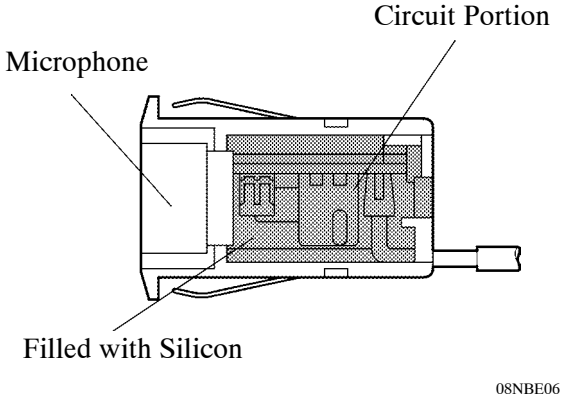
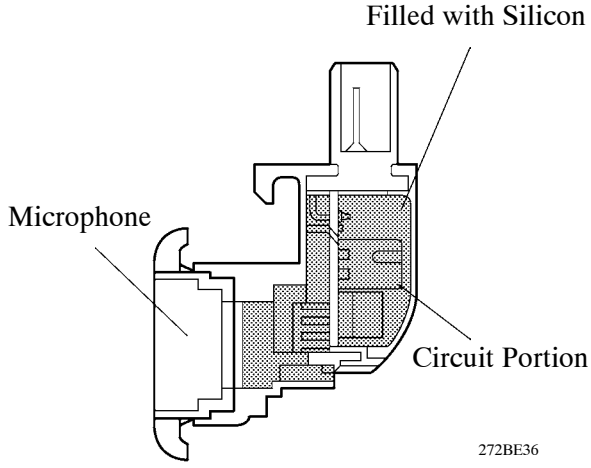
## ■CONSTRUCTIONS AND OPERATION

### 1. Ultrasonic Sensor

- The ultrasonic sensor consists of the microphone that transmits and receives ultrasonic wave and circuit portion.
- The circuit portion is filled with Silicon to prevent water from entering.




**Corner Sensors**




**Rear Center Sensors**



### 2. Clearance Warning Buzzer

- Depending on the detection distance and the detection area, the sound pattern of the clearance warning buzzer will vary.

| Detection Area | Detection Distance | cm (in.) | Buzzer Sound Pattern ON/OFF Time (sec.) | Fundamental Frequency (kHz.) |
|---|---|---|---|---|
| Corner | Long | 50 ± 5 to 37.5 ± 4 (19.7 ± 2 to 14.8 ± 1.6) | 0.05/0.15 | 1.5 ● Low Pitch |
| | Middle | 37.5 ± 4 to 25 ± 3 (14.8 ± 1.6 to 9.8 ± 1.2) | 0.05/0.05 | |
| | Short | 25 ± 3 or less (9.8 ± 1.2 or less) | Continuous Sound/0 | |
| Rear Center | Long | 150 ± 15 to 100 ± 10 (59 ± 5.9 to 39.4 ± 3.9) | 0.075/0.225 | 3.7 ● High Pitch |
| | Middle | 100 ± 10 to 50 ± 5 (39.4 ± 3.9 to 19.7 ± 2) | 0.075/0.075 | |
| | Short | 50 ± 5 or less (19.7 ± 2 or less) | Continuous Sound/0 | |

## 3. Clearance Warning ECU

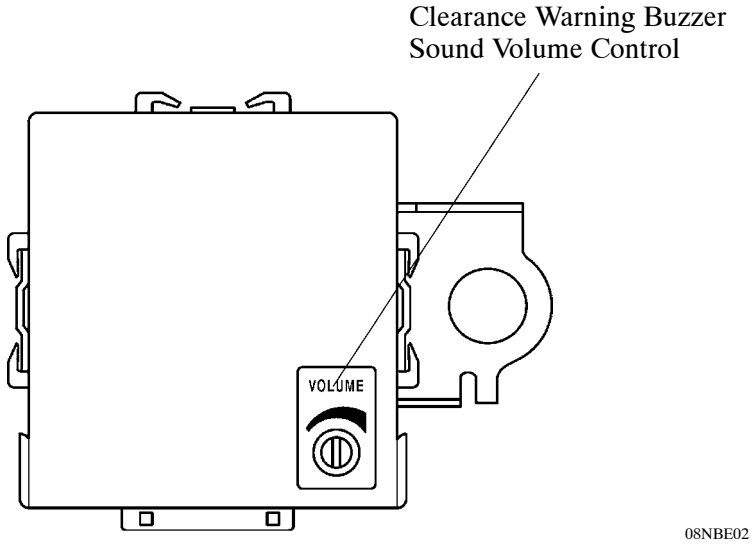
### General

The clearance warning ECU provides the following functions:

- Switching the transmission and reception of ultrasonic signals.
- Processing received signals.
- Determining the presence absence of obstacles.
- Controlling the actuation of the clearance warning buzzer.
- Detecting whether there is an open circuit in the ultrasonic sensors.

In addition, it contains a clearance warning buzzer volume adjustment screw through which the sound volume of the clearance warning buzzer can be adjusted as desired. The sound volume is set at the maximum level as the default*.

*: Only for corner sensors.



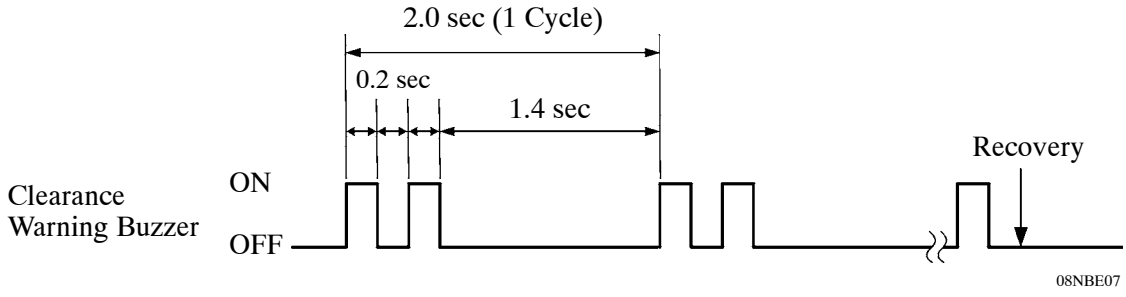
### Initial Check (Self-Diagnosis)

- After about 0.4 seconds from the Toyota parking assist system has started up, the clearance warning ECU sounds the buzzer for 1.0 ± 0.3 seconds, while checking for malfunction in the ultrasonic sensors.
- If the ultrasonic sensor is disconnection, the clearance warning buzzer will alarm as follows, until the ultrasonic sensor returns to normal condition.

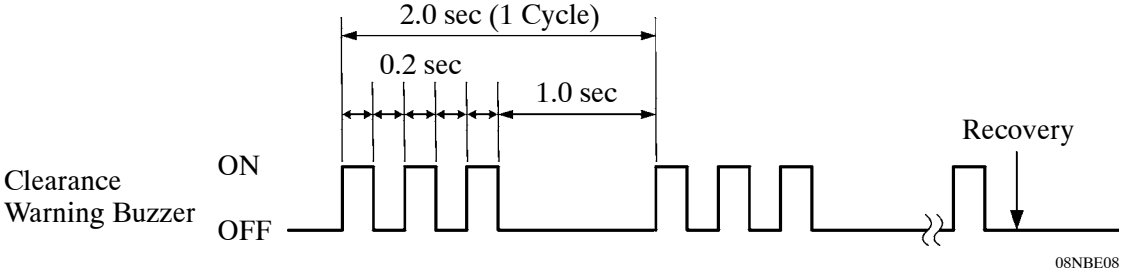
| Disconnected Sensor | | Buzzer Sound Pattern ON/OFF Time | Operating Buzzer |
|---|---|---|---|
| Front or Rear Corner | Right | Buzzer Timing 1 | Clearance Warning Buzzer (for Corner Sensors) |
| | Left | Buzzer Timing 2 | |
| | Right & Left | Buzzer Timing 3 | |
| Rear Center | Right | Buzzer Timing 1 | Clearance Warning Buzzer (for Center Sensors) |
| | Left | Buzzer Timing 2 | |
| | Right & Left | Buzzer Timing 3 | |



**▶ Buzzer Timing 1 ◀**




**▶ Buzzer Timing 2 ◀**




**▶ Buzzer Timing 3 ◀**

