

2010 Transmission

Automatic Transmission - 6T70/6T75 - Equinox & Terrain

DTC P0218

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 P0218

Transmission Fluid Overtemperature

CIRCUIT/SYSTEM DESCRIPTION

The primary source of heat in the transmission is the torque converter. Hot oil exits the torque converter through the torque converter clutch (TCC) control valve and flows to the transmission cooler supply line. The supply line connects to the cooler, which is in the radiator. From the cooler, the oil returns through the oil cooler return line and enters the lubrication circuits. After lubricating the internal components, the oil returns to the oil pan. The transmission fluid temperature (TFT) sensor is located in the control solenoid valve assembly.

CONDITIONS FOR RUNNING THE DTC

- The ignition voltage is 8.6 volts or greater.
- The TFT is -39 to +149°C (-38 to +300°F) for 5 seconds.

CONDITIONS FOR SETTING THE DTC

The TFT is 140°C (284°F) or greater for 1 minute.

ACTION TAKEN WHEN THE DTC SETS

DTC P0218 is a Type C DTC.

CONDITIONS FOR CLEARING THE DTC

DTC P0218 is a Type C DTC.

DIAGNOSTIC AIDS

The driver information center (DIC), if equipped, will display 'TRANSMISSION HOT- Idle Engine' when the

TFT reaches 132°C (270°F). The TFT on the scan tool should rise steadily to a normal operating temperature, and then stabilize. Ask about the customer's driving habits, trailer towing, etc. Trailer towing should occur in D4. Ensure the engine cooling system is functioning normally.

REFERENCE INFORMATION

Schematic Reference

- Automatic Transmission Controls Schematics
- Park - Engine Running
- Fluid Passages

Description and Operation

- Transmission General Description
- Transmission Indicators and Messages

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

CIRCUIT/SYSTEM VERIFICATION

1. Review the Failure Records when the DTC set. Verify the engine coolant temperature is less than 125°C (257°F).
 - If greater than the specified range, refer to Engine Overheating.
2. Inspect the transmission cooling system for restrictions or damage.
3. Perform the Transmission Fluid Level and Condition Check to verify correct fluid level and condition.
4. Perform the Transmission Fluid Cooler Flushing and Flow Test to verify proper transmission oil cooler flow.
5. Perform the Line Pressure Check to verify proper transmission line pressure.
6. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

REPAIR PROCEDURES

NOTE: Perform the Transmission Adaptive Values Learn any time a transmission related component is serviced.

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

DTC P0562, P0563, OR P2534

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 P0562

System Voltage Low Voltage

DTC P0563

System Voltage High Voltage

DTC P2534

Ignition On/Start Switch Circuit Low Voltage

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition	P0562, P2534	P0562, P2534	P0563	-
Ground	-	P0562, P2534	-	-

CIRCUIT/SYSTEM DESCRIPTION

The transmission control module (TCM) within the control solenoid valve assembly continuously monitors the system voltage on the ignition voltage circuit. Lower than normal voltage may be inadequate to operate the transmission control solenoids properly. Improper solenoid operation may cause erratic transmission operation, which may result in internal damage. These DTCs detect high or low TCM voltage for an extended period.

CONDITIONS FOR RUNNING THE DTC

P0562

- Ignition voltage was 6.0 volts or greater and has not dropped below 2.0 volts.
- Engine speed is 1,200 RPM or greater.

P0563

Ignition voltage was 6.0 volts or greater and has not dropped below 2.0 volts.

P2534

- The engine is running.
- Normal CAN communication is enabled.

CONDITIONS FOR SETTING THE DTC

P0562

The TCM detects system voltage is 11 volts or less for 4 seconds in a period of 12 seconds.

P0563

The TCM detects system voltage is 18 volts or greater for 10 seconds.

P2534

The TCM detects ignition voltage between 2.0 volts and 6.0 volts for 7 seconds or greater with the engine running.

ACTION TAKEN WHEN THE DTC SETS

P0562 and P0563

DTCs P0562 and P0563 are Type C DTCs.

P2534

- DTC P2534 is a Type A DTC.
- The TCM turns the high side driver OFF.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM commands the torque converter clutch (TCC) OFF.
- The TCM limits the transmission to reverse and fifth gear operation.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.

CONDITIONS FOR CLEARING THE DTC

- DTCs P0562 and P0563 are Type C DTCs.
- DTC P2534 is a Type A DTC.

DIAGNOSTIC AIDS

- Observe the driver information center (DIC) messaging that would indicate the electrical system requires service.

- Running the engine with a battery charger attached may cause DTC P0563 to set.
- Inspect for the following conditions:
 - Loose or damaged terminals at the generator
 - Loose or worn generator drive belt

REFERENCE INFORMATION

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

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

DT-47825-20: Adapter Harness

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

CIRCUIT/SYSTEM VERIFICATION

1. Engine running, accessories OFF, measure and record the battery voltage at the battery terminals. The voltage should be between 12.6-15.0 volts.

- If the voltage is not within the specified range, or the charge indicator light is ON, refer to **Charging System Test**.
2. Observe the scan tool TCM Ignition Voltage parameter. The reading should be between 12.6-15.0 volts.
 3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

1. Ignition OFF, disconnect the 20-way harness connector at the transmission.
2. Connect the **DT-47825-20** to the 20-way transmission harness connector. See **Special Tools**.
3. Test for less than 10 ohms between the ground circuit terminals listed below and ground.
 - Terminal 1
 - Terminal 18
 - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, verify that a test lamp illuminates between the ignition and B+ circuit terminals listed below and ground.
 - Terminal 10
 - Terminal 13
 - Terminal 15
 - If the test lamp does not illuminate, test the affected ignition or B+ circuit for a short to ground or an open/high resistance.
5. If all circuits test normal, replace the control solenoid valve assembly.

REPAIR PROCEDURES

NOTE:

- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
- Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection**.

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0601-P0604 OR P062F

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: DTCs P0601, P0602, P0603, P0604 or P062F could set in other control modules. Verify the DTCs are set in the transmission control module (TCM).

DTC P0601

Control Module Read Only Memory Performance

DTC P0602

Control Module Not Programmed

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 handled inside the control solenoid valve assembly and no external circuits are involved.

CONDITIONS FOR RUNNING THE DTC

Ignition voltage is between 8.6 volts and 18.0 volts.

CONDITIONS FOR SETTING THE DTC

P0601

The read only memory (ROM) test has failed 5 or greater times.

P0602

The TCM has not been programmed and is unable to detect the start program.

P0603

The TCM has detected a memory checksum error.

P0604

The TCM has detected a random access memory (RAM) test error 5 or greater times.

P062F

The TCM has detected a non-volatile memory error during power-down.

ACTION TAKEN WHEN THE DTC SETS

P0601, P0602, P0603, P0604, or P062F

- DTCs P0601, P0602, P0603, P0604, and P062F are Type A DTCs.
- The TCM limits the transmission to reverse and 5th gear operation.
- The TCM commands maximum line pressure.
- The TCM forces the torque converter clutch (TCC) OFF.
- The TCM freezes transmission adaptive functions.
- The TCM commands the high side driver OFF.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.

CONDITIONS FOR CLEARING THE DTC

DTCs P0601, P0602, P0603, P0604, and P062F are Type A DTCs.

REFERENCE INFORMATION

Description and Operation

Electronic Component Description for control solenoid valve assembly

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

CIRCUIT/SYSTEM VERIFICATION

CAUTION: Before programming a control module, the following must be observed, or control module damage may occur:

- The TIS terminal, MDI, and/or scan tool must have the latest

software.

- The vehicle battery must be fully charged. The battery voltage should be between 12-14 volts.
- The TIS terminal, MDI, and/or scan tool connections must be secure.
- A battery charger must NOT be connected to the battery when programming a control module.

1. Ignition OFF for 1 minute.
2. Ignition ON, with a scan tool, verify that DTC P0602 is not set.
 - If the DTC is set, program the TCM. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Programming and Setup (6T70/6T75)** or **Control Solenoid Valve and Transmission Control Module Assembly Programming and Setup (6T30/6T40/6T45/6T50)** . If the DTC resets, replace the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
3. Observe the DTC information with a scan tool. DTCs P0601, P0603, P0604, and P062F should not set.
 - If DTC P0601, P0603, P0604, or P062F sets, replace the control solenoid valve assembly.
4. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

REPAIR PROCEDURES

NOTE: Perform the **Transmission Adaptive Values Learn** any time a transmission related component is serviced.

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0634

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 (TCM) temperature sensor is located inside of the control solenoid valve assembly which has no serviceable components. The TCM monitors the TCM sensor for over temperature protection.

CONDITIONS FOR RUNNING THE DTC

- The ignition voltage is 8.6 volts or greater.
- The TCM temperature is between 0-170°C (32-338°F) for 0.25 second or greater.
- DTC P0634 is not set.

CONDITIONS FOR SETTING THE DTC

Condition 1

The TCM detects an internal temperature condition of 146°C (295°F) or greater for 5 seconds.

Condition 2

The ignition voltage is 18 volts or greater and the TCM detects an internal temperature condition of 50°C (122°F) or greater for 2 seconds.

ACTION TAKEN WHEN THE DTC SETS

- DTC P0634 is a Type A DTC.
- The TCM limits the transmission to reverse and 5th gear operation.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM commands maximum line pressure.
- The TCM shuts down.

CONDITIONS FOR CLEARING THE DTC

DTC P0634 is a Type A DTC.

REFERENCE INFORMATION

Description and Operation

Electronic Component Description for control solenoid valve assembly

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

CIRCUIT/SYSTEM VERIFICATION

NOTE: If DTC P0218 is set, diagnose that DTC first.

1. Ignition ON, review the Failure Records when the DTC set. Verify the scan tool Engine Coolant Temperature parameter is less than 125°C (257°F).
 - If greater than the specified range, refer to **Engine Overheating** .
2. Engine running, accessories OFF, measure and record the battery voltage at the battery terminals with a DMM. The voltage should be between 12.6-15.0 volts.
 - If not within the specified range, or the charge indicator light is ON, refer to **Charging System Test** .
3. Perform the **Transmission Fluid Level and Condition Check** to verify correct fluid level and condition.
4. Perform the **Transmission Fluid Cooler Flushing and Flow Test** to verify proper transmission oil cooler flow.
5. Operate the vehicle within the conditions for running and setting the DTC until normal engine temperature is reached. Verify the scan tool TCM Temperature parameter is less than 146°C (295°F).
 - If greater than the specified range, inspect the transmission cooling system for obstructions to the airflow of the radiator or transmission due to debris, kinked, or damaged transmission fluid lines, or damage to the transmission cooler. If all the items test normal, replace the control solenoid valve assembly.
6. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

REPAIR PROCEDURES

- NOTE:**
- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
 - Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0658 OR P0659

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 P0658

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 (TCM) high side driver 1 is located inside of the control solenoid valve assembly, which has no serviceable components. The high side driver 1 provides power to the pressure control solenoids and shift solenoids. This fault is handled inside the TCM and no external circuits are involved.

CONDITIONS FOR RUNNING THE DTC

P0658

- High side driver 1 is enabled.
- DTC P0658 is not set.

P0659

DTC P0659 is not set.

CONDITIONS FOR SETTING THE DTC

P0658

The TCM detects an internal open or short to ground in the high side driver 1 circuit for 1 second.

P0659

During TCM power-up and prior to the high side driver being enabled, the TCM detects an internal short to voltage on the high side driver 1 circuit a total of 3 times out of 5 consecutive readings.

ACTION TAKEN WHEN THE DTC SETS

P0658

- DTC P0658 is a Type A DTC.
- The TCM turns the high side driver OFF.

- The TCM turns OFF all solenoids.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM commands the torque converter clutch (TCC) OFF.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM limits the transmission to reverse and 5th gear operation.

P0659

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.

REFERENCE INFORMATION

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

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

DT-47825-20: Adapter Harness

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

CIRCUIT/SYSTEM VERIFICATION

1. Ignition ON, verify with a scan tool the High Side Driver 1 parameter displays Enabled.
2. Engine Running, gear selector lever in Park position. Verify with a scan tool the following test status parameters displays OK:
 - High Side Driver 1 Circuit Low Voltage Test Status
 - High Side Driver 1 Circuit Open Test Status
 - High Side Driver 1 Circuit High Voltage Test Status
3. Operate the vehicle within the Conditions for Running and Setting the DTC. The DTCs should not set. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF, remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
 2. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .
 3. Place the control solenoid valve assembly on a clean work surface near the transmission assembly.
 4. Connect **DT-47825-20**: adapter harness between the vehicle wire harness electrical connector, and the control solenoid valve assembly electrical connector.
 5. Ignition ON, verify with a scan tool the following test status parameters display OK:
 - High Side Driver 1 Circuit Low Voltage Test Status
 - High Side Driver 1 Circuit Open Test Status
 - High Side Driver 1 Circuit High Voltage Test Status
- If any test status parameter displays Fault or Malfunction, replace the control solenoid valve assembly.

REPAIR PROCEDURES

- NOTE:**
- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
 - Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0667, P0668, OR P0669

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 (TCM) temperature sensor is located inside of the control solenoid valve assembly, which has no serviceable components. The TCM temperature sensor provides the temperature of the TCM. This temperature reading is used in various shifting and diagnostic routines in the TCM software. This fault is handled inside the TCM and no external circuits are involved.

CONDITIONS FOR RUNNING THE 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, P0307, P0308, P0401, P042E, P0658, P0667, P0668, P0669, P06AD, P06AE, P0712, P0713, P0716, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, or P2730 is not set.
- Brake torque is not active.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- The engine torque signal is valid.
- The throttle position signal is valid.

P0668

- DTC P0668 is not set.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.

P0669

- DTC P0669, P0716, P0717, P0722, or P0723 is not set.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.

CONDITIONS FOR SETTING THE DTC

P0667

- The difference between the transmission fluid temperature (TFT) and TCM substrate temperature is greater than 20-50°C (36-90°F), depending on the average of the TFT, TCM substrate and TCM power up temperatures.
- The difference between the TCM power up temperature and TCM substrate temperature is greater than 8-10°C (14-18°F) depending on the average of the TFT, TCM substrate and TCM power up temperatures.
- The above conditions have to be met for 5 minutes within a 6 minute period.

P0668

The TCM temperature is -249°C (-416°F) or lower for 1 minute.

P0669

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

ACTION TAKEN WHEN THE DTC SETS

- DTCs P0667, P0668, and P0669 are Type B DTCs.
- The TCM defaults the TCM substrate temperature to the TCM power up temperature.

CONDITIONS FOR CLEARING THE DTC

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

DIAGNOSTIC AIDS

The TCM temperature sensor is located inside of the control solenoid valve assembly and its output should resemble that of the TFT sensor output.

REFERENCE INFORMATION

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

Description and Operation

Electronic Component Description for control solenoid valve assembly

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, verify the scan tool TCM Temperature parameter is between -247 and +247°C (-412 and +477°F).
 - If not within the specified range, replace the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
2. Operate the vehicle at 64 km/h (40 mph) for 10 minutes. Monitor the TCM Temperature and the Transmission Fluid Temperature parameters with a scan tool. The TCM Temperature parameter should increase by greater than 2°C (3.5°F). Also, the TCM Temperature and the Transmission Fluid Temperature parameters should be within 20°C (36°F) of each other.
 - If the TCM Temperature parameter does not increase by greater than 2°C (3.5°F) or the TCM Temperature and Transmission Fluid Temperature parameters are not within 20°C (36°F), then replace the control solenoid valve assembly.
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

REPAIR PROCEDURES

NOTE:

- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.

- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P06AC-P06AE

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

CONDITIONS FOR RUNNING THE DTC

P06AC

- 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, P0307, P0308, P0401, P042E, P0658, P0668, P0669, P06AC, P06AD, P06AE, P0712, P0713, P0716, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, or P2730 is not set.

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- Brake torque is not active.
- The engine torque signal is valid.
- The throttle position signal is valid.

P06AD

- DTC P06AD, P0716, P0717, P0722, or P0723 is not set.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.

P06AE

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P06AE is not set.

CONDITIONS FOR SETTING THE DTC

P06AC

- The difference between the transmission fluid temperature (TFT) and TCM power up temperature is greater than 20-50°C (36-90°F), depending on the average of the TFT, TCM substrate, and TCM power up temperatures.
- The difference between the TCM substrate temperature and TCM power up temperature is greater than 8-10°C (14-18°F) depending on the average of the TFT, TCM substrate, and TCM power up temperatures.
- The above conditions have to be met for 5 minutes within a 6 minute period.

P06AD

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

P06AE

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

ACTION TAKEN WHEN THE DTC SETS

- DTC P06AC, P06AD, P06AE are Type B DTCs.
- The TCM defaults the TCM power up temperature to the TCM substrate temperature.

CONDITIONS FOR CLEARING THE DTC

DTC P06AC, P06AD, P06AE are Type B DTCs.

REFERENCE INFORMATION

Connector End View Reference

Component Connector End Views

Description and Operation

- Transmission General Description
- Electronic Component Description for control solenoid valve assembly

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

CIRCUIT/SYSTEM VERIFICATION

1. Operate the vehicle at 64 km/h (40 mph) for 10 minutes.
 - If the DTC resets, replace the control solenoid valve assembly. Refer to Control Solenoid Valve and Transmission Control Module Assembly Replacement .
2. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

REPAIR PROCEDURES

NOTE:

- Perform the Transmission Adaptive Values Learn following all transmission related repairs
- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0711, P0712, OR P0713

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 (TFT) sensor is located inside of the transmission control module (TCM) assembly which has no serviceable components. The TFT sensor provides transmission fluid temperature to the TCM. This fault is handled inside the TCM and no external circuits are involved.

CONDITIONS FOR RUNNING THE DTC

P0711

- 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, P0307, P0308, P0401, P042E, P0658, P0668, P0669, P06AD, P06AE, P0711, P0712, P0713, P0716, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, or P2730 is not set.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- Brake torque is not active.
- The engine torque signal is valid.
- The throttle position signal is valid.

P0712

- DTC P0712, P0716, P0717, P0722, or P0723 is not set.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.

P0713

- DTC P0713, P0716, P0717, P0722, or P0723 is not set.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.

CONDITIONS FOR SETTING THE DTC

P0711

The difference between the TFT and TCM temperature and the difference between the TFT and TCM power up temperature are both greater than 20-50°C (36-90°F). The temperature threshold is dependent on the average temperature of the TFT, TCM temperature, and TCM power up temperature. The conditions have to be met for 5 minutes within a 6 minute period.

P0712

The TFT is -74°C (-101°F) or lower for 1 minute.

P0713

The TFT is 174°C (345°F) or greater for 1 minute.

ACTION TAKEN WHEN THE DTC SETS

- DTCs P0711, P0712, and P0713 are Type B DTCs.
- The TCM defaults the TFT to the TCM Temperature.

CONDITIONS FOR CLEARING THE DTC

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

DIAGNOSTIC AIDS

The TCM temperature sensor is located inside of the control solenoid valve assembly and its output should resemble that of the TFT sensor output.

REFERENCE INFORMATION

Connector End View Reference

- Component Connector End Views
- Inline Harness Connector End Views

Description and Operation

Electronic Component Description for control solenoid valve assembly

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 operating temperature, verify the scan tool Transmission Fluid Temperature parameter is between -74 and +174°C (-101 and +345°F).
 - If not within the specified range, replace the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
2. Operate the vehicle at 64 km/h (40 mph) for 10 minutes. Monitor the TCM Temperature and the Transmission Fluid Temperature parameters with a scan tool. The TCM Temperature and Transmission Fluid Temperature parameters should be within 20°C (36°F) of each other.
 - If greater than the specified range, replace the control solenoid valve assembly.
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

REPAIR PROCEDURES

NOTE:

- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
- Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0716 OR P0717

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
Input Speed Sensor Supply Voltage	P0717	P0717	-	P0716
Input Speed Sensor Signal	P0716, P0717	P0716, P0717	P0716, P0717	P0716

TYPICAL SCAN TOOL DATA

Transmission ISS

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature, transmission in PARK Parameter Normal Range: 500-5,800 RPM			
ISS/OSS Supply Voltage	0 RPM	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: Engine running, normal operating temperature Parameter Normal Range: OK			
Input Speed Sensor Supply Voltage	Out of Range	OK	Out of Range

CIRCUIT/SYSTEM DESCRIPTION

The input speed sensor (ISS) is a hall-effect type sensor. The ISS mounts to the inside of the automatic transmission case assembly and connects to the control solenoid valve assembly through a 2-wire harness and connector. The sensor faces the reluctor wheel which is attached to the 4-5-6 clutch and 3-5-R clutch housing.

The sensor receives 8.3-9.3 volts on the ISS supply voltage circuit from the transmission control module (TCM). As the 4-5-6 clutch and 3-5-R clutch housing rotates, the sensor produces a signal frequency based on the teeth of the reluctor wheel. This signal is transmitted through the ISS signal circuit to the TCM. The TCM 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, P0716, P0717, P0752, P0973, or P0974 is not set.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- The engine torque signal is valid.
- The throttle position signal is valid.

P0717

- DTC P0717 is not set.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- The vehicle speed is 16 km/h (10 mph) or greater.
- The engine torque is 50 N.m (37 lb ft) or greater.
- The engine torque signal is valid.

CONDITIONS FOR SETTING THE DTC

P0716

Transmission input speed drops 1,350 RPM for 1 second and does not recover.

P0717

Transmission input shaft speed is less than 50 RPM for 5 seconds.

ACTION TAKEN WHEN THE DTC SETS

- P0716 and P0717 are Type A DTCs.
- The TCM freezes transmission adaptive functions.
- The TCM commands the high side driver OFF.
- The TCM commands TCC OFF.
- The TCM commands maximum line pressure.
- The TCM disables neutral idle.
- The TCM inhibits Tap Up/Down function.

- The TCM inhibits manual shifting of forward gears.
- The TCM limits the transmission to reverse and 5th gear operation.

CONDITIONS FOR CLEARING THE DTC

P0716 and P0717 are Type A DTCs.

DIAGNOSTIC AIDS

Damage or misalignment of the 4-5-6 clutch and 3-5-R clutch housing reductor machined teeth surface may cause a speed sensor malfunction.

REFERENCE INFORMATION

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

Description and Operation

Electronic Component Description for ISS

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. Ignition ON, verify with a scan tool the transmission ISS/OSS Supply Voltage test status parameter displays OK.

2. Engine idling in Park, observe the scan tool Transmission ISS parameter while varying the engine speed. The Transmission ISS parameter should change with the engine speed and not drop out.
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF, remove the control valve body cover. Refer to **Control Valve Body Cover Replacement**.
2. Connect the TCM harness connector.
3. Disconnect the ISS wiring harness connector X3 from the control solenoid valve assembly.
4. Ignition ON, test for 8.3-9.3 volts between the ISS voltage circuit terminal A, on the TCM assembly, and ground.
 - If not within the specified range, replace the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement**.
5. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Input Shaft Speed/Output Shaft Speed Input Test**.
6. Inspect the reluctor for damage or misalignment. Repair or replace as necessary.
7. If all of the above test normal, replace the input speed sensor.

REPAIR PROCEDURES

NOTE:

- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.

Input Speed Sensor Replacement

- Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection**.

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P071A

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 P071A

Transmission Tow Mode Switch Circuit

CIRCUIT/SYSTEM DESCRIPTION

Tow/haul mode enables the operator to achieve enhanced shift performance when towing or hauling a load. When tow/haul mode is selected, the tow/haul switch input signal to the body control module (BCM) is momentarily toggled to zero volts. This signals the transmission control module (TCM) to extend the length of time between upshifts and increase transmission line pressure. Cycling the tow/haul switch again disables tow/haul mode and returns the transmission to a normal shift pattern.

CONDITIONS FOR RUNNING THE DTC

- No Transmission Mode Switch Signal DTC P1762.
- The engine speed is greater than 500 RPM for 5 seconds.
- The system voltage is 8-18 volts.

CONDITIONS FOR SETTING THE DTC

The Tow Mode switch remains closed, low voltage, for 600 seconds.

ACTION TAKEN WHEN THE DTC SETS

DTC P071A is a Type C DTC.

CONDITIONS FOR CLEARING THE DTC

DTC P071A is a Type C DTC.

DIAGNOSTIC AIDS

If the electrical circuit tests are OK and the shift pattern is not occurring, there may be a mechanical/hydraulic condition that prevents operation. Refer to **Symptoms - Automatic Transmission** .

REFERENCE INFORMATION

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

Component Connector End Views

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

With a scan tool observe the Tow/Haul switch parameter in Body Controls data list. With the ignition On or engine running, operate the Tow/Haul switch several times, and observe the parameter as you operate the switch. The parameter should toggle between Active and Inactive when the switch is operated.

CIRCUIT/SYSTEM TESTING

1. Ignition Off, transmission in Park, disconnect the Tow/Haul switch connector.
2. Test for less than 1 ohm of resistance between the Tow/Haul switch signal circuit terminal B and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition On, verify the scan tool Tow/Haul parameter displays Inactive.
 - If not the specified value, test the signal circuit for a short to ground. If the circuit tests normal, replace the BCM.
4. Install a fused jumper between the signal circuit and ground. Verify the scan tool parameter displays Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the BCM.
5. If all circuits test normal, replace the Tow/Haul switch.
6. 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.

COMPONENT TESTING

Verify the Tow/Haul Mode parameter on the scan tool while cycling the tow/haul switch.

1. Ignition Off, transmission in Park, disconnect the transmission Tow/Haul switch assembly.
2. Test for infinite resistance between the Tow/Haul switch with the switch in the Open position.
 - If not the specified value, replace the Tow/Haul switch assembly.
3. Depress and hold the Tow/Haul switch.
4. Test for less than 1 ohm of resistance between the Tow/Haul switch signal circuit terminals B and A while the switch is depressed.
 - If greater than the specified value, replace the Tow/Haul switch assembly.

REPAIR PROCEDURES

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

- **Control Module References** for BCM replacement, setup, and programming.
- **Automatic Transmission Range Selector Lever Replacement**

DTC P0722 OR P0723

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 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
OSS Supply Voltage	P0722	P0722	-	-
OSS Signal	P0722, P0723	P0722, P0723	P0722, P0723	-

TYPICAL SCAN TOOL DATA

Transmission OSS

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 0-7,000 RPM			
OSS Supply Voltage	0 RPM	0 RPM	-
Transmission OSS 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			
Transmission OSS Signal	OK	OK	OK
OSS Supply Voltage	Out of Range	OK	Out of Range

CIRCUIT/SYSTEM DESCRIPTION

The output speed sensor (OSS) is a hall-effect type sensor. The sensor faces the front differential transfer drive gear. The sensor receives 8.3-9.3 volts on the OSS supply voltage circuit from the transmission control module (TCM). As the output shaft rotates, the sensor produces a signal frequency based on the machined surface of the output shaft. This signal is transmitted through the OSS signal circuit to the TCM. The TCM 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

- No DTCs P0101, P0102, P0103, P0121, P0122, P0123, P0716, P0717, P0722, or P0723.
- The selected range is not PARK or NEUTRAL.
- The transmission input speed is between 1,000-6,500 RPM.
- The engine speed is between 3,200-5,000 RPM.
- The calc. throttle position is greater than 5 percent.
- The throttle position signal is valid.
- The engine torque is greater than 35 N.m (26 lb ft).
- The engine torque signal is valid.
- The TFT is greater than -40°C (-40°F).
- The engine speed is greater than 400 RPM for 5 seconds.
- The ignition voltage is 8.6 volts or greater.

P0723

- No DTCs P0101, P0102, P0103, P0121, P0122, P0123, P0723, P0973, P0974, P0976, P0977.
- Greater than 5 seconds since last range change.
- The engine speed is greater than 400 RPM for 5 seconds.
- The ignition voltage is greater than 8.6 volts.
- The engine torque signal is valid.
- The throttle position signal is valid.

CONDITIONS FOR SETTING THE DTC

P0722

The transmission output speed is 70 RPM or less for 4.5 seconds.

P0723

- The transmission output speed is 210 RPM or greater for 0.2 second.
- The transmission output speed drops 650 RPM for greater than 1.5 seconds and does not recover.

ACTION TAKEN WHEN THE DTC SETS

- DTCs P0722 and P0723 are Type A DTCs.
- The TCM freezes transmission adaptive functions.
- The TCM turns OFF the high sided driver, which turns OFF all solenoids.
- The TCM commands maximum line pressure.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM limits the transmission to reverse and 5th gear operation.

CONDITIONS FOR CLEARING THE DIC/DTC

DTCs P0722 and P0723 are Type A DTCs.

DIAGNOSTIC AIDS

- Damage or misalignment of the front differential transfer drive gear teeth surface or metallic debris on the face of the sensor may cause a speed sensor malfunction.
- Proper torque of the OSS mounting bolt is critical to proper OSS operation.

REFERENCE INFORMATION

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

Description and Operation

Electronic Component Description for output speed sensor (OSS)

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. Ignition ON, verify with a scan tool the transmission ISS/OSS Supply Voltage parameter displays OK.
2. Operate the vehicle at 16-32 km/h (10-20 mph) while observing the scan tool Transmission OSS parameter. The Transmission OSS parameter should vary with the vehicle speed and not drop out.
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF, remove the control valve body cover. Refer to **Control Valve Body Cover Replacement** .
2. Connect the TCM harness connector.
3. Disconnect the OSS harness connector X4 from the control solenoid valve assembly.
4. Ignition ON, test for 8.3-9.3 volts between the OSS voltage circuit terminal A 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** .

5. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Input Shaft Speed/Output Shaft Speed Input Test** .
6. Inspect the front differential transfer drive gear teeth surface for damage or misalignment and for metallic debris on the face of the sensor. Repair or replace as necessary.
7. If all circuits test normal, replace the output speed sensor.

REPAIR PROCEDURES

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

NOTE: Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.

- **Output Speed Sensor Replacement**

NOTE: Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .

- **Control Module References** for control solenoid valve assembly replacement, setup, and programming

DTC P0741 OR P0742

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 P0741

Torque Converter Clutch (TCC) System Stuck Off

DTC P0742

Torque Converter Clutch (TCC) System Stuck On

CIRCUIT/SYSTEM DESCRIPTION

The torque converter clutch (TCC) pressure control (PC) solenoid is part of the control solenoid valve assembly which has no serviceable components. The TCC PC solenoid is a normally low pressure control solenoid. The TCC PC 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 (TCM) will increase TCC PC current flow, duty cycle, to the TCC

solenoid. The TCC PC 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 TCM decreasing current flow to the TCC PC solenoid. This results in decreasing the apply pressure which allows the TCC control valve to move to the release position. The TCM calculates torque converter slip speed based on engine speed and transmission input shaft speed.

CONDITIONS FOR RUNNING THE DTC

P0741

- No 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, P0741, P0742, P2763, or P2764.
- The engine speed is greater than 400 RPM for 5 seconds.
- The ignition voltage is greater than 8.6 volts.
- The transmission fluid temperature (TFT) is 20-130°C (68-266°F).
- The throttle position is greater than 8 percent.
- The engine torque is greater than 50 N.m (36 lb ft).
- The 2nd gear ratio is between 2.67-3.07.
- The 3rd gear ratio is between 1.71-1.97.
- The 4th gear ratio is between 1.32-1.51.
- The 5th gear is between 0.93-1.07.
- The 6th gear is between 0.69-0.79.
- The TCC is commanded ON.
- The engine torque signal is valid.
- The throttle position signal is valid.

P0742

- No 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, P0741, P0742, P2763, or P2764.
- The commanded range is 2nd gear or higher.
- The ignition voltage is greater than 8.6 volts.
- The TFT is 20-130°C (68-266°F).
- The calc. throttle position is greater than 8 percent.
- The engine torque is greater than 80 N.m (59 lb ft).
- The engine speed is greater than 500 RPM.
- The vehicle speed is greater than 16 km/h (10 mph).
- The gear ratio is between 0.69-3.07.

- The engine torque signal is valid.
- The throttle position signal is valid.
- The TCC is commanded OFF.

CONDITIONS FOR SETTING THE DTC

P0741

- The TCC Pressure command is greater than 500 kPa (73 psi) for 2 seconds.
- The TCM detects TCC slip greater than 50 RPM for 4 seconds when the TCC is commanded ON. This must occur 3 times.

P0742

The TCM detects the TCC slip between -20 and +30 RPM for 2.5 seconds or greater when the TCC is commanded OFF. This must occur 6 times.

ACTION TAKEN WHEN THE DTC SETS

P0741

- DTC P0741 is a Type B DTC.
- The TCM inhibits high gear.
- The TCM inhibits TCC.
- The TCM forces hot mode shift pattern.

P0742

- DTC P0742 is a Type A DTC.
- The TCM freezes transmission adaptive functions.
- The TCM forces hot mode shift pattern.

CONDITIONS FOR CLEARING THE DIC/DTC

P0741

DTC P0741 is a Type B DTC.

P0742

DTC P0742 is a Type A DTC.

REFERENCE INFORMATION

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

Component Connector End Views

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

CIRCUIT/SYSTEM VERIFICATION

1. Perform the Transmission Fluid Level and Condition Check to verify correct fluid level and condition.
2. Engine idling in Park, verify with a scan tool the Transmission ISS/OSS Supply Voltage parameter displays OK.
3. Engine idling in Park. Observe the Engine Speed and Transmission ISS parameters on the scan tool, while varying the engine speed. The Transmission ISS parameter should vary with engine speed and not drop out.
4. Operate the vehicle at 16-32 km/h (10-20 mph) while observing the Transmission OSS parameter on the scan tool. The Transmission OSS parameter should vary with the vehicle speed and not drop out.

NOTE: **Perform a scan tool snapshot, during the road test.**

5. Perform the Road Test . Verify the transmission operation performs as indicated, in the road test instructions.
6. Review the scan tool snapshot transmission data parameters. Verify the engine and transmission data parameters display the correct values in all forward gear ranges:
 - Engine Speed
 - Engine Coolant Temperature

- Transmission ISS
 - Transmission OSS
 - Vehicle Speed
 - Transmission Fluid Temperature
 - TCC Pressure Control Solenoid Valve Pressure Command
 - TCC Slip Speed
7. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

1. Perform the **Line Pressure Check** . Verify the transmission line pressures are within the specified ranges.
 - If not within the specified ranges, refer to **Fluid Pressure High or Low** .
2. Ignition OFF, remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
3. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test** . Test all solenoids on the control solenoid valve assembly. A pressure change should occur for each solenoid.
 - If the control solenoid valve assembly does not pass the performance test, replace the control solenoid valve assembly.
4. Listed in the table below are conditions for each component that could set DTC P0741 or P0742. Carefully inspect each component for that condition. Repair or replace as necessary.

DTCs	Component	Condition
P0741 P0742	Upper Valve Body	TCC Control Valve • Stuck TCC control valve • Damaged valve/bore
P0741 P0742	Upper Valve Body	TCC Regulator Valve • Stuck TCC regulator valve • Damaged valve/bore
P0741 P0742	Control Solenoid Valve Assembly	TCC Pressure Control Solenoid • Not pressurizing - Stuck OFF or leaking • Not exhausting - Stuck ON • Control signal fluid supply leak - valve body filter plate assembly cracked or damaged gasket seal
		• Torque converter clutch delamination or material worn off

P0741	Torque Converter	• Damaged seal • Converter bolts too long - damaging the clutch apply surface
P0741	Support	Damaged seal
P0741 P0742	A/Trans Case Cover (403)	Release blow-off • Not seating/sealing • Damaged Spring
P0741	Upper Valve Body	Release exhaust port/orifice plugged or blocked.
P0741	Turbine Shaft	Turbine shaft O-ring seal cut or damaged

REPAIR PROCEDURES

NOTE:

- Perform the Transmission Adaptive Values Learn following all transmission related repairs.
- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Control Valve Lower Body and Upper Body Replacement
- Torque Converter Removal
- Torque Converter Installation
- Torque Converter and Differential Housing, Front Differential Transfer Drive Gear, and Front Differential Carrier Removal and Torque Converter and Differential Housing Installation
- Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0751 OR P0752

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 P0751

Shift Solenoid Valve 1 Performance - Stuck Off

DTC P0752

CIRCUIT/SYSTEM DESCRIPTION

The shift solenoid (SS) valve 1 is part of the control solenoid valve assembly, which has no serviceable components. The solenoid operates by the transmission control module (TCM) opening or closing the ground circuit. With the solenoid circuit open, the plunger forces the metering ball against the actuator feed limit seat, blocking the flow and any existing pressure is exhausted through the exhaust port. With the solenoid circuit grounded (solenoid ON), the internal plunger moves, allowing the metering valve to move away from the actuator feed limit seat and against the exhaust seat, creating signal fluid pressure. The signal fluid pressure acts against the clutch select valve 2 to overcome the valve spring force, moving the valve to the apply position. Fluid pressure from the R1/4-5-6 regulator valve flows through clutch select valve 2 and is directed to either the low and reverse clutch or the 4-5-6 clutch, depending on the position of the select valve 2.

CONDITIONS FOR RUNNING THE DTC

P0751

- The ignition voltage is greater than 8.6 volts.
- The engine speed is 400 RPM or greater for 5 seconds.
- The throttle position signal is valid.
- The engine torque signal is valid.
- The high side driver (HSD) is enabled.
- The output shaft speed is greater than 0 RPM or the throttle position is greater than 0.4 percent.
- The transmission fluid temperature is 0°C (32°F) or greater.
- No 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, or P182E.

P0752

- The ignition voltage is greater than 8.6 volts.
- The engine speed is 400 RPM or greater for 5 seconds.
- The HSD is enabled.
- The throttle position signal is valid.
- The output shaft speed is greater than 0 RPM, or the throttle position is greater than 0.4 percent.
- The transmission fluid temperature is 0°C (32°F) or greater.
- No 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, or P182E.

CONDITIONS FOR SETTING THE DTC

P0751

Commanded gear equals first lock, the gear ratio is 1.34-1.48, and gear box slip is greater than 200 RPM for 0.3 second, 8 times.

P0752

The transmission has achieved 1st Locked, 1st Free-Wheel, or 2nd, the 456/R1 pressure switch is pressurized, and gear box slip is greater than 200 RPM for 2 seconds, 5 times.

ACTION TAKEN WHEN THE DTC SETS

P0751

- DTC P0751 is a Type B DTC.
- The TCM inhibits first range.

P0752

- DTC P0752 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 limits the transmission to reverse, first, and third range operation.

CONDITIONS FOR CLEARING THE DTC

P0751

DTC P0751 is a Type B DTC.

P0752

DTC P0752 is a Type A DTC.

DIAGNOSTIC AIDS

Before performing a road test, configure and setup the scan tool for snapshot mode. This allows 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**
- **Inline Harness Connector End Views**

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

CIRCUIT/SYSTEM VERIFICATION

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

1. Perform the **Transmission Fluid Level and Condition Check** to verify correct fluid level and condition.

NOTE: Perform a scan tool snapshot during the road test.

2. Perform the **Road Test** . Verify the transmission operation performs as indicated, in the road test instructions.
3. Review the scan tool snapshot transmission data parameters. Verify the engine and transmission data parameters display the correct values in all forward gear ranges:
 - Engine Speed
 - Transmission ISS
 - Transmission OSS
 - Vehicle Speed
 - Shift Solenoid Valve 1
 - TRANSMISSION FLUID PRESSURE Switch 1
 - TRANSMISSION FLUID PRESSURE Switch 3
 - TRANSMISSION FLUID PRESSURE Switch 4
 - TRANSMISSION FLUID PRESSURE Switch 5

4. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

1. Perform the **Line Pressure Check** . Verify the transmission line pressure gauge is within the range specified in the Line PC Solenoid Valve Pressure table. Refer to **Solenoid Valve Pressure** .
 - If not within the specified range, repair as necessary. Refer to **Fluid Pressure High or Low** for further diagnosis.
2. Ignition OFF, remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
3. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test** . Test all solenoids on the control solenoid valve assembly. A pressure change should occur for each solenoid.
 - If the control solenoid valve assembly does not pass the performance test, replace the control solenoid valve assembly.
4. Listed in the table below are conditions for each component that could set DTC P0751 or P0752. Carefully inspect each component for that condition. Repair or replace as necessary.

DTCs	Component	Condition
P0751 P0752	Upper Control Valve Body	Clutch select valve 2 stuck - debris, sediment, binding, or scored bore
P0751	Upper Control Valve Body	Bore plug - clutch select valve 2 - undersized bore plug causing a leak - plug should be a valve fit in the bore.
P0751	Upper Control Valve Body	Check ball #2 - missing, damaged/malformed, seat in the valve body damage/leaking.
P0751 P0752	Control Solenoid Valve Assembly	Shift Solenoid 1 • Not pressurizing - Stuck OFF or leaking • Not exhausting - Stuck ON • Control signal fluid supply leak - valve body filter plate assembly cracked or damaged gasket seal Pressure control solenoid 3 - Stuck ON or OFF or leaking
P0751	Lower Control Valve Body	Low and reverse, and 4-5-6 clutch regulator valve - stuck or sticking - debris, sediment, binding, or scored bore

REPAIR PROCEDURES

NOTE:

- Perform the Transmission Adaptive Values Learn following all transmission related repairs.
- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, or programming

DTC P0756

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 P0756

Shift Solenoid Valve 2 Performance - Stuck Off

CIRCUIT/SYSTEM DESCRIPTION

The shift solenoid (SS) valve 2 is part of the control solenoid valve assembly, which has no serviceable components. The SS valve 2 is a normally closed (NC) solenoid valve and controls fluid to the clutch select valve 3. The solenoid operates by the transmission control module (TCM) opening or closing the ground circuit. With the solenoid circuit grounded, solenoid on, the internal plunger moves and allows the metering ball to move away from the feed seat and against the exhaust seat, 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.

CONDITIONS FOR RUNNING THE DTC

- No 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, or P182E.
- The engine speed is 400 RPM or greater for 5 seconds.
- The high side driver (HSD) is enabled.
- The ignition voltage is 8.6 volts or greater.
- Throttle position signal is valid.
- Transmission fluid temperature (TFT) is 0°C (32°F) or greater.

CONDITIONS FOR SETTING THE DTC

- Commanded Gear is 1st locked.
- Gearbox Slip is 200 RPM up or greater for 3 seconds.
- If above conditions exist, the TCM will command second range. If the gear ratio is between 2.7 and 3.0 for 1 second, the counter will increment, and the DTC will set after 5 occurrences.

ACTION TAKEN WHEN THE DTC SETS

- DTC P0756 is a Type A DTC.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM limits the transmission to reverse, first, and third range operation.

CONDITIONS FOR CLEARING THE DTC

DTC P0756 is a Type A DTC.

REFERENCE INFORMATION

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

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

CIRCUIT/SYSTEM VERIFICATION

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

1. Perform the **Transmission Fluid Level and Condition Check** to verify correct fluid level and condition.

NOTE: Perform a scan tool snapshot, during the road test.

2. Perform the **Road Test** . Verify the transmission operation performs as indicated, in the road test instructions.
3. Review the scan tool snapshot transmission data parameters. Verify the engine and transmission data parameters display the correct values in all forward gear ranges:
 - Engine Speed
 - Transmission ISS
 - Transmission OSS
 - Vehicle Speed
 - Shift Solenoid Valve 2
 - Transmission Fluid Pressure Switch 1
 - Transmission Fluid Pressure Switch 3
 - Transmission Fluid Pressure Switch 4
 - Transmission Fluid Pressure Switch 5
4. Record the Freeze Frame/Failure Records data. Clear the DTCs.
5. Engine running, brakes applied, transmission gear shift selector in reverse. Shift to drive and accelerate to 56 km/h (35 mph) with calculated throttle position greater than 15 percent. Perform this test 5 consecutive times. The DTC should not set.
6. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

1. Perform the **Line Pressure Check** . Verify the transmission line pressures are within the range specified in the Line PC Solenoid Valve Pressure table. Refer to **Solenoid Valve Pressure** .
 - If not within the specified ranges, refer to **Fluid Pressure High or Low** .
2. Ignition OFF, remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
3. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test** . Test all solenoids on the control solenoid valve assembly. A pressure change should occur for each solenoid valve.

- If the control solenoid valve assembly does not pass the performance test, replace the control solenoid valve assembly.
4. Listed in the table below are conditions for each component that could set DTC P0756. Carefully inspect each component for that condition. Repair or replace as necessary.

DTCs	Component	Condition
P0756	Upper Control Valve Body	• Clutch select valve 3 stuck OFF- debris, sediment, binding or scored bore • Bore plug - clutch select valve 3 - undersized bore plug causing a leak - plug should be a valve fit in the bore. • Check ball #3 - missing, damaged/malformed, Seat in the valve body damage/leaking.
P0756	Control Solenoid Valve Assembly	• Shift solenoid 2 not pressurizing - Stuck OFF or leaking • Control signal fluid supply leak - valve body filter plate assembly cracked or damaged gasket seal
P0756	Pump Assembly	Fluid pump vanes and fluid pump rotor broken
P0756	Pump Seal	Seal is torn or cut, causing a small leak that is overcome with enough speed and pump capacity.
P0756	Mechanical Diode	Broken or not capable of holding torque

REPAIR PROCEDURES

NOTE:

- Perform the Transmission Adaptive Values Learn following all transmission related repairs.
- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Control Valve Upper Body Assembly Cleaning and Inspection
- Control Module References for control solenoid valve assembly replacement, setup, or programming

DTC P0776 OR P0777

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 P0776

Clutch Pressure Control (PC) Solenoid 2 - Stuck Off

DTC P0777

Clutch Pressure Control (PC) Solenoid 2 - Stuck On

CIRCUIT/SYSTEM DESCRIPTION

The clutch pressure control (PC) solenoid 2 is part of the control solenoid valve assembly, which has no serviceable components. The PC solenoid 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 (TCM) calculates gear ratio based on the RPM signals from the input speed sensor (ISS) and the output speed sensor (OSS). The TCM compares the expected transmission gear ratio to the calculated gear ratio for each commanded gear.

CONDITIONS FOR RUNNING THE DTC

P0776

- No ISS 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, or P182E.
- The ignition voltage is greater than 8.6 volts.
- The engine speed is greater than 400 RPM for 5 seconds.
- The transmission fluid temperature is 0°C (32°F) or greater.
- The transmission output speed is 16 RPM or greater, or the throttle position is 0.4 percent or greater.
- The throttle position signal is valid.
- The high side driver (HSD) is commanded ON.

P0777

- No 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, or P182E.
- The transmission fluid temperature is 0°C (32°F) or greater.
- The transmission output shaft speed is 350 RPM or greater.
- The transmission input speed is 200 RPM or greater.
- The commanded gear is not 1st range.
- The HSD is enabled.

CONDITIONS FOR SETTING THE DTC

P0776

The TCM detects an incorrect on-coming clutch gear ratio, or flare, when the 3-5-R clutch is commanded ON for 3 seconds and the transmission input shaft speed is 200 RPM or greater from the anticipated input shaft speed.

P0777

The TCM detects an incorrect off-going clutch gear ratio, or tie-up, when the 3-5-R clutch is commanded OFF for 1.2 seconds and the transmission input shaft speed is 40 RPM or less from the anticipated input shaft speed.

ACTION TAKEN WHEN THE DTC SETS

P0776

- DTC P0776 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tap Up/Down function.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits manual shifting of forward gears.
- The TCM limits the transmission to 2nd, 4th, or reverse operation.

P0777

- DTC P0777 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM freezes transmission adaptive functions.
- The TCM limits the transmission to 3rd and reverse operation.

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
- Inline Harness Connector End Views

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

CIRCUIT/SYSTEM VERIFICATION

1. Engine idling in Park, with parking brake applied and drive wheels chocked.
2. Perform the **Transmission Fluid Level and Condition Check** to verify correct fluid level and condition.
3. Monitor the Transmission Fluid Pressure (TFP) Switch 1 with a scan tool. Place the gear select lever in Park, Reverse, and Neutral range. Verify the TFP Switch 1 parameter states are correct for Park, Reverse, and Neutral. Refer to **Transmission Fluid Pressure Switch Logic** .
4. Place the gear select lever in Drive range. Command the shift transmission with a scan tool through all forward ranges. Verify the TFP Switch 1 parameter states are correct for all forward ranges. Refer to **Transmission Fluid Pressure Switch Logic** .
5. Engine idling in Park, verify with a scan tool the Transmission ISS/OSS Supply Voltage parameter displays OK.
6. Engine idling in Park. Observe the Transmission ISS parameter on the scan tool, while varying the engine speed. The Transmission ISS parameter should vary with engine speed and not drop out.
7. Operate the vehicle at 16-32 km/h (10-20 mph) while observing the Transmission OSS parameter on the scan tool. The Transmission OSS parameter should vary with the vehicle speed and not drop out.

NOTE: **Perform a scan tool snapshot, during the road test.**

8. Perform the **Road Test** . Verify the transmission operation performs as indicated in the road test

instructions.

9. Review the scan tool snapshot data. Verify the following transmission data parameters display the correct values for each gear range:
 - Transmission ISS
 - Transmission OSS
 - PC Solenoid 2
 - TFP Switch 1
10. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Perform the **Line Pressure Check** . Verify the transmission line pressure gauge is within the range specified in the Line PC Solenoid Valve Pressure table. Refer to **Solenoid Valve Pressure** .
 - If not within the specified ranges, refer to **Fluid Pressure High or Low** .
2. Ignition OFF, remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
3. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test** . A pressure change should occur for each solenoid valve.
 - If the control solenoid valve assembly does not pass the performance test, replace the control solenoid valve assembly.
4. Listed in the table below, are conditions for each component that could set DTC P0776 or P0777. Carefully inspect each component for that condition. Repair or replace as necessary.

DTCs	Component	Condition
P0776 P0777	Upper Control Valve Body Assembly (349)	3-5-R regulator valve (336) stuck/sticking - debris, binding, damaged valve, or scored bore
P0776	Lower Control Valve Body Assembly (374)	• Actuator feed limit circuit supply fluid to solenoid restricted or not available - debris, stuck limit valve (362) or sediment blockage • 3-5-R clutch boost valve (364) - binding or scored bore - can cause harsh shifts
P0776 P0777	Control Solenoid Valve Assembly	• Clutch pressure control solenoid 2 stuck ON or stuck OFF • Control solenoid valve filter plate assembly, blocked or damaged gasket seal
P0776 P0777	A/Trans Fluid Pump (203)	• Fluid pump housing vanes/rotor/slide damaged/scored • A/Trans pump fluid outlet seal assembly (57)

		damaged/leaking
P0776	A/Trans Fluid Filter Assembly (201)	Oil filter (201) or filter seal (202) loose or damaged
P0776	Transmission Cooling/Lubrication	• Restriction/leak in oil to air (OAC) cooler/radiator • Restricted/leaking/kinked/damaged transmission oil cooler lines • Restriction/leak in transmission fluid pump assembly
P0776	Torque Converter Assembly (27)	Torque converter overstressed due to high temperature, fluid boiled out
P0776	Automatic Transmission Fluid Filter Assembly (201)	Oil filter (201) or filter seal (202) loose, plugged, or damaged
P0776	4-5-6 and 3-5-R Clutch Housing Assembly	• 3-5-R clutch backing plate retaining ring not seated or wave plate broken • Torn, cut, or rolled 3-5-R piston seal (417) • Inner/outer seal damaged • Dam pressure too high
P0776	A/Trans Case Cover (403)	Blow off regulator ball stuck.
P0776 P0777	Input shaft support	3-5-R and 4-5-6 clutch fluid seal rings (404) damaged, worn, or leaking

REPAIR PROCEDURES

NOTE:

- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
- Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Valve Lower Body and Upper Body Replacement**
- **Low and Reverse Clutch and 1-2-3-4 Clutch Plate Removal**
- **Control Module References** for control solenoid valve assembly replacement, setup, and programming

DTC P0796 OR P0797

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 P0796

Pressure Control Solenoid Valve 3 Stuck Off

DTC P0797

Pressure Control Solenoid Valve 3 Stuck On

CIRCUIT/SYSTEM DESCRIPTION

The clutch pressure control (PC) solenoid 3 is part of the control solenoid valve assembly, which has no serviceable components. The PC solenoid 3 regulates transmission fluid pressure (TFP) to the R1/4-5-6 clutch regulator valve which controls pressure to the low and reverse clutch and the 4-5-6 clutch. The transmission control module (TCM) calculates gear ratio based on the RPM signals from the input speed sensor (ISS) and the output speed sensor (OSS). The TCM compares the expected transmission gear ratio to the calculated gear ratio for each commanded gear.

CONDITIONS FOR RUNNING THE DTC

P0796 or P0797

- No ISS 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, or P182E.
- The ignition voltage is greater than 8.6 volts.
- The engine speed is greater than 400 RPM for 5 seconds.
- The output speed is 16 RPM or greater, or the throttle position is 0.4 percent or greater.
- The throttle position signal is valid.
- The high side driver (HSD) is commanded ON.
- The transmission fluid temperature is 0°C (32°F) or greater.

CONDITIONS FOR SETTING THE DTC

P0796

The TCM detects an incorrect ON-coming clutch gear ratio or shift flare when the R1 or 4-5-6 clutch is commanded ON.

P0797

The TCM detects an incorrect OFF-going clutch gear ratio or shift tie-up when the R1 or 4-5-6 clutch is commanded OFF.

ACTION TAKEN WHEN THE DTC SETS

P0796

- DTC P0796 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM limits the transmission to 1st, 3rd, or reverse operation.

P0797

- DTC P0797 is a Type A DTC.
- The TCM commands maximum line pressure.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM limits the transmission to 4th and reverse 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

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

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

CIRCUIT/SYSTEM VERIFICATION

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

1. Engine idling in Park, with parking brake applied and drive wheels chocked.
2. Monitor the Transmission Fluid Pressure Switch 5 parameter with a scan tool. Place the gear select lever in Park, Reverse, and Neutral range. Verify the Transmission Fluid Pressure Switch 5 parameter states are correct for Park, Reverse, and Neutral. Refer to Transmission Fluid Pressure Switch Logic .
3. Place the gear select lever in Drive range. Command the shift transmission with a scan tool through all forward ranges. Verify the Transmission Fluid Pressure Switch 5 parameter states are correct for all forward ranges. Refer to Transmission Fluid Pressure Switch Logic .
4. Engine idling in Park, verify with a scan tool the transmission ISS/OSS Supply Voltage parameter displays OK.
5. Engine idling in Park. Observe the Transmission ISS parameter on the scan tool, while varying the engine speed. The Transmission ISS parameter should vary with engine speed and not drop out.
6. Operate the vehicle at 16-32 km/h (10-20 mph) while observing the Transmission OSS parameter on the scan tool. The Transmission OSS parameter should vary with the vehicle speed and not drop out.

NOTE: Perform a scan tool snapshot during the road test.

7. Perform the Road Test . Verify the transmission operation performs as indicated in the road test instructions.
8. Review the scan tool snapshot data. Verify the following transmission data parameters display the correct values for each gear range:
 - Transmission ISS
 - Transmission OSS
 - Pressure Control Solenoid Valve 3
 - Transmission Fluid Pressure Switch 5
9. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

1. Perform the Line Pressure Check . Verify the transmission line pressure gauge is within the range specified in the Line PC Solenoid Valve Pressure table. Refer to Solenoid Valve Pressure .

- If not within the specified ranges, refer to **Fluid Pressure High or Low** .
- 2. Ignition OFF, remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
- 3. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Solenoid Performance Test** . A pressure change should occur for each solenoid valve.
 - If the control solenoid valve assembly does not pass the performance test, replace the control solenoid valve assembly.
- 4. Listed in the table below, are conditions for each component that could set DTC P0776 or P0777. Carefully inspect each component for that condition. Repair or replace as necessary.

DTCs	Component	Condition
P0796 P0797	Control Valve Upper Body Assembly (349)	4-5-6 regulator valve (326) stuck/sticking - debris, binding, damaged valve, or scored bore
P0796	Lower Control Valve Body Assembly (374)	• Actuator feed limit circuit supply fluid to solenoid restricted or not available, debris, stuck limit valve (362), or sediment blockage • 4-5-6 clutch boost valve (360) - binding or scored bore - can cause harsh shifts • 4-5-6 clutch accumulator piston (366) - leaking, cracked, or broken
P0796 P0797	Input shaft support	3-5-R and 4-5-6 clutch fluid seal rings (404) damaged, worn, or leaking
P0796 P0797	Control Solenoid Valve Assembly (314)	• Clutch pressure control solenoid 3 stuck ON or stuck OFF • Control solenoid filter plate assembly cracked, blocked, or damaged gasket seal
P0796	4-5-6 Clutch Housing Assembly (441)	• 4-5-6 clutch piston assembly (439) damaged/leaking • Inner/outer seal damaged • Dam pressure too high
P0796	A/Trans Case Cover (403)	Blow off regulator ball stuck
P0796	Transmission Cooling/Lubrication	• Restriction/leak in oil to air (OAC) cooler/radiator • Restricted/leaking/kinked/damaged transmission oil cooler lines • Restriction/leak in transmission fluid pump assembly
P0796	Torque Converter Assembly (27)	Fluid pump or torque converter overstressed due to high temperature, fluid boiled out
P0796	4-5-6 Reaction Carrier Hub Assembly	4-5-6 reaction carrier hub/shaft - broken hub weld
	A/Trans Fluid Filter Assembly	Oil filter (201) or filter seal (202) loose or damaged

P0796	(201)	
P0796	A/Trans Fluid Pump (203)	A/Trans pump fluid outlet seal assembly (57) damaged/leaking

REPAIR PROCEDURES

NOTE:

- Perform the Transmission Adaptive Values Learn following all transmission related repairs.
- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Control Valve Lower Body and Upper Body Replacement
- Low and Reverse Clutch and 1-2-3-4 Clutch Plate Removal and 3-5-Reverse and 4-5-6 Clutch Housing Disassemble
- Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0815, P0816, OR P0826

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

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

Tap Up/Tap Down Shift Signal	P0826	P0826	P0826	-
------------------------------	-------	-------	-------	---

TYPICAL SCAN TOOL DATA

Driver Shift Request

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Tap Up/Tap Down Switch Signal	Invalid	None	Invalid/None

CIRCUIT/SYSTEM DESCRIPTION

When the shift lever is placed in manual mode (M) this activates the driver shift request (DSR), also known as the tap shift function. The DSR allows the vehicle operator to shift gears by pressing the plus (+) button for an upshift or the minus (-) button for a downshift. A 12 volt signal circuit is provided by the body control module (BCM) to the plus or minus buttons. When a plus or minus button is pressed, a corresponding voltage drop occurs across the resistor network embedded in the switches. This voltage drop is monitored by the BCM. The BCM will send the request to the transmission control module (TCM) to perform the upshift or downshift.

CONDITIONS FOR RUNNING THE DTC

P0815 or P0816

- DTC P0815, P0816, P0826, P1761, P182E, P1876, P1877, or P1915 is not set.
- The time since the range change is 1 second or greater.
- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.

P0826

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P0826 or P1761 is not set.

CONDITIONS FOR SETTING THE DTC

P0815 - Condition 1

The TCM detects an upshift request for 1 second in PARK or neutral.

P0815 - Condition 2

The TCM detects an upshift request for 10 minutes in any forward range.

P0816 - Condition 1

The TCM detects a downshift request for 1 second in PARK or neutral.

P0816 - Condition 2

The TCM detects a downshift request for 10 minutes in any forward range.

P0826

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

ACTION TAKEN WHEN THE DTC SETS

- DTCs P0815, P0816, and P0826 are Type C DTCs.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.

CONDITIONS FOR CLEARING THE DTC

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

REFERENCE INFORMATION

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

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

CIRCUIT/SYSTEM VERIFICATION

1. Ignition ON, observe the scan tool Driver Shift Control Mode parameter while moving the transmission shift lever through all the positions. The parameter should display Inactive in the park, reverse, neutral, and drive positions, and Active in the M position.
2. Shift lever in the M position, verify the scan tool Driver Shift Request parameter changes from None to Upshift when the plus button is pressed, and from none to Downshift when the minus button is pressed.
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

1. Ignition OFF, disconnect the shift lever assembly electrical connector from the shift lever assembly.
2. Test for less than 10 ohms between the shift lever harness connector terminal 2 and ground.
 - If greater than the specified range, repair the ground circuit.
3. Ignition ON, verify the scan tool Driver Shift Control Mode parameter displays inactive.
 - If not the expected results, test the signal circuit between shift lever assembly connector terminal 3 and the BCM for a short to voltage or ground. If the circuit tests normal, replace the BCM.
4. Ignition OFF, connect a test lamp between shift lever harness connector B+ terminal 1 and ground circuit terminal 2.
5. Ignition ON, verify the test lamp is illuminated.
 - If the light stays off, test the B+ circuit for an open/high resistance. If the circuit tests normal, replace the BCM.
6. Test for 11-13 volts at the shift lever assembly harness connector between signal circuit terminal 3 and ground.
 - If not within the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
7. Ignition OFF, connect the shift lever harness connector.
8. Ignition ON, back probe the shift lever assembly connector and test for 11-13 volts between terminal 3 and ground with the shift lever in park, reverse, neutral, and drive.
 - If not within the specified range, replace the shift lever assembly.
9. Use a DMM to monitor the voltage between shift lever assembly connector terminal 3 and ground with the shift lever in the M position, with the tap up plus button depressed, and the M position with the tap down minus button depressed. Compare the readings and verify the voltages are correct for each position as follows:
 - Manual: 8.0-10.6 volts
 - Tap down: 5.1-7.3 volts
 - Tap up: 2.0-4.6 volts
 - If not within the specified range, test the signal circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the shift lever assembly.

10. If all circuits test normal, replace the BCM.

REPAIR PROCEDURES

NOTE:

- Perform the Transmission Adaptive Values Learn following all transmission related repairs.
- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Control Module References for BCM or control solenoid valve assembly replacement, setup and programming
- Transmission Control Replacement

DTC P0842 OR P0843

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

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
TFP Switch 1 Signal	P0842	P0843	P0843	-
TFP Switch 3 Signal	P0872	P0873	P0873	-
TFP Switch 4 Signal	P0877	P0878	P0878	-
TFP Switch 5 Signal	P0989	P0990	P0990	-

CIRCUIT/SYSTEM DESCRIPTION

The transmission fluid pressure (TFP) switch 1 is part of the control solenoid valve assembly, which has no serviceable components. The transmission control module (TCM) supplies a signal circuit to the TFP Switch 1. The TFP Switch 1 has an internal case ground. TFP Switch 1 is normally closed or LOW. When oil pressure is present at the TFP 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 TCM monitors the TFP 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 TFP switch 1. When the 3-5 reverse clutch is commanded ON, the 3-5 reverse clutch regulator valve moves and pressure to the TFP switch 1 is exhausted through the 3-5 reverse clutch regulator valve.

CONDITIONS FOR RUNNING THE DTC

P0842 or P0843

- No DTCs P0711, P0712, P0713, P0716, P0717, P0722, P0723, P0742, P0751, P0756, P0757, P0973, P0974, P0976, P0977, P1915, P182E.
- The high side driver (HSD) is ON.
- The engine speed is 400 RPM or greater for 5 seconds.
- The engine speed is 550 RPM or greater.
- Ignition voltage is 8.6 volts or greater.
- The transmission fluid temperature (TFT) is 0-120°C (32-248°F).

CONDITIONS FOR SETTING THE DTC

P0842

The TCM detects that the TFP switch 1 signal voltage remains LOW after the 3-5-Reverse clutch transitions from a HIGH pressure state to a LOW pressure state. The TCM counts each incident. The DTC sets when 25 counts are accumulated.

P0843

The TCM detects that the TFP switch 1 signal voltage remains HIGH after the 3-5-Reverse clutch transitions from a LOW pressure state to a HIGH pressure state. The TCM counts each incident. The DTC sets when 35 counts are accumulated.

ACTION TAKEN WHEN THE DTC SETS

- DTCs P0842 and P0843 are Type C DTCs.
- The TCM 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 TFP switch may malfunction due to normal debris in the transmission fluid causing a TFP Switch DTC to intermittently set. This type of failure should not be immediately noticeable to a customer, as the switch outputs are used for shift adaptives 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
- Inline Harness Connector End Views

Description and Operation

- Transmission General Description
- Electronic Component Description for control solenoid valve assembly

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-47825-20: Adapter Harness

For equivalent regional tools, refer to Special Tools .

CIRCUIT/SYSTEM VERIFICATION

1. If there are any other transmission related DTCs set, diagnose those DTCs first. Refer to Diagnostic Trouble Code (DTC) List - Vehicle .

2. Engine idling in Park with parking brake applied, and drive wheels chocked.
3. Monitor the Transmission Fluid Pressure Switch 1, Transmission Fluid Pressure Switch 3, Transmission Fluid Pressure Switch 4, and Transmission Fluid Pressure Switch 5 parameters with a scan tool.
4. Place the gear select lever in Park, Reverse, and Neutral range. Verify the TFP Switch parameter states are correct for each range. Refer to **Transmission Fluid Pressure Switch Logic** .
5. Place the gear select lever in Drive range. Command the shift transmission with a scan tool through all forward ranges. Verify the TFP Switch parameter states are correct for each range. Refer to **Transmission Fluid Pressure Switch Logic** .
6. Operate the vehicle within the conditions for running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF. Remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
2. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .
3. Place the control solenoid valve assembly on a clean work surface near the transmission assembly.
4. Connect **DT-47825-20**: harness between the vehicle wire harness electrical connector, and the control solenoid valve assembly electrical connector.
5. Ignition ON, verify with a scan tool that the Transmission Fluid Pressure Switch 1, Transmission Fluid Pressure Switch 3, Transmission Fluid Pressure Switch 4, and Transmission Fluid Pressure Switch 5 parameters change states when gently pushing on each TFP switch with the eraser end of a pencil.
 - If any TFP Switch parameter does not change states, replace the control solenoid valve assembly.

REPAIR PROCEDURES

- NOTE:**
- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
 - Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, or programming

DTC P0850-P0852

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 (PNP) Switch Circuit

DTC P0851

Park/Neutral Position (PNP) Switch Circuit Low Voltage

DTC P0852

Park/Neutral Position (PNP) Switch Circuit High Voltage

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park/Neutral 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 Parameter Normal Range: 12 Volts = In-Gear, 0 Volts = Park/Neutral			
Park/Neutral Signal	Park/Neutral	In-Gear	In-Gear

CIRCUIT/SYSTEM DESCRIPTION

The transmission manual shift shaft switch assembly, also known as the internal mode switch (IMS), is a sliding contact switch attached to the manual shift shaft inside the transmission case. The park/neutral position (PNP) switch is integrated into the IMS and connects to the transmission control module (TCM) lead-frame through a short wire harness. The circuit uses the TCM as a pass-through connector only. The park/neutral signal is sent from the park/neutral switch directly to the engine control module (ECM) and is used for engine start enable.

CONDITIONS FOR RUNNING THE DTC

- Ignition voltage is between 8-18 volts.
- Engine speed is greater than 1,000 RPM.

CONDITIONS FOR SETTING THE DTC

P0850 and P0851

- The ECM detects the park/neutral switch signal equals 0 volts when the IMS reports a Drive range for 0.2 second.
- TP is equal to or greater than 10 percent.
- Engine torque is equal to or greater than 75 N.m (55 lb ft).
- Vehicle speed is equal or greater than 10 km/h (6 mph).

P0852

The ECM detects the park/neutral switch signal equals 12 volts (in-gear) when the IMS reports a park/neutral range for 0.2 second.

ACTION TAKEN WHEN THE DTC SETS

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

CONDITIONS FOR CLEARING THE DTC

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

REFERENCE INFORMATION

Schematic Reference

Automatic Transmission Controls Schematics

Connector End View Reference

- Component Connector End Views
- Inline Harness Connector End Views

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-47825-20: Adapter Harness

For equivalent regional tools, refer to Special Tools .

CIRCUIT/SYSTEM VERIFICATION

1. If there are any other transmission DTCs set, diagnose those DTCs first. Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
2. Perform the Range Selector Lever Cable Adjustment procedure to verify proper adjustment.
3. Ignition ON, observe the scan tool ECM PNP Switch parameter while moving the gear shift lever from Park and through all ranges. The parameter should display Park/Neutral when in Park or Neutral and In-Gear when in Reverse or Drive.
4. Observe the scan tool TCM IMS A/B/C/P parameter while slowly moving the gear shift lever from Park through all ranges. The parameter should match each gear range that is selected. Refer to Transmission Internal Mode Switch Logic .
5. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF, disconnect the 20-way harness connector at the transmission.
2. Install the **DT-47825-20:** harness to the 20-way harness connector to the engine harness.
3. Test for less than 10 ohms between the ground circuit terminal 18 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, verify the scan tool ECM PNP Switch parameter displays In Gear.
 - If not the specified value, test the P/N signal circuit for a short to ground. If the circuit tests normal, replace the engine control module.
5. Connect a 3-amp fused jumper wire between the TCM harness connector terminal 3 and terminal 18. Verify the PNP Switch parameter changes to Park/Neutral.
 - If not the specified value, test the P/N signal circuit for an open/high resistance. If the circuit tests normal, replace the engine control module.

6. Ignition OFF, remove the control valve body cover. Refer to **Control Valve Body Cover Replacement**.
7. Connect the TCM harness connector.
8. Disconnect the IMS connector at the control solenoid valve assembly.
9. Ignition ON, verify the scan tool IMS A/B/C/P parameter displays HI for all four signal circuits.
 - If not the specified value, replace the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement**.
10. Verify the scan tool ECM PNP Switch parameter displays In Gear.
 - If not the specified value, replace the control solenoid valve assembly.
11. Connect a 3-amp fused jumper wire between each transmission range signal circuit terminal listed below and the IMS ground circuit, terminal A. Verify the corresponding scan tool IMS A/B/C/P parameter displays LOW when terminals E, D, C, and B are connected to the IMS ground and the ECM PNP Switch parameter displays Park/Neutral when terminal F is connected to ground.
 - Switch Signal A terminal E
 - Switch Signal B terminal D
 - Switch Signal C terminal C
 - Switch Signal P terminal B
 - PNP Switch Signal terminal F
 - If not the specified value, replace the control solenoid valve assembly.
12. If all circuits test normal, replace the IMS.

REPAIR PROCEDURES

NOTE:

- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
- Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection**.

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for ECM or control solenoid valve assembly replacement, setup, and programming
- **Range Selector Lever Cable Adjustment**
- **Control Valve Body Cover Replacement**
- **Manual Shift Detent Lever with Shaft Position Switch Assembly Replacement**

DTC P0872 OR P0873

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

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
TFP Switch 1 Signal	P0842	P0843	P0843	-
TFP Switch 3 Signal	P0872	P0873	P0873	-
TFP Switch 4 Signal	P0877	P0878	P0878	-
TFP Switch 5 Signal	P0989	P0990	P0990	-

TYPICAL SCAN TOOL DATA

Transmission Fluid Pressure Switch 1

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 12 volts = High, 0 volts = Low			
Transmission Fluid Pressure Switch 1 Control	Low	High	High

Transmission Fluid Pressure Switch 3

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 12 volts = High, 0 volts = Low			
Transmission Fluid Pressure Switch 3 Control	Low	High	High

Transmission Fluid Pressure Switch 4

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 12 volts = High, 0 volts = Low			

Transmission Fluid Pressure Switch 4 Control	Low	High	High
--	-----	------	------

Transmission Fluid Pressure Switch 5

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 12 volts = High, 0 volts = Low			
Transmission Fluid Pressure Switch 5 Control	Low	High	High

CIRCUIT/SYSTEM DESCRIPTION

The transmission fluid pressure (TFP) switch 3 is part of the control solenoid valve assembly, which has no serviceable components. The transmission control module (TCM) supplies a signal circuit to the TFP switch 3. The TFP switch 3 has an internal case ground. The TFP switch 3 is normally closed or LOW. When oil pressure is present at the TFP 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 TCM monitors the TFP 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 TFP switch 3. When the 2-6 clutch is commanded ON, the 2-6 clutch regulator valve moves and pressure to the TFP switch 3 is exhausted through the 2-6 clutch regulator valve.

CONDITIONS FOR RUNNING THE DTC

P0872 or P0873

- DTC P0711, P0712, P0713, P0716, P0717, P0722, P0723, P0742, P0751, P0756, P0757, P0973, P0974, P0976, P0977, P1915, or P182E is not set.
- The high side driver (HSD) is ON.
- The engine speed is 400 RPM or greater for 5 seconds.
- The engine speed is 550 RPM or greater.
- Ignition voltage is 8.6 volts or greater.
- The transmission fluid temperature (TFT) is 0-120°C (32-248°F).

CONDITIONS FOR SETTING THE DTC

P0872

The TCM detects that the TFP switch 3 signal voltage remains LOW after the 2-6 clutch transitions from a HIGH pressure state to a LOW pressure state. The TCM counts each incident. The DTC sets when 18 counts are accumulated.

P0873

The TCM detects that the TFP switch 3 signal voltage remains HIGH after the 2-6 clutch transitions from a LOW pressure state to a HIGH pressure state. The TCM counts each incident. The DTC sets when 20 counts

are accumulated.

ACTION TAKEN WHEN THE DTC SETS

- DTCs P0872 and P0873 are Type C DTCs.
- The TCM 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 TFP switch may malfunction due to normal debris in the transmission fluid causing a TFP Switch DTC to intermittently set. This type of failure should not be immediately noticeable to a customer, as the switch outputs are used for shift adaptives 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**
- **Inline Harness Connector End Views**

Description and Operation

- **Transmission General Description**
- **Electronic Component Description** for control solenoid valve assembly

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-47825-20: Adapter Harness

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

CIRCUIT/SYSTEM VERIFICATION

1. If there are any other transmission related DTCs set, diagnose those DTCs first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
2. Engine idling in Park with parking brake applied, and drive wheels chocked.
3. Monitor the Transmission Fluid Pressure Switch 1, Transmission Fluid Pressure Switch 3, Transmission Fluid Pressure Switch 4, and Transmission Fluid Pressure Switch 5 parameters with a scan tool.
4. Place the gear select lever in Park, Reverse, and Neutral range. Verify the TFP Switch parameter states are correct for each range. Refer to **Transmission Fluid Pressure Switch Logic** .
5. Place the gear select lever in Drive range. Command the Shift Transmission with a scan tool through all forward ranges. Verify the TFP Switch parameter states are correct for each range. Refer to **Transmission Fluid Pressure Switch Logic** .
6. Operate the vehicle within the conditions for running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF. Remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
2. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .
3. Place the control solenoid valve assembly on a clean work surface near the transmission assembly.
4. Connect **DT-47825-20:** harness between the vehicle wire harness electrical connector, and the control solenoid valve assembly electrical connector.
5. Ignition ON, verify with a scan tool that the Transmission Fluid Pressure Switch 1, Transmission Fluid Pressure Switch 3, Transmission Fluid Pressure Switch 4, and Transmission Fluid Pressure Switch 5 parameters change states when gently pushing on each TFP switch with the eraser end of a pencil.
 - If any TFP Switch parameter does not change states, replace the control solenoid valve assembly.

REPAIR PROCEDURES

- NOTE:**
- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
 - Before replacing the TCM, perform the **Control Solenoid Valve and**

Transmission Control Module Assembly Inspection .

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, or programming

DTC P0877 OR P0878

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

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
TFP Switch 1 Signal	P0842	P0843	P0843	-
TFP Switch 3 Signal	P0872	P0873	P0873	-
TFP Switch 4 Signal	P0877	P0878	P0878	-
TFP Switch 5 Signal	P0989	P0990	P0990	-

TYPICAL SCAN TOOL DATA

Transmission Fluid Pressure Switch 1

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 12 volts = High, 0 volts = Low			
Transmission Fluid Pressure Switch 1 Control	Low	High	High

Transmission Fluid Pressure Switch 3

--	--	--	--

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 12 volts = High, 0 volts = Low			
Transmission Fluid Pressure Switch 3 Control	Low	High	High

Transmission Fluid Pressure Switch 4

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 12 volts = High, 0 volts = Low			
Transmission Fluid Pressure Switch 4 Control	Low	High	High

Transmission Fluid Pressure Switch 5

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Engine running, normal operating temperature Parameter Normal Range: 12 volts = High, 0 volts = Low			
Transmission Fluid Pressure Switch 5 Control	Low	High	High

CIRCUIT/SYSTEM DESCRIPTION

The transmission fluid pressure (TFP) switch 4 is part of the control solenoid valve assembly which has no serviceable components. The transmission control module (TCM) supplies a signal circuit to the TFP switch 4. The TFP switch 4 has an internal case ground. TFP switch 4 is normally closed or LOW. When oil pressure is present at the TFP 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 TCM monitors the TFP 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 TFP 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 TFP switch 4 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, P0742, P0751, P0756, P0757, P0973, P0974, P0976, P0977, P1915, P182E is not set.
- The engine speed is 400 RPM or greater for 5 seconds.
- The engine speed is 550 RPM or greater.
- Ignition voltage is 8.6 volts or greater.
- The transmission fluid temperature (TFT) is 0-120°C (32-248°F).

CONDITIONS FOR SETTING THE DTC

P0877

The TCM detects that the TFP 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 TCM counts each incident. The DTC sets when 5 counts are accumulated.

P0878

The TCM detects that the TFP 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 TCM counts each incident. The DTC sets when 8 counts are accumulated.

ACTION TAKEN WHEN THE DTC SETS

- DTCs P0877 and P0878 are Type C DTCs.
- The TCM 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 TFP switch may malfunction due to normal debris in the transmission fluid causing a TFP Switch DTC to intermittently set. This type of failure should not be immediately noticeable to a customer, as the switch outputs are used for shift adaptives 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
- Inline Harness Connector End Views

Description and Operation

- Transmission General Description
- Electronic Component Description for control solenoid valve assembly

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-47825-20: Adapter Harness

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

CIRCUIT/SYSTEM VERIFICATION

1. If there are any other transmission related DTCs set, diagnose those DTCs first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
2. Engine idling in Park with parking brake applied, and drive wheels chocked.
3. Monitor the Transmission Fluid Pressure Switch 1, Transmission Fluid Pressure Switch 3, Transmission Fluid Pressure Switch 4, and Transmission Fluid Pressure Switch 5 parameters with a scan tool.
4. Place the gear select lever in Park, Reverse, and Neutral range. Verify the TFP Switch parameter states are correct for each range. Refer to **Transmission Fluid Pressure Switch Logic** .
5. Place the gear select lever in Drive range. Command the Shift Transmission with a scan tool through all forward ranges. Verify the TFP Switch parameter states are correct for each range. Refer to **Transmission Fluid Pressure Switch Logic** .
6. Operate the vehicle within the conditions for running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF. Remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
2. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .
3. Place the control solenoid valve assembly on a clean work surface near the transmission assembly.
4. Connect **DT-47825-20:** harness between the vehicle wire harness electrical connector, and the control

solenoid valve assembly electrical connector.

5. Ignition ON, verify with a scan tool that the Transmission Fluid Pressure Switch 1, Transmission Fluid Pressure Switch 3, Transmission Fluid Pressure Switch 4, and Transmission Fluid Pressure Switch 5 parameters change states when gently pushing on each TFP switch with the eraser end of a pencil.
 - If any TFP Switch parameter does not change states, replace the control solenoid valve assembly.

REPAIR PROCEDURES

NOTE:

- Perform the Transmission Adaptive Values Learn following all transmission related repairs.
- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, or programming

DTC P0961-P0963

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 P0961

Line Pressure Control Solenoid Valve System Performance

DTC P0962

Line Pressure Control Solenoid Valve Control Circuit Low Voltage

DTC P0963

Line Pressure Control Solenoid Valve Control Circuit High Voltage

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Line PC Solenoid Control	P0962	P0963	P0963	P0961

TYPICAL SCAN TOOL DATA

Line Pressure Control Solenoid Valve Performance Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Operating Conditions: Ignition ON Parameter Normal Range: OK				
Line PC Solenoid Control	-	-	-	Fault or Malfunction

Line Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Operating Conditions: Ignition ON Parameter Normal Range: OK				
Line PC Solenoid Control	Fault or Malfunction	-	-	-

Line Pressure Control Solenoid Valve Control Circuit High Voltage Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Operating Conditions: Ignition ON Parameter Normal Range: OK				
Line PC Solenoid Control	-	Fault or Malfunction	Fault or Malfunction	-

CIRCUIT/SYSTEM DESCRIPTION

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

CONDITIONS FOR RUNNING THE DTC

- The engine speed is greater than 400 RPM for 5 seconds.
- The ignition voltage is 8.6 volts or greater.

CONDITIONS FOR SETTING THE DTC

The TCM detects an internal electrical malfunction of the line PC solenoid where the measured line PC solenoid current does not equal the commanded line PC solenoid current for 5 seconds.

P0962

The TCM detects a short to ground or an open/high resistance on the line PC solenoid control circuit for 1 second.

P0963

The TCM detects an open or a short to voltage on the line PC solenoid control circuit for 1 second.

ACTION TAKEN WHEN THE DTC SETS

P0961 or P0963

- DTCs P0961 and P0963 are Type C DTCs.
- The TCM freezes transmission adaptive functions.
- The TCM commands maximum line pressure.

P0962

- DTC P0962 is a Type A DTC.
- The TCM limits the transmission to reverse and 5th gear.
- The TCM inhibits the torque converter clutch (TCC).
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM turns the HSD OFF.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.
- The TCM enables torque management.

CONDITIONS FOR CLEARING THE DIC/DTC

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

REFERENCE INFORMATION

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

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

DT-47825-20: Adapter Harness

For equivalent regional tools, refer to Special Tools .

CIRCUIT/SYSTEM VERIFICATION

1. Engine running in Park position. Move the gear shifter lever into each gear position and back into Park position. Verify with a scan tool the following test status parameters display OK:
 - 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
2. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF, remove the control solenoid valve assembly. Refer to Control Solenoid Valve and Transmission Control Module Assembly Replacement .
2. Perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .
3. Place the control solenoid valve assembly on a clean work surface near the transmission assembly.

4. Connect **DT-47825-20**: harness between the vehicle wire harness electrical connector, and the control solenoid valve assembly electrical connector.
5. Ignition ON, verify with a scan tool the following test status parameters display OK:
 - 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 any test status parameter displays Fault or Malfunction, replace the control solenoid valve assembly.

REPAIR PROCEDURES

NOTE:

- Perform the Transmission Adaptive Values Learn following all transmission related repairs.
- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0965-P0967

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

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Pressure Control Solenoid Valve 2 Control	P0966	P0977	P0977	P0965

TYPICAL SCAN TOOL DATA

Pressure Control Solenoid Valve 2 Performance Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Operating Conditions: Ignition ON Parameter Normal Range: OK				
Pressure Control Solenoid Valve 2 Control	-	-	-	Fault or Malfunction

Pressure Control Solenoid Valve 2 Control Circuit Low Voltage Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Operating Conditions: Ignition ON Parameter Normal Range: OK				
Pressure Control Solenoid Valve 2 Control	Fault or Malfunction	-	-	-

Pressure Control Solenoid Valve 2 Control Circuit High Voltage Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Operating Conditions: Ignition ON Parameter Normal Range: OK				
Pressure Control Solenoid Valve 2 Control	-	Fault or Malfunction	Fault or Malfunction	-

CIRCUIT/SYSTEM DESCRIPTION

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

CONDITIONS FOR RUNNING THE DTC

P0965

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P0965 is not set.

P0966

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P0966 is not set.

P0967

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P0967 is not set.

CONDITIONS FOR SETTING THE DTC

P0965

The TCM detects an internal electrical performance malfunction of the clutch PC solenoid 2 control circuit where the measured clutch PC solenoid 2 current does not equal the commanded clutch PC solenoid 2 current for 5 seconds.

P0966

The TCM detects a short to ground on the clutch PC solenoid 2 control circuit for 1 second.

P0967

The TCM detects an open or short to voltage on the clutch PC solenoid 2 control circuit for 1 second.

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 limits the transmission to reverse and 5th gear operation.

- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM turns the HSD OFF.
- The TCM forces the torque converter clutch (TCC) OFF.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.

P0967

- DTC P0967 is a Type A DTC.
- The TCM limits the transmission to reverse and 3rd gear operation.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- 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

Connector End View Reference

- **Component Connector End Views**
- **Inline Harness Connector End Views**

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

DT-47825-20: Adapter Harness

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

CIRCUIT/SYSTEM VERIFICATION

1. Operate the vehicle in second gear long enough to ensure at least a 3°C (5°F) rise in TCM temperature, then operate the vehicle in Park for 5 seconds.
2. Operate the vehicle in drive range. Allow the transmission to shift through all forward gear ranges. Verify with a scan tool the following test status parameters display OK:
 - 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
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF, remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
2. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .
3. Place the control solenoid valve assembly on a clean work surface near the transmission assembly.
4. Connect **DT-47825-20:** harness between the vehicle wire harness electrical connector, and the control solenoid valve assembly electrical connector.
5. Ignition ON, verify with a scan tool the following test status parameters display OK:
 - 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 any test status parameter displays Fault or Malfunction, replace the control solenoid valve assembly.

REPAIR PROCEDURES

NOTE: • Perform the **Transmission Adaptive Values Learn** following all

transmission related repairs.

- Before replacing the TCM, perform the Control Solenoid Valve and Transmission Control Module Assembly Inspection .

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0969-P0971

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

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Pressure Control Solenoid Valve 3 Control	P0970	P0971	P0971	P0969

TYPICAL SCAN TOOL DATA

Pressure Control Solenoid Valve 3 Performance Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Operating Conditions: Ignition ON Parameter Normal Range: OK				
Pressure Control Solenoid Valve 3				Fault or

Control	-	-	-	Malfunction
---------	---	---	---	-------------

Pressure Control Solenoid Valve 3 Control Circuit Low Voltage Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Operating Conditions: Ignition ON Parameter Normal Range: OK				
Pressure Control Solenoid Valve 3 Control	Fault or Malfunction	-	-	-

Pressure Control Solenoid Valve 3 Control Circuit High Voltage Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Operating Conditions: Ignition ON Parameter Normal Range: OK				
Pressure Control Solenoid Valve 3 Control	-	Fault or Malfunction	Fault or Malfunction	-

CIRCUIT/SYSTEM DESCRIPTION

The clutch pressure (PC) solenoid 3 is part of the control solenoid valve assembly, which has no serviceable components. The normally high clutch PC solenoid 3 regulates and directs the clutch PC solenoid 3 oil pressure to the R1/4-5-6 clutch regulator valve and 4-5-6 clutch boost valve. Increasing clutch PC solenoid 3 oil pressure increases oil pressure to the low and reverse clutch or the 4-5-6 clutch, depending on the position of the clutch select valve 2. The transmission control module (TCM) varies the current to the PC solenoid 3 through a low side driver. Decreasing the current to the clutch PC solenoid 3 increases clutch PC solenoid 3 oil pressure by closing OFF the solenoid exhaust port. Increasing the current to the clutch PC solenoid 3, decreases clutch PC solenoid 3 oil pressure by opening the solenoid exhaust port. Clutch PC solenoid 3 power is supplied by the TCM through a high side driver (HSD). The HSD protects the circuit and components from excessive current flow. If excessive current flow is detected, the HSD will turn OFF. When the fault is corrected the HSD will reset.

CONDITIONS FOR RUNNING THE DTC

P0969

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P0969 is not set.

P0970

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P0970 is not set.

P0971

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P0971 is not set.

CONDITIONS FOR SETTING THE DTC

P0969

The TCM detects an internal electrical performance malfunction of the clutch PC solenoid 3 control circuit where the measured clutch PC solenoid 3 currents does not equal the commanded clutch PC solenoid 3 current for 5 seconds.

P0970

The TCM detects a short to ground on the clutch PC solenoid 3 control circuit for 1 second.

P0971

The TCM detects an open or short to voltage on the clutch PC solenoid 3 control circuit for 1 second.

ACTION TAKEN WHEN THE DTC SETS

P0969

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

P0970 or P0971

- DTCs P0970 and P0971 are Type A DTCs.
- The TCM limits the transmission to reverse and 5th gear operation.
- The TCM inhibits the torque converter clutch (TCC).
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM turns the HSD OFF.
- 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 DTC.
- DTCs P0970 and P0971 are Type A DTCs.

REFERENCE INFORMATION

Connector End View Reference

- Component Connector End Views
- Inline Harness Connector End Views

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

DT-47825-20: Adapter Harness

For equivalent regional tools, refer to Special Tools .

CIRCUIT/SYSTEM VERIFICATION

1. Operate the vehicle in second gear long enough to ensure at least a 3°C (5°F) rise in TCM temperature, then operate the vehicle in Park for 5 seconds.
2. Operate the vehicle in drive range. Allow the transmission to shift through all forward gear ranges. Verify with a scan tool the following test status parameters display OK:
 - 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
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF, remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
2. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .
3. Place the control solenoid valve assembly on a clean work surface near the transmission assembly.
4. Connect **DT-47825-20**: harness between the vehicle wire harness electrical connector, and the control solenoid valve assembly electrical connector.
5. Ignition ON, verify with a scan tool the following test status parameters display OK:
 - 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 any test status parameter displays Fault or Malfunction, replace the control solenoid valve assembly.

REPAIR PROCEDURES

- NOTE:**
- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
 - Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming

DTC P0973 OR P0974

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

Shift Solenoid Valve 1 Control Circuit High Voltage

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Shift Solenoid 1 Control	P0973	P0974	P0974	-

TYPICAL SCAN TOOL DATA

Shift Solenoid Valve 1 Control Circuit High Voltage Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Ignition ON Parameter Normal Range: OK			
Shift Solenoid 1 Control	-	-	Fault or Malfunction

Shift Solenoid Valve 1 Control Circuit Open Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Ignition ON Parameter Normal Range: OK			
Shift Solenoid 1 Control	-	Fault or Malfunction	-

Shift Solenoid Valve 1 Control Circuit Low Voltage Test Status

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Ignition ON Parameter Normal Range: OK			
Shift Solenoid 1 Control	Fault or Malfunction	-	-

CIRCUIT/SYSTEM DESCRIPTION

The shift solenoid (SS) 1 is part of the control solenoid valve assembly, which has no serviceable components. SS 1 is a normally closed (NC) ON/OFF solenoid and is controlled by the transmission control module (TCM) through a low side driver. When the SS 1 is energized (ON), SS 1 fluid pressure is directed to the clutch select valve 2, which allows the valve to overcome the spring pressure and move to the applied position. Power to the SS 1 is supplied by the TCM through a high side driver (HSD). The HSD protects the circuit and components from excessive current flow. If excessive current flow is detected, the HSD will turn OFF. When the fault is corrected, the HSD will reset.

CONDITIONS FOR RUNNING THE DTC

P0973

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P0973 is not set.

P0974

- The engine speed is 400 RPM or greater for 5 seconds.
- The ignition voltage is 8.6 volts or greater.
- DTC P0974 is not set.

CONDITIONS FOR SETTING THE DTC

P0973

The control solenoid valve assembly detects a short to ground on the SS 1 control circuit for 2 seconds.

P0974

The control solenoid valve assembly detects an open or a short to power on the SS 1 control circuit for 2 seconds.

ACTION TAKEN WHEN THE DTC SETS

P0973

- DTC P0973 is a Type A DTC.
- The TCM limits the transmission to reverse and 5th gear operation.
- The TCM inhibits torque converter clutch (TCC) engagement.
- The TCM commands maximum line pressure.
- The TCM freezes transmission adaptive functions.
- The TCM commands the HSD OFF.
- The TCM inhibits Tap Up/Down function.
- The TCM inhibits manual shifting of forward gears.

P0974

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

CONDITIONS FOR CLEARING THE DIC/DTC

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

REFERENCE INFORMATION

Connector End View Reference

- Component Connector End Views
- Inline Harness Connector End Views

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

DT-47825-20: Adapter Harness

For equivalent regional tools, refer to Special Tools .

CIRCUIT/SYSTEM VERIFICATION

1. Operate the vehicle in second gear long enough to ensure at least a 3°C (5°F) rise in TCM temperature, then operate the vehicle in Park for 5 seconds.
2. Place the gear selector in Reverse for 5 seconds and then idle the vehicle in Park for 5 seconds. Verify with a scan tool the following test status parameters display OK:
 - 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
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

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

1. Ignition OFF, remove the control solenoid valve assembly. Refer to **Control Solenoid Valve and Transmission Control Module Assembly Replacement** .
2. Perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .
3. Place the control solenoid valve assembly on a clean work surface near the transmission assembly.
4. Connect **DT-47825-20**: harness between the vehicle wire harness electrical connector, and the control solenoid valve assembly electrical connector.
5. Ignition ON, verify with a scan tool the following test status parameters display OK:
 - 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 any test status parameter displays Fault or Malfunction, replace the control solenoid valve assembly.

REPAIR PROCEDURES

- NOTE:**
- Perform the **Transmission Adaptive Values Learn** following all transmission related repairs.
 - Before replacing the TCM, perform the **Control Solenoid Valve and Transmission Control Module Assembly Inspection** .

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control solenoid valve assembly replacement, setup, and programming