
PARKING SENSOR SYSTEM

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Outline

- The parking sensor system detects obstructions in the blind spot (vehicle front/rear/corners) to a wide extent using ultrasonic sensors and notifies the driver of the obstructions using the indicator and buzzer.

Warning

- **The parking sensor is a device to assist the driver in confirming safety. It is not a substitute for the driver and cannot guarantee 100% safety. Do not rely completely on the parking sensor and drive while confirming the safety of the surrounding area visually.**
- The following circumstances may obstruct the ultrasonic sensor resulting in an accident:
 - Ice, snow, or dirt is adhering to the ultrasonic sensor.
 - The ultrasonic sensor is covered by foreign material (such as bumper stickers).
 - A shock is applied to the bumper in an accident and the ultrasonic sensor installation angle is deviated.
 - The ultrasonic sensor is exposed to heavy rain or water-spray from the road.
 - There is another device emitting ultrasonic waves (such as a parking assist system of another vehicle) near the ultrasonic sensor.
- The parking sensor may not operate correctly under the following conditions:
 - Ice, snow, or dirt is adhering to the ultrasonic sensor surface.
 - The ultrasonic sensor is frozen.
 - The vehicle is in a tilted position.
 - The vehicle is parked on a steep incline or there is a difference in height between lines.
 - Obstructions have approached too close to the sensor.
- The parking sensor may not detect the following items:
 - Thin objects such as wire or rope
 - Items which absorb ultrasonic waves easily, such as cotton or snow
 - Angular-shaped objects
 - Tall objects with protruding at the top
 - Short objects
 - Objects located immediately below the bumper, such as wheel stoppers
- The warning alert may activate while driving near parked vehicles/guardrails/walls on a narrow road, or while driving on a slope, gravel road, or grass field. This is a normal effect caused by the system's response to ultrasonic waves, and does not indicate a malfunction.

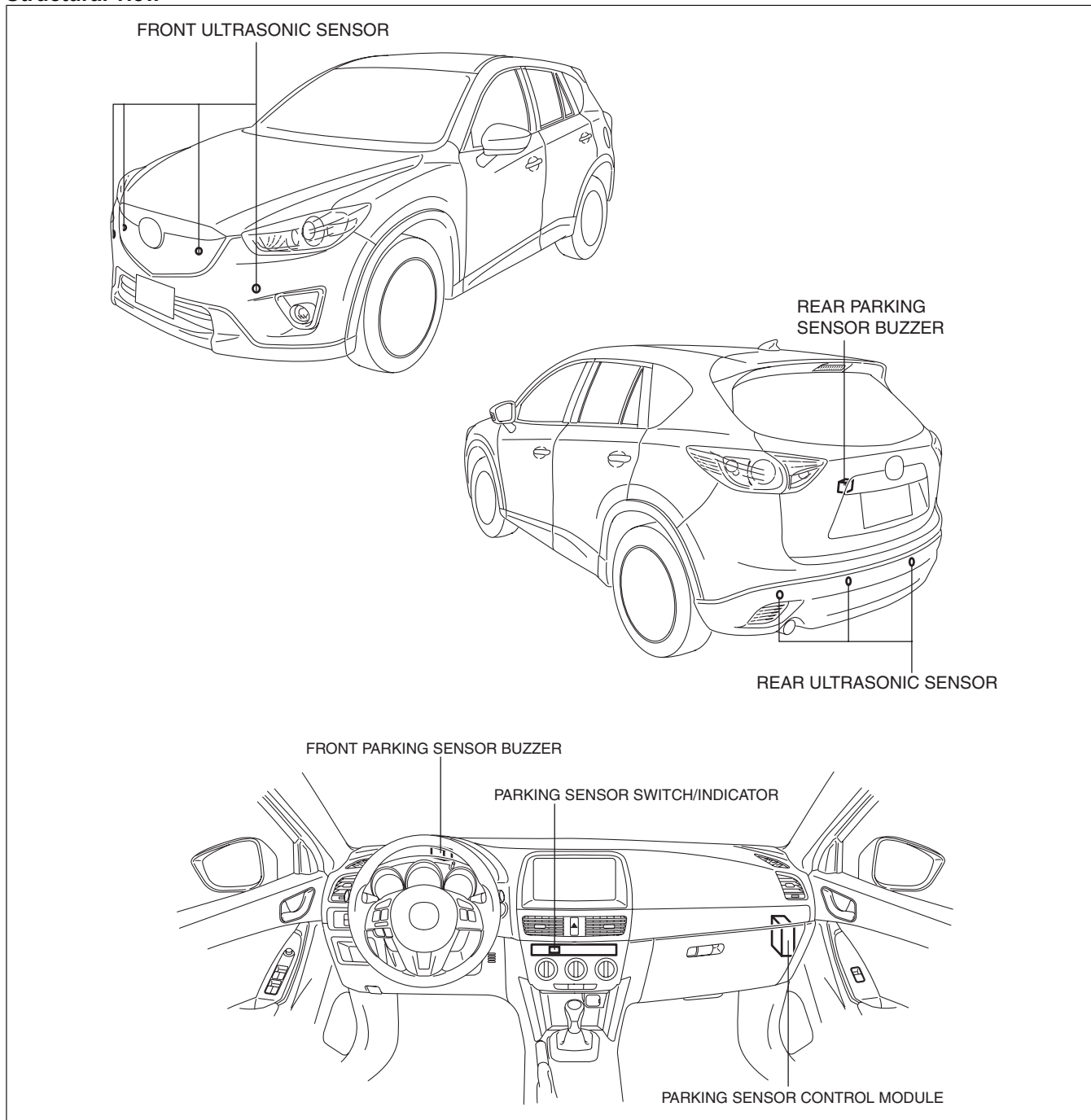
Function

- The ultrasonic sensor assembled to the bumper detects an obstruction and the parking sensor control module notifies the driver of the area and the distance between the vehicle and the obstruction using the parking sensor buzzer, parking sensor indicator, and parking sensor screen (with color LCD and audio unit only).

Volume adjustment function

- The volume of the parking sensor buzzer can be adjusted. Refer to the Workshop Manual for the adjustment procedure.

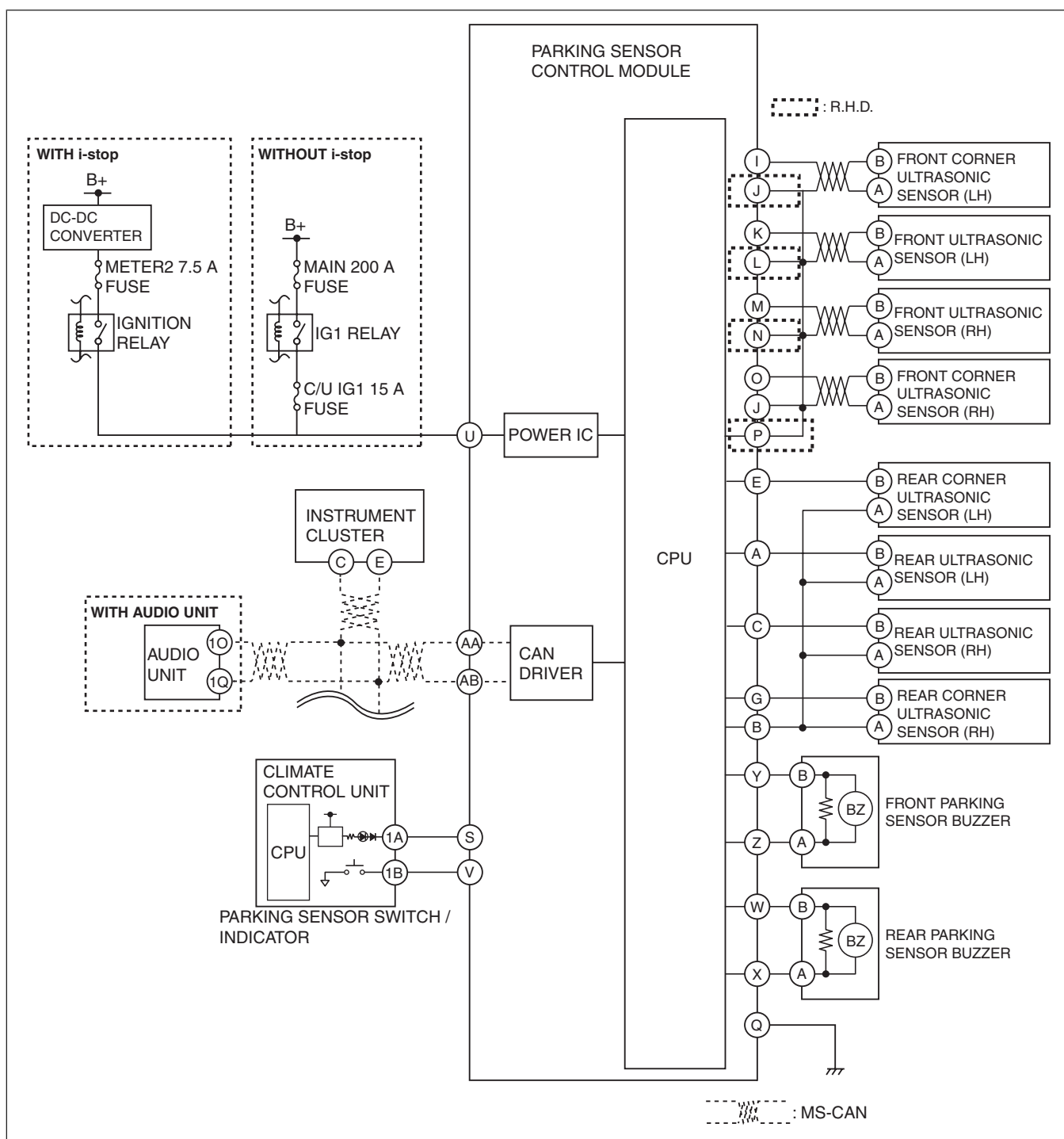
Structural view



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System wiring diagram

- Twisted pair wiring harnesses are used between the front ultrasonic sensors and the parking sensor control module because many of the electrical components on the front ultrasonic sensor may be affected by noise.

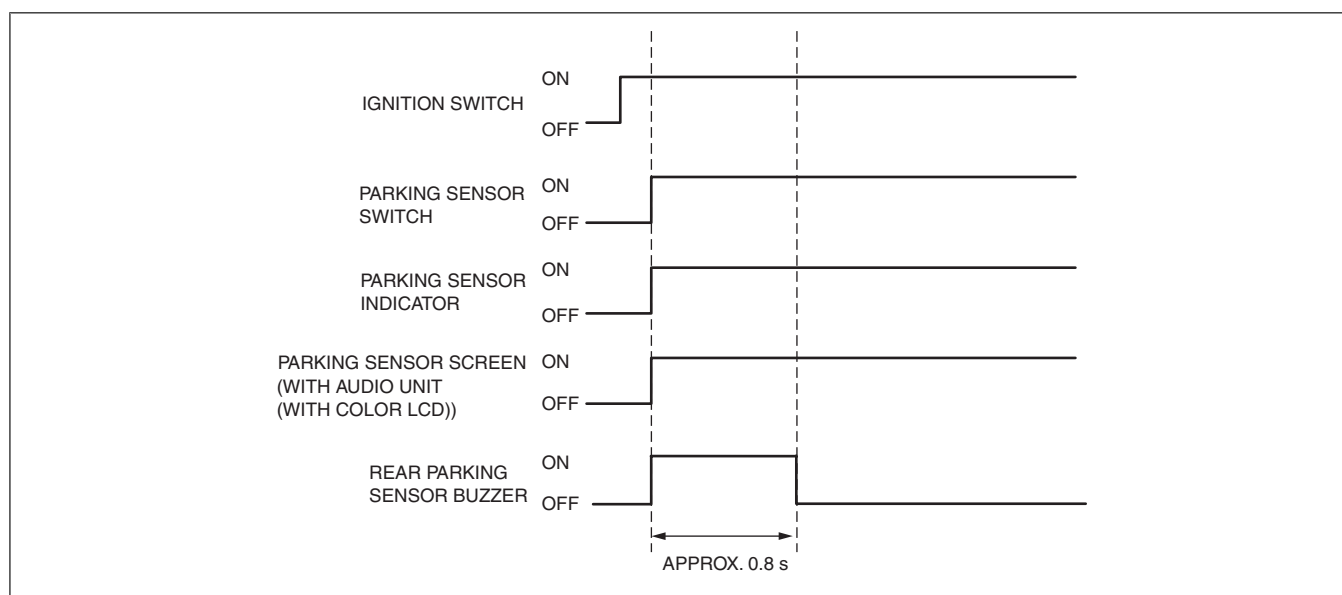


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Operation

Operation condition

- If any one of the following conditions is met, the parking sensor system operates.
 - Parking sensor switch turned on (system on) with ignition switched ON (engine on) and vehicle speed of less than 10 km/h {6.2 mph}
 - Selector lever shifted to R position (ATX)/reverse gear (MTX) with ignition switched ON (engine on) and vehicle speed of less than 10 km/h {6.2 mph}
- If the operation condition is met, the rear parking sensor buzzer sounds for approx. 0.8 s and the parking sensor indicator illuminates. In addition, the parking sensor screen is displayed on the audio unit (with color LCD) screen.



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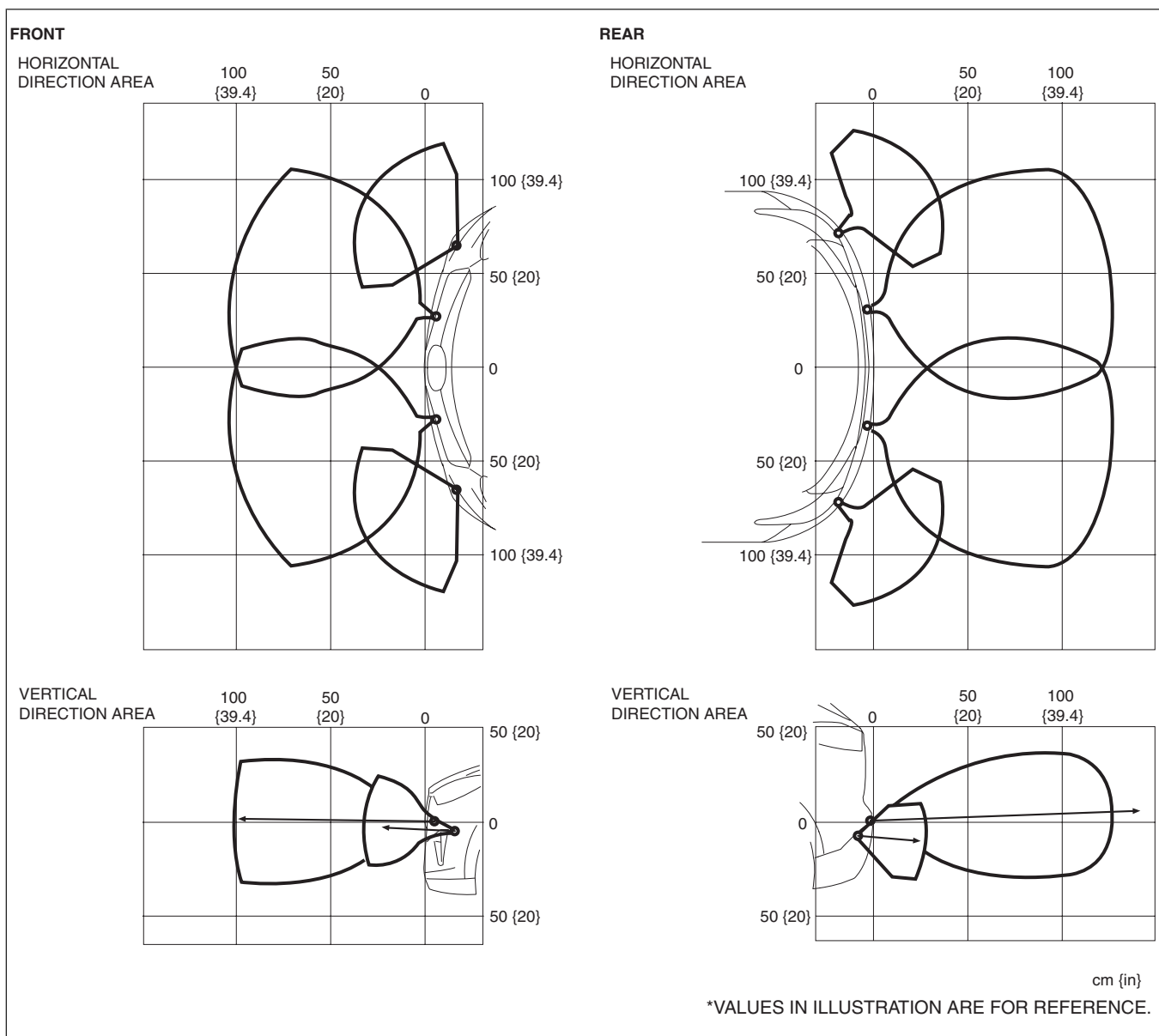
- If the system activates, the ultrasonic sensor starts to detect obstructions. For the ultrasonic sensor which is operating, refer to the following table.

×: Indicator illumination/flashing —: Not operating

Vehicle condition		Parking sensor indicator	Ultrasonic sensor			
Shift lever	Vehicle speed		Front		Rear	
			Corner	Center	Corner	Center
Except R position (ATX)/reverse gear (MTX)	Less than approx. 10 km/h {6.2 mph}	On	×	×	—	—
	Approx. 10 km/h {6.2 mph} or more	Off	—	—	—	—
R position (ATX)/reverse gear (MTX)	Less than approx. 10 km/h {6.2 mph}	On	×	—	×	×
	Approx. 10 km/h {6.2 mph} or more	On	—	—	—	×

Obstruction Detection Area

- Each ultrasonic sensor detects obstructions in the following areas.



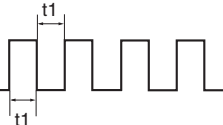

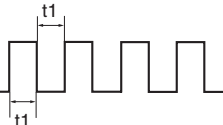
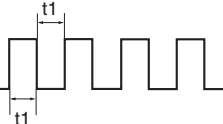
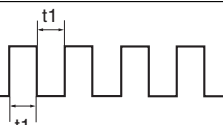
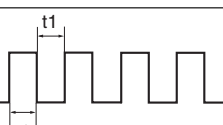
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Illumination/flashing of parking sensor indicator, buzzer sound pattern

Obstructions detected

- Change in the illumination/flashing of the parking sensor indicator and the amount of time the buzzer sounds are as follows:
- The parking sensor indicator and buzzer are non-synchronized.

Ultrasonic sensor	Zone	Distance from obstruction	Parking sensor buzzer sound pattern
Front/rear corner sensor	Short distance	Approx. 0—25 cm {9.8 in}	ON CONTINUOUS OFF
	Intermediate distance	Approx. 25—38 cm {9.9—14.0 in}	ON OFF t1 : Approx 0.055-0.095 s
	Long distance	Approx. 38—55 cm {15—21 in}	ON OFF t1 : Approx 0.12-0.18 s

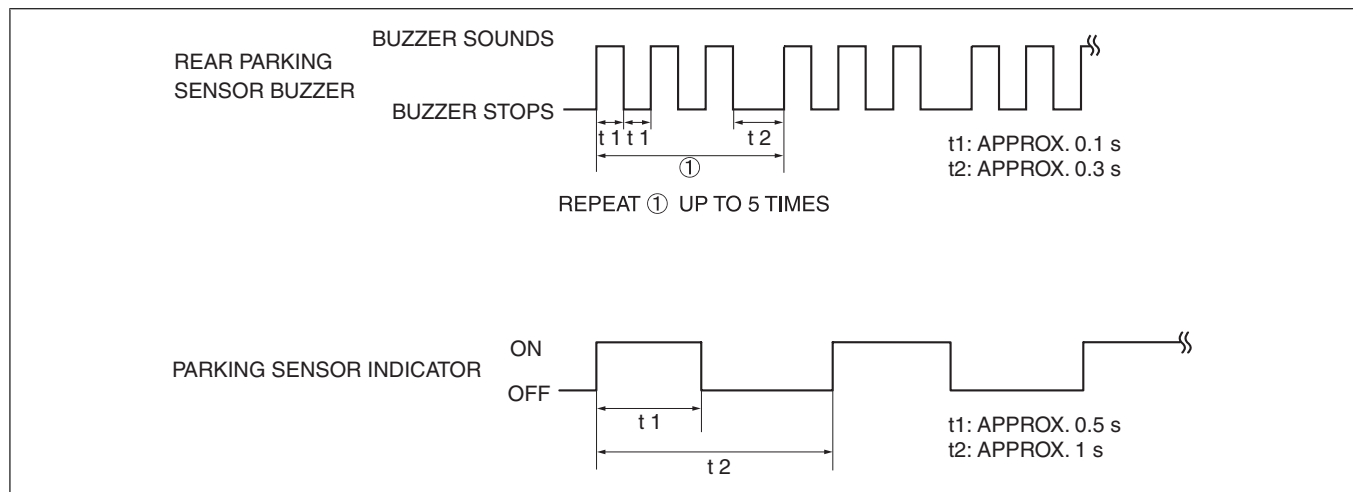
Front sensor	Short distance	Approx. 0—40 cm {15 in}	ON ————— CONTINUOUS OFF
	Intermediate distance	Approx. 40—50 cm {16—19 in}	ON  OFF t1 : Approx 0.055-0.095 s
	Long distance	Approx. 50—65 cm {20—25 in}	ON  OFF t1 : Approx 0.055-0.095 s
	Maximum long distance	Approx. 65—110 cm {26—43.3 in}	ON  OFF t1 : Approx 0.055-0.095 s
Rear sensor	Short distance	Approx. 0—35 cm {13 in}	ON ————— CONTINUOUS OFF
	Intermediate distance	Approx. 35—45 cm {14—17 in}	ON  OFF t1 : Approx 0.055-0.095 s
	Long distance	Approx. 45—60 cm {18—23 in}	ON  OFF t1 : Approx 0.055-0.095 s
	Maximum long distance	Approx. 60—150 cm {24.0—59.0 in}	ON  OFF t1 : Approx 0.055-0.095 s

Ultrasonic sensor malfunction is detected

- If the parking sensor control module detects that there is a malfunction in the ultrasonic sensor circuit, it sounds the buzzer in the following pattern and flashes the parking sensor indicator.

Note

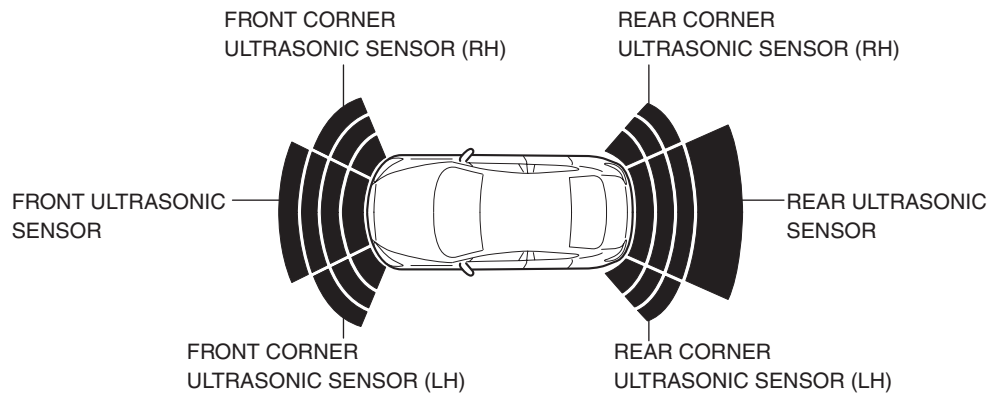
- If there is a malfunction in the front ultrasonic sensor circuit, the front parking sensor buzzer sounds. If there is a malfunction in the rear ultrasonic sensor circuit, the rear parking sensor buzzer sounds.



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- Flashes the indicator for the sensor location that is malfunctioning on the parking sensor screen.

PARKING SENSOR SCREEN



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