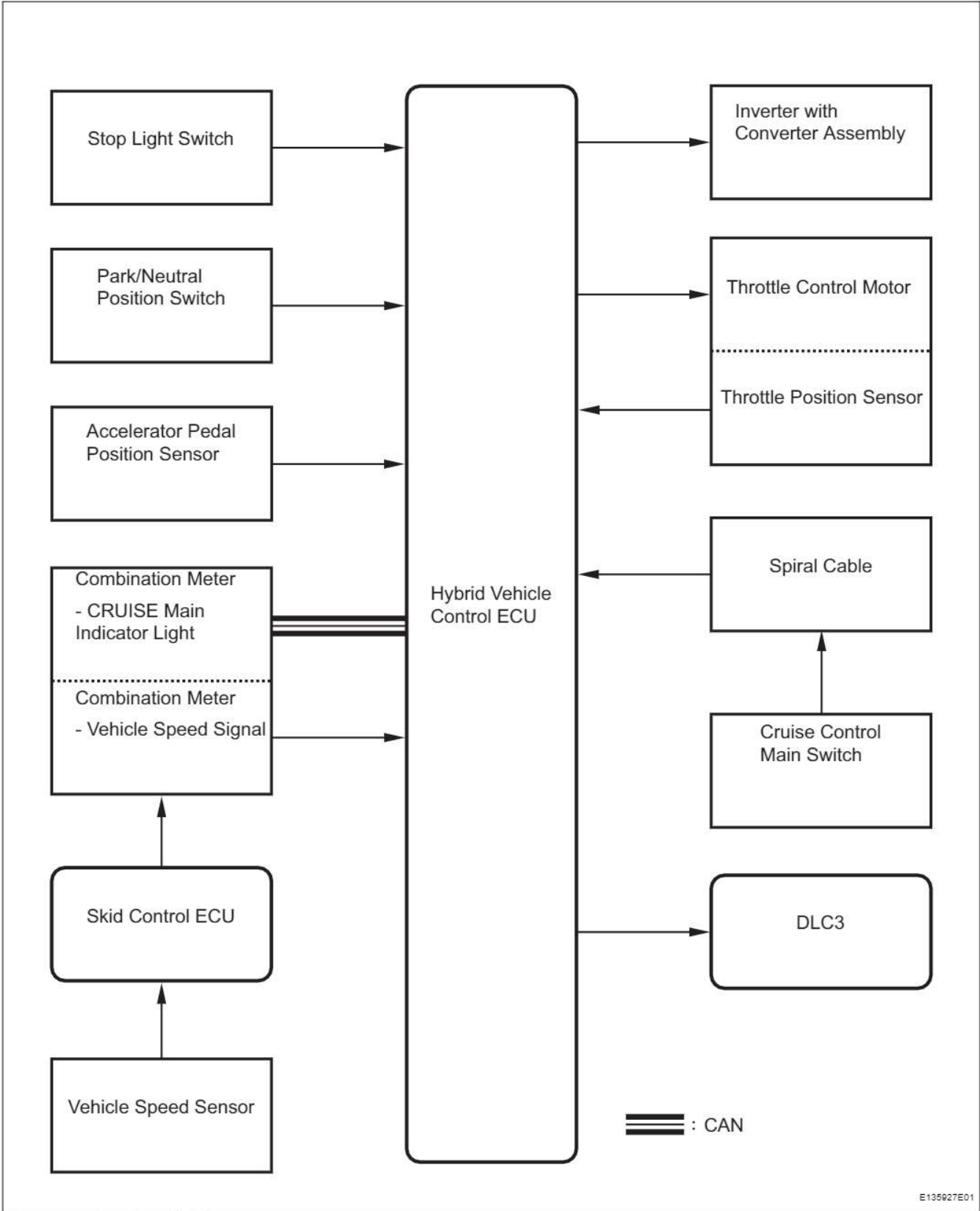


SYSTEM DIAGRAM

CC



Communication Table:

Sender	Receiver	Signal	Line
Hybrid Vehicle Control ECU	Combination Meter ECU	CRUISE main indicator operation signal	CAN

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 hybrid vehicle control ECU receives signals from each switch and sensor, and maintains constant vehicle speed by optimizing the use of the engine and motor driving force.

- The hybrid vehicle control ECU receives signals such as ON-OFF, - (COAST)/SET, + (ACCEL)/RES (RESUME), and CANCEL from the cruise control main switch and executes the appropriate command.
- The hybrid vehicle control ECU illuminates the combination meter's CRUISE main indicator light when it receives a cruise control main switch ON signal.
- The hybrid vehicle control ECU cancels the cruise control system when the brake pedal is depressed and the hybrid vehicle control ECU receives a stop light switch signal.
- The hybrid vehicle control ECU receives a park/neutral position switch signal and cancels the cruise control system when the shift lever is moved from the D to the N or B position.

2. LIMIT CONTROL

(a) Low speed limit

The lowest possible limit of the speed setting range is 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 but the stored vehicle speed will be retained when the vehicle speed drops below the low speed limit 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 approximately 200 km/h (125 mph). The cruise control system cannot be set when the driving vehicle speed exceeds the high speed limit. Also, + (ACCEL)/RES (RESUME) cannot be used to increase speed beyond the high speed limit.

CC

3. OPERATION OF CRUISE CONTROL

The cruise control main switch operates 7 functions: SET, - (COAST), TAP-DOWN, RES (RESUME), + (ACCEL), TAP-UP, and CANCEL. 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.

(a) SET CONTROL

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

(b) - (COAST) CONTROL

The hybrid vehicle 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 - (COAST)/SET (for approximately 0.6 seconds) while the cruise control system is in operation, the stored vehicle speed decreases by approximately 1.6 km/h (1.0 mph) at each tap. When the cruise control main switch is released from - (COAST)/SET and the difference between the driving and stored vehicle speed is more than 5 km/h (approximately 3 mph), the driving vehicle speed is stored and constant speed control is maintained.

(d) ACCELERATION CONTROL

The hybrid vehicle 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 in operation.

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

CC

CC-8

CRUISE CONTROL – CRUISE CONTROL SYSTEM

CC

(e) TAP-UP CONTROL

When tapping up the cruise control main switch to + (ACCEL)/RES (RESUME) (for approximately 0.6 seconds) while the cruise control system is in operation, the stored vehicle speed increases by approximately 1.6 km/h (1.0 mph) at each tap. However, when the difference between the driving and the stored vehicle speed is more than 5 km/h (approximately 3 mph), the stored vehicle speed will not be changed.

(f) RESUME CONTROL

If cruise control operation was canceled under any of the manual cancel conditions (other than turning the cruise control main switch off), and if the driving speed is above the low speed limit, pushing the cruise control main switch to + (ACCEL)/RES (RESUME) restores the vehicle speed memorized at the time of cancellation, and maintains constant speed control.

(g) MANUAL CANCEL CONTROL

Performing any of the following will cancel the cruise control system while in operation (the stored vehicle speed in the hybrid vehicle control ECU will be maintained).

- Pulling the cruise control main switch to CANCEL
- Depressing the brake pedal
- Moving the shift lever from the D to the N or B position.
- Turning the cruise control main switch off (the stored vehicle speed in the hybrid vehicle control ECU will not be maintained).

4. AUTO CANCEL (FAIL-SAFE)

This system has an automatic cancellation function (fail-safe) (See page [CC-17](#)).

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedures to troubleshoot the cruise control system.
- *: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 PROBLEM SYMPTOM CONFIRMATION

NEXT

3 CHECK CAN COMMUNICATION SYSTEM*

Refer to PRECAUTION (See page [CA-1](#)).

(a) Check for output DTCs.

Result

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

HINT:

The hybrid vehicle control ECU of this system is connected to the CAN communication system.

Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN communication system.

B

PROCEED TO "CAN COMMUNICATION SYSTEM"

A

4 DTC CHECK AND CLEAR*

Refer to DTC CHECK / CLEAR (See page [CC-17](#)).

NEXT

5 DTC CHECK (OTHER THAN CAN SYSTEM DTC)*

Result

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

CC-10

CRUISE CONTROL – CRUISE CONTROL SYSTEM

A

GO TO STEP 7

B

6

DTC CHART

Refer to DIAGNOSTIC TROUBLE CODE CHART (See page [CC-19](#)).

CC

NEXT

GO TO STEP 10

7

PROBLEM SYMPTOM CONFIRMATION

Result

Result	Proceed to
Symptom occurs	A
Symptom does not occur	B

A

GO TO STEP 9

B

8

SYMPTOM SIMULATION

Refer to ELECTRONIC CIRCUIT INSPECTION PROCEDURE (See page [IN-67](#)).

NEXT

Go to step 7

9

PROBLEM SYMPTOMS TABLE

Refer to PROBLEM SYMPTOMS TABLE (See page [CC-12](#)).

NEXT

10

CIRCUIT INSPECTION*

NEXT

11

TERMINALS OF ECU

Refer to TERMINALS OF ECU (See page [TW-23](#)).

CRUISE CONTROL – CRUISE CONTROL SYSTEM

CC-11

NEXT

12 IDENTIFICATION OF PROBLEM

NEXT

13 REPAIR OR REPLACE

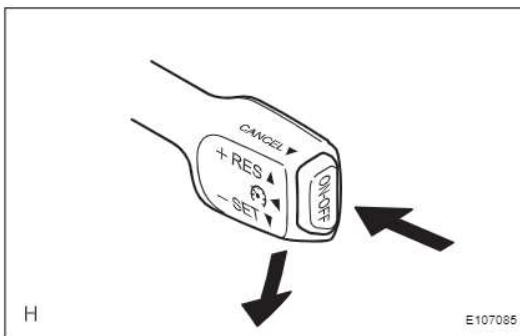
NEXT

14 CONFIRMATION TEST

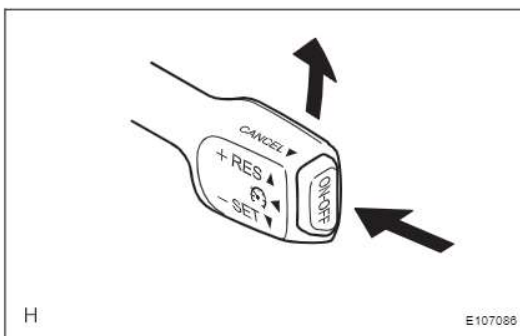
NEXT

CC

END

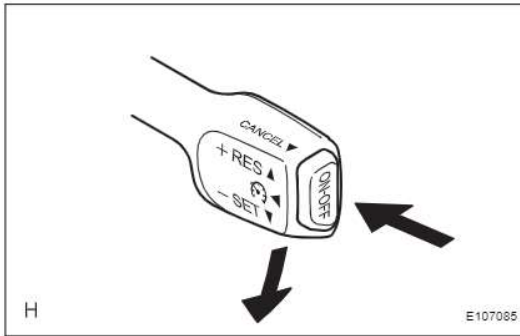
**ROAD TEST****1. PROBLEM SYMPTOM CONFIRMATION**

- (a) Inspect the SET function.
 - (1) Turn the cruise control main switch on.
 - (2) Drive at the required speed between 40 km/h (25 mph) and 200 km/h (125 mph).
 - (3) Push the cruise control main switch to - (COAST)/SET.
 - (4) After releasing the switch, check that the vehicle cruises at the set speed.
- (b) Inspect the + (ACCEL) function.
 - (1) Turn the cruise control main switch on.
 - (2) Drive at the required speed between 40 km/h (25 mph) and 200 km/h (125 mph).
 - (3) Push the cruise control main switch to - (COAST)/SET.
 - (4) Check that vehicle speed increases while the cruise control main switch is pushed to + (ACCEL)/RES (RESUME), and that the vehicle cruises at the newly set speed when the switch is released.
 - (5) Push the cruise control main switch to + (ACCEL)/RES (RESUME) and then release it immediately. Check that vehicle speed increases by approximately 1.6 km/h (1.0 mph) (tap-up control).

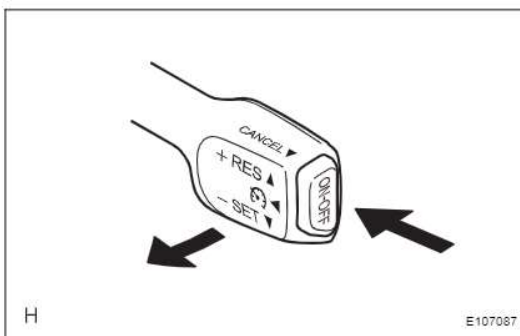


CC-12

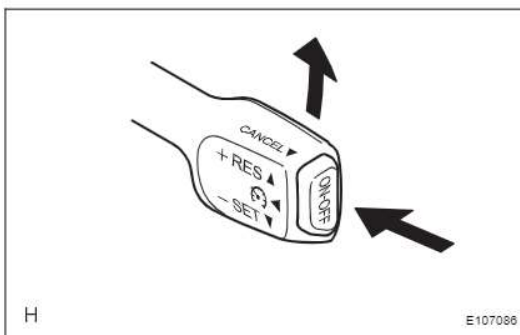
CRUISE CONTROL – CRUISE CONTROL SYSTEM



- (c) Inspect the - (COAST) function.
- (1) Turn the cruise control main switch on.
 - (2) Drive at the required speed between 40 km/h (25 mph) and 200 km/h (125 mph).
 - (3) Push the cruise control main switch to - (COAST)/SET.
 - (4) Check that vehicle speed decreases while the cruise control main switch is pushed to - (COAST)/SET, and the vehicle cruises at the newly set speed when the switch is released.
 - (5) Push the cruise control main switch to - (COAST)/SET, and then release it immediately. Check that vehicle speed decreases by approximately 1.6 km/h (1.0 mph) (tap-down control).



- (d) Inspect the CANCEL function.
- (1) Turn the cruise control main switch on.
 - (2) Drive at the required speed between 40 km/h (25 mph) and 200 km/h (125 mph).
 - (3) Push the cruise control main switch to - (COAST)/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.
 - Pulling the cruise control main switch to CANCEL
 - Depressing the brake pedal
 - The shift lever is moved from the D to the N or B position.
 - Turning the cruise control main switch off



- (e) Inspect the RES (RESUME) function.
- (1) Turn the cruise control main switch on.
 - (2) Drive at the required speed between 40 km/h (25 mph) and 200 km/h (125 mph).
 - (3) Push the cruise control main switch to - (COAST)/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 + (ACCEL)/RES (RESUME) at a driving speed of more than 40 km/h (25 mph), check that the vehicle resumes the speed set prior to the cancellation.

CRUISE CONTROL – CRUISE CONTROL SYSTEM

CC-13

PROBLEM SYMPTOMS TABLE

HINT:

Be sure to perform the SYMPTOM SIMULATION procedures before replacing the hybrid vehicle control ECU. If these symptoms are no longer present, the cause of the problem may be poor intermittent electrical contact (open or short) of a wire harness or connector.

Cruise control system:

Symptom	Suspected Area	See page
Vehicle speed cannot be set. (The CRUISE main indicator light comes on.)	1. Cruise control switch circuit	CC-28
	2. Combination meter	ME-14
	3. Vehicle speed sensor circuit	CC-20
	4. Stop light switch	CC-24
	5. Park/Neutral position switch circuit	HV-90
	6. If the symptoms still occur after the above areas have been inspected and have proven to be normal, replace the hybrid vehicle control ECU.	HV-570
Pushing the ON-OFF button does not turn the cruise control system on. (Vehicle speed cannot be set.)	1. Stop light switch circuit	CC-24
	2. Vehicle speed sensor circuit	CC-20
	3. Cruise control switch circuit	CC-28
	4. Park/Neutral position switch circuit	HV-90
	5. If the symptoms still occur after the above areas have been inspected and have proven to be normal, replace the hybrid vehicle control ECU.	HV-570
Cruise control is canceled while it is operating.	1. Stop light switch circuit	CC-24
	2. Park/Neutral position switch circuit	HV-90
	3. Cruise control switch circuit	CC-28
	4. Vehicle speed sensor circuit	CC-20
	5. Combination meter	ME-14
	6. If the symptoms still occur after the above areas have been inspected and have proven to be normal, replace the hybrid vehicle control ECU.	HV-570
Pulling back on the control main switch does not cancel cruise control. (The CRUISE main indicator light remains on.)	1. Cruise control switch circuit 2. If the symptoms still occur after the above area has been inspected and has proven to be normal, replace the hybrid vehicle control ECU.	CC-28 HV-570
Pulling back on the control main switch does not cancel cruise control. (The CRUISE main indicator light goes off.)	Replace the hybrid vehicle control ECU	HV-570
Cruise control is not canceled when vehicle speed drops below the low speed limit. (The CRUISE main indicator light remains on.)	1. Vehicle speed sensor circuit	CC-20
	2. If the symptoms still occur after the above area has been inspected and has proven to be normal, replace the hybrid vehicle control ECU.	HV-570
Cruise control is not canceled when vehicle speed drops below the low speed limit. (The CRUISE main indicator light goes off.)	Replace the hybrid vehicle control ECU	HV-570
Depressing the brake pedal does not cancel cruise control. (The CRUISE main indicator light remains on.)	1. Stop light switch circuit	CC-24
	2. If the symptoms still occur after the above area has been inspected and has proven to be normal, replace the hybrid vehicle control ECU.	HV-570
Depressing the brake pedal does not cancel cruise control. (The CRUISE main indicator light goes off.)	Replace the hybrid vehicle control ECU	HV-570
Moving the shift lever does not cancel cruise control.	1. Park/Neutral position switch circuit	HV-90
	2. If the symptoms still occur after the above area has been inspected and has proven to be normal, replace the hybrid vehicle control ECU.	HV-570

CC

CC-14

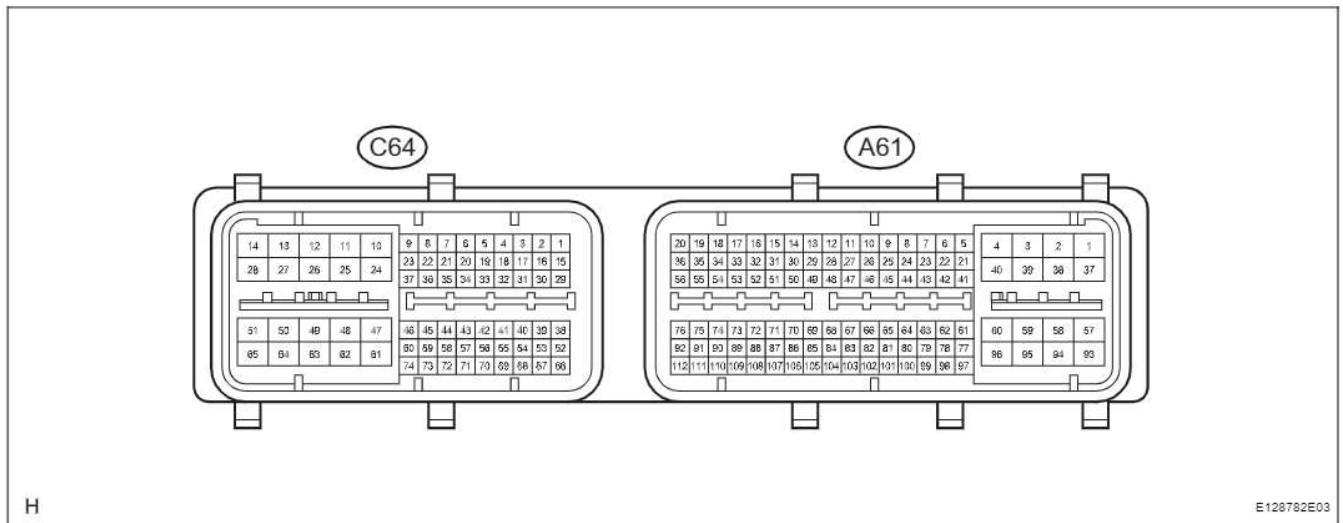
CRUISE CONTROL – CRUISE CONTROL SYSTEM

Symptom	Suspected Area	See page
Hunting (Speed is not constant.)	1. Vehicle speed sensor circuit	CC-20
	2. Combination meter	ME-14
	3. If the symptoms still occur after the above areas have been inspected and have proven to be normal, replace the hybrid vehicle control ECU. (2AZ-FXE)	HV-15
The CRUISE main indicator light remains blinking.	1. TC and CG terminal circuit	CC-35
	2. If the symptoms still occur after the above area has been inspected and has proven to be normal, replace the hybrid vehicle control ECU.	HV-570

CC

TERMINALS OF ECU

1. CHECK HYBRID VEHICLE CONTROL ECU



Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
A61-33 (TC) - C64-14 (E1)	P - W-B	Ground	Power switch on (IG)	10 to 14 V
A61-33 (TC) - C64-14 (E1)	P - W-B	Ground	Terminals TC and CG of DLC3 connected	Below 1 V
A61-56 (STP) - C64-14 (E1)	W - W-B	Stop light signal	Power switch on (IG), brake pedal depressed	10 to 14 V
A61-56 (STP) - C64-14 (E1)	W - W-B	Stop light signal	Power switch on (IG), brake pedal released	Below 1 V
A61-74 (CCS) - C64-14 (E1)	W - W-B	Cruise control main switch circuit	Power switch on (IG)	10 to 14 V
A61-74 (CCS) - C64-14 (E1)	W - W-B	Cruise control main switch circuit	CANCEL switch ON	6.6 to 10.1 V
A61-74 (CCS) - C64-14 (E1)	W - W-B	Cruise control main switch circuit	SET/COAST switch ON	4.5 to 7.1 V
A61-74 (CCS) - C64-14 (E1)	W - W-B	Cruise control main switch circuit	RES/ACC switch ON	2.3 to 4.0 V
A61-74 (CCS) - C64-14 (E1)	W - W-B	Cruise control main switch circuit	MAIN switch ON	Below 1 V
A61-55 (ST1-) - C64-14 (E1)	GR - W-B	Stop light signal	Power switch on (IG), brake pedal depressed	Below 1 V
A61-55 (ST1-) - C64-14 (E1)	GR - W-B	Stop light signal	Power switch on (IG), brake pedal released	10 to 14 V
A61-21 (SPDI) - C64-14 (E1)	L - W-B	Vehicle speed signal	Approximately 20 km/h (12 mph)	Pulse generation (Waveform 1)

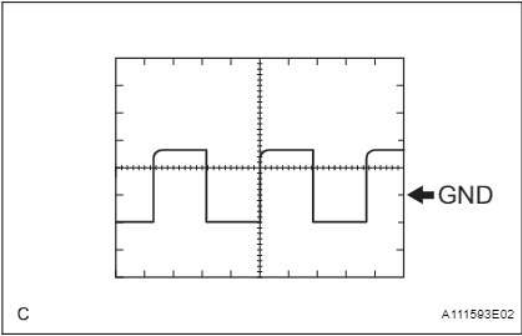
2. Oscilloscope waveforms

HINT:

Oscilloscope waveform samples are provided here for information purposes. Noise and fluttering waveforms have been omitted.

CC-16

CRUISE CONTROL – CRUISE CONTROL SYSTEM



(a) Waveform 1 (vehicle speed signal)

Item	Contents
Terminal	SPDI - E1
Equipment Setting	5 V/DIV., 20 ms./DIV.
Condition	Driving at approximately 20 km/h (12 mph) with power switch on (READY)

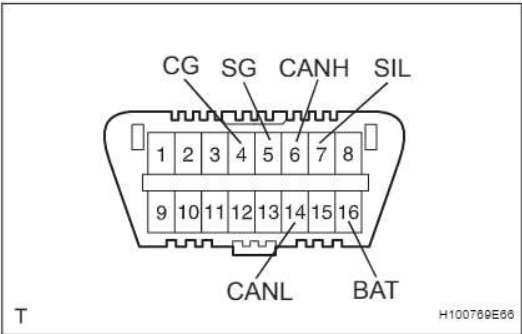
HINT:
The higher the vehicle speed, the shorter the cycle.

DIAGNOSIS SYSTEM

1. DESCRIPTION
- The 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 and multiplex communication systems. Use the intelligent tester to check and solve the problem.

CC

2. CHECK DLC3
- (a) The ECU uses the ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962, and matches the ISO 15765-4 format.



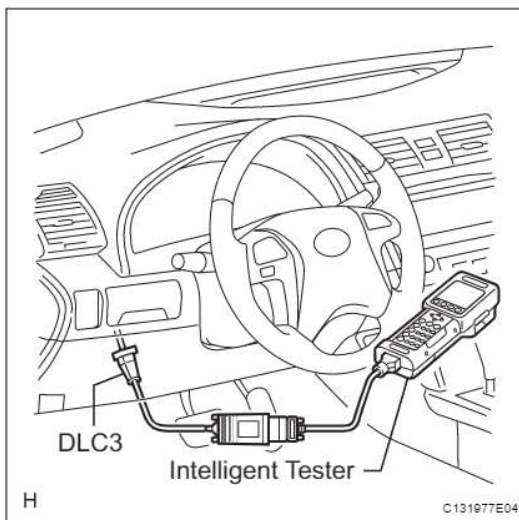
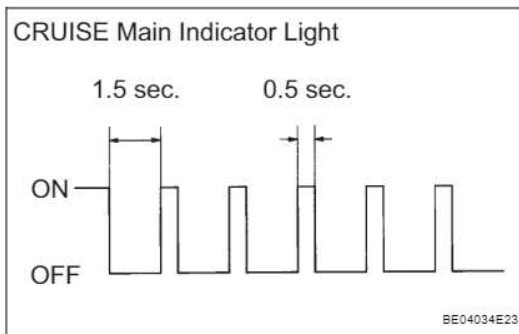
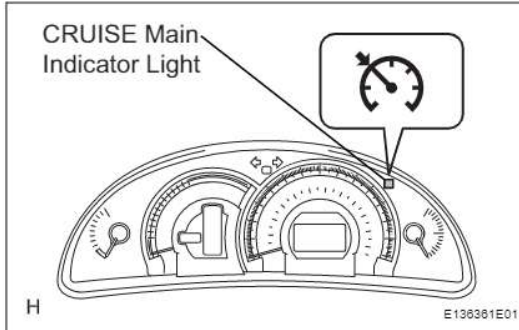
Terminal No. (Symbols)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	10 to 14 V
CANH (6) - CANL (14)	CAN bus line	Power switch off*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Power switch off*	200 Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Power switch off*	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Power switch off*	6 kΩ or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Power switch off*	6 kΩ or higher

- NOTICE:
- *: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the power switch, any other switches or the doors.
- If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.
- (b) Connect the cable of the intelligent tester to the DLC3, turn the power switch on (IG), and attempt to use the tester. If the display indicates that a communication error has occurred, there is a problem with either the vehicle or the tester.
- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 of the original vehicle.

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CRUISE CONTROL – CRUISE CONTROL SYSTEM

- If communication is still not possible when the tester is connected to another vehicle, the problem may be in the tester itself. Consult the Service Department listed in the tester's instruction manual.



3. CHECK INDICATOR

- Turn the power switch on (IG).

- Check that the CRUISE main indicator light illuminates when the cruise control main switch is turned on, and that the indicator light turns off when the main switch is turned off. If the results are not as specified, inspect the CRUISE main indicator light circuit (See page [CC-34](#)).

HINT:

While driving using cruise control, the hybrid vehicle control ECU activates AUTO CANCEL of the cruise control system when a malfunction occurs in one of the following: vehicle speed sensors, stop light switch, or any other related part. When AUTO CANCEL is activated, the CRUISE main indicator light outputs the blinking pattern shown to the left. At the same time, data related to the malfunction is stored as a DTC.

DTC CHECK / CLEAR

1. DTC CHECK

- Connect the intelligent tester to the DLC3.
 - Connect the intelligent tester to the Controller Area Network Vehicle Interface Module (CAN VIM). Then connect the CAN VIM to the Data Link Connector 3 (DLC3).
- Turn the power switch on (IG).
- Read the DTCs by following the prompts on the tester screen.

HINT:

Refer to the intelligent tester operator's manual for further details.

2. DTC CLEAR

- Connect the intelligent tester to the DLC3.
- Turn the power switch on (IG).
- Operate the intelligent tester to erase the codes.

HINT:

Refer to the intelligent tester operator's manual for further details.

CRUISE CONTROL – CRUISE CONTROL SYSTEM**CC-19****FAIL-SAFE CHART****HINT:**

If the following conditions are detected while the 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 open or short in stop light switch circuit - There is problem with vehicle speed signal - There is problem with throttle position sensor and motor	Turn cruise control main switch on again
CRUISE main indicator light blinks	- There is problem with input circuit of stop light switch circuit - There is problem with cancel circuit	- Turn cruise control main switch on again - Turn power switch off then on again
CRUISE main indicator light remains on (Cruise control is canceled)	- Vehicle speed is lower than low speed limit (approx. 40 km/h (25 mph)) while running with cruise control on - VSC operates - Electrically controlled brake operates	Push cruise control main switch to + (ACCEL)/RES (RESUME)
	Vehicle speed is lower than stored speed by approx. 16 km/h (10 mph) or more	Push cruise control main switch to - (COAST)/SET

CC

CC-20

CRUISE CONTROL – CRUISE CONTROL SYSTEM

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator, and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save diagnostic time.

- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Read the DATA LIST according to the display on the tester.

Hybrid vehicle control ECU (Cruise control):

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
VEHICLE SPD	Vehicle speed / min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Actual vehicle speed	-
MEMORY SPD	Cruise control memorized speed / min.: 0 km/h (0 mph), max.: 200 km/h (125 mph)	Actual stored vehicle speed	-
THROTTLE	Throttle opening angle / min.: 0°, max.: 125°	Actual demanded throttle angle	-
CRUISE CONTROL	Cruise control system active condition / ON or OFF	ON: Cruise control system activated OFF: Cruise control system deactivated	-
MAIN SW (MAIN)	Main switch signal (Main CPU) / ON or OFF	ON: Cruise control main switch on OFF: Cruise control main switch off	"3"
CCS READY M	Cruise control system standby condition (Main CPU) / ON or OFF	ON ↔ OFF: Switching each time ON-OFF button is pushed	"1"
CCS INDICATOR M	Cruise indicator signal (Main CPU) / ON or OFF	ON: "CRUISE" on OFF: "CRUISE" off	"2"
CANCEL SW	CANCEL switch signal / ON or OFF	ON: CANCEL switch on OFF: CANCEL switch off	-
SET/COAST SW	SET / COAST switch signal / ON or OFF	ON: - (COAST) / SET switch on OFF: - (COAST) / SET switch off	-
RES/ACC SW	RES / ACC switch signal / ON or OFF	ON: + (ACCEL) / RES (RESUME) switch on OFF: + (ACCEL) / RES (RESUME) switch off	-
STP LIGHT SW1 M	Stop light switch signal (Main CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW1-S	Stop light switch signal (Sub CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW2-S	Stop light switch signal (Sub CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
CCS OPER STATUS	Cruise control condition / ON or OFF	ON: Cruise control operating OFF: Cruise control not operating	-
VEHICLE SPD CHG	Vehicle speed sudden change / ON or OFF	ON: Sudden change in vehicle speed OFF: No change in vehicle speed	-
SHIFT D POS	Shift D position / ON or OFF	ON: Shift lever in D OFF: Shift lever is except in D	-

HINT:

- "3" is OK but "1" is NG → Hybrid vehicle control ECU failure

- "1" is OK but "2" is NG → DTC output or hybrid vehicle control ECU failure
- "3" is OK but the CRUISE main indicator light does not turn on → CRUISE main indicator light, wire harness, or hybrid vehicle control ECU failure

2. PERFORM ACTIVE TEST

HINT:
Performing the intelligent tester's ACTIVE TEST allows relays, VSVs, actuators, and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save diagnostic time. The DATA LIST can be displayed during the ACTIVE TEST.

- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Perform the ACTIVE TEST according to the display on the tester.

HINT:
The power switch must be turned on (IG) to proceed to the ACTIVE TEST using the intelligent tester.



Combination meter:

Tester Display	Test Part	Control Range	Diagnostic Note
CRUISE INDIC	CRUISE main indicator light	ON / OFF	-

DIAGNOSTIC TROUBLE CODE CHART

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

Cruise control system:

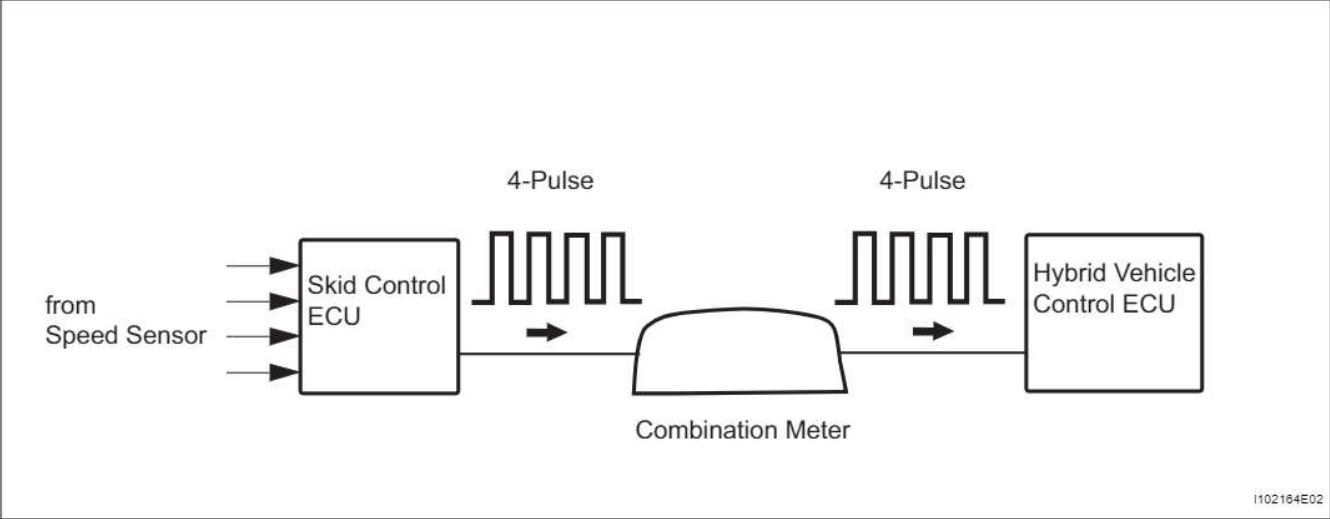
DTC Code	Detection Item	Trouble Area	See page
P0500	Vehicle Speed Sensor Malfunction	1. Vehicle speed sensor 2. Vehicle speed sensor signal circuit 3. Combination meter 4. Wire harness and connector 5. Hybrid vehicle control ECU	CC-20
P0571	Brake Switch "A" Circuit	1. Stop light switch 2. Stop light switch circuit 3. Hybrid vehicle control ECU	CC-24
P0607	Control Module Performance	Hybrid vehicle control ECU	CC-27

CC

DTC	P0500	Vehicle Speed Sensor Malfunction
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DESCRIPTION

The speed sensor for the skid control ECU detects wheel speed and sends appropriate signals to the skid control ECU. The skid control ECU converts these wheel speed signals into 4-pulse signals and outputs them to the hybrid vehicle control ECU via the combination meter. The hybrid vehicle control ECU determines vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detection Condition	Trouble Area
P0500	The vehicle speed signal from the vehicle speed sensor is cut for 0.14 sec. or more while cruise control is in operation.	- Vehicle speed sensor - Vehicle speed sensor signal circuit - Combination meter - Wire harness or connector - Hybrid vehicle control ECU

WIRING DIAGRAM



CC-24

CRUISE CONTROL – CRUISE CONTROL SYSTEM

INSPECTION PROCEDURE

1 CHECK OPERATION OF SPEEDOMETER

- (a) Drive the vehicle and check if the function of the speedometer in the combination meter is normal.

OK:

The actual vehicle speed and the speed indicated on the speedometer are the same.

HINT:

The vehicle speed sensor is functioning normally when the indication on the speedometer is normal.

NG

GO TO SPEEDOMETER CIRCUIT (See page ME-42)

OK

2 READ VALUE ON INTELLIGENT TESTER (VEHICLE SPEED SIGNAL)

- (a) Check the DATA LIST for proper functioning of the vehicle speed signal.

Hybrid vehicle control ECU

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
VEHICLE SPD	Cruise control vehicle speed/min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Actual vehicle speed is displayed	-

OK:

The speed displayed on the tester screen is almost the same as the speed indicated on the combination meter.

NG

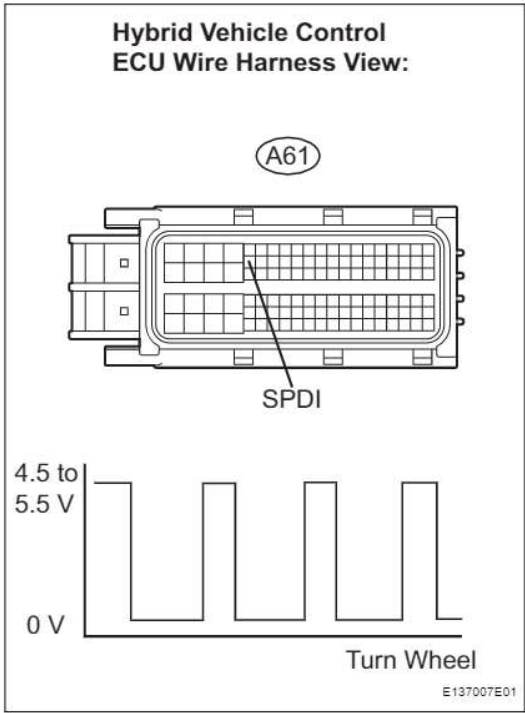
Go to step 3

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page CC-12)

3 INSPECT HYBRID VEHICLE CONTROL ECU (SPD VOLTAGE)

- (a) Turn the power switch on (IG).
(b) Move the shift lever to neutral.
(c) Jack up the vehicle.



OK

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

Standard voltage

Tester Connection	Specified Condition
A61-21 (SPDI) - Body ground	Waveform appears

HINT:
The output voltage fluctuates up and down, in a pattern similar to the diagram on the left, when the wheel is turned slowly.

NG

Go to step 4

CC

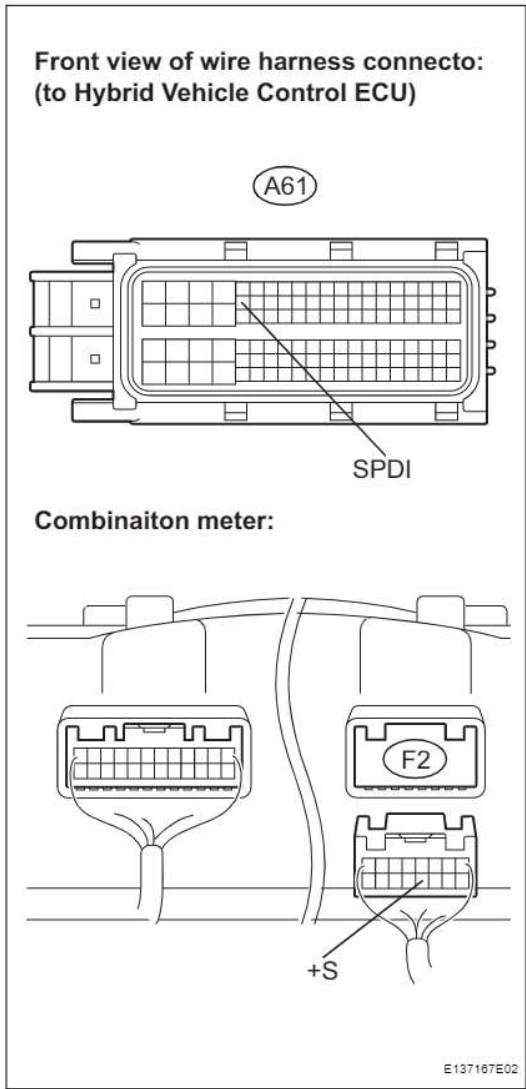
REPLACE HYBRID VEHICLE CONTROL ECU (See page HV-570)

CC-26

CRUISE CONTROL – CRUISE CONTROL SYSTEM

4

CHECK HARNESS AND CONNECTOR (HYBRID VEHICLE CONTROL ECU - COMBINATION METER)



- (a) Disconnect the A61 ECU connector.
- (b) Disconnect the F1 combination meter connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A61-21 (SPDI) - F2-12 (+S)	Below 1Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE HYBRID VEHICLE CONTROL ECU (See page HV-570)

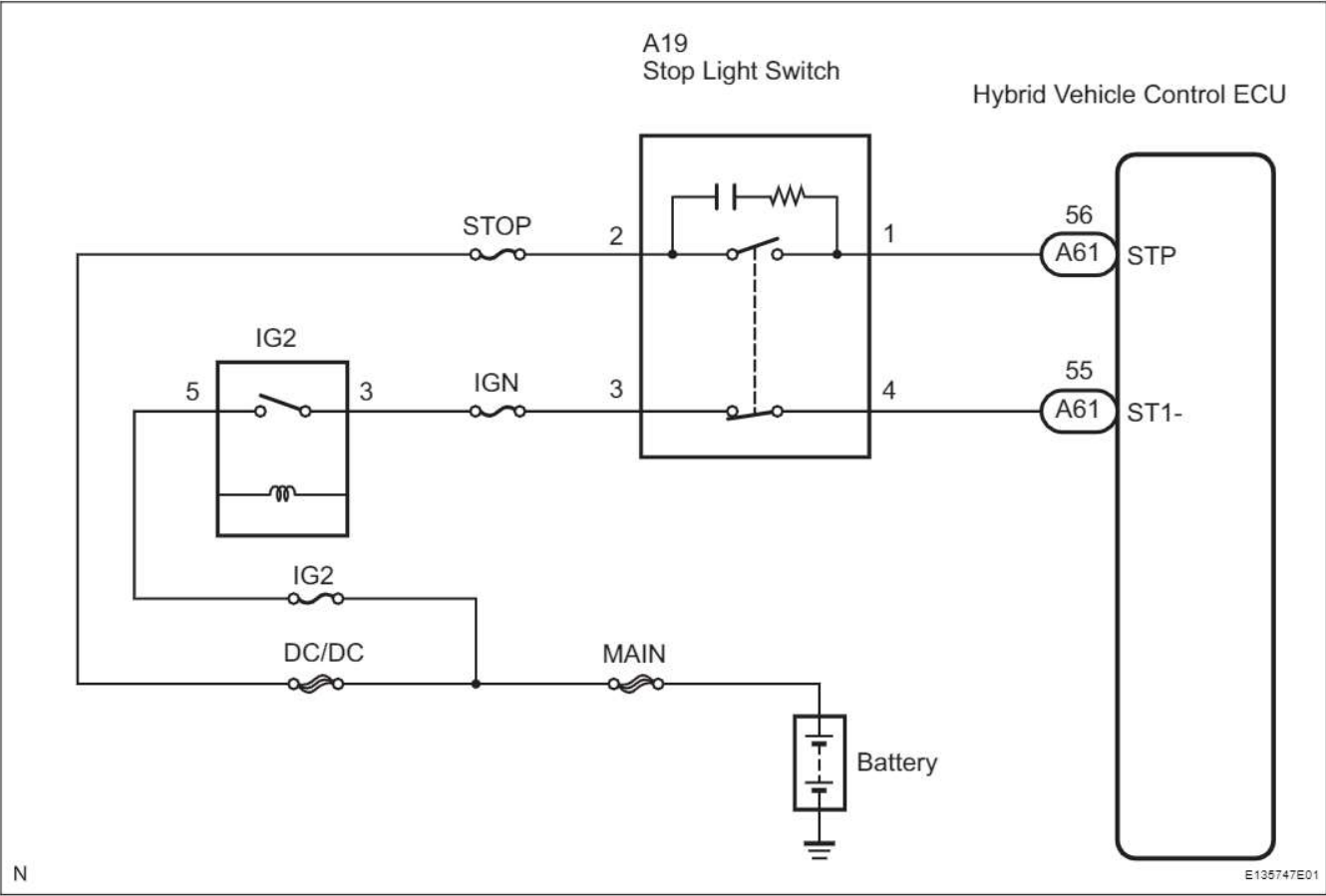
DTC	P0571	Brake Switch "A" Circuit
-----	-------	--------------------------

DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the hybrid vehicle control ECU. When the hybrid vehicle 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. The cancellation condition occurs when voltage is applied to terminal STP. When the brake is applied, voltage is normally applied to terminal STP of the hybrid vehicle control ECU through the STOP SW fuse and the stop light switch, and the hybrid vehicle control ECU turns the cruise control off.

DTC No.	DTC Detection Condition	Trouble Area
P0571	When voltage of STP terminal and that of ST1- terminal of hybrid vehicle control ECU are less than 1 V for 0.5 sec. or more	- Stop light switch - Stop light switch circuit - Hybrid vehicle control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	READ VALUE ON INTELLIGENT TESTER
---	----------------------------------

- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the power switch on (IG), and turn the intelligent tester main switch on.

CC-28

CRUISE CONTROL – CRUISE CONTROL SYSTEM

- (c) Check the DATA LIST for proper functioning of the stop light switch.

Hybrid vehicle control ECU (Cruise control):

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
STP LIGHT SW1 M	Stop light switch signal (Main CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW1-S	Stop light switch signal (Sub CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW2-S	Stop light switch signal (Sub CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

OK:

When the brake pedal is operated, the display changes as shown above.

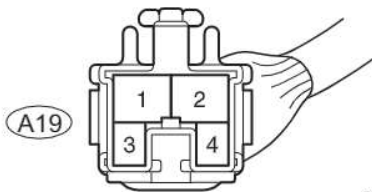
OK

REPLACE HYBRID VEHICLE CONTROL ECU
(See page [HV-570](#))

NG

2

CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH - BATTERY)

Stop Light Switch Wire Harness
Side Connector Front View:

- (a) Disconnect the A19 connector from the stop light switch.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
A19-2 - Body ground	Always	10 to 14 V
A19-3 - Body ground	Power switch on (IG)	10 to 14 V

NG

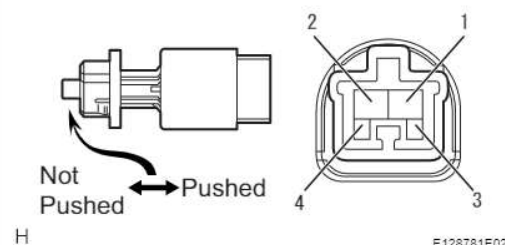
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

INSPECT STOP LIGHT SWITCH

Stop Light Switch:



- (a) Remove the stop light switch. (See page [BR-73](#))
(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 k Ω or higher
1 - 2	Switch pin pushed	10 k Ω or higher
3 - 4	Switch pin pushed	Below 1 Ω

- (c) Install the stop light switch.

NG

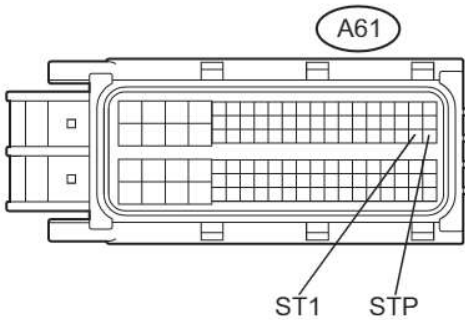
REPLACE STOP LIGHT SWITCH (See page [BR-73](#))

OK

4

CHECK HYBRID VEHICLE CONTROL ECU

Hybrid Vehicle Control ECU
Wire Harness View:



- (a) Reconnect the stop light switch connector.
- (b) Disconnect the A61 connector from the hybrid vehicle control ECU.
- (c) Turn the power switch on (IG).
- (d) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Brake Pedal Condition	Specified Condition
A61-56 (STP) - Body ground	Depressed	10 to 14 V
A61-56 (STP) - Body ground	Released	Below 1 V
A61-55 (ST1-) - Body ground	Depressed	Below 1 V
A61-55 (ST1-) - Body ground	Released	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR (STOP LIGHT SWITCH -
HYBRID VEHICLE CONTROL ECU)

OK

REPLACE HYBRID VEHICLE CONTROL ECU (See page [HV-570](#))

CC-30

CRUISE CONTROL – CRUISE CONTROL SYSTEM

DTC	P0607	Control Module Performance
-----	-------	----------------------------

DESCRIPTION

This DTC indicates internal abnormalities in the hybrid vehicle control ECU.

DTC No.	DTC Detection Condition	Trouble Area
P0607	When both of the following conditions are met: - The STP signals input to the supervisory CPU and control ECU in the hybrid vehicle control ECU are different for 0.15 sec. or more 0.4 sec. have passed after a cruise cancel input signal (STP input) is input to the hybrid vehicle control ECU	Hybrid vehicle control ECU

HINT:
The hybrid vehicle 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 remains on until the power switch is turned off.

INSPECTION PROCEDURE

1	REPLACE HYBRID VEHICLE CONTROL ECU
---	------------------------------------

(a) (See page [HV-570](#))

NEXT

END

CRUISE CONTROL – CRUISE CONTROL SYSTEM

CC-31

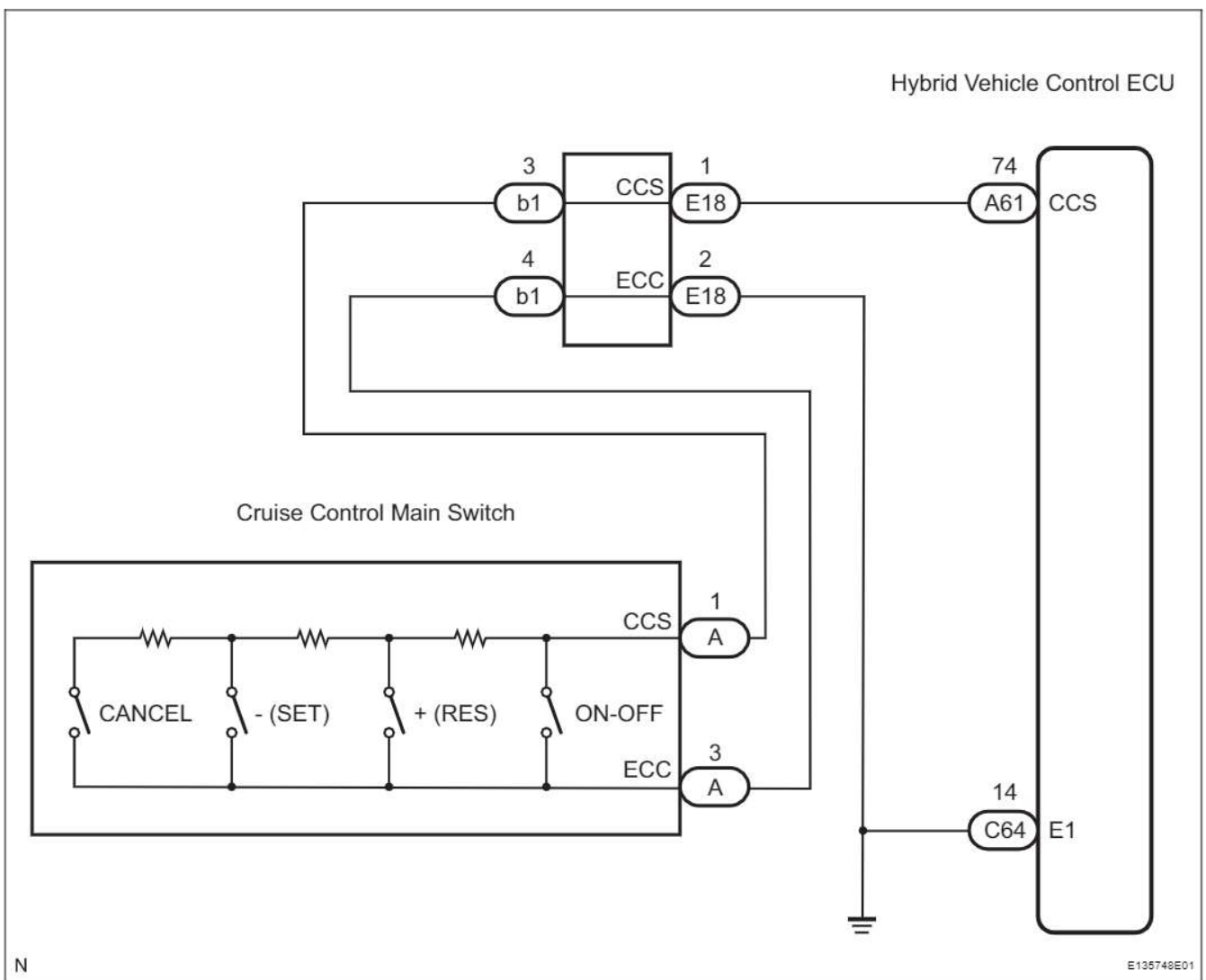
Cruise Control Switch Circuit

DESCRIPTION

The cruise control main switch operates 7 functions: SET, - (COAST), TAP-DOWN, RES (RESUME), + (ACCEL), TAP-UP, and CANCEL. The SET, TAP-DOWN, and - (COAST) functions, and the RES (RESUME), TAP-UP, and + (ACCEL) functions are operated with the same switch. The cruise control main switch is an automatic return type switch which turns on only while operating it in the direction of each arrow and turns off after releasing it. The internal contact point of the cruise control main switch is turned on with the switch operation. The hybrid vehicle control ECU then reads the voltage value that has been changed by the switch operation to control SET, - (COAST), RES (RESUME), + (ACCEL), and CANCEL.

CC

WIRING DIAGRAM



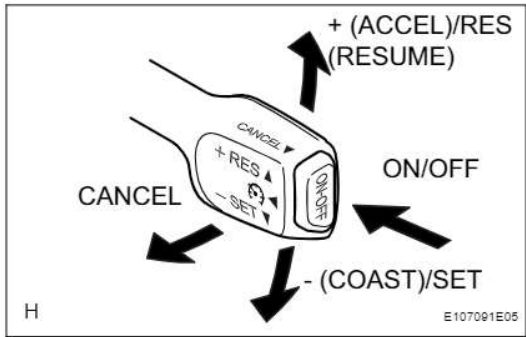
CC-32

CRUISE CONTROL – CRUISE CONTROL SYSTEM

INSPECTION PROCEDURE

1

READ VALUE ON INTELLIGENT TESTER



- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the power switch on (IG) and turn the intelligent tester main switch on.
- (c) Check the DATA LIST for proper functioning of the cruise control main switch.

Hybrid vehicle control ECU (Cruise control):

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
MAIN SW (MAIN)	Main switch signal (Main CPU)/ ON or OFF	ON: Cruise control main switch on OFF: Cruise control main switch off	-
CANCEL SW	CANCEL switch signal/ON or OFF	ON: CANCEL switch on OFF: CANCEL switch off	-
SET / COAST SW	SET / COAST switch signal/ON or OFF	ON: - (COAST)/SET switch on OFF: - (COAST)/SET switch off	-
RES / ACC SW	RES / ACC switch signal/ON or OFF	ON: + (ACCEL)/RES (RESUME) switch on OFF: + (ACCEL)/RES (RESUME) switch off	-

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

Result	Proceed to
OK	A
NG (All items are defective)	B
NG (1 to 4 items are defective)	C

A

PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE
(See page CC-12)

C

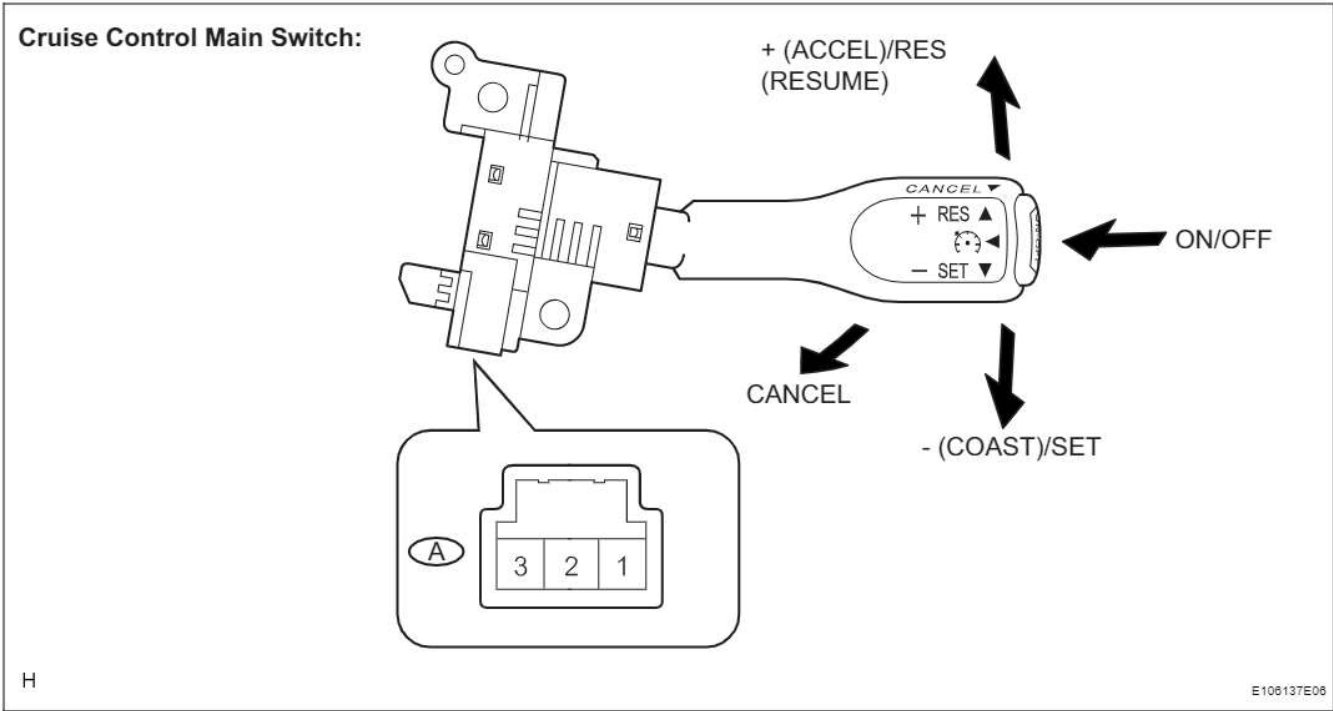
REPLACE CRUISE CONTROL MAIN SWITCH
(See page CC-38)

B

2

INSPECT CRUISE CONTROL MAIN SWITCH

- (a) Remove the cruise control main switch (See page CC-38).
- (b) Measure the resistance according to the value(s) in the table below.



Standard resistance

Tester Connection	Switch Condition	Specified Condition
A-1 (CCS) - A-3 (ECC)	Neutral	10 kΩ or higher
	+ (ACCEL)/RES (RESUME)	216 to 264 Ω
	- (COAST)/SET	567 to 693 Ω
	CANCEL	1,386 to 1,694 Ω
	Main switch on	Below 1 Ω

NG

REPLACE CRUISE CONTROL MAIN SWITCH
(See page [CC-38](#))

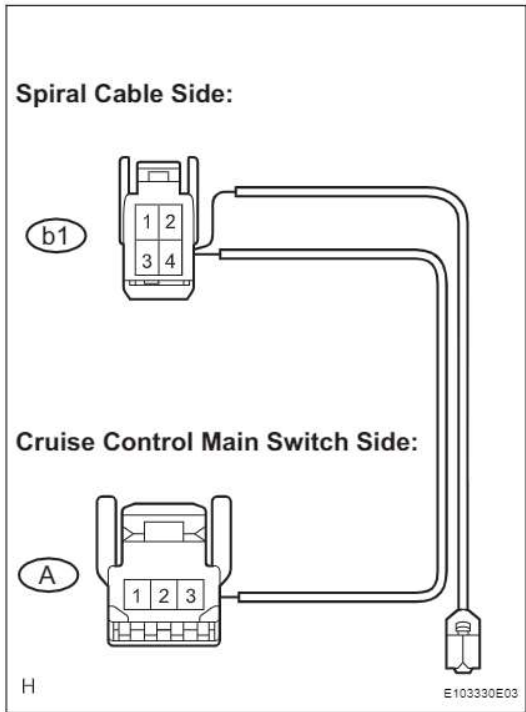
OK

CC-34

CRUISE CONTROL – CRUISE CONTROL SYSTEM

3

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



- (a) Disconnect the b1 connector from the spiral cable.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A-1 - b1-3	Below 1 Ω
A-3 - b1-4	Below 1 Ω

NG

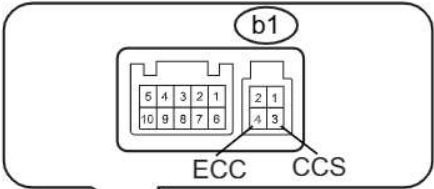
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

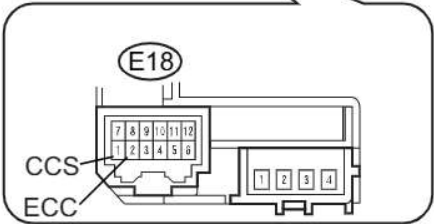
4

CHECK SPIRAL CABLE

Cruise Control Main Switch Side:



Vehicle Side:



H E106780E15

OK

NOTICE:
The spiral cable is an important part of the SRS airbag system. Incorrect removal or installation of the spiral cable may prevent the airbag from deploying. Be sure to read the pages shown in the brackets.

HINT:

- Removal (See page RS-357)
- Installation (See page RS-359)

(a) Remove the spiral cable.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Spiral Cable Position	Specified Condition
b1-3 - E18-1 (CCS)	Center	Below 1 Ω
	2.5 rotations to the left	
	2.5 rotations to the right	
b1-4 - E18-2 (ECC)	Center	Below 1 Ω
	2.5 rotations to the left	
	2.5 rotations to the right	

HINT:
The spiral cable can make a maximum of approximately 5 rotations.

NG → REPLACE SPIRAL CABLE (See page RS-357)

CC-36

CRUISE CONTROL – CRUISE CONTROL SYSTEM

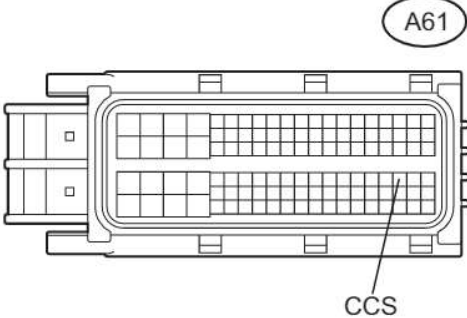
5

CHECK WIRE HARNESS (SPIRAL CABLE - HYBRID VEHICLE CONTROL ECU AND BODY GROUND)

Vehicle Side Connector Front View:



Hybrid Vehicle Control ECU Wire Harness View:



H

E124687E01

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

Standard resistance

Tester Connection	Condition	Specified Condition
E18-1 (CCS) - A61-74 (CCS)	Always	Below 1 Ω
A61-74 (CCS) - Body ground	Always	10 kΩ or higher
E18-2 (ECC) - Body ground	Always	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE HYBRID VEHICLE CONTROL ECU (See page HV-570)

CRUISE CONTROL – CRUISE CONTROL SYSTEM

CC-37

Cruise Main Indicator Light Circuit

DESCRIPTION

- The hybrid vehicle control ECU detects a cruise control main switch signal and sends it to the combination meter through CAN. The CRUISE main indicator light then 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 the circuit.

INSPECTION PROCEDURE

CC

1 PERFORM ACTIVE TEST USING INTELLIGENT TESTER

- Connect the intelligent tester to the DLC3.
- Check the CRUISE main indicator light by performing the ACTIVE TEST.

Combination meter:

Tester Display	Test Part	Control Range	Diagnostic Note
CRUISE INDIC	CRUISE main indicator light	ON / OFF	-

OK:

Indicator light comes on/goes off.

NG

REPLACE COMBINATION METER ASSEMBLY (See page [ME-64](#))

OK

2 READ VALUE ON INTELLIGENT TESTER

- Connect the intelligent tester to the DLC3.
- Turn the power switch on (IG) and turn the intelligent tester main switch on.
- Check the DATA LIST for proper functioning of the CRUISE main indicator light.

Hybrid vehicle control ECU (Cruise control):

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
CCS INDICATOR M	Cruise indicator signal (Main CPU) / ON or OFF	ON: "CRUISE" on OFF: "CRUISE" off	-

OK:

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

NG

REPLACE HYBRID VEHICLE CONTROL ECU (See page [HV-570](#))

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page [CC-12](#))

CC-38

CRUISE CONTROL – CRUISE CONTROL SYSTEM

TC and CG Terminal Circuit

DESCRIPTION

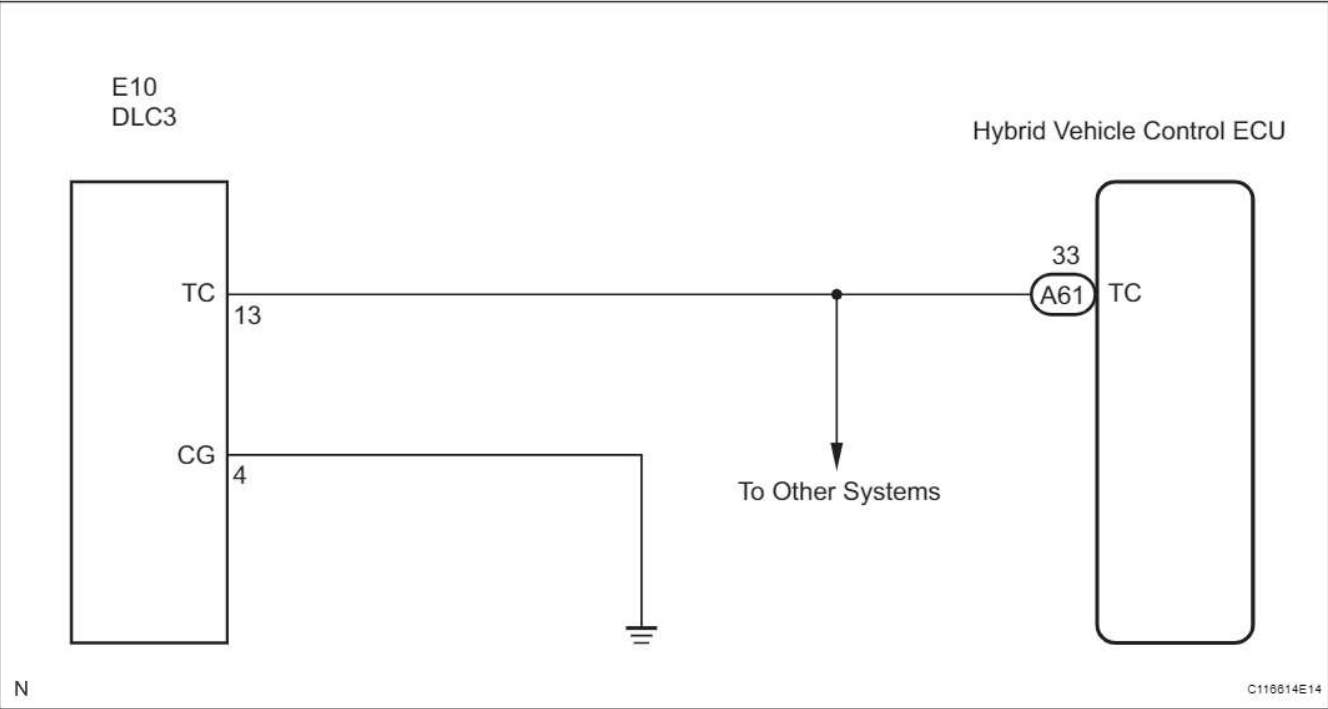
Connecting terminals TC and CG of the DLC3 causes the system to enter self-diagnostic mode. If a malfunction is present, DTCs will be output.

HINT:

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

CC

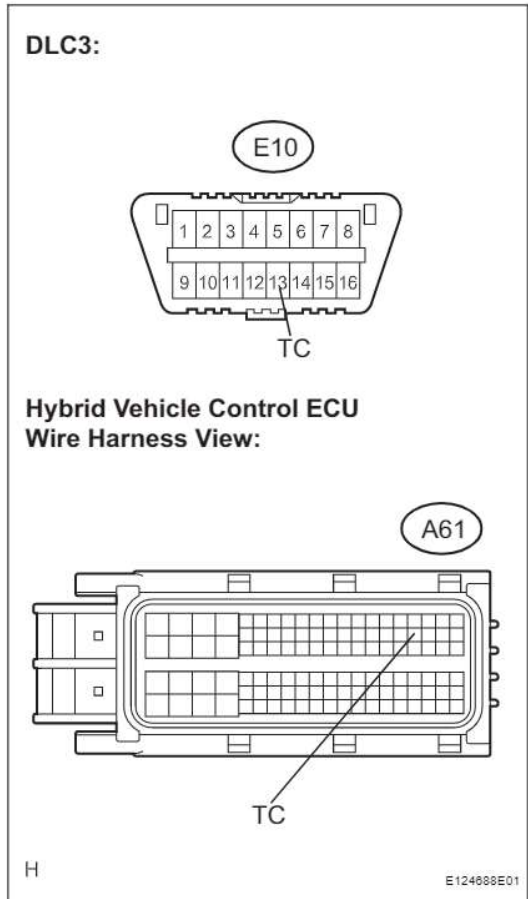
WIRING DIAGRAM



INSPECTION PROCEDURE

1

CHECK WIRE HARNESS (TERMINAL TC of DLC3 - HYBRID VEHICLE CONTROL ECU)



- (a) Disconnect the A61 connector from the hybrid vehicle control ECU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A61-33 (TC) - E10-13 (TC)	Always	Below 1 Ω

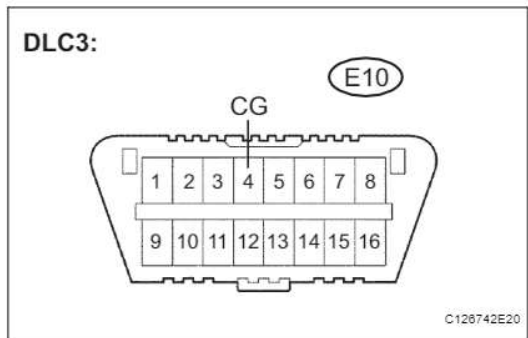
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (DLC3 - HYBRID VEHICLE CONTROL ECU)

OK

2

CHECK WIRE HARNESS (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
E10-4 (CG) - Body ground	Always	Below 1 Ω

NG

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

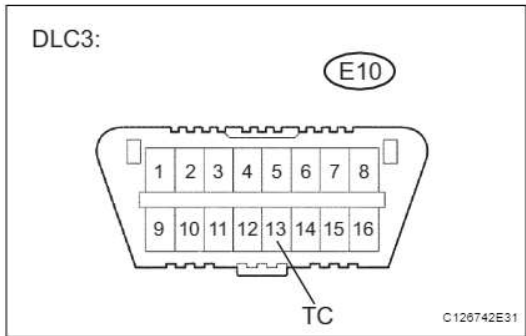
OK

CC-40

CRUISE CONTROL – CRUISE CONTROL SYSTEM

3

CHECK WIRE HARNESS (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
E10-13 (TC) - Body ground	Always	10 kΩ or higher

NG

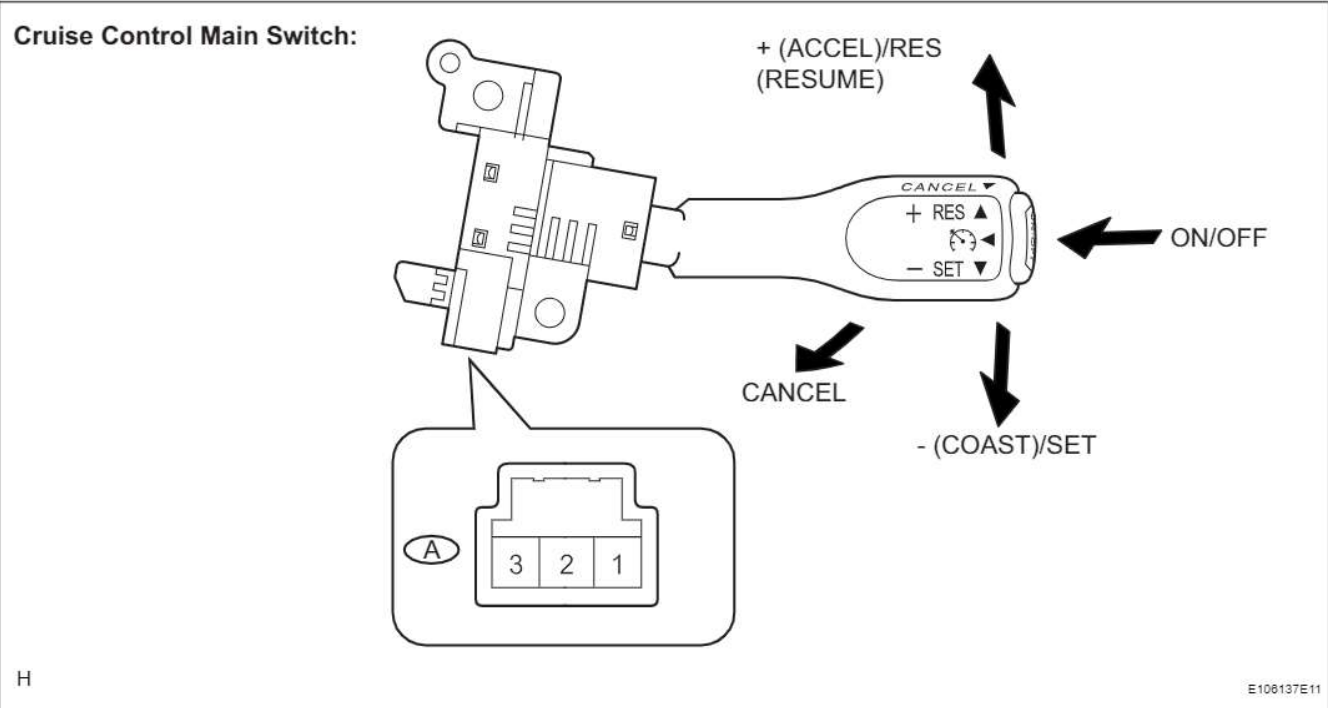
REPAIR OR REPLACE HARNESS OR CONNECTOR OR EACH ECU

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page [CC-12](#))

INSPECTION

1. INSPECT CRUISE CONTROL MAIN SWITCH
- (a) Remove the cruise control main switch



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

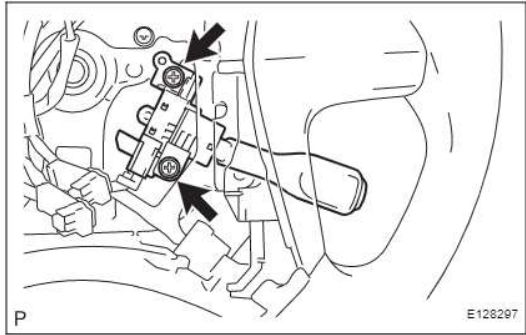
Standard resistance

Tester Connection	Switch Condition	Specified Condition
A-1 (CCS) - A-3 (ECC)	Neutral	10 kΩ or higher
	+ (ACCEL)/RES (RESUME)	216 to 264Ω
	- (COAST)/SET	567 to 693Ω
	CANCEL	1,386 to 1,694Ω
	Main Switch on	Below 1Ω

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

INSTALLATION

1. INSTALL CRUISE CONTROL MAIN SWITCH
- (a) Install the cruise control main switch with the 2 screws.
Torque: 2.4 N*m (24 kgf*cm, 21 in.*lbf)
- (b) Connect the connector.
2. INSTALL STEERING PAD (See page RS-346)
3. INSTALL LOWER NO. 2 STEERING WHEEL COVER (See page RS-347)
4. INSTALL LOWER NO. 3 STEERING WHEEL COVER (See page RS-347)
5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL



6. INSPECT SRS WARNING LIGHT
(See page [RS-33](#))

CC

CRUISE CONTROL SYSTEM

PRECAUTION

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

System Name	See procedure
SFI system	IN-43

CC

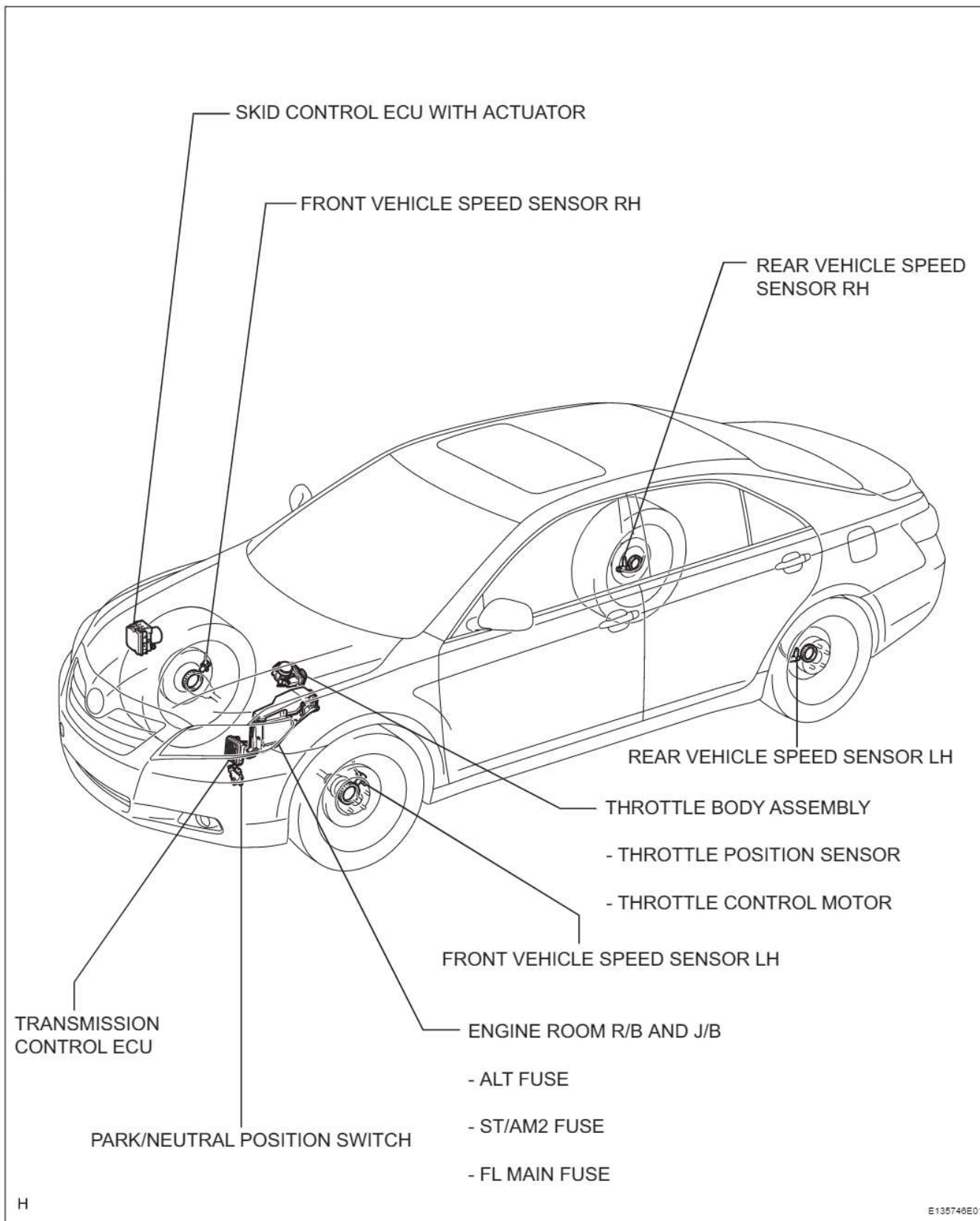
1. HANDLING PRECAUTION FOR CRUISE CONTROL SYSTEM

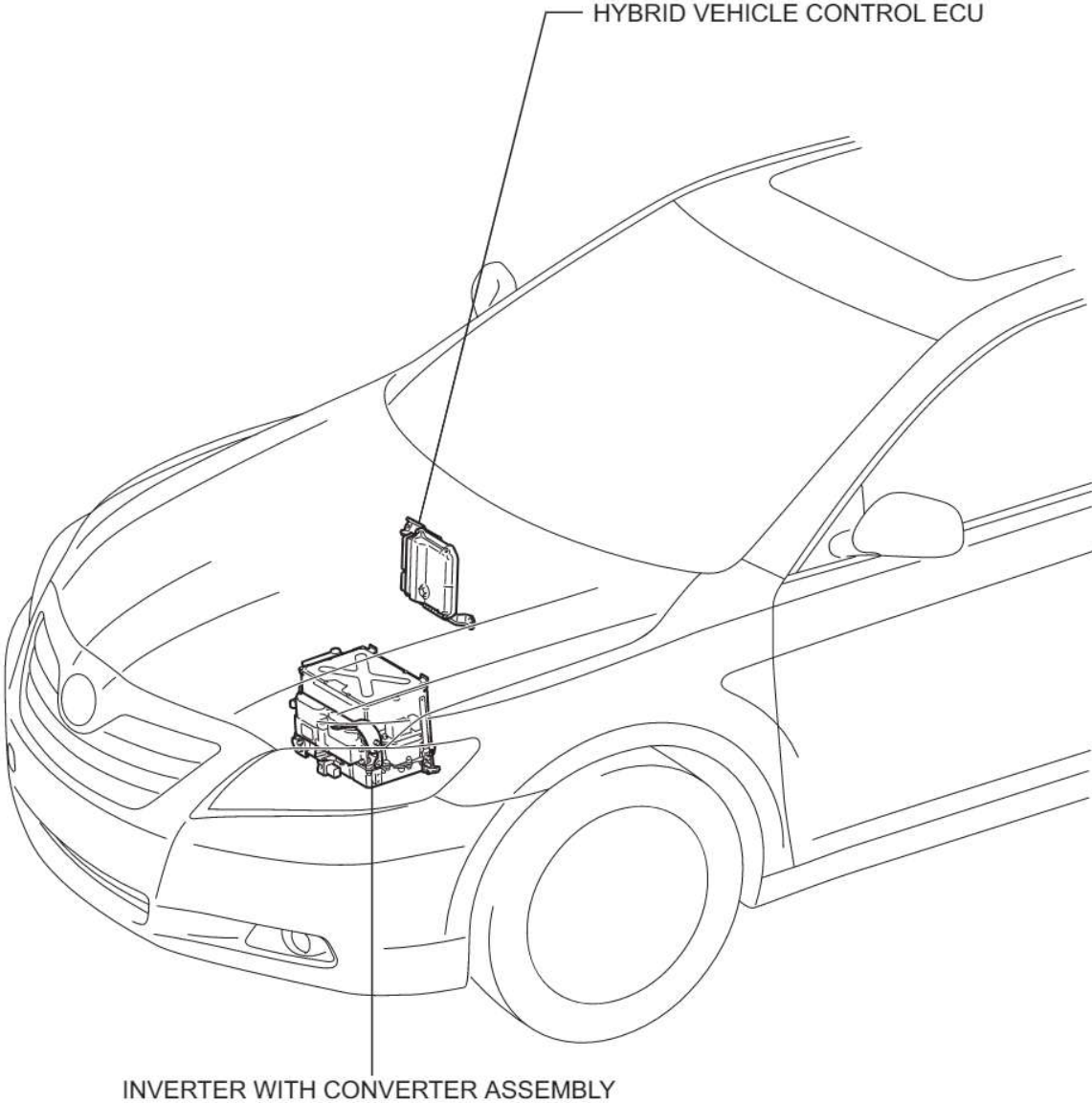
- (a) Turn the cruise control main switch off when not using the cruise control system.
- (b) Be careful as the vehicle speed will increase when driving downhill with the cruise control system on.
- (c) The + (ACCEL)/RES (RESUME) operation will change according to the cruise control system status. When the cruise control system is operating, the + (ACCEL) function operates. When the cruise control system is not operating, the RES (RESUME) function operates.
- (d) If the CRUISE main indicator light blinks while the cruise control system is operating, turn the cruise control main switch off to cancel the cruise control system. After canceling the cruise control system, if the cruise control main switch cannot be turned on, or the cruise control system is canceled immediately after turning the cruise control main switch 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

CC-2

CRUISE CONTROL – CRUISE CONTROL SYSTEM

PARTS LOCATION

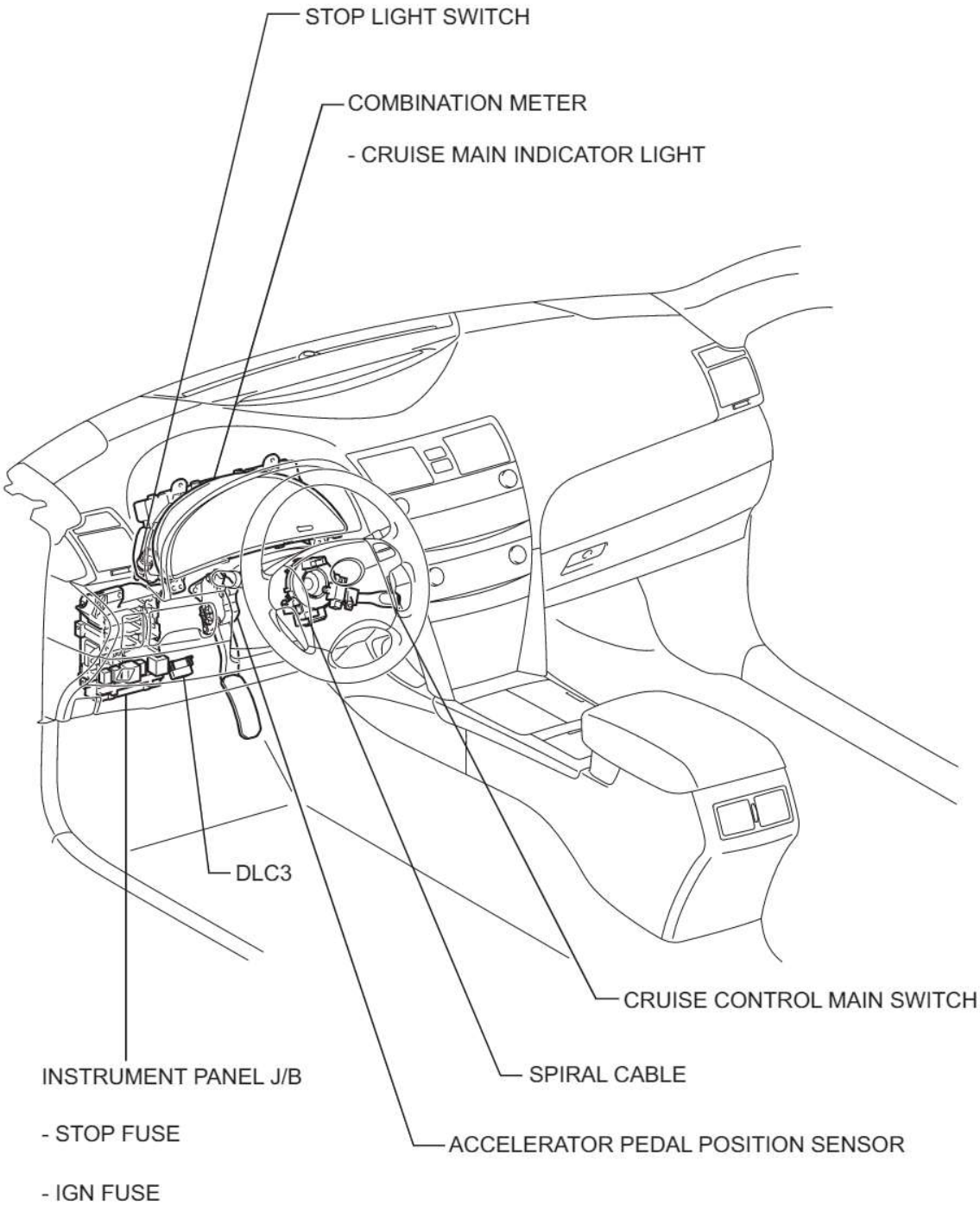




CC-4

CRUISE CONTROL – CRUISE CONTROL SYSTEM

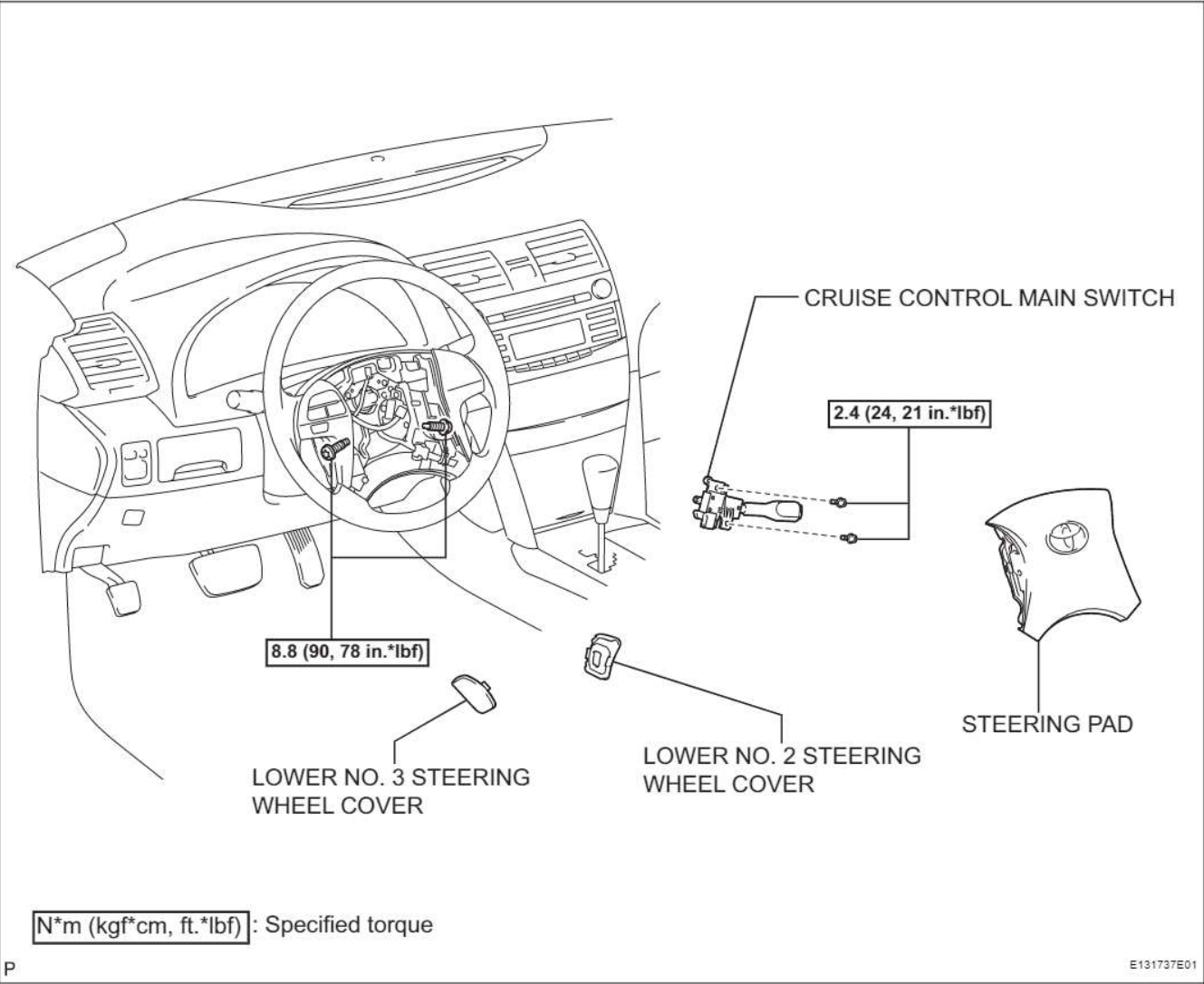
CC



H

E135643E03

CRUISE CONTROL MAIN SWITCH
COMPONENTS



REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait for 90 seconds after disconnecting the cable to prevent airbag deployment (See page [RS-1](#)).

2. REMOVE LOWER NO. 3 STEERING WHEEL COVER (See page [RS-345](#))
3. REMOVE LOWER NO. 2 STEERING WHEEL COVER (See page [RS-345](#))
4. REMOVE STEERING PAD (See page [RS-345](#))
5. REMOVE CRUISE CONTROL MAIN SWITCH
 - (a) Disconnect the connector.
 - (b) Remove the 2 screws and the cruise control main switch.

CC