

SECTION **SN**  
SONAR SYSTEM

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# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

#### Precaution for Trouble Diagnosis

INFOID:000000008222335

##### AV COMMUNICATION SYSTEM

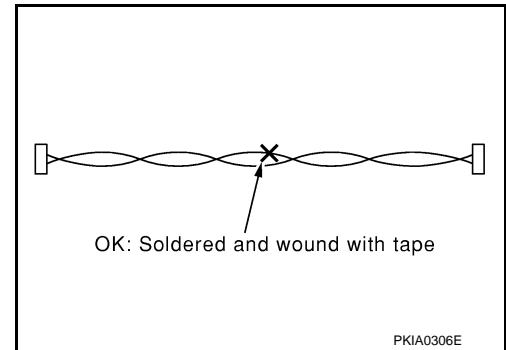
- Do not apply voltage of 7.0 V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0 V or less.
- Be sure to turn ignition switch OFF and disconnect the battery cable from the negative terminal before checking the circuit.

#### Precaution for Harness Repair

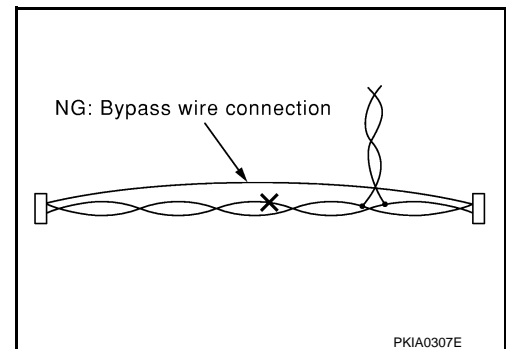
INFOID:000000008222336

##### AV COMMUNICATION SYSTEM

- Solder the repaired parts, and wrap with tape. [Frays of twisted line must be within 110 mm (4.33 in).]



- Do not perform bypass wire connections for the repair parts. (The spliced wire will become separated and the characteristics of twisted line will be lost.)



#### Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000008222582

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

##### **WARNING:**

**Always observe the following items for preventing accidental activation.**

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".**

## PRECAUTIONS

< PRECAUTION >

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- **Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

**WARNING:**

Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

# COMPONENT PARTS

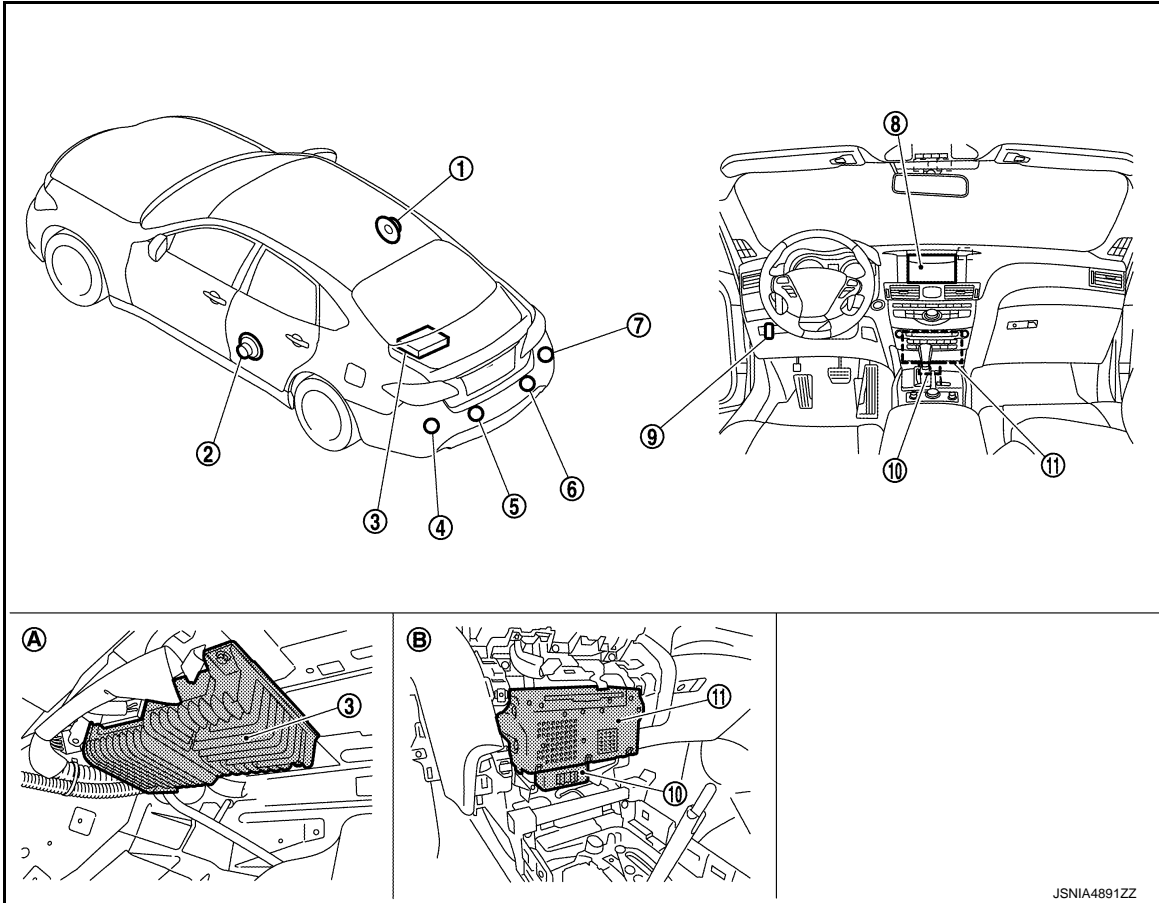
< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### COMPONENT PARTS

#### Component Parts Location

INFOID:000000008222340



- |   |                            |                            |
|---|----------------------------|----------------------------|
| 1. Rear door speaker RH                     | 2. Rear door speaker LH    | 3. BOSE amp.               |
| 4. Corner sensor rear LH                    | 5. Center sensor rear LH   | 6. Center sensor rear RH   |
| 7. Corner sensor rear RH                    | 8. Display unit            | 9. Sonar system OFF switch |
| 10. Sonar control unit                      | 11. AV control unit        |                            |
| A. Rear parcel shelf lower part (left side) | B. Instrument panel center |                            |

#### Component Description

INFOID:000000008222341

Component	Description
SONAR CONTROL UNIT	<ul style="list-style-type: none"> <li>Converts a signal received from the corner sensor and the center sensor into a distance signal (center sensor: four levels, corner sensor: three levels) to transmit it to the AV control unit via AV communication.</li> <li>The activation condition is controlled by inputting the reverse signal and the vehicle speed signal.</li> <li>The sonar system turns OFF when receiving a sonar system OFF switch signal.</li> <li>Capable of system settings and trouble diagnoses with CONSULT (K-LINE).</li> </ul>
CORNER SENSOR REAR (LH, RH) CENTER SENSOR REAR (LH, RH)	When a distance from an obstacle is detected, a distance signal is transmitted to the sonar control unit.
SONAR SYSTEM OFF SWITCH	<ul style="list-style-type: none"> <li>The sonar system OFF switch signal is transmitted to the sonar control unit.</li> <li>Integrated with triple switch.</li> </ul>

## COMPONENT PARTS

### < SYSTEM DESCRIPTION >

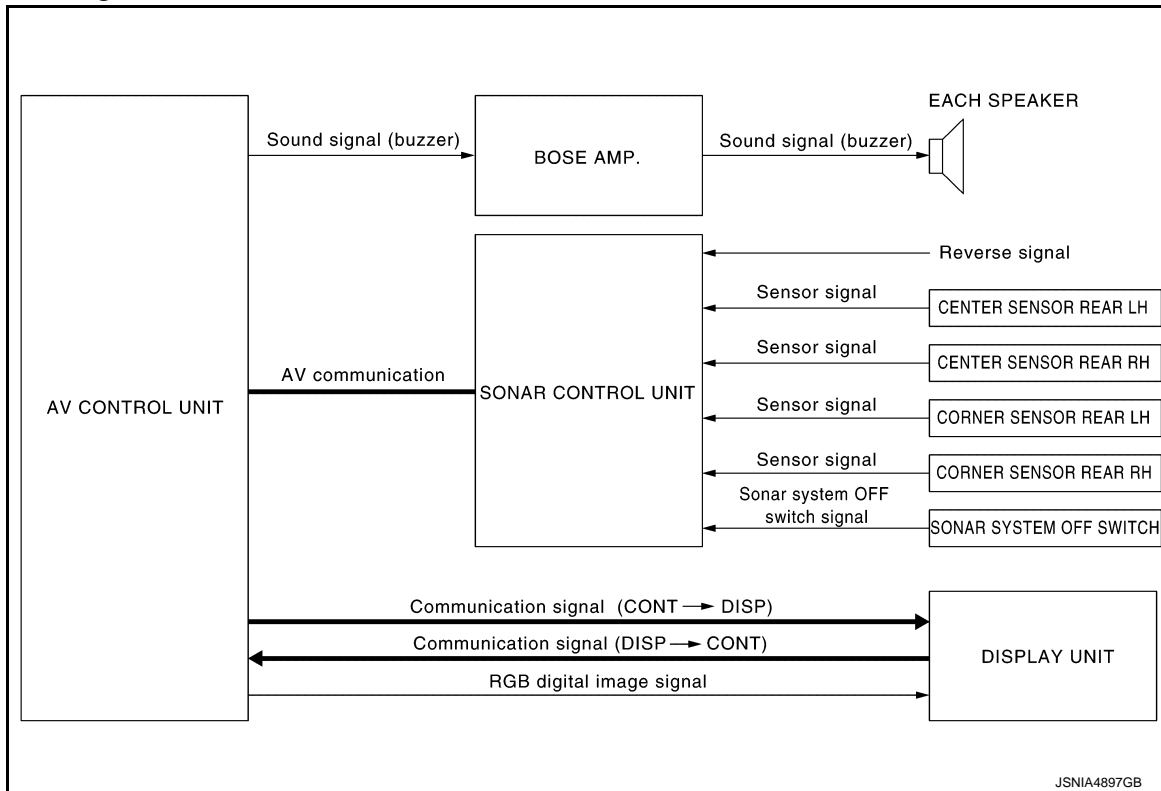
Component	Description
AV CONTROL UNIT	<ul style="list-style-type: none"><li>• An image on the display is switched between the AV control unit and the display unit via serial communication.</li><li>• Transmits an RGB digital image signal to the display unit and a sound signal (buzzer) to the BOSE amp., based on the signal received from the sonar control unit via AV communication.</li></ul>
DISPLAY UNIT	<ul style="list-style-type: none"><li>• An RGB digital image signal is transmitted from the AV control unit.</li><li>• An image on the display is switched between the AV control unit and the display unit via serial communication.</li></ul>
BOSE AMP.	Receives a sound signal (buzzer) from the AV control unit and transmits the signal to the each speaker.
EACH SPEAKER	Receives a sound signal (buzzer) from the AV control unit to allow the buzzer to sound.

# SONAR SYSTEM

< SYSTEM DESCRIPTION >

## SONAR SYSTEM

### System Diagram



### System Description

INFOID:00000000822343

- The sonar sensor installed to the rear bumper detects obstacles around the bumper.
- When the rear corner sensor or the rear center sensor detects an obstacle during rear view monitor indication, the buzzer sounds via each speaker and the location of the obstacle is indicated on the display unit by displaying an icon.
- Sonar system turns ON/OFF with the sonar system OFF switch.
- The sonar control unit is connected to the AV control unit via the AV communication.
- Sonar control unit is connected to the diagnosis connector via K-Line and allows diagnoses with CONSULT.

#### WARNING BY BUZZER

- The cycle of buzzer changes according to the distance from an obstacle: the center sensor, in four levels; the corner sensor, in three levels.
- Each sonar sensor transmits a sensor signal to the sonar control unit when detecting an obstacle.
- The sonar control unit converts a signal received from each sonar sensor into a distance signal (center sensor: four levels, corner sensor: three levels) and transmits it to the AV control unit via AV communication.
- The AV control unit transmits a buzzer signal to the BOSE amp. when receiving a distance signal from the sonar control unit.
- When receiving a buzzer signal, the BOSE amp. transmits the buzzer signal to each speaker.
- When each speaker receives a sound signal (buzzer), a buzzer sounds.
- When the rear center sensor or the rear corner sensor detects an obstacle, a buzzer is heard from the speakers on the rear side.

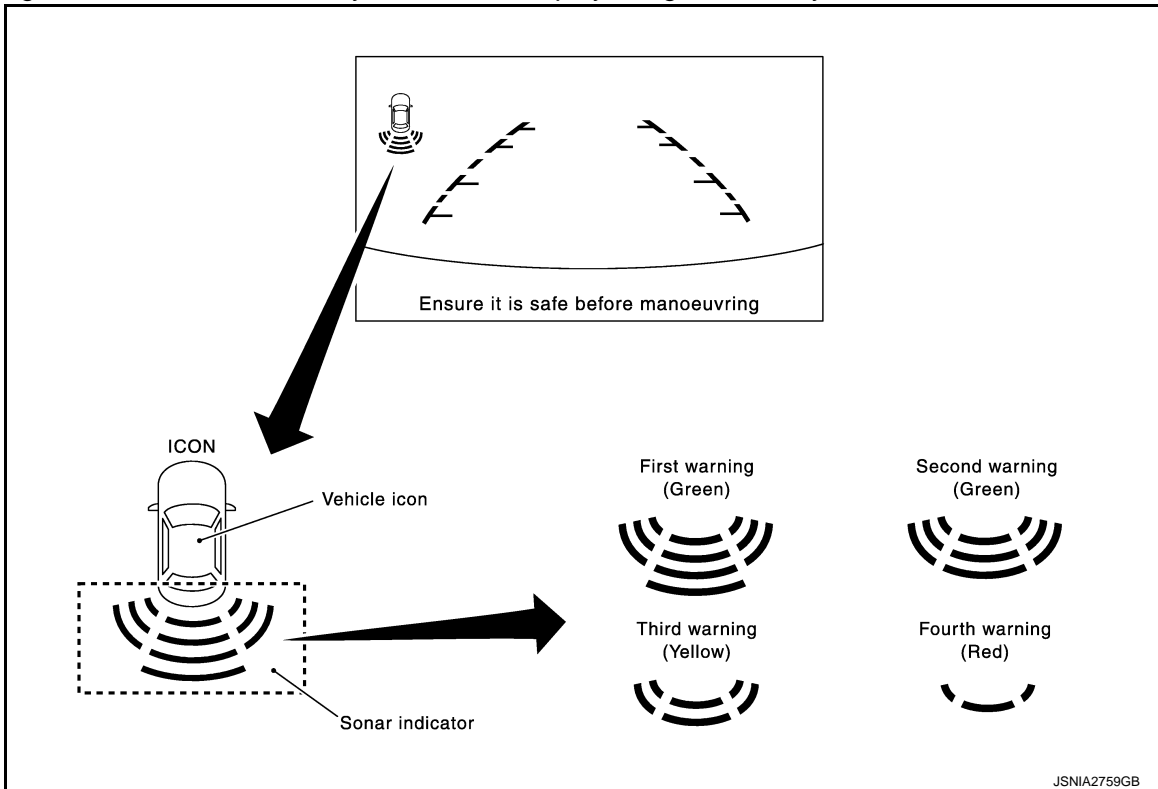
#### WARNING BY INDICATOR

- Detecting an obstacle except when in reverse gear (during map screen, etc.), the direction and the distance to the obstacle are displayed in full-screen.
- Detecting an obstacle when in reverse gear, the direction and the distance to the obstacle are displayed on the rear view monitor with icons.
- The color and the number of bars of the sonar indicator changes, according to the distance to an obstacle (during full-screen display).

# SONAR SYSTEM

## < SYSTEM DESCRIPTION >

- The color and the number of blinks of the sonar indicator changes, according to the distance to an obstacle (during icon indication).
- The sonar display function can be turned ON/OFF from “SETTING” of “Other”. In this case, buzzer sounds by turning OFF the display function.
- Each sonar sensor transmits a sensor signal to the sonar control unit when detecting an obstacle.
- The sonar control unit converts a signal received from each sonar sensor into distance signal (center sensor: four levels, corner sensor: three levels) and transmits it to the AV control unit via AV communication.
- The AV control unit transmits a RGB digital image signal to the front display unit, based on the received signal.
- When receiving a RGB digital image signal, the front display unit indicates “Full screen display” or “Icon display.”
- Warning indications of the sonar system on the display are generated by the AV control unit.



## ACTIVATION CONDITION

The rear sensor activates in the following conditions.

- Sonar system OFF switch indicator ON
- Reverse signal ON
- P range signal OFF
- During obstacle detection

x: applicable

Sonar system OFF switch indicator	Reverse signal	Sonar sensor
ON	ON	X*
	OFF	—
OFF	—	—

## NOTE:

\*: When the rear sensors simultaneously detect different obstacle:

- The sonar sensor detecting shorter distance from the object has priority to sound a buzzer.

## OBSTACLE DETECTION DISTANCE

- The sonar control unit controls the obstacle detection distance. The detection distance differs between the corner sensor and the center sensor.
- The sonar control unit control a warning buzzer cycle which changes in 4 levels (for center) or in 3 levels (for corner), according to the detection distance.

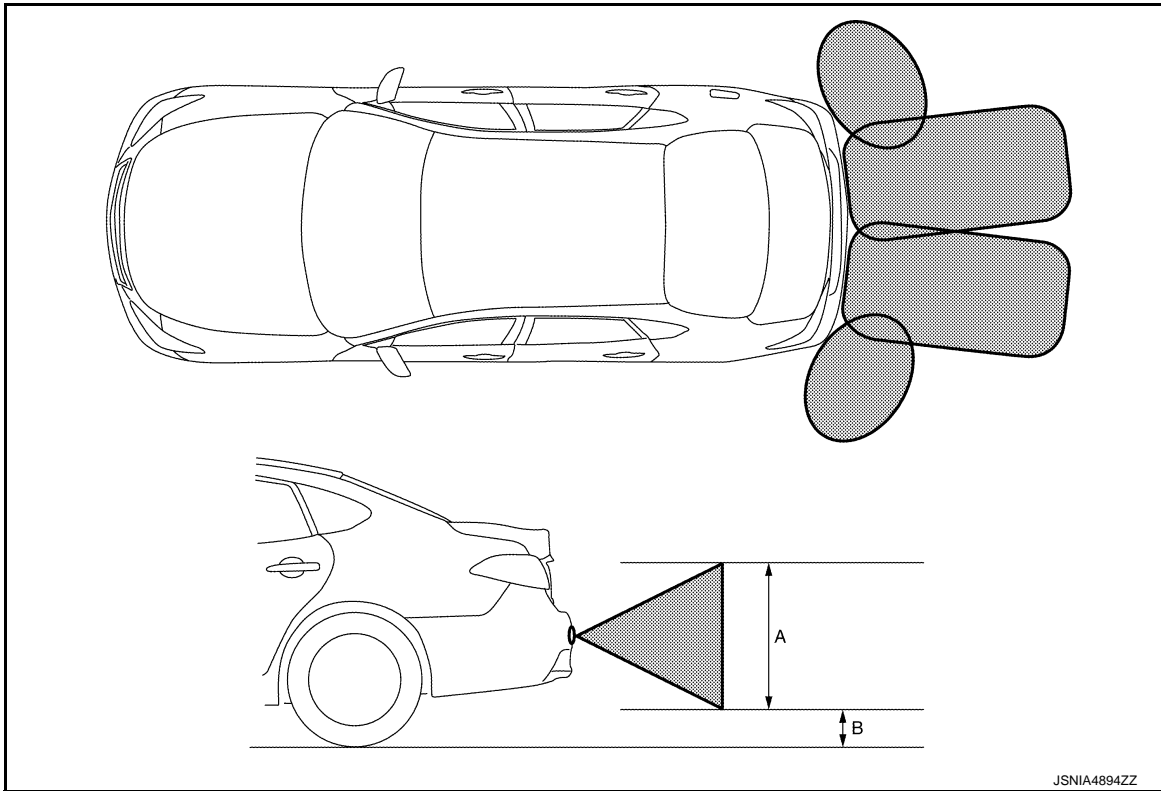


# SONAR SYSTEM

## < SYSTEM DESCRIPTION >

- The detection condition setting is adjustable in 4 levels with CONSULT. Refer to [SN-11, "CONSULT Function"](#).
- CONSULT enables the center sensor (rear) not to detect the range of 40 cm (15.75 in) or less to prevent from the trailer hitch vehicle detection error. Refer to [SN-11, "CONSULT Function"](#).

Obstacle detection range image



A. Approx. 50 cm (19.6 in)

B. Approx. 15 cm (5.9 in)

### Detection distance (default value)

Warning item	Corner sensor	Center sensor
First warning	—	60 – 100 cm (23.6 – 39.3 in)
Second warning	50 – 60 cm (19.6 – 23.6 in)	50 – 60 cm (19.6 – 23.6 in)
Third warning	30 – 50 cm (11.8 – 19.6 in)	30 – 50 cm (11.8 – 19.6 in)
Fourth warning	Less than 30 cm (11.8 in)	Less than 30 cm (11.8 in)

### Warning Buzzer Frequency

- The warning buzzer cycle changes between 4 levels (for center) and 3 levels (for corner) according to the detection distance.

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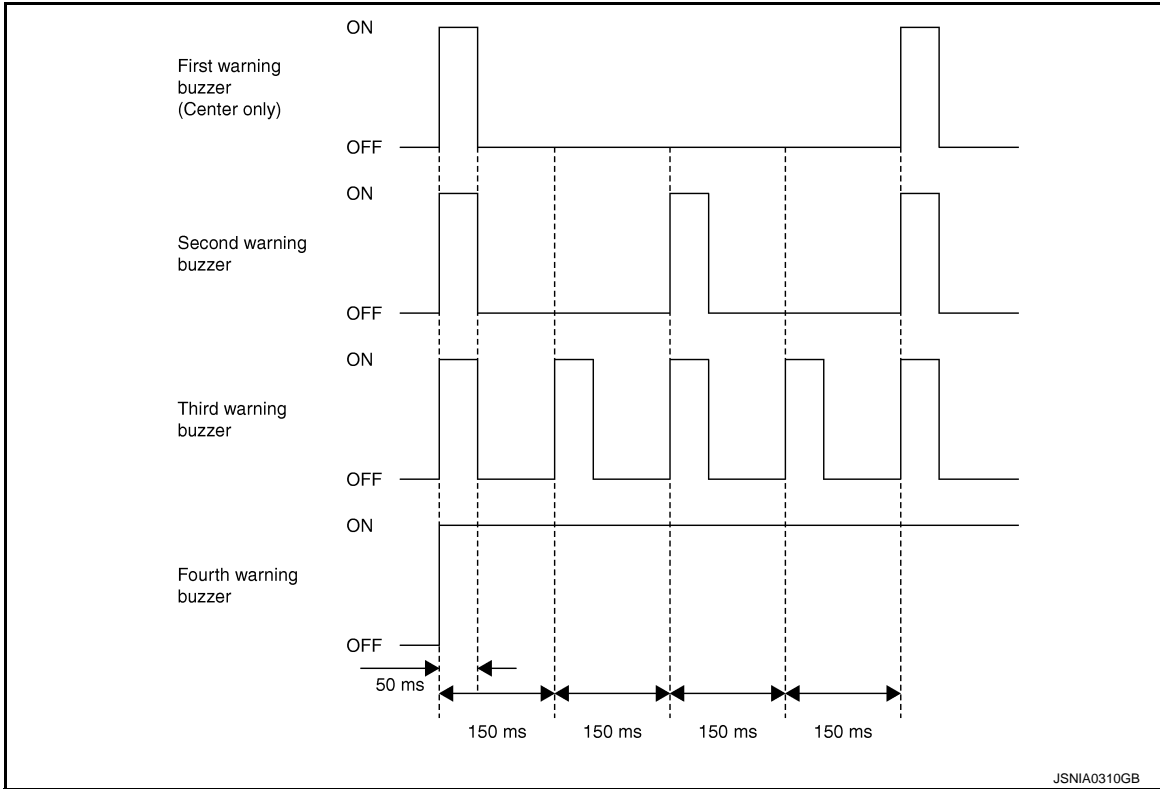
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# SONAR SYSTEM

## < SYSTEM DESCRIPTION >

- The nearest sensor from the detected obstacle determines the buzzer cycle if plural sensors detect any obstacle simultaneously detected obstacles.



### NOTE:

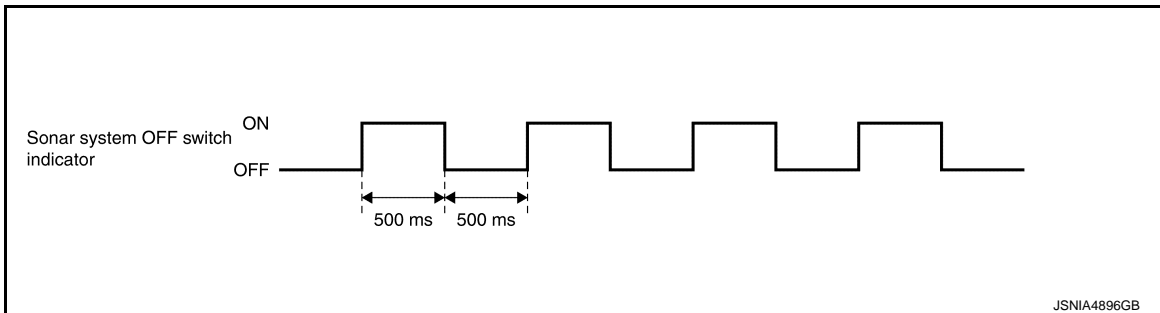
The warning buzzer of the corner sensor sounds as follows.

- As for the first, second and third stages, the warning buzzer sound for 3 seconds at maximum.
- As for the fourth stage, the warning buzzer does not stop even after a lapse of 3 seconds.
- Buzzer stops when the vehicle moves away from an obstacle and the warning level decreases.

## Fail-Safe

INFOID:000000008222344

The warning buzzer function is deactivated and the sonar system OFF switch indicator blinks when a sensor system error is detected.



# DIAGNOSIS SYSTEM (SONAR CONTROL UNIT)

< SYSTEM DESCRIPTION >

## DIAGNOSIS SYSTEM (SONAR CONTROL UNIT)

### CONSULT Function

INFOID:000000008222345

### APPLICATION ITEMS

CONSULT can display each diagnostic item, using the diagnostic test modes shown below:

Test mode	Function
Ecu Identification	Sonar control unit part number can be read.
Self Diagnostic Results	Sonar control unit checks the conditions and displays memorized error.
Data Monitor	Sonar control unit input/output data in real time.
Active Test	Gives a drive signal to a load to check the operation.
Work support	Changes setting of each function.

### ECU IDENTIFICATION

Displays the part number of the sonar control unit.

### SELF-DIAGNOSTIC RESULTS

For details, refer to [SN-16, "DTC Index"](#).

### DATA MONITOR

#### NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor Item	Display	Description
REAR BUZZER	On	Buzzer (backward) output condition.
	Off	Buzzer (backward) non-output condition.
REVERSE RANGE	On	Shift the selector lever to R position.
	Off	Shift the selector lever other than R position.
CANCEL SW	On	While pressing the sonar system OFF switch.
	Off	Other than above.
CANCEL SW IND	On	When sonar system OFF switch indicator is ON.
	Blink	When sonar system OFF switch indicator is blinking.
	Off	When sonar system OFF switch indicator is OFF.
CR SEN [RL] CR SEN [RR]	ERROR	When a sensor is abnormal.
	LV.0	When a sensor is not detection.
	LV.2	The distance between the corner sensor and an obstacle is 50 cm (19.6 in) or more and less than 60 cm (23.6 in).
	LV.3	The distance between the corner sensor and an obstacle is 30 cm (11.8 in) or more and less than 50 cm (19.6 in).
	LV.4	The distance between corner sensor and an obstacle less than 30 cm (11.8 in).
CTR SEN [RL] CTR SEN [RR]	ERROR	When a sensor is abnormal.
	LV.0	When a sensor is not detection.
	LV.1	The distance between the center sensor and an obstacle is 60 cm (23.6 in) or more and less than 100 cm (39.3 in).
	LV.2	The distance between the center sensor and an obstacle is 50 cm (19.6 in) or more and less than 60 cm (23.6 in).
	LV.3	The distance between the center sensor and an obstacle is 30 cm (11.8 in) or more and less than 50 cm (19.6 in).
	LV.4	The distance between center sensor and an obstacle less than 30 cm (11.8 in).

# DIAGNOSIS SYSTEM (SONAR CONTROL UNIT)

## < SYSTEM DESCRIPTION >

Monitor Item	Display	Description
DISPLAY INFO	On	Icon display indication condition.
	Off	Icon display non-indication condition.

## ACTIVE TEST

Active test item	Function
BUZZER	This test is able to check buzzer operation.
CANCEL SW	This test is able to check sonar system OFF switch indicator operation.
SONAR SENSOR	This test is able to check each sonar sensor operation.

## WORK SUPPORT

Work support item	Function
CORNER SEN DISTANCE SET	Corner sensor warning buzzer distance is adjustable to 4 phases.
CENTER SEN DISTANCE SET	Center sensor warning buzzer distance is adjustable to 4 phases.
VOLUME SETTING	Warning buzzer volume can set it 2 phases.
TRAILER HITCH MODE	Center sensor (RR, RL) only is adjustable not to detect the distance less than 40 cm (15.7 in). <b>NOTE:</b> This adjustment is for preventing to miss detect the distance when installing the trailer hitch.

### CORNER SEN DISTANCE SET

Corner sensor warning buzzer distance can set it to 4 phases as follows.

Warning item	FARTHER	FAR	NORMAL (Default)	NEAR
Second stage warning	70 – 80 cm (27.5 – 31.4 in)	60 – 70 cm (23.6 – 27.5 in)	50 – 60 cm (19.6 – 23.6 in)	40 – 50 cm (15.7 – 19.6 in)
Third stage warning	50 – 70 cm (19.6 – 27.5 in)	40 – 60 cm (15.7 – 23.6 in)	30 – 50 cm (11.8 – 19.6 in)	30 – 40 cm (11.8 – 15.7 in)
Fourth stage warning	Less than 50 cm (19.6 in)	Less than 40 cm (15.7 in)	Less than 30 cm (11.8 in)	Less than 30 cm (11.8 in)

The default of this model is "NORMAL".

### CENTER SEN DISTANCE SET

Center sensor warning buzzer distance can set it to 4 phases as follows.

Warning item	FARTHER	FAR	NORMAL (Default)	NEAR
First stage warning	80 – 120 cm (31.4 – 47.2 in)	70 – 110 cm (27.5 – 43.3 in)	60 – 100 cm (23.6 – 39.3 in)	50 – 90 cm (19.6 – 35.4 in)
Second stage warning	70 – 80 cm (27.5 – 31.4 in)	60 – 70 cm (23.6 – 27.5 in)	50 – 60 cm (19.6 – 23.6 in)	40 – 50 cm (15.7 – 19.6 in)
Third stage warning	50 – 70 cm (19.6 – 27.5 in)	40 – 60 cm (15.7 – 23.6 in)	30 – 50 cm (11.8 – 19.6 in)	30 – 40 cm (11.8 – 15.7 in)
Fourth stage warning	Less than 50 cm (19.6 in)	Less than 40 cm (15.7 in)	Less than 30 cm (11.8 in)	Less than 30 cm (11.8 in)

The default of this model is "NORMAL".

### VOLUME SETTING

Warning buzzer volume can set it to 2 phases.

### TRAILER HITCH MODE

Center sensor (RR, RL) only is adjustable not to detect the distance less than 40 cm (15.7 in).

**When installing the trailer hitch : ON**

**When not installing the trailer hitch : OFF**

# SONAR CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

## ECU DIAGNOSIS INFORMATION

### SONAR CONTROL UNIT

#### Reference Value

INFOID:000000008222346

#### VALUES ON THE DIAGNOSIS TOOL

**NOTE:**

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

CONSULT MONITOR ITEM

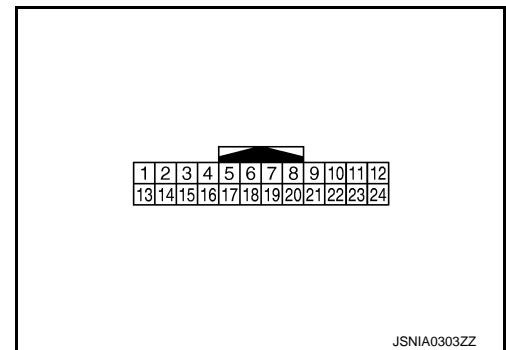
Monitor Item	Condition		Value/Status
REAR BUZZER	Ignition switch ON	Buzzer output condition.	On
		Buzzer non-output condition.	Off
P RANGE	Ignition switch ON	Shift the selector lever to P position.	On
		Shift the selector lever other than P position.	Off
REVERSE RANGE	Ignition switch ON	Shift the selector lever to R position.	On
		Shift the selector lever other than R position.	Off
CANCEL SW	Ignition switch ON	While pressing the sonar system OFF switch indicator.	On
		Other than above.	Off
CANCEL SW IND	Ignition switch ON	When sonar system OFF switch indicator indicator lamp is ON.	On
		When sonar system OFF switch indicator is blinking.	Blink
		When sonar system OFF switch indicator indicator is OFF.	Off
CR SEN [RL]	Ignition switch ON	When a sensor is abnormal.	ERROR
		When a sensor is not detection.	LV.0
		The distance between the corner sensor and an obstacle is 50 cm (19.6 in) or more and less then 60 cm (23.6 in).	LV.2
		The distance between the corner sensor and an obstacle is 30 cm (11.8 in) or more and less then 50 cm (19.6 in).	LV.3
		The distance between corner sensor and an obstacle less than 30 cm (11.8 in).	LV.4
CR SEN [RR]	Ignition switch ON	When a sensor is abnormal.	ERROR
		When a sensor is not detection.	LV.0
		The distance between the corner sensor and an obstacle is 50 cm (19.6 in) or more and less then 60 cm (23.6 in).	LV.2
		The distance between the corner sensor and an obstacle is 30 cm (11.8 in) or more and less then 50 cm (19.6 in).	LV.3
		The distance between corner sensor and an obstacle less than 30 cm (11.8 in).	LV.4
CTR SEN [RL]	Ignition switch ON	When a sensor is abnormal.	ERROR
		When a sensor is not detection.	LV.0
		The distance between the center sensor and an obstacle is 60 cm (23.6 in) or more and less then 100 cm (39.3 in).	LV.1
		The distance between the center sensor and an obstacle is 50 cm (19.6 in) or more and less then 60 cm (23.6 in).	LV.2
		The distance between the center sensor and an obstacle is 30 cm (11.8 in) or more and less then 50 cm (19.6 in).	LV.3
		The distance between center sensor and an obstacle less than 30 cm (11.8 in).	LV.4

# SONAR CONTROL UNIT

## < ECU DIAGNOSIS INFORMATION >

Monitor Item	Condition		Value/Status
CTR SEN [RR]	Ignition switch ON	When a sensor is abnormal.	ERROR
		When a sensor is not detection.	LV.0
		The distance between the center sensor and an obstacle is 60 cm (23.6 in) or more and less then 100 cm (39.3 in).	LV.1
		The distance between the center sensor and an obstacle is 50 cm (19.6 in) or more and less then 60 cm (23.6 in).	LV.2
		The distance between the center sensor and an obstacle is 30 cm (11.8 in) or more and less then 50 cm (19.6 in).	LV.3
		The distance between center sensor and an obstacle less than 30 cm (11.8 in).	LV.4
DISPLAY INFO	Ignition switch ON	Icon display indication condition.	On
		Icon display non-indication condition.	Off

## TERMINAL LAYOUT

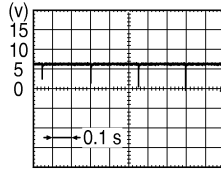
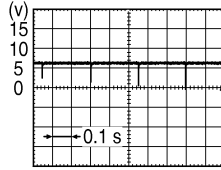


## PHYSICAL VALUES

Terminal No. (Wire color)		Description		Input/ Output	Condition	Value (Approx.)
+	-	Signal name				
1 (LG)	Ground	Ignition signal	Input	Ignition switch ON	—	Battery voltage
2 (SB)	Ground	Sonar system OFF switch signal	Input	Ignition switch ON	While pressing the sonar system OFF switch.	2.0 V
					Other than above.	12.0 V
5 (W)	12 (B)	Corner sensor signal rear LH	Input	Ignition switch ON	Shift the selector lever to R position.	 SKIB8942E
6 (B)	12 (B)	Corner sensor signal rear RH	Input	Ignition switch ON	Shift the selector lever to R position.	 SKIB8942E

# SONAR CONTROL UNIT

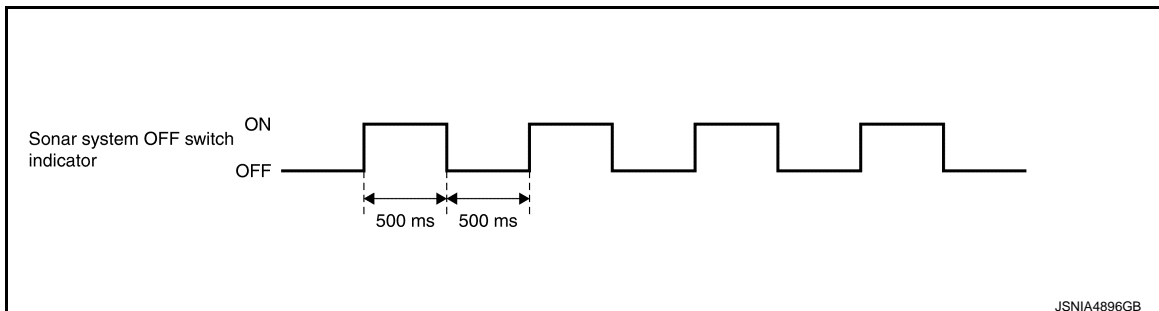
## < ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
7 (G)	12 (B)	Center sensor signal rear LH	Input	Ignition switch ON	Shift the selector lever to R position.	 SKIB8942E
8 (R)	12 (B)	Center sensor signal rear RH	Input	Ignition switch ON	Shift the selector lever to R position.	 SKIB8942E
11 (B)	Ground	Sonar system OFF switch indicator signal	Output	Ignition switch ON	Sonar system OFF switch indicator is ON.	0 V
					Sonar system OFF switch indicator is OFF.	12.0 V
13 (L)	Ground	ACC power supply	Input	Ignition switch ACC	—	Battery voltage
17 (BG)	Ground	Reverse range signal	Input	Ignition switch ON	Shift the selector lever to R position.	12.0 V
					Shift the selector lever other than R position.	0 V
18 (V)	—	K-line (CONSULT)	—	—	—	—
19 (SB)	—	AV communication signal (H)	Input/ Output	—	—	—
20 (LG)	—	AV communication signal (L)	Input/ Output	—	—	—
24 (B)	Ground	Ground	—	Ignition switch ON	—	0 V

### Fail-Safe

INFOID:000000008273211

The warning buzzer function is deactivated and the sonar system OFF switch indicator blinks when a sensor system error is detected.



# SONAR CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

## DTC Index

INFOID:000000008222348

DTC	Display item [Code]	Malfunction is detected when...	Reference
B2704	CORNER SENSOR [RL] [B2704]	Corner sensor rear LH is malfunctioning.	<a href="#">SN-20. "DTC Logic"</a>
B2705	SENSOR HARNESS OPEN [CR-RL] [B2705]	Corner sensor rear LH harness circuit is open.	<a href="#">SN-21. "Diagnosis Procedure"</a>
B2706	CORNER SENSOR [RR] [B2706]	Corner sensor rear RH is malfunctioning.	<a href="#">SN-22. "DTC Logic"</a>
B2707	SENSOR HARNESS OPEN [CR-RR] [B2707]	Corner sensor rear RH harness circuit is open.	<a href="#">SN-23. "Diagnosis Procedure"</a>
B2708	CENTER SENSOR [RL] [B2708]	Center sensor rear LH is malfunctioning.	<a href="#">SN-24. "DTC Logic"</a>
B2709	SENSOR HARNESS OPEN [CT-BL] [B2709]	Center sensor rear LH harness circuit is open.	<a href="#">SN-25. "Diagnosis Procedure"</a>
B270A	CENTER SENSOR [RR] [B270A]	Center sensor rear RH is malfunctioning.	<a href="#">SN-26. "DTC Logic"</a>
B270B	SENSOR HARNESS OPEN [CT-BR] [B270B]	Center sensor rear RH harness circuit is open.	<a href="#">SN-27. "Diagnosis Procedure"</a>

**NOTE:**

"TIME" means the following.

- 0: Means detected malfunction at present. (From malfunction detection to turning ignition switch OFF)
- 1–39: Means detected malfunction in past.



# SONAR SYSTEM


< WIRING DIAGRAM >

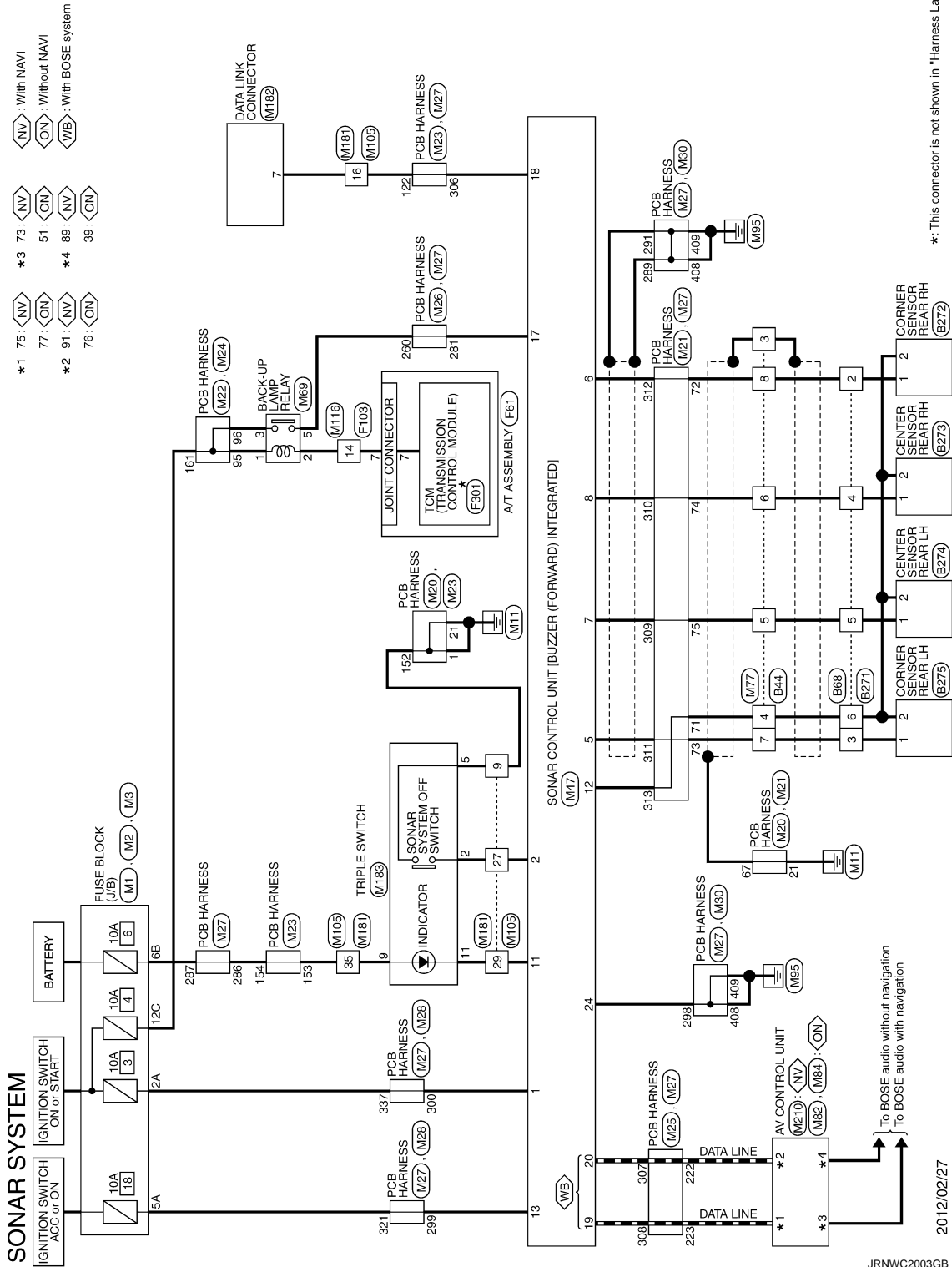
## WIRING DIAGRAM

### SONAR SYSTEM

#### Wiring Diagram

INFOID:000000008222349

For connector terminal arrangements, harness layouts, and alphabets in a  (option abbreviation; if not described in wiring diagram), refer to [GI-12. "Connector Information"](#).



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SN

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

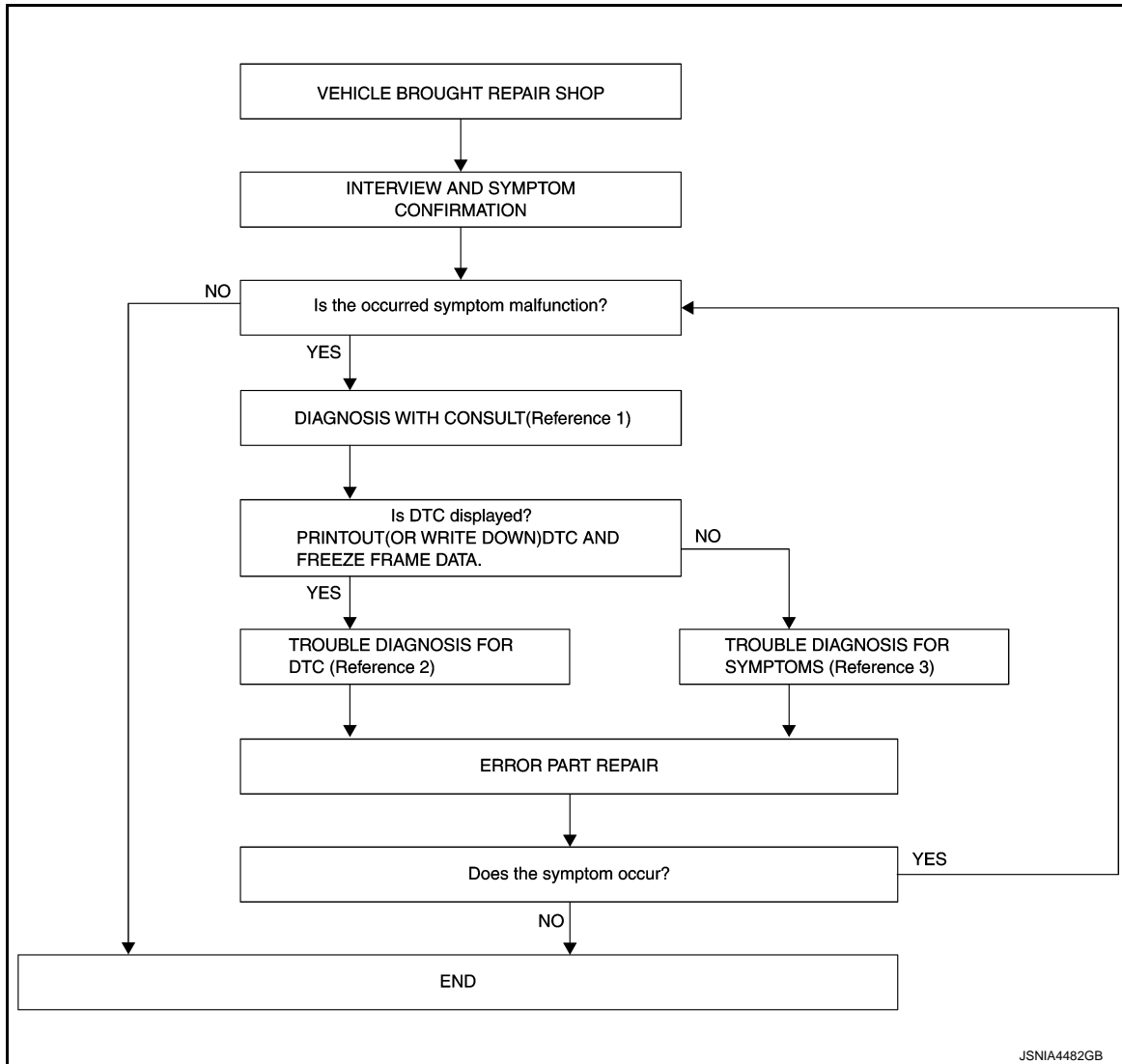
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000008222350

#### OVERALL SEQUENCE



- Reference 1... Refer to [SN-11. "CONSULT Function"](#).
- Reference 2... Refer to [SN-16. "DTC Index"](#).
- Reference 3... Refer to [SN-32. "Symptom Table"](#).

#### DETAILED FLOW

##### 1. INTERVIEW AND SYMPTOM CONFIRMATION

Check the malfunction symptoms by performing the following items.

- Interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred).
- Check if mud, or other foreign objects are not adhering to the sonar sensor.
- Check if there is no deformation, scratches, or other damage to the sonar sensor.
- Check if water has not accumulated in the sonar sensor.
- Check the symptom.

Is the occurred symptom malfunction?

YES >> GO TO 2.

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

NO >> INSPECTION END

## 2. DIAGNOSIS WITH CONSULT

1. Connect CONSULT and perform a self-diagnosis for "SONAR". Refer to [SN-11, "CONSULT Function"](#).
2. When DTC is detected, follow the instructions below:
  - Record DTC and Freeze Frame Data.

Is DTC displayed?

YES >> GO TO 3.

NO >> GO TO 4.

## 3. TROUBLE DIAGNOSIS FOR DTC

1. Check the DTC indicated in the self-diagnosis results.
2. Perform the relevant diagnosis referring to the DTC Index. Refer to [SN-16, "DTC Index"](#).

>> GO TO 5.

## 4. TROUBLE DIAGNOSIS FOR SYMPTOMS

Perform the relevant diagnosis referring to the diagnosis chart by symptom. Refer to [SN-32, "Symptom Table"](#).

>> GO TO 5.

## 5. ERROR PART REPAIR

1. Repair or replace the identified malfunctioning parts.
2. Perform a self-diagnosis for "SONAR" with CONSULT.
3. Check that the symptom does not occur.

Does the symptom occur?

YES >> GO TO 1.

NO >> INSPECTION END

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# B2704 CORNER SENSOR [RL]

< DTC/CIRCUIT DIAGNOSIS >

## DTC/CIRCUIT DIAGNOSIS

### B2704 CORNER SENSOR [RL]

#### Description

INFOID:000000008222361

Component	Description
CORNER/CENTER SENSOR	The obstacle distance is detected. The signal is transmitted to the sonar control unit.

#### DTC Logic

INFOID:000000008222362

#### DTC DETECTION LOGIC

DTC No.	CONSULT indication	DTC detection condition	Troubleshooting
B2704	CORNER SENSOR [RL] [B2704]	Corner sensor rear LH is malfunctioning.	Replace corner sensor rear LH Refer to <a href="#">SN-35, "Removal and Installation"</a>

# B2705 SENSOR HARNESS OPEN [CR-RL]

< DTC/CIRCUIT DIAGNOSIS >

## B2705 SENSOR HARNESS OPEN [CR-RL]

### Description

INFOID:000000008222363

Component	Description
CORNER/CENTER SENSOR	The obstacle distance is detected. The signal is transmitted to the sonar control unit.

### DTC Logic

INFOID:000000008222364

### DTC DETECTION LOGIC

DTC No.	CONSULT indication	DTC detection condition	Troubleshooting
B2705	SENSOR HARNESS OPEN [CR-RL] [B2705]	Corner sensor rear LH harness circuit is open.	Check corner sensor rear LH circuit

### Diagnosis Procedure

INFOID:000000008222365

#### 1. CHECK HARNESS CORNER SENSOR REAR LH SIGNAL CIRCUIT

- Turn ignition switch OFF.
- Disconnect sonar control unit connector and corner sensor rear LH connector.
- Check continuity between sonar control unit harness connector and corner sensor rear LH harness connector.

Sonar control unit		Corner sensor rear LH		Continuity
Connector	Terminal	Connector	Terminal	
M47	5	B275	1	Existed

- Check continuity between sonar control unit harness connector and ground.

Sonar control unit		Ground	Continuity
Connector	Terminal		
M47	5		Not existed

Is the inspection result normal?

- YES >> GO TO 2.  
 NO >> Repair harness or connector.

#### 2. CHECK HARNESS CORNER SENSOR REAR LH GROUND CIRCUIT

Check continuity between sonar control unit harness connector and corner sensor rear LH harness connector.

Sonar control unit		Corner sensor rear LH		Continuity
Connector	Terminal	Connector	Terminal	
M47	12	B275	2	Existed

Is the inspection result normal?

- YES >> INSPECTION END  
 NO >> Repair harness or connector.

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# B2706 CORNER SENSOR [RR]

< DTC/CIRCUIT DIAGNOSIS >

## B2706 CORNER SENSOR [RR]

### Description

INFOID:000000008222366

Component	Description
CORNER/CENTER SENSOR	The obstacle distance is detected. The signal is transmitted to the sonar control unit.

### DTC Logic

INFOID:000000008222367

### DTC DETECTION LOGIC

DTC No.	CONSULT indication	DTC detection condition	Troubleshooting
B2706	CORNER SENSOR [RR] [B2706]	Corner sensor rear RH is malfunctioning.	Replace corner sensor rear RH Refer to <a href="#">SN-35. "Removal and Installation"</a>

# B2707 SENSOR HARNESS OPEN [CR-RR]

< DTC/CIRCUIT DIAGNOSIS >

## B2707 SENSOR HARNESS OPEN [CR-RR]

### Description

INFOID:000000008222368

Component	Description
CORNER/CENTER SENSOR	The obstacle distance is detected. The signal is transmitted to the sonar control unit.

### DTC Logic

INFOID:000000008222369

### DTC DETECTION LOGIC

DTC No.	CONSULT indication	DTC detection condition	Troubleshooting
B2707	SENSOR HARNESS OPEN [CR-RR] [B2707]	Corner sensor rear RH harness circuit is open.	Check corner sensor rear RH circuit

### Diagnosis Procedure

INFOID:000000008222370

#### 1. CHECK HARNESS CORNER SENSOR REAR RH SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sonar control unit connector and corner sensor rear RH connector.
3. Check continuity between sonar control unit harness connector and corner sensor rear RH harness connector.

Sonar control unit		Corner sensor rear RH		Continuity
Connector	Terminal	Connector	Terminal	
M47	6	B272	1	Existed

4. Check continuity between sonar control unit harness connector and ground.

Sonar control unit		Ground	Continuity
Connector	Terminal		
M47	6		Not existed

Is the inspection result normal?

- YES >> GO TO 2.  
 NO >> Repair harness or connector.

#### 2. CHECK HARNESS CORNER SENSOR REAR RH GROUND CIRCUIT

Check continuity between sonar control unit harness connector and corner sensor rear RH harness connector.

Sonar control unit		Corner sensor rear RH		Continuity
Connector	Terminal	Connector	Terminal	
M47	12	B272	2	Existed

Is the inspection result normal?

- YES >> INSPECTION END  
 NO >> Repair harness or connector.

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## B2708 CENTER SENSOR [BL]

< DTC/CIRCUIT DIAGNOSIS >

### B2708 CENTER SENSOR [BL]

#### Description

INFOID:000000008222371

Component	Description
CORNER/CENTER SENSOR	The obstacle distance is detected. The signal is transmitted to the sonar control unit.

#### DTC Logic

INFOID:000000008222372

#### DTC DETECTION LOGIC

DTC No.	CONSULT indication	DTC detection condition	Troubleshooting
B2708	CENTER SENSOR [BL] [B2708]	Center sensor rear LH is malfunctioning.	Replace center sensor rear LH Refer to <a href="#">SN-35. "Removal and Installation"</a>



# B2709 SENSOR HARNESS OPEN [CT-BL]

< DTC/CIRCUIT DIAGNOSIS >

## B2709 SENSOR HARNESS OPEN [CT-BL]

### Description

INFOID:000000008222373

Component	Description
CORNER/CENTER SENSOR	The obstacle distance is detected. The signal is transmitted to the sonar control unit.

### DTC Logic

INFOID:000000008222374

### DTC DETECTION LOGIC

DTC No.	CONSULT indication	DTC detection condition	Troubleshooting
B2709	SENSOR HARNESS OPEN [CT-BL] [B2709]	Center sensor rear LH harness circuit is open.	Check center sensor rear LH circuit

### Diagnosis Procedure

INFOID:000000008222375

#### 1. CHECK HARNESS CENTER SENSOR REAR LH SIGNAL CIRCUIT

- Turn ignition switch OFF.
- Disconnect sonar control unit connector and center sensor rear LH connector.
- Check continuity between sonar control unit harness connector and center sensor rear LH harness connector.

Sonar control unit		Center sensor rear LH		Continuity
Connector	Terminal	Connector	Terminal	
M47	7	B274	1	Existed

- Check continuity between sonar control unit harness connector and ground.

Sonar control unit		Ground	Continuity
Connector	Terminal		
M47	7		Not existed

Is the inspection result normal?

- YES >> GO TO 2.  
 NO >> Repair harness or connector.

#### 2. CHECK HARNESS CENTER SENSOR REAR LH GROUND CIRCUIT

Check continuity between sonar control unit harness connector and center sensor rear LH harness connector.

Sonar control unit		Center sensor rear LH		Continuity
Connector	Terminal	Connector	Terminal	
M47	12	B274	2	Existed

Is the inspection result normal?

- YES >> INSPECTION END  
 NO >> Repair harness or connector.

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## B270A CENTER SENSOR [BR]

< DTC/CIRCUIT DIAGNOSIS >

### B270A CENTER SENSOR [BR]

#### Description

INFOID:000000008222376

Component	Description
CORNER/CENTER SENSOR	The obstacle distance is detected. The signal is transmitted to the sonar control unit.

#### DTC Logic

INFOID:000000008222377

#### DTC DETECTION LOGIC

DTC No.	CONSULT indication	DTC detection condition	Troubleshooting
B270A	CENTER SENSOR [BR] [B270A]	Center sensor rear RH is malfunctioning.	Replace center sensor rear RH Refer to <a href="#">SN-35. "Removal and Installation"</a>

# B270B SENSOR HARNESS OPEN [CT-BR]

< DTC/CIRCUIT DIAGNOSIS >

## B270B SENSOR HARNESS OPEN [CT-BR]

### Description

INFOID:000000008222378

Component	Description
CORNER/CENTER SENSOR	The obstacle distance is detected. The signal is transmitted to the sonar control unit.

### DTC Logic

INFOID:000000008222379

### DTC DETECTION LOGIC

DTC No.	CONSULT indication	DTC detection condition	Troubleshooting
B270B	SENSOR HARNESS OPEN [CT-BR] [B270B]	Center sensor rear RH harness circuit is open.	Check center sensor rear RH circuit

### Diagnosis Procedure

INFOID:000000008222380

#### 1. CHECK HARNESS CENTER SENSOR REAR RH SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sonar control unit connector and center sensor rear RH connector.
3. Check continuity between sonar control unit harness connector and center sensor rear RH harness connector.

Sonar control unit		Center sensor rear RH		Continuity
Connector	Terminal	Connector	Terminal	
M47	8	B273	1	Existed

4. Check continuity between sonar control unit harness connector and ground.

Sonar control unit		Ground	Continuity
Connector	Terminal		
M47	8		Not existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair harness or connector.

#### 2. CHECK HARNESS CENTER SENSOR REAR RH GROUND CIRCUIT

Check continuity between sonar control unit harness connector and center sensor rear RH harness connector.

Sonar control unit		Center sensor rear RH		Continuity
Connector	Terminal	Connector	Terminal	
M47	12	B273	2	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair harness or connector.

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# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## POWER SUPPLY AND GROUND CIRCUIT SONAR CONTROL UNIT

### SONAR CONTROL UNIT : Diagnosis Procedure

INFOID:000000008222391

#### 1.CHECK FUSE

Check for blown fuses.

Power source	Fuse No.
Ignition switch ACC or ON	19
Ignition switch ON or START	3

Is the inspection result normal?

YES >> GO TO 2.

NO >> Be sure to eliminate cause of malfunction before installing new fuse.

#### 2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between sonar control unit harness connector and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Value (Approx.)
ACC power supply	M47	13	ACC	Battery voltage
Ignition signal	M47	1	ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair sonar control unit power supply harness.

#### 3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sonar control unit connector.
3. Check continuity between sonar control unit harness connector and ground.

Sonar control unit		Ground	Continuity
Connector	Terminal		
M47	24		Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair sonar control unit ground harness.

# R RANGE SIGNAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## R RANGE SIGNAL CIRCUIT

### Description

INFOID:000000008222395

The sonar control unit turns the sonar system activation ON when inputting the reverse signal.

### Component Function Check

INFOID:000000008222396

#### 1. SONAR CONTROL UNIT DATA MONITOR INSPECTION

Check "REVERSE RANGE" with "DATA MONITOR" of "SONAR".

R range

Vehicle condition	Indication
Shift the selector lever to R position	: On
Shift the selector lever other than R position	: Off

>> INSPECTION END

### Diagnosis Procedure

INFOID:000000008222397

#### 1. CHECK R RANGE SIGNAL

1. Turn ignition switch ON.
2. Check voltage between sonar control unit harness connector and ground.

(+)		(-)	Condition	Voltage (Approx.)
Connector	Terminal			
M47	17	Ground	Shift the selector lever to R position.	12.0 V
			Shift the selector lever other than R position.	0 V

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Repair harness or connector.

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# SONAR SYSTEM OFF SWITCH CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## SONAR SYSTEM OFF SWITCH CIRCUIT

### Description

INFOID:000000008222401

The sonar control unit turns the sonar system activation OFF when inputting the sonar system OFF switch signal.

### Component Function Check

INFOID:000000008222402

### 1. SONAR CONTROL UNIT DATA MONITOR INSPECTION

Check "CANCEL SW" with "DATA MONITOR" of "SONAR".

Sonar system OFF switch

Vehicle condition	Indication
While pressing the sonar system OFF switch	: On
Other than above	: Off

>> INSPECTION END

### Diagnosis Procedure

INFOID:000000008222403

### 1. CHECK HARNESS SONAR SYSTEM OFF SWITCH SIGNAL CIRCUIT

1. Disconnect sonar control unit connector and triple switch connector.
2. Check continuity between sonar control unit harness connector and triple switch harness connector.

Sonar control unit		Triple switch		Continuity
Connector	Terminal	Connector	Terminal	
M47	2	M183	2	Existed

3. Check continuity between sonar control unit harness connector and ground.

Sonar control unit		Ground	Continuity
Connector	Terminal		
M47	2		Not existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair harness or connector.

### 2. CHECK VOLTAGE SONAR CONTROL UNIT

1. Connect sonar control unit connector.
2. Turn ignition switch ON.
3. Check voltage between sonar control unit harness connector and ground.

(+)		(-)	Voltage (Approx.)
Connector	Terminal		
M47	2	Ground	12.0 V

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace sonar control unit. Refer to [SN-34, "Removal and Installation"](#).

### 3. CHECK SONAR SYSTEM OFF SWITCH

1. Turn ignition switch OFF.
2. Check sonar system OFF switch function. Refer to [SN-30, "Component Function Check"](#).

# SONAR SYSTEM OFF SWITCH CIRCUIT

## < DTC/CIRCUIT DIAGNOSIS >

### Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace sonar system OFF switch. Refer to [SN-36. "Removal and Installation"](#).

### **4.**CHECK HARNESS SONAR SYSTEM OFF SWITCH GROUND CIRCUIT

1. Turn ignition switch ON.
2. Check continuity between sonar system OFF switch harness connector and ground.

Triple switch		Ground	Continuity
Connector	Terminal		Existed
M183	5		Existed

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair harness or connector.

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# SONAR SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### SONAR SYSTEM SYMPTOMS

#### Symptom Table

INFOID:000000008222404

Symptom	Check item	Diagnosis method
All sonar sensors do not activate.	"SONAR" is indicated on "SELECT SYSTEM" screen after connection CONSULT.	<ul style="list-style-type: none"> <li>Perform "Self Diagnostic Result" of "SONAR" with CONSULT. Refer to <a href="#">SN-11, "CONSULT Function"</a>.</li> <li>Perform the on board diagnosis of MULTI AV. Refer to <a href="#">AV-143, "On Board Diagnosis Function"</a>.</li> <li>Check reverse signal for sonar control unit. Refer to <a href="#">SN-29, "Diagnosis Procedure"</a>.</li> </ul>
	"SONAR" is not indicated on "SELECT SYSTEM" screen after connection CONSULT.	Check sonar control unit power supply and ground circuit. Refer to <a href="#">SN-28, "SONAR CONTROL UNIT : Diagnosis Procedure"</a> .
Any sonar sensor does not activate.	—	Perform "Self Diagnostic Result" of "SONAR" with CONSULT. Refer to <a href="#">SN-11, "CONSULT Function"</a> .
Sonar indicator is not displayed by display unit.	—	Perform the on board diagnosis of MULTI AV. Refer to <a href="#">AV-143, "On Board Diagnosis Function"</a> .



# NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

## NORMAL OPERATING CONDITION

Description

INFOID:000000008491086

RELATED TO SONAR

Symptom	Possible cause
Unstable object detection	<ul style="list-style-type: none"><li>• The degree of surface roughness of a stone or gravel is large.</li><li>• When used in poor weather conditions, such as heavy snow/rain or strong wind.</li><li>• When subjected to an ultrasonic noise generated from exhaust muffler or brakes.</li><li>• When left standing under a boiling sun or in cold climate.</li><li>• When the surface of the sensor is frozen or covered with snow/dirt/moisture.</li><li>• When a retrofitted xenon lamp, lighting license plate, or harness is close to the sensor body or sensor harness.</li><li>• When subjected to loop coil noises generated from a vehicle detector placed at an intersection or coin parking area.</li></ul>
Object undetectable	<ul style="list-style-type: none"><li>• Air-containing objects, such as cloth, cotton, glass wool, dust, and snow.</li><li>• Thin objects, such as rope, chain, and wire.</li><li>• Smooth-faced objects placed in a slanting direction.</li><li>• Fast-moving small animals.</li><li>• A corner of an angular object.</li></ul> <p><b>NOTE:</b> If the sensor detection part is scratched, obstacles cannot be detected.</p>

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# SONAR CONTROL UNIT

< REMOVAL AND INSTALLATION >

---

## REMOVAL AND INSTALLATION

### SONAR CONTROL UNIT

#### Removal and Installation

INFOID:000000008222405

#### REMOVAL

1. Remove the AV control unit. Refer to [AV-265. "Removal and Installation"](#).
2. Remove sonar control unit screw, then disconnect sonar control unit connector and remove the sonar control unit.

#### INSTALLATION

Install in the reverse order of removal.

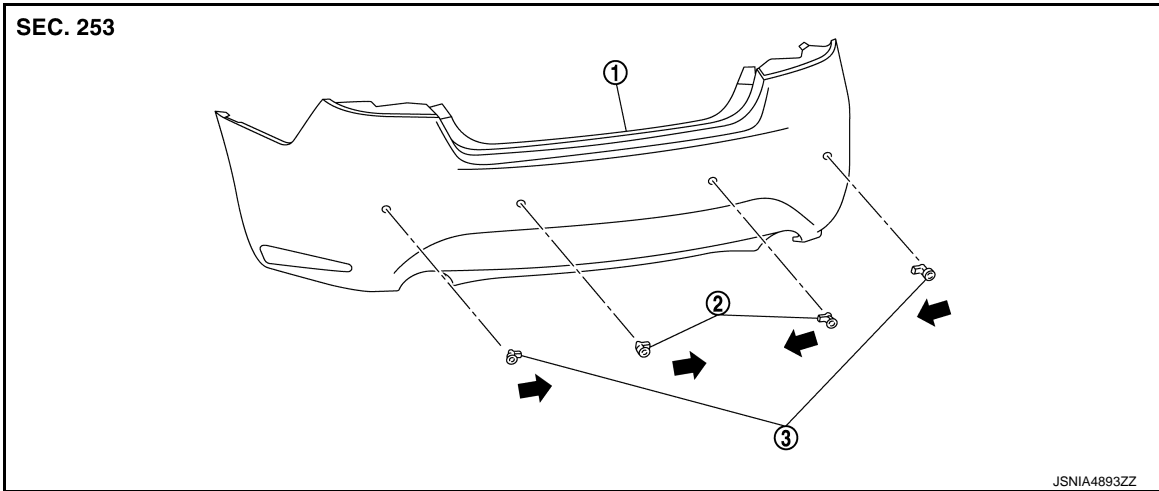
# SONAR SENSOR

< REMOVAL AND INSTALLATION >

## SONAR SENSOR

### Exploded View

INFOID:000000008222406



1. Rear bumper

2. Center sensor rear

3. Corner sensor rear

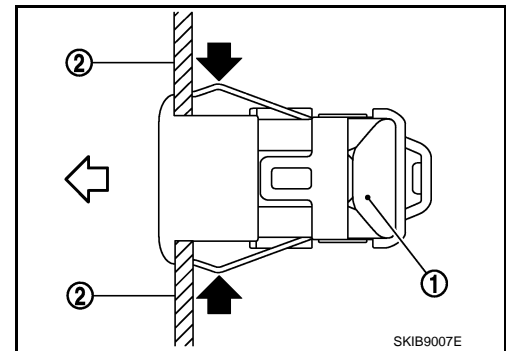
← :Connector direction

### Removal and Installation

INFOID:000000008222407

#### REMOVAL

1. Remove the front bumper or rear bumper.
2. Press the spring fixing the sensor (1) (black arrows).
3. Remove the sensor (1) to the white arrow direction.



#### INSTALLATION

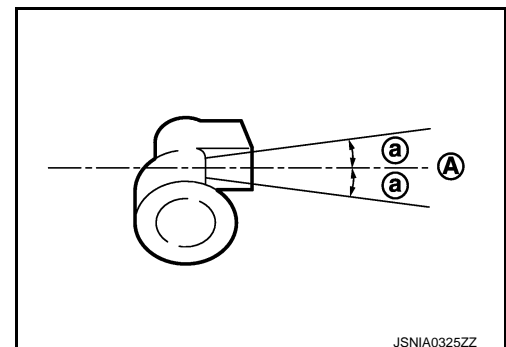
Install the bumper when the pawl engages.

#### CAUTION:

The connector direction is within  $\pm 10^\circ$  from the horizontal position when assembling the bumper.

A : Horizontal position

a :  $10^\circ$



# SONAR SYSTEM OFF SWITCH

< REMOVAL AND INSTALLATION >

---

## SONAR SYSTEM OFF SWITCH

### Removal and Installation

INFOID:000000008222409

#### REMOVAL

1. Remove the instrument driver lower panel. Refer to [IP-13. "Removal and Installation"](#).
2. Disengage the pawls. And then remove sonar system OFF switch.

#### INSTALLATION

Install in the reverse order of removal.