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## 2-35. TRANSMISSION SYSTEM TESTS (4L80-E)

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The 4L80-E Transmission system is equipped with a computer called the Transmission Control Module (TCM) (located left rear seat compartment; for M996A2 and M997A2 vehicles, located in the left exterior stowage compartment) which interprets, analyzes and records electronic signals from sensors and switches located on the engine, brake pedal, and transmission. The recorded codes stored in the TCM are known as TROUBLE CODES which are retrieved using the Diagnostic Switch Cable on the J2 connector of the TCM. The TCM can protect the transmission from damage by locking it in Second Gear, with maximum fluid pressure, until the problem has been corrected. The following procedures will detail diagnostic testing, troubleshooting and corrective action for any existing faults. These Transmission System tests may be run any time you think there is a transmission problem or if you were sent here by another test chain. This paragraph has a different kind of flow chart to guide you through testing because of the many problems that can occur. The most common problems are loose or corroded wiring connections. To troubleshoot the transmission, you will need a diagnostic switch cable, digital multimeter and a throttle position (TP) sensor test cable.

### **CAUTION**

Do not disconnect battery without recording Trouble Codes. Failure to do so will result in loss of diagnostic test codes.

The diagnostic test codes (DTC) are transmitted from the TCM to transmission lamp located next to the shift lever. When Diagnostic Switch Cable is connected to the J2 connector, the system is placed in the diagnostic mode, which causes the transmission lamp to flash. The transmission lamp will flash once, pause, flash twice (meaning code 12) pause, flash once, pause, flash twice (code 12 again), and do this one more time for a total of three times, which means the system is operational.

### **NOTE**

Diagnostic test code 63 will be set at all times.

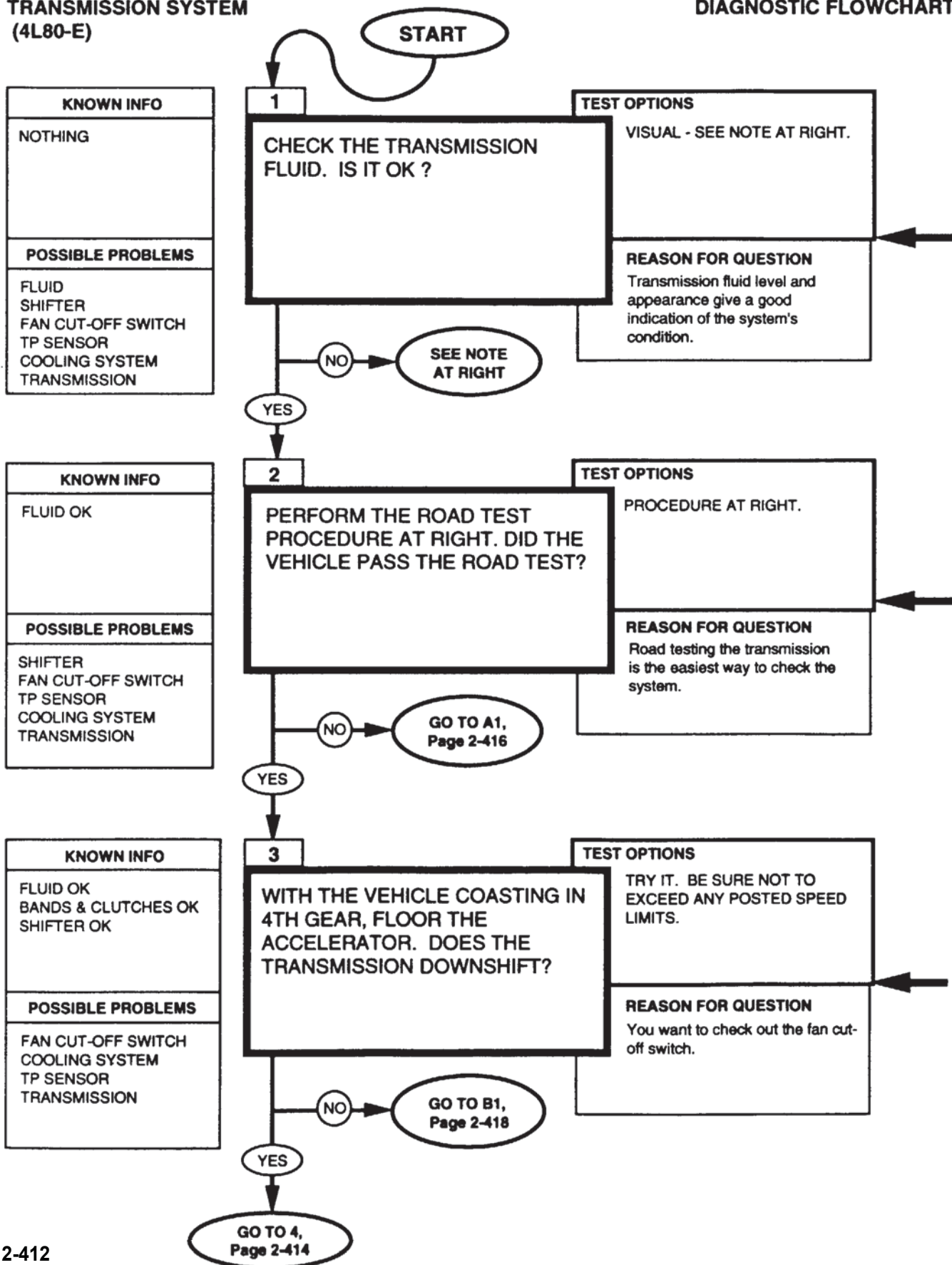
For example if the TCM is sending the trouble code 74, the lamp will flash 12 three times, flash 63 three times, which is set all the time and is to be disregarded, flash code 7 and 4, 7 and 4, 7 and 4 for code 74, and then 12, 12, 12, which ends the diagnostic check. These codes will repeat again, if not taken out of diagnostic mode.

The TCM J1 connector will be used to diagnose and troubleshoot wiring, sensor connectors, pins, solenoids, and brake switch, to insure all external problems are checked and corrected prior to TCM and transmission faults.

On the following pages you will find diagrams and charts of the major portions of the transmission circuits. These are designed to help you isolate a problem and correct it.

**TRANSMISSION SYSTEM  
(4L80-E)**

**DIAGNOSTIC FLOWCHART**



## REFERENCE INFORMATION

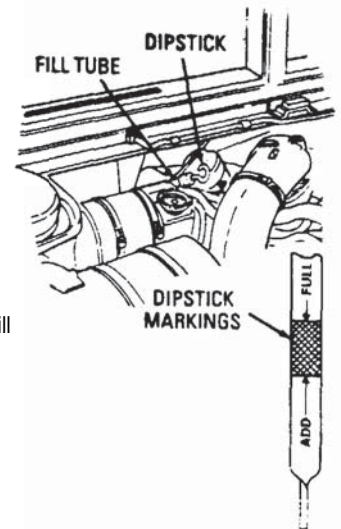
TRANSMISSION SYSTEM  
(4L80-E)Procedure for checking transmission fluid

1. Start engine
2. Hold down brake pedal and move transmission shift lever through all ranges including reverse. Leave the lever in each range for 2 seconds.
3. Engage parking brake and place shift lever in neutral. Check fluid level on dipstick.
4. Proper level is between FULL and ADD marks on dipstick.

**NOTE**

Check fluid for a burnt smell, grit, discoloration, air bubbles, or a milky appearance.

- Burnt smell, discoloration, or grit indicates worn or damaged internal components. Notify DS maintenance
- Bubbles indicate an overfilled system or air leaks in the system. Drain the fluid and refill to proper level. Refer to (para 5-2).
- Milky appearance is due to water in the system. Change the fluid and filter.
- Check fill tube for indications of fluid being blown out. If fluid is being blown out, check vent line for obstructions, and refill transmission to proper level. Refer to (para. 5-2).

Road Test Procedure

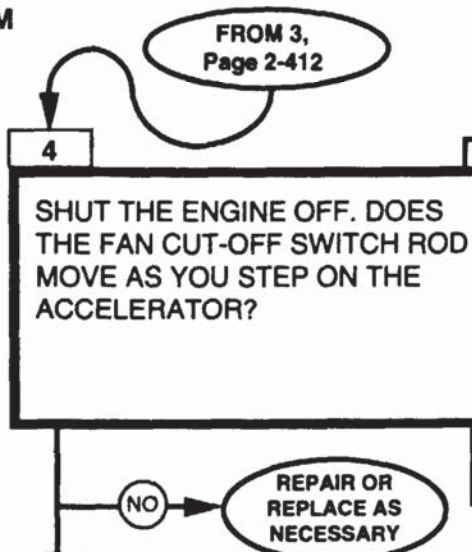
1. Position shift lever in "D" (overdrive) and accelerate vehicle from 0 mph. A 1-2, 2-3 and 3-4 shift should occur at all throttle openings. Allow vehicle to coast down to about 0 mph and 4-3, 3-2 and 2-1 shifts should occur.
2. Position transmission shift lever in "D" (drive) and accelerate vehicle from 0 mph. A 1-2 and 2-3 shift should occur at all throttle openings. Allow vehicle to coast down to about 0 mph and 3-2 and 2-1 shifts should occur.
3. Position transmission shift lever in "2" (low two) and accelerate vehicle from 0 mph. A 1-2 shift should occur at all throttle openings. No 2-3 shift can be obtained in this range. A 1-2 shift in 2 is somewhat firmer than in "D". This is normal.
4. Position shift lever in "1" and accelerate the vehicle from 0 mph. No upshifts should occur in this range.
5. Position shift lever in "D" and with the vehicle speed at approximately 45 mph, close throttle and move lever to "3". Transmission should downshift to 3rd gear. An increase in engine rpm and engine braking effect should be noticed.
6. Position shift lever in "D" and with the vehicle speed at approximately 35 mph, close throttle and move lever to "2". Transmission should downshift to 2nd gear. An increase in engine rpm and engine braking effect should be noticed.
7. Position shift lever "2" and with the vehicle speed at approximately 25 mph, close the throttle and move lever to "1". Transmission should downshift to 1st gear. An increase in engine RPM and engine braking effect should be noticed.
8. Position shift lever in "R" and check for reverse operation.
9. Hard shifting may be indicative of an underfilled or dogged system.

The fan cut off switch and TP sensor are used to shift the transmission to a lower gear under heavy acceleration. The system also disengages the engine cooling fan so as to allow maximum engine power to be used for moving the vehicle.

# TRANSMISSION SYSTEM (4L80-E)

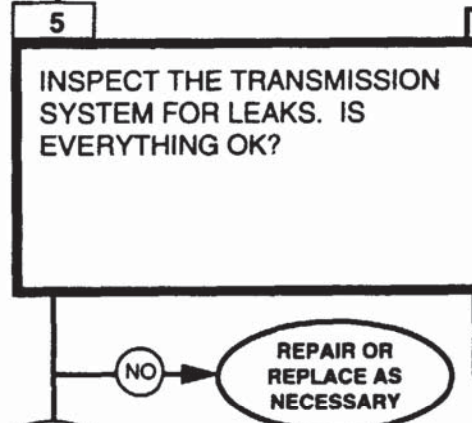
## DIAGNOSTIC FLOWCHART

KNOWN INFO
FLUID OK BANDS & CLUTCHES OK SHIFTER OK TP SENSOR OK
POSSIBLE PROBLEMS
FAN CUT-OFF SWITCH COOLING



TEST OPTIONS
VISUAL INSPECTION.
REASON FOR QUESTION
The fan cut-off switch is needed for telling the transmission when to shift.

KNOWN INFO
FLUID OK BANDS & CLUTCHES OK SHIFTER OK TP SENSOR OK FAN CUT-OFF SWITCH OK
POSSIBLE PROBLEMS
LEAKS COOLING



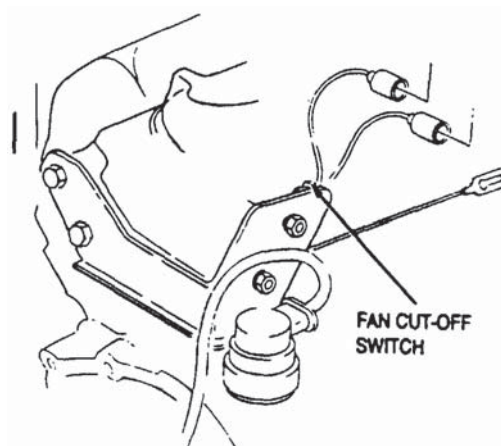
TEST OPTIONS
VISUAL.
REASON FOR QUESTION
To see if anything is leaking

## REFERENCE INFORMATION

## TRANSMISSION SYSTEM (4L80-E)



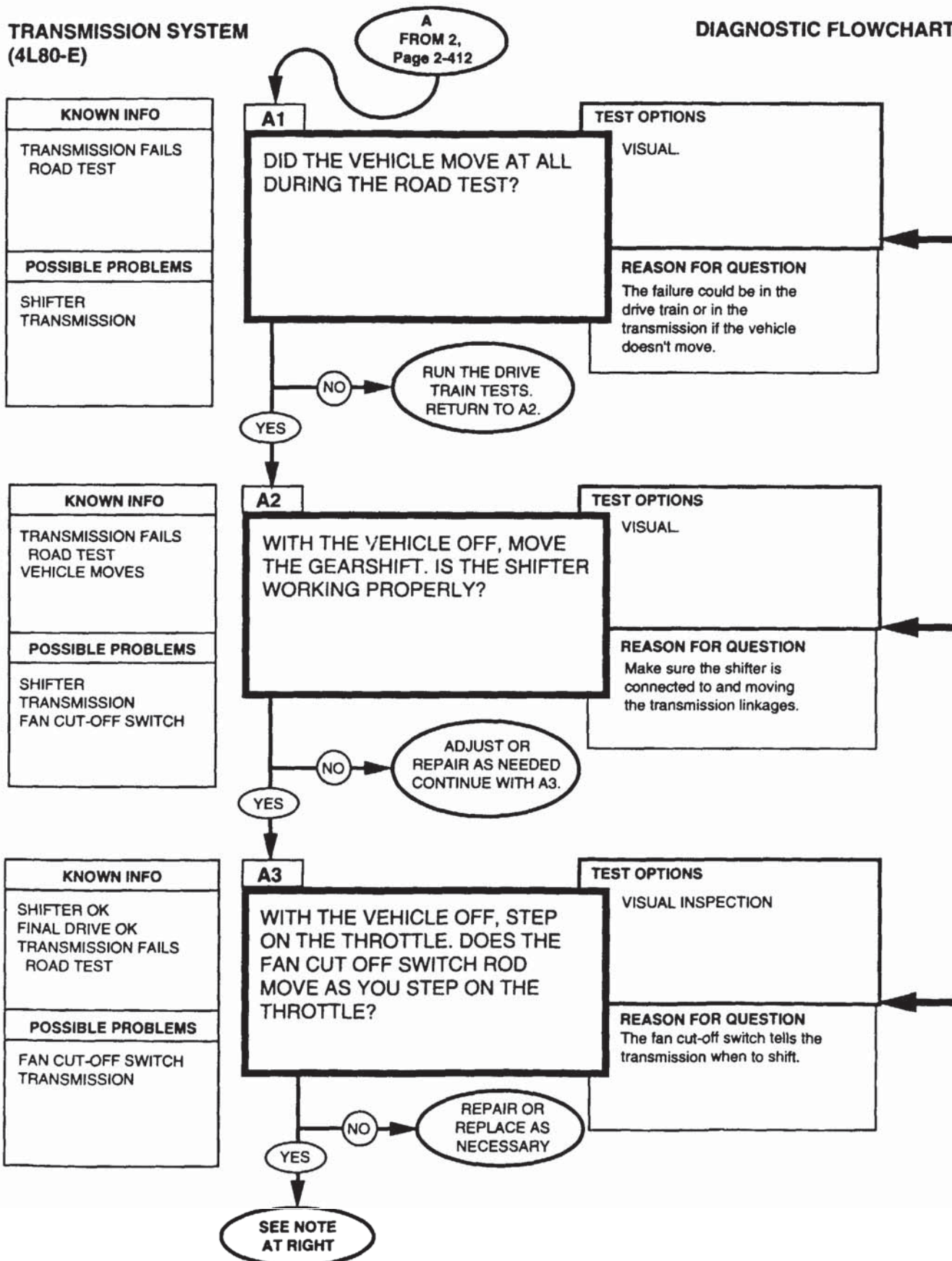
Repair or replace fan cut-off switch,  
refer to (para 4-44).





# TRANSMISSION SYSTEM (4L80-E)

## DIAGNOSTIC FLOWCHART

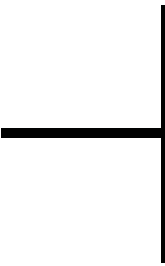


REFERENCE INFORMATION

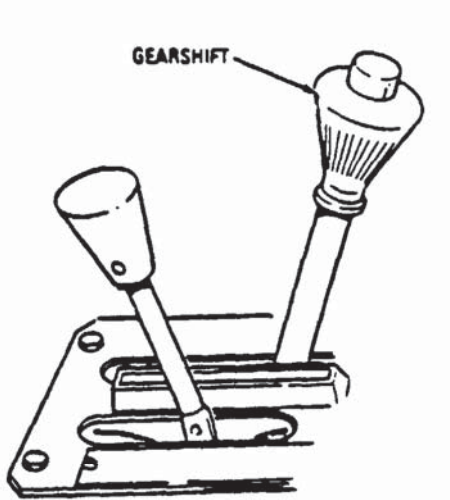
TRANSMISSION SYSTEM  
(4L80-E)



If the drivetrain system checks out OK, the problem is either the transmission itself, the shifter or the modulator. The DRIVETRAIN tests are located in Paragraph 2-33of this manual.



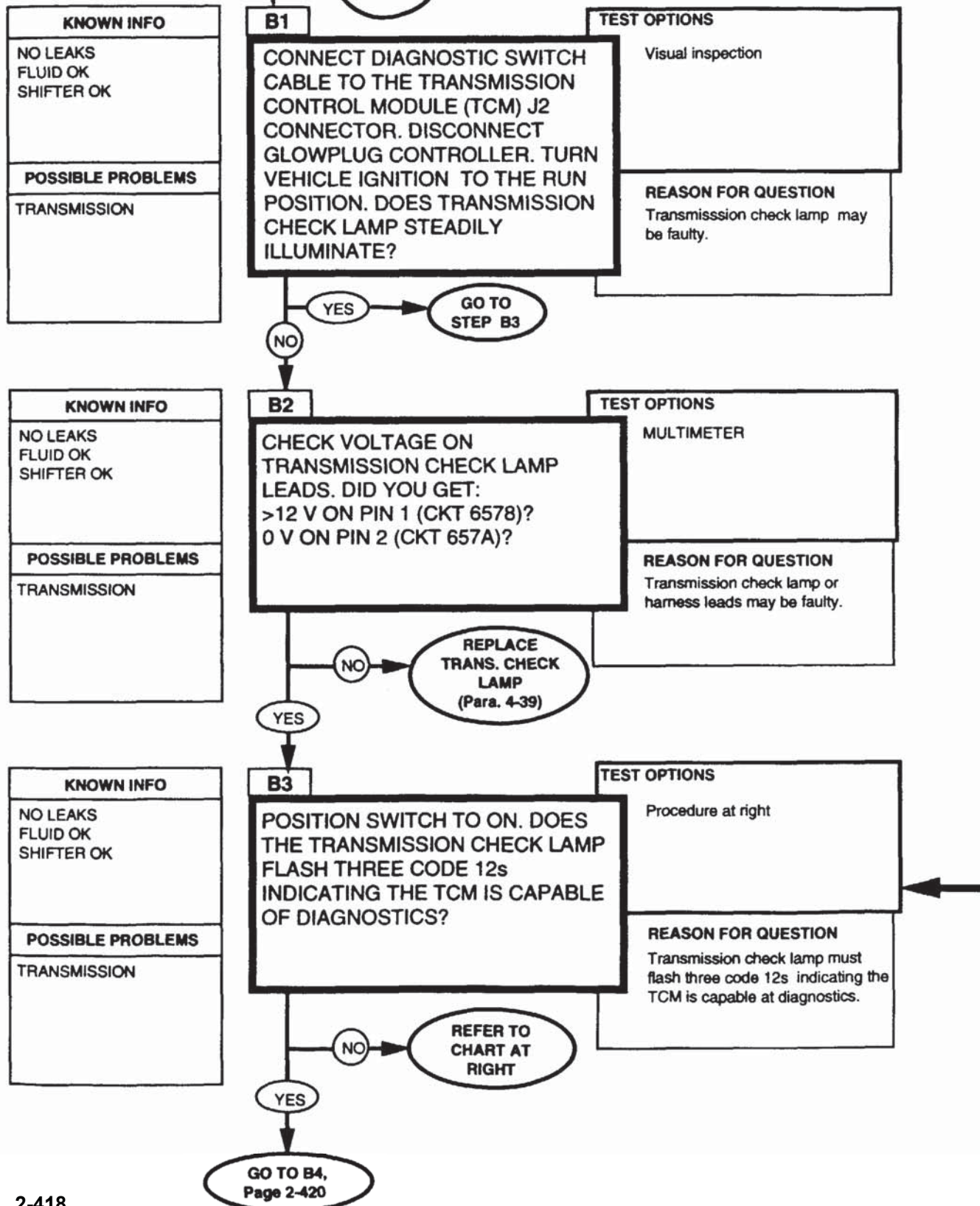
Make sure that the detents in the shifter correspond to the shift positions shown on the plate. Have an assistant move the shifter and look to see that the linkage is moving at the transmission.  
Linkage repair and adjustment procedures are shown in Paragraph 5-13.



Look for a fan cut-off switch problem if the vehicle was not shifting, or was not shifting as well as it should be.  
**NOTE**  
Run the BRAKES and DRIVETRAIN tests in this manual. If you don't find any faults, notify DS maintenance.

**TRANSMISSION SYSTEM  
(4L80-E)**

**DIAGNOSTIC FLOWCHART**





## REFERENCE INFORMATION

TRANSMISSION SYSTEM  
(4L80-E)

## Will Not Display DTC Code 12, or Check Transmission "ON" Steady

(NOTE: TRANSMISSION CHECK LAMP IS THE LAMP NEXT TO THE SHIFT LEVER MARKED TRANS-ONLY.)

IGNITION ON, ENGINE OFF AND GLOWPLUG  
CONTROLLER DISCONNECTED (PARA 4-29).

REMOVE DIAGNOSTIC SWITCH CABLE. INSTALL JUMPER  
CABLE BETWEEN PINS A AND E of J2 ON TCM. ASS'Y.

NO DTC 12

DTC 12 FLASHES

CHECK DIAGNOSTIC CABLE  
FOR OPEN AND REPAIR.

READ CODES AND REMOVE  
JUMPER.

- IGNITION OFF.
- DISCONNECT TCM CONNECTOR.
- IGNITION ON.

TRANS CHECK LAMP OFF.

TRANS CHECK LAMP ON.

- IGNITION OFF.
- DIAGNOSTIC TERMINAL  
NOT GROUNDED.
- RECONNECT TCM  
CONNECTOR.
- IGNITION ON AND  
ENGINE OFF.
- PROBE PIN E ON J2 TO  
GROUND.

REPAIR SHORT TO  
GROUND IN CKT 657A.  
(REFER TO PARA. 4-85).

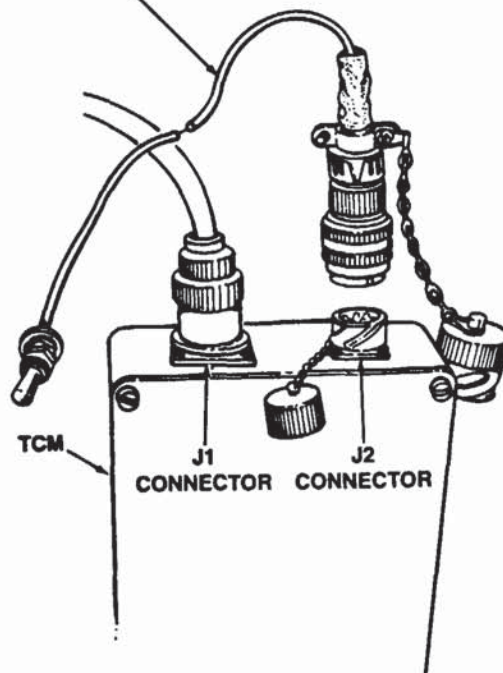
NO DTC 12

DTC 12 FLASHES

REPLACE DEFECTIVE TCM.  
(REFER TO PARA 4-42).

OPEN CKT PIN A J2.  
REPLACE TCM.  
(REFER TO PARA 4-42).

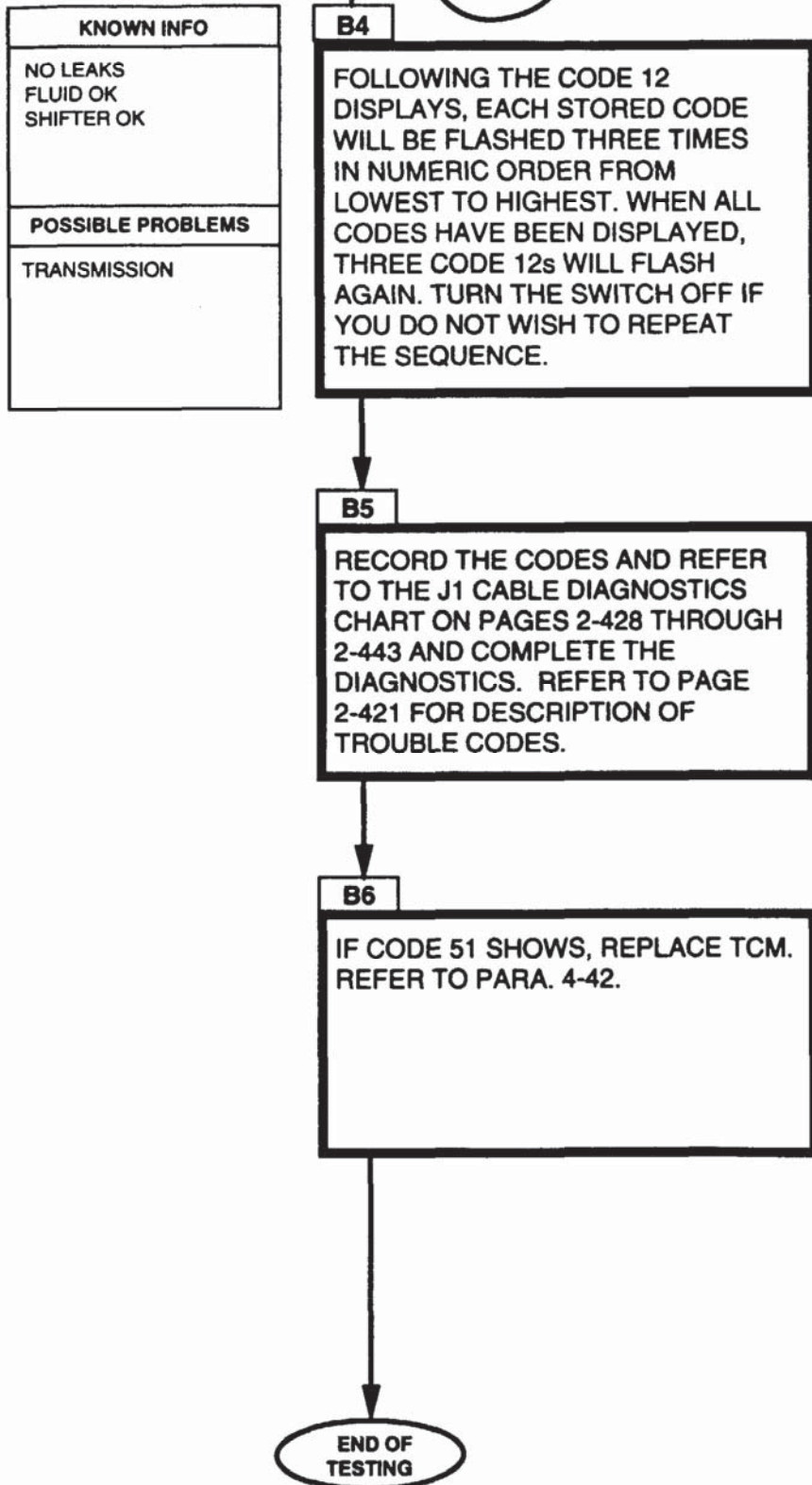
DIAGNOSTIC  
SWITCH  
CABLE



NOTE: AFTER TROUBLESHOOTING, RECONNECT GLOWPLUG CONTROLLER. VEHICLE WILL HAVE TO BE OPERATED IN ORDER FOR TCM TO RECEIVE TROUBLE CODES. AFTER REPAIRS, CHECK TRANS LAMP OPERATION.

TRANSMISSION SYSTEM  
(4L80-E)

DIAGNOSTIC FLOWCHART



**REFERENCE INFORMATION****TRANSMISSION SYSTEM  
(4L80-E)**

The following chart will help you find the code you need. The J1 cable diagnostics checks (page 2-428) must be performed. Always correct the lower code number first. If code 51 shows up, replace TCM (para. 4-42), operate vehicle, and recheck for trouble codes.

<b>TROUBLE CODE</b>	<b>CIRCUIT</b>	<b>PAGE NO.</b>
21	Throttle Position High	2-422
22	Throttle Position Low	2-422
24	Transmission Output Speed Sensor (TOSS)	2-422
28	Transmission Range Pressure Switch	2-422
37	Torque Converter Clutch (TCC) Brake Switch Stuck "ON"	2-422
38	TCC Brake Switch Stuck "OFF"	2-422
39	TCC Stuck "OFF"	2-423
51	Transmission Control Module (TCM) Bad	2-423
52	System Voltage High Long	2-423
53	System Voltage High	2-423
58	Transmission Temperature High	2-423
59	Transmission Temperature Low	2-423
68	Transmission Component Slipping	2-424
69	Torque Converter Clutch (TCC) Stuck "ON"	2-424
71	Engine Speed Sensor Circuit Low	2-424
73	Pressure Control Solenoid (PCS) Current	2-424
74	Transmission Input Speed Sensor (TISS) Circuit	2-425
75	System Voltage Low	2-425
79	Transmission Fluid Overtemp	2-425
81	2-3 Shift Solenoid Circuit Fault	2-425
82	1-2 Shift Solenoid Circuit Fault	2-426
83	TCC Solenoid (PWM) Circuit Fault	2-426
85	Undefined Ratio	2-426
86	Low Ratio	2-427
87	High Ratio	2-427

## TRANSMISSION SYSTEM (4L80-E)

### DTC 21/22

#### Throttle Position (TP) Sensor Circuit High/ Throttle Position Sensor Circuit Low

##### **Circuit Description:**

The TP sensor contains a resistor strip with one end connected to a 5-volt supply and the other to ground. The signal is connected to a movable contact within the TP sensor. As the accelerator pedal is applied, and the throttle shaft rotates, the voltage signal will increase from approximately 0.5 to 4.5 volts.

##### **DTC 21 Will Set When:**

- Engine is operating.
- TP sensor signal voltage is greater than 4.9 volts.
- Conditions are met for one second.

##### **DTC 22 Will Set When:**

- Engine is operating.
- TP sensor signal voltage is less than 0.2 volt.
- Conditions are met for one second.

### DTC 24

#### Output Speed Sensor Signal

##### **Circuit Description:**

The Output Speed sensor is a magnetic induction type sensor. Gear teeth pressed onto the output shaft induce an alternating voltage into the sensor.

##### **DTC 24 Will Set When:**

- Not in P/N.
- CKT voltage is constant.
- Engine speed is greater than 3000 rpm.
- Output speed is less than 200 rpm.
- TP is between 10% and 100%.
- All conditions are met for 3 seconds.

## REFERENCE INFORMATION

### DTC 28

#### Transmission Range (TR) Pressure Switch Assembly (PSA) Fault

##### **Circuit Description:**

The Transmission Range (TR) switch assembly consists of five normally open pressure switches mounted on the valve body. The TCM supplies battery voltage to each range signal. By grounding one or more of these circuits through various combinations of the pressure switches, the TCM assembly detects what transmission range has been selected by the vehicle operator. When the transmission electrical connector is disconnected, the ground potential for the three range signals to the TCM will be removed and D2 gear will be indicated.

##### **DTC 28 Will Set When:**

- Range signals "A" and "C" are both zero volts.
- Condition is met for 2 seconds.

### DTC 37/38

#### Torque Converter Clutch (TCC) Brake Switch Stuck "ON"/ TCC Brake Switch Stuck "OFF"

##### **Circuit Description:**

The normally closed brake switch supplies a B+ signal volt when the TCC brake switch is closed (brake pedal not applied).

##### **DTC 37 Will Set When:**

- CKT 810B is open.
- Then vehicle speed is between 5 mph (8 kph) and 20 mph (32 kph) for greater than 6 seconds.
- Then vehicle speed is greater than 20 mph (32 kph) for greater than 6 seconds.
- For a complete total of seven times.

##### **DTC 38 Will Set When:**

- TCC brake switch feed CKT 810B has constant voltage.
- Vehicle speed is greater than 20 mph (32 kph) for greater than 6 seconds.
- Then vehicle speed is between 5 mph (8 kph) and 20 mph (32 kph) for greater than 6 seconds.
- For a complete total of seven times.

## REFERENCE INFORMATION

TRANSMISSION SYSTEM  
(4L80-E)**DTC 39**  
**TCC Stuck "OFF"****Circuit Description:**

The TCM commands the TCC PWM solenoid "ON" by modulating TCC signal fluid acting on the converter clutch shift valve. Then TCC fluid applies the torque converter clutch.

**DTC 39 Will Set When:**

- TCC is commanded "ON."
- TCC slip speed greater than 65 RPM.
- Trans range in D3 or D4.
- 2nd or 3rd gear.
- All conditions are met for two seconds.

**DTC 51**  
**Faulty or Incorrect****Circuit description:**

The transmission Control Module (TCM), an on board computer, receives and processes input signals from sensors on the vehicle and delivers output signals to the solenoids located on the control valve assembly. These solenoids control the transmission operating pressures, upshift and downshift patterns and torque converter clutch (TCC) operation.

**DTC 51 Will Set When:**

- There is an uncorrectable computational error, or an input is in error intermittently.

**DTC 52/53**  
**System Voltage High Long/  
System Voltage High****Circuit Description:**

Ignition voltage is supplied to the control module to indicate the status of the ignition switch. Battery voltage is supplied to the control module to, in part, maintain memory of learned functions and parameters.

**DTC 52 Will Set When:**

- The ignition is "ON" and the system voltage is greater than 16 volts.
- Condition is met for 109 minutes.

**DTC 53 Will Set When:**

- The ignition is "ON" and the system voltage is greater than 19.5 volts.
- Condition is met for 2 minutes.

**DTC 58**  
**Transmission Fluid Temperature (TFT)  
Sensor Circuit Low  
(High Temperature Indicated)****Circuit Description:**

The TFT sensor is a thermistor that controls the signal voltage to the TCM. The TCM supplies a 5-volt reference signal to the sensor on TWC pin "L." When the transmission fluid is cold, the sensor resistance is high and the TCM will sense high signal voltage.

As the transmission fluid temperature warms to normal transmission operating temperature 212°F (100°C), the sensor resistance becomes less and the voltage decreases to approximately 1.5 to 2.0 volts. With DTC 79 also set, check the transmission cooling system.

**DTC 58 Will Set When:**

- Signal voltage indicates TFT greater than 304°F (151°C).
- Condition is met for 1 second.



**TRANSMISSION SYSTEM  
(4L80-E)**

**REFERENCE INFORMATION**

**DTC 59  
Transmission Fluid Temperature (TFT)  
Sensor Circuit High  
(Low Temperature Indicated)**

***Circuit Description:***

The TFT sensor is a thermistor that controls the signal voltage to the TCM. The TCM supplies a 5-volt reference signal to the sensor on TWC Pin "L." When the transmission fluid is cold, the sensor resistance is high and the TCM will sense high signal voltage.

As the transmission fluid temperature warms to normal transmission operating temperature 212°F (100°C), the sensor resistance becomes less and the voltage decreases to approximately 1.5 to 2.0 volts.

***DTC 59 Will Set When:***

- Signal voltage indicates TFT less than -34°F (-37°C).
- Condition is met for 1 second.

**DTC 68  
Transmission Component Slipping  
*Circuit Description:***

The TCM monitors the difference in engine Speed and input Speed.

***DTC 68 Will Set When:***

- TCC slip speed greater than 200 RPM.
  - Fourth gear is indicated.
  - TCC is locked.
  - Not in park/neutral.
  - All conditions are met for 2 seconds.
- 
- Trans range switch indicates D3 or D4.
  - Commanded gear indicates 2nd or 3rd gear.
  - All conditions are met for 2 seconds.

**DTC 69  
Torque Converter Clutch (TCC) Stuck "ON"**

***Circuit Description:***

The TCM commands the TCC PWM solenoid "ON" by modulating TCC signal fluid acting on the converter clutch shift valve. Then TCC fluid applies the torque converter clutch.

***DTC 69 Will Set When:***

- TCC slip speed RPM indicates between -5 and +10 RPM.
- TCC solenoid is commanded "OFF."
- TP sensor signal is greater than 25%.

**DTC 71  
Engine Speed, Sensor Circuit Low**

***Circuit Description:***

The camshaft position sensor (CPS) detects the rotational speed of the camshaft. As the camshaft rotates, an AC signal is generated in the circuit. This signal provides the input to determine engine speed for use in various calculations including TCC slip speed and overdrive ratio.

***DTC 71 Will Set When:***

- Engine speed less than 50 rpm
- Transmission range indicates, R, D4, D3, or D1.
- Conditions are met for 2 seconds.

## REFERENCE INFORMATION

TRANSMISSION SYSTEM  
(4L80-E)**DTC 73**  
**Pressure Control Solenoid (PCS) Circuit**  
**Current Error (Force Motor Circuit)*****Circuit Description:***

The pressure control solenoid is a TCM-controlled device used to regulate transmission line pressure. The TCM compares TP voltage, engine rpm and other inputs to determine the appropriate line pressure of a given load. The TCM will regulate the pressure by applying a varying amperage to the pressure control solenoid. The applied amperage can vary from 0.1 to 1.1 amp. The TCM then monitors the amperage at the return line.

***DTC 73 Will Set When:***

- The return amperage varies greater than 0.16 amps from the commanded amperage.
- All conditions are met for 1 second.

**DTC 74**  
**Transmission Input Speed**  
**Sensor (TISS) Circuit*****Circuit Description:***

The TISS sensor consists of a permanent magnet surrounded by a coil of wire. As the forward clutch housing rotates, an AC voltage is induced in the circuit. The signal voltage and frequency vary directly with the forward clutch rotational speed.

***DTC 74 Will Set When"***

- Trans range not in park or neutral.
- Engine speed greater than 300 rpm.
- Trans output speed greater than 200 rpm.
- Trans input speed less than 50 rpm.
- All conditions are met for 2 seconds.

**DTC 75**  
**System Voltage Low*****Circuit Description:***

Ignition voltage is supplied to the control module to indicate the status of the ignition switch. Battery voltage is supplied to the control module to, in part, maintain memory of learned functions and parameters.

***DTC 75 Will Set When:***

- The ignition is "ON."
- Ignition feed voltage to the control module is less than the graduated scale of:
  - -40°F (-40°C) = 7.3 volts.
  - 194°F (-90°C) = 10.3 volts.
  - 302°F (-150°C) = 11.7 volts.
- Engine speed greater than 1000 rpm.
- All conditions are met for 4 seconds.

**DTC 79**  
**Transmission Fluid Overtemp*****Circuit Description:***

The Transmission Fluid Temperature (TFT) sensor is a thermistor that controls the signal voltage to the TCM. The TCM supplies a 5-volt reference signal to the sensor on CKT 923A. When the transmission fluid is cold, the sensor resistance is high and the TCM will sense high signal voltage.

As the transmission fluid temperature warms to normal transmission operating temperature 212°F (100°C), the sensor resistance becomes less and the voltage decreases to approximately 1.5 to 2.0 volts.

***DTC 79 Will Set When:***

- Trans fluid temp greater than 295°F (146°C).
- All conditions are met for 30 minutes.

**TRANSMISSION SYSTEM  
(4L80-E)****REFERENCE INFORMATION****DTC 81  
2-3 Shift Solenoid Circuit Fault*****Circuit Description:***

Ignition voltage is supplied directly to the 2-3 shift solenoid. The TCM controls the solenoid by providing the ground path through CKT 315A to TCM.

***DTC 81 Will Set When:***

- The TCM commands the solenoid “ON” and voltage remains high.
- The TCM commands the solenoid “OFF” and voltage remains low.
- All conditions are met for 2 seconds.

**DTC 82  
1-2 Shift Solenoid Fault*****Circuit Description:***

Ignition voltage is supplied directly to the 1-2 shift solenoid. The TCM controls the solenoid by providing the ground path through CKT 237A to TCM.

***DTC 82 Will Set When:***

- The TCM commands the solenoid “ON” and voltage remains high.
- The TCM commands the solenoid “OFF” and voltage remains low.
- All conditions are met for 2 seconds.

**DTC 83  
TCC Solenoid (PWM) Circuit Fault*****Circuit Description:***

The control module supplies a ground through an internal Quad-Driver Module (QDM) allowing 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 solenoid 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 the 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 TCC shift 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.

***DTC 83 Will Set When:***

- The TCM commands the solenoid “ON” and voltage remains high.
- The TCM commands the solenoid “OFF” and voltage remains low.
- AU conditions are met for 2 seconds.

## REFERENCE INFORMATION

TRANSMISSION SYSTEM  
(4L80-E)**DTC 85**  
**Undefined Ratio Error***Circuit Description:*

The control module calculates ratio based on the transmission input speed and output speed sensor reading. The control module compares the known transmission ratio to the calculated ratio for the particular gear range selected.

**DTC 85 Will Set When:**

- TP is greater than 25%.
- Not in park neutral, or 4th gear.
- Engine speed is greater than 300 rpm.
- Vehicle speed is greater than 7 mph (11 kph).

COMMANDED GEAR	IF CALCULATED RATIO IS:	
	LESS THAN	MORE THAN
1st	2.38	2.63
2nd	1.43	1.58
3rd	0.95	1.05
REV	1.97	2.17

- All conditions are met for 2 seconds.

**DTC 86**  
**Low Ratio Error***Circuit Description:*

The control module calculates ratio based on the transmission input speed and output speed sensor readings. The control module compares the known transmission ratio to the calculated ratio for the particular gear range selected.

**DTC 86 Will Set When:**

- Not in park, reverse, or neutral.
- Engine speed greater than 300 rpm.
- TP greater than 25%.
- Vehicle speed is greater than 7 mph (11 kph).
- Trans gear ratio is less than 1.06 in first or second gear.
- All conditions are met for 2 seconds.

**DTC 87**  
**High Ratio Error***Circuit Description:*

The control module calculates ratio based on the transmission input speed and output speed sensor readings. The control module compares the known transmission ratio to the calculated ratio for the particular gear range selected.

**DTC 87 Will Set When:**

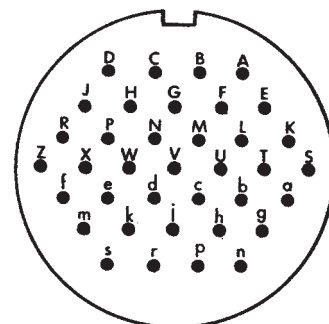
- TP greater than 25%.
- Not in park, reverse, or neutral.
- Engine speed greater than 300 rpm.
- Vehicle speed greater than 7 mph (11 kph).
- Transmission temperature is greater than 68°F (20°C).
- All conditions are met for 2 seconds.

# TRANSMISSION SYSTEM (4L80-E)

## DIAGNOSTIC FLOWCHART

### NOTE

- The following diagnostics will help isolate and repair problem circuits, wires, pins, connectors, sensors, circuit breakers, and solenoids.
- For repair of all wiring, refer to para. 4-85.
- Check connector pins before inserting probes.



J1

### J1 CABLE DIAGNOSTICS CHART

J1 Voltage Measurements With Ignition ON, Engine OFF,  
and Glow Plug Controller Disconnected. Refer to para 4-29.

CKT NOM.	CKT #	PIN	TO	PIN	EXP READ
IGN PWR	291D	j	a or b		12VDC
Battery Pos	537D	Z	a or b		12VDC
Trans Lp	657A	U*	a or b		LED Lights
Brake Sw	810B	W	a or b		12V (Brake OFF)
Brake Sw	810B	W	a or b		O (Brake ON)

\* Jumper wire from U to a or b.

Reconnect Glow Plug Controller; refer to para 4-29.  
J1 Voltage Measurement With Ignition ON, Engine ON,  
and Transmission in PARK.

CKT NOM.	CKT #	PIN	TO	PIN	EXP READ
Engine RPM	349A	h	c or p		0.3 Volts min @ idle
Press SW A	765A	A	a or b		Open wire
Press SW B	763A	B	a or b		0 to 1 ohms
Press SW C	764A	C	a or b		Open wire

No Go to pg 2-430

No Go to pg 2-431

No Go to pg 2-432

No Go to pg 2-433

No Go to pg 2-433

Go to pg 2-434

No Go to pg 2-442

No Go to pg 2-442

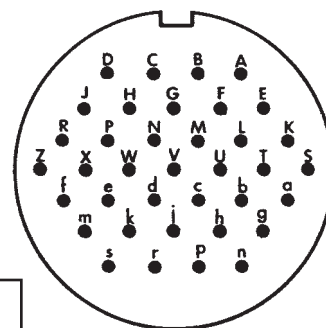
No Go to pg 2-442



## DIAGNOSTIC FLOWCHART

TRANSMISSION SYSTEM  
(4L80-E)**NOTE**

Check connector pins before inserting probes.

*J1 CABLE DIAGNOSTICS CHART (Cont'd)***J1 Resistance Measurements With Ignition OFF**

CKT NOM.	CKT #	PIN	TO	PIN	EXP READ
Battery Neg	599A	a	Shunt		0 ohms
Battery Neg	599B	b	Shunt		0 ohms
TPS	355A	s	c or p		~ 1 to 2 Kohms
TPS	350A	d	c or p		4 to 6 Kohms
TISS	495A 496A	m	n		1 to 2 Kohms
TOSS	497A 498A	S	R		1 to 2 Kohms
TCC SOL	924A	X	j		~ 8 to 12 ohms
SHIFT SOL A	237A	E	j		~18 to 24 ohms
SHIFT SOL B	375A	D	j		~18 to 24 ohms
FORCE MTR	264A 265A	g	k		3.5 to 5.2 ohms
Trans Temp Sensor	923A	e	c or p		40 ohm to 5 Kohm (High Temp → Low Resist.)

No Go to pg 2-431

No Go to pg 2-431

No Go to pg 2-435

No Go to pg 2-435

No Go to pg 2-436

No Go to pg 2-437

No Go to pg 2-438

No Go to pg 2-439

No Go to pg 2-440

No Go to pg 2-441

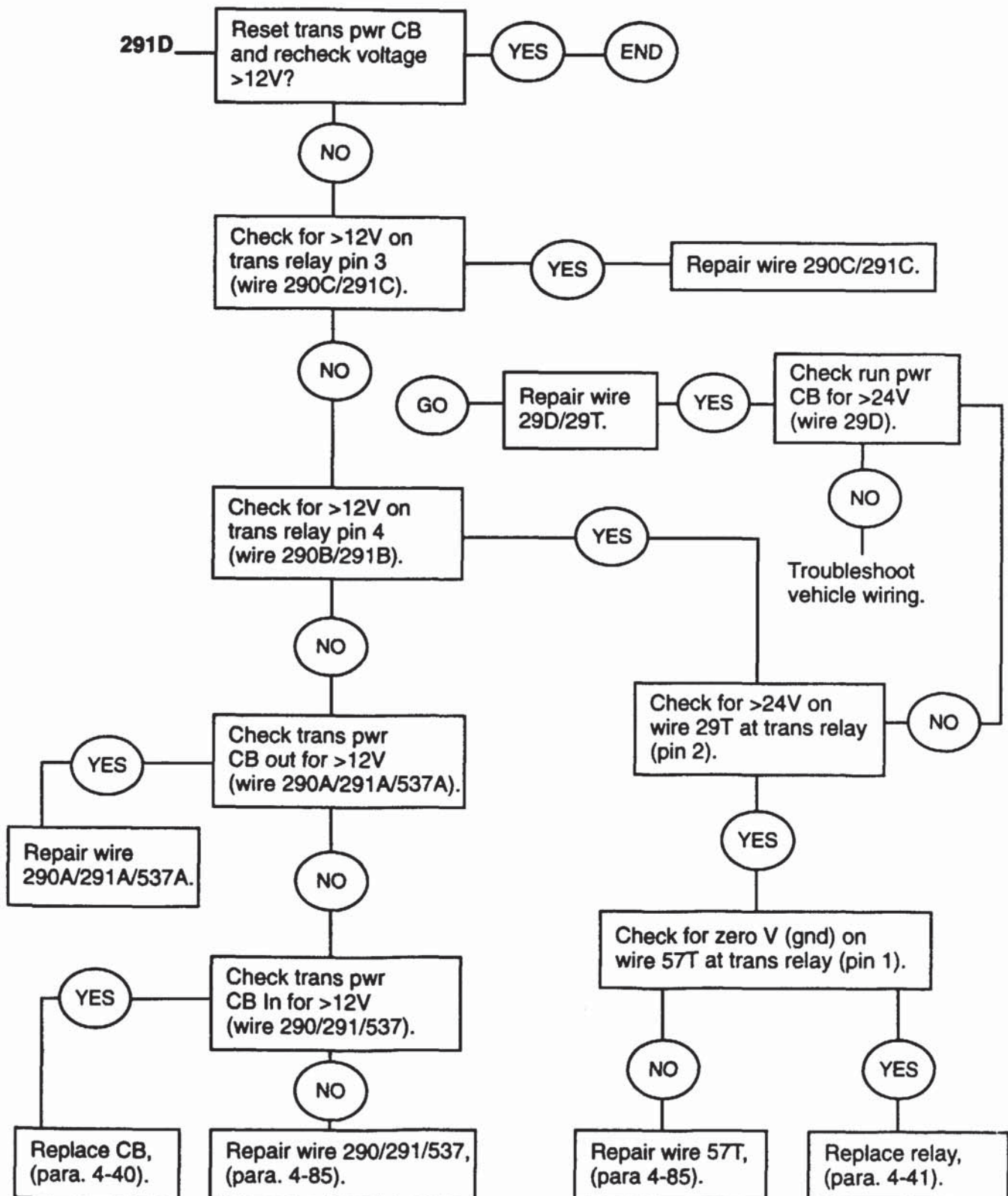
No Go to pg 2-443

Upon completion of J1 cable diagnostics, operate the vehicle and recheck for codes to insure codes have cleared. If codes have not cleared, refer to DS Maintenance.

**TRANSMISSION SYSTEM  
(4L80-E)**

**IGN POWER CIRCUIT**

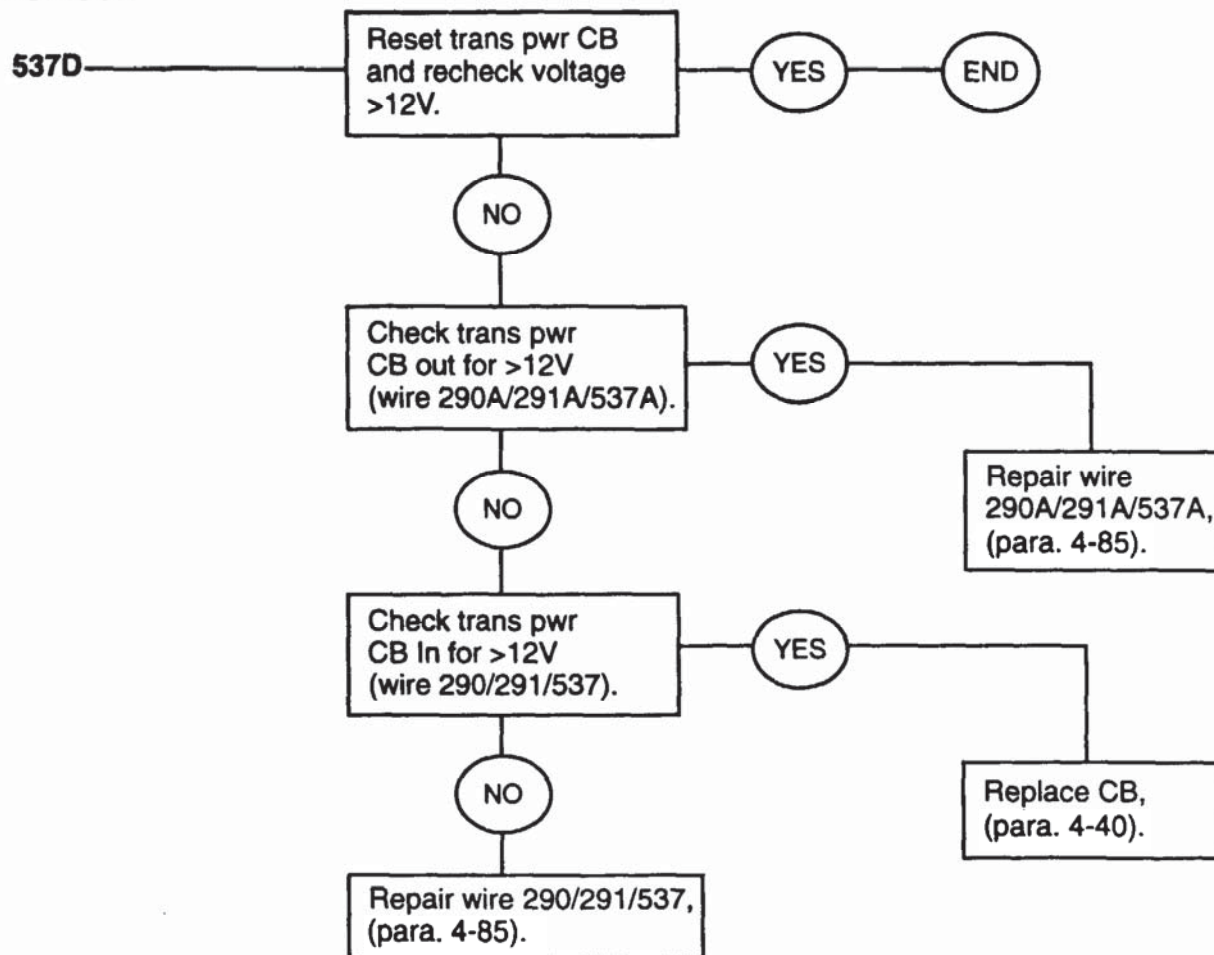
**DIAGNOSTIC FLOWCHART**



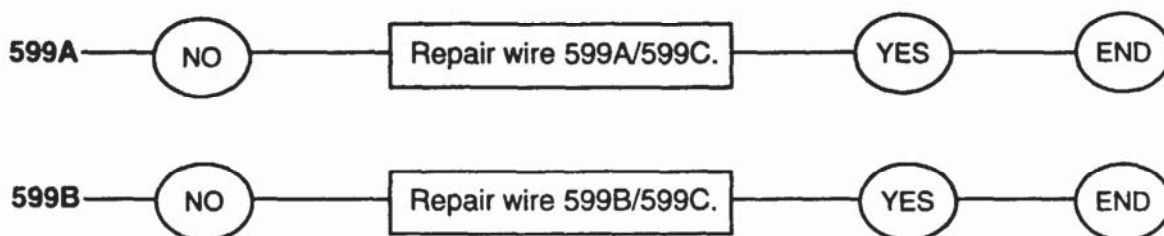
# DIAGNOSTIC FLOWCHART

## TRANSMISSION SYSTEM (4L80-E)

### BATTERY CIRCUIT



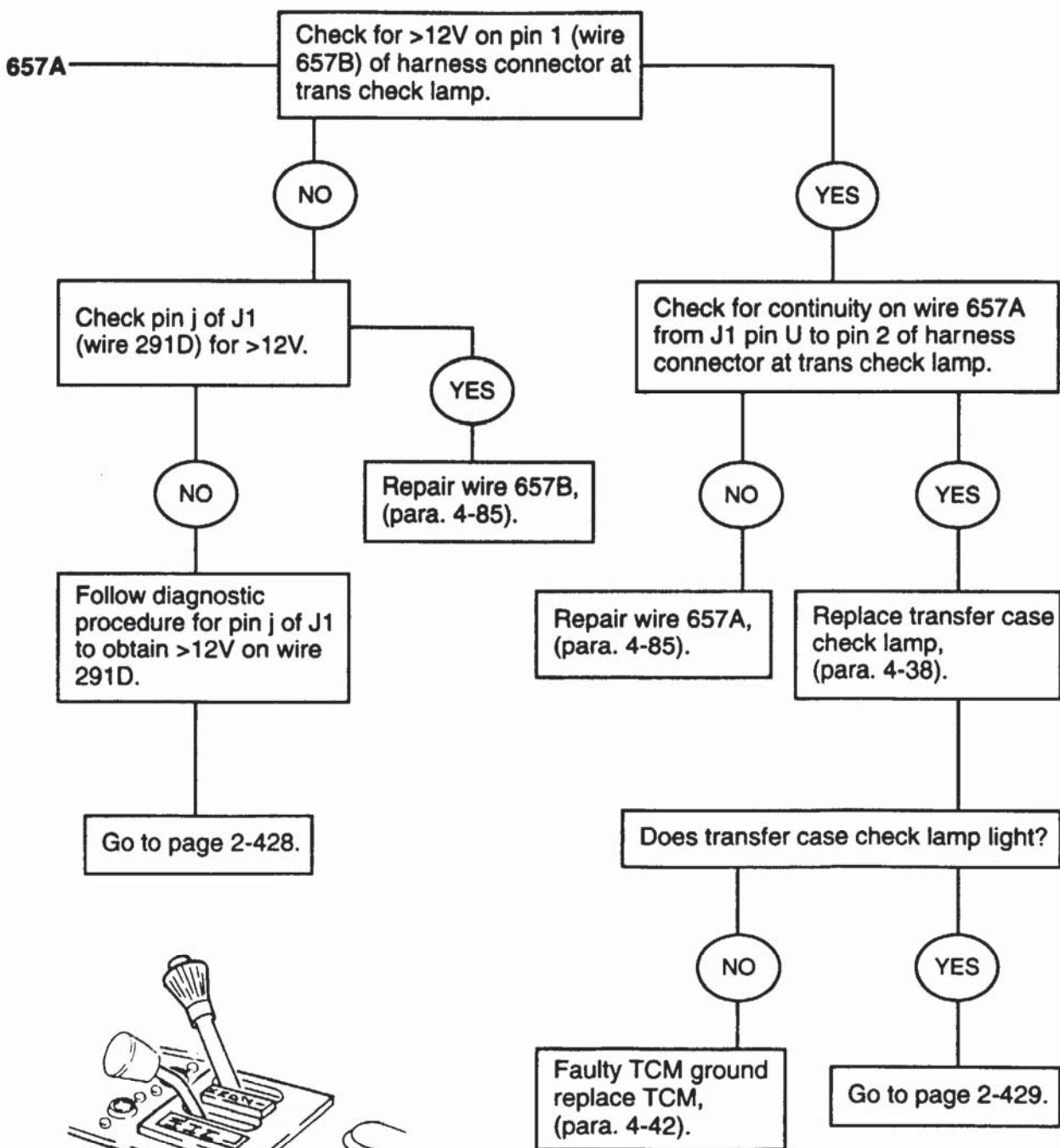
### VEHICLE GROUND CIRCUIT



# TRANSMISSION SYSTEM (4L80-E)

## DIAGNOSTIC FLOWCHART

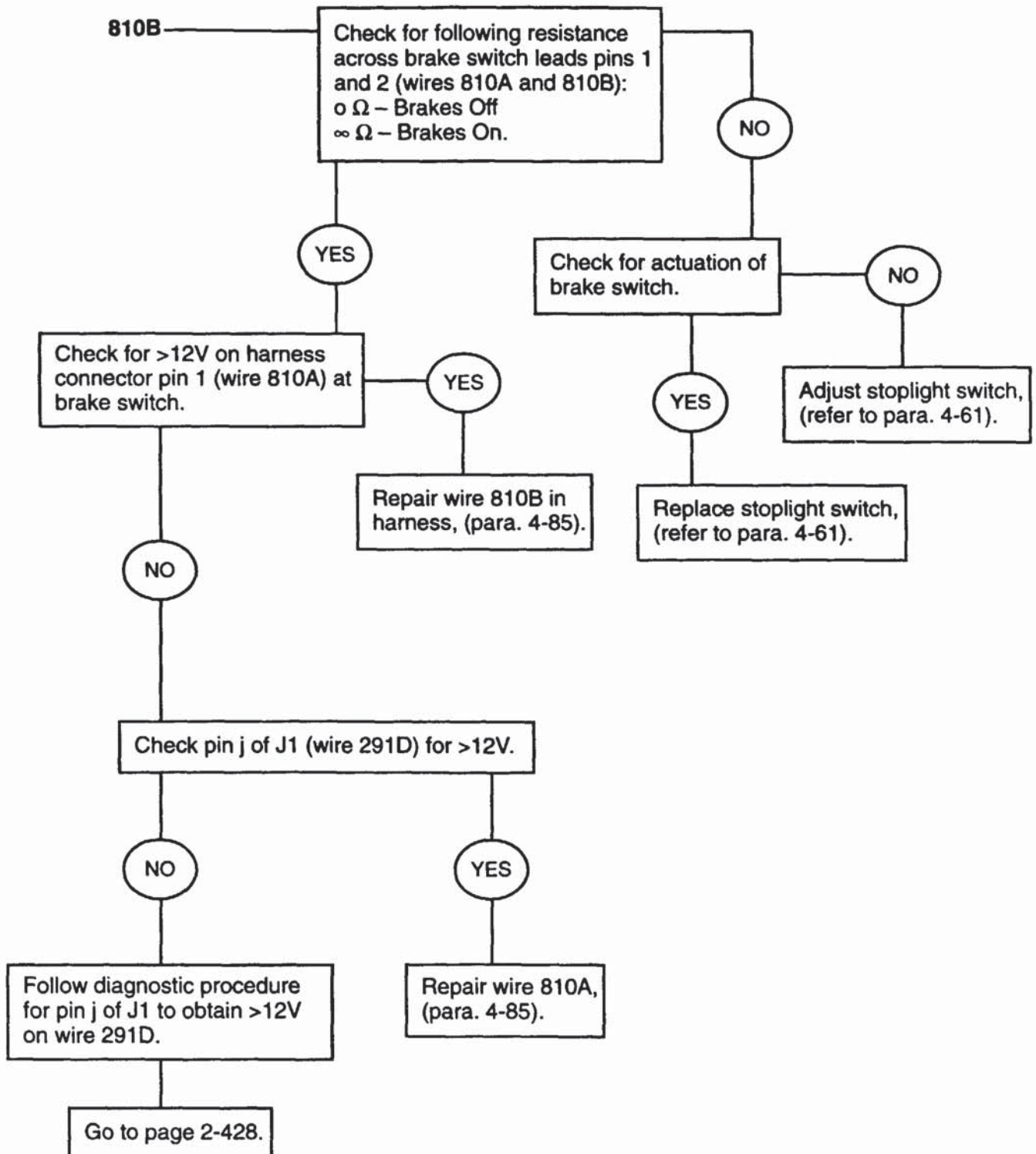
### TRANSMISSION LIGHT CIRCUIT



## DIAGNOSTIC FLOWCHART

TRANSMISSION SYSTEM  
(4L80-E)

## BRAKE SWITCH CIRCUIT

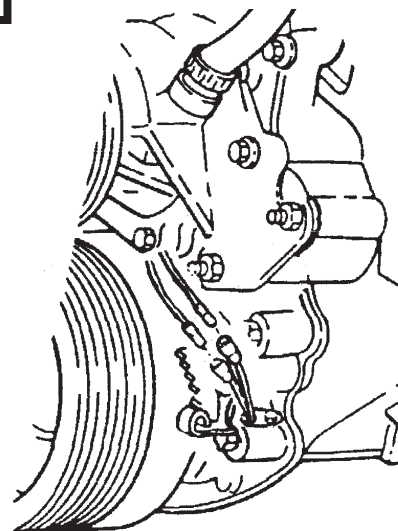
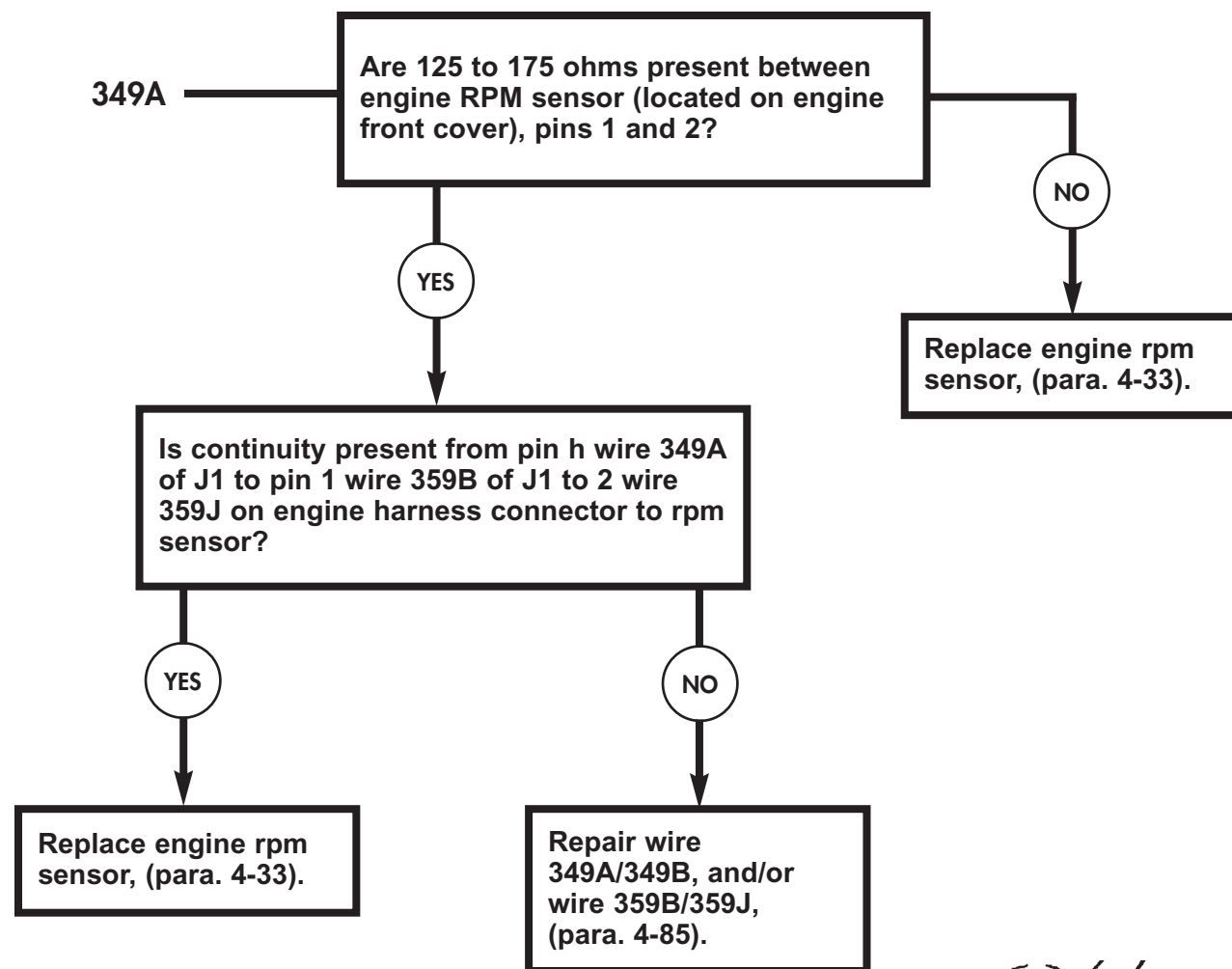


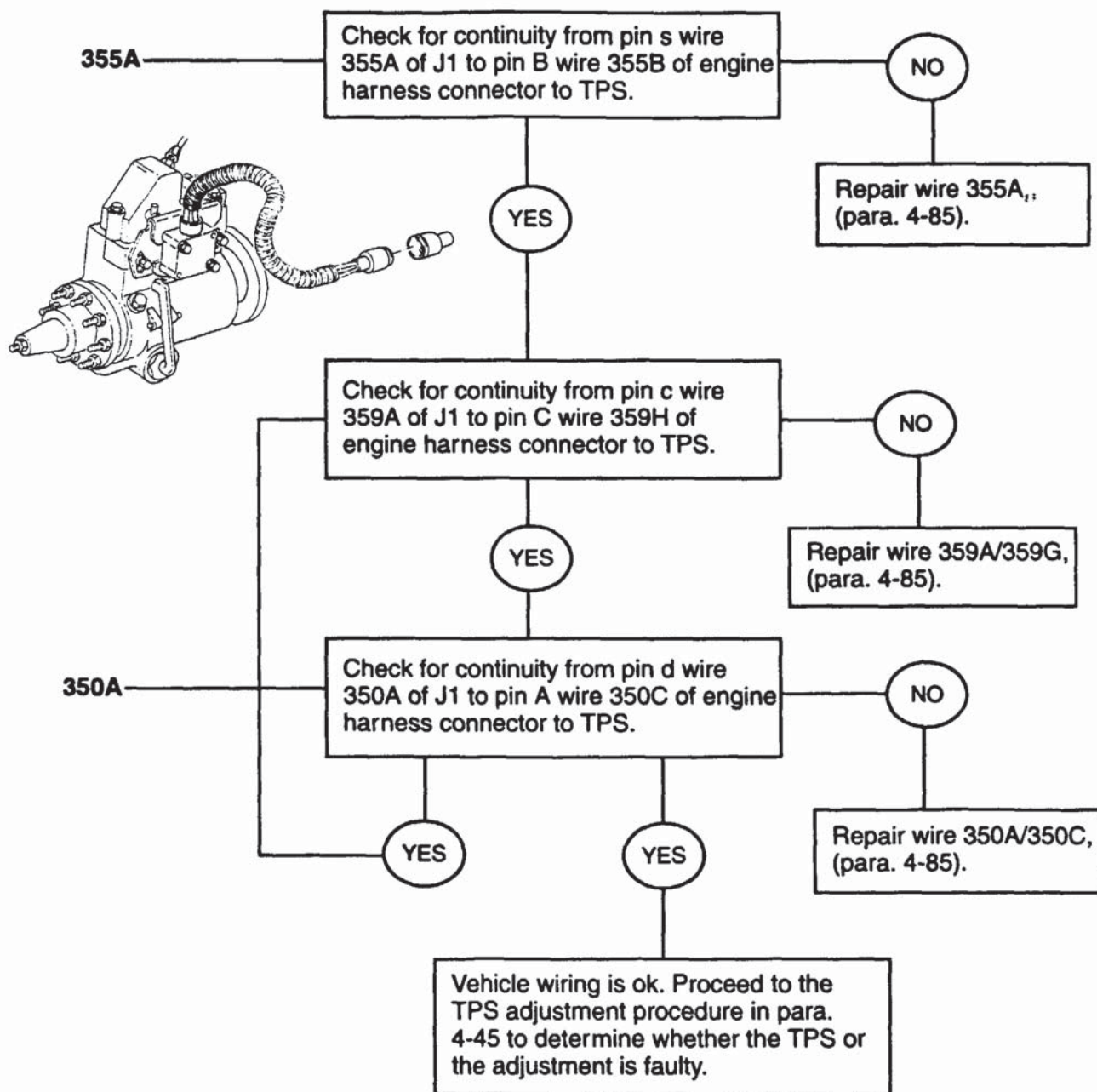


TRANSMISSION SYSTEM  
(4L80-E)

ENGINE RPM SENSOR

DIAGNOSTIC FLOWCHART



**DIAGNOSTIC FLOWCHART****TRANSMISSION SYSTEM  
(4L80-E)****THROTTLE POSITION SENSOR  
CIRCUIT**

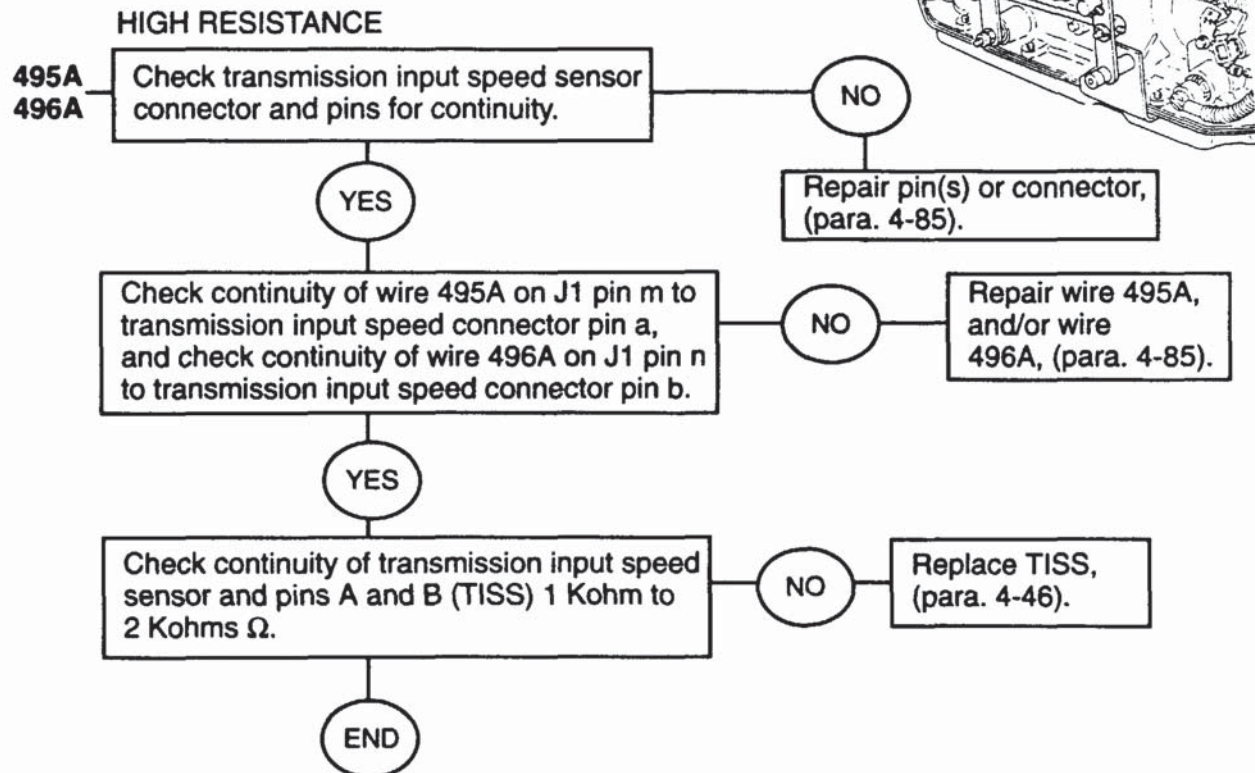
# TRANSMISSION SYSTEM (4L80-E)

## DIAGNOSTIC FLOWCHART

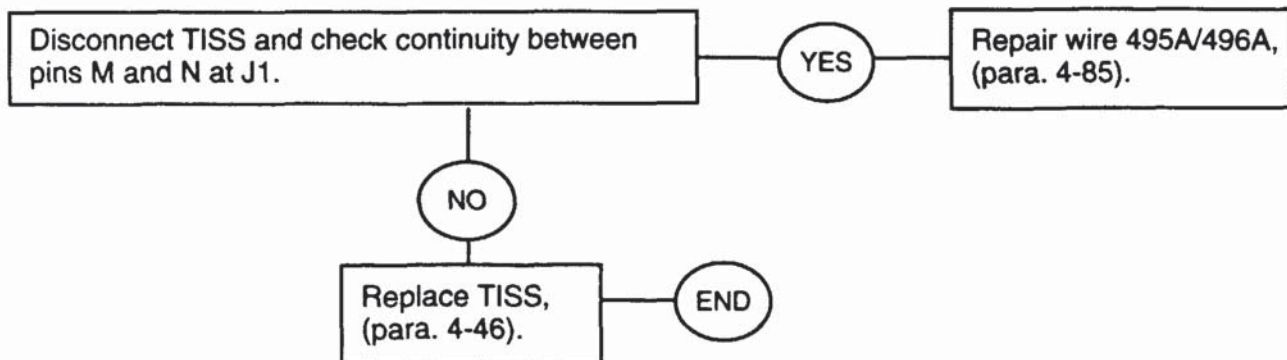
### TRANSMISSION INPUT SPEED SENSOR (TISS) CIRCUIT

#### NOTE

If reading from J1 diagnostics chart is greater than 2, perform high resistance - less than 1 perform low resistance.



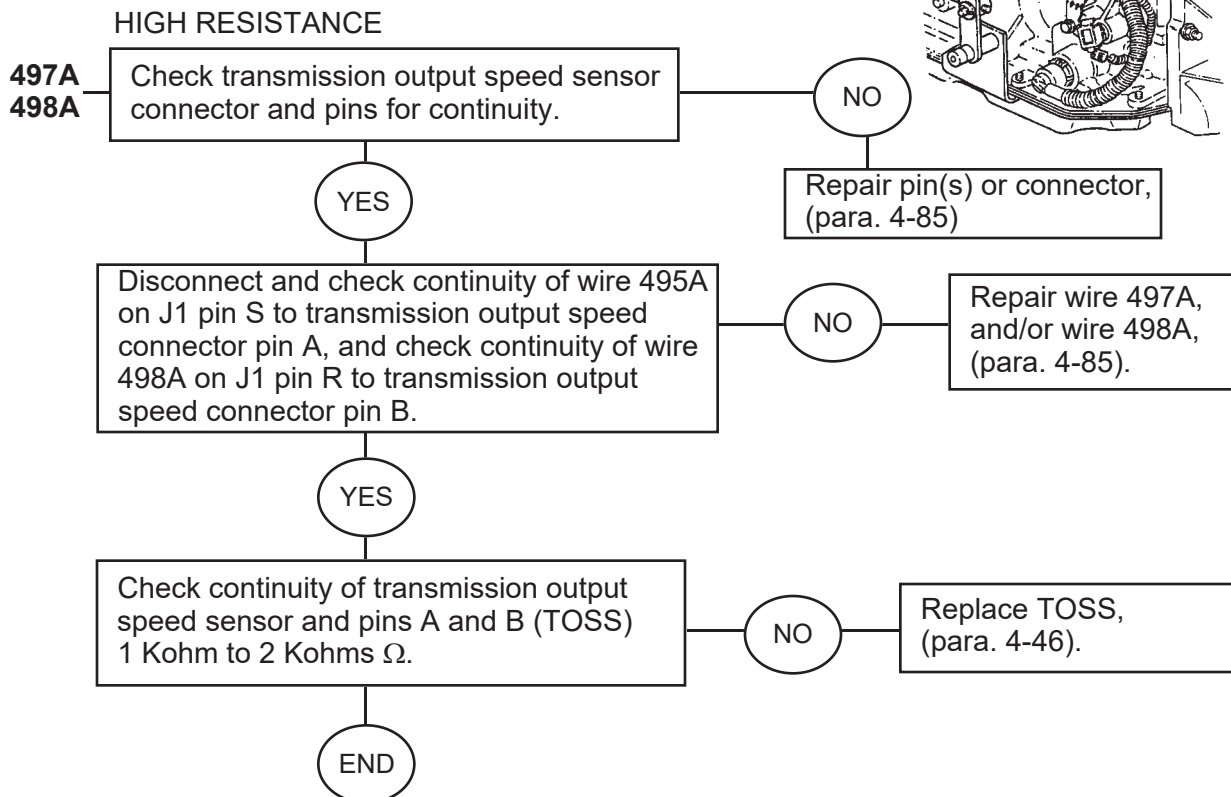
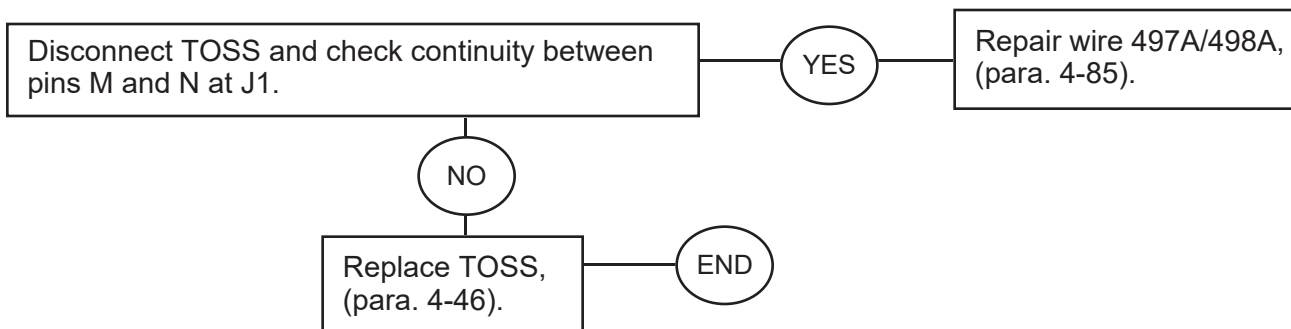
### LOW RESISTANCE



## DIAGNOSTIC FLOWCHART

TRANSMISSION SYSTEM  
(4L80-E)TRANSMISSION OUTPUT SPEED  
SENSOR (TOSS) CIRCUIT**NOTE**

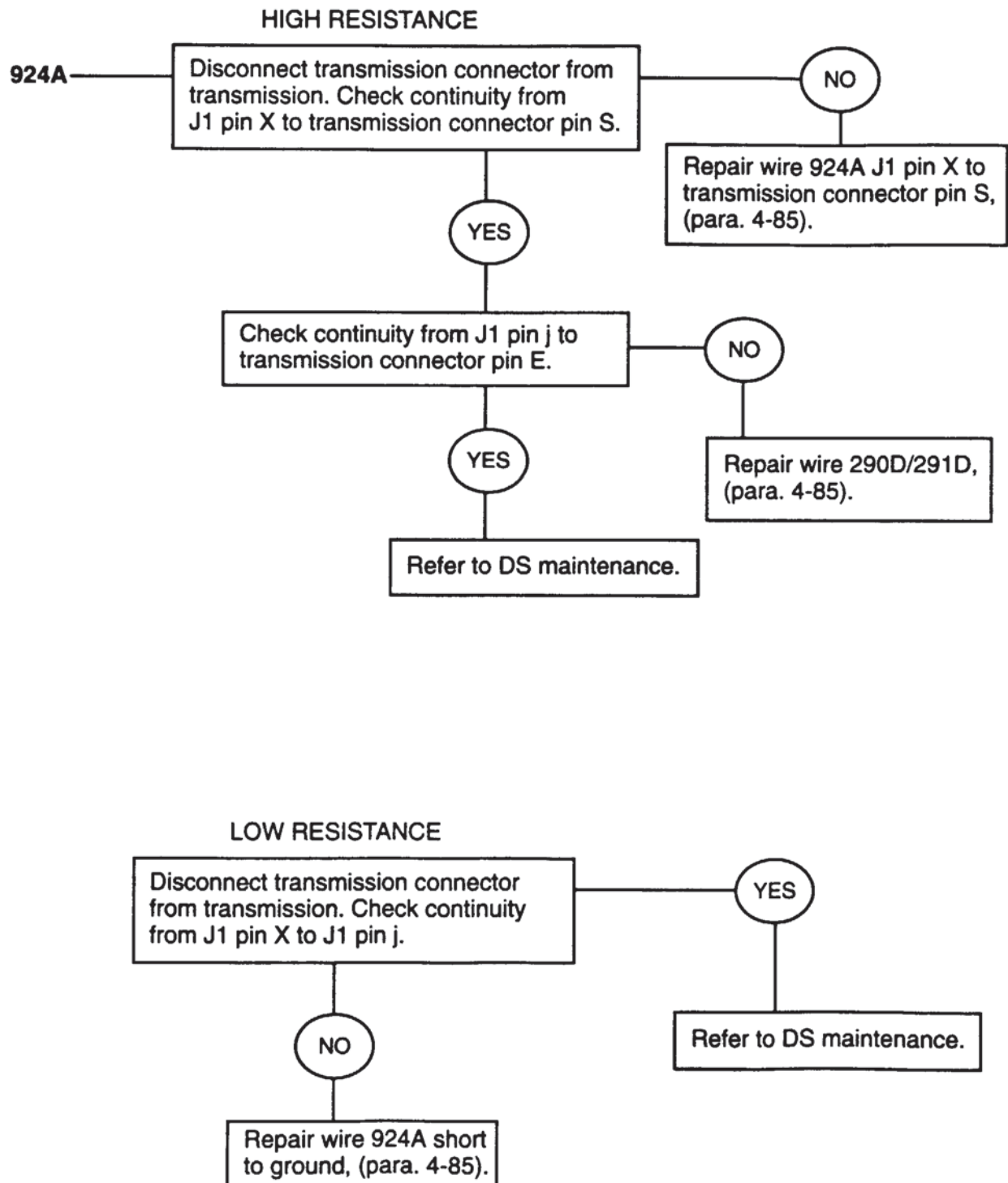
If reading from J1 diagnostics chart is greater than 2, perform high resistance - less than 1 perform low resistance.

**LOW RESISTANCE**

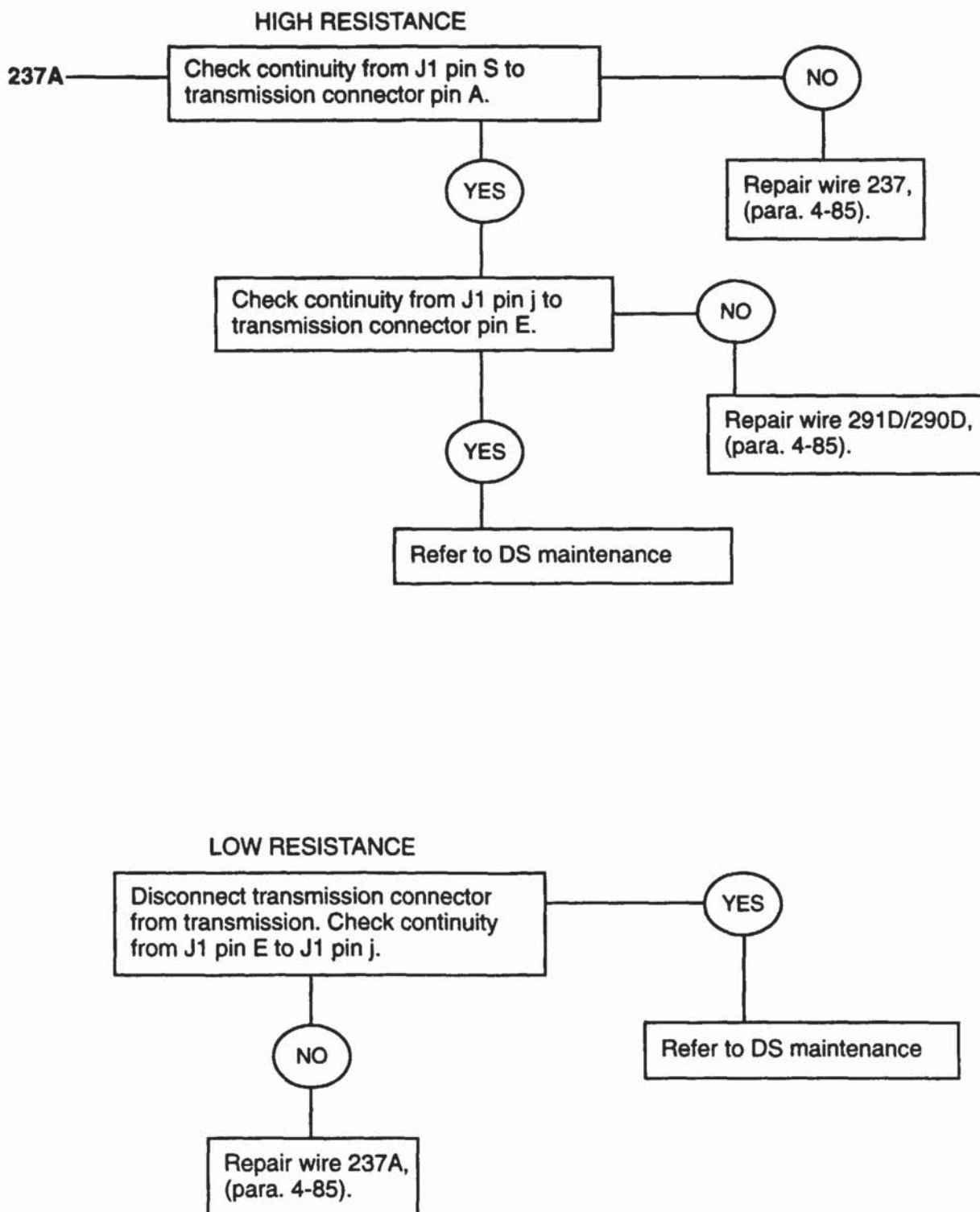
**TRANSMISSION SYSTEM  
(4L80-E)**

**TORQUE CONVERTER CLUTCH  
SOLENOID CIRCUIT**

**DIAGNOSTIC FLOWCHART**



## DIAGNOSTIC FLOWCHART

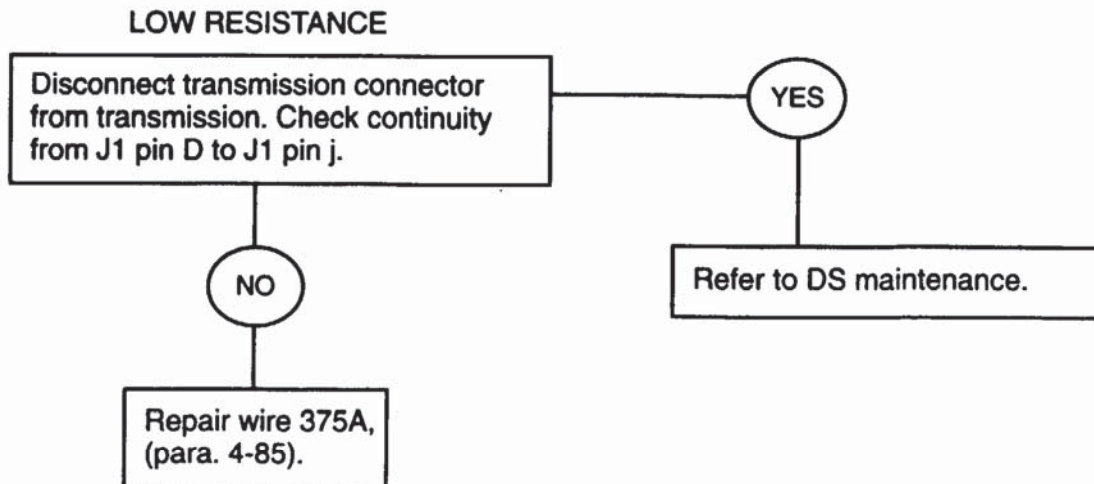
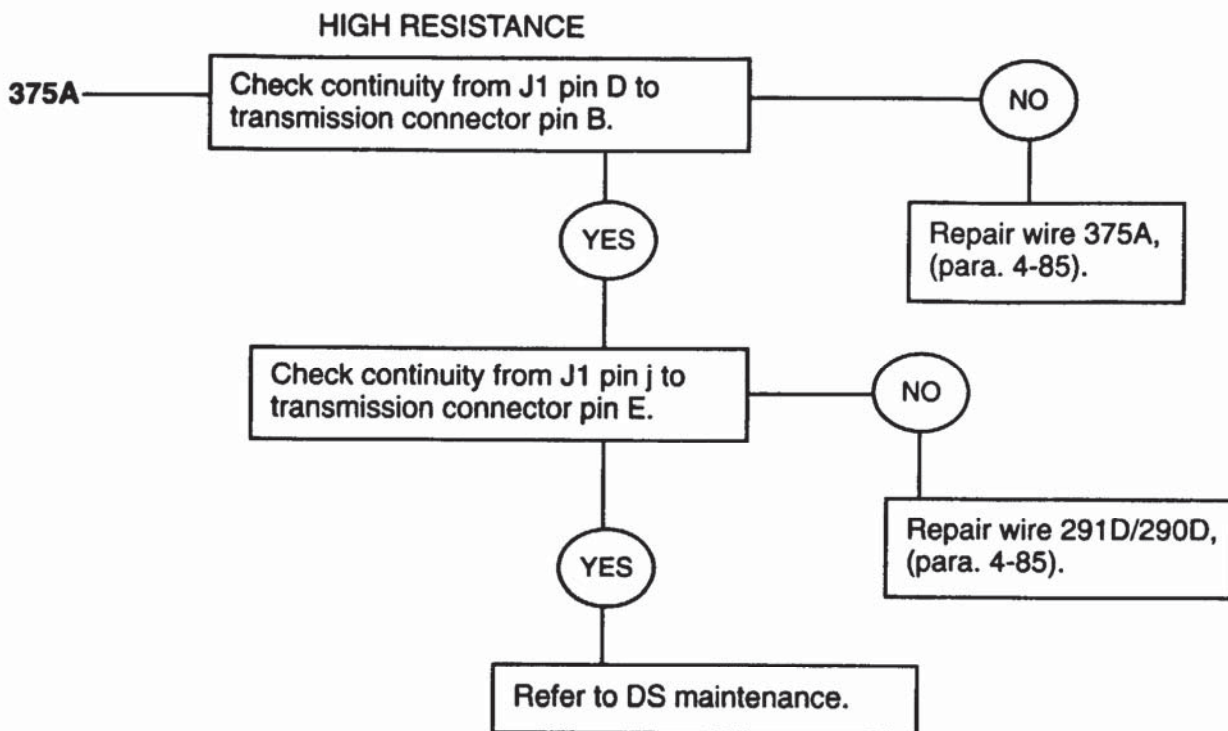
TRANSMISSION SYSTEM  
(4L80-E)1-2 SHIFT SOLENOID CIRCUIT SHIFT  
SOLENOID A



# TRANSMISSION SYSTEM (4L80-E)

## 2-3 SHIFT SOLENOID CIRCUIT SHIFT SOLENOID B

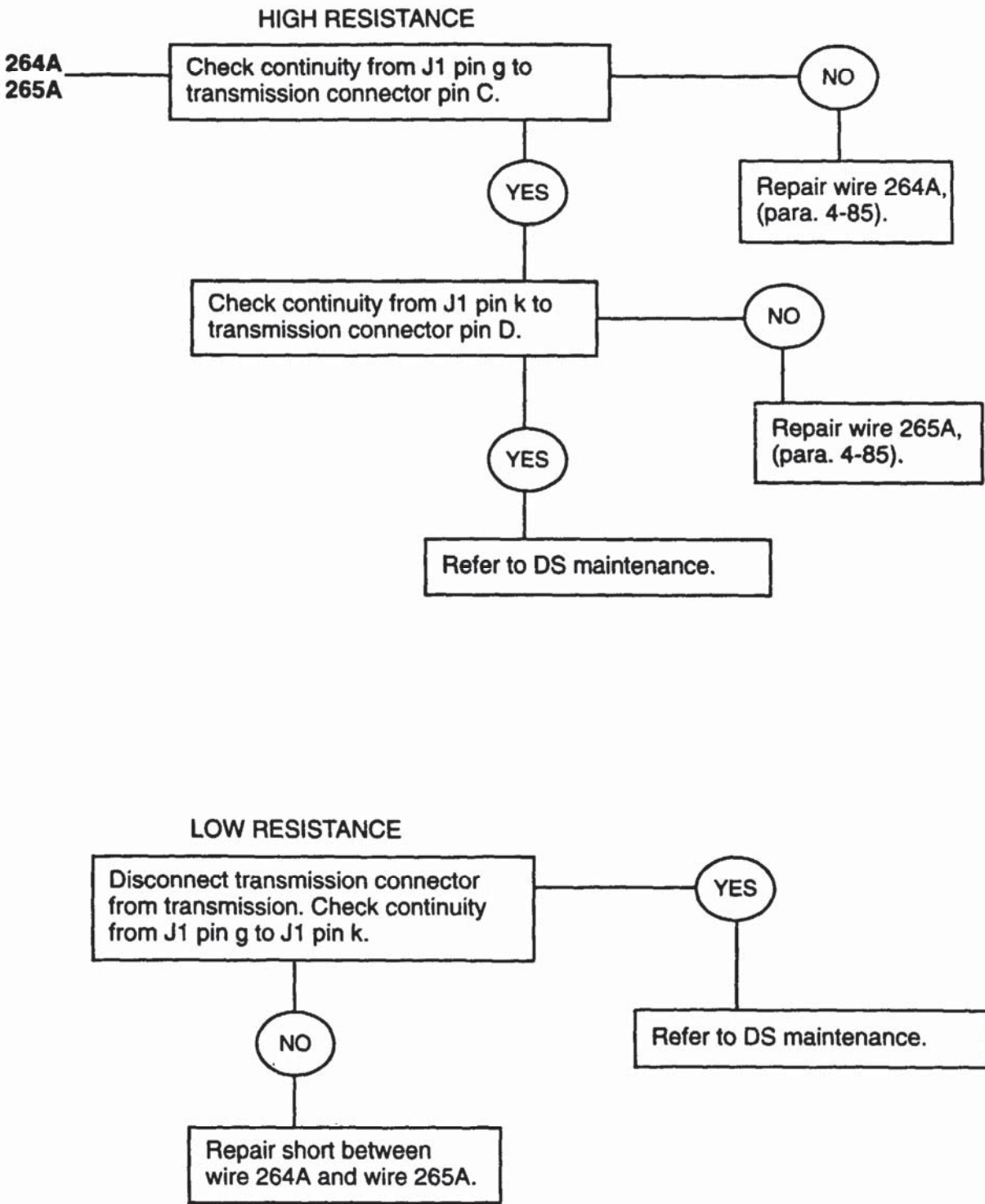
## DIAGNOSTIC FLOWCHART



DIAGNOSTIC FLOWCHART

TRANSMISSION SYSTEM  
(4L80-E)

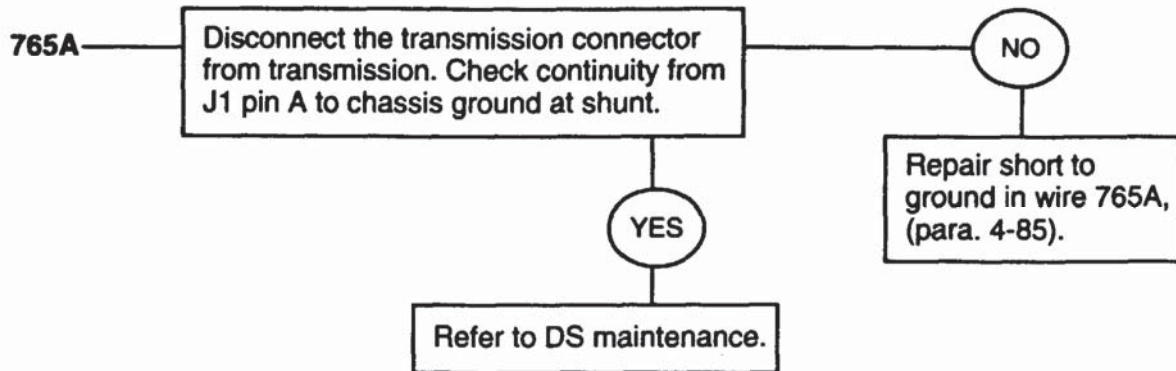
PRESSURE CONTROL SOLENOID CIRCUIT  
FORCE MOTOR HIGH



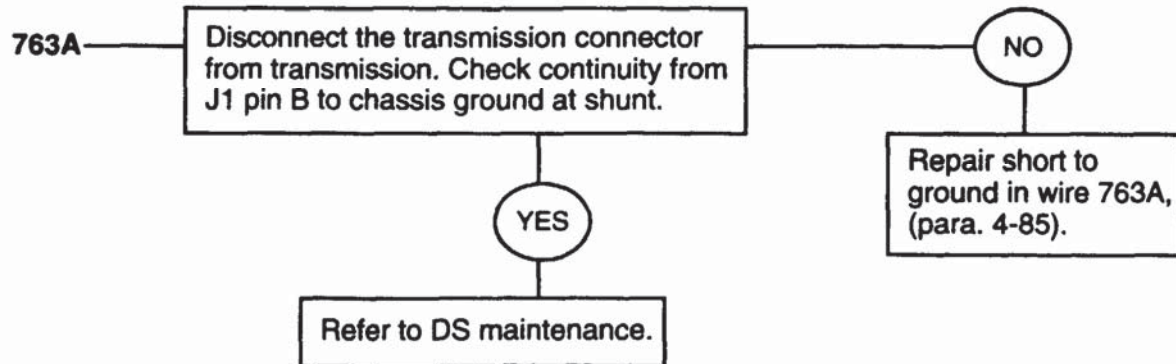
# TRANSMISSION SYSTEM (4L80-E)

## DIAGNOSTIC FLOWCHART

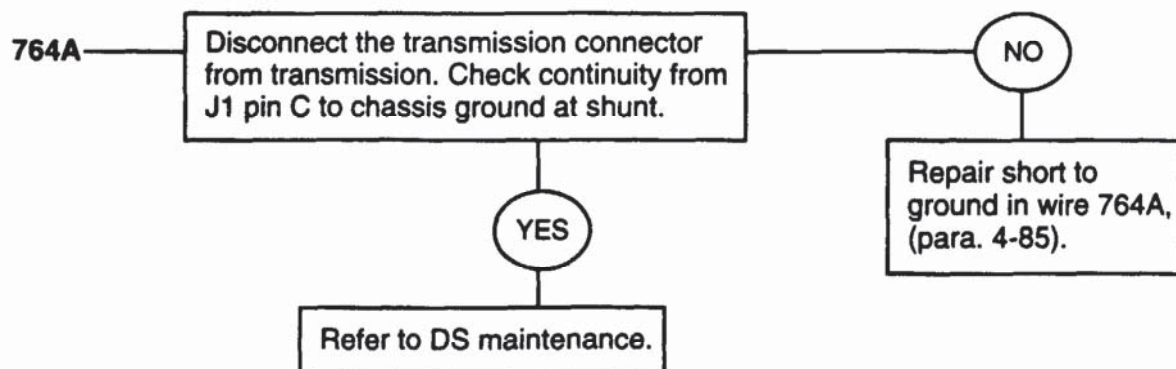
### TRANSMISSION RANGE PRESSURE SWITCH, CIRCUIT PRESSURE SWITCH A



### TRANSMISSION RANGE PRESSURE SWITCH, CIRCUIT PRESSURE SWITCH B



### TRANSMISSION RANGE PRESSURE SWITCH, CIRCUIT PRESSURE SWITCH C



DIAGNOSTIC FLOWCHART

TRANSMISSION SYSTEM  
(4L80-E)

TRANSMISSION TEMPERATURE SENSOR

The transmission temperature sensor is a thermistor. The resistance decreases as the temperature increases at 68°F (20°C) the resistance should be from 2980 to 4020 ohms, at 248°F (120°C) the resistance should be 90 to 111 ohms.

