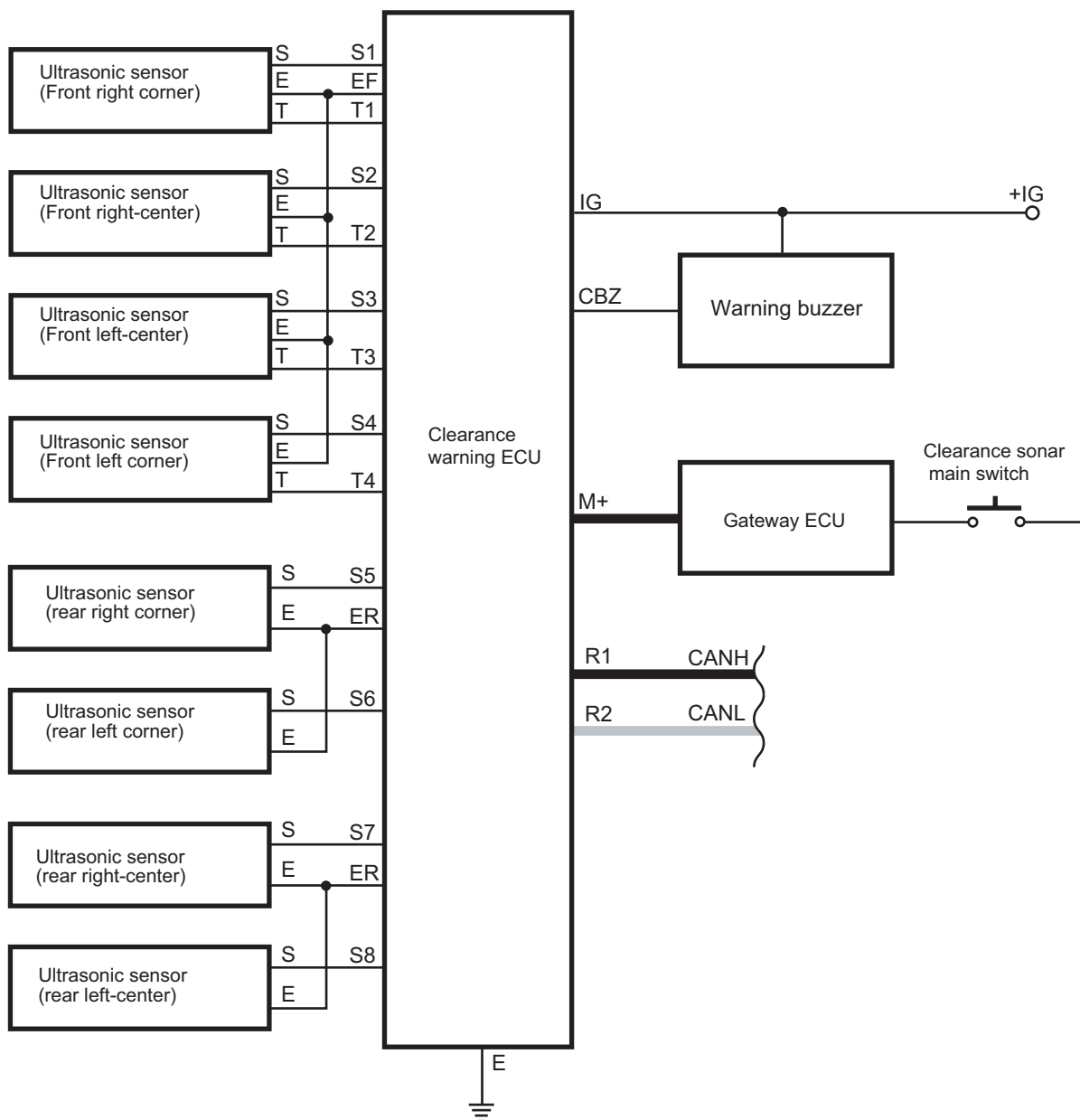


Park Assist Communication System

- The clearance warning ECU transmits the sensor detection data to the meter ECU or the screen through the communication wires of the individual systems to effect display control. In addition, the clearance warning ECU receives data from the individual ECUs via the BEAN (Body Electronics Area Network) and CAN (Controller Area Network) in order to determine the operating conditions of the system and effect correction control.



Judgment of Operation Conditions.

- The clearance warning ECU receives the "vehicle speed signal" from the meter ECU and the "shift position signal" from the engine ECU through the communication wires of the individual systems, in order to determine* their operating conditions.

❖REFERENCE❖

*If the communication between the clearance warning ECU, the engine ECU, and the meter ECU is disrupted, the system prohibits its operation.

Basic Operation

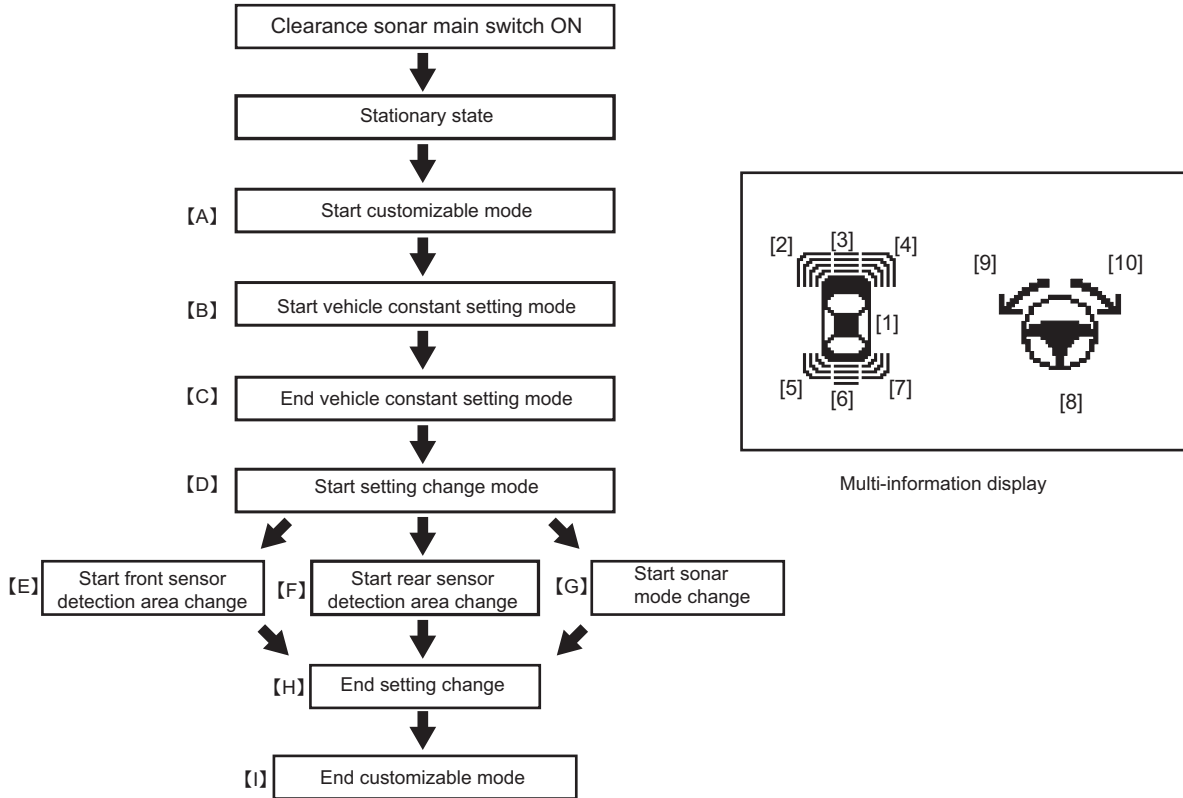
- Upon receiving the inputs of the IG ON and the clearance sonar main switch ON signals, the clearance warning ECU determines the operating conditions based on the signals provided by the BEAN (Body Electronics Area Network), and supplies power to the sensors in order to start the control of the system.
- The individual sensors transmit ultrasound waves at a predetermined interval, under the control of the CPU that is built into the clearance warning ECU. The signal of the sensor to which these ultrasound waves are reflected become amplified and sent to the CPU. Then, the CPU calculates the distance to the obstacle based on the length of time that elapses from the transmission to the reflection.
- The clearance warning ECU transmits the data containing the position of the sensor that detected an obstacle and the distance to the obstacle to the screen through the BEAN (Body Electronics Area Network), via the meter ECU or gateway ECU, in order to control the display. At the same time, it actuates the built-in driver circuit to control the sounding of the buzzer.

Customizable Function

- A customizable mode is used to set the various functions of the clearance sonar.
- When the vehicle is stopped (0km/h vehicle speed), the system can be transferred to a desired customizable mode or an intelligent tester II may be used to utilize the customizable mode*.

❖REFERENCE❖

* : Make sure to start the customizable mode with the steering wheel aimed straight ahead. Otherwise, the system may not be able to make a proper contact/avoidance judgment.



Multi-Information Display Indication Settings in Each Mode

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	Note
[A]	○	×	×	×	×	-	×	△	△	△	[8],[9],[10] will illuminate if the steering wheel neutral point is not set
[B]	○	×	×	×	×	-	×	○	○	○	[1],[8] to [10] will flashing for 2 seconds; then, only [1] will flash* Simultaneously,[2],[4]will illuminate
[C]	○	×	×	×	×	-	×	×	×	×	[1] will flash
[D]	○	×	×	×	×	-	×	×	×	×	[1] will flash
[E]	○	○	×	×	△	-	△	×	×	×	[1],[2] will flash. At the same time, if the front sensor detection area is set to 50cm(19.7in.) to 1m(39.4in.), [5] will illuminate. If it is not set, [7] will flash.
[F]	○	×	○	×	△	-	△	×	×	×	[1],[3] will flash. At the same time, if the rear sensor detection area is set to 60cm(23.6in.) to 1.5m(59.1in.), [5] will illuminate. If it is not set, [7] will flash.
[G]	○	×	×	○	△	-	△	×	×	×	[1],[4] will flash. At the same time, if the steering sensing mode is set, [5] will flash. If the normal mode is set, [7] will illuminate.
[H]	○	△	△	△	△	-	△	×	×	×	[E],[F],and [G] will flash their changed settings for 5 seconds.
[I]	○	○	○	○	○	-	○	○	○	○	All except [6] will illuminate for 2 seconds.*

○ :Illumination ○ :Flashing
△ :Flashes depending on condition
× :No illumination or flashing

*:Will flash (or illuminate) simultaneously with the buzzer.

Note:Even if [8], [9], or [10] is flashing due to a steering angle sensor or other abnormality, during customized mode, steering-related functions are treated as normal and the set status is displayed.

Customizable Mode State Transition Conditions

1: Start customizable mode and set the constant setting mode

	Mode		Transition Conditions	Buzzer Sounding State When Conditions Are Met
1	Start customizable mode*1		With the main switch pressed, repeat the light control switch turn on and off three times.	Sound for 2 second(once)
	End vehicle constant setting mode		After the steering wheel is operated full lock-to-lock to the right and left, the clearance warning ECU verifies and memorizes the neutral point and the maximum right-left steering angle value.*2	Sound twice
	Start setting change mode		Operate the clearance sonar main switch five times.	Sound 5 times
2	a	Start front sensor detection area change	Operate the clearance sonar main switch once.	Sound once
		Front sensor has 50cm(19.7in.) to 1m detection	Operate the clearance sonar main switch once.	Sound once
		Front sensor does not have 50cm(19.7in.) to 1m detection	Operate the clearance sonar main switch twice	Sound twice
	b	Start rear sensor detection area change	Operate the clearance sonar main switch twice	Sound twice
		Rear sensor has 60cm{23.6in.} to 150cm{59.1} detection	Operate the clearance sonar main switch once.	Sound once
		Rear sensor does not have 60cm{23.6in.} to 150cm{59.1} detection	Operate the clearance sonar main switch twice	Sound twice
	c	Start sonar mode change	Operate the clearance sonar main switch three times.	Sound 3 times
		Change to steering guidance mode	Operate the clearance sonar main switch once.	Sound once
		Change to normal sonar mode	Operate the clearance sonar main switch twice	Sound twice
3	End vehicle constant setting mode		End setting change.	Sound for 2 second(Sound once)

❖REFERENCE❖

*1 : Simultaneously with the start of the customizable mode, the system starts the vehicle constant setting mode and temporarily memorizes the present steering angle as the neutral point.

*2 : To transfer to the distance changing setup mode without resetting the neutral point, press the clearance sonar switch once to transfer the mode.

List of Setting Items

Setting item	Initial value	Setting value
Changing sonar modes	steering guidance mode	normal clearance sonar mode/steering guidance mode/customizable mode
Changing front detection area (display 50cm{19.7in.} to 100cm{39.4in.} and sound buzzer)	With Function	With Function /Without Function
Changing back sonar detection area (display 60cm{23.6in.} to 150cm{59.1in.} and sound buzzer)	With Function	With Function /Without Function
Setting steering neutral angle point	—	Determined during the customizable mode in accordance with the lock-to-lock movement of the steering wheel.
Setting maximum steering angle value	—	Determined during the customizable mode in accordance with the lock-to-lock movement of the steering wheel.

- When the following conditions apply, the system will sound a buzzer to inform the end of the customizable mode, and ends the customizable mode.

Customizable Mode Interruption Conditions

During the vehicle constant setting mode, the steering wheel right and left full lock-to-lock movement is not completed within 30 seconds.
After transferring to one mode, it does not transfer to another mode within 30 seconds.
A number of clearance sonar main switch operations that are not in the transition conditions are performed.
The clearance sonar main switch is operated while the buzzer is sounding*.

❖REFERENCE❖

* : During the vehicle constant setting mode, the system will not interrupt the customizable mode, but will end the vehicle constant setting mode.

- Various settings can be made by utilizing the intelligent tester II, in addition to the setting items in the customizable mode.

List of Setting Items Other Than Customizable Mode

Setting item	Initial value	Setting value
Function to sound the buzzer if the position of the obstacle does not change over 3 seconds	With Function	With Function /Without Function
Operation of the back sonar in a position other than "P" or "R"	Without Function	With Function /Without Function