■ SYSTEM OPERATION

1. General

The cruise control has the following control functions.

Function	Outline
Constant Speed Control	The hybrid vehicle control ECU compares the actual and set vehicle speeds. If the actual speed is higher than the set speed, it regulates the drive force of the electric motor and engine in order to decelerate the vehicle. If the actual speed is lower than the set speed, it regulates the drive force in order to accelerate the vehicle.
Set Control	When the vehicle has met the following condition, and the cruise control main switch is pressed to the -/SET side and released after the ON-OFF button on the cruise control main switch is pressed to turn the system on, the hybrid vehicle control ECU will store the vehicle speed and then maintain the vehicle constantly at that speed. • The vehicle is running at a speed of about 25 mph (40 km/h) or more.
Low Speed Limit Control	The low speed limit is the lowest speed that cruise control can be set at and it is designed to be approx. 25 mph (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, the cruise control will be cancelled automatically. However the set speed is kept in memory.
COAST Switch Control	While the cruise control main switch is held to the -/SET side, the vehicle speed and the set vehicle speed change as follows: • The vehicle will decelerate. • The set vehicle speed changes to the speed that the vehicle is traveling at when the COAST switch (-/SET side operation) is released.
Tap Down Control	When the cruise control main switch is pushed momentarily (approx. 0.6 sec.) to the -/SET side, the vehicle speed and the vehicle set speed change as follows: • The vehicle will decelerate in increments of approx. 1 mph (1.6 km/h) each time the switch is pressed. • However, if the difference between the actual vehicle speed and the set vehicle speed is greater than 3.1 mph (5 km/h), the set vehicle speed will change to the speed at which the vehicle was being driven at the time the switch was released.
ACC Switch Control	When the cruise control main switch is held to the +/RES side, the vehicle speed and the set vehicle speed change as follows: • The vehicle will accelerate. • The set vehicle speed changes to the speed at which the vehicle was being driven at the time the switch was released.
Tap Up Control	When the cruise control main switch is pushed momentarily (approx. 0.6 sec.) to the +/RES side, the vehicle speed and the set vehicle speed change as follows. • The vehicle will accelerate in increments of approx. 1 mph (1.6 km/h) each time the switch is pressed. • However, if the difference between the actual vehicle speed and the set vehicle speed is greater than 3.1 mph (5 km/h), the set vehicle speed will not change.
RES Switch Control	If cruise control is cancelled for any reason other than a malfunction or cruise control main switch operation and vehicle speed is more than the low speed limit, the vehicle speed is returned to the speed before the cancellation of cruise operation by pushing the cruise control main switch to the +/RES side. The cruise control mode can be resumed even if the vehicle speed drops below the low speed limit, because the speed in the memory is not cleared.

(Continued)

Control	Outline
Manual Cancel Control	If any of the following signals are sent to the hybrid vehicle control ECU, the cruise control is cancelled accordingly. • The shift lever is shifted from D to N or B. • Stop light switch ON signal/The brake pedal is depressed. • CANCEL switch ON signal (the cruise control main switch is moved to the CANCEL side) • Cruise control switch (ON-OFF button) OFF signal
Automatic Cancel Control	If any of the following conditions occur during cruise control operation, the speed that is set in the memory is cleared and the cruise control is cancelled. • Stop light switch open or short circuit • The vehicle speed signal is not input for a predetermined period of time (approx. 140 msec). Furthermore, the CRUISE main indicator light will blink until the ON-OFF button on the cruise control main switch is used to turn the system off, and the operation of the cruise control will be disabled until the ON-OFF button is turned on again.
	If any of the following conditions occur during cruise control operation, the speed that is set in the memory is cleared and the cruise control is cancelled. • Stop light switch input signal is abnormal. • Cancel circuit malfunction. Furthermore, the CRUISE main indicator light will blink until the ON-OFF button on the cruise control main switch is used to turn the system off, and the operation of the cruise control will be disabled until the power source mode is switched to IG-ON again.
	If the following condition occurs during cruise control driving, the speed that is set in the memory is cleared and the cruise control is cancelled. • Vehicle speed decreases by 10 mph (16 km/h) or more below the speed at which the cruise control was set.
	If any of the following conditions occur during cruise control operation, the speed that is set in the memory is cleared and the cruise control is cancelled. • THS-II operation is abnormal. • Cruise control system communication malfunction. Furthermore, the CRUISE main indicator light will turn off, and the operation of the cruise control will be disabled until the power source mode is switched to IG-ON again.
	If any of the following conditions occur during cruise control driving, the cruise control is cancelled. • Vehicle speed is below the low speed limit [approx. 25 mph (40 km/h)]. • VSC operation.
Diagnosis	If the hybrid vehicle control ECU does not receive a vehicle speed signal for a predetermined period of time during cruising, or if cruise control is cancelled (automatic cancel) due to a malfunction of the cruise control, stop light switch or vehicle speed signal, the hybrid vehicle control ECU immediately blinks the CRUISE main indicator light due to the malfunction. The information relating to the malfunction will be stored in the hybrid vehicle control ECU.

2. Diagnosis

If a malfunction occurs in the cruise control system during cruise control operation, the hybrid vehicle control ECU automatically cancels control and blinks the CRUISE main indicator light to inform the driver of the malfunction. At this time, the hybrid vehicle control ECU memorizes the malfunction in the form of 5-digit DTCs (Diagnostic Trouble Codes).

- The 5-digit DTCs can be read by connecting Techstream to DLC3.

For details, see the 2008 HIGHLANDER HYBRID VEHICLE Repair Manual (Pub. No. RM07V0U).