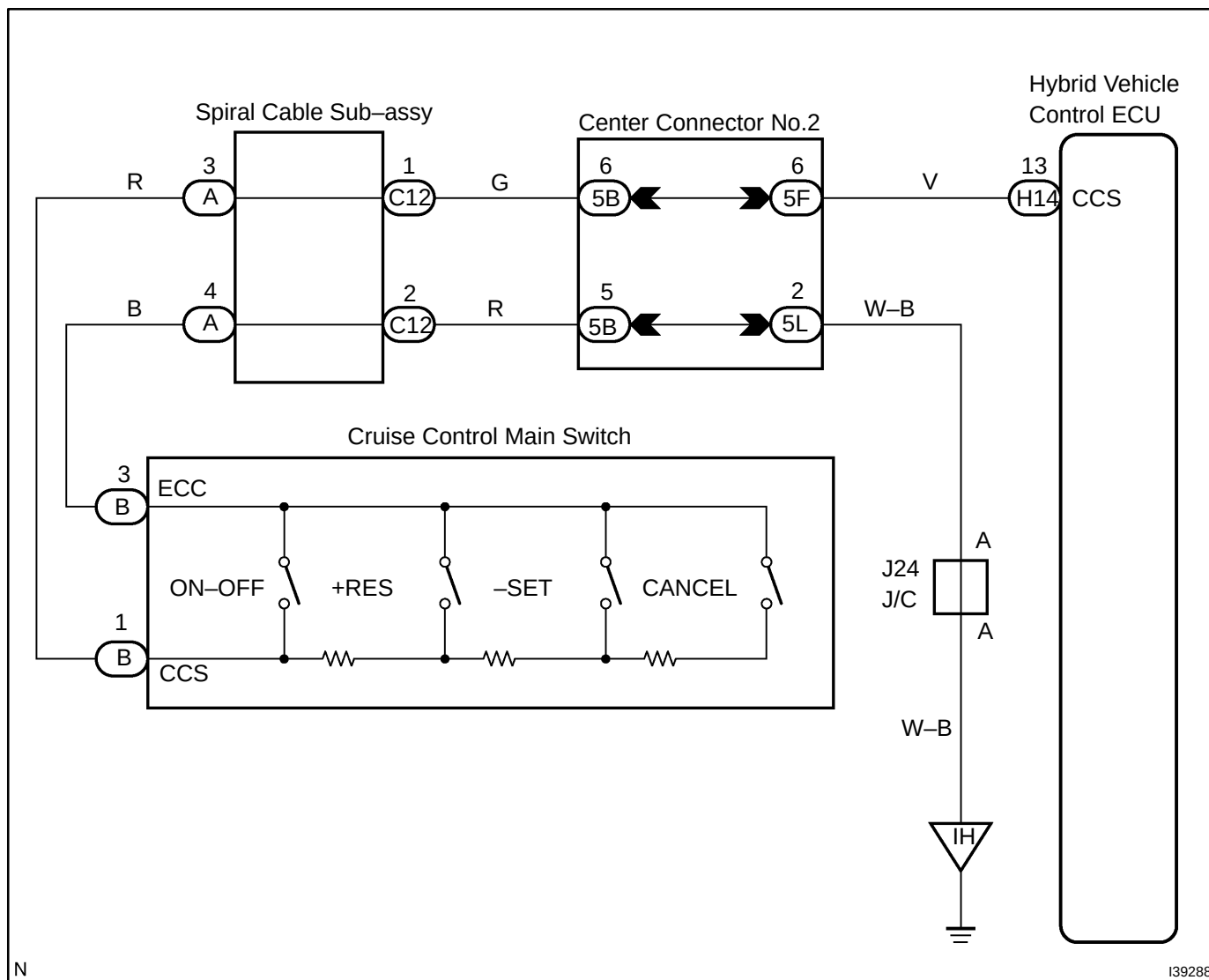


CRUISE CONTROL SWITCH CIRCUIT

CIRCUIT DESCRIPTION

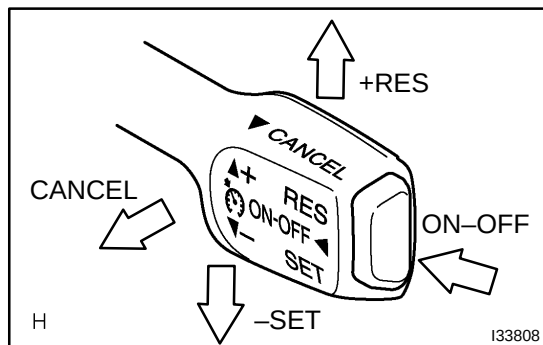
The cruise control main switch operates seven functions: SET, COAST, TAP-DOWN, RESUME, ACCEL, TAP-UP, and CANCEL. The SET, TAP-DOWN and COAST functions, and the RESUME and, TAP-UP ACCEL functions share the same switch. Each function can be controlled by moving the switch in the directions of the arrows on the cruise control main switch assy. The switch will return automatically after being released. The internal contact point of the cruise control main switch is turned on with the switch operation. Then the hybrid vehicle control ECU reads the voltage value which has been changed by the resistance in the switch in order to control SET, COAST, RESUME, ACCEL, and CANCEL.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 READ VALUE OF HAND-HELD TESTER



- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Select the items "MAIN SW (MAIN)", "MAIN SW (SUB)", "CANCEL SW", "SET/COAST SW", and "RES/ACC SW" in the DATA LIST, and check the display on the tester screen when the cruise control main switch is operated.

HYBRID VEHICLE CONTROL ECU:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
MAIN SW (MAIN)	Cruise main switch signal (Main CPU)/ON or OFF	ON: Cruise control main switch ON-OFF button is pushed on OFF: Cruise control main switch ON-OFF button is pushed off	—
MAIN SW (SUB)	Cruise main switch signal (Sub CPU)/ON or OFF	ON: Cruise control main switch ON-OFF button is pushed on OFF: Cruise control main switch ON-OFF button is pushed off	—
CANCEL SW	CANCEL switch signal/ON or OFF	ON: Cruise control main switch is pulled to CANCEL OFF: Cruise control main switch is not pulled to CANCEL	—
SET/COAST SW	—/SET switch signal/ON or OFF	ON: Cruise control main switch is pushed to —/SET OFF: Cruise control main switch is not pushed to —/SET	—
RES/ACC SW	+/RES switch signal/ON or OFF	ON: Cruise control main switch is pushed to +/RES OFF: Cruise control main switch is not pushed to +/RES	—

OK:

When cruise control main switch operation is performed, the standard values will be above.

NG

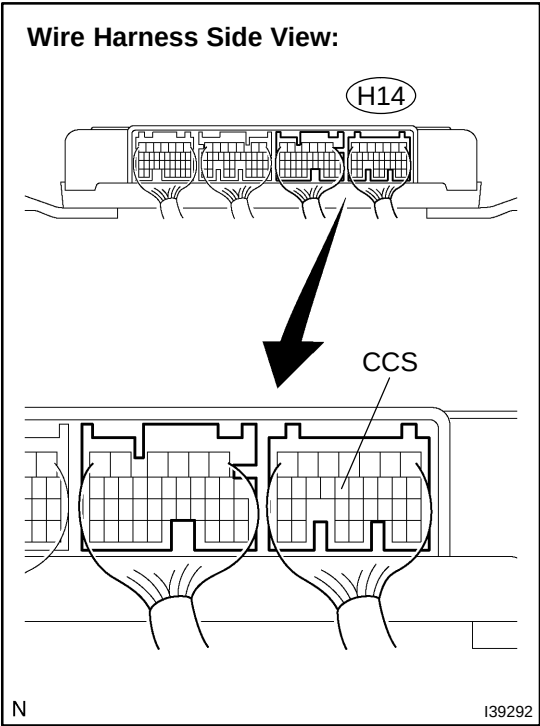
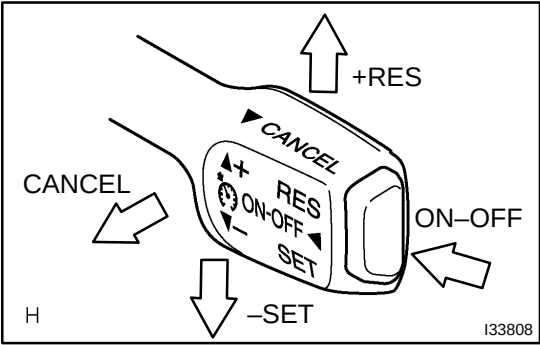
Go to step 3

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-2689)

2

INSPECT HYBRID VEHICLE CONTROL ECU



- (a)
- Turn the power switch on (IG).
- (b)
- Measure the voltage according to the value(s) in the table below.

Standard:

Symbol (Terminal Connection)	Switch Condition	Specified Value
CCS (H14-13) – Body ground	Neutral	10 to 14 V
CCS (H14-13) – Body ground	+RES	6.6 to 10.1 V
CCS (H14-13) – Body ground	–SET	4.5 to 7.1 V
CCS (H14-13) – Body ground	CANCEL	2.3 to 4.0 V
CCS (H14-13) – Body ground	ON–OFF button is on	Below 1 V

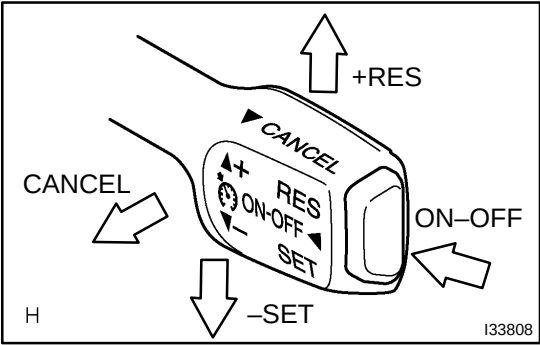
OK

NG

Go to step 3

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-2689)

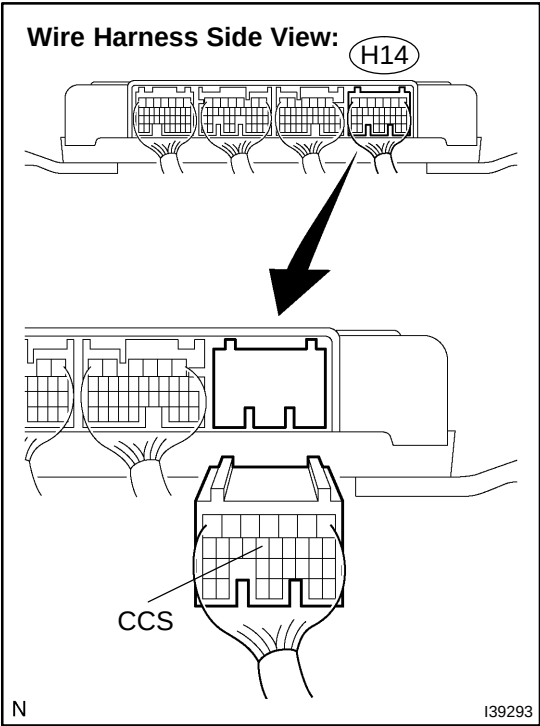
3 INSPECT CRUISE CONTROL MAIN SWITCH



- (a) Disconnect the H14 connector of the hybrid vehicle control ECU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Symbol (Terminal Connection)	Switch Condition	Specified Value
CCS (H14-13) – Body ground	Neutral	10 kΩ or higher
CCS (H14-13) – Body ground	+RES	210 to 270 Ω
CCS (H14-13) – Body ground	–SET	560 to 700 Ω
CCS (H14-13) – Body ground	CANCEL	1,380 to 1,700 Ω
CCS (H14-13) – Body ground	ON–OFF button is on	Below 1 Ω



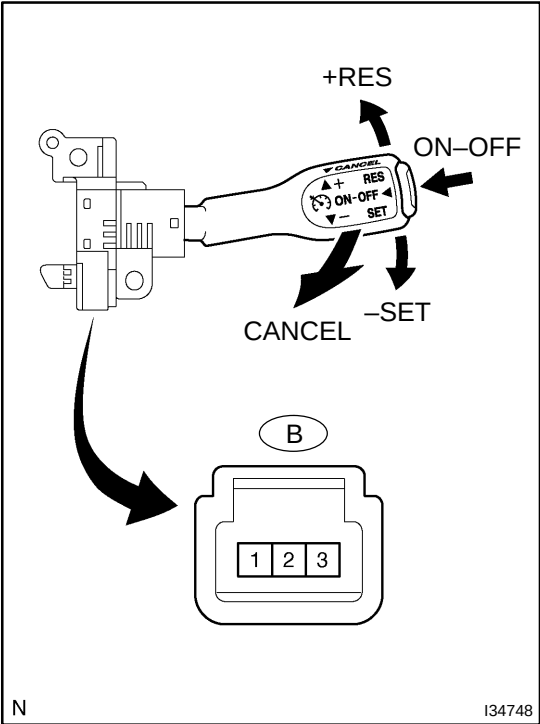
NG Go to step 4

OK

REPLACE HYBRID VEHICLE CONTROL ECU (SEE PAGE 21-124)

4

INSPECT CRUISE CONTROL MAIN SWITCH



- (a) Disconnect the cruise main control switch connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Switch Condition	Specified Value
B-1 – B-3	Neutral	10 kΩ or higher
B-1 – B-3	+RES	210 to 270 Ω
B-1 – B-3	-SET	560 to 700 Ω
B-1 – B-3	CANCEL	1,380 to 1,700 Ω
B-1 – B-3	ON-OFF button is on	Below 1 Ω

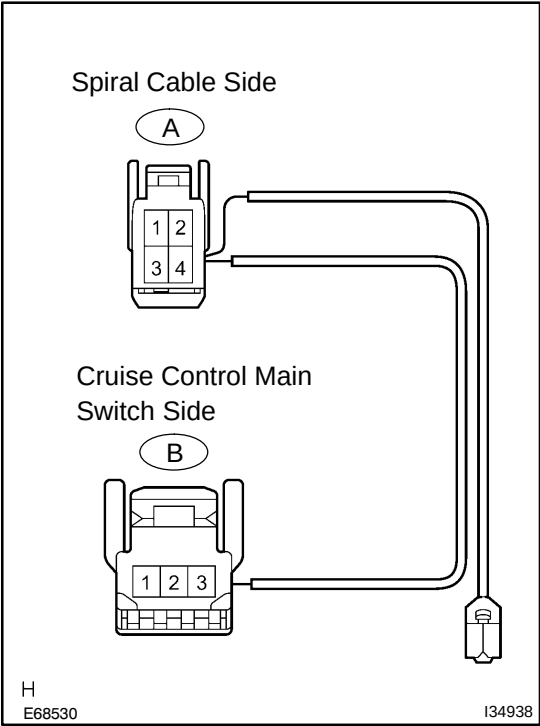
NG

REPLACE CRUISE CONTROL MAIN SWITCH
(SEE PAGE 82-1)

OK

5

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



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

Standard:

Terminal Connection	Condition	Specified Value
A-3 – B-1	Always	Below 1 Ω
A-4 – B-3	Always	Below 1 Ω

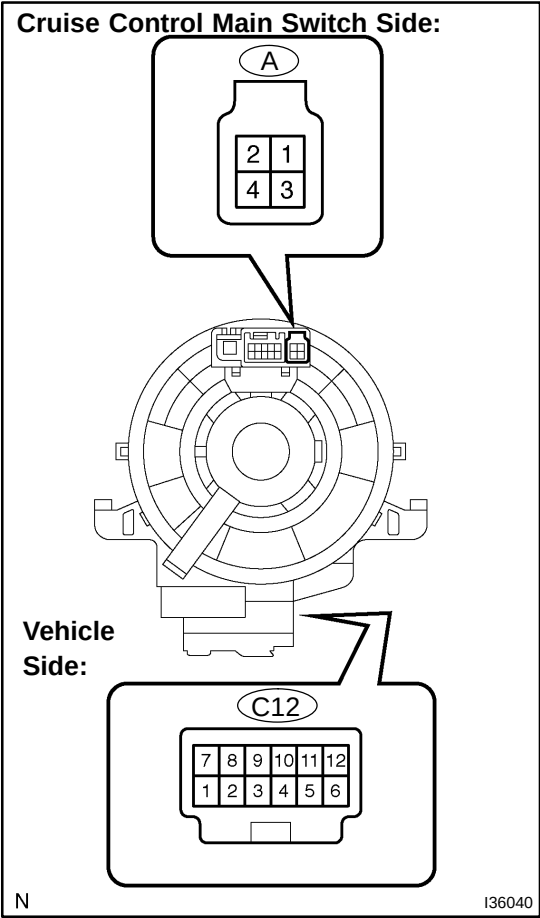
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6

INSPECT SPIRAL CABLE SUB-ASSY



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

Standard:

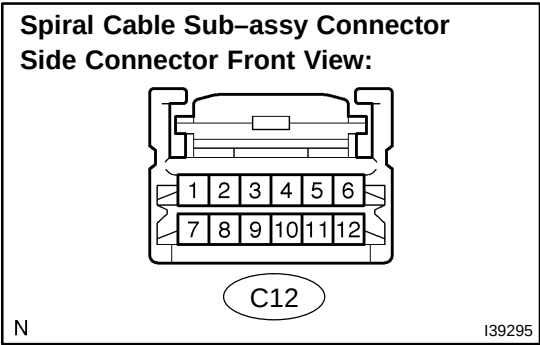
Terminal Connection	Condition	Specified Value
A-3 – C12-1	Always	Below 1 Ω
A-4 – C12-2	Always	Below 1 Ω

OK

NG REPLACE SPIRAL CABLE SUB-ASSY
(SEE PAGE 60-29)

7

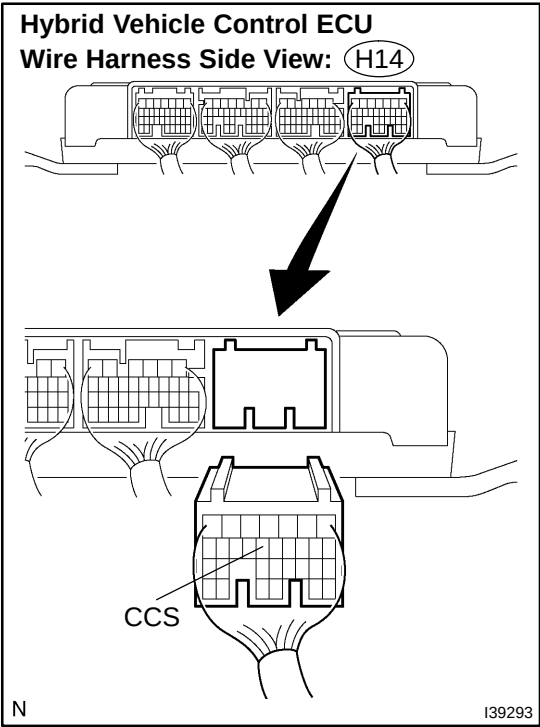
CHECK HARNESS AND CONNECTOR (SPIRAL CABLE SUB-ASSY – HYBRID VE-
HICLE CONTROL ECU)



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

Standard:

Symbol (Terminal Connection)	Condition	Specified Value
CCS (H14-13) – C12-1	Always	Below 1 Ω
CCS (H14-13) – Body ground	Always	10 kΩ or higher



NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR (SPIRAL CABLE SUB-ASSY –
HYBRID VEHICLE CONTROL ECU)

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL CABLE SUB-ASSY – BODY
GROUND)

CRUISE MAIN INDICATOR LIGHT CIRCUIT

CIRCUIT DESCRIPTION

The hybrid vehicle control ECU outputs the cruise control operation status to the CRUISE main indicator light on the combination meter.

The cruise main indicator light circuit uses CAN and BEAN for communication. If there are any malfunctions in this circuit, check for DTCs in the CAN communication system and the multiplex communication system.

INSPECTION PROCEDURE

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Select the items "CCS INDICATOR M" and "CCS INDICATOR S", and check the display on the tester screen when the cruise control main switch ON-OFF button is pushed on and when it is pushed off.

CRUISE CONTROL (HYBRID VEHICLE CONTROL ECU):

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
CCS INDICATOR M	Cruise indicator signal (Main CPU)/ON or OFF	ON: CRUISE main indicator is on OFF: CRUISE main indicator is off	–
CCS INDICATOR S	Cruise indicator signal (Sub CPU)/ON or OFF	ON: CRUISE main indicator is on OFF: CRUISE main indicator is off	–

OK:

Indication on the tester switches between ON and OFF in accordance with the indicator light status.

Result:

OK	A
NG (ON/OFF switches only on the tester.)	B
NG (ON/OFF does not switch on the tester.)	C

B

**GO TO COMBINATION METER SYSTEM
(SEE PAGE 05-1983)**

C

**REPLACE HYBRID VEHICLE CONTROL ECU
(SEE PAGE 21-124)**

A

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-2689)**

DIAGNOSIS SYSTEM

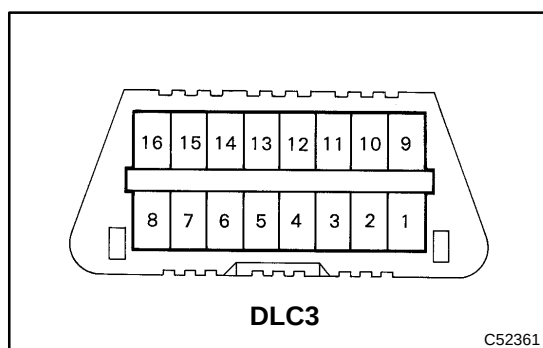
1. DESCRIPTION

The hybrid vehicle control ECU controls the cruise control function of the vehicle.

The DTCs and data stored in the cruise control system can be read from the DLC3 of the vehicle.

After checking for DTCs, if the CRUISE main indicator light does not come on, there may be a problem in the cruise control system.

Use the hand-held tester to check and solve the problem.



2. CHECK THE DLC3

The hybrid vehicle control ECU of the vehicle uses ISO 9141-2 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Symbols (Terminals No.)	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	11 to 14 V
CANH (6) – CANL (14)	HIGH-level CAN bus line	Power switch is off	54 to 67 Ω
CANH (6) – Battery positive	HIGH-level CAN bus line	Power switch is off	1 M Ω or higher
CANH (6) – CG (4)	HIGH-level CAN bus line	Power switch is off	3 k Ω or higher
CANL (14) – Battery positive	LOW-level CAN bus line	Power switch is off	1 M Ω or higher
CANL (14) – CG (4)	LOW-level CAN bus line	Power switch is off	3 k Ω or higher

HINT:

If the display shows "UNABLE TO CONNECT TO VEHICLE" after connecting the hand-held tester to the DLC3 and turning the power switch on (IG), there is a problem on either the vehicle side or the tool side.

- If communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

CRUISE

H

I39302

3. CHECK THE INDICATOR

- (a) Turn the power switch on (IG).
- (b) Check that the CRUISE main indicator light comes on when the cruise control main switch ON–OFF button is pushed on, and that the indicator light goes off when the ON–OFF button is pushed off.

HINT:

- If there is a problem with the indicator light, inspect the cruise main indicator light circuit (see page [05-2715](#)).
- If a malfunction occurs in the vehicle speed sensor, stop lamp switch assy or other related parts while driving with cruise control, and the hybrid vehicle control ECU activates AUTO CANCEL of the cruise control and then the CRUISE main indicator light starts to blink, informing the driver of the malfunction. At the same time, data of the malfunction is stored as a DTC.

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

According to the DATA LIST displayed on the hand-held tester, the values of the components such as switches, sensors, and actuators can be read without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

The CRUISE CONTROL data list is displayed while the hand-held tester is connected to the DLC3 with the power switch on (IG). Access the data list by following the prompts on the tester screen.

- Connect the hand-held tester to the DLC3.
- Turn the power switch on (IG).
- Read the DATA LIST according to the display on the tester.

HYBRID VEHICLE CONTROL ECU:

Item	Measurement Item/ Display (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	—
MEMORY SPD	Cruise control memorized speed/ min.: 1 km/h (0.6 mph), max.: 255 km/h (158 mph)	Actual stored vehicle speed is displayed	—
THROTTLE	Request opening angle/ min.: 0%, max.: 125%	Actual throttle opening angle is displayed	—
CRUISE CTRL	Cruise control system active condition/ON or OFF	ON: Cruise control is activated OFF: Cruise control is deactivated	—
MAIN SW (MAIN)	Cruise main switch signal (Main CPU)/ON or OFF	ON: Cruise control main switch ON-OFF button is pushed on OFF: Cruise control main switch ON-OFF button is pushed off	"3"
MAIN SW (SUB)	Cruise main switch signal (Sub CPU)/ON or OFF	ON: Cruise control main switch ON-OFF button is pushed on OFF: Cruise control main switch ON-OFF button is pushed 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 READY S	Cruise control system standby condition (Sub 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 main indicator light is on OFF: CRUISE main indicator light is off	"2"
CCS INDICATOR S	Cruise indicator signal (Sub CPU)/ON or OFF	ON: CRUISE main indicator light is on OFF: CRUISE main indicator light is off	"2"
CANCEL SW	CANCEL switch signal/ON or OFF	ON: Cruise control main switch is pulled to CANCEL OFF: Cruise control main switch is not pulled to CANCEL	—
SET/COAST SW	—/SET switch signal/ON or OFF	ON: Cruise control main switch is pushed to —/SET OFF: Cruise control main switch is not pushed to —/SET	—

RES/ACC SW	+ /RES switch signal/ON or OFF	ON: Cruise control main switch is pushed to +/RES OFF: Cruise control main switch is not pushed to +/RES	–
STP LIGHT SW1 M	Stop lamp switch signal (Main CPU)/ON or OFF	ON: Brake pedal is depressed OFF: Brake pedal is released	–
STP LIGHT SW2 S	Stop lamp switch signal (Sub CPU)/ON or OFF	ON: Brake pedal is depressed OFF: Brake pedal is released	–
STP LIGHT SW1 S	Stop lamp switch signal (Sub CPU)/ON or OFF	ON: Brake pedal is depressed OFF: Brake pedal is released	–
SHIFT D POS	Shift lever position sensor signal (D position)/ON or OFF	ON: Shift position is D OFF: Shift position is except D	–
VEHICLE SPD CHG	Vehicle speed sudden change/ON or OFF	ON: Change OFF: Not change	–

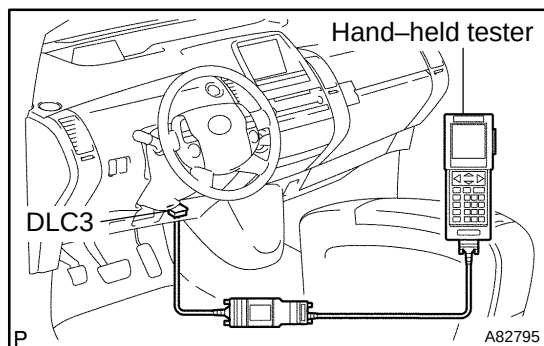
HINT:

"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 come on. → CRUISE main indicator, wire harness, or hybrid vehicle control ECU failure

DTC CHECK/CLEAR



1. CHECK FOR DTCs

- (a) Using the hand-held tester, check for DTCs.
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the power switch on (IG).
 - (3) Read the DTCs on the tester screen.

HINT:

The hand-held tester has a "Snapshot" function which records the monitored data.

Refer to the hand-held tester operator's manual for further details.

2. CLEAR THE DTCs

- (a) Using the hand-held tester, clear the DTCs.
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the power switch on (IG).
 - (3) Clear the DTCs by following the prompts on the tester screen.

HINT:

Refer to the hand-held tester operator's manual for further details.

FAIL-SAFE CHART

1. 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 an open or short in the stop lamp switch circuit. • Vehicle speed signal changes suddenly.	• Push the cruise control main switch ON-OFF button "on" again.
CRUISE main indicator light blinks.	• There is a problem with the input circuit of the stop lamp switch circuit.	• The indicator light blinks until the cruise control main switch ON-OFF button is pushed on again. • Constant speed control is prohibited until the power switch is turned off.
CRUISE main indicator light goes off.	• Vehicle speed is below the low speed limit (approx. 40 km/h (approx. 25 mph)) while driving with the cruise control on. • Vehicle speed is lower than the stored speed by approx. 16 km/h (approx. 9.9 mph) or more while driving with the cruise control on.	• Push the cruise control main switch to -/RES.

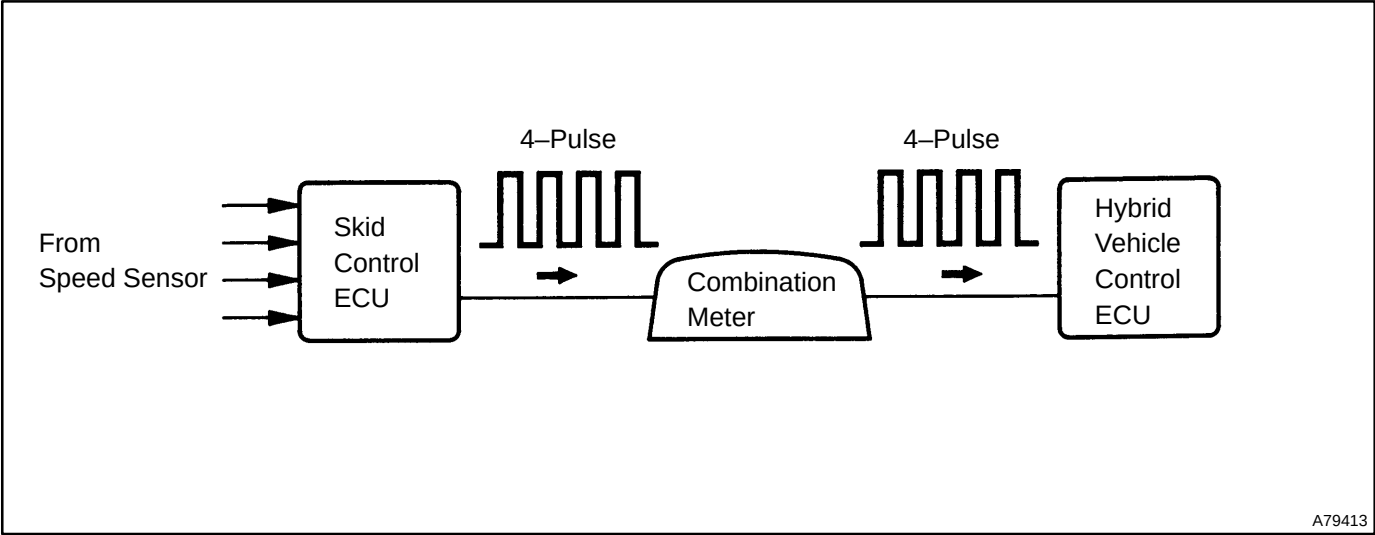
DTC	P0500	VEHICLE SPEED SENSOR "A"
-----	-------	--------------------------

CIRCUIT DESCRIPTION

The speed sensor for the skid control ECU detects wheel speed and sends appropriate signals to the skid control ECU.

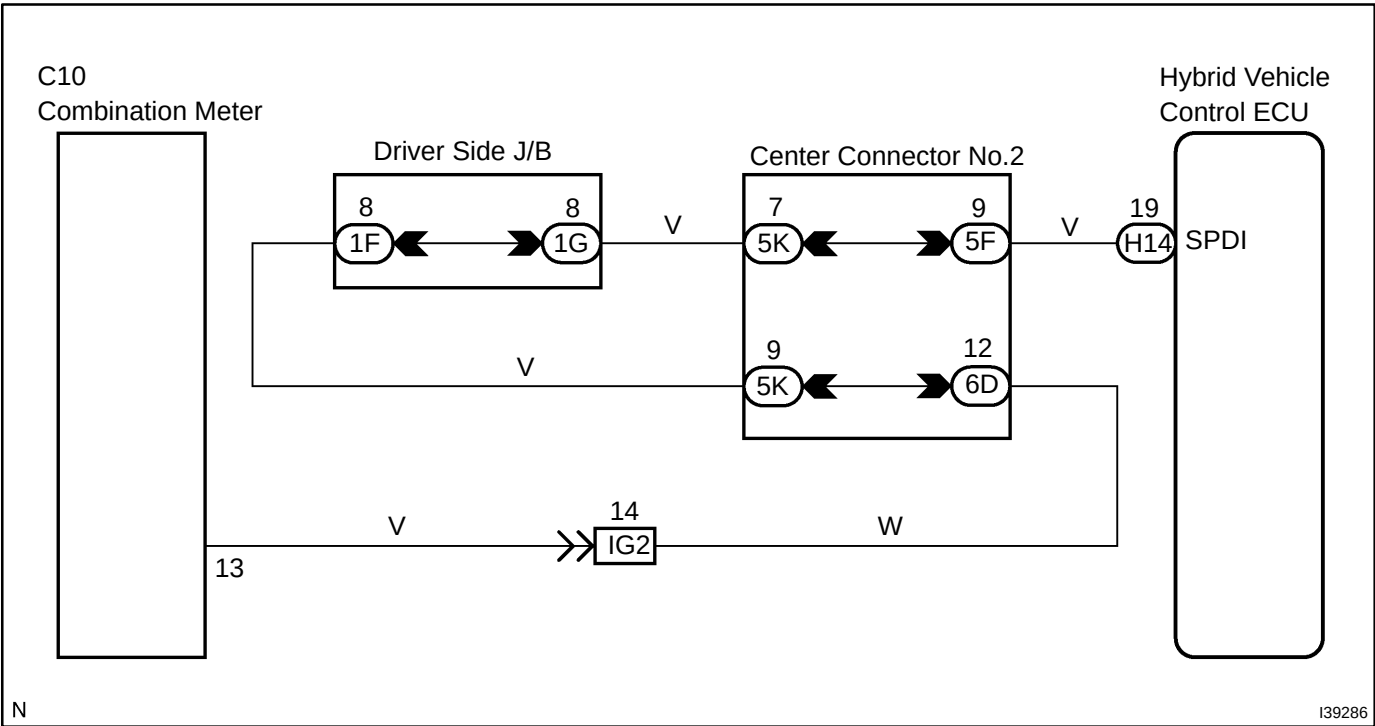
The skid control ECU converts these wheel speed signals into 4-pulse signals and outputs them to the hybrid vehicle control ECU via the combination meter.

The hybrid vehicle control ECU determines vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	This trouble code is output when a signal from the vehicle speed sensor is cut for 0.14 sec. or more while the cruise control is in operation.	• Vehicle speed sensor • Vehicle speed sensor circuit • Combination meter • Hybrid vehicle control ECU

WIRING DIAGRAM



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:

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

CHECK SPEEDOMETER CIRCUIT (SEE PAGE 05-2000)

OK

2 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the power switch on (IG).
 (c) Select the item "VEHICLE SPD" in the DATA LIST and check that the speed displayed on the tester screen is the same as the one indicated on the combination meter.

HYBRID VEHICLE CONTROL ECU:

Item	Measurement Item/ Display (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 the one indicated on the combination meter.

NG

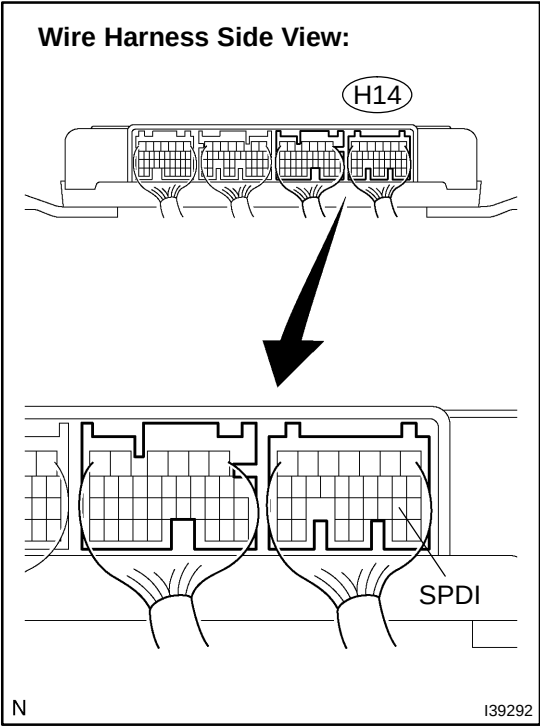
Go to step 3

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (SEE PAGE 05-2689)

3

INSPECT HYBRID VEHICLE CONTROL ECU (SPD VOLTAGE)

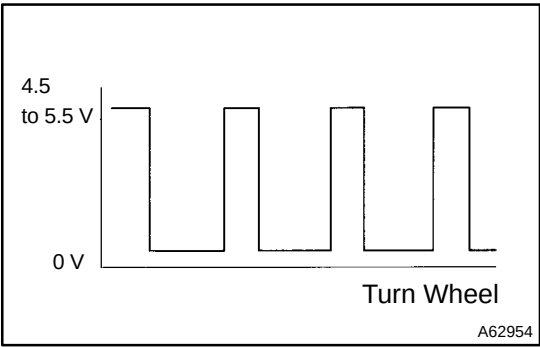


- (a) Turn the power switch on (IG).
- (b) Move the shift lever to neutral.
- (c) Jack up the vehicle.
- (d) Measure the voltage between terminal SPD1 of the hybrid vehicle control ECU and body ground.

Standard:

Symbol (Tester Connection)	Specified Condition
SPDI (H14-19) – Body ground	Waveform appears

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



OK

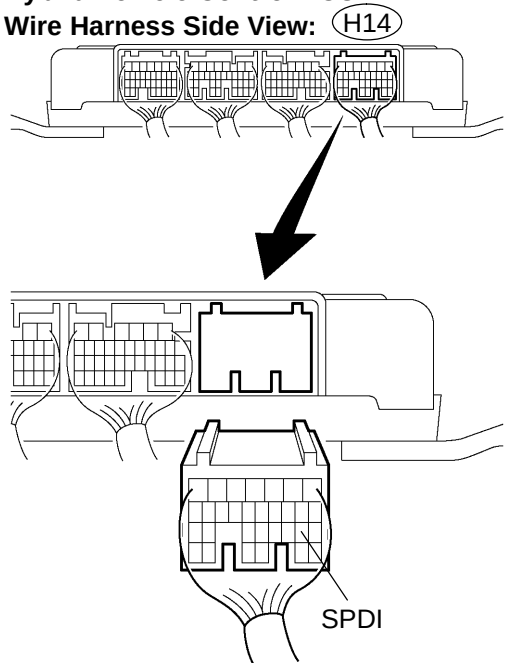
NG

Go to step 4

REPLACE HYBRID VEHICLE CONTROL ECU (SEE PAGE 21-124)

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

**Hybrid Vehicle Control ECU
Wire Harness Side View:**

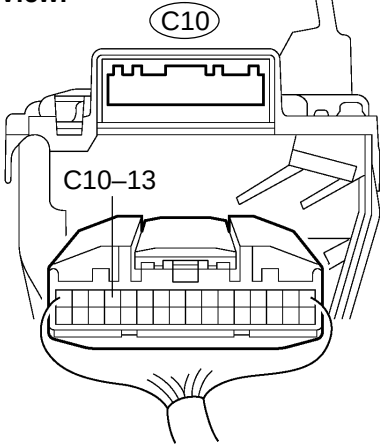


- (a) Disconnect the H14 connector of the hybrid vehicle control ECU and the combination meter connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Symbol (Terminal Connection)	Condition	Specified Value
SPDI (H14-19) – C10-13	Always	Below 1 Ω
SPDI (H14-19) – Body ground	Always	10 kΩ or higher

**Combination Meter Wire Harness
Side View:**



NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE COMBINATION METER ECU (SEE PAGE 71-19)

DTC	P0571	BRAKE SWITCH "A" CIRCUIT
------------	--------------	---------------------------------

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop lamp switch sends a signal to the hybrid vehicle control ECU. Receiving the signal, the hybrid vehicle control ECU cancels the cruise control. Even if there is a malfunction in the stop lamp signal circuit while the cruise control is in operation, normal driving is maintained due to fail-safe function.

Cruise control is cancelled when positive battery voltage is applied to terminal STP.

When the brake pedal is depressed, positive voltage is applied to terminal STP of the hybrid vehicle control ECU through the STOP fuse and the stop lamp switch, and the hybrid vehicle control ECU cancels the cruise control.

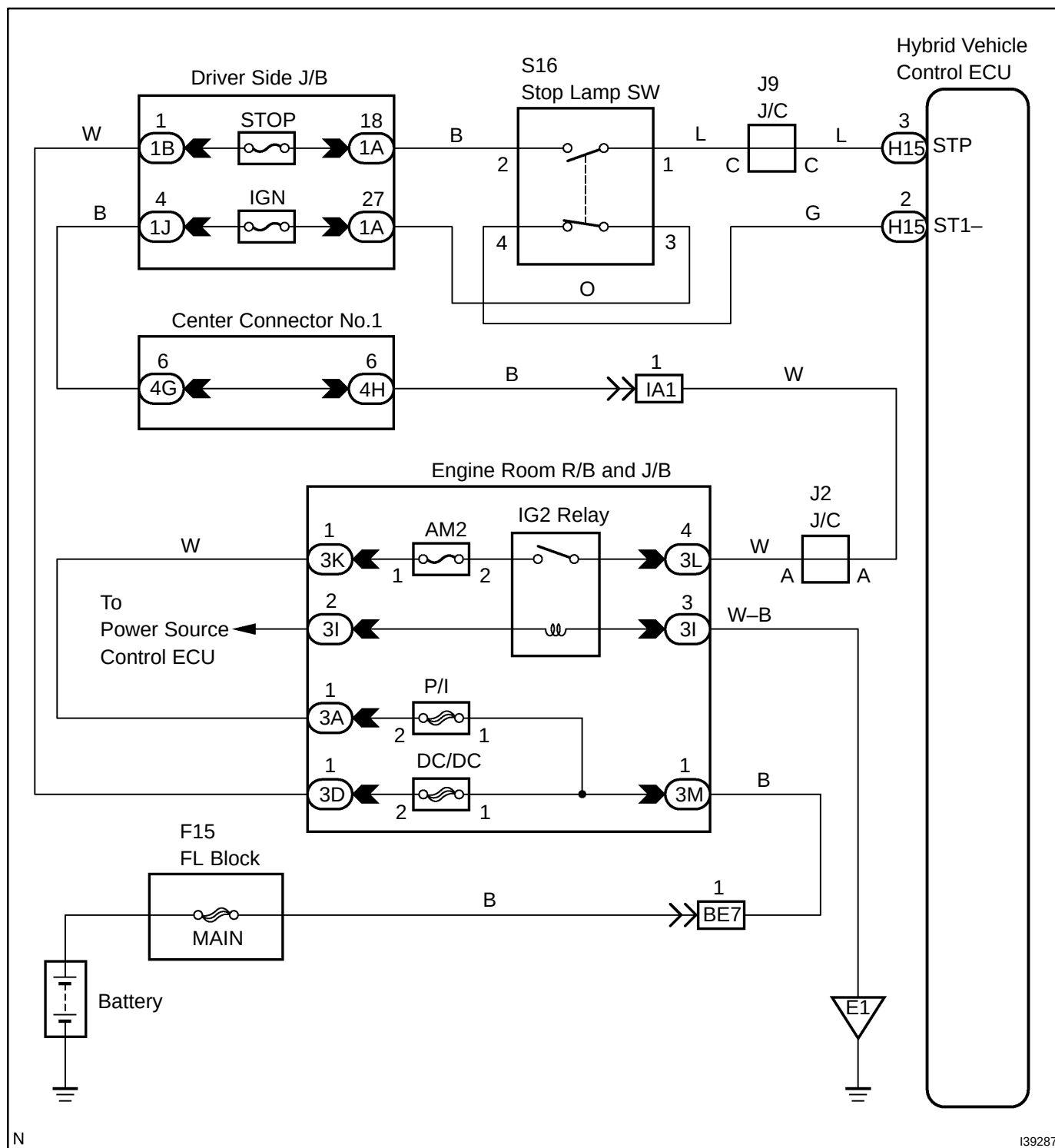
When the brake pedal is released, positive voltage is applied to terminal ST1– of the hybrid vehicle control ECU through the IGN fuse and the stop lamp switch, and the hybrid vehicle control ECU operates the cruise control.

HINT:

Inspect the fuses and relays before confirming the suspected areas which are shown in the table below.

DTC No.	DTC Detecting Condition	Trouble Area
P0571	The trouble code is output when voltages of terminals ST1– and STP of the hybrid vehicle control ECU are both below 1 V for 0.5 sec. or more.	• Stop lamp switch • Stop lamp switch circuit • Hybrid vehicle control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT STOP LAMP SWITCH OPERATION

- (a) Check that the stop lamp comes on when the brake pedal is depressed, and goes off when the brake pedal is released.

OK:

The stop lamp comes on/goes off normally.

HINT:

The stop lamp uses the circuit on the terminal STP side of the hybrid vehicle control ECU.

NG

**INSPECT STOP LAMP SWITCH CIRCUIT
(SEE PAGE 05-1677)**

OK

2 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the power switch on (IG).
 (c) Select the items "STP LIGHT SW2 M", "STP LIGHT SW2 S", and "STP LIGHT SW1 S" in the DATA LIST, and check the display on the tester screen when the brake pedal is depressed and when it is released.

HYBRID VEHICLE CONTROL ECU:

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

OK:

When brake pedal operation is performed, the standard values will be above.

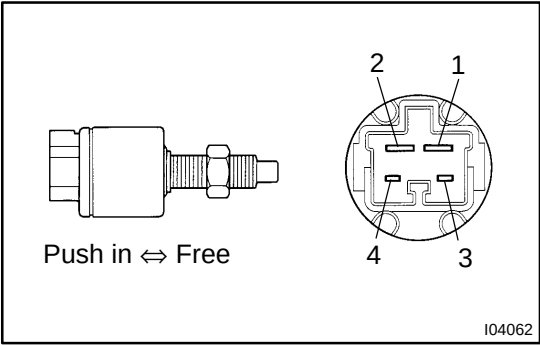
NG

Go to step 3

OK

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-2689)**

3 INSPECT STOP LAMP SWITCH ASSY



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

Standard:

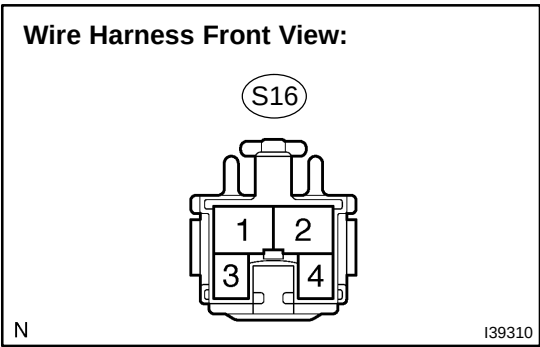
Switch Condition	Terminal Connection	Specified Value
Switch pin free	3 – 4	10 kΩ or higher
Switch pin pushed in	3 – 4	Below 1 Ω

NG

REPLACE STOP LAMP SWITCH ASSY

OK

4 CHECK HARNESS AND CONNECTOR (STOP LAMP SWITCH – BATTERY)



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

Standard:

Symbol (Terminal Connection)	Condition	Specified Value
S16-3 – Body ground	Always	10 to 14 V

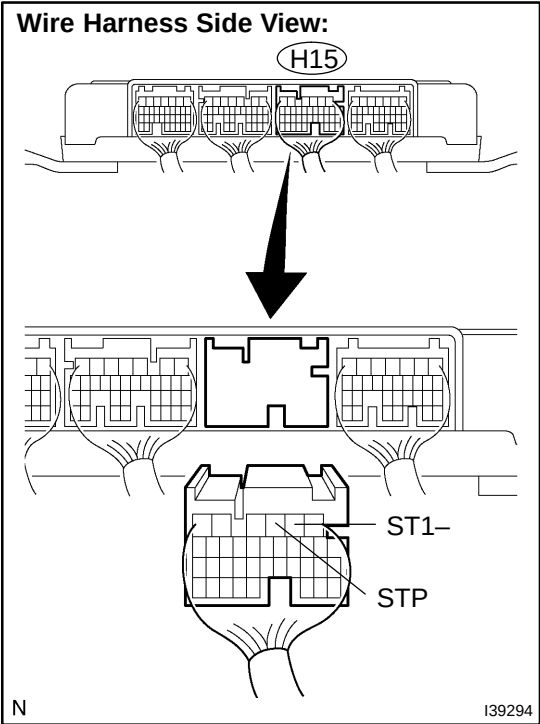
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5

INSPECT HYBRID VEHICLE CONTROL ECU



- (a) Reconnect the stop lamp switch connector.
- (b) Disconnect the H15 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:

Symbol (Terminal Connection)	Pedal Condition	Specified Value
STP (H15-3) – Body ground	Brake pedal is depressed	10 to 14 V
STP (H15-3) – Body ground	Brake pedal is released	Below 1 V
ST1– (H15-2) – Body ground	Brake pedal is depressed	Below 1 V
ST1– (H15-2) – Body ground	Brake pedal is released	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR (STOP LAMP SWITCH – HYBRID
VEHICLE CONTROL ECU)

OK

REPLACE HYBRID VEHICLE CONTROL ECU (SEE PAGE 21-124)

DTC	P0607	CONTROL MODULE PERFORMANCE
------------	--------------	-----------------------------------

CIRCUIT DESCRIPTION

DTC 0607 is stored when an internal abnormality of the hybrid vehicle control ECU is detected.

DTC No.	DTC Detecting Condition	Trouble Area
P0607	The hybrid vehicle control ECU has a supervisory CPU and a control CPU inside. This trouble code is output when input STP signals to each CPU are different for 0.15 sec. or more.	Hybrid vehicle control ECU

HINT:

If DTC P0607 is 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. At the same time, the CRUISE main indicator light blinks to inform the driver of the malfunction.

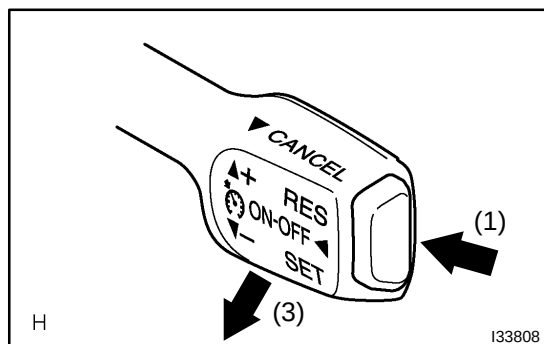
When this trouble code is detected, fail-safe remains on until the power switch is turned off.

INSPECTION PROCEDURE

1	REPLACE HYBRID VEHICLE CONTROL ECU (SEE PAGE 21-124)
----------	---

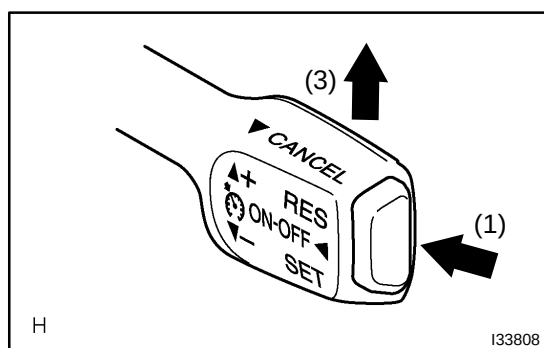
ROAD TEST

05HG9-01

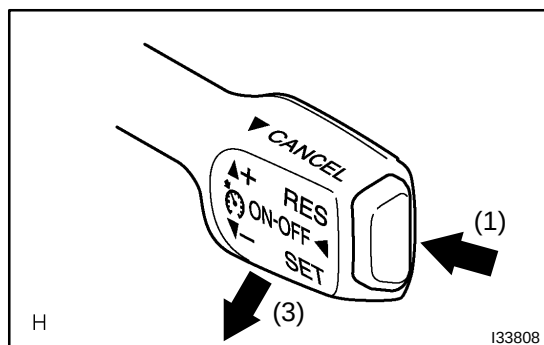


1. PROBLEM SYMPTOM CONFIRMATION

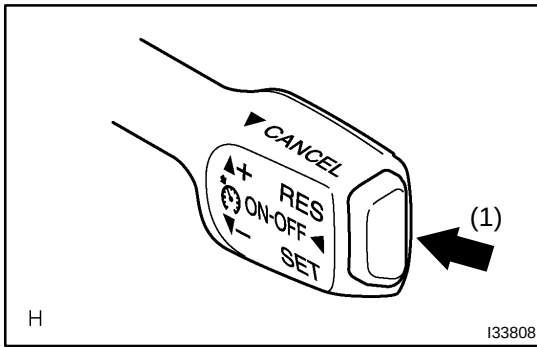
- (a) Inspect the SET function.
- (1) Push the ON-OFF button "on".
 - (2) Drive at the required speed (40 km/h (25 mph) or higher).
 - (3) Push the cruise control main switch to -/SET.
 - (4) Check that the vehicle cruises at the set speed after releasing the switch.



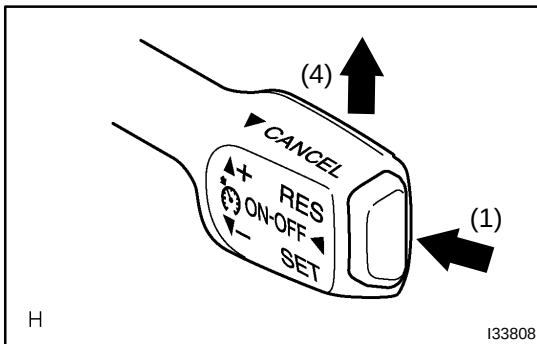
- (b) Inspect the "+" (ACCEL)" function.
- (1) Push the ON-OFF button "on".
 - (2) Drive at the required speed (40 km/h (25 mph) or higher).
 - (3) Push the cruise control main switch to -/SET.
 - (4) Check that vehicle speed increases while the cruise control main switch is pushed to +/RES, and that the vehicle cruises at the newly set speed when the switch is released.
 - (5) Momentarily push the cruise control main switch to +/RES and then immediately release it. Check that vehicle speed increases by approximately 1.6 km/h (1.0 mph). (Tap-up function)



- (c) Inspect the "-" (COAST)" function.
- (1) Push the 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 decreases while the cruise control main switch is pushed to -/SET, and that the vehicle cruises at the newly set speed when the switch is released.
 - (5) Momentarily push the cruise control main switch to -/SET and then immediately release it. Check that vehicle speed decreases by approximately 1.6 km/h (1.0 mph). (Tap-down function)



- (d) Inspect the CANCEL function.
- (1) Push the 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) When doing one or more of the following, check that the cruise control system is cancelled and that the normal driving mode is reset:
 - Depressing the brake pedal
 - Shifting into any position except D
 - Pushing the ON-OFF button "off"
 - Pulling the cruise control main switch to CANCEL



- (e) Inspect the RES (RESUME) function.
- (1) Push the 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) When doing one or more of the following, check that the cruise control system is cancelled and that the normal driving mode is reset:
 - Depressing the brake pedal
 - Shifting into any position except D
 - Pulling the cruise control main switch to CANCEL
 - (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 restores the speed which was maintained before cancellation.

SYSTEM DESCRIPTION

1. CRUISE CONTROL SYSTEM DESCRIPTION

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

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

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 driving speed is below the low speed limit. Constant speed control will be automatically cancelled and the stored vehicle speed will be erased when the vehicle speed goes below the low speed limit while the constant speed control is in operation.

(b) High speed limit

The highest possible limit of the speed setting range is set at approximately 180 km/h (112 mph). The cruise control system cannot be set when the driving speed is over the high speed limit. Speed up using RESUME/+ with the cruise control main switch assy also cannot be set beyond the high speed limit.

3. CRUISE CONTROL OPERATION

(a) Cruise control main switch

The cruise control main switch operates seven functions: SET, COAST, TAP-DOWN, RESUME, ACCEL, TAP-UP, and CANCEL. The SET, TAP-DOWN and COAST functions, and the RESUME, TAP-UP and ACCEL functions share the same switch. Each function can be controlled by moving the switch in the directions of the arrows on the cruise control main switch assy. The switch will return automatically after being released.

(b) Set control

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

(c) 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.

Vehicle speed, when the cruise control main switch is released from -/SET, is stored and constant speed control is maintained.

(d) Tap-down control

When tapping down on the cruise control main switch to -/SET (for approx. 0.5 second) while the cruise control system is in operation, the stored vehicle speed decreases each time by approximately 1.6 km/h (1.0 mph).

However, when the difference between the driving and the stored vehicle speed is more than 5 km/h (approx. 3.1 mph), the vehicle speed, when the cruise control main switch is released from -/SET, will be stored and constant speed control is maintained.

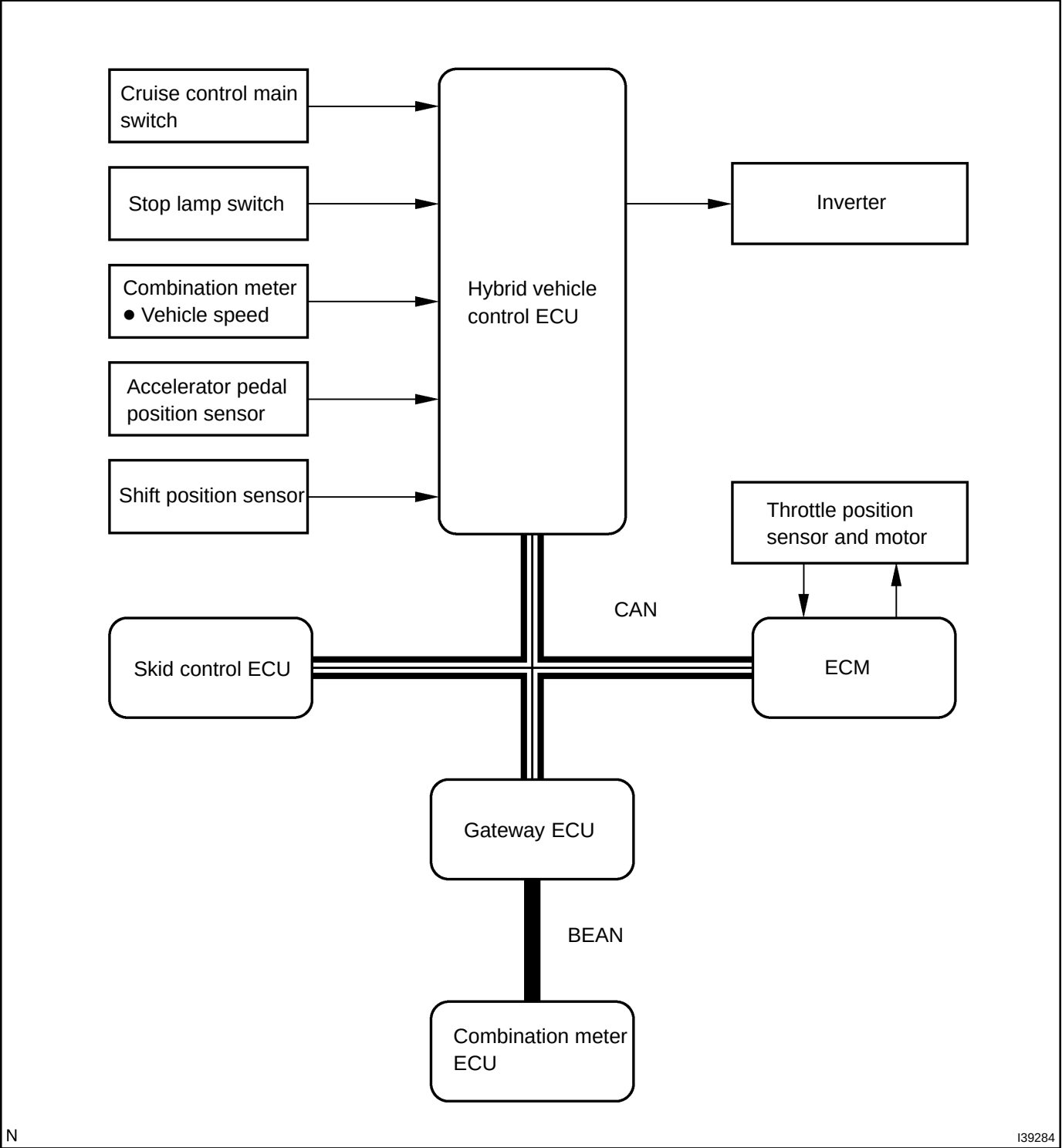
(e) Acceleration control

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.

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

- (f) Tap-up control
When tapping up on the cruise control main switch to +/RES (for approx. 0.5 second) while the cruise control system is in operation, the stored vehicle speed increases each time by approximately 1.6 km/h (1.0 mph). However, when the difference between the driving and the stored vehicle speed is more than 5 km/h (approx. 3.1 mph), the stored vehicle speed will not be changed.
- (g) Resume control
If constant speed control was cancelled with the stop lamp switch 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 restarts constant speed control.
- (h) Manual cancel control
Doing any of the following cancels the cruise control system while in operation. (The stored vehicle speed in the hybrid vehicle ECU is maintained.)
- Depressing the brake pedal
 - Shifting into any position except D
 - Pushing the cruise control main switch to CANCEL
 - Pushing the cruise control main switch ON–OFF button "off" (The stored vehicle speed in the hybrid vehicle control ECU is not maintained.)
- (i) Auto cancel (fail-safe)
This system has an automatic cancellation function (fail-safe) (for details, see page [05-2694](#)).

SYSTEM DIAGRAM



Transmitting ECU (transmitter)	Receiveing ECU	Signals	Communication Method
Hybrid Vehicle Control ECU	ECM	• Engine torque demand signal	• CAN
Hybrid Vehicle Control ECU	Combination Meter ECU	• CRUISE main indicator signal • Cruise control warning signal	• CAN • BEAN
Skid Control ECU	Hybrid Vehicle Control ECU	• Cruise control cancel signal	• CAN

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		VIN	
		Production Date	
		Licence Plate No.	
Date Vehicle Brought in		Odometer Reading	km mile

Condition of Problem Occurrence	Date Problem Occurred	
	Frequency Problem occurs	☐ Continuous ☐ Intermittent (times a day)
	Vehicle Speed When Problem Occurred	km (mile)

Symptoms	☐ Cancel occurs while driving with cruise control	● Driving condition ☐ Urban road ☐ Freeway ☐ Uphill ☐ Downhill ● Is it possible to restart cruise control? ☐ Yes ☐ No
	☐ Unable to cancel cruise control	☐ Depressing brake pedal ☐ Shifting into any position except D ☐ Pushing cruise control main switch to CANCEL
	☐ Cruise control malfunction	☐ No acceleration ☐ No deceleration ☐ Hunting occurs ☐ No downshift ☐ No upshift after downshift
	☐ Cruise control main switch malfunction	☐ SET ☐ + ☐ - ☐ RES ☐ CANCEL
	☐ CRUISE main indicator light malfunction	☐ Remains on ☐ Does not come on ☐ Blinks

DTC check	First Time	☐ Normal System Code ☐ Trouble Code (Code)
	Second Time	☐ Normal System Code ☐ Trouble Code (Code)

DIAGNOSTIC TROUBLE CODE CHART

If a trouble code is displayed during the DTC check, check the circuit listed for that code. For details of each code, refer to the "See page" under the respective "DTC No." in the DTC chart.

DTC No. (See page)	Circuit Inspection	Trouble Area
P0500 (05-2698)	Vehicle Speed Sensor "A"	• Vehicle speed sensor • Vehicle speed sensor circuit • Combination meter • Hybrid vehicle control ECU
P0571 (05-2702)	Brake Switch "A" Circuit	• Stop lamp switch • Stop lamp switch circuit • Hybrid vehicle control ECU
P0607 (*1) (05-2707)	Control Module Performance	• Hybrid vehicle control ECU

HINT:

*1: DTC P0607 indicates an internal abnormality of the hybrid vehicle control ECU. If this DTC is output, replace the hybrid vehicle control ECU.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

The hand-held tester can be used at steps 4, 5, 6, 7, and 12.

1

VEHICLE BROUGHT TO WORK SHOP



2

CUSTOMER PROBLEM ANALYSIS (SEE PAGE 05-2686)



3

PROBLEM SYMPTOM CONFIRMATION



4

CHECK BODY MULTIPLEX COMMUNICATION SYSTEM (SEE PAGE 05-2549)

(a) Check for body multiplex communication system DTC output.

HINT:

The hybrid vehicle control ECU is connected to the multiplex communication system (BEAN) via the CAN communication system. Therefore before troubleshooting, make sure that there is no trouble in the multiplex communication system.

MULTIPLEX SYSTEM DTC IS OUTPUT (PROCEED TO "BODY MULTIPLEX COMMUNICATION SYSTEM")

MULTIPLEX SYSTEM DTC IS NOT OUTPUT (GO TO STEP 5)

5

CHECK CAN COMMUNICATION SYSTEM (SEE PAGE 05-2602)

(a) Check for CAN communication system DTC output.

HINT:

The hybrid vehicle control ECU is connected to the CAN communication system. Therefore before troubleshooting, make sure that there is no trouble in the CAN communication system.

CAN SYSTEM DTC IS OUTPUT (PROCEED TO "CAN COMMUNICATION SYSTEM")

CAN SYSTEM DTC IS NOT OUTPUT (GO TO STEP 6)

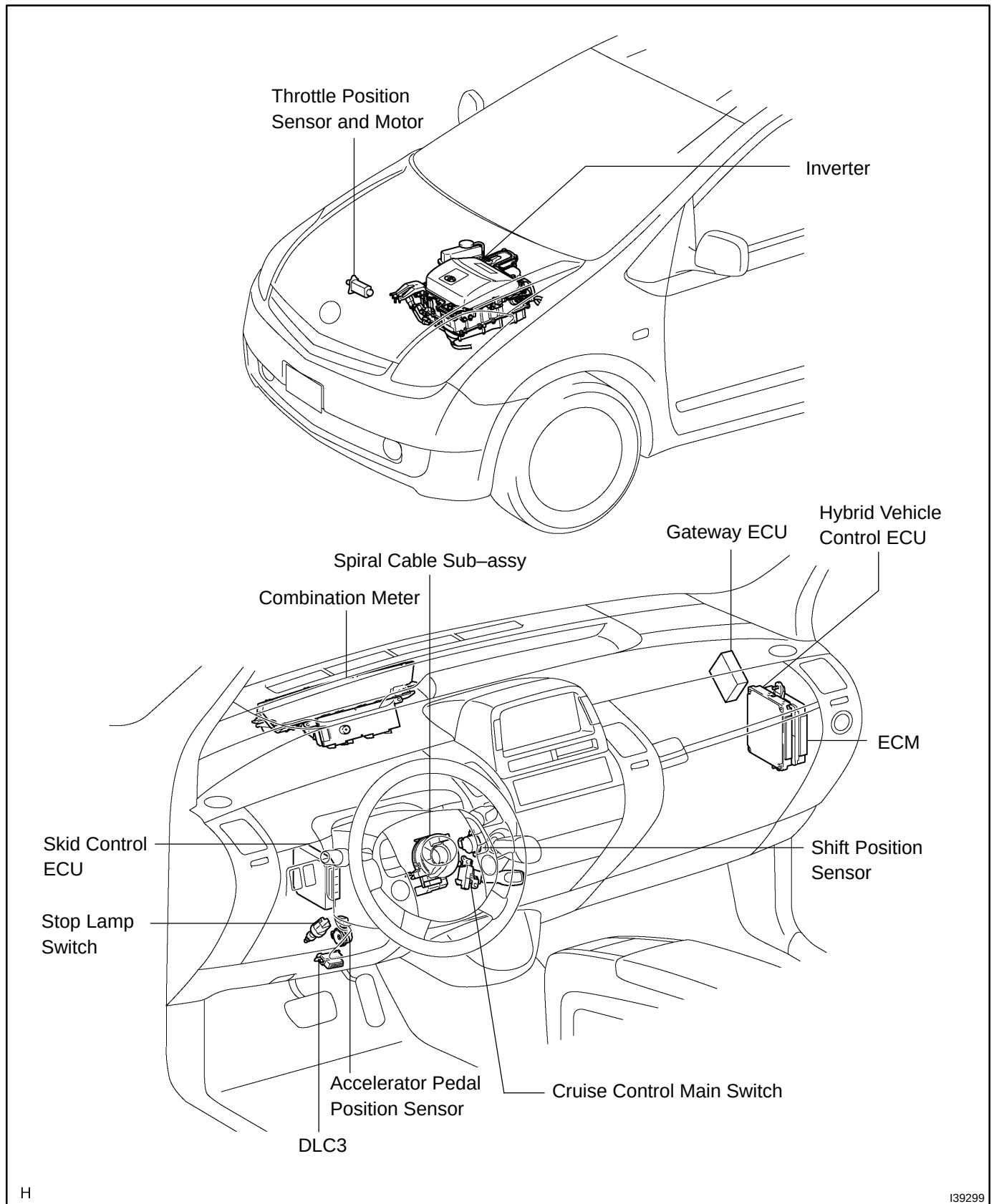
6

CHECK AND CLEAR DTC (EXCEPT MULTIPLEX SYSTEM DTC) (SEE PAGE 05-2693)



7	DTC CHECK (EXCEPT MULTIPLEX SYSTEM DTC) (SEE PAGE 05-2693)
TROUBLE CODE (GO TO STEP 8)	
NORMAL SYSTEM CODE (GO TO STEP 9)	
8	DTC CHART (SEE PAGE 05-2697)
GO TO STEP 12	
9	PROBLEM SYMPTOM SIMULATION
SYMPTOM DOES NOT OCCUR (GO TO STEP 10)	
SYMPTOM OCCURS (GO TO STEP 11)	
10	SYMPTOM SIMULATION (SEE PAGE 01-47)
11	PROBLEM SYMPTOMS TABLE (SEE PAGE 05-2689)
12	CIRCUIT INSPECTION (SEE PAGES 05-2698 – 05-2715)
13	TERMINALS OF ECU (SEE PAGE 05-2690)
14	PROBLEM IDENTIFICATION
15	REPAIR OR REPLACE
16	CONFIRMATION TEST
END	

LOCATION



CRUISE CONTROL SYSTEM

05HG3-01

PRECAUTION

NOTICE FOR INITIALIZATION:

When the negative (–) battery terminal is disconnected, initialize the following system after the terminal is reconnected.

System Name	See page
Power Window Control System	01-28

NOTICES FOR HYBRID SYSTEM ACTIVATION:

- When the warning lamp is illuminated or the battery has been disconnected and reconnected, pressing the power switch may not start the system on the first try. If so, press the power switch again.
- With the power switch's power mode changed to ON (IG), disconnect the battery. If the key is not in the key slot during reconnection, DTC B2799 may be output.

NOTICE:

Push the cruise control main switch ON–OFF button "off" and reset the cruise control if the CRUISE main indicator light blinks while driving with cruise control. When the cruise control cannot be set by this procedure or cancelled immediately after setting, there may be a problem in the cruise control system.

Do not inspect the cruise control system under the following road conditions:

- Heavy traffic
- Steep downhill
- Sharp turns
- Icy or snowy roads
- Slippery roads

PROBLEM SYMPTOMS TABLE

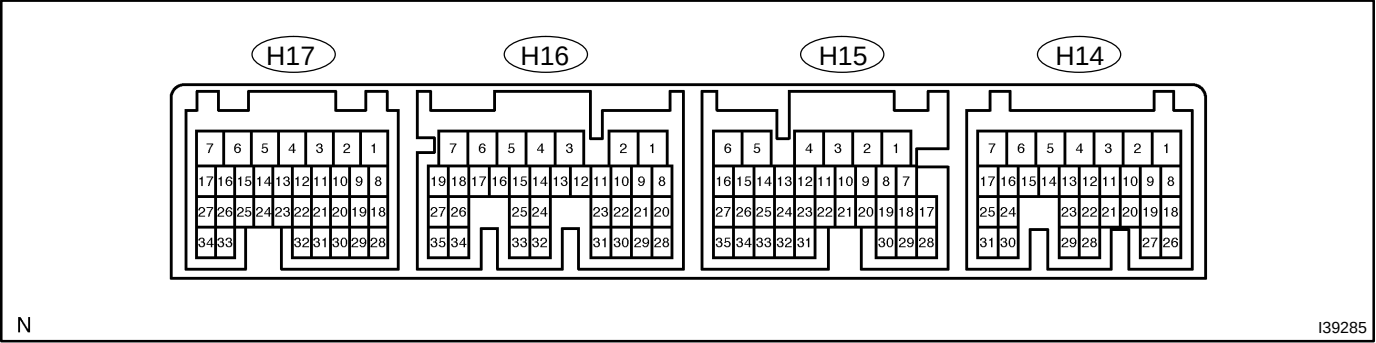
If a normal system code is displayed during the DTC check but a problem still occurs, check each circuit and component for the problem symptom in the order shown in the table below.

HINT:

Inspect the fuses and relays before confirming the suspected areas which are shown in the chart below. Inspect the relevant circuits and component in numerical order. If the problem still exists even after inspecting all the circuits and components and confirming that they are all normal, replace the hybrid vehicle control ECU.

Symptom	Suspected Area	See page
ON-OFF button cannot be pushed on. (CRUISE main indicator light on the combination meter does not come on.)	2. Cruise control switch circuit 3. CRUISE main indicator light circuit 4. Combination meter 5. Hybrid vehicle control ECU	05-2708 05-2715 71-19 21-124
Vehicle speed cannot be set. (Indicator light on the combination meter comes on when ON-OFF button is pushed on, but it goes off when vehicle speed is set.)	1. Cruise control switch circuit 2. Hybrid vehicle control ECU	05-2708 21-124
Setting cannot be done. (Indicator light on the combination meter comes on when ON-OFF button is pushed on, and it remains on while setting.)	1. Cruise control switch circuit 2. Stop lamp switch circuit (DTC P0571) 3. Shift position sensor circuit (DTC P0705) 4. Combination meter 5. Hybrid vehicle control ECU	05-2708 05-2702 05-468 71-19 21-124
Cruise control is cancelled while driving. (CRUISE main indicator light remains on.)	1. Cruise control switch circuit 2. Vehicle speed sensor circuit (DTC P0500) 3. Stop lamp switch circuit (DTC P0571) 4. CRUISE main indicator light circuit 5. Hybrid vehicle control ECU	05-2708 05-2698 05-2702 05-2715 21-124
Hunting occurs. (Speed is not constant.)	1. Vehicle speed sensor circuit (DTC P0500) 2. Hybrid vehicle control ECU	05-2698 21-124
Setting cannot be cancelled (when functions such as COAST, ACCEL, RESUME, set speed change are operated with control switch).	1. Cruise control switch circuit 2. Hybrid vehicle control ECU	05-2708 21-124

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Value
ST1- – GND1 (H15-2 – H14-1)	G – W-B	Stop lamp signal	Power switch is on (IG) Depress brake pedal → Release brake pedal	Below 1 V → 10 to 14 V
STP – GND1 (H15-3 – H14-1)	L – W-B	Stop lamp signal	Power switch is on (IG) Depress brake pedal → Release brake pedal	10 to 14 V → Below 1 V
CCS – GND1 (H14-13 – H14-1)	V – W-B	Cruise control main switch circuit	Power switch is on (IG) → CANCEL switch is held on → -/SET switch is held on → +/RES switch is held on → ON-OFF button is pushed on	10 to 14 V → 6.6 to 10.1 V → 4.5 to 7.1 V → 2.3 to 4.0 V → Below 1 V
SPDI – GND1 (H14-19 – H14-1)	V – W-B	Vehicle speed input signal	Power switch is on (IG) Slowly turn wheels	Below 1 V to above 5 V