

AXIOM

TRANSMISSION

TRANSMISSION CONTROL SYSTEM (4L30-E)

CONTENTS

Service Precaution	7A1-2	DTC P0705 Transmission Range Switch (Mode Switch) Illegal Position	7A1-27
General Description	7A1-2	DTC P0706 Transmission Range Switch (Mode Switch) Performance	7A1-30
Electronic Control Diagram	7A1-3	DTC P0711 Transmission Fluid Temperature (TFT) Sensor Performance	7A1-33
Powertrain Control Module (PCM)	7A1-4	DTC P0712 Transmission Fluid Temperature (TFT) Sensor Circuit Low Input	7A1-36
Control System Diagram	7A1-5	DTC P0713 Transmission Fluid Temperature (TFT) Sensor Circuit High Input	7A1-39
Shift Control	7A1-6	DTC P0719 Brake Switch Circuit Low (Stuck On)	7A1-42
Band Apply Control	7A1-6	DTC P0722 Automatic Transmission Output Speed Sensor (OSS) Low Input	7A1-45
Torque Converter Clutch Control (Electronically Controlled Capacity Clutch = ECCC)	7A1-6	DTC P0723 Automatic Transmission Output Speed Sensor (OSS) Intermittent	7A1-48
Line Pressure Control	7A1-6	DTC P0724 Brake Switch Circuit High (Stuck Off)	7A1-51
On-Board Diagnostic System	7A1-6	DTC P0730 Gear Error Without Input Speed	7A1-53
Fail Safe Mechanism	7A1-6	DTC P0742 Torque Converter Clutch (TCC) System Stuck On	7A1-56
Torque Management Control	7A1-6	DTC P0748 Pressure Control Solenoid (PCS) (Force Motor) Circuit Electrical	7A1-58
ATF Warning Control	7A1-6	DTC P0751 Shift Solenoid A Performance (Stuck Off)	7A1-60
Reverse Lock Out Control	7A1-6	DTC P0752 Shift Solenoid A Performance (Stuck On)	7A1-62
Downhill Control	7A1-6	DTC P0753 Shift Solenoid A Electrical	7A1-64
Uphill Control	7A1-6	DTC P0756 Shift Solenoid B Performance (Stuck Off)	7A1-67
Shift Mode Control	7A1-7	DTC P0757 Shift Solenoid B Performance (Stuck On)	7A1-69
Gear Shift Control	7A1-8	DTC P0758 Shift Solenoid B Electrical	7A1-71
Winter Drive Mode	7A1-9	DTC P1850 Brake Band Apply Solenoid Malfunction	7A1-75
Backup Mode	7A1-9	DTC P1860 TCC PWM Solenoid Electrical	7A1-79
Functions of Input / Output Components ..	7A1-10	DTC P1870 Transmission Component Slipping (TCC Stuck Off)	7A1-82
Diagnosis	7A1-11	Circuit Diagram	7A1-84
Electronic Diagnosis	7A1-11	Parts Location	7A1-86
Check Trans Indicator	7A1-11	Harness Connector Faces	7A1-87
Diagnostic Check	7A1-11	Transmission Fluid Temperature (TFT) Sensor Specifications	7A1-89
"Check Trans" Check	7A1-12		
Tech 2 OBD II Connection	7A1-13		
Transmission Data	7A1-18		
OBD II Diagnostic Management System ..	7A1-19		
16 – Terminal Data Link Connector (DLC) .	7A1-20		
Malfunction Indicator Lamp (MIL)	7A1-21		
DTC Types	7A1-21		
Clear DTC	7A1-22		
DTC Check	7A1-22		
PCM Precaution	7A1-22		
Information On PCM	7A1-22		
Intermittent Conditions	7A1-23		
Transmission And PCM Identification	7A1-23		
Diagnostic Trouble Code (DTC) Identification	7A1-24		
DTC P0218 Transmission Fluid Over Temperature	7A1-25		

Service Precaution

WARNING: THIS VEHICLE HAS A SUPPLEMENTAL RESTRAINT SYSTEM (SRS). REFER TO THE SRS COMPONENT AND WIRING LOCATION VIEW IN ORDER TO DETERMINE WHETHER YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING. WHEN YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING, REFER TO THE SRS SERVICE INFORMATION. FAILURE TO FOLLOW WARNINGS COULD RESULT IN POSSIBLE AIR BAG DEPLOYMENT, PERSONAL INJURY, OR OTHERWISE UNNEEDED SRS SYSTEM REPAIRS.

CAUTION: Always use the correct fastener in the proper location. When you replace a fastener, use **ONLY** the exact part number for that application. ISUZU will call out those fasteners that require a replacement after removal. ISUZU will also call out the fasteners that require thread lockers or thread sealant. **UNLESS OTHERWISE SPECIFIED**, do not use supplemental coatings (Paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.

General Description

The 4L30-E is a 4-speed fully automatic transmission. It uses a microcomputer as a control unit to judge running conditions including throttle opening rate and vehicle speed, then it sets the shifting point in the optimum timing so that best driving performance can be achieved.

In addition, the built-in shift mode select function can select three shift modes according to the driver's preference:

- Normal mode –Normal shift pattern.
- Winter mode –Starts in 3rd gear to reduce slippage on ice or snow.
- Power mode has a delayed upshift when more powerful acceleration is required.

Also, the built-in fail safe function ("backup mode") assures driving performance even if the vehicle speed sensor, throttle signal or any solenoid fails.

Further, the self-diagnostic function conducts diagnosis in a short time when the control system fails, thus improving serviceability.

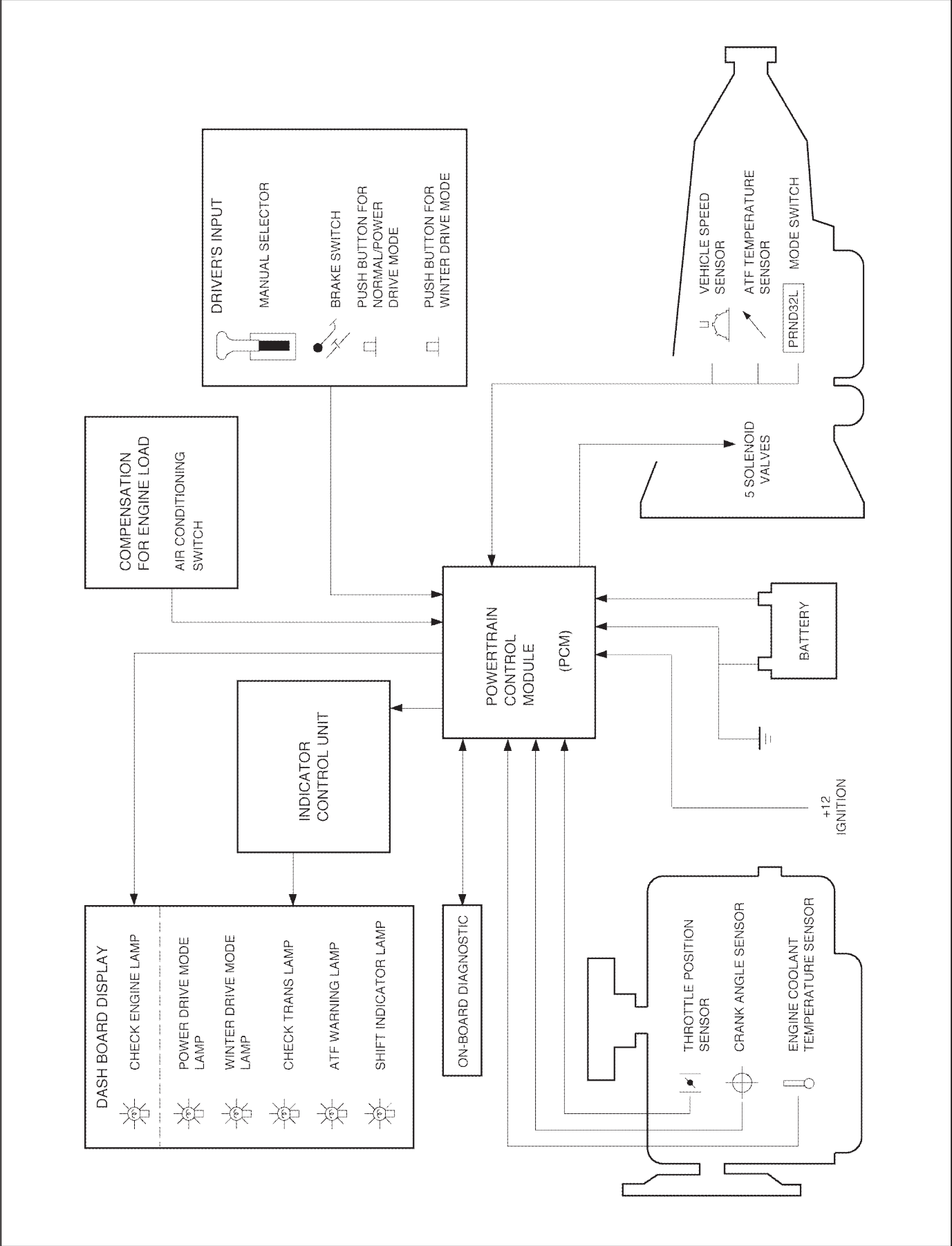
The major features of 4L30-E are as follows:

- A compact structure consisting of 2 sets of planetary gears and flat torque converter.
- Electronic control selects the optimum shift mode according to the driving conditions.
- Electronic control maintains the optimum hydraulic pressure for clutch, band brake as well as transmission so that shift feeling is improved.
- Two sets of planetary gears reduce friction of power train.

Also, a lockup mechanism in the torque converter reduces fuel consumption.

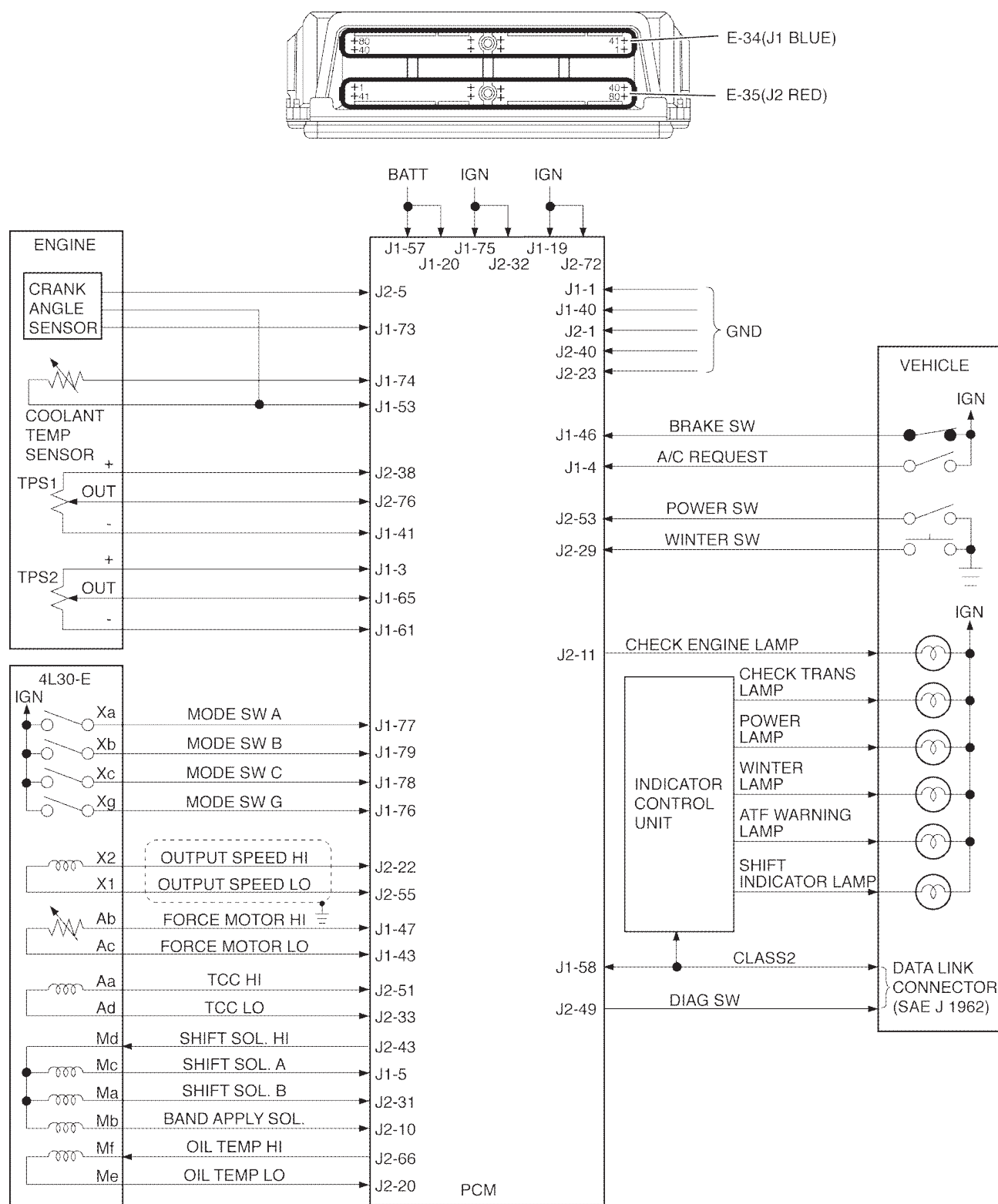
- Wide gear ratio and high torque rate of torque converter provide excellent starting performance.

Electronic Control Diagram



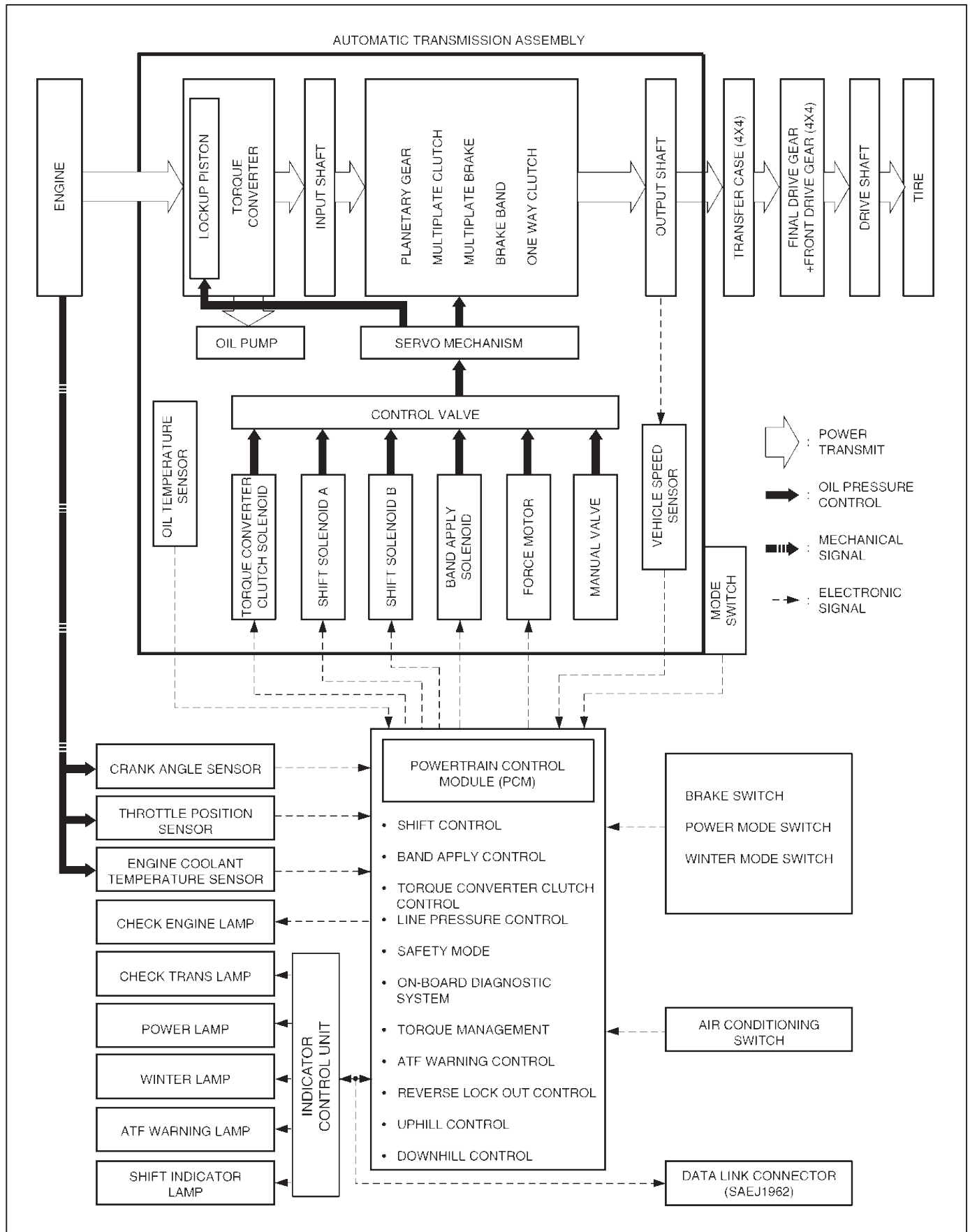
7A1-4 TRANSMISSION CONTROL SYSTEM (4L30-E)

Powertrain Control Module (PCM)



TPS : Throttle Position Sensor
TCC : Torque Converter Clutch

Control System Diagram



Shift Control

The transmission gear is shifted according to the shift pattern selected by the driver. In shifting gears, the gear ratio is controlled by the ON/ OFF signal using the shift solenoid A and the shift solenoid B.

Band Apply Control

The band apply is controlled when in the 3-2 downshift (engine overrun prevention) and the garage shift (shock control).

The band apply solenoid is controlled by the signal from the Pulse Width Modulation (PWM) to regulate the flow of the oil.

Torque Converter Clutch Control (Electronically Controlled Capacity Clutch = ECCC)

The clutch apply is controlled by moving the converter clutch valve by commanding Torque Converter Clutch (TCC) solenoid using the PWM signal.

Line Pressure Control

The throttle signal allows the current signal to be sent to the force motor. After receiving the current signal, the force motor activates the pressure regulator valve to regulate the line pressure.

On-Board Diagnostic System

Several malfunction displays can be stored in the Powertrain Control Module (PCM) memory, and read out of it afterward.

The serial data lines, which are required for the testing of the final assembly and the coupling to other electronic modules, can be regulated by this function.

Fail Safe Mechanism

If there is a problem in the transmission system, the PCM will go into a "backup" mode.

The vehicle can still be driven, but the driver must use the select lever to shift gears.

Torque Management Control

The transmission control side sends the absolute spark advance signal to the engine control side while the transmission is being shifted. This controls the engine spark timing in compliance with the vehicle running condition to reduce the shocks caused by the change of speed.

ATF Warning Control

The oil temperature sensor detects the ATF oil temperature to control the oil temperature warning, TCC, and the winter mode.

Reverse Lock Out Control

With the selector lever in reverse position, the PCM will not close the PWM solenoid until the vehicle is below 11 km/h (6.8 mph), thus preventing reverse engagement above this speed.

Downhill Control

This mode is automatically activated from "NORMAL" mode only when downhill conditions are recognized.

The shift pattern is identical to "NORMAL" mode except 3-4 and 4-3 shift lines at low throttle modified to get engine braking on a larger speed range.

ECCC lines unchanged compared to "NORMAL" mode.

Uphill Control

When Uphill condition are recognized the 2-3 and 3-4 shift and TCC apply take place only when the engine torque is sufficient in order to avoid shift hunting.

Shift Mode Control

① Mode Type

Mode Type	Select lever position
Normal drive mode (NOR)	Entire range (excluding "R")
Power drive mode (PWR)	Entire range (excluding "R")
Winter drive mode	"D" range only

② Mode selection

Mode Type	SWITCH (SW)		LAMP	
	POW/NOR. SW	WINTER SW	POWER DRIVE LAMP	WINTER DRIVE LAMP
Normal drive mode (NOR)	OFF	OFF	OFF	OFF
Power drive mode (PWR)	ON	OFF	ON	OFF
Winter drive mode	ON/OFF	ON	OFF	ON

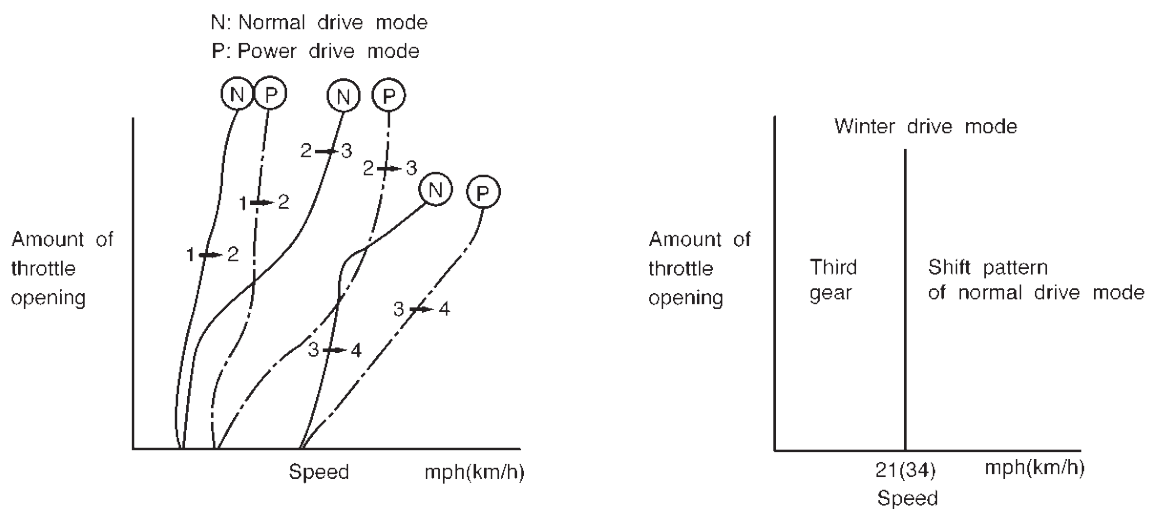
However, the winter switch prevails over the PWR/NOR switch.

The mode becomes normal drive mode when the winter switch is operated from ON to OFF.

③ Comparison of mode

- (1) The normal drive mode is set at the normal shift points.
- (2) The shift points of the power drive mode are shifted to the higher speed side, compared to the normal drive mode.
- (3) The winter drive mode is a special mode used exclusively for starting in third gear.

Shift diagram



7A1-8 TRANSMISSION CONTROL SYSTEM (4L30-E)

Gear Shift Control

① Shift pattern

SELECT LEVER RANGE	SHIFT PATTERN
D (Drive)	1 ⇄ 2TCC ⇄ 3TCC ⇄ 4TCC
3 (Third)	1 ⇄ 2TCC ⇄ 3TCC ← 4TCC
2 (Second)	1 ⇄ 2TCC ← 3TCC
L (First)	1 ← 2

TCC = Torque Converter Clutch

② Gear position

The gear is selected by ON/OFF of two solenoids.

Gear \ SOL	A	B
4 (Fourth)	×	×
3 (Third)	○	×
2 (Second)	○	○
1 (First)	×	○
P (park)		
R (Reverse)	×	○
N (Neutral)		

○ = ON

× = OFF

Shift solenoid A
(Normally closed)

ON → PRESSURE TO
SHIFT VALVE

Shift solenoid B
(Normally open)

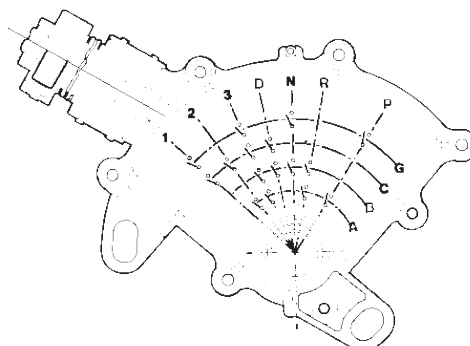
OFF → PRESSURE TO
SHIFT VALVE

③ Selecting gear position

Seven types of positions can be selected according to 5 signals from the mode switch as below.

SELECT LEVER RANGE	MODE SW TERMINALS				
	5(D)	8(A)	7(B)	6(C)	3(G)
P (park)	•	•			•
R (Reverse)	•	•	•		
N (Neutral)	•		•		•
D (Drive)	•		•	•	
3 (Third)	•	•	•	•	•
2 (Second)	•	•		•	
L (First)	•			•	•

• = Continuity



Winter Drive Mode

1. Operation

The winter switch will operate when switched on after all of the following conditions are present:

Conditions:

- a. The select lever position is "D" range only.
- b. Vehicle speed is 7 mph (11 km/h) or less.
- c. Transmission oil temperature is 130°C (266°F) or less.
- d. Accelerator opening is at 8% or less.

2. Cancel Release

1. Cancellation by driver
 - a. Turning off the winter drive mode switch
 - b. Shifting select position to "3", "2", or "L" (winter drive mode is not canceled by selecting "N", "R", or "P").
 - c. Ignition key is turned off.
2. Automatic cancellation
 - a. When vehicle runs at 21mph (34 km/h) or more for 1 second or more
 - b. When transmission oil temperature reaches 130°C (266°F) or above

NOTE: The mode returns to normal drive mode or power drive mode after the winter drive mode is canceled.

Backup Mode

If a major system failure occurs which could affect safety or damage the transmission under normal vehicle operation, the diagnostic system detects the fault and overrides the Powertrain Control Module (PCM).

The "CHECK TRANS" light flashes to alert the driver, and the transmission must be manually shifted as follows:

Select lever position	Gear Ratio Selected
D	4 (Fourth)
Manual 3	4 (Fourth)
Manual 2	3 (Third)
Manual L	1 (First)
R	Reverse

Shifts are firmer to prevent clutch slip and consequent wear. The fault should be corrected as soon as possible.

7A1-10 TRANSMISSION CONTROL SYSTEM (4L30-E)

Functions of Input / Output Components

Components		Function	
I N P U T S I G N A L	Speed sensor (fixed to transmission)	Senses rotation of output shaft and feeds the data to Powertrain Control Module (PCM).	
	Throttle position sensor (TPS) (fixed to engine)	Senses the extent of throttle valve opening and the speed of the throttle valve lever motion to open the valve. Feeds the data to PCM.	
	Brake switch (fixed to brake pedal)	Senses whether the driver has pressed the brake pedal or not and feeds the information to PCM.	
	Mode switch (fixed to transmission)	Senses the select lever position, and feeds the information to PCM.	
	Power drive switch (fixed to front console)	Senses whether the driver has selected the power mode, and feeds the information to PCM.	
	T/M oil temperature sensor	Senses the T/M oil temperature and feeds the data to PCM	
	Engine coolant temperature sensor	Senses the engine coolant temperature, and feeds the data to PCM.	
	Engine speed signal	Feeds the signals monitoring engine speed to PCM from crank angle sensor.	
	Air conditioning information	Senses whether the air conditioner has been switched on or not, and feeds the information to PCM.	
	Winter switch (fixed to front console)	Senses whether the driver has selected the winter mode, and feeds the information to PCM.	
	Cruise controller (Overdrive OFF signal)	Downshift takes place when overdrive OFF signal is received from auto cruise controller integrated in PCM.	
O U T P U T S I G N A L	S O L E N O I D	Shift solenoid A, B	Selects shift point and gear position suited to the vehicle running condition on the basis of PCM output.
		Band apply solenoid	Controls oil flow suited to the vehicle running condition on the basis of PCM output.
		Torque Converter Clutch PWM solenoid	Controls clutch apply suited to the vehicle running condition on the basis of PCM output.
		Force motor (Pressure regulator valve)	Adjusts the oil pump delivery pressure to line pressure suited to the vehicle running condition on the basis of PCM output.

Diagnosis

Electronic Diagnosis

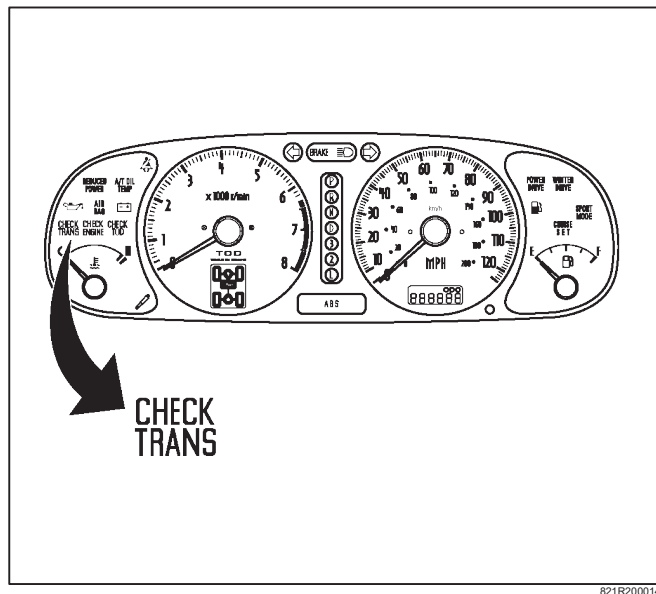
How To Diagnose The Problem

1. To avoid incorrect diagnostics, this book needs to be followed accurately. Unless stated, do not jump directly to a section that could contain the solution. Some important information may be missed.
2. The sections in CAPITALS and bold are the main sections that can be found in the contents.
3. The GO TO "**SECTION**" means to continue to check going to the "section".
4. The GO THROUGH "**SECTION**" means to go through the "section" and then to go back to the place the GO THROUGH was written.
5. BASIC ELECTRIC CIRCUITS:
You should understand the basic theory of electricity. This includes the meaning of voltage, amps, ohms, and what happens in a circuit with an open or shorted wire. You should also be able to read and understand wiring diagrams.

Check Trans Indicator

Find CHECK TRANS indicator and verify if it is

- A. Flashing: GO TO **DIAGNOSTIC CHECK**.
- B. Staying on: GO THROUGH **CHECK TRANS CHECK**.
- C. Is never ON when the ignition key is turned on: GO THROUGH **CHECK TRANS CHECK**.
- D. Is ON during 2 seconds at ignition but OFF after: Normal operation. No DTC or malfunction.



Diagnostic Check

This test determines if the transmission or its input or output connections or sensors are failing.

1. Connect the Tech 2: GO THROUGH **Tech 2 OBD II CONNECTION**.

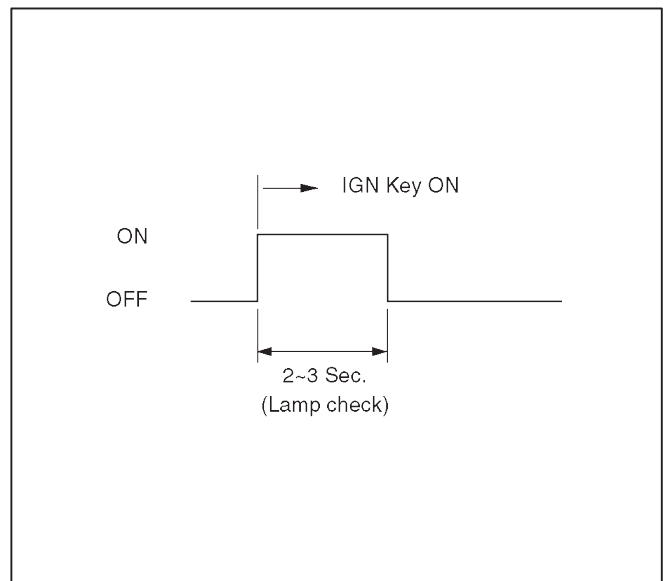
2. Turn on the ignition but not the engine.
3. Push "F0" on Tech 2 to see the Diagnostic Trouble Code (DTC):
4. Do you have a DTC?

YES: write down all code numbers and do the **DTC CHECK**

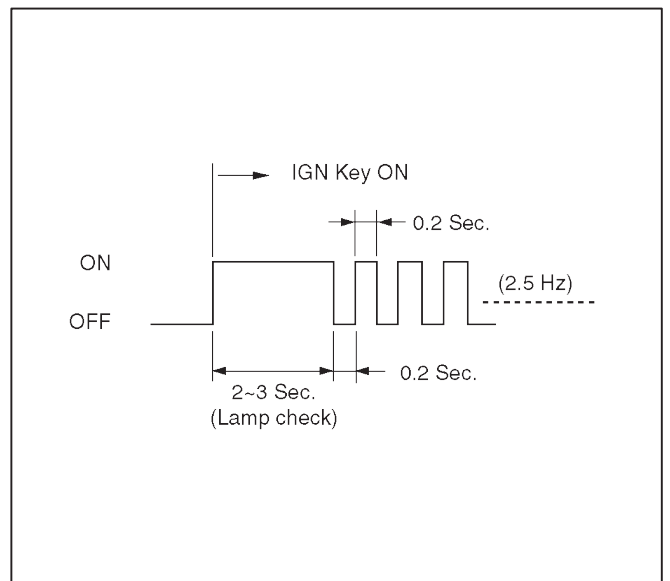
NO: the DTC can not help you finding the problem.

1. GO THROUGH "**CHECK TRANS**" CHECK
2. If it is flashing and the flash is 0.2 seconds ON and 0.2 seconds OFF, this means that you should have a DTC stored. Please recheck GO TO **DIAGNOSTIC CHECK** and if you find the same problem, replace the Powertrain Control Module (PCM).

Normal



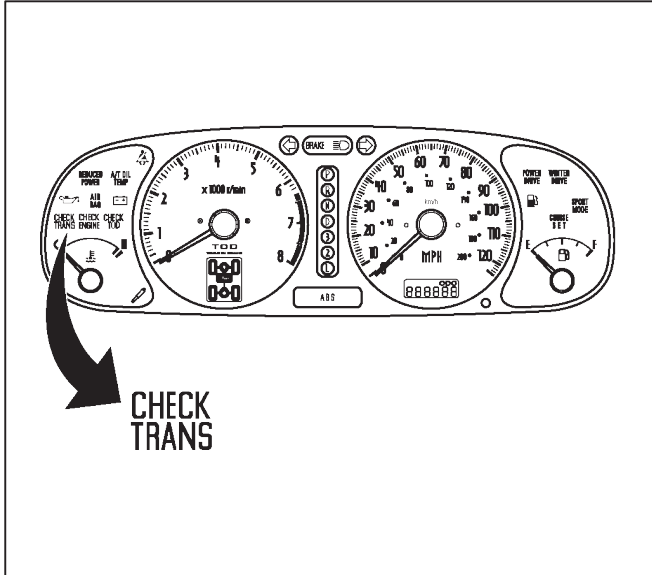
Abnormal



7A1-12 TRANSMISSION CONTROL SYSTEM (4L30-E)

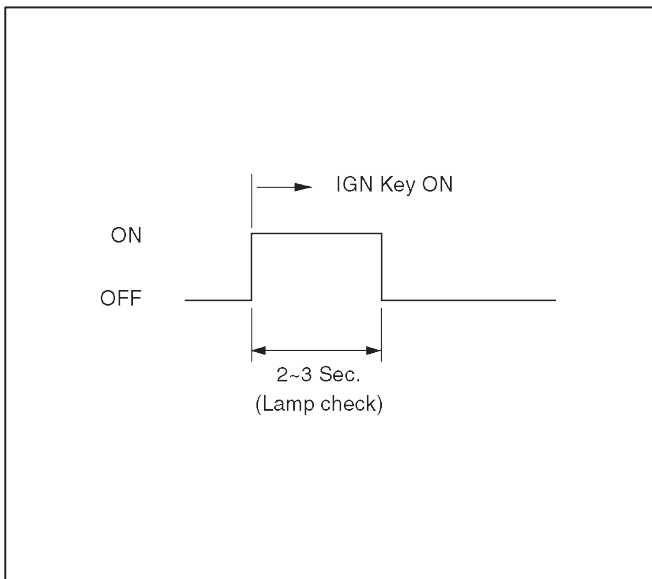
“Check Trans” Check

- Indicator is ON during 2~3 seconds at ignition (or when the engine is cranked) but it is OFF after the engine starts. The indicator is working normally GO TO **DIAGNOSTIC CHECK**.



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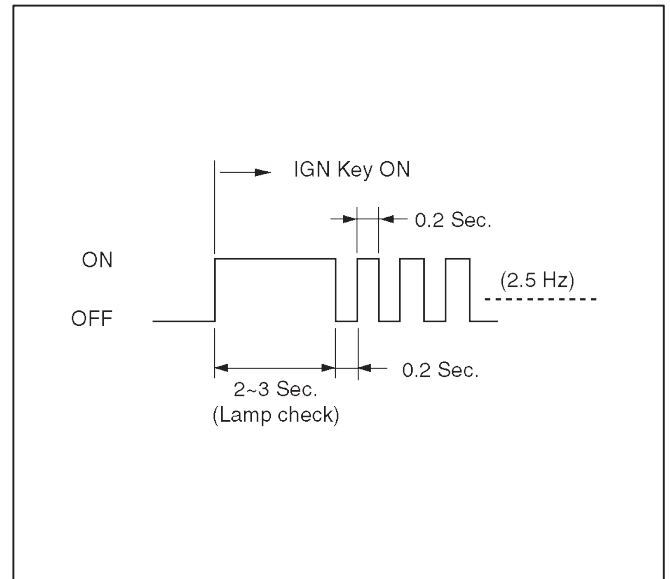
Normal



C07R200005

- Indicator is flashing and the flash is 0.2 seconds ON and 0.2 seconds OFF always when ignition is on (engine cranked or not). This means that there is a malfunction. GO TO **DIAGNOSTIC CHECK**.

Abnormal

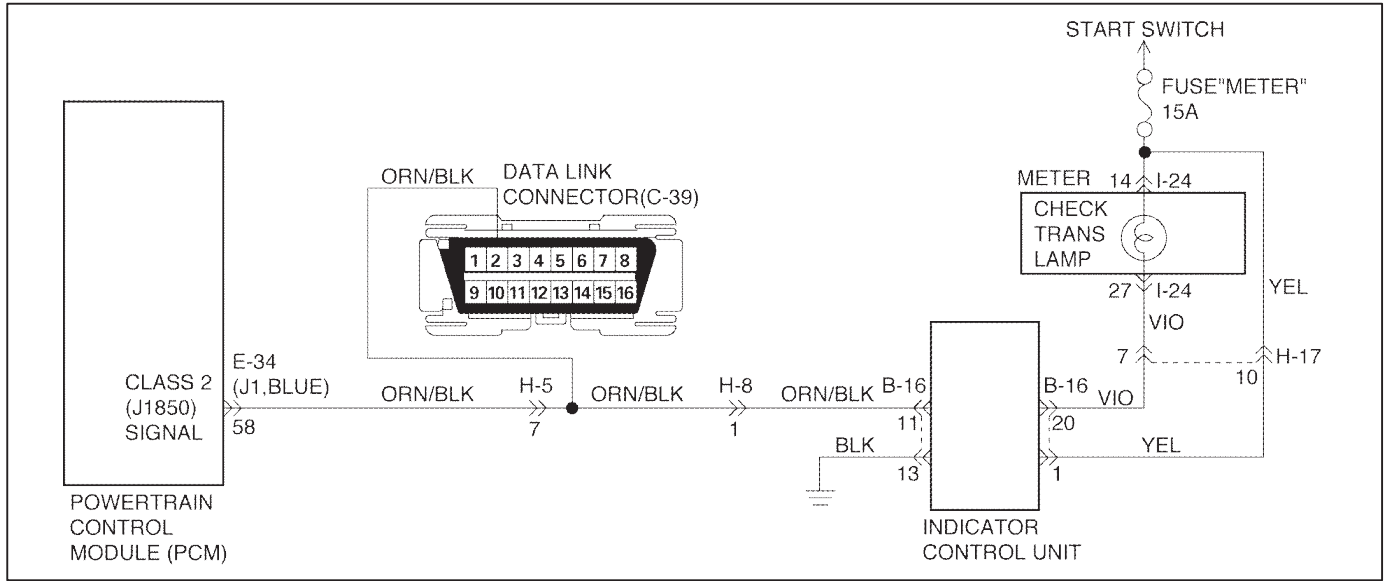


C07R200006

- Indicator is staying ON always when Ignition is ON.
 - This means that connection between the lamp and the indicator control unit is shorted to ground.
 - Verify if instrument panel terminal 27 of connector I-24 is shorted to ground.
 - Verify if the indicator control unit connector B-16 terminal 20 is shorted to ground.
 - Verify that the instrument panel terminal 14 of connector I-24 is connected to battery.
 - If problem solved: GO TO **CHECK TRANS INDICATOR**.
NO: Replace Powertrain Control Module (PCM).
- Indicator is staying OFF with the ignition ON (engine OFF).
 - This means that connection between the lamp and the indicator control unit is shorted to battery or opened.
 - Verify if instrument panel terminal 27 of connector I-24 is shorted to battery or open.
 - Verify if the indicator control unit connector B-16 terminal 20 is shorted to battery or open.
 - Verify that the instrument panel terminal 14 of connector I-24 is connected to battery. If not, check the fuses and the connections (terminal 7 of connector H-17) voltage.

5. If problem solved: GO TO **CHECK TRANS INDICATOR**.

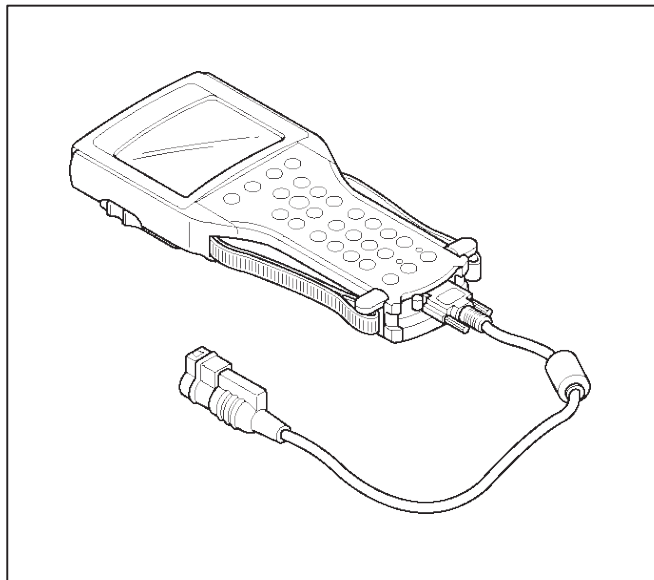
NO: Replace Powertrain Control Module (PCM).



Tech 2 OBD II Connection

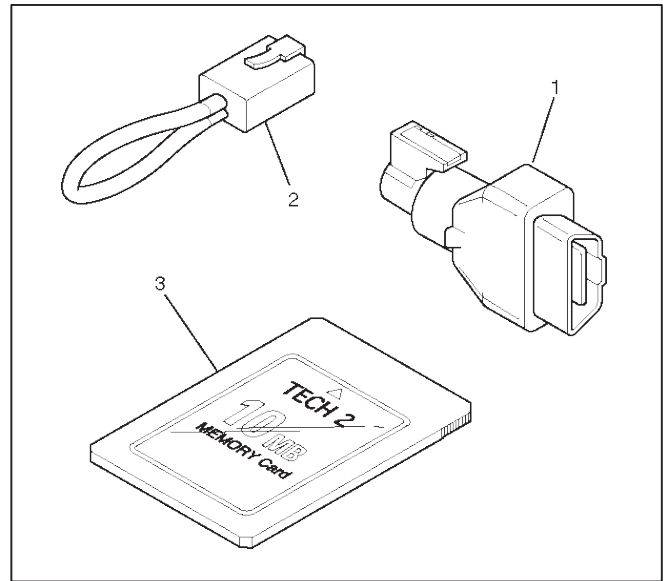
In order to access OBD II Powertrain Control Module (PCM) data, use of the Tech 2 scan tool kit (7000086) is required.

- The electronic diagnosis equipment is composed of:
 - Tech 2 hand held scan tool unit (7000057) and DLC cable (3000095).



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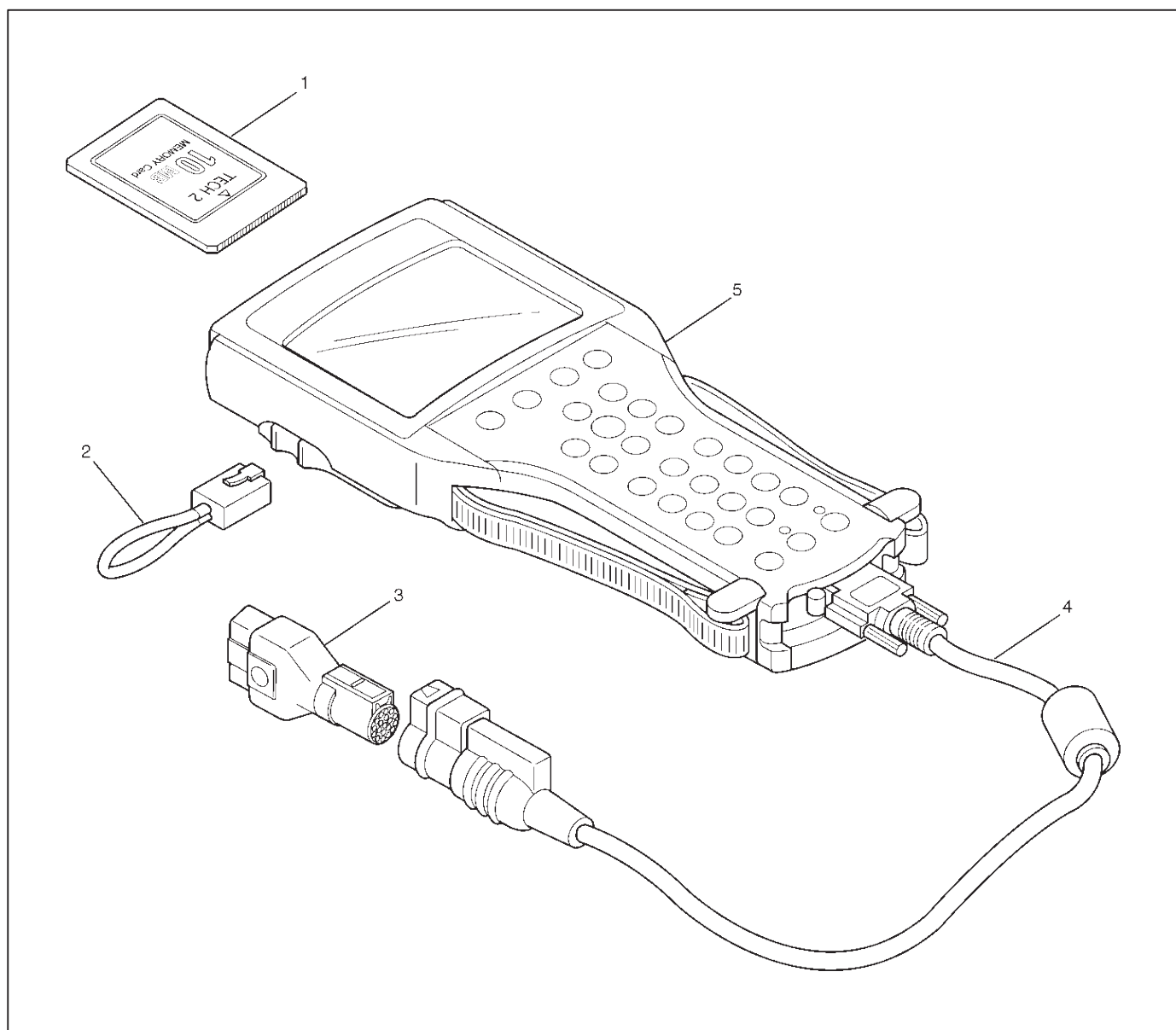
- SAE 16/19 adaptor (3000098) (1), RS 232 loop back connector (3000112) (2), and PCMCIA card (3000117) (3).



F07RW033

7A1-14 TRANSMISSION CONTROL SYSTEM (4L30-E)

2. Connecting the TECH2



901RW180

Legend

- (1) PCMCIA Card
- (2) RS 232 Loop Back Connector

- (3) SAE 16/19 Adapter
- (4) DLC Cable
- (5) Tech 2

● Before operating the Isuzu PCMCIA card with the Tech 2, the following steps must be performed:

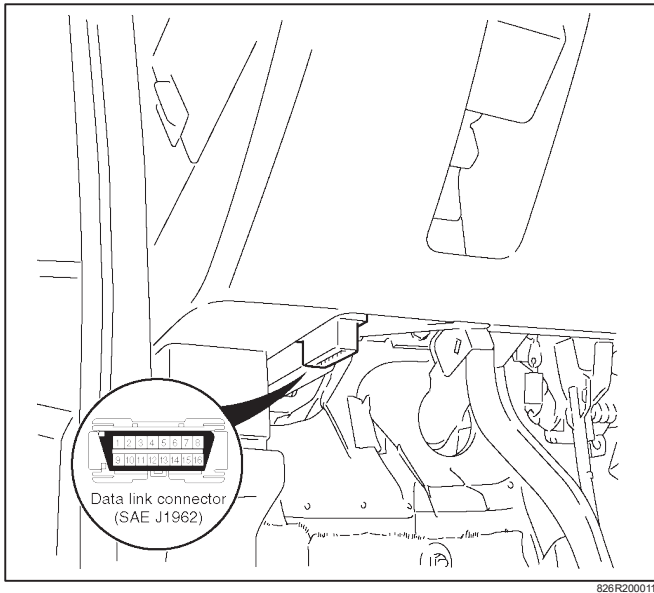
1. The Isuzu 2002 System PCMCIA card (1) inserts into the Tech 2 (5).

2. Connect the SAE 16/19 adapter (3) to the DLC cable (4).

3. Connect the DLC cable to the Tech 2 (5)

4. Make sure the vehicle ignition is off.

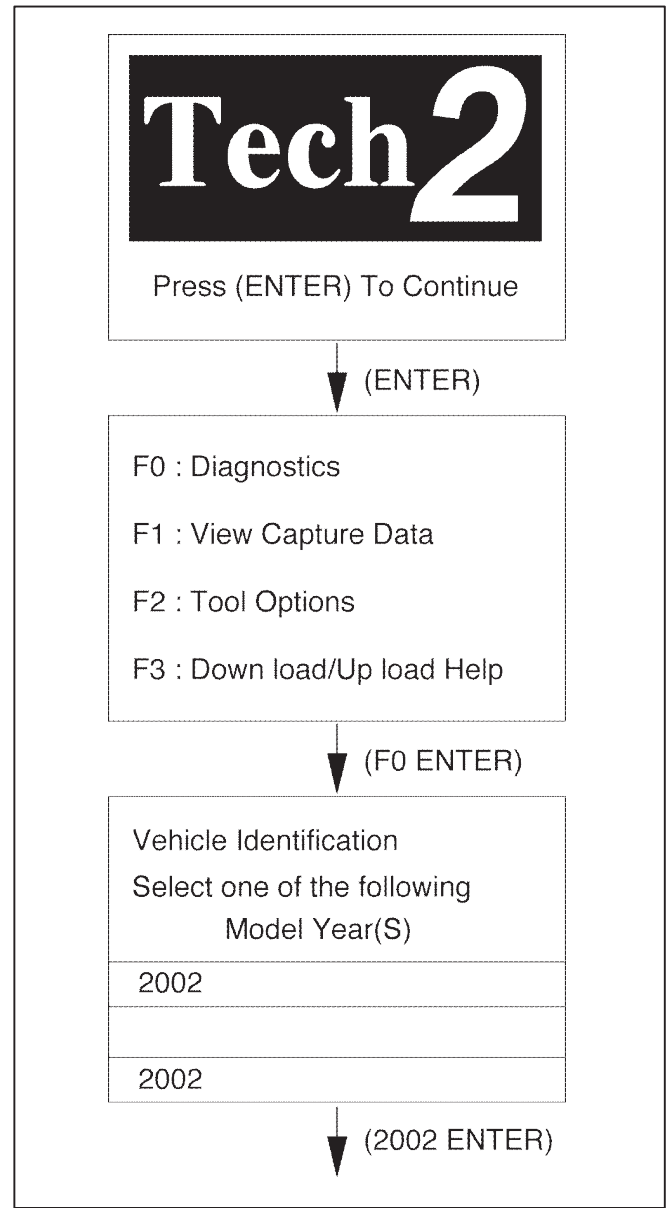
5. Connect the Tech 2 SAE 16/19 adaptor to the vehicle DLC.



6. The vehicle ignition turns on.
7. Verify the Tech 2 power up display.

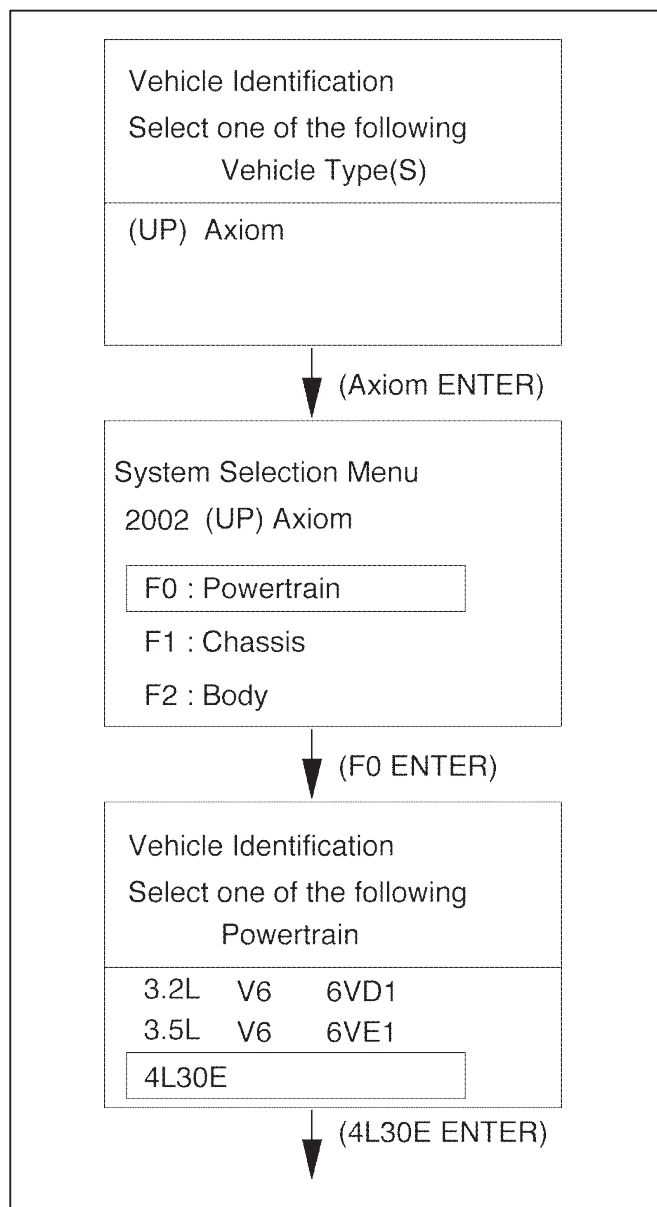


8. The power up screen is displayed when you power up the tester with the Isuzu systems PCMCIA card. Follow the operating procedure below.



NOTE: The RS232 Loop back connector is only to use for diagnosis of Tech 2 and refer to *user guide of the Tech 2*.

7A1-16 TRANSMISSION CONTROL SYSTEM (4L30-E)



060R200033

Once the test vehicle has been identified an "Application (Powertrain) Menu" screen appears. Please select the appropriate application.

The following table shows, which functions are used for the available equipment versions.

F0: Diagnostic Trouble Codes

F0: Read DTC Info Ordered By Priority

F1: Clear DTC Information

F2: DTC Information

F1: Data Display

F0: Transmission Data

F2: Snap Shot

F3: Actuator Tests

F0: Lamps

F0: Check Light

F1: Winter Drive Lamp

F2: Power Drive Lamp

F3: AT Oil Temperature Lamp

F1: Solenoids

F0: Solenoid 1-2/3-4 Test

F1: Solenoid 2-3 Test

F2: TCC Solenoid

F3: Band Apply Solenoid

F4: Pressure Control Solenoid (PCS)

F4: Function Tests

F0: Reset Oil Life Monitor

Diagnostic Trouble Codes

The purpose of the "Diagnostic Trouble Codes" mode is to display stored PCM trouble codes.

When "Diagnostic Trouble Codes" is selected an "Application Menu" screen appears.

Clear DTC Information

The purpose of the "Clear DTC Information" mode is to command the clearing of stored PCM trouble codes.

When "Clear DTC Information" is selected, a "Clear DTC Information", warning screen appears. This screen informs you that by cleaning DTC's, "all stored DTC information in controller will be erased".

Do you want to clear DTC's (Yes/No).

Press either the Yes or No key when answering.

After clearing codes, confirm system operation by test driving the vehicle.

Allow the vehicle to shift through all four forward gears in a manner which attempts to repeat the failure condition.

NOTE: When the trouble has not been repaired and the trouble code cannot be erased, check the vehicle again.

DTC Information

When "DTC Information" is selected, an "Application Menu" appears with a list of DTC information function keys addressing DTC specifics and their origins.

Function key selections may vary for particular vehicle and/or system.

Data Display

The purpose of the "Data Display" mode is to continuously monitor data parameters.

The current actual values of all important sensors and signals in the system are display through F1 mode.

When "Data Display" is selected an "Application Menu" appears. Please select either "Engine" or "Transmission Data Display".

See "Transmission Data" on next page.

Snapshot

When "Snapshot" is selected an "Application Menu" appears.

When "Transmission Snapshot" application is selected from the "Application Menu", a "Snapshot Menu" appears, displaying several options. "Snapshot" options may vary from one system to another.

"Snapshot" allows a recording of all vehicle parameters. There parameters may then be replayed at a future point in time.

This action allows you to focus on making the condition occur, rather than trying to view all of the data in anticipation of the fault. The snapshot will collect parameter information around a trigger point that you select.

When a snapshot is taken. It is recorded onto the PCMCIA memory card. When the Tech 2 is powered down. Snapshots are not lost.

Actuator Tests

The purpose of "Actuator Tests" mode is to check for correct operation of electronic system actuators.

Lamps

You can operate the lamps by pressing the ON and OFF buttons.

Preconditions: none

Solenoid

Solenoid 1-2/3-4, Solenoid 2-3, TCC Solenoid

You can operate the solenoids by pressing the ON and OFF buttons.

Preconditions: P-N position, no vehicle speed, no engine speed

Band Apply Solenoid

You can operate the solenoid by pressing the ON and OFF buttons.

Preconditions: P-N position, idle engine speed, no vehicle speed.

Pressure Control Solenoid (PCS)

You can set desired PCS Current using the "Increment" (+25) and "Decrement" (-25) button. The PC Solenoid Data informs about PCS Current, Pressure and Duty Cycle.

Preconditions: P-N position, no engine speed, no vehicle speed

Reset Oil Life Monitor

Displays parameter "Oil Life Monitor" and resets to 100% if Yes-button is pressed on Reset-question. "No" leaves test.

Preconditions: no vehicle speed, no engine speed

NOTE:

Freeze Frame (Powertrain DTC A/B Type)

Freeze Frame is an element of the Diagnostic Management System which stores various vehicle information at the moment an emissions-related fault is stored in memory and when the MIL is commanded on. These data can help to identify the cause of a fault. Refer to *Storing And Erasing Freeze Frame Data* for more detailed information.

Failure Records (Powertrain DTC C/D Type)

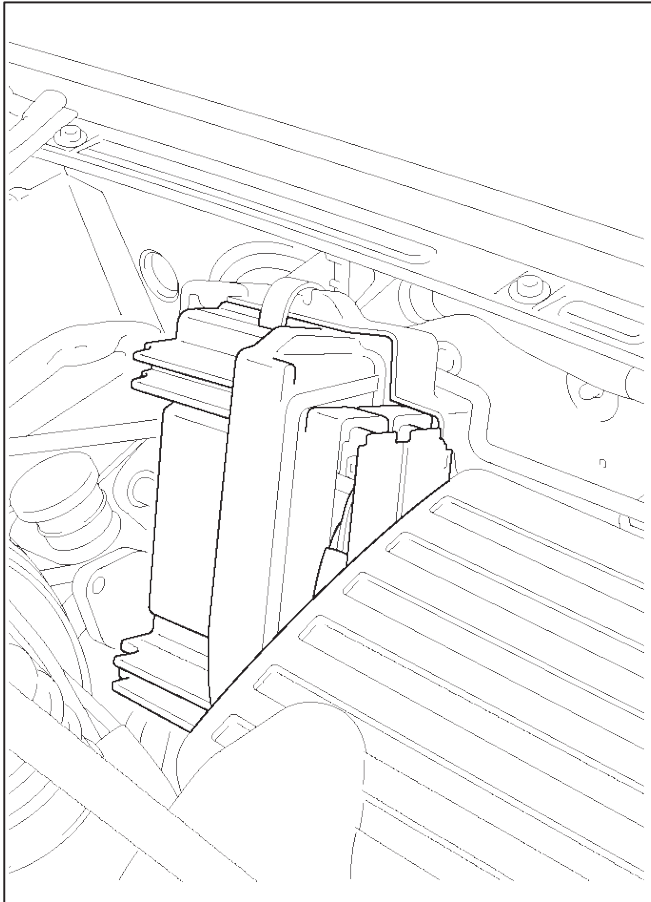
Failure Records data is an enhancement of the OBD II Freeze Frame feature. Failure Records store the same vehicle information as does Freeze Frame, but it will store that information for any fault which is stored in on-board memory, while Freeze Frame stores information only for emission-related faults that command the MIL on.

7A1-18 TRANSMISSION CONTROL SYSTEM (4L30-E)**Transmission Data**

Tech 2 string	Unit	Engine running at idle
Ignition Voltage	V	12.8 ~ 14.1 V
Engine Speed	RPM	750 ~ 900 RPM
Vehicle Speed	km/h, MPH	0 MPH
AT Output Speed (Automatic Transmission)	RPM	0 RPM
AT Input Speed Ratio (Automatic Transmission)		0.0
Throttle Position	%	0 %
AT Oil Temperature (Automatic Transmission)	°C, °F	70 ~ 80°C (158 ~ 176°F)
Transmission Temperature	°C, °F	75 ~ 110°C (167 ~ 230°F)
AT Oil Temperature Lamp (Automatic Transmission)	On/Off	Off
AT Oil Life Monitor (Automatic Transmission)	%	100 %
AT Oil Life Lamp (Automatic Transmission)	On/Off	(Not used)
Commanded Gear		1
Current Gear		1
Mode Switch A	Inactive/Active	Active
Mode Switch B	Inactive/Active	Inactive
Mode Switch C	Inactive/Active	Inactive
Mode Switch G	Inactive/Active	Active
Selector Position		Park
1-2 Shift Solenoid A	On/Off	Off
2-3 Shift Solenoid B	On/Off	On
Solenoid Brake Band	On/Off	Off
TCC Slip Speed	RPM	750 ~ 900 RPM
TCC Solenoid	On/Off	Off
TCC Duty Cycle	%	0 %
PCS Current (Pressure Control Solenoid)	A	approx. 1.0 A
PCS Duty Cycle (Pressure Control Solenoid)	%	approx. 45 ~ 60 %
Desired PCS Pressure (Pressure Control Solenoid)	kPa	43 ~ 52 kPa
Shift Pressure	kPa	43 ~ 52 kPa
Brake Switch	On/Off	On
Winter Switch	On/Off	Off
Winter Drive Lamp	On/Off	Off
Power Switch	Normal	Normal
Power Drive Lamp	Off/On	Off
Emergency Mode	Inactive/Active	Inactive
ABS Status	On/Off	(Not used)

OBD II Diagnostic Management System

Powertrain Control Module (PCM) Location

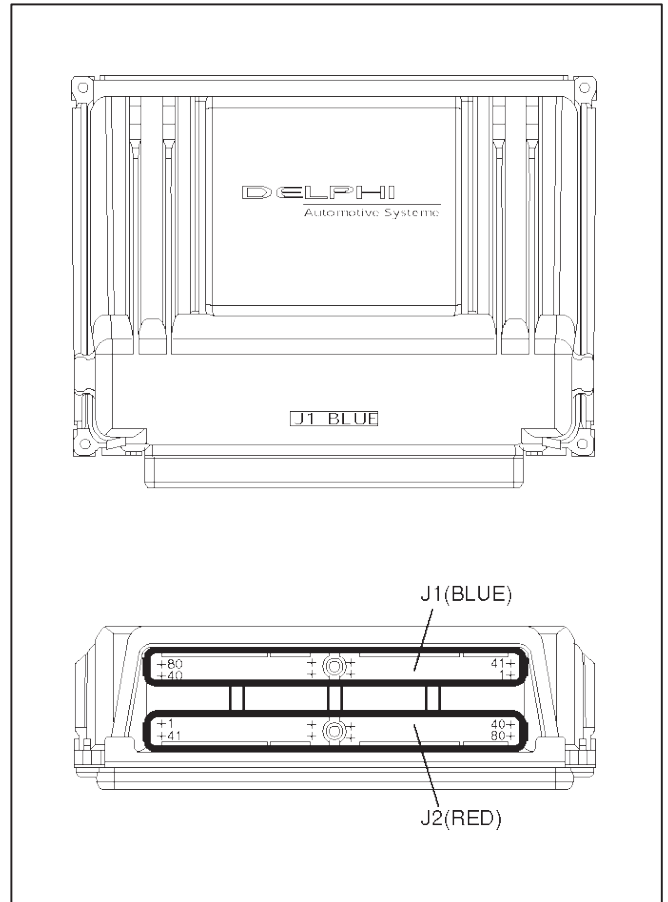


825R100018

Class 2 Serial Data Bus

OBD II technology requires a much more sophisticated PCM than does OBD I technology. The OBD II PCM diagnostic management system not only monitors systems and components that can impact emissions, but they also run active tests on these systems and components. The decision making functions of OBD II PCMs have also greatly increased. To accommodate this expansion in diagnostic complexity, Isuzu engineers have designed the Class 2 serial data bus, which meets SAE J1850 recommended practice for serial data.

“Serial Data” refers to information which is transferred in a linear fashion – over a single line, one bit at a time. A “Data Bus” is an electronic pathway through which serial data travels.



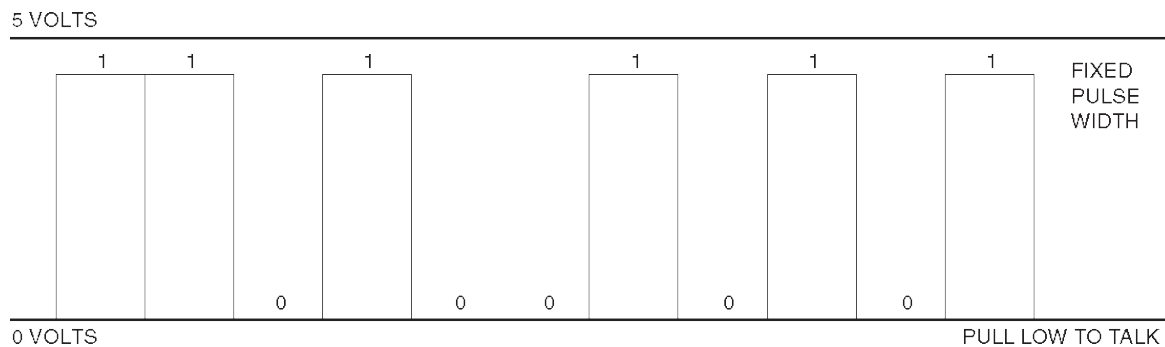
826RY002

AXIOM previously used a 5 volt data bus called UART, which is an acronym for “Universal Asynchronous Receive and Transmit”. When neither the vehicle’s control module nor the diagnostic tool, such as a Tech 2, are “talking,” the voltage level of the bus at rest is 5 volts. The two computers talk to each other at a rate of 8,192 bits per second, by toggling or switching the voltage on the data bus from 5 volts to ground.

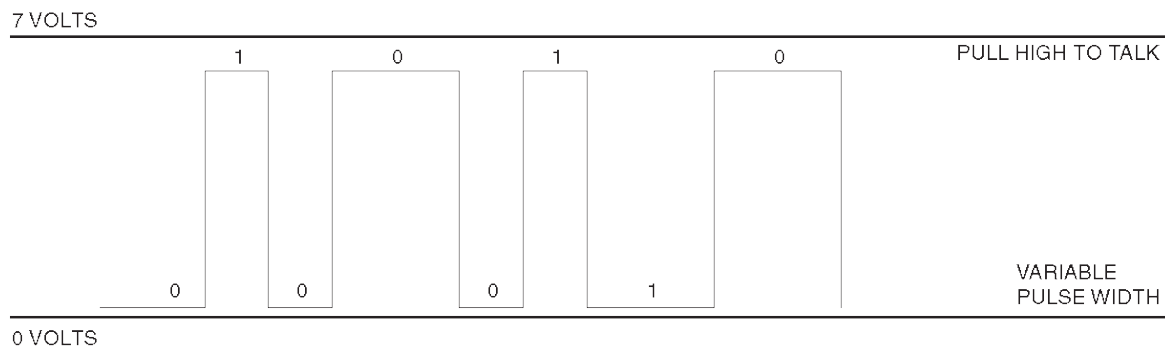
Class 2 data, which is used on OBD II vehicles, is quite different. Data is transferred at a rate of 10.4 kilobits per second, and the voltage is toggled between zero and 7 volts.

7A1-20 TRANSMISSION CONTROL SYSTEM (4L30-E)

UART



CLASS 2



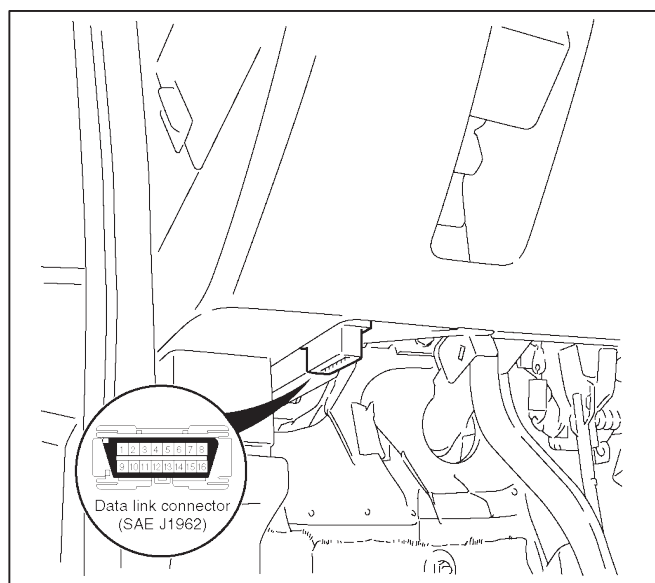
Class 2 data is also pulse width modulated. Each bit of information can have one of two lengths: long or short. On the other hand, UART data bits come in only one length (short). The pulse width modulation of Class 2 data allows better utilization of the data line.

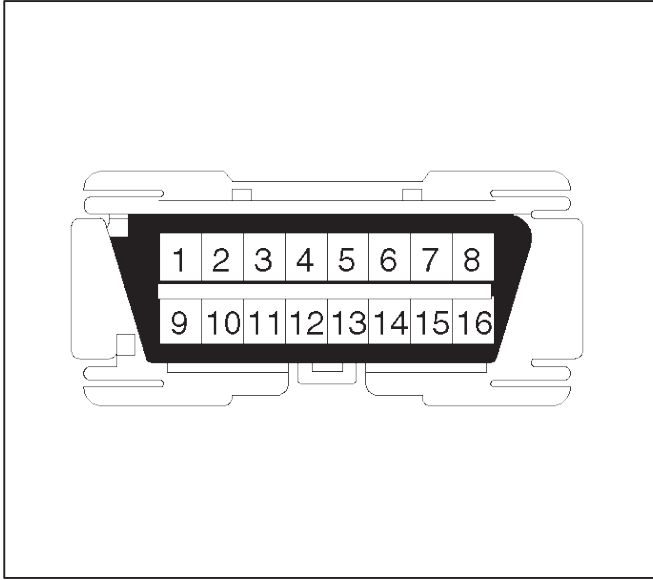
The message carried on Class 2 data streams are also prioritized. This means that if two devices try to communicate on the data line at the same time, only the higher priority message will continue. The device with the lower priority message must wait.

NOTE: The Class 2 data wire is always terminal 2 of the new 16-terminal Data Link Connector (DLC).

16 – Terminal Data Link Connector (DLC)

OBD II standardizes Data Link Connector (DLC) configurations. The DLC, formerly referred to as the ALDL, will be a 16-terminal connector found on the lower left side of the driver's side instrument panel. All manufacturers must conform to this 16-terminal standard.





810RT022

- PIN 1 – DIAG. SW
- PIN 2 – J1850 Bus + L line on 2-wire systems, or single wire (Class 2)
- PIN 3 – Active suspension diagnostic enable
- PIN 4 – Chassis ground pin
- PIN 5 – Signal ground pin
- PIN 6 – (Not used)
- PIN 7 – TOD diagnostic enable
- PIN 8 – TOD diagnostic enable
- PIN 9 – Primary UART
- PIN 10 – (Not used)
- PIN 11 – (Not used)
- PIN 12 – ABS diagnostic or CCM diagnostic enable
- PIN 13 – SIR diagnostic enable
- PIN 14 – (Not used)
- PIN 15 – (Not used)
- PIN 16 – Battery power from vehicle unswitched (4 AMP MAX.)

Malfunction Indicator Lamp (MIL)

The Malfunction Indicator Lamp (MIL) looks the same as the MIL you are already familiar with (“CHECK ENGINE” lamp). However, OBD II requires for it illuminate under a strict set of guidelines. Basically, the MIL is turned on when the PCM detects a DTC that will impact the vehicle’s emissions.

The MIL is under the control of the Diagnostic Executive. The MIL will be turned on if a component or system which has an impact on vehicle emissions indicates a malfunction or fails to pass an emissions-related diagnostic test. It will stay on until the system or component passes the same test, for three consecutive trips, with no emissions-related faults.

DTC Types

Each DTC is directly related to a diagnostic test. The Diagnostic Management System sets DTC based on the failure of the tests during a trip or trips. Certain tests must fail two (2) consecutive trips before the DTC is set. The following are the four (4) types of DTCs and the characteristics of those codes:

- Type A
 - Emissions related
 - Requests illumination of the MIL of the first trip with a fail
 - Stores a History DTC on the first trip with a fail
 - Stores a Freeze Frame (if empty) (DTC Information for 6VE1 engine)
 - Stores a Fail Record
 - Updates the Fail Record each time the diagnostic test fails
- Type B
 - Emissions related
 - “Armed” after one (1) trip with a fail
 - “Disarmed” after one (1) trip with a pass
 - Requests illumination of the MIL on the *second consecutive trip* with a fail
 - Stores a History DTC on the second consecutive trip with a fail (The DTC will be armed after the first fail)
 - Stores a Freeze Frame on the second consecutive trip with a fail (if empty) (DTC Information for 6VE1 engine)
 - Stores a Fail Record when the first test fails (not dependent on *consecutive trip* fails)
 - Updates the Fail Record each time the diagnostic test fails

(Some special conditions apply to misfire and fuel trim DTCs)

- Type C (if the vehicle is so equipped)
 - Non-Emissions related
 - Requests illumination of the Service Lamp or the service message on the Drive Information Center (DIC) on the *first trip* with a fail
 - Stores a History DTC on the *first trip* with a fail
 - *Does not* store a Freeze Frame
 - Stores Fail Record when test fails
 - Updates the Fail Record each time the diagnostic test fails
- Type D
 - Non-Emissions related
 - Not request illumination of any lamp
 - Stores a History DTC on the *first trip* with a fail
 - *Does not* store a Freeze Frame
 - Stores Fail Record when test fails
 - Updates the Fail Record each time the diagnostic test fails

7A1–22 TRANSMISSION CONTROL SYSTEM (4L30–E)

IMPORTANT: Only four Fail Records can be stored. Each Fail Record is for a different DTC. It is possible that there will not be Fail Records for every DTC if multiple DTCs are set.

Clear DTC

NOTE: If you clear the DTC (Diagnostic Trouble Codes) you will not be able to read any codes recorded during the last occurrence.

NOTE: To use the DTC again to identify a problem, you will need to reproduce the fault or the problem. This may require a new test drive or just turning the ignition on (this depends on the nature of the fault).

1. If you have a Tech 2:
 1. Connect the Tech 2 if it is still not connected **GO THROUGH Tech 2 OBD II CONNECTION.**
 2. Push “F1: Clear DTC Information” in the Application Menu and answer “Yes” to the question “Do you want to clear DTC’s?”
 - a. When a malfunction still exists and the Tech 2 displays “4L30E CODES NOT CLEARED”. This means that the problem is still there or that the recovery was not done. Please **GO TO DTC CHECK.**
 - b. When a malfunction has been repaired and the recovery is done. The Tech 2 displays “4L30E CODES CLEARED”.
2. If you have no Tech 2:

Disconnect the PCM battery feed as necessary.

DTC Check

1. Diagnostic Trouble Codes (DTC) have been identified by Tech 2.
2. You have written the list of the DTCs. The order of the malfunctions has no meanings for this PCM. Usually only one or two malfunctions should be set for a given problem.
3. Check directly the DTCs you identified. The DTCs are sorted by number. Refer to *Diagnostic Trouble Code (DTC) Identification in this section.*

PCM Precaution

The PCM can be damaged by:

1. Electrostatic discharge
2. The short circuit of some terminals to voltage or to ground.

Electrostatic Discharge Damage Description:

1. Electronic components used to control systems are often designed to carry very low voltage, and are very susceptible to damage caused by electrostatic discharge. It is possible for less than 100 volts of static electricity to cause damage to some electronic components. By comparison, it takes as much as 4,000 volts for a person to even feel the zap of a static discharge.

2. There are several ways for a person to become statically charged. The most common methods of charging are by friction and induction. An example of charging by friction is a person sliding across a car seat, in which a charge of as much as 25,000 volts can build up. Charging by induction occurs when a person with well insulated shoes stands near a highly charged object and momentarily touches ground. Charges for the same polarity are drained off, leaving the person highly charged with the opposite polarity. Static charges of either type can cause damage, therefore, it is important to use care when handling and testing electronic components.

NOTICE: To prevent possible electrostatic discharge damage:

1. Do not touch the PCM connector pins or soldered components on the PCM circuit board.
2. Be sure to follow the guidelines listed below if servicing any of these electronic components:
3. Do not open the replacement part package until it is time to install the part.
4. Avoid touching electrical terminals of the part.
5. Before removing the part from its package, ground the package to a known good ground on the vehicle.
6. Always touch a known good ground before handling the part. This step should be repeated before installing the part if the part has been handled while sliding across the seat, while sitting down from a standing position or while walking some distance.

Information On PCM

1. The Powertrain Control Module (PCM) is located in the center console and is the control center of the electronic transmission control system.
2. The PCM must be maintained at a temperature below 85° (185°F) at all times. This is most essential if the vehicle is put through a paint baking process. The PCM will become inoperative if its temperature exceeds 85°C (185°F). Therefore, it is recommended that the PCM be removed or that temporary insulation be placed around the PCM during the time the vehicle is in a paint oven or other high temperature process.
3. The PCM is designed to process the various inputs and then respond by sending the appropriate electrical signals to control transmission upshift, downshift, shift feel and torque converter clutch engagement.
4. The PCM constantly interprets information from the various sensors, and controls the systems that affect transmission and vehicle performance. By analyzing operational problems, the PCM is able to perform a diagnostic function by displaying DTC(s) and aid the technician in making repairs.

Intermittent Conditions

If the Tech 2 displays a diagnostic trouble code as intermittent, or if after a test drive a DTC does not reappear though the detection conditions for this DTC are present, the problem is most likely a faulty electrical connection or loose wiring. Terminals and grounds should always be the prime suspect. Intermittents rarely occur inside sophisticated electronic components such as the PCM.

Use the DTC information to understand which wires and sensors are involved.

When an intermittent problem is encountered, check suspect circuits for:

1. Poor terminal to wire connection.
2. Terminals not fully seated in the connector body (backed out).
3. Improperly formed or damaged terminals.
4. Loose, dirty, or corroded ground connections:
HINT: Any time you have an intermittent in more than one circuit, check whether the circuits share a common ground connection.

5. Pinched or damaged wires.

6. Electro-Magnetic Interference (EMI):

HINT: Check that all wires are properly routed away from coil, and generator. Also check for improperly installed electrical options, such as lights, 2-way radios, etc.

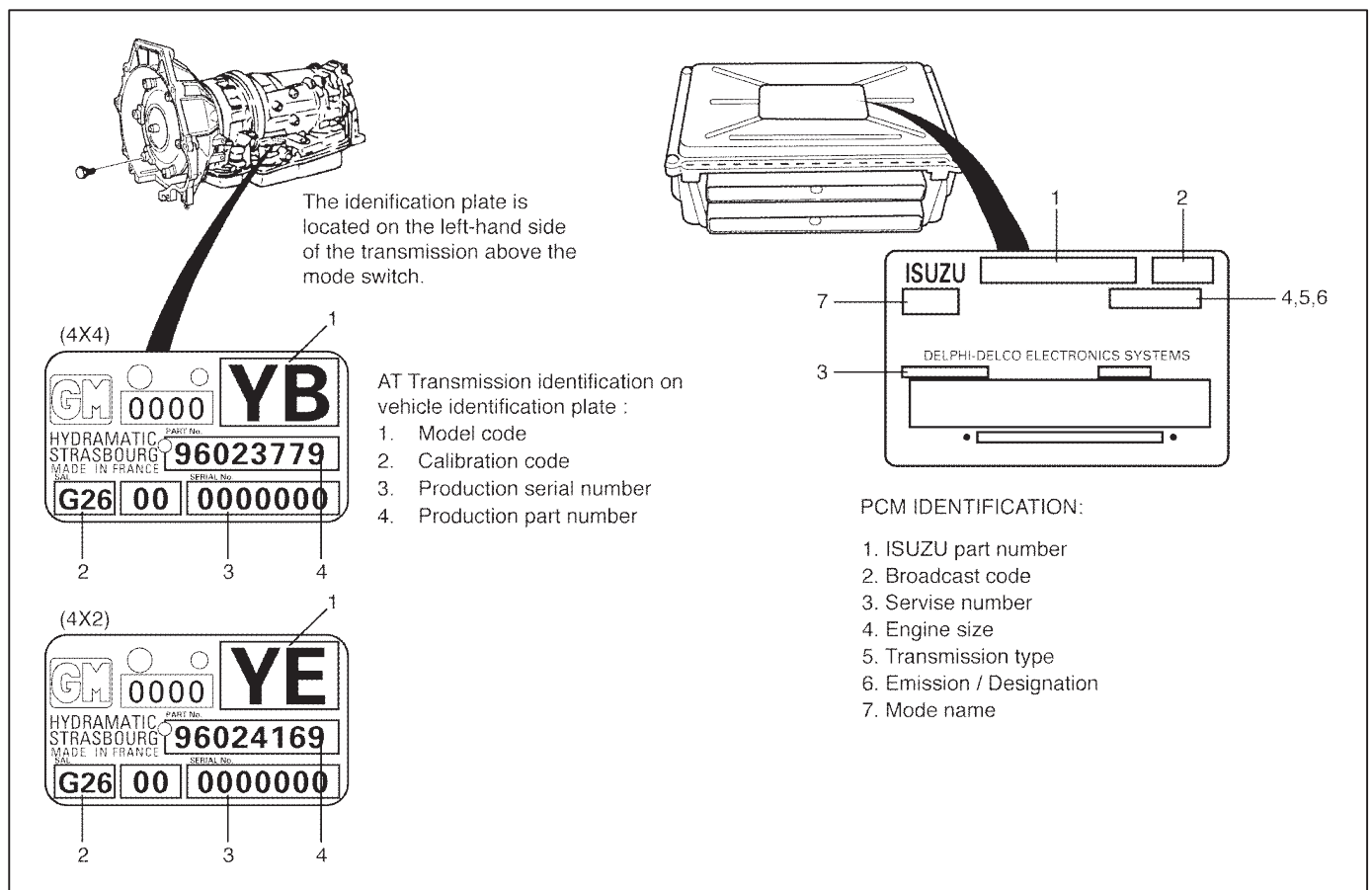
Use the F2: SNAPSHOT mode of the Tech 2 to help isolate the cause of an intermittent fault. The snapshot mode will record information before and after the problem occurs. Set the snapshot to "trigger" on the suspect DTC. If you notice the reported symptom during the test drive, trigger the snapshot manually.

After the snapshot has been triggered, command the Tech 2 to play back the flow of data recorded from each of the various sensors. Signs of an intermittent fault in a sensor circuit are sudden unexplainable jump in data values out of the normal range.

Transmission And PCM Identification

The chart below contains a list of all important information concerning rear axle ratio, Powertrain Control Module (PCM), and transmission identification.

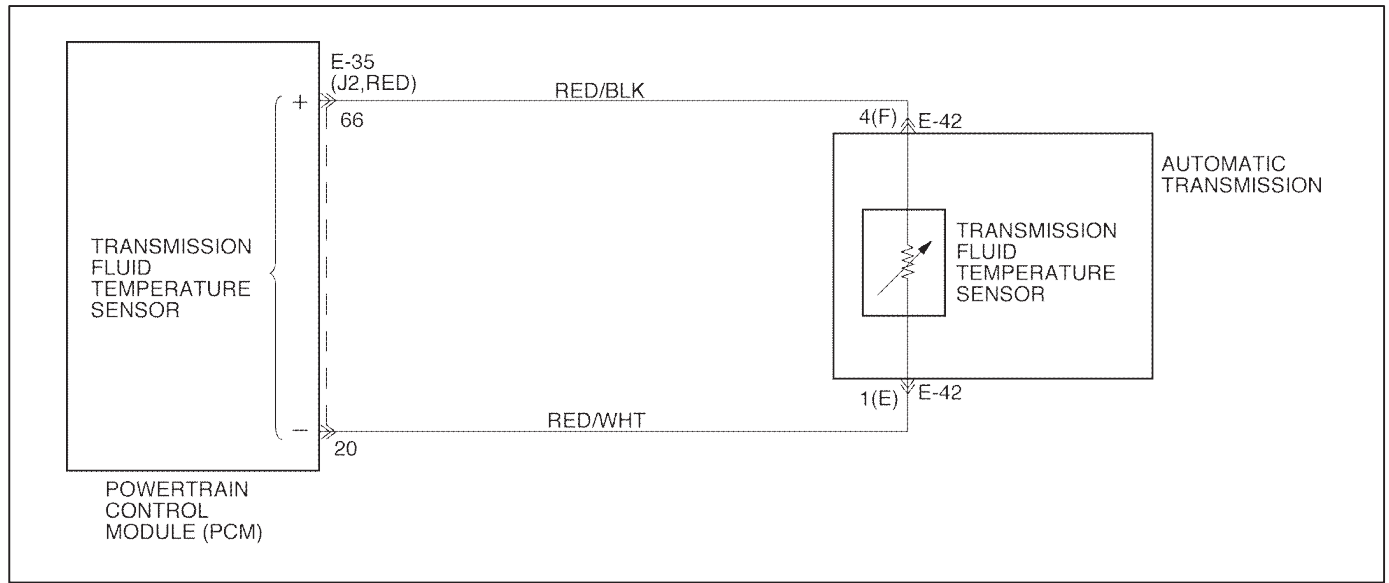
VEHICLE		Rr axle Ratio	PCM	TRANSMISSION		
Type	Engine		ISUZU Parts No.	Calibration Code	Isuzu Part No.	Model Code
Isuzu / Axiom	3.5L V6	4.300	8-97287-830-0	G26	8-96023-779-0	YB (4×4)
			8-09389-969-0	G26	8-96024-169-0	YE (4×2)



7A1–24 TRANSMISSION CONTROL SYSTEM (4L30–E)**Diagnostic Trouble Code (DTC)
Identification**

DTC NUMBER	DTC NAME	DTC TYPE	MIL “CHECK ENGINE”	“CHECK TRANS”
P0218	Transmission Fluid Over Temperature	D		
P0705	Transmission Range Switch (Mode Switch) Illegal Position	D		
P0706	Transmission Range Switch (Mode Switch) Performance	D		
P0711	Transmission Fluid Temperature (TFT) Sensor Performance	D		
P0712	Transmission Fluid Temperature (TFT) Sensor Circuit Low Input	D		
P0713	Transmission Fluid Temperature (TFT) Sensor Circuit High Input	D		
P0719	Brake Switch Circuit Low (Stuck On)	D		
P0722	Automatic Transmission Output Speed Sensor (OSS) Low Input	B	ON	Flash
P0723	Automatic Transmission Output Speed Sensor (OSS) Intermittent	B	ON	Flash
P0724	Brake Switch Circuit High (Stuck Off)	D		
P0730	Gear Error Without Input Speed	C		Flash
P0742	Torque Converter Clutch (TCC) System Stuck On	B	ON	Flash
P0748	Pressure Control Solenoid (PCS) (Force Motor) Circuit Electrical	C		Flash
P0751	Shift Solenoid A Performance (Stuck Off)	B	ON	Flash
P0752	Shift Solenoid A Performance (Stuck On)	B	ON	Flash
P0753	Shift Solenoid A Electrical	B	ON	Flash
P0756	Shift Solenoid B Performance (Stuck Off)	B	ON	Flash
P0757	Shift Solenoid B Performance (Stuck On)	B	ON	Flash
P0758	Shift Solenoid B Electrical	B	ON	Flash
P1850	Brake Band Apply Solenoid Malfunction	D		
P1860	TCC Solenoid Electrical	B	ON	Flash
P1870	Transmission Component Slipping (TCC Stuck Off)	B	ON	Flash

DTC TYPE	DEFINITION
B	Emission related, turn on MIL (Check Engine) and flashing Check Trans after 2 consecutive trips (Removal to confirmed)
C	Non–emission related, flashing Check Trans on 1st failure
D	Non–emission related, no lamps

DTC P0218 Transmission Fluid Over Temperature

D07R200004

Circuit Description

The Transmission Fluid Temperature (TFT) sensor is a thermister that controls the signal voltage to the PCM. The PCM supplies a 5-volt reference to the sensor on circuit RED/BLK. When the transmission fluid is cold, the sensor resistance is high and the PCM will sense high signal voltage. As the fluid temperature warms to a normal transmission operating temperature of 100°C (212°F), the sensor resistance becomes less and the voltage decreases to 1.5 to 2.0 volts.

This DTC detects a high transmission temperature for a long period of time. This is a type "D" DTC.

Conditions For Setting The DTC

- No TFT DTCs P0712 or P0713.
- TFT is greater than 135°C (275°F).
- All conditions met for 21 seconds.

Action Taken When The DTC Sets

- Hot mode TCC Shift Pattern.
- The PCM will not illuminate the Malfunction Indicator Lamp (MIL).
- ATF Lamp ON. (TFT is greater than 145°C (293°F))
- Disable E-side TCC OFF request.

Conditions For Clearing The DTC

- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warm-up cycles without a failure reported.

- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Inspect the wiring for poor electrical connections at the PCM and transmission 7-way connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well.
Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.
- Check harness routing for a potential short to ground in circuit RED/BLK.
- Scan tool TFT sensor temperature should rise steadily to about 100°C (212°F), then stabilize.
- Check for a "skewed" (mis-scaled) sensor by comparing the TFT sensor temperature to the ambient temperature after a vehicle cold soak. A "skewed" sensor can cause delayed garage shifts or TCC complaints.
- Check for a possible torque converter stator problem.
- Verify customer driving habits, trailer towing, etc.

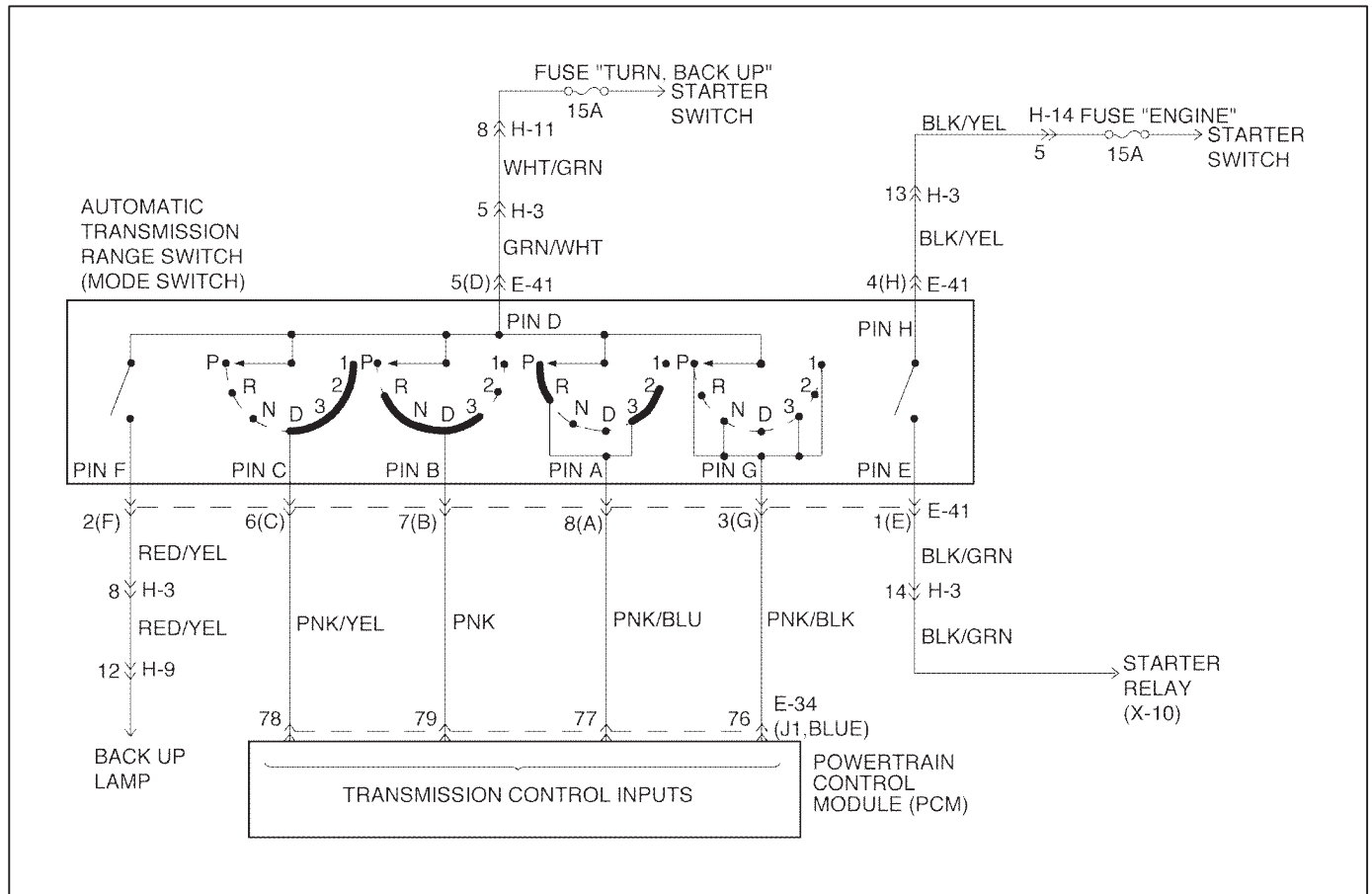
Test Description

The numbers below refer to the step numbers on the diagnostic chart.

3. This test checks for a "skewed" sensor or shorted circuit.
4. This test simulates a TFT DTC P0713.

7A1–26 TRANSMISSION CONTROL SYSTEM (4L30–E)**DTC P0218 Transmission Fluid Over Temperature**

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On–Board Diagnostic (OBD) System Check"?	Go to <i>Step 2</i>	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	Perform the following checks: • Check for possible engine system problems. • Transmission fluid checking procedure. Refer to <i>Checking Transmission Fluid Level and Condition in Automatic Transmission (4L30–E) Section</i>. Were the checks performed?	Go to <i>Step 3</i>	—
3	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Failure Records" for reference, as data will be lost when "Clear Info" function is used. 3. Record the DTC "Failure Records". Is the TFT sensor signal voltage less than 1.54 volts?	Go to <i>Step 4</i>	Go to <i>Diagnostic Aids</i>
4	1. Turn the ignition "off". 2. Disconnect the transmission 7–way connector E–42 (additional DTCs may set). 3. With the engine "off", turn the ignition switch "on". Is the TFT sensor signal voltage greater than 4.92 volts?	Go to <i>Internal Wiring Harness Check</i>	Go to <i>Step 5</i>
5	Inspect/repair circuit RED/BLK for a short to ground. Was a problem found?	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	1. Inspect the PCM for poor connections. 2. Replace the PCM if no poor connections were found. Is the replacement complete?	Go to <i>Step 7</i>	—
7	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and ensure the following conditions are met: TFT is less than 125°C (257°F) for at least 10 seconds. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P0705 Transmission Range Switch (Mode Switch) Illegal Position**Circuit Description**

- The range switch supplies the Powertrain Control Module (PCM) with information regarding the selector lever position: P, R, N, D, 3, 2 or L. The selector lever position is indicated by the state of four ON/OFF contacts. The range switch is located on one side of the transmission. It is on the transmission manual shaft and is fixed to the main case.
- The range switch is also used to provide the information P or N to the engine crank wiring. The engine can be cranked only if connector E-41 terminal 4(H) is connected to terminal 1(E) which is connected to ground.
- The range switch is also used to provide the backup lamp power in reverse. This is the reason why the range switch is supplied through a 15A fuse (TURN, BACK UP). This fuse can burn due to a short circuit in the back up lamp.

This DTC detects when a fuse is open or the range switch circuit does not work. This is a type "D" DTC.

Conditions For Setting The DTC

- Range switch illegal positions met for 5 seconds.

Action Taken When The DTC Sets

- Default to D position.
- Inhibit torque management.
- Maximum line pressure.

- Turn Force Motor OFF.
- The PCM will not illuminate the Malfunction Indicator Lamp (MIL).

Conditions For Clearing The DTC

- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Refer to *accompanying chart for the normal range signals and the illegal combinations*.
- Inspect the wiring for poor electrical connections at the PCM and at the transmission 8-way connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.
- Refer to the "Range Switch Logic Table" for further information.

7A1–28 TRANSMISSION CONTROL SYSTEM (4L30–E)

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

3. This test checks the indicated range signal to the manual valve actually selected.
6. This test checks for continuity between each selected range switch connector terminals.

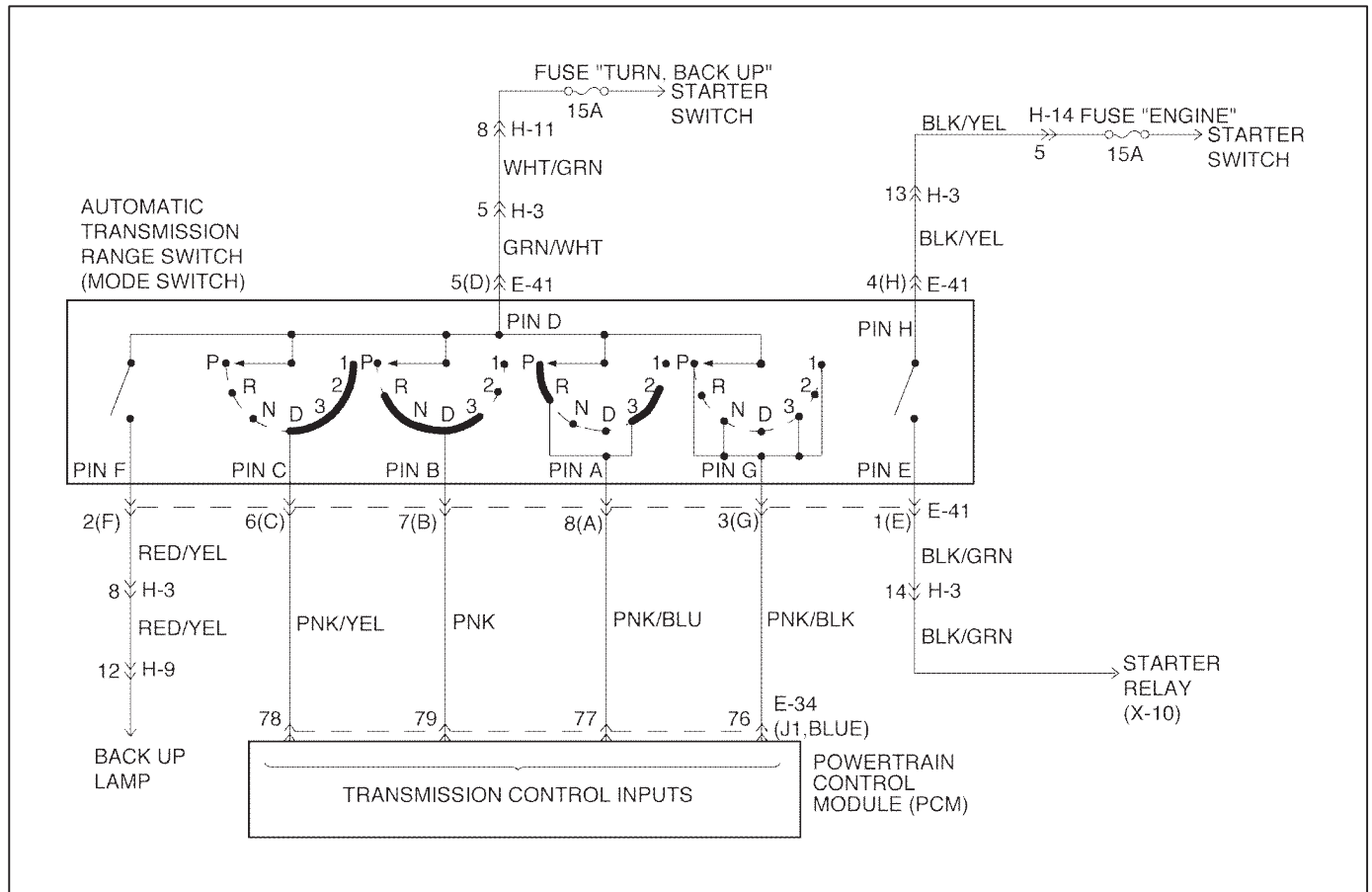
Range Switch Logic Table

Range Position	Range Switch Pin			
	A	B	C	P(G)
Park	ON	OFF	OFF	ON
Reverse	ON	ON	OFF	OFF
Neutral	OFF	ON	OFF	ON
D4	OFF	ON	ON	OFF
D3	ON	ON	ON	ON
2	ON	OFF	ON	OFF
L	OFF	OFF	ON	ON
Illegal	OFF	OFF	OFF	OFF
Illegal	OFF	OFF	OFF	ON

DTC P0705 Transmission Range Switch (Mode Switch) Illegal Position

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On–Board Diagnostic (OBD) System Check"?	Go to <i>Step 2</i>	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	Perform the following checks: • The transmission linkage from the select lever to the manual valve is adjusted properly. • Diagnostic circuit check. Were the checks performed?	Go to <i>Step 3</i>	—
3	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". 4. Select each transmission range: DL, D2, D3, D4, N, R, and P. Does each selected transmission range match the scan tool "Range Switch" display?	Go to <i>Diagnostic Aids</i>	Go to <i>Step 4</i>
4	Are all range switch pin displays incorrect?	Go to <i>Step 5</i>	Go to <i>Step 6</i>
5	Check fuse and wiring to the 8–way connector terminal 5(D) for opens. Refer to <i>Mode Switch in Automatic Transmission (4L30–E) section</i> . If no problem was found, replace the range switch. Is the replacement complete?	Go to <i>Step 9</i>	—
6	1. Disconnect the 8–way range switch connector. 2. Using ohmmeter, check continuity between terminal 5(D) and respectively terminals 3(G), 6(C), 7(B) and 8(A) of the 8–way range switch connector. 3. Move shift selector lever through all positions and compare results with "Range Switch Logic Table". Is one range switch pin display incorrect?	Go to <i>Step 7</i>	Go to <i>Step 8</i>
7	Check the affected wiring and connector, and repair. Is the repair complete?	Go to <i>Step 9</i>	—
8	Check the Powertrain Control Module (PCM) connectors for poor connection. If no problem was found, replace the PCM. Is the replacement complete?	Go to <i>Step 9</i>	—
9	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and road test the vehicle. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P0706 Transmission Range Switch (Mode Switch) Performance



Circuit Description

- The range switch supplies the Powertrain Control Module (PCM) with information regarding the selector lever position: P, R, N, D, 3, 2 or L. The selector lever position is indicated by the state of four ON/OFF contacts. The range switch is located on one side of the transmission. It is on the transmission manual shaft and is fixed to the main case.
- The range switch is also used to provide the information P or N to the engine crank wiring. The engine can be cranked only if connector E-41 terminal 4(H) is connected to terminal 1(E) which is connected to ground.
- The range switch is also used to provide the back up lamp power in reverse. This is the reason why the mode switch is supplied through a 15A fuse (TURN, BACK UP). This fuse can burn due to a short circuit in the back up lamp.
- This DTC detects an invalid state of the range switch or the range switch circuit by deciphering the range switch inputs. This is a type "D" DTC.

Conditions For Setting The DTC

This DTC will set if any of the following conditions occurs:

Condition 1 ("R" bad position):

- Engine is running.
- No output speed DTCP0722, P0723.

- Output speed greater than 3,200 RPM.
- Range switch indicates "R".
- All conditions met for 4 seconds.

Condition 2 ("P" or "N" bad position):

- Engine is running.
- No TPS codes.
- Engine speed is less than 3,000 RPM.
- TP angle is greater than 20%.
- Range switch indicates "P" or "N".
- All conditions met for 4 seconds.

Action Taken When The DTC Sets

- Default to "D" position.
- The PCM will not illuminate the Malfunction Indicator Lamp (MIL).

Conditions For Clearing The DTC

- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Refer to *the accompanying chart for the normal range signals and the illegal combinations.*
- Inspect the wiring for poor electrical connections at the PCM and at the transmission 8-way connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.
- Refer to the *“Range Switch Logic Table”* for further information.

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

3. This test checks the indicated range signal to the manual valve actually selected.
6. This test checks for continuity between each selected range switch connector terminals.

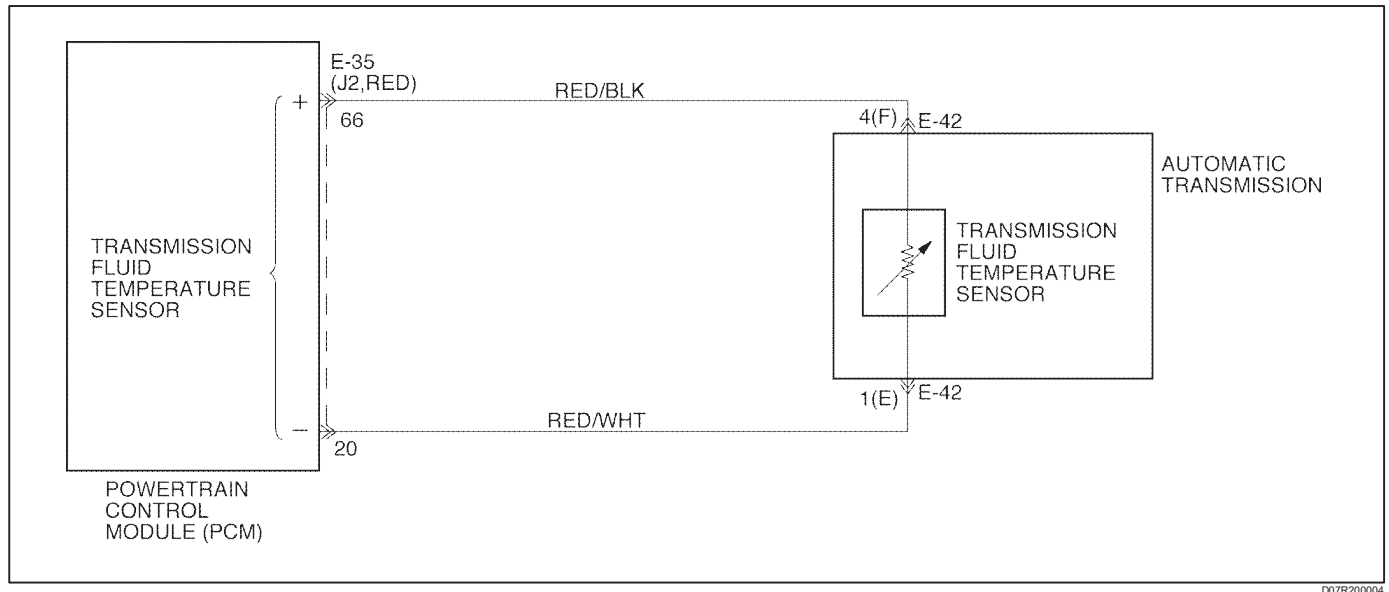
Range Switch Logic Table

Range Position	Range Switch Pin			
	A	B	C	P(G)
Park	ON	OFF	OFF	ON
Reverse	ON	ON	OFF	OFF
Neutral	OFF	ON	OFF	ON
D4	OFF	ON	ON	OFF
D3	ON	ON	ON	ON
2	ON	OFF	ON	OFF
L	OFF	OFF	ON	ON
Illegal	OFF	OFF	OFF	OFF
Illegal	OFF	OFF	OFF	ON

7A1-32 TRANSMISSION CONTROL SYSTEM (4L30-E)

DTC P0706 Transmission Range Switch (Mode Switch) Performance

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	Perform the following checks: • The transmission linkage from the select lever to the manual valve is adjusted properly. • Diagnostic circuit check. Were the checks performed?	Go to Step 3	—
3	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". 4. Select each transmission range: DL, D2, D3, D4, N, R, and P. Does each selected transmission range match the scan tool "Range Switch" display?	Go to <i>Diagnostic Aids</i>	Go to Step 4
4	Are all range switch pin displays incorrect?	Go to Step 5	Go to Step 6
5	Check fuse and wiring to the 8-way connector terminal 5(D) for opens. Refer to <i>Mode Switch in Automatic Transmission (4L30-E) section</i> . If no problem was found, replace the range switch. Is the replacement complete?	Go to Step 9	—
6	1. Disconnect the 8-way range switch connector. 2. Using ohmmeter, check continuity between terminal 5(D) and respectively terminals 3(G), 6(C), 7(B) and 8(A) of the 8-way range switch connector. 3. Move shift selector lever through all positions and compare results with "Range Switch Logic Table". Is one range switch pin display incorrect?	Go to Step 7	Go to Step 8
7	Check the affected wiring and connector, and repair. Is the repair complete?	Go to Step 9	—
8	Check the Powertrain Control Module (PCM) connectors for poor connection. If no problem was found, replace the PCM. Is the replacement complete?	Go to Step 9	—
9	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and road test the vehicle. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to Step 1	Repair verified Exit DTC table

DTC P0711 Transmission Fluid Temperature (TFT) Sensor Performance

D07R200004

Circuit Description

The TFT sensor is a thermister that controls the signal voltage to the PCM. The PCM supplies a 5 volt reference signal to the sensor on circuit RED/WHT. When the transmission fluid is cold, the sensor resistance is high and the PCM detects high signal voltage. As the transmission fluid temperature increases to normal operating temperature of 100°C (212°F), the sensor resistance becomes less and the voltage decreases to 1.5 to 2 volts.

When the PCM detects a TFT sensor that remains at the startup value, or a sensor that has a change delta of greater than 20°C (36°F) less than 1 second, DTC P0711 sets. DTC P0711 is a type D.

Conditions For Setting The DTC

- No VSS DTCs P0722 or P0723.
- No Transmission Component Slipping DTC P1870.
- Engine is running.
- TFT is between 20 A/D (Analog/Digital) counts and 248 A/D counts.
- TFT is between -40°C (-40°F) and +21°C (69.8°F) at engine startup.
- Engine coolant temperature is greater than 70°C (150°F).
- Engine coolant temperature has changed by greater than 50°C (90°F) since engine startup.
- Vehicle speed has been greater than 5 mph for greater than 410 seconds since engine startup (cumulative timer).
- TCC slip speed has been greater than 120 rpm for greater than 410 seconds since engine startup (cumulative timer).
- Battery voltage is between 10 and 16 volts.

All of the above is true and either of the following occurs:

- If the sensor is stuck, the TFT has not changed for greater than 2 counts (from startup temperature) for greater than 410 seconds.

- If the sensor shows an unrealistic change, the TFT exhibits a change delta of greater than 20°C (36°F), greater than 14 times in 7 seconds.

Action Taken When The DTC Sets

- Transmission default temperature will be:
80°C (176°F) if engine temperature code is set.
100°C (212°F) if engine temperature is warm.
80°C (176°F) if engine run time is greater than 5 minutes.
21°C (69.8°F) if engine run time is less than 5 minutes.
- The PCM will not illuminate the Malfunction Indicator Lamp (MIL).

Conditions For Clearing The DTC

- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Inspect the wiring for poor electrical connection at the PCM. Inspect the wiring for poor electrical connections at the transmission 7-way connector. Look for the following conditions:
 - a. A bent terminal
 - b. A backed out terminal
 - c. A damaged terminal
 - d. Poor terminal tension
 - e. A chafed wire
 - f. A broken wire inside the insulation

7A1–34 TRANSMISSION CONTROL SYSTEM (4L30–E)

- When diagnosing for an intermittent short or open connection, move the wiring harness while watching the test equipment for a change.
- First diagnose and clear any engine DTCs or TP Sensor codes. Then inspect for any transmission DTCs that may have reset.

Test Description

The number below refers to the step number on the diagnostic chart:

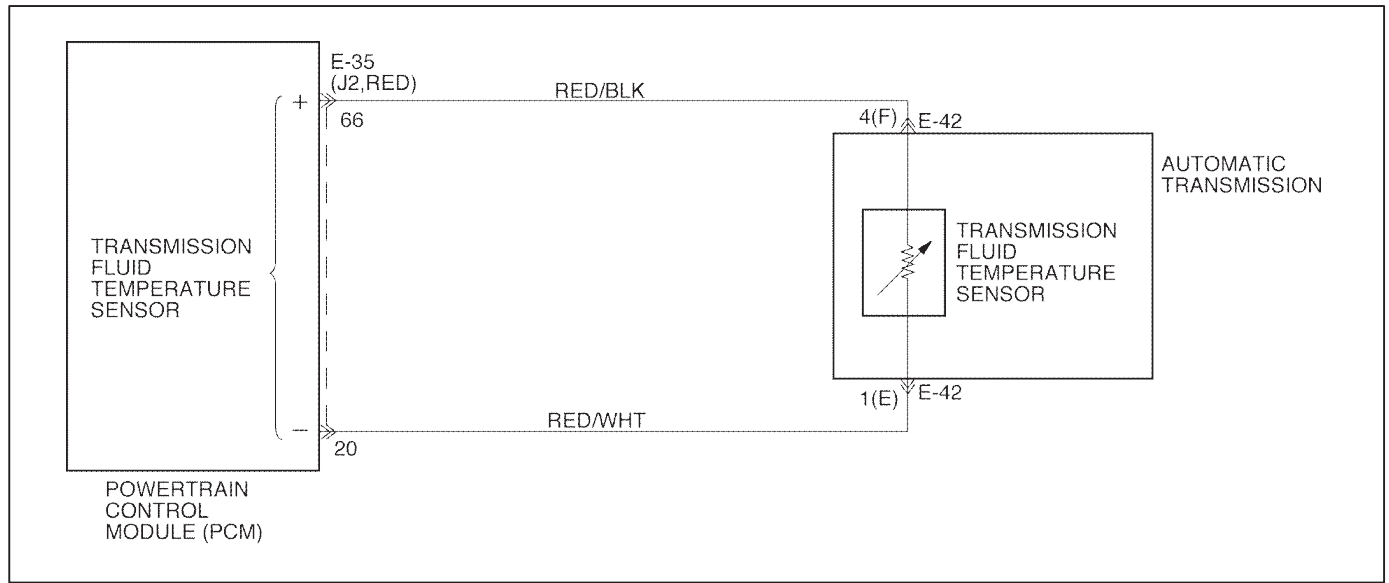
3. This test checks PCM and associated wiring up to the 7–way connector. If the voltage increases to match chart the problem is isolated to the transmission wiring.

DTC P0711 Transmission Fluid Temperature (TFT) Sensor Performance

Step	Action	Yes	No
1	Was the Powertrain On–Board Diagnostic (OBD) System Check performed?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	Perform the transmission fluid checking procedure. Refer to <i>Checking Transmission Fluid Level and Condition in Automatic Transmission (4L30–E) section</i> . Did you perform the fluid checking procedure?	Go to Step 3	Go to <i>Checking Transmission Fluid Level and Condition in Automatic Transmission (4L30–E) section</i>
3	1. Install the scan tool. 2. With the engine “off”, turn the ignition switch to the “on” position. NOTE: Before clearing DTCs, use the scan tool in order to record the Freeze Frame and Failure Records for reference. The Clear Info function will erase the data. 3. Record the DTC Freeze Frame and Failure Records. 4. Select TFT on the scan tool. 5. While observing the scan tool display, move or massage the engine wiring harness from PCM connectors E35–66 and E35–20 to the transmission 7–way connector E–42. Does the TFT change by more than $\pm 20^{\circ}\text{C}$ (36°F)?	Go to Step 6	Go to Step 4
4	1. Turn the ignition “off”. 2. Disconnect the transmission 7–way connector E–42. 3. Install Jumper Harness on the transmission side of the 7–way connector E–42. 4. Using the J39200 DVOM and J35616 Connector Test Adapter Kit, connect the DVOM leads from terminal E42–4(F) to terminal E42–1(E). 5. Set the DVOM on MIN/MAX to measure resistance. 6. Record the TFT sensor resistance. 7. Move or massage the automatic transmission wiring harness assembly from the PCM to the TFT sensor connector. (See Transmission Fluid Temperature (TFT) Sensor Specifications.) Does the DVOM MAX display a resistance greater than the value recorded in Action item 6 of this step?	Go to Step 7	Go to Step 5
5	Does the DVOM MIN display a resistance less than the value recorded in Action item 6 of step 4?	Go to Step 8	—
6	Inspect circuit RED/BLK and RED/WHT of the engine wiring harness for an intermittent open or short condition. Repair the circuits if necessary. Did you find a problem?	Go to Step 12	Go to Step 11

DTC P0711 Transmission Fluid Temperature (TFT) Sensor Performance (Cont'd)

Step	Action	Yes	No
7	Inspect the automatic transmission wiring harness assembly for an intermittent open in circuits RED/BLK and RED/WHT. Did you find a problem?	Go to <i>Step 9</i>	Go to <i>Step 10</i>
8	Inspect the automatic transmission wiring harness assembly for an intermittent shorted condition in circuits RED/BLK and RED/WHT. Did you find a problem?	Go to <i>Step 9</i>	Go to <i>Step 10</i>
9	Replace the automatic transmission wiring harness assembly. Is the replacement complete?	Go to <i>Step 12</i>	—
10	Replace TFT Sensor. Refer to <i>Transmission Oil Temperature Sensor (Main Case) in Automatic Transmission (4L30–E) section</i> . Is the replacement complete?	Go to <i>Step 12</i>	—
11	Replace the PCM. Refer to <i>Powertrain Control Module (PCM) in Automatic Transmission (4L30–E) section</i> . Is the replacement complete?	Go to <i>Step 12</i>	—
12	In order to verify your repair, perform the following procedure. 1. Select DTC. 2. Select Clear Info. 3. Drive the vehicle and ensure the following conditions are met: • The TFT changes by more than 2.25°C (4.05°F) for 11 seconds since startup. • The TFT does not change by more than 20°C (36°F) within 0.200 second for a period of at least 11 seconds. 4. Select Specific DTC. 5. Enter DTC P0711. Has the test run and passed?	System OK	Begin the diagnosis again Go to <i>Step 1</i>

DTC P0712 Transmission Fluid Temperature (TFT) Sensor Circuit Low Input

D07R200004

Circuit Description

The TFT sensor is a thermister that controls the signal voltage to the PCM. The PCM supplies a 5-volt reference signal to the sensor on circuit RED/BLK. When the transmission fluid is cold, the sensor resistance is high. The PCM detects high signal voltage. As the transmission fluid temperature increases to the normal operating temperature of 100°C (212°F), the sensor resistance becomes less and the voltage decreases to 1.5 to 2 volts. With transmission fluid over temperature and DTC P0218 also set, check the transmission cooling system.

This DTC detects a continuous short to ground in the TFT signal circuit or the TFT sensor. This is a type "D" DTC.

Conditions For Setting The DTC

- Battery voltage is between 10 and 16 volts.
- Ignition is "on".
- TFT sensor indicating a voltage less than 0.4 volts.
- All conditions met for 20 seconds.

Action Taken When The DTC Sets

- Transmission default temperature will be:
80°C (176°F) if engine temperature code is set.
100°C (212°F) if engine temperature is warm.
80°C (176°F) if engine run time is greater than 5 minutes.
21°C (69.8°F) if engine run time is less than 5 minutes.
- The PCM will not illuminate the Malfunction Indicator Lamp (MIL).

Conditions For Clearing The DTC

- The DTC can be cleared from the PCM history by using a scan tool.

- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Check harness routing for a potential short to ground in circuit RED/BLK. Scan tool TFT display should rise steadily to about 100°C (212°F), then stabilize.
- Inspect the wiring for poor electrical connection at the PCM and transmission 7-way connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.
- The temperature to resistance value scale may be used to test the TFT sensor at the various temperature levels to evaluate the possibility of a "skewed" (mis-scaled) sensor.
A "skewed" sensor could result in delayed garage shifts or TCC complaints.
- Verify customer driving habits, trailer towing, etc.

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

3. This test checks for a short to ground or a "skewed" sensor.
4. This test checks for an internal fault within the transmission by creating an open.

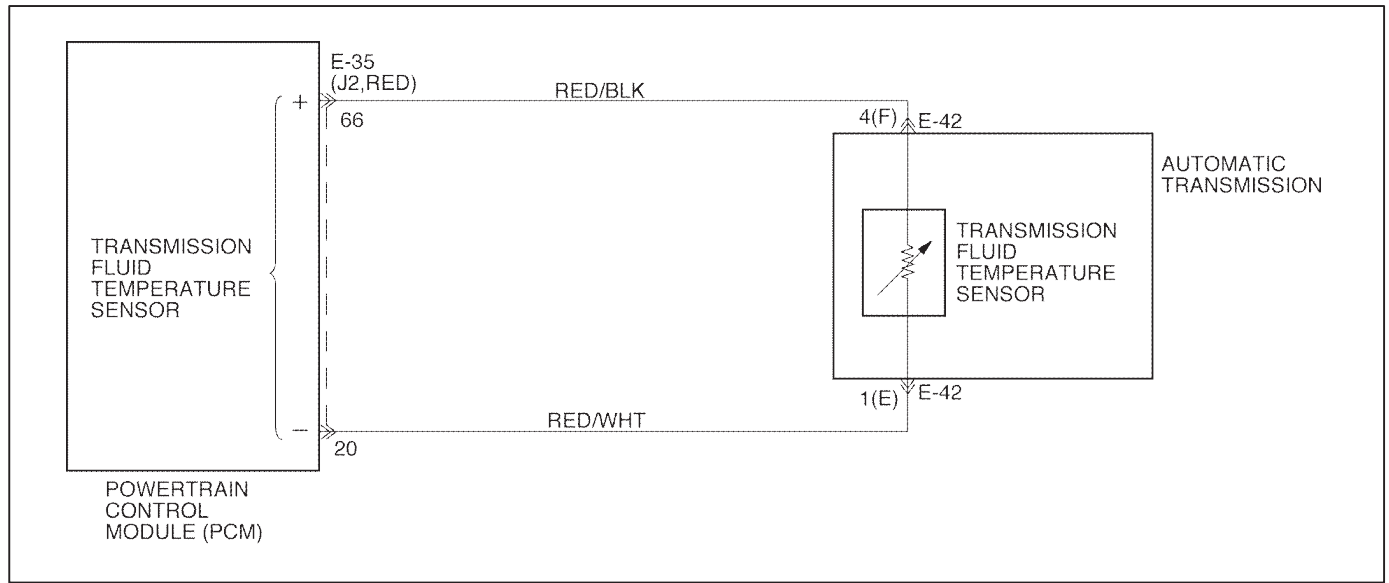
DTC P0712 Transmission Fluid Temperature (TFT) Sensor Circuit Low Input

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	Perform the transmission fluid checking procedure. Refer to <i>Checking Transmission Fluid Level and Condition in Automatic Transmission (4L30-E) section</i> Was the fluid checking procedure performed?	Go to Step 3	Refer to <i>Checking Transmission Fluid Level and Condition in Automatic Transmission (4L30-E) section</i>
3	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". Does the scan tool display a TFT sensor signal voltage less than 0.4 volts?	Go to Step 4	Go to <i>Diagnostic Aids</i>
4	1. Turn the ignition "off". 2. Disconnect the transmission 7-way connector E-42. 3. Turn the ignition "on". Does the TFT signal voltage change to match the voltage 4.92 volts?	Go to Step 5	Go to Step 10
5	Using the J39200 DVOM, measure the resistance between terminals E42-4(F) and E42-1(E). Is the resistance within specifications? (See Transmission Fluid Temperature (TFT) Sensor Specifications.)	Go to <i>Diagnostic Aids</i>	Go to Step 6
6	1. Disconnect the transmission 7-way connector E-42. 2. Using the J39200 DVOM, measure the resistance between terminals E42-4(F) and E42-1(E). Is the resistance within specifications? (See Transmission Fluid Temperature (TFT) Sensor Specifications.)	Go to <i>Diagnostic Aids</i>	Go to Step 7
7	1. Remove the transmission oil pan. Refer to <i>Transmission Oil Temperature Sensor (Main Case) in Automatic Transmission (4L30-E) section</i> . 2. Check the internal wiring harness for a short to ground. Was a problem found?	Go to Step 9	Go to Step 8
8	1. Disconnect the internal wiring harness at the TFT sensor. 2. Measure the resistance of the TFT sensor. Is the resistance within specifications? (See Transmission Fluid Temperature (TFT) Sensor Specifications.)	Go to <i>Diagnostic Aids</i>	Go to Step 9
9	Replace the TFT Sensor. Is the replacement complete?	Go to Step 13	—
10	Check circuit RED/BLK for a short to ground. Was a problem found?	Go to Step 13	Go to Step 11

7A1–38 TRANSMISSION CONTROL SYSTEM (4L30–E)

DTC P0712 Transmission Fluid Temperature (TFT) Sensor Circuit Low Input (Cont'd)

Step	Action	Yes	No
11	Check the PCM for faulty connections. Was a problem found?	Go to <i>Step 13</i>	Go to <i>Step 12</i>
12	Replace the PCM. Refer to <i>Powertrain Control Module (PCM) in Automatic Transmission (4L30–E) section</i> . Is the replacement complete?	Go to <i>Step 13</i>	—
13	1. After the repair is complete, use the scan tool to select “DTC”, then “Clear Info” function and ensure the following conditions are met: TFT sensor indicates a voltage greater than 0.33 volts for 2 seconds. 2. Review the scan tool “DTC info”. Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P0713 Transmission Fluid Temperature (TFT) Sensor Circuit High Input

D07R200004

Circuit Description

The TFT sensor is a thermistor that controls the signal voltage to the PCM. The PCM supplies a 5-volt reference signal to the sensor on circuit RED/BLK. When the transmission fluid is cold, the sensor resistance is high and the PCM will sense high signal voltage. As the transmission fluid temperature warms to the normal operating temperature of 100°C (212°F), the sensor resistance becomes less and the voltage decreases to about 1.5 to 2 volts.

This DTC detects a continuous open or short to power in the TFT signal circuit or the TFT sensor. This is a type "D" DTC.

Conditions For Setting The DTC

- Battery voltage is between 10 and 16 volts.
- Ignition is "on".
- TFT sensor indicating a voltage greater than 4.86 volts.
- All conditions met for 20 seconds.

Action Taken When The DTC Sets

- Transmission default temperature will be:
80°C (176°F) if engine temperature code is set.
100°C (212°F) if engine temperature is warm.
80°C (176°F) if engine run time is greater than 5 minutes.
21°C (69.8°F) if engine run time is less than 5 minutes.
- The PCM will not illuminate the Malfunction Indicator Lamp (MIL).

Conditions For Clearing The DTC

- The DTC can be cleared from the PCM history by using a scan tool.

- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Inspect the wiring for poor electrical connection at the PCM and transmission 7-way connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.
- Scan tool displays transmission fluid temperature in degrees. After transmission is operating, the temperature should rise steadily to about 100°C (212°F), then stabilize.
- The temperature to resistance value scale may be used to check the TFT sensor at the various temperature levels to evaluate the possibility of a "skewed" (mis-scaled) sensor.
A "skewed" sensor could result in hard shifts or TCC complaints.

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

3. This check verifies problem in the TFT sensor circuit.
4. This test simulates a TFT sensor DTC P0712. If the PCM recognizes the low signal voltage (high temperature), and the scan tool displays 146°C (295°F) or greater, the PCM and wiring are OK.
5. This test checks the TFT sensor and internal wiring harness.

7A1-40 TRANSMISSION CONTROL SYSTEM (4L30-E)

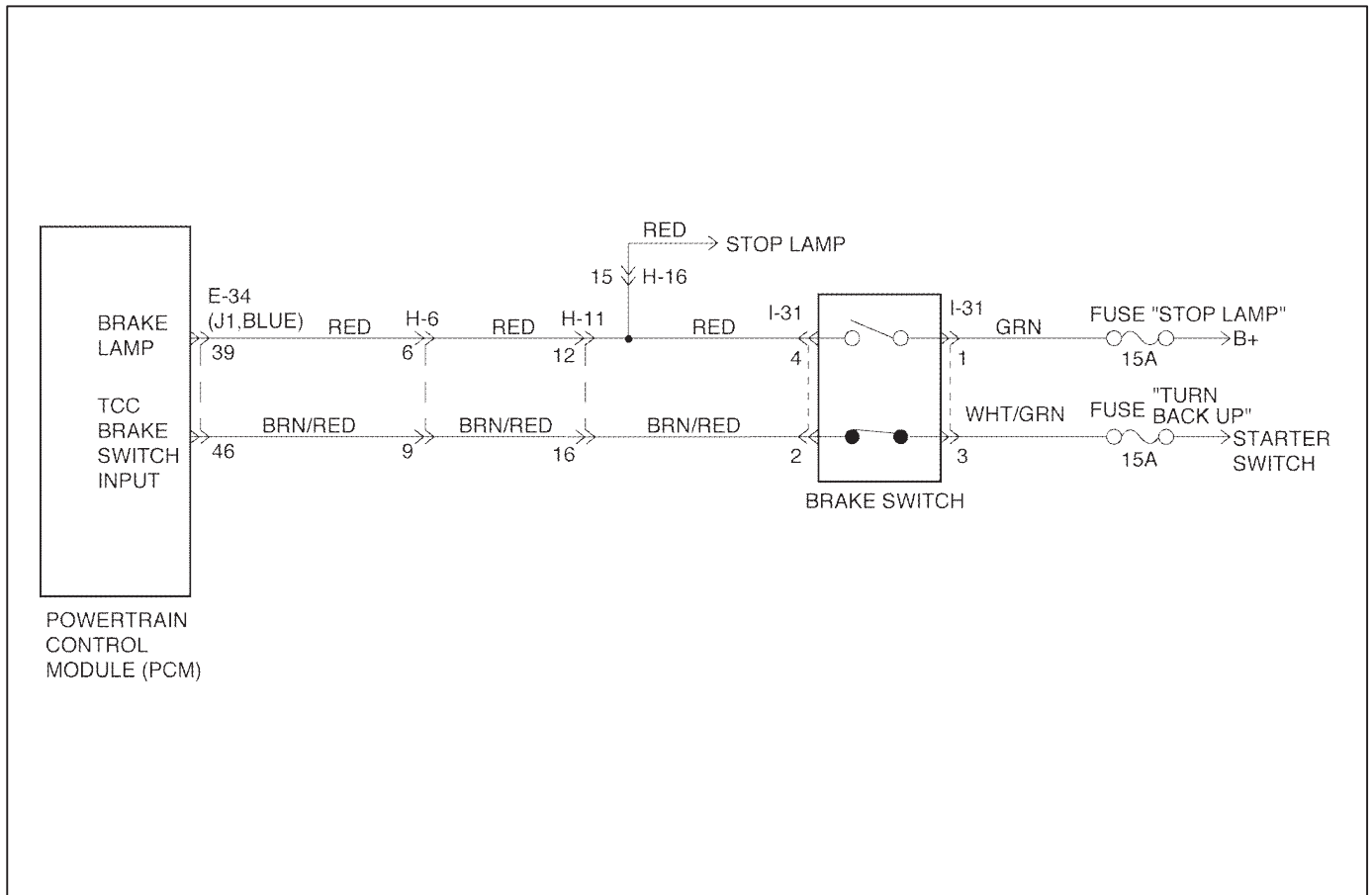
DTC P0713 Transmission Fluid Temperature (TFT) Sensor Circuit High Input

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emission in Engine</i> section
2	Perform the transmission fluid checking procedure. Refer to <i>Checking Transmission Fluid Level and Condition in Automatic Transmission (4L30-E)</i> section. Was the fluid checking procedure performed?	Go to Step 3	Refer to <i>Checking Transmission Fluid Level and Condition in Automatic Transmission (4L30-E)</i> section
3	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". Does the scan tool display a TFT sensor signal voltage greater than 4.86 volts?	Go to Step 4	Go to <i>Diagnostic Aids</i>
4	1. Turn the ignition "off". 2. Disconnect the transmission 7-way connector E-42. 3. Install a fused jumper wire from terminal E42-4(F) to E42-1(E) on the engine harness. 4. Turn the ignition "on". Does the TFT signal voltage drop to less than 0.4 volts?	Go to Step 5	Go to Step 10
5	1. Turn the ignition "off". 2. Using the J39200 DVOM, measure the resistance between terminals E42-4(F) and E42-1(E). Is the resistance within specifications? (See Transmission Fluid Temperature (TFT) Sensor Specifications.)	Go to <i>Diagnostic Aids</i>	Go to Step 6
6	1. Disconnect the transmission 7-way connector E-42. 2. Using the J39200 DVOM, measure the resistance between terminals E42-4(F) and E42-1(E). Is the resistance within specifications? (See Transmission Fluid Temperature (TFT) Sensor Specifications.)	Go to <i>Diagnostic Aids</i>	Go to Step 7
7	1. Remove the transmission oil pan. 2. Check the internal wiring harness for an open. Refer to <i>Transmission Oil Temperature Sensor (Main Case) in Automatic Transmission (4L30-E)</i> section. Was a problem found and corrected?	Go to Step 14	Go to Step 8
8	1. Disconnect the internal wiring harness at the TFT sensor. 2. Measure the resistance of the TFT sensor. Is the resistance within specifications? (See Transmission Fluid Temperature (TFT) Sensor Specifications.)	Go to <i>Diagnostic Aids</i>	Go to Step 9
9	Replace TFT sensor. Refer to <i>Transmission Oil Temperature Sensor (Main Case) in Automatic Transmission (4L30-E)</i> section. Is the replacement complete?	Go to Step 14	—

DTC P0713 Transmission Fluid Temperature (TFT) Sensor Circuit High Input (Cont'd)

Step	Action	Yes	No
10	Check circuit RED/BLK for an open or short to B+. Was a problem found?	Go to <i>Step 14</i>	Go to <i>Step 11</i>
11	Check circuit RED/WHT for an open. Was a problem found?	Go to <i>Step 14</i>	Go to <i>Step 12</i>
12	Check the PCM for faulty or intermittent connections. Was a problem found?	Go to <i>Step 14</i>	Go to <i>Step 13</i>
13	Replace the PCM. Refer to <i>Powertrain Control Module (PCM) in Automatic Transmission (4L30–E) section</i> . Is the replacement complete?	Go to <i>Step 14</i>	—
14	1. After the repair is complete, use the scan tool to select “DTC”, then “Clear Info” function and ensure the following conditions are met: 2. TFT sensor indicates a voltage less than 4.92 volts for 2 seconds. 3. Review the scan tool “DTC Info”. Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P0719 Brake Switch Circuit Low (Stuck On)



Circuit Description:

The brake switch indicates brake pedal status to the Powertrain Control Module (PCM). The brake switch is a normally-closed switch that supplies battery voltage on circuit BRN/RED to the PCM. Applying the brake pedal opens the switch, interrupting voltage to the PCM. When the brake pedal is released, the PCM receives a constant voltage signal. If the PCM receives a zero voltage signal at the brake switch input, and the Torque Converter Clutch (TCC) is engaged, the PCM de-energizes the Torque Converter Clutch Solenoid Valve (TCC Sol. Valve). The PCM disregards the brake switch input for TCC scheduling if there is a brake switch circuit fault (Refer to *Diagnostic Aids*).

When the PCM detects an open brake switch circuit (0 volts, low input) during accelerations, then DTC P0719 sets. DTC P0719 is a type D DTC.

Conditions For Setting The DTC

- No OSS Assy. DTCs P0722 or P0723.
- The PCM detects an open brake switch or circuit (0 volts) for 15 minutes without changing for 2 seconds, and the following events occur seven consecutive times.
 - The vehicle speed is less than 8 km/h (5 mph).
 - then the vehicle speed is 8–32 km/h (5–20 mph) for 4 seconds.
 - then the vehicle speed is greater than 32 km/h (20 mph) for 4 seconds.

Action Taken When The DTC Sets

- The PCM does not illuminate the Malfunction Indicator Lamp (MIL).
- DTC P0719 stores in PCM history.

Conditions For Clearing The DTC

- A scan tool can clear the DTC from the PCM history. The PCM clears the DTC from the PCM history if the vehicle completes 40 warm-up cycles without a failure reported.
- The PCM cancels the DTC default actions when the fault no longer exists and the ignition is OFF long enough in order to power down the PCM.

Diagnostic Aids

- Inspect the wiring for poor electrical connections at the PCM and brake switch. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.
- Check customer driving habits and/or unusual driving conditions (i.e. stop and go, highway).
- Check brake switch for proper mounting and adjustment.

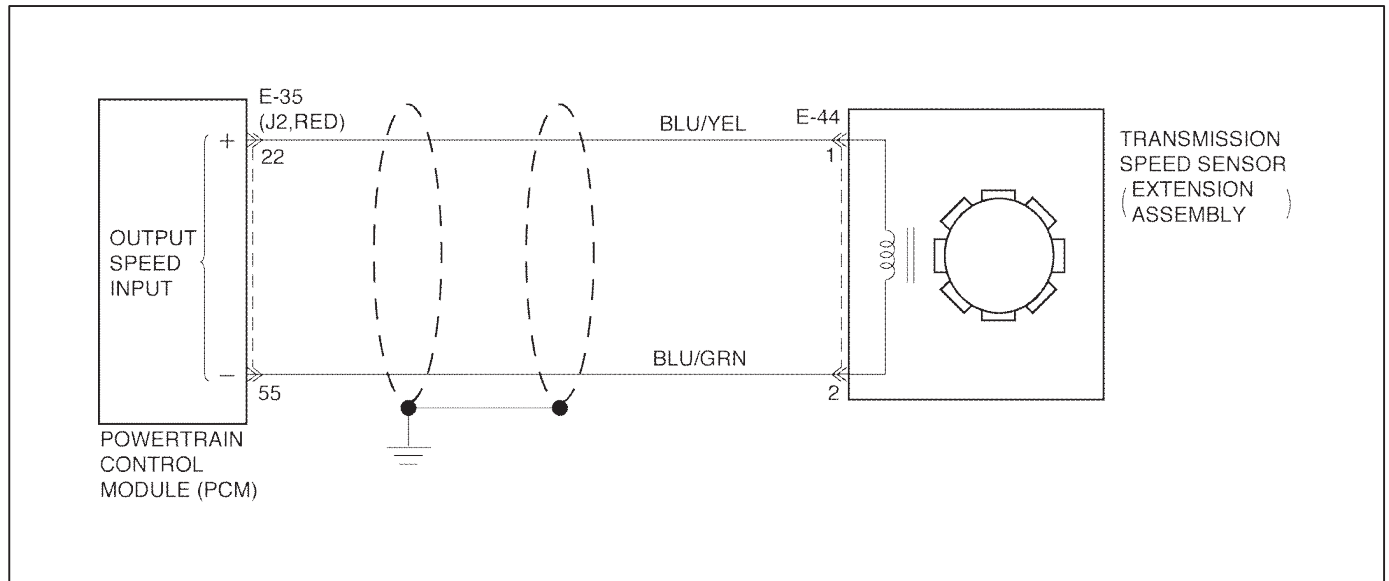
Test Description

The numbers below refer to the step numbers on the diagnostic chart:

3. This step isolates the brake switch as a source for setting the DTC.

7A1-44 TRANSMISSION CONTROL SYSTEM (4L30-E)**DTC P0719 Brake Switch Circuit Low (Stuck On)**

Step	Action	Yes	No
1	Was the Powertrain On-Board Diagnostic (OBD) System Check performed?	Go to Step 2	Go to <i>Powertrain OBD System Check</i>
2	1. Install the scan tool. 2. With the engine "off," turn the ignition switch to the "on" position. NOTE: Before clearing the DTC(s), use the scan tool in order to record the "Failure Records" for reference. Using the "Clear Info" function will erase the stored "Failure Records" from the PCM. 3. Record the "DTC Failure Records", then clear the DTC(s). 4. Select "TCC Brake Switch" on the scan tool. 5. Disconnect the brake switch connector from the brake switch. 6. Connect a test lamp from cavity I31-3 of the brake switch connector to a known good ground. Is the test lamp ON?	Go to Step 3	Go to Step 4
3	Install a J 36169-A Fused Jumper Wire from terminal I31-2 to terminal I31-3 of the brake switch connector. Did the TCC Brake Switch status change from Open to Closed?	Go to Step 7	Go to Step 9
4	1. Remove the fuse "TURN, BACK UP". 2. Inspect the fuse for an open. Is the fuse open?	Go to Step 5	Go to Step 8
5	Inspect circuit WHT/GRN for a short to ground condition. Repair the circuit if necessary. Did you find a short to ground condition?	Go to Step 11	Go to Step 6
6	Inspect circuit BRN/RED for a short to ground condition. Repair the circuit if necessary. Did you find a short to ground condition?	Go to Step 11	Go to Step 10
7	Replace the brake switch. Is the replacement complete?	Go to Step 11	—
8	Inspect circuit WHT/GRN for an open condition. Repair the circuit if necessary. Did you find and correct an open condition?	Go to Step 11	—
9	Inspect circuit BRN/RED for an open. Did you find an open condition?	Go to Step 11	Go to Step 10
10	Replace the PCM. Is the replacement complete?	Go to Step 11	—
11	In order to verify your repair, perform the following procedure: 1. Select DTC. 2. Select Clear Info. 3. With the engine "off," turn the ignition switch to the "on" position. 4. Do not depress the brake pedal. 5. Verify that the Brake Switch status indicates "Closed" (12 volts) for 2 seconds. 6. Select Specific DTC. Enter DTC P0719. Has the test run and passed?	System OK	Begin the diagnosis again. Go to Step 1

DTC P0722 Automatic Transmission Output Speed Sensor (OSS) Low Input

D07R200006

Circuit Description

Output speed information is provided to the PCM by the OSS, which is a permanent magnet (PM) generator. The PM generator produces a pulsing AC voltage. The AC voltage level and number of pulses increases as the speed of the vehicle increases. The PCM then converts the pulsing voltage to output speed, which is used for calculations. The vehicle speed can be displayed with a scan tool.

This DTC detects a low output speed when there is a high engine speed in a drive gear range. This is a type "B" DTC.

Conditions For Setting The DTC

- No MAP DTCs P0107 or P0108, P0106, P1106, P1107.
- No TPS DTCs P0122 or P0123.
- Not in Park or Neutral.
- TP angle is greater than 10%.
- Engine vacuum is between 0 and 70kPa.
- Engine speed is between 3000 and 7000 rpm.
- Transmission output speed is less than 0 rpm.
- All conditions met for 5 seconds.

Action Taken When The DTC Sets

- Fixed to 4th gear.
- Maximum line pressure.
- Inhibit TCC engagement.
- For lamp illuminate refer to *DTC type definition (type B)*.

Conditions For Clearing The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool. The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- An OSS DTC P0722 will set when no output speed is at detected at start off.
- Inspect the wiring for poor electrical connection at the PCM. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move or massage the wiring harness while observing test equipment for a change.

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

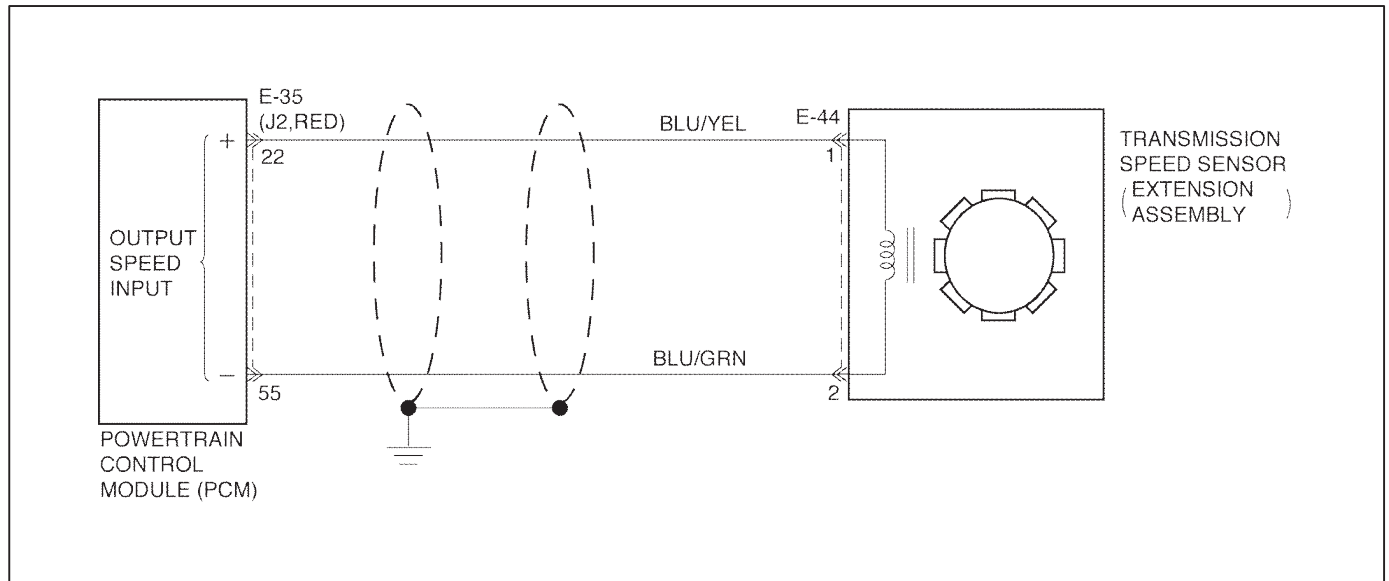
4. This test checks the OSS circuit.
5. This test checks the integrity of the OSS.
7. This test checks the 5-volt and ground circuit of the PCM.

DTC P0722 Automatic Transmission Output Speed Sensor (OSS) Low Input

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". 4. Raise the drive wheels. 5. Start the engine. 6. Place the transmission in any drive range. With the drive wheels rotating, does the "Trans Output Speed" increase with the drive wheel speed?	Go to <i>Diagnostic Aids</i>	Go to Step 3
3	Check for the most current and/or incorrect calibration. Is the calibration current?	Go to Step 16	Go to Step 4
4	1. Turn the ignition "off". 2. Disconnect the E35 (RED) PCM connector. 3. Using the J39200 DVOM, measure the resistance between harness connector terminals E35-22 and E35-55. Is the reading 3000 ohms?	Go to Step 5	Go to Step 6
5	1. Select AC volts. 2. Rotate the rear wheels, ensuring the driveshaft is turning. Is the voltage greater than 0.5 volts?	Go to Step 7	Go to Step 8
6	Inspect circuits BLU/YEL and BLU/GRN for a poor connection or an open circuit. Was a problem found?	Go to Step 17	Go to Step 8
7	1. Reconnect the E35 (RED) PCM connector. 2. Disconnect the OSS harness from the OSS. 3. With the engine "off", turn the ignition "on". 4. Using the J 39200 DVOM, measure the voltage at the OSS harness connector terminals E44-1 and E44-2. Is the reading between 4.0 to 5.1 volts?	Go to Step 16	Go to Step 10
8	1. Remove the OSS. 2. Check the output shaft speed sensor rotor for damage or misalignment. Refer to <i>Speed Sensor (Extension Assembly) in Automatic Transmission (4L30-E) section</i> . Was a problem found?	Go to Step 17	Go to Step 9
9	Replace the OSS. Is the replacement complete?	Go to Step 17	—
10	Was the reading in step 7 less than 4.0 volts?	Go to Step 12	Go to Step 11
11	Was the reading in Step 7 greater than 5.1 volts?	Go to Step 15	—
12	Using the J 39200 DVOM to chassis ground, measure the voltage on circuit BLU/YEL. Is the reading between 4.0 to 5.1 volts?	Go to Step 13	Go to Step 14

DTC P0722 Automatic Transmission Output Speed Sensor (OSS) Low Input (Cont'd)

Step	Action	Yes	No
13	Repair the open in circuit BLU/GRN. Is the repair complete?	Go to <i>Step 17</i>	—
14	Check circuit BLU/YEL for a short to ground or open. Was a problem found and corrected?	Go to <i>Step 17</i>	Go to <i>Step 16</i>
15	Repair the short to B+ in circuit BLU/YEL. Is the repair complete?	Go to <i>Step 17</i>	—
16	Replace the PCM. Refer to <i>Powertrain Control Module (PCM) in automatic Transmission (4L30–E) section</i> . Is the replacement complete?	Go to <i>Step 17</i>	—
17	1. After the repair is complete, use the scan tool to select “DTC”, then “Clear Info” function and operate the vehicle under the following conditions: Transmission output speed is greater than 101 rpm for 3 seconds. 2. Review the scan tool “DTC Info”. Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P0723 Automatic Transmission Output Speed Sensor (OSS) Intermittent

D07R200006

Circuit Description

Output speed information is provided to the PCM by the OSS, which is a permanent magnet (PM) generator. The PM generator produces a pulsing AC voltage. The AC voltage level and number of pulses increases as the speed of the vehicle increases. The PCM then converts the pulsing voltage to output speed, which is used for calculations. The vehicle speed can be displayed with a scan tool.

This DTC detects a fast decrease of output speed when engine running in a drive gear range. This is a type "B" DTC.

Conditions For Setting The DTC

Drive range

- Engine running time is greater than 5 seconds.
- Output speed is greater than 1300 rpm for 2 second.
- NORAW-NOLAST < 200 rpm for 2 seconds.
 - NORAW: Latest raw data of output shaft speed.
 - NOLAST: Filtered previous data of output speed.
- Transmission negative output speed change is greater than 1300 rpm.
- Conditions met for 3 seconds.

Action During Detection Time

- Output speed value is frozen

Action Taken When The DTC Sets

- Fixed to 4th gear.
- Maximum line pressure.
- Inhibit TCC engagement.
- For lamp illuminate refer to *DTC type definition (type B)*.

Conditions For Clearing The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- A OSS DTC P0723 will set when output speed has been detected and is lost.
- Inspect the wiring for poor electrical connection at the PCM. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

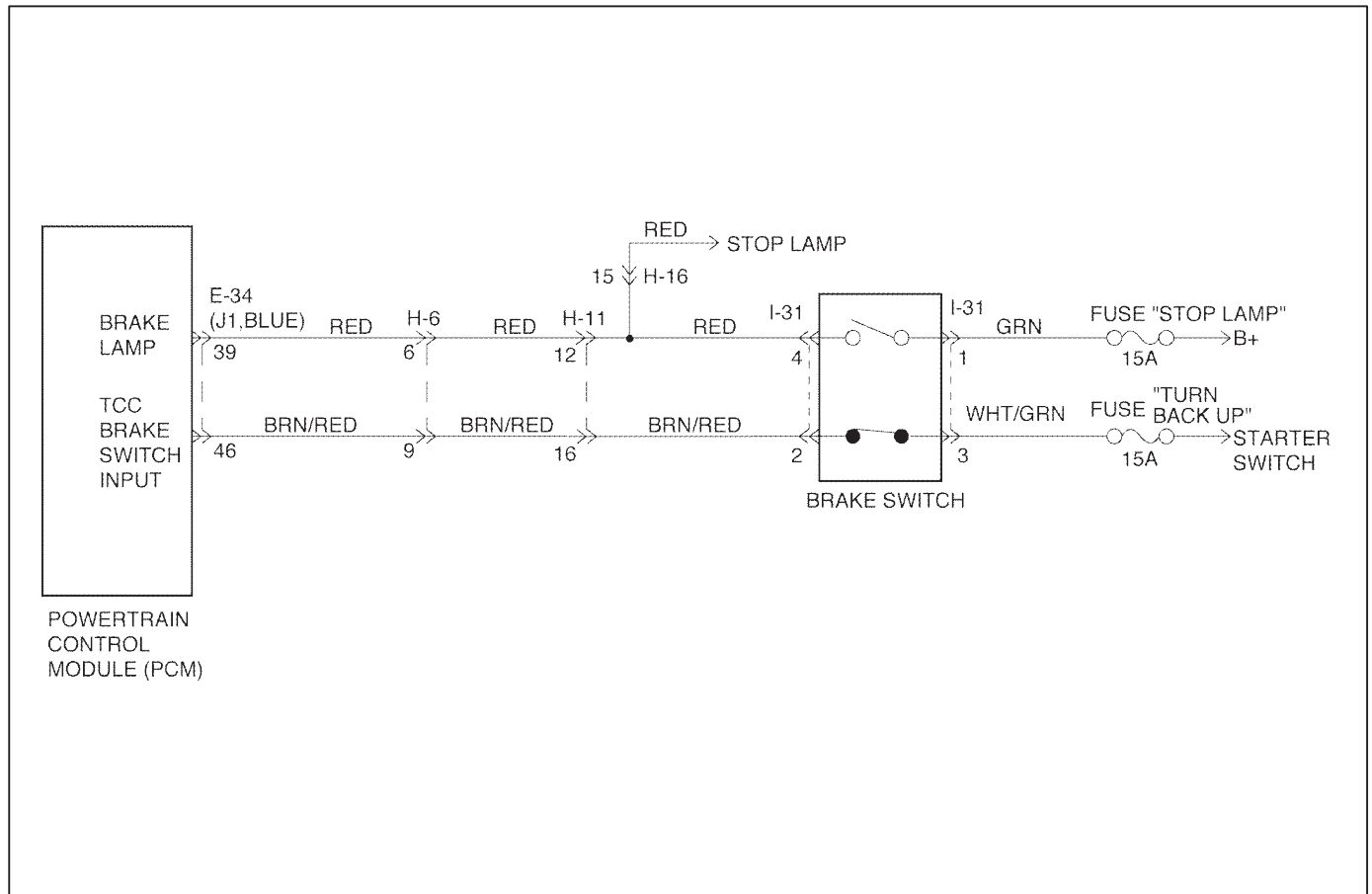
4. This test checks the OSS circuit.
5. This test checks the integrity of the OSS.
7. This test checks the 5-volt and ground circuit of the PCM.

DTC P0723 Automatic Transmission Output Speed Sensor (OSS) Intermittent

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". 4. Raise the drive wheels. 5. Start the engine. 6. Place the transmission in any drive range. With the drive wheels rotating, does the "Trans Output Speed" increase with the drive wheel speed?	Go to <i>Diagnostic Aids</i>	Go to Step 3
3	Check for the most current and/or incorrect calibration. Is the calibration current?	Go to Step 16	Go to Step 4
4	1. Turn the ignition "off". 2. Disconnect the E35 (RED) PCM connector. 3. Using the J39200 DVOM, measure the resistance between harness connector terminals E35-22 and E35-55. Is the reading 3,000 ohms?	Go to Step 5	Go to Step 6
5	1. Select AC volts. 2. Rotate the rear wheels, ensuring the driveshaft is turning. Is the voltage greater than 0.5 volts?	Go to Step 7	Go to Step 8
6	Inspect circuits BLU/YEL and BLU/GRN for a poor connection or an open circuit. Was a problem found?	Go to Step 17	Go to Step 8
7	1. Reconnect the E35 (RED) PCM connector. 2. Disconnect the OSS harness from the OSS. 3. With the engine "off", turn the ignition "on". 4. Using the J 39200 DVOM, measure the voltage at the OSS harness connector terminals E44-1 and E44-2. Is the reading between 4.0 to 5.1 volts?	Go to Step 16	Go to Step 10
8	1. Remove the OSS. 2. Check the output shaft speed sensor rotor for damage or misalignment. Refer to <i>Speed Sensor (Extension Assembly) in Automatic Transmission (4L30-E) section</i> . Was a problem found?	Go to Step 17	Go to Step 9
9	Replace the OSS. Is the replacement complete?	Go to Step 17	—
10	Was the reading in step 7 less than 4.0 volts?	Go to Step 12	Go to Step 11
11	Was the reading in Step 7 greater than 5.1 volts?	Go to Step 15	—
12	Using the J 39200 DVOM to chassis ground, measure the voltage on circuit BLU/YEL. Is the reading between 4.0 to 5.1 volts?	Go to Step 13	Go to Step 14

7A1–50 TRANSMISSION CONTROL SYSTEM (4L30–E)**DTC P0723 Automatic Transmission Output Speed Sensor (OSS) Intermittent (Cont'd)**

Step	Action	Yes	No
13	Repair the open in circuit BLU/GRN. Is the repair complete?	Go to <i>Step 17</i>	—
14	Check circuit BLU/YEL for a short to ground or open. Was a problem found and corrected?	Go to <i>Step 17</i>	Go to <i>Step 16</i>
15	Repair the short to B+ in circuit BLU/YEL. Is the repair complete?	Go to <i>Step 17</i>	—
16	Replace the PCM. Refer to <i>Powertrain Control Module (PCM) in Automatic Transmission (4L30–E) section</i> . Is the replacement complete?	Go to <i>Step 17</i>	—
17	1. After the repair is complete, use the scan tool to select “DTC”, then “Clear Info” function and operate the vehicle under the following conditions: Transmission output speed is greater than 101 rpm for 3 seconds. 2. Review the scan tool “DTC Info”. Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P0724 Brake Switch Circuit High (Stuck Off)**Circuit Description:**

The brake switch indicates brake pedal status to the Powertrain Control Module (PCM). The brake switch is a normally-closed switch that supplies battery voltage on circuit BRN/RED to the PCM. Applying the brake pedal opens the switch, interrupting voltage to the PCM. When the brake pedal is released, the PCM receives a constant voltage signal. If the PCM receives a zero voltage signal at the brake switch input, and the Torque Converter Clutch (TCC) is engaged, the PCM de-energizes the Torque Converter Clutch Solenoid Valve (TCC Sol. Valve). The PCM disregards the brake switch input for TCC scheduling if there is a brake switch circuit fault (Refer to *Diagnostic Aids*).

When the PCM detects a closed brake switch circuit (12 volts, high input) during decelerations, then DTC P0724 sets. DTC P0724 is a type D DTC.

Conditions For Setting The DTC

- No OSS Assy. DTCs P0722 or P0723.
- The PCM detects a closed brake switch circuit (12 volts) without changing and the following events occur seven consecutive times.
 - The vehicle speed is greater than 32 km/h (20 mph) for 4 seconds.
 - then the vehicle speed is between 8–32 km/h (5–20 mph) for 4 seconds.
 - then the vehicle speed is less than 8 km/h (5 mph).

Action Taken When The DTC Sets

- The PCM does not illuminate the Malfunction Indicator Lamp (MIL).
- DTC P0724 stores in PCM history.

Conditions For Clearing The DTC

- A scan tool can clear the DTC from the PCM history. The PCM clears the DTC from the PCM history if the vehicle completes 40 warm-up cycles without a failure reported.
- The PCM cancels the DTC default actions when the fault no longer exists and the ignition is OFF long enough in order to power down the PCM.

Diagnostic Aids

- Inspect the wiring for poor electrical connection at the PCM. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.
- Check customer driving habits and/or unusual traffic conditions (i.e. stop and go, expressway).
- Check brake switch for proper mounting and adjustment.

7A1–52 TRANSMISSION CONTROL SYSTEM (4L30–E)

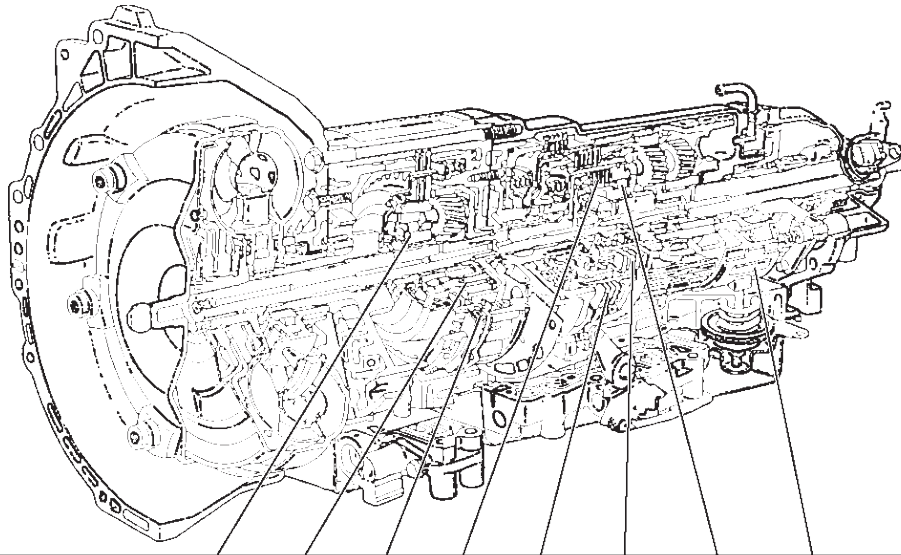
Test Description

The numbers below refer to the step numbers on the diagnostic chart:

2. This step isolates the brake switch as a source for setting the DTC.

DTC P0724 Brake Switch Circuit High (Stuck Off)

Step	Action	Yes	No
1	Was the Powertrain On–Board Diagnostic (OBD) System Check performed?	Go to <i>Step 2</i>	Go to <i>Powertrain OBD System Check</i>
2	1. Install the scan tool. 2. With the engine “off,” turn the ignition switch to the “on” position. NOTE: Before clearing the DTC(s), use the scan tool in order to record the “Failure Records” for reference. Using the “Clear Info” function will erase the stored “Failure Records” from the PCM. 3. Record the DTC Failure Records, then clear the DTC(s). 4. Select “Brake Switch” on the scan tool. 5. Disconnect the brake switch connector from the brake switch. Did the TCC brake switch status change from “Closed” to “Open”?	Go to <i>Step 3</i>	Go to <i>Step 4</i>
3	Replace the brake switch. Is the replacement complete?	Go to <i>Step 6</i>	—
4	Inspect circuit BRN/RED for a short to B+ condition. Repair the circuit if necessary. Did you find a short to B+ condition?	Go to <i>Step 6</i>	Go to <i>Step 5</i>
5	Replace the PCM. Is the replacement complete?	Go to <i>Step 6</i>	—
6	In order to verify your repair, perform the following procedure: 1. Select DTC. 2. Select “Clear Info”. 3. With the engine “off” turn the ignition switch to the “on” position. 4. Apply the brake pedal. 5. Verify that the brake switch status indicates “Open” (0 volts) for 2 seconds. 6. Select Specific DTC. Enter DTC P0724. Has the test run and passed?	System OK	Begin the diagnosis again. Go to <i>Step 1</i>

DTC P0730 Gear Error Without Input Speed

RANGE	GEAR	SOL A N.C.	SOL B N.O.	O/DRIVE FREE WHEEL (OFW)	O/RUN CLUTCH (OC)	FOURTH CLUTCH (C4)	THIRD CLUTCH (C3)	REVERSE CLUTCH (RC)	SECOND CLUTCH (C2)	PRINCIPLE SPRAG ASM (PFW)	BAND ASM (B)	ENGINE BRAKING	TORQUE CONV. CLUTCH
P-N		OFF	ON		APP							NO	NO
R	REVERSE	OFF	ON	LD	APP			APP		LD		NO	NO
D	1ST	OFF	ON	LD	APP					LD	APP	NO	NO
	2ND	ON	ON	LD	APP				APP	FW	APP	YES	ECCC
	3RD	ON	OFF	LD	APP		APP		APP	NE		YES	ECCC
	4TH	OFF	OFF	FW		APP	APP		APP	NE		YES	ECCC
3	1ST	OFF	ON	LD	APP					LD	APP	NO	NO
	2ND	ON	ON	LD	APP				APP	FW	APP	YES	ECCC
	3RD	ON	OFF	LD	APP		APP		APP	NE		YES	ECCC
2	1ST	OFF	ON	LD	APP		APP			LD	APP	YES	NO
	2ND	ON	ON	LD	APP				APP	FW	APP	YES	ECCC
L	1ST	OFF	ON	LD	APP		APP			LD	APP	YES	NO

LD : LOCKED IN DRIVE

FW : FREEWHEELING

NE : NOT EFFECTIVE

APP : APPLIED

D07RY00055

Circuit Description

- The Powertrain Control Module (PCM) calculates the slippage of the converter and transmission based upon the engine speed, the output speed, and the current gear ratio.
- The slippage of the converter at a high enough engine speed is low. The transmission should not slip more than a given value when there is no shift.
- This DTC detects a slip at each gear. This is a type "C" DTC.

Conditions For Setting The DTC

- No Output Speed Sensor DTC(s) P0722, P0723.
- Not in Park, Neutral, or Reverse.
- Engine speed is greater than 3,500 rpm.
- 3 seconds since upshift.

- No Transmission Range Switch DTC(s) P0705, P0706.
- 3 seconds since downshift.
- 3 seconds since garage shift (N→D).
- And one of the following conditions occur:
 - Slip is greater than 508 rpm in 1st gear.
 - Slip is greater than 468 rpm in 2nd gear.
 - Slip is greater than 449 rpm on 3rd gear.
 - Slip is greater than 440 rpm on 4th gear.
- All conditions met for 5.5 seconds.

Action Taken When The DTC Sets

- Maximum line pressure.
- The PCM will not illuminate the Malfunction Indicator Lamp (MIL).

7A1-54 TRANSMISSION CONTROL SYSTEM (4L30-E)

- The PCM will illuminate the CHECK TRANS Lamp.
- Turn force motor OFF.

Conditions For Clearing The DTC/CHECK TRANS Lamp

- The PCM will turn “off” the CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from PCM memory by using a scan tool.
- The DTC can also be cleared from memory when the vehicle has made 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC Actions Taken items when the fault conditions no longer exist and the ignition is cycles “off” long enough to power down the PCM.

Diagnostic Aids

- Check for intermittent output speed sensor circuit problems.
- Check for possible incorrect calibration. (PCM part No., tire specification, and rear axle ratio)

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

3. This step checks for possible low fluid level causing slipping resulting in an undefined gear ratio.
4. This step checks for correct gear ratios for commanded gears.
5. This step checks for low line pressure.

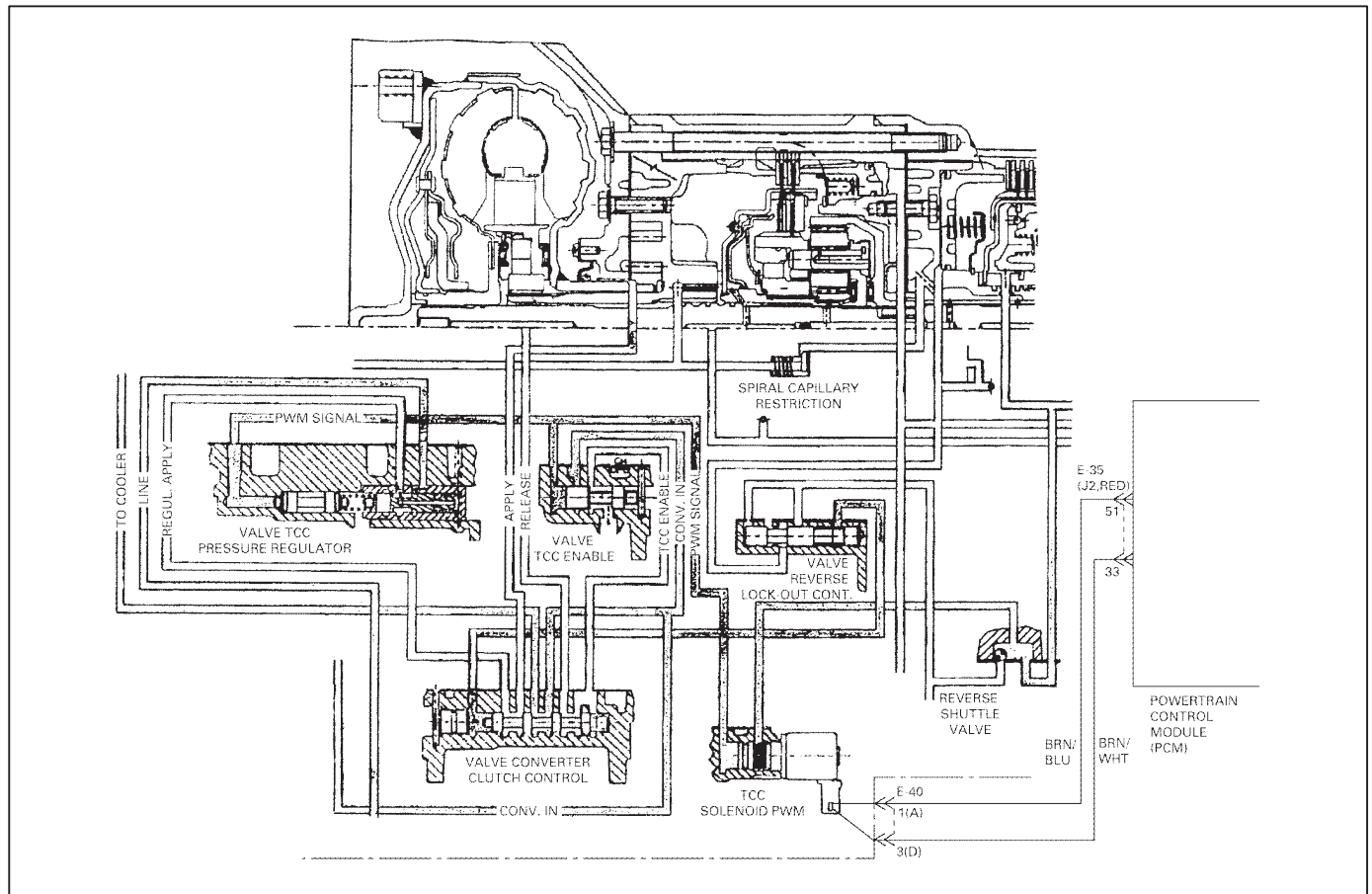
DTC P0730 Gear Error Without Input Speed

Step	Action	Yes	No
1	Were you sent here from the “On–Board Diagnostic (OBD) System Check”?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emission in Engine section</i>
2	Visually inspect the transmission cooling system for fluid leaks. • Refer to <i>Chart 16: Possible Causes of Transmission Fluid Leaks of Mechanical/Hydraulic Diagnosis Symptoms Index in Automatic Transmission (4L30–E) section</i> Was condition found and corrected?	Go to Step 7	Go to Step 3
3	Refer to <i>Checking Transmission Fluid Level and Condition in Automatic Transmission (4L30–E) section</i> . Has transmission fluid checking procedure been performed?	Go to Step 4	Go to <i>Checking Transmission Fluid Level and Condition in Automatic Transmission (4L30–E) section</i>
4	1. Install the scan tool. 2. Turn the ignition switch to the “on” position. 3. Engine not running. NOTE: Before clearing DTC(s) use the scan tool to record the “Failure Records” for reference, as data will be lost when the “Clear Info” function is used. 4. Record the Failure Record data. 5. Use the scan tool snapshot mode to record transmission gear ratios. 6. Drive vehicle in transmission gear ranges L, 2, 3, and D with the engine speed is greater than 3,500 rpm for 5.5 seconds. 7. Record each transmission gear. 1st:2.73 – 2.99 2nd:1.54 – 1.71 3rd:0.93 – 1.05 4th:0.66 – 0.78 Does commanded gear ratio match ranges as shown?	Refer to <i>Diagnostic Aids</i>	Go to Step 5

DTC P0730 Gear Error Without Input Speed (Cont'd)

Step	Action	Yes	No
5	Perform line pressure check. ● Refer to <i>Line Pressure Test in Automatic Transmission (4L30-E) section</i> . Was condition found and corrected?	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Check for possible clutch slippage. ● Refer to <i>Chart 6: Diagnostic Trouble Code (DTC) P0730 of Mechanical/Hydraulic Diagnosis Symptoms Index in Automatic Transmission (4L30-E) section</i> . Was condition found and corrected?	Go to <i>Step 7</i>	—
7	1. After the repair is complete, use the scan tool to select "DTC", then "Clear info" function. 2. Operate the vehicle under the following conditions: ● Drive the vehicle in D4 with the engine speed greater than 3,500 rpm to obtain anyone of the following gear ratios for seven seconds. 1st 1:2.73 – 1:2.99 2nd 1:1.54 – 1:1.71 3rd 1:0.93 – 1:1.05 4th 1:0.66 – 1:0.78 Has the last test failed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P0742 Torque Converter Clutch (TCC) System Stuck On



D07R200008

Circuit Description

The PCM energizes the TCC solenoid by creating an ignition voltage on circuit BRN/BLU. When ignition voltage is energized by the PCM, the TCC solenoid stops converter signal oil from exhausting. This causes converter signal oil pressure to increase and move the TCC valve. The TCC solenoid will deenergize when the PCM no longer provides ignition voltage. When the TCC solenoid is deenergized, it will exhaust fluid and release the TCC.

This DTC detects low torque converter slip when the TCC is commanded "off". This is a type "B" DTC.

Conditions For Setting The DTC

The following conditions occur once per TCC cycle, three consecutive times:

- No TPS DTCs P0122 or P0123.
- No OSS DTCs P0722 or P0723.
- No TCC solenoid DTC P1860.
- TP angle is greater than 20%.
- Engine speed is greater than 500 rpm and less than 3,000 rpm.
- Engine vacuum is between 0 and 70 kPa.
- Commanded gear is not 1st.
- Gear range is D4.
- TCC is commanded "off".
- No TCC Stuck off DTC P1870.
- TCC slip speed is between -20 and 40 rpm for 2 seconds.
- Vehicle speed is greater than 25 km/h (15 mph) and less than 120 km/h (75 mph).
- Speed ratio is greater than 0.9 and less than 2.0.

Action Taken When The DTC Sets

- For lamp illuminate refer to *DTC type definition (type B)*.
- Inhibit TCC engagement.

Conditions For Clearing The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- If the TCC is mechanically stuck “on” with the parking brake applied and any gear range selected, the TCC fluid will mechanically apply the TCC, possibly causing an engine stall.

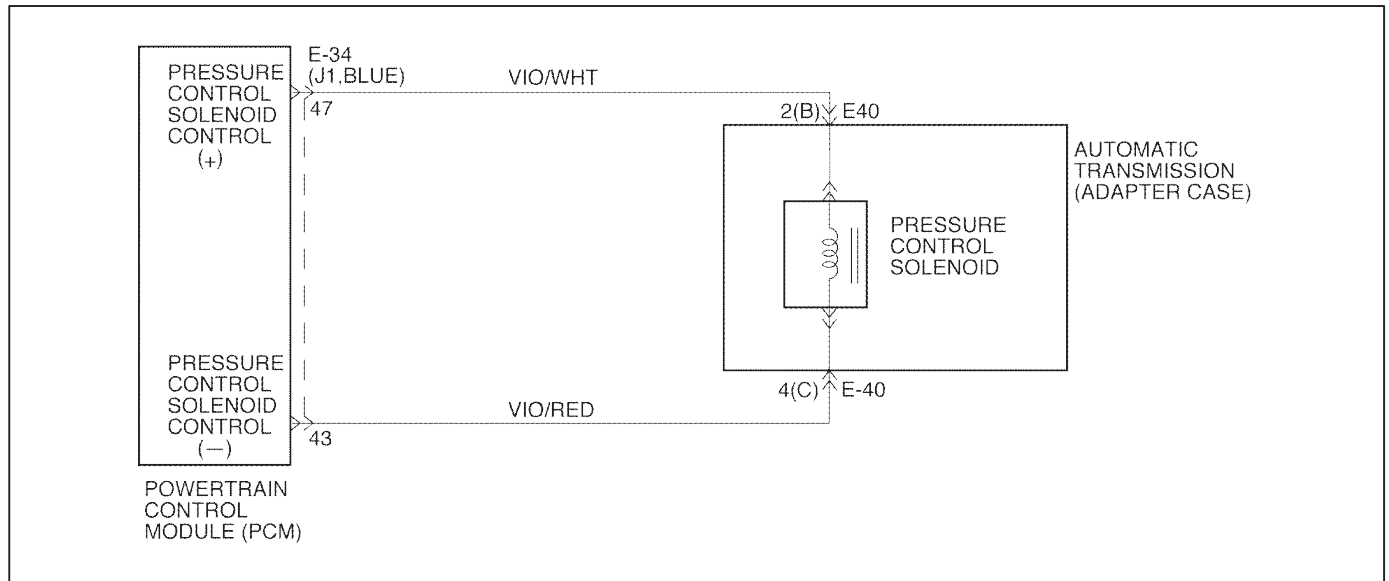
Test Description

The number below refers to the step number on the diagnostic chart:

3. This test checks the mechanical state of the TCC. (When the PCM commands the TCC solenoid “off”, the slip speed should increase).

DTC P0742 Torque Converter Clutch (TCC) System Stuck On

Step	Action	Yes	No
1	Were you sent here from the “Powertrain On–Board Diagnostic (OBD) System Check”?	Go to <i>Step 2</i>	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	1. Install the scan tool. 2. With the engine “off”, turn the ignition switch “on”. NOTE: Before clearing DTC(s), use the scan tool to record “Freeze Frame” and “Failure Records” for reference, as data will be lost when the “Clear Info” function is used. 3. Record the DTC “Freeze Frame” and “Failure Records”. 4. Using the scan tool, verify the “TP Sensor” operation. Are the “TP Sensor” values within 0.6 – 5.0 volts?	Go to <i>Step 3</i>	Go to <i>Diagnostic Aids</i>
3	Drive the vehicle in the D4 drive range in fourth gear under steady acceleration, with a TP angle greater than 20%. Does the scan tool display “TCC Slip Speed” between –30 and +30 rpm, while the displayed TCC solenoid state is “off”?	Go to <i>Step 4</i>	Go to <i>Diagnostic Aids</i>
4	The TCC is mechanically stuck “on”. Check the following items: • Clogged exhaust orifice in the TCC solenoid. • Converter clutch apply valve stuck in the apply position. • Misaligned or damaged valve body gasket. • Restricted release passage. Was a problem found and corrected?	Go to <i>Step 5</i>	—
5	1. After the repair is complete, use the scan tool to select “DTC”, then “Clear Info” function and ensure the following conditions are met: TCC slip speed must be between 200 and 2,500 rpm for 4 seconds. 2. Review the scan tool “DTC Info”. Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P0748 Pressure Control Solenoid (PCS) (Force Motor) Circuit Electrical

D07R20009

Circuit Description

The PCS is a PCM-controlled device used to regulate transmission line pressure. The PCM compares TPS voltage, engine rpm, and other inputs to determine the line pressure appropriate for a given load. The PCM will regulate the pressure by applying a varying amperage to the PCS. The applied amperage can vary from 70 to 1060 milliamperes (mA), and is monitored by the PCM.

This DTC detects a continuous open or short to ground in the PCS circuit or the PCS. This is a type "C" DTC.

Conditions For Setting The DTC

- Battery voltage is between 10 and 16 volts.
- The PCM detects that the difference between commanded and actual current is 200 milliamperes (mA) for over 1 second.
- Engine speed is greater than 300 rpm.

Action Taken When the DTC Sets

- The PCM will not illuminate the Malfunction Indicator Lamp (MIL).
- Maximum line pressure.
- The PCM will illuminate the CHECK TRANS Lamp.
- Turn Force Motor OFF (Durability).

Conditions For Clearing The DTC/CHECK TRANS Lamp

- The PCM will turn "off" the CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.

- The DTC can be cleared from PCM history by using a scan tool.
- The DTC will be cleared from memory when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Inspect the wiring for poor electrical connection at the PCM and at the transmission 4-way connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.

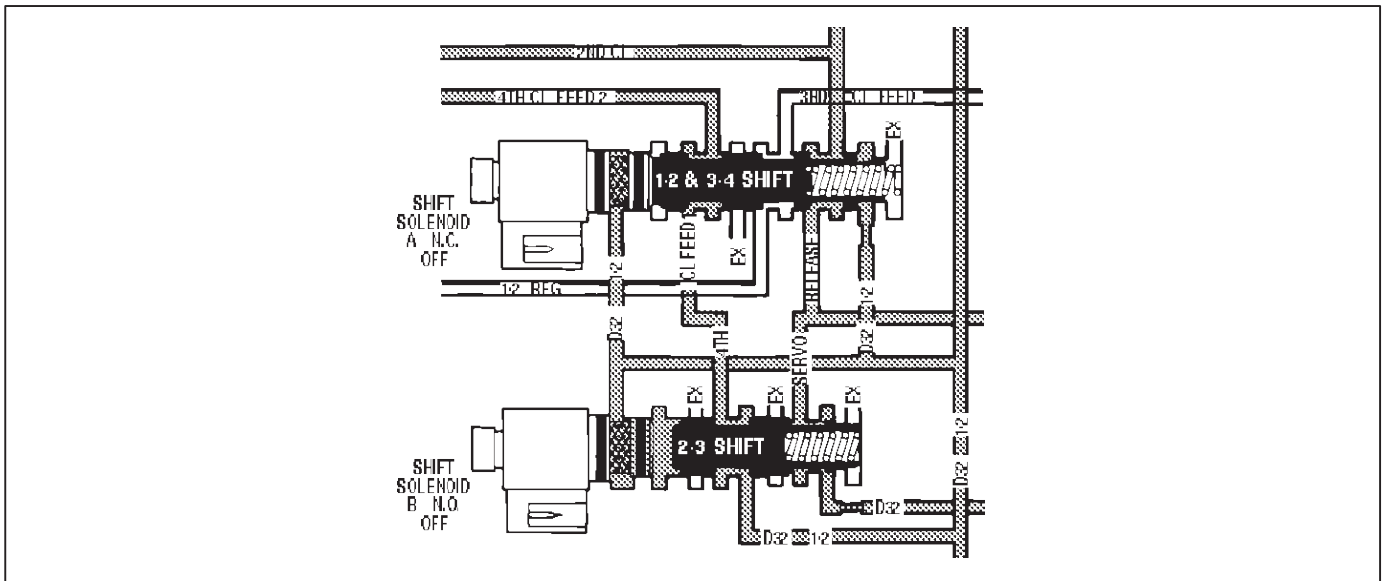
Test Description

The numbers below refer to the *step numbers on the diagnostic chart*:

2. This test checks the ability of the PCM to command the PCS.
3. This test checks the PCS and internal wiring harness for incorrect resistance.

DTC P0748 Pressure Control Solenoid (PCS) (Force Motor) Circuit Electrical

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On–Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emission in Engine section</i>
2	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Failure Records". 4. While the engine is operating, put the transmission in Park. 5. Using the scan tool, apply 70 through 1060 milliampere (mA) while observing "PC Ref. Current" and "PC Act. Current". Is the "PC Act. Current" reading always within 160 mA?	Go to <i>Diagnostic Aids</i>	Go to Step 3
3	1. Turn the ignition "off". 2. Disconnect the transmission 4–way connector E–40. 3. Using the J39200 DVOM, measure the resistance between terminals E40–2(B) and E40–4(C). Is the resistance within 3–7 ohms?	Go to Step 7	Go to Step 4
4	1. Remove the transmission oil pan. Refer to <i>Solenoid (Adapter Case Valve Body) in Automatic Transmission (4L30–E) section</i> . 2. Disconnect the internal wiring harness at the PCS. 3. Measure the resistance of the PCS. Is the resistance within 3–7 ohms?	Go to Step 6	Go to Step 5
5	Replace the PCS. Is the replacement complete?	Go to Step 10	—
6	Repair the internal wiring harness for an open. Is the repair complete?	Go to Step 10	—
7	Inspect/repair circuits VIO/WHT and VIO/RED. Was a problem found?	Go to Step 10	Go to Step 8
8	Inspect/repair circuits VIO/WHT and VIO/RED for a short to ground or poor connections. Was a problem found?	Go to Step 10	Go to Step 9
9	Replace the PCM. Refer to <i>Powertrain Control Module (PCM) in Automatic Transmission (4L30–E) section</i> . Is the replacement complete?	Go to Step 10	—
10	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and ensure the following conditions are met: The PCS duty cycle is not at its electrical high or low limit. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to Step 1	Repair verified Exit DTC table

DTC P0751 Shift Solenoid A Performance (Stuck Off)**Circuit Description**

The shift solenoid A is used to control fluid flow acting on the 1-2 and 3-4 shift valves. The solenoid is a normally close exhaust valve that is used with the shift solenoid B to allow four different shifting combinations. The DTC detects when there is only a 1-1-4-4 shift pattern depending on the state of the mechanical failure instead of a 1-2-3-4 shift pattern. This is a type "B" DTC.

Conditions For Setting The DTC

- No ETC DTCs.
- No OSS DTCs P0722 or P0723.
- No TCC solenoid DTCs P0742, P1860, P1870.
- No shift solenoid A DTC P0753.
- No shift solenoid B DTC P0758.
- Gear range is D4.
- Transmission temperature is between 20° and 130°C (68° and 266°F).
- Output speed is greater than 375 rpm.
- No range code P0705, P0706.
- No torque code (to be confirmed).
- Engine run for more 0 seconds and not influed cut-off (to be confirmed).

All the above conditions have been met and the combination of conditions 1, 2 occur two consecutive times.

Condition 1:

- 2nd gear is commanded for ≥ 1 second.
- $40 \leq \text{Engine Torque} \leq 400 \text{ N}\cdot\text{m}$
- Speed ratio ≥ 0.6
- Throttle position $\geq 10 \%$
- $800 \leq \text{TCC Slip} \leq 4000 \text{ rpm}$
- $2.75 \leq \text{Modeled Ratio} \leq 3.2$ for 1 second.

Condition 2:

- 3rd gear is commanded for ≥ 1 second.
- $40 \leq \text{Engine Torque} \leq 400 \text{ N}\cdot\text{m}$
- Throttle position $\geq 10 \%$
- $-8000 \leq \text{TCC Slip} \leq 8000 \text{ rpm}$
- Speed ratio ≥ 0.45
- $0.62 \leq \text{Modeled Ratio} \leq 0.92$ for 3 second.

Action Taken When the DTC Sets

- Maximum line pressure.
- For lamp illuminate refer to *DTC type definition (type B)*.
- Turn Force Motor OFF.

Conditions For Clearing The The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Verify that the transmission meets the specifications in the 4L30-E shift speed chart.
- Other internal transmission failures may cause more than one shift to occur.

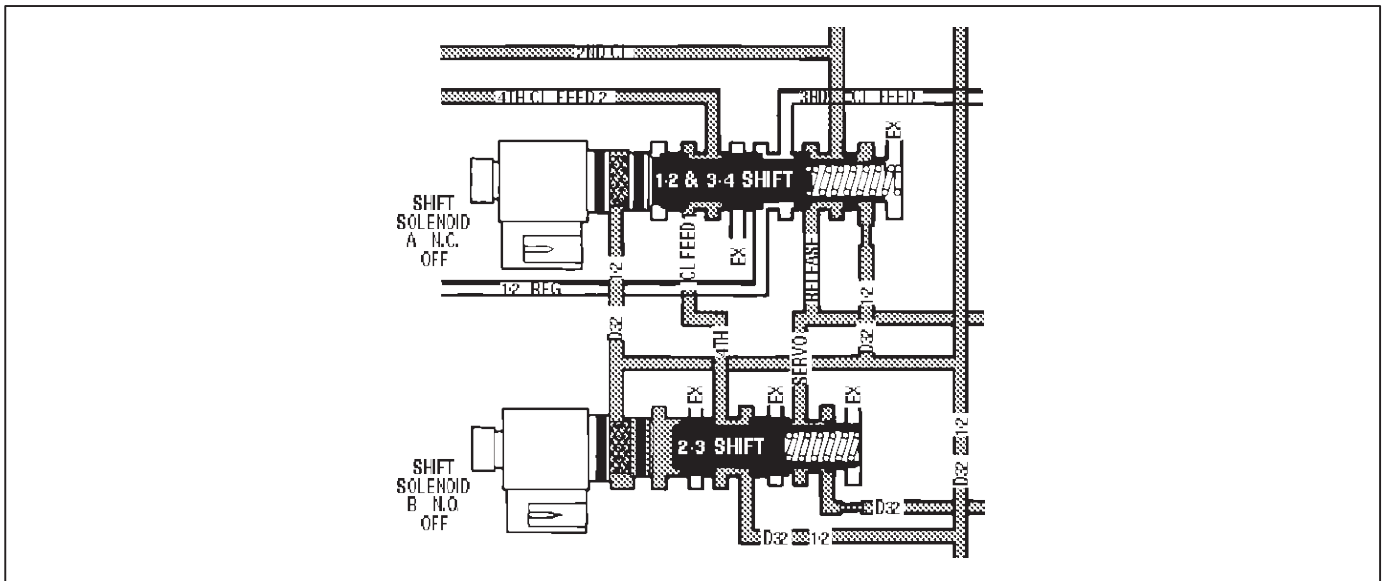
Test Description

The numbers below refer to the step numbers on the diagnostic chart:

2. This test checks the function of the range switch (mode switch).
3. This test checks that the scan tool commanded all shifts, all shifts solenoids responded correctly, but all the shifts did not occur.

DTC P0751 Shift Solenoid A Performance (Stuck Off)

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emission in Engine</i> section
2	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". 4. With the engine operating, apply the brake pedal and select each transmission range DL, D2, D3, D4, N, R, and P. Does each selected transmission range match the "TR Switch" on the scan tool?	Go to Step 3	Go to "Range Switch Logic Table"
3	1. While the engine is operating, raise the drive wheels. 2. With the transmission in D4 range, use the scan tool to command 1st, 2nd and 3rd, and 4th gears while accelerating the vehicle. Was a 1-1-4-4 only shift pattern detected? (Road testing the vehicle may be necessary).	Go to Step 4	Go to <i>Diagnostic Aids</i>
4	Check the shift solenoid/hydraulic circuit for: ● One or both of the shift solenoids for an internal malfunction. ● Contamination or sediment in one or both of the shift solenoids. ● Damaged seals on one or both of the shift solenoids. Refer to <i>Solenoid (Main Case Valve Body) in Automatic Transmission (4L30-E)</i> section. Was a problem found and corrected?	Go to Step 5	Go to <i>Diagnostic Aids</i>
5	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and road test the vehicle. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to Step 1	Repair verified Exit DTC table

DTC P0752 Shift Solenoid A Performance (Stuck On)

D07RT011

Circuit Description

The shift solenoid A is used to control fluid flow acting on the 1-2 and 3-4 shift valves. The solenoid is a normally close exhaust valve that is used with the shift solenoid B to allow four different shifting combinations. The DTC detects when there is only a 2-2-3-3 shift pattern depending on the state of the mechanical failure instead of a 1-2-3-4 shift pattern. This is a type "B" DTC.

Conditions For Setting The DTC

- No ETC DTCs.
- No OSS DTCs P0722 or P0723.
- No TCC solenoid DTC P0742, P1860, P1870.
- No shift solenoid A DTC P0753.
- No shift solenoid B DTC P0758.
- Gear range is D4.
- Output speed is greater than 375 rpm.
- Transmission temperature is between 20° and 130°C (68° and 266°F).
- No range code P0705, P0706.
- No torque code (to be confirmed).
- Engine run for more 0 seconds and not influed cut-off (to be confirmed).

All the above conditions have been met and the combination of condition 1, 2 occur two consecutive times.

Condition 1:

- 1st gear is commanded for ≥ 1 sec
- $40 \leq \text{Engine Torque} \leq 400 \text{ N}\cdot\text{m}$
- Throttle positon $\geq 10\%$
- $-8000 \leq \text{TCC slip} \leq 8000 \text{ rpm}$
- Transmission out speed $\geq 375 \text{ rpm}$
- Speed ratio ≥ 0.3
- $1.5 \leq \text{Modeled Ratio} \leq 2.4$ for 0.687 seconds

Condition 2:

- 4th Gear is commanded for ≥ 1 sec.
- $40 \leq \text{Engine Torque} \leq 400 \text{ N}\cdot\text{m}$
- Trottle position $\geq 10\%$
- $-8000 \leq \text{TCC slip} \leq 8000 \text{ rpm}$
- Speed ratio ≥ 0.6
- $0.92 \leq \text{Modeled Ratio} \leq 1.5$ for 7 seconds

Action Taken When the DTC Sets

- Maximum line pressure.
- For lamp illuminate refer to *DTC type definition (type B)*.
- Turn Force Motor OFF.

Conditions For Clearing The The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Verify that the transmission meets the specifications in the 4L30-E shift speed chart.
- Other internal transmission failures may cause more than one shift to occur.

Test Description

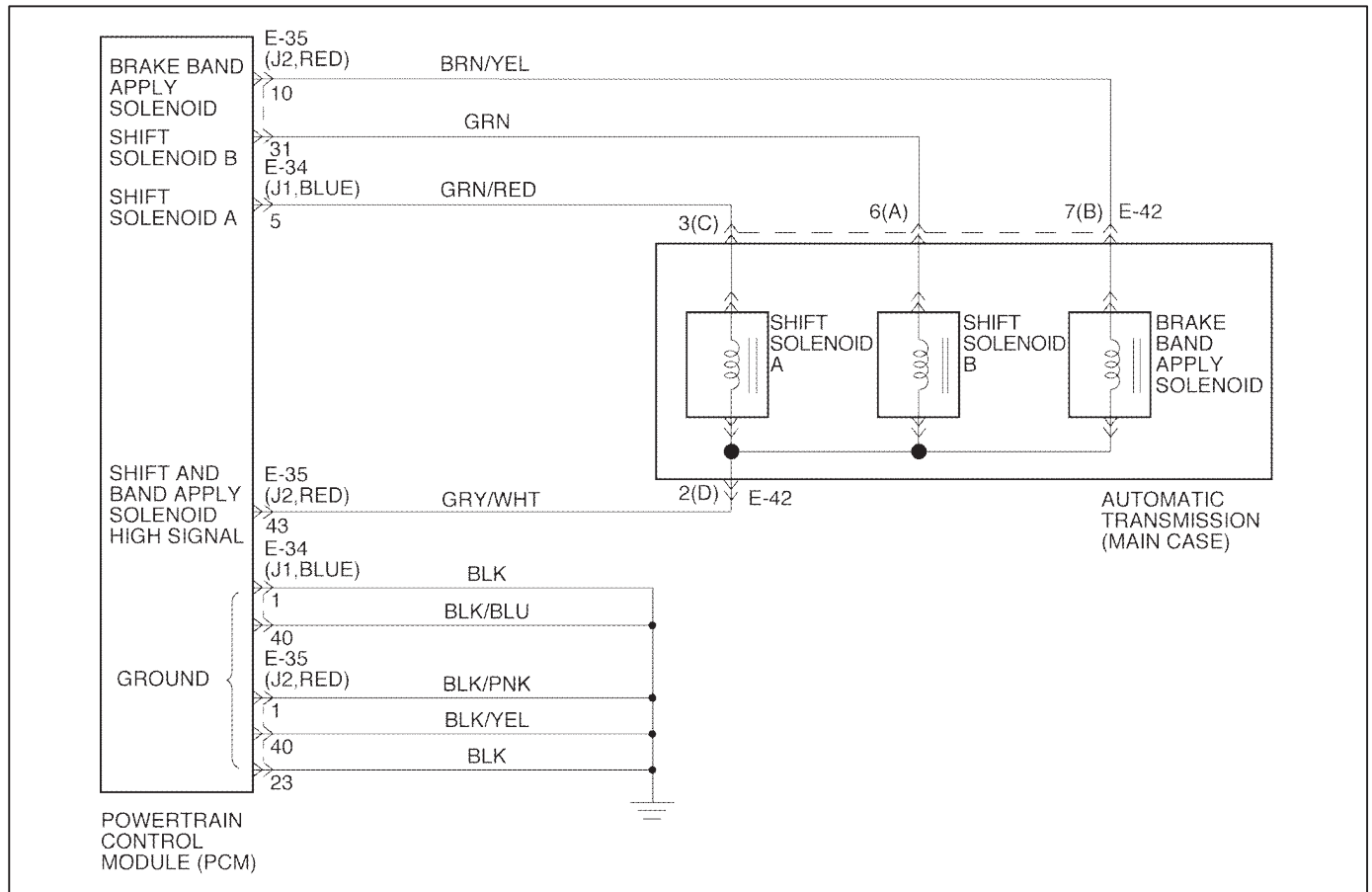
The numbers below refer to the step numbers on the diagnostic chart:

2. This test checks the function of the range switch (mode switch).
3. This test checks that the scan tool commanded all shifts, all shifts solenoids responded correctly, but all the shifts did not occur.

DTC P0752 Shift Solenoid A Performance (Stuck On)

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". 4. With the engine operating, apply the brake pedal and select each transmission range DL, D2, D3, D4, N, R, and P. Does each selected transmission range match the "TR Switch" on the scan tool?	Go to Step 3	Go to <i>"Range Switch Logic Table"</i>
3	1. While the engine is operating, raise the drive wheels. 2. With the transmission in D4 range, use the scan tool to command 1st, 2nd and 3rd, and 4th gears while accelerating the vehicle. Was a 2-2-3-3 only shift pattern detected? (Road testing the vehicle may be necessary).	Go to Step 4	Go to <i>Diagnostic Aids</i>
4	Check the shift solenoid/hydraulic circuit for: ● One or both of the shift solenoids for an internal malfunction. ● Contamination or sediment in one or both of the shift solenoids. ● Damaged seals on one or both of the shift solenoids. Refer to <i>Solenoid (Main Case Valve Body) in Automatic Transmission (4L30-E) section</i> . Was a problem found and corrected?	Go to Step 5	Go to <i>Diagnostic Aids</i>
5	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and road test the vehicle. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to Step 1	Repair verified Exit DTC table

DTC P0753 Shift Solenoid A Electrical



Circuit Description

- The shift solenoid A is a simple on/off solenoid located in the main case valve body. The solenoid is the normally closed type. In second or third gear the Powertrain Control Module (PCM) energizes the solenoid to open a fluid inlet port. When the port is open, fluid pressure actuates the shift valve.
- The solenoid is activated by a current. This current is produced by applying a voltage to one side (the High side) and a ground to the other side (Low side).
- The High Side Driver (HSD) is a circuit of the PCM that acts as a switch between the solenoids and the supply voltage. The High side of the solenoid is permanently supplied with voltage, except in BACKUP MODE or when ignition is off the HSD is turned off.

This DTC detects a continuous open or short to ground in the shift solenoid A circuit or the shift solenoid A. This is a type "B" DTC.

Conditions For Setting The DTC

- Ignition is "on", Engine "run".
- Battery voltage is between 10 and 16 volts.
- The PCM commands the solenoid "on" and the voltage remains high (B+), or the PCM commands the solenoid "off" and the voltage remains low (zero volts).
- All conditions met for 0.84 – 1.0 seconds.

Action Taken When The DTC Sets

- Maximum line pressure.
- Immediate landing to 4th gear.
- Inhibit TCC engagement.
- For lamp illuminate refer to *DTC type definition (type B)*.

Conditions For Clearing The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Inspect the wiring for poor electrical connection at the PCM and at the transmission 7-way connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.

- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.
- An open ignition feed circuit can cause multiple DTCs to set.
- A shift solenoid B DTC P0758 could also set with a shift solenoid A electrical failure.

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

3. This test checks for power to the shift solenoid A from the ignition through the PCM.

5. This test measures the resistance of the component.
8. This test checks the function of the shift solenoid A and the transmission internal wiring harness.

Shift Solenoid Status Chart

Gear	Shift solenoid A	Shift solenoid B
1st	OFF	ON
2nd	ON	ON
3rd	ON	OFF
4th	OFF	OFF

DTC P0753 Shift Solenoid A Electrical

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On–Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emission in Engine</i> section
2	1. Install the scan tool. 2. With the engine "on", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". Were DTCs P0753, P0758, P1860 set?	Go to Step 3	Go to <i>Diagnostic Aids</i>
3	1. Turn the ignition "on". 2. Using the J39200 DVOM, measure the voltage between PCM connector terminals E35–43 and E34–1 (GND). Is the voltage within 10–12 volts?	Go to Step 4	Go to Step 5
4	1. Turn the ignition "off". 2. Disconnect the E-34 (BLUE) and E-35 (RED) PCM connector. 3. Turn the ignition "on". 4. Using the J39200 DVOM, measure the voltage between PCM connector terminals E34–5 and ground. Is the voltage within 10 – 12 volts?	Go to Step 10	Go to Step 5
5	1. Turn the ignition "off". 2. Disconnect the E-34 (BLUE) and E-35 (RED) PCM connector. 3. Using the J39200 DVOM, measure the resistance between PCM connector terminals E35–43 and E34–5. Is the resistance within 18 – 20 ohms?	Go to Step 6	Go to Step 8
6	1. Disconnect the E-34 (BLUE) and E-35 (RED) PCM connectors. 2. Using the J39200 DVOM, check a continuity between PCM terminals E34–5 and ground. Is there a continuity?	Go to Step 11	Go to Step 7
7	Using the J39200 DVOM, check a continuity between E-35 (RED) PCM terminal 43 and ground. Is there a continuity?	Go to Step 12	Go to Step 9

7A1-66 TRANSMISSION CONTROL SYSTEM (4L30-E)

DTC P0753 Shift Solenoid A Electrical (Cont'd)

Step	Action	Yes	No
8	1. Disconnect the transmission main case 7-way connector E-42. 2. Using the J39200 DVOM, measure the resistance between terminals E42-2(D) and E42-3(C). Is the resistance within 18–20 ohms?	Go to Step 13	Go to Step 14
9	Check every connection at the PCM connector. Was a problem found?	Go to Step 16	Go to Step 15
10	The wiring harness between PCM connector terminals E34-5 and transmission harness terminal E42-3(C) is shorted to voltage. Was a problem found and corrected?	Go to Step 17	—
11	The wiring harness between PCM connector terminal E34-5 and transmission harness terminal E42-3(C) is shorted to ground. Was a problem found and corrected?	Go to Step 17	—
12	The wiring harness between PCM connector terminals E35-43 and transmission harness terminal E42-2(D) is shorted to ground. Was a problem found and corrected?	Go to Step 17	—
13	The wiring harness between PCM connector E-34 or E-35 and transmission 7-way connector E42 is open or poor connection. Was a problem found and corrected?	Go to Step 17	—
14	The shift solenoid A is faulty. Replace the shift solenoid A. Refer to <i>Solenoid (Main Case Valve Body) in Automatic Transmission (4L30-E) section</i> . Is the replacement complete?	Go to Step 17	—
15	The PCM may be faulty. Replace the PCM. Refer to <i>Powertrain Control Module (PCM) in Automatic Transmission (4L30-E) section</i> . Is the replacement complete?	Go to Step 17	—
16	Repair the PCM connector connection. Was a problem found and corrected?	Go to Step 17	—
17	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and operate the vehicle under the following conditions: • The shift solenoid A is commanded "on" and the voltage drops to zero. • The shift solenoid A is commanded "off" and the voltage increases to B+. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to Step 1	Repair verified Exit DTC table

7A1-68 TRANSMISSION CONTROL SYSTEM (4L30-E)

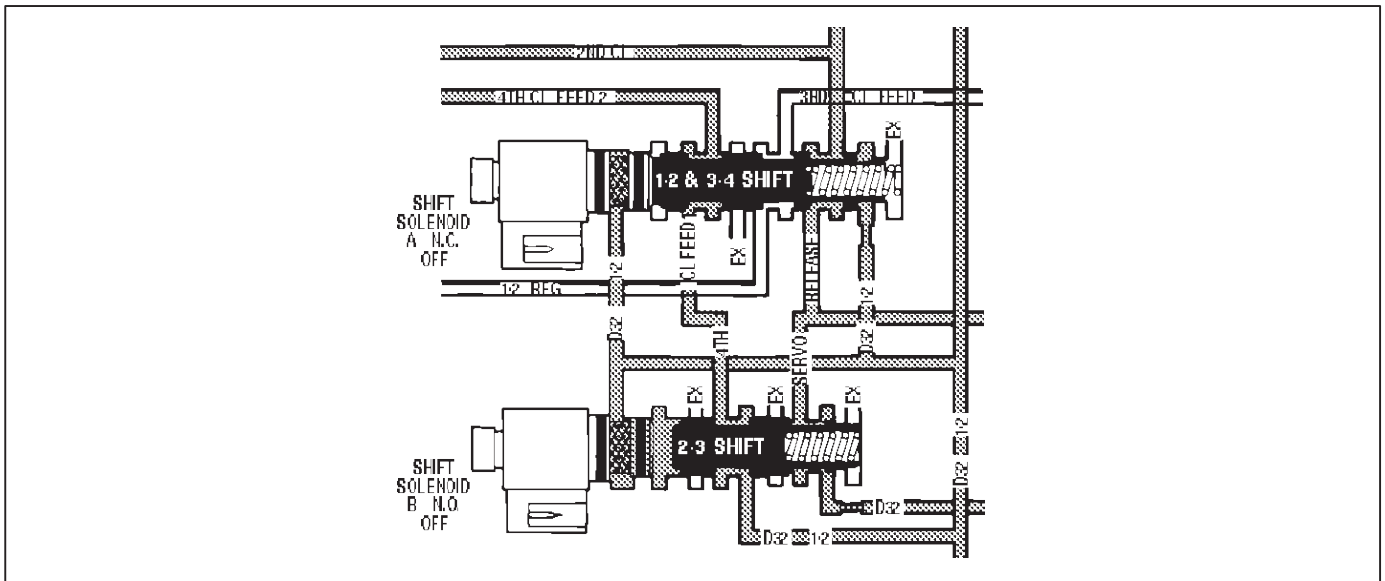
Test Description

The numbers below refer to the step numbers on the diagnostic chart:

2. This test checks the function of the range switch (mode switch).
3. This test checks for selected gear ratio vs. a ratio not obtainable under normal driving conditions.

DTC P0756 Shift Solenoid B Performance (Stuck Off)

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emission in Engine section</i>
2	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". 4. With the engine operating, apply the brake pedal and select each transmission range DL, D2, D3, D4, N, R, and P. Does each selected transmission range match the "TR Switch" on the scan tool?	Go to Step 3	Go to "Range Switch Logic Table"
3	1. While the engine is operating, raise the drive wheels. 2. With the transmission in D4 range, use the scan tool to command 1st, 2nd, and 3rd, and 4th gears while accelerating the vehicle. Was a 4-3-3-4 shift pattern detected? (Road testing the vehicle may be necessary.)	Go to Step 4	Go to <i>Diagnostic Aids</i>
4	Check the shift solenoid/hydraulic circuit for: ● One or both of the shift solenoids for an internal malfunction. ● Contamination or sediment in one or both of the shift solenoids. ● Damaged seals on the one or both of the shift solenoids. Refer to <i>Solenoid (Main Case Valve Body) in Automatic Transmission (4L30-E) section</i> . Was a problem found and corrected?	Go to Step 5	Go to <i>Diagnostic Aids</i>
5	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and road test the vehicle. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to Step 1	Repair verified Exit DTC table

DTC P0757 Shift Solenoid B Performance (Stuck On)

D07RT011

Circuit Description

The shift solenoid B is used to control fluid flow acting on the 2–3 shift valves. The solenoid is a normally open exhaust valve that is used with the shift solenoid A to allow four different shift combinations.

This DTC detects when there is only a 1–2–2–1 shift pattern depending on the state of the mechanical failure instead of a 1–2–3–4 shift pattern. This is a type “B” DTC.

Conditions For Setting The DTC

- No ETC DTCs.
- No OSS DTCs P0722 or P0723.
- No TCC solenoid DTC P0742, P1860, P1870.
- No shift solenoid A DTCs P0753.
- No shift solenoid B DTC P0758.
- Gear range is D4.
- Output speed is greater than 375 rpm.
- Transmission fluid temperature is between 20° and 130°C (68° and 266°F).
- No range code P0705, P0706.
- No torque code (to be confirmed).
- Engine run for more 0 seconds and not influed cut-off (to be confirmed).

All of the above conditions have been met and the combination of condition 1,2 occur two consecutive times.

Condition 1:

- 3rd gear is commanded for ≥ 1 second
- $40 \leq \text{Engine Torque} \leq 400 \text{ N}\cdot\text{m}$
- Throttle positon $\geq 10\%$
- $-8000 \leq \text{TCC slip} \leq 8000 \text{ rpm}$
- Transmission out speed $\geq 375 \text{ rpm}$
- Speed ratio ≥ 0.6
- $1.44 \leq \text{Modeled Ratio} \leq 2.4$ for 4 seconds

Condition 2:

- 4th Gear is commanded for ≥ 1 second
- $15 \leq \text{Engine Torque} \leq 400 \text{ N}\cdot\text{m}$
- Trottle position $\geq 10\%$
- $-8000 \leq \text{TCC slip} \leq 8000 \text{ rpm}$
- Speed ratio ≥ 0.6
- $2.75 \leq \text{Modeled Ratio} \leq 3.2$ for 2 seconds

Action Taken When the DTC Sets

- Maximum line pressure.
- For lamp illuminate refer to *DTC type definition (type B)*.
- Turn Force Motor OFF.

Conditions For Clearing The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled “off” long enough to power down the PCM.

Diagnostic Aids

- Verify that the transmission meets the specifications in the 4L30-E shift speed chart.
- Other internal transmission failures may cause more than one shift to occur.

7A1-70 TRANSMISSION CONTROL SYSTEM (4L30-E)

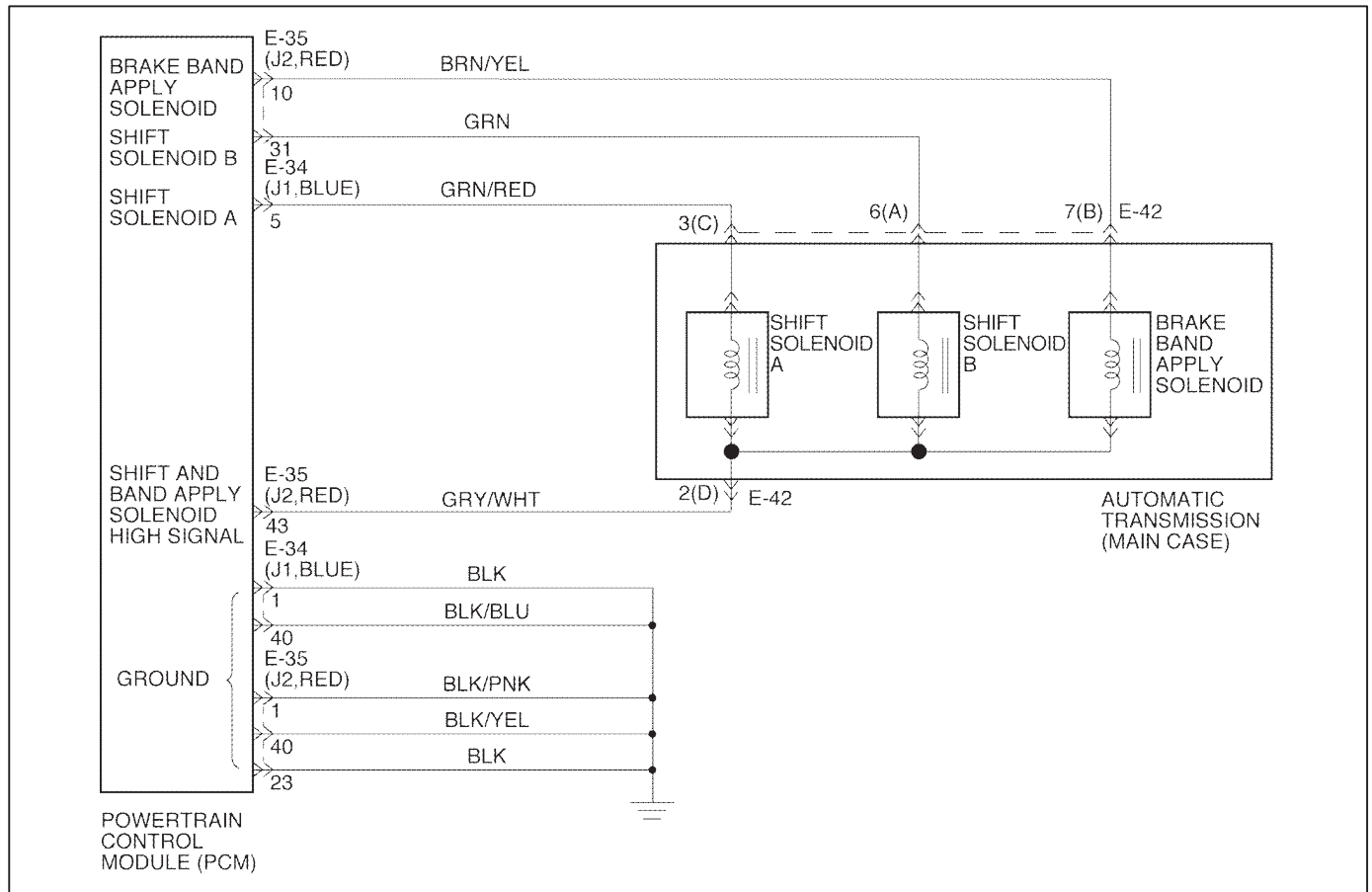
Test Description

The numbers below refer to the step numbers on the diagnostic chart:

2. This test checks the function of the range switch (mode switch).
3. This test checks for selected gear ratio vs. a ratio not obtainable under normal driving conditions.

DTC P0757 Shift Solenoid B Performance (Stuck On)

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine</i> section
2	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". 4. With the engine operating, apply the brake pedal and select each transmission range DL, D2, D3, D4, N, R, and P. Does each selected transmission range match the "TR Switch" on the scan tool?	Go to Step 3	Go to <i>"Range Switch Logic Table"</i>
3	1. While the engine is operating, raise the drive wheels. 2. With the transmission in D4 range, use the scan tool to command 1st, 2nd, and 3rd, and 4th gears while accelerating the vehicle. Was a 4-3-3-4 shift pattern detected? (Road testing the vehicle may be necessary.)	Go to Step 4	Go to <i>Diagnostic Aids</i>
4	Check the shift solenoid/hydraulic circuit for: • One or both of the shift solenoids for an internal malfunction. • Contamination or sediment in one or both of the shift solenoids. • Damaged seals on the one or both of the shift solenoids. Refer to <i>Solenoid (Main Case Valve Body) in Automatic Transmission (4L30-E)</i> section. Was a problem found and corrected?	Go to Step 5	Go to <i>Diagnostic Aids</i>
5	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and road test the vehicle. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to Step 1	Repair verified Exit DTC table

DTC P0758 Shift Solenoid B Electrical**Circuit Description**

- The shift solenoid B is a simple on/off solenoid located in the main case valve body. It is normally open. When the port is open, fluid pressure actuates the shift valve. In first or second gear, the Powertrain Control Module (PCM) energizes the solenoid to close a fluid inlet port.
- The solenoid is activated by current. This current is produced by applying a voltage to one side (the High side) and a ground to the other side (Low side).
- The High Side Driver (HSD) is a circuit of the PCM that acts as a switch between the solenoids and the supply voltage. The High side of the solenoid is permanently supplied with voltage. In BACKUP MODE or when the ignition is off, the HSD is turned off.

This DTC detects a continuous open or short to ground in the shift solenoid B circuit or shift solenoid B. This is a type "B" DTC.

Conditions For Setting The DTC

- Ignition is "on", Engine "run".
- Battery voltage is between 10 and 16 volts.
- The PCM commands the solenoid "on" and the voltage remains high (B+), or the PCM commands the solenoid "off" and the voltage remains low (zero volts).
- All conditions met for 0.84 ~ 1.0 seconds.

Action Taken When The DTC Sets

- Fixed to 4th gear.
- Maximum line pressure.
- Inhibit TCC engagement.
- For lamp illuminate refer to *DTC type definition (type B)*.

Conditions For Clearing The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Inspect the wiring for poor electrical connections at the PCM and transmission 7-way connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.

7A1–72 TRANSMISSION CONTROL SYSTEM (4L30–E)

- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.

Test Description

The numbers below refer to the *step numbers on the diagnostic chart*:

5. This test measures the resistance of the component.
6. This test checks the function of the shift solenoid B and the transmission internal wiring harness.
9. This test checks for power to the shift solenoid B from the ignition through the PCM.

Shift Solenoid Status Chart

Gear	Shift solenoid A	Shift solenoid B
1st	OFF	ON
2nd	ON	ON
3rd	ON	OFF
4th	OFF	OFF

DTC P0758 Shift Solenoid B Electrical

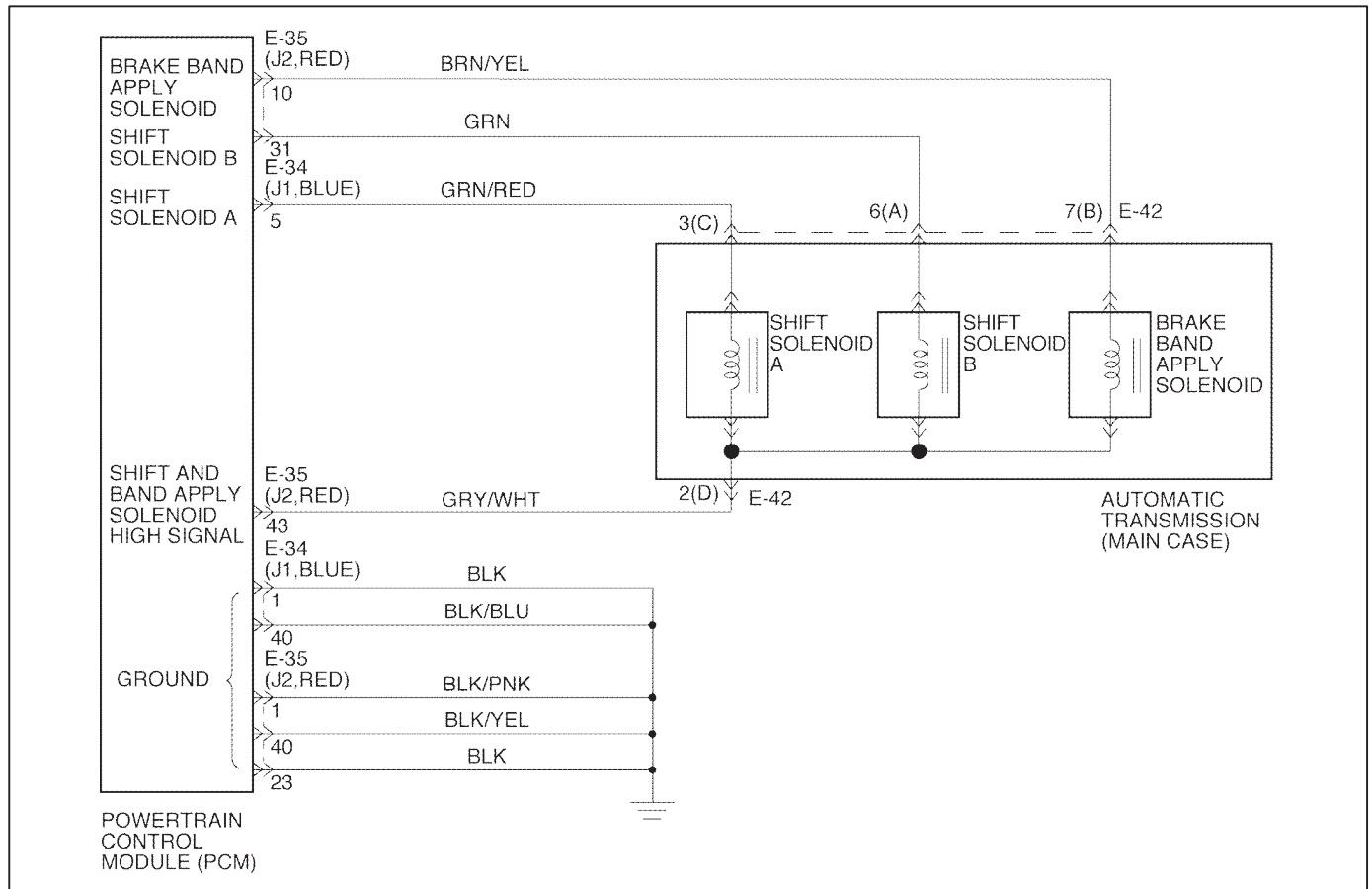
Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emission in Engine section</i>
2	1. Install the scan tool. 2. With the engine "on", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". Were DTCs P0753, P0758, P1860 set?	Go to Step 4	Go to Step 3
3	1. The engine "on". 2. Apply brake pedal and select transmission range "D". 3. Press and hold down the winter switch and select transmission mode "winter". Does the scan tool display DTC P0758 at 3rd gear?	Go to Step 7	Go to <i>Diagnostic Aids</i>
4	1. Turn the ignition "off". 2. Disconnect the E-34 (BLUE) and E-35 (RED) PCM connectors. 3. Turn the ignition "on". 4. Using the J39200 DVOM, measure the voltage between PCM connector terminals E35-31 and E35-1. Is the voltage within 10 – 12 volts?	Go to Step 13	Go to Step 5
5	1. Turn the ignition "off". 2. Using the J39200 DVOM, measure the resistance between PCM connector terminals E35-31 and E35-43. Is the resistance within 18 – 20 ohms?	Go to Step 14	Go to Step 6
6	1. Disconnect the transmission main case connector E-42. 2. Using the J39200 DVOM, measure the resistance between terminals E42-6(A) and E42-2(D). Is the resistance within 18 – 20 ohms?	Go to Step 15	Go to Step 16
7	1. Turn the ignition "off". 2. Disconnect the E-34 (BLUE) and E-35 (RED) PCM connectors. 3. Using the J39200 DVOM, measure the resistance between PCM connector terminals E35-31 and E35-43. Is the resistance within 18 – 20 ohms?	Go to Step 8	Go to Step 10
8	Using the J39200 DVOM, check a continuity between PCM connector terminal E35-31 and ground. Is there a continuity?	Go to Step 17	Go to Step 9
9	Using the J39200 DVOM, check a continuity between PCM connector terminal E35-43 and ground. Is there a continuity?	Go to Step 18	Go to Step 11
10	1. Disconnect the transmission main case connector E-42. 2. Using the J39200 DVOM, measure the resistance between terminals E42-6(A) and E42-2(D). Is the resistance within 18 – 20 ohms?	Go to Step 19	Go to Step 20

7A1-74 TRANSMISSION CONTROL SYSTEM (4L30-E)

DTC P0758 Shift Solenoid B Electrical (Cont'd)

Step	Action	Yes	No
11	Check every connection of the PCM. Was a problem found and corrected?	Go to <i>Step 22</i>	Go to <i>Step 12</i>
12	1. Connect the E-34 (BLUE) and E-35 (RED) PCM connectors to the PCM. 2. Turn the ignition "on", the engine "on". 3. Repeat Step 3. Does the scan tool display DTC P0758 at 3rd gear?	Go to <i>Step 21</i>	Go to <i>Diagnostic Aids</i>
13	The wiring harness between PCM connector terminal E35-31 and transmission main case terminal E42-6(A) is shorted to voltage. Was a problem found and corrected?	Go to <i>Step 22</i>	—
14	The PCM internal terminal E35-31 is shorted to voltage. Replace the PCM. Refer to <i>Powertrain Control Module (PCM) in Automatic Transmission (4L30-E) section</i> . Is the replacement complete?	Go to <i>Step 22</i>	—
15	The wiring harness between PCM connector and transmission main case 7-way connector is shorted. Was a problem found and corrected?	Go to <i>Step 22</i>	—
16	The shift solenoid B is faulty, or the internal wiring harness from the shift solenoid B is shorted. Was a problem found and corrected?	Go to <i>Step 22</i>	—
17	The wiring harness between PCM connector terminal E35-31 and transmission main case connector terminal E42-6(A) is shorted to ground. Was a problem found and corrected?	Go to <i>Step 22</i>	—
18	The wiring harness between PCM connector terminal E35-43 and transmission main case connector terminal E42-2(D) is shorted to ground. Was a problem found and corrected?	Go to <i>Step 22</i>	—
19	The wiring harness between PCM connector terminal E35-31 and transmission main case connector terminal E42-6(A), or between PCM connector terminal E35-43 and main case connector terminal E42-2(D) is open. Was a problem found and corrected?	Go to <i>Step 22</i>	—
20	The internal wiring harness from the shift solenoid B is open, or the shift solenoid B is faulty. Was a problem found and corrected?	Go to <i>Step 22</i>	—
21	Replace the PCM. Is the replacement complete?	Go to <i>Step 22</i>	—
22	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and operate the vehicle under the following conditions: • The shift solenoid B is commanded "on" and voltage drops to zero. • The shift solenoid B is commanded "off" and voltage increases to B+. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P1850 Brake Band Apply Solenoid Malfunction



Circuit Description

- The brake band apply solenoid is a normally open solenoid which controls the flow of fluid for brake band application. The Powertrain Control Module (PCM) uses Pulse Width Modulation (PWM) and changes the duty cycle to control the solenoid. The PCM turns the solenoid on (energized) and off (deenergized) at a constant frequency. The length of time the solenoid is energized during each on/off cycle is called the pulse width. By varying or "modulating" the pulse width, the solenoid output pressure is changed. Since the solenoid is normally open, increasing the pulse width increases the duty cycle and decreases the output pressure. PWM control provides smooth band application without an accumulator. The band is only applied in first and second gears.
- In the event of an electrical failure (open), the solenoid regulates at the maximum oil flow (0% duty cycle).
- The solenoid is activated by a current. This current is produced by applying a voltage to one side (the High side) and a ground to the other side (Low side).
- The High Side Driver (HSD) is a circuit of the PCM that acts as a switch between the solenoids and the supply voltage. The High side of the solenoid is permanently supplied with voltage. When the ignition is off, the HSD is turned off.

This DTC detects a continuous open or short to ground in the brake band apply solenoid circuit or the brake band apply solenoid. This is a type "D" DTC.

Conditions For Setting The DTC

- Battery voltage is between 10 and 16 volts.
- Ignition is "on", Engine "run".
- The PCM commands the solenoid "on" and the voltage remains high (B+), or the PCM commands the solenoid "off" and the voltage remains low (zero volts).
- All conditions met in 1.34 ~ 1.56 seconds.

Action Taken When The DTC Sets

- Inhibit brake band apply solenoid.
- The PCM will not illuminate the Malfunction Indicator Lamp (MIL).

Conditions For Clearing The DTC

- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled "off" long enough to power down the PCM.

7A1–76 TRANSMISSION CONTROL SYSTEM (4L30–E)

Diagnostic Aids

- Inspect the wiring for poor electrical connection at the PCM and at the transmission 7–way connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

3. This test checks for power to the brake band apply solenoid from the ignition through the PCM.
4. This test checks the resistance of the transmission internal wiring harness and brake band apply solenoid.
5. This test checks the ability of the PCM and wiring to control the ground circuit.

DTC P1850 Brake Band Apply Solenoid Malfunction

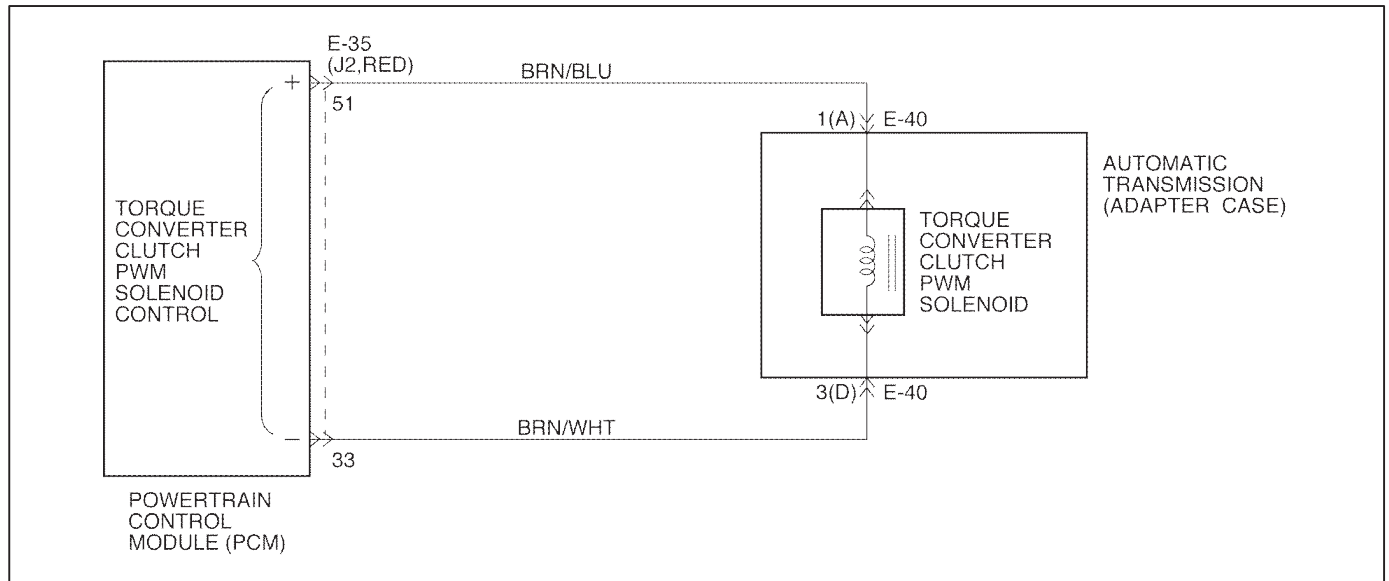
Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emission in Engine section</i>
2	1. Install the scan tool. 2. With the engine "on", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". Were DTCs P0753, P0758 set?	Go to Step 3	Go to Step 4
3	Using the J39200 DVOM, back probe between PCM connector terminals E35-43 and E35-1. Is the voltage between 10 to 12 volts?	Go to Step 5	Go to Step 6
4	1. Turn the ignition "off". 2. Disconnect the E-34 (BLUE) and E-35 (RED) PCM connector. 3. Using the J39200 DVOM, measure the resistance between PCM connector terminals E35-43 and E35-10. Is the resistance within 10-12 ohms?	Go to Step 10	Go to Step 11
5	Using the J39200 DVOM, back probe between PCM connector terminals E35-10 and E35-1. Is the voltage between 10 to 12 volts?	Go to Step 19	Go to Step 4
6	1. Turn the ignition "off". 2. Disconnect the E-34 (BLUE) and E-35 (RED) PCM connector. 3. Using the J39200 DVOM, check continuity between PCM terminal E35-43 and ground. Is there a continuity?	Go to Step 7	Go to Step 8
7	1. Disconnect the transmission main case connector E-42. 2. Using the J39200 DVOM, check continuity between the terminal E42-7(B) and ground. Is there continuity?	Go to Step 13	Go to Step 14
8	1. Disconnect the E-34 (BLUE) and E-35 (RED) PCM Connector. 2. Using the J39200 DVOM, measure the resistance between the PCM connector terminals E35-43 and E35-10. Is the resistance within 10-12 ohms?	Go to Step 19	Go to Step 9
9	1. Disconnect the transmission main case connector E-42. 2. Using the J39200 DVOM, measure the resistance between the terminals E42-7(B) and E42-2(D). Is the resistance within 10-12 ohms?	Go to Step 15	Go to Step 16
10	Using the J39200 DVOM, check continuity between PCM terminal E35-10 and ground. Is there continuity?	Go to Step 12	Go to Step 19
11	1. Disconnect the transmission main case connector E-42. 2. Using the J39200 DVOM, measure the resistance between the terminals E42-7(B) and E42-2(D). Is the resistance within 10-12 ohms?	Go to Step 18	Go to Step 16

7A1-78 TRANSMISSION CONTROL SYSTEM (4L30-E)

DTC P1850 Brake Band Apply Solenoid Malfunction (Cont'd)

Step	Action	Yes	No
12	1. Disconnect the transmission main case connector E-42. 2. Using the J39200 DVOM, check continuity between the terminals E42-7(B) and ground. Is there a continuity?	Go to Step 13	Go to Step 17
13	The brake band apply solenoid is faulty, or the internal wiring harness from the brake band apply solenoid is shorted to ground. Was a problem found and corrected?	Go to Step 20	—
14	The wiring harness between the PCM connector terminal E35-43 and the transmission main case connector terminal E42-2(D) is shorted to ground. Was a problem found and corrected?	Go to Step 20	—
15	The wiring harness between the PCM connector terminal E35-43 and the transmission main case connector terminal E42-2(D) is open. Was a problem found and corrected?	Go to Step 20	—
16	The brake band apply solenoid is faulty, or the internal wiring harness from the brake band apply solenoid is open. Was a problem found and corrected?	Go to Step 20	—
17	The wiring harness between the PCM connector terminal E35-10 and the transmission main case connector terminal E42-7(B) is shorted to ground. Was a problem found and corrected?	Go to Step 20	—
18	The wiring harness between the PCM connector terminal E35-10 and the transmission main case connector terminal E42-7(B) is open. Was a problem found and corrected?	Go to Step 20	—
19	Check every connection at the PCM. If OK, replace the PCM. Refer to <i>Powertrain Control Module (PCM) in Automatic Transmission (4L30-E) section</i> . Is the replacement complete?	Go to Step 20	—
20	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and ensure the following conditions are met: • The brake band apply solenoid is commanded "on" and the volts drop to zero. • The brake band apply solenoid is commanded "off" and the volts increase to B+. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to Step 1	Repair verified Exit DTC table

DTC P1860 TCC PWM Solenoid Electrical



D07R200011

Circuit Description

The PCM allows current to flow through the solenoid coil according to the duty cycle (percentage of “on” and “off” time). This current flow through the solenoid coil creates a magnetic field that magnetizes the solid core. The magnetized core attracts the check ball to seat against spring pressure. This blocks the exhaust for the TCC signal fluid and allows 2–3 drive fluid to feed to TCC signal circuit. The TCC signal fluid pressure acts on the TCC regulator valve to regulate line pressure and to apply fluid pressure to the torque converter clutch shift control valve. When the TCC shift valve is in the apply position, regulated apply fluid pressure is directed through the TCC valve to apply the torque converter clutch. The TCC PWM solenoid is used in conjunction with the TCC PWM solenoid to regulate fluid to the torque converter. The TCC PWM solenoid is attached to the valve body within the transmission.

This DTC detects a continuous open or short to ground or ignition in the TCC circuit or the TCC PWM solenoid. This is a type “B” DTC.

Conditions For Setting The DTC

- Battery voltage is between 10 and 16 volts.
- No shift solenoid A DTCs P0751 or P0752 or P0753.
- No shift solenoid B DTCs P0756 or P0757 or P0758.
- Ignition is “on”, Engine “run”.
- The PCM commands the solenoid “on” and the voltage remains low (zero volts).
- The PCM commands the solenoid “off” and the voltage remains high (B+).
- All conditions met for 0.875 ~ 1.25 seconds.

Action Taken When The DTC Sets

- Inhibit TCC engagement.

- For lamp illuminate refer to *DTC type definition (type B)*.

Conditions For Clearing The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exists and the ignition is cycled “off” long enough to power down the PCM.

Diagnostic Aids

- Inspect the wiring for poor electrical connections at the PCM and at the transmission connector. Look for possible bent, backed out, deformed or damaged terminals. Check for weak terminal tension as well. Also check for a chafed wire that could short to bare metal or other wiring. Inspect for a broken wire inside the insulation.
- When diagnosing for a possible intermittent short or open condition, move the wiring harness while observing test equipment for a change.

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

3. This test checks for voltage to the solenoid.
4. This test checks the ability of the PCM and wiring to control the ignition circuit.
9. This test checks the resistance of the TCC solenoid and the internal wiring harness.

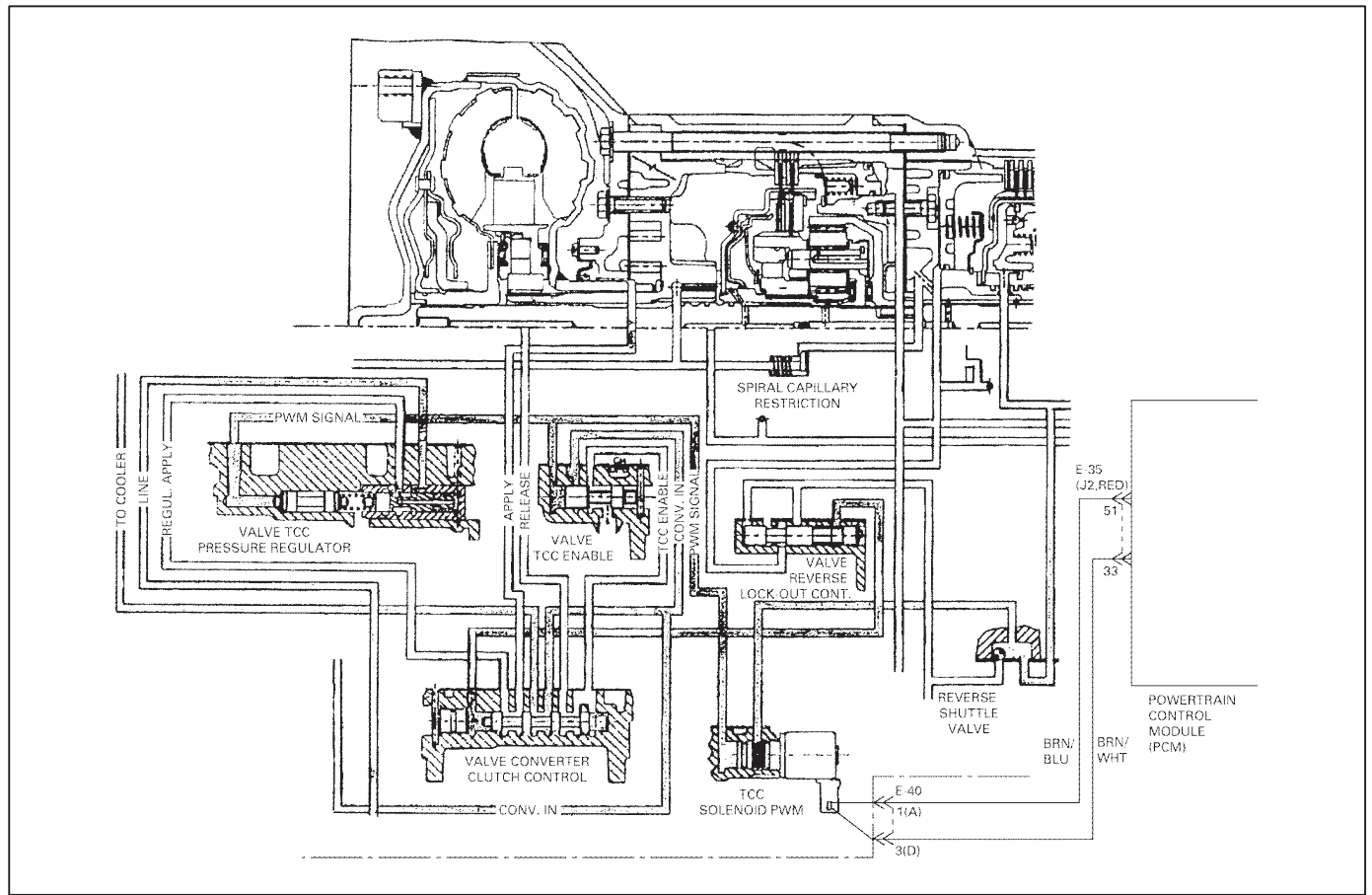
7A1-80 TRANSMISSION CONTROL SYSTEM (4L30-E)**DTC P1860 TCC PWM Solenoid Electrical**

Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emission in Engine section</i>
2	1. Install the scan tool. 2. With the engine "on", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". Was DTC P1860 set?	Go to Step 3	Go to Step 4
3	Using the J39200 DVOM, back probe between PCM connector terminals E35-51 and E35-33. Is the voltage 0?	Go to Step 5	Go to Step 6
4	1. Apply brake pedal and select transmission range "D". 2. Do a test drive, and increase the vehicle speed to TCC "on" at 4th. Does the scan tool display DTC P1860 at TCC "ON"?	Go to Step 9	Go to <i>Diagnostic Aids</i>
5	1. Turn the ignition "off". 2. Disconnect the E-35 (RED) PCM connector. 3. Using the J39200 DVOM, measure the resistance between PCM connector terminals E35-51 and E35-33. Is the resistance within 18 – 20 ohms?	Go to Step 7	Go to Step 8
6	The wiring harness between PCM connector terminal E35-51 and transmission adapter case connector terminal E40-1(A) is shorted to voltage. Was a problem found and corrected?	Go to Step 15	Go to Step 16
7	Intermittent condition. Check the wiring harness and terminals between PCM connector J2 and transmission adapter case connector E-40. Was a problem found and corrected?	Go to Step 15	Go to Step 16
8	1. Disconnect the transmission adapter case connector E-40. 2. Using the J39200 DVOM, measure the resistance between terminal E40-1(A) and ground. Is the resistance within 18 – 20 ohms?	Go to Step 13	Go to Step 14
9	1. Turn the ignition "off". 2. Disconnect the E-35 (RED) PCM connector. 3. Using the J39200 DVOM, measure the resistance between terminals E35-51 and E35-33. Is the resistance within 18 – 20 ohms?	Go to Step 15	Go to Step 10
10	1. Disconnect the transmission adapter case connector E-40. 2. Using the J39200 DVOM, measure the resistance between terminal E40-1(A) and ground. Is the resistance within 18-20 ohms?	Go to Step 11	Go to Step 12
11	The wiring harness between PCM connector E-35 and adapter case connector E-40 is shorted to ground. Was a problem found and corrected?	Go to Step 17	—

DTC P1860 TCC PWM Solenoid Electrical (Cont'd)

Step	Action	Yes	No
12	The TCC solenoid is faulty, or the internal wiring harness from the TCC solenoid is shorted to ground. Was a problem found and corrected?	Go to <i>Step 17</i>	—
13	The wiring harness between PCM connector terminal E35-51 and adapter case terminal E40-1(A) is open. Was a problem found and corrected?	Go to <i>Step 17</i>	—
14	The TCC solenoid is faulty, or the internal wiring harness from the TCC solenoid is open. Was a problem found and corrected?	Go to <i>Step 17</i>	—
15	Check every connection at the PCM. If OK, replace the PCM. Refer to <i>Powertrain Control Module (PCM) in Automatic Transmission (4L30-E) section</i> . Is the replacement complete?	Go to <i>Step 17</i>	—
16	Check the PCM connector terminal E35-51, and transmission adapter case connector terminal E40-1(A). Was a problem found and corrected?	Go to <i>Step 17</i>	—
17	1. After the repair is complete, use the scan tool to select "DTC", then "Clear Info" function and ensure the following conditions are met: • The TCC solenoid is commanded "on" and the volts increase to B+. • The TCC solenoid is commanded "off" and the volts drop to zero. 2. Review the scan tool "DTC Info". Has the last test failed or is the current DTC displayed?	Begin diagnosis again Go to <i>Step 1</i>	Repair verified Exit DTC table

DTC P1870 Transmission Component Slipping (TCC Stuck Off)



Circuit Description

The PCM monitors the difference in engine speed and transmission output speed. For example in D3 drive range with the ECCC commanded, the engine speed should closely match transmission output speed. This DTC detects excessive TCC slip when the ECCC is engaged. This is a type "B" DTC.

Conditions For Setting The DTC

The following conditions are met for three TCC cycles with reported excessive TCC slip conditions.

- No OSS DTCs P0722 or P0723.
- No shift solenoid A DTCs P0751 or P0752 or P0753.
- No shift solenoid B DTCs P0756 or P0757 or P0758.
- No TCC solenoid DTCs P0742 or P1860 or P1870.
- Engine speed is between 1,000 and 3,500 rpm for 0.5 seconds.
- Gear range is D4.
- $13\% < \text{TPS} < 99\%$
- $50 < \text{Engine Torque} < 300 \text{ N}\cdot\text{m}$
- TFT is between 20° and 150°C (68° and 302°F).
- TCC slip speed is between 250 rpm and 800 rpm for 3 times 7 seconds.
- Vehicle speed is between 25 km/h (15 mph) and 225 km/h (158 mph).
- Speed ratio is between 0.6 and 0.95.
- ECCC is "ON".

- Low $(0.8) < \text{TCC Capacity} < \text{hi} (0.99)$ for 5 seconds

Action Taken When The DTC Sets

- Only stored in memory.
- For lamp illuminate refer to *DTC type definition (type B)*.

Conditions For Clearing The MIL/DTC

- The PCM will turn off the MIL and CHECK TRANS Lamp after three consecutive ignition cycles without a failure reported.
- The DTC can be cleared from the PCM history by using a scan tool.
- The DTC will be cleared from history when the vehicle has achieved 40 warmup cycles without a failure reported.
- The PCM will cancel the DTC default actions when the fault no longer exist and the ignition is cycled "off" long enough to power down the PCM.

Diagnostic Aids

- Range switch malfunction could set a DTC P1870.
- A mechanical failure of the shift solenoids, TCC solenoid, or TCC PWM solenoid could set a DTC P1870.
- Internal transmission failures may set a DTC P1870.
- An intermittent or incorrect engine speed signal may set a DTC P1870.

Test Description

The numbers below refer to the step numbers on the diagnostic chart:

2. This test checks the indicated range signal to the actual selected range. A faulty switch could set a DTC P1870.
3. This test checks the torque converter for slippage while in a commanded lockup state.

Range Switch Logic Table

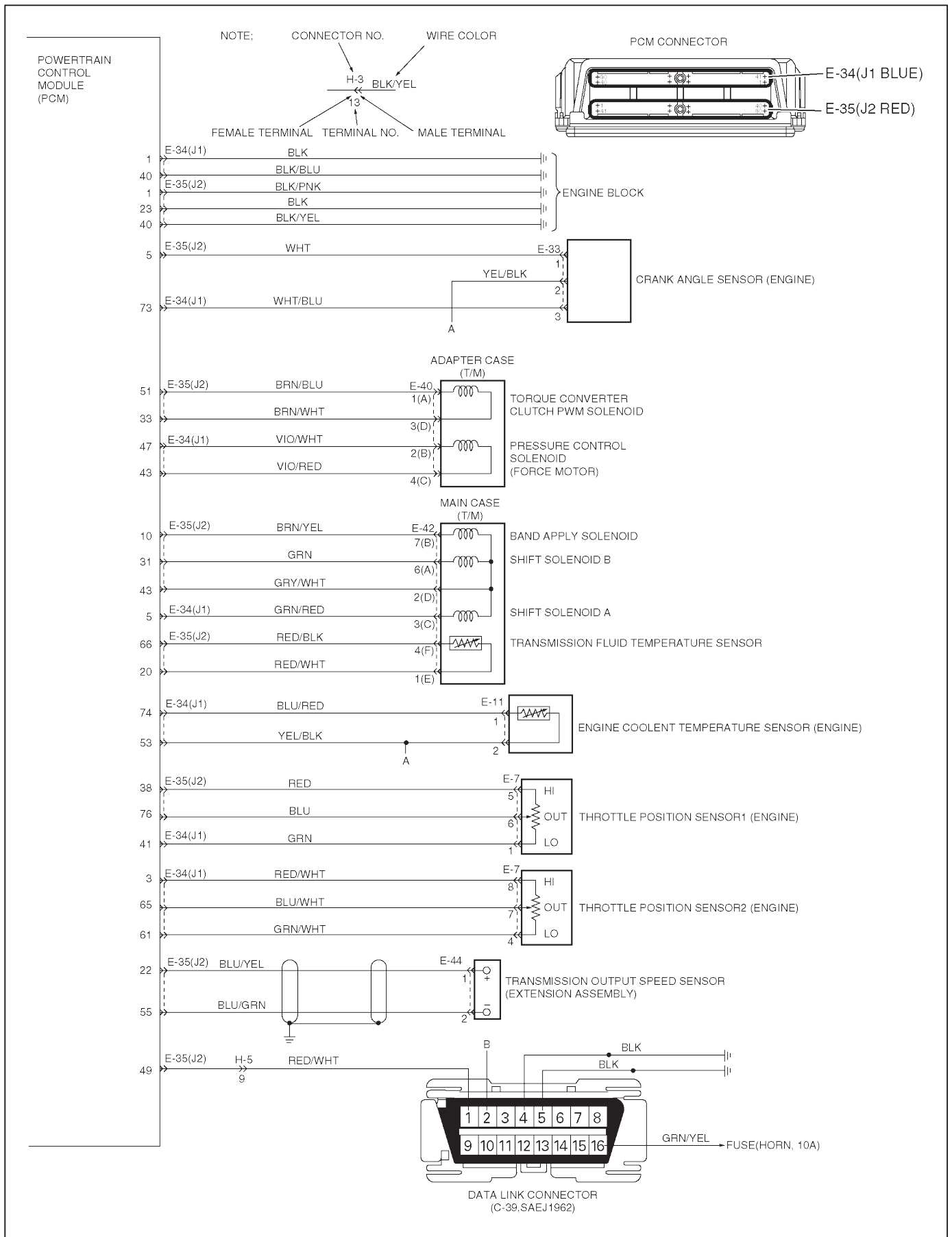
Range Position	Range Switch Pin			
	A	B	C	P(G)
Park	ON	OFF	OFF	ON
Reverse	ON	ON	OFF	OFF
Neutral	OFF	ON	OFF	ON
D4	OFF	ON	ON	OFF
D3	ON	ON	ON	ON
2	ON	OFF	ON	OFF
L	OFF	OFF	ON	ON
Illegal	OFF	OFF	OFF	OFF
Illegal	OFF	OFF	OFF	ON

DTC P1870 Transmission Component Slipping (TCC Stuck Off)

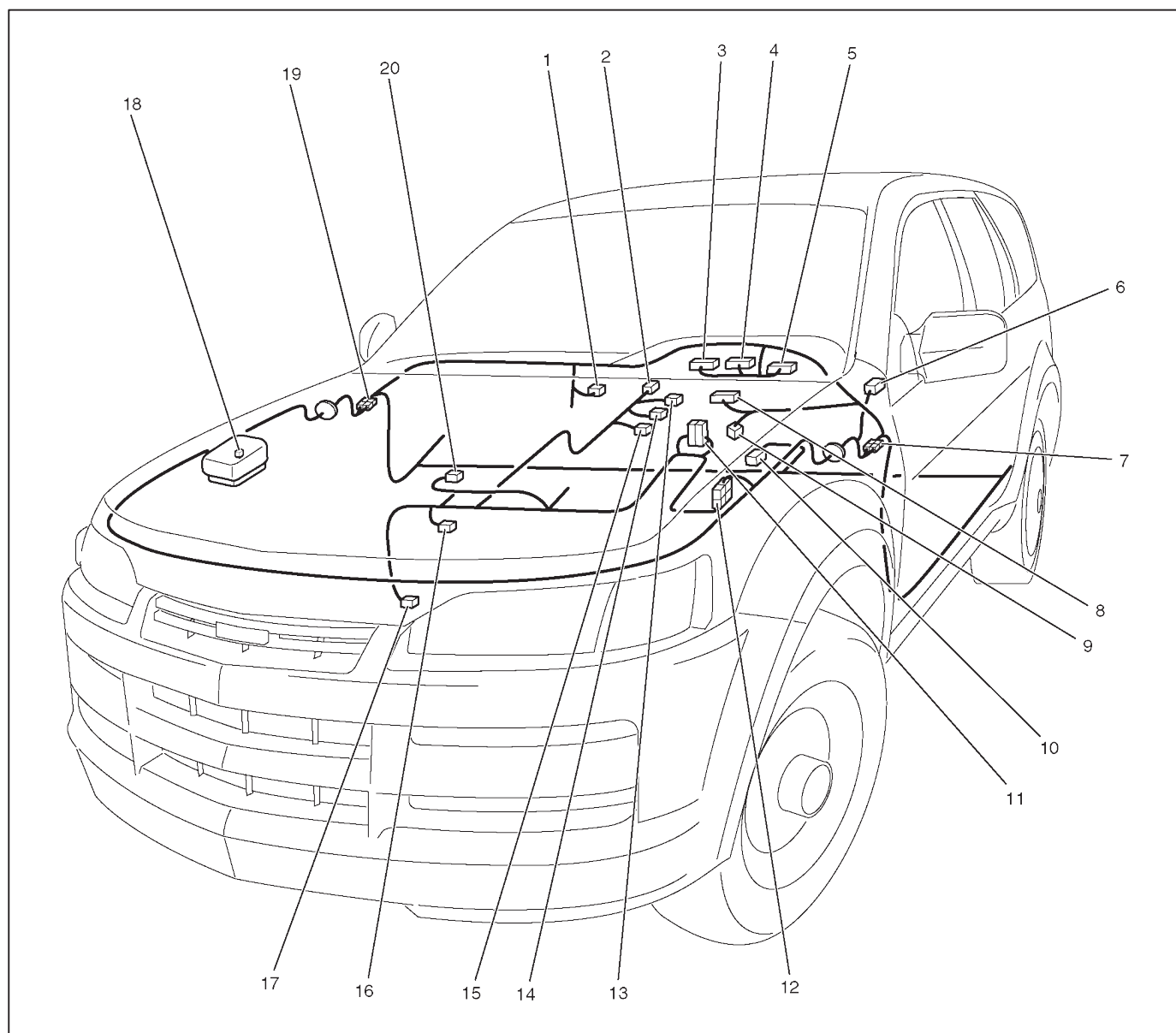
Step	Action	Yes	No
1	Were you sent here from the "Powertrain On-Board Diagnostic (OBD) System Check"?	Go to Step 2	Go to <i>OBD System Check</i> Refer to <i>Driveability and Emissions in Engine section</i>
2	1. Install the scan tool. 2. With the engine "off", turn the ignition switch "on". NOTE: Before clearing DTC(s), use the scan tool to record "Freeze Frame" and "Failure Records" for reference, as data will be lost when the "Clear Info" function is used. 3. Record the DTC "Freeze Frame" and "Failure Records". 4. Apply the brake pedal. 5. Select each transmission range: DL, D2, D3, D4, N, R, and P. Does each selected transmission range match the scan tool "TR Switch" display?	Go to Step 3	Go to "Range Switch Logic Table"
3	Drive the vehicle in 4th gear while the TCC is engaged. At any time is the "TCC Slip Speed" greater than 130 rpm for 8 seconds while the TCC is engaged?	Go to <i>System Diagnosis Charts</i>	Go to <i>Diagnostic Aids</i>

Circuit Diagram





Parts Location

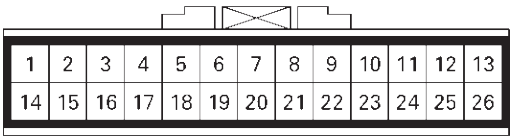
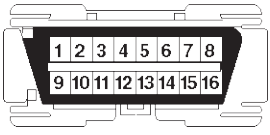
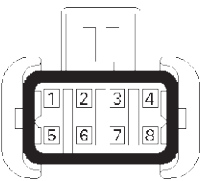
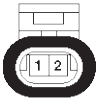
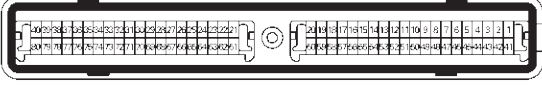
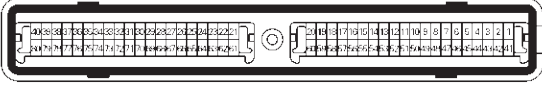
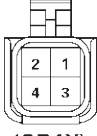
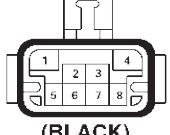


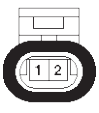
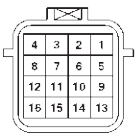
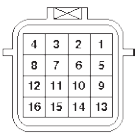
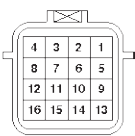
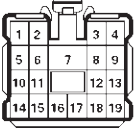
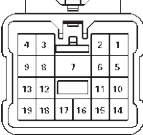
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Legend

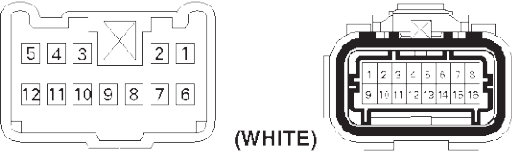
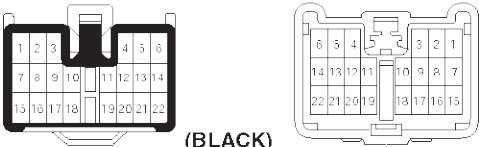
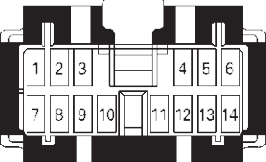
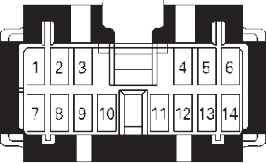
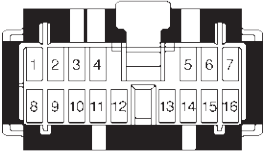
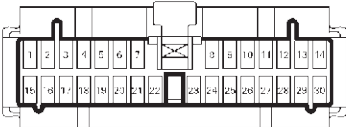
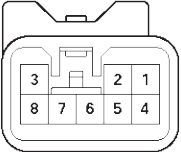
- | | |
|-------------------------------|---|
| (1) Connector I-10 | (11) Powertrain Control Module (PCM) Connector E-34, E-35 |
| (2) Connector E-44 | (12) Connector H-3, H-5, H-6 |
| (3) Connector I-22 | (13) Connector E-42 |
| (4) Connector I-23 | (14) Connector E-41 |
| (5) Connector I-24 | (15) Connector E-40 |
| (6) Data Link Connector C-39 | (16) Connector E-11 |
| (7) Connector H-9, H-11, H-16 | (17) Connector E-33 |
| (8) Connector I-32 | (18) Connector X-11 |
| (9) Connector I-31 | (19) Connector H-8, H-14, H-17, H-18 |
| (10) Connector B-16 | (20) Connector E-7 |

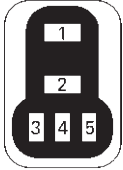
Harness Connector Faces

No.	Connector face
B-16	
C-39	
E-7	
E-11	
E-33	
E-34 (J1)	 (BLUE)
E-35 (J2)	 (RED)
E-40	 (GRAY)
E-41	 (BLACK)

No.	Connector face
E-42	 (BLACK)
E-44	
H-3	 (WHITE) 
H-5	 (GREEN) 
H-6	 (BLUE) 
H-8	 (BLUE) 
H-9	 (BLUE) 
H-11	 (BLACK) 
H-14	 (BLACK) 

7A1-88 TRANSMISSION CONTROL SYSTEM (4L30-E)

No.	Connector face
H-16	 (WHITE)
H-17	 (WHITE)
H-18	 (BLACK)
I-10	
I-22	
I-23	
I-24	
I-31	
I-32	

No.	Connector face
X-11	

Transmission Fluid Temperature (TFT) Sensor Specifications

Temperature	Temperature	Minimum Resistance	Nominal Resistance	Maximum Resistance	Signal
°F	°C	Ω	Ω	Ω	Volts
-40	-40	600500	664200	731100	5.00
-22	-30	319800	350400	382400	4.65
-4	-20	177400	192700	208600	4.41
14	-10	102200	110100	118300	4.00
32	0	60870	65110	69450	3.52
50	10	37410	39750	42120	2.98
68	20	23660	24980	26300	2.40
86	30	15270	16120	16970	1.85
104	40	10040	10660	11290	1.43
122	50	6758	7211	7673	4.29
140	60	4645	4980	5324	4.04
158	70	3255	3506	3765	3.69
176	80	2323	2513	2710	3.34
194	90	1685	1831	1982	3.04
212	100	1242	1355	1472	2.58
230	110	929	1017	1109	2.24
248	120	704	773	846	1.97
266	130	540	595	653	1.67
284	140	419	464	511	1.42
302	150	329	365	403	1.16