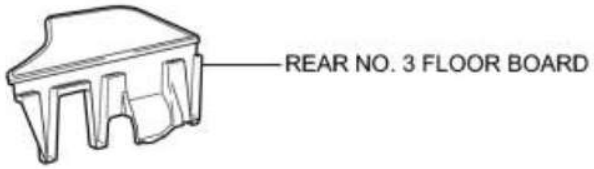
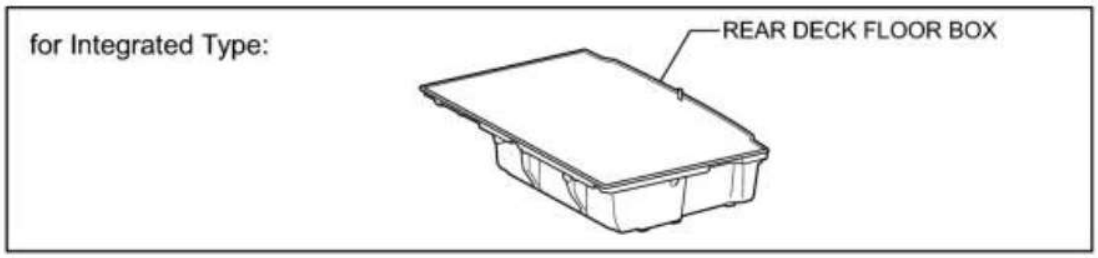
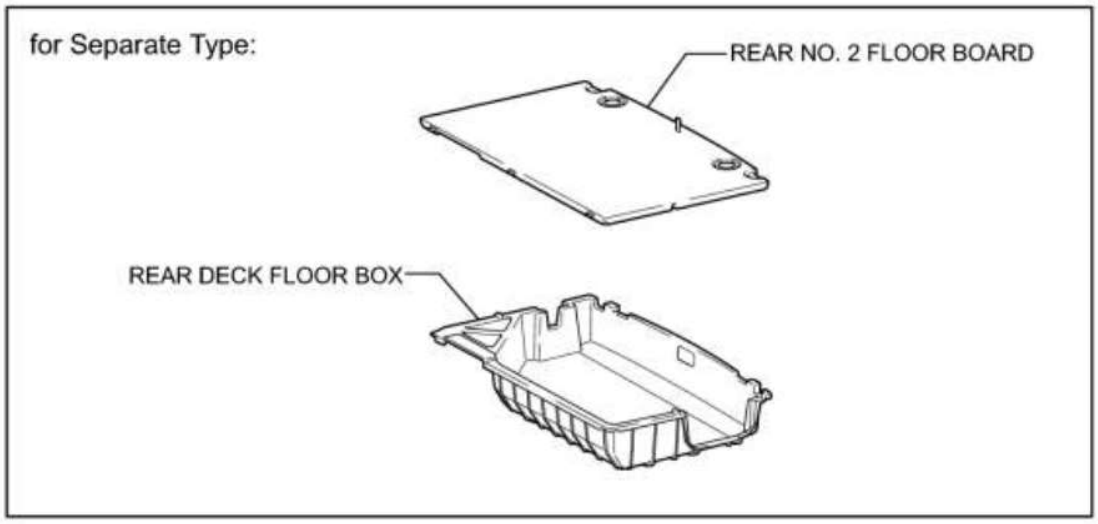
# COMPONENTS

# ILLUSTRATION



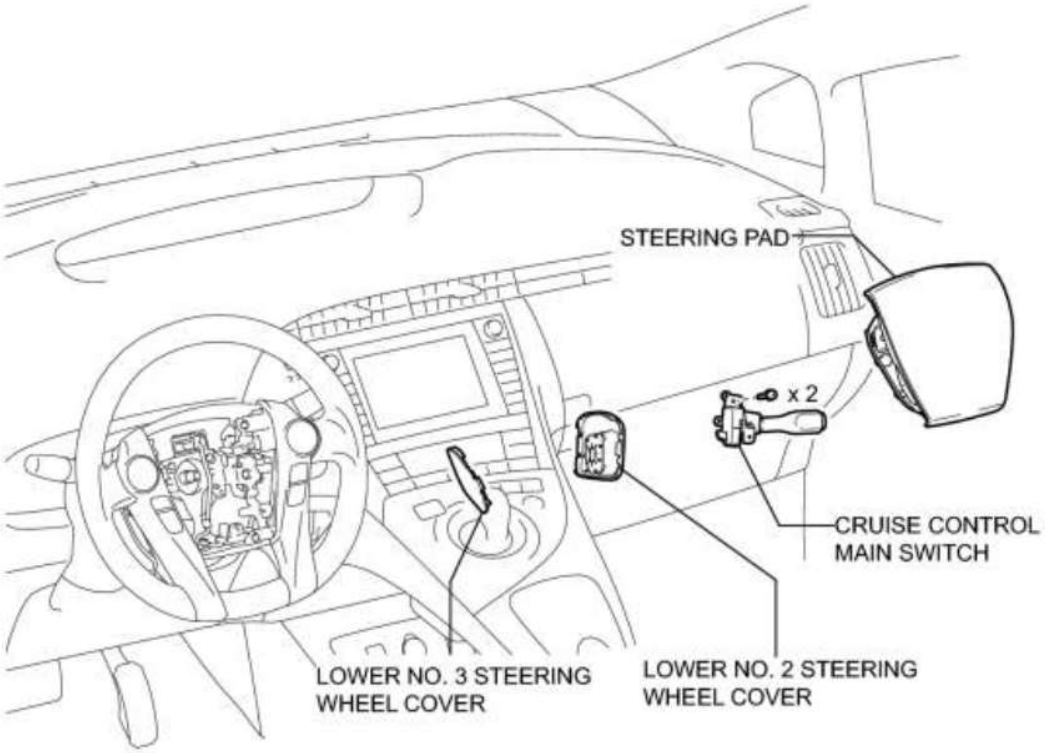




P

# ILLUSTRATION

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P

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# REMOVAL

1. REMOVE REAR NO. 2 FLOOR BOARD (for Separate Type) INFO

2. REMOVE REAR DECK FLOOR BOX INFO

3. REMOVE REAR NO. 3 FLOOR BOARD INFO

4. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

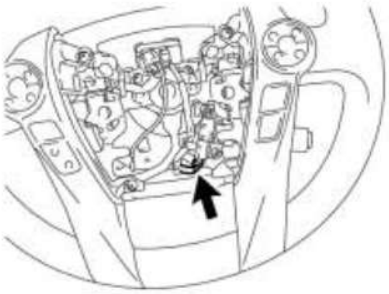
When disconnecting the cable, some systems need to be initialized after the cable is reconnected INFO.

5. REMOVE LOWER NO. 3 STEERING WHEEL COVER INFO

6. REMOVE LOWER NO. 2 STEERING WHEEL COVER INFO

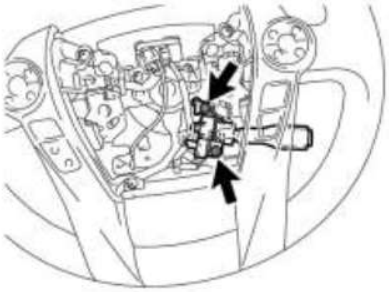
7. REMOVE STEERING PAD INFO

8. REMOVE CRUISE CONTROL MAIN SWITCH



P

(a) Disconnect the connector.



P

(b) Remove the 2 screws and cruise control main switch.

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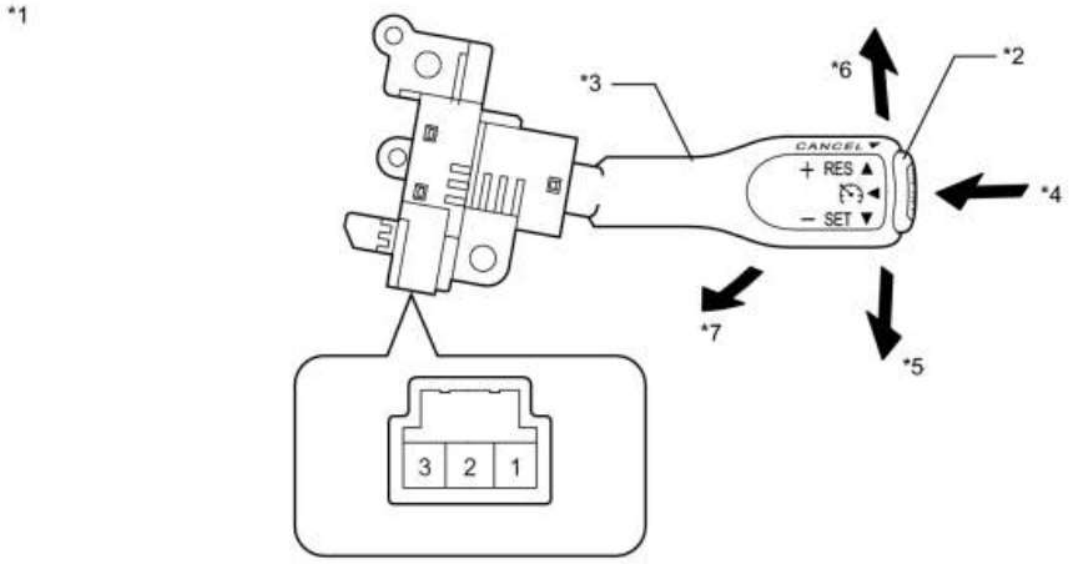
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# INSPECTION

1. INSPECT CRUISE CONTROL MAIN SWITCH

(a) for cruise control system:

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




**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Component without harness connected<br>(Cruise Control Main Switch) | *2 | Main Switch |
| *3 | Lever | *4 | ON/OFF |
| *5 | - SET | *6 | + RES |
| *7 | CANCEL | - | - |

Standard Resistance:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| 1 - 3 | Main Switch off*1 | 1 MΩ or higher |
| | Main Switch on | Below 2.5 Ω |
| | + RES | 235 to 245 Ω |
| | - SET | 617 to 643 Ω |
| | CANCEL | 1509 to 1571 Ω |

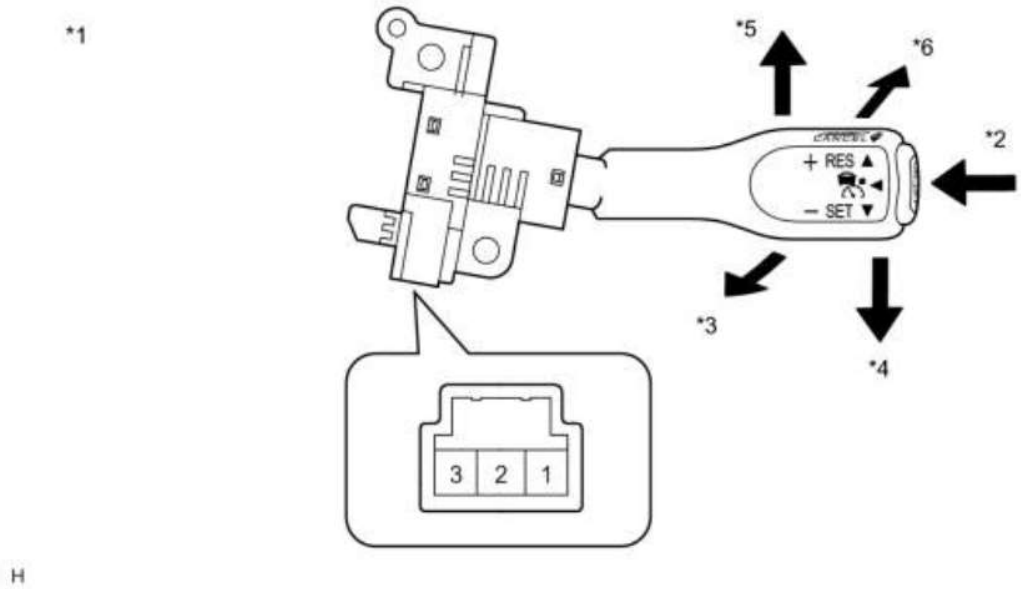
*1: Lever is in the neutral position

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If the result is not as specified, replace the cruise control main switch.

(b) for dynamic radar cruise control system:

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




**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Component without harness connected<br><br>(Cruise Control Main Switch) | *2 | ON/OFF |
| *3 | CANCEL | *4 | - SET |
| *5 | + RES | *6 | MODE |

Standard Resistance:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| 1 - 2<br><br>1 - 3 | Main Switch off*1 | 1 MΩ or higher |
| 1 - 3 | Main switch on | Below 2.5 Ω |
| 1 - 2 | MODE | Below 2.5 Ω |
| 1 - 3 | + RES | 235 to 245 Ω |
| 1 - 3 | - SET | 617 to 643 Ω |
| 1 - 3 | CANCEL | 1509 to 1571 Ω |

*1: Lever is in the neutral position

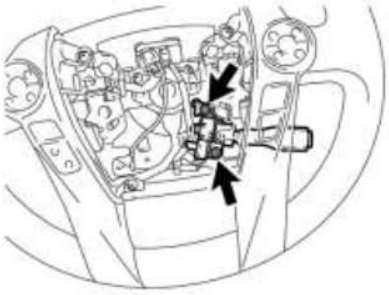
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If the result is not as specified, replace the cruise control main switch.

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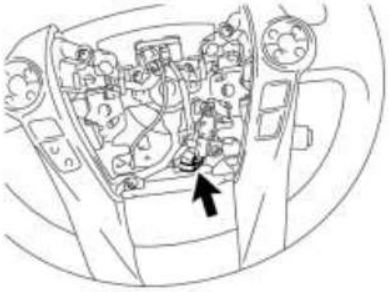
# INSTALLATION

1. INSTALL CRUISE CONTROL MAIN SWITCH



P

(a) Install the cruise control main switch with the 2 screws.



P

(b) Connect the connector.

2. INSTALL STEERING PAD INFO

3. INSTALL LOWER NO. 3 STEERING WHEEL COVER INFO

4. INSTALL LOWER NO. 2 STEERING WHEEL COVER INFO

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected INFO.

6. INSTALL REAR NO. 3 FLOOR BOARD INFO

7. INSTALL REAR DECK FLOOR BOX INFO

8. INSTALL REAR NO. 2 FLOOR BOARD (for Separate Type) INFO

9. INSPECT STEERING PAD INFO

10. INSPECT SRS WARNING LIGHT

(a) Inspect SRS warning light INFO.

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# PRECAUTION

1. NOTICE FOR INITIALIZATION

NOTICE:

When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

| System Name | See Procedure |
|---|---|
| Advanced Parking Guidance System | INFO |

2. HANDLING PRECAUTION FOR CRUISE CONTROL SYSTEM

(a) Turn the cruise control main switch (ON-OFF button) off when not using the cruise control system.

(b) Be careful as the vehicle speed increases when driving downhill with the cruise control system on.

(c) The +RES operation changes according to the cruise control system status. When the cruise control system is operating, the + function operates. When the cruise control system is not operating, the RES function operates.

(d) If the cruise main indicator light blinks while the cruise control system is operating, turn the cruise control main switch (ON-OFF button) off to reset the cruise control system. After the reset, if the cruise control main switch (ON-OFF button) cannot be turned on, or the cruise control system is canceled immediately after turning the cruise control main switch (ON-OFF button) on, the system may have a malfunction.

(e) Do not use the cruise control system where the road conditions are as follows:

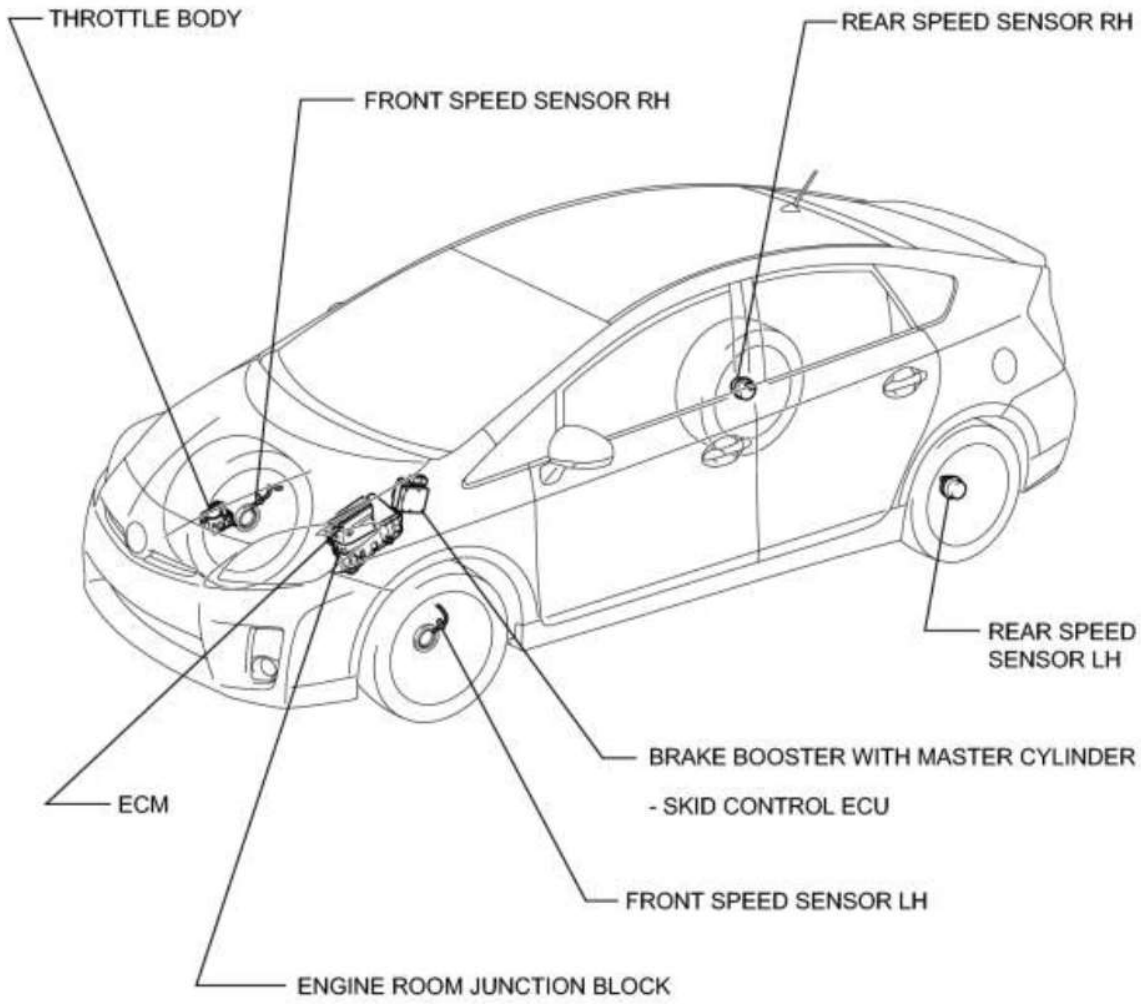
- Heavy traffic
- Steep decline
- Roads with sharp turns
- Icy or snowy roads
- Slippery roads

(f) Do not use the cruise control system while towing.

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# PARTS LOCATION

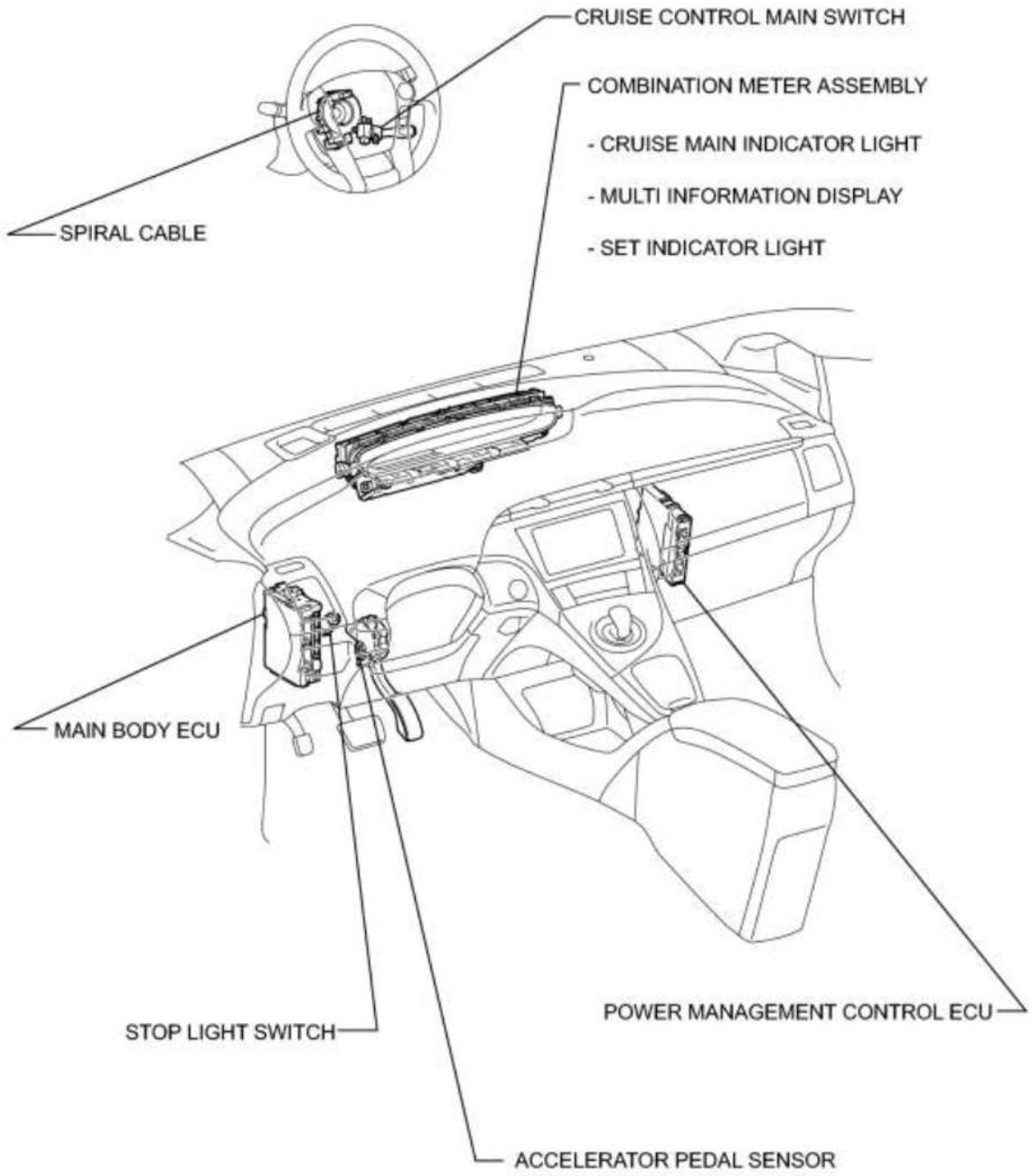
# ILLUSTRATION




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# ILLUSTRATION

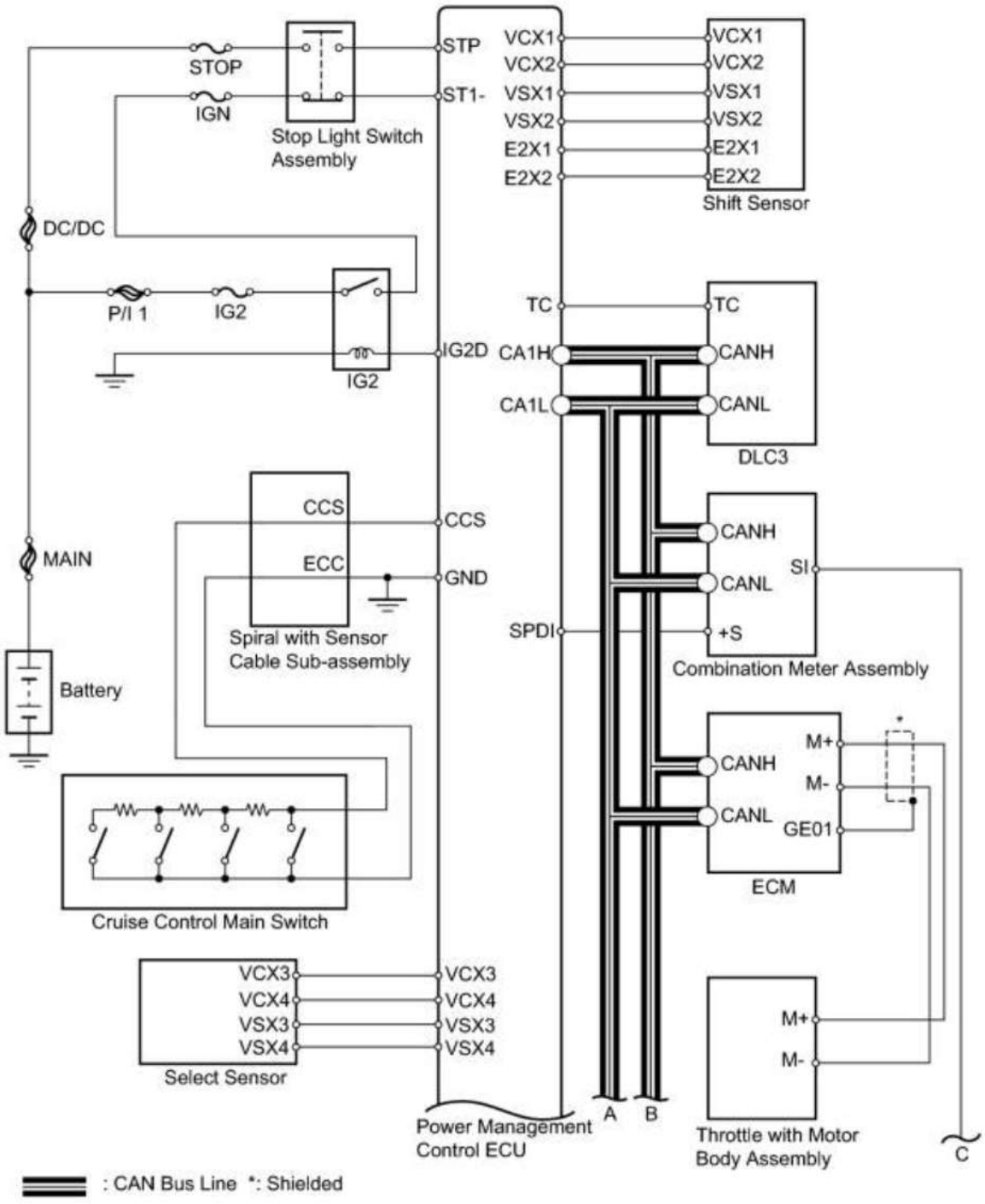
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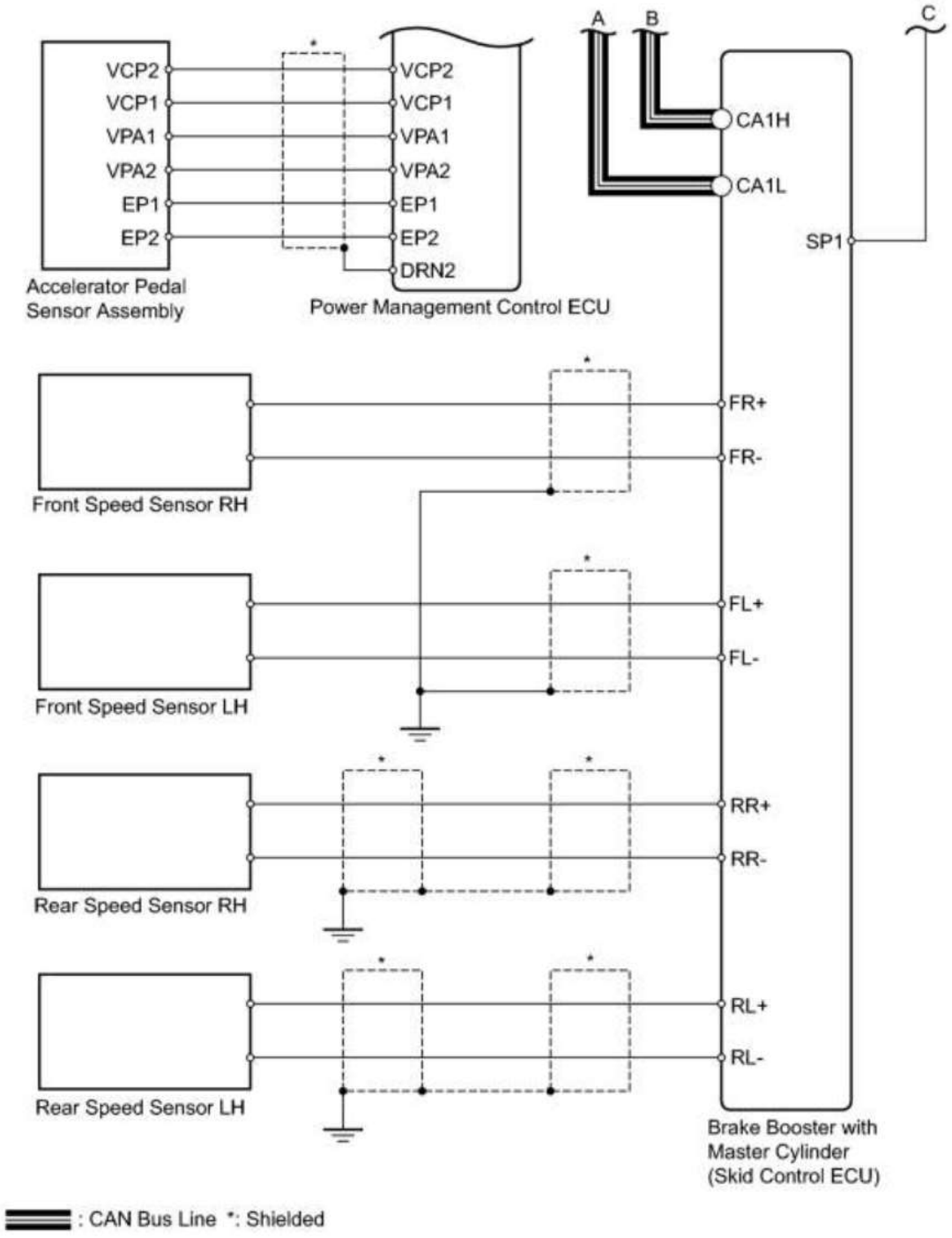

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# SYSTEM DIAGRAM




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c

## Communication Table

| Sender | Receiver | Signal | Line |
|---|---|---|---|
| Power management control ECU | Combination meter assembly<br><br>(Cruise Main Indicator | • Cruise main indicator and SET indicator operation signal<br>• Cruise control diagnosis signal | CAN |

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| Sender | Receiver | Signal | Line |
|---|---|---|---|
| | Light)<br><br>("SET" Indicator) | | |
| Brake booster with master cylinder (skid control ECU) | Power management control ECU | Electronically controlled brake system malfunction signal | CAN |
| Power management control ECU | ECM | Throttle actuator operation signal | CAN |
| ECM | Power management control ECU | Throttle position signal | CAN |

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# SYSTEM DESCRIPTION

1. CRUISE CONTROL SYSTEM

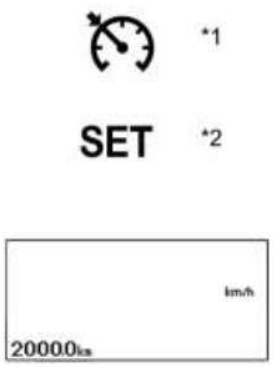
The cruise control system maintains constant vehicle speed. It enables the driver to adjust the vehicle speed by operating the cruise control main switch without using the accelerator pedal.

The power management control ECU receivers signals from each switch and sensor, and maintains constant vehicle speed by optimizing the use of the engine and motor driving force.

- The power management control ECU receives signals such as ON-OFF, - SET, + RES, and CANCEL from the cruise control main switch and executes the command.
- The power management control ECU illuminates the combination meter's cruise main indicator light when it receives a cruise control main switch (ON-OFF button) ON signal.

**Text in Illustration**

| | |
|---|---|
| *1 | Cruise Main Indicator Light |
| *2 | "SET" Indicator |




- The power management control ECU displays "SET" on the multi-information display when constant speed control is started by pushing the cruise control main switch to "- SET".
- The power management control ECU cancels cruise control operation when the brake pedal is depressed and the power management control ECU receives a stop light switch signal.
- The power management control ECU cancels cruise control operation when the shift lever is moved from D to N or B position, and the power management control ECU receives a shift position sensor signal.

2. LIMIT CONTROL

(a) Low speed limit

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

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be automatically canceled but the stored vehicle speed will be retained when the vehicle speed drops below the low speed limit of 40 km/h (25 mph) while the cruise control is in operation.

(b) High speed limit

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

3. CRUISE CONTROL OPERATION

The cruise control main switch operates 7 functions: SET, -, TAP-DOWN, RES, +, TAP-UP, and CANCEL. The SET, TAP-DOWN, and - functions, and the RES, TAP-UP, and + functions are operated with the same switch. The cruise control main switch is an automatic return type switch which turns on only while it is being operated in the direction of each arrow and turns off after being released.

(a) SET CONTROL

Vehicle speed is stored and constant speed control is maintained when pushing the cruise control main switch to - SET while driving with the main switch on (the cruise main indicator light and "SET" indicator come on), and the vehicle speed is within the set speed range (between the low and high speed limits).

(b) - CONTROL

The power management control ECU decreases the cruise control demand speed and controls the engine and motor driving force to decelerate the vehicle when - SET on the cruise control main switch is pressed and held while the cruise control system is in operation. When the cruise control main switch is released from - SET, vehicle speed is stored and constant speed control is maintained.

(c) TAP-DOWN CONTROL

When tapping down the cruise control main switch to - SET (for approximately 0.6 seconds) while the cruise control system 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 vehicle speed is stored and constant speed control is maintained.

(d) + CONTROL

The power management control ECU increases the cruise control demand speed and controls the engine and motor driving force to accelerate the vehicle when pushing and holding the cruise control main switch to + RES while the cruise control system is in operation.

When the cruise control main switch is released from + RES, vehicle speed is stored and constant speed control is maintained.

(e) TAP-UP CONTROL

When tapping up the cruise control main switch to + RES (for approximately 0.6 seconds) while the cruise control system is in operation, the stored vehicle speed increases each time by approximately 1.6 km/h (1 mph).

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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.

(f) RES CONTROL

If cruise control operation was canceled with the stop light switch assembly or the CANCEL switch, and if driving speed is within the limit range, pushing the cruise control main switch to + RES restores vehicle speed memorized at the time of cancellation, and maintains constant speed control.

(g) MANUAL CANCEL CONTROL

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

- Depressing the brake pedal
- Moving the shift lever from D to N or B position
- Pushing the cruise control main switch to CANCEL
- Turning the cruise control main switch (ON-OFF button) off (the stored vehicle speed in the ECM is not maintained)

4. AUTO CANCEL (FAIL-SAFE)

This system has an automatic cancellation function (fail-safe) INFO.

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# HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

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

| | |
|---|---|
| 1. | VEHICLE BROUGHT TO WORKSHOP |

NEXT

| | |
|---|---|
| 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

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

(a) 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 INFO GO TO CAN COMMUNICATION SYSTEM

A

| | |
|---|---|
| 4. | CHECK FOR DTC* |

Refer to DTC Check / Clear INFO.

(a) Check for DTCs and note any codes that are output.

(b) Clear the DTCs.

(c) Recheck for DTCs. Try to reproduce the DTCs by duplicating the conditions indicated by the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC does not reoccur | A |

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| Result | Proceed to |
|---|---|
| DTC reoccurs | B |

B ▶ INFO GO TO DTC CHART

A ▼

| | |
|---|---|
| 5. | PROBLEM SYMPTOMS TABLE |

Refer to Problem Symptoms Table INFO.

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 ▼

| | |
|---|---|
| 6. | OVERALL ANALYSIS AND TROUBLESHOOTING* |

(a) Terminals of ECU INFO

(b) Data List / Active Test INFO

NEXT ▼

| | |
|---|---|
| 7. | ADJUST, REPAIR OR REPLACE |

NEXT ▼

| | |
|---|---|
| 8. | CONFIRMATION TEST |

NEXT ▶ **END**

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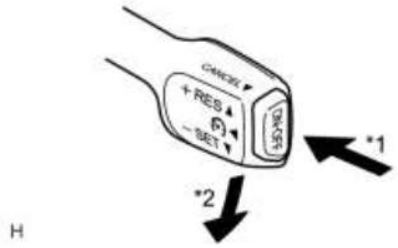
# ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

(a) Inspect the SET function.

**Text in Illustration**

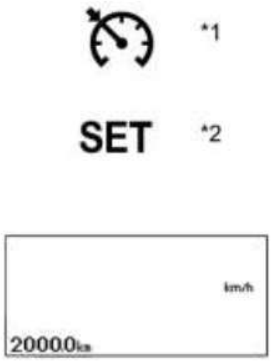
| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |




(1) Turn the cruise control main switch (ON-OFF button) on.

(2) Check that the cruise main indicator light illuminates on the combination meter assembly.

(3) Drive at a speed of between 40 km/h (25 mph) and 200 km/h (125 mph).




(4) Push the cruise control main switch to - SET.

## Text in Illustration

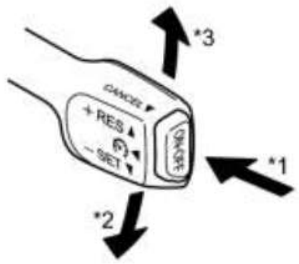
| | |
|---|---|
| *1 | Cruise Main Indicator Light |
| *2 | "SET" Indicator |

(5) Check that "SET" is indicated on the multi-information display.

(6) After releasing the switch, check that the vehicle cruises at the set speed.

(b) Inspect the + function.

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## Text in Illustration

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |
| *3 | + RES |

(1) Turn the cruise control main switch (ON-OFF button) on.

(2) Drive at the required speed (40 km/h (25 mph) or higher).

(3) Push the cruise control main switch to - SET.

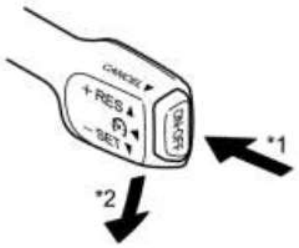
(4) Check that vehicle speed increases while the cruise control main switch is pushed to + RES, and that the vehicle cruises at the newly set speed when the switch is released.

(5) Push the cruise control main switch to + RES and then release it immediately. Check that vehicle speed increases by approximately 1.6 km/h (1 mph) (tap-up control).

(c) Inspect the - function.

## Text in Illustration

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |




H

(1) Turn the cruise control main switch (ON-OFF button) on.

(2) Drive at a speed of between 40 km/h (25 mph) and 200 km/h (125 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.

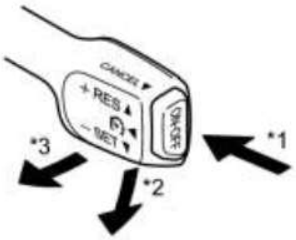
(5) Push the cruise control main switch to - SET, and then release it immediately. Check that vehicle speed decreases by approximately 1.6 km/h (1 mph) (tap-down control).

(d) Inspect the CANCEL function.

## Text in Illustration

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |

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| | |
|---|---|
| *3 | CANCEL |

(1) Turn the cruise control main switch (ON-OFF button) on.

(2) Drive at a speed of between 40 km/h (25 mph) and 200 km/h (125 mph).

(3) Push the cruise control main switch to - SET.

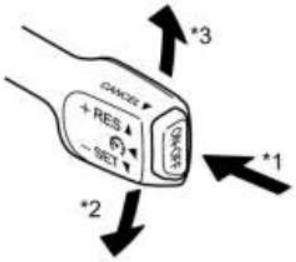
(4) When performing any one of the following, check that the operation of the cruise control system is cancelled, normal driving resumes and "SET" on the multi-information display goes off.

- Depressing the brake pedal
- Moving the shift lever from D to N or selecting 3rd, 2nd, or 1st gear with the shift lever in S
- Turning the cruise control main switch off
- Pulling the cruise control main switch to CANCEL

(e) Inspect the RES function.

## Text in Illustration

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |
| *3 | + RES |




(1) Turn the cruise control main switch (ON-OFF button) on.

(2) Drive at a speed of between 40 km/h (25 mph) and 200 km/h (125 mph).

(3) Push the cruise control main switch to - SET.

(4) Cancel cruise control operation 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 speed of more than 40 km/h (25 mph), check that the vehicle resumes the speed set prior to the cancellation and that "SET" is also displayed on the multi-information display.

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# 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.

**Cruise Control System**

| Symptom | Suspected Area | See page |
|---|---|---|
| The cruise control main switch cannot be turned on. | Cruise control switch circuit | INFO |
| | CRUISE main indicator light circuit | INFO |
| | Power management control ECU | INFO |
| Vehicle speed setting cannot be performed (the cruise main indicator light on the combination meter illuminates when the main switch is turned on, but turns off when SET function is operating). | Cruise control switch circuit | INFO |
| | Power management control ECU | INFO |
| Vehicle speed setting cannot be performed (the cruise main indicator light on the combination meter illuminates when the main switch is turned on, and remains illuminated when SET function is operating). | Stop light switch circuit | INFO |
| | Vehicle speed sensor circuit | INFO |
| | Cruise control switch circuit | INFO |
| | Hybrid control system | INFO |
| | Power management control ECU | INFO |
| The cruise control is canceled while it is operating. | Stop light switch circuit | INFO |
| | Hybrid control system | INFO |
| | Electronically controlled brake system | INFO |
| | Cruise control switch circuit | INFO |
| | Vehicle speed sensor circuit | INFO |
| | Power management control ECU | INFO |

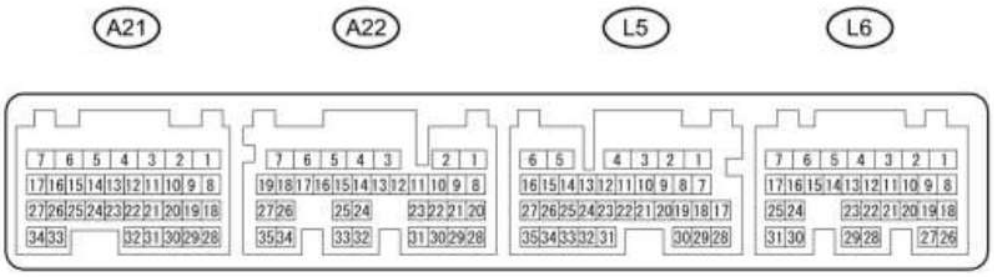
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| Symptom | Suspected Area | See page |
|---|---|---|
| Pulling back on the control main switch does not cancel the cruise control. (The cruise main indicator light remains on.) | Cruise control switch circuit | INFO |
| | Power management control ECU | INFO |
| Pulling back on the control main switch does not cancel the cruise control. (The cruise main indicator light goes off.) | Power management control ECU | INFO |
| 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 | INFO |
| | Power management control ECU | INFO |
| The cruise control is not canceled when vehicle speed drops below the low speed limit. (The cruise main indicator light goes off.) | Power management control ECU | INFO |
| Depressing the brake pedal does not cancel the cruise control. (The cruise main indicator light remains on.) | Stop light switch circuit | INFO |
| | Power management control ECU | INFO |
| Depressing the brake pedal does not cancel the cruise control. (The cruise indicator main light goes off.) | Power management control ECU | INFO |
| Moving the shift lever does not cancel the cruise control. (The cruise main indicator light remains on.) | Hybrid control system | INFO |
| | Power management control ECU | INFO |
| Moving the shift lever does not cancel the cruise control. (The cruise indicator main light goes off.) | Power management control ECU | INFO |
| Hunting (Speed is not constant.) | Vehicle speed sensor circuit | INFO |
| | SFI system | INFO |
| | Power management control ECU | INFO |
| The cruise main indicator light remains blinking. | TC and CG terminal circuit | INFO |
| | Power management control ECU | INFO |
| The "SET" indicator does not comes on (SET function operate normally) | Cruise SET indicator light circuit | INFO |
| | Power management control ECU | INFO |

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# TERMINALS OF ECU

1. CHECK POWER MANAGEMENT CONTROL ECU



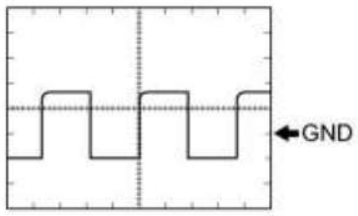

| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| A22-7 (ST1-) - L5-6 (E1) | R - BR | Stop light switch signal | Power switch on (IG), Brake pedal released | 7.5 to 14 V |
| A22-7 (ST1-) - L5-6 (E1) | R - BR | Stop light switch signal | Power switch on (IG), Brake pedal depressed | Below 1 V |
| A22-23 (STP) - L5-6 (E1) | L - BR | Stop light switch signal | Brake pedal released | Below 1 V |
| A22-23 (STP) - L5-6 (E1) | L - BR | Stop light switch signal | Brake pedal depressed | 7.5 to 14 V |
| L5-6 (E1) - Body ground | BR - Body ground | Earth (ground) circuit of power management control ECU | Always | Below 1 Ω |
| L5-11(TC) - L5-6 (E1) | P - BR | Terminal TC of DLC3 | Power switch on (IG) | 11 to 14 V |
| L5-11(TC) - L5-6 (E1) | P - BR | Terminal TC of DLC3 | Terminals TC and CG of DLC3 connected | Below 1 V |
| L5-14 (SPDI) - L5-6 (E1) | V - BR | Vehicle speed signal | Driving at 20 km/h (12 mph) | Pulse generation (see waveform 1) |
| L6-22 (CCS) - L5-6 (E1) | R - BR | Cruise control main switch circuit | Power switch on (IG) | 10 to 14 V |
| L6-22 (CCS) - L5-6 (E1) | R - BR | Cruise control main switch circuit | Power switch on (IG), MAIN switch on | Below 1 V |
| L6-22 (CCS) - L5-6 (E1) | R - BR | Cruise control main switch circuit | Power switch on (IG), + RES switch on | 2.3 to 4.0 V |
| L6-22 (CCS) - L5-6 (E1) | R - BR | Cruise control main switch circuit | Power switch on (IG), - SET switch on | 4.5 to 7.1 V |

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| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| L6-22 (CCS) - L5-6 (E1) | R - BR | Cruise control main switch circuit | Power switch on (IG), CANCEL switch on | 6.6 to 10.1 V |
| L6-24 (CA1L) - L5-6 (E1) | W - BR | CAN communication line | Power switch on (IG) | Pulse generation (see waveform 2) |
| L6-25 (CA1H) - L5-6 (E1) | B - BR | CAN communication line | Power switch on (IG) | Pulse generation (see waveform 3) |

(a) WAVEFORM 1

(1) Vehicle speed signal

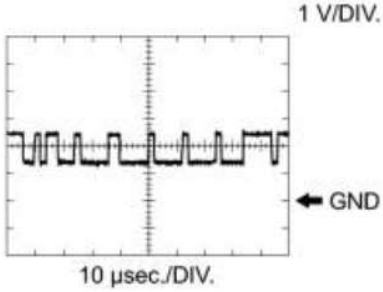



| Power Management Control ECU Terminal Name | Between SPDI and E1 |
|---|---|
| Tester Range | 5 V/DIV., 20 ms./DIV. |
| Condition | Driving at 20 km/h (12 mph) |

- The wavelength becomes shorter as the vehicle speed increases.
- Depending on the vehicle, the output waveform voltage may rise to 12 V if influenced by optionally installed systems.

(b) WAVEFORM 2

(1) CAN communication signal




| Power Management Control ECU Terminal Name | Between CA1L and E1 |
|---|---|
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

HINT:

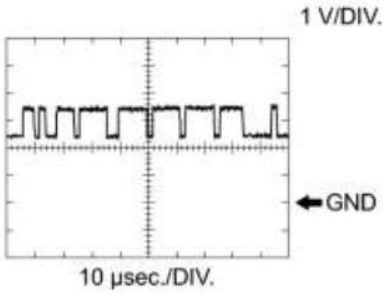
The waveform varies depending on the CAN communication signal.

(c) WAVEFORM 3

(1) CAN communication signal

| Power Management Control ECU Terminal | Between CA1H and E1 |
|---|---|

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| Name | |
|---|---|
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

HINT:

The waveform varies depending on the CAN communication signal.

T

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# DIAGNOSIS SYSTEM

1. DESCRIPTION

The power management control ECU controls the cruise control system of the vehicle. The data and DTCs relating to the cruise control system can be read from the DLC3 of the vehicle. If either DTC or CRUISE OK is not displayed on the multi-information display on the combination meter when checking for DTCs, there may be a problem with either the combination meter or the CAN communication system. Use the Techstream to check and solve the problem.

HINT:

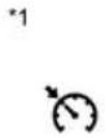
If a vehicle speed sensor, stop light switch or any other related part malfunctions, the power management control ECU cancels cruise control operation automatically.

2. CHECK DLC3

(a) Check the DLC3 INFO.

3. CHECK INDICATOR

(a) Turn the power switch on (IG).



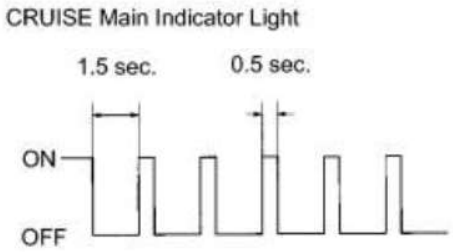

**Text in Illustration**

| | |
|---|---|
| *1 | Cruise Main Indicator Light |

(b) Check that the CRUISE main indicator light turns on when the cruise control switch (ON-OFF button) is turned on, and that the indicator light turns off when the control switch (ON-OFF button) is turned off.

HINT:

- If the indicator check result is not normal, proceed to troubleshooting for the cruise main indicator light circuit INFO.
-




If a malfunction occurs in the speed sensor or stop light switch, etc., during cruise control driving, the power management control ECU activates the AUTO CANCEL of the cruise control and turns on and

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off the CRUISE main indicator light to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a diagnostic trouble code.

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# DTC CHECK / CLEAR

1. CHECK DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Tune the Techstream on.

(d) Enter the following menus: Powertrain / Cruise Control / Trouble Codes.

(e) Read the DTCs.

2. CLEAR DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Cruise Control / Trouble Codes.

(e) Clear the DTCs.

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# FAIL-SAFE CHART

HINT:

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

| Vehicle Condition | Auto Cancel Condition | Re-operation Condition |
|---|---|---|
| Cruise main indicator light blinks | • There is problem with input circuit of stop light switch circuit<br>• There is problem with cancel circuit<br>• There is problem with electronically controlled brake system<br>• There is open or short in stop light switch circuit<br>• Communication stop between brake booster with master cylinder (skid control ECU) and power management control ECU<br>• There is problem with hybrid vehicle control system | • Turn cruise control main switch on again<br>• Turn power switch off then on (IG) again |
| Cruise main indicator light remains on (Cruise control is canceled) | • Vehicle speed is lower than low speed limit (approximately. 40 km/h (25 mph)) while running with cruise control on<br>• Electronically controlled brake system operates | Push cruise control main switch to + RES |
| | • Vehicle speed is lower than stored speed by approximately 16 km/h (10 mph) or more | Push cruise control main switch to - SET |

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# DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows 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.

NOTICE:

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.

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Cruise Control / Data List.

(e) According to the display on the Techstream, read the Data List.

**Cruise Control (Power Management Control ECU)**

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| CCS Vehicle Spd | Vehicle speed/min.: 0 km/h (0 mph), max.: 255 km/h (159 mph) | Actual vehicle speed is displayed | - |
| CCS Mem Vehicle Spd | Vehicle speed/min.: 0 km/h (0 mph), max.: 255 km/h (159 mph) | Actual vehicle speed stored in memory | - |
| Cruise Control | Cruise control/ON or OFF | ON: Cruise control activated<br><br>OFF: Cruise control deactivated | - |
| Main SW M-CPU | Cruise control switch (M-CPU)/ON or OFF | ON: Cruise main switch on<br><br>OFF: Cruise main switch off | - |
| CCS Ready M-CPU | Cruise control system standby condition (M-CPU)/ON or OFF | Each time main switch is pushed, ON/OFF changes | - |
| CCS Indicator M-CPU | Cruise main indicator (M-CPU)/ON or OFF | ON: Cruise main indicator light on<br><br>OFF: Cruise main indicator light off | - |

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Cancel Switch | CANCEL switch/ON or OFF | ON: CANCEL switch on<br>OFF: CANCEL switch off | - |
| SET/COAST Switch | - SET switch/ON or OFF | ON: - SET switch on<br>OFF: - SET switch off | - |
| RES/ACC Switch | + RES switch/ON or OFF | ON: + RES switch on<br>OFF: + RES switch off | - |
| Stop Light SW M-CPU | Stop light switch signal (Main CPU)/ON or OFF | ON: Brake pedal depressed<br>OFF: Brake pedal released | - |
| Cruise Operation Status | Shift position signal (D position)/ON or OFF | ON: Shift lever in D<br>OFF: Shift lever not in D | - |
| Cruise Request Driving Force | Cruise control driving force signal/min.: -51.2 kN, max.: 51.2 kN | Actual driving force | - |
| # Codes | Number of present trouble codes/min.: 0, max.: 255 | Number of DTCs displayed | - |

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.

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

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

(e) According to the display on the Techstream, perform the "Active Test".

**Combination Meter**

| Tester Display | Test Part | Control Range | Diagnostic Note |
|---|---|---|---|
| Indicat. Lamp Cruise | Cruise main indicator light | ON / OFF | - |

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# DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a trouble code is displayed during the DTC check, inspect the trouble areas listed for that code. For details of the code, refer to the "See page" below.

**Cruise Control System**

| DTC Code | Detection Item | Trouble Area | See page |
|---|---|---|---|
| P0571 | Brake Switch "A" Circuit | - Stop light switch assembly<br>- Stop light switch assembly circuit<br>- Power management control ECU | INFO |
| P0575 | Cruise Control Input Circuit | - Power management control ECU | INFO |
| P1578 | Brake System Malfunction | - Electronically controlled brake system | INFO |
| U0122 | Lost Communication with Vehicle Dynamics Control Module | - Brake booster with master cylinder (skid control ECU)<br>- CAN communication system<br>- Power management control ECU | INFO |

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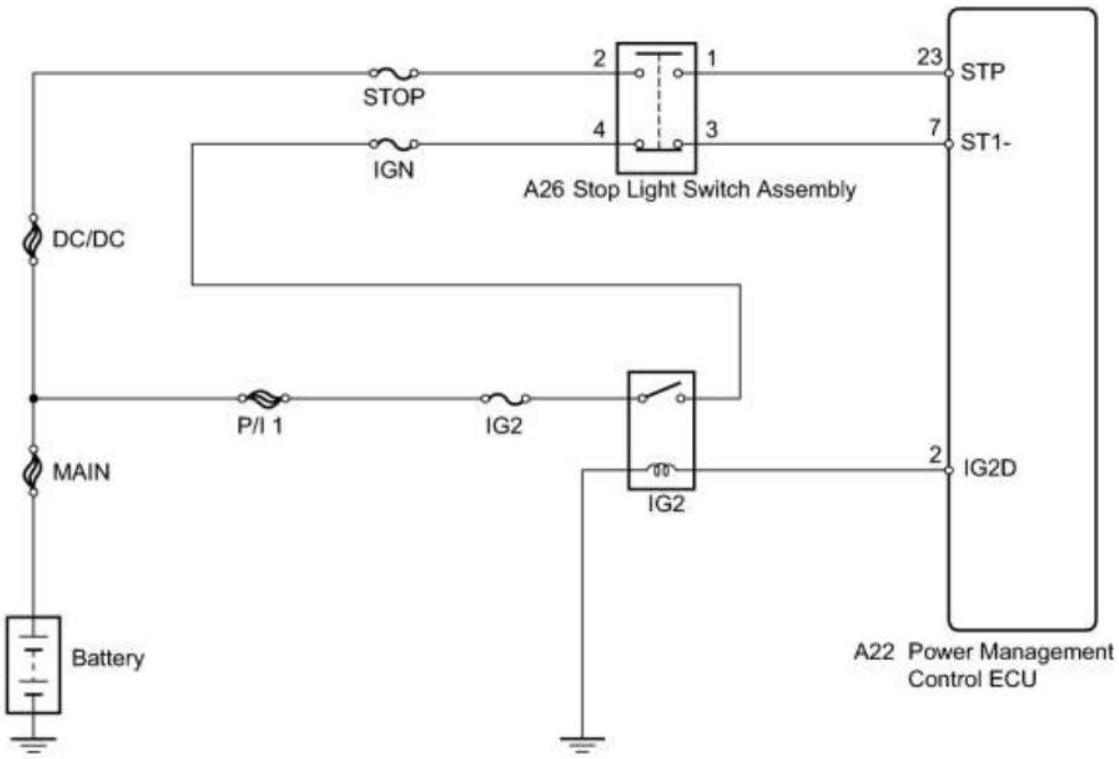
| DTC | P0571 | Brake Switch "A" Circuit |
|---|---|---|

# DESCRIPTION

When the brake pedal is depressed, the stop light switch assembly sends a signal to the power management control ECU. When the power management control ECU receives this signal, it cancels the cruise control. The fail-safe function operates to enable normal driving even if there is a malfunction in the stop light signal circuit. Cruise control cancellation occurs when voltage is applied to terminal STP. When the brake is applied, voltage is normally applied to terminal STP of the power management control ECU through the STOP fuse and the stop light switch assembly, and the power management control ECU turns the cruise control off.

| DTC | DTC Detection Condition | Trouble Area |
|---|---|---|
| P0571 | Voltage of STP signal and that of ST1- signal of power management control ECU are less than 1 V for 0.5 seconds or more | • Stop light switch assembly<br>• Stop light switch assembly circuit<br>• Power management control ECU |

# WIRING DIAGRAM




# INSPECTION PROCEDURE

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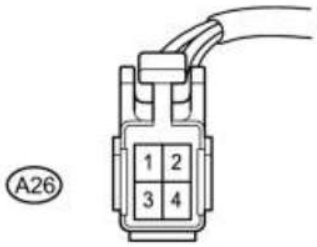
NOTICE:

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

# PROCEDURE

| | |
|---|---|
| 1. | INSPECT STOP LIGHT SWITCH ASSEMBLY (POWER SOURCE) |

*1




(a) Disconnect the stop light switch assembly connector.

N

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

Standard Voltage:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A26-2 - Body ground | Always | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Switch Assembly) |

(c) Reconnect the stop light switch assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - BATTERY)

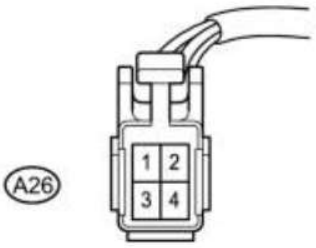
OK ▼

| | |
|---|---|
| 2. | INSPECT STOP LIGHT SWITCH ASSEMBLY (POWER SOURCE) |

(a) Disconnect the stop light switch assembly connector.

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*1




N

(b) Turn the power switch on (IG).

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

Standard Voltage:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| A26-4 - Body ground | Power switch on (IG) | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Switch Assembly) |

(d) Reconnect the stop light switch assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - IG2 RELAY)

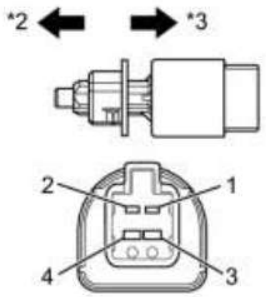
OK ▼

| | |
|---|---|
| 3. | INSPECT STOP LIGHT SWITCH ASSEMBLY |

(a) Remove the stop light switch assembly INFO.

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*1




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

Standard Resistance:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| 1 - 2 | Switch pin not pushed | Below 1 Ω |
| 3 - 4 | Switch pin not pushed | 10 kΩ or higher |
| 1 - 2 | Switch pin pushed | 10 kΩ or higher |
| 3 - 4 | Switch pin pushed | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Component without harness connected<br><br>(Stop Light Switch Assembly) |
| *2 | Not pushed |
| *3 | Pushed |

(c) Reinstall the stop light switch assembly INFO.

NG ▶ REPLACE STOP LIGHT SWITCH ASSEMBLY

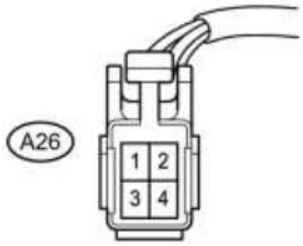
OK ▼

| | |
|---|---|
| 4. | CHECK HARNESS AND CONNECTOR (POWER MANAGEMENT CONTROL ECU - STOP LIGHT SWITCH ASSEMBLY) |

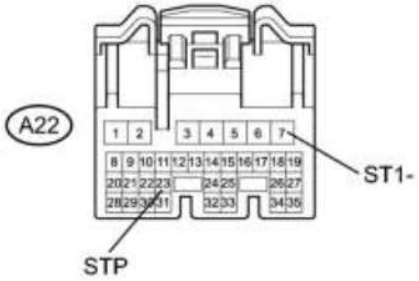
(a) Disconnect the power management control ECU connector.

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*1




*2




(b) Disconnect the stop light switch assembly connector.

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

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A22-23 (STP) - A26-1 | Always | Below 1 Ω |
| A22-7 (ST1-) - A26-3 | Always | Below 1 Ω |

Standard Resistance (Check for Short):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A22-23 (STP) or A26-1 - Body ground | Always | 10 kΩ or higher |
| A22-7 (ST1-) or A26-3 - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br>(to Stop Light Switch Assembly) |
| *2 | Front view of wire harness connector<br>(to Power Management Control ECU) |

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(d) Reconnect the stop light switch assembly connector.

(e) Reconnect the power management control ECU connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER MANAGEMENT CONTROL ECU - STOP LIGHT SWITCH ASSEMBLY)

OK ▶ **REPLACE POWER MANAGEMENT CONTROL ECU**

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| | | |
|---|---|---|
| DTC | P0575 | Cruise Control Input Circuit |

# DESCRIPTION

This DTC indicates the internal abnormalities of the power management control ECU.

| DTC | DTC Detection Condition | Trouble Area |
|---|---|---|
| P0575 | When both of the following conditions are met:<br>• STP signals input to the power management control ECU supervisory CPU and control ECU are different for 0.15 seconds or more<br>• 0.4 seconds have passed after cruise cancel input signal (STP input) is input to the power management control ECU | Power management control ECU |

HINT:

The power management control ECU receives signals from each sensor to control all functions of the cruise control system. When a trouble code is detected, the fail-safe function activates and remains on until the power switch is turned off.

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | READ OUTPUT DTC (P0575) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Clear the DTC INFO.

(e) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch (ON-OFF button) on.

(3) Push the -SET switch to activate the cruise control.

(f) Enter the following menus: Powertrain / Cruise Control / Trouble Codes.

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(g) Read the DTCs.

Result:

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

B ▶ REPLACE POWER MANAGEMENT CONTROL ECU

A ▶ **USE SIMULATION METHOD TO CHECK**

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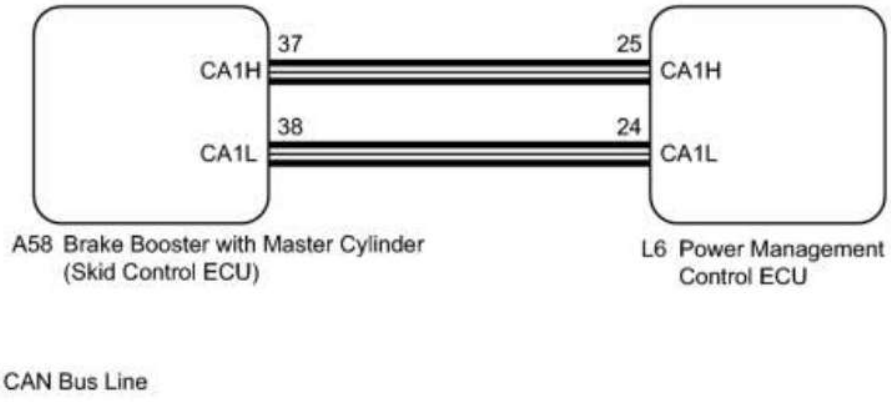
| | | |
|---|---|---|
| DTC | P1578 | Brake System Malfunction |

# DESCRIPTION

This DTC is output when the electronically controlled brake system has a problem. Check the electronically controlled brake system when this DTC is output.

| DTC No. | DTC Detection Condition | Trouble Area |
|---|---|---|
| P1578 | The power management control ECU receives a brake system error signal for 0.2 sec. or more while the cruise control is in operation | Electronically controlled brake system |

# WIRING DIAGRAM




# INSPECTION PROCEDURE

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.

# PROCEDURE

| | |
|---|---|
| 1. | CHECK DTC (ELECTRONICALLY CONTROLLED BRAKE SYSTEM) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

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(d) Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.

(e) Read the DTC.

Result:

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

B GO TO ELECTRONICALLY CONTROLLED BRAKE SYSTEM

A

| | |
|---|---|
| 2. | CHECK WHETHER DTC OUTPUT RECORDS (CRUISE CONTROL SYSTEM) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch (ON-OFF button) on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Cruise Control / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC P1578 is output | B |

B REPLACE BRAKE BOOSTER WITH MASTER CYLINDER

A **USE SIMULATION METHOD TO CHECK**

| | |
|---|---|
| 3. | REPLACE BRAKE BOOSTER WITH MASTER CYLINDER |

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Replace the brake booster with master cylinder (skid control ECU) INFO.

NEXT

▼

| 4. | CHECK WHETHER DTC OUTPUT RECORDS (CRUISE CONTROL SYSTEM) |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Clear the DTC INFO.

(e) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch (ON-OFF button) on.

(3) Push the -SET switch to activate the cruise control.

(f) Enter the following menus: Powertrain / Cruise Control / Trouble Codes.

(g) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC P1578 is output | B |

B ▶ REPLACE POWER MANAGEMENT CONTROL ECU

A ▶ **END**

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| DTC | U0122 | Lost Communication with Vehicle Dynamics Control Module |
|---|---|---|

# DESCRIPTION

The vehicle speed sensor sends the vehicle speed signal to the brake booster with master cylinder (skid control ECU), and then it is sent to the power management control ECU.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| U0122 | While power switch is on (IG), communication stop between brake booster with master cylinder (skid control ECU) and power management control ECU continues for 2.6 seconds or more | • Brake booster with master cylinder (skid control ECU)<br>• CAN communication system<br>• Power management control ECU |

# INSPECTION PROCEDURE

Refer to CAN Communication System INFO.

# PROCEDURE

| 1. | CHECK CAN COMMUNICATION SYSTEM |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Select "Bus Check" from the "System Select".

(c) Select "Communication Malfunction DTC" from the "Bus Check" screen, and then select "Enter".

Result:

| Result | Proceed to |
|---|---|
| CAN communication system DTC is not output | A |
| CAN communication system DTC is output | B |

B ▶ GO TO CAN COMMUNICATION SYSTEM

A ▶ **USE SIMULATION METHOD TO CHECK**

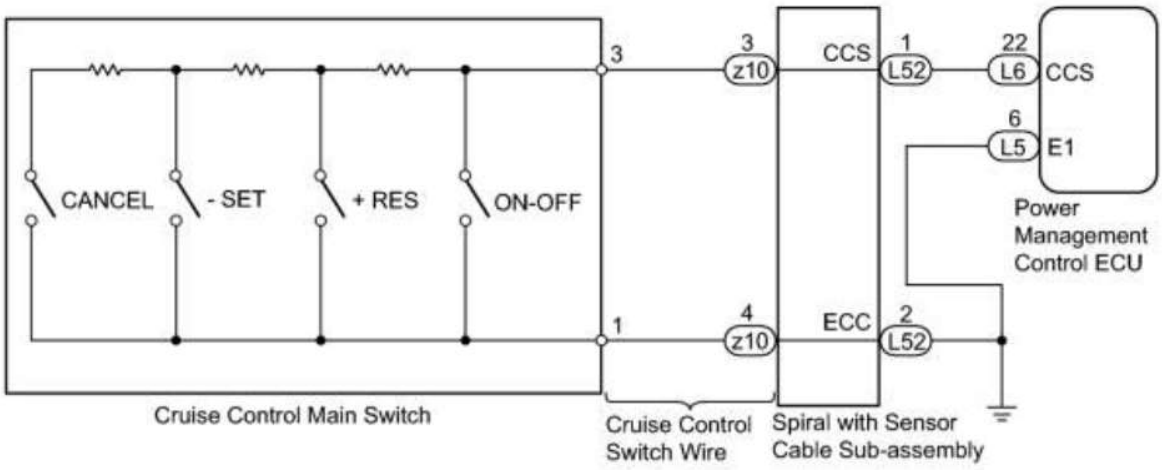
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Cruise Control Switch Circuit

# DESCRIPTION

The cruise control main switch operates 7 functions: SET, -, TAP-DOWN, RES, +, TAP-UP, and CANCEL. The SET, TAP-DOWN, and - functions, and the RES, TAP-UP, and + functions are operated with the same switch. The cruise control main switch is an automatic return type switch which turns on only while it is being operated it in the direction of each arrow and turns off after being released. The internal contact point of the cruise control main switch is turned on with the switch operation. Then the power management control ECU reads the voltage value that has been changed by the switch operation to control SET, -, RES, +, and CANCEL.

# WIRING DIAGRAM



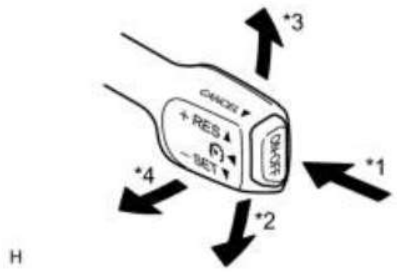

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | READ VALUE USING TECHSTREAM |

(a) Connect the Techstream to the DLC3.

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(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Cruise Control / Data List.

(e) Check the Data List for proper functioning of the cruise control main switch.

**Cruise Control (Power Management Control ECU)**

| Techstream Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Main SW M-CPU | Cruise control switch (Main CPU)/ON or OFF | ON: Cruise main switch (ON-OFF button) on<br><br>OFF: Cruise main switch (ON-OFF button) off | - |
| Cancel Switch | CANCEL switch signal/ON or OFF | ON: CANCEL switch on<br><br>OFF: CANCEL switch off | - |
| SET/COAST Switch | - SET switch signal/ON or OFF | ON: - SET switch on<br><br>OFF: - SET switch off | - |
| RES/ACC Switch | + RES switch signal/ON or OFF | ON: + RES switch on<br><br>OFF: + RES switch off | - |

**Text in Illustration**

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |
| *3 | + RES |
| *4 | CANCEL |

OK:

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

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**Result**

| Result | Proceed to |
|---|---|
| OK | A |
| NG (All items are defective) | B |
| NG (1 to 3 items are defective) | C |

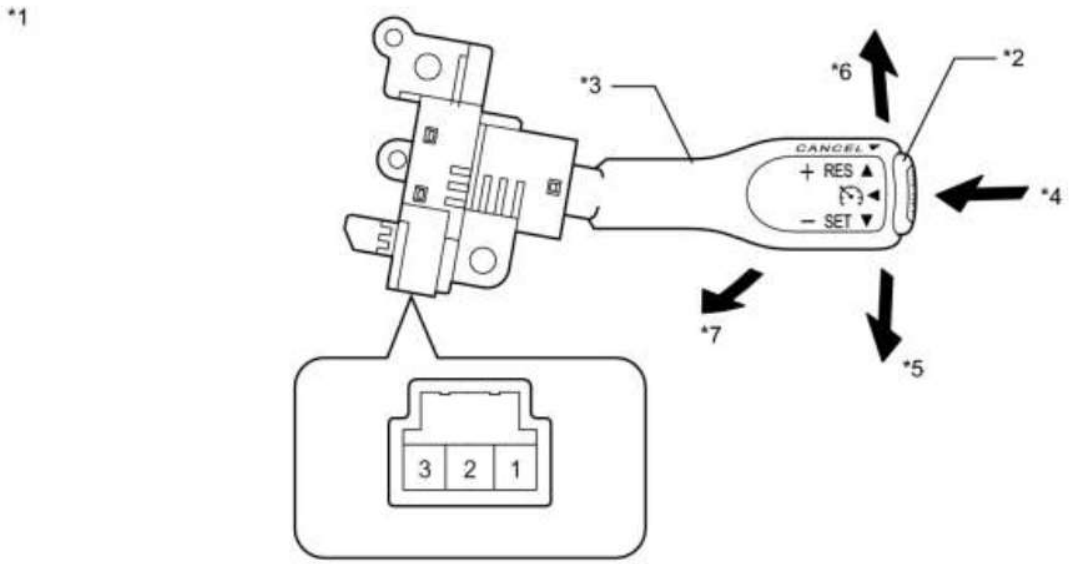
C REPLACE CRUISE CONTROL MAIN SWITCH

B INSPECT CRUISE CONTROL MAIN SWITCH

A **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

| | |
|---|---|
| 2. | INSPECT CRUISE CONTROL MAIN SWITCH |

(a) Remove the cruise control main switch INFO.




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

Standard Resistance:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| 1 - 3 | Main switch off*1 | 1 MΩ or higher |
| | Main switch on | Below 2.5 Ω |
| | + RES | 235 to 245 Ω |
| | - SET | 617 to 643 Ω |
| | CANCEL | 1509 to 1571 Ω |

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*1: The cruise control main switch lever is in the neutral position.

**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Component without harness connected<br><br>(Cruise Control Main Switch) | *2 | Main Switch |
| *3 | Lever | *4 | ON-OFF |
| *5 | - SET | *6 | + RES |
| *7 | CANCEL | - | - |

(c) Install the cruise control main switch INFO.

NG ▶ REPLACE CRUISE CONTROL MAIN SWITCH

OK

▼

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

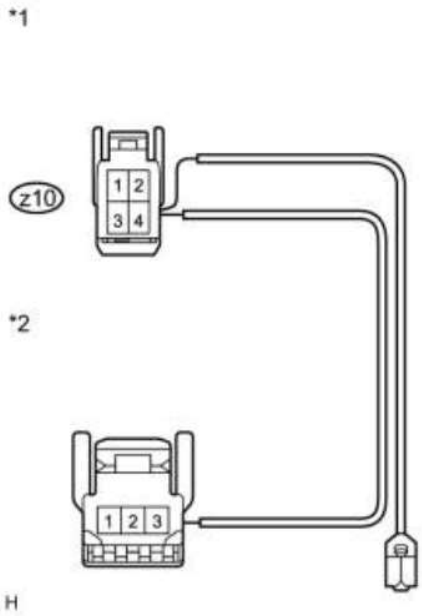
(a) Disconnect the connector from the spiral with sensor cable sub-assembly.

(b) Disconnect the connector from the cruise control main switch.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| Cruise control main switch side connector terminal 3 - z10-3 | Always | Below 1 Ω |
| Cruise control main switch side connector terminal 1 - z10-4 | Always | Below 1 Ω |




**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Spiral with Sensor Cable Sub-assembly) |
| *2 | Front view of wire harness connector<br><br>(to Cruise Control Main Switch) |

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(d) Reconnect the connector to the cruise control main switch.

(e) Reconnect the connector to the spiral with sensor cable sub-assembly.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (CRUISE CONTROL MAIN SWITCH - SPIRAL CABLE SUB-ASSEMBLY)

OK

▼

| 4. | CHECK SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY |
|---|---|

NOTICE:

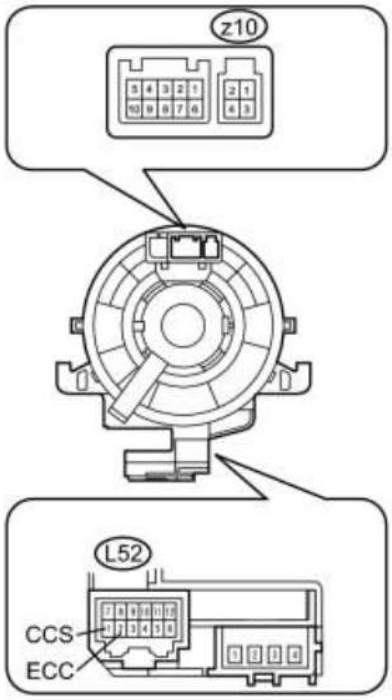
The spiral with sensor cable sub-assembly is an important part of the SRS airbag system. Incorrect removal or installation of the spiral with sensor cable sub-assembly may cause airbag deployment. Be sure to read the page shown in the brackets.

*1

(a) Remove the spiral with sensor cable sub-assembly INFO.

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

Standard Resistance:




| Tester Connection | Condition | Specified Condition |
|---|---|---|
| z10-3 - L52-1 (CCS) | The spiral with sensor cable sub-assembly is centered | Below 1 Ω |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the left | |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the right | |
| z10-4 - L52-2 (ECC) | The spiral with sensor cable sub-assembly is centered | Below 1 Ω |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the left | |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the right | |

**Text in Illustration**

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| | |
|---|---|
| *1 | Component without harness connected<br><br>(Spiral with Sensor Cable Sub-assembly) |

HINT:

The spiral with sensor cable sub-assembly makes a maximum of approximately 5 rotations.

(c) Remove the spiral with sensor cable sub-assembly INFO.

NG ▶ REPLACE SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY

OK

▼

| | |
|---|---|
| 5. | CHECK HARNESS AND CONNECTOR (SPIRAL CABLE SUB-ASSEMBLY - POWER MANAGEMENT CONTROL ECU) |

(a) Disconnect the power management control ECU connector.

(b) Disconnect the spiral with sensor cable sub-assembly connector.

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

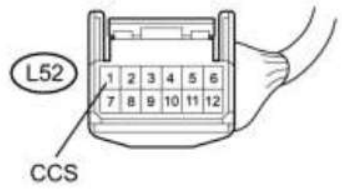
Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L52-1 (CCS) - L6-22 (CCS) | Always | Below 1 Ω |

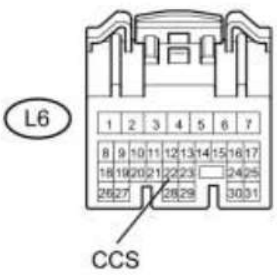
Standard Resistance (Check for Short):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L52-1 (CCS) or L6-22 (CCS) - Body ground | Always | 10 kΩ or higher |

*1




*2




# Text in Illustration

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Spiral with Sensor Cable Sub-assembly) |
| *2 | Front view of wire harness connector<br><br>(to Power Management Control ECU) |

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(d) Reconnect the spiral with sensor cable sub-assembly connector.

(e) Reconnect the power management control ECU connector.

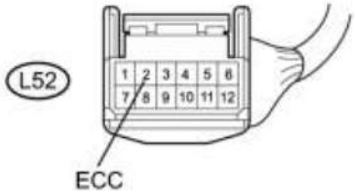
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL CABLE SUB-ASSEMBLY - POWER MANAGEMENT CONTROL ECU)

OK

▼

| | |
|---|---|
| 6. | CHECK HARNESS AND CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - BODY GROUND) |

*1




(a) Disconnect the spiral with sensor cable sub-assembly connector.

c

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L52-2 (ECC) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Spiral with Sensor Cable Sub-assembly) |

(c) Reconnect the spiral with sensor cable sub-assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - BODY GROUND)

OK ▶ **REPLACE POWER MANAGEMENT CONTROL ECU**

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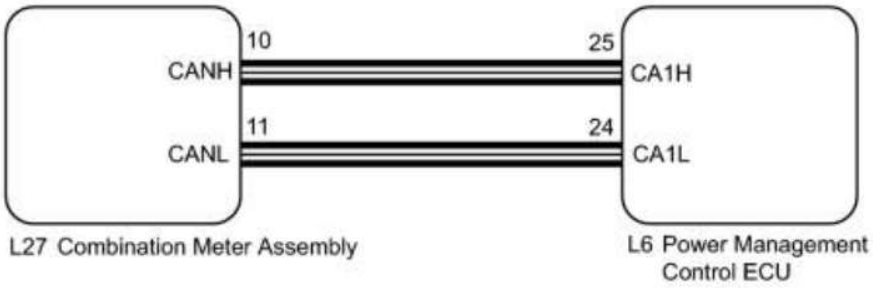
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| Cruise Main Indicator Light Circuit |
|---|

# DESCRIPTION

- The power management control ECU detects a cruise control switch signal and sends it to the combination meter assembly through CAN. Then the cruise main indicator light comes on.
- The cruise main indicator light circuit uses CAN for communication. If there is a malfunction in this circuit, check for DTCs in the CAN communication system before troubleshooting this circuit.

# WIRING DIAGRAM




: CAN Bus Line

# INSPECTION PROCEDURE

# PROCEDURE

| 1. | PERFORM ACTIVE TEST USING TECHSTREAM |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

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

(e) Check the cruise main indicator light by performing the Active Test.

**Combination Meter**

| Techstream Display | Test Part | Control Range | Diagnostic Note |
|---|---|---|---|
| Indicat. Lamp Cruise | Cruise main indicator light | ON / OFF | - |

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OK:

The display changes as shown above according to Active Test operation.

NG ▶ REPLACE NO. 3 METER CIRCUIT PLATE
OK
▼

| | |
|---|---|
| 2. | READ VALUE USING TECHSTREAM |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Cruise Control / Data List.

(e) Check the Data List for proper functioning of the cruise main indicator light.

**Cruise Control**

| Techstream Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| CCS Indicator M-CPU | Cruise main indicator (M-CPU)/ON or OFF | ON: Cruise main indicator light on<br><br>OFF: Cruise main indicator light off | - |

OK:

The display changes as shown above according to cruise control main switch operation.

NG ▶ REPLACE POWER MANAGEMENT CONTROL ECU
OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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| Cruise SET Indicator Light Circuit |
|---|

# DESCRIPTION

- The power management control ECU detects a cruise control switch signal and sends it to the combination meter assembly through CAN. Then the SET indicator light comes on.
- The SET indicator light circuit uses CAN for communication. If there is a malfunction in this circuit, check for DTCs in the CAN communication system before troubleshooting this circuit.

# WIRING DIAGRAM

Refer to "Cruise Main Indicator Light Circuit" INFO.

# INSPECTION PROCEDURE

# PROCEDURE

| 1. | PERFORM ACTIVE TEST USING TECHSTREAM |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

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

(e) Check the SET indicator light by performing the Active Test.

**Combination Meter**

| Tester Display | Test Part | Control Range | Diagnostic Note |
|---|---|---|---|
| Indicat. Lamp SET | CRUISE SET indicator light | SET indicator light BLINK / OFF | - |

OK:

The SET indicator light blinks or goes off according to Techstream operation.

NG ▶ REPLACE NO.3 METER CIRCUIT PLATE

OK ▼

| 2. | READ VALUE USING TECHSTREAM |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

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(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Cruise Control / Data List.

(e) According to the display on tester, read the Data List.

**Cruise control**

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| SET/COAST Switch | - SET switch / ON or OFF | ON: - SET switch ON<br><br>OFF: - SET switch off | - |

OK:

The display changes as shown above according to cruise control main switch operation.

NG ▶ REPLACE POWER MANAGEMENT CONTROL ECU
OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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| TC and CG Terminal Circuit |
|---|

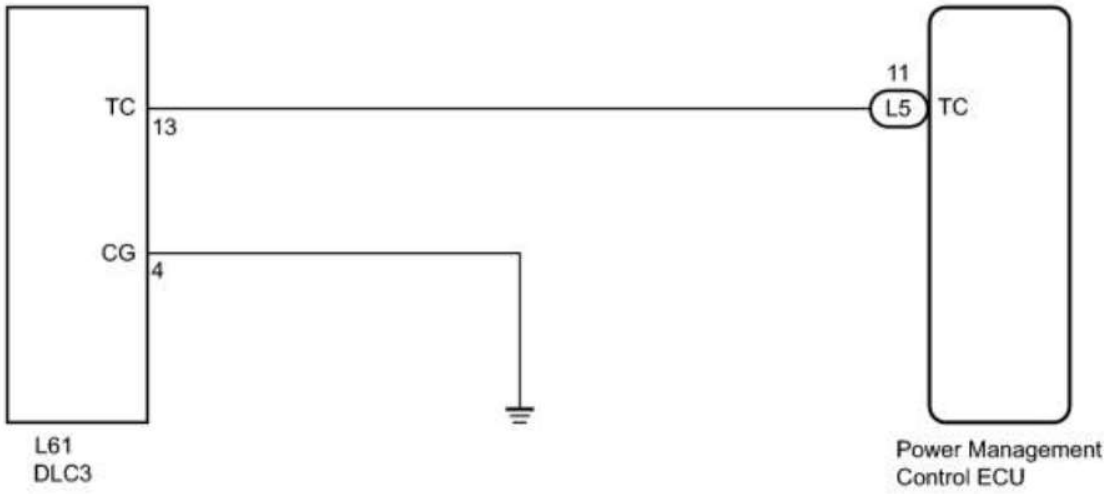
# DESCRIPTION

Connecting terminals TC and CG of the DLC3 causes the system to enter self-diagnostic mode. If a malfunction is present, the cruise main indicator light 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




# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | CHECK HARNESS AND CONNECTOR (TERMINAL TC of DLC3 - POWER MANAGEMENT CONTROL ECU) |

(a) Disconnect the power management control ECU connector.

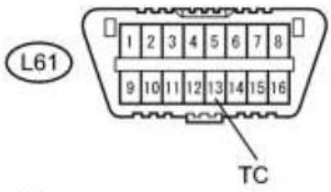
(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

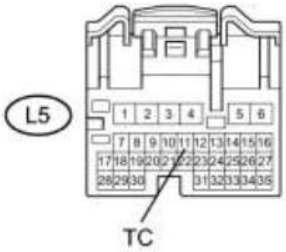
| Tester Connection | Condition | Specified Condition |
|---|---|---|

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| | | | |
|---|---|---|---|
| *1 | L5-11 (TC) - L61-13 (TC) | Always | Below 1 Ω |




*2




**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *2 | Front view of wire harness connector<br><br>(to Power Management Control ECU) |

(c) Connect the power management control ECU connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DLC3 - POWER MANAGEMENT CONTROL ECU)

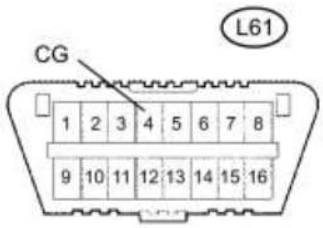
OK

▼

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

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

*1




Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L61-4 (CG) - Body ground | Always | Below 1 Ω |

## Text in Illustration

| | |
|---|---|
| *1 | DLC3 |

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DLC3 - BODY GROUND)

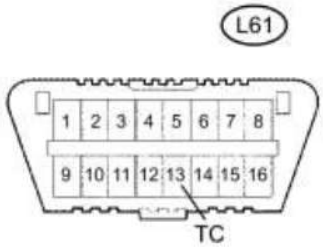
OK

▼

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

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

*1




Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L61-13 (TC) - Body ground | Always | 10 kΩ or higher |

## Text in Illustration

| | |
|---|---|
| *1 | DLC3 |

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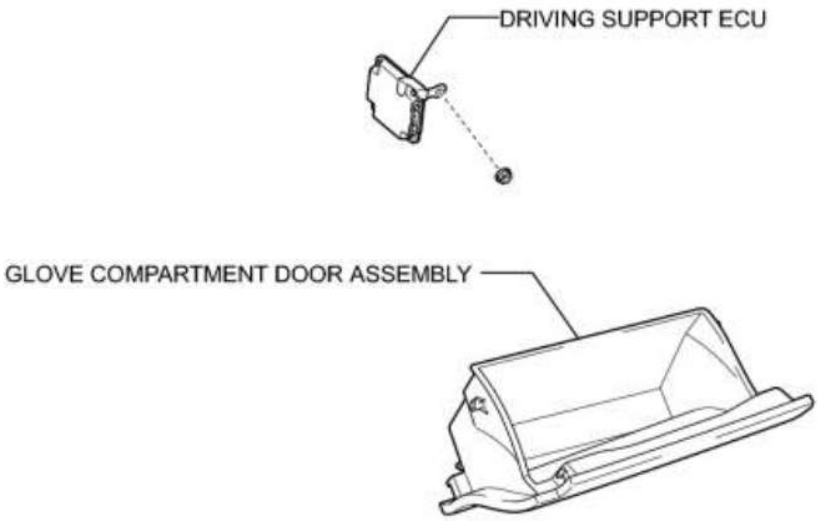
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR OR EACH ECU

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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# COMPONENTS

# ILLUSTRATION



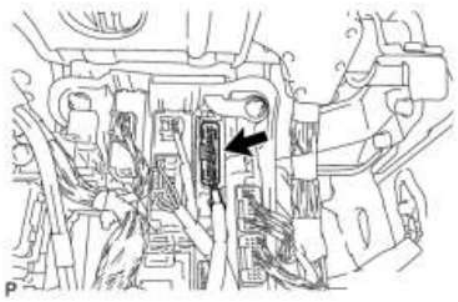

P

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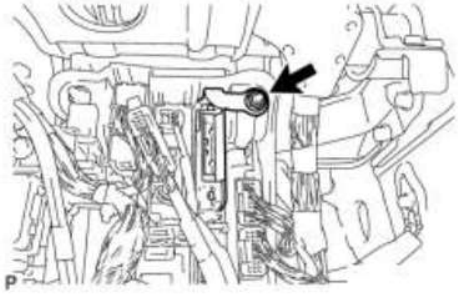
# REMOVAL

1. REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY INFO

2. REMOVE DRIVING SUPPORT ECU



(a) Disconnect the connector.

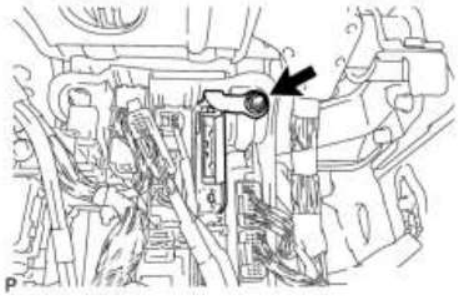


(b) Remove the nut and driving support ECU.

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# INSTALLATION

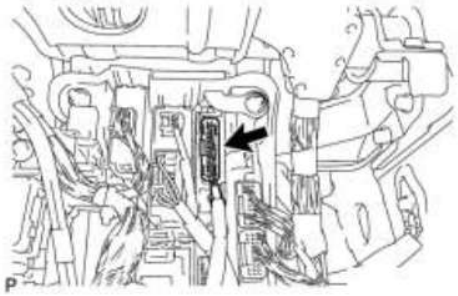
1. INSTALL DRIVING SUPPORT ECU



(a) Install the driving support ECU with the nut.

NOTICE:

Do not install the driving support ECU if it has been damaged or impacted in any way.



(b) Connect the connector.

2. INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY INFO

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# PRECAUTION

1. NOTICE FOR INITIALIZATION

NOTICE:

When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

| System Name | See Procedure |
|---|---|
| Advanced Parking Guidance System | INFO |

2. HANDLING PRECAUTION FOR DYNAMIC RADAR CRUISE CONTROL SYSTEM

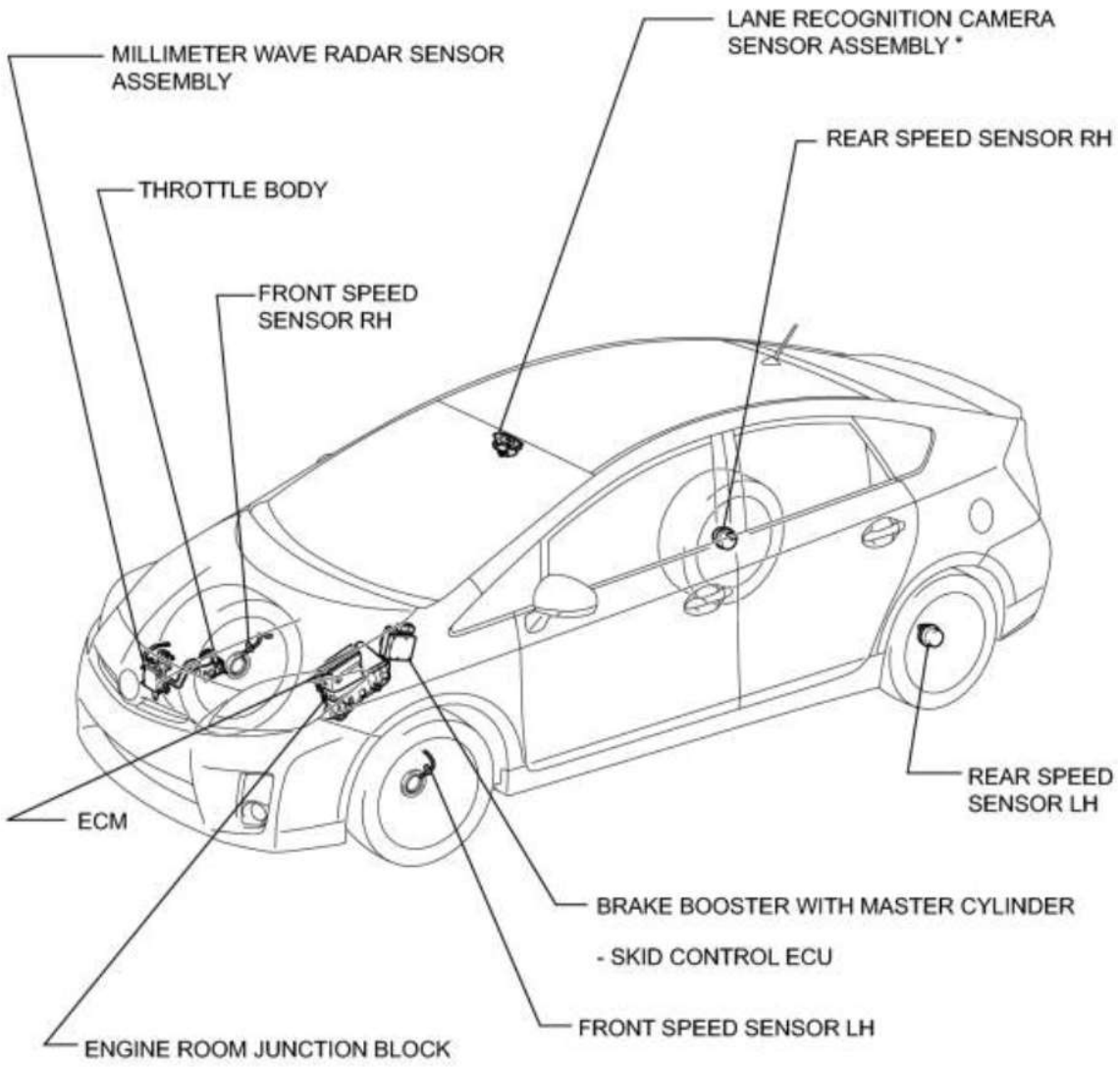
Keep in mind the following points when inspecting the dynamic radar cruise control system.

- 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 to the set speed 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 (ON-OFF button) 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: constant speed control mode and vehicle-to-vehicle distance control mode. Confirm which mode is selected when using the dynamic radar cruise control system.

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# PARTS LOCATION

# ILLUSTRATION

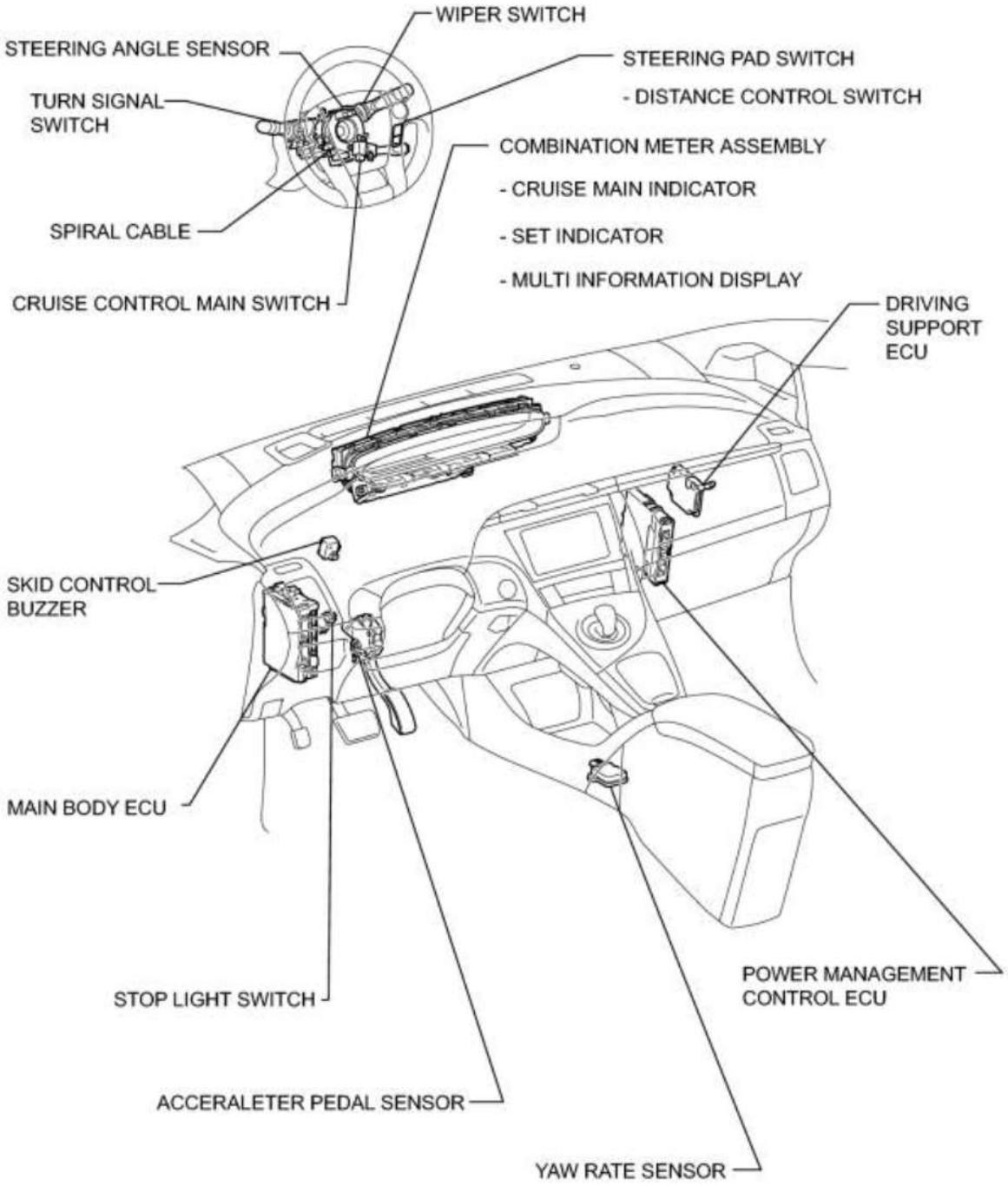



*: with Lane Keeping Assist System

H

# ILLUSTRATION

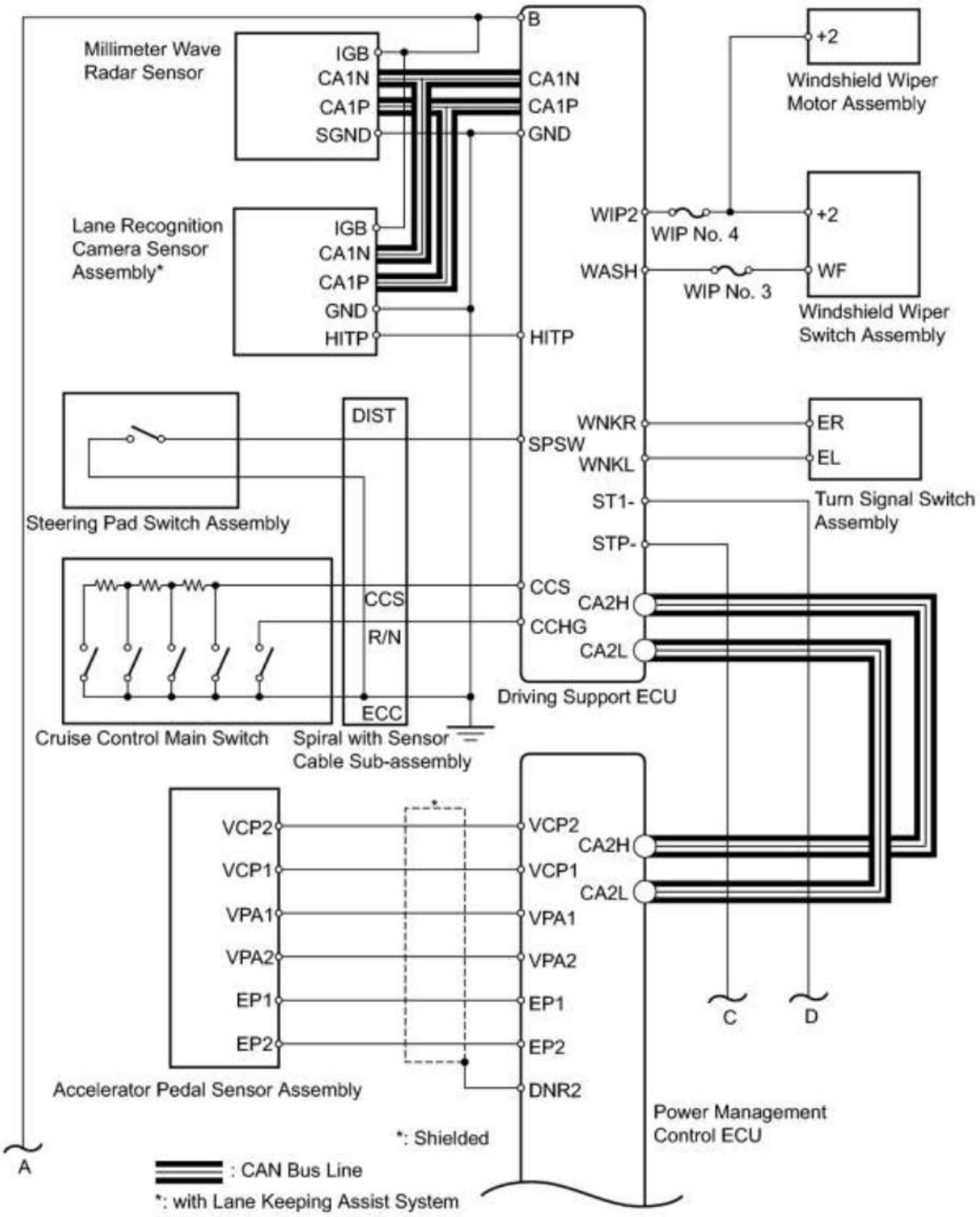
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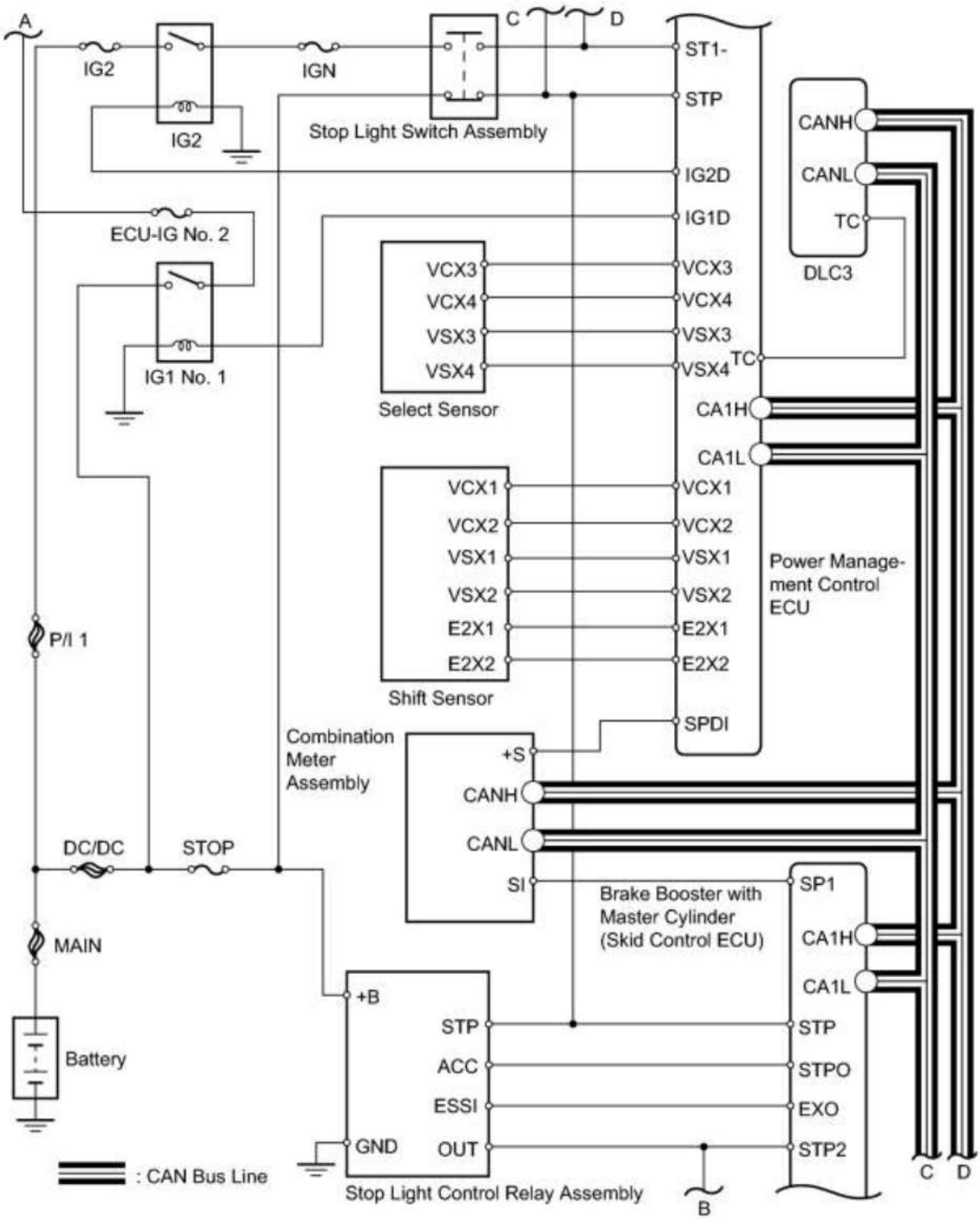

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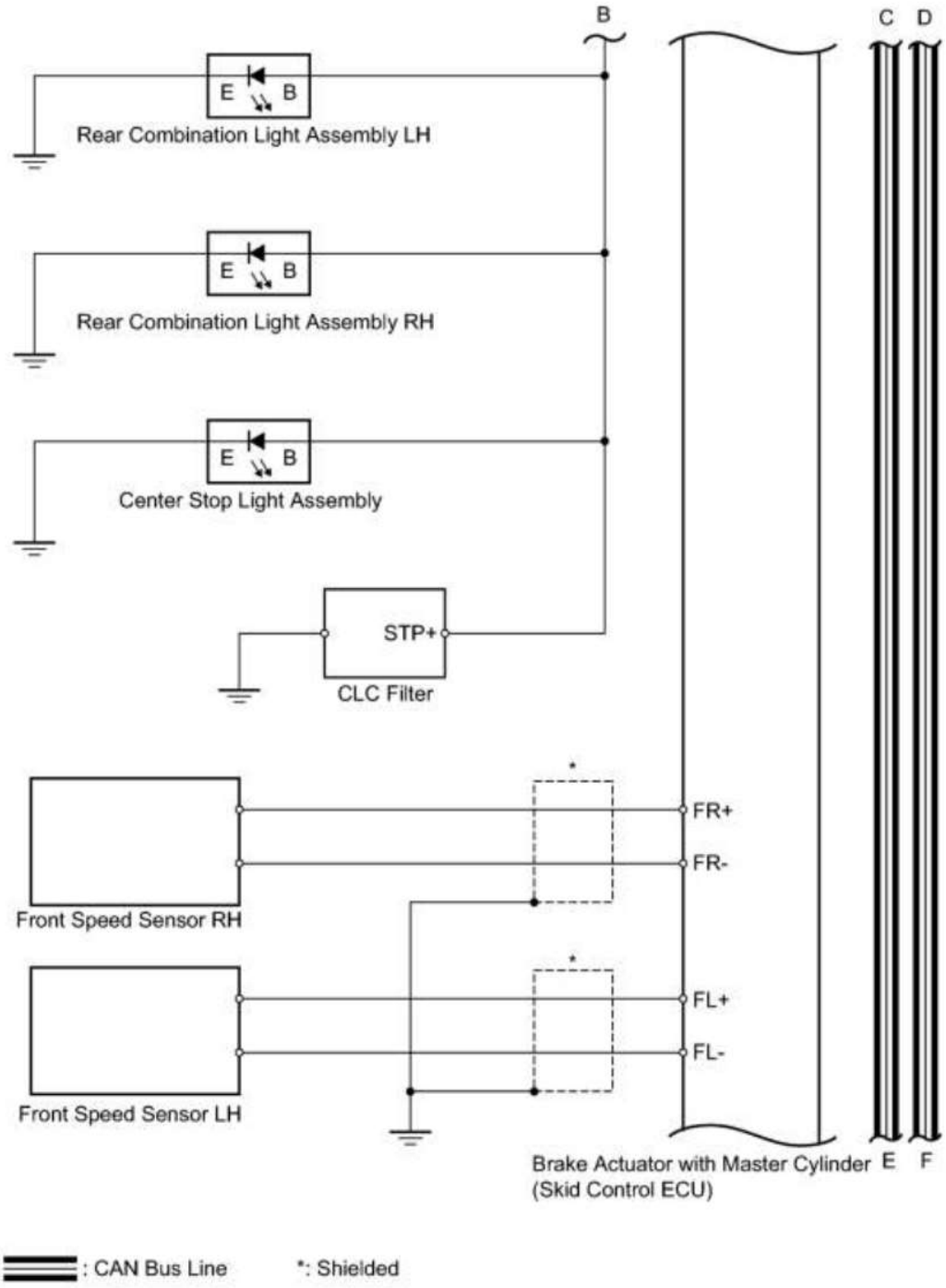
# SYSTEM DIAGRAM



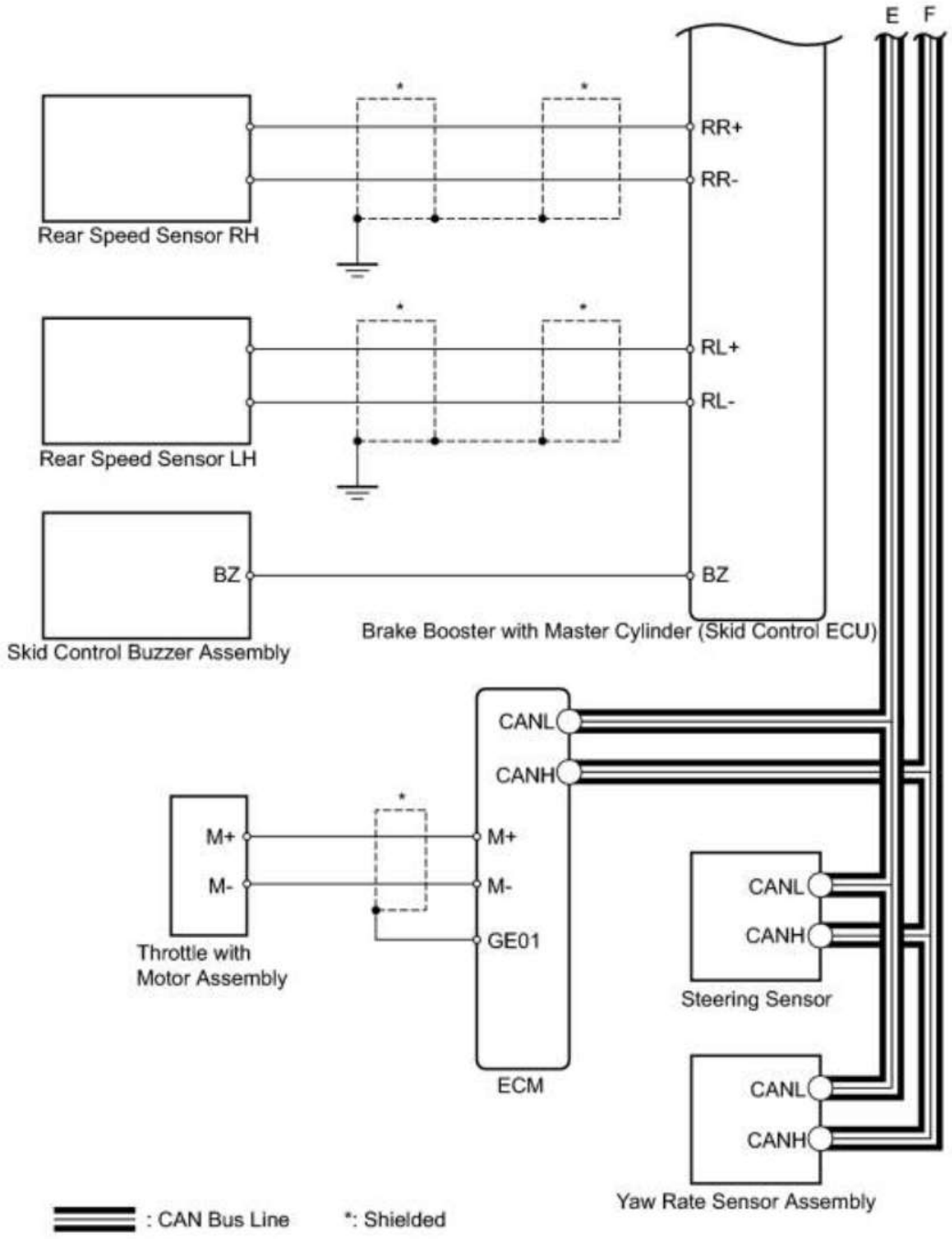

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## Communication Table

| Sender | Receiver | Signal | Line |
|---|---|---|---|
| Power Management Control ECU | Driving Support ECU | Actual driving force signal | CAN |
| | | Accelerator pedal idle position signal | |
| | | Accelerator pedal position signal | |

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| Sender | Receiver | Signal | Line |
|---|---|---|---|
| | | Shift position signal (D and R) | |
| | | Cruise control operation signal | |
| | | Cruise control cancel demand signal | |
| | | Hybrid control system malfunction signal | |
| | | SFI system malfunction signal | |
| Driving Support ECU | Power Management Control ECU | Target driving force signal | CAN |
| | | Forward vehicle relative speed | |
| Brake Booster with Master Cylinder (Skid Control ECU) | Driving Support ECU | Speed signal | CAN |
| | | Speed sensor signal | |
| | | Vehicle acceleration signal | |
| | | Brake control operation signal | |
| | | Electronically controlled brake system malfunction signal | |
| | | Speed sensor warning signal | |
| | | Stop light switch control relay malfunction signal | |
| | | Skid control buzzer malfunction signal | |
| | | Cruise control cancel demand signal | |
| | | Yaw rate sensor zero point signal | |
| Driving Support ECU | Brake Booster with Master Cylinder (Skid Control ECU) | Skid control buzzer operate demand signal | CAN |
| | | Brake control demand signal | |
| Driving Support ECU | Combination Meter Assembly | Vehicle approach warning signal | CAN |
| | | Forward vehicle detection signal | |
| | | Cruise control diagnosis signal | |
| | | Vehice-to-vehicle distance signal | |
| | | Dirt present on millimeter wave radar sensor signal | |
| | | Bad weather detection signal | |
| | | Vehice-to-vehicle distance control signal | |
| | | Vehice-to-vehicle distance control check mode signal | |
| | | Vehice-to-vehicle distance control standby signal | |
| | | Constant speed cruise signal | |

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| Sender | Receiver | Signal | Line |
|---|---|---|---|
| | | Cruise indicator light operation signal | |
| | | Cruise control warning signal | |
| | | Dynamic radar cruise warning signal | |
| | | Cruise control vehicle speed signal | |
| | | Millimeter wave radar sensor beam axis deviation signal | |
| | | Country specification information signal | |
| Combination Meter Assembly | Driving Support ECU | Country specification information signal | CAN |
| Main Body ECU | Driving Support ECU | Country specification information signal | CAN |
| Yaw Rate Signal | Driving Support ECU | Yaw rate signal | CAN |
| | | Yaw rate sensor malfunction signal | |
| Steering Sensor (Built into Spiral with Sensor Cable Sub-assembly) | Driving Support ECU | +B open circuit malfunction signal | CAN |
| | | Steering sensor malfunction signal | |
| | | Steering angle signal | |
| | | Steering signal zero point signal | |

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# SYSTEM DESCRIPTION

1. GENERAL

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

- Vehicle-to-vehicle distance control mode is always selected when starting the dynamic radar cruise control system.
- Operation of 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. 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) 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.

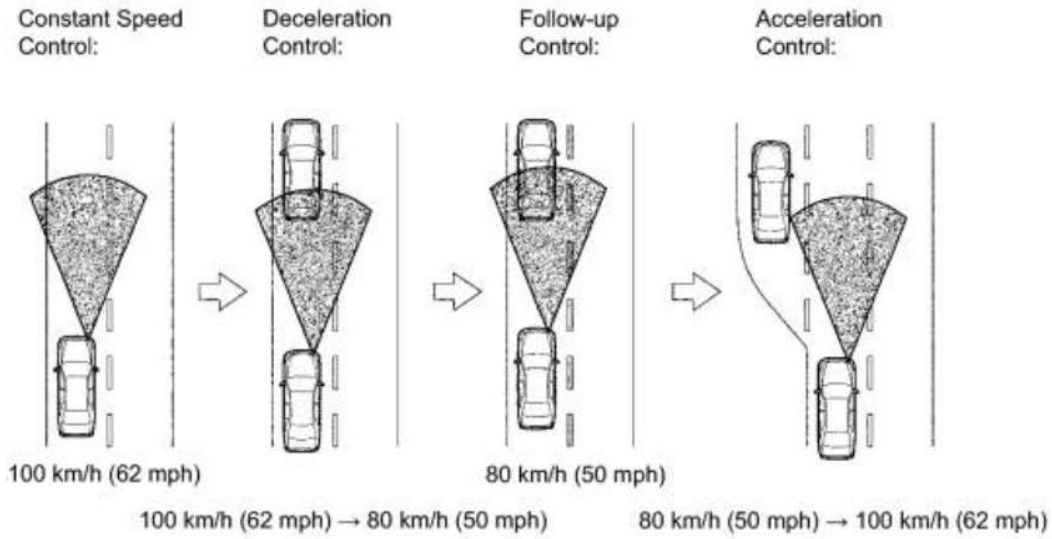
(d) The millimeter wave radar sensor and the driving support ECU control the system while the vehicle-to-vehicle distance control mode is operating, and send signals to each actuator and ECU.

(e) In vehicle-to-vehicle distance control mode, the dynamic radar cruise control system receives signals from the yaw rate 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 vehicle-to-vehicle distance control mode is in operating. 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).

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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 Meter Assembly (Cruise main indicator Light) | • Comes on when the main switch (ON-OFF button) is on<br>• If the driving support ECU detects a malfunction, this light flashes to warn the driver |
| Combination Meter Assembly (Master Warning Light) | If the 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 Assembly (Buzzer) | If the 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 Assembly (Multi-information Display) | • The driving support ECU displays "SET" on the multi-information display when constant speed control is started by pushing the cruise control main switch to "- SET".<br>• While the system is in vehicle-to-vehicle distance control mode, the multi-information display receives signals from the driving support ECU, in order to display system conditions in the graphic area<br>• If the driving support ECU detects a malfunction signal while the vehicle is operating under cruise control, a warning message will be displayed in the warning area to inform the driver |
| Cruise Control Main Switch (ON-OFF button) | Turns the cruise control system on or off |

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| Item | Outline |
|---|---|
| Cruise Control Main Switch (Control Switch) | • Vehicle speed setting, deceleration setting, preset speed resumption, acceleration setting, and cancel signals are output to the driving support ECU through the operation of this switch<br>• Switches the control mode: constant speed control mode and vehicle-to-vehicle distance control mode |
| Steering Pad Switch (Vehicle-to-vehicle Distance Control Switch) | While the system is in vehicle-to-vehicle distance control mode, the driver can operate the steering pad switch (vehicle-to-vehicle distance control switch) to select the vehicle-to-vehicle distance in three stages: long, middle, and short |
| Stop Light Switch Assembly | 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 brake booster with master cylinder (skid control ECU) is sent to the driving support ECU |
| Yaw Rate Sensor | Detects the yaw rate of the vehicle and transmits its signal to the driving support ECU |
| Brake Booster with Master Cylinder (Skid Control ECU) | • Actuates the brakes in accordance with signals from the brake booster with master cylinder (skid control ECU)<br>• While the system is in vehicle-to-vehicle distance control mode, the brake booster with master cylinder (skid control ECU) actuates the brake actuator in accordance with a brake request signal received from the driving support ECU<br>• Upon receiving a signal from the driving support ECU, the brake booster with master cylinder (skid control ECU) sounds the skid control buzzer |
| Skid Control Buzzer | This buzzer sounds upon receiving a signal from the brake booster with master cylinder (skid control ECU) |
| Power Management Control ECU | Controls the dynamic radar cruise control system in accordance with signals from switches, sensors, and the driving support ECU |
| 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 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 brake booster with master cylinder (skid control ECU)<br>• If the driving support ECU detects a malfunction in the dynamic radar cruise control system, it will store DTCs (Diagnostic Trouble Codes) |

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3. LIMIT CONTROL

(a) Low speed limit

The lowest possible limit of the speed setting range is set at approximately 40 km/h (25 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 operating.

(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)

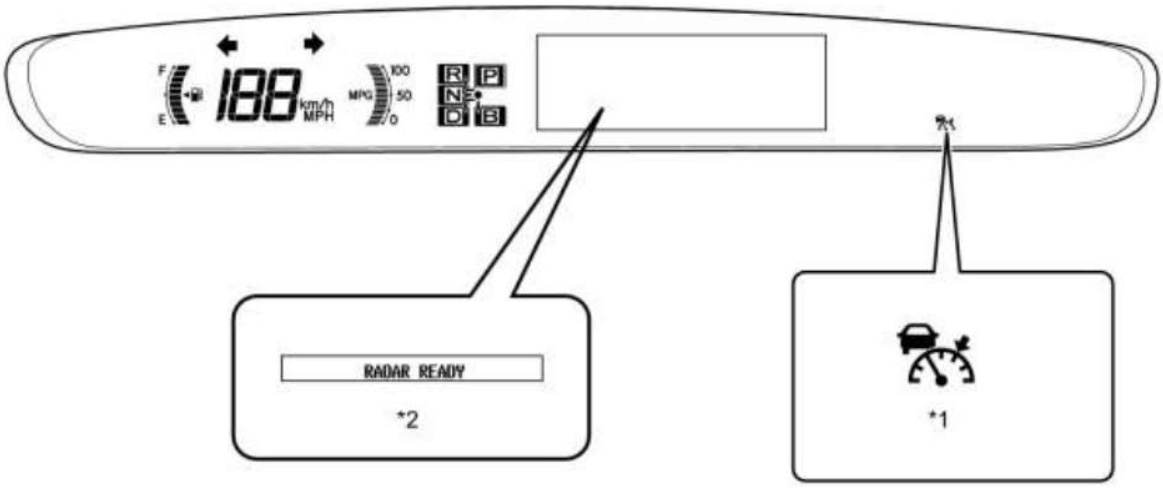
The highest possible limit of the speed setting range is set at approximately 170 km/h (105 mph).

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 "RADAR READY" indicator comes on).

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Cruise Main Indicator Light<br><br>(Vehicle-to-vehicle distance control mode) | *2 | "RADAR READY" Indicator |

- 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 ("RADAR READY" is on) switches the mode to 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 constant speed control mode (cruise main indicator light and "SET" indicator comes on).

## Text in Illustration

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| | |
|---|---|
| *1 | Cruise Main Indicator Light<br><br>(Constant speed control mode) |
| *2 | "SET" Indicator |




(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 ("RADAR READY" is on), and vehicle speed is within the set speed range (between the low and high speed limits) (cruise main indicator light and "SET" indicator comes on).




## Text in Illustration

| | |
|---|---|
| *1 | Cruise Main Indicator Light<br><br>(Vehicle-to-vehicle distance control mode) |
| *2 | "SET" Indicator |

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

The power management control ECU decreases the cruise control demand speed and controls the engine and motor driving force to decelerate the vehicle when - SET on the cruise control main switch is pressed and held while the cruise control system is operating. When the cruise control main switch is released from - SET, vehicle speed is stored and constant speed control is maintained.

(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 or 5 mph per second.

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

When tapping down the cruise control main switch to - SET (for approximately 0.6 seconds or less) while the constant speed control mode is operating, 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)

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When tapping down the cruise control main switch to - SET (for approximately 0.6 seconds or less) while the vehicle-to-vehicle distance control mode is operating, the stored vehicle speed decreases each time by approximately 1.6 km/h or 1 mph.

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

The power management control ECU increases the cruise control demand speed and controls the engine and motor driving force to accelerate the vehicle when + RES on the cruise control main switch is pressed and held while the cruise control system is operating.

When the cruise control main switch is released from + RES, 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 vehicle-to-vehicle distance control mode is operating, the stored vehicle speed increases by approximately 5 km/h or 5 mph per second. 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 or less) while the constant speed control mode is operating, 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 or less) while vehicle-to-vehicle distance control mode is operating, the stored vehicle speed increases each time by approximately 1.6 km/h or 1 mph.

(l) MANUAL CANCEL CONTROL

Performing any of the following cancels the cruise control system while it is operating (the stored vehicle speed in the driving support ECU is maintained).

- Depressing the brake pedal
- Moving the shift lever from D to N or, selecting 3rd, 2nd, or 1st range 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 driving support ECU is not maintained)

(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 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.

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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 brake booster with master cylinder (skid control ECU) via the driving support ECU.

6. AUTO CANCEL (FAIL-SAFE)

This system has an automatic cancellation function (fail-safe) INFO.

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# 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

| | |
|---|---|
| 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

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

(a) 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 INFO GO TO CAN COMMUNICATION SYSTEM

A

| | |
|---|---|
| 4. | CHECK FOR DTC* |

Refer to DTC Check / Clear INFO.

(a) Check for DTCs and note any codes that are output.

(b) Clear the DTCs.

(c) 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 |

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| Result | Proceed to |
|---|---|
| DTC reoccurs | B |

B ▶ INFO GO TO DTC CHART

A ▼

| | |
|---|---|
| 5. | PROBLEM SYMPTOMS TABLE |

Refer to Problem Symptoms Table INFO.

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 8

A ▼

| | |
|---|---|
| 6. | OVERALL ANALYSIS AND TROUBLESHOOTING* |

(a) Terminals of ECU INFO

(b) Data List / Active Test INFO

NEXT ▼

| | |
|---|---|
| 7. | ADJUST, REPAIR OR REPLACE |

NOTICE:

When the millimeter wave radar sensor is replaced with a new one, adjustment of the radar sensor beam axis must be performed INFO.

NEXT ▼

| | |
|---|---|
| 8. | CONFIRMATION TEST |

NEXT ▶ **END**

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# ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

HINT:

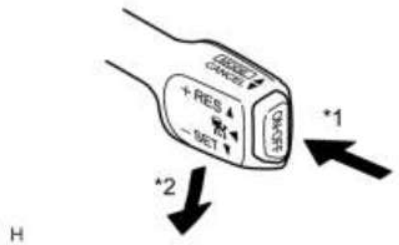
The dynamic radar cruise control system has two cruise control modes: the constant speed control mode and vehicle-to-vehicle distance control mode.

- 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**

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |




(1) Turn the main switch on.

(2) Check that the cruise main indicator light illuminates on the combination meter assembly.

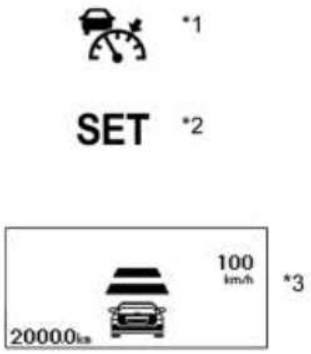
(3) Drive at a speed between 50 km/h (30 mph) and 170 km/h (105 mph).

(4) Push the cruise control main switch to - SET.

## Text in Illustration

| | |
|---|---|
| *1 | Cruise Main Indicator Light |
| *2 | "SET" Indicator |
| *3 | Multi-information Display |

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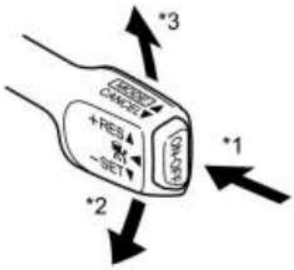

(5) Check that "SET" is indicated on the multi-information display.

(6) After releasing the switch, check that the vehicle cruises at the set speed.

(b) Inspect the + (ACCEL) function.

## Text in Illustration

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |
| *3 | + RES |




(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:

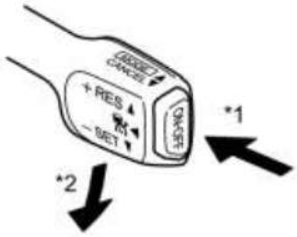
*: Constant speed control mode: increases by 1.6 km/h (1.0 mph); vehicle-to-vehicle distance control mode: increases by 1 km/h or 1 mph.

(c) Inspect the - (COAST) function.

## Text in Illustration

| | |
|---|---|
| *1 | ON/OFF |

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H

| | |
|---|---|
| *2 | - SET |

(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).

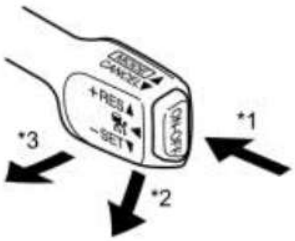
HINT:

*: Constant speed control mode: decreases by 1.6 km/h (1.0 mph); vehicle-to-vehicle distance control mode: decreases by 1.6 km/h or 1 mph.

(d) Inspect the CANCEL function.

## Text in Illustration

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |
| *3 | CANCEL |




(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.

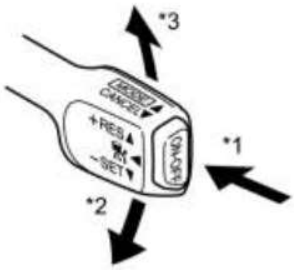
- Depressing the brake pedal
- Moving the shift lever from D to N or selecting shift lever in B
- Turning the main switch off
- Pulling the cruise control main switch to CANCEL

(e) Inspect the RES (RESUME) function.

## Text in Illustration

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |

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| | |
|---|---|
| *3 | + RES |

(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" is also displayed on the multi-information display.

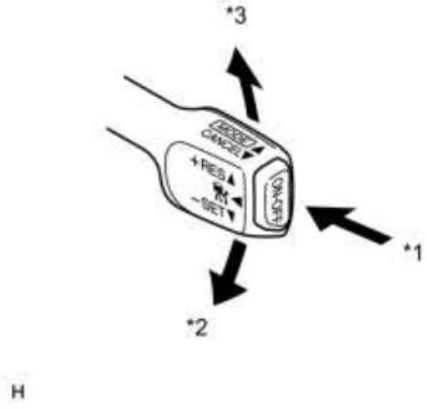
HINT:

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.

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# OPERATION CHECK

1. INPUT SIGNAL CHECK



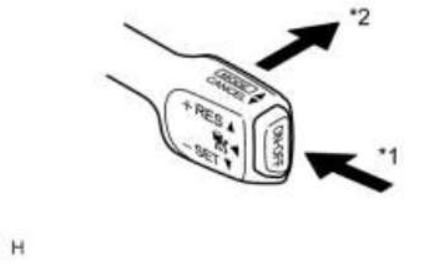

(a) Connect the Techstream to the DLC3.

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

## Text in Illustration

| | |
|---|---|
| *1 | ON/OFF |
| *2 | - SET |
| *3 | + RES |

2. INSPECT MODE SWITCH




(a) Turn the power switch on (IG).

**Text in Illustration**

| | |
|---|---|
| *1 | ON/OFF |
| *2 | 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 "RADAR READY" goes off on the display.

(c) Check that the cruise main indicator light (vehicle-to-vehicle distance control mode) goes off and the cruise main indicator light (constant speed control mode) illuminates.

## Text in Illustration

| | |
|---|---|
| *1 | Multi-information Display |

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| | |
|---|---|
| *2 | Cruise Main Indicator Light<br><br>(Vehicle-to-vehicle distance control mode) |
| *3 | Cruise Main Indicator Light<br><br>(Constant speed control mode) |

NOTICE:

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 power switch off and repeat the procedure above.

3. INSPECT STEERING PAD SWITCH ASSEMBLY

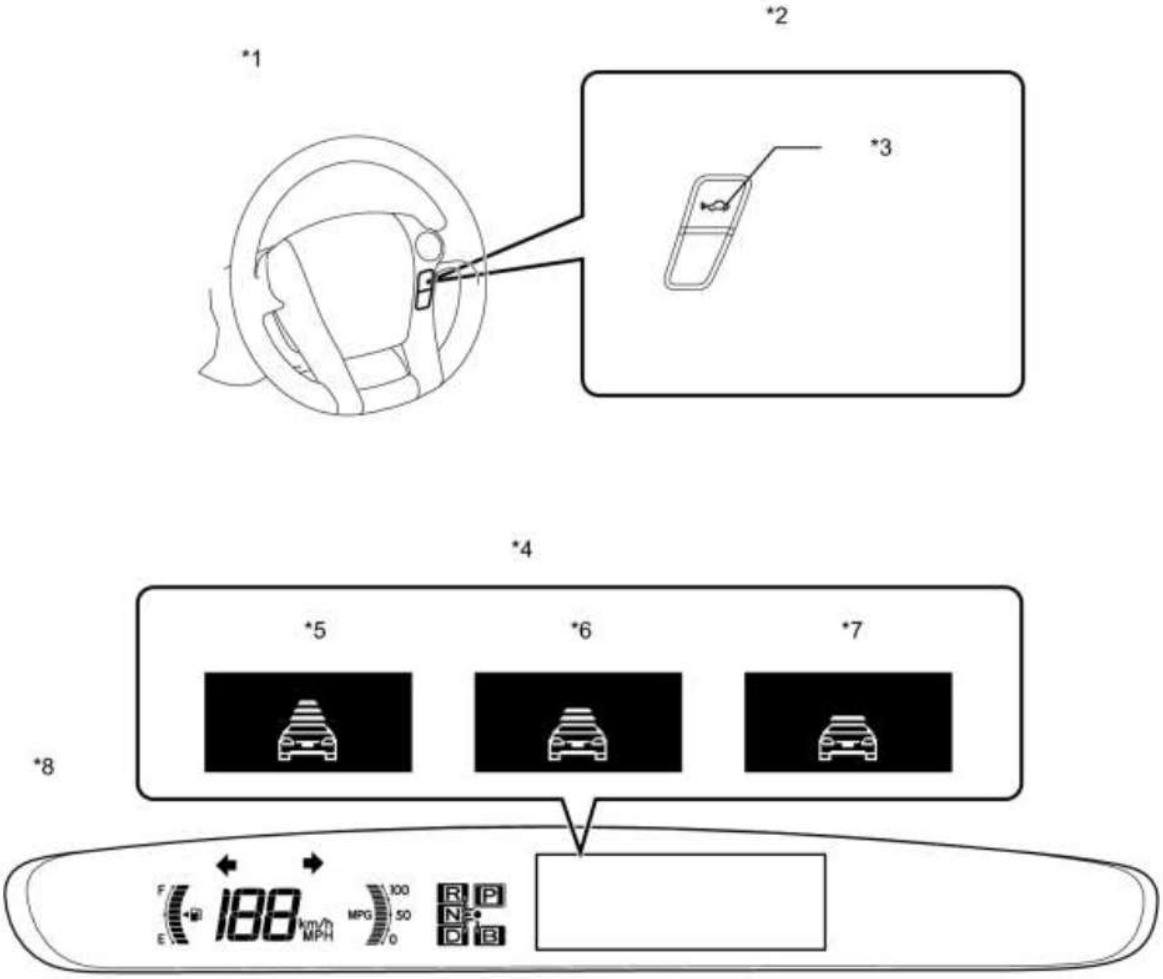
(a) Turn the power switch on (IG).

(b) Turn the cruise control main switch (ON-OFF button) on.

(c) Turn on the vehicle-to-vehicle 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.

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Steering Wheel | *2 | Steering Pad Switch |
| *3 | Distance Control Switch | *4 | Multi-information Display |
| *5 | Long | *6 | Middle |
| *7 | Short | *8 | Combination Meter |

HINT:

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

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# 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 page |
|---|---|---|
| The cruise control main switch (ON-OFF button) cannot be turned on. | Driving support ECU power source circuit | INFO |
| | Cruise control switch circuit | INFO |
| | CRUISE main indicator light circuit | INFO |
| | Power management control ECU | INFO |
| | Driving support ECU | INFO |
| Setting cannot be changed between constant speed control mode and vehicle-to-vehicle distance control mode. | Cruise control switch circuit | INFO |
| | Combination meter assembly | INFO |
| | Driving support ECU | INFO |
| Set distance cannot be changed. | Distance control switch circuit | INFO |
| | Combination meter assembly | INFO |
| | Driving support ECU | INFO |
| Setting cannot be canceled in vehicle-to-vehicle distance control mode. | Combination meter assembly | INFO |
| | Millimeter wave radar sensor assembly | INFO |
| | Driving support ECU | INFO |
| 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 | INFO |
| | Driving support ECU | INFO |
| 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 is | Stop light switch circuit | INFO |
| | Vehicle speed sensor circuit | INFO |

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| Symptom | Suspected Area | See page |
|---|---|---|
| operating.) | Cruise control switch circuit | INFO |
| | Hybrid control system | INFO |
| | Driving support ECU | INFO |
| Vehicle speed setting cannot be performed with the vehicle-to-vehicle distance control mode. (The cruise main indicator light on combination meter illuminates when main switch is turned on, and remains on when SET function is operating.) | Millimeter wave radar sensor | INFO |
| | Stop light switch circuit | INFO |
| | Vehicle speed sensor circuit | INFO |
| | Cruise control switch circuit | INFO |
| | Hybrid control system | INFO |
| | Wiper signal circuit | INFO |
| | Electronically controlled brake system | INFO |
| While vehicle is driven with cruise control on, the control is canceled. | Stop light switch circuit | INFO |
| | Hybrid control system | INFO |
| | Electronically controlled brake system | INFO |
| | Cruise control switch circuit | INFO |
| | Vehicle speed sensor circuit | INFO |
| | Wiper signal circuit | INFO |
| | Driving support ECU | INFO |
| Pulling back on the control main switch does not cancel the cruise control. (The cruise main indicator light remains on.) | Cruise control switch circuit | INFO |
| | Driving support ECU | INFO |
| Pulling back on the control main switch does not cancel the cruise control. (The cruise main indicator light goes off.) | Driving support ECU | INFO |
| 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 | INFO |
| | Driving support ECU | INFO |
| The cruise control is not canceled when vehicle speed drops below the low speed limit. (The cruise main indicator light goes off.) | Driving support ECU | INFO |
| Depressing the brake pedal does not cancel the cruise control. (The cruise main indicator light remains on.) | Stop light switch circuit | INFO |
| | Driving support ECU | INFO |
| Depressing the brake pedal does not cancel the cruise control. (The cruise main indicator light goes off.) | Driving support ECU | INFO |
| Vehicle speed cannot be canceled with wiper HI. (The cruise main indicator | Wiper signal circuit | INFO |

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| Symptom | Suspected Area | See page |
|---|---|---|
| light remains on.) | Driving support ECU | INFO |
| Vehicle speed cannot be canceled with wiper HI. (The cruise main indicator light goes off.) | Driving support ECU | INFO |
| Moving the shift lever does not cancel the cruise control. (The cruise main indicator light remains on.) | Hybrid control system | INFO |
| | Driving support ECU | INFO |
| Moving the shift lever does not cancel the cruise control. (The cruise main indicator light goes off.) | Driving support ECU | INFO |
| Hunting (Speed is not constant.) | Vehicle speed sensor circuit | INFO |
| | SFI system | INFO |
| | Hybrid control system | INFO |
| | Driving support ECU | INFO |
| Even though front millimeter wave radar sensor is not dirty, CLEAN RADAR SENSOR is displayed | Millimeter wave radar sensor assembly is dirty | - |
| | Adjust front millimeter wave radar sensor assembly | INFO |
| | Millimeter wave radar sensor assembly | INFO |
| No information on the multi-information display | Combination meter assembly | INFO |
| Beam axis of millimeter wave radar sensor cannot be adjusted (completed). | Check position, distance and angle of reflector | INFO |
| | Check installation of millimeter wave radar sensor | INFO |
| | Millimeter wave radar sensor assembly | INFO |
| | Driving support ECU | INFO |
| Alarm buzzer does not sound. | Skid control buzzer circuit | INFO |
| | Electronically controlled brake system | INFO |
| | Millimeter wave radar sensor assembly | INFO |
| | Driving support ECU | INFO |
| No brake control (when decelerating) | Electronically controlled brake system | INFO |
| | Driving support ECU | INFO |
| The SET indicator light does not illuminate (SET function operates normally) | Cruise SET indicator light circuit | INFO |

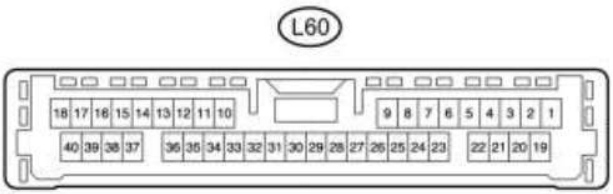
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| Symptom | Suspected Area | See page |
|---|---|---|
| | Driving support ECU | INFO |
| The cruise main indicator light remains blinking | TC and CG terminal circuit | INFO |
| | Driving support ECU | INFO |

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# TERMINALS OF ECU

1. CHECK DRIVING SUPPORT ECU




| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| L60-6 (SPSW) - L60-25 (GND) | R - W-B | Steering pad switch signal<br><br>(distance control signal) | Power switch on (IG)<br><br>Distance control switch off | 10 to 14 V |
| L60-6 (SPSW) - L60-25 (GND) | R - W-B | Steering pad switch signal<br><br>(distance control signal) | Power switch on (IG)<br><br>Distance control switch on | 6 to 7 V |
| L60-10 (CCHG) - L60-25 (GND) | G - W-B | Cruise control main switch signal | Power switch on (IG),<br><br>MODE switch off | 10 to 14 V |
| L60-10 (CCHG) - L60-25 (GND) | G - W-B | Cruise control main switch signal | Power switch on (IG),<br><br>MODE switch on | Below 1 V |
| L60-17 (CA2L) - L60-25 (GND) | W - W-B | CAN communication signal | Power switch on (IG) | Pulse generation<br><br>(See waveform 1) |
| L60-18 (CA1N) - L60-25 (GND) | L - W-B | CAN communication signal | Power switch on (IG) | Pulse generation<br><br>(See waveform 2) |
| L60-23 (CCS) - L60-25 (GND) | V - W-B | Cruise control main switch signal | Power switch on (IG) | 10 to 14 V |
| L60-23 (CCS) - L60-25 (GND) | V - W-B | Cruise control main switch signal | Power switch on (IG),<br><br>CANCEL switch | 6.6 to 10.1 V |

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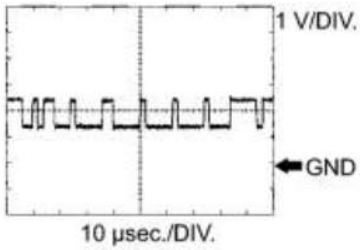
| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| | | | on | |
| L60-23 (CCS) - L60-25 (GND) | V - W-B | Cruise control main switch signal | Power switch on (IG),<br><br>-SET switch on | 4.5 to 7.1 V |
| L60-23 (CCS) - L60-25 (GND) | V - W-B | Cruise control main switch signal | Power switch on (IG),<br><br>+RES switch on | 2.3 to 4.0 V |
| L60-23 (CCS) - L60-25 (GND) | V - W-B | Cruise control main switch signal | Power switch on (IG),<br><br>Main switch on | Below 1 V |
| L60-24 (HITP) - L60-25 (GND) | G - W-B | CAN signal<br><br>(Hi temperature) | Power switch on (IG) | - |
| L60-25 (GND) - Body ground | W-B - Body ground | Earth (ground circuit of driving support ECU) | Always | Below 1 Ω |
| L60-27 (STP-) - L60-25 (GND) | Y - W-B | Stop light signal | Brake pedal released | Below 1 V |
| L60-27 (STP-) - L60-25 (GND) | Y - W-B | Stop light signal | Brake pedal depressed | 7.5 to 14 V |
| L60-28 (ST1-) - L60-25 (GND) | R - W-B | Stop light signal | Power switch on (IG),<br><br>Brake pedal released | 7.5 to 14 V |
| L60-28 (ST1-) - L60-25 (GND) | R - W-B | Stop light signal | Power switch on (IG),<br><br>Brake pedal depressed | Below 1 V |
| L60-30 (+B) - L60-25 (GND) | B - W-B | Power source | Power switch on (IG) | 11 to 14 V |
| L60-32 (WIP2) - L60-25 (GND) | P - W-B | Wiper switch signal | Power switch on (IG),<br><br>Wiper switch off | Below 1 V |
| L60-32 (WIP2) - L60-25 (GND) | P - W-B | Wiper switch signal | Power switch on (IG),<br><br>Wiper switch LO position | 6 to 7 V |
| L60-32 (WIP2) - L60-25 (GND) | P - W-B | Wiper switch signal | Power switch on | 11 to 14 V |

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| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| | | | (IG),<br><br>Wiper switch HI position | |
| L60-39 (CA2H) - L60-25 (GND) | B - W-B | CAN communication signal | Power switch on (IG) | Pulse generation<br><br>(See waveform 3) |
| L60-40 (CA1P) - L60-25 (GND) | Y - W-B | CAN communication signal | Power switch on (IG) | Pulse generation<br><br>(See waveform 4) |

(a) WAVEFORM 1

(1) CAN communication signal



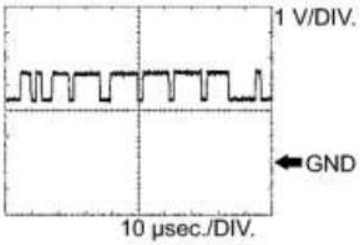

| | |
|---|---|
| Driving support ECU Terminal Name | Between CA2L and GND |
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

HINT:

The waveform varies depending on the CAN communication signal.

(b) WAVEFORM 2

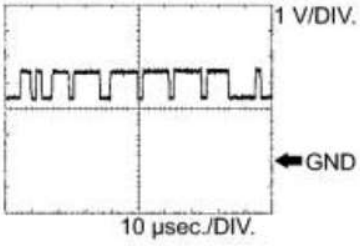
(1) CAN communication signal




| | |
|---|---|
| Driving support ECU Terminal Name | Between CA1N and GND |
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

(c) WAVEFORM 3

(1) CAN communication signal



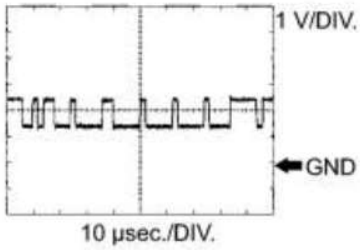

| | |
|---|---|
| Driving support ECU Terminal Name | Between CA2H and GND |
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

HINT:

The waveform varies depending on the CAN communication signal.

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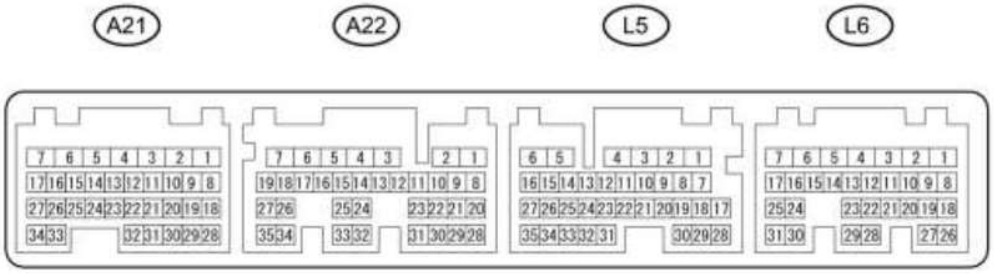
(d) WAVEFORM 4




(1) CAN communication signal

| | |
|---|---|
| Driving support ECU Terminal Name | Between CA1P and GND |
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

2. CHECK POWER MANAGEMENT CONTROL ECU



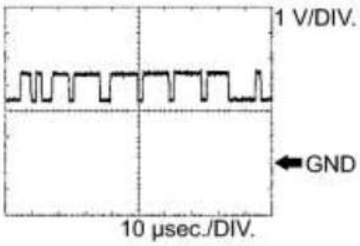

| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| L5-6 (E1) - Body ground | BR - Body ground | Earth (ground) circuit of power management control ECU | Always | Below 1 Ω |
| L5-11 (TC) - L5-6 (E1) | P - BR | Terminal TC of DLC3 | Power switch on (IG) | 11 to 14 V |
| L5-11 (TC) - L5-6 (E1) | P - BR | Terminal TC of DLC3 | Terminals TC and CG of DLC3 connected | Below 1 V |
| L5-34 (CA2H) - L5-6 (E1) | P - BR | CAN communication line | Power switch on (IG) | Pulse generation (see waveform 1) |
| L5-35 (CA2L) - L5-6 (E1) | V - BR | CAN communication line | Power switch on (IG) | Pulse generation (see waveform 2) |
| L6-24 (CA1L) - L5-6 (E1) | W - BR | CAN communication line | Power switch on (IG) | Pulse generation |

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| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| | | | | (see waveform 2) |
| L6-25 (CA1H) - L5-6 (E1) | B - BR | CAN communication line | Power switch on (IG) | Pulse generation<br><br>(see waveform 1) |

(a) WAVEFORM 1

(1) CAN communication signal



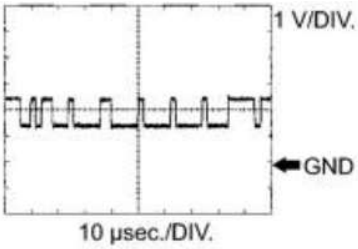

| | |
|---|---|
| Power management control ECU Terminal Name | Between CA1H - E1 or CA2H - E1 |
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

HINT:

The waveform varies depending on the CAN communication signal.

(b) WAVEFORM 2

(1) CAN communication signal




| | |
|---|---|
| Power management control ECU Terminal Name | Between CA1L - E1 or CA2L - E1 |
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

HINT:

The waveform varies depending on the CAN communication signal.

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# DIAGNOSIS SYSTEM

1. DIAGNOSIS FUNCTION

(a) 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 driving support ECU.

**Text in Illustration**

| | |
|---|---|
| *1 | Multi-information Display |
| *2 | Master Warning Light |
| *3 | Cruise Main Indicator Light<br><br>(Constant speed control mode) |
| *4 | Cruise Main Indicator Light<br><br>(Vehicle-to-vehicle distance control mode) |

HINT:

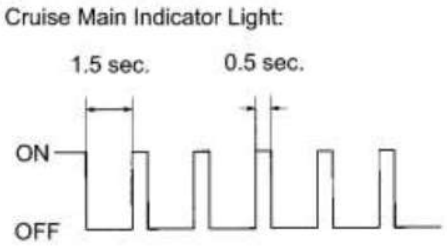
During constant speed control mode, the cruise main indicator light (constant speed control mode) flashes. During vehicle-to-vehicle distance control, the cruise main indicator light (vehicle-to-vehicle distance control mode) flashes.




NOTICE:

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

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2. DESCRIPTION

(a) The driving support ECU 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 either DTC or CRUISE OK is not displayed on the multi-information display on the combination meter assembly when checking for DTCs, there may be a problem with either the combination meter or the CAN communication system. Use the Techstream to check and solve the problem.

3. CHECK DLC3

(a) Check the DLC3 INFO.

4. CHECK INDICATOR




(a) Turn the power switch on (IG).

## Text in Illustration

| | |
|---|---|
| *1 | Multi-information Display |
| *2 | Cruise Main Indicator Light<br><br>(Vehicle-to-vehicle distance control mode) |

(b) Check that the cruise main indicator light and RADAR READY indicator 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.

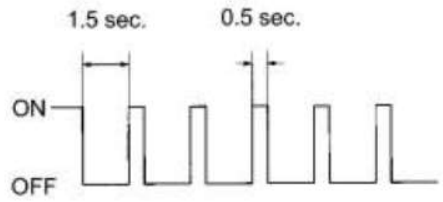
HINT:

- If the indicator check result shows a problem, proceed to troubleshooting the combination meter assembly.
- If a malfunction occurs in the vehicle speed sensors, the stop light switch assembly, 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

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time, the malfunction is stored as a diagnostic trouble code.

Cruise Main Indicator Light:




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# DTC CHECK / CLEAR

1. CHECK DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(e) Read the DTCs.

2. CLEAR DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(e) Clear the DTCs.

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# FAIL-SAFE CHART

1. 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 operating, 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




| | |
|---|---|
| *1 | Multi-information Display |
| *2 | Master Warning Light |
| *3 | Cruise Main Indicator Light<br><br>(Constant speed control mode) |
| *4 | Cruise Main Indicator Light<br><br>(Vehicle-to-vehicle distance control mode) |

| Vehicle Condition | Auto Cancel Condition | Fail-safe Deactivation Condition |
|---|---|---|
| • Cruise main indicator light blinks<br>• Master warning light comes on<br>• "CHECK CRUISE SYSTEM" is displayed<br>• "Pong" warning sound is heard | Millimeter wave radar sensor or driving support ECU country specification information malfunction | Turn cruise control main switch (ON-OFF button) on again |

2. Vehicle-to-vehicle distance control mode:

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

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## Text in Illustration

| | |
|---|---|
| *1 | Multi-information Display |
| *2 | Master Warning Light |
| *3 | Cruise Main Indicator Light<br><br>(Vehicle-to-vehicle distance control mode) |

| Vehicle Condition | Auto Cancel Condition | Fail-safe Deactivation Condition |
|---|---|---|
| • Cruise main indicator light blinks<br>• Master warning light comes on<br>• "CHECK CRUISE SYSTEM" is displayed<br>• "Pong" warning sound is heard | • Open or short in stop light switch circuit<br>• Problem with vehicle speed signal<br>• There is problem with millimeter wave radar sensor<br>• Beam axis of millimeter wave radar sensor deviates<br>• Other than condition above dynamic radar cruise control system malfunction<br>• Malfunction in the hybrid vehicle control system | Power switch on (IG) again |

3. Vehicle-to-vehicle distance control mode:

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




## Text in Illustration

| | |
|---|---|
| *1 | Multi-information Display |
| *2 | Master Warning Light |
| *3 | Cruise Main Indicator Light<br><br>(Vehicle-to-vehicle distance control mode) |

| Vehicle Condition | Auto Cancel Condition | Fail-safe Deactivation Condition |
|---|---|---|
| • Master warning light | There is dirt on millimeter wave radar | Recover from condition on left |

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| | | |
|---|---|---|
| comes on<br>• Cruise main indicator light blinks<br>• "CLEAN RADAR SENSOR" is displayed<br>• "Pong" warning sound is heard | sensor | (RESUME operation is possible after recovery) |
| • Cruise main indicator light blinks<br>• Master warning light comes on<br>• "CRUISE NOT AVAILABLE " is displayed<br>• "Pong" warning sound is heard | • Wiper switch is in HI position<br>• Millimeter wave radar sensor is least sensitive because of bad weather such as rain, fog, snow, and sandstorms | • Recover from condition on left (RESUME operation is possible after recovery)<br>• Turn cruise control main switch on again |

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 operating, 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 goes off | • Vehicle speed is lower than low speed limit (approximately 40 km/h (25 mph)) while cruise control is operating<br>• Constant Speed Control Mode:<br>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 |

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# DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows 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.

NOTICE:

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.

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Entire the following menus: Powertrain / Radar Cruise / Data List.

(e) According to the display on the Techstream, read the "Data List".

**Radar Cruise**

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Cruise Control Main Switch | Cruise control switch signal/ON or OFF | ON: Main switch on<br>OFF: Main switch off | - |
| RES/ACC Switch | +RES switch signal/ON or OFF | ON: +RES switch on<br>OFF: +RES switch off | - |
| SET/COAST Switch | -SET switch signal/ON or OFF | ON: -SET switch on<br>OFF: -SET switch off | - |
| Distance Control Switch | Distance control switch signal/ON or OFF | ON: Distance control switch on<br>OFF: Distance control switch off | - |
| PCS Brake OFF Switch | Pre-collision cancel switch status/ON or OFF | ON: Pre-collision cancel switch on<br>OFF: Pre-collision cancel switch off | - |
| Cruise Control | Cruise control system operation | ON: Cruise control system | - |

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| | signal/ON or OFF | operating<br><br>OFF: Cruise control system not operating | |
| Constant Speed Mode | Constant speed mode signal/ON or OFF | ON: Dynamic radar cruise control system is in constant speed mode<br><br>OFF: Dynamic radar cruise control system is in vehicle-to-vehicle distance control mode | - |
| Cruise Control Mode | Cruise control mode signal/All Spd, Hi Spd or Normal | All Spd: Vehicle-to-vehicle distance control mode (w/ full-speed following function)<br><br>Hi Spd: Vehicle-to-vehicle distance control mode (w/o full-speed following function)<br><br>Normal: Constant speed mode | - |
| CCS Mem Vehicle Spd | Cruise control memorized speed/min.: 0 km/h (0 mph), max.: 320 km/h (199 mph) | Memorized speed: Cruise control activated | - |
| Vehicle Distance | Distance to vehicle in front/min.: 0 m (0 ft.), max.: 255 m (836.65 ft.) | Actual distance to vehicle | - |
| Stop Light SW 1 (M CPU) | Stop light switch (Main-CPU) signal/ON or OFF | ON: Brake pedal depressed<br><br>OFF: Brake pedal released | - |
| Stop Light SW 1 (S CPU) | Stop light switch (Sub-CPU) signal/ON or OFF | ON: Brake pedal depressed<br><br>OFF: Brake pedal released | - |
| Stop Light SW 2 (M CPU) | Stop light switch (Main-CPU) signal/ON or OFF | ON: Brake pedal depressed<br><br>OFF: Brake pedal released | - |
| Wiper (Hi) | Windshield wiper switch Hi signal/ON or OFF | ON: Windshield wiper switch Hi position<br><br>OFF: Windshield wiper switch except Hi position | - |
| Wiper (Lo) | Windshield wiper switch Lo signal/ON or OFF | ON: Windshield wiper switch Lo position<br><br>OFF: Windshield wiper switch except Lo position | - |
| Tail Light | Tail light switch signal/ON or OFF | ON: Tail light switch on<br><br>OFF: Tail light switch off | - |

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Vhcl Spd Calc-Whl Spd | Vehicle speed/min.: -327 km/h (-203 mph), max.: 327 km/h (204 mph) | Actual vehicle speed | - |
| Vhcl Spd-Brake ECU | Vehicle speed/min.: -327 km/h (-203 mph), max.: 327 km/h (204 mph) | Actual vehicle speed | - |
| Invalid Whl Spd Sens Num | Invalid wheel speed sensor/min.: 0, max.: 255 | Actual invaild wheel speed sensor | - |
| Rear Whl Spd LH Sensor | Rear speed sensor LH signal/Normal or Abnormal | Normal: Rear speed sensor LH is normal<br><br>Abnormal: Rear speed sensor LH is abnormal | - |
| Rear Whl Spd RH Sensor | Rear speed sensor RH signal/Normal or Abnormal | Normal: Rear speed sensor RH is normal<br><br>Abnormal: Rear speed sensor RH is abnormal | - |
| Front Whl Spd LH Sensor | Front speed sensor LH signal/Normal or Abnormal | Normal: Front speed sensor LH is normal<br><br>Abnormal: Front speed sensor LH is abnormal | - |
| Front Whl Spd RH Sensor | Front speed sensor RH signal/Normal or Abnormal | Normal: Front speed sensor RH is normal<br><br>Abnormal: Front speed sensor RH is abnormal | - |
| Vehicle Acceleration | Vehicle acceleration/min.: -5 m/s2, max.: 5 m/s2 | Actual vehicle acceleration | - |
| Whl Spd/Deceleration Sen | Wheel speed sensor/Deceleration sensor signal/Avail or Not Avail | Avail: Wheel speed sensor/Deceleration sensor availed<br><br>Not Avail: Wheel speed sensor/Deceleration sensor not availed | - |
| Closed Throttle Position | Accelerator pedal idle position signal/ON or OFF | ON: Accelerator pedal released<br><br>OFF: Accelerator pedal depressed | - |
| Yaw Rate Sensor | Yaw rate value/min.: -100 deg/s, max.: 100 deg/s | Actual yaw rate value | - |
| Deceleration Sensor 1 | Deceleration value/min.: -14.7 m/s2, max.: 14.7 m/s2 | Actual deceleration value | - |
| Deceleration Sensor 2 | Deceleration value/min.: -14.7 m/s2, max.: 14.7 m/s2 | Actual deceleration value | - |
| Tar Accel for ACC | Target vehicle acceleration for vehicle-to-vehicle distance control mode/min.: -5.12 | Actual target vehicle acceleration | - |

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| | m/s2, max.: 5.12 m/s2 | | |
| Tar Accel for CCS | Target vehicle acceleration for constant speed mode/min.: -5.12 m/s2, max.: 5.12 m/s2 | Actual target vehicle acceleration | - |
| Request Driving Force | Cruise control system request driving force/min.: -65536 N, max.: 65534 N | Actual request driving force | - |
| ECM/PCM Command | Origin of the driving force request/Pedal, None or DS | Pedal: Accelerator pedal depressed<br><br>None: Driving force not requested<br><br>DS: Radar cruise control system operating | - |
| Max Val of Available DF | Maximum value of available driving force/min.: -65536 N, max.: 65534 N | Actual available driving force maximum value | - |
| Min Val of Available DF | Minimum value of available driving force/min.: -65536 N, max.: 65534 N | Actual available driving force minimum value | - |
| Forward Vhcl Relative Spd | Vehicle ahead relative speed/min.: -128 m/s, max.: 127 m/s | Actual vehicle ahead relative speed | - |
| Vehicle Approach Warning | Forward vehicle approach warning signal/ON or OFF | ON: Forward vehicle approach<br><br>OFF: Forward vehicle not approach | - |
| Vhcl Stability Ctrl Buzz | Skid control buzzer operation signal/ON or OFF | ON: Skid control buzzer operating<br><br>OFF: Skid control buzzer not operating | - |
| Brk Rqst to Elec Ctrl Brk | Braking request to brake control/Not Ctrl, None, Exist, None , Exist or Disable | Driving support ECU control demand | - |
| Forward Vehicle Detect | Vehicle ahead detection signal/Detect or No Dtct | Detect: Vehicle ahead detected<br><br>No Dtct: Vehicle ahead not detected | - |
| CCS Main SW-Ready | Dynamic radar cruise control system standby condition/ON or OFF | ON: Dynamic radar cruise control system standby<br><br>OFF: Dynamic radar cruise control system not standby | - |
| CCS System Check | Multi-information display "Cruise Control System Check" display signal/ON or OFF | ON: "Cruise Control System Check" displayed<br><br>OFF: "Cruise Control System Check" not displayed | - |
| FRS-Dirt | Memorized dirt on millimeter wave radar sensor history | ON: Dirt on millimeter wave radar | - |

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| | | sensor history memorized<br><br>OFF: Dirt on millimeter wave radar sensor history not memorized | |
| Bad Wthr Hist(F Radar Sen) | Memorized millimeter wave radar sensor bad weather history/ON or OFF | ON: Millimeter wave radar sensor bad weather history memorized<br><br>OFF: Millimeter wave radar sensor bad weather history not memorized | - |
| Frnt Radar Sens Temp Hi | Millimeter wave radar sensor high temperature abnormality/ON or OFF | ON: Millimeter wave radar sensor abnormal<br><br>OFF: Millimeter wave radar sensor normal | - |
| CCS Cancel by Low Spd | Dynamic radar cruise control system (constant speed mode) low speed cancel signal/ON or OFF | ON: Low speed cancel signal ON<br><br>OFF: Low speed cancel signal OFF | - |
| Cancl CCS by Com Delay | Dynamic radar cruise control system (constant speed mode) cancel signal/ON or OFF | ON: Cancel signal ON<br><br>OFF: Cancel signal OFF | - |
| Cancl CCS by RAM Malfnc | Dynamic radar cruise control system (constant speed mode) cancel signal/ON or OFF | ON: Cancel signal ON<br><br>OFF: Cancel signal OFF | - |
| A-CCS Cancl-Radar/Wip | Dynamic radar cruise control system (vehicle-to vehicle distance control mode) cancel signal/ON or OFF | ON: Cancel signal ON<br><br>OFF: Cancel signal OFF | - |
| Country# (F Radar Sens) | Millimeter wave radar sensor country signal/JPN, NA, EURO, AUS SAFC, OTHER, TWN, CHINA, THAI, GCC, NOFIX | Actual country code | - |
| Steering Angle | Steering angle/min.: -3072 deg, max.: 3070.5 deg | Actual steering angle | - |
| Zero Point Angle Sens | Zero point steeromg angle sensor/min.: -3072 deg, max.: 3070.5 deg | Actual zero point steering angle | - |
| Radar | Millimeter wave radar sensor operation signal/Emission or Stop | Emission: Millimeter wave radar sensor signal sent<br><br>Stop: Millimeter wave radar sensor signal stopped | - |
| #Codes | Number of present trouble codes/min.: 0, max.: 255 | Number of DTCs displayed | - |

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2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Test allows relays, VSVs, actuators and parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Test early in troubleshooting is one way to save diagnostic time. Data List information can be display while performing Active Test.

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) For Cruise Main Indicator Light (Combination Meter):

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

(e) For Skid Control Buzzer (ABS/VSC/TRAC):

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

(f) Perform Active Test according to the display on the tester.

HINT:

The power switch must be turned on (IG) to proceed with the Active Test using the Techstream.

**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 |

**ABS/VSC/TRAC**

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

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# DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a trouble code is displayed during the DTC check, inspect the trouble areas listed for that code. For details of the code, refer to the "See page" below.

**Dynamic Radar Cruise Control System**

| DTC Code | Detection Item | Trouble Area | See page |
|---|---|---|---|
| C1A01 | Driving Support ECU | Driving support ECU | INFO |
| C1A02 | Vehicle Information Not Obtained | - Driving support ECU<br>- Main body ECU | INFO |
| C1A03 | Driving Support ECU Internal Logical Error | Driving support ECU | INFO |
| C1A05 | Stop Light Switch Circuit | - Stop light switch assembly<br>- Stop light switch circuit<br>- Driving support ECU | INFO |
| C1A06 | Stop Light Switch Input Circuit | Driving support ECU | INFO |
| C1A0A | Front Radar Sensor Region Code Mismatch | - Millimeter wave radar sensor assembly<br>- Main body ECU<br>- Driving support ECU | INFO |
| C1A0C | Object Recognition Camera Region Code Mismatch | - Lane recognition camera sensor assembly<br>- Driving support ECU | INFO |
| C1A10 | Front Radar Sensor | - Millimeter wave radar sensor assembly<br>- Driving support ECU | INFO |
| C1A11 | Front Radar Sensor Incorrect Axial Gap | - Millimeter wave radar sensor assembly<br>- Driving support ECU | INFO |
| C1A14 | Front Radar Sensor Beam Axis Not Adjusted | - Millimeter wave radar sensor assembly<br>- Driving support ECU | INFO |
| C1A20 | Object Recognition ECU | - Lane recognition camera sensor assembly<br>- Driving support ECU | INFO |
| C1A22 | Object Recognition Camera Incorrect Axial Gap | - Lane recognition camera sensor assembly<br>- Driving support ECU | INFO |

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| DTC Code | Detection Item | Trouble Area | See page |
|---|---|---|---|
| C1A23 | Object Recognition Camera Initialization Incomplete | - Lane recognition camera sensor assembly<br>- Driving support ECU | INFO |
| C1A40 | ENG / EHV Device | - Hybrid control system<br>- Power management control ECU<br>- SFI system<br>- ECM<br>- Driving support ECU | INFO |
| C1A41 | Brake Request Value Mismatch between ENG / EHV and Driving Support ECU | - Electronically controlled brake system<br>- Hybrid control system<br>- Power management control ECU<br>- Brake booster with maser cylinder (skid control ECU)<br>- Driving support ECU | INFO |
| C1A4A | Skid Control Buzzer Circuit | - Electronically controlled brake system<br>- Driving support ECU | INFO |
| C1A4B | Stop Light Relay Circuit | - Stop light control relay<br>- Stop light control relay circuit<br>- Brake booster with maser cylinder (skid control ECU) | INFO |
| C1A50 | Brake System | - Electronically controlled brake system<br>- Driving support ECU | INFO |
| P1615 | Communication Error from Distance Control ECU to HV ECU | - Driving support ECU<br>- Power management control ECU | INFO |
| U0122 | Lost Communication with Vehicle Dynamics Control Module | - Brake booster with maser cylinder (skid control ECU)<br>- CAN communication system<br>- Driving support ECU | INFO |
| U0123 | Lost Communication with Yaw Rate Sensor Module | - Yaw rate sensor | INFO |

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| DTC Code | Detection Item | Trouble Area | See page |
|---|---|---|---|
| | | - CAN communication system<br>- Driving support ECU | |
| U0126 | Lost Communication with Steering Angle Sensor Module | - Steering angle sensor<br>- CAN communication system<br>- Driving support ECU | INFO |
| U0235 | Lost Communication with Cruise Control Front Distance Range Sensor | - Millimeter wave radar sensor assembly<br>- Millimeter wave radar sensor circuit<br>- Driving support ECU | INFO |
| U0293 | Lost Communication with HV ECU | - Power management control ECU<br>- CAN communication system<br>- Driving support ECU<br>- Brake booster with maser cylinder (skid control ECU) | INFO |
| U1104 | Lost Communication with Driving Support ECU | - Driving support ECU<br>- CAN communication system<br>- Millimeter wave radar sensor assembly<br>- Power management control ECU<br>- Brake booster with maser cylinder (skid control ECU) | INFO |
| U1119 | Lost Communication with Object Recognition ECU (CAN) | - Lane recognition camera sensor assembly<br>- CAN communication system<br>- Driving support ECU | INFO |

| DTC | C1A01 | Driving Support ECU |
|---|---|---|

# DESCRIPTION

This DTC indicates the internal abnormalities of the driving support ECU.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A01 | While power switch is on (IG) and dynamic radar cruise control system is operating, | Driving |

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| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| | driving support ECU detects an internal malfunction for 1 sec. | support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | READ OUTPUT DTC |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A01 is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU

A ▶ **USE SIMULATION METHOD TO CHECK**

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| DTC | C1A02 | Vehicle Information Not Obtained |
|---|---|---|

# DESCRIPTION

When the driving support ECU is replaced with a new one, it acquires the country specification information (destination, steering wheel position, etc.) from the main body ECU. When the country specification information in the driving support ECU and main body ECU do not match, DTC C1A02 is output.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A02 | While power switch is on (IG) and dynamic radar cruise control system is operating, driving support ECU does not receive vehicle destination information | • Driving support ECU<br>• Main body ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| 1. | CHECK CAN COMMUNICATION SYSTEM |
|---|---|

(a) Select the "CAN Bus Check" from the "System Selection Menu" screen on the Techstream.

(b) Select "Communication Malfunction DTC" from the "CAN Bus Check" screen, and then select "Enter".

OK:

CAN communication system DTC is not output.

NG ▶ GO TO CAN COMMUNICATION SYSTEM

OK ▼

| 2. | CHECK WHETHER DTC OUTPUT RECURS |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

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(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A02 is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU

A ▶ **USE SIMULATION METHOD TO CHECK**

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| | | |
|---|---|---|
| DTC | C1A03 | Driving Support ECU Internal Logical Error |
| DTC | C1A06 | Stop Light Switch Input Circuit |

# DESCRIPTION

This DTC indicates the internal abnormalities of the driving support ECU.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A03 | Cruise control input signal abnormal | Driving support ECU |
| C1A06 | Stop light switch input signal abnormal | Driving support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | READ OUTPUT DTC |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A03 or C1A06 is output | B |

B REPLACE DRIVING SUPPORT ECU

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A **USE SIMULATION METHOD TO CHECK**

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| | | |
|---|---|---|
| DTC | C1A05 | Stop Light Switch Circuit |
| DTC | C1A4B | Stop Light Relay Circuit |

# DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the driving support ECU. Upon receiving the signal, the driving support ECU cancels the dynamic radar cruise control system. Even if there is a malfunction in the stop light signal circuit while the cruise control is operating, normal driving is maintained due to the fail-safe function. Dynamic radar cruise control is canceled when positive battery voltage is applied to terminal STP-.

When the brake pedal is released, positive voltage is applied to terminal ST1- of the driving support ECU through the IGN fuse and the stop light switch, and the driving support ECU operates the dynamic radar cruise control.

The brake booster with master cylinder (skid control ECU) receives a signal from the driving support ECU and operates the brake actuator. The brake booster with master cylinder (skid control ECU) operates the brake actuator and at the same time illuminates the stop lights by operating the stop light control relay.

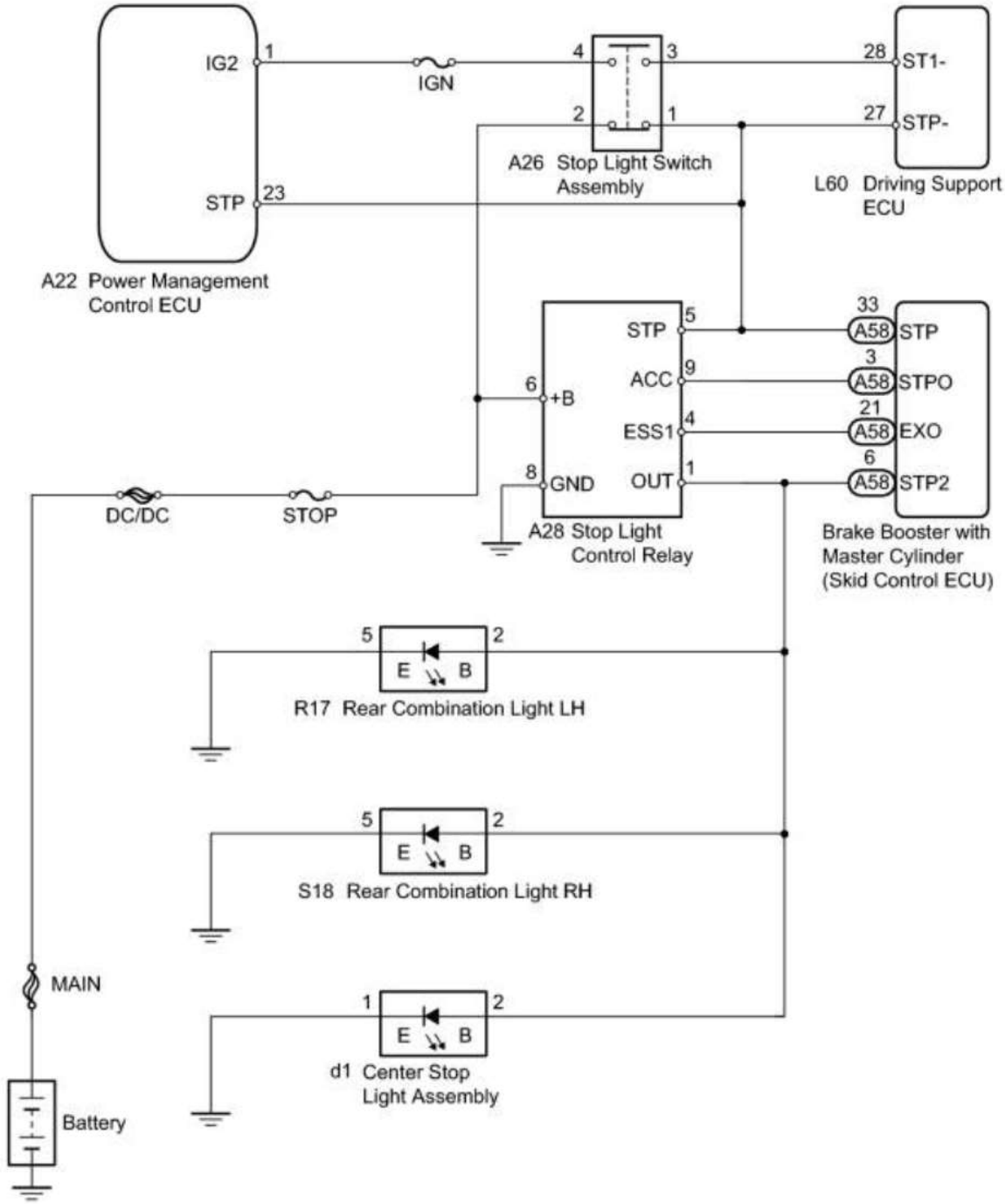
The stop light switch assembly sends a brake pedal operation signal to the driving support ECU.

After receiving the signal, the ECM performs fail-safe control by canceling the cruise control function.

| DTC No. | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A05 | Voltages of terminals ST1- and STP- of driving support ECU are both below 1 V for 1 second | • Stop light switch assembly<br>• Stop light switch circuit<br>• Driving support ECU |
| C1A4B | This trouble code is stored when the brake booster with master cylinder (skid control ECU) detects a malfunction in the stop light control relay circuit for 1 second while the dynamic cruise control is operating. | • Stop light control relay<br>• Stop light control relay circuit<br>• Brake booster with master cylinder (Skid control ECU) |

# WIRING DIAGRAM

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# INSPECTION PROCEDURE

HINT:

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

# PROCEDURE

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| | |
|---|---|
| 1. | READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH ASSEMBLY) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(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 stop light switch.

**Radar Cruise**

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Stop Light SW 1 (M CPU) | Stop light switch (Main-CPU) signal/ON or OFF | ON: Brake pedal depressed<br><br>OFF: Brake pedal released | - |
| Stop Light SW 1 (S CPU) | Stop light switch (Sub-CPU) signal/ON or OFF | ON: Brake pedal depressed<br><br>OFF: Brake pedal released | - |
| Stop Light SW 2 (M CPU) | Stop light switch (Main-CPU) signal/ON or OFF | ON: Brake pedal depressed<br><br>OFF: Brake pedal released | - |

OK:

Display changes according to brake pedal operation described in above table.

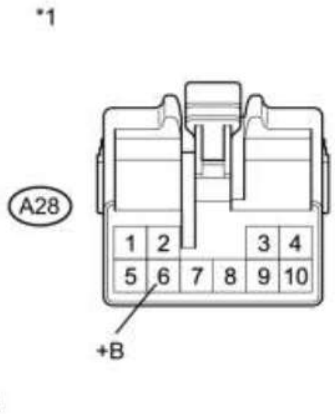
NG ▶ CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - POWER SOURCE)

OK ▼

| | |
|---|---|
| 2. | CHECK HARNESS AND CONNECTOR (STOP LIGHT CONTROL RELAY POWER SOURCE) |

(a) Disconnect the stop light control relay connector.

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

Standard Voltage:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A28-6 (+B) - Body ground | Always | 11 to 14 V |

**Text in Illustration**

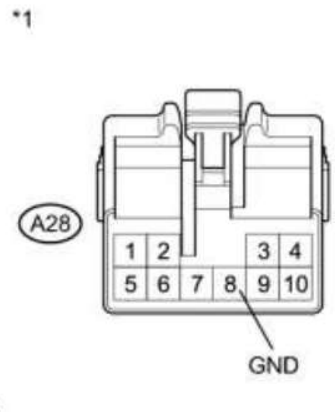
| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Control Relay) |

(c) Reconnect the stop light control relay connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT CONTROL RELAY - STOP FUSE)

OK ▼

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




(a) Disconnect the stop light control relay connector.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A28-8 (GND) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Control Relay) |

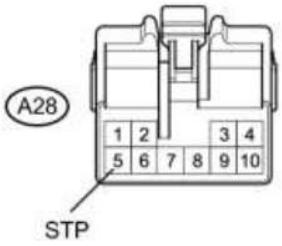
(c) Reconnect the stop light control relay connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT CONTROL RELAY - BODY GROUND)

OK ▼

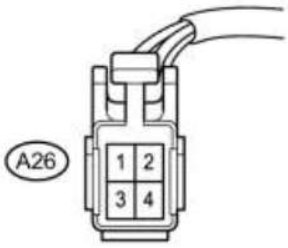
| | |
|---|---|
| 4. | CHECK HARNESS AND CONNECTOR (STOP LIGHT CONTROL RELAY - STOP LIGHT SWITCH ASSEMBLY) |

*1




(a) Disconnect the stop light control relay connector.

*2




(b) Disconnect the stop light switch assembly connector.

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

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Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A26-1 - A28-5 (STP) | Always | Below 1 Ω |

Standard Resistance (Check for Short):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A26-1 or A28-5 (STP) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Control Relay) |
| *2 | Front view of wire harness connector<br><br>(to Stop Light Switch Assembly) |

(d) Reconnect the stop light switch assembly connector.

(e) Reconnect the stop light control relay connector.

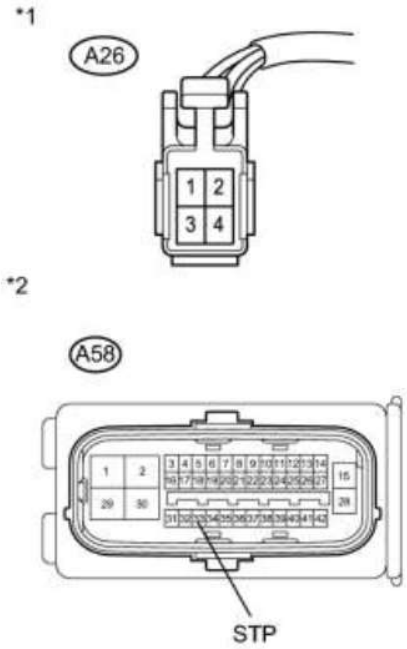
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT CONTROL RELAY - STOP LIGHT SWITCH ASSEMBLY)

OK ▼

| | |
|---|---|
| 5. | CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - SKID CONTROL ECU) |

(a) Disconnect the stop light switch assembly connector.

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(b) Disconnect the brake booster with master cylinder (skid control ECU) connector.

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

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A26-1 - A58-33 (STP) | Always | Below 1 Ω |

Standard Resistance (Check for Short):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A26-1 or A58-33 (STP) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Switch Assembly) |
| *2 | Front view of wire harness connector<br><br>(to Brake Booster with Master Cylinder (Skid Control ECU)) |

(d) Reconnect the stop light switch assembly connector.

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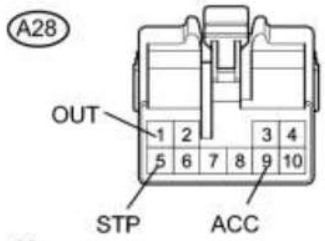
(e) Reconnect the brake booster with master cylinder (skid control ECU) connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - SKID CONTROL ECU)

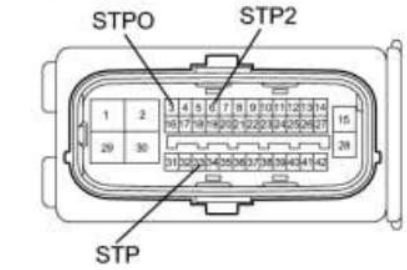
OK ▼

| | |
|---|---|
| 6. | CHECK HARNESS AND CONNECTOR (STOP LIGHT CONTROL RELAY - SKID CONTROL ECU) |

*1




*2




(a) Disconnect the stop light control relay connector.

(b) Disconnect the brake booster with master cylinder (skid control ECU) connectors.

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

Standard Resistance (Check for Open):

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| A28-1 (OUT) - A58-6 (STP2) | Always | Below 1 Ω |
| A28-5 (STP) - A58-33 (STP) | Always | Below 1 Ω |
| A28-9 (ACC) - A58-3 (STP0) | Always | Below 1 Ω |

Standard Resistance (Check for Short):

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| A28-1 (OUT) or A58-6 (STP2) - Body ground | Always | 10 kΩ or higher |
| A28-5 (STP) or A58-33 (STP) - Body ground | Always | 10 kΩ or higher |

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| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| A28-9 (ACC) or A58-3 (STP0) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Control Relay) |
| *2 | Front view of wire harness connector<br><br>(to Brake Booster with Master Cylinder (Skid Control ECU)) |

(d) Reconnect the stop light control relay connector.

(e) Reconnect the brake booster with master cylinder (skid control ECU) connectors.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT CONTROL RELAY - SKID CONTROL ECU)

OK ▼

| | |
|---|---|
| 7. | INSPECT STOP LIGHT CONTROL RELAY |

(a) Inspect the stop light control relay INFO.

NG ▶ REPLACE STOP LIGHT CONTROL RELAY

OK ▼

| | |
|---|---|
| 8. | REPLACE BRAKE BOOSTER WITH MASTER CYLINDER (SKID CONTROL ECU) |

(a) Replace the brake booster with master cylinder (skid control ECU) INFO.

NEXT ▼

| | |
|---|---|
| 9. | CHECK WHETHER DTC OUTPUT RECORDS (DTC C1A05 OR C1A4B) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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.

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(1) Drive the vehicle at a speed of 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A05 or C104B is output | B |

B ▶ REPLACE POWER MANAGEMENT CONTROL ECU

A ▶ **END**

| | |
|---|---|
| 10. | REPLACE POWER MANAGEMENT CONTROL ECU |

(a) Replace the power management control ECU INFO.

NEXT ▼

| | |
|---|---|
| 11. | CHECK WHETHER DTC OUTPUT RECORDS (DTC C1A05 OR C1A4B) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

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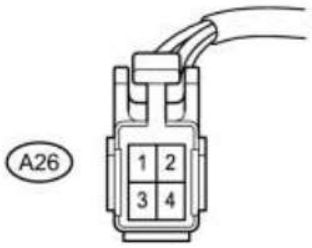
| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A05 or C104B is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU

A ▶ **END**

| | |
|---|---|
| 12. | CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - POWER SOURCE) |

*1




(a) Disconnect the stop light switch assembly connector.

N

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

Standard Voltage:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A26-2 - Body ground | Always | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Switch Assembly) |

(c) Reconnect the stop light switch assembly connector.

NG ▶ CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - STOP LIGHT CONTROL RELAY)

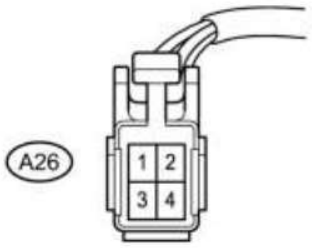
OK ▼

| | |
|---|---|
| 13. | CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - POWER SOURCE) |

(a) Disconnect the stop light switch assembly connector.

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*1




N

(b) Turn the power switch on (IG).

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

Standard Voltage:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A26-4 - Body ground | Power switch on (IG) | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Switch Assembly) |

(d) Reconnect the stop light switch assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - POWER MANAGEMENT CONTROL ECU)

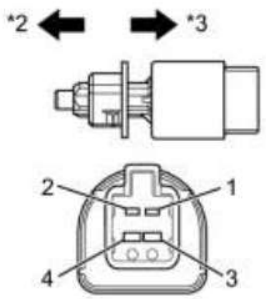
OK ▼

| | |
|---|---|
| 14. | INSPECT STOP LIGHT SWITCH ASSEMBLY |

(a) Remove the stop light switch assembly INFO.

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*1




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

Standard Resistance:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| 1 - 2 | Switch pin not pushed | Below 1 Ω |
| 3 - 4 | Switch pin not pushed | 10 kΩ or higher |
| 1 - 2 | Switch pin pushed | 10 kΩ or higher |
| 3 - 4 | Switch pin pushed | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Component without harness connected<br><br>(Stop Light Switch Assembly) |
| *2 | Not pushed |
| *3 | Pushed |

(c) Install the stop light switch assembly INFO.

NG ▶ REPLACE STOP LIGHT SWITCH ASSEMBLY

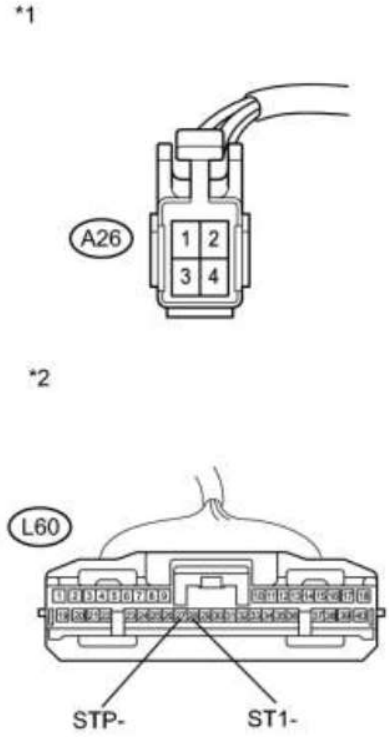
OK

▼

| | |
|---|---|
| 15. | CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - DRIVING SUPPORT ECU) |

(a) Disconnect the stop light switch assembly connector.

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(b) Disconnect the driving support ECU connector.

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

Standard Resistance (Check for Open):

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| A26-3 - L60-28 (ST1-) | Always | Below 1 Ω |
| A26-1 - L60-27 (STP-) | Always | Below 1 Ω |

Standard Resistance (Check for Open):

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| A26-3 or L60-28 (ST1-) - Body ground | Always | 10 kΩ or higher |
| A26-1 or L60-27 (STP-) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br>(to Stop Light Switch Assembly) |
| *2 | Front view of wire harness connector<br>(to Driving Support ECU) |

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(d) Reconnect the stop light switch assembly connector.

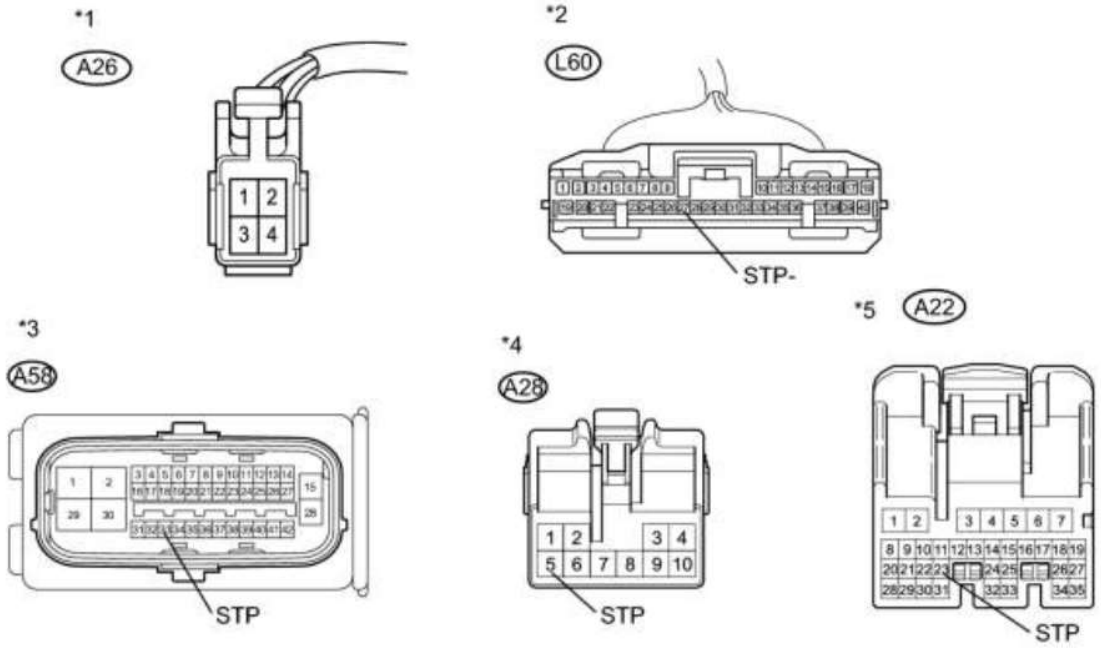
(e) Reconnect the driving support ECU connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - DRIVING SUPPORT ECU)

OK ▼

| | |
|---|---|
| 16. | CHECK HARNESS AND CONNECTOR |

(a) Disconnect the stop light switch assembly connector.




(b) Disconnect the driving support ECU connector.

(c) Disconnect the stop light control relay connector.

(d) Disconnect the brake booster with master cylinder (skid control ECU) connector.

(e) Disconnect the power management control ECU connector.

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

Standard Resistance (Check for Short):

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|

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| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| A26-1 or L60-27 (STP-) - Body ground | Always | 10 kΩ or higher |
| A26-1 or A58-33 (STP) - Body ground | Always | 10 kΩ or higher |
| A26-1 or A28-5 (STP) - Body ground | Always | 10 kΩ or higher |
| A26-1 or A22-23 (STP) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Switch Assembly) | *2 | Front view of wire harness connector<br><br>(to Driving Support ECU) |
| *3 | Front view of wire harness connector<br><br>(to Brake Booster with Master Cylinder (Skid Control ECU)) | *4 | Front view of wire harness connector<br><br>(to Stop Light Control Relay) |
| *5 | Front view of wire harness connector<br><br>(to Power Management Control ECU) | - | - |

(g) Reconnect the stop light switch assembly connector.

(h) Reconnect the driving support ECU connector.

(i) Reconnect the power management control ECU connector.

(j) Reconnect the stop light control relay connector.

(k) Reconnect the brake booster with master cylinder (skid control ECU) connector.

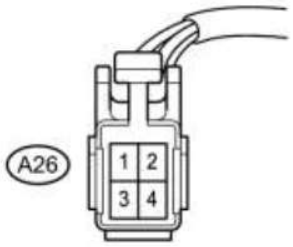
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR
OK ▶ **REPLACE DRIVING SUPPORT ECU**

| | |
|---|---|
| 17. | CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - STOP LIGHT CONTROL RELAY) |

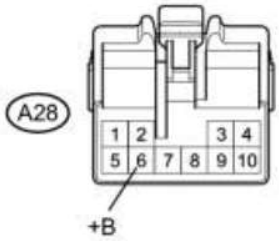
(a) Disconnect the stop light switch assembly connector.

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*1




*2




(b) Disconnect the stop light control relay connector.

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

Standard Resistance (Check for Short):

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| A26-2 or A28-6 (+B) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Stop Light Switch Assembly) |
| *2 | Front view of wire harness connector<br><br>(to Stop Light Control Relay) |

(d) Reconnect the stop light switch assembly connector.

(e) Reconnect the stop light control relay connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - STOP LIGHT CONTROL RELAY)

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - BATTERY)**

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| DTC | C1A0A | Front Radar Sensor Region Code Mismatch |
|---|---|---|

# DESCRIPTION

The driving support ECU uses the millimeter wave radar sensor and lane recognition camera sensor to detect obstacles in front of the vehicle.

When the millimeter wave radar sensor assembly is replaced with a new one, it acquires the country specification information from the driving support ECU. Also, when the driving support ECU is replaced with a new one, it receives the country specification information from the main body ECU. When the country specification information in the sensor and ECU do not match, DTC C1A0A is output.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A0A | While power switch is on (IG), country specification information in driving support ECU and front millimeter wave radar sensor do not match for 1 second | • Millimeter wave radar sensor assembly<br>• Main body ECU<br>• Driving support ECU |

# INSPECTION PROCEDURE

NOTICE:

When the millimeter wave radar sensor is replaced with a new one, adjustment of the radar sensor beam axis must be performed INFO.

# PROCEDURE

| 1. | READ VALUE USING TECHSTREAM |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Radar Cruise / Data List / Country# (F Radar Sens).

(e) Read the Data List and check the country specification information of the front millimeter wave radar sensor and vehicle.

**Radar Cruise**

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Country# (F | Millimeter wave radar sensor country signal/JPN, NA, EURO, | Actual country | - |

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Radar Sens) | AUS, SAFC, OTHER, TWN, CHINA, THAI, GCC, NOFIX | code | |

**Result**

| Result | Proceed to |
|---|---|
| Country specification information for vehicle and millimeter wave radar sensor match | A |
| Country specification information for vehicle and millimeter wave radar sensor do not match | B |

B ▶ REPLACE MILLIMETER WAVE RADAR SENSOR ASSEMBLY

A ▼

| | |
|---|---|
| 2. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A0A) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A0A is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU

A ▶ **END**

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| DTC | C1A0C | Object Recognition Camera Region Code Mismatch |
|---|---|---|

# DESCRIPTION

w/ Lane-keeping Assist System

When the lane recognition camera sensor assembly is replaced with a new one, it acquires the country specification information from the driving support ECU. The lane recognition camera sensor assembly has information about the market it is intended for use in (country specification information such as the destination, steering wheel position etc.). When a new camera sensor is installed and the country specification information does not match that of the driving support ECU, the ECU stores DTC C1A0C.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A0C | While initial check is running, power switch is on (IG) and system is operating, country specification information in driving support ECU and lane recognition camera sensor assembly do not match | • Lane recognition camera sensor assembly<br>• Driving support ECU |

# INSPECTION PROCEDURE

NOTICE:

When the lane recognition camera sensor assembly is replaced with a new one, adjust the lane recognition camera sensor assembly INFO.

# PROCEDURE

| 1. | REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY |
|---|---|

(a) Replace lane recognition camera sensor assembly INFO.

(b) Adjust the lane recognition camera sensor assembly INFO.

NEXT

| 2. | CHECK DTC OUTPUT |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) Perform the following to make sure that the DTC detection conditions are met.

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HINT:

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

(1) Drive the vehicle at a speed of 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

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

B ▶ REPLACE DRIVING SUPPORT ECU

A ▶ **USE SIMULATION METHOD TO CHECK**

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| | | |
|---|---|---|
| DTC | C1A10 | Front Radar Sensor |

# DESCRIPTION

The driving support ECU uses the millimeter wave radar sensor and lane recognition camera sensor to detect obstacles in front of the vehicle.

When the driving support ECU receives information that there is a malfunction in the millimeter wave radar sensor assembly, DTC C1A10 is stored.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A10 | While power switch is on (IG), driving support ECU receives information that there is malfunction in millimeter wave radar sensor assembly for 1 second | • Millimeter wave radar sensor assembly<br>• Driving support ECU |

# INSPECTION PROCEDURE

NOTICE:

When the millimeter wave radar sensor is replaced with a new one, adjustment of the front sensor beam axis must be performed INFO.

# PROCEDURE

| | |
|---|---|
| 1. | REPLACE MILLIMETER WAVE RADAR SENSOR ASSEMBLY |

(a) Replace the millimeter wave radar sensor assembly INFO.

NEXT

| | |
|---|---|
| 2. | ADJUST MILLIMETER WAVE RADAR SENSOR ASSEMBLY |

(a) Adjust the millimeter wave radar sensor assembly INFO.

NEXT

| | |
|---|---|
| 3. | CHECK WHETHER DTC OUTPUT RECURS |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

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(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A10 is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU
A ▶ **END**

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| | | |
|---|---|---|
| DTC | C1A11 | Front Radar Sensor Incorrect Axial Gap |
| DTC | C1A14 | Front Radar Sensor Beam Axis Not Adjusted |

# DESCRIPTION

The driving support ECU uses the millimeter wave radar sensor and lane recognition camera sensor to detect obstacles in front of the vehicle.

When the vehicle is determined to be driving in a straight line or on a slow curve based on signals from the yaw rate sensor, the millimeter wave radar sensor assembly performs a self diagnosis to check if the sensor beam axis is deviated from the vehicle movement direction. When the millimeter wave radar sensor assembly's beam axis is deviated, the driving support ECU detects this, and outputs DTC C1A11.

After installing a new millimeter wave radar sensor assembly, if the sensor beam axis adjustment is not performed, DTC C1A14 is stored.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A11 | While power switch is on (IG) and after driving at approximately 50 km/h (31 mph) for 10 hours, driving support ECU determines that aim of front millimeter wave radar sensor's beam axis is deviated | • Millimeter wave radar sensor assembly<br>• Driving support ECU |
| C1A14 | Driving at 10 km/h (6 mph) or more while front millimeter wave radar sensor's axis adjustment has not been performed | • Millimeter wave radar sensor assembly<br>• Driving support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | ADJUST FRONT MILLIMETER WAVE RADAR SENSOR |

(a) Adjust the front millimeter wave radar sensor INFO.

NEXT

| | |
|---|---|
| 2. | CHECK WHETHER DTC OUTPUT RECURS (C1A11 OR C1A14) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) Perform the following to make sure that the DTC detection conditions are met.

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HINT:

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

(1) Drive the vehicle at a speed of 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A11 or C1A14 is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU
A ▶ **END**

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| | | |
|---|---|---|
| DTC | C1A20 | Object Recognition ECU |

# DESCRIPTION

w/ Lane-keeping Assist System

When the driving support ECU receives information that there is a malfunction in the lane recognition camera sensor assembly, DTC C1A20 is output.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A20 | While power switch is on (IG), driving support ECU receives information that there is malfunction in lane recognition camera sensor assembly for 1 second or more | • Lane recognition camera sensor assembly<br>• Driving support ECU |

# INSPECTION PROCEDURE

NOTICE:

When the lane recognition camera sensor assembly is replaced with a new one, adjust the lane recognition camera sensor assembly INFO.

# PROCEDURE

| | |
|---|---|
| 1. | REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY |

(a) Replace the lane recognition camera sensor assembly INFO.

(b) Adjust the lane recognition camera sensor assembly INFO.

NEXT

| | |
|---|---|
| 2. | CHECK DTC OUTPUT |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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.

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(1) Drive the vehicle at a speed of 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

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

B ▶ REPLACE DRIVING SUPPORT ECU
A ▶ **END**

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| | | |
|---|---|---|
| DTC | C1A22 | Object Recognition Camera Incorrect Axial Gap |
| DTC | C1A23 | Object Recognition Camera Initialization Incomplete |

# DESCRIPTION

w/ Lane-keeping Assist System

If the driving support ECU determines that the lane recognition camera sensor assembly axis is deviated, DTC C1A22 is stored. Also, if the lane recognition camera sensor assembly beam axis adjustment is not performed after installing the lane recognition camera sensor assembly, DTC C1A23 is stored.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A22 | While power switch is on (IG), driving support ECU detects lane recognition camera sensor assembly beam axis deviation for 1 second or more | • Lane recognition camera sensor assembly<br>• Driving support ECU |
| C1A23 | While power switch is on (IG), driving support ECU detects that lane recognition camera sensor assembly adjustment has not been completed for 1 second or more | • Lane recognition camera sensor assembly<br>• Driving support ECU |

# INSPECTION PROCEDURE

NOTICE:

When the lane recognition camera sensor assembly is replaced with a new one, adjust the lane recognition camera sensor assembly INFO.

# PROCEDURE

| | |
|---|---|
| 1. | ADJUST LANE RECOGNITION CAMERA SENSOR ASSEMBLY |

(a) Adjust the lane recognition camera sensor assembly INFO.

NEXT

| | |
|---|---|
| 2. | CHECK DTC OUTPUT |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) Perform the following to make sure that the DTC detection conditions are met.

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HINT:

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

(1) Drive the vehicle at a speed of 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

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

B ▶ REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY
A ▶ **END**

| | |
|---|---|
| 3. | REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY |

(a) Replace the lane recognition camera sensor assembly INFO.

(b) Adjust the lane recognition camera sensor assembly INFO.

NEXT ▼

| | |
|---|---|
| 4. | CHECK DTC OUTPUT |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

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(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

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

B ▶ REPLACE DRIVING SUPPORT ECU
A ▶ **END**

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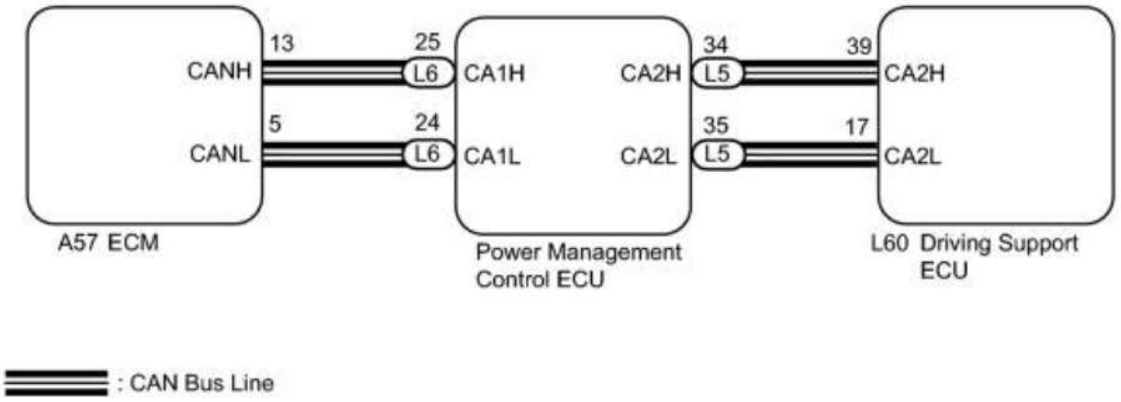
| DTC | C1A40 | ENG / EHV Device |
|---|---|---|

# DESCRIPTION

When the driving support ECU receives a hybrid control system or SFI system malfunction signal from the power management control ECU or ECM via the CAN communication line, DTC C1A40 is stored.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A40 | While power switch is on (IG), hybrid control system or SFI system malfunction signal is detected for 1 second | • Hybrid control system<br>• Power management control ECU<br>• SFI system<br>• ECM<br>• Driving support ECU |

# WIRING DIAGRAM




# INSPECTION PROCEDURE

# PROCEDURE

| 1. | READ OUTPUT DTC (HYBRID CONTROL SYSTEM) |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Hybrid Control / Trouble Codes.

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(e) Read the DTCs.

Result:

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

B ▶ GO TO HYBRID CONTROL SYSTEM

A ▼

| | |
|---|---|
| 2. | READ OUTPUT DTC (SFI SYSTEM) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs.

Result:

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

B ▶ GO TO SFI SYSTEM

A ▼

| | |
|---|---|
| 3. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A40) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

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(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A40 is output | B |

B ▶ REPLACE POWER MANAGEMENT CONTROL ECU

A ▶ **USE SIMULATION METHOD TO CHECK**

| | |
|---|---|
| 4. | REPLACE POWER MANAGEMENT CONTROL ECU |

(a) Replace the power management control ECU INFO.

NEXT ▼

| | |
|---|---|
| 5. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A40) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |

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| Result | Proceed to |
|---|---|
| DTC C1A40 is output | B |

B ▶ REPLACE ECM
A ▶ **END**

| | |
|---|---|
| 6. | REPLACE ECM |

(a) Replace the ECM INFO.

NEXT
▼

| | |
|---|---|
| 7. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A40) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A40 is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU
A ▶ **END**

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| DTC | C1A41 | Brake Request Value Mismatch between ENG / EHV and Driving Support ECU |
|---|---|---|

# DESCRIPTION

The brake booster with master cylinder (skid control ECU) receives brake control request signals from the power management control ECU and driving support ECU.

When the request signals received from the power management control ECU and driving support ECU are not consistent, the brake booster with master cylinder (skid control ECU) determines that a malfunction has occurred and sends a malfunction signal to the driving support ECU.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A41 | While power switch is on (IG), brake request signal from power management control ECU and driving support ECU are inconsistent for 1 second | • Electronically controlled brake system<br>• Hybrid control system<br>• Power management control ECU<br>• Brake booster with master cylinder (Skid control ECU)<br>• Driving support ECU |

# WIRING DIAGRAM

Refer to DTC C1A50 INFO.

# INSPECTION PROCEDURE

# PROCEDURE

| 1. | READ OUTPUT DTC (ELECTRONICALLY CONTROLLED BRAKE SYSTEM) |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.

(e) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|

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

B ▶ GO TO ELECTRONICALLY CONTROLLED BRAKE SYSTEM

A ▼

| | |
|---|---|
| 2. | READ OUTPUT DTC (HYBRID CONTROL SYSTEM) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Hybrid Control / Trouble Codes.

(e) Read the DTCs.

Result:

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

B ▶ GO TO HYBRID CONTROL SYSTEM

A ▼

| | |
|---|---|
| 3. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A41) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

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(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A41 is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU
A ▶ **USE SIMULATION METHOD TO CHECK**

| | |
|---|---|
| 4. | REPLACE DRIVING SUPPORT ECU |

(a) Replace the driving support ECU INFO.

NEXT

| | |
|---|---|
| 5. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A41) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A41 is output | B |

B ▶ REPLACE BRAKE BOOSTER WITH MASTER CYLINDER
A ▶ **END**

| | |
|---|---|
| 6. | REPLACE BRAKE BOOSTER WITH MASTER CYLINDER |

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(a) Replace the brake booster with master cylinder (skid control ECU) INFO.

NEXT

| | |
|---|---|
| 7. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A41) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A41 is output | B |

B ▶ REPLACE POWER MANAGEMENT CONTROL ECU

A ▶ **END**

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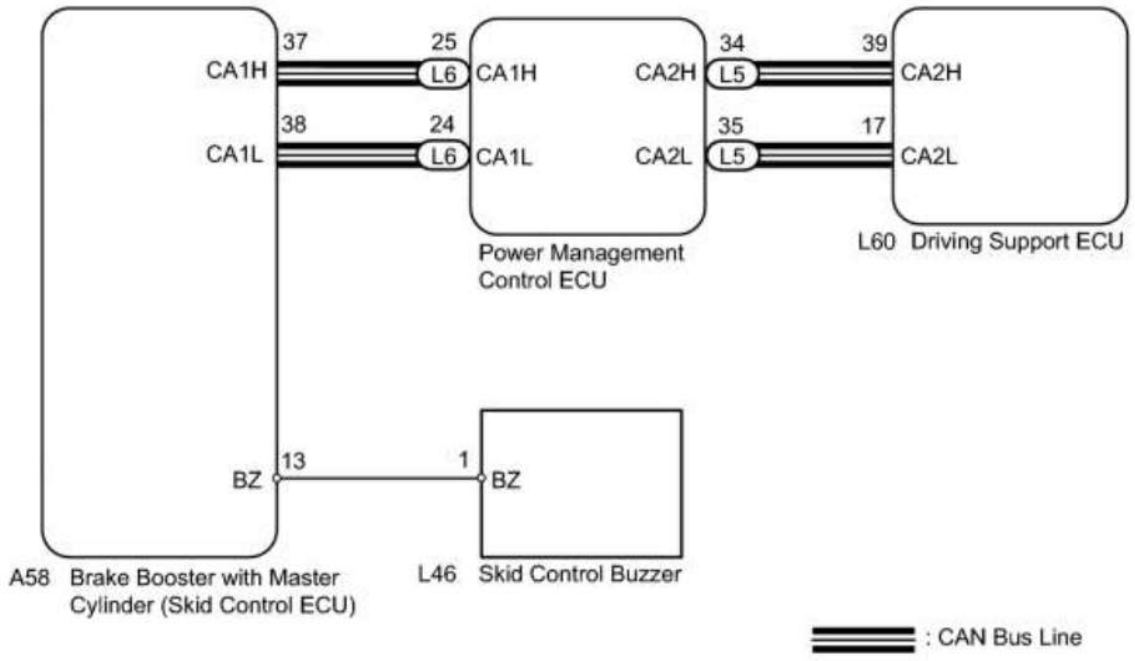
| | | |
|---|---|---|
| DTC | C1A4A | Skid Control Buzzer Circuit |

# DESCRIPTION

The driving support ECU sends a sounding signal to the brake booster with master cylinder (skid control ECU) to sound the skid control buzzer.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A4A | While power switch is on (IG), skid control buzzer circuit malfunction signal is received by brake booster with master cylinder (skid control ECU) for 1 second | • Electronically controlled brake system<br>• Driving support ECU |

# WIRING DIAGRAM




# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | PERFORM ACTIVE TEST USING TECHSTREAM (SKID CONTROL BUZZER) |

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(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Chassis / ABS/VSC/TRAC / Active Test / Buzzer.

(e) Perform the Active Test.

OK:

Skid control buzzer sounds.

NG ▶ GO TO ELECTRONICALLY CONTROLLED BRAKE SYSTEM
OK
▼

| | |
|---|---|
| 2. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A4A) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A4A is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU
A ▶ **USE SIMULATION METHOD TO CHECK**

| | |
|---|---|
| 3. | REPLACE DRIVING SUPPORT ECU |

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(a) Replace the driving support ECU INFO.

NEXT

| | |
|---|---|
| 4. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A4A) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A4A is output | B |

B REPLACE BRAKE BOOSTER WITH MASTER CYLINDER

A **END**

| | |
|---|---|
| 5. | REPLACE BRAKE BOOSTER WITH MASTER CYLINDER |

(a) Replace the brake booster with master cylinder (skid control ECU) INFO.

NEXT

| | |
|---|---|
| 6. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A4A) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

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(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A4A is output | B |

B ▶ REPLACE POWER MANAGEMENT CONTROL ECU
A ▶ **END**

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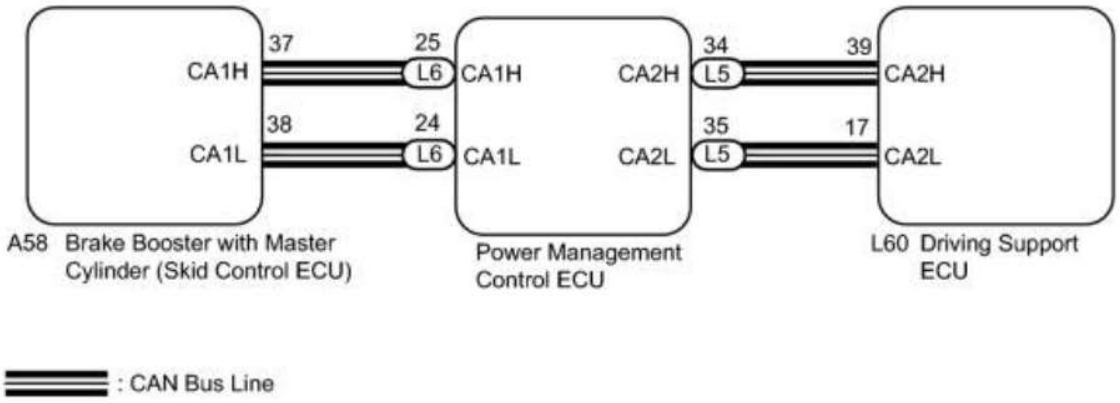
| DTC | C1A50 | Brake System |
|---|---|---|

# DESCRIPTION

When the driving support ECU receives an electronically controlled brake system malfunction signal from the brake booster with master cylinder (skid control ECU) via the CAN communication line, DTC C1A50 is stored.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A50 | When signal malfunction from brake booster with master cylinder (skid control ECU) continues for 1 second while dynamic radar cruise control is operating | • Electronically controlled brake system<br>• Driving support ECU |

# WIRING DIAGRAM




# INSPECTION PROCEDURE

# PROCEDURE

| 1. | READ OUTPUT DTC (ELECTRONICALLY CONTROLLED BRAKE SYSTEM) |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.

(e) Read the DTCs.

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Result:

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

B ▶ GO TO ELECTRONICALLY CONTROLLED BRAKE SYSTEM

A ▼

| | |
|---|---|
| 2. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A50) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A50 is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU

A ▶ **USE SIMULATION METHOD TO CHECK**

| | |
|---|---|
| 3. | REPLACE DRIVING SUPPORT ECU |

(a) Replace the driving support ECU INFO.

NEXT ▼

| | |
|---|---|
| 4. | CHECK WHETHER DTC OUTPUT RECURS (DTC C1A50) |

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(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A50 is output | B |

B ▶ REPLACE BRAKE BOOSTER WITH MASTER CYLINDER
A ▶ **END**

| | |
|---|---|
| 5. | REPLACE BRAKE BOOSTER WITH MASTER CYLINDER |

(a) Replace the brake booster with master cylinder (skid control ECU) INFO.

NEXT

| | |
|---|---|
| 6. | CHECK WHETHER DTC OUTPUT RECURS |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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.

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(1) Drive the vehicle at a speed of 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC C1A50 is output | B |

B ▶ REPLACE POWER MANAGEMENT CONTROL ECU
A ▶ **END**

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| | | |
|---|---|---|
| DTC | P1615 | Communication Error from Distance Control ECU to HV ECU |

# DESCRIPTION

This DTC is stored when a communication error occurs between the driving support ECU and power management control ECU.

| DTC No. | DTC Detection Condition | Trouble Area |
|---|---|---|
| P1615 | All of the following conditions are met<br><br>(a) Power switch on (IG)<br><br>(b) Communication error between driving support ECU and power management control ECU for 0.5 seconds or more | • Driving support ECU<br>• Power management control ECU |

# WIRING DIAGRAM

Refer to DTC C1A40 INFO.

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | READ OUTPUT DTC (DYNAMIC RADAR CRUISE CONTROL SYSTEM) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(e) Read the DTCs.

Result:

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

B ▶ GO TO DTC CHART

A ▼

| | |
|---|---|
| 2. | CHECK WHETHER DTC OUTPUT RECURS (DTC P1615) |

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(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Clear the DTCs INFO.

(e) Turn the power switch off.

(f) Turn the power switch on (IG).

(g) Enter the following menus: Powertrain / Hybrid Control / Trouble Codes.

(h) Read the DTCs.

Result:

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

B ▶ REPLACE DRIVING SUPPORT ECU

A ▶ **USE SIMULATION METHOD TO CHECK**

| | |
|---|---|
| 3. | REPLACE DRIVING SUPPORT ECU |

(a) Replace the driving support ECU INFO.

NEXT ▼

| | |
|---|---|
| 4. | CHECK WHETHER DTC OUTPUT RECURS (DTC P1615) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Clear the DTCs INFO.

(e) Turn the power switch off.

(f) Turn the power switch on (IG).

(g) Enter the following menus: Powertrain / Hybrid Control / Trouble Codes.

(h) Read the DTCs.

Result:

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

B ▶ REPLACE POWER MANAGEMENT CONTROL ECU

A ▶ **END**

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| | | |
|---|---|---|
| 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 | U0293 | Lost Communication with HV ECU |
| DTC | U1104 | Lost Communication with Driving Support ECU |

# DESCRIPTION

These DTCs are output when a communication malfunction occurs between the sensors and ECUs.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| U0122 | While dynamic radar cruise control is either preparing for operation or operating and power switch is on (IG), communication stop from brake booster with master cylinder (skid control ECU) to driving support ECU continues for 1 second or more | • Brake booster with master cylinder (Skid control ECU)<br>• CAN communication system<br>• Driving support ECU |
| U0123 | While dynamic radar cruise control is either preparing for operation or operating and power switch is on (IG), communication stop from yaw rate sensor to driving support ECU continues for 1 second or more | • Yaw rate sensor<br>• CAN communication system<br>• Driving support ECU |
| U0126 | While dynamic radar cruise control is either preparing for operation or operating and power switch is on (IG), communication stop from steering angle sensor to driving support ECU continues for 1 second or more | • Steering angle sensor<br>• CAN communication system<br>• Driving support ECU |
| U0293 | While dynamic radar cruise control is either preparing for operation or operating and power switch is on (IG), communication stop from power management control ECU to driving support ECU or brake booster with master cylinder (skid control ECU) continues for 1 second or more | • Power management control ECU<br>• CAN communication system<br>• Driving support ECU<br>• Brake booster with master cylinder (Skid control ECU) |
| U1104 | While dynamic radar cruise control is either preparing for operation or operating and power switch is on (IG), communication stop from driving support ECU to millimeter wave radar sensor assembly, power management control ECU or brake booster with master cylinder (skid control ECU) continues for 1 second or more | • Driving support ECU<br>• CAN communication system<br>• Millimeter wave radar sensor assembly<br>• Power management control ECU<br>• Brake booster with |

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| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| | | master cylinder (Skid control ECU) |

# WIRING DIAGRAM

Refer to System Diagram INFO.

Refer to U0235 INFO.

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | READ OUTPUT DTC |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(e) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC U1104 is output | A |
| DTCs other than U1104 are output | B |

B ▶ GO TO CAN COMMUNICATION SYSTEM

A ▼

| | |
|---|---|
| 2. | CHECK CAN COMMUNICATION SYSTEM |

(a) Select "CAN Bus Check" from the "System Selection Menu" screen on the Techstream.

(b) Select "Communication Malfunction DTC" from the "CAN Bus Check" screen, and then select "Enter".

OK:

Communication system is normal.

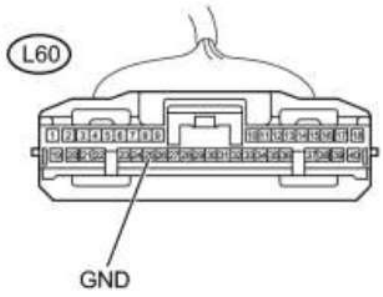
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NG ▶ GO TO CAN COMMUNICATION SYSTEM

OK ▼

| | |
|---|---|
| 3. | CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT ECU - BODY GROUND) |

*1




(a) Disconnect the driving support ECU connector.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L60-25 (GND) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Driving Support ECU) |

(c) Reconnect the driving support ECU connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DRIVING SUPPORT ECU - BODY GROUND)

OK ▼

| | |
|---|---|
| 4. | REPLACE DRIVING SUPPORT ECU |

(a) Replace the driving support control ECU INFO.

NEXT ▼

| | |
|---|---|
| 5. | CHECK WHETHER DTC OUTPUT RECURS |

(a) Connect the Techstream to the DLC3.

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(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC is not output | A |
| DTC U1104 is output | B |

B ▶ REPLACE MILLIMETER WAVE RADAR SENSOR ASSEMBLY
A ▶ **END**

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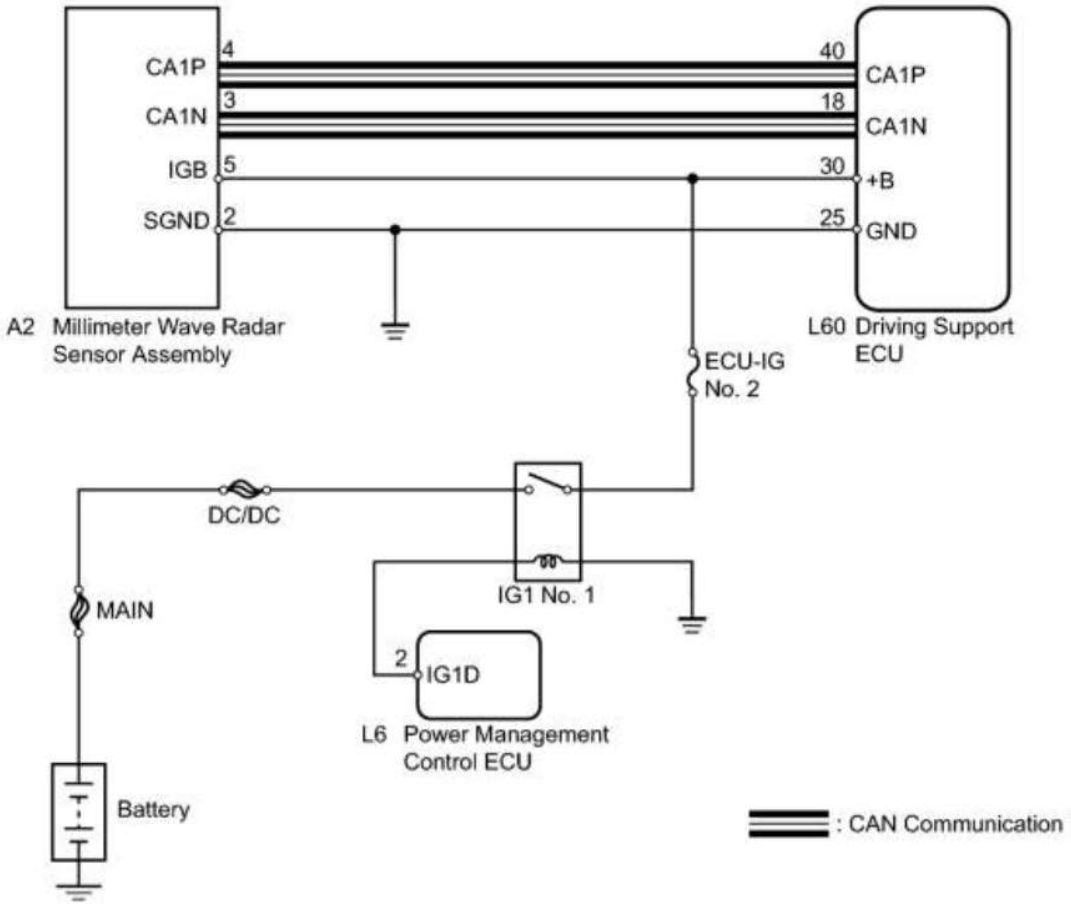
| DTC | U0235 | Lost Communication with Cruise Control Front Distance Range Sensor |
|---|---|---|

# 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 assembly transmits information about the vehicle in front to the driving support ECU.

| DTC No. | DTC Detection Condition | Trouble Area |
|---|---|---|
| U0235 | The seat belt control ECU detects a communication error signal (from the millimeter wave radar sensor assembly to the driving support ECU) for 1 second or more while the dynamic radar cruise control is operating | • Millimeter wave radar sensor assembly<br>• Millimeter wave radar sensor circuit<br>• Driving support ECU |

# WIRING DIAGRAM




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# INSPECTION PROCEDURE

NOTICE:

When the millimeter wave radar sensor is replaced with a new one, adjustment of the radar sensor beam axis must be performed INFO.

# PROCEDURE

| | |
|---|---|
| 1. | CHECK CAN COMMUNICATION SYSTEM |

(a) Select "CAN Bus Check" from the "System Selection Menu" screen on the Techstream.

(b) Select "Communication Malfunction DTC" from the "CAN Bus Check" screen, and then select "Enter".

OK:

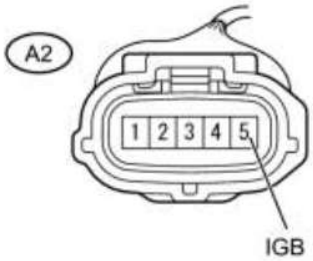
Communication system is normal.

NG ▶ GO TO CAN COMMUNICATION CIRCUIT

OK ▼

| | |
|---|---|
| 2. | CHECK HARNESS AND CONNECTOR (MILLIMETER WAVE RADAR SENSOR POWER SOURCE) |

*1




(a) Disconnect the millimeter wave radar sensor assembly connector.

(b) Turn the power switch on (IG).

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

Standard Voltage:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| A2-5 (IGB) - Body ground | Power switch on (IG) | 11 to 14 V |

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**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Millimeter Wave Radar Sensor Assembly) |

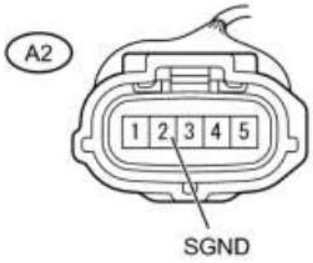
(d) Reconnect the millimeter wave radar sensor assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (MILLIMETER WAVE RADAR SENSOR ASSEMBLY - IG1 NO. 1 RELAY)

OK ▼

| | |
|---|---|
| 3. | CHECK HARNESS AND CONNECTOR (MILLIMETER WAVE RADAR SENSOR ASSEMBLY - BODY GROUND) |

*1




(a) Disconnect the millimeter wave radar sensor assembly connector.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A2-2 (SGND) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Millimeter Wave Radar Sensor Assembly) |

(c) Reconnect the millimeter wave radar sensor assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (MILLIMETER WAVE RADAR SENSOR ASSEMBLY - BODY GROUND)

OK ▼

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| | |
|---|---|
| 4. | REPLACE MILLIMETER WAVE RADAR SENSOR ASSEMBLY |

(a) Replace the millimeter wave radar sensor assembly INFO.

(b) Adjust the millimeter wave radar sensor assembly INFO.

NEXT

| | |
|---|---|
| 5. | CHECK WHETHER DTC OUTPUT RECURS (DTC U0235) |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

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

B ▶ REPLACE DRIVING SUPPORT ECU

A ▶ **END**

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| DTC | U1119 | Lost Communication with Object Recognition ECU (CAN) |
|---|---|---|

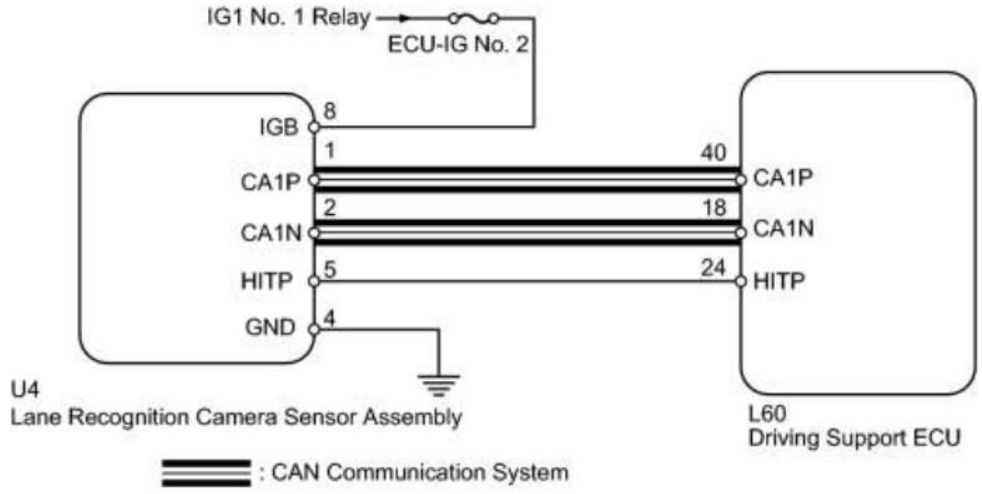
# DESCRIPTION

with Lane-keeping Assist System.

Because of the location of the lane recognition camera assembly, it is subject to high temperatures. If the lane recognition camera sensor assembly becomes too hot, the power source is shut down to protect the system. At that time CAN communication also stops. However, in order to inform the driving support ECU that CAN communication has not stopped because of a CAN communication error, on/off signals are periodically sent from the HITP terminal.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| U1119 | While power switch is on (IG), communication stop between lane recognition camera sensor and driving support ECU continues for 1 second or more | • Lane recognition camera sensor assembly<br>• CAN communication system<br>• Driving support ECU |

# WIRING DIAGRAM




# INSPECTION PROCEDURE

HINT:

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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.

# PROCEDURE

| | |
|---|---|
| 1. | CHECK DTC OUTPUT |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

| Result | Proceed to |
|---|---|
| DTC U1119 is output | A |
| DTC other than U1119 is output | B |

B ▶ GO TO CAN COMMUNICATION CIRCUIT

A ▼

| | |
|---|---|
| 2. | READ VALUE USING TECHSTREAM |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / Pre-Collision 2/ Data List / Recog ECU H Temp Hist.

(e) Confirm the judgment history.

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Pre-Collision 2:

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Recog ECU H Temp Hist | Object recognition ECU temperature condition history/ ON or OFF | ON: History exists<br><br>OFF: No history | - |

Result:

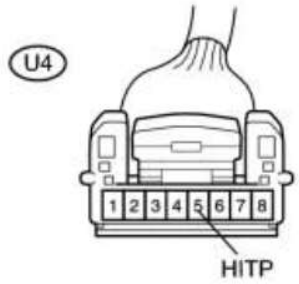
| Result | Proceed to |
|---|---|
| ON is displayed | A |
| OFF is displayed | B |

B ▶CHECK CAN COMMUNICATION SYSTEM

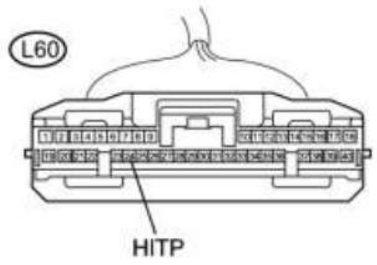
A ▼

| | |
|---|---|
| 3. | CHECK HARNESS OR CONNECTOR (DRIVING SUPPORT ECU - LANE RECOGNITION CAMERA SENSOR) |

*1




*2




(a) Disconnect the driving support ECU connector and lane recognition camera sensor connector.

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

Standard Resistance:

| Tester Condition | Condition | Specified Condition |
|---|---|---|

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| Tester Condition | Condition | Specified Condition |
|---|---|---|
| U4-5 (HITP) - L60-24 (HITP) | Always | Below 1 Ω |
| U4-5 (HITP) or L60-24 (HITP) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Lane Recognition Camera Sensor Assembly) |
| *2 | Front view of wire harness connector<br><br>(to Driving Support ECU) |

(c) Reconnect the connectors.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DRIVING SUPPORT ECU - LANE RECOGNITION CAMERA SENSOR)

OK ▶ **REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY**

| | |
|---|---|
| 4. | REPAIR OR REPLACE HARNESS OR CONNECTOR (DRIVING SUPPORT ECU - LANE RECOGNITION CAMERA SENSOR) |

(a) Repair or replace harness or connector.

NEXT ▼

| | |
|---|---|
| 5. | CHECK DTC OUTPUT |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

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Result:

| Result | Proceed to |
|---|---|
| DTC U1119 is not output | A |
| DTC U1119 is output | B |

B ▶ GO TO CAN COMMUNICATION CIRCUIT
A ▶ **END**

| | |
|---|---|
| 6. | CHECK CAN COMMUNICATION SYSTEM |

(a) Check CAN communication system INFO.

NG ▶ GO TO CAN COMMUNICATION CIRCUIT
OK
▼

| | |
|---|---|
| 7. | REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY |

(a) Replace the lane recognition camera sensor assembly INFO.

(b) Adjust the lane recognition camera sensor INFO.

NEXT
▼

| | |
|---|---|
| 8. | CHECK DTC OUTPUT |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Clear the DTCs INFO.

(d) 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 40 km/h (25 mph) or more.

(2) Turn the cruise control main switch on.

(3) Push the -SET switch to activate the cruise control.

(e) Enter the following menus: Powertrain / Radar Cruise / Trouble Codes.

(f) Read the DTCs.

Result:

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| Result | Proceed to |
|---|---|
| DTC U1119 is not output | A |
| DTC U1119 is output | B |

B ▶ REPLACE DRIVING SUPPORT ECU

A ▶ **END**

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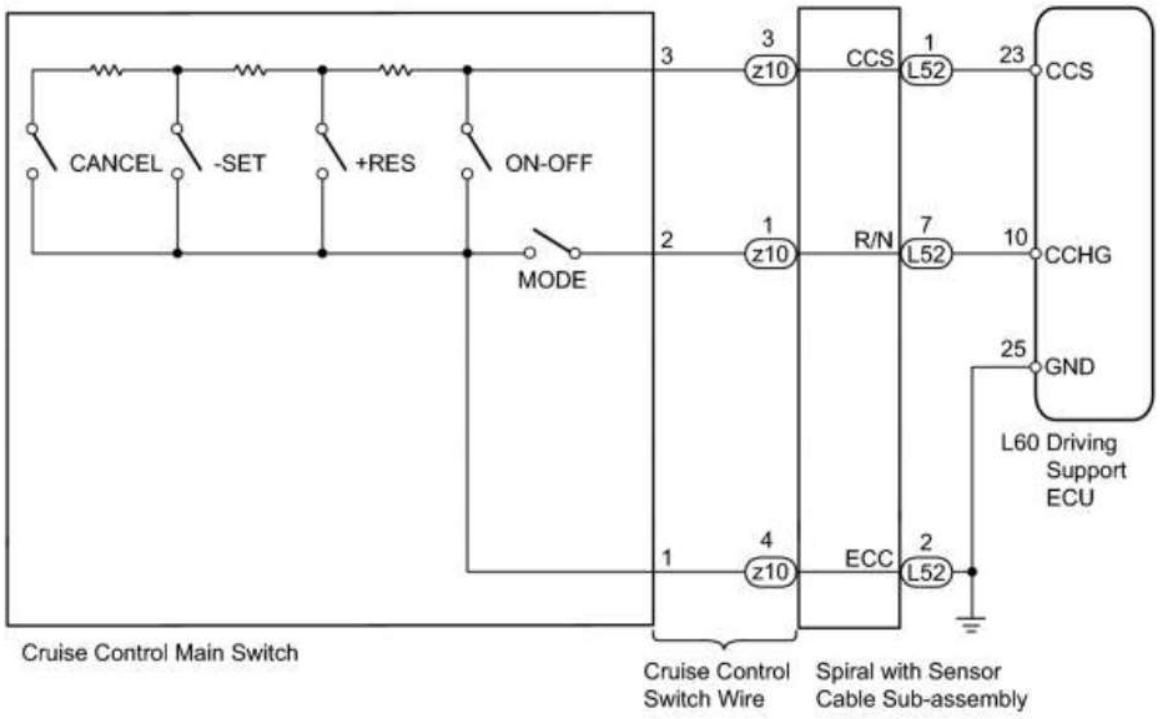
Cruise Control Switch Circuit

# 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 it is being operated it in the direction of each arrow and turns off after being released. The internal contact points of the cruise control main switch are turned on with the switch operation. The driving support ECU 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: constant speed control mode and vehicle-to-vehicle distance control mode.

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

# WIRING DIAGRAM



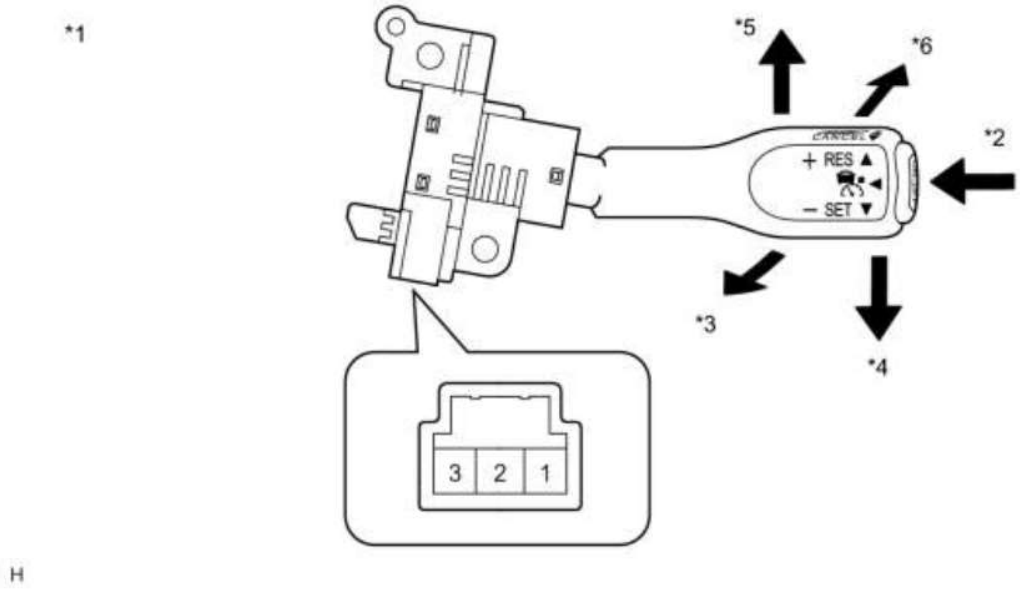

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# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | INSPECT CRUISE CONTROL MAIN SWITCH |

(a) Remove the cruise control main switch INFO.




**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Component without harness connected<br>(Cruise Control Main Switch) | *2 | ON-OFF |
| *3 | CANCEL | *4 | -SET |
| *5 | +RES | *6 | MODE |

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

Standard Resistance:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| 1 - 2<br>1 - 3 | Main switch off*1 | 1 MΩ or higher |
| 1 - 3 | Main switch on | Below 2.5 Ω |
| 1 - 2 | MODE | Below 2.5 Ω |
| 1 - 3 | + RES | 235 to 245 Ω |

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| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| 1 - 3 | - SET | 617 to 643 Ω |
| 1 - 3 | CANCEL | 1509 to 1571 Ω |

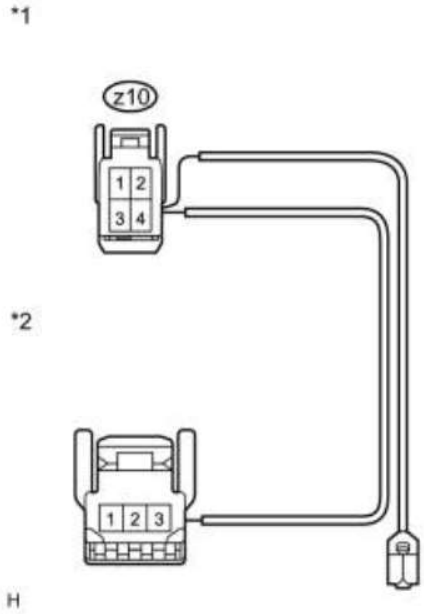
*1: The cruise control main switch lever is in the neutral position.

(c) Reinstall the cruise control main switch INFO.

NG ▶ REPLACE CRUISE CONTROL MAIN SWITCH

OK ▼

| | |
|---|---|
| 2. | CHECK HARNESS AND CONNECTOR (SPIRAL CABLE - CRUISE CONTROL MAIN SWITCH) |




(a) Disconnect the connector from the spiral with sensor cable sub-assembly.

(b) Disconnect the connector from the cruise control main switch.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| Cruise control main switch side connector terminal 1 - z10-4 | Always | Below 1 Ω |
| Cruise control main switch side connector terminal 2 - z10-1 | Always | Below 1 Ω |
| Cruise control main switch side connector terminal 3 - z10-3 | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Spiral with Sensor Cable Sub-assembly) |

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| | |
|---|---|
| *2 | Front view of wire harness connector<br><br>(to Cruise Control Main Switch) |

(d) Reconnect the connector to the spiral with sensor cable sub-assembly.

(e) Reconnect the connector to the cruise control main switch.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL CABLE SUB-ASSEMBLY - CRUISE CONTROL MAIN SWITCH)

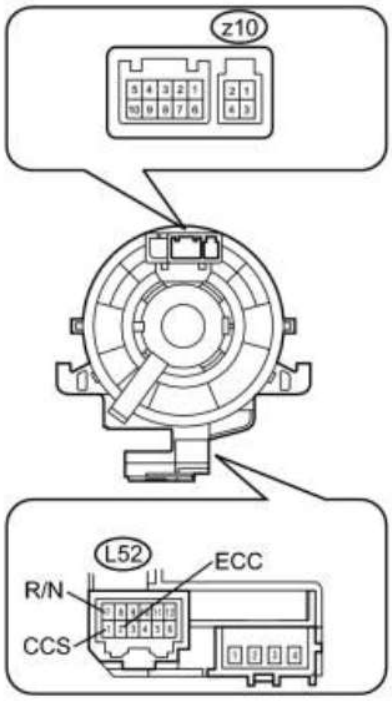
OK ▼

| | |
|---|---|
| 3. | INSPECT SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY |

NOTICE:

The spiral with sensor cable sub-assembly is an important part of the SRS airbag system. Incorrect removal or installation of the spiral with sensor cable sub-assembly may cause airbag deployment. Be sure to read the page shown in the brackets.

*1




(a) Remove the spiral with sensor cable sub-assembly INFO.

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

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Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| z10-1 - L52-7 (R/N) | The spiral with sensor cable sub-assembly is centered | Below 1 Ω |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the left | |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the right | |
| z10-3 - L52-1 (CCS) | The spiral with sensor cable sub-assembly is centered | Below 1 Ω |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the left | |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the right | |
| z10-4 - L52-2 (ECC) | The spiral with sensor cable sub-assembly is centered | Below 1 Ω |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the left | |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the right | |

**Text in Illustration**

| | |
|---|---|
| *1 | Component without harness connected<br><br>(Spiral with Sensor Cable Sub-assembly) |

HINT:

The spiral with sensor cable sub-assembly makes a maximum of approximately 5 rotations.

(c) Install the spiral with sensor cable sub-assembly INFO.

NG ▶ REPLACE SPIRAL WITH CABLE SUB-ASSEMBLY

OK

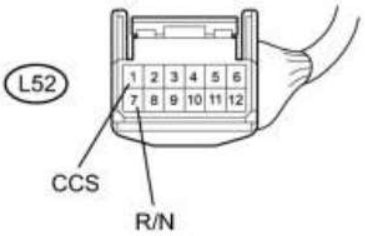
▼

| | |
|---|---|
| 4. | CHECK HARNESS AND CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - DRIVING SUPPORT ECU) |

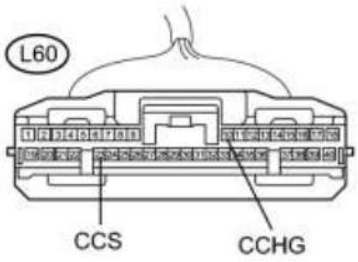
(a) Disconnect the driving support ECU connector.

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*1




*2




(b) Disconnect the spiral with sensor cable sub-assembly connector.

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

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L60-23 (CCS) - L52-1 (CCS) | Always | Below 1 Ω |
| L60-10 (CCHG) - L52-7 (R/N) | Always | Below 1 Ω |

Standard Resistance (Check for Short):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L60-23 (CCS) or L52-1 (CCS) - Body ground | Always | 10 kΩ or higher |
| L60-10 (CCHG) or L52-7 (R/N) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br>(to Spiral with Sensor Cable Sub-assembly) |
| *2 | Front view of wire harness connector<br>(to Driving Support ECU) |

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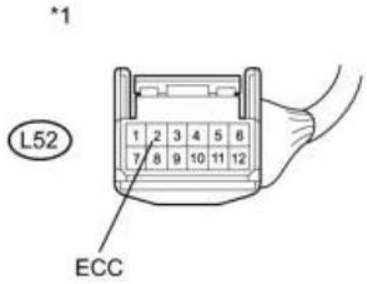
(d) Reconnect the driving support driving support ECU connector.

(e) Reconnect the spiral with sensor cable sub-assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - DRIVING SUPPORT ECU)

OK ▼

| | |
|---|---|
| 5. | CHECK HARNESS AND CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - BODY GROUND) |




(a) Disconnect the spiral with sensor cable sub-assembly connector.

c

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

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L52-2 (ECC) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Spiral with Sensor Cable Sub-assembly) |

(c) Reconnect the spiral with sensor cable sub-assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - BODY GROUND)

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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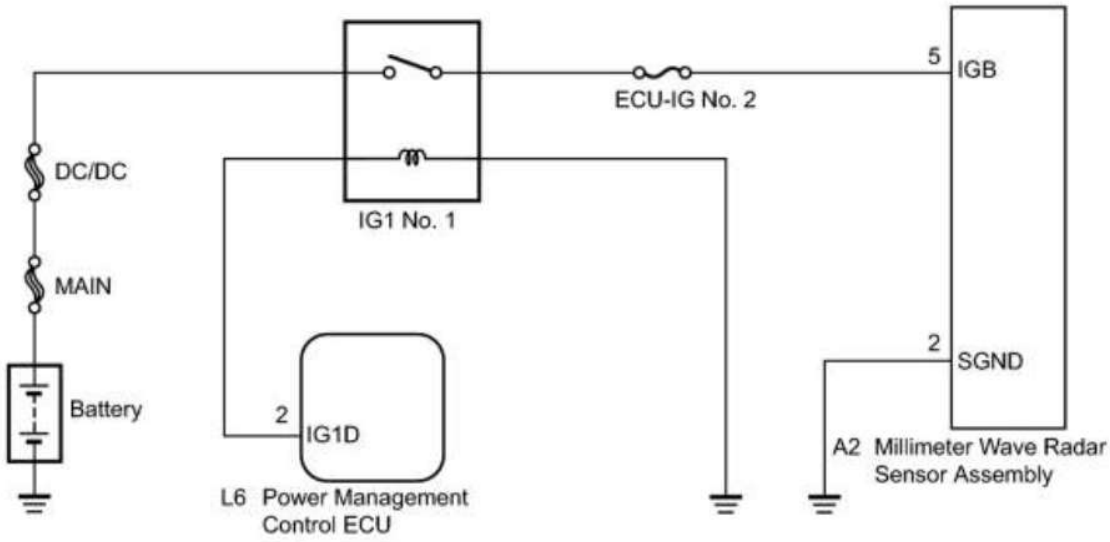
Millimeter Wave Radar Sensor Power Source Circuit

# DESCRIPTION

When the power switch is turned on (IG), battery voltage is applied to terminal IGB of the millimeter wave radar sensor assembly.

This circuit provides power to the millimeter wave radar sensor. The millimeter wave radar sensor emits radio waves towards 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 the vehicle and the object in front. This data is transmitted to the distance control ECU.

# WIRING DIAGRAM




# INSPECTION PROCEDURE

# PROCEDURE

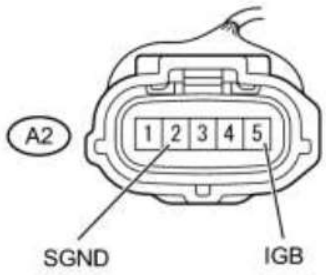
| | |
|---|---|
| 1. | CHECK MILLIMETER WAVE RADAR SENSOR ASSEMBLY (IGB VOLTAGE) |

(a) Disconnect the millimeter wave radar sensor assembly connector.

(b) Turn the power switch on (IG).

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*1




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

Standard Voltage:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A2-5 (IGB) - A2-2 (SGND) | Power switch on (IG) | 10 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Millimeter Wave Radar Sensor Assembly) |

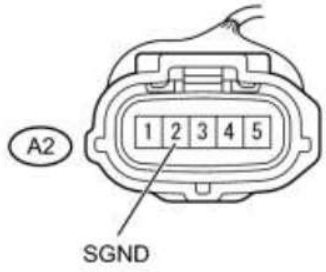
(d) Reconnect the millimeter wave radar sensor assembly connector.

NG ▶ CHECK HARNESS AND CONNECTOR (MILLIMETER WAVE RADAR SENSOR ASSEMBLY - BODY GROUND)

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

| | |
|---|---|
| 2. | CHECK HARNESS AND CONNECTOR (MILLIMETER WAVE RADAR SENSOR ASSEMBLY - BODY GROUND) |

*1




(a) Disconnect the millimeter wave radar sensor assembly connector.

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

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A2-2 (SGND) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector |

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| | |
|---|---|
| | (to Millimeter Wave Radar Sensor Assembly) |

(c) Reconnect the millimeter wave radar sensor assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (MILLIMETER WAVE RADAR SENSOR ASSEMBLY - BODY GROUND)

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (MILLIMETER WAVE RADAR SENSOR ASSEMBLY - IG1 NO. 1 RELAY)**

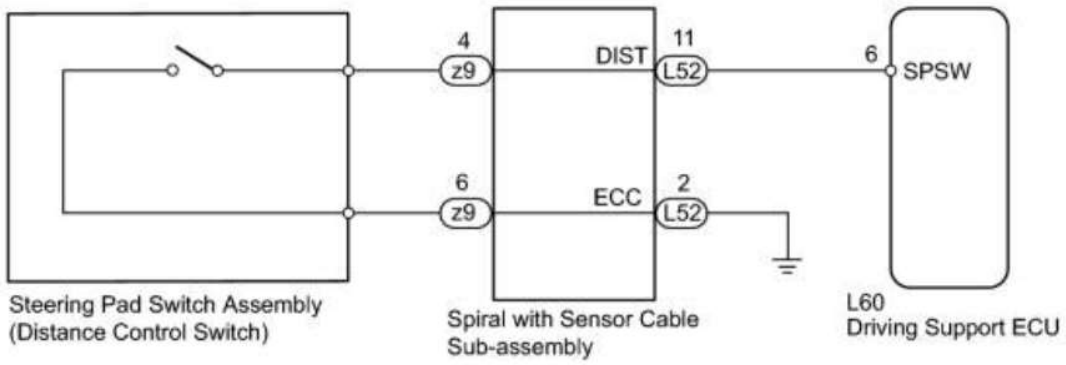
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| Distance Control Switch Circuit |
|---|

# DESCRIPTION

The distance control switch sets vehicle-to-vehicle distance control mode. The distance control switch is installed in the steering pad switch assembly. The vehicle-to-vehicle distance set value can be changed by operating the steering pad switch assembly (distance control switch) while the dynamic radar cruise control system is operating.

# WIRING DIAGRAM




# INSPECTION PROCEDURE

# PROCEDURE

| 1. | READ VALUE USING TECHSTREAM (DISTANCE CONTROL SWITCH) |
|---|---|

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Cruise / Data List / Distance Control Switch.

(e) Check the Data List proper functioning of the distance control switch.

Radar Cruise:

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Distance Control Switch | Distance control switch signal/ON or OFF | ON: Distance control switch on<br><br>OFF: Distance control switch off | - |

OK:

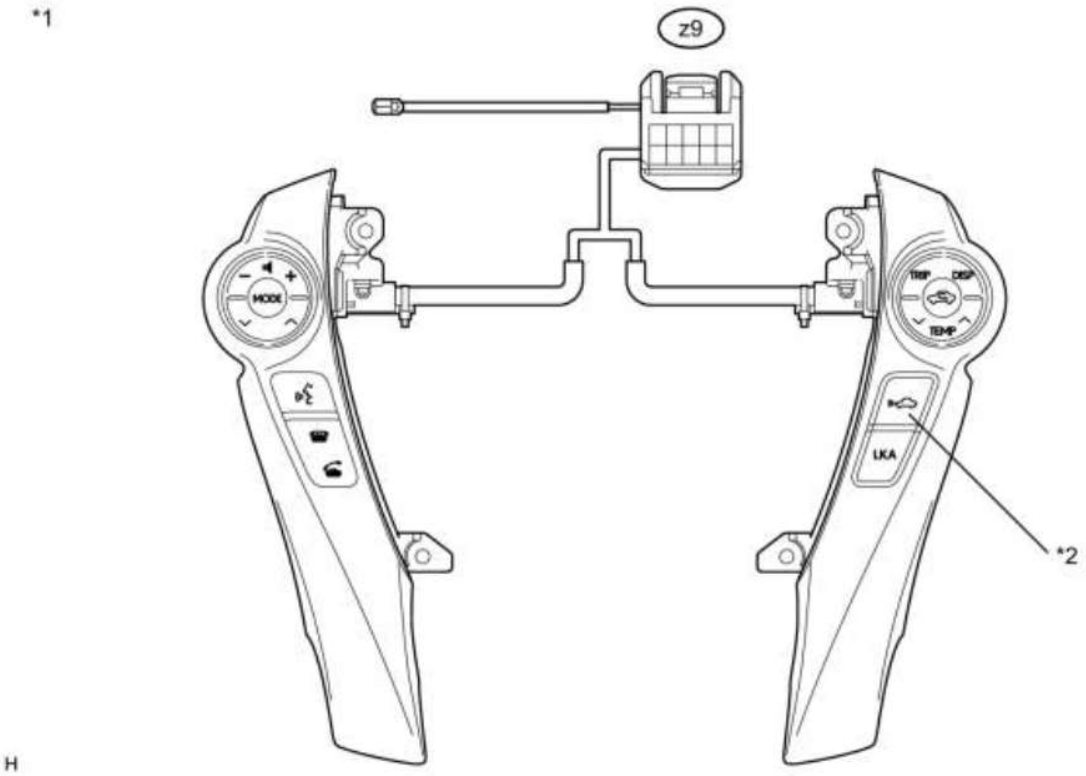
When the distance control switch is operated, the display changes in accordance with switch operation.

NG ▶ INSPECT STEERING PAD SWITCH ASSEMBLY

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

| | |
|---|---|
| 2. | INSPECT STEERING PAD SWITCH ASSEMBLY |

(a) Remove the steering pad switch assembly INFO.




**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Component without harness connected | *2 | Distance Control Switch |

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| | | | |
|---|---|---|---|
| | (Steering Pad Switch Assembly) | | |

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

Standard Resistance:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| z9-4 - z9-6 | Distance control switch ON | Below 2.5 Ω |
| z9-4 - z9-6 | Distance control switch OFF | 10 kΩ or higher |

(c) Install the steering pad switch assembly INFO.

NG ▶ REPLACE STEERING PAD SWITCH ASSEMBLY

OK

▼

| | |
|---|---|
| 3. | INSPECT SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY |

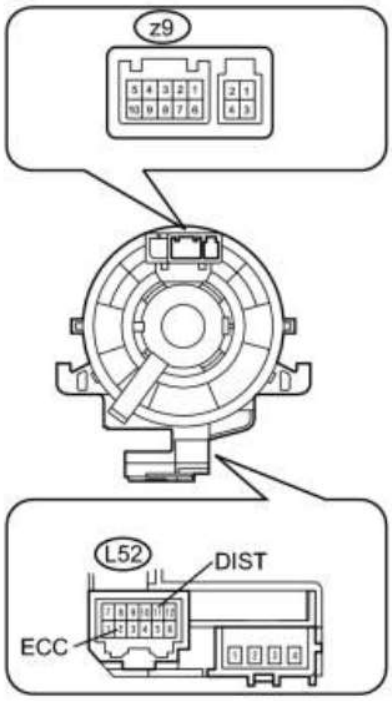
NOTICE:

The spiral with sensor cable sub-assembly is an important part of the SRS airbag system. Incorrect removal or installation of the spiral with sensor cable sub-assembly may cause airbag deployment. Be sure to read the page shown in the brackets.

(a) Remove the spiral with sensor cable sub-assembly INFO.

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*1




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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| z9-4 - L52-11 (DIST) | The spiral with sensor cable sub-assembly is centered | Below 1 Ω |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the left | |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the right | |
| z9-6 - L52-2 (ECC) | The spiral with sensor cable sub-assembly is centered | Below 1 Ω |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the left | |
| | The spiral with sensor cable sub-assembly position is 2.5 rotations to the right | |

**Text in Illustration**

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| | |
|---|---|
| *1 | Component without harness connected<br><br>(Spiral with Sensor Cable Sub-assembly) |

HINT:

The spiral with sensor cable sub-assembly makes a maximum of approximately 5 rotations.

(c) Install the spiral with sensor cable sub-assembly INFO.

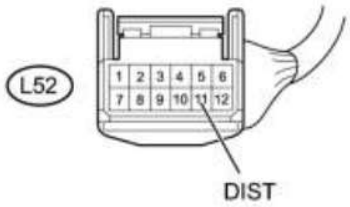
NG ▶ REPLACE SPIRAL WITH CABLE SUB-ASSEMBLY

OK

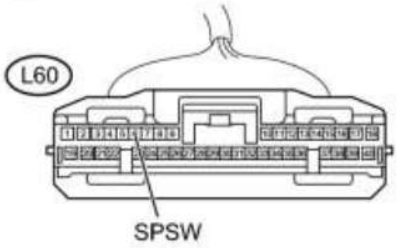
▼

| | |
|---|---|
| 4. | CHECK HARNESS AND CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - DRIVING SUPPORT ECU) |

*1




*2




(a) Disconnect the driving support ECU connector.

(b) Disconnect the spiral with sensor cable sub-assembly connector.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|

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| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L60-6 (SPSW) - L52-11 (DIST) | Always | Below 1 Ω |
| L60-6 (SPSW) or L52-11 (DIST) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Spiral with Sensor Cable Sub-assembly) |
| *2 | Front view of wire harness connector<br><br>(to Driving Support ECU) |

(d) Reconnect the driving support ECU connector.

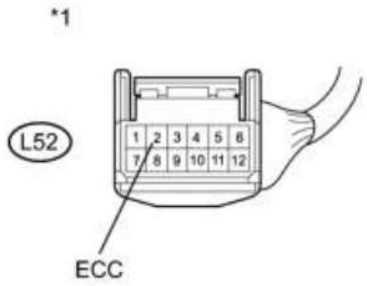
(e) Reconnect the spiral with sensor cable sub-assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - DRIVING SUPPORT ECU)

OK

▼

| | |
|---|---|
| 5. | CHECK HARNESS AND CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - BODY GROUND) |




(a) Disconnect the spiral with sensor cable sub-assembly connector.

c

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

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L52-2 (ECC) - Body ground | Always | Below 1 Ω |

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**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Spiral with Sensor Cable Sub-assembly) |

(c) Reconnect the spiral with sensor cable sub-assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY - BODY GROUND)

OK ▶ **REPLACE DRIVING SUPPORT ECU**

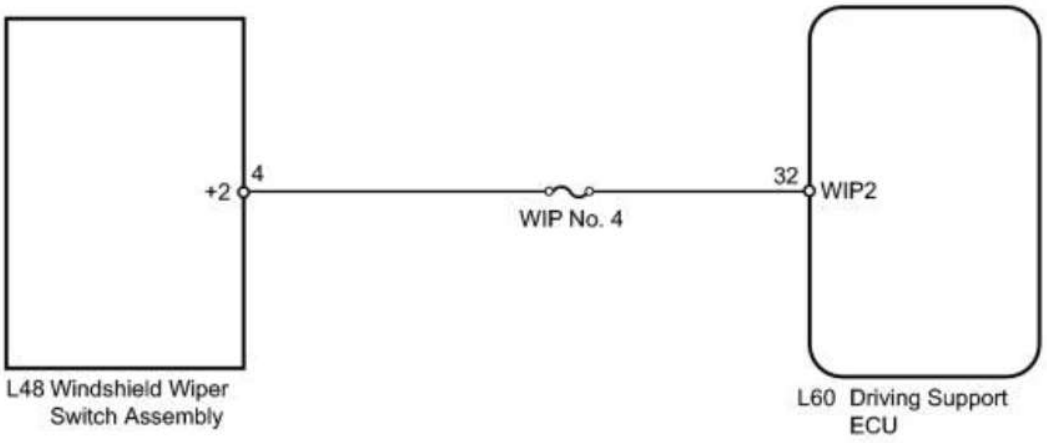
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| Wiper Signal Circuit |
|---|

# DESCRIPTION

When the driving support ECU detects that the wipers are operating at high speed, the dynamic radar cruise control system will be canceled.

# WIRING DIAGRAM




# INSPECTION PROCEDURE

NOTICE:

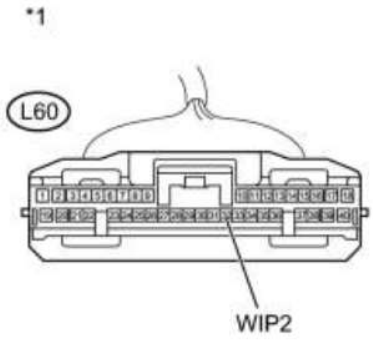
Inspect the fuses for circuits related to this system before performing the following inspection procedure.

# PROCEDURE

| | |
|---|---|
| 1. | INSPECT DRIVING SUPPORT ECU |

(a) Disconnect the driving support ECU connector.

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(b) Turn the power switch on (IG).

(c) Set the windshield wiper switch assembly to the HI position.

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

Standard Voltage:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L60-32 (WIP2) - Body ground | Power switch on (IG)<br><br>Windshield wiper switch assembly Hi position | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Driving Support ECU) |

(e) Reconnect the driving support ECU connector.

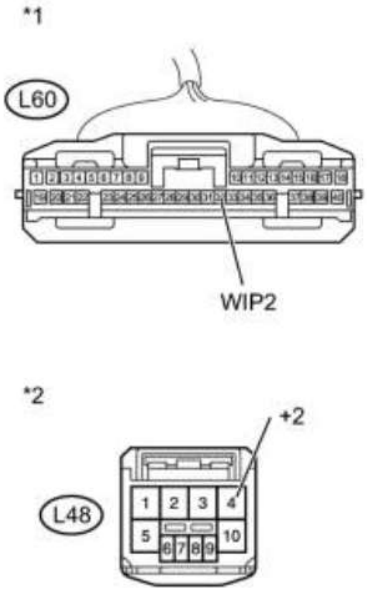
NG ▶ CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT CONTROL ECU - WINDSHIELD WIPER SWITCH)

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

| | |
|---|---|
| 2. | CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT CONTROL ECU - WINDSHIELD WIPER SWITCH) |

(a) Disconnect the driving support ECU connector.

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(b) Disconnect the windshield wiper switch assembly connector.

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

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L60-32 (WIP2) - L48-4 (+2) | Always | Below 1 Ω |

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L60-32 (WIP2) or L48-4 (+2) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Driving Support ECU) |
| *2 | Front view of wire harness connector<br><br>(to Windshield Wiper Switch Assembly) |

(d) Reconnect the driving support ECU connector.

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(e) Reconnect the windshield wiper switch assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DRIVING SUPPORT CONTROL ECU - WINDSHIELD WIPER SWITCH)

OK ▶ **GO TO WIPER AND WASHER SYSTEM**

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Cruise Main Indicator Light Circuit

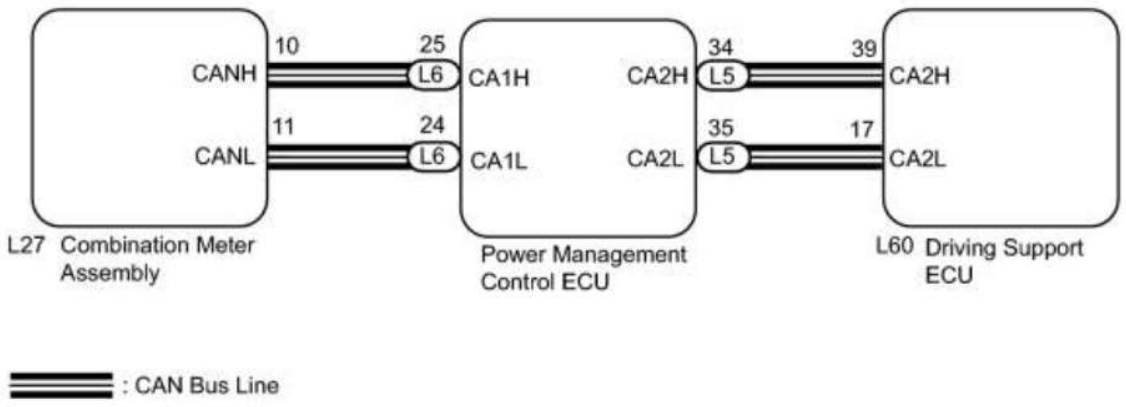
# DESCRIPTION

When the cruise control main switch is turned on, the cruise main indicator light and "RADAR READY" indicator 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 assembly as the alarm buzzer sounds. Items such as "Clean Radar Sensor", "Cruise not Available", "Check Cruise System", and "Radar Cruise Ready" are displayed on the multi-information display on the combination meter assembly when the driving support ECU detects signals from each sensor and actuator and sends them to the combination meter assembly 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 by the cruise control system and the vehicle-to-vehicle distance will shorten. At this time, the system sounds the buzzer and the master warning light blinks 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.

# WIRING DIAGRAM




# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | PERFORM ACTIVE TEST USING TECHSTREAM |

(a) Connect the Techstream to the DLC3.

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(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

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

(e) Check the cruise main indicator light by performing 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 display changes in accordance with Active Test operation.

NG ▶ REPLACE NO. 3 METER CIRCUIT PLATE

OK

▼

| | |
|---|---|
| 2. | READ VALUE USING TECHSTREAM |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(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**

| Techstream Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Cruise Control Main Switch | Cruise control switch signal/ON or OFF | ON: Main switch on<br>OFF: Main switch off | - |

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OK:

When the cruise control main switch is operated, the display changes in accordance with switch operation.

NG ▶ REPLACE DRIVING SUPPORT ECU

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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| Cruise SET Indicator Light Circuit |
|---|

# DESCRIPTION

- The driving support ECU detects a cruise control switch signal and sends it to the combination meter assembly through CAN. Then the SET indicator light comes on.
- The SET indicator light circuit uses CAN for communication. If there is a malfunction in this circuit, check for DTCs in the CAN communication system before troubleshooting this circuit.

# WIRING DIAGRAM

Refer to "Cruise Main Indicator Light Circuit" INFO.

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | PERFORM ACTIVE TEST USING TECHSTREAM |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

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

(e) Check the SET indicator light by performing the Active Test.

**Combination Meter**

| Tester Display | Test Part | Control Range | Diagnostic Note |
|---|---|---|---|
| Indicat. Lamp SET | CRUISE SET indicator light | SET indicator light BLINK / OFF | - |

OK:

The SET indicator light blinks or goes off according to Techstream operation.

NG ▶ REPLACE NO.3 METER CIRCUIT PLATE

OK ▼

| | |
|---|---|
| 2. | READ VALUE USING TECHSTREAM |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

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(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Radar Cruise / Data List.

(e) According to the display on tester, read the Data List.

**Radar Cruise**

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| SET/COAST Switch | - SET switch / ON or OFF | ON: - SET switch ON<br><br>OFF: - SET switch off | - |

OK:

The display changes as shown above according to cruise control main switch operation.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

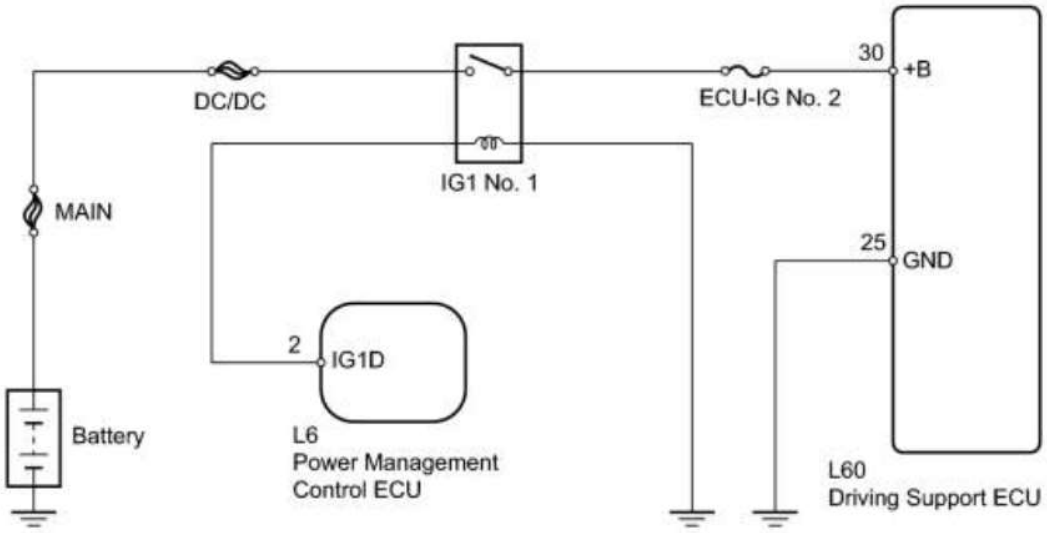
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ECU Power Source Circuit

# DESCRIPTION

- The driving support ECU assembly controls the cruise control system based on information sent from switches, sensors and ECUs.
- The power management control ECU sends current to the IG1 No. 1 relay. This closes the contact points in the relay so that power is supplied to the driving support ECU +B terminal.

# WIRING DIAGRAM




# INSPECTION PROCEDURE

NOTICE:

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

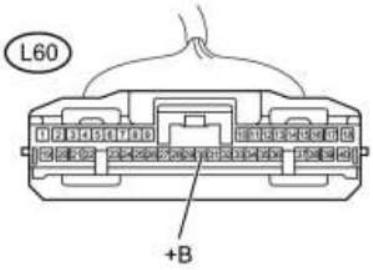
# PROCEDURE

| | |
|---|---|
| 1. | CHECK DRIVING SUPPORT ECU (+B VOLTAGE) |

(a) Disconnect the driving support ECU connector.

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*1




(b) Turn the power switch on (IG).

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

Standard Voltage:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| L60-30 (+B) - Body ground | Power switch on (IG) | 11 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Driving Support ECU) |

(d) Reconnect the driving support ECU connector.

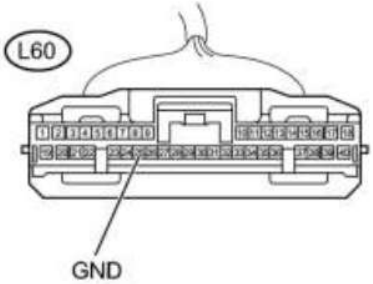
NG ▶ INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK

▼

| | |
|---|---|
| 2. | CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT ECU - BODY GROUND) |

*1




(a) Disconnect the driving support ECU connector.

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

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L60-25 (GND) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Driving Support ECU) |

(c) Reconnect the driving support ECU connector.

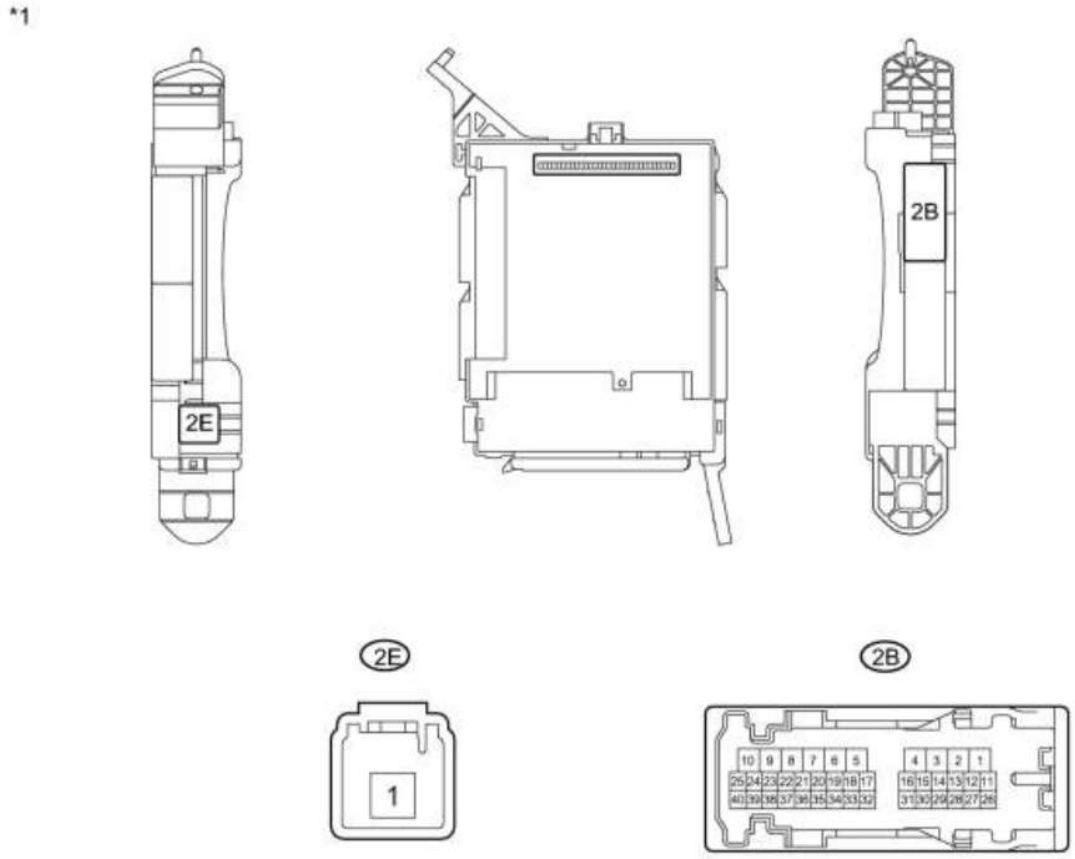
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DRIVING SUPPORT ECU - BODY GROUND)

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

| | |
|---|---|
| 3. | INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY |

(a) Remove the instrument panel junction block assembly.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| 2E-1 - 2B-16 | Always | 10 kΩ or higher |
| 2E-1 - 2B-16 | Battery voltage applied between terminals 2B-25 and 2B-6 | Below 1 Ω |

**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Instrument Panel Junction Block Assembly | - | - |

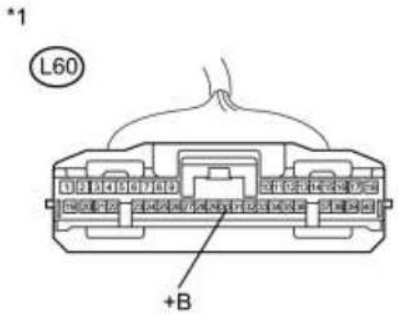
(c) Reinstall the instrument panel junction block assembly.

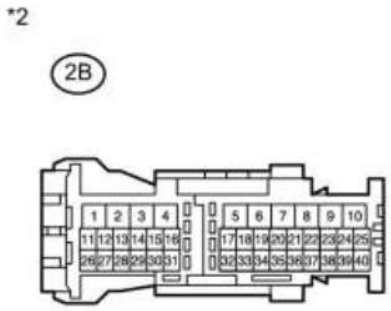
NG ▶ REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK ▼

| | |
|---|---|
| 4. | CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT ECU - INSTRUMENT PANEL JUNCTION BLOCK) |

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(a) Disconnect the driving support ECU connector.

(b) Disconnect the instrument panel junction block assembly connector.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L60-30 (+B) - 2B-16 | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Driving Support ECU) |
| *2 | Instrument Panel Junction Block |

(d) Reconnect the instrument panel junction block assembly connector.

(e) Reconnect the driving support ECU connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DRIVING SUPPORT ECU - INSTRUMENT

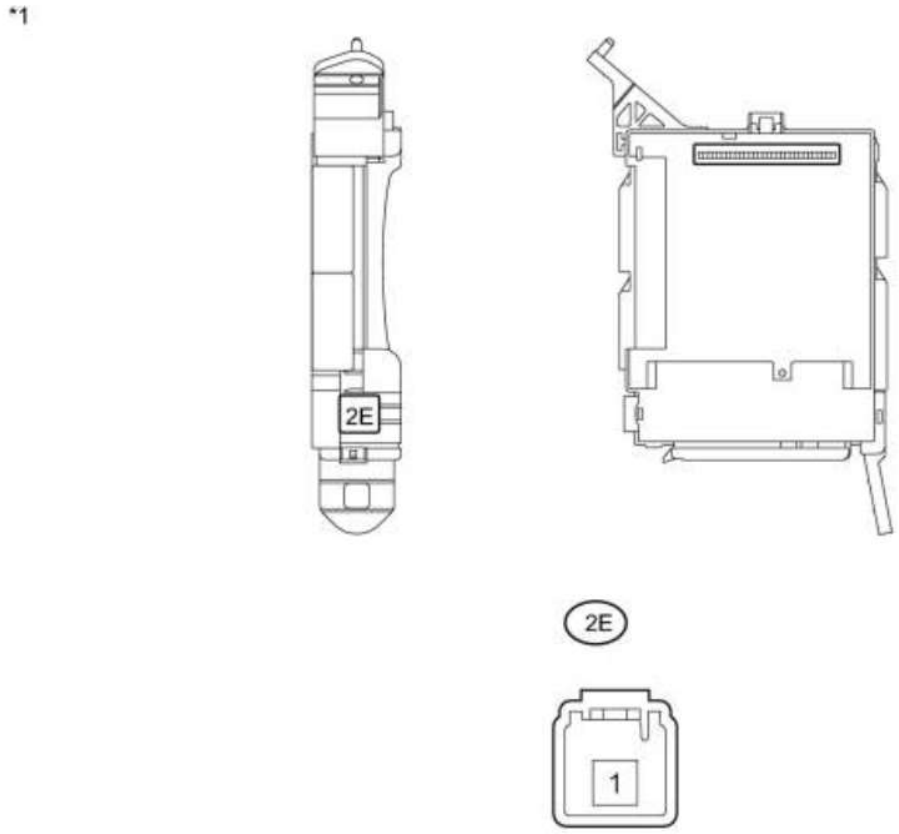
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PANEL JUNCTION BLOCK)

OK

| | |
|---|---|
| 5. | CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK POWER SOURCE CIRCUIT) |

(a) Disconnect the instrument panel junction block assembly connector.




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

Standard Voltage:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| 2E-1 - Body ground | Always | 11 to 14 V |

**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Instrument Panel Junction Block Assembly | - | - |

(c) Reconnect the instrument panel junction block assembly connector.

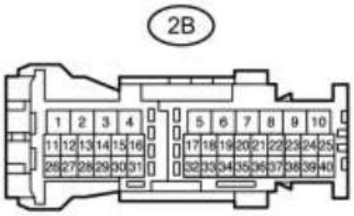
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NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY - BATTERY)

OK ▼

| | |
|---|---|
| 6. | CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY - BODY GROUND) |

*1




(a) Disconnect the instrument panel junction block assembly connector.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| 2B-6 - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Instrument Panel Junction Block Assembly |

(c) Reconnect the instrument panel junction block assembly connector.

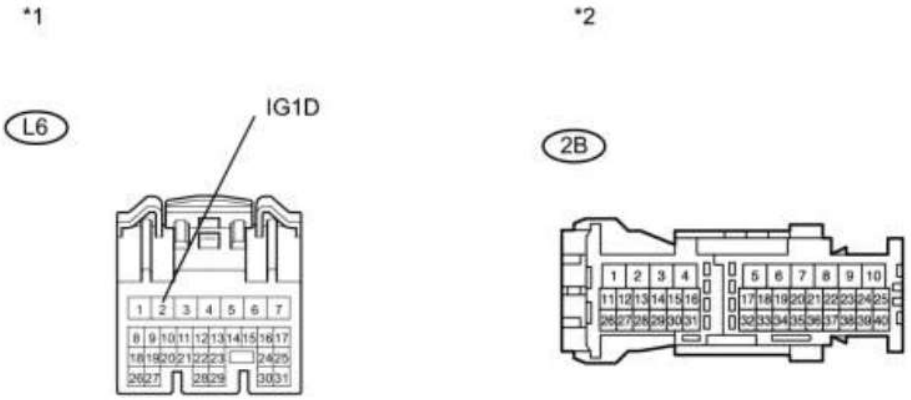
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY - BODY GROUND)

OK ▼

| | |
|---|---|
| 7. | CHECK HARNESS AND CONNECTOR (POWER MANAGEMENT CONTROL ECU - INSTRUMENT PANEL J/B ASSEMBLY) |

(a) Disconnect the power management control ECU connector.

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Front view of wire harness connector<br>(to Power Management Control ECU) | *2 | Instrument Panel Junction Block Assembly |

(b) Disconnect the instrument panel junction block assembly connector.

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

Standard Resistance (Check for Open):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| 2B-25 - L6-2 (IG1D) | Always | Below 1 Ω |

Standard Resistance (Check for Short):

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| 2B-25 or L6-2 (IG1D) - Body ground | Always | 10 kΩ or higher |

(d) Reconnect the power management control ECU connector.

(e) Reconnect the instrument panel junction block assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER MANAGEMENT CONTROL ECU - INSTRUMENT PANEL J/B ASSEMBLY)

OK ▶ **GO TO SMART KEY SYSTEM**

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TC and CG Terminal Circuit

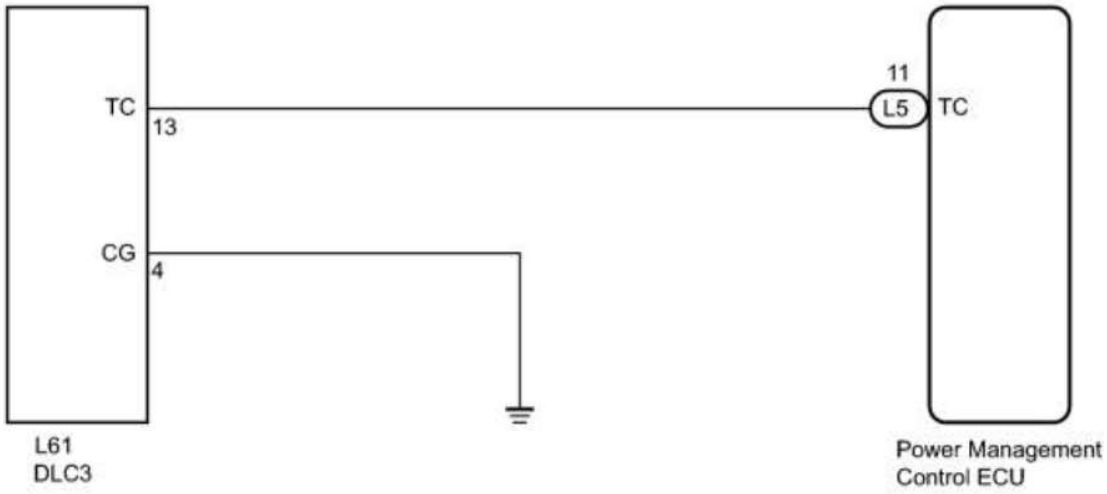
# DESCRIPTION

Connecting terminals TC and CG of the DLC3 causes the system to enter self-diagnostic mode. If a malfunction is present, the cruise main indicator light 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



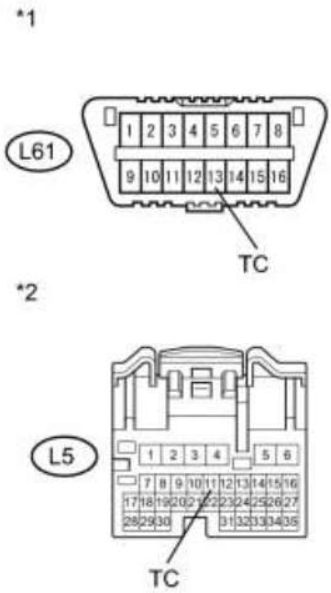

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# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | CHECK HARNESS AND CONNECTOR (TERMINAL TC of DLC3 - ECM) |

(a) Disconnect the power management control ECU connector.




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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L5-11 (TC) - L61-13 (TC) | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | DLC3 |
| *2 | Front view of wire harness connector<br><br>(to Power Management Control ECU) |

(c) Reconnect the power management control ECU connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DLC3 - POWER MANAGEMENT CONTROL ECU)

OK

▼

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

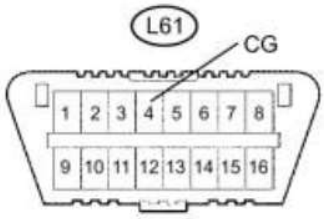
(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L61-4 (CG) - Body ground | Always | Below 1 Ω |

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*1




## Text in Illustration

| | |
|---|---|
| *1 | DLC3 |

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DLC3 - BODY GROUND)

OK

▼

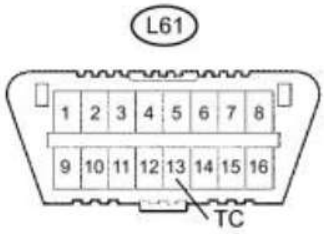
| | |
|---|---|
| 3. | CHECK HARNESS AND CONNECTOR (TERMINAL TC of DLC3 - BODY GROUND) |

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L61-13 (TC) - Body ground | Always | 10 kΩ or higher |

*1




## Text in Illustration

| | |
|---|---|
| *1 | DLC3 |

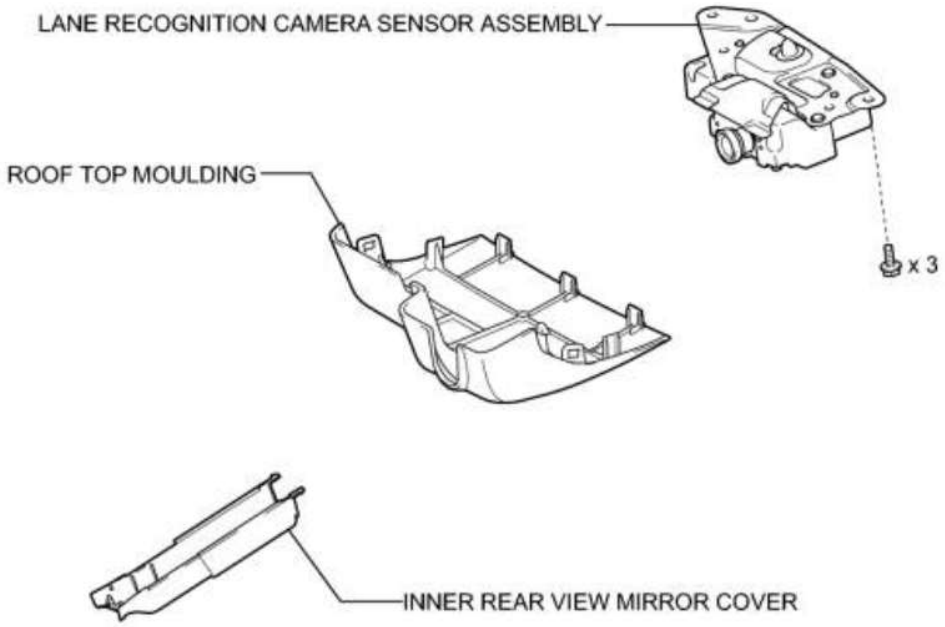
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR OR EACH ECU

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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# COMPONENTS

# ILLUSTRATION



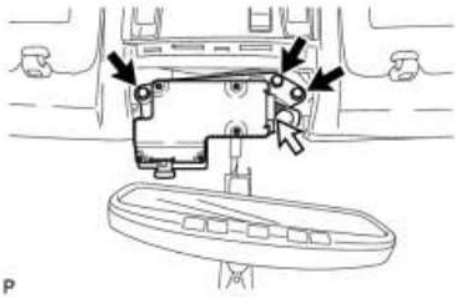

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# REMOVAL

1. REMOVE INNER REAR VIEW MIRROR COVER INFO

2. REMOVE ROOF TOP MOULDING INFO



P

3. REMOVE LANE RECOGNITION CAMERA SENSOR ASSEMBLY

(a) Disconnect the connector.

(b) Remove the 3 bolts.

(c) Detach the clip and remove the lane recognition camera sensor assembly.

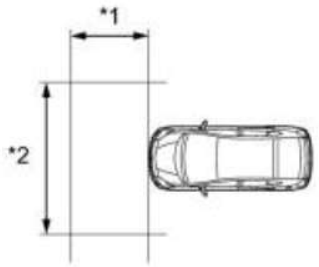
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# ADJUSTMENT

HINT:

If the lane recognition camera sensor is replaced or removed and installed, or the toe-in is adjusted, perform the lane recognition camera sensor adjustment.

1. ADJUST LANE RECOGNITION CAMERA SENSOR ASSEMBLY




P

**Text in Illustration**

| | |
|---|---|
| *1 | 1.5 m or more |
| *2 | 3 m or more |

- Make sure there are no black and white patterned objects in front of the vehicle.
- Be sure to perform the measurement on a level surface that is free of obstacles and extends 1.5 m (4.92 ft.) or more in front of the vehicle.
- Make sure that there is no wind when performing the measurement.
- Check that there are no reflective materials in the surroundings or on the ground within a 3 m (9.84 ft.) x 3 m (9.84 ft.) area in front of the vehicle.
- Perform the inspection in a bright area.

(a) Prepare for beam axis learning.

(1) Move the vehicle to a level surface.

(2) Make sure the engine oil in the vehicle is at the specified level.

(3) Make sure the engine coolant in the vehicle is at the specified level.

(4) Make sure the fuel tank is full.

(5) Make sure the spare tire is in the vehicle.

(6) Make sure the standard tools are in the vehicle.

(7) Make sure nobody is in the vehicle.

(8) Make sure no extra loads are in the vehicle.

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(9) Adjust the tire pressures to the specified pressure.

(10) Clean the windshield.

(11) If the lens of the lane recognition camera sensor is dirty, apply a small amount of lens cleaner to a clean and soft cloth, and clean the lens.

(b) Perform the front wheel alignment adjustment.

(1) Perform the front wheel alignment adjustment INFO.

NOTICE:

Perform this procedure as accurately as possible.

(c) Perform the rear wheel alignment adjustment.

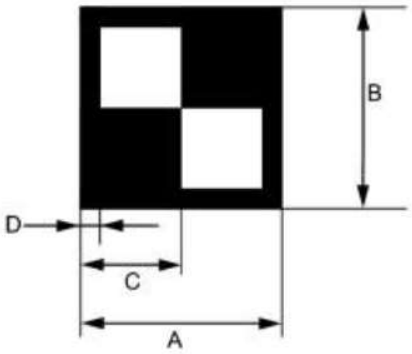
(1) Perform the rear wheel alignment adjustment INFO.

NOTICE:

- Perform this procedure as accurately as possible.

(d) Create a target sheet.

(1) Print or copy the illustration . Check that the dimensions are +/- 5 mm (0.197 in.) of the ones in the table below.




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Dimension:

| Area | Specification |
|---|---|
| A | 160 mm (6.30 in.) |
| B | 160 mm (6.30 in.) |
| C | 80 mm (3.15 in.) |

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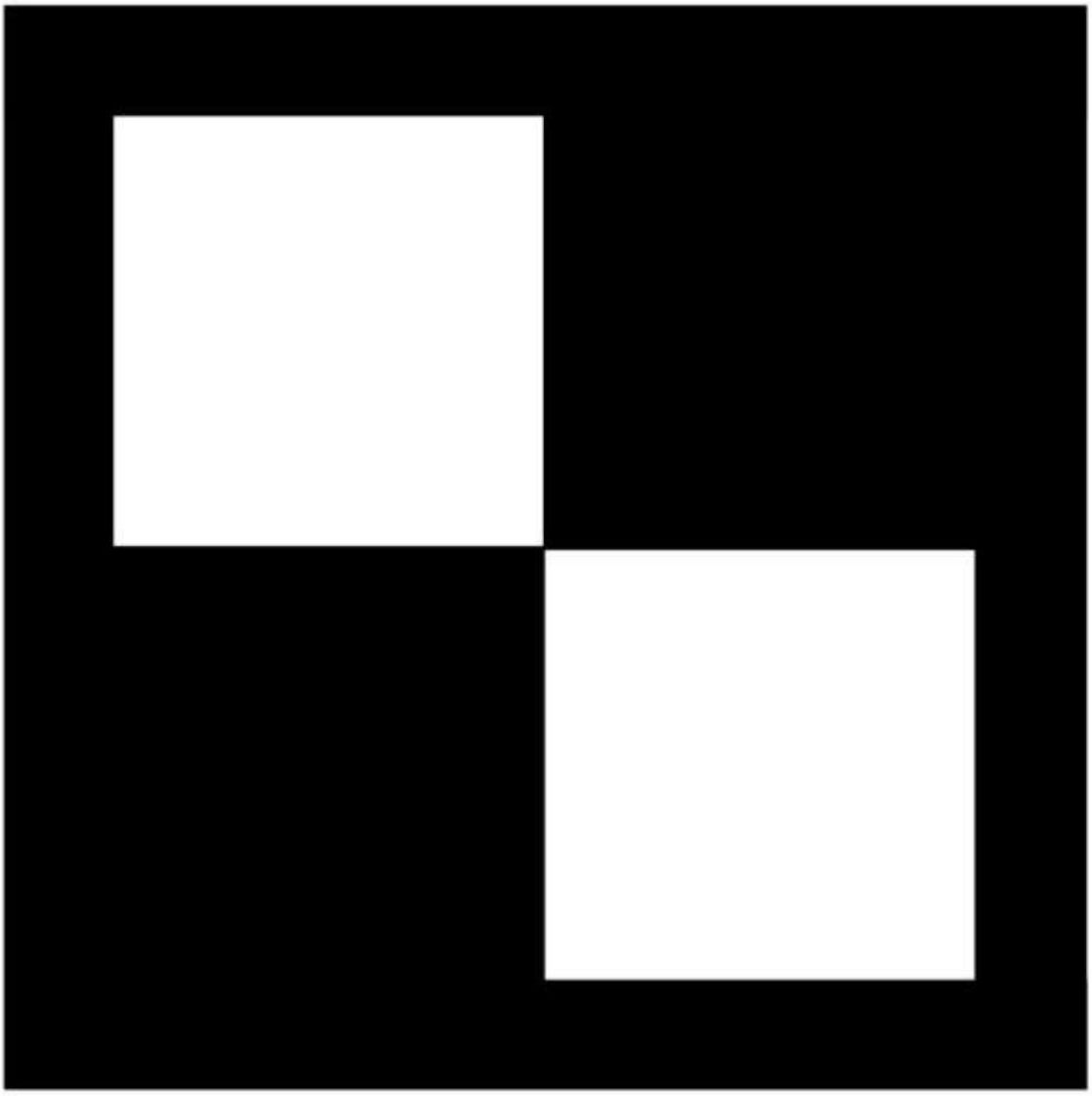
| Area | Specification |
|---|---|
| D | 16 mm (0.630 in.) |

NOTICE:

- Make sure that the black areas of the target sheet it not glossy.
- Make sure that the borders of the black and white areas on the target sheet it straight, and are not warped or blurry.

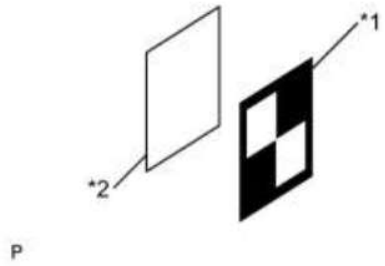
If the print or copy's dimensions are not as specified, adjust settings and reprint or recopy so that the print or copy's dimensions are as specified.

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(e) Attach the target sheet.




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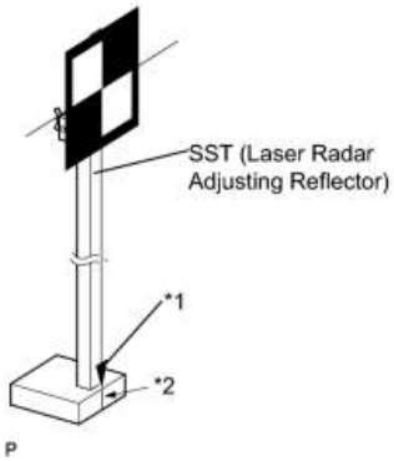
**Text in Illustration**

| | |
|---|---|
| *1 | Target Sheet |
| *2 | Cardboard, etc. |

(1) Place the prepared target sheet on a piece of cardboard of the same size with the black area on the top right, as shown in the illustration. Then use double-sided tape to fix the target sheet in place.

NOTICE:

Do not attach reflective tape, such as transparent adhesive tape, etc. to the target face, as this may affect target recognition.




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(2) Hang a weight with a pointed tip from the center of the target sheet. Then, with double-sided tape, attach the target sheet to the reflector so that the weight aligns with the mark-off line of SST (laser radar adjusting reflector).

SST: 09870-60000

09870-60010

09870-60020

## Text in Illustration

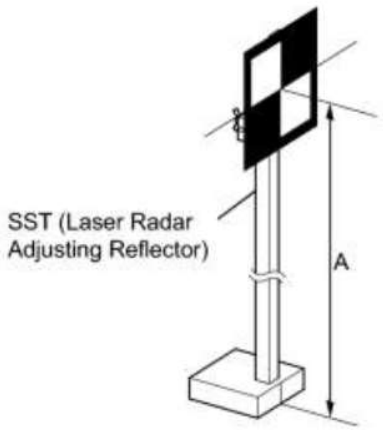
| | |
|---|---|
| *1 | Pointed Tip Weight |
| *2 | Mark-off Line |

- Perform this procedure as accurately as possible.
- Attach the target sheet so that it is horizontal with the ground.

(3) Move the reflector up and down to position the center of the target at the height shown in the illustration, and fix it in place.

Dimension A:

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986 mm (3.23 ft.)

SST: 09870-60000

09870-60010

09870-60020

NOTICE:

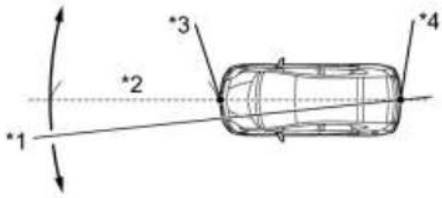
Perform this procedure as accurately as possible.

(f) Measure the target placement point.

NOTICE:

- Do not place black and white patterned objects near the target.
- Face the vehicle toward a wall with no patterns, or make sure the background behind the target has no patterns.
- Perform this procedure as accurately as possible.
- Do not place reflective materials in the area behind the target.
- Make sure the distance between the target and wall is within 3 m (9.84 ft.).
- Make sure the target's shadow is not on the wall, as the camera may have a recognition error.

(1) From the center of the front and back bumpers (center of the emblems), hang a weight with a pointed tip, and mark the front bumper center point A and the rear bumper center point B on the ground.




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## Text in Illustration

| | |
|---|---|
| *1 | Line |
| *2 | Approx. 2 m |
| *3 | Point A |
| *4 | Point B |

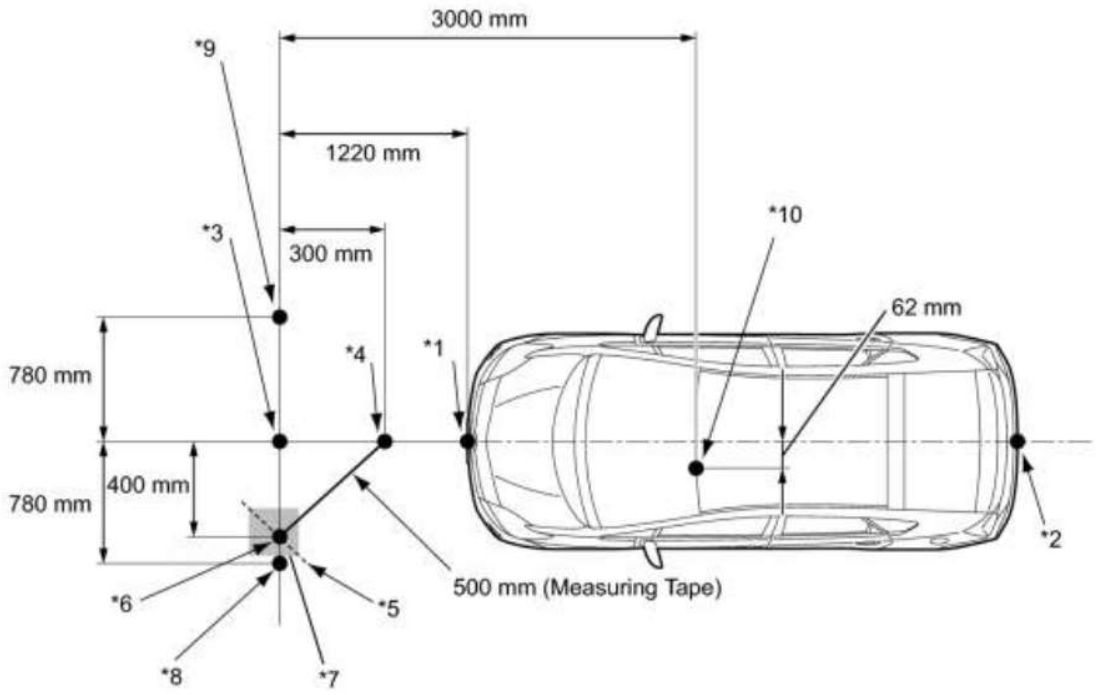
(2) Draw a line that connects points A and B, and extend the line approximately 2 m (6.56 ft.) beyond the front of the vehicle.

HINT:

Secure the end of a string to point B. Then hold the other end of the string approximately 2 m (6.56 ft.) in front of the vehicle, and move it to the left or right to align the string with point A to make a straight line.

(3) Mark point C 1220 mm (4.00 ft.) from the front bumper center point A (placement point 1).

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Point A | *2 | Point B |
| *3 | Placement Point 1 Point C | *4 | Point D |
| *5 | Line E | *6 | Point F |
| *7 | Place Tape (Gray Area) Approx. 400 mm from Point C | *8 | Placement Point 2 Point G |
| *9 | Placement Point 3 Point H | *10 | Lane Recognition Camera Sensor Position |

(4) From point C, move 300 mm (11.8 in.) towards the front bumper center point A and mark point D.

(5) From point C, place marking tape at the point 400 mm (1.30 ft.) perpendicular to the line that connects points A and B.

NOTICE:

Place the tape so that there is plenty of surface area along the perpendicular line.

(6) Using a measuring tape of 5 m (16.41 ft.) or more, and point D as the center point, draw the part of a 500 mm (1.64 ft.) circle that overlaps the marking tape (line E).

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(7) Mark point F where the following intersect: 1) from point C, the point that is 400 mm (1.30 ft.) perpendicular from the line that connects point A and B; and 2) line E.

(8) Set the measuring tape from point C to F. Then mark point G 780 mm (2.56 ft.) from point C (line extending from point C to F) (placement point 2).

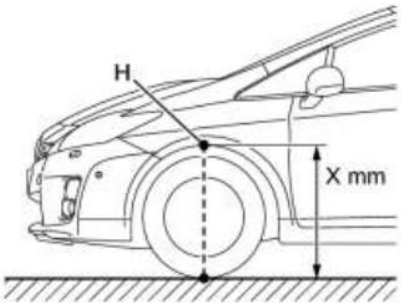
(9) Set the measuring tape from point F to C. Then mark point H 780 mm (2.56 ft.) beyond point C (placement point 3).

(10) Set a string between points G and H, and draw a line on the ground (target placement line).

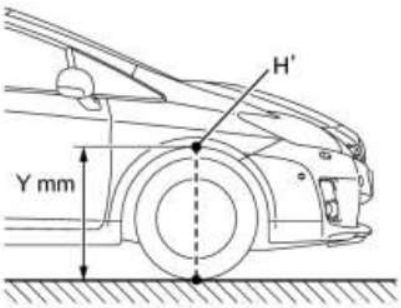
(g) Measure lane recognition camera sensor height.

NOTICE:

- Do not place black and white patterned objects near the target.
- Face the vehicle toward a wall with no patterns, or make sure the background behind the target has no patterns.
- Perform this procedure as accurately as possible.
- Do not place reflective materials in the area behind the target.
- Make sure the distance between the target and wall is within 3 m (9.84 ft.).
- Make sure the target's shadow is not on the wall, as the camera may have a recognition error.




(1) Measure the distance (X mm or in.) from the ground to point H for the front left wheel arch.




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(2) Measure the distance (Y mm or in.) from the ground to point H' for the front right wheel arch.

(3) The average of the 2 distances (X mm or in, Y mm or in.) plus 617 mm (2.03 ft.) is the height of the lane recognition camera sensor.

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(h) Memorize camera/target position.

NOTICE:

- Close all doors.
- Perform the procedure with no one in the vehicle.
- During the procedure, do not lean on the vehicle.
- Turn on the clearance lights.
- Do not turn on the headlights.

(1) When using the Techstream:

1. Connect the Techstream to the DLC3.
2. Turn the power switch on (IG).*1
3. Turn the Techstream on.
4. Select "Chassis" from the display screen.
5. Select "Lane Keeping Assist" from the display screen.
6. Select "Utility" from the display screen.
7. Select "Camera/target position memory".

   HINT:

   A buzzer will sound for 1 second.

8. Follow the Techstream display, and continue with the adjustment.

(2) Input the measured height of the lane recognition camera sensor and the horizontal position of the camera "-62 mm (-2.44 in.)" into the input screen. Then press the "Enter" button on the display screen.

(3) Input "3000 mm (9.833 ft.)" for the distance from the camera to the target and "986 mm (3.23 ft.)" for the height of the target into the input screen. Then press the "Enter" button on the display screen.

(4) Press the "Exit" button to finish the camera/target position memory mode.

NOTICE:

If "Error Camera/target position memory" is displayed on the screen, press the "Try Again" button, and repeat from procedure *1 again.

(i) Perform beam axis learning.

(1) Select "Chassis" from the display screen.

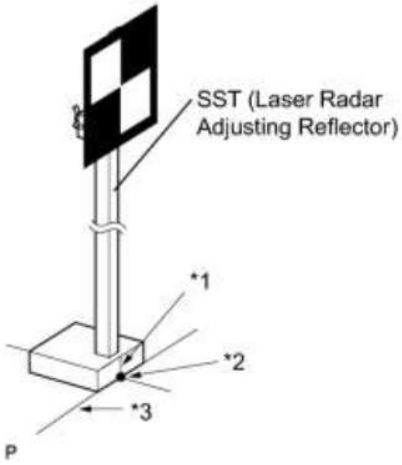
(2) Select "Lane Keeping Assist" from the display screen.*1

(3) Select "Utility" from the display screen.

(4) Select "Camera Axis Adjust" from the display screen.

(5) Follow the Techstream display, and continue with the adjustment.

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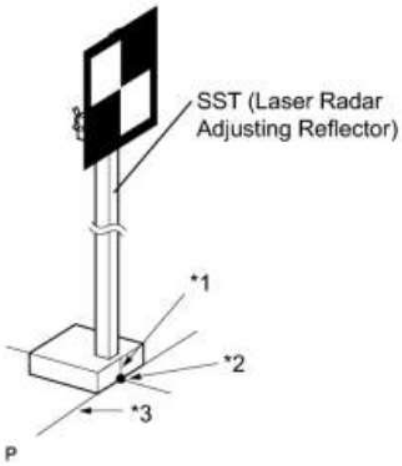



(6) Align the target sheet with the target placement line, and align the mark-off line with placement point 1 (point C).

## Text in Illustration

| | |
|---|---|
| *1 | Mark-off Line |
| *2 | Point C |
| *3 | Target Placement Line |

(7) Check that the screen displays beam axis learning for target 1, then press the "Enter" button on the display screen.




(8) Align the target sheet with the target placement line, and align the mark-off line with placement point 2 (point G).

## Text in Illustration

| | |
|---|---|
| *1 | Mark-off Line |
| *2 | Point G |
| *3 | Target Placement Line |

(9) Check that the screen displays beam axis learning for target 2, then press the "Enter" button on the display screen.

NOTICE:

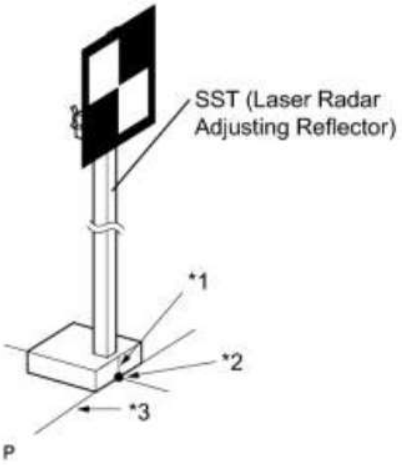
Within 3 minutes after the screen displays the beam axis learning for target 2, move the target and press the "Enter" button on the display screen.

(10) Align the target sheet with the target placement line, and align the mark-off line with placement point 3 (point H).

## Text in Illustration

| | |
|---|---|
| *1 | Mark-off Line |
| *2 | Point H |
| *3 | Target Placement Line |

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(11) Check that the screen displays beam axis learning for target 3, then press the "Enter" button on the display screen.

NOTICE:

Within 3 minutes after the screen displays the beam axis learning for target 3, move the target and press the "Enter" button on the display screen.

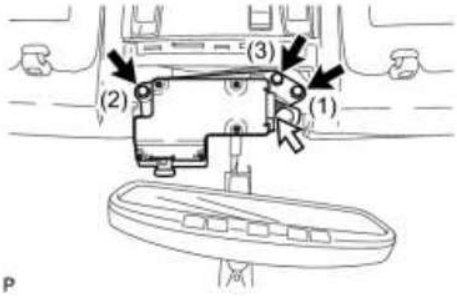
(12) Press the "Exit" button to finish the beam axis learning mode.

## If "Error camera axis adjust" is displayed on the screen, press the "Exit" button. Then after checking the conditions below, turn the power switch on (IG) and off, and repeat from procedure *1 again.

- Height of the target.
- Distance from lane recognition camera sensor to target.
- Orientation of target (black area positioned on top right).
- If surrounding area is bright enough.
- If black and white patterned objects are placed near the target.

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# INSTALLATION




1. INSTALL LANE RECOGNITION CAMERA SENSOR ASSEMBLY

(a) Attach the lane recognition camera sensor assembly with the clip.

(b) Temporarily install the lane recognition camera sensor assembly with the 3 bolts.

(c) Tighten the 3 bolts in the order shown in the illustration to install the lane recognition camera sensor assembly.

(d) Connect the connector.

2. INSTALL ROOF TOP MOULDING INFO

3. INSTALL INNER REAR VIEW MIRROR COVER INFO

4. ADJUST LANE RECOGNITION CAMERA SENSOR ASSEMBLY INFO

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# PRECAUTION

1. NOTICE FOR INITIALIZATION

NOTICE:

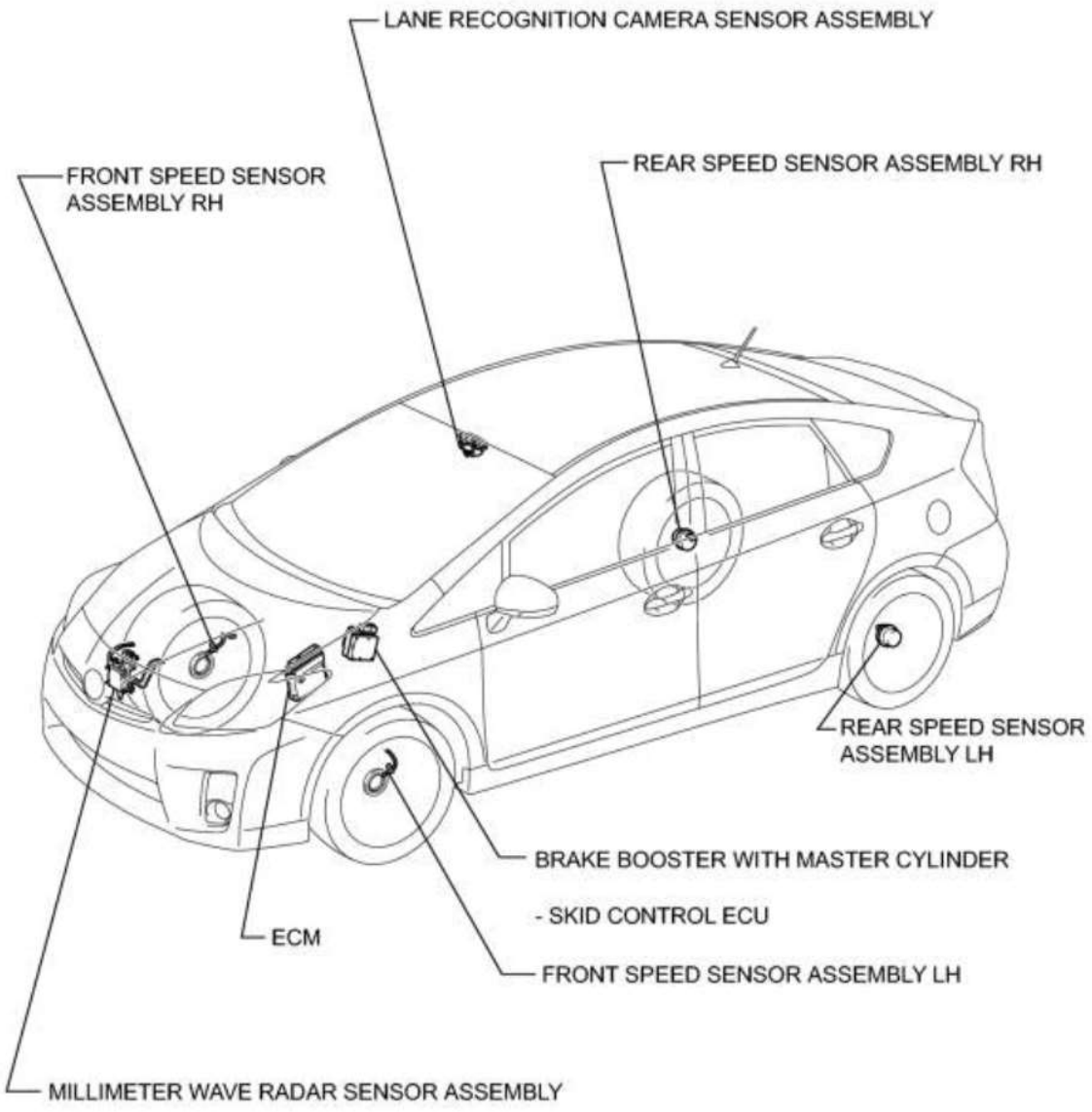
When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

| System Name | See Procedure |
|---|---|
| Advanced Parking Guidance System | INFO |

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# PARTS LOCATION

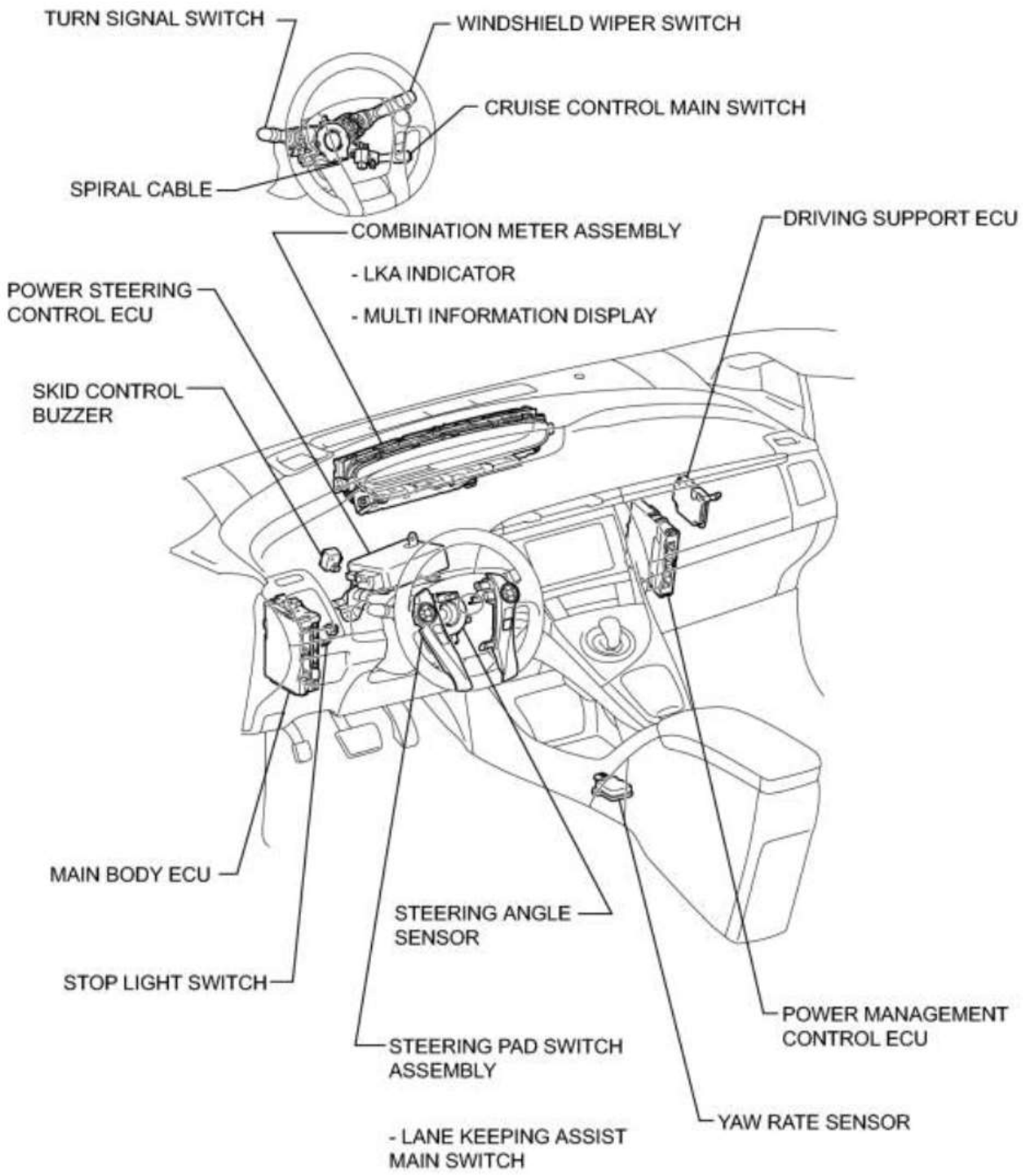
# ILLUSTRATION




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# ILLUSTRATION

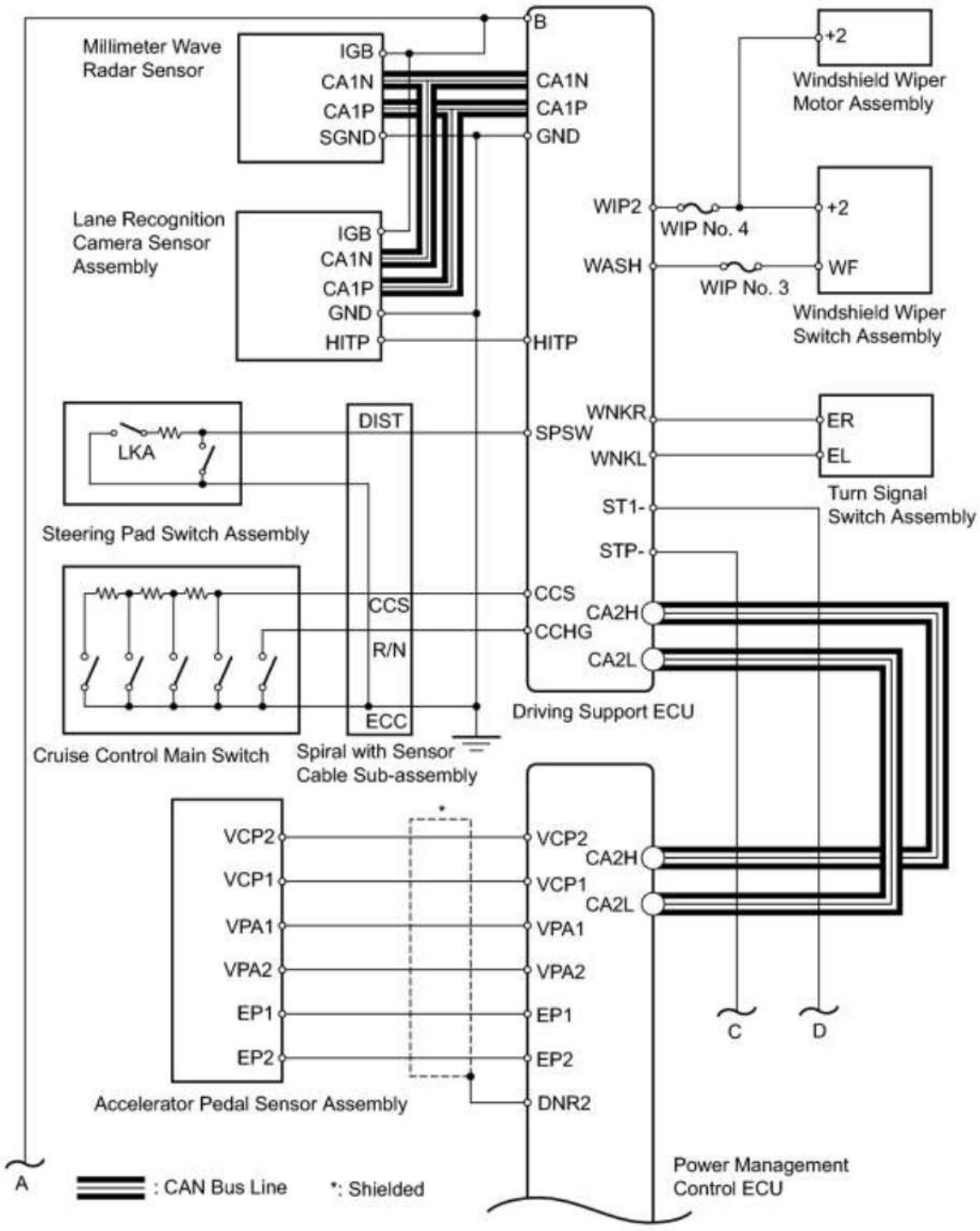
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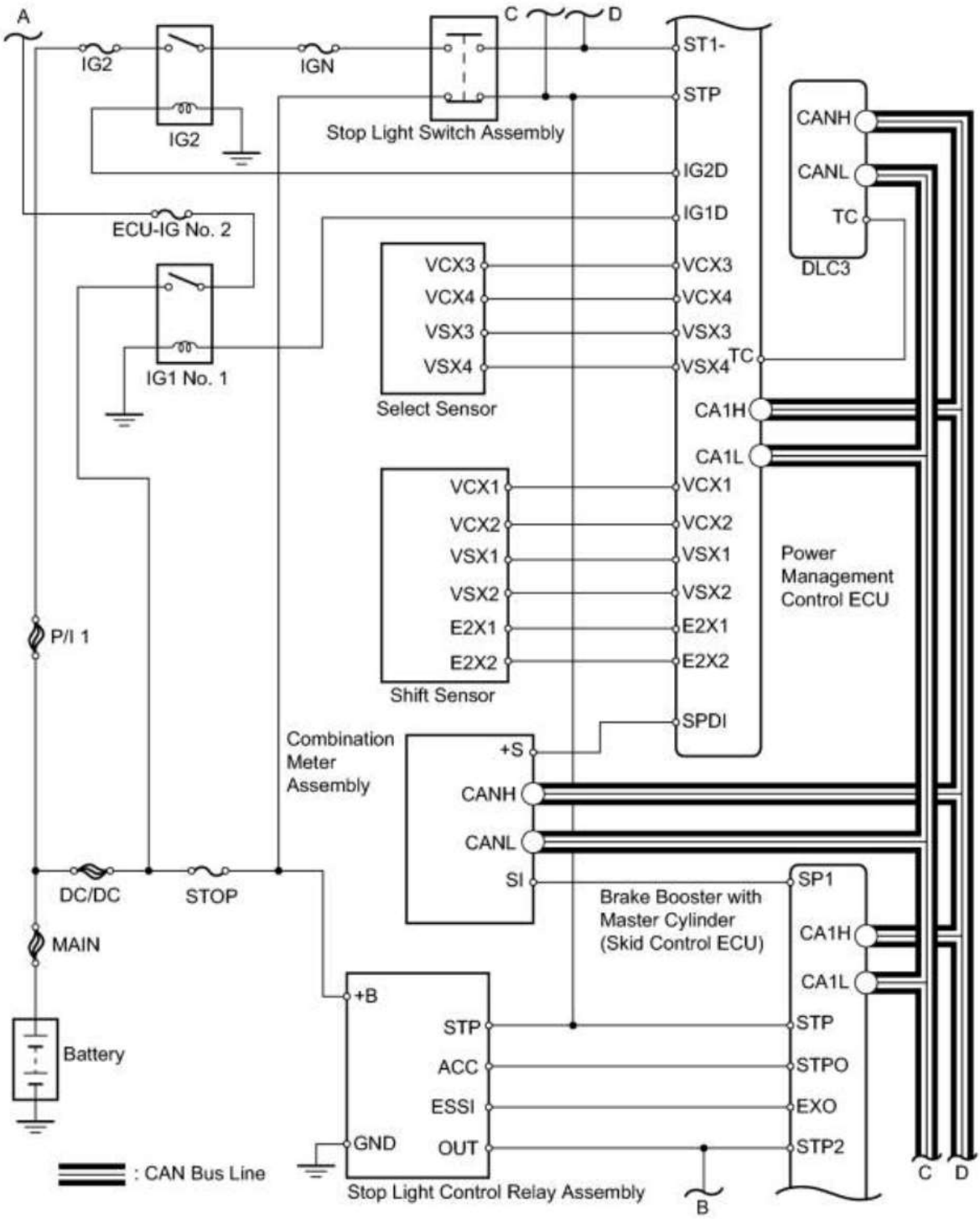

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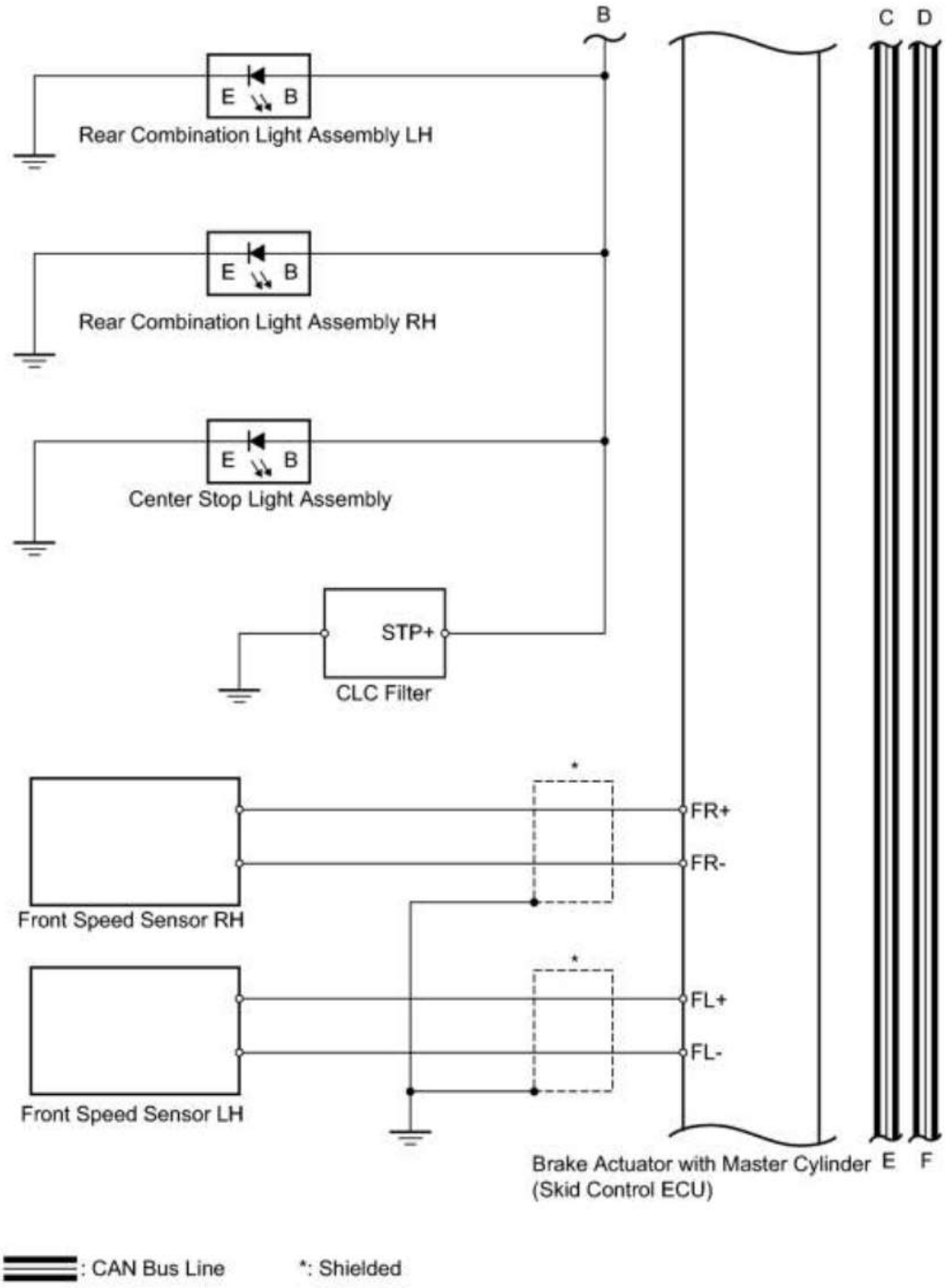
# SYSTEM DIAGRAM



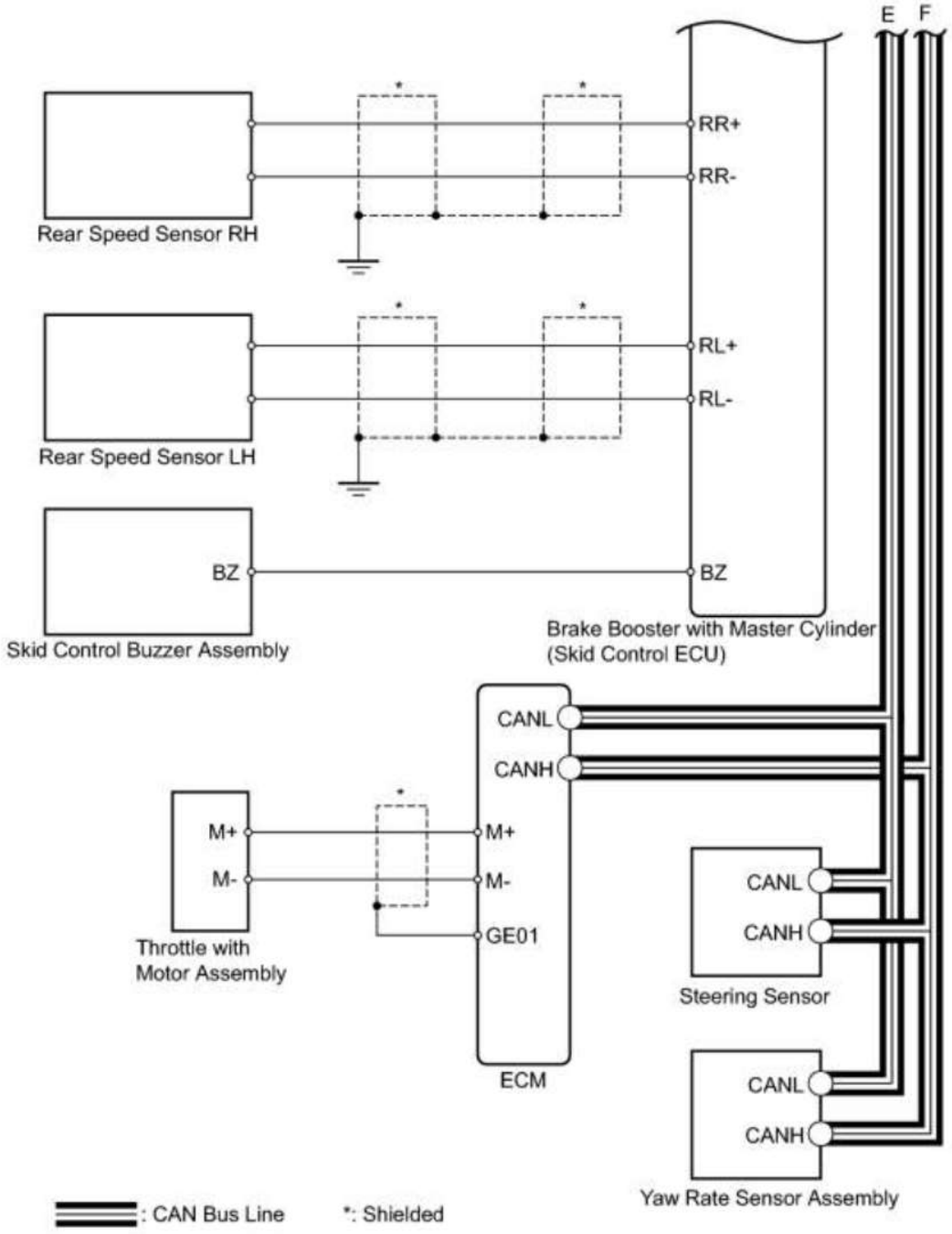

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## Communication Table

| Sender ECU | Receiver ECU | Signal | Line |
|---|---|---|---|
| Driving support ECU | Combination meter | • LKA indicator light signal<br>• Lane-keeping assist system malfunction signal<br>• Warning buzzer signal<br>• Cruise control signal | CAN |

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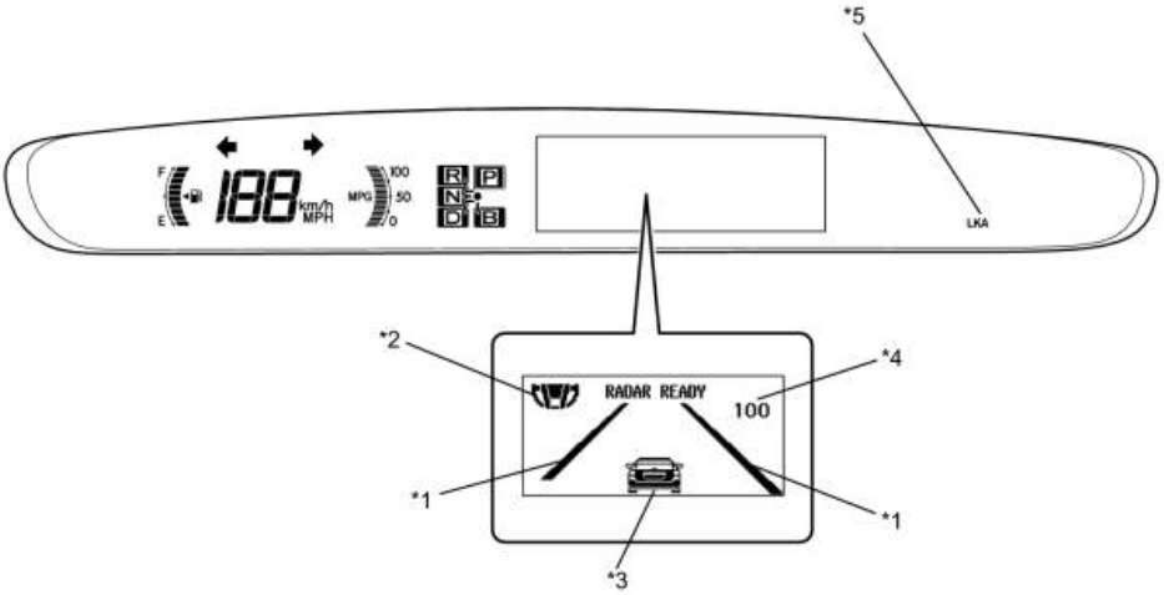
| Sender ECU | Receiver ECU | Signal | Line |
|---|---|---|---|
| | | • Multi-information display signal | |
| Power management control ECU | Driving support ECU | • Accelerator pedal position signal<br>• Shift position signal (D and R)<br>• Cruise control operation signal<br>• Cruise control cancel demand signal<br>• Hybrid control system malfunction signal<br>• SFI system malfunction signal | CAN |
| Driving support ECU | Power management control ECU | Target driving force signal | CAN |
| Millimeter wave radar sensor | Driving support ECU | Distance to vehicle in front signal | CAN |
| Brake booster with master cylinder (skid control ECU) | Driving support ECU | • Vehicle speed signal<br>• Yaw rate sensor malfunction signal<br>• Stop light control relay malfunction signal<br>• Skid control buzzer malfunction signal<br>• Vehicle stability control signal | CAN |
| Main body ECU | Driving support ECU | Vehicle specification information<br>(destination, steering wheel position) | CAN |
| Power steering control ECU | Driving support ECU | Steering assist signal | CAN |
| Lane-recognition camera sensor assembly | Driving support ECU | White line signal | CAN |
| Driving support ECU | Power steering control ECU | Torque assist demand signal | CAN |
| Driving support ECU | Brake booster with master cylinder (skid control ECU) | Skid control buzzer sound signal | CAN |

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# SYSTEM DESCRIPTION

## 1. LANE-KEEPING ASSIST DESCRIPTION

(a) The lane-keeping assist system uses an image of the road from the lane-recognition camera sensor to detect the lane markers for the lane that the vehicle is in. If the system detects that the vehicle is about to move out of its lane, it uses the warning buzzer, multi-information display and steering assistance to warn the driver.




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**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | White lines | *2 | Steering wheel |
| *3 | Radar cruise display | *4 | Radar cruise set vehicle speed |
| *5 | LKA Indicator | - | - |

- White lines
  - The white line indicate the condition of the lane keeping assist system.
    i. Lines are not displayed: Lane keeping assist system is off.
    ii. Thin lines are displayed: Lane keeping assist system is off.
    iii. Thick lines are displayed: Lane keeping assist system is operating.
- Steering wheel
  - When the steering wheel is displayed, this indicates that the lane keeping assist function is operating.
- Radar cruise display
  - Indicates operation conditions for radar cruise
- Radar cruise set vehicle speed

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- Indicates the set vehicle speed when the radar cruise is activated

However, in the following conditions, the lane-keeping assist system may not function normally.

- Vehicle is near toll booths or similar areas
- Road has no lane marker
- Lane marker are cracked
- Road has yellow lines
- There is a shadow on either of the lane marker
- As a result of reflections, road surface is bright
- Road with reflective surface similar to concrete road
- Area where brightness changes suddenly, such as entrances and exits of tunnels or similar area
- Bright light directed at sensor
- Incline of road varies, winding road or other type of road where road surface is irregular
- Bad weather
- Frozen or snowy roads
- Road surface with water or other liquid

2. SYSTEM OPERATION

(a) Lane departure warning function:

The lane departure warning function operates when the lane-keeping assist switch is on, the vehicle speed is 48 km/h (30 mph) or more, and lane markers on the road surface are detected. With the lane departure warning function operating, if the vehicle is about to move out of the lane and this is detected by the driving support ECU, the ECU uses the warning buzzer and the multi-information display to warn the driver. Also, the ECU uses the electronic power steering system's motor to apply steering force and give suggestions to the driver for lane departure avoidance.

HINT:

This function only provides suggestions for lane departure avoidance. This function does not automatically move the vehicle within a lane.

| Lane Departure Warning Function Operation Stop Condition | Restart Condition |
|---|---|
| When vehicle speed is less than 48 km/h (30 mph) | When vehicle speed is 48 km/h (30 mph) |
| When turn signal light switch is operated | When turn signal light switch is turned off |
| When steering force above a specified amount is applied | When steering force above a specified amount is not applied |
| When windshield wiper switch is set to Lo or Hi | When windshield wiper switch is turned off |
| When lane recognition camera sensor cannot detect lane marker | When lane recognition camera sensor can detect lane marker |
| While brake pedal operation is being detected | After brake pedal operation is completed |
| After lane departure warning has been issued | When the vehicle is back to its lane, or a few seconds have passed since warning was executed |

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(b) Lane-keeping assist function:

The lane-keeping assist function operates when the lane-keeping assist switch is ON, the vehicle speed is approximately 72 to 180 km/h (45 to 112 mph) and the dynamic radar cruise control system is ON. With the lane-keeping assist function operating, steering assistance is provided for the driver according to the driving conditions so that the vehicle stays near the midpoint of a lane. When the vehicle cannot be maintained within a lane and this is detected by the driving support ECU, the ECU uses the warning buzzer and the multi-information display to warn the driver. During the lane-keeping assist function operation, if any of the following conditions occurs, the lane-keeping assist function will stop operating. If the condition is no longer detected, the lane-keeping assist function will automatically start operating again.

| Lane-keeping Assist Function Operation Stop Condition | Restart Condition |
|---|---|
| When lane recognition camera sensor cannot detect lane marker | When lane recognition camera sensor can detect lane marker |
| When vehicle speed is not within 72 to 180 km/h (45 to 112 mph) | When vehicle speed is within 72 to 180 km/h (45 to 112 mph) |
| When turn signal light switch is operated | When turn signal light switch is turned off |
| When windshield wiper switch is set to Lo or Hi | When windshield wiper switch is turned off |
| When steering force above a specified amount is applied | When steering force above specified amount is not detected |
| When steering force above a specified amount does not occur* | When steering operation is detected |
| When changing lanes | When driving within a lane is confirmed |

HINT:

*: This refers to situations where the vehicle is driven for 15 seconds or more on a lane that is straight; or 5 seconds or more on a curved road (curve radius 1000 m (3281 ft.) or less).

During the lane-keeping assist function operation, if any of the following conditions is detected, the lane-keeping assist function will stop operating.

- When dynamic radar cruise control system is canceled*
- When lane-keeping assist switch is turned off
- When object recognition camera sensor's interior temperature is 70°C (158°F) or more
- When lane-keeping assist system is malfunctioning

HINT:

*: During the lane-keeping assist function operation, if the dynamic radar cruise control system is canceled, the lane-keeping assist system will change from the lane-keeping assist function to the lane departure warning function.

3. LKA INDICATOR LIGHT

The LKA indicator light is built into the combination meter. It informs the driver of the operational condition or malfunctions of the lane keeping assist system.

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| LKA Indicator | System Condition |
|---|---|
| Off | Not activated |
| On | Activated |
| Blink | Malfunction |

4. FUNCTION OF MAIN COMPONENTS

| Item | Outline |
|---|---|
| Power steering control ECU | • Based on signal from driving support ECU, power steering control ECU applies steering force<br>• Sends driver's steering operation information to driving support ECU |
| Brake booster with master cylinder (skid control ECU) | • Receives buzzer operation signal from driving support ECU, and sends it to skid control buzzer.<br>• Sends vehicle speed information to driving support ECU |
| Steering angle sensor | Detects driver's steering torque and transmits its signal to power steering control ECU |
| Yaw rate sensor | Detects yaw rate of vehicle and transmits its signal to driving support ECU |
| Combination meter (LKA indicator light) | • Turns on when lane-keeping assist switch is on<br>• If driving support ECU detects malfunction, this light flashes to warn driver |
| Combination meter (Warning buzzer) | When lane-keeping assist system detects malfunction, warning buzzer sounds once to inform driver |
| Cruise control main switch | Turns cruise control system on / off |
| Stop light switch assembly | Detects depressing of brake pedal and transmits its signal to driving support ECU |
| Skid control buzzer | This buzzer sounds upon receiving signal from brake booster with master cylinder (skid control ECU) |
| Vehicle speed sensor | Sends vehicle speed signal to brake booster with master cylinder (skid control ECU), and then it is sent to driving support ECU |
| Driving support ECU | • Based on lane marker information and information from other functions, driving support ECU sends signals to electronic power steering control ECU so that it applies steering force<br>• Controls multi-information display and buzzer sound condition<br>• Monitors lane-keeping assist malfunctions, and records diagnostic information |
| Lane-recognition camera sensor | Obtains an image of the road in front of the vehicle. An internal image processor generates information such as lane width, road curvature, yaw angle and the amount of vehicle offset from the center of the lane, and this information is sent to the driving support ECU. |
| Millimeter wave radar sensor | Detects a preceding vehicle and calculates the distance to the preceding vehicle. |
| Lane keeping assist main switch | Activates or deactivates the system. |

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| Item | Outline |
|---|---|
| Windshield wiper switch | Sends the operation condition of the windshield wiper switch to the driving support ECU. |
| Turn signal switch | Sends the operation condition of the turn signal switch to the driving support ECU. |
| Combination meter | • Controls the multi-information display and illumination of the LKA indicator in accordance with the respective display request signals from the driving support ECU.<br>• Sounds the meter buzzer in accordance with the buzzer request signal from the driving support ECU. |
| Multi-information display | Displays the operating condition of the system. |

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# HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the lane-keeping assist system.
- *: Use the Techstream.

| | |
|---|---|
| 1. | VEHICLE BROUGHT TO WORKSHOP |

NEXT

| | |
|---|---|
| 2. | INSPECT BATTERY VOLTAGE |

Standard voltage:

11 to 14 V

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

NEXT

| | |
|---|---|
| 3. | CHECK COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM* |

(a) Use the Techstream to check if the CAN Communication System is functioning normally.

**Result**

| Result | Proceed to |
|---|---|
| CAN communication system DTC is not output | A |
| CAN communication system DTC is output | B |

B INFO Go to CAN COMMUNICATION SYSTEM

A

| | |
|---|---|
| 4. | CHECK FOR DTC* |

(a) Check for DTCs INFO.

(b) Clear the DTCs INFO.

(c) Recheck for DTCs INFO.

**Result**

| Result | Proceed to |
|---|---|
| DTC does not reoccur | A |
| DTC reoccurs | B |

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B ▶ Go to step 7

A ▼

| | |
|---|---|
| 5. | PROBLEM SYMPTOMS TABLE |

(a) Problem symptoms table INFO.

**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 ▼

| | |
|---|---|
| 6. | OVERALL ANALYSIS AND TROUBLESHOOTING* |

(a) Terminals of ECU INFO.

(b) Data List / Active Test INFO.

NEXT ▼

| | |
|---|---|
| 7. | REPAIR OR REPLACE |

NEXT ▼

| | |
|---|---|
| 8. | CONFIRMATION TEST |

NEXT ▶ **END**

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# PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of the problem symptom. 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.

**Lane-keeping Assist System**

| Symptom | Suspected Area | See page |
|---|---|---|
| Lane-keeping assist system does not operate | Main switch circuit | INFO |
| | Lane-recognition camera sensor assembly | INFO |
| | Harness and connector | - |
| | Driving support ECU | INFO |
| LKA indicator light is abnormal (Does not turn on) | Indicator light circuit | INFO |
| | Main switch circuit | INFO |
| | Combination meter | INFO |
| | Driving support ECU | INFO |
| LKA indicator light is abnormal (Remains on) | Indicator light circuit | INFO |
| | Main switch circuit | INFO |
| | Combination meter | INFO |
| | Driving support ECU | INFO |
| Lane-keeping assist system is not canceled even when turn signal light switch is operated | Turn signal light switch | INFO |
| | Harness or connector | - |
| | Driving support ECU | INFO |
| Lane-keeping assist system is not canceled even when windshield wiper switch is operated (Lo or Hi) | Windshield wiper switch | INFO |
| | Harness or connector | - |
| | Driving support ECU | INFO |
| Increase in cases that driver can see line marker but system cannot detect lane markers | Windshield glass is dirty | - |
| | Lane recognition camera sensor is dirty | - |
| | Adjust object recognition camera sensor | INFO |
| | Driving support ECU | INFO |
| Lane-keeping assist system is operating, but no operation condition is displayed on multi-information display in combination meter | Combination meter | INFO |
| | Driving support ECU | INFO |
| Buzzer does not sound even when lane markers are lost during lane departure warning function | Skid control buzzer | INFO |
| | Brake booster with master | INFO |

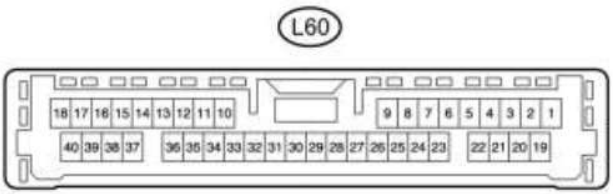
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| Symptom | Suspected Area | See page |
|---|---|---|
| | cylinder (skid control ECU) | |
| | Driving support ECU | INFO |
| Lane-keeping assist system cannot detect line marker during nighttime | Headlight | INFO |
| | Driving support ECU | INFO |

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# TERMINALS OF ECU

1. CHECK DRIVING SUPPORT ECU




(a) Measure the voltage and/or resistance according to the value(s) in the table below.

| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| L60-6 (SPSW) - L60-25 (GND) | R - W-B | Steering pad switch signal<br><br>(Lane keeping assist main switch signal) | Power switch on (IG)<br><br>Lane keeping assist main switch off | 10 to 14 V |
| L60-6 (SPSW) - L60-25 (GND) | R - W-B | Steering pad switch signal<br><br>(Lane keeping assist main switch signal) | Power switch on (IG)<br><br>Lane keeping assist main switch on | 6 to 7 V |
| L60-10 (CCHG) - L60-25 (GND) | G - W-B | Cruise control main switch signal | Power switch on (IG)<br><br>MODE switch on | Below 1 V |
| L60-10 (CCHG) - L60-25 (GND) | G - W-B | Cruise control main switch signal | Power switch on (IG)<br><br>MODE switch off | 10 to 14 V |
| L60-9 (WASH) - L60-25 (GND) | V - W-B | Washer switch signal | Power switch on (IG)<br><br>Washer switch off | 10 to 14 V |
| L60-9 (WASH) - L60-25 (GND) | V - W-B | Washer switch signal | Power switch on (IG)<br><br>Washer switch on | Below 1 V |
| L60-17 (CA2L) - L60-25 (GND) | W - W-B | CAN communication signal | Power switch on (IG) | Pulse generation<br><br>(See waveform 1) |
| L60-18 (CA1N) - L60-25 (GND) | L - W-B | CAN communication signal | Power switch on (IG) | Pulse generation |

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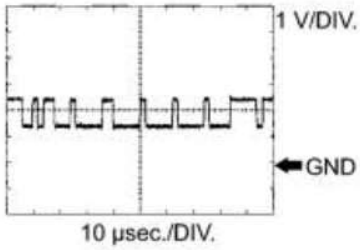
| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| | | | | (See waveform 2) |
| L60-23 (CCS) - L60-25 (GND) | V - W-B | Cruise control main switch signal | Power switch on (IG) | 10 to 14 V |
| L60-23 (CCS) - L60-25 (GND) | V - W-B | Cruise control main switch signal | Power switch on (IG), CANCEL switch on | 6.6 to 10.1 V |
| L60-23 (CCS) - L60-25 (GND) | V - W-B | Cruise control main switch signal | Power switch on (IG), Main switch on | Below 1 V |
| L60-24 (HITP) - L60-25 (GND) | G - W-B | CAN signal (Hi temperature) | Power switch on (IG) | 10 to 14 V |
| L60-30 (B) - Body ground | B - Body ground | Power supply | Always | 11 to 14 V |
| L60-25 (GND) - Body ground | W-B - Body ground | Body ground | Always | Below 1 Ω |
| L60-27 (STP-) - Body ground | Y - Body ground | Stop light switch assembly signal input | Depress brake pedal | 7.5 to 14 V |
| L60-27 (STP-) - Body ground | Y - Body ground | Stop light switch assembly signal input | Release brake pedal | Below 1 V |
| L60-28 (ST1-) - Body ground | R - Body ground | Stop light switch assembly signal input | Power switch on (IG), release brake pedal | 7.5 to 14 V |
| L60-28 (ST1-) - Body ground | R - Body ground | Stop light switch assembly signal input | Power switch on (IG), depress brake pedal | Below 1 V |
| L60-30 (+B) - L60-25 (GND) | B - W-B | Power source | Power switch on (IG) | 11 to 14 V |
| L60-32 (WIP2) - L60-25 (GND) | P - W-B | Wiper switch signal | Power switch on (IG), Wiper switch off | Below 1 V |
| L60-32 (WIP2) - L60-25 (GND) | P - W-B | Wiper switch signal | Power switch on (IG), Wiper switch LO position | 6 to 7 V |
| L60-32 (WIP2) - L60-25 (GND) | P - W-B | Wiper switch signal | Power switch on (IG), Wiper switch HI position | 10 to 14 V |
| L60-34 (WNKR) - L60-25 (GND) | B -W-B | Winker R signal | Power switch on (IG) Winker off | 10 to 14 V |

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| Terminal No. (Symbol) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---|---|---|---|---|
| L60-34 (WNKR) - L60-25 (GND) | B - W-B | Winker R signal | Power switch on (IG)<br>Winker R | Below 1 V |
| L60-35 (WNKL) - L60-25 (GND) | P - W-B | Winker L signal | Power switch on (IG)<br>Winker off | 10 to 14 V |
| L60-35 (WNKL) - L60-25 (GND) | P - W-B | Winker L signal | Power switch on (IG)<br>Winker L | Below 1 V |
| L60-39 (CA2H) - L60-25 (GND) | B - W-B | CAN communication signal | Power switch on (IG) | Pulse generation<br>(See waveform 3) |
| L60-40 (CA1P) - L60-25 (GND) | Y - W-B | CAN communication signal | Power switch on (IG) | Pulse generation<br>(See waveform 4) |

(b) WAVEFORM 1

(1) CAN communication signal



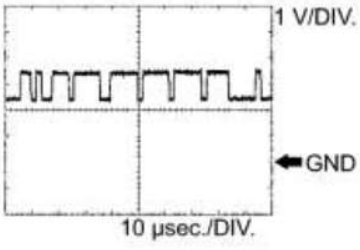

| | |
|---|---|
| Driving support ECU Terminal Name | Between CA2L and GND |
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

HINT:

The waveform varies depending on the CAN communication signal.

(c) WAVEFORM 2

(1) CAN communication signal



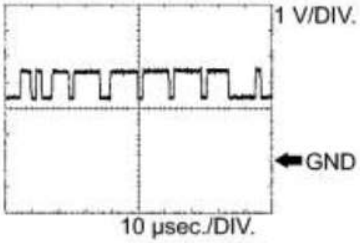

| | |
|---|---|
| Driving support ECU Terminal Name | Between CA1N and GND |
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

(d) WAVEFORM 3

(1) CAN communication signal

| | |
|---|---|
| Driving support ECU Terminal Name | Between CA2H and GND |

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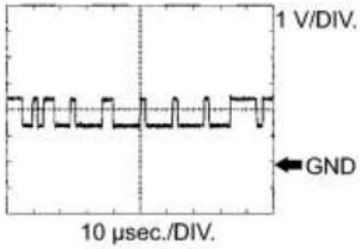



| | |
|---|---|
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

HINT:

The waveform varies depending on the CAN communication signal.

(e) WAVEFORM 4




(1) CAN communication signal

| | |
|---|---|
| Driving support ECU Terminal Name | Between CA1P and GND |
| Tester Range | 1 V/DIV., 10 µsec./DIV. |
| Condition | Power switch on (IG) |

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# DTC CHECK / CLEAR

1. CHECK DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(e) Read the DTCs.

2. CLEAR DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(e) Clear the DTCs.

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# DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows values or status 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.

NOTICE:

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.

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Using the Techstream, enter the following menus:

(1) Select: All ECUs / (desired menu) / Data List /

(e) Check the values by referring to the table below.

**Radar Cruise**

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Country# (F Radar Sens) | Millimeter wave radar sensor country signal / JPN, NA, EURO, AUS, SAFC, OTHER TWN, CHINA, THAI, GCC, NOFIX | Actual country code | - |

**Lane Keeping Assist**

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Wiper Information | Wiper operation status / Unoperate, Oil off, Mist, Washer, Unknown, Lo, Hi | The respective operational status displayed | - |
| LKA Indicator | LKA indicator light signal / Nothing, Blink, Light | Light: LKA indicator light turns on<br><br>Nothing: LKA indicator light turns off<br><br>Blink: LKA indicator light blinking | - |
| LKA System | Lane-keeping assist system indicator / | - | - |

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Indicator | Unknown, Check, Disable, Adjust | | |
| LKA Main SW | Lane-keeping assist main switch signal / ON or OFF | ON: Lane-keeping assist main switch is ON<br><br>OFF: Lane-keeping assist main switch is OFF | - |
| Head Light | Head light signal / ON or OFF | Head light signal status | - |
| Head Light (High Beam) | Head Light (Hi Beam) signal / ON or OFF | Head Light (Hi Beam) signal status | - |
| Turn Light RH | Turn Light RH signal / ON or OFF | Turn Light RH signal status | - |
| Turn Light LH | Turn Light LH signal / ON or OFF | Turn Light LH signal status | - |
| Left Lane Type | Left lane type signal / Dashed or Solid | Dashed: Left lane dashed<br><br>Solid: Left lane solid | - |
| Right Lane Type | Right lane type signal / Dashed or Solid | Dashed: Right lane dashed<br><br>Solid: Right lane solid | - |
| Lane Undetectable | Lane undetectable signal / Undetectable or Detect | Undetectable: Lane undetectable<br><br>Detect: Lane detected | - |
| Left Lane Detection | Left lane detection signal / Undetectable or Detect | Undetectable: Left lane undetectable<br><br>Detect: Left lane detected | - |
| Right Lane Detection | Right lane detection signal / Undetectable or Detect | Undetectable: Right lane undetectable<br><br>Detect: Right lane detected | - |
| Left Lane Change | Left lane change signal / ON or OFF | ON: When left lane change is performed<br><br>OFF: When left lane change is not performed | - |
| Right Lane Change | Right lane change signal / ON or OFF | ON: When right lane change is performed<br><br>OFF: When right lane change is not performed | - |
| Lane Position | Lane position / min.: -327.68 m, max.: 327.67 m | Actual lane position | - |
| Lane Width | Lane width / min.: 0 m, max.: 655.35 m | Actual lane width | - |
| Small Steering Force Demand | Small steering force demand signal / ON or OFF | ON: Steering assist function operates | - |

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| | | OFF: Steering assist function does not operate | |
| Lane-Keeping Assist Demand | Lane-keeping assist demand signal / ON or OFF | ON: Lane-keeping assist function operates<br><br>OFF: Lane-keeping assist function does not operate | - |
| Skid Control Buzzer Demand | Skid control buzzer demand signal / ON or OFF | ON: Skid control buzzer sounds<br><br>OFF: Skid control buzzer does not sound | - |
| Target Steering Wheel Torque | Target steering wheel torque / min.: -100 N*m, max.: 100 N*m | Actual steering wheel torque | - |
| Left Lane Indicator | Left lane recognition signal / Nothing, Heavy, Closing or H blink | Nothing: Left lane indicator is not shown<br><br>Heavy: Left lane indicator is fully shown<br><br>Closing: Only left lane indicator outline is shown<br><br>H blink: Left lane indicator is blinking | - |
| Right Lane Indicator | Right lane recognition signal / Nothing, Heavy, Closing or H blink | Nothing: Right lane indicator is not shown<br><br>Heavy: Right lane indicator is fully shown<br><br>Closing: Only right lane indicator outline is shown<br><br>H blink: Right lane indicator is blinking | - |
| Steering Indicator | Meter display signal of lane-keeping assist function / Nothing, Light or Blink | Nothing: Steering wheel assistance is not displayed<br><br>Light: Steering wheel assistance is displayed<br><br>Blink: Steering wheel assistance is blinking | - |
| LKA Abnormal Buzzer | Lane-keeping assist system abnormal buzzer signal / ON or OFF | ON: Lane-keeping assist system abnormal | - |

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| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| | | OFF: Lane-keeping assist system normal | |
| Lane Detection Impossible Buz | Lane-keeping detection impossible buzzer signal / Nothing, Light or Blink | Light: Lane-keeping detection impossible buzzer sounds<br><br>Nothing: Lane-keeping detection impossible buzzer does not sound<br><br>Blink: Ready indicator turns blink | - |
| Ready Indicator | Ready indicator light signal / Nothing, Light or Blink | Nothing: Ready indicator turns on<br><br>Blink: Ready indicator turns off<br><br>Light: Ready indicator turns blinking | - |
| LKA Temporarily Disable | Lane-keeping assist system temporarily disabled signal / ON or OFF | ON: Lane-keeping assist system is temporarily disabled<br><br>OFF: Lane-keeping assist system is operating | - |
| EPS Trq Sens Output | EPS torque sensor output signal / -7 N/m to 7 N/m | The torque sensor output signal status displayed | - |
| The Number of DTCs | Number of DTCs / min.: 0, max.: 255 | Actual number of DTCs | - |

**ABS/VSC/TRAC**

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Vehicle Speed | Vehicle speed/ min.: 0 km/h (0 mph), max.: 326.4 km/h (204 mph) | Actual vehicle speed is displayed | - |

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Test 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 Test early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Test.

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

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(c) Turn the Techstream on.

(d) Using the Techstream, enter the following menus:

(1) Select: All ECUs / (desired menu) / Active Test /

(e) Perform the Active Test by referring to the table below.

**Combination Meter**

| Tester Display | Test Part | Control Range | Diagnostic Note |
|---|---|---|---|
| Drift From The Lane | LKA indicator light ON / OFF | ON / OFF | - |

**ABS/VSC/TRAC**

| Tester Display | Test Part | Control Range | Diagnosis Note |
|---|---|---|---|
| Buzzer | Skid control buzzer sounds | ON / OFF | - |

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# DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a trouble code is displayed during the DTC check, inspect the trouble area listed for that code. For details of the code, refer to the "See page" below.

**Lane-keeping Assist System**

| DTC Code | Detection Item | Trouble Area | See page |
|---|---|---|---|
| C1A01 | Driving Support ECU | - Driving support ECU | INFO |
| C1A02 | Vehicle Information Not Obtained | - Driving support ECU<br>- Main body ECU | INFO |
| C1A05 | Stop Light Switch Circuit | - Stop light switch assembly<br>- Stop light switch assembly circuit<br>- Harness or connector<br>- Driving support ECU | INFO |
| C1A06 | Stop Light Switch Input Circuit | - Driving support ECU | INFO |
| C1A0C | Object Recognition Camera Region Code Mismatch | - Lane recognition camera sensor assembly<br>- Driving support ECU | INFO |
| C1A20 | Object Recognition ECU | - Lane recognition camera sensor assembly<br>- Driving support ECU | INFO |
| C1A22 | Object Recognition Camera Incorrect Axial Gap | - Lane recognition camera sensor assembly<br>- Driving support ECU | INFO |
| C1A23 | Object Recognition Camera Initialization Incomplete | - Lane recognition camera sensor assembly<br>- Driving support ECU | INFO |
| C1A45 | Vehicle Speed Sensor | - Vehicle speed sensor<br>- Brake booster with master cylinder (skid control ECU)<br>- CAN communication system<br>- Driving support ECU | INFO |
| C1A46 | Yaw Rate Sensor | - Yaw rate sensor<br>- Brake booster with master cylinder (skid | INFO |

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| DTC Code | Detection Item | Trouble Area | See page |
|---|---|---|---|
| | | control ECU)<br><br>- Driving support ECU | |
| C1A4A | Skid Control Buzzer Circuit | - Skid control buzzer<br><br>- Skid control buzzer circuit<br><br>- Brake booster with master cylinder (skid control ECU)<br><br>- Driving support ECU | INFO |
| C1A70 | Power Steering Control System | - Power steering system<br><br>- CAN communication system<br><br>- Driving support ECU | INFO |
| C1A71 | Power Steering Control Torque | - Power steering system<br><br>- CAN communication system<br><br>- Driving support ECU | INFO |
| U0122 | Lost Communication with Vehicle Dynamics Control Module | - Brake booster with master cylinder (skid control ECU)<br><br>- CAN communication system<br><br>- Driving support ECU | INFO |
| U0123 | Lost Communication with Yaw Rate Sensor Module | - Yaw rate sensor<br><br>- CAN communication system<br><br>- Driving support ECU | INFO |
| U0131 | Lost Communication with Power Steering Control Module | - Power steering control ECU<br><br>- CAN communication system<br><br>- Driving support ECU | INFO |
| U1104 | Lost Communication with Driving Support ECU | - Driving support ECU<br><br>- CAN communication system<br><br>- Brake booster with master cylinder (skid control ECU)<br><br>- Lane recognition camera sensor assembly | INFO |

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| DTC Code | Detection Item | Trouble Area | See page |
|---|---|---|---|
| | | - Power steering control ECU | |
| U1119 | Lost Communication with Object Recognition ECU (CAN) | - Lane recognition camera sensor assembly<br>- CAN communication system<br>- Driving support ECU<br>- Harness or connector | INFO |

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| | | |
|---|---|---|
| DTC | C1A01 | Driving Support ECU |

# DESCRIPTION

The driving support ECU uses the lane-recognition camera sensor assembly to detect obstacles in front of the vehicle and the direction that the driver's head is facing.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A01 | While initial check is running, power switch is on (IG) and system is operating, driving support ECU detects an internal malfunction for 1 second or more | Driving support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTC INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle and operate lane keeping assist control.

(f) Recheck for DTCs INFO.

OK:

DTC C1A01 is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU

OK ▶ **USE SIMULATION METHOD TO CHECK**

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| | | |
|---|---|---|
| DTC | C1A02 | Vehicle Information Not Obtained |

# DESCRIPTION

When the driving support ECU is replaced with a new one, it acquires the country specification information (destination, steering wheel position, etc.) from the main body ECU. When the country specification information in the driving support ECU and main body ECU do not match, DTC C1A02 is stored.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A02 | Inconsistent vehicle specification information between the main body ECU and driving support ECU continues for 1 second or more | • Driving support ECU<br>• Main body ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | CHECK DTC OUTPUT (CAN COMMUNICATION SYSTEM) |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch on (IG).

(d) Recheck for DTCs INFO.

OK:

DTC C1A02 is not output.

NG ▶ GO TO CAN COMMUNICATION SYSTEM
OK ▶ **REPLACE DRIVING SUPPORT ECU**

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| DTC | C1A05 | Stop Light Switch Circuit |
|---|---|---|

# DESCRIPTION

When the brake pedal is depressed, the stop light switch assembly sends signal to the driving support ECU.

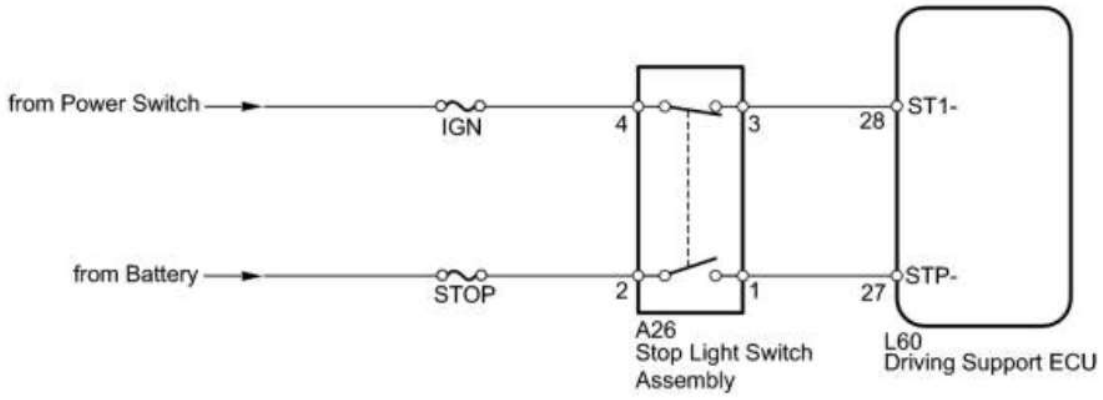
Receiving the signal, the driving support ECU cancels the dynamic radar cruise control system. Even if there is a malfunction in the stop light signal circuit while the cruise control is operating, normal driving is maintained due to fail-safe function.

When the brake pedal is depressed, positive voltage is applied to terminal STP- of the driving support ECU through the STOP fuse and the stop light switch assembly, and the driving support ECU cancels the cruise control.

When the brake pedal is released, positive voltage is applied to terminal ST1- of the driving support ECU through the IGN fuse and the stop light switch assembly, and the driving support ECU operates the dynamic radar cruise control.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A05 | When vehicle speed is 50 km/h (31 mph) or more with lane-keeping assist switch on, voltages of terminals ST1- and STP- of driving support ECU are both below 1 V for 0.5 sec. or more | • Stop light switch assembly<br>• Stop light switch assembly circuit<br>• Harness or connector<br>• Driving support ECU |

# WIRING DIAGRAM




# INSPECTION PROCEDURE

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NOTICE:

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

- STP signal conditions can be checked using the Techstream.

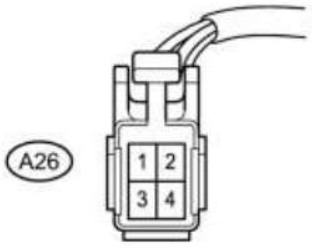
a. Connect the power switch on (IG).
b. Turn the power switch on (IG).
c. Enter the following menus: Powertrain / Radar Cruise / Data List / Stop Light SW 1 (M-CPU).
d. Check the STP signal when the brake pedal is depressed and released.

| Brake Pedal Operation | Tester Display |
|---|---|
| Depressed | ON |
| Released | OFF |

# PROCEDURE

| | |
|---|---|
| 1. | CHECK STOP LIGHT SWITCH ASSEMBLY (TERMINAL VOLTAGE) |

*1




(a) Disconnect the stop light switch assembly connector.

N

(b) Turn the power switch on (IG).

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

Standard Voltage:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| A26-2 - Body ground | Power switch on (IG) | 9 to 14 V |
| A26-4 - Body ground | Power switch on (IG) | 9 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector |

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| | |
|---|---|
| | (to Stop Light Switch Assembly) |

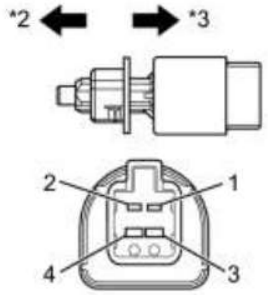
(d) Reconnect the stop light switch assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT FOR STOP LIGHT SWITCH ASSEMBLY)

OK ▼

| | |
|---|---|
| 2. | INSPECT STOP LIGHT SWITCH ASSEMBLY |

*1




(a) Disconnect the stop light switch assembly connector.

(b) Remove the stop light switch assembly.

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

Standard Resistance:

| Tester Connection | Switch Position | Specified Condition |
|---|---|---|
| 1 - 2 | Switch pin not pushed | Below 1 Ω |
| | Switch pin pushed | 10 kΩ or higher |
| 3 - 4 | Switch pin not pushed | 10 kΩ or higher |
| | Switch pin pushed | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Component without harness connected<br><br>(Stop Light Switch Assembly) |
| *2 | Not pushed |
| *3 | Pushed |

(d) Reinstall the stop light switch assembly.

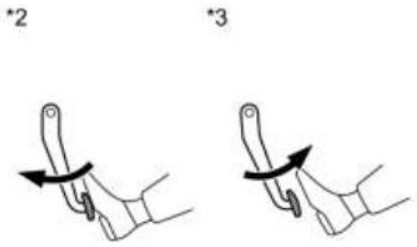
(e) Reconnect the stop light switch assembly connector.

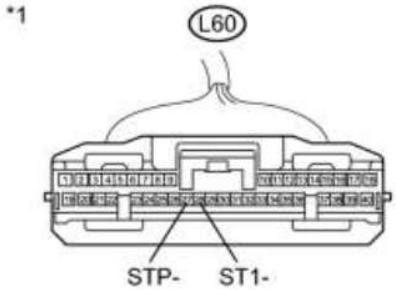
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NG ▶ REPLACE STOP LIGHT SWITCH ASSEMBLY

OK ▼

| | |
|---|---|
| 3. | CHECK DRIVING SUPPORT ECU (STP- AND ST1 - VOLTAGE) |




(a) Disconnect the driving support ECU connector.

(b) Turn the power switch on (IG).

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

Standard Voltage:

| Tester Connection | Switch Position | Specified Condition |
|---|---|---|
| L60-27 (STP-) - Body ground | Released | Below 1.5 V |
| | Depressed | 7.5 to 14 V |
| L60-28 (ST1-) - Body ground | Released | 7.5 to 14 V |
| | Depressed | Below 1.5 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Driving Support ECU) |
| *2 | Brake Pedal Depressed |
| *3 | Brake Pedal Released |

(d) Reconnect the driving support ECU connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ **REPLACE DRIVING SUPPORT ECU**

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| DTC | C1A06 | Stop Light Switch Input Circuit |
|---|---|---|

# DESCRIPTION

This DTC indicates the internal abnormal items of the driving support ECU.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A06 | Stop light switch assembly input signal abnormal<br><br>(driving support ECU internal circuit) | Driving support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| 1. | CHECK DTC OUTPUT |
|---|---|

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle and operate lane keeping assist control.

(f) Recheck for DTCs INFO.

OK:

DTC C1A06 is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU

OK ▶ **USE SIMULATION METHOD TO CHECK**

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| DTC | C1A0C | Object Recognition Camera Region Code Mismatch |
|---|---|---|

# DESCRIPTION

When the lane recognition camera sensor assembly is replaced with a new one, it acquires the country specification information from the driving support ECU. The lane recognition camera sensor assembly has information about the market it is intended for use in (country specification information such as the destination, steering wheel position etc.). When a new camera sensor is installed and the country specification information does not match that of the driving support ECU, the ECU stores DTC C1A0C.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A0C | While initial check is running, power switch is on (IG) and system is operating, country specification information in driving support ECU and lane recognition camera sensor assembly do not match | • Lane recognition camera sensor assembly<br>• Driving support ECU |

# INSPECTION PROCEDURE

NOTICE:

When the lane recognition camera sensor assembly is replaced with a new one, adjust the lane recognition camera sensor assembly INFO.

# PROCEDURE

| 1. | REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY |
|---|---|

(a) Replace lane recognition camera sensor assembly INFO.

(b) Adjust the lane recognition camera sensor assembly INFO.

NEXT

| 2. | CHECK DTC OUTPUT |
|---|---|

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle and operate lane keeping assist control.

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(f) Recheck for DTCs.

OK:

DTC C1A0C is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

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| DTC | C1A20 | Object Recognition ECU |
|---|---|---|

# DESCRIPTION

When the driving support ECU receives information that there is a malfunction in the lane recognition camera sensor assembly, DTC C1A20 is stored.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A20 | When vehicle speed is 50 km/h (31 mph) or more with lane-keeping assist switch on, driving support ECU receives information that there is malfunction in lane recognition camera sensor assembly for 1 second or more | • Lane recognition camera sensor assembly<br>• Driving support ECU |

# INSPECTION PROCEDURE

NOTICE:

When the lane recognition camera sensor assembly is replaced with a new one, adjust the lane recognition camera sensor assembly INFO.

# PROCEDURE

| 1. | REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY |
|---|---|

(a) Replace the lane recognition camera sensor assembly INFO.

(b) Adjust the lane recognition camera sensor assembly INFO.

NEXT

| 2. | CHECK DTC OUTPUT |
|---|---|

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle at a speed of 50 km/h (31 mph) or more, and operate lane keeping assist control.

(f) Recheck for DTCs.

OK:

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DTC C1A20 is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

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| | | |
|---|---|---|
| DTC | C1A22 | Object Recognition Camera Incorrect Axial Gap |
| DTC | C1A23 | Object Recognition Camera Initialization Incomplete |

# DESCRIPTION

If the driving support ECU determines that the lane recognition camera sensor assembly axis is deviated, DTC C1A22 is output. Also, if the lane recognition camera sensor assembly beam axis adjustment is not performed after installing the lane recognition camera sensor assembly, DTC C1A23 is stored.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A22 | When vehicle speed is 50 km/h (31 mph) or more with lane-keeping main switch is on, driving support ECU detects lane recognition camera sensor assembly beam axis deviation for 1 second or more | • Lane recognition camera sensor assembly<br>• Driving support ECU |
| C1A23 | When vehicle speed is 50 km/h (31 mph) or more with lane-keeping main switch is on, driving support ECU detects that lane recognition camera sensor assembly adjustment has not been completed for 1 second or more | • Lane recognition camera sensor assembly<br>• Driving support ECU |

# INSPECTION PROCEDURE

NOTICE:

When the lane recognition camera sensor assembly is replaced with a new one, adjust the lane recognition camera sensor assembly INFO.

# PROCEDURE

| | |
|---|---|
| 1. | ADJUST LANE RECOGNITION CAMERA SENSOR ASSEMBLY |

(a) Adjust the lane recognition camera sensor assembly INFO.

NEXT

| | |
|---|---|
| 2. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

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(e) Drive the vehicle at a speed of 50 km/h (31 mph) or more, and operate lane keeping assist control.

(f) Recheck for DTCs.

OK:

DTC is not output.

NG ▶ REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY
OK ▶ **END**

| | |
|---|---|
| 3. | REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY |

(a) Replace the lane recognition camera sensor assembly INFO.

(b) Adjust the lane recognition camera sensor assembly INFO.

NEXT
▼

| | |
|---|---|
| 4. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle at a speed of 50 km/h (31 mph) or more, and operate lane keeping assist control.

(f) Recheck for DTCs.

OK:

DTC is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

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| DTC | C1A45 | Vehicle Speed Sensor |
|---|---|---|

# DESCRIPTION

The driving support ECU receives vehicle speed signals from the brake booster with master cylinder (skid control ECU) via the CAN communication line to control the lane-keeping assist system. When the driving support ECU receives information that there is a malfunction in the vehicle speed sensor, DTC C1A45 is stored.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A45 | When vehicle speed is 50 km/h (31 mph) or more with lane-keeping assist switch on, malfunction in vehicle speed sensor is received from brake booster with master cylinder (skid control ECU) | • Vehicle speed sensor<br>• Brake booster with master cylinder (skid control ECU)<br>• CAN communication system<br>• Driving support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| 1. | CHECK DTC OUTPUT (CAN COMMUNICATION SYSTEM) |
|---|---|

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Check for DTCs.

OK:

CAN communication system DTC is not output.

NG ▶ GO TO CAN COMMUNICATION SYSTEM

OK ▼

| 2. | CHECK FOR DTC (ELECTRONICALLY CONTROLLED BRAKE SYSTEM) |
|---|---|

(a) Clear the DTCs INFO.

(b) Turn the power switch off.

(c) Turn the power switch on (IG).

(d) Drive the vehicle at a speed of 50 km/h (31 mph) or more, and operate lane keeping assist control.

(e) Check DTCs for electrical controlled brake system INFO.

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OK:

DTC C0200/31, C0205/32, C0210/33 or C0215/34 is not output.

NG ▶ GO TO ELECTRONICALLY CONTROLLED BRAKE SYSTEM
OK
▼

| | |
|---|---|
| 3. | REPLACE BRAKE BOOSTER WITH MASTER CYLINDER |

(a) Replace the brake booster with master cylinder (skid control ECU) INFO.

NEXT
▼

| | |
|---|---|
| 4. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle at a speed of 50 km/h (31 mph) or more, and operate lane keeping assist control.

(f) Recheck for DTCs.

OK:

DTC C1A45 is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

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| | | |
|---|---|---|
| DTC | C1A46 | Yaw Rate Sensor |

# DESCRIPTION

The brake booster with master cylinder (skid control ECU) receives vehicle stability signals from the yaw rate sensor and sends the signals to the driving support ECU. If the brake booster with master cylinder (skid control ECU) detects that the yaw rate sensor is malfunctioning, the brake booster with master cylinder (skid control ECU) sends a malfunction signal to the driving support ECU and outputs DTC C1A46. Also, when DTC C1A46 is stored, the brake booster with master cylinder (skid control ECU) stores DTC at the same time.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A46 | While vehicle speed is 50 km/h (31 mph) or more, malfunction signal from brake booster with master cylinder (skid control ECU), yaw rate sensor to driving support ECU is detected for 1 second or more | • Yaw rate sensor<br>• Brake booster with master cylinder (skid control ECU)<br>• Driving support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | CHECK FOR DTC (ELECTRONICALLY CONTROLLED BRAKE SYSTEM) |

(a) Check for DTCs (electronically controlled brake system) INFO.

OK:

Electronically controlled brake system DTC is not output.

NG ▶ GO TO ELECTRONICALLY CONTROLLED BRAKE SYSTEM

OK

▼

| | |
|---|---|
| 2. | REPLACE BRAKE BOOSTER WITH MASTER CYLINDER |

(a) Replace the brake booster with master cylinder INFO.

NEXT

▼

| | |
|---|---|
| 3. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

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(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle at a speed of 50 km/h (31 mph) or more, and operate lane keeping assist control.

(f) Recheck for DTCs.

OK:

DTC C1A46 is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

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| | | |
|---|---|---|
| DTC | C1A4A | Skid Control Buzzer Circuit |

# DESCRIPTION

If the vehicle is about to move out of the lane markers while the lane-keeping assist function is operating, the driving support ECU sends a sounding signal to the brake booster with master cylinder (skid control ECU) to sound the skid control buzzer in order to warn the driver.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A4A | While power switch is on (IG), skid control buzzer circuit malfunction signal is received by brake booster with master cylinder (skid control ECU) for 1 second or more | • Skid control buzzer<br>• Skid control buzzer circuit<br>• Brake booster with master cylinder (skid control ECU)<br>• Driving support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| | |
|---|---|
| 1. | PERFORM ACTIVE TEST USING TECHSTREAM (SKID CONTROL BUZZER) |

(a) Using the Techstream, enter the following menus: Chassis / ABS/VSC/TRAC / Active Test / Buzzer.

(b) Perform Active Test.

**ABS/VSC/TRAC**

| Tester Display | Test Part | Control Range | Diagnosis Note |
|---|---|---|---|
| Buzzer | Skid control buzzer sounds | ON / OFF | - |

OK:

Skid control buzzer sounds.

NG ▶ GO TO ELECTRONICALLY CONTROLLED BRAKE SYSTEM

OK ▼

| | |
|---|---|
| 2. | REPLACE BRAKE BOOSTER WITH MASTER CYLINDER |

(a) Replace the brake booster with master cylinder (skid control ECU) INFO.

NEXT ▼

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| | |
|---|---|
| 3. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Recheck for DTCs.

OK:

DTC C1A4A is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

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| DTC | C1A70 | Power Steering Control System |
|---|---|---|

# DESCRIPTION

When the lane departure warning function operates, the driving support ECU sends a signal to the power steering control ECU to operate the steering motor.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A70 | When vehicle speed is 50 km/h (31 mph) or more with lane-keeping assist switch on, malfunction signal of power steering system is input to driving support ECU | • Power steering system<br>• CAN communication system<br>• Driving support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| 1. | CHECK FOR DTC (POWER STEERING SYSTEM) |
|---|---|

(a) Check for DTCs (power steering system) INFO.

OK:

Power steering system DTC is not output.

HINT:

If DTC C1A70 is output even after troubleshooting the power steering system, replace the driving support ECU.

NG ▶ GO TO POWER STEERING SYSTEM

OK

▼

| 2. | REPLACE POWER STEERING CONTROL ECU |
|---|---|

(a) Replace the power steering control ECU INFO.

NEXT

▼

| 3. | CHECK DTC OUTPUT |
|---|---|

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

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(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle at a speed of 50 km/h (31 mph) or more, and operate lane keeping assist control.

(f) Recheck for DTCs.

OK:

DTC C1A70 is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

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| DTC | C1A71 | Power Steering Control Torque |
|---|---|---|

# DESCRIPTION

When the lane departure warning function operates, the driving support ECU sends a signal to the power steering control ECU to operate the steering motor.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| C1A71 | When lane keeping assist switch is on and vehicle speed is 50 km/h (31 mph) or more, driving support ECU receives torque abnormally signal from steering control system | • Power steering system<br>• CAN communication system<br>• Driving support ECU |

# INSPECTION PROCEDURE

# PROCEDURE

| 1. | CHECK DTC OUTPUT (CAN COMMUNICATION SYSTEM) |
|---|---|

(a) Check for DTCs (CAN communication system) INFO.

OK:

CAN communication system DTC is not output.

NG ▶ GO TO CAN COMMUNICATION SYSTEM

OK ▼

| 2. | CHECK FOR DTC (POWER STEERING SYSTEM) |
|---|---|

(a) Check for DTCs (power steering system) INFO.

OK:

Power steering system DTC is not output.

HINT:

If DTC C1A71 is output even after troubleshooting the power steering system, replace the driving support ECU.

NG ▶ GO TO POWER STEERING SYSTEM

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OK

| | |
|---|---|
| 3. | REPLACE POWER STEERING CONTROL ECU |

(a) Replace the power steering control ECU INFO.

NEXT

| | |
|---|---|
| 4. | CHECK FOR DTC |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle at a speed of 50 km/h (31 mph) or more, and operate lane keeping assist control.

(f) Recheck for DTCs.

OK:

DTC C1A71 is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

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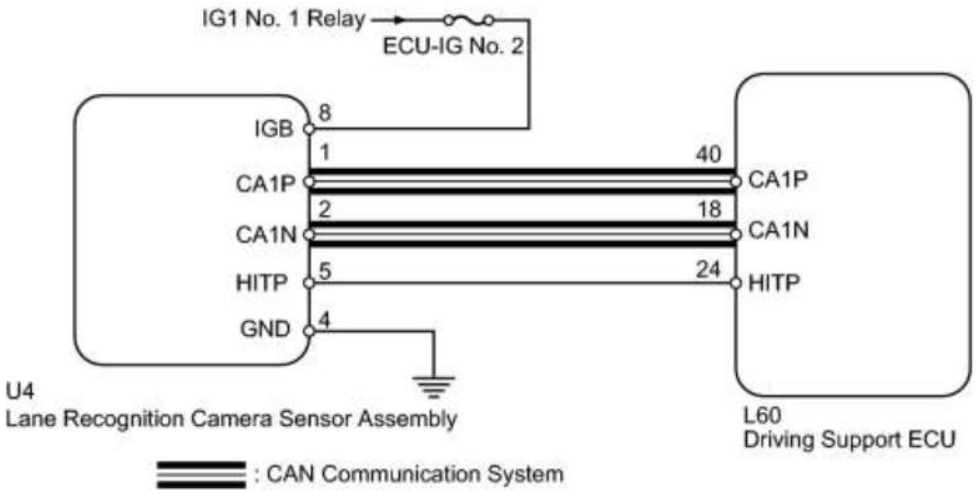
| | | |
|---|---|---|
| DTC | U0122 | Lost Communication with Vehicle Dynamics Control Module |
| DTC | U0123 | Lost Communication with Yaw Rate Sensor Module |
| DTC | U0131 | Lost Communication with Power Steering Control Module |
| DTC | U1104 | Lost Communication with Driving Support ECU |

# DESCRIPTION

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| U0122 | While power switch is on (IG), communication stop from brake booster with master cylinder (skid control ECU) to driving support ECU continues for 1 second or more | • Brake booster with master cylinder (skid control ECU)<br>• CAN communication system<br>• Driving support ECU |
| U0123 | While power switch is on (IG), communication stop from yaw rate sensor to driving support ECU continues for 1 second or more | • Yaw rate sensor<br>• CAN communication system<br>• Driving support ECU |
| U0131 | While power switch is on (IG), communication stop from power steering control ECU to driving support ECU continues for 1 second or more | • Power steering control ECU<br>• CAN communication system<br>• Driving support ECU |
| U1104 | While power switch is on (IG), communication stop from driving support ECU to skid control ECU assembly, lane recognition camera sensor assembly or power steering control ECU continues for 1 second or more | • Driving support ECU<br>• CAN communication system<br>• Brake booster with master cylinder (skid control ECU)<br>• Lane recognition camera sensor assembly<br>• Power steering control ECU |

# WIRING DIAGRAM

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# INSPECTION PROCEDURE

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.

# PROCEDURE

| | |
|---|---|
| 1. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Check for DTCs INFO.

Result:

| Result | Proceed to |
|---|---|
| DTC U1104 is output | A |
| DTC other than U1104 is output | B |

B ▶ GO TO CAN COMMUNICATION CIRCUIT

A ▼

| | |
|---|---|
| 2. | CHECK CAN COMMUNICATION SYSTEM |

(a) Select "CAN Bus Check" from the "System Selection Menu" screen on the Techstream.

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(b) Select "Communication Malfunction DTC" from the "CAN Bus Check" screen, and then select "Enter".

OK:

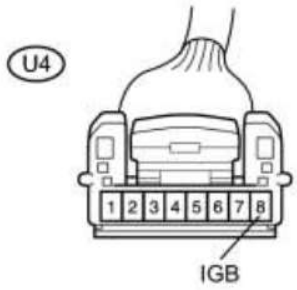
CAN communication is normal.

NG ▶ GO TO CAN COMMUNICATION CIRCUIT

OK ▼

| | |
|---|---|
| 3. | CHECK HARNESS AND CONNECTOR (LANE RECOGNITION CAMERA SENSOR ASSEMBLY POWER SOURCE) |

*1




N

(a) Disconnect the lane recognition camera sensor assembly connector.

(b) Turn the power switch on (IG).

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

Standard Voltage:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| U4-8 (IGB) - Body ground | Power switch on (IG) | 10 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Lane Recognition Camera Sensor Assembly) |

(d) Reconnect the recognition camera sensor connector.

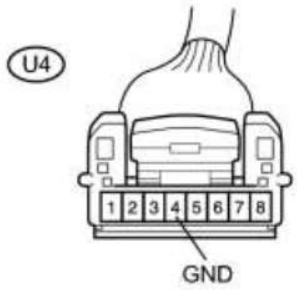
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (IGB CIRCUIT)

OK ▼

| | |
|---|---|
| 4. | CHECK HARNESS AND CONNECTOR (LANE RECOGNITION CAMERA SENSOR ASSEMBLY GND CIRCUIT) |

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*1




(a) Disconnect the lane recognition camera sensor assembly connector.

N

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| U4-4 (GND) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Lane Recognition Camera Sensor Assembly) |

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK ▼

| | |
|---|---|
| 5. | REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY |

(a) Replace the lane recognition camera sensor assembly INFO.

(b) Adjust the lane recognition camera assembly INFO.

NEXT ▼

| | |
|---|---|
| 6. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

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(e) Drive the vehicle and operate lane keeping assist control.

(f) Recheck for DTCs.

OK:

DTC is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

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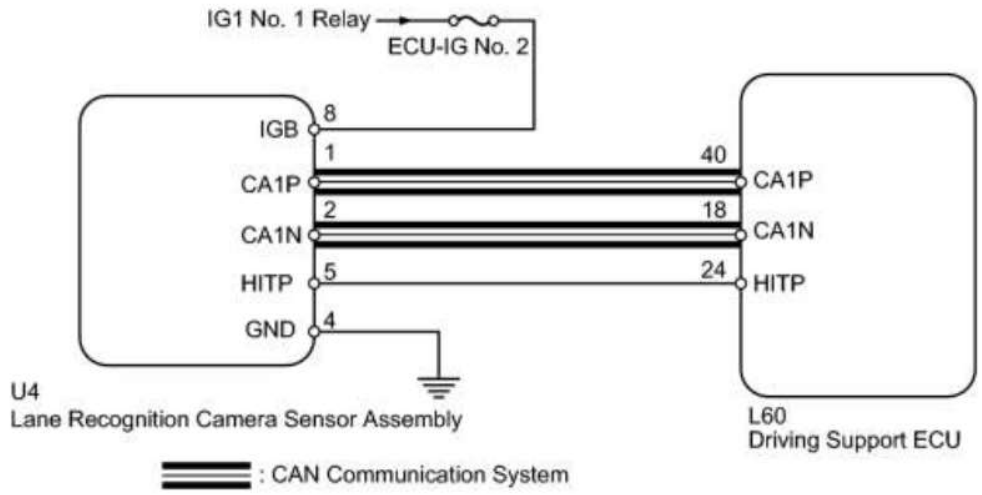
| DTC | U1119 | Lost Communication with Object Recognition ECU (CAN) |
|---|---|---|

# DESCRIPTION

Because of the location of the lane recognition camera assembly, it is subject to high temperatures. If the lane recognition camera sensor assembly becomes too hot, the power source is shut down to protect the system. At that time CAN communication also stops. However, in order to inform the driving support ECU that CAN communication has not stopped because of a CAN communication error, on/off signals are periodically sent from the HITP terminal.

| DTC Code | DTC Detection Condition | Trouble Area |
|---|---|---|
| U1119 | When vehicle speed is 50 km/h (31 mph) or more with lane-keeping main switch is on, communication stop from lane recognition camera sensor to driving support ECU continues for 1 second or more | • Lane recognition camera sensor<br>• CAN communication system<br>• Driving support ECU<br>• Harness or connector |

# WIRING DIAGRAM




# INSPECTION PROCEDURE

HINT:

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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.

# PROCEDURE

| | |
|---|---|
| 1. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Check for DTCs INFO.

Result:

| Result | Proceed to |
|---|---|
| DTC U1119 is output | A |
| DTC other than U1119 is output | B |

B ▶ GO TO CAN COMMUNICATION CIRCUIT

A ▼

| | |
|---|---|
| 2. | READ VALUE USING TECHSTREAM |

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Enter the following menus: All ECUs / Pre-Collision 2/ Data List / Recog ECU H Temp Hist.

(e) Confirm the judgment history.

Pre-Collision 2:

| Tester Display | Measurement Item/Range | Normal Condition | Diagnostic Note |
|---|---|---|---|
| Recog ECU H Temp Hist | Object recognition ECU temperature condition history/ ON or OFF | ON: History exists<br><br>OFF: No history | - |

Result:

| Result | Proceed to |
|---|---|
| ON is displayed | A |
| OFF is displayed | B |

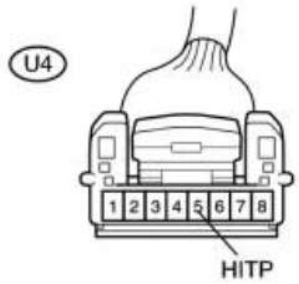
B ▶ CHECK CAN COMMUNICATION SYSTEM

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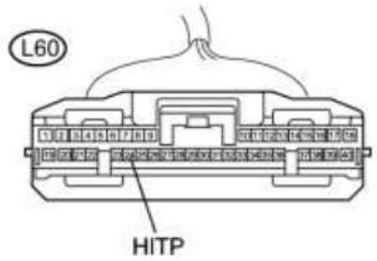
A

| | |
|---|---|
| 3. | CHECK HARNESS AND CONNECTOR (DRIVING SUPPORT ECU - LANE RECOGNITION CAMERA SENSOR) |

*1




*2




(a) Disconnect the driving support ECU connector and lane recognition camera sensor connector.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| U4-5 (HITP) - L60-24 (HITP) | Always | Below 1 Ω |
| U4-5 (HITP) or L60-24 (HITP) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Lane Recognition Camera Sensor Assembly) |
| *2 | Front view of wire harness connector<br><br>(to Driving Support ECU) |

(c) Reconnect the connectors.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (DRIVING SUPPORT ECU - LANE

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RECOGNITION CAMERA SENSOR)

OK ▶ **REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY**

| | |
|---|---|
| 4. | REPAIR OR REPLACE HARNESS OR CONNECTOR (DRIVING SUPPORT ECU - LANE RECOGNITION CAMERA SENSOR) |

(a) Repair or replace harness or connector.

NEXT ▼

| | |
|---|---|
| 5. | CHECK DTC OUTPUT |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTC INFO.

(c) Turn the power switch off.

(d) Start the engine.

(e) Drive the vehicle and operate lane keeping assist control.

(f) Check for DTCs INFO.

Result:

| Result | Proceed to |
|---|---|
| DTC U1119 is not output | A |
| DTC U1119 is output | B |

B ▶ GO TO CAN COMMUNICATION CIRCUIT

A ▶ **END**

| | |
|---|---|
| 6. | CHECK CAN COMMUNICATION SYSTEM |

(a) Check CAN communication system INFO.

NG ▶ GO TO CAN COMMUNICATION CIRCUIT

OK ▼

| | |
|---|---|
| 7. | REPLACE LANE RECOGNITION CAMERA SENSOR ASSEMBLY |

(a) Replace the lane recognition camera sensor assembly INFO.

(b) Adjust the lane recognition camera sensor assembly INFO.

NEXT ▼

| | |
|---|---|
| 8. | CHECK DTC OUTPUT |

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(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Trouble Codes.

(b) Clear the DTCs INFO.

(c) Turn the power switch off.

(d) Turn the power switch on (IG).

(e) Drive the vehicle and operate lane keeping assist control.

(f) Recheck for DTCs.

OK:

DTC is not output.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **END**

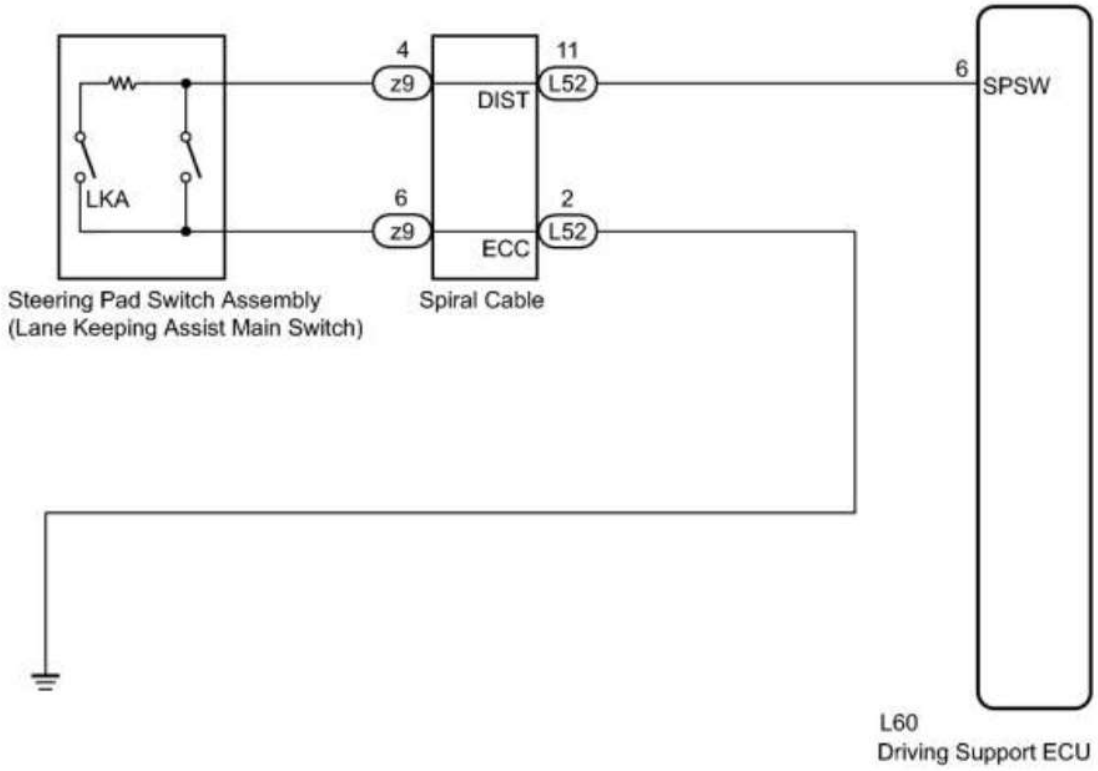
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| Main Switch Circuit |
|---|

# DESCRIPTION

The driving support ECU receives lane-keeping assist main switch ON/OFF signal from the steering pad switch assembly.

# WIRING DIAGRAM




# INSPECTION PROCEDURE

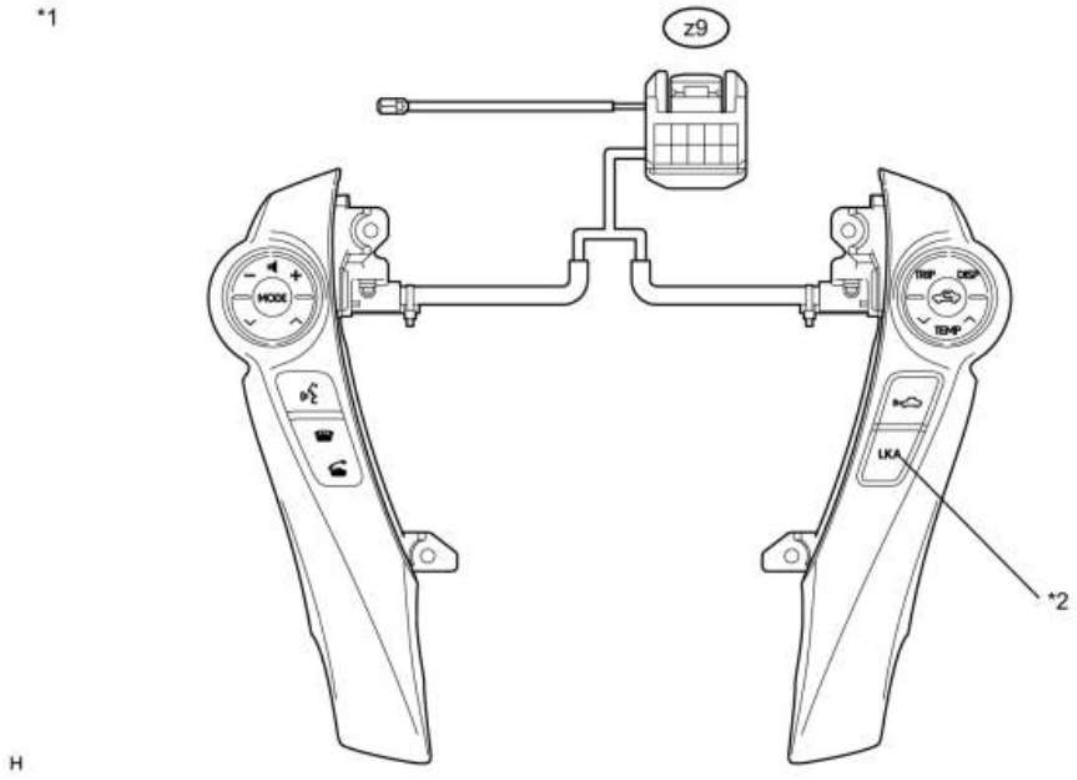
# PROCEDURE

| 1. | INSPECT STEERING PAD SWITCH ASSEMBLY |
|---|---|

(a) Remove the steering pad switch INFO.

(b) Disconnect the z9 connector from the spiral cable.

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Component without harness connected<br><br>(Steering Pad Switch Assembly) | *2 | Lane Keeping Assist Main Switch |

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

Standard Resistance:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| z9-4 - z9-6 | Lane keeping assist main switch ON | Below 2.5 Ω |
| z9-4 - z9-6 | Lane keeping assist main switch OFF | 10 kΩ or higher |

(d) Reconnect the connector.

(e) Reinstall the steering pad switch INFO.

NG ▶ REPLACE STEERING PAD SWITCH ASSEMBLY

OK

▼

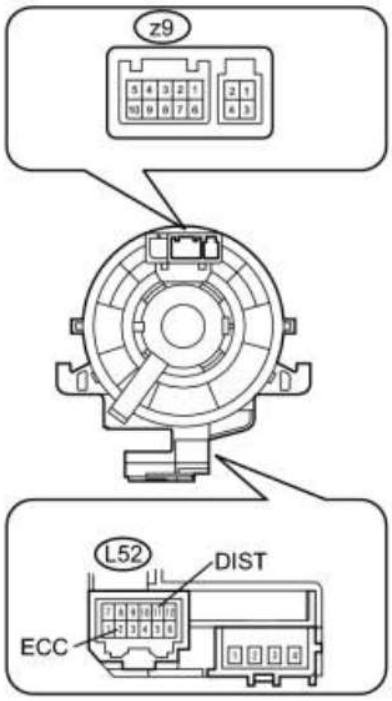
| | |
|---|---|
| 2. | CHECK AND REPLACE SPIRAL CABLE SUB-ASSEMBLY |

NOTICE:

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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 page shown in the brackets.

*1




(a) Remove the spiral cable sub-assembly INFO.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| z9-4 - L52-11 (DIST) | The spiral cable position is center | Below 1 Ω |
| | The spiral cable position is 2.5 rotations to the left | |
| | The spiral cable position is 2.5 rotations to the right | |
| z9-6 - L52-2 (ECC) | The spiral cable position is center | Below 1 Ω |
| | 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**

| | |
|---|---|
| *1 | Component without harness connected |

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| | |
|---|---|
| | (Spiral Cable Sub-assembly) |

HINT:

The spiral cable makes a maximum of approximately 5 rotations.

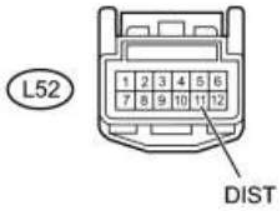
(c) Install the spiral cable sub-assembly INFO.

NG ▶ REPLACE SPIRAL CABLE SUB-ASSEMBLY

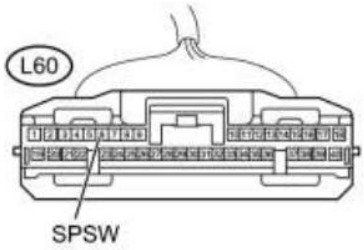
OK ▼

| | |
|---|---|
| 3. | CHECK HARNESS AND CONNECTOR (SPIRAL CABLE - DRIVING SUPPORT ECU) |

*1




*2




(a) Disconnect the driving support ECU connector.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L52-11 (DIST) - L60-6 (SPSW) | Always | Below 1 Ω |
| L52-11 (DIST) - Body ground | Always | 10 kΩ or higher |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector |

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| | |
|---|---|
| | (to Spiral Cable Sub-assembly) |
| *2 | Front view of wire harness connector<br><br>(to Driving Support ECU) |

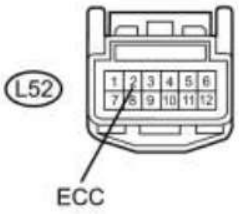
(c) Reconnect the driving support ECU connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL CABLE - DRIVING SUPPORT ECU)

OK ▼

| | |
|---|---|
| 4. | CHECK HARNESS AND CONNECTOR (BODY GROUND CIRCUIT) |

*1




(a) Disconnect the spiral cable connector.

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

Standard Resistance:

| Tester Connection | Condition | Specified Condition |
|---|---|---|
| L52-2 (ECC) - Body ground | Always | Below 1 Ω |

**Text in Illustration**

| | |
|---|---|
| *1 | Front view of wire harness connector<br><br>(to Spiral Cable Sub-assembly) |

(c) Reconnect the connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (BODY GROUND CIRCUIT)

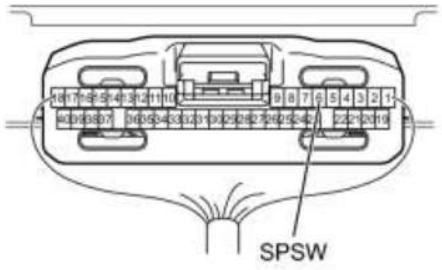
OK ▼

| | |
|---|---|
| 5. | INSPECT DRIVING SUPPORT ECU |

(a) Turn the power switch on (IG).

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*1




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

Standard Voltage:

| Tester Connection | Switch Condition | Specified Condition |
|---|---|---|
| L60-6 (SPSW) - Body ground | • Power switch on (IG)<br>• Lane keeping assist main switch ON | 6 to 7 V |
| | • Power switch on (IG)<br>• Lane keeping assist main switch OFF | 10 to 14 V |

**Text in Illustration**

| | |
|---|---|
| *1 | Component without harness connected<br><br>(Driving Support ECU) |

NG ▶ REPLACE DRIVING SUPPORT ECU

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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| |
|---|
| Indicator Circuit |

# DESCRIPTION

- When the driving support ECU detects a lane-keeping assist main switch signal, it sends the signal to the combination meter via CAN communication. Then the LKA indicator light turns on.
- The LKA 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

# PROCEDURE

| | |
|---|---|
| 1. | PERFORM ACTIVE TEST USING TECHSTREAM (LKA INDICATOR LIGHT) |

(a) Select the Active Test, use the Techstream to generate a control command, and then check that the LKA indicator light illuminates.

**Combination Meter**

| Tester Display | Test Part | Control Range | Diagnostic Note |
|---|---|---|---|
| Drift From The Lane | LKA indicator light | ON / OFF | - |

OK:

LKA indicator light turns on / turns off.

NG ▶ REPLACE NO. 3 METER CIRCUIT PLATE

OK ▼

| | |
|---|---|
| 2. | READ VALUE USING TECHSTREAM (LKA INDICATOR LIGHT) |

(a) Using the Techstream, enter the following menus: All ECUs / Lane Keeping Assist / Data List / LKA Indicator.

(b) Check the Data List for proper functioning of the LKA indicator light.

**Lane Keeping Assist**

| Tester Display | Test Details | Normal Condition | Diagnostic Note |
|---|---|---|---|
| LKA Indicator | LKA indicator light signal / ON or OFF | ON: LKA indicator light turns on<br>OFF: LKA indicator light turns off | - |

OK:

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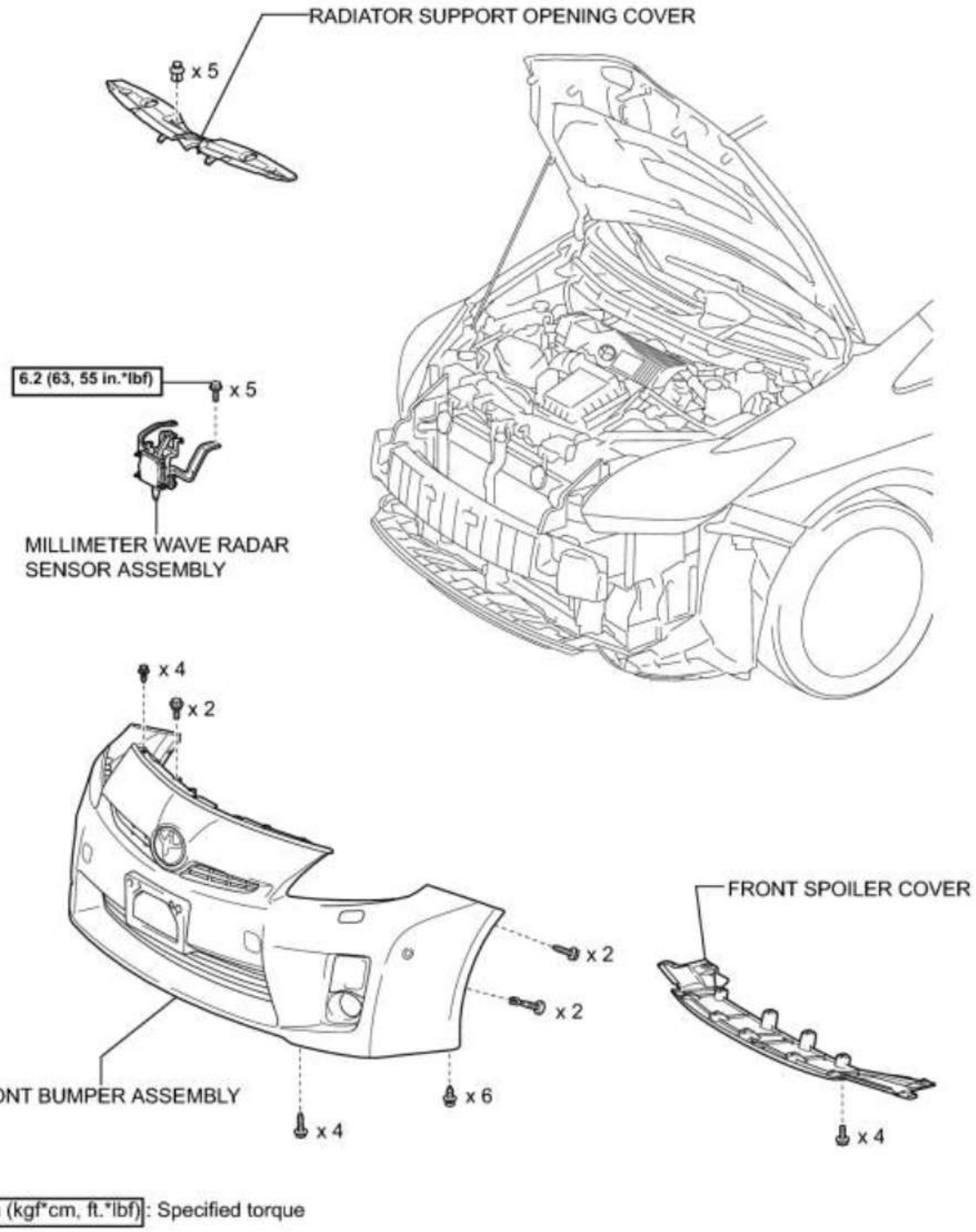
LKA indicator light turns on / turns off.

NG ▶ REPLACE DRIVING SUPPORT ECU
OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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# COMPONENTS

# ILLUSTRATION




N*m (kgf*cm, ft.*lbf): Specified torque

P

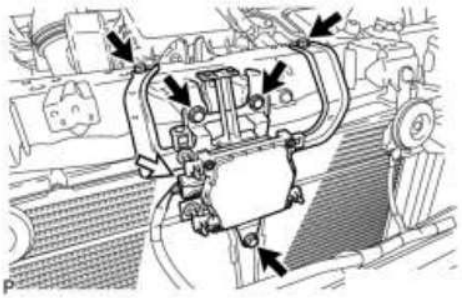
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# REMOVAL

1. REMOVE RADIATOR SUPPORT OPENING COVER INFO

2. REMOVE FRONT BUMPER ASSEMBLY INFO

3. REMOVE MILLIMETER WAVE RADAR SENSOR ASSEMBLY



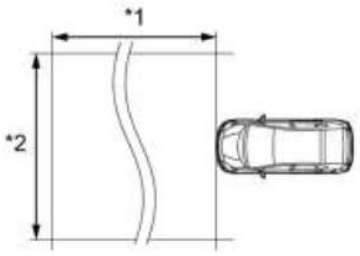
(a) Disconnect the connector.

(b) Remove the 5 bolts and millimeter wave radar sensor assembly.

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# ADJUSTMENT

1. ADJUST MILLIMETER WAVE RADAR SENSOR ASSEMBLY




P

**Text in Illustration**

| | |
|---|---|
| *1 | Approx. 10 m |
| *2 | Approx. 14 m |

CAUTION:

Exposure to radio frequency emissions is hazardous to your health. It is hazardous to your health to be within 20 cm (7.87 in.) of the device's radio frequency aperture.

NOTICE:

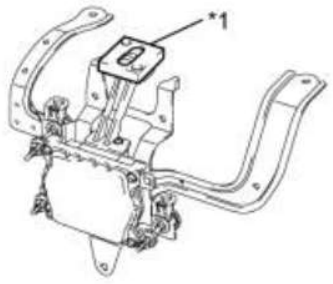
- This device complies with FCC radio frequency emission regulations.
- Perform measurements on a level surface.
- Make sure that no large pieces of metal are within a 10 m (32.8 ft.) x 14 m (45.9 ft.) area in front of the vehicle. If possible, the surrounding area should also be free of large metal objects.

(a) Before adjusting the radar beam axis, prepare the vehicle as follows.

(1) Check the tire pressure and adjust it if necessary.

(2) Remove all excess weight from the vehicle (luggage, heavy objects, etc.).

(b) Check and adjust the vertical direction of the radar sensor.




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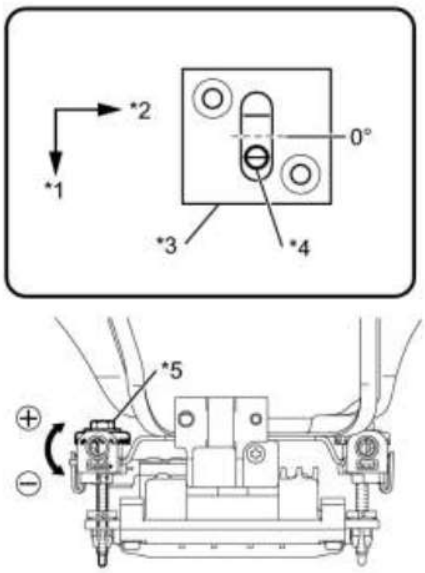
**Text in Illustration**

| | |
|---|---|
| *1 | Level |

(1) Remove dust, oil and foreign matter from the radar sensor's level rack.

(2) Set a level on the radar sensor's level rack.

(3) Check that the level's air bubble is within the red frame.




P

## Text in Illustration

| | |
|---|---|
| *1 | FR |
| *2 | LH |
| *3 | Level |
| *4 | Air Bubble |
| *5 | Bolt A |

OK:

Level's air bubble is within the red frame.

If the bubble is not within the red frame, use a screwdriver to adjust the bolt A until the air bubble is within the red frame.

- The adjustable range within the level's red frame is +/-0.2°.
- The target angle is +0.2° (upward angle of 0.2°).

Result:

| Adjustment Direction | Adjustment Procedure | Adjustment Angl |
|---|---|---|
| Vertical adjustment | Upward direction: Turn bolt A to negative (-) side | For every 1.4 rotations adjustment bolt, sensor moves about 1° |
| | Downward direction: Turn bolt A to positive (+) side | |

(c) Adjust the reflector height.

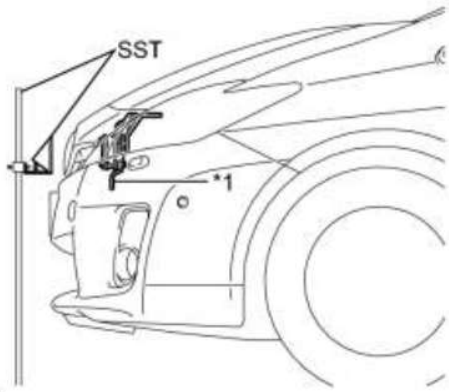
## Text in Illustration

| | |
|---|---|
| *1 | Millimeter Wave Radar Sensor |

(1) Adjust the reflector so that the center of SST reflector is the same

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height as the millimeter wave radar sensor.




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SST: 09870-60000

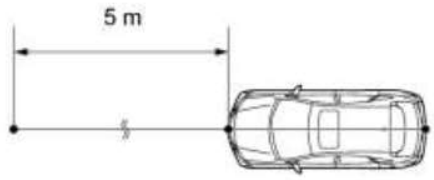
09870-60010

SST: 09870-60040

HINT:

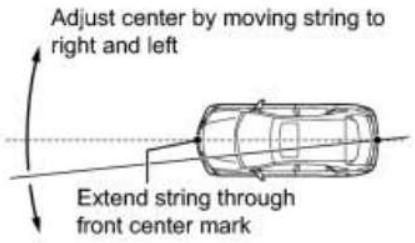
Prepare a 10 m (32.8 ft.) string, string with a sharp-pointed weight (plumb bob), and 5 m (16.4 ft.) tape measure.

(d) Place the reflector.




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(1) Hang the string (with weight) from the center of the vehicle's rear emblem. Mark the vehicle's rear center point on the ground. Repeat for the front of the vehicle.




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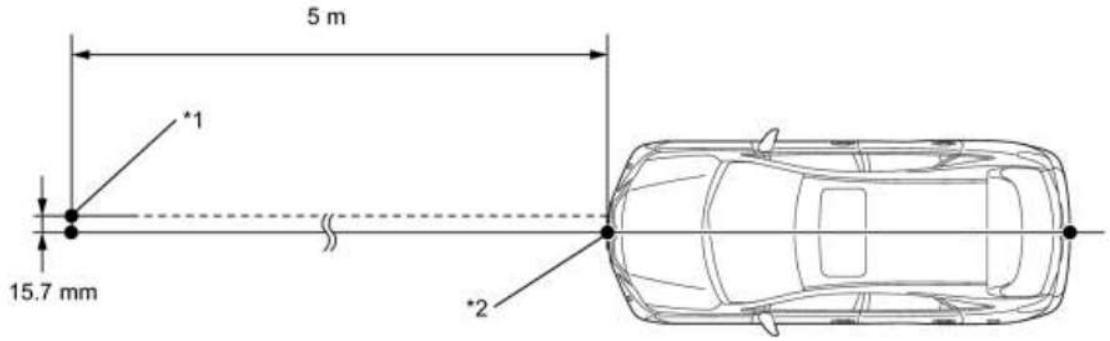
(2) Set one end of the 10 m (32.8 ft.) string on the vehicle's rear center point. Run the string over the vehicle's front center point to a position 5 m (16.4 ft.) beyond the vehicle's front center point, as shown in the illustration. Mark the 5 m (16.4 ft.) position.

(3) Using a tape measure, measure 15.7 mm (0.618 in.) to the right of the 5 m (16.4 ft.) position. Place the reflector at that position.

NOTICE:

Perform the operation as precisely as possible.

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**Text in Illustration**

| | | | |
|---|---|---|---|
| *1 | Reflector Placement Point | *2 | Millimeter Wave Radar Sensor Position |

(e) Check the radar beam axis.

(1) When using the Techstream:

1. Connect the Techstream to the DLC3.
2. Turn the power switch on (IG).
3. Turn the Techstream on, and turn the cruise control main switch on.
4. Select "Connect to Vehicle".
5. Select each item on the display screen and proceed to the next screen.
6. Under "System Selection Menu", select "Radar Cruise".
7. Select "Utility".
8. Select "Beam Axis Adjustment" and proceed to the next screen.

   HINT:

   A buzzer will sound for 1 second.

9. Follow the Techstream display, and continue with the adjustment.

   CAUTION:

   Do not come within 20 cm (7.87 in.) of the radar sensor.

   NOTICE:

   - Turn the cruise control main switch on before pressing "Next".
   - Make sure there is at least 20 cm (7.87 in.) between the radar sensor and any nearby individuals.

(2) Check the following items on the laser cruise divergence data screen.

NOTICE:

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While using the Techstream beam axis adjustment mode, the actual direction and angle of the radar sensor may be different from the Techstream data. In such a case, the deviation is displayed on the combination meter's multi-information display.

1. Confirm that the distance value is approximately 5 m (16.4 ft.).

   HINT:

   - A value between 0.0 m (0.0 ft.) and 6.3 m (20.7 ft.) should be indicated.
   - If the distance is 0.0 m (0.0 ft.), the sensor cannot detect the target. Reconfirm that there is no metal in the specified area in front of the vehicle (refer to the Notice at the beginning of this adjustment procedure).
2. Confirm that the left/right side value is between 0.0 m (0.0 ft.) and 6.3 m (20.7 ft.).

   HINT:

   If the distance is 0.0 m (0.0 ft.), the sensor cannot detect the target. Reconfirm that there is no metal in the specified area in front of the vehicle (refer to the Notice at the beginning of this adjustment procedure).

(f) Check and adjust the horizontal direction of the radar sensor.

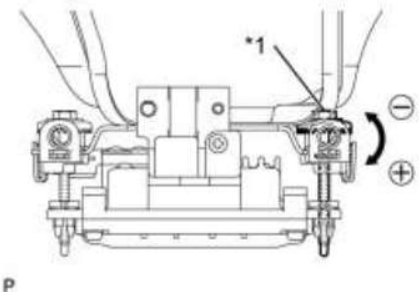
(1) Check that the divergence of the radar beam axis is 0°.

Standard:

0° (Both right and left)

If the axis is not as specified, use a screwdriver to adjust the bolt B until the divergence of the radar beam axis is 0°.

(2) Based on the measured divergence of the beam axis, turn and adjust the bolt B for horizontal adjustment of the millimeter wave radar sensor using a screwdriver.




## Text in Illustration

| | |
|---|---|
| *1 | Bolt B |

Result:

| Adjustment Direction | Adjustment Procedure | Adjustment Angle |
|---|---|---|
| Horizontal adjustment | Right direction: Turn bolt B to positive (+) side. | For every 2.5 rotations of adjustment bolt, sensor moves about 1° |
| | Left direction: Turn bolt B to negative (-) side. | |

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- If "LEFT SIDE: 1.0°" is displayed, the divergence is 1.0° in the left direction. Turn the bolt B approximately 2.5 turns to the negative (-) side.
- If the value does not change to 0°, it is possible that the sensor is aiming at something different. Reconfirm that there are no reflective materials in the surrounding area.

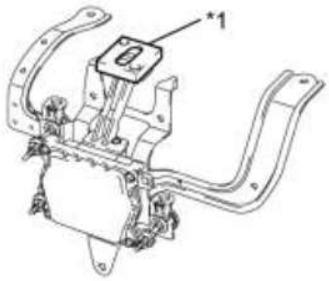
(3) Select "Next". The driving learning value is automatically reset.

HINT:

A buzzer will sound for 10 seconds or more.

(4) Disconnect the Techstream from the DLC3.

(g) Recheck and readjust the vertical direction of the radar sensor.




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(1) Set a level on the radar sensor's level rack.

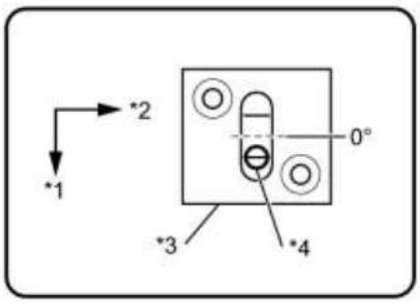
## Text in Illustration

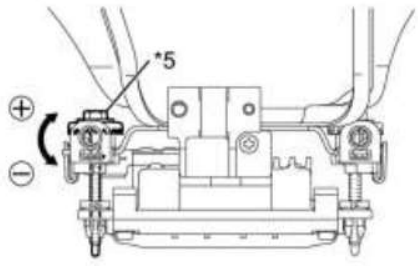
| | |
|---|---|
| *1 | Level |

(2) Check that the level's air bubble is within the red frame.

## Text in Illustration

| | |
|---|---|
| *1 | FR |
| *2 | LH |
| *3 | Level |
| *4 | Air Bubble |
| *5 | Bolt A |




P

OK:

Level's air bubble is within the red frame.

If the bubble is not within the red frame, use a screwdriver to adjust the bolt A until the level's air bubble is within the red frame.

- The adjustable range within the red frame is +/-0.2°.
- The target angle is +0.2° (upward angle of 0.2°).

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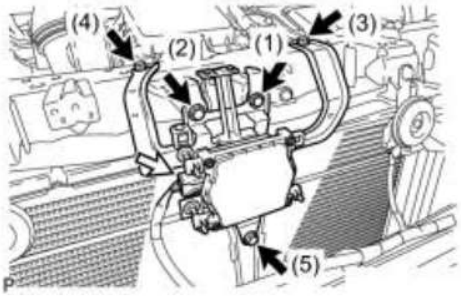
Result:

| Adjustment Direction | Adjustment Procedure | Adjustment Angl |
|---|---|---|
| Vertical adjustment | Upward direction: Turn bolt A to negative (-) side | For every 1.4 rotations adjustment bolt, sensor moves about 1° |
| | Downward direction: Turn bolt A to positive (+) side | |

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# INSTALLATION

1. INSTALL MILLIMETER WAVE RADAR SENSOR ASSEMBLY




(a) Tighten the 5 bolts on the millimeter wave radar sensor assembly.

Torque: **6.2 N·m (63 kgf·cm, 55in·lbf)**

HINT:

Tighten the bolts in the order indicated in the illustration.

(b) Connect the connector.

2. INSTALL FRONT BUMPER ASSEMBLY INFO

3. ADD WASHER FLUID (w/ Headlight Cleaner System) INFO

4. PREPARE VEHICLE FOR FOG LIGHT AIMING ADJUSTMENT INFO

5. PREPARE FOR FOG LIGHT AIMING INFO

6. INSPECT FOG LIGHT AIMING INFO

7. ADJUST FOG LIGHT AIMING INFO

8. ADJUST MILLIMETER WAVE RADAR SENSOR ASSEMBLY INFO

9. INSTALL RADIATOR SUPPORT OPENING COVER INFO

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