Cruise control system consists of Cruise Control Electronic Control Unit (CC ECU), actuator, control cable, speed sensor, parking brake switch, main and cruise control switches, stoplight switch, park/neutral switch (A/T), clutch switch (M/T) and related wiring. See Fig. 1.

System allows vehicle to cruise at a desired speed greater than 25 MPH. Speed control will cancel when brake pedal or clutch pedal (M/T) is depressed, CANCEL switch is activated or automatic transmission shift lever is moved to "N" position (A/T). If vehicle speed slows to less than 25 MPH or drops 10 MPH less than preset speed, speed control will also cancel.

Pressing cruise ON-OFF (main) switch to ON position, activates cruise control system. CRUISE indicator light in instrument cluster illuminates to indicate activation of system. To set speed, increase vehicle speed to desired speed (must be over 25 MPH). Pull cruise control switch downward to SET/COAST position and release switch. Vehicle speed will now be maintained. To increase speed, depress accelerator pedal enough to exceed set speed. When accelerator pedal is released, speed will return to speed previously set.

To cancel set speed, pull cruise control switch to CANCEL position, depress brake pedal, depress clutch pedal (M/T) or place shift lever in "N" position (A/T). If vehicle speed slows to less than 25 MPH, set speed will automatically cancel. If vehicle speed drops 10 MPH less than preset speed, set speed will also automatically cancel.

Pushing cruise control switch upward to RES/ACC position allows vehicle to return to set speed before cancellation. Pushing cruise control switch upward to RES/ACC position and keeping it there gradually increases vehicle speed. Pulling cruise control switch downward to SET/COAST position and keeping it there gradually decreases vehicle speed.
Fig. 1: Locating Cruise Control Components
Courtesy of Toyota Motor Sales, U.S.A., Inc.

ACTUATOR
Actuator consists of a motor, safety magnetic clutch, control arm and position sensor. When actuator receives a signal from CC ECU, it engages safety magnetic clutch and activates motor. Motor causes control arm to move, opening or closing engine throttle valve.

When motor rotates forward, control arm also rotates via safety magnetic clutch, gears and drive shaft. Control arm pulls a cable connected to engine throttle valve and opens the valve accordingly. When motor rotates in a reverse direction, control arm also rotates in a reverse direction and engine throttle valve closes.

CRUISE CONTROL SWITCH

ON-OFF (Main) Switch
Cruise ON-OFF switch is power switch for cruise control system. When ignition is turned off, cruise ON-OFF switch is also turned off. Switch remains off even when ignition is turned on again.

SET/COAST Position
With cruise ON-OFF switch on, and vehicle speed greater than 25 MPH, pull cruise control switch downward to SET/COAST position and release switch. CC ECU will store and constantly control vehicle speed.

While in cruise control mode, if cruise control switch is pulled downward and held in SET/COAST position, actuator will be energized. Engine throttle valve will close, and vehicle will decelerate until switch is released. From then on, CC ECU will store and constantly control new vehicle speed.

RES/ACC Position
If cruise control system is canceled by any of various cancellation methods, the previously set speed can be resumed by pushing cruise control switch upward to RES/ACC position and then releasing switch. Set speed, however, cannot be resumed if vehicle speed drops to less than 25 MPH, as CC ECU memory will be cleared.

While in cruise control mode, if cruise control switch is pushed upward and held in RES/ACC position, actuator motor will be energized. Engine throttle valve will open, and vehicle will accelerate until switch is released. From then on, CC ECU stores new vehicle speed and controls that speed constantly.

CANCEL Switch
When CANCEL switch is pulled on, a cancellation signal is sent to CC ECU, causing cruise control system to cancel.

CRUISE CONTROL ELECTRONIC CONTROL UNIT (CC ECU)

CC ECU constantly monitors and compares set speed with actual vehicle speed from input sensors. When vehicle speed is different from set speed, CC ECU activates actuator motor to change engine throttle valve, changing vehicle speed.

CC ECU includes a self-diagnostic function. If cruise control system is canceled by any condition other than driver operation, CC ECU assumes a malfunction has occurred and may set a corresponding trouble code. See SELF-DIAGNOSTIC SYSTEM.

SPEED SENSOR

Speed sensor is mounted on transmission. Speed sensor rotor shaft is driven by a gear on speedometer output shaft. For each shaft rotation, speed sensor sends a 4-pulse signal which is sent to CC ECU. CC ECU calculates vehicle speed from this pulse frequency.
SELF-DIAGNOSTIC SYSTEM

When vehicle is in cruise control mode, system will cancel due to a malfunction in actuator, speed sensor or cruise control switch circuits. When cruise control functions are canceled, CRUISE indicator light will flash for .5 seconds with a 1.5 second pause separating each flash, indicating 2-digit trouble code(s) are stored in CC ECU memory. See CC ECU TROUBLE CODE DEFINITION table under SELF-DIAGNOSTICS. Two digit trouble code(s) will be stored in CC ECU memory until ignition is turned off. See SELF-DIAGNOSTICS.

Not all malfunctions set a trouble code. When a malfunction is present that does not set a trouble code, CRUISE indicator light will flash on and off every .25 seconds indicating normal system operation. See TROUBLE SHOOTING BY SYMPTOM under TROUBLE SHOOTING.

NOTE: Intermittent failures may cause CRUISE indicator light to flicker or illuminate. Light will go out after fault goes away. Fault may or may not be present at time of testing; however, a corresponding trouble code may be stored in CC ECU memory. See SELF-DIAGNOSTICS.

SELF-DIAGNOSTICS

CAUTION: Vehicles that are equipped with Supplemental Restraint System (SRS). SRS wiring harness is routed close to instrument cluster, steering wheel and related components. All SRS wiring harnesses and connectors are Yellow. DO NOT use electrical test equipment on these circuits. Before working on cruise control components, disable air bag system. See the AIR BAG RESTRAINT SYSTEM article in the ACCESSORIES & EQUIPMENT section.

WARNING: Wait at least 90 seconds after disabling SRS. Back-up power circuit, capacitor, maintains system voltage for about 90 seconds after battery is disconnected. Servicing cruise control system before 90 seconds may cause accidental air bag deployment and possible personal injury.

READING TROUBLE CODES

Trouble codes are displayed as flashes of CRUISE indicator light. All trouble codes are 2-digit numbers. After a 4 second pause, code(s) will begin to flash. A .5 second flash indicates one digit with a 1.5 second pause separating each digit of a code. A 2.5 second pause separates each trouble code. See Fig. 2. Trouble codes with a 2, 3 or 4 as the first digit, a .5 second flash separates each tenth indicated.

CC ECU outputs trouble codes from lowest to highest. These codes indicate current faults in system and should be serviced in order of appearance. Pay careful attention to length of pauses in order to read codes correctly. See Fig. 2.
RETRIEVING TROUBLE CODES

1) Codes from CC ECU self-diagnostic system are retrieved
through self-test diagnostic Data Link Connector (DLC). Test drive vehicle to allow trouble codes to set in CC ECU memory. If CRUISE indicator light begins to flash for .5 seconds with a 1.5 second pause separating each flash while driving, or cruise control will not set or operate, check for trouble codes. Go to next step.

2) Stop vehicle and leave ignition switch in ON position. If ignition switch is turned to OFF position, any stored trouble codes will be erased from CC ECU memory. Connect jumper wire between DLC self-diagnostic terminals. See Fig. 3.

3) If any code is present, perform test(s) in order given. See CC ECU TROUBLE CODE DEFINITION table. See TROUBLE CODE/CIRCUIT TEST CHARTS. If CRUISE indicator light begins flashing on and off every .25 seconds (normal) and no trouble codes are present, but a malfunction still exists, go to TROUBLE SHOOTING BY SYMPTOM under TROUBLE SHOOTING.

4) If CRUISE indicator light does not flash and no trouble codes are present, but cruise control system malfunction still exists, go to TROUBLE SHOOTING BY SYMPTOM under TROUBLE SHOOTING.

Fig. 3: Identifying DLC Terminals
Courtesy of Toyota Motor Sales, U.S.A., Inc.

CC ECU TROUBLE CODE DEFINITION TABLE
Trouble Code (1)                      Problem Diagnosis

Normal ..................................... Indicator Light Flashes On And Off Every .25 Seconds, CC System Can Not Be Set Or Does Not Operate
11 ......................................... Overcurrent/Short In Motor Circuit
12 ............................. Overcurrent/Short In Magnet Clutch Circuit & Open In Magnet Clutch Circuit
13 ........................................ Position Sensor Detects Abnormal Voltage
14 .................................. Open In Actuator Motor Circuit & Position Sensor Signal Value Does Not Change When Motor Operates
21 ................................. Speed Sensor Signal Not Input To CC ECU
23 (2) ............ Actual Vehicle Speed Decreased 10 MPH Or More Below Speed Set During Cruise Control Operation & Vehicle Speed Sensor Pulse Is Abnormal
32 ................................. Short In Control Switch Circuit
34 .................. Voltage Abnormality In Control Switch Circuit
41 ...... Duty Ratio Of 100 Percent Output to Motor Acceleration Side
42 ............................................. Source Voltage Drop

(1) - Perform test numbers in order given.
(2) - When vehicle speed is reduced on uphill roads, speed can be set again and driving continued. No malfunction is present.

CLEARING CODES

CAUTION: Do not disconnect vehicle battery to clear codes.

1) Turn ignition off. To clear codes from CC ECU memory, remove ECU-B fuse for 10 seconds. ECU-B fuse is located in engine compartment relay block No. 2, on left inner fender panel.

2) This procedure erases fault codes from CC ECU memory. If problem has not been corrected or fault is still present, code will be reset in CC ECU memory. Check that CRUISE indicator light flashes on and of every .25 seconds (normal) after reinstalling fuse.

TROUBLE SHOOTING

NOTE: Before TROUBLE SHOOTING BY SYMPTOM, perform SELF-DIAGNOSTICS. TROUBLE SHOOTING BY SYMPTOM should only be performed if CRUISE indicator light flashes a normal pattern or does not flash at all, and a cruise control system malfunction exists.

TROUBLE SHOOTING BY SYMPTOM

NOTE: Perform circuit tests when CRUISE indicator light flashes a normal pattern or does not flash at all, and a cruise control system malfunction exists. See TROUBLE CODE/CIRCUIT TEST CHARTS. Perform circuit tests in order listed.

SET Not Occurring Or CANCEL Occurring (Flash Pattern Normal)
Perform the following tests. Check Cruise Control ECU. See CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ACTUATOR MOTOR CIRCUIT
* ACTUATOR MAGNET CLUTCH CIRCUIT
* ACTUATOR POSITION SENSOR CIRCUIT
* SPEED SENSOR CIRCUIT
* CONTROL SWITCH CIRCUIT (CRUISE CONTROL SWITCH)
* STOPLIGHT SWITCH CIRCUIT
* PARKING BRAKE SWITCH CIRCUIT
* PARK/NEUTRAL SWITCH CIRCUIT (A/T)
* MAIN SWITCH CIRCUIT (CRUISE CONTROL SWITCH)

SET Not Occurring Or CANCEL Occurring
(Trouble Code Does Not Output)
Perform the following test. Check Cruise Control ECU. See
CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ECU POWER SOURCE CIRCUIT

Actual Vehicle Speed Deviates Above Or Below The Set Speed
Perform the following tests. Check actuator control cable.
See ACTUATOR CONTROL CABLE INSPECTION. Check Cruise Control ECU. See
CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ACTUATOR MOTOR CIRCUIT
* ACTUATOR MAGNET CLUTCH CIRCUIT
* ACTUATOR POSITION SENSOR CIRCUIT
* SPEED SENSOR CIRCUIT
* IDLE SWITCH CIRCUIT (MAIN THROTTLE POSITION SENSOR)
* ELECTRONIC CONTROLLED TRANSMISSION COMMUNICATION CIRCUIT

Gear Shifting Is Frequent Between 3rd And OD When Driving On
Uphill Road (Hunting)
Perform the following test. Check Cruise Control ECU. See
CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ELECTRONIC CONTROLLED TRANSMISSION COMMUNICATION CIRCUIT

Cruise Control Not Canceled, Even When Brake Pedal Depressed
Perform the following tests. Check actuator control cable.
See ACTUATOR CONTROL CABLE INSPECTION. Check Cruise Control ECU. See
CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ACTUATOR MOTOR CIRCUIT
* ACTUATOR MAGNET CLUTCH CIRCUIT
* ACTUATOR POSITION SENSOR CIRCUIT
* STOPLIGHT SWITCH CIRCUIT

Cruise Control Not Canceled, Even When Parking Brake
Lever Pulled
Perform the following tests. Check actuator control cable.
See ACTUATOR CONTROL CABLE INSPECTION. Check Cruise Control ECU. See
CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ACTUATOR MOTOR CIRCUIT
* ACTUATOR MAGNET CLUTCH CIRCUIT
* ACTUATOR POSITION SENSOR CIRCUIT
* PARKING BRAKE SWITCH CIRCUIT

Cruise Control Not Canceled, Even When Transmission Is
Shifted To Except "D" Range (A/T)
Perform the following tests. Check actuator control cable.
See ACTUATOR CONTROL CABLE INSPECTION. Check Cruise Control ECU. See
CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ACTUATOR MOTOR CIRCUIT
* ACTUATOR MAGNET CLUTCH CIRCUIT
* ACTUATOR POSITION SENSOR CIRCUIT
* PARK/NEUTRAL SWITCH CIRCUIT (A/T)

Cruise Control Not Canceled, Even When Clutch Pedal Is
Depressed (M/T)
Perform the following tests. Check actuator control cable. See ACTUATOR CONTROL CABLE INSPECTION. Check Cruise Control ECU. See CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ACTUATOR MOTOR CIRCUIT
* ACTUATOR MAGNET CLUTCH CIRCUIT
* ACTUATOR POSITION SENSOR CIRCUIT
* CLUTCH SWITCH CIRCUIT (M/T)

Control Switch Does Not Operate (SET/COAST, RES/ACC, CANCEL Not Possible)
Perform the following tests. Check actuator control cable. See ACTUATOR CONTROL CABLE INSPECTION. Check Cruise Control ECU. See CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ACTUATOR MOTOR CIRCUIT
* ACTUATOR MAGNET CLUTCH CIRCUIT
* ACTUATOR POSITION SENSOR CIRCUIT
* CONTROL SWITCH CIRCUIT (CRUISE CONTROL SWITCH)

SET Possible At 25 MPH Or Less, Or CANCEL Does Not Operate At 25 MPH Or Less
Perform the following tests. Check actuator control cable. See ACTUATOR CONTROL CABLE INSPECTION. Check Cruise Control ECU. See CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ACTUATOR MOTOR CIRCUIT
* ACTUATOR MAGNET CLUTCH CIRCUIT
* ACTUATOR POSITION SENSOR CIRCUIT
* SPEED SENSOR CIRCUIT

Poor Response In ACC and RES Modes
Perform the following tests. Check actuator control cable. See ACTUATOR CONTROL CABLE INSPECTION. Check Cruise Control ECU. See CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ACTUATOR MOTOR CIRCUIT
* ACTUATOR MAGNET CLUTCH CIRCUIT
* ACTUATOR POSITION SENSOR CIRCUIT
* ELECTRONIC CONTROLLED TRANSMISSION COMMUNICATION CIRCUIT

O/D Does Not Resume, Even Through Road Is Not Uphill
Perform the following test. Check Cruise Control ECU. See CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* ELECTRONIC CONTROLLED TRANSMISSION COMMUNICATION CIRCUIT

Diagnostic Trouble Code Memory Is Erased
Perform the following test. Check Cruise Control ECU. See CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

* BACK-UP POWER SOURCE CIRCUIT

Diagnostic Trouble Code Is Not Output, Or Is Output When It Should Not Be
Check Cruise Control ECU. See CRUISE CONTROL ECU CIRCUIT TESTING CHARTS.

CRUISE Indicator Light Remains On, Or Fails To Illuminate
Check indicator bulb, cruise control ECU, meter circuit plate and wiring harness. Repair or replace as necessary.

ACTUATOR CONTROL CABLE INSPECTION
Check for properly installed actuator, control cable, and throttle link. Check for properly connected control cable and throttle link. Check for smooth operation of actuator and throttle link. Check if control cable is too tight or too loose. If control cable is too tight, idle RPM will increase. If control cable is too loose, loss of uphill speed will increase.

**INPUT SIGNAL CHECK**

**Output Of Code**

1) Pull cruise control switch downward to SET/COAST position, or push cruise control switch upward to RES/ACC position and hold in position. Press cruise ON-OFF (main) switch to ON position. Check that CRUISE indicator light flashes 2-3 times repeatedly after 3 seconds. Turn SET/COAST or RES/ACC switch off.

2) Operate each of the following switches as described. See Fig. 4. Note flashing pattern of CRUISE indicator light while operating switches as specified. After completing checks, turn main switch off.

**NOTE:** When 2 or more signals are input to CC ECU, only the lowest numbered code is displayed.

<table>
<thead>
<tr>
<th>No.</th>
<th>Operation Method</th>
<th>CRUISE MAIN Indicator Light Blinking Pattern</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turn SET/COAST switch ON.</td>
<td>Light ON 0.25 OFF 1 sec 0.25</td>
<td>SET/COAST switch circuit is normal.</td>
</tr>
<tr>
<td>2</td>
<td>Turn RES/ACC switch ON.</td>
<td>Light ON OFF</td>
<td>RES/ACC switch circuit is normal.</td>
</tr>
<tr>
<td>3</td>
<td>Turn CANCEL switch ON.</td>
<td>Light Switch OFF</td>
<td>CANCEL switch circuit is normal.</td>
</tr>
<tr>
<td>3</td>
<td>Turn stop light switch ON. (Depress brake pedal)</td>
<td>Light ON Switch OFF</td>
<td>Stop light switch circuit is normal.</td>
</tr>
<tr>
<td>3</td>
<td>Turn parking brake switch ON. (Pull up the parking brake lever)</td>
<td>Light OFF Switch ON</td>
<td>Parking brake switch circuit is normal.</td>
</tr>
<tr>
<td>3</td>
<td>Turn neutral start switch OFF. (Shift to except D range)</td>
<td>Light ON Switch ON</td>
<td>Park/neutral position switch circuit is normal.</td>
</tr>
<tr>
<td>3</td>
<td>Turn clutch switch OFF. (Depress clutch pedal)</td>
<td>Light OFF Switch OFF</td>
<td>Clutch switch circuit is normal.</td>
</tr>
<tr>
<td>4</td>
<td>Drive at 40 km/h (25 mph) or higher.</td>
<td>Light ON OFF</td>
<td>Speed sensor is normal.</td>
</tr>
<tr>
<td>4</td>
<td>Drive at 40 km/h (25 mph) or below.</td>
<td>Light ON OFF</td>
<td>Speed sensor is normal.</td>
</tr>
</tbody>
</table>

**NOTE:** For check Nos. 1 and 2 - Turn ignition switch to ON position.  
For check No. 3 - Turn ignition switch to ON position and place shift lever in 'D' position (A/T).  
For check No. 4 - Raise and support vehicle. Start engine and place shift lever in 'D' position (A/T).

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Fig. 4: Checking Cruise Control ECU Input Signal

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

**CRUISE CONTROL ECU CIRCUIT TESTING CHARTS**

**NOTE:** CC ECU circuit testing charts are provided to pinpoint a malfunctioning circuit. Checking pin voltages at CC ECU
connector will help determine if CC ECU is receiving and sending proper voltage signals. Using test charts may also help in determining if there is a short or open in harness or connectors. Test circuit continuity, resistance and voltages by backprobing CC ECU harness connector.

**NOTE:** Unless stated otherwise in testing procedures, perform all voltage tests using a Digital Volt-Ohmmeter (DVOM) with a minimum 10-megohm input impedance. Voltage readings may vary slightly due to battery condition or charging rate.

---

**CRUISE CONTROL ECU CONNECTOR**

<table>
<thead>
<tr>
<th>No.</th>
<th>Symbol</th>
<th>Terminal Name</th>
<th>No.</th>
<th>Symbol</th>
<th>Terminal Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DTP+</td>
<td>Stop Light Switch</td>
<td>14</td>
<td>B</td>
<td>Power Source</td>
</tr>
<tr>
<td>2</td>
<td>D</td>
<td>Park/Neutral Position Switch (A/T) Clutch Switch (M/T)</td>
<td>15</td>
<td>BATT</td>
<td>Backup Power Source</td>
</tr>
<tr>
<td>3</td>
<td>PKB</td>
<td>Parking Brake Switch</td>
<td>16</td>
<td>STP-</td>
<td>Stop Light Switch</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>-</td>
<td>17</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>-</td>
<td>18</td>
<td>CDE</td>
<td>Control Switch</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>-</td>
<td>19</td>
<td>CMS</td>
<td>Main Switch</td>
</tr>
<tr>
<td>7</td>
<td>PI</td>
<td>CRUISE MAIN Indicator Light</td>
<td>20</td>
<td>SPD</td>
<td>Vehicle Speed Sensor</td>
</tr>
<tr>
<td>8</td>
<td>Tc</td>
<td>DLC2</td>
<td>21</td>
<td>DL</td>
<td>Throttle Position Sensor</td>
</tr>
<tr>
<td>9</td>
<td>OD</td>
<td>ECM</td>
<td>22</td>
<td>ECT</td>
<td>No.2 Solenoid Valve</td>
</tr>
<tr>
<td>10</td>
<td>L</td>
<td>Magnetic Clutch</td>
<td>23</td>
<td>VR1</td>
<td>Position Sensor</td>
</tr>
<tr>
<td>11</td>
<td>MO</td>
<td>Motor</td>
<td>24</td>
<td>VR2</td>
<td>Position Sensor</td>
</tr>
<tr>
<td>12</td>
<td>MO</td>
<td>Motor</td>
<td>25</td>
<td>VR3</td>
<td>Position Sensor</td>
</tr>
<tr>
<td>13</td>
<td>GND</td>
<td>Ground</td>
<td>26</td>
<td>L</td>
<td>Actuator Ground</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Symbol</th>
<th>Condition</th>
<th>Standard Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 13</td>
<td>STP+</td>
<td>Depress brake pedal.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Release brake pedal.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(A/T) Depress clutch pedal.</td>
<td>Below 1 V</td>
</tr>
<tr>
<td>2 - 13</td>
<td>D</td>
<td>(M/T) Shift to except D range.</td>
<td>Below 1 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(M/T) Release clutch pedal (A/T) shift to D range.</td>
<td>Below 1 V</td>
</tr>
<tr>
<td>3 - 13</td>
<td>PKB</td>
<td>IG ON.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pull up parking brake lever.</td>
<td>Below 2 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IG ON.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td>7 - 13</td>
<td>PI</td>
<td>IG ON. Main Switch ON.</td>
<td>Below 2 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Main indicator light ON.</td>
<td>Below 2 V</td>
</tr>
<tr>
<td></td>
<td>VR3</td>
<td>IG ON. Main switch OFF.</td>
<td>Below 2 V</td>
</tr>
<tr>
<td>8 - 13</td>
<td>Tc</td>
<td>Ignition switch ON.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td>9 - 13</td>
<td>O/D</td>
<td>Except during cruise control driving.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>O/D Switch ON. During cruise control driving, (1st driving).</td>
<td>Below 1 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O/D Switch OFF. During cruise control driving, (3rd driving).</td>
<td>Below 1 V</td>
</tr>
<tr>
<td>10 - 13</td>
<td>L</td>
<td>Except during cruise control driving.</td>
<td>9 - 14 V</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>During cruise control driving.</td>
<td>9 - 14 V</td>
</tr>
<tr>
<td>11 - 13</td>
<td>MC</td>
<td>During cruise control driving.</td>
<td>9 - 14 V</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>COAST switch hold ON.</td>
<td>Below 1 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Except during cruise control driving.</td>
<td>Below 1 V</td>
</tr>
</tbody>
</table>

Fig. 5: Cruise Control ECU Terminal Voltages (1 Of 2)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.
### Trouble Code/Circuit Test Charts

**NOTE:** Following charts courtesy of Toyota Motor Sales, U.S.A., Inc.

**Codes 11, 14 & 41 - Actuator Motor Circuit**

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Symbols</th>
<th>Condition</th>
<th>Standard Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 - 13</td>
<td>MO → GND</td>
<td>During cruise control driving. SET switch ON. (moment)</td>
<td>8 - 14 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Except during cruise control driving.</td>
<td>Below 1 V</td>
</tr>
<tr>
<td>13 - Body Ground</td>
<td>GND → Body Ground</td>
<td>Always.</td>
<td>Below 1 V</td>
</tr>
<tr>
<td>14 - 13</td>
<td>B → GND</td>
<td>Ignition switch ON.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td>15 - 13</td>
<td>BATT → GND</td>
<td>Always.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td>16 - 13</td>
<td>STP → GND</td>
<td>Depress brake pedal.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Release brake pedal.</td>
<td>Below 1.5 V</td>
</tr>
<tr>
<td>18 - 13</td>
<td>CCS → GND</td>
<td>IG ON. Main switch ON. Switch neutral position</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IG ON. Main switch ON. CANCEL switch hold ON.</td>
<td>4.1 - 7.2 V</td>
</tr>
<tr>
<td>19 - 13</td>
<td>CMS → GND</td>
<td>IG ON. Main switch ON. SET/COAST switch hold ON.</td>
<td>2.3 - 4.6 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IG ON. Main switch ON. RESUME/ACCEL switch hold ON.</td>
<td>0.7 - 2.5 V</td>
</tr>
<tr>
<td>20 - 13</td>
<td>SPD → GND</td>
<td>IG ON. Main switch OFF. (Indicator light OFF)</td>
<td>Below 2 V</td>
</tr>
<tr>
<td>21 - 13</td>
<td>IDL → GND</td>
<td>Engine start. Car stationary.</td>
<td>Below 1.5 V or 10 - 14 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>During driving. (Pulse generated)</td>
<td>5 - 7 V</td>
</tr>
<tr>
<td>22 - 13</td>
<td>ECT → GND</td>
<td>IG ON. Throttle valve fully opened.</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IG ON. Throttle valve fully closed.</td>
<td>Below 2 V</td>
</tr>
<tr>
<td>23 - 13</td>
<td>VR1 → GND</td>
<td>During cruise control driving. O/D switch ON.</td>
<td>Below 1.0 V</td>
</tr>
<tr>
<td>24 - 25</td>
<td>VR2 → VR3</td>
<td>During cruise control driving. O/D switch OFF (3rd driving).</td>
<td>10 - 14 V</td>
</tr>
<tr>
<td>25 - 13</td>
<td>VR3 → GND</td>
<td>Ignition switch ON.</td>
<td>4.5 - 5 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>During cruise control driving.</td>
<td>1 - 4.5 V</td>
</tr>
<tr>
<td>26 - 13</td>
<td>L → GND</td>
<td>IG ON. Control Plate fully opened.</td>
<td>3.4 - 5.1 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IG ON. Control plate fully closed.</td>
<td>0.6 - 1.6 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Always.</td>
<td>Below 1 V</td>
</tr>
</tbody>
</table>

**Fig. 6: Cruise Control ECU Terminal Voltages (2 Of 2)**

Courtesy of Toyota Motor Sales, U.S.A., Inc.
1 Check actuator motor.

- Remove cruise control actuator.
- Disconnect actuator connector.

C
1. Connect positive + lead to terminal 5 and negative − lead to terminal 4 of actuator connector.
   (Magnetic clutch ON)
2. When battery positive voltage is applied to each of the actuator connector terminals check that the control plate moves smoothly without hesitating.

<table>
<thead>
<tr>
<th>Terminal Moving direction</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleration side</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deceleration side</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. With the motor rotating as in 2., check that the motor is stopped by limit switches when the control plate moves to fully opened or fully closed position.

OK
NG Replace actuator assembly.

2 Check harness and connector between cruise control ECU and actuator motor

OK
NG Repair or replace harness or connector.

Proceed to CODE 12 ACTUATOR MAGNET CLUTCH CIRCUIT chart. If Code 11, 14 and/or 41 is present, check and replace cruise control ECU.

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Fig. 7: Codes 11, 14 & 41 - Actuator Motor Circuit

CODE 12 - ACTUATOR MAGNET CLUTCH CIRCUIT
1. Check actuator magnet clutch.

- **OK**
  - (1) Remove cruise control actuator.
  - (2) Disconnect actuator connector.
  - **C** Move the control plate by hand.
  - **OK** Control plate moves. (Magnetic clutch off)
  - **C** (1) Connect positive + lead to terminal 5 and negative − lead to terminal 4 of actuator connector.
  - (2) Move the control plate by hand.
  - **OK** Control plate doesn’t move. (Magnet clutch on)

- **NG** Replace actuator assembly.

2. Check stop light switch.

- **OK**
  - **D** Disconnect stop light switch connector.
  - **C** Check continuity between terminals.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch position</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch pin free (Brake pedal depressed)</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Switch pin pushed in (Brake pedal released)</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

- **NG** Replace stop light switch.

3. Check for open and short in harness and connectors between ECU and stop light switch, stop light switch and magnetic clutch, magnetic clutch and body ground

- **OK**

Proceed to CODES 13 & 14 ACTUATOR POSITION SENSOR CIRCUIT chart. If Code 12 is present, check harness and connector for loose connection. If connection is okay, check and replace cruise control ECU.

Fig. 8: Code 12 - Actuator Magnet Clutch Circuit

CODES 13 & 14 - ACTUATOR POSITION SENSOR CIRCUIT
Check voltage between terminals VR2 and VR3 of ECU connector.

1. Check actuator position sensor.

2. Check for open and short in harness and connector between ECU and actuator position sensor.

3. Release and connector for loose connection.

If connection is normal check and replace ECU.

 codes 21 & 23 - speed sensor circuit
Fig. 10: Code 21 & 23 - Speed Sensor Circuit

CODES 32 & 34 - (CRUISE) CONTROL SWITCH CIRCUIT
1. Input signal check.

<table>
<thead>
<tr>
<th>Input Signal</th>
<th>Indicator light blinking pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET/COAST SWITCH</td>
<td>ON 2 Pulse</td>
</tr>
<tr>
<td>RESUME/ACCEL SWITCH</td>
<td>OFF 3 Pulse</td>
</tr>
<tr>
<td>CANCEL SWITCH</td>
<td>ON Switch OFF Switch ON</td>
</tr>
</tbody>
</table>

- (1) See input signal check.
- (2) Check the indicator light operation when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

OK
- SET/COAST, RESUME/ACCEL Switch
  The signals shown in the table on the left should be output when each switch is ON. The signal should disappear when the switch is turned OFF.
  CANCEL Switch.
  The indicator light goes off when the cancel switch is turned ON.

NG
- Proceed to STOPLIGHT SWITCH CIRCUIT chart.

2. Check voltage between terminal CCS of ECU connector and body ground.

- (1) Turn ignition switch ON.
- (2) Measure voltage between terminal CCS of ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>10 – 14 V</td>
</tr>
<tr>
<td>RES/ACC</td>
<td>0.7 – 2.5 V</td>
</tr>
<tr>
<td>SET/COAST</td>
<td>2.3 – 4.6 V</td>
</tr>
<tr>
<td>CANCEL</td>
<td>4.1 – 7.2 V</td>
</tr>
</tbody>
</table>

OK
- Proceed to STOPLIGHT SWITCH CIRCUIT chart.

NG
- Go to stop 3.
3 Check control switch.

- Disconnect

- Measure resistance between terminals 3 and 4 of control switch connector when control switch is operated.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>1 MΩ or higher</td>
</tr>
<tr>
<td>RES/ACC</td>
<td>60 – 80 Ω</td>
</tr>
<tr>
<td>SET/COAST</td>
<td>180 – 220 Ω</td>
</tr>
<tr>
<td>CANCEL</td>
<td>400 – 440 Ω</td>
</tr>
</tbody>
</table>

*Note: When diagnostic trouble code 34 is displayed, carefully check that resistance is always in neutral position, particularly when switching between RES/ACC and SET/COAST.*

OK Replace cruise control switch.

NG Replace cruise control switch.

4 Check for open and short in harness and connector between ECU and control switch

OK

NG Repair or replace harness or connector.

Check and replace ECU.

Fig. 12: Codes 32 & 34 – (Cruise) Control Switch Circuit (2 Of 2)

STOPLIGHT SWITCH CIRCUIT
1. Check operation of stop light.

   - OK: Check that stop light comes on when brake pedal is depressed, and turns off when brake pedal is released.
   - NG: Check stop light circuit.

2. Input signal check.

   - OK: See input signal check.
   - NG: Proceed to IDLE SWITCH CIRCUIT chart.

3. Check voltage between terminal STP+, STP- of ECU connector and body ground.

   - OK: Proceed to IDLE SWITCH CIRCUIT chart.
   - NG: Check for open in harness and connectors between terminal STP+ of ECU and stop light switch, terminal STP- of ECU and stop light switch.

   - OK: Check and replace ECU.
   - NG: Repair or replace harness or connector.

4. IDLE SWITCH CIRCUIT

   - Fig. 13: Stoplight Switch Circuit
1. Check voltage between terminal IDL of ECU connector and body ground.

- **OK**: Proceed to ELECTRONICALLY CONTROLLED TRANSAXLE COMMUNICATION CIRCUIT chart.

2. Check throttle position sensor.

- **OK**: Replace throttle position sensor.

3. Check for open and short in harness and connector between ECU and throttle position sensor, throttle position sensor and body ground.

- **OK**: Check and replace ECU.

**Fig. 14: Idle Switch Circuit**

ELECTRONICALLY CONTROLLED TRANSAXLE COMMUNICATION CIRCUIT
1. **Check operation of overdrive.**

- **OK**
- **NG** Check and Repair Electronic controlled transmission

2. **Check voltage between terminal OD of harness side connector of ECU and body ground.**

<table>
<thead>
<tr>
<th>ON</th>
<th>Remove ECU with connector still connected.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IG ON</td>
<td>(1) Disconnect ECU connector.</td>
</tr>
<tr>
<td></td>
<td>(2) Turn ignition switch ON.</td>
</tr>
<tr>
<td></td>
<td>(3) Measure voltage between terminal OD of harness side connector of ECU and body ground.</td>
</tr>
<tr>
<td>OK Voltage: 10 – 14 V</td>
<td>Go to step 5.</td>
</tr>
</tbody>
</table>

- **OK**
- **NG** Go to step 5.

---

Fig. 15: Electronically Controlled Transaxle Communication Circuit

(1 OF 2)
3. Check voltage between terminal ECT of cruise control ECU connector and body ground (On test drive).

- **OK**
  - Check voltage between terminal ECT of cruise control ECU connector and body ground when OD switch is on and off.
  - Table:
    | Gear Position | Voltage   |
    |---------------|-----------|
    | N/Ar          | 11 - 14 V |
    | 3rd           | 10 - 14 V |

- **NG**
  - Proceed to PARKING BRAKE SWITCH CIRCUIT chart.

4. Check for open and short in harness and connector between terminal ECT of cruise control ECU and electronically controlled transmission solenoid.

- **OK**
  - Repair or replace harness or connector.

- **NG**
  - Repair or replace harness or connector.

5. Check for open and short in harness and connector between terminal OD of ECU and terminal OD1 of ECM.

- **OK**
  - Repair or replace harness or connector.

- **NG**
  - Repair or replace harness or connector.

Check and replace ECM.

---

Fig. 16: Electronically Controlled Transaxle Communication Circuit

PARKING BRAKE SWITCH CIRCUIT
1. Check operation of brake warning light.
   ✓ Check that the brake warning light in the instrument panel comes on when the parking brake lever is pulled up with the engine running, and the light goes off when the parking brake lever is released.
   ✔ OK
   ✗ NG
   → Check brake warning light circuit.

2. Input signal check.
   ✓ 1. See input signal check
   2. Check the indicator light when the parking brake lever is pulled up.
   ✔ OK
   ✗ NG
   → The indicator light goes off when the parking brake lever is pulled up.
   → Proceed to PARK/NEUTRAL SWITCH CIRCUIT (A/T) chart.

3. Check voltage between terminal PKB of cruise control ECU connector and body ground.
   ✓ Remove cruise control ECU with connectors still connected.
   ✓ 1. Turn ignition switch ON.
   2. Measure voltage between terminal PKB of cruise control ECU connector and body ground, when the parking brake lever is pulled up and released.
   ✔ OK
   ✗ NG
   → Proceed to PARK/NEUTRAL SWITCH CIRCUIT (A/T) chart.

4. Check for open in harness and connector between cruise control ECU and brake warning light.
   ✔ OK
   ✗ NG
   → Repair or replace harness or connector.

Check and replace cruise control ECU.
Fig. 18: Park/Neutral Switch Circuit (A/T)

1. Check operation of starter.
   - OK: Check that the starter operates normally and that the engine starts.
   - NG: Diagnose and repair engine as necessary.

2. Input signal check.
   - ON: Shifting into except D range
   - OFF: The indicator light goes off when shifting into except D range.
   - OK: Proceed to CLUTCH SWITCH CIRCUIT (M/T) chart.

3. Check voltage between terminal D of ECU connector and body ground.
   - ON: Remove ECU with connectors still connected.
   - NG: Turn ignition switch ON.
   - P: (1) Measure voltage between terminal D of ECU connector and body ground, when shifting into D range and other ranges.
   - C: (2) Shift Position | Voltage
   - OK: D range | 10 – 14 V
   - Other ranges | Below 1 V
   - OK: Proceed to CLUTCH SWITCH CIRCUIT (M/T) chart.

4. Check for open in harness and connector between ECU and GAUGE fuse
   - OK: Repair or replace harness or connector.

Check and replace ECU

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CLUTCH SWITCH CIRCUIT (M/T)
1. Check operation of starter.
   - OK: Check that the starter operates normally and that the engine starts.
   - NG: Diagnose and repair engine as necessary.

2. Input signal check.
   - Clutch pedal is depressed
   - ON
   - OFF
   - OK: The indicator light goes off when the clutch pedal is depressed.
   - NG
   - OK: Proceed to ECU POWER SOURCE CIRCUIT chart.

3. Check voltage between terminal D of ECU connector and body ground.
   - ON IG ON
   - P: Remove ECU with connectors still connected.
   - C: (1) Turn ignition switch ON.
     (2) Measure voltage between terminal D of ECU connector and body ground, when the clutch pedal is depressed.
   - OK: Proceed to ECU POWER SOURCE CIRCUIT chart.

4. Check for open in harness and connector between ECU and GAUGE fuse
   - OK
   - NG: Repair or replace harness or connector.

Check and replace ECU.

Fig. 19: Clutch Switch Circuit (M/T)

ECU POWER SOURCE CIRCUIT
### 1. Check ECU-IG fuse.

- **OK**
  - **Remove ECU IG fuse from Inpano J/B.**
  - **OK**
  - **Check continuity of ECU-IG fuse.**
  - **OK**
  - **Continuity**

- **NG**
  - **Check for short in all the harness and components connected to the ECU-IG fuse.**

### 2. Check voltage between terminals B and GND of ECU connector.

- **OK**
  - **Remove ECU with connectors still connected.**
  - **OK**
  - **(1) Turn ignition switch ON.**
  - **(2) Measure voltage between terminals B and GND of ECU connector.**
  - **OK**
  - **Voltage: 10 – 14 V**

- **NG**
  - **Proceed to BACK-UP POWER SOURCE CIRCUIT chart.**

*Fig. 20: ECU Power Source Circuit (1 Of 2)*
Check continuity between terminal GND of ECU connector and body ground.

- OFF
- IG OFF

Measure resistance between terminal GND of cruise control ECU connector and body ground.

- OK: Resistance: 1 Ω or loss

Check and repair harness and connector between battery and ECU.

- NG: Repair or replace harness or connector.

Fig. 21: ECU Power Source Circuit (2 Of 2)

BACK-UP POWER SOURCE CIRCUIT
### 1. Check ECU-B fuse.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/B No.2</td>
<td><img src="image" alt="ECU-B Fuse" /></td>
</tr>
<tr>
<td>P</td>
<td>Remove ECU-B fuse from R/B No.2.</td>
</tr>
<tr>
<td>G</td>
<td>Check continuity of ECU-B fuse.</td>
</tr>
<tr>
<td>OK</td>
<td>Continuity</td>
</tr>
<tr>
<td>NG</td>
<td>Check for short in all the harness and components connected to the ECU-B fuse</td>
</tr>
</tbody>
</table>

### 2. Check voltage between terminal BATT of ECU connector and body ground.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>IG OFF</td>
</tr>
<tr>
<td><img src="image" alt="BATT" /></td>
<td><img src="image" alt="ECU Connector" /></td>
</tr>
<tr>
<td>P</td>
<td>Remove ECU with connectors still connected.</td>
</tr>
<tr>
<td>G</td>
<td>Measure voltage between terminal BATT of ECU connector and body ground.</td>
</tr>
<tr>
<td>OK</td>
<td>Voltage: 10 – 14 V</td>
</tr>
<tr>
<td>NG</td>
<td>Proceed to MAIN SWITCH CIRCUIT (CRUISE CONTROL SWITCH) chart.</td>
</tr>
</tbody>
</table>

**Check and repair harness and connector between battery and ECU.**

---

**Fig. 22: Back-up Power Source Circuit**

**MAIN SWITCH CIRCUIT (CRUISE CONTROL SWITCH)**
1. Check voltage between terminal CMS and GND of cruise control ECU connector.

   - P: Remove cruise control ECU with connectors still connected.
   - C: 1. Turn ignition switch ON.
        2. Measure voltage between terminal CMS and GND of cruise control ECU connector when main switch is hold on and off.
   - OK

     | Main switch | Voltage |
     |-------------|---------|
     | OFF        | 10 – 14 V |
     | ON         | Below 2 V |

   - NG
     Proceed to TC TERMINAL CIRCUIT chart.

2. Check main switch.

   - P: 1. Remove steering wheel center pad
        2. Disconnect cruise control switch connector.
   - C: Check continuity between terminals 2 and 4 of cruise control switch connector when main switch is held on and off.
   - OK

     | Terminals |
     |-----------|
     | Main switch |
     | OFF       |
     | Hold ON   |

   - NG
     Replace control switch.

3. Check harness and connector between cruise control ECU and main switch, main switch and body ground

   - OK

   - NG
     Repair or replace harness or connector.

Check and replace cruise control ECU.

---

Fig. 23: Main Switch Circuit (Cruise Control Switch)

TC TERMINAL CIRCUIT
1. Check voltage between terminals Tc and E1 of DLC1.

   UN IG ON

   (1) Turn ignition switch ON.
   (2) Measure voltage between terminals Tc and E1 of DLC1.

   Voltage: 10 – 14 V

   OK

   NG Proceed to ACTUATOR CONTROL CABLE INSPECTION.

2. Check for open and short in harness and connector between ECU and DLC1, DLC1 and body ground

   OK

   NG Repair or replace harness or connector.

Check and replace ECU.

Fig. 24: TC Terminal Circuit

WIRING DIAGRAM
Fig. 25: Cruise Control System Wiring Diagram