Condition Check
 - Road Test
 - Line Pressure Check

CONTROL SOLENOID VALVE AND TRANSMISSION CONTROL MODULE ASSEMBLY INSPECTION

During transmission manufacturing and assembly, small pieces of material may become dislodged. This may also happen after the transmission has been in operation for a period of time. Because the transmission control solenoid valve assembly is continually immersed in transmission oil, material particles or slivers of metallic debris may become deposited on the control solenoid valve assembly. Often this material is very small and can be hard to see. For this reason, it is important that the control solenoid valve assembly be thoroughly inspected.

spection of the control solenoid valve assembly should include the following:

- Clean inspection area - Like all transmission service work, cleanliness is very important. Be sure the area where you are inspecting is free of dust and dirt. Have non-glossy white or lightly colored paper down on the inspection surface. This will enhance the lighting and help to see particles that have come from the control solenoid valve assembly.
- Lighting - Good lighting is necessary for a thorough inspection. If shop lighting is limited, use natural light. A second source of lighting, such as a penlight, is helpful for close examination. A magnifying glass can also be helpful to see into difficult places.
- Cleaning - Clean shop air may be used for spot cleaning as long as the debris can be removed without it becoming lodged somewhere else. It is best to rinse or flush particles away with GM Brake Parts Cleaner. Do not use a cloth rag to wipe the control solenoid valve assembly, as it could leave lint behind.

Control Solenoid Valve Assembly Housing and Filter Plate

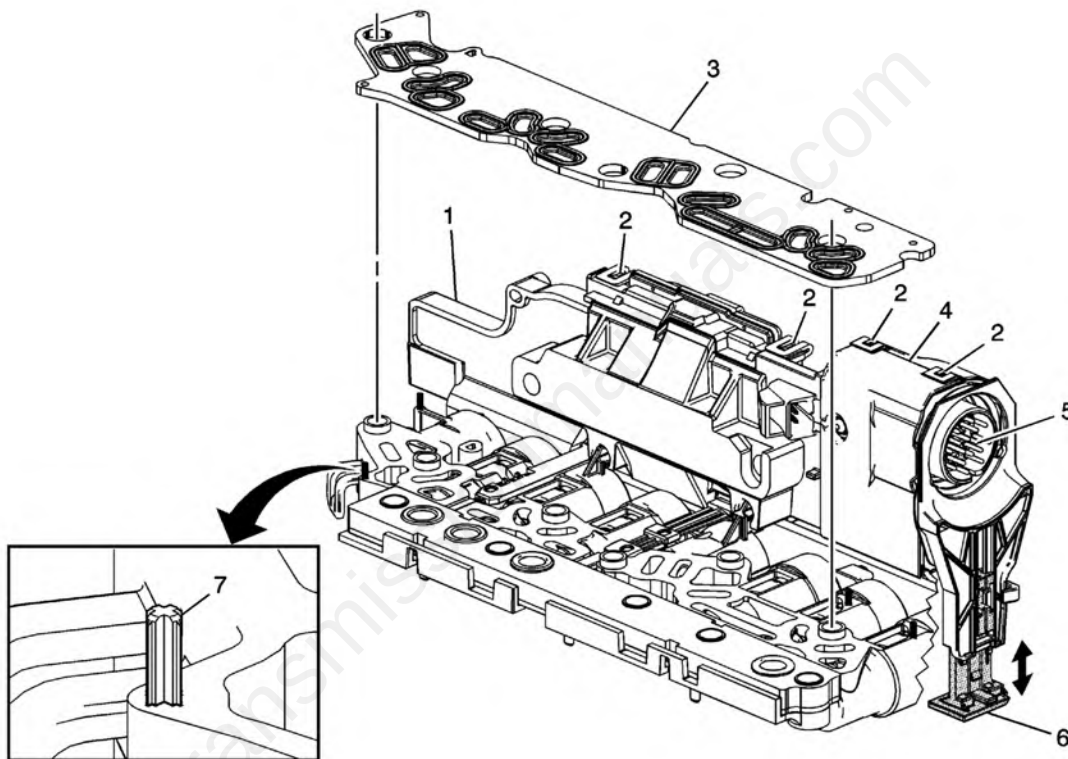


Fig. 1: View Of Control Solenoid (w/Body & TCM) Valve Assembly Housing & Filter Plate
Courtesy of GENERAL MOTORS COMPANY

NOTE: At the end of the inspection process where debris is found, it is required the transmission fluid and filter be replaced. Any time the control solenoid valve assembly has been removed, it is mandatory the filter plate assembly (3) be replaced.

1. Inspect the control solenoid valve assembly housing (1) for damage, cracks, or parting seam (4) separation. Inspect all housing lock tabs (2). Any defect will need to be evaluated for critical operation. Ensure all screws along the control solenoid valve assembly housing are present. Remove and closely examine the filter plate assembly (3) for sediment or debris attached to the screen. If sediment or debris is found on the filter screen, be sure to inspect the solenoid supply or control ports that correspond to location of the debris on the filter plate screen. Inspect the filter plate gasket for proper sealing. If poor sealing is found, be sure to inspect the affected solenoid fluid port entrance and exit for sediment or debris deposits. Thoroughly flush the solenoid cavity with GM Brake Parts Cleaner and replace the filter plate assembly (3). It is not necessary

Remove all clutch plate soot from the entire surface of the control solenoid valve assembly housing.

Inspect the control solenoid valve assembly filter plate retaining tabs (7). Broken or missing tabs do not require the control solenoid valve assembly be replaced. The filter plate can still be adequately aligned using the bolt hole sleeves. Early design control solenoid valve assembly use four filter plate retaining tabs (7).

- Examine the 16-way connector (5) cavity for material that could make contact between the electrical pins. Also, look for bent or loose connector pins and ensure the connector lock (6) is functioning and is in good condition.

Control Solenoid Valve Assembly Inspection - Solenoids, Sensors, and Contacts

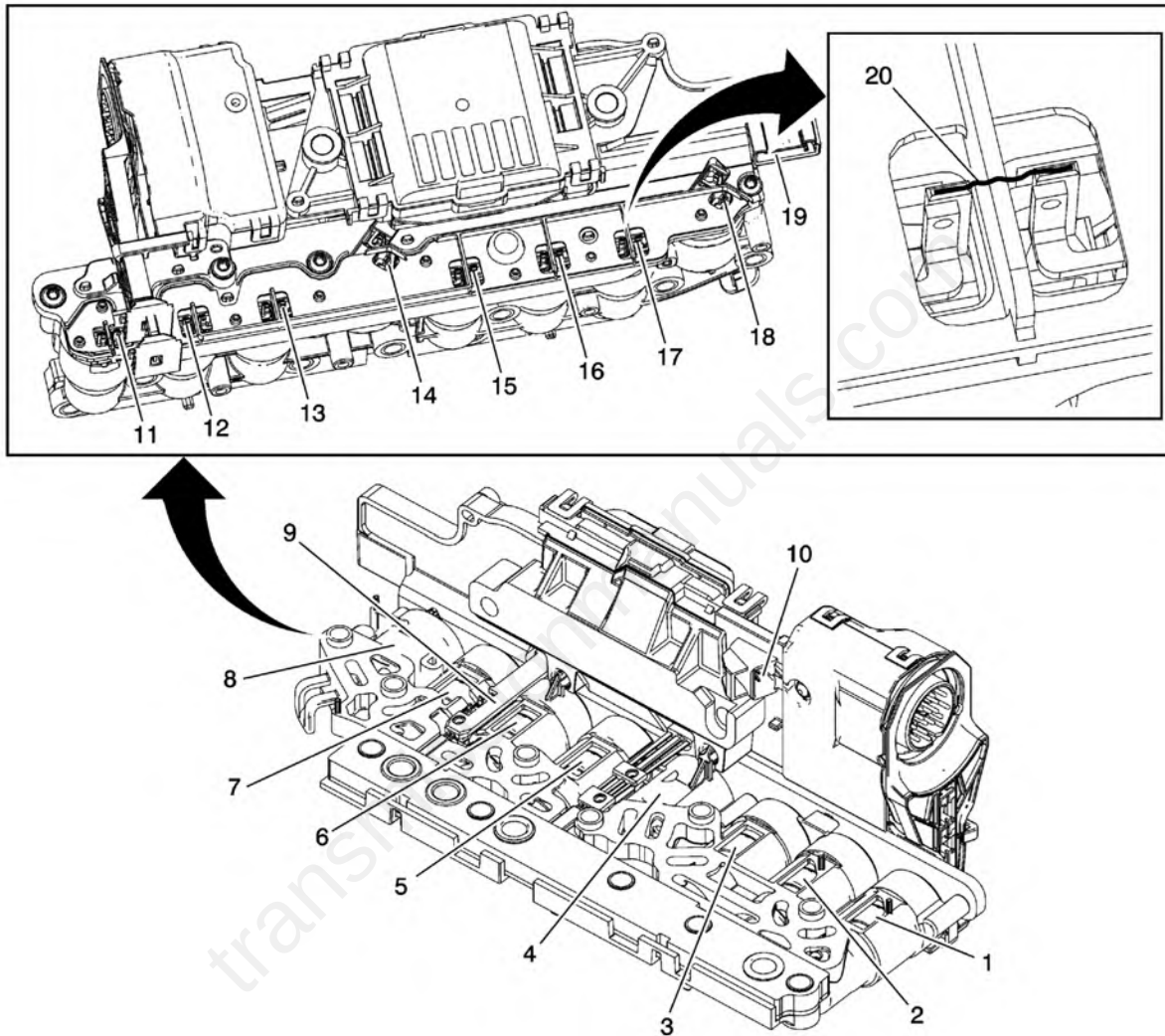


Fig. 2: View Of Control Solenoid (w/Body & TCM) Valve Assembly Inspection - Solenoids, Sensors & Contacts

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Pressure Control Solenoid 3 (PCS3)
2	Pressure Control Solenoid 4 (PCS4)
3	Pressure Control Solenoid 2 (PCS2)
4	Shift Solenoid 2 (SS2)
5	Torque Converter Clutch (TCC) Solenoid
6	Pressure Control Solenoid 5 (PCS5)
7	Pressure Control Solenoid 1 (PCS1)

Solenoid Name	Illustration Number of Solenoid Lead	Expected Resistance (Ohms)
8 Shift Solenoid 1 (SS1)	Lead	
9	Transmission Fluid Temperature (TFT) Sensor	
10	Input Speed Sensor/Output Speed Sensor (ISS/OSS) Connector	
11	Pressure Control Solenoid 3 (PCS3) Contact Lead	
12	Pressure Control Solenoid 4 (PCS4) Contact Lead	
13	Pressure Control Solenoid 2 (PCS2) Contact Lead	
14	Shift Solenoid 2 (SS2) Contact Lead	
15	Torque Converter Clutch (TCC) Solenoid Contact Lead	
16	Pressure Control Solenoid 5 (PCS5) Contact Lead	
17	Pressure Control Solenoid 1 (PCS1) Contact Lead	
18	Shift Solenoid 1 (SS1) Contact Lead	
19	Internal Mode Switch (IMS) Connector	
20	Metallic Slivers, Debris or Sediment	

1. With the filter plate removed, the control solenoid valve assemblies (1-8) can be inspected. Closely examine the solenoid electrical contact lead solder connections (11-18). Look for material that could make contact between the electrical leads. This is where material particles, metallic slivers, debris or sediment (20) can collect. Carefully inspect all sixteen solenoid electrical contact leads (11-18) for build up of material that could form an electrical short. Inspect the solenoid contact leads (11-18) for terminal separation or weak solder joints. Thoroughly flush away all debris with GM Brake Parts Cleaner.
2. Inspect the transmission fluid temperature (TFT) sensor (9), the input speed sensor/output speed sensor (ISS/OSS) connector (10), and the internal mode switch (IMS) connector (19). Look inside the connector cavities for material that could make contact between the electrical pins. Also look for bent or loose electrical pins. If the TFT sensor (9) is heavily coated with clutch soot, rinse with GM Brake Parts Cleaner.
3. Check the resistance of the solenoids at room temperature and verify with the following table. If the resistance is not within the expected range, carefully inspect the solenoid contact leads.

Solenoid Resistance

Solenoid Name	Illustration Number of Solenoid Lead	Expected Resistance (Ohms)
Pressure Control Solenoid 3 (PCS3)	11	4.5-5.5 Ω
Pressure Control Solenoid 4 (PCS4)	12	4.5-5.5 Ω
Pressure Control Solenoid 2 (PCS2)	13	4.5-5.5 Ω
Shift Solenoid 2 (SS2)	14	23.5-24.5 Ω
Torque Converter Clutch (TCC) Solenoid	15	4.5-5.5 Ω
Pressure Control Solenoid 5 (PCS5)	16	4.5-5.5 Ω
Pressure Control Solenoid 1 (PCS1)	17	4.5-5.5 Ω
Shift Solenoid 1 (SS1)	18	23.5-24.5 Ω

Control Solenoid Valve Assembly Supply and Control Fluid Inspection

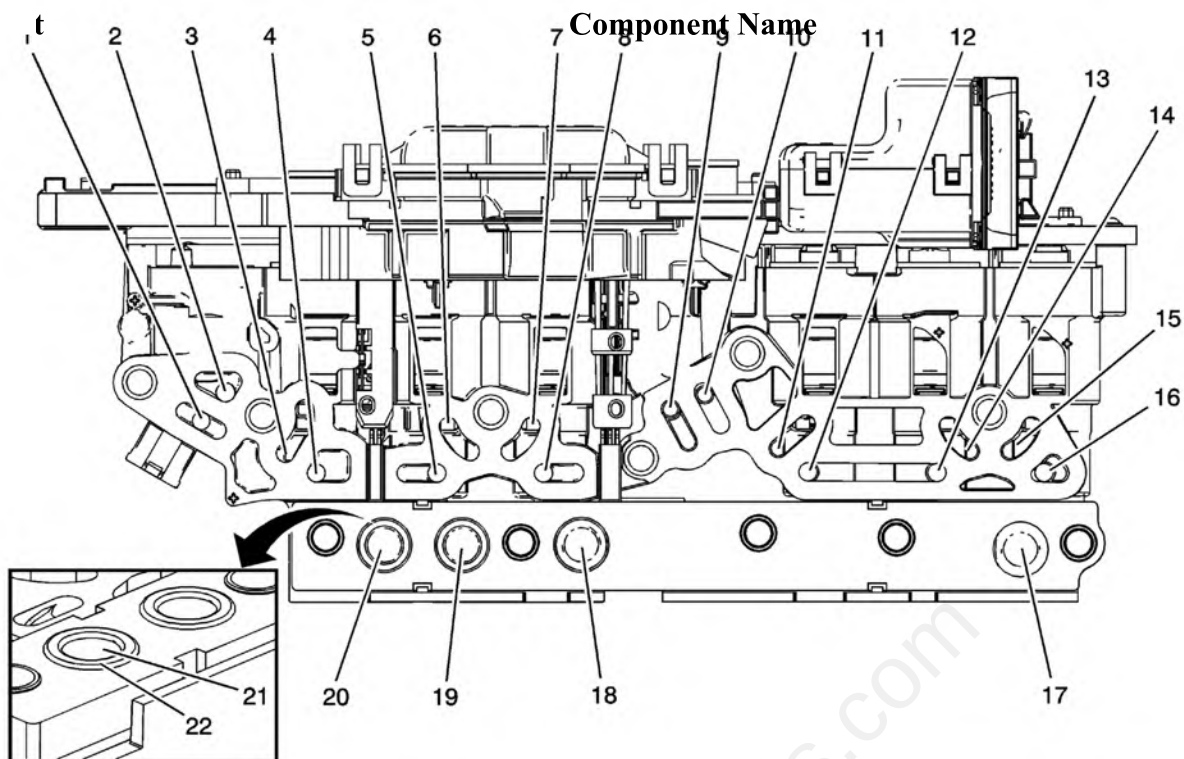


Fig. 3: View Of Control Solenoid (w/Body & TCM) Valve Assembly Supply & Control Fluid Inspection
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Shift Solenoid 1 Supply Port
2	Shift Solenoid 1 Control Port
3	Line Pressure Control Solenoid 1 Control Port
4	Line Pressure Control Solenoid 1 Supply Port
5	Pressure Control Solenoid 5 Supply Port
6	Pressure Control Solenoid 5 Control Port
7	TCC Pressure Control Solenoid Control Port
8	TCC Pressure Control Solenoid Supply Port
9	Shift Solenoid 2 Supply Port
10	Shift Solenoid 2 Control Port
11	Pressure Control Solenoid 2 Control Port
12	Pressure Control Solenoid 2 Supply Port
13	Pressure Control Solenoid 4 Supply Port
14	Pressure Control Solenoid 4 Control Port
15	Pressure Control Solenoid 3 Control Port
16	Pressure Control Solenoid 3 Supply Port
17	Transmission Fluid Pressure (TFP) Switch 5
18	Transmission Fluid Pressure (TFP) Switch 3
19	Transmission Fluid Pressure (TFP) Switch 1
20	Transmission Fluid Pressure (TFP) Switch 4
21	TFP Switch Membrane
22	TFP Switch Gasket

After the filter plate is removed, the control solenoid valve fluid supply and control ports (1-16) can be inspected. Solenoid openings are identified in the illustration. Inspect the following supply and control opening for material particles, metallic slivers, debris, or sediment. Look into solenoid fluid supply openings 1, 4, 5, 8, 9, 12, 13, and 16. Look inside the solenoid fluid control ports 2, 3, 6, 7, 10, 11, 14 and 15. If sediment or debris is found in any one of these port openings, look for holes or tears in the filter plate screen. The filter plate gasket may be leaking caused by a torn gasket, poor sealing, or a deformed plate. As necessary, thoroughly flush away all debris in the supply and control fluid ports with GM Brake Parts Cleaner.

2. Inspect the four transmission fluid pressure (TFP) switches (17-20) for trapped debris or sediment. Any sediment or debris found under a switch membrane requires the control solenoid valve assembly to be replaced. Check all TFP switch membranes (21) for cracks, cuts or pin holes. Ensure all TFP switch gaskets (22) are secure and are not deformed, torn, or improperly seated. As necessary, thoroughly rinse debris and sediment from the top of the switches. It is not necessary to remove the clutch plate soot from the entire surface of the control solenoid valve assembly housing.

CONTROL SOLENOID VALVE AND TRANSMISSION CONTROL MODULE ASSEMBLY INPUT SHAFT SPEED/OUTPUT SHAFT SPEED INPUT TEST

Special Tools

- **DT-47825-10** Jumper Harness
- **J 35616** GM-Approved Terminal Test Kit
- **J 38522** Variable Signal Generator

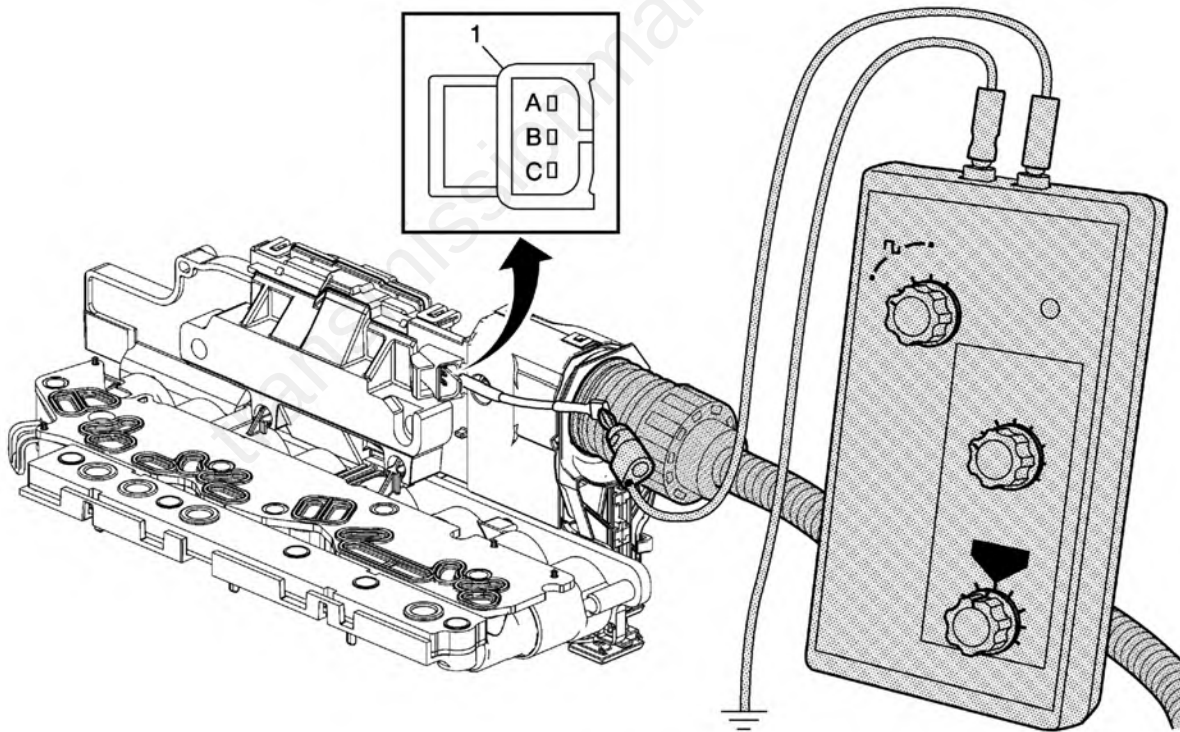


Fig. 4: Identifying J 35616 And J 38522

Courtesy of GENERAL MOTORS COMPANY

The purpose of this test is to provide a simulated input/output speed sensor (ISS/OSS) signal to the control solenoid valve assembly ISS/OSS input circuits.

Transmission Input Speed Sensor

OFF, connect the **DT-47825-10** jumper harness between the vehicle wire harness electrical connector, and the control solenoid valve assembly electrical connector.

2. Disconnect the ISS/OSS wiring harness connector X3 (1) from the control solenoid valve assembly.
3. Ignition ON, test for 8.3-9.3 volts between the ISS/OSS voltage circuit terminal B on the control solenoid valve assembly and ground at the transmission case.
 - If not within the specified range, replace the control solenoid valve assembly. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Replacement](#) .
4. Using the **J 35616** terminal test kit, connect the **J 38522** variable signal generator red lead to the ISS signal circuit terminal A on the TCM.
5. Connect the black lead from the **J 38522** variable signal generator to ground at the transmission case.
6. Set the **J 38522** variable signal generator to 5 volts, the frequency to 300, and the percent duty cycle to 50 or the normal position.
7. Ignition ON, verify with a scan tool the Transmission ISS parameter is between 760-785 RPM.
 - If not within the specified range, replace the control solenoid valve assembly. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Replacement](#) .

Transmission Output Speed Sensor

1. Ignition OFF, connect the **DT-47825-10** jumper harness between the vehicle wire harness electrical connector, and the control solenoid valve assembly electrical connector.
2. Disconnect the ISS/OSS wiring harness connector X3 (1) from the control solenoid valve assembly.
3. Ignition ON, test for 8.3-9.3 volts between the ISS/OSS voltage circuit terminal B on the control solenoid valve assembly and ground at the transmission case.
 - If not within the specified range, replace the control solenoid valve assembly. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Replacement](#) .
4. Using the **J 35616** terminal test kit, connect the **J 38522** variable signal generator red lead to the OSS signal circuit terminal C on the TCM.
5. Connect the black lead from the **J 38522** variable signal generator to ground at the transmission case.
6. Set the **J 38522** variable signal generator to 5 volts, the frequency to 300, and the percent duty cycle to 50 or the normal position.
7. Ignition ON, verify with a scan tool the Transmission OSS parameter is between 495-505 RPM.
 - If not within the specified range, replace the control solenoid valve assembly. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Replacement](#) .

CONTROL SOLENOID VALVE AND TRANSMISSION CONTROL MODULE ASSEMBLY SOLENOID PERFORMANCE TEST

Special Tools

DT-47825 Control Solenoid Test Plate

The purpose of this procedure is to test the operation of the control solenoid valve assembly for a stuck open or stuck closed solenoid. The **DT-47825** control solenoid test plate bolts to the mounting surface of the control solenoid valve assembly. Pressurized air is routed into the aluminum test block, through the control solenoid valve assembly, and back to the gauge on the test block.

A pressure gauge is used to measure the pressurized air through the solenoid control ports. When a solenoid is commanded ON with the scan tool, pressurized air flows through the solenoid control port and displays on the pressure gauge. When the solenoid is commanded OFF with the scan tool, there is no pressurized air flow through

Control port to the pressure gauge. The recommended shop air pressure for this test is 620.5-690.4 Kpa (90-100 psi).

Control Solenoid Valve Assembly with Control Solenoid Test Plate

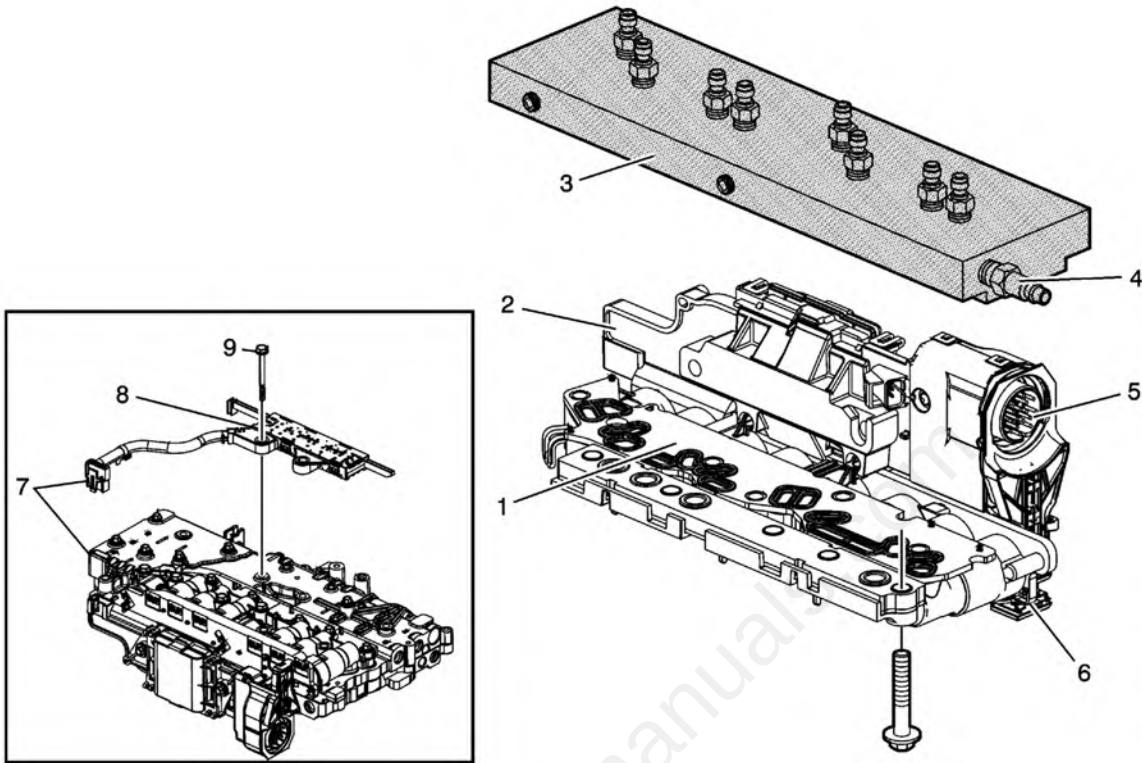


Fig. 5: View Of Control Solenoid (w/Body & TCM) Valve Assembly With Control Solenoid Test Plate
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Filter Plate Assembly
2	Control Solenoid Valve Assembly
3	DT-47825 Control Solenoid Test Plate
4	Air Connection Port
5	Transmission 16-Way Pass-Through Connector
6	Electrical Connector Slide Lock
7	A/Trans Manual Shift Shaft Position Switch Assembly Electrical Connector
8	A/Trans Manual Shift Shaft Position Switch Assembly
9	Bolt M6 x 14.5

NOTE: To avoid solenoid overheating and possible internal damage, do not continuously operate the solenoid for more than 2 minutes at a time.

The TCM will normally cycle some of the transmission solenoids ON and OFF to keep the solenoid passages clean and clear. This is a normal function and may cause the valves to cycle open and closed quickly when the TCM is powered up. This can make the pressure gauge needle flicker or move from high and low as the valves open and close, allowing air to exit the ports where the pressure gauge is not connected.

WARNING: Use of eye goggles is necessary to prevent personal injury.

To avoid transmission fluid contact with exposed skin, use shop towels to cover

the test plate parts in order to prevent fluid from being released into the air, as any remaining transmission fluid in the control solenoid valve assembly will be forced out, and bodily injury may occur.

It is necessary to drain the control solenoid valve assembly of all remaining transmission fluid before attaching the test plate. Use caution when attaching air to the test plate, as any residual transmission fluid in the control solenoid valve assembly will be forced out. Use shop towels to cover the test plate ports in order to prevent fluid from being released into the air.

Preliminary Procedures

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Remove the transmission fluid pan and filter. Refer to [Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement](#) .
3. Remove the transmission electrical connector. Refer to [Automatic Transmission Electrical Connector Passage Sleeve Replacement](#) .
4. Remove the control solenoid valve assembly from the transmission. Refer to [Control Valve Lower Body and Upper Body Replacement](#) .
5. Ensure that the manual shift shaft position switch is disconnected and removed before performing the test. Failure to disconnect the switch will cause inaccurate test results and possible misdiagnosis.

Solenoid Testing Procedure

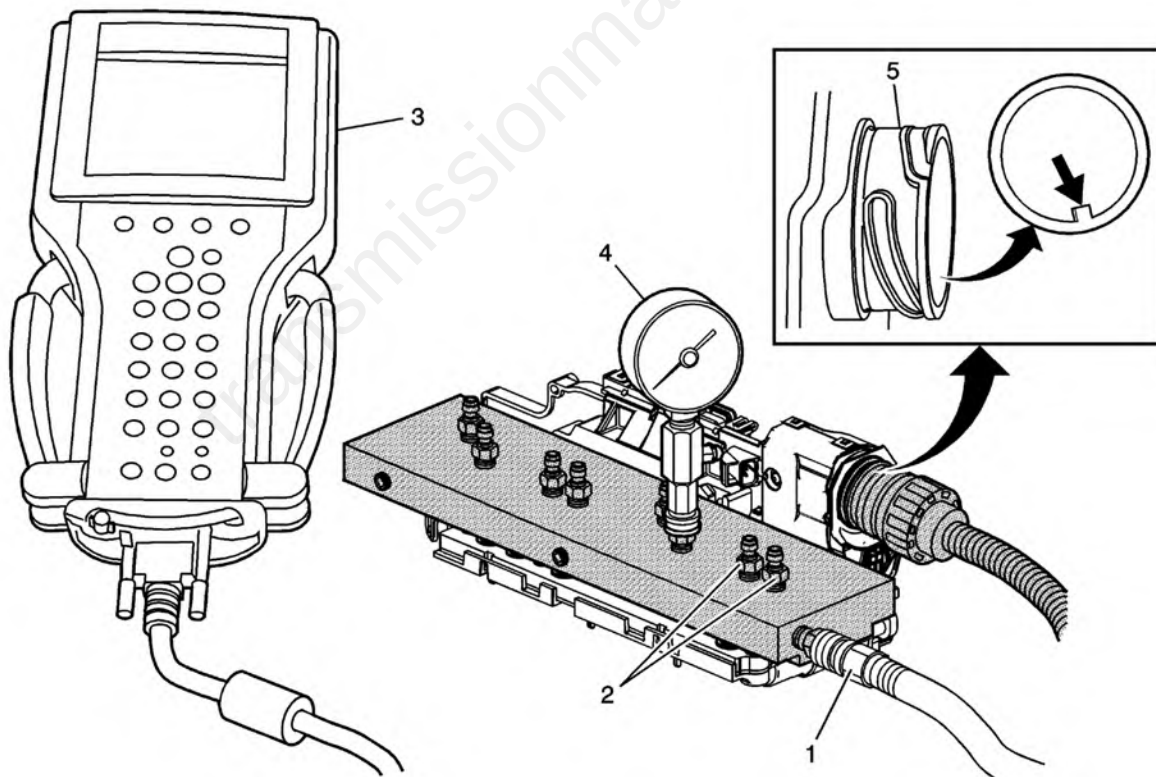


Fig. 6: Identifying Solenoid Testing Procedure
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Regulated Air Supply

t		Test Plate	Commanded State	
2	Solenoid	Test Ports	Port	ON OFF
3	Scan Tool			
4	Test Pressure Gauge			
5	Electrical Connector Sleeve			

CAUTION: Do not probe any circuit with a multi-meter. Resistance tests across the serial data bus circuits will damage the TCM.

CAUTION: The TCM connector sleeve allows the test tool harness to be correctly orientated for electrical operation of the TCM. Do not connect the test harness to the TCM without using the connector sleeve. Failure to use the sleeve could allow the test harness to be incorrectly positioned which will result in permanent TCM damage.

1. Align and install the electrical connector sleeve to the control solenoid valve assembly and secure with the connector slide lock.
2. If necessary, clean each side of the filter plate assembly and install the filter plate assembly back on the control solenoid valve assembly. Clean the mounting surface of the **DT-47825** control solenoid test plate.
3. Bolt the **DT-47825** control solenoid test plate to the control solenoid valve assembly mounting surface. Use the bolts and washers supplied with the tool to attach the test block. Tighten the bolts to 5 N.m (44 lb in).
4. Connect the test harness supplied with the **DT-47825** control solenoid test plate to the vehicle harness and to the TCM. Engage the connector locks.
5. Connect shop air to the **DT-47825** control solenoid test plate air inlet. Do not exceed the recommended air pressure of 620.5-689.4 Kpa (90-100 psi).
6. Connect the test pressure gauge to the test port for the solenoid to be tested.
7. With the ignition ON and the scan tool communicating with the vehicle, command the solenoid to be tested ON and OFF. Watch the air pressure gauge for a change as you command the solenoid. Refer to Control Solenoid Valve Assembly Solenoid Performance Test Plate to Component Identification for correct solenoid function and test plate port connections for the solenoid being tested.
8. The solenoid should allow air pressure to flow when commanded ON and prevent air pressure flow when commanded OFF. The test results are read on the pressure gauge.
9. Command the solenoid valve ON and OFF several times to determine the condition of the solenoid in question. Release the test air pressure from the pressure gauge between solenoid tests.

Control Solenoid Valve Assembly Solenoid Performance Test Plate to Component Identification

Solenoid	Test Plate Port	Commanded State	
		ON	OFF
PC Solenoid 2, 3-5 Rev. CL	C	Full pressure to gauge	No pressure to gauge
PC Solenoid 3, 4-5-6 Low Rev CL	A	Full pressure to gauge	No pressure to gauge
PC Solenoid 4, 2-6 CL	B	Full pressure to gauge	No pressure to gauge
PC Solenoid 5, 1-2-3-4 CL	F	Full pressure to gauge	No pressure to gauge
Shift Solenoid 1	H	Full pressure to gauge	No pressure to gauge
Shift Solenoid 2	D	Full pressure to gauge	No pressure to gauge
TCC PC Solenoid	E	Full pressure to gauge	No pressure to gauge
Line PC Solenoid	G	Command to highest setting, full pressure to gauge	Command to lowest setting, below 620.5 Kpa (90 psi) to gauge

NSMISSION ADAPTS

The Reset Transmission Adapts is a procedure for automatic transmissions in which the shift pressure learn values of each individual clutch is reset to zero or a base calibrated value, in the transmission control module (TCM).

Once the transmission adapts are set to zero or a calibrated value, the vehicle is then road test under various drive cycle events for the TCM to relearn shift pressure values for the best possible shift feel in all gear ranges.

The Reset Transmission Adapts procedure must be performed when one of the following repairs have been made to the transmission. Failure to perform the procedure after one of the following repairs may result in poor transmission performance, DTCs being set, or customer dissatisfaction.

- Transmission internal service, repair or overhaul
 - Valve body repair or replacement
 - Control solenoid valve assembly replacement
 - Any service/repair in response to a shift quality concern
1. Install any components or connectors that have been removed or replaced during diagnosis.
 2. Perform any adjustments, programming or setup procedures that are required when a component or module is removed or replaced.
 3. Clear the DTCs.
 4. Ignition OFF, all vehicle systems OFF, this may take up to 2 minutes.

NOTE: Do not cycle or turn the ignition switch OFF until directed to do so below.

5. Ignition ON, engine running, with a scan tool Reset Transmission Adapts.
6. Perform the [Road Test](#).
7. Ignition OFF for 2 minutes.

TOW/HAUL SWITCH/INDICATOR ALWAYS ON OR INOPERATIVE

Circuit/System Description

The Tow/Haul Mode indicator bulb on the instrument cluster is supplied 12 volts and ground by the instrument cluster module. When the Tow/Haul mode is selected, the body control module will send a request on the serial data communication line to the instrument cluster module to turn ON the Tow/Haul indicator. Pressing and releasing the Tow/Haul Switch again will turn OFF the indicator and return the transmission to normal shifting.

Diagnostic Aids

If the electrical circuit checks are OK and the tow/haul shift pattern is not occurring, there may be a mechanical/hydraulic condition that prevents tow/haul operation. Refer to [Symptoms - Automatic Transmission](#).

Reference Information

Schematic Reference

[Automatic Transmission Controls Schematics](#)

Connector End View Reference

- [COMPONENT CONNECTOR END VIEWS - INDEX](#)
- [INLINE HARNESS CONNECTOR END VIEWS - INDEX](#)

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Ignition OFF, monitor the instrument cluster.
2. Ignition ON, verify the Tow/Haul mode indicator momentarily illuminates, during the instrument cluster bulb check.
 - **If the Tow/Haul indicator does not illuminate or is always ON**

Refer to Circuit/System Testing.
 - **If the Tow/Haul indicator does illuminate and is not always ON**
3. Verify with a scan tool the Tow/Haul switch parameter changes from Inactive to Active and back to Inactive with each cycle of the switch.
 - **If the parameter does not change states**

Refer to Circuit/System Testing.
 - **If the parameter does change states**
4. Verify the Tow/Haul indicator on the instrument cluster turns ON and OFF with each switch activation.
 - **If the indicator does not turn ON and OFF**

Refer to Circuit/System Testing.
 - **If the indicator turns ON and OFF**
5. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF. Disconnect the harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 min. for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 14 and ground.
 - **If greater than 5 Ω**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Ignition OFF.
4. Test for less than 1 V on the signal circuit terminal 11 at the S48A Multifunction Switch - Instrument Panel harness connector.

greater than 1 V

1. Ignition OFF.
2. Disconnect the X2 harness connector at the K9 Body Control Module. Ignition ON.
3. Test for less than 1 V on the signal circuit terminal 11 at the S48A Multifunction Switch - Instrument Panel harness connector and ground.
 - If 1 V or greater, repair the short to B+/Ignition in the signal circuit.
 - If less than 1 V, replace the K9 Body Control Module.

• If less than 1 V

5. Ignition ON.
6. Test for 11.6-12.4 V on the signal circuit terminal 11 at the S48A Multifunction Switch - Instrument Panel harness connector and ground.

• If not between 11.6-12.4 V

1. Ignition OFF.
2. Disconnect the appropriate harness connector at the K9 Body Control Module.
3. Test for less than 2 Ω in the signal circuit end to end.
 - If greater than 2 Ω , repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

• If between 11.6-12.4 V

7. Test for less than 1 Ω between terminal 11 and terminal 14 on the S48 Multifunction Switch - Instrument Panel connector, while depressing and holding the Tow/Haul switch close.

• If greater than 1 Ω

Replace the S48 Multifunction Switch - Instrument Panel.

• If less than 1 Ω

8. Refer to [Symptoms - Data Communications](#).

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the diagnostic procedure.

Body Control Module (BCM) assembly replacement. Refer to [Control Module References](#) for replacement, setup, and programming.

TRANSMISSION FLUID LEVEL AND CONDITION CHECK

This procedure checks both the transmission fluid level, as well as the condition of the fluid itself. Since the transmission on this vehicle is not equipped with a fill tube and dipstick, a tube in the bottom pan is used to set the fluid level.

More information, including an instructional video, can be found at the following GM training websites:
www.gmtraining.com: 17041.62V - 6-Speed Automatic Transmission Fluid Checking and Filling Procedures,
www.gmtrainingcollege.com: A26021.01T - Check and Fill Procedure for 6-Speed Automatic Transmissions.

CAUTION: The transmission fluid level must be checked when the transmission fluid temperature (TFT) is between 30-50°C (86-122°F). If the TFT is not within this range, operate the vehicle or allow the fluid to cool as required. Setting the fluid level with a TFT outside this range will result in either an under or over-filled transmission. TFT>50°C=under-filled, TFT<30°C=over-filled. An under-filled transmission will cause premature component wear or damage. An over-filled

transmission will cause fluid to discharge out the vent tube, fluid foaming, or pump cavitation.

1. Observe the TFT using the driver information center (DIC) or a scan tool.
2. Start and idle the engine.
3. Depress the brake pedal and move the shift lever through each gear range. Pause for at least 3 seconds in each range. Move the shift lever back to PARK. Ensure the engine RPM is low (500-800 RPM).
4. Allow the engine to idle for at least 1 minute.
5. Raise the vehicle on a hoist. The vehicle must be level, with the engine running and the shift lever in the PARK range.

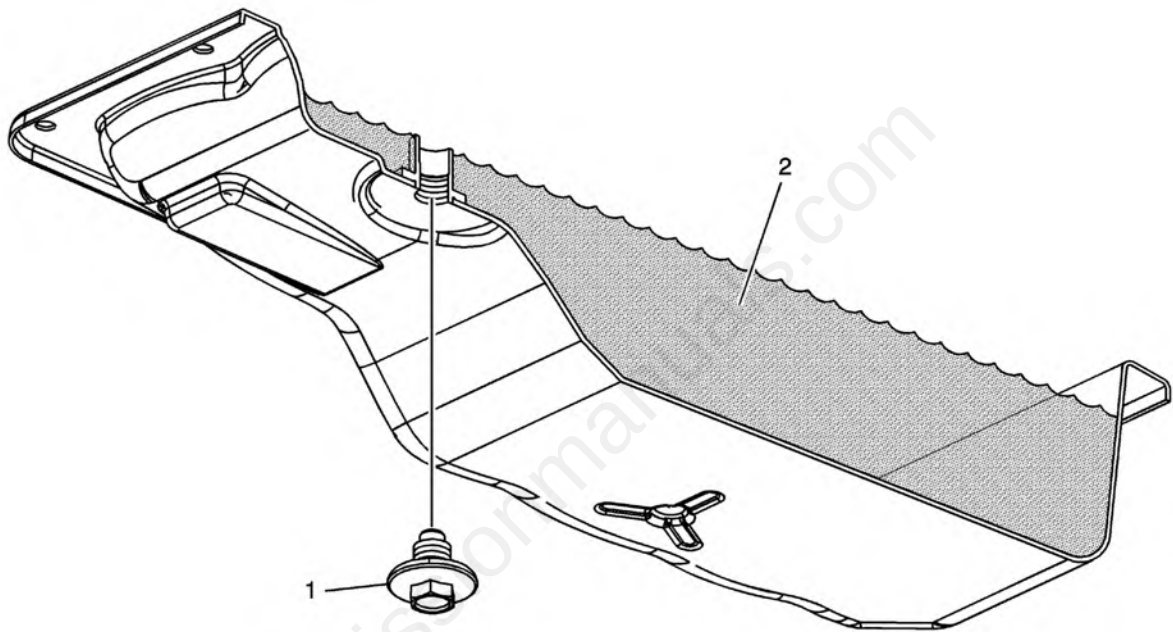


Fig. 7: Locating Transmission Oil Level Check Plug

Courtesy of GENERAL MOTORS COMPANY

CAUTION: THE ENGINE MUST BE RUNNING when the trans oil level check plug is removed or excessive fluid loss will occur, resulting in an under-filled condition. An under-filled transmission will cause premature component wear or damage.

NOTE: Continue to monitor the TFT. If the TFT is not within the specified values, reinstall the trans oil level check plug and repeat the previous steps.

6. Remove the trans oil level check plug (1) from the transmission fluid pan. Allow any fluid (2) to drain.
 - If the fluid is flowing as a steady stream, wait until the fluid begins to drip.
 - If no fluid comes out, add fluid until fluid drips out. Refer to [Transmission Fluid Fill Procedure](#).
7. Inspect the fluid color. The fluid should be red or dark brown.
 - If the fluid color is very dark or black and has a burnt odor, inspect the fluid and inside of the bottom pan for excessive metal particles or other debris. A small amount of "friction" material in the bottom pan is a "normal" condition. If large pieces and/or metal particles are noted in the fluid or bottom pan,

flush the oil cooler and cooler lines and overhaul the transmission. If there are no signs of transmission internal damage noted, replace the fluid filter assembly, repair the oil cooler, and flush the cooler lines.

- Fluid that is cloudy or milky or appears to be contaminated with water indicates engine coolant or water contamination. Refer to [Engine Coolant/Water in Transmission](#).

CAUTION: Refer to [Fastener Caution](#) .

8. Replace the trans oil level check plug and tighten to 25 N.m (18 lb ft).
9. Inspect for external leaks. Refer to [Fluid Leak Diagnosis](#).
10. Reset the oil life monitor only if the fluid was changed.

TRANSMISSION FLUID FILL PROCEDURE

Special Tools

- DT 47784 Transmission Fluid Fill Pan Adapter
- DT 45096 Transmission Oil Cooling System Flush and Flow Test Tool
- DT 45096-30 Transmission Cooler Flush Adapters
- DT 45096-40 Transflow Oil Fill Adapter

For equivalent regional tools, refer to [Special Tools](#) .

CAUTION: Check the transmission fluid level immediately after adding fluid and before vehicle operation. Do not overfill the transmission. An overfilled transmission may result in foaming or fluid to be expelled out the vent tube when the vehicle is operated. Overfilling will result in possible damage to the transmission.

Check the transmission fluid level, refer to [Transmission Fluid Level and Condition Check](#).

More information, including an instructional video, can be found at the following GM training websites:
www.gmtraining.com: 17041.62V - 6-Speed Automatic Transmission Fluid Checking and Filling Procedures,
www.gmtrainingcollege.com: A26021.01T - Check and Fill Procedure for 6-Speed Automatic Transmissions.

Fill Tube Plug Method

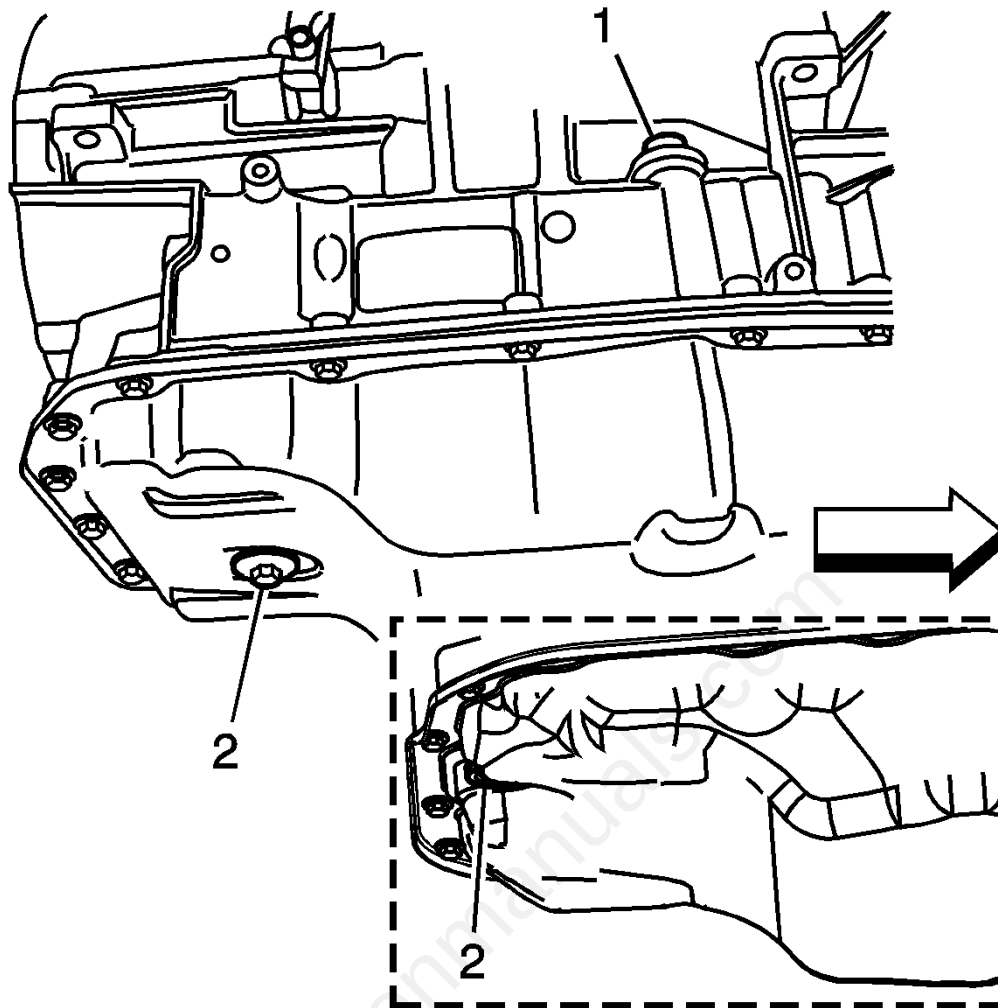


Fig. 8: Identifying Fluid Fill Tube Plug

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Use Dexron® VI transmission fluid only. Failure to use the proper fluid may result in transmission internal damage.

1. Perform this procedure for vehicles with transmissions that are not equipped with a fill tube and dipstick. Based on accessibility, transmission fluid may be added through the fluid fill tube plug assembly (1) hole or through the oil level check plug (2) hole in the bottom of the transmission fluid pan.

CAUTION: Before removing the transmission fluid fill tube plug assembly, thoroughly clean around the plug to prevent dirt or contaminants from entering the transmission during plug removal. Use compressed air to dislodge any caked dirt that may be stuck on and around the plug area. Use a mirror to confirm the area is free of dirt before removing the plug. Failure to clean around the plug may result in transmission contamination.

2. Clean around the fluid fill tube plug (1).

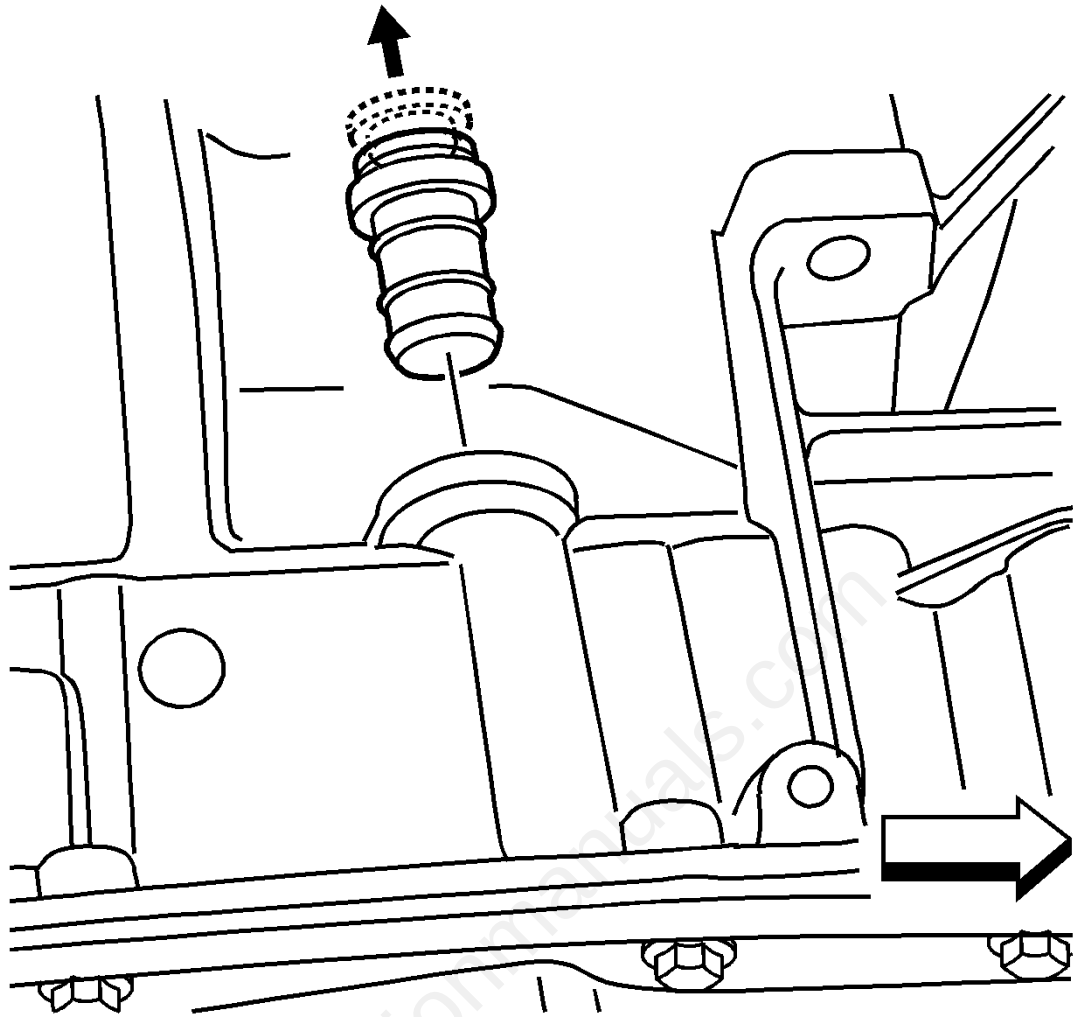


Fig. 9: Fill Tube Plug Plunger

Courtesy of GENERAL MOTORS COMPANY

NOTE: It may be necessary to use a long pair of 90 degree needle nose pliers to lift the plunger and remove the plug assembly.

3. Unlock the fill tube plug by lifting the plunger. Once the plunger is lifted, remove the entire plug assembly.
4. Determine the approximate amount of fluid needed to fill the transmission, based on the repair performed. Refer to [Approximate Fluid Capacities](#) . To avoid an under-fill condition, slightly overfill the transmission, and then allow the extra fluid to drain out through the oil level check plug during the transmission fluid level and condition check procedure.

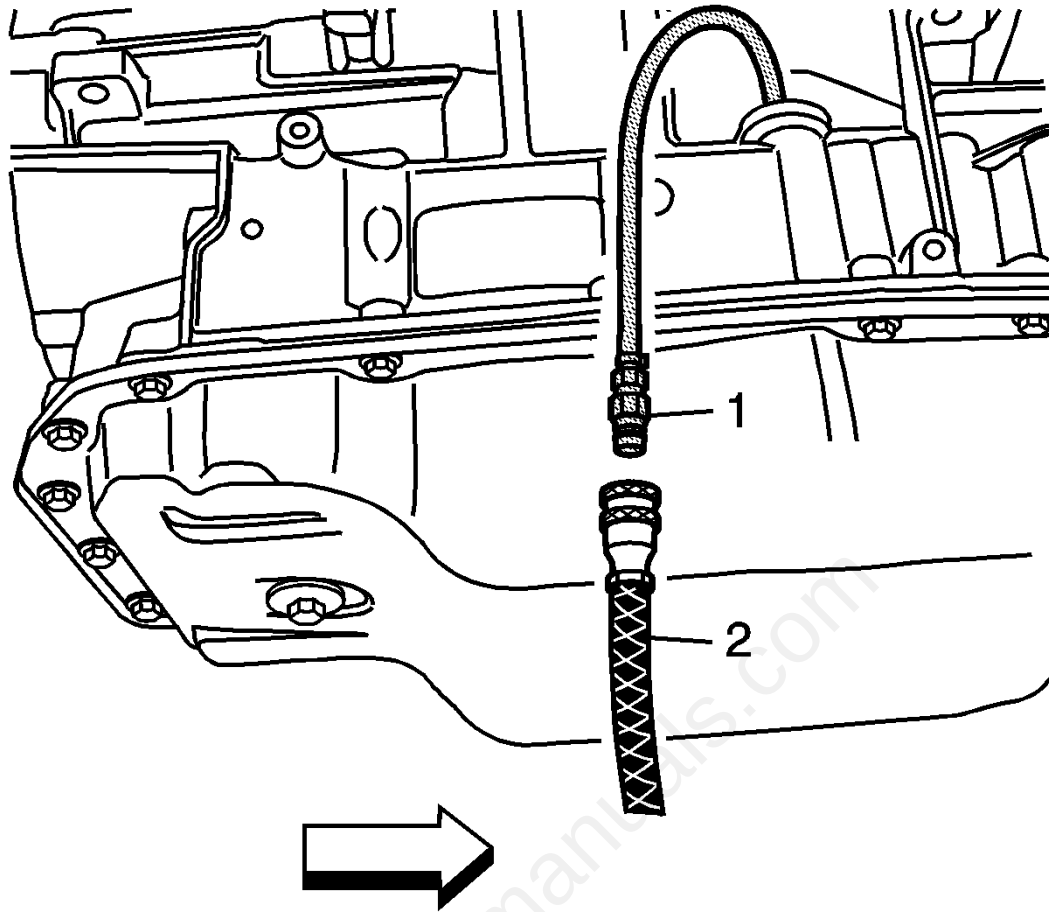


Fig. 10: View Of J 45096-40 And J 45096
 Courtesy of GENERAL MOTORS COMPANY

NOTE: The J 45096 flush and flow test tool is being utilized as a convenient method to pump the fluid into the bottom pan. A suitable hand pump may also be used instead. When using the DT 45096 flush and flow test tool, monitor the display panel to determine the amount of fluid being pumped from the tool supply tank into the transmission.

5. Using the **DT 45096-40** transflow oil fill adapter (1) and the **DT 45096** flush and flow test tool (2), or a suitable hand pump, add transmission fluid through the fill tube plug opening. Refer to [Transmission Fluid Cooler Flushing and Flow Test](#) for complete **DT 45096** flush and flow test tool operating instructions. Use the FLOW position on the main function switch to pump the fluid.

CAUTION: Check the transmission fluid level immediately after adding fluid and before vehicle operation. Do not overfill the transmission. An overfilled transmission may result in foaming or fluid to be expelled out the vent tube when the vehicle is operated. Overfilling will result in possible damage to the transmission.

6. Check the fluid level. Refer to [Transmission Fluid Level and Condition Check](#).

Check Plug Method

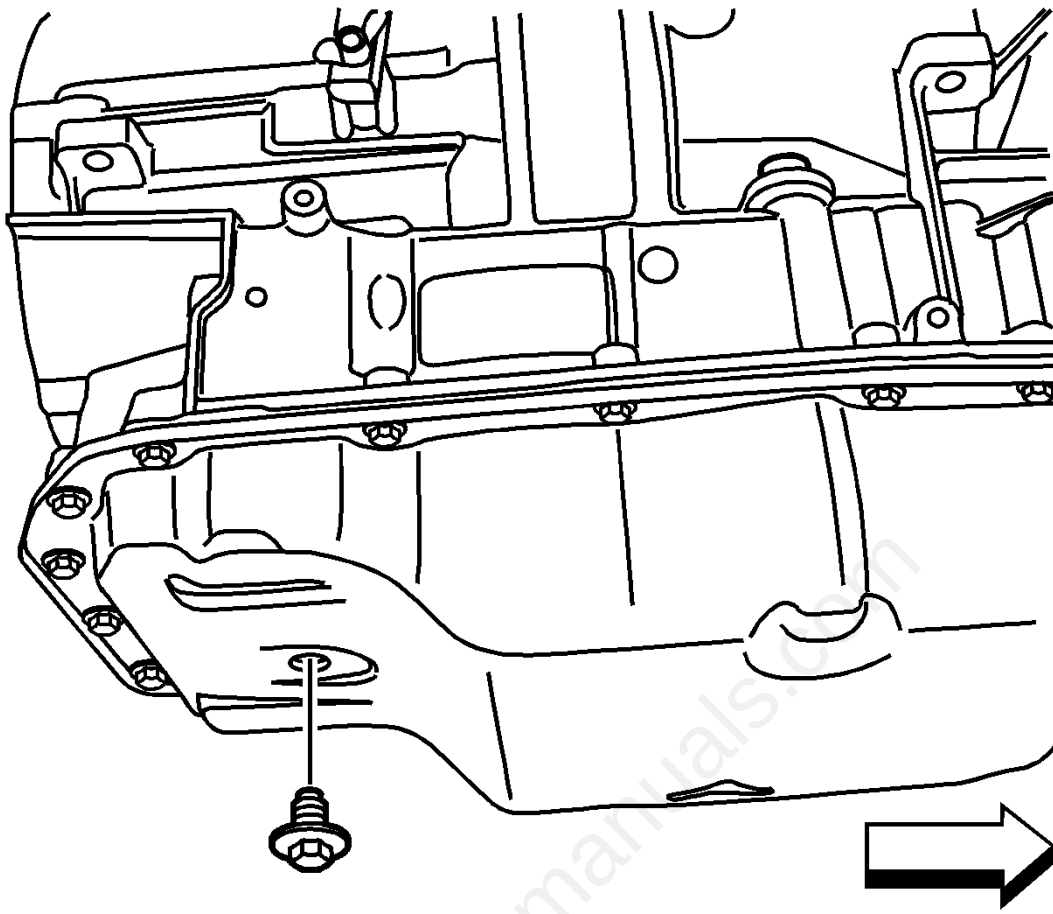


Fig. 11: Identifying Oil Level Check Plug

Courtesy of GENERAL MOTORS COMPANY

NOTE: When the oil level check plug is removed with the engine OFF, transmission fluid may drain from the hole.

1. Remove the oil level check plug.

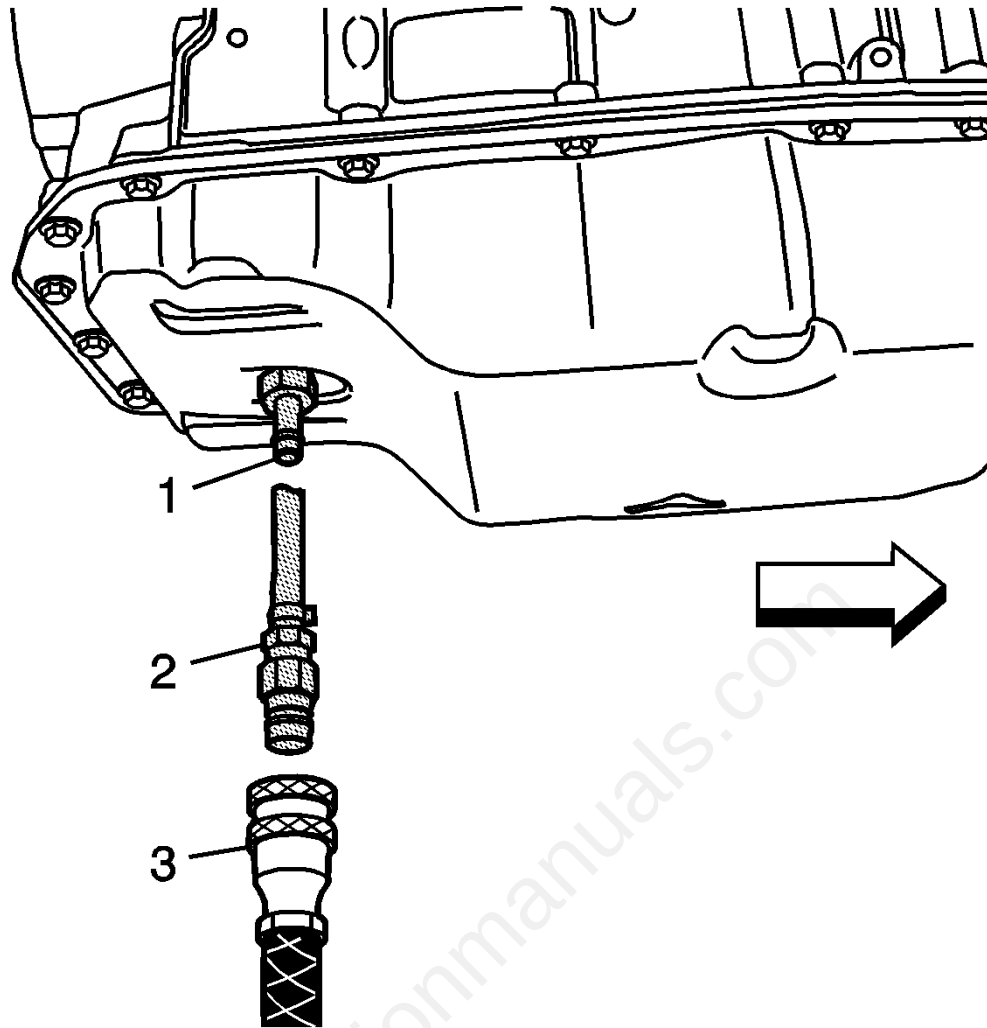


Fig. 12: Fluid Fill Pan Adapter, Cooler Flush Adapters & Flush & Flow Test Tool

Courtesy of GENERAL MOTORS COMPANY

2. Install the **DT 47784** fluid fill pan adapter (1) and, if necessary, one adapter from the **DT 45096-30** cooler flush adapters (2).
3. Determine the approximate amount of fluid needed to fill the transmission, based on the repair performed. Refer to [Approximate Fluid Capacities](#) . To avoid an under-fill condition, slightly overfill the transmission, and then allow the extra fluid to drain out through the oil level check plug during the transmission fluid level and condition check procedure.

NOTE: The DT 45096 flush and flow test tool is being utilized as a convenient method to pump the fluid into the bottom pan. A suitable hand pump may also be used instead. When using the DT 45096 flush and flow test tool, monitor the display panel to determine the amount of fluid being pumped from the tool supply tank into the transmission.

4. Using the **DT 47784** fluid fill pan adapter (1), **DT 45096-30** cooler flush adapters (2), and the **DT 45096** flush and flow test tool (3), add transmission fluid through the check plug hole. Refer to [Transmission Fluid Cooler Flushing and Flow Test](#) for complete J 45096 operating instructions. Use the FLOW position on the main function switch to pump the fluid.

NOTE: Failure to start the engine and move the shift lever through the gear ranges before removing the DT 47784 fluid fill pan adapter and DT 45096-30 cooler

flush adapters from the bottom pan will result in an excess amount of fluid draining from the check plug hole. This may lead to an under-fill condition.

5. Start the engine and move the shift lever through each gear range. Pause for at least 3 seconds in each gear range.

CAUTION: Check the transmission fluid level immediately after adding fluid and before vehicle operation. Do not overfill the transmission. An overfilled transmission may result in foaming or fluid to be expelled out the vent tube when the vehicle is operated. Overfilling will result in possible damage to the transmission.

6. With the engine still running, remove the **DT 47784** fluid fill pan adapter (1), (2), and **DT 45096** flush and flow test tool (3) and then check the fluid level. Refer to [Transmission Fluid Level and Condition Check](#).

LINE PRESSURE CHECK

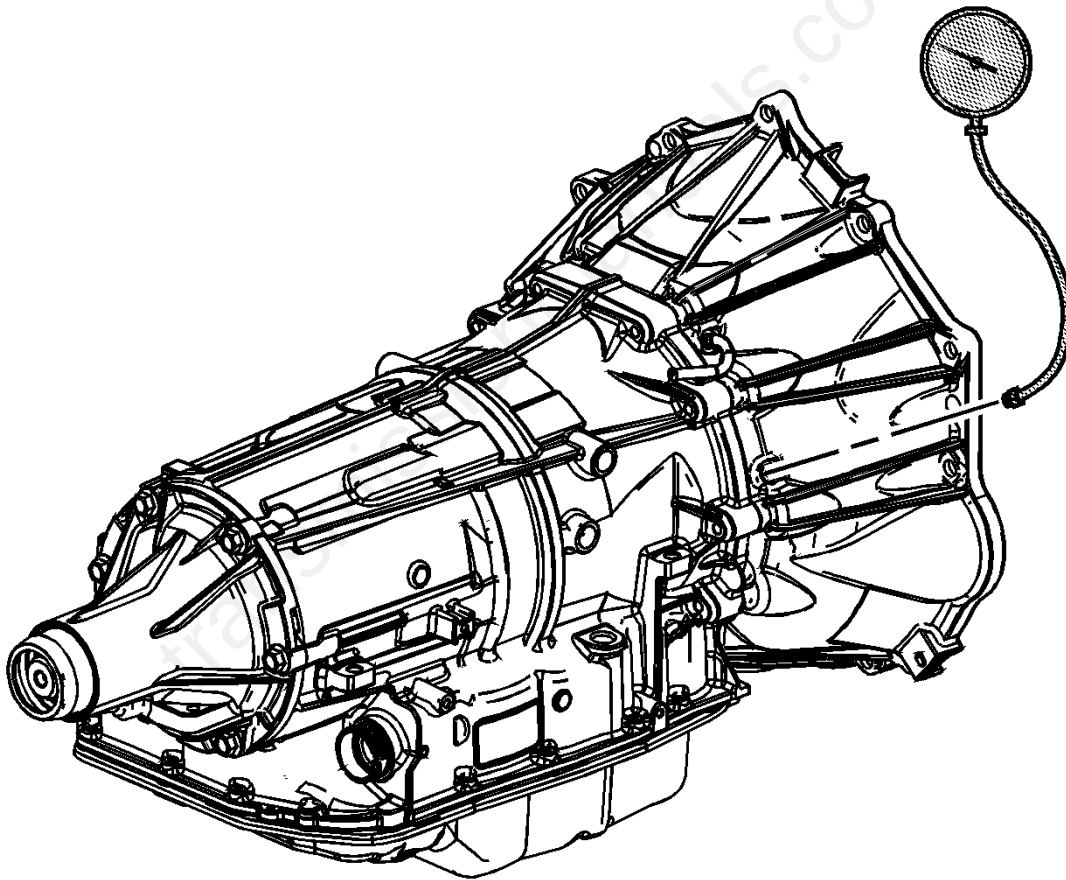


Fig. 13: View Of Transmission Fluid Pressure Gage
Courtesy of GENERAL MOTORS COMPANY

Special Tools

GE 21867 Pressure Gauge

For special tools, refer to [Special Tools](#).
 Line PC Solenoid Approximate line pressure shown on pressure gauge @ 1500 RPM

Commanded State (KPa)

Kpa

PSI

WARNING: Keep the brakes applied at all times in order to prevent unexpected vehicle motion. Personal injury may result if the vehicle moves unexpectedly.

1. Install a scan tool.
2. Start the engine.
3. Inspect the transmission for the proper fluid level. Refer to [Transmission Fluid Level and Condition Check](#).
4. Use the scan tool to inspect for any active or stored diagnostic trouble codes.
5. Inspect the manual linkage at the transmission for proper function.
6. Turn the engine OFF.

NOTE: You may need to remove or disconnect components in order to gain access to the transmission line pressure test hole plug.

7. Remove the line pressure test hole plug.
8. Install the **GE 21867** pressure gauge.
9. Access the Scan Tool Transmission Output Controls for the Line PC Solenoid.
10. Start the engine.

NOTE: In order to achieve accurate line pressure readings, the following procedure should be performed at least three times.

The values displayed on the scan tool screen will not match the actual pressures indicated on the pressure gauge.

Control the Line PC Solenoid in PARK or NEUTRAL with the engine speed at approximately 1500 RPM and the TFT between 35-55°C (95-131°F). This protects the clutches from extreme high or low line pressures and ensures a consistent pump capacity.

11. Use the scan tool to increase and decrease line pressure, allowing the pressure to stabilize between increments.
12. Compare the pressure readings on the gauge with the table below.
13. If the pressure readings on the gauge are erratic, or are more than 10% greater or less than the range specified in the table below, refer to [Fluid Pressure High or Low](#).
14. Turn the engine OFF.
15. Remove the **GE 21867** pressure gauge.

CAUTION: Refer to [Fastener Caution](#).

16. Install the line pressure test hole plug. Tighten the pressure plug to 11 N.m (97 lb in).

Line Pressure

Scan tool Line PC Solenoid Commanded State (KPa)	Approximate line pressure shown on pressure gauge @ 1500 RPM	
	Kpa	PSI
None	310-550	45-80
200	655-900	95-130

Line PC Solenoid Commanded State (KPa)	Approximate line pressure shown on pressure gauge @ 1500 RPM	
	Kpa	PSI
400	1100-1310	160-190
600	1520-1725	220-250
800	1860-2070	270-300

ROAD TEST

The following test provides a method of evaluating the condition of the automatic transmission. The test is structured so that most driving conditions would be achieved. The test is divided into the following parts:

- Electrical Function Check
- Upshift Control and Torque Converter Clutch (TCC) Apply
- Part Throttle Step-In Downshifts
- Manual Downshifts
- Coasting Downshifts
- Manual Gear Range Selection
 - REVERSE
 - Driver Shift Control

NOTE: Complete the test in the sequence given. Incomplete testing cannot guarantee an accurate evaluation.

Before the road test, ensure the following:

- The engine is performing properly.
- Transmission fluid level is correct. Refer to [Transmission Fluid Level and Condition Check](#).
- Tire pressure is correct.

During the road test:

- Perform the test only when traffic conditions permit.
- Operate the vehicle in a controlled, safe manner.
- Observe all traffic regulations.
- View the scan tool data while conducting this test.

Take along qualified help in order to operate the vehicle safely.

- Observe any unusual sounds or smells.

After the road test, check the following:

- Inspect for proper transmission fluid level. Refer to [Transmission Fluid Level and Condition Check](#).
- Inspect for any diagnostic trouble codes (DTCs) that may have set during the testing. Refer to the applicable DTC.
- Monitor the scan tool data for any abnormal readings or data.
- Inspect for fluid leaks. Refer to [Fluid Leak Diagnosis](#).

Electrical Function Check

procedure first in order to ensure the electronic transmission components are functioning properly. If these components are not checked, a simple electrical condition could be misdiagnosed.

1. Connect the scan tool.
2. Ensure the gear selector is in PARK and set the parking brake.
3. Start the engine.
4. Verify that the following scan tool data can be obtained and is functioning properly.

Refer to [Control Module References](#) for typical data values. Data that is questionable may indicate a concern.

- Engine Speed
- Transmission ISS
- Transmission OSS
- Vehicle Speed
- IMS
- Commanded Gear
- Gear Ratio
- Line PC Sol. Pressure Cmd.
- Brake Switch
- ECT, Engine Data List
- Trans. Fluid Temp.
- TCM Temperature
- Calc. Throttle Position
- Ignition Voltage
- TFP Switch 1
- TFP Switch 3
- TFP Switch 4
- TFP Switch 5
- PC Sol. 2 Pressure Cmd.
- PC Sol. 3 Pressure Cmd.
- PC Sol. 4 Pressure Cmd.
- PC Sol. 5 Pressure Cmd.
- Shift Solenoid 1
- Shift Solenoid 2
- TCC PC Sol. Duty Cycle
- TCC Slip Speed

5. Check the garage shifts.
 1. Apply the brake pedal and ensure the parking brake is set.
 2. Move the gear selector through the following ranges:
 1. PARK to REVERSE
 2. REVERSE to NEUTRAL
 3. NEUTRAL to DRIVE
 4. DRIVE to REVERSE

5. REVERSE to DRIVE

3. Pause 2 to 3 seconds in each gear position.
4. Verify the gear engagements are immediate (less than 2 seconds to complete if trans fluid temperature is above 20Â°C) and not harsh. Note that these shifts may be almost imperceptible in some applications. Using the scan tool to monitor Transmission ISS achieving 0 rpm can be used to check delay in these cases.

NOTE: Harsh engagement may be caused by any of the following conditions:

- High engine idle speed-Compare engine idle speed to desired idle speed.
- Incorrect line pressure-Investigate Line PC Sol. Pressure Cmd. kPa (psi), also perform [Line Pressure Check](#).
- A default condition caused by certain DTCs that result in maximum line pressure to prevent clutch slippage.
- Incomplete adapting or incorrect adapting-Repeat maneuver multiple times to see if shift quality improves. If it does not, refer to the service procedures for [Harsh Garage Shift](#), and for [Harsh, Soft, Delayed or Slipping First or Reverse Gear](#).

NOTE: Delayed engagement may be caused by any of the following conditions:

- Low idle speed-Compare engine idle speed to desired idle speed.
- Low fluid level
- Incorrect line pressure-Investigate Line PC Sol. Pressure Cmd. kPa (psi), also perform [Line Pressure Check](#).
- Cold transmission fluid temperature (TFT)-Use the scan tool to determine TFT.
- Selector linkage-Inspect and adjust as necessary.
- Incomplete adapting or incorrect adapting-Repeat maneuver multiple times to see if delay improves. If it does not, refer to the service procedures for [Harsh, Soft, Delayed or Slipping First or Reverse Gear](#).

6. Monitor transmission range on the scan tool, transmission data list.

1. Apply the brake pedal and ensure the parking brake is set.
2. Move the gear selector through all ranges.
3. Pause 2 to 3 seconds in each range.
4. Return gear selector to PARK.
5. Verify that all selector positions match the scan tool display.

7. Check throttle position input.

1. Apply the brake pedal and ensure the parking brake is set.
2. Ensure the gear selector is in PARK.
3. Monitor the scan tool Calc. Throttle Position while increasing and decreasing engine speed with the throttle pedal. The scan tool Calc. Throttle Position percentage should increase and decrease with engine speed.

If any of the above checks do not perform properly, record the result for reference after completion of the road test.

I and Torque Converter Clutch (TCC) Apply

The TCM calculates the upshift points based primarily on 2 inputs: throttle position and vehicle speed. When the TCM determines that conditions are met for a shift to occur, the TCM commands the shift by varying current to the appropriate PC solenoids to control oncoming and offgoing clutch pressures.

Perform the following steps:

1. Monitor the following scan tool parameters:

- Calc. Throttle Position
- Vehicle Speed
- Engine Speed
- Transmission ISS
- Transmission OSS
- Commanded Gear
- TCC PC Sol. Pressure Cmd.
- TCC Slip Speed
- TFP Switch 1
- TFP Switch 3
- TFP Switch 4
- TFP Switch 5
- PC Sol. 2 Pressure Cmd.
- PC Sol. 3 Pressure Cmd.
- PC Sol. 4 Pressure Cmd.
- PC Sol. 5 Pressure Cmd.
- Shift Solenoid 1 and 2

2. Place the gear selector in the DRIVE position.

3. Accelerate the vehicle using a steady throttle position between 15 and 20 percent. Hold the throttle steady.

4. As the transmission upshifts, there should be a noticeable shift feel or engine speed change within 1 to 2 seconds of the commanded gear change. The PC solenoid pressure command should change to "YES" for the oncoming clutch and the PC solenoid pressure command should change to "NO" for the offgoing clutch.

5. Note any harsh, soft or delayed shifts or slipping. Note any noise or vibration.

6. The TCC feel may not be noticeable. In many applications the TCC will apply after the 1-2 shift and TCC events will not be easily detected using engine speed.

NOTE: This transmission is equipped with an electronically controlled capacity clutch (ECCC), which allows operation of the clutch without fully locking to the torque converter cover. The clutch maintains a small amount of slippage, approximately 20 RPM, in 2nd, 3rd, 4th, 5th, and 6th gears, depending on the vehicle application. ECCC was developed to reduce the possibility of noise, vibration or chugle caused by TCC apply. Full lockup is available at highway speeds on some applications.

7. Monitor TCC PC solenoid pressure command while driving and check TCC slip speed when the pressure command indicates that the TCC is commanded to apply:

When the TCC applies, slip speed should be controlled to below 100 RPM when the transmission is not shifting and the throttle is held steady. If the TCC slip exceeds this value for more than 6 seconds after the

↳ Sol. Pressure Command indicates that the TCC is commanded on:

- Check for DTCs.
- Refer to [Torque Converter Diagnosis](#).

Part Throttle Step-In Downshifts

1. Place the gear selector in the DRIVE position.
2. Accelerate the vehicle at light throttle (5-15 percent) until 3rd gear is just achieved.
3. Quickly increase throttle angle until commanded gear indicates that a downshift to 2nd gear is commanded.
4. Verify that the transmission downshifts within 2 seconds of the throttle movement.
5. Repeat steps 2 to 4 at higher speed to achieve 4th gear and then step in to command a 4th gear to 3rd gear downshift.
6. Repeat steps 2 to 4 at higher speed to achieve 5th gear and then step in to command a 5th to 4th gear downshift.
7. Repeat steps 2 to 4 at higher speed to achieve 6th gear and then step in to command a 6th gear to 5th gear downshift.
8. Note any harsh, soft or delayed shifts or slipping. Note any noise or vibration.

Manual Downshifts

Manual downshift testing is not required since all vehicles equipped with the 6L45/50/80/90 are also equipped with some form of Driver Shift Control (DSC). The TCM will automatically override DSC downshifts to protect the transmission from damage.

Coasting Downshifts

1. Place the gear selector in the DRIVE position.
2. Accelerate the vehicle to 6th gear with the TCC applied.
3. Release the throttle and apply the brakes.
4. Verify that the downshifts occur as commanded by monitoring gear ratio, which should change after commanded gear changes.

Manual Gear Range Selection

This application does not utilize manual forward gear ranges.

Reverse

Perform the following test using a 10-15 percent throttle position.

1. With the vehicle stopped, move the gear selector to REVERSE.
2. Slowly accelerate the vehicle.
3. Verify that there is no noticeable slip, noise or vibration.

Driver Shift Control (DSC)

Refer to the owner's manual for specific instructions on the type of DSC available in this application. Utilize the DSC to ensure that the transmission responds appropriately to driver's commands. The TCM will upshift automatically when maximum engine speed is achieved and will protect from any downshift which may cause excessive engine RPMs.

INVERTER DIAGNOSIS

Torque Converter Stator

The torque converter stator roller clutch can have 2 different malfunctions.

- The stator assembly freewheels in both directions.
- The stator assembly remains locked up in both directions.

Poor Acceleration at Low Speed - Stator Roller Clutch Freewheels at All Times

If the stator is freewheeling at all times, the vehicle tends to have poor acceleration from a standstill and at speeds below 48-55 km/h (30-34 mph). At speeds above 48-55 km/h (30-34 mph), the vehicle may act normally.

For poor acceleration at low speeds, you should first determine that the exhaust system is not blocked, and the transmission is in First gear when starting out. If the engine freely accelerates to high RPM in NEUTRAL, you can assume that the engine and the exhaust system are normal. Check for poor performance in DRIVE and REVERSE to help determine if the stator is freewheeling at all times.

Poor Acceleration at High Speed - Stator Roller Clutch is Locked Up at All Times

If the stator is locked up at all times, performance is normal when accelerating from a standstill. Engine RPM and vehicle speed are limited or restricted at speeds above 48-55 km/h (30-34 mph). Visual examination of the converter may reveal a blue color from overheating.

Torque Converter Bearing Noise

NOTE: Do not confuse this noise with pump whine noise, which is usually noticeable in all gear ranges. Pump whine will vary with line pressure.

Torque converter whine is noticed when the vehicle is stopped and the transmission is in DRIVE or REVERSE. This noise will increase as you increase the engine RPM. The noise will stop when the vehicle is moving or when you apply the torque converter clutch, because there is no slip speed across the bearings.

Perform a stall test to verify that the noise is actually coming from the torque converter:

1. Place your foot on the brake.
2. Put the gear selector in DRIVE.

CAUTION: You may damage the transmission if you depress the accelerator for more than 6 seconds.

3. Depress the accelerator to approximately 1, 200 RPM for no more than six seconds.

A torque converter noise will increase under this load.

Torque Converter Clutch

The torque converter clutch (TCC) is applied by fluid pressure, which is controlled by a TCC pressure control (PC) solenoid. This solenoid is part of the control solenoid valve assembly, which is located inside the automatic transmission assembly. The solenoid is controlled through a combination of computer controlled switches and sensors. Electronically controlled capacity clutch (ECCC) is controlled slip across the TCC.

Torque Converter Clutch Shudder

gnosing torque converter clutch (TCC) shudder is to note when it happens and under what conditions. TCC shudder should only occur during the apply, release, or ECCC conditions of the converter clutch. Shudder should never occur after the TCC is fully locked (approximately 0 RPM slip).

If Shudder Occurs During TCC Apply, Release, and ECCC

If the shudder occurs while the TCC is applying, the problem can be within the transmission or the torque converter. Something is causing one of the following conditions to occur:

- The clutch is not engaging completely.
- The clutch is not releasing completely.
- The clutch is releasing and applying rapidly and continuously.

One of the following conditions may be causing the TCC Shudder to occur:

- Leaking turbine shaft/TCC seals
- A restricted release orifice
- A distorted clutch or converter cover due to long flexplate to converter bolts
- Defective friction material on the TCC plate

If Shudder Occurs After TCC has Locked

Engine problems may go unnoticed under light throttle and load, but they become noticeable after the TCC has locked when going up a hill or accelerating.

Refer to **Symptoms - Engine Controls** in order to avoid misdiagnosis of TCC shudder and the unnecessary disassembly of a transmission or the unnecessary replacement of a torque converter.

Torque Converter Vibration Test

NOTE: The **Noise and Vibration Analysis** procedure should be performed prior to performing this test.

Isolating Vibration

NOTE: Some engine/transmission combinations cannot be balanced in this manner due to restricted access or limited clearances between the torque converter bolts and the engine.

To isolate and correct a flexplate or torque converter vibration:

1. With the engine at idle speed and the transmission in PARK or NEUTRAL, observe the vibration.
2. Turn the engine OFF.
3. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle**.
4. Remove the torque converter access cover and the bolts (if equipped).
5. Mark the relationship of the torque converter to the flexplate.
6. Rotate the torque converter to inspect for defects or missing balance weights.
7. Index the converter according to "Indexing Torque Converter" procedure located within this procedure.
8. If the vibration remains, it is most likely caused by the engine.
9. Refer to "Torque Converter Replacement Guide" located within this procedure.

Indexing Torque Converter

and correct a torque converter vibration, the following procedure may have to be performed several times to achieve the best possible torque converter to flexplate balance.

1. Remove the torque converter bolts.
2. Rotate the torque converter one bolt position from the original marked position.

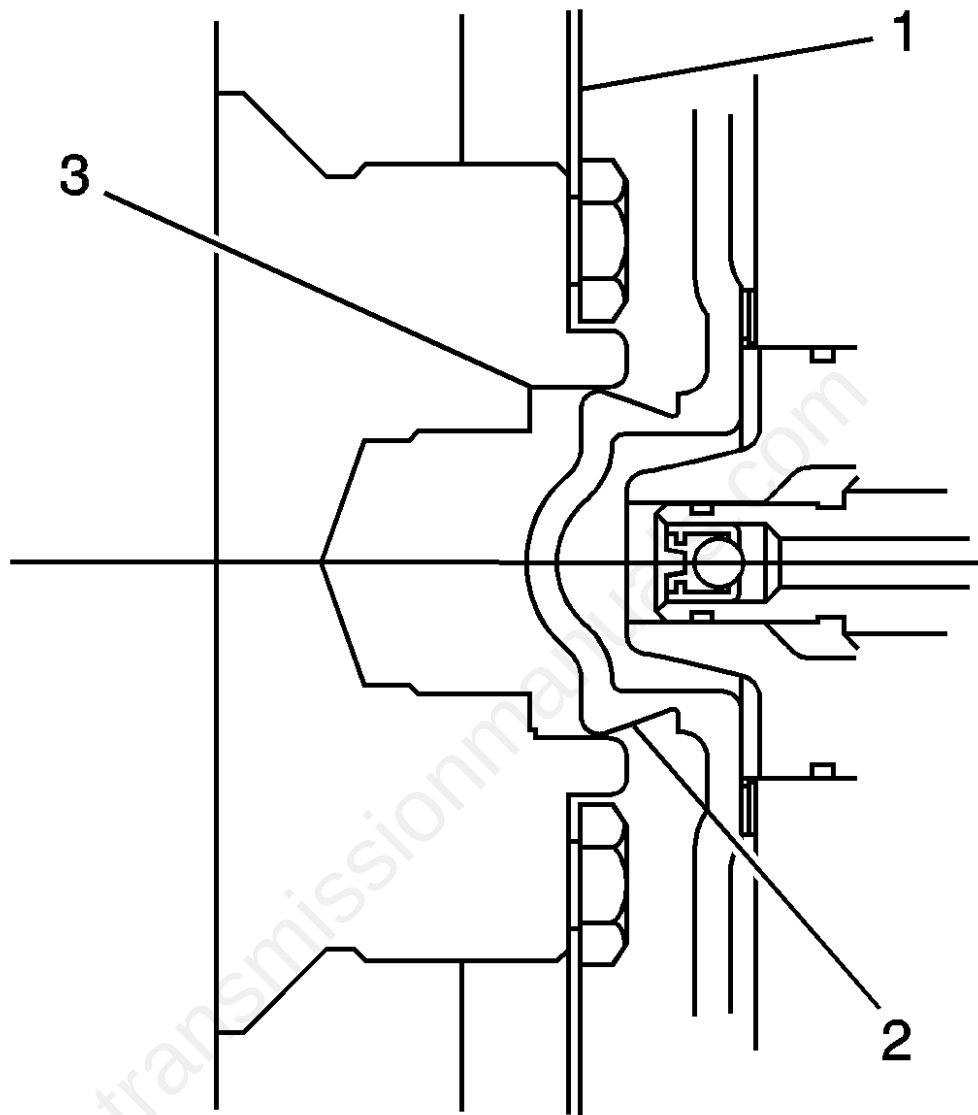


Fig. 14: View Of Torque Converter Hub In Engine Crankshaft

Courtesy of GENERAL MOTORS COMPANY

CAUTION: When installing the torque converter to the flexplate, make sure to use specified bolts. **DO NOT** use longer bolts. Using longer bolts will result in deformation of the torque converter cover and cause internal damage.

CAUTION: Refer to [Fastener Caution](#) .

3. Align the torque converter pilot (2) in the engine crankshaft (3). Install the torque converter to flexplate bolts, and tighten according to [Fastener Specifications \(Off Vehicle\)](#) [Fastener Specifications \(On Vehicle\)](#)
4. Lower the vehicle.
5. With the engine at idle speed and the transmission in PARK or NEUTRAL, observe the vibration.

his procedure until the best possible balance is obtained.

Action

6. Install the torque converter access cover and bolts (if equipped) and tighten according to [Fastener Specifications \(Off Vehicle\)](#) [Fastener Specifications \(On Vehicle\)](#) .

Torque Converter Replacement Guide

Condition	Action
• Transmission Fluid Oxidized/Discolored • Clutch Fiber Material	Do not replace the torque converter. Refer to Transmission Fluid Level and Condition Check .
Transmission Fluid Contaminated with Metal Particles	NOTE: Do not replace the torque converter for clutch system or gearset component damage. Fine metallic debris or clutch plate material that is suspended in the fluid will not cause damage to the internal torque converter components nor any internal transmission components.
Harsh Gear Shifts	Do not replace the torque converter. Refer to Symptoms - Automatic Transmission .
Noise-Whine	• Refer to Symptoms - Automatic Transmission. • Do not replace the torque converter if noise is present in Neutral/Park. Refer to Symptoms - Engine Mechanical .
Vibration-Out of Balance	Refer to Torque Converter Vibration Test in this procedure.
No Drive/Slips in Drive	Do not replace the torque converter until completing all engine and transmission diagnostics.
Idle Surge/Rough Idle	Do not replace the torque converter. Refer to Symptoms - Engine Controls .
TCC Apply/Release Shudder	Do not replace the torque converter. Refer to Torque Converter Clutch Shudder in this procedure.
TCC Chuggle	Do not replace the torque converter. Refer to Symptoms - Engine Controls .
DTC P0741-TCC Stuck OFF/High Slip-Intermittent Only	Do not replace the torque converter. Refer to DTC P0741 or P0742 diagnostic table.
DTC P0741-TCC Stuck OFF/High Slip	Do not replace the torque converter. Refer to DTC P0741 or P0742 diagnostic table.
DTC P0742-TCC Stuck ON	Do not replace the torque converter. Refer to DTC P0741 or P0742 diagnostic table.

Condition	Action
Transmission Fluid Contaminated with Sludge/Metal Particles as a result of: • Engine Coolant/Oil • Pump damage • Drive sprocket support damage • Turbine/stator shaft damage • Internal converter damage with no damage found in the transmission	Replace the torque converter.
Poor Acceleration above 48 km/h (30 mph) - Good Launch	Do not replace the torque converter until completing all engine and transmission diagnostics. • Refer to Torque Converter Stator in this procedure. • Refer to Symptoms - Engine Controls .
Poor Launch - Good Acceleration above 48 km/h (30 mph)	Do not replace the torque converter until completing all engine and transmission diagnostics. • Refer to Torque Converter Stator in this procedure. • Refer to Symptoms - Engine Controls .
Stripped Converter Bolt Holes	• Replace the torque converter. • Inspect flexplate and refer to Lower Engine Noise, Regardless of Engine Speed .
Torque Converter Pilot Damaged	Replace the torque converter.
Torque Converter Hub surface is damaged - scored, raised/transferred metal.	Replace the torque converter.
External Leaks in the weld areas - hub, lug or closure weld.	Replace the torque converter.
Broken/Cracked Flexplate	Replace the torque converter.
Torque Converter Discolored/Overheated	Replace the torque converter.

FLEX PLATE/TORQUE CONVERTER VIBRATION TEST

Isolating Vibration

CAUTION: Some engine/transaxle combinations cannot be balanced in this manner due to restricted access or limited clearances between the torque converter bolts and the engine. Ensure that the bolts do not bottom out in the lug nuts or the torque converter cover which could dent and cause internal damage.

To isolate and correct a flywheel or torque converter vibration, separate the torque converter from the flywheel to determine if vibration is in the engine or transmission.

1. With the engine at idle speed and the transmission in PARK or NEUTRAL, observe the vibration.

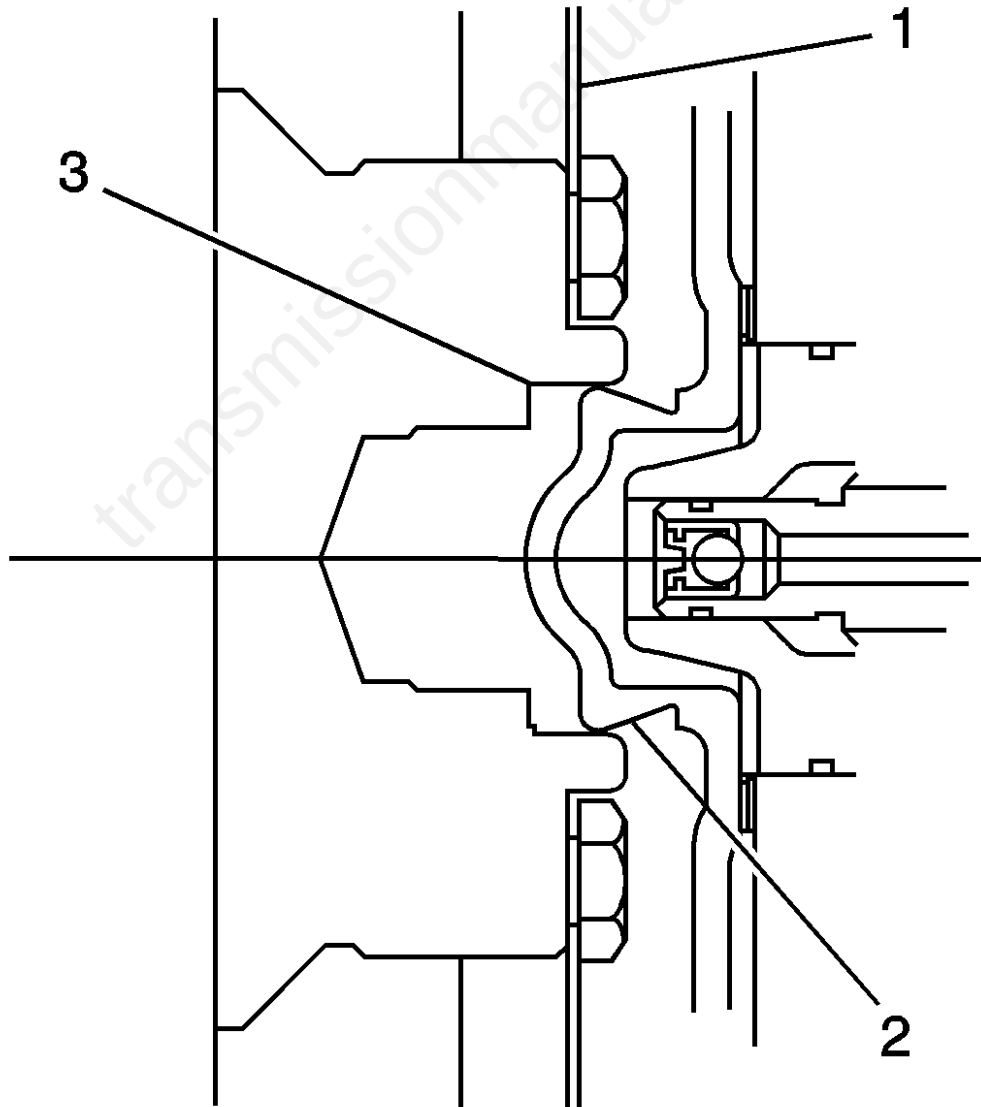
; engine OFF.

3. Raise and suitably support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
4. Remove the transmission converter cover bolts and the cover.
5. Mark the relationship of the converter to the flywheel.
6. Remove the bolts attaching the converter to the flywheel.
7. Slide the torque converter away from the flywheel.
8. Rotate the flywheel and torque converter to inspect for defects or missing balance weights.
9. Lower the vehicle.
10. With the engine at idle speed and the transmission in PARK or NEUTRAL, observe the vibration. Refer to [Diagnostic System Check - Vehicle](#) .
11. Turn the engine OFF.

Indexing Torque Converter

To determine and correct a torque converter vibration, the following procedure may have to be performed several times to achieve the best possible torque converter to flywheel balance.

1. Raise and suitably support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Rotate the torque converter one bolt position.



3. Align the torque converter hub (2) in the engine crankshaft (3) and install the torque converter to flywheel bolts.
4. Lower the vehicle.
5. With the engine at idle speed and the transmission in PARK or NEUTRAL, observe the vibration. Refer to [Noise and Vibration Analysis](#).

Repeat this procedure until you obtain the best possible balance.

6. Install the transmission converter cover bolts and the cover.

BUSHING AND MATING SHAFT INSPECTION

NOTE: Proper bushing and corresponding mating shaft inspection should be performed before replacing the bushing, shaft, and in some cases, the component which houses the bushing. Thoroughly clean and dry the bushing and shaft surfaces before inspecting for damage.

Any of the following bushing conditions require replacement of the bushing and/or housing:

- Discoloration due to heat distress
- Misalignment or displacement of bushing as a result of spinning in housing
- Medium to heavy scoring that can be easily detected with fingernail. Light scoring is a normal condition.
- Debris embedded into the bushing lining material
- Obvious damage, including excessive and uneven wear
- Excessive polishing. Minor polishing of the bushing is an indication of normal wear and does not require replacement.

Any of the following conditions require replacement of the bushing's mating shaft:

- Discoloration due to heat distress
- Rough surface finish that can be easily detected with finger
- Obvious shaft abnormalities, including warping or uneven surfaces
- Obvious damage or cracking

VIBRATION

Checks	Causes
Lug bolts for the Torque Converter (1)	Inspect for loose torque converter (1) lug bolts.
Input Sun Gear Thrust Washer (55)	Inspect for wear or damage.
Turbine Shaft Thrust Bearing Assembly (57)	Inspect for wear or damage.
2-6 and 3-5-R Clutch Hub Thrust Bearing Assembly (65)	Inspect the bearing for wear or damage.

Checks	Causes
Output Carrier Assembly (68)	- Inspect the carrier assembly for damaged pinion gears, thrust washers, pins, and rollers. - Inspect for a worn or damaged center support roller bearing assembly (485). - Inspect for damaged thrust bearings (486, 488). - Inspect the carrier assembly for damaged output carrier rear sun gear thrust bearing (captured).
Output Carrier Thrust Bearing Assembly (69)	Inspect the bearing for wear or damage.
Output Shaft Thrust Bearing Assembly (71)	Inspect the bearing for wear or damage.
1-2-3-4 Clutch Hub Thrust Bearing Assembly (63)	Inspect the bearing for wear or damage.
Turbine Shaft Thrust Bearing Assembly (57)	Inspect the bearing for wear or damage.
Clutch Select Solenoid Valve Spring (353)	Inspect for broken spring within the lower valve body in the torque converter clutch regulator apply valve line up (355).

NOISE AND VIBRATION ANALYSIS

A noise or vibration that is noticeable when the vehicle is in motion MAY NOT be the result of the transmission.

If noise or vibration is noticeable in PARK and NEUTRAL with the engine at idle, but is less noticeable as RPM increases, the cause may be from poor engine performance.

- Vibration may also be caused by a small amount of water inside the converter.
- Inspect the tires for the following conditions:
 - Uneven wear
 - Imbalance
 - Mixed sizes
 - Mixed radial and bias ply
- Inspect the suspension components for the following conditions:
 - Alignment wear or damage
 - Loose fasteners
 - Driveline damage or wear
- Inspect the engine and transmission mounts for damage and loose bolts.
- Inspect the transmission case mounting holes for the following conditions:
 - Missing bolts, nuts, and studs
 - Stripped threads
 - Cracks
- Inspect the flywheel for the following conditions:
 - Missing or loose bolts
 - Cracks
 - Imbalance

the torque converter for the following conditions:

Causes

- Missing or loose bolts or lugs
- Missing or loose balance weights
- Imbalance caused by heat distortion or fluid contamination

WHINE/GROWL NOISE THAT CHANGES WITH VEHICLE SPEED

Checks	Causes
2-6 and 3-5-R Clutch Hub Thrust Bearing Assembly (65)	Inspect the bearing for wear or damage.
Output Carrier Assembly (68)	• Inspect the carrier assembly for damaged pinion gears, thrust washers, pins, and rollers. • Inspect for a damaged center support roller bearing assembly (485). • Inspect for damaged thrust bearings (486, 488). • Inspect for damaged sun gears (487, 489). • Inspect the carrier assembly for damaged output carrier rear sun gear thrust bearing (captured). • Inspect for damaged or stripped splines on the output carrier assembly.
Output Carrier Thrust Bearing Assembly (69)	Inspect the bearing for wear or damage.
Output Shaft Assembly (70)	• Inspect for damaged internal gears (495, 497). • Inspect the output carrier bushing (498) for damage or wear.
Output Shaft Thrust Bearing Assembly (71)	Inspect the bearing for wear or damage.
Input Sun Gear Thrust Washer (55)	Inspect the washer for wear or damage.
Input Sun Gear Thrust Bearing (54)	Inspect the bearing for wear or damage.
Input Sun Gear (53)	Inspect for spline wear or damage.
Input Carrier Assembly (52)	Inspect the carrier assembly for damaged pinion gears, thrust washers, pins, and rollers.
1-2-3-4 Clutch Hub Thrust Bearing Assembly (63)	Inspect the bearing for wear or damage.
2-6 and 3-5-R Clutch (with Output Carrier Outer Sun Gear Shaft) Hub Assembly (64)	Inspect the output carrier inner sun gear shaft bushings (60 and 62) for damage or wear.
Turbine Shaft Thrust Bearing Assembly (57)	Inspect the bearing for wear or damage.
Fluid Filter Assembly (26)	• Inspect for damaged or restricted fluid filter assembly (26) • Inspect for damaged fluid filter seal assembly (25) or improper sealing interface (leaks, fluid aeration).
Automatic Transmission Fluid Pump Seal (5)	Inspect for worn or damaged seal.

Checks	Causes
Transmission Fluid Level	Inspect to ensure the transmission fluid is at the proper level. Transmission Fluid Level and Condition Check

WHINE/GROWL NOISE THAT CHANGES WITH ENGINE SPEED

Checks	Causes
Transmission Fluid Level	Inspect to ensure the transmission fluid is at the proper level. Transmission Fluid Level and Condition Check

NOISE IN FIRST OR REVERSE GEAR

Checks	Causes
Center Support with 2-6 Low and Reverse Clutch Assembly (67)	- Inspect for damaged or worn low and reverse clutch plates (463-465). - Inspect for damaged low and reverse clutch backing plate (462). Inspect for worn splines on backing plate. - Inspect for damaged low and reverse clutch backing plate retaining ring (461). - Inspect for damaged low and reverse clutch piston assembly (470), spring (469), spring retaining ring (466), and center support assembly (459). - Inspect for damaged low clutch sprag assembly (467). Holding the sprag assembly with the retaining ring facing up, and the inner race of the sprag assembly fixed, the outer race should freewheel counterclockwise. - Inspect for cut, worn, or damaged low clutch sprag seal (468).
Output Carrier Assembly (68)	Inspect for damaged or stripped splines on the output carrier assembly.

NOISE IN FIRST, SECOND, THIRD, FOURTH, FIFTH, OR REVERSE GEAR

Checks	Causes
Input Carrier Assembly (52)	Inspect thrust washers, pinion gears, and pins for wear or damage.
Input Sun Gear (53)	Inspect for damaged sun gear.
1-2-3-4 and 3-5-R Clutch Assembly (51)	Inspect for worn or damaged clutch bearing (428).

NOISE IN FIRST, SECOND, SIXTH, OR REVERSE GEAR

Checks	Causes
Center Support with 2-6 Low and Reverse Clutch Assembly (67)	Inspect for worn or damaged output carrier outer sun gear shaft front and rear bushings (458 and 460).
Output Carrier Assembly (68)	Inspect for a worn or damaged center support roller bearing assembly (485).

NOISE IN SECOND OR SIXTH GEAR

Checks	Causes

Checks	Causes
Center Support with 2-6 Low and Reverse Clutch Assembly (67)	- Inspect for damaged or worn output carrier outer sun gear shaft front bushing (458). - Inspect for damaged or worn output carrier outer sun gear shaft rear bushing (460). - Inspect for damaged 2-6 clutch backing plate (451). Inspect for worn splines on backing plate. - Inspect for damaged 2-6 clutch backing plate retaining ring (450). - Inspect for damaged 2-6 clutch piston assembly (457), spring (456), retaining ring (455), and center support assembly (459).

NOISE DURING 3-4 OR 4-3 SHIFTS

Checks	Causes
4-5-6 Clutch (with Output Carrier Shaft and Dampener) Hub Assembly (58)	- Inspect hub assembly (475), dampener (476), and apply plate (477) for wear or damage. - Inspect for damaged or worn 4-5-6 clutch backing plate (432).

NOISE IN FOURTH, FIFTH, OR SIXTH GEAR

Checks	Causes
Input Sun Gear Thrust Washer (55)	Inspect for wear or damage.
Turbine Shaft Thrust Bearing Assembly (57)	Inspect for wear or damage.
4-5-6 Clutch (with Output Carrier Shaft and Dampener) Hub Assembly (58)	- Inspect for damaged or worn 4-5-6 clutch backing plate (432). - Inspect for improper selective 4-5-6 clutch backing plate retaining ring (431).

CLUTCH PLATE DIAGNOSIS

Composition Plates

Dry the plates and inspect the plates for the following conditions:

- Pitting
- Flaking
- Delamination-splitting or separation of bonded clutch material
- Wear
- Glazing
- Cracking
- Charring
- Chips or metal particles embedded in the lining

position plate which shows any of these conditions.

Steel Plates

Wipe the plates dry and check the plates for heat discoloration. If the surfaces are smooth, even if color smear is indicated, you can reuse the plate. If the plate is discolored with heat spots or if the surface is scuffed, replace the plate.

Causes of Burned Clutch Plates

The following conditions can result in a burned clutch plate:

- Incorrect usage of clutch or apply plates
- Engine coolant or water in the transmission fluid
- A cracked clutch piston
- Damaged or missing seals
- Low line pressure
- Valve body conditions
 - The valve body face is not flat.
 - Porosity is between channels.
 - The valve bushing clips are improperly installed.
 - The checkballs are misplaced.
- The Teflon® seal rings are worn or damaged.

ENGINE COOLANT/WATER IN TRANSMISSION

CAUTION: The antifreeze or water will deteriorate the seals, gaskets and the glue that bonds the clutch material to the pressure plate. Both conditions may cause permanent damage to the transmission.

If antifreeze or water has entered the transmission, perform the following:

1. Disassemble the transmission.
2. Replace all of the rubber type seals. The coolant will attack the seal material which will cause leakage.
3. Replace the composition-faced clutch plate assemblies. The facing material may separate from the steel center portion.
4. Replace all of the nylon parts - washers.
5. Replace the torque converter.
6. Thoroughly clean and rebuild the transmission, using new gaskets and oil filter.
7. Flush the cooler lines after the transmission cooler has been properly repaired or replaced.

FLUID LEAK DIAGNOSIS

General Method

1. Verify that the leak is transmission fluid.

CAUTION: Do not clean using brake cleaner or other reactive solvents as these solvents can damage rubber gaskets, seals and bushings.

2. Thoroughly clean the suspected leak area using a rag.

Do not idle vehicle, this will not actuate transmission systems, and do not drive the vehicle on the freeway as this will splatter oil inhibiting leak diagnosis.

3. Operate the vehicle for 15-20 minutes under city driving conditions until normal operating temperatures are reached.
4. Park the vehicle over clean paper or cardboard.
5. Shut OFF the engine.
6. Look for fluid spots on the paper.
7. Make the necessary repairs.

Powder Method

CAUTION: Do not clean using brake cleaner or other reactive solvents as these solvents can damage rubber gaskets, seals and bushings.

1. Thoroughly clean the suspected leak area using a rag.
2. Apply an aerosol type powder, such as foot powder, to the suspected leak area.

NOTE: Do not idle vehicle, this will not actuate transmission systems, and do not drive the vehicle on the freeway as this will splatter oil inhibiting leak diagnosis.

3. Operate the vehicle for 15-20 minutes under city driving conditions until normal operating temperatures are reached.
4. Shut OFF the engine.
5. Inspect the suspected leak area.
6. Trace the leak path through the powder in order to find the source of the leak.
7. Make the necessary repairs.

Dye and Black Light Method

A fluid dye and black light kit is available from various tool manufacturers.

1. Follow the manufacturer's instructions in order to determine the amount of dye to use.
2. Detect the leak with the black light.
3. Make the necessary repairs.

Find the Cause of the Leak

Pinpoint the leak and trace the leak back to the source. You must determine the cause of the leak in order to repair the leak properly. For example, if you replace a gasket, but the sealing flange is bent, the new gasket will not repair the leak. You must also repair the bent flange. Before you attempt to repair a leak, check for the following conditions, and make repairs as necessary:

Gaskets

- Fluid level/pressure is too high
- Plugged vent or drain-back holes
- Improperly tightened fasteners
- Dirty or damaged threads

flanges or sealing surface

- Scratches, burrs, or other damage to the sealing surface
- Damaged or worn gasket
- Cracking or porosity of the component
- Improper sealant used, where applicable
- Incorrect gasket

Seals

- Fluid level/pressure is too high
- Plugged vent or drain-back holes
- Damaged seal bore
- Damaged or worn seal
- Improper installation
- Cracks in component
- Manual or output shaft surface is scratched, nicked, or damaged
- Loose or worn bearing causing excess seal wear

Possible Points of Fluid Leaks

Transmission Oil Pan

- Incorrectly tightened oil pan bolts
- Improperly installed or damaged oil pan gasket
- Damaged oil pan or mounting face
- Incorrect oil pan gasket

Case Leak

- Damaged vehicle speed sensor seal
- Damaged manual shaft seal
- Loose or damaged oil cooler connector fittings
- Worn or damaged propeller shaft oil seal
- Loose line pressure pipe plug
- Porous casting warped torque converter housing

Leak at the Torque Converter End

- Converter leak in the weld area
- Converter seal lip cut. Check the converter hub for damage
- Converter seal bushing moved forward and damaged
- Converter seal garter spring missing from the seal
- Porous casting of the transmission case or the oil pump

Leak at the Vent Pipe

- Overfilled system
- Water or coolant in the fluid; The fluid will appear milky

- Incorrect fluid level indicator
- Plugged vent
- Drain-back holes plugged
- Mispositioned oil pump to case gasket, if equipped

Leak at Cooler Lines/Coolers

- Leak in the front radiator transmission oil cooler
- External coolers
- Rear differential coolers - external and internal to differential, if equipped

Leak Inspection Points

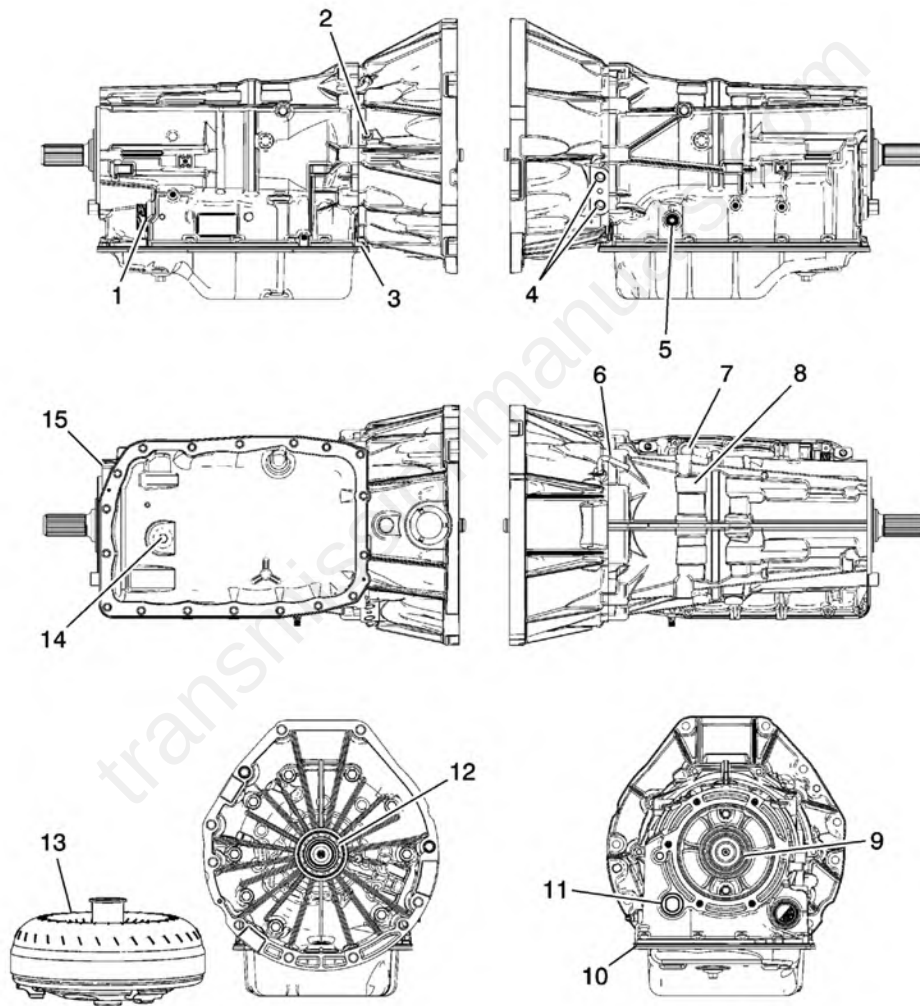


Fig. 16: Identifying Leak Inspection Points

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Automatic Transmission Electrical Connector Passage Sleeve
2	Line Pressure Test Hole Plug
3	Converter Housing to Case Joint
4	Trans Fluid Cooler Pipe Fitting Seals

Check	Manual Shift Shaft Seal	Component	Causes
6		Automatic Transmission Vent Pipe	
7		Fluid Fill Tube Plug Assembly	
8		Transmission Case Assembly	
9		Output Shaft Seal Assembly	
10		A/Trans Fluid Pan Gasket	
11		Actuator Guide - Park Pawl	
12		Torque Converter Fluid Seal Assembly	
13		Torque Converter Assembly	
14		Trans Oil Level Check Plug	
15		Case Extension to Case Joint	

CASE POROSITY REPAIR

Some external leaks are caused by case porosity in non-pressurized areas. You can usually repair these leaks with the transmission in the vehicle.

1. Thoroughly clean the area to be repaired with a cleaning solvent. Air dry the area.

WARNING: Epoxy adhesive may cause skin irritations and eye damage. Read and follow all information on the container label as provided by the manufacturer.

2. Using instructions from the manufacturer, mix a sufficient amount of an epoxy to make the repair.
3. While the transmission case is still hot, apply the epoxy. You can use a clean, dry soldering acid brush to clean the area and also to apply the epoxy cement. Make certain that the area to be repaired is fully covered.
4. Allow the epoxy cement to cure for three hours before starting the engine.
5. Repeat the fluid leak diagnosis procedures.

AUTOMATIC TRANSMISSION FLUID LEAKS

Checks	Causes
Torque Converter (1)	Inspect for damage, cracks at the lug, hub and seal welds.
Torque Converter Housing (203)	• Verify leak is ATF and not oil from rear of engine. • Inspect for housing porosity or damage. • Inspect for worn or damaged torque converter seal (201). • Inspect for loose line pressure plug. • Inspect cooler line attachment for loose bolt, worn or damaged seal, or leak at line to boss joint. • Inspect vent pipe attachment to housing and hose. • Verify torque of housing to case bolts.
Automatic Transmission Fluid Pump Seal (5)	Inspect for cut, wear, or damage.

Checks	Causes
Case Assembly	- Inspect for porosity or damage. - Inspect manual shaft seal. - Inspect control wiring input sleeve seals. - Inspect rear case plugs (12) (4WD/AWD only, 4WD may also be cast over).
Extension Assembly	- Verify oil is from transmission and not transfer case assembly (4WD/AWD). - Inspect extension seal assembly (inner seal behind boot - 2WD only). - Inspect extension to case seal (2WD only).
Pan Assembly	- Inspect the pan assembly for damage. - Inspect gasket for damage or wear. - Inspect case and pan for damage and flatness at gasket interface area.
Cooler Lines/Coolers	- Inspect and follow cooler lines to front radiator and external coolers. - Some vehicles may have rear differential external and internal coolers.

SHIFT INDICATOR INDICATES WRONG GEAR SELECTION

Checks	Causes
Shift Cable	- Inspect for damage. - Verify proper attachment to shifter. - Verify cable is locked into shifter bracket. - Verify cable is properly attached to the transmission. - Verify that the cable is locked into the transmission bracket. - Verify proper shift cable adjustment.
Manual Shaft	- Verify shift lever is properly attached to the manual shaft. - Verify manual shaft is not twisted or damaged.
Manual Shift Detent Lever with Shaft Position Switch Assembly, IMS	Verify proper operation. Refer to Transmission Internal Mode Switch Logic .

NO PARK OR DRIVE

Checks	Causes

Checks	Causes
Output Shaft Assembly (70)	Inspect for a broken or damaged output shaft. Inspect for worn splines.
Case Assembly	• Inspect for broken or damaged case. • Inspect for broken or bent park pawl actuator. • Inspect for broken or missing park pawl actuator guide pin or manual shaft pin. • Inspect for broken, loose or misaligned park pawl guide. • Inspect for binding or broken park pawl or actuator assembly.
Manual Shift Detent Lever Assembly (511)	Inspect for broken or disengaged manual valve detent.

HARSH GARAGE SHIFT

Checks	Causes
NOTE: On cold days, approximately 32Â°F (0Â°C) or colder, the transmission is designed to shift differently. The transmission uses a warm-up mode shift schedule until the engine reaches normal operating temperature. While the transmission is in warm-up mode, it is normal for transmission upshifts to be delayed or held longer. This feature improves heater performance by giving quicker vehicle warm-ups.	
Engine	Elevated engine RPM - Verify correct engine operating rpm per application.
A/Trans Fluid Pump Cover Assembly (219)	• Inspect for damaged, stuck, sticky pressure regulator valve (233) and springs (234 and 235). • Inspect for damaged, stuck, sticky isolator valve (236) and sleeve (237).
Control Solenoid (w/Body and TCM) Valve Assembly (314)	• Incorrect or inadequate adapt activity - Perform Reset Transmission Adapts procedure. • Incorrect TCM temperature reporting - Monitor TCM temperature using Tech 2. • Line pressure control solenoid incorrect pressure.

Checks	Causes
1-2-3-4 and 3-5-R Clutch Assembly (51)	- Inspect for damaged 1-2-3-4 clutch piston (414), piston housing (417), spring (413), and dam assembly (412). - Inspect for cut, worn, or damaged 1-2-3-4 clutch piston seal (416), inner seal (423), and housing seals (424 and 425). - Inspect for improper selective 1-2-3-4 clutch backing plate retaining ring (429). - Inspect for damaged 3-5-R clutch piston (421), apply ring (405), and spring (420). - Inspect for cut, worn, or damaged 3-5-R clutch piston dam O-ring seal (418), inner seal (419), and outer seal (422). - Inspect for improper selective 3-5-R clutch backing plate retaining ring (400).

NO DRIVE IN ALL RANGES

Checks	Causes
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Torque Converter (with Fluid Pump) Housing Assembly (2)	Inspect for damaged or scored pump housing (203), cover (219), rotor (217), slide (212), and vanes (216).
Fluid Filter Assembly (26)	- Inspect for damaged or restricted fluid filter assembly (26). - Inspect for damaged fluid filter seal assembly (25) or improper sealing interface, leaks, and fluid aeration.
Automatic Transmission Fluid Pump Seal (5)	Inspect for worn or damaged seal.
A/Trans Cooling/Lubrication System	Inspect transmission oil cooler (radiator) and cooler line seals for restrictions, damage, kinks, or leaks.
Torque Converter Assembly (1)	Inspect for overheating (blued), ballooning, leaks, or other damage.
1-2-3-4 and 3-5-R Clutch Assembly (51)	- Inspect clutch pack retaining rings (400 and 429) for proper installation. - Inspect housing and clutch pistons and seals for damage or leaks.
Control Valve Lower Body Assembly (351)	- Inspect for stuck, sticky or damaged clutch select valve (352). - Inspect for stuck checkballs.
Manual Valve (354)	Inspect the manual valve detent lever assembly (505) and connection to the manual valve (354).
A/Trans Manual Shift Shaft Position Switch Assembly (308)	Inspect the switch assembly (308) and connection to the manual valve (354).
A/Trans Manual Shift Shaft Position Switch Assembly (308)	Inspect PRNDL commands to and from vehicle using GDS 2.

Checks	Causes
Control Solenoid (w/Body and TCM) Valve Assembly (314)	Inspect PRNDL commands to and from vehicle using GDS 2.
A/Trans Fluid Pump (Transfer) Seal Assembly (19)	Inspect for damage or leaks.
Output Shaft Assembly (499)	Inspect for spline wear or damage.
Output Carrier Assembly (490)	- Inspect the carrier assembly for damaged pinion gears, thrust washers, pins, and rollers. - Inspect for damaged thrust bearings (486 and 488). - Inspect for damaged sun gears (487 and 489). - Inspect the carrier assembly for damaged output carrier rear sun gear thrust bearing (captured).
Low Clutch Sprag Assembly (467)	Inspect for excessive wear or damage.
Input Carrier Assembly (52)	Inspect carrier assembly for damaged pinion gears, thrust washers, pins, and rollers.
Input Sun Gear (53)	Inspect for spline wear or damage.
Control Valve Upper Body Assembly (304)	Inspect for sticking, damaged, or worn 1-2-3-4 clutch regulator valve (337).

NO FIRST GEAR

Checks	Causes
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Center (with 2-6 Low and Reverse Clutch) Support Assembly (67)	- Inspect for damaged low clutch sprag assembly (467). Holding the sprag assembly with the retaining ring facing up, and the inner race of the sprag assembly fixed, the outer race should freewheel counterclockwise. - Inspect for damaged low and reverse clutch piston assembly (470), spring (469), spring retaining ring (466), and center support assembly (459). - Inspect for damaged or worn low and reverse clutch plates (463-465). - Inspect for damaged low and reverse clutch backing plate retaining ring (461). - Inspect for cut, worn, or damaged low clutch sprag seal (468).
Control Valve Upper Body Assembly (304)	- Inspect for sticking, damaged, or worn 1st/Rev and 4-5-6 clutch regulator valve (327) and spring (326). - Inspect for sticking, damaged, or worn #2 ball check valve. - Inspect for sticking, damaged, or worn #3 ball check valve. - Inspect for sticking, damaged, or worn 1-2-3-4 clutch regulator valve (337).

Checks	Causes
Control Valve Lower Body Assembly (307)	- Inspect for sticking, damaged, or worn clutch select valve 2 (352) and spring (353). - Inspect for sticking, damaged, or worn clutch select valve 3 (352) and spring (353).
Center Support Fluid Passage Seal Assembly (20)	- Inspect for worn, cut, or damaged seals. - Inspect for proper seal (20) size (6L45/50E MYA/MYB) vs (6L80/90E MYC/MYD).

NO FIRST AND REVERSE GEARS

Checks	Causes
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	Inspect for sticking, damaged, or worn 1st/rev and 4-5-6 clutch regulator valve (327) and spring (326).
Control Valve Lower Body Assembly (307)	Inspect for sticking, damaged, or worn clutch select valve 3 (352) and spring (353).
Control Valve Lower Body Assembly (307)	Inspect for sticking, damaged, or worn clutch select valve 2 (352) and spring (353).
Control Valve Upper Body Assembly (304)	Inspect for sticking, damaged, or worn #2 ball check valve
Center (with 2-6 Low and Reverse Clutch) Support Assembly (67)	- Inspect for damaged low and reverse clutch piston assembly (470), spring (469), spring retaining ring (466), and center support assembly (459). - Inspect for damaged or worn low and reverse clutch plates (463-465). - Inspect for damage low and reverse clutch backing plate retaining ring (461). - Inspect for damaged low clutch sprag assembly (467). Holding the sprag assembly with the retaining ring facing up, and the inner race of the sprag assembly fixed, the outer race should freewheel counterclockwise. - Inspect for cut, worn, or damaged low clutch sprag seal (468).
Center Support Fluid Passage Seal Assembly (20)	- Inspect for worn, cut, or damaged seals. - Inspect for proper seal (20) size (6L45/50E MYA/MYB) vs (6L80/90E MYC/MYD).
Pump Cover (219)	Inspect for sticking or damaged TCC control valve (227).

HARSH, SOFT, DELAYED OR SLIPPING FIRST OR REVERSE GEAR

Checks	Causes

Checks	Causes
NOTE: On cold days, approximately 32Â°F (0Â°C) or colder, the transmission is designed to shift differently. The transmission uses a warm-up mode shift schedule until the engine reaches normal operating temperature. While the transmission is in warm-up mode, it is normal for transmission upshifts to be delayed or held longer. This feature improves heater performance by giving quicker vehicle warm-ups.	
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	- Inspect for sticking, damaged, or worn 1-R/4-5-6 clutch regulator valve (327) and spring (326). - Inspect for damaged or sticking #2 ball check valve.
Control Valve Lower Body Assembly (307)	Inspect for sticking, damaged, or worn clutch select valve 3 (352) and spring (353).
Control Valve Lower Body Assembly (307)	Inspect for sticking, damaged, or worn clutch select valve 2 (352) and spring (353).
Center (with 2-6 Low and Reverse Clutch) Support Assembly (67)	- Inspect for damaged low and reverse clutch piston assembly (470), spring (469), spring retaining ring (466), and center support assembly (459). - Inspect for damaged or worn low and reverse clutch plates (463 and 465). - Inspect for damaged low and reverse clutch backing plate retaining ring (461). - Inspect for damaged low clutch sprag assembly (467). Holding the sprag assembly with the retaining ring facing up, and the inner race of the sprag assembly fixed, the outer race should freewheel counterclockwise. - Inspect for cut, worn, or damaged low clutch sprag seal (468).
Control Solenoid (w/Body and TCM) Valve Assembly (314)	- Perform solenoid valve assembly function test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test. - Incorrect or inadequate adapt activity - Perform Reset Transmission Adapts procedure.
A/Trans Fluid Pump Cover Assembly (219)	- Inspect for damaged, stuck, sticky pressure regulator valve (233) and spring (234 and 235). - Inspect for damaged, stuck, sticky isolator valve (236) and sleeve (237).
Center Support Fluid Passage Seal Assembly (20).	- Inspect for worn, cut, or damaged seals. - Inspect for proper seal (20) size (6L45/50E MYA/MYB) vs (6L80.90E MYC/MYD).

SECOND, THIRD, AND FOURTH GEAR

Checks	Causes
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	Inspect for sticking, damaged, or worn 1-2-3-4 clutch regulator valve (337) and spring (326).
Control Solenoid (w/Body and TCM) Valve Assembly (314)	- Inspect for contamination or debris. - Pressure control solenoid 5 commanded/failed LOW (off) or leaking - Perform solenoid valve assembly function test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test.
1-2-3-4 and 3-5-R Clutch Assembly (51)	- Inspect clutch pack retaining ring (429) for proper installation. If the retaining ring is out of the groove the following parts must be replaced: 1-2-3-4 and 3-5-R clutch housing (427), 1-2-3-4 and 3-5-R clutch bearing assembly (428) and the 1-2-3-4 clutch backing plate retaining ring. - Inspect for a cracked or damaged 1-2-3-4 clutch piston (414), piston housing (417), spring (413), and dam assembly (412). - Inspect for cut, worn, or damaged 1-2-3-4 clutch piston seal (416), inner seal (423), and housing seals (424 and 425). - Inspect for improper selective 1-2-3-4 clutch backing plate retaining ring (429).
Fluid Filter Assembly (26)	- Inspect for damaged or restricted fluid filter assembly (26). - Inspect for damaged fluid filter seal assembly (25) or improper sealing interface, leaks, and fluid aeration.
Torque Converter (with Fluid Pump) Housing Assembly (2)	Inspect for damaged or scored pump housing (203), cover (219), rotor (217), slide (212) and vanes (216).
Torque Converter (with Fluid Pump) Housing Assembly (2)	Inspect for damaged or leaking 1-2-3-4 and 3-5-R clutch fluid seal rings (230).
Center (w/2-6 Low and Reverse Clutch) Support Assembly (67)	Inspect for worn or damaged low clutch sprag assembly (467).
A/Trans Fluid Pump (Transfer) Seal Assembly (19)	Inspect for damage or leaks.
1-2-3-4 Clutch (with Output Carrier Inner Sun Gear Shaft) Hub Assembly (61)	Inspect for damaged splines on the hub assembly.

HARSH, SOFT, DELAYED OR SLIPPING 1-2-3-4 SHIFT

Checks	Causes

Checks	Causes
NOTE: On cold days, approximately 32Â°F (0Â°C) or colder, the transmission is designed to shift differently. The transmission uses a warm-up mode shift schedule until the engine reaches normal operating temperature. While the transmission is in warm-up mode, it is normal for transmission upshifts to be delayed or held longer. This feature improves heater performance by giving quicker vehicle warm-ups.	
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	- Inspect for sticking, damaged, or worn 1-2-3-4 clutch regulator valve (337) and spring (326). - Inspect for damaged or stuck #1 ball check valve.
Control Solenoid (w/Body and TCM) Valve Assembly (314)	- Inspect for contamination or debris. - Pressure control solenoid 5 commanded/failed LOW (off) or leaking - Perform solenoid valve assembly function test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test. - Incorrect or inadequate adapt activity - Perform Reset Transmission Adapts procedure. - Line pressure control solenoid incorrect pressure.
1-2-3-4 and 3-5-R Clutch Assembly (51)	- Inspect for damaged 1-2-3-4 clutch piston (414), piston housing (417), spring (413), and dam assembly (412). - Inspect for cut, worn, or damaged 1-2-3-4 clutch piston seal (416), inner seal (423), and housing seals (424 and 425). - Inspect 3-5 reverse clutch housing for cracked weld. - Inspect for improper selective 1-2-3-4 clutch backing plate retaining ring (429). - Inspect for damaged 3-5-R clutch piston (421), apply ring (405), and spring (420). - Inspect for cut, worn, or damaged 3-5-R clutch piston dam O-ring seal (418), inner seal (419), and outer seal (422). - Inspect for improper selective 3-5-R clutch backing plate retaining ring (400).
Torque Converter (with Fluid Pump) Housing Assembly (2)	Inspect for damaged or leaking 1-2-3-4 and 3-5-R clutch fluid seal rings (230).
A/Trans Fluid Pump Cover Assembly (219)	- Inspect for damaged, stuck, sticky pressure regulator valve (233) and springs (234 and 235). - Inspect for damaged, stuck, sticky isolator valve (236) and sleeve (237).
Torque Converter (with Fluid Pump) Housing Assembly (2)	Inspect for damaged or scored pump housing (203), cover (219), rotor (217), slide (212) and vanes (216).

Checks	Causes
Fluid Filter Assembly (26)	- Inspect for damaged or restricted fluid filter assembly (26). - Inspect for damaged fluid filter seal assembly (25) or improper sealing interface, leaks, and fluid aeration.
A/Trans Fluid Pump (Transfer) Seal Assembly (19)	Inspect for damage or leaks.

NO SECOND AND SIXTH GEAR

Checks	Causes
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	Inspect for sticking, damaged, or worn 2-6 clutch regulator valve (334) and spring (326).
Control Solenoid (w/Body and TCM) Valve Assembly (314)	Pressure control solenoid 4 commanded/failed LOW (off) or leaking - Perform solenoid valve assembly function test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test .
Center (with 2-6 Low and Reverse Clutch) Support Assembly (67)	- Inspect for proper installation of the 2-6 clutch return spring retaining ring (455). - Inspect for damaged 2-6 clutch piston assembly (457), spring (456), retaining ring (455), and center support housing (459). - Inspect for worn or damaged 2-6 clutch plates (451-453).
Center Support Fluid Passage Seal Assembly (20)	- Inspect for worn, cut, or damaged seals. - Inspect for proper seal (20) size (6L45/50E MYA/MYB) vs (6L80/90E MYC/MYD).

HARSH, SOFT, DELAYED OR SLIPPING SECOND OR SIXTH GEAR

Checks	Causes
NOTE: On cold days, approximately 32Â°F (0Â°C) or colder, the transmission is designed to shift differently. The transmission uses a warm-up mode shift schedule until the engine reaches normal operating temperature. While the transmission is in warm-up mode, it is normal for transmission upshifts to be delayed or held longer. This feature improves heater performance by giving quicker vehicle warm-ups.	
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	- Inspect for sticking, damaged or worn 2-6 clutch regulator valve (334) and spring (326). - Inspect for damaged or sticking #6 ball check valve.

Checks	Causes
Control Solenoid (w/Body and TCM) Valve Assembly (314)	- Pressure Control Solenoid 4 commanded/failed LOW (off) or leaking - Perform solenoid valve assembly function test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test. - Incorrect or inadequate adapt activity - Perform Reset Transmission Adapts procedure.
Center (with 2-6 Low and Reverse Clutch) Support Assembly (67)	- Inspect for proper installation of the 2-6 clutch return spring retaining ring (455). - Inspect for damaged 2-6 clutch piston assembly (457), spring (456), retaining ring (455), and center support assembly (459). - Inspect for worn or damaged 2-6 clutch plates (451-453).
A/Trans Fluid Pump Cover Assembly (219)	- Inspect for damaged, stuck, sticky pressure regulator valve (233) and springs (234 and 235). - Inspect for damaged, stuck, sticky isolator valve (236) and sleeve (237).
Center Support Fluid Passage Seal Assembly (20)	- Inspect for worn, cut, or damaged seals. - Inspect for proper seal (20) size (6L45/50E MYA/MYB) vs (6L80/90E MYC/MYD).

NO THIRD, FIFTH, AND REVERSE GEAR

Checks	Causes
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	- Inspect for sticking, damaged, or worn 3-5-R regulator valve (336) and valve spring (326). - Inspect for damaged or stuck #7 ball check valve.
Control Valve Lower Body Assembly (307)	Inspect for worn, damaged, or sticking clutch select solenoid valve 3 (352) and valve spring (353).

Checks	Causes
1-2-3-4 and 3-5-R Clutch Assembly (51)	- Inspect for proper installation of 3-5-R clutch backing plate retaining ring (400). - Inspect for worn, damaged, or leaking clutch bearing seal assembly (428). - Inspect for damaged or worn 3-5-R clutch plates (401-404). - Inspect for damaged 3-5-R clutch piston (421), apply ring (405), and spring (420). - Inspect for cut, worn, or damaged 3-5-R clutch piston dam O-ring seal (418), inner seal (419), and outer seal (422). - Inspect for improper selective 3-5-R clutch backing plate retaining ring (400).
Control Solenoid (w/Body and TCM) Valve Assembly (314)	Pressure control solenoid 2 commanded/failed HIGH (off) or leaking - Perform solenoid valve assembly function test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test .
A/Trans Fluid Pump (Transfer) Seal Assembly (19)	Inspect for damage or leaks.

HARSH, SOFT, DELAYED OR SLIPPING THIRD, FIFTH, OR REVERSE GEAR

Checks	Causes
NOTE: On cold days, approximately 32°F (0°C) or colder, the transmission is designed to shift differently. The transmission uses a warm-up mode shift schedule until the engine reaches normal operating temperature. While the transmission is in warm-up mode, it is normal for transmission upshifts to be delayed or held longer. This feature improves heater performance by giving quicker vehicle warm-ups.	
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	- Inspect for sticking, damaged, or worn 3-5-R regulator valve (336) and valve spring (326). - Inspect for damaged or stuck #7 ball check valve.
Control Valve Lower Body Assembly (307)	Inspect for worn, damaged, or sticking clutch select solenoid valve 3 (352) and valve spring (353).
Control Solenoid (w/Body and TCM) Valve Assembly (314)	- Pressure control solenoid 2 commanded/failed HIGH (off) or leaking - Perform solenoid valve assembly function test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test. - Incorrect or inadequate adapt activity - Perform Reset Transmission Adapts procedure.

Checks	Causes
1-2-3-4 and 3-5-R Clutch Assembly (51)	- Inspect for proper installation of 3-5-R clutch backing plate retaining ring (400). - Inspect for worn, damaged, or leaking clutch bearing seal assembly (428). - Inspect for damaged or worn 3-5-R clutch plates (401-404). - Inspect for damaged 3-5-R clutch piston (421), apply ring (405), and spring (420). - Inspect 3-5 reverse clutch housing for cracked weld. - Inspect for cut, worn, or damaged 3-5-R clutch piston dam O-ring seal (418), inner seal (419), and outer seal (422). - Inspect for improper selective 3-5-R clutch backing plate retaining ring (400).
A/Trans Fluid Pump Cover Assembly (219)	- Inspect for damaged, stuck, sticky pressure regulator valve (233) and springs (234 and 235). - Inspect for damaged, stuck, sticky isolator valve (236) and sleeve (237).
A/Trans Fluid Pump (Transfer) Seal Assembly (19)	Inspect for damage or leaks.

NO FOURTH, FIFTH, AND SIXTH GEAR

Checks	Causes
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	Inspect for sticking, damaged, or worn R-1/4-5-6 clutch regulator valve (327) and spring (326).
4-5-6 (with Turbine Shaft) Clutch Assembly (56)	- Inspect for cut, worn, or damaged turbine shaft fluid seal rings (442). - Inspect for damaged piston (439), piston dam (437), dam retaining ring (436), and clutch spring (438). - Inspect for worn or damaged 4-5-6 clutch plates (432-435). - Inspect for damaged or leaking clutch housing (441). - Inspect for improper selective 4-5-6 clutch backing plate retaining ring (431). - Inspect for damaged or distorted turbine shaft.
A/Trans Fluid Pump Seal Assembly (18)	Inspect for cut, leaking, or damaged seal.
4-5-6 Clutch (with Output Carrier Shaft and Dampener) Hub Assembly (58)	- Inspect the shaft for damage or wear. - Inspect the hub assembly (475), dampener (476), and apply plate (477) for wear or damage.

Checks	Causes
A/Trans Cooling/Lubrication System	Inspect transmission oil cooler (radiator) and cooler lines/seals for restrictions, damage, kinks or leaks.
Control Solenoid (w/Body and TCM) Valve Assembly (314)	Pressure control solenoid 3 commanded/failed HIGH (off) or leaking - Perform solenoid valve assembly function test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test .
Torque Converter (with Fluid Pump) Housing Assembly (2)	- Inspect for damaged or scored pump housing (203), cover (219), rotor (217), slide (212), and vanes (216). - Inspect for damaged or porous pump cover assembly (219). Inspect pump surfaces for flatness. - Inspect for excessive fluid pump rotor (217) clearance or damage. Ensure proper selective rotor is being utilized.
Output Shaft Assembly (70)	Inspect for damaged or stripped splines on the output shaft.

HARSH, SOFT, DELAYED OR SLIPPING 4-5-6 SHIFT

Checks	Causes
NOTE: On cold days, approximately 32°F (0°C) or colder, the transmission is designed to shift differently. The transmission uses a warm-up mode shift schedule until the engine reaches normal operating temperature. While the transmission is in warm-up mode, it is normal for transmission upshifts to be delayed or held longer. This feature improves heater performance by giving quicker vehicle warm-ups.	
A/Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	- Inspect for sticking, damaged, or worn 1-R/4-5-6 clutch regulator valve (327) and spring (326). - Inspect for damaged or sticking #3 and #4 ball check valves.
Control Valve Lower Body Assembly (307)	Inspect for worn, damaged, or sticking clutch select solenoid valve 2 (352) and valve spring (353).
Control Solenoid (w/Body and TCM) Valve Assembly (314)	- Pressure Control Solenoid 3 commanded/failed HIGH (off) or leaking - Perform solenoid valve assembly function test. Refer to Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test. - Incorrect or inadequate adapt activity - Perform Reset Transmission Adapts procedure.

Checks	Causes
4-5-6 (with Turbine Shaft) Clutch Assembly (56)	- Inspect for cut, worn, or damaged turbine shaft fluid seal rings (442). - Inspect for damaged piston (439), piston dam (437), dam retaining ring (436), and clutch spring (438). - Inspect for damaged or worn 4-5-6 clutch plates (432-435). - Inspect for damage or leaking clutch housing (441). - Inspect for improper selective 4-5-6 clutch backing plate retaining ring (431). - Inspect for damaged or distorted turbine shaft.
A/Trans Fluid Pump Seal Assembly (18)	Inspect for cut, leaking, or damaged seal.
4-5-6 Clutch (with Output Carrier Shaft and Dampener) Hub Assembly (58)	- Inspect shaft for damage or wear. - Inspect hub assembly (475), dampener (476), and apply plate (477) for wear or damage.
A/Trans Fluid Pump Cover Assembly (219)	- Inspect for damaged, stuck, sticky pressure regulator valve (233) and springs (234 and 235). - Inspect for damaged, stuck, sticky isolator valve (236) and sleeve (237).

NO TORQUE CONVERTER CLUTCH APPLY

Checks	Causes
Torque Converter Assembly (1)	Diagnose torque converter for possible internal damage. Refer to Torque Converter Diagnosis .
Fluid Pump Cover Assembly (219)	- Inspect for worn, damaged, or sticking converter feed limit valve (220) and spring (221). - Inspect for worn, damaged, or sticking TCC control valve (227) and spring (226). - Inspect for damaged stator shaft.
Control Valve Lower Body Assembly (307)	Inspect for worn, damaged, or sticking torque converter clutch (TCC) regulator apply valve (355). Refer to Control Solenoid Valve and Transmission Control Module Assembly Inspection .
4-5-6 (with Turbine Shaft) Clutch Assembly (56)	- Inspect for damaged turbine shaft. - Inspect for damaged turbine shaft O-ring seal.
Torque Converter (with Fluid Pump) Housing Assembly (2)	Inspect for leaking or damaged torque converter fluid seal assembly (201), torque converter bushing (206), turbine shaft o-ring seal (443) and torque converter (with fluid pump) housing assembly (2).

NO TORQUE CONVERTER CLUTCH RELEASE

Checks	Causes
Torque Converter Assembly (1)	Diagnose torque converter for possible internal damage. Refer to Torque Converter Diagnosis .
Fluid Pump Cover Assembly (219)	- Inspect for worn, damaged, or sticking converter feed limit valve (220) and spring (221). - Inspect for worn, damaged, or sticking torque converter clutch (TCC) control valve (227) and spring (226).
Control Valve Lower Body Assembly (307)	Inspect for worn, damaged, or sticking TCC regulator apply valve (355).

HARSH TORQUE CONVERTER CLUTCH APPLY, OR INOPERATIVE OR NO ELECTRONICALLY CONTROLLED CAPACITY CLUTCH CONTROL

Checks	Causes
NOTE: On cold days, approximately 32Â°F (0Â°C) or colder, the transmission is designed to shift differently. The transmission uses a warm-up mode shift schedule until the engine reaches normal operating temperature. While the transmission is in warm-up mode, it is normal for transmission upshifts to be delayed or held longer. This feature improves heater performance by giving quicker vehicle warm-ups.	
Torque Converter Assembly (1)	- Inspect for leaking or damaged torque converter clutch hub seal. - Diagnose torque converter assembly for possible internal damage. Refer to Torque Converter Diagnosis.
Clutch Select Solenoid Valve Spring (353)	Inspect for broken spring within the lower valve body in the torque converter clutch regulator apply valve line up (355).

NO REVERSE GEAR

Checks	Causes
A//Trans Fluid Pan Assembly (29)	Verify proper fluid level and condition, inspect transmission assembly for leaks.
Control Valve Upper Body Assembly (304)	- Inspect for sticking, damaged, or worn 3-5-R regulator valve (336) and valve spring (326). - Inspect for damaged or missing #5 ball check valve.
Control Valve Lower Body Assembly (307)	Inspect for worn, damaged, or sticking clutch select solenoid valve 3 (352) and valve spring (353).

Checks	Causes
1-2-3-4 and 3-5-R Clutch Assembly (51)	- Inspect for proper installation of 3-5-R clutch backing plate retaining ring (400). - Inspect for worn, damaged, or leaking clutch bearing seal assembly (428). - Inspect for damaged or worn 3-5-R clutch plates (401-404). - Inspect for damaged 3-5-R clutch piston (421), apply ring (405), and spring (420). - Inspect for cut, worn, or damaged 3-5-R clutch piston dam O-ring seal (418), inner seal (419), and outer seal (422). - Inspect for improper selective 3-5-R clutch backing plate retaining ring (400).
Torque Converter (with Fluid Pump) Housing Assembly (2)	- Inspect for worn or damaged 1-2-3-4 and 3-5-R clutch fluid seal rings (230). - Inspect for damaged or scored pump housing (203), cover (219), rotor (217), slide (212), and vanes (216). - Inspect for damaged or porous pump cover assembly (219). Inspect pump surfaces for flatness. - Inspect for excessive fluid pump rotor (217) clearance or damage. Ensure proper selective rotor is being utilized.
Center Support Fluid Passage Seal Assembly (20), A/Trans Fluid Pump Seal Assemblies (18 and 19)	- Inspect for worn, cut, or damaged seals. - Inspect for proper seal (20) size (6L45/50E MYA/MYB) vs (6L80/90E MYC/MYD).
Center (w/2-6 Low and Reverse Clutch) Support Assembly (67)	- Inspect for damaged or leaking low and reverse clutch piston assembly (470). - Inspect for damaged or worn low and reverse clutch plates (462-465). - Inspect for damaged low clutch sprag assembly (467). Holding the sprag assembly with the retaining ring facing up, and the inner race of the sprag assembly fixed, the outer race should freewheel counterclockwise.
2-6 and 3-5-R Clutch (with Output Carrier Outer Sun Gear Shaft) Hub Assembly (64)	Inspect for damaged or distorted shaft on hub assembly.
Output Shaft Assembly (70)	Inspect for damaged or stripped splines on the output shaft.

FLUID PRESSURE HIGH OR LOW

Checks	Causes

Checks	Causes
Torque Converter Housing with Fluid Pump Assembly (2)	• Inspect for worn, sticking, or damaged pressure regulator valve (233). • Inspect for worn, sticking, or damaged pressure regulator valve outer spring (234). • Inspect for worn, sticking, or damaged pressure regulator valve inner spring (235). • Inspect for worn, sticking, or damaged isolator valve (236) and sleeve (237). • Inspect for worn, sticking, or damaged pressure relief ball valve (225). • Inspect for worn, sticking, or damaged pressure relief ball valve spring (224). • Inspect for damaged or porous pump cover assembly (219). Inspect for pump surfaces not flat. • Inspect for excessive fluid pump rotor (217) clearance or damage. Ensure proper selective rotor is being utilized. • Inspect for damaged fluid pump slide (212). Ensure proper selective slide is being utilized. • Inspect for worn, sticking, or damaged fluid pump slide outer spring (211). • Inspect for worn or damaged fluid pump slide seal (213), seal support (214), pivot pin (215), fluid seal ring (209), and O-ring seal (210). • Inspect for worn or damaged fluid pump vane rings (207) and rotor guide (208). • Inspect fluid filter assembly (26) for torque converter friction material.
Control Valve Upper Body Assembly (321)	• Inspect for worn, sticking, or damaged actuator feed limit valve (325) and spring (324). • Inspect for worn, sticking, or damaged clutch boost valve (329) and spring (330).
Control Valve (w/Body and TCM) Valve Assembly	Inspect for leaking or damaged filter plate assembly seals (16). Verify VBS operation in not stuck high or low.
Fluid Filter Assembly (26)	• Inspect for damaged or restricted fluid filter assembly (26). • Inspect for damaged fluid filter seal assembly (25).

NO TORQUE CONVERTER CLUTCH SLIP WITH TORQUE CONVERTER CLUTCH ENGAGED

Checks	Causes
Clutch Select Solenoid Valve Spring (353)	Inspect for broken spring within the lower valve body in the torque converter clutch regulator apply valve line up (355).

transmissionmanuals.com