

AUTO TRANS DIAGNOSIS - A-340

1998 Toyota Supra

1997-98 AUTOMATIC TRANSMISSIONS
Toyota A-340 Series Electronic Controls

Lexus:
1997; LX450
1998; LX470
Toyota:
1997-98; Land Cruiser, Tacoma, T100, 4Runner

APPLICATION

TRANSMISSION APPLICATIONS (LEXUS)

Vehicle	Transmission Model
LS400 (1997)	A-340E
SC300	A-340E
SC400 (1997)	A-340E

APPLICATIONS (TOYOTA)

Vehicle	Transmission Model
Supra	A-340E
Tacoma	
2WD V6	A-340E
4WD 4-Cyl. (2.7L)	A-340F
4WD V6	A-340F
T100	
2WD 4-Cyl. (2.7L)	A-340E
2WD V6	A-340E
4WD V6	A-340F
4Runner	
2WD 4-Cyl. (2.7L)	A-340E
2WD V6	A-340E
4WD 4-Cyl. (2.7L)	A-340F
4WD V6	A-340F

CAUTION: All models are equipped with Supplemental Restraint System (SRS). When servicing vehicle, use care to avoid accidental air bag deployment. All SRS electrical connections and wiring harnesses are covered with Yellow insulation. SRS-related components are located in steering column, center console, instrument panel and lower panel on instrument panel. DO NOT use electrical test equipment on these circuits. If necessary, deactivate SRS before servicing components. See AIR BAG SERVICING article in APPLICATIONS & IDENTIFICATION.

DESCRIPTION

Automatic transmission for all models is electronically controlled. The A-340E is an electronically controlled transmission without a transfer case. The A-340F is an electronically controlled transmission with a mechanically controlled transfer case.

On all models, transmission shifting and torque converter lock-up are controlled by an Electronic Controlled Transmission (ECT) Electronic Control Unit (ECU). Control unit is referred to as the ECT

ECU. ECT ECU is combined with engine ECU into one unit.

ECT ECU receives information from various input devices and uses this information to control shift solenoids for transmission shifting and lock-up solenoid (also called SL or SLU solenoid) for torque converter lock-up. SLN solenoid is used to control hydraulic pressure acting on accumulator control valve. Valve assists in smooth shifting. Solenoids are mounted on transmission valve body. See Figs. 1-8.

A pattern select switch is located near shift lever on center console. Pattern select switch contains a POWER (PWR) and a NORMAL (NORM) operating position. When pattern select switch is depressed (PWR position), transmission upshifts and downshifts will occur at a higher vehicle speed than with switch released. An indicator light on instrument panel indicates pattern select switch is depressed (PWR position).

Overdrive (OD) switch is mounted on shift lever. See Figs. 1-8. When OD switch is depressed to ON position, transmission will shift into 4th gear when shift lever is in "D" position, and OD OFF light on instrument panel will go off. When OD switch is released to OFF position, transmission will shift into 3rd gear, and OD OFF light will come on.

Transmission is equipped with a shift lock and key lock system. Shift lock system prevents shift lever from being moved from Park unless brake pedal is depressed. In case of a malfunction, shift lever can be released by depressing shift lock override button, located near shift lever. Key lock system prevents ignition key from being moved from ACC to LOCK position on ignition switch unless shift lever is in Park. For more information on shift lock and key lock system, see appropriate SHIFT LOCK SYSTEM article.

OPERATION

ECT ECU

ECT ECU receives information from various input devices and uses this information to control No. 1 and No. 2 solenoids on transmission valve body for transmission shifting and lock-up solenoid (also called SL or SLU solenoid) for torque converter lock-up. ECT ECU contains a self-diagnostic system, which will store a Diagnostic Trouble Code (DTC) if a failure or problem exists in electronic control system. Trouble code can be retrieved to determine problem area. See SELF-DIAGNOSTIC SYSTEM. Note the location of the ECT ECU. See Figs. 1-8.

ECT ECU INPUT DEVICES

Pattern Select Switch Signal

Pattern select switch delivers an input signal to ECT ECU to indicate transmission shift points selected by vehicle operator. Pattern select switch is located near shift lever on center console. T100 is not equipped with a pattern select switch.

Park/Neutral Position (PNP) Switch Signal

PNP switch delivers an input signal to ECT ECU indicating shift lever position. Switch is located on side of transmission.

Throttle Position (TP) Sensor Signal

TP sensor delivers an input signal to ECT ECU indicating throttle position. TP sensor is located on side of throttle body.

Vehicle Speed Sensor (VSS) Signal (Lexus Models & Toyota Supra)

Vehicle speed signal is delivered to ECT ECU by vehicle speed sensor. Vehicle speed sensor detects transmission output shaft RPM. Gear shift point and lock-up timing are controlled by ECT ECU based on signals from vehicle speed sensor and throttle position sensor.

VSS (Except Lexus Models & Toyota Supra)

Vehicle speed signal is delivered to ECT ECU by No. 1 and No. 2 vehicle speed sensors. No. 1 vehicle speed sensor is driven by a gear on transmission output shaft, and indicates actual vehicle speed. No. 2 vehicle speed sensor detects transmission output shaft RPM. Gear shift point and lock-up timing are controlled by ECT ECU based on signals from No. 2 vehicle speed sensor and throttle position sensor. On Tacoma and T100, No. 1 vehicle speed sensor is located in combination meter. See Figs. 6 and 7.

OD Direct Clutch Speed Sensor Signal

Sensor delivers input signal to ECT ECU, indicating OD input shaft RPM. By comparing OD direct clutch drum signal and No. 2 vehicle speed sensor signal, ECT ECU detects shift timing of gears and controls engine torque and hydraulic pressure in response to various conditions. Sensor is located on left side of transmission, near torque converter housing.

Brakelight Switch Signal

Brakelight switch delivers input signal to ECT ECU, indicating vehicle braking. Brakelight switch is located on brake pedal support.

OD Switch Signal

OD switch provides an input signal to ECT ECU to indicate when overdrive is selected by vehicle operator. OD switch is mounted on shift lever.

Engine Coolant Temperature (ECT) Sensor Signal

Coolant temperature sensor delivers input signal to ECT ECU, indicating engine coolant temperature.

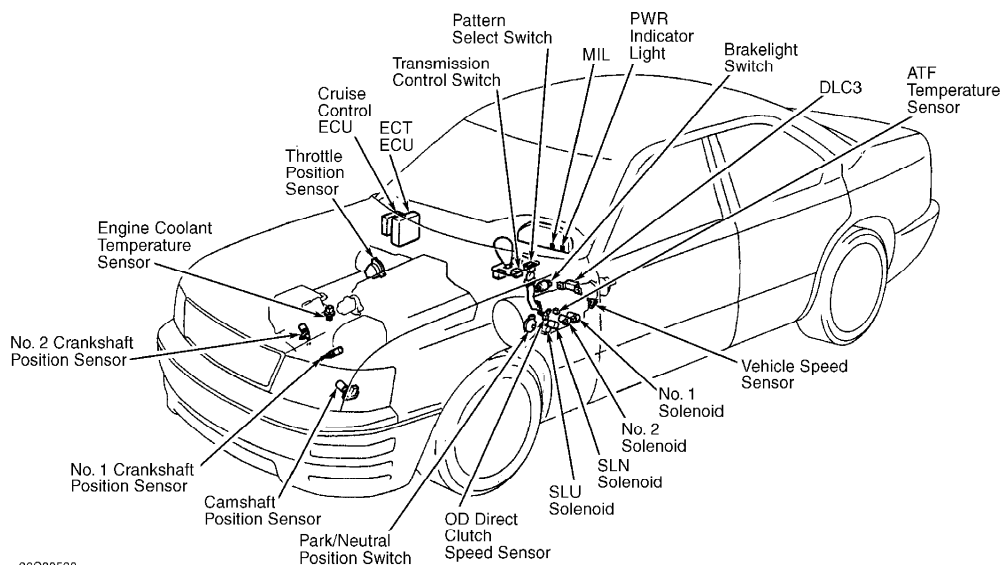
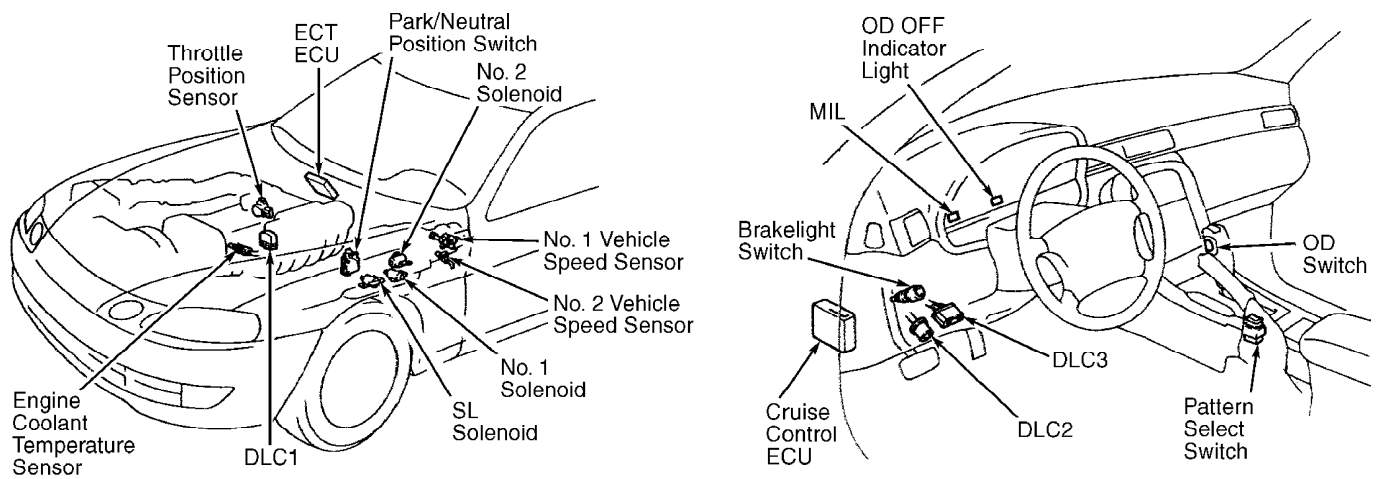
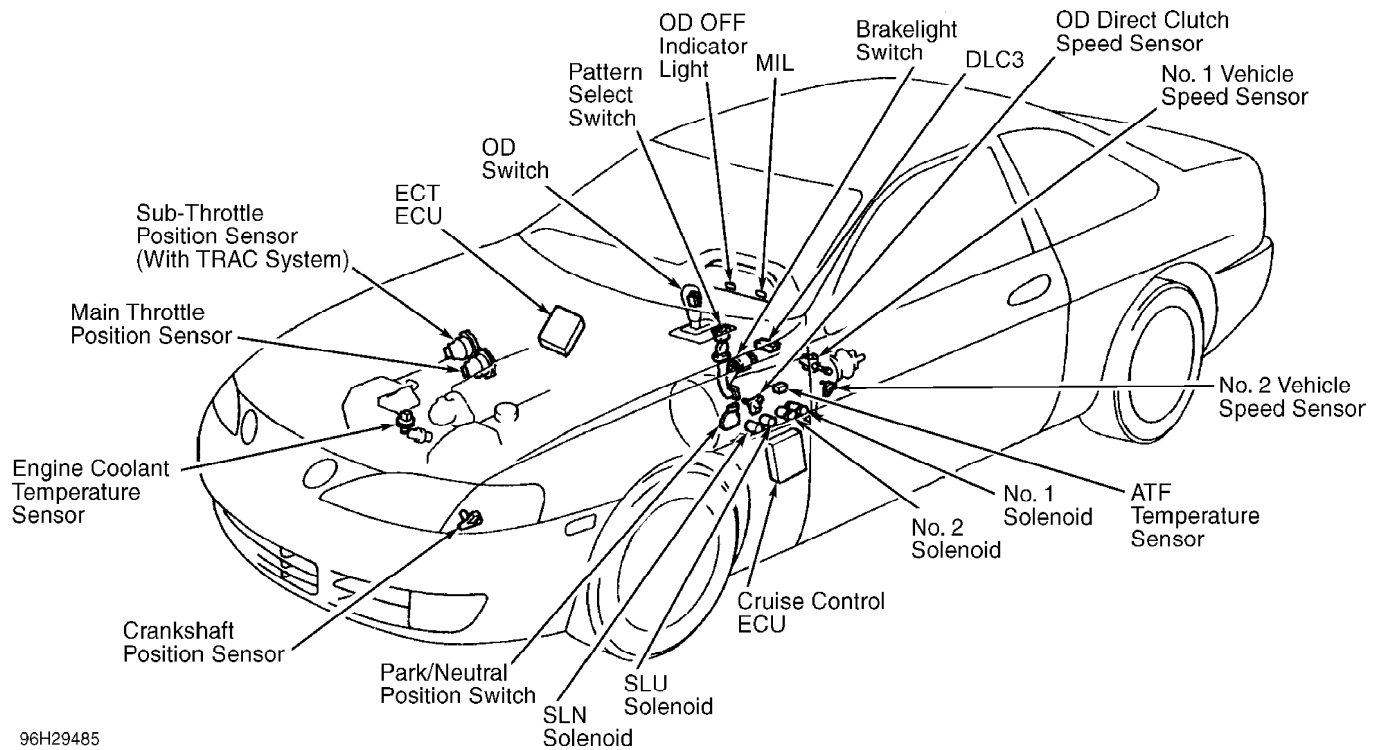


Fig. 1: Identifying Input & Output Devices (1997-98 Lexus LS400)
Courtesy of Toyota Motor Sales, U.S.A.,



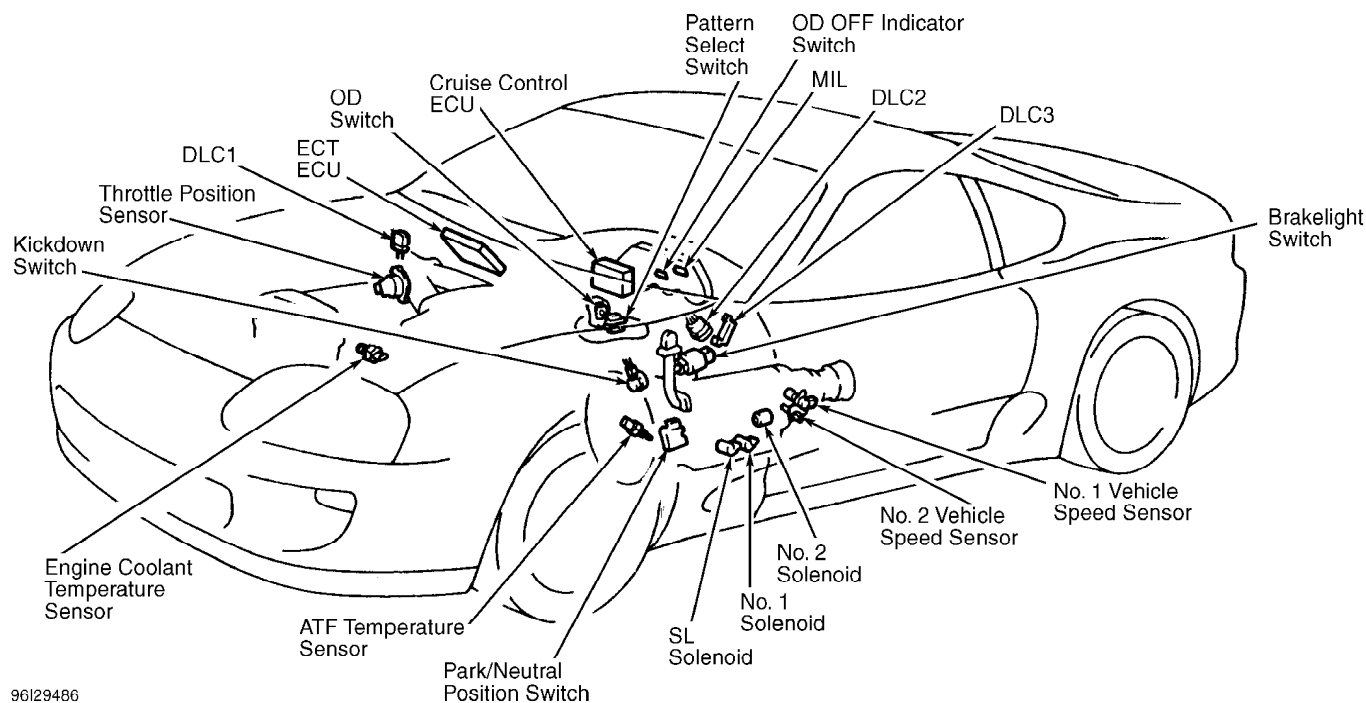
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Fig. 2: Identifying Input & Output Devices (1997-98 Lexus SC300)
Courtesy of Toyota Motor Sales, U.S.A.,

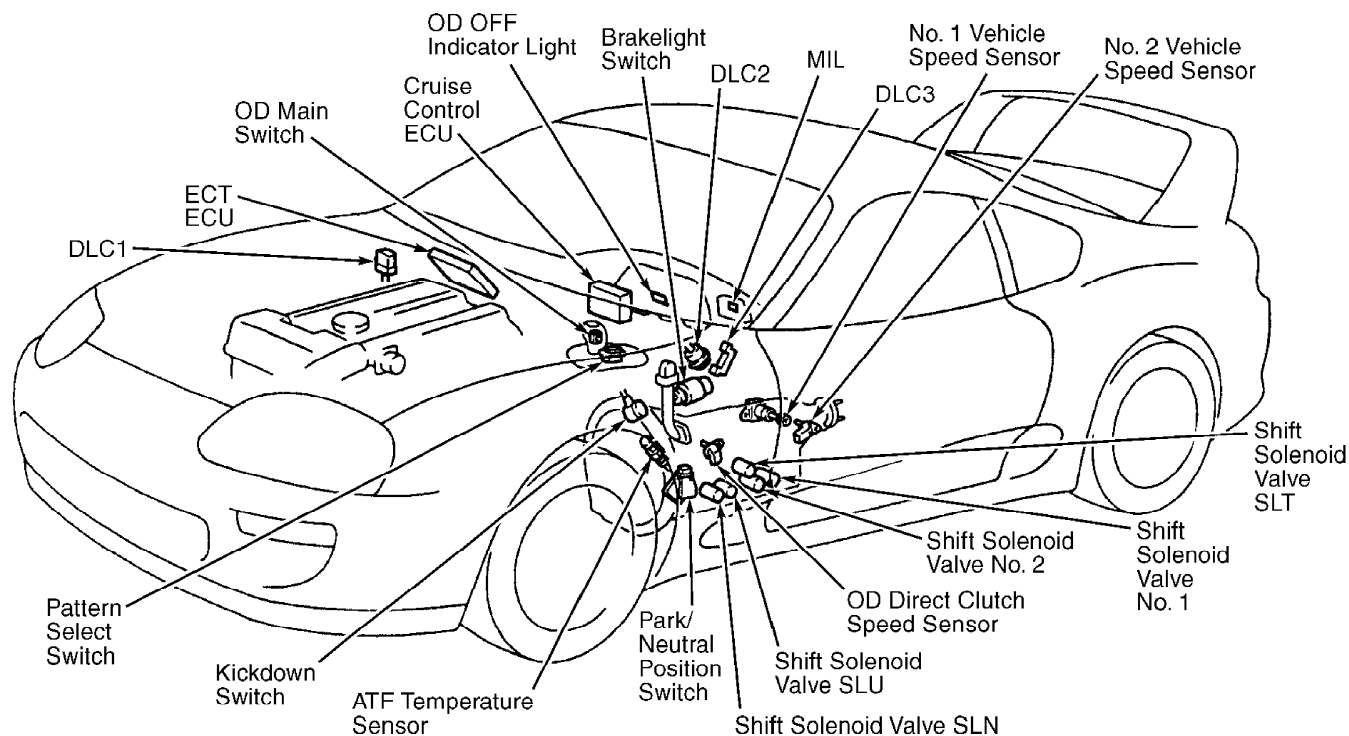


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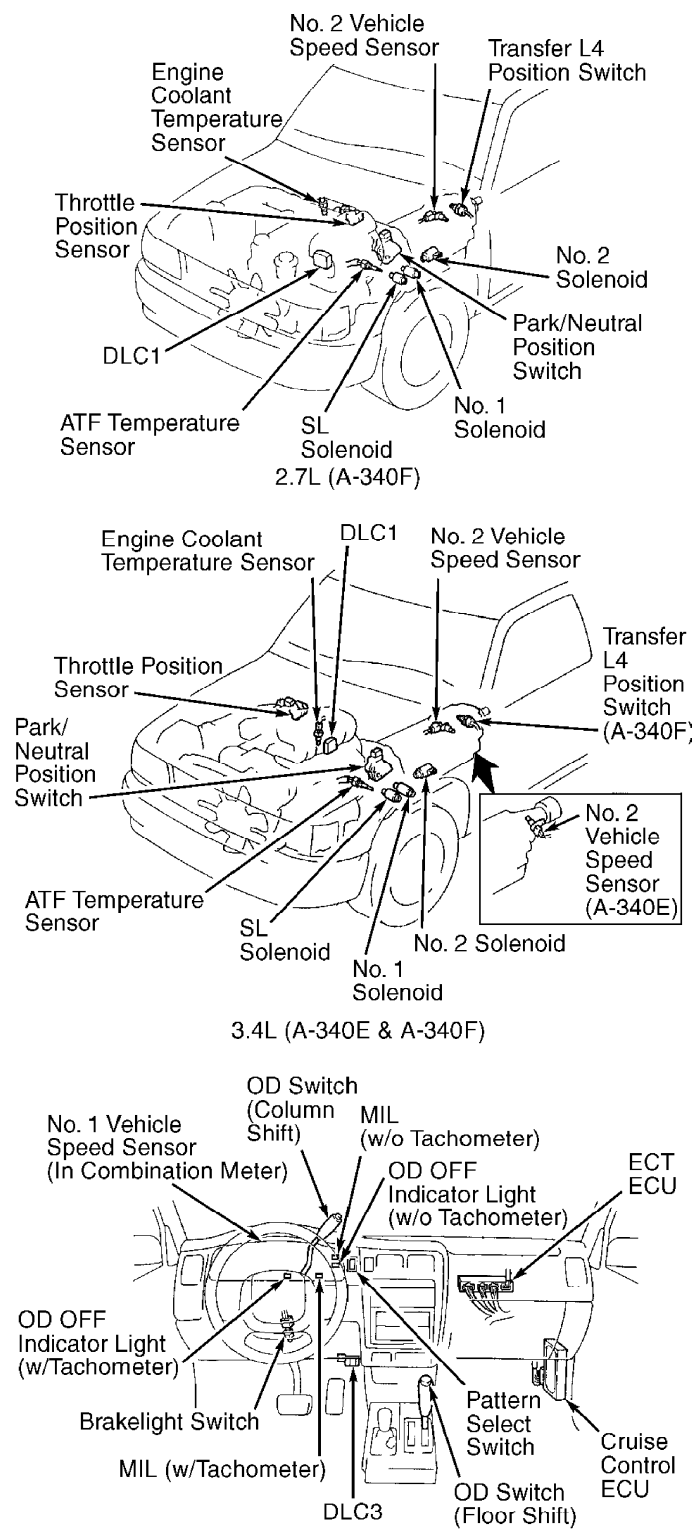
Fig. 3: Identifying Input & Output Devices (1997 Lexus SC400
Shown; 1998 SC300 Is Similar)
Courtesy of Toyota Motor Sales, U.S.A.,



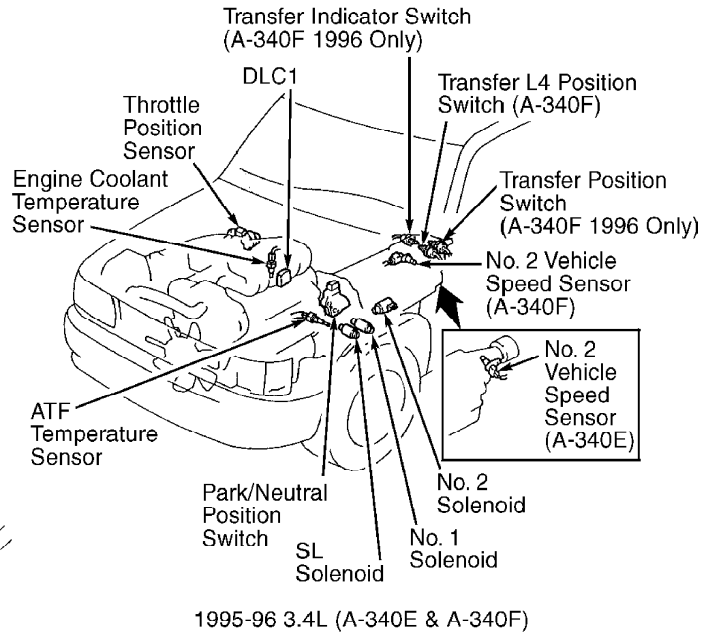
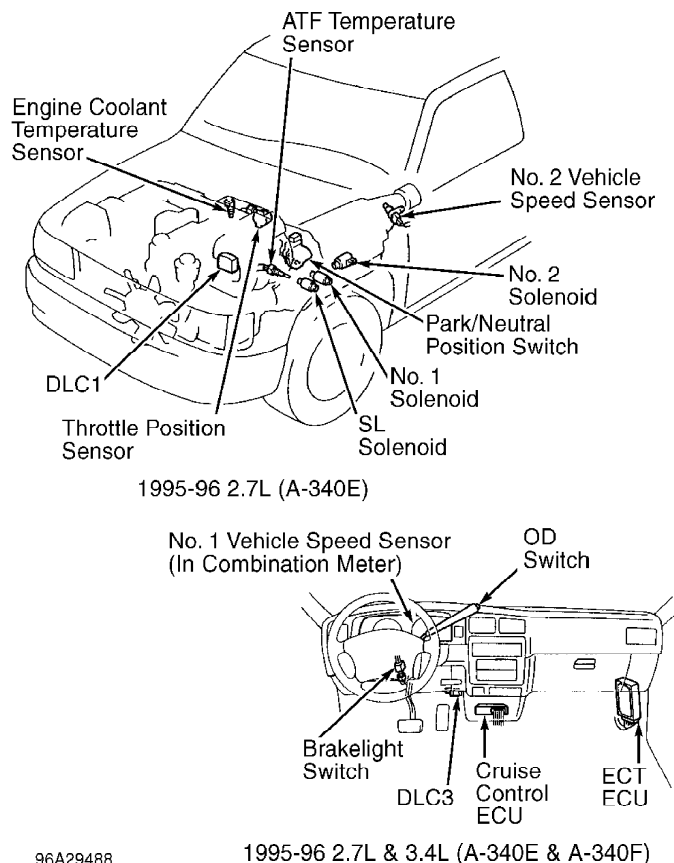
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 Fig. 4: Identifying Input & Output Devices (1997-98 Toyota Supra Non-Turbo)
 Courtesy of Toyota Motor Sales, U.S.A.,



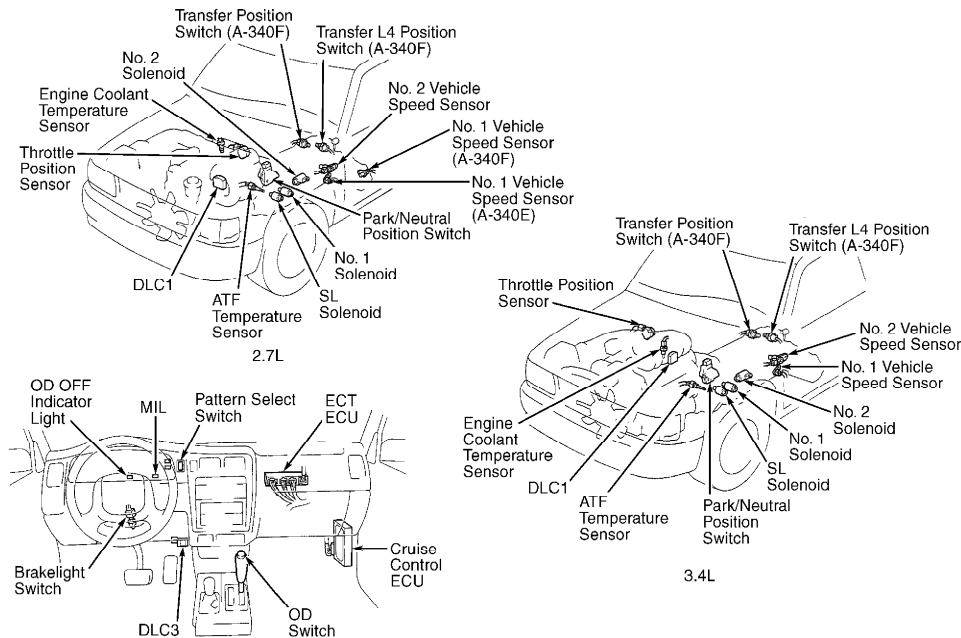
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 Fig. 5: Identifying Input & Output Devices (1997-98 Toyota Supra Turbo)
 Courtesy of Toyota Motor Sales, U.S.A.,



99C05211
 Fig. 6: Identifying Input & Output Devices (1997-98 Toyota Tacoma)
 Courtesy of Toyota Motor Sales, U.S.A.,



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Fig. 7: Identifying Input & Output Devices (1997-98 Toyota T100)
Courtesy of Toyota Motor Sales, U.S.A.,



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Fig. 8: Identifying Input & Output Devices (1997-98 Toyota 4Runner)
Courtesy of Toyota Motor Sales, U.S.A.,

ATF Temperature Sensor

Sensor delivers an input signal to ECT ECU to indicate fluid temperature. Sensor converts fluid temperature into a resistance value. Sensor is located on side of transmission. See Figs. 1-8.

Cruise Control Electronic Control Unit (ECU)

Cruise control ECU delivers an input signal to control overdrive operation in accordance with vehicle speed when cruise control is operating.

Transmission Control Switch (LS400)

Switch delivers an input signal when shift lever is moved from "D" position to "3" position. ECT ECU prohibits transmission from shifting into overdrive when shift lever is in the "3" position. See Fig. 1.

Transfer Position Switch

Switch delivers an input signal to ECT ECU to indicate transfer case gear position. Sensor is located on transfer case rear extension housing. See Figs. 6-8.

"L4" Position Switch

Switch delivers an input signal to ECT ECU to indicate transfer case is in low gear. Switch is located on transfer case extension housing. See Figs. 6-8.

ECT ECU OUTPUT DEVICES

No. 1 & No. 2 Solenoids

ECT ECU controls transmission shifting by delivering an output signal to operate proper solenoid. Solenoids are located on transmission valve body. See Figs. 1-8. Solenoids are operated in accordance with shift lever position. If a solenoid malfunctions, fail-safe gear may be selected. See Fig. 9.

NOTE: In some gears, ECT ECU provides a fail-safe system which will place transmission in designated gear depending on solenoid failure.

Lock-Up Solenoid

ECT ECU controls torque converter lock-up by delivering an output signal to lock-up solenoid. Lock-up solenoid (also called SL or SLU solenoid) is activated when shift lever is in "D" position and vehicle is at specified speed. Lock-up solenoid is located on transmission valve body. See Figs. 1-8.

SLN Solenoid

SLN solenoid controls hydraulic pressure acting on accumulator control valve when transmission shifts and assists in smooth shifting. ECT ECU determines optimum control pressure according to signals from TP sensor, vehicle speed sensor and direct clutch drum speed sensor, and controls volume of current flow to SLN solenoid. Amount of current flow to SLN solenoid is controlled by duty cycle ratio of ECT ECU output signal, causing a momentary change in hydraulic pressure acting on clutches during shifting. When duty cycle ratio is high, pressure is low. SLN solenoid is located on transmission valve body. See Figs. 1, 3 and 5.

Position	NORMAL			NO.1 SOLENOID MALFUNCTIONING			NO.2 SOLENOID MALFUNCTIONING			BOTH SOLENOIDS MALFUNCTIONING
	Solenoid valve		Gear	Solenoid valve		Gear	Solenoid valve		Gear	Gear when shift selector is manually operated
	No.1	No.2		No.1	No.2		No.1	No.2		
D	ON	OFF	1st	×	ON	3rd	ON	×	1st	O/D
	ON	ON	2nd	×	ON	3rd	OFF	×	O/D	O/D
	OFF	ON	3rd	×	ON	3rd	OFF	×	O/D	O/D
	OFF	OFF	O/D	×	OFF	O/D	OFF	×	O/D	O/D
2	ON	OFF	1st	×	ON	3rd	ON	×	1st	3rd
	ON	ON	2nd	×	ON	3rd	OFF	×	3rd	3rd
	OFF	ON	3rd	×	ON	3rd	OFF	×	3rd	3rd
L	ON	OFF	1st	×	OFF	1st	ON	×	1st	1st
	ON	ON	2nd	×	ON	2nd	ON	×	1st	1st

×: Malfunctions

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Fig. 9: Checking No. 1 & No. 2 Solenoid Operation
Courtesy of Toyota Motor Sales, U.S.A.,

MANUAL SHIFT TEST

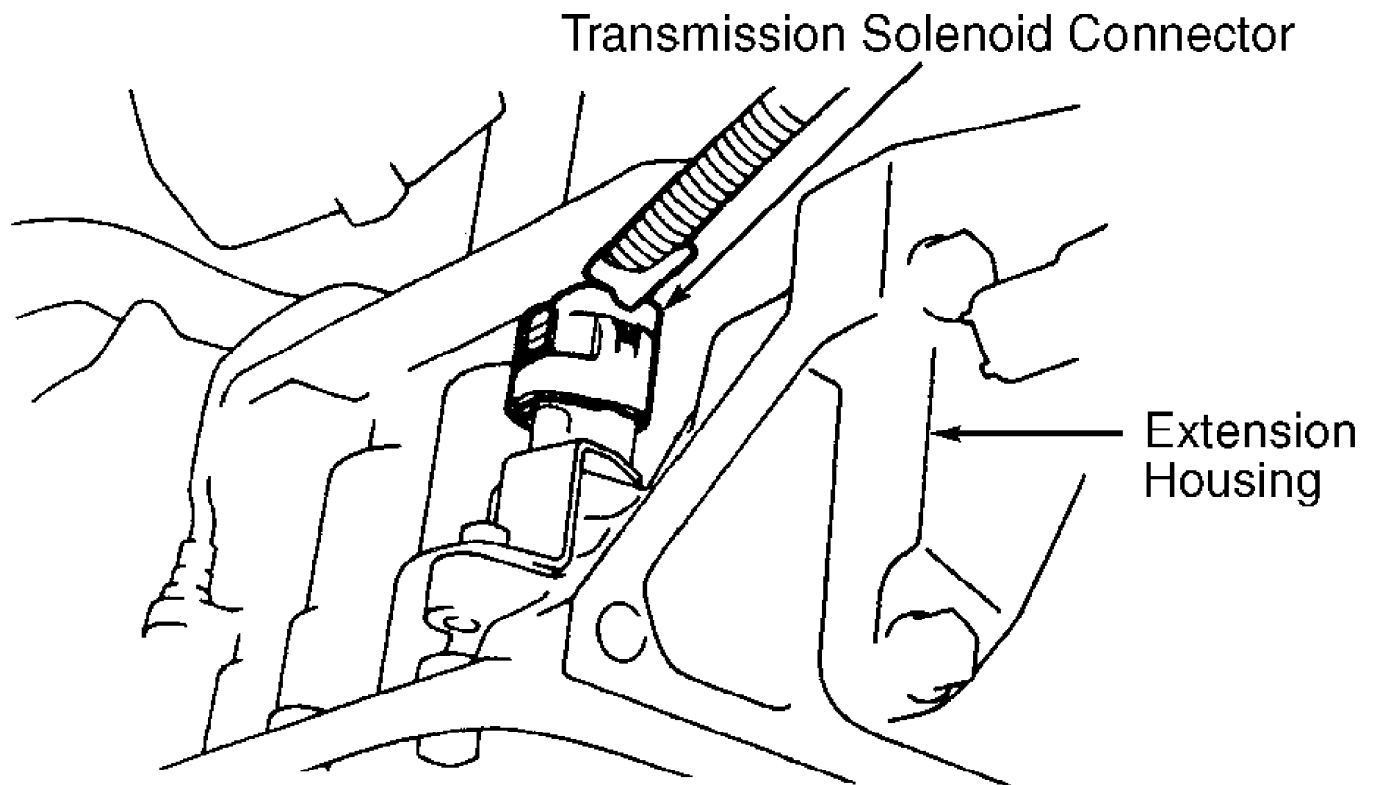
NOTE: Perform manual shift test if no trouble codes exist. Manual shift test determines if problem area is in electrical circuits or a mechanical transmission problem.

1) With ignition off, disconnect electrical connector for solenoids from transmission. See Fig. 10. Road test vehicle and ensure transmission gear changes correspond with shift lever position. See GEAR APPLICATION table.

2) If abnormality exists, a mechanical transmission problem exists. Turn ignition off. Reconnect electrical connector. Clear trouble codes from ECT ECU memory, as disconnecting electrical connector may set a trouble code. See CLEARING TROUBLE CODES under SELF-DIAGNOSTIC SYSTEM.

GEAR APPLICATION

Shift Lever Position	Gear
"D"	Overdrive
"2"	3rd
"L"	1st
"R"	Reverse
"P"	Park



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Fig. 10: Locating Transmission Solenoid Connector
Courtesy of Toyota Motor Sales, U.S.A.,

SELF-DIAGNOSTIC SYSTEM

SYSTEM DIAGNOSIS

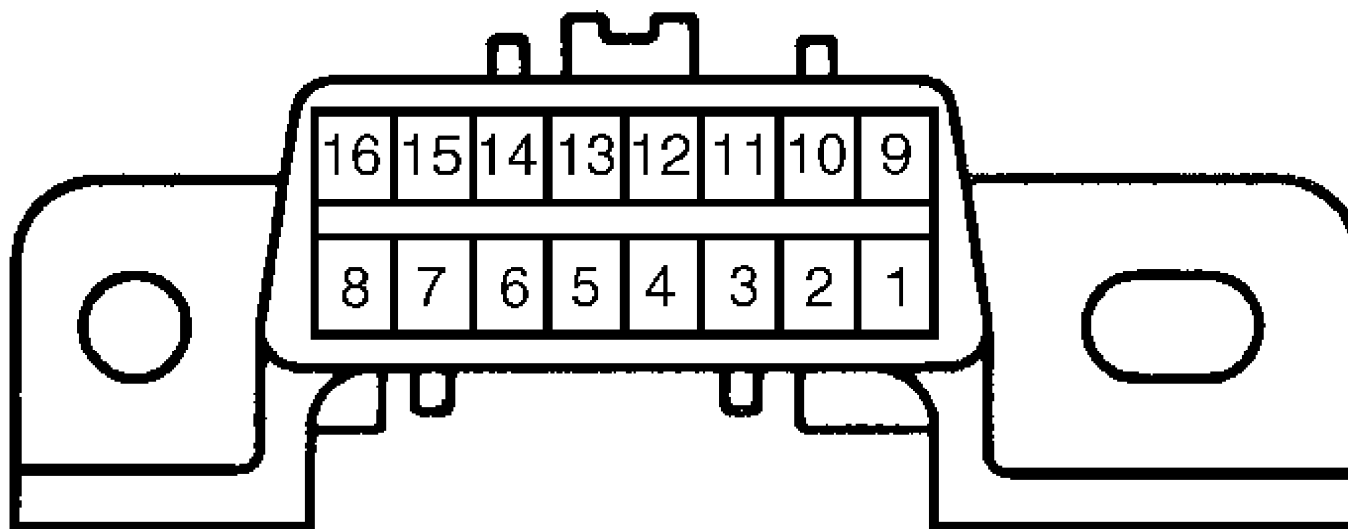
NOTE: Before testing transmission, ensure fluid level is correct and throttle and shift cables are properly adjusted. Ensure engine starts with shift lever in "P" (Park) and "N" (Neutral) to ensure proper adjustment of park/neutral position switch. Transmission must first be tested by checking for stored trouble codes. See RETRIEVING TROUBLE CODES.

ECT ECU monitors engine and transmission operation and contains a self-diagnostic system which stores Diagnostic Trouble Codes (DTC). A Malfunction Indicator Light (MIL), also called CHECK ENGINE light, located on instrument panel, will illuminate if a system or component fails and sets a DTC.

MIL illuminates with ignition switch in ON position, engine off (KOEO). Once engine is started, MIL should go out. If MIL remains illuminated, ECT ECU has detected a malfunction or abnormality in system. If MIL does not illuminate, inspect circuit and light. See WIRING DIAGRAMS.

If malfunction does not reoccur in 3 trips, MIL goes off, but Diagnostic Trouble Code (DTC) remains recorded in ECT ECU memory. Trouble codes may only be retrieved using an appropriate scan tool or Lexus/Toyota scan tool connected to 16-pin Data Link Connector (DLC3), located at lower left corner of instrument panel or below parking brake handle. Scan tool provides freeze-frame data and can be used to clear trouble codes.

ECT ECU records engine operating condition (fuel system, calculated load, coolant temperature, fuel trim (mixture), engine speed, vehicle speed, etc.) with 1st malfunction ONLY. Information is ONLY for 1st recorded failure, even if more than one code has been recorded. Freeze-frame data is only updated when all trouble codes have been cleared, or a misfire or fuel-trim malfunction has occurred.



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Fig. 11: Identifying Data Link Connector (DLC3) Terminals
Courtesy of Toyota Motor Sales, U.S.A.,

RETRIEVING TROUBLE CODES

NOTE: Before retrieving trouble codes, ensure sufficient battery voltage exists for proper self-diagnosis system operation. Ensure proper operation of MIL light.

NOTE: MIL will illuminate for all trouble codes except DTC P1765.

NOTE: For additional engine performance or other system related trouble codes present that are not listed in the DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION table, see appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE section.

ECT ECU Codes

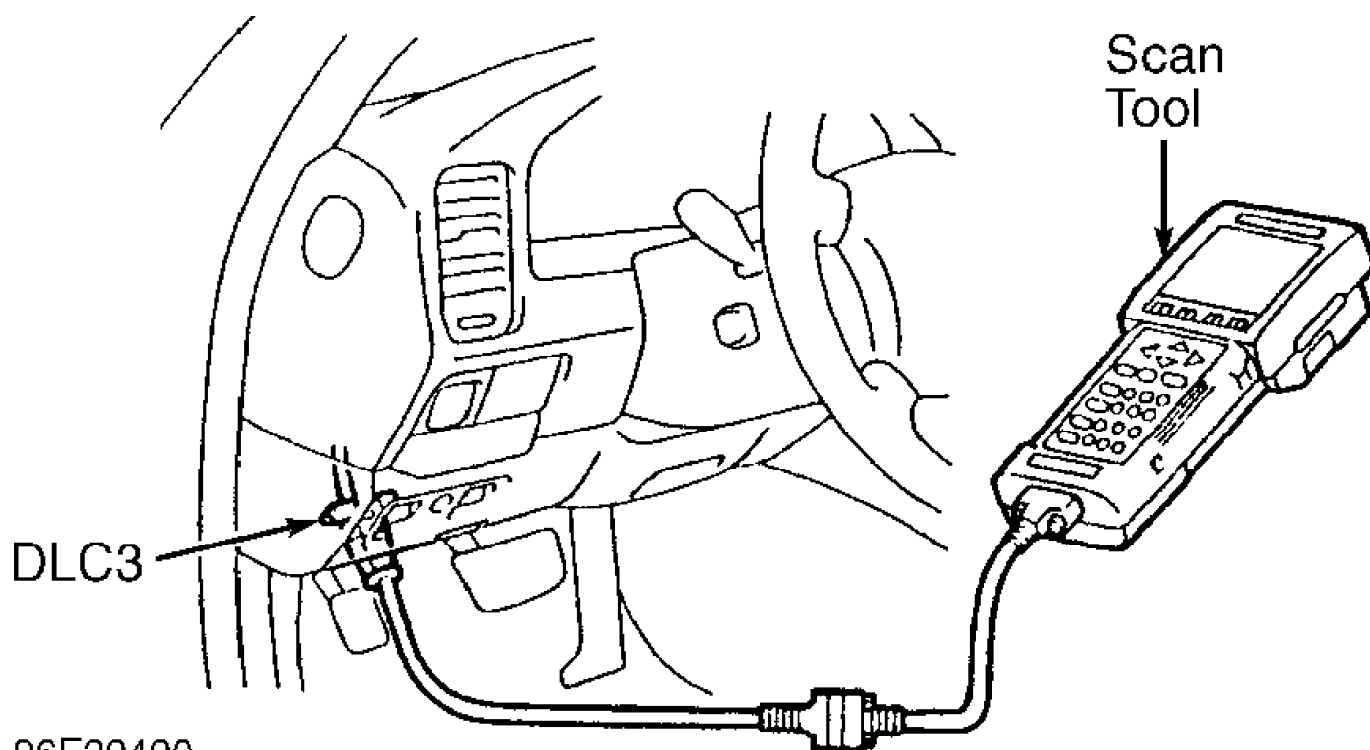
1) Connect scan tool to Data Link Connector (DLC3). DLC3 is located at lower left corner of instrument panel or below parking brake handle. See Figs. 12 and 13.

2) Turn ignition on. Turn on scan tool. Retrieve any trouble codes stored in memory following scan tool instructions. See DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION table.

3) Trouble codes recorded may not have illuminated MIL. When certain malfunctions or trouble codes initially occur, they will be temporarily stored in ECT ECU memory, but MIL will not illuminate.

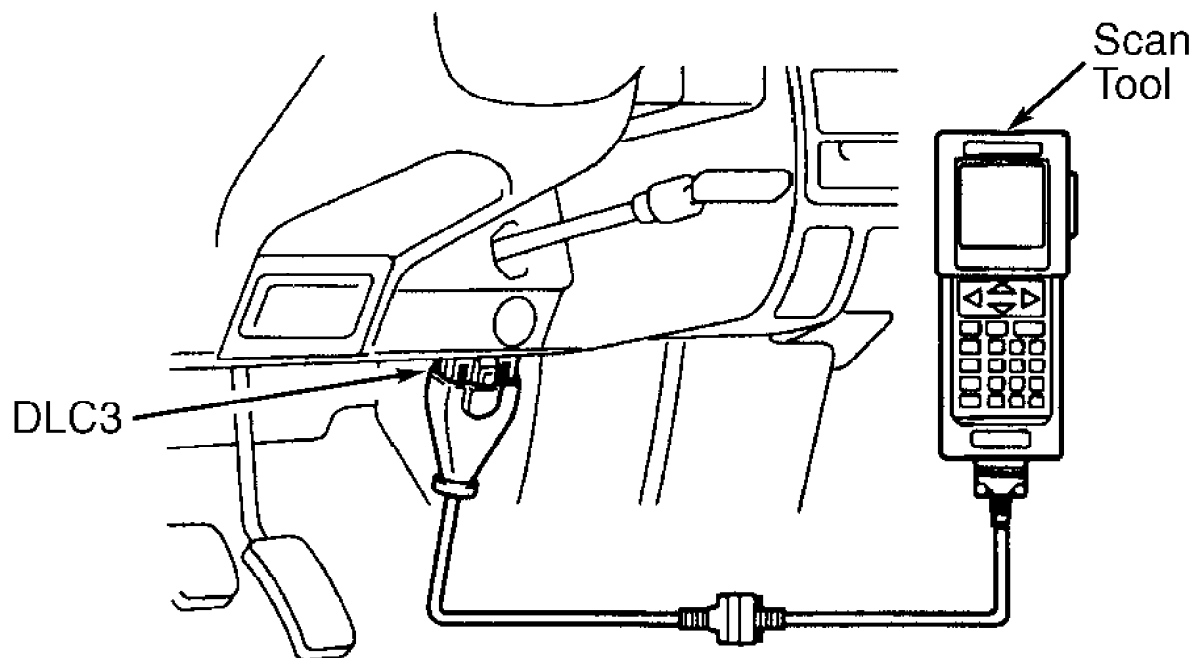
4) Second time malfunction or trouble code is detected, MIL will illuminate, provided ignition is turned off and then back on after malfunction or trouble code was first detected. This process is referred to as 2 trip detection logic and only applies to specific trouble codes.

5) Record freeze-frame data. If using Lexus/Toyota scan tool, ensure tool is in NORMAL mode. CHECK MODE will erase all codes.



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Fig. 12: Connecting Scan Tool To Data Link Connector (DLC3) Lexus LS400, SC300, SC400 & Supra
 Courtesy of Toyota Motor Sales, U.S.A.,



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Fig. 13: Connecting Scan Tool To Data Link Connector (DLC3) Tacoma, T100 & 4Runner
 Courtesy of Toyota Motor Sales, U.S.A.,

DTC	(1) Probable Cause
P0500	No. 1 Vehicle Speed Sensor
P0710	ATF Temperature Sensor
P0715	(3) OD Direct Clutch Speed Sensor
P0720	No. 1 Vehicle Speed Sensor
P0750	No. 1 Solenoid
P0753	No. 1 Solenoid Circuit
P0755	No. 2 Solenoid
P0758	No. 2 Solenoid Circuit
P0770	(2) Lock-Up Solenoid
P0773	Lock-Up Solenoid Circuit
P1520	Brakelight Switch Circuit
P1700	No. 2 Vehicle Speed Sensor Circuit
P1755	(3) SLU Solenoid Circuit
P1755	(3) SLT Solenoid Circuit
P1765	(3) SLN Solenoid Circuit
P1780	Park/Neutral Position Switch

- (1) - Check listed component for probable cause. Check wiring and connections of specified component.
 (2) - Also called SL or SLU solenoid.
 (3) - LS400, SC400 and Supra.
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CLEARING TROUBLE CODES

Once repairs have been performed, trouble codes must be cleared from ECT ECU memory. DTCs may be cleared by following methods:

- * Scan tool (follow manufacturer's instructions).
- * Remove EFI fuse (15-amp) from engine compartment relay box on left fender panel, for 10 seconds or more to clear memory in ECT ECU.
- * Disconnect negative battery cable (memory for electronic components will be also be canceled).

DIAGNOSTIC TESTS

When trouble shooting transmission, first check for stored trouble codes and repair as necessary. If no trouble codes exist, perform manual shift test to determine if problem area is in electrical circuits or a mechanical transmission problem. See MANUAL SHIFT TEST.

NOTE: On Lexus SC300, SC400 and Supra (with 3-connector ECT ECU), manufacturer recommends using Check Harness (09990-0100) connected to ECT ECU when performing circuit tests at ECT ECU harness connector. Harness connects between ECT ECU terminals and ECT ECU harness connector. Check harness test terminals are same as ECT ECU harness connector terminals. For ECT ECU locations, see Figs. 2-5.

NOTE: For wire color and circuit identification, see WIRING DIAGRAMS.

NOTE: For additional circuit and component information not covered in WIRING DIAGRAMS, see appropriate WIRING DIAGRAMS article in ENGINE PERFORMANCE section.

DTC P0500: NO. 1 VEHICLE SPEED SENSOR (VSS) FAULT

Circuit Description

On all models except LS400, SC300, SC400 and Supra, No. 1 Vehicle Speed Sensor (VSS), driven by transmission output shaft, outputs a pulse signal to combination meter. Combination meter converts signal to a more precise waveform for ECT ECU. On SC300, SC400 and Supra, VSS outputs a pulse signal for every revolution of the rotor, which is driven by transmission output shaft. Signal is used by ECT ECU to determine vehicle speed. DTC is set when ECT ECU does not detect any signal while vehicle is in motion. Possible causes are:

- * Open or short in vehicle speed sensor circuit.
- * No. 1 VSS failure.
- * Combination meter malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure (LS400, 1998 SC300 & 1998 Supra Non-Turbo)

1) Test drive vehicle and determine if speedometer is functioning properly. If speedometer is okay, go to next step. If speedometer is not functioning, go to NO. 1 VEHICLE SPEED SENSOR under COMPONENT TESTS.

2) Gain access to ECT ECU. See Fig. 1. Disconnect appropriate ECT ECU connector. Using DVOM, measure resistance between ECT ECU terminals SP2+ and SP2-. See ECT ECU VOLTAGES under CIRCUIT TESTS. If resistance is 560-680 ohms, replace ECT ECU and retest. If resistance is not 560-680 ohms, test speed sensor. See NO. 1 VEHICLE SPEED SENSOR under COMPONENT TESTS. Replace as necessary. If sensor is okay, check and repair circuits between ECT ECU and speed sensor. See WIRING DIAGRAMS.

1997 SC300 & SC400

1) Test drive vehicle and determine if speedometer is functioning properly. If speedometer is okay, go to next step. If speedometer is not functioning, see appropriate INSTRUMENT PANELS article in ACCESSORIES & EQUIPMENT section.

2) Raise and support vehicle. Shift transmission into Neutral. Access ECT ECU harness connector and install check harness. See Figs. 2 and 3. Disconnect cruise control ECU connector. Disconnect Blue power steering ECU 6-pin connector, located behind instrument panel, to right of center console.

3) Turn ignition on. Using DVOM, measure voltage between ground and check harness terminal SPD (terminal No. 2 on connector E11), while rotating rear wheel. See ECT ECU VOLTAGES under CIRCUIT TESTS. If voltage is not 4.5-5.5 volts, check and repair open circuit between combination meter and ECT ECU. If voltage is as specified, replace ECT ECU and retest.

Supra Turbo & 1997 Non-Turbo

1) Test drive vehicle and determine if speedometer is functioning properly. If speedometer is okay, go to next step. If speedometer is not functioning, see NO. 1 VEHICLE SPEED SENSOR (VSS) under COMPONENT TESTS.

2) Raise and support vehicle. Shift transmission into Neutral. Access ECT ECU harness connector and install check harness. Disconnect cruise control ECU connector. See Figs. 4 and 5. Disconnect Blue power steering ECU 6-pin connector, located behind instrument panel, at right kick panel.

3) Turn ignition on. Using DVOM, measure voltage between ground and check harness terminal SP1, while rotating rear wheel. See ECT ECU VOLTAGES under CIRCUIT TESTS. If voltage is not 4.5-5.5 volts, check and repair open circuit between combination meter and ECT ECU.

See WIRING DIAGRAMS. If voltage is as specified, replace ECT ECU and retest.

Tacoma, T100 & 4Runner

1) Test drive vehicle and determine if speedometer is functioning properly. If speedometer is okay, go to next step. If speedometer is not functioning, go to NO. 1 VEHICLE SPEED SENSOR (VSS) under COMPONENT TESTS.

2) Gain access to ECT ECU. See Figs. 6-8. Disconnect ECT ECU connector. Disconnect cruise control ECU (if applicable). Raise and support vehicle. Shift transmission into Neutral. Turn ignition on. Using DVOM, measure voltage between ECT ECU terminal SP1 and ground while rotating rear wheel. See ECT ECU VOLTAGES under CIRCUIT TESTS. If voltage is not 4.5-5.5 volts and generated intermittently, check and repair open circuit between combination meter and ECT ECU. See WIRING DIAGRAMS. If voltage is 4.5-5.5 volts and generated intermittently, replace ECT ECU and retest.

DTC P0710: ATF TEMPERATURE SENSOR

Circuit Description

ATF temperature sensor converts fluid temperature into a resistance value which is input to ECT ECU. DTC is set when temperature sensor resistance is less than 79 ohms, or after engine has been operating for 15 minutes or more, temperature sensor resistance is more than 156 k/ohms. Either condition must be set for .5 second or more. Possible causes are:

- * Open or short in ATF temperature sensor circuit.
- * ATF temperature sensor malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Raise and support vehicle. Disconnect ATF temperature sensor connector. Remove sensor. On LS400, SC300, SC400 and Supra, sensor is part of internal transmission harness. See TOYOTA A-340 & A-350 SERIES OVERHAUL article. Connect ohmmeter leads between sensor terminals. See WIRING DIAGRAMS.

2) On all models, submerge sensor in water. Heat water while measuring sensor resistance. See ATF TEMPERATURE SENSOR RESISTANCE table. If resistance is not as specified, replace sensor. If resistance is as specified, inspect and repair wiring harness circuits between sensor and ECT ECU. If circuits are okay, replace ECT ECU.

ATF TEMPERATURE SENSOR RESISTANCE

Application & Temperature	Ohms
LS400, SC300, SC400 & 1998 Supra Non-Turbo	
50°F (10°C)	6500
230°F (110°C)	300
Supra (Except 1998 Supra Non-Turbo)	
68°F (20°C)	12,080
230°F (110°C)	780
Tacoma & 4Runner	
68°F (20°C)	4,290
230°F (110°C)	690
T100	
68°F (20°C)	13,000
230°F (110°C)	800

DTC P0715: OD DIRECT CLUTCH SPEED SENSOR

Circuit Description

OD direct clutch speed sensor, located at left front side of transmission near torque converter housing, detects OD input shaft RPM from rotation of OD direct clutch drum. By comparing OD direct clutch speed signal and vehicle speed sensor signal, ECT ECU detects shift timing of gears and controls engine torque and hydraulic pressure in response to various conditions. This assists in smooth shifting. DTC is set when gear change cannot be performed, gear position is 1st, 2nd or 3rd, output shaft RPM is 1000 RPM or more, input shaft RPM is 300 RPM or less, speed sensor operation is normal, and No. 1, No. 2 and SLU solenoid operation is normal. All conditions must be set for 5 seconds or more. Possible causes are:

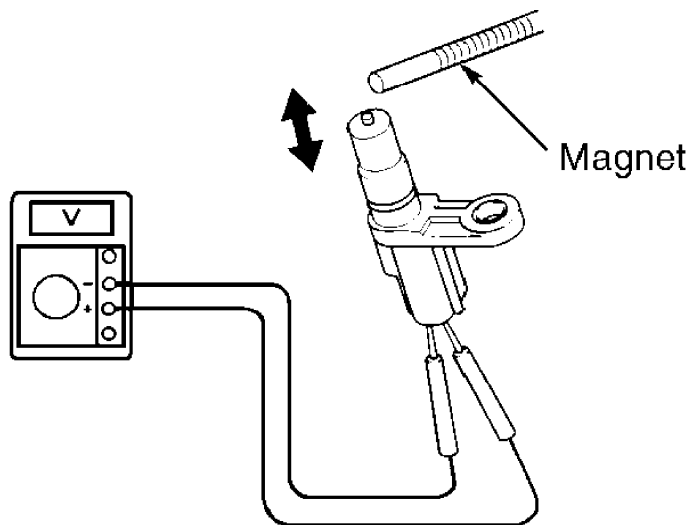
- * Open or short in OD direct clutch speed sensor circuit.
- * OD direct clutch speed sensor malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Ensure ignition is off. Access ECT ECU. Disconnect ECT ECU harness connector and install check harness to ECT ECU harness connector (if applicable). DO NOT connect check harness to ECT ECU. Using ohmmeter, measure resistance between terminal NCO+ and terminal NCO- at check harness. See ECT ECU VOLTAGES under CIRCUIT TESTS. Resistance should be 560-680 ohms. If resistance is within specification, replace ECT ECU. If resistance is not within specification, go to next step.

2) Remove OD direct clutch speed sensor from transmission. Measure resistance between sensor terminals. Resistance should be 560-680 ohms. If resistance is not as specified, replace sensor. If resistance is as specified, check and repair circuits between sensor and ECT ECU.

3) Check voltage between sensor terminals when a magnet is put close to tip of speed sensor. See Fig. 14. If a low intermittent voltage is generated, sensor is okay. If no voltage is generated, replace speed sensor.



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Fig. 14: Testing Speed Sensors
Courtesy of Toyota Motor Sales, U.S.A.,

DTC P0720: NO. 1 VEHICLE SPEED SENSOR FAULT

Circuit Description

No. 1 Vehicle Speed Sensor (VSS), (also called output speed sensor), is mounted in combination meter. Sensor contains a magnet which is rotated by speedometer cable. Reed switch in speed sensor is turned on and off 4 times for every revolution of speedometer. Signal is transmitted to ECT ECU. ECT ECU determines vehicle speed based on frequency of pulse signals. DTC is set when ECT ECU detects one or more of the following 500 times continuous: When no No. 1 vehicle speed sensor signal is received after 16 pulses of No. 2 vehicle speed sensor. Vehicle speed is 5.6 MPH or more for at least 4 seconds, and transmission and transfer case are in any shift lever position except Park and Neutral. Possible causes are:

- * Open or short in vehicle speed sensor circuit.
- * No. 1 VSS failure.
- * Combination meter malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Test drive vehicle and determine if speedometer is functioning properly. If speedometer is okay, go to next step. If speedometer is not functioning, go to NO. 1 VEHICLE SPEED SENSOR under COMPONENT TESTS.

2) Disconnect cruise control ECU. Raise and support vehicle. Shift transmission into Neutral. Turn ignition on. Using DVOM, measure voltage between ECT ECU terminal SP1 and ground while rotating rear wheel. See ECT ECU VOLTAGES under CIRCUIT TESTS. If voltage is not 4-6 volts and generated intermittently, check and repair open circuit between combination meter and ECT ECU. See WIRING DIAGRAMS. If voltage is 4-6 volts and generated intermittently, replace ECT ECU and retest.

DTC P0750 & P0755: NO. 1 & NO. 2 SOLENOID FAULT

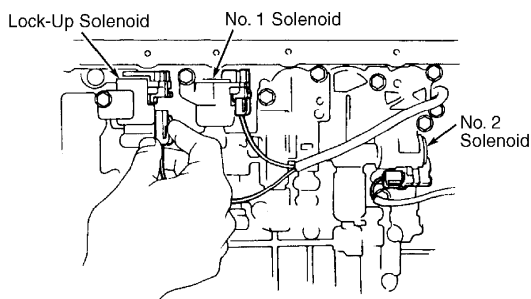
Circuit Description

ECT ECU uses signal from No. 1 vehicle speed sensor to determine actual gear position. ECT ECU compares actual gear with shift schedule in memory to detect mechanical trouble of solenoids and/or valve body. DTC is set if during normal driving, gear required by ECT ECU does not match actual gear after 2 trips have been completed. Possible causes are:

- * No. 1 and/or No. 2 solenoid is stuck open or closed.
- * Valve body is clogged or valve(s) is stuck.

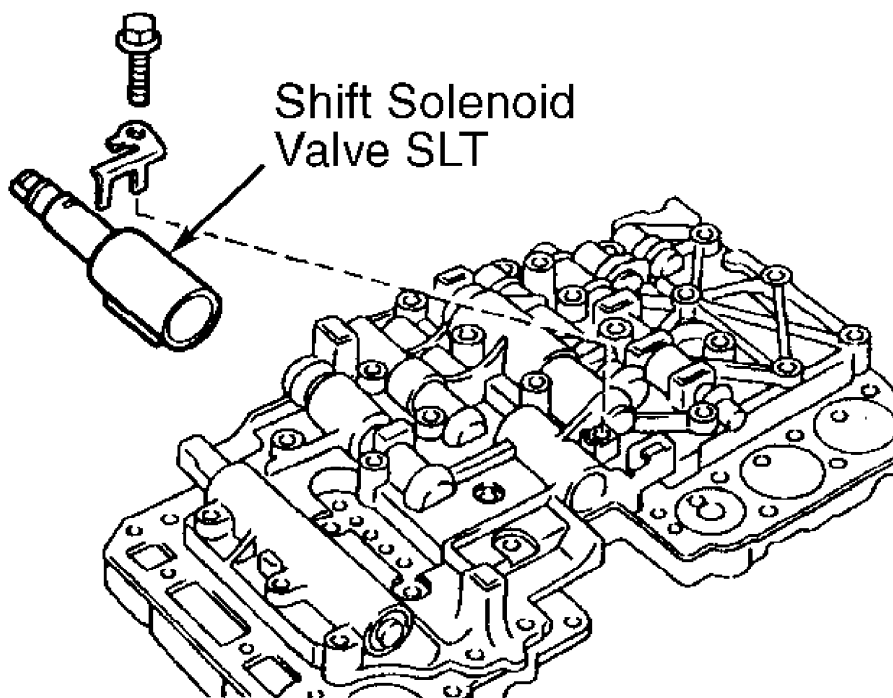
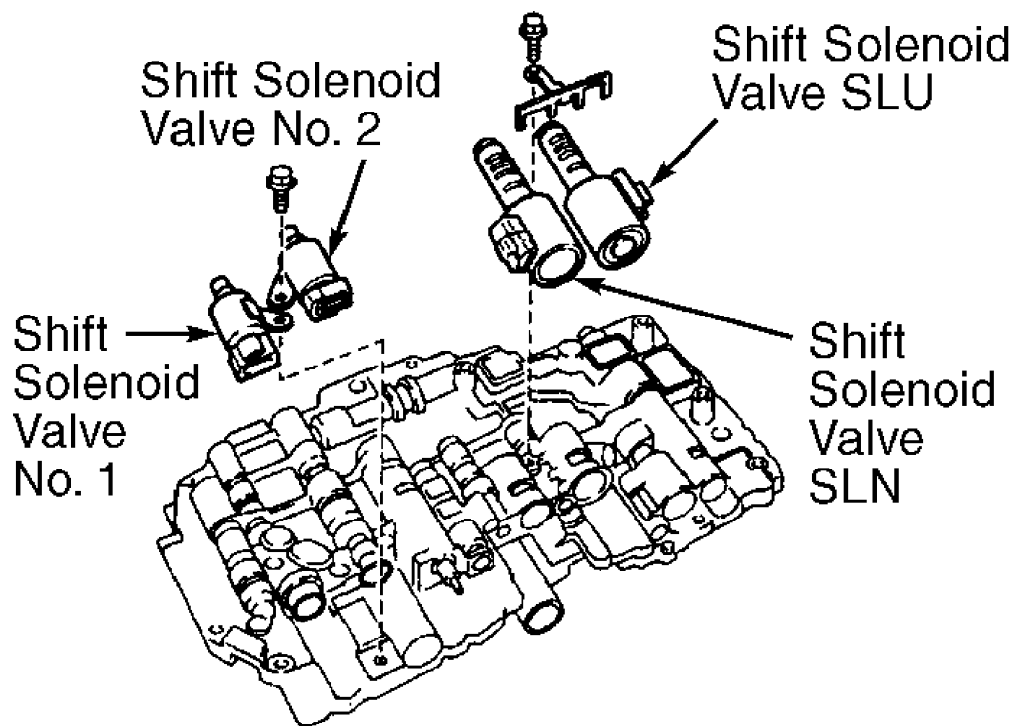
Diagnosis & Repair Procedure

Remove suspect solenoid. Inspect operation of solenoids. See appropriate solenoid test under COMPONENT TESTS. If solenoids are okay, inspect valve body. See TOYOTA A-340 & A-350 SERIES OVERHAUL article.



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Fig. 15: Locating Shift Solenoids (Tacoma, T-100 & 4Runner)
Courtesy of Toyota Motor Sales, U.S.A.,



99A05229

Fig. 16: Locating Shift Solenoids (Except Tacoma, T-100 & 4Runner)
 Courtesy of Toyota Motor Sales, U.S.A.,

DTC P0753 & P0758: NO. 1 & NO. 2 SOLENOID CIRCUIT

Circuit Description

Shifting is performed in combination with ON and OFF position of shift solenoids controlled by ECT ECU. If an open or short circuit occurs in any shift solenoid, ECT ECU reverts to fail-safe mode. See Fig. 9. ECT ECU turns lock-up (also called SL or SLU) solenoid off at same time. DTCs are output when a open or short circuit occurs. Possible causes are:

- * No. 1 and/or No. 2 solenoid circuit.
- * No. 1 and/or No. 2 solenoid malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Ensure ignition is off. Access ECT ECU. See Figs. 1-8. On LS400, SC300, SC400 and Supra, disconnect ECT ECU harness connector and install check harness on wiring harness connector. DO NOT connect check harness to ECT ECU. On all other models, disconnect appropriate ECT ECU connector. On all models, measure resistance between ground and terminal S1 and/or S2 at check harness or ECT ECU connector. See ECT ECU VOLTAGES under CIRCUIT TESTS. If resistance is 11-15 ohms, replace ECT ECU and retest. If resistance is not within specification, go to next step.

2) Disconnect transmission solenoid harness connector. See Fig. 10. Check continuity between terminal S1 and/or S2 of transmission harness connectors and corresponding terminal of check harness or ECT ECU. See ECT ECU VOLTAGES under CIRCUIT TESTS. If continuity exists for all circuits, go to next step. If continuity does not exist for any circuit, inspect and repair circuit(s) as needed.

3) Measure resistance between transmission connector terminal S1 and/or S2 and ground. See ECT ECU VOLTAGES under CIRCUIT TESTS. If resistance is 11-15 ohms, replace solenoid. If resistance is not as specified, replace transmission sub-harness as needed.

DTC P0770: LOCK-UP (SL/SLU) SOLENOID

Circuit Description

ECT ECU uses signals from throttle position sensor, airflow meter and crankshaft position sensor to monitor engagement of Torque Converter Clutch (TCC). ECT ECU compares engagement condition of TCC with lock-up schedule in memory to detect mechanical trouble of lock-up solenoid, valve body and torque converter. DTC is set when TCC lock-up does not occur during appropriate speed, or lock-up does not release at appropriate speed. Possible causes are:

- * Lock-up solenoid is stuck open or closed.
- * Valve body clogged or valve stuck.
- * TCC malfunction.

Diagnosis & Repair Procedure (LS400, SC300, SC400 & Supra)

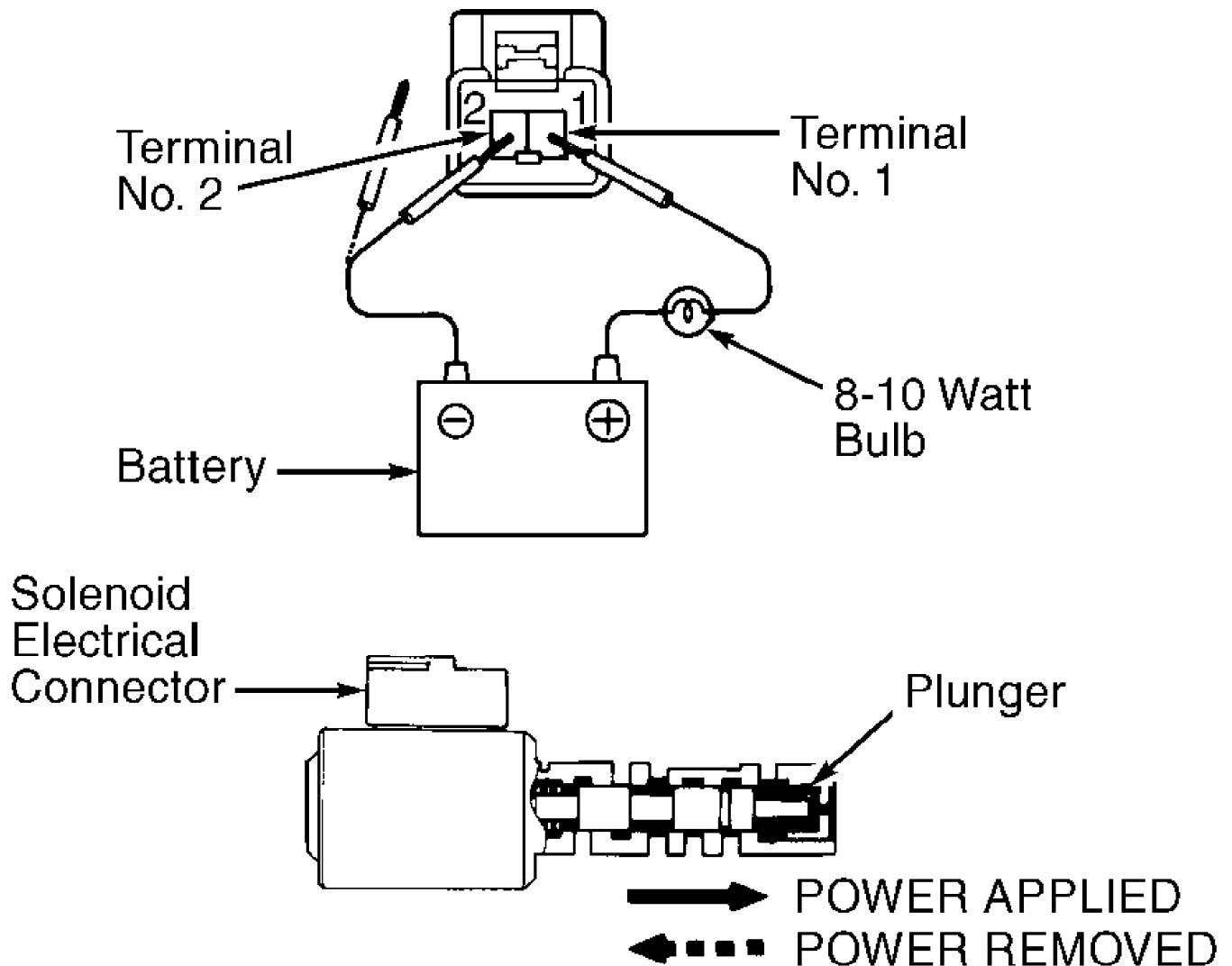
1) Connect a jumper wire with an 8-10 watt bulb in series between battery positive terminal and lock-up solenoid terminal No. 1. Connect another jumper wire between battery negative terminal and lock-up solenoid terminal No. 2. See Fig. 17.

2) Solenoid plunger should move away from solenoid electrical connector. Remove jumper wire from solenoid terminal No. 2. Solenoid plunger should move back toward solenoid electrical connector. If solenoid plunger responds properly, go to next step. If solenoid plunger does not respond, replace lock-up solenoid and retest.

3) If solenoid plunger responds properly, check and repair valve body as necessary. See TOYOTA A-340 & A-350 SERIES OVERHAUL article. If solenoid plunger does not respond properly, replace lock-up solenoid.

Diagnosis & Repair Procedure (Except LS400, SC300, SC400 & Supra)

Remove and inspect operation of solenoid. See LOCK-UP SOLENOID under COMPONENT TESTS. If solenoid is okay, inspect valve body. See TOYOTA A-340 & A-350 SERIES OVERHAUL article.



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Fig. 17: Testing Lock-Up, SLN & SLT Solenoid (LS400, SC300, SC400 & Supra)

Courtesy of Toyota Motor Sales, U.S.A.,

DTC P0773: LOCK-UP (SL/SLU) SOLENOID CIRCUIT

Circuit Description

Lock-up solenoid is turned on and off by signals from ECT ECU to control hydraulic pressure affecting lock-up relay valve. Lock-up relay valve controls operation of Torque Converter Clutch (TCC). If ECT ECU detects a malfunction, fail-safe function is enabled. See Fig. 11. DTC is output when an open or short circuit occurs. Possible causes are:

- * Lock-up solenoid open or short circuit.

- * Lock-up solenoid malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Ensure ignition is off. Access ECT ECU. Disconnect ECT ECU harness connector. Backprobing ECT ECU harness connector with ohmmeter, measure resistance between terminal SL and ground. See ECT ECU VOLTAGES under CIRCUIT TESTS. If resistance is 11-15 ohms, replace ECT ECU and retest. If resistance is not within specification, go to next step.

2) Disconnect solenoid harness connector at transmission. Check continuity between terminal SL of transmission harness connector and corresponding terminal of ECT ECU harness connector. See ECT ECU VOLTAGES under CIRCUIT TESTS.

3) If continuity does not exist, check and repair circuit as needed. If continuity exists, measure resistance between transmission connector terminals SL and ground. If resistance is 11-15 ohms, replace solenoid. If resistance is not as specified, replace transmission sub-harness as needed.

DTC P1520: STOPLIGHT SWITCH SIGNAL MALFUNCTION

Circuit Description

Stoplight signal is used to detect when brakes have been applied. ECU uses this signal to control fuel cut-off. DTC is set if stoplight switch does not turn off when vehicle is being driven. Possible causes are:

- * Short in stoplight switch signal circuit.
- * Stoplight switch.
- * ECT ECU.

NOTE: For wiring diagram, see appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE section.

Diagnosis & Repair

1) Check stoplights. If stoplights do not function properly, repair as necessary and retest system. If stoplights function properly, go to next step.

2) Turn ignition on. Backprobing, measure voltage between ground and BK or STP terminal ECU connector. With brake pedal depressed, voltage should be 7.5-14.0 volts. With brake pedal released, voltage should be less than 1.5 volt. If voltage is not as specified, go to next step. If voltage is as specified, check wire harness and connectors. Problem is intermittent.

3) Check for short circuit in wiring harness between ECU and stoplight switch. See WIRING DIAGRAMS article in ENGINE PERFORMANCE section. Repair as necessary and retest system. If wiring harness is okay, replace ECU. Retest system.

DTC P1700: NO. 2 VEHICLE SPEED SENSOR (VSS) CIRCUIT

Circuit Description (Except T100 With 3.4L)

No. 2 vehicle speed sensor detects transmission output shaft RPM and sends signals to ECT ECU. An AC voltage is generated in No. 2 vehicle speed sensor coil as rotor mounted on output shaft rotates. This voltage is sent to ECT ECU. Gear shift point and lock-up timing are controlled by ECT ECU based on signals from No. 2 vehicle speed sensor and throttle position sensor. If No. 2 vehicle speed sensor malfunctions, ECT ECU uses input signals from No. 1 vehicle speed sensor as a back-up signal. DTC is output when no signal is detected from No. 2 vehicle speed sensor while No. 1 vehicle speed sensor sends 4 pulses to ECT ECU. Vehicle speed is more than 5.6 MPH for at least 4

seconds. Possible causes are:

- * Sensor open or short circuit.
- * Sensor malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Ensure ignition is off. Access ECT ECU. See Figs. 1-8. Disconnect ECT ECU harness connector. On Lexus SC300, install check harness on wiring harness connector. DO NOT connect check harness to ECT ECU. On all models, using ohmmeter, measure resistance between terminals SP2+ and SP2- at appropriate ECT ECU harness connector. See ECT ECU VOLTAGES under CIRCUIT TESTS. Resistance should be 560-680 ohms. If resistance is as specified, replace ECT ECU and retest. If resistance is not within specification, go to next step.

2) Remove No. 2 vehicle speed sensor from transmission. Measure resistance between sensor terminals. Resistance should be 560-680 ohms. If resistance is not as specified, replace sensor. If resistance is as specified, check and repair circuits between sensor and ECT ECU harness connector.

3) Check voltage between sensor terminals when a magnet is put close to tip of speed sensor. See Fig. 14. If a low intermittent voltage is generated, sensor is okay. If no voltage is generated, replace speed sensor.

Circuit Description (T100 With 3.4L)

A rotor with a built-in magnet is mounted on output shaft. Each time output shaft completes one revolution, permanent magnet activates reed switch. Reed switch is built into No. 2 vehicle speed sensor. Signal is generated and is sent to ECT ECU. ECT ECU controls shift points and lock-up operation. Sensor outputs one pulse for every revolution of output shaft. If No. 2 vehicle speed sensor malfunctions, ECT ECU uses input signal from No. 1 vehicle speed sensor as a back-up signal. DTC is output when no signal is detected from No. 2 vehicle speed sensor while No. 1 vehicle speed sensor sends 4 pulses to ECT ECU. Vehicle speed is more than 5.6 MPH for at least 4 seconds. Possible causes are:

- * Sensor open or short circuit.
- * Sensor malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Ensure ignition is off. Access ECT ECU. See Fig. 7. Raise and support vehicle. Shift transmission into Neutral. Rotate rear wheel. Backprobing appropriate ECT ECU harness connector with ohmmeter, measure resistance between terminal No. SP2+ and ground (E1). See ECT ECU VOLTAGES under CIRCUIT TESTS. Resistance should pulse between zero ohms and infinite ohms. If resistance is within specification, replace ECT ECU. If resistance is not within specification, go to next step.

2) Remove No. 2 speed sensor from transmission extension housing. Measure resistance between sensor terminals. Resistance should pulse between zero ohms and infinite ohms when a magnet is put close to tip of speed sensor. See Fig. 14. If resistance is not as specified, replace sensor. If resistance is as specified, check and repair circuits between sensor and ECT ECU.

DTC P1755: LOCK-UP/SLU SOLENOID CIRCUIT

Circuit Description

Lock-up solenoid is turned on and off by signals from ECT ECU. Amount of current flow to solenoid is controlled by duty cycle

ratio of ECT ECU output signal. The higher the duty cycle ratio, the higher the lock-up hydraulic pressure becomes during lock-up operation. DTC is output when ECT ECU outputs a duty signal to lock-up solenoid in 90 percent or higher duty cycle ratio. Current to solenoid is 350-550 milliamps or less. Possible causes are:

- * Lock-up solenoid open or short circuit.
- * Lock-up solenoid malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Disconnect transmission solenoid harness connector. See Fig. 10. Using ohmmeter, measure resistance between terminals SLU+ and SLU- on transmission component connector. See ECT ECU VOLTAGES under CIRCUIT TESTS. If resistance is 5.0-5.6 ohms, replace ECT ECU. If resistance is not 5.0-5.6 ohms, go to next step.

2) Raise and support vehicle. Remove transmission oil pan. See TOYOTA A-340 & A-350 SERIES OVERHAUL article. Disconnect solenoid connector. See Fig. 16. Using ohmmeter, measure resistance between solenoid connector terminals. If resistance is 5.0-5.6 ohms, replace transmission sub-harness. If resistance is not 5.0-5.6 ohms, replace solenoid.

DTC P1760: SLT SOLENOID CIRCUIT (LINE PRESSURE CONTROL)

Circuit Description

Throttle pressure is applied to primary regulator valve, which modulates line pressure, causes SLT solenoid to precisely modulate line pressure according to accelerator pedal effort, or engine power output detected. This reduces fluctuation of line pressure and provides smooth shifting. Upon receiving throttle valve opening angle signal, ECT ECU controls line pressure by sending predetermined duty cycle ratio to SLT solenoid, activating solenoid, modulating line pressure and generating throttle pressure. DTC is output when voltage at SLT- terminal at ECT ECU is zero or 12 volts for one second or more, indicating a solenoid duty cycle is not present. Possible causes are:

- * SLT solenoid open or short circuit.
- * SLT solenoid malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Disconnect transmission solenoid harness connector. Using ohmmeter, measure resistance between terminals SLT+ and SLT- on transmission component connector. If resistance is 5.0-5.6 ohms, go to next step. If resistance is not 5.0-5.6 ohms, replace SLT solenoid.

2) Raise and support vehicle. Remove transmission oil pan. See TOYOTA A-340 & A-350 OVERHAUL article. Disconnect solenoid connector. See Fig. 16. Remove SLT solenoid. Connect a jumper wire with an 8-10 watt bulb in series between battery positive terminal and SLT solenoid terminal No. 1. Connect another jumper wire between battery negative terminal and terminal No. 2. See Fig. 17.

3) Solenoid plunger should move away from solenoid electrical connector. Remove jumper wire from solenoid terminal No. 2. Solenoid plunger should move back toward solenoid electrical connector. If solenoid plunger responds properly, go to next step. If solenoid plunger does not respond, replace SLT solenoid and retest.

4) If solenoid plunger responds properly, inspect transmission sub-harness. Repair as needed. If sub-harness is okay, replace ECT ECU.

DTC P1765: SLN SOLENOID CKT (ACCUM BACK PRESSURE MODULATION)

Circuit Description

SLN solenoid controls hydraulic pressure acting on accumulator control valve. ECT ECU determines optimum operating pressure according to signals from throttle position sensor, vehicle speed sensor and direct clutch speed sensor. Amount of current flow to solenoid is controlled by duty cycle ratio of ECT ECU output signal, causing a momentary change to hydraulic pressure acting on clutches during shifting. When duty cycle ratio is high, hydraulic pressure acting on clutches is low. DTC is output when ECT ECU outputs a duty signal to lock-up solenoid of at least 5 percent for 3.3 milliseconds. Possible causes are:

- * SLN solenoid open or short circuit.
- * SLN solenoid malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Ensure ignition is off. Raise and support vehicle. Remove transmission oil pan. Disconnect SLN solenoid connector. See Fig. 16. Using an ohmmeter, measure resistance between solenoid connector terminals. Ensure resistance is 7.5-8.5 ohms. If resistance is not as specified, check solenoid operation.

2) Connect a jumper wire with an 8-10 watt bulb in series between battery positive terminal and SLN solenoid terminal No. 1. Connect another jumper wire between battery negative terminal and SLN solenoid terminal No. 2. See Fig. 17.

3) Solenoid plunger should move away from solenoid electrical connector. Remove jumper wire from solenoid terminal No. 2. Solenoid plunger should move back toward solenoid electrical connector. If solenoid plunger responds properly, go to next step. If solenoid plunger does not respond, replace SLN solenoid and retest.

4) If solenoid plunger responds properly, inspect and repair circuit(s) between SLN solenoid and ECT ECU. If circuits are okay, replace ECT ECU and retest. If solenoid plunger does not respond properly, replace lock-up solenoid.

DTC P1780: PARK/NEUTRAL POSITION (PNP) SWITCH

Circuit Description

PNP switch verifies shift lever position and sends signals to ECT ECU. If no signal is received from PNP switch, ECT ECU defaults to Drive ("D") position. DTC is output when ECT ECU detects 2 or more circuits are on. Vehicle speed has to be 25-44 MPH for 30 seconds or more with engine speed at 1500-2500 RPM. Possible causes are:

- * Short in PNP switch circuit.
- * PNP switch malfunction.
- * ECT ECU malfunction.

Diagnosis & Repair Procedure

1) Turn ignition off. Access ECT ECU. See Figs. 1-8. Disconnect ECT ECU harness connector. On Lexus SC300, SC400 and Supra (with 3-connector ECT ECU), install check harness between ECT ECU and wiring harness. On all models, turn ignition on. Using DVOM, measure voltage at terminals NSW, "R", "2" and "L" of ECT ECU wiring harness or check harness between terminal and body ground with gear selector in each shift position. See ECT ECU VOLTAGES under CIRCUIT TESTS.

2) On Lexus SC300 and Toyota Supra, ensure 7.5-14 volts is present at NSW terminal at ECT ECU harness connector or check harness in all shift positions. Ensure 7.5-14 volts is present at terminals "R", "2" and "L" at ECT ECU harness connector or check harness with gear selector in "R", "2" and "L" position.

3) On all other models, ensure 9-14 volts is present at NSW terminal at ECT ECU harness connector or check harness in all shift positions. Ensure 9-14 volts is present at terminals "R", "2" and "L" at ECT ECU harness connector or check harness with gear selector in "R", "2" and "L" position.

4) On all models, if voltage is not as specified, check park/neutral position switch. See PARK/NEUTRAL POSITION (PNP) SWITCH under COMPONENT TESTS. If switch is okay, check and repair circuit(s) between PNP switch and ECT ECU. See WIRING DIAGRAMS.

CIRCUIT TESTS

BRAKELIGHT SIGNAL

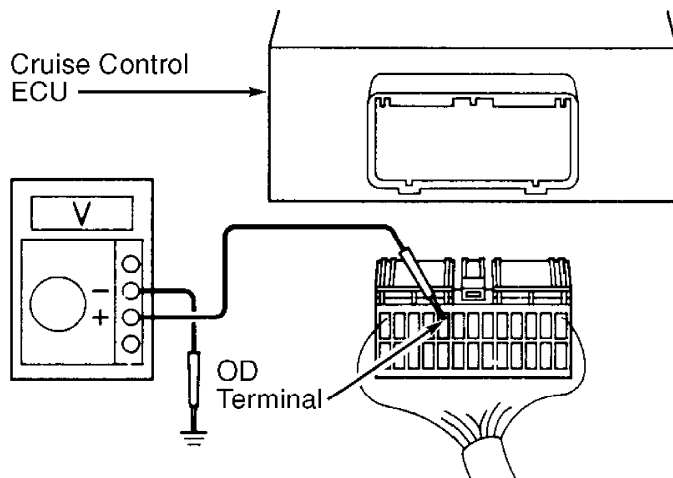
1) Inspect operation of brakelights. Repair as needed. If switch is suspect, see BRAKELIGHT SWITCH under COMPONENT TESTS. If circuit is suspect, diagnose and repair as necessary. See WIRING DIAGRAMS.

2) Connect scan tool to DLC3. See Figs. 1-8. Turn ignition on. Read STP signal while depressing and releasing brake pedal. Ensure signal cycles when pressing brake pedal. If signal cycles, replace ECT ECU. If signal does not cycle, inspect and repair circuit between brakelight switch and ECT ECU. If circuit is okay, replace ECT ECU.

OVERDRIVE CANCEL SIGNAL

1) Access ECT ECU. See Figs. 1-8. On Lexus SC300, SC400 and Supra, connect check harness to ECT ECU. On all models, turn ignition on. Measure voltage between terminal OD1 of appropriate ECT ECU harness connector and ground. See ECT ECU VOLTAGES under CIRCUIT TESTS. If voltage is 4-6 volts, substitute known good ECT ECU and retest. If voltage is not 4-6 volts, go to next step.

2) Turn ignition off. Disconnect cruise control ECU harness connector. See Figs. 1-8. Turn ignition on. Measure voltage between terminal OD and ground. See Fig. 18. If 4-6 volts is present, replace cruise control ECU and retest. If 4-6 volts is not present, inspect and repair circuit between cruise control ECU and ECT ECU.

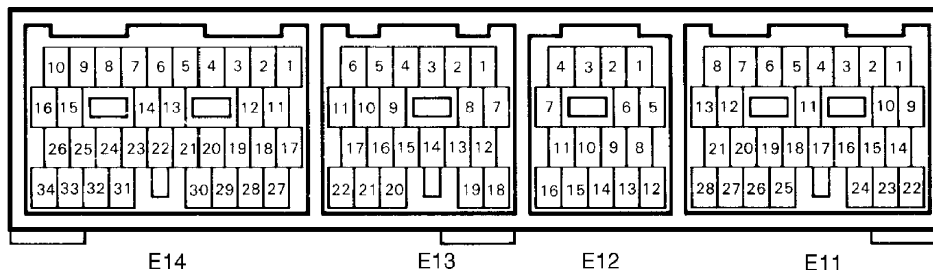


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Fig. 18: Identifying Cruise Control ECU Terminals
Courtesy of Toyota Motor Sales, U.S.A.,

ECT ECU VOLTAGES

Access ECT ECU. See Figs. 1-8. On Lexus SC300, SC400 and Supra, connect check harness to ECT ECU. On all models, turn ignition on. Using voltmeter, measure voltage at ECT ECU or check harness. Check voltage between selected terminal and terminal E1 (ground). Voltage should be as specified in pin voltage tables. See Figs. 19-32.



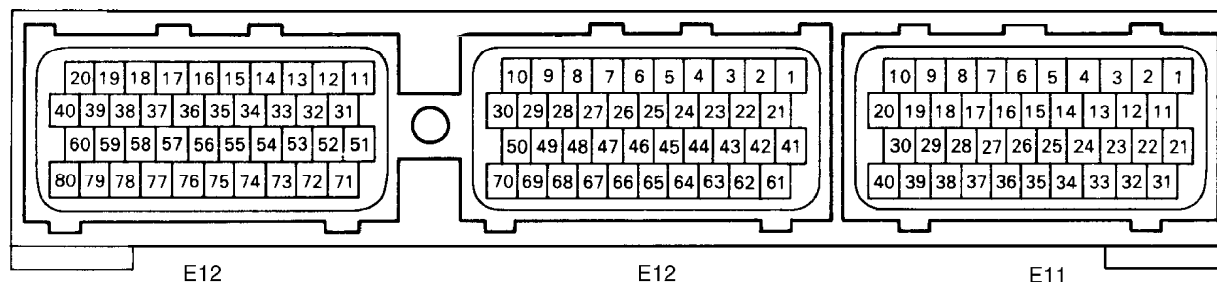
Connector, Terminal No. Symbols Wiring Color	Condition	Standard Value
E14,11 – E12,16 S1 – E1 R – BR	IG OFF and disconnect ECM connector IG ON 1st or 2nd gear 3rd or OD gear	10 – 16 Ω 10 – 14 V 10 – 14 V Below 1 V
E14,17 – E12,16 S2 – E1 W – BR	IG OFF and disconnect ECM connector IG ON 2nd or 3rd gear 1st or OD gear	10 – 16 Ω Below 1 V 10 – 14 V Below 1 V
E14,1 – E14,3 SLN ⁺ – SLN ⁻ B-R – GR	IG ON Engine is idling	Below 3 V Pulse signal is output Below 1 V \leftrightarrow 10 – 14 V
E13,2 – E13,3 NCO ⁺ – NCO ⁻ Y – L	IG OFF and disconnect ECM connector Engine is running	560 – 680 Ω Pulse signal is output Below 1 V \leftrightarrow 4 – 5 V
E14,2 – E14,4 SLU ⁺ – SLU ⁻ L-Y – B	IG ON Engine is idling	Below 3 V Pulse signal is output Below 1 V \leftrightarrow 10 – 14 V
E11,7 – E12,16 OD1 – E1 V-R – BR	IG ON	10 – 14 V
E11,5 – E12,16 PWR – E1 L-W – BR	Turn IG ON Pattern select switch 'NORM' Pattern select switch 'PWR'	Below 1 V 10 – 14 V
E12,12 – E12,16 L – E1 G-B – BR	Turn IG ON Shift lever L position Shift lever other than L position	10 – 14 V Below 1 V

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Fig. 19: ECT ECU Pin Voltage Table – 1997 LS400 (1 Of 2,
Component Connector View)
Courtesy of Toyota Motor Sales, U.S.A.,

Connector,Terminal No. Symbols Wiring Color	Condition	Standard Value
E12,13 – E12,16 2 – E1 G – BR	Turn IG ON Shift lever 2 position Shift lever other than 2 position	10 – 14 V Below 1 V
E12,14 – E12,16 R – E1 R-B – BR	Shift lever R position Shift lever other than R position	10 – 14 V Below 1 V
E11,28 – E12,16 3 – E1 L-Y – BR	Turn IG ON Shift lever 3 position Shift lever other than 3 position	10 – 14 V Below 1 V
E14,13 – E12,16 STA – E1 B – BR	Shift lever position P or N position, IG START	10 – 14 V
E14,14 – E12,16 NSW – E1 L-Y – BR	Turn IG ON Shift lever P or N position Shift lever other than P and N position	Below 1 V 10 – 14 V
E11,16 – E12,16 BK – E1 G-R – BR	Turn IG ON Brake pedal is depressed Brake pedal is released	10 – 14V Below 1 V
E12,6 – E13,22 OIL – E2 Y – BR	ATF temperature 110 °C (230 °F) or more ATF temperature 10 °C (50 °F)	Below 1 V 3.5 V
E13,9 – E13,4 SP2 ⁺ – SP2 ⁻ G – R	IG OFF and disconnect ECM connector Engine is running	560 – 680 Ω Pulse signal is output Below 1 V ↔ 4 – 5 V

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Fig. 20: ECT ECU Pin Voltage Table – 1997 LS400 (2 Of 2,
Component Connector View)
Courtesy of Toyota Motor Sales, U.S.A.,

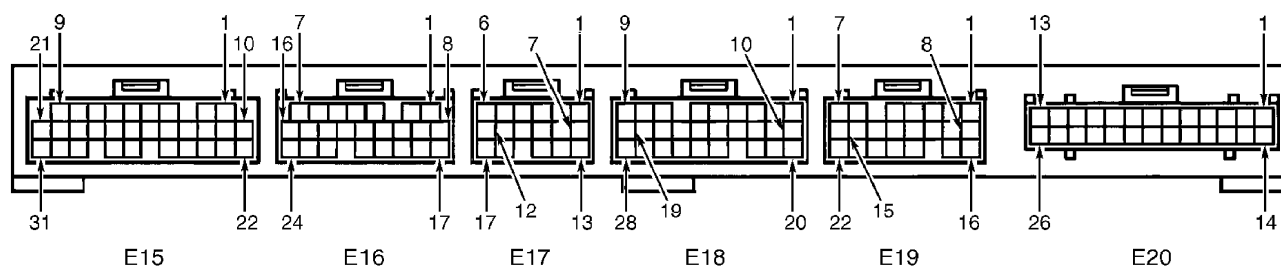


Connector, Terminal No. Symbols Wiring Color	Condition	Standard Value
B, 10 – B, 69 S1 – E1 LG – BR	IG OFF and disconnect ECM connector IG ON 1st or 2nd gear 3rd or OD gear	11 – 15 Ω 9 – 14 V 9 – 14 V Below 1.5 V
B, 9 – B, 69 S2 – E1 R-W – BR	IG OFF and disconnect ECM connector IG ON 2nd or 3rd gear 1st or OD gear	11 – 15 Ω Below 1.5 V 9 – 14 V Below 1.5 V
B, 8 – B, 69 SL – E1 R-L – BR	IG OFF and disconnect ECM connector IG ON Vehicle driving under lock – up position	11 – 15 Ω Below 1.5 V 9 – 14 V
B, 23 – B, 3 SP2+ – SP2- L-Y – R-Y	IG OFF and disconnect ECM connector Engine is running	560 – 680 Ω Pulse signal is output Below 1.5 V ↔ 4–6 V
A, 12 – B, 69 OD1 – E1 BR-Y – BR	IG ON	9 – 14 V
A, 28 – B, 69 OD2 – E1 GR-R – BR	OD main switch ON (OD ON) OD main switch OFF (OD OFF)	9 – 14 V Below 3 V
A, 10 – B, 69 L – E1 W – BR	IG ON Shift lever L position Shift lever other than L position	7.5 – 14 V Below 1.5 V
A, 9 – B, 69 2 – E1 G – BR	IG ON Shift lever 2 position Shift lever other than 2 position	7.5 – 14 V Below 1.5 V
B, 76 – B, 69 NSW – E1 B-W – BR	IG ON Shift lever P or N position Shift lever other than P and N position	Below 3 V 9 – 14 V
A, 18 – B, 69 PWR – E1 G-O – BR	IG ON Pattern select switch: PWR Pattern select switch: NORM	7.5 – 14 V Below 1.5 V

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Fig. 21: ECT ECU Pin Voltage Table – 1997 SC300 (Component Connector View)

Courtesy of Toyota Motor Sales, U.S.A.,

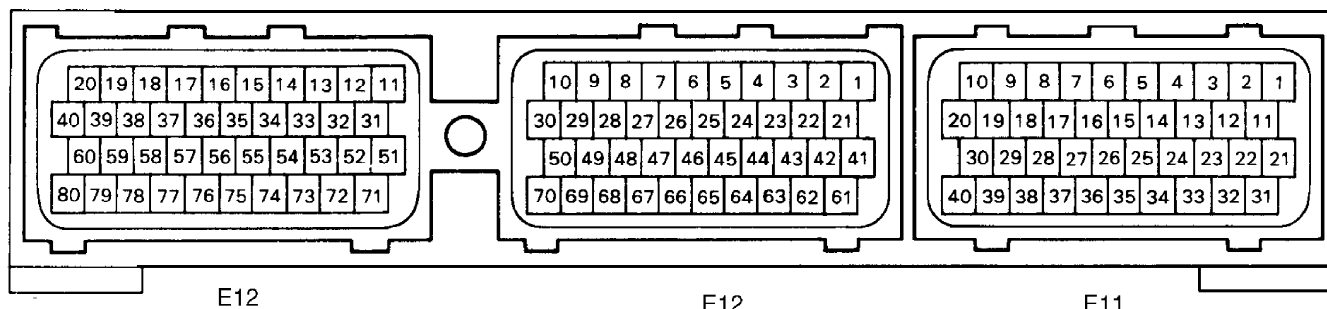


Symbols (Terminals No.)	Wiring Color	Condition	Voltage (V)
S1 – E1 (E17, 1 – E16, 17)	L ↔ W–R	IG ON	10 ~ 14
		1st or 2nd gear	10 ~ 14
		3rd or 4th gear	Below 1.5
S2 – E1 (E17, 2 – E16, 17)	G–Y ↔ W–R	IG ON	Below 1.5
		2nd or 3rd gear	10~ 14
		1st or 4th gear	Below 1.5
SLN+ – SLN– (E17, 8 – E17, 14)	P ↔ G–W	IG ON	10 ~ 14
SLU+ – SLU– (E17, 7 – E17, 13)	L–R ↔ L–B	IG ON	10 ~ 14
SLT+ – SLT– (E17, 9 – E17, 15)	B–Y ↔ R–B	IG ON	10 ~ 14
NCO+ – NCO– (E17, 4 – E17, 10)	G ↔ R	Engine is idling	Pulse signal is output Below 1 ↔ 4 ~ 5
3 – E1 (E18, 7 – E16, 17)	W–L ↔ W–R	Turn IG ON and shift lever 3 position	10 ~ 14
		Turn IG ON and shift lever other than 3 position	Below 1.5
L – E1 (E16, 21 – E16, 17)	W ↔ W–R	Turn IG ON and shift lever L position	10 ~ 14
		Turn IG ON and shift lever other than L position	Below 1.5
2 – E1 (E16, 20 – E16, 17)	G ↔ W–R	Turn IG ON and shift lever 2 position	10 ~ 14
		Turn IG ON and shift lever other than 2 position	Below 1.5
R – E1 (E18, 16 – E16, 17)	L ↔ W–R	IG ON and shift lever R position	10 ~ 14
		IG ON and shift lever other than R position	Below 1.5
NSW – E1 (E15, 24 – E16, 17)	Y ↔ W–R	Turn IG ON and shift lever P or N position	Below 1.5
		Turn IG ON and shift lever other than P or N position	10 ~ 14
D – E1 (E18, 17, – E16, 17)	G–Y ↔ W–R	Turn IG ON and shift lever D or 3 position	10 ~ 14
		Turn IG ON and shift lever other than D or 3 position	Below 1.5
OIL – E2 (E17, 17 – E17, 18)	G–R ↔ BR	ATF temperature: 110°C (230°F) or more	Below 1.5
SP2+ – SP2– (E17, 5 – E17, 11)	L–Y ↔ R–Y	Vehicle is running	Pulse signal is output Below 1.5 ↔ 4 ~ 5
PWR – E1 (E18, 12 – E16, 17)	G–O ↔ W–R	Turn IG ON and pattern select switch "PWR"	Below 1.5
		Turn IG ON and pattern select switch "NORM"	10 ~ 14
SNW1 – E1 (E19, 3 – E16, 17)	G–Y ↔ W–R	Turn IG ON and SNOW mode switch "ON"	10 ~ 14
		Turn IG ON and SNOW mode switch "OFF"	Below 1.5

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Fig. 22: ECT ECU Pin Voltage Table – 1998 SC300 (Component Connector View)

Courtesy of Toyota Motor Sales, U.S.A.,



Connector, Terminal No. Symbols Wiring Color	Condition	Standard Value
B10 – B69 S1 – E1 LG – BR	IG OFF and disconnect ECM connector IG ON 1st or 2nd gear 3rd or OD gear	10 – 16 Ω 10 – 14 V 10 – 14 V Below 1 V
B9 – B69 S2 – E1 W·R – BR	IG OFF and disconnect ECM connector IG ON 2nd or 3rd gear 1st or OD gear	10 – 16 Ω 10 – 14 V Below 1 V 10 – 14 V
B11 – B13 SLN ⁺ – SLN ⁻ B·R – R·B	Turn IG ON	10 – 14 V
B21 – B1 NCO ⁺ – NCO ⁻ R – G	IG OFF and disconnect ECM connector Engine is running	560 – 680 Ω Pulse signal is output Below 1 V ↔ 4 – 6 V
B12 – B14 SLU ⁺ – SLU ⁻ B·W – L	Turn IG ON	10 – 14 V
A12 – B69 OD1 – E1 BR·Y – BR	Turn IG ON	4 – 6 V
A18 – B69 PWR – E1 G·O – BR	Turn IG ON Pattern select switch 'NORM' Pattern select switch 'PWR'	Below 1 V 7.5 – 14 V
A10 – B69 L – E1 W – BR	Turn IG ON Shift lever L position Shift lever other than L position	10 – 14 V Below 1 V
A9 – B69 2 – E1 G – BR	Turn IG ON Shift lever 2 position Shift lever other than 2 position	10 – 14 V Below 1 V

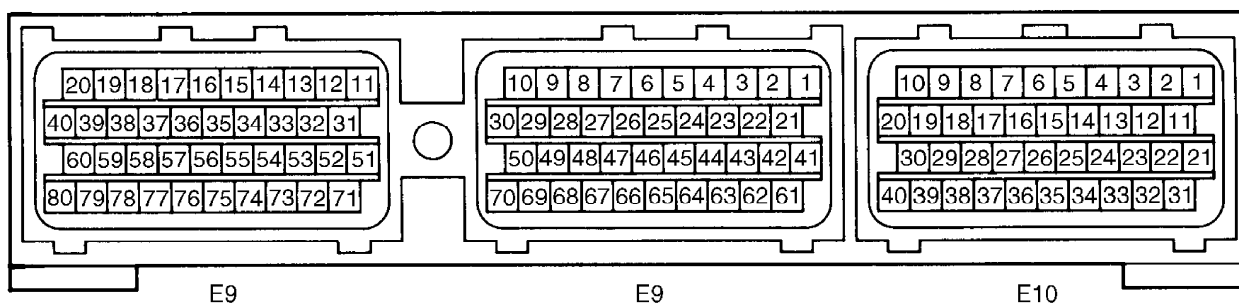
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Fig. 23: ECT ECU Pin Voltage Table – 1997 SC400 (1 Of 2,
Component Connector View)
Courtesy of Toyota Motor Sales, U.S.A.,

Connector,Terminal No. Symbols Wiring Color	Condition	Standard Value
A7 – B69 R – E1 R-B – BR	Turn IG ON Shift lever R position Shift lever other than R position	10 – 14 V Below 1 V
B76 – B69 NSW – E1 B-W – BR	Turn IG ON Shift lever P or N position Shift lever other than P and N position	Below 1 V 10 – 14 V
A4 – B69 BK – E1 G-W – BR	Turn IG ON Brake pedal is depressed Brake pedal is released	Below 1 V 10 – 14 V
B24 – B65 OIL – E2 L – BR	ATF temperature 110 °C (230 °F) or more ATF temperature 10 °C (50 °F)	Below 1 V 3.5 V
B23 – B3 SP2+ – SP2- P – V	IG OFF and disconnect ECM connector Engine is running	560 – 680 Ω Pulse signal is output Below 1 V ↔ 4 – 5 V
A28 – B69 OD2 – E1 GR-R – BR	Turn IG ON OD main switch: ON OD main switch: OFF	10 – 14 V Below 1 V

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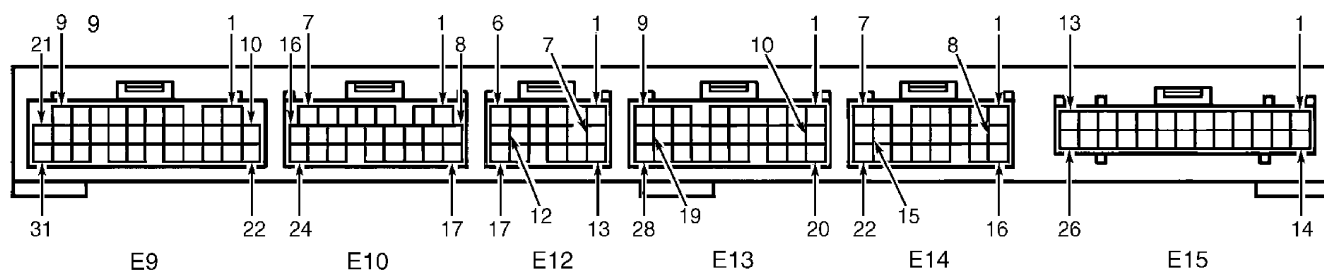
Fig. 24: ECT ECU Pin Voltage Table – 1997 SC400 (2 Of 2,
Component Connector View)
Courtesy of Toyota Motor Sales, U.S.A.,



Symbols (Terminals No.)	Wiring Color	Condition	Voltage (V)
S1 – E1 (B, 10 – B, 69)	W-R ↔ BR	IG ON	10 ~ 14
		1st or 2nd gear	10 ~ 14
		3rd or OD gear	Below 1.5
S2 – E1 (B, 9 – B, 69)	R-L ↔ BR	IG ON	Below 1.5
		2nd or 3rd gear	10 ~ 14
		1st or OD gear	Below 1.5
SLN ⁻ – E1 (B, 13 – B, 69)	Y-G ↔ BR	IG ON	10 ~ 14
NCO ⁺ – NCO ⁻ (B, 21 – B, 1)	L ↔ Y	Engine is idling	Pulse signal is output Below 1 ↔ 4 ~ 5
SLU ⁻ – E1 (B, 14 – B, 69)	LG-B ↔ BR	IG ON	10 ~ 14
OD1 – E1 (A, 12 – B, 69)	BR-B ↔ BR	IG ON	4 ~ 6
M – E1 (A, 18 – B, 69)	G-Y ↔ BR	Turn IG ON and pattern select switch "MANU"	Below 3
		Turn IG ON and pattern select switch "NORM"	10 ~ 14
L – E1 (A, 10 – B, 69)	G-B ↔ BR	Turn IG ON and shift lever L position	10 ~ 14
		Turn IG ON and shift lever other than L position	Below 1.5
2 – E1 (A, 9 – B, 69)	LG-R ↔ BR	Turn IG ON and shift lever 2 position	10 ~ 14
		Turn IG ON and shift lever other than 2 position	Below 1.5
R – E1 (A, 7 – B, 69)	R-B ↔ BR	IG ON and shift lever R position	10 ~ 14
		IG ON and shift lever other than R position	Below 1.5
OD2 – E1 (A, 28 – B, 69)	V-G ↔ BR	IG ON and OD main switch ON (OD ON)	10 ~ 14
		IG ON and OD main switch (OD OFF)	Below 3
SLT ⁺ – SLT ⁻ (B, 31 – B, 12)	W-G ↔ LG-R	IG ON	10 ~ 14
NSW – E1 (B, 76 – B, 69)	B-W ↔ BR	Turn IG ON and shift lever P or N position	Below 1.5
		Turn IG ON and shift lever other than P or N position	10 ~ 14
OIL – E2 (B, 24 – B, 65)	O ↔ BR-B	ATF temperature: 110°C (230°F) or more	Below 1.5
SP2 ⁺ – SP2 ⁻ (B, 23 – B, 3)	R ↔ G	Vehicle is running	Pulse signal is output Below 1.5 ↔ 4 ~ 5
MI – E1 (A, 25 – B, 69)	W-L ↔ BR	Turn IG ON and pattern select switch "MANU"	Below 3
		Turn IG ON and pattern select switch "NORM"	10 ~ 14

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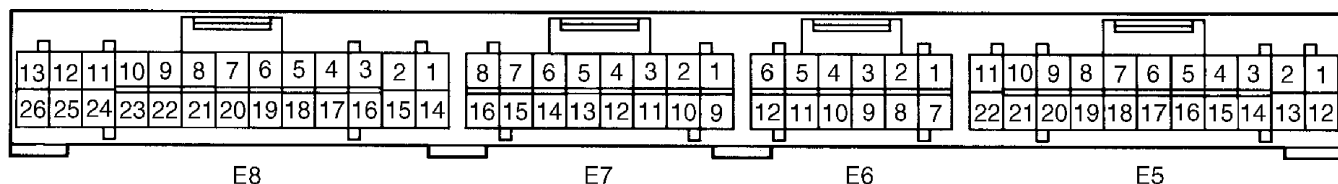
Fig. 25: ECT ECU Pin Voltage Table – 1997 Supra Turbo & Non-Turbo, 1998 Supra Turbo (Turbo Pin Voltage Table Shown; Non-Turbo Pin Voltage Table Similar (Component Connector View)
Courtesy of Toyota Motor Sales, U.S.A.,



Symbols (Terminals No.)	Wiring Color	Condition	Voltage (V)
S1 – E1 (E12, 1 – E10, 17)	W–R ↔ BR	IG ON	10 ~ 14
		1st or 2nd gear	10 ~ 14
		3rd or OD gear	Below 1.5
S2 – E1 (E12, 2 – E10, 17)	R–L ↔ BR	IG ON	Below 1.5
		2nd or 3rd gear	10 ~ 14
		1st or OD gear	Below 1.5
SLN+ – SLN– (E12, 8 – E12, 14)	Y–G ↔ P	IG ON	10 ~ 14
SLU+ – SLU–(E12, 7 – E12, 13)	G–W ↔ L–R	IG ON	10 ~ 14
SLT+ – SLT–(E12, 9 – E12, 15)	G–R ↔ R–B	IG ON	10 ~ 14
NCO+ – NCO– (E12, 4 – E12, 10)	R ↔ G	Engine is idling	Pulse signal is output Below 1 ↔ 4 ~ 5
M – E1 (E15, 5 – E10, 17)	G–Y ↔ BR	Turn IG ON and pattern select switch "MANU"	Below 3
		Turn IG ON and pattern select switch "NORM"	10 ~ 14
L – E1 (E10, 21 – E10, 17)	G–B ↔ BR	Turn IG ON and shift lever L position	10 ~ 14
		Turn IG ON and shift lever other than L position	Below 1.5
2 – E1 (E10, 20 – E10, 17)	L–Y ↔ BR	Turn IG ON and shift lever 2 position	10 ~ 14
		Turn IG ON and shift lever other than 2 position	Below 1.5
R – E1 (E13, 16 – E10, 17)	R–B ↔ BR	IG ON and shift lever R position	10 ~ 14
		IG ON and shift lever other than R position	Below 1.5
NSW – E1 (E9, 24 – E10, 17)	B–W ↔ BR	Turn IG ON and shift lever P or N position	Below 1.5
		Turn IG ON and shift lever other than P or N position	10 ~ 14
OD2 – E1 (E13, 28 – E10, 17)	V ↔ BR	IG ON and OD main switch ON (OD ON)	10 ~ 14
		IG ON and OD main switch (OD OFF)	Below 3
D – E1 (E13, 7 – E10 17)	G–R ↔ BR	Turn IG ON and shift lever D position	10 ~ 14
		Turn IG ON and shift lever other than D position	Below 1.5
OIL – E2 (E12, 17 – E10, 17)	L–B ↔ W–B	ATF temperature: 110°C (230°F) or more	Below 1.5
SP2+ – SP2–(E12, 5 – E12, 11)	L–Y ↔ R–Y	Vehicle is running	Pulse signal is output Below 1.5 ↔ 4 ~ 5
MI – E1 (E15, 18 – E10, 17)	W–L ↔ BR	Turn IG ON and pattern select switch "MANU"	Below 3
		Turn IG ON and pattern select switch "NORM"	10 ~ 14

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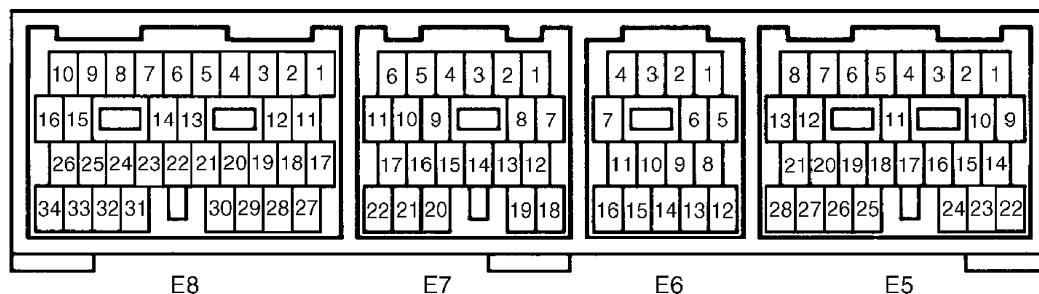
Fig. 26: ECT ECU Pin Voltage Table – 1998 Supra Non-Turbo
(Component Connector View)
Courtesy of Toyota Motor Sales, U.S.A.,



Symbols (Terminals No.)	Wiring Color	Condition	Voltage (V)
S1 – E1 (E8, 8 – E8, 24)	V–Y ↔ BR	IG ON	9 ~ 14
		IG ON and 1st or 2nd gear	9 ~ 14
		IG ON and 3rd or OD gear	Below 1.5
S2 – E1 (E8, 21 – E8, 24)	LG ↔ BR	IG ON	Below 1.5
		IG ON and 2nd or 3rd gear	9 ~ 14
		IG ON and 1st or OD gear	Below 1.5
SL – E1 (E8, 20 – E8, 24)	R–G ↔ BR	IG ON	Below 1.5
		IG ON and vehicle driving under lock-up position	9 ~ 14
SP2+ – SP2– (E7, 9 – E7, 3)	Y–R ↔ W–R	IG ON and engine is running	Pulse signal is output Below 1.5 ↔ 4 ~ 6
OD1 – E1 (E5, 18 – E8, 24)	L ↔ BR	IG ON	9 ~ 14
OD2 – E1 (E5, 5 – E8, 24)	L–O ↔ BR	IG ON and OD main switch ON (OD OFF)	Below 3
		IG ON and OD main switch OFF (OD ON)	9 ~ 14
OIL – E2 (E8, 16 – E7, 9)	V–R ↔ BR–B	IG ON and ATF temperature: 115°C (239°F) or more	Below 1.5
L – E1 (E5, 15 – E8, 24)	V–W ↔ BR	IG ON and Shift lever L position	7.5 ~ 14
		IG ON and Shift lever other than L position	Below 1.5
2 – E1 (E5, 16 – E8, 24)	P ↔ BR	IG ON and Shift lever 2 position	7.5 ~ 14
		IG ON and Shift lever other than 2 position	Below 1.5
R – E1 (E5, 17 – E8, 24)	R–B ↔ BR	IG ON and Shift lever R position	7.5 ~ 14
		IG ON and Shift lever other than R position	Below 1.5
NSW – E1 (E5, 22 – E8, 24)	B ↔ BR	IG ON and Shift lever P or N position	Below 3
		IG ON and Shift lever other than P or N position	9 ~ 14
PWR – E1 (E5, 14 – E8, 24)	G ↔ BR	IG ON and Pattern select switch "NORM"	Below 1.5
		IG ON and Pattern select switch "PWR"	7.5 ~ 14

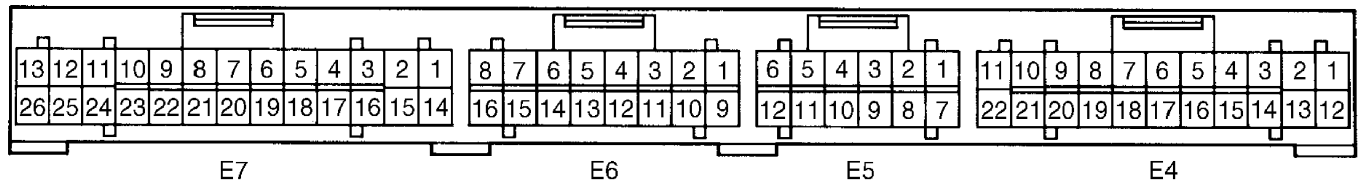
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Fig. 27: ECT ECU Pin Voltage Table – 1997–98 Tacoma 2.7L
(Component Connector View)
Courtesy of Toyota Motor Sales, U.S.A.,



Symbols (Terminals No.)	Wiring Color	Condition	Voltage (V)
S1 – E1 (E8, 11 – E6, 16)	V–Y ↔ BR	IG ON	9 ~ 14
		IG ON and 1st or 2nd gear	9 ~ 14
		IG ON and 3rd or OD gear	Below 1.5
S2 – E1 (E8, 17 – E6, 16)	LG ↔ BR	IG ON	Below 1.5
		IG ON and 2nd or 3rd gear	9 ~ 14
		G ON and 1st or OD gear	Below 1.5
SL – E1 (E8, 27 – E6, 16)	R–G ↔ BR	IG ON	Below 1.5
		IG ON and vehicle driving under lock-up position	9 ~ 14
SP2+ – SP2- (E7, 9 – E7, 4)	Y–R ↔ W–R	IG ON and turn one rear wheel slowly	Pulse signal is output Below 1.5 ↔ 4 ~ 6
OD1 – E1 (E5, 7 – E6, 16)	L ↔ BR	IG ON	9 ~ 14
OD2 – E1 (E5, 6 – E6, 16)	L–O ↔ BR	IG ON and OD main switch ON (OD OFF)	Below 3
		IG ON and OD main switch OFF (OD ON)	9 ~ 14
OIL – E2 (E7, 12 – E7, 22)	V–R ↔ BR–B	IG ON and ATF temperature: 115°C (239°F) or more	Below 1.5
L – E1 (E5, 1 – E6, 16)	V–W ↔ BR	IG ON and Shift lever L position	7.5 ~ 14
		IG ON and Shift lever other than L position	Below 1.5
2 – E1 (E5, 10 – E6, 16)	P ↔ BR	IG ON and Shift lever 2 position	7.5 ~ 14
		IG ON and Shift lever other than 2 position	Below 1.5
R – E1 (E5, 15 – E6, 16)	R–B ↔ BR	IG ON and Shift lever R position	7.5 ~ 14
		IG ON and Shift lever other than R position	Below 1.5
NSW – E1 (E8, 14 – E6, 16)	B ↔ BR	IG ON and Shift lever P or N position	Below 3
		IG ON and Shift lever other than P or N position	9 ~ 14
PWR – E1 (E5, 12 – E8, 16)	G ↔ BR	IG ON and Pattern select switch "NORM"	Below 1.5
		IG ON and Pattern select switch "PWR"	7.5 ~ 14

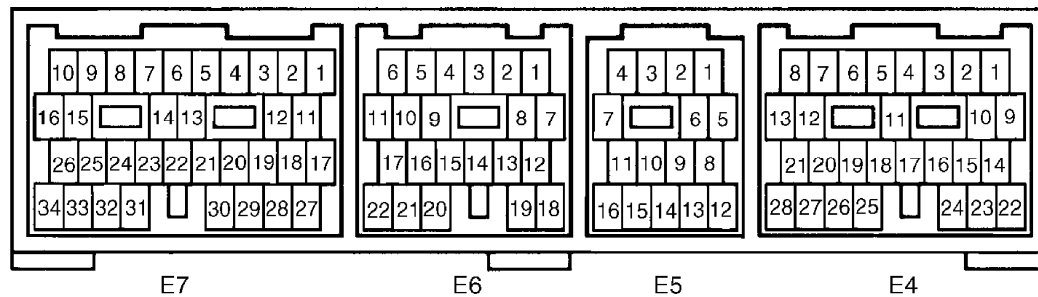
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 Fig. 28: ECT ECU Pin Voltage Table – 1997–98 Tacoma 3.4L (1 Of 2,
 Component Connector View)
 Courtesy of Toyota Motor Sales, U.S.A.,



Symbols (Terminals No.)	Wiring Color	Condition	Voltage (V)
S1 – E1 (E7, 10 – E7, 24)	W ↔ BR	IG ON	9 ~ 14
		IG ON and 1st or 2nd gear	9 ~ 14
		IG ON and 3rd or OD gear	Below 1.5
S2 – E1 (E7, 9 – E7, 24)	B-W ↔ BR	IG ON	Below 1.5
		IG ON and 2nd or 3rd gear	9 ~ 14
		IG ON and 1st or OD gear	Below 1.5
SL – E1 (E7, 8 – E7, 24)	Y-W ↔ BR	IG ON	Below 1.5
		IG ON and vehicle driving under lock-up position	9 ~ 14
SP2+ – SP2- (E5, 10 – E5, 4)	BR-R ↔ W-R	Vehicle is running	Pulse signal is output Below 1.5 ↔ 4 ~ 6
OD1 – E1 (E4, 7 – E7, 24)	Y-R ↔ BR	IG ON	9 ~ 14
OD2 – E1 (E4, 5 – E7, 24)	Y-O ↔ BR	IG ON and OD main switch ON (OD OFF)	Below 3
		IG ON and OD main switch OFF (OD ON)	9 ~ 14
OIL – E2 (E7, 21 – E6, 9)	G-B ↔ BR-B	ATF temperature: 110°C (230°F) or more	Below 1.5
L – E1 (E4, 15 – E7, 24)	V-W ↔ BR	IG ON and Shift lever L position	7.5 ~ 14
		IG ON and Shift lever other than L position	Below 1.5
2 – E1 (E4, 16 – E7, 24)	V-R ↔ BR	IG ON and Shift lever 2 position	7.5 ~ 14
		IG ON and Shift lever other than 2 position	Below 1.5
R – E1 (E4, 17 – E7, 24)	R-Y ↔ BR	IG ON and Shift lever R position	7.5 ~ 14
		IG ON and Shift lever other than R position	Below 1.5
NSW – E1 (E4, 22 – E7, 24)	B-Y ↔ BR	IG ON and Shift lever P or N position	Below 1.5
		IG ON and Shift lever other than P or N position	9 ~ 14

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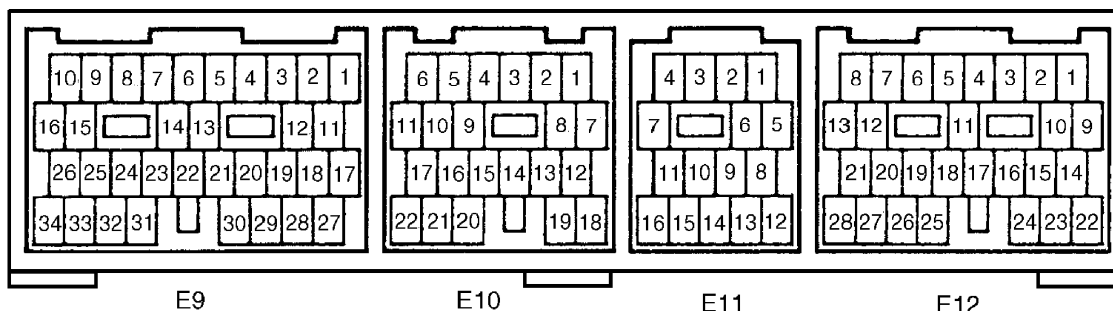
Fig. 29: ECT ECU Pin Voltage Table - 1997-98 T100 2.7L (Component Connector View)
Courtesy of Toyota Motor Sales, U.S.A.,



Symbols (Terminals No.)	Wiring Color	Condition	Voltage (V)
S1 – E1 (E7, 11 – E5, 16)	W ↔ BR	IG ON	9 ~ 14
		IG ON and 1st or 2nd gear	9 ~ 14
		IG ON and 3rd or OD gear	Below 1.5
S2 – E1 (E7, 17 – E5, 16)	B–W ↔ BR	IG ON	Below 1.5
		IG ON and 2nd or 3rd gear	9 ~ 14
		IG ON and 1st or OD gear	Below 1.5
SL – E1 (E7, 27 – E5, 16)	Y–B ↔ BR	IG ON	Below 1.5
		Vehicle driving under lock-up position	9 ~ 14
SP2 – E1 (E6, 9 – E5, 16)	BR–R ↔ BR	IG ON and turn one rear wheel slowly	Pulse signal is output Below 1.5 ↔ 4 ~ 6
OD1 – E1 (E4, 7 – E5, 16)	Y–R ↔ BR	IG ON	9 ~ 14
OD2 – E1 (E4, 6 – E5, 16)	Y–G ↔ BR	IG ON and OD main switch ON (OD OFF)	Below 3
		IG ON and OD main switch OFF (OD ON)	9 ~ 14
OIL – E2 (E6, 12 – E6, 22)	G–B ↔ BR–B	ATF temperature: 110°C (230°F) or more	Below 1.5
L – E1 (E4, 3 – E5, 16)	V–W ↔ BR	IG ON and Shift lever L position	7.5 ~ 14
		IG ON and Shift lever other than L position	Below 1.5
2 – E1 (E4, 2 – E5, 16)	P–G ↔ BR	IG ON and Shift lever 2 position	7.5 ~ 14
		IG ON and Shift lever other than 2 position	Below 1.5
R – E1 (E4, 1 – E11, 16)	R–B ↔ BR	IG ON and Shift lever R position	7.5 ~ 14
		IG ON and Shift lever other than R position	Below 1.5
NSW – E1 (E7, 14 – E6, 16)	B–O ↔ BR	IG ON and Shift lever P or N position	Below 3
		IG ON and Shift lever other than P or N position	9 ~ 14
TFN – E1 (E4, 17 – E5, 16)	Y ↔ BR	IG ON and Transfer shift position N	Below 3
		IG ON and Transfer shift position other N	9 ~ 14

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Fig. 30: ECT ECU Pin Voltage Table - 1997-98 T100 3.4L (Component Connector View)
Courtesy of Toyota Motor Sales, U.S.A.,

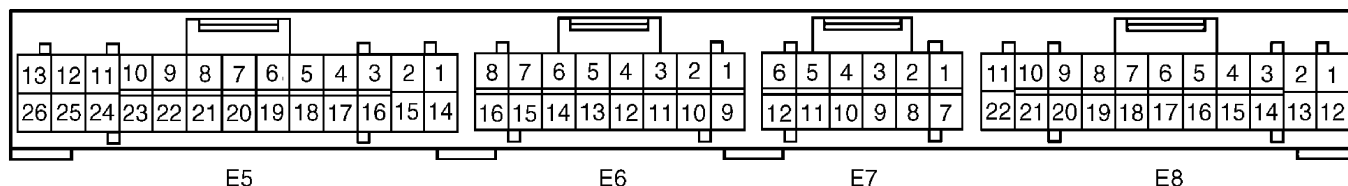


Symbols (Terminals No.)	Wiring Color	Condition	Voltage (V)
S1 – E1 (E9, 11 – E11, 16)	LG–R ↔ BR	IG ON	9 ~ 14
		1st or 2nd gear	9 ~ 14
		3rd or OD gear	Below 1.5
S2 – E1 (E9, 17 – E11, 16)	LG ↔ BR	IG ON	Below 1.5
		2nd or 3rd gear	9 ~ 14
		1st or OD gear	Below 1.5
SL – E1 (E9, 27 – E11, 16)	G–R ↔ BR	IG ON	Below 1.5
		Vehicle driving under lock-up position	9 ~ 14
SP2+ – SP2- (E10, 9 – E10, 4)	Y–R ↔ W–R	Engine is running	Pulse signal is output Below 1.5 ↔ 4 ~ 6
OD1 – E1 (E12, 7 – E11, 16)	BR–Y ↔ BR	IG ON	9 ~ 14
OD2 – E1 (E12, 6 – E11, 16)	L–O ↔ BR	OD main switch ON (OD OFF)	Below 3
		OD main switch OFF (OD ON)	9 ~ 14
OIL – E2 (E9, 30 – E10, 22)	V–Y ↔ BR–B	ATF temperature: 115°C (239°F) or more	Below 1.5
L – E1 (E12, 1 – E11, 16)	LG ↔ BR	IG ON and Shift lever L position	9 ~ 14
		IG ON and Shift lever other than L position	Below 1.5
2 – E1 (E12, 10 – E11, 16)	V–R ↔ BR	IG ON and Shift lever 2 position	9 ~ 14
		IG ON and Shift lever other than 2 position	Below 1.5
R – E1 (E12, 15 – E11, 16)	R–Y ↔ BR	IG ON and Shift lever R position	9 ~ 14
		IG ON and Shift lever other than R position	Below 1.5
NSW – E1 (E9, 14 – E11, 16)	B ↔ BR	IG ON and Shift lever P or N position	Below 1.5
		IG ON and Shift lever other than P or N position	9 ~ 14
TFN – E1 (E11, 9 – E11, 16)	L–R ↔ BR	IG ON and Transfer shift position H2 or H4	9 ~ 14
		IG ON and Transfer shift position L4	Below 1.5
PWR – E1 (E10, 12 – E9, 24)	G–R ↔ BR	IG ON and Pattern select switch "NORM"	Below 1.5
		IG ON and Pattern select switch "PWR"	9 ~ 14

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Fig. 31: ECT ECU Pin Voltage Table – 1997–98 4Runner 2.7L
(Component Connector View)

Courtesy of Toyota Motor Sales, U.S.A.,



Symbols (Terminals No.)	Wiring Color	Condition	Voltage (V)
S1 – E1 (E5, 8 – E5, 24)	LG–R ↔ BR	IG ON	9 ~ 14
		1st or 2nd gear	9 ~ 14
		3rd or OD gear	Below 1.5
S2 – E1 (E5, 21 – E5, 24)	LG ↔ BR	IG ON	Below 1.5
		2nd or 3rd gear	9 ~ 14
		1st or OD gear	Below 1.5
SL – E1 (E5, 20 – E5, 24)	G–R ↔ BR	IG ON	Below 1.5
		Vehicle driving under lock-up position	9 ~ 14
SP2+ – SP2- (E7, 9 – E7, 3)	Y–R ↔ W–R	Engine is running	Pulse signal is output Below 1.5 ↔ 4 ~ 6
OD1 – E1 (E8, 18 – E5, 24)	BR–Y ↔ BR	IG ON	9 ~ 14
OD2 – E1 (E8, 5 – E5, 24)	L–O ↔ BR	OD main switch ON (OD OFF)	Below 3
		OD main switch OFF (OD ON)	9 ~ 14
OIL – E2 (E5, 16 – E6, 9)	V–Y ↔ BR–B	ATF temperature: 115°C (239°F) or more	Below 1.5
L – E1 (E12, 15 – E5, 24)	LG ↔ BR	IG ON and Shift lever L position	9 ~ 14
		IG ON and Shift lever other than L position	Below 1.5
2 – E1 (E12, 16 – E5, 24)	V–R ↔ BR	IG ON and Shift lever 2 position	9 ~ 14
		IG ON and Shift lever other than 2 position	Below 1.5
R – E1 (E12, 17 – E5, 24)	R–Y ↔ BR	IG ON and Shift lever R position	9 ~ 14
		IG ON and Shift lever other than R position	Below 1.5
NSW – E1 (E8, 22 – E5, 24)	B ↔ BR	IG ON and Shift lever P or N position	Below 1.5
		IG ON and Shift lever other than P or N position	9 ~ 14
TFN – E1 (E8, 13 – E5, 24)	L–R ↔ BR	IG ON and Transfer shift position H2 or H4	9 ~ 14
		IG ON and Transfer shift position L4	Below 1.5
PWR – E1 (E8, 14 – E5, 24)	G–R ↔ BR	IG ON and Pattern select switch "NORM"	Below 1.5
		IG ON and Pattern select switch "PWR"	9 ~ 14

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 Fig. 32: ECT ECU Pin Voltage Table – 1997–98 4Runner 3.4L
 (Component Connector View)
 Courtesy of Toyota Motor Sales, U.S.A.,

COMPONENT TESTS

NO. 1 VEHICLE SPEED SENSOR (VSS)

NOTE: LS400 is equipped with only one speed sensor.

Lexus LS400

1) Remove speed sensor from transmission. See Fig. 1. Using DVOM, measure resistance between sensor terminals. Resistance should be 560–680 ohms. If resistance is not as specified, replace sensor. If

resistance is as specified, check and repair circuits between sensor and ECT ECU.

2) Check voltage between sensor terminals when a magnet is passed close to tip of speed sensor. See Fig. 14. If a low intermittent voltage is generated, sensor is okay. If no voltage is generated, replace speed sensor.

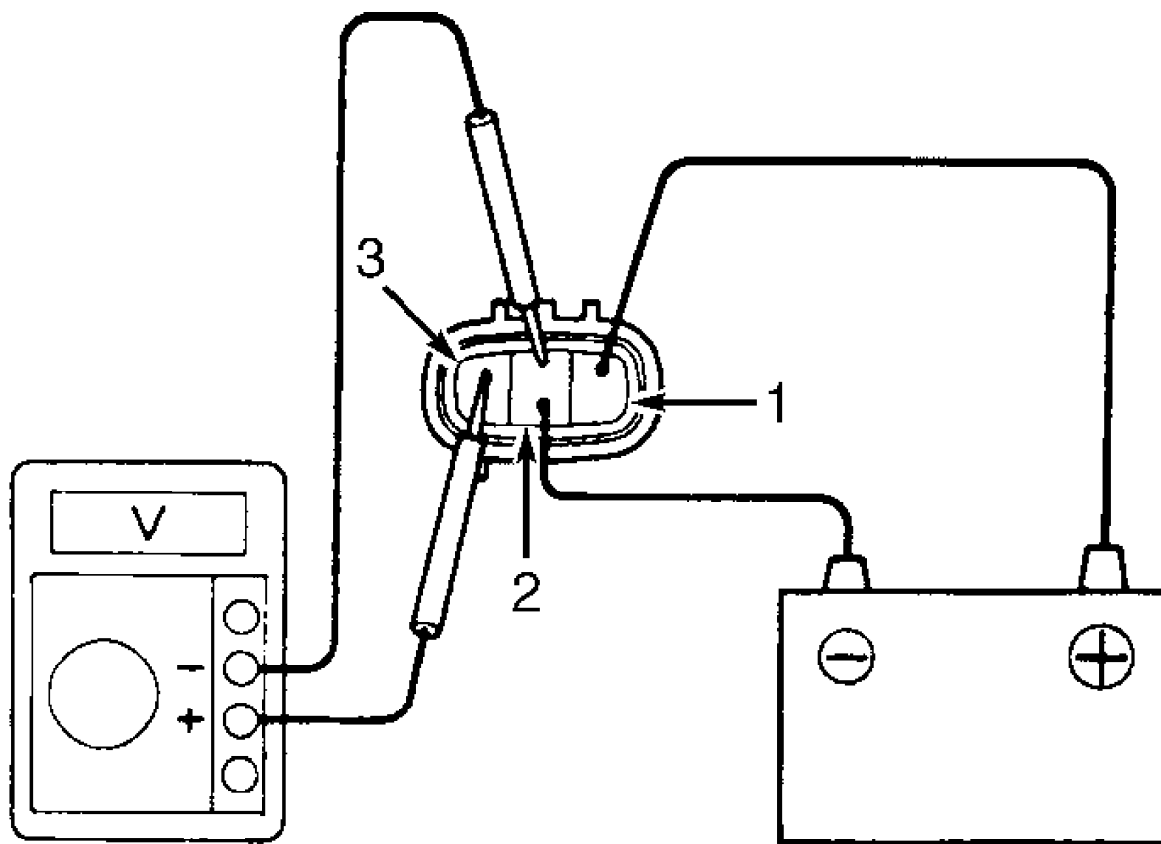
Tacoma & T100

Ensure continuity exists between terminals "A" and "B" 4 times per revolution of speedometer shaft. See Figs. 35 and 36. If continuity is as specified, replace speedometer.

Except Lexus LS400, Tacoma & T100

1) Disconnect electrical connector from No. 1 vehicle speed sensor. See Figs. 2, 3, 4 and 8. Connect positive battery lead to terminal No. 1 and negative lead to terminal No. 2. Connect positive lead of voltmeter to terminal No. 3 and negative lead to terminal No. 2. See Figs. 33 and 34.

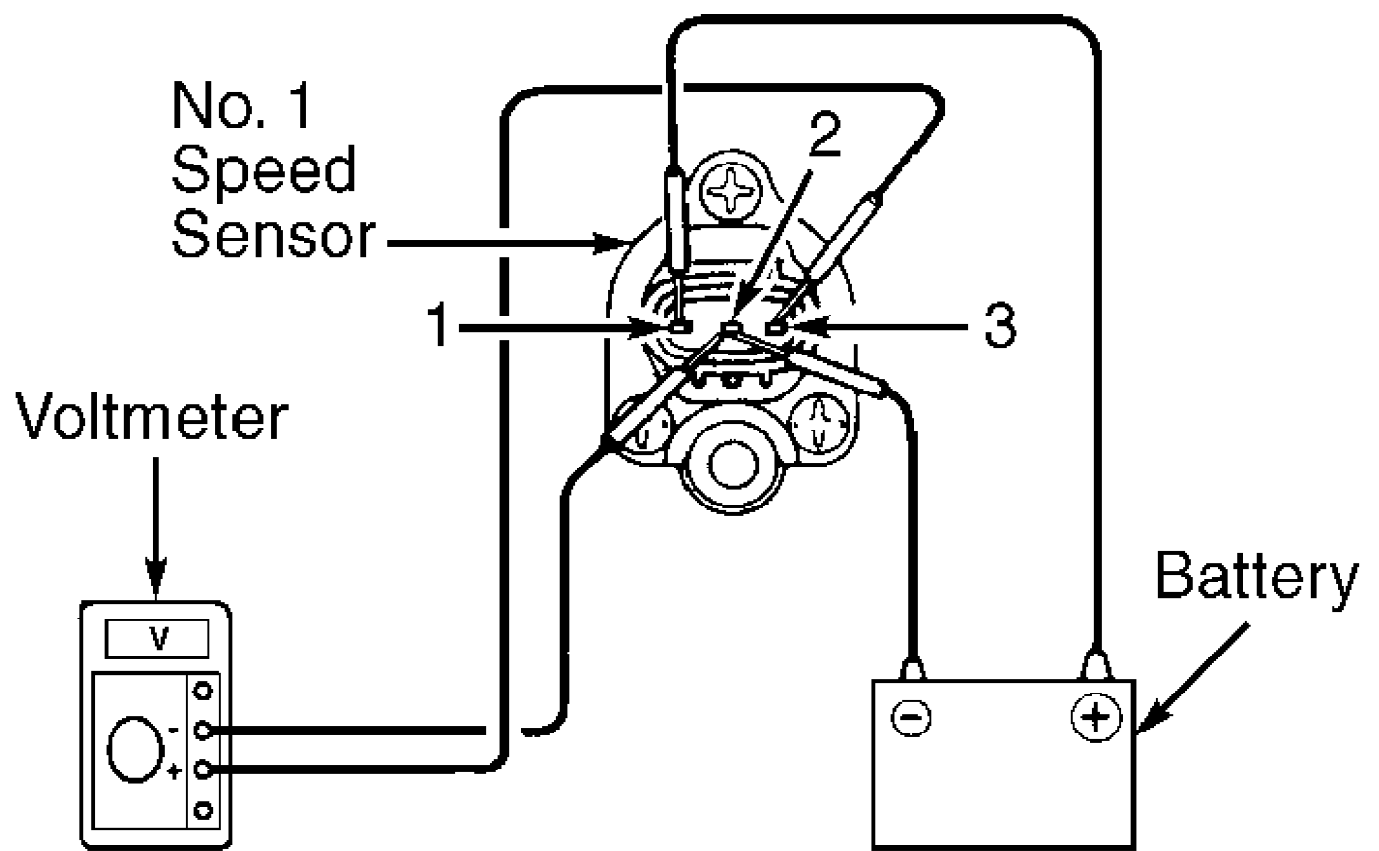
2) Raise and support one vehicle rear wheel. Rotate wheel and monitor voltmeter. Ensure voltage changes from zero to 11 volts. Voltage should change 4 times per each revolution of speedometer cable shaft. Replace speed sensor if voltage does not change as specified.



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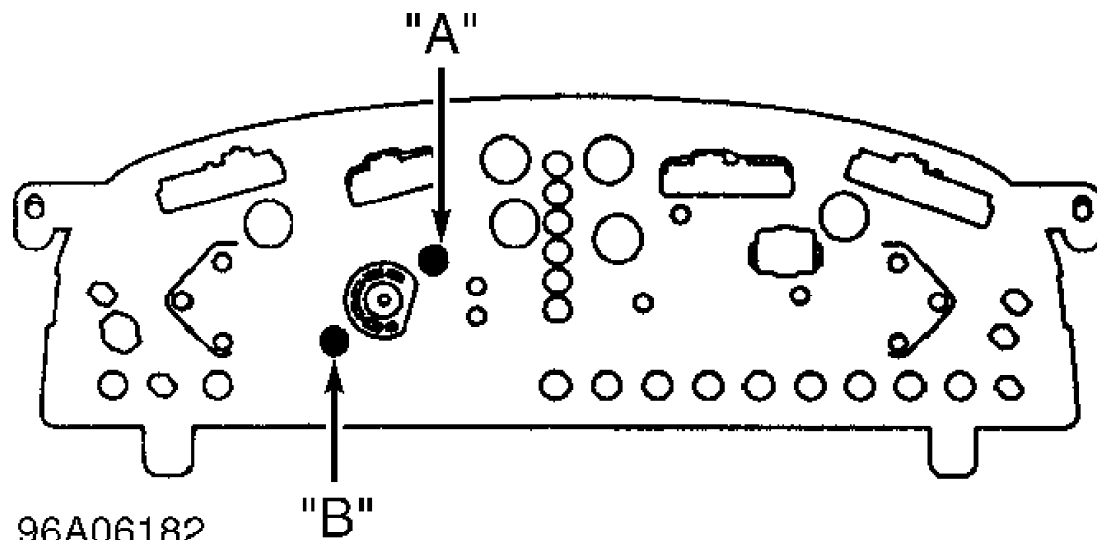
Fig. 33: Checking No. 1 Vehicle Speed Sensor (Except Tacoma, T100 & 4Runner 4WD)

Courtesy of Toyota Motor Sales, U.S.A.,



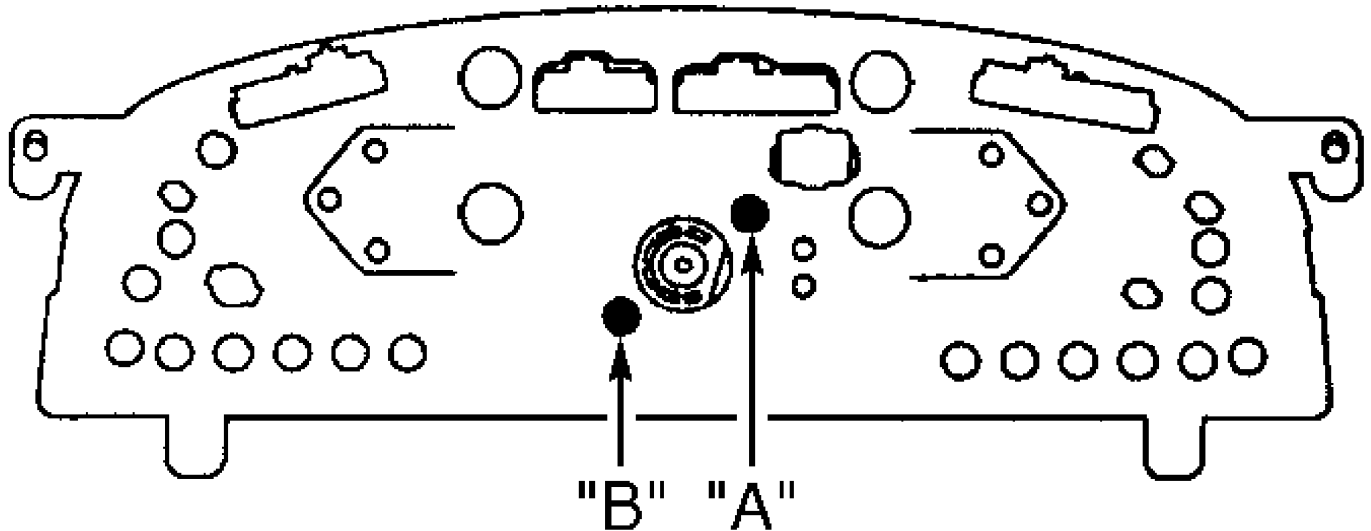
93G24154

Fig. 34: Checking No. 1 Vehicle Speed Sensor (4Runner 4WD)
Courtesy of Toyota Motor Sales, U.S.A.,



96A06182

Fig. 35: Checking No. 1 Vehicle Speed Sensor (Tacoma & T100 -
With Tachometer)
Courtesy of Toyota Motor Sales, U.S.A.,



96C06183

Fig. 36: Checking No. 1 Vehicle Speed Sensor (Tacoma & T100 - Without Tachometer)
Courtesy of Toyota Motor Sales, U.S.A.,

NO. 1 & NO. 2 SOLENOIDS

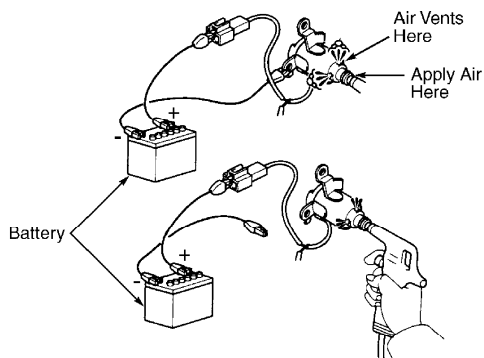
1) To check solenoid seals, remove suspect solenoid. Connect battery voltage to solenoid. Apply 71 psi (5 kg/cm²) to solenoid with battery voltage connected. See Fig. 37.

2) With battery voltage applied, air should pass through solenoid. Disconnect voltage to solenoid. Ensure air does not pass through solenoid. Replace solenoid if defective.

LOCK-UP SOLENOID

1) To check solenoid seals, remove suspect solenoid. Connect battery voltage to solenoid. Apply 71 psi (5 kg/cm²) to solenoid with battery voltage connected. See Fig. 37.

2) With battery voltage applied, air should not pass through solenoid. Disconnect voltage to solenoid. Ensure air does pass through solenoid. Replace solenoid if defective.



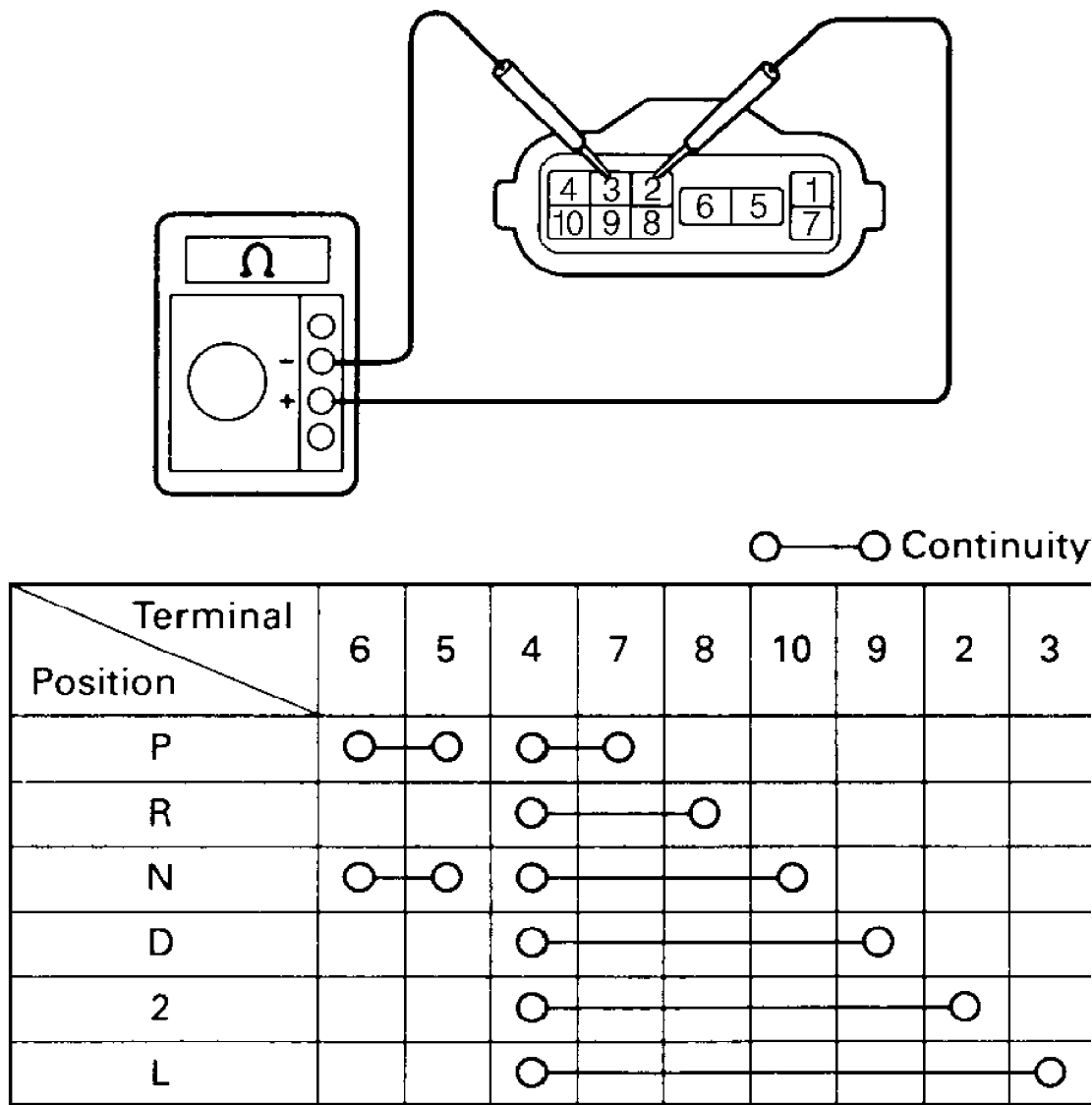
95119545
Fig. 37: Checking Solenoids
Courtesy of Toyota Motor Sales, U.S.A.,

SLN SOLENOID

Raise and support vehicle. Remove transmission oil pan. Remove appropriate solenoid. To check solenoid operation, connect positive battery voltage to solenoid terminal No. 1. Ensure a 8-10 watt bulb is placed in-line of positive lead. See Fig. 17. Connect negative lead to terminal No. 2 and monitor valve's movement. Replace as needed.

PARK/NEUTRAL POSITION (PNP) SWITCH

Disconnect harness connector at park/neutral position switch. Switch is located on side of transmission. Using ohmmeter, check for continuity between specified terminals in accordance with shift lever position. See Fig. 38. Replace PNP switch if defective.

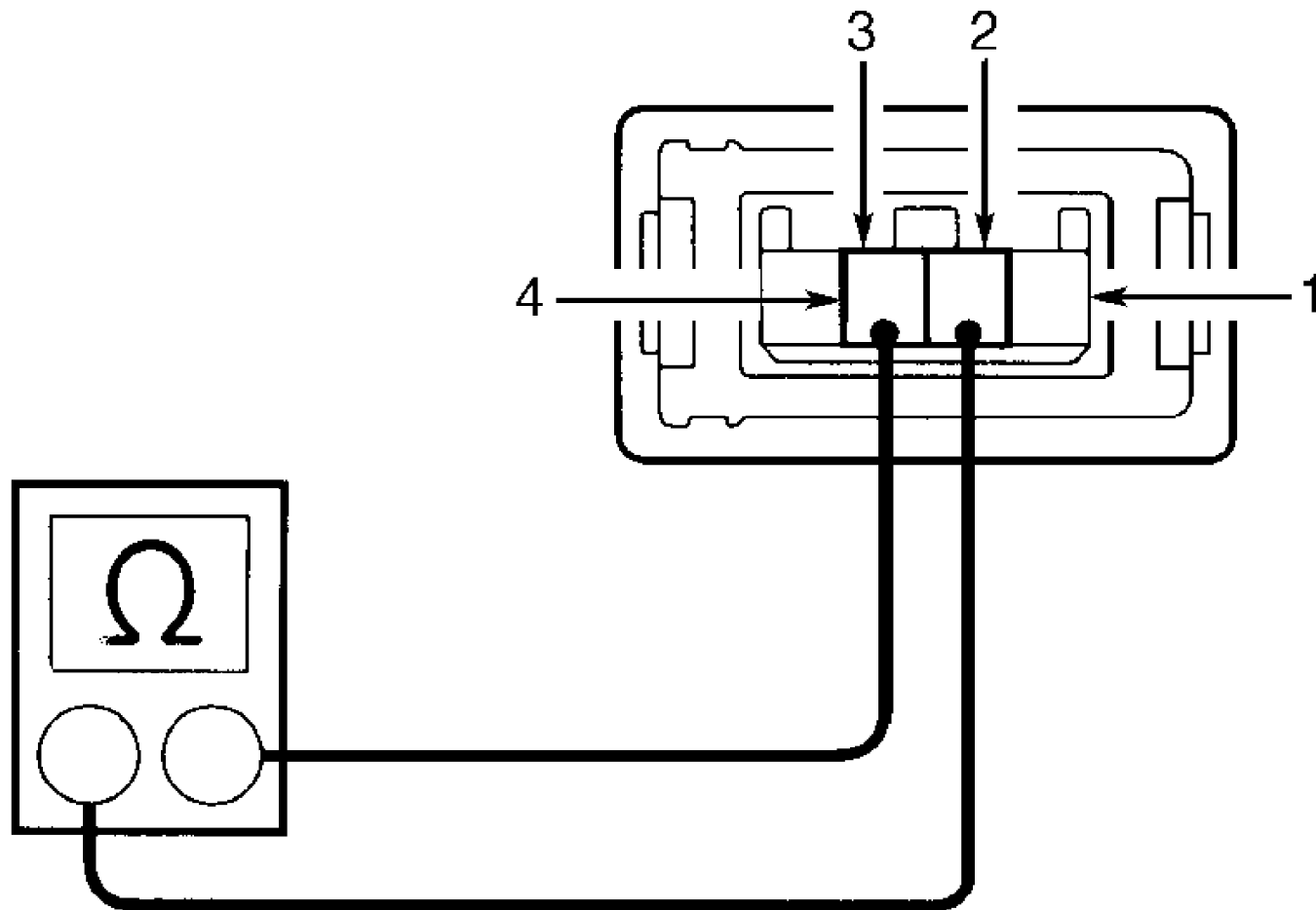


95C20398
Fig. 38: Testing Park/Neutral Position (PNP) Switch
Courtesy of Toyota Motor Sales, U.S.A.,

PATTERN SELECT SWITCH

NOTE: T100 is not equipped with a pattern select switch.

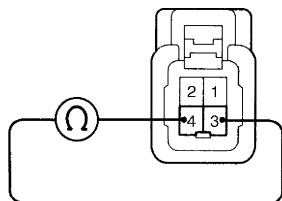
Disconnect electrical connector from pattern select switch. Using ohmmeter, ensure continuity exists between terminals No. 3 and 4 with switch in PWR position on Lexus LS400, SC300, SC400 and Supra. Ensure continuity exists between terminals No. 2 and 3 with switch in PWR position on Tacoma and 4Runner. See Figs. 39 and 40. No continuity should exist in NORM position. Replace switch as necessary.



96C29506

Fig. 39: Pattern Select Switch Terminals (Lexus LS400, Tacoma & 4Runner)

Courtesy of Toyota Motor Sales, U.S.A.,



96D29507

Fig. 40: Pattern Select Switch Terminals (Lexus SC300, SC400 & Supra)

Courtesy of Toyota Motor Sales, U.S.A.,

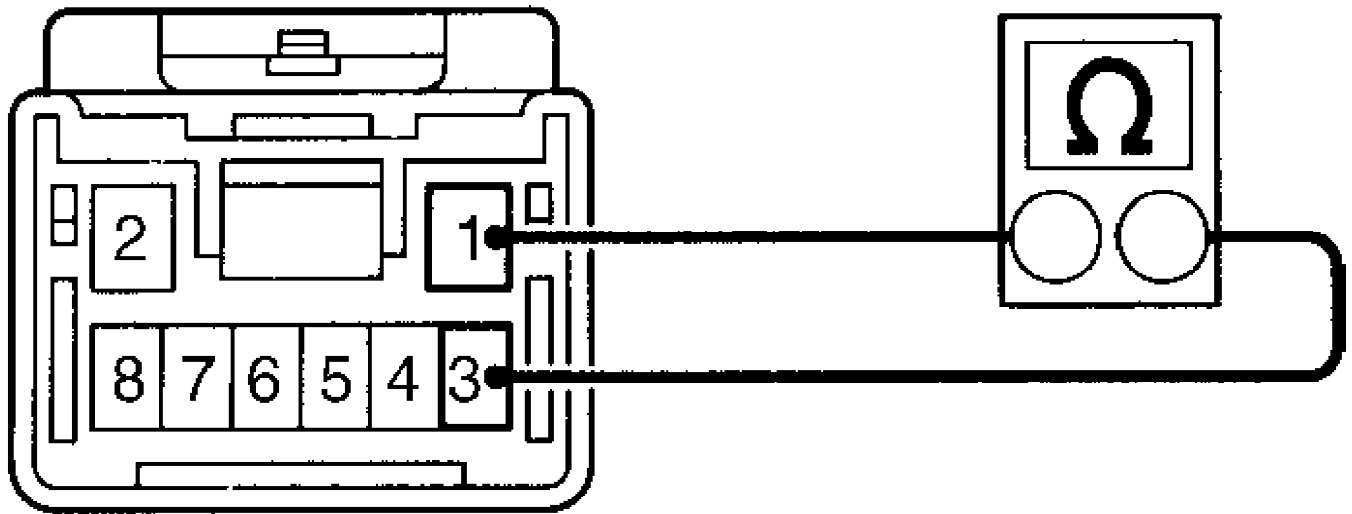
OVERDRIVE (OD) SWITCH

Except Tacoma & 4Runner

Disconnect electrical connector from OD switch, located on shift lever. Using ohmmeter, ensure continuity exists between switch terminals with switch released (OFF position). Ensure no continuity exists with switch depressed (ON position). Replace switch if defective.

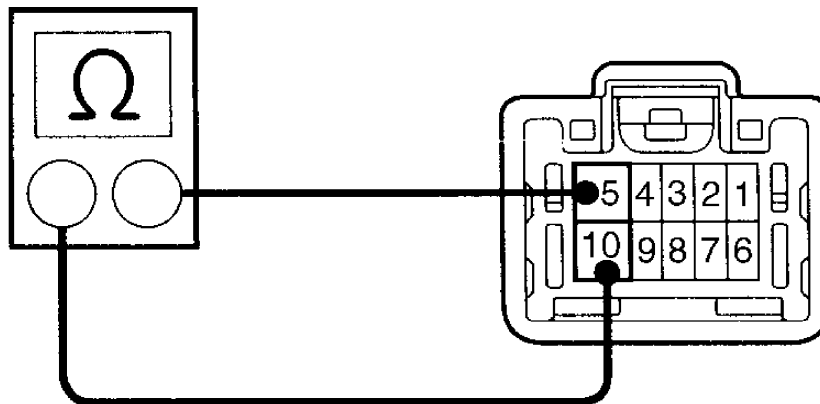
Tacoma & 4Runner

Disconnect electrical connector from OD switch, located on shift lever. Using ohmmeter, ensure continuity exists between switch terminals No. 1 and 3 on Tacoma with column shift, or terminals No. 5 and 10 on Tacoma with floor shift and 4Runner, with switch released (OFF position). Ensure no continuity exists with switch depressed (ON position). See Figs. 41 and 42. Replace switch if defective.



96E29508

Fig. 41: Checking OD Switch (Tacoma & 4Runner - Column Shift)
Courtesy of Toyota Motor Sales, U.S.A.,

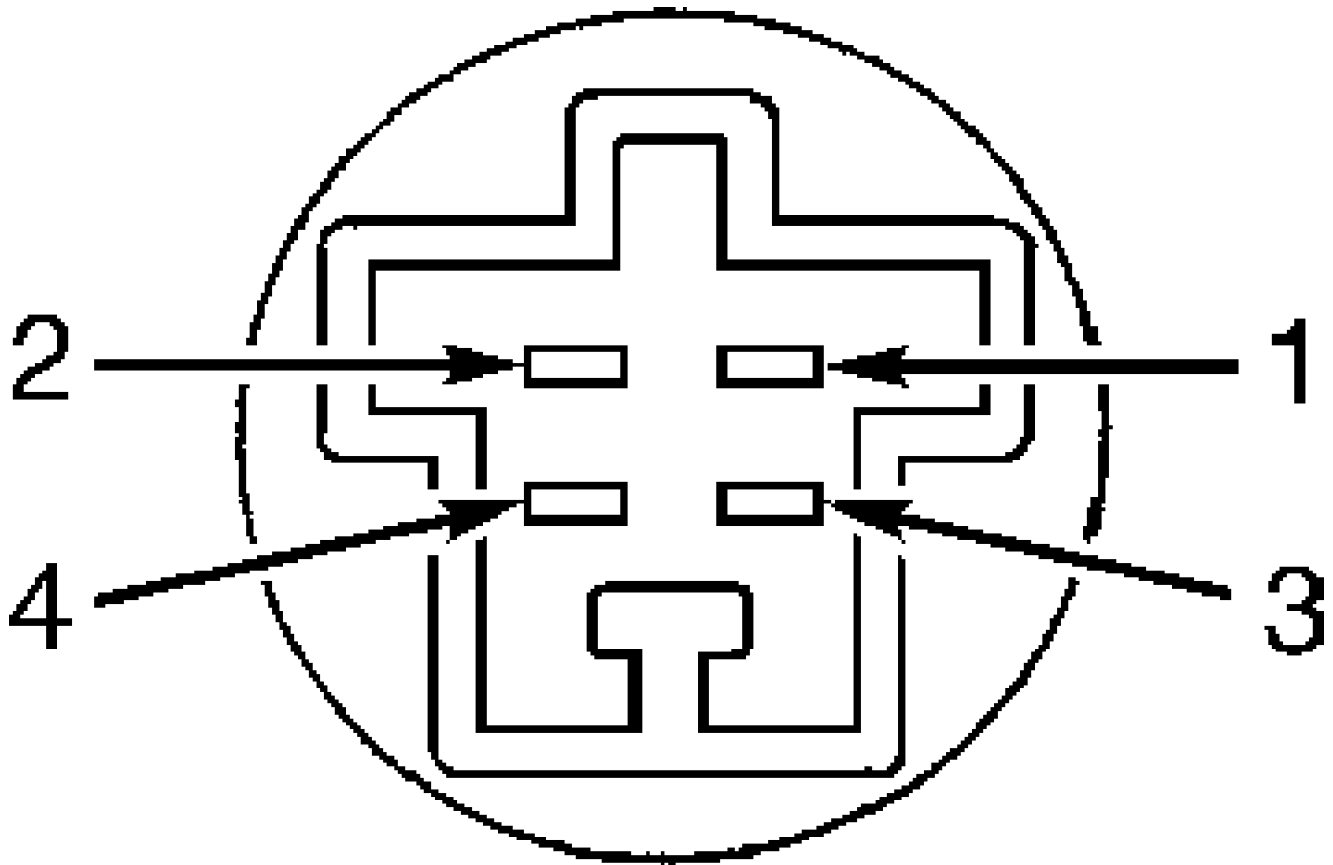


96F29509

Fig. 42: Checking OD Switch (Tacoma & 4Runner - Floor Shift)
Courtesy of Toyota Motor Sales, U.S.A.,

BRAKELIGHT SWITCH

Disconnect electrical connector from brakelight switch, located near brake pedal. Using ohmmeter, ensure continuity exists between switch terminals No. 1 and 2 with brake pedal depressed. Continuity should exist between terminals No. 3 and 4 with pedal released. See Fig. 43.



93E24160

Fig. 43: Identifying Brakelight Switch Terminals
Courtesy of Toyota Motor Sales, U.S.A.,

KICKDOWN SWITCH

Supra Non-Turbo

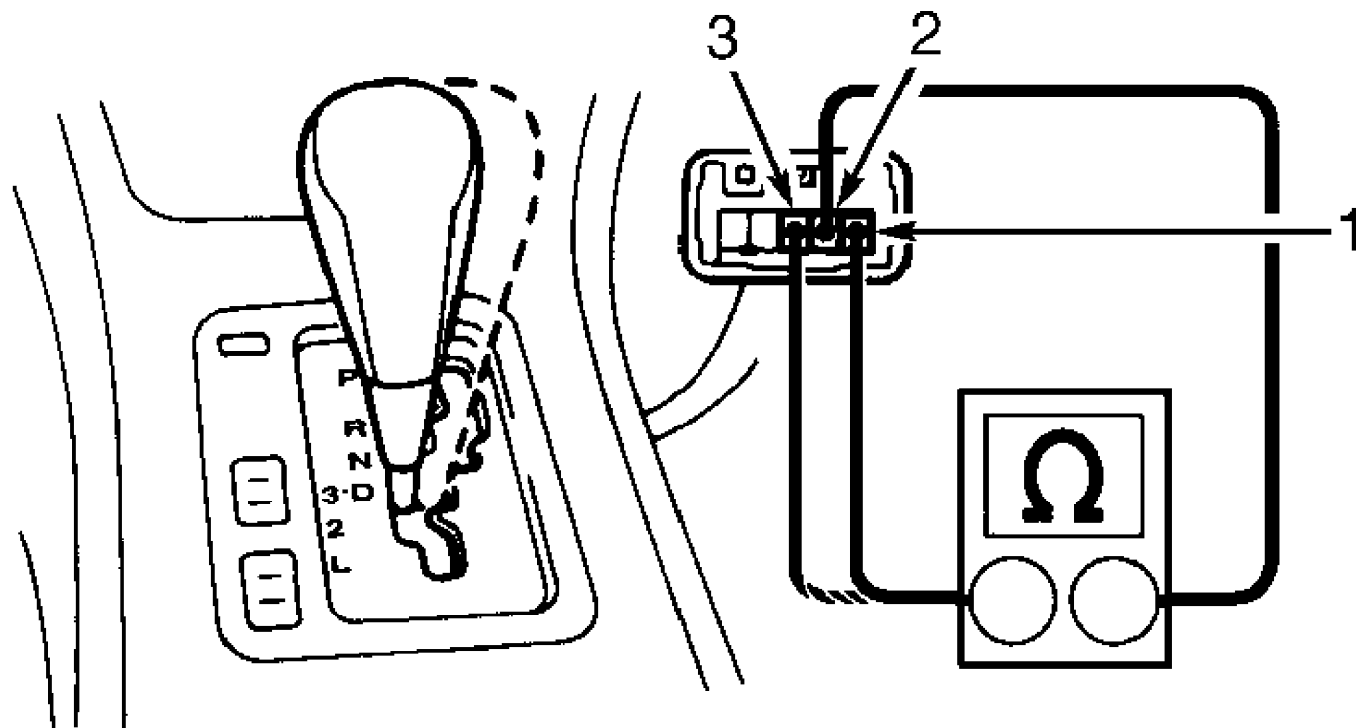
Disconnect electrical connector from kickdown switch, located under accelerator pedal. Using ohmmeter, ensure continuity does not exist between switch terminals with switch released (OFF position). Ensure continuity exists with switch depressed (ON position). Replace switch if defective.

TRANSMISSION CONTROL SWITCH

LS400

Disconnect transmission control switch, located under console. Using ohmmeter, ensure continuity exists between switch terminals No. 1 and 2 with shift lever in "3" position. Ensure

continuity exists between switch terminals No. 2 and 3 with shift lever in "D". See Fig. 44. Replace switch if defective.



96129510

Fig. 44: Identifying Transmission Control Switch Terminals (LS400)
Courtesy of Toyota Motor Sales, U.S.A.,

REMOVAL & INSTALLATION

BRAKELIGHT SWITCH

Removal & Installation

Disconnect electrical connector. Remove lock nut, and unscrew brakelight switch. To install, screw brakelight switch inward until brakelight plunger contacts brake pedal.

SOLENOIDS

Removal & Installation

Solenoids are located on transmission valve body. Raise and support vehicle. Remove transmission oil pan. Remove bolt, solenoid and "O" ring from valve body. To install, reverse removal procedure using NEW "O" ring.

PARK/NEUTRAL POSITION (PNP) SWITCH

Removal

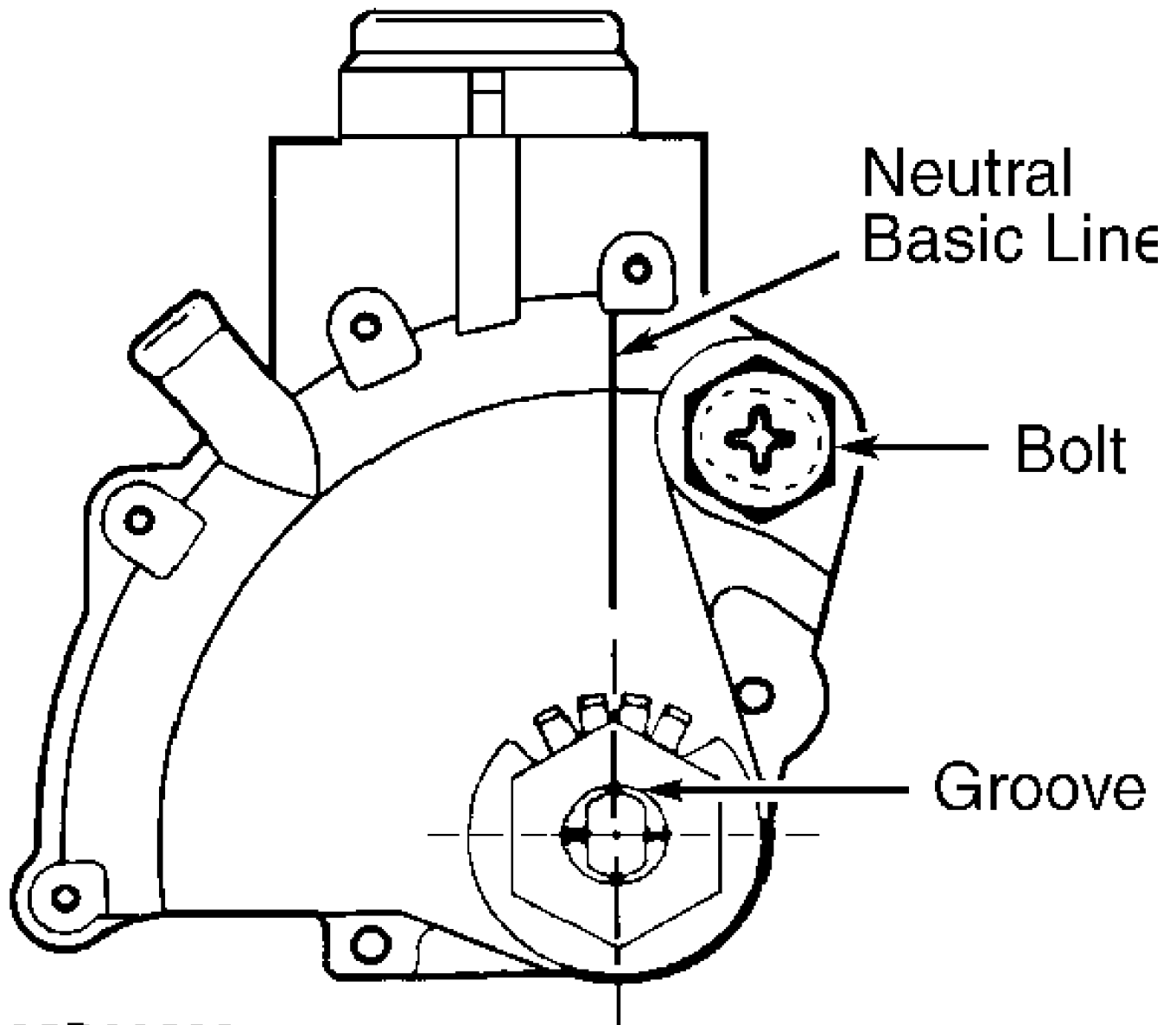
Park/Neutral Position (PNP) switch is located on side of transmission. Remove lock nut, washer and manual lever from control shaft. See Fig. 45. Bend up tabs on lock washer. Remove lock nut, lock washer and seal from control shaft. Remove retaining bolts and switch.

Installation

1) Install switch on control shaft. Loosely install switch retaining bolts. Install seal and lock washer. Install lock nut and tighten to specification. See TORQUE SPECIFICATIONS. Bend tabs on lock washer over against lock nut.

2) Ensure parking brake is applied. Temporarily install manual lever on control shaft. Place shift lever in Neutral. Remove manual lever. Rotate park/neutral position switch and align neutral basic line on PNP switch with groove. See Fig. 45.

3) Hold PNP switch in this position. Tighten retaining bolts to specification. To install remaining components, reverse removal procedure.



95D20399

Fig. 45: Removing & Installing PNP Switch
Courtesy of Toyota Motor Sales, U.S.A.,

OVERDRIVE (OD) SWITCH

Overdrive (OD) switch is mounted on shift lever. See Figs. 2-8. Replacement information not available from manufacturer.

ENGINE COOLANT TEMPERATURE SENSOR

Removal & Installation

Drain cooling system. Disconnect engine coolant temperature sensor connector. See Figs. 1-8. Remove coolant temperature sensor. To install, reverse removal procedure. Refill cooling system and check for leaks.

NO. 1 & NO. 2 VEHICLE SPEED SENSOR (VSS)

NOTE: No. 1 vehicle speed sensor on Tacoma and T100 is located in combination meter. For removal and installation procedures, see appropriate INSTRUMENT PANELS article in ACCESSORIES & EQUIPMENT section.

Removal & Installation (All Except Tacoma & T100)

Disconnect electrical connector. Remove appropriate vehicle speed sensor from transmission. See Figs. 1-4 and 8. To install, reverse removal procedure.

OD DIRECT CLUTCH SPEED SENSOR

Removal & Installation

Disconnect electrical connector from sensor. Remove bolt and sensor. See Figs. 1 and 3. To install, reverse removal procedure.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
ATF Temperature Sensor	11 (15)
No. 1 Vehicle Speed Sensor	12 (16)
	INCH Lbs. (N.m)
PNP Switch Bolt	115 (13)
PNP Switch Nut	
Lexus SC300, Supra, T100 & 4Runner	35 (3.9)
All Other Models	61 (6.9)
Solenoid Bolt	89 (10)
Speed Sensor Bolt	
LS400	48 (5.4)
No. 2 & OD Direct Clutch	48 (5.4)

WIRING DIAGRAMS

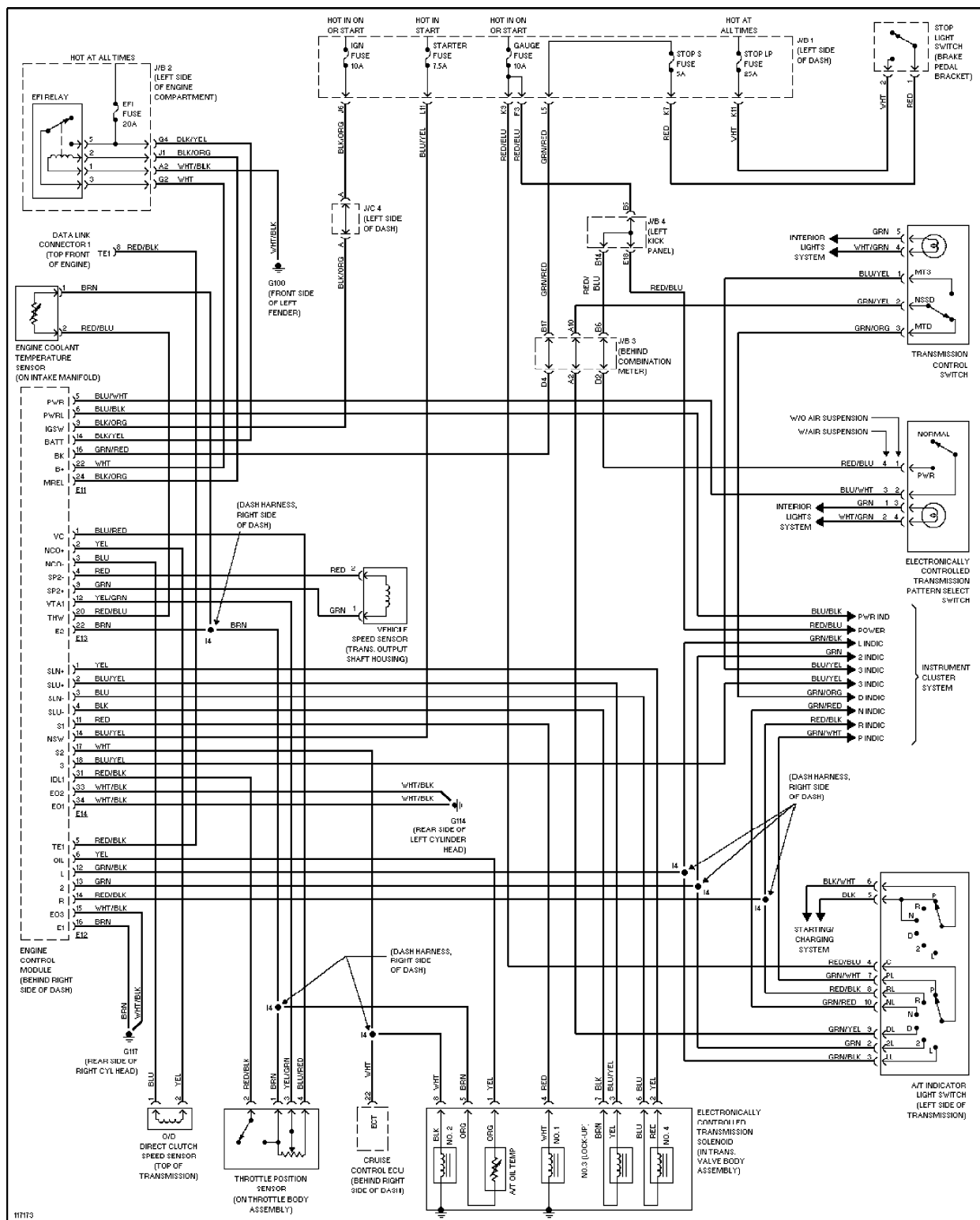


Fig. 46: Transmission Wiring Diagram (1997 Lexus LS400)

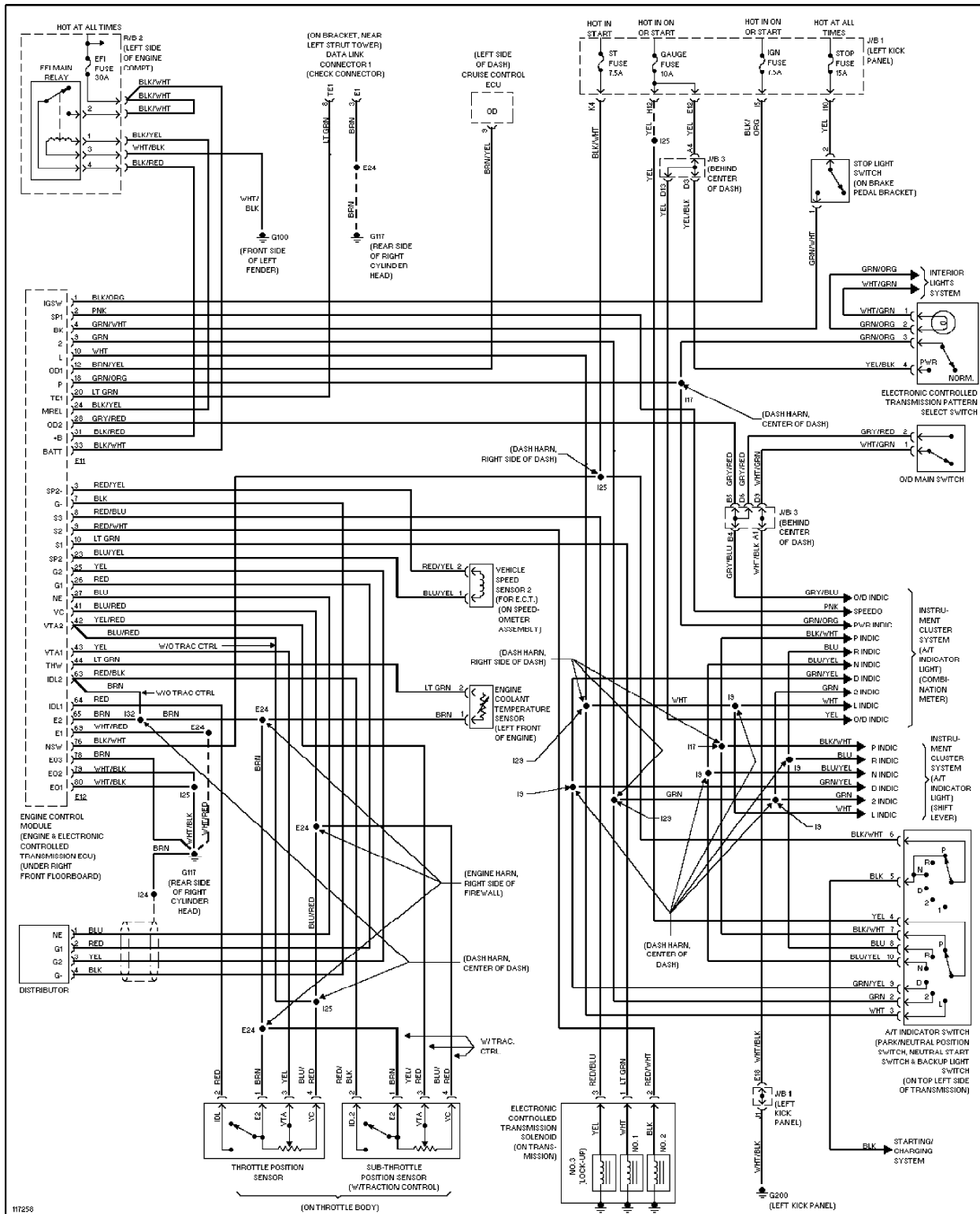
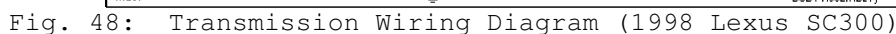


Fig. 47: Transmission Wiring Diagram (1997 Lexus SC300)



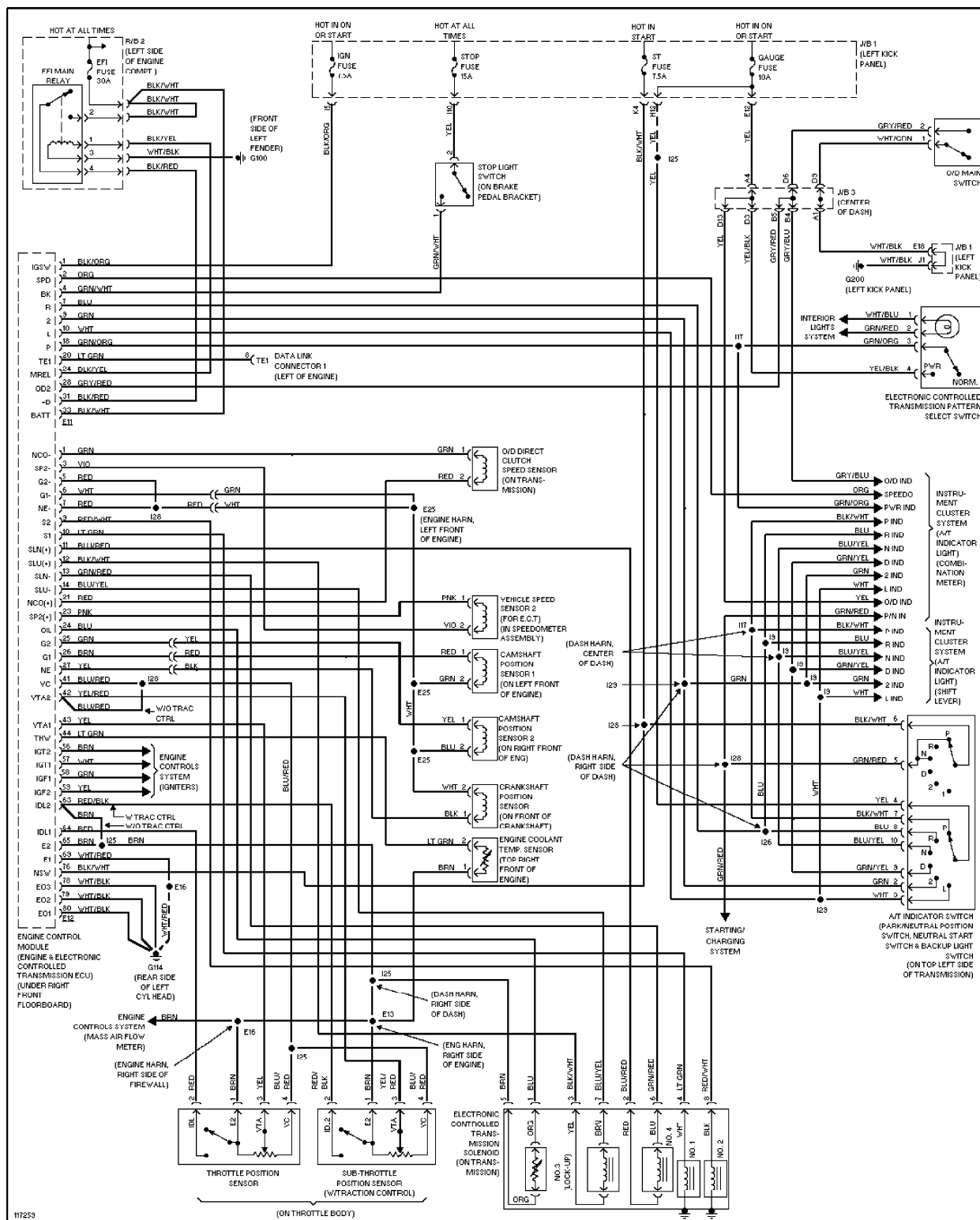
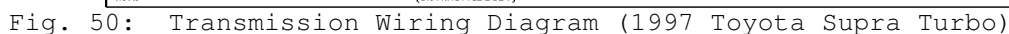


Fig. 49: Transmission Wiring Diagram (1997 Lexus SC400)



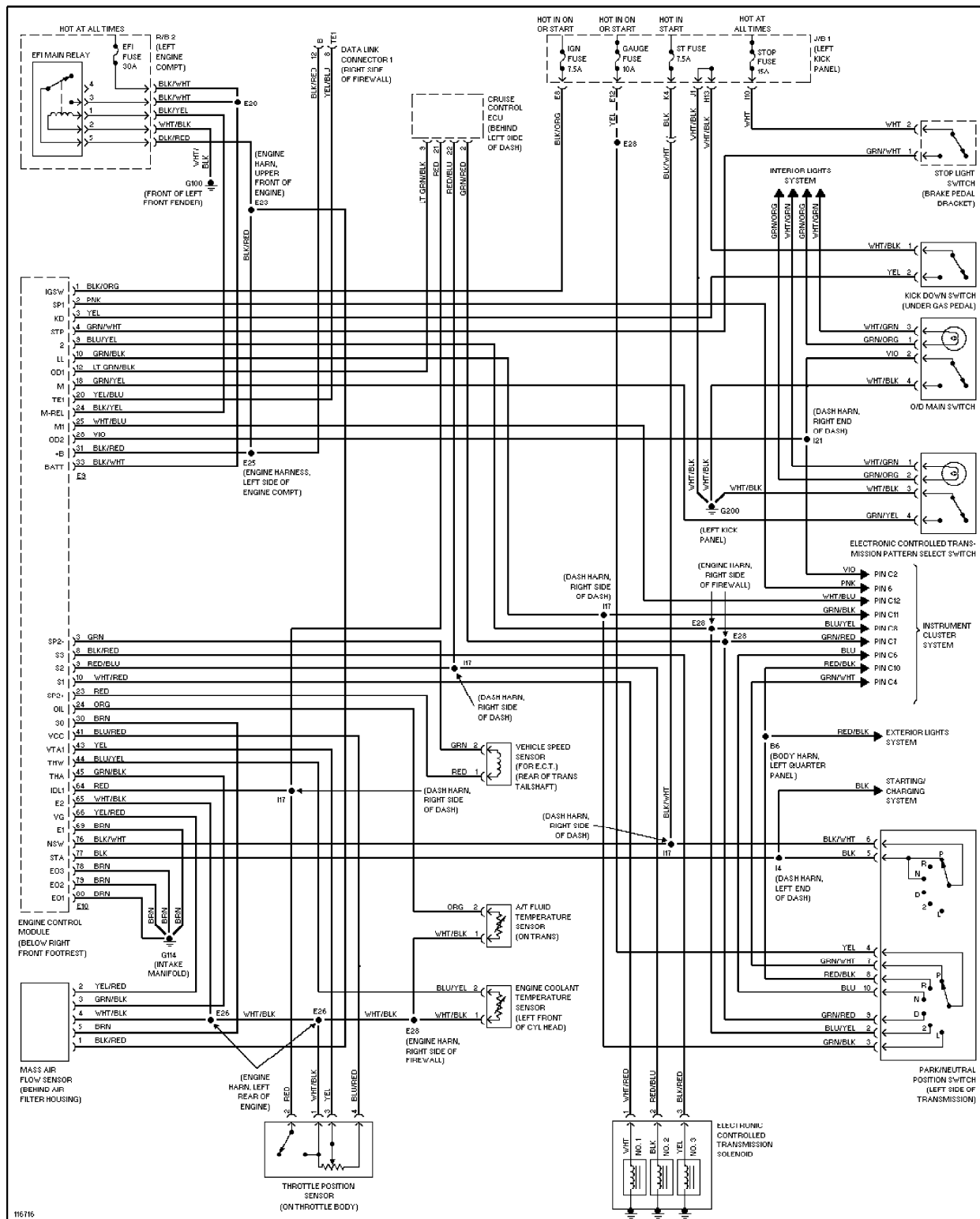


Fig. 51: Transmission Wiring Diagram (1997 Toyota Supra Non-Turbo)

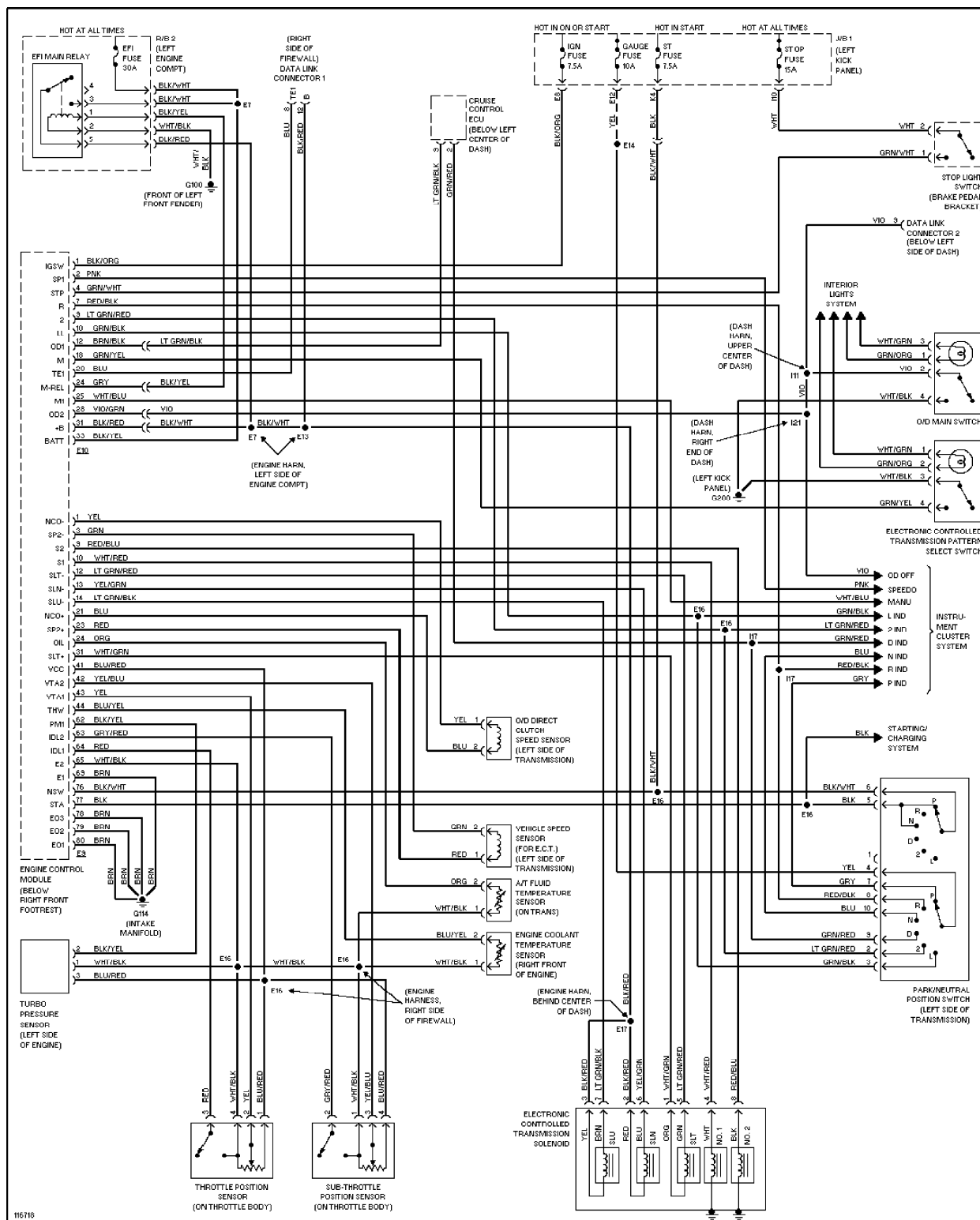


Fig. 52: Transmission Wiring Diagram (1998 Toyota Supra Turbo)

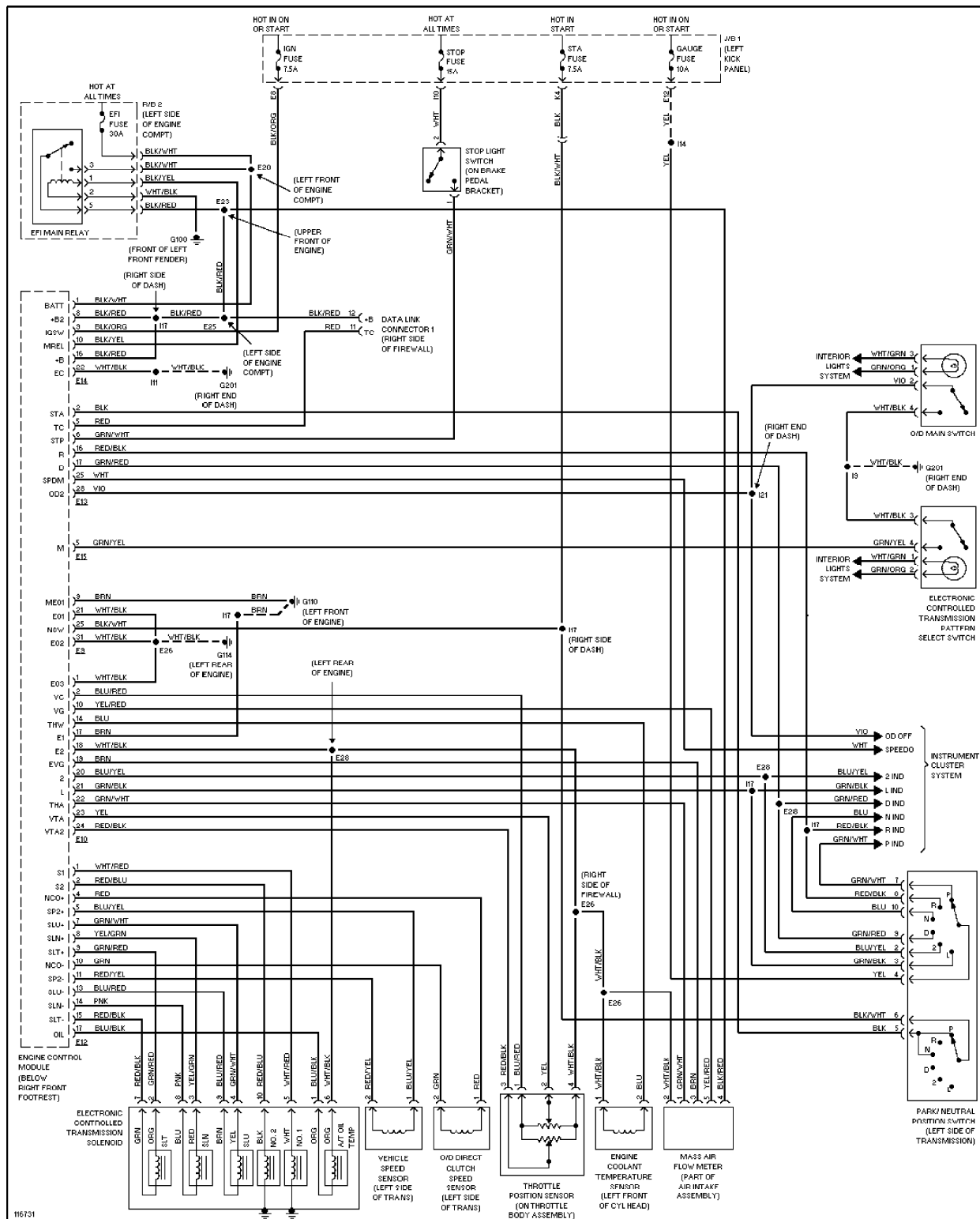


Fig. 53: Transmission Wiring Diagram (1998 Toyota Supra Non-Turbo)

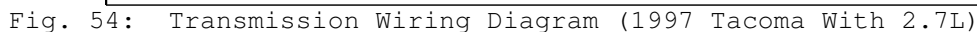
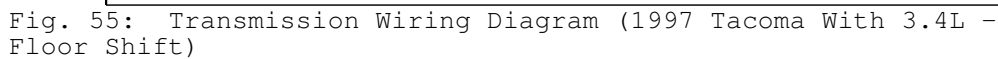


Fig. 54: Transmission Wiring Diagram (1997 Tacoma With 2.7L)



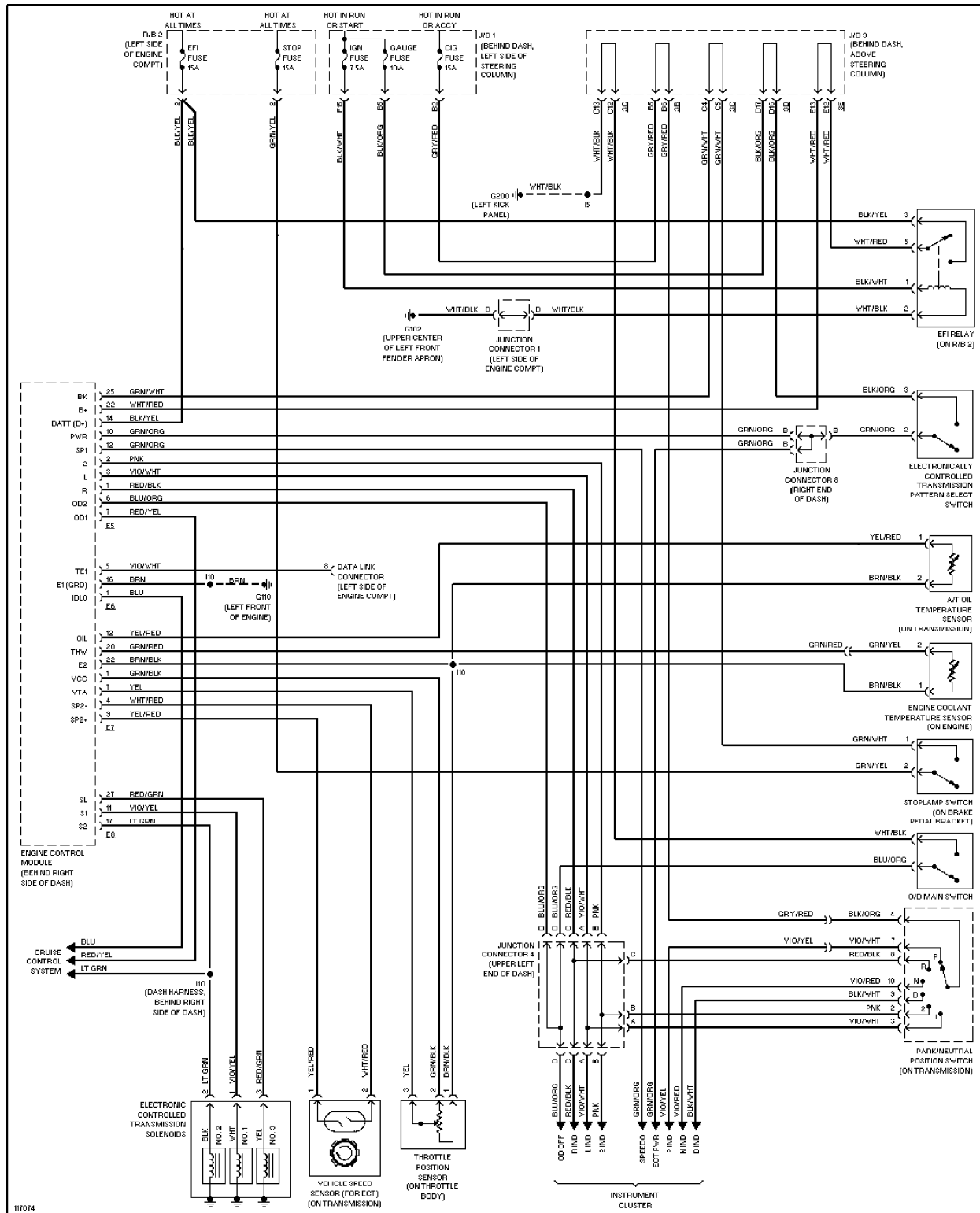
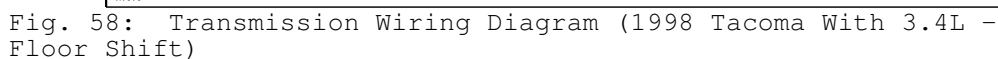


Fig. 56: Transmission Wiring Diagram (1997 Tacoma With 3.4L - Column Shift)





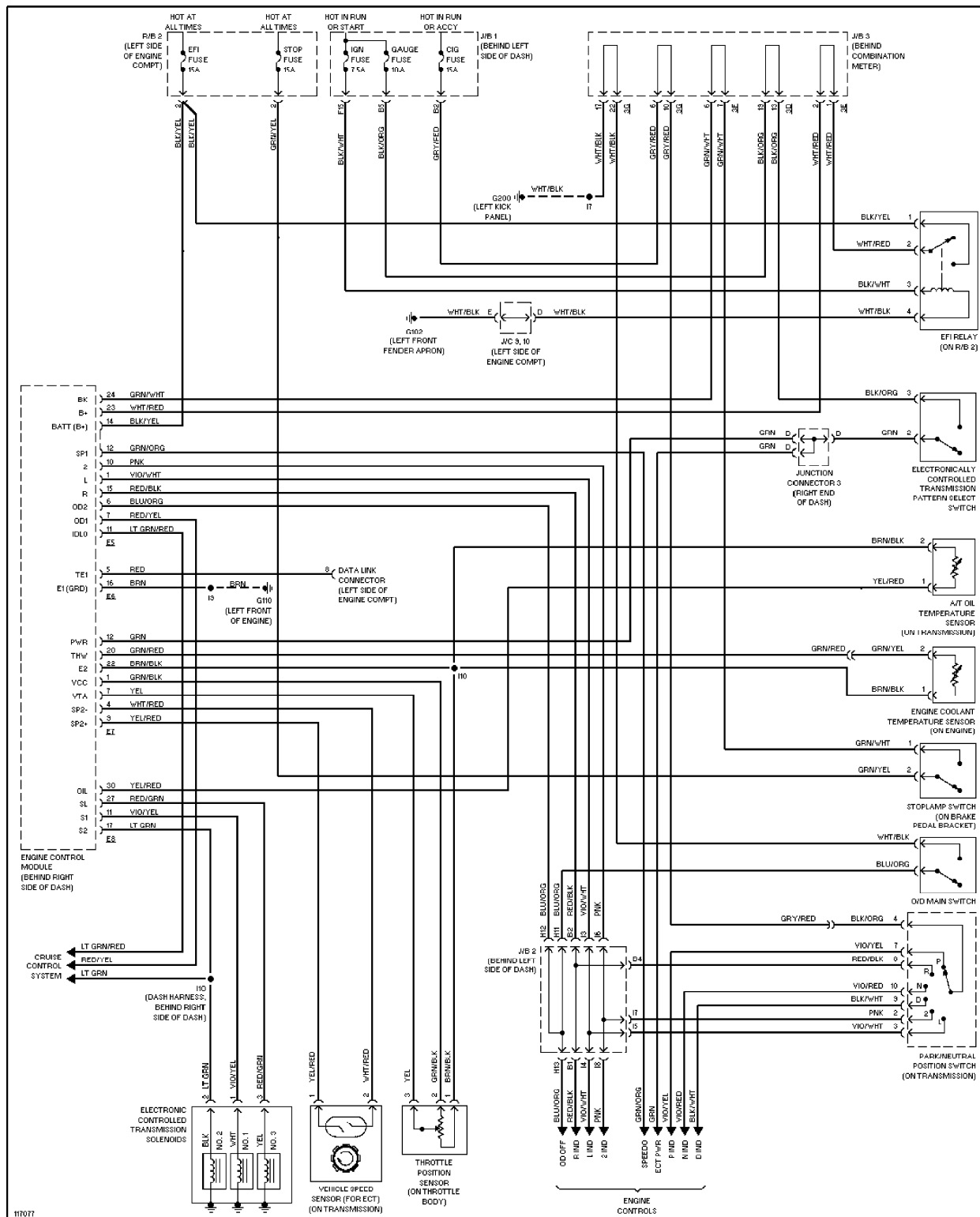
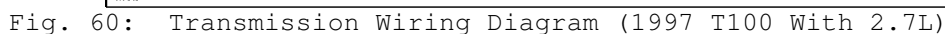
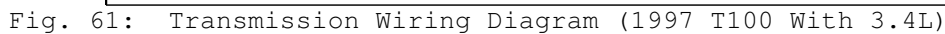
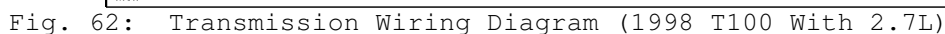


Fig. 59: Transmission Wiring Diagram (1998 Tacoma With 3.4L - Column Shift)







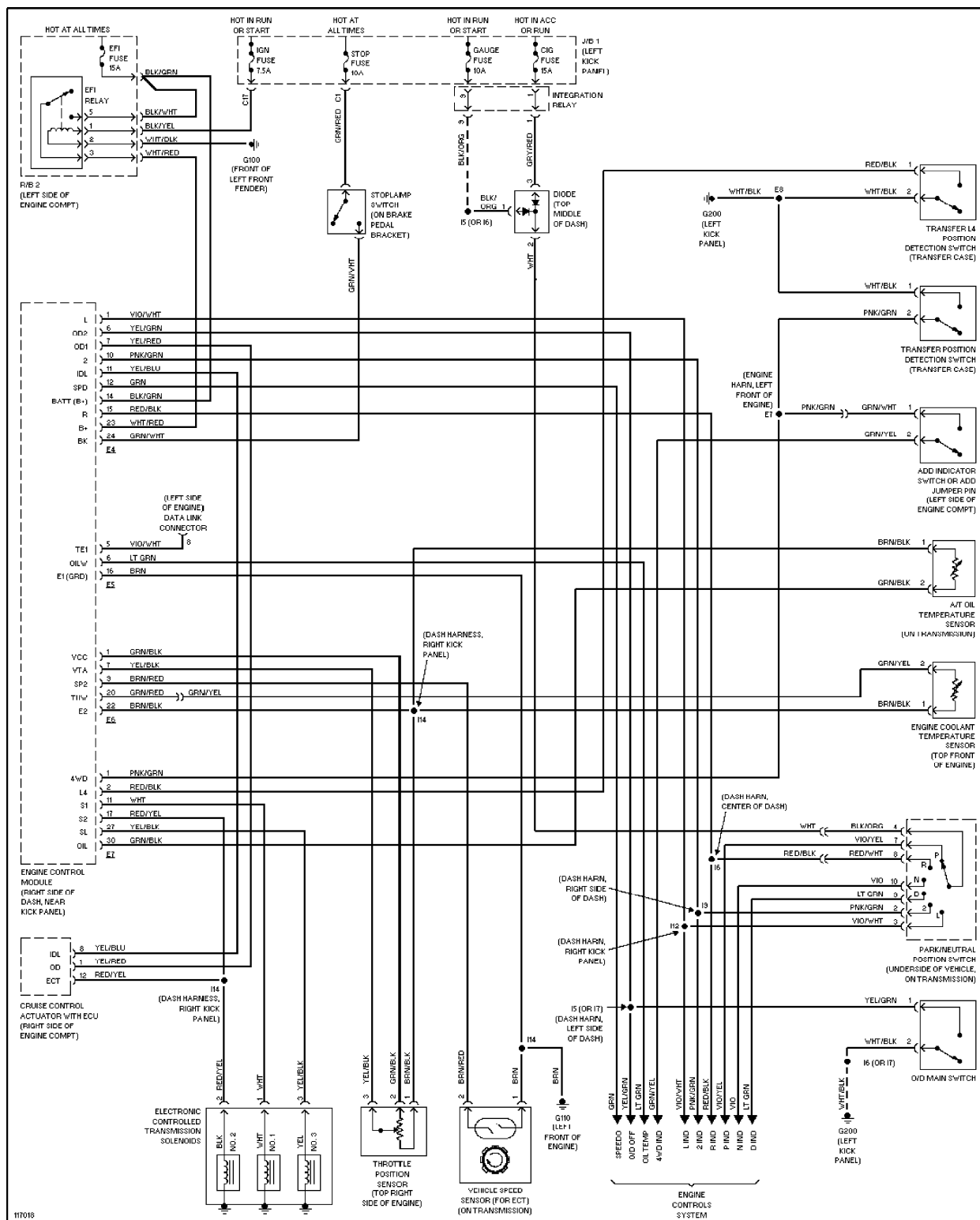


Fig. 63: Transmission Wiring Diagram (1998 T100 With 3.4L)

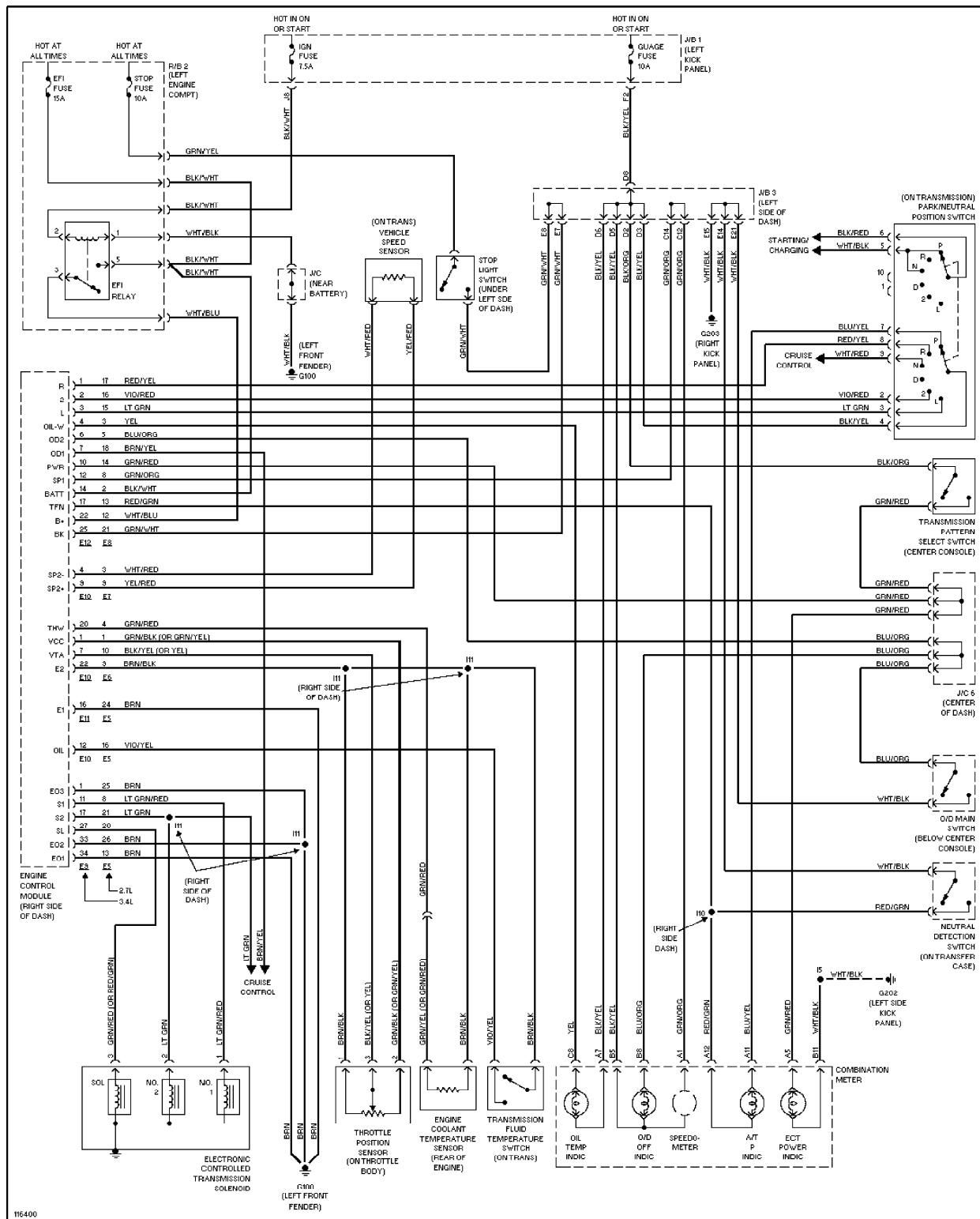


Fig. 64: Transmission Wiring Diagram (1997 4Runner)

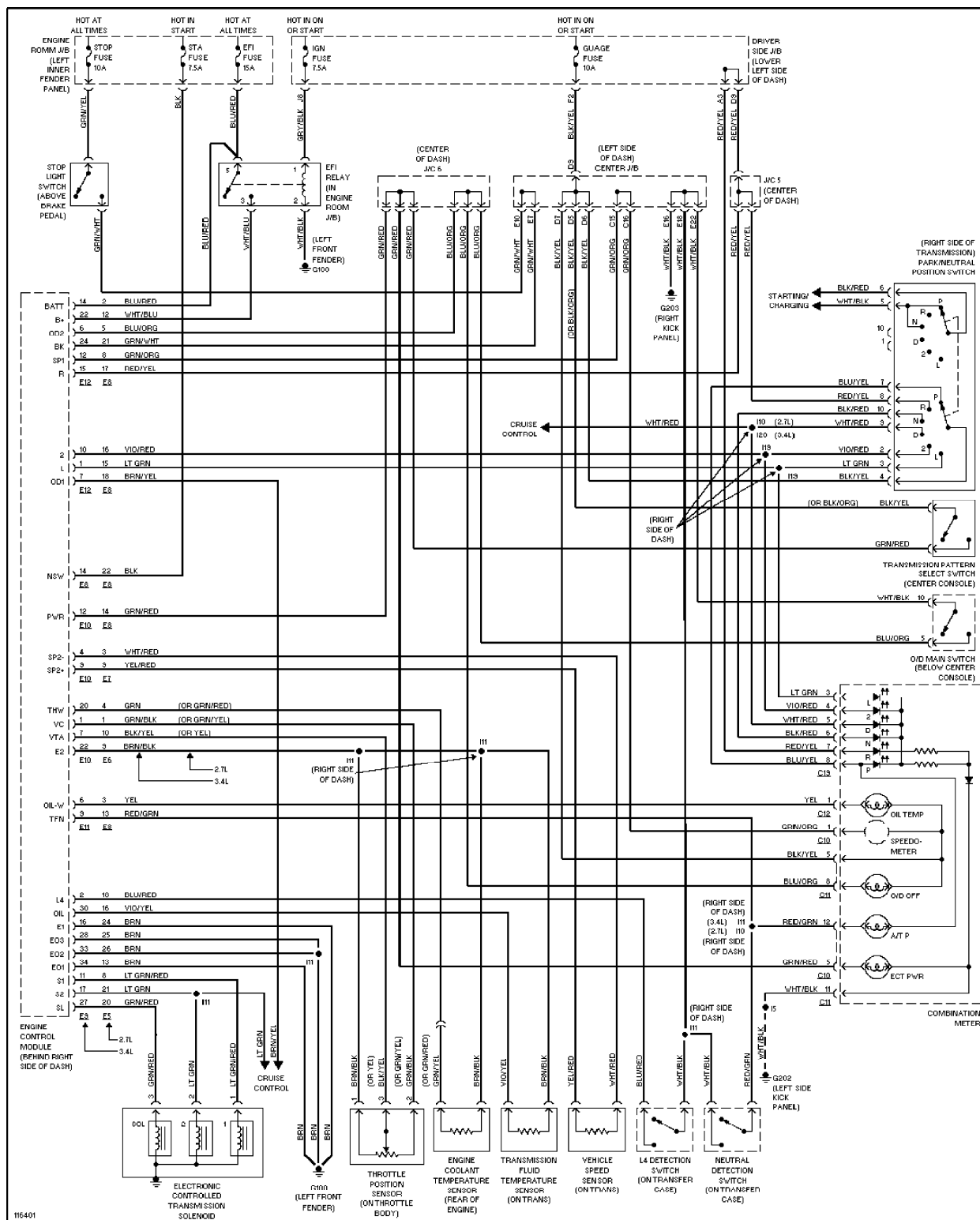


Fig. 65: Transmission Wiring Diagram (1998 4Runner)