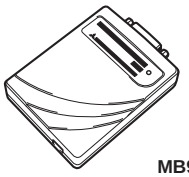
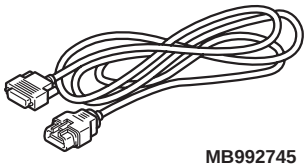
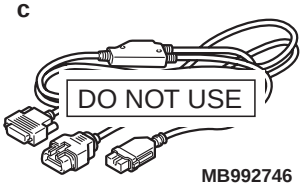
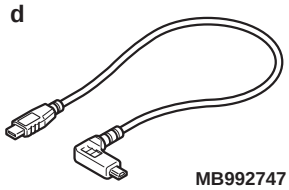
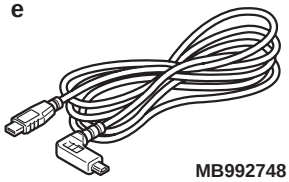
GROUP 54C

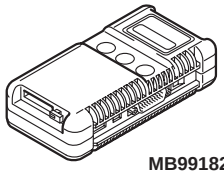
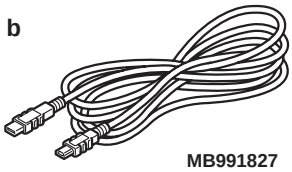
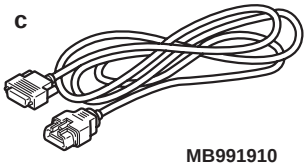
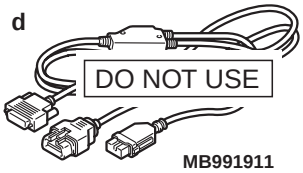
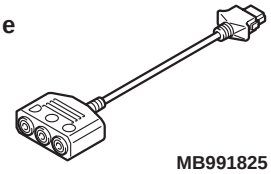
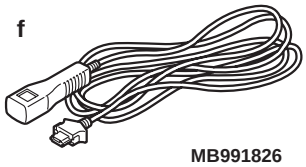
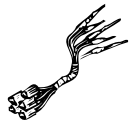
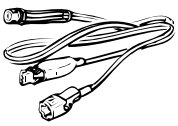
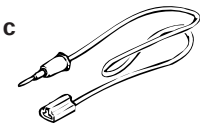
CONTROLLER AREA NETWORK (CAN)

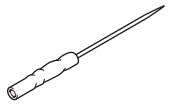
CONTENTS

SPECIAL TOOL

M1548304200983

Tool	Number	Name	Use
a  MB992744 b  MB992745 c  MB992746 d  MB992747 e  MB992748 ACB05421AB	a. MB992744 b. MB992745 c. MB992746 d. MB992747 e. MB992748	a. Vehicle communication interface-Lite (V.C.I.-Lite) b. V.C.I.-Lite main harness A (for vehicles with CAN communication) c. V.C.I.-Lite main harness B (for vehicles without CAN communication) d. V.C.I.-Lite USB cable short e. V.C.I.-Lite USB cable long	CAN bus diagnostics

Tool	Number	Name	Use
a  MB991824 b  MB991827 c  MB991910 d  MB991911 e  MB991825 f  MB991826 MB991955	MB991955 a. MB991824 b. MB991827 c. MB991910 d. MB991911 e. MB991825 f. MB991826	M.U.T.-III sub-assembly a. Vehicle communication interface (V.C.I.) b. M.U.T.-III USB cable c. M.U.T.-III main harness A (for vehicles with CAN communication) d. M.U.T.-III main harness B (for vehicles without CAN communication) e. Measuring adapter harness f. M.U.T.-III trigger harness	CAN bus diagnostics **⚠ CAUTION** **For vehicles with CAN communication, use the M.U.T.-III main harness A to send simulated vehicle speed. If you connect the M.U.T.-III main harness B instead, the CAN communication does not function correctly.**
a  b  c  d  MB991223	MB991223 a. MB991219 b. MB991220 c. MB991221 d. MB991222	Wiring harness set a. Check harness b. LED harness c. LED harness adapter d. Probe	Continuity check and voltage measurement at wiring harness or connector a. For checking connector pin contact pressure b. For checking power supply circuit c. For checking power supply circuit d. For connecting a locally sourced tester

Tool	Number	Name	Use
 MB992006	MB992006	Extra fine probe	Continuity check and voltage measurement at wiring harness or connector
	MB991709	Wiring harness set	Checking the ABS-ECU

TEST EQUIPMENT

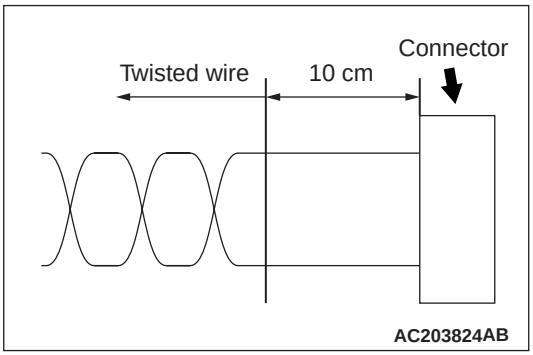
M1548304300281

Test equipment	Name	Use
 AC000019	Digital multimeter	Checking CAN bus circuit (for resistance and voltage measurements)

SERVICE PRECAUTIONS

M1548302100270

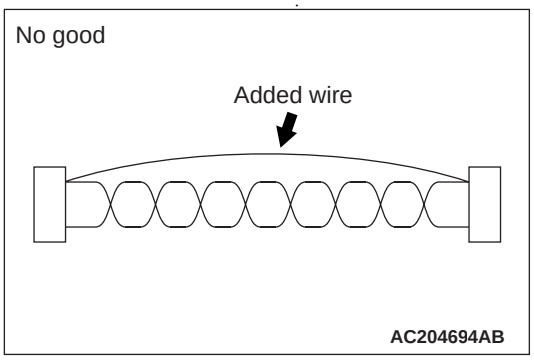
Warnings in diagnosis section	Details regarding warning
⚠ CAUTION **When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.**	–
⚠ CAUTION **A digital multimeter should be used.**	**When measuring resistance value or voltage in CAN bus lines, use a digital multimeter. If not using a digital multimeter, the equipments, which are connected through the CAN communication lines, may be damaged.**
⚠ CAUTION **When measuring the resistance, disconnect the negative battery terminal.**	**Disconnect the negative battery terminal when measuring the resistance value in the CAN bus line. If you fail to do so, the equipments, which are connected through the CAN communication lines, may be damaged.**
⚠ CAUTION **The test wiring harness should be used.**	**Always use the test harness when measuring the voltage or resistance value at the female connector. If you fail to do so, connectors may be damaged.**

Warnings in diagnosis section	Details regarding warning
⚠ CAUTION **The strand end of the twist wire should be within 10 cm from the connector.**	 **If you repair the wire due to a defective connector or its terminal or harness wire, you should cut the wire so that the strand end of the twist wire should be within 10 cm from the connector as shown. If it exceeds 10 cm, twist the wiring harness just like the original twisted wire. If the strand end exceeds 10 cm, a communication error may be caused.**
⚠ CAUTION **Strictly observe the specified wiring harness repair procedure.**	**When you repair a CAN bus line, observe the precautions on how to repair the CAN bus line strictly. Refer to P.54C-6. If a new wire is added or a splice point is modified for the CAN_L or CAN_H line, an error in the CAN communication may be caused.**

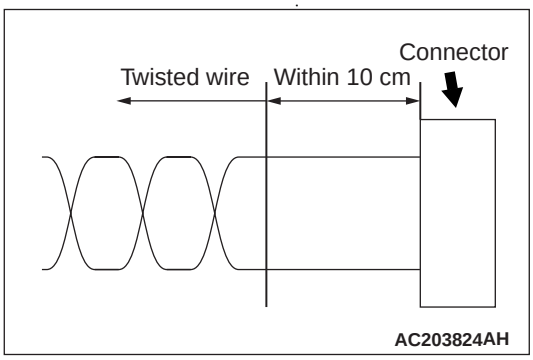
PRECAUTIONS ON HOW TO REPAIR THE CAN BUS LINES

M1548301900273

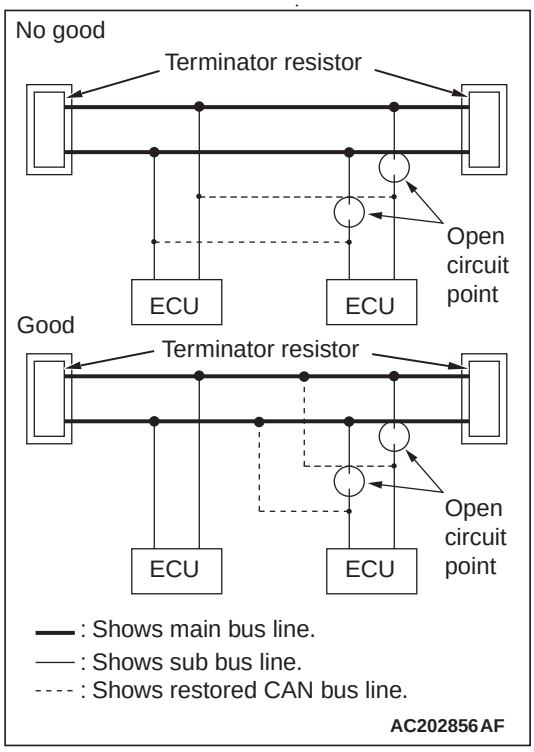
PRECAUTIONS ON HOW TO REPAIR THE CAN BUS LINES



If the CAN bus line(s) are repaired, renew all the twisted wires between the end connectors. If the wiring harness is partially repaired, or only CAN_L or CAN_H line is repaired, noise suppression is deteriorated, causing a communication error.



If the connector or wire on the main bus line or the sub-bus wire is replaced, the frayed end of the twisted wire should be within 10 cm from the connector. If it exceeds 10 cm, twist the wiring harness just like the original twisted wire. If the frayed end exceeds 10 cm, noise suppression is deteriorated, causing a communication error.



If a sub-bus line is repaired, splice a new wire directly into the main bus line. If a new wire is spliced into the sub-bus line, which is connected to another device, the CAN communication will be disabled.

PRECAUTIONS ON HOW TO REPAIR THE TERMINATOR RESISTOR

If one-side terminator resistor is broken, the CAN communication will continue although noise suppression is deteriorated. No diagnosis codes may be set even if the terminator resistor was broken. If a damage is found, replace the ECU which incorporates the defective terminator resistor.

CAN BUS LINE REPAIR HARNESS (PART NAME AND NUMBER)

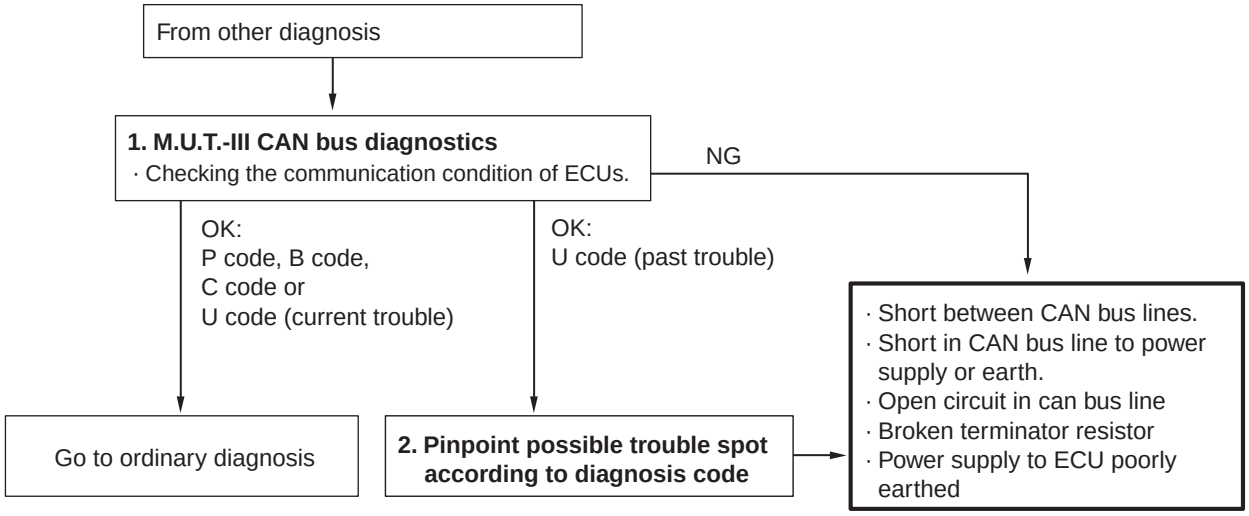
Part name	Part number
Twist pair cable	MN151514

EXPLANATION ABOUT THE M.U.T.-III CAN BUS DIAGNOSTICS

M1548300100694

The M.U.T.-III CAN bus diagnostics carries out the three checks below automatically, and then displays current condition of the CAN bus lines according to the check results.

CAN BUS LINE DIAGNOSTIC FLOW



ACB05636AB

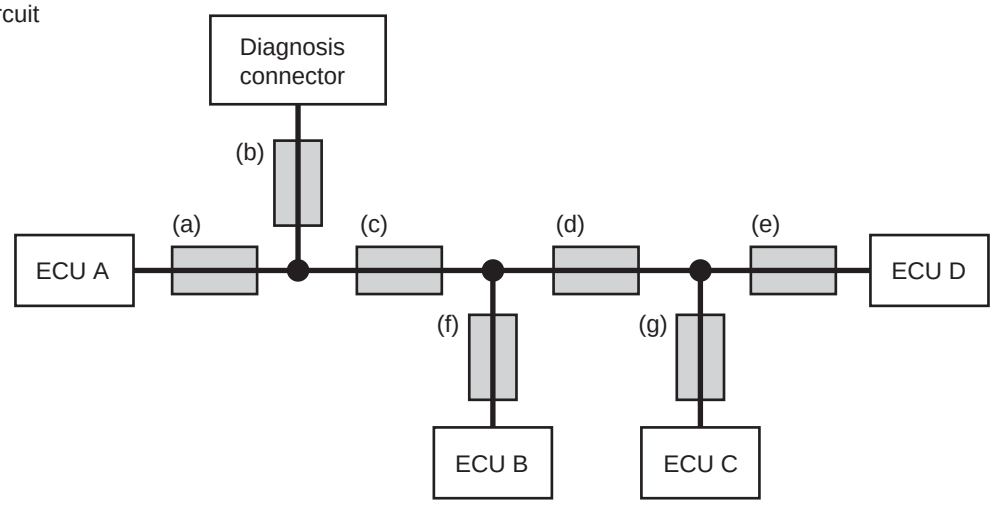
1. M.U.T.-III CAN bus diagnostics

   The M.U.T.-III diagnoses CAN bus lines in accordance with the following strategy.

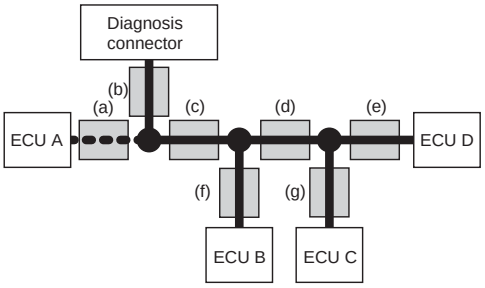
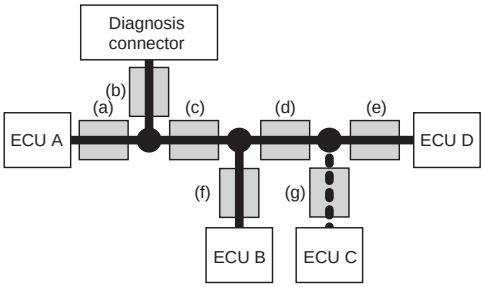
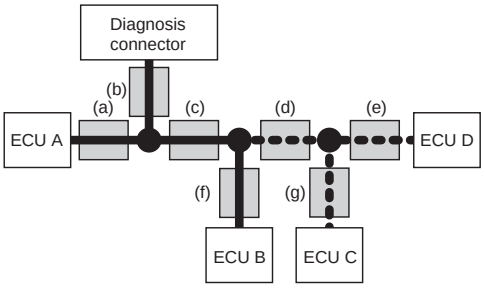
   - Checking the communication condition of ECUs

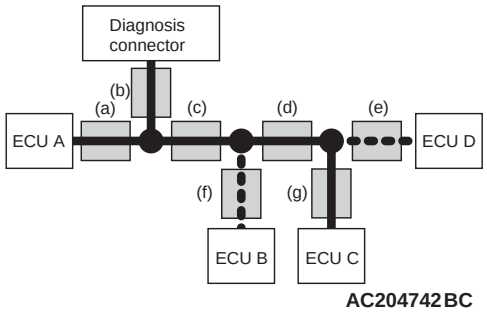
The M.U.T.-III narrows down troubles in circuit by itself. Its strategies are as follows.

Reference circuit



AC502594AB

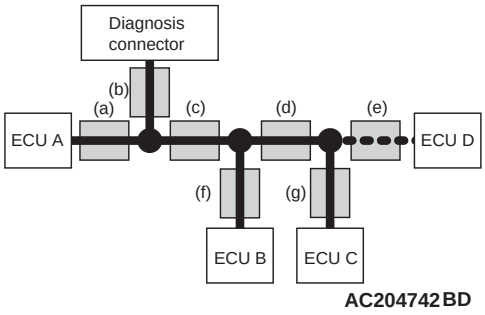
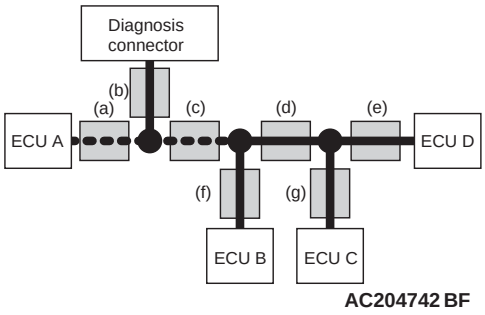
ECU which cannot communicate with the M.U.T.-III	Possible trouble spot	Logic for narrowing down trouble spot	
ECU A	CAN bus line (a) and power supply system to ECU A	ECU A communicates with the M.U.T.-III via CAN bus lines (a) and (b). The M.U.T.-III judges that CAN bus line (b) is normal, because it can communicate with other ECUs. Possible trouble may be present in CAN bus line (a) or the power supply system to ECU A.	 AC204742 AZ
ECU C	CAN bus line (g) and power supply system to ECU C	ECU C communicates with the M.U.T.-III via CAN bus lines (b), (c), (d) and (g). The M.U.T.-III judges that CAN bus lines (b), (c) and (d) are normal, because it can communicate with ECUs B and D. Possible trouble may be present in CAN bus line (g) or the power supply system to ECU C.	 AC204742 BA
ECU C and ECU D	Trouble in CAN bus line (d)	ECUs C ad D communicate with the M.U.T.-III via CAN bus lines (b), (c), (d), (e) and (g). The M.U.T.-III judges that CAN bus lines (b) and (c) are normal, because it can communicate with ECU B. Possible trouble may be present in CAN bus line (d), (e) or (g) or the power supply system to ECU D or C. CAN bus line (d) is shared by ECUs C and D when they communicate with the M.U.T.-III, so CAN bus line (d) is suspected as ultimate cause. CAN bus line (g) or (e) and power supply systems to ECU C or D are also suspected as second cause.	 AC204742BB

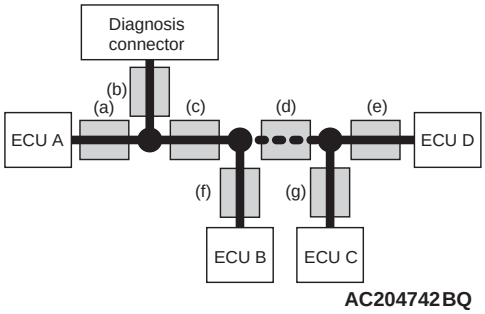
ECU which cannot communicate with the M.U.T.-III	Possible trouble spot	Logic for narrowing down trouble spot	
ECU B and ECU D	CAN bus line (e) or (f) or power supply system to ECU B or D	ECUs B ad D communicate with the M.U.T.-III via CAN bus lines (b), (c), (d), (e) and (f). The M.U.T.-III judges that CAN bus lines (b), (c) and (d) are normal, because it can communicate with ECU C. Possible trouble may be present in CAN bus line (f) or (e) or the power supply system to ECU B or D.	

2. If diagnosis code related to CAN communication is set as past trouble, isolate opens as described below.

   NOTE: If you pinpoint trouble spot according to diagnosis code, you should use time-out diagnosis code. diagnosis code related to failure information is set when the data to be set contains an error, so CAN bus line itself is probably normal.

NOTE: Time-out diagnosis codes are stored in each ECU memory individually. Therefore, it is possible that these diagnosis codes have not been set simultaneously. If the trouble spot cannot be found when you diagnose by judging from multiple diagnosis codes, check the communication lines between each ECU.

Diagnosis code to be set	Possible trouble spot	Logic for narrowing down trouble spot	
Time-out diagnosis code associated with ECU D is stored in ECU A, ECU B and ECU C. Time-out diagnosis code associated with ECUs A, B, C and D is stored in ECU.	Trouble in CAN bus line (e) and power supply system to ECU D	When time-out diagnosis code associated with ECU D is stored in ECU A, B and C, or time-out diagnosis code associated with ECUs A, B and C is stored in ECU D, CAN bus line (e) is suspected. When diagnosis code is not stored in ECU D, the power supply to ECU D is suspected.	
Time-out diagnosis code associated with ECU A is stored in ECUs B, C and D. Time-out diagnosis code associated with ECUs B, C and D is stored in ECU A.	Trouble in CAN bus line (a) or (c) and power supply system to ECU A.	When time-out diagnosis code associated with ECU A is stored in ECUs B, C and D, or time-out diagnosis code associated with ECUs B, C and D is stored in ECU A, CAN bus line (a) or (c) is suspected. When diagnosis code is not stored in ECU A, the power supply to ECU A is suspected.	

Diagnosis code to be set	Possible trouble spot	Logic for narrowing down trouble spot	
Time-out diagnosis codes associated with ECUs C and D are stored in ECU A and ECU B. Time-out diagnosis codes associated with ECUs A and B are stored in ECU C and ECU D.	Trouble in CAN bus line (d)	If time-out diagnosis codes associated with ECUs C and D are stored in ECUs A and B, or time-out codes associated with ECUs A and B are stored in ECUs C and D, CAN bus line (d) is suspected. CAN bus line (g) or (e) and power supply systems to ECU C or D are also suspected as second cause.	 AC204742BQ

TROUBLESHOOTING

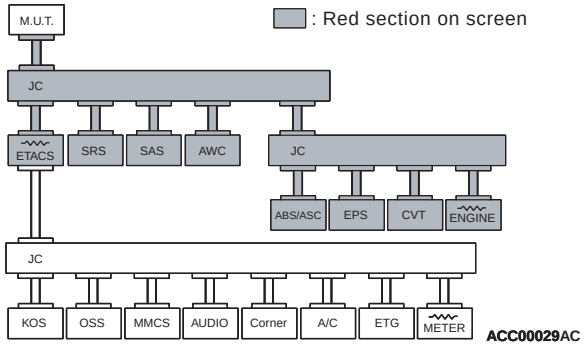
CAN BUS DIAGNOSTICS TABLE

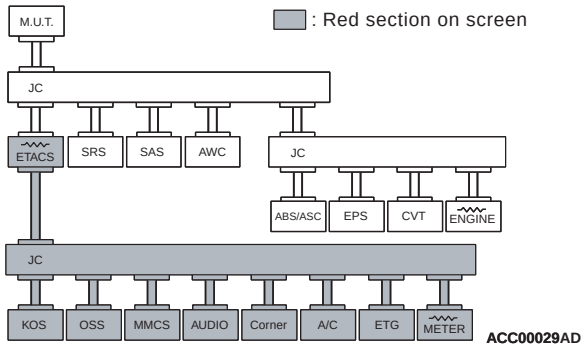
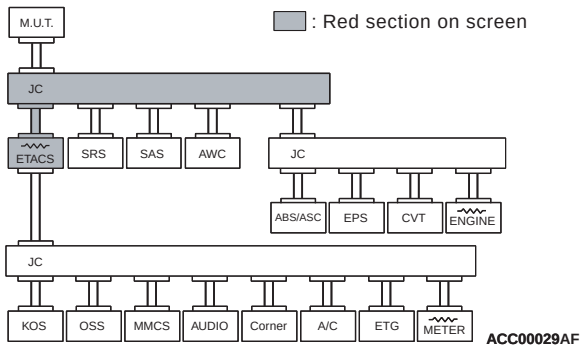
M1548300202675

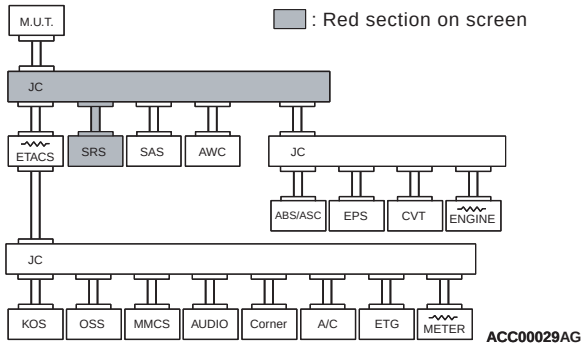
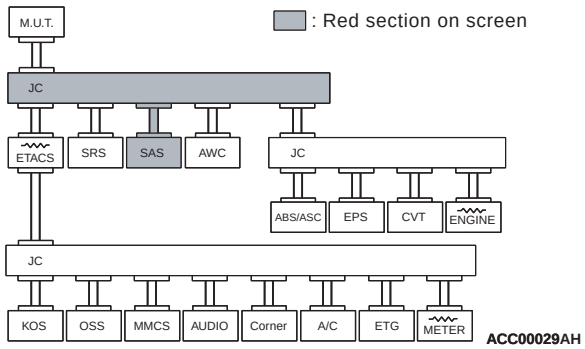
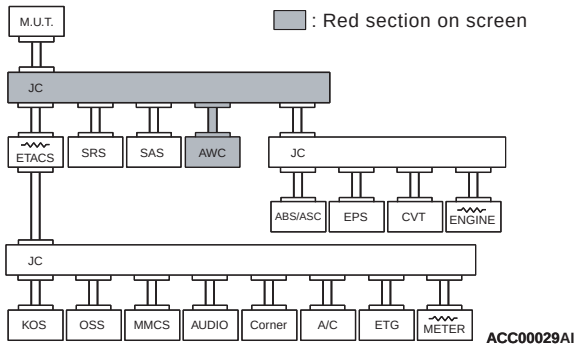
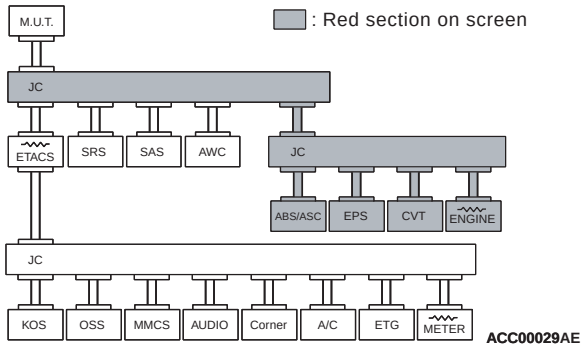
⚠ CAUTION

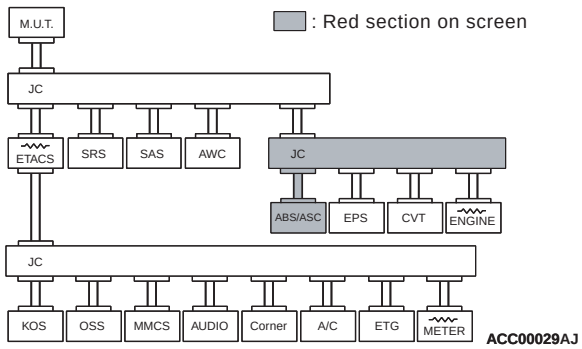
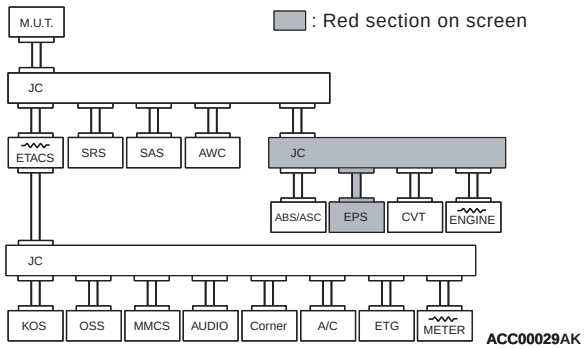
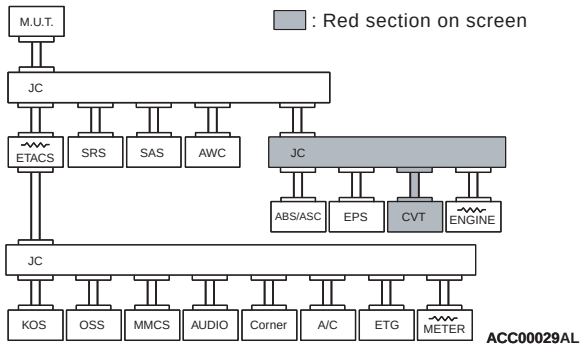
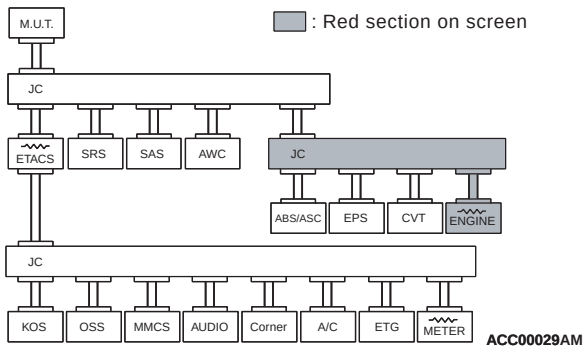
During diagnosis, a diagnosis code associated with another system may be set when the ignition switch is turned on with connector(s) disconnected. After completing the repair, confirm all systems for diagnosis code(s). If diagnosis code(s) are set, erase them all.

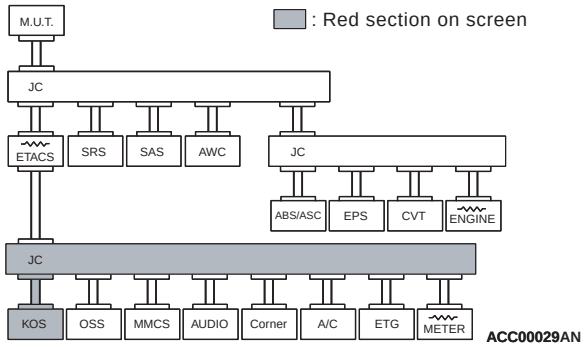
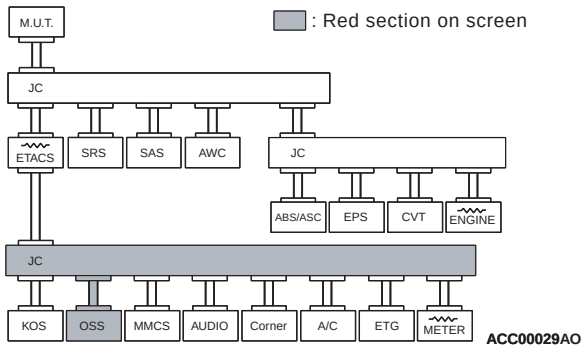
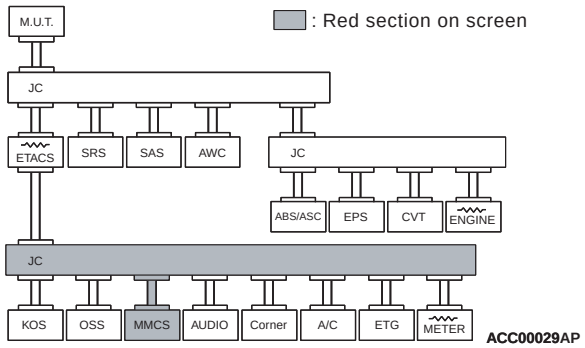
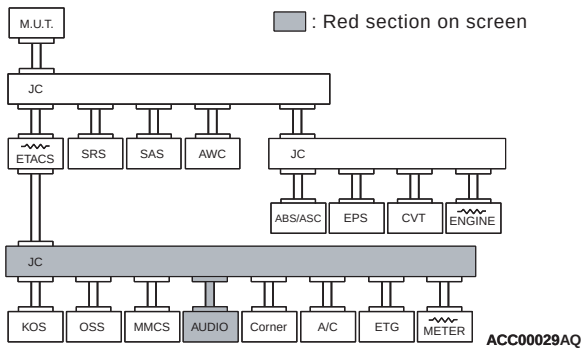
This diagnosis applies only to the CAN bus lines. If a different system is defective, proceed to the applicable diagnosis section for each system. Observe the diagnosis procedure below only when the CAN bus line is defective.

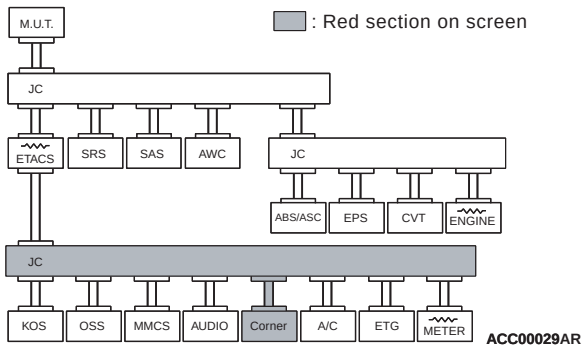
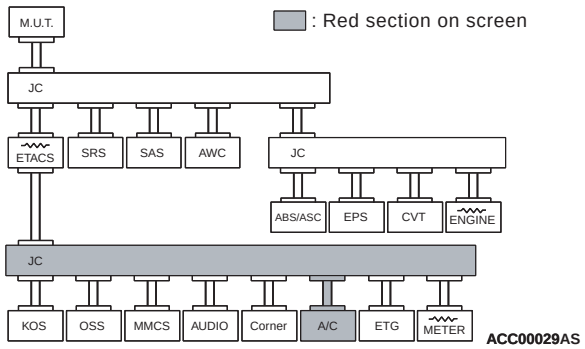
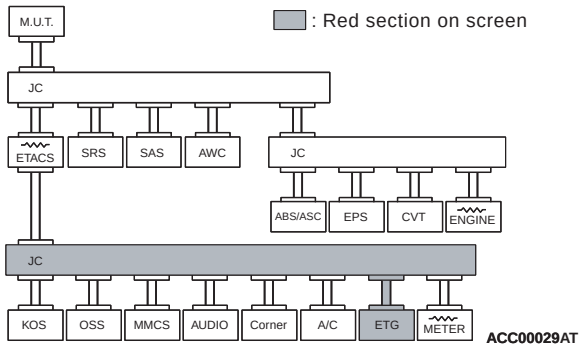
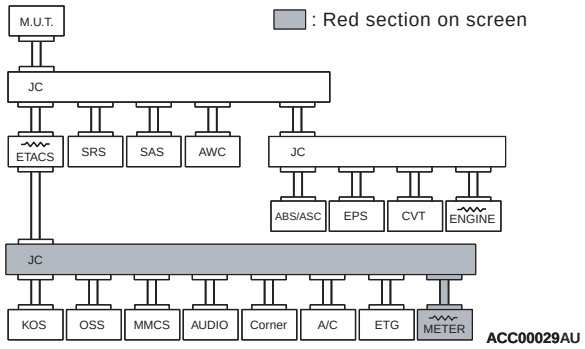
M.U.T.-III screen (The ECUs that are not adopted are not displayed.)	Comment	Diagnosis detail	Reference page
 ACC00029AC	Failure in red displayed area is estimated.	Diagnosis Item 1 Communication with no ECUs is possible (CAN-C).	P.54C-17
–	–	Diagnosis Item 2*1 Diagnose shorts in the power supply to CAN-C.	P.54C-18

M.U.T.-III screen (The ECUs that are not adopted are not displayed.)	Comment	Diagnosis detail	Reference page
–	–	Diagnosis Item 3*1 Diagnose shorts in the earth to CAN-C.	P.54C-26
–	–	Diagnosis Item 4*1 Diagnose shorts between CAN_H and L lines (CAN-C).	P.54C-33
	CAN-C-Mid: Failure in red displayed area is estimated.	Diagnosis Item 5 Communication with no ECUs is possible (CAN-C-Mid).	P.54C-39
–	–	Diagnosis Item 6*2 Diagnose shorts in the power supply to CAN-C-Mid.	P.54C-40
–	–	Diagnosis Item 7*2 Diagnose shorts in the earth to CAN-C-Mid.	P.54C-48
–	–	Diagnosis Item 8*2 Diagnose shorts between CAN_H and L lines (CAN-C-Mid).	P.54C-56
	CAN-C: Failure in red displayed area is estimated.	Diagnosis Item 9 Diagnose when the M.U.T.-III cannot receive the data sent by ETACS-ECU.	P.54C-61

M.U.T.-III screen (The ECUs that are not adopted are not displayed.)	Comment	Diagnosis detail	Reference page
	CAN-C: Failure in red displayed area is estimated.	Diagnosis Item 10 Diagnose when the M.U.T.-III cannot receive the data sent by SRS-ECU.	P.54C-62
	CAN-C: Failure in red displayed area is estimated.	Diagnosis Item 11 Diagnose when the M.U.T.-III cannot receive the data sent by steering wheel sensor.	P.54C-63
	CAN-C: Failure in red displayed area is estimated.	Diagnosis Item 12 Diagnose when the M.U.T.-III cannot receive the data sent by 4WD-ECU <4WD>.	P.54C-64
	CAN-C: Failure in red displayed area is estimated.	Diagnosis Item 13 Diagnose the lines between the joint connectors (CAN-HI and CAN1).	P.54C-65

M.U.T.-III screen (The ECUs that are not adopted are not displayed.)	Comment	Diagnosis detail	Reference page
	CAN-C: Failure in red displayed area is estimated.	Diagnosis Item 14 Diagnose when the M.U.T.-III cannot receive the data sent by ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>.	P.54C-66
	CAN-C: Failure in red displayed area is estimated.	Diagnosis Item 15 Diagnose when the M.U.T.-III cannot receive the data sent by EPS-ECU.	P.54C-67
	CAN-C: Failure in red displayed area is estimated.	Diagnosis Item 16 Diagnose when the M.U.T.-III cannot receive the data sent by CVT-ECU.	P.54C-68
	CAN-C: Failure in red displayed area is estimated.	Diagnosis Item 17 Diagnose when the M.U.T.-III cannot receive the data sent by engine-ECU.	P.54C-69

M.U.T.-III screen (The ECUs that are not adopted are not displayed.)	Comment	Diagnosis detail	Reference page
 ACC00029AN	CAN-C-Mid: Failure in red displayed area is estimated.	Diagnosis Item 18 Diagnose when the M.U.T.-III cannot receive the data sent by KOS-ECU. <Vehicles with KOS>	P.54C-70
 ACC00029AO	CAN-C-Mid: Failure in red displayed area is estimated.	Diagnosis Item 19 Diagnose when the M.U.T.-III cannot receive the data sent by OSS-ECU. <Vehicles with OSS>	P.54C-71
 ACC00029AP	CAN-C-Mid: Failure in red displayed area is estimated.	Diagnosis Item 20 Diagnose when the M.U.T.-III cannot receive the data sent by CAN box unit <vehicles with MMCS>.	P.54C-72
 ACC00029AQ	CAN-C-Mid: Failure in red displayed area is estimated.	Diagnosis Item 21 Diagnose when the M.U.T.-III cannot receive the data sent by radio and CD player <vehicles with radio and CD player>.	P.54C-73

M.U.T.-III screen (The ECUs that are not adopted are not displayed.)	Comment	Diagnosis detail	Reference page
	CAN-C-Mid: Failure in red displayed area is estimated.	Diagnosis Item 22 Diagnose when the M.U.T.-III cannot receive the data sent by corner sensor/back sensor-ECU <vehicles with reversing sensor system>.	P.54C-74
	CAN-C-Mid: Failure in red displayed area is estimated.	Diagnosis Item 23 Diagnose when the M.U.T.-III cannot receive the data sent by A/C-ECU.	P.54C-75
	CAN-C-Mid: Failure in red displayed area is estimated.	Diagnosis Item 24 Diagnose when the M.U.T.-III cannot receive the data sent by electric tailgate control unit <vehicles with electric tailgate>.	P.54C-76
	CAN-C-Mid: Failure in red displayed area is estimated.	Diagnosis Item 25 Diagnose when the M.U.T.-III cannot receive the data sent by combination meter.	P.54C-77

NOTE:

- *[*1]: diagnosis items 2, 3 and 4 should be checked AFTER the cause of the fault is determined in diagnosis item 1 "Communication with no ECUs is possible (CAN-C)".*
- *[*2]: diagnosis items 6, 7 and 8 should be checked AFTER the cause of the fault is determined in diagnosis item 5 "Communication with no ECUs is possible (CAN-C-Mid)".*

CAN-RELATED CONNECTOR POSITION

M1548304101291

Connector number	Connector name
A-04	ABS-ECU <Vehicles without ASC>
A-05	ASC-ECU <Vehicles with ASC>
B-07	Engine-ECU
C-04	Corner sensor/back sensor-ECU <vehicles with reversing sensor system>
C-09	KOS-ECU <vehicles with KOS>
C-23	Instrument panel wiring harness and floor wiring harness combination
C-26	Joint connector (CAN-LO)
C-27	Joint connector (CAN-HI)
C-29	Joint connector (CAN1)
C-101	Combination meter
C-109	Radio and CD player <vehicles with radio and CD player>
C-113	OSS-ECU <Vehicles with OSS>
C-116	CAN box unit <vehicles with MMCS>
C-123	SRS-ECU
C-126	Instrument panel wiring harness and front wiring harness combination
C-131	CVT-ECU
C-205	A/C-ECU
C-218	EPS-ECU
C-220	Diagnosis connector
C-224	4WD-ECU <4WD>
C-309	Steering wheel sensor
C-417	ETACS-ECU
D-10	Electric tailgate control unit <vehicles with electric tailgate>

CAN BUS DIAGNOSIS

Diagnosis Item 1: Communication with no ECUs is possible (CAN-C).

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

TROUBLESHOOTING HINTS

- Malfunction in CAN-C (short to earth or power supply, wire short to one another)
- Malfunction in the ECUs which are interconnected via CAN-C (internal error)
- Malfunction (open circuit) of wiring harness, connector (s) between the diagnosis connector and joint connector(s)

DIAGNOSIS PROCEDURE

STEP 1. Check the CAN-C for short to power supply. Voltage measurement at diagnosis connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(2) Voltage between diagnosis connector terminal No.6 (CAN_H) and body earth

OK: Less than 4.0 V

(3) Voltage between diagnosis connector terminal No.14 (CAN_L) and body earth

OK: Less than 4.0 V

Q: Is the check result normal?

YES <Voltage is less than 4.0 V in both CAN_H and CAN_L> : Go to Step 2.
NO <Voltage is 4.0 V or more in either CAN_H or CAN_L> : Perform diagnosis item 2 "Diagnose shorts in the power supply to CAN-C". Refer to P.54C-18.

STEP 2. Check the CAN-C for short to earth. Resistance measurement at diagnosis connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between diagnosis connector terminal No.6 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between diagnosis connector terminal No.14 (CAN_L) and body earth

OK: 1 kΩ or more

Q: Is the check result normal?
YES <Resistance value is 1 kΩ or more in both CAN_H and CAN_L> : Go to Step 3.
NO <Resistance value is less than 1 kΩ in either CAN_H or CAN_L> : Perform diagnosis item 3 "Diagnose shorts in the earth to CAN-C". Refer to P.54C-26.

STEP 3. Check the CAN-C for short to each other. Resistance measurement at diagnosis connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between diagnosis connector terminal Nos.6 and 14

OK: 60 ± 10 Ω

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO <Resistance value is less than 60 ± 10 Ω> : Perform diagnosis Item 4 "Diagnose shorts between CAN_H and L lines (CAN-C)". Refer to P.54C-33.
NO <Resistance value is 1 kΩ or more> : Check the wires between diagnosis connector and joint connector (CAN-HI) for open circuit, and check the terminal resistors in the engine-ECU and the ETACS-ECU for open circuit. Then repair or replace if necessary.

Diagnosis Item 2: Diagnose shorts in the power supply to CAN-C.

⚠ CAUTION
- **When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.**
- **When the ETACS-ECU of vehicles without KOS is replaced, the encrypted code of the ignition key needs to be registered to the ETACS-ECU. (If the encrypted code is not registered, the engine cannot be started. Register the encrypted code as described in GROUP 54A, Immobilizer System – How to Register Key ID .)**

TROUBLE JUDGEMENT CONDITIONS

The M.U.T.-III judges the trouble when it is impossible to receive the periodically sent data and the voltage of CAN_H or CAN_L line is more than 4.0 V.

TROUBLESHOOTING HINTS

- Malfunction of the wiring harness
- Malfunction of the connector
- Malfunction of the ETACS-ECU
- Malfunction of the SRS-ECU
- Malfunction of the steering wheel sensor
- Malfunction of the 4WD-ECU <4WD>
- Malfunction of the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>
- Malfunction of the EPS-ECU
- Malfunction of the CVT-ECU
- Malfunction of the engine-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check the CAN-C. Voltage measurement at diagnosis connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

NOTE: This inspection allows you to check that there is a short to power supply in either CAN_H line or CAN_L line. Thus, in the following steps, check the CAN-C that is defective.

(1) Disconnect engine-ECU connector and ETACS-ECU connector, and measure the voltage at the harness side of diagnosis connector.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between diagnosis connector terminal No.6 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between diagnosis connector terminal No.14 (CAN_L) and body earth

OK: 4.0 V or less

(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <Both of the measurement results show 4.0 V or less> Go to Step 24.
NO : <Either of CAN_H line or CAN_L line the measurement results show more than 4.0 V> Go to Step 2.

STEP 2. Check the CAN-C. Voltage measurement at C-126 intermediate connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the intermediate connector, and measure at its female-side intermediate connector (at the front wiring harness side).
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between C-126 intermediate connector terminal No.15 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between C-126 intermediate connector terminal No.16 (CAN_L) and body earth

OK: 4.0 V or less

(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 13.
NO : <More than 4.0 V> Go to Step 3.

STEP 3. Check the CAN-C between joint connector (CAN1) and the engine-ECU. Voltage measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN1) terminal No.10 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN1) terminal No.21 (CAN_L) and body earth

OK: 4.0 V or less

(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 4.
NO : <More than 4.0 V> Repair the wiring harness between joint connector (CAN1) and the engine-ECU connector.

STEP 4. Check the CAN-C between joint connector (CAN1) and the CVT-ECU. Voltage measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN1) terminal No.6 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN1) terminal No.17 (CAN_L) and body earth

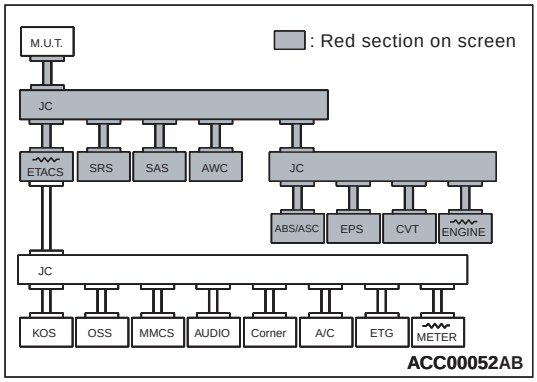
OK: 4.0 V or less

(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 7.
NO : <More than 4.0 V> Go to Step 5.

STEP 5. M.U.T.-III CAN bus diagnostics [CVT-ECU connector disconnected]

(1) Disconnect CVT-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN1) and the CVT-ECU connector.
NO : Check the CVT-ECU connector, and repair if necessary. If the CVT-ECU connector is in good condition, go to Step 6.

STEP 6. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the CVT-ECU connector, and repair if necessary. If the CVT-ECU connector is in good condition, replace the CVT-ECU.

STEP 7. Check the CAN-C between joint connector (CAN1) and the EPS-ECU. Voltage measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN1) terminal No.8 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN1) terminal No.19 (CAN_L) and body earth

OK: 4.0 V or less

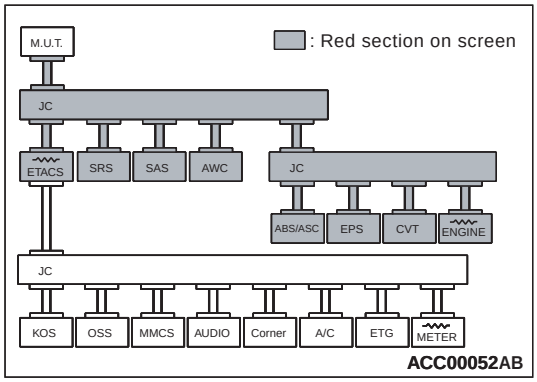
(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 10.
NO : <More than 4.0 V> Go to Step 8.

STEP 8. M.U.T.-III CAN bus diagnostics [EPS-ECU connector disconnected]

(1) Disconnect EPS-ECU connector, and diagnose

by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN1) and the EPS-ECU connector.
NO : Check the EPS-ECU connector, and repair if necessary. If the EPS-ECU connector is in good condition, go to Step 9.

STEP 9. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the EPS-ECU connector, and repair if necessary. If the EPS-ECU connector is in good condition, replace the EPS-ECU.

STEP 10. Check the CAN-C between joint connector (CAN1) and the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>. Voltage measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

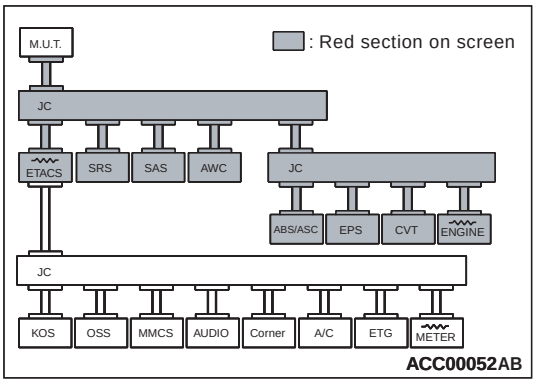
⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN1) terminal No.9 (CAN_H) and body earth
OK: 4.0 V or less
(4) Voltage between joint connector (CAN1) terminal No.20 (CAN_L) and body earth
OK: 4.0 V or less
(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <4.0 V or less> Repair intermediate connector C-126, or the wiring harness between joint connector (CAN1) and the intermediate connector C-126.
NO : <More than 4.0 V> Go to Step 11.

STEP 11. M.U.T.-III CAN bus diagnostics [ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector disconnected]

(1) Disconnect ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN1) and the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector.
NO : Check the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector, and repair if necessary. If the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector is in good condition, go to Step 12.

STEP 12. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector, and repair if necessary. If the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector is in good condition, replace the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>.

STEP 13. Check the CAN-C between joint connector (CAN-HI) and the ETACS-ECU. Voltage measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-HI) terminal No.11 (CAN_H) and body earth
OK: 4.0 V or less
(4) Voltage between joint connector (CAN-HI) terminal No.22 (CAN_L) and body earth
OK: 4.0 V or less
(5) Disconnect the negative battery terminal.

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES <2WD> : <4.0 V or less> Go to Step 17.
YES <4WD> : <4.0 V or less> Go to Step 14.
NO : <More than 4.0 V> Repair the wiring harness between joint connector (CAN-HI) and the ETACS-ECU connector.

STEP 14. Check the CAN-C between joint connector (CAN-HI) and the 4WD-ECU. Voltage measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

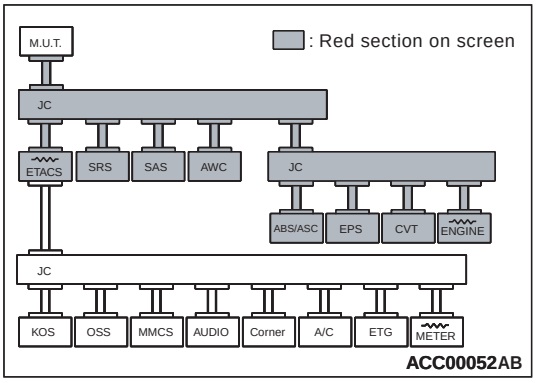
(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-HI) terminal No.5 (CAN_H) and body earth
OK: 4.0 V or less
(4) Voltage between joint connector (CAN-HI) terminal No.16 (CAN_L) and body earth
OK: 4.0 V or less
(5) Disconnect the negative battery terminal.

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 17.
NO : <More than 4.0 V> Go to Step 15.

STEP 15. M.U.T.-III CAN bus diagnostics [4WD-ECU connector disconnected]

(1) Disconnect 4WD-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?

YES : Check the intermediate connector, and repair if necessary. If the intermediate connector is in good condition, repair the wiring harness between joint connector (CAN-HI) and the 4WD-ECU connector.
NO : Check the 4WD-ECU connector, and repair if necessary. If the 4WD-ECU connector is in good condition, go to Step 16.

STEP 16. M.U.T.-III CAN bus diagnostics (retest the system)
Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the 4WD-ECU connector, and repair if necessary. If the 4WD-ECU connector is in good condition, replace the 4WD-ECU.

STEP 17. Check the CAN-C between joint connector (CAN-HI) and the steering wheel sensor. Voltage measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

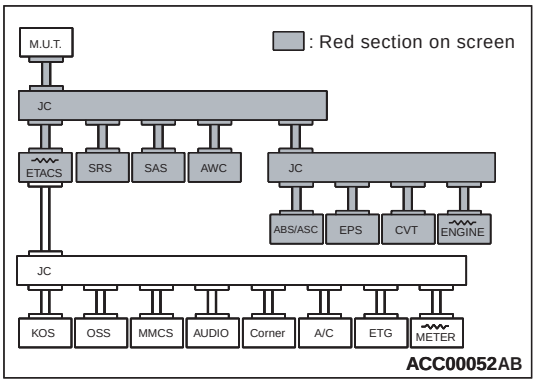
⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-HI) terminal No.6 (CAN_H) and body earth
OK: 4.0 V or less
(4) Voltage between joint connector (CAN-HI) terminal No.17 (CAN_L) and body earth
OK: 4.0 V or less
(5) Disconnect the negative battery terminal.

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 20.
NO : <More than 4.0 V> Go to Step 18.

STEP 18. M.U.T.-III CAN bus diagnostics [steering wheel sensor connector disconnected]
(1) Disconnect steering wheel sensor connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-HI) and the steering wheel sensor connector.
NO : Check the steering wheel sensor connector, and repair if necessary. If the steering wheel sensor connector is in good condition, go to Step 19.

STEP 19. M.U.T.-III CAN bus diagnostics (retest the system)
Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the steering wheel sensor connector, and repair if necessary. If the steering wheel sensor connector is in good condition, replace the steering wheel sensor.

STEP 20. Check the CAN-C between joint connector (CAN-HI) and the SRS-ECU. Voltage measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-HI) terminal No.30 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN-HI) terminal No.29 (CAN_L) and body earth

OK: 4.0 V or less

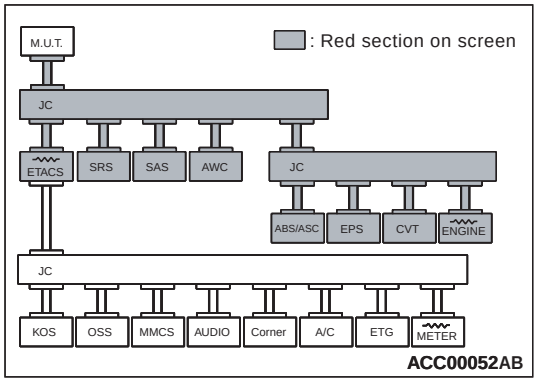
(5) Disconnect the negative battery terminal.

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 23.
NO : <More than 4.0 V> Go to Step 21.

STEP 21. M.U.T.-III CAN bus diagnostics [SRS-ECU connector disconnected]

(1) Disconnect SRS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-HI) and the SRS-ECU connector.
NO : Check the SRS-ECU connector, and repair if necessary. If the SRS-ECU connector is in good condition, go to Step 22.

STEP 22. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the SRS-ECU connector, and repair if necessary. If the SRS-ECU connector is in good condition, replace the SRS-ECU.

STEP 23. Check the CAN-C between joint connector (CAN-HI) and the diagnosis connector. Voltage measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-HI) terminal No.9 (CAN_H) and body earth

OK: Less than 1.0 V

(4) Voltage between joint connector (CAN-HI) terminal No.20 (CAN_L) and body earth

OK: Less than 1.0 V

(5) Disconnect the negative battery terminal.

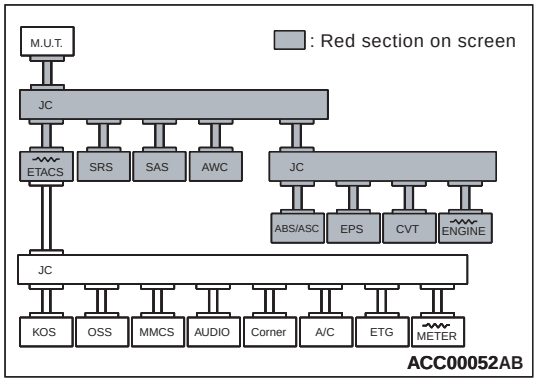
⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

YES : <Less than 1.0 V> Repair the intermediate connector C-126, or the wiring harness between joint connector (CAN-HI) and the intermediate connector C-126.
NO : <1.0 V or more> Repair the diagnosis connector, or the wiring harness between joint connector (CAN-HI) and the diagnosis connector.

STEP 24. M.U.T.-III CAN bus diagnostics [engine-ECU connector disconnected]

(1) Disconnect engine-ECU connector and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Go to Step 26.
NO : Check the engine-ECU connector, and repair if necessary. If the engine-ECU connector is in good condition, go to Step 25.

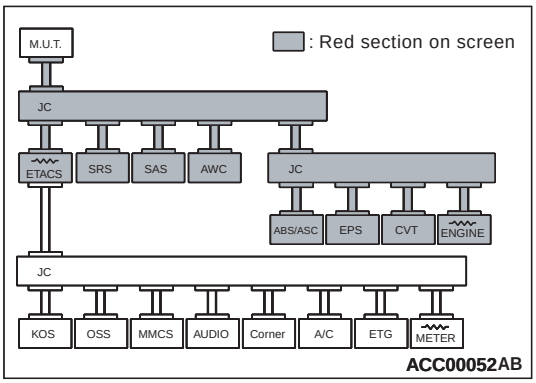
STEP 25. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the engine-ECU connector, and repair if necessary. If the engine-ECU connector is in good condition, replace the engine-ECU.

STEP 26. M.U.T.-III CAN bus diagnostics [ETACS-ECU connector disconnected]

(1) Disconnect ETACS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, go to Step 27.

STEP 27. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, replace the ETACS-ECU.

Diagnosis Item 3: Diagnose shorts in the earth to CAN-C.

⚠ CAUTION

- **When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.**
- **When the ETACS-ECU of vehicles without KOS is replaced, the encrypted code of the ignition key needs to be registered to the ETACS-ECU. (If the encrypted code is not registered, the engine cannot be started. Register the encrypted code as described in GROUP 54A, Immobilizer System – How to Register Key ID .)**

TROUBLE JUDGEMENT CONDITIONS

The M.U.T.-III judges the trouble when it is impossible to receive the periodically sent data and the voltage of CAN_H or CAN_L line is less than 1.0 V.

TROUBLESHOOTING HINTS

- Malfunction of the wiring harness
- Malfunction of the connector
- Malfunction of the ETACS-ECU
- Malfunction of the SRS-ECU
- Malfunction of the steering wheel sensor
- Malfunction of the 4WD-ECU <4WD>
- Malfunction of the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>
- Malfunction of the EPS-ECU
- Malfunction of the CVT-ECU
- Malfunction of the engine-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check the CAN-C. Resistance measurement at diagnosis connector.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-5.

NOTE: This inspection allows you to check that there is a short to earth in either CAN_H line or CAN_L line. Thus, in the following steps, check the CAN-C that is defective.

(1) Disconnect engine-ECU connector and ETACS-ECU connector, and measure the resistance at harness side of diagnosis connector.

⚠ CAUTION

When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between diagnosis connector terminal No.6 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between diagnosis connector terminal No.14 (CAN_L) and body earth

OK: 1 kΩ or more

Q: Is the check result normal?

YES : <Both of the measurement results show 1 kΩ or more> Go to Step 24.

NO : <Either of CAN_H line or CAN_L line the measurement results show less than 1 kΩ> Go to Step 2.

STEP 2. Check the CAN-C. Resistance measurement at C-126 intermediate connector.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the intermediate connector, and measure at its female-side intermediate connector (at the front wiring harness side).

⚠ CAUTION

When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between C-126 intermediate connector terminal No.15 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between C-126 intermediate connector terminal No.16 (CAN_L) and body earth

OK: 1 kΩ or more

Q: Is the check result normal?

YES : <1 kΩ or more> Go to Step 13.

NO : <Less than 1 kΩ > Go to Step 3.

STEP 3. Check the CAN-C between joint connector (CAN1) and the engine-ECU. Resistance measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN1) terminal No.10 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN2) terminal No.21 (CAN_L) and body earth

OK: 1 kΩ or more

Q: Is the check result normal?
YES <CVT> : <1 kΩ or more> Go to Step 4.
NO : <Less than 1 kΩ > Repair the wiring harness between joint connector (CAN1) and the engine-ECU connector.

STEP 4. Check the CAN-C between joint connector (CAN1) and the CVT-ECU. Resistance measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN1) terminal No.6 (CAN_H) and body earth

OK: 1 kΩ or more

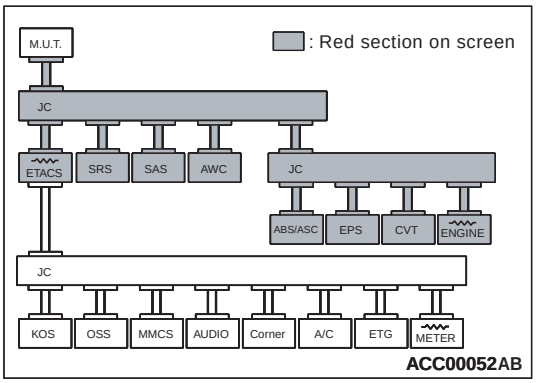
(4) Resistance between joint connector (CAN1) terminal No.17 (CAN_L) and body earth

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 7.
NO : <Less than 1 kΩ > Go to Step 5.

STEP 5. M.U.T.-III CAN bus diagnostics [CVT-ECU connector disconnected]

(1) Disconnect CVT-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN bus lines, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN1) and the CVT-ECU connector.
NO : Check the CVT-ECU connector, and repair if necessary. If the CVT-ECU connector is in good condition, go to Step 6.

STEP 6. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the CVT-ECU connector, and repair if necessary. If the CVT-ECU connector is in good condition, replace the CVT-ECU.

STEP 7. Check the CAN line between joint connector (CAN1) and the EPS-ECU. Resistance measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between joint connector (CAN1) terminal No.8 (CAN_H) and body earth

OK: 1 kΩ or more

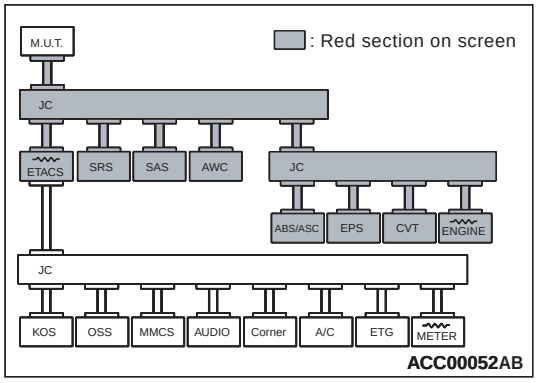
(4) Resistance between joint connector (CAN1) terminal No.19 (CAN_L) and body earth

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 10.
NO : <Less than 1 kΩ > Go to Step 8.

STEP 8. M.U.T.-III CAN bus diagnostics [EPS-ECU connector disconnected]

(1) Disconnect EPS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN1) and the EPS-ECU connector.
NO : Check the EPS-ECU connector, and repair if necessary. If the EPS-ECU connector is in good condition, go to Step 9.

STEP 9. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the EPS-ECU connector, and repair if necessary. If the EPS-ECU connector is in good condition, replace the EPS-ECU.

STEP 10. Check the CAN-C between joint connector (CAN1) and the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>. Resistance measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between joint connector (CAN1) terminal No.9 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN1) terminal No.20 (CAN_L) and body earth

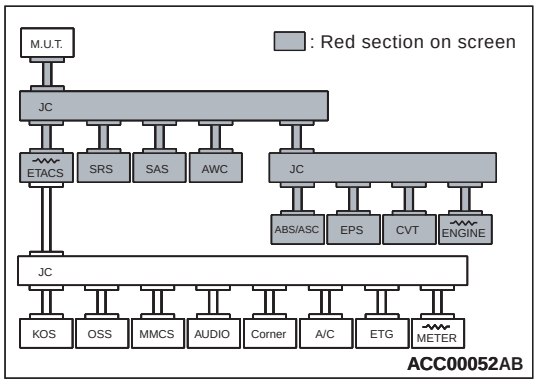
OK: 1 kΩ or more

Q: Is the check result normal?

YES : <1 kΩ or more> Repair intermediate connector C-126, or the wiring harness between joint connector (CAN1) and intermediate connector C-126.
NO : <Less than 1 kΩ > Go to Step 11.

STEP 11. M.U.T.-III CAN bus diagnostics [ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector disconnected]

(1) Disconnect ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN1) and the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector.
NO : Check the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector, and repair if necessary. If the EPS-ECU connector is in good condition, go to Step 12.

STEP 12. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector, and repair if necessary. If the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector is in good condition, replace the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>.

STEP 13. Check CAN line between joint connector (CAN-HI) and the ETACS-ECU. Resistance measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between joint connector (CAN-HI) terminal No.11 (CAN_H) and body earth
OK: 1 kΩ or more
(4) Resistance between joint connector (CAN-HI) terminal No.22 (CAN_L) and body earth
OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES <2WD> : <1 kΩ or more> Go to Step 17.
YES <4WD> : <1 kΩ or more> Go to Step 14.
NO : <Less than 1 kΩ > Repair the wiring harness between joint connector (CAN-HI) and the ETACS-ECU connector.

STEP 14. Check the CAN-C between joint connector (CAN-HI) and the 4WD-ECU. Resistance measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-HI) terminal No.5 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-HI) terminal No.16 (CAN_L) and body earth

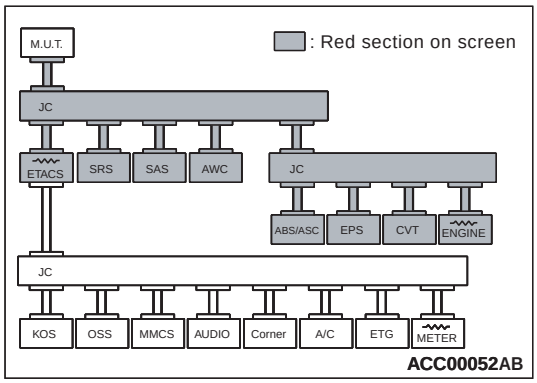
OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 17.
NO : <Less than 1 kΩ > Go to Step 15.

STEP 15. M.U.T.-III CAN bus diagnostics [4WD-ECU connector disconnected]

(1) Disconnect 4WD-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN bus lines, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Check the intermediate connector, and repair if necessary. If the intermediate connector is in good condition, repair the wiring harness between joint connector (CAN-HI) and the 4WD-ECU connector.
NO : Check the 4WD-ECU connector, and repair if necessary. If the 4WD-ECU connector is in good condition, go to Step 16.

STEP 16. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the 4WD-ECU connector, and repair if necessary. If the 4WD-ECU connector is in good condition, replace the 4WD-ECU.

STEP 17. Check the CAN-C between joint connector (CAN-HI) and the steering wheel sensor. Resistance measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-HI) terminal No.6 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-HI)

terminal No.17 (CAN_L) and body earth

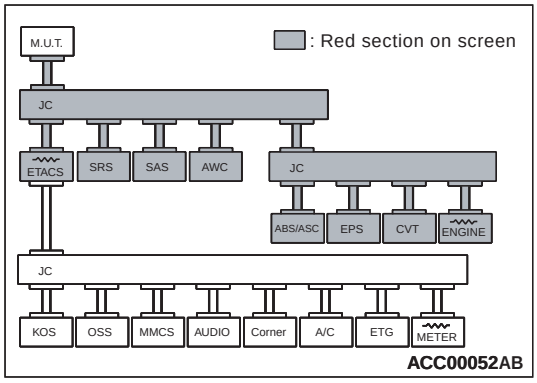
OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 20.
NO : <Less than 1 kΩ > Go to Step 18.

STEP 18. M.U.T.-III CAN bus diagnostics [steering wheel sensor connector disconnected]

(1) Disconnect steering wheel sensor connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-HI) and the steering wheel sensor connector.
NO : Check the steering wheel sensor connector, and repair if necessary. If the steering wheel sensor connector is in good condition, go to Step 19.

STEP 19. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the steering wheel sensor connector, and repair if necessary. If the steering wheel sensor connector is in good condition, replace the steering wheel sensor.

STEP 20. Check the CAN-C between joint connector (CAN-HI) and the SRS-ECU. Resistance measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between joint connector (CAN-HI) terminal No.30 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-HI) terminal No.29 (CAN_L) and body earth

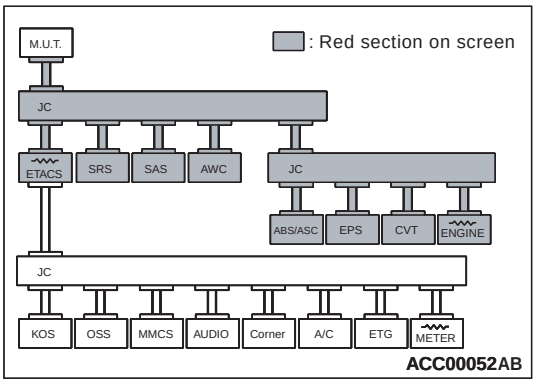
OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 23.
NO : <Less than 1 kΩ > Go to Step 21.

STEP 21. M.U.T.-III CAN bus diagnostics [SRS-ECU connector disconnected]

(1) Disconnect SRS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN bus lines, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?

YES : Repair the wiring harness between joint connector (CAN-HI) and the SRS-ECU connector.
NO : Check the SRS-ECU connector, and repair if necessary. If the SRS-ECU connector is in good condition, go to Step 22.

STEP 22. M.U.T.-III CAN bus diagnostics (retest the system)
Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the SRS-ECU connector, and repair if necessary. If the SRS-ECU connector is in good condition, replace the SRS-ECU.

STEP 23. Check the CAN-C between joint connector (CAN-HI) and the diagnosis connector. Resistance measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between joint connector (CAN-HI) terminal No.9 (CAN_H) and body earth

OK: 1 kΩ or more

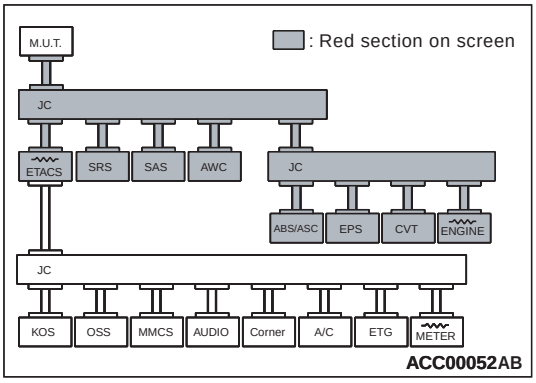
(4) Resistance between joint connector (CAN-HI) terminal No.20 (CAN_L) and body earth

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the intermediate connector C-126, or the wiring harness between joint connector (CAN-HI) and the intermediate connector C-126.
NO : <Less than 1 kΩ > Repair the diagnosis connector, or the wiring harness between joint connector (CAN-HI) and the diagnosis connector.

STEP 24. M.U.T.-III CAN bus diagnostics [engine-ECU connector disconnected]
(1) Disconnect engine-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

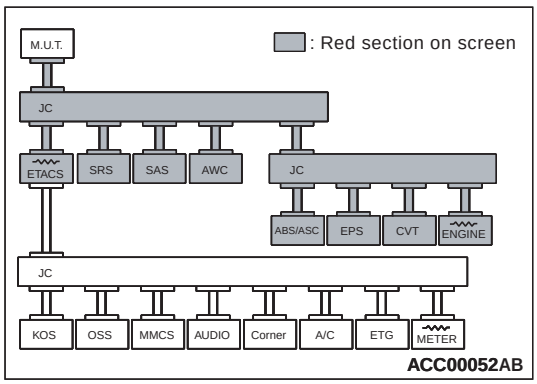
Q: Does M.U.T.-III screen correspond to the illustration?
YES : Go to Step 26.
NO : Check the engine-ECU connector, and repair if necessary. If the engine-ECU connector is in good condition, go to Step 25.

STEP 25. M.U.T.-III CAN bus diagnostics (retest the system)
Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the engine-ECU connector, and repair if necessary. If the engine-ECU connector is in good condition, replace the engine-ECU.

STEP 26. M.U.T.-III CAN bus diagnostics [ETACS-ECU connector disconnected]
(1) Disconnect ETACS-ECU connector, and

diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).

NO : Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, go to Step 27.

STEP 27. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).

NO : Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, replace the ETACS-ECU.

Diagnosis Item 4: Diagnose shorts between CAN_H and L lines (CAN-C)

⚠ CAUTION

- **When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.**
- **When the ETACS-ECU of vehicles without KOS is replaced, the encrypted code of the ignition key needs to be registered to the ETACS-ECU. (If the encrypted code is not registered, the engine cannot be started. Register the encrypted code as described in GROUP 54A, Immobilizer System – How to Register Key ID .)**

TROUBLE JUDGEMENT

When all of the following conditions are met, the M.U.T.-III determines that a short circuit is present between CAN_L and CAN_H lines.

- The M.U.T.-III cannot receive the periodic transmission data from any ECUs.
- The voltage between CAN-C (CAN_L and CAN_H lines) is 1.0 V or more, 4.0 V or less.
- The resistance at CAN-C (CAN_L and CAN_H lines) is 2 Ω or less.

TROUBLESHOOTING HINTS

- Malfunction of the wiring harness
- Malfunction of the connector
- Malfunction of the ETACS-ECU
- Malfunction of the SRS-ECU
- Malfunction of the steering wheel sensor
- Malfunction of the 4WD-ECU <4WD>
- Malfunction of the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>
- Malfunction of the EPS-ECU
- Malfunction of the CVT-ECU
- Malfunction of the engine-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: C-126 intermediate connector

⚠ CAUTION

The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the defective connector.

STEP 2. Resistance measurement at C-126 intermediate connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the connector, and measure at its female-side intermediate connector (at the front wiring harness side).
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

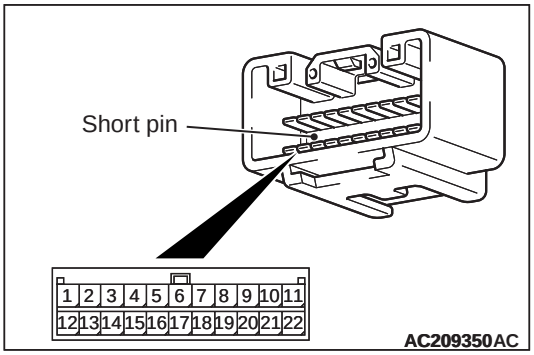
(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between C-126 intermediate connector terminal Nos.15 and 16

OK: 120 ± 20 Ω

Q: Is the check result normal?
YES : <Within 120 ± 20 Ω> Go to Step 12.
NO : <Not within 120 ± 20 Ω> Go to Step 3.

STEP 3. Connector check: joint connector (CAN1)

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.



When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair a defective connector or replace the joint connector.

STEP 4. Resistance measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN1) terminal Nos.10 and 21

OK: 120 ± 20 Ω

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <Within 120 ± 20 Ω> Go to Step 6.
NO : <Not within 120 ± 20 Ω> Go to Step 5.

STEP 5. Resistance measurement at engine-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the engine-ECU, and measure at the equipment side.
(2) Resistance between engine-ECU connector terminal Nos.90 and 91

OK: 120 ± 20 Ω

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

YES : <Within 120 ± 20 Ω> Repair the wiring harness between joint connector (CAN1) and the engine-ECU connector.
NO : <Not within 120 ± 20 Ω> Check the engine-ECU connector, and repair if necessary. If the engine-ECU connector is in good condition, replace the engine-ECU.

STEP 6. Resistance measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN1) terminal Nos.6 and 17

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 8.
NO : <Less than 1 kΩ> Go to Step 7.

STEP 7. Resistance measurement at CVT-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the CVT-ECU, and measure at the equipment side.
(2) Resistance between CVT-ECU connector terminal Nos.4 and 5

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Check intermediate connector, and repair if necessary. If the intermediate connector is in good condition, repair the wiring harness between joint connector (CAN1) and the CVT-ECU connector.
NO : <Less than 1 kΩ> Check the CVT-ECU connector, and repair if necessary. If the CVT-ECU connector is in good condition, replace the CVT-ECU.

STEP 8. Resistance measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN1) terminal Nos.8 and 19

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 10.
NO : <Less than 1 kΩ> Go to Step 9.

STEP 9. Resistance measurement at EPS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the EPS-ECU, and measure at the equipment side.
(2) Resistance between EPS-ECU connector

terminal Nos.3 and 4

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN1) and the EPS-ECU connector.
NO : <Less than 1 kΩ> Check the EPS-ECU connector, and repair if necessary. If the EPS-ECU connector is in good condition, replace the EPS-ECU.

STEP 10. Resistance measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.
(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN1) terminal Nos.9 and 20

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN1) and C-126 intermediate connector.
NO : <Less than 1 kΩ> Go to Step 11.

STEP 11. Resistance measurement at ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.
(1) Remove the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>, and measure at the equipment side.
(2) Resistance between ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector terminal Nos.10 and 11

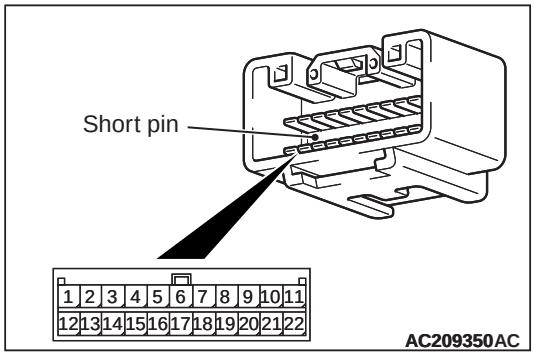
OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN1) and the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector.
NO : <Less than 1 kΩ> Check the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector, and repair if necessary. If the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector is in good condition, replace the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>.

STEP 12. Connector check: joint connector (CAN-HI)

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.



When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?

YES : Go to Step 13.
NO : Repair a defective connector or replace the joint connector.

STEP 13. Resistance measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-HI) terminal Nos.11 and 22

OK: 120 ± 20 Ω

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES <2WD> : <Within 120 ± 20 Ω> Go to Step 17.
YES <4WD> : <Within 120 ± 20 Ω> Go to Step 15.
NO : <Not within 120 ± 20 Ω> Go to Step 14.

STEP 14. Resistance measurement at ETACS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the ETACS-ECU, and measure at the equipment side.
(2) Resistance at ETACS-ECU connector terminal Nos.18 and 19

OK: 120 ± 20 Ω

Q: Is the check result normal?
YES : <Within 120 ± 20 Ω> Repair the wiring harness between joint connector (CAN-HI) and the ETACS-ECU connector.
NO : <Not within 120 ± 20 Ω> Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, replace the ETACS-ECU.

STEP 15. Resistance measurement at joint connector (CAN1).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-HI) terminal Nos.5 and 16

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 17.
NO : <Less than 1 kΩ> Go to Step 16.

STEP 16. Resistance measurement at 4WD-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the 4WD-ECU, and measure at the equipment side.
(2) Resistance at 4WD-ECU connector terminal Nos.5 and 13

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <1 kΩ or more> Check intermediate connector, and repair if necessary. If the intermediate connector is in good condition, repair the wiring harness between joint connector (CAN-HI) and the 4WD-ECU connector.
NO : <Less than 1 kΩ> Check the 4WD-ECU connector, and repair if necessary. If the 4WD-ECU connector is in good condition, replace the 4WD-ECU.

STEP 17. Resistance measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-HI) terminal Nos.6 and 17

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 19.
NO : <Less than 1 kΩ> Go to Step 18.

STEP 18. Resistance measurement at steering wheel sensor connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the steering wheel sensor, and measure at the equipment side.
(2) Resistance at steering wheel sensor connector terminal Nos.3 and 4

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN-HI) and the steering wheel sensor connector.
NO : <Less than 1 kΩ> Check the steering wheel sensor connector, and repair if necessary. If the steering wheel sensor connector is in good condition, replace the steering wheel sensor.

STEP 19. Resistance measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-HI) terminal Nos.8 and 19

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 21.
NO : <Less than 1 kΩ> Go to Step 20.

STEP 20. Resistance measurement at SRS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the SRS-ECU, and measure at the equipment side.
(2) Resistance at SRS-ECU connector terminal Nos.29 and 30

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN-HI) and the SRS-ECU connector.
NO : <Less than 1 kΩ> Check the SRS-ECU connector, and repair if necessary. If the SRS-ECU connector is in good condition, replace the SRS-ECU.

STEP 21. Resistance measurement at joint connector (CAN-HI).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the joint connector (CAN-HI), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-HI) terminal Nos.9 and 20

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN-HI) and the C-126 intermediate connector.
NO : <Less than 1 kΩ> Check the diagnosis connector, and repair if necessary. If the diagnosis connector is in good condition, repair the wiring harness between joint connector (CAN-HI) and the diagnosis connector.

Diagnosis Item 5: Communication with no ECUs is possible (CAN-C-Mid).

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

TROUBLESHOOTING HINTS

- Malfunction in CAN-C-Mid (short to earth or power supply, wire short to one another)
- Malfunction in the ECUs which are interconnected via CAN-C-Mid (internal error)
- Malfunction (open circuit) of wiring harness, connector (s) between the ETACS-ECU and joint connector(s)

DIAGNOSIS PROCEDURE

STEP 1. Check the CAN-C-Mid for short to power supply. Voltage measurement at ETACS-ECU connector by backprobing.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(2) Voltage between ETACS-ECU connector terminal No.17 (CAN_H) and body earth by backprobing

OK: Less than 4.0 V

(3) Voltage between ETACS-ECU connector terminal No.16 (CAN_L) and body earth by backprobing

OK: Less than 4.0 V

Q: Is the check result normal?
YES <Voltage is less than 4.0 V in both CAN_H and CAN_L> : Go to Step 2.
NO <Voltage is 4.0 V or more in either CAN_H or CAN_L> : Perform diagnosis item 6 "Diagnose shorts in the power supply to CAN-C-Mid". Refer to P.54C-40.

STEP 2. Check the CAN-C-Mid for short to earth. Resistance measurement at ETACS-ECU connector by backprobing.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is

disconnected.
(3) Resistance between ETACS-ECU connector terminal No.17 (CAN_H) and body earth by backprobing

OK: 1 kΩ or more

(4) Resistance between ETACS-ECU connector terminal No.16 (CAN_L) and body earth by backprobing

OK: 1 kΩ or more

Q: Is the check result normal?
YES <Resistance value is 1 kΩ or more in both CAN_H and CAN_L> : Go to Step 3.
NO <Resistance value is less than 1 kΩ in either CAN_H or CAN_L> : Perform diagnosis item 7 "Diagnose shorts in the earth to CAN-C-Mid". Refer to P.54C-48.

STEP 3. Check the CAN-C-Mid for short to each other. Resistance measurement at ETACS-ECU connector by backprobing.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between ETACS-ECU connector terminal Nos.16 and 17 by backprobing

OK: 60 ± 10 Ω

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO <Resistance value is less than 60 ± 10 Ω> : Perform diagnosis Item 8 "Diagnose shorts between CAN_H and L lines (CAN-C-Mid)". Refer to P.54C-56.
NO <Resistance value is 1 kΩ or more> : Check the wires between ETACS-ECU connector and joint connector (CAN-LO) for open circuit, and check the terminal resistors in the combination meter and the ETACS-ECU for open circuit. Then repair or replace if necessary.

Diagnosis Item 6: Diagnose shorts in the power supply to CAN-C-Mid.

⚠ CAUTION
- **When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.**
- **When the ETACS-ECU of vehicles without KOS is replaced, the encrypted code of the ignition key needs to be registered to the ETACS-ECU. (If the encrypted code is not registered, the engine cannot be started. Register the encrypted code as described in GROUP 54A, Immobilizer System – How to Register Key ID .)**

TROUBLE JUDGEMENT CONDITIONS

The M.U.T.-III judges the trouble when it is impossible to receive the periodically sent data and the voltage of CAN_H or CAN_L line is more than 4.0 V.

TROUBLESHOOTING HINTS

- Malfunction of the wiring harness
- Malfunction of the connector
- Malfunction of the ETACS-ECU
- Malfunction of the A/C-ECU
- Malfunction of the KOS-ECU <Vehicles with KOS>
- Malfunction of the OSS-ECU <Vehicles with OSS>
- Malfunction of the CAN box unit <vehicles with MMCS>
- Malfunction of the radio and CD player <vehicles with radio and CD player>
- Malfunction of the corner sensor/back sensor-ECU <vehicles with reversing sensor system>
- Malfunction of the electric tailgate control unit <vehicles with electric tailgate>
- Malfunction of the combination meter

DIAGNOSIS PROCEDURE

STEP 1. Check the CAN-C-Mid. Voltage measurement at ETACS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

NOTE: This inspection allows you to check that there is a short to power supply in either CAN_H line or CAN_L line. Thus, in the following steps, check the CAN-C-Mid that is defective.

(1) Disconnect combination meter connector and ETACS-ECU connector, and measure the voltage at the harness side of ETACS-ECU connector.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between ETACS-ECU connector terminal No.17 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between ETACS-ECU connector terminal No.16 (CAN_L) and body earth

OK: 4.0 V or less

(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <Both of the measurement results show 4.0 V or less> Go to Step 25.
NO : <Either of CAN_H line or CAN_L line the measurement results show more than 4.0 V> Go to Step 2.

STEP 2. Check the CAN-C-Mid between joint connector (CAN-LO) and the ETACS-ECU. Voltage measurement at joint connector (CAN-LO).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-LO) terminal No.11 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN-LO) terminal No.22 (CAN_L) and body earth

OK: 4.0 V or less

(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 3.
NO : <More than 4.0 V> Repair the wiring harness between joint connector (CAN-LO) and the ETACS-ECU connector.

STEP 3. Check the CAN-C-Mid between joint connector (CAN-LO) and the A/C-ECU. Voltage measurement at joint connector (CAN-LO).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-LO) terminal No.6 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN-LO) terminal No.17 (CAN_L) and body earth

OK: 4.0 V or less

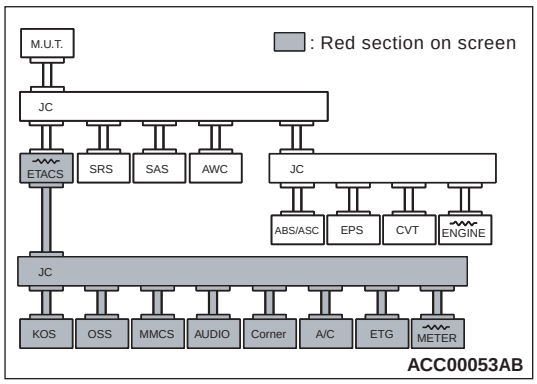
(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 6.
NO : <More than 4.0 V> Go to Step 4.

STEP 4. M.U.T.-III CAN bus diagnostics [A/C-ECU connector disconnected]

(1) Disconnect A/C-ECU connector, and diagnose by

using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-LO) and the A/C-ECU connector.
NO : Check the A/C-ECU connector, and repair if necessary. If the A/C-ECU connector is in good condition, go to Step 5.

STEP 5. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the A/C-ECU connector, and repair if necessary. If the A/C-ECU connector is in good condition, replace the A/C-ECU.

STEP 6. Check the CAN-C-Mid between joint connector (CAN-LO) and the electric tailgate control unit <vehicles with electric tailgate>. Voltage measurement at joint connector (CAN-LO).

NOTE: Steps 6 to 8 are only for vehicles with electric tailgate. On vehicles without it, go to Step 9.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-LO) terminal No.8 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN-LO) terminal No.19 (CAN_L) and body earth

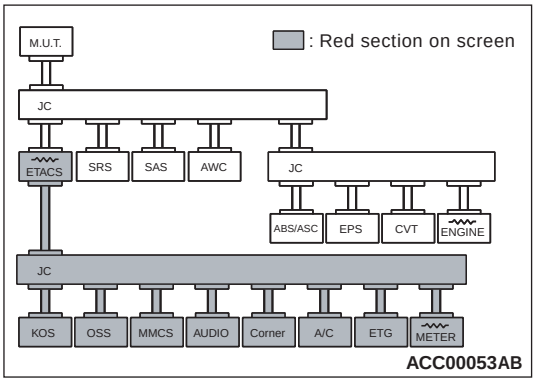
OK: 4.0 V or less

(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 9.
NO : <More than 4.0 V> Go to Step 7.

STEP 7. M.U.T.-III CAN bus diagnostics [electric tailgate control unit connector disconnected]

(1) Disconnect electric tailgate control unit connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Check the intermediate connector, and repair if necessary. If the intermediate connector is in good condition, repair the wiring harness between joint connector (CAN-LO) and the electric tailgate control unit connector.
NO : Check the electric tailgate control unit connector, and repair if necessary. If the electric tailgate control unit connector is in good condition, go to Step 8.

STEP 8. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the electric tailgate control unit connector, and repair if necessary. If the electric tailgate control unit connector is in good condition, replace the electric tailgate control unit.

STEP 9. Check the CAN-C-Mid between joint connector (CAN-LO) and the corner sensor/back sensor-ECU <vehicles with reversing sensor system>. Voltage measurement at joint connector (CAN-LO).

NOTE: Steps 9 to 11 are only for vehicles with reversing sensor system. On vehicles without it, go to Step 12.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

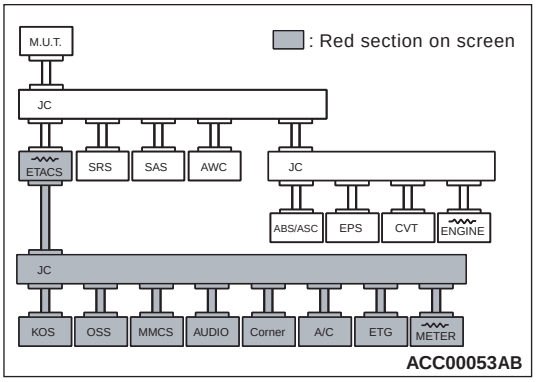
⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-LO) terminal No.4 (CAN_H) and body earth
OK: 4.0 V or less
(4) Voltage between joint connector (CAN-LO) terminal No.15 (CAN_L) and body earth
OK: 4.0 V or less
(5) Disconnect the negative battery terminal.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 12.
NO : <More than 4.0 V> Go to Step 10.

STEP 10. M.U.T.-III CAN bus diagnostics [corner sensor/back sensor-ECU connector disconnected]

(1) Disconnect corner sensor/back sensor-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-LO) and the corner sensor/back sensor-ECU connector.
NO : Check the corner sensor/back sensor-ECU connector, and repair if necessary. If the corner sensor/back sensor-ECU connector is in good condition, go to Step 11 .

STEP 11. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the corner sensor/back sensor-ECU connector, and repair if necessary. If the corner sensor/back sensor-ECU connector is in good condition, replace the corner sensor/back sensor-ECU.

STEP 12. Check the CAN-C-Mid between joint connector (CAN-LO) and the radio and CD player. Voltage measurement at joint connector (CAN-LO).

NOTE: Steps 12 to 14 are only for vehicles with radio and CD player system. On vehicles without it, go to Step 15.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-LO) terminal No.7 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN-LO) terminal No.18 (CAN_L) and body earth

OK: 4.0 V or less

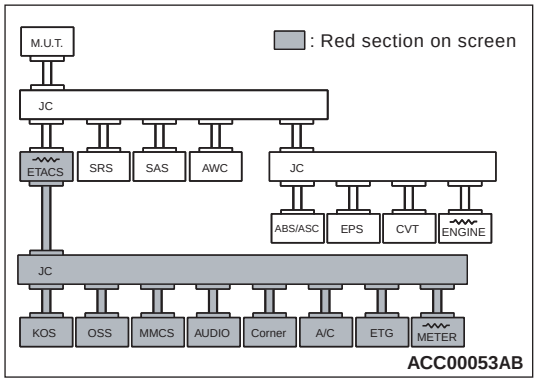
(5) Disconnect the negative battery terminal.

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 15.
NO : <More than 4.0 V> Go to Step 13.

STEP 13. M.U.T.-III CAN bus diagnostics [radio and CD player connector disconnected]

(1) Disconnect radio and CD player connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-LO) and the radio and CD player connector.
NO : Check the radio and CD player connector, and repair if necessary. If the radio and CD player connector is in good condition, go to Step 14.

STEP 14. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the radio and CD player connector, and repair if necessary. If the radio and CD player connector is in good condition, replace the radio and CD player.

STEP 15. Check the CAN-C-Mid between joint connector (CAN-LO) and the CAN box unit. Voltage measurement at joint connector (CAN-LO).

NOTE: Steps 15 to 17 are only for vehicles with MMCS. On vehicles without it, go to Step 18 .

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-LO) terminal No.3 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN-LO) terminal No.14 (CAN_L) and body earth

OK: 4.0 V or less

(5) Disconnect the negative battery terminal.

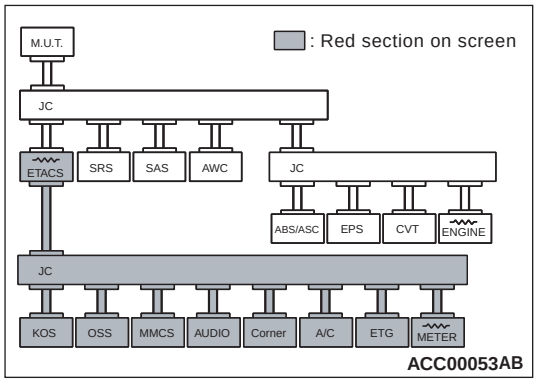
⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

YES : <4.0 V or less> Go to Step 18.
NO : <More than 4.0 V> Go to Step 16.

STEP 16. M.U.T.-III CAN bus diagnostics [CAN box unit connector disconnected]

(1) Disconnect CAN box unit connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-LO) and the CAN box unit connector.
NO : Check the CAN box unit connector, and repair if necessary. If the CAN box unit connector is in good condition, go to Step 17.

STEP 17. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the CAN box unit connector, and repair if necessary. If the CAN box unit connector is in good condition, replace the CAN box unit.

STEP 18. Check the CAN-C-Mid between joint connector (CAN-LO) and the OSS-ECU. Voltage measurement at joint connector (CAN-LO).

NOTE: Steps 18 to 20 are only for vehicles with OSS. On vehicles without it, go to Step 21.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-LO) terminal No.10 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN-LO) terminal No.21 (CAN_L) and body earth

OK: 4.0 V or less

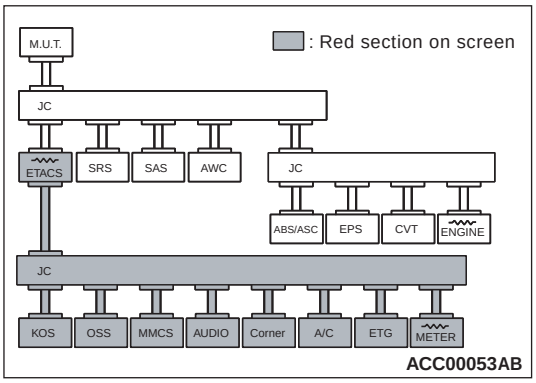
(5) Disconnect the negative battery terminal.

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 21.
NO : <More than 4.0 V> Go to Step 19.

STEP 19. M.U.T.-III CAN bus diagnostics [OSS-ECU connector disconnected]

(1) Disconnect OSS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?

YES : Repair the wiring harness between joint connector (CAN-LO) and the OSS-ECU connector.
NO : Check the OSS-ECU connector, and repair if necessary. If the OSS-ECU connector is in good condition, go to Step 20.

STEP 20. M.U.T.-III CAN bus diagnostics (retest the system)
Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the OSS-ECU connector, and repair if necessary. If the OSS-ECU connector is in good condition, replace the OSS-ECU.

STEP 21. Check the CAN-C-Mid between joint connector (CAN-LO) and the KOS-ECU. Voltage measurement at joint connector (CAN-LO).

NOTE: Steps 21 to 23 are only for vehicles with KOS. On vehicles without it, go to Step 24.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

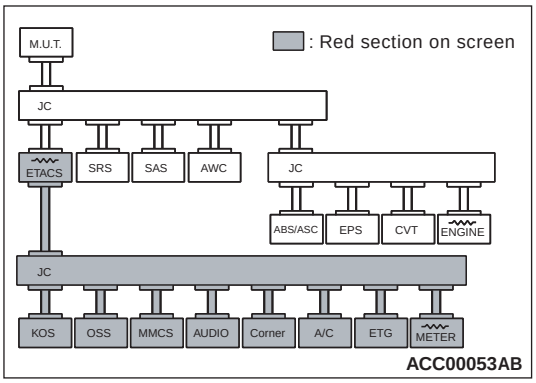
⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-LO) terminal No.5 (CAN_H) and body earth
OK: 4.0 V or less
(4) Voltage between joint connector (CAN-LO) terminal No.16 (CAN_L) and body earth
OK: 4.0 V or less
(5) Disconnect the negative battery terminal.

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <4.0 V or less> Go to Step 24.
NO : <More than 4.0 V> Go to Step 22.

STEP 22. M.U.T.-III CAN bus diagnostics [KOS-ECU connector disconnected]
(1) Disconnect KOS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-LO) and the KOS-ECU connector.
NO : Check the KOS-ECU connector, and repair if necessary. If the KOS-ECU connector is in good condition, go to Step 23.

STEP 23. M.U.T.-III CAN bus diagnostics (retest the system)
Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the KOS-ECU connector, and repair if necessary. If the KOS-ECU connector is in good condition, replace the KOS-ECU.

STEP 24. Check the CAN-C-Mid between joint connector (CAN-LO) and the combination meter. Voltage measurement at joint connector (CAN-LO).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and

measure at the wiring harness side.
(2) Connect the negative battery terminal, and turn the ignition switch to the ON position.
(3) Voltage between joint connector (CAN-LO) terminal No.9 (CAN_H) and body earth

OK: 4.0 V or less

(4) Voltage between joint connector (CAN-LO) terminal No.20 (CAN_L) and body earth

OK: 4.0 V or less

(5) Disconnect the negative battery terminal.

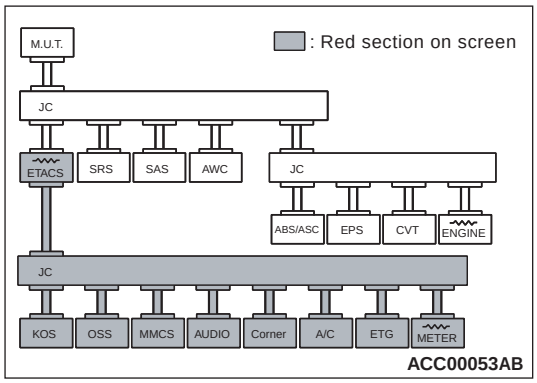
Q: Is the check result normal?

YES : <4.0 V or less> Repair intermediate connector C-26.

NO : <More than 4.0 V> Repair the wiring harness between joint connector (CAN-LO) and the combination meter connector.

STEP 25. M.U.T.-III CAN bus diagnostics [combination meter connector disconnected]

(1) Disconnect combination meter connector and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?

YES : Go to Step 27

NO : Check the combination meter connector, and repair if necessary. If the combination meter connector is in good condition, go to Step 26.

STEP 26. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

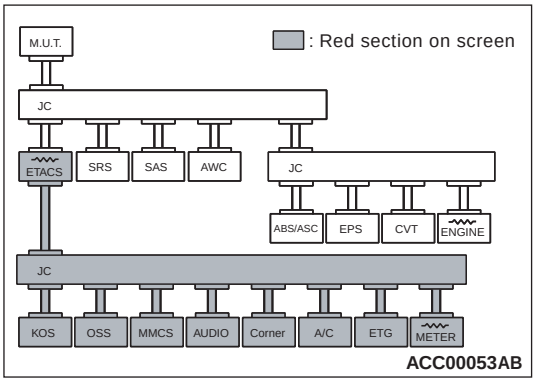
Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).

NO : Check the combination meter connector, and repair if necessary. If the combination meter connector is in good condition, replace the combination meter.

STEP 27. M.U.T.-III CAN bus diagnostics [ETACS-ECU connector disconnected]

(1) Disconnect ETACS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).

NO : Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, go to Step 28.

STEP 28. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, replace the ETACS-ECU.

Diagnosis Item 7: Diagnose shorts in the earth to CAN-C-Mid.

⚠ CAUTION
- **When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.**
- **When the ETACS-ECU of vehicles without KOS is replaced, the encrypted code of the ignition key needs to be registered to the ETACS-ECU. (If the encrypted code is not registered, the engine cannot be started. Register the encrypted code as described in GROUP 54A, Immobilizer System – How to Register Key ID .)**

TROUBLE JUDGEMENT CONDITIONS

The M.U.T.-III judges the trouble when it is impossible to receive the periodically sent data and the voltage of CAN_H or CAN_L line is less than 1.0 V.

TROUBLESHOOTING HINTS

- Malfunction of the wiring harness
- Malfunction of the connector
- Malfunction of the ETACS-ECU
- Malfunction of the A/C-ECU
- Malfunction of the KOS-ECU <Vehicles with KOS>
- Malfunction of the OSS-ECU <Vehicles with OSS>
- Malfunction of the CAN box unit <vehicles with MMCS>
- Malfunction of the radio and CD player <vehicles with radio and CD player>
- Malfunction of the corner sensor/back sensor-ECU <vehicles with reversing sensor system>
- Malfunction of the electric tailgate control unit <vehicles with electric tailgate>
- Malfunction of the combination meter

DIAGNOSIS PROCEDURE

STEP 1. Check the CAN-C-Mid. Resistance measurement at ETACS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

NOTE: This inspection allows you to check that there is a short to earth in either CAN_H line or CAN_L line. Thus, in the following steps, check the CAN-C-Mid that is defective.

(1) Disconnect combination meter connector and ETACS-ECU connector, and measure the resistance at harness side of ETACS-ECU connector.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between ETACS-ECU connector terminal No.17 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between ETACS-ECU connector terminal No.16 (CAN_L) and body earth

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <Both of the measurement results show 1 kΩ or more> Go to Step 25.
NO : <Either of CAN_H line or CAN_L line the measurement results show less than 1 kΩ> Go to Step 2.

STEP 2. Check the CAN-C-Mid between joint connector (CAN-LO) and the ETACS-ECU. Resistance measurement at joint connector (CAN-LO).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-LO) terminal No.11 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-LO) terminal No.22 (CAN_L) and body earth

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 3.
NO : <Less than 1 kΩ > Repair the wiring harness between joint connector (CAN-LO) and the ETACS-ECU connector.

STEP 3. Check the CAN-C-Mid between joint connector (CAN-LO) and the A/C-ECU. Resistance measurement at joint connector (CAN-LO).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-LO) terminal No.6 (CAN_H) and body earth

OK: 1 kΩ or more

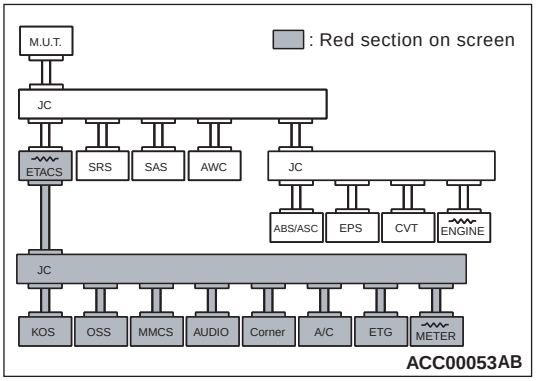
(4) Resistance between joint connector (CAN-LO) terminal No.17 (CAN_L) and body earth

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 6.
NO : <Less than 1 kΩ > Go to Step 4.

STEP 4. M.U.T.-III CAN bus diagnostics [A/C-ECU connector disconnected]

(1) Disconnect A/C-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-LO) and the A/C-ECU connector.
NO : Check the A/C-ECU connector, and repair if necessary. If the A/C-ECU connector is in good condition, go to Step 5.

STEP 5. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the A/C-ECU connector, and repair if necessary. If the A/C-ECU connector is in good condition, replace the A/C-ECU.

STEP 6. Check the CAN-C-Mid between joint connector (CAN-LO) and the electric tailgate control unit <vehicles with electric tailgate>. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 6 to 8 are only for vehicles with electric tailgate. On vehicles without it, go to Step 9.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.

⚠ CAUTION

When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-LO) terminal No.8 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-LO) terminal No.19 (CAN_L) and body earth

OK: 1 kΩ or more

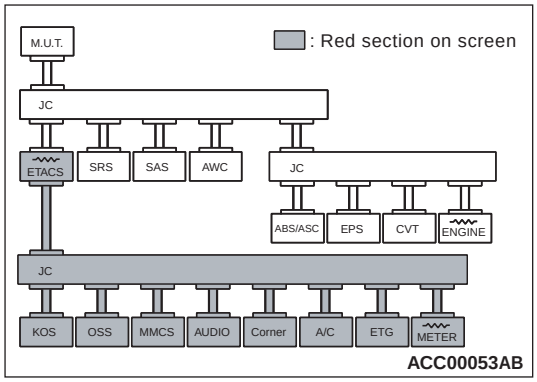
Q: Is the check result normal?

YES : <1 kΩ or more> Go to Step 9.

NO : <Less than 1 kΩ > Go to Step 7.

STEP 7. M.U.T.-III CAN bus diagnostics [electric tailgate control unit connector disconnected]

(1) Disconnect electric tailgate control unit connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?

YES : Check the intermediate connector, and repair if necessary. If the intermediate connector is in good condition, repair the wiring harness between joint connector (CAN-LO) and the electric tailgate control unit connector.

NO : Check the electric tailgate control unit connector, and repair if necessary. If the electric tailgate control unit connector is in good condition, go to Step 8.

STEP 8. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).

NO : Check the electric tailgate control unit connector, and repair if necessary. If the electric tailgate control unit connector is in good condition, replace the electric tailgate control unit.

STEP 9. Check the CAN-C-Mid between joint connector (CAN-LO) and the corner sensor/back sensor-ECU <vehicles with reversing sensor system>. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 9 to 11 are only for vehicles with reversing sensor system. On vehicles without it, go to Step 12.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.

⚠ CAUTION

When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-LO)

terminal No.4 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-LO) terminal No.15 (CAN_L) and body earth

OK: 1 kΩ or more

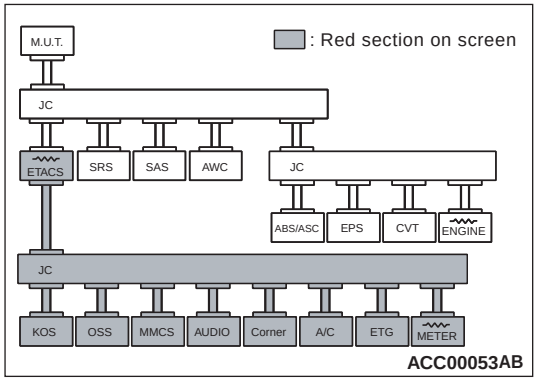
Q: Is the check result normal?

YES : <1 kΩ or more> Go to Step 12.

NO : <Less than 1 kΩ > Go to Step 10.

STEP 10. M.U.T.-III CAN bus diagnostics [corner sensor/back sensor-ECU connector disconnected]

(1) Disconnect corner sensor/back sensor-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?

YES : Repair the wiring harness between joint connector (CAN-LO) and the corner sensor/back sensor-ECU connector.

NO : Check the corner sensor/back sensor-ECU connector, and repair if necessary. If the corner sensor/back sensor-ECU connector is in good condition, go to Step 11.

STEP 11. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).

NO : Check the corner sensor/back sensor-ECU connector, and repair if necessary. If the corner sensor/back sensor-ECU connector is in good condition, replace the corner sensor/back sensor-ECU.

STEP 12. Check the CAN-C-Mid between joint connector (CAN-LO) and the radio and CD player. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 12 to 14 are only for vehicles with radio and CD player system. On vehicles without it, go to Step 15.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.

⚠ CAUTION

When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-LO) terminal No.7 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-LO) terminal No.18 (CAN_L) and body earth

OK: 1 kΩ or more

⚠ CAUTION

Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

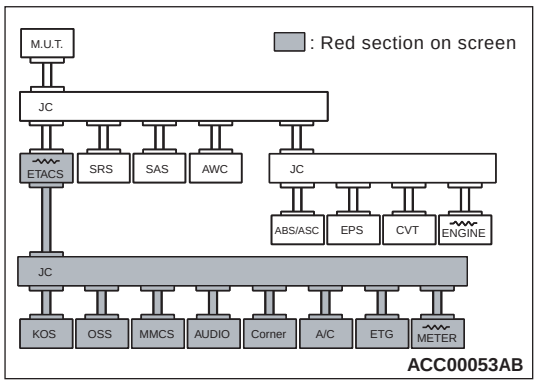
YES : <1 kΩ or more> Go to Step 15.

NO : <Less than 1 kΩ > Go to Step 13.

STEP 13. M.U.T.-III CAN bus diagnostics [radio and CD player connector disconnected]

(1) Disconnect radio and CD player connector, and

diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?

YES : Repair the wiring harness between joint connector (CAN-LO) and the radio and CD player connector.

NO : Check the radio and CD player connector, and repair if necessary. If the radio and CD player connector is in good condition, go to Step 14.

STEP 14. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).

NO : Check the radio and CD player connector, and repair if necessary. If the radio and CD player connector is in good condition, replace the radio and CD player.

STEP 15. Check the CAN-C-Mid between joint connector (CAN-LO) and the CAN box unit. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 15 to 17 are only for vehicles with MMCS. On vehicles without it, go to Step 18.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.

⚠ CAUTION

When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-LO) terminal No.3 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-LO) terminal No.14 (CAN_L) and body earth

OK: 1 kΩ or more

⚠ CAUTION

Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

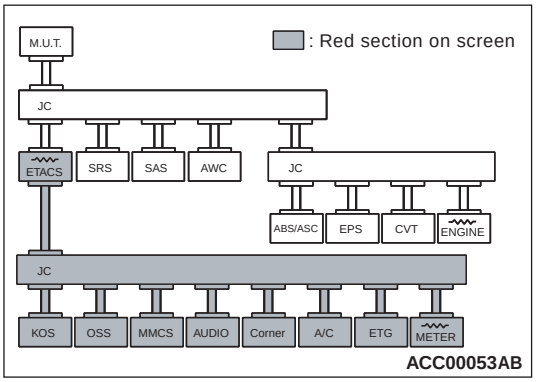
Q: Is the check result normal?

YES : <1 kΩ or more> Go to Step 18.

NO : <Less than 1 kΩ > Go to Step 16.

STEP 16. M.U.T.-III CAN bus diagnostics [CAN box unit connector disconnected]

(1) Disconnect CAN box unit connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN1) and the CAN box unit connector.
NO : Check the CAN box unit connector, and repair if necessary. If the CAN box unit connector is in good condition, go to Step 17.

STEP 17. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the CAN box unit connector, and repair if necessary. If the CAN box unit connector is in good condition, replace the CAN box unit.

STEP 18. Check the CAN-C-Mid between joint connector (CAN-LO) and the OSS-ECU. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 18 to 20 are only for vehicles with OSS. On vehicles without it, go to Step 21.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

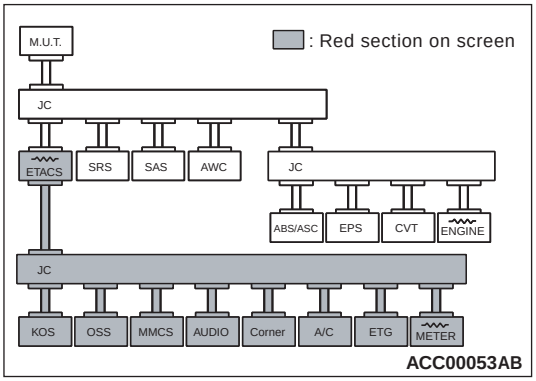
(2) Ensure that the negative battery terminal is disconnected.
(3) Resistance between joint connector (CAN-LO) terminal No.10 (CAN_H) and body earth
OK: 1 kΩ or more
(4) Resistance between joint connector (CAN-LO) terminal No.21 (CAN_L) and body earth
OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 21.
NO : <Less than 1 kΩ > Go to Step 19.

STEP 19. M.U.T.-III CAN bus diagnostics [OSS-ECU connector disconnected]

(1) Disconnect OSS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-LO) and the OSS-ECU connector.
NO : Check the OSS-ECU connector, and repair if necessary. If the OSS-ECU connector is in good condition, go to Step 20.

STEP 20. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the OSS-ECU connector, and repair if necessary. If the OSS-ECU connector is in good condition, replace the OSS-ECU.

STEP 21. Check the CAN-C-Mid between joint connector (CAN-LO) and the KOS-ECU. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 21 to 23 are only for vehicles with KOS. On vehicles without it, go to Step 24.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-LO) terminal No.5 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-LO) terminal No.16 (CAN_L) and body earth

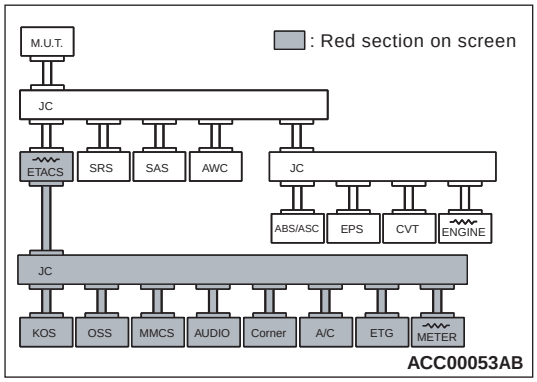
OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 24.
NO : <Less than 1 kΩ > Go to Step 22.

STEP 22. M.U.T.-III CAN bus diagnostics [KOS-ECU connector disconnected]

(1) Disconnect KOS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Repair the wiring harness between joint connector (CAN-LO) and the KOS-ECU connector.
NO : Check the KOS-ECU connector, and repair if necessary. If the KOS-ECU connector is in good condition, go to Step 23.

STEP 23. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the KOS-ECU connector, and repair if necessary. If the KOS-ECU connector is in good condition, replace the KOS-ECU.

STEP 24. Check the CAN-C-Mid between joint connector (CAN-LO) and the combination meter. Resistance measurement at joint connector (CAN-LO).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(2) Ensure that the negative battery terminal is disconnected.

(3) Resistance between joint connector (CAN-LO) terminal No.9 (CAN_H) and body earth

OK: 1 kΩ or more

(4) Resistance between joint connector (CAN-LO) terminal No.20 (CAN_L) and body earth

OK: 1 kΩ or more

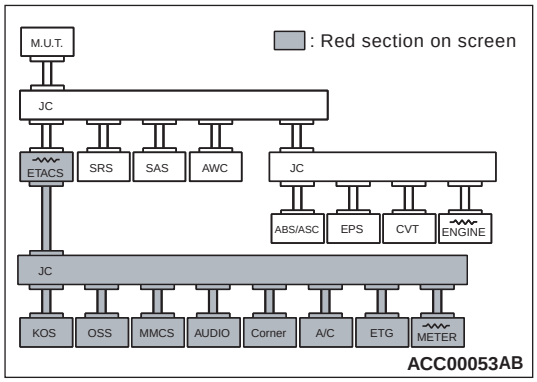
⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

YES : <1 kΩ or more> Repair intermediate connector C-26.
NO : <Less than 1 kΩ > Repair the wiring harness between joint connector (CAN-LO) and the combination meter connector.

STEP 25. M.U.T.-III CAN bus diagnostics [combination meter connector disconnected]

(1) Disconnect combination meter connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : Go to Step 27
NO : Check the combination meter connector, and repair if necessary. If the combination meter connector is in good condition, go to Step 26.

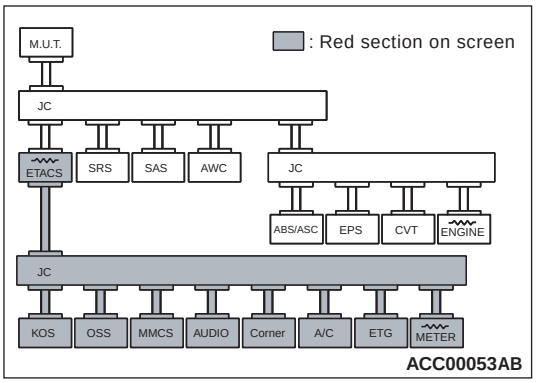
STEP 26. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the combination meter connector, and repair if necessary. If the combination meter connector is in good condition, replace the combination meter.

STEP 27. M.U.T.-III CAN bus diagnostics [ETACS-ECU connector disconnected]

(1) Disconnect ETACS-ECU connector, and diagnose by using the M.U.T.-III.



(2) Diagnose CAN-C-Mid, and check if M.U.T.-III screen is as shown in the illustration.

Q: Does M.U.T.-III screen correspond to the illustration?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, go to Step 28.

STEP 28. M.U.T.-III CAN bus diagnostics (retest the system)

Diagnose CAN-C-Mid, and check if M.U.T.-III screen shows normal state.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, replace the ETACS-ECU.

Diagnosis Item 8: Diagnose shorts between CAN_H and L lines (CAN-C-Mid).

⚠ CAUTION

- **When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.**
- **When the ETACS-ECU of vehicles without KOS is replaced, the encrypted code of the ignition key needs to be registered to the ETACS-ECU. (If the encrypted code is not registered, the engine cannot be started. Register the encrypted code as described in GROUP 54A, Immobilizer System – How to Register Key ID .)**

TROUBLE JUDGEMENT

When all of the following conditions are met, the M.U.T.-III determines that a short circuit is present between CAN_L and CAN_H lines.

- The M.U.T.-III cannot receive the periodic transmission data from any ECUs.
- The voltage between CAN-C-Mid (CAN_L and CAN_H lines) is 1.0 V or more, 4.0 V or less.
- The resistance at CAN-C-Mid (CAN_L and CAN_H lines) is 2 Ω or less.

TROUBLESHOOTING HINTS

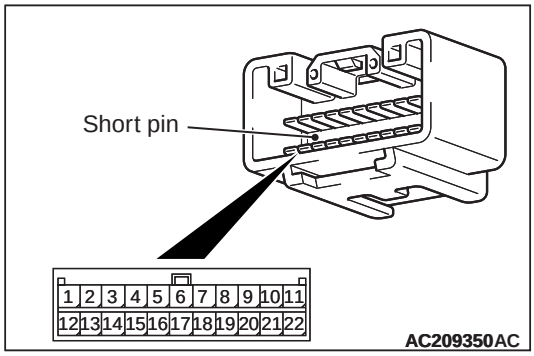
- Malfunction of the wiring harness
- Malfunction of the connector
- Malfunction of the ETACS-ECU
- Malfunction of the A/C-ECU
- Malfunction of the KOS-ECU <Vehicles with KOS>
- Malfunction of the OSS-ECU <Vehicles with OSS>
- Malfunction of the CAN box unit <vehicles with MMCS>
- Malfunction of the radio and CD player <vehicles with radio and CD player>
- Malfunction of the corner sensor/back sensor-ECU <vehicles with reversing sensor system>
- Malfunction of the electric tailgate control unit <vehicles with electric tailgate>
- Malfunction of the combination meter

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-LO)

⚠ CAUTION

The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.



When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2
NO : Repair a defective connector or replace the joint connector.

STEP 2. Resistance measurement at joint connector (CAN-LO).

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION

When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-LO)

terminal Nos.11 and 22

OK: 120 ± 20 Ω

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <Within 120 ± 20 Ω> Go to Step 4.
NO : <Not within 120 ± 20 Ω> Go to Step 3.

STEP 3. Resistance measurement at ETACS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the ETACS-ECU, and measure at the equipment side.
(2) Resistance between ETACS-ECU connector terminal Nos.16 and 17

OK: 120 ± 20 Ω

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <Within 120 ± 20 Ω> Repair the wiring harness between joint connector (CAN-LO) and the ETACS-ECU connector.
NO : <Not within 120 ± 20 Ω> Check the ETACS-ECU connector, and repair if necessary. If the ETACS-ECU connector is in good condition, replace the ETACS-ECU.

STEP 4. Resistance measurement at joint connector (CAN-LO).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-LO) terminal Nos.6 and 17

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 6.
NO : <Less than 1 kΩ> Go to Step 5.

STEP 5. Resistance measurement at A/C-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the A/C-ECU, and measure at the equipment side.
(2) Resistance between A/C-ECU connector terminal Nos.31 and 32

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN-LO) and the A/C-ECU connector.
NO : <Less than 1 kΩ> Check the A/C-ECU connector, and repair if necessary. If the A/C-ECU connector is in good condition, replace the A/C-ECU.

STEP 6. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 6 and 7 are only for vehicles with electric tailgate. On vehicles without it, go to Step 8.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is

disconnected.
(4) Resistance between joint connector (CAN-LO) terminal Nos.8 and 19

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 8.
NO : <Less than 1 kΩ> Go to Step 7.

STEP 7. Resistance measurement at electric tailgate control unit connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.
(1) Remove the electric tailgate control unit, and measure at the equipment side.
(2) Resistance between electric tailgate control unit connector terminal Nos.7 and 8

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Check the intermediate connector, and repair if necessary. If the intermediate connector is in good condition, repair the wiring harness between joint connector (CAN-LO) and the electric tailgate control unit connector.
NO : <Less than 1 kΩ> Check the electric tailgate control unit connector, and repair if necessary. If the electric tailgate control unit connector is in good condition, replace the electric tailgate control unit.

STEP 8. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 8 and 9 are only for vehicles with reversing sensor system. On vehicles without it, go to Step 10.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.
(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-LO) terminal Nos.4 and 15

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 10.
NO : <Less than 1 kΩ> Go to Step 9.

STEP 9. Resistance measurement at corner sensor/back sensor-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.
(1) Remove the corner sensor/back sensor-ECU, and measure at the equipment side.
(2) Resistance between corner sensor/back sensor-ECU connector terminal Nos.19 and 20

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN-LO) and the corner sensor/back sensor-ECU connector.
NO : <Less than 1 kΩ> Check the corner sensor/back sensor-ECU connector, and repair if necessary. If the corner sensor/back sensor-ECU connector is in good condition, replace the corner sensor/back sensor-ECU.

STEP 10. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 10 and 11 are only for vehicles with radio and CD player system. On vehicles without it, go to Step 12.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION

When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-LO) terminal Nos.7 and 18

OK: 1 kΩ or more

⚠ CAUTION

Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

YES : <1 kΩ or more> Go to Step 12.
NO : <Less than 1 kΩ> Go to Step 11.

STEP 11. Resistance measurement at radio and CD player connector.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the radio and CD player, and measure at the equipment side.
(2) Resistance at radio and CD player connector terminal Nos.3 and 13

OK: 1 kΩ or more

Q: Is the check result normal?

YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN-LO) and the radio and CD player connector.
NO : <Less than 1 kΩ> Check the radio and CD player connector, and repair if necessary. If the radio and CD player connector is in good condition, replace the radio and CD player.

STEP 12. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 12 and 13 are only for vehicles with MMCS. On vehicles without it, go to Step 14 .

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION

When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-LO) terminal Nos.3 and 14

OK: 1 kΩ or more

⚠ CAUTION

Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

YES : <1 kΩ or more> Go to Step 14.
NO : <Less than 1 kΩ> Go to Step 13.

STEP 13. Resistance measurement at CAN box unit connector.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the CAN box unit, and measure at the equipment side.
(2) Resistance at CAN box unit connector terminal Nos.13 and 14

OK: 1 kΩ or more

Q: Is the check result normal?

YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN-LO) and the CAN box unit connector.
NO : <Less than 1 kΩ> Check the CAN box unit connector, and repair if necessary. If the CAN box unit connector is in good condition, replace the CAN box unit.

STEP 14. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 14 and 15 are only for vehicles with OSS. On vehicles without it, go to Step 16 .

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-LO) terminal Nos.10 and 21

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 16.
NO : <Less than 1 kΩ> Go to Step 15.

STEP 15. Resistance measurement at OSS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the OSS-ECU, and measure at the equipment side.
(2) Resistance at OSS-ECU connector terminal Nos.1 and 14

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN-LO) and the OSS-ECU connector.
NO : <Less than 1 kΩ> Check the OSS-ECU connector, and repair if necessary. If the OSS-ECU connector is in good condition, replace the OSS-ECU.

STEP 16. Resistance measurement at joint connector (CAN-LO).

NOTE: Steps 16 and 17 are only for vehicles with KOS. On vehicles without it, go to Step 18 .

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-LO) terminal Nos.5 and 16

OK: 1 kΩ or more

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <1 kΩ or more> Go to Step 18.
NO : <Less than 1 kΩ> Go to Step 17.

STEP 17. Resistance measurement at KOS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the KOS-ECU, and measure at the equipment side.
(2) Resistance at KOS-ECU connector terminal Nos.2 and 3

OK: 1 kΩ or more

Q: Is the check result normal?
YES : <1 kΩ or more> Repair the wiring harness between joint connector (CAN-LO) and the KOS-ECU connector.
NO : <Less than 1 kΩ> Check the KOS-ECU connector, and repair if necessary. If the KOS-ECU connector is in good condition, replace the KOS-ECU.

STEP 18. Resistance measurement at joint connector (CAN-LO).

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO), and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Resistance between joint connector (CAN-LO) terminal Nos.9 and 20

OK: 120 ± 20 Ω

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

YES : <Within 120 ± 20 Ω> The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).
NO : <Not within 120 ± 20 Ω> Go to Step 19.

STEP 19. Resistance measurement at combination meter connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the combination meter, and measure at the equipment side.
(2) Resistance at combination meter connector terminal Nos.14 and 15

OK: 120 ± 20 Ω

Q: Is the check result normal?

YES : <Within 120 ± 20 Ω> Repair the wiring harness between joint connector (CAN-LO) and the combination meter connector.
NO : <Not within 120 ± 20 Ω> Check the combination meter connector, and repair if necessary. If the combination meter connector is in good condition, replace the combination meter.

Diagnosis Item 9: Diagnose when the M.U.T.-III cannot receive the data sent by ETACS-ECU.

⚠ CAUTION

- **When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.**
- **When the ETACS-ECU of vehicles without KOS is replaced, the encrypted code of the ignition key needs to be registered to the ETACS-ECU. (If the encrypted code is not registered, the engine cannot be started. Register the encrypted code as described in GROUP 54A, Immobilizer System – How to Register Key ID .)**

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the ETACS-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the ETACS-ECU data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from ETACS-ECU cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the ETACS-ECU
- Malfunction of the ETACS-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-HI) and ETACS-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-HI) and ETACS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the joint connector (CAN-HI) and the ETACS-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-HI) terminal No.11 and ETACS-ECU connector terminal No.19

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-HI) terminal No.22 and ETACS-ECU connector terminal No.18

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Go to Step 3 .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-HI) and the ETACS-ECU connector.

STEP 3. Resistance measurement at ETACS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the ETACS-ECU, and measure at the equipment side.
(2) Resistance at ETACS-ECU connector terminal Nos.18 and 19

OK: 120 ± 20 Ω

Q: Is the check result normal?
YES : <Within 120 ± 20 Ω> Power supply to the ETACS-ECU may be suspected. Diagnose the ETACS. Refer to GROUP 54A ETACS – Troubleshooting Refer to .
NO : <Not within 120 ± 20 Ω> Replace the ETACS-ECU.

Diagnosis Item 10: Diagnose when the M.U.T.-III cannot receive the data sent by SRS-ECU

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the SRS-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the SRS-ECU data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from SRS-ECU cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the SRS-ECU
- Malfunction of the SRS-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-HI) and SRS-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-HI) and SRS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI) and the SRS-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-HI) terminal No.8 and SRS-ECU connector terminal No.30
OK: Continuity (2 Ω or less)
(5) Continuity between joint connector (CAN-HI) terminal No.19 and SRS-ECU connector terminal No.29
OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the SRS-ECU may be suspected. Diagnose the SRS. Refer to GROUP 52B – Troubleshooting – .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-HI) and the SRS-ECU connector.

Diagnosis Item 11: Diagnose when the M.U.T.-III cannot receive the data sent by steering wheel sensor.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the steering wheel sensor" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the steering wheel sensor data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from steering wheel sensor cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the steering wheel sensor
- Malfunction of the steering wheel sensor

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-HI) and steering wheel sensor connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-HI) and steering wheel sensor connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI) and the steering wheel sensor connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-HI) terminal No.6 and steering wheel sensor connector terminal No.3

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-HI) terminal No.17 and steering wheel sensor connector terminal No.4

OK: Continuity (2 Ω or less)

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the steering wheel sensor may be suspected. Diagnose the steering wheel sensor. Refer to GROUP 35C – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-HI) and the steering wheel sensor connector.

Diagnosis Item 12: Diagnose when the M.U.T.-III cannot receive the data sent by 4WD-ECU <4WD>.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the 4WD-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the 4WD-ECU data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from 4WD-ECU cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the 4WD-ECU
- Malfunction of the 4WD-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-HI) and 4WD-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-HI) and 4WD-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-HI) and the 4WD-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-HI) terminal No.5 and 4WD-ECU connector terminal No.5

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-HI) terminal No.16 and 4WD-ECU connector terminal No.13

OK: Continuity (2 Ω or less)

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the 4WD-ECU may be suspected. Diagnose the electronic control 4WD. Refer to GROUP 27C – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Check the intermediate connector, and repair if necessary. If the intermediate connector is in good condition, repair the wiring harness between joint connector (CAN-HI) and the 4WD-ECU connector.

Diagnosis Item 13: Diagnose the lines between the joint connectors (CAN-HI and CAN1).

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION
The diagnostic result demonstrates that "diagnose the lines between the joint connectors (CAN-HI and CAN1)" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the engine-ECU data.

TROUBLE JUDGEMENT CONDITIONS
M.U.T.-III judges the trouble when the periodically sent data from engine-ECU cannot be received.

PROBABLE CAUSE
Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. Connector check: C-126 intermediate connector, joint connector (CAN-HI) and joint connector (CAN1)

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-HI) and C-126 intermediate connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the joint connector (CAN-HI) and the intermediate connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF)

position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-HI) terminal No.10 and C-126 intermediate connector terminal No.15

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-HI) terminal No.21 and C-126 intermediate connector terminal No.16

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Go to Step 3 .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-HI) and intermediate connector C-126.

STEP 3. Resistance measurement at joint connector (CAN1) and C-126 intermediate connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1) and the intermediate connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN1) terminal No.11 and C-126 intermediate connector terminal No.15

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN1) terminal No.22 and C-126 intermediate connector terminal No.16

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Follow diagnosis item 9, 10, 11, 12, 14, 15, 16 and 17. Refer to P.54C-11.
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN1) and intermediate connector C-126.

Diagnosis Item 14: Diagnose when the M.U.T.-III cannot receive the data sent by ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>
- Malfunction of the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC>

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN1) and ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN1) and ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1) and the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN1) terminal No.9 and ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector terminal No.11

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN1) terminal No.20 and ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector terminal No.10

OK: Continuity (2 Ω or less)

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> may be suspected. Diagnose the ABS <vehicles without ASC> Refer to GROUP 35B – Troubleshooting , or ASC <vehicles with ASC> Refer to GROUP 35C – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN1) and the ABS-ECU <vehicles without ASC> or ASC-ECU <vehicles with ASC> connector.

Diagnosis Item 15: Diagnose when the M.U.T.-III cannot receive the data sent by EPS-ECU.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the EPS-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the EPS-ECU data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from EPS-ECU cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the EPS-ECU
- Malfunction of the EPS-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN1) and EPS-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN1) and EPS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1) and the EPS-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN1) terminal No.8 and EPS-ECU connector terminal No.4

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN1) terminal No.19 and EPS-ECU connector terminal No.3

OK: Continuity (2 Ω or less)

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the EPS-ECU may be suspected. Diagnose the EPS. Refer to GROUP 37 – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN1) and the EPS-ECU connector.

Diagnosis Item 16: Diagnose when the M.U.T.-III cannot receive the data sent by CVT-ECU.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the CVT-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the CVT-ECU data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from CVT-ECU cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the CVT-ECU
- Malfunction of the CVT-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN1) and CVT-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN1) and CVT-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN1) and the CVT-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN1) terminal No.6 and CVT-ECU connector terminal No.4

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN1) terminal No.17 and CVT-ECU connector terminal No.5

OK: Continuity (2 Ω or less)

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the CVT-ECU may be suspected. Diagnose the CVT. Refer to GROUP 23A – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN1) and the CVT-ECU connector.

Diagnosis Item 17: Diagnose when the M.U.T.-III cannot receive the data sent by engine-ECU.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the engine-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the engine-ECU data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from engine-ECU cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the engine-ECU
- Malfunction of the engine-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN1) and engine-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN1) and engine-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect the joint connector (CAN1) and the engine-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF)

position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN1) terminal No.10 and engine-ECU connector terminal No.90

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN1) terminal No.21 and engine-ECU connector terminal No.91

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Go to Step 3 .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN1) and the engine-ECU.

STEP 3. Resistance measurement at engine-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the engine-ECU, and measure at the equipment side.
(2) Resistance between engine-ECU connector terminal Nos.90 and 91

OK: 120 ± 20 Ω

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <Within 120 ± 20 Ω> Power supply to the engine-ECU may be suspected. Diagnose the fuel system. Refer to GROUP 13A – Troubleshooting .
NO : <Not within 120 ± 20 Ω> Replace the engine-ECU.

Diagnosis Item 18: Diagnose when the M.U.T.-III cannot receive the data sent by KOS-ECU. <Vehicles with KOS>

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION
The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the KOS-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the KOS-ECU data only.

TROUBLE JUDGEMENT CONDITIONS
M.U.T.-III judges the trouble when the periodically sent data from KOS-ECU cannot be received.

PROBABLE CAUSES
- Damaged harness wires and connectors
- Power supply circuit malfunction of the KOS-ECU
- Malfunction of the KOS-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-LO) and KOS-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-LO) and KOS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO) and the KOS-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-LO) terminal No.5 and KOS-ECU connector terminal No.3

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-LO) terminal No.16 and KOS-ECU connector terminal No.2

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the KOS-ECU may be suspected. Diagnose the KOS. Refer to GROUP 42B – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-LO) and the KOS-ECU connector.

Diagnosis Item 19: Diagnose when the M.U.T.-III cannot receive the data sent by OSS-ECU. <Vehicles with OSS>

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the OSS-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the OSS-ECU data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from OSS-ECU cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the OSS-ECU
- Malfunction of the OSS-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-LO) and OSS-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-LO) and OSS-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO) and the

OSS-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-LO) terminal No.10 and OSS-ECU connector terminal No.1

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-LO) terminal No.21 and OSS-ECU connector terminal No.14

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the OSS-ECU may be suspected. Diagnose the OSS. Refer to GROUP 42B – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-LO) and the OSS-ECU connector.

Diagnosis Item 20: Diagnose when the M.U.T.-III cannot receive the data sent by CAN box unit <vehicles with MMCS>.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the CAN box unit" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the CAN box unit data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from CAN box unit cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the CAN box unit
- Malfunction of the CAN box unit

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-LO) and CAN box unit connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-LO) and CAN box unit connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO) and the CAN box unit connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF)

position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-LO) terminal No.3 and CAN box unit connector terminal No.14

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-LO) terminal No.14 and CAN box unit connector terminal No.13

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the CAN box unit may be suspected. Diagnose the MMCS.
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-LO) and the CAN box unit connector.

Diagnosis Item 21: Diagnose when the M.U.T.-III cannot receive the data sent by radio and CD player <vehicles with radio and CD player>.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the radio and CD player" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the radio and CD player data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from radio and CD player cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the radio and CD player
- Malfunction of the radio and CD player

position.

⚠ CAUTION
When measuring the resistance, disconnect the

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-LO) and radio and CD player connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-LO) and radio and CD player connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO) and the radio and CD player connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) **negative battery terminal. For details refer to P.54C-5.**
(3) Ensure that the negative battery terminal is

disconnected.
(4) Continuity between joint connector (CAN-LO) terminal No.7 and radio and CD player connector terminal No.3

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-LO) terminal No.18 and radio and CD player connector terminal No.13

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

YES : <All the resistances measure 2 Ω or less> Power supply to the radio and CD player may be suspected. Diagnose the radio and CD player. Refer to GROUP 54A Radio and CD Player – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-LO) and the radio and CD player connector.

Diagnosis Item 22: Diagnose when the M.U.T.-III cannot receive the data sent by corner sensor/back sensor-ECU <vehicles with reversing sensor system>.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the corner sensor/back sensor-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the corner sensor/back sensor-ECU data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from corner sensor/back sensor-ECU cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the corner sensor/back sensor-ECU
- Malfunction of the corner sensor/back sensor-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-LO) and corner sensor/back sensor-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-LO) and corner sensor/back sensor-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO) and the corner sensor/back sensor-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF)

position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-LO) terminal No.4 and corner sensor/back sensor-ECU connector terminal No.19

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-LO) terminal No.15 and corner sensor/back sensor-ECU connector terminal No.20

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the corner sensor/back sensor-ECU may be suspected. Diagnose the reversing sensor. Refer to GROUP 54A Reversing Sensor – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-LO) and the corner sensor/back sensor-ECU connector.

Diagnosis Item 23: Diagnose when the M.U.T.-III cannot receive the data sent by A/C-ECU.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the A/C-ECU" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the A/C-ECU data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from A/C-ECU cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the A/C-ECU
- Malfunction of the A/C-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-LO) and A/C-ECU connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-LO) and A/C-ECU connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO) and the A/C-ECU connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF) **negative battery terminal. For details refer to P.54C-5.**
(3) Ensure that the negative battery terminal is

position.

⚠ CAUTION
When measuring the resistance, disconnect the

disconnected.
(4) Continuity between joint connector (CAN-LO) terminal No.6 and A/C-ECU connector terminal No.32

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-LO) terminal No.17 and A/C-ECU connector terminal No.31

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?

YES : <All the resistances measure 2 Ω or less> Power supply to the A/C-ECU may be suspected. Diagnose the A/C. Refer to GROUP 55 – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-LO) and the A/C-ECU connector.

Diagnosis Item 24: Diagnose when the M.U.T.-III cannot receive the data sent by electric tailgate control unit <vehicles with electric tailgate>.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the electric tailgate control unit" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the electric tailgate control unit data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from electric tailgate control unit cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the electric tailgate control unit
- Malfunction of the electric tailgate control unit

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-LO) and electric tailgate control unit connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-LO) and electric tailgate control unit connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO) and the electric tailgate control unit connector, and measure at the wiring harness side.
(2) Turn the ignition switch to the LOCK (OFF)

position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-LO) terminal No.8 and electric tailgate control unit connector terminal No.7

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-LO) terminal No.19 and electric tailgate control unit connector terminal No.8

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Power supply to the electric tailgate control unit may be suspected. Diagnose the electric tailgate. Refer to GROUP 42A – Troubleshooting .
NO : <Either or all of the resistances measure more than 2 Ω> Check the intermediate connector, and repair if necessary. If the intermediate connector is in good condition, repair the wiring harness between joint connector (CAN-LO) and the electric tailgate control unit connector.

Diagnosis Item 25: Diagnose when the M.U.T.-III cannot receive the data sent by combination meter.

⚠ CAUTION
When servicing a CAN bus line, earth yourself by touching a metal object such as an unpainted water pipe. If you fail to do, a component connected to the CAN bus line may be broken.

FUNCTION

The diagnostic result demonstrates that "the M.U.T.-III cannot receive the sent data from the combination meter" when the M.U.T.-III checks the periodically sent data from each ECU and cannot receive the combination meter data only.

TROUBLE JUDGEMENT CONDITIONS

M.U.T.-III judges the trouble when the periodically sent data from combination meter cannot be received.

PROBABLE CAUSES

- Damaged harness wires and connectors
- Power supply circuit malfunction of the combination meter
- Malfunction of the combination meter

DIAGNOSIS PROCEDURE

STEP 1. Connector check: joint connector (CAN-LO) and combination meter connector

⚠ CAUTION
The strand end of the twist wire should be within 10 cm from the connector. For details refer to P.54C-5.

When checking the joint connector, ensure that its wiring harness side and its short pins are not damaged.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the defective connector. Replace the joint connector as necessary.

STEP 2. Resistance measurement at joint connector (CAN-LO) and combination meter connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

⚠ CAUTION
The test wiring harness should be used. For details refer to P.54C-5.

(1) Disconnect joint connector (CAN-LO) and the combination meter connector, and measure at the wiring harness side.

(2) Turn the ignition switch to the LOCK (OFF) position.

⚠ CAUTION
When measuring the resistance, disconnect the negative battery terminal. For details refer to P.54C-5.

(3) Ensure that the negative battery terminal is disconnected.
(4) Continuity between joint connector (CAN-LO) terminal No.9 and combination meter connector terminal No.14

OK: Continuity (2 Ω or less)

(5) Continuity between joint connector (CAN-LO) terminal No.20 and combination meter connector terminal No.15

OK: Continuity (2 Ω or less)

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <All the resistances measure 2 Ω or less> Go to Step 3 .
NO : <Either or all of the resistances measure more than 2 Ω> Repair the wiring harness between joint connector (CAN-LO) and the combination meter.

STEP 3. Resistance measurement at combination meter connector.

⚠ CAUTION
A digital multimeter should be used. For details refer to P.54C-5.

(1) Remove the combination meter, and measure at the equipment side.
(2) Resistance between combination meter connector terminal Nos.14 and 15

OK: 120 ± 20 Ω

⚠ CAUTION
Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Is the check result normal?
YES : <Within 120 ± 20 Ω> Power supply to the combination meter may be suspected. Diagnose the combination meter. Refer to GROUP 54A Combination Meter – Troubleshooting .
NO : <Not within 120 ± 20 Ω> Replace the combination meter.

CAN-RELATED DIAGNOSIS CODE TABLE

M1548300302445

Code No.	Code name (M.U.T.-III display)	Output ECU	Action
U0001	Bus error (CAN-C)	CVT-ECU	CAN bus line diagnostics
U0100	Engine CAN timeout	CVT-ECU, 4WD-ECU, ASC-ECU, EPS-ECU, SRS-ECU, Combination meter, ETACS-ECU	
U0101	T/M CAN timeout	Engine-ECU, 4WD-ECU, ASC-ECU, ETACS-ECU	
U0114	4WD CAN timeout	ABS-ECU, ASC-ECU, EPS-ECU, ETACS-ECU	
U0121	ABS/ASC CAN timeout	Engine-ECU, CVT-ECU, 4WD-ECU, ETACS-ECU	
U0126	SAS CAN timeout	4WD-ECU, ASC-ECU	
U0131	EPS CAN timeout	Engine-ECU, ETACS-ECU	
U0141	ETACS CAN timeout	Engine-ECU, CVT-ECU, 4WD-ECU, ABS-ECU, ASC-ECU, EPS-ECU, Electric tailgate control unit, KOS-ECU, OSS-ECU, SRS-ECU, Combination meter, Corner sensor/back sensor-ECU, Radio and CD player, A/C-ECU	
U0151	SRS-ABG CAN timeout	ETACS-ECU	
U0155	Meter CAN timeout	Electric tailgate control unit, KOS-ECU, OSS-ECU, Radio and CD player, Corner sensor/back sensor-ECU, ETACS-ECU, A/C-ECU	
U0164	A/C CAN timeout	Electric tailgate control unit, KOS-ECU, OSS-ECU, Combination meter, Radio and CD player, ETACS-ECU	
U0168	WCM/KOS CAN timeout	Electric tailgate control unit, OSS-ECU, Combination meter, Radio and CD player, ETACS-ECU, A/C-ECU	
U0184	AUDIO CAN timeout	Electric tailgate control unit, Combination meter, ETACS-ECU, A/C-ECU	
U0230	Power Gate CAN timeout	KOS-ECU, Combination meter, Radio and CD player, ETACS-ECU, A/C-ECU	
U0245	AND CAN timeout	Electric tailgate control unit, KOS-ECU, Combination meter, ETACS-ECU, A/C-ECU	
U1000	OSS CAN timeout	Electric tailgate control unit, KOS-ECU, Combination meter, Radio and CD player, ETACS-ECU, A/C-ECU	
U1005	Corner/Back SNS.ECU CAN timeout	Combination meter, ETACS-ECU	
U1073	Bus-off	4WD-ECU, ABS-ECU, ASC-ECU, EPS-ECU	
	Bus-off (CAN-C-Mid)	ETACS-ECU	

Code No.	Code name (M.U.T.-III display)	Output ECU	Action
U0167	Immobilizer CAN communication	Engine-ECU	Diagnose CAN bus lines and confirm input signals.
U0331	ECU internal error	ETACS-ECU	
U0401	Engine (CAN message)	4WD-ECU, ASC-ECU	
U0415	ABS (CAN message)	Engine-ECU	
U0428	SAS (CAN message)	4WD-ECU, ASC-ECU	
U0431	ETACS (CAN message)	4WD-ECU	
U1190	No receive fault detect signal	EPS-ECU, Electric tailgate control unit, KOS-ECU, OSS-ECU, SRS-ECU, Combination meter, Corner sensor/back sensor-ECU, Radio and CD player, A/C-ECU	
U1195	Coding not completed	CVT-ECU, 4WD-ECU, ABS-ECU, ASC-ECU, EPS-ECU, Electric tailgate control unit, KOS-ECU, OSS-ECU, SRS-ECU, Combination meter, Radio and CD player, A/C-ECU	
U1197	Coding data unavailable	CVT-ECU, ABS-ECU, ASC-ECU, EPS-ECU	
U1199	Chassis No. not programmed	SRS-ECU, A/C-ECU	
U119A	Chassis No. mismatch	4WD-ECU, SRS-ECU	
U1425	T/M (CAN message)	4WD-ECU	
U1427	Implausible wheel speed data	4WD-ECU	
U1428	Sensor Cluster (CAN message)	4WD-ECU	