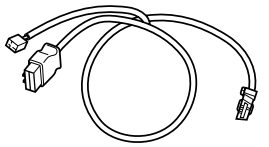
L2 MULTIPLEX COMMUNICATION SYSTEM

■ CAN COMMUNICATION SYSTEM
1 CAN COMMUNICATION SYSTEM
1-1 ARTICLES TO BE PREPARED

SST

Shape	Part No.	Part name
	09991-87403-000	Wire,diagnosis check
	09991-87404-000 (09991-87401-000)	Wire,engine control system inspection

Instrument

Electrical Tester

1-2 HANDLING INSTRUCTIONS OF CONTROL SYSTEM
1-2-1 MAINTENANCE INSTRUCTION

1.Pay attention to the following points when performing checking and maintenance of the CAN.

CAUTION

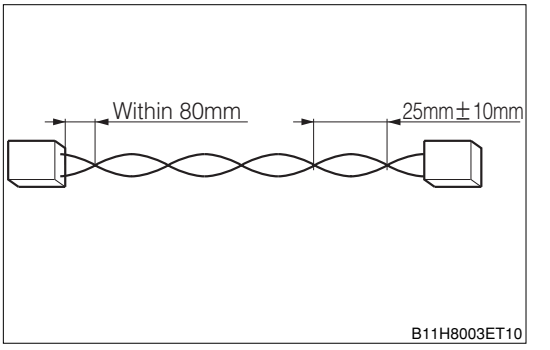
- When repairing the communication failure, perform repairing without disconnecting the negative terminal of the battery until the checking of the connection condition of the connector is finished.
- When disconnecting the negative terminal of the battery, record all of the diagnosis codes memorized.
- When performing checking and repairing of the CAN line, perform the operation after discharging the static electricity charged in the body.
- When measuring the resistance value of the CAN line, turn IG switch to "LOCK".
- There is a risk of damaging the ECU if the terminals are mistaken, when measuring the resistance within the CAN line and ECU.
- When measuring the resistance within the ECU, do not apply voltage of 7.0V or above to the measuring terminals.
- Perform measurements swiftly.

1-2-2 PRECAUTIONS DURING HARNESS REPAIR

1.Perform tape wind after soldering the repair section.

CAUTION

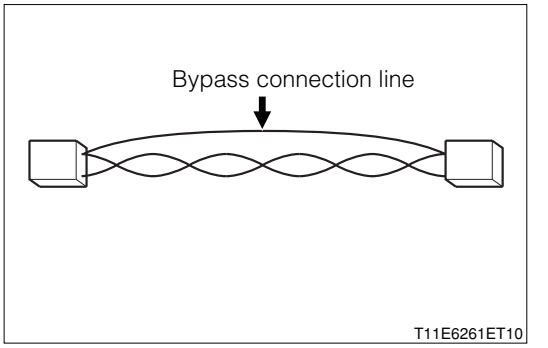
- Make sure that the bus (communication wire) is twisted when assembling. In so doing, do not make any gap between the CAN-H and CAN-L.
- Keep the difference of length of the CAN-H and CAN-L within 100 mm.
- Keep the fray of the twist of the connector connection within 80 mm.
- The pitch of the twist shall be set to 25mm±10mm.



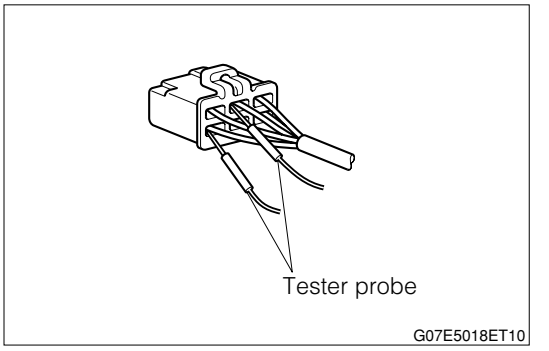
2.Do not connect the bypass wiring of the repaired section.

CAUTION

- If bypass wiring is connected, the characteristic features of the twist line will be lost.

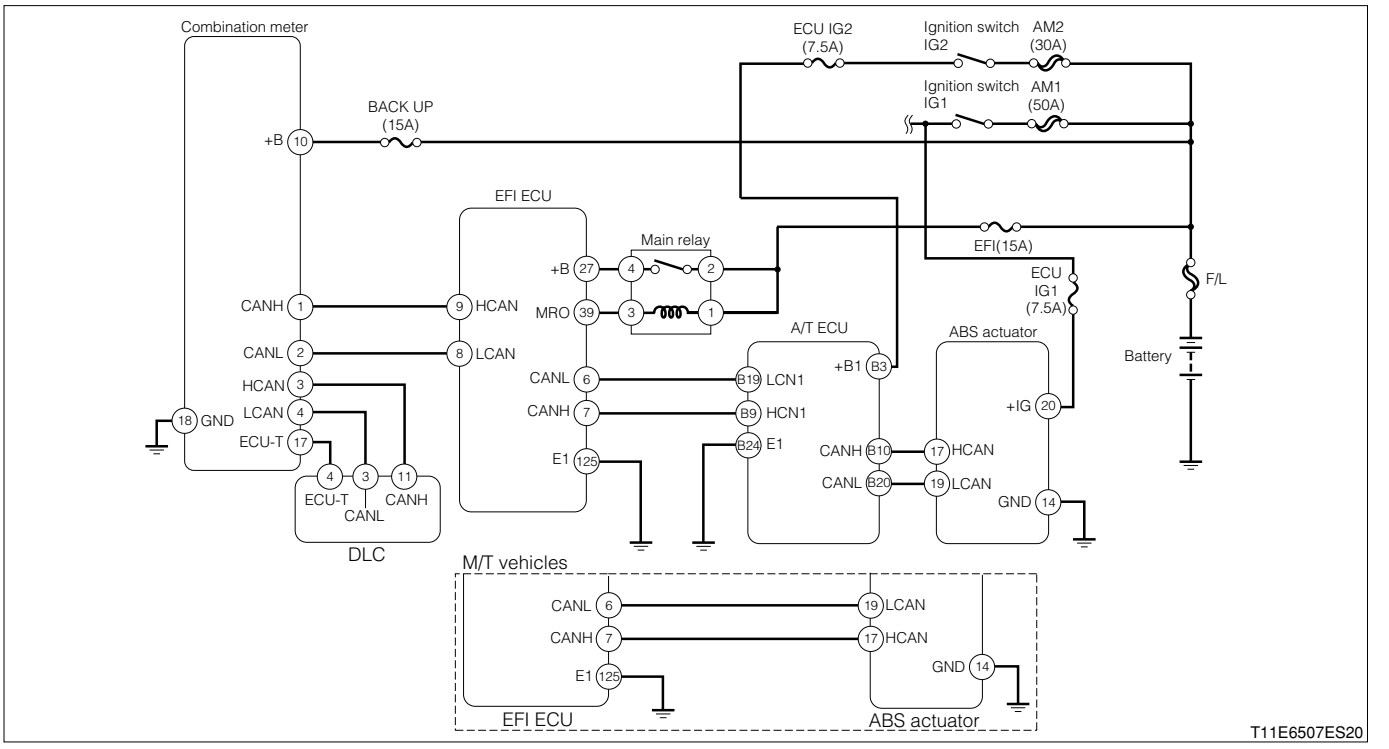


3.Generally, continuity check is performed by applying a tester from behind the connector.

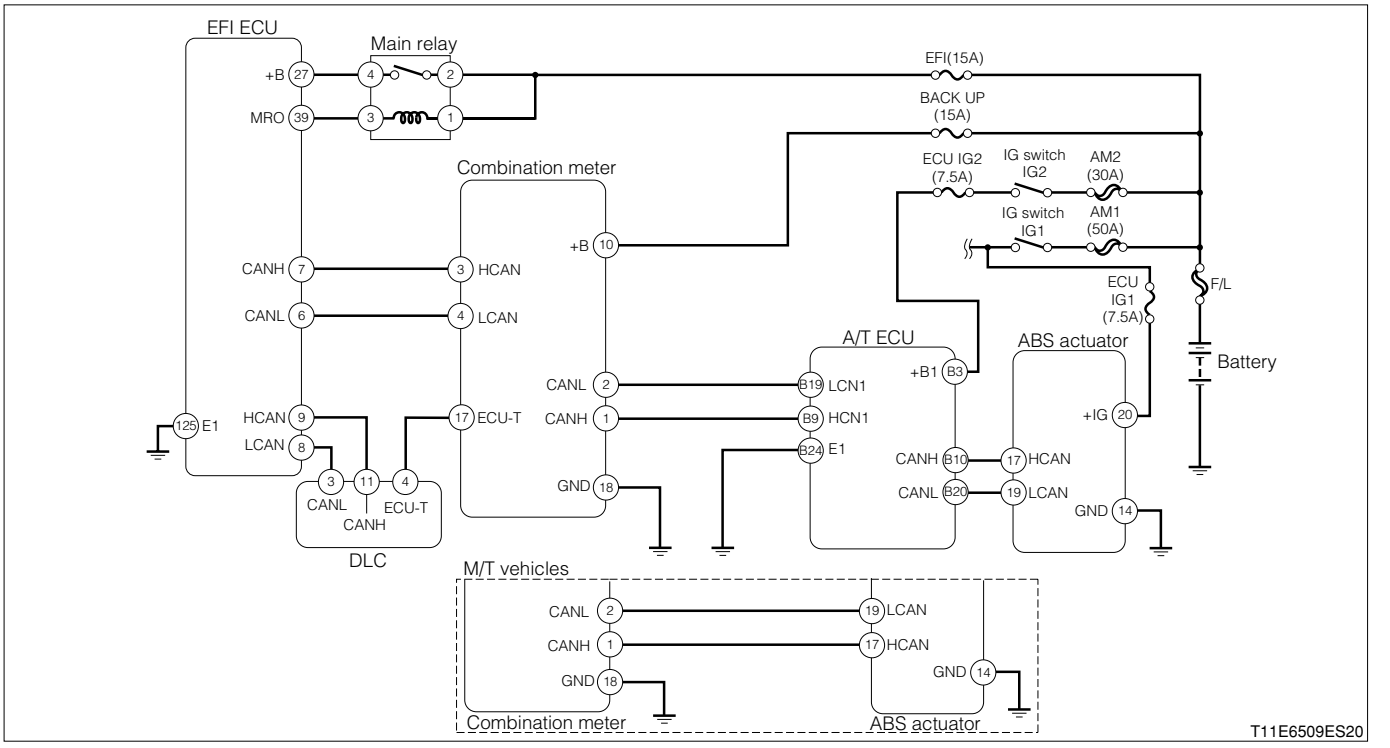


1-3 SYSTEM WIRING DIAGRAM

RHD vehicles

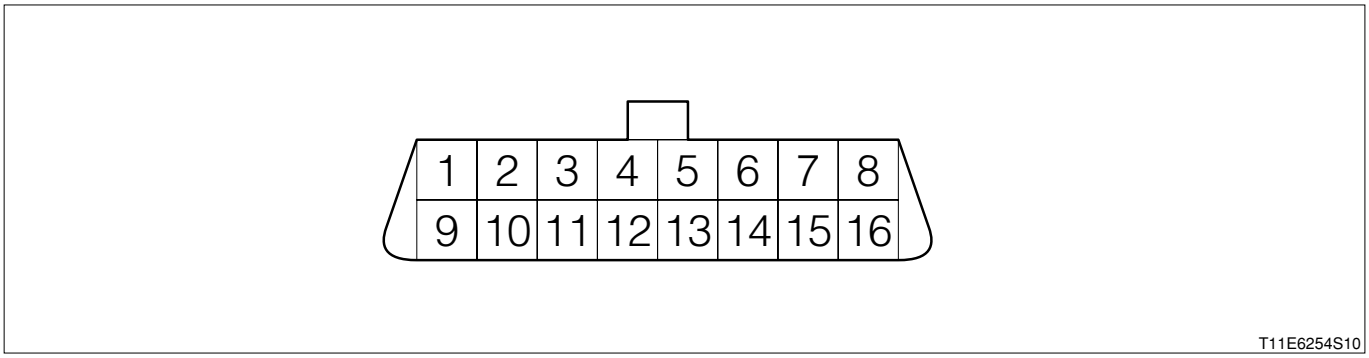


LHD vehicles



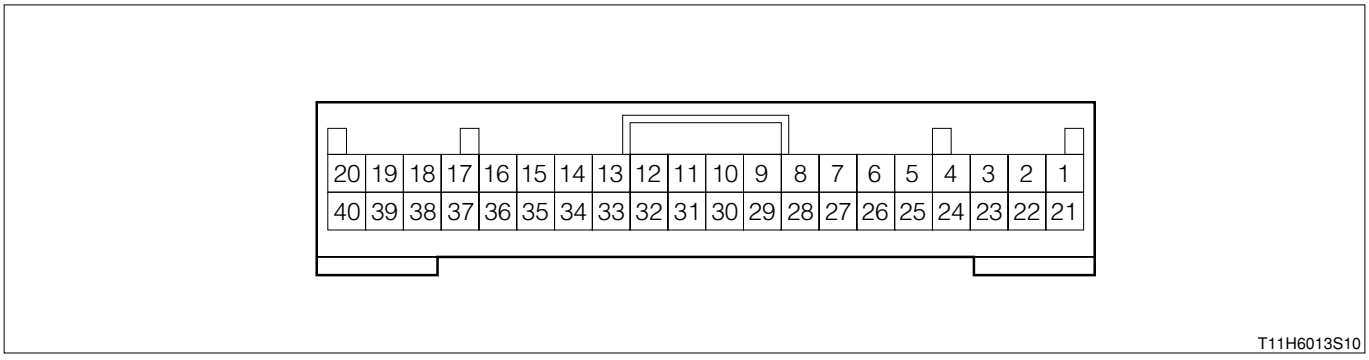
1-4 ARRANGEMENT OF ECU TERMINAL

DLC terminal arrangement diagram



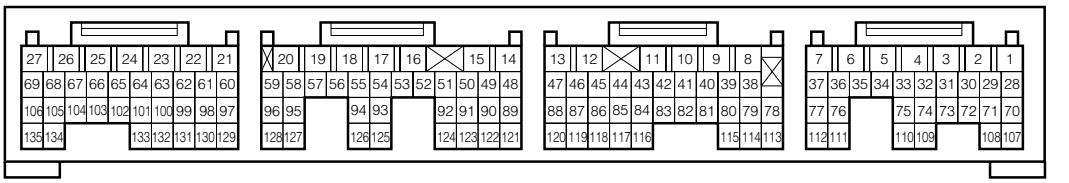
Terminal No.	Terminal code	Terminal name
3	CANL	CAN communication LO
11	CANH	CAN communication HI

Combination meter side terminal arrangement diagram



Terminal No	Terminal code	Terminal name
1	CANH	CAN communication HI (1)
2	CANL	CAN communication LO (1)
3	HCAN	CAN communication HI (2)
4	LCAN	CAN communication LO (2)
10	+B	+B power supply
18	GND	Earth

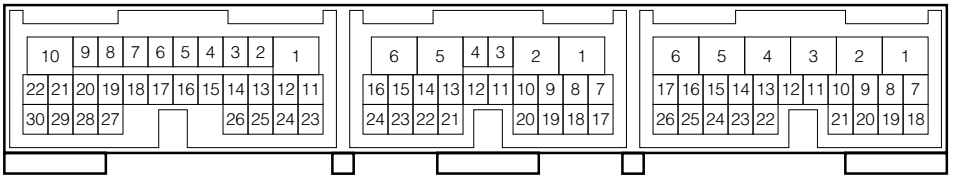
EFI ECU side terminal arrangement diagram



H11E6091S10

Terminal No	Terminal code	Terminal name
6	CANL	CAN communication LO (1)
7	CANH	CAN communication HI (1)
8	LCAN	CAN communication LO (2)
9	HCAN	CAN communication HI (2)
27	+B	EFI ECU power supply
125	E1	Computing system earth

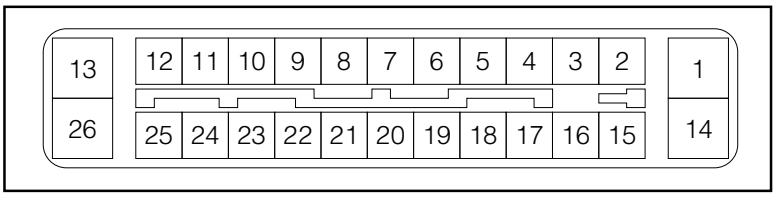
A/T ECU side terminal arrangement diagram



T11K5006S10

Terminal No	Terminal code	Terminal name
B3	+B	A/T ECU power supply
B9	HCN1	CAN communication HI (1)
B10	CANH	CAN communication HI (2)
B19	LCN1	CAN communication LO (1)
B20	CANL	CAN communication LO (2)
B24	E1	Sensor earth

ABS actuator side terminal arrangement diagram

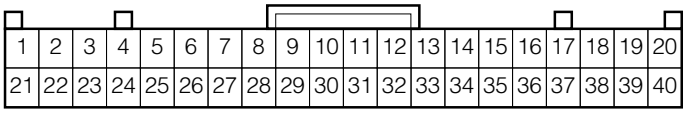


T11C5001S10

Terminal No	Terminal code	Terminal name
14	GND	Earth
17	HCAN	CAN communication HI
19	LCAN	CAN communication LO
20	+IG	IG power supply

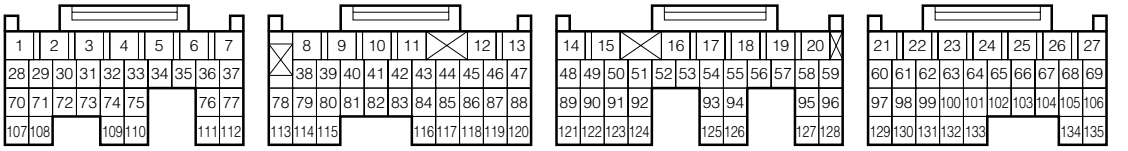
1-5 ARRANGEMENT OF VEHICLE HARNESS SIDE CONNECTOR TERMINALS

Combination meter connection vehicle harness side connector



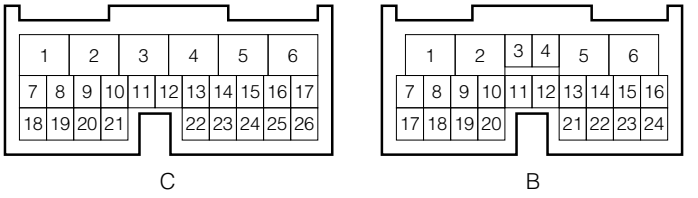
T11E6255S10

EFI ECU connection vehicle harness side connector



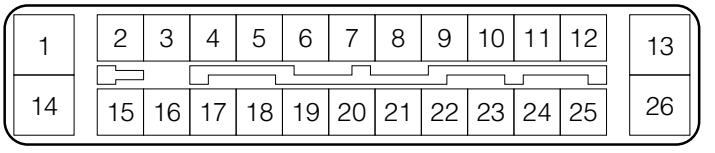
H11E6051S10

A/T ECU connection vehicle harness side connector



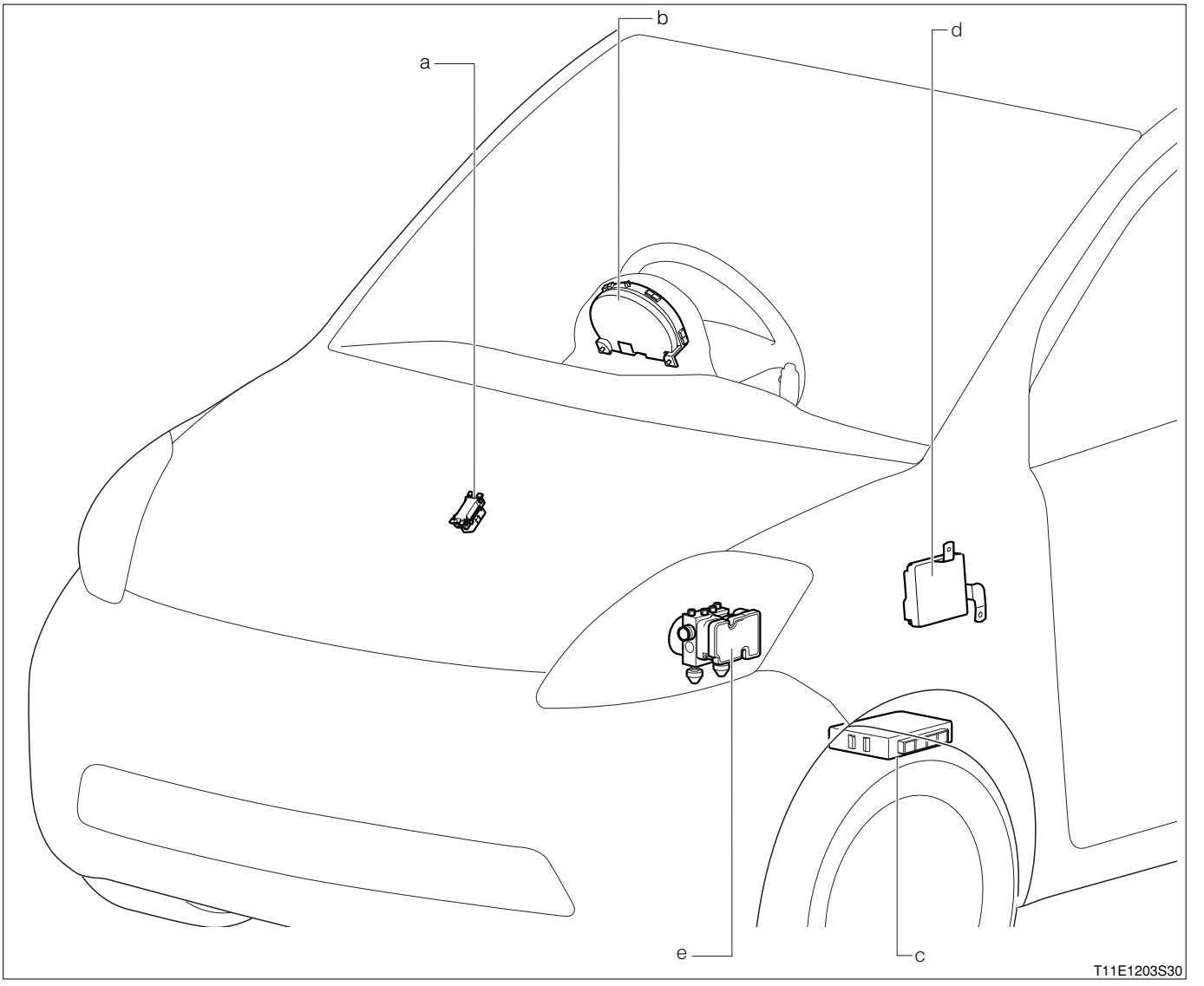
T11E6253S10

ABS actuator connection vehicle harness side connector



T11C5002S10

1-6 LOCATION OF COMPONENTS



	Part name
a	DLC
b	Combination meter (meter ECU)
c	Engine control computer (EFI ECU)
d	Transmission control computer (A/T ECU) (A/T vehicles)
e	ABS actuator (ABS ECU) (ABS-equipped vehicles)

1-7 HOW TO PROCEED WITH TROUBLE SHOOTING

1.This system incorporates diagnosis functions that will locate malfunctioning parts, thus providing a vital clue in trouble shooting.

∑1. Bringing malfunctioning vehicle to workshop

▼Go to ∑2.

∑2. Diagnosis by interview

1.Gather enough information from the customer on conditions, environment, and phenomenon in which the malfunction took place.

▼Go to ∑3.

∑3. Normal operation confirmation of the diagnosis code indication of the LCD in meter

1.Use the SST to short-circuit the DLC terminals between 4(ECU-T) - 13(E).

SST: 09991-87403-000
09991-87404-000

2.Check that the meter LCD indicates the diagnosis code (including the normal codes).

SPECIFIED VALUE: It indicates.

NOTE

- It is fine even if the codes that are not related to CAN are outputted.

▼If it is OK, proceed to ∑4.

▼If it is NG, perform following checks of the meter. Replace the meter if there are no problems.

(1) Harness check between the meter - DLC and DLC - body earth.

(2) Meter power supply system and earth system check

∑4. Confirmation and recording of diagnostic code of meter LCD (CAN related)

1.Check and record the CAN-related diagnostic code (codes 0051 - 0053) outputted on the meter LCD.

SPECIFIED VALUE: Codes 0051 - 0053 are not indicated.

▼If it is OK, proceed to ∑8.

▼If it is NG, proceed to ∑5.

∑5. Basic check

1.Perform basic check.

Refer to Page L2-14.

▼Proceed to ∑6.

∑6. Reconfirmation of diagnosis code of meter LCD (CAN related)

1.Reconfirm the diagnosis codes (codes 0051 - 0053) related to CAN indicated in the meter LCD.

SPECIFIED VALUE: Codes 0051 - 0053 are not indicated.

▼If it is OK, proceed to ∑8.

▼If it is NG, proceed to ∑7.

Σ7. Trouble shooting according to diagnosis code

1.Perform troubleshooting for the outputted diagnostic code.
Refer to Page L2-20.

▼Go to Σ8.

Σ8. Diagnosis code erasure

1.Erase the diagnosis code of the CAN communication employed system.
(1) Erasing procedures of diagnosis code of combination meter
(2) Erasing procedures of diagnosis code of EFI ECU
Refer to Page B8-36.

(3) Erasing procedures of diagnosis code of A/T ECU
Refer to Page F5-27.

(4) Erasing procedures of diagnosis code of ABS actuator
Refer to Page E3-20.

▼Proceed to Σ9.

Σ9. Reconfirmation of diagnosis code of meter LCD (CAN related)

1.Reconfirm the diagnosis codes (codes 0051 - 0053) related to CAN indicated in the meter LCD.
SPECIFIED VALUE: Codes 0051 - 0053 are not indicated.

▼If it is OK, proceed to Σ10.
▼If it is NG, proceed to Σ5 for a recheck.

Σ10. Confirmation test

1.Ensure that the problem that the customer described has been completely corrected and the operation is back to normal.
▼If it is OK, finish the trouble shooting.
▼In the case of NG, go back to Σ3 for a recheck.

1-8 INQUIRY

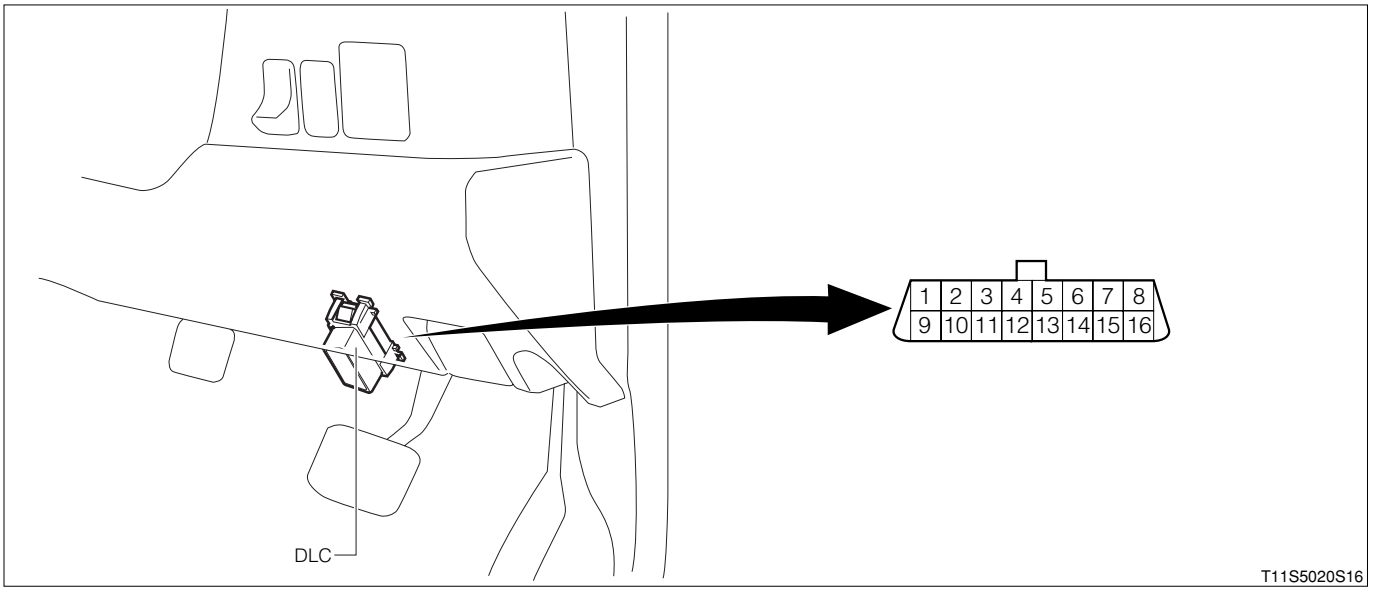
1.In an effort to remove causes for malfunction from the vehicle concerned, it is impossible to determine the cause without confirming the malfunction phenomenon. If the phenomenon is not confirmed, the vehicle may not be able to return to the normal conditions even if you continue your work. The diagnosis through interviews is to collect information from the customer before confirming the malfunction phenomena. The diagnosis through interviews provides very important clues in reproducing malfunction phenomena.
2.Since the information obtained by the diagnosis through interviews is referred to during the trouble shooting, it is imperative to make an inquiry of the customer, centering on the items related to the malfunction, instead of simply asking general questions.

1-9 CONFIRMATION, RECORD AND ERASURE OF DIAGNOSIS CODE

1.The diagnostic code remains displayed as long as the communication failure exists, and will be erased when the communication is back to the normal state. It is necessary, therefore, to record diagnostic codes before removing the battery negative (-) terminal.

1-9-1 CHECKING METHOD OF DIAGNOSIS

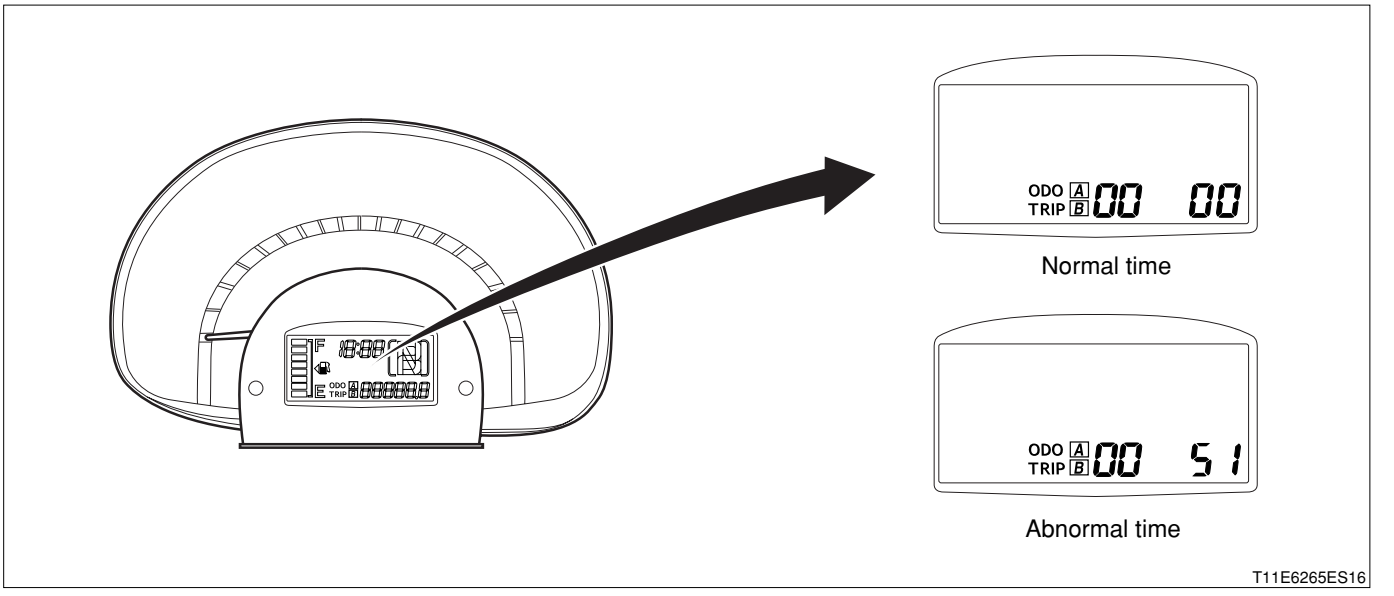
1.Stop the vehicle.
2.Turn IG switch to "LOCK".
3.Short the terminals 4 (ECU-T) and 13 (E) of DLC, using SST.
SST: 09991-87403-000
09991-87404-000



CAUTION

- Do not mistake the connection position of the connectors since it may cause malfunction.

4.Turn ON the IG switch and read the diagnosis code indicated in figures on the meter LCD.



NOTE

- Other than the diagnosis codes related to the CAN communication system, diagnosis codes of the Immobilizer system, meter, LIN communication system are also indicated on the meter LCD.
- When plural codes are to be outputted, they are outputted, starting from a smaller code number. Furthermore, when one cycle of indications is completed, these codes are repeatedly outputted at intervals of four seconds.

1-9-2 CANCELING METHOD OF DIAGNOSIS

1.There are following two ways to erase diagnostic codes.

(1) The communication error diagnosis code will be erased automatically when the communication problem has been solved.

(2) Turn the IG switch to "LOCK"

1-9-3 CONTENTS OF DIAGNOSIS

Code No.		Warning indication (Provided: ○, Not provided: ×)	(Provided: ○, Not provided: ×)	Contents of diagnosis
LCD	4-digit			
0	–	×	×	Normal
51	–	×	×	Communication failure with EFI ECU
52	–	×	×	Communication failure with A/T ECU
53	–	×	×	Communication failure with ABS ECU

NOTE

- The meter LCD displays diagnosis codes for the meter, and LIN communication system, in addition to those for the CAN communication system.

Meter (0041 - 0041, 0061)

Refer to Page J3-14.

LIN communication system (0011 - 0021)

Refer to Page L2-44.

1-10 BASIC CHECK

∑1. CAN line resistance value check

1.Measure the resistance value between the following terminals.

(1) Between DLC3 (CANL) - DLC11 (CANH)

SPECIFIED VALUE: 55 - 65Ω

NOTE

- When the wires between DLC3 (CANL) - DLC11 (CANH) are short circuited, the resistance value is about 0Ω.
  When the CAN line has open wire between the combination meter - EFI ECU, the resistance value is about 120Ω.

Measured value	SPECIFICATIONS	Judgment
In the case of OK	—	a
If the reading is 55Ω or below.	RHD vehicles	b
	LHD vehicles	c
If the reading is 65Ω or above.	RHD vehicles	d
	LHD vehicles	e

▼In case of a, proceed to ∑6.
▼In case of b, proceed to ∑2.
▼In case of c, proceed to ∑3.
▼In case of d, proceed to ∑4.
▼In case of e, proceed to ∑5.

∑2. Short-circuit check with CAN line (RHD vehicles)

1.Perform checking of the harness and connectors between the following terminals.

(1) Between DLC3 (CANL) - combination meter connection vehicle harness side connector 4 (LCAN)

(2) Between DLC11 (CANH) - combination meter connection vehicle harness side connector 3 (HCAN)

(3) Between combination meter connection vehicle harness side connector 1 (CANH) - EFI ECU connection vehicle harness side connector 9 (HCAN)

(4) Between combination meter connection vehicle harness side connector 2 (CANL) - EFI ECU connection vehicle harness side connector 8 (LCAN)

2.Check the harness and connector between the following terminals on the A/T vehicle.

(1) Between EFI ECU connection vehicle harness side connector 6 (CANL) - A/T ECU connection vehicle harness side connector B19 (LCN1)

(2) Between EFI ECU connection vehicle harness side connector 7 (CANH) - A/T ECU connection vehicle harness side connector B9 (HCN1)

(3) Between A/T ECU connection vehicle harness side connector B10 (CANH) - ABS actuator connection vehicle harness side connector 17 (HCAN)

(4) Between A/T ECU connection vehicle harness side connector B20 (CANL) - ABS actuator connection vehicle harness side connector 19 (LCAN)

3.Check the harness and connector between the following terminals on the M/T vehicle.

(1) Between EFI ECU connection vehicle harness side connector 6 (CANL) 14 (GND) ABS actuator connection vehicle harness side connector 19 (LCAN)

(2) Between EFI ECU connection vehicle harness side connector 7 (CANH) - ABS actuator connection vehicle harness side connector 17 (HCAN)

⊃3. Check of CAN line for short-circuit (LHD vehicles)

1.Perform checking of the harness and connectors between the following terminals.
(1) Between DLC3 (CANL) - combination meter connection vehicle harness side connector 4 (LCAN)
(2) Between DLC11 (CANH) - combination meter connection vehicle harness side connector 9 (HCAN)
(3) Between EFI ECU connection vehicle harness side connector 6 (CANL) - combination meter connection vehicle harness side connector 4 (LCAN)
(4) Between EFI ECU connection vehicle harness side connector 7 (CANH) - combination meter connection vehicle harness side connector 3 (HCAN)

2.Check the harness and the connector between the following terminals on the A/T vehicle.
(1) Between combination meter connection vehicle harness side connector 1 (CANH) - A/T ECU connection vehicle harness side connector B9 (HCN1)
(2) Between combination meter connection vehicle harness side connector 2 (CANL) - A/T ECU connection vehicle harness side connector B19 (LCN1)
(3) Between A/T ECU connection vehicle harness side connector B10 (CANH) - ABS actuator connection vehicle harness side connector 19 (LCAN)
(4) Between A/T ECU connection vehicle harness side connector B20 (CANL) - ABS actuator connection vehicle harness side connector 19 (LCAN)

3.Check the harness and the connector between the following terminals on the M/T vehicle.
(1) Between combination meter connection vehicle harness side connector 1 (CANH) - ABS actuator connection vehicle harness side connector 19 (LCAN)
(2) Between combination meter connection vehicle harness side connector 2 (CANL) - ABS actuator connection vehicle harness side connector 19 (LCAN)

⊃4. Check of CAN line for open wire (RHD vehicles)

1.Perform checking of the harness and connectors between the following terminals.
(1) Between DLC3 (CANL) - combination meter connection vehicle harness side connector 4 (LCAN)
(2) Between DLC11 (CANH) - combination meter connection vehicle harness side connector 3 (HCAN)
(3) Between combination meter connection vehicle harness side connector 1 (CANH) - EFI ECU connection vehicle harness side connector 9 (HCAN)
(4) Between combination meter connection vehicle harness side connector 2 (CANL) - EFI ECU connection vehicle harness side connector 8 (LCAN)

⊃5. Check of CAN line for open wire (LHD vehicls)

1.Check the harness and the connector between the following terminals.
(1) Between DLC3 (CANL) - EFI ECU connection vehicle harness side connector 8 (LCAN)
(2) Between DLC11 (CANH) - EFI ECU connection vehicle harness side connector 9 (HCAN)
(3) Between EFI ECU connection vehicle harness side connector 6 (CANL) - combination meter connection vehicle harness side connector 4 (LCAN)
(4) Between EFI ECU connection vehicle harness side connector 7 (CANH) - combination meter connection vehicle harness side connector 3 (HCAN)

⊳6. Check of CAN line for short-circuit

1.Perform continuity check between the following terminals.0252
(1) Between DLC3 (CANL) - battery positive (+) terminal
(2) Between DLC11 (CANH) - battery positive (+) terminal
(3) Between DLC3 (CANL) - body earth
(4) Between DLC11 (CANH) - body earth
SPECIFIED VALUE: No continuity exists.

▼If it is OK, proceed to ⊳7.
▼If it is NG, repair or replace the malfunctioning sections

⊳7. Connector connection check

1.Check the connecting conditions of the connectors in the following sections.
NOTE
• Check connectors especially for loosening or half fit.

(1) DLC
(2) Combination meter
(3) EFI ECU
(4) A/T ECU
(5) ABS actuator
SPECIFIED VALUE: No failure exists.

▼If it is OK, proceed to ⊳8.
▼If it is NG, repair or replace the malfunctioning sections.

⊳8. Connector condition check

1.Turn IG switch to "LOCK".
2.Disconnect the negative terminal of the battery.
NOTE
• Record the diagnosis codes of all the systems before disconnecting the negative terminal of the battery.

3.Disconnect all the connectors of the ECU of the CAN communication employed system.
4.Perform the following checks for the ECU connection vehicle harness side connector of the CAN communication employed system and the DLC connector and each terminal.
(1) Falling off
(2) Bend
(3) Poor fit
SPECIFIED VALUE: No failure exists.

▼If it is OK and the vehicle is a RHD vehicle, go to ⊳9.
▼If it is OK and the vehicle is a LHD vehicle, go to ⊳10.
▼If it is NG, repair or replace the malfunctioning sections.

⊃9. Harness check (RHD vehicles)

1.Disconnect all the connectors of the combination meter, EFI ECU, A/T ECU and ABS actuator.
2.Perform continuity check between the following terminals.
(1) Between DLC3 (CANL) - combination meter connection vehicle harness side connector 4 (LCAN)
(2) Between DLC11 (CANH) - combination meter connection vehicle harness side connector 3 (HCAN)
(3) Between combination meter connection vehicle harness side connector 1 (CANH) - EFI ECU connection vehicle harness side connector 9 (HCAN)
(4) Between combination meter connection vehicle harness side connector 2 (CANL) - EFI ECU connection vehicle harness side connector 8 (LCAN)
3.Check continuity between the following terminals on the A/T vehicle.
(1) Between EFI ECU connection vehicle harness side connector 6 (CANL) - A/T ECU connection vehicle harness side connector B19 (LCN1)
(2) Between EFI ECU connection vehicle harness side connector 7 (CANH) - A/T ECU connection vehicle harness side connector B9 (HCN1)
(3) Between A/T ECU connection vehicle harness side connector B10 (CANH) - ABS actuator connection vehicle harness side connector 17 (HCAN)
(4) Between A/T ECU connection vehicle harness side connector B20 (CANL) - ABS actuator connection vehicle harness side connector 19 (LCAN)
4.Check continuity between the following terminals on the M/T vehicle.
(1) Between EFI ECU connection vehicle harness side connector 6 (CANL) - ABS actuator connection vehicle harness side connector 19 (LCAN)
(2) Between EFI ECU connection vehicle harness side connector 7 (CANH) - ABS actuator connection vehicle harness side connector 19 (LCAN)

SPECIFIED VALUE: Continuity exists.

▼If it is OK, proceed to ⊃11.
▼If it is NG, repair or replace the malfunctioning sections.

⊃10. Wire harness check (LHD vehicle)

1.Remove all the connectors on the EFI ECU, combination meter, A/T ECU, and ABS actuator.
2.Check continuity between the following terminals.
(1) Between DLC3 (CANL) - EFI ECU connection vehicle harness side connector 8 (LCAN)
(2) Between DLC4 (HCAN) - EFI ECU connection vehicle harness side connector 9 (HCAN)
(3) Between EFI ECU connection vehicle harness side connector 6 (CANL) - combination meter connection vehicle harness side connector 4 (LCAN)
(4) Between EFI ECU connection vehicle harness side connector 7 (CANH) - combination meter connection vehicle harness side connector 3 (HCAN)
3.Check continuity between the following terminals on the A/T vehicle.
(1) Between combination meter connection vehicle harness side connector 1 (CANH) - A/T ECU connection vehicle harness side connector B9 (HCN1)
(2) Between combination meter connection vehicle harness side connector 2 (CANL) - A/T ECU connection vehicle harness side connector B19 (LCN1)
(3) Between A/T ECU connection vehicle harness side connector B10 (CANH) - ABS actuator connection vehicle harness side connector 17 (HCN1)
(4) Between A/T ECU connection vehicle harness side connector B20 (CANL) - ABS actuator connection vehicle harness side connector 19 (LCAN)

4.Check continuity between the following terminals on the M/T vehicle.
(1) Between combination meter connection vehicle harness side connector 1 (CANH) - ABS actuator connection vehicle harness side connector 17 (HCAN)
(2) Between combination meter connection vehicle harness side connector 2 (CANL) - ABS actuator connection vehicle harness side connector 19 (LCAN)
SPECIFIED VALUE: Continuity exists

▼If it is OK, go to ⊳11.
▼In the case of NG, repair or replace the malfunctioning sections.

⊳11. Combination meter voltage check
1.Connect the connectors of the EFI ECU and A/T ECU.
NOTE
• When connecting, connect so that there are no half fit connectors.

2.Turn "ON"the IG switch.
3.Measure the voltage between the following terminals.
(1) Between combination meter connection vehicle harness side connector 10 (+B) - body earth
SPECIFIED VALUE: Battery voltage

▼If it is OK, proceed to ⊳12.
▼If it is NG, check the power supply system of the combination meter.

⊳12. Combination meter earth check
1.Turn the IG switch to "LOCK".
2.Perform continuity check between the following terminals.
(1) Between combination meter connection vehicle harness side connector 18 (GND) - body earth
SPECIFIED VALUE: Continuity exists.

▼If it is OK, proceed to ⊳13.
▼If it is NG, repair or replace the malfunctioning section.

⊳13. ECU power supply voltage check
1.Turn "ON" the IG switch.
2.Measure the voltage between the terminals of the CAN communication employed system.
(1) Between EFI ECU connection vehicle harness side connector 27 (+B) - body earth
(2) Between A/T ECU connection vehicle harness side connector B3 (+B) - body earth
(3) Between ABS actuator connection vehicle harness side connector 20 (+IG) - body earth
SPECIFIED VALUE: Battery voltage

▼If it is OK, proceed to ⊳14.
▼If it is NG, repair or replace the malfunctioning section.

⊳14. ECU earth check

1.Turn the IG switch to "LOCK".

2.Perform continuity check between the terminals of the CAN communication employed system.

(1) Between EFI ECU connection vehicle harness side connector 125 (E1) - body earth

(2) Between A/T ECU connection vehicle harness side connector B24 (E1) - body earth

(3) Between ABS actuator connection vehicle harness side connector 14 (GND) - body earth

SPECIFIED VALUE: Continuity exists

▼If it is OK, perform circuit check of each ECU.

▼If it is NG, repair or replace the malfunctioning section.

1-11 TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

1-11-1 NO.0051 (EFI ECU COMMUNICATION FAILURE)

(1) Output conditions

1.When the CAN communication (meter reception) between the combination meter - EFI ECU has been disrupted for 12 seconds or more.

(2) Checking points

1.Is the harness between the combination meter - EFI ECU normal?
2.Is there any abnormality in the connectors of the EFI ECU?
3.Is the combination meter normal?
4.Is the EFI ECU normal?

(3) Checking method

Σ>1. Diagnosis code confirmation

1.Check if the diagnosis codes related to CAN are outputted in the meter LCD.

▼If No.0052 is outputted simultaneously, refer to the trouble shooting of "No.0051, No.0052 simultaneous output".
Refer to Page L2-28.

▼If No.0053 is outputted simultaneously, refer to the trouble shooting of "No.0051, No.0053 simultaneous output".
Refer to Page L2-31.

▼If No.0052 and No.0053 are outputted simultaneously, refer to the trouble shooting of "No.0051, No.0052 and No.0053 simultaneous output".
Refer to Page L2-35.

▼If only No.0051 is output, proceed to Σ>2.

Σ>2. CAN basic check

1.Perform basic check of CAN.
Refer to Page L2-14.

▼Proceed to Σ>3.

Σ>3. EFI ECU internal resistance check

1.Disconnect all connectors of the EFI ECU.
2.Measure the resistance value between the following terminals.
(1) Between EFI ECU side connector 6 (CANL) - EFI ECU side connector 7 (CANH)
(2) Between EFI ECU side connector 8 (LCAN) - EFI ECU side connector 9 (HCAN)
SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to Σ>4.
▼If it is NG, replace the EFI ECU.

⊃4. Combination meter internal resistance check

1.Disconnect all the connectors of the combination meter.

2.Measure the resistance value between the following terminals.

(1) Between combination meter side connector 1 (CANH) - combination meter side connector 2 (CANL)

(2) Between combination meter side connector 3 (HCAN) - combination meter side connector 4 (LCAN)

SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, perform circuit check of the combination meter and the EFI ECU.

▼If it is NG, replace the combination meter.

1-11-2 NO.0052 (A/T ECU COMMUNICATION FAILURE)

(1) Output conditions

1.When the CAN communication (meter reception) between the combination meter - A/T ECU has been disrupted for 12 seconds or more.

(2) Checking points

1.Is the harness between the EFI ECU - A/T ECU normal (RHD vehicle)?
2.Is the harness between the combination meter - A/T ECU normal (LHD vehicle)?
3.Is the harness between the A/T ECU - ABS ECU normal?
4.Is there any abnormality in the connectors of the A/T ECU?
5.Is the ABS ECU normal?
6.Is the A/T ECU normal?
7.Is the ABS actuator normal?

(3) Checking method

Σ>1. Diagnosis code confirmation

1.Check if the diagnosis codes related to CAN are outputted in the meter LCD.

▼If No.0051 is outputted simultaneously, refer to the trouble shooting of "No.0051, No.0052 simultaneous output".

Refer to Page L2-28.

▼If No.0053 is outputted simultaneously, refer to the trouble shooting of "No.0052, No.0053 simultaneous output".

Refer to Page L2-33.

▼If No.0051 and No.0053 are outputted simultaneously, refer to the trouble shooting of "No.0051, No.0052 and No.0053 simultaneous output".

Refer to Page L2-35.

▼If only No.0052 is outputted, proceed to Σ>2.

Σ>2. CAN basic check

1.Perform basic check of CAN.

Refer to Page L2-14.

▼If the vehicle is RHD, go to Σ>3.
▼If the vehicle is LHD, go to Σ>4.

Σ>3. Short-circuit check between CAN lines (RHD vehicles)

1.Turn IG switch to "LOCK".
2.Disconnect the negative terminal of the battery.
3.Disconnect all connectors of the EFI ECU and A/T ECU.
4.Perform continuity check between the following terminals.
(1) Between EFI ECU connection vehicle harness side connector 6 (CANL) - EFI ECU connection vehicle harness side connector 7 (CANH)
(2) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - A/T ECU connection vehicle harness side connector B19 (LCN1)

SPECIFIED VALUE: No continuity exists.

▼If it is OK, proceed to Σ>5.
▼If it is NG, repair or replace the malfunctioning section.

∑4. Short-circuit check between CAN lines (LHD vehicles)

1.Set the IG switch to LOCK.
2.Remove the battery negative (-) terminal.
3.Remove all the connectors on the combination meter and the A/T ECU.
4.Check for continuity between the following terminals.
(1) Between combination meter connection vehicle harness side connector 1 (CANH) - combination meter connection vehicle harness side connector 2 (CANL)
(2) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - A/T ECU connection vehicle harness side connector B19 (LCN1)
SPECIFIED VALUE: No continuity exists

▼If it is OK, go to ∑5.
▼In the case of NG, repair or replace the malfunctioning sections.

∑5. CAN line short-circuit check

1.Perform continuity check between the following terminals.
(1) Between A/T ECU connection vehicle harness side connector B19 (LCN1) - battery positive (+) terminal
(2) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - battery positive (+) terminal
(3) Between A/T ECU connection vehicle harness side connector B19 (LCN1) - body earth
(4) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - body earth
SPECIFIED VALUE: No continuity exists.

▼If it is OK, proceed to ∑6.
▼If it is NG, repair or replace the malfunctioning section.

∑6. EFI ECU internal resistance check

1.Disconnect all the connectors of the EFI ECU.
2.Measure the resistance value between the following terminals.
(1) Between EFI ECU side connector 6 (CANL) - EFI ECU side connector 7 (CANH)
(2) Between EFI ECU side connector 8 (LCAN) - EFI ECU side connector 9 (HCAN)
SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to ∑7.
▼If it is NG, replace the EFI ECU.

∑7. Combination meter internal resistance check

1.Disconnect the connectors of the combination meter.
2.Measure the resistance value between the following terminals.
(1) Between combination meter side connector 1 (CANH) - combination meter side connector 2 (CANL)
(2) Between combination meter side connector 3 (HCAN) - combination meter side connector 4 (LCAN)
SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to ∑8.
▼If it is NG, replace the combination meter.

⊳8. A/T ECU internal circuit check

1.Disconnect all the connectors of the A/T ECU.

2.Perform continuity check between the following terminals.

(1) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B19 (LCN1)

(2) Between A/T ECU side connector B10 (CANH) - A/T ECU side connector B20 (CANL)

(3) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B10 (CANH)

(4) Between A/T ECU side connector B19 (LCN1) - A/T ECU side connector B20 (CANL)

SPECIFIED VALUE:

Between measured terminals	Continuity
Between B9 (HCN1) - B19 (LCN1)	Continuity exists (less than 1MΩ)
Between B10 (CANH) - B20 (CANL)	
Between B9 (HCN1) - B10 (CANH)	Continuity exists (1Ω or less)
Between B19 (LCN1) - B20 (CANL)	

▼If everything is OK, perform circuit check of the EFI ECU, the A/T ECU and the combination meter.

▼If even one of them is NG, replace the A/T ECU.

1-11-3 NO.0053 (ABS ECU COMMUNICATION FAILURE)

(1) Output conditions

1.When the CAN communication (meter reception) between the combination meter - ABS actuator has been disrupted for 12 seconds or more.

(2) Checking points

① Right hand drive vehicles

1.Is the harness between the EFI ECU - A/T ECU normal?
2.Is the harness between the A/T ECU - ABS ECU normal? (A/T vehicles)
3.Is the harness between EFI ECU - ABS ECU normal? (M/T vehicle).
4.Is there any abnormality in the connectors of the A/T ECU?
5.Is there any abnormality in the connectors of the ABS ECU?
6.Is the A/T ECU normal?
7.Is the ABS ECU normal?

② Left hand drive vehicles

1.Is the harness between the combination meter and A/T ECU normal?
2.Is the harness between A/T ECU - ABS ECU normal? (A/T vehicle).
3.Is the harness between the combination meter and ABS ECU normal? (M/T vehicle).
4.Is the A/T ECU connector normal?
5.Is the ABS ECU connector normal?
6.Is the A/T ECU normal?
7.Is the ABS ECU normal?

(3) Checking method

Σ>1. Diagnosis code confirmation

1.Check if the diagnosis codes related to CAN are outputted in the meter LCD.

▼If No.0051 is outputted simultaneously, refer to the trouble shooting of "No.0051, No.0053 simultaneous output".

Refer to Page L2-31.

▼If No.0052 is outputted simultaneously, refer to the trouble shooting of "No.0052, No.0053 simultaneous output".

Refer to Page L2-33.

▼If No.0051 and No.0052 are outputted simultaneously, refer to the trouble shooting of "No.0051, No.0052 and No.0053 simultaneous output".

Refer to Page L2-35.

▼If only No.0053 is outputted, proceed to Σ>2.

Σ>2. CAN basic check

1.Perform basic check of CAN.

Refer to Page L2-14.

▼Proceed to Σ>3.

Σ3. Short-circuit check between CAN lines

1.Turn IG switch to "LOCK".
2.Disconnect the negative terminal of the battery.
3.Disconnect all connectors of the EFI ECU, A/T ECU and ABS actuator.
4.Perform continuity check between the following terminals.
(1) Between EFI ECU connection vehicle harness side connector 6 (CANL) - EFI ECU connection vehicle harness side connector 7 (CANH)
(2) Between ABS actuator connection vehicle harness side connector 17 (HCAN) - ABS actuator connection vehicle harness side connector 19 (LCAN)
5.Check for continuity between the following terminals on the A/T vehicle.
(1) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - A/T ECU connection vehicle harness side connector B19 (LCN1)
(2) Between A/T ECU connection vehicle harness side connector B10 (CANH) - A/T ECU connection vehicle harness side connector B20 (CANL)
SPECIFIED VALUE: No continuity exists.

▼If it is OK, proceed to Σ4.
▼If it is NG, repair or replace the malfunctioning section.

Σ4. CAN line short-circuit check

1.Perform continuity check between the following terminals.
(1) Between ABS actuator connection vehicle harness side connector 17 (HCAN) - battery positive (+) terminal
(2) Between ABS actuator connection vehicle harness side connector 19 (LCAN) - battery positive (+) terminal
(3) Between ABS actuator connection vehicle harness side connector 17 HCAN) - body earth
(4) Between ABS actuator connection vehicle harness side connector 19 (LCAN) - body earth
SPECIFIED VALUE: No continuity exists.

▼If it is OK, proceed to Σ5.
▼If it is NG, repair or replace the malfunctioning section.

Σ5. EFI ECU internal resistance check

1.Disconnect all the connectors of the EFI ECU.
2.Measure the resistance value between the following terminals.
(1) Between EFI ECU side connector 6 (CANL) - EFI ECU side connector 7 (CANH)
(2) Between EFI ECU side connector 8 (LCAN) - EFI ECU side connector 9 (HCAN)
SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to Σ6.
▼If it is NG, replace the EFI ECU.

∑6. Combination meter internal resistance check

1.Disconnect the connectors of the combination meter.
2.Measure the resistance value between the following terminals.
(1) Between combination meter side connector 1 (CANH) - combination meter side connector 2 (CANL)
(2) Between combination meter side connector 3 (HCAN) - combination meter side connector 4 (LCAN)
SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to ∑7.
▼If it is NG, replace the combination meter.

∑7. ABS actuator internal circuit check

1.Disconnect the connectors of the ABS actuator.
2.Perform continuity check between the following terminals.
(1) Between ABS actuator side connector 17 (HCAN) - ABS actuator side connector 19 (LCAN)
SPECIFIED VALUE: Continuity exists (less than 1MΩ)

▼If it is OK, proceed to ∑8.
▼If it is OK and the vehicle is a M/T vehicle, check circuits of the EFI ECU, ABS actuator, and combination meter.
Refer to Page A1-24.

▼If it is NG, replace the ABS actuator.
Refer to Page E3-1.

∑8. A/T ECU internal circuit check

1.Disconnect all the connectors of the A/T ECU.
2.Perform continuity check between the following terminals.
(1) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B19 (LCN1)
(2) Between A/T ECU side connector B10 (CANH) - A/T ECU side connector B20 (CANL)
(3) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B10 (CANH)
(4) Between A/T ECU side connector B19 (LCN1) - A/T ECU side connector B20 (CANL)
SPECIFIED VALUE:

Between measured terminals	Continuity
Between B9 (HCN1) - B19 (LCN1)	Continuity exists (less than 1MΩ)
Between B10 (CANH) - B20 (CANL)	
Between B9 (HCN1) - B10 (CANH)	Continuity exists (1Ω or less)
Between B19 (LCN1) - B20 (CANL)	

▼If everything is OK, perform circuit check of the EFI ECU, the A/T ECU, the ABS actuator and the combination meter.
▼If even one of them is NG, replace the A/T ECU.

1-11-4 NO.0051, NO.0052 SIMULTANEOUS OUTPUT

(1) Checking points

1.Is the EFI ECU normal?
2.Is the A/T ECU normal?
3.Is the harness between the combination meter - EFI ECU normal?
4.Is the harness between the EFI ECU - A/T ECU normal? (RHD vehicles)
5.Is the harness between the A/T ECU - ABS actuator normal? (ABS-equipped vehicles)
6.Is the harness between the combination meter - DLC normal? (RHD vehicles)
7.Is the harness between the A/T ECU - combination meter normal? (LHD vehicles)
8.Is the harness between the EFI ECU - DLC normal? (LHD vehicles)

(2) Checking method

Σ>1. CAN basic check

1.Perform basic check of CAN.
Refer to Page L2-14.

▼In the case of vehicles not equipped with ABS, proceed to Σ>2.
▼In the case of vehicles equipped with ABS, proceed to Σ>5.

Σ>2. Short-circuit check between CAN lines

1.Turn IG switch to "LOCK".
2.Disconnect the negative terminal of the battery.
3.Disconnect all the connectors of the combination meter, the EFI ECU, the A/T ECU.
4.In the case of RHD vehicles, perform continuity check between the following terminals.
(1) Between combination meter connection vehicle harness side connector 3 (HCAN) - combination connection vehicle harness side connector 4 (LCAN)
(2) Between EFI ECU connection vehicle harness side connector 6 (CANL) - EFI ECU connection vehicle harness side connector 7 (CANH)
5.In the case of LHD vehicles, perform continuity check between the following terminals.
(1) Between combination meter connection vehicle harness side connector 1 (CANH) - combination connection vehicle harness side connector 2 (CANL)
(2) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - A/T ECU connection vehicle harness side connector B19 (LCN1)
SPECIFIED VALUE: No continuity exists.

▼If it is OK, proceed to Σ>3.
▼If it is NG, repair or replace the malfunctioning section.

Σ>3. CAN line earth side short-circuit check

1.Perform continuity check between the following terminals.
(1) Between combination meter connection vehicle harness side connector 1 (CANH) - body earth terminal
(2) Between combination meter connection vehicle harness side connector 2 (CANL) - body earth terminal
(3) Between EFI ECU connection vehicle harness side connector 6 (CANL) - body earth terminal
(4) Between A/T ECU connection vehicle harness side connector 7 (CANH) - body earth terminal
SPECIFIED VALUE: Continuity exists.

▼If it is OK, proceed to Σ>4.
▼If it is NG, repair or replace the malfunctioning section.

∑4. CAN line +B side short-circuit check

1.Perform continuity check between the following terminals.

(1) Between combination meter connection vehicle harness side connector 1 (CANH) - battery positive (+) terminal

(2) Between combination meter connection vehicle harness side connector 2 (CANL) - battery positive (+) terminal

(3) Between A/T ECU connection vehicle harness side connector B19 (LCN1) - battery positive (+) terminal

(4) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - battery positive (+) terminal

SPECIFIED VALUE: Continuity exists.

▼If it is OK, proceed to ∑5.

▼If it is NG, repair or replace the malfunctioning section.

∑5. EFI ECU internal resistance check

1.Disconnect all the connectors of the EFI ECU.

2.Measure the resistance value between the following terminals.

(1) Between EFI ECU side connector 6 (CANL) - EFI ECU side connector 7 CANH)

(2) Between EFI ECU side connector 8 (LCAN) - EFI ECU side connector 9 (HCAN)

SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to ∑6.

▼If it is NG, replace the EFI ECU.

∑6. Combination meter internal resistance check

1.Disconnect the connectors of the combination meter.

2.Measure the resistance value between the following terminals.

(1) Between combination meter side connector 1 (CANH) - combination meter side connector 2 (CANL)

(2) Between combination meter side connector 3 (HCAN) - combination meter side connector 4 (LCAN)

SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to ∑7.

▼If it is NG, replace the combination meter.

⊃7. A/T ECU internal circuit check

1.Disconnect all the connectors of the A/T ECU.

2.Perform continuity check between the following terminals.

(1) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B19 (LCN1)

(2) Between A/T ECU side connector B10 (CANH) - A/T ECU side connector B20 (CANL)

(3) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B10 (CANH)

(4) Between A/T ECU side connector B19 (LCN1) - A/T ECU side connector B20 (CANL)

SPECIFIED VALUE:

Between measured terminals	Continuity
Between B9 (HCN1) - B19 (LCN1)	Continuity exists (less than 1MΩ)
Between B10 (CANH) - B20 (CANL)	
Between B9 (HCN1) - B10 (CANH)	Continuity exists (1Ω or less)
Between B19 (LCN1) - B20 (CANL)	

▼If everything is OK, perform circuit check of the combination meter, the EFI ECU, and the A/T ECU.

▼If even one of them is NG, replace the A/T ECU.

1-11-5 NO.0051, NO.0053 SIMULTANEOUS OUTPUT

(1) Checking points

1.Is the EFI ECU normal?
2.Is the ABS actuator normal?
3.Is the harness between the combination meter - EFI ECU normal?
4.Is the harness between the EFI ECU - A/T ECU normal? (RHD vehicles, A/T vehicles)
5.Is the harness between the A/T ECU - ABS actuator normal? (RHD vehiles, A/T vehicles)
6.Is the harness between the combination meter - DLC normal? (RHD vehicles)
7.Is the harness between the EFI ECU - DLC normal? (LHD vehicles)

(2) Checking method

Σ>1. CAN basic check

1.Perform basic check of CAN.
Refer to Page L2-14.

▼In the case of M/T vehicles, proceed to Σ>2.
▼In the case of A/T vehicles, proceed to Σ>5.

Σ>2. Short-circuit check between CAN lines

1.Turn IG switch to "LOCK".
2.Disconnect the negative terminal of the battery.
3.Disconnect all the connectors of the combination meter, the EFI ECU, the A/T ECU and the ABS actuator.
4.In the case of RHD vehicles, perform continuity check between the following terminals.
(1) Between combination meter connection vehicle harness side connector 3 (HCAN) - combination connection vehicle harness side connector 4 (LCAN)
(2) Between EFI ECU connection vehicle harness side connector 6 (CANL) - EFI ECU connection vehicle harness side connector 7 (CANH)
(3) Between ABS actuator connection vehicle harness side connector 17 (HCAN) - ABS actuator connection vehicle harness side connector 19 (LCAN)
5.In the case of LHD vehicles, perform continuity check between the following terminals.
(1) Between combination meter connection vehicle harness side connector 1 (CANH) - combination connection vehicle harness side connector 2 (CANL)
(2) Between ABS actuator connection vehicle harness side connector 17 (HCAN) - ABS actuator connection vehicle harness side connector 19 (LCAN)
SPECIFIED VALUE: No continuity exists.

▼If it is OK, proceed to Σ>3.
▼If it is NG, repair or replace the malfunctioning section.

Σ>3. CAN line earth side short-circuit check

1.Perform continuity check between the following terminals.
(1) Between combination meter connection vehicle harness side connector 1 (CANH) - body earth terminal
(2) Between combination meter connection vehicle harness side connector 2 (CANL) - body earth terminal
SPECIFIED VALUE: Continuity exists.

▼If it is OK, proceed to Σ>4.
▼If it is NG, repair or replace the malfunctioning section.

∑4. CAN line +B side short-circuit check

1.Perform continuity check between the following terminals.

(1) Between combination meter connection vehicle harness side connector 1 (CANH) - battery positive (+) terminal

(2) Between combination meter connection vehicle harness side connector 2 (CANL) - battery positive (+) terminal

SPECIFIED VALUE: Continuity exists.

▼If it is OK, proceed to ∑5.

▼If it is NG, repair or replace the malfunctioning section.

∑5. EFI ECU internal resistance check

1.Disconnect all the connectors of the EFI ECU.

2.Measure the resistance value between the following terminals.

(1) Between EFI ECU side connector 6 (CANL) - EFI ECU side connector 7 (CANH)

(2) Between EFI ECU side connector 8 (LCAN) - EFI ECU side connector 9 (HCAN)

SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to ∑6.

▼If it is NG, replace the EFI ECU.

Refer to Page B8-1.

∑6. ABS actuator internal circuit check

1.Disconnect the connectors of the ABS actuator.

2.Perform continuity check between the following terminals.

(1) Between ABS actuator side connector 17 (HCAN) - ABS actuator side connector 19 (LCAN)

SPECIFIED VALUE: Continuity exists (less than 1MΩ)

▼If it is OK, perform circuit check of the EFI ECU and the ABS actuator.

▼If it is NG, replace the ABS actuator.

1-11-6 NO.0052, NO.0053 SIMULTANEOUS OUTPUT

(1) Checking points

1.Is the EFI ECU normal?
2.Is the A/T ECU normal?
3.Is the harness between EFI ECU - A/T ECU normal?

(2) Checking method

Σ>1. CAN basic check

1.Perform basic check of CAN.
Refer to Page L2-14.

▼Proceed to Σ>2.

Σ>2. Harness check

1.Turn IG switch to "LOCK".
2.Disconnect the negative terminal of the battery.
3.Disconnect all the connectors of the EFI ECU and the A/T ECU.
4.Perform continuity check between the following terminals.
(1) Between EFI ECU connection vehicle harness side connector 6 (CANL) - EFI ECU connection vehicle harness side connector 7 (CANH)
(2) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - A/T ECU connection vehicle harness side connector B19 (LCN1)
SPECIFIED VALUE: No continuity exists

▼If it is OK, proceed to Σ>3.
▼If it is NG, repair or replace the malfunctioning section.

Σ>3. CAN line short-circuit check

1.Perform continuity check between the following terminals.
(1) Between A/T ECU connection vehicle harness side connector B19 (LCN1) - battery positive (+) terminal
(2) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - battery positive (+) terminal
(3) Between A/T ECU connection vehicle harness side connector B19 (LCN1) - body earth
(4) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - body earth
SPECIFIED VALUE: No continuity exists.

▼If it is OK, proceed to Σ>4.
▼If it is NG, repair or replace the malfunctioning section.

Σ>4. EFI ECU internal resistance check

1.Disconnect all the connectors of the EFI ECU.
2.Measure the resistance value between the following terminals.
(1) Between EFI ECU side connector 6 (CANL) - EFI ECU side connector 7 (CANH)
(2) Between EFI ECU side connector 8 (LCAN) - EFI ECU side connector 9 (HCAN)
SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to Σ>5.
▼If it is NG, replace the EFI ECU.

∑5. Combination meter internal resistance check.

1.Disconnect the connectors of the combination meter.

2.Measure the resistance value between the following terminals.

(1) Between combination meter side connector 1 (CANH) - combination meter side connector 2 (CANL)

(2) Between combination meter side connector 3 (HCAN) - combination meter side connector 4 (LCAN)

SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to ∑6.

▼If it is NG, replace the combination meter.

∑6. A/T ECU internal circuit check

1.Disconnect the connectors of the A/T ECU.

2.Perform continuity check between the following terminals.

(1) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B19 (LCN1)

(2) Between A/T ECU side connector B10 (CANH) - A/T ECU side connector B20 (CANL)

(3) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B10 (CANH)

(4) Between A/T ECU side connector B19 (LCN1) - A/T ECU side connector B20 (CANL)

SPECIFIED VALUE:

Between measured terminals	Continuity
Between B9 (HCN1) - B19 (LCN1)	Continuity exists (less than 1MΩ)
Between B10 (CANH) - B20 (CANL)	
Between B9 (HCN1) - B10 (CANH)	Continuity exists (1Ω or less)
Between B19 (LCN1) - B20 (CANL)	

▼If everything is OK, perform circuit check of the combination meter, the EFI ECU, and the A/T ECU.

▼If even one of them is NG, replace the A/T ECU.

1-11-7 NO.0051, NO.0052, NO.0053 SIMULTANEOUS OUTPUT

(1) Checking points

1.Is the EFI ECU normal?
2.Is the A/T ECU normal?
3.Is the ABS actuator normal?
4.Is the harness between the combination meter - EFI ECU normal?
5.Is the harness between the EFI ECU - A/T ECU normal?
6.Is the harness between the A/T ECU - ABS actuator normal?
7.Is the harness between the combination meter - DLC normal?

(2) Checking method

Σ>1. CAN basic check

1.Perform basic check of CAN.
Refer to Page L2-14.

▼Proceed to Σ>2.

Σ>2. Short-circuit check between CAN lines

1.Turn IG switch to "LOCK".
2.Disconnect the negative terminal of the battery.
3.Disconnect all the connectors of the combination meter, the EFI ECU, the A/T ECU and the ABS actuator.
4.Perform continuity check between the following terminals.
(1) Between combination meter connection vehicle harness side connector 3 (HCAN) - combination connection vehicle harness side connector 4 (LCAN)
(2) Between EFI ECU connection vehicle harness side connector 6 (CANL) - EFI ECU connection vehicle harness side connector 7 (CANH)
(3) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - A/T ECU connection vehicle harness side connector B19 (LCN1)
(4) Between A/T ECU connection vehicle harness side connector B10 (CANH) - A/T ECU connection vehicle harness side connector B20 (CANL)
(5) Between ABS actuator connection vehicle harness side connector 17 (HCAN) - ABS actuator connection vehicle harness side connector 19 (LCAN)

SPECIFIED VALUE: No continuity exists.

▼If it is OK, proceed to Σ>3.
▼If it is NG, repair or replace the malfunctioning section.

∑3. CAN line earth side short-circuit check

1.Perform continuity check between the following terminals.

(1) Between combination meter connection vehicle harness side connector 1 (CANH) - body earth terminal

(2) Between combination meter connection vehicle harness side connector 2 (CANL) - body earth terminal

(3) Between A/T ECU connection vehicle harness side connector B19 (LCN1) - body earth terminal

(4) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - body earth terminal

(5) Between A/T ECU connection vehicle harness side connector B10 (CANH) - body earth terminal

(6) Between A/T ECU connection vehicle harness side connector B20 (CANL) - body earth terminal

SPECIFIED VALUE: Continuity exists.

▼If it is OK, proceed to ∑4.

▼If it is NG, repair or replace the malfunctioning section.

∑4. CAN line +B side short-circuit check

1.Perform continuity check between the following terminals.

(1) Between combination meter connection vehicle harness side connector 1 (CANH) - battery positive (+) terminal

(2) Between combination meter connection vehicle harness side connector 2 (CANL) - battery positive (+) terminal

(3) Between A/T ECU connection vehicle harness side connector B19 (LCN1) - battery positive (+) terminal

(4) Between A/T ECU connection vehicle harness side connector B9 (HCN1) - battery positive (+) terminal

(5) Between A/T ECU connection vehicle harness side connector B10 (CANH) - battery positive (+) terminal

(6) Between A/T ECU connection vehicle harness side connector B20 (CANL) - battery positive (+) terminal

SPECIFIED VALUE: Continuity exists.

▼If it is OK, proceed to ∑5.

▼If it is NG, repair or replace the malfunctioning section.

∑5. EFI ECU internal resistance check

1.Disconnect all the connectors of the EFI ECU.

2.Measure the resistance value between the following terminals.

(1) Between EFI ECU side connector 6 (CANL) - EFI ECU side connector 7 (CANH)

(2) Between EFI ECU side connector 8 (LCAN) - EFI ECU side connector 9 (HCAN)

SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to ∑6.

▼If it is NG, replace the EFI ECU.

⊃6. Combination meter internal resistance check

1.Disconnect the connectors of the combination meter.
2.Measure the resistance value between the following terminals.
(1) Between combination meter side connector 1 (CANH) - combination meter side connector 2 (CANL)
(2) Between combination meter side connector 3 (HCAN) - combination meter side connector 4 (LCAN)
SPECIFIED VALUE: 110 - 130Ω

▼If it is OK, proceed to ⊃7.
▼If it is NG, replace the combination meter.

⊃7. A/T ECU internal circuit check

1.Disconnect all the connectors of the A/T ECU.
2.Perform continuity check between the following terminals.
(1) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B19 (LCN1)
(2) Between A/T ECU side connector B10 (CANH) - A/T ECU side connector B20 (CANL)
(3) Between A/T ECU side connector B9 (HCN1) - A/T ECU side connector B10 (CANH)
(4) Between A/T ECU side connector B19 (LCN1) - A/T ECU side connector B20 (CANL)
SPECIFIED VALUE:

Between measured terminals	Continuity
Between B9 (HCN1) - B19 (LCN1)	Continuity exists (less than 1MΩ)
Between B10 (CANH) - B20 (CANL)	
Between B9 (HCN1) - B10 (CANH)	Continuity exists (1Ω or less)
Between B19 (LCN1) - B20 (CANL)	

▼If everything is OK, proceed to ⊃8.
▼If even one of them is NG, replace the A/T ECU.

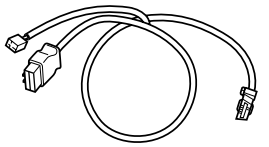
⊃8. ABS actuator internal circuit check

1.Disconnect the connectors of the ABS actuator.
2.Perform continuity check between the following terminals.
(1) Between ABS actuator side connector 17 (HCAN) - ABS actuator side connector 19 (LCAN)
SPECIFIED VALUE: Continuity exists (less than 1MΩ)

▼If it is OK, perform circuit check of the combination meter, the EFI ECU, A/T ECU and the ABS actuator.
▼If it is NG, replace the ABS actuator.

■ LIN COMMUNICATION SYSTEM
1 LIN COMMUNICATION SYSTEM
1-1 ARTICLES TO BE PREPARED

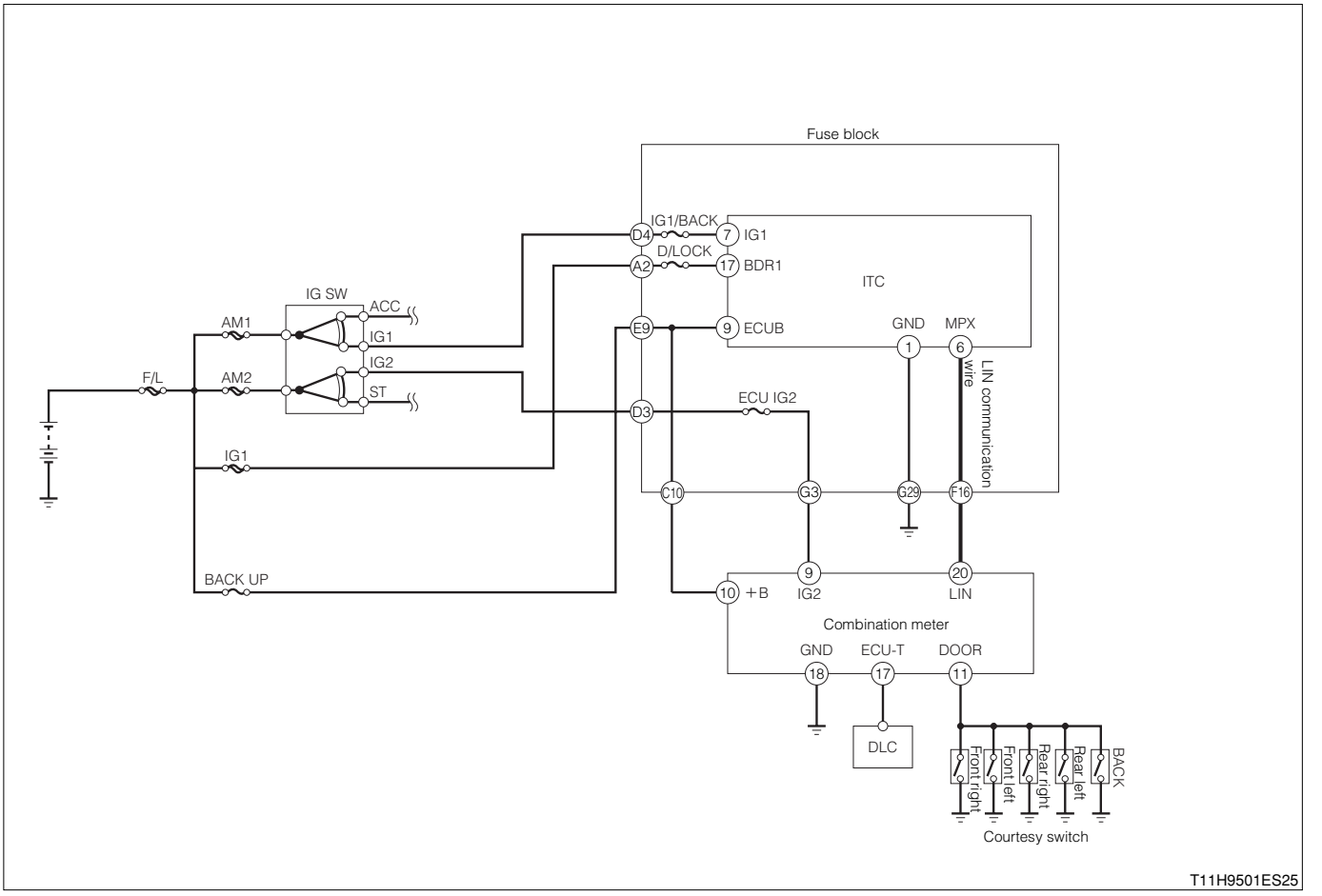
SST

Shape	Part No.	Part name
	09991-87403-000	Wire,diagnosis check
	09991-87404-000 (09991-87401-000)	Wire,engine control system inspection

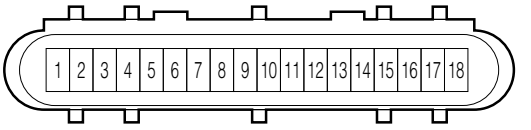
Instrument

Electrical Tester

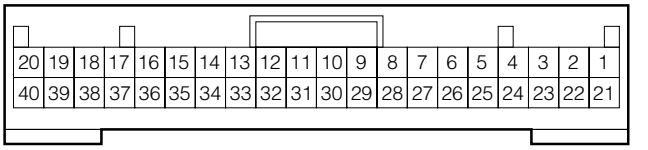
1-2 SYSTEM WIRING DIAGRAM



1-3 ARRANGEMENT OF ECU TERMINAL



ITC



Combination meter

T11H9502ES20

Meter terminal name (Multiplex communication system)

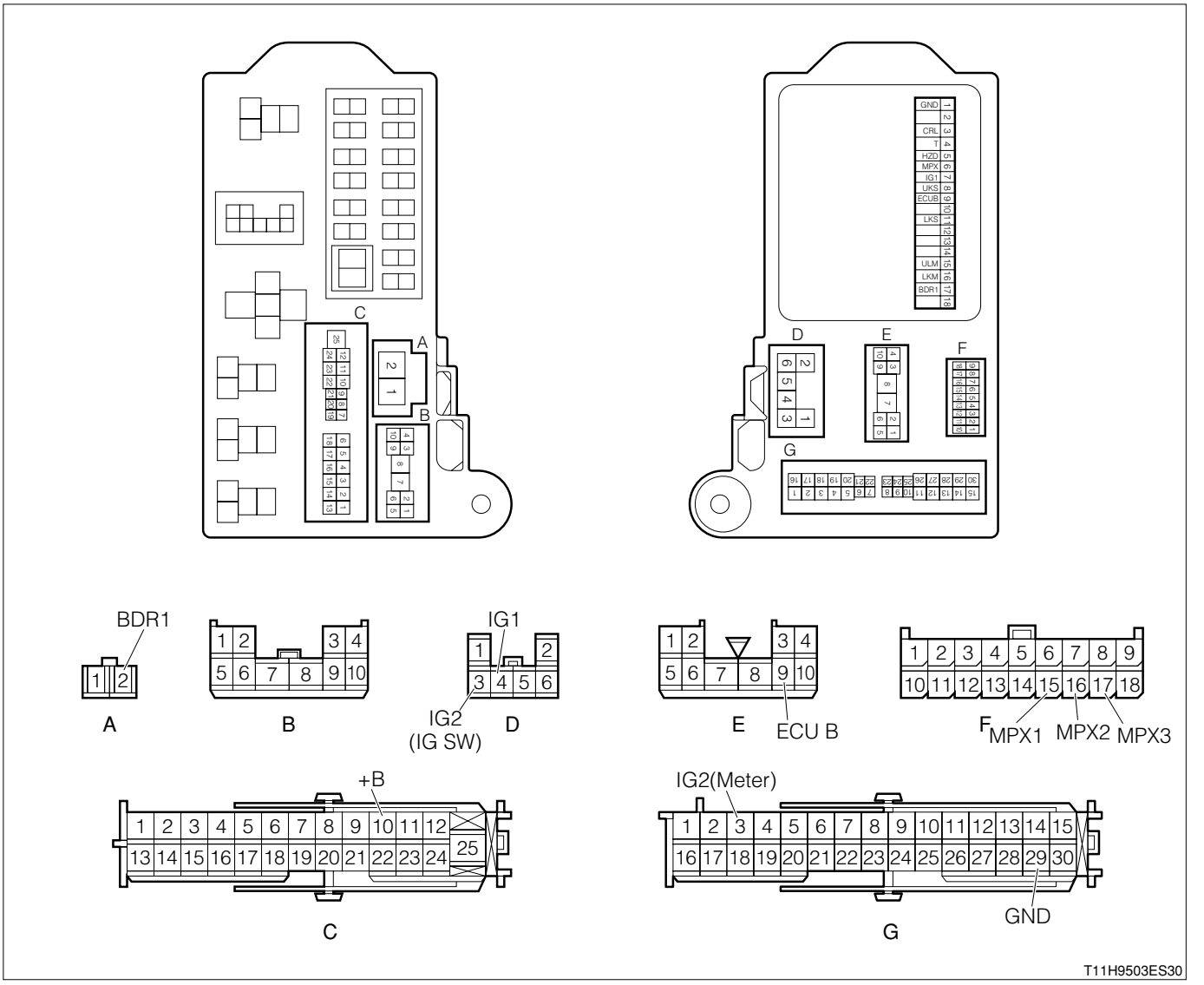
Terminal No.	Terminal code	Terminal name
9	IG2	IG power supply
10	+B	+B power supply
11	DOOR	Input of courtesy switch signal
17	ECU-T	ECU-T terminal signal input
18	GND	Earth
20	LIN	LIN communication input/output

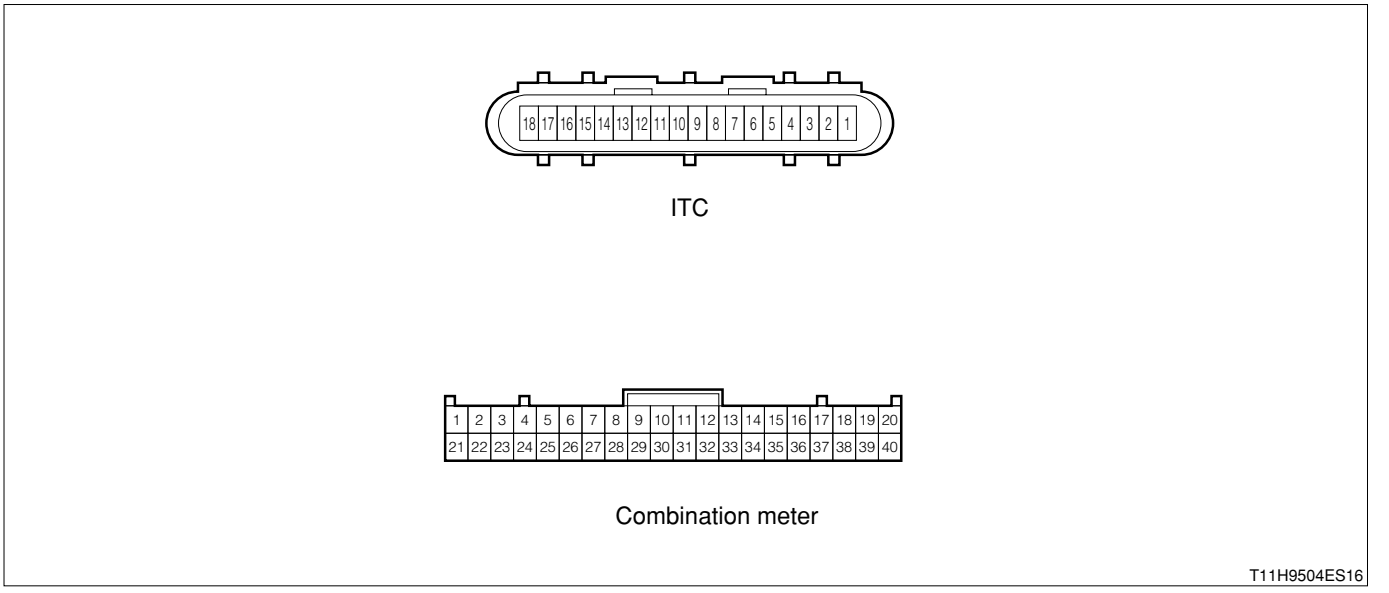
ITC terminal name (Multiplex communication system)

Terminal No.	Terminal code	Terminal name
1	GND	Earth
6	MPX	Multiple communication input/output
7	IG1	ECU power supply
9	ECU B	ECU power supply
17	BDR1	Power supply

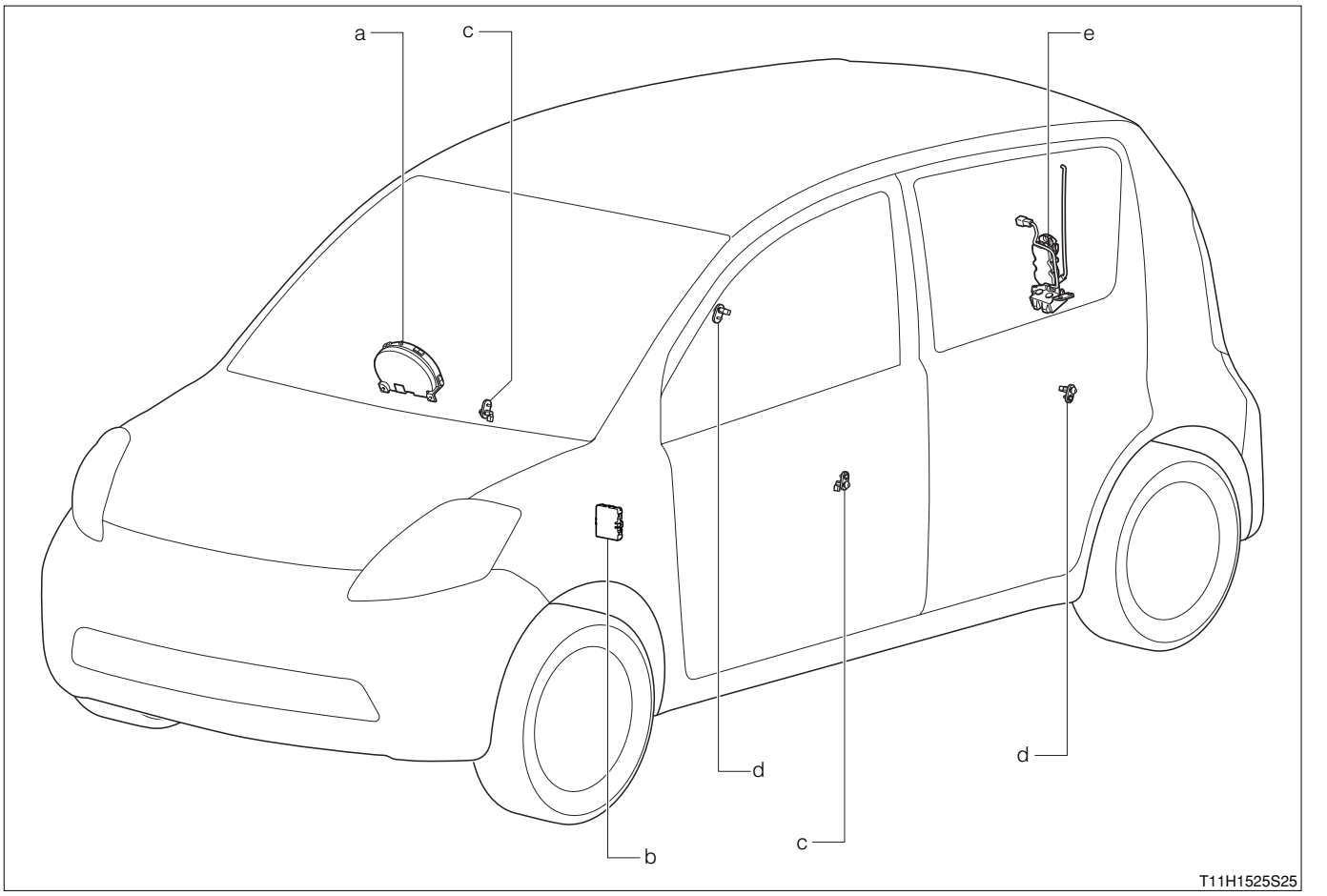
1-4 ARRANGEMENT OF VEHICLE HARNESS SIDE CONNECTOR TERMINALS

Fuse block





1-5 LOCATION OF COMPONENTS



The illustration represents the RHD vehicle. In the case of the LHD vehicle, the combination meter is located at the left side.

a	Meter ECU (inside the combination meter)
b	ITC
c	Front door courtesy switch
d	Rear door courtesy switch
e	Back door courtesy switch (inside the back door lock Ay)

1-6 HOW TO PROCEED WITH TROUBLE SHOOTING

1.This system incorporates diagnosis functions that will locate malfunctioning parts, thus providing a vital clue in trouble shooting.

∑1. Bringing malfunctioning vehicle to workshop

▼Go to Step ∑2.

∑2. Diagnosis by interview

1.Gather enough information from the customer on conditions, environment, and phenomenon in which the malfunction took place.

▼Go to Step ∑3.

∑3. Diagnostic code check and record

1.Use the SST to short-circuit the DLC terminals between 4(ECU-T) - 13(E).
SST: 09991-87403-000

2.Check and record the diagnostic code outputted on the meter LCD.

▼Go to Step ∑4.

∑4.Reproduction and confirmation of malfunction phenomenon

1.Check the problems and their conditions.

▼Go to Step ∑5.

∑5.Trouble-shooting according to diagnosis code

1.Perform troubleshooting for the outputted diagnostic code.

▼Go to Step ∑6.

∑6.Confirmation test

1.Ensure that the problem that the customer described has been completely corrected and the operation is back to normal.

▼If it is OK, finish the trouble shooting.

▼In the case of NG, go back to Step ∑3 for a recheck.

1-7 INQUIRY

1.In an effort to remove causes for malfunction from the vehicle concerned, it is impossible to determine the cause without confirming the malfunction phenomenon. If the phenomenon is not confirmed, the vehicle may not be able to return to the normal conditions even if you continue your work. The diagnosis through interviews is to collect information from the customer before confirming the malfunction phenomena. The diagnosis through interviews provides very important clues in reproducing malfunction phenomena.

2.Since the information obtained by the diagnosis through interviews is referred to during the trouble shooting, it is imperative to make an inquiry of the customer, centering on the items related to the malfunction, instead of simply asking general questions.

1-8 CONFIRMATION, RECORD AND ERASURE OF DIAGNOSIS CODE

1.The error message of the diagnostic code remains displayed as long as the communication failure exists, and will be erased when the communication is back to normal. If the battery negative (-) terminal is disconnected during the communication failure, any of the diagnostic error codes for communication with the exception of short-circuit will not be displayed again. It is necessary, therefore, to record diagnostic codes before removing the battery negative (-) terminal.

1-8-1 CHECKING METHOD OF DIAGNOSIS

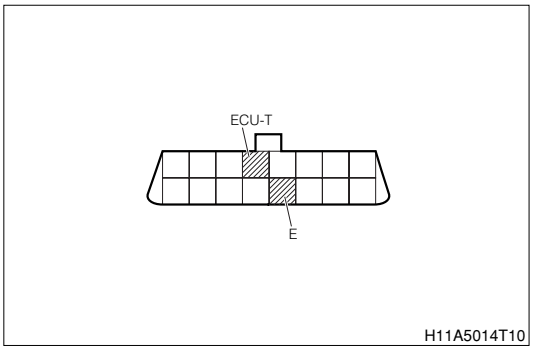
1.Stop the vehicle.

2.Turn the IG switch to "LOCK".

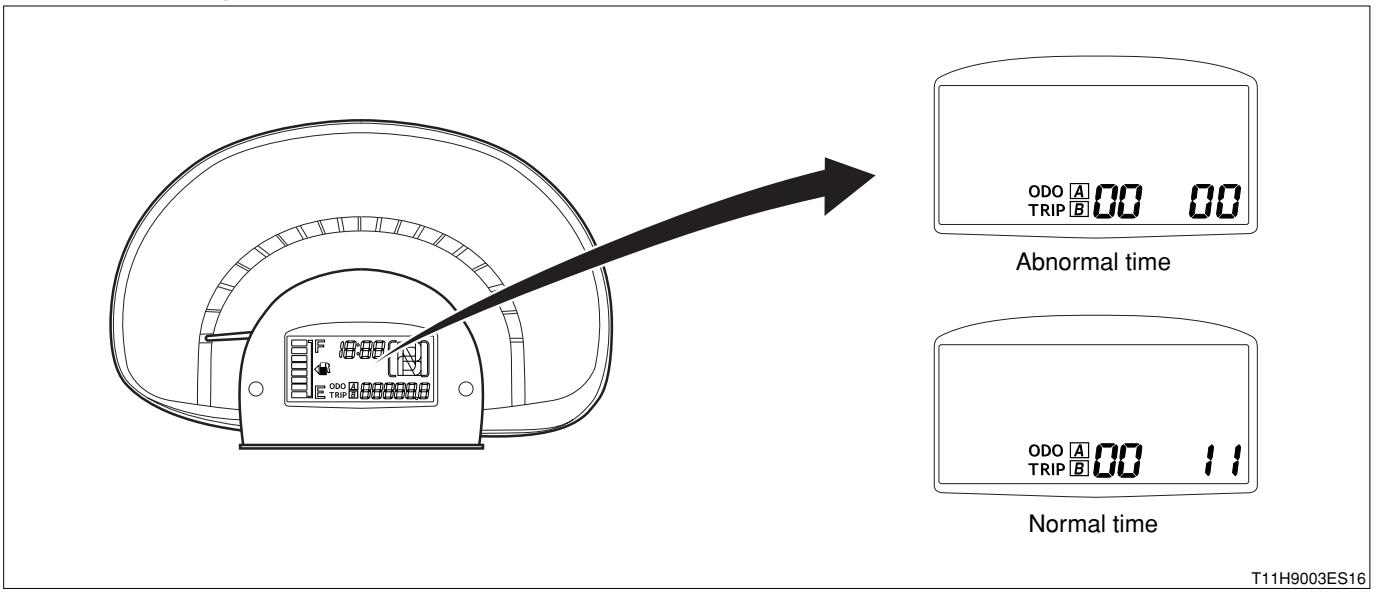
CAUTION

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

SST: 09991-87403-000
09991-87404-000



3.With the IG switch turned ON, read the diagnosis code that is indicated on the LCD (Liquid Crystal Display) using numerals.



CAUTION

- If battery power has been restored while ECU communication fails, or the ECU is removed, the ITC will not display a malfunction code, but will display the normal code of "00 00".

NOTE

- The meter LCD displays diagnosis codes for the meter, and CAN communication system, in addition to those for the LIN communication system.
- When plural codes are to be outputted, they are outputted, starting from a smaller code number. Furthermore, when one cycle of indications is completed, these codes are repeatedly outputted at intervals of four seconds.

1-8-2 CANCELING METHOD OF DIAGNOSIS

There are following two ways to erase diagnostic codes.

1.The diagnosis error code will be erased automatically when the communication problem has been solved.

2.Turn the IG switch to "LOCK".

CAUTION

- During the repair work of communication failures with the exception of short-circuit repair, keep the battery negative (-) terminal connected until connection of the connector has been checked. (Code No.00 11)

1-8-3 CONTENTS OF DIAGNOSIS

Code No.		Warning indication (Provided: ○, Not provided: ×)	Code memory (Provided: ○, Not provided: ×)	Contents of diagnosis
LCD	4 digits			
00 00	–	×	×	The status is normal, or diagnostic codes 00 11 is not re-outputted due to the battery negative (-) terminal being disconnected.
00 11	–	×	×	ITC communication failure (except for short-circuit)
00 21	–	×	×	Short-circuit in communication wire/short-circuit in ECU internal communication circuit

NOTE

- The meter LCD displays diagnosis codes for the meter, and CAN communication system, in addition to those for the LIN communication system.

Meter (00 41 - 00 43, 00 61)

Refer to Page J3-14.

CAN communication system (00 51 - 00 53)

Refer to Page L2-13.

1-9 TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

1-9-1 NO.00 11 (ITC COMMUNICATION FAILURE (EXCEPT FOR SHORT-CIRCUIT))

CAUTION

- During the repair work of communication failures, keep the battery negative (-) terminal connected until connection of the connector has been checked.

Σ>1.Check of ITC connector connecting state

1.Short-circuit the ECU-T terminal to the E terminal of the DLC, and turn the IG switch to "ON" to display a diagnostic code.

2.With the battery negative (-) terminal connected, shake the ITC lightly in an up-and-down direction and a right-and-left direction. Check the display status of the diagnostic code.

SPECIFIED VALUE: Code No.00 11 shall disappear.

▼If it is OK, plug the connector securely and see what happens.

▼If it is NG, go to step Σ>2.

Σ>2. Check of meter connector connecting state

1.With the battery negative (-) terminal connected, shake the meter connecting connector lightly in an up-and-down direction and a right-and-left direction. Check the display status of the diagnostic code.

SPECIFIED VALUE: Code No.00 11 shall disappear.

▼If it is OK, plug the connector securely and see what happens.

▼If it is NG, go to step Σ>3.

Σ>3. Check of fuse block connector connecting state

1.With the battery negative (-) terminal connected, shake the fuse block connecting connector lightly in an up-and-down direction and a right-and-left direction. Check the display status of the diagnostic code.

SPECIFIED VALUE: Code No.00 11 shall disappear.

▼If it is OK, plug the connector securely and see what happens.

▼If it is NG, go to step Σ>4.

Σ>4. Wiring harness check

1.Check the following wire harness for continuity.

(1) The vehicle harness side connector terminal F16(MPX2) of the fuse block - the vehicle harness side connector terminal 20(LIN) of the meter.

SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step Σ>5.

▼If it is NG, repair or replace the wire harness.

Σ>5. Fuse block check

1.Check the following fuse block terminals for continuity.

(1) The ITC fuse block side connector terminal 6 (MPX) - the fuse block connector terminal F16(MPX2).

SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step Σ>6.

▼If it is NG, replace the fuse block.

⊳6. Check of ITC power supply system and earth system

1.Disconnect the ITC from the fuse block.

2.Check voltage between the ITC fuse block side connector power supply terminal, earth terminal, and the body earth.

SPECIFIED VALUE: 10 - 14V

▼If it is OK, go to step ⊳7.

▼In the case of NG, repair or replace the fuse block and wire harness.

⊳7. Check of meter power supply system and earth system

1.Disconnect the connector from the meter.

2.Check voltage between the vehicle harness side connector power supply terminal of the meter, earth terminal, and the body earth.

SPECIFIED VALUE: 10 - 14V

▼If it is OK, replace the ITC. If the problem is not solved after the replacement, replace the meter, too.

▼If it is NG, repair or replace the wire harness.

1-9-2 NO.00 21 SHORT-CIRCUIT IN COMMUNICATION WIRE/SHORT-CIRCUIT IN ECU INTERNAL COMMUNICATION CIRCUIT

NOTE

- When the code No.0021 is outputted, if abnormality takes place in an ECU, it is impossible to identify the malfunctioning ECU. Therefore, remove the ECU other than the meter ECU to identify the malfunctioning ECU.
- If the code can not be erased, there may be a short circuit in the harness.
- If there is no abnormality given above, the meter ECU might be causing the abnormality.

Σ1. Diagnosis code confirmation (at time of ITC removal)

1.After removing the battery negative (-) terminal, remove the ITC from the fuse block.Install the battery negative (-) terminal.
2.Install the battery negative (-) terminal.
3.After short circuiting the terminals ECU-T and E of the DLC, turn ON the IG switch to indicate the diagnosis code.
4.Check the indicating condition of the diagnosis code.
SPECIFIED VALUE: Code No.00 21 shall disappear.

▼If it is OK, go to step Σ2.
▼If it is NG, go to step Σ3.

Σ2. Check of ITC power supply system and earth system

1.Check the voltage between the ITC fuse block side connector power supply terminal, earth terminal and body earth.
SPECIFIED VALUE: 10 - 14V

▼If OK, replace the ITC.
▼If NG, repair or replace the fuse block and wire harness.

Σ3. Wiring harness check

1.Check the following wire harness for continuity.
(1) The vehicle harness side connector terminal F16(MPX2) of the fuse block - the vehicle harness side connector terminal 20(LIN) of the meter.
SPECIFIED VALUE: Between the wire harness connecter terminal concerned and body earth: No short circuit exists.
Between the wire harness connecter terminal concerned and other terminal in the same connector: No short circuit exists.

▼If it is OK, go to step Σ3.
▼If it is NG, repair or replace the wire harness.

∑>4. Fuse block check

1.Check the following fuse block terminals for continuity.

(1) ITC fuse block side connector terminal 6(MPX) - fuse block connector terminal F16(MPX2) - F15(MPX1) - F17(MPX3)

SPECIFIED VALUE: Between the connecter terminal concerned and body earth: No short circuit exists.
Between the connecter terminal concerned and other terminal in the same connector:
(Except between terminals 16(MPX2) - F15(MPX1) - F17(MPX3)): No short circuit exists.

▼If it is OK, go to step ∑>5.

▼If it is NG, replace the fuse block.

∑>5. Check of meter power supply system and earth system

1.Disconnect the connector from the meter.

2.Check voltage between the vehicle harness side connector power supply terminal of the meter, earth terminal, and the body earth.

SPECIFIED VALUE: 10 - 14V

▼If OK, replace the meter.

▼If it is NG, repair or replace the wire harness.