
METER

METER & GAUGE SYSTEM

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METER & GAUGE SYSTEM

HOW TO PROCEED TROUBLESHOOTING

1 PUTTING THE CAR IN THE GARAGE

2 INQUIRY AND PHENOMENON CHECK

<HINT>

See page 63-11

(1) Check trouble information by using the inquiry sheet.

Check result	Procedure
If phenomenon can be identified	A
If phenomenon cannot be identified	B

B

TO TROUBLE SIMULATION (See page 01-30)

A

3 LIN COMMUNICATION SYSTEM CHECK

<HINT>

See page 94-4

Check result	Procedure
Without error	A
With error	B

B

TO LIN COMMUNICATION SYSTEM SECTION (See page 94-3)

A

4 CAN COMMUNICATION SYSTEM CHECK

<HINT>

See page 95-9

Check result	Procedure
Without error	A
With error	B

B

TO CAN COMMUNICATION SYSTEM SECTION (See page 95-4)

A

5 LIST OF SYMPTOM

<HINT>

See page 63-8

(1) Referring to the list by symptom, check if the trouble symptom fall under the list.

Check result	Procedure
Does not fall under the list by symptom.	A
Falls under the list by symptom.	B

B

TO STEP 5

A

6 BASED ON THE TROUBLE PHENOMENON, PERFORM TROUBLESHOOTING FOLLOWING THE PROCEDURES BELOW.

(1) Function Check (See page 63-2)

(2) ECU Terminal Sequence (See page 63-19)

63

7 ADJUSTMENT, REPAIR OR REPLACEMENT

8 CHECK TEST

END

FUNCTION CHECK

1. LED check

(1) LED lighting check when IG OFF to ON

(a) Check if each indicator and warning indicator lights when the ignition switch is turned on.

Indicator and warning lamp	Ignition switch operation	Lighting specification
Water temperature indicator (HOT)	IG OFF → ON	Lamp on for about three seconds
Brake	IG OFF → ON	Lamp on for about three seconds
ABS (with ABS)	IG OFF → ON	Lamp on for about three seconds
SLIP (with VSC)	IG OFF → ON	Lamp on for about three seconds
VSC (with VSC)	IG OFF → ON	Lamp on for about three seconds

<HINT>

The request for lighting is made by the other ECU.

(2) Seat belt warning indicator check

(a) Insert the tongue plate of the seat belt of the driver's seat or passenger seat into the buckle with the ignition switch on, and confirm that the seat belt warning indicator blinks and then goes out.

Indicator and warning lamp	Ignition switch operation	Lighting specification
Driver's seat belt warning	IG OFF → ON	> Blink → Tongue plate insertion → Extinction > Extinction → Tongue plate removal → Blink
Passenger seat belt warning	IG OFF → ON	> Passenger seat occupied → Blink → Tongue plate insertion → Extinction > Extinction → Tongue plate removal → Blink → Passenger leaving → Extinction

2. Speedometer check

(1) Operation check

(a) Using a speedometer tester, check the indication error of the speedometer and the operation of the odometer.

Europe (MPH indication)

Typical tester indication speed [MPH]	Permissible meter value range [MPH]
20	20.5-22.7
40	40.6-43.6
60	60.8-64.4
80	81.1-85.1
100	101.4-105.9
120	121.7-126.6

Europe (km/h indication), G.C.C. Countries

Typical tester indication speed [km/h]	Permissible meter value range [km/h]
40	40.6-44.7
60	60.6-65.1
80	80.8-85.8
100	101.2-106.4
120	121.4-127.1
140	141.7-147.7
160	161.7-168.7
180	181.9-189.5
200	202.2-210.2

Other regions

Typical tester indication speed [km/h]	Permissible meter value range [km/h]
40	36.6-40.7
60	56.6-61.6
80	76.5-82.5
100	96.9-102.9
120	117.3-123.3
140	137.3-144.3
160	157.3-165.3
180	177.3-186.3
200	197.3-207.3

<CAUTION>

If the air pressure of the tires is inappropriate, the indication error increases. Therefore, adjust the air pressure of the tires in advance.

(b) Check the range of the indicator pointer

Specified value: 0.3km and below

3. Tachometer check

(1) Operation check

(a) Start the engine.

(b) Check the indication error of the tachometer by using a revolution counter.

Revolution counter indication [rpm]	Permissible meter value range [rpm] () indicates a reference value.
700	595-805
1,000	(900-1100)
2,000	(1850-2150)

Revolution counter indication [rpm]	Permissible meter value range [rpm] () indicates a reference value.
3,000	2800-3200
4,000	(3800-4200)
5,000	4800-5200
6,000	(5750-6250)
7,000	6700-7300
8,000	(7700-8300)

<CAUTION>

Do not revolve the engine more than the permissible number of revolutions (to the red zone on the meter).

4. Oil pressure warning check

(1) Operation check

(a) Disconnect the connector of the engine oil pressure switch assembly.

(b) Start the engine.

(c) Using test lead wires, check the oil pressure warning indicator when the vehicle wire harness connector terminal is short-circuited with the body ground.

Reference: The engine oil pressure indicator lights.

5. Engine oil pressure switch assembly check

(1) Conductivity Check

(a) Using a tester, check electrical continuity between the engine oil pressure switch terminal and body ground.

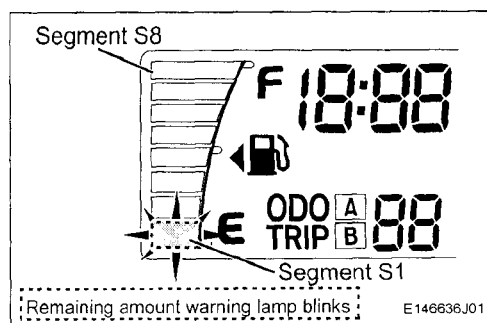
Engine state	Reference
When engine stops	With electrical continuity
When engine is running	Without electrical continuity

6. Fuel receiver gauge and warning lamp check

(1) Circuit check

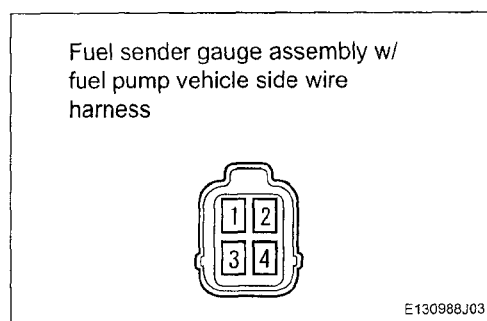
(a) Disconnect the connector of the fuel sender gauge assembly.

(b) Disconnect the minus terminal of the battery and re-connect it.



(c) Check the state of the fuel receiver gauge when the ignition switch is turned on.

Reference: Remaining fuel warning indicator operates and segment S1 blinks.



(d) Using test lead wires, check the lighting state of the segment of the fuel receiver gauge when between terminals 1 and 2 of the vehicle wire harness connector are short-circuited.

Reference: All segments, S1 to S8, light and the remaining fuel warning indicator stops.

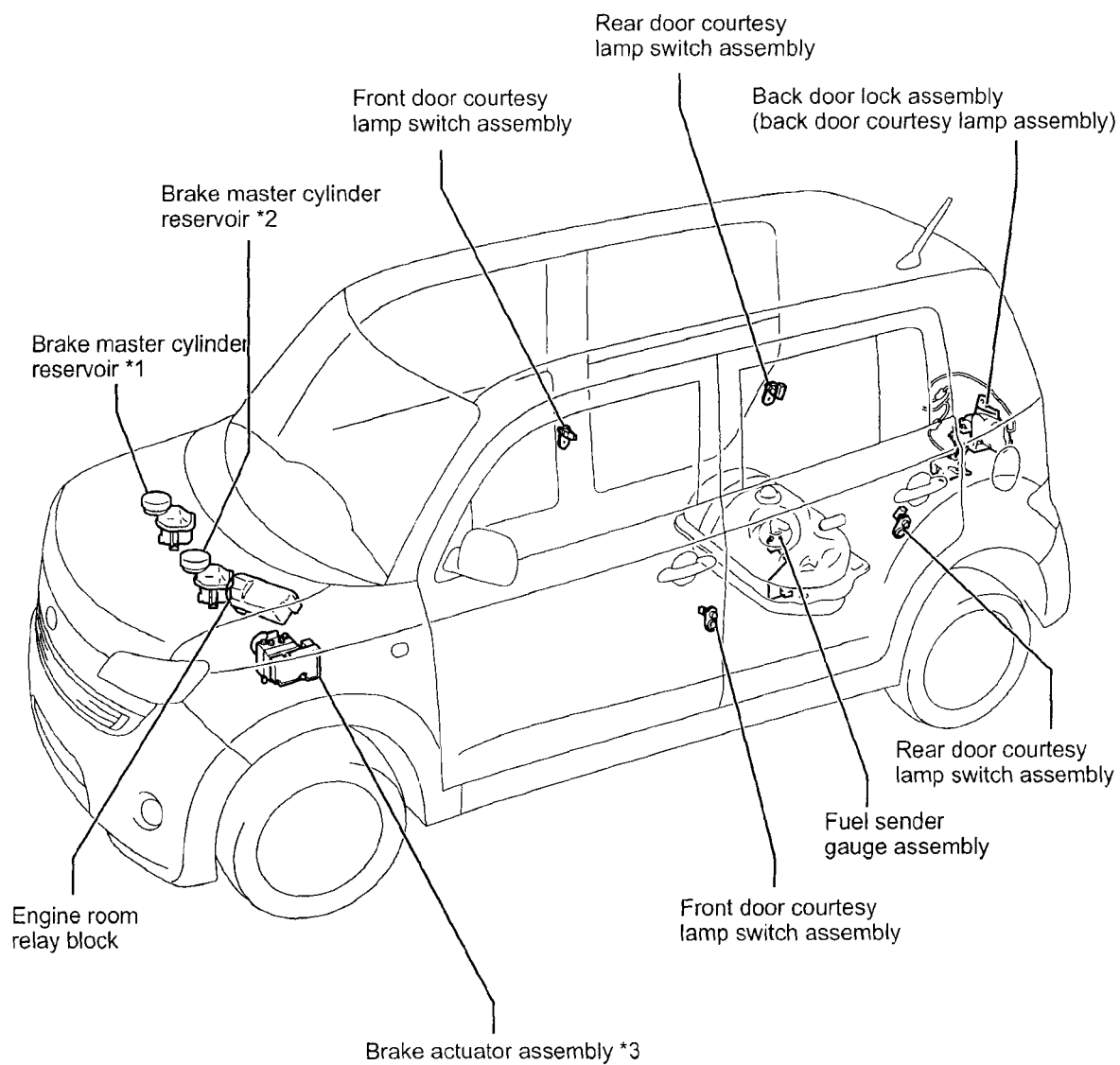
7. Buzzer operation check

(1) Operation check

(a) Activate each warning function and check the operation of the built-in buzzer of the combination meter assembly.

Warning function	Check condition	Check condition
Light not-turned-off warning	Tail lamp lighting, IG OFF, (without key) → driver's seat door open	Continuous sound

PART LAYOUT



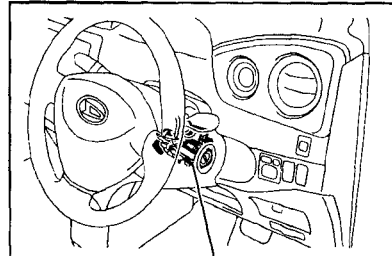
*1: RHD

*2: LHD

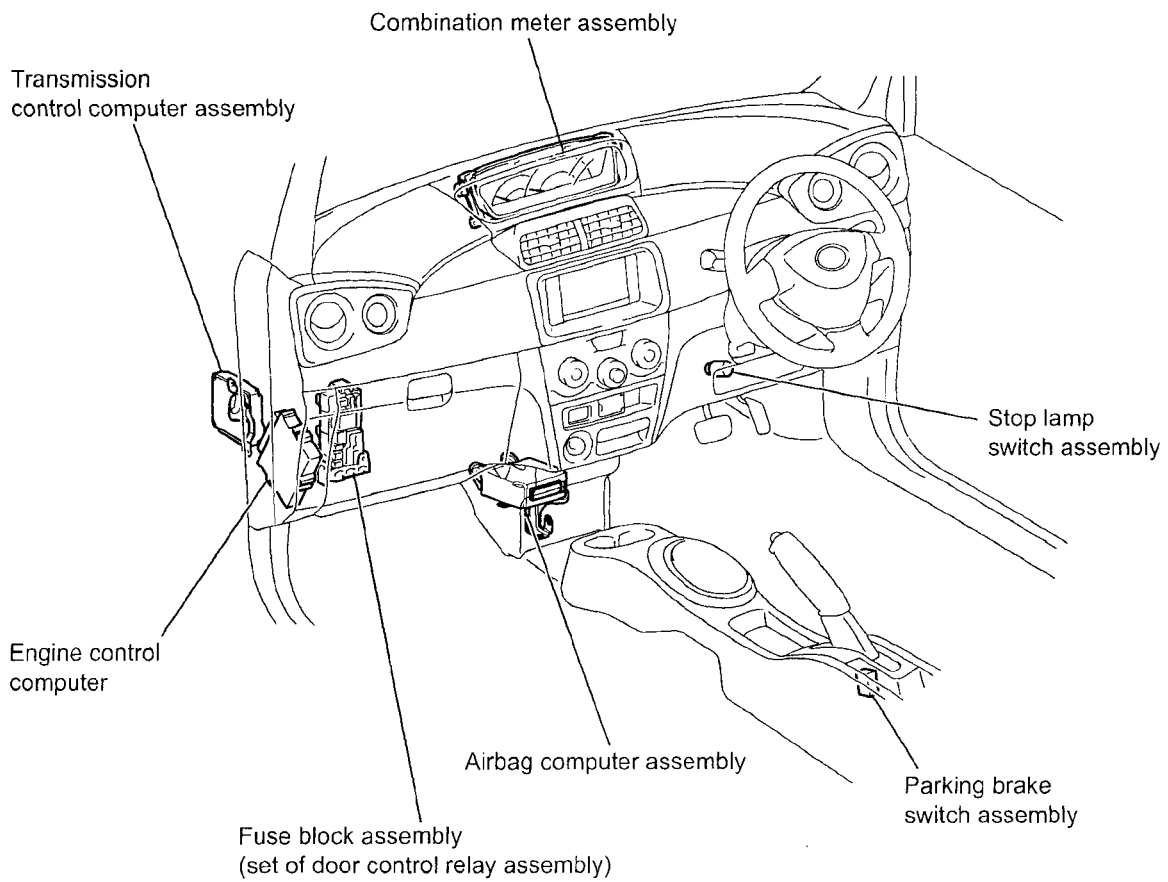
*3: with ABS & VSC

RHD:

Transponder key ECU



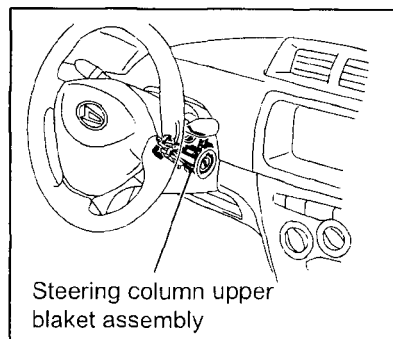
Steering column upper
blaket assembly



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LHD:

Transponder key ECU



Steering column upper
blaket assembly

Transmission
control computer assembly

Combination meter assembly

Engine control
computer

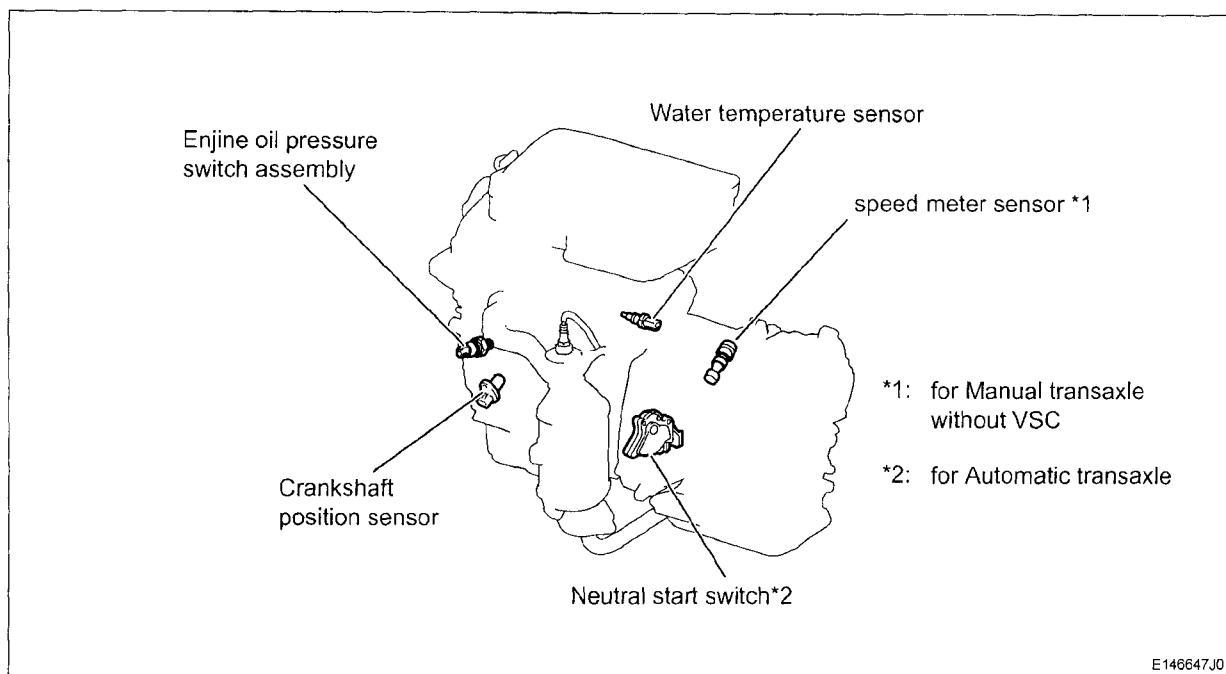
Stop lamp
switch assembly

Airbag computer assembly

Parking brake
switch assembly

Fuse block assembly
(set of door control relay assembly)

63



LIST OF DIAGNOSTIC TROUBLE CODE

Diagnostic trouble code	Diagnostic item	Reference page
11	Body integrated controller communication error (except short)	94-2
21	LIN communication line short	94-2
41	A/T shift signal not received	63-21
42	Two or more A/T shift information signals received	63-21
43	CAN communication system connected ECU information reading not allowed	63-23
51	ENG communication blackout	95-3
52	EAT communication blackout	95-3
53	ABS communication blackout	95-3
54	STR (steering angle sensor) communication blackout	95-3
61	Low voltage error	63-23

LIST OF SYMPTOM

Meter/gauge

Symptom	Checking items	Reference page
Speedometer fault (for M/T vehicle, ABS/VSC non installed cars)	Speedometer check	63-3
	Combination meter assembly check	63-19
	Speed meter sensor check	29-65
	Vehicle wire harness and connector (combination meter assembly speed sensor)	-
Speedometer fault (other than above)	See troubleshooting flowchart [speedometer fault].	63-24
Tachometer fault	See troubleshooting flowchart [tachometer fault].	63-29
Odometer/trip meter fault (Speedometer is normal.)	Combination meter assembly replacement	63-39
Fuel receiver gauge fault	See troubleshooting flowchart [fuel receiver gauge fault].	63-30
Water temperature warning lamp fault	See troubleshooting flowchart [water temperature warning lamp fault].	63-33

Indicator and warning lamp

Symptom	Checking items	Reference page
Check engine warning lamp fault	Meter LED lighting check	63-2
	Engine control computer check	06-17
	Combination meter assembly check	63-19
	Vehicle wire harness and connector (combination meter assembly ↔ engine control computer)	-
Charge warning lamp fault	Meter LED lighting check	63-2
	Alternator L terminal	-
	Combination meter assembly check	63-19
	Vehicle wire harness and connector (combination assembly ↔ alternator L terminal)	-
Oil pressure warning lamp fault	Meter LED lighting check	63-2
	Engine oil pressure switch assembly check	63-42
	Combination meter assembly check	63-19
	Vehicle wire harness or connector (engine oil pressure switch ↔ combination meter)	-
Water temperature indicator lamp fault (CAN communication input)	Meter LED lighting check	63-2
	Water temperature check	06-187
	See troubleshooting flowchart [water temperature warning fault].	63-33
	CAN communication system	95-4
A/T shift position indicator fault (CAN communication input)	See troubleshooting flowchart [neutral start switch assembly system].	26-57
	Engine control computer check or replacement	26-67
	Combination meter assembly check	06-17
	CAN communication system	63-19
Brake warning lamp fault (CAN communication input [Directly input the fluid level and parking brake]).	Meter LED lighting check	63-2
	See troubleshooting flowchart [Brake warning lamp always lights] (with ABS).	44-55
	See troubleshooting flowchart [Brake warning lamp always lights] (with VSC).	44-137
ABS warning lamp fault (CAN communication input)	Meter LED lighting check	63-2
	See troubleshooting flowchart [ABS warning lamp always lights (with ABS)].	44-53
	See troubleshooting flowchart [ABS warning lamp always lights (with VSC)].	44-135
	CAN communication system	95-4
VSC warning lamp fault (CAN communication input)	Meter LED lighting check	63-2
	See troubleshooting flowchart [VSC warning is indicated but no error code is output].	44-146
	CAN communication system	95-4
Slip indicator lamp fault (CAN communication input)	Meter LED lighting check	63-2
	See troubleshooting flowchart [slip indicator lamp].	44-140
	CAN communication system	95-4
Air bag warning lamp fault	Meter LED lighting check	63-2
	See troubleshooting flowchart [Warning lamp always lights].	55-200
	See troubleshooting flowchart [Warning lamp does not light].	55-197
P/S warning lamp fault	Meter LED lighting check	63-2
	See troubleshooting flowchart [EPS warning lamp].	49-49
BEAM indicator lamp fault	Combination meter assembly check	63-19
	Vehicle wire harness and connector (combination meter ↔ head lamp dimmer switch)	-
TAIL indicator lamp fault (Lighting system is normal.)	Combination meter assembly check	63-19
	Vehicle wire harness and connector (combination meter ↔ head lamp dimmer switch)	-
TURN indicator lamp fault	Combination meter assembly check	63-19
	Vehicle wire harness and connector (combination meter ↔ flasher relay)	-

Symptom	Checking items	Reference page
Door warning lamp fault	Combination meter assembly replacement	63-39
Remaining fuel warning	Combination meter assembly check	63-19
	Fuel sender gauge check	63-43
	Vehicle wire harness and connector (fuel sender gauge ↔ combination meter assembly)	-
Driver's seat belt warning lamp fault	Seat belt warning system	56-3
Passenger seat belt warning lamp	Seat belt warning system	56-3
Security indicator fault	Transponder key ECU check or replacement	-
	CAN communication system	95-4

Buzzer

Symptom	Checking items	Reference page
All buzzers do not sound	Combination meter assembly replacement	63-39
Seat belt warning buzzer fault*1	Buzzer cancel setting by DS-II	-
	Seat belt warning system	56-3
Light not-turned-off warning buzzer fault (Lighting system is normal and door warning lights when door is opened.)	Combination meter assembly replacement	63-40
Speed alarm buzzer fault (Speedometer is normal,)*2	Combination meter assembly replacement	63-39

<HINT>

*1: for Europe

*2: for G.C.C. Countries

INQUIRY SHEET

Combination Meter System Check Sheet

Inspector's Name:

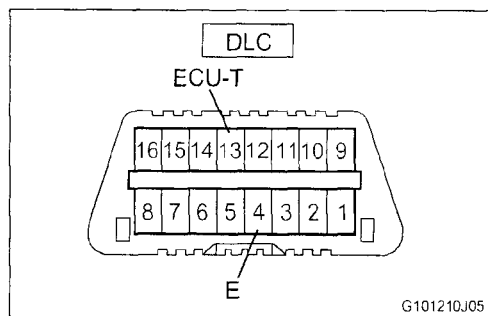
Customer's Name		License Plate No.
		First Registration Year
		Frame No.
Date Vehicle Brought In	/ /	Odometer Reading km
Date Problem First Occured	/ /	
Frequency Problem Occurs	Constant Occasionally ___times/day	
Weather	Clear Cloudy Rainy Others ()	
Ambient Air Temperature	Approximately °C	
Problem Symptoms	Speedometer operation malfunction Fails to move Large discrepancy Others ()	
	Tachometer operation malfunction Fails to move Large discrepancy Others ()	
	Fuel gauge operation malfunction Fails to move Large discrepancy Others ()	
	Coolant temperature gauge operation malfunction Fails to move Large discrepancy Others ()	
	Indicator/warning light does not illuminate (_____light)	
	Indicator/warning light always illuminates (_____light)	
	Buzzer does not sound (Buzzer)	
	Others	

DIAGNOSTIC TROUBLE CODE CHECK / ERASE

1. Diagnostic trouble code check (diagnosis check mode)/(reading by LCD in meter and warning lamp)

<CAUTION>

Before checking the diagnostic trouble code, turn on the ignition switch and check if the security indicator lamp lights normally and LCD displays normally.



(1) Using SST, short circuit between 13 (ECU-T) and 4 (E) terminals of DLC.

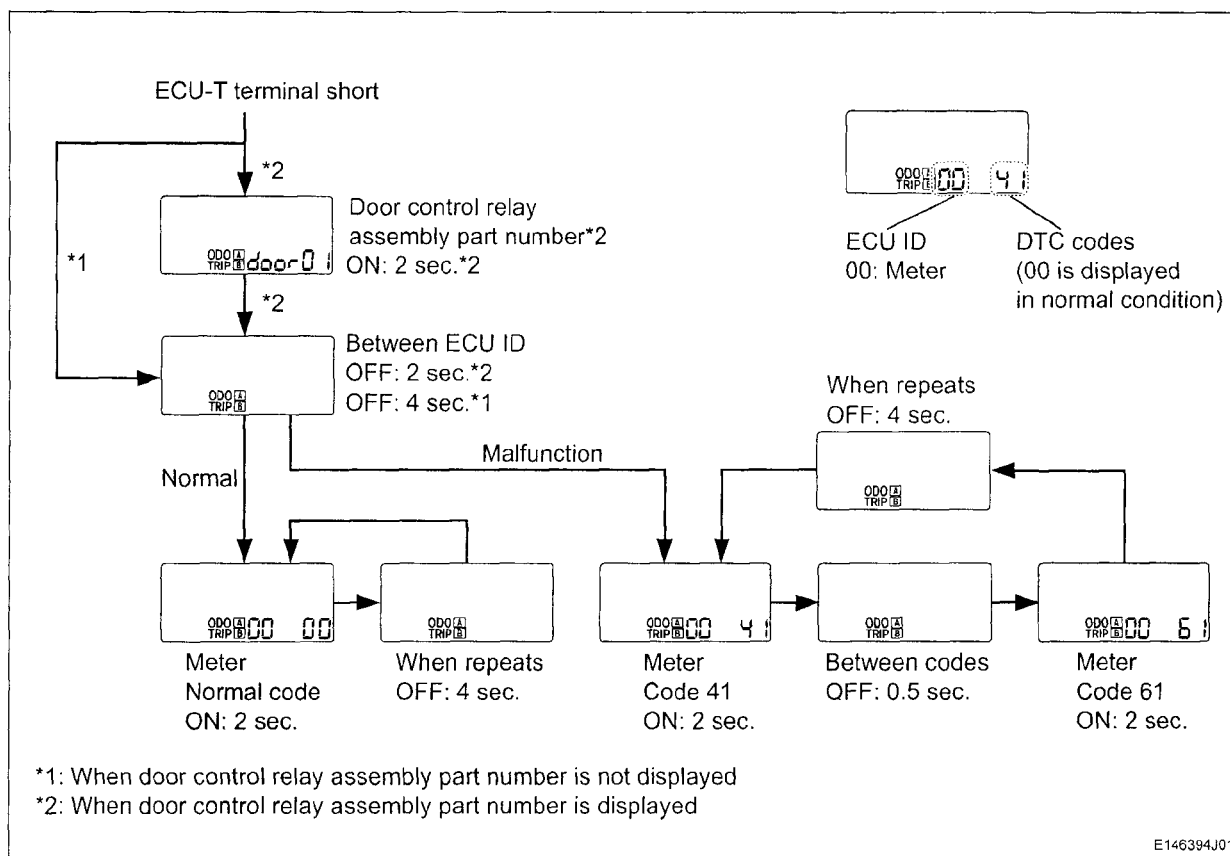
SST 09991-87403, 09991-87404

<CAUTION>

- > Do not connect the connector at a wrong position as it may cause malfunctioning.
- > The vehicle must stop.

(2) Turn IG ON and start outputting a diagnostic trouble code.

(a) The security indicator of the combination assembly will blink and, at the same time, the LCD of the meter displays a diagnostic trouble code No.



<HINT>

- > All the recorded codes are repeatedly displayed, starting from the one with the lowest number.
- > If there is only one code, the code is displayed and re-displayed four seconds later. If there are two or more codes, all the codes are displayed at interval of 2.5 seconds, starting from the code with the lowest number. After four seconds, the codes are displayed again starting from the one with the lowest number.
- > The higher two digits display the ID of ECU and the lower two digits display a diagnostic trouble code No. When "00" is displayed on the higher two digits, a diagnostic trouble code of the combination meter assembly is displayed.

(3) After checking the diagnostic trouble code, open short-circuit between terminals 13 (ECU-T) and 4 (E) of DLC.

<HINT>

- > If the security indicator lamp lights, the chances are the wire harness is short-circuited (pinched) or the computer is not good.
- > If no code is displayed normally nor does the security indicator lamp light, it suggests that the ECU-T circuit between DLC and combination meter assembly and the diagnosis communication line break, or the computer is faulty.
- > The computer may not be good if a meaningless code is output.

2. Diagnostic trouble code memory erase (by disconnecting battery minus terminal)

- (1) After the location where the error code has been generated is identified and repaired, the diagnostic trouble code memory can be erased by disconnecting the minus terminal of the battery for 30 seconds and above. After erasing the memory, output a diagnostic trouble code again to check if the normal code is output.

MEMORY-RELATED WORKS

1. CAN communication destination information setting

<CAUTION>

When the combination meter assembly is replaced, it is necessary to set up CAN communication destinations except for a M/T vehicle without ABS/VSC.

<HINT>

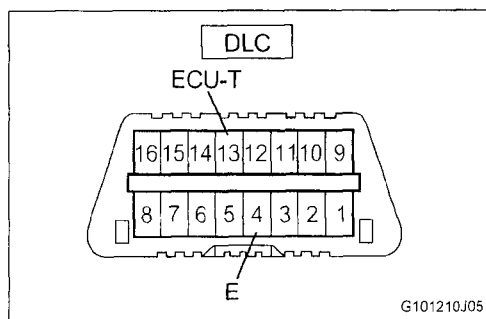
- > The CAN communication destination information that combination meter assembly stores is to recognize whether engine control computer, transmission control computer assembly, and brake actuator assembly are present.
- > The combination meter assembly, based on this CAN communication destination information, determines which indicator and/or warning lamp should be turned on.
- > The CAN communication destination information is not erased even if the battery or the connector of the combination meter assembly is removed.

- (1) Check vehicle specifications.

<HINT>

Check vehicle specifications as to whether the transmission and ABS/VSC exist or not.

- (2) Set the IG switch to LOCK.



- (3) Use SST to short-circuit the ECU-T terminal and E terminal of DLC located beneath the instrument panel.

SST 09991-87403, 09991-87404

<CAUTION>

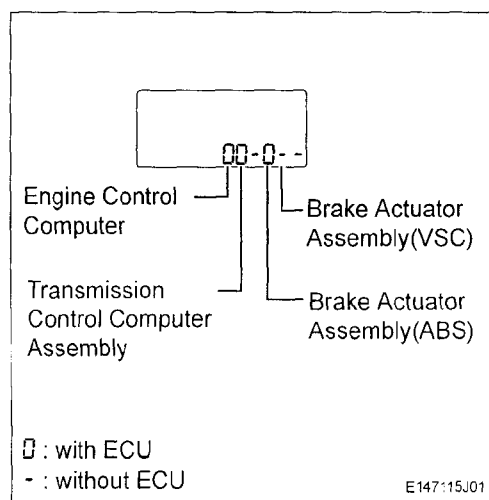
Connecting the connector in the wrong location could cause a malfunction. Therefore, make sure the connection is correct.

- (4) Turn the IG switch ON, while the odometer/trip selection switch remains ON.
- (5) Set the odometer/trip selection switch to OFF.
- (6) Set the odometer/trip selection switch to ON again and hold more than 3 seconds.

<HINT>

When the switch is held for more than 3 seconds, the LCD display will indicate "b-0000" and blinks.

- (7) A buzzer sounds in about 6 seconds, CAN communication destination information is stored, and the setup is complete.



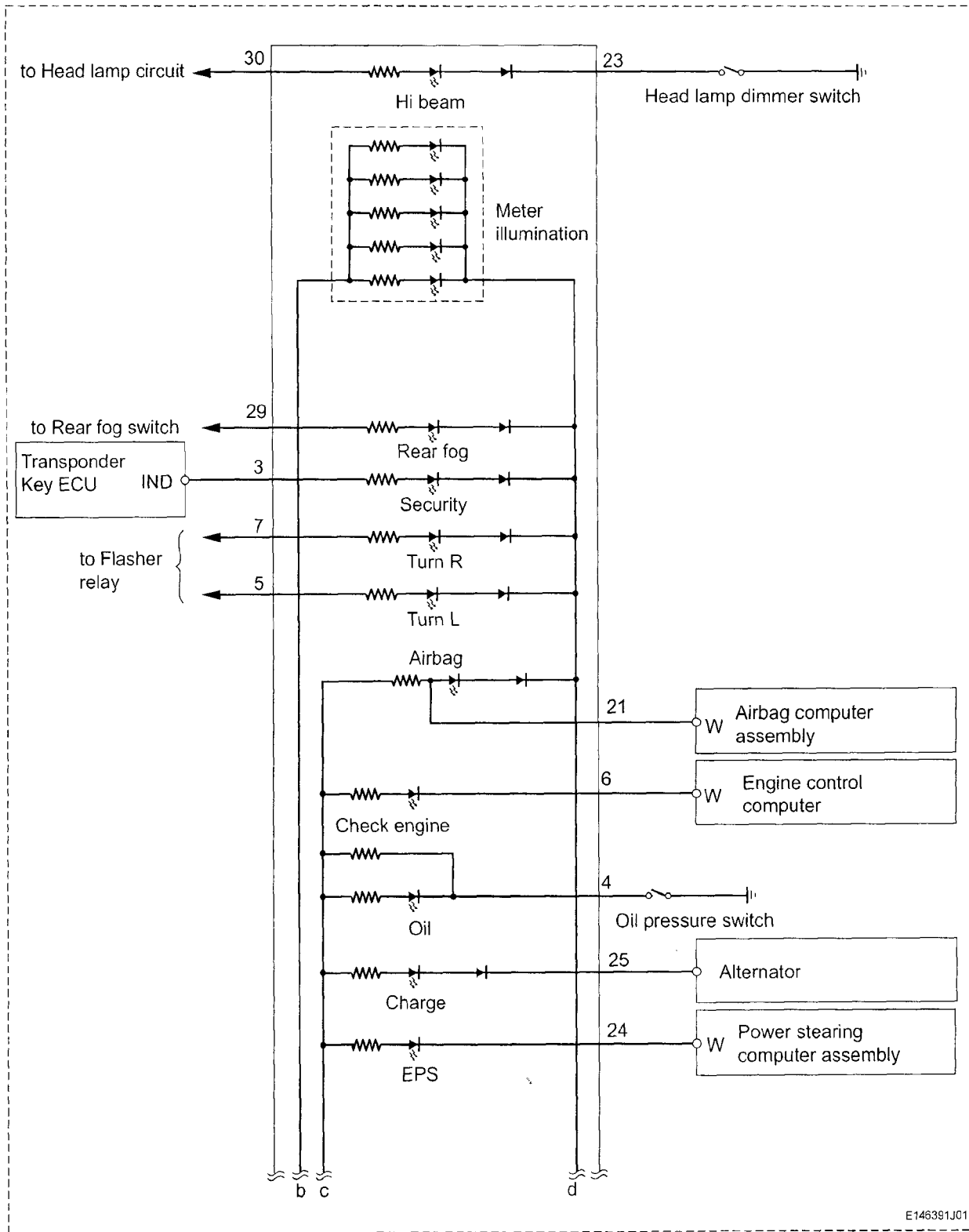
- (8) The CAN communication destination information is displayed on the LCD display. Check whether the vehicle specification matches the information displayed.

<HINT>

- > The factory setting for CAN communication destination of the combination meter assembly is that the vehicle is a M/T vehicle without ABS/VSC equipped.
- > If "-FAIL-" is displayed, it suggests that the combination meter assembly is faulty.

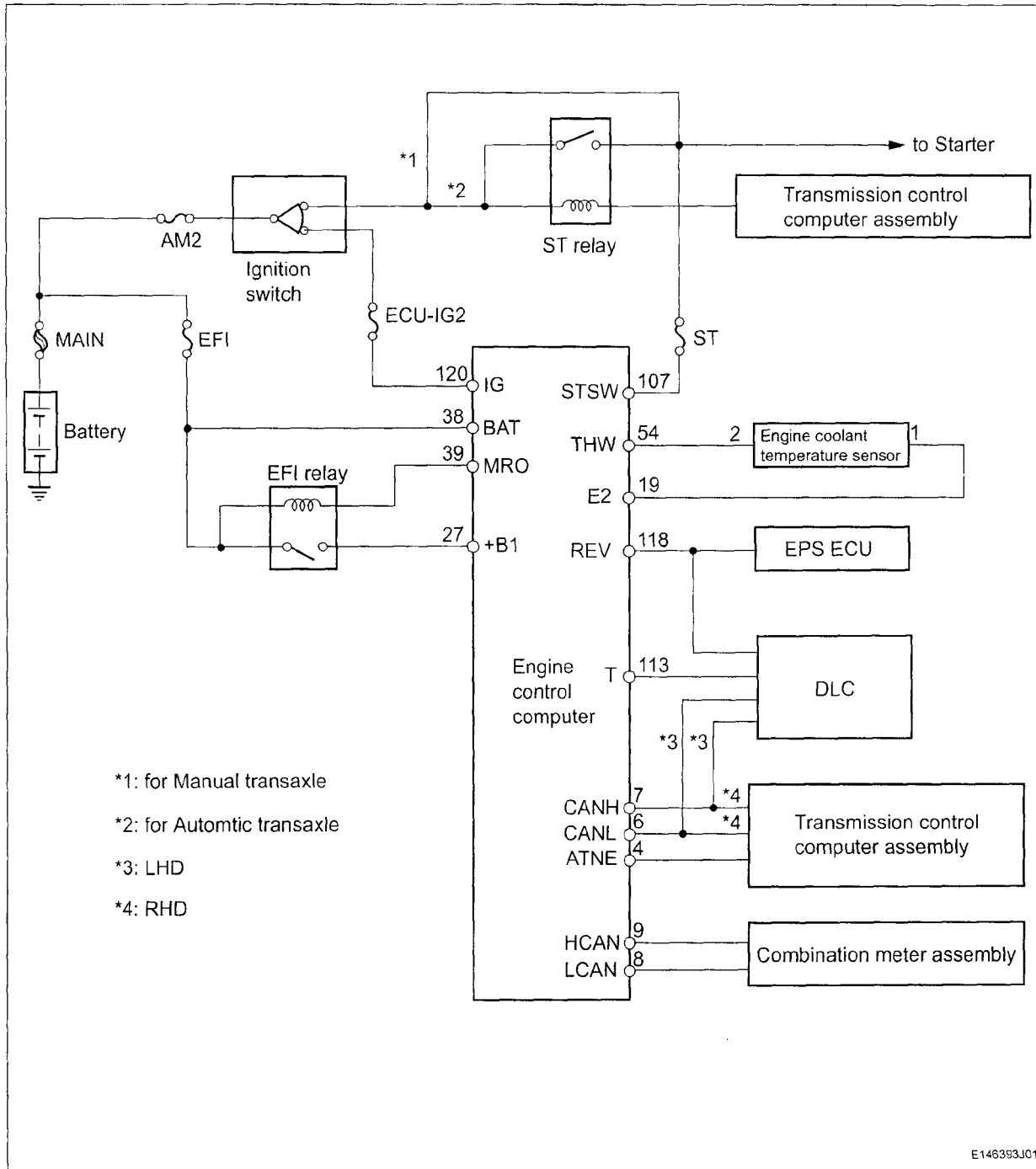
CIRCUIT DIAGRAM

1. Combination meter assembly

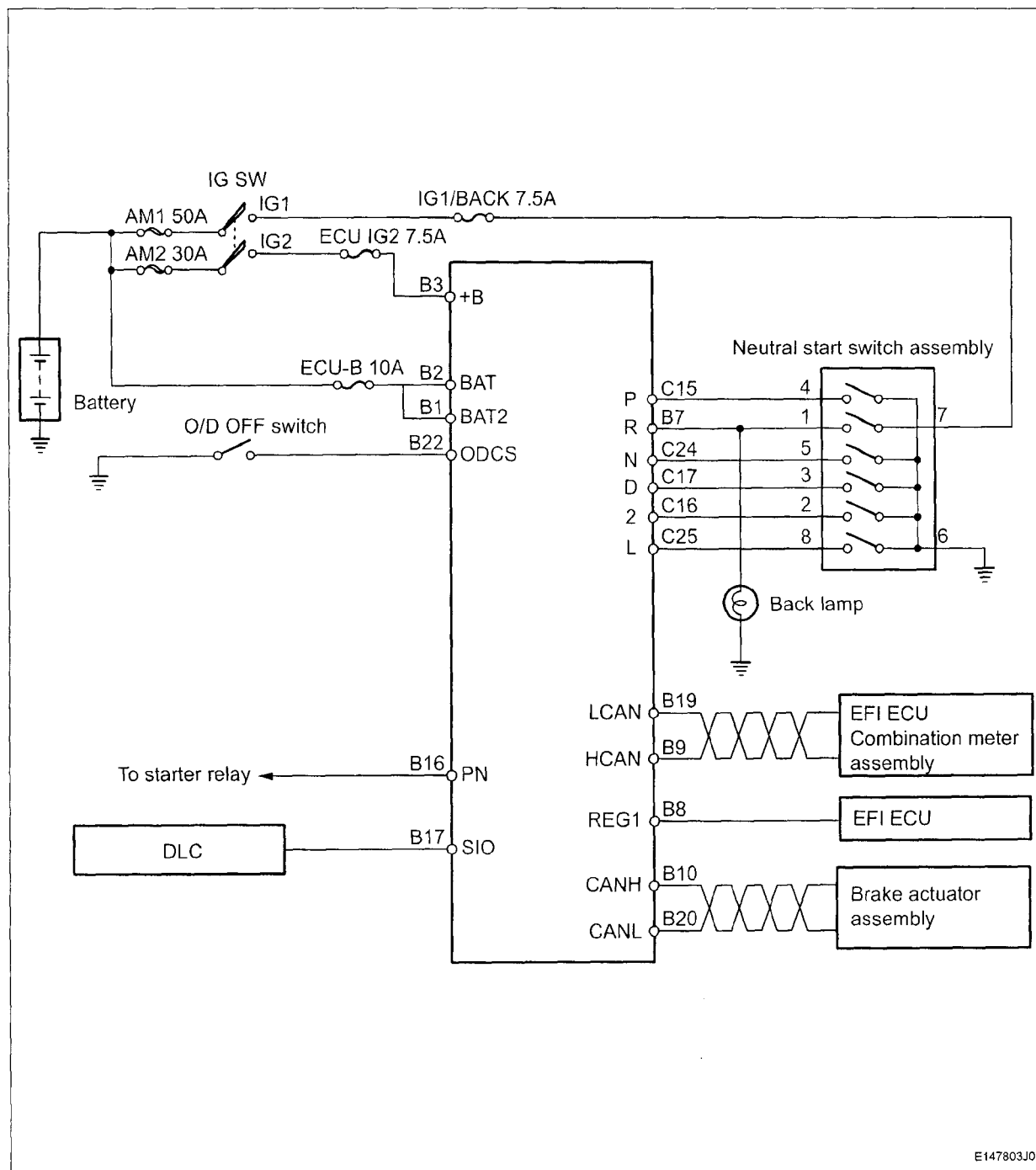




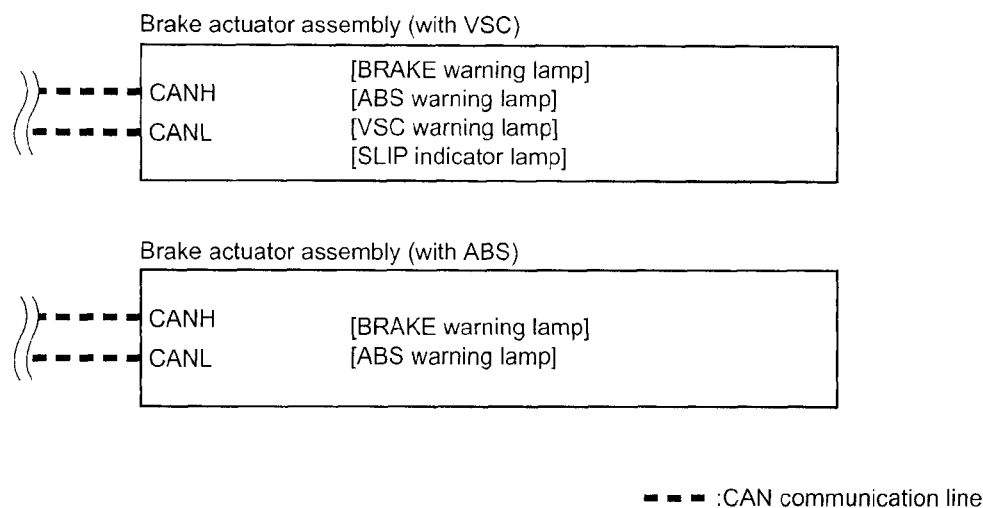
2. CAN communication input (engine control computer)



3. CAN communication input (transmission control computer assembly)



4. CAN communication input



E133541J02

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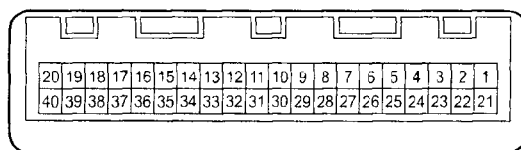
ECU TERMINAL SEQUENCE

1. Combination meter assembly

(1) Input/output signal check

(a) Using a tester, check the voltage and electrical continuity of each terminal of the wire harness connector by touching the tester rod with the terminal from the back side with the connector connected.

Combination meter assembly

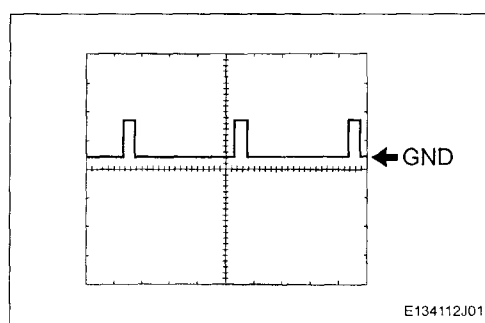


E130991J03

Terminal number (terminal symbol)	Input/output	Item	Measuring condition	Reference
1 ↔ body ground	Input	Voltage	IG OFF ↔ ON	1 V and below ↔ 11 to 14 V
2 ↔ body ground	Input	Voltage	Always	11 to 14 V
3 ↔ body ground	Input	Voltage	Engine immobilizer system SET	Pulse generated (waveform 1)
4 ↔ body ground	Input	Voltage	IG ON, OIL pressure warning extinction ↔ lighting	1 V and below ↔ 11 to 14 V
5 ↔ body ground	Input	Voltage	Turn-left indicator extinction ↔ blinking	1 V and below ↔ 11 to 14 V
6 ↔ body ground	Input	Voltage	IG ON, CHK E/G indicator lighting ↔ extinction	1 V and below ↔ 11 to 14 V
7 ↔ body ground	Input	Voltage	Turn-right indicator extinction ↔ blinking	1 V and below ↔ 11 to 14 V
8 ↔ body ground	Input	Voltage	All doors closed ↔ Any door is opened	1 V and below ↔ 11 to 14 V
10 ↔ body ground	Output	Voltage	Key switch OFF ↔ ON	1 V and below ↔ 11 to 14 V
11 ↔ body ground	Input	Voltage	Key switch OFF ↔ ON	1 V and below ↔ 11 to 14 V
12 ↔ body ground	Input	Voltage	Tail switch OFF ↔ ON	1 V and below ↔ 11 to 14 V
13 ↔ body ground	Input	Voltage	IG OFF ↔ ON (ACC)	1 V and below ↔ 11 to 14 V

Terminal number (terminal symbol)	Input/output	Item	Measuring condition	Reference
14 ↔ body ground	-	Electrical continuity	Always	With electrical continuity
16 ↔ body ground	Input	Waveform	Vehicle running at about 20 km/h	Pulse generated (waveform 2)
17 ↔ body ground	Input	Voltage	TRC OFF switch OFF ↔ ON	1 V and below ↔ 11 to 14 V
18 ↔ body ground	-	Electrical continuity	Always	With electrical continuity
21 ↔ body ground	Input	Voltage	IG ON, AIR BAG warning extinction ↔ lighting	1 V and below ↔ 10 to 12 V
23 ↔ body ground	Input	Voltage	Beam indicator extinction ↔ lighting	1 V and below ↔ 11 to 14 V
24 ↔ body ground	Input	Voltage	EPS warning indicator lighting ↔ extinction	1 V and below ↔ 11 to 14 V
25 ↔ body ground	Input	Voltage	Charge indicator lighting ↔ extinction	4 V and below ↔ 11 to 14 V
29 ↔ body ground	Input	Voltage	IG ON, rear fog lamp switch OFF ↔ ON	1 V and below ↔ 11 to 14 V
30 ↔ body ground	Input	Voltage	Beam indicator extinction ↔ lighting	1 V and below ↔ 11 to 14 V
31 ↔ body ground	Input	Voltage	IG ON, driver's seat belt attached ↔ detached	1 V and below ↔ 11 to 14 V
32 ↔ body ground	Input	Voltage	IG ON, passenger seat occupied with seat belt attached ↔ detached	1 V and below ↔ 11 to 14 V
33 ↔ body ground	Input	Voltage	Fuel F ↔ E	1 V and below ↔ 4 to 7 V
34 ↔ body ground	Input	Electrical continuity	Parking brake activated ↔ released	With ↔ without electrical continuity
35 ↔ body ground	Input	Voltage	Brake level error ↔ normal	1 V and below ↔ 11 to 14 V
36 ↔ body ground	Output	Waveform	Vehicle running at about 20 km/h	Pulse generated (waveform 2)
37 ↔ body ground	Input/output	Waveform	Engine stops, IG ON	Pulse generation
38 ↔ body ground	Input/output	Waveform	Engine stops, IG ON	Pulse generation
39 ↔ body ground	Input/output	Waveform	Engine stops, IG ON	Pulse generation
40 ↔ body ground	Input/output	Waveform	Engine stops, IG ON	Pulse generation

63

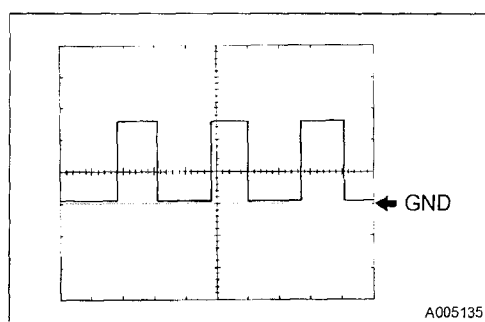


(b)Waveform 1

Item	Description
Measuring terminal	14 ↔ 7
Measuring instrument set	2.5V/DIV, 500ms/DIV
Measuring condition	Engine immobilizer system SET

<HINT>

As the vehicle speed increases, the cycle is shortened.



(c)Waveform 2

Item	Description
Measuring terminal	16 ↔ body ground 36 ↔ body ground
Measuring instrument set	5 V/DIV, 20 ms/DIV
Measuring condition	Running at about 20 km/h

<HINT>

As the vehicle speed increases, the cycle is shortened.

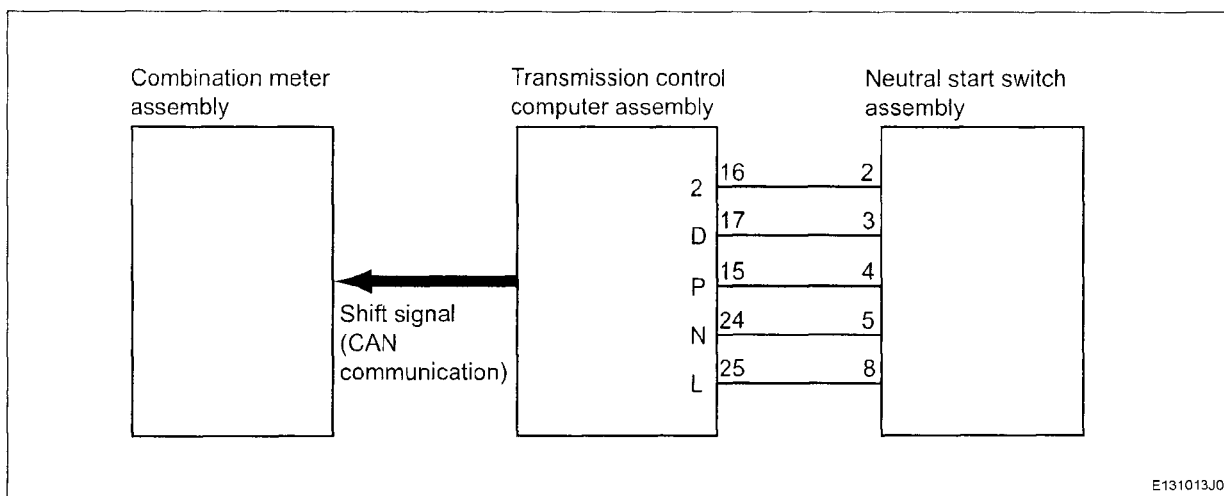
DTC	41	A/T SHIFT SIGNAL NOT RECEIVED
-----	----	-------------------------------

DTC	42	MULTIPLE A/T SHIFT SIGNAL RECEIVED
-----	----	------------------------------------

Function description

The combination meter assembly (meter ECU) receives a shift position signal from the transmission control computer assembly by CAN communication and turn on/off the shift position indicator lamp

Circuit diagram



Check Procedure

1	READING DIAGNOSTIC TROUBLE CODE
---	---------------------------------

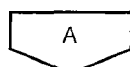
SST 09991-87403, 09991-87404

- (1) Check if a code related to CAN is not displayed as a diagnostic trouble code (See page 63-12).

Reference

Check result	Procedure
51 - 53 are not output.	To A
51 - 53 are output.	To B

B	TO CAN COMMUNICATION SYSTEM
---	-----------------------------



2	READING DIAGNOSTIC TROUBLE CODE
---	---------------------------------

- (1) Check the diagnostic trouble code related to the transmission control computer assembly by using DS-II.

Reference

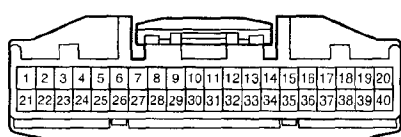
Check result	Procedure
P0705/56 is output.	To A
P0705/56 is not output.	To B

A

TROUBLESHOOT THE TRANSMISSION CONTROL
COMPUTER ASSEMBLY.

B

3

WIRE HARNESS AND CONNECTOR CHECK (COMBINATION METER ASSEMBLY - BATTERY AND
BODY GROUND)Combination meter assembly
(Wire harness side connector)

E146637J01

- (1) Disconnect the connector of the combination meter assembly.
- (2) Using a tester, check the voltage and electrical continuity between each terminal of the connector of the vehicle harness of the combination meter assembly and body ground.

Reference

Terminal number (terminal symbol)	Item	Condition	Reference
1 ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V
2 ↔ body ground	Voltage	Always	11 - 14 V
14 ↔ body ground	Electrical continuity	Always	With electrical continuity

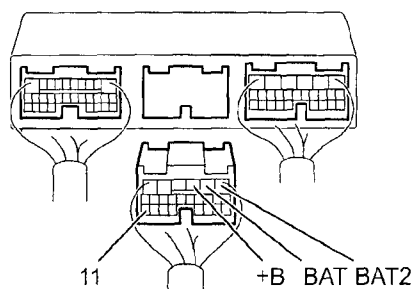
63

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS
OR THE CONNECTOR

OK

4

WIRE HARNESS AND CONNECTOR CHECK (TRANSMISSION CONTROL COMPUTER ASSEMBLY -
BATTERY AND BODY GROUND)Transmission control
computer assembly

C144262J04

- (1) Disconnect connector B of the transmission control computer assembly.
- (2) Using a tester, check the voltage and electrical continuity between terminal B of the vehicle harness of the transmission control computer assembly and body ground.

Reference

Terminal number (terminal symbol)	Item	Condition	Reference
B1 (BAT2) ↔ body ground	Voltage	Always	11 - 14 V
B2 (BAT) ↔ body ground	Voltage	Always	11 - 14 V
B3 (+B) ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V
B24 (11) ↔ body ground	Electrical continuity	Always	With electrical continuity

<CAUTION>

If the combination meter assembly is replaced, set CAN Communication Destination Information after the replacement (See page 63-13).

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS
OR THE CONNECTOR

OK

COMBINATION METER ASSEMBLY REPLACEMENT

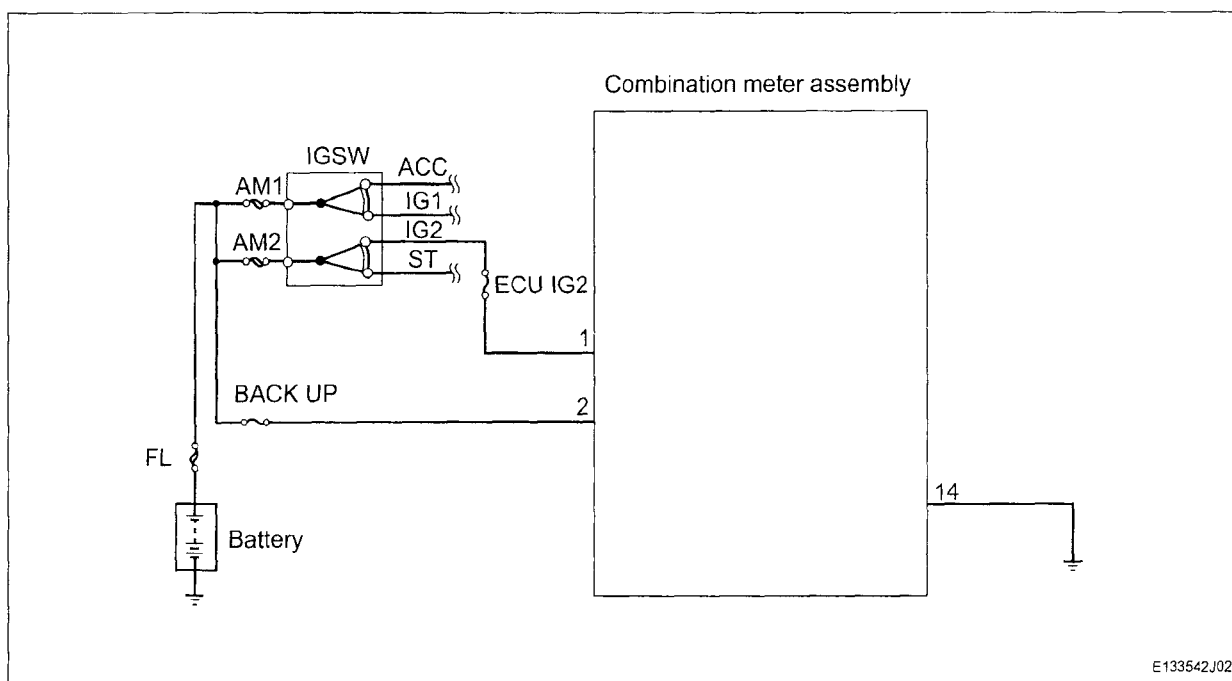
DTC	43	CAN COMMUNICATION SYSTEM CONNECTION ECU INFORMATION READOUT DISABLE
DTC	61	LOW VOLTAGE ABNORMAL

Function description

The combination meter assembly (meter ECU) cannot receive CAN communication signals from the brake actuator assembly/ transmission control computer assembly (No. 43), or cannot execute CAN communication because the IG voltage is insufficient (No. 61).

Circuit diagram

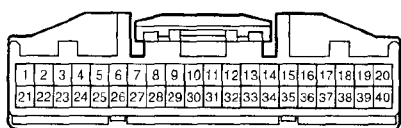
63



Check procedure

1 WIRE HARNESS AND CONNECTOR CHECK (COMBINATION METER ASSEMBLY - BATTERY AND BODY GROUND)

Combination meter assembly
(Wire haness side connector)



E146637J01

- (1) Disconnect the connector of the combination meter assembly.
- (2) Using a tester, check the voltage and electrical continuity between the connector of the vehicle harness of the combination meter assembly and body ground.

Reference

Terminal number	Item	Condition	Reference
1 ↔ body ground	Voltage	IIG OFF → ON	0 V → 11 - 14 V
2 ↔ body ground	Voltage	Always	11 - 14 V
14 ↔ body ground	Electrical continuity	Always	With electrical continuity

<CAUTION>

If the combination meter assembly is replaced, set CAN Communication Destination Information after the replacement (See page 63-13)

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS
OR THE CONNECTOR

OK

COMBINATION METER ASSEMBLY REPLACEMENT

SPEEDOMETER OPERATION FAULT

Circuit description

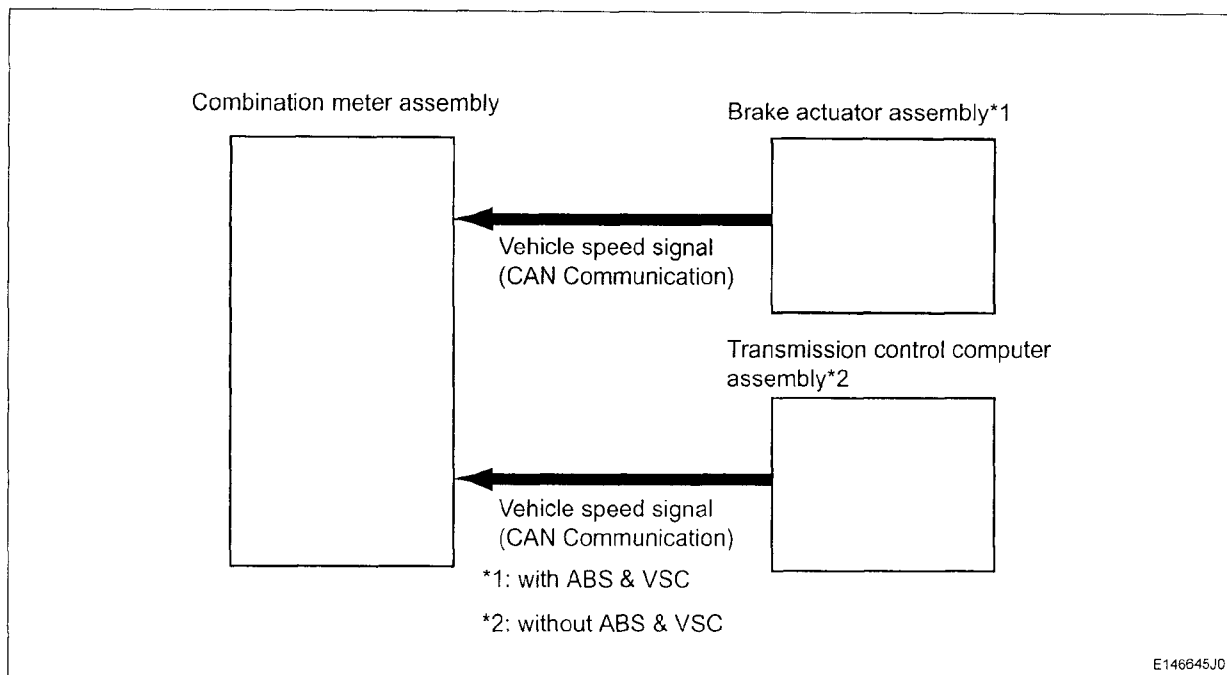
with ABS & VCS:

The combination meter assembly (meter ECU) receives vehicle speed signals from the brake actuator assembly by CAN communication, drives the pointer of the speedometer, and controls the trip meter.

without ABS & VCS:

The combination meter assembly (meter ECU) receives vehicle speed signals from the transmission control computer assembly by CAN communication, drives the pointer of the speedometer, and controls the trip meter.

Circuit diagram



Check procedure

1	READING DIAGNOSTIC TROUBLE CODE
---	---------------------------------

SST 09991-87403, 09991-87404

- (1) Check if a code related to CAN is not displayed as a diagnostic trouble code (See page 63-12)

Reference

Check result	Procedure
51 - 53 are not output.	To A
51 - 53 are output.	To B

B TO CAN COMMUNICATION SYSTEM

A

2	BRAKE CONTROL SYSTEM CHECK
---	----------------------------

- (1) Check the brake control system.

Result

Check result	Procedure
ABS/VCS installed car	To A
ABS/VCS non-installed car	To B

B TO STEP 6

A

3 READING DIAGNOSTIC TROUBLE CODE

- (1) Using DS-II, check the diagnostic trouble code concerning the brake control system.

Reference: C0200/21, C0205/2, C0210/23, C0215/24, C1235/25, C1236/26, C1237/29, or C1239/28 is not output as the diagnostic trouble code.

Check result	Procedure
Above diagnostic trouble code is not displayed.	To A
Above diagnostic trouble code is displayed.	To B

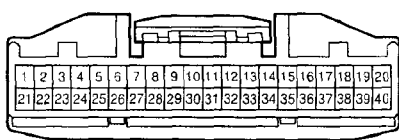
B

TROUBLESHOOT THE OUTPUT DIAGNOSTIC TROUBLE CODE.

A

4 WIRE HARNESS AND CONNECTOR CHECK (COMBINATION METER ASSEMBLY - BATTERY AND BODY GROUND)

Combination meter assembly
(Wire harness side connector)



E146637J01

- (1) Disconnect the connector of the combination meter assembly.
(2) Using a tester, check the voltage and electrical continuity between each terminal of the connector of the vehicle harness of the combination meter assembly and body ground.

Reference

Terminal symbol	Item	Condition	Reference
1 ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V
2 ↔ body ground	Voltage	Always	11 - 14 V
14 ↔ body ground	Electrical continuity	Always	With electrical continuity

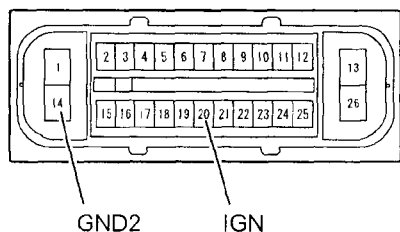
NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

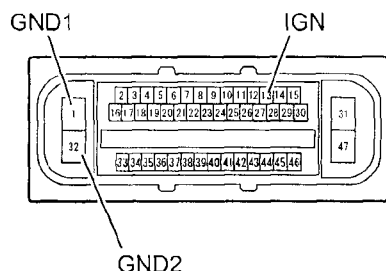
OK

5 WIRE HARNESS AND CONNECTOR CHECK (BRAKE ACTUATOR ASSEMBLY - BATTERY AND BODY GROUND)

Brake actuator assembly (with ABS)
(W/H side connector)



Brake actuator assembly (with VSC)
(W/H side connector)



E146646J01

- (1) Disconnect the connector of the brake actuator assembly.
- (2) Using a tester, check the voltage and electrical continuity between each terminal of the connector of the vehicle harness of the brake actuator assembly and body ground.

Reference
ABS installed car

Terminal number (terminal symbol)	Item	Condition	Reference
14 (GND2) ↔ body ground	Electrical continuity	Always	With electrical continuity
20 (IGN) ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V

VSC installed car

Terminal number (terminal symbol)	Item	Condition	Reference
1 (GND1) ↔ body ground	Electrical continuity	Always	With electrical continuity
32 (GND2) ↔ body ground	Electrical continuity	Always	With electrical continuity
13 (IGN) ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V

<CAUTION>

If the combination meter assembly is replaced, set CAN Communication Destination Information after the replacement (See page 63-13)

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS
OR THE CONNECTOR

OK

COMBINATION METER ASSEMBLY REPLACEMENT

6 READING DIAGNOSTIC TROUBLE CODE

- (1) Check the diagnostic trouble code related to the transmission control computer assembly by using DS-II.

Reference: Diagnostic trouble code P0720/42 is not output.

Check result	Procedure
Above diagnostic trouble code is not displayed.	To A
Above diagnostic trouble code is displayed.	BTo B

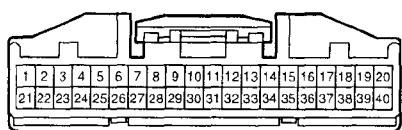
B

TROUBLESHOOT THE OUTPUT DIAGNOSTIC TROUBLE CODE

A

7 WIRE HARNESS AND CONNECTOR CHECK (COMBINATION METER ASSEMBLY - BATTERY AND BODY GROUND)

Combination meter assembly
(Wire harness side connector)



E146637J01

- (1) Disconnect the connector of the combination meter assembly.
- (2) Using a tester, check the voltage and electrical continuity between each terminal of the connector of the vehicle harness of the combination meter assembly and body ground.

Reference

Terminal number	Item	Condition	Reference
1 ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V
2 ↔ body ground	Voltage	Always	11 - 14 V
14 ↔ body ground	Electrical continuity	Always	With electrical continuity

NG

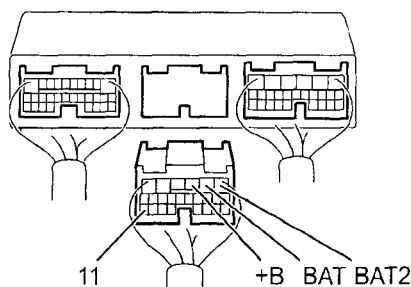
REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

63

OK

8 WIRE HARNESS AND CONNECTOR CHECK (TRANSMISSION CONTROL COMPUTER ASSEMBLY - BATTERY AND BODY GROUND)

Transmission control
computer assembly



Connector B

C144262J04

- (1) Disconnect connector B of the transmission control computer assembly.
- (2) Using a tester, check the voltage and electrical continuity between terminal B of the connector of the vehicle harness of the transmission control computer assembly and body ground.

Reference

Terminal number (terminal symbol)	Item	Condition	Reference
B1 (BAT2) ↔ body ground	Voltage	Always	11 - 14 V
B2 (BAT) ↔ body ground	Voltage	Always	11 - 14 V
B3 (+B) ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V
B24 (11) ↔ body ground	Electrical continuity	Always	With electrical continuity

<CAUTION>

If the combination meter assembly is replaced, set CAN Communication Destination Information after the replacement (See page 63-13)

NG

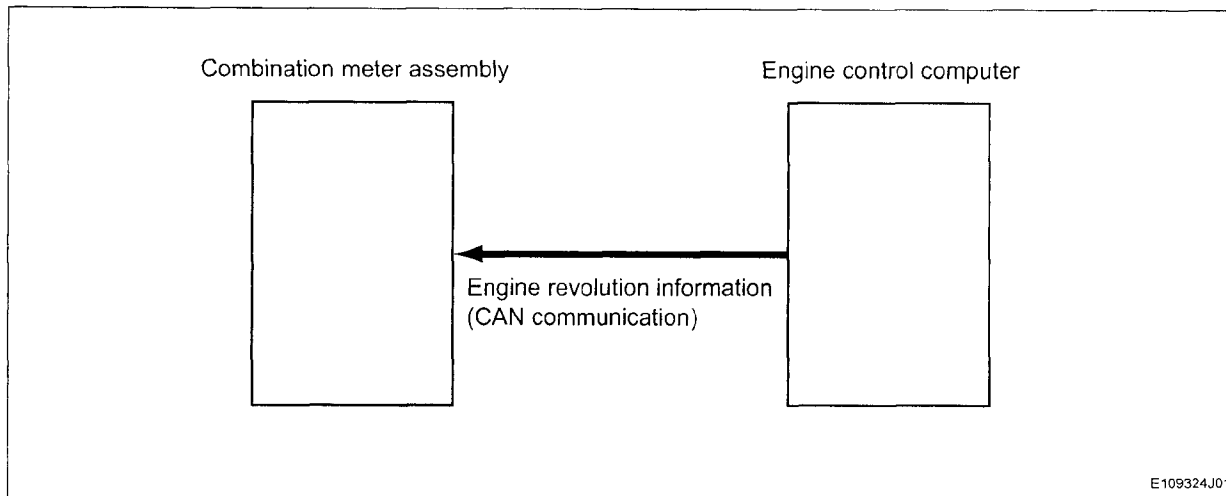
REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

OK

COMBINATION METER ASSEMBLY REPLACEMENT

TACHOMETER FAULT

Circuit diagram



63

Check procedure

1

READING DIAGNOSTIC TROUBLE CODE

SST 09991-87403, 09991-87404

- (1) Check if a code related to CAN is not displayed as a diagnostic trouble code (See page 63-12)

Check result	Procedure
51 - 53 are not output.	To A
51 - 53 are output.	To B

B

TO CAN COMMUNICATION SYSTEM

A

2

READING DIAGNOSTIC TROUBLE CODE

- (1) Using DS-II, check the diagnostic trouble code concerning the engine control computer.

Check result	Procedure
P0335/13 is not output.	To A
P0335/13 is output.	To B

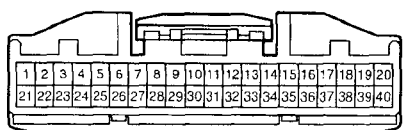
B

TO EFI SYSTEM (DIAGNOSTIC TROUBLE CODE LIST)

A

3 WIRE HARNESS AND CONNECTOR CHECK (COMBINATION METER ASSEMBLY - BATTERY AND BODY GROUND)

Combination meter assembly
(Wire harness side connector)



E146637J01

- (1) Disconnect the connector of the combination meter assembly.
- (2) Using a tester, check the voltage between power, ground terminals and body ground of the connector at the vehicle of the combination meter assembly.

Reference

Terminal number	Item	Condition	Reference
1 ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V
2 ↔ body ground	Voltage	Always	11 - 14 V
14 ↔ body ground	Electrical continuity	Always	With electrical continuity

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

OK

63

4 ENGINE CONTROL COMPUTER CHECK (POWER SYSTEM)

- (1) Check the power system of the engine control computer by using a tester (See page 06-127)

<CAUTION>

If the combination meter assembly is replaced, set CAN Communication Destination Information after the replacement (See page 63-13)

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

OK

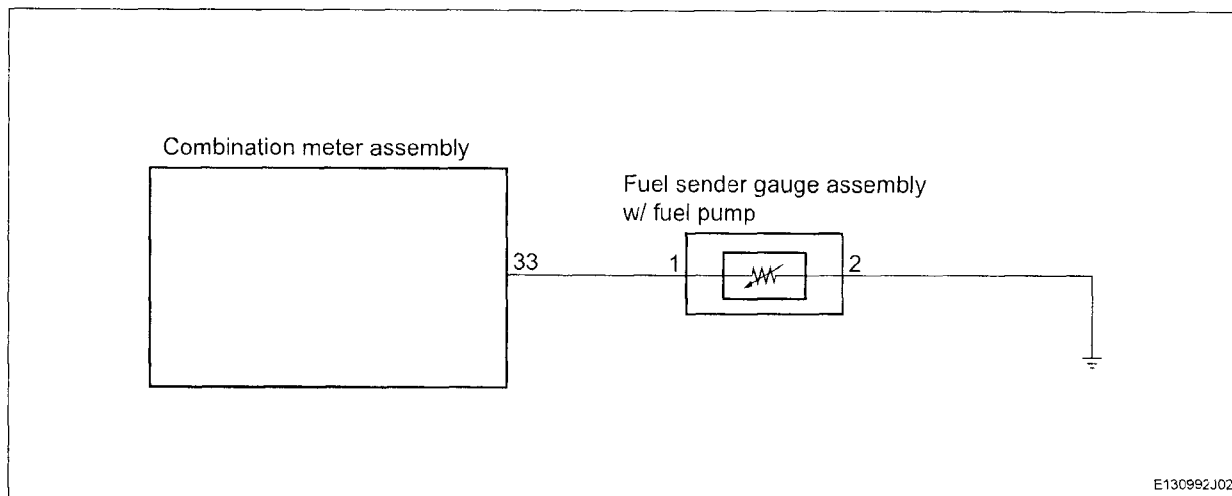
COMBINATION METER ASSEMBLY REPLACEMENT (IF NO IMPROVEMENT IS MADE, REPLACE THE ENGINE CONTROL COMPUTER.)

FUEL RECEIVER GAUGE FAULT

<HINT>

If the remaining fuel warning lamp operates normally (See page 63-4), the combination meter assembly is defective.

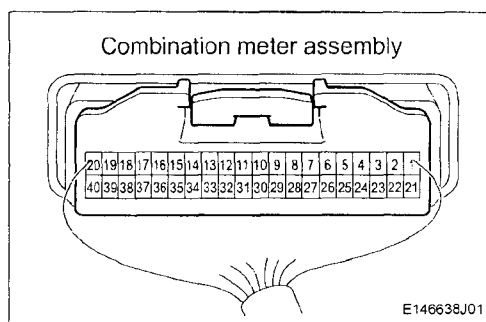
Circuit diagram



Check procedure

63

1 COMBINATION METER ASSEMBLY CHECK



- (1) Disconnect the connector of the fuel sender gauge assembly.
 - (2) Using a tester, check the voltage between terminal 33 and body ground with the connector of the combination meter assembly connected.
- Specified value

Terminal number	Check condition	Specified value
33 ↔ body ground	IG ON	11 - 14 V

<CAUTION>

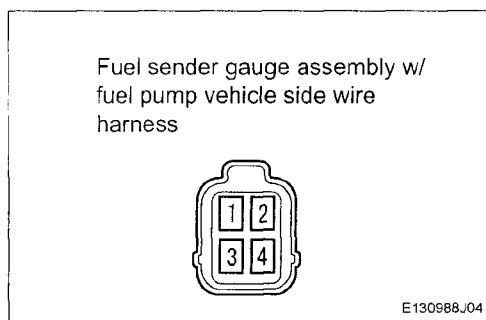
If the combination meter assembly is replaced, set CAN Communication Destination Information after the replacement (See page 63-12)

NG

COMBINATION METER ASSEMBLY REPLACEMENT

OK

2 COMBINATION METER ASSEMBLY CHECK (FUEL GAUGE)



SST 09991-87403

- (1) Disconnect the connector of the fuel sender gauge assembly.
- (2) Short-circuit between terminals 1 and 2 of the fuel sender gauge assembly.
- (3) Turn on the ignition switch and check the indication of the fuel receiver gauge.

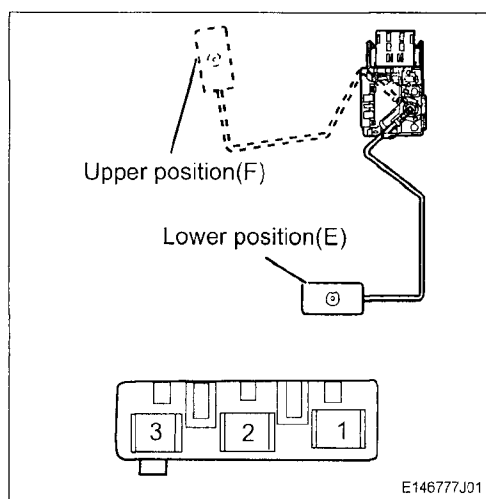
Reference: All segments, between S1 and S8, of the fuel receiver gauge light.

NG

TO STEP 4

OK

3 FUEL SENDER GAUGE ASSEMBLY UNIT CHECK



OK

(1) Resistance check

<CAUTION>

Do not get fire or flammable materials close.

- Check if the float moves smoothly.
- Using a tester, check the resistance between connector terminals 2 and 1 when the float is moved from the upper-end position (F) to the lower-end position (E) or vice versa. Also check if the resistance continuously changes.

Specified value

Terminal number	Float position	Specified value
2 ↔ 1	Upper-end position (F)	2.0 - 4.0 Ω
2 ↔ 1	Lower-end position (E)	119.0 - 121.0 Ω

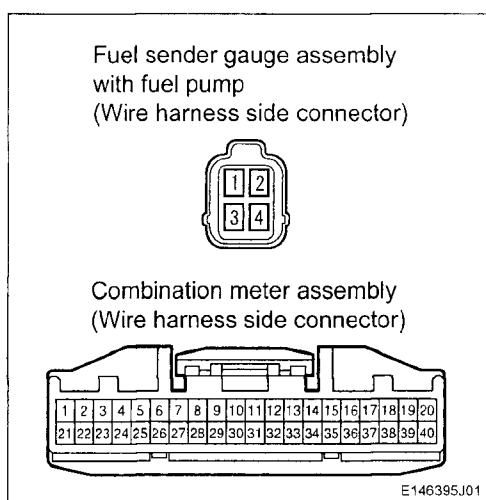
NG

FUEL SENDER GAUGE ASSEMBLY REPLACEMENT

63

NORMAL STATE RESTORATION (A TROUBLE SYMPTOM OCCURRED BECAUSE OF THE FAULTY CONTACT OF THE CONNECTOR TERMINAL BUT IT IS CONSIDERED THAT THE NORMAL STATE HAS BEEN RESTORED BY RE-CONNECTING THE CONNECTOR.)

4 WIRE HARNESS AND CONNECTOR CHECK (FUEL SENDER GAUGE ASSEMBLY - COMBINATION METER ASSEMBLY AND BODY GROUND)



- Disconnect the connectors of the combination meter assembly and fuel sender gauge assembly.
- Using a tester, check the electrical continuity between terminal 33 of the combination meter assembly and terminal 1 of the fuel sender gauge, and electrical continuity between terminal 2 of the fuel sender gauge assembly and body ground.

Reference

Terminal number (Fuel sender gauge assembly ↔ combination meter assembly)	Item	Measuring condition	Specified value
1 ↔ 33	Electrical continuity	Always	With electrical continuity

Reference

Terminal symbol (Fuel sender gauge assembly)	Item	Measuring condition	Reference
2 ↔ body ground	Electrical continuity	Always	With electrical continuity

<CAUTION>

If the combination meter assembly is replaced, set CAN Communication Destination Information after the replacement (See page 63-13)

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

OK

COMBINATION METER ASSEMBLY REPLACEMENT

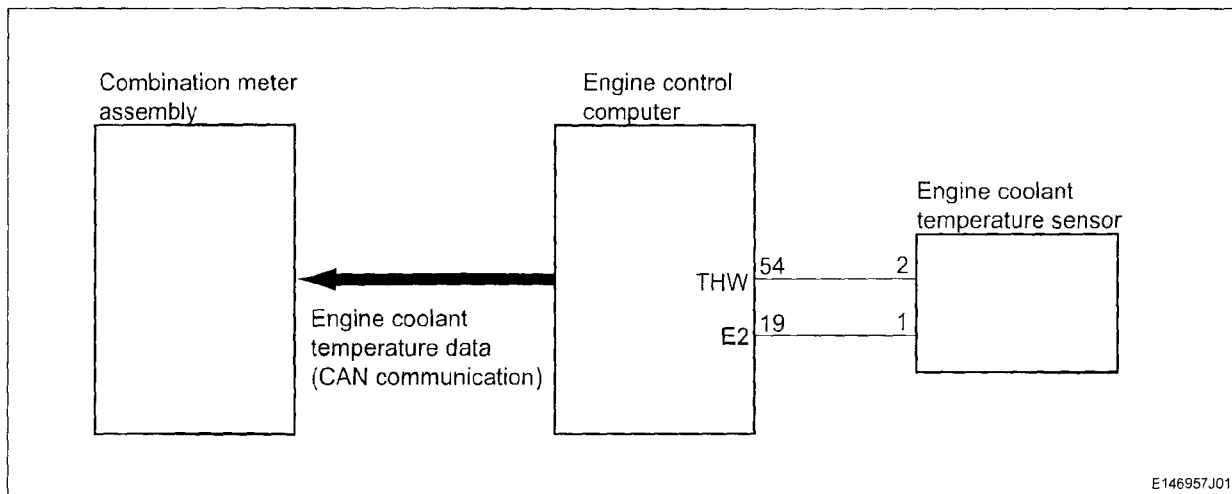
HIGH WATER TEMPERATURE WARNING LAMP AND LOW WATER TEMPERATURE INDICATOR LAMP FAULT

Function description

The combination meter assembly (meter ECU) receives signals from the engine control computer by CAN communication.

Circuit diagram

63



Check procedure

1 READING DIAGNOSTIC TROUBLE CODE

SST 09991-87403, 09991-87404

- (1) Check if a diagnostic trouble codes concerning CAN is not displayed (See page 63-12)

Reference

Check result	Procedure
51 - 53 are not output.	To A
51 - 53 are output.	To B

B

TO CAN COMMUNICATION SYSTEM

A

2 READING DIAGNOSTIC TROUBLE CODE

- (1) Using DS-II, check the diagnostic trouble code concerning the engine control computer.

Reference

Check result	Procedure
P0115/42 is output.	To A
P0115/42 is not output.	To B

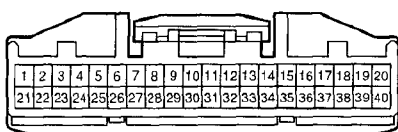
A

TO EFI SYSTEM (DIAGNOSTIC TROUBLE CODE LIST)

B

3 WIRE HARNESS AND CONNECTOR CHECK (COMBINATION METER ASSEMBLY - BATTERY AND BODY GROUND)

Combination meter assembly
(Wire harness side connector)



E146637J01

- (1) Disconnect the connector of the combination meter assembly.
(2) Using a tester, check the voltage and electrical continuity between each terminal of the connector of the vehicle harness of the combination meter assembly and body ground.

Reference

Terminal symbol	Item	Condition	Reference
1 ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V
2 ↔ body ground	Voltage	Always	11 - 14 V
14 ↔ body ground	Electrical continuity	Always	With electrical continuity

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

OK

4 ENGINE CONTROL COMPUTER CHECK (POWER SYSTEM)

- (1) By using a tester, check the electrical system of the engine control computer (See page 06-127)

<CAUTION>

If the combination meter assembly is replaced, set CAN Communication Destination Information after the replacement (See page 63-13)

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

OK

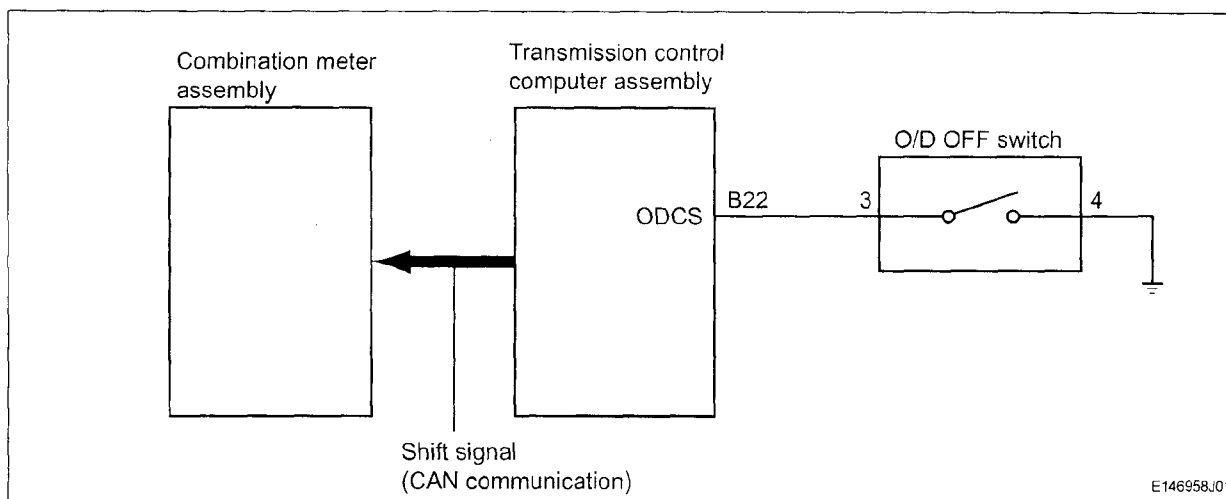
COMBINATION METER ASSEMBLY REPLACEMENT

O/D OFF INDICATOR LAMP DOES NOT LIGHT

Function description

The combination meter assembly (meter ECU) receives O/D OFF signal from the transmission control computer assembly and turns on/off the indicator lamp.

Circuit diagram



Check procedure

1 READING DIAGNOSTIC TROUBLE CODE

SST 09991-87403, 09991-87404

- (1) Check if a code related to CAN is not displayed as a diagnostic trouble code (See page 63-12)

Reference

Check result	Procedure
51 - 53 are not output.	To A
51 - 53 are output.	To B

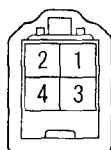
B

TO CAN COMMUNICATION SYSTEM

A

2 TRANSMISSION FLOOR SHIFT ASSEMBLY UNIT CHECK (O/D OFF SWITCH)

Transmission floor shift assembly



E146639J01

- (1) Disconnect the connector of the transmission floor shift assembly.
- (2) Using a tester, check electrical continuity between the terminals of the transmission floor shift assembly connector.

Reference

Terminal number (terminal symbol)	Condition	Reference
3 ↔ 4	O/D OFF switch OFF → ON	With → without electrical continuity

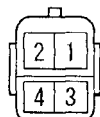
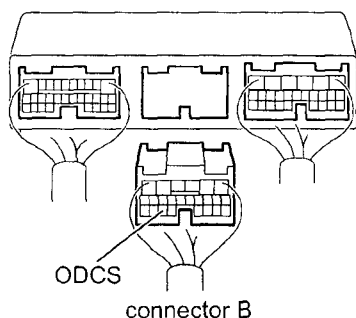
NG

TRANSMISSION FLOOR SHIFT ASSEMBLY REPLACEMENT

OK

63

3 WIRE HARNESS AND CONNECTOR CHECK (TRANSMISSION FLOOR SHIFT ASSEMBLY - TRANSMISSION CONTROL COMPUTER ASSEMBLY AND BODY GROUND)

Transmission floor shift assembly
W/H side connectorTransmission control
computer assembly

E146635J01

- (1) Disconnect the connectors of the transmission floor shift assembly and transmission control computer assembly.
- (2) Using a tester, check electrical continuity between the connector terminal of the vehicle harness of the transmission control computer assembly and between the connector terminal of the vehicle harness of the transmission floor shift assembly and body ground.

Reference

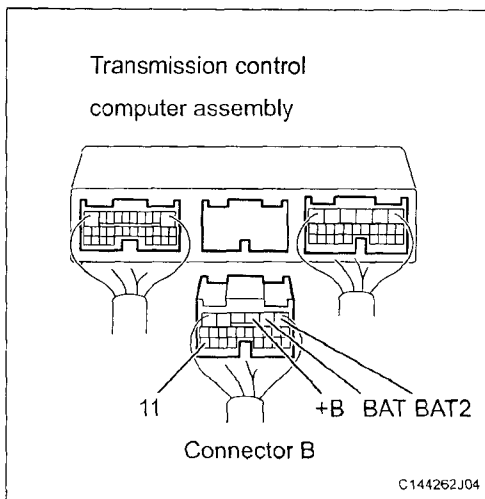
Terminal symbol (column shift lever assembly) ↔ Transmission control computer assembly	Reference
3 ↔ B22 (ODCS)	With electrical continuity
4 ↔ body ground	With electrical continuity

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

OK

4 WIRE HARNESS AND CONNECTOR CHECK (TRANSMISSION CONTROL COMPUTER ASSEMBLY - BATTERY AND BODY GROUND)



- (1) Disconnect connector B of the transmission control computer assembly.
- (2) Using a tester, check the voltage and electrical continuity between terminal B of the connector of the vehicle harness of the transmission control computer assembly and body ground.

Reference

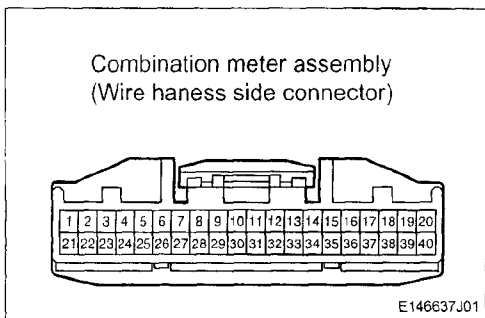
Terminal number (terminal symbol)	Item	Condition	Reference
B1 (BAT2) ↔ body ground	Voltage	Always	11 - 14 V
B2 (BAT) ↔ body ground	Voltage	Always	11 - 14 V
B3 (+B) ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V
B24 (11) ↔ body ground	Electrical continuity	Always	With electrical continuity

NG

REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

OK

5 WIRE HARNESS AND CONNECTOR CHECK (COMBINATION METER ASSEMBLY - BATTERY AND BODY GROUND)



- (1) Disconnect the connector of the combination meter assembly.
- (2) Using a tester, check the voltage and electrical continuity between each terminal of the connector of the vehicle harness of the combination meter assembly and body ground.

Reference

Terminal number (terminal symbol)	Item	Condition	Reference
1 ↔ body ground	Voltage	IG OFF → ON	0 V → 11 - 14 V
2 ↔ body ground	Voltage	Always	11 - 14 V
14 ↔ body ground	Electrical continuity	Always	With electrical continuity

<CAUTION>

If the combination meter assembly is replaced, set CAN Communication Destination Information after the replacement (See page 63-13)

NG

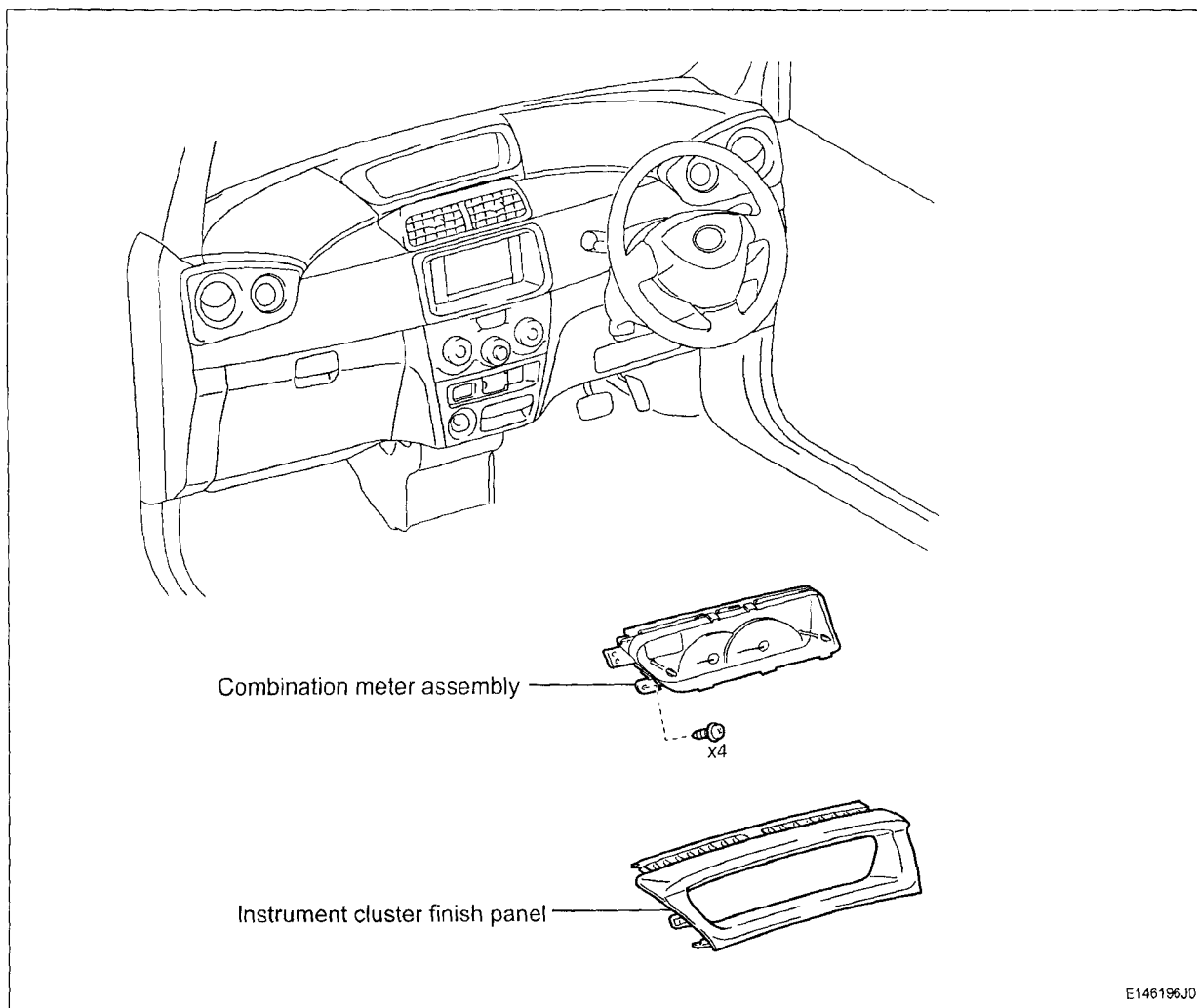
REPAIR OR REPLACEMENT OF THE WIRE HARNESS OR THE CONNECTOR

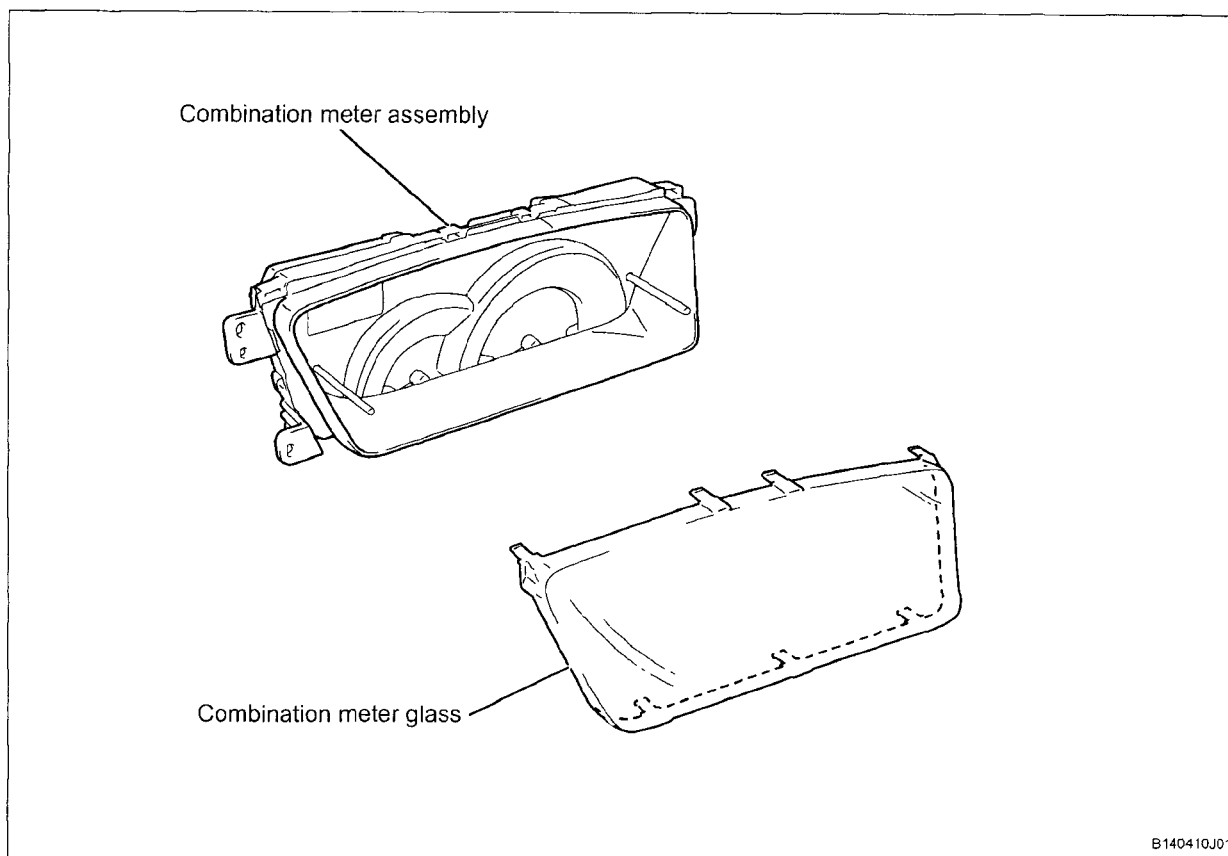
OK

COMBINATION METER ASSEMBLY REPLACEMENT

COMBINATION METER ASSEMBLY

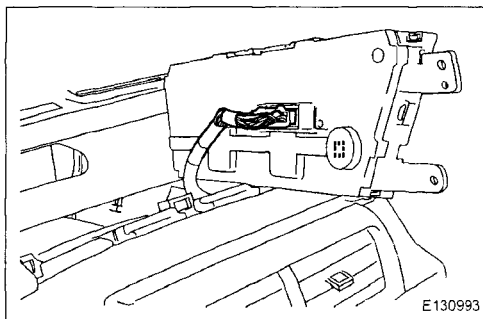
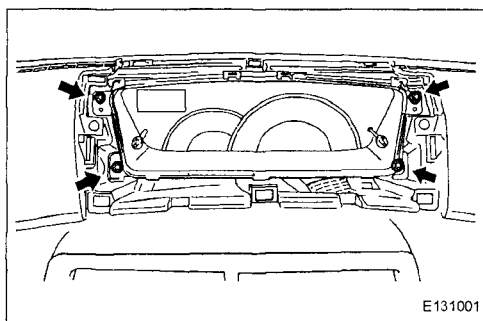
COMPONENTS





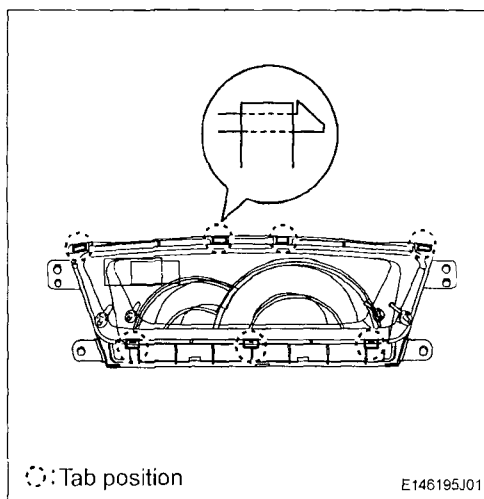
REMOVAL

1. Battery Minus Terminal Disconnection
2. Instrument cluster finish panel removal(See page78-19)
3. Combination meter assembly removal
 - (1) Remove four screws and remove the combination meter assembly by pulling it toward the rear side of the vehicle.



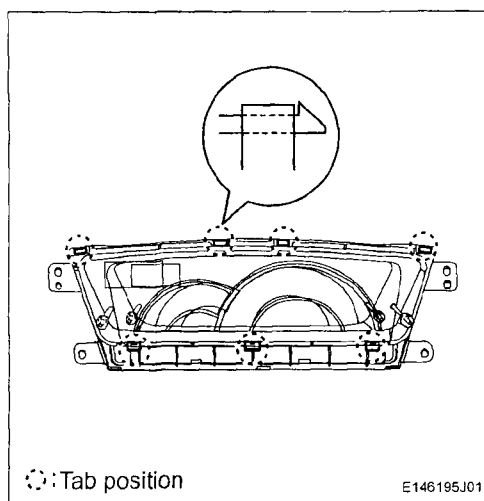
- (2) Disconnect the connector.

DISASSEMBLY



1. Combination meter glass removal
 - (1) Unfit the tab at seven places and remove the combination meter glass.

REASSEMBLY



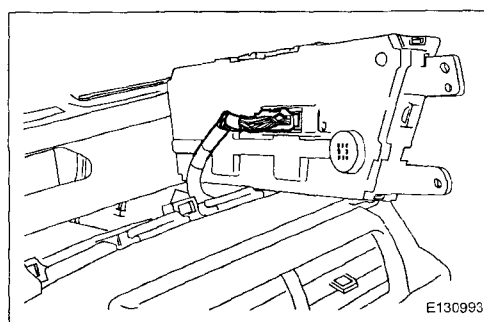
1. Combination meter glass installation
 - (1) Fit the tab at seven places and attach the combination meter glass.

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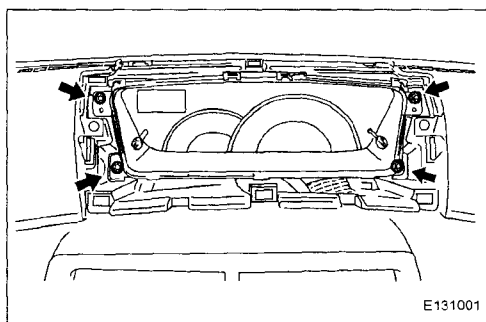
INSTALLATION

<CAUTION>

After the combination meter assembly is replaced, set CAN Communication Destination Information.(See page 63-13)



1. Combination meter assembly installation
 - (1) Connect the connector.



(2) Attach the combination meter assembly with four screws.

2. Instrument cluster finish panel installation (See page78-33)
3. Battery minus terminal connection
Specified value: $T=6.4\text{N}\cdot\text{m}$ {65kgf*cm}

ENGINE OIL PRESSURE SWITCH ASSEMBLY

ON-VEHICLE INSPECTION

1. Engine oil pressure switch assembly check

(1) Conductivity check

(a) Disconnect the connector of the engine oil pressure switch assembly.

(b) Using a tester, check electrical continuity between the engine oil pressure switch assembly terminal and body earth.

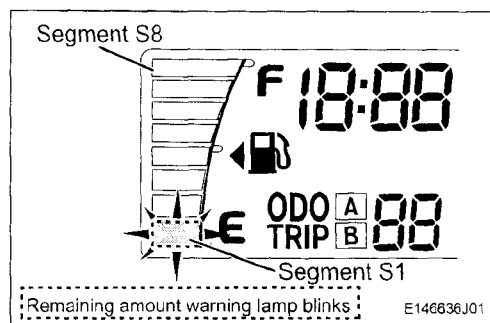
Reference:

When engine stops ...with electrical continuity

When engine is running...without electrical continuity

FUEL SENDER GAGE ASSEMBLY

ON-VEHICLE INSPECTION



1. Fuel receiver gage and warning lamp check

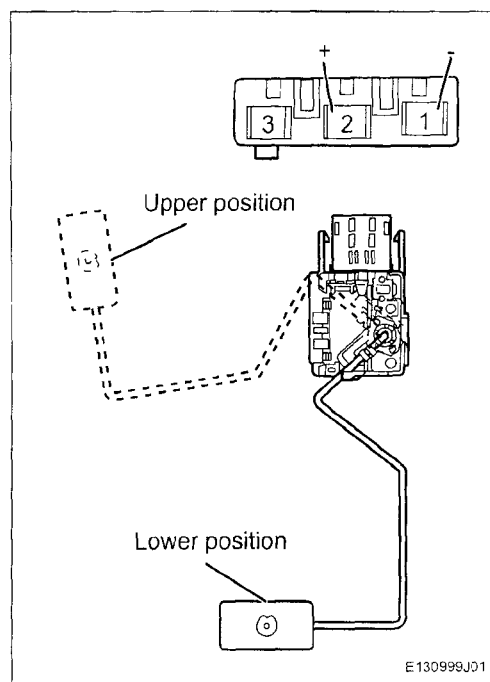
(1) Remaining fuel warning check

- (a) Check if segment S1 blinks if the remaining fuel is 17% and below of the total tank capacity when the ignition switch is on.

Specified value

Driving method	Fuel capacity	Blinking cycle
2WD	7.5 liters (17% of total tank capacity) and below	0.6 second
4WD	6.6 liters (17% of total tank capacity) and below	0.6 second

INSPECTION



1. Fuel sender gage assembly check

(1) Resistance Check

<WARNING>

Do not get fire or flammable materials close.

- (a) Check if the float moves smoothly between the F level (upper-end position) and E level (lower-end position).

- (b) Using a tester, check the resistance between connector terminals 2 (+) and 1 (-) when the float is at the upper-end position and when it is at the bottom position. Also check if the resistance continuously changes.

Specified value:

Float position	Specified value [Ω]
F (upper-end)	3.0 $\pm$ 1 Ω
E (lower-end)	120 $\pm$ 1 Ω