

INTUITIVE PARKING ASSIST SYSTEM

PRECAUTION

NOTICE:

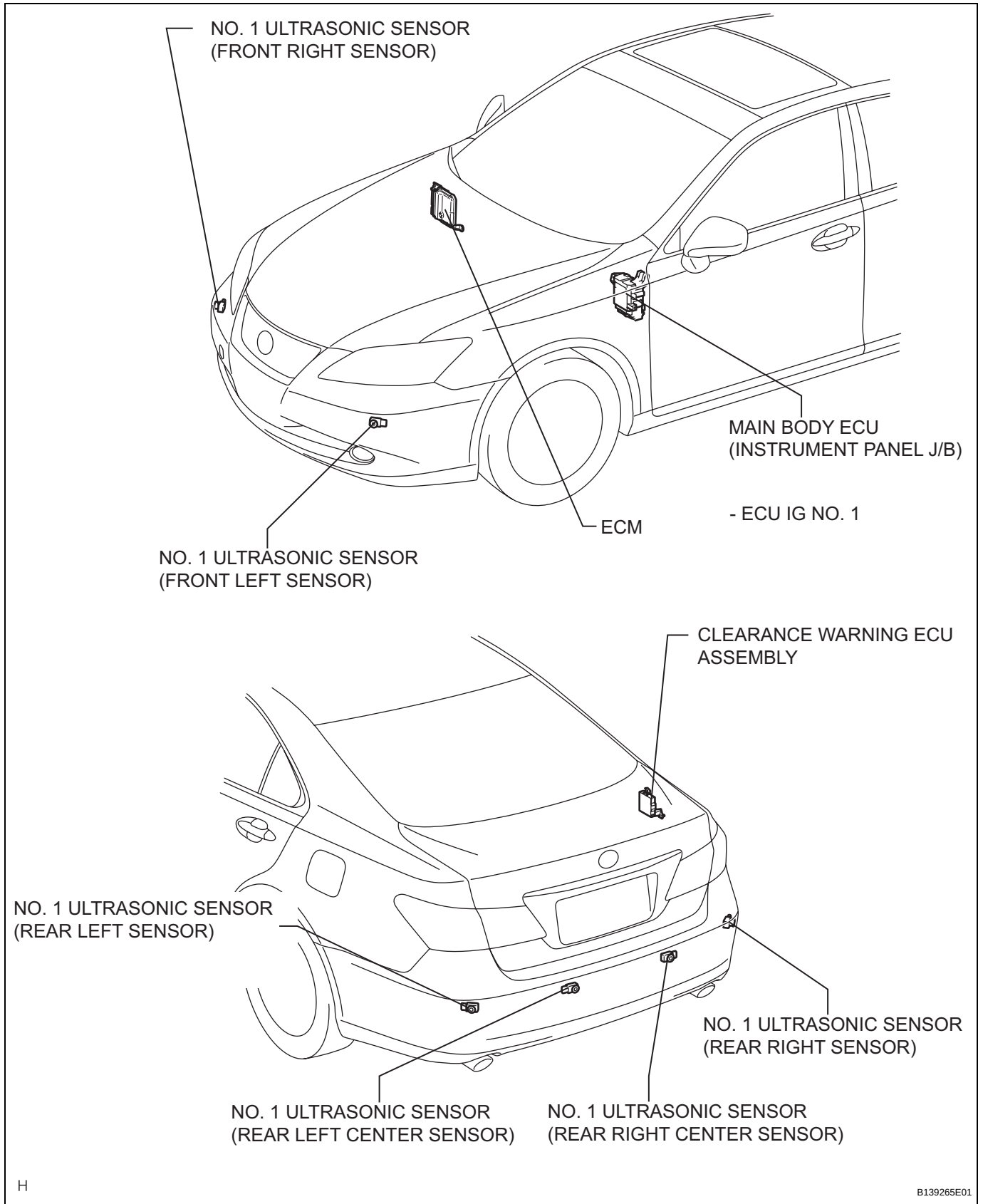
Some systems need to be initialized after reconnecting the negative (-) battery terminal (See page [IN-33](#)).

1. PRECAUTIONS FOR INTUITIVE PARKING ASSIST SYSTEM

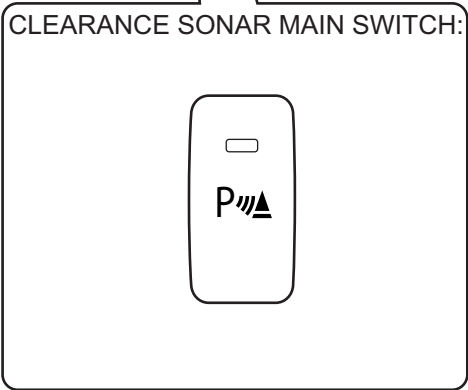
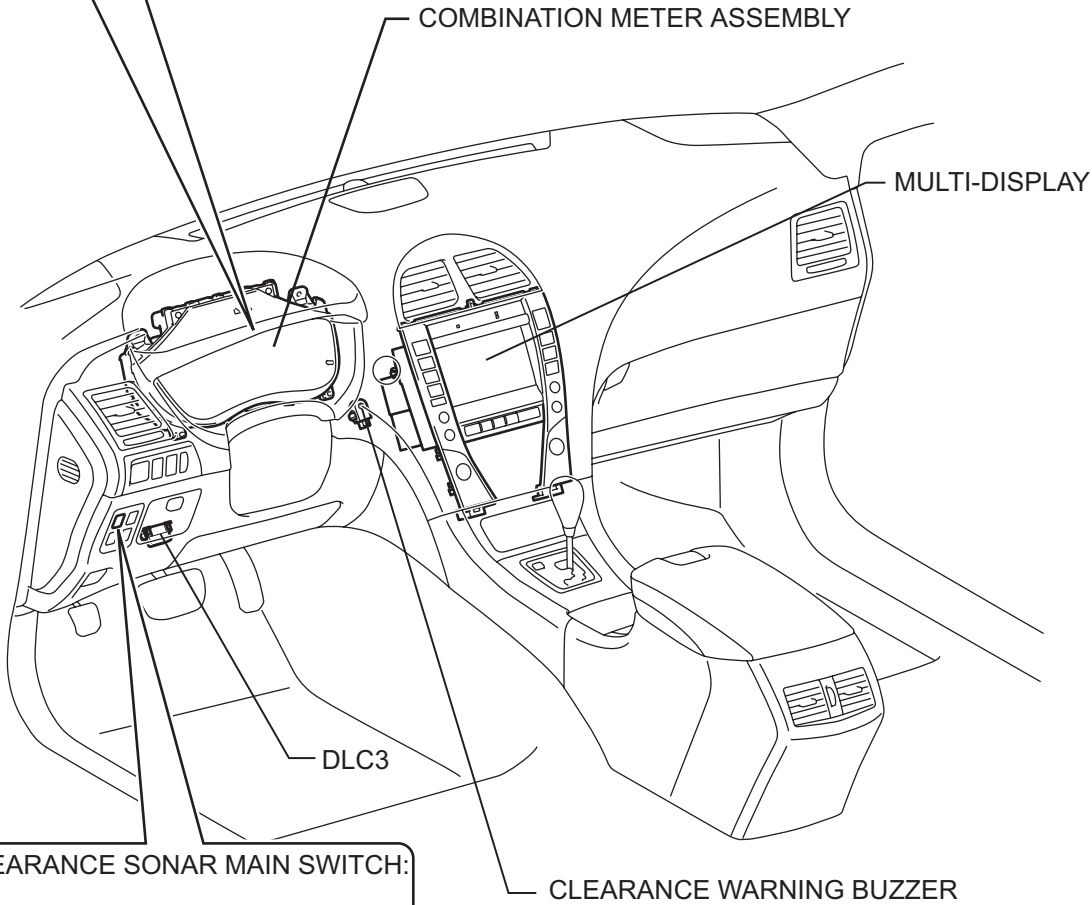
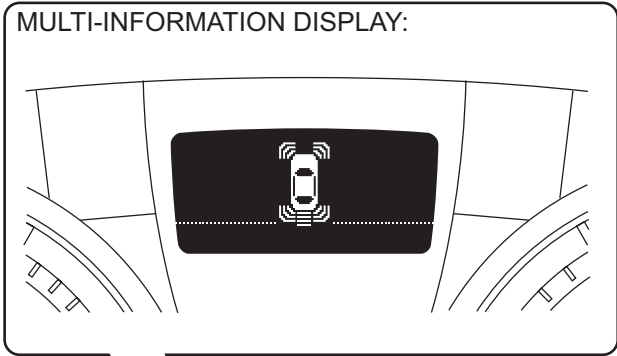
- (a) Under the following conditions, the detection function may not function properly:
 - (1) The sensor is covered with foreign matter, such as mud or snow (detection function returns to normal when the sensor is cleaned).
 - (2) The sensor is frozen (detection function returns to normal when the temperature of the sensor rises).
 - (3) The sensor is covered with a hand.
- HINT:
 - In very cold weather where a malfunction display appears, the sensor may not be able to detect obstacles.
 - If the malfunction display appears, visually check the sensor first. If the sensor is free of foreign matter but the malfunction display remains, the sensor may have a malfunction.
- (b) The detection range may be affected by the following conditions:
 - (1) The sensor is covered with foreign matter, such as mud or snow.
 - (2) The vehicle is in an excessively hot or cold area.
- (c) Under the following conditions, a detection error may occur:
 - (1) Driving on a bumpy road, an unpaved road, or in tall grass.
 - (2) Ultrasonic waves from items such as another vehicle's horn, motorcycle engine sounds, a large vehicle's air brake sound, or another vehicle's sonar are transmitted near the vehicle.
 - (3) It is raining heavily or the sensor comes into contact with water (sprayed).
 - (4) The vehicle is tilted at a large angle.
 - (5) The vehicle is equipped with a commercial fender pole or a wireless mechanism antenna.
 - (6) The sensor is covered with foreign matter, such as mud or snow.
 - (7) The vehicle is moving toward a high curb or the corner of a pointed object.
- (d) The sensor cannot detect some objects such as the following:
 - (1) Thin objects, such as wires and ropes.
 - (2) Materials that absorb ultrasonic waves, such as cotton, snow, etc.

- (3) Objects with sharp edges.
- (4) Short objects.
- (5) Tall, overhanging objects.
- (e) Other notices:
 - (1) The sensor cannot detect objects directly under the bumper. (The sensor may detect low objects and thin poles, and then lose track of the objects.)
 - (2) The sensor may not be able to detect obstacles that are too close to the sensor.
 - (3) The sensor may not be able to detect obstacles if it is dropped or subjected to a strong impact.

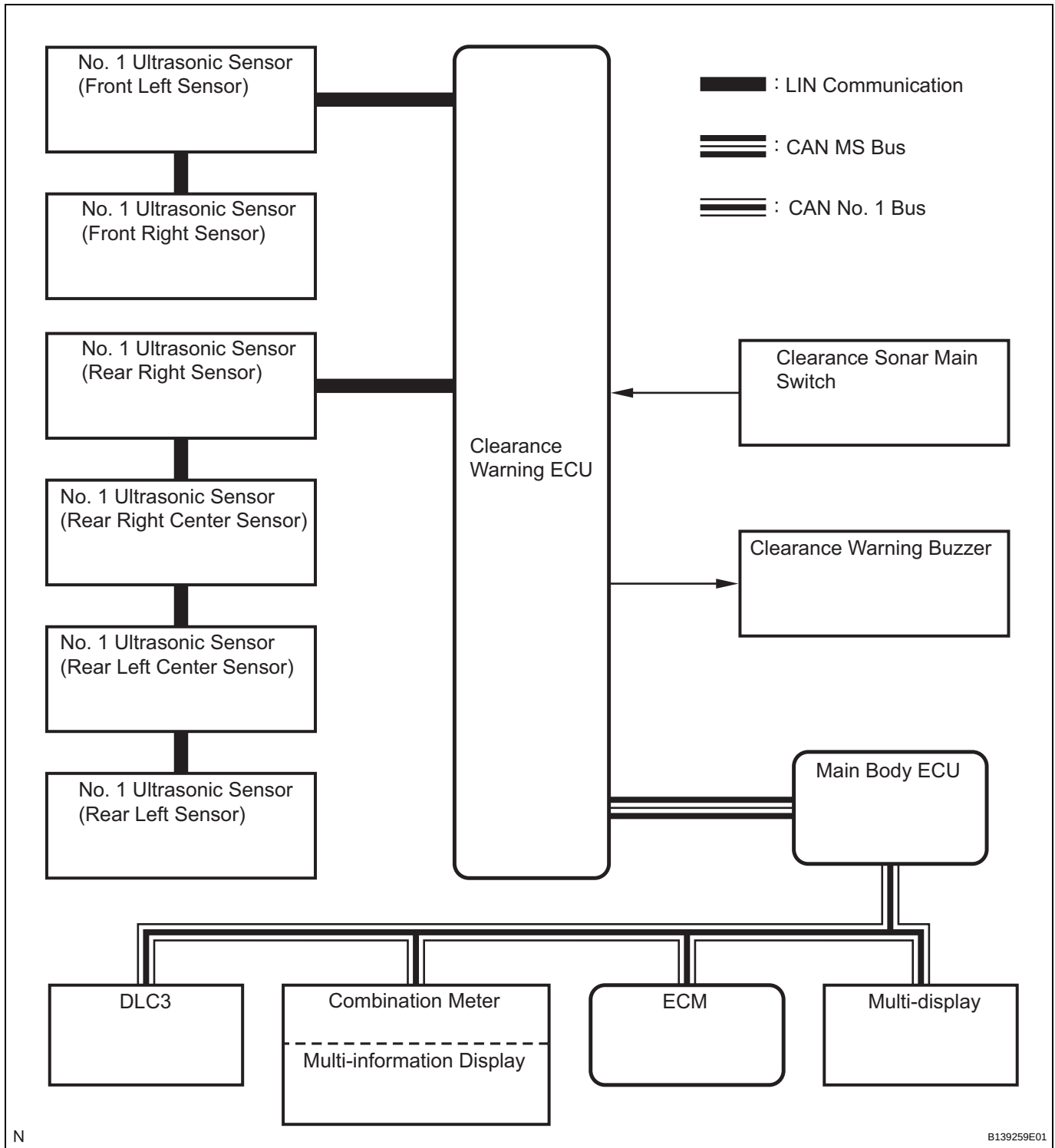
PARTS LOCATION



PM



SYSTEM DIAGRAM



Input signal to clearance warning ECU:

Transmitting ECU (transmitter)	Signal	Communication Method
Combination Meter	Vehicle speed signal	CAN
ECM	Shift position signal	CAN
Multi-display	Clearance sonar system setting change signal	CAN

Output signal from clearance warning ECU:

Receiving ECU	Signal	Communication Method
Combination Meter	Display signal	CAN
Multi-display	Display signal	CAN

SYSTEM DESCRIPTION

1. GENERAL

- (a) This system uses ultrasonic sensors to detect any obstacles at the corners and the rear of the vehicle. The system then informs the driver of the distance between the sensors and the obstacles as well as their positions by indicating them on the multi-display or multi-information display and by sounding a buzzer.

2. FUNCTION OF COMPONENTS

Component	Function
Ultrasonic sensor (6)	Detects the distance between the vehicle and an obstacle
Clearance warning buzzer	Sounds the buzzer to inform the driver according to the distance to the obstacle
Multi-information display on the combination meter	Transmits a vehicle speed signal to the clearance warning ECU. - Displays the location of the obstacle and the approximate distance between the vehicle and the obstacle. - Informs the driver if the ultrasonic sensors malfunction, or if they freeze or become dirty
Clearance sonar main switch	Operating this switch allows the operation of intuitive parking assist to be enabled or disabled.
Multi-display	Displays the location of the obstacle and the approximate distance between the vehicle and the obstacle. The buzzer volume, distance required to sound the buzzer and distance required to trigger the display can be chosen on the setup screen for the intuitive parking assist system.
Clearance warning ECU	Judges the approximate distance between the vehicle and the obstacle based on the signals from the ultrasonic sensors and sends it to the multi-information display or the multi-display. Sounds the clearance warning buzzer.
ECM	Transmits a shift position signal to the clearance sonar ECU.

3. OPERATION EXPLANATION

- (a) The operating condition of each intuitive parking assist differs according to its installed position as shown in the table below:

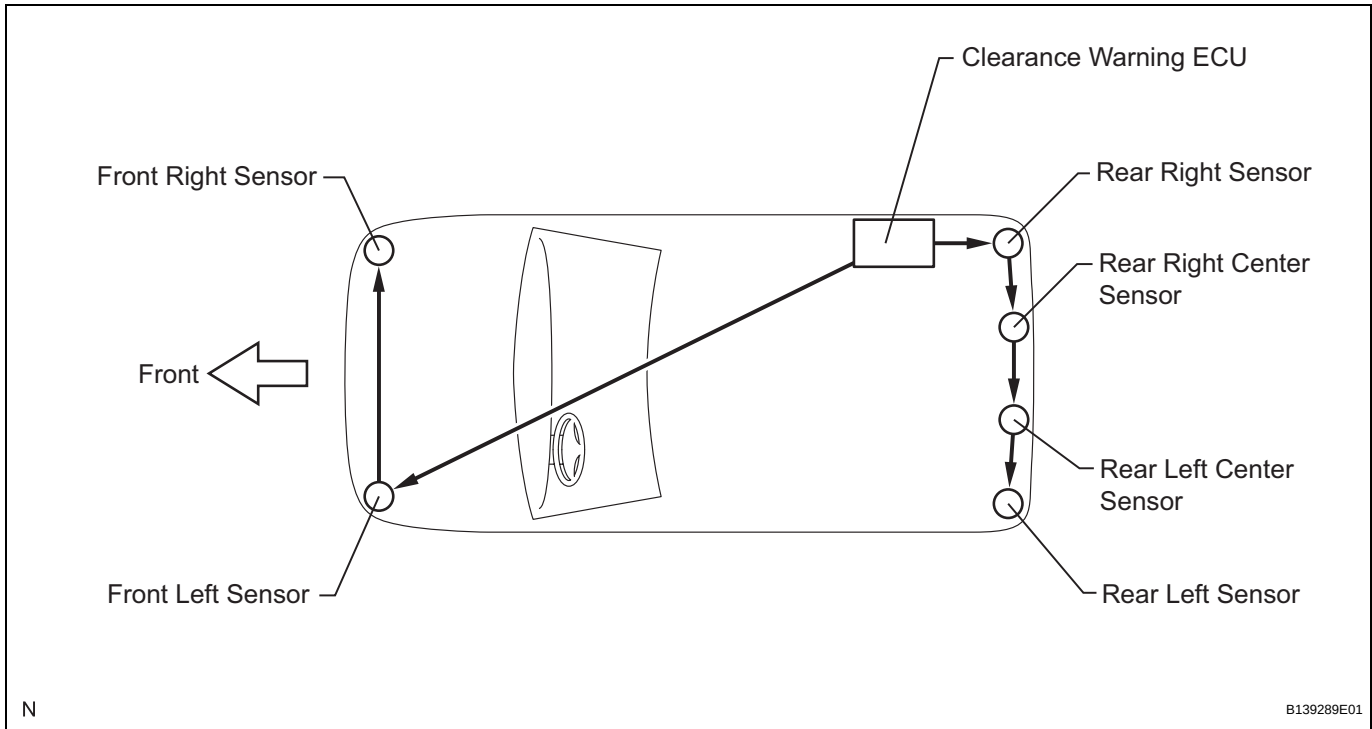
Installation Position	Operating Condition
Front Corner Sensor	- Engine switch is ON (IG). - Clearance sonar main switch is ON. - Shift position is except P. - Vehicle speed is approx. 10 km/h (6.2 mph) or less. The sensor stops operating when the vehicle speed exceeds 15 km/h (9.3 mph), and starts operating when the vehicle speed drops to below 10 km/h (6.2 mph).
Rear Corner Sensor	- Engine switch is ON (IG). - Clearance sonar main switch is ON. - Shift position is R. - Vehicle speed is approx. 10 km/h (6.2 mph) or less. The sensor stops operating when the vehicle speed exceeds 15 km/h (9.3 mph), and starts operating when the vehicle speed drops to below 10 km/h (6.2 mph).
Rear Center Sensor	- Engine switch is ON (IG). - Clearance sonar main switch is ON. - Shift position is R.

4. ECU OR SENSORS WHICH COMMUNICATE THROUGH LIN COMMUNICATION

HINT:

- The clearance warning ECU and sensors communicate with each other using LIN communication.

- Allocation refers to the process of the clearance warning ECU setting aside IDs for the sensors.
 - The vehicle has the sensors arranged in two groups. There is a front series and a rear series. The sensors are connected in a "daisy chain".
- (a) Initialization mode:
An ID is allocated to each sensor and sensor diagnosis is performed.



- (1) When any of the following conditions are met, the clearance warning ECU provides power to the first sensors in each series (front left sensor and rear right sensor):
 - The engine switch is turned on (IG).
 - The sensor operating conditions (described previously) are met and the clearance sonar main switch is turned on.
 - Vehicle speed is below 25 km/h (15.5 mph).
- (2) After the power is supplied, the front left sensor and rear right sensor enter standby mode to receive an ID from the ECU. When a certain amount of time has elapsed, the ECU sends an ID allocation signal to these sensors.
- (3) The front left sensor and rear right sensors receive the ID allocation signal from the ECU and perform self-diagnosis. When the sensor self-diagnosis is complete, the ECU sends an ID allocation confirmation signal to the sensors.

- (4) After the ID allocation confirmation is performed, the ECU provides power to the second sensors in each series (front right sensor and rear right center sensor) via the first sensors. In the same manner as the first sensors, the second sensors enter the standby mode. When a certain amount of time has elapsed, the ECU sends an ID allocation signal to the second sensors.
- (5) The above operation will be repeated until an ID is allocated to the last sensor, which is in the rear series (rear left sensor). Initialization ends when ID allocation to all ultrasonic sensors is complete.
- (b) Detection mode:

After the initialization mode is complete, the system switches into the detection mode. In the detection mode, the clearance warning ECU sends information request signals and sensor activation signals to the ultrasonic sensors and receives detection result signals from the sensors.

 - (1) The clearance warning ECU regularly sends ID signals, information request signals, and sensor activation signals to an ultrasonic sensor according to the LIN schedule.
 - (2) When a certain amount of time has elapsed (sensor detection operation is complete), the clearance warning ECU sends an ID signal to the sensor to receive a detection result signal.
 - (3) The ultrasonic sensor sends a detection result signal or detection information signal to the ECU.
 - (4) The above operation is repeatedly performed for each ultrasonic sensor.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the clearance sonar system.
- *: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS

- (a) Refer to HOW TO PROCEED WITH TROUBLESHOOTING (See page [IN-39](#)).

NEXT

3 CHECK AND CLEAR DTC*

- (a) Refer to the DTC check/clear (See page [PM-28](#)).

NEXT

4 CHECK INITIAL CHECK FUNCTION

- (a) Refer to the operation check (See page [PM-11](#)).

Result

Result	Proceed to
Symptom does not occur	A
Symptom occurs	B

B

Go to step 6

A

5 SYMPTOM SIMULATION

- (a) Refer to HOW TO PROCEED WITH TROUBLESHOOTING (See page [IN-39](#)).

NEXT

6 CHECK CAN COMMUNICATION SYSTEM*

- (a) Refer to HOW TO PROCEED WITH TROUBLESHOOTING (See page [CA-11](#)).

HINT:

The clearance warning ECU is connected to the CAN communication system. Therefore, be sure to check that there are no problems in the CAN communication system before performing troubleshooting.

NEXT

7 DTC CHECK*

(a) Refer to the DTC check/clear (See page [PM-28](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B

Go to step 9

A

8 DTC CHART

(a) Refer to the diagnostic trouble code chart (See page [PM-31](#)).

NEXT

PM

Go to step 10

9 PROBLEM SYMPTOMS TABLE

(a) Refer to the problem symptoms table (See page [PM-25](#)).

NEXT

10 CIRCUIT INSPECTION

NEXT

11 IDENTIFICATION OF PROBLEM

NEXT

12 REPAIR OR REPLACE

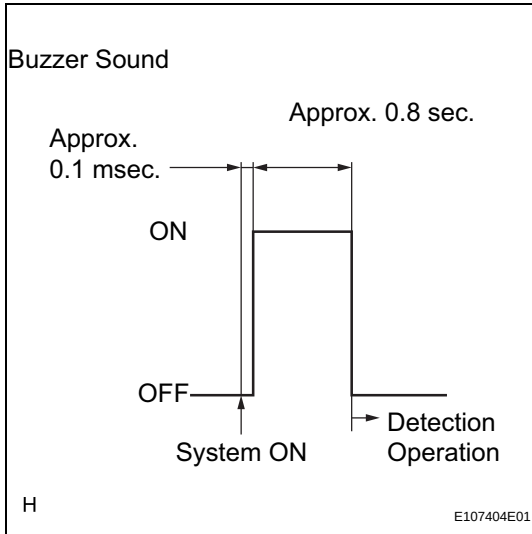
NEXT

13

CONFIRMATION TEST

NEXT

END



OPERATION CHECK

1. SELF-CHECK FUNCTION INSPECTION

- (a) Turn the engine switch on (IG).
- (b) When the intuitive parking assist system is turned on, check that the following occurs: 1) after 0.1 milliseconds, the buzzer sounds for approximately 0.8 seconds, and 2) the system starts the obstacle detection operation.

HINT:

- If a sensor has an open circuit or a sensor's detection operation malfunctions because it is wet or frozen, a malfunction display is shown on the multi-information display or multi-display, and the buzzer sounds.
- When the sensor condition returns to normal, the system ends normal clearance sonar mode.
- If the clearance sonar main switch is on and the engine switch is turned on (IG), the buzzer does not sound.

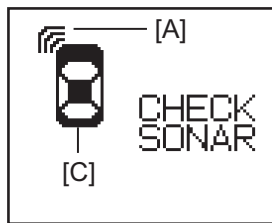
2. MALFUNCTION DISPLAY (MULTI-INFORMATION DISPLAY)

(a) Ultrasonic sensor open circuit

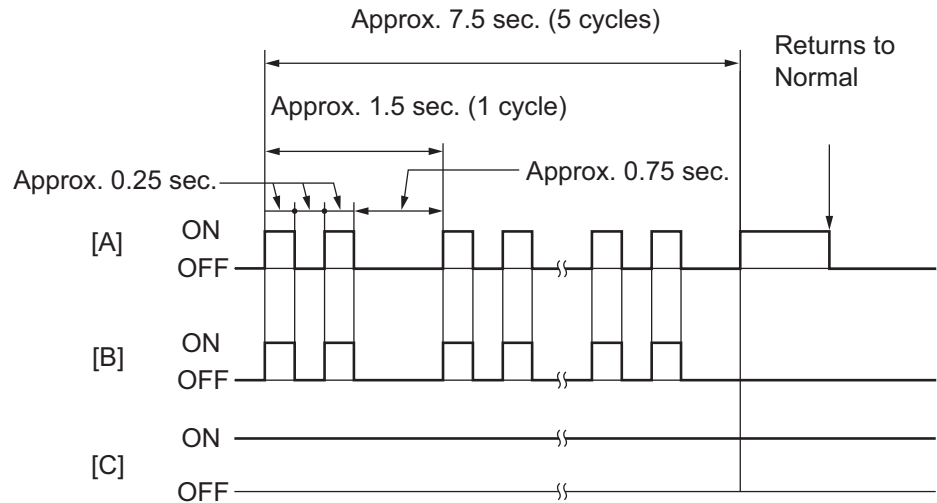
- (1) If there is an open circuit between the ultrasonic sensor and the clearance warning ECU or if a sensor is malfunctioning, the malfunction is displayed as shown in the illustration.

Example (Front Left Sensor Disconnection):

Multi-information Display



[B] : Clearance Warning Buzzer



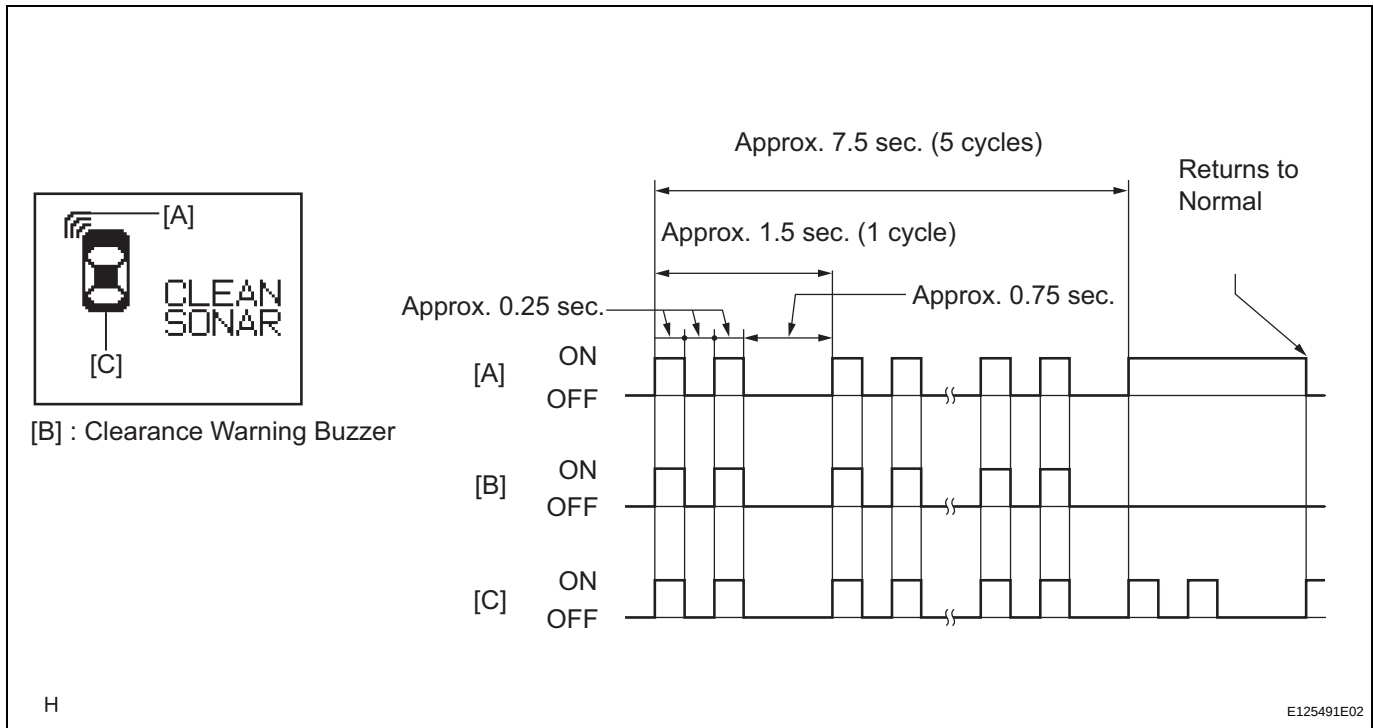
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HINT:

- The example shows an open circuit in the ultrasonic sensor (front left sensor).
- If a sensor has an open circuit, refer to "Open circuit is displayed as a result of self-check" in the Problem Symptoms Table to inspect it.

(b) Ultrasonic sensor frozen

- (1) If a sensor is covered with foreign matter, such as mud or snow, the affected sensor is displayed as shown in the illustration.



HINT:

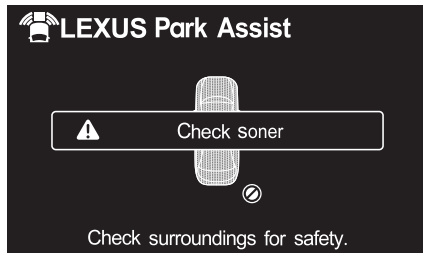
- The example shows that the ultrasonic sensor (front left sensor) is covered with foreign matter.
- If "CLEAN SONAR" is displayed, cleaning the foreign matter from the sensor will return the sensor to normal.

3. MALFUNCTION DISPLAY (MULTI-DISPLAY)**(a) Ultrasonic sensor open circuit**

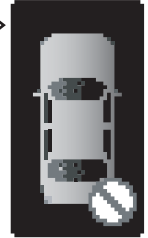
- (1) If there is an open circuit between the ultrasonic sensor and the clearance warning ECU or if a sensor is malfunctioning, the malfunction is displayed as shown in the illustration.

Ultrasonic Sensor Open Circuit:

Multi-display



*Multi-display (Shift Lever Position R)



*: with Rear View Monitor System

E123663E03

HINT:

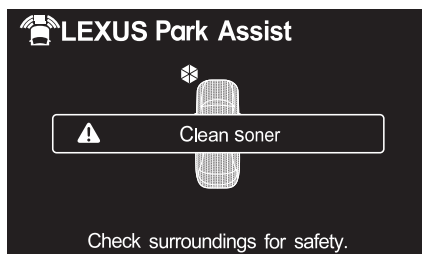
- This example shows an open circuit in the ultrasonic sensor (rear right sensor).
- If a sensor has an open circuit, refer to "Open circuit is displayed as a result of self-check" in the Problem Symptoms Table to inspect it.

(b) Ultrasonic sensor frozen

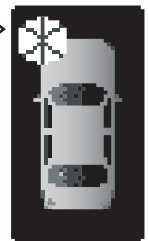
- (1) If a sensor is covered with foreign matter, such as mud or snow, the affected sensor is displayed as shown in the illustration.

Ultrasonic Sensor Frozen:

Multi-display



*Multi-display (Shift Lever Position R)



*: with Rear View Monitor System

E123664E02

HINT:

- The example shows that the ultrasonic sensor (front left sensor) is covered with foreign matter.

- If "CLEAN SONAR" is displayed, cleaning the foreign matter from the sensor will return the sensor to normal.

4. DETECTION RANGE MEASUREMENT AND DISPLAY INSPECTION

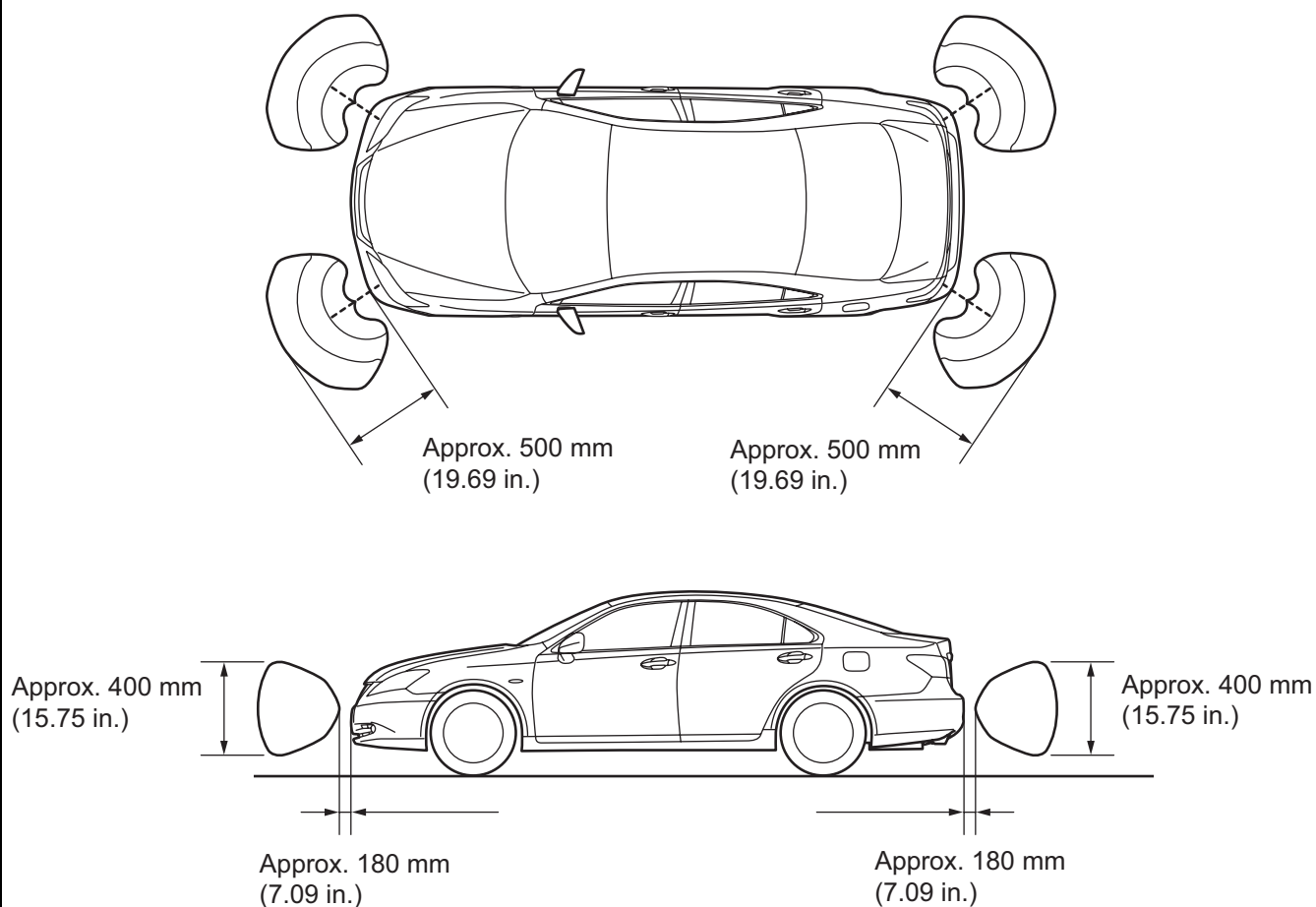
(a) Detection range measurement

NOTICE:

Make sure the vehicle does not move by applying the parking brake firmly.

- (1) Turn the engine switch on (IG).
- (2) Move the shift lever to the reverse position to check the ultrasonic sensors (rear sensors).
- (b) Turn the clearance sonar main switch on.
- (c) Move a ϕ 60 mm (2.36 in.) pole near each sensor to measure its detection range.
 - (1) Measure the clearance sonar's detection range.

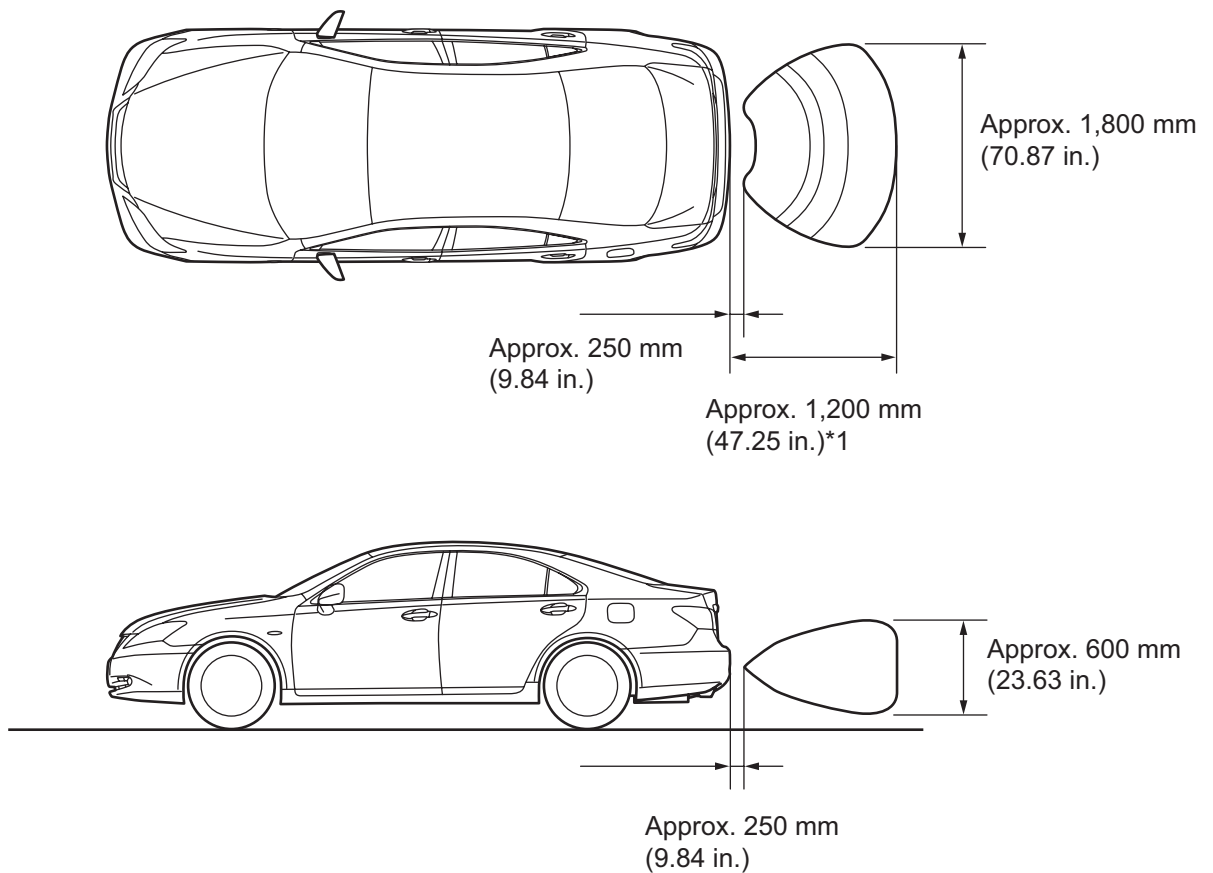
Clearance Sonar:



NOTICE:

These detection ranges are applicable when positioning the ϕ 60 mm (2.36 in.) pole parallel or perpendicular to the ground. The ranges vary depending on the measuring method and type of obstacle (such as walls).

(2) Measure the back sonar's detection range.

Back Sonar:**PM**

H

B139268E01

NOTICE:

- These detection ranges are applicable when positioning the ϕ 60 mm (2.36 in.) pole parallel or perpendicular to the ground. The ranges vary depending on the measuring method and type of obstacle (such as walls).

- ***1: A pole with a diameter of approximately 60 mm (2.36 in.) can be detected within this detection area. If there is a cylinder-shaped object with a diameter of approximately 400 mm (15.74 in.), the detection area expands to approximately 1,500 mm (59.05 in.).**

(d) When the ultrasonic sensors (front clearance sonar) have detected an obstacle, check the display and buzzer sound.

Operation condition:

Engine Switch	Clearance Sonar Main Switch	Shift Lever Position	Vehicle Speed
ON (IG)	ON	In any position except P	10 km/h (6 mph) or less

(1) Check the buzzer sound according to the waveform shown in the illustration.

Buzzer Sound:

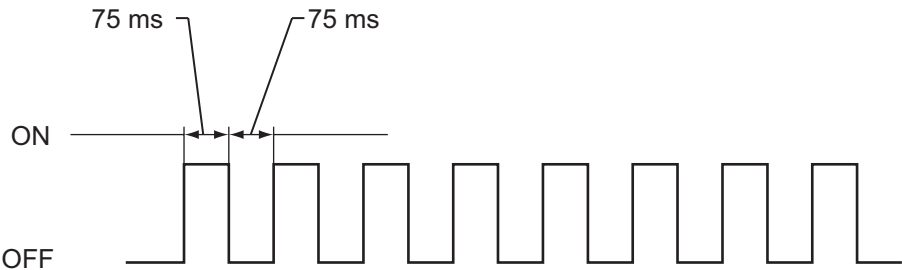
*1: Close-range Detection

Within Approx.
250 +/- 50 mm
(9.84 +/- 1.97 in.)



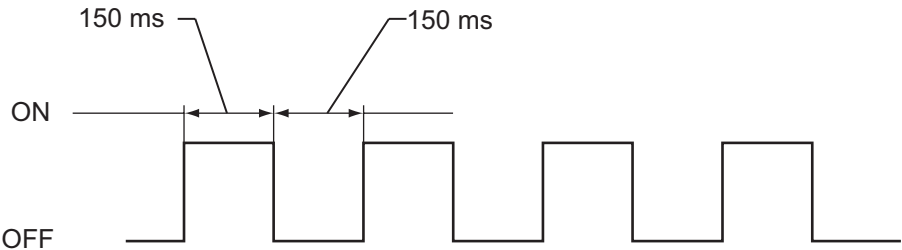
*2: Medium-range Detection

From Approx. 250 +/- 50 to
375 +/- 50 mm (9.84 +/- 1.97
to 14.76 +/- 1.97 in.)



*3: Long-range Detection

From Approx. 375 +/- 50 to
500 +/- 50 mm (14.76 +/- 1.97
to 19.69 +/- 1.97 in.)



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Multi-information display (shift lever position R)

Detection Range	During Detection
*1 Close-range detection Within approx. 250 +/- 50 mm (9.84 +/- 1.97 in.)	Buzzer: Sounds continuously Number of bars displayed: 1 (Blinking)

Detection Range	During Detection
*2 Medium-range detection From approx. 250 +- 50 to 375 +- 50 mm (9.84 +- 1.97 to 14.76 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 75 ms / OFF: 75 ms) Number of bars displayed: 2 (illuminated)
*3 Long-range detection From approx. 375 +- 50 to 500 +- 50 mm (14.76 +- 1.97 to 19.69 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 150 ms) Number of bars displayed: 3 (illuminated)

Multi-display (shift lever position not in P)

Detection Range	During Detection
*1 Close-range detection Within approx. 250 +- 50 mm (9.84 +- 1.97 in.)	Buzzer: Sounds continuously Number of bars displayed: 1 (red illumination)
*2 Medium-range detection From approx. 250 +- 50 to 375 +- 50 mm (9.84 +- 1.97 to 14.76 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 75 ms / OFF: 75 ms) Number of bars displayed: 2 (yellow illumination)
*3 Long-range detection From approx. 375 +- 50 to 500 +- 50 mm (14.76 +- 1.97 to 19.69 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 150 ms) Number of bars displayed: 3 (yellow illumination)

with Rear view monitor (shift lever position R)

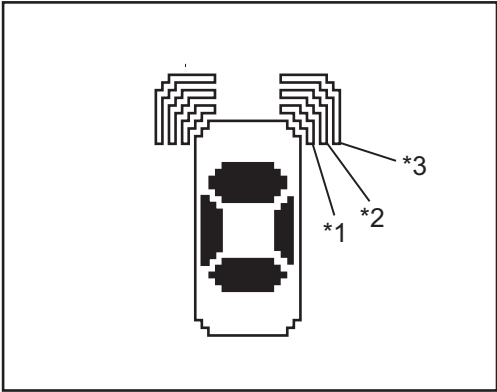
Detection Range	During Detection
*1 Close-range detection Within approx. 250 +- 50 mm (9.84 +- 1.97 in.)	Buzzer: Sounds continuously *4: Illumination (red)
*2 Medium-range detection From approx. 250 +- 50 to 375 +- 50 mm (9.84 +- 1.97 to 14.76 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 75 ms. / OFF: 75 ms) *4: Blinking (yellow)
*3 Long-range detection From approx. 375 +- 50 to 500 +- 50 mm (14.76 +- 1.97 to 19.69 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 150 ms) *4: Blinking (yellow)

HINT:

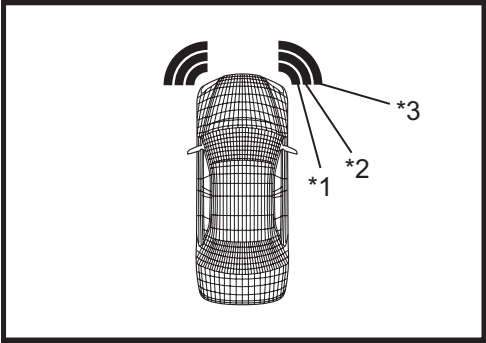
- Ultrasonic waves are used to measure the detection range; however, the detection range may vary depending on the ambient temperature.
- Refer to the illustration of the display below.

(2) Check the display according to the illustration below while the buzzer is sounding.

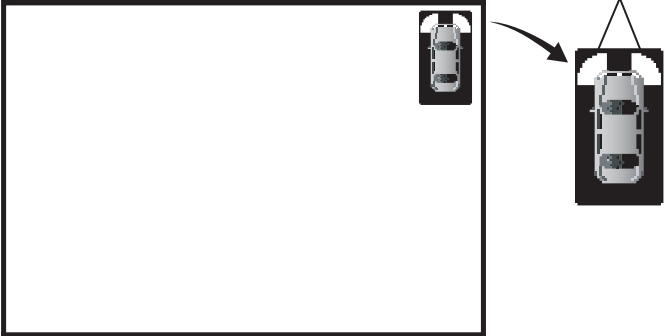
Multi-information Display



Multi-display



*Multi-display (Shift Lever Position R)



PM

*: with Rear View Monitor System

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(e) When the ultrasonic sensors (back sonar) have detected an obstacle, check the display and buzzer sound.

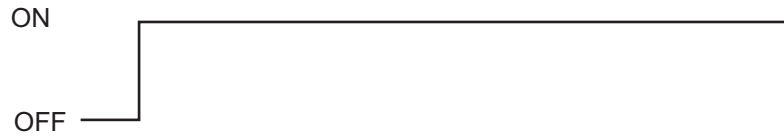
Engine Switch	Clearance Sonar Main Switch	Shift Lever Position
ON (IG)	ON	Reverse Position

(1) Check the buzzer sound according to the waveform shown in the illustration.

Buzzer Sound:

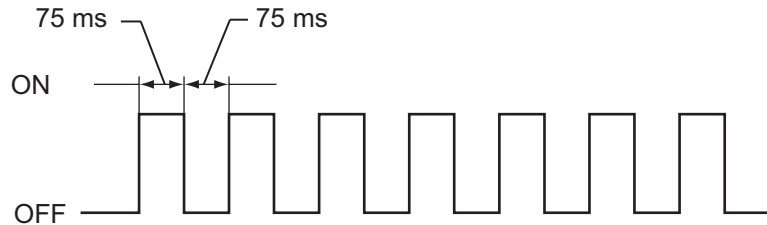
*1: Close-range Detection

Within Approx.
350 +/- 50 mm
(13.78 +/- 1.97 in.)



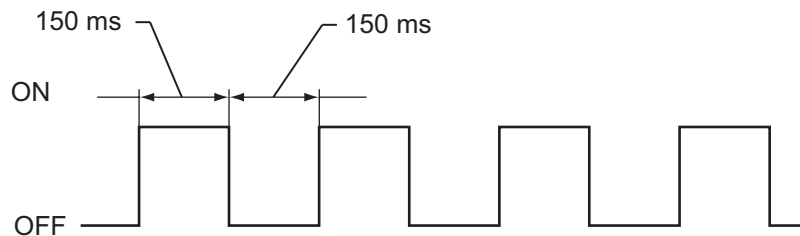
*2: Medium-range Detection

From Approx. 350 +/- 50 to
450 +/- 50 mm (13.78 +/- 1.97
to 17.72 +/- 1.97 in.)



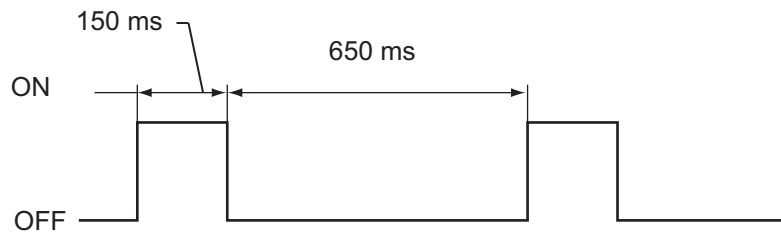
*3: Long-range Detection

From Approx. 450 +/- 50 to
600 +/- 60 mm (17.72 +/- 1.97
to 23.62 +/- 2.36 in.)



*4: Maximum Long-range Detection

From Approx. 600 +/- 60 to
1,500 +/- 150 mm (23.62 +/- 2.36
to 59.06 +/- 5.91 in.)



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Multi-information display (shift lever position R)

Detection Range	During Detection
*1 Close-range detection Within approx. 350 +/- 50 mm (13.78 +/- 1.97 in.)	Buzzer: Sounds continuously Number of bars displayed: 1 (blinking)
*2 Medium-range detection From approx. 350 +/- 50 to 450 +/- 50 mm (13.78 +/- 1.97 to 17.72 +/- 1.97 in.)	Buzzer: Sounds intermittently (ON: 75 ms / OFF: 75 ms) Number of bars displayed: 2 (illuminated)
*3 Long-range detection From approx. 450 +/- 50 to 600 +/- 60 mm (17.72 +/- 1.97 to 23.62 +/- 2.36 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 150 ms) Number of bars displayed: 3 (illuminated)

Detection Range	During Detection
*4 Maximum long-range detection From approx. 600 +- 60 to 1,500 +-150 mm (23.62 +- 2.36 to 59.06 +- 5.91 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 650 ms) Number of bars displayed: 4 (illuminated)

Multi-display (shift lever position R)

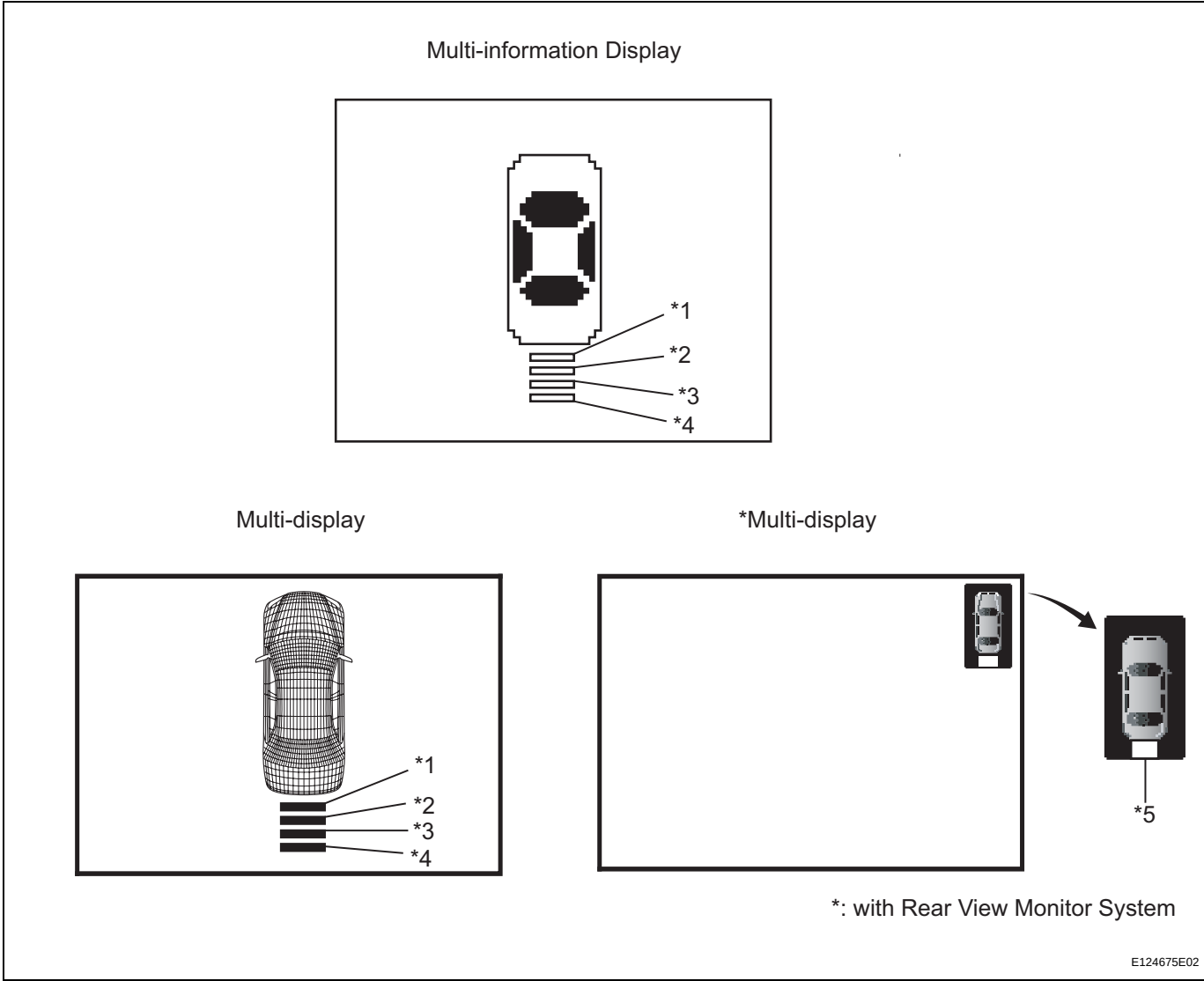
Detection Range	During Detection
*1 Close-range detection Within approx. 350 +- 50 mm (13.78 +- 1.97 in.)	Buzzer: Sounds continuously Number of bars displayed: 1 (red illumination)
*2 Medium-range detection From approx. 350 +- 50 to 450 +- 50 mm (13.78 +- 1.97 to 17.72 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 75 ms / OFF: 75 ms) Number of bars displayed: 2 (yellow illumination)
*3 Long-range detection From approx. 450 +- 50 to 600 +- 60 mm (17.72 +- 1.97 to 23.62 +- 2.36 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 150 ms) Number of bars displayed: 3 (yellow illumination)
*4 Maximum long-range detection From approx. 600 +- 60 to 1,500 +-150 mm (23.62 +- 2.36 to 59.06 +- 5.91 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 650 ms) Number of bars displayed: 4 (yellow illumination)

with Rear view monitor (shift lever position R)

Detection Range	During Detection
*1 Close-range detection Within approx. 350 +- 50 mm (13.78 +- 1.97 in.)	Buzzer: Sounds continuously *5: Illumination (red)
*2 Medium-range detection From approx. 350 +- 50 to 450 +- 50 mm (13.78 +- 1.97 to 17.72 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 75 ms / OFF: 75 ms) *5: Blinking (yellow)
*3 Long-range detection From approx. 450 +- 50 to 600 +- 50 mm (17.72 +- 1.97 to 23.62 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 150 ms) *5: Blinking (yellow)
*4 Maximum long-range detection From approx. 600 +- 50 to 1,500 mm (23.62 +- 1.97 to 59.06 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 650 ms) *5: Blinking (yellow)

- HINT:
- Ultrasonic waves are used to measure the detection range; however, the detection range may vary depending on the ambient temperature.
 - Refer to the illustration of the display below.

(2) Check the display according to the illustration below while the buzzer is sounding.

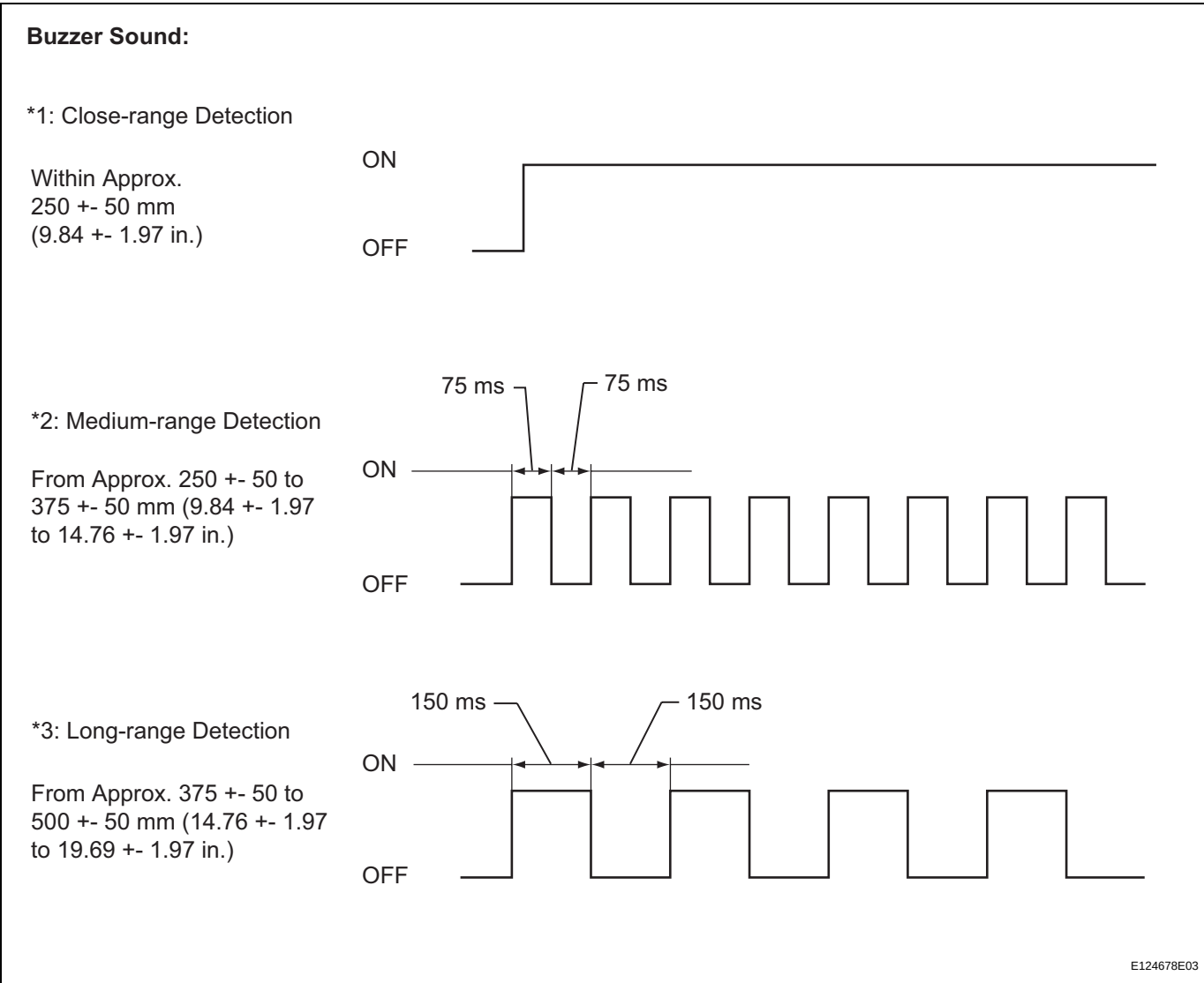


(f) When the ultrasonic sensors (rear clearance sonar) have detected an obstacle, check the display and buzzer sound.

Operation condition:

Engine Switch	Clearance Sonar Main Switch	Shift Lever Position	Vehicle Speed
ON (IG)	ON	Reverse Position	10 km/h (6 mph) or less

(1) Check the buzzer sound according to the waveform shown in the illustration.



Multi-information display (shift lever position R)

Detection Range	During Detection
*1 Close-range detection Within approx. 250 +- 50 mm (9.84 +- 1.97 in.)	Buzzer: Sounds continuously Number of bars displayed: 1 (blinking)
*2 Medium-range detection From approx. 250 +- 50 to 375 +- 50 mm (9.84 +- 1.97 to 14.76 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 75 ms / OFF: 75 ms) Number of bars displayed: 2 (illuminated)
*3 Long-range detection From approx. 375 +- 50 to 500 +- 50 mm (14.76 +- 1.97 to 19.69 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 150 ms) Number of bars displayed: 3 (illuminated)

Multi-display (shift lever position R)

Detection Range	During Detection
*1 Close-range detection Within approx. 250 +- 50 mm (9.84 +- 1.97 in.)	Buzzer: Sounds continuously Number of bars displayed: 1 (red illumination)

Detection Range	During Detection
*2 Medium-range detection From approx. 250 +- 50 to 375 +- 50 mm (9.84 +- 1.97 to 14.76 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 75 ms / OFF: 75 ms) Number of bars displayed: 2 (yellow illumination)
*3 Long-range detection From approx. 375 +- 50 to 500 +- 50 mm (14.76 +- 1.97 to 19.69 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 150 ms) Number of bars displayed: 3 (yellow illumination)

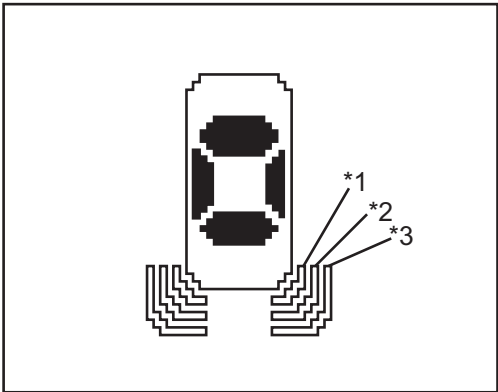
with Rear view monitor (shift lever position R)

Detection Range	During Detection
*1 Close-range detection Within approx. 250 +- 50 mm (9.84 +- 1.97 in.)	Buzzer: Sounds continuously *4 : Illumination (red)
*2 Medium-range detection From approx. 250 +- 50 to 375 +- 50 mm (9.84 +- 1.97 to 14.76 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 75 ms / OFF: 75 ms) *4: Blinking (yellow)
*3 Long-range detection From approx. 375 +- 50 to 500 +- 50 mm (14.76 +- 1.97 to 19.69 +- 1.97 in.)	Buzzer: Sounds intermittently (ON: 150 ms / OFF: 150 ms) *4: Blinking (yellow)

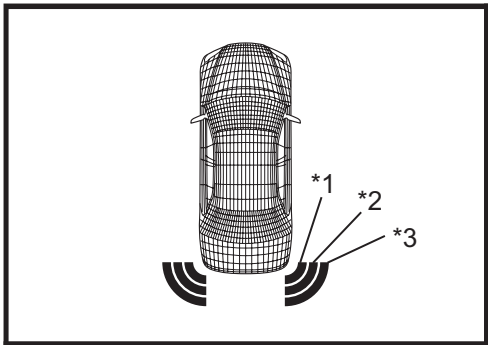
HINT:

- Ultrasonic waves are used to measure the detection range; however, the detection range may vary depending on the ambient temperature.
 - Refer to the illustration of the display below.
- (2) Check the display according to the illustration below while the buzzer is sounding.

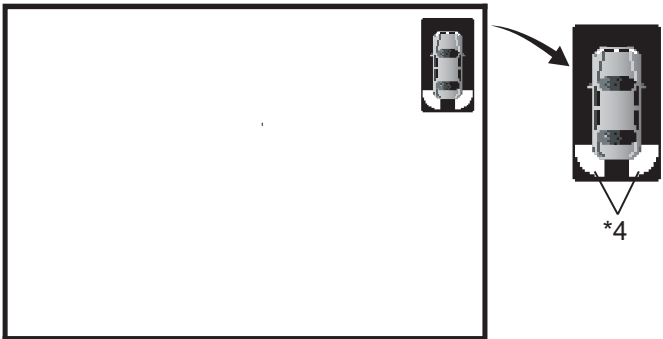
Multi-information Display



Multi-display



*Multi-display



*: with Rear View Monitor System

CUSTOMIZE PARAMETERS

1. CUSTOMIZE PARAMETERS (INTELLIGENT TESTER)

(a) The following items can be customized:

NOTICE:

- When the customer requests a change in a function, first make sure that the function can be customized.
- Be sure to make a note of the current settings before customizing.
- When troubleshooting a function, first make sure that the function is set to the default setting.

Warning

DISPLAY	DEFAULT	CONTENTS	SETTING
RR SENSOR RANGE	WIDE	Function to set buzzer activation range (for rear center sensors)	NARROW / WIDE
KEEP SENSE BUZ	AVAIL	Function to make buzzer sound when distance between vehicle and obstacle does not change for more than 3 seconds	NOT AVAIL / AVAIL
F & R BUZZER VOL	M2	Function to change volume of buzzer	L / M1 / M2 / M3 / H

Sensor:

DISPLAY	DEFAULT	CONTENTS	SETTING
SENSOR COND/N	AVAIL	Function to make sensors available when shift position is N	NOT AVAIL / AVAIL

Display:

DISPLAY	DEFAULT	CONTENTS	SETTING
DISPLAY MODE	ALL	Function to change display mode	ALL / UNDISP

PROBLEM SYMPTOMS TABLE

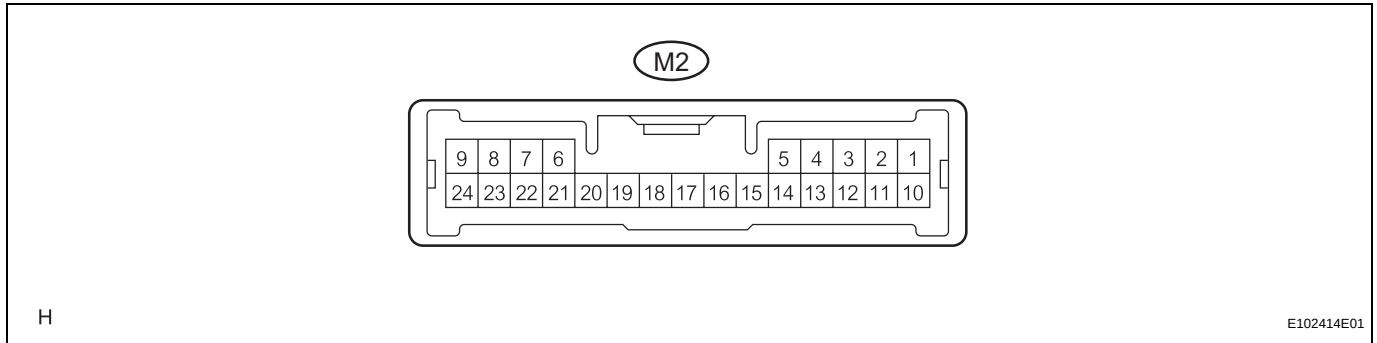
INTUITIVE PARKING ASSIST SYSTEM:

Symptom	Suspected Area	See page
System does not operate at all (self-check function does not operate)	1. Clearance warning ECU power source circuit	PM-76
	2. Clearance sonar main switch circuit	PM-66
	3. Clearance warning ECU assembly	-
Ultrasonic sensor (clearance sonar) does not operate (self-check function does not operate)	1. Front left sensor (ultrasonic sensor) malfunction	PM-33
	2. Front right sensor (ultrasonic sensor) malfunction	PM-35
	3. Rear left sensor (ultrasonic sensor) malfunction	PM-38
	4. Rear right sensor (ultrasonic sensor) malfunction	PM-49
	5. Clearance warning ECU assembly	-
Ultrasonic sensor (back sensor) does not operate (self-check function does not operate)	1. Rear left center sensor (ultrasonic sensor) malfunction	PM-41
	2. Rear right center sensor (ultrasonic sensor) malfunction	PM-45
	3. Clearance warning ECU assembly	-
Sonar detection operation is normal but buzzer operation is intermittent	1. Clearance warning buzzer circuit	PM-72
	2. Clearance warning ECU assembly	-
Detection operation is normal but sonar displays do not appear on multi-information display	1. Vehicle wire harness or connector (CAN communication)	CA-11
	2. Clearance warning ECU assembly	-
	3. Combination meter assembly	-
Detection operation is normal but sonar displays do not appear on multi-display	1. Vehicle wire harness or connector (CAN communication)	CA-11
	2. Clearance warning ECU assembly	-
	3. Multi-display	-
Open circuit is displayed as a result of self-check	1. Front left sensor (ultrasonic sensor) malfunction	PM-33
	2. Front right sensor (ultrasonic sensor) malfunction	PM-35
	3. Rear left sensor (ultrasonic sensor) malfunction	PM-35
	4. Rear right sensor (ultrasonic sensor) malfunction	PM-49
	5. Rear left center sensor (ultrasonic sensor) malfunction	PM-41
	6. Rear right center sensor (ultrasonic sensor) malfunction	PM-45
Operating indicator does not illuminate	1. Clearance sonar main switch circuit	PM-66
	2. Clearance warning ECU assembly	-
Freeze condition is displayed as a result of self-check	1. Remove ice, mud or snow from the ultrasonic sensor	-
Combination meter operates normally, but detection operates when shift lever position is P, or detection does not operate when shift lever is not in P	1. Vehicle wire harness or connector (CAN communication)	CA-11
	2. Clearance warning ECU assembly	-
Combination meter operates normally but errors occur when vehicle speed exceeds 10 km/h (6 mph)	1. Vehicle wire harness or connector (CAN communication)	CA-11
	2. Clearance warning ECU	-
	3. Combination meter	-
System operates with shift lever not in R, or does not operate with shift lever in R position (rear ultrasonic sensor)	1. Vehicle wire harness or connector (CAN communication)	CA-11
	2. Clearance warning ECU assembly	-

TERMINALS OF ECU

1. CHECK CLEARANCE WARNING ECU

(a) Disconnect the M2 ECU connector.



(b) Measure the resistance and voltage between each terminal of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
CLSW (M2-1) - E (M2-21)	Y - W-B	Clearance sonar main switch signal	Engine switch off	Below 1 V
			Engine switch on (IG), clearance sonar main switch ON	10 to 14 V
IG (M2-10) - E (M2-21)	B - W-B	IG signal / IG power source signal	Engine switch off	Below 1 V
			Engine switch on (IG)	10 to 14 V
E (M2-21) - Body ground	W-B - Body ground	ECU ground	Always	Below 1 Ω

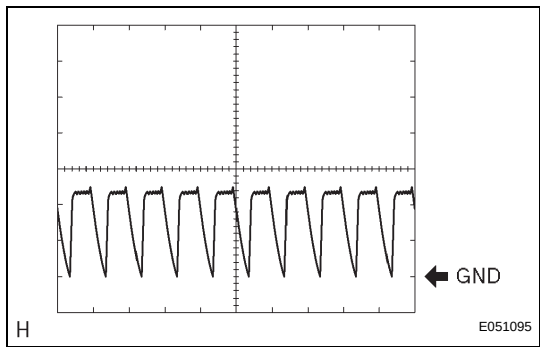
If the result is not as specified, there may be a malfunction on the wire harness side.

(c) Reconnect the M2 ECU connector.

(d) Measure the resistance and voltage according to the value(s) in the table below.

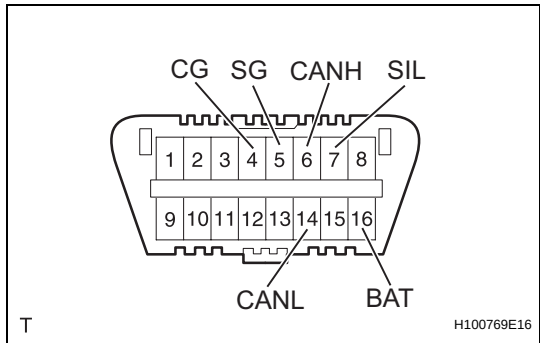
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
L1 (M2-2) - E (M2-21)	P - W-B	Clearance sonar main switch indicator signal	Engine switch on (IG), clearance sonar main switch OFF	10 to 14 V
			Engine switch on (IG), clearance sonar main switch ON	Below 1 V
BOR (M2-7) - E (M2-21)	L - W-B	Rear sensor circuit power source	Engine switch off	Below 1 V
			Engine switch on (IG)	7 to 9 V
BOF (M2-9) - E (M2-21)	V - W-B	Front sensor circuit power source	Engine switch off	Below 1 V
			Engine switch on (IG)	7 to 9 V
CBZ (M2-12) - E (M2-21)	W - W-B	Clearance warning buzzer signal	Buzzer not sounding	Below 1 V
			Buzzer sounding	Waveform 1
E2 (M2-22) - E (M2-21)	G - W-B	Rear sensor circuit ground	Always	Below 1 Ω
E1 (M2-24) - E (M2-21)	GR - W-B	Front sensor circuit ground	Always	Below 1 Ω

If the result is not as specified, the ECU may have a malfunction.



(e) Reference:
(1) Waveform 1

Item	Content
Symbols (Terminal No.)	CBZ (M2-12) - E (M2-21)
Tool Setting	2 V/DIV., 1 msec./DIV.
Condition	Buzzer sounding



DIAGNOSIS SYSTEM

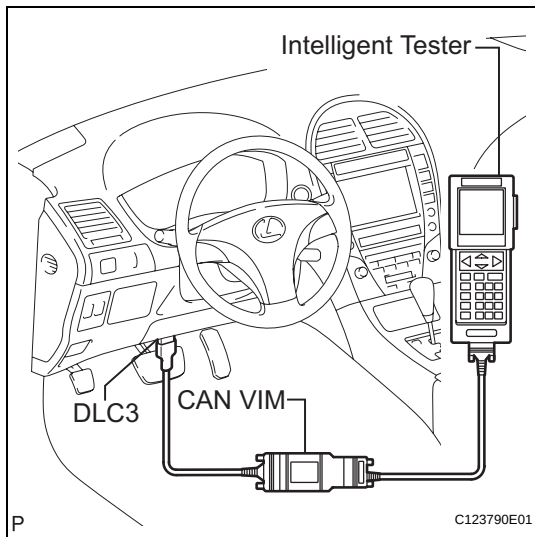
1. CHECK DLC3
- (a) The vehicle's ECU uses ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

Symbols (Terminal No.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	10 to 14 V
CANH (6) - CANL (14)	CAN bus line	Engine switch OFF*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Engine switch OFF*	200 Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Engine switch OFF*	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Engine switch OFF*	6 kΩ or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Engine switch OFF*	6 kΩ or higher

NOTICE:

***: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the engine switch, any other switches or the doors.**

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.



- (b) Connect the cable of the intelligent tester (with CAN VIM) to the DLC3, turn the engine switch on (IG) and attempt to use the intelligent tester. If the screen displays a communication error message, a problem exists on the vehicle side or tester side.

HINT:

- If communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself. Consult the Service Department listed in the tool's instruction manual.

DTC CHECK / CLEAR

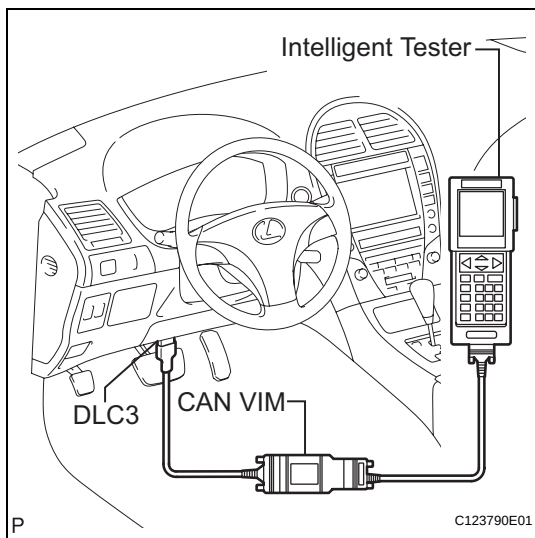
1. CHECK DTC

- (a) Connect the intelligent tester to the Controller Area Network Vehicle Interface Module (CAN VIM). Then connect the CAN VIM to the DLC3.
- (b) Turn the engine switch on (IG).
- (c) Read the DTCs by following the directions on the tester screen.

HINT:

Refer to the intelligent tester operator's manual for further details.

PM

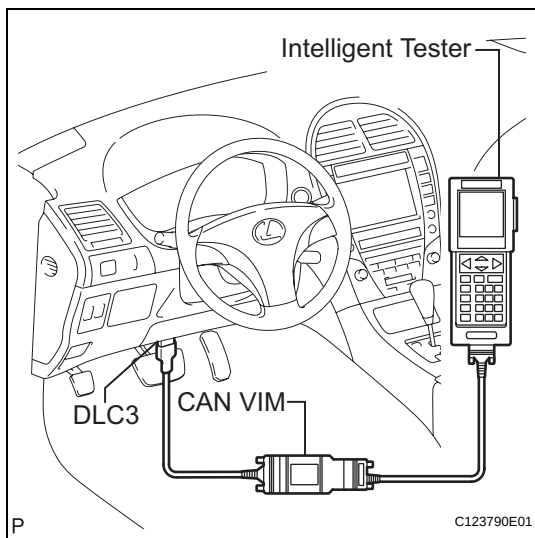


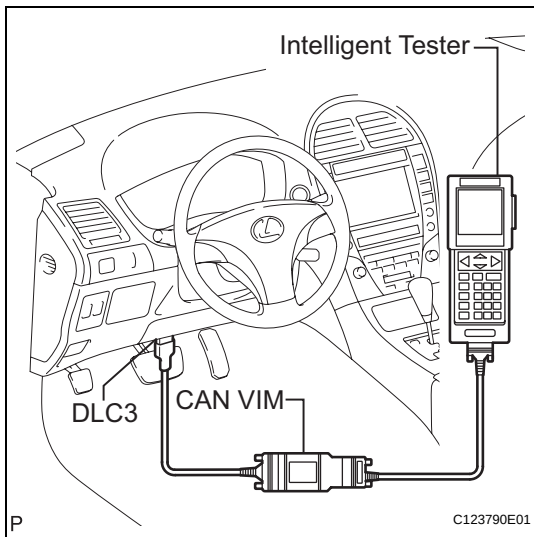
2. CLEAR DTC

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the engine switch on (IG).
- (c) Erase the DTCs by following the directions on the tester's screen.

HINT:

Refer to the intelligent tester operator's manual for further details.





DATA LIST / ACTIVE TEST

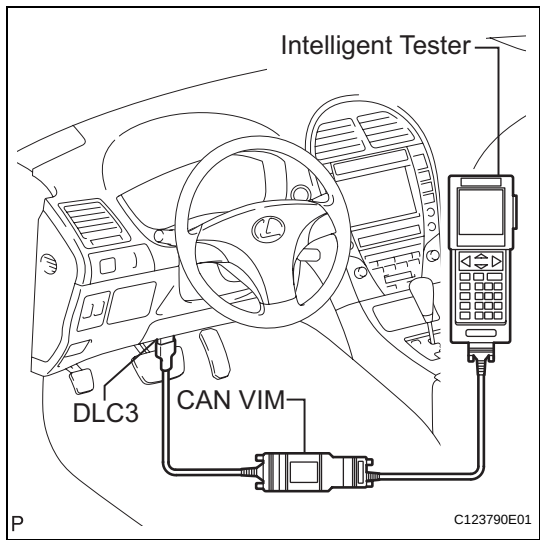
1. READ DATA LIST

- Connect the intelligent tester to the DLC3.
- Turn the engine switch on (IG).
- Operate the intelligent tester according to the display and select "Data List".

Clearance warning ECU:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
MAIN SW	Clearance sonar main switch / OFF or ON	OFF: Clearance sonar main switch OFF ON: Clearance sonar main switch ON	-
ECU TYPE	Type of clearance warning ECU / NORMAL or STEER	NORMAL: Normal clearance sonar type	STEER: Steering sensing type
FL SENS	Front left sensor information / UNDTCT, LONG, M LONG, MIDDLE, CLOSE, FREEZE, OPEN or BLINK	UNDTCT: Not detected LONG: Detected (long-range) M LONG: Detected (mid long-range) MIDDLE: Detected (medium-range) CLOSE: Detected (close-range) OPEN: Open (Open in sensor) FREEZE: Freeze (Sensor is frozen) BLINK: Blink (All displays blinking)	-
FR SENS	Front right sensor information / UNDTCT, LONG, M LONG, MIDDLE, CLOSE, FREEZE, OPEN or BLINK	UNDTCT: Not detected LONG: Detected (long-range) M LONG: Detected (mid long-range) MIDDLE: Detected (medium-range) CLOSE: Detected (close-range) OPEN: Open (Open in sensor) FREEZE: Freeze (Sensor is frozen) BLINK: Blink (All displays blinking)	-
RL SENS	Rear left sensor information / UNDTCT, LONG, MIDDLE, CLOSE, FREEZE, OPEN or BLINK	UNDTCT: Not detected LONG: Detected (long-range) M LONG: Detected (mid long-range) MIDDLE: Detected (medium-range) CLOSE: Detected (close-range) OPEN: Open (Open in sensor) FREEZE: Freeze (Sensor is frozen) BLINK: Blink (All displays blinking)	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RL CENTER SENS	Rear left center sensor information / UNDTCT, LONG, MIDDLE, CLOSE, FREEZE, OPEN or BLINK	UNDTCT: Not detected LONG: Detected (long-range) M LONG: Detected (mid long-range) MIDDLE: Detected (medium-range) CLOSE: Detected (close-range) OPEN: Open (Open in sensor) FREEZE: Freeze (Sensor is frozen) BLINK: Blink (All displays blinking)	-
RR CENTER SENS	Rear right center sensor information / UNDTCT, LONG, MIDDLE, CLOSE, FREEZE, OPEN or BLINK	UNDTCT: Not detected LONG: Detected (long-range) M LONG: Detected (mid long-range) MIDDLE: Detected (medium-range) CLOSE: Detected (close-range) OPEN: Open (Open in sensor) FREEZE: Freeze (Sensor is frozen) BLINK: Blink (All displays blinking)	-
RR SENS	Rear right sensor information / UNDTCT, LONG, MIDDLE, CLOSE, FREEZE, OPEN or BLINK	UNDTCT: Not detected LONG: Detected (long-range) M LONG: Detected (mid long-range) MIDDLE: Detected (medium-range) CLOSE: Detected (close-range) OPEN: Open (Open in sensor) FREEZE: Freeze (Sensor is frozen) BLINK: Blink (All displays blinking)	-
PARKING SIGNAL	Parking signal / OFF or ON	OFF: Except P position ON: Shift lever position is P	-
REVERSE SIGNAL	Reverse signal / OFF or ON	OFF: Except R position ON: Shift lever position is R	-
VEHICLE SPEED	Vehicle speed signal / SN STOP or SN WORK	SN STOP: Vehicle speed is 10 km/h or more SN WORK: Vehicle speed is below 10 km/h	-
SONAR DETECTION	Sonar detection condition / STOP or WORK	STOP: Sonar detection is not operating WORK: Sonar detection is operating	-
# CODE	Number DTCs recorded / Min.: 0 or Max.: 255	-	-



- 2. PERFORM ACTIVE TEST**
- (a) Connect the intelligent tester to the DLC3.
 - (b) Turn the engine switch on (IG).
 - (c) Following the display on the intelligent tester, perform the "Active Test".

Clearance warning ECU:

Tester Display	Test Part	Control Range	Diagnostic Note
BUZZER	Rear buzzer (Clearance warning buzzer)	STOP or OPERATE	-

DIAGNOSTIC TROUBLE CODE CHART

INTUITIVE PARKING ASSIST SYSTEM

DTC Code	Detection Item	Trouble Area	See page
C1AE1	Front Left Sensor Malfunction	1. No. 1 ultrasonic sensor (Front left sensor) 2. Clearance warning ECU assembly	PM-33
C1AE4	Front Right Sensor Malfunction	1. No. 1 ultrasonic sensor (Front right sensor) 2. Wire harness 3. Clearance warning ECU assembly	PM-35
C1AE6	Rear Left Sensor Malfunction	1. No. 1 ultrasonic sensor (Rear left sensor) 2. Wire harness 3. Clearance warning ECU assembly	PM-38
C1AE7	Rear Left Center Sensor Malfunction	1. No. 1 ultrasonic sensor (Rear left center sensor) 2. Wire harness 3. Clearance warning ECU assembly	PM-41
C1AE8	Rear Right Center Sensor Malfunction	1. No. 1 ultrasonic sensor (Rear right center sensor) 2. Wire harness 3. Clearance warning ECU assembly	PM-45
C1AE9	Rear Right Sensor Malfunction	1. No. 1 ultrasonic sensor (Rear right sensor) 2. Clearance warning ECU assembly	PM-49
C1AEC	Front Sensor Communication Malfunction	1. Front No. 1 ultrasonic sensor circuit 2. Clearance warning ECU assembly	PM-51
C1AED	Rear Sensor Communication Malfunction	1. Rear No. 1 ultrasonic sensor circuit 2. Clearance warning ECU assembly	PM-57

DTC**C1AE1****Front Left Sensor Malfunction****DESCRIPTION**

The No. 1 ultrasonic sensor (front left sensor) is installed on the front bumper. The clearance warning ECU detects obstacles based on signals received from the front left sensor. If the front left sensor has an open or other malfunction, it will not function normally.

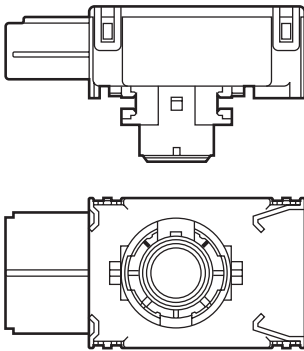
DTC No.	DTC Detection Condition	Trouble Area
B2232	Malfunction of No. 1 ultrasonic sensor (Front left sensor)	- No. 1 ultrasonic sensor (Front left sensor) - Clearance warning ECU assembly

INSPECTION PROCEDURE**1****CHECK DTC OUTPUT**

- (a) Delete the DTCs (See page [PM-28](#)).
 (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTC C1AE1 is output	A
No DTCs is output	B

B**USE SIMULATION METHOD TO CHECK****A****2****REPLACE NO. 1 ULTRASONIC SENSOR (FRONT LEFT SENSOR)****No. 1 Ultrasonic Sensor:**

H

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- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT**3****CHECK DTC OUTPUT**

- (a) Delete the DTCs (See page [PM-28](#)).
 (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTC C1AE1 is output	A
No DTCs is output	B



REPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))

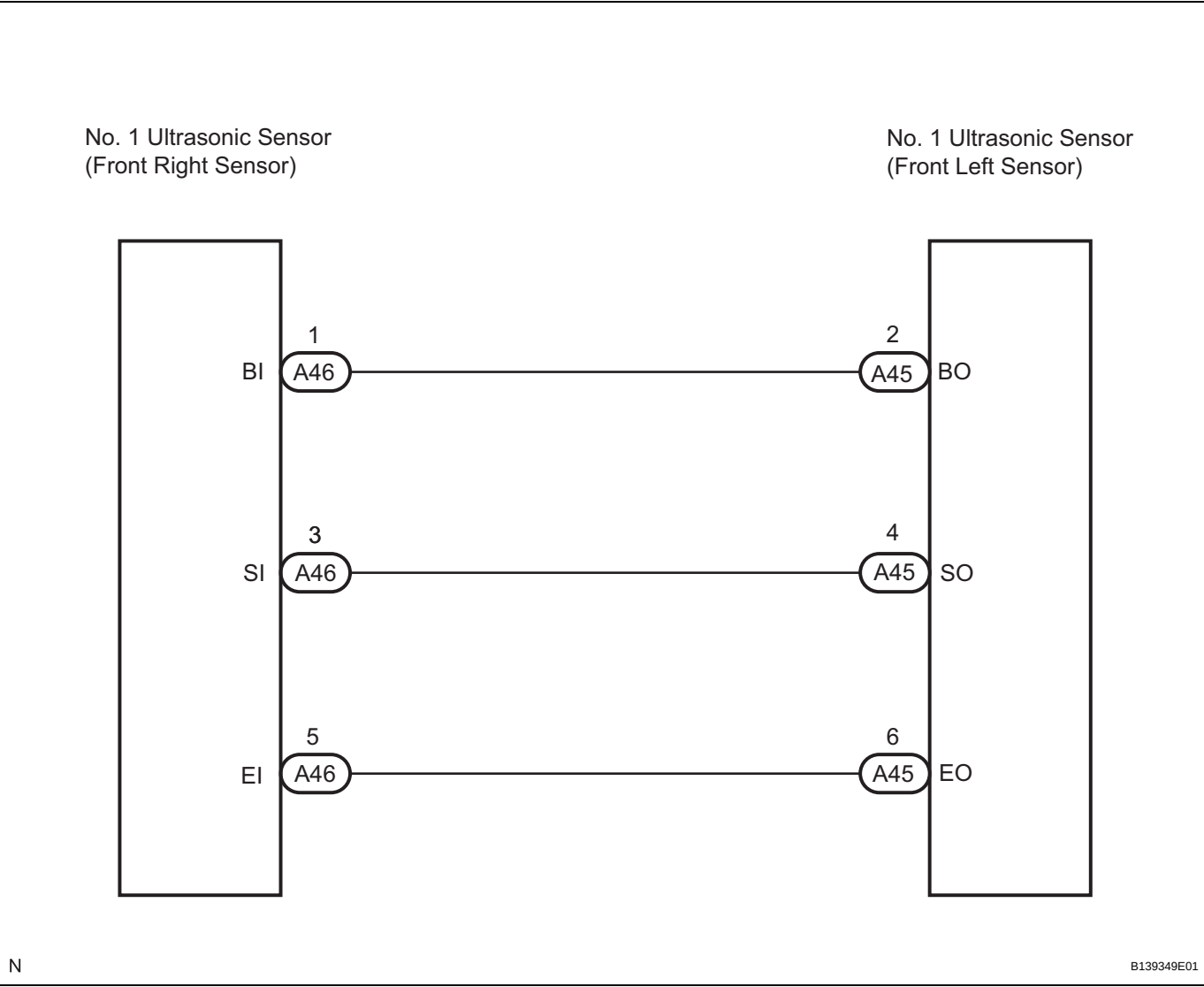
DTC	C1AE4	Front Right Sensor Malfunction
-----	-------	--------------------------------

DESCRIPTION

The No. 1 ultrasonic sensor (front right sensor) is installed on the front bumper. The clearance warning ECU detects obstacles based on signals received from the front right sensor. If the front right sensor has an open circuit or other malfunction, it will not function normally.

DTC No.	DTC Detection Condition	Trouble Area
B2232	Malfunction of No. 1 ultrasonic sensor (Front right sensor)	- No. 1 ultrasonic sensor (Front right sensor) - Wire harness (Front right sensor - Front left sensor) - Clearance warning ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK DTC OUTPUT
---	------------------

- (a) Delete the DTCs (See page [PM-28](#)).
- (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTC C1AE4 is output	A
No DTC is output	B

B

USE SIMULATION METHOD TO CHECK

A

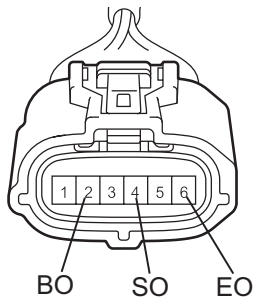
2

CHECK HARNESS AND CONNECTOR (FRONT LEFT SENSOR - FRONT RIGHT SENSOR)

Wire Harness Side Connector Front View:

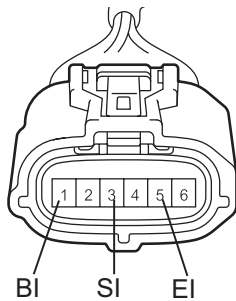
A45

No. 1 Ultrasonic Sensor (Front Left Sensor)



A46

No. 1 Ultrasonic Sensor (Front Right Sensor)



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- (a) Disconnect the A45 and A46 sensor connectors.
 (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A45-2 (BO) - A46-1 (BI)	Always	Below 1 Ω
A45-4 (SO) - A46-3 (SI)		
A45-6 (EO) - A46-5 (EI)		
A45-2 (BO) - Body ground		10 k Ω or higher
A45-4 (SO) - Body ground		
A45-6 (EO) - Body ground		

NG

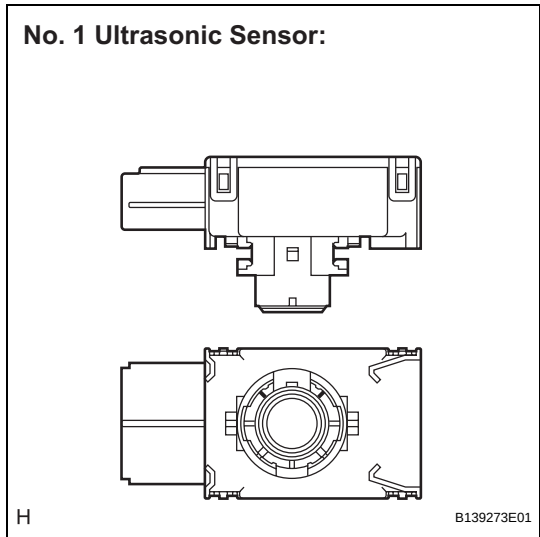
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PM

3

REPLACE NO. 1 ULTRASONIC SENSOR (FRONT RIGHT SENSOR)



- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT

4

CHECK DTC OUTPUT

PM

- (a) Delete the DTCs (See page [PM-28](#)).
(b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTC C1AE4 is output	A
No DTC is output	B

A

B

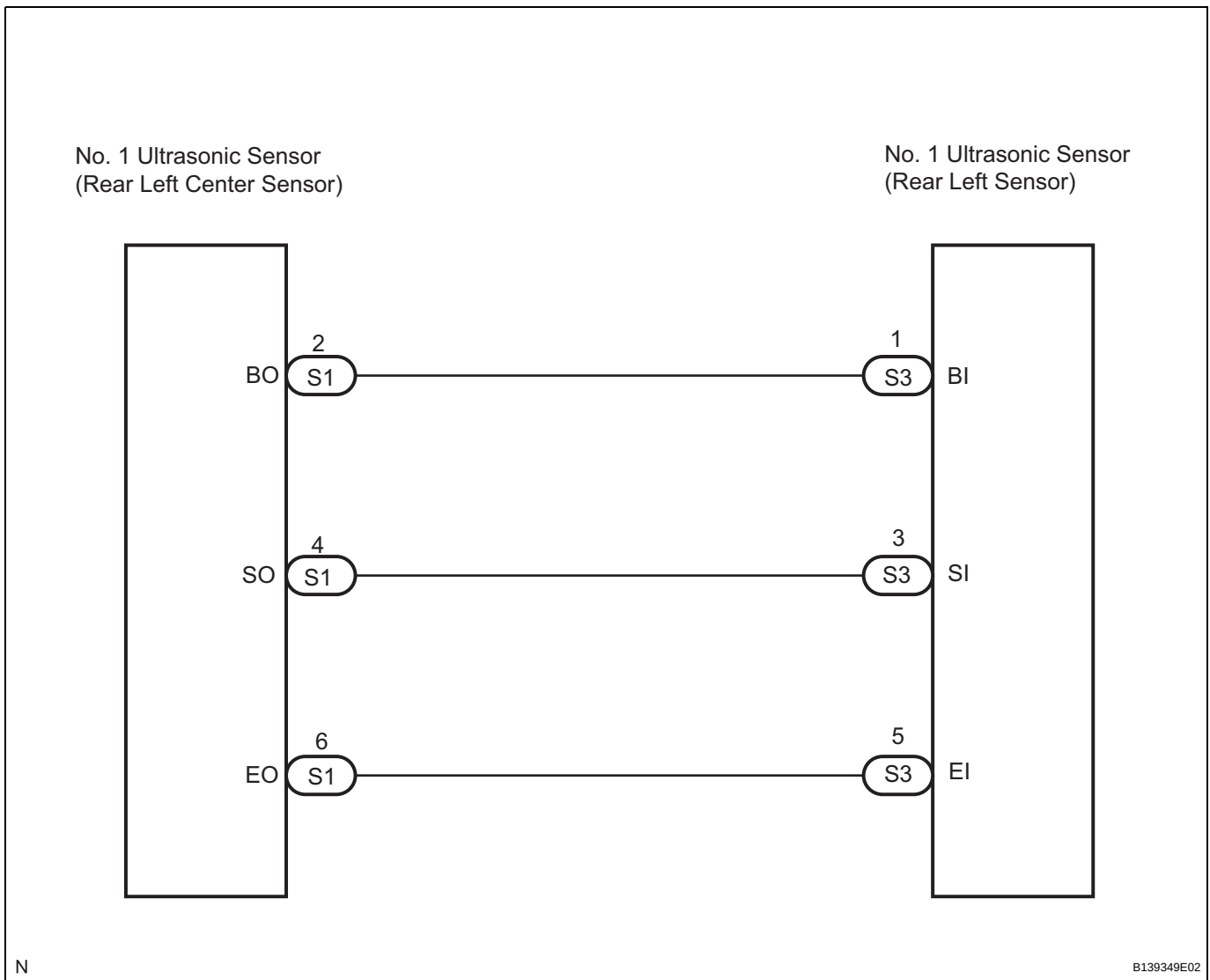
END

REPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))

DTC**C1AE6****Rear Left Sensor Malfunction****DESCRIPTION**

The No. 1 ultrasonic sensor (rear left sensor) is installed on the front bumper. The clearance warning ECU detects obstacles based on signals received from the rear left sensor. If the rear left sensor has an open circuit or other malfunction, it will not function normally.

DTC No.	DTC Detection Condition	Trouble Area
C1AE6	Malfunction of No. 1 ultrasonic sensor (Rear left sensor)	- No. 1 ultrasonic sensor (Rear left sensor) - Wire harness (Rear left sensor - Rear left center sensor) - Clearance warning ECU assembly

WIRING DIAGRAM**PM****INSPECTION PROCEDURE****1****CHECK DTC OUTPUT**

- Delete the DTCs (See page [PM-28](#)).
- Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTC C1AE6 is output	A
No DTC is output	B

B

USE SIMULATION METHOD TO CHECK

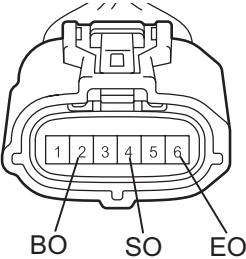
A

2

CHECK HARNESS AND CONNECTOR (REAR LEFT SENSOR - REAR LEFT CENTER SENSOR)

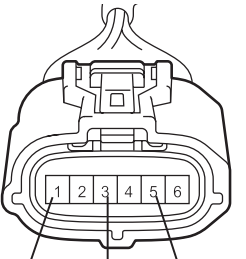
Wire Harness Side Connector Front View:

S1
No. 1 Ultrasonic Sensor
(Rear Left Center Sensor)



BO SO EO

S3
No. 1 Ultrasonic Sensor (Rear Left Sensor)



BI SI EI

H

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- (a) Disconnect the S1 and S3 sensor connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

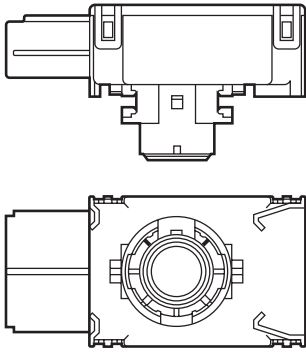
Tester Connection	Condition	Specified Condition
S1-2 (BO) - S3-1 (BI)	Always	Below 1 Ω
S1-4 (SO) - S3-3 (SI)		
S1-6 (EO) - S3-5 (EI)		
S1-2 (BO) - Body ground		10 kΩ or higher
S1-4 (SO) - Body ground		
S1-6 (EO) - Body ground		

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PM

3 REPLACE NO. 1 ULTRASONIC SENSOR (REAR LEFT SENSOR)**No. 1 Ultrasonic Sensor:**

H

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- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT**4 CHECK DTC OUTPUT**

- (a) Delete the DTCs (See page [PM-28](#)).
(b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTC C1AE6 is output	A
No DTC is output	B

B**END****A****PM****REPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))**

DTC**C1AE7****Rear Left Center Sensor Malfunction****DESCRIPTION**

The No. 1 ultrasonic sensor (rear left center sensor) is installed on the front bumper. The clearance warning ECU detects obstacles based on signals received from the rear left center sensor. If the rear left center sensor has an open circuit or other malfunction, it will not function normally.

DTC Combination Table

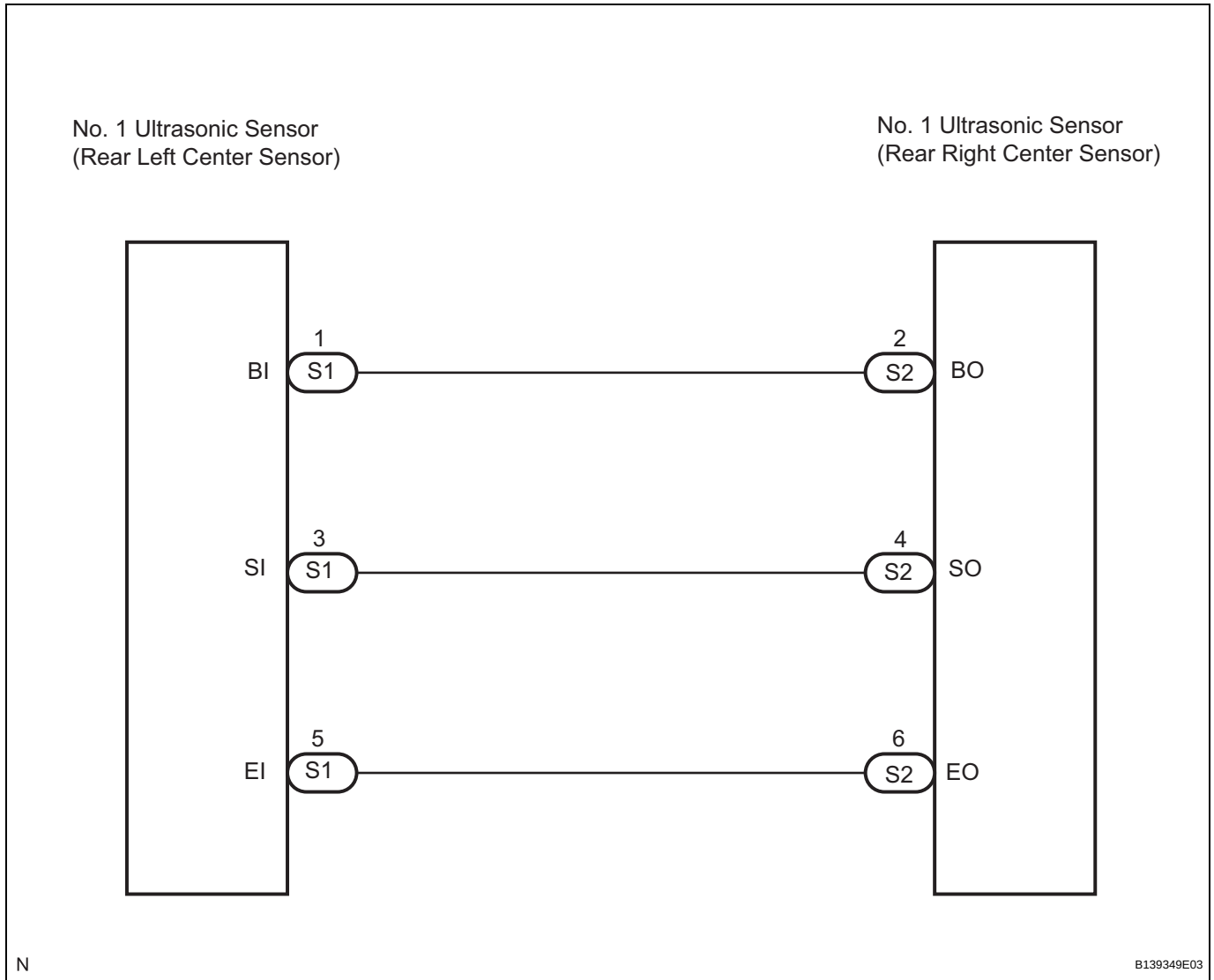
DTC NO.	C1AE6	C1AE7	C1AE8	C1AE9	Trouble Area
DTC Detection Condition	○	○	-	-	1. Rear left center sensor malfunction 2. Open in wire harness between rear right center sensor and rear left center sensor 3. Clearance warning ECU malfunction
	-	○	-	-	Rear left center sensor malfunction

○: DTC is output

-: DTC is not output

DTC No.	DTC Detection Condition	Trouble Area
C1AE7	Malfunction of No. 1 ultrasonic sensor (Rear left center sensor)	- No. 1 ultrasonic sensor (rear left center sensor) - Wire harness (rear left center sensor - rear right center sensor) - Clearance warning ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK DTC OUTPUT

- Delete the DTCs (See page [PM-28](#)).
- Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE6 and C1AE7 are output	A
DTC C1AE7 is output	B
No DTC is output	C

B

Go to step 3

C

USE SIMULATION METHOD TO CHECK

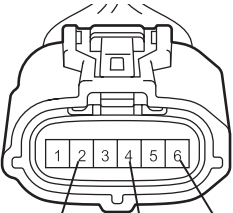
A

2

CHECK HARNESS AND CONNECTOR (REAR LEFT CENTER SENSOR - REAR RIGHT CENTER SENSOR)

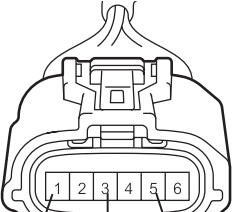
Wire Harness Side Connector Front View:

S2
No. 1 Ultrasonic Sensor
(Rear Right Center Sensor)



BO SO EO

S1
No. 1 Ultrasonic Sensor
(Rear Left Center Sensor)



BI SI EI

H

B139278E03

- (a) Disconnect the S2 and S1 sensor connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
S2-2 (BO) - S1-1 (BI)	Always	Below 1 Ω
S2-4 (SO) - S1-3 (SI)		
S2-6 (EO) - S1-5 (EI)		
S2-2 (BO) - Body ground	Always	10 kΩ or higher
S2-4 (SO) - Body ground		
S2-6 (EO) - Body ground		

NG

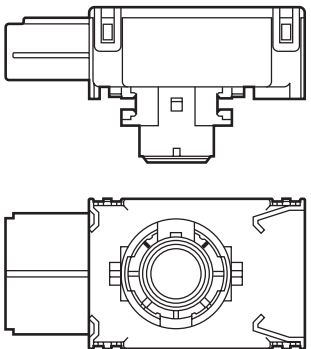
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

REPLACE NO. 1 ULTRASONIC SENSOR (REAR LEFT CENTER SENSOR)

No. 1 Ultrasonic Sensor:



H

B139273E01

- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT

4

CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [PM-28](#)).
- (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE6 and C1AE7 are output	A
No DTC is output	B

B

END

AREPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))

DTC**C1AE8****Rear Right Center Sensor Malfunction****DESCRIPTION**

The No. 1 ultrasonic sensor (rear right center sensor) is installed on the front bumper. The clearance warning ECU detects obstacles based on signals received from the rear right center sensor. If the rear right center sensor has an open circuit or other malfunction, it will not function normally.

DTC Combination Table

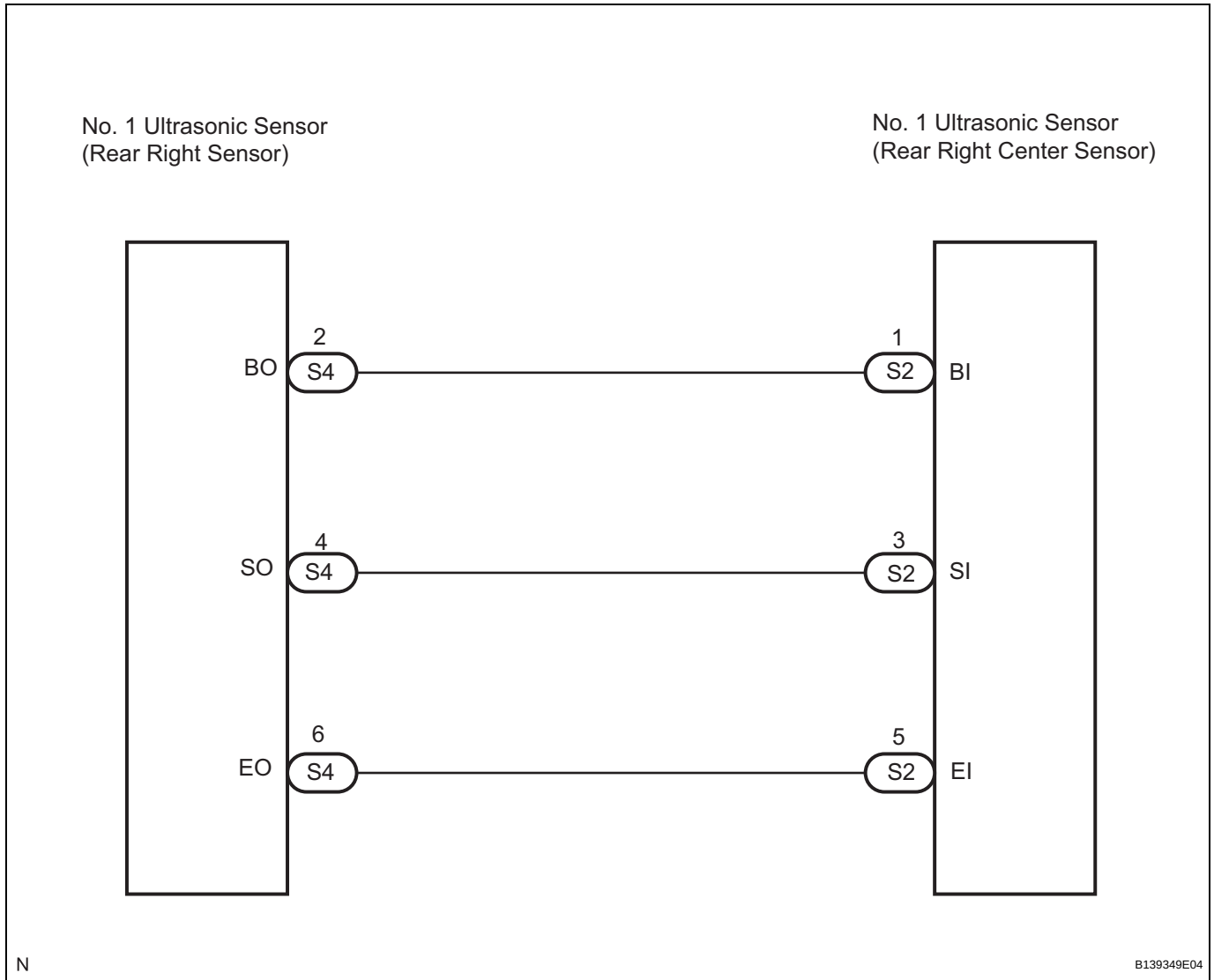
DTC NO.	C1AE6	C1AE7	C1AE8	C1AE9	Trouble Area
DTC Detection Condition	○	○	○	-	1. Rear right center sensor malfunction 2. Open in wire harness between rear right center sensor and rear right sensor 3. Clearance warning ECU malfunction
	-	-	○	-	Rear right center sensor malfunction

○: DTC is output

-: DTC is not output

DTC No.	DTC Detection Condition	Trouble Area
C1AE8	Malfunction of No. 1 ultrasonic sensor (Rear right center sensor)	- No. 1 ultrasonic sensor (rear right center sensor) - Wire harness (rear right center sensor - right sensor) - Clearance warning ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [PM-28](#)).
 (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE6, C1AE7 and C1AE8 are output	A
DTC C1AE8 is output	B
No DTC is output	C

B

Go to step 3

C

USE SIMULATION METHOD TO CHECK

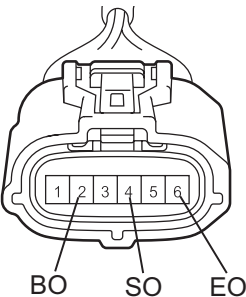
A

2

CHECK HARNESS AND CONNECTOR (REAR RIGHT CENTER SENSOR - REAR RIGHT SENSOR)

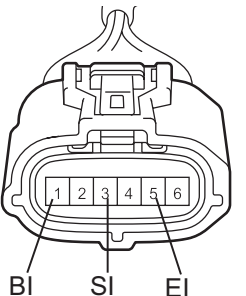
Wire Harness Side Connector Front View:

S4
No. 1 Ultrasonic Sensor (Rear Right Sensor)



BO SO EO

S2
No. 1 Ultrasonic Sensor (Rear Right Center Sensor)



BI SI EI

H

B139278E02

- (a) Disconnect the S4 and S2 sensor connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
S4-2 (BO) - S2-1 (BI)	Always	Below 1 Ω
S4-4 (SO) - S2-3 (SI)		
S4-6 (EO) - S2-5 (EI)		
S4-2 (BO) - Body ground	Always	10 kΩ or higher
S4-4 (SO) - Body ground		
S4-6 (EO) - Body ground		

NG

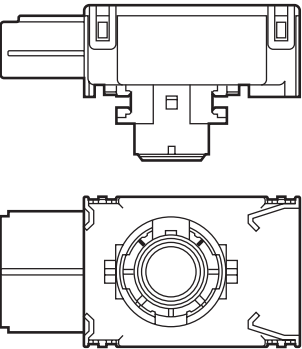
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

REPLACE NO. 1 ULTRASONIC SENSOR (REAR RIGHT CENTER SENSOR)

No. 1 Ultrasonic Sensor:



H

B139273E01

- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT

4

CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [PM-28](#)).
- (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE6, C1AE7 and C1AE8 are output	A
No DTC is output	B

B

END

AREPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))

DTC**C1AE9****Rear Right Sensor Malfunction****DESCRIPTION**

The No. 1 ultrasonic sensor (rear right sensor) is installed on the front bumper. The clearance warning ECU detects obstacles based on signals received from the rear right sensor. If the rear right sensor has an open or other malfunction, it will not function normally.

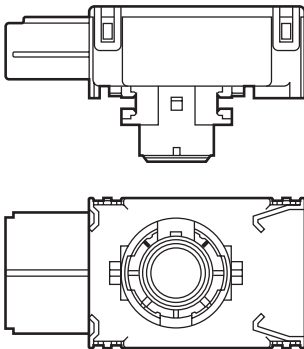
DTC No.	DTC Detection Condition	Trouble Area
C1AE9	Malfunction of No. 1 ultrasonic sensor (rear right sensor)	- No. 1 ultrasonic sensor (rear right sensor) - Clearance warning ECU assembly

INSPECTION PROCEDURE**1 CHECK DTC OUTPUT**

- (a) Delete the DTCs (See page [PM-28](#)).
 (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTC C1AE9 is output	A
No DTC is output	B

B**USE SIMULATION METHOD TO CHECK****A****2 REPLACE NO. 1 ULTRASONIC SENSOR (REAR RIGHT SENSOR)****No. 1 Ultrasonic Sensor:**

H

B139273E01

- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT**3 CHECK DTC OUTPUT**

- (a) Delete the DTCs (See page [PM-28](#)).
 (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTC C1AE9 is output	A
No DTC is output	B



REPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))

DTC	C1AEC	Front Sensor Communication Malfunction
-----	-------	--

DESCRIPTION

This DTC is stored when there is an open or short circuit in the communication line between the front sensors and the clearance warning ECU, or when there is a malfunction in a front sensor.

DTC Combination Table

DTC NO.	C1AEC	C1AE1	C1AE4	Trouble Area
DTC Detection Condition	○	○	○	1. Front left sensor malfunction 2. Front right sensor malfunction
	-	○	○	3. Open or short in wire harness between front left sensor and clearance warning ECU 4. Open or short in wire harness between front left sensor and front right sensor 5. Clearance warning ECU malfunction

○: DTC is output
-: DTC is not output

PM

Front No. 1 Ultrasonic Sensor Position:

No. 1 Ultrasonic Sensor (Front Right Sensor)

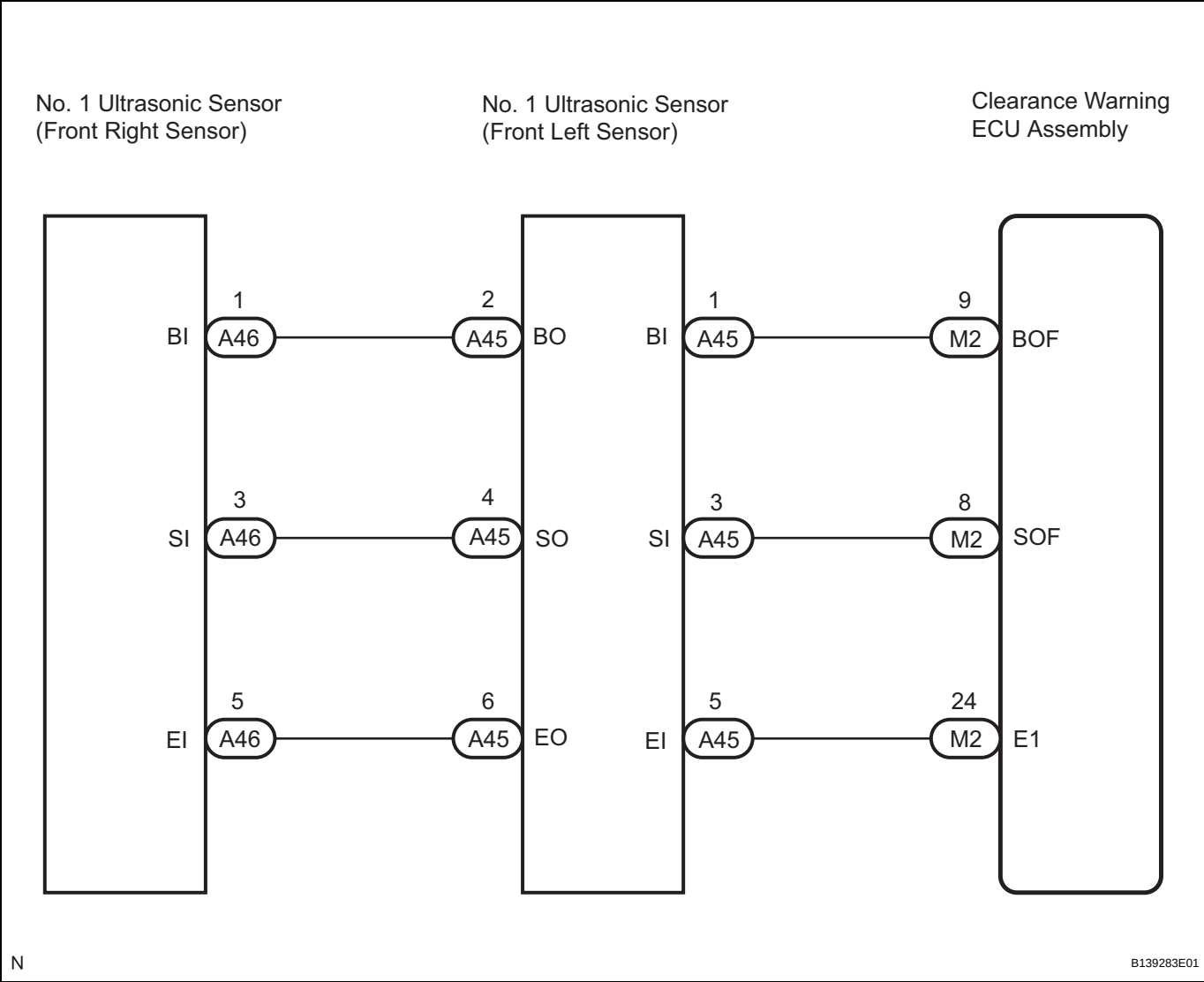
No. 1 Ultrasonic Sensor (Front Left Sensor)

H

B139270E02

DTC No.	DTC Detection Condition	Trouble Area
C1AEC	Malfunctions of all front sensors are detected during initialization mode after the engine switch is turned on (IG)	- Front No. 1 ultrasonic sensor circuit - Clearance warning ECU assembly

WIRING DIAGRAM



PM

INSPECTION PROCEDURE

1	CHECK DTC OUTPUT
---	------------------

- (a) Delete the DTCs (See page [PM-28](#)).
- (b) Turn the engine switch off.
- (c) Turn the engine switch on (IG).
- (d) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE1, C1AE4 and C1AEC are output	A
No DTCs are output	B

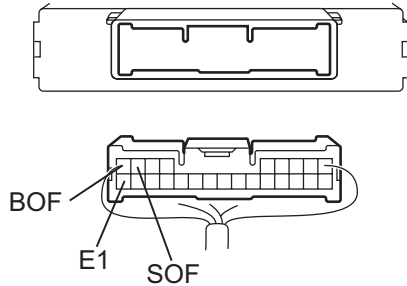
B	USE SIMULATION METHOD TO CHECK
---	--------------------------------



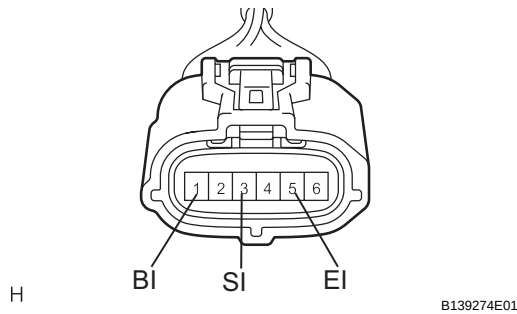
2

CHECK HARNESS AND CONNECTOR (CLEARANCE WARNING ECU - FRONT LEFT SENSOR)**Wire Harness Side Connector Rear View:**

M2
Clearance Warning ECU Assembly

**Wire Harness Side Connector Front View:**

A45
No. 1 Ultrasonic Sensor (Front Left Sensor)



B139274E01

- Disconnect the M2 ECU connector.
- Disconnect the A45 sensor connector.
- Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
M2-9 (BOF) - A45-1 (BI)	Always	Below 1 Ω
M2-8 (SOF) - A45-3 (SI)		
M2-24 (E1) - A45-5 (EI)		
M2-9 (BOF) - Body ground		10 k Ω or higher
M2-8 (SOF) - Body ground		
M2-24 (E1) - Body ground		

NG

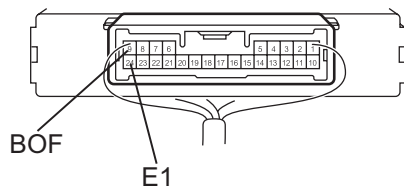
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

CHECK CLEARANCE WARNING ECU ASSEMBLY**Wire Harness Side Connector Rear View:**

M2
Clearance Warning ECU Assembly



H

B139288E01

- Reconnect the M2 ECU connector.
- Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
M2-24 (E1) - Body ground	Always	Below 1 Ω

- Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
M2-9 (BOF) - Body ground	Engine switch on (IG)	7 to 9 V

NG

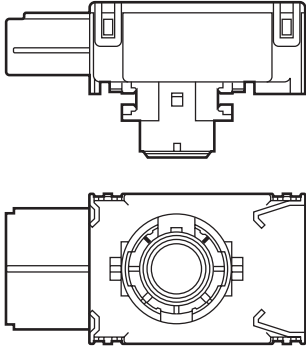
REPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))

OK

4

REPLACE NO. 1 ULTRASONIC SENSOR (FRONT LEFT SENSOR)

No. 1 Ultrasonic Sensor:



H

B139273E01

- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT

5

CHECK DTC OUTPUT

PM

- (a) Delete the DTCs (See page [PM-28](#)).
(b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE1, C1AE4 and C1AEC are output	A
No DTCs are output	B

B

END

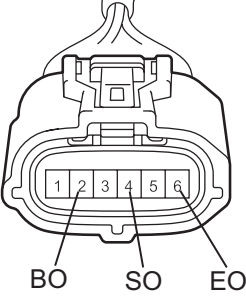
A

6

CHECK HARNESS AND CONNECTOR (FRONT LEFT SENSOR - FRONT RIGHT SENSOR)

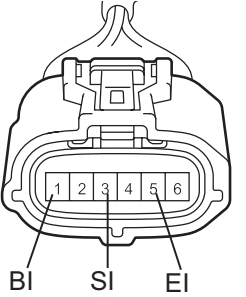
Wire Harness Side Connector Front View:

A45
No. 1 Ultrasonic Sensor (Front Left Sensor)



BO SO EO

A46
No. 1 Ultrasonic Sensor (Front Right Sensor)



BI SI EI

H

B139278E01

- (a) Disconnect the A45 and A46 sensor connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A45-2 (BO) - A46-1 (BI)	Always	Below 1 Ω
A45-4 (SO) - A46-3 (SI)		
A45-6 (EO) - A46-5 (EI)		
A45-2 (BO) - Body ground		10 kΩ or higher
A45-4 (SO) - Body ground		
A45-6 (EO) - Body ground		

NG

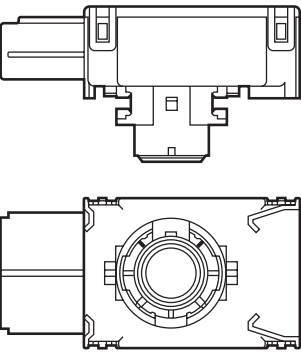
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7

REPLACE NO. 1 ULTRASONIC SENSOR (FRONT RIGHT SENSOR)

No. 1 Ultrasonic Sensor:



H

B139273E01

- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT

8 CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [PM-28](#)).
(b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE1, C1AE4 and C1AEC are output	A
No DTCs are output	B

B**END****A****REPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))**

DTC**C1AED****Rear Sensor Communication Malfunction****DESCRIPTION**

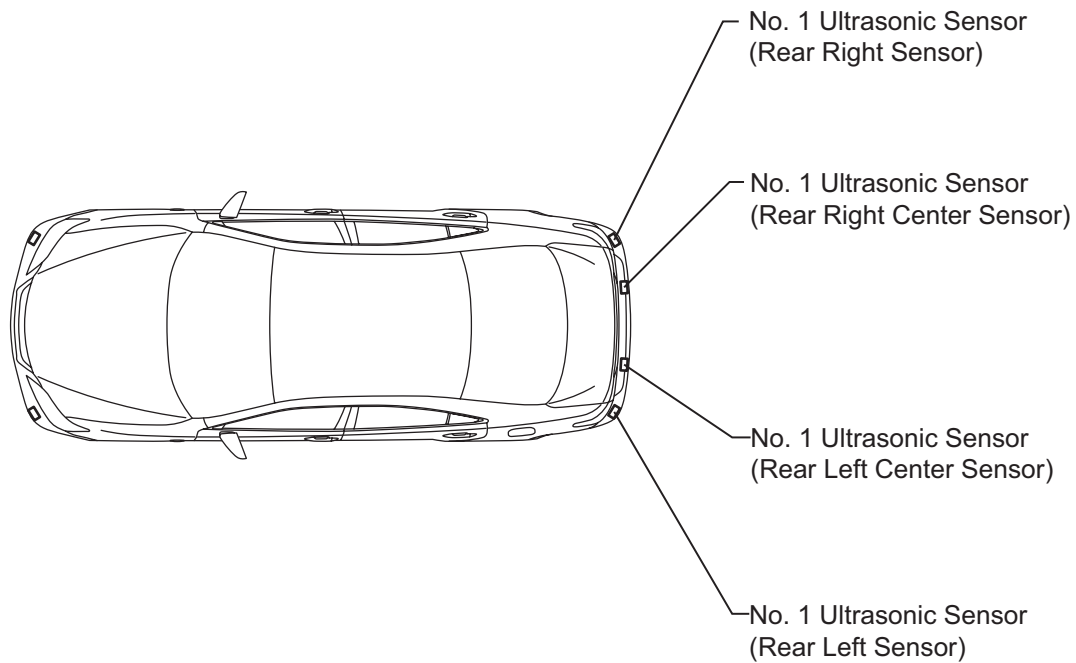
This DTC is stored when there is an open or short circuit in the communication line between the rear sensors and the clearance warning ECU, or when there is a malfunction in a rear sensor.

DTC Combination Table

DTC NO.	C1AED	C1AE6	C1AE7	C1AE8	C1AE9	Trouble Area
DTC Detection Condition	○	○	○	○	○	1. Rear right sensor malfunction 2. Rear right center sensor malfunction 3. Rear left center sensor malfunction 4. Rear left sensor malfunction 5. Open or short in wire harness between rear right sensor and clearance warning ECU 6. Open or short in wire harness between rear right center sensor and rear right center sensor 7. Open or short in wire harness between rear right center sensor and rear left center sensor 8. Open or short in wire harness between rear left center sensor and rear left sensor 9. Clearance warning ECU malfunction
	-	○	○	○	○	

○: DTC is output

-: DTC is not output

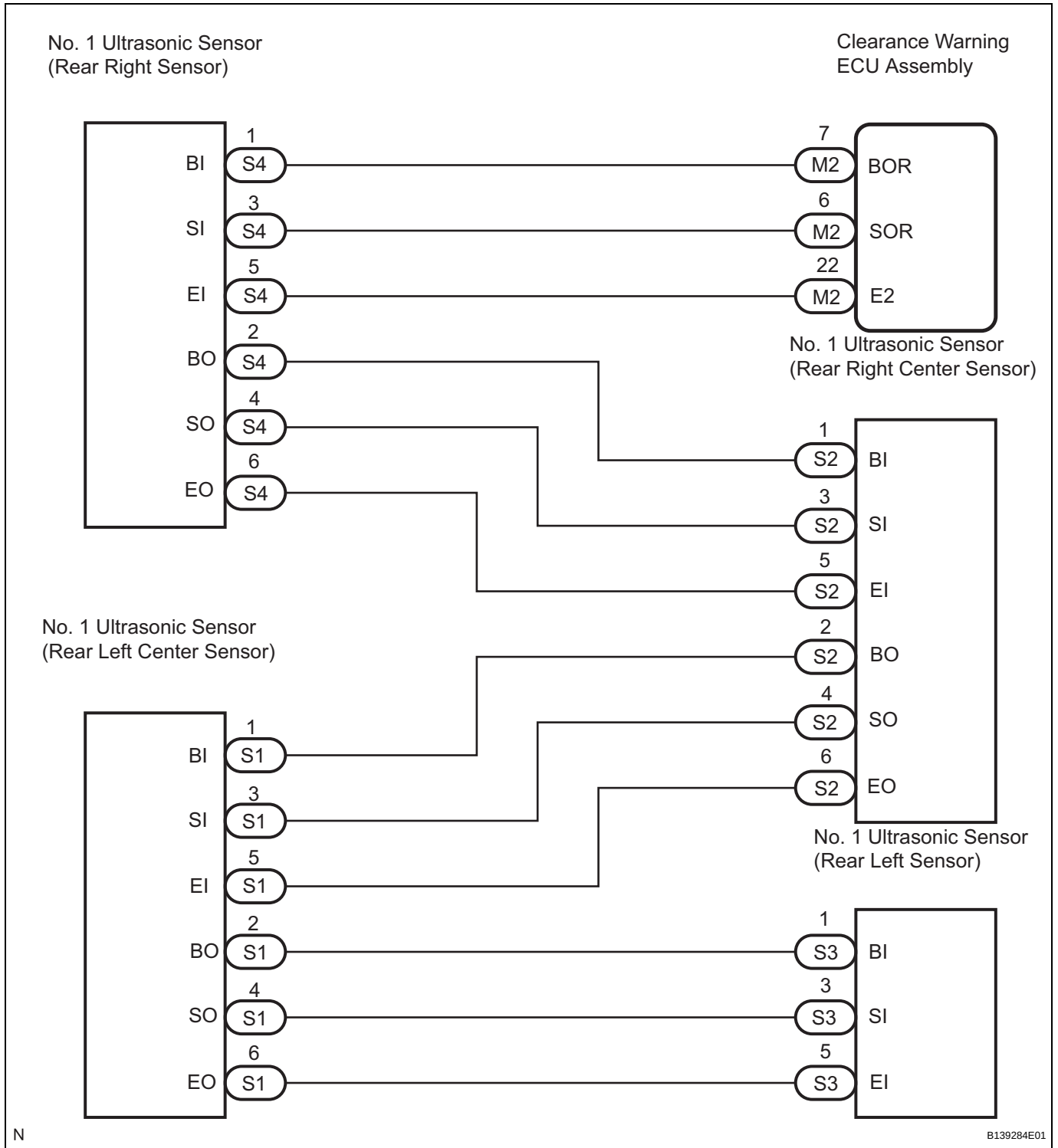
PM**Rear No. 1 Ultrasonic Sensor Position:**

H

B139270E03

DTC No.	DTC Detection Condition	Trouble Area
C1AED	Malfunctions of all rear sensors are detected during initialization mode after the engine switch is turned on (IG)	- Rear No.1 ultrasonic sensor circuit - Clearance warning ECU

WIRING DIAGRAM



PM

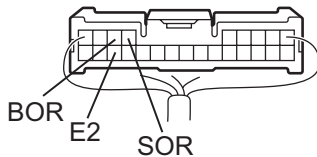
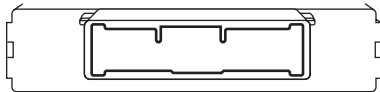
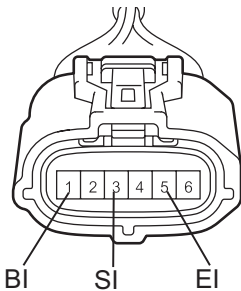
INSPECTION PROCEDURE

1 CHECK DTC OUTPUT

- Delete the DTCs (See page [PM-28](#)).
- Turn the engine switch off.
- Turn the engine switch on (IG).

(d) Recheck for DTCs (See page [PM-28](#)).**Result**

Result	Proceed to
DTCs C1AE6, C1AE7, C1AE8, C1AE9 and C1AED are output	A
No DTCs are output	B

B**USE SIMULATION METHOD TO CHECK****A****2****CHECK HARNESS AND CONNECTOR (CLEARANCE WARNING ECU - REAR RIGHT SENSOR)****Wire Harness Side Connector Rear View:**M2
Clearance Warning ECU Assembly**Wire Harness Side Connector Front View:**S4
No. 1 Ultrasonic Sensor (Rear Right Sensor)

H

B139274E02

- (a) Disconnect the M2 ECU connector.
 (b) Disconnect the S4 sensor connector.
 (c) Measure the resistance according to the value(s) in the table below.

Standard resistance

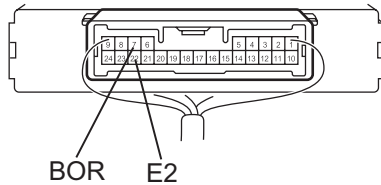
Tester Connection	Condition	Specified Condition
M2-7 (BOR) - S4-1 (BI)	Always	Below 1 Ω
M2-6 (SOR) - S4-3 (SI)		
M2-22 (E2) - S4-5 (EI)		
M2-7 (BOR) - Body ground		10 k Ω or higher
M2-6 (SOR) - Body ground		
M2-22 (E2) - Body ground		

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****PM**

3 CHECK CLEARANCE WARNING ECU ASSEMBLY

Wire Harness Side Connector Rear View:

M2
Clearance Warning ECU Assembly



H

B139288E02

- (a) Reconnect the M2 ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
M2-22 (E2) - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
M2-7 (BOR) - Body ground	Engine switch on (IG)	7 to 9 V

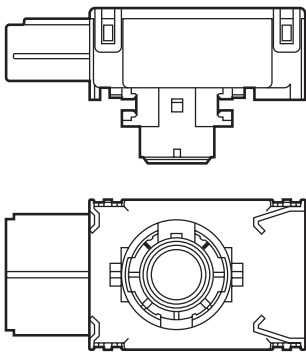
NG

REPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))

OK

4 REPLACE NO. 1 ULTRASONIC SENSOR (REAR RIGHT SENSOR)

No. 1 Ultrasonic Sensor:



H

B139273E01

- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT

5 CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [PM-28](#)).
- (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE6, C1AE7, C1AE8, C1AE9 and C1AED are output	A

PM

Result	Proceed to
No DTCs are output	B

B

END

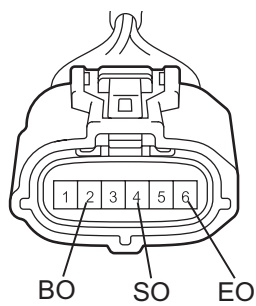
A

6

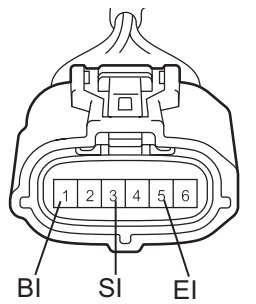
CHECK HARNESS AND CONNECTOR (REAR RIGHT SENSOR - REAR RIGHT CENTER SENSOR)

Wire Harness Side Connector Front View:

S4
No. 1 Ultrasonic Sensor (Rear Right Sensor)



S2
No. 1 Ultrasonic Sensor (Rear Right Center Sensor)



H

B139278E02

- (a) Disconnect the S4 and S2 sensor connectors.
- (b) Measure the resistance according to the value(s) in the table below.

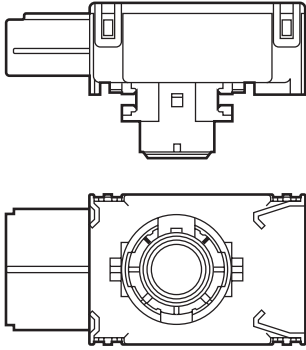
Standard resistance

Tester Connection	Condition	Specified Condition
S4-2 (BO) - S2-1 (BI)	Always	Below 1 Ω
S4-4 (SO) - S2-3 (SI)		
S4-6 (EO) - S2-5 (EI)		
S4-2 (BO) - Body ground		10 kΩ or higher
S4-4 (SO) - Body ground		
S4-6 (EO) - Body ground		

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7**REPLACE NO. 1 ULTRASONIC SENSOR (REAR RIGHT CENTER SENSOR)****No. 1 Ultrasonic Sensor:**

H

B139273E01

- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT**8****CHECK DTC OUTPUT**

- (a) Delete the DTCs (See page [PM-28](#)).
(b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE6, C1AE7, C1AE8, C1AE9 and C1AED are output	A
No DTCs are output	B

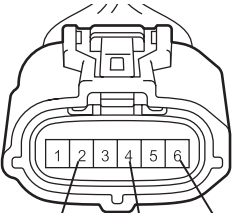
B**END****A****PM**

9

CHECK HARNESS AND CONNECTOR (REAR RIGHT CENTER SENSOR - REAR LEFT CENTER SENSOR)

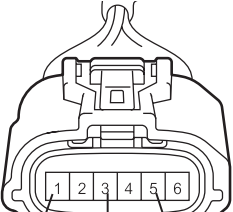
Wire Harness Side Connector Front View:

S2
No. 1 Ultrasonic Sensor
(Rear Right Center Sensor)



BO SO EO

S1
No. 1 Ultrasonic Sensor
(Rear Left Center Sensor)



BI SI EI

H

B139278E03

- (a) Disconnect the S2 and S1 sensor connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
S2-2 (BO) - S1-1 (BI)	Always	Below 1 Ω
S2-4 (SO) - S1-3 (SI)		
S2-6 (EO) - S1-5 (EI)		
S2-2 (BO) - Body ground	Always	10 kΩ or higher
S2-4 (SO) - Body ground		
S2-6 (EO) - Body ground		

NG

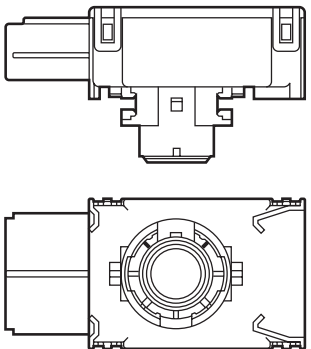
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

10

REPLACE NO. 1 ULTRASONIC SENSOR (REAR LEFT CENTER SENSOR)

No. 1 Ultrasonic Sensor:



H

B139273E01

- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT

11 CHECK DTC OUTPUT

- (a) Delete the DTCs (See page [PM-28](#)).
 (b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE6, C1AE7, C1AE8, C1AE9 and C1AED are output	A
No DTCs are output	B

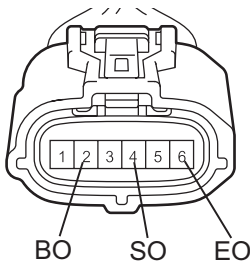
B

END

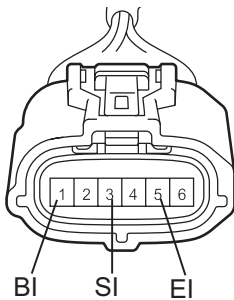
A

12 CHECK HARNESS AND CONNECTOR (REAR LEFT CENTER SENSOR - REAR LEFT SENSOR)**Wire Harness Side Connector Front View:**

S1
No. 1 Ultrasonic Sensor
(Rear Left Center Sensor)



S3
No. 1 Ultrasonic Sensor (Rear Left Sensor)



H

B139278E04

- (a) Disconnect the S1 and S3 sensor connectors.
 (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
S1-2 (BO) - S3-1 (BI)	Always	Below 1 Ω
S1-4 (SO) - S3-3 (SI)		
S1-6 (EO) - S3-5 (EI)		
S1-2 (BO) - Body ground		10 k Ω or higher
S1-4 (SO) - Body ground		
S1-6 (EO) - Body ground		

NG

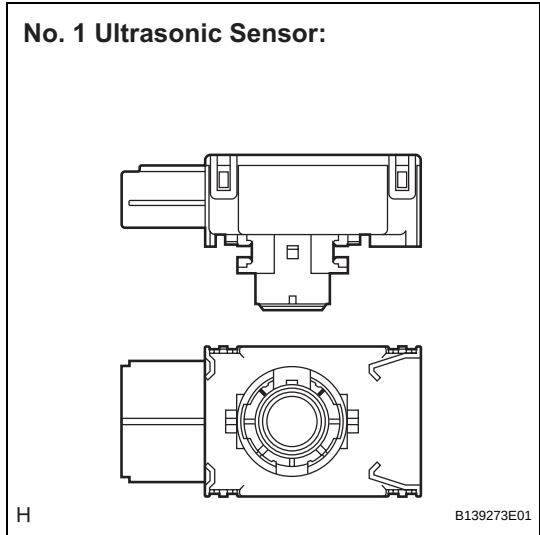
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PM

13

REPLACE NO. 1 ULTRASONIC SENSOR (REAR LEFT SENSOR)



- (a) Replace the ultrasonic sensor (See page [PM-99](#)) with a normally functioning sensor.

NEXT

14

CHECK DTC OUTPUT

PM

- (a) Delete the DTCs (See page [PM-28](#)).
(b) Recheck for DTCs (See page [PM-28](#)).

Result

Result	Proceed to
DTCs C1AE6, C1AE7, C1AE8, C1AE9 and C1AED are output	A
No DTCs are output	B

A

B END

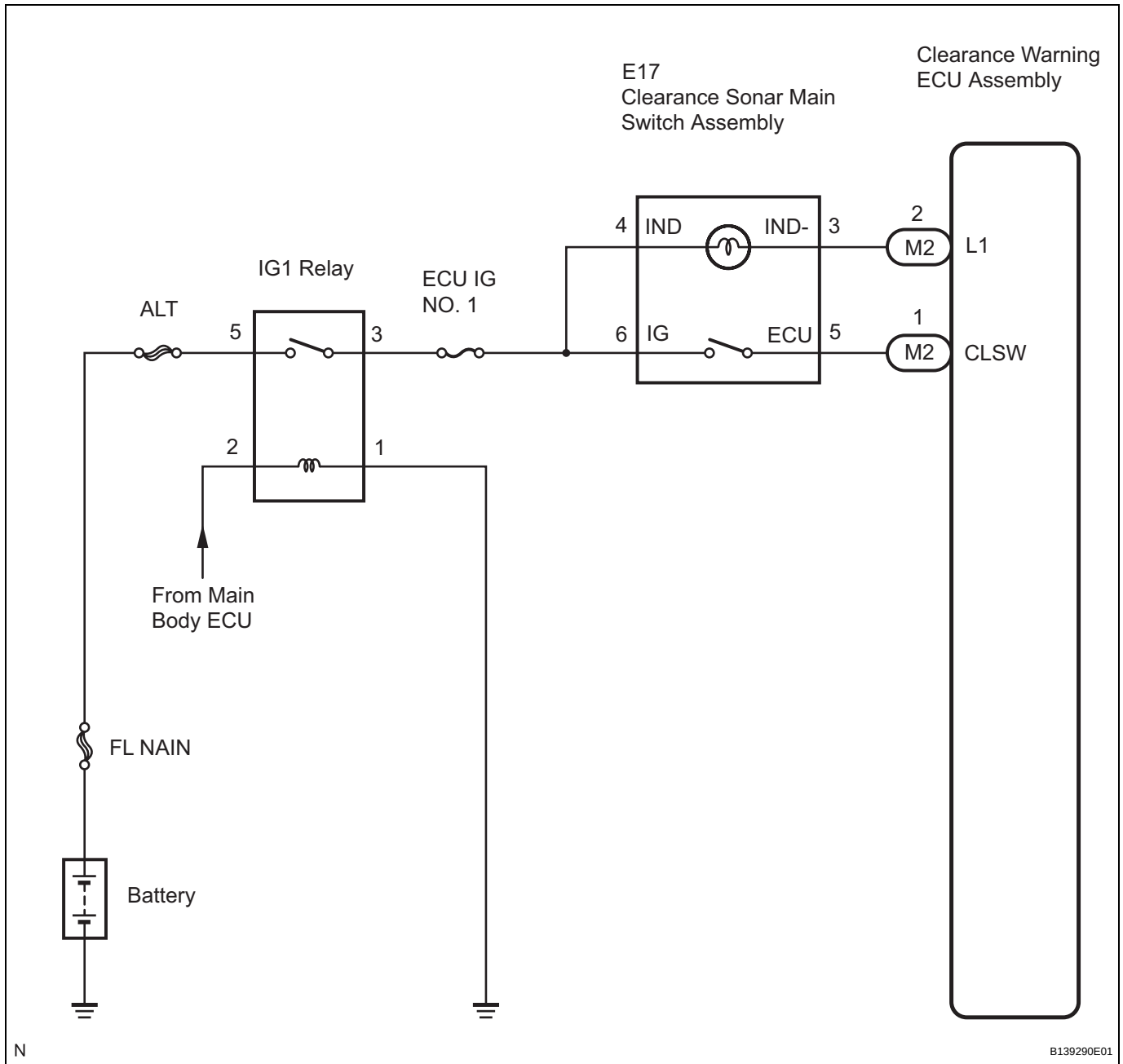
REPLACE CLEARANCE WARNING ECU ASSEMBLY (See page [PM-93](#))

Clearance Sonar Main Switch Circuit

DESCRIPTION

When the clearance sonar main switch is turned on, an ON signal is sent to the clearance warning ECU and the indicator on the switch comes on. The intuitive parking assist system starts operating according to this signal.

WIRING DIAGRAM



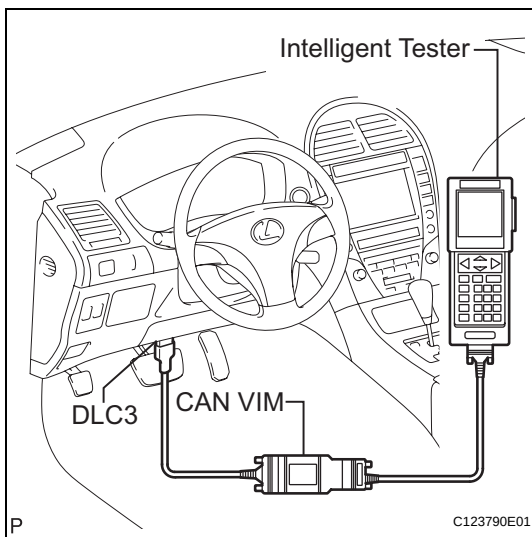
INSPECTION PROCEDURE

1 CHECK INTUITIVE PARKING ASSIST SYSTEM

- (a) Check the operation of the intuitive parking assist system
(See page [PM-11](#)).

Result

Result	Proceed to
Even if the clearance sonar main switch is turned on, the system does not operate.	A
The indicator on the switch does not come on even though the system starts operating.	B

B**Go to step 6****A****2 READ VALUE OF INTELLIGENT TESTER**

- (a) Connect the intelligent tester to the DLC3.
 (b) Turn the engine switch on (IG).
 (c) Turn the intelligent tester main switch on.
 (d) Turn the clearance sonar main switch on.
 (e) Select the item below in the Data List, and read its value displayed on the intelligent tester to check the clearance sonar main switch.

Clearance warning ECU:

Tester Display	Measurement Item/ Range	Normal Condition	Diagnostic Note
MAIN SW	Clearance sonar main switch / OFF or ON	OFF: Clearance sonar main switch OFF ON: Clearance sonar main switch ON	-

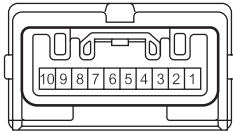
OK:

ON (Clearance sonar main switch is pressed)
appears on the tester.

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE**

NG

3**INSPECT CLEARANCE SONAR MAIN SWITCH ASSEMBLY****Clearance Sonar Main Switch Assembly:**

H

B139271E01

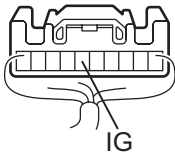
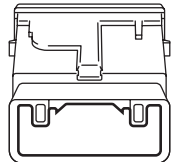
- (a) Remove the clearance sonar main switch assembly.
 (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
5 - 6	Switch free (OFF)	10 k Ω or higher
	Switch pushed (ON)	Below 1 Ω

NG**REPLACE CLEARANCE SONAR MAIN SWITCH ASSEMBLY****OK****4****CHECK HARNESS AND CONNECTOR (CLEARANCE SONAR MAIN SWITCH - BATTERY)****Wire Harness Side Connector Rear View:**

E17
 Clearance Sonar Main Switch A ssembly



H

B139276E01

- (a) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E17-6 (IG) - Body ground	Engine switch on (IG)	10 to 14 V

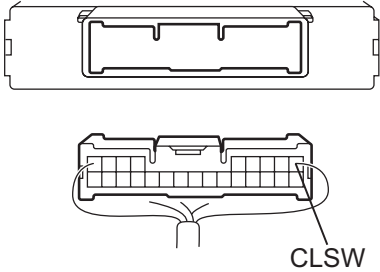
NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****PM**

5

CHECK HARNESS AND CONNECTOR (CLEARANCE WARNING ECU - CLEARANCE SONAR MAIN SWITCH)

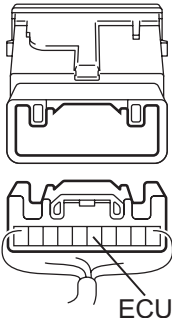
Wire Harness Side Connector Rear View :

M2
Clearance Warning ECU Assembly



CLSW

E17
Clearance Sonar Main Switch Assembly



ECU

H

B139275E01

- (a) Disconnect the M2 ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
M2-1 (CLSW) - E17-5 (ECU)	Always	Below 1 Ω
M2-1 (CLSW) - Body ground		10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

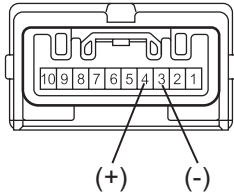
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

6

INSPECT CLEARANCE SONAR MAIN SWITCH ASSEMBLY

Clearance Sonar Main Switch Assembly:



H

B139271E02

- (a) Remove the clearance sonar main switch.
(b) Apply battery voltage and check operation of the main switch, as shown in the table below.

OK

Measurement Condition	Specified Condition
Battery positive (+) → Terminal 4 Battery negative (-) → Terminal 3	Indicator light comes on

NG

REPLACE CLEARANCE SONAR MAIN SWITCH ASSEMBLY

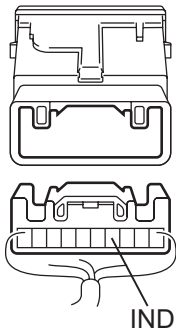
OK

7

CHECK HARNESS AND CONNECTOR (CLEARANCE SONAR MAIN SWITCH - BATTERY)

Wire Harness Side Connector Rear View:

E17
Clearance Sonar Main Switch Assembly



H

B139276E03

- (a) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E17-4 (IND) - Body ground	Engine switch on (IG)	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

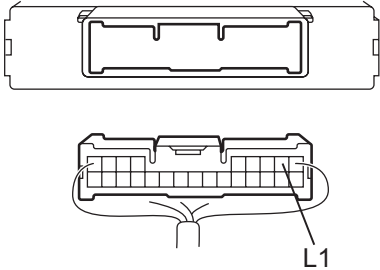
PM

8

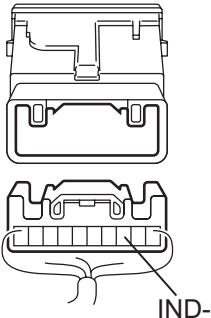
CHECK HARNESS AND CONNECTOR (CLEARANCE WARNING ECU - CLEARANCE SONAR MAIN SWITCH)

Wire Harness Side Connector Rear View :

M2
Clearance Warning ECU Assembly



E17
Clearance Sonar Main Switch Assembly



H

B139275E02

- (a) Disconnect the M2 ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
M2-2 (L1) - E17-3 (IND-)	Always	Below 1 Ω
M2-2 (L1) - Body ground		10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

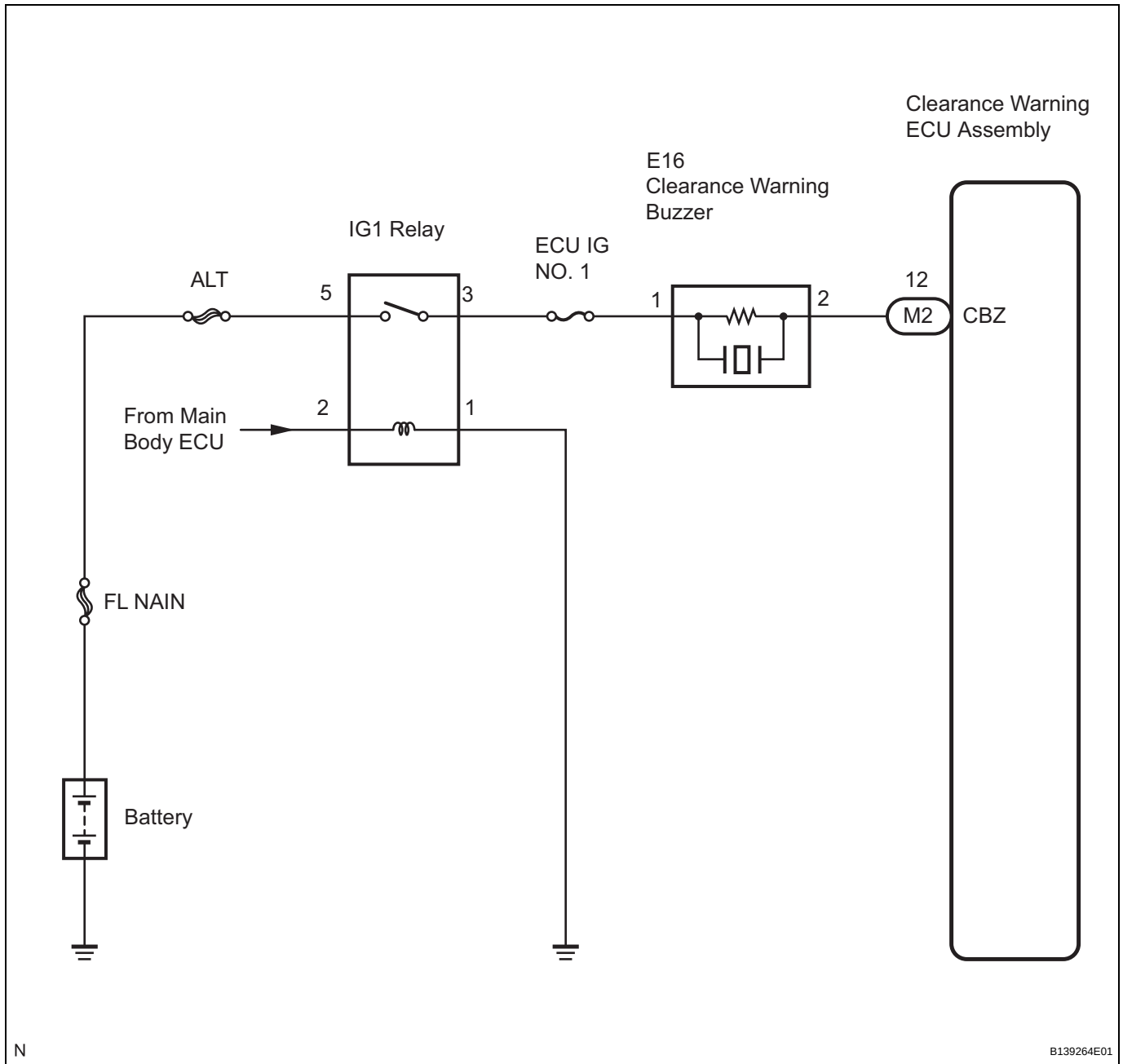
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

Clearance Warning Buzzer Circuit

DESCRIPTION

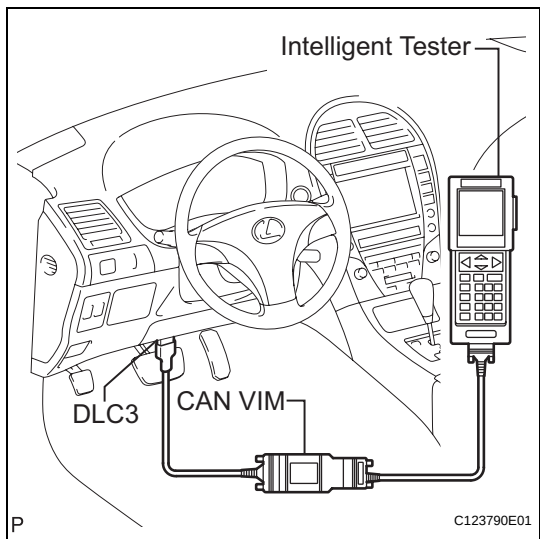
The clearance warning buzzer sounds using by pulse signals sent from the clearance warning ECU assembly. The buzzer sounds to alert the driver and the buzzer frequency changes depending on the distance to an obstacle.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST BY INTELLIGENT TESTER



- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the engine switch on (IG).
- (c) Turn the intelligent tester main switch on.
- (d) Turn the clearance sonar main switch on.
- (e) Select the Active Test, use the intelligent tester to generate a control command, and then check that the buzzer operates.

Clearance warning ECU:

Tester Display	Test Part	Control Range	Diagnostic Note
REAR BUZZER	Rear buzzer (Clearance warning buzzer)	STOP or OPERATE	-

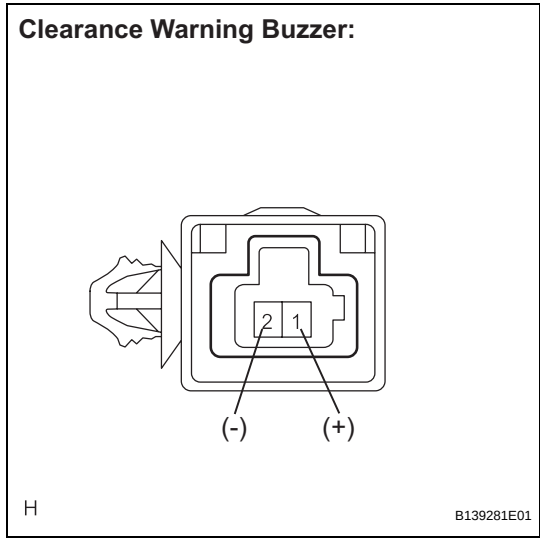
PM

OK:
Clearance warning buzzer sounds.

OK → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

NG

2 INSPECT CLEARANCE WARNING BUZZER



- (a) Remove the clearance warning buzzer (See page [PM-95](#)).
- (b) Apply battery voltage and check operation of the warning buzzer, as shown in the table below.

OK

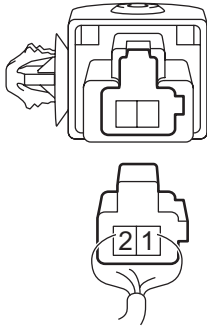
Measurement Condition	Specified Condition
Battery positive (+) → Terminal 1 Battery negative (-) → Terminal 2	Operating sound occurs

HINT:
The clearance warning buzzer does not sound when battery voltage is not applied because the buzzer is a separately-excited type.

NG → REPLACE CLEARANCE WARNING BUZZER (See page [PM-95](#))

OK

3

CHECK HARNESS AND CONNECTOR (CLEARANCE WARNING BUZZER - BATTERY)**Wire Harness Side Connector Rear View:**E16
Clearance Warning Buzzer

H

B139280E01

- (a) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E16-1 - Body ground	Engine switch on (IG)	10 to 14 V

NG

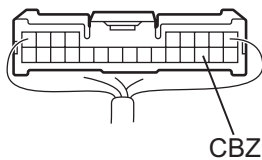
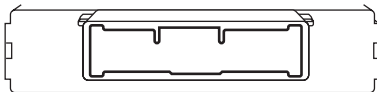
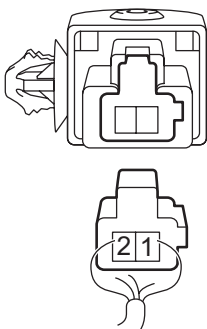
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4

CHECK HARNESS AND CONNECTOR (CLEARANCE WARNING ECU - CLEARANCE WARNING BUZZER)

PM

Wire Harness Side Connector Rear View:M2
Clearance Warning ECU AssemblyE16
Clearance Warning Buzzer

H

B139279E04

- (a) Disconnect the M2 ECU connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
M2-12 (CBZ) - E16-2	Always	Below 1 Ω
M2-12 (CBZ) - Body ground		10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

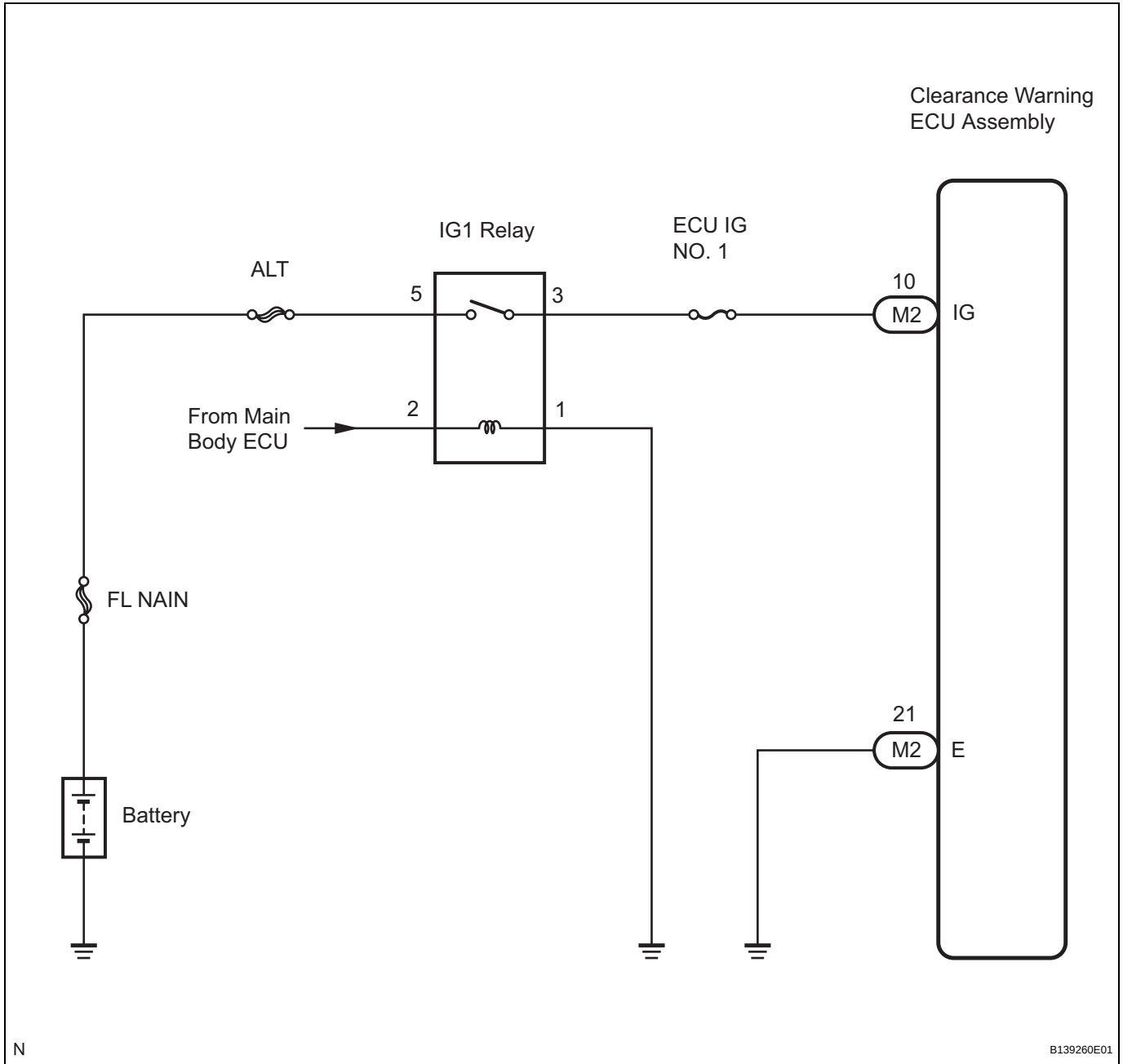
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

Clearance Warning ECU Power Source Circuit

DESCRIPTION

This circuit provides power to operate the clearance warning ECU.

WIRING DIAGRAM



PM

INSPECTION PROCEDURE

1 INSPECT FUSE (ECU IG NO. 1)

- Remove the ECU IG No. 1 fuse from the instrument panel junction block.
- Measure the resistance of the ECU IG No. 1 fuse.

Standard resistance:

Below 1 Ω

NG

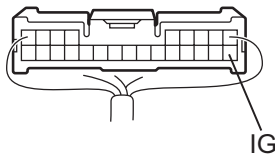
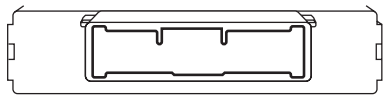
REPLACE FUSE (ECU IG NO. 1)

OK

2

CHECK HARNESS AND CONNECTOR (CLEARANCE WARNING ECU - BATTERY)

Wire Harness Side Connector Rear View:

M2
Clearance Warning ECU Assembly

H

B139282E01

- (a) Disconnect the M2 ECU connector.
 (b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
M2-10 (IG) - Body ground	Engine switch on (IG)	10 to 14 V

NG

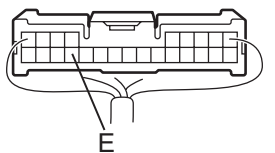
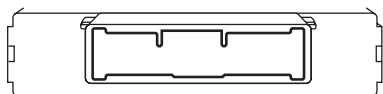
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

CHECK HARNESS AND CONNECTOR (CLEARANCE WARNING ECU - BODY GROUND)

Wire Harness Side Connector Rear View:

M2
Clearance Warning ECU Assembly

H

B139282E02

- (a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
M2-21 (E) - Body ground	Always	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

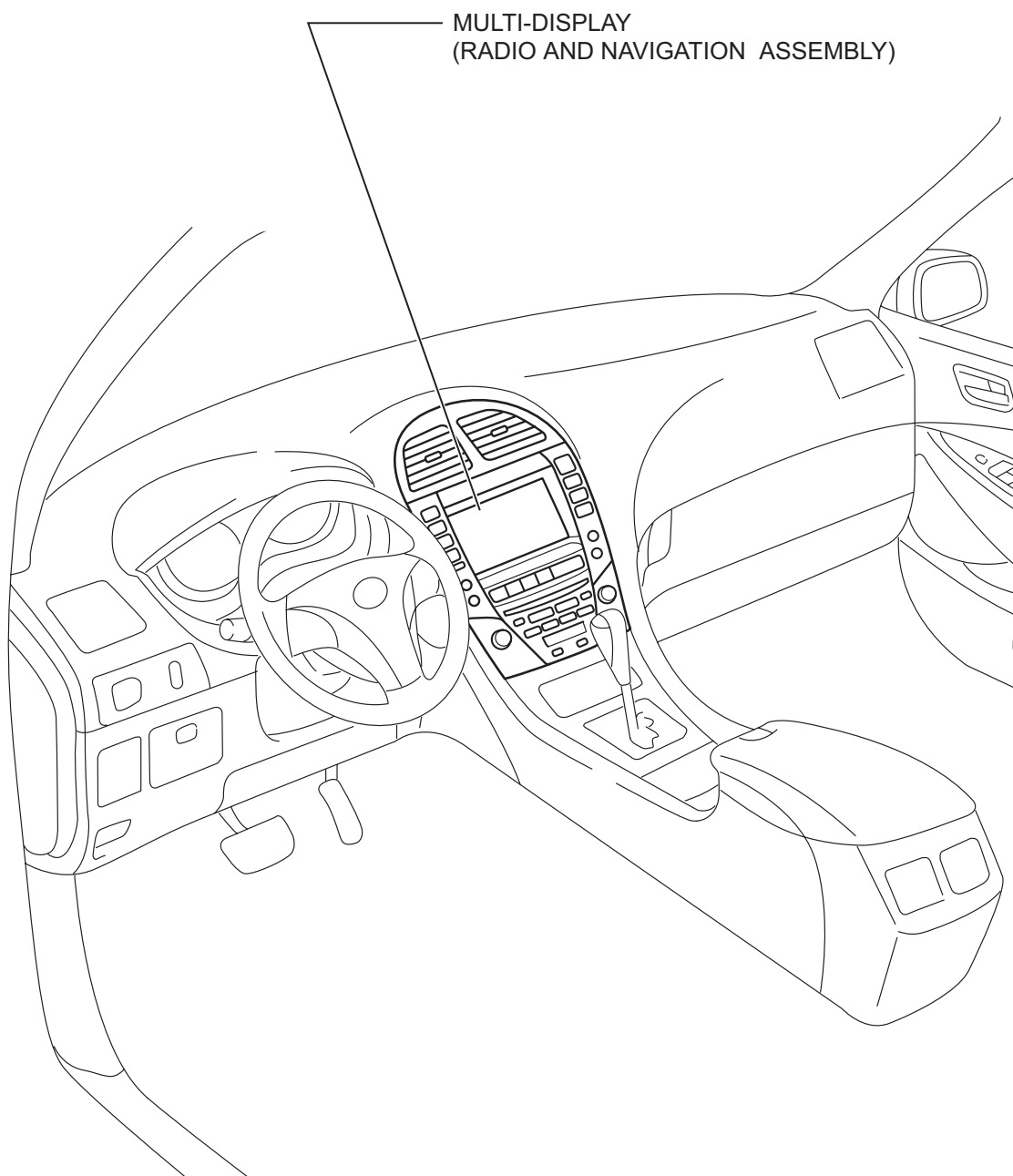
REAR VIEW MONITOR SYSTEM

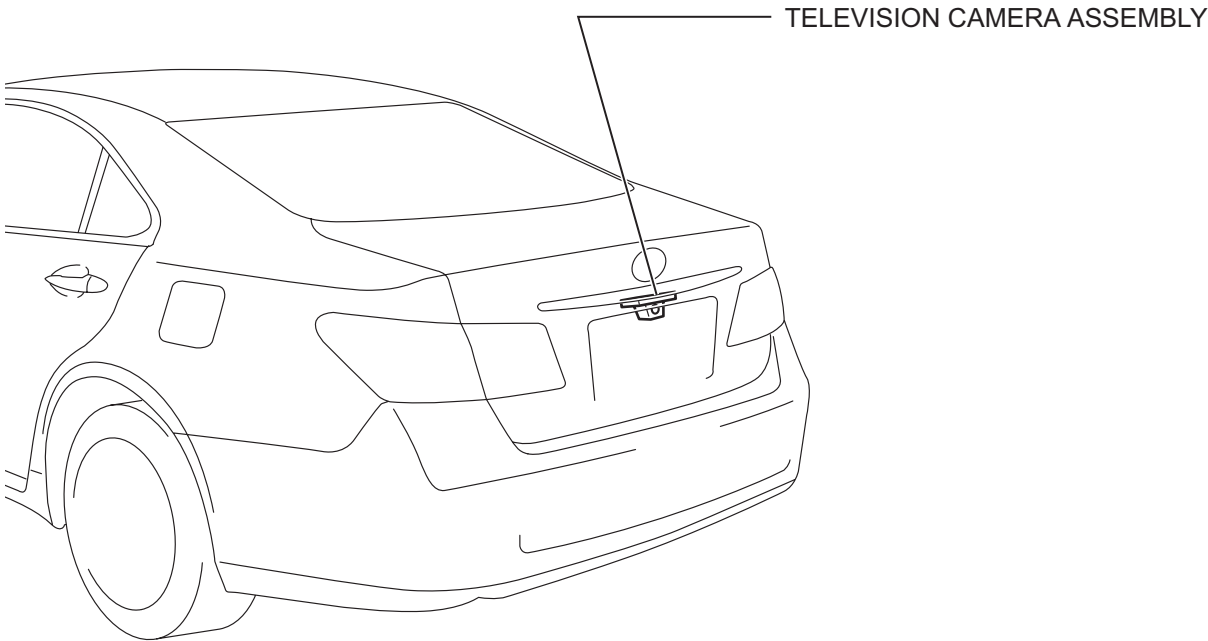
PRECAUTION

NOTICE:

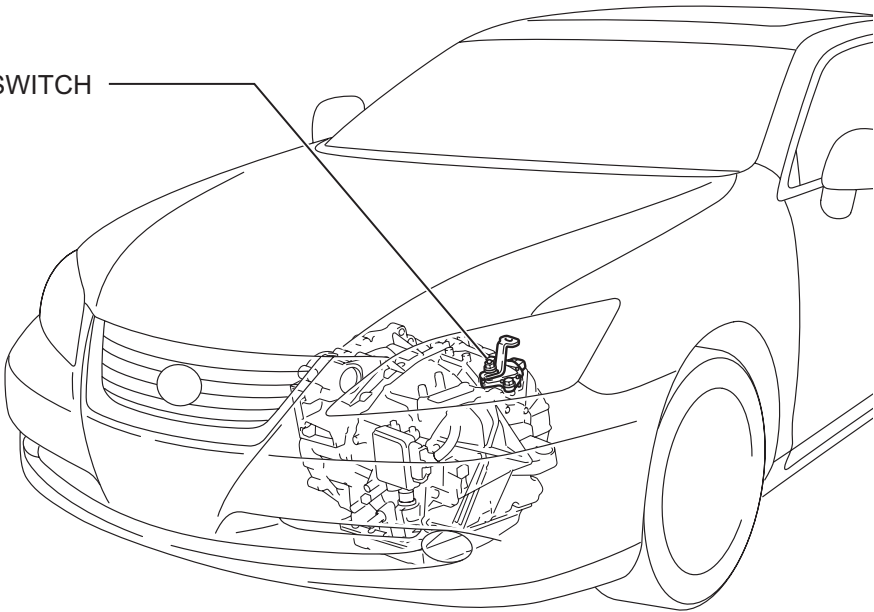
Some systems need to be initialized after reconnecting the negative (-) battery terminal (See page [IN-33](#)),

PARTS LOCATION

**PM**

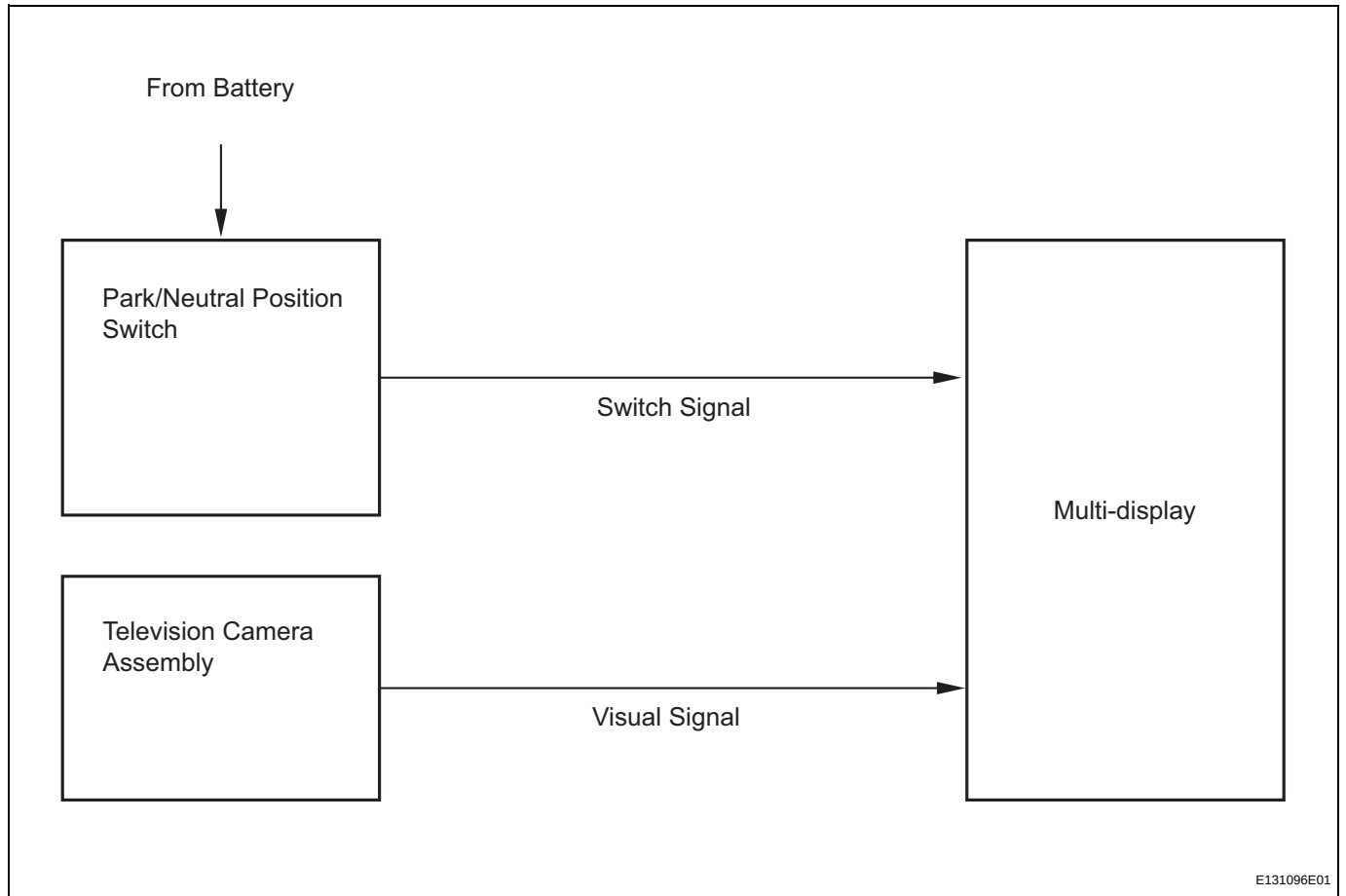


PARK/NEUTRAL POSITION SWITCH



PM

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

1. GENERAL

- (a) To assist the driver in parking the vehicle by displaying an image of the area behind the vehicle, this system has a television camera mounted on the luggage compartment door. The system displays the image on the multi-display.
- (b) This system consists of the following components:
 - (1) Multi-display
 - (2) Television camera assembly
 - (3) Park/Neutral Position Switch

2. FUNCTION OF COMPONENTS

- (a) The multi-display controls the system by using information from the following components:

Item	Function
Television Camera Assembly	• Mounted on the luggage compartment door to transmit an image of the area behind the vehicle to the multi-display. • A color video camera that uses a CCD (Charge Coupled Device) and a wide-angle lens.
Multi-display	• Receives video signals, which contain an image of the area behind the vehicle taken with the television camera assembly. • Effects control of the system by receiving a shift position signal from the park/neutral position switch. • Displays the rear view monitor image on the display panel.
Park/Neutral Position Switch	Transmits a reverse shift position signal to the multi-display.

3. OPERATION EXPLANATION

- (a) The park/neutral position switch outputs the R position signal to the multi-display when the shift lever is moved to the R position. After receiving the R position signal, the multi-display switches from the navigation system to the rear view monitor system.

4. NOTES FOR REAR VIEW MONITOR

- (a) Notes for the rear view monitor.
 - (1) The rear view monitor may not function properly if subjected to a severe blow by any hard object.
 - (2) Do not "scrub" the lens of the camera because it is made of resin. Scrubbing it may scratch the cover and affect the image. Prevent organic solvents, waxes, bond removing solvents, or glass coating from adhering to the cover. Clean it off immediately, and wash with water.
 - (3) Exposing the camera to a sudden temperature change may affect proper functioning of the camera.
 - (4) A clear image may not appear if the camera is dirty with snow, mud, etc. In this case, wash it with water and wipe off the lens. Use a detergent to remove dirt if necessary.
- (b) Images are difficult to discern even in normal conditions if:
 - (1) The camera lens is frosted over (the image immediately after turning the engine switch on (IG) may be blurred or darker than normal).

- (2) A strong beam of light, such as a sunbeam or headlight, hits the camera.
- (3) It is too dark around the camera (at night, etc.).
- (4) The ambient temperature around the camera is either too high or too low.

HINT:

When a strong light, such as a sunbeam reflected off the vehicle's body, hits the camera, the image may be blurred. This is called the "SMEAR" phenomenon, peculiar to the CCD camera.

HOW TO PROCEED WITH TROUBLESHOOTING

1

VEHICLE BROUGHT TO WORKSHOP

NEXT

2

CUSTOMER PROBLEM ANALYSIS

NEXT

3

CHECK DTC OF NAVIGATION SYSTEM

(a) Refer to the diagnostic check/clear of the navigation system (See page [NS-48](#)).

DTC IS OUTPUT (Go to navigation system)

DTC IS NOT OUTPUT (Go to step 4)

PM

4

PROBLEM SYMPTOM CONFIRMATION

SYMPTOM DOES NOT OCCUR (Go to step 5)

SYMPTOM OCCURS (Go to step 6)

5

SYMPTOM SIMULATION

NEXT

6

CHECK IF THE SAME SYMPTOM APPEARS IN THE NAVIGATION SYSTEM

(a) Refer to the navigation system (See page [NS-41](#)).

THE SYMPTOM APPEARS (FOLLOW THE NAVIGATION SYMPTOM CHART TO PERFORM TROUBLESHOOTING)

THE SYMPTOM DOES NOT APPEAR (Go to step 7)

7

PROBLEM SYMPTOMS TABLE

(a) Refer to the problem symptoms table (See page [PM-25](#)).



THE CORRESPONDING SYMPTOM EXISTS
(Go to step 9)



THE CORRESPONDING SYMPTOM DOES NOT EXIST (Go to step 8)

8**BASED ON THE MALFUNCTION SYMPTOM, PERFORM TROUBLESHOOTING BELOW**

(a) Terminals of ECU (See page [PM-26](#)).

NEXT**9****ADJUST, REPAIR OR REPLACE****NEXT****10****CONFIRMATION TEST****NEXT****END****PM**

PROBLEM SYMPTOMS TABLE

HINT:

- Before inspecting the suspected areas listed in the table below, check the fuses and relays.
- Before inspecting the suspected areas listed in the table below, check for DTCs.
- Methods used to verify the cause of the problem are listed in order of probability in the suspected area column.

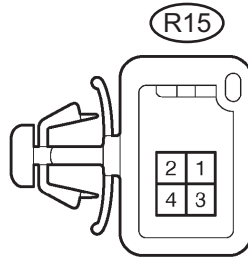
REAR VIEW MONITOR SYSTEM

Symptom	Suspected Area	See page
When shift lever is in R position, rear view monitor image is not displayed	1. Reverse signal circuit	PM-86
	2. Proceed to "Display Signal Circuit between Multi-display and Television Camera Assembly	PM-88
	3. Multi-display	NS-233
When shift lever is in R position, rear view monitor image is not displayed	1. Multi-display power source circuit	NS-228
	2. Proceed to "Display Signal Circuit between Multi-display and Television Camera Assembly	PM-88
	3. Multi-display	NS-233
When shift lever is not in R position, rear view monitor image is displayed.	1. Proceed to "Display Signal Circuit between Multi-display and Television Camera Assembly	PM-88
	2. Multi-display	NS-233
	3. Television Camera Assembly	PM-104
Problem with the rear view monitor image (color, disorder of picture).	1. Proceed to "Display Signal Circuit between Multi-display and Television Camera Assembly	PM-88
	2. Multi-display	NS-233
	3. Television Camera Assembly	PM-104

TERMINALS OF ECU

1. TELEVISION CAMERA ASSEMBLY

(a) Disconnect the R15 camera connector.



I035060E14

(b) Measure the voltage and resistance between each terminal of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Value
CGND (R15-3) - Body ground	W - Body ground	Ground	Always	Below 1 Ω
CB+ (R15-4) - CGND (R15-3)	B - W	Power source	Engine switch on (IG), shift lever R position	Approx. 6 V

If the result is not as specified, there may be a malfunction on the wire harness side.

(c) Reconnect the R15 camera connector.

(d) Measure the voltage and frequency between each terminal of the connector.

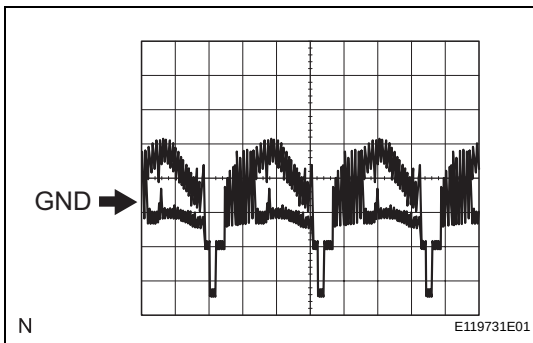
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Value
CV+ (R15-2) - CV- (R15-1)	R - Shielded	Display signal	Engine switch on (IG), shift lever R position	See waveform 1

If the result is not as specified, the camera may have a malfunction.

(e) Reference:

Oscilloscope waveform

(1) Waveform 1



Item	Content
Measurement terminal	CV+ - CV-
Measurement setting	0.2 V/DIV., 0.2 μ S/DIV.
Condition	Engine switch on (IG), Shift lever R position

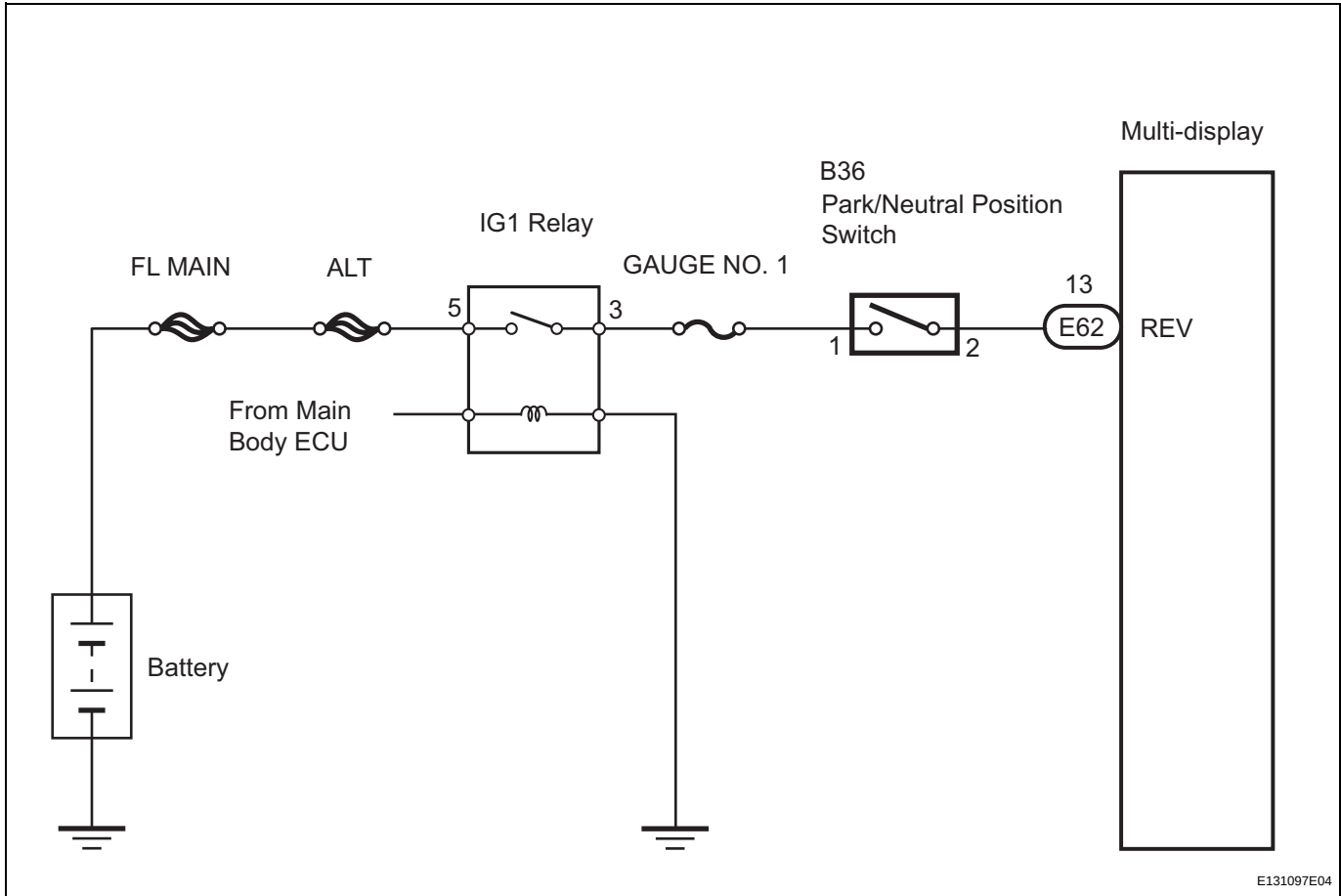
2. MULTI-DISPLAY (See page [NS-44](#))

Reverse Signal Circuit

DESCRIPTION

The multi-display receives a reverse signal from the park/neutral position switch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1

CHECK BACK-UP LIGHT

- (a) Move the shift lever to the R position and check if the back-up light comes on.

OK:

The back-up light comes on.

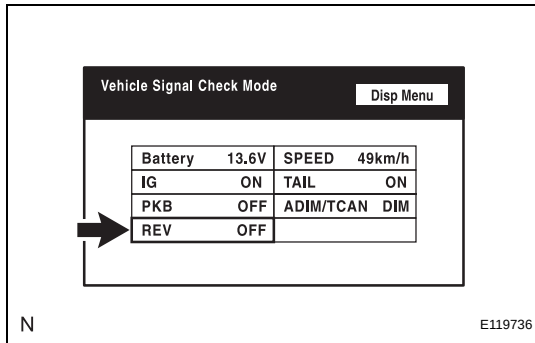
NG

GO TO LIGHTING SYSTEM

OK

2

CHECK VEHICLE SIGNAL (DISPLAY CHECK MODE)



(a) Enter the "Display Check" mode (Vehicle Signal Check Mode) (See page [NS-21](#)).

(b) Check that the display changes between ON and OFF according to the shift lever operation (P and R).

OK

Shift Lever Position	Display
R	ON
Except R	OFF

HINT:

This display is updated once per second. As a result, it is normal for the display to lag behind the actual change in the switch.

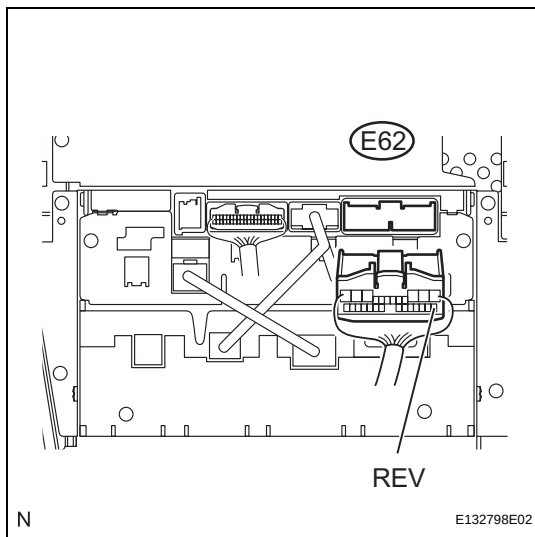
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

NG

3

INSPECT MULTI-DISPLAY



(a) Disconnect the multi-display connector E62.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester connection	Condition	Specified condition
REV (E62-13) - Body ground	Engine switch is on (IG). Shift lever is moved to R position.	10 to 14 V
REV (E62-13) - Body ground	Engine switch is on (IG). Shift lever is moved to any position except R.	Below 1 V

OK

REPLACE MULTI-DISPLAY

NG

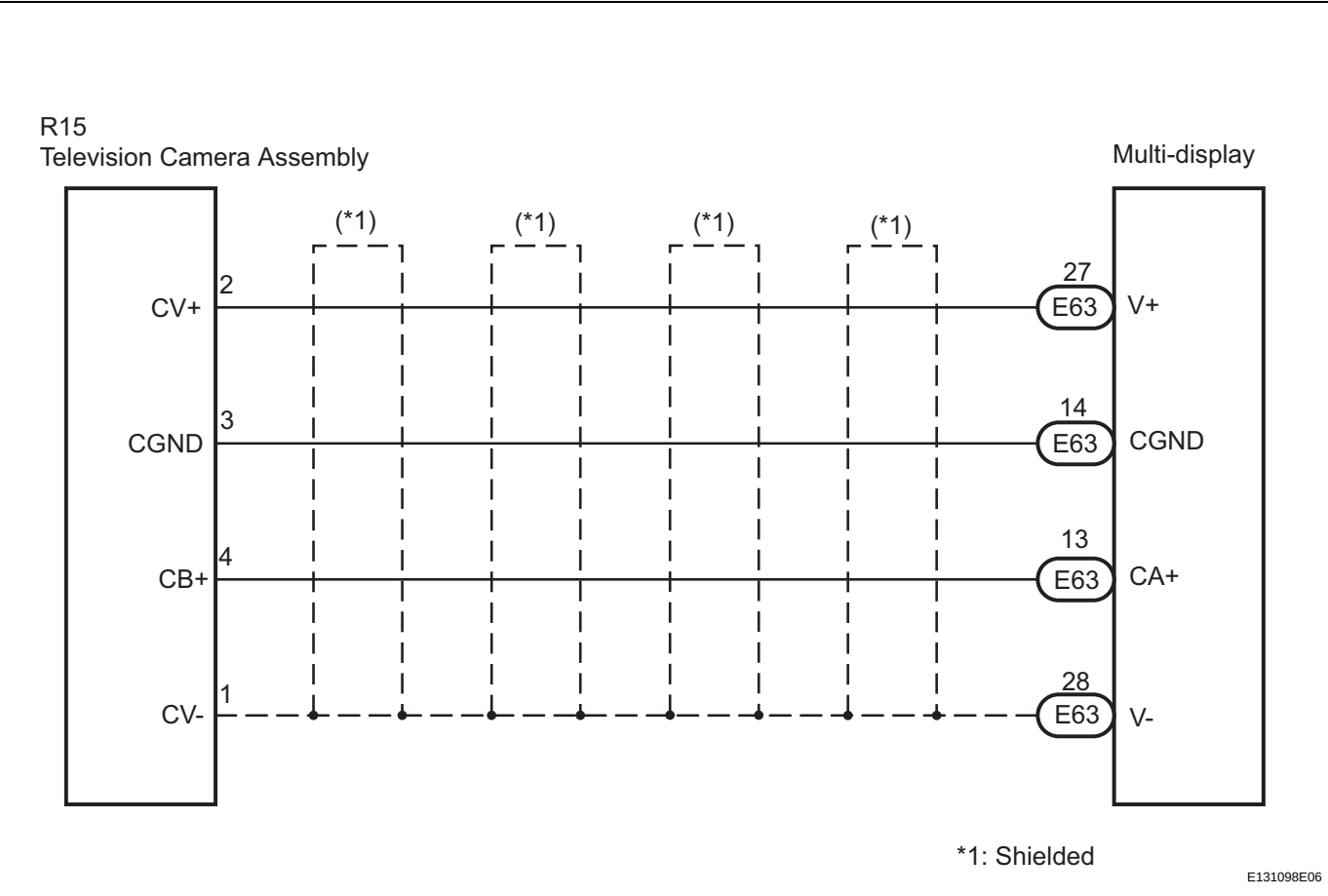
CHECK AND REPLACE HARNESS AND CONNECTOR (MULTI-DISPLAY - PARK/NEUTRAL POSITION SWITCH)

PM

Display Signal Circuit between Multi-display and Television Camera Assembly

DESCRIPTION
This is the display signal circuit of the television camera assembly.

WIRING DIAGRAM

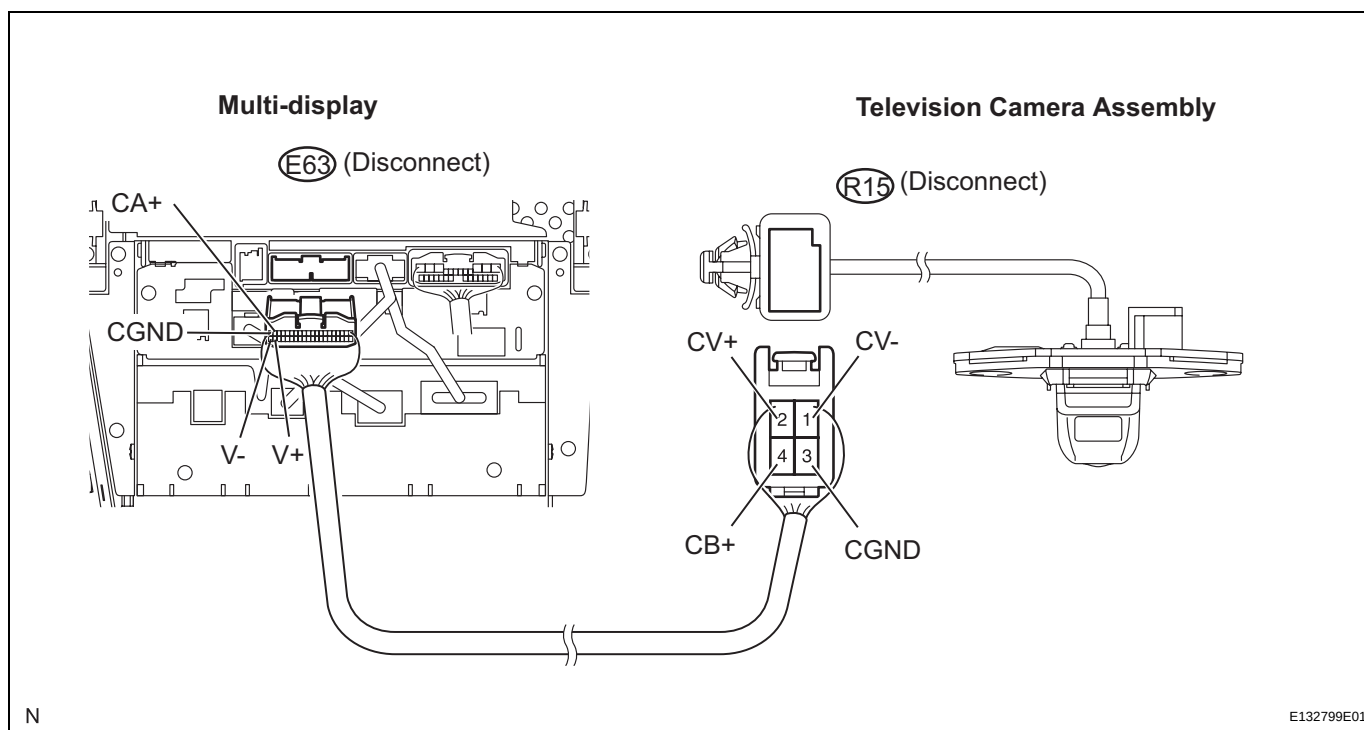


INSPECTION PROCEDURE

- | | |
|---|--|
| 1 | CHECK HARNESS AND CONNECTOR (MULTI-DISPLAY - TELEVISION CAMERA ASSEMBLY) |
|---|--|
- (a)

Disconnect the E63 connector from the multi-display.
- (b)

Disconnect the R15 connector from the television camera assembly.



(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester connection (Terminal No.)	Condition	Specified condition
CB+ (R15-4) - CA+ (E63-13)	Always	Below 1 Ω
CGND (R15-3) - CGND (E63-14)	Always	Below 1 Ω
CV+ (R15-2) - V+ (E63-27)	Always	Below 1 Ω
CV- (R15-1) - V- (E63-28)	Always	Below 1 Ω
CB+ (R15-4) - Body ground	Always	10 k Ω or higher
CGND (R15-3) - Body ground	Always	10 k Ω or higher
CV+ (R15-2) - Body ground	Always	10 k Ω or higher
CV- (R15-1) - Body ground	Always	10 k Ω or higher

NG

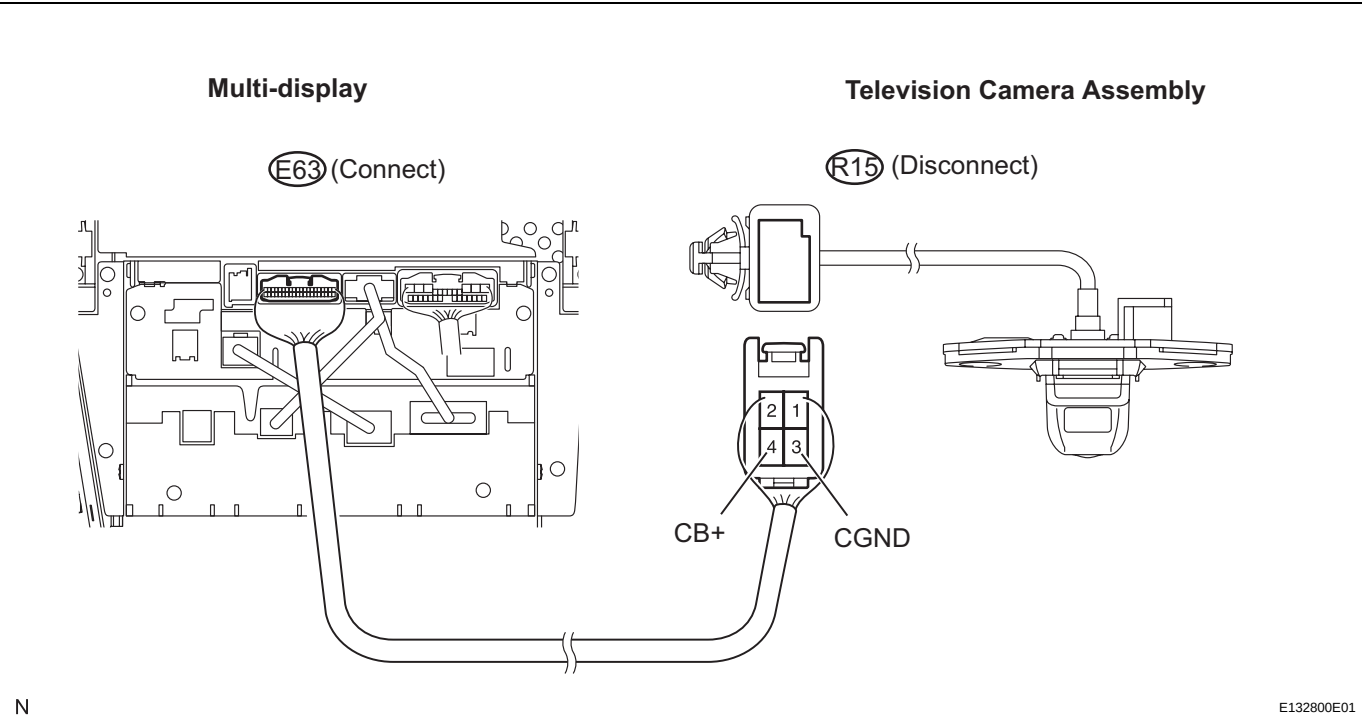
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2

INSPECT MULTI-DISPLAY

(a) Reconnect the multi-display E63 connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester connection	Condition	Specified condition
CB+ (R15-4) - CGND (R15-3)	Engine switch on (IG) Shift lever R position	Approx. 6 V

OK

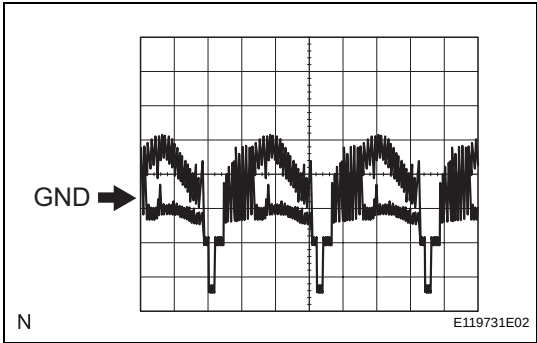
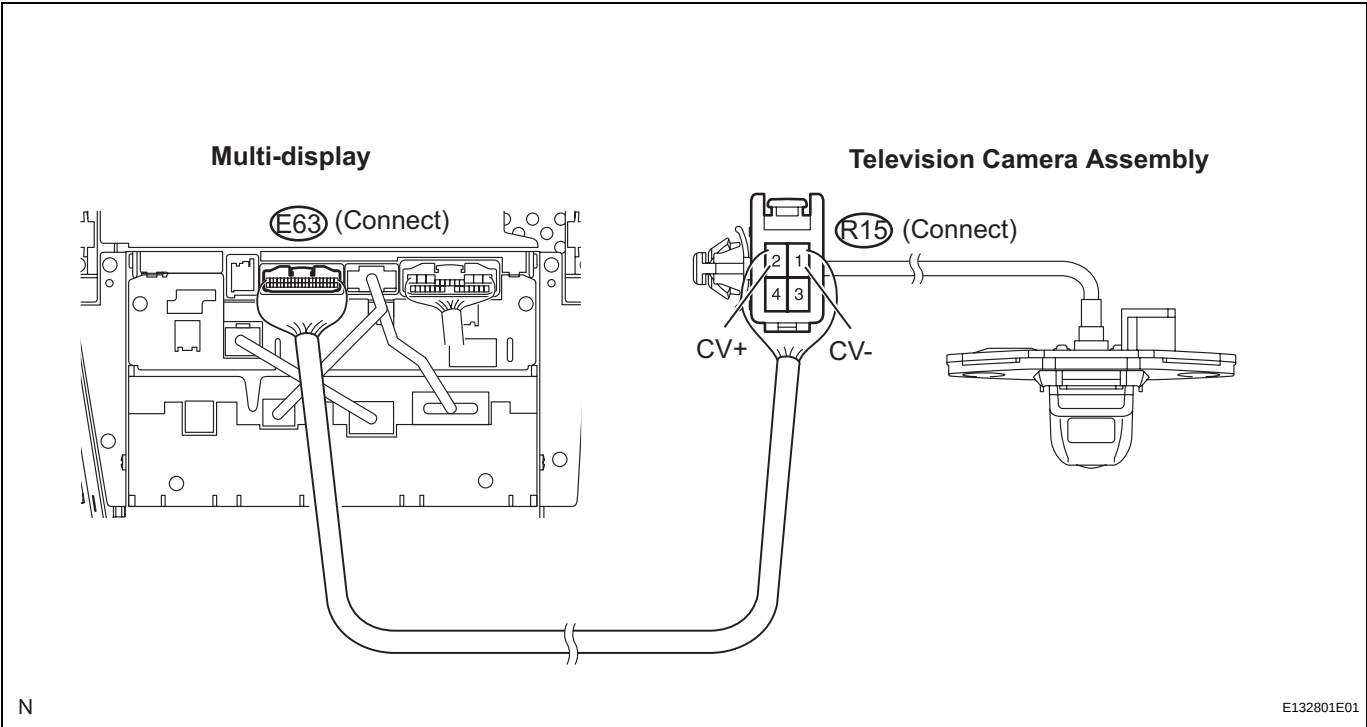
NG

REPLACE MULTI-DISPLAY

3

INSPECT TELEVISION CAMERA ASSEMBLY

(a) Reconnect the television camera assembly R15 connector.



(b) Check the waveform of the television camera assembly using an oscilloscope.

PM

Standard waveform

Tester connection	Condition	Specified condition
CV+ (R15-2) - CV- (R15-1)	Engine switch on (IG) Shift lever R position	Shown in the illustration

NG

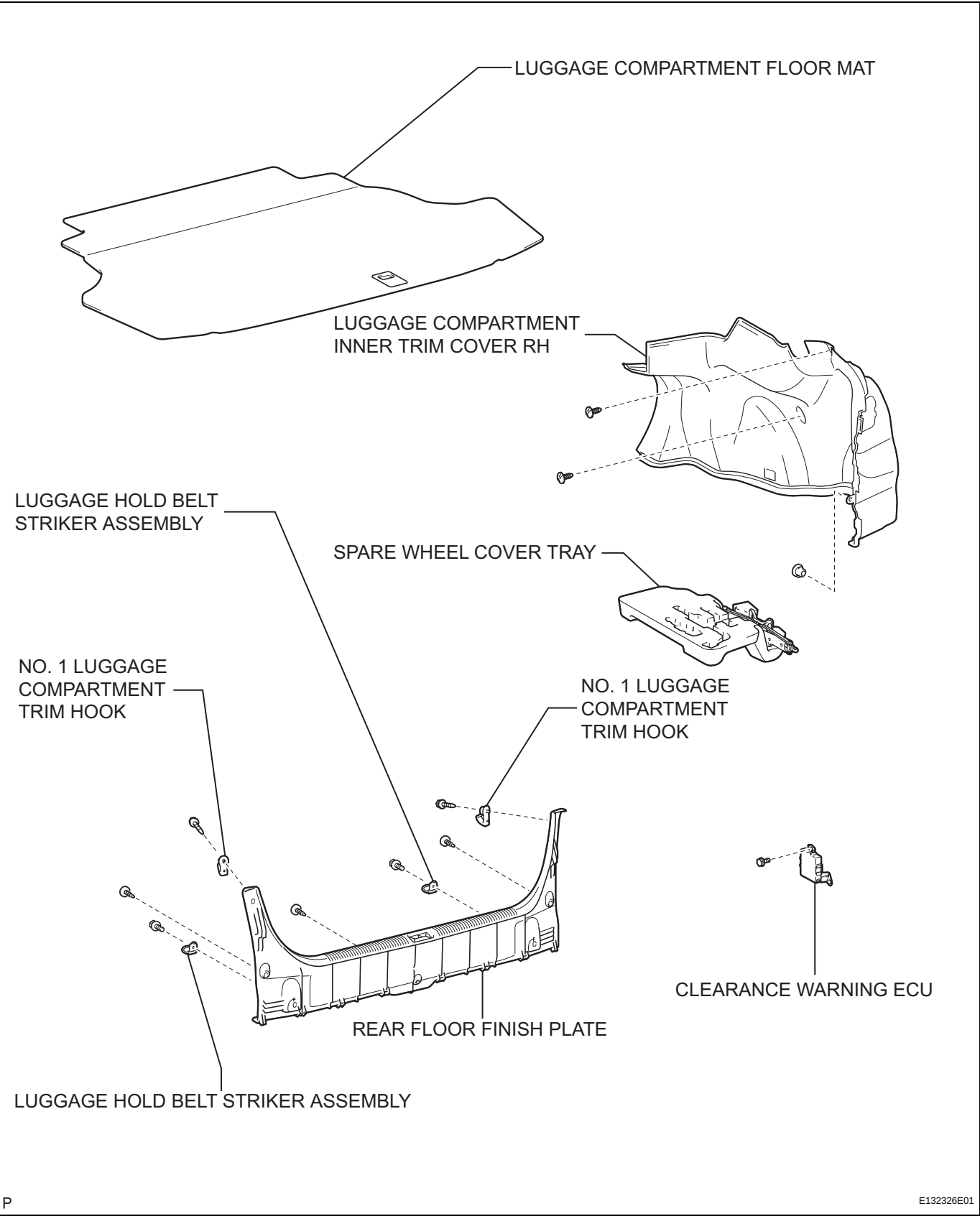
REPLACE TELEVISION CAMERA ASSEMBLY

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

CLEARANCE WARNING ECU

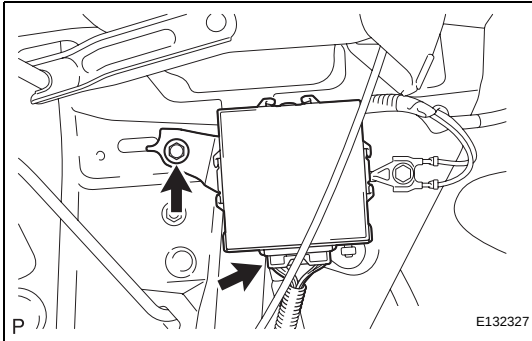
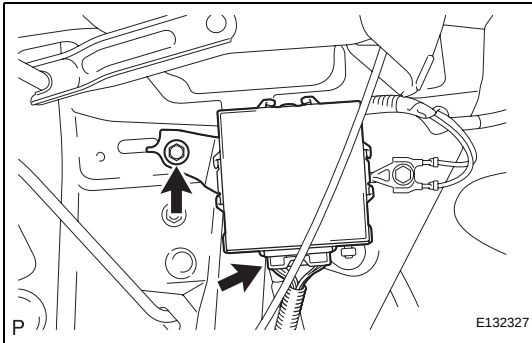
COMPONENTS



PM

REMOVAL

1. REMOVE LUGGAGE COMPARTMENT FLOOR MAT
2. REMOVE SPARE WHEEL COVER TRAY
3. REMOVE LUGGAGE HOLD BELT STRIKER ASSEMBLY (See page [ED-82](#))
4. REMOVE NO. 1 LUGGAGE COMPARTMENT TRIM HOOK (See page [ED-83](#))
5. REMOVE REAR FLOOR FINISH PLATE (See page [ED-83](#))
6. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER RH (See page [ED-83](#))
7. REMOVE CLEARANCE WARNING ECU
 - (a) Disconnect the connector.
 - (b) Remove the bolt and clearance warning ECU.

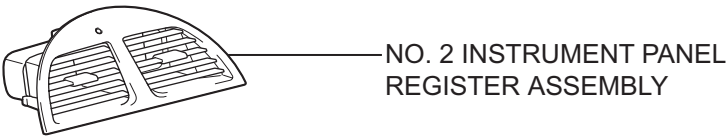


INSTALLATION

1. INSTALL CLEARANCE WARNING ECU
 - (a) Install the clearance warning ECU with the bolt.
 - (b) Connect the connector.
2. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER RH (See page [ED-88](#))
3. INSTALL REAR FLOOR FINISH PLATE (See page [ED-88](#))
4. INSTALL NO. 1 LUGGAGE COMPARTMENT TRIM HOOK (See page [ED-89](#))
5. INSTALL LUGGAGE HOLD BELT STRIKER ASSEMBLY (See page [ED-89](#))
6. INSTALL SPARE WHEEL COVER TRAY
7. INSTALL LUGGAGE COMPARTMENT FLOOR MAT

CLEARANCE WARNING BUZZER

COMPONENTS



without Navigation System:

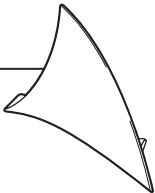
INTEGRATION CONTROL PANEL WITH RADIO RECEIVER ASSEMBLY

with Navigation System:

MULTI-DISPLAY WITH RADIO RECEIVER ASSEMBLY



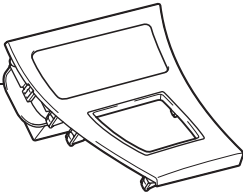
INSTRUMENT PANEL
FINISH PANEL END LH



INSTRUMENT PANEL
FINISH PANEL END RH



UPPER CONSOLE PANEL ASSEMBLY
WITH FRONT ASH RECEPTACLE



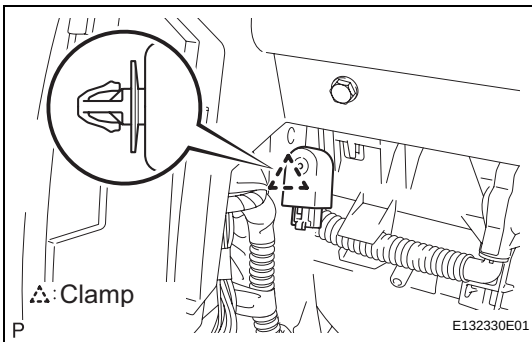
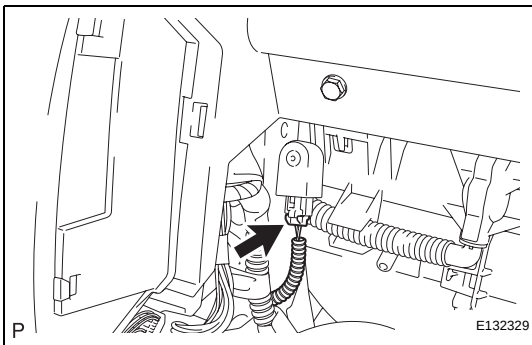
SHIFT LEVER KNOB SUB-ASSEMBLY



PM

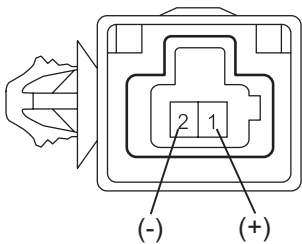
REMOVAL

1. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (See page [IP-16](#))
2. REMOVE UPPER CONSOLE PANEL ASSEMBLY WITH FRONT ASH RECEPTACLE (See page [IP-16](#))
3. REMOVE INSTRUMENT PANEL FINISH PANEL END LH (See page [IP-13](#))
4. REMOVE INSTRUMENT PANEL FINISH PANEL END RH (See page [IP-15](#))
5. REMOVE NO. 2 INSTRUMENT PANEL REGISTER ASSEMBLY (See page [IP-17](#))
6. REMOVE INTEGRATION CONTROL PANEL WITH RADIO RECEIVER ASSEMBLY (w/o Navigation System) (See page [AV-168](#))
7. REMOVE MULTI-DISPLAY WITH RADIO RECEIVER ASSEMBLY (w/ Navigation System) (See page [AV-170](#))
8. REMOVE CLEARANCE WARNING BUZZER
 - (a) Disconnect the connector.



- (b) Disengage the clamp and remove the clearance warning buzzer.

Clearance Warning Buzzer:



H

B139281E01

INSPECTION

1. INSPECT CLEARANCE WARNING BUZZER

- (a) Apply battery voltage and check operation of the warning buzzer, as shown in the table below.

Result

Measurement Condition	Specified Condition
Battery voltage (+) → 1 Battery voltage (-) → 2	Operating sound occurs

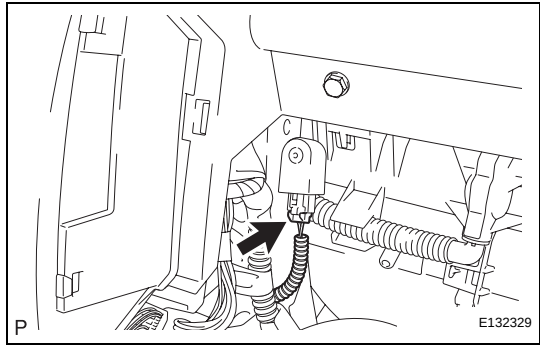
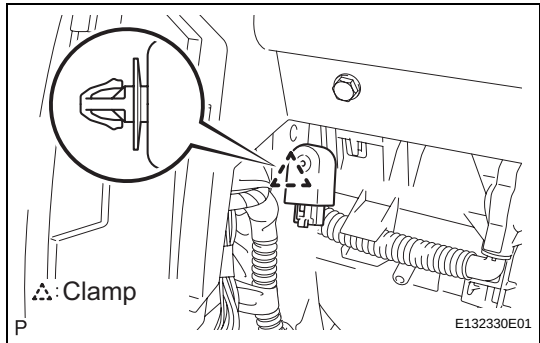
HINT:

The clearance warning buzzer does not sound without battery voltage applied because the buzzer is a separately-excited type.

INSTALLATION

1. INSTALL CLEARANCE WARNING BUZZER

- (a) Engage the clamp and install the clearance warning buzzer.



- (b) Connect the connector.

2. INSTALL INTEGRATION CONTROL PANEL WITH RADIO RECEIVER ASSEMBLY (w/o Navigation System) (See page [AV-172](#))

3. INSTALL MULTI-DISPLAY WITH RADIO RECEIVER ASSEMBLY (w/ Navigation System) (See page [AV-173](#))

4. INSTALL INSTRUMENT PANEL FINISH PANEL END LH (See page [IP-46](#))

5. INSTALL INSTRUMENT PANEL FINISH PANEL END RH (See page [IP-44](#))

6. INSTALL UPPER CONSOLE PANEL ASSEMBLY WITH FRONT ASH RECEPTACLE (See page [IP-42](#))

7. INSTALL NO. 2 INSTRUMENT PANEL REGISTER ASSEMBLY (See page [IP-41](#))

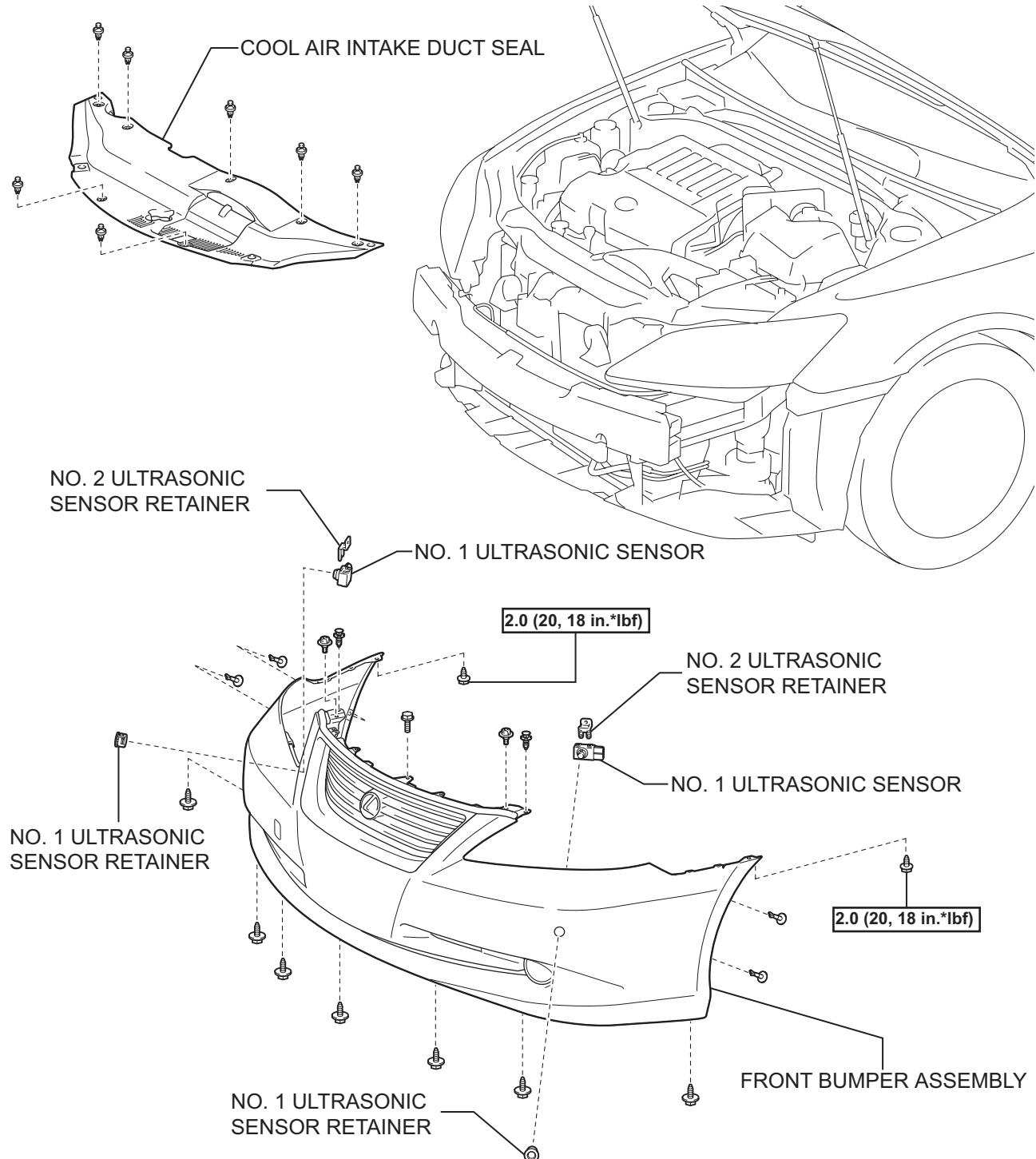
8. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (See page [IP-42](#))

9. ADJUST CLOCK

ULTRASONIC SENSOR

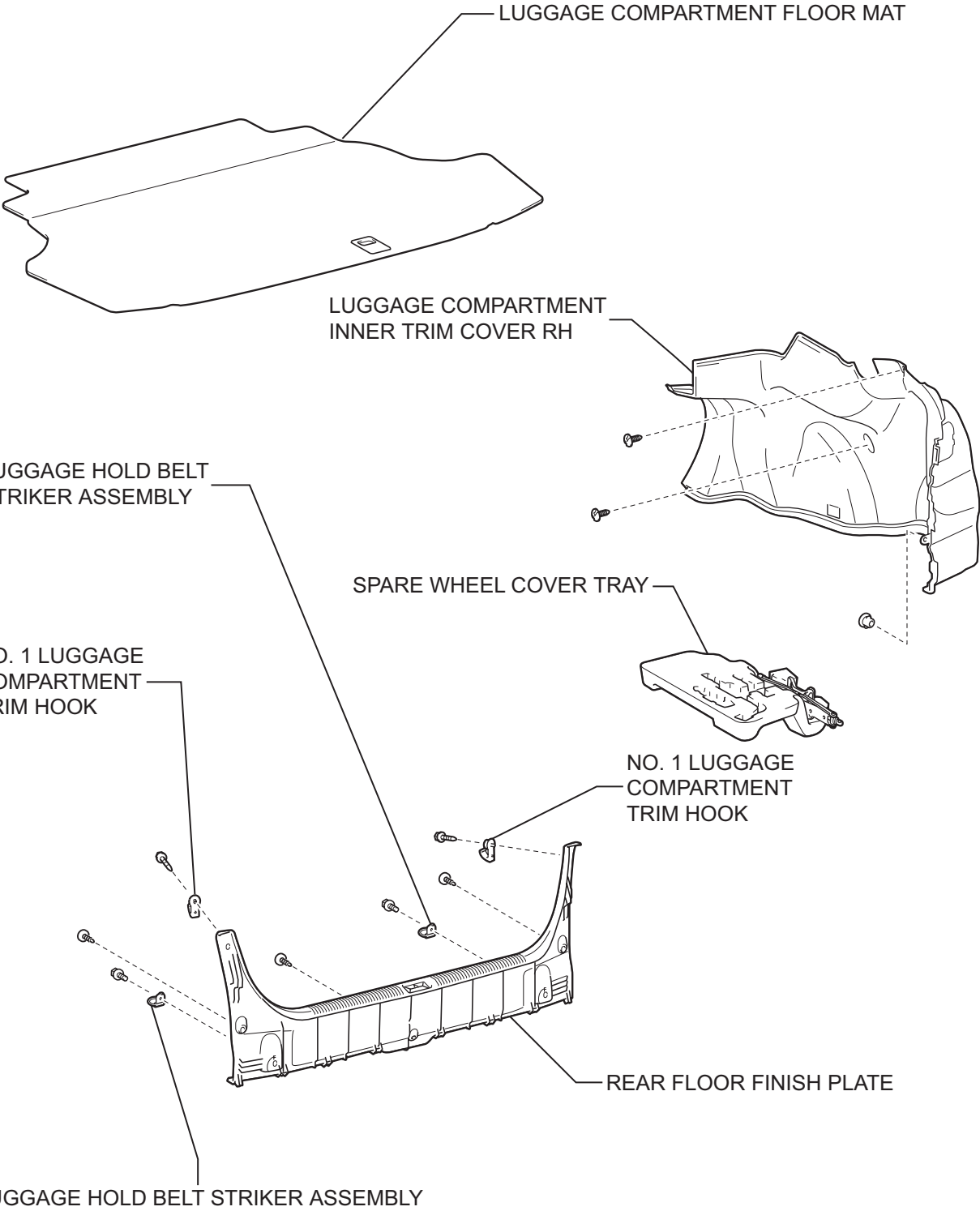
COMPONENTS

for Front Side:



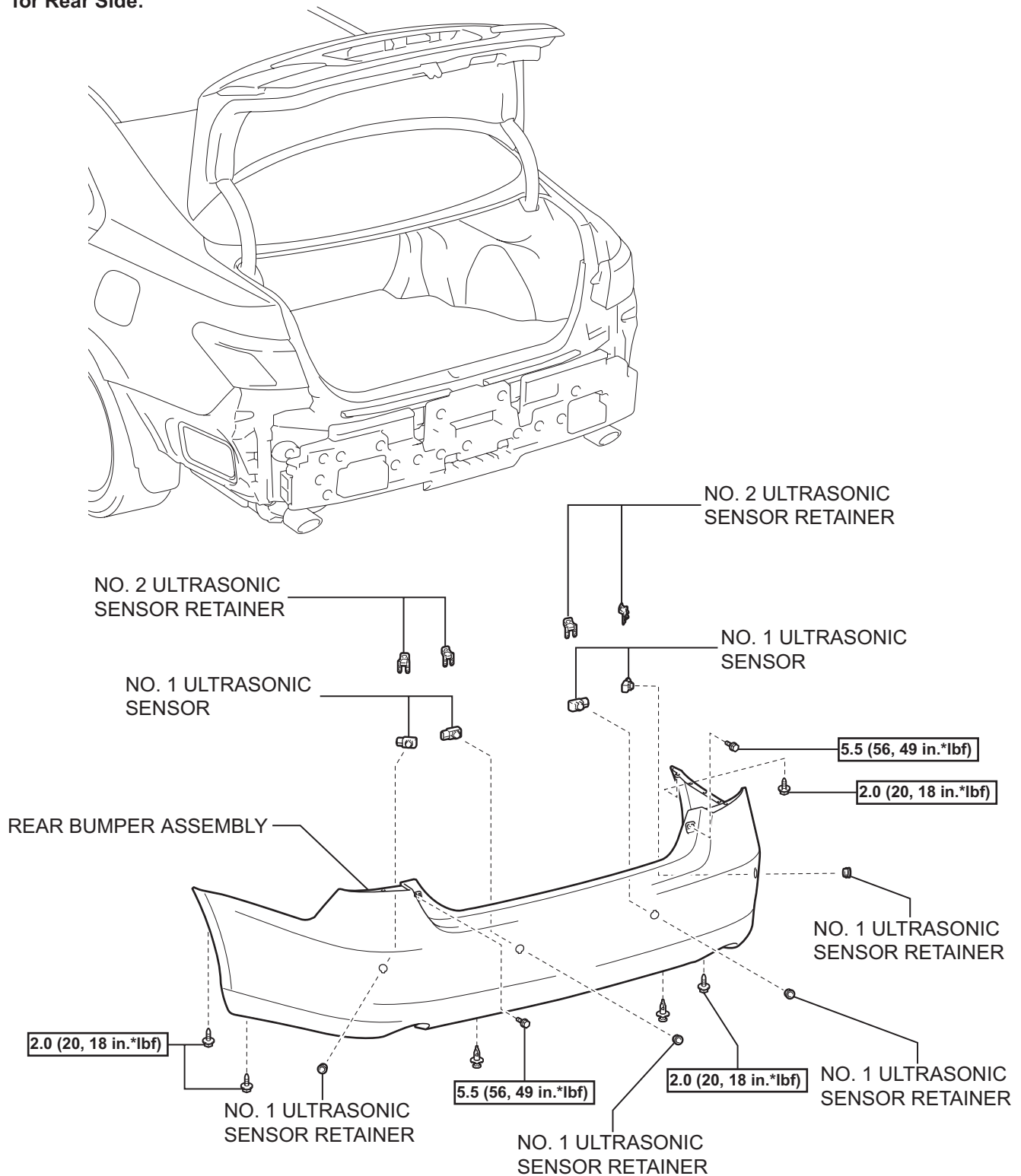
N*m (kgf*cm, ft.*lbf): Specified torque

for Rear Side:



PM

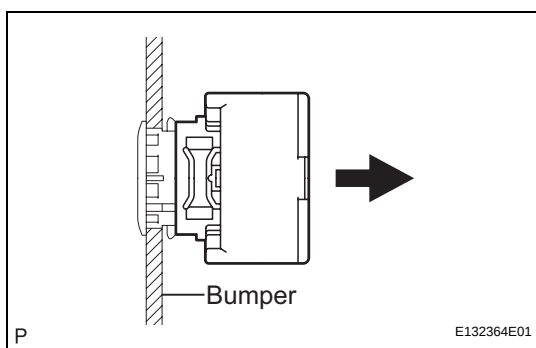
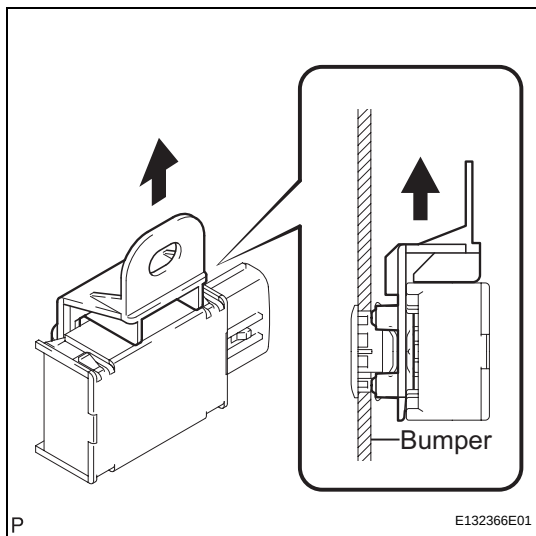
for Rear Side:



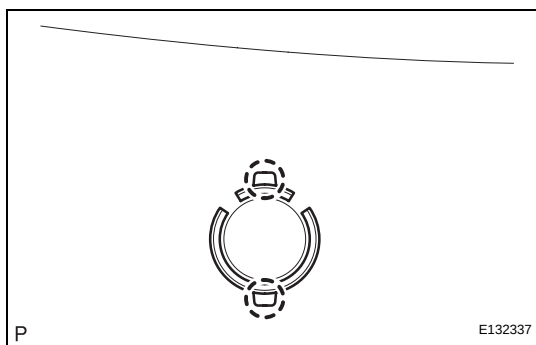
N*m (kgf*cm, ft.*lbf): Specified torque

REMOVAL

1. REMOVE COOL AIR INTAKE DUCT SEAL (for Front Side) (See page [ET-4](#))
2. REMOVE FRONT BUMPER ASSEMBLY (for Front Side) (See page [ET-5](#))
3. REMOVE NO. 1 ULTRASONIC SENSOR (for Front Side)
 - (a) Disconnect the No. 1 ultrasonic sensor connector.
 - (b) Remove the No. 2 ultrasonic sensor retainer as shown in the illustration.



- (c) Remove the No. 1 ultrasonic sensor from the No. 1 ultrasonic sensor retainer.

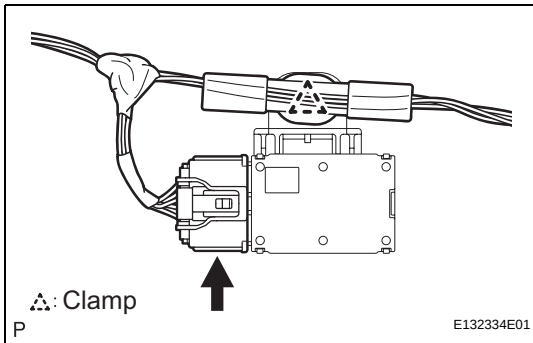


4. REMOVE NO. 1 ULTRASONIC SENSOR RETAINER (for Front Side)
 - (a) Disengage the 2 claws and remove the No. 1 ultrasonic sensor retainer from the front bumper assembly.
5. REMOVE LUGGAGE COMPARTMENT FLOOR MAT (for Rear Side)
6. REMOVE SPARE WHEEL COVER TRAY (for Rear Side)
7. REMOVE LUGGAGE HOLD BELT STRIKER ASSEMBLY (for Rear Side) (See page [ED-82](#))
8. REMOVE NO. 1 LUGGAGE COMPARTMENT TRIM HOOK (for Rear Side) (See page [ED-83](#))
9. REMOVE REAR FLOOR FINISH PLATE (for Rear Side) (See page [ED-83](#))

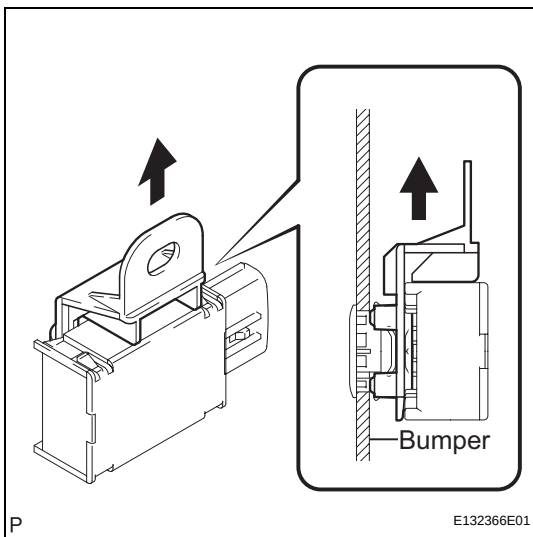
10. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER RH (for Rear Side) (See page [ED-83](#))
11. REMOVE REAR BUMPER ASSEMBLY (for Rear Side) (See page [ET-19](#))

12. REMOVE NO. 1 ULTRASONIC SENSOR (for Rear Side)

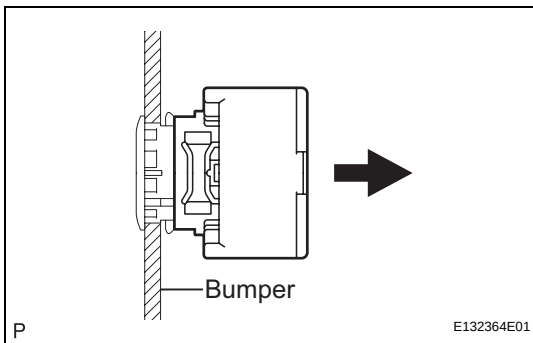
- (a) Disconnect the No. 1 ultrasonic sensor connector.
- (b) Disengage the clamp.



- (c) Remove the No. 2 ultrasonic sensor retainer as shown in the illustration.

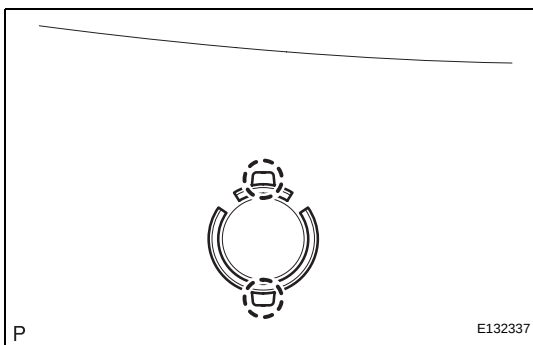


- (d) Remove the No. 1 ultrasonic sensor from the No. 1 ultrasonic sensor retainer.



13. REMOVE NO. 1 ULTRASONIC SENSOR RETAINER (for Rear Side)

- (a) Disengage the 2 claws and remove the No. 1 ultrasonic sensor retainer from the rear bumper assembly.



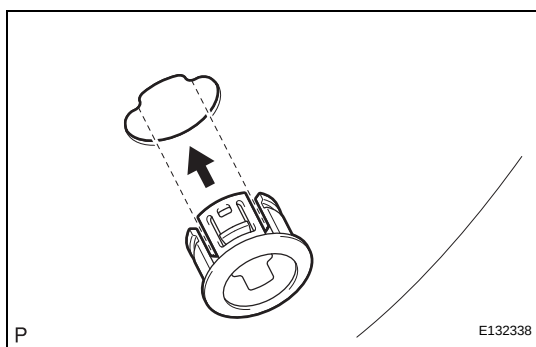
INSTALLATION

1. INSTALL NO. 1 ULTRASONIC SENSOR RETAINER (for Rear Side)

- (a) Install the No. 1 ultrasonic sensor retainer as shown in the illustration.

HINT:

Align the protrusions on the bumper hole with the slits of the No. 1 ultrasonic sensor retainer and install the No. 1 ultrasonic sensor.

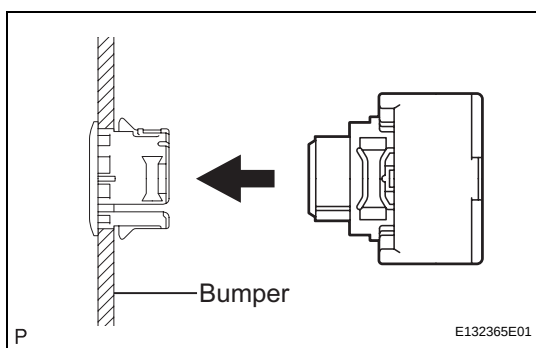


2. INSTALL NO. 1 ULTRASONIC SENSOR (for Rear Side)

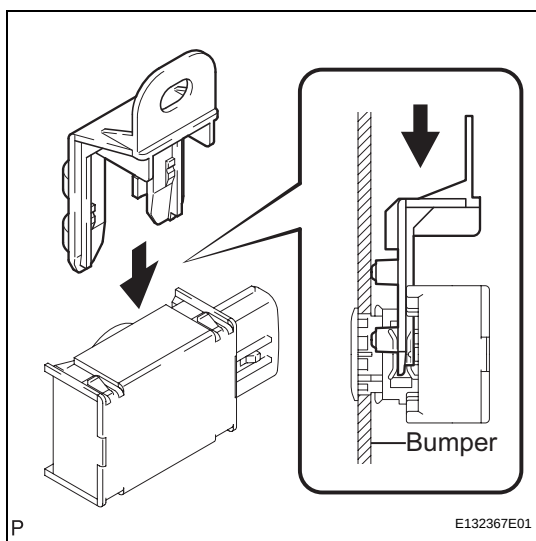
NOTICE:

Do not apply excessive force to the No. 1 ultrasonic sensor while performing the following procedures.

- (a) Install the No. 1 ultrasonic sensor to the No. 1 ultrasonic sensor retainer.



- (b) Install the No. 2 ultrasonic sensor retainer as shown in the illustration.



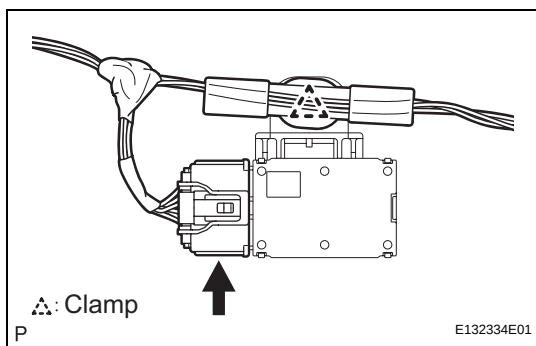
- (c) Connect the No. 2 ultrasonic sensor connector and engage the clamp.

3. INSTALL REAR BUMPER ASSEMBLY (for Rear Side) (See page [ET-23](#))

4. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER RH (for Rear Side) (See page [ED-88](#))

5. INSTALL REAR FLOOR FINISH PLATE (for Rear Side) (See page [ED-88](#))

6. INSTALL NO. 1 LUGGAGE COMPARTMENT TRIM HOOK (for Rear Side) (See page [ED-89](#))



7. **INSTALL LUGGAGE HOLD BELT STRIKER ASSEMBLY (for Rear Side)** (See page [ED-89](#))
8. **INSTALL SPARE WHEEL COVER TRAY (for Rear Side)**
9. **INSTALL LUGGAGE COMPARTMENT FLOOR MAT (for Rear Side)**
10. **INSTALL NO. 1 ULTRASONIC SENSOR RETAINER (for Front Side)**
 - (a) Install the No. 1 ultrasonic sensor retainer as shown in the illustration.

HINT:

Align the protrusions on the bumper hole with the slits of the No. 1 ultrasonic sensor retainer and install the No. 1 ultrasonic sensor.

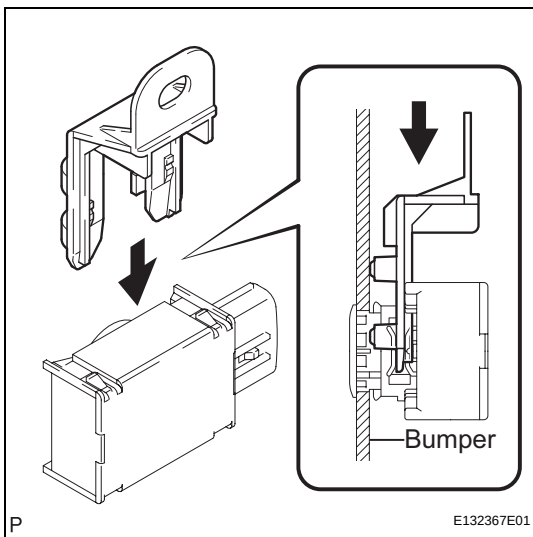
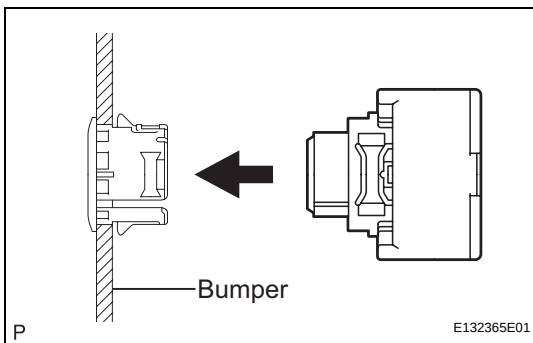
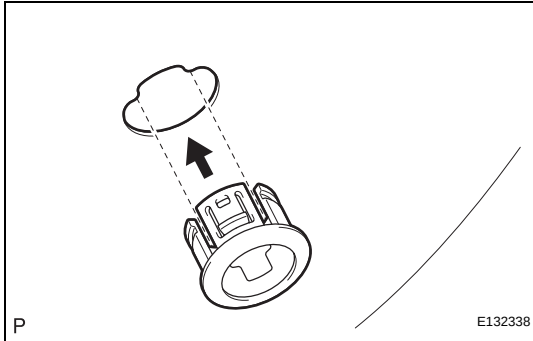
11. **INSTALL NO. 1 ULTRASONIC SENSOR (for Front Side)**

NOTICE:

Do not apply excessive force to the No. 1 ultrasonic sensor while performing the following procedures.

- (a) Install the No. 1 ultrasonic sensor to the No. 1 ultrasonic sensor retainer.

PM

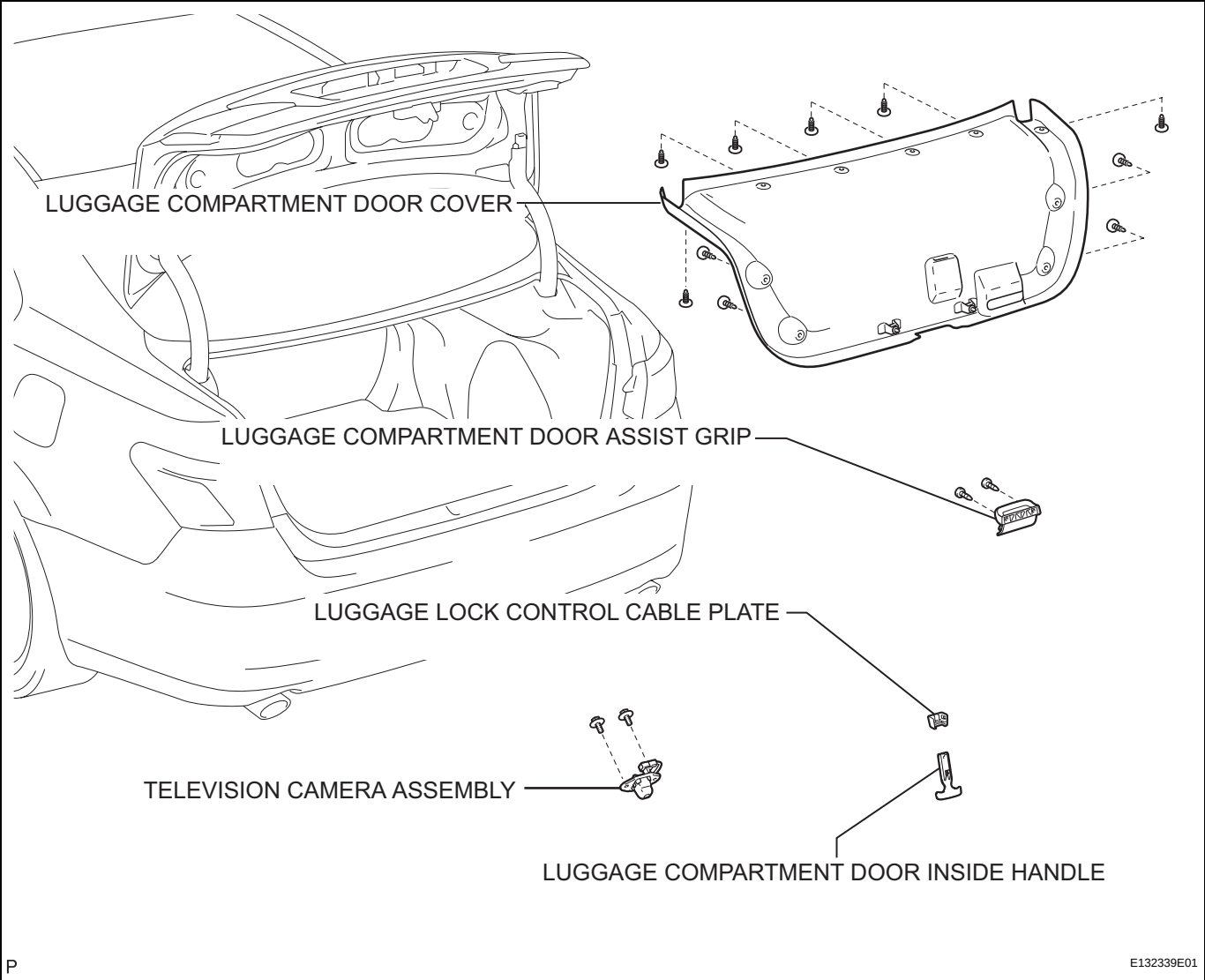


- (b) Install the No. 2 ultrasonic sensor retainer as shown in the illustration.

12. **INSTALL FRONT BUMPER ASSEMBLY (for Front Side)** (See page [ET-14](#))
13. **INSTALL COOL AIR INTAKE DUCT SEAL (for Front Side)** (See page [ET-14](#))
14. **VEHICLE PREPARATION FOR FOG LIGHT AIM ADJUSTMENT** (See page [LI-141](#))
15. **PREPARATION FOR FOG LIGHT AIMING** (See page [LI-142](#))
16. **FOG LIGHT AIMING INSPECTION** (See page [LI-143](#))
17. **FOG LIGHT AIMING ADJUSTMENT** (See page [LI-144](#))

TELEVISION CAMERA

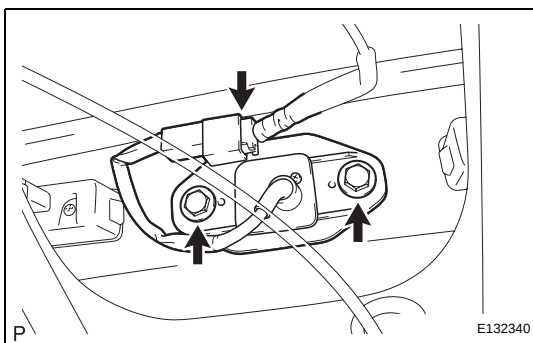
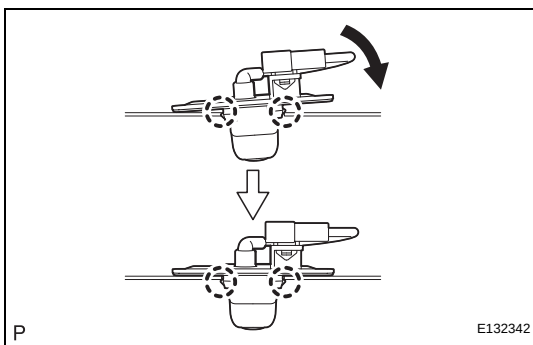
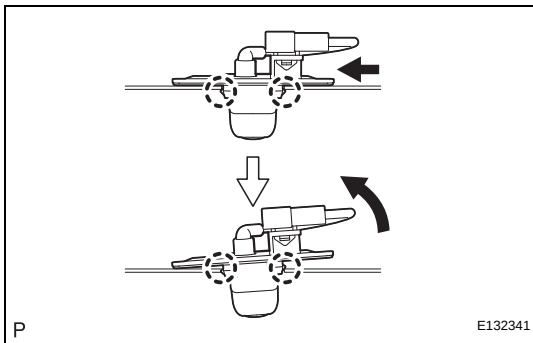
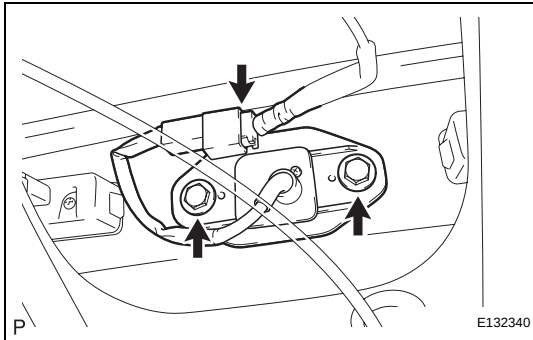
COMPONENTS



PM

REMOVAL

1. REMOVE LUGGAGE COMPARTMENT DOOR ASSIST GRIP (See page [ET-71](#))
2. REMOVE LUGGAGE LOCK CONTROL CABLE PLATE (See page [ET-71](#))
3. REMOVE LUGGAGE COMPARTMENT DOOR INSIDE HANDLE (See page [ET-71](#))
4. REMOVE LUGGAGE COMPARTMENT DOOR COVER (See page [ET-72](#))
5. REMOVE TELEVISION CAMERA ASSEMBLY
 - (a) Disconnect the television camera connector.
 - (b) Remove the 2 bolts.



- (c) Disengage the 2 claws and remove the television camera assembly as shown in the illustration.

PM

INSTALLATION

1. INSTALL TELEVISION CAMERA ASSEMBLY
 - (a) Engage the 2 claws and temporarily install the television camera assembly to the luggage compartment as shown in the illustration.
 - (b) Install the television camera assembly with the 2 bolts.
 - (c) Connect the television camera connector.
2. INSTALL LUGGAGE COMPARTMENT DOOR COVER (See page [ET-74](#))
3. INSTALL LUGGAGE COMPARTMENT DOOR INSIDE HANDLE (See page [ET-74](#))
4. INSTALL LUGGAGE LOCK CONTROL CABLE PLATE (See page [ET-75](#))

5. INSTALL LUGGAGE COMPARTMENT DOOR ASSIST GRIP (See page [ET-75](#))