

CRUISE CONTROL SYSTEM

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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GENERAL INFORMATION

Overview

Description

Turn on the constant speed cruise control switch after vehicle reaches a certain speed, and the set vehicle speed can be maintained by constant speed cruise control, without accelerator depressed. When active speed limit function is turned on, vehicle speed does not exceed the speed limit set. Cruise control system consists of the following components:

- Constant speed cruise control switch (multi-function switch)
- Instrument cluster (ICM)
- Engine control module (ECM)
- Transmission control unit (TCU)
- ABS/ESP control module
- Accelerator pedal
- Brake switch

Do not use cruise control in the following situations. Otherwise, it may result in a loss of vehicle control and cause an accident, resulting in serious injury or even death.

- In traffic congestion areas.
- On roads with sharp bends.
- On winding roads.
- On wet and slippery roads, such as those covered with rain, ice or snow.
- On steep hills. Vehicle speed may be higher (or lower) than the set speed. This will cause engine speed to rise sharply and briefly to increase vehicle speed to set speed range.

Operation

Engine control module (ECM) receives button signal from constant speed cruise control switch (multi-function switch), and then engine control module (ECM) turns on the indicator on the meter via CAN net. According to speed signal, brake signal, acceleration and deceleration signal and current working conditions, ECM determines whether to enter or cancel cruise state. After entering state, ECM controls throttle opening angle to stabilize the vehicle within the set vehicle speed range.

Description of Constant Speed Cruise Function

1. Cruise ON inspection

- With ignition switch ON, press cruise main switch, cruise indicator on the meter turns on and blinks (pre-cruise state, it is normal).
- When vehicle is driving at speed range of 40 - 150 km/h, for example, when the vehicle speed is 110 km/h, press SET/- button to cruise at a constant speed of 110 km/h (the speed when the SET/- button is pressed). Meanwhile, cruise indicator on the meter remains ON.

2. Cruise OFF

- In cruise state (e.g. 110 km/h):
 - (a) Press the cruise main switch to cancel the cruise state and cruise indicator on the meter turns off.
 - (b) Press the CANCEL button to cancel the cruise state and cruise indicator on the meter blinks (pre-cruise state). The icon is displayed on the left upper of the LED screen.
 - (c) Lift EPB button during driving, then brake and depress clutch to exit the cruise state.

3. Cruise setting

- Under the cruise state, depress the accelerator pedal or brake pedal to increase or decrease vehicle speed. Press SET/- button of cruise system while releasing the accelerator pedal or brake pedal, vehicle is cruising at new vehicle speed, and indicator on the meter remains on. New set speed will be displayed at left upper of the LED screen.

4. Cruise short press / long press acceleration

- Slow adjustment
 - (a) Shortly press RES/+ button once to set the vehicle speed to increase 1 km/h.
 - (b) Shortly press RES/- button once to set the vehicle speed to decrease 1 km/h.
 - (c) The speed during releasing button is the set speed.
- Quick adjustment
 - (a) Long press RES/+ button to increase continuously the set speed.
 - (b) Long press RES/- button to decrease continuously the set speed.
 - (c) The speed during releasing button is the set speed.

5. Cruise recovery

- In the cruise state, depress the brake pedal to flash the cruise indicator on the meter (pre-cruise state, normal condition), and the vehicle speed decreases.
 - (a) When vehicle speed is over 40 km/h, release the brake pedal and press RES/+ button, then the vehicle accelerates until the cruise state before depressing the brake pedal is returned. Cruise indicator on the meter remains on.
 - (b) When vehicle speed is below 40 km/h, release the brake pedal and press RES+ button, the vehicle can not return to the cruise state before depressing the brake pedal. However, further depress the accelerator until vehicle speed is over 40 km/h, release the brake pedal and press RES+ button, the vehicle accelerates until the cruise state before depressing the brake pedal is returned. Cruise indicator on the meter remains on.

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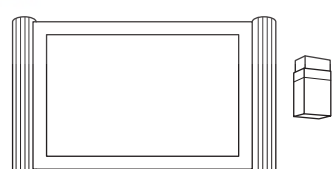
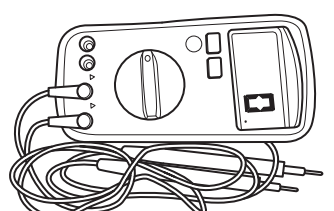
Specifications

Torque Specifications

Description	Torque (N·m)
Steering Wheel Quick Button	0.7 ± 0.2

Tools

General Tools

Diagnostic Tester	 001
Digital Multimeter	 002

Diagnosis Tools

Diagnostic Tester

When connecting the diagnostic tester:

- Connect diagnostic tester (the latest software) to diagnostic interface for communication with vehicle.
- Diagnostic interface is located on instrument panel lower left protector.
- Diagnostic interface uses a trapezoidal design which can hold 16 terminals.

Digital Multimeter

When using digital multimeter:

- Troubleshoot electrical malfunctions and wire harness system.
- Look for basic malfunction.
- Measure voltage, current and resistance.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- If malfunction is intermittent, perform the followings:
- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Look for broken, bent, protruded or corroded terminals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit works. Circuits are very sensitive to proper grounding. A loose or corroded ground can affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contacting is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if add-on accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimps. Make sure that all wire harnesses are clean and securely fastened while providing a good ground path.

DIAGNOSIS & TESTING

Diagnosis Content

Problem Symptoms Table

Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Vehicle speed can not be set (Meter indicator does not illuminate)	Wire harness or connector
	Engine control module (ECM)
	Instrument cluster
Vehicle speed can not be set (Cruise/speed limit indicator illuminates normally)	Constant speed cruise control switch
	Wire harness or connector
	Brake switch
	ESP/EPB
	Clutch switch (for MT model)
	Body control module (BCM)
	Engine control module (ECM)

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Diagnosis Procedure

Hint

Use following procedures to troubleshoot the brake control system.

1	Vehicle brought to workshop
---	-----------------------------

Result

Proceed to
Next

Next

2	Check battery voltage
---	-----------------------

Check if battery voltage is normal.

OK

Standard voltage: Not less than 12 V.

Result

Proceed to
OK
NG

NG

Replace the battery

OK

3 Customer problem analysis**Result**

Proceed to
Next

Next

4 Check for DTCs (current DTC and history DTC)**Result**

Proceed to
No DTC
Current DTC
History DTC

History DTC

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5 Problem repair (no DTC), then go to step 8**Result**

Proceed to
Next

Next

Go to step 8

6 Troubleshoot according to Diagnostic Trouble Code (DTC) chart, then go to step 8**Result**

Proceed to
Next

Next

Go to step 8

7 Troubleshoot according to Problem Symptoms Table, then go to step 8**Result**

Proceed to
Next

Next

8	Adjust, repair or replace
----------	----------------------------------

Result

Proceed to
Next

Next

9	Conduct test and confirm malfunction has been repaired
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Result

Proceed to
Next

Next

End

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ON-VEHICLE SERVICE

Constant Speed Cruise Switch

Removal

Warning:

- Be sure to read the precautions for SRS airbag before removing steering wheel quick button.
 - Be sure to wear necessary safety equipment to prevent accidents when removing constant speed cruise switch.
 - DO NOT damage the clip on steering wheel quick button trim cover when removing constant speed cruise switch.
1. Turn off all electrical equipment and the ignition switch.
 2. Disconnect the negative battery cable for more than 1 minute.
 3. Remove the driver airbag (See page 32-65).
 4. Remove the steering wheel quick button trim cover.
 - (a) Disconnect the steering wheel quick button connector (1), remove fixing screw (2) from ground wire harness.

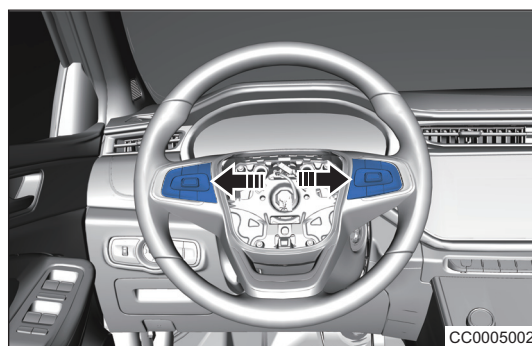
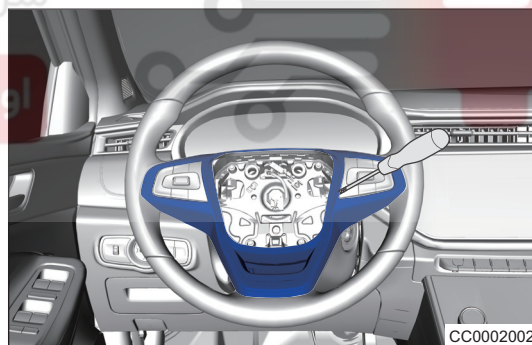
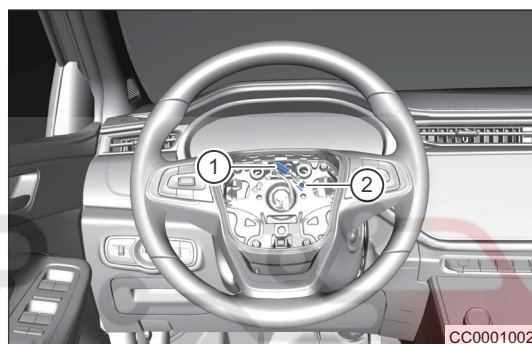
Tightening torque

$0.7 \pm 0.2 \text{ N}\cdot\text{m}$

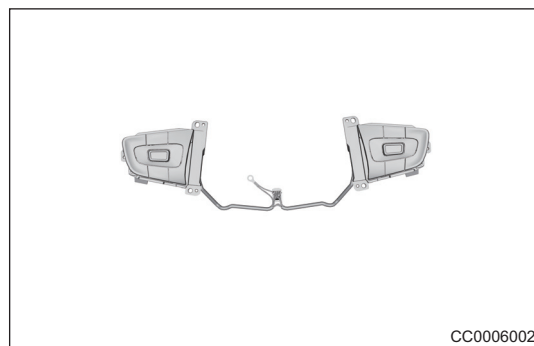
- (b) Using a screwdriver wrapped with protective tape, pry off the steering wheel quick button trim cover bright streak.

5. Remove the steering wheel quick button.

- (a) Using a screwdriver wrapped with protective tape, pry off the claws on steering wheel quick button.



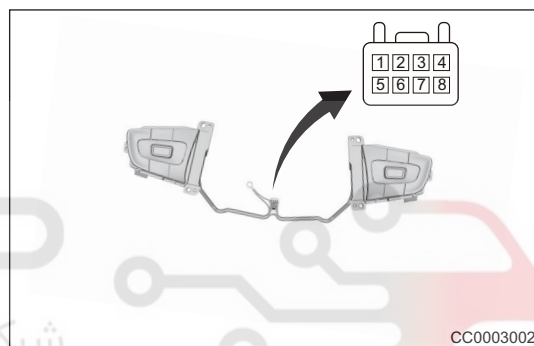
- (b) Remove the steering wheel quick button.



Inspection

1. Check the constant speed cruise switch.
 - (a) Check constant speed cruise switch for damage. Replace them if necessary.
 - (b) Check constant speed cruise switch connector for damage or poor terminal connection. Replace them if necessary.
 - (c) Using digital multimeter, check for continuity between the terminals of constant speed cruise switch according to the table.

Multimeter Connection	Condition	Operation Resistance
Terminal 1 - Terminal 2	Not press button	Resistance ∞ or above $M\Omega$
Terminal 1 - Terminal 2	Press ON/OFF button	Less than 1 Ω
Terminal 1 - Terminal 2	Press SET/- button	680 Ω
Terminal 1 - Terminal 2	Press SET/+ button	2.2 k Ω



If result is not as specified, replace the steering wheel quick button.

2. Check connectors for damage. Replace if necessary.

Installation

1. Installation is in the reverse order of removal.

Caution:

- Operate carefully to prevent damage to other components, when installing the constant speed cruise switch.
- Install each connector into place when installing constant speed cruise switch.
- Tighten fixing screw to the specified torque when installing constant speed cruise switch.
- Check steering wheel quick button for proper operation, after installing constant speed cruise switch.