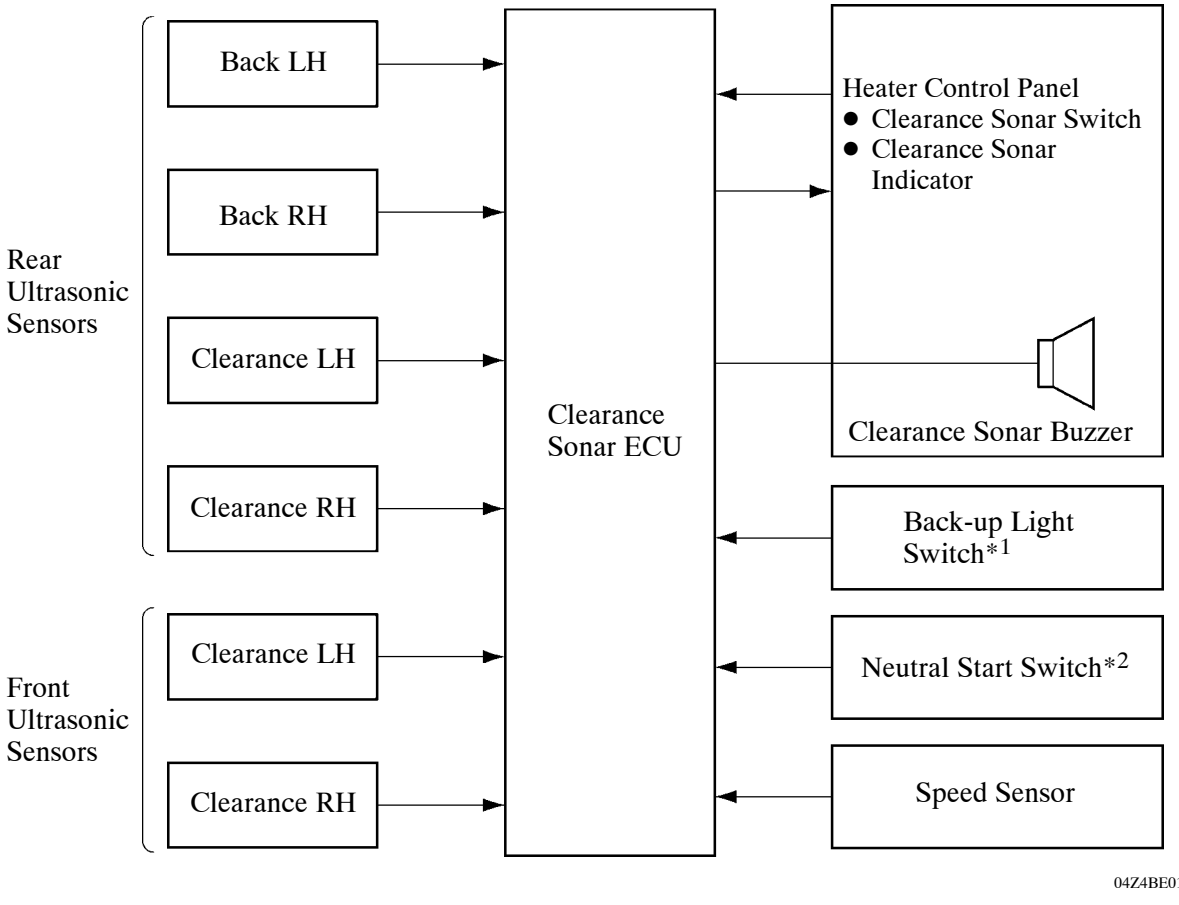
■TOYOTA PARKING ASSIST SYSTEM

1. Front and Rear Clearance Sonar, Back Sonar

General

- The size of the ultrasonic sensors has been reduced, and sensors are now shared for the back sonar system and the clearance sonar system.
- The size of the clearance sonar ECU has been reduced.

System Diagram

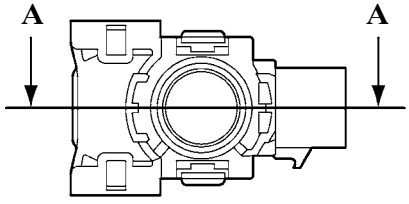


*1: For Manual Transmission Models
*2: For Automatic Transmission Models

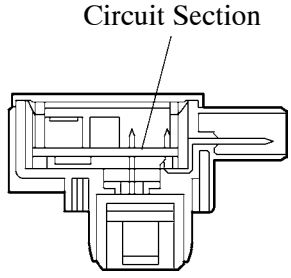
Construction and Operation

1) Ultrasonic Sensor

The following numbers of ultrasonic sensors are provided: 2 in the front corners, 2 in the rear corners, and 2 in the center of the back section. Each ultrasonic sensor consists of a sensor portion that transmits and receives ultrasonic waves and a pre-amplifier that amplifies them. The ultrasonic sensors output the ultrasonic transmission and reception signals to the clearance sonar ECU.



Ultrasonic Sensor



A – A Cross Section

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2) Prohibiting Conditions

- When the vehicle speed is 10 km/h (6.25 mph) or less.

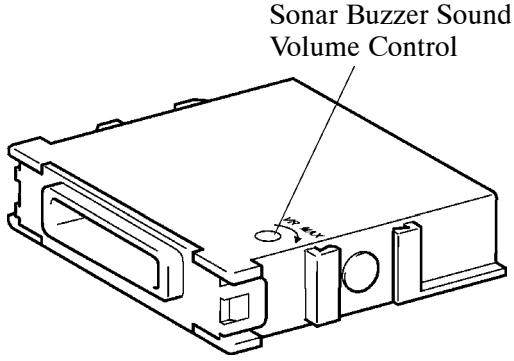
▶ Gearshift lever position for all sensors ◀

Gear Position / Sensors	R	Except P and R
Front corner sensor	Detect	Detect
Rear corner sensor	Detect	Prohibition
Back sensor	Detect	Prohibition

- When detecting sensors are abnormal in open and freezing detection, and obstacle detection.

3) Clearance Sonar ECU

- The size of the clearance sonar ECU has been reduced. Its installation position has not changed.



04Z4BE04

Handling Precautions

The detection function of this system may not operate properly in the following conditions:

- When ice, snow or mud gets on the sensors. If they are removed, the system will work properly.
- When the sensor is frozen. If defrosted, the system will work properly.
- When the sensor is covered with something. If it is removed, the system will work properly.

NOTES:

Especially in cold weather, a malfunction warning screen may appear on the display due to frozen sensors. If the malfunction warning screen appears on the display, be sure to check the sensor. If the malfunction warning screen appears despite no mud, ice or snowflakes on the sensor, the sensor might have malfunctioned.

The following conditions may have an influence on the detection range:

- When foreign matter such as snowflakes or mud gets on the sensors.
- When the vehicle is operated under a scorching sun or in a freezing climate.

The system may improperly detect in the following conditions:

- When the vehicle is being driven on bumpy road, gravel road, or on grass.
- When the sound of horns from other vehicles, the sound of a motorcycle engine, the sound of the air brakes of a large truck, or an object that generates ultrasonic waves is in the vicinity of the vehicle.
- When there is a downpour or water is splashing on the vehicle.
- When the vehicle posture tilts significantly.
- When an antenna for a wireless transmitter is mounted on the vehicle.
- When the sensors are covered with mud, ice, or snow.
- When the vehicle travels in the direction of a tall curb or square curb.
- When other vehicles with sonar are in the vicinity of the vehicle.
- When a towing hitch is mounted on the vehicle.

There are cases in which the objects listed below cannot be detected:

- Thin objects such as wire or rope.
- Objects with surfaces that are too small to reflect ultrasonic waves such as wire gauze or fence.
- Objects that absorb sound waves such as cotton or snow.
- Objects that have sharp edges.
- Objects that are short in height.
- Objects that are tall and protrude at the top.

Others:

- Objects directly underneath the bumpers cannot be detected. Even if objects that are located lower than the sensors or thin stakes are detected once, they might not be detected after the vehicle comes closer to those objects.
- An object might not be detected if it comes too close to the sensors.
- The sensors might not detect properly if they are exposed to strong shocks such as being struck or having objects thrown at them.
- Be careful not to let steam or high-pressure water of car washers or any other water get into the sensor section. When using them, keep them as far away from the sensor section as possible.