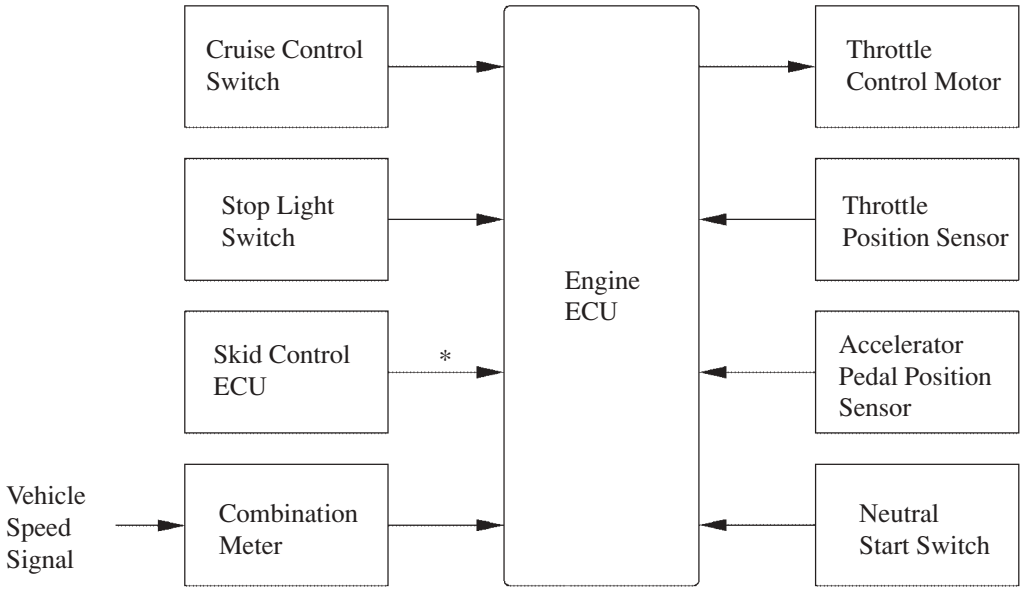
CRUISE CONTROL SYSTEM

■DESCRIPTION

- Along with the adoption of the ETCS-i (Electronic Throttle Control System-intelligent) in the 3MZ-FE engine, the cruise control system has been changed from the conventional actuator control to electronic throttle control.
- The cruise control ECU has been integrated in the Engine ECU.

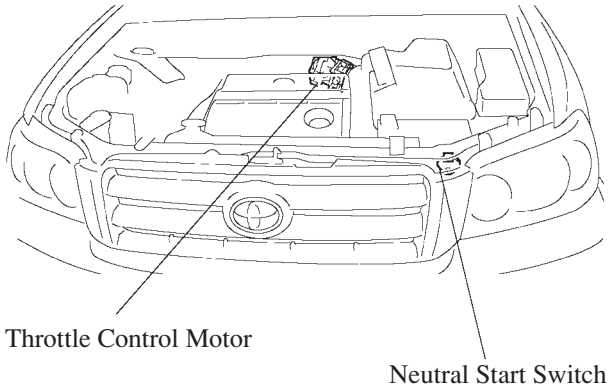
1. System Diagram

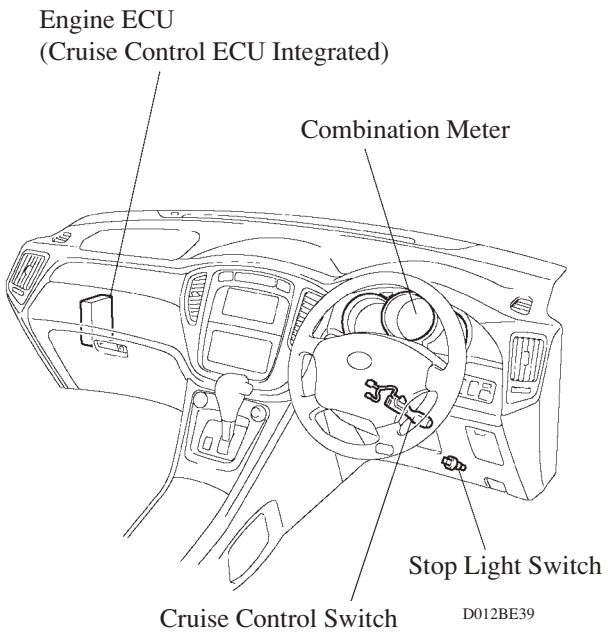


*: VSC Operation Signal

257HL112

2. Layout of Main Component





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3. Function

The cruise control has the following functions.

Function	Outline
Constant Speed Control	The constant speed control controls the driving speed of the vehicle to a set speed. It compares the driving speed to a set speed. If the driving speed is higher than the set speed, it outputs a signal to operate the throttle control motor in the closing direction of the throttle valve. Conversely, if the driving speed is lower than the set speed, it outputs a signal to operate the throttle control motor in the opening direction of the throttle control motor.
Set Control	When the cruise control switch is pressed to the SET/ – side and released while the vehicle is running within a cruising speed control range (approx. 40 km/h or more) with the MAIN switch turned on, the Engine ECU (integrated cruise control ECU) stores the vehicle speed and controls at that speed constantly.
Coast Control	When the cruise control switch is kept pushed to the SET/ – side while running in the cruise control mode, the throttle control motor is energized in the throttle closing direction. The vehicle keeps decelerating and the Engine ECU (integrated cruise control ECU) stores the vehicle speed when the hand is released from the cruise control switch. From then on, the Engine ECU (integrated cruise control ECU) controls the vehicle speed at that speed constantly.
Tap-Down Control	When the difference between the actual vehicle speed and the set speed is less than 5 km/h, the set speed can be lowered approx. 1.6 km/h each time by operating the SET/ – switch quickly within approx. 0.5 seconds.
Accelerator Control	When the cruise control switch is kept pushed to the RES/ + side while running in the cruise control mode, the throttle control motor is energized in the throttle opening direction. The vehicle keeps accelerating and the Engine ECU (integrated cruise control ECU) stores the vehicle speed when the hand is released from the cruise control switch. From then on, the Engine ECU (integrated cruise control ECU) controls the vehicle speed at that speed constantly.
Tap-Up Control	When the difference between the actual vehicle speed and the set speed is less than 5 km/h, the set speed can be increased approx. 1.6 km/h each time by operating the RES/ + switch quickly within approx. 0.5 seconds.
Low Speed Limit Control	The low speed limit is the lowest speed that cruise control can be set and is designed at approx. 40 km/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 automatically and the set speed in the memory is cleared.
Manual Cancel Control	If any of the following signals is sent to the Engine ECU (integrated cruise control ECU) while the vehicle is running in the cruise control mode, the cruise control mode is cancelled accordingly. ● Stop light switch ON signal (Depress the brake pedal) ● D position circuit in Neutral start switch OFF signal. (Shift the transmission shift lever from D to N, 2, or L) ● CANCEL switch ON signal ● MAIN switch OFF signal

(Continue)

Resume Control	After the cruise control mode is cancelled by any of the cancel switches (except canceling by the main switch OFF), the mode can be resumed and controlled at the set speed by operating the cruise control switch in the RES/ + direction providing that the vehicle speed has not dropped below the low speed limit (approx. 40 km/h). The mode cannot be resumed if the vehicle speed once drops below the low speed limit, because the speed in the memory is cleared.
Automatic Cancel Control	When any of the following conditions occur during cruise control driving, the speed that is set in the memory is cleared to cancel the cruise control mode. Furthermore, the cruise main indicator light blinks until the MAIN switch is turned OFF, and the operation of the cruise control is disabled until the MAIN switch is turned ON again. ● Stop light switch open or short circuit. ● The vehicle speed signal is not set for a predetermined period of time. (approx. 140 sec) ● ETCS-i malfunction
	When any of the following conditions occur during the cruise control driving, the speed that is set in the memory is cleared to cancel the cruise control mode. Furthermore, the cruise main indicator light blinks until the MAIN switch is turned OFF, and the operation of the cruise control is disabled until the ignition switch is turned OFF again. ● Stop light switch input signal abnormal. ● Cruise control switch input signal abnormal.
	When any of the following conditions occurs during the cruise control driving, the set speed in the memory is cleared to cancel the cruise control mode. Cruise control can not be resumed, so the system needs re-setting. ● The vehicle speed falls below the low speed limit (approx. 40 km/h). ● The vehicle speed drops more than 16 km/h below the set speed as in uphill driving.
Automatic Transmission Control	When the vehicle is cruising uphill, there is a case where the overdrive turns off depending on the ECT control. After that, when the Engine ECU judges the end of cruising up from the throttle valve opening angle, the overdrive will turn on again after about 2 seconds. Also, in case that the overdrive turns off during accelerator or resume control, it will turn on after finishing accelerator or resume control.
Diagnosis	When the Engine ECU (integrated cruise control ECU) does not receive a vehicle speed signal for a predetermined period of time during cruising, or when cruise control is cancelled (automatic cancel) by a malfunction in the cruise control switch, stop light switch or vehicle speed signal, the Engine ECU (integrated cruise control ECU) immediately blinks the cruise main indicator light on the combination meter to alert the driver of the system malfunction. The contents of malfunctions are coded and stored in the Engine ECU (integrated cruise control ECU).

4. Diagnosis

- When the Engine ECU (integrated cruise control ECU) does not receive a vehicle speed signal for a predetermined period of time during cruising, or when cruise control is cancelled (automatic cancel) by a malfunction in the cruise control switch, stop light switch or vehicle speed signal, the Engine ECU (integrated cruise control ECU) immediately blinks the cruise main indicator light on the combination meter to alert the driver of the system malfunction. The contents of malfunction are coded and stored in the Engine ECU (integrated cruise control ECU).
- The DTC (Diagnostic Trouble Code) can be accessed by connecting a hand-held tester to DLC3 terminal or the SST (09843-18040) to the Tc and CG terminals of the DLC3 and reading the blinking of the cruise main indicator light.
  A hand-held tester can be used to read 5-digit codes. With the SST, 2-digit codes can be read from the number of blinks of the cruise main indicator light. For details, see the Kluger Repair Manual. (Pub. No. RM1087E)
- The DTC listed below is used.

DTC No.		Circuit Inspection
5-digit	2-digit	
P0500	21	Vehicle speed sensor circuit open
P0503	23	Vehicle speed signal abnormal
P0571	52	Stop light switch circuit malfunction
P0607	54	● Control module performance ● Input signal circuit malfunction