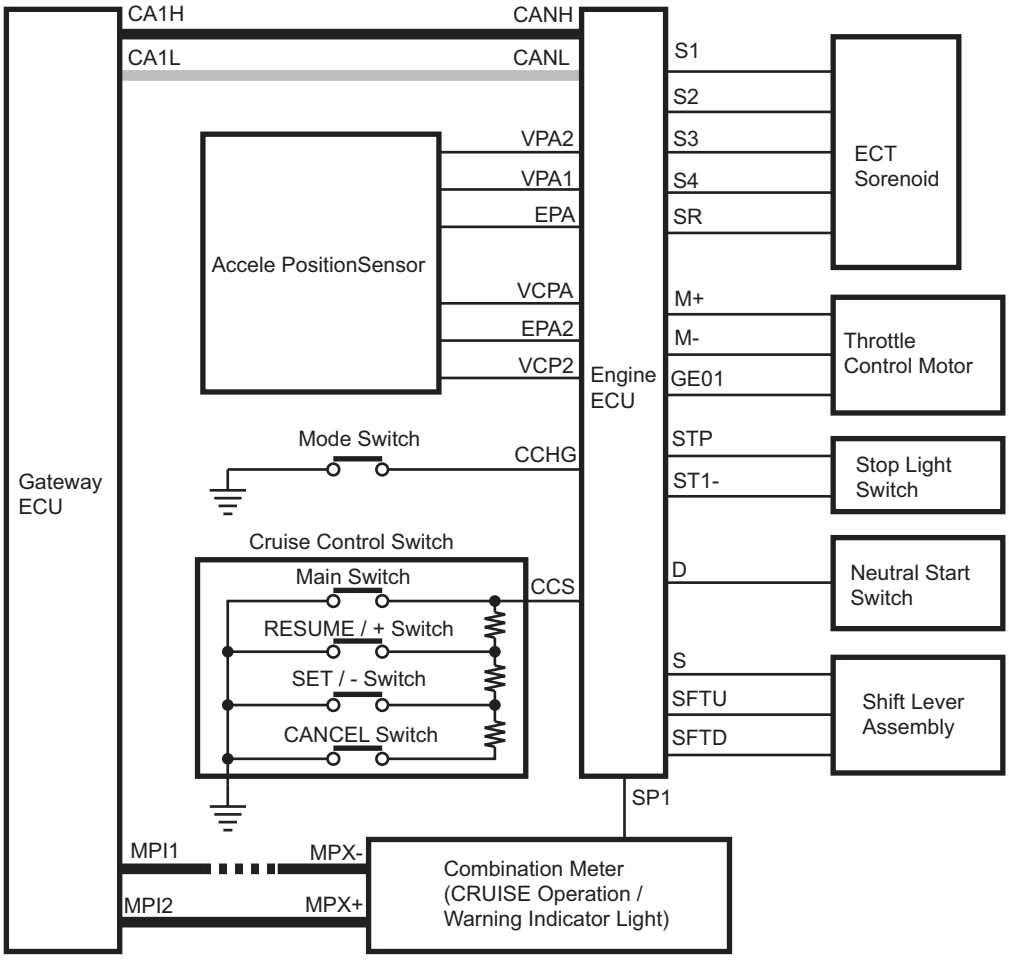
Engine ECU

● The engine ECU, which has a built-in microprocessor, provides the following types of functions: SET/- (deceleration control), RESUME/+ (acceleration control), CANCEL, vehicle speed calculation, motor output control, and overdrive control. The built-in microprocessor receives the inputs of signals from the switches and sensors, processes those signals in accordance with a program that is stored in memory, and controls the throttle control motor. In addition, it has a built-in function to diagnose a system malfunction through the use of the cruise operation/warning indicator light in the combination meter.



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Control by Engine ECU

• The engine ECU controls the cruise control system as described below.

Cruise control function list

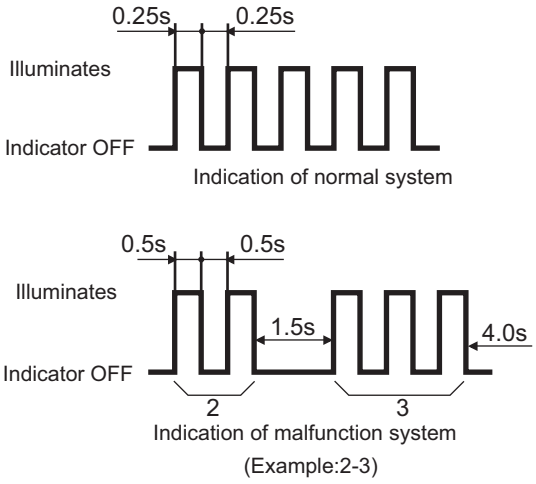
Control name	Control contents	
Set Control	·	When the driver operates the SET/- switch while the main switch is ON and the vehicle is being driven at an approximate speed between 43 and 170 km/h(EU)43 and 106 mph(EU right handle except Ireland and Cyprus) ,43 and 139 km/h(other country) the ECU memorizes the vehicle speed at the time the driver releases the switch OFF, and controls the vehicle at a constant speed.
Set speed(low speed limit)	·	The low speed limit is the lowest speed that cruise control can be set and is designed at approx. 25mph(40km/h). The cruise control cannot be set below that speed. If the vehicle speed drops below that speed while running in the cruise control mode, the cruise control is cancelled (deletes the vehicle speed memory) automatically.
Set speed(High Speed Limit)	·	The upper limit of the settable speed range is approximately 125 mph(200 km/h). Thus, the driver cannot set a driving speed that exceeds the high speed limit. Furthermore, the driver cannot accelerate the vehicle higher than the high speed limit by operating the RESUME/+ switch in an attempt to increase the speed.
Constant-Speed Control	·	The ECU compares the driving speed against the memorized speed, calculates the cruise control request value so that the driving speed will match the memorized speed, and controls the throttle control motor.
Acceleration Control	·	If the driver continues to press the RESUME/+ switch ON while the vehicle is being driven under cruise control, the ECU actuates the throttle control motor in the opening direction of the throttle valve, in order to increase the speed. The ECU memorizes the vehicle speed at the time the driver releases the switch OFF, and controls the vehicle at a constant speed. The ECU accepts a switch operation signal while the vehicle speed is between approximately 25 and 125 mph(43 and 200 km/h).
	·	If the driver momentarily (approximately 0.5 seconds) presses the RESUME/+ switch ON while the vehicle is being driven under cruise control, the ECU increases the memorized speed by approximately 5 mph(5 km/h) with each pressing of the switch (this is called a "tap-up" function). However, the ECU will not change the memorized speed if the difference between the memorized speed and the driving speed is above approximately 3 mph(5 km/h).

Control name	Control contents	
Deceleration Control	·	If the driver continues to press the SET/- switch ON while the vehicle is being driven under cruise control, the ECU actuates the throttle control motor in the closing direction of the throttle valve (without fully closing the throttle valve) in order to decelerate the vehicle. The ECU memorizes the vehicle speed at the time the driver releases the switch OFF, and controls the vehicle at a constant speed. The ECU accepts a switch operation signal while the vehicle speed is between approximately 25 and 125 mph (43 and 200 km/h).
	·	If the driver momentarily (approximately 0.5 seconds) presses the SET/- switch ON while the vehicle is being driven under cruise control, the ECU decreases the memorized speed by approximately 5 mph(5km/h) with each pressing of the switch (this is called a "tap-down" function). If the difference between the memorized speed and the driving speed is above approximately 3 mph(5 km/h), the ECU memorizes the vehicle speed at the time the driver releases the SET/- switch OFF and controls the vehicle at a constant speed.
Resume Control	·	If the driver effects manual cancel control to cancel the driving operation of the vehicle under cruise control (without turning the cruise control main switch OFF), the driver can operate the RESUME/+ switch from OFF to ON to resume the speed that the ECU has memorized when the driver effected manual cancel control. Then, the ECU effects constant acceleration control. This control is enabled provided that the vehicle speed is above approximately 25 mph(40 km/h).
Manual cancelle function	·	The ECU cancels cruise control if it receives the input of any of the signals listed below while the vehicle is being driven under cruise control.
	1	Stoplight switch is ON (by pressing the brake pedal).
	2	"D" position signal is OFF or a gear other than 6th, 5th, or 4th is selected in the "S" mode.
	3	CANCEL switch of the operation switch is ON.
	4	Cruise control main switch is OFF.
	5	VSC is operating.

Control name	Control contents	
Auto cancelle function	·	If any one of the conditions listed below occurs while the vehicle is being driven under cruise control, the ECU deletes the memorized speed and cancels the control. Then, it blinks the cruise control indicator light and disables the control until the main switch is turned ON again.
	1	An open or short circuit in the stoplight switch.
	2	A failure in the vehicle speed signal.
	3	A failure in the throttle control motor.
	·	If any one of the conditions listed below occurs while the vehicle is being driven under cruise control, the ECU deletes the memorized speed and cancels the control. Then, it blinks the cruise control indicator light until the main switch is turned ON again. The ECU will not accept the operation of the main switch until the ignition is turned OFF.
	1	A failure in the stoplight switch signal input circuit.
	2	A failure in the cancel circuit.
	·	If any one of the conditions listed below occurs while the vehicle is being driven under cruise control, the ECU deletes the memorized speed and cancels the control (and the control can be reset).
	1	The vehicle speed is below approximately 25 mph(40 km/h).
	2	The vehicle speed is approximately 10 mph(16 km/h) less than the memorized speed.
Over drive function	·	While the vehicle is being driven under cruise control, the ECU might cancel the over-drive, particularly if the vehicle is being driven uphill. After the overdrive cancellation, if the ECU determines that the uphill drive has ended, it will resume the overdrive mode after the counting of the overdrive resume timer has been completed. However, if the vehicle speed drops below the overdrive resume speed before the counting of the resume timer has been completed, the timer resets itself. The timer will restart counting after the vehicle reaches the overdrive resume speed again.

Indication of Results of Diagnosis of System Failure Location

• To access the results of the diagnosis in the form of DTCs (Diagnostic Trouble Codes), short the terminals Tc and E of the DLC3 connector located below the instrument finish lower panel on the driver side while the ignition is ON. The DTCs are determined by counting the blinking of the cruise operation/warning indicator light. If the system has diagnosed malfunctions in multiple sections, the light will output the DTCs in ascending order.



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LIst of failure diagnotic result display

Code No.	Failure diagnostic item
2-1	• An open in the vehicle speed signal.
2-3	• Malfunction in the vehicle speed signal.
5-2	• An open or short circuit in the stop light switch.
5-4	• Malfunction in the stop light switch input circuit • Malfunction in the cancel circuit