

WINDSHIELD WIPER AND WASHER

GENERAL DESCRIPTION CONCERNING THE WINDSHIELD WIPER AND WASHER

M1549021500257

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80

The following ECUs affect the functions and control of the windshield wiper and washer.

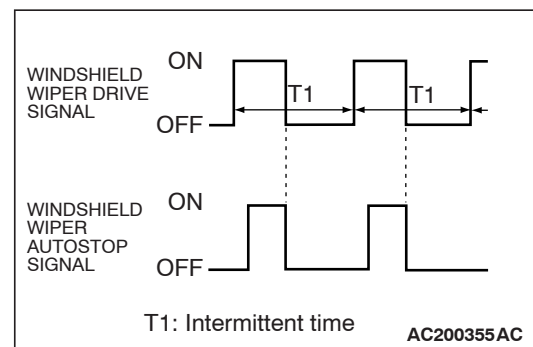
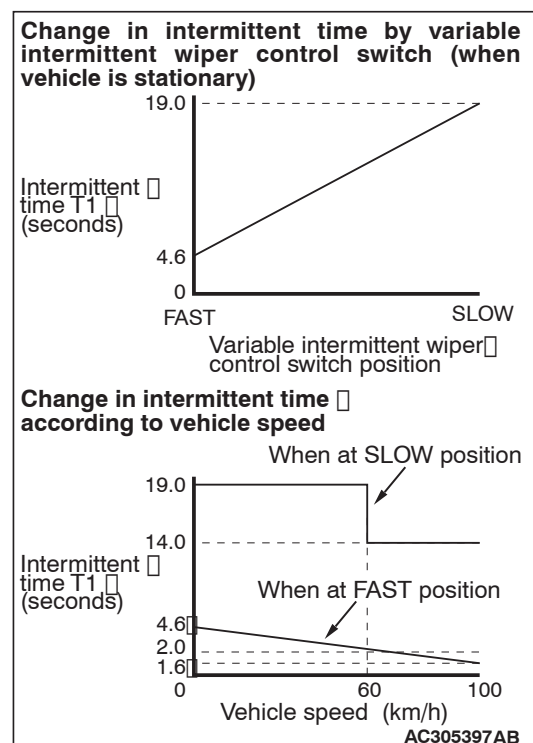
FUNCTION	CONTROL ECU	
Windshield wiper and washer control function	Intermittent control (Vehicle speed-dependent variable type)	ETACS-ECU, front-ECU, column switch
	Mist wiper control	ETACS-ECU, column switch
	Low speed wiper and high speed wiper control	ETACS-ECU, column switch
	Washer control	ETACS-ECU, column switch

Windshield wiper and washer control function

Intermittent control (vehicle speed-dependent variable type)

ETACS-ECU uses the dial position of the variable intermittent wiper control switch and the vehicle speed signal sent by the combination meter to calculate the interval to be sent to the front-ECU.

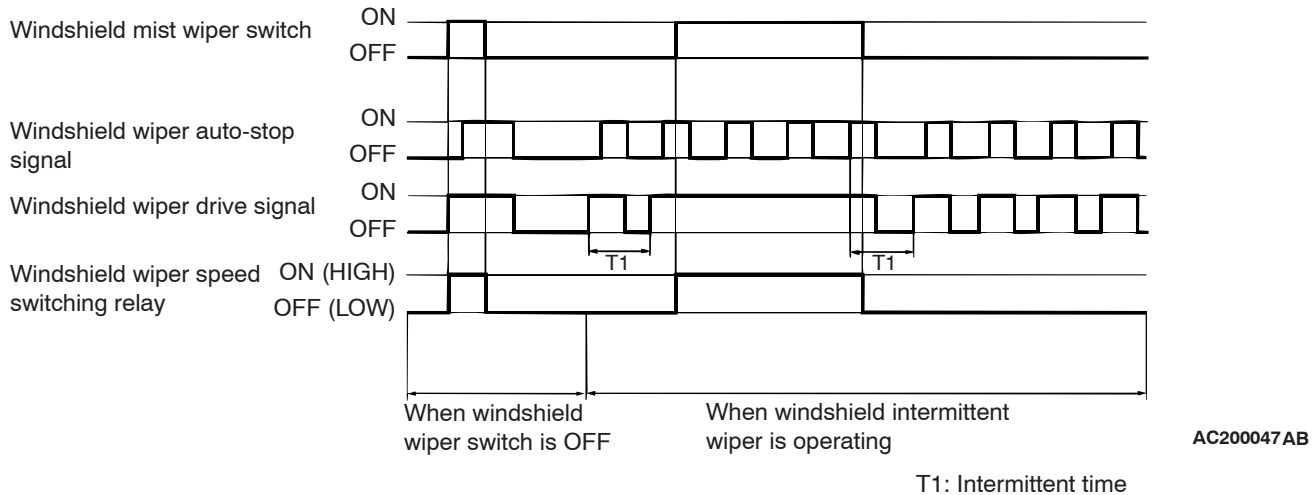
NOTE: The speed-sensitive wiper can be customized on vehicles equipped with a multi center display (middle grade type). Refer to P.54B-486.



The front-ECU determines the intermittent time T1 from the input SWS data signal, and turns ON the windshield wiper drive signal. When the wiper is at the STOP position, the windshield wiper auto-stop signal goes OFF, then turns OFF the windshield wiper drive signal. After the intermittent time T1 seconds from when the windshield wiper drive signal turned ON, the windshield wiper drive signal is turned ON again and the above operation is repeated.

NOTE: If the intermittent time T1 is within 2 seconds, the wiper is operated consecutively at LOW-speed by the front-ECU.

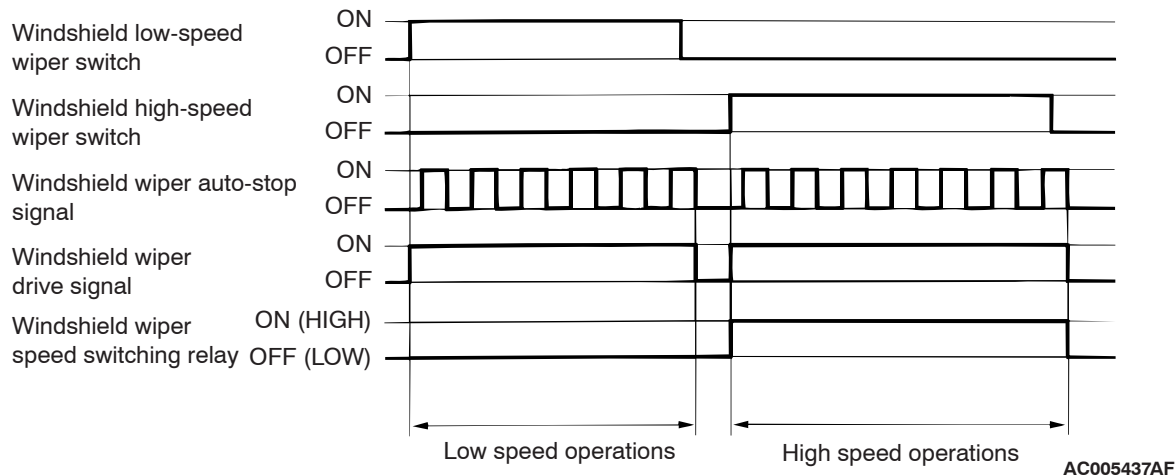
Mist wiper control



When the ignition switch is in the ACC or ON position, and the windshield mist wiper switch is turned ON, the front-ECU turns ON the windshield wiper drive signal. At the same time, the wiper speed switching relay is turned ON (HIGH-SPEED). While the windshield mist wiper switch is ON, the windshield wiper will operate at high speed. Then, if the windshield mist wiper switch is turned off, the wiper operates at low speed until it stops at the predetermined park position.

When the windshield mist switch is turned on briefly, the wiper operates once at low speed. At the point the windshield mist switch is turned ON, if the windshield wiper has been operating intermittently, the same operations as the above will be performed while the windshield mist wiper switch is ON. After the windshield mist wiper switch goes OFF, the intermittent operations will be set again T1 seconds after the last windshield wiper auto-stop signal turning ON.

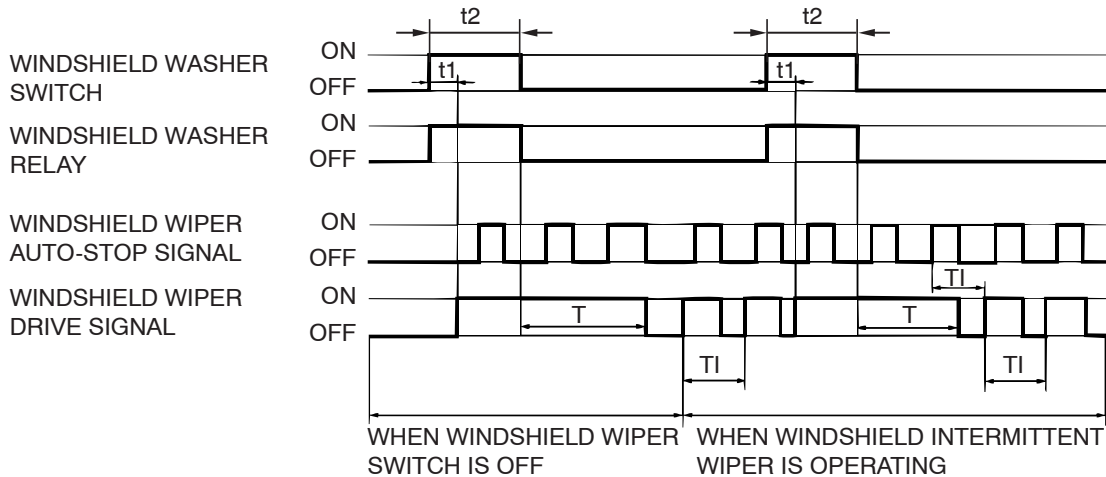
Low speed wiper and high speed wiper control



When the ignition switch is at the ACC or ON position, and the windshield low speed wiper switch of the column switch is turned ON, the front-ECU turns ON the windshield wiper drive signal, turns OFF (LO) the windshield wiper speed relay, and operates the

windshield wiper at low speed. Next, when the windshield high speed wiper switch is turned ON, the windshield wiper drive signal is turned ON, the windshield wiper speed switching relay is turned ON (HI), and the windshield wiper is operated at high speed.

Washer control



T: WIPER OPERATING TIME AFTER WINDSHIELD WASHER SWITCH IS OFF

TI: INTERMITTENT TIME t_1 : 0.15 SECONDS t_2 : WINDSHIELD WASHER OPERATING TIME

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When the ignition switch is in the ACC or ON position, and the windshield washer switch is turned ON, the front-ECU turns ON the windshield washer relay. The windshield wiper drive signal is turned ON after 0.15 seconds until 2 seconds after the windshield

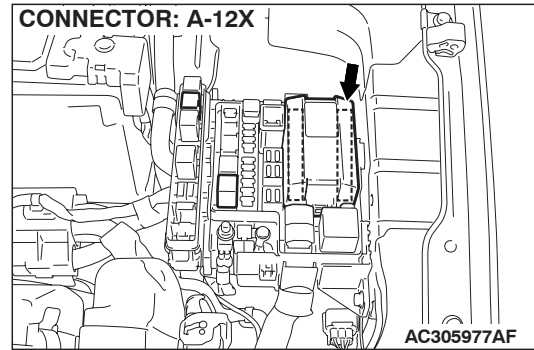
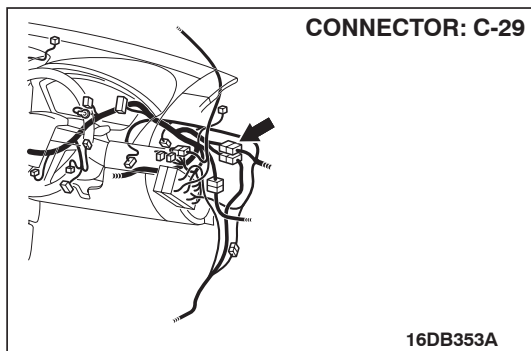
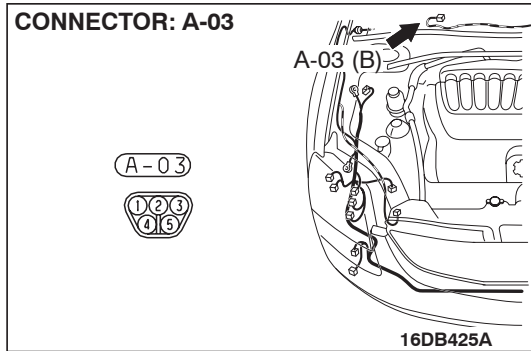
washer switch goes OFF to operate the windshield wiper continuously. When the windshield washer switch is turned ON, if the windshield wiper is operating intermittently, intermittent operations will be continued after continuous operations.

NOTE: The wiper drive signal output time varies according to the conditions. Refer to the following table for details.

	WHEN WIPER SWITCH IS OFF			WHEN WIPER SWITCH IS SET TO INT			WHEN WIPER SWITCH IS SET TO LO OR HI		
t_2	0.15 second or less	0.15 - 0.8 second	0.8 second or more	0.15 second or less	0.15 - 0.8 second	0.8 second or more	0.15 second or less	0.15 - 0.8 second	0.8 second or more
T	0 second	1.2 seconds	2 seconds	0 second	1.2 seconds	2 seconds	0 second	1.2 seconds	2 seconds

INSPECTION PROCEDURE G-1: Windshield Wiper and Washer: The windshield wiper do not work at all.

NOTE: This troubleshooting procedure requires use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."



CIRCUIT OPERATION

- The windshield wiper and washer switch sends a signal through the column-ECU (incorporated in the column switch) to the front-ECU. If the column-ECU sends a windshield wiper and washer switch "ON" signal to the front-ECU, the front-ECU turns on the relay (incorporated in the front-ECU), thus causing the windshield wiper and washer motor to be turned on.
- If the SWS communication line is defective, the front-ECU operates windshield wiper motor by using the other communication lines (wiper backup circuit) instead of that line. In this case, the windshield wiper works at low speed regardless of the windshield wiper and washer switch positions ("LO" or "HIGH").

TECHNICAL DESCRIPTION (COMMENT)

If the windshield wiper does not work at all, the windshield wiper motor, column switch (windshield wiper and washer switch) or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams [GROUP-90](#)
- Refer to configuration diagrams [GROUP-80](#)
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The wiper motor may be defective
- The column switch may be defective
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the following ECUs:

- Column-ECU
- Front-ECU

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

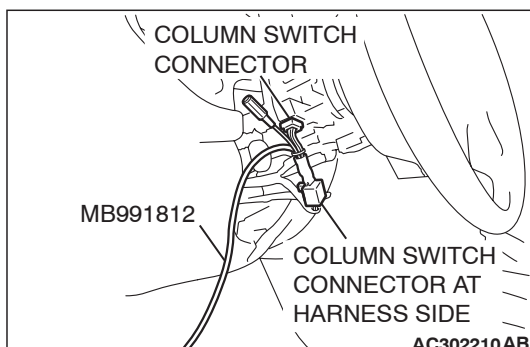
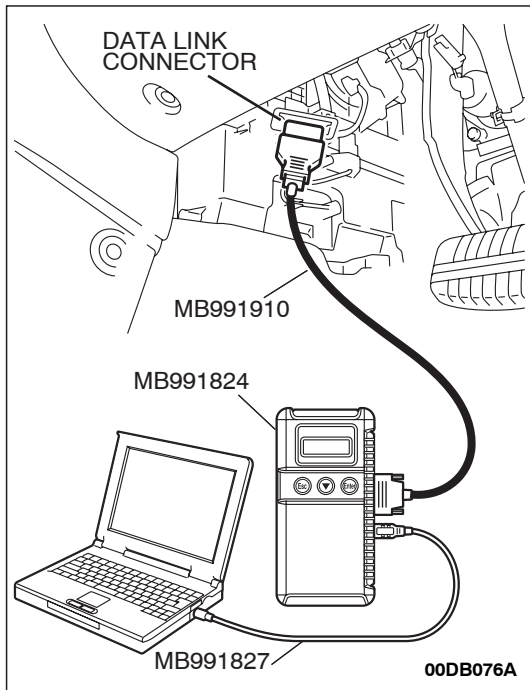
- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "ON" position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM Check."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "ECU COMM Check."
- (4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menus for both the "COLUMN ECU" and the "FRONT ECU" menus.

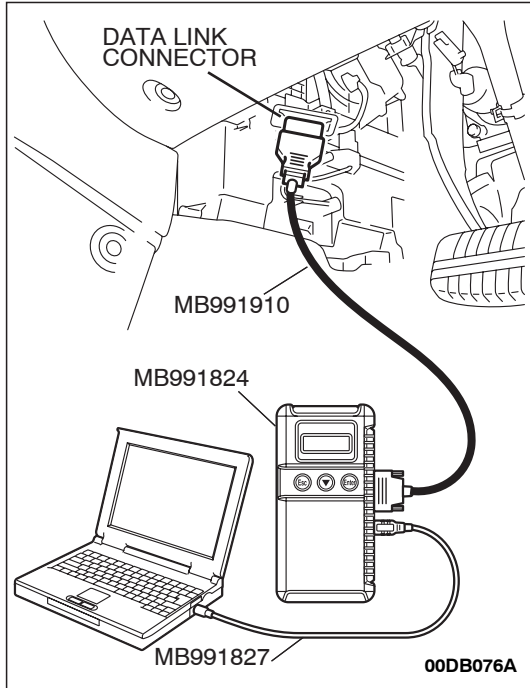
Q: Is "OK" displayed for the "COLUMN ECU" and "FRONT ECU" menu?

"OK" is displayed for all the items : Go to Step 2.

"NG" is displayed for the "COLUMN ECU" menu : Refer to Inspection Procedure A-2 "Communication with the column switch (column-ECU) is not possible [P.54B-68](#)."

"NG" is displayed for the "FRONT ECU" menu : Refer to Inspection procedure A-4 "Communication with the front-ECU is not possible [P.54B-80](#)."





STEP 2. Check the input signal by using "FUNCTION DIAG." menu of the SWS monitor.

Check the input signals from the following switches:

- Ignition switch: ACC
- Windshield wiper switch: INT

- (1) Operate the MUT-III according to the procedure below to display "F.WIPER INT."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "WIPER."
 - g. Select "F.WIPER INT."
- (2) Check that normal conditions are displayed for the items described in the table below.

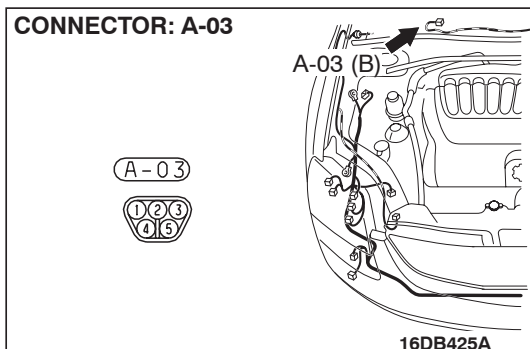
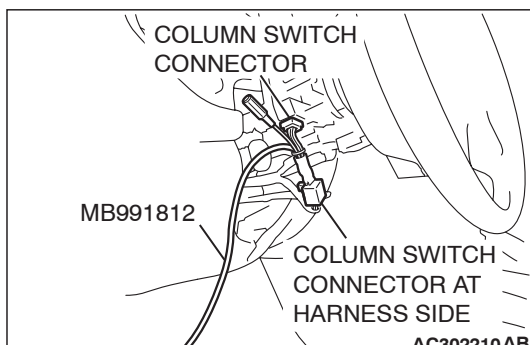
ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 05	INT WIPER SW	ON
ITEM 70	FRONT ECU ACK	NORMAL ACK or HI-BEAM ACK

Q: Are normal conditions displayed for "INT WIPER SW" and "FRONT ECU ACK"?

Normal conditions displayed for all the items : Go to Step 3.

Normal condition is not displayed for the "INT WIPER SW" : Replace the column switch. Verify that the windshield wiper works normally.

Normal condition is not displayed for the "FRONT ECU ACK" : Replace the front-ECU. Verify that the windshield wiper works normally.



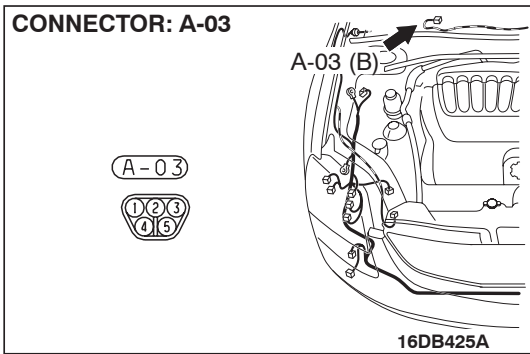
STEP 3. Check windshield wiper motor connector A-03 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is windshield wiper motor connector A-03 in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the windshield wiper works normally.

CONNECTOR: A-03



STEP 4. Check the windshield wiper motor.

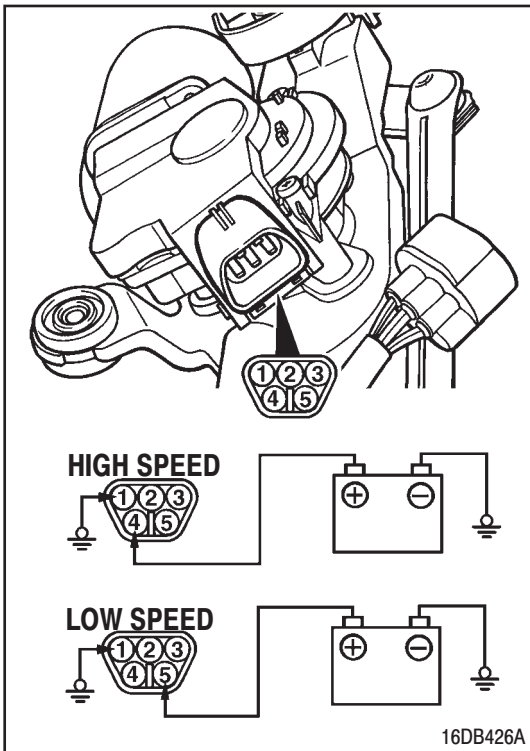
(1) Disconnect windshield wiper motor connector A-03.

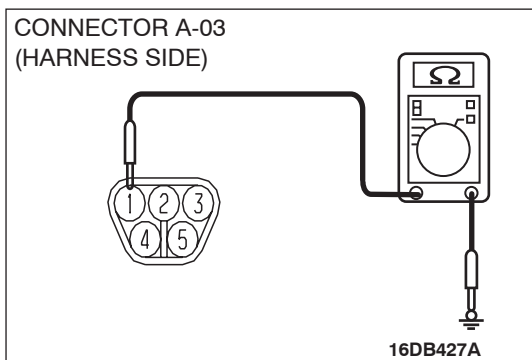
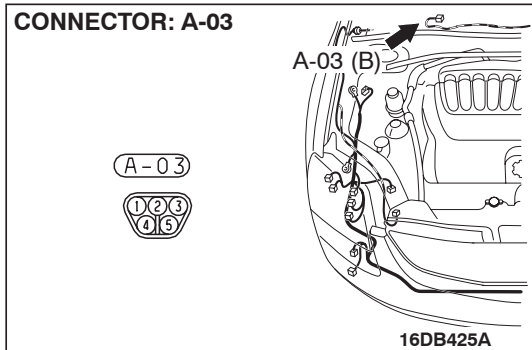
(2) Connect a battery to the windshield wiper motor as shown. Then check that the windshield wiper motor operates normally at high and low speeds.

Q: Does the windshield wiper motor operate normally?

YES : Go to Step 5.

NO : Replace the windshield wiper motor. Verify that the windshield wiper works normally.





STEP 5. Check the ground circuit to the windshield wiper motor. Measure the resistance at the windshield wiper motor connector A-03.

(1) Disconnect windshield wiper motor connector A-03 and measure the resistance available at the wiring harness side of the connector.

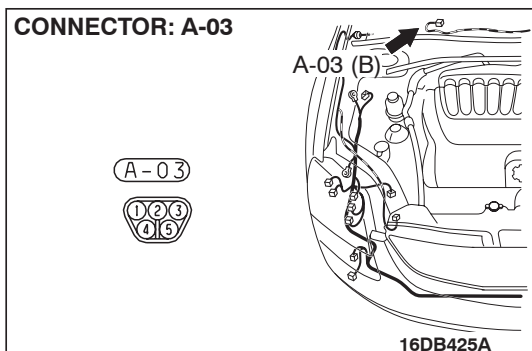
(2) Measure the resistance value between terminal 1 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 7.

NO : Go to Step 6.

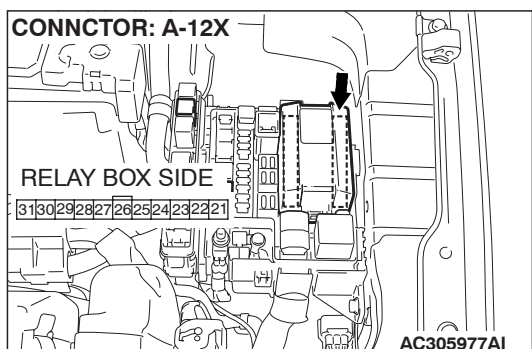


STEP 6. Check the wiring harness between windshield wiper motor connector A-03 (terminal 1) and ground.

Q: Is the wiring harness between windshield wiper motor connector A-03 (terminal 1) and ground in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify the windshield wiper works normally.

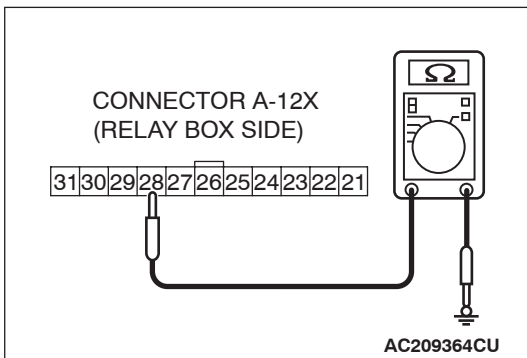
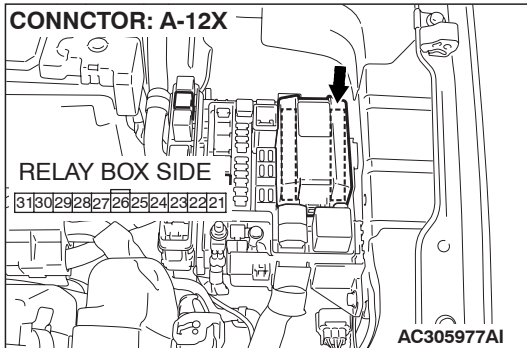


STEP 7. Check front-ECU connector A-12X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front-ECU connector A-12X in good condition?

YES : Go to Step 8.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the windshield wiper works normally.



STEP 8. Check the ignition switch (ACC) circuit to the front-ECU. Measure the voltage at front-ECU connector A-12X.

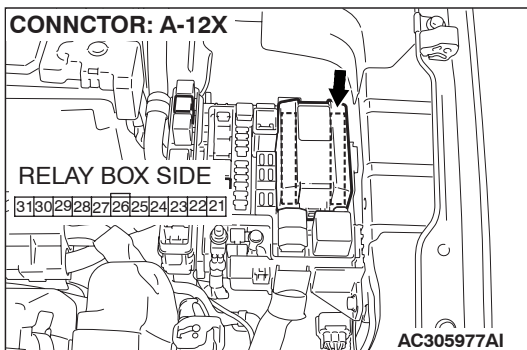
- (1) Disconnect front-ECU connector A-12X and measure the resistance available at the relay box side of the connector.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal 28 and ground.
 - The voltage should measure approximately 12 volts (battery positive voltage).

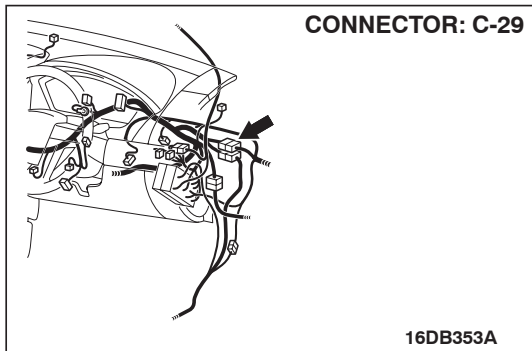
Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Replace the front-ECU. Verify that the windshield wiper works normally.

NO : Go to Step 9.



STEP 9. Check the wiring harness between front-ECU connector A-12X (terminal 28) and the ignition switch (ACC).



NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between front-ECU connector A-12X (terminal 28) and the ignition switch (ACC) in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the windshield wiper works normally.

INSPECTION PROCEDURE G-2: Windshield Wiper and Washer: The windshield wipers do not work when the windshield wiper switch is at "INT" or "MIST" position or the windshield washer switch is at "ON" position. However, the wipers work at low speed when the windshield wiper switch is at "LO" or "HI."

NOTE: This troubleshooting procedure requires use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

TECHNICAL DESCRIPTION (COMMENT)

This system may be at fail-safe mode as the SWS communication line is defective.

If the system cannot receive any signal from the column switch (windshield wiper and washer switch) due to a open circuit in the SWS communication line or other reasons, the system will enter the fail-safe mode when the ignition switch is at the "ACC" position.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The column switch may be defective
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the following ECUs:

- Column-ECU
- Front-ECU

CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

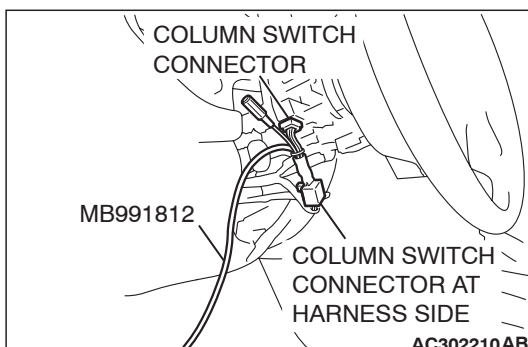
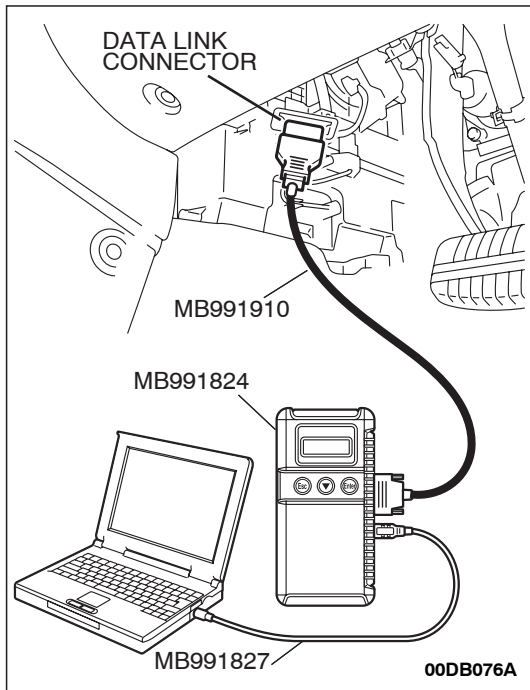
- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "ON" position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM CHECK."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "ECU COMM Check."
- (4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menus for both the "COLUMN ECU" and the "FRONT ECU" menus.

Q: Is "OK" displayed for the "COLUMN ECU" and "FRONT ECU" menu?

"OK" is displayed for all the items : Replace the front-ECU. Verify that the windshield wiper works normally.

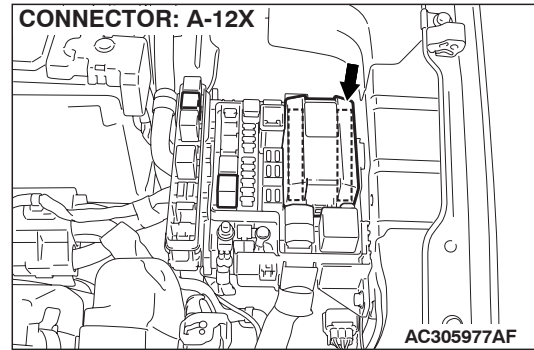
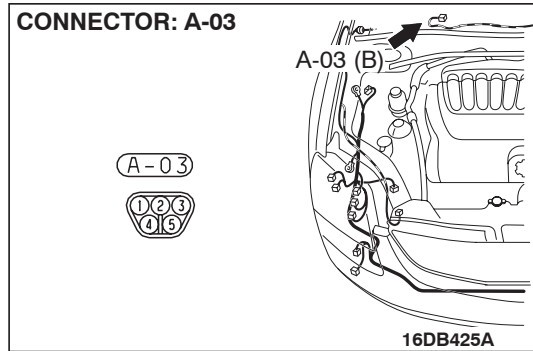
"NG" is displayed for the "COLUMN ECU" menu : Refer to Inspection Procedure A-2 "Communication with the column switch (column-ECU) is not possible [P.54B-68](#)."

"NG" is displayed for the "FRONT ECU" menu : Refer to Inspection procedure A-4 "Communication with the front-ECU is not possible [P.54B-80](#)."



INSPECTION PROCEDURE G-3: Windshield Wiper and Washer: All of the windshield wiper switch positions are defective.

NOTE: This troubleshooting procedure requires use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."



TECHNICAL DESCRIPTION (COMMENT)

If either of the windshield wiper switch positions is defective, the windshield wiper motor, column switch (windshield wiper and washer switch) or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The wiper motor may be defective
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Check the input signal by using "DATA LIST" menu of the SWS monitor.

Turn the ignition switch to the ACC position before checking input signals from the windshield wiper switch.

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

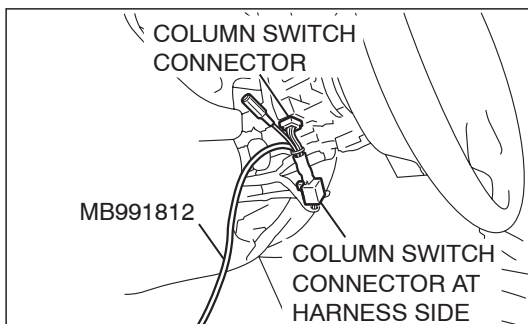
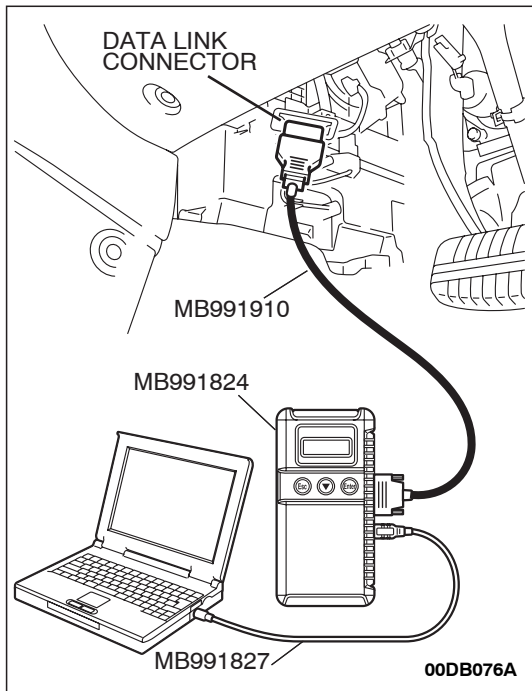
- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Operate Diagnostic Tool MB991958 according to the procedure below to display "COLUMN ECU."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Data List."
 - f. Select "COLUMN ECU."
- (3) Check that normal conditions are displayed for the items described in the table below.

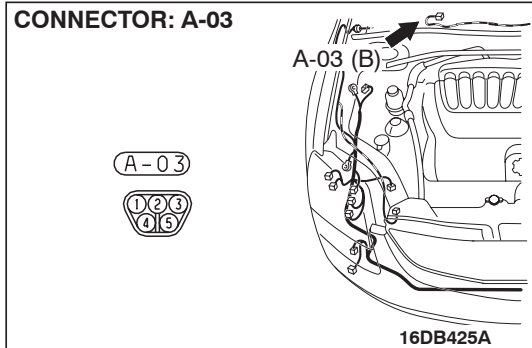
ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 05	INT WIPER SW	ON
ITEM 06	LO WIPER SW	ON
ITEM 07	HI WIPER SW	ON
ITEM 08	MIST WIPER SW	ON

Q: Are normal conditions displayed for "INT WIPER SW", "LO WIPER SW", "HI WIPER SW" and "MIST WIPER SW"?

YES : Go to Step 2.

NO : Refer to Inspection Procedure M-6 "ETACS-ECU does not receive any signal from the windshield mist wiper switch [P.54B-423](#)."





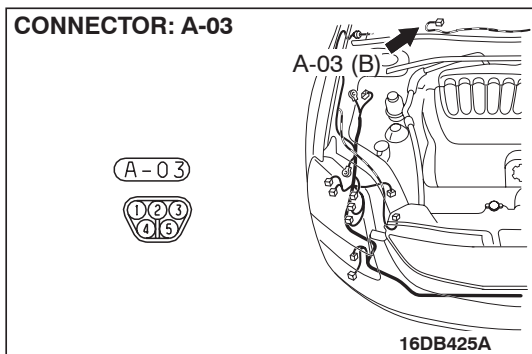
STEP 2. Check windshield wiper motor connector A-03 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is windshield wiper motor connector A-03 in good condition?

YES : Go to Step 3.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Verify that the windshield wiper operates normally when the windshield wiper switch is moved to each position.



STEP 3. Check the windshield wiper motor.

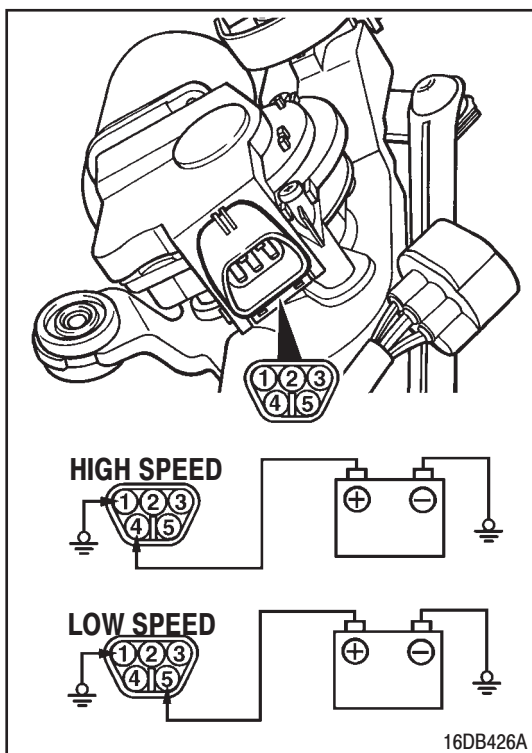
(1) Disconnect windshield wiper motor connector A-03.

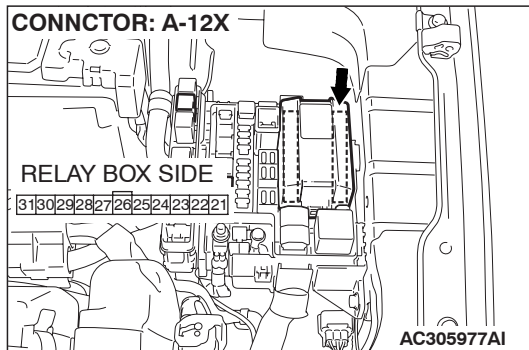
(2) Connect a battery to the windshield wiper motor as shown. Then check the windshield wiper motor operates normally at high and low speeds.

Q: Does the windshield wiper motor operate normally?

YES : Go to Step 4.

NO : Replace the windshield wiper motor. Verify that the windshield wiper operates normally when the windshield wiper switch is moved to each position.



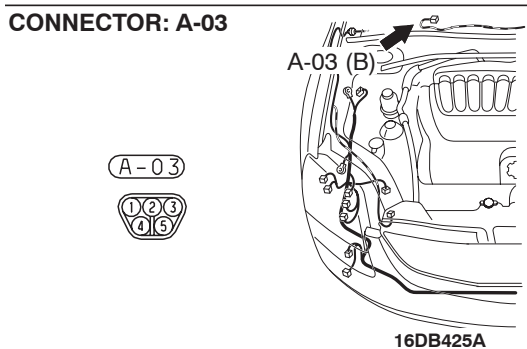


STEP 4. Check front-ECU connector A-12X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front-ECU connector A-12X in good condition?

YES : Go to Step 5.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the windshield wiper operates normally when the windshield wiper switch is moved to each position.

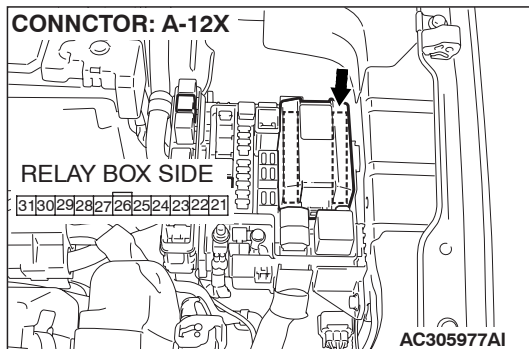


STEP 5. Check the wiring harness between windshield wiper motor connector A-03 (terminals 5 and 4) and front-ECU connector A-12X (terminals 25 and 24).

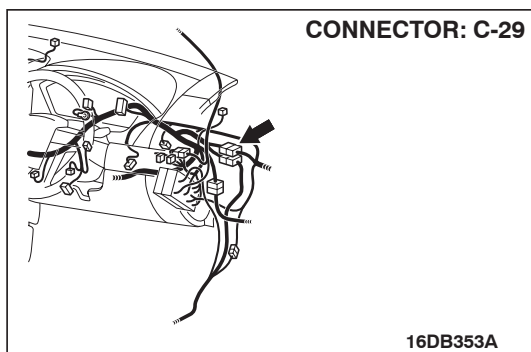
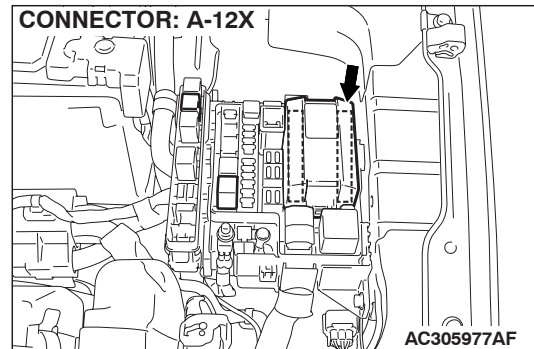
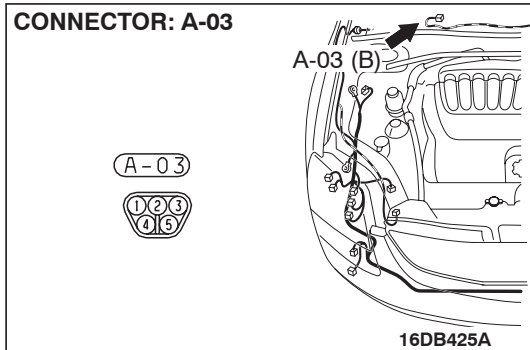
Q: Is the wiring harness between windshield wiper motor connector A-03 (terminals 5 and 4) and front-ECU connector A-12X (terminals 25 and 24) in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the windshield wiper operates normally when the windshield wiper switch is moved to each position.



INSPECTION PROCEDURE G-4: Windshield Wiper and Washer: Windshield wipers does not stop at the predetermined park position.



TECHNICAL DESCRIPTION (COMMENT)

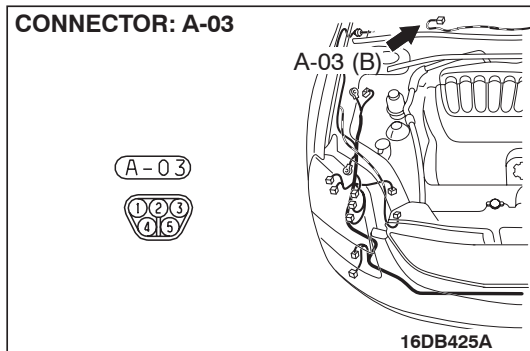
If the windshield wipers do not stop at predetermined park position, the windshield wiper motor or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The windshield wiper motor may be defective
- The front-ECU may be defective

DIAGNOSIS

Required Special Tool:



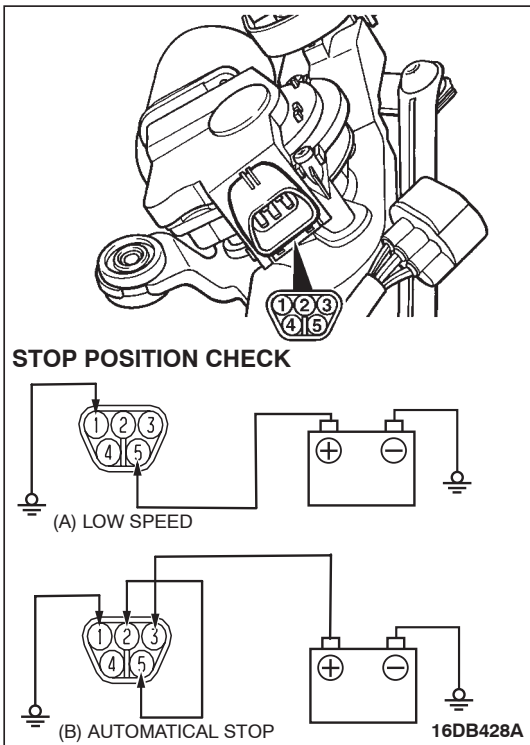
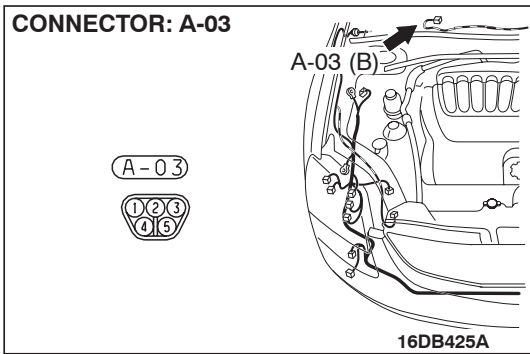
STEP1. Check windshield wiper motor connector A-03 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is windshield wiper motor connector A-03 in good condition?

YES : Go to Step 2.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the windshield wiper works normally.

CONNECTOR: A-03



STEP 2. Check the windshield wiper motor.

(1) Disconnect windshield wiper motor connector A-03.

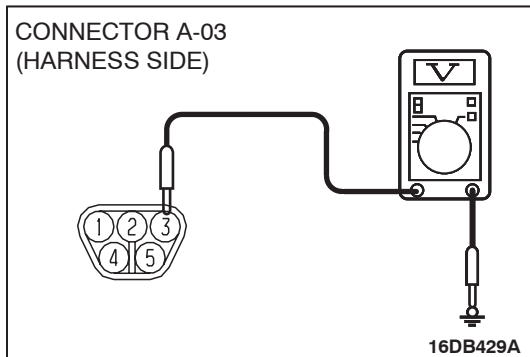
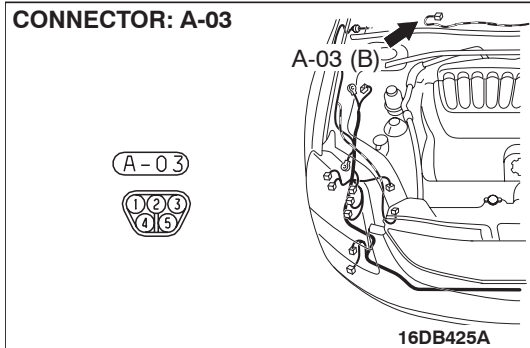
(2) Connect the vehicle battery to the windshield wiper motor connector as shown, and operate the windshield wiper at low speed. While the windshield wiper is working, disconnect the battery at positions other than the predetermined park position to stop the windshield wiper motor.

(3) When the battery is connected as shown, the motor should run at low speed, and then stop at the predetermined park position.

Q: Does the windshield wiper motor operate normally?

YES : Go to Step 3.

NO : Replace the windshield wiper motor. The windshield wiper should now stop at the predetermined park position.



STEP 3. Check the ignition switch (ACC) circuit to the windshield wiper motor. Measure the voltage at windshield wiper motor connector A-03.

(1) Disconnect windshield wiper motor connector A-03 and measure the voltage available at the wiring harness side of the connector.

(2) Turn the ignition switch to the "ACC" position.

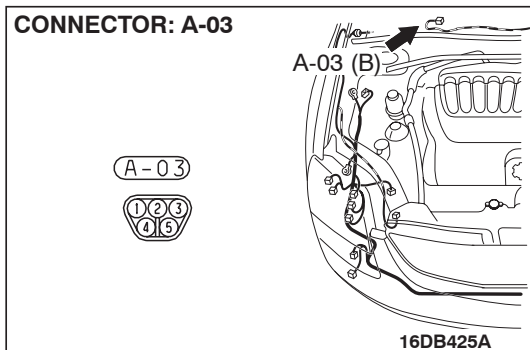
(3) Measure the voltage between terminal 3 and ground.

- The voltage should measure approximately 12 volts (battery positive voltage).

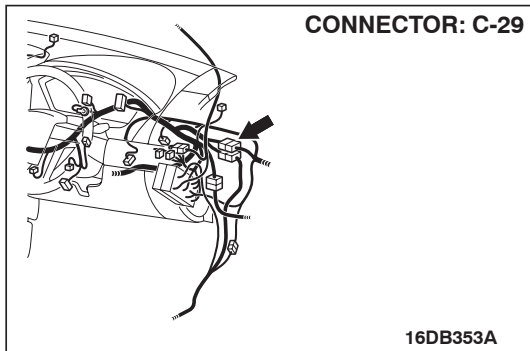
Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 5.

NO : Go to Step 4.



STEP 4. Check the wiring harness between windshield wiper motor connector A-03 (terminal 3) and the ignition switch (ACC).

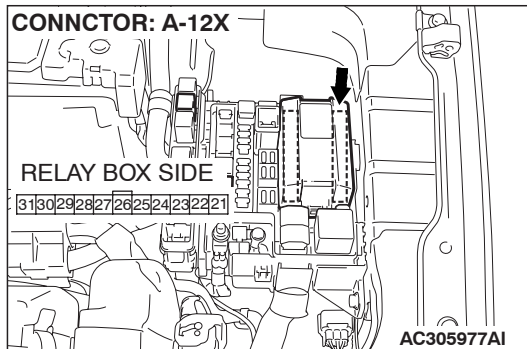


NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between windshield wiper motor connector A-03 (terminal 3) and the ignition switch (ACC) in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the windshield wiper works normally.

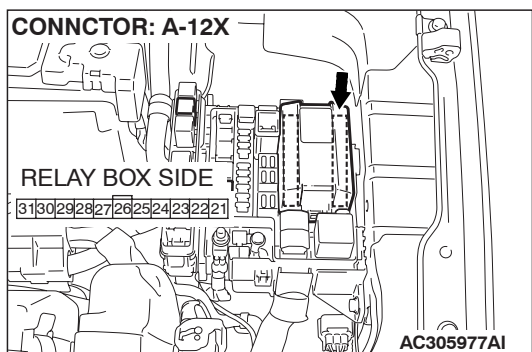
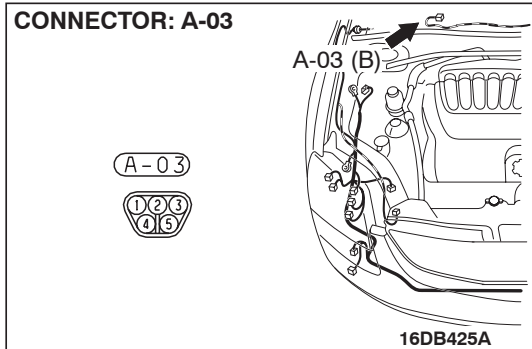


STEP 5. Check front-ECU connector A-12X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front-ECU connector A-12X in good condition?

YES : Go to Step 6.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). The windshield wiper should stop at the predetermined park position.



STEP 6. Check the wiring harness between windshield wiper motor connector A-03 (terminal 2) and front-ECU connector A-12X (terminal 29).

Q: Is the wiring harness between windshield wiper motor connector A-03 (terminal 2) and front-ECU connector A-12X (terminal 29) in good condition?

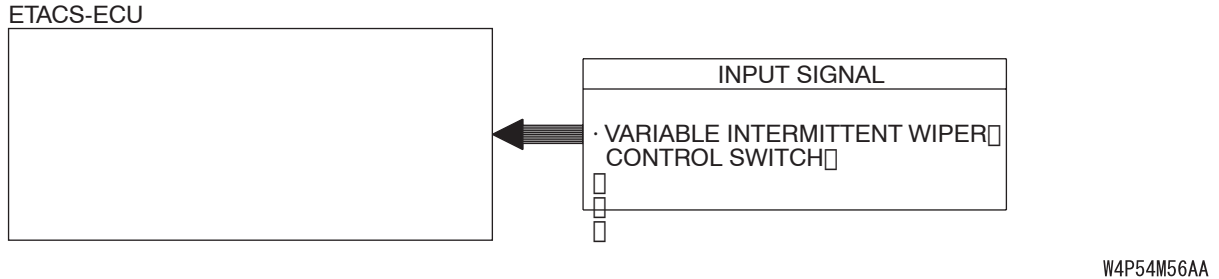
YES : Replace the front-ECU. The windshield wiper should stop at the predetermined park position.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the windshield wiper works normally

INSPECTION PROCEDURE G-5: Windshield Wiper and Washer: The windshield intermittent wiper interval cannot be adjusted by using the variable intermittent wiper control switch.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

Variable Intermittent Wiper Control Switch Input Signal



TECHNICAL DESCRIPTION (COMMENT)

If the windshield intermittent wiper interval is not changed by operating the windshield intermittent wiper interval adjusting knob or according to the vehicle speed, the column switch, the ETACS-ECU or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The ETACS-ECU may be defective
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

Check the input signal by using "DATA LIST" menu of the SWS monitor.

Set each switch to the following condition to check input signals from the variable intermittent wiper control switch:

- Ignition switch: ACC
- Windshield wiper switch: INT

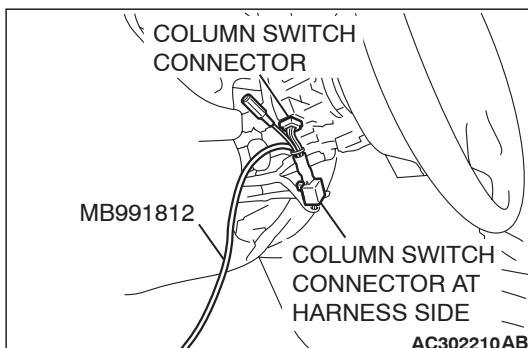
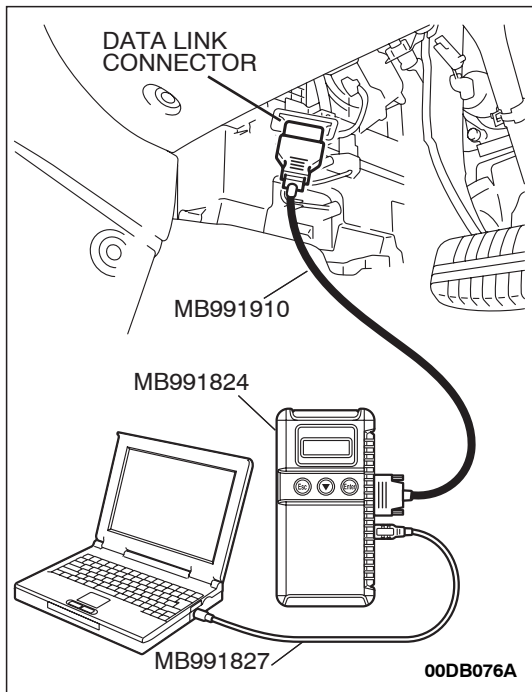
⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Operate Diagnostic Tool MB991958 according to the procedure below to display "F.WIPER INT."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "WIPER."
 - g. Select "F.WIPER INT."
- (3) Check that normal conditions are displayed for the items described in the table below.

NOTE: Also check that the windshield wiper interval changes smoothly when the variable intermittent wiper control switch is rotated from "SLOW" to "FAST" position.

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 37	INT WIPER TIME	1.6 – 19.0 s



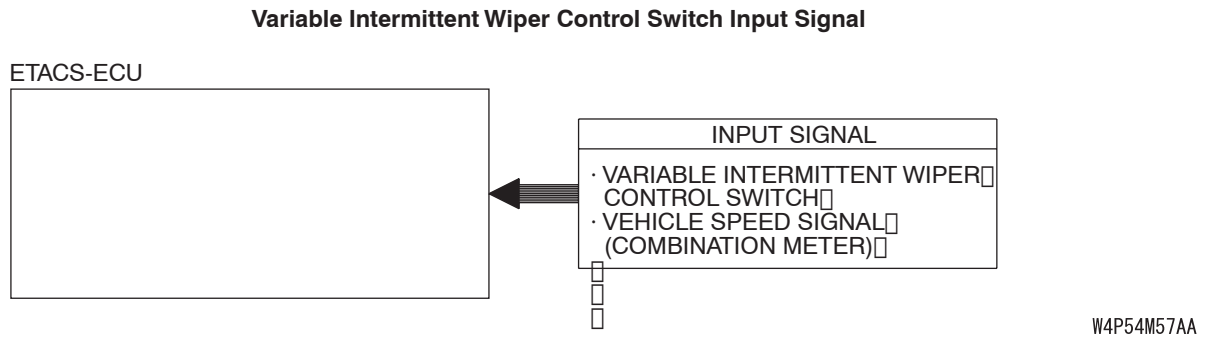
Q: Does the value change within the normal range when the windshield intermittent wiper interval adjusting knob is rotated?

YES : Replace the front-ECU. Check that the windshield intermittent wiper interval changes according to the vehicle speed or while the windshield intermittent wiper interval adjusting knob is rotated.

NO : Refer to Inspection Procedure M-7 "ETACS-ECU does not receive any signal from the variable intermittent wiper control switch [P.54B-426](#)."

INSPECTION PROCEDURE G-6: Windshield Wiper and Washer: The windshield intermittent wiper interval is not changed according to the vehicle speed.

NOTE: This troubleshooting procedure requires use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."



TECHNICAL DESCRIPTION (COMMENT)

If the windshield intermittent wiper interval does not change according to the vehicle speed, the ETACS-ECU or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The combination meter may be defective
- The ETACS-ECU may be defective
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Using Diagnostic Tool MB991958, diagnose the CAN bus line.

⚠ CAUTION

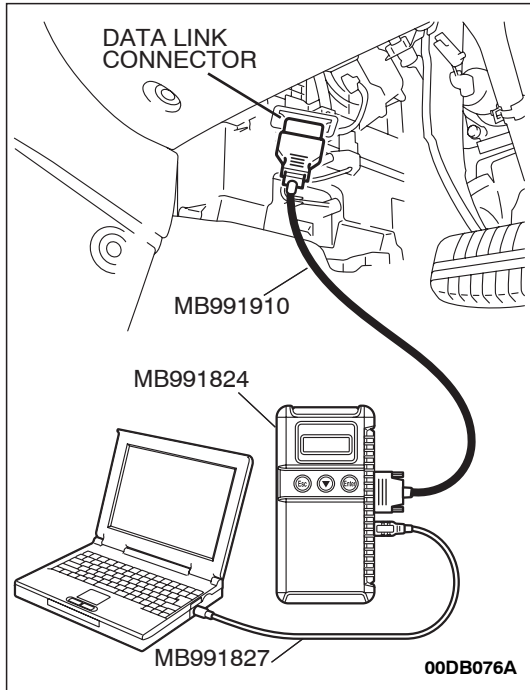
To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958.

- (1) Connect Diagnostic Tool MB991958. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose the CAN bus line.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line found to be normal?

YES : Go to Step 2.

NO : Repair the CAN bus line (Refer to GROUP 54C, Diagnosis [P.54C-15](#)).



STEP 2. Using Diagnostic Tool MB991958, read the combination meter diagnostic trouble code.

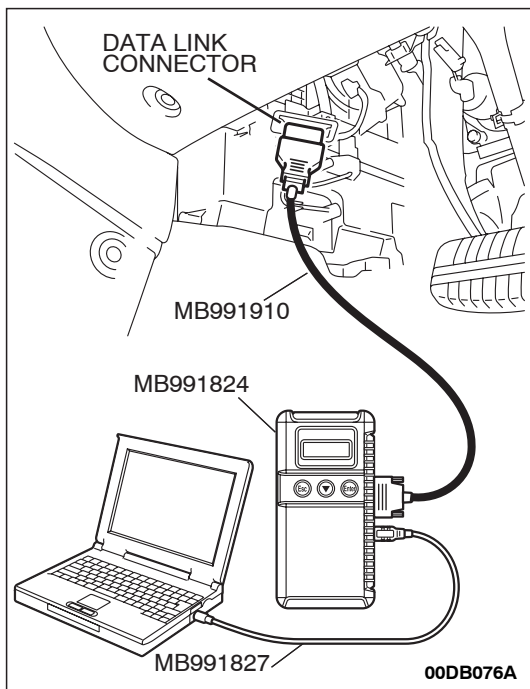
Check whether the combination meter-related DTC is set.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check whether the combination meter-related DTC is set.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the DTC set?

YES : Diagnose the combination meter. Refer to [P.54A-48](#).

NO : Go to Step 3.



STEP 3. Check the input signal by using "DATA LIST" menu of the SWS monitor.

Check the input signals from the following switches:

- Ignition switch: ACC
- Windshield wiper switch: INT
- Intermittent wiper control: slow side

⚠ CAUTION

Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

- (1) Operate the Diagnostic Tool MB991958 according to the procedure below to display "F.WIPER INT."
 - a. Select "System select."
 - b. Select "SWS."
 - c. Select "SWS MONITOR."
 - d. Select "Function Diag."
 - e. Select "WIPER."
 - f. Select "F.WIPER INT."
- (2) Check that normal conditions are displayed for the items described in the table below.

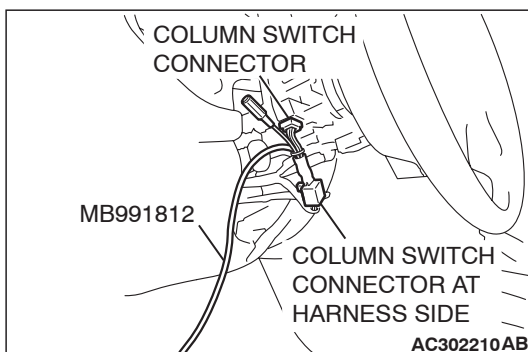
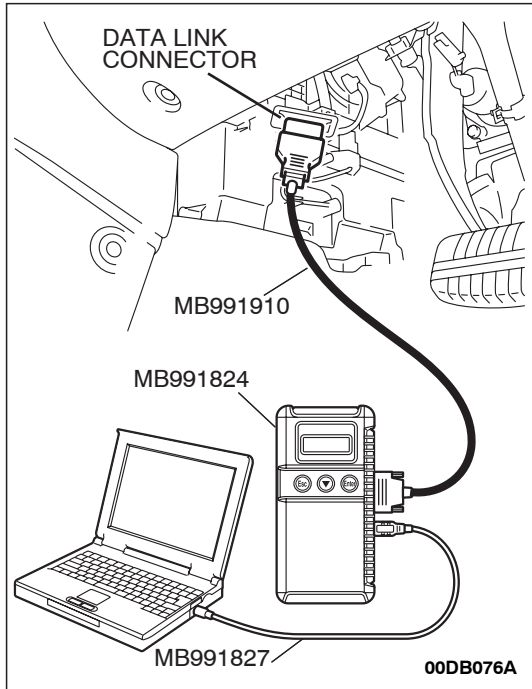
NOTE: Also check that the wiper interval changes smoothly when the vehicle is accelerated from 0 km/h (0 mph) to 60 km/h (37.5 mph).

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 37	INT WIPER TIME	14.0 – 19.0 s

Q: Does the value change within the normal range when the variable intermittent wiper control switch is rotated?

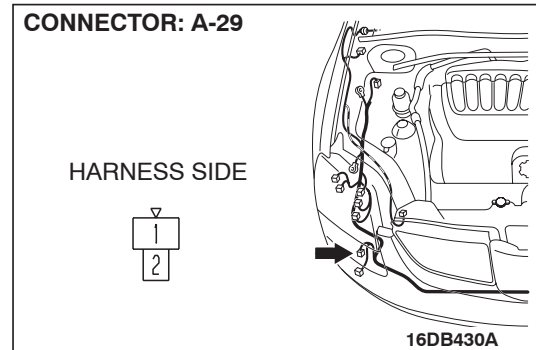
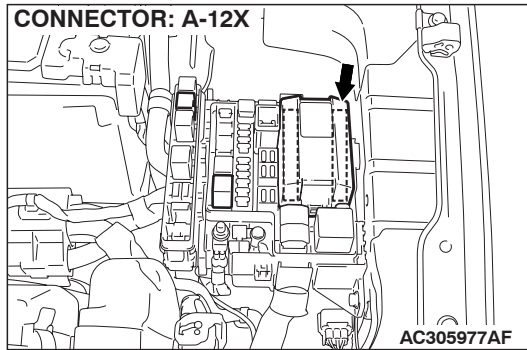
YES : Replace the front-ECU. The windshield intermittent wiper interval should change according to the vehicle speed.

NO : Replace the ETACS-ECU. The windshield intermittent wiper interval should change according to the vehicle speed.



INSPECTION PROCEDURE G-7: Windshield Wiper and Washer: The windshield washer does not work.

NOTE: This troubleshooting procedure requires use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."



CIRCUIT OPERATION

The windshield washer switch sends a signal through the column-ECU (incorporated in the column switch) to the front-ECU. If the column-ECU sends a windshield washer switch "ON" signal to the front-ECU, the front-ECU turns on the relay (incorporated in the front-ECU), thus causing the windshield washer motor to be turned on.

TECHNICAL DESCRIPTION (COMMENT)

If the windshield washer does not work normally, the windshield washer motor, the column switch (windshield wiper and washer switch) or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The windshield washer motor may be defective
- The column switch may be defective
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Verify the windshield wiper operation.

Q: Does the windshield wiper operate normally?

YES : Go to Step 2.

NO : Refer to Inspection Procedure G-1 "The windshield wiper do not work at all P.54B-226."

STEP 2. Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the following ECUs:

- Column-ECU
- Front-ECU

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

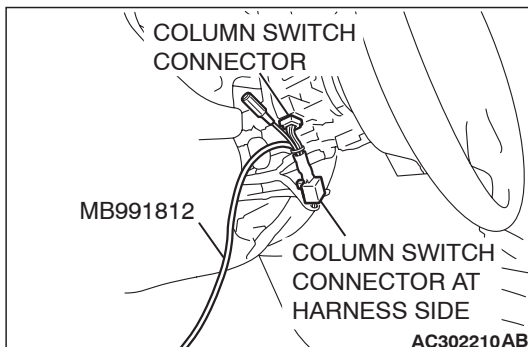
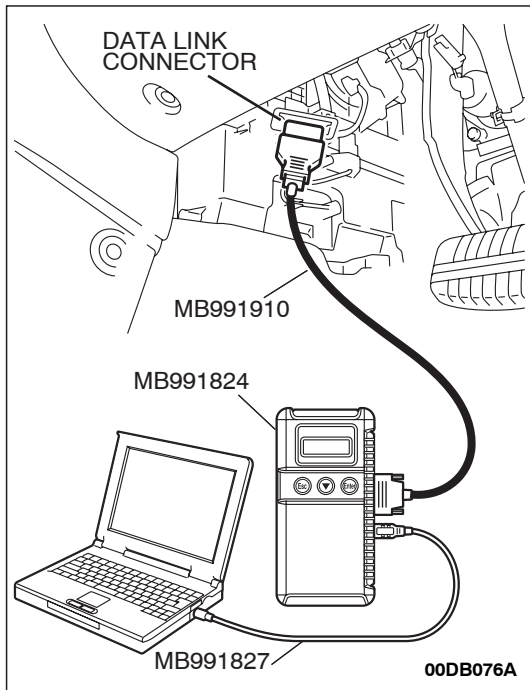
- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "ON" position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM Check."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "ECU COMM Check."
- (4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menus for both the "COLUMN ECU" and the "FRONT ECU" menus.

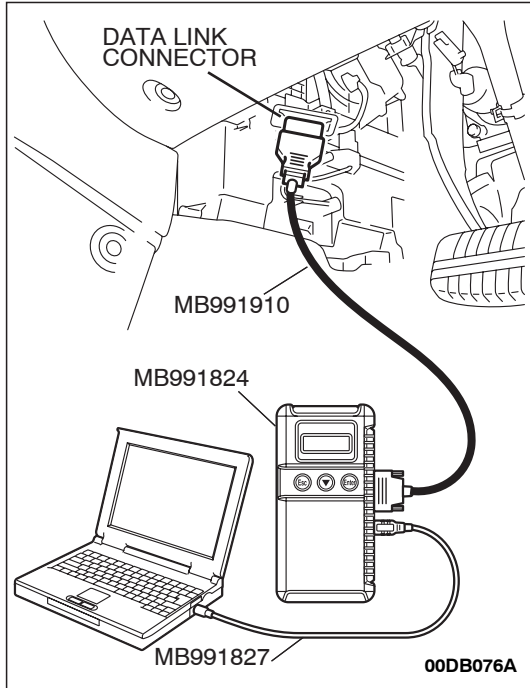
Q: Is "OK" displayed for the "COLUMN ECU" and "FRONT ECU" menu?

"OK" is displayed for all the items : Go to Step 3.

"NG" is displayed for the "COLUMN ECU" menu : Refer to Inspection Procedure A-2 "Communication with the column switch (column-ECU) is not possible [P.54B-68](#)."

"NG" is displayed for the "FRONT ECU" menu : Refer to Inspection procedure A-4 "Communication with the front-ECU is not possible [P.54B-80](#)."





STEP 3. Check the input signal by using "FUNCTION DIAG." menu of the SWS monitor.

Check the input signals from the following switches:

- Ignition switch: ACC
- Windshield washer switch: ON

- (1) Operate the Diagnostic Tool MB991958 according to the procedure below to display "F.WIPER WASH."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "WIPER."
 - g. Select "F.WIPER WASH."
- (2) Check that normal conditions are displayed for the items described in the table below.

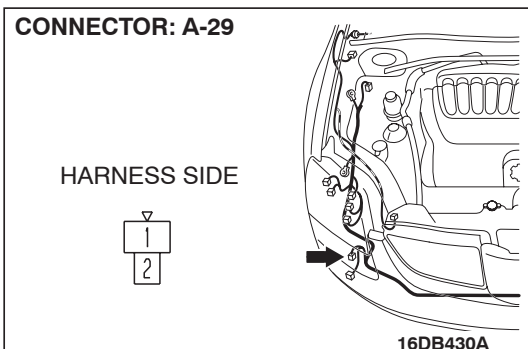
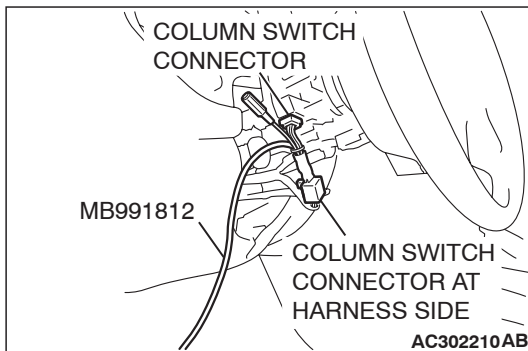
ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 09	FRONT WASH.SW	ON
ITEM 70	FRONT ECU ACK	NORMAL ACK or HI-BEAM ACK

Q: Are normal conditions displayed for "FRONT WASH.SW" and "FRONT ECU ACK"?

Normal conditions displayed for all the items : Go to Step 4.

Normal condition is not displayed for the "FRONT WASH.SW" : Replace the column switch. Verify that the windshield washer works normally.

Normal condition is not displayed for the "FRONT ECU ACK" : Replace the front-ECU. Verify that the windshield washer works normally.

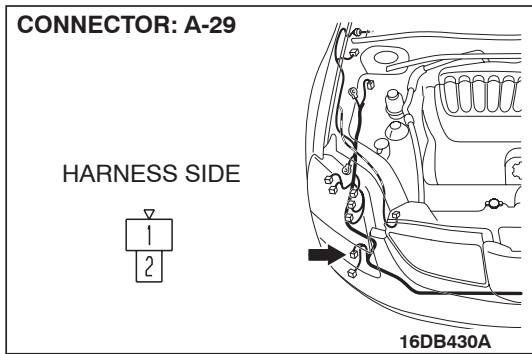


STEP 4. Check windshield washer motor connector A-29 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is windshield washer motor connector A-29 in good condition?

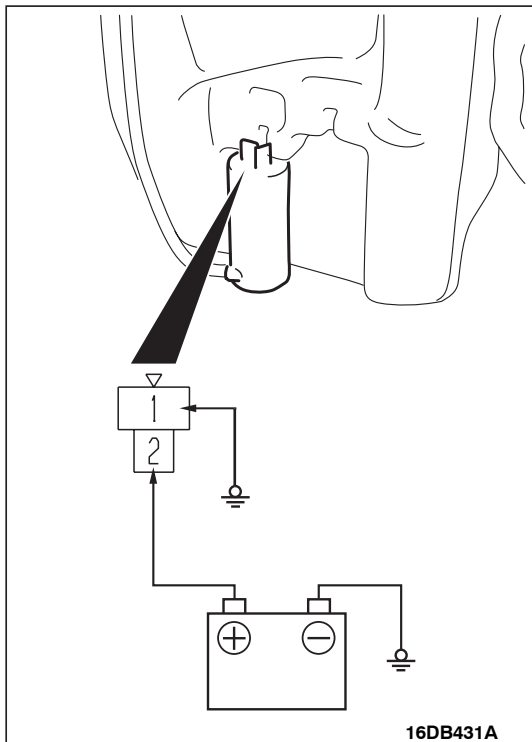
YES : Go to Step 5.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the windshield washer works normally.



STEP 5. Check the windshield washer motor.

- (1) Disconnect windshield washer motor connector A-29, and check at windshield washer motor connector side.
- (2) Fill the windshield washer tank with washer fluid.

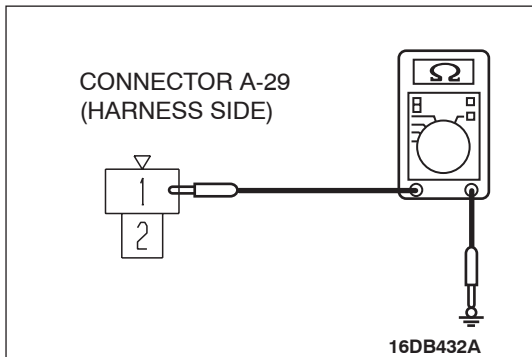
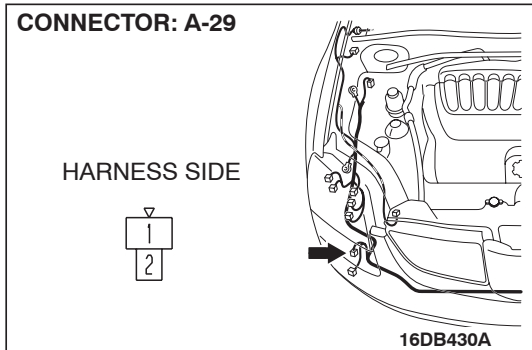


- (3) When battery voltage is applied between terminals 1 and 2, washer fluid should spray out.

Q: Does the windshield washer motor operate normally?

YES : Go to Step 6.

NO : Replace the windshield washer motor. Verify that the windshield washer works normally.



STEP 6. Check the ground circuit to the windshield washer motor. Measure the resistance at the windshield washer motor connector A-29.

(1) Disconnect windshield washer motor connector A-29 and measure the resistance available at the wiring harness side of the connector.

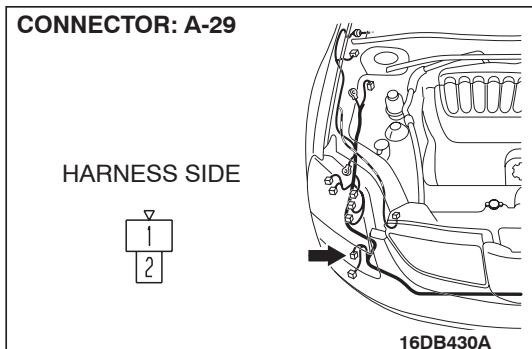
(2) Measure the resistance value between terminal 1 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 8.

NO : Go to Step 7.

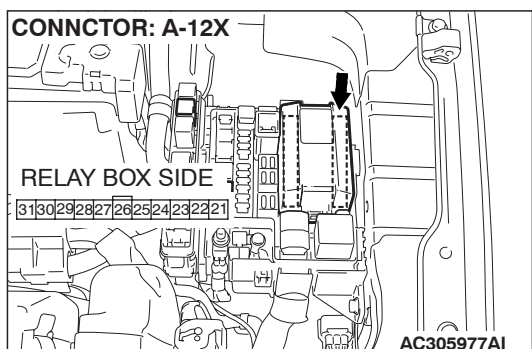


STEP 7. Check the wiring harness between windshield washer motor connector A-29 (terminal 1) and ground.

Q: Is the wiring harness between windshield washer motor connector A-29 (terminal 1) and ground in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the windshield washer works normally.

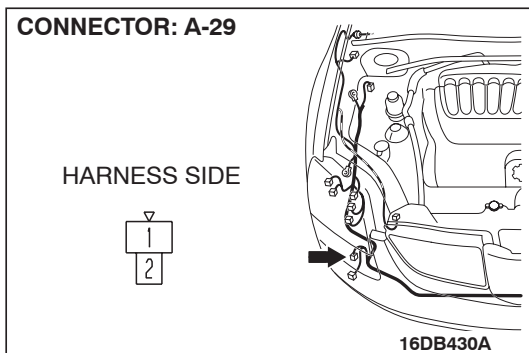
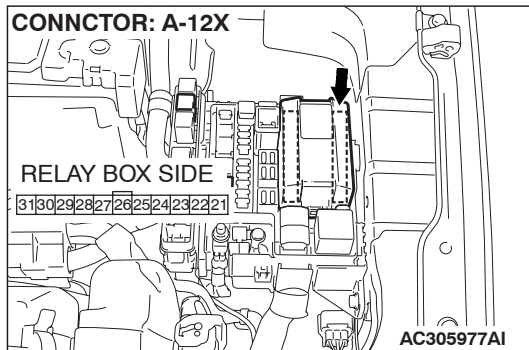


STEP 8. Check front-ECU connector A-12X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front-ECU connector A-12X in good condition?

YES : Go to Step 9.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the windshield washer works normally.



STEP 9. Check the wiring harness between windshield washer motor connector A-29 (terminal 2) and front-ECU connector A-12X (terminal 31).

Q: Is the wiring harness between windshield washer motor connector A-29 (terminal 2) and front-ECU connector A-12X (terminal 31) in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the windshield washer works normally.

HEADLAMP AND TAILLAMP

GENERAL DESCRIPTION CONCERNING THE HEADLAMPS AND TAILLAMPS

M1549021300264

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80

The following ECUs affect the functions and control of the headlamps and the taillamps.

FUNCTION	CONTROL ECU
Taillamps	Front-ECU, column switch
Headlamps	ETACS-ECU, front-ECU, column switch
High-beam indicator lamp	ETACS-ECU, column switch
Headlamp automatic-shutoff function	ETACS-ECU, front-ECU, column switch
Dimmer automatic reset function	Front-ECU, column switch

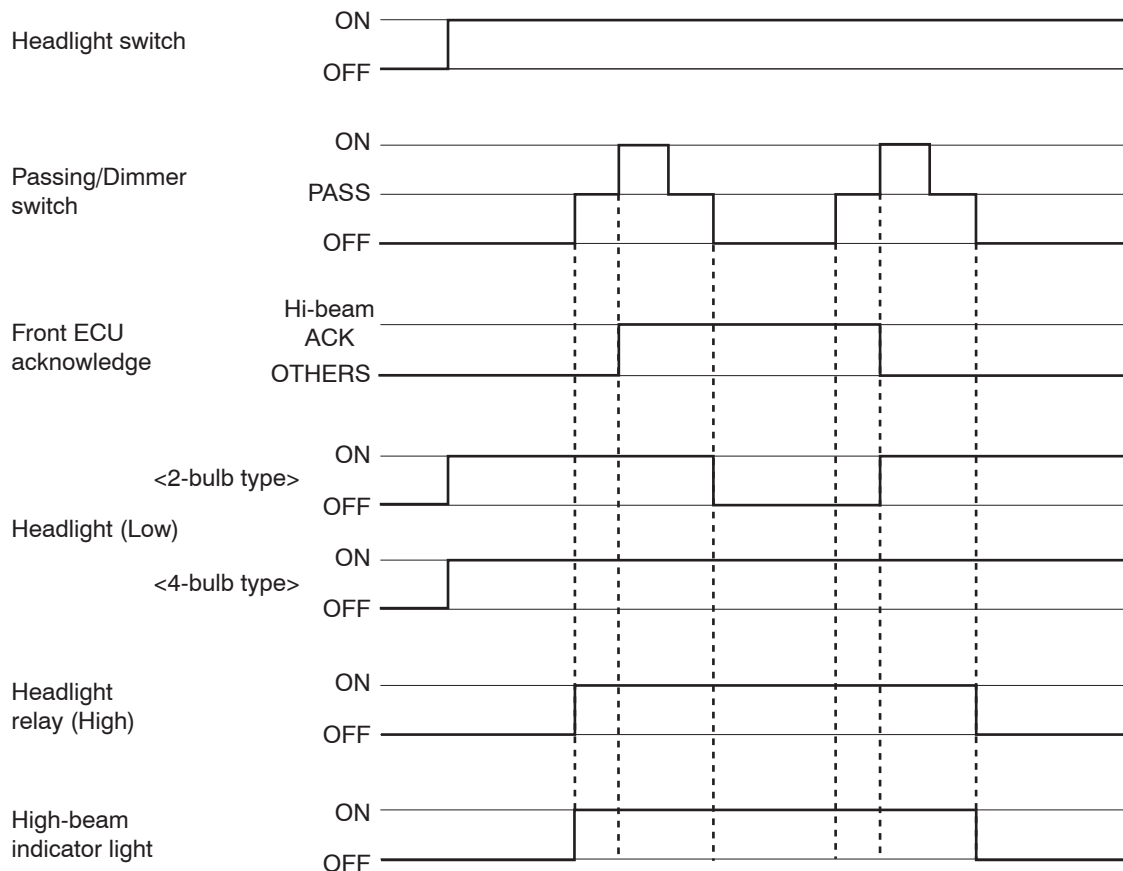
Taillamps and headlamps illumination

Taillamps

If the column switch sends a taillamp switch "ON" signal to the front-ECU, the front-ECU turns on its taillamp relay, causing the taillamps to illuminate.

NOTE: This description covers the taillamps only. In actual driving, the taillamps may be turned off due to the headlamp automatic shut-off function. For the details of the headlamp automatic shut-off function, refer to .

Headlamps



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If the column switch sends a headlamp switch "ON" signal to the front-ECU, the front-ECU turns on its headlamp relay (LOW), causing the low-beam headlamps to illuminate. If the dimmer switch is turned on while the headlamp relay (LOW) is on, the front-ECU turns on the headlamp relay (HIGH), causing the high-beam headlamps to illuminate.

NOTE: This description covers the headlamps only. In actual driving, the headlamps may be turned off due to the headlamp automatic shut-off function. For the details of the headlamp automatic shut-off function, refer to .

High-beam indicator lamp

At the same time that the high-beams are illuminated, the ETACS-ECU sends a signal to illuminate the high beam indicator via the CAN bus line. The combination meter receives the transmitted signal and turns the high-beam indicator on and off.

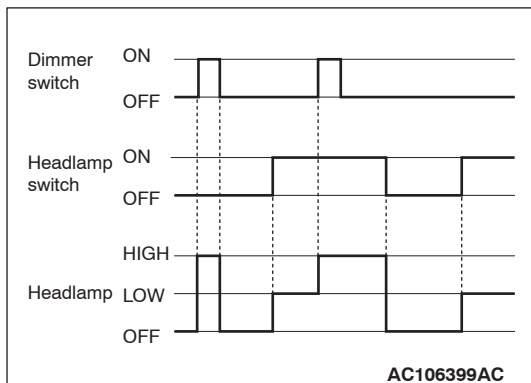
Headlamp automatic-shutdown function

Even if the lighting switch (taillamps switch or headlamp switch) is ON, the headlamps (including the taillamps) will automatically go off in the following conditions to prevent the battery from discharging as a result of forgetting to turn off lamps. If the ignition key is turned from "ON" to "LOCK" (OFF) or "ACC" position with the lighting switch turned ON, and this state continues for three minutes, the headlamps will automatically be turned off. If the driver's seat door is opened during these three minutes, the headlamps will go off one second later.

NOTE: The headlamp automatic-shutoff function can be customized on vehicles equipped with a multi center display (middle grade type). Refer to [P.54B-486](#).

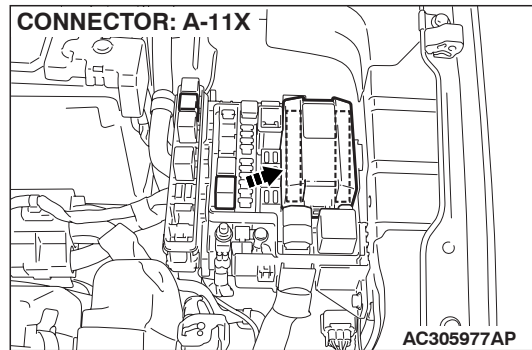
Dimmer automatic reset function

If the headlamp switch is turned off while the high-beam headlamps are on, the dimmer switch will be reset. Because of this, the headlamps will illuminate at low beam the next time that they are turned on. The dimmer switch will be also reset if the dimmer switch is turned on unintentionally while the passing switch is operated.



INSPECTION PROCEDURE H-1: Headlamp and Taillamp: The taillamps do not illuminate normally.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to connect the SWS monitor, refer to "How to connect SWS monitor P.54B-13."



CIRCUIT OPERATION

When the lighting switch is set to "TAIL" position, the "TAIL" signal is sent through the column-ECU (incorporated in the column switch) to the front-ECU. If the front-ECU receives the "TAIL" signal through the column-ECU, the front-ECU turns on the taillamp relay (incorporated in the front-ECU), thus causing the taillamps to illuminate.

TECHNICAL DESCRIPTION (COMMENT)

If the taillamps do not illuminate normally, the column switch or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the following ECUs:

- Column switch (column-ECU)
- Front-ECU

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

(1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."

(2) Turn the ignition switch to the "LOCK" (OFF) position.

(3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM Check."

- Select "Interactive Diagnosis."
- Select "System select."
- Select "SWS."
- Select "SWS MONITOR."
- Select "ECU COMM Check."

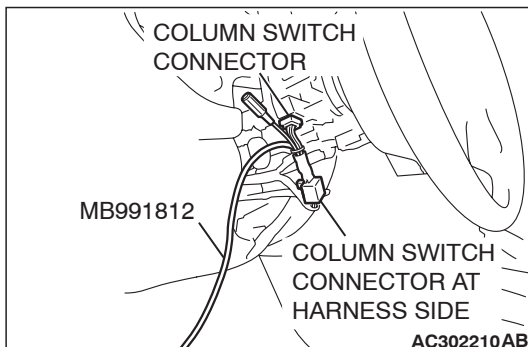
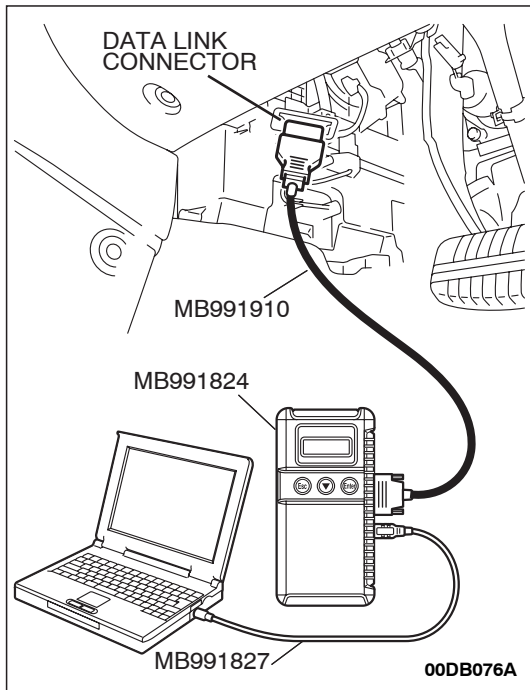
(4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menus for both the "COLUMN ECU" and the "FRONT ECU" menus.

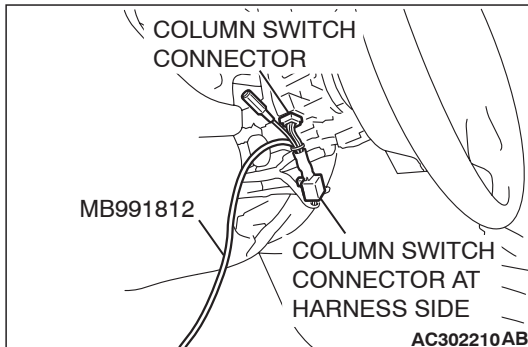
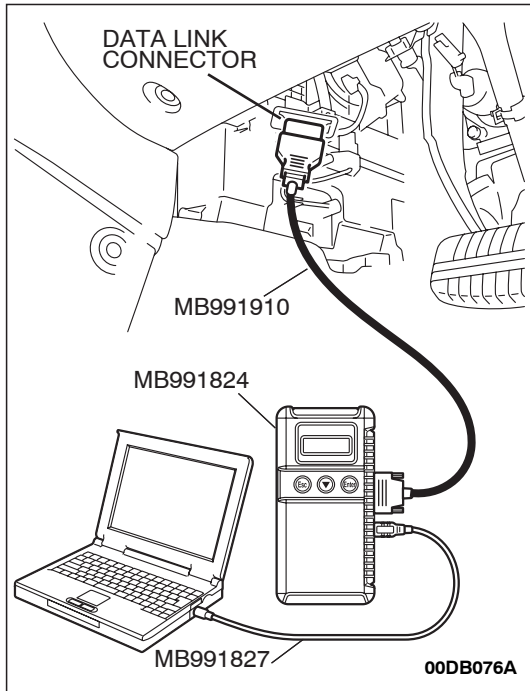
Q: Is "OK" displayed for both the "COLUMN ECU" and "FRONT ECU" menu?

"OK" is displayed for all the items : Go to Step 2.

"NG" is displayed for the "COLUMN ECU" menu : Refer to Inspection Procedure A-2 "Communication with the column switch (column-ECU) is not possible [P.54B-68](#)."

"NG" is displayed for the "FRONT ECU" menu : Refer to Inspection Procedure A-4 "Communication with the front-ECU is not possible [P.54B-80](#)."





STEP 2. Check the input signal by using "FUNCTION DIAG." menu of the SWS monitor.

Check the input signals from the following switches:

- Ignition switch: ON
- Lighting switch: TAIL

NOTE: Turn the ignition switch to the "ON" position in order to disable the headlamp automatic shutdown function.

- (1) Operate Diagnostic Tool MB991958 according to the procedure below to display "TAILLAMP."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "LIGHTING."
 - g. Select "TAILLAMP."
- (2) Check that normal conditions are displayed for the items described in the table below.

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 01	TAILLAMP SW	ON
ITEM 35	H/L AUTO-CUT	OFF
ITEM 70	FRONT ECU ACK	NORMAL ACK

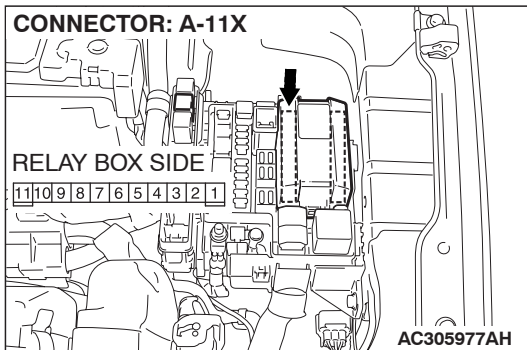
Q: Does the Diagnostic Tool MB991958 display the items "TAILLAMP SW", "H/L AUTO-CUT" and "FRONT ECU ACK" as normal condition?

Normal conditions are displayed for all the items : Go to Step 3.

Normal condition is not displayed for "TAILLAMP SW" :
Refer to Inspection Procedure M-5 "ETACS-ECU does not receive any signal from the taillamp switch [P.54B-420.](#)"

Normal condition is not displayed for "H/L AUTO-CUT" :
Refer to Inspection Procedure H-9 "Headlamp automatic shutoff function does not work normally [P.54B-305.](#)"

Normal condition is not displayed for "FRONT ECU ACK" : Replace the front-ECU. Verify that the taillamps illuminate normally.



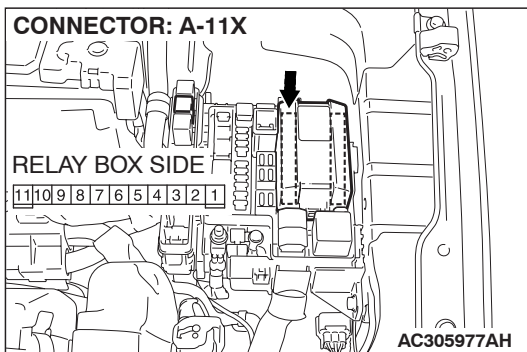
STEP 3. Check front-ECU connector A-11X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front-ECU connector A-11X in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Verify that the taillamps illuminate normally.



STEP 4. Check the battery power supply circuit to the front-ECU. Measure the voltage at front-ECU connector A-11X.

(1) Disconnect front-ECU connector A-11X and measure the voltage available at the relay box side of the connector.

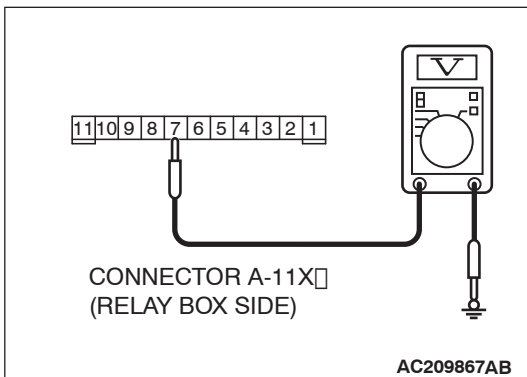
(2) Measure the voltage between terminal 7 and ground.

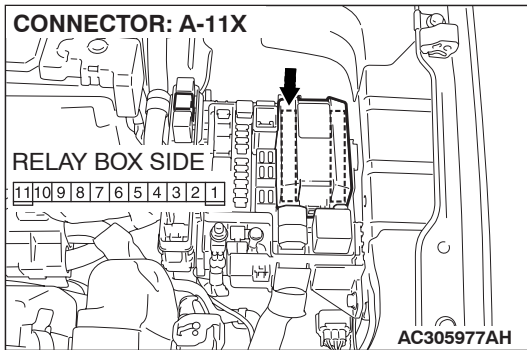
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Replace the front-ECU. Verify that the taillamps illuminate normally.

NO : Go to Step 5.





STEP 5. Check the wiring harness between front-ECU connector A-11X (terminal 7) and the battery.

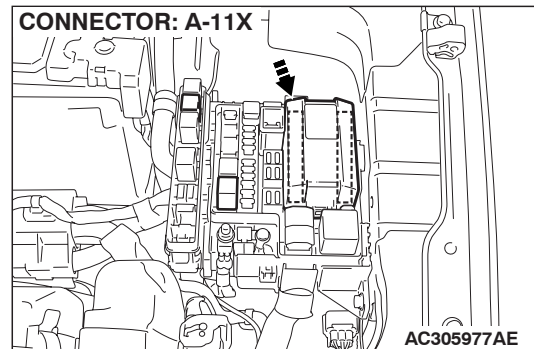
Q: Is the wiring harness between front-ECU connector A-11X (terminal 7) and the battery in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the taillamps illuminate normally.

INSPECTION PROCEDURE H-2: Headlamp and Taillamp: The headlamps (low-beam) do not illuminate normally.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."



CIRCUIT OPERATION

- When the lighting switch is set to "HEAD" position, the "HEAD" signal is sent through the column-ECU (incorporated in the column switch) to the front-ECU. If the front-ECU receives the "HEAD" signal through the column-ECU, the front-ECU turns on the headlamp relay (incorporated in the front-ECU), thus causing the headlamps to illuminate. The headlamps always illuminate at low-beam by the headlamp dimmer switch automatic resetting function.
- If the SWS communication line is defective, the front-ECU operates the headlamps by using the other communication lines (headlamp backup circuit) instead of that line.

TECHNICAL DESCRIPTION (COMMENT)

If the headlamps (low-beam) do not illuminate normally, the column switch or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams [GROUP-90](#)
- Refer to configuration diagrams [GROUP-80](#)
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable

- MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the following ECUs:

- Column switch (column-ECU)
- Front-ECU

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

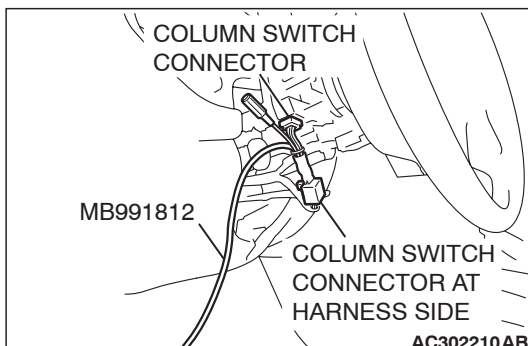
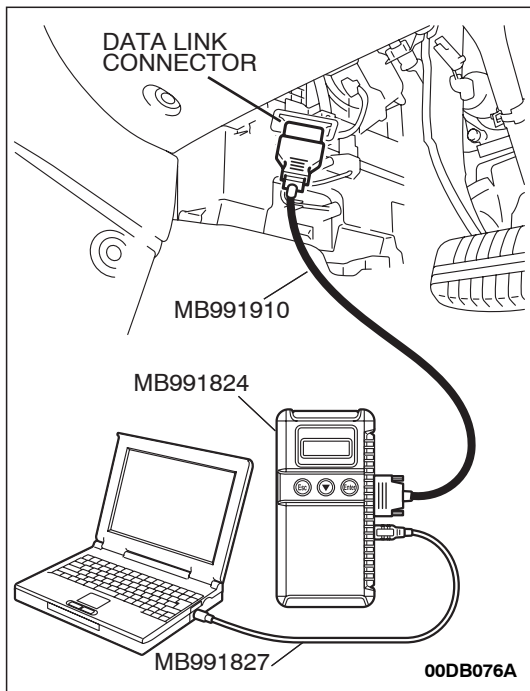
- (1) Connect the special tool. Refer to "How to connect SWS monitor P.54B-13."
- (2) Turn the ignition switch to the "LOCK" (OFF) position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM Check."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "ECU COMM Check."
- (4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menus for both the "COLUMN ECU" and the "FRONT ECU" menus.

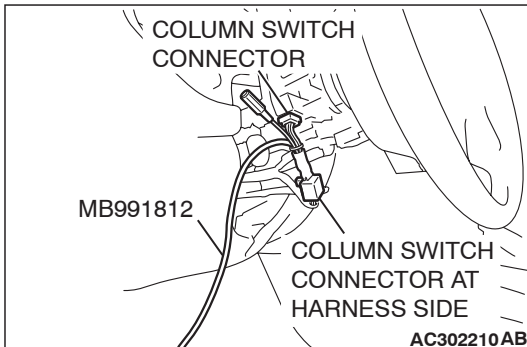
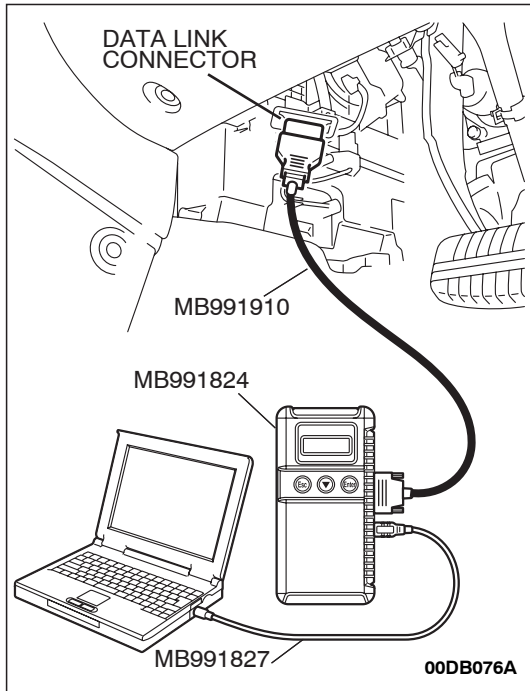
Q: Is "OK" displayed for both the "COLUMN ECU" and "FRONT ECU" menus?

"OK" is displayed for all the items : Go to Step 2.

"NG" is displayed for the "COLUMN ECU" menu : Refer to Inspection Procedure A-2 "Communication with the column switch (column-ECU) is not possible P.54B-68."

"NG" is displayed for the "FRONT ECU" menu : Refer to Inspection Procedure A-4 "Communication with the front-ECU is not possible P.54B-80."





STEP 2. Check the input signal by using "FUNCTION DIAG." menu of the SWS monitor.

Check the input signals from the following switches:

- Ignition switch: ON
- Lighting switch: HEAD

- (1) Operate Diagnostic Tool MB991958 according to the procedure below to display "HEADLAMP LO."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "LIGHTING."
 - g. Select "HEADLAMP LO."
- (2) Check that normal conditions are displayed for the items described in the table below.

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 00	HEADLAMP SW	ON
ITEM 35	H/L AUTO-CUT	OFF
ITEM 70	FRONT ECU ACK	NORMAL ACK

Q: Does the Diagnostic Tool MB991958 display the items "HEADLAMP SW", "H/L AUTO-CUT" and "FRONT ECU ACK" as normal condition?

Normal conditions are displayed for all the items : Go to Step 3.

Normal condition is not displayed for "HEADLAMP SW"

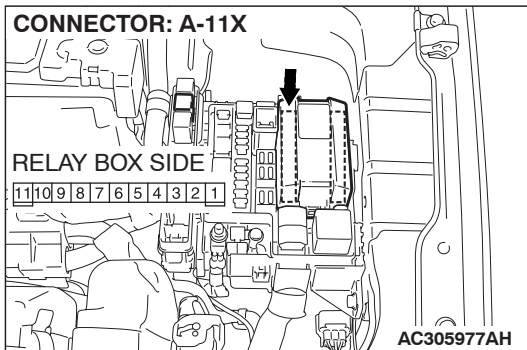
: Refer to Inspection Procedure M-5 "ETACS-ECU does not receive any signal from the headlamp switch [P.54B-420.](#)"

Normal condition is not displayed for "H/L AUTO-CUT" :

Refer to Inspection Procedure H-9 "Headlamp automatic shutoff function does not work normally [P.54B-305.](#)"

Normal condition is not displayed for "FRONT ECU ACK"

: Replace the front-ECU. Verify that the headlamps (low-beam) illuminate normally.

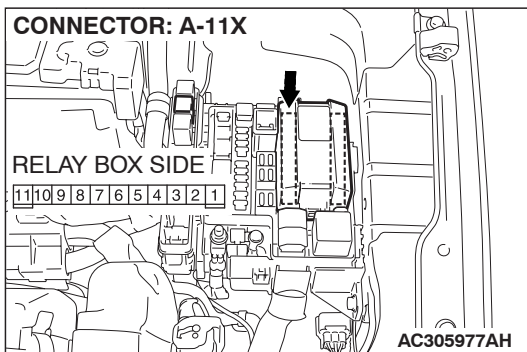


STEP 3. Check front-ECU connector A-11X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front-ECU connector A-11X in good condition?

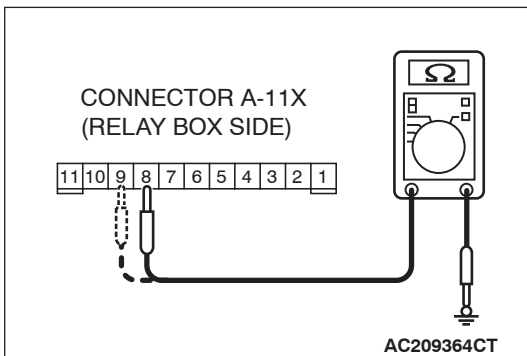
YES : Go to Step 4.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the headlamps (low-beam) illuminate normally.



STEP 4. Check the battery power supply circuit to the front-ECU. Measure the voltage at front-ECU connector A-11X.

(1) Disconnect front-ECU connector A-11X and measure the voltage available at the relay box side of the connector.



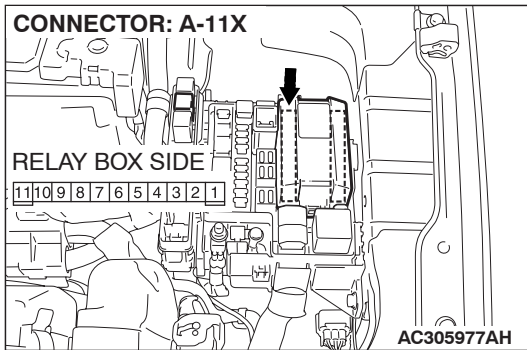
(2) Measure the voltage between terminal numbers 8 and ground, and also between terminal 9 and ground.

- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Replace the front-ECU. Verify that the headlamps (low-beam) illuminate normally.

NO : Go to Step 5.



STEP 5. Check the wiring harness between front-ECU connector A-11X (terminals 8 and 9) and the battery.

Q: Is the wiring harness between front-ECU connector A-11X (terminals 8 and 9) and the battery in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the headlamps (low-beam) illuminate normally.

INSPECTION PROCEDURE H-3: Headlamp and Taillamp: The headlamps (high-beam) do not illuminate normally.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

CIRCUIT OPERATION

When the dimmer switch is turned on, the column switch sends a signal to the front-ECU. Then the front-ECU switches the headlamps from low-beam to high beam or vice versa.

TECHNICAL DESCRIPTION (COMMENT)

If the headlamps (high beam) do not illuminate normally, the column switch or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the following ECUs:

- Column switch (column-ECU)
- Front-ECU

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

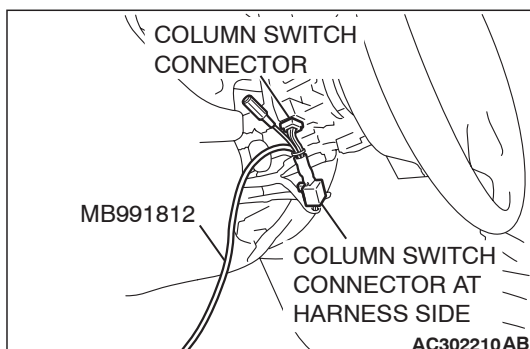
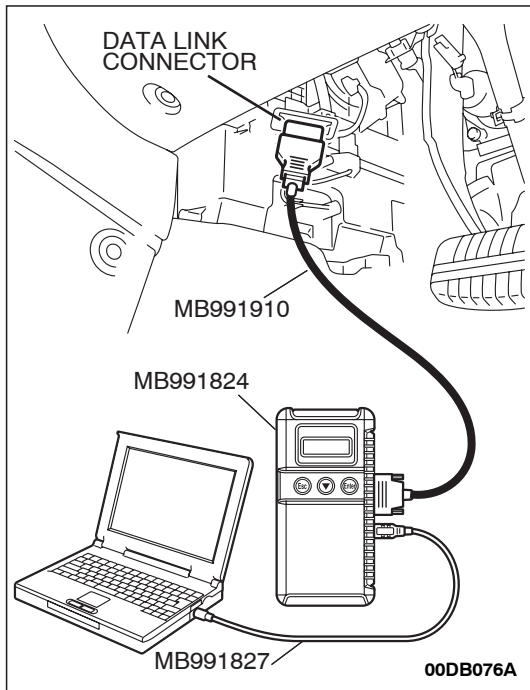
- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "LOCK" (OFF) position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM Check."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "ECU COMM Check."
- (4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menus for both the "COLUMN ECU" and the "FRONT ECU" menus.

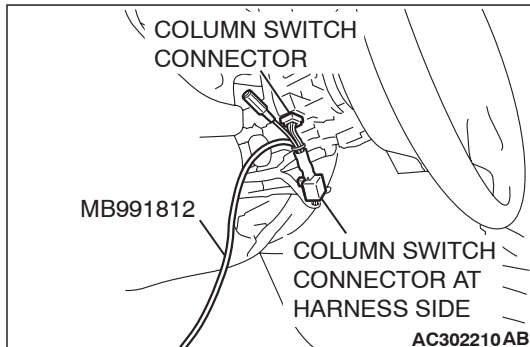
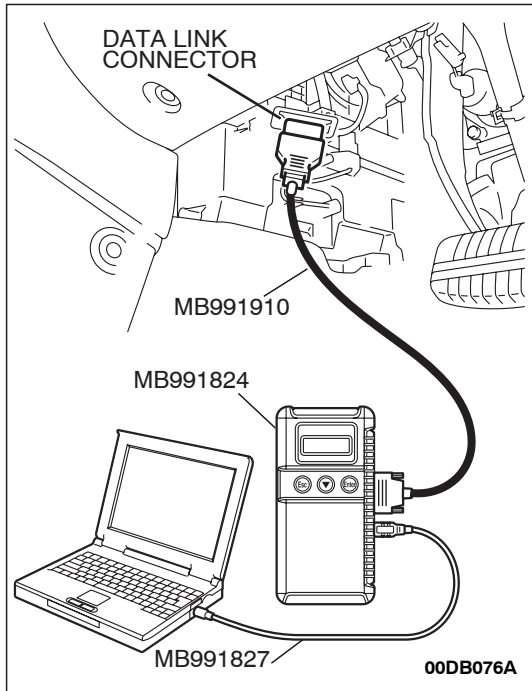
Q: Is "OK" displayed for both the "COLUMN ECU" and "FRONT ECU" menus?

"OK" is displayed for all the items : Go to Step 2.

"NG" is displayed for the "COLUMN ECU" menu : Refer to Inspection Procedure A-2 "Communication with the column switch (column-ECU) is not possible [P.54B-68](#)."

"NG" is displayed for the "FRONT ECU" menu : Refer to Inspection Procedure A-4 "Communication with the front-ECU is not possible [P.54B-80](#)."





STEP 2. Check the input signal by using "FUNCTION DIAG." menu of the SWS monitor.

Check the input signals from the following switches:

- Ignition switch: ON
- Lighting switch: HEAD
- Dimmer switch: ON

- (1) Operate Diagnostic Tool MB991958 according to the procedure below to display "HEADLAMP HI."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "LIGHTING."
 - g. Select "HEADLAMP HI."
- (2) Check that normal conditions are displayed for the items described in the table below.

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 00	HEADLAMP SW	ON
ITEM 02	DIMMER SW	OFF (should turn "ON" momentarily when the dimmer switch is operated)
ITEM 35	H/L AUTO-CUT	OFF
ITEM 70	FRONT ECU ACK	HI-BEAM ACK

Q: Does the Diagnostic Tool MB991958 display the items "HEADLAMP SW", "DIMMER SW", "H/L AUTO-CUT" and "FRONT ECU ACK" as normal condition?

Normal conditions are displayed for all the items :

Replace the front-ECU. Verify that the headlamps (high-beam) illuminate normally.

Normal condition is not displayed for "HEADLAMP SW"

: Refer to Inspection Procedure M-5 "ETACS-ECU does not receive any signal from the headlamp switch [P.54B-420.](#)"

Normal condition is not displayed for "DIMMER SW" :

Refer to Inspection Procedure M-5 "ETACS-ECU does not receive any signal from the dimmer switch [P.54B-420.](#)"

Normal condition is not displayed for "H/L AUTO-CUT" :

Refer to Inspection Procedure H-9 "Headlamp automatic shutoff function does not work normally [P.54B-305.](#)"

Normal condition is not displayed for "FRONT ECU

ACK" : Replace the front-ECU. Verify that the headlamps (high-beam) illuminate normally.

INSPECTION PROCEDURE H-4: Headlamp and Taillamp: When the passing switch is turned "ON," the headlamps (low-beam or high-beam) do not illuminate.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

TECHNICAL DESCRIPTION (COMMENT)

If both of the headlamps (low-beam and high-beam) do not illuminate, the input circuit from the passing switch or the front-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Check the headlamps.

Q: Do the headlamps (low-beam and high-beam) illuminate normally?

The headlamps illuminate normally. : Go to Step 2.

Headlamps (low-beam) do not illuminate normally :

Refer to Inspection Procedure H-2 "The headlamps (low-beam) do not illuminate normally [P.54B-264](#).

Headlamps (high-beam) do not illuminate normally :

Refer to Inspection Procedure H-3 "The headlamps (high-beam) do not illuminate normally [P.54B-268](#).

STEP 2. Check the input signal by using "DATA LIST" menu of the SWS monitor.

Turn the passing switch to the "ON" position before checking input signals from the passing switch.

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

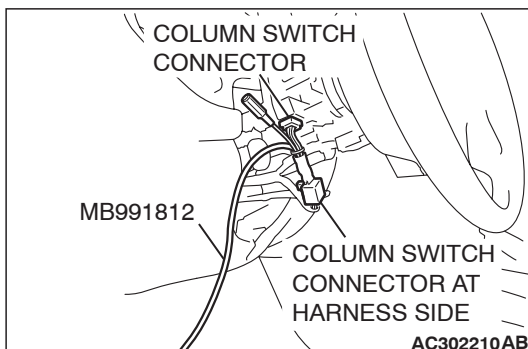
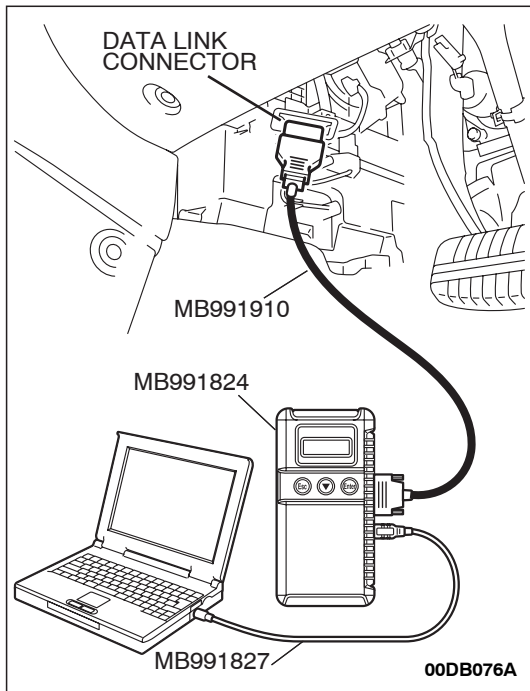
- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Operate Diagnostic Tool MB991958 according to the procedure below to display "COLUMN ECU."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Data List."
 - f. Select "COLUMN ECU."
- (3) Check that normal conditions are displayed for the items described in the table below.

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 03	PASSING SW	ON

Q: Does the Diagnostic Tool MB991958 display "PASSING SW" as normal condition?

YES : Replace the front-ECU. When the passing switch is turned "ON", the headlamps (low-beam and high-beam) should illuminate normally.

NO : Refer to Inspection Procedure M-5 "ETACS-ECU does not receive any signal from the passing switch [P.54B-420](#)."



INSPECTION PROCEDURE H-5: Headlamp and Taillamp: Headlamps do not illuminate when the lighting switch is at "TAIL," and "PASSING" position, but illuminate at low-beam when the switch is at "HEAD" position. At this position, the headlamps cannot be changed to high beam by operating the dimmer switch.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

TECHNICAL DESCRIPTION (COMMENT)

If the headlamps illuminate at low-beam regardless of the lighting switch positions, the headlamp operation is in fail-safe mode.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the following ECUs:

- ETACS-ECU
- Column-ECU
- Front-ECU

CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "LOCK" (OFF) position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM Check."
 - a. Select "System select."
 - b. Select "SWS."
 - c. Select "SWS MONITOR."
 - d. Select "ECU COMM Check."
- (4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menus for the "ETACS ECU", "COLUMN ECU" and "FRONT ECU" menus.

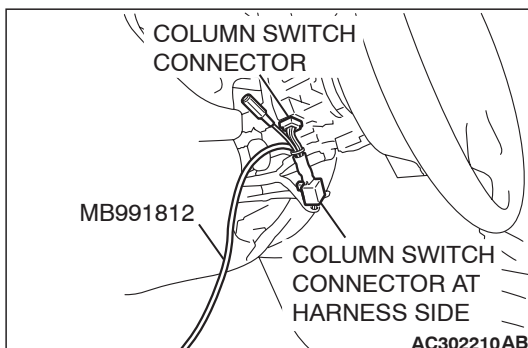
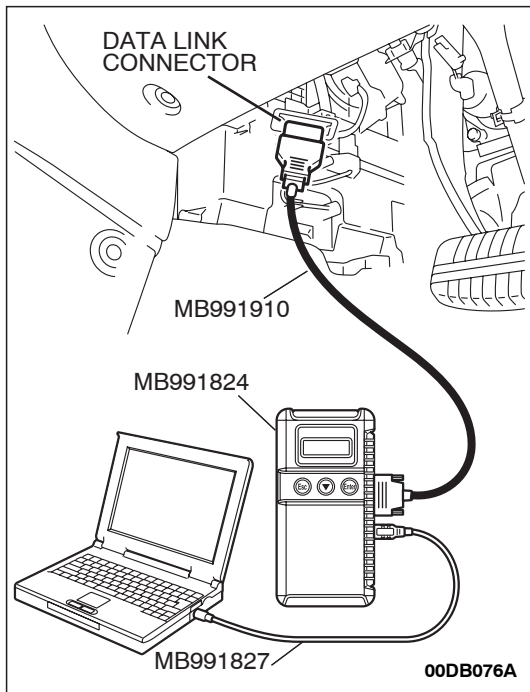
Q: Is "OK" displayed for both the "ETACS ECU", "COLUMN ECU" and "FRONT ECU" menus?

"OK" is displayed for all the items : Replace the front-ECU. Verify that the headlamps and the taillamps illuminate normally.

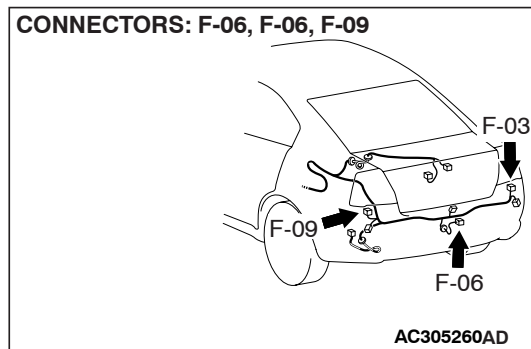
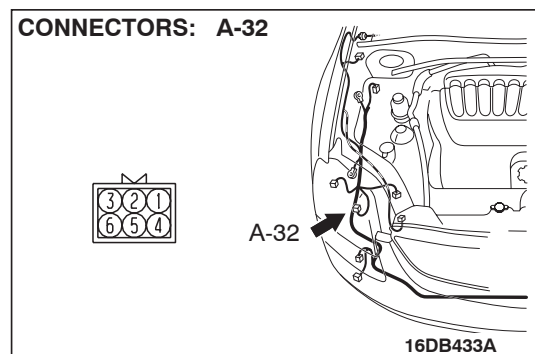
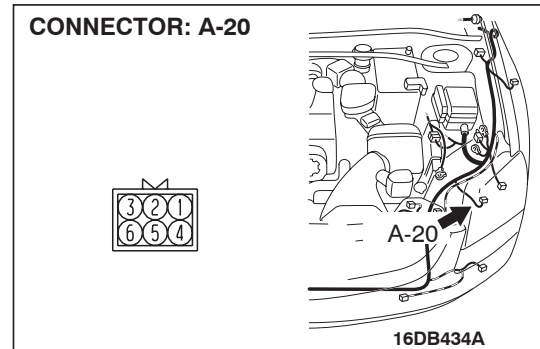
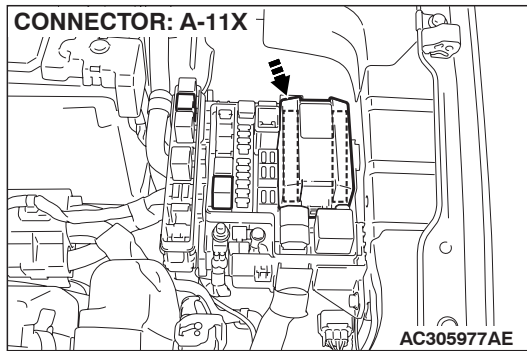
"NG" is displayed for the "ETACS ECU" menu : Refer to Inspection Procedure A-3 "Communication with the ETACS-ECU is not possible [P.54B-74](#)."

"NG" is displayed for the "COLUMN ECU" menu : Refer to Inspection Procedure A-2 "Communication with the column switch (column-ECU) is not possible [P.54B-68](#)."

"NG" is displayed for the "FRONT ECU" menu : Refer to Inspection Procedure A-4 "Communication with the front-ECU is not possible [P.54B-80](#)."



INSPECTION PROCEDURE H-6: Headlamp and Taillamp: The front park lamps, taillamps or the licence plate lamps do not illuminate.



TECHNICAL DESCRIPTION (COMMENT)

If the front park lamps, taillamps or the licence plate lamp do not illuminate, their bulb may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams [GROUP-90](#)
- Refer to configuration diagrams [GROUP-80](#)
- The front park lamp bulb may be defective
- The stop/taillamp bulb may be defective
- The licence plate lamp bulb may be defective
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector

DIAGNOSIS

Required Special Tool:

- MB991223: Harness Set

STEP 1. Check the operation of each lamp.

Q: Which lamp does not illuminate?

front park lamp (LH), taillamp (LH), and licence plate lamp : Go to Step 2.

front park lamp (RH), taillamp (RH) : Go to Step 4.

taillamp (LH) and licence plate lamp : Go to Step 6.

taillamp (LH) : Go to Step 8.

taillamp (RH) : Go to Step 13.

front park lamp (LH) : Go to Step 19.

front park lamp (RH) : Go to Step 25.

licence plate lamp : Go to Step 31.

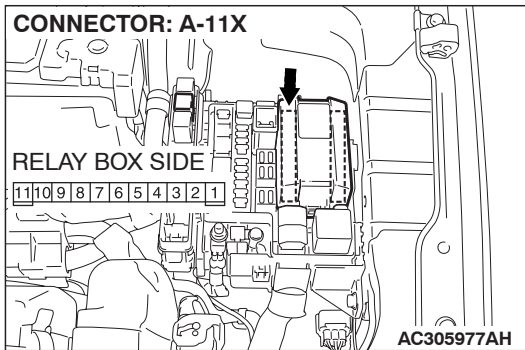
All lamps : Refer to Inspection Procedure H-1 "The taillamps do not illuminate normally [P.54B-260](#)."

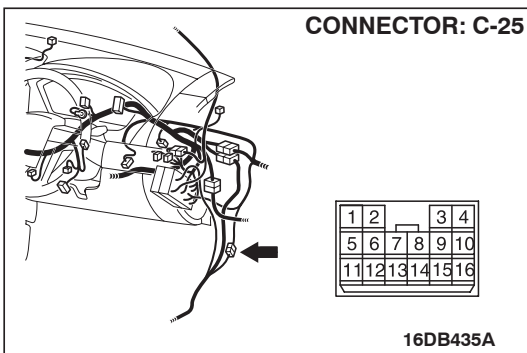
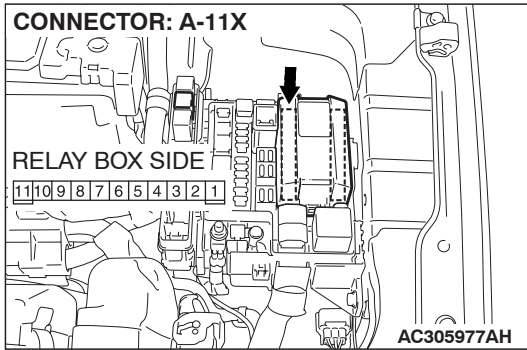
STEP 2. Check front-ECU connector A-11X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front-ECU connector A-11X in good condition?

YES : Go to Step 3.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). The front park lamp (LH), taillamp (LH), and the licence plate lamp should illuminate normally.





STEP 3. Check the wiring harness between intermediate connector C-25 (terminal 10) and front-ECU connector A-11X (terminal 4).

Q: Is the wiring harness between intermediate connector C-25 (terminal 10) and front-ECU connector A-11X (terminal 4) in good condition?

YES : No action is necessary and testing is complete.

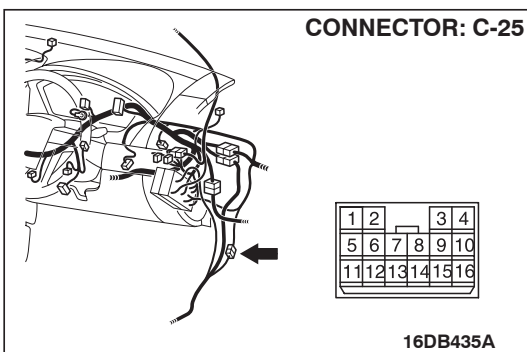
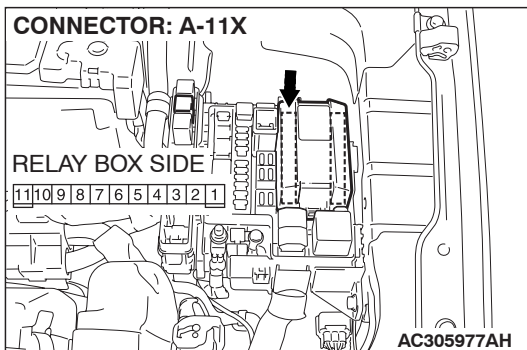
NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. The front parking lamp (LH), taillamp (LH), and the licence plate lamp should illuminate normally.

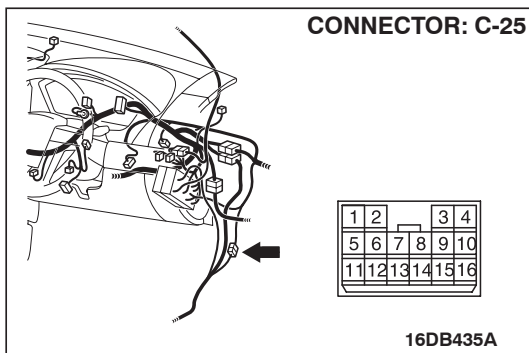
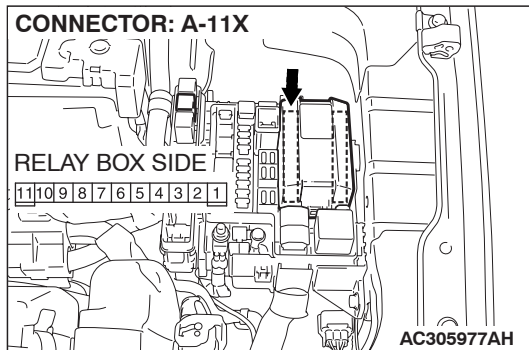
STEP 4. Check intermediate connector C-25 and front-ECU connector A-11X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are intermediate connector C-25 and front-ECU connector A-11X in good condition?

YES : Go to Step 5.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). The front parking lamp (RH), and the taillamp (RH) should illuminate normally.



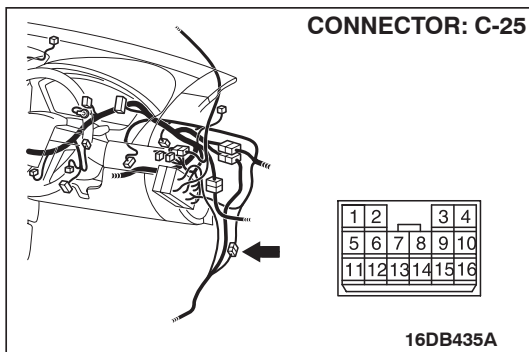


STEP 5. Check the wiring harness between intermediate connector C-25 (terminal 8) and front-ECU connector A-11X (terminal 4).

Q: Is the wiring harness between intermediate connector C-25 (terminal 8) and front-ECU connector A-11X (terminal 4) in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. The front parking lamp (RH), and the taillamp (RH) should illuminate normally.

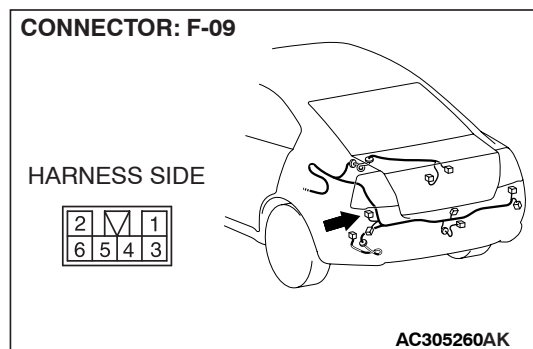


STEP 6. Check intermediate connector C-25 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is intermediate connector C-25 in good condition?

YES : Go to Step 7.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). The taillamp (LH) and the licence plate lamp should illuminate normally.



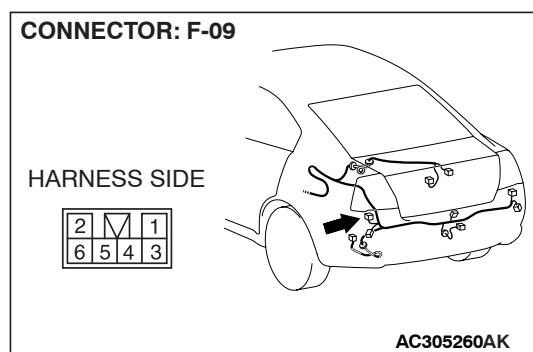
STEP 7. Check the wiring harness between intermediate connector C-25 (terminal 10) and rear combination lamp (LH) connector F-09 (terminal 4).

NOTE: Check intermediate connector C-25 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-25 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between intermediate connector C-25 (terminal 10) and rear combination lamp (LH) connector F-09 (terminal 4) in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. The taillamp (LH) and the licence plate lamp should illuminate normally.



STEP 8. Check rear combination lamp (LH) connector F-09 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is rear combination lamp (LH) connector F-09 in good condition?

YES : Go to Step 9.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Check that the taillamp (LH) illuminates normally.

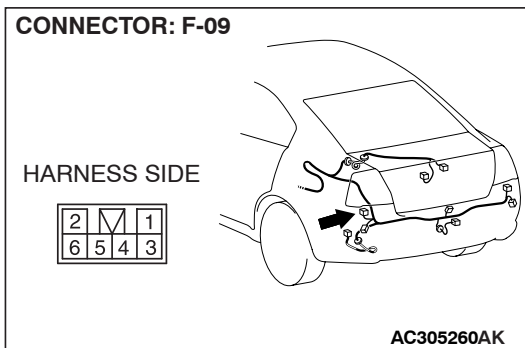
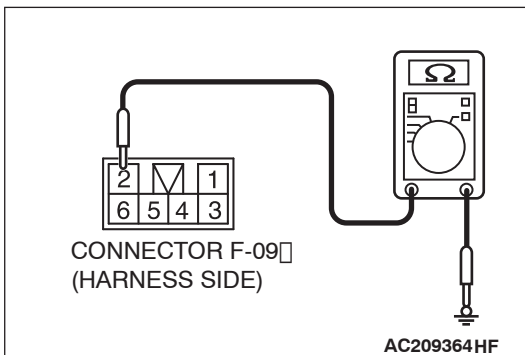
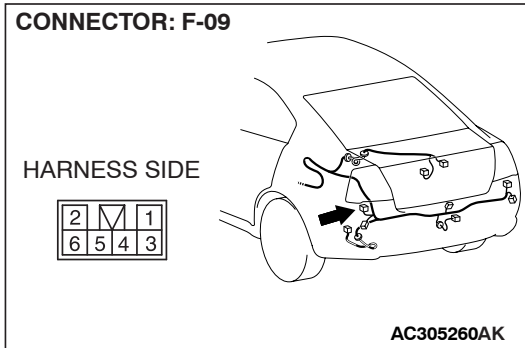
STEP 9. Check the stop/taillamp bulb (LH).

- (1) Remove the stop/taillamp bulb (LH).
- (2) Verify that the stop/taillamp bulb (LH) is not damaged or burned out.

Q: Is the stop/taillamp bulb (LH) in good condition?

YES : Go to Step 10.

NO : Replace the stop/taillamp bulb (LH). Verify that the taillamp (LH) illuminates normally.



STEP 10. Check the ground circuit to the rear combination lamp (LH). Measure the resistance at rear combination lamp (LH) connector F-09.

(1) Disconnect rear combination lamp (LH) connector F-09 and measure the resistance available at the wiring harness side of the connector.

(2) Measure the resistance value between terminal 2 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 12.

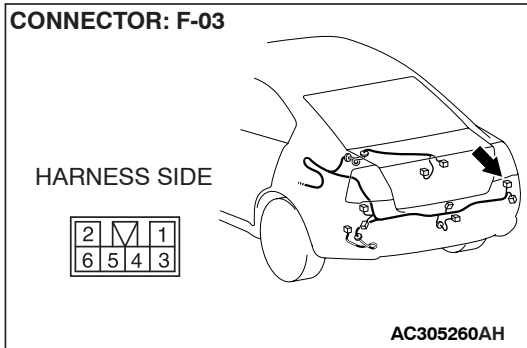
NO : Go to Step 11.

STEP 11. Check the wiring harness between rear combination lamp (LH) connector F-09 (terminal 2) and ground.

Q: Is the wiring harness between rear combination lamp (LH) connector F-09 (terminal 2) and ground in good condition?

YES : Replace the rear combination lamp socket (LH).
Verify that the taillamp (LH) illuminates normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the taillamp (LH) illuminates normally.



STEP 12. Check rear combination lamp (RH) connector F-03 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is rear combination lamp (RH) connector F-03 in good condition?

YES : Go to Step 14.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Check that the taillamp (RH) illuminates normally.

STEP 13. Check the stop/taillamp bulb (RH).

- (1) Remove the stop/taillamp bulb (RH).
- (2) Verify that the stop/taillamp bulb (RH) is not damaged or burned out.

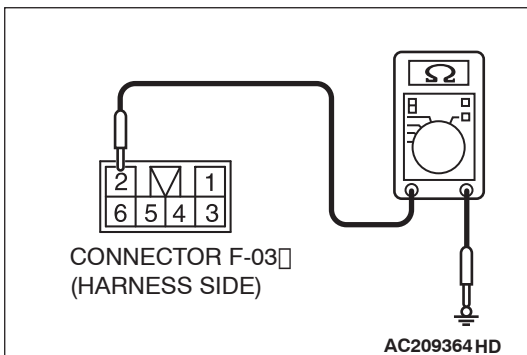
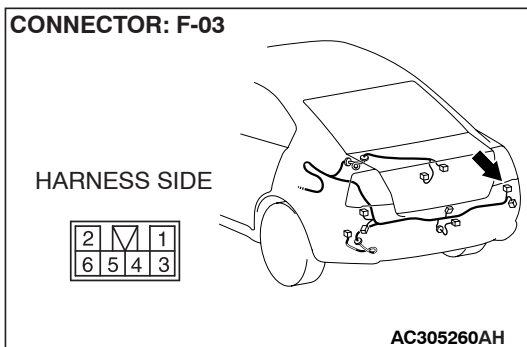
Q: Is the stop/taillamp bulb (RH) in good condition?

YES : Go to Step 14.

NO : Replace the stop/taillamp bulb (RH). Verify that the taillamp (RH) illuminates normally.

STEP 14. Check the ground circuit to the rear combination lamp (RH). Measure the resistance at rear combination lamp (RH) connector F-03.

- (1) Disconnect rear lamp (RH) connector F-03 and measure the resistance available at the wiring harness side of the connector.



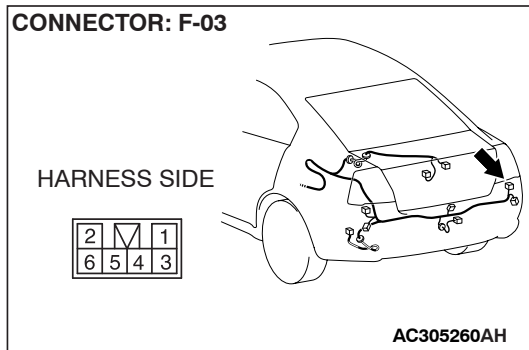
- (2) Measure the resistance value between terminal 2 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 17.

NO : Go to Step 16.

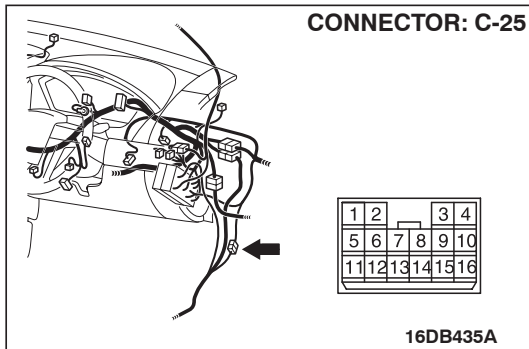


STEP 15. Check the wiring harness between rear combination lamp (RH) connector F-03 (terminal 2) and ground.

Q: Is the wiring harness between rear combination lamp (RH) connector F-03 (terminal 2) and ground in good condition?

YES : Replace the rear combination lamp socket (RH).
Verify that the taillamp (RH) illuminates normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the taillamp (RH) illuminates normally.



STEP 16. Check intermediate connector C-25 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

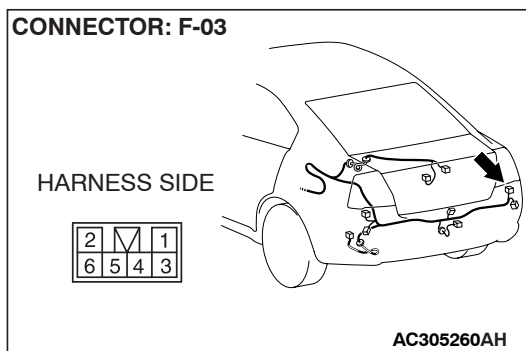
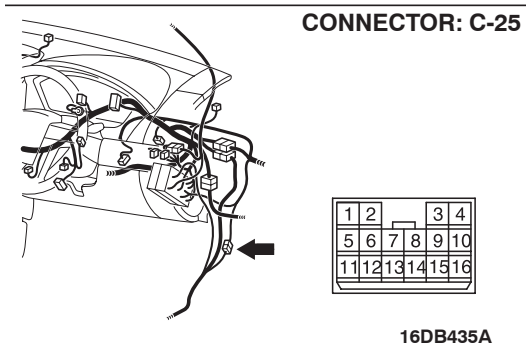
Q: Is intermediate connector C-25 in good condition?

YES : Go to Step 17.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

[P.00E-2](#). Check that the taillamp (RH) illuminates normally.

STEP 17. Check the wiring harness between rear combination lamp (RH) connector F-03 (terminal 4) and intermediate connector C-25 (terminal 8).

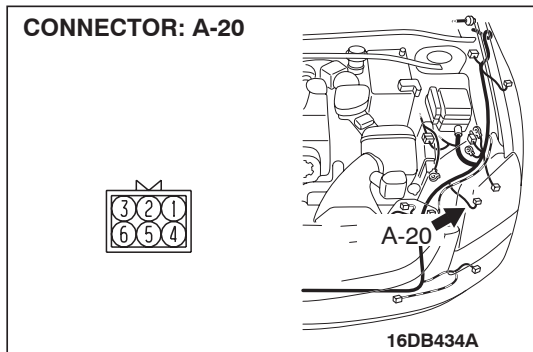


NOTE: Check intermediate connector C-25 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-25 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between rear combination lamp (RH) connector F-03 (terminal 4) and intermediate connector C-25 (terminal 8) in good condition?

YES : Replace the rear combination lamp socket (RH).
Verify that the taillamp (RH) illuminates normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the taillamp (RH) illuminates normally.



STEP 18. Check front combination lamp (LH) connector A-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front combination lamp (LH) connector A-20 in good condition?

YES : Go to Step 19.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Check that the front park lamp (LH) illuminates normally.

STEP 19. Check the front park lamp bulb (LH).

- (1) Remove the front park lamp bulb (LH).
- (2) Verify that the front park lamp bulb (LH) is not damaged or burned out.

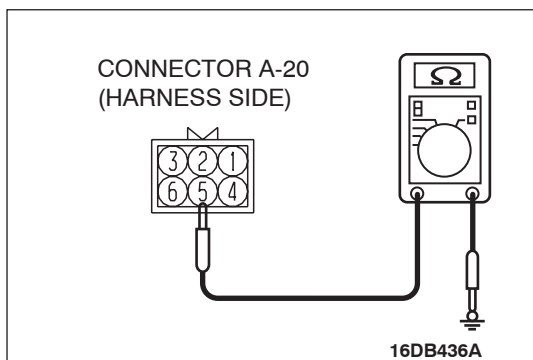
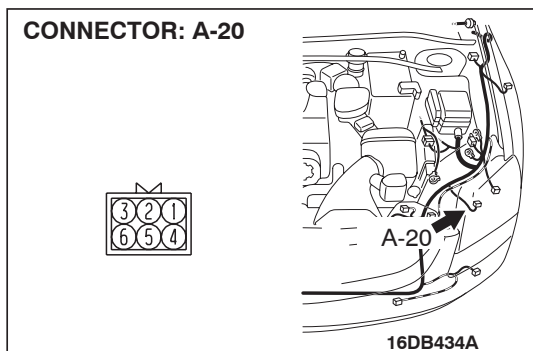
Q: Is the front park lamp bulb (LH) in good condition?

YES : Go to Step 20.

NO : Replace the front park lamp bulb (LH). Verify that the front park lamp (LH) illuminates normally.

STEP 20. Check the ground circuit to the front parking lamp (LH). Measure the resistance at front combination lamp (LH) connector A-20.

- (1) Disconnect front combination lamp (LH) connector A-20 and measure the resistance available at the wiring harness side of the connector.



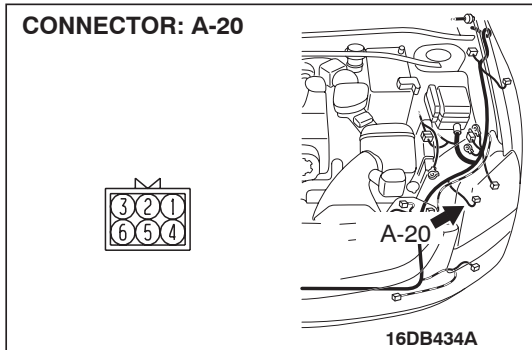
- (2) Measure the resistance value between terminal 5 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 22.

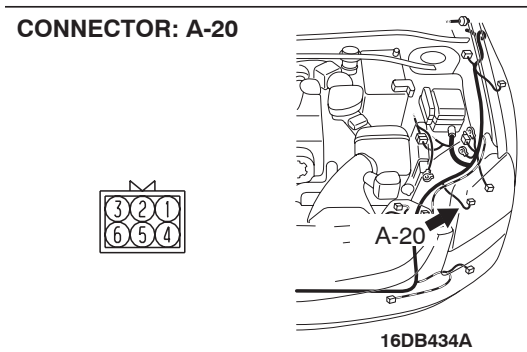
NO : Go to Step 21.



STEP 21. Check the wiring harness between front combination lamp (LH) connector A-20 (terminal 5) and ground.

Q: Is the wiring harness between front combination lamp (LH) connector A-20 (terminal 5) and ground in good condition?

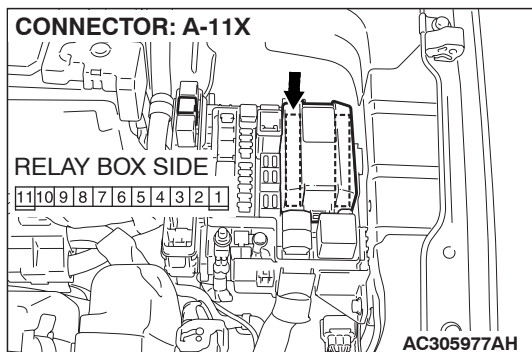
- YES :** Replace the front combination lamp socket (LH).
Verify that the front parking lamp (LH) illuminates normally.
- NO :** The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the front park lamp (LH) illuminates normally.



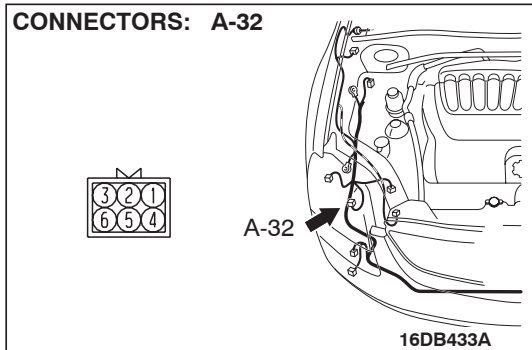
STEP 22. Check the wiring harness between front combination lamp (LH) connector A-20 (terminal 2) and front-ECU connector A-11X (terminal 4).

Q: Is the wiring harness between front combination lamp (LH) connector A-20 (terminal 2) and front-ECU connector A-11X (terminal 4) in good condition?

- YES :** No action is necessary and testing is complete.
- NO :** The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the front park lamp (LH) illuminates normally.



CONNECTORS: A-32



STEP 23. Check front combination lamp (RH) connector A-32 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front combination lamp (RH) connector A-32 in good condition?

YES : Go to Step 24.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Check that the front park lamp (RH) illuminates normally.

STEP 24. Check the front parklamp bulb (RH).

- (1) Remove the front park lamp bulb (RH).
- (2) Verify that the front park lamp bulb (RH) is not damaged or burned out.

Q: Is the front park lamp bulb (RH) in good condition?

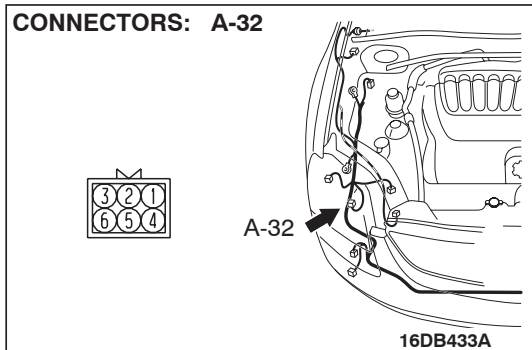
YES : Go to Step 25.

NO : Replace the front park lamp bulb (RH). Verify that the front park lamp (RH) illuminates normally.

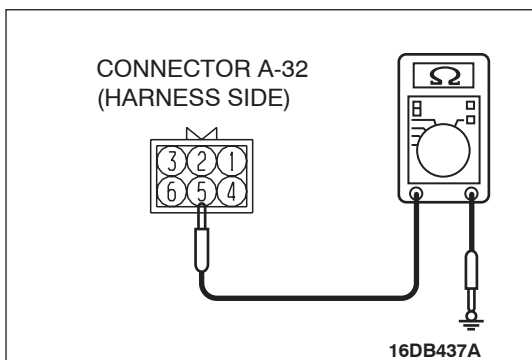
STEP 25. Check the ground circuit to the front parking lamp (RH). Measure the resistance at front combination lamp (RH) connector A-32.

- (1) Disconnect front combination lamp (RH) connector A-32, and measure the resistance available at the harness side of the connector.

CONNECTORS: A-32



CONNECTOR A-32
(HARNESS SIDE)



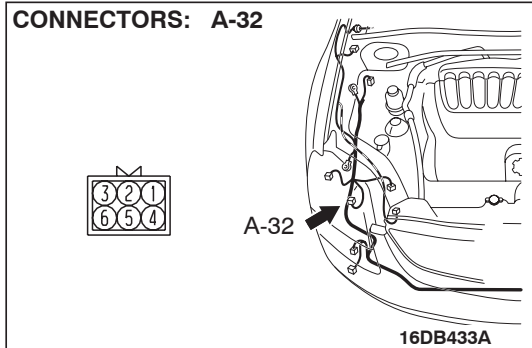
- (2) Measure the resistance value between terminal 5 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 27.

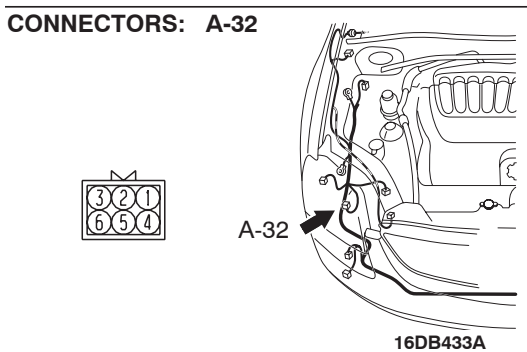
NO : Go to Step 26.



STEP 26. Check the wiring harness between front combination lamp (RH) connector A-32 (terminal 5) and ground.

Q: Is the wiring harness between front combination lamp (RH) connector A-32 (terminal 5) and ground in good condition?

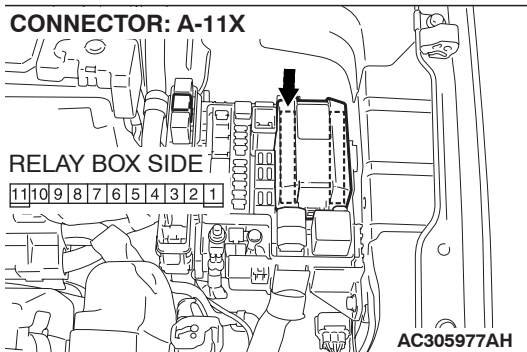
- YES :** Replace the front combination lamp socket (RH).
Verify that the front park lamp (RH) illuminates normally.
- NO :** The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the front park lamp (RH) illuminates normally.

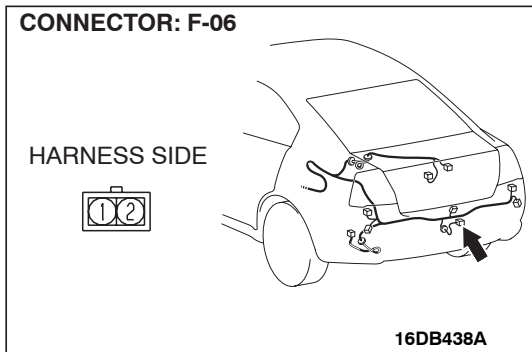


STEP 27. Check the wiring harness between front combination lamp (RH) connector A-32 (terminal 2) and front-ECU connector A-11X (terminal 4).

Q: Is the wiring harness between front combination lamp (RH) connector A-32 (terminal 2) and front-ECU connector A-11X (terminal 4) in good condition?

- YES :** No action is necessary and testing is complete.
- NO :** The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the front parking lamp (RH) illuminates normally.





STEP 28. Check licence plate lamp connector F-06 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is licence plate lamp connector F-06 in good condition?

YES : Go to Step 29.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Check that the licence plate lamps illuminate normally.

STEP 29. Check the licence plate lamp bulbs.

- (1) Remove the licence plate lamp bulbs.
- (2) Verify that both licence plate lamp bulbs are not damaged or burned out.

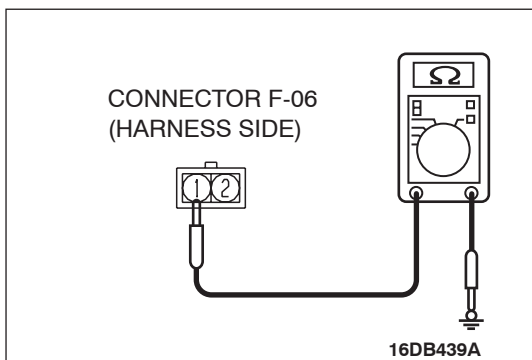
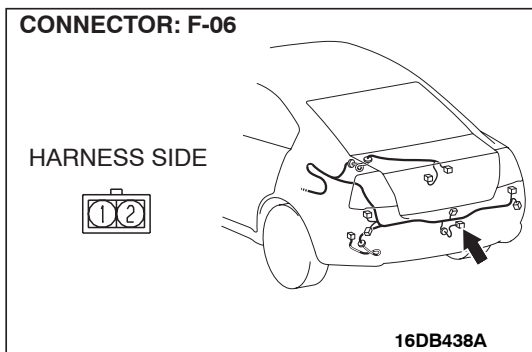
Q: Are both licence plate lamp bulbs in good condition?

YES : Go to Step 30.

NO : Replace the licence plate lamp bulbs. Verify that the licence plate lamps illuminate normally.

STEP 30. Check the ground circuit to the licence plate lamp. Measure the resistance at licence plate lamp connector F-06.

- (1) Disconnect licence plate lamp connector F-06 and measure the resistance available at the wiring harness side of the connector.



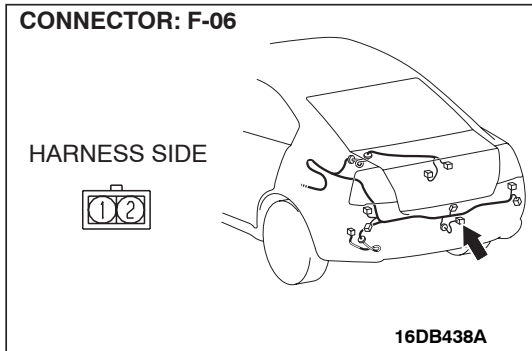
- (2) Measure the resistance value between terminal 1 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 32.

NO : Go to Step 31.

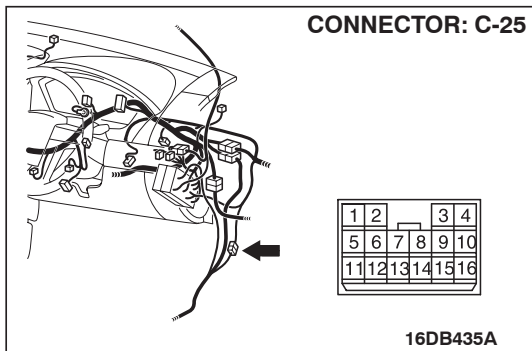


STEP 31. Check the wiring harness between licence plate lamp connector F-06 (terminal 1) and ground.

Q: Is the wiring harness between licence plate lamp connector F-06 (terminal 1) and ground in good condition?

YES : Replace the licence plate lamp socket. Verify that the licence plate lamps illuminate normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the licence plate lamps illuminate normally.

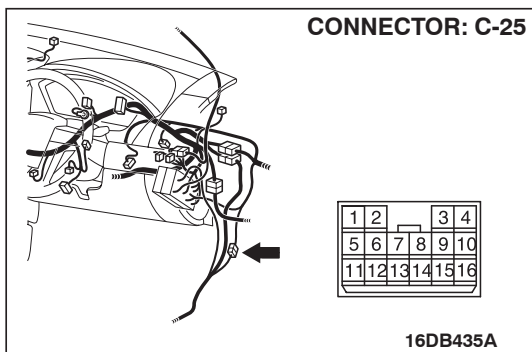


STEP 32. Check intermediate connector C-25 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is intermediate connector C-25 in good condition?

YES : Go to Step 33.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Check that the licence plate lamps illuminate normally.

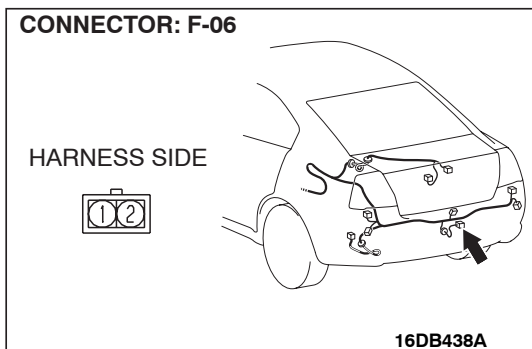


STEP 33. Check the wiring harness between licence plate lamp connector F-06 (terminal 2) and intermediate connector C-25 (terminal 10).

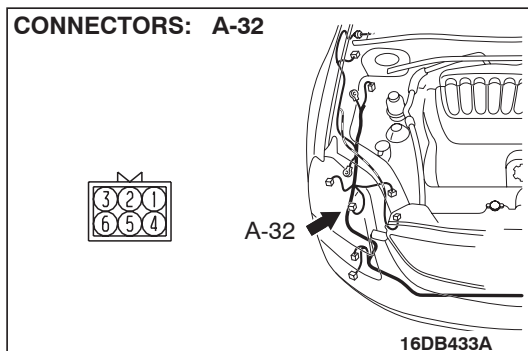
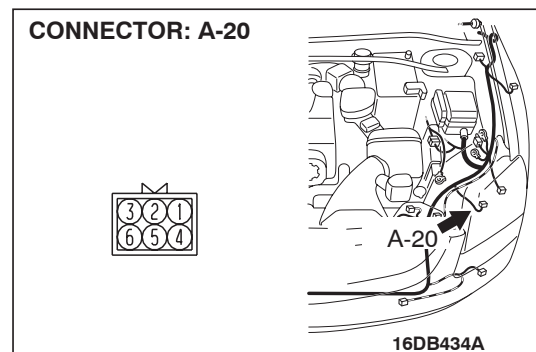
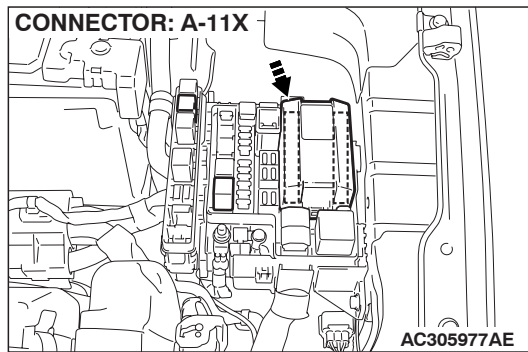
Q: Is the wiring harness between licence plate lamp connector F-06 (terminal 2) and intermediate connector C-25 (terminal 10) in good condition?

YES : Replace the licence plate lamp socket. Verify that the licence plate lamps illuminate normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the licence plate lamps illuminate normally.



INSPECTION PROCEDURE H-7: Headlamp and Taillamp: One of the headlamps does not illuminate.



TECHNICAL DESCRIPTION (COMMENT)

If one of the headlamps does not illuminate, a headlamp bulb may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The headlamp bulb may be defective
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector

DIAGNOSIS

Required Special Tool:

- MB991223: Harness Set

STEP 1. Check the headlamp operation.

Q: Which of the headlamps does not illuminate?

LH (low beam) : Go to Step 2.

RH (low beam) : Go to Step 6.

LH (only low-beam) : Go to Step 10.

RH (only low-beam) : Go to Step 13.

LH (only high beam) : Go to Step 16.

RH (only high beam) : Go to Step 21.

Low beam only (both RH and LH) : Refer to Inspection Procedure H-2 "The headlamps (low-beam) do not illuminate normally [P.54B-264](#)."

High beam only (both RH and LH) : Refer to Inspection Procedure H-3 "The headlamps (high-beam) do not illuminate normally [P.54B-268](#)."

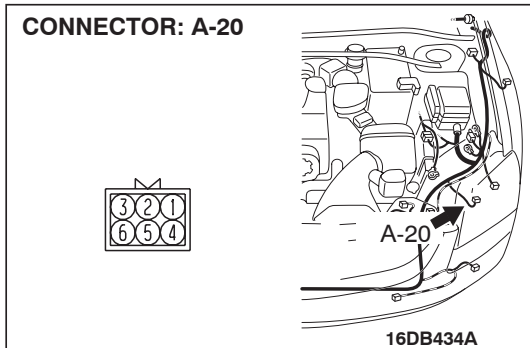
High beam indicator lamp : Refer to Inspection Procedure H-8 "The high-beam indicator lamp does not illuminate [P.54B-301](#)."

STEP 2. Check headlamp (LH) connector A-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is headlamp (LH) connector A-20 in good condition?

YES : Go to Step 3.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Check that the headlamps illuminate normally.



STEP 3. Check headlamp (LH) bulb.

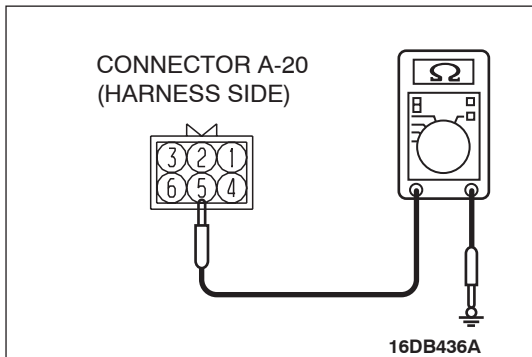
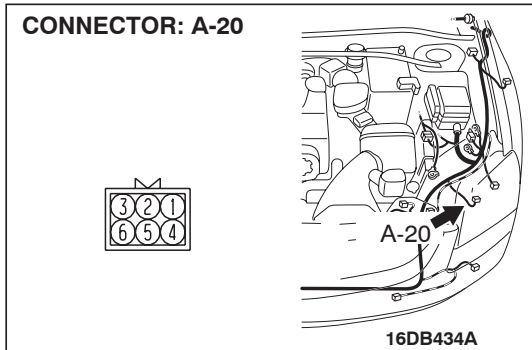
(1) Remove the headlamp (LH) bulb.

(2) Verify that the headlamp (LH) bulb is not damaged or burned out.

Q: Is headlamp (LH) bulb normal?

YES : Go to Step 4.

NO : Replace the headlamp (LH) bulb. Verify that the headlamps illuminate normally.



STEP 4. Check the ground circuit to the front Headlamp (LH). Measure the resistance at front combination lamp (LH) connector A-20.

(1) Disconnect front combination lamp (LH) connector A-20 and measure the resistance available at the wiring harness side of the connector.

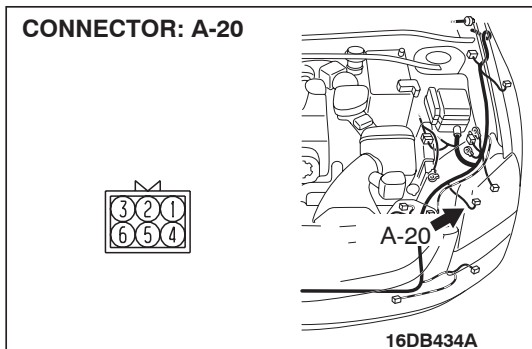
(2) Measure the resistance value between terminal (5) and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 10.

NO : Go to Step 5.

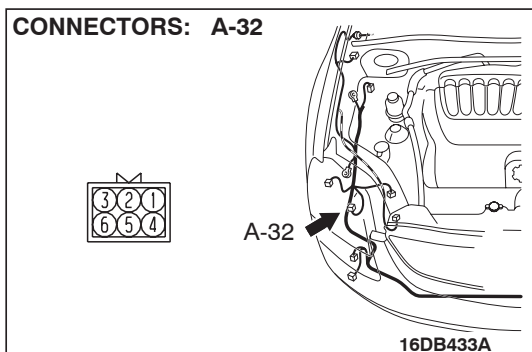


STEP 5. Check the wiring harness between headlamp (LH) connector A-20 (terminal 5) and ground.

Q: Is the wiring harness between headlamp (LH) connector A-20 (terminal 5) and ground in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the headlamps illuminate normally.



STEP 6. Check headlamp (RH) connector A-32 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is headlamp (RH) connector A-32 in good condition?

YES : Go to Step 6.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Check that the headlamps illuminate normally.

STEP 7. Check the headlamp (RH) bulb.

- (1) Remove the headlamp (RH) bulb.
- (2) Verify that the headlamp (RH) bulb is not damaged or burned out.

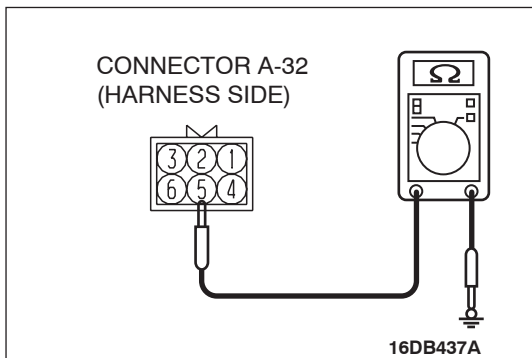
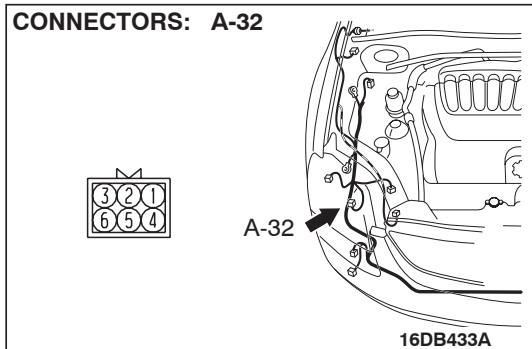
Q: Is headlamp (RH) bulb normal?

YES : Go to Step 8.

NO : Replace the headlamp (RH) bulb. Verify that the headlamps illuminate normally.

STEP 8. Check the ground circuit to the front Headlamp (RH). Measure the resistance at front combination lamp (RH) connector A-32.

- (1) Disconnect front combination lamp (RH) connector A-32 and measure the resistance available at the wiring harness side of the connector.



- (2) Measure the resistance value between terminal (5) and ground.
 - The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to step 13.

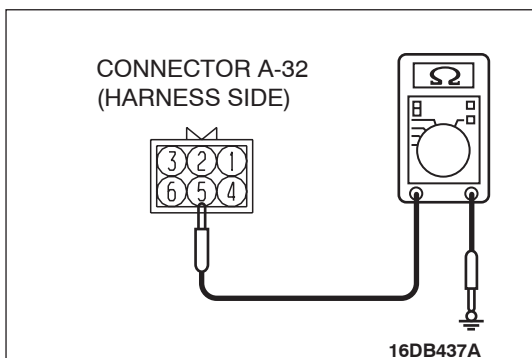
NO : Go to Step 9.

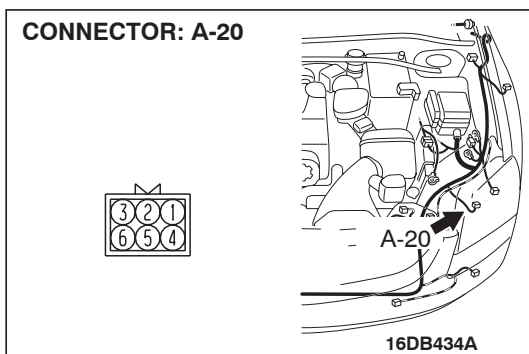
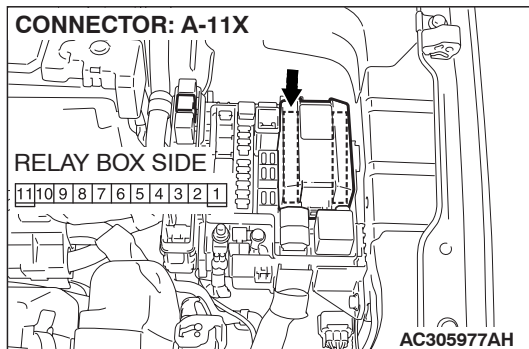
STEP 9. Check the wiring harness between headlamp (RH) connector A-32 (terminal 5) and ground.

Q: Is the wiring harness between headlamp (RH) connector A-32 (terminal 5) and ground in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the headlamps illuminate normally.





STEP 10. Check headlamp (LH) connector A-20 and front-ECU connector A-11X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are headlamp (LH) connector A-20 and front-ECU connector A-11X in good condition?

YES : Go to Step 11.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Check that the headlamps illuminate normally.

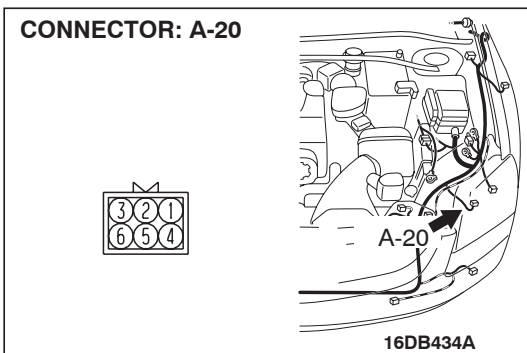
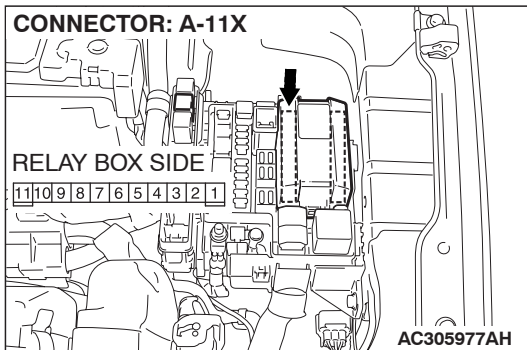
STEP 11. Check headlamp (LH) bulb.

- (1) Remove the headlamp (LH) bulb.
- (2) Verify that the headlamp (LH) bulb is not damaged or burned out.

Q: Is headlamp (LH) bulb normal?

YES : Go to Step 12.

NO : Replace the headlamp (LH) bulb. Verify that the headlamps illuminate normally.



STEP 12. Check the wiring harness between headlamp (LH) connector A-20 (terminal 6) and front-ECU connector A-11X (terminal 6).

Q: Is the wiring harness between headlamp (LH) connector A-20 (terminal 6) and front-ECU connector A-11X (terminal 6) in good condition?

YES : No action is necessary and testing is complete.

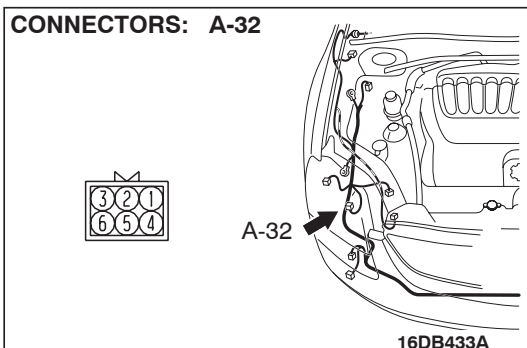
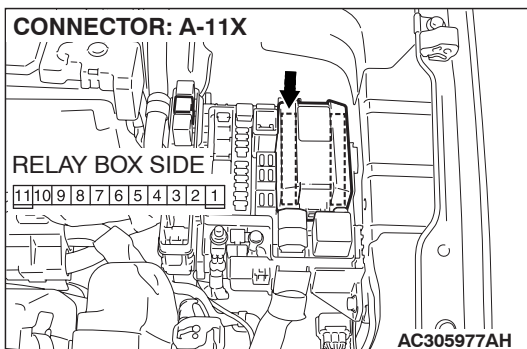
NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the headlamps illuminate normally.

STEP 13. Check headlamp (RH) connector A-32 and front-ECU connector A-11X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are headlamp (RH) connector A-32 and front-ECU connector A-11X in good condition?

YES : Go to Step 14.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Check that the headlamps illuminate normally.



STEP 14. Check the headlamp (RH) bulb.

- (1) Remove the headlamp (RH) bulb.
- (2) Verify that the headlamp (RH) bulb is not damaged or burned out.

Q: Is headlamp (RH) bulb normal?

YES : Go to Step 15.

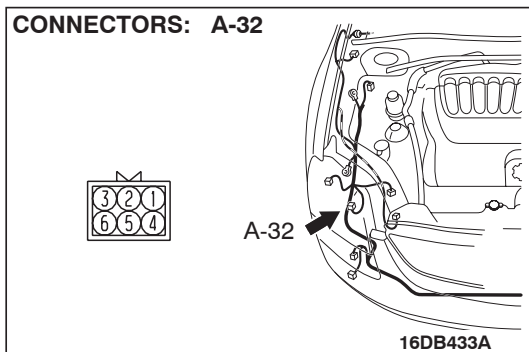
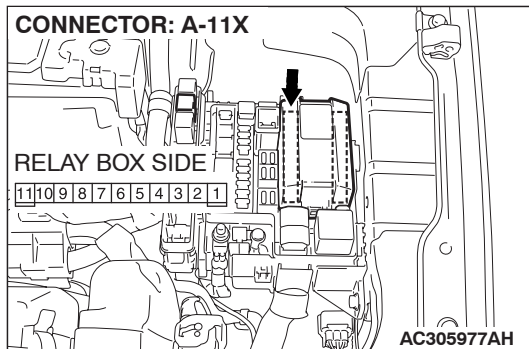
NO : Replace the headlamp (RH) bulb. Verify that the headlamps illuminate normally.

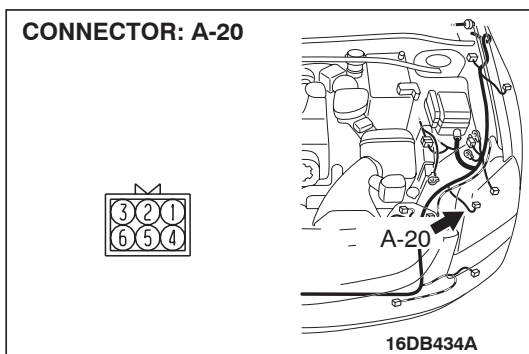
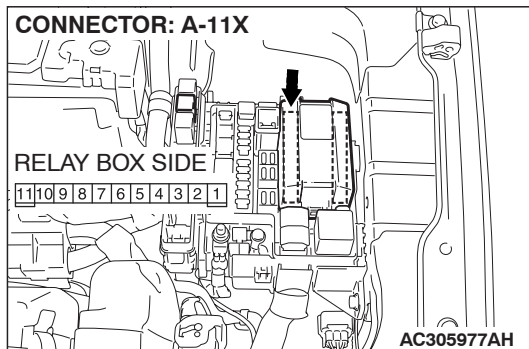
STEP 15. Check the wiring harness between headlamp (RH) connector A-32 (terminal 6) and front-ECU connector A-11X (terminal 6).

Q: Is the wiring harness between headlamp (RH) connector A-32 (terminal 6) and front-ECU connector A-11X (terminal 6) in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the headlamps illuminate normally.





STEP 16. Check headlamp (LH) connector A-20 and front-ECU connector A-11X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are headlamp (LH) connector A-20 and front-ECU connector A-11X in good condition?

YES : Go to Step 17.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Verify that the headlamps illuminate normally.

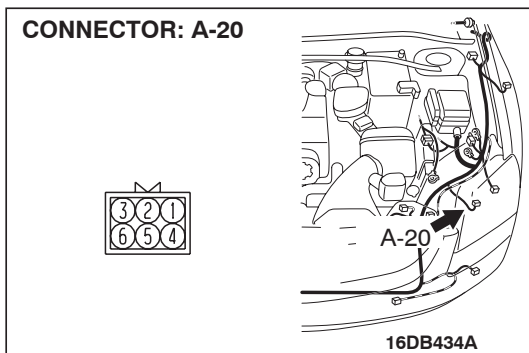
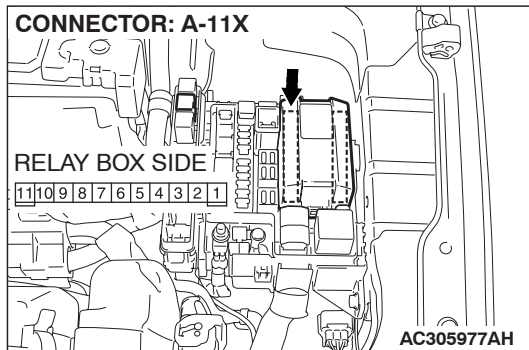
STEP 17. Check headlamp (LH) bulb.

- (1) Remove the headlamp (LH) bulb.
- (2) Verify that the headlamp (LH) bulb is not damaged or burned out.

Q: Is headlamp (LH) bulb normal?

YES : Go to Step 18.

NO : Replace the headlamp (LH) bulb. Verify that the headlamps illuminate normally.

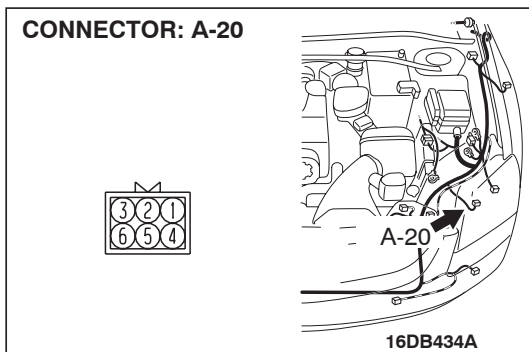


STEP 18. Check the wiring harness between headlamp (LH) connector A-20 (terminals 3 and 4) and front-ECU connector A-11X (terminal 10).

Q: Is the wiring harness between headlamp (LH) connector A-20 (terminals 3 and 4) and front-ECU connector A-11X (terminal 10) in good condition?

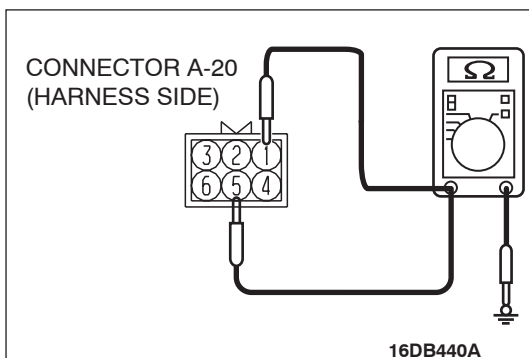
YES : Go to step 19.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the headlamps illuminate normally.



STEP 19. Check the ground circuit to the front Headlamp (LH). Measure the resistance at front combination lamp (LH) connector A-20.

(1) Disconnect front combination lamp (LH) connector A-20 and measure the resistance available at the wiring harness side of the connector.



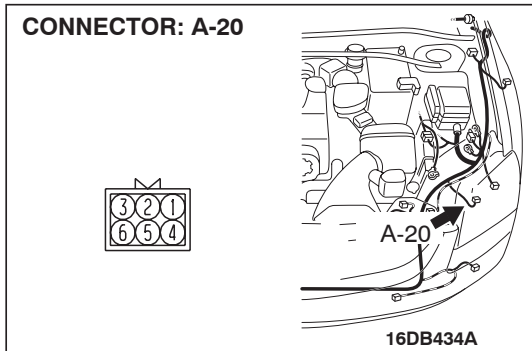
(2) Measure the resistance value between terminals (5 and 1) and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : .No action is necessary and testing is complete.

NO : Go to Step 20.

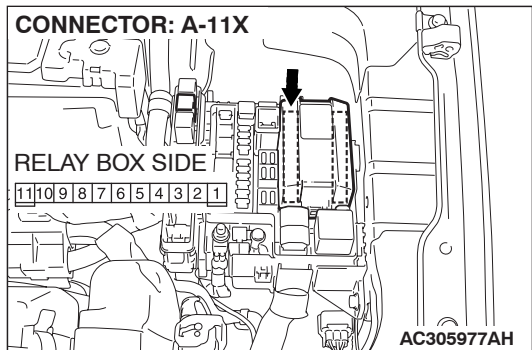


STEP 20. Check the wiring harness between headlamp (LH) connector A-20 (terminals 5 and 1) and ground.

Q: Is the wiring harness between headlamp (LH) connector A-20 (terminals 5 and 1) and ground in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the headlamps illuminate normally.

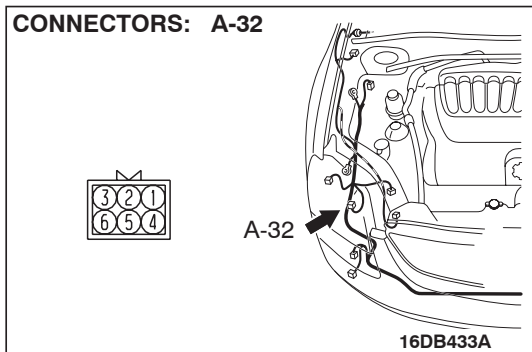


STEP 21. Check headlamp (RH) connector A-32 and front-ECU connector A-11X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are headlamp (RH) connector A-32 and front-ECU connector A-11X in good condition?

YES : Go to Step 22.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the headlamps illuminate normally.



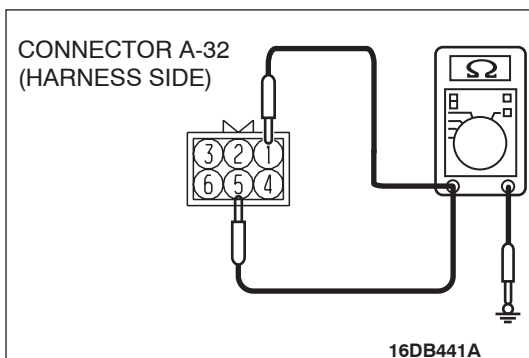
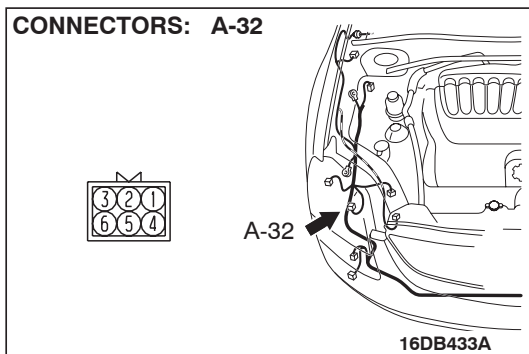
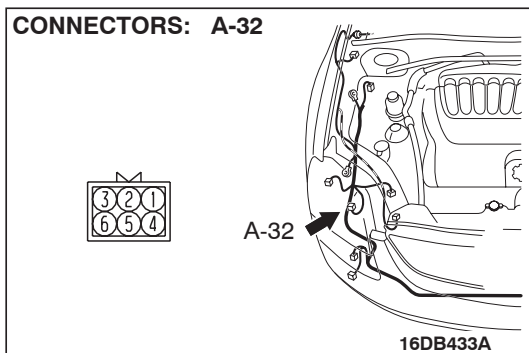
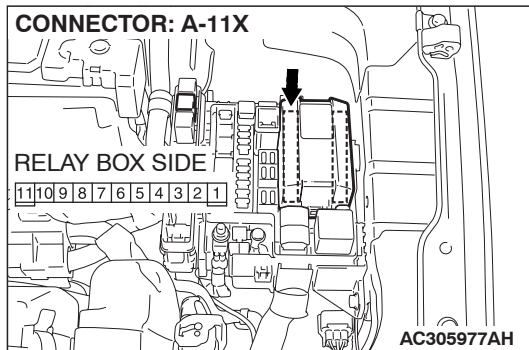
STEP 22. Check the headlamp (RH) bulb.

- (1) Remove the headlamp (RH) bulb.
- (2) Verify that the headlamp (RH) bulb is not damaged or burned out.

Q: Is headlamp (RH) bulb normal?

YES : Go to Step 23.

NO : Replace the headlamp (RH) bulb. Verify that the headlamps illuminate normally.



STEP 23 . Check the wiring harness between headlamp (RH) connector A-32 (terminals 3 and 4) and front-ECU connector A-11X (terminal 10).

Q: Is the wiring harness between headlamp (RH) connector A-32 (terminals 3 and 4) and front-ECU connector A-11X (terminal 10) in good condition?

YES : Go to step 24.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the headlamps illuminate normally.

STEP 24. Check the ground circuit to the front Headlamp (RH). Measure the resistance at front combination lamp (RH) connector A-32.

(1) Disconnect front combination lamp (RH) connector A-32 and measure the resistance available at the wiring harness side of the connector.

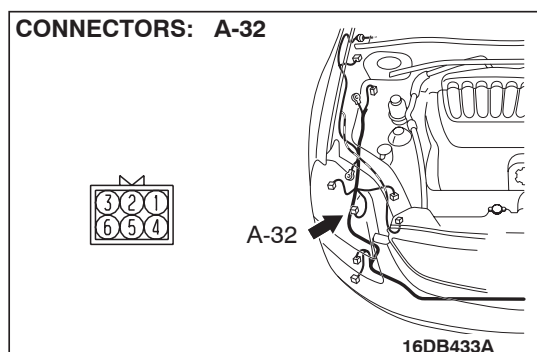
(2) Measure the resistance value between terminals (5 and 1) and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : .No action is necessary and testing is complete.

NO : Go to Step 25.



STEP 25. Check the wiring harness between headlamp (RH) connector A-32 (terminals 5 and 1) and ground.

Q: Is the wiring harness between headlamp (RH) connector A-32 (terminals 5 and 1) and ground in good condition?

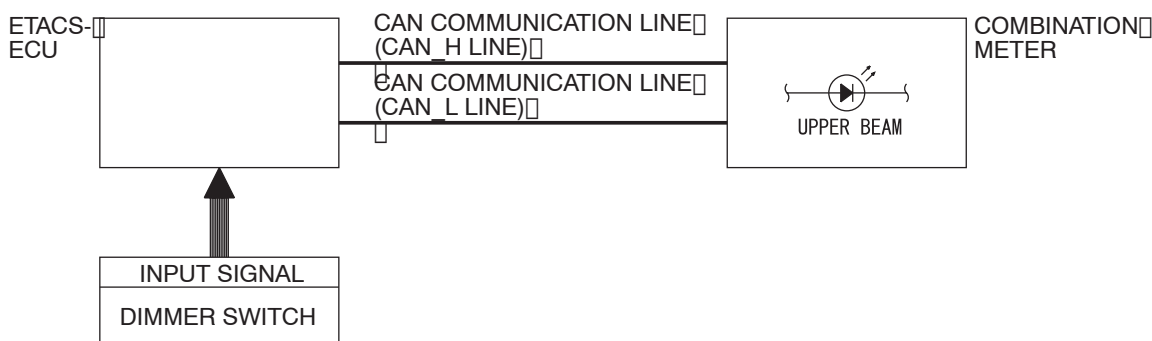
YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the headlamps illuminate normally.

INSPECTION PROCEDURE H-8: Headlamp and Taillamp: The High-beam indicator lamp does not illuminate.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

High-Beam Indicator Light Circuit



W4P54M70AA

CIRCUIT OPERATION

At the same time that the high beams are illuminated, the ETACS-ECU sends a signal to illuminate the high beam indicator via the CAN bus line.

TECHNICAL DESCRIPTION (COMMENT)

If the high beam indicator does not illuminate normally, connector(s), wiring harness in the CAN bus lines, the ETACS-ECU or the combination meter may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The combination meter may be defective
- The ETACS-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Check the headlamps.

When the lighting switch is operated, check that the headlamps illuminate/go off normally.

Q: Are the headlamps in good condition?

YES : Go to Step 2.

NO : First, repair the headlamps. Refer to Inspection Procedure H-7 "One of the headlamps does not illuminate [P.54B-290](#)."

STEP 2. Using Diagnostic Tool MB991958, diagnose the CAN bus line.

CAUTION

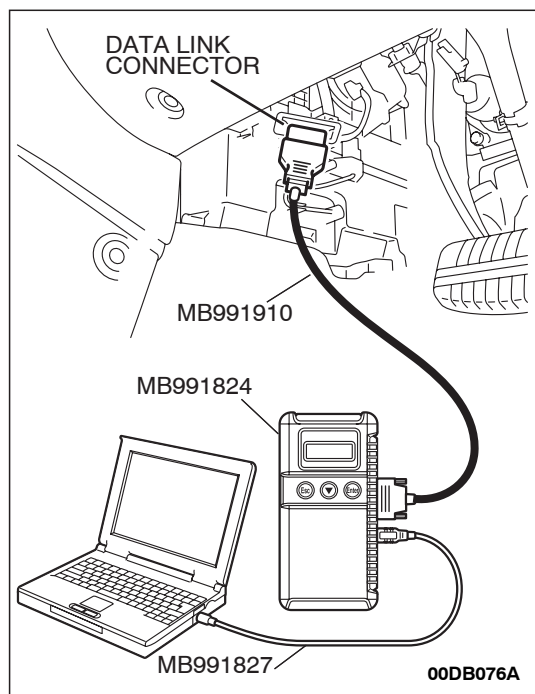
To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958.

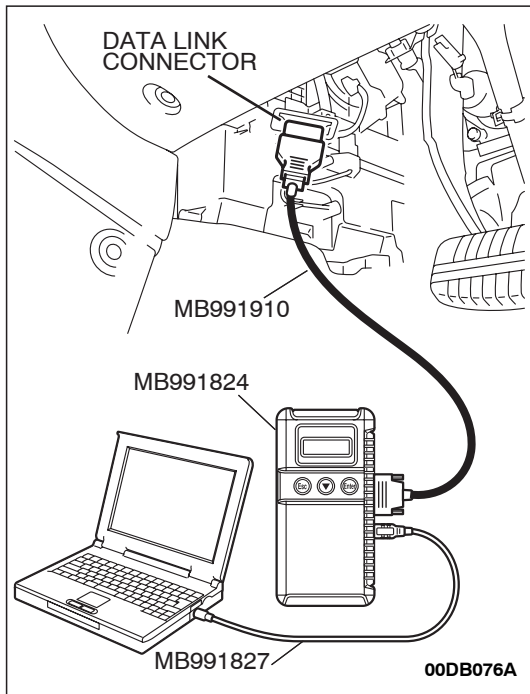
- (1) Connect Diagnostic Tool MB991958. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose the CAN bus line.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line found to be normal?

YES : Go to Step 3.

NO : Repair the CAN bus line (Refer to GROUP 54C, Diagnosis [P.54C-15](#)).





STEP 3. Using Diagnostic Tool MB991958, read the combination meter diagnostic trouble code.

Check whether a combination meter-related DTC is set.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check whether the combination meter-related DTC is set.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the DTC set?

YES : Diagnose the combination meter. Refer to [P.54A-48](#).

NO : Go to Step 4.

STEP 4. Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the ETACS-ECU.

⚠ CAUTION

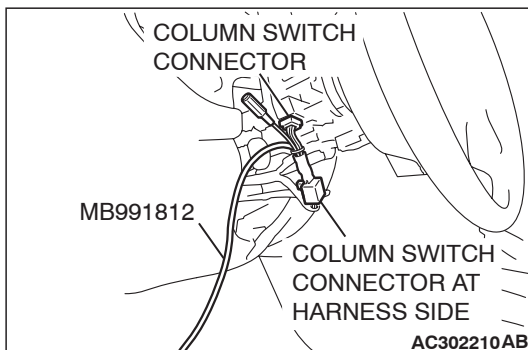
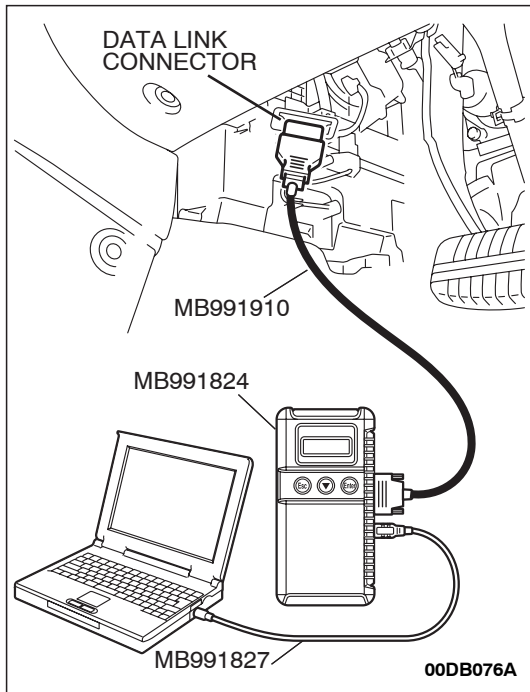
Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

- (1) Connect the SWS monitor. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "LOCK" (OFF) position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM Check."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "ECU COMM Check."
- (4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menu for the "ETACS ECU" menu.

Q: Is "OK" displayed for the "ETACS ECU" menu?

YES : Go to Step 5.

NO : Refer to Inspection Procedure A-3 "Communication with the ETACS-ECU is not possible [P.54B-74](#)."



STEP 5. Replace the combination meter.

- (1) Replace the combination meter.
- (2) Check that the high beam indicator lamp illuminates normally.

Q: Does the high beam indicator lamp illuminate normally?

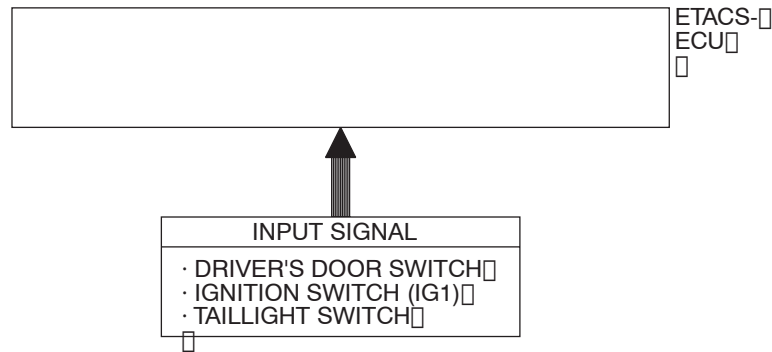
YES : No action is necessary and testing is complete.

NO : Replace the ETACS-ECU. Check that the high beam indicator lamp illuminates normally.

INSPECTION PROCEDURE H-9: Headlamp and Taillamp: Headlamp automatic shutoff function does not work normally.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

Headlight Automatic Shutt-Down Function



CIRCUIT OPERATION

The ETACS-ECU operates the headlamp automatic shutdown function according to the following signals:

- Ignition switch (IG1): OFF
- Driver's door switch: ON
- Taillamp switch: ON
- Headlamp switch: ON

The ETACS-ECU operates the headlamp automatic shutdown function under the following conditions:

- Ignition key: Other than "ON" position
- Driver's door: open
- Taillamps or headlamps: on

TECHNICAL DESCRIPTION (COMMENT)

If the function does not work normally, the input circuit system from the switches, the ETACS-ECU or the front-ECU may be defective (refer to "CIRCUIT OPERATION").

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The front-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Check the adjustment function.

Q: Has a setting other than "No auto-shutoff" been selected for the headlamp automatic shutdown function?

YES : Go to Step 2.

NO : Set the headlamp automatic shutdown function to another setting other than "No auto-shutoff".

STEP 2. Check the input signal by using "DATA LIST" menu of the SWS monitor.

Check the input signals from the following switches:

- Ignition switch: "ON" to "OFF"
- Lighting switch: "TAIL" or "HEAD"

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

- (1) Connect the special tool. Refer to "How to connect SWS monitor P.54B-13."
- (2) Turn the ignition switch to the "LOCK" (OFF) position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "H/L AUTO-CUT."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "LIGHTING."
 - g. Select "H/L AUTO-CUT."
- (4) Check that normal conditions are displayed for the items described in the table below.

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 01	TAILLAMP SW	ON
ITEM 30	IG SW (IG1)	OFF

- (5) When the driver's door is opened, check that normal conditions are displayed for the items described in the table below.

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 32	FRONT DOOR SW	ON
ITEM 35	H/L AUTO-CUT	ON

Q: Does the Diagnostic Tool MB991958 display the items "TAILLAMP SW", "IG SW IG1", "FRONT DOOR SW" and "H/L AUTO-CUT" as normal condition?

Normal conditions are displayed for all the items :

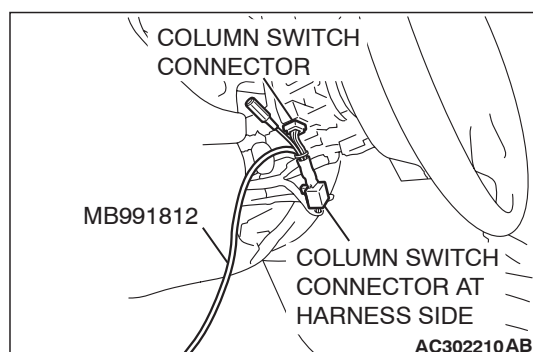
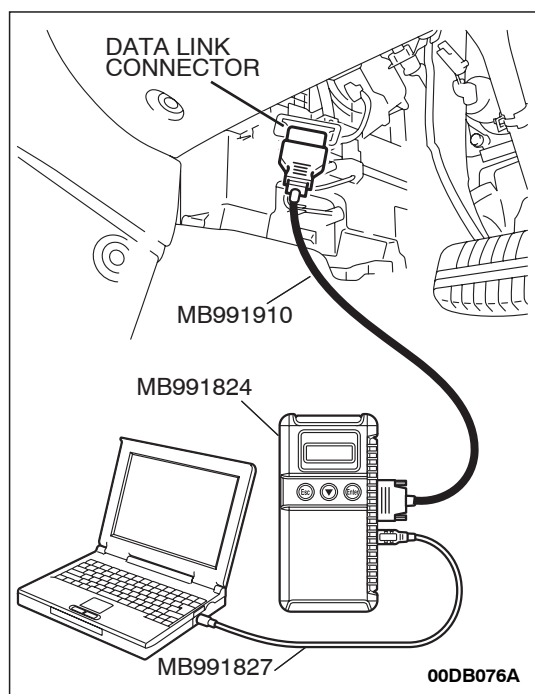
Replace the front-ECU. Verify that the headlamp automatic shutdown function works normally.

Normal condition is not displayed for "TAILLAMP SW" :

Refer to Inspection Procedure M-5 "ETACS-ECU does not receive any signal from the taillamp switch P.54B-420."

Normal condition is not displayed for "IG SW (IG1)" :

Refer to Inspection Procedure M-2 "ETACS-ECU does not receive any signal from the ignition switch



(IG1) [P.54B-408.](#)"

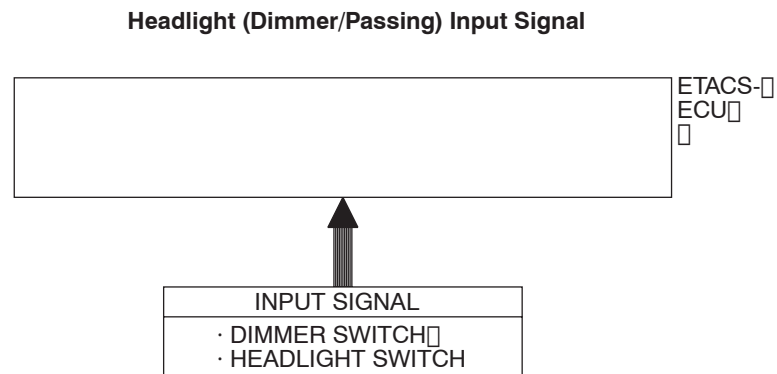
Normal condition is not displayed for "FRONT DOOR

SW" : Refer to Inspection Procedure M-4 "ETACS-ECU does not receive any signal from the front door switches [P.54B-413.](#)"

Normal condition is not displayed for "H/L AUTO-CUT" :

Replace the front-ECU. Check that the headlamp automatic shutdown function works normally.

INSPECTION PROCEDURE H-10: Headlamp and Taillamp: Headlamp dimmer switch automatic resetting function does not work normally.



W4P54M72AA

CIRCUIT OPERATION

The headlamp dimmer switch automatic resetting function is controlled by the front-ECU.

TECHNICAL DESCRIPTION (COMMENT)

If the headlamp dimmer switch automatic resetting function does not work normally, the front-ECU may be defective.

TROUBLESHOOTING HINT

- Refer to circuit diagrams [GROUP-90](#)
- Refer to configuration diagrams [GROUP-80](#)

The front-ECU may be defective

DIAGNOSIS

Replace the front-ECU.

Check that the headlamp dimmer switch automatic resetting function works normally.

FLASHER TIMER

GENERAL DESCRIPTION CONCERNING THE FLASHER TIMER

M1549023600238

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80

The following ECUs affect the functions and control of the flasher timer.

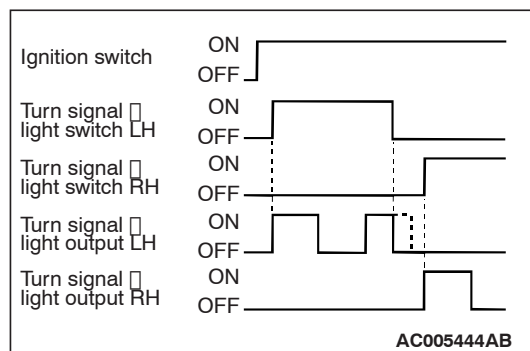
FUNCTION	CONTROL ECU
Turn-signal lamp	ETACS-ECU, column switch
Turn-signal indicators	ETACS-ECU, column switch
Hazard warning lamp	ETACS-ECU

FLASHER TIMER FUNCTION

TURN-SIGNAL LAMP

The turn-signal lamp output (flashing signal) is turned ON when the ignition switch is ON and the turn-signal lamp switch is ON (LH or RH). If the front turn-signal lamp or rear turn-signal lamp bulb has burned out, the flashing speed increases to indicate that the bulb has burned out.

NOTE: If LH or RH side turn signal lamp bulbs have burned out, the flashing speed will remain the same.



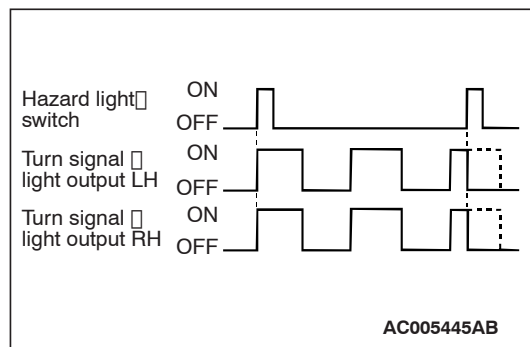
TURN-SIGNAL INDICATORS

At the same time that the turn-signal lamps are illuminated, the ETACS-ECU sends a signal to illuminate the turn-signal lamp indicator via the CAN bus line. The combination meter receives the transmitted signal and turns the turn-signal lamp indicator on and off.

HAZARD WARNING LAMP

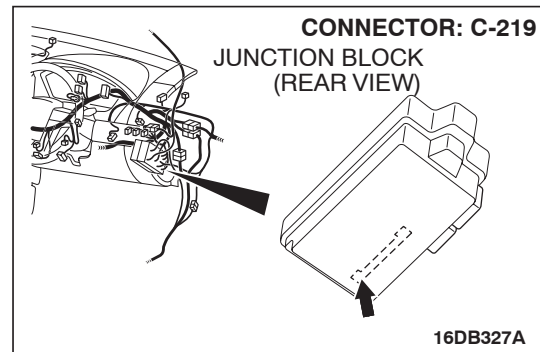
Detects the signal where the hazard warning lamp switch input changes from OFF to ON, and reverse the flashing state according to this signal. The hazard warning lamps toggle on and off whenever the hazard warning lamp switch is operated.

NOTE: The hazard warning lamp switch is a push-return type toggle switch.



INSPECTION PROCEDURE I-1: Flasher Timer: Turn-signal lamps do not flash when the turn-signal lamp switch is turned on.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."



CIRCUIT OPERATION

- The turn-signal lamp switch sends a signal through the column-ECU (incorporated in the column switch) to the ETACS-ECU. If the column-ECU sends a turn-signal lamp switch "ON" signal to the ETACS-ECU, the ETACS-ECU turns on the flasher timer (incorporated in the ETACS-ECU), thus causing the turn-signal lamps to flash.
- The ETACS-ECU operates the turn-signal lamps according to the following signals:
 - Ignition switch (IG1): ON
 - Turn-signal lamp switch: ON
- The ETACS-ECU flashes the turn-signal lamps under the following conditions:
 - Ignition key: "ON" position
 - Turn-signal lamp switch: Left or right turn-signal position

TECHNICAL DESCRIPTION (COMMENT)

If the turn-signal lamps do not flash normally, the input circuits from the switches described in "CIRCUIT OPERATION" or the ETACS-ECU may be defective. If the hazard warning lamps do not flash, the power supply line to the ETACS-ECU (dedicated to the turn-signal lamps) may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The ETACS-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Check the hazard warning lamp.

Q: Do the hazard warning lamps work normally?

- YES** : Go to Step 7.
NO : Go to Step 2.

STEP 2. Check the turn-signal lamps.

Q: Does either of the turn-signal lamps illuminate?

Only right or left side lamp does not illuminate. : Go to Step 3.

Turn-signal lamps do not illuminate at all : Go to Step 4.

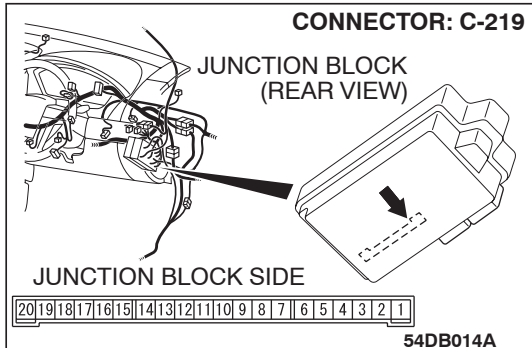
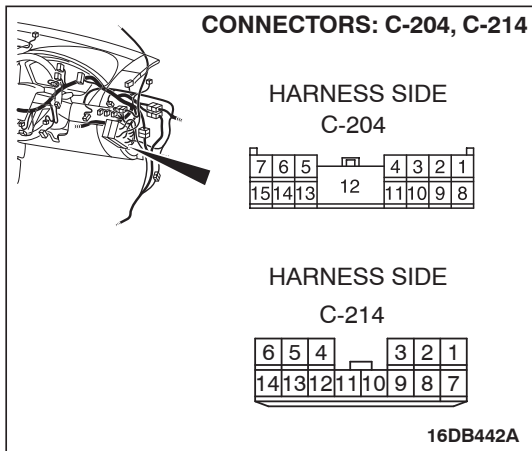
STEP 3. Check ETACS-ECU connector C-219, junction block connectors C-214 and C-204 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are ETACS-ECU connector C-219, junction block connectors C-214 and C-204 in good condition?

YES : Replace the ETACS-ECU. Verify that the turn-signal lamps illuminate normally.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Verify that the turn-signal lamps illuminate normally.



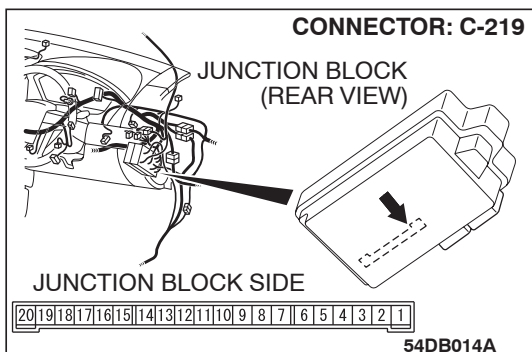
STEP 4. Check ETACS-ECU connector C-219 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

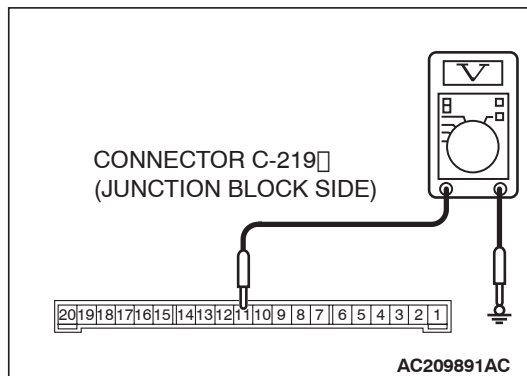
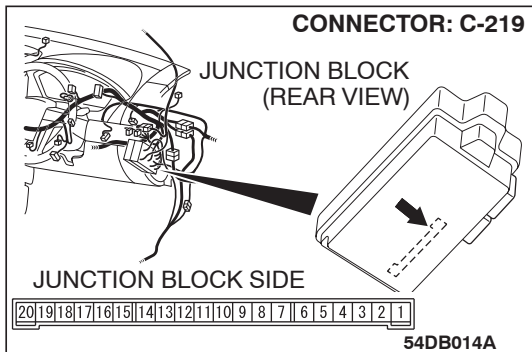
Q: Is ETACS-ECU connector C-219 in good condition?

YES : Go to Step 5.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Verify that the turn-signal lamps illuminate normally.





STEP 5. Check the battery power supply circuit to the ETACS-ECU. Measure the voltage at ETACS-ECU connector C-219.

(1) Disconnect ETACS-ECU connector C-219, and measure the voltage available at the junction block side of the connector.

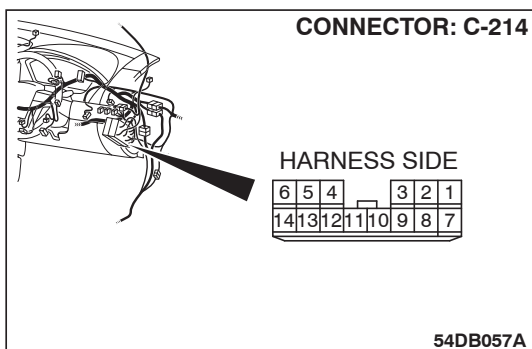
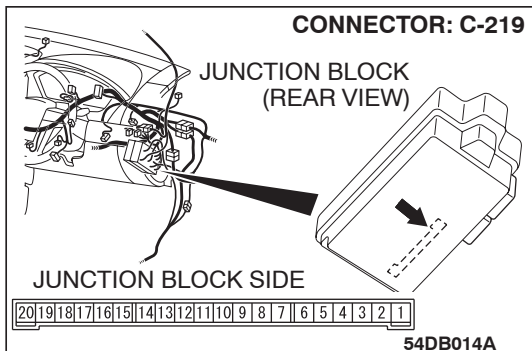
(2) Measure the voltage between terminal 11 and ground.

- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Replace the ETACS-ECU. Verify that the turn-signal lamps illuminate normally.

NO : Go to Step 6.



STEP 6. Check the wiring harness between ETACS-ECU connector C-219 (terminal 11) and the battery.

NOTE: Also check junction block connector C-214 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-214 is damaged, Repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between ETACS-ECU connector C-219 (terminal 11) and the battery in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

STEP 7. Check the input signal by using "FUNCTION DIAG." menu of the SWS monitor.

Check the input signals from the following switches:

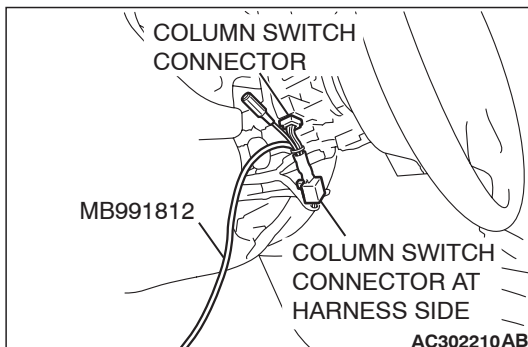
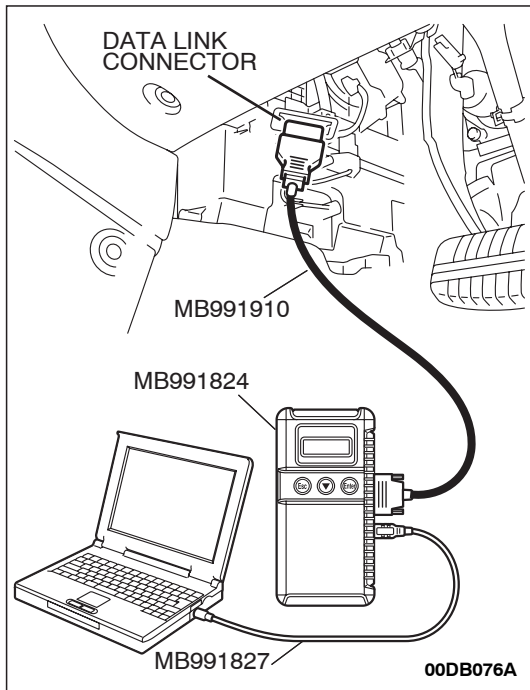
- Ignition switch: ON
- Turn-signal lamp switch: RH

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "LOCK" (OFF) position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "TURN SIG.RH."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "TURN SIGNAL."
 - g. Select "TURN SIG.RH."
- (4) Check that normal conditions are displayed for the items described in the table below.

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 10	T/S RH SW	ON
ITEM 30	IG SW (IG1)	ON



Q: Does the Diagnostic Tool MB991958 display the items "T/S RH SW" and "IG SW (IG1)" as normal condition?

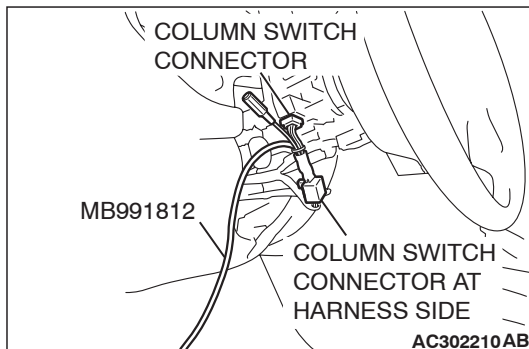
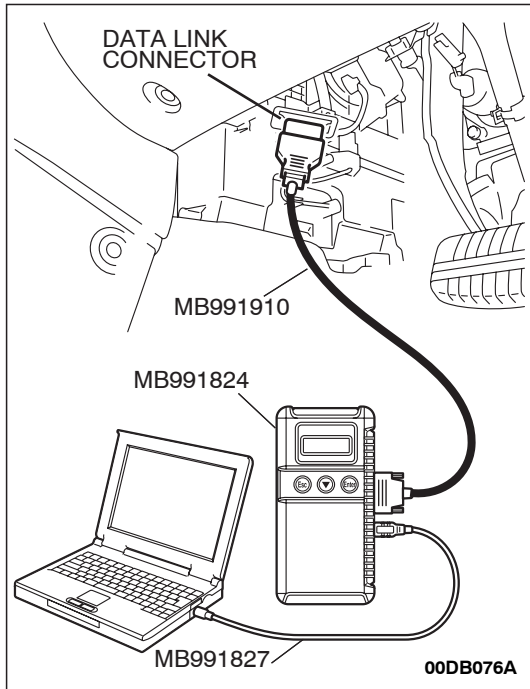
Normal conditions are displayed for all the items : Go to Step 8.

Normal condition is not displayed for "T/S RH SW" :

Refer to Inspection Procedure M-5 "ETACS-ECU does not receive any signal from the turn-signal lamp switch [P.54B-420](#)."

Normal condition is not displayed for "IG SW (IG1)" :

Refer to Inspection Procedure M-2 "ETACS-ECU does not receive any signal from the ignition switch (IG1) [P.54B-408](#)."

**STEP 8. Check the input signal by using "FUNCTION DIAG." menu of the SWS monitor.**

If the Ignition switch is turned to the "ON" position and the turn-signal lamp switch (LH) is turned on, normal conditions should be displayed for the items described in the table below.

- (1) Operate Diagnostic Tool MB991958 according to the procedure below to display "TURN SIG.LH."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "TURN SIGNAL."
 - g. Select "TURN SIG.LH."
- (2) Check that normal conditions are displayed for the item described in the table below.

ITEM No.	ITEM NAME	NORMAL CONDITION
ITEM 11	T/S LH SW	ON

Q: Do the Diagnostic Tool display the item "T/S LH SW" as normal condition?

YES : Replace the ETACS-ECU. Verify that the turn-signal lamps illuminate normally.

NO : Refer to Inspection Procedure M-5 "ETACS-ECU does not receive any signal from the turn-signal lamp switch [P.54B-420](#)."

INSPECTION PROCEDURE I-2: Flasher Timer: Hazard warning lamps do not flash when the hazard warning lamp switch is turned on.**CIRCUIT OPERATION**

If the ETACS-ECU receives "ON" signal from the hazard warning lamp switch, the ETACS-ECU turns on the flasher timer (incorporated in the ETACS-ECU), thus causing the turn-signal lamps to flash.

TECHNICAL DESCRIPTION (COMMENT)

If the hazard warning lamps do not flash, the power supply line to the ETACS-ECU (dedicated to the turn-signal lamps) or the ETACS-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams [GROUP-90](#)
- Refer to configuration diagrams [GROUP-80](#)
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The ETACS-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A

STEP 1. Check the turn-signal lamps.

Q: Do the turn-signal lamps illuminate normally?

YES : Go to Step 2.

NO : Refer to Inspection Procedure I-1 "Turn-signal lamps do not flash when the turn-signal lamp switch is turned on [P.54B-310](#)."

STEP 2. Check the input signal (by using the pulse check mode of the monitor).

Check input signal from the hazard warning lamp switch.

CAUTION

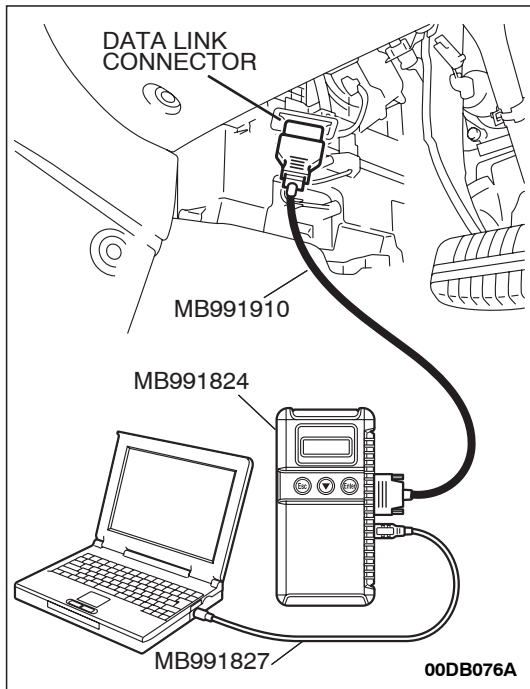
To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958.

- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Operate Diagnostic Tool MB991958 according to the procedure below to display "Pulse check."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "Pulse Checking."
- (3) Check that Diagnostic Tool MB991958 sounds when the hazard warning lamp switch is turned from "OFF" to "ON."

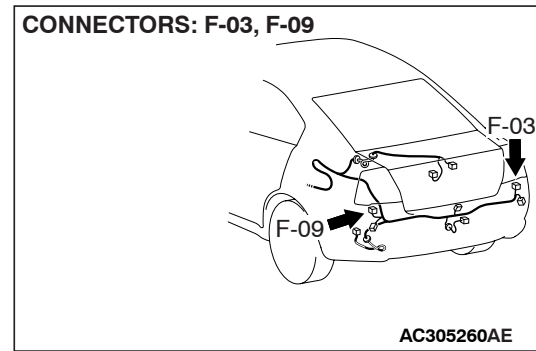
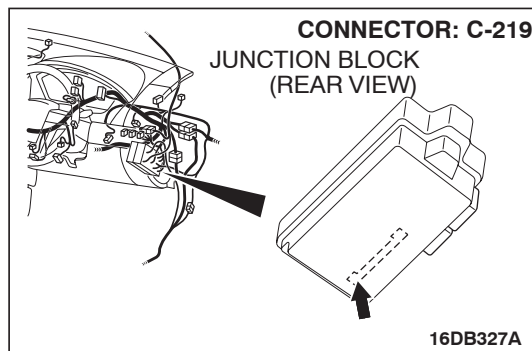
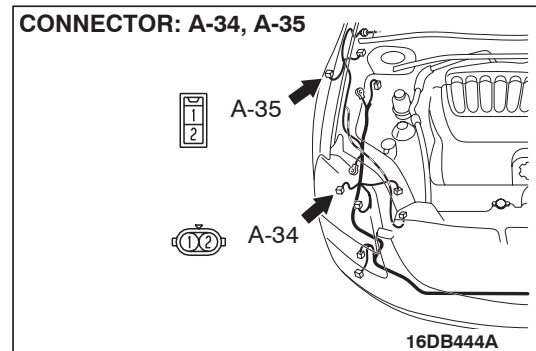
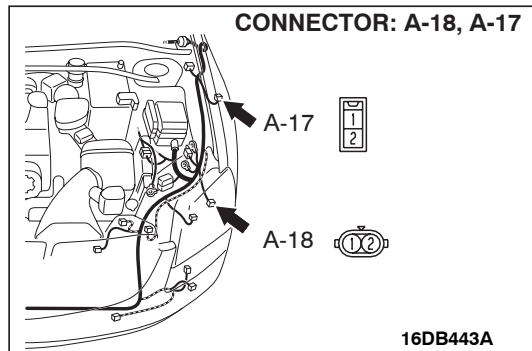
Q: Does Diagnostic Tool MB991958 sound when the hazard warning lamp switch is turned from "OFF" to "ON"?

YES : Replace the ETACS-ECU. Verify that the hazard warning lamps illuminate normally.

NO : Refer to Inspection Procedure N-2 "ETACS-ECU does not receive any signal from the hazard warning lamp switch [P.54B-436](#)."



INSPECTION PROCEDURE I-3: Flasher Timer: One of the turn-signal lamps does not illuminate.



TECHNICAL DESCRIPTION (COMMENT)

If the right or left turn-signal lamp does not illuminate, their bulb may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams [GROUP-90](#)
- Refer to configuration diagrams [GROUP-80](#)
- The turn-signal lamp bulb may be defective
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector

DIAGNOSIS

Required Special Tool:

- MB991223: Harness Set

STEP 1. Check the hazard warning lamp.

Q: Which turn-signal lamp does not illuminate?

front turn-signal lamp (LH) : Go to Step 2.

side turn-signal lamp (LH) : Go to Step 8.

front turn-signal lamp (RH) : Go to Step 14.

side turn-signal lamp (RH) : Go to Step 20.

rear combination lamp (LH) : Go to Step 26.

rear combination lamp (RH) : Go to Step 32.

Turn-signal indicators : Refer to Inspection Procedure I-4

"The turn-signal lamp indicator does not illuminate normally [P.54B-335](#)."

LH side only : Refer to Inspection Procedure I-1

"Turn-signal lamps do not flash when the turn-signal lamp switch is turned on [P.54B-310](#)."

RH side only : Refer to Inspection Procedure I-1

"Turn-signal lamps do not flash when the turn-signal lamp switch is turned on [P.54B-310](#)."

Both LH and RH sides : Refer to Inspection Procedure I-2

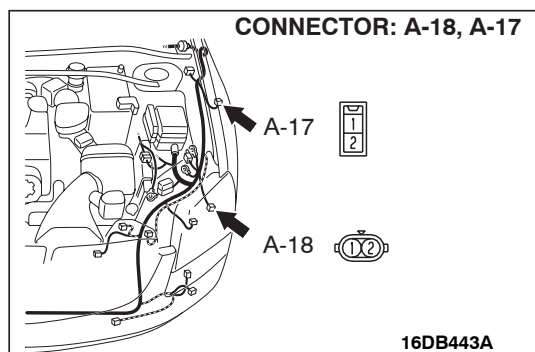
"Hazard warning lamps do not flash when the hazard warning lamp switch is turned on [P.54B-314](#)."

STEP 2. Check front combination lamp (LH) connector A-18 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front combination lamp (LH) connector A-18 in good condition?

YES : Go to Step 3.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 3. Check the front turn-signal lamp bulb (LH).

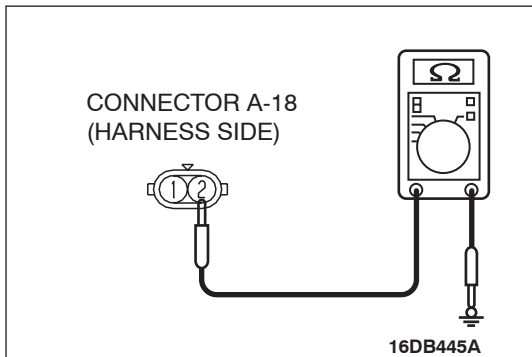
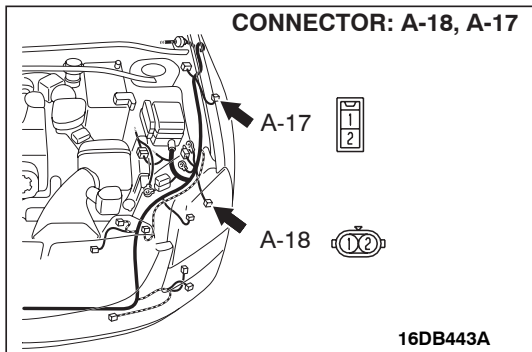
(1) Remove the front turn-signal (LH) lamp bulb.

(2) Verify that the front turn-signal lamp bulb (LH) is not damaged or burned out.

Q: Is the front turn-signal (LH) lamp bulb in good condition?

YES : Go to Step 4.

NO : Replace the front turn-signal (LH) lamp bulb. Verify that the turn-signal lamps illuminate normally.



**STEP 4. Check the ground circuit to the ETACS-ECU.
Measure the resistance at front combination lamp (LH)
connector A-18.**

(1) Disconnect front combination lamp (LH) connector A-18 and measure the resistance available at the wiring harness side of the connector.

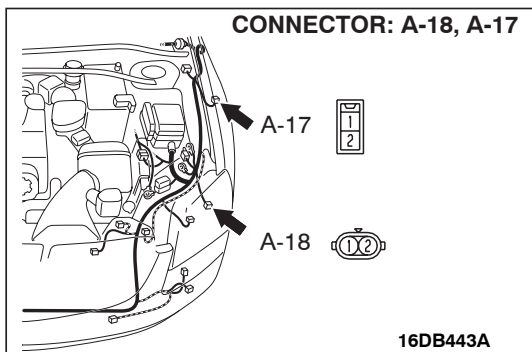
(2) Measure the resistance value between terminal 2 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 6.

NO : Go to Step 5.



STEP 5. Check the wiring harness between front combination lamp (LH) connector A-18 (terminal 2) and ground.

Q: Is the wiring harness between front combination lamp (LH) connector A-18 (terminal 2) and ground in good condition?

YES : Replace the front combination lamp socket (LH).
Verify that the turn-signal lamps illuminate normally.

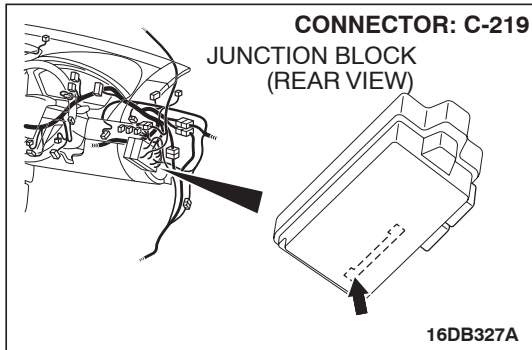
NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

STEP 6. Check ETACS-ECU connector C-219 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

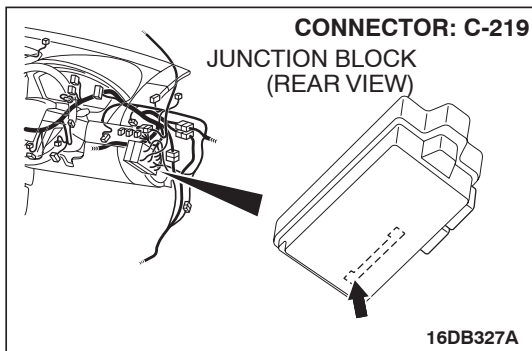
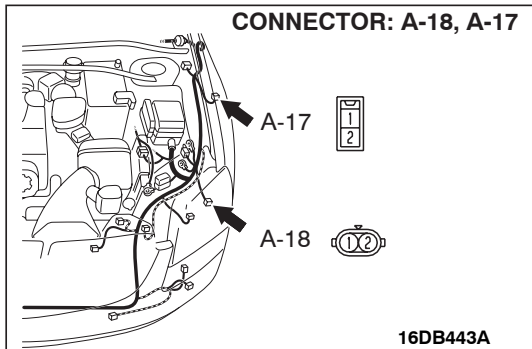
Q: Is ETACS-ECU connector C-219 in good condition?

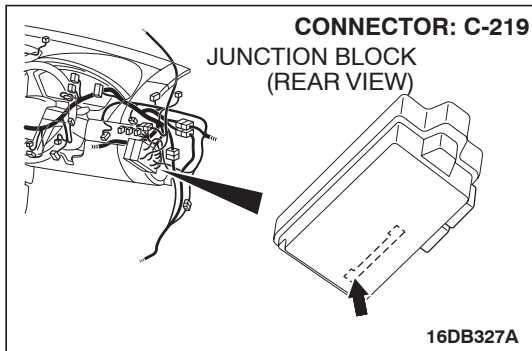
YES : Go to Step 7.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 7. Check the wiring harness between front combination lamp (LH) connector A-18 (terminal 1) and ETACS-ECU connector C-219 (terminal 14).

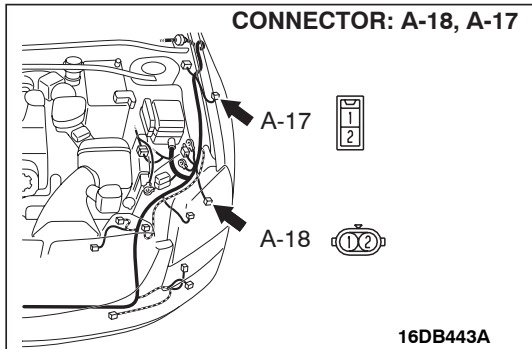




NOTE: Also check junction block connector C-214 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-214 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between front combination lamp (LH) connector A-18 (terminal 1) and ETACS-ECU connector C-219 (terminal 14) in good condition?

- YES :** Replace the front combination lamp socket (LH).
Verify that the turn-signal lamps illuminate normally.
- NO :** The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.



STEP 8. Check side turn signal- lamp (LH) connector A-17 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is side turn-signal lamp (LH) connector A-17 in good condition?

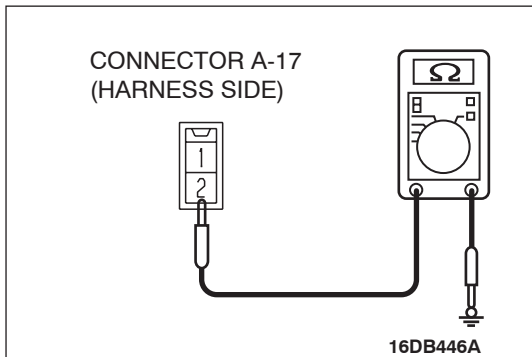
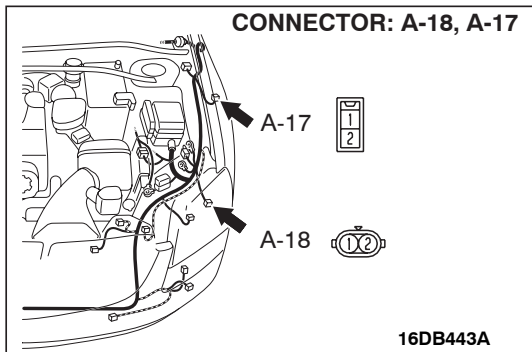
- YES :** Go to Step 9.
- NO :** Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.

STEP 9. Check the side turn-signal lamp bulb (LH).

- (1) Remove the side turn-signal (LH) lamp bulb.
- (2) Verify that the side turn-signal lamp bulb (LH) is not damaged or burned out.

Q: Is the side turn-signal (LH) lamp bulb in good condition?

- YES :** Go to Step 10.
- NO :** Replace the side turn-signal (LH) lamp bulb. Verify that the turn-signal lamps illuminate normally.



**STEP 10. Check the ground circuit to the ETACS-ECU.
Measure the resistance at side turn-signal lamp (LH)
connector A-17.**

(1) Disconnect side turn-signal lamp (LH) connector A-17 and measure the resistance available at the wiring harness side of the connector.

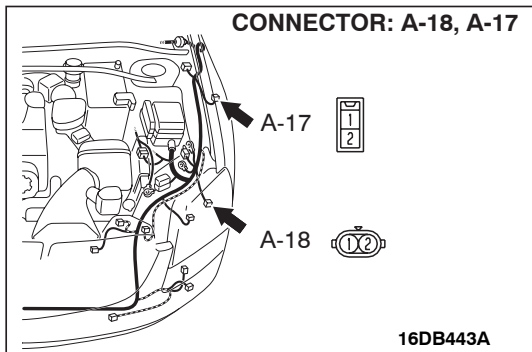
(2) Measure the resistance value between terminal 2 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 12.

NO : Go to Step 11.



**STEP 11. Check the wiring harness between side
turn-signal lamp (LH) connector A-17 (terminal 2) and
ground.**

**Q: Is the wiring harness between side turn-signal lamp
(LH) connector A-17 (terminal 2) and ground in good
condition?**

YES : Replace the side turn-signal lamp socket (LH). Verify that the turn-signal lamps illuminate normally.

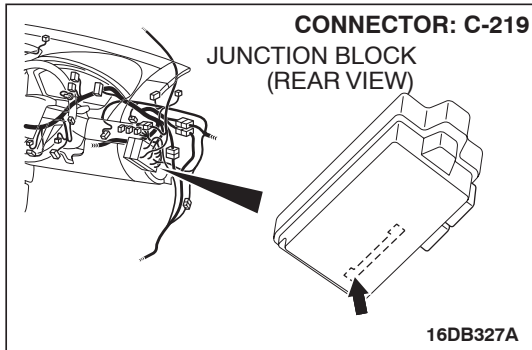
NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

STEP 12. Check ETACS-ECU connector C-219 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

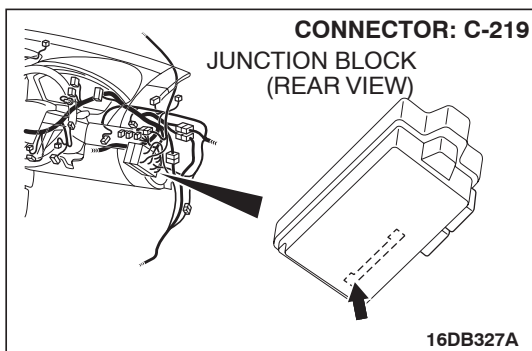
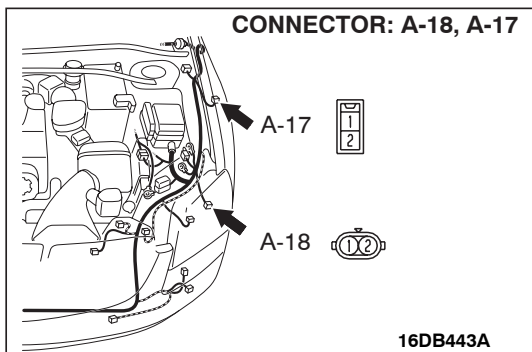
Q: Is ETACS-ECU connector C-219 in good condition?

YES : Go to Step 7.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 13. Check the wiring harness between side turn-signal lamp (LH) connector A-17 (terminal 1) and ETACS-ECU connector C-219 (terminal 14).



NOTE: Also check junction block connector C-214 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-214 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between side turn-signal lamp (LH) connector A-17 (terminal 1) and ETACS-ECU connector C-219 (terminal 14) in good condition?

YES : Replace the side turn-signal lamp socket (LH). Verify that the turn-signal lamps illuminate normally.

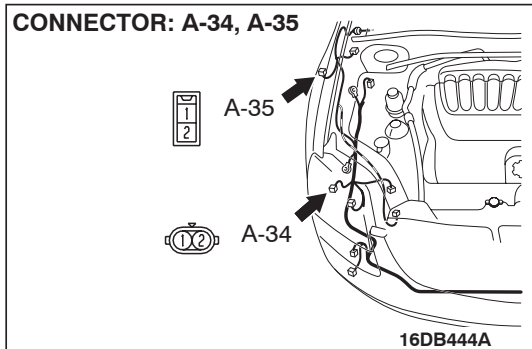
NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

STEP 14. Check front combination lamp (RH) connector A-34 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front combination lamp (RH) connector A-34 in good condition?

YES : Go to Step 15.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 15. Check the front turn-signal lamp bulb (RH).

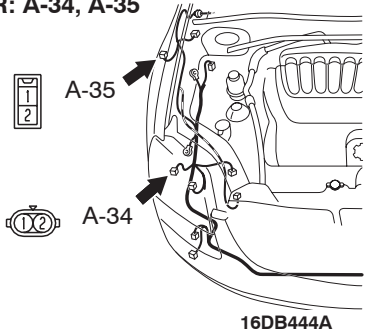
- (1) Remove the front turn-signal (RH) lamp bulb.
- (2) Verify that the front turn-signal lamp bulb (RH) is not damaged or burned out.

Q: Is the front turn-signal (RH) lamp bulb in good condition?

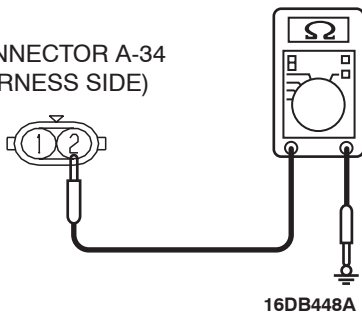
YES : Go to Step 16.

NO : Replace the front turn-signal (RH) lamp bulb. Verify that the turn-signal lamps illuminate normally.

CONNECTOR: A-34, A-35



CONNECTOR A-34
(HARNESS SIDE)



STEP 16. Check the ground circuit to the front combination lamp (RH). Measure the resistance at front combination lamp (RH) connector A-34.

(1) Disconnect front combination lamp (RH) connector A-34 and measure the resistance available at the wiring harness side of the connector.

(2) Measure the resistance value between terminal 2 and ground.

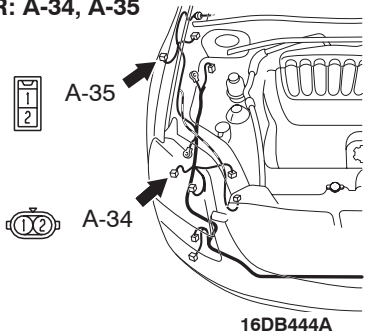
- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 18.

NO : Go to Step 17.

CONNECTOR: A-34, A-35

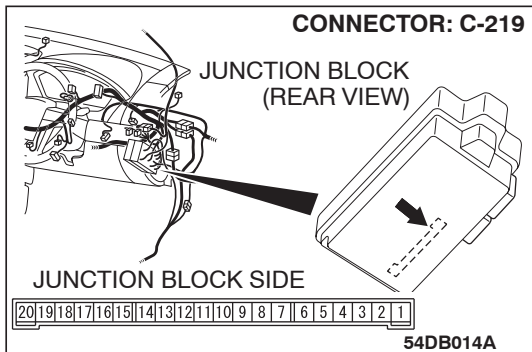


STEP 17. Check the wiring harness between front combination lamp (RH) connector A-34 (terminal 2) and ground.

Q: Is the wiring harness between front combination lamp (RH) connector A-34 (terminal 2) and ground in good condition?

YES : Replace the front combination lamp socket (RH).
Verify that the turn-signal lamps illuminate normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

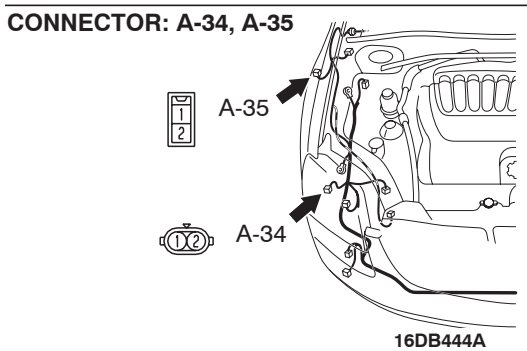


STEP 18. Check ETACS-ECU connector C-219 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

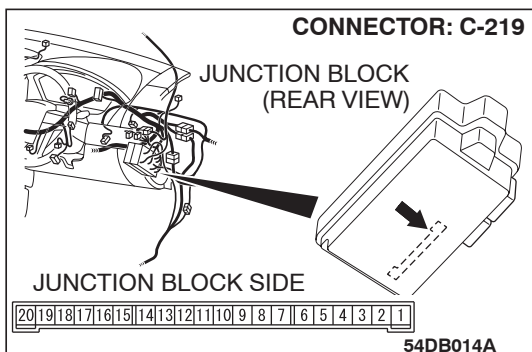
Q: Is ETACS-ECU connector C-219 in good condition?

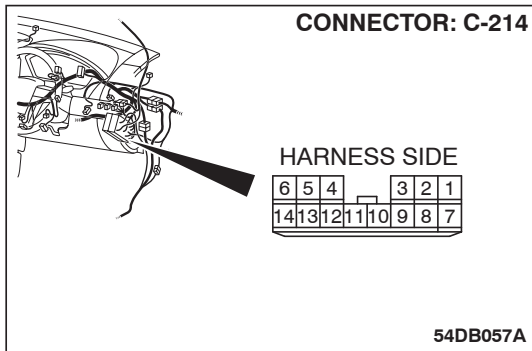
YES : Go to Step 19.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 19. Check the wiring harness between front combination lamp (RH) connector A-34 (terminal 1) and ETACS-ECU connector C-219 (terminal 9).

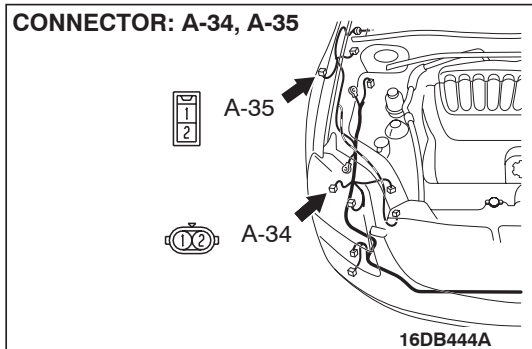




NOTE: Also check junction block connector C-214 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-214 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between front combination lamp (RH) connector A-34 (terminal 1) and ETACS-ECU connector C-219 (terminal 9) in good condition?

- YES :** Replace the front combination lamp socket (RH).
Verify that the turn-signal lamps illuminate normally.
- NO :** The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.



STEP 20. Check side turn-signal lamp (RH) connector A-35 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is side turn-signal lamp (RH) connector A-35 in good condition?

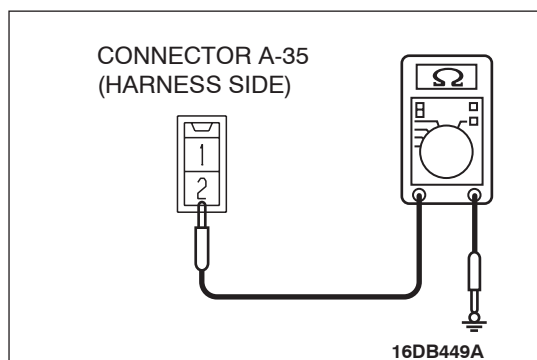
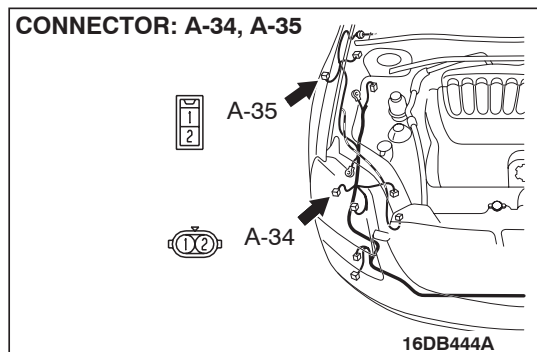
- YES :** Go to Step 21.
- NO :** Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.

STEP 21. Check the side turn-signal lamp bulb (RH).

- (1) Remove the side turn-signal (RH) lamp bulb.
- (2) Verify that the side turn-signal lamp bulb (RH) is not damaged or burned out.

Q: Is the side turn-signal (RH) lamp bulb in good condition?

- YES :** Go to Step 22.
- NO :** Replace the side turn-signal (RH) lamp bulb. Verify that the turn-signal lamps illuminate normally.



STEP 22. Check the ground circuit to the side turn-signal lamp (RH). Measure the resistance at side turn-signal lamp (RH) connector A-35.

(1) Disconnect side turn-signal lamp (RH) connector A-35 and measure the resistance available at the wiring harness side of the connector.

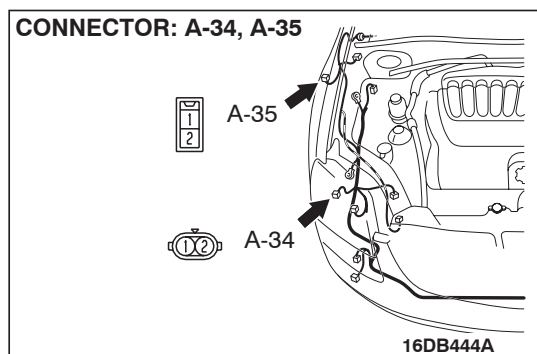
(2) Measure the resistance value between terminal 2 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 24.

NO : Go to Step 23.

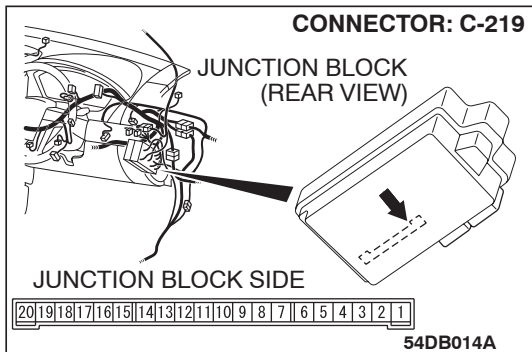


STEP 23. Check the wiring harness between side turn-signal lamp (RH) connector A-35 (terminal 2) and ground.

Q: Is the wiring harness between side turn-signal lamp (RH) connector A-35 (terminal 2) and ground in good condition?

YES : Replace the side turn-signal lamp socket (RH). Verify that the turn-signal lamps illuminate normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

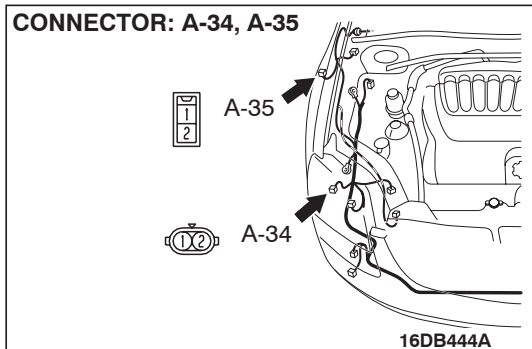


STEP 24. Check ETACS-ECU connector C-219 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

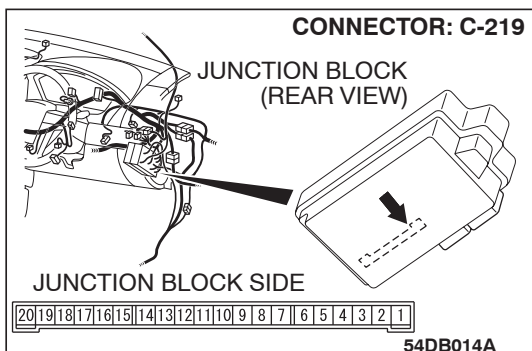
Q: Is ETACS-ECU connector C-219 in good condition?

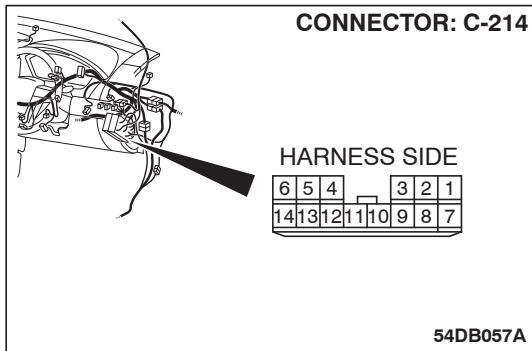
YES : Go to Step 25.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 25. Check the wiring harness between side turn-signal lamp (RH) connector A-35 (terminal 1) and ETACS-ECU connector C-219 (terminal 9).





NOTE: Also check junction block connector C-214 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-214 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between side turn-signal lamp (RH) connector A-35 (terminal 1) and ETACS-ECU connector C-219 (terminal 9) in good condition?

YES : Replace the side turn-signal lamp socket (RH). Verify that the turn-signal lamps illuminate normally.

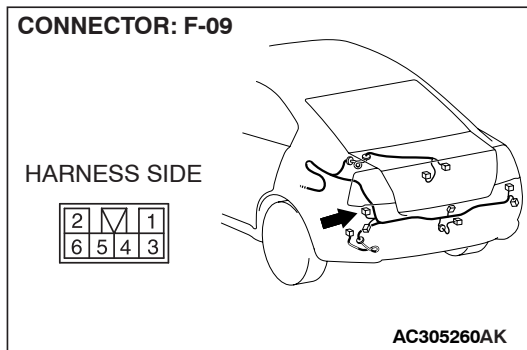
NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

STEP 26. Check rear combination lamp (LH) connector F-09 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is rear combination lamp (LH) connector F-09 in good condition?

YES : Go to Step 27.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 27. Check the rear turn-signal lamp bulb (LH).

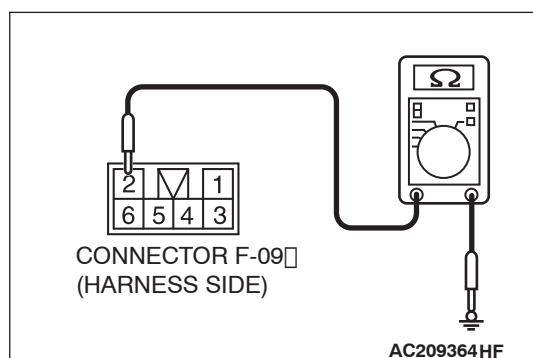
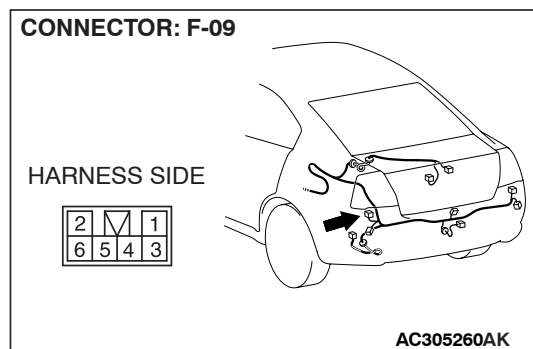
(1) Remove the rear turn-signal (LH) lamp bulb.

(2) Verify that the rear turn-signal lamp bulb (LH) is not damaged or burned out.

Q: Is the rear turn-signal (LH) lamp bulb in good condition?

YES : Go to Step 28.

NO : Replace the rear turn-signal (LH) lamp bulb. Verify that the turn-signal lamps illuminate normally.



STEP 28. Check the ground circuit to the rear combination lamp (LH). Measure the resistance at rear combination lamp (LH) connector F-09.

(1) Disconnect rear combination lamp (LH) connector F-09 and measure the resistance available at the wiring harness side of the connector.

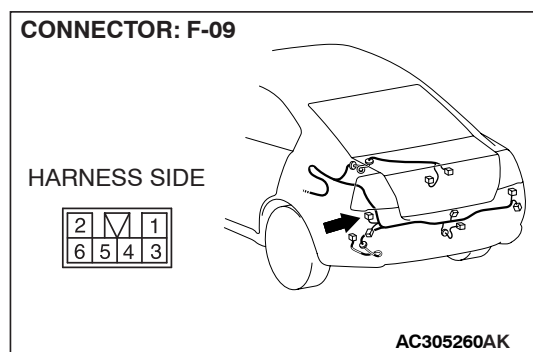
(2) Measure the resistance value between terminal 2 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 30.

NO : Go to Step 29.

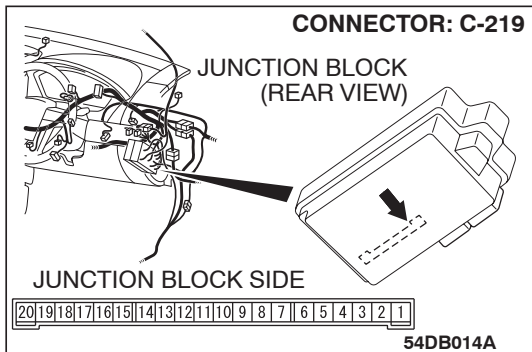


STEP 29. Check the wiring harness between rear combination lamp (LH) connector F-09 (terminal 2) and ground.

Q: Is the wiring harness between rear combination lamp (LH) connector F-09 (terminal 2) and ground in good condition?

YES : Replace the rear combination lamp socket assembly (LH). Verify that the turn-signal lamps illuminate normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

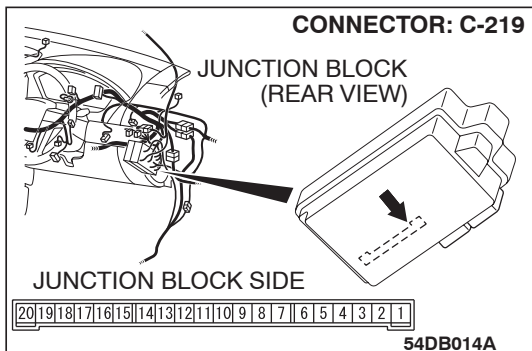


STEP 30. Check ETACS-ECU connector C-219 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

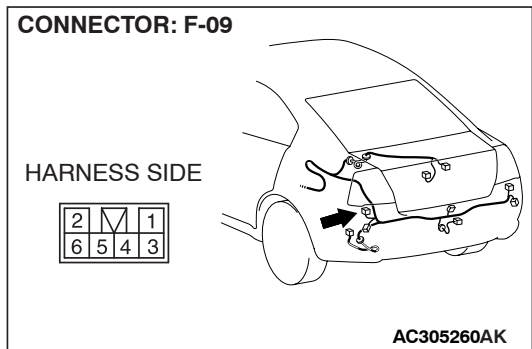
Q: Is ETACS-ECU connector C-219 in good condition?

YES : Go to Step 31.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 31. Check the wiring harness between rear combination lamp (LH) connector F-09 (terminal 5) and ETACS-ECU connector C-219 (terminal 14).



NOTE: Also check junction block connector C-204 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-204 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between rear combination lamp (LH) connector F-09 (terminal 5) and ETACS-ECU connector C-219 (terminal 14) in good condition?

YES : Replace the rear combination lamp socket assembly (LH). Verify that the turn-signal lamps illuminate normally.

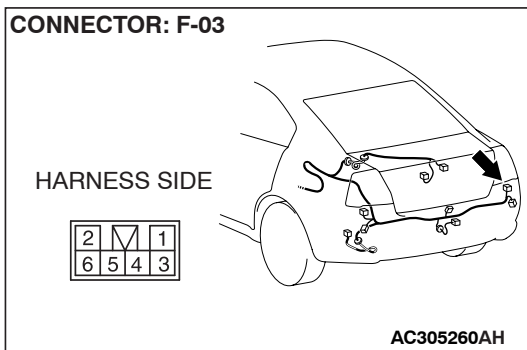
NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

STEP 32. Check rear combination lamp (RH) connector F-03 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is rear combination lamp (RH) connector F-03 in good condition?

YES : Go to Step 33.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 33. Check the rear turn-signal lamp bulb (RH).

- (1) Remove the rear turn-signal (RH) lamp bulb.
- (2) Verify that the rear turn-signal lamp bulb (RH) is not damaged or burned out.

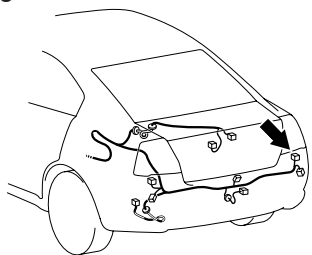
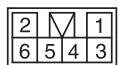
Q: Is the rear turn-signal (RH) lamp bulb in good condition?

YES : Go to Step 34.

NO : Replace the rear turn-signal (RH) lamp bulb. Verify that the turn-signal lamps illuminate normally.

CONNECTOR: F-03

HARNESS SIDE



AC305260AH

STEP 34. Check the ground circuit to the rear turn-signal lamp (RH). Measure the resistance at rear combination lamp (RH) connector F-03.

(1) Disconnect rear combination lamp (RH) connector F-03 and measure the resistance available at the harness side of the connector.

(2) Measure the resistance value between terminal 2 and ground.

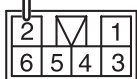
- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

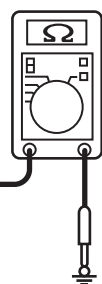
YES : Go to Step 36.

NO : Go to Step 35.

CONNECTOR F-03
(HARNESS SIDE)

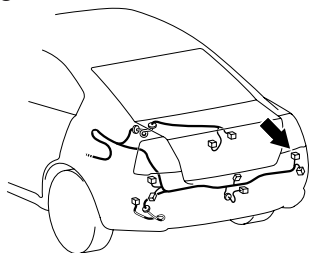
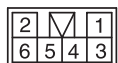


AC209364 HD



CONNECTOR: F-03

HARNESS SIDE



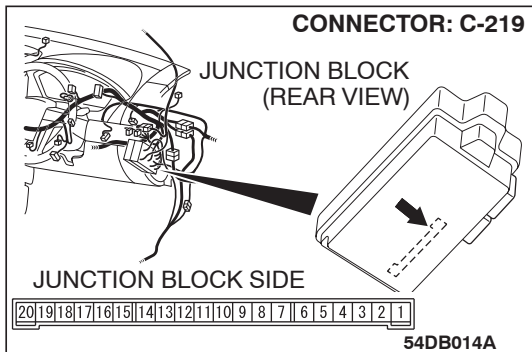
AC305260AH

STEP 35. Check the wiring harness between rear combination lamp (RH) connector F-03 (terminal 2) and ground.

Q: Is the wiring harness between rear combination lamp (RH) connector F-03 (terminal 2) and ground in good condition?

YES : Replace the rear combination lamp socket assembly (RH). Verify that the turn-signal lamps illuminate normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

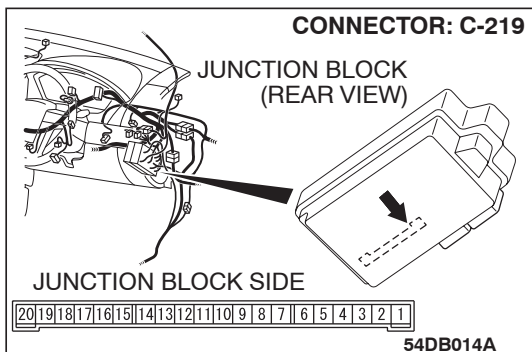


STEP 36. Check ETACS-ECU connector C-219 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

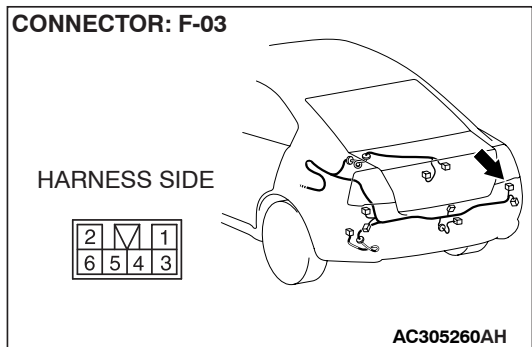
Q: Is ETACS-ECU connector C-219 in good condition?

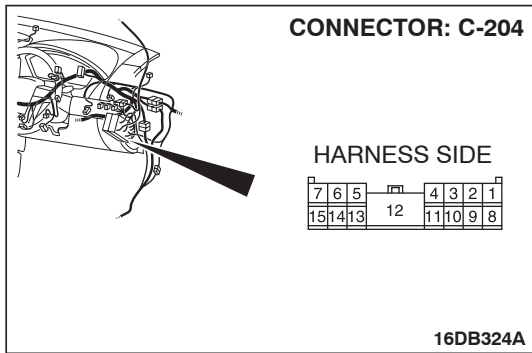
YES : Go to Step 37.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Verify that the turn-signal lamps illuminate normally.



STEP 37. Check the wiring harness between rear combination lamp (RH) connector F-03 (terminal 5) and ETACS-ECU connector C-219 (terminal 9).





NOTE: Also check junction block connector C-204 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-204 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Is the wiring harness between rear combination lamp (RH) connector F-03 (terminal 5) and ETACS-ECU connector C-219 (terminal 9) in good condition?

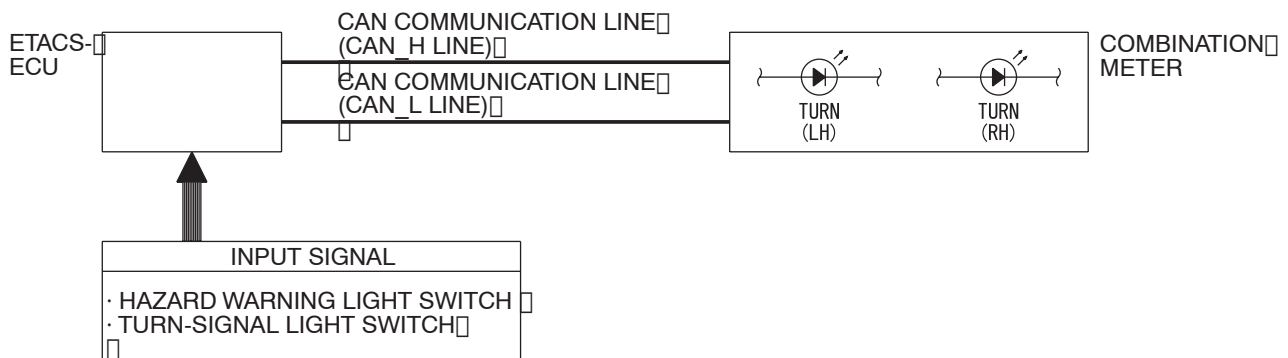
YES : Replace the rear combination lamp socket assembly (RH). Verify that the turn-signal lamps illuminate normally.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the turn-signal lamps illuminate normally.

INSPECTION PROCEDURE I-4: The turn-signal lamp indicator does not illuminate normally.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor [P.54B-13](#)."

Turn-signal Lights Indicator Light Circuit



W4P54M82AA

CIRCUIT OPERATION

At the same time that the turn-signal lamps are illuminated, the ETACS-ECU sends a signal to illuminate the turn-signal lamp indicator via the CAN bus line.

TECHNICAL DESCRIPTION (COMMENT)

If the turn-signal indicator does not illuminate normally, connector(s), wiring harness in the CAN bus lines, the ETACS-ECU or the combination meter may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The combination meter may be defective
- The ETACS-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Check the turn-signal lamps.

When the column switch or the hazard warning lamp switch are operated, check that the turn-signal lamps illuminate and go off normally.

Q: Are the turn-signal lamps in good condition?

YES : Go to Step 2.

NO : First, repair the turn-signal lamp(s). Refer to Inspection Procedure I-3 "One of the turn-signal lamps does not illuminate [P.54B-316](#)."

STEP 2. Using Diagnostic Tool MB991958, diagnose the CAN bus line.

CAUTION

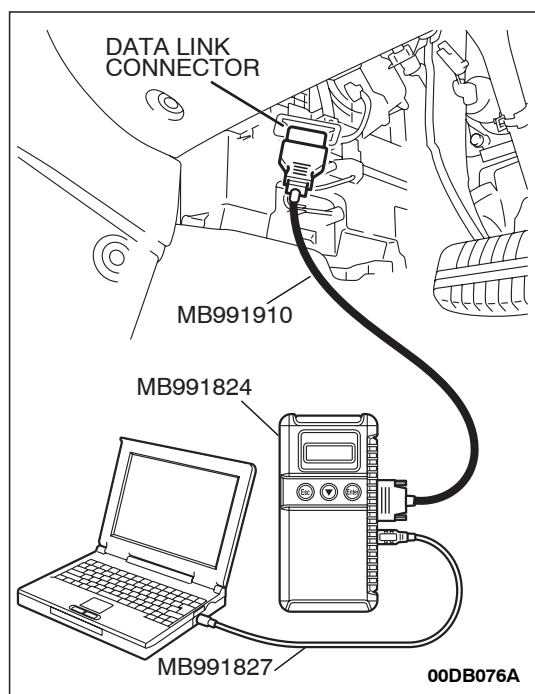
To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958.

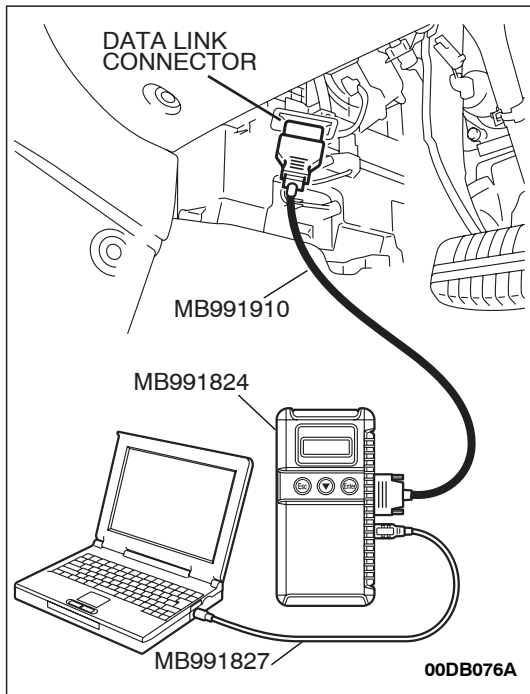
- (1) Connect Diagnostic Tool MB991958. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose the CAN bus line.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line found to be normal?

YES : Go to Step 3.

NO : Repair the CAN bus line (Refer to GROUP 54C, Diagnosis [P.54C-15](#)).





STEP 3. Using Diagnostic Tool MB991958, read the combination meter diagnostic trouble code.

Check whether the combination meter-related DTC is set.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check whether a combination meter-related DTC is set.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the DTC set?

YES : Diagnose the combination meter. Refer to [P.54A-48](#).

NO : Go to Step 4.

STEP 4. Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the ETACS-ECU.

⚠ CAUTION

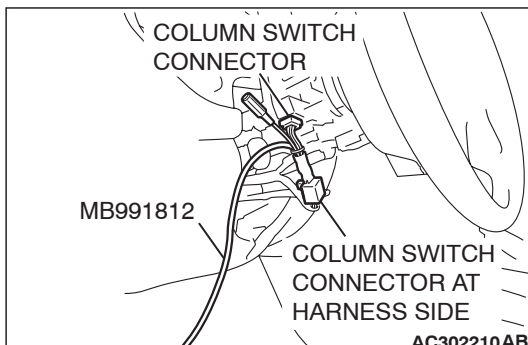
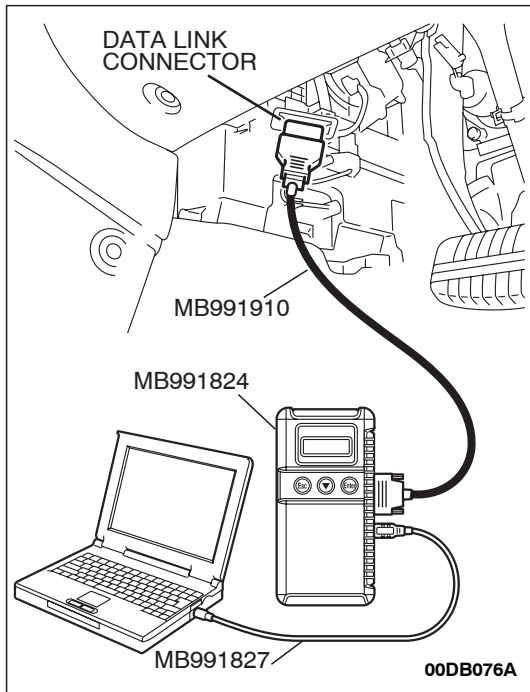
Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

- (1) Connect the SWS monitor. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "ON" position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM Check."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "ECU COMM Check."
- (4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menu for the "ETACS ECU" menu.

Q: Is "OK" displayed for the "ETACS ECU" menu?

YES : Go to Step 5.

NO : Refer to Inspection Procedure A-3 "Communication with the ETACS-ECU is not possible [P.54B-74](#)."



STEP 5. Replace the combination meter.

- (1) Replace the combination meter.
- (2) Check that the turn-signal lamp indicator lamps illuminate normally.

Q: Are the turn-signal indicator lamps in good condition?

YES : No action is necessary and testing is complete.

NO : Replace the ETACS-ECU. Check that the turn-signal lamp indicator lamps illuminate normally.

FOG LAMP

GENERAL DESCRIPTION CONCERNING THE FOG LAMPS

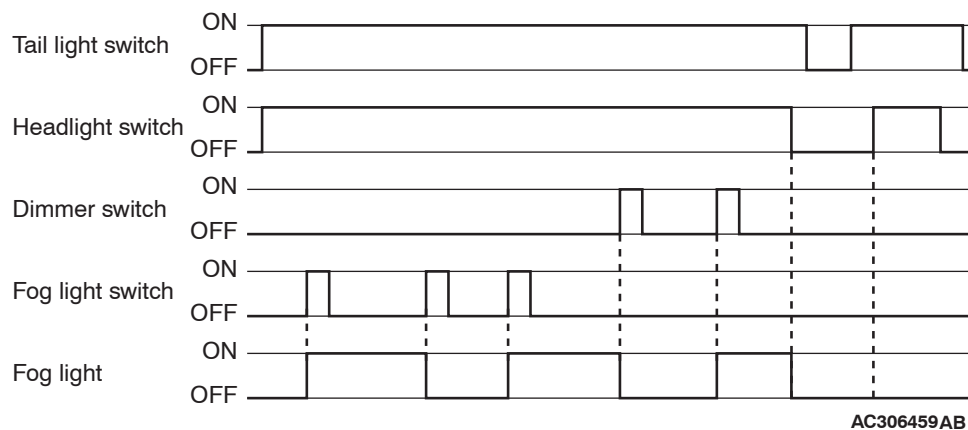
M1549021400216

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80

The following ECUs affect the functions and control of the fog lamps.

FUNCTION	CONTROL ECU
Fog lamp	ETACS-ECU, front-ECU, column switch
Fog lamp indicator	ETACS-ECU, column switch

Fog lamp



The fog lamps will illuminate only when the fog lamp switch is operated while the low-beam headlamps are on.

The fog lamps will be switched off when any of the following conditions is met. The fog lamps will also be switched off automatically by headlamp automatic shutoff function.

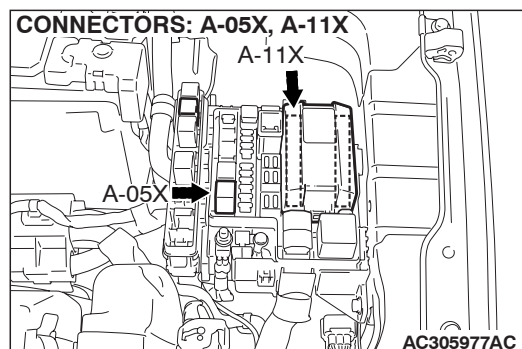
- When the high-beam headlamps are switched on, the fog lamps will be switched off. If the low-beam headlamps are switched on again, the fog lamps will illuminate again.
- When the headlamp switch is turned off or the tail lamps and headlamps are off, the fog lamps will be switched off. If the low-beam headlamps are switched on again, the fog lamps will not illuminate again.

Fog lamp indicator

At the same time that the fog lamps are illuminated, the ETACS-ECU sends a signal to illuminate the fog lamp indicator via the CAN bus line. The combination meter receives the transmitted signal and turns the fog lamp indicator on and off.

INSPECTION PROCEDURE J-1: Fog Light: Fog lamps do not illuminate when the fog lamp switch is turned on.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."



CIRCUIT OPERATION

- The ETACS-ECU sends a fog lamp illumination request signal ("LAMP ON" signal) to the front-ECU when the fog lamp switch is turned on while the headlamps are illuminating at low beam.
- Then the front-ECU switches on its relay to illuminate the fog lamps.

TECHNICAL DESCRIPTION (COMMENT)

If the headlamps illuminate at low beam, the fog lamp relay, the fog lamp switch, the front-ECU or the ETACS-ECU may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The fog lamp relay may be defective
- The front-ECU may be defective
- The ETACS-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Check the headlamp (low-beam) operation.

Q: Do the headlamps illuminate at low beam normally?

YES : Go to Step 2.

NO : Refer to Inspection Procedure H-2 "The headlamps (low-beam) do not illuminate normally P.54B-264."

STEP 2. Check the input signal by using "FUNCTION DIAG." menu of the SWS monitor.

Set each switch to the following condition before checking input signal from the fog lamp switch:

- Ignition switch: ON
- Fog lamp switch: ON

NOTE: Turn the ignition switch to the "ON" position in order to disable the headlamp automatic shutdown function.

⚠ CAUTION

To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958. Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

- (1) Connect the special tool. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Operate Diagnostic Tool MB991958 according to the procedure below to display "F.FOG."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "Function Diag."
 - f. Select "LIGHTING."
 - g. Select "F.FOG."
- (3) Check that normal conditions are displayed for the items described in the table below.

ITEM NO.	ITEM NAME	NORMAL CONDITION
ITEM 30	IG SW (IG1)	ON
ITEM 36	F.FOG LAMP	ON

Q: Does the Diagnostic Tool MB991958 display the items "IG SW (IG1)" and "F.FOG LAMP" as normal condition?

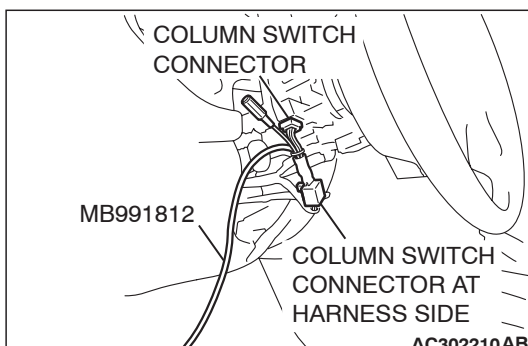
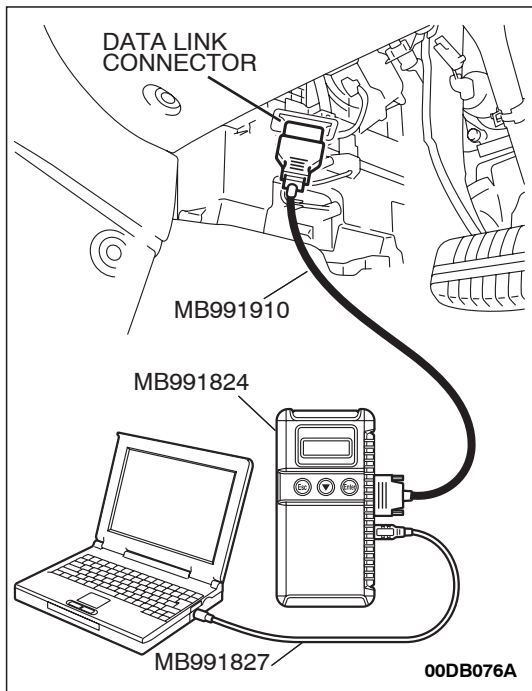
Normal conditions are displayed for all the items : Go to Step 3.

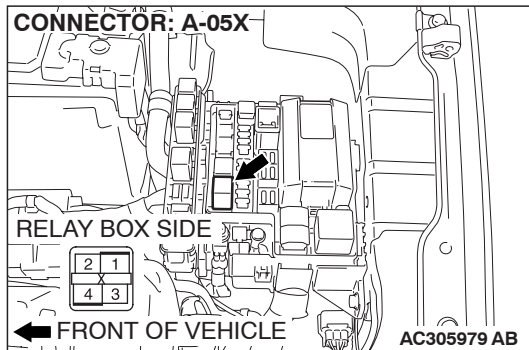
Normal condition is not displayed for "IG SW (IG1)" :

Refer to Inspection Procedure M-2 "ETACS-ECU does not receive any signal from the ignition switch (IG1) [P.54B-408](#)."

Normal condition is not displayed for "F.FOG LAMP" :

Refer to Inspection Procedure M-3 "ETACS-ECU does not receive any signal from the fog lamp switch [P.54B-410](#)."





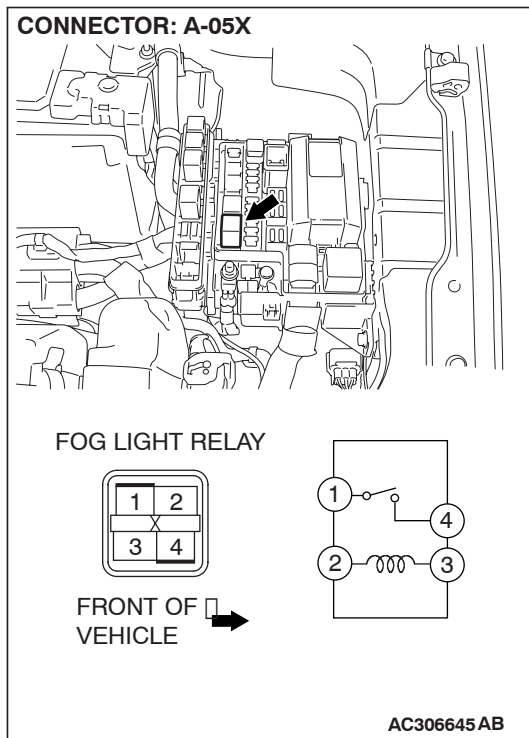
STEP 3. Check fog lamp relay connector A-05X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is fog lamp relay connector A-05X in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Verify that the fog lamps illuminate normally.



STEP 4. Check the fog lamp relay.

BATTERY VOLTAGE	TESTER CONNECTION	SPECIFIED CONDITION
Not applied	1 – 4	Open circuit
<ul style="list-style-type: none"> Connect terminal 2 to the positive battery terminal Connect terminal 3 to the negative battery terminal 	1 – 4	Less than 2 ohms

Q: Is the fog lamp relay in good condition?

YES : Go to Step 5.

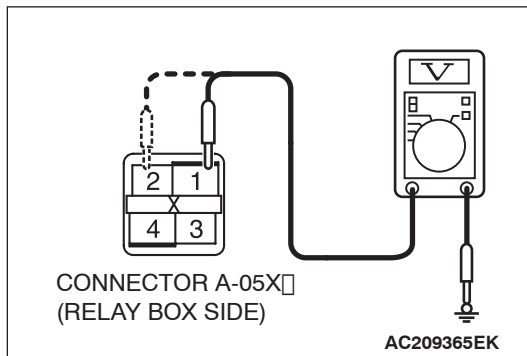
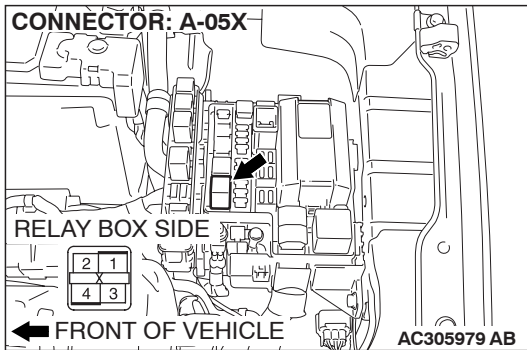
NO : Replace the fog lamp relay. Verify that the fog lamps illuminate normally.

STEP 5. Check the battery power supply circuit to the fog lamp relay. Measure the voltage at fog lamp relay connector A-05X.

⚠ CAUTION

The top and bottom of the fog lamp relay are difficult to identify. Prior to inspection, confirm the triangle mark on the relay box.

- (1) Disconnect fog lamp relay connector A-05X and measure the voltage available at the relay box side of the connector.



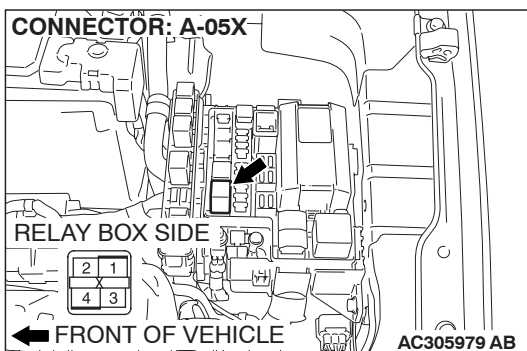
- (2) Measure the voltage between terminal 1 and ground, and also between terminal 2 and ground.

- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 7.

NO : Go to Step 6.

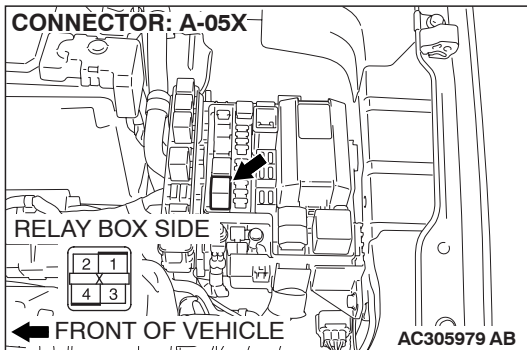


STEP 6. Check the wiring harness between fog lamp relay connector A-05X (terminals 1 and 2) and the battery.

Q: Is the wiring harness between fog lamp relay connector A-05X (terminals 1 and 2) and the battery in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the fog lamps illuminate normally.

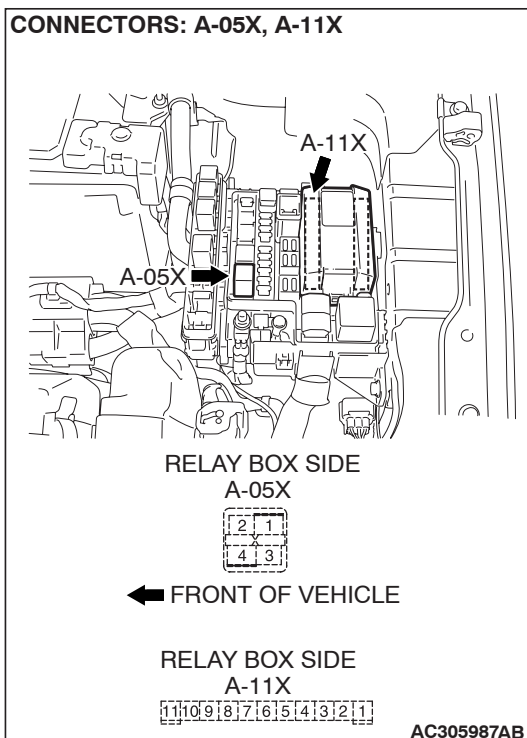


STEP 7. Check front-ECU connector A-11X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is front-ECU connector A-11X in good condition?

YES : Go to Step 8.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Verify that the fog lamps illuminate normally.



STEP 8. Check the wiring harness between fog lamp relay connector A-05X (terminal 3) and front-ECU connector A-11X (terminal 11).

Q: Is the wiring harness between fog lamp relay connector A-05X (terminal 3) and front-ECU connector A-11X (terminal 11) in good condition?

YES : Go to Step 9.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the fog lamps illuminate normally.

STEP 9. Replace the ECU.

- (1) Replace the front-ECU.
- (2) The fog lamps should illuminate normally.

Q: Do the fog lamps illuminate normally?

YES : No action is necessary and testing is complete.

NO : Replace the ETACS-ECU. Verify that the fog lamps illuminate normally.

INSPECTION PROCEDURE J-2: Fog Light: Fog lamps do not go out when the headlamps (low-beam) are turned off while the fog lamps are on.

TECHNICAL DESCRIPTION (COMMENT)

If the trouble above occurs, the front-ECU may be defective.

TROUBLESHOOTING HINT

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80

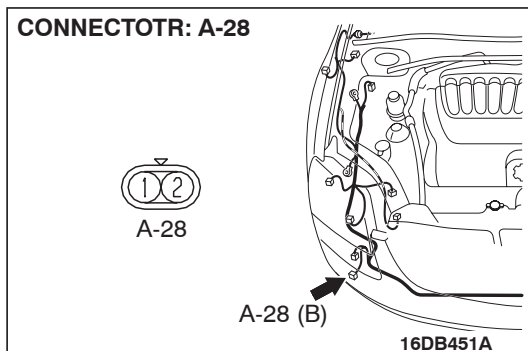
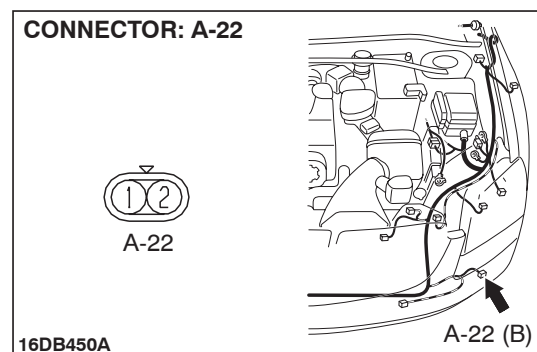
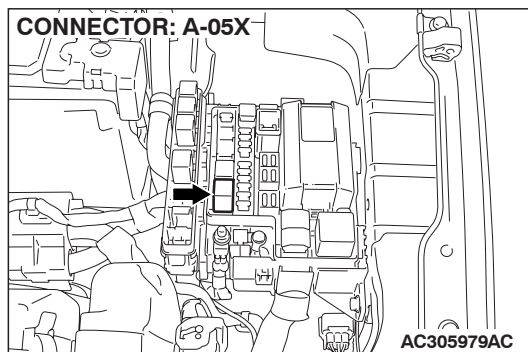
The front-ECU may be defective

DIAGNOSIS

Replace the front-ECU.

The fog lamps should go out when the headlamps (low-beam) are turned off while the fog lamps are on.

INSPECTION PROCEDURE J-3: Fog Light: One of the fog lamps does not illuminate.



TECHNICAL DESCRIPTION (COMMENT)

If one of the fog lamps does not illuminate, the fog lamp relay or the fog lamp bulb may be defective. If the fog lamp indicator lamp does not illuminate, the combination meter may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The fog lamp bulb may be defective

DIAGNOSIS

Required Special Tool:

- MB991223: Harness Set

STEP 1. Verify that the fog lamps and the fog lamp indicator lamp illuminate.

Q: Do the fog lamps and the fog lamp indicator lamp illuminate normally?

Only the fog lamp (LH) does not illuminate : Go to Step 2.

Only the fog lamp (RH) does not illuminate : Go to Step 8.

Only the fog lamp indicator does not illuminate : Refer to Inspection Procedure J-4 "The fog lamp indicator does not illuminate normally [P.54B-350](#)."

Both of the fog lamps do not illuminate : Refer to Inspection Procedure J-1 "Fog lamps do not illuminate when the fog lamp switch is turned on [P.54B-340](#)."

STEP 2. Check fog lamp (LH) connector A-22 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is fog lamp (LH) connector A-22 in good condition?

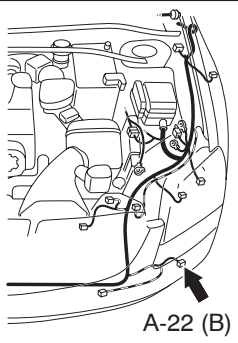
YES : Go to Step 3.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Check that the fog lamps illuminate normally.

CONNECTOR: A-22



16DB450A



STEP 3. Check the fog lamp bulb (LH).

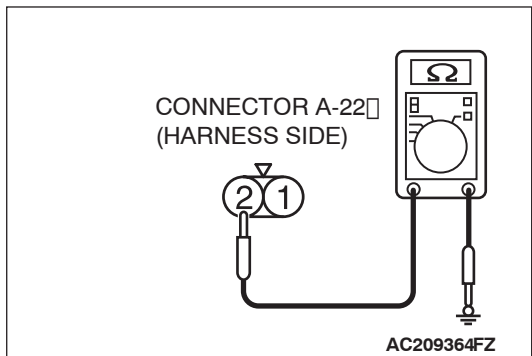
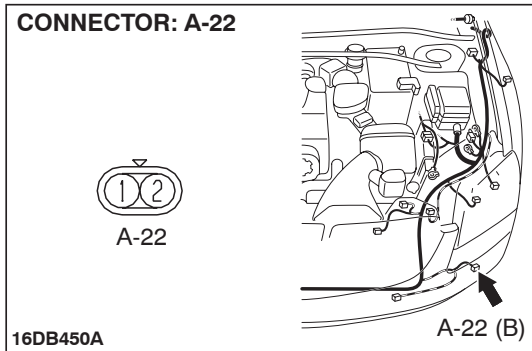
(1) Remove the fog lamp bulb (LH).

(2) Verify that the fog lamp bulb (LH) is not damaged or burned out.

Q: Is the fog lamp bulb (LH) in good condition?

YES : Go to Step 4.

NO : Replace the fog lamp bulb (LH). Verify that the fog lamps illuminate normally.



STEP 4. Check the ground circuit to the fog lamp (LH). Measure the resistance at fog lamp (LH) connector A-22.

(1) Disconnect fog lamp (LH) connector A-22 and measure the resistance available at the wiring harness side of the connector.

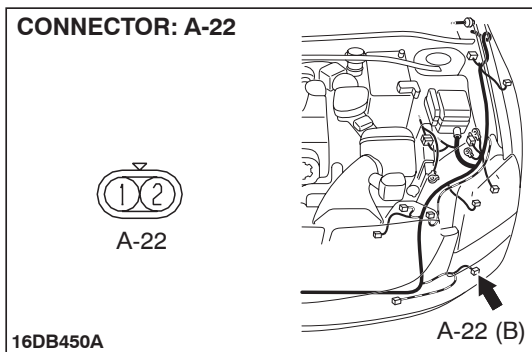
(2) Measure the resistance value between terminal 2 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 6.

NO : Go to Step 5.

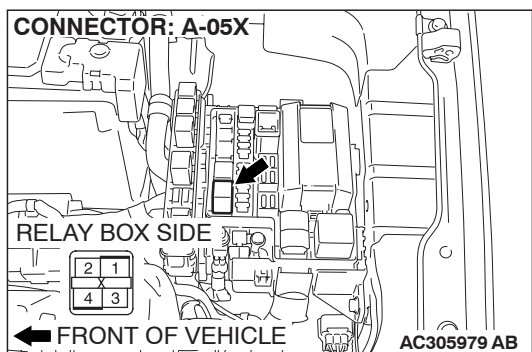


STEP 5. Check the wiring harness between fog lamp (LH) connector A-22 (terminal 2) and ground.

Q: Is the wiring harness between fog lamp (LH) connector A-22 (terminal 2) and ground in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the fog lamps illuminate normally.



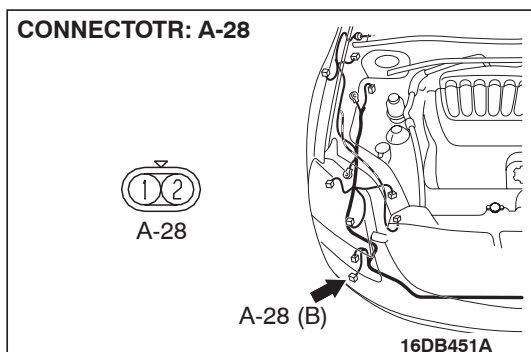
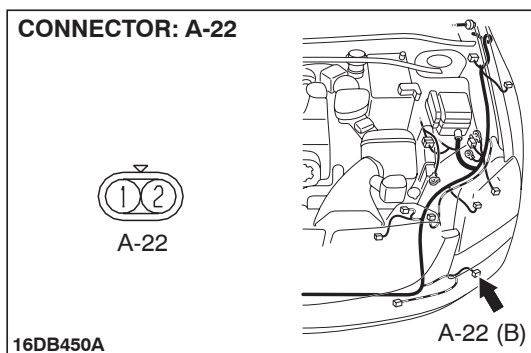
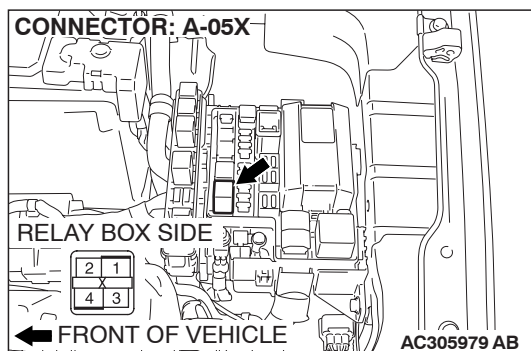
STEP 6. Check fog lamp relay connector A-05X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is fog lamp relay connector A-05X in good condition?

YES : Go to Step 7.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Check that the fog lamps illuminate normally.



STEP 7. Check the wiring harness between fog lamp relay connector A-05X (terminal 4) and fog lamp (LH) connector A-22 (terminal 1).

Q: Is the wiring harness between fog lamp relay connector A-05X (terminal 4) and fog lamp (LH) connector A-22 (terminal 1) in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the fog lamps illuminate normally.

STEP 8. Check fog lamp (RH) connector A-28 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is fog lamp (RH) connector A-28 in good condition?

YES : Go to Step 9.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Check that the fog lamps illuminate normally.

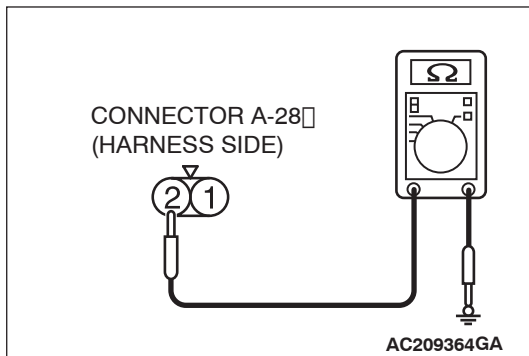
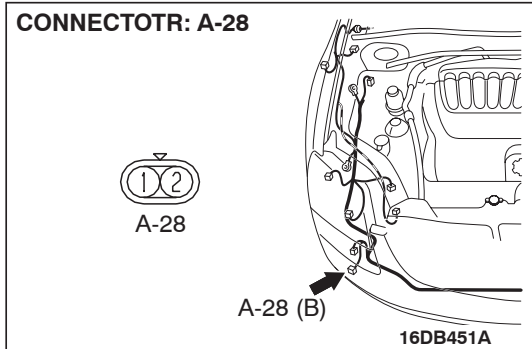
STEP 9. Check the fog lamp bulb (RH).

- (1) Remove the fog lamp bulb (RH).
- (2) Verify that the fog lamp bulb (RH) is not damaged or burned out.

Q: Is the fog lamp bulb (RH) in good condition?

YES : Go to Step 10.

NO : Replace the fog lamp bulb (RH). Verify that the fog lamps illuminate normally.



STEP 10. Check the ground circuit to the fog lamp (RH). Measure the resistance at fog lamp (RH) connector A-28.

(1) Disconnect fog lamp (RH) connector A-28 and measure the resistance available at the wiring harness side of the connector.

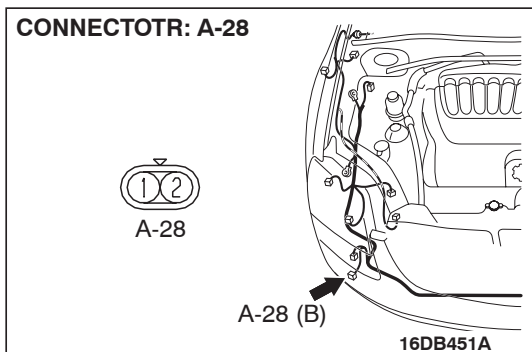
(2) Measure the resistance value between terminal 2 and ground.

- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 12.

NO : Go to Step 11.

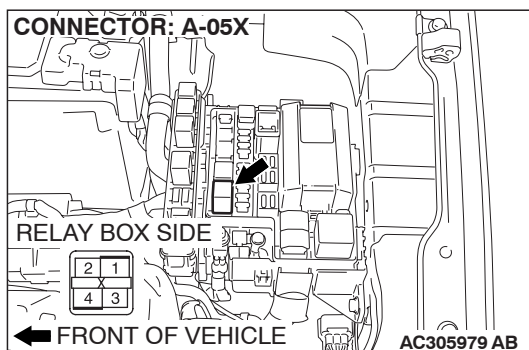


STEP 11. Check the wiring harness between fog lamp (RH) connector A-28 (terminal 2) and ground.

Q: Is the wiring harness between fog lamp (RH) connector A-28 (terminal 2) and ground in good condition?

YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the fog lamps illuminate normally.



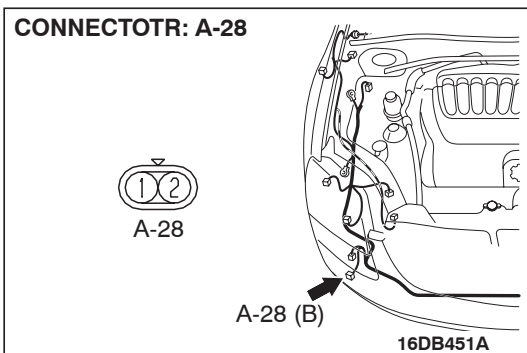
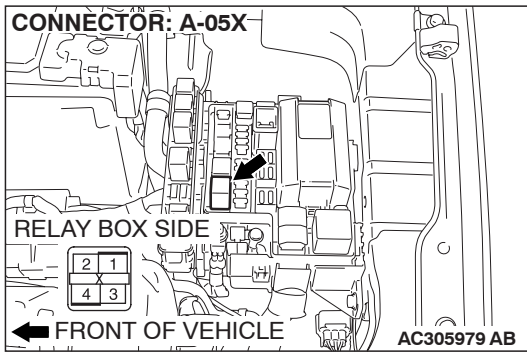
STEP 12. Check fog lamp relay connector A-05X for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is fog lamp relay connector A-05X in good condition?

YES : Go to Step 13.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection

P.00E-2. Check that the fog lamps illuminate normally.



STEP 13. Check the wiring harness between fog lamp relay connector A-05X (terminal 4) and fog lamp (RH) connector A-28 (terminal 1).

Q: Is the wiring harness between fog lamp relay connector A-05X (terminal 4) and fog lamp (RH) connector A-28 (terminal 1) in good condition?

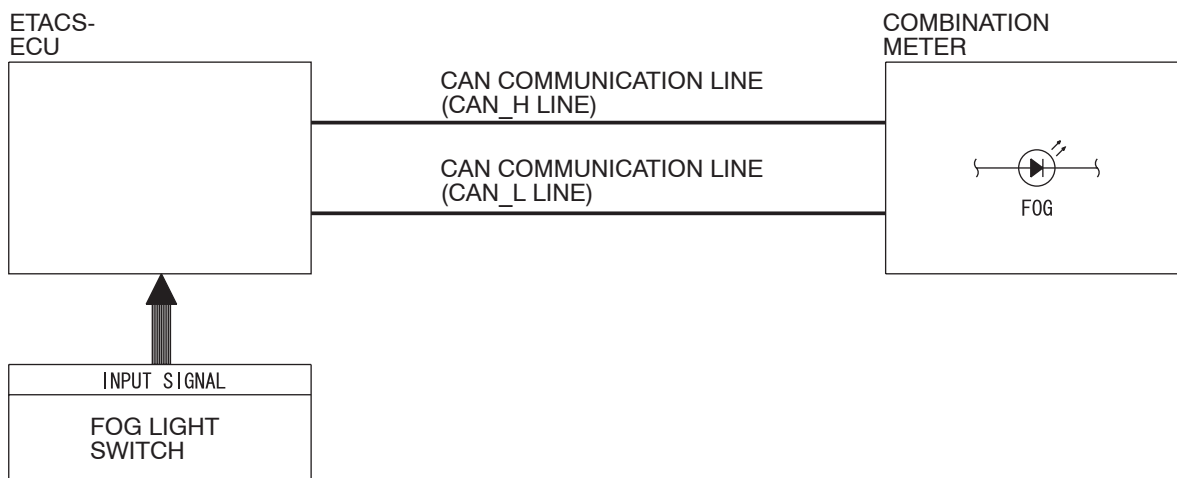
YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. Verify that the fog lamps illuminate normally.

INSPECTION PROCEDURE J-4: The fog lamp indicator does not illuminate normally.

NOTE: This troubleshooting procedure requires the use of Diagnostic Tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

Fog Light Indicator Light Circuit



CIRCUIT OPERATION

At the same time that the fog lamps are illuminated, the ETACS-ECU sends a signal to illuminate the fog lamp indicator via the CAN bus line.

TECHNICAL DESCRIPTION (COMMENT)

If the fog lamp indicator does not illuminate normally, connector(s), wiring harness in the CAN bus lines, the ETACS-ECU or the combination meter may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The combination meter may be defective
- The ETACS-ECU may be defective

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
 - MB991806: SWS Monitor Cartridge
 - MB991812: SWS Monitor Harness (For Column-ECU)
 - MB991822: Test Probe Harness

STEP 1. Check the fog lamps.

When the fog lamp switch is operated, check that the fog lamps illuminate/go off normally.

Q: Are the fog lamps operating properly?

YES : Go to Step 2.

NO : First, repair the fog lamps. Refer to Inspection Procedure J-3 "One of the fog lamps does not illuminate [P.54B-345](#)."

STEP 2. Using Diagnostic Tool MB991958, diagnose the CAN bus line.

CAUTION

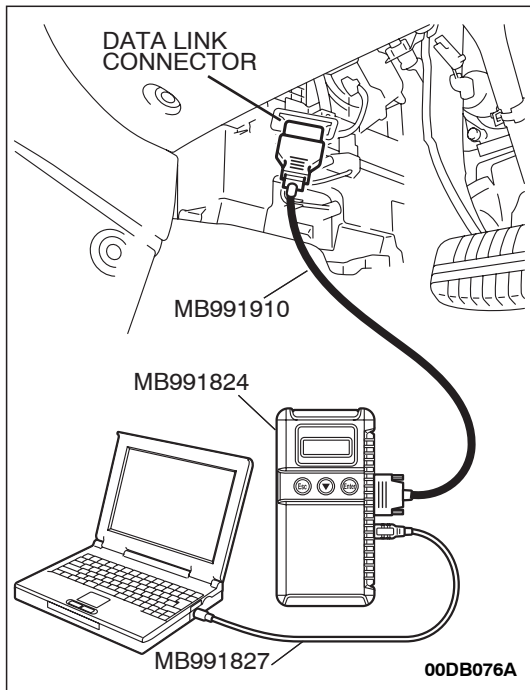
To prevent damage to Diagnostic Tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting Diagnostic Tool MB991958.

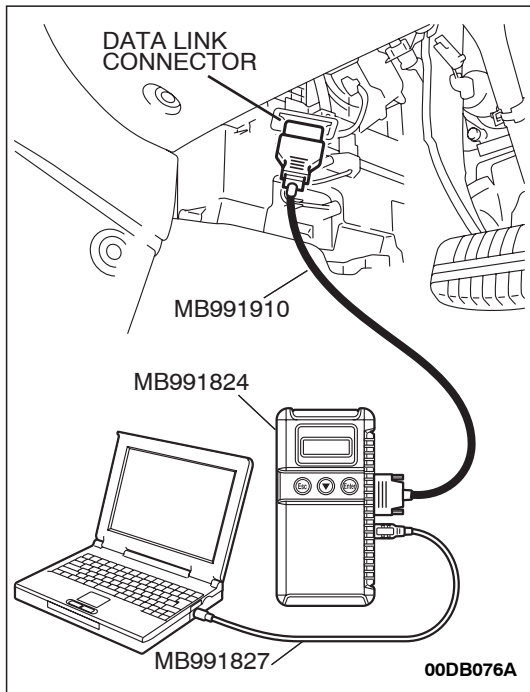
- (1) Connect Diagnostic Tool MB991958. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose the CAN bus line.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line found to be normal?

YES : Go to Step 3.

NO : Repair the CAN bus line (Refer to GROUP 54C, Diagnosis [P.54C-15](#)).





STEP 3. Using Diagnostic Tool MB991958, read the combination meter diagnostic trouble code.

- (1) Check whether a combination meter-related DTC is set.
- (2) Turn the ignition switch to the "ON" position.
Check whether the combination meter-related DTC is set.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the DTC set?

YES : Diagnose the combination meter. Refer to [P.54A-48](#).

NO : Go to Step 4.

STEP 4. Use Diagnostic Tool MB991958 to select "ECU COMM Check" on the SWS monitor display.

Check the ETACS-ECU.

⚠ CAUTION

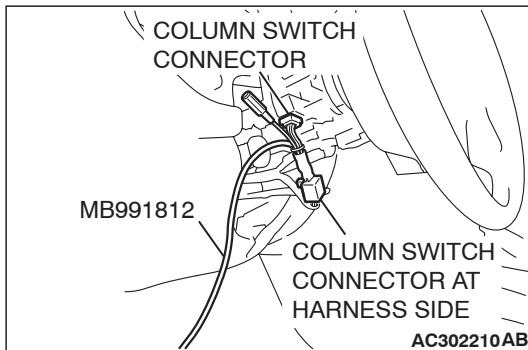
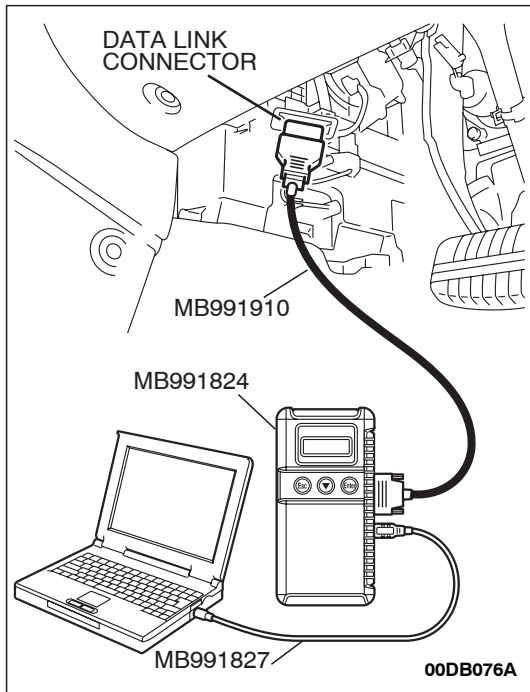
Connect special tool MB991910 before connecting special tool MB991812. Be sure to connect special tool MB991806 after turning on special tool MB991824.

- (1) Connect the SWS monitor. Refer to "How to connect SWS monitor [P.54B-13](#)."
- (2) Turn the ignition switch to the "ON" position.
- (3) Operate Diagnostic Tool MB991958 according to the procedure below to display "ECU COMM Check."
 - a. Select "Interactive Diagnosis."
 - b. Select "System select."
 - c. Select "SWS."
 - d. Select "SWS MONITOR."
 - e. Select "ECU COMM Check."
- (4) Diagnostic Tool MB991958 should show "OK" on the "ECU COMM Check" menu for the "ETACS ECU" menu.

Q: Is "OK" displayed for the "ETACS ECU" menu?

YES : Go to Step 5.

NO : Refer to Inspection Procedure A-3 "Communication with the ETACS-ECU is not possible [P.54B-74](#)."



STEP 5. Replace the combination meter.

- (1) Replace the combination meter.
- (2) Check that the fog lamp indicator lamp illuminates normally.

Q: Is the fog lamp indicator lamp operating properly?

YES : No action is necessary and testing is complete.

NO : Replace the ETACS-ECU. Check that the fog lamp indicator lamp illuminates normally.

[NEXT PAGE](#)