

ACCESSORIES & EQUIPMENT

Dynamic Radar Cruise Control System (Diagnostic Codes & Circuit Tests) - Sienna

DYNAMIC RADAR CRUISE CONTROL SYSTEM

DTC P0500: VEHICLE SPEED SENSOR MALFUNCTION; DTC P0503: VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION

DESCRIPTION

The dynamic radar cruise control system uses the same vehicle speed signal that is sent to the ECM for the SFI system. If DTC P0500 and P0503 is detected, perform the diagnosis using the inspection procedure for DTC P0500 and P0503 in the SFI system. Refer to **DTC P0500: Vehicle Speed Sensor "A"** . The speed signal is converted for use by the cruise control inside the ECM. Both the SFI system and the dynamic radar cruise control system can set DTC P0500 and P0503, however, the detection conditions of the two systems are different.

DTC No.	DTC Detection Condition	Trouble Area
P0500	The vehicle speed signal from the vehicle speed sensor is cut for 0.14 second or more while cruise control is in operation	• Vehicle speed sensors • Vehicle speed sensor signal circuit • Combination meter assembly • ECM
P0503	A momentary interruption and noise are detected when a rapid change of the vehicle speed occurs while cruise control is in operation.	• Vehicle speed sensors • Vehicle speed sensor signal circuit • Combination meter assembly • ECM

WIRING DIAGRAM

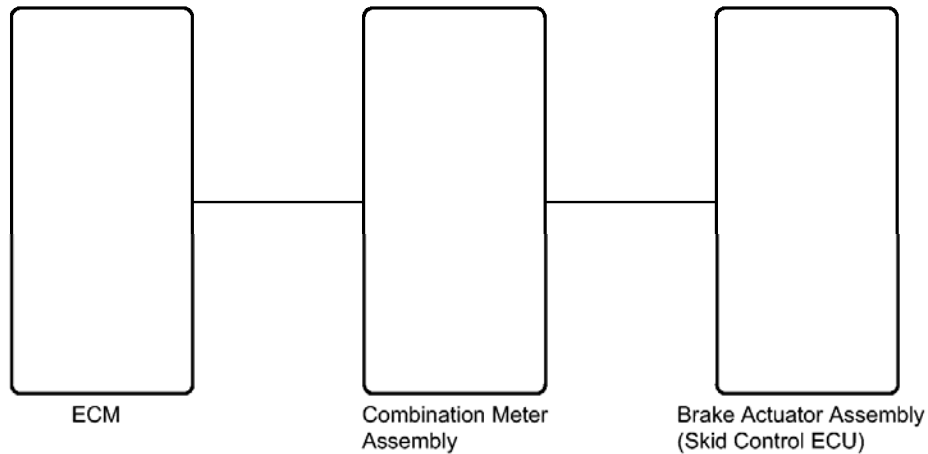


Fig. 1: Vehicle Speed Sensor Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

This DTC may be output by the vehicle stability control system at the same time. In that case, perform troubleshooting for the vehicle stability control system first.

PROCEDURE

1. **CHECK DTC (VEHICLE STABILITY CONTROL SYSTEM)**
 - a. Connect the Techstream to the DLC3.
 - b. Turn the ignition switch to ON.
 - c. Turn the Techstream on.
 - d. Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.
 - e. Check for DTCs.

RESULT

Result	Proceed to
DTC is not output	A
DTC	

is output	B
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B --> See step 4

A: Go to next step

2. REPLACE COMBINATION METER ASSEMBLY

- Replace the combination meter assembly. Refer to REMOVAL .

NEXT: Go to next step

3. CHECK DTC (CRUISE CONTROL SYSTEM)

- Clear the DTCs. Refer to DTC CHECK / CLEAR .
- Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

- Drive the vehicle at a speed of 50 km/h (30 mph) or more.
 - Turn the cruise control main switch on.
 - Push the -SET switch to activate the cruise control.
- Check for DTCs. Refer to DTC CHECK / CLEAR .

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> See step 5

A --> END

4. GO TO VEHICLE STABILITY CONTROL SYSTEM (DTC CHART). Refer to DIAGNOSTIC TROUBLE CODE CHART

5. REPLACE ECM. Refer to REMOVAL

DTC P0571: STOP LIGHT SWITCH CIRCUIT MALFUNCTION

DESCRIPTION

The ECM receives the brake demand signal from the stop light switch and transmits it to the master skid control ECU. The master cylinder solenoid (skid control ECU) receives the signal from the ECM and operates the brake actuator.

DTC No.	DTC Detection Condition	Trouble Area
P0571	Voltage of STP terminal and that of ST1- terminal of ECM are less than 1 V for 0.5 second or more.	- Stop light switch - Stop light switch circuit - ECM - Harness or connector
	This trouble code is output when the ECM detects the stop light control relay error signal from the skid control ECU for 0.2 second or more while the dynamic cruise control is in operation.	- Stop light control relay - Stop light control relay circuit - Brake actuator assembly (Skid control ECU) - Harness or connector

WIRING DIAGRAM

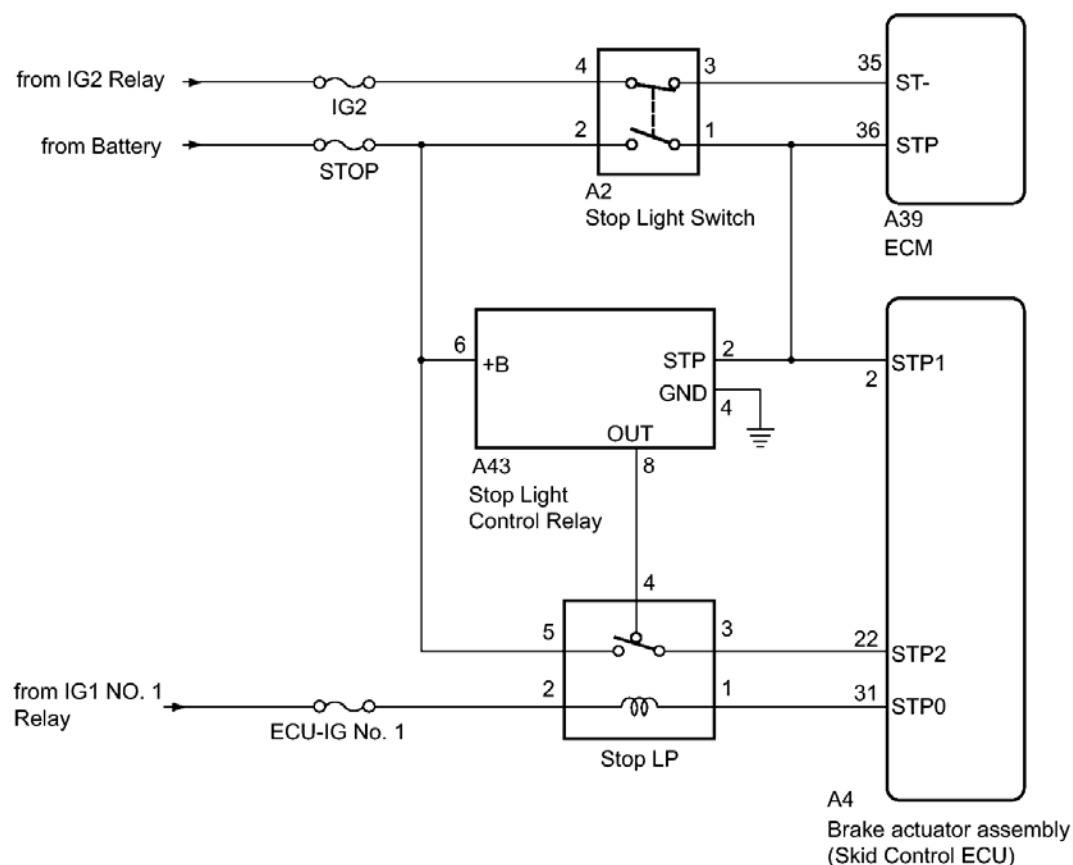


Fig. 2: Skid Control ECU Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH)

- a. Using the Techstream, read the Data List.

RADAR CRUISE

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stp Light SW M-CPU	Stop light switch signal (Main CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

OK

Normal conditions listed above are displayed.

NG --> See step 9

OK: Go to next step

2. INSPECT STOP LP RELAY

- a. Remove the STOP LP relay from the engine room relay block.

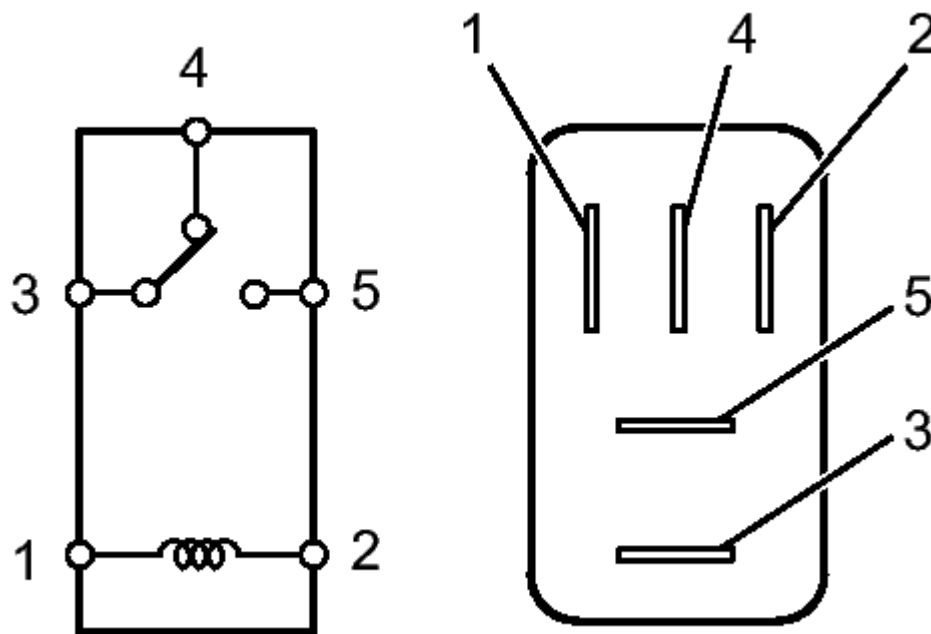


Fig. 3: Inspecting Brake Light Relay (BRK LP)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
3 - 4	Battery voltage is applied to terminals 1 and 2	10 kohms higher
	Battery voltage is not applied to terminals 1 and 2	Below 1 ohms
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kohms higher
	Battery	

	voltage is applied to terminals 1 and 2	Below 1 ohms
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NG --> **REPLACE STOP LP RELAY**

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (STOP LIGHT CONTROL RELAY - BATTERY AND BODY GROUND)

- a. Disconnect the stop light control relay connector.

*a

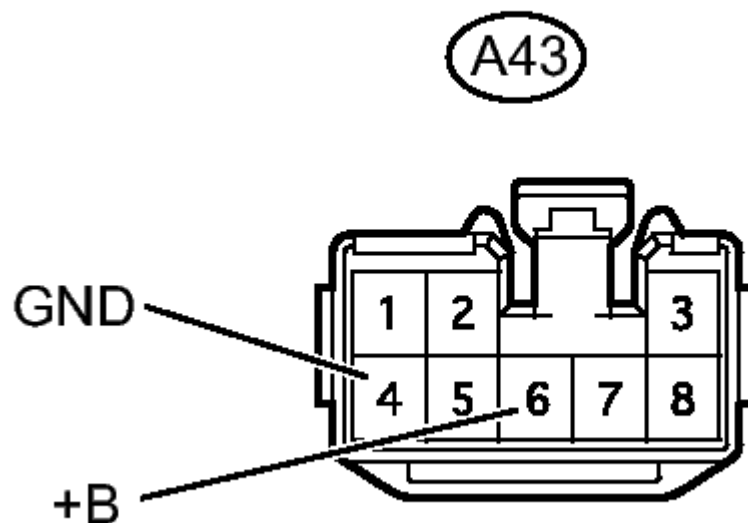


Fig. 4: Checking Harness And Connector (Stop Light Control Relay - Battery And Body Ground)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
A43-6 (+B) - Body ground	Always	11 to 14 V

- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A43-4 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Stop Light Control Relay)
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NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. **CHECK HARNESS AND CONNECTOR (STOP LIGHT CONTROL RELAY - STOP LIGHT SWITCH)**
- Disconnect the stop light control relay connector.
 - Disconnect the stop light switch connector.
 - Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A2-1 - A43-2 (STP)	Always	Below 1 ohms
A2-1 - Body ground	Always	10 kohms higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

5. CHECK HARNESS AND CONNECTOR (STOP LIGHT CONTROL RELAY - STOP LP RELAY)

- a. Disconnect the stop light control relay connector.
- b. Remove the stop light relay from the engine room relay block.
- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A43-8 (OUT) - Stop light relay terminal 4	Always	Below 1 ohms
A43-8 (OUT) - Body ground	Always	10 kohms higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

6. CHECK STOP LIGHT CONTROL RELAY

- a. Remove the stop light control relay with its connector still connected. Refer to **REMOVAL** .

*a

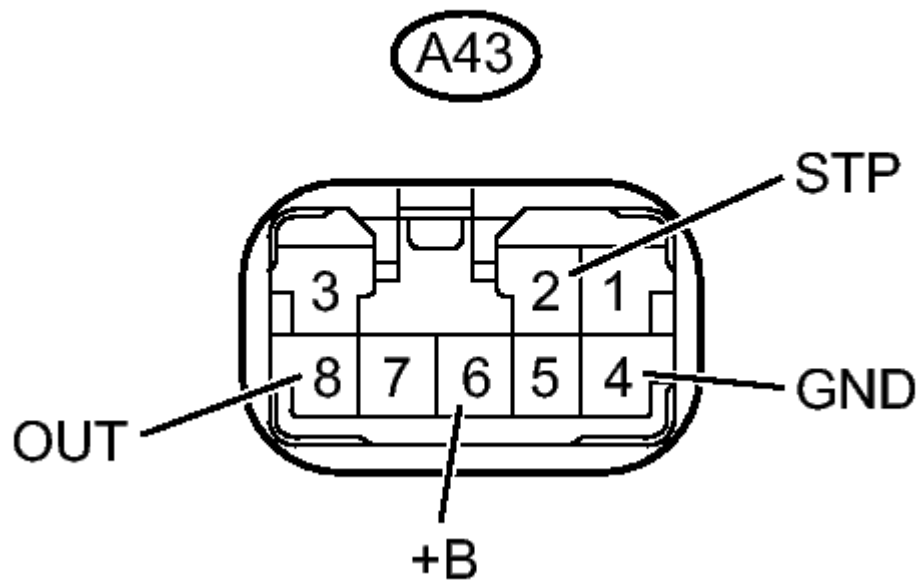


Fig. 5: Checking Stop Light Control Relay
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A43-6 (+B) - A43-4 (GND)	Always	11 to 14 V
A43-2 (STP) - Body ground	Stop light switch on (Brake pedal depressed)	11 to 14 V
	Stop light switch off (Brake pedal released)	Below 1 V
A43-8 (OUT) -	Stop light switch on (Brake pedal depressed)	11 to 14 V

Body ground	Stop light switch off (Brake pedal released)	Below 1 V
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TEXT IN ILLUSTRATION

*a	Component with harness connected (Stop Light Control Relay)
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NG --> See step 13

OK: Go to next step

7. CHECK HARNESS AND CONNECTOR (STOP LP RELAY - BATTERY)

- a. Remove the STOP LP relay from the engine room relay block.

*a

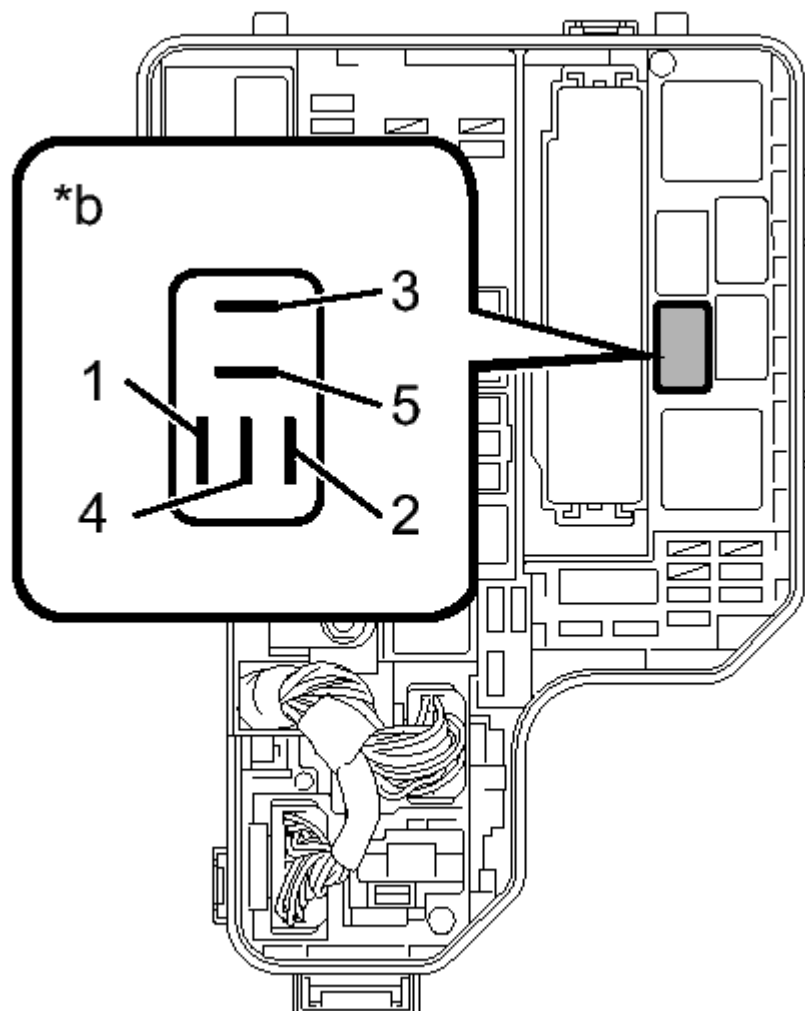


Fig. 6: Identifying STOP LP Relay

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
Stop light relay terminal 1 - Body ground	Ignition switch ON	11 to 14 V
Stop light relay		

terminal 5 - Body ground		
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TEXT IN ILLUSTRATION

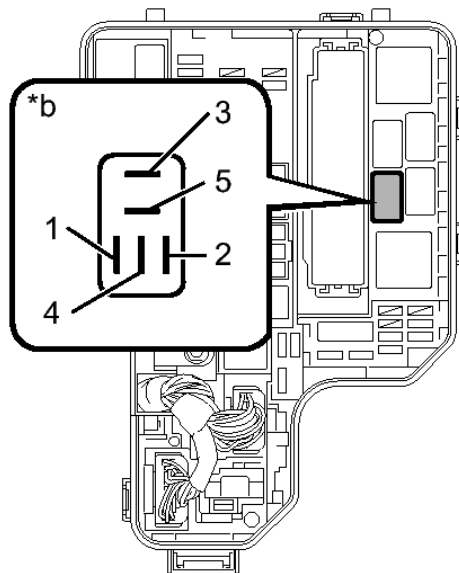
*a	Engine Room Relay Block
*b	Front view of of relay block STOP LP Relay Holder

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

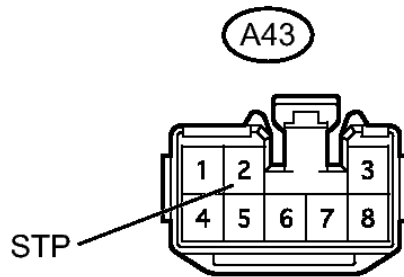
OK: Go to next step

8. **CHECK HARNESS AND CONNECTOR (STOP LP RELAY, STOP LIGHT CONTROL RELAY - SKID CONTROL ECU**
 - a. Disconnect the skid control ECU connector.

*a



*c



*d

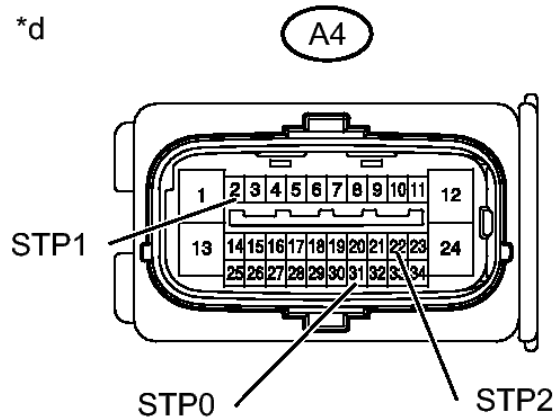


Fig. 7: Checking Harness And Connector (Stop LP Relay, Stop Light Control Relay - Skid Control ECU)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the stop light relay from the engine room relay block.

- c. Disconnect the stop light control relay connector.
- d. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
Stop light relay terminal 1 - A4-31 (STP0)	Always	Below 1 ohms
A43-2 (STP) - A4-2 (STP1)		
Stop light relay terminal 3 - A4-22 (STP2)		
Stop light relay terminal 2 - Body ground	Always	10 kohms higher
A43-2 (STP) - Body ground		
Stop light relay terminal 3 - Body ground		

TEXT IN ILLUSTRATION

*a	Engine Room Relay Block
*b	STOP LP Relay Holder
	Front view of wire

*c	harness connector (to Stop Light Control Relay)
*d	Front view of wire harness connector (to Skid Control ECU)

NG --> **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK --> **See step 14**

9. **INSPECT STOP LIGHT SWITCH**

- a. Remove the stop light switch. Refer to **REMOVAL** .

*a

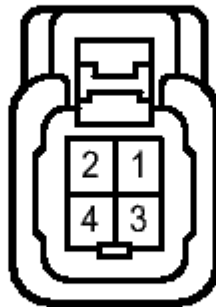


Fig. 8: Measuring Resistance Of Stop Light Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Pin not pushed	Below 1 ohms
	Pin pushed	10 kohms higher
3 - 4	Pin not pushed	10 kohms higher
	Pin pushed	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Component without harness connected (Stop Light Switch)
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NG --> See step 15

OK: Go to next step

10. CHECK HARNESS AND CONNECTOR (STOP LP SWITCH - BATTERY)

- Disconnect the stop light switch connector.

*a

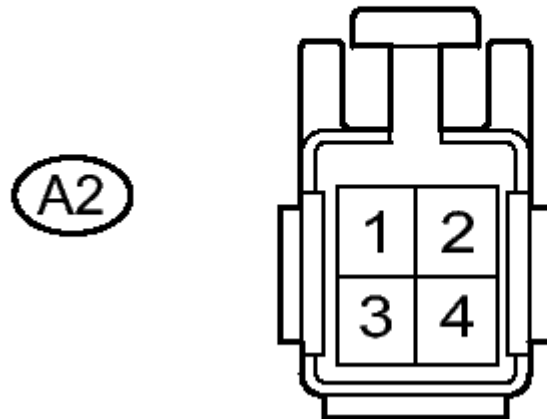


Fig. 9: Measuring Voltage Of STOP LP Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A2-2 - Body ground	Always	11 to 14 V
A2-4 - Body ground	Ignition switch ON	

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Stop Light Switch)
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NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

11. CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH - ECM)

- a. Disconnect the ECM connector.
- b. Disconnect the stop light switch connector.
- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A2-3 - A39-35 (ST1-)	Always	Below 1 ohms
A2-1 - A39-36 (STP)		
A2-1 - Body ground	Always	10 kohms higher
A2-3 - Body ground		

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 12

12. REPLACE ECM. Refer to REMOVAL

13. REPLACE STOP LIGHT CONTROL RELAY. Refer to REMOVAL

14. REPLACE MASTER CYLINDER SOLENOID (SKID CONTROL ECU). Refer to REMOVAL

15. REPLACE STOP LIGHT SWITCH. Refer to REMOVAL

DTC P0575: CRUISE CONTROL INPUT CIRCUIT

DESCRIPTION

This DTC indicates a malfunction in the ECM.

HINT:

The ECM receives signals from each sensor to control all the functions of the cruise control with the microcomputer. When a malfunction is detected, fail-safe remains on until the ignition switch is turned off.

DTC No.	DTC Detection Condition	Trouble Area
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P0575	ECM has a supervisory CPU and control ECU inside. When each input STP signal is different for 0.15 second or more, this trouble code is output. This trouble code is also output after 0.4 second have passed from the time a cruise cancel input signal (STP input) is input to the ECM.	ECM
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INSPECTION PROCEDURE

PROCEDURE

1. CHECK DTC

- Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

- Drive the vehicle at a speed of 50 km/h (30 mph) or more.
 - Turn the cruise control main switch on.
 - Push the -SET switch to activate the cruise control.
- Check for DTCs. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC is not output	A
DTC P0575 is output	B

B --> See step 3

A --> See step 2

- USE SIMULATION METHOD TO CHECK. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
- REPLACE ECM. Refer to REMOVAL**

DTC P1570: RADAR SENSOR MALFUNCTION

DESCRIPTION

The millimeter wave radar sensor emits radar beams toward an object in front and measures the distance and direction of the object by receiving the beam reflections. Based on the reflections, the sensor calculates the difference in speed between your own vehicle and the object in front. This data is transmitted to the driving support ECU.

DTC No.	DTC Detection Condition	Trouble Area
P1570	The ECM detects a radar sensor malfunction signal for 0.15 second or more while the dynamic radar cruise control is in operation	Millimeter wave radar sensor

HINT:

The millimeter wave radar sensor monitors the millimeter wave circuit activation by itself. This DTC is output when one of the following occurs: 1) the monitor is malfunctioning, 2) an EEPROM error is detected, 3) a voltage error is detected, and 4) the radar sensor is not adjusted. When raindrops or snowflakes strike the millimeter wave radar sensor face, the distance between the vehicle in front and your own vehicle cannot be measured correctly. The dynamic radar cruise control system functions by detecting the beam reflections from the vehicle directly in front. In the following cases, the system may not be able to detect the vehicle in front and may not properly maintain the correct vehicle-to-vehicle distance:

- The vehicle in front is a tall trailer.
- There are heavy emissions from a vehicle in front or vehicles in other lanes.

INSPECTION PROCEDURE

NOTE: When the millimeter wave radar sensor is replaced with a new one, adjustment of the radar sensor beam axis must be performed. Refer to ADJUSTMENT .

PROCEDURE

1. ADJUST MILLIMETER WAVE RADAR SENSOR

- a. Adjust the millimeter wave radar sensor. Refer to ADJUSTMENT .

NEXT: Go to next step

2. CHECK DTC

- a. Clear the DTCs. Refer to DTC CHECK / CLEAR .
- b. Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

1. Drive the vehicle at a speed of 50 km/h (30 mph) or more.
2. Turn the cruise control main switch on.
- c. Check for DTCs. Refer to **DTC CHECK / CLEAR**.

RESULT

Result	Proceed to
DTC is not output	A
DTC P1570 is output	B

B --> See step 3

A --> END

3. REPLACE MILLIMETER WAVE RADAR SENSOR. Refer to REMOVAL

DTC P1572: IMPROPER AIMING OF RADAR SENSOR BEAM AXIS

DESCRIPTION

This DTC is output when the scanning angle of the millimeter wave radar sensor is incorrect. This DTC is also output when the millimeter wave radar sensor beam axis is determined to be in an incorrect position.

DTC No.	DTC Detection Condition	Trouble Area
P1572	The ECU detects that the millimeter wave radar sensor beam axis is in an incorrect position (0.15 second or more) while the dynamic radar cruise control is in operation	Millimeter wave radar sensor

INSPECTION PROCEDURE

NOTE: When the millimeter wave radar sensor is replaced with a new one, adjustment of the radar sensor beam axis must be performed. Refer to **ADJUSTMENT**.

PROCEDURE

1. ADJUST MILLIMETER WAVE RADAR SENSOR

- a. Adjust the millimeter wave radar sensor. Refer to **ADJUSTMENT**.

NEXT: Go to next step

2. CHECK DTC

- a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- b. Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

1. Drive the vehicle at a speed of 50 km/h (30 mph) or more.
 2. Turn the cruise control main switch on.
- c. Check for DTCs. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC is not output	A
DTC P1572 is output	B

B --> See step 3

A --> END

3. REPLACE MILLIMETER WAVE RADAR SENSOR. Refer to REMOVAL

DTC P1575: WARNING BUZZER MALFUNCTION

DESCRIPTION

The skid control ECU receives an alarm demand signal from the driving support ECU and operates the skid control buzzer. The buzzer sounds to warn that the distance between the vehicle in front and your own vehicle is decreasing.

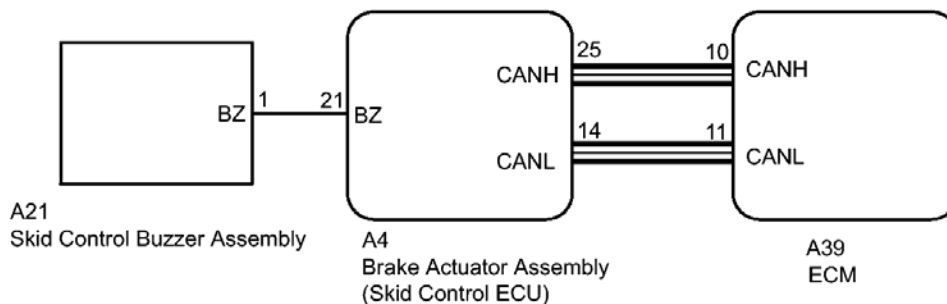
DTC No.	DTC Detection Condition	Trouble Area
P1575	The ECM receives a buzzer abnormal signal for 0.2 second or more while the dynamic radar cruise control is in operation	• Skid control buzzer • Skid control buzzer circuit • Brake actuator assembly (Skid control ECU)

- ECM

HINT:

If the vehicle ahead in the same lane significantly decreases its speed or another vehicle moves in front of your vehicle, adequate deceleration cannot be applied and the vehicle-to-vehicle distance will shorten. At this time, the system sounds the buzzer to inform the driver. This circuit uses CAN communication. Therefore, if there are any malfunctions in the communication circuit, one or more DTCs in the CAN communication system are output.

WIRING DIAGRAM



≡ : CAN Communication Line

Fig. 10: Warning Buzzer Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: If beam axis adjustment using the Techstream is completed by pressing "Finish", it will be necessary to perform adjustment of the radar sensor assembly.

PROCEDURE

1. CHECK CAN COMMUNICATION SYSTEM

- Select "Bus Check" from the "System Selection Menu" screen on the Techstream.
- Select "Communication Malfunction DTC" from the "Bus Check" screen, and then select "Enter".

OK

CAN communication is normal.

NG --> GO TO CAN COMMUNICATION SYSTEM

OK: Go to next step

2. CHECK BUZZER

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream main switch on, and turn the cruise control main switch on.
- d. Enter the following menus: Radar Cruise / Utility / Beam Axis Adjustment.

NOTE: **Completing beam axis adjustment by pressing "Finish" will cause the learning values to be reset, so be sure to cancel beam axis adjustment by pressing "Exit" immediately after the buzzer sounds.**

- e. Follow the instructions on the Techstream display, and proceed to the next screen.

OK

A buzzer will sound for 1 second.

- f. Press "Exit" to cancel beam axis adjustment.

NG --> See step 5

OK: Go to next step

3. READ OUTPUT DTC (DTC P1575)

- a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- b. Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

1. Drive the vehicle at a speed for which cruise control operation is possible.
2. Turn the cruise control main switch on.
- c. Read the DTCs. Refer to **DTC CHECK / CLEAR** .

OK

DTC is not output.

NG --> See step 6

OK --> See step 4

4. **USE SIMULATION METHOD TO CHECK. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

5. **GO TO VEHICLE STABILITY CONTROL SYSTEM. Refer to Skid Control Buzzer Circuit**
6. **REPLACE ECM. Refer to REMOVAL**

DTC P1578: BRAKE SYSTEM MALFUNCTION

DESCRIPTION

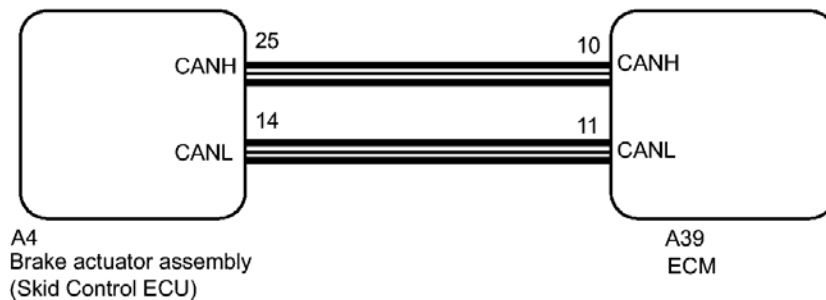
This DTC is output when the VSC system has a problem. Check the VSC system when this DTC is output.

DTC No.	DTC Detection Condition	Trouble Area
P1578	The ECM receives a brake system error signal for 0.2 second or more while the dynamic radar cruise control is in operation	• VSC system • ECM

HINT:

This circuit uses CAN communication. Therefore, if there are any malfunctions in the communication circuit, one or more DTCs in the CAN communication system are output.

WIRING DIAGRAM



≡≡≡ : CAN Communication Line

Fig. 11: Brake System Circuit Wiring Diagram

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK DTC (VEHICLE STABILITY CONTROL SYSTEM)**
 - a. Connect the Techstream to the DLC3.
 - b. Turn the ignition switch to ON.
 - c. Turn the Techstream on.

- d. Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.
- e. Check for DTCs.

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> See step 3

A --> See step 2

2. **REPLACE ECM. Refer to REMOVAL**
3. **GO TO VEHICLE STABILITY CONTROL SYSTEM (DTC CHART). Refer to DIAGNOSTIC TROUBLE CODE CHART**

DTC P1615: COMMUNICATION ERROR FROM DISTANCE CONTROL ECU TO ECM

DESCRIPTION

The driving support ECU and ECM always communicate the data for vehicle general control and diagnosis function each other through communication line.

The driving support ECU determines the distance, relative speed, and target deceleration speed based on the signal from the millimeter wave radar sensor, and it transmits a control demand signal to the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P1615	While the dynamic radar cruise control is either preparing for operation or operating, if communication data from the driving support ECU is logically inconsistent for a certain amount of time, the ECM records this logical error code	• Driving support ECU • ECM

INSPECTION PROCEDURE

PROCEDURE

1. **REPLACE DRIVING SUPPORT ECU**
 - a. Replace the driving support ECU. Refer to REMOVAL .

NEXT: Go to next step

2. CHECK DTC

- a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- b. Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

1. Drive the vehicle at a speed of 50 km/h (30 mph) or more.
 2. Turn the cruise control main switch on.
 3. Push the -SET switch to activate the cruise control.
- c. Check for DTCs. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC is not output	A
DTC P1615 is output	B

B --> See step 3

A --> END

3. REPLACE ECM. Refer to REMOVAL

DTC P1616: COMMUNICATION ERROR FROM ECM TO DISTANCE CONTROL ECU

DESCRIPTION

The ECM receives signals from each sensor and ECU, then sends signals such as A/T signals, cruise control operation signals, low speed operation signals and brake control operation signals, to the driving support ECU. The ECM is the only component that has a function to record and output the DTCs in the dynamic radar cruise control system. Therefore, if the driving support ECU detects a communication error from the ECM, it sends a malfunction signal back to the ECM.

DTC No.	DTC Detection Condition	Trouble Area
	While the dynamic radar cruise control is either preparing for operation or	

P1616	operating, if the ECM continuously receives a logical error signal from the driving support ECU for more than a specific amount of time, the ECM records this logical error code	• Driving support ECU • ECM
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INSPECTION PROCEDURE

PROCEDURE

1. REPLACE ECM

- Replace the ECM. Refer to REMOVAL .

NEXT: Go to next step

2. CHECK DTC

- Clear the DTCs. Refer to DTC CHECK / CLEAR .
- Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

- Drive the vehicle at a speed of 50 km/h (30 mph) or more.
 - Turn the cruise control main switch on.
- Check for DTCs. Refer to DTC CHECK / CLEAR .

RESULT

Result	Proceed to
DTC is not output	A
DTC P1616 is output	B

B --> See step 3

A --> END

3. REPLACE DRIVING SUPPORT ECU. Refer to REMOVAL

DTC P1617: DISTANCE CONTROL ECU MALFUNCTION

DESCRIPTION

In the dynamic radar cruise control system, the ECM and the driving support ECU communicate with one another to control the system based on some designation information. If the designation information of the ECM and driving support ECU is different or the driving support ECU is malfunctioning, this DTC is recorded.

DTC No.	DTC Detection Condition	Trouble Area
P1617	While the dynamic radar cruise control is either preparing for operation or operating, if a designation signal from the ECM and a designation return signal from the driving support ECU do not match or the driving support ECU is malfunctioning for more than a specific amount of time, the ECM records this trouble code	• Driving support ECU • ECM

INSPECTION PROCEDURE

PROCEDURE

1. REPLACE DRIVING SUPPORT ECU

- Replace the driving support ECU. Refer to **REMOVAL** .

NEXT: Go to next step

2. CHECK DTC OUTPUT

- Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

- Drive the vehicle at a speed of 50 km/h (30 mph) or more.
 - Turn the cruise control main switch on.
- Check for DTCs. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC is not output	A
DTC P1617	B

is	
output	

B --> See step 3

A --> END

3. REPLACE ECM. Refer to REMOVAL

DTC P1630: COMMUNICATION ERROR FROM VSC TO ECM

DESCRIPTION

The skid control ECU sends signals such as cruise control cancel signals and brake demand response signals to the ECM when the dynamic radar cruise control system is in operation.

DTC No.	DTC Detection Condition	Trouble Area
P1630	While the dynamic radar cruise control is either preparing for operation or operating, if communication data from the skid control ECU is logically inconsistent for a certain amount of time, the ECM records this logical error code	• Communication circuit • Brake actuator assembly (Skid control ECU) • ECM

INSPECTION PROCEDURE

PROCEDURE

1. CHECK DTC (CAN COMMUNICATION SYSTEM)

- Check for DTCs. Refer to DIAGNOSIS SYSTEM .

NG --> See step 4

OK: Go to next step

2. REPLACE BRAKE ACTUATOR ASSEMBLY

- Replace the brake actuator assembly. Refer to REMOVAL .

NEXT: Go to next step

3. CHECK DTC (RADAR CRUISE CONTROL SYSTEM)

- Clear the DTCs. Refer to DTC CHECK / CLEAR .
- Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

1. Drive the vehicle at a speed of 50 km/h (30 mph) or more.
 2. Turn the cruise control main switch on.
- c. Check for DTCs. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC is not output	A
DTC P1630 is output	B

B --> See step 5

A --> END

4. **GO TO CAN COMMUNICATION SYSTEM. Refer to DIAGNOSTIC TROUBLE CODE CHART**
5. **REPLACE ECM. Refer to REMOVAL**

DTC P1631: COMMUNICATION ERROR FROM ECM TO VSC**DESCRIPTION**

The ECM sends signals such as dynamic radar cruise control operation signals, brake operation demand signals, and buzzer operation demand signals to the skid control ECU when the dynamic radar cruise control is in operation. The ECM is the only component that has a function to record and output the DTCs in the dynamic radar cruise control system. Therefore, if the skid control ECU detects a communication error from the ECM, it sends a malfunction signal back to the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P1631	While the dynamic radar cruise control is either preparing for operation or operating, if the ECM continuously receives a logical error signal from the skid control ECU for a certain amount of time, the ECM records this logical error code	• Communication circuit • ECM • Brake actuator assembly (Skid control ECU)

INSPECTION PROCEDURE

PROCEDURE

1. CHECK DTC (CAN COMMUNICATION SYSTEM)

- a. Check for DTCs. Refer to DIAGNOSIS SYSTEM .

NG --> See step 4

OK: Go to next step

2. REPLACE ECM

- a. Replace the ECM. Refer to REMOVAL .

NEXT: Go to next step

3. CHECK DTC (RADAR CRUISE CONTROL SYSTEM)

- a. Clear the DTCs. Refer to DTC CHECK / CLEAR .
- b. Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

1. Drive the vehicle at a speed of 50 km/h (30 mph) or more.
 2. Turn the cruise control main switch on.
- c. Check for DTCs. Refer to DTC CHECK / CLEAR .

RESULT

Result	Proceed to
DTC is not output	A
DTC P1631 is output	B

B --> See step 5

A --> END

4. GO TO CAN COMMUNICATION SYSTEM. Refer to DIAGNOSTIC TROUBLE CODE CHART
5. REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL

DTC U0100: LOST COMMUNICATION WITH ECM / PCM "A"; DTC U0122: LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE; DTC U0123: LOST COMMUNICATION WITH YAW RATE SENSOR MODULE; DTC U0126: LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE; DTC U1104: LOST COMMUNICATION WITH DRIVING SUPPORT ECU

DESCRIPTION

The ECM communicates several signals with each sensor and ECU by CAN communication circuit.

If there are any malfunctions in the communication circuit, one or more DTCs in the CAN communication system are output.

DTC No.	DTC Detection Condition	Trouble Area
U0100	While the dynamic radar cruise control is either preparing for operation or operating, if the ECM continuously receives a communication cut off signal from the driving support ECU for more than a specific amount of time, the ECM records this communication cut off code	• Communication circuit • ECM • Driving support ECU
	While the dynamic radar cruise control is either preparing for operation or operating, if the ECM continuously receives a communication cut off signal from the skid control ECU for a certain amount of time, the ECM records this communication cut off code	• Communication circuit • ECM • Brake actuator assembly (Skid control ECU)
U0122	While dynamic radar cruise control is either preparing for operation or operating, if communication data from the skid control ECU is invalid for a certain amount of time, the ECM records the communication cut off code	• Communication circuit • Brake actuator assembly (Skid control ECU) • ECM
U0123	While the dynamic radar cruise control is either preparing for operation or operating, the ECM continuously receives a yaw rate and acceleration sensor malfunction signal for a certain amount of time	• Communication circuit • Yaw rate and acceleration sensor • Driving support ECU • ECM
	While the dynamic radar cruise control is either preparing for operation or operating, if the ECM	• Communication circuit

U0126	continuously receives a steering sensor communication error signal for a certain amount of time, the driving support ECU sends a signal to the ECM to record this trouble code	• Steering angle sensor • Driving support ECU • ECM
U1104	While dynamic radar cruise control is either preparing for operation or operating a communication stop between the driving support ECU and ECM for a certain amount of time.	• Driving support ECU • Communication circuit • ECM

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK DTC (CAN COMMUNICATION SYSTEM)**
 - a. Check for DTCs. Refer to **DIAGNOSIS SYSTEM** .

NEXT --> See step 2

2. **CHECK CAN COMMUNICATION SYSTEM. Refer to DIAGNOSTIC TROUBLE CODE CHART**

DTC U0235: LOST COMMUNICATION WITH CRUISE CONTROL FRONT DISTANCE RANGE SENSOR

DESCRIPTION

The millimeter wave radar sensor and driving support ECU transmit the data for general vehicle control and diagnosis function along the communication line. The millimeter wave radar sensor transmits information about the vehicle in front to the driving support ECU.

DTC No.	DTC Detection Condition	Trouble Area
U0235	The ECM detects a communication error signal (from the millimeter wave radar sensor to the driving support ECU) for 0.15 second or more while the dynamic radar cruise control is in operation	• Communication circuit • Millimeter wave radar sensor • Driving support ECU

WIRING DIAGRAM

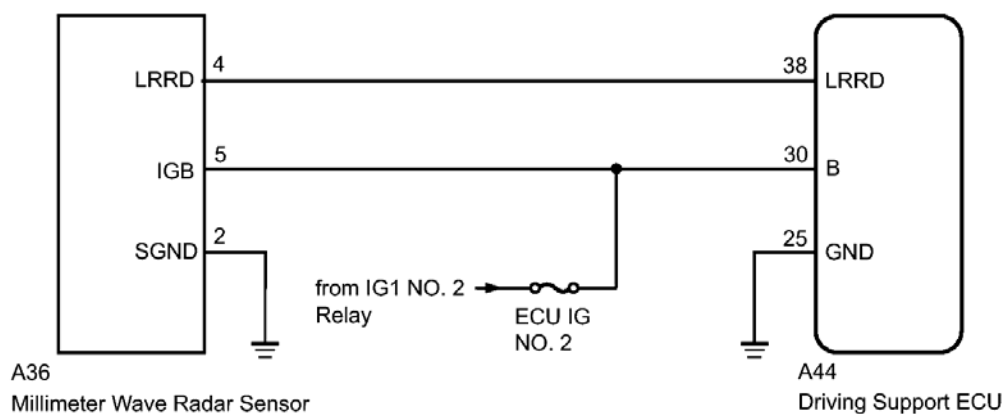


Fig. 12: Millimeter Wave Radar Sensor Circuit Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- When the millimeter wave radar sensor is replaced with a new one, adjustment of the radar sensor beam axis must be performed. Refer to **ADJUSTMENT**.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT ECU - MILLIMETER WAVE RADAR SENSOR)

- Disconnect the driving support ECU and millimeter wave radar sensor connectors.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A44-16 (LRDD) - A36-3 (LRDD)	Always	Below 1 ohms
A44-16 (LRDD) - Body	Always	10 kohms or higher

ground		
--------	--	--

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. CHECK HARNESS AND CONNECTOR (MILLIMETER WAVE RADAR SENSOR - BODY GROUND)
- a. Disconnect the millimeter wave radar sensor connector.

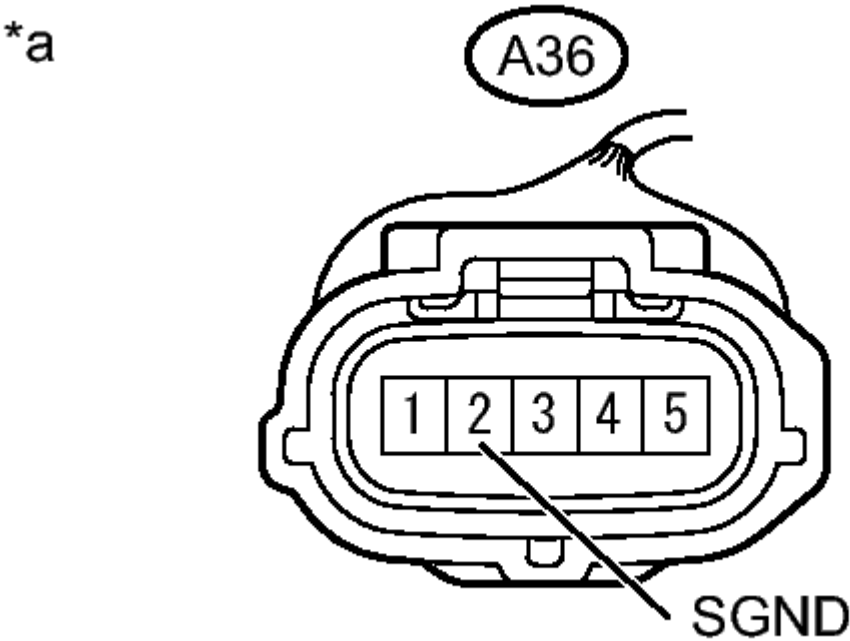


Fig. 13: Checking Harness And Connector (Millimeter Wave Radar Sensor - Body Ground)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A36-2 (SGND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

Front

view of wire harness connector
*a (to Millimeter Wave Radar Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR

- a. Disconnect the driving support ECU connector.

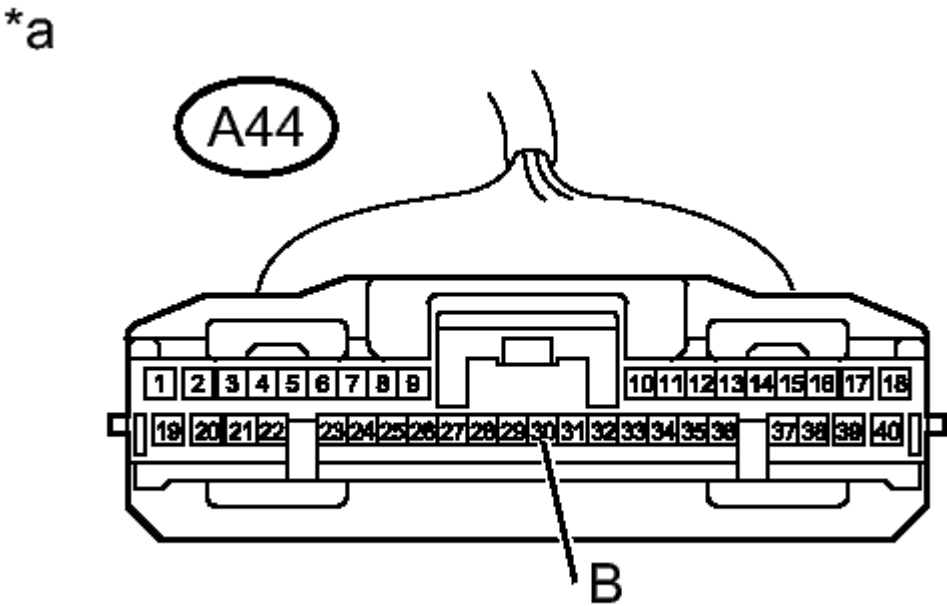


Fig. 14: Measuring Voltage Of Driving Support ECU
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition

A44-30 (B) - Body ground	Ignition switch ON	11 to 14 V
--------------------------------	--------------------------	------------

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Driving Support ECU)
----	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT ECU - BODY GROUND)

- Disconnect the driving support ECU connector.

*a

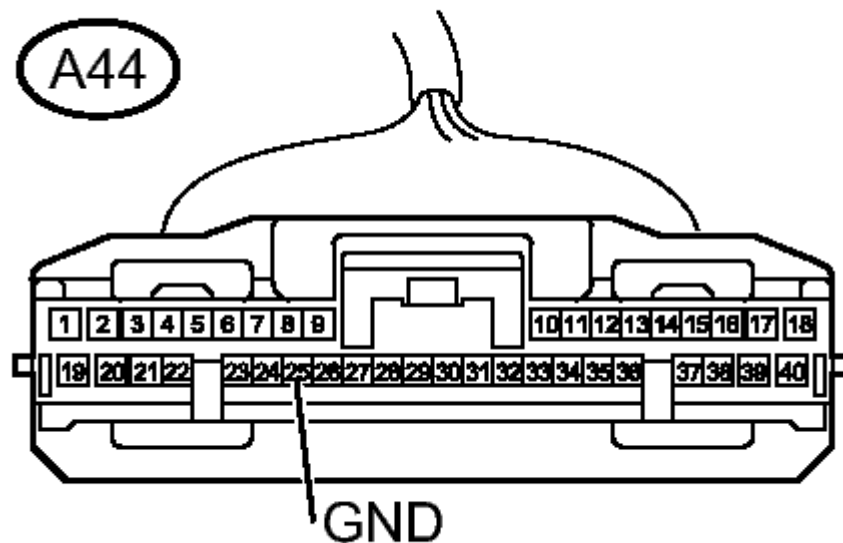


Fig. 15: Checking Harness And Connector (Driving Support ECU - Body Ground)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A44-25 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Driving Support ECU)
----	---

- c. Reconnect the driving support ECU connector.

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

5. CHECK DRIVING SUPPORT ECU

- a. Measure the voltage according to the value(s) in the table below.

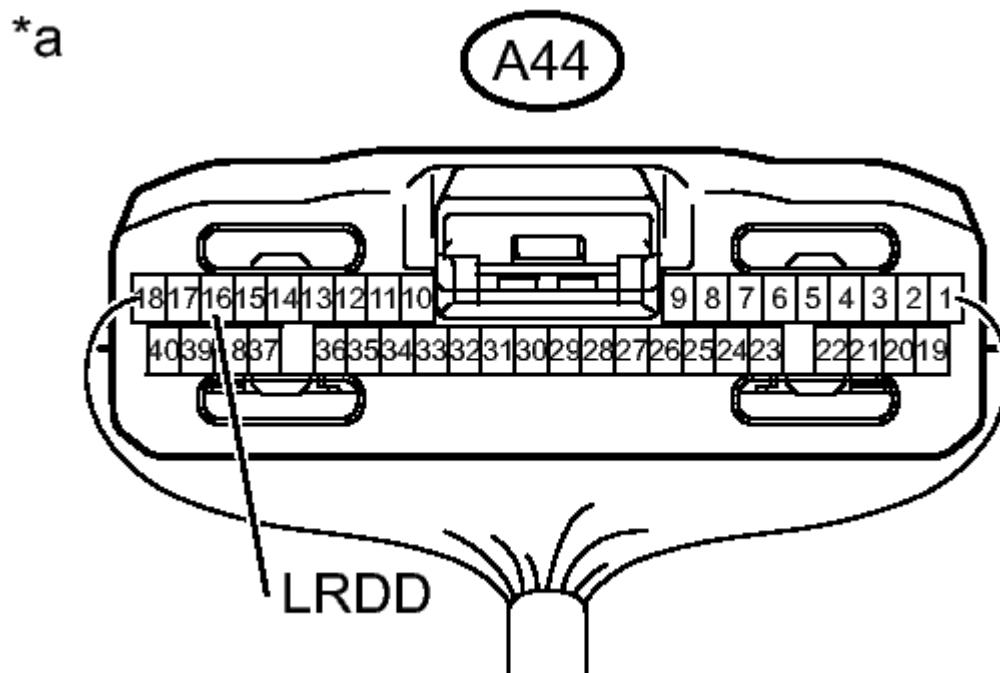


Fig. 16: Checking Driving Support ECU
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A44-16 (LRDD) - Body ground	Ignition switch ON	4.5 to 5.5 V

TEXT IN ILLUSTRATION

*a	Component with harness connected: (Driving Support ECU)
----	--

NG --> See step 8

OK: Go to next step

6. REPLACE MILLIMETER WAVE RADAR SENSOR

- a. Replace the millimeter wave radar sensor. Refer to **REMOVAL** .
- b. Adjust the millimeter wave radar sensor. Refer to **ADJUSTMENT** .

NEXT: Go to next step

7. CHECK DTC OUTPUT

- a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- b. Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

1. Drive the vehicle at a speed of 50 km/h (30 mph) or more.
2. Turn the cruise control main switch on.
3. Push the -SET switch to activate the cruise control.
- c. Check for DTCs. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC is not output	A
DTC U0235 is output	B

B --> See step 8

A --> END

8. REPLACE DRIVING SUPPORT ECU. Refer to **REMOVAL**

DTC U1102: LOST COMMUNICATION WITH RADAR SENSOR

DESCRIPTION

The millimeter wave radar sensor and driving support ECU transmit the data for general vehicle control and diagnosis function along the communication line. The driving support ECU determines the curve radius information based on signals from the steering wheel and yaw rate and acceleration sensor. The driving support ECU transmits the current vehicle speed and curve radius information to the millimeter wave radar sensor.

DTC No.	DTC Detection Condition	Trouble Area
---------	-------------------------	--------------

U1102	The ECM detects a communication error signal (from the driving support control ECU to the millimeter wave radar sensor) for 0.15 second or more while the dynamic radar cruise control is in operation	• Communication circuit • Millimeter wave radar sensor • Driving support ECU
-------	--	--

WIRING DIAGRAM

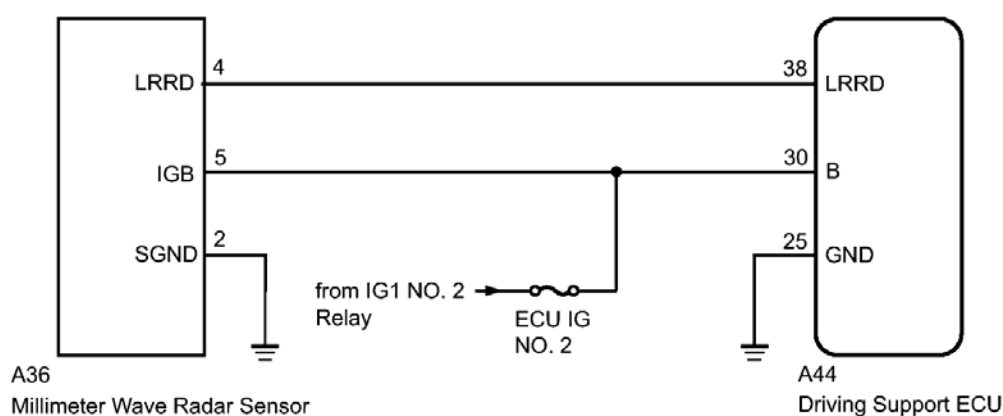


Fig. 17: Millimeter Wave Radar Sensor Circuit Wiring Diagram

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- When the millimeter wave radar sensor is replaced with a new one, adjustment of the radar sensor beam axis must be performed. Refer to ADJUSTMENT .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT ECU - MILLIMETER WAVE RADAR SENSOR)

- Disconnect the driving support ECU and millimeter wave radar sensor connectors.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A44-38 (LRRD) - A36-4 (LRRD)	Always	Below 1 ohms
A44-38 (LRRD) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. CHECK HARNESS AND CONNECTOR (MILLIMETER WAVE RADAR SENSOR POWER SOURCE CIRCUIT)
 - a. Disconnect the millimeter wave radar sensor connector.

*a

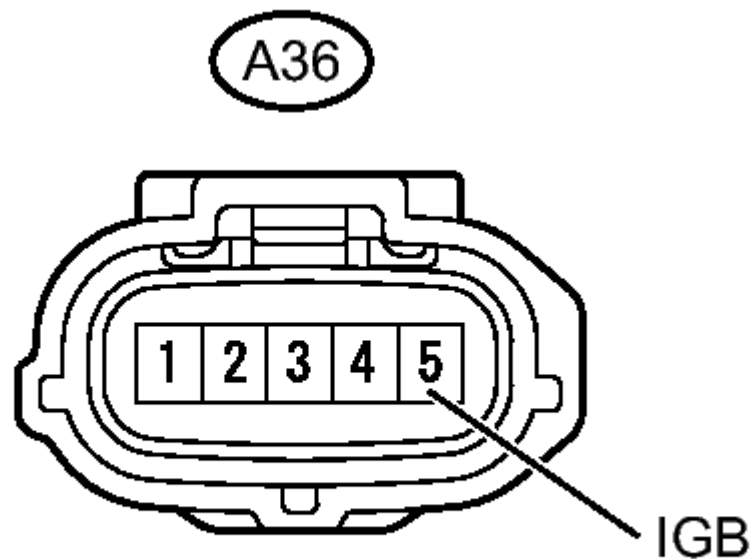


Fig. 18: Checking Harness And Connector (Millimeter Wave Radar Sensor Power Source Circuit)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Turn the ignition switch to ON.
- c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A36-5 (IGB) - Body ground	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Millimeter Wave Radar Sensor)
----	--

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (MILLIMETER WAVE RADAR SENSOR - BODY GROUND)**
 - a. Disconnect the millimeter wave radar sensor connector.

*a

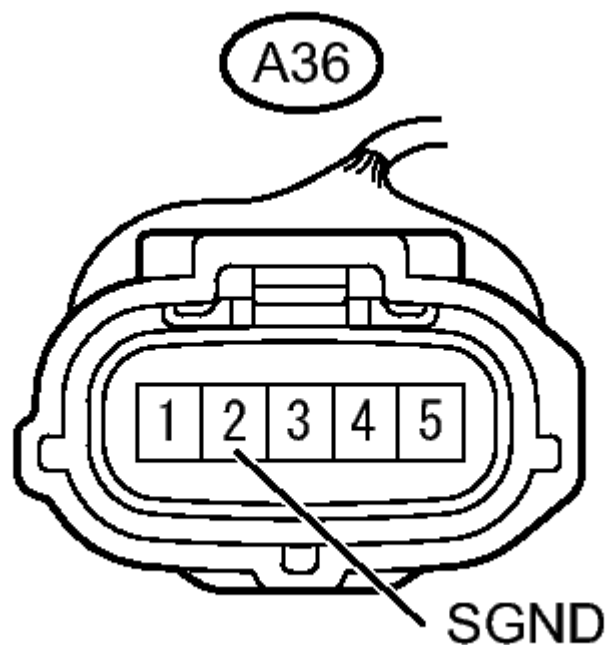


Fig. 19: Checking Harness And Connector (Millimeter Wave Radar Sensor - Body Ground)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A36-2 (SGND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Millimeter Wave Radar Sensor)
----	--

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. CHECK MILLIMETER WAVE RADAR SENSOR

- a. Disconnect the driving support ECU connector.

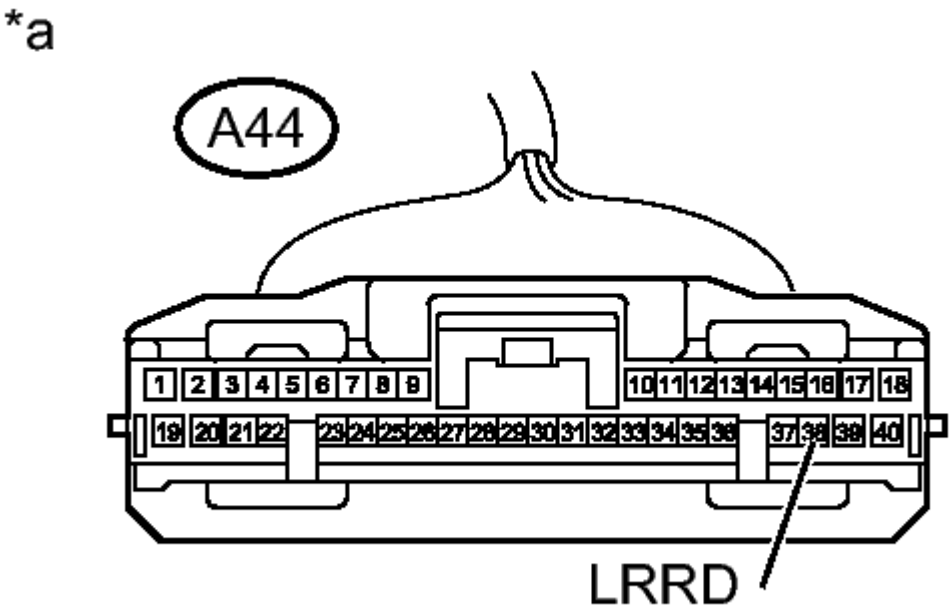


Fig. 20: Checking Millimeter Wave Radar Sensor
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Turn the ignition switch to ON.
- c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
A44-38 (LRRD) - Body ground	Ignition switch ON	4.5 to 5.5 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector
----	--------------------------------------

(to Driving Support ECU)

NG --> See step 7

OK: Go to next step

5. REPLACE DRIVING SUPPORT ECU

- a. Replace the driving support ECU. Refer to REMOVAL .

NEXT: Go to next step

6. CHECK DTC OUTPUT

- a. Clear the DTCs. Refer to DTC CHECK / CLEAR .
- b. Perform the following to make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the malfunction cannot be detected.

1. Drive the vehicle at a speed of 50 km/h (30 mph) or more.
2. Turn the cruise control main switch on.
- c. Check for DTCs. Refer to DTC CHECK / CLEAR .

RESULT

Result	Proceed to
DTC is not output	A
DTC U1102 is output	B

B --> See step 7

A --> END

7. REPLACE MILLIMETER WAVE RADAR SENSOR. Refer to REMOVAL

CIRCUIT TESTS

Cruise Control Switch Circuit

DESCRIPTION

The cruise control main switch operates 8 functions: SET, -(COAST), TAP-DOWN, RES (RESUME), + (ACCEL), TAP-UP, CANCEL, and MODE. The SET, TAP-DOWN, and - (COAST) functions, and the RES (RESUME), TAP-UP, and + (ACCEL) functions are operated with the same switch. The cruise control main switch is an automatic return type switch which turns on only while operating it in the direction of each arrow and turns off after releasing it. The internal contact point of the cruise control main switch is turned on with the switch operation. The ECM then reads the voltage value that has been changed by the switch operation to control MODE, SET, - (COAST), RES (RESUME), + (ACCEL), and CANCEL. The dynamic radar cruise control system has two cruise control modes: the constant speed control mode and vehicle-to-vehicle distance control mode.

- The vehicle-to-vehicle distance control mode is always selected when starting up the dynamic radar cruise control system.
- The operation of the constant speed control mode is the same as that for a conventional cruise control system.

WIRING DIAGRAM

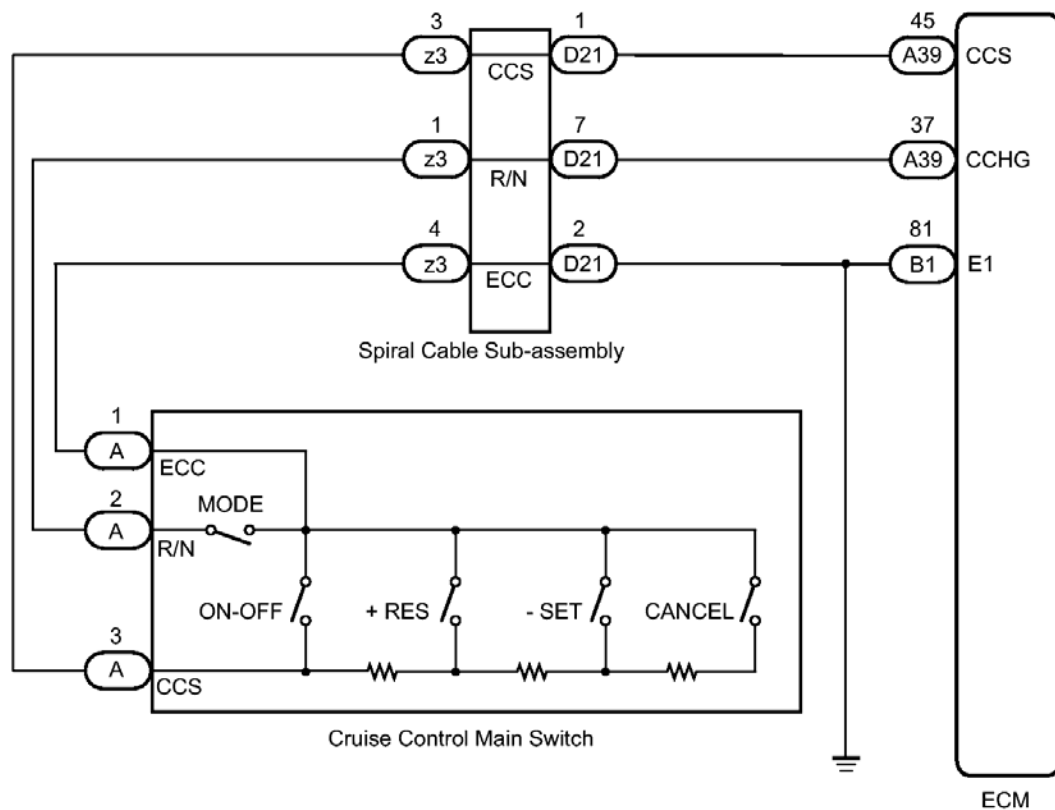


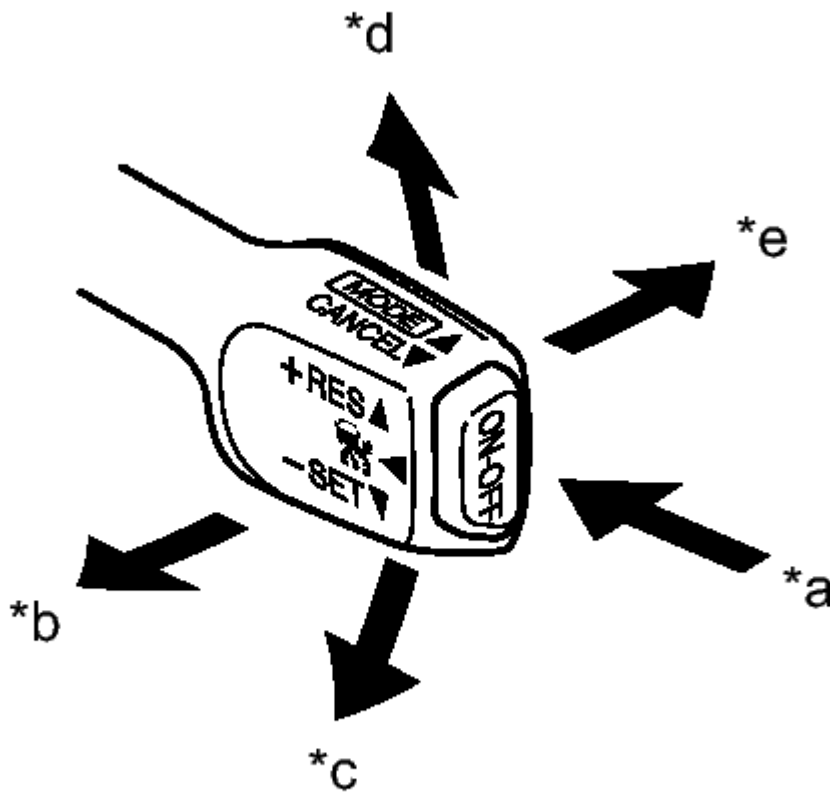
Fig. 21: Cruise Control Switch Circuit Wiring Diagram

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM



H

Fig. 22: Checking Cruise Control Switch

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Radar Cruise / Data List.
- e. Check the Data List for proper functioning of the cruise control main switch.

TEXT IN ILLUSTRATION

*a	ON-OFF
*b	CANCEL
*c	-SET
*d	+RES
*e	MODE

RADAR CRUISE (ECM)

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Main SW M-CPU	Main switch signal (Main CPU)/ON or OFF	ON: Main switch ON OFF: Main switch OFF	-
Cancel Switch	CANCEL switch signal/ON or OFF	ON: CANCEL switch ON OFF: CANCEL switch OFF	-
SET/COAST Switch	SET/COAST switch signal/ON or OFF	ON: - SET switch ON OFF: - SET switch OFF	-
RES/ACC Switch	RES/ACC switch signal/ON or OFF	ON: + RES switch ON OFF: + RES switch OFF	-

OK

When the cruise control main switch is operated, the display changes as shown above.

RESULT

Result	Proceed to
OK	A
NG (all items are defective)	B
NG (1 to 3 items are defective)	C

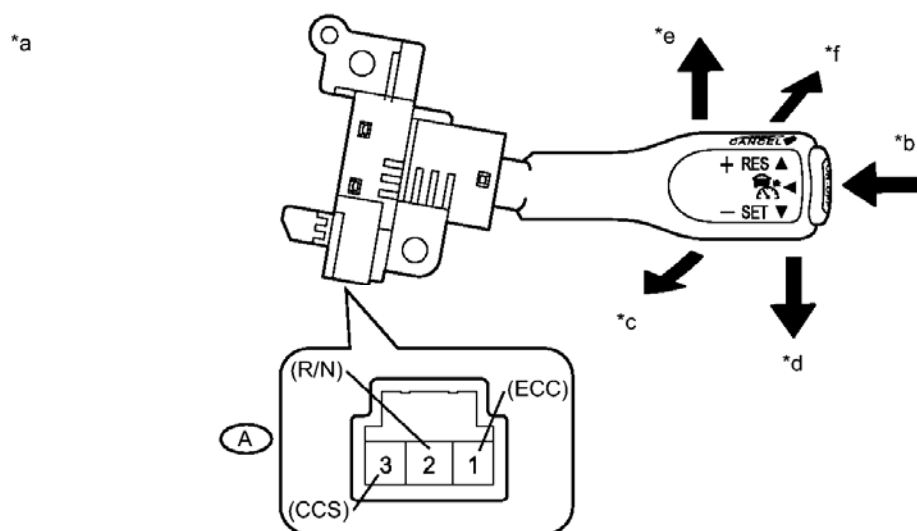
B --> See step 2

C --> See step 8

A --> See step 7

2. INSPECT CRUISE CONTROL MAIN SWITCH

- Remove the cruise control main switch. Refer to **REMOVAL**.



H

Fig. 23: Inspecting Cruise Control Main Switch

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	Component without harness connected (Cruise	*b	ON-OFF
----	---	----	--------

	Control Main Switch)		
*c	CANCEL	*d	-SET
*e	+RES	*f	MODE

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
A-1 (ECC) - A-2 (R/N) A-1 (ECC) - A-3 (CCS)	Main switch off*1	10 kohms or higher
A-1 (ECC) - A-3 (CCS)	Main switch on	Below 2.5 ohms
A-1 (ECC) - A-2 (R/N)	MODE	Below 2.5 ohms
A-1 (ECC) - A-3 (CCS)	+ RES	235 to 245 ohms
A-1 (ECC) - A-3 (CCS)	- SET	617 to 643 ohms
A-1 (ECC) - A-3 (CCS)	CANCEL	1509 to 1571 ohms

*1: The lever is in the neutral position.

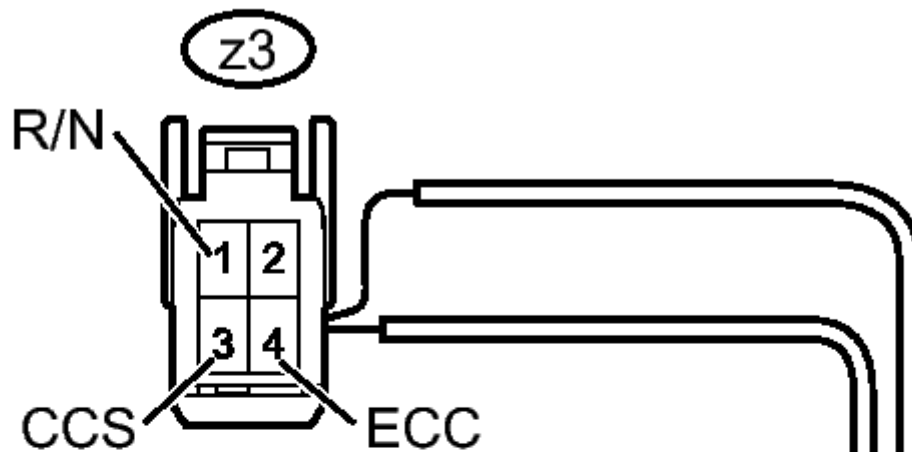
NG --> See step 8

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (SPIRAL CABLE - CRUISE CONTROL MAIN SWITCH)

- a. Disconnect the cruise control switch wire connector from the spiral cable and cruise control main switch.

*a



*b

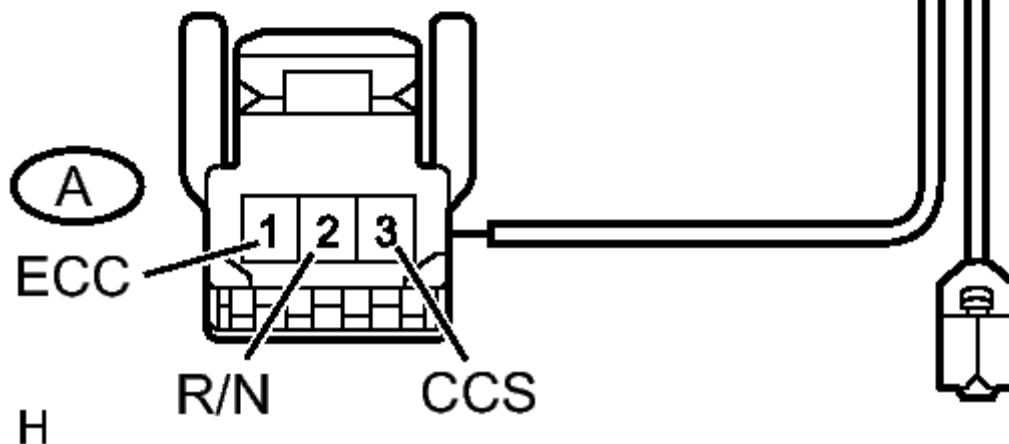


Fig. 24: Checking Harness And Connector (Spiral Cable - Cruise Control Main Switch)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A-1 (ECC) - z3-4 (ECC)	Always	Below 1 ohms
A-2 (R/N) - z3-1 (R/N)	Always	Below 1 ohms
A-3 (CCS) - z3-3 (CCS)	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Cruise control switch wire (to Spiral Cable Sub-assembly)
*b	Cruise control switch wire (to Cruise Control Main Switch)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. INSPECT SPIRAL CABLE SUB-ASSEMBLY

NOTE: The spiral cable is an important part of the SRS airbag system. Incorrect removal or installation of the spiral cable may cause airbag deployment. Be sure to read the information shown in the brackets.

- a. Remove the spiral cable sub-assembly. Refer to REMOVAL .

*a

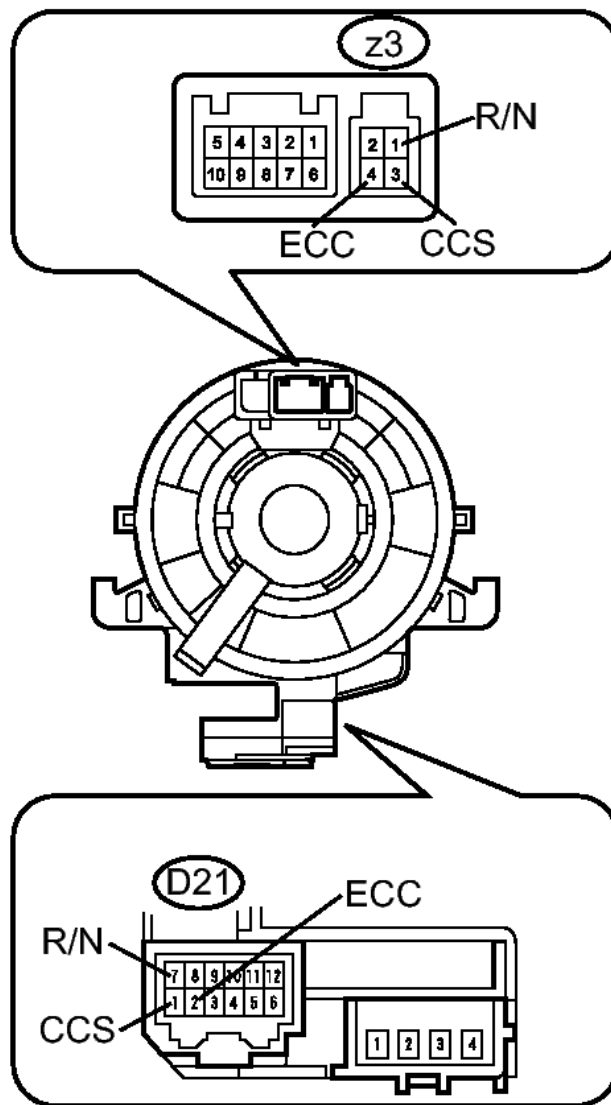


Fig. 25: Inspecting Spiral Cable Sub-Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
z3-1 (R/N) - D21-7 (R/N)	The spiral cable position is center	Below 1 ohms
	The spiral cable position is 2.5 rotations to the left	
	The spiral cable position is 2.5 rotations to the right	
z3-3 (CCS) - D21-1 (CCS)	The spiral cable position is center	Below 1 ohms
	The spiral cable position is 2.5 rotations to the left	
	The spiral cable position is 2.5 rotations to the right	
z3-4 (ECC) - D21-2	The spiral cable position is center	Below 1
	The spiral cable position is 2.5 rotations	

(ECC)	to the left	ohms
	The spiral cable position is 2.5 rotations to the right	

TEXT IN ILLUSTRATION

*a	Component without harness
	connected (Spiral Cable Sub-assembly)

HINT:

The spiral cable makes a maximum of approximately 5 rotations.

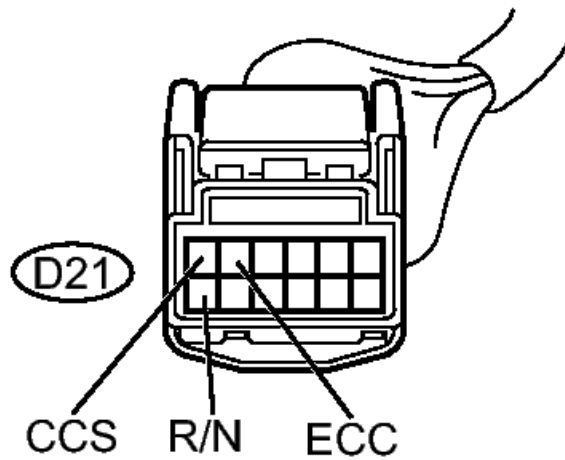
- c. Install the spiral cable sub-assembly. Refer to **INSTALLATION** .

NG --> See step 9

OK: Go to next step

5. **CHECK HARNESS AND CONNECTOR (SPIRAL CABLE - ECM, BODY GROUND)**
 - a. Disconnect the ECM connectors.

*a



*b

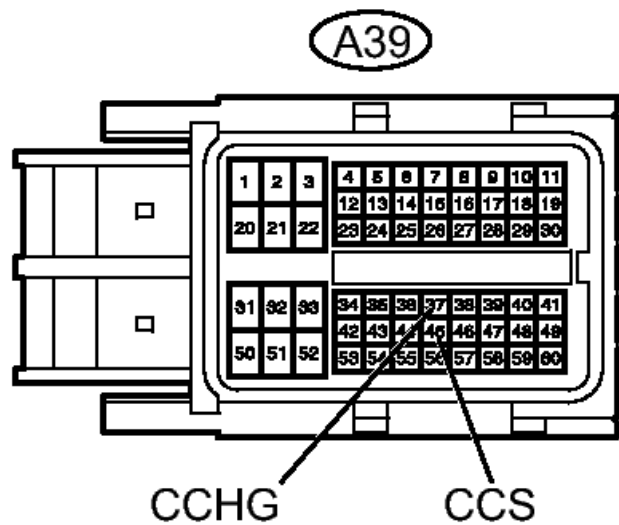


Fig. 26: Checking Harness And Connector (Spiral Cable - ECM, Body Ground)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D21-1 (CCS) - A39-45 (CCS)	Always	Below 1 ohms
D21-7 (R/N) - A39-37 (CCHG)	Always	Below 1 ohms
D21-1 (CCS) - Body ground	Always	10 kohms or higher
D21-7 (R/N) - Body ground	Always	10 kohms or higher
D21-2 (ECC) - Body ground	Always	Below 1 ohms

- c. Reconnect the ECM connector.

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Spiral Cable Sub-assembly)
*b	Front view of wire harness connector (to ECM)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 6

6. **REPLACE ECM. Refer to REMOVAL**
7. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
8. **REPLACE CRUISE CONTROL MAIN SWITCH. Refer to REMOVAL**
9. **REPLACE SPIRAL CABLE SUB-ASSEMBLY. Refer to REMOVAL**

Distance Control Switch Circuit

DESCRIPTION

The distance control switch sets the vehicle-to-vehicle distance control mode. The distance control switch is installed in the steering pad switch. The vehicle-to-vehicle distance set value can be changed by operating the steering pad switch (distance control switch) while the dynamic radar cruise control system is in operation. The steering pad switch uses the BEAN to communicate with each ECU. Therefore, it does not have a direct connection with the ECM. If there are any malfunctions in the communication line of the steering pad switch, one or more DTCs in the multiplex communication system are output.

WIRING DIAGRAM

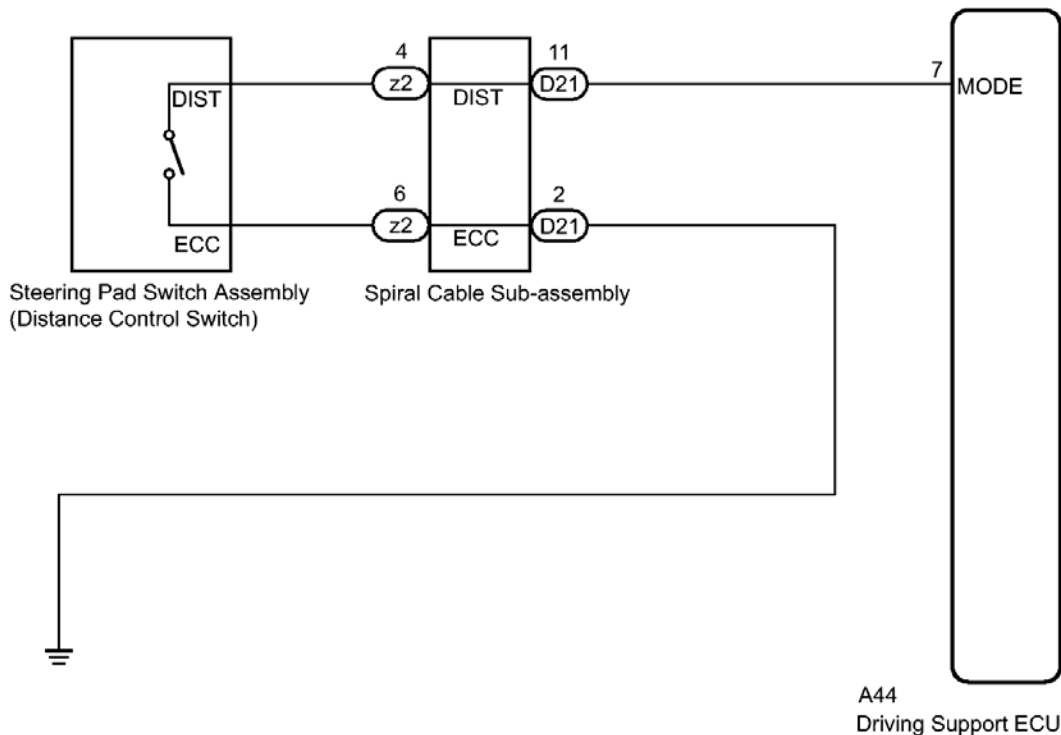


Fig. 27: Distance Control Switch Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

- 1. INSPECT STEERING PAD SWITCH ASSEMBLY
 - a. Remove the steering pad. Refer to **REMOVAL** .
 - b. Disconnect the z2 connector from the spiral cable.

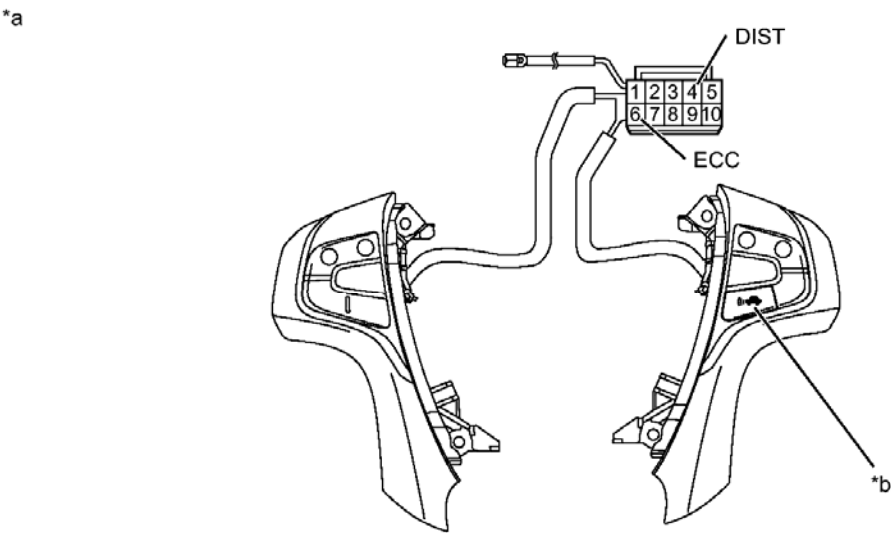


Fig. 28: Inspecting Steering Pad Switch Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Steering Pad Switch Assembly)	*b	Distance Control Switch
----	---	----	-------------------------------

- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

--	--	--

Tester Connection	Switch Condition	Specified Condition
4 (DIST) - 6 (ECC)	Distance control switch on	Below 2.5 ohms
4 (DIST) - 6 (ECC)	Distance control switch off	10 kohms or higher

d. Install the steering pad. Refer to **INSTALLATION** .

NG --> See step 6

OK: Go to next step

2. INSPECT SPIRAL CABLE SUB-ASSEMBLY

NOTE: The spiral cable is an important part of the SRS airbag system. Incorrect removal or installation of the spiral cable may cause airbag deployment. Be sure to read the information shown in the brackets.

a. Remove the spiral cable sub-assembly. Refer to **REMOVAL** .

*a

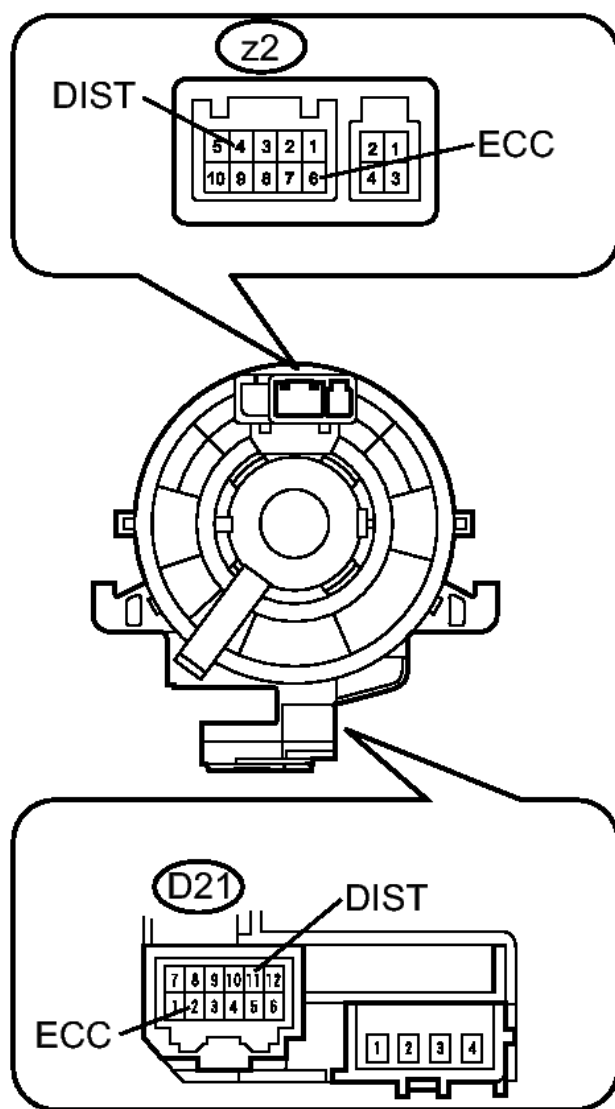


Fig. 29: Inspecting Spiral Cable Sub-Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
z2-4 (DIST) - D21-11 (DIST)	The spiral cable position is center	Below 1 ohms
	The spiral cable position is 2.5 rotations to the left	
	The spiral cable position is 2.5 rotations to the right	
z2-6 (ECC) - D21-2 (ECC)	The spiral cable position is center	Below 1 ohms
	The spiral cable position is 2.5 rotations to the left	
	The spiral cable position is 2.5 rotations to the right	

TEXT IN ILLUSTRATION

*a	Component without harness connected (Spiral Cable Sub-
----	--

|assembly)

HINT:

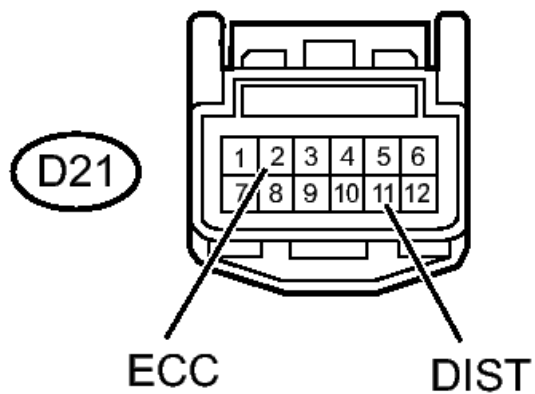
The spiral cable makes a maximum of approximately 5 rotations.

NG --> See step 7

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (SPIRAL CABLE - DRIVING SUPPORT ECU, BODY GROUND)**
 - a. Disconnect the driving support ECU connector.

*a



*b

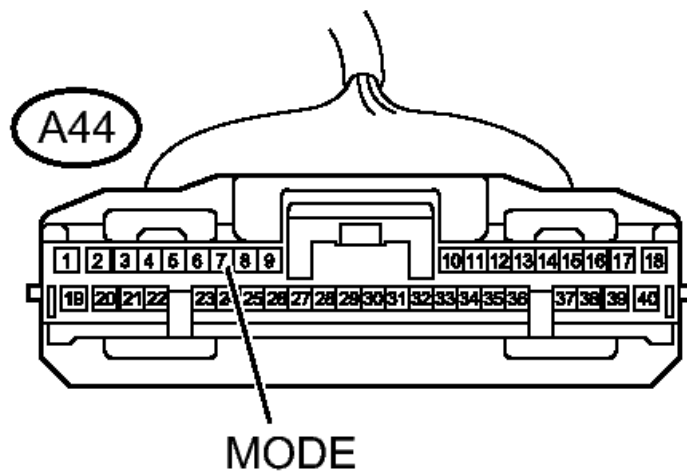


Fig. 30: Checking Harness And Connector (Spiral Cable - Driving Support ECU, Body Ground)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D21-11 (DIST) - A44-7 (MODE)	Always	Below 1 ohms
D21-11 (DIST) - Body ground	Always	10 kohms or higher
D21-2 (ECC) - Body ground	Always	Below 1 ohms

- c. Reconnect the driving support ECU connector.

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Spiral Cable Sub-assembly)
*b	Front view of wire harness connector (to Driving Support ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. INSPECT DRIVING SUPPORT ECU

- a. Turn the ignition switch to ON.

*a

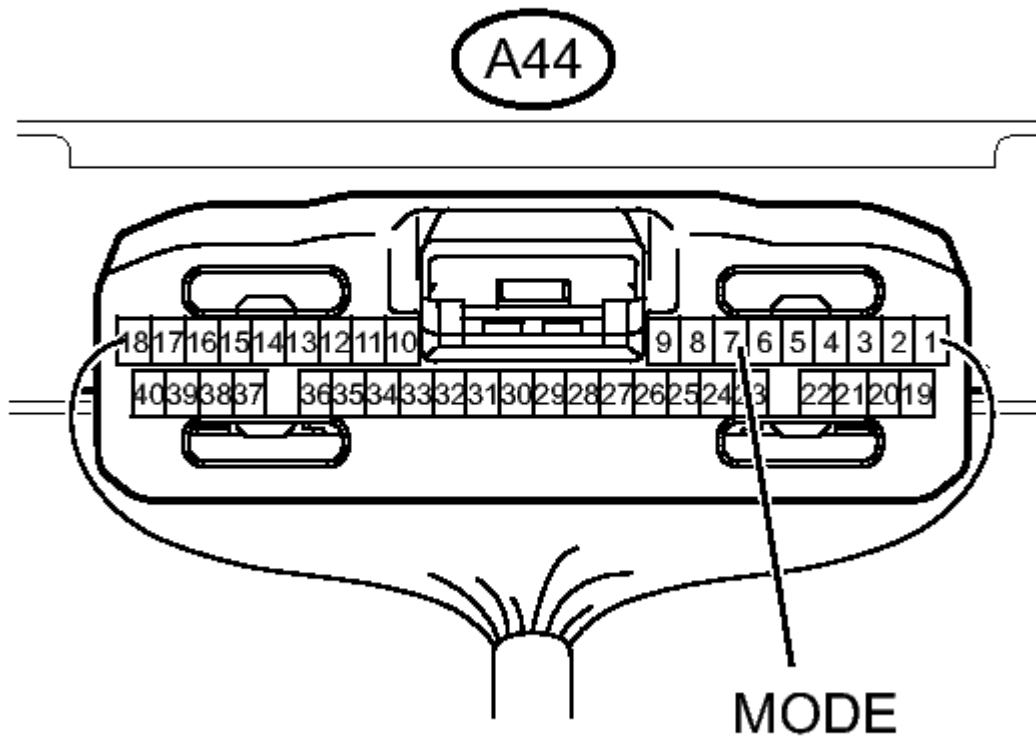


Fig. 31: Inspecting Driving Support ECU
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A44-7 (MODE) - Body ground	Distance control switch on	0 to 2 V
	Distance control switch off	11 to 14 V

TEXT IN ILLUSTRATION

*a	Component with harness connected (Driving Support ECU)
----	--

NG --> See step 8

OK --> See step 5

5. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
6. **REPLACE STEERING PAD SWITCH ASSEMBLY. Refer to REMOVAL**
7. **REPLACE SPIRAL CABLE SUB-ASSEMBLY. Refer to REMOVAL**
8. **REPLACE DRIVING SUPPORT ECU. Refer to REMOVAL**

Cruise Main Indicator Light Circuit

DESCRIPTION

When the cruise control main switch is turned on, the cruise main indicator light and READY indicator light come on. This indicates the control condition (presence or absence of a vehicle in front, vehicle-to-vehicle distance, and set vehicle speed) and fail-safe state through the CAN communication system. The master warning light and cruise main indicator light come on and vehicle-to-vehicle distance information is displayed on the combination meter as the alarm buzzer sounds. Items such as "E1", "E2", and "E3" are displayed on the multi-information display on the combination meter when the ECM detects signals from each sensor and actuator and sends them to the combination meter via CAN.

HINT:

If the vehicle in front in the same lane significantly decreases vehicle speed or another vehicle moves in front of your vehicle, adequate deceleration cannot be applied and the vehicle-to-vehicle distance will shorten. At this time, the system sounds the buzzer to warn the driver. Each indicator in the dynamic radar cruise control uses CAN for communication. Therefore, if there are any malfunctions in this circuit, check for DTCs in the CAN communication system before troubleshooting this circuit.

INSPECTION PROCEDURE

PROCEDURE

1. **PERFORM ACTIVE TEST USING TECHSTREAM**
 - a. Connect the Techstream to the DLC3.
 - b. Turn the ignition switch to ON.

- c. Turn the Techstream on.
- d. Enter the following menus: Body Electrical / Combination Meter / Active Test.
- e. Check the cruise indicator light by performing the Active Test.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Cruise	Cruise main indicator light (Constant speed control mode)	OFF or ON	Confirm that the vehicle is stopped with engine idling
Indicat. Radar Cruise	Cruise main indicator light (Vehicle-to-vehicle distance control mode)	OFF or ON	Confirm that the vehicle is stopped with engine idling

OK

The indicator light blinks/turns off.

NG --> See step 4

OK: Go to next step

2. READ VALUE USING TECHSTREAM

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Radar Cruise / Data List.
- e. Check the Data List for proper functioning of the cruise main indicator light.

RADAR CRUISE

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note

CCS Ready M-CPU	Cruise control system standby condition (Main CPU)/ON or OFF	Each time main switch is pushed, ON/OFF changes	1
CCS Indicator M-CPU	Cruise indicator signal (Main CPU)/ON or OFF	ON: Cruise main indicator light on OFF: Cruise main indicator light off	2

OK

When the cruise control main switch is operated, the display changes as shown above.

HINT:

1 is OK, but 2 is NG --> DTC output or ECM failure

NG --> See step 5

OK --> See step 3

3. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
4. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**
5. **REPLACE ECM. Refer to REMOVAL**

Cruise READY Indicator Light Circuit

DESCRIPTION

- When the ECM detects a cruise control switch on signal from the cruise control switch, it sends it to the combination meter assembly through CAN communication. Then the cruise control READY indicator light turns on.
- The cruise control READY indicator light circuit uses CAN communication. If there is a malfunction in this circuit, check for DTCs in the CAN communication system before troubleshooting this circuit.

INSPECTION PROCEDURE

NOTE: When the ECM is replaced with a new one, initialization must be performed.
Refer to **REMOVAL** .

PROCEDURE

1. PERFORM ACTIVE TEST USING TECHSTREAM

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Body Electrical / Combination Meter / Active Test.
- e. Check the cruise READY indicator light by performing the Active Test.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
Radar Cruise Ready Indicator	Radar Cruise control READY indicator light	ON/OFF	-

OK

Cruise control READY indicator light turns on/off.

NG --> See step 4

OK: Go to next step

2. READ VALUE USING TECHSTREAM

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Radar Cruise / Data List.
- e. Check the Data List for proper functioning of the READY indicator light.

RADAR CRUISE

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
SET/COAST Switch	-SET switch signal / ON or OFF	ON: -SET switch on OFF: -SET	-



OK

On screen, each item changes between ON and OFF according to above chart.

NG --> See step 5

OK --> See step 3

3. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
4. **GO TO METER / GAUGE SYSTEM. Refer to PROBLEM SYMPTOMS TABLE**
5. **REPLACE ECM. Refer to REMOVAL**

ECU Power Source Circuit

DESCRIPTION

This circuit provides power to operate the driving support ECU. The driving support ECU determines information about the vehicle in front based on data from the radar sensor, and then decides how much acceleration and/or deceleration is needed to maintain the set distance. The driving support ECU also requests the skid control ECU to apply braking and to sound the buzzer.

WIRING DIAGRAM

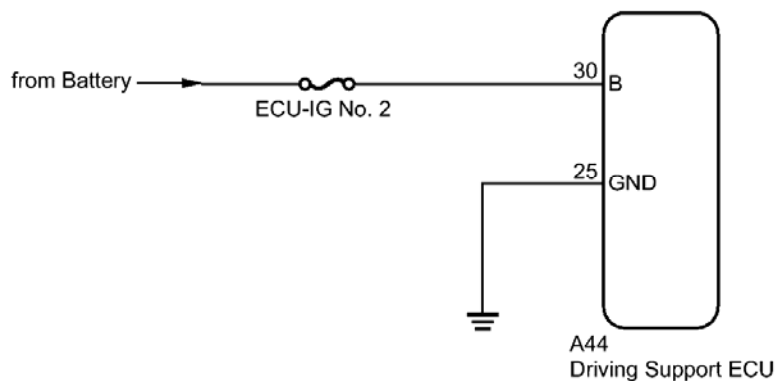


Fig. 32: ECU Power Source Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

- 1. **CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT ECU - POWER SOURCE AND GROUND)**
 - a. Disconnect the driving support ECU connector.

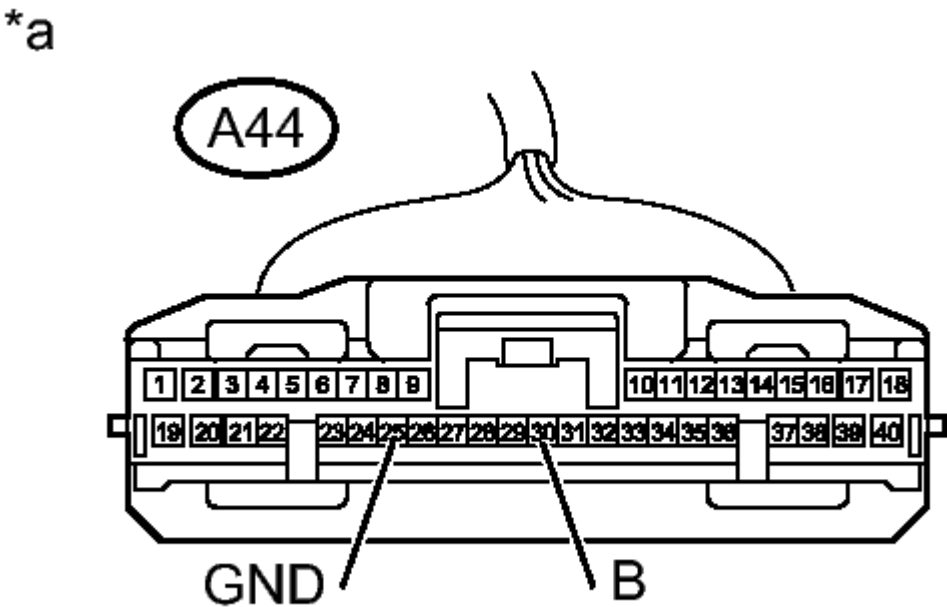


Fig. 33: Measuring Voltage Of Driving Support ECU
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A44-30 (B) - Body ground	Ignition switch ON	11 to 14 V

- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

--	--	--

Tester Connection	Condition	Specified Condition
A44-25 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Driving Support ECU)
----	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 2

- 2. PROCEED TO NEXT INSPECTION PROCEDURE SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**

TC and CG Terminal Circuit

DESCRIPTION

Connecting terminals TC and CG of the DLC3 causes the system to enter the self-diagnostic mode. If a malfunction is present, the MIL will blink.

HINT:

When a particular warning light remains blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in the relevant ECU is suspected.

WIRING DIAGRAM

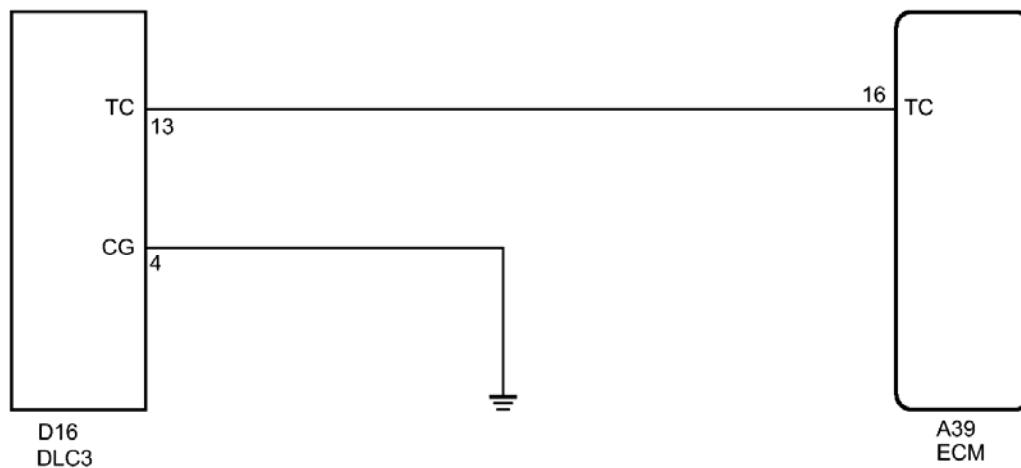


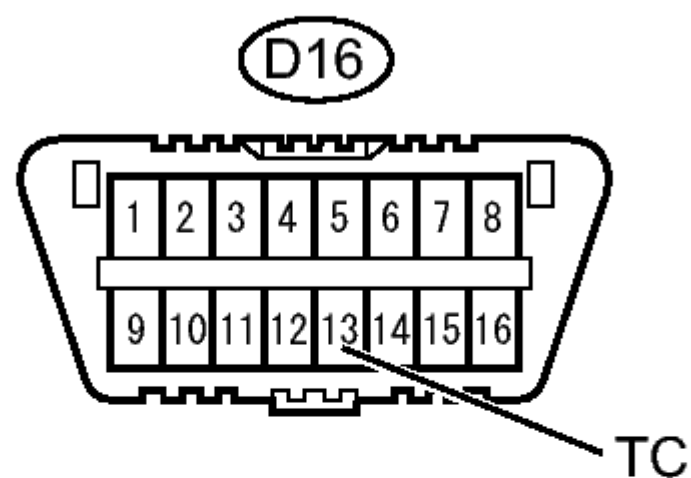
Fig. 34: TC and CG Terminal Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (TERMINAL TC of DLC3 - ECM)**
 - a. Disconnect the ECM connector.

*a



*b

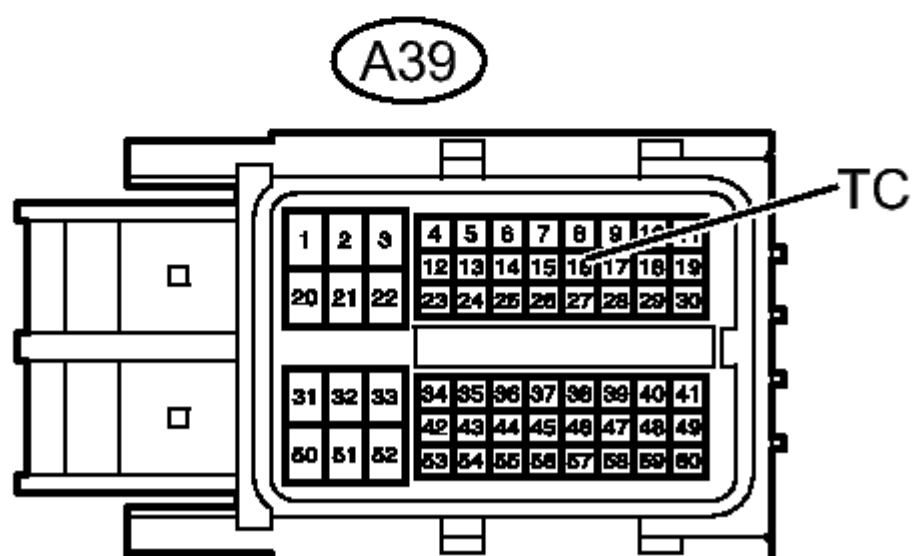


Fig. 35: Checking Harness And Connector (Terminal TC Of DLC3 - ECM)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A39-16 (TC) - D16-13 (TC)	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	DLC3
*b	Front view of wire harness connector (to ECM)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. CHECK HARNESS AND CONNECTOR (TERMINAL CG of DLC3 - BODY GROUND)

*a

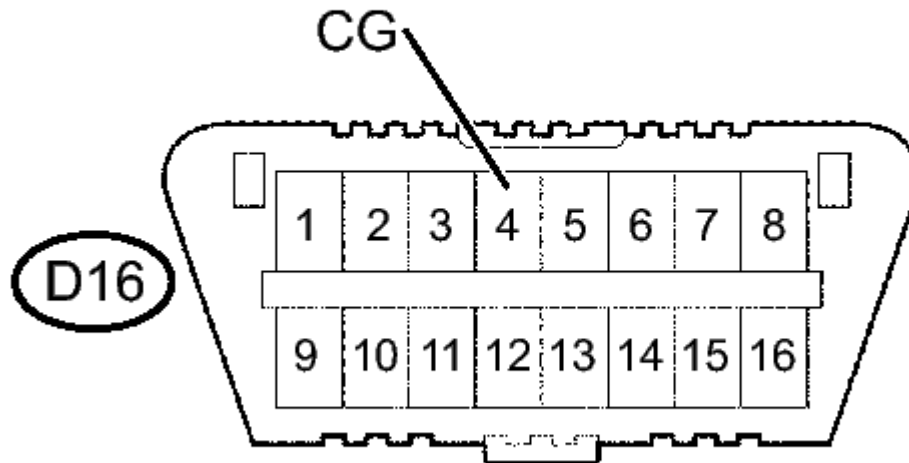


Fig. 36: Checking Harness And Connector (Terminal CG Of DLC3 - Body Ground)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- a. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D16-4 (CG) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a|DLC3

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (TERMINAL TC of DLC3 - BODY GROUND)

*a

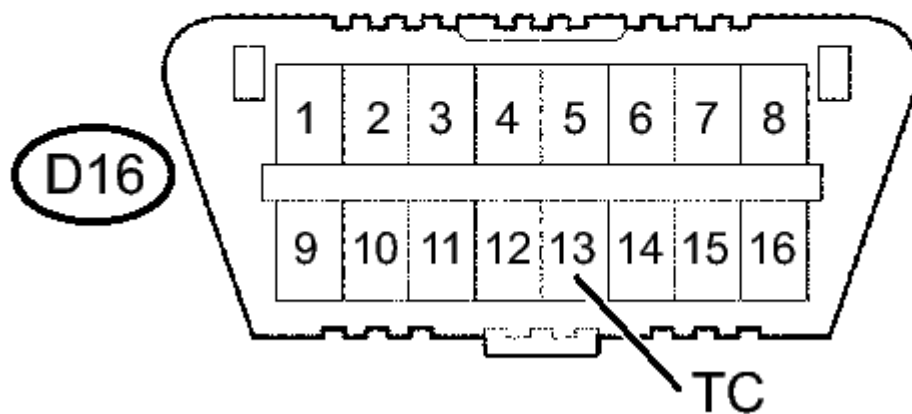


Fig. 37: Checking Harness And Connector (Terminal TC Of DLC3 - Body Ground) Measuring Voltage Of Driving Support ECU
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- a. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D16-13 (TC) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*aDLC3

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR OR EACH ECU

OK --> See step 4

4. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**

ACCESSORIES & EQUIPMENT

Dynamic Radar Cruise Control System (Diagnostics - Introduction) - Sienna

DYNAMIC RADAR CRUISE CONTROL SYSTEM

PRECAUTION

PRECAUTION

1. IGNITION SWITCH EXPRESSIONS

- a. The type of ignition switch used on this model differs according to the specifications of the vehicle. The expressions listed in the table below are used in this information.

Expression	Ignition Switch (Position)	Engine Switch (Condition)
Ignition Switch off	Lock	Off
Ignition Switch ON	ON	On (IG)
Ignition Switch ACC	ACC	On (ACC)
Engine Start	START	Start

2. HANDLING PRECAUTION FOR DYNAMIC RADAR CRUISE CONTROL SYSTEM

Keep in mind the following points when inspecting the dynamic radar cruise control system.

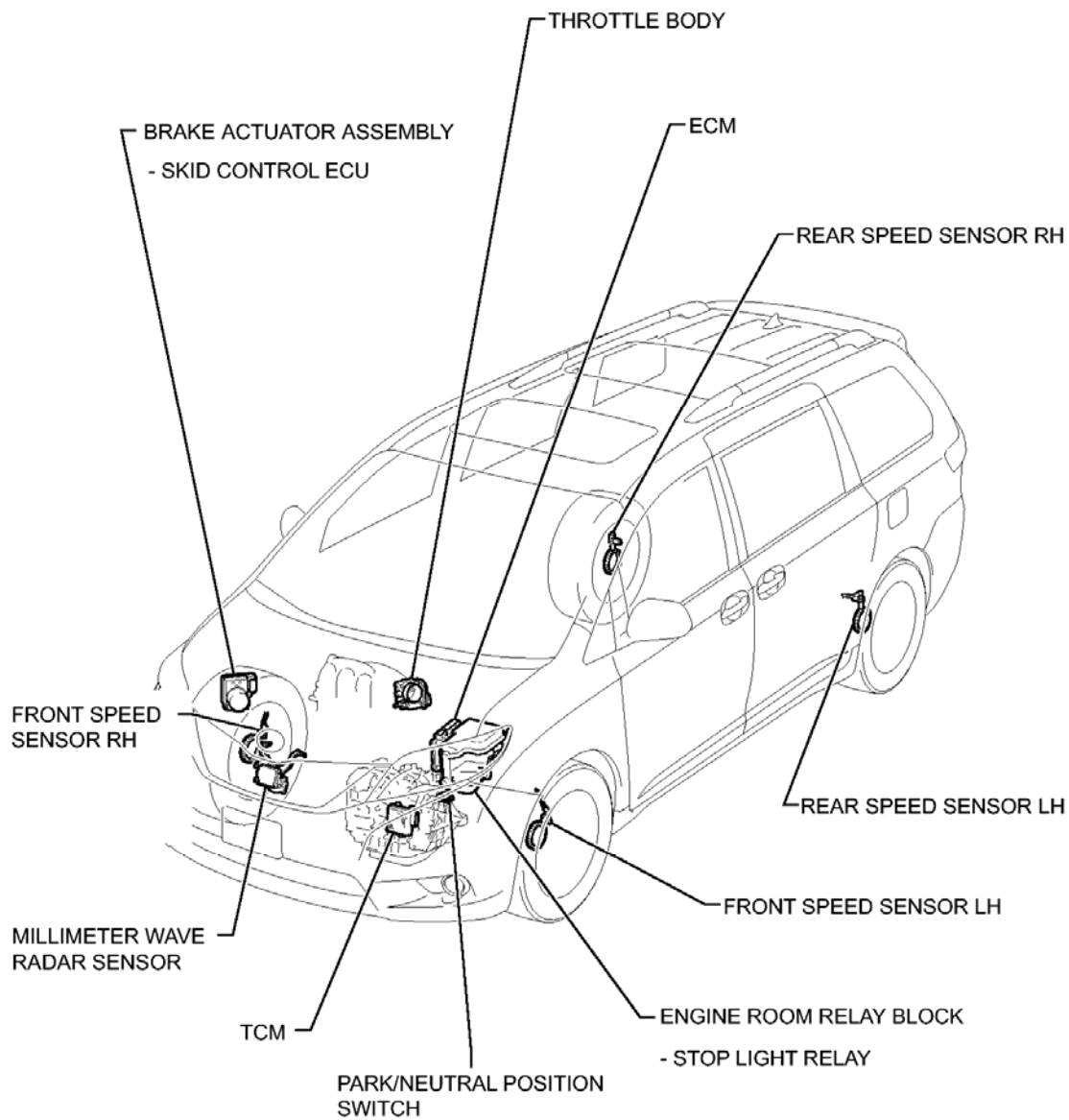
- As there is a limitation on the vehicle-to-vehicle distance controlling capability, do not overly rely on the dynamic radar cruise control system.
- Do not neglect to pay constant attention to the vehicle-to-vehicle distance and the traffic conditions when using the dynamic radar cruise control system. Decelerate with the brake pedal, or accelerate with the accelerator pedal, according to the situation, to keep an appropriate distance with the vehicle in front.
- When the vehicle in front decelerates rapidly or another vehicle moves in front of the vehicle, decelerating in time to avoid a collision may not be possible without additional braking.
- The dynamic radar cruise control system is designed to assist in maintaining an appropriate distance with the vehicle in front. However, the system alone is not sufficient. It is imperative that the driver pays attention at all times.
- The millimeter wave radar sensor can automatically detect dirt on the sensor face and inform the driver, but dirt may not always be detected. Keep the sensor face clean.
- The dynamic radar cruise control system does not work, or give vehicle-approaching warning, for

vehicles which are stopped or driving at significantly slower speeds. Always pay attention to those other vehicles.

- The millimeter wave radar sensor detection area is narrow at close range, so detection of a vehicle moving just in front may be delayed, or a motorcycle running on the side of the same lane may not be detected. The distance to the vehicle in front may not be maintained properly due to these reasons.
- Even if + (ACCEL) is operated to increase the set vehicle speed, the vehicle does not accelerate because the speed is controlled in accordance with the speed of the vehicle in front while driving with the vehicle-to-vehicle distance control mode on (follow-up cruising). However, as the set vehicle speed has been increased by + (ACCEL) operation, the vehicle keeps accelerating when there is no vehicle in front. Check the set speed with the set vehicle speed indication on the display.
- The controlled vehicle distance may be shorter than the set vehicle distance when cruising on a long downhill road.
- The cruise control main switch must be turned off and then on if all of the following occur: 1) the cruise main indicator light blinks, 2) the master warning light illuminates at the same time as a "pong" sound, and 3) the fail message is shown on the multi-information display.
- The vehicle-approaching warning buzzer does not sound in the constant speed control mode because the presence of the vehicle in front and the distance to it are not judged as in the vehicle-to-vehicle distance control mode. Pay attention to the distance to the vehicle in front.
- The dynamic radar cruise control system has 2 cruise control modes: the constant speed control mode and vehicle-to-vehicle distance control mode. Confirm which mode is selected when using the dynamic radar cruise control system.

PARTS LOCATION

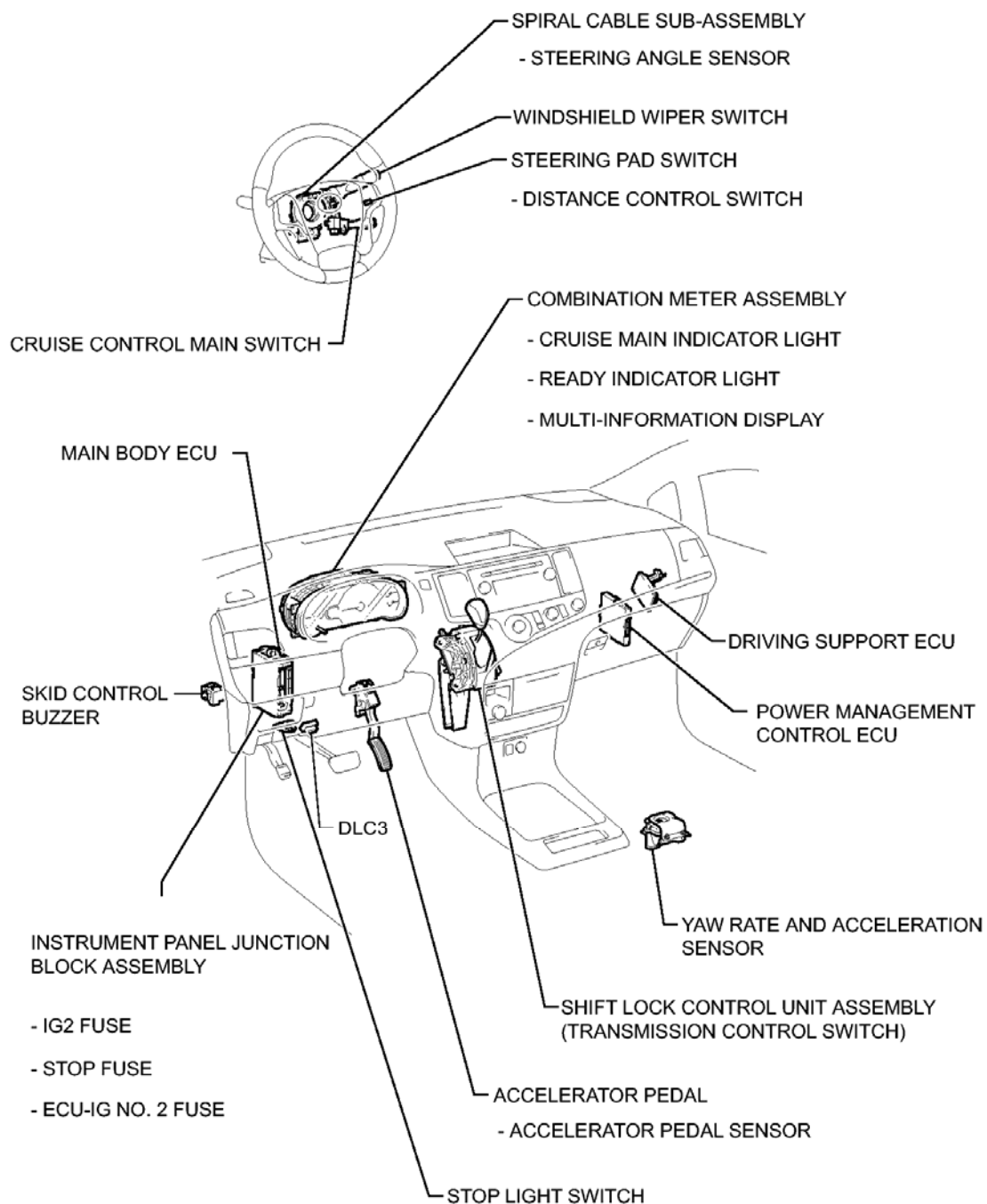
ILLUSTRATION



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Fig. 1: Dynamic Radar Cruise Control System Components Location (1 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ILLUSTRATION



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Fig. 2: Dynamic Radar Cruise Control System Components Location (2 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DIAGRAM

SYSTEM DIAGRAM

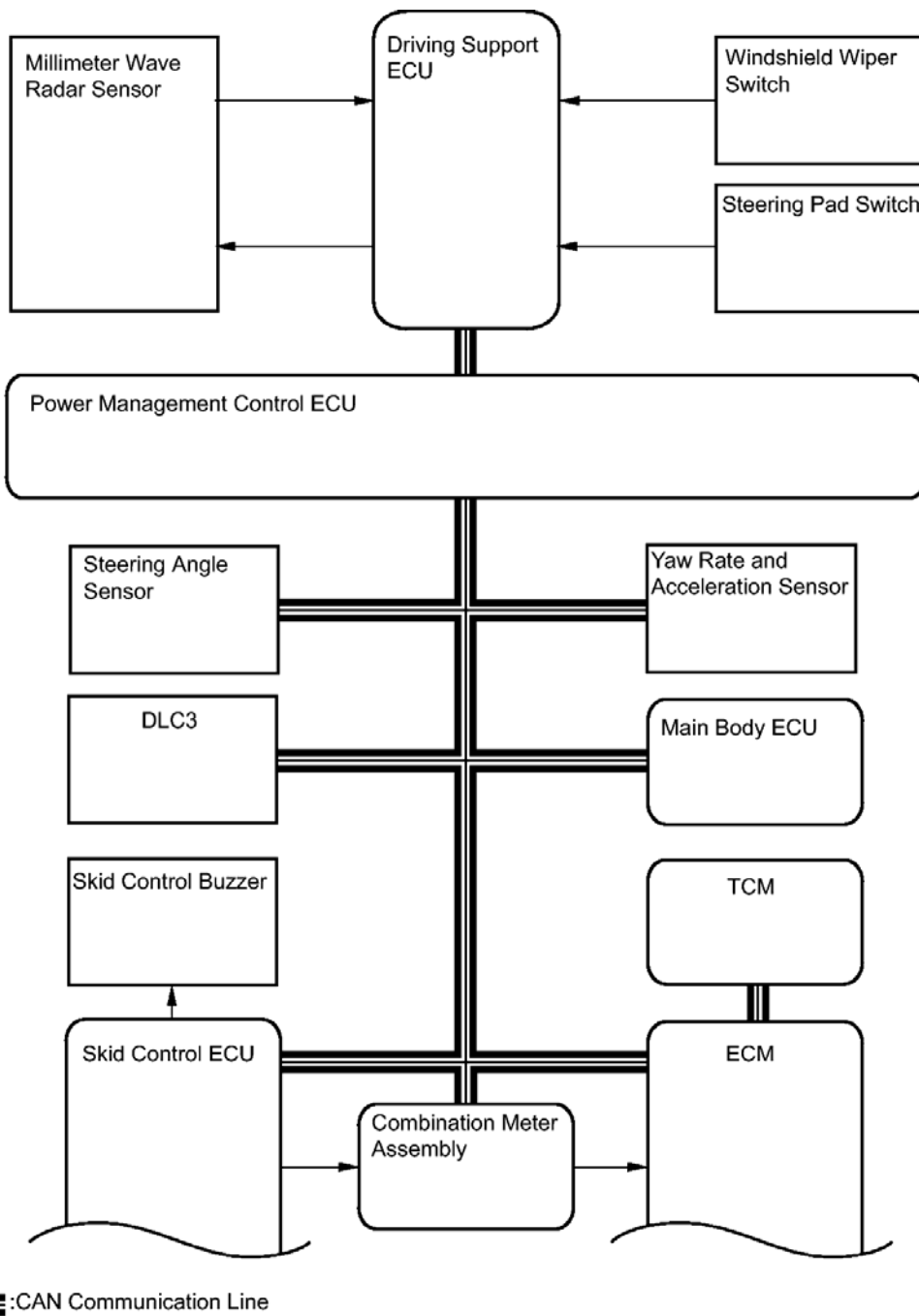


Fig. 3: Dynamic Radar Cruise Control System Diagram (1 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

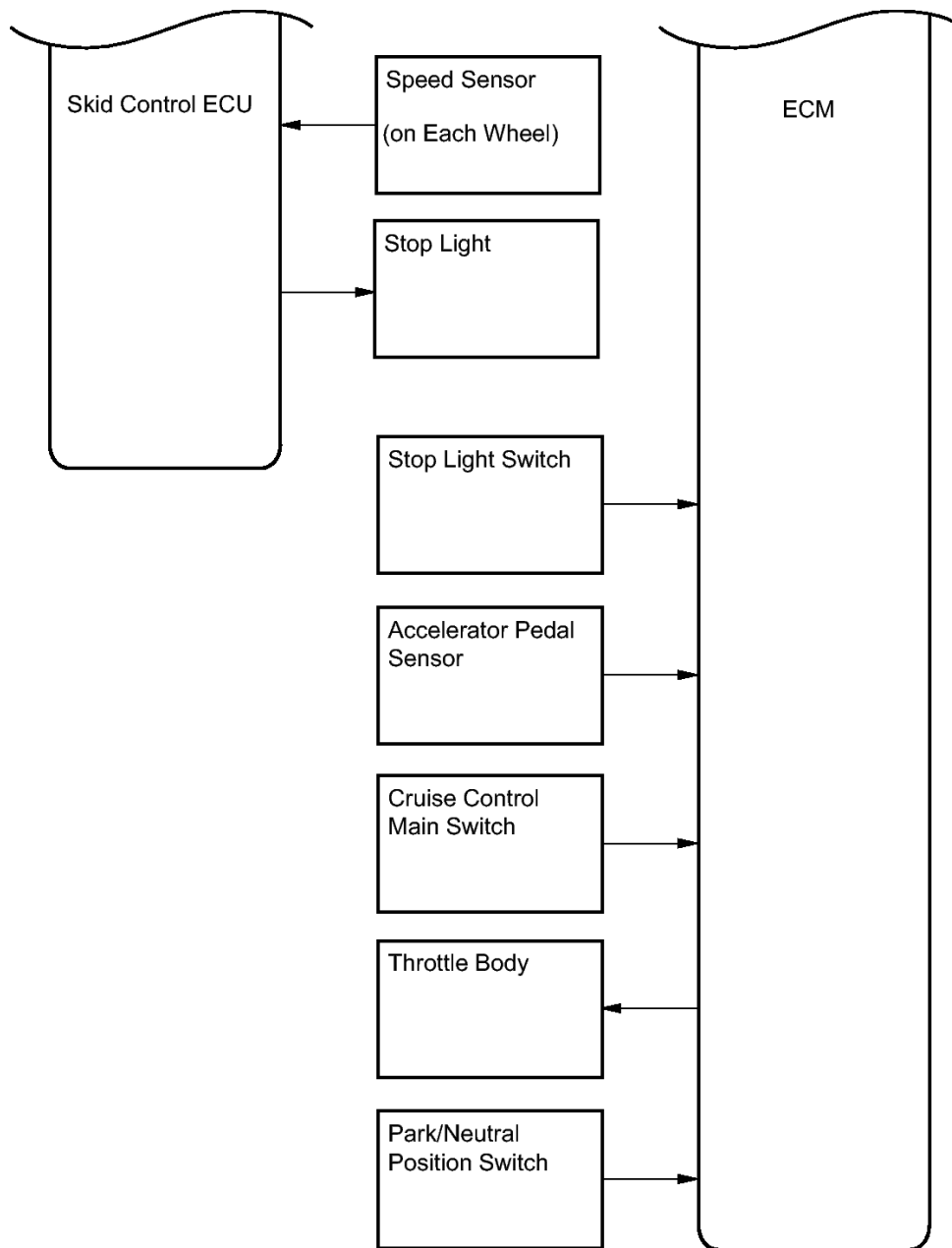


Fig. 4: Dynamic Radar Cruise Control System Diagram (2 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

COMMUNICATION TABLE

Sender	Receiver	Signal	Line
		- A/T signal - Cruise control	

ECM	Driving Support ECU	operation signal • Accelerator pedal idle signal • Set vehicle distance signal • Brake demand response signal • Stored vehicle speed signal • Current vehicle speed signal • Cruise control switch signal • Brake control operation signal • Cruise control demand torque signal • Dynamic radar cruise designation signal • Brake control interrupting signal • Cruise control demand opening angle signal	CAN
		• Millimeter wave radar sensor beam axis deviation signal • Millimeter wave radar sensor malfunction signal • Dirt present on millimeter wave radar sensor signal	

Driving Support ECU	ECM	• Bad weather detection signal • Communication error signal (from driving support ECU to millimeter wave radar sensor) • Communication error signal (from ECM to driving support ECU) • Communication error signal (from skid control ECU to driving support ECU) • Yaw rate communication error signal • Steering angle sensor communication error signal • Driving support ECU voltage signal • Dynamic radar cruise designation response signal • Estimated vehicle speed signal • Vehicle-to-vehicle distance signal • Vehicle-to-vehicle distance control signal • Brake control demand signal	CAN
---------------------------	-----	---	-----

		• Throttle fully closed demand signal • Approach warning signal (skid control buzzer demand signal) • Cruise target deceleration gradient signal • Vehicle-to-vehicle distance control acceleration signal	
ECM	Skid Control ECU	• Cruise target deceleration gradient signal • Cruise target deceleration signal • Throttle fully closed demand signal • Brake control demand signal • Cruise control operation signal • Approach warning signal (skid control buzzer demand signal)	CAN
Skid Control ECU	Driving Support ECU	• Wheel speed signal • Speed sensor power drop signal • Speed sensor condition signal • Yaw rate and acceleration sensor signal	CAN

		• Yaw rate and acceleration sensor zero point error signal	
Skid Control ECU	ECM	• Brake component malfunction signal • Brake control malfunction signal • Drive wheel slip signal • Cruise control cancel signal • Skid control buzzer malfunction signal • Communication logic error signal (from ECM to skid control ECU) • Brake demand response signal • Brake control interrupting signal • Brake control operation signal	CAN
Steering Angle Sensor	Driving Support ECU	• +B open circuit malfunction signal • Sensor malfunction signal • Steering angle signal • Sensor zero point signal	CAN
Yaw Rate	Driving	• Yaw rate sensor	

and Acceleration Sensor	Support ECU	signal • Yaw rate sensor voltage signal	CAN
ECM	Combination Meter (Meter ECU)	• Cruise control diagnosis signal (DTC) • Preceding vehicle detection signal • Approach warning signal • Vehicle-to-vehicle distance signal • Dirt present on millimeter wave radar sensor signal • Bad weather detection signal • Vehicle-to-vehicle distance control signal • Vehicle-to-vehicle distance control check mode signal • Vehicle-to-vehicle distance control standby condition signal • Constant speed cruise signal • Cruise main indicator operation signal • Cruise control warning signal • Dynamic radar cruise warning signal • Cruise control vehicle speed signal	CAN

Driving Support ECU	Combination Meter (Meter ECU)	• Millimeter wave radar sensor beam axis deviation signal • Vehicle-to-vehicle distance signal • Preceding vehicle detection signal	CAN
ECM	TCM	• Shift up/down request signal	CAN
TCM	ECM	• Shift up/down response	CAN

SYSTEM DESCRIPTION

SYSTEM DESCRIPTION

1. GENERAL

- a. The dynamic radar cruise control system has two cruise control modes: the constant speed control mode and vehicle-to-vehicle distance control mode.
 - The vehicle-to-vehicle distance control mode is always selected when starting the dynamic radar cruise control system.
 - Operation of the constant speed control mode is the same as that for a conventional cruise control system.
- b. This system maintains the vehicle running at the speed that the driver has set, as long as there are no vehicles ahead in the same lane. Then, the system maintains the vehicle distance that has been set by the driver. If the system detects a vehicle driving at a slower speed ahead while the driver is driving at a constant speed, it closes the throttle valve to decelerate. If further deceleration is required, the system controls the brake actuator in order to apply the brakes. Thereafter, if there are no vehicles ahead within the set vehicle-to-vehicle distance because either the vehicle ahead or the driver has changed lanes, the system accelerates slowly to reach the set vehicle speed and resumes driving at the constant speed.
- c. The constant speed control mode is designed to maintain a constant cruising speed. The vehicle-to-vehicle distance control mode is designed to control cruising at a constant speed function, deceleration cruising function, follow-up cruising function, and acceleration cruising function.
- d. The millimeter wave radar sensor and the driving support ECU control the system while the vehicle-to-vehicle distance control mode is in operation, and send signals to each actuator and ECU.
- e. In vehicle-to-vehicle distance control mode, the dynamic radar cruise control system receives signals from the yaw rate and acceleration sensor and the steering angle sensor. Based on these signals, the system then estimates curve radius and compensates for information on the preceding

vehicle while turning. It can also compensate using brake control when approaching another vehicle.

- f. This system judges the presence of a vehicle in front and the distance to it based on the signals from the radar sensor while the vehicle-to-vehicle distance control mode is in operation. Using this information, the system informs the driver of any danger with the warning buzzer, performs brake control, and turns on the stop light when approaching the vehicle in front.
- g. The following illustration shows a control example under the following conditions: own vehicle speed is 100 km/h (62 mph) and the speed of the vehicle in front is 80 km/h (50 mph). Setting of the vehicle distance can be changed to 3 distances by operating the distance control switch (distance control switch): long (approximately 50 m (160 ft.)), middle (approximately 40 m (130 ft.)), and short (approximately 30 m (100 ft.)) when the vehicle speed is approximately 80 km/h (50 mph).

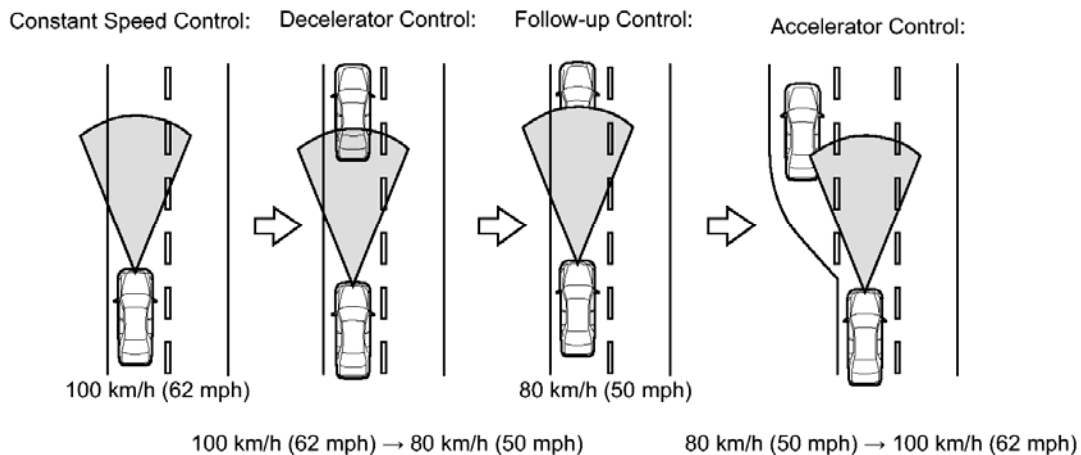


Fig. 5: Types Of Vehicle Speed Conditions
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

- Vehicle distance increases and decreases in accordance with vehicle speed.
- Controlling condition is indicated on the multi-information display in the combination meter.

2. FUNCTION OF MAIN COMPONENTS

Item	Outline
Combination	• Comes on when the main switch is on • If the driving

Meter (Cruise main indicator Light)	support ECU detects a malfunction, this light flashes to warn the driver
Combination Meter (Master Warning Light)	If the ECM or driving support ECU detects an automatic cancel signal while the vehicle is operating under cruise control, this light comes on to inform the driver
Combination Meter (Buzzer)	If the ECM or driving support ECU detects an automatic cancel signal while the vehicle is operating under cruise control, this buzzer sounds only once to inform the driver
Combination Meter	While the system is in vehicle-to- vehicle distance control mode, the multi- information display receives signals from the ECM in order to display system conditions in the

(Multi-information Display)	graphic area. • If the ECM or driving support ECU detects a malfunction signal while the vehicle is operating under cruise control, a warning message is displayed in the warning area to inform the driver.
Cruise Control Main Switch (Main Switch)	Turns the cruise control system on or off
Cruise Control Main Switch (Control Switch)	• Vehicle speed setting, deceleration setting, preset speed resumption, acceleration setting, and canceling signals are output to the ECM through the operation of this switch • Switches the control mode: constant speed control

	mode and vehicle-to-vehicle distance control mode
Steering Pad Switch (Distance Control Switch)	While the system is in the vehicle-to-vehicle distance control mode, the driver can operate the steering pad switch (distance control switch) to select the vehicle-to-vehicle distance in three stages: long, middle, and short
Stop Light Switch	Detects the depression of the brake pedal and transmits its signal to the ECM
Windshield Wiper Switch	Transmits wiper control switch information to the driving support ECU
Millimeter Wave Radar Sensor	Radiates radar rays forward, uses the reflected rays for detecting the presence of a vehicle in front, vehicle-to-vehicle distance, and relative speed, and transmits this information to the driving support ECU
Steering Angle Sensor	Detects the angle and direction of steering and transmits its signal to the driving

	support ECU
Vehicle Speed Sensor (SP1)	A vehicle speed signal which is output from the skid control ECU is sent to the ECM via the meter
Yaw Rate and Acceleration Sensor	Detects the yaw rate of the vehicle and transmits its signal to the driving support ECU
Skid Control ECU	• Actuates the brakes in accordance with signals from the skid control ECU • While the system is in the vehicle-to-vehicle distance control mode, the skid control ECU actuates the brake actuator in accordance with a brake request signal received from the driving support ECU • Upon receiving a signal from the driving support ECU, the

	skid control ECU sounds the skid control buzzer • The skid control ECU operates the brake actuator and illuminates the stop light.
Skid Control Buzzer	This buzzer sounds upon receiving a signal from the skid control ECU
ECM	• Controls the dynamic radar cruise control system in accordance with signals from switches, sensors, and the driving support ECU • If the ECM detects a malfunction in the dynamic radar cruise control system, it will output DTCs (Diagnostic Trouble Codes)
TCM	Controls the transmission in accordance with

	the signal from the ECM
Throttle Position Sensor and Motor	Upon receiving a signal from the ECM, the throttle control motor actuates the throttle valve
Driving Support ECU	While the system is in the vehicle-to-vehicle distance control mode, the driving support ECU detects a vehicle in front based on a signal from the millimeter wave radar sensor. Then, the driving support ECU calculates the acceleration or deceleration rate in order to attain the target vehicle-to-vehicle distance, and outputs a request signal to the ECM and skid control ECU

3. LIMIT CONTROL

a. Low speed limit

The lowest possible limit of the speed setting range is set at approximately 50 km/h (30 mph). The cruise control system cannot be set when the driving vehicle speed is below the low speed limit. Cruise control operation will be automatically canceled when the vehicle speed decreases below the low speed limit of 40 km/h (25 mph) while the cruise control is in operation.

b. High speed limit (constant speed control mode)

The highest possible limit of the speed setting range is set at approximately 200 km/h (125 mph). The cruise control system will be set at the high speed limit when the cruise control is set and the vehicle speed is over the high speed limit. Also, + RES cannot be used to increase speed over the high speed limit.

- c. High speed limit (vehicle-to-vehicle distance control mode)

The highest possible limit of the speed setting range is set at approximately 170 km/h (105 mph).

4. CRUISE CONTROL OPERATION

The cruise control main switch operates 8 functions: SET, - (COAST), TAP-DOWN, RES (RESUME), + (ACCEL), TAP-UP, CANCEL, and MODE. The SET, TAP-DOWN, and - (COAST) functions, and the RES (RESUME), TAP-UP, and + (ACCEL) functions are operated with the same switch. The cruise control main switch is an automatic return type switch which turns on only while operating it in the direction of each arrow and turns off after releasing it. The dynamic radar cruise control system has two cruise control modes: the constant speed control mode and vehicle-to-vehicle distance control mode.

- The vehicle-to-vehicle distance control mode is always selected when starting up the dynamic radar cruise control system (cruise main indicator light and READY indicator light comes on).

TEXT IN ILLUSTRATION

*a	Cruise Main Indicator Light (Vehicle- to- vehicle distance control mode)
*b	READY Indicator Light

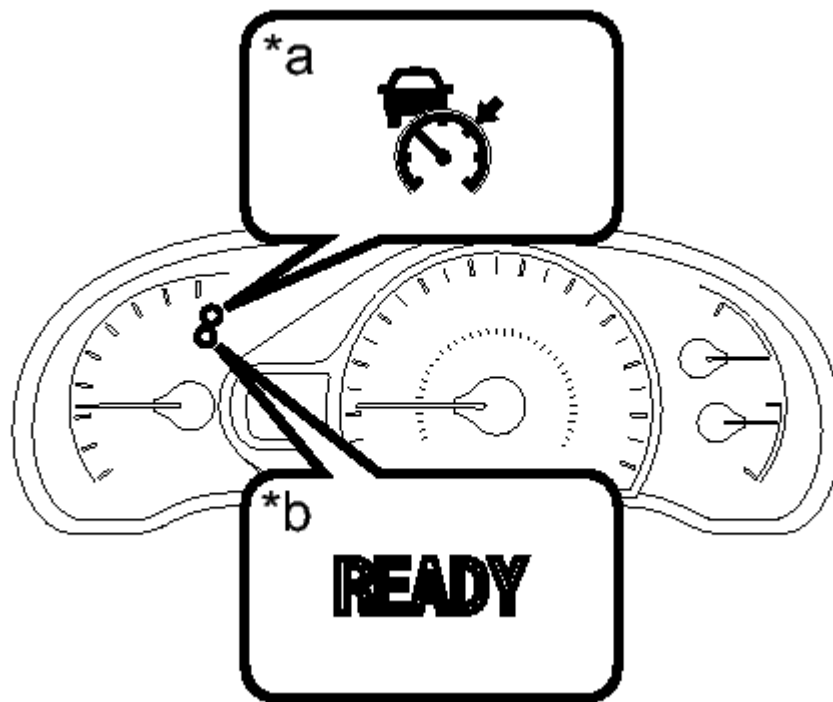


Fig. 6: Identifying Cruise Main Indicator Light And READY Indicator Light
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Operation of the constant speed control mode is the same as that for a conventional cruise control system.

a. **MODE CONTROL**

Pushing the switch to MODE for more than 1 second while driving with the cruise control main switch ON-OFF button on (READY indicator light is on) switches the mode to the constant speed control mode.

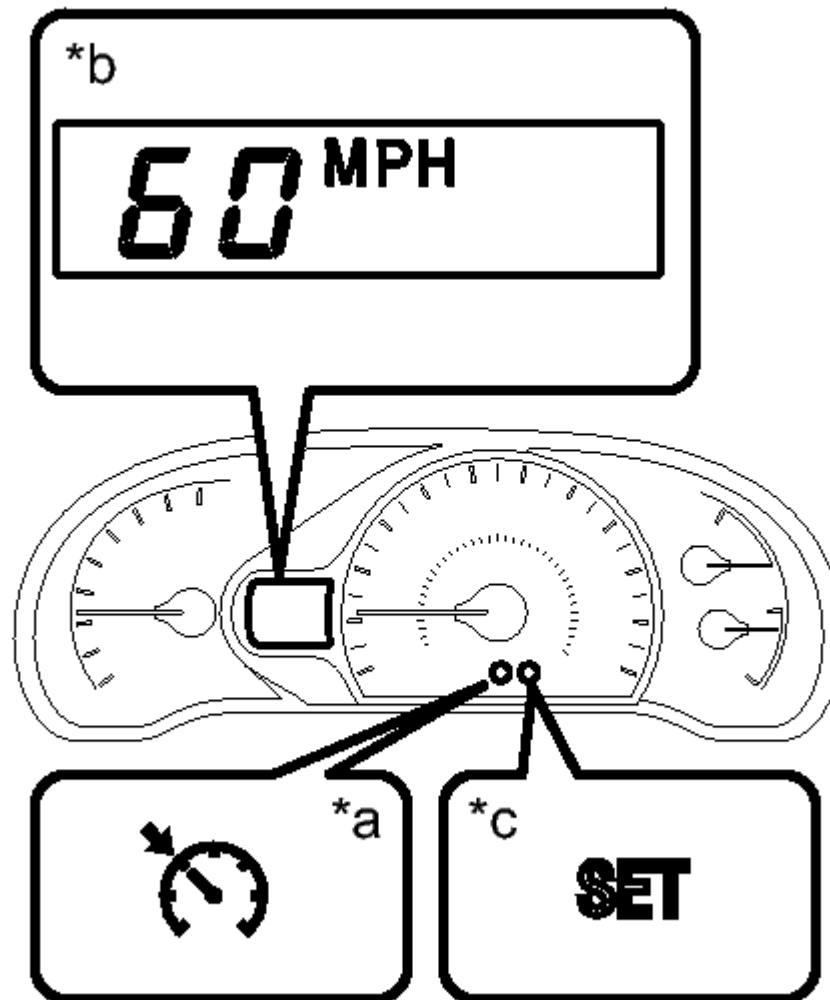
b. **SET CONTROL (Constant speed control mode)**

The vehicle speed is stored and constant speed control is maintained when pushing the switch to - SET while driving with the vehicle speed within the set speed range (between the low and high speed limits) after pushing the cruise control main switch ON-OFF button on, and entering the constant speed control mode (cruise main indicator light and SET indicator light comes on).

TEXT IN ILLUSTRATION

*a	Cruise Main Indicator Light (Constant speed control mode)
----	--

*b	Multi-information Display
*c	SET Indicator Light



Y

Fig. 7: Identifying Cruise Main Indicator Light And SET Indicator Light
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

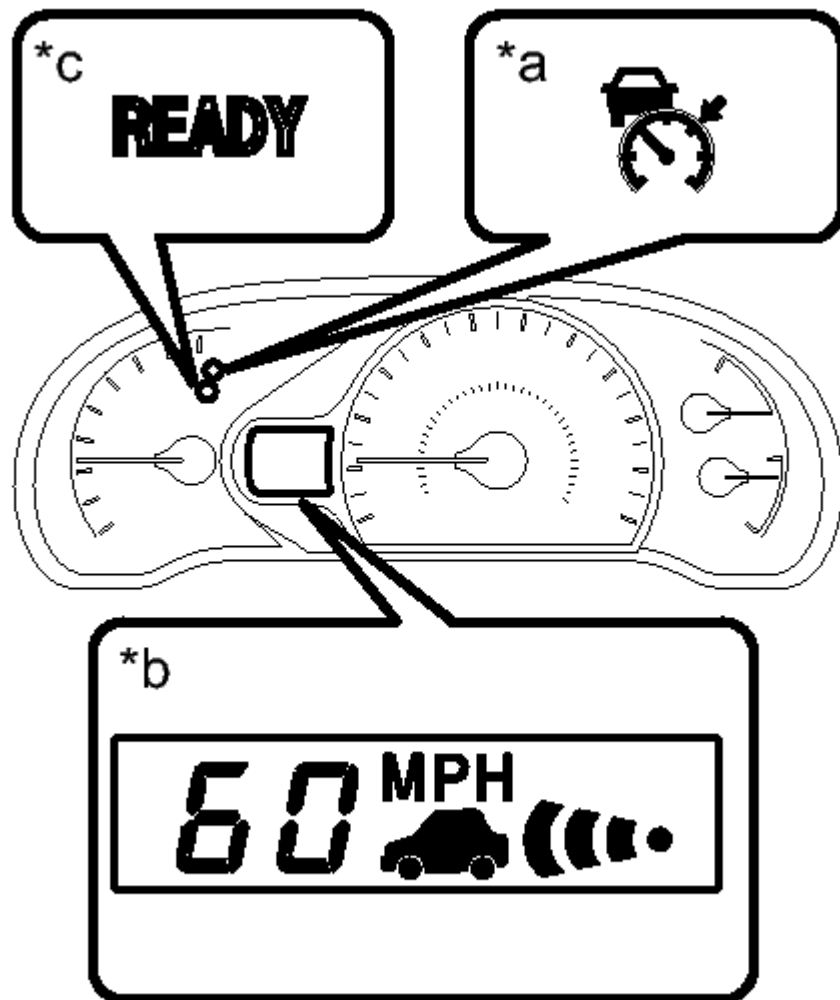
c. SET CONTROL (Vehicle-to-vehicle distance control mode)

The vehicle speed is stored and vehicle-to-vehicle distance control is maintained when pushing the switch to - SET while driving with the cruise control main switch on (cruise main indicator light and READY indicator light are on), and vehicle speed is within the set speed range (between the low and high speed limits). The READY indicator light turns off when Vehicle-to-vehicle distance

control mode is set.

TEXT IN ILLUSTRATION

*a	Cruise Main Indicator Light (Vehicle- to-vehicle distance control mode)
*b	Multi- information Display
*c	READY Indicator Light



Y

Fig. 8: Identifying Cruise Main Indicator Light And READY Indicator Light
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- d. - (COAST) CONTROL (Constant speed control mode)

When the cruise control main switch is held to - SET while the cruise control system is operating, the ECM sends a "throttle valve opening angle 0°" demand signal to the cruise control system. Then the vehicle speed, when the cruise control main switch is released, is stored and maintained.

HINT:

An actual throttle valve opening angle of 0° is not possible due to the idle speed control, etc.

- e. - (COAST) CONTROL (Vehicle-to-vehicle distance control mode)

When the cruise control main switch is held to - SET while the cruise control system is operating,

the stored vehicle speed decreases by approximately 5 km/h (CANADA) or 5 mph (USA).

f. TAP-DOWN - (CONTROL) (Constant speed control mode)

When tapping down the cruise control main switch to - SET (for approximately 0.6 seconds) while the constant speed control mode is in operation, the stored vehicle speed decreases each time by approximately 1.6 km/h (1 mph). When the cruise control main switch is released from - SET and the difference between the driving and stored vehicle speeds is more than 5 km/h (3 mph), the driving vehicle speed is stored and constant speed control is maintained.

g. TAP-DOWN CONTROL (Vehicle-to-vehicle distance control mode)

When tapping down the cruise control main switch to - SET (for approximately 0.6 seconds) while the vehicle-to-vehicle distance control mode is in operation, the stored vehicle speed decreases each time by approximately 1 km/h (CANADA) or 1 mph (USA).

h. + (ACCEL) CONTROL (Constant speed control mode)

The throttle valve motor of the throttle position sensor and motor is instructed by the ECM to open the throttle valve when + RES on the cruise control main switch is pressed and held while the constant speed control mode is in operation. When the cruise control main switch is released from + RES, the vehicle speed is stored and constant speed control is maintained.

i. + (ACCEL) CONTROL (Vehicle-to-vehicle distance control mode)

When + RES on the cruise control main switch is pressed and held while the vehicle-to-vehicle distance control mode is in operation, the stored vehicle speed increases by approximately 5 km/h (CANADA) or 5 mph (USA). Pushing the cruise control main switch to + RES while following the vehicle in front with the vehicle-to-vehicle distance control mode does not increase the actual vehicle speed, but changes only the set vehicle speed.

j. TAP-UP CONTROL (Constant speed control mode)

When tapping up the cruise control main switch to + RES (approximately 0.6 seconds) while the constant speed control mode is in operation, the stored vehicle speed increases each time by approximately 1.6 km/h (1 mph). However, when the difference between the driving and the stored vehicle speeds is more than 5 km/h (3 mph), the stored vehicle speed will not be changed.

k. TAP-UP CONTROL (Vehicle-to-vehicle distance control mode)

When tapping up the cruise control main switch to + RES (for approximately 0.6 seconds) while the vehicle-to-vehicle distance control mode is in operation, the stored vehicle speed increases each time by approximately 1 km/h (CANADA) or 1 mph (USA).

l. MANUAL CANCEL CONTROL

Performing any of the following cancels the cruise control system while it is in operation (the stored vehicle speed in the ECM is maintained).

- Depressing the brake pedal
- Moving the shift lever from D to N or, shifting the transmission to the 3rd, 2nd, or 1st gear with the shift lever in S
- Pushing the cruise control main switch to CANCEL
- Turning the cruise control main switch off (the stored vehicle speed in the ECM is not maintained)
- VSC system is activated.

m. **RES (RESUME) CONTROL**

If the cruise control operation was canceled by the stop light switch, CANCEL switch, or shift lever operation, and if driving speed is within the set speed range, pushing the cruise control main switch to + RES restores the vehicle speed memorized at the time of cancellation, and maintains constant speed control. In the constant speed control mode, once the vehicle speed drops below the low speed limit, RESUME operation is possible after accelerating past the low speed limit and pushing the cruise control main switch to + RES.

5. **BRAKE CONTROL**

The driving support ECU determines the distance to the vehicle in front, relative speed, target decreasing speed, and deceleration rate. Based on these data, the ECU transmits a brake demand signal to the skid control ECU via the ECM.

6. **DOWN SHIFT CONTROL**

While the cruise control system is in operation, the transmission may downshift from an overdrive gear on an uphill road. After the downshift, if the system determines that the uphill inclination has become smaller based on the throttle valve opening angle, the transmission automatically returns to an overdrive gear.

7. **AUTO CANCEL (FAIL-SAFE)**

This system has an automatic cancellation function (fail-safe). Refer to **FAIL-SAFE CHART**.

HOW TO PROCEED WITH TROUBLESHOOTING

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the dynamic radar cruise control system.
- *: Use the Techstream.

1. **VEHICLE BROUGHT TO WORKSHOP**

NEXT: Go to next step

2. INSPECT BATTERY VOLTAGE

Standard voltage

11 to 14 V

If the voltage is below 11 V, replace or recharge the battery before proceeding to the next step.

NEXT: Go to next step

3. CHECK COMMUNICATION FUNCTION OF CONTROLLER AREA NETWORK (CAN)*

- Use the Techstream to check if the CAN communication system is functioning normally.

RESULT

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B

B --> GO TO CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING

A: Go to next step

4. CHECK FOR DTC*

Refer to DTC Check / Clear. Refer to **DTC CHECK / CLEAR.**

- Check for DTCs and note any codes that are output.
- Clear the DTCs.
- Recheck for DTCs. Try to prompt the DTCs by duplicating the conditions indicated by the DTCs.

RESULT

Result	Proceed to
DTC does not reoccur	A
DTC	B

reoccurs

B --> GO TO DTC CHART. Refer to DIAGNOSTIC TROUBLE CODE CHART

A: Go to next step

5. PROBLEM SYMPTOMS TABLE

Refer to **PROBLEM SYMPTOMS TABLE**.

RESULT

Result	Proceed to
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B --> Go to step 7

A: Go to next step

6. OVERALL ANALYSIS AND TROUBLESHOOTING*

- Terminals of ECU. Refer to **TERMINALS OF ECU**
- Data List / Active Test. Refer to **DATA LIST / ACTIVE TEST**

NEXT: Go to next step

7. ADJUST, REPAIR OR REPLACE

NOTE: When the millimeter wave radar sensor or ECM are replaced with a new one, adjustment of the radar sensor beam axis must be performed. Refer to **ADJUSTMENT** .

NEXT: Go to next step

8. CONFIRMATION TEST

NEXT --> END

ROAD TEST

ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

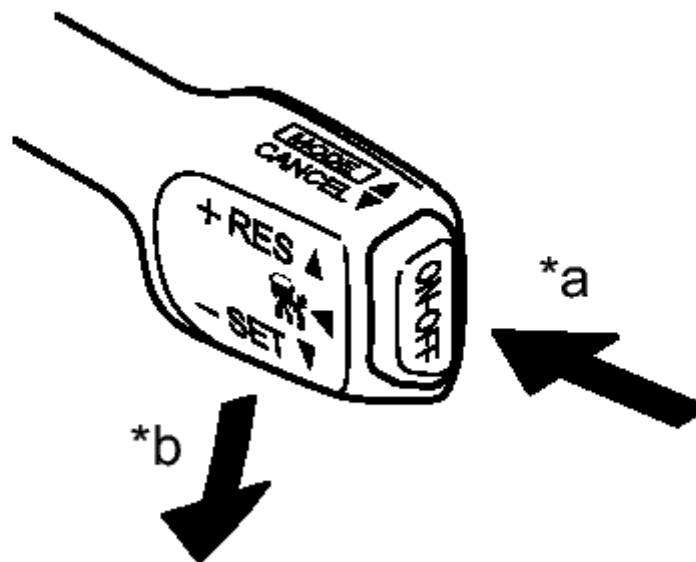
HINT:

The dynamic radar cruise control system has two cruise control modes: the constant speed control mode and vehicle-to-vehicle distance control mode.

- The vehicle-to-vehicle distance control mode is always selected when starting up the dynamic radar cruise control system.
 - Operation of the constant speed control mode is the same as that for a conventional cruise control system.
- a. Inspect the SET function.

TEXT IN ILLUSTRATION

*a	ON/OFF
*b	SET



H

Fig. 9: Identifying Cruise Control Main Switch To - SET
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1. Turn the main switch on.
2. Check that the cruise main indicator light and READY indicator light and READY indicator illuminate on the combination meter assembly.

3. Drive at a speed between 50 km/h (30 mph) and 170 km/h (105 mph).
4. Push the cruise control main switch to - SET.

TEXT IN ILLUSTRATION

*a	Cruise Main Indicator Light
*b	Multi- information Display
*c	READY Indicator Light

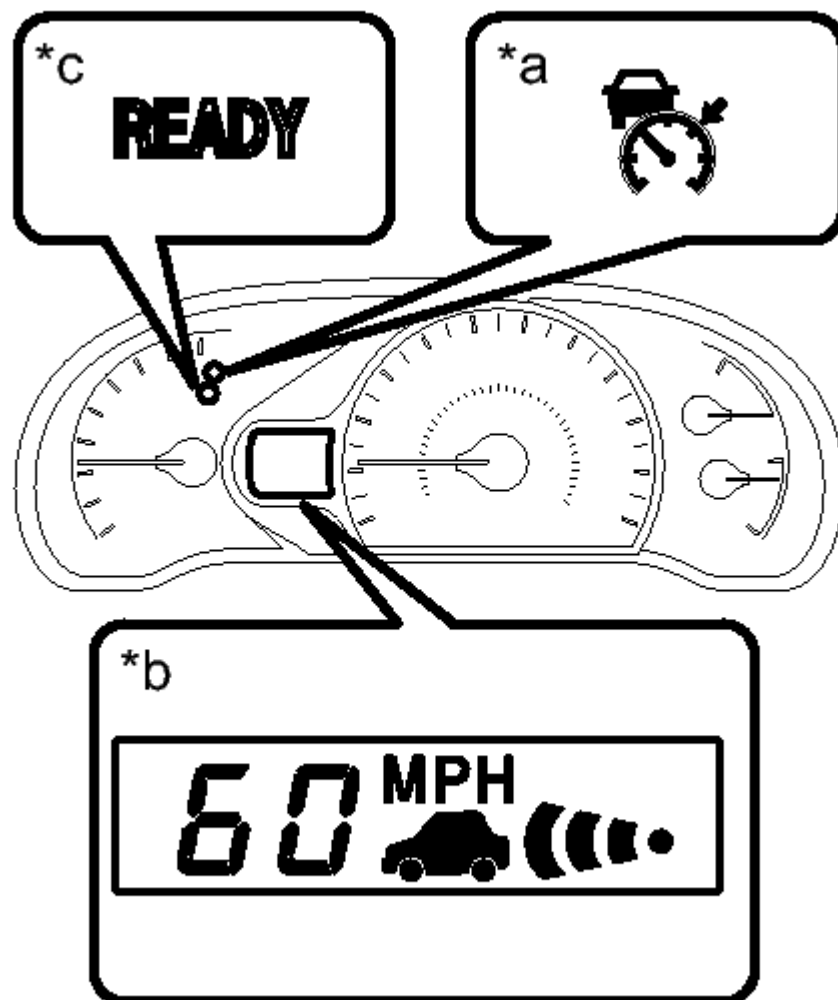


Fig. 10: Identifying Cruise Main Indicator Light And READY Indicator Light
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. Check that READY indicator light turns on on the combination meter assembly.
 6. After releasing the switch, check that the vehicle cruises at the set speed.
- b. Inspect the + (ACCEL) function.

TEXT IN ILLUSTRATION

*a	ON/OFF
*b	- SET
*c	+ RES

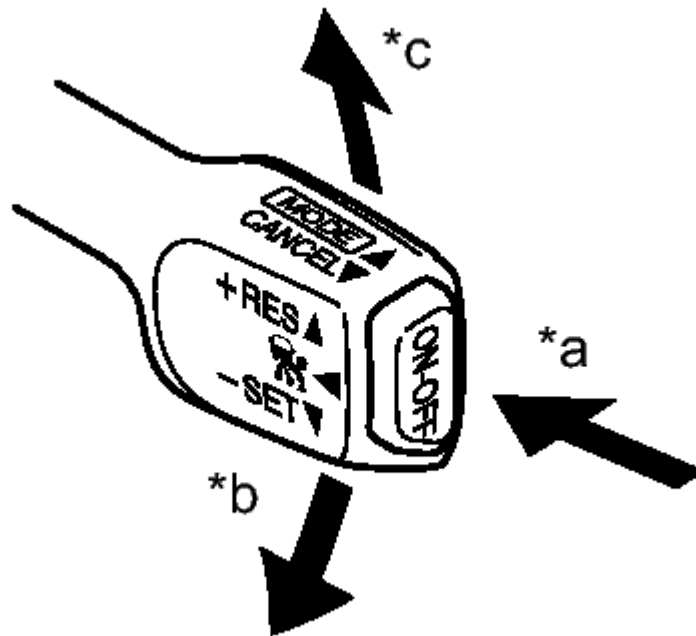


Fig. 11: Inspecting + (ACCEL) Function.
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1. Turn the main switch on.
2. Drive at a speed between 50 km/h (30 mph) and 170 km/h (105 mph).
3. Push the cruise control main switch to - SET.
4. Check that vehicle speed increases while the cruise control main switch is pushed to + RES, and that the vehicle cruises at the newly set speed when the switch is released.
5. Push the cruise control main switch to + RES and then release it immediately. Check that vehicle speed increases* (tap-up control).

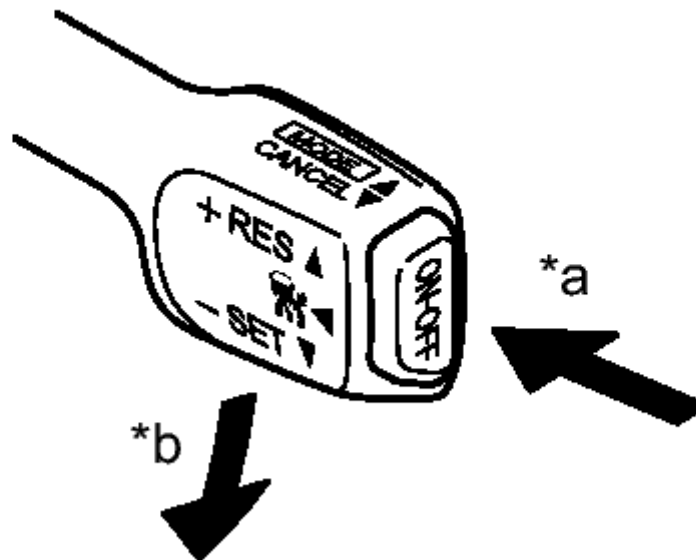
HINT:

*: Constant speed control mode: increases by 1.6 km/h (1 mph); vehicle-to-vehicle distance control mode: increases by 1 km/h or 1 mph.

- c. Inspect the - (COAST) function.

TEXT IN ILLUSTRATION

*a	ON/OFF
*b	- SET



H

Fig. 12: Identifying Cruise Control Main Switch To - SET
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1. Turn the main switch on.
2. Drive at a speed between 50 km/h (30 mph) and 170 km/h (105 mph).
3. Push the cruise control main switch to - SET.
4. Check that vehicle speed decreases while the cruise control main switch is pushed to - SET, and the vehicle cruises at the newly set speed when the switch is released.
5. Push the cruise control main switch to - SET, and then release it immediately. Check that vehicle speed decreases* (tap-down control).

HINT:

*: Constant speed control mode: decreases by 1.6 km/h (1 mph); vehicle-to-vehicle distance control mode: decreases by 1 km/h or 1 mph.

- d. Inspect the CANCEL function.

TEXT IN ILLUSTRATION

*a	ON/OFF
*b	- SET
*c	CANCEL

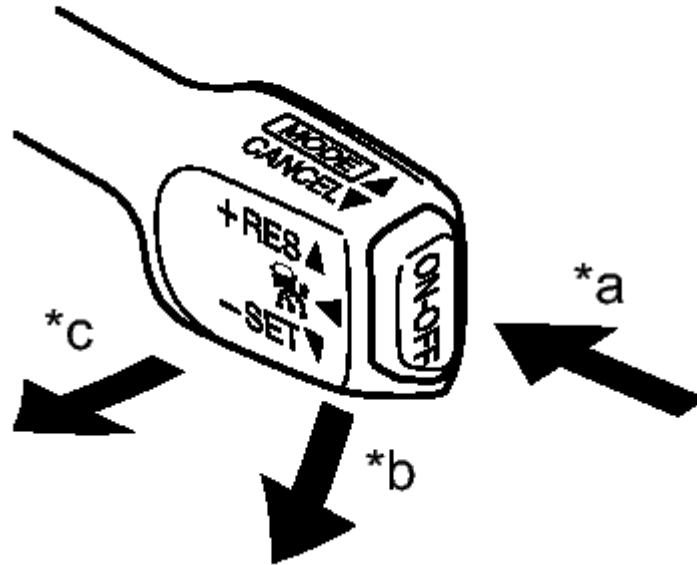


Fig. 13: Inspecting CANCEL Function

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1. Turn the main switch on.
2. Drive at a speed between 50 km/h (30 mph) and 170 km/h (105 mph).
3. Push the cruise control main switch to - SET.
4. When performing any one of the following, check that the cruise control system is canceled and that the normal driving mode is reset.
 - Depressing the brake pedal
 - Moving the shift lever from D to N or shifting the transaxle is to the 3rd, 2nd, or 1st gear with the shift lever in S
 - Turning the main switch off
 - Pulling the cruise control main switch to CANCEL
- e. Inspect the RES (RESUME) function.

TEXT IN ILLUSTRATION

*a	ON/OFF
*b	- SET
*c	+ RES

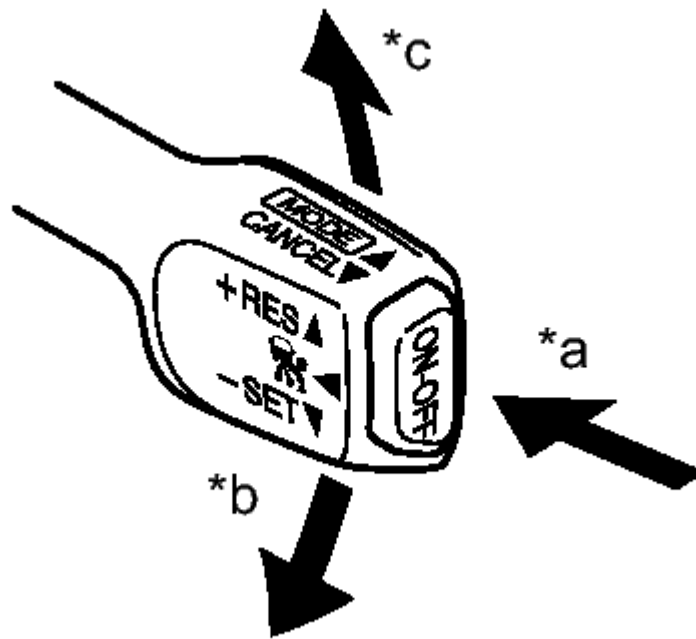


Fig. 14: Inspecting + (ACCEL) Function.

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1. Turn the main switch on.
2. Drive at a speed between 50 km/h (30 mph) and 170 km/h (105 mph).
3. Push the cruise control main switch to - SET.
4. Cancel the cruise control system by performing any of the above operations (other than turning the main switch off).
5. After pushing the cruise control main switch to "+ RES" at a driving speed of more than 40 km/h (25 mph), check that the vehicle resumes the speed set prior to the cancellation and that SET indicator light illuminates on the combination meter assembly.

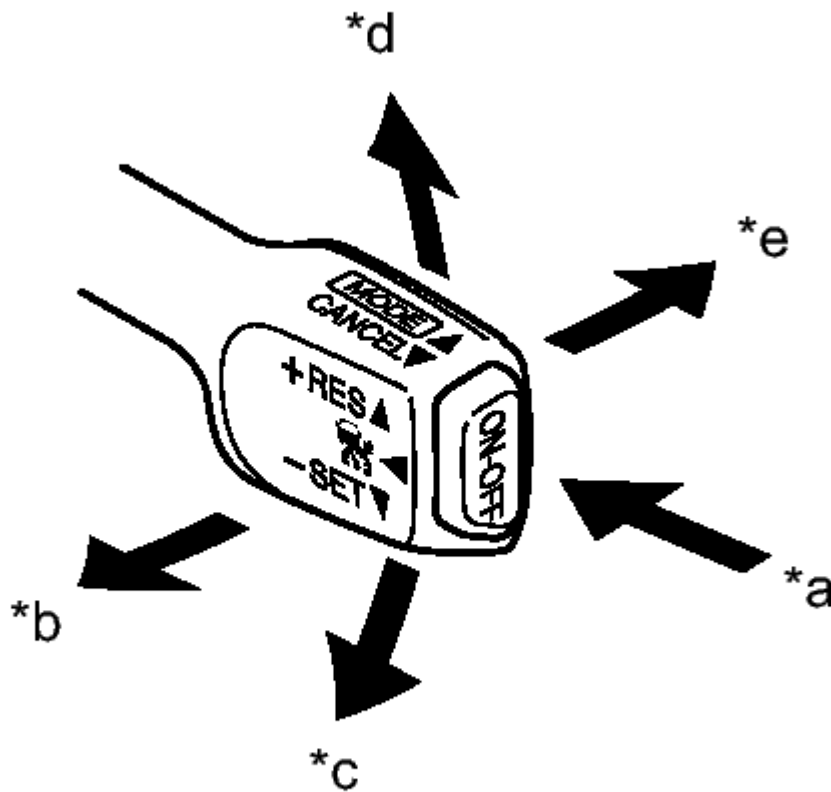
HINT:

The stored vehicle speed is retained even if vehicle speed drops below 40 km/h (25 mph) once. The previously stored vehicle speed can be resumed by pushing the cruise control main switch to + RES when vehicle speed returns to approximately 40 km/h (25 mph) or more.

OPERATION CHECK

OPERATION CHECK

1. INPUT SIGNAL CHECK



H

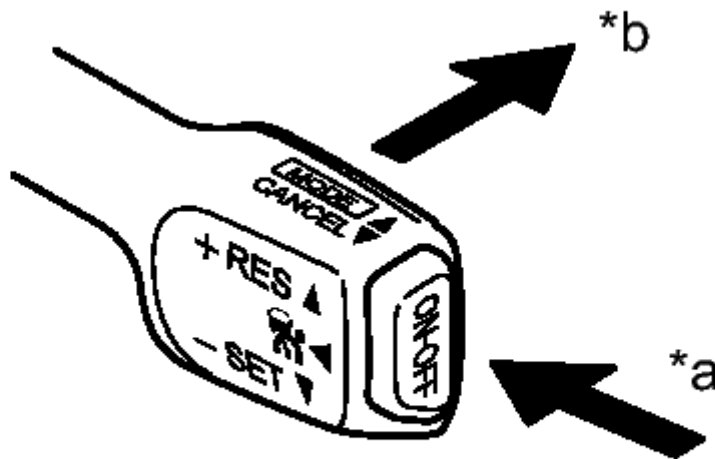
Fig. 15: Checking Cruise Control Switch
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- a. Connect the Techstream to the DLC3.
- b. Check the cruise control main switch using the Data List function of the Techstream (ON-OFF, CANCEL, - SET, + RES, and MODE).

TEXT IN ILLUSTRATION

*a	ON/OFF
*b	CANCEL
*c	- SET
*d	+ RES
*e	MODE

2. INSPECT MODE SWITCH



H

Fig. 16: Inspecting Mode Switch

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- a. Turn the ignition switch to ON.

TEXT IN ILLUSTRATION

*a	ON/OFF
*b	MODE

- b. Turn the cruise control main switch on. Then push the main switch to MODE for 1 second or more to change to the constant speed control mode. Check that READY indicator light turns off on the combination meter.
- c. Check that the cruise main indicator light (vehicle-to-vehicle distance control mode) turns off and the cruise main indicator light (constant speed control mode) illuminates.

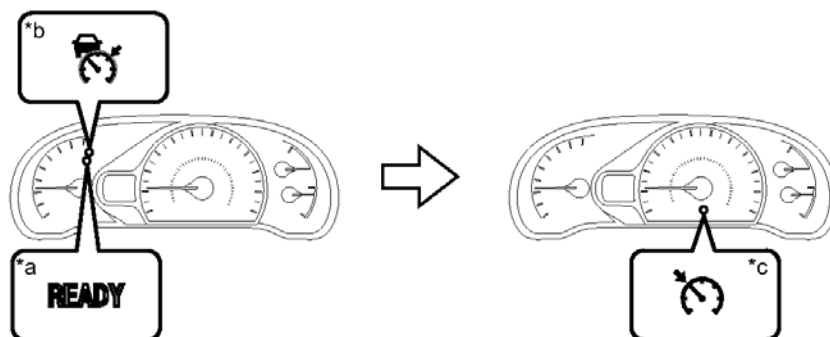


Fig. 17: Identifying Cruise Main Indicator Light And READY Indicator Light
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	READY Indicator Light	*b	Cruise Main Indicator Light (Vehicle- to- vehicle distance control mode)
*c	Cruise Main Indicator Light (Constant speed control mode)	-	-

NOTE: Do not push any other switches before pushing the main switch to **MODE**. If another switch is pushed, turn the main switch off and repeat the procedure above.

HINT:

If a malfunction is detected, turn the ignition switch off and repeat the procedure above.

3. INSPECT STEERING PAD SWITCH ASSEMBLY

- a. Turn the ignition switch to ON.
- b. Turn the cruise control main switch on.
- c. Turn on the distance control switch of the steering pad switch.
- d. Check that the indication of the vehicle-to-vehicle distance, which is shown on the multi-information display on the combination meter, changes from long to middle to short in that order.

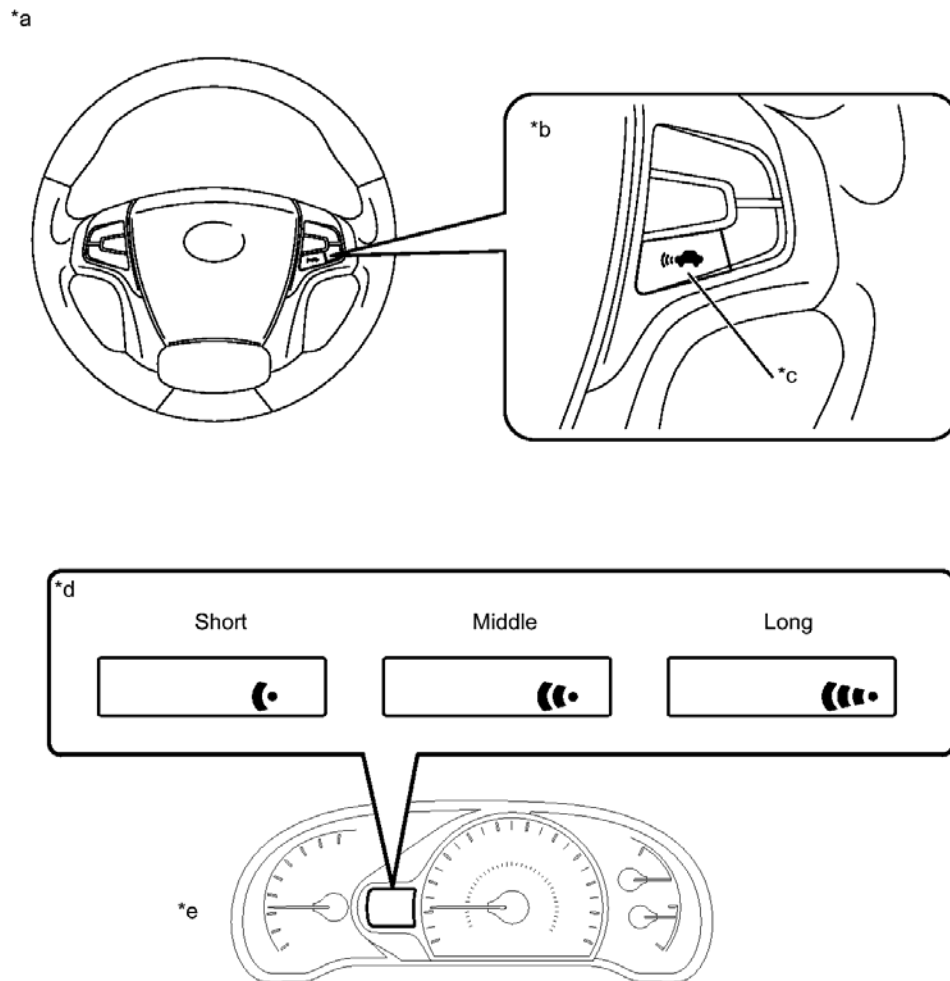


Fig. 18: Inspecting Steering Pad Switch Assembly
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	Steering Wheel	*b	Steering Pad Switch
*c	Distance Control Switch	*d	Multi-information Display
*e	Combination Meter	-	-

HINT:

The indication is automatically set to long each time the engine is started.

PROBLEM SYMPTOMS TABLE

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

DYNAMIC RADAR CRUISE CONTROL SYSTEM

Symptom	Suspected Area	See
The cruise control main switch cannot be turned on.	Cruise control switch circuit	Refer to <u>Cruise Control Switch Circuit</u>
	Cruise main indicator light circuit	Refer to <u>Cruise Main Indicator Light Circuit</u>
	ECM	Refer to <u>REMOVAL</u>
Setting cannot be changed between constant speed control mode and vehicle-to-vehicle distance control mode.	Cruise control switch circuit	Refer to <u>Cruise Control Switch Circuit</u>
	Meter/gauge system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>
	ECM	Refer to <u>REMOVAL</u>
Set distance cannot be changed.	Distance control switch circuit	Refer to <u>Distance Control Switch Circuit</u>
	Driving support ECU	Refer to <u>REMOVAL</u>
	Meter/gauge system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>
	ECM	Refer to <u>REMOVAL</u>
Setting cannot be canceled in vehicle-to-vehicle distance control mode.	Meter/gauge system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>
	ECU power source circuit	Refer to <u>ECU Power Source Circuit</u>
	LGND terminal circuit	Refer to <u>TERMINALS OF ECU</u>
	Millimeter wave radar sensor	Refer to <u>ADJUSTMENT</u>
	ECM	Refer to <u>REMOVAL</u>
	Driving support ECU	Refer to <u>REMOVAL</u>
Vehicle speed setting cannot be performed. (The cruise main indicator light on combination meter illuminates when main switch is turned on, but turns off when operating SET function.)	Cruise control switch circuit	Refer to <u>Cruise Control Switch Circuit</u>
	ECM	Refer to <u>REMOVAL</u>

Vehicle speed setting cannot be performed with the constant speed mode. (The cruise main indicator light on combination meter illuminates when main switch is turned on, and remains on when operating SET function.)	Stop light switch circuit	Refer to <u>DTC P0571: Stop Light Switch Circuit Malfunction</u>
	Vehicle speed sensor circuit	Refer to <u>DTC P0500: Vehicle Speed Sensor Malfunction; DTC P0503: Vehicle Speed Sensor Circuit Malfunction</u>
	Cruise control switch circuit	Refer to <u>Cruise Control Switch Circuit</u>
	Transmission control switch circuit	Refer to <u>Transmission Control Switch Circuit</u>
	ECM	Refer to <u>REMOVAL</u>
	Vehicle stability control system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>
	Driving support ECU	Refer to <u>REMOVAL</u>
While vehicle is driven with cruise control on, the control is canceled. (The cruise main indicator light remains on.)	Stop light switch circuit	Refer to <u>DTC P0571: Stop Light Switch Circuit Malfunction</u>
	Transmission control switch circuit	Refer to <u>Transmission Control Switch Circuit</u>
	Vehicle stability control system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>
	Cruise control switch circuit	Refer to <u>Cruise Control Switch Circuit</u>
	Vehicle speed sensor circuit	Refer to <u>DTC P0500: Vehicle Speed Sensor Malfunction; DTC P0503: Vehicle Speed Sensor Circuit Malfunction</u>
	Wiper switch circuit (w/ rain sensor)	Refer to <u>PROBLEM SYMPTOMS TABLE</u>
	Wiper switch circuit (w/o rain sensor)	Refer to <u>PROBLEM SYMPTOMS TABLE</u>
	Driving support ECU	Refer to <u>REMOVAL</u>
	Park/neutral position switch	Refer to <u>INSPECTION</u>
Pulling back on the control main switch does not cancel the cruise control. (The cruise main indicator light turns off.)	ECM	Refer to <u>REMOVAL</u>
The cruise control is not canceled when vehicle speed drops below the low speed limit. (The cruise main indicator light remains on.)	Vehicle speed sensor circuit	Refer to <u>DTC P0500: Vehicle Speed Sensor Malfunction; DTC P0503: Vehicle Speed Sensor Circuit Malfunction</u>
	ECM	Refer to <u>REMOVAL</u>
The cruise control is not canceled when vehicle		

speed drops below the low speed limit. (The cruise main indicator light turns off.)	ECM	Refer to <u>REMOVAL</u>
Depressing the brake pedal does not cancel the cruise control. (The cruise main indicator light remains on.)	Stop light switch circuit	Refer to <u>DTC P0571: Stop Light Switch Circuit Malfunction</u>
	ECM	Refer to <u>REMOVAL</u>
Depressing the brake pedal does not cancel the cruise control. (The cruise main indicator light turns off.)	ECM	Refer to <u>REMOVAL</u>
Vehicle speed cannot be canceled with wiper HI. (The cruise main indicator light remains on.)	Wiper switch circuit (w/ rain sensor)	Refer to <u>PROBLEM SYMPTOMS TABLE</u>
	Wiper switch circuit (w/o rain sensor)	Refer to <u>PROBLEM SYMPTOMS TABLE</u>
	ECM	Refer to <u>REMOVAL</u>
Vehicle speed cannot be canceled with wiper HI. (The cruise main indicator light turns off.)	ECM	Refer to <u>REMOVAL</u>
	Transmission control switch circuit	Refer to <u>Transmission Control Switch Circuit</u>
	Park/neutral position switch	Refer to <u>INSPECTION</u>
	ECM	Refer to <u>REMOVAL</u>
Moving the shift lever does not cancel the cruise control. (The cruise main indicator light turns off.)	ECM	Refer to <u>REMOVAL</u>
Hunting (Speed is not constant.)	Vehicle speed sensor circuit	Refer to <u>DTC P0500: Vehicle Speed Sensor Malfunction; DTC P0503: Vehicle Speed Sensor Circuit Malfunction</u>
	SFI system	-
	ECM	Refer to <u>REMOVAL</u>
The cruise main indicator light remains blinking.	TC and CG terminal circuit	Refer to <u>TC and CG Terminal Circuit</u>
	ECM	Refer to <u>REMOVAL</u>
Beam axis of millimeter wave radar sensor cannot be adjusted (completed).	Check position, distance and angle of reflector	-
	Check installation of millimeter wave radar sensor	Refer to <u>INSTALLATION</u>
	Millimeter wave radar sensor	Refer to <u>ADJUSTMENT</u>
	Driving support ECU	Refer to <u>REMOVAL</u>

	ECM	Refer to <u>REMOVAL</u>
Alarm buzzer does not sound.	Skid control buzzer circuit	Refer to <u>Skid Control Buzzer Circuit</u>
	Vehicle stability control system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>
	Millimeter wave radar sensor	Refer to <u>ADJUSTMENT</u>
	Driving support ECU	Refer to <u>REMOVAL</u>
No brake control (when decelerating)	Vehicle stability control system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>
	Driving support ECU	Refer to <u>REMOVAL</u>
	ECM	Refer to <u>REMOVAL</u>
The READY indicator light does not come on	Cruise READY Indicator Light Circuit	Refer to <u>Cruise READY Indicator Light Circuit</u>
	Meter/gauge system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>
The Main indicator light does not come on	Cruise Main Indicator Light Circuit	Refer to <u>Cruise Main Indicator Light Circuit</u>
	Meter/gauge system	Refer to <u>HOW TO PROCEED WITH TROUBLESHOOTING</u>

TERMINALS OF ECU

TERMINALS OF ECU

1. CHECK DRIVING SUPPORT ECU

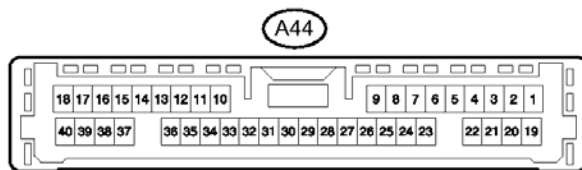


Fig. 19: Driving Support ECU Connector Terminal Identification
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
A44-30 (B) - A44-25 (GND)	L - BR	Battery	Always	11 to 14 V
A44-39		CAN	CAN	

(CA2H) - A44-25 (GND)	R - BR	communication signal	communication circuit	Pulse generation
A44-17 (CA2L) - A44-25 (GND)	W - BR	CAN communication signal	CAN communication circuit	Pulse generation
A44-25 (GND) - Body ground	BR - Body ground	Ground	Always	Below 1 V
A44-7 (MODE) - A44-25 (GND)	W - BR	Steering pad switch signal (Distance control switch signal)	Ignition switch ON, Steering pad switch signal ON	0 to 2 V
			Ignition switch ON, Steering pad switch signal OFF	11 to 14 V
A44-16 (LRDD) - A44-25 (GND)	B - BR	Millimeter wave radar sensor input signal	Ignition switch ON	Pulse generation (See Fig. 20)
A44-38 (LRRD) - A44-25 (GND)	W - BR	Millimeter wave radar sensor output signal	Ignition switch ON	Pulse generation (See Fig. 21)
A44-32 (WIP2) - A44-25 (GND)	L - BR	Wiper switch signal	Ignition switch ON, wiper switch HI position	11 to 14 V
			Ignition switch ON, wiper switch LO position	Below 1 V

a. Waveform 1

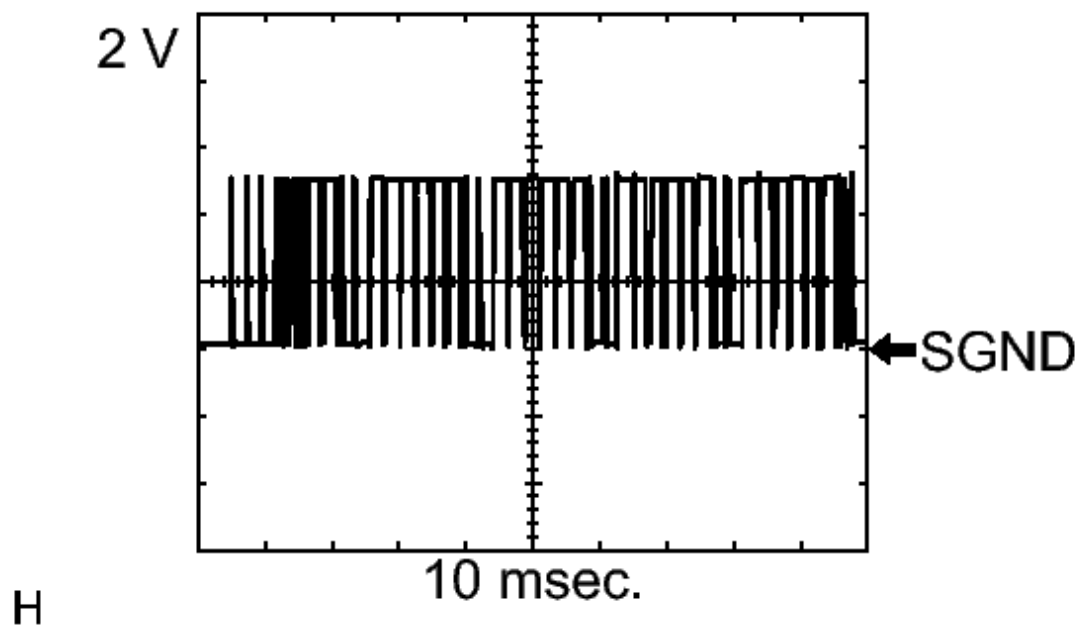


Fig. 20: Identifying Waveform 1

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Tester Connection	A44-16 (LRDD) - A44-25 (GND)
Tool Setting	2 V/DIV., 10 msec./DIV.
Condition	Ignition switch to ON

b. Waveform 2

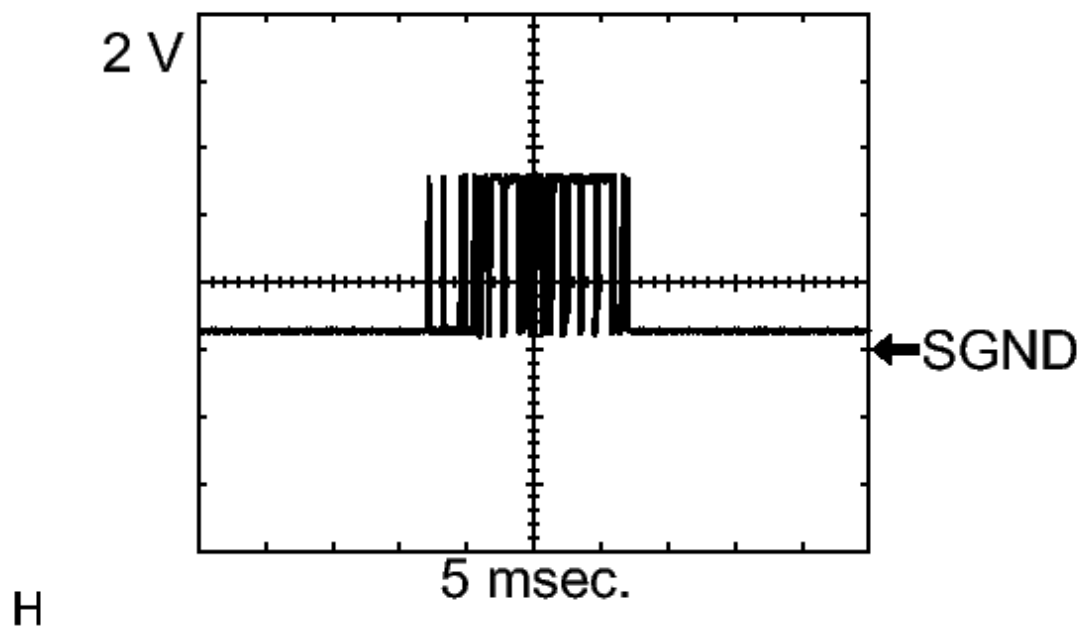


Fig. 21: Identifying Waveform 2
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Tester Connection	A44-38 (LRRD) - A44-25 (GND)
Tool Setting	2 V/DIV., 5 msec./DIV.
Condition	Ignition switch to ON

2. CHECK ECM

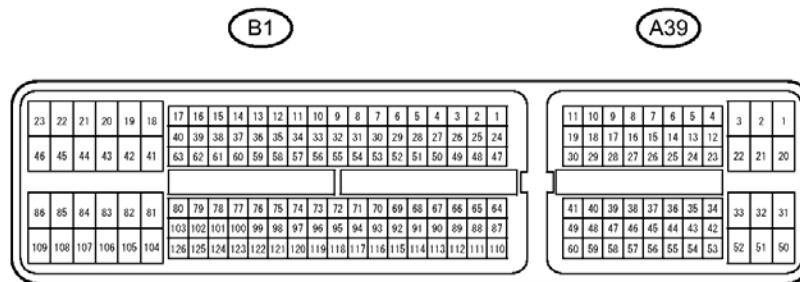


Fig. 22: ECM Connector Terminal Identification - For 2GR-FE (1 Of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
A39-16 (TC) - B1-81 (E1)	P-B - BR	Ground	Ignition switch ON	10 to 14 V
			Terminals TC and CG of DLC3 connected	Below 1 V
A39-35 (ST-) - B1-81 (E1)	LG-R - BR	Stop light signal	Ignition switch ON, Brake pedal depressed (Stop light switch on)	Below 1 V
			Ignition switch ON, Brake pedal released (Stop light switch off)	10 to 14 V
			Ignition switch ON,	

A39-36 (STP) - B1-81 (E1)	L - BR	Stop light signal	Brake pedal released (Stop light switch off)	Below 1 V
			Ignition switch ON, Brake pedal depressed (Stop light switch on)	10 to 14 V
A39-37 (CCHG) - B1-81 (E1)	P - BR	Distance control switch signal	Ignition switch ON, Cruise control main switch on, MODE switch on	Below 1 V
			Ignition switch ON, Cruise control main switch on, MODE switch off	10 to 14 V
A39-44 (LGND) - Body ground	R - Body ground	Ground	Always	Below 1 ohms
A39-45 (CCS) -		Cruise control	Ignition switch ON	10 to 14 V
			Ignition switch ON, CANCEL switch on	6.6 to 10.1 V
			Ignition switch ON, -	4.5 to 7.1

B1-81 (E1)	B - BR	main switch signal	SET switch on	V
			Ignition switch ON, + RES switch on	2.3 to 4.0 V
			Ignition switch ON, Main switch on	Below 1 V
B1-81 (E1) - Body ground	BR - Body ground	Ground	Always	Below 1 ohms

If the value is not within the specified range, the ECM may have a malfunction.

DIAGNOSIS SYSTEM

DIAGNOSIS SYSTEM

1. DIAGNOSIS FUNCTION

- The diagnosis function makes the master warning light and the multi-information display come on, and the cruise main indicator light blinks as shown in the illustration. When a malfunction occurs in the dynamic radar cruise control system, the DTCs are stored in the ECM.

TEXT IN ILLUSTRATION

*a	Multi- information Display
*b	Master Warning Light
*c	Cruise Main Indicator Light (Constant speed control mode)
	Cruise Main Indicator Light

(Vehicle-
to-vehicle
*d distance
control
mode)

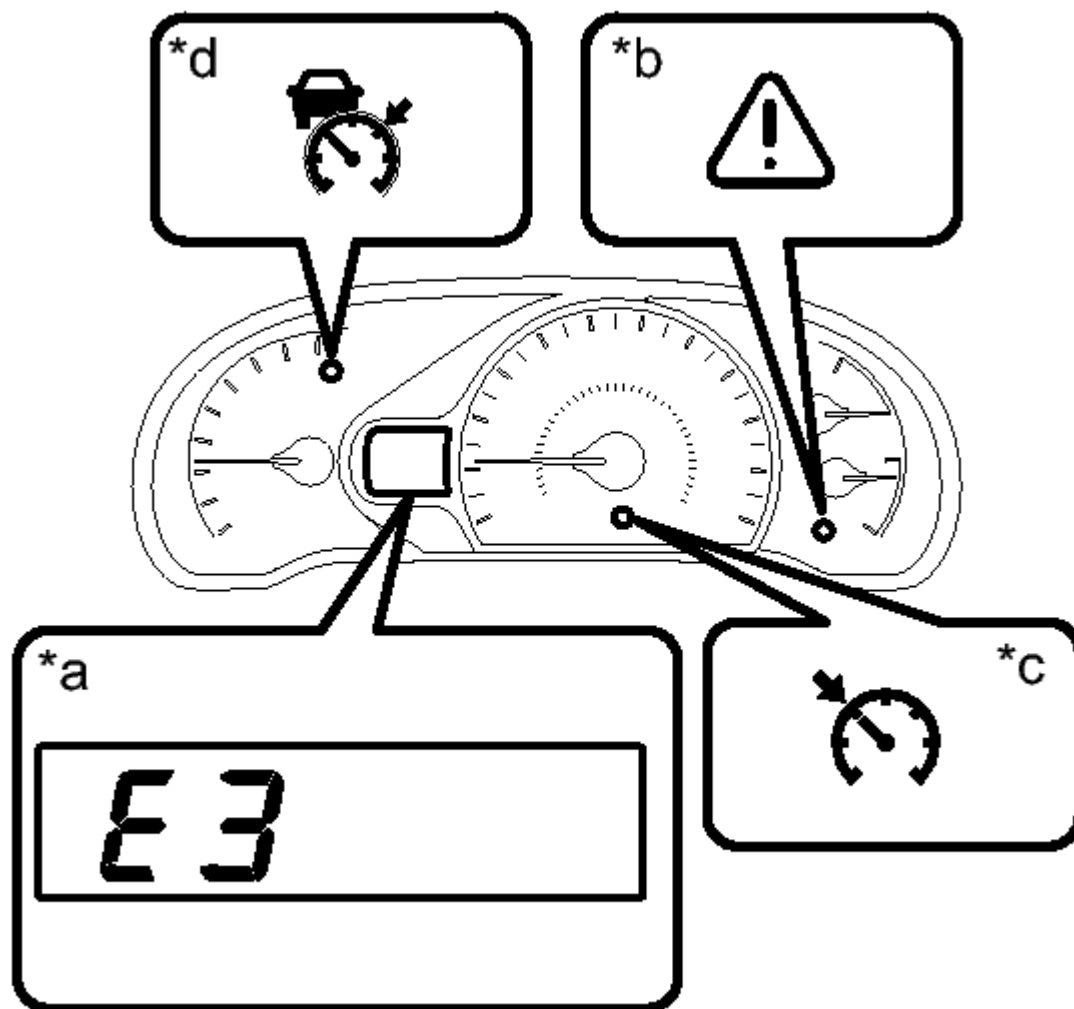


Fig. 23: Identifying Master Warning Light, Multi-Information Display And Cruise Main Indicator Light

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE:

- The master warning light turns off if the system returns to normal condition.

Cruise Main Indicator Light:

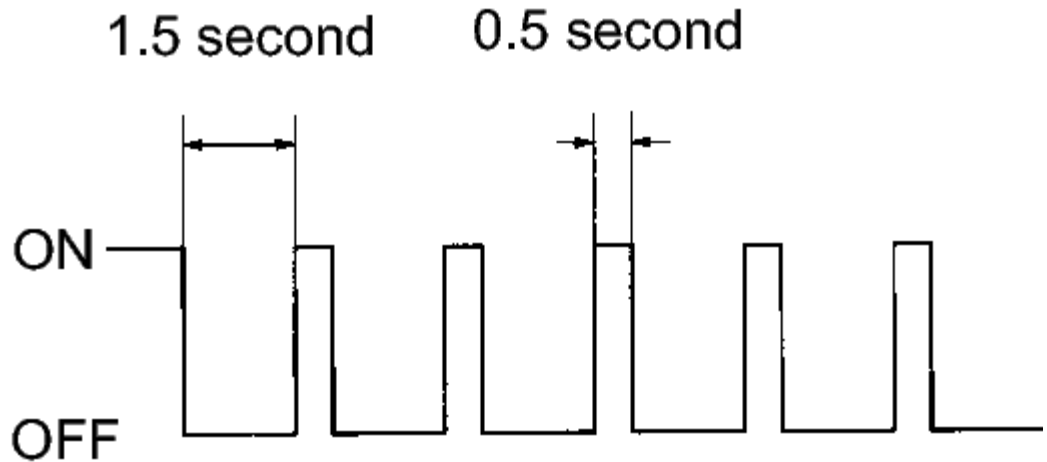


Fig. 24: Identifying Cruise Main Indicator Light On/Off Intervals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Since the stored data in the ECM is cleared by disconnecting the EFI or ETCS fuses or the battery terminal, do not disconnect them until the inspection has been completed.

2. DESCRIPTION

- a. The ECM controls the dynamic radar cruise control system of the vehicle. The data and DTCs relating to the dynamic radar cruise control system can be read from the DLC3 of the vehicle. If the cruise main indicator light does not come on after the DTC check, there may be a problem with either the combination meter or the CAN communication systems. Use the Techstream to check and solve the problem.

3. CHECK DLC3

- a. Check the DLC3. Refer to **DTC CHECK / CLEAR**.

4. CHECK INDICATOR

- a. Turn the ignition switch to ON.

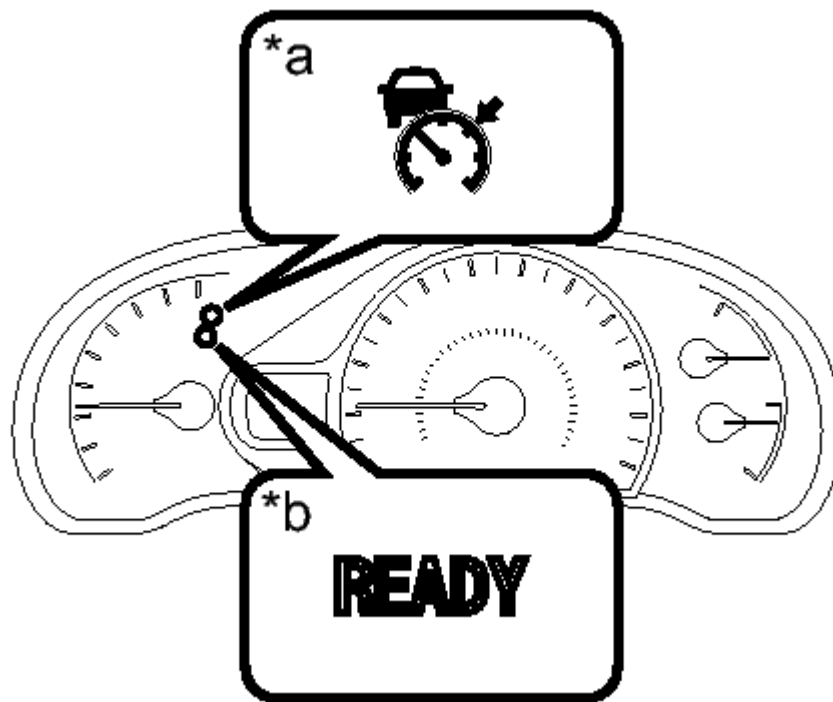


Fig. 25: Identifying Cruise Main Indicator Light And READY Indicator Light
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Check that the cruise main indicator light and READY indicator light come on when the main switch ON-OFF button is pushed on, and that the indicator light and the indicator go off when the ON-OFF button is pushed off.

HINT:

- If the indicator check result shows a problem, proceed to troubleshooting the combination meter.
- If a malfunction occurs in the vehicle speed sensors, the stop light switch, or other related parts during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and blinks the cruise main indicator light. This indicator light informs the driver of the malfunction. At the same time, the malfunction is stored as a diagnostic trouble code.

Cruise Main Indicator Light:

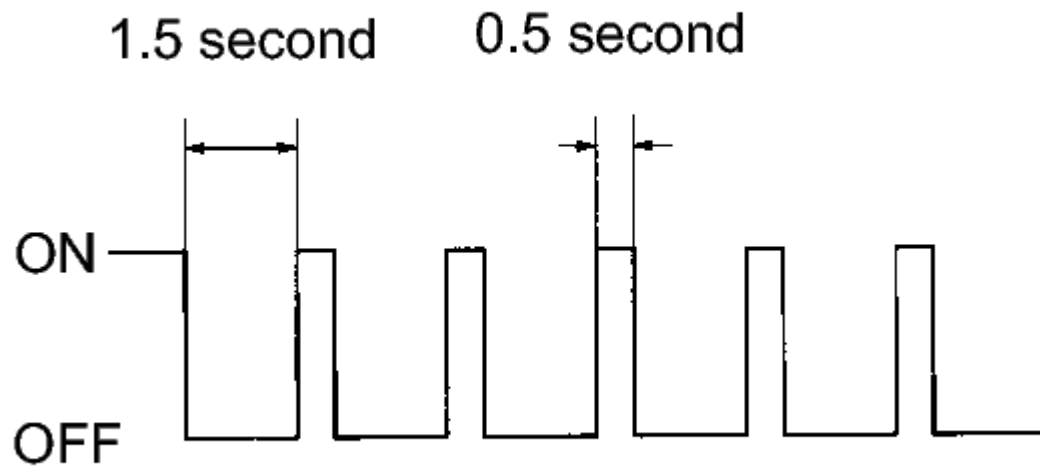


Fig. 26: Identifying Cruise Main Indicator Light On/Off Intervals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

*a	Cruise Main Indicator Light (Vehicle- to- vehicle distance control mode)
*b	READY Indicator Light

DTC CHECK / CLEAR

DTC CHECK / CLEAR

1. CHECK DTC

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

- e. Check the details of the DTC(s). Refer to **DIAGNOSTIC TROUBLE CODE CHART**.

2. CLEAR DTC

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.
- e. Clear the DTCs.

FAIL-SAFE CHART

FAIL-SAFE CHART

- 1. Constant speed control mode and vehicle-to-vehicle distance control mode:

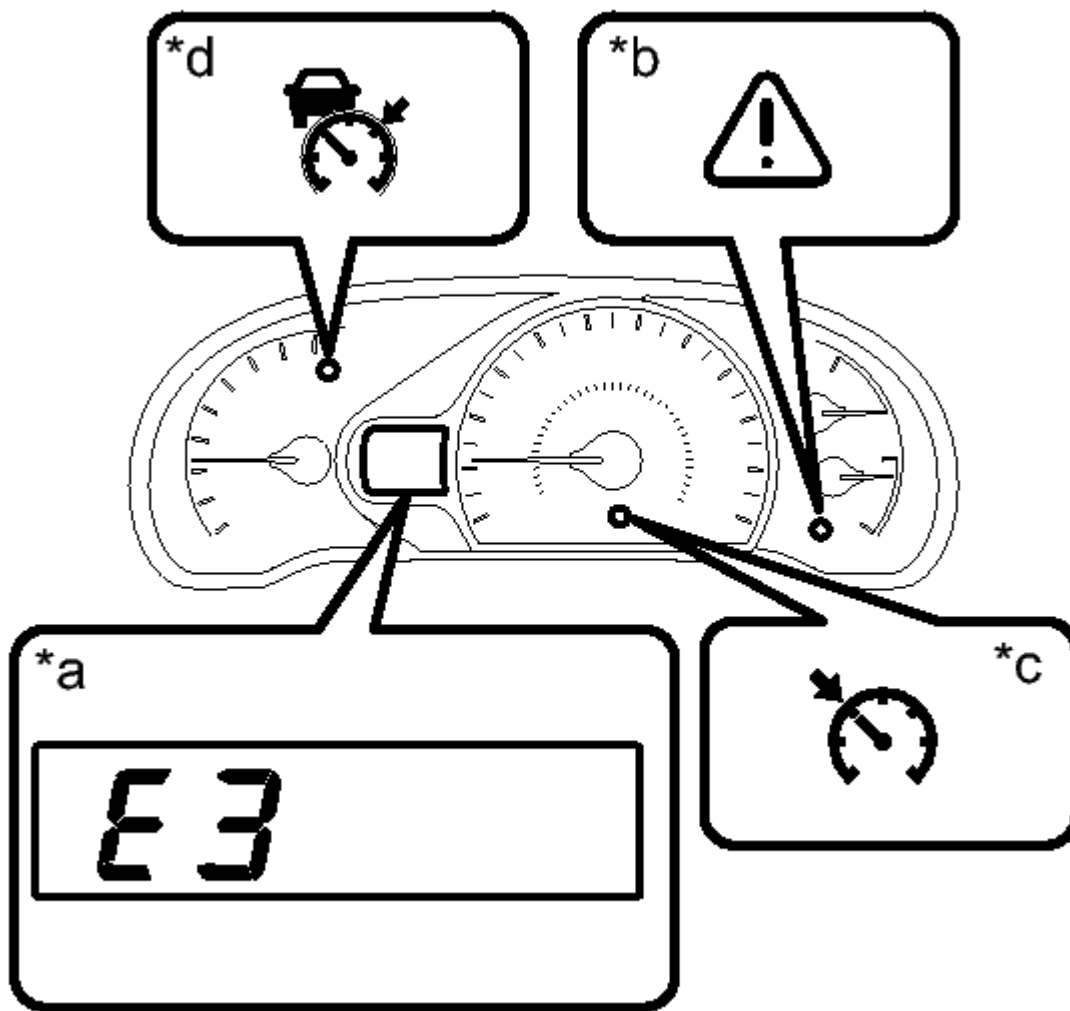


Fig. 27: Identifying Master Warning Light, Multi-Information Display And Cruise Main Indicator Light
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

If the following conditions are detected while the dynamic radar cruise control system is in operation, the system clears the stored vehicle speed in the ECM and cancels the dynamic radar cruise control operation.

HINT:

During constant speed control mode, the cruise main indicator light (constant speed control mode) flashes. During vehicle-to-vehicle distance control, the cruise main indicator light (vehicle-to-vehicle distance control mode) flashes.

TEXT IN ILLUSTRATION

*a	Multi-information Display
*b	Master Warning Light
*c	Cruise Main Indicator Light (Constant speed control mode)
*d	Cruise Main Indicator Light (Vehicle-to-vehicle distance control mode)

Vehicle Condition	Auto Cancel Condition	Fail-safe Deactivation Condition
Cruise main indicator light blinks	Open or short in stop	

• Master warning light comes on • "E3" is displayed • "Pong" warning sound is heard	• Problem with vehicle speed signal	light switch circuit Turn cruise control main switch on again
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2. Vehicle-to-vehicle distance control mode:

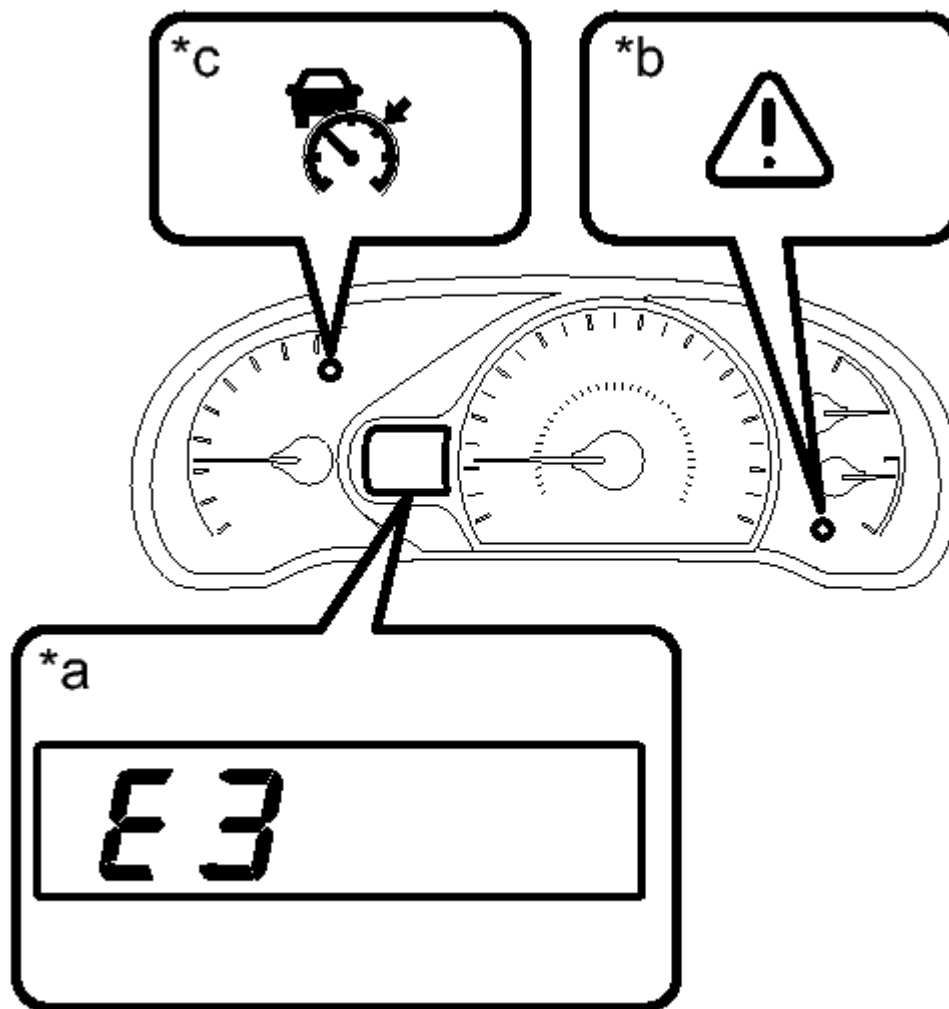


Fig. 28: Identifying Dynamic Radar Cruise Control System Is In Operation
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

If the following conditions are detected while the dynamic radar cruise control system is in operation, the system clears the stored vehicle speed in the ECM and cancels the dynamic radar cruise control operation.

TEXT IN ILLUSTRATION

*a	Multi-information Display
*b	Master Warning Light
*c	Cruise Main Indicator Light (Vehicle-to-vehicle distance control mode)

Vehicle Condition	Auto Cancel Condition	Fail-safe Deactivation Condition
• Cruise main indicator light blinks • Master warning light comes on • "E3" is displayed • "Pong" warning sound is heard	• There is problem with millimeter wave radar sensor • Beam axis of millimeter wave radar sensor deviates • Dynamic radar cruise control system malfunction	Ignition switch ON again

3. Vehicle-to-vehicle distance control mode:

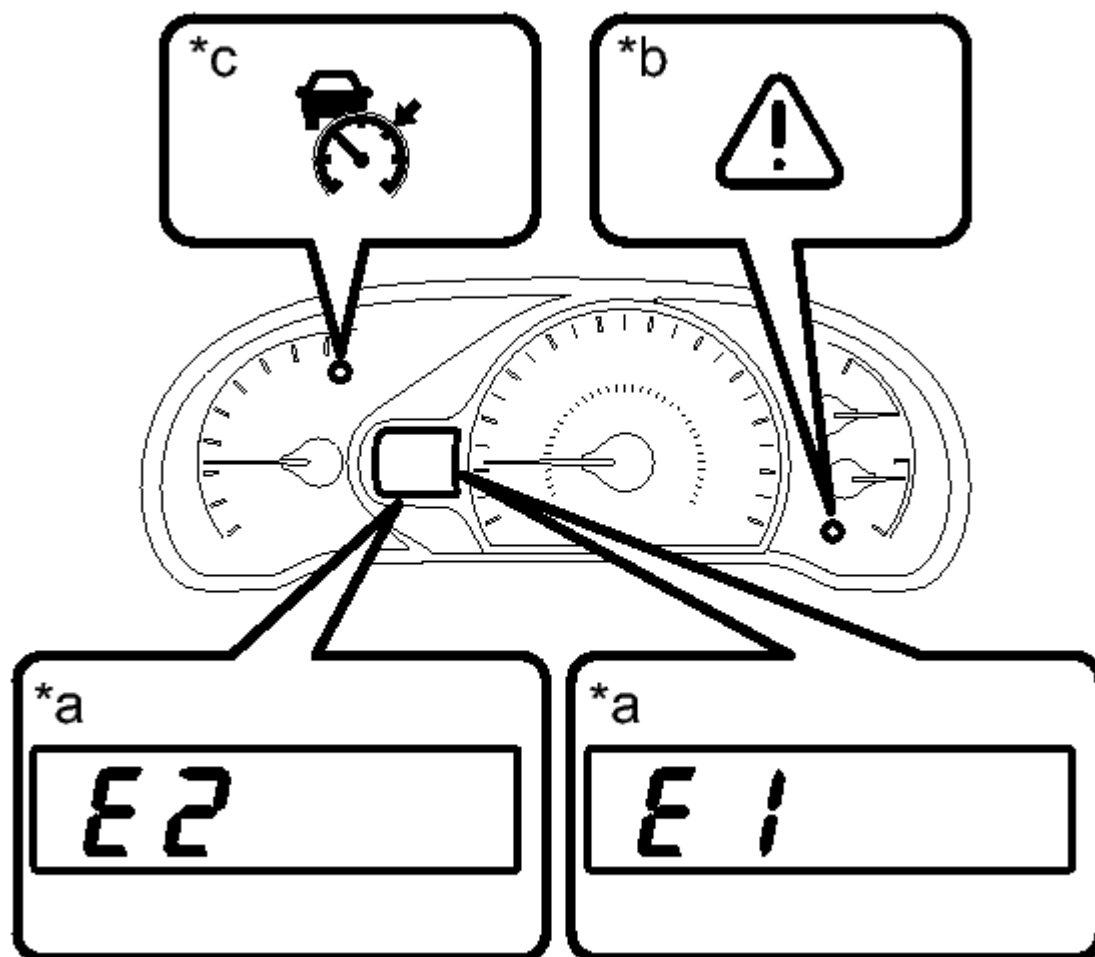


Fig. 29: Identifying Vehicle-To-Vehicle Distance Control Mode
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

If the following conditions are detected while the dynamic radar cruise control system is in operation, the system maintains the stored vehicle speed in the ECM and cancels the dynamic radar cruise control operation.

TEXT IN ILLUSTRATION

*a	Multi-information Display
*b	Master Warning Light
	Cruise Main

*c	Indicator Light (Vehicle- to-vehicle distance control mode)
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Vehicle Condition	Auto Cancel Condition	Fail-safe Deactivation Condition
• Master warning light comes on • Cruise main indicator light blinks • "E1" is displayed • "Pong" warning sound is heard	There is dirt on millimeter wave radar sensor	Recover from condition on left (RESUME operation is possible after recovery)
• Cruise main indicator light blinks • Master warning light comes on • "E2" is displayed • "Pong" warning sound is heard	• Wiper switch is in HI position • ECT-SNOW switch is on • Millimeter wave radar sensor is least sensitive because of bad weather such as rain, fog, snow, and	• Recover from condition on left (RESUME operation is possible after recovery) • Turn cruise control main switch on again

	sandstorms	
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4. Constant speed control mode and vehicle-to-vehicle distance control mode:

If the following conditions are detected while the dynamic radar cruise control system is in operation, the system clears the stored vehicle speed and cancels the dynamic radar cruise control operation.

Vehicle Condition	Auto Cancel Condition	Fail-safe Deactivation Condition
• Cruise main indicator light turns off • "Pi Pi" warning sound is hard	• Vehicle speed is lower than low speed limit (approximately 40 km/h (25 mph)) while cruise control is operating • Constant Speed Control Mode: Vehicle speed is lower than stored vehicle speed by 16 km/h (10 mph) or more while cruise control is operating	Push the cruise control main switch to + RES

DATA LIST / ACTIVE TEST

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTE: In the table below, the values listed under "Normal Condition" are

reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Radar Cruise / Data List.
- Read the Data List according to the display on the Techstream.

RADAR CRUISE

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Accel Request	Accelerator request signal/min.: - 2621.44 km/h/s, max.: 2621.36 km/h/s	No vehicle in front	-
Vehicle Distance	Millimeter wave radar sensor/min.: 0 m (0 ft.), max.: 6553.5 m (2150 ft.)	Distance to vehicle in front	-
L/C Option Flag	Dynamic radar cruise option flag/No or Yes	Yes: Dynamic radar cruise control system can be used No: Dynamic radar cruise control system cannot be used	-
Car Dist Time Setting	Status of the Car Distance Time Setting /Mid, Shrt, No, Long	Vehicle-to-vehicle distance selected by steering pad switch (distance control switch)	-
O/D Cut Request	O/D cut request/Not Req or Request	Not Req: Idling	-

Shift Down Rqst to 3rd	Shift down request to 3rd gear/Not Req or Request	Not Req: Idling	-
Shift Down Rqst to 4th	Shift down request to 4th gear/Not Req or Request	Not Req: Idling	-
Alarm Request	Alarm request signal/Not Req or Request	Request: When beeping Not Req: When not beeping	-
All Throttle Close Rqst	All throttle close request/Not Req or Request	ON: Request OFF: Not Req	-
Brake Control Request	Brake control request/Not Req or Request	ON: Request OFF: Not Req	-
Targ Decl Slope	Cruise target deceleration slope/0.03, 0.06, 0.11, 0.15	0.03, 0.06, 0.11, 0.15	-
CCS Vehicle Spd	Vehicle speed sensor/min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Actual vehicle speed	-
CCS Mem Vehicle Spd	Cruise control memorized speed/min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Memorized speed: Cruise control activated	-
Throttle Opening Angle	Throttle opening angle/min.: 0°, max.: 125°	Actual demanded throttle angle	-
	Cruise control	ON: Cruise control	

Cruise Control	system active condition/ON or OFF	activated OFF: Cruise control deactivated	-
Main SW M-CPU	Main switch signal (Main CPU)/ON or OFF	ON: Main switch on OFF: Main switch off	3
CCS Ready M-CPU	Cruise control system standby condition (Main CPU)/ON or OFF	Each time main switch is pushed, ON/OFF changes	1
CCS Indicator M-CPU	Cruise indicator signal (Main CPU)/ON or OFF	ON: Cruise main indicator light on OFF: Cruise main indicator light off	2
Cancel Switch	CANCEL switch signal/ON or OFF	ON: CANCEL switch on OFF: CANCEL switch off	-
SET/COAST Switch	SET/COAST switch signal/ON or OFF	ON: - SET switch on OFF: - SET switch off	-
RES/ACC Switch	RES/ACC switch signal/ON or OFF	ON: + RES switch on OFF: + RES switch off	-
Stp Light SW M-CPU	Stop light switch signal (Main CPU)/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Cruise Operation Status	Cruise control condition/ON or OFF	ON: Cruise control operated OFF: Cruise control operation stopped	-

VSC Fail Safe Flag	VSC fail-safe flag/Not Req or Request	VSC communication fail safe in operation	-
Brake Cancel Switch	Brake Cancel Signal/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

HINT:

- 3 is OK, but 1 is NG --> ECM failure
- 1 is OK, but 2 is NG --> DTC output or ECM failure
- 3 is OK, but the cruise main indicator light does not illuminate --> Combination meter assembly, wire harness, or ECM failure

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- For Cruise Main Indicator Light (Combination Meter):

Enter the following menus: Body Electrical / Combination Meter / Active Test.

- For Skid Control Buzzer:

Enter the following menus: Chassis / ABS/VSC/ TRAC / Active Test.

- Perform Active Test according to the display on the Techstream.

HINT:

The ignition switch must be turned to ON to proceed with the Active Test using the Techstream.

COMBINATION METER

Tester	Test	Control	Diagnostic
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Display	Part	Range	Note
Indicat. Lamp Cruise	Cruise main indicator light (Constant speed control mode)	OFF or ON	Confirm that the vehicle is stopped with engine idling
Indicat. Radar Cruise	Cruise main indicator light (Vehicle- to- vehicle distance control mode)	OFF or ON	Confirm that the vehicle is stopped with engine idling

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
Buzzer	Skid control buzzer	Buzzer ON/OFF	Buzzer can be heard

DIAGNOSTIC TROUBLE CODE CHART

DIAGNOSTIC TROUBLE CODE CHART

If a trouble code is displayed during the DTC check, check the trouble areas listed for that code in the table below and proceed to the appropriate information.

DYNAMIC RADAR CRUISE CONTROL SYSTEM

DTC Code	Detection Item	Trouble Area	See
P0500	Vehicle Speed Sensor Malfunction	- Vehicle speed sensors - Vehicle speed sensor signal circuit - Combination meter assembly - ECM	Refer to <u>DTC P0500: Vehicle Speed Sensor Malfunction;</u> <u>DTC P0503: Vehicle Speed Sensor Circuit Malfunction</u>
P0503	Vehicle Speed Sensor Circuit Malfunction	- Vehicle speed sensors - Vehicle speed sensor signal circuit - Combination meter	Refer to <u>DTC P0500: Vehicle Speed Sensor Malfunction;</u> <u>DTC P0503: Vehicle Speed</u>

		assembly - ECM	<u>Sensor Circuit Malfunction</u>
P0571	Stop Light Switch Circuit Malfunction	- Stop light switch - Stop light switch circuit - ECM - Stop light control relay - Stop light control relay circuit - Brake actuator assembly (Skid control ECU) - Harness or connector	Refer to <u>DTC P0571: Stop Light Switch Circuit Malfunction</u>
P0575	Cruise Control Input Circuit	- ECM	Refer to <u>DTC P0575: Cruise Control Input Circuit</u>
P1570	Radar Sensor Malfunction	- Millimeter wave radar sensor	Refer to <u>DTC P1570: Radar Sensor Malfunction</u>
P1572	Improper Aiming of Radar Sensor Beam Axis	- Millimeter wave radar sensor	Refer to <u>DTC P1572: Improper Aiming of Radar Sensor Beam Axis</u>
P1575	Warning Buzzer Malfunction	- Skid control buzzer - Skid control buzzer circuit - Brake actuator assembly (Skid control ECU) - ECM	Refer to <u>DTC P1575: Warning Buzzer Malfunction</u>
P1578	Brake System Malfunction	- VSC system - ECM	Refer to <u>DTC P1578: Brake System Malfunction</u>
P1615	Communication Error from Distance Control ECU to ECM	- Driving support ECU - ECM	Refer to <u>DTC P1615: Communication Error from Distance Control ECU to ECM</u>
P1616	Communication Error from ECM to Distance Control ECU	- Driving support ECU - ECM	Refer to <u>DTC P1616: Communication Error from ECM to Distance Control ECU</u>
P1617	Distance Control ECU Malfunction	- Driving support ECU - ECM	Refer to <u>DTC P1617: Distance Control ECU Malfunction</u>
P1630	Communication Error from VSC to ECM	- Communication circuit - Brake actuator assembly (Skid control ECU) - ECM	Refer to <u>DTC P1630: Communication Error from VSC to ECM</u>
P1631	Communication Error from ECM to VSC	- Communication circuit - Brake actuator assembly (Skid control ECU) - ECM	Refer to <u>DTC P1631: Communication Error from ECM to VSC</u>
			Refer to <u>DTC U0100: Lost Communication with ECM / PCM "A"; DTC U0122: Lost</u>

U0100	Lost Communication with ECM / PCM "A"	- Communication circuit - ECM - Driving support ECU - Brake actuator assembly (Skid control ECU)	<u>Communication with Vehicle Dynamics Control Module;</u> <u>DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module; DTC U1104: Lost Communication with Driving Support ECU</u>
U0122	Lost Communication with Vehicle Dynamics Control Module	- Communication circuit - Brake actuator assembly (Skid control ECU) - ECM	Refer to <u>DTC U0100: Lost Communication with ECM / PCM "A"; DTC U0122: Lost Communication with Vehicle Dynamics Control Module;</u> <u>DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module; DTC U1104: Lost Communication with Driving Support ECU</u>
U0123	Lost Communication with Yaw Rate Sensor Module	- Communication circuit - Yaw rate and acceleration sensor - Driving support ECU - ECM	Refer to <u>DTC U0100: Lost Communication with ECM / PCM "A"; DTC U0122: Lost Communication with Vehicle Dynamics Control Module;</u> <u>DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module; DTC U1104: Lost Communication with Driving Support ECU</u>
U0126	Lost Communication with Steering Angle Sensor Module	- Communication circuit - Steering angle sensor - Driving support ECU - ECM	Refer to <u>DTC U0100: Lost Communication with ECM / PCM "A"; DTC U0122: Lost Communication with Vehicle Dynamics Control Module;</u> <u>DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module; DTC U1104: Lost</u>

			<u>Communication with Driving Support ECU</u>
U0235	Lost Communication with Cruise Control Front Distance Range Sensor	- Communication circuit - Millimeter wave radar sensor - Driving support ECU	Refer to <u>DTC U0235: Lost Communication with Cruise Control Front Distance Range Sensor</u>
U1102	Lost Communication with Radar Sensor	- Communication circuit - Millimeter wave radar sensor - Driving support ECU	Refer to <u>DTC U1102: Lost Communication with Radar Sensor</u>
U1104	Lost Communication with Driving Support ECU	- Driving support ECU - Communication circuit - ECM	Refer to <u>DTC U0100: Lost Communication with ECM / PCM "A"; DTC U0122: Lost Communication with Vehicle Dynamics Control Module; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module; DTC U1104: Lost Communication with Driving Support ECU</u>