MITSUBISHI MOTORS

SERVICE BULLETIN

GLOBAL AFTER SALES OFFICE, MITSUBISHI MOTORS CORPORATION

PURPOSE : CHANGE	ISSUE NO. : MSB-15E54-001A	DATE : 2015-10-14
SUBJECT : Addition of the maintenance procedures due to the adoption of the multi around monitor		<DESTINATION/MODEL> (EU/RUSSIA) <M/Y> 16
GROUP : Gr:54(Chassis Electrical)		OUTLANDER PHEV(GG0W)

1. Description :

Please refer to the attached document for the information about the change of mention in the applicable service manual.

2. Affected service manuals :

Applicable manual	Pub. No.	Applicable title (INFO ID)
2016 OUTLANDER/ OUTLANDER PHEV Workshop Manual	CGFE16E1-CD (English) CGFF16E1-CD (French) CGFG16E1-CD (German) CGFS16E1-CD (Spanish) CGFI16E1-CD (Italian) N/A (RUSSIA)	Added below " ADJUSTMENT FUNCTION M545-00-251-65700-01)"

3. About the details :

Please refer to the attached document (Attached sheet 1-46)

4. Effective time : From 16MY of the related vehicles

Revision history

		MSB No.	Issued Date	
Original		MSB-15E54-001	2015/6/1	
Revision	A	MSB-15E54-001A	2015/10/14	※This time

※Attached sheets of 14, 30, 38,39,40, 41and 42 are revised this time.

MULTI AROUND MONITOR

GENERAL INFORMATION

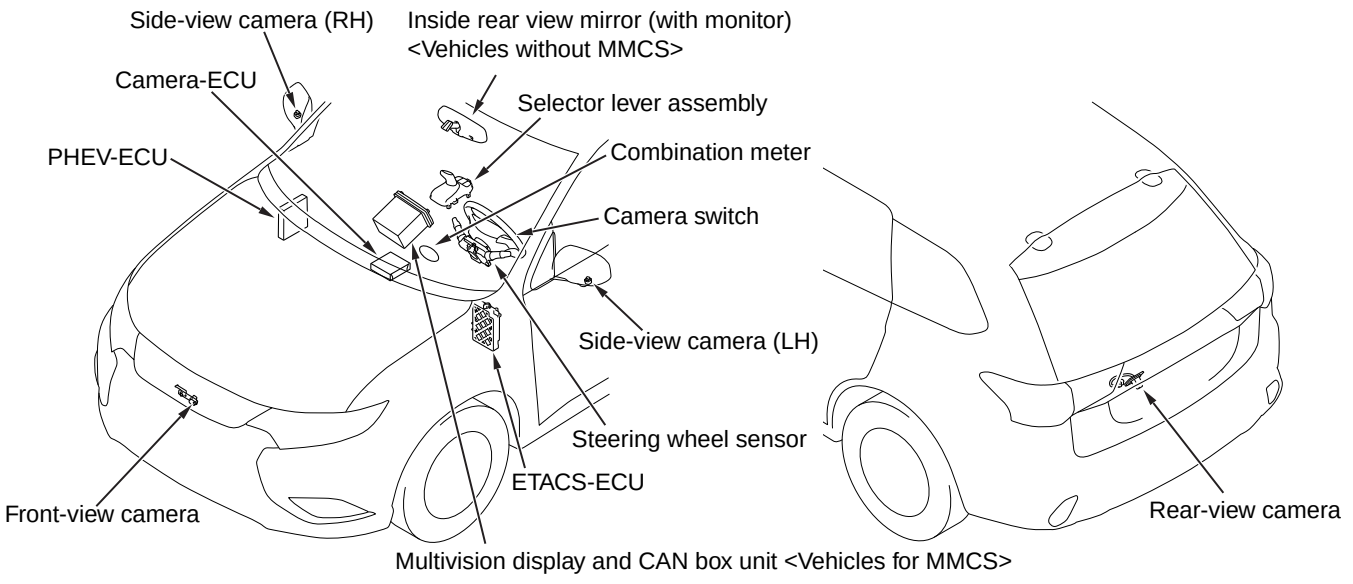
M1540905600658

⚠ CAUTION

- **The multi around monitor helps the driver recognise an obstacle. When you drive your vehicle, you must monitor the safety around your vehicle by yourself.**
- **The number of occupied passengers or the quantity of remaining fuel may affect the guide lines on the display. This may lead to dimensional deviations. Therefore, you should use this system as only a guide.**
- **The property of the camera lens (wide-angle lens) may cause the displayed image to be distorted or the displayed distances to deviate from the actual ones.**
- **The camera is a precision device. It should not be exposed to strong impact such as high-pressure car washes. A malfunction may result.**
- **To ensure the camera image is clearly visible, wipe the lens with a damped rag and then a dry rag to remove dust, rain drops or snow.**
- **Be careful not to damage the camera lens. Any damage may have an adverse effect on the screen image.**

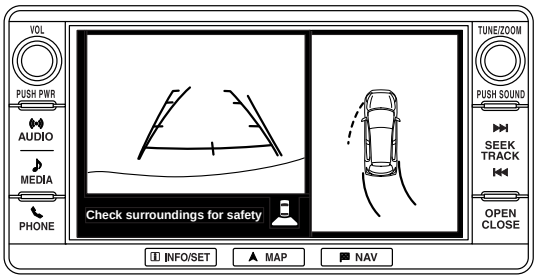
The multi around monitor system consists of four cameras; front, rear and right/left sides (on outside mirrors). By using these cameras, the system displays front, rear and side views as well as bird's eye-view (compound view) on the multivision display <vehicles with MMCS>, or the inside rear view mirror assembly (with integrated monitor) * <vehicles without MMCS> to help the driver monitor the safety around the vehicle.

*NOTE: *: The inside rear view mirror assembly (with integrated monitor) is also equipped with an automatic anti-dazzling function. For more information, refer to GROUP 52A – Inside Rear View Mirror.*



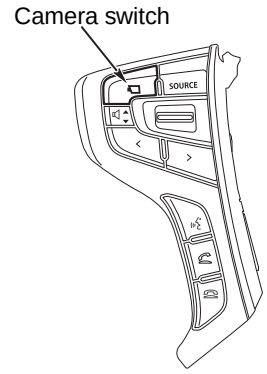
ACF00448AB

Multivision display <Vehicles with MMCS>



ACF00469

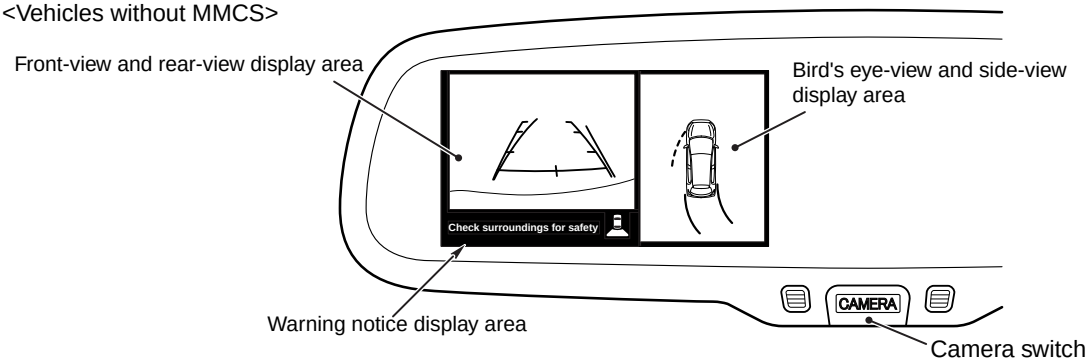
Steering audio remote control switch



ACE04335

ACF02574AB

Inside rear view mirror assembly
<Vehicles without MMCS>



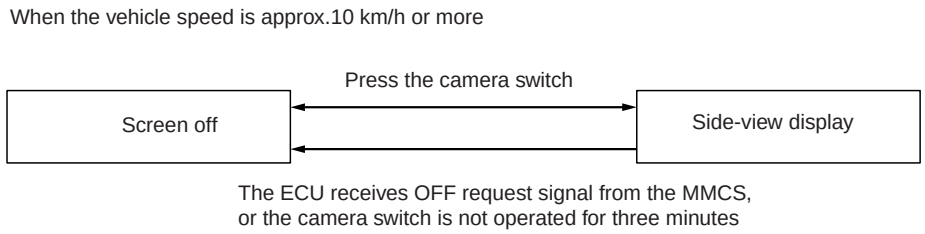
ACF00430AB

Parts name	Functional description
Front-view camera	Is supplied with power through the camera-ECU, and sends a camera image to it.
Rear-view camera	
Side-view camera (LH), (RH)	
Camera switch (integrated in the steering wheel audio remote control switch)	Sends a camera switch signal through the multivision display to the camera-ECU.
steering wheel sensor	Informs the ETACS-ECU of a steering wheel angle.
Camera-ECU	• Receives various signals from the ECUs via CAN. • Overlays a guide line on a camera image, and sends it to the multivision display <vehicles with MMCS>, the inside rear view mirror assembly (with integrated monitor) <vehicles without MMCS>. • Receives a camera switch signal from the MMCS <vehicles with MMCS> or inside rear view mirror assembly (with integrated monitor) <vehicles without MMCS> and switches the camera images.
Inside rear view mirror assembly (with integrated monitor)	• Incorporates a monitor at the left side, and displays a camera image on it by receiving a camera image signal from the camera-ECU. • Incorporates a camera switch and sends a camera switch signal to the camera-ECU by pressing the camera switch.

Parts name	Functional description
Multivision display, CAN box unit	• MMCS receives camera image output request signal from the camera-ECU through the CAN box unit. • MMCS receives camera image signal from the camera-ECU, and displays a camera image on the screen.
ETACS-ECU	Informs the camera-ECU of the electric motor switch status, the steering wheel angle, the selector lever position, the vehicle speed signal, the back-up lamp status and the vehicle condition.
PHEV-ECU	Informs the ETACS-ECU of the vehicle speed and the selector lever position.
ASC-ECU	Sends a vehicle speed signal to the PHEV-ECU.
Diagnosis connector	Is connected to M.U.T.-III to read the diagnosis code and service data associated with the camera-ECU.
Selector lever assembly	Informs the PHEV-ECU of the selector lever position.

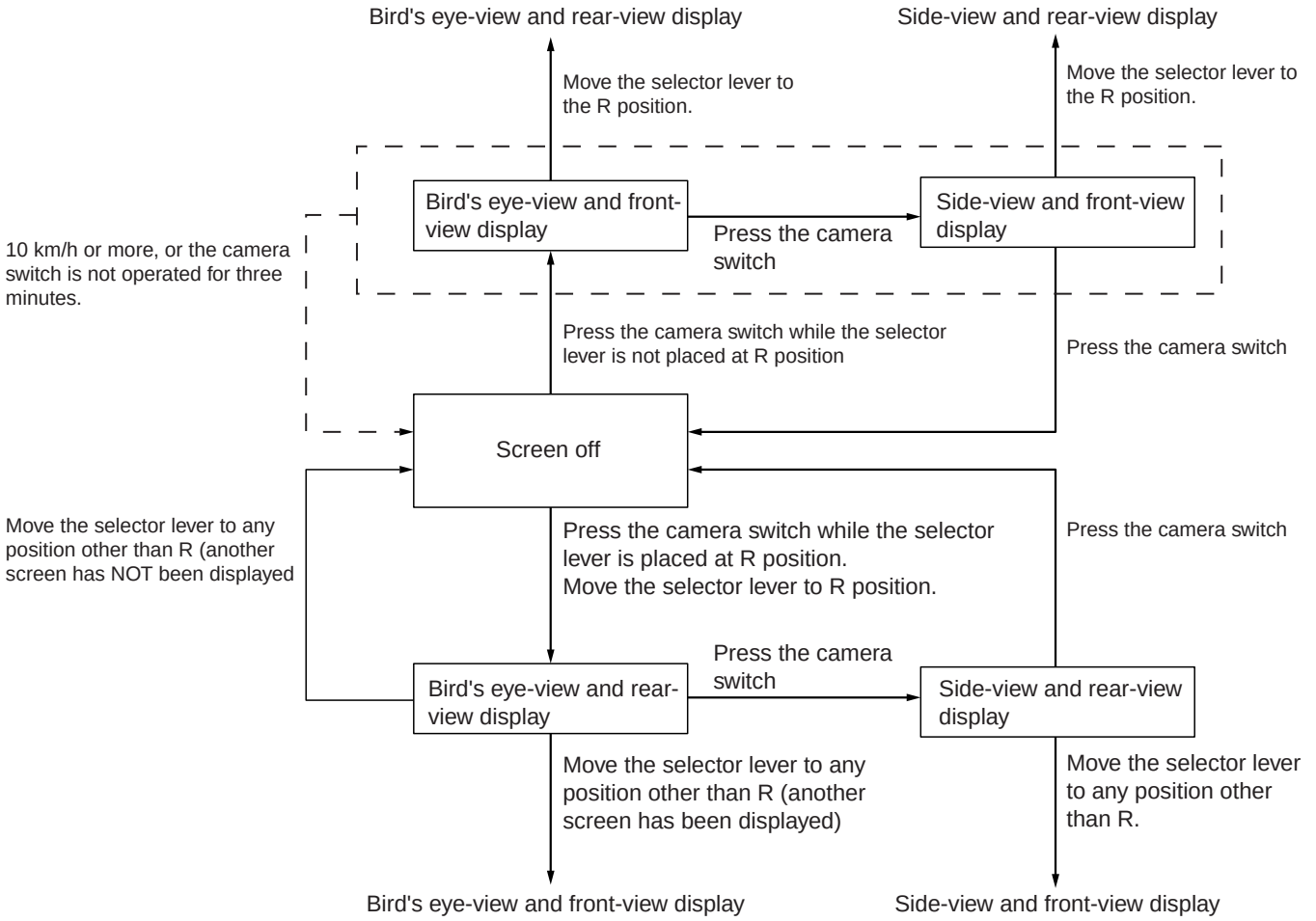
Screen transition

Screen transition will progress in accordance with the camera switch signal <Vehicles with MMCS>, which MMCS receives from the camera switch, your operation of the camera switch, which is integrated in the inside rear view mirror assembly <Vehicles without MMCS>, OFF request signal (by MMCS), the selector lever operation and vehicle speed signal as follows:



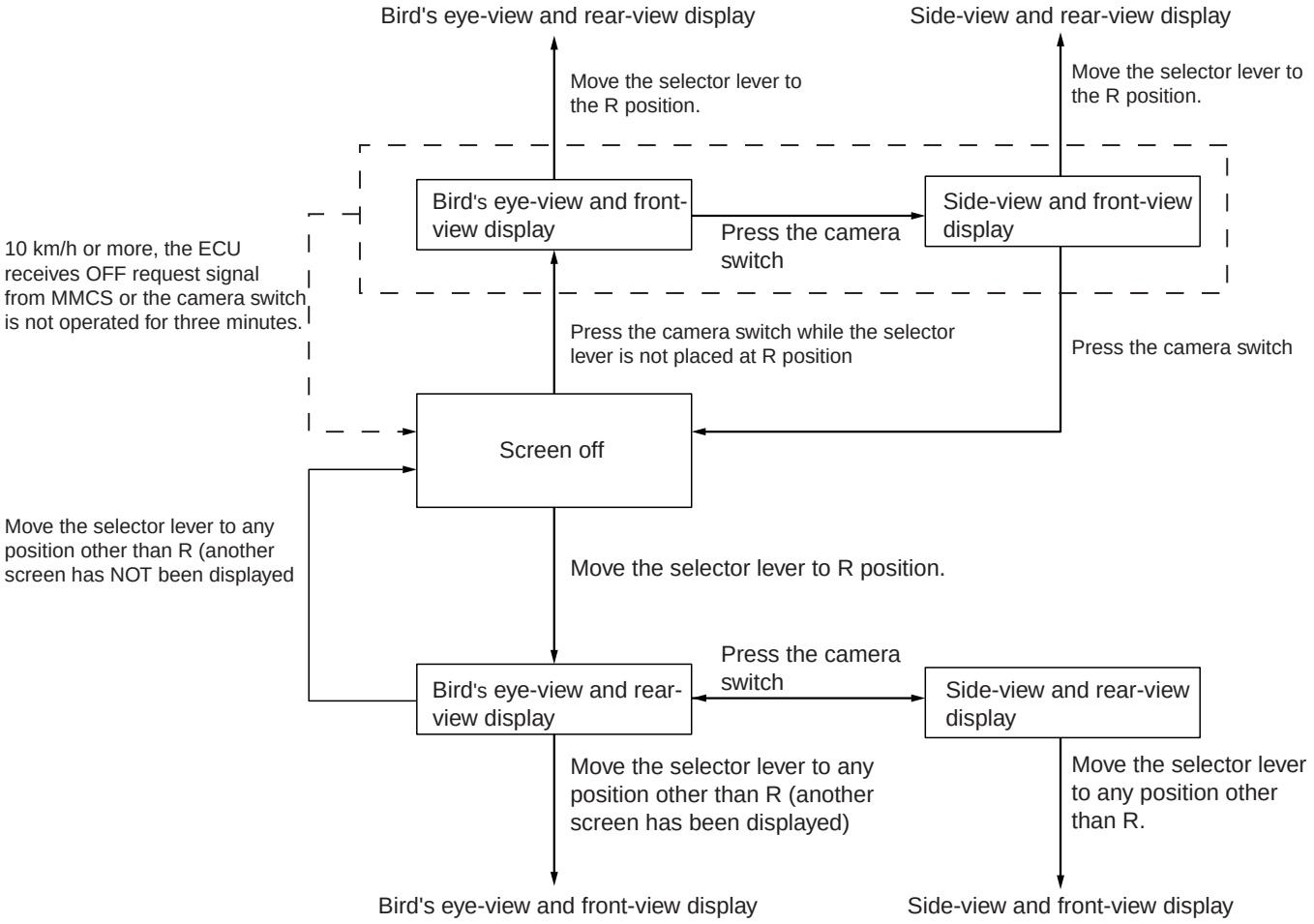
ACC07119AC

The vehicle speed is less than 10 km/h.
<Vehicles with inside rear view mirror assembly (with integrated monitor)>



ACC07120AF

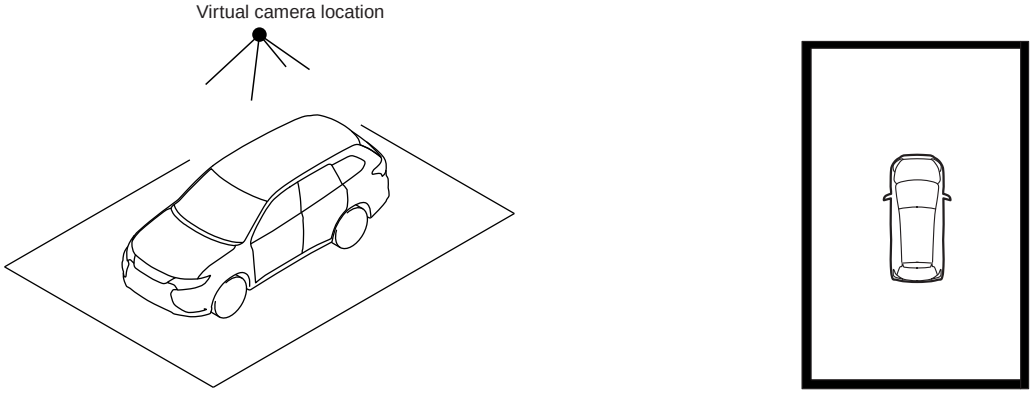
The vehicle speed is less than 10 km/h.
<Vehicles with MMCS>



ACF02645AC

Function

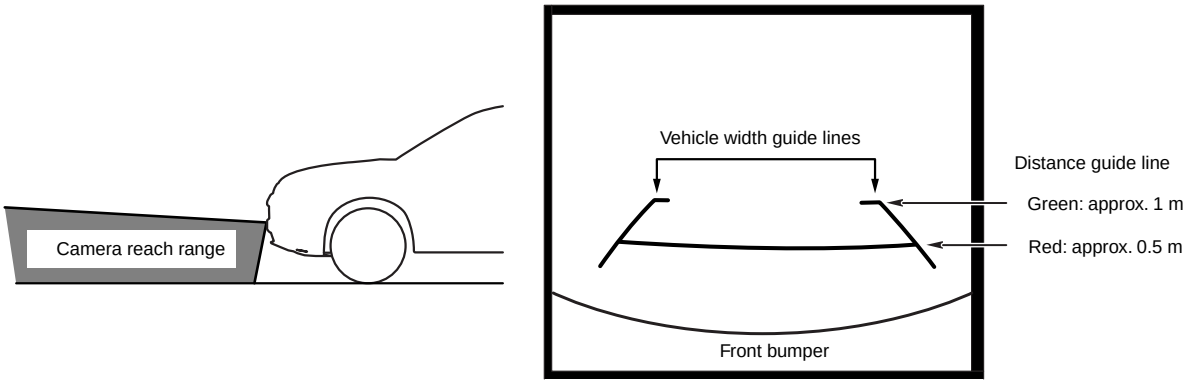
Bird's eye-view function



ACF00431AB

The camera-ECU processes four camera images and stitches them together to realise a bird’s eye-view.

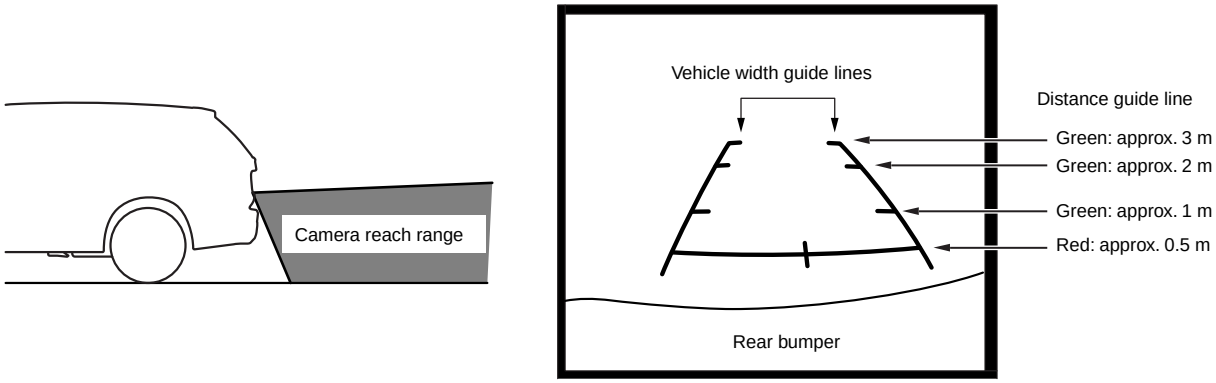
Front-view function



ACF00432AB

A vehicle width guide line and a distance guide line are overlaid on the front-view camera image.

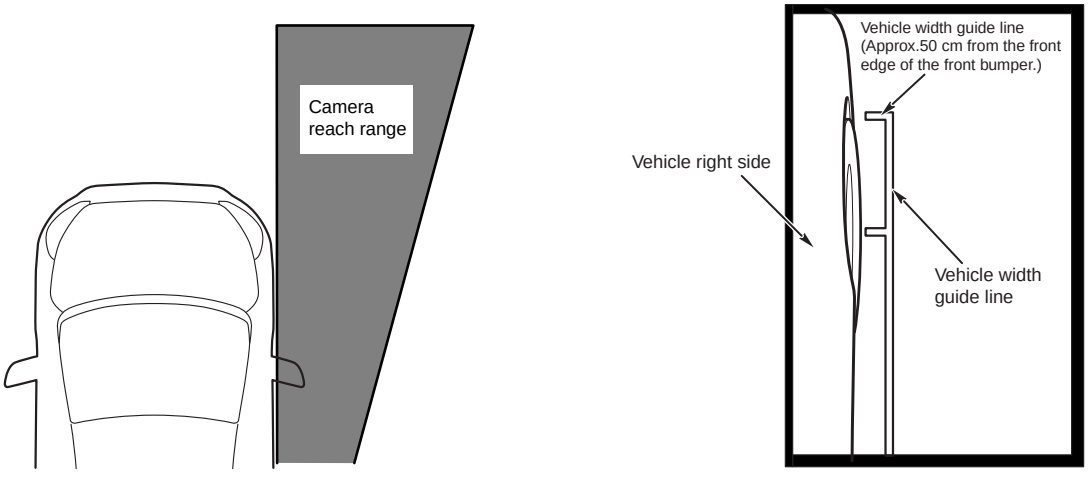
Rear-view function



ACF00433AB

A vehicle width guide line and a distance guide line are overlaid on the rear-view camera image.

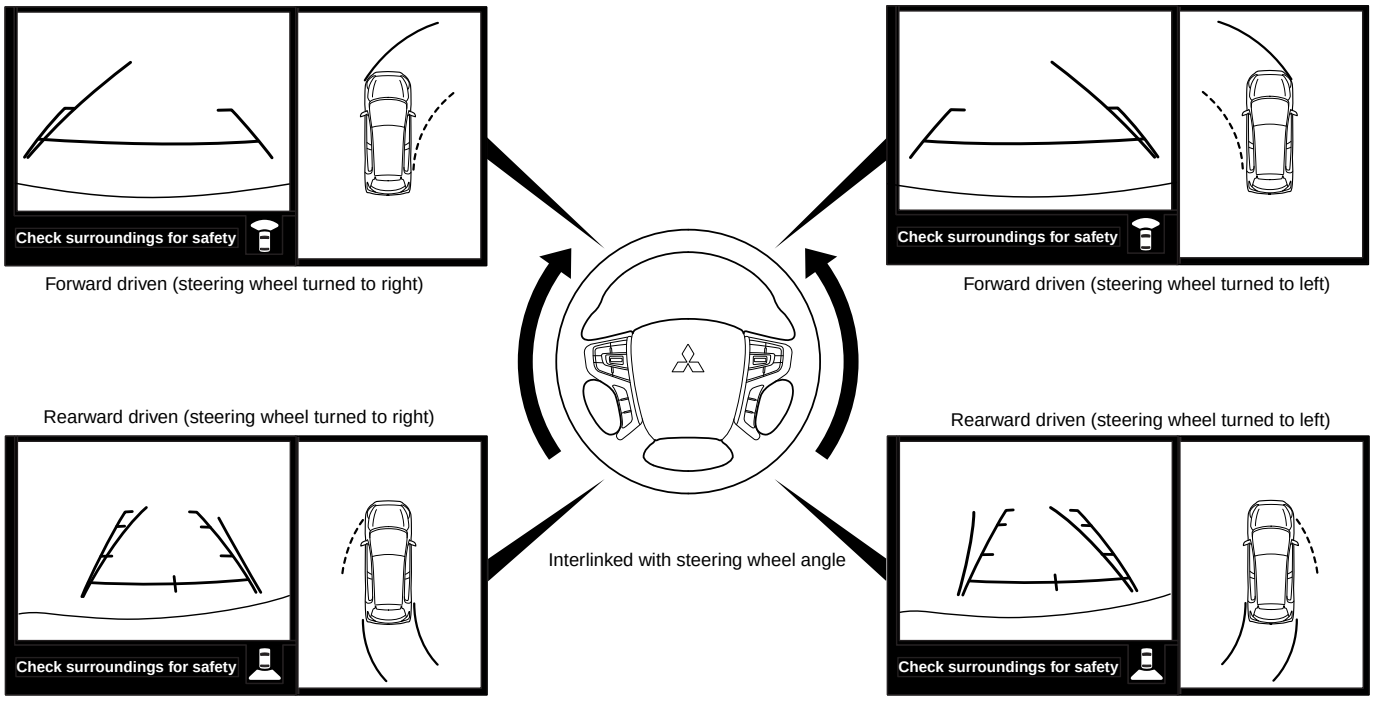
Side-view function



ACF02798AB

A vehicle width guide line are overlaid on the side-view camera (RH) image.

Expected driving path display function



ACF02616AB

Displays a driving path, which is expected in accordance with the steering wheel angle.

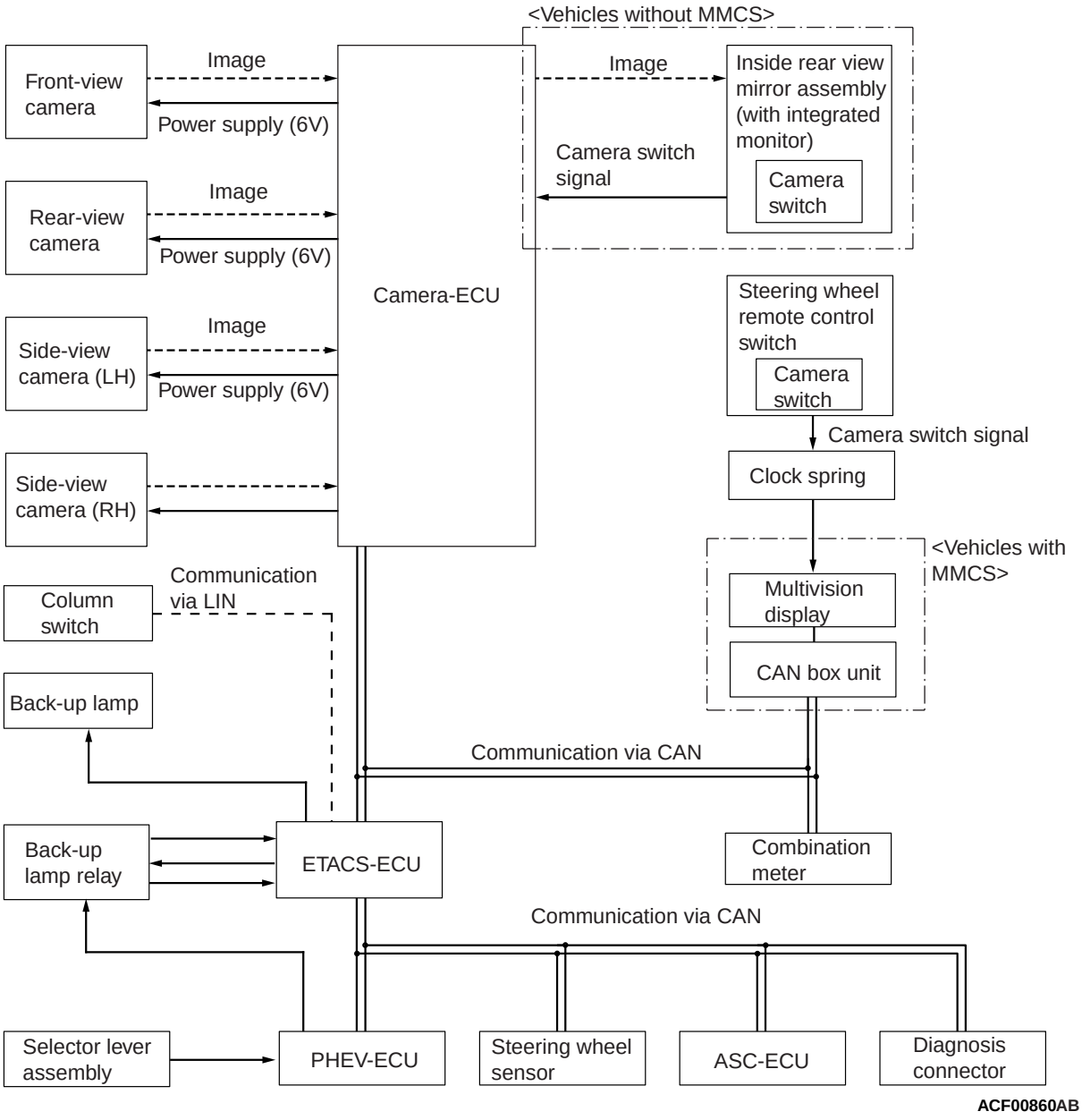
Language setting <Vehicles without MMCS>
Selects an interface language, which is displayed on the warning notice area, in accordance with a language selection signal sent by the combination meter.

Dimmer function <Vehicle without MMCS>
Reduces the brightness of vehicle icons or others not to interfere with the driver's vision at night (When the position lamps illuminate).

Fail-safe function

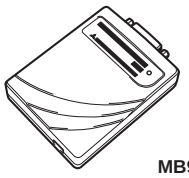
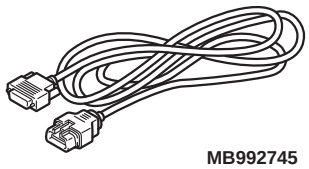
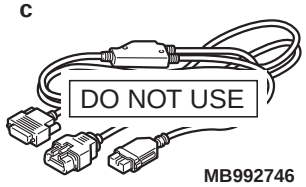
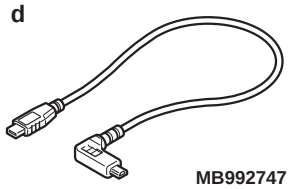
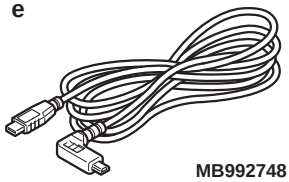
The camera-ECU always monitors its own status and the camera signals. If the ECU detects a failure, it will set a diagnosis code and display a message to alert the driver.

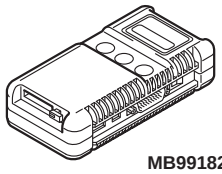
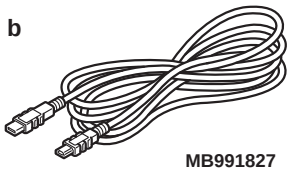
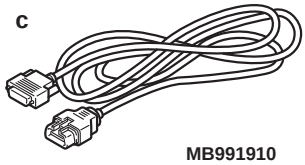
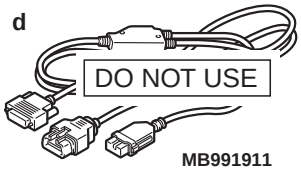
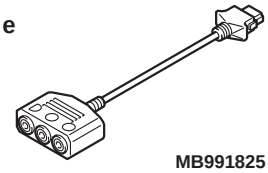
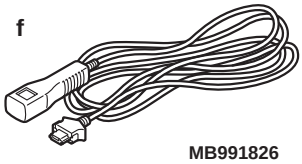
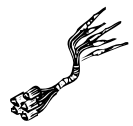
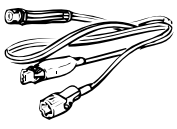
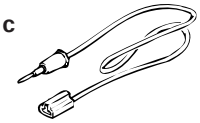
System configuration

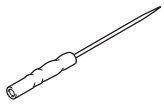


SPECIAL TOOLS

M1540902100319

Tool	Number	Name	Use
a  MB992744 b  MB992745 c  MB992746 d  MB992747 e  MB992748 ACB05421AB	a. MB992744 b. MB992745 c. MB992746 d. MB992747 e. MB992748	a. Vehicle communication interface-Lite (V.C.I.-Lite) b. V.C.I.-Lite main harness A (for vehicles with CAN communication) c. V.C.I.-Lite main harness B (for vehicles without CAN communication) d. V.C.I.-Lite USB cable short e. V.C.I.-Lite USB cable long	Camera-ECU check (diagnosis code display, service data display, actuator test or calibration by using the M.U.T.-III)

Tool	Number	Name	Use
a  MB991824 b  MB991827 c  MB991910 d  MB991911 e  MB991825 f  MB991826 MB991955	MB991955 a. MB991824 b. MB991827 c. MB991910 d. MB991911 e. MB991825 f. MB991826	M.U.T.-III sub-assembly a. Vehicle Communication Interface (V.C.I.) b. M.U.T.-III USB cable c. M.U.T.-III main harness A (Vehicles with CAN communication system) d. M.U.T.-III main harness B (Vehicles without CAN communication system) e. M.U.T.-III measure adapter f. M.U.T.-III trigger harness	⚠ CAUTION **For vehicles with CAN communication, use M.U.T.-III main harness A to send simulated vehicle speed. If you connect M.U.T.-III main harness B instead, the CAN communication does not function correctly.** Camera-ECU check (diagnosis code display, service data display, actuator test or calibration by using the M.U.T.-III)
a  b  c  d  MB991223	MB991223 a. MB991219 b. MB991220 c. MB991221 d. MB991222	Harness set a. Check harness b. LED harness c. LED harness adapter d. Probe	Continuity check and voltage measurement at harness wire or connector a. For checking connector pin contact pressure b. For checking power supply circuit c. For checking power supply circuit d. For connecting a locally sourced tester

Tool	Number	Name	Use
 MB992006	MB992006	Extra fine probe	Continuity check and voltage measurement at harness wire or connector
–	MB993003	Calibration marker	Camera calibration *NOTE: At least two calibration markers are required for calibration.*

TROUBLESHOOTING

STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

M1540902300368

Refer to GROUP 00 – Contents of troubleshooting.

DIAGNOSIS FUNCTION

M1540900500087

HOW TO READ DIAGNOSIS CODE

Refer to GROUP 00 – Diagnosis function.

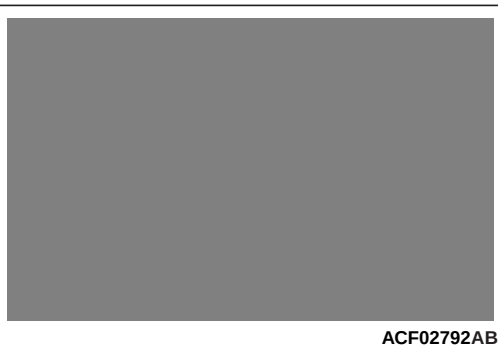
HOW TO ERASE DIAGNOSIS CODE

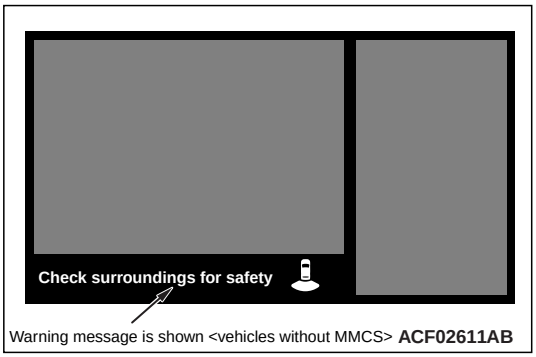
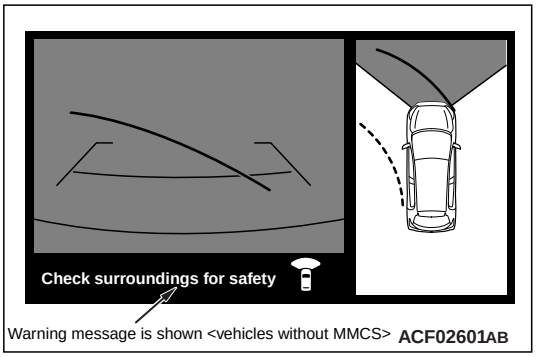
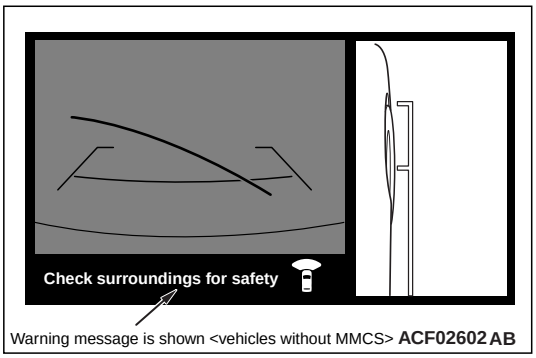
Refer to GROUP 00 – Diagnosis function.

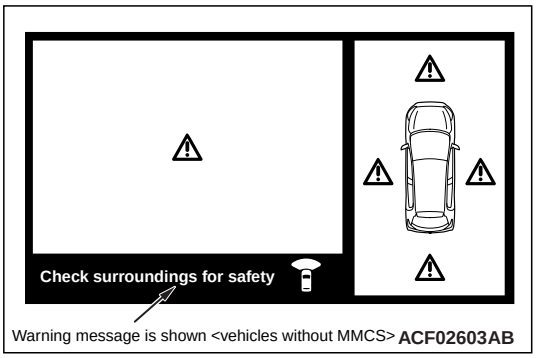
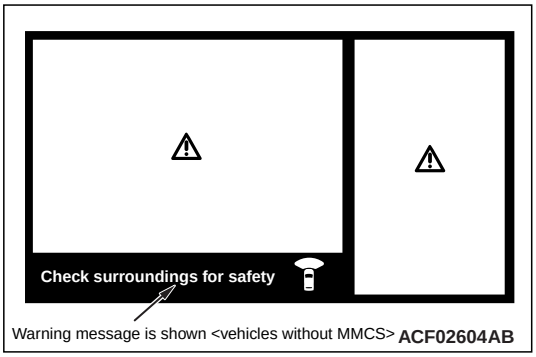
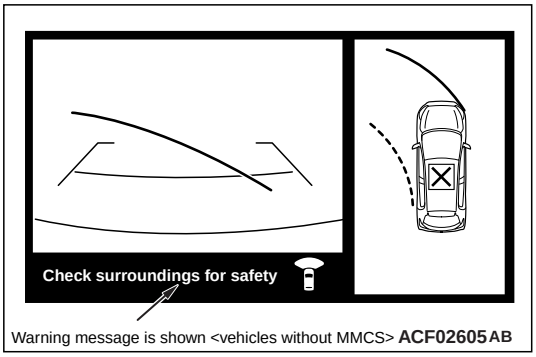
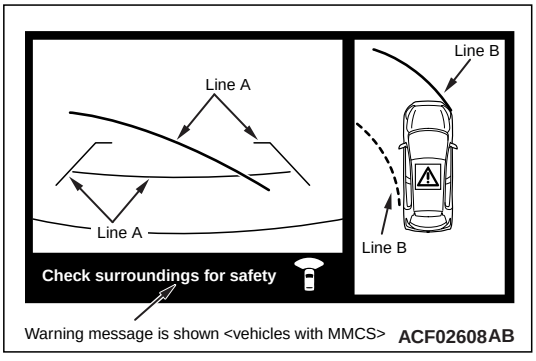
Error display function

M1540907300062

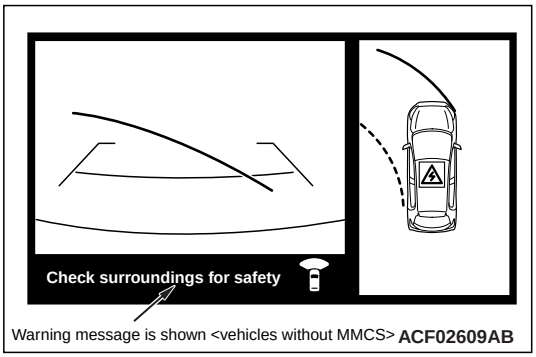
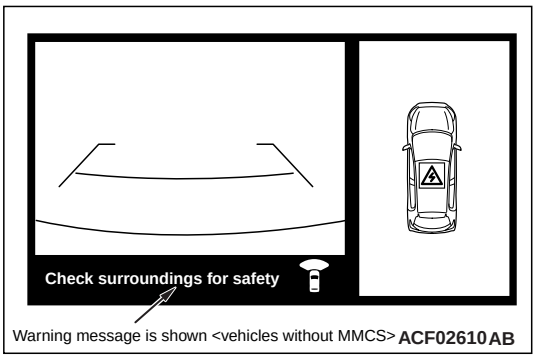
When the camera-ECU detects any error, a relevant message will be displayed on the monitor screen.

Fault type	Monitor screen	Causes
Entire screen is black	 ACC07819AB The entire screen is black.	The camera-ECU fails. (diagnosis code No.B2541, B2544 is set)
Entire screen is blue <vehicles without MMCS>	 ACF02792AB The entire screen is blue.	A blue screen may be caused by an external noise. When the inside rear view mirror receives an error signal, the entire monitor section will be displayed in blue, and then disappear in three seconds. If the mirror receives a normal signal again, the monitor section will be resumed.

Fault type	Monitor screen	Causes
Screen freeze	 Warning message is shown <vehicles without MMCS> **ACF02611AB** Entire camera image is grey.	Screen transition does not progress (diagnosis code No.B254E is set)
Interrupted screen	<Bird's eye-view and front-view>  Warning message is shown <vehicles without MMCS> **ACF02601AB** <Side-view and front-view>  Warning message is shown <vehicles without MMCS> **ACF02602AB** Some of the camera images (segments) are not displayed (partially blue).	Either of the cameras fails (diagnosis code No.B2501, B2503, B2546, B2547 or B254B is set). *NOTE: The left figure shows that the front camera fails.*

Fault type	Monitor screen	Causes
Not calibrated	<Bird's eye-view and front-view>  Warning message is shown <vehicles without MMCS> ACF02603AB <Side-view and front-view>  Warning message is shown <vehicles without MMCS> ACF02604AB "!" will be displayed on the camera image, which has not been calibrated yet.	Any of the cameras has not been calibrated yet. (diagnosis code No.B2542 or B2548 is set) *NOTE: "!" mark may be displayed due to an failure in ASIC external flashing even if diagnosis code No.B2542 or B2548 is not set. If the calibration has not bee completed successfully, replace the camera-ECU and calibrate it again.*
Replacement of the ECU	 Warning message is shown <vehicles without MMCS> ACF02605AB "x" mark is displayed on the vehicle icon.	The camera-ECU fails. (diagnosis code No.B2505, B2540, B2543 or B2544 is set)
Confirm how the data is configured	 Warning message is shown <vehicles with MMCS> ACF02608AB "!" mark is displayed on the vehicle icon.	The camera-ECU fails. (diagnosis code No.U1195, U1197 is set) *NOTE: When the vehicle information data is not registered in the camera-ECU (diagnosis code No.U1195 is set), neither the line A nor B is not displayed.*

Attached sheet 14

Fault type	Monitor screen	Causes
Error on CAN message	 Warning message is shown <vehicles without MMCS> ACF02609AB "Thunder" mark is displayed on the vehicle icon.	Any fault(s) other than the steering angle exist in the CAN communication. (diagnosis code No.U0100 is set)
	 Warning message is shown <vehicles without MMCS> ACF02610AB "Thunder" mark is displayed on the vehicle icon.	A fault on the steering angle information exists in the CAN communications. (diagnosis code No.B254A or U0126 is set)

DIAGNOSIS CODE CHART

M1540900400080

⚠ CAUTION

- **During troubleshooting, a diagnosis code associated with other systems may be set when the electric motor switch is turned ON with connector(s) disconnected. On the completion of trouble-shooting, confirm all systems for diagnosis code(s). If diagnosis code(s) are set, erase them all.**
- **When you replace the camera-ECU, you should teach the camera-ECU for the multi-around monitor by writing a learned value. On completion, you should check the camera image on the multi around monitor "Bird's eye-view." If necessary, calibrate the camera.**
- **When you remove/install or replace the camera, you should check the camera image on the multi around monitor "Bird's eye-view." ~~Always~~ calibrate the camera.**

<Incorrect> <Correct> If necessary, A

Diagnosis code No.	Diagnostic item	Reference page
B2501	Rear view camera fault	
B2503	Nose view camera fault	
B2505	ECU internal error (EEPROM) fault	
B2540	CPU fault	
B2541	ASIC fault	
B2542	SDRAM fault	
B2543	EEPROM fault at start up	
B2544	Flash ROM fault	

Diagnosis code No.	Diagnostic item	Reference page
B2546	LH side view CAMERA fault	
B2547	RH side view CAMERA fault	
B2548	Calibration not completed	
B254A	Steering angle sensor fault	
B254B	CAMERA output voltage fault	
B254E	Camera ECU output pictures fault	
B254F	IG status fault	
U0100*	PHEV-ECU CAN timeout	
U0141	ETACS CAN timeout	
U0155	Meter CAN timeout	
U0245	NAVI/DISP.AUDIO CAN timeout <vehicles with MMCS>	
U1195	Coding not completed	
U1197	Coding data unavailable	

NOTE: It is referred to as "U0100 Engine CAN time-out" on M.U.T.-III.

DIAGNOSIS CODE PROCEDURES

Code No.B2501 Rear view camera fault

TROUBLE JUDGEMENT
If signal from the rear-view camera cannot be received for 5 seconds or more, the camera-ECU sets diagnosis code No.B2501.

NOTE: When diagnosis code No.B2501 is set, the segment, which corresponds to a defective camera, is displayed in blue.

PROBABLE CAUSES
- Malfunction of rear-view camera
- Malfunction of camera-ECU
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. Check the wiring harness between rear-view camera connector and camera-ECU connector.
Check the following.
- Check of open circuit in ACCR line.
- Check of open circuit in GNDR line.
- Check of open or short circuit in VRV line.
- Check of open circuit in SVRV line.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the connector(s) or wiring harness.

STEP 2. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Go to Step 3.
NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

STEP 3. Check the rear-view camera.
Use an oscilloscope to check the output waveform of the rear-view camera.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Replace the rear-view camera.

STEP 4. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2503 Nose view camera fault

TROUBLE JUDGEMENT
If signal from the front-view camera cannot be received for 5 seconds or more, the camera-ECU sets diagnosis code No.B2503.

NOTE: When diagnosis code No.B2503 is set, the segment, which corresponds to a defective camera, is displayed in blue.

PROBABLE CAUSES
- Malfunction of front-view camera
- Malfunction of camera-ECU
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. Check the wiring harness between front-view camera connector and camera-ECU connector.
Check the following.
- Check of open circuit in ACCN line.
- Check of open circuit in GNDN line.
- Check of open or short circuit in VNV line.
- Check of open circuit in N-EX line.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the connector(s) or wiring harness.

STEP 2. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Go to Step 3.
NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

STEP 3. Check the front-view camera.
Use an oscilloscope to check the output waveform of the front-view camera.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Replace the front-view camera.

STEP 4. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2505 ECU internal error (EEPROM) fault

TROUBLE JUDGEMENT
When the camera-ECU detects the internal error (EEPROM), it sets diagnosis code No. B2505.

NOTE: "x" mark is displayed on the vehicle icon when diagnosis code No.B2505 is set.

PROBABLE CAUSES
- Malfunction of camera-ECU

DIAGNOSIS PROCEDURE

Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2540 CPU fault

TROUBLE JUDGEMENT
The camera-ECU detects the CPU fail, the camera-ECU sets diagnosis code No.B2540.

NOTE: "x" mark is displayed on the vehicle icon when diagnosis code No.B2540 is set.

PROBABLE CAUSES
- Malfunction of camera-ECU

DIAGNOSIS PROCEDURE

Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2541 ASIC fault

TROUBLE JUDGEMENT
When the camera-ECU detects the internal error (ASIC fail), it sets diagnosis code No.B2541.

NOTE: When diagnosis code No.B2541 is set, the entire monitor screen is displayed in black.

PROBABLE CAUSES
- Malfunction of camera-ECU

DIAGNOSIS PROCEDURE

Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2542 SDRAM fault

TROUBLE JUDGEMENT
When the camera-ECU detects the internal error (SDRAM fail), it sets diagnosis code No.B2542.

NOTE: "!" mark is displayed on the vehicle icon when diagnosis code No.B2542 is set.

PROBABLE CAUSES
- Failed calibration
- Malfunction of camera-ECU

DIAGNOSIS PROCEDURE

Check whether the diagnosis code is set again.
Calibrate the camera-ECU, and check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU, and then repeat the calibration.
NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2543 EEPROM fault at start up

TROUBLE JUDGEMENT
When the camera-ECU detects the internal error (EEPROM), it sets diagnosis code No. B2543.

NOTE: "x" mark is displayed on the vehicle icon when diagnosis code No.B2543 is set.

PROBABLE CAUSES
- Malfunction of camera-ECU

DIAGNOSIS PROCEDURE

Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2544 Flash ROM fault

TROUBLE JUDGEMENT
When the camera-ECU detects the internal error (Flash ROM), it sets diagnosis code No.B2544.

NOTE: When diagnosis code No.B2544 is set, the entire monitor screen is displayed in black. Alternatively, "x" mark is displayed on the vehicle icon.

PROBABLE CAUSES
- Malfunction of camera-ECU

DIAGNOSIS PROCEDURE

Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?

YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2546 LH side view CAMERA fault

TROUBLE JUDGEMENT

If signal from the side-view camera (LH) cannot be received for 5 seconds or more, the camera-ECU sets diagnosis code No.B2546.

NOTE: When diagnosis code No.B2546 is set, the segment, which corresponds to a defective camera, is displayed in blue.

PROBABLE CAUSES

- Malfunction of door mirror assembly (LH)
- Malfunction of camera-ECU
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. Check the wiring harness between side-view camera (LH) connector and camera-ECU connector.

Check the following.

- Check of open circuit in ACCS line.
- Check of open circuit in GNDS line.
- Check of open or short circuit in VSV line.
- Check of open circuit in S-EX line.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the connector(s) or wiring harness.

STEP 2. Check whether the diagnosis code is set again.

Check again if the diagnosis code is set in the camera-ECU.

(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?

YES : Go to Step 3.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

STEP 3. Check the side-view camera (LH).

Use an oscilloscope to check the output waveform of the side-view camera (LH).

Q: Is the check result normal?

YES : Go to Step 4.

NO : Replace the side-view camera (LH).

STEP 4. Check whether the diagnosis code is set again.

Check again if the diagnosis code is set in the camera-ECU.

(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?

YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2547 RH side view CAMERA fault

TROUBLE JUDGEMENT

If signal from the side-view camera (RH) cannot be received for 5 seconds or more, the camera-ECU sets diagnosis code No.B2547.

NOTE: When diagnosis code No.B2547 is set, the segment, which corresponds to a defective camera, is displayed in blue.

PROBABLE CAUSES

- Malfunction of side-view camera (RH)

- Malfunction of camera-ECU
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. Check the wiring harness between side-view camera (RH) connector and camera-ECU connector.
Check the following.
- Check of open circuit in ACCY line.
- Check of open circuit in GNDY line.
- Check of open or short circuit in VYV line.
- Check of open circuit in Y-EX line.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the connector(s) or wiring harness.

STEP 2. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Go to Step 3.
NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

STEP 3. Check the side-view camera (RH).
Use an oscilloscope to check the output waveform of the side-view camera (RH).

Q: Is the check result normal?
YES : Go to Step 4.
NO : Replace the side-view camera (RH).

STEP 4. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.
NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B2548 Calibration not completed

TROUBLE JUDGEMENT
When the camera-ECU has not been calibrated, diagnosis code No.B2548 will be set.

NOTE:
- *"!" mark is displayed against the camera, which has not been calibrated yet, when diagnosis code No.B2548 is set.*
- *Diagnosis code No.B2548 will be erased automatically after learned values are written to the camera-ECU successfully or a relevant camera has been calibrated.*

PROBABLE CAUSES
- The camera-ECU not calibrated
- Malfunction of camera-ECU

DIAGNOSIS PROCEDURE

Check whether the diagnosis code is set again.
Calibrate the camera-ECU, and check again if the diagnosis code is set in the camera-ECU.
(1) Calibrate the camera-ECU.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Repeat the calibration.
NO : The procedure is complete.

Code No.B254A Steering angle sensor fault

TROUBLE JUDGEMENT
When the camera-ECU receives any of the following unfeasible values from the steering wheel sensor, diagnosis code No.B254A will be set:
- The steering wheel sensor cannot recognise any steering wheel angle for at least 2.5 seconds.
- The ECU receives the signal, which informs of an internal malfunction or incomplete initialisation, from the steering wheel sensor for at least 2.5 seconds.

NOTE: "thunder" mark is displayed on the vehicle icon when diagnosis code No.B254A is set.

PROBABLE CAUSES
- Malfunction of steering wheel sensor (column switch assembly)
- The steering wheel sensor has not learned the neutral point of the steering wheel.
- Malfunction of camera-ECU
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus lines. (Refer to GROUP 54C – Troubleshooting).

STEP 2. Check the steering wheel sensor.
Calibrate the steering wheel sensor (teach-in a neutral position). (Refer to GROUP 35C – Steering wheel sensor calibration.)

Q: Has the calibration been completed successfully?
YES : Go to Step 3.
NO : Replace the steering wheel sensor (column switch assembly).

STEP 3. M.U.T.-III data list.
Using the camera-ECU service data, check the steering wheel status.

Item No.	M.U.T.-III display	Check condition	Normal condition
7	Steering wheel angle	Vehicle stopped (the steering wheel is in the neutral position)	-6 to 6 °
		Running	Nearly the same as the steering wheel operation angle <-720 to 720 deg>

Q: Is the check result normal?
YES : Go to Step 4.
NO : Replace the steering wheel sensor (column switch assembly). Then go to Step 4 .

STEP 4. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.
NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B254B CAMERA output voltage fault

TROUBLE JUDGEMENT
When the camera-ECU detects any of the conditions below, the ECU sets diagnosis code No. B254B.
- Power supply voltage to a camera remains 5.2 V or less for at least 5 seconds.
- Power supply voltage to a camera remains 7 V or more for at least 5 seconds.

NOTE: When diagnosis code No.B254B is set, the segment, which corresponds to a defective camera, is displayed in blue.

PROBABLE CAUSES
- Malfunction of front-view camera
- Malfunction of rear-view camera
- Malfunction of side-view camera (LH)
- Malfunction of side-view camera (RH)

- Malfunction of camera-ECU
- Damaged harness wires and connectors (power supply lines to a camera short to power supply or earth)

DIAGNOSIS PROCEDURE

STEP 1. Voltage measurement at camera connectors (ACCN, ACCR, ACCS and ACCY terminals)

(1) Disconnect the all camera connectors, and measure at the wiring harness side.
(2) Turn on the power supply mode, and then check the power supply lines to a relevant camera.
  a. Check the voltage between the front-view camera connector (ACCN terminal) and body earth.
    OK: 5.5 - 6.5 V
  b. Check the voltage between the rear-view camera connector (ACCR terminal) and body earth.
    OK: 5.5 - 6.5 V
  c. Check the voltage between the side-view camera (LH) connector (ACCS terminal) and body earth.
    OK: 5.5 - 6.5 V
  d. Check the voltage between the side-view camera (RH) connector (ACCY terminal) and body earth.
    OK: 5.5 - 6.5 V

Q: Is the check result normal?
YES : Go to Step 3.
NO : Go to Step 2.

STEP 2. Check of short to earth circuit in ACCN, ACCR, ACCS and ACCY lines between camera connectors and camera-ECU connector.

(1) Disconnect the all camera connectors and camera-ECU connector, and measure at the wiring harness side.
  a. Measure the resistance between the front-view camera connector (ACCN terminal) and body earth.
    OK: No continuity
  b. Measure the resistance between the front-view camera connector (ACCN terminal) and camera-ECU connector (except ACCN terminal).
    OK: No continuity
  c. Measure the resistance between the rear-view camera connector (ACCR terminal) and body earth.
    OK: No continuity
  d. Measure the resistance between the rear-view camera connector (ACCR terminal) and camera-ECU connector (except ACCR terminal).
    OK: No continuity
  e. Measure the resistance between the side-view camera (LH) connector (ACCS terminal) and body earth.
    OK: No continuity
  f. Measure the resistance between the side-view camera (LH) connector (ACCS terminal) and camera-ECU connector (except ACCS terminal).
    OK: No continuity
  g. Measure the resistance between the side-view camera (RH) connector (ACCY terminal) and body earth.
    OK: No continuity
  h. Measure the resistance between the side-view camera (RH) connector (ACCY terminal) and camera-ECU connector (except ACCY terminal).
    OK: No continuity

Q: Is the check result normal?
YES : Replace the camera-ECU.

NO : Repair the connector(s) or wiring harness.

STEP 3. Voltage measure at camera-ECU connector (ACCN, ACCR, ACCS and ACCY terminals)

(1) Connect camera connectors one after the other, and then measure at the power supply terminal of the corresponding camera-ECU connector by backprobing.
(2) Turn on the power supply mode.
(3) Connect the front-view camera connector.
(4) Check the voltage between camera-ECU connector (ACCN terminal) and body earth.
  OK: 5.5 - 6.5 V
(5) Connect the rear-view camera connector.
(6) Check the voltage between camera-ECU connector (ACCR terminal) and body earth.
  OK: 5.5 - 6.5 V
(7) Connect the side-view camera (LH) connector.
(8) Check the voltage between camera-ECU

connector (ACCS terminal) and body earth.

OK: 5.5 - 6.5 V

(9) Connect the side-view camera (RH) connector.
(10)Check the voltage between camera-ECU connector (ACCY terminal) and body earth.

OK: 5.5 - 6.5 V

Q: Is the check result normal?
YES : Go to Step 4.
NO : Replace the failure camera.

STEP 4 Diagnosis code recheck
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The procedure is complete.

Code No.B254E Camera ECU output pictures fault

TROUBLE JUDGEMENT
When the camera-ECU detects an unfeasible image signal for 5 seconds, diagnosis code No.B254E will be set.

PROBABLE CAUSES
- Malfunction of camera-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check the multivision display operation.
Check if the multivision display normally and the sound is output.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Troubleshoot the MMCS.

STEP 2. Check of short to power supply, short to earth, and open circuit in VOUT line between camera-ECU connector and multivision display connector.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the connector(s) or wiring harness.

STEP 3. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.B254F IG status fault

TROUBLE JUDGEMENT
When the camera-ECU does not receive any electric motor switch status signals from the ETACS-ECU for 5 seconds, diagnosis code No.B254F will be set.

PROBABLE CAUSES
- Malfunction of ETACS-ECU
- Malfunction of camera-ECU
- Malfunction of CAN bus

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. Diagnosis code recheck.
Check if diagnosis code No.U0141 is set.

Q: Is the diagnosis code set?
YES : Troubleshoot the diagnosis code No.U0141.

NO : Go to Step 3.

STEP 3. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).

Code No.U0100 PHEV-ECU CAN timeout

⚠ CAUTION
- **If diagnosis code No.U0100 is set, be sure to diagnose the CAN bus line.**
- **Whenever the ECU is replaced, ensure that the input and output signal circuits are normal.**

TROUBLE JUDGEMENT
If signal from the PHEV-ECU cannot be received for 2500 milliseconds or more, the camera-ECU sets diagnosis code No.U0100.

NOTE: "Thunder" mark is displayed on the vehicle icon when diagnosis code No.U0100 is set.

PROBABLE CAUSES
- Malfunction of PHEV-ECU
- Malfunction of ETACS-ECU
- Malfunction of camera-ECU
- Malfunction of CAN bus

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting) and then go to Step 5.

STEP 2. M.U.T.-III diagnosis code
Check if diagnosis code No.U0141 is set in the camera-ECU.

Q: Is the diagnosis code set?
YES : Troubleshoot the diagnosis code No.U0141.

NO : Go to Step 3.

STEP 3. M.U.T.-III other system diagnosis code
Check if diagnosis code No.U0100 is set in the ASC-ECU.

Q: Is the diagnosis code set?
YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Diagnosis code recheck
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the PHEV-ECU. (Refer to GROUP 54D – PHEV-ECU.)
NO : A poor connection, open circuit, or other intermittent malfunction in the CAN bus line between the camera-ECU and the PHEV-ECU. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction.)

STEP 5. Diagnosis code recheck
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?

YES : Replace the camera-ECU.

NO : A poor connection, open circuit, or other intermittent malfunction in the CAN bus line between the camera-ECU and the PHEV-ECU. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction.)

Code No.U0141 ETACS CAN timeout

⚠ CAUTION
- **If diagnosis code No.U0141 is set, be sure to diagnose the CAN bus line.**
- **Whenever the ECU is replaced, ensure that the input and output signal circuits are normal.**

TROUBLE JUDGEMENT
If signal from the ETACS-ECU cannot be received for 2500 milliseconds or more, the camera-ECU sets diagnosis code No.U0141.

PROBABLE CAUSES
- Malfunction of ETACS-ECU
- Malfunction of camera-ECU
- Malfunction of CAN bus

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting) and then go to Step 4.

STEP 2. M.U.T.-III other system diagnosis code
Check if diagnosis code No.U0141 is set in the combination meter.

Q: Is the diagnosis code set?
YES : Go to Step 3.
NO : Go to Step 4.

STEP 3. Diagnosis code recheck
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the ETACS-ECU.
NO : A poor connection, open circuit, or other intermittent malfunction in the CAN bus line between the camera-ECU and the ETACS-ECU. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction.)

STEP 4. Diagnosis code recheck
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : A poor connection, open circuit, or other intermittent malfunction in the CAN bus line between the camera-ECU and the ETACS-ECU. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction.)

Code No.U0155 Meter CAN timeout

⚠ CAUTION
- **If diagnosis code No.U0155 is set, be sure to diagnose the CAN bus line.**
- **Whenever the ECU is replaced, ensure that the input and output signal circuits are normal.**

TROUBLE JUDGEMENT
If signal from the combination meter cannot be received for 2500 milliseconds or more, the camera-ECU sets diagnosis code No.U0155.

PROBABLE CAUSES
- Malfunction of combination meter
- Malfunction of camera-ECU
- Malfunction of CAN bus

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting) and then go to Step 4.

STEP 2. M.U.T.-III other system diagnosis code
Check if diagnosis code No.U0155 is set in the KOS-ECU.

Q: Is the diagnosis code set?
YES : Go to Step 3.
NO : Go to Step 4.

STEP 3. Diagnosis code recheck
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the combination meter.
NO : A poor connection, open circuit, or other intermittent malfunction in the CAN bus line between the camera-ECU and the combination meter. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction.)

STEP 4. Diagnosis code recheck
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : A poor connection, open circuit, or other intermittent malfunction in the CAN bus line between the camera-ECU and the combination meter. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction.)

Code No.U0245 NAVI/DISP.AUDIO CAN timeout <vehicles with MMCS>

⚠ CAUTION
- **If diagnosis code No.U0245 is set, be sure to diagnose the CAN bus line.**
- **Whenever the ECU is replaced, ensure that the input and output signal circuits are normal.**

TROUBLE JUDGEMENT
If signal from the CAN box unit (MMCS) cannot be received for 2500 milliseconds or more, the camera-ECU sets diagnosis code No.U0245.

PROBABLE CAUSES
- Malfunction of CAN box unit (MMCS)
- Malfunction of camera-ECU
- Malfunction of CAN bus

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting) and then go to Step 4.

STEP 2. M.U.T.-III other system diagnosis code
Check if diagnosis code No.U0245 is set in the combination meter.

Q: Is the diagnosis code set?
YES : Go to Step 3.
NO : Go to Step 4.

STEP 3. Diagnosis code recheck
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the CAN box unit (MMCS).
NO : A poor connection, open circuit, or other intermittent malfunction in the CAN bus line between the camera-ECU and the CAN box unit (MMCS). (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction.)

STEP 4. Diagnosis code recheck
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : A poor connection, open circuit, or other intermittent malfunction in the CAN bus line between the camera-ECU and the CAN box unit (MMCS). (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction.)

Code No.U1195 Coding not completed

⚠ CAUTION
If diagnosis code No.U1195 is set, be sure to diagnose the CAN bus line.

TROUBLE JUDGEMENT
If the vehicle information data is not registered to the camera-ECU, the camera-ECU sets diagnosis code No.U1195.

NOTE: "!" mark is displayed on the vehicle icon when diagnosis code No.U1195 is set.

PROBABLE CAUSES
- Variant coding not performed
- Malfunction of ETACS-ECU
- Malfunction of camera-ECU
- Malfunction of CAN bus

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics.
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. M.U.T.-III other system diagnosis code.
Check if diagnosis code is set in the ETACS-ECU.

Q: Is the diagnosis code set?
YES : Diagnose the ETACS.
NO : Go to Step 3.

STEP 3. Diagnosis code recheck.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?

YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).

Code No.U1197 Coding data unavailable

⚠ CAUTION
If diagnosis code No.U1197 is set, be sure to diagnose the CAN bus line.

TROUBLE JUDGEMENT
This diagnosis code will be set when the variant coding for the ETACS-ECU has not been implemented.

NOTE: "!" mark is displayed on the vehicle icon when diagnosis code No.U1197 is set.

PROBABLE CAUSES
- Variant coding not performed
- Malfunction of ETACS-ECU
- Malfunction of camera-ECU
- Malfunction of CAN bus

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics.
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. M.U.T.-III other system diagnosis code.
Check if diagnosis code is set in the ETACS-ECU.

Q: Is the diagnosis code set?
YES : Diagnose the ETACS.
NO : Go to Step 3.

STEP 3. ETACS-ECU coding data check.
Using M.U.T.-III, check if any abnormality is present to the coding data which are stored in the ETACS-ECU.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Replace the ETACS-ECU.

STEP 4. Diagnosis code recheck.
Check again if the diagnosis code is set in the camera-ECU.
(1) Erase the diagnosis code.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check if the diagnosis code is set.

Q: Is the diagnosis code set?
YES : Replace the camera-ECU.

NO : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunction).

DATA LIST REFERENCE TABLE

M1540901400102

Item No.	M.U.T.-III display	Check condition	Normal condition
1	Shift information	Selector lever: except R position	Not R
		Selector lever: R position	R
2	Steering angle information	A steering wheel angle signal is not received.	Disable
		A steering wheel angle signal is received.	Enable
3	Position lamp information	Column switch (lighting switch): except TAIL	OFF
		Column switch (lighting switch): TAIL	ON
4	Vehicle speed information	Vehicle stopped	Disable
		Running	Enable

Item No.	M.U.T.-III display	Check condition	Normal condition
5	Camera switch	Camera switch: OFF	OFF
		Camera switch: ON	ON
6*	Camera off request	–	OFF
		–	ON
7	Steering wheel angle	Vehicle stopped (the steering wheel is in the neutral position)	-6 to 6 °
		Running	Nearly the same as the steering wheel operation angle <-720 to 720 deg>
8	Picture input signal (Front)	Front-view camera signal is normal	Normal
		Front-view camera signal is abnormal	Abnormal
9	Picture input signal (Rear)	Rear-view camera signal is normal	Normal
		Rear-view camera signal is abnormal	Abnormal
10	Picture input signal (Left side)	Side-view camera (LH) signal is normal	Normal
		Side-view camera (LH) signal is abnormal	Abnormal
11	Picture input signal (Right side)	Side-view camera (RH) signal is normal	Normal
		Side-view camera (RH) signal is abnormal	Abnormal

*NOTE: *: are displayed, but not used for service and maintenance.*

ACTUATOR TEST TABLE

M1540901500079

Item No.	M.U.T.-III display	Driven component
1	Display output	Switches the images on the monitor forcibly.

SPECIAL FUNCTION

M1540910500066

Initialisation

Item No.	M.U.T.-III display	Contents
1	Calibration data initialisation	For calibrating a camera. For how to calibrate a camera. (for factory setting)

Calibration

Item No.	M.U.T.-III display	Contents
1	Front camera	For calibrating a camera. For how to calibrate a camera.
2	Rear camera	
3	Left side camera	
4	Right side camera	

Write learned value(Changed ECU)

M.U.T.-III display	Contents
Learned value Read&save	For calibrating a camera. For how to calibrate a camera.
Saved learned value writing	

TROUBLE SYMPTOM CHART

M1540900300812

⚠ CAUTION

- **When you replace the camera-ECU, you should teach the camera-ECU for the multi-around monitor by writing a learned value. On completion, you should check the camera image on the multi around monitor "Bird's eye-view." If necessary, calibrate the camera.**
- **When you remove/install or replace the camera, you should check the camera image on the multi around monitor "Bird's eye-view." ~~Always~~ If necessary, calibrate the camera.**

<Incorrect> <Correct>

Trouble symptom	Inspection Procedure No.	Reference page
Check the camera-ECU power supply circuit.	1	
No image is displayed.	2	
Any of the camera images is blue.	3	
The image is not switched when the selector lever is moved to the R position.	4	
A screen is not switched when the vehicle speed reaches a predetermined value.	5	
A camera image is displayed when the selector lever is moved to the R position, but it is not switched when the camera switch is pressed.	6	

SYMPTOM PROCEDURES

Inspection Procedure 1: Check the camera-ECU power supply circuit.

COMMENT ON TROUBLE SYMPTOM
If the multiaround monitor do not work at all, the power supply circuit or camera-ECU may have a problem.

PROBABLE CAUSES
- Malfunction of camera-ECU
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. Resistance measurement at camera-ECU connector (GND terminal).
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the camera-ECU connector (GND terminal) and body earth.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the earth circuit.

STEP 2. Voltage measurement at camera-ECU connector (+B terminal)
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Check the voltage between the camera-ECU connector (+B terminal) and body earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 4.
NO : Go to Step 3.

STEP 3. Check of short to power supply, short to earth, and open circuit in +B line between camera-ECU connector and fusible link.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).
NO : Repair the connector(s) or wiring harness.

STEP 4. Retest the system.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).
NO : Replace the camera-ECU.

Inspection Procedure 2: No image is displayed.

COMMENT ON TROUBLE SYMPTOM
When no image is displayed, the camera-ECU, the multivision display <with MMCS>, the power supply to inside rear view mirror assembly (with integrated monitor) <vehicles without MMCS> or the inside rear view mirror assembly (with integrated monitor) <vehicles without MMCS> may be defective.

PROBABLE CAUSES
- Malfunction of camera-ECU
- Malfunction of multivision display <vehicles with MMCS>
- Malfunction of inside rear view mirror assembly (with integrated monitor) <vehicles without MMCS>
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code
Check if diagnosis code is set in the camera-ECU.

Q: Is the diagnosis code set?
YES : Diagnose the camera-ECU.

NO : Go to Step 2.

STEP 2. Camera image check.
1. Turn the ignition switch from "LOCK" (OFF) position to "ON" position.
2. Move the selector lever to the "R" (reverse) position.
3. Check that camera image is switched.

Q: Is the check result normal?
YES : Troubleshoot the ignition switch. Refer to Inspection Procedure 6 "A camera image is displayed when the selector lever is moved to the R position, but it is not switched when the camera switch is pressed.".
NO <vehicles with MMCS> : Go to Step 3.
NO <vehicles without MMCS> : Go to Step 6.

STEP 3. Check the multivision display operation.
Check if the multivision display normally and the sound is output.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Troubleshoot the multivision display.

STEP 4. Check of open circuit in VOUT and SOUT lines between multivision display connector and camera-ECU connector.

Q: Is the check result normal?
YES : Go to Step 5.
NO : Repair the connector(s) or wiring harness.

STEP 5. Retest the system.

Q: Is the check result normal?
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00 / How to Cope with Intermittent Malfunction).
NO : Replace the multivision display.

STEP 6. Check the inside rear view mirror assembly (with integrated monitor).
(1) Turn the electric motor switch from the "OFF" position to the "ON" position.
(2) Check that the indicator of the inside rear view mirror assembly (with integrated monitor) illuminates.

Q: Is the check result normal?
YES : Go to Step 11.
NO : Go to Step 7.

STEP 7. Resistance measurement at the inside rear view mirror assembly (with integrated monitor) connector (E terminal).
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the inside rear view mirror assembly (with integrated monitor)

connector (E terminal) and the body earth.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?
YES : Go to Step 9.
NO : Go to Step 8.

STEP 8. Check of open circuit in E line between inside rear view mirror assembly (with integrated monitor) connector and body earth.

Q: Is the check result normal?
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00 / How to Cope with Intermittent Malfunction).
NO : Repair the connector(s) or wiring harness.

STEP 9. Voltage measurement at the inside rear view mirror assembly (with integrated monitor) connector (ACC+ terminal).

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the electric motor switch from the "OFF" position to the "ON" position.
(3) Check the voltage between the inside rear view mirror assembly (with integrated monitor) connector (ACC+ terminal) and body earth.

OK: System voltage

Q: Is the check result normal?
YES : Replace the inside rear view mirror assembly (with integrated monitor) (Refer to GROUP 52A – Inside Rear View Mirror).
NO : Go to Step 10.

STEP 10. Check of short to power supply, short to earth, and open circuit in ACC+ line between the inside rear view mirror assembly (with integrated monitor) connector and ETACS-ECU connector.

Q: Is the check result normal?
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00 / How to Cope with Intermittent Malfunction).
NO : Repair the connector(s) or wiring harness.

STEP 11. Voltage measurement at the inside rear view mirror assembly (with integrated monitor) connector (C-ON terminal).

(1) Disconnect the inside rear view mirror assembly (with integrated monitor) connector, and measure at the wiring harness side.
(2) Execute the actuator test. <When the camera image is displayed>
- Item No.1: Select "Display output".

(3) Check the voltage between the inside rear view mirror assembly (with integrated monitor) connector (C-ON terminal) and body earth.

OK: 4.0 V – 6.2 V

(4) Execute the actuator test. <When the camera image is not displayed>
- Item No.1: Select "Display output".

(5) Check the voltage between the inside rear view mirror assembly (with integrated monitor) connector (C-ON terminal) and body earth.

OK: 4.0 V or less

Q: Is the check result normal?
YES : Go to Step 13.
NO : Go to Step 12.

STEP 12. Check of open circuit in C-ON line between inside rear view mirror assembly (with integrated monitor) connector and camera-ECU connector.

Q: Is the check result normal?
YES : Replace the camera-ECU.

NO : Repair the connector(s) or wiring harness.

STEP 13. Check of open circuit in VOUT and SOUT lines between inside rear view mirror assembly (with integrated monitor) connector and camera-ECU connector.

Q: Is the check result normal?
YES : Go to Step 14.
NO : Repair the connector(s) or wiring harness.

STEP 14. Retest the system.

Q: Is the check result normal?
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00 / How to Cope with Intermittent Malfunction).
NO : Replace the inside rear view mirror assembly (with integrated monitor) (Refer to GROUP 52A – Inside Rear View Mirror).

Inspection Procedure 3: Any of the camera images is blue.

COMMENT ON TROUBLE SYMPTOM
If any of the cameras does not send an image input signal to the camera-ECU, the relevant segment will be blue in the camera image screen. In addition, if any image input signal fails in the camera-ECU, a diagnosis code will be set.

PROBABLE CAUSES
- Malfunction of any camera
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code
Check if diagnosis code is set in the camera-ECU.

Q: Is the diagnosis code set?
YES : Diagnose the camera-ECU.

NO : Go to Step 2.

STEP 2. Check of open circuit in VNV, VRV, VSV or VYV line between camera connector and camera-ECU connector.
Check the signal wires to a defective camera.
- Check of open circuit in VNV line between front-view camera connector and camera-ECU connector.
- Check of open circuit in VRV line between rear-view camera connector and camera-ECU connector.
- Check of open circuit in VSV line between side-view camera (LH) connector and camera-ECU connector.
- Check of open circuit in VYV line between side-view camera (RH) connector and camera-ECU connector.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the connector(s) or wiring harness.

STEP 3. Retest the system.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).
NO : Replace the failure camera.

Inspection Procedure 4: The image is not switched when the selector lever is moved to the R position.

COMMENT ON TROUBLE SYMPTOM
When the monitor screen is not switched although the selector lever is moved to the "R" position, the selector lever signal system may be defective.

PROBABLE CAUSES
- Malfunction of camera-ECU
- Malfunction of CAN bus
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. Check the operation of the back-up lamp.
Check that the back-up lamp illuminate normally.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Troubleshoot the back-up lamp.

STEP 3. M.U.T.-III data list.
Using the camera-ECU service data.
- Electric motor switch: ON position
- Operate the selector lever.

Item No.	M.U.T.-III display	Check condition	Normal condition
1	Shift information	Selector lever: except R position	Not R
		Selector lever: R position	R

Q: Is the check result normal?
YES : Go to Step 5.
NO : Go to Step 4.

STEP 4. M.U.T.-III other system diagnosis code
Check whether the PHEV-ECU diagnosis codes are set or not.

Q: Is the diagnosis code set?
YES : Diagnose the PHEV-ECU.
NO : Go to Step 5.

STEP 5. Retest the system.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).
NO : Replace the camera-ECU.

Inspection Procedure 5: A screen is not switched when the vehicle speed reaches a predetermined value.

COMMENT ON TROUBLE SYMPTOM
The camera-ECU switches the monitor screen according to a vehicle speed signal. If it is not switched, the vehicle speed signal system may be defective.

PROBABLE CAUSES
- Malfunction of camera-ECU
- Malfunction of CAN bus
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. M.U.T.-III data list.
Using the camera-ECU service data.
- Perform a test run of the vehicle.

Item No.	M.U.T.-III display	Check condition	Normal condition
4	Vehicle speed information	Running	Enable

Q: Is the check result normal?
YES : Go to Step 4.
NO : Go to Step 3.

STEP 3. M.U.T.-III other system diagnosis code
Check if a vehicle speed signal-related diagnosis code is set in the PHEV-ECU.

Q: Is the diagnosis code set?
YES : Diagnose the PHEV-ECU.
NO : Go to Step 4.

STEP 4. Retest the system.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).
NO : Replace the camera-ECU.

Inspection Procedure 6: A camera image is displayed when the selector lever is moved to the R position, but it is not switched when the camera switch is pressed.

COMMENT ON TROUBLE SYMPTOM
A camera image is displayed when the selector lever is moved to the R position, but it is not switched when the camera switch is pressed. In this case, the camera input signal system may be defective.

PROBABLE CAUSES
- Malfunction of camera-ECU
- Malfunction of camera switch (steering wheel remote control switch) <vehicles with MMCS>
- Malfunction of inside rear view mirror assembly (with integrated monitor) (malfunction of camera switch) <vehicles without MMCS>
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III data list.
Using the camera-ECU service data.
- Operate the camera switch.

Item No.	M.U.T.-III display	Check condition	Normal condition
5	Camera switch	Camera switch: OFF	OFF
		Camera switch: ON	ON

Q: Is the check result normal?
YES : Go to Step 7.
NO <vehicles with MMCS> : Go to Step 2.
NO <vehicles without MMCS> : Go to Step 5.

STEP 2. Check the operation of the audio remote control switch.
Check that the audio remote control switch operation normally.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Troubleshoot the audio remote control switch.

STEP 3. Check of short to power supply, short to earth, and open circuit in REM+, REM- line between multivision display connector and steering wheel remote control switch connector.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the connector(s) or wiring harness.

STEP 4. Check the camera switch (steering wheel remote control switch).
Check the camera switch.

Q: Is the check result normal?
YES : Replace the multivision display.
NO : Replace the steering wheel remote control switch.

STEP 5. Check of open circuit in CMSW lines between inside rear view mirror assembly (with integrated monitor) connector and camera-ECU connector.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the connector(s) or wiring harness.

STEP 6. Retest the system.
Check that the multi around monitor operates normally.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).
NO : Replace the inside rear view mirror assembly (with integrated monitor).

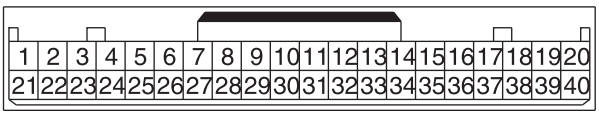
STEP 7. Retest the system.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction).
NO : Replace the camera-ECU.

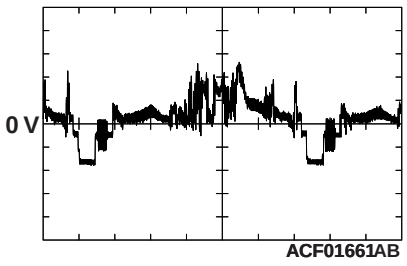
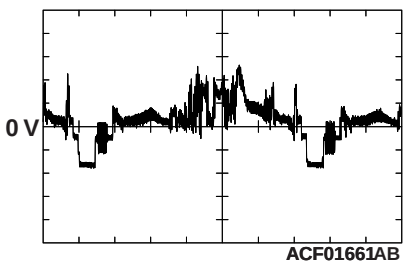
CHECK AT CAMERA-ECU TERMINAL

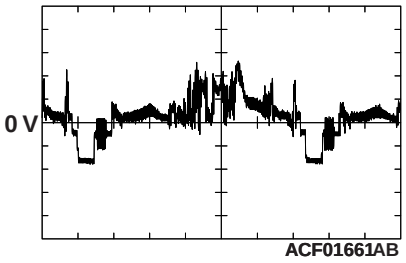
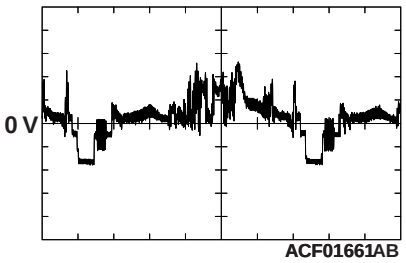
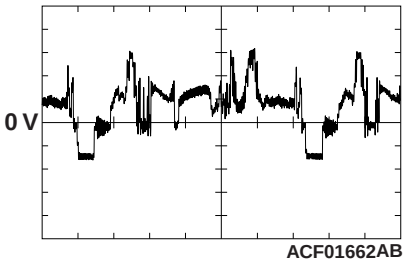
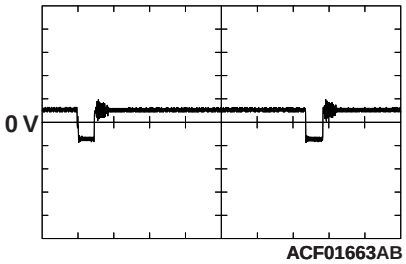
M1540901700095

C-249



ACF02513AB

Terminal No.	Terminal code	Check item	Check condition	Normal condition
1	CANH	CAN-C Hi	–	–
2	–	–	–	–
3	C-ON	Image output request	• Power supply mode: ON • When the camera image is displayed	4.0 – 6.2 V
			• Power supply mode: ON • When the camera image is not displayed	4.0 V or less
4	–	–	–	–
5	VSV	Side-view camera (LH) image input	Power supply mode: ON	Monitor a waveform with an oscilloscope.  ACF01661AB (DIV: 200 mV/10 microseconds)
6	S-EX	Earth for side-view camera (LH) image	Power supply mode: ON	0.5 V or less
7	VRV	Rear-view camera image input	Power supply mode: ON	Monitor a waveform with an oscilloscope.  ACF01661AB (DIV: 200 mV/10 microseconds)
8	SVRV	Earth for rear-view camera image	Power supply mode: ON	0.5 V or less

Terminal No.	Terminal code	Check item	Check condition	Normal condition
9	VNV	Front-view camera image input	Power supply mode: ON	Monitor a waveform with an oscilloscope.  (DIV: 200 mV/10 microseconds)
10	Y-EX	Earth for side-view camera (RH) image	Power supply mode: ON	0.5 V or less
11	VYV	Side-view camera (RH) image input	Power supply mode: ON	Monitor a waveform with an oscilloscope.  (DIV: 200 mV/10 microseconds)
12, 13	–	–	–	–
14	VOUT	Camera image output	A camera image is displayed on the MMCS or the inside rear view mirror assembly (with integrated monitor).	Monitor a waveform with an oscilloscope.  (DIV: 200 mV/10 microseconds)
			A camera image is NOT displayed on the MMCS or the inside rear view mirror assembly (with integrated monitor).	Monitor a waveform with an oscilloscope.  (DIV: 200 mV/10 microseconds)

Terminal No.	Terminal code	Check item	Check condition	Normal condition
15	ACCS	Power supply to side-view camera (LH)	Power supply mode: ON	5.5 – 6.5 V
16	ACCR	Power supply to rear-view camera	Power supply mode: ON	5.5 – 6.5 V
17	ACCN	Power supply to front-view camera	Power supply mode: ON	5.5 – 6.5 V
18	ACCY	Power supply to side-view camera (RH)	Power supply mode: ON	5.5 – 6.5 V
19	–	–	–	–
20	+B	Power supply to camera-ECU	Power supply mode: ON	System voltage
21	CANL	CAN-C Lo	–	–
22, 23	–	–	–	–
24	CMSW	Input from camera switch	• Power supply mode: ON • Camera switch: ON	2.0 V or less
			• Power supply mode: ON • Camera switch: OFF	4.5 V or more
25 – 28	–	–	–	–
29	N-EX	Earth for front-view camera image	Power supply mode: ON	0.5 V or less
30 – 33	–	–	–	–
34	SOUT	Earth for camera image output	Power supply mode: ON	0.5 V or less
35	GNDS	Earth for side-view camera (LH)	Power supply mode: ON	0.5 V or less
36	GNDR	Earth for rear-view camera	Power supply mode: ON	0.5 V or less
37	GNDN	Earth for front-view camera	Power supply mode: ON	0.5 V or less
38	GNDY	Earth for side-view camera (RH)	Power supply mode: ON	0.5 V or less
39	–	–	–	–
40	GND	GND	Power supply mode: ON	0.5 V or less

ON-VEHICLE SERVICE

<Correct>
Calibration

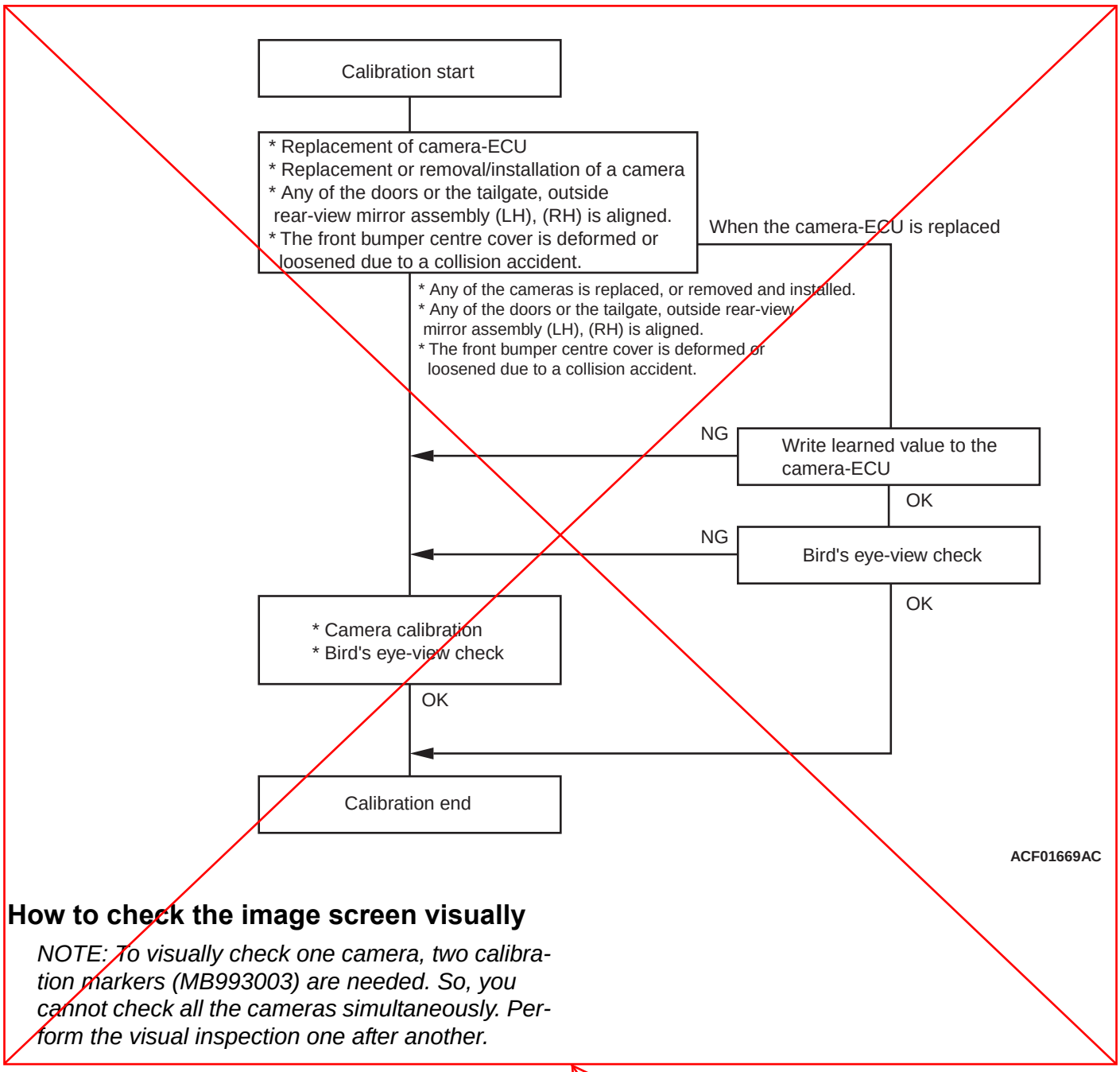
A <Incorrect>
~~**Camera calibration**~~

A <Deleted>

M1540909900059

Calibrate ~~the camera-ECU~~ according to the procedure below after the following operation is performed:

- Replacement of the camera-ECU
- The front bumper centre cover is deformed or loosened due to a collision accident.
- Removal and installation/replacement of a camera
- Any of the door or the tailgate, Outside rear-view mirror assembly (LH), (RH) is aligned.



How to check the image screen visually

NOTE: To visually check one camera, two calibration markers (MB993003) are needed. So, you cannot check all the cameras simultaneously. Perform the visual inspection one after another.

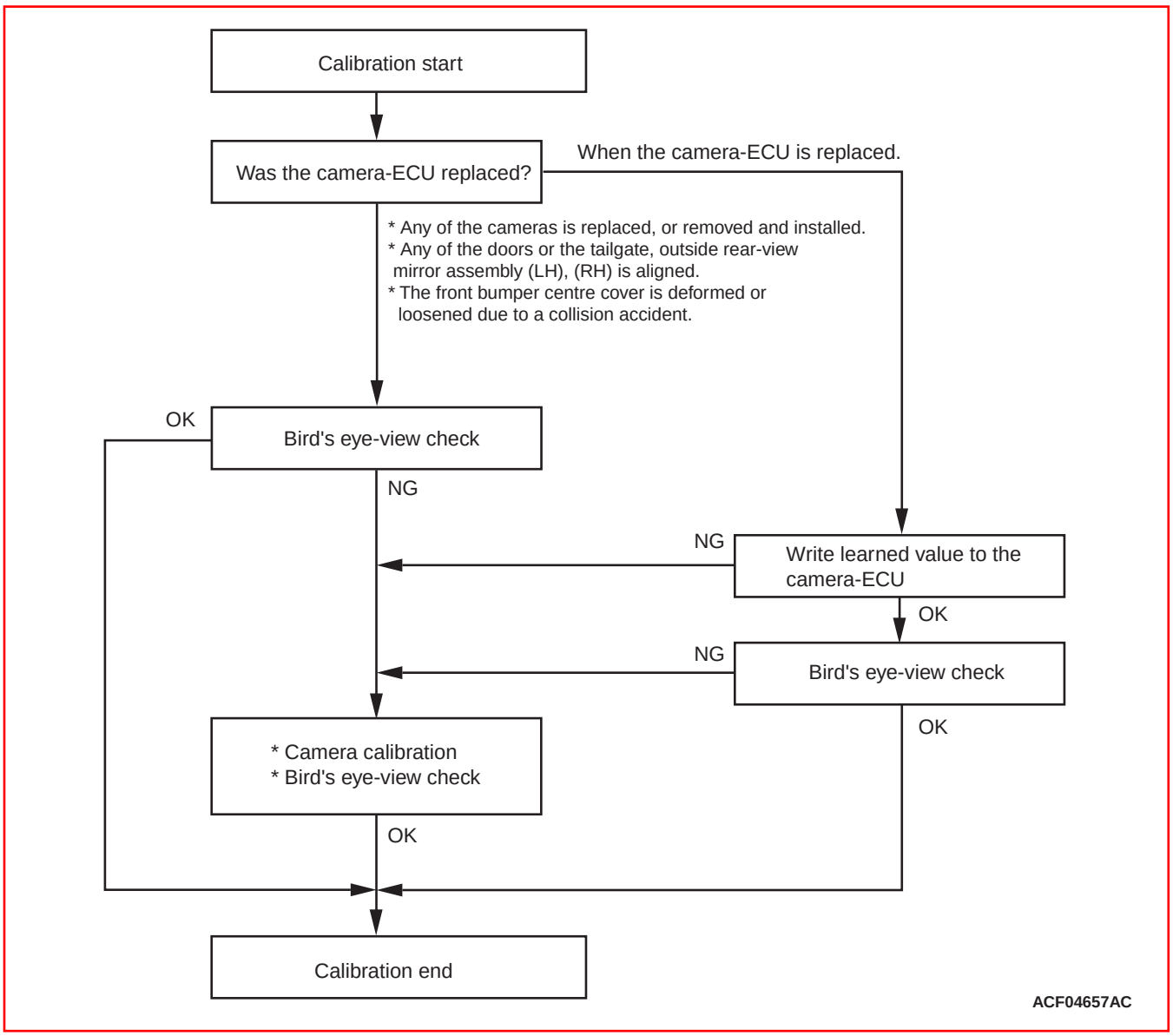
<Old>

Insert the attached sheet 39 (2/2)

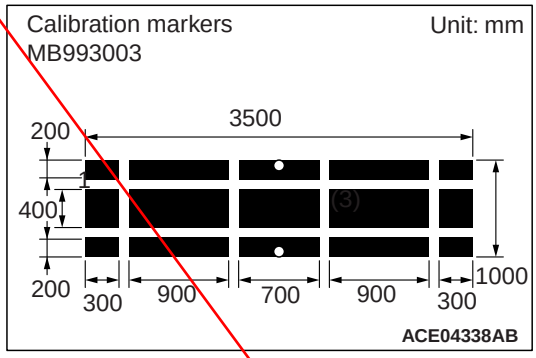
A <New>

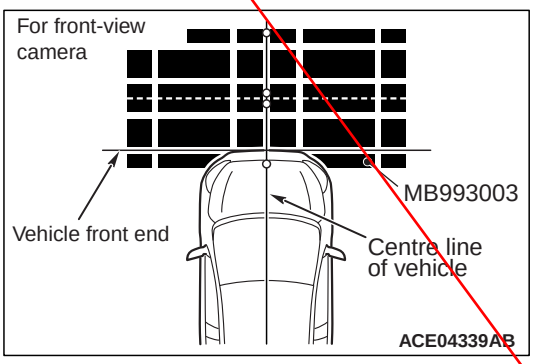
<New>

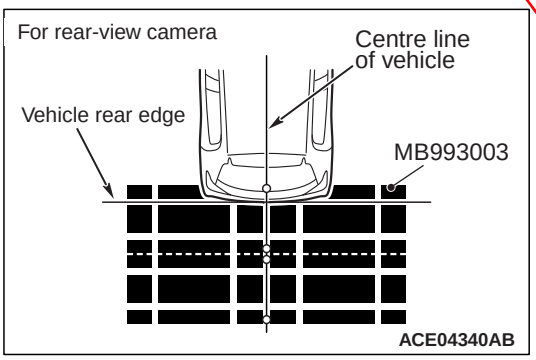
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Attached sheet 39 (2/2)

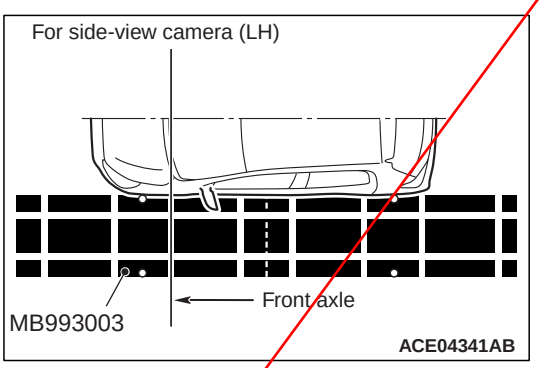


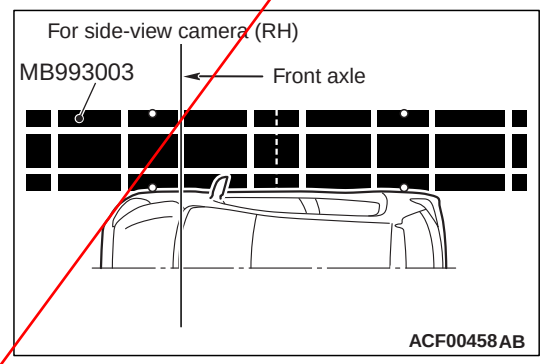
CHASSIS ELECTRICAL
MULTI AROUND MONITOR



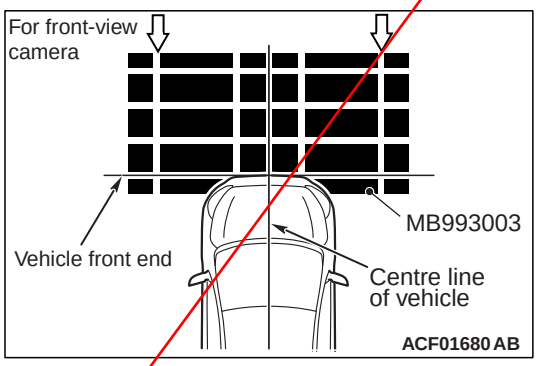


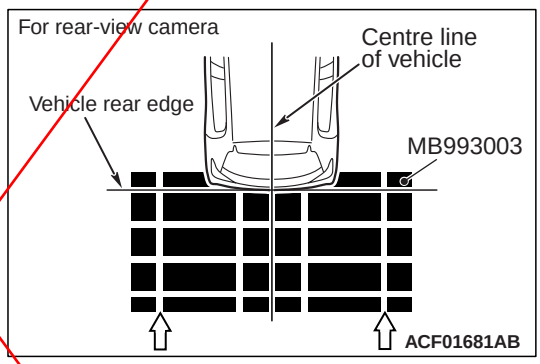


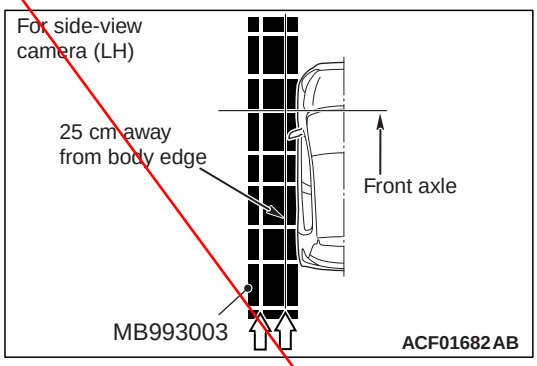


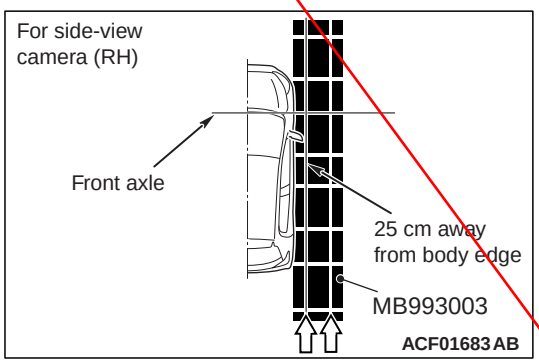


1. Position the calibration markers (MB993003) as shown.
2. Press the camera switch on the steering wheel remote control switch (LH) <vehicles with MMCS> or inside rear view mirror assembly (with integrated monitor) <vehicles without MMCS> to display the bird's eye-view on the multivision display.



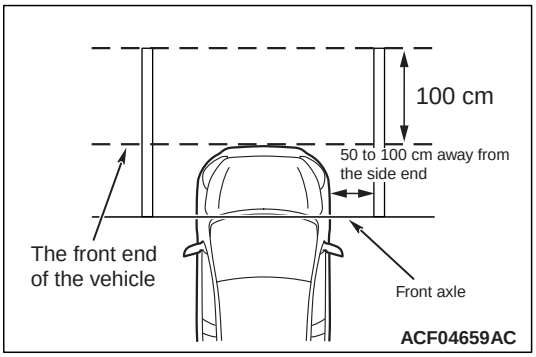




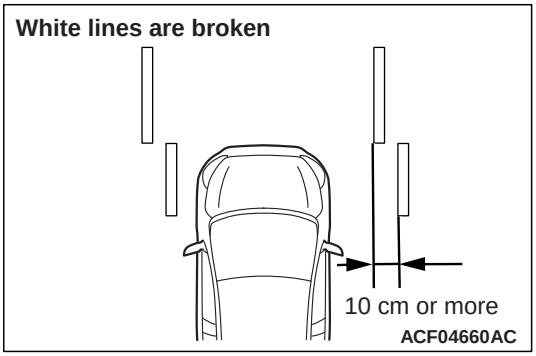


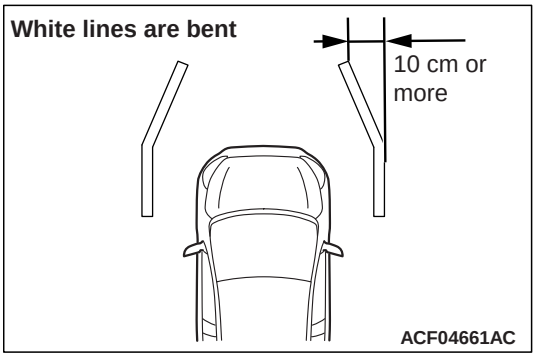
How to check the image screen visually

Checking image from the front view camera



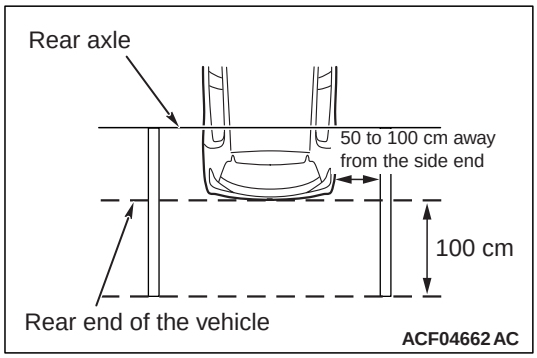
1. Draw white 10 cm-wide lines next to either side of the vehicle.
2. Press the camera switch on the steering wheel remote control switch (LH) <vehicles with MMCS> or inside rear view mirror assembly (with integrated monitor) <vehicles without MMCS> to display the bird's eye-view on the multivision display.



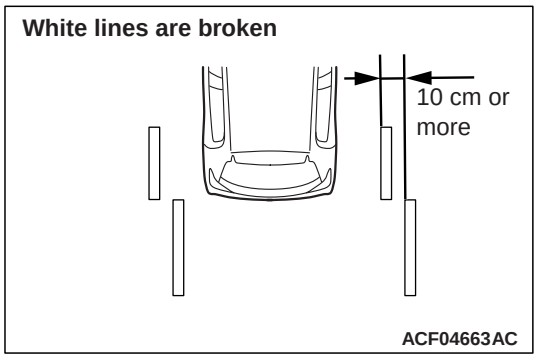


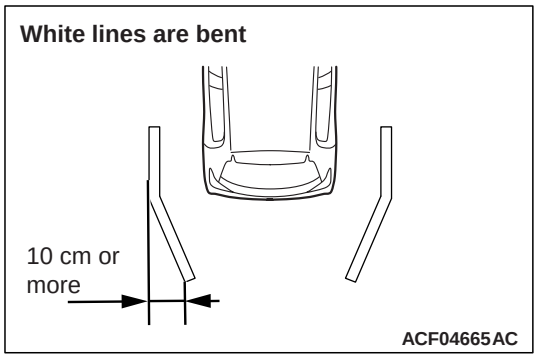
3. Two white lines should be displayed as "straight line". When the line is broken or offset, calibrate the cameras.

Checking image from the rear view camera



1. Draw white 10 cm-wide lines next to either side of the vehicle.
2. Press the camera switch on the steering wheel remote control switch (LH) <vehicles with MMCS> or inside rear view mirror assembly (with integrated monitor) <vehicles without MMCS> to display the bird's eye-view on the multivision display.

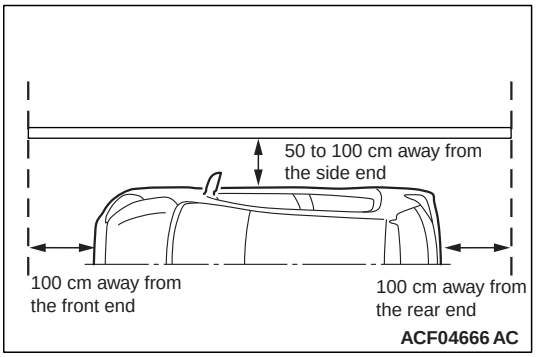




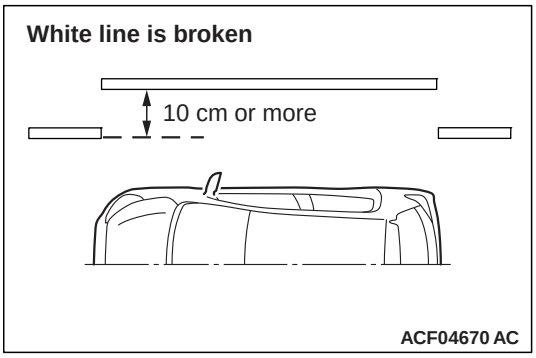
3. Two white lines should be displayed as "straight line". When the line is broken or offset, calibrate the cameras.

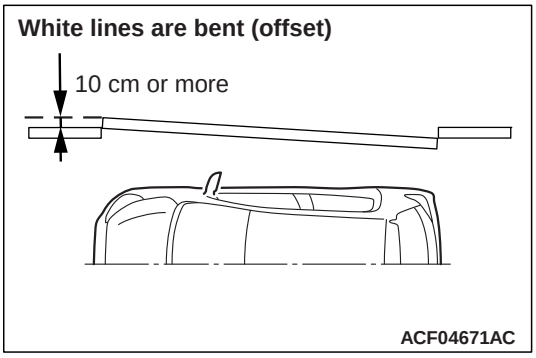
Checking image from the side view camera (RH)

NOTE: The left side camera must be also calibrated.



1. Draw white 10 cm-wide lines next to the right side of the vehicle.
2. Press the camera switch on the steering wheel remote control switch (LH) <vehicles with MMCS> or inside rear view mirror assembly (with integrated monitor) <vehicles without MMCS> to display the bird's eye-view on the multivision display.





3. Two white lines should be displayed as "straight line". When the line is broken or offset, calibrate the cameras.

<Deleted>

3. Check that the white lines, which are indicated by arrows, are shown as "straight line" on the bird's eye view image. (These lines should be also continuous in the same thickness.)

How to write learned value to the camera-ECU

When the camera is replaced, write a learned value to the new camera-ECU according to the procedure below.

1. Connect M.U.T.-III to the diagnosis connector (For how to connect M.U.T.-III, refer to the GROUP 00 – Diagnosis Function).
2. Select "Write learned value(Changed ECU)" and then "Learned value Read&save" in the special functions for the multi-around monitor system to save the learned value, which is stored in the current camera-ECU, to the M.U.T.-III.

   NOTE: If the learned value cannot be read, replace the camera-ECU and then calibrate the camera.
3. Replace the camera-ECU.
4. Select "Write learned value(Changed ECU)" and then "Saved learned value writing" in the special functions to write the learned value, which is stored in the M.U.T.-III, to the camera-ECU.
5. If any problems are not found on the screen, the calibration is complete. If any problem is found, calibrate the camera.

How to calibrate a camera

⚠ CAUTION <Incorrect>

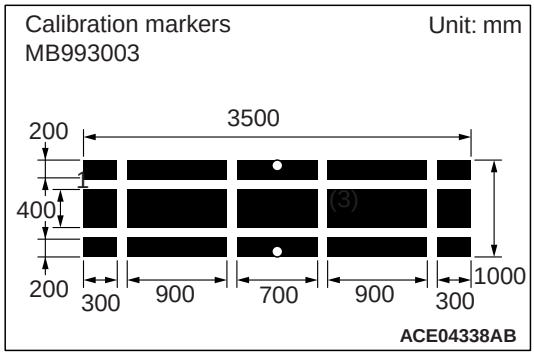
Do not interrupt a camera vision range while a camera-ECU is calibrated.

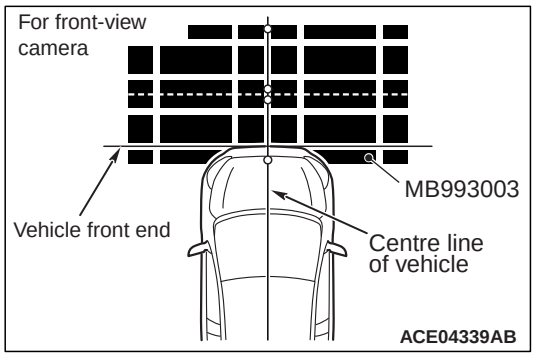
1. When the camera-ECU is replaced, first write a learned value to the camera-ECU.
2. Park the vehicle on a level surface.

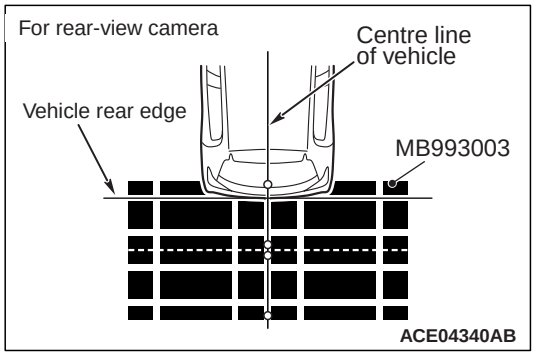
   NOTE: Prevent sun light rays from interfering with the camera, otherwise the monitor screen will be reflected in white. Ideally, the brightness of a road surface should be low (such as black).
3. One person should sit on the driver's seat.
4. Connect M.U.T.-III to the diagnosis connector (For how to connect M.U.T.-III, refer to the GROUP 00 – Diagnosis Function).

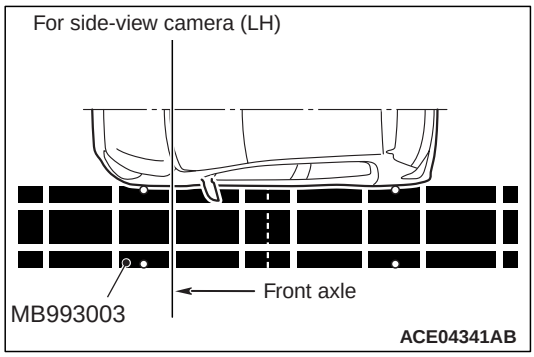
<Correct>

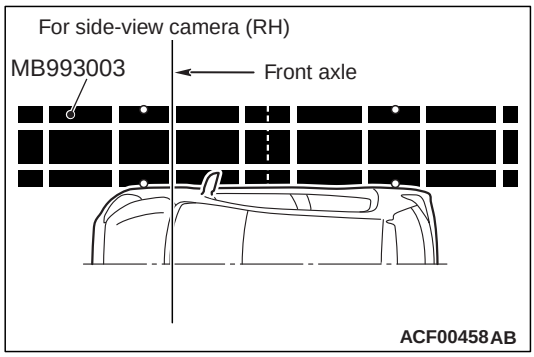
• Do not interrupt a camera vision range while a camera-ECU is calibrated.
• Before the calibration, make sure that no drops of water or dirt are adheared to the respective camera lense. If yes, an incorrect calibration may be caused. Wipe off it with a damp clotch, then wipe again with a dry cloth.











5. Position the calibration markers (MB993003) as shown.
   - Position the calibration markers in respect to the relevant camera only.

   NOTE:
   - *The calibration markers should be located in the permissible range. The range is within ±3 mm and 1° from the standard position.*

A <Incorrect> <Correct>

6. ~~Turn on the power supply mode.~~ ← Turn "ON → OFF → ON" the power supply mode.
7. Use the M.U.T.-III to calibrate the camera.

   NOTE: When you execute the calibration, all calibration-related data will be erased from the ECU.
8. Select "Calibration" in the "special function" for the multi-around monitor system.
9. Select a camera to be calibrated on the service data located to the left of the calibration screen, and then press "OK".

A <Correct>
Insert the attached sheet 42 (2/2)

Item No.	Item name	Contents
1	Front camera	Calibrate only the selected camera.
2	Rear camera	
3	Left side camera	
4	Right side camera	

10. Select the camera being calibrated in the creen, and the press "OK".
    ' button after the execution screen is displayed.
12. When the calibration has completed successfully, "Completed" will be displayed on the service data item No.13.
13. If the calibration has failed, "Error" will be displayed on the service data item No.13. For details of errors, refer to "Calibration error table".
14. If any problems are not found on the screen, the calibration is complete. If any problems are found, repeat the calibration.

Calibration error table

Item No.	Item name <Incorrect>	Error contents	Troubleshooting
14	~~Coding not comp detection flag~~	~~The variant coding for the ETACS-ECU has not been implemented.~~	~~The variant coding is carried out.~~
15	Door open detection flag	Any of the doors and tailgate are open.	Check that any of the doors and tailgate are closed. If no, close the door or the tailgate.
16	Front camera error flag	The front-view camera does not recognise either of the calibration markers precisely.	1. Check the vehicle conditions. • Are prerequisites for the calibration satisfied? • Is the vehicle parked in a correct position? • Is the camera lens contaminated? 2. Check the calibration markers. • Are the calibration markers positioned correctly? • Are the calibration markers contaminated? • Is any of the calibration markers hard to see due to a sunlight refection? 3. Repeat the calibration.
17	Rear camera error flag	The rear-view camera does not recognise either of the calibration markers precisely.	
18	Left side camera error flag	The side-view camera (LH) does not recognise either of the calibration markers precisely.	
19	Right side camera error flag	The side-view camera (RH) does not recognise either of the calibration markers precisely.	

<Correct>

Coding not comp/ Setting err.flag	The variant coding for the ETACS-ECU has not been implemented.	Check whether diagnosis code U1195 is set. If yes, diagnose the system according to the diagnosis code.
	Requirements for the calibration are not satisfied.	Check whether the requirements for the calibration are satisfied. • Are the calibration markers positioned correctly? • Is a strong illumination, which a camera misinterprets as a white line on the calibration marker, emitted nearby?

Item No.	Item name	Error contents	Troubleshooting
20	Flash ROM writing error flag	Internal malfunction of camera-ECU	1. Repeat the calibration. 2. If any error code is displayed again, replace the camera-ECU. 3. Repeat the calibration.
21	SD-RAM error flag		
22	EEPROM writing error flag		

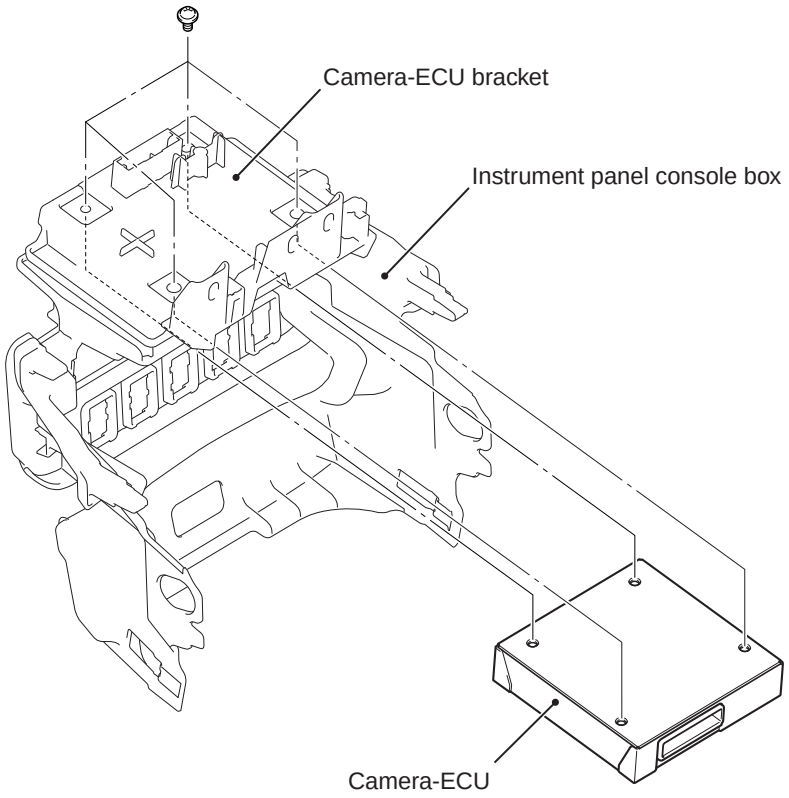
CAMERA-ECU REMOVAL AND INSTALLATION

M1540906900094

⚠ CAUTION

- **When you replace the camera-ECU, you should teach the camera-ECU for the multi-around monitor by writing a learned value. On completion, you should check the camera image on the multi around monitor "Bird's eye-view." If necessary, calibrate the camera.**
- **To ensure the camera image is clearly visible, wipe the lens with a damped rag and then a dry rag to remove dust, rain drops or snow.**
- **Be careful not to damage the camera. Any damage may have an adverse effect on the screen image.**

Pre-removal and post-installation operation
- Instrument Panel Lower Centre Removal And Installation (Refer to GROUP 52A – Instrument Centre Panel Assembly).
- Multivision Display Assembly Removal And Installation (Refer to Mitsubishi Multi Communication System (MMCS)).
- Hands Free-ECU Removal And Installation (Refer to Hands Free-ECU).



ACF01064AB

CAMERA REMOVAL AND INSTALLATION

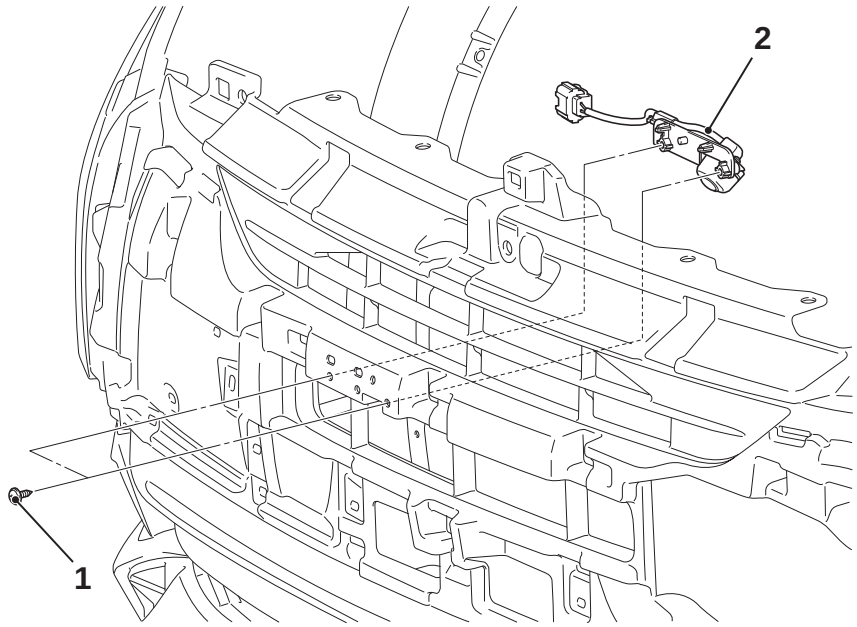
M1540905500424

⚠ CAUTION

- **When you remove/install or replace the camera, you should check the camera image on the multi around monitor "Bird's eye-view." If necessary, calibrate the camera.**
- **To ensure the camera image is clearly visible, wipe the lens with a damped rag and then a dry rag to remove dust, rain drops or snow.**
- **Be careful not to damage the camera. Any damage may have an adverse effect on the screen image.**
- For how to remove the side view camera, refer to GROUP 51 – Door Mirror Removal and Installation.

<FRONT VIEW CAMERA>

Pre-removal Operation	Post-installation Operation
• Front Bumper Assembly Removal (Refer to GROUP 51 – Front Bumper Assembly). • Front Bumper Centre cover Removal (Refer to GROUP 51 – Front Bumper Assembly).	• Front Bumper Assembly Installation (Refer to GROUP 51 – Front Bumper Assembly). • Front Bumper Centre Cover Installation (Refer to GROUP 51 – Front Bumper Assembly).



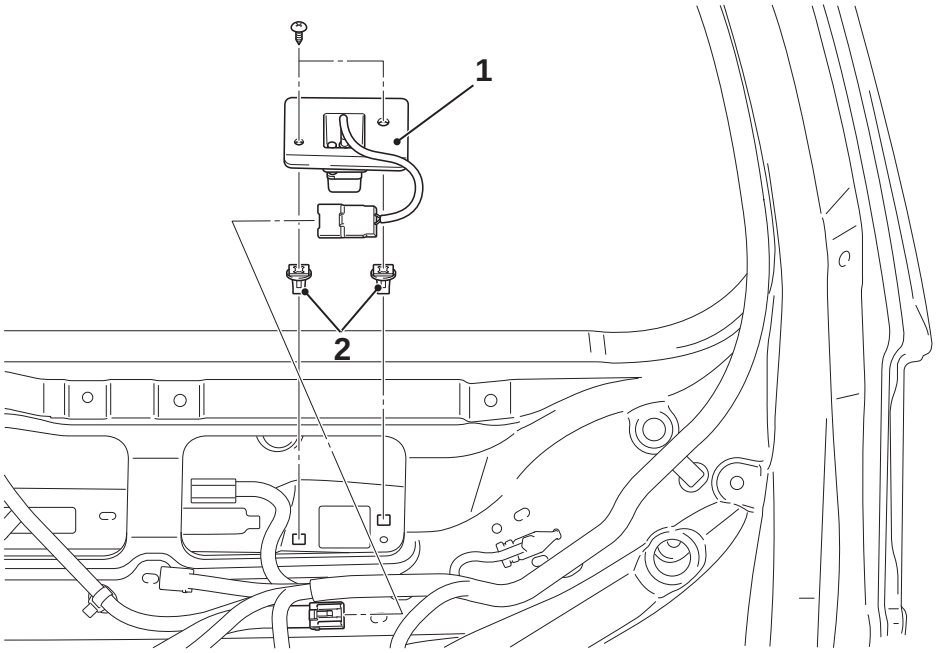
ACE04328AB

Removal steps

1. Screw
2. Front view camera

<REAR VIEW CAMERA>

Pre-removal Operation	Post-installation Operation
• Tailgate Trim Removal (Refer to GROUP 52A – Tailgate Trim).	• Tailgate Trim Installation (Refer to GROUP 52A – Tailgate Trim).

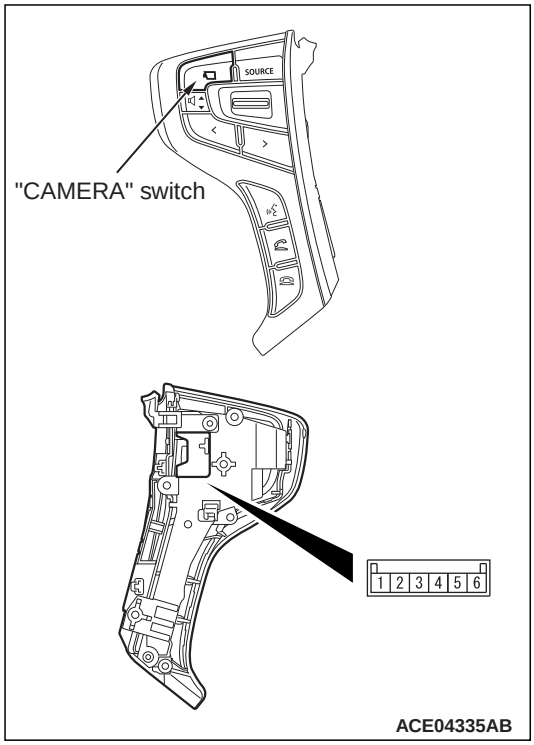


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Removal steps
1. Rear view camera
2. Grommet

STEERING WHEEL CAMERA SWITCH CHECK

M1544015700484



ACE04335AB

Switch Position	Tester Connection	Resistance
"CAMERA" switch pushed	1 – 2	Approximately 13.0 KΩ

ILLUMINATION CHECK

Apply the battery voltage to the connector terminal No.4, earth the terminal No.6, and then check that the illumination lights up.