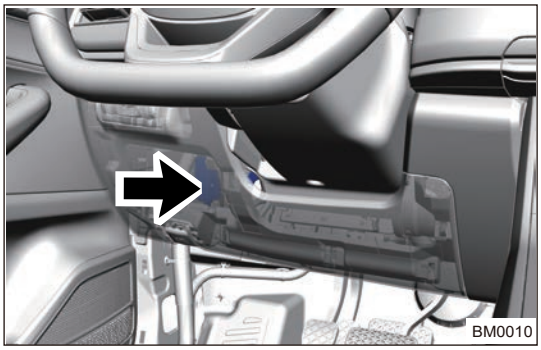
BODY CONTROL SYSTEM

GENERAL INFORMATION

System Overview

Description

Body control module is called BCM for short which integrates most of vehicle electrical appliances, and it is an important part of the body electrical system.



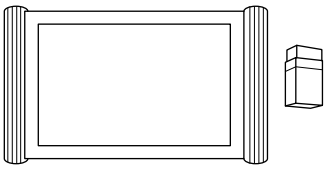
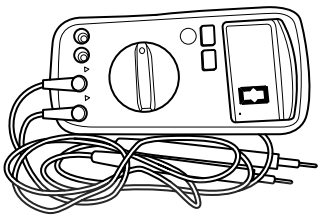
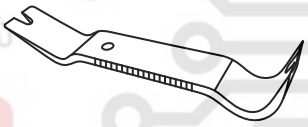
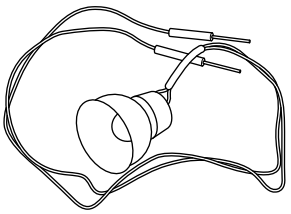
Function Description

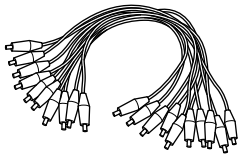
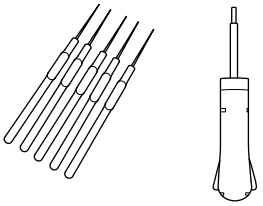
1. Tire Pressure Function (if vehicle is equipped with tire pressure): Tire pressure monitoring system is an active safety device, which can monitor tire pressure and temperature in real time and display tire pressure and temperature on meter. When tire pressure is too low or temperature is too high, tire pressure monitoring system will warn the driver of driving danger.
2. Window jam protection function (if the vehicle is equipped with jam protection function): When window auto up or remote one-button window up function is operated, if a passenger is jammed by automatically rising window due to carelessness, the jam protection control module control glass regulator motor to operate in reverse before motor reaches the jam protection set force, so that window glass lowers at a certain distance and prevent passenger being jammed.
3. The main functions are as below: defrost, turn signal light, lane change, hazard warning light, position light, park light, low beam light, follow me home, car location, high beam, passing light, rear fog light control, daytime running light, battery save, dome light, third row dome light, rear view mirror ground light, window, PEPS button background light control, anti-theft management, trunk opening management (with PLG), door status, central lock, front wiper control, front washer control, back-up light control, key status position signal, sudden braking hazard warning light double flashing alarm function, assist steering illumination, brake light control, rear view mirror folding, DVD settings, remote control function, LIN ambient light.

BCM Installation Position

It is installed on body under instrument panel.

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006
Interior Crow Plate	 RCH002506
Bulb Test Light (21 W)	 RCH008706

Tool Name	Tool Drawing
Jumper Wire	 RCH008806
Wire Harness Terminal Tools	 RCH008906

Torque Specifications

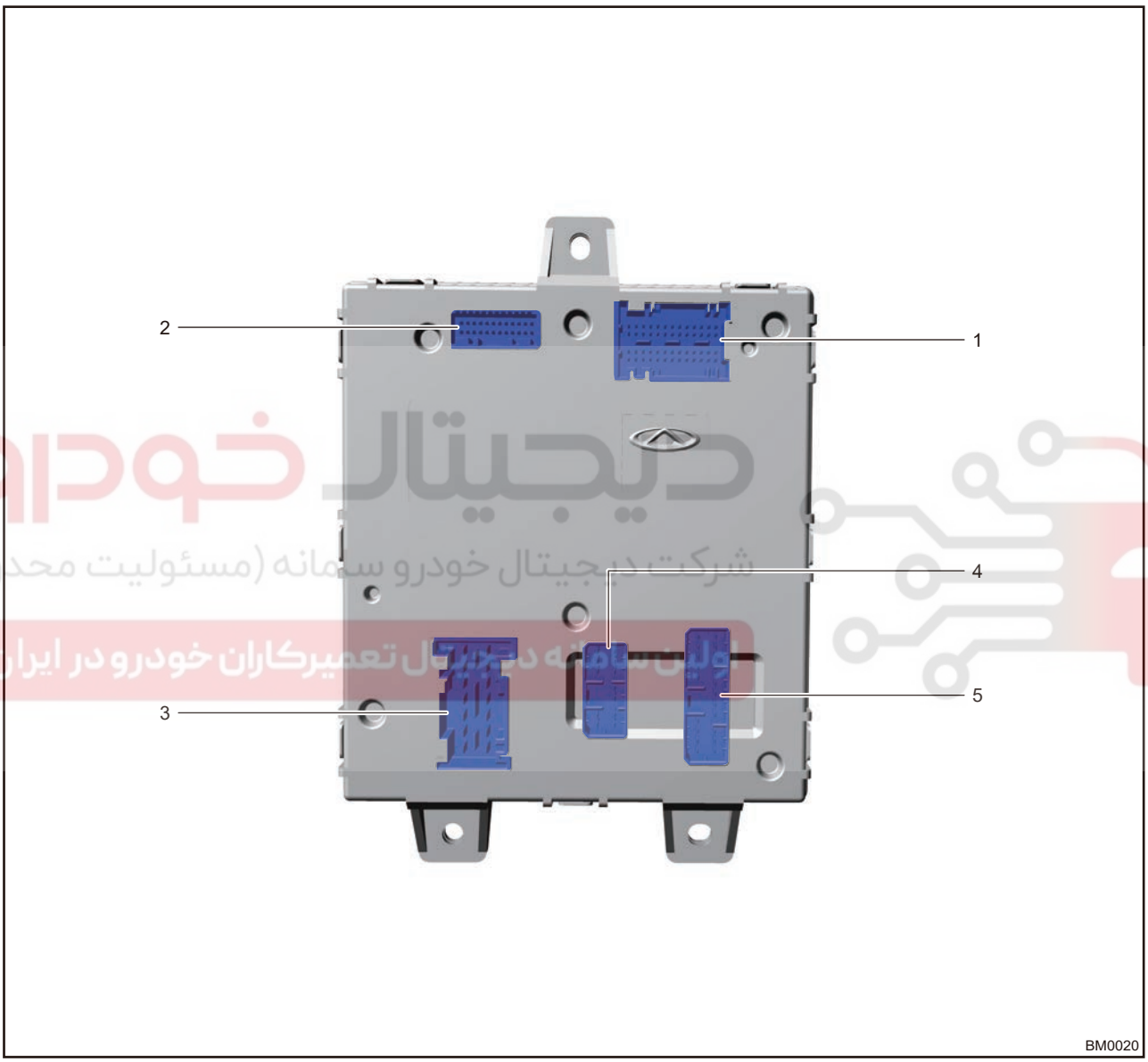
Description	Torque (N•m)
Body Control Module Bracket Fixing Nut	7 ± 1
Instrument Panel Lower Left Protector Assembly	1.5 ± 0.5
Instrument Panel Fuse and Relay Box Fixing Nut	7 ± 1

DIAGNOSIS & TESTING

Diagnosis Contents

Terminal Definition

Body Control Module Terminal Definition



1-52	Pin Connector	2-24	Pin Connector
3-14	Pin Connector	4-12	Pin Connector
5-20	Pin Connector		

52-Pin connector terminal definition

PIN	Description	PIN	Description
1-01	Right Rear View Mirror Ground Light Output	1-27	Dome Light Output
1-02	Left Scuff Plate Welcome Light Output	1-28	3rd Row Dome Light Output
1-03	LIN Signal (Battery Sensor)	1-29	Rear Defroster Output
1-04	-	1-30	High Speed Wiper Output
1-05	Left Windshield with Power Heating	1-31	Steering Wheel Heat Relay
1-06	Right Windshield with Power Heating	1-32	Light Sensor Input
1-07	Collision Signal	1-33	Window Regulator Switch FR
1-08	Movable Side Rear Turn Light Diagnostic	1-34	Window Regulator Switch FL
1-09	Front Turn Light Diagnostic	1-35	-
1-10	Door Open Signal RL	1-36	Passenger Side Window Regulator Disabled Switch
1-11	Headlight Leveling	1-37	Door Open Signal FR
1-12	Door Open Signal RR	1-38	-
1-13	Door Lock Status Signal FL	1-39	Brake Switch Input
1-14	Left Rear View Mirror Ground Light Output	1-40	Passenger Side Window Regulator Disabled Switch Operation Indicator
1-15	Scuff Plate Welcome Light Output FR	1-41	NTC+
1-16	LIN Signal (Sunlight Rain)	1-42	Low Speed Wiper Output
1-17	Front Fog Light Output	1-43	Low Beam Light Output
1-18	High Beam Light Output	1-44	Horn Output
1-19	Window Regulator Switch RR	1-45	Analog Ground
1-20	Passenger Side Window Regulator Switch FR	1 - 46	Turn Light Switch

PIN	Description	PIN	Description
1-21	Passenger Side Window Regulator Switch RL	1 - 47	Window Regulator Switch RL
1-22	Passenger Side Window Regulator Switch RR	1-48	Back Door Open Signal
1-23	Door Open Signal FL	1-49	Central Control Lock Switch Input
1-24	Front Wiper Stop Position Signal	1 - 50	Central Control Unlock Switch Input
1-25	Steering Wheel Heater Switch In	1-51	Fixing Side Rear Turn Light Diagnosis
1-26	Rear Wiper Stop Position Signal	1-52	Front Compartment Cover Contact Switch

24-Pin connector terminal definition

PIN	Description	PIN	Description
2-01	Steering Wheel Heater Ind	2-13	Turn Light Enable
2-02	High Speed CAN Signal Low Terminal	2-14	Hazard Light Operation Indicator Light
2-03	-	2-15	High Speed CAN Signal High Terminal
2-04	LIN	2-16	-
2-05	ACC Signal Input	2-17	IGN Signal Input
2-06	Front Fog Light Input	2-18	-
2-07	Rear Fog Light Input	2-19	Rear Washer Input
2-08	Front Wiper Input	2-20	Front Washer Input
2-09	Rear Defroster Input	2-21	Rear Wiper Input
2-10	Rear View Mirror Folding Input	2-22	Front Wiper Input
2-11	Hazard Light Input	2-23	Lighting Input
2-12	High Beam - Flash Input	2-24	Wiper Sensitivity Switch

14-Pin connector terminal definition

PIN	Description	PIN	Description
3-01	Power Source 3	3-08	Window Up Output RL
3-02	Power Source 6	3-09	Window Down Output RL

PIN	Description	PIN	Description
3-03	Ground 1	3-10	Power Source 1
3-04	Ground 2	3-11	Window Up Output FR
3-05	Window Down Output RR	3-12	Window Down Output FR
3-06	Window Up Output RR	3-13	Window Up Output FL
3-07	Power Source 2	3-14	Window Down Output FL

12-Pin connector terminal definition

PIN	Description	PIN	Description
4-01	-	4-07	Welcome Light Enable
4-02	Central Control Unlock Output	4-08	-
4-03	Central Control Lock Output	4-9	Power Source 5
4-04	Back Door Unlock Output	4-10	Rear Wiper Output
4-05	Front Washer Output	4-11	-
4-06	-	4-12	Rear Washer Output

20-Pin connector terminal definition

PIN	Description	PIN	Description
5-01	-	5-11	High Mounted Stop Light Output
5-02	Outer Rear View Mirror Unfolding Output	5-12	-
5-03	Outer Rear View Mirror Folding Output	5-13	Nozzle Heating
5-04	Left Turn Light Output	5-14	Left Daytime Running Light Output
5-05	Right Turn Light Output	5-15	Right Daytime Running Light Output
5-06	Anti-theft Horn	5-16	Battery Save Output
5-07	Back-up Light Output	5-17	Rear Fog Light Output
5-08	Left and Right Brake Light Output	5-18	-

PIN	Description	PIN	Description
5-09	Front Position Light + Back Light + Ambient Light	5-19	-
5-10	Rear Position Light + License Plate Light	5-20	Power Source 4

BCM Function Test Reporter

Defrost Function

1. Defroster operation conditions: (1) IGN ON; (2) defroster signal active
   a. Active the defroster switch when the key is in OFF, ACC or START, the defroster will not operate.
2. When defroster is operating: Defroster stopped when 20 minutes elapsed
3. When defroster is operating: Active the defroster signal again, defroster stops
4. When defroster is operating: Key is switched from IGN ON to ACC or OFF, defroster stops
5. When defroster is operating: After the operation time reaches to 20 min. ± 5 s, defroster stops
6. When defroster is operating: When it is in Crank, defroster is paused. After Crank is finished, defroster resumes

Hint:
When voltage is below 11.5 V for more than 5 s, defroster output is shut down temporarily. If voltage is above 12.5 V for more than 15 s in the following counting time, the output will be restarted.

Turn Signal Light Function

1. Left turn signal light operating conditions: IGN ON; left turn signal light switch is activated
2. When left turn signal light is operating: the flashing frequency of left turn signal light is 400 ms on and 400 ms off.
   a. When left turn signal light is operating: Key is switched from ON to OFF, left turn signal light stops operating and meter stops flashing.
3. When left turn signal light is operating
   a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as left turn signal light;
   b. If the corresponding 21 W bulb is damaged, BCM sends CAN signal and the frequency is 2 times of normal operating frequency. No matter whether the bulb is damaged or not, BCM will work and send signals.
4. Right turn signal light operating conditions: IGN ON; right turn signal light switch is activated
5. When right turn signal light is operating: the flashing frequency of right turn signal light is 400 ms on and 400 ms off.
   a. When right turn signal light is operating: key is switched from ON to OFF, right turn signal light stops operating and meter stops flashing.
6. When right turn signal light is operating
   a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as right turn signal light;
   b. If the corresponding 21 W bulb is damaged, BCM sends signal and the frequency is 2 times of normal operating frequency. No matter whether the bulb is damaged or not, BCM will work and send signals.
7. When left/right turn signal light is operating: left/right turn signal light input is deactivated, left/right turn signal light should stop operating immediately
8. When left/right turn signal light is operating: Key is switched from IGN ON to ACC or OFF, and left/right turn signal light stops operating immediately.

Lane Change Function

1. Left lane change operating conditions: IGN ON; left turn signal light switch activates shortly (50 ms～1000 ms)
2. When left lane change is operating: left turn signal light flashes 3 times at frequency of 400 ms on and 400 ms off
3. When left lane change is operating
   a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as left turn signal light;
   b. If the corresponding 21 W bulb is damaged, BCM sends CAN signal and the frequency is 2 times of normal operating frequency. No matter whether the bulb is damaged or not, BCM will work and send CAN signals.
4. During left lane change operation: left turn signal light switch is activated (50 ms～1000 ms) shortly again, and left turn signal light flashes 3 times again
5. When left lane change is operating: Left turn signal switch remains active (> 1000 ms) and automatically switches to left turn signal light operating logic.
6. When left lane change is operating: Key is switched from IGN ON to ACC or OFF, and left turn signal light stops operating immediately.
7. When left lane change is operating: After flashing 3 times, left turn signal light should stop operating immediately.
8. Right lane change operating conditions: IGN ON; right turn signal light switch activates shortly (50 ms～1000 ms)
9. When right lane change is operating: right turn signal light flashes 3 times at frequency of 400 ms on and 400 ms off
10. When right lane change is operating
    a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as left turn signal light;
    b. If the corresponding 21 W bulb is damaged, BCM sends CAN signal and the frequency is 2 times of normal operating frequency. No matter whether the bulb is damaged or not, BCM will work and send CAN signals.
11. During right lane change operation: right turn signal light switch is activated (50 ms～1000 ms) shortly again, and right turn signal flashes 3 times again
12. When right lane change is operating: Right turn signal switch remains active (>1000 ms) and automatically switches to right turn signal light operating logic
13. When right lane change is operating: key is switched from IGN ON to ACC or OFF, and right turn signal light stops operating immediately
14. When right lane change is operating: After flashing 3 times, right turn signal light should stop operating immediately

Hazard Warning Light Function

1. Hazard warning light function activation conditions: hazard warning light switch is activated when hazard warning light is not activated
2. When hazard warning light is activated: Flashing frequency of left/right turn signal light and hazard warning light indicator are 400 ms on and 400 ms off
3. When hazard warning light is activated
   a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as turn signal light;
   b. If any 21 W bulb is damaged, the CAN signal frequency of turn signal light and the flashing frequency of hazard warning indicator will be 2 times of normal operating frequency.
4. When hazard warning light is activated: hazard warning light switch is activated again and hazard warning light function is turned off; left/right turn signal light stops operating immediately

5. When ABM sends a collision signal, hazard warning light function should be activated automatically (CAN signal of left/right turn signal light, indicator and turn signal light). Automatically activated hazard warning light function due to collision can be canceled as key is switched to OFF, then to ON or hazard warning light button is pressed
6. When turn signal light function and hazard warning light function are both effective, BCM should perform the next action

Hint:
In a ignition cycle, BCM responds to one collision signal only.

Position Light

1. Position light activation conditions: IGN ON or ACC; small light input or low beam light input is activated
2. When position light is operating: BCM should send CAN signal
3. When position light is operating: When small light input and low beam input are deactivated, small light stops operating
4. When position light is operating: when key is switched to OFF, small light stops operating and sends CAN signal

Parking light

1. Parking light activation conditions: Key is switched to OFF; small light switch is activated
2. When parking light is activated: small light comes on and BCM should send CAN signal
3. When parking light is activated: small light switch is deactivated and small light is turned off, BCM should send CAN signal

Low Beam Light

1. Low beam light activation conditions: IGN ON; low beam light switch is activated
2. When low beam light is activated: BCM sends signal
3. When low beam light is activated: when low beam switch input is canceled, low beam light turns off immediately
4. When low beam light is activated: Key is switched from IGN ON to ACC or OFF, low beam light turns off immediately.

Follow Me Home

1. Light is in manual mode
   a. FMH function activation condition: Flash switch is activated within 2 minutes after key is switched to OFF, and it can be activated again within 2 minutes regardless of whether FMH function is manually turned off or automatically turned off due to overtime.
   b. When FMH function is activated: Low beam light and small light are illuminated, and both CAN signal and FMH time are sent
   c. When FMH function is activated: default duration is 30 S. Activating Flash switch again for a short time will increase duration of FMH function by 30 S each time, but no more than 8 times
   d. When FMH function is activated: Flash switch is activated for 2 seconds, FMH function will be manually turned off - low beam light and position light will turn off immediately and cumulative duration of FMH will be reset.
   e. When FMH function is activated: key is switched to ACC or IGN ON, FMH function will be turned off - low beam light and clearance will turn off immediately and cumulative duration of FMH will be reset.
   f. When FMH function is activated: FMH function will be automatically turned off after set FMH working time is reached: low beam light and position light will turn off immediately.
2. Light is in automatic mode
   a. The vehicle has fortification condition, light combination switch is in AUTO, remote controller lock button is pressed, and BCM receives valid signal sent from rain sensor, and low beam light and position light are automatically turned on for 30s.

b. After 30 S or ignition key is switched to OFF/ON/ACC or light combination switch is switched from AUTO, low beam light and position light are turned off.

Car Locating

1. Light is in manual mode
   a. LMC function activation condition: IGN OFF; FMH is activated in this same ignition cycle (-ON⩾ACC⩾OFF) and automatically turns off due to overtime; remote control unlock signal is received; four doors are closed.
   b. When LMC function is activated: Low beam light and small light are on and send CAN signal.
   c. When LMC function is activated: FMH function cannot be activated, low beam light and small light operate in LMC mode.
   d. When LMC function is activated: Remote control lock signal (four doors are closed) is received, LMC function is turned off - low beam light and position light are off.
   e. When LMC function is activated: Any door is opened, LMC function is turned off – low beam light and small light are off.
   f. When LMC function is activated: Any key is switched to ACC or IGN ON, LMC function is turned off – low beam light and position light are off.
   g. When LMC function is activated: After receiving remote control unlock signal, LMC function delays 60 s (subject to remote control unlock time received)
   h. When LMC function is activated: Longest duration is 60 s, LMC function will turn off automatically after overtime.
2. Light is in automatic mode
   a. The key is in OFF, light combination switch is in AUTO, remote controller unlock button is pressed, and BCM receives valid signal sent from rain sensor, and low beam light and position light turn on for 30 seconds.
   b. After 30 seconds or ignition key is switched to ACC, low beam light and position light are turned off.
   c. When LMC function is activated, if the activation conditions are met again or FMH function is activated, it counts down from 30 s again and the light will not flash.

Automatic Lighting

1. Automatic light activation conditions: IGN in ON position; light switch in AUTO; LIN valid signal sent from rain sensor received
2. After automatic light ON function is activated, BCM sends low beam light and position light CAN signals to instrument cluster.
3. Low beam lights go out if any condition is met
   a. IGN switch is not in ON position.
   b. Light switch is switched from AUTO.
   c. Rain sensor LIN signal is invalid.
4. Position lights go out if any condition is met.
   a. IGN switch is not in ON position.
   b. After light switch is switched away from AUTO for 2 s.
   c. After rain sensor LIN signal is valid for 5 s.

High Beam Light

1. High beam light operating conditions: IGN ON; low beam lights are in activating status, high beam light switch is activated
2. When high beam light is operating: high beam lights come on and send CAN signal
3. When high beam light is operating: when vehicle is in Crank, high beam lights temporarily stop operating but CAN data will be sent continuously and resume operation after Crank.
4. When high beam light is operating: High beam light switch is deactivated and high beam lights turn off
5. When high beam light is operating: Low beam light switch is deactivated and high beam lights turn off

6. When high beam light is operating: Key is switched from IGN ON to ACC or OFF, high beam lights turn off.

Flash Function

1. Flash operating conditions: IGN ON; Flash switch is activated
2. When Flash is operating: high beam lights come on and send signal
3. When Flash is operating: when vehicle is in Crank, high beam lights temporarily stop operating and resume operation after Crank
4. When Flash is operating: When Flash switch is deactivated, high beam lights turn off
5. When Flash is operating: Key is switched from IGN ON to ACC or OFF, high beam lights turn off.

Front Fog Light Control

1. Front fog light operating conditions: IGN ON; position lights are in activating status, front fog lights switch is activated
2. When front fog lights are operating: Front fog lights come on and sends CAN signal
3. When front fog light is operating: Front fog switch activation is canceled and front fog lights go out
4. When front fog lights are operating: Key is switched from IGN ON to ACC or OFF, front fog lights go out
5. When front fog light is operating: Small light is turned off; front fog lights go out and send CAN signal

Rear Fog Light Control

1. Rear fog light operating conditions: IGN-ON; front fog light or low beam light load is activated; rear fog light switch is activated.
2. When rear fog light is operating: Rear fog light comes on and sends CAN signal.
3. When rear fog light is operating: When rear fog light switch is activated again, rear fog lights turn off.
4. When rear fog light is operating: When key is switched from IGN ON to ACC or OFF, rear fog lights turn off.
5. When rear fog light is operating: When low beam light or front fog light is turned off, rear fog light turns off at the same time.

Daytime Running Light

1. Daytime running light operating conditions: engine is started; low and high beam lights are not activated
2. When daytime running light is operating: when engine is stopped, daytime running light function is turned off
3. When daytime running light is operating: The activation of position light, low beam light and front fog light will cause daytime running lights to be turned off
4. When daytime running light is operating: Flash function does not affect daytime running light

Battery Save

1. Battery save function remains active during IGN ON or IGN ACC
2. Battery save function remains active without other wake-up sources within 15 minutes after IGN OFF
3. Battery save timing within 15 minutes after key is turned to OFF: Any door or back door unlocking signal received, key insertion or removal will reset timing to 15 minutes

Hint:

- Battery save load includes: Key light, dome light and luggage compartment light.
- Battery Save can be woken up by central control unlock or mechanical unlock after Battery Save is turned off.

Dome Light

1. Key insertion and removal, dome light and key light control
   a. When key is removed, BCM turns on dome light and key light is on for 3 minutes (fades in and fades out).

b. Within 3 minutes of dome light operation: Key insertion does not affect the operation timing of dome light and key light.
c. Within 3 minutes of dome light operation: When the key is turned to IGN ON, dome light and key light will fade out immediately.
d. Within 3 minutes of dome light operation: If all doors are closed after any door is opened, dome light and key light continue to work for 8 seconds, and then fade out.

2. Door status, dome light and key light control
   a. If any of doors is opened and remains open, dome light comes on for 3 minutes (fades in and fades out).
   b. Within 3 minutes of dome light operation: If another door is opened while one door remains open, dome light continues to come on for 3 minutes, and then fads out.
   c. Within 3 minutes of dome light operation: When the key is turned to ON, all doors are closed, dome light will fade out immediately.
   d. Within 3 minutes of dome light operation: When the key is turned to OFF or ACC and all doors are closed, dome light will fade out after 8 s; if the key is turned to IG ON within 8 s, dome light will fade out immediately.
3. Remote control key, dome light and key light control
   a. When BCM receives unlock signal from remote controller: No matter what status the door is in, dome light comes on for 15 seconds (fades in and fades out).
   b. Within 15 seconds of dome light operation: When the key is turned to ING ON, the dome light will fade out immediately.
   c. Within 15 s of dome light operation: When RF is fortified successful, dome light will come off immediately.
   d. Within 15 s of dome light operation: When any door is opened, dome light enters into mode 2.
4. Collision signal, dome light and key light control
   a. When the key is turned to IG ON, if CAN signal value is not “00”, BCM will illuminate dome light for 30 minutes. There is no fade-in process, including fade-out process.
   b. Within 30 minutes of dome light illumination: If key is switched to OFF, dome light will fade out immediately.
   c. Within 30 minutes of dome light illumination: If BCM receives RF key lock signal, dome light turns off immediately and there is no fade-out process.

Hint:

- Please turn rear dome light switch to door control gear to test above function logic.
- In any of above conditions (key insertion and removal, door status, remote control key) triggers dome light to come on, another event is triggered again, and dome light illumination time is reset.

Luggage Compartment Light

1. Luggage compartment light operating conditions: Luggage compartment is opened and luggage compartment light continuously turn on for 15 minutes.
2. Luggage compartment light is operating: Luggage compartment is closed and luggage compartment light turns off immediately.

Rear View Mirror Foot Light

1. Remote control and foot light function
   a. With key in OFF/ACC, perform unlock operation through key or remote function, foot light turns on for 15 seconds.
   b. In OFF status, BCM receives wireless fortifying/remote fortifying/PLG fortifying signal, and vehicle enters fortifying mode successfully, foot light turns on for 15 seconds.
   c. With key in ON or after counting down for 15 seconds, foot light turns off.
2. Foot light function controlled by door status signal
   a. With key in OFF/ACC/ON, open any door, BCM controls the foot light to turns on for 3 minutes.

b. Within 3 minutes of foot light operation: If another door is opened while one door remains open, foot light continues to come on for 3 minutes, and then fades out.
c. In OFF/ACC status, foot light comes on, four doors close, BCM controls foot light to come on for 8 seconds and then go off; Turn key to ON within 8 seconds after foot light is on, and foot light turns off immediately.
d. When ground light comes on, with IGN in ON condition, the ground light will go out immediately if four doors are closed.

Hint:

- When ground light comes on, BCM enters door condition signal control ground light logic if any door is opened.
- Ground light will not illuminate if back door is opened.
- When the ground light comes on, if BCM is fortified or unfortified, BCM enter remote control signal/ PEPS signal control ground light logic.

Window

1. Window activating conditions: Within 2 minutes since IGN ON or IGN switches away from ON position and both front doors were not opened; enable window switch
2. Window switch has 4 states
   a. Manual UP: When switch is in this position, window is moving up. When switch leaves this position, window stops;
   b. Manual DOWN: When switch is in this position, window is moving down. When switch leaves this position, window stops;
   c. Auto UP: When switch is in this position, window is moving up automatically until it stops due to block or position changed;
   d. Auto DOWN: When switch is in this position, window is moving down automatically until it stops due to block or position changed.
3. When window is operated under auto mode: Press corresponding window up or down switch again to stop the operation.
4. When window is operated under auto mode: For example, after 2 minutes which described in point 1, the operating window stops after finishing this operation.
5. When window is operated under manual mode: For example, after 2 minutes which described in point 1, the operating window stops immediately.
6. Within 2 minutes when key is in ACC or OFF: If any front door opens, window function is disabled.
7. When window disable switch is activated: Input of passenger side will be disabled; if the operating window is activated by switch of passenger side, it will stop immediately. When window disable switch cancel is activated, passenger side input disable is canceled and window disable indicator goes off
8. When key is in ACC or OFF: Window switch input will be invalid if any front door is opened (it is still invalid when closing the door after front door is opened); And if window is operating when front door is opened, stop the window immediately.
9. When engine starts, the operating window will stop immediately and it cannot resume after engine has started

PEPS ENGINE START STOP switch backlight control

1. When position light is on: BCM continuously sends CAN signal to illuminate PEPS backlight
2. When small light is off

a. The door status changes as follows:

- When any door is opened, BCM continuously sends CAN signal to turn on the backlight for 3 minutes, and then sends CAN signal after 3 minutes to turn off the backlight.
- Within 3 minutes of backlight illumination, if another door is opened, timing will restart again.
- In IGN-ON state, during 3 minutes of backlight illumination, if all doors are closed, backlight will be turned off after 3 seconds.
- In IGN-OFF/ACC status, within 3 minutes of backlight illumination, if all doors are closed, backlight will turn off after continuously turning on for 11 s.

b. PEPS SMART/RKE control:

- When BCM receives locking failure signal (regardless of door status) for 2 times, BCM continuously illuminates backlight for 18 s and then turn it off after 18 s.
- If key is switched to ON within 18 s, backlight will turn off immediately.
- If key LOCK signal is received within 18 s, backlight will be turned off immediately.
- If any door is opened within 18 S, it is performed according to door status control strategy.

Anti-theft Management

1. Fortifying mode
   a. Trigger conditions:
- IGN is in OFF (it is not in IGN ON or ACC)
- Four doors & two covers are closed;
- BCM receives remote control lock command.

   b. BCM feedback when fortifying mode is entered:
- Turn signal light flashes once (turn on for 500 ms) and sends the corresponding CAN signal;
- Theft deterrent indicator is continuous flash at frequency of 100ms, 1900ms.
- Actuate the anti-theft horn 50 ms and high and low pitched horns 15 ms.

2. Fortifying failure mode
   a. Trigger conditions:
- IGN is in OFF (it is not in IGN ON or ACC)
- Any of four doors & two covers is open;
- BCM receives remote control lock command.

   b. BCM light feedback when fortifying failure mode is entered:
- Turn signal light flashes two times (flashing for 500 ms, interval time is 1s) and sends the corresponding CAN signal.

   c. When entering fortifying failure mode:
- If four doors are closed and any of the two covers is opened, BCM will perform central control lock once;
- If two covers are closed and any of the doors is opened, BCM will perform central control lock then unlock (the interval time is 500 ms)

3. Intrusion mode
   a. Trigger conditions: BCM will enter to alarm status after the following conditions are met when the vehicle is in fortifying mode:
- Doors or engine hood is opened;
- Key is turned to IGN ON;
- Luggage compartment is opened forcibly.

b. After entering to intrusion mode, BCM feedback the conditions within one alarm cycle (30 s):

- Anti-theft horn (high and low pitched horns sound at frequency of 500 ms ON and 500 ms OFF) operates for 28 ± 2s, pause for 5s;
- Left and right turn signal lights flash 28s at frequency of 75 times/min (400 ms on, 400 ms off) and pause for 5s, and send the corresponding signals;
- Anti-theft indicator continuously flashes at frequency of 100 ms on, 200 ms off, 100 ms on, 600 ms off.

c. All doors, engine hood, luggage compartment and IGN ON illegal activation action are alarm trigger sources:

- In the same alarm source, a single trigger source can trigger 3 alarm cycles at most;
- In multiple alarm trigger sources, BCM can trigger 8 alarm cycles at most (after 8 alarm cycles, the sound and light alarm will stop);
- If the intrusion ends, BCM will stop alarm after the current alarm cycle. If the same alarm source is triggered again after the alarm is over, BCM will perform the remaining alarm cycles.
- If the four doors & two covers are closed at the end of the alarm, BCM will enter fortifying mode.

4. Fortifying deactivation mode
   a. Activation conditions: vehicle is in alarm mode; BCM receives RF unlock command or BCM detects signals for 1 s continuously after 2 s when the key is switched to IGN ON.
   b. When the alarm is released: vehicle exits anti-theft function mode; anti-theft horn (high and low pitched horns (if equipped)) stops working, and the turn signal light stops flashing.
   c. After alarm is released, if key is not in IGN ON, anti-theft indicator light still flashes at a frequency of 100 ms on, 200 ms off, 100 ms on and 600 ms off; if the key is in IGN ON, anti-theft indicator light stops flashing.
5. Re-fortifying mode
   a. Trigger conditions:

- Vehicle is in fortifying mode;
- BCM receives remote control unlock command.

   b. BCM feedbacks when fortifying mode is released.

- Theft deterrent indicator turns off immediately;
- Turn signal light flashes 2 times at frequency of 500 ms on and 500 ms off, and sends the corresponding CAN signals.

   c. Within 30 ± 2 seconds after fortifying mode is released:

- If any of all doors, engine hood or luggage compartment are open, BCM exits anti-theft mode;
- If all doors, engine hood and luggage compartment are always closed, BCM will lock automatically and enter the fortifying state after 30 s, and anti-theft indicator will flash at the frequency of 100 ms on and 1900 ms off.

6. Luggage compartment opening mode
   a. Trigger conditions:

- Vehicle is in fortifying mode;
- BCM receives the remote control luggage compartment open command for more than 1.5 s.

   b. BCM feedback when luggage compartment opening mode is triggered:

- Turn signal light illuminates for 1 s and sends the corresponding signals.
- Luggage compartment is open and no alarm is triggered.

   c. Then close the luggage compartment, vehicle returns to the fortifying state, and if there is no legal key, the luggage compartment switch cannot open luggage compartment.
   d. After using remote control to open the luggage compartment: After BCM receives remote control lock command, vehicle will immediately lock and return to fortifying state, but the turn signal light prompts fortifying failure.

e. After using remote control to open the luggage compartment and close it again: After BCM receives remote control lock command, vehicle will immediately lock and return to fortifying state, but the turn signal light prompts fortifying successfully. If there is no registered key after the luggage compartment closed, the switch will not open the luggage compartment.

Luggage Compartment Opening Management (without PLG)

1. When the central control lock is in unlock state
   a. When the luggage compartment opening switch is activated, the luggage compartment opens.
2. When the central control lock is in lock state
   a. Luggage compartment is opened

- IGN OFF;
- BCM receives RF open trunk command for more than 1.5s.
- Turn signal light illuminates and sends CAN signals to open trunk;

3. After luggage compartment is opened by remote control, close it manually, if there is no registered key (PKE), the luggage compartment will not open by the luggage compartment button.

CAUTION

- When luggage compartment is opened, the luggage compartment light turns on.
- When luggage compartment is opened, the actuate time of motor is 200 ms.
- When the vehicle speed reaches 10km/h, the luggage compartment will not be opened (please note that the ignition remains in IGN while testing - BSM is 15 nodes).

Luggage Compartment Opening Management (with PLG)

1. When vehicle is in fortifying deactivation mode
   a. When trunk switch is activated, trunk opens/closes; Turn signal light flashes twice with a frequency of 200 ms ON - 200 ms OFF.
   b. During back door opening/closing, short press remote controller to stop back door at current position.
   c. With global fortifying, BCM performs vehicle fortifying after trunk closer switch is pressed and the following conditions are met:

- IGN OFF;
- Four doors and engine hood are closed;
- Back door is locked within 10 s.

2. When vehicle is in fortifying deactivation mode
   a. Luggage compartment is open/closed

- IGN OFF/ACC position.
- BCM receives remote control trunk command for more than 1.5 s with turn signal light flashing twice at a frequency of 200 ms on - 200 ms Off.
   b. During back door opening/closing, short press remote controller to stop back door at current position.
   c. After back door is closed, the vehicle returns to fortifying state.

Door, Hood and Luggage Compartment Door Status

1. BCM sends CAN signal to open/close front left door.
2. BCM sends CAN signal to open/close front right door.
3. BCM sends CAN signal to open/close rear left door.
4. BCM sends CAN signal to open/close rear right door.
5. BCM sends CAN signal to open/close engine compartment cover
6. BCM sends CAN signal to open/close trunk.

Central Control Lock

1. Central control lock activation conditions

- Close all four doors;
- Vehicle is not in anti-theft state;
- Central control lock locked switch is activated.

2. Central control unlock activation conditions

- Central control lock unlocked switch is activated;
- Vehicle is not in anti-theft state.

3. Mechanical lock locked/unlocked activation conditions

- Central control lock or mechanical lock locked switch is activated;
- Vehicle is not in anti-theft state.

4. Auto unlock (if equipped) activation conditions

- Vehicle speed is 0 km/h;
- Door lock is locked;
- Key is switched to OFF from other positions.

Hint:
The bench testing needs to ensure that there is no speed signal after IGN is turned off.

5. Collision unlock

- After BCM receives CAN signal when IGN ON: BCM performs central control unlocking twice and the interval time is 1 s (regardless of the door state); locking is prohibited; key is switched to OFF, prohibit locking is canceled.

CAUTION
• BCM receives unlocking or locking command twice in 1 second and the second time will be ignored. • BCM is powered on again after powered off, BCM has no lock or unlock action. • For remote control lock and unlock function, please refer to lock and unlock contents in anti-theft management.

Front Wiper Control

1. Low speed wiper mode (Note: Wiper switch)
   a. Activation conditions: IGN ON; low speed range switch of the wiper is activated.
   b. When low speed wiper is operating: When wiper switch is switched to other operation mode, the wiper will work in other modes immediately.
   c. When wiper switch is switched to OFF from low speed range, the wiper will operate at low speed automatically until it returns to wiper stop position (whether it is IGN ON or not).
2. High speed wiper mode
   a. Activation conditions: IGN ON; high speed range switch of the wiper is activated.
   b. When high speed wiper is operating: When wiper switch is switched to other operation mode, the wiper will work in other modes immediately.
   c. When wiper switch is switched to OFF from high speed range, the wiper will operate at low speed automatically until it returns to wiper stop position (whether it is IGN ON or not).
3. Intermittent wiper mode (without rain sensor)
   a. Activation conditions: IGN ON; wiper intermittent/automatic switch is activated.
   b. There are 4 gear positions on wiper sensitivity switch: 13 s, 8 s, 4 s, 2 s.

c. When the intermittent wiper activation status switches intermittent time to other gear positions, the operation status of wiper is as below:

- When new time interval is shorter than the original one: If wiper is in pause status, wiper will operate at new interval at once; If wiper is in moving status, wiper will operate at new interval since it is paused.
- When new time interval is longer than the original one: If wiper is in pause status, wiper will operate in new intermittent since it is paused at the next time after completing the current cycle; If wiper is in moving status, wiper will operate at new interval since it is paused.

4. Auto wiper (with rain sensor)
   a. With switch in Auto, BCM receives LIN signal sent from rain sensor, and drives wiper to operate.
   b. Once LIN signal S_AUTO_H is received, high speed wiper operates.
   c. Once LIN signal S_AUTO_L is received, low speed wiper operates.
   d. When LIN signal is interrupted or ignition key is out of ON position, if wiper is not in Park position, it will continue to operate until reaching Park position.
   e. Operation stops during ignition and restores when ignition is finished.

Front Washer Control

1. Front washer operation condition: IGN ON
2. Front washer operation will keep on outputting when front washer is activated
3. Washing starts operating after IGN-CRANK stops operating and resumes operating after starting
4. When front washer operation is over

- When wiper switch is in OFF position, wiper will operate for 3 cycles at low speed, and it operates for 1 cycle again after 6 ± 0.2 seconds; If BCM receives new front washer operation requirements during 3 cycles and 6 seconds of this wiper, wiper will perform new operation.
- When wiper is in intermittent mode, wiper will operate for 3 cycles at low speed, and then it keeps the intermittent mode.

Rear Wiper Control

1. Activation conditions: IGN ON; rear wiper is activated
2. During rear wiper is operating, if rear wiper switch is turned to OFF and rear wiper is not in Stop position, rear wiper will continue to operate until it stops at stopping position
3. During rear wiper is operating, if ignition key is turned to ON and rear wiper is not in Stop position, rear wiper will continue to operate until it stops at stopping position
4. During rear wiper operation, the rear wiper when engine starts, and resumes operating after engine has started.
5. When BCM judges front wiper is opened and reverse gear is input, rear wiper operates automatically with interval of 4 s. When either front wiper or reverse gear is closed, rear wiper stops.

Rear Washer Control

1. Rear washer operation condition: IGN ON
2. Rear washer operation will keep on outputting when front washer is activated
3. Rear washing starts operating after IGN-CRANK stops operating and resumes operating after starting
4. When rear washer operation is finished

- When wiper switch is in OFF position, wiper will operate for 3 cycles at low speed; If BCM receives new rear reset operation requirements during 3 cycles, wiper will perform new operation.
- When wiper is in sweeping mode, wiper will sweep in original condition and continue to keep original condition after washer switch is released.

Back-up Light Control

1. Back-up light operating conditions: IGN in ON
2. After receiving reverse switch signal or CAN signal sent from TCU, BCM turns on backup light.
3. If there is no switch signal and CAN signal, it will turn off back-up light.

Key Status Position Signal

1. BCM sends the corresponding KeySts according to the actual location of the key
2. The continuous activation time is up to 10 s when engine starts, and KeySts is sent after 10s. If ACC and ON positions change, BCM sends the corresponding key KeySts according to the actual position of key.

Sudden Braking Hazard Warning Light Alarm Function

1. If the following conditions are met, hazard warning light is activated (CAN signals of left/right turn signal light, indicator light and turn signal light flash at frequency of 140 ms on/140 ms off)

- The key position is in ON position.
- CAN signal sent from ESP is received.

2. If any of following conditions is met, stop the hazard warning light (left/right turn signal light, indicator light and turn signal light CAN signal) flashes

- CAN signal sent from ESP is received;
- Key position is in OFF position.

CAUTION
• When hazard warning light of this function is operating, operate hazard warning light switch, this function stops immediately. • During this operation, BCM receives collision signal and function stops immediately.

Assist Steering Illumination

1. When following conditions are met, turn on the fog light auxiliary light function

- Key position is in ON position.
- The turn signal light turns on or steering column rotates by 45° or more.
- Low beam light turns on.
- Vehicle speed is less than 40km/h.

2. When any of following conditions is met, turn off the fog light auxiliary light function

- Key position is in ACC or OFF position.
- Turn signal light turns off and steering column is turned by less than 10°.
- Low beam light turns on.
- Vehicle speed is less than 40km/h.

3. When fog light auxiliary light is activated, meter indicator is not activated
4. This function can perform a on-line configuration.

Brake Light Control

1. When any of following conditions is met, turn on the brake light function.

- When brake switch is pressed, brake switch is a high level self-locking switch;
- CAN signal sent from EPB is received;
- CAN signal sent from ESP is received.

2. When brake light function is turned on, left and right brake lights and high mounted stop light turn on at the same time.
3. When all the above conditions are not met, left and right brake lights and high mounted stop light turn off simultaneously.

Rear View Mirror Folding

1. The switch is point contact type. Press the folding switch, the mirror is automatically folded, and press it again, the mirror is automatically unfolded

2. When it is powered on again after powered off, BCM stores the switch state before powered off
3. When the vehicle speed is greater than 10km/h, the folding function is shielded and the unfolding function works
4. When the vehicle is in Crank, the unfold/fold function is paused and the function is restored after crank is finished

DVD Settings

1. Daytime running light function

- DVD setting is ON to turn on the daytime running light function; DVD setting is OFF to turn off the daytime running light function.

2. Fortifying prompt

- DVD is set to Light, turn signal light flashes once and horn does not sound when it is fortified;
- DVD is set to Horn, horn sounds and turn signal light does not flash when it is fortified;
- DVD setting is light and Horn that turn signal light flashes and horn sounds when it is fortified.

3. Auto lock

- DVD is set to ON to turn on the auto lock function; DVD setting is OFF to turn off the auto lock function.

4. Headlight delay

- DVD is set to On to turn on the headlight delay function; DVD is set to off to turn off the headlight delay function.

5. Rear view mirror folding

- DVD is set to On to turn on the rear view mirror folding function; DVD is set to off to turn off the rear view mirror folding function.

Remote Control Function

1. Remote fortifying mode
   a. Trigger conditions:

- IGN is in OFF (it is not in IGN ON or ACC)
- Four doors & two covers are closed;
- BCM receives remote fortifying command.

   b. BCM feedback when fortifying mode is entered:

- Turn signal light flashes once (turn on for 500 ms) and sends the corresponding signal;
- Theft deterrent indicator is continuous flash at frequency of 100ms, 1900ms.
- Actuate the anti-theft horn 50 ms and high and low pitched horns 15 ms.

2. Remote fortifying deactivation mode
   a. Trigger conditions:

- IGN is in OFF (it is not in IGN ON or ACC)
- Four doors & two covers are closed;
- BCM receives remote fortifying command.

   b. BCM feedback when remote fortifying deactivation mode is entered:

- BCM performs fortifying deactivation, four doors and luggage compartment unlocks and left/right turn signal lights flash twice (500 ms on and 500 ms off, continuous for two times)

3. Remote open luggage compartment mode
   a. Trigger conditions:

- Key position is in OFF;
- BCM receives remote open luggage compartment command.

b. BCM feedback when luggage compartment opening mode is triggered:

- Turn signal light illuminates for 1 s and sends the corresponding signals.
- Trunk is open to start motor and no alarm is triggered.

4. Remote car location mode
   a. Trigger conditions:

- IGN-OFF/IGN-ACC;
- BCM receives car location function command.
  b. BCM feedback when remote start mode is entered
- High and low pitched horns sound 3 s, left and right turn signal lights flash 3 s and low beam light turns on 15 s.

5. Remote start mode
   a. Trigger conditions: BCM receives PEPS signal
   b. BCM feedback when remote start mode is entered

- Anti-theft alarm function caused by ON gear position is shielded, but caused by four doors, engine hood and back door is not shielded.
- After BCM shields the alarm, it sends signals (CAN1) to PEPS and (CAN2) to CLM (when PEPS receives the signals, it will control the vehicle to start).
- After BCM receives engine state signal, it will turn on position light and send signals.
  c. Exit remote start mode: Turn the key to OFF position
  d. BCM feedback when remote start mode is exited:

- BCM will not shield the anti-theft alarm caused by ON gear position.
- BCM sends signals.

LIN Ambient Light

1. Initial status

   - When vehicle rolls from the line and powered on for the first time or vehicle battery is powered on again after disconnection, ambient light function default is on, and it turns on/off according to DVD setting.

2. Ambient light turns on / off
   a. When all the following conditions are met, BCM sends LIN signals (ambient light ON)

- The position light output is in activated condition.
- DVD setting is ON.
  b. Position light output is deactivated or DVD setting is OFF, ambient light turns off.

3. Door control logic related to ambient light
   a. When all the following conditions are met, BCM sends LIN signals (ambient light ON)

- Position light output is not activated.
- Vehicle is in fortifying deactivation mode.
- Any door is opened.
- DVD setting is ON.
  b. Ambient light turns on for 3 minutes
  c. Close all doors within 3 minutes after ambient light comes on, and the light turns off after 8 seconds delay
  d. Open any other door within 3 minutes after ambient light is turned on, then count again for 3 minutes after the last door is opened

e. When the position light output is not activated, if any condition is met, BCM will immediately send LIN signal (ambient light turns off)
   - The vehicle is fortified successfully.
   - DVD settings are turned off.

4. Ambient light color
   a. After the vehicle is powered on first time after leaving production line or powered on after battery is disconnected and reconnected from vehicle, the related driving mode is OFF by default. Then turn on/off according to DVD settings.
   b. When the related driving mode is OFF: Ambient light colour is blue by default, then choose different colour according to DVD settings.
   c. When related driving mode is turned on
      - In ECO mode, ambient light illuminates in green.
      - In SPORT mode, ambient light illuminates in red.
      - In NORMAL mode, ambient light illuminates in blue.
5. Ambient light brightness (musical rhythm)
   a. Initial status
      - When vehicle rolls from the line and powered on for the first time or vehicle battery is powered on again after disconnection, musical rhythm mode default is off.
   b. When musical rhythm mode is off: Ambient light brightness is Level 3, and different levels can be selected according to DVD setting.
   c. When musical rhythm mode is on: According to different brightness level signals sent from IHU, it changes levels from zero with the musical rhythm

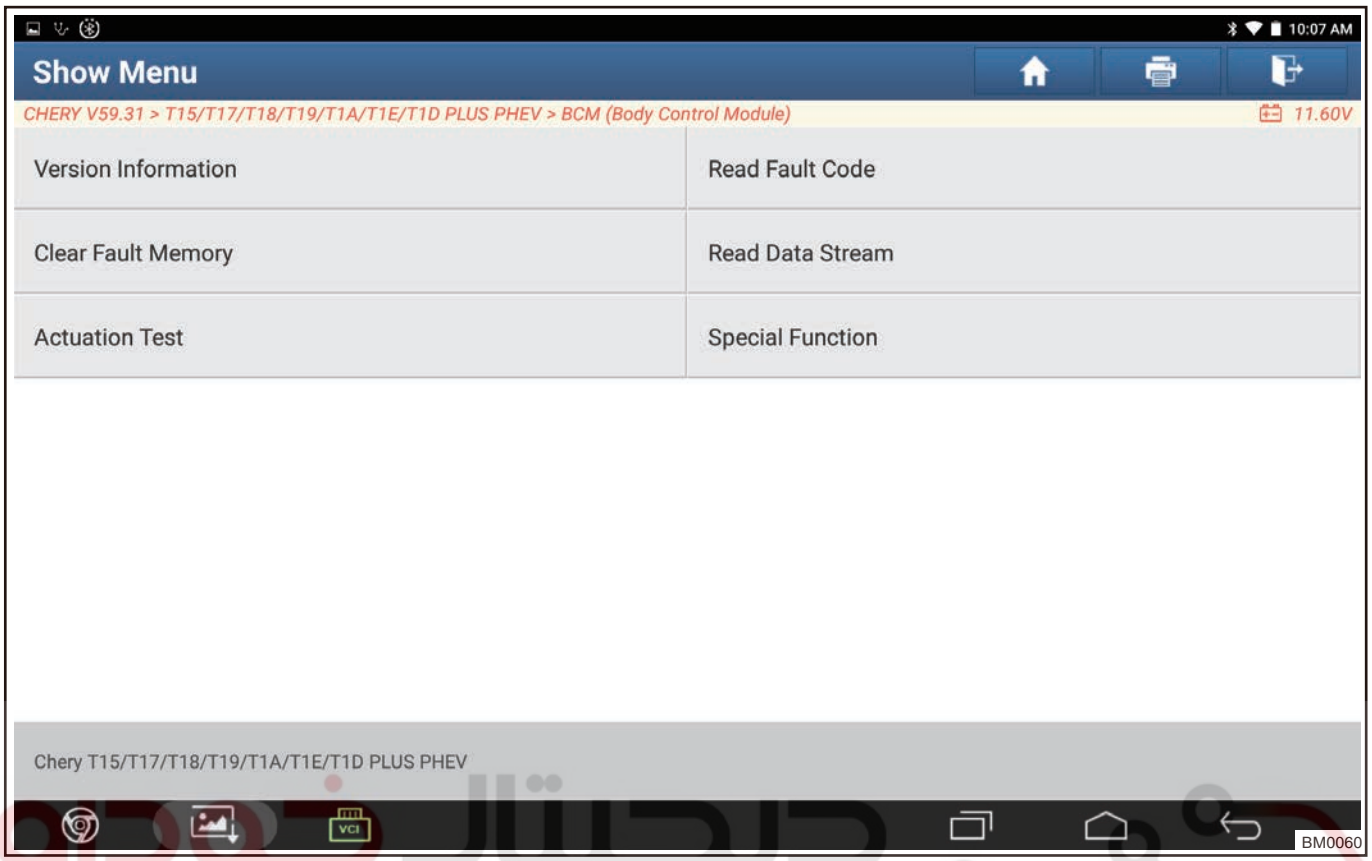
Matching Learning

Software configuration information writing

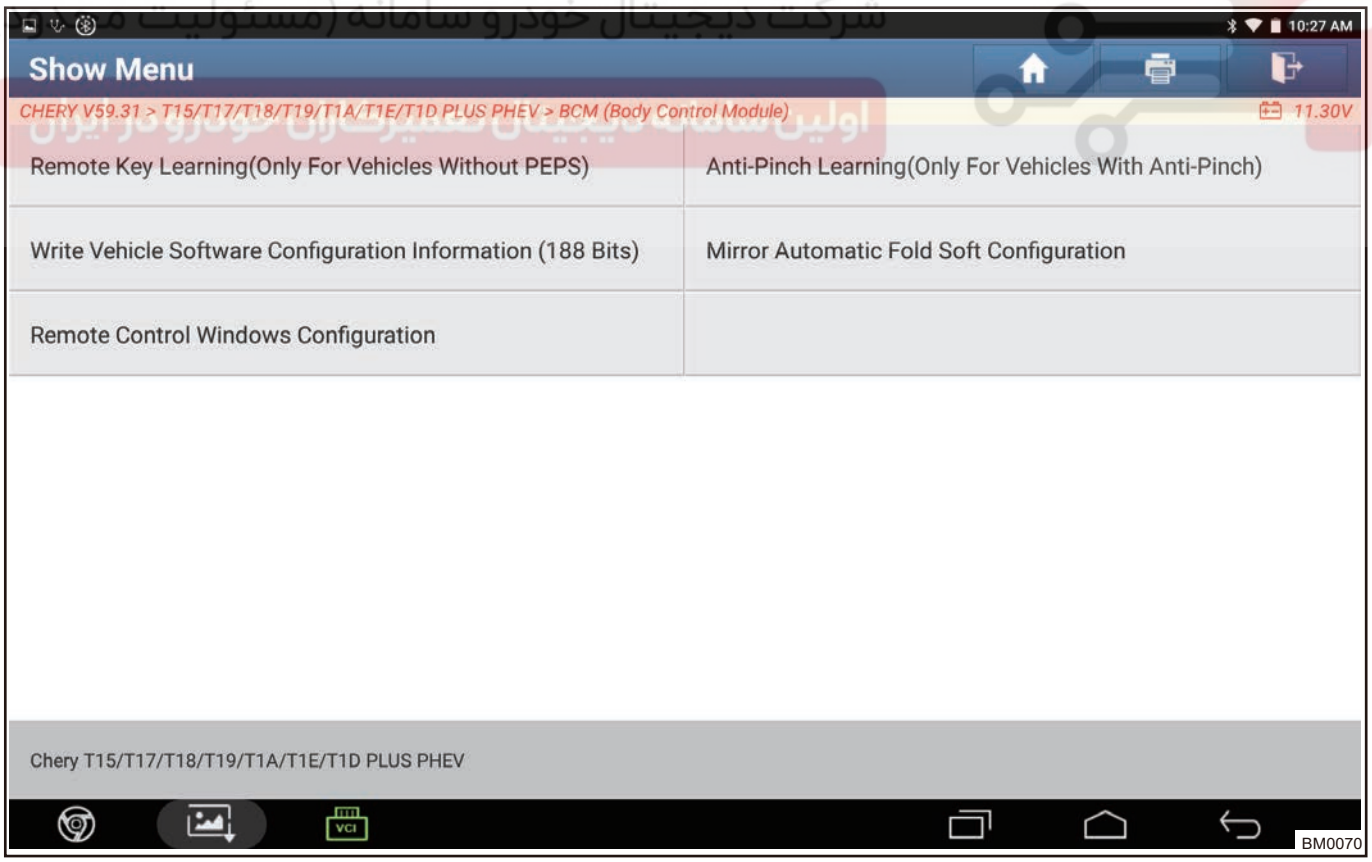
CAUTION

- Write the configuration code after replacing BCM with a new one.
- If it is a non-PEPS model and has engine immobilizer configuration, it needs to be configured for anti-theft matching and then for remote control matching, if it is a PEPS model, there is no need to do the operation in this step.
- Perform tire pressure sensor learning if the vehicle has a tire pressure configuration.
- Perform jam protection learning if the vehicle has a window jam protection configuration.

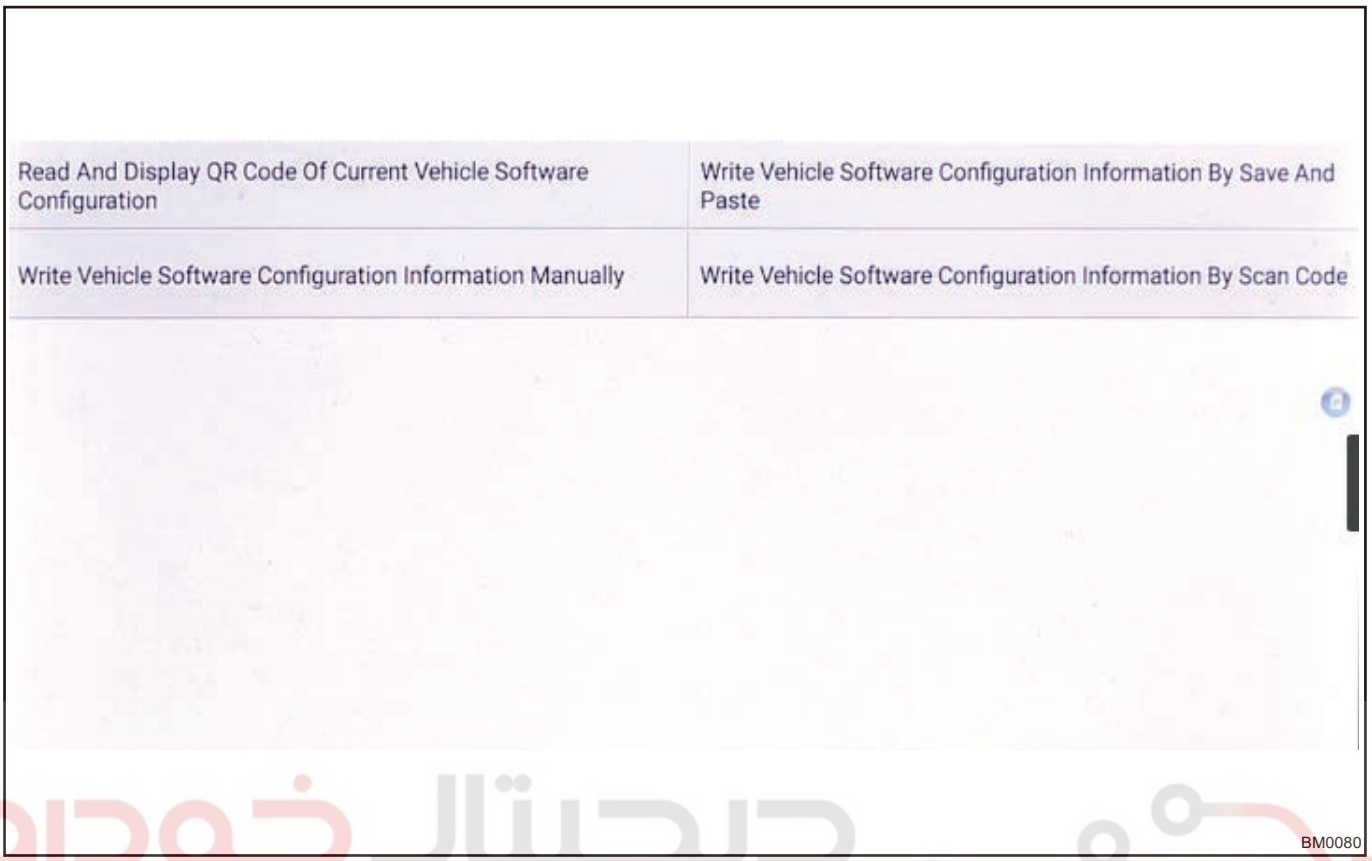
1. Use the diagnostic tester to connect the vehicle to enter the system. Click Body Control Module (BCM).
2. Click Special Function.



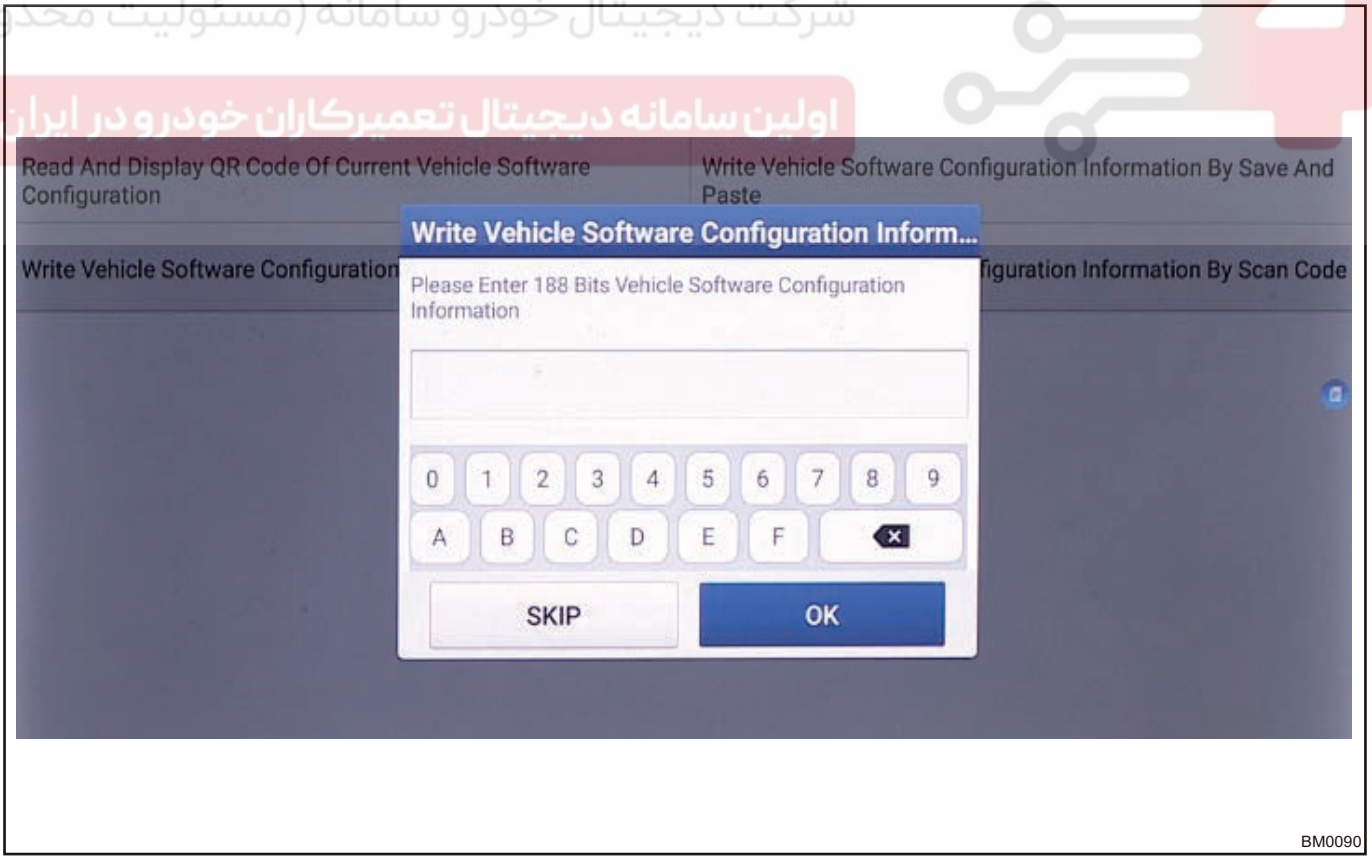
3. Click “Write Vehicle Software Configuration Information”.



4. Click “Write Vehicle Software Configuration Information Manually”.



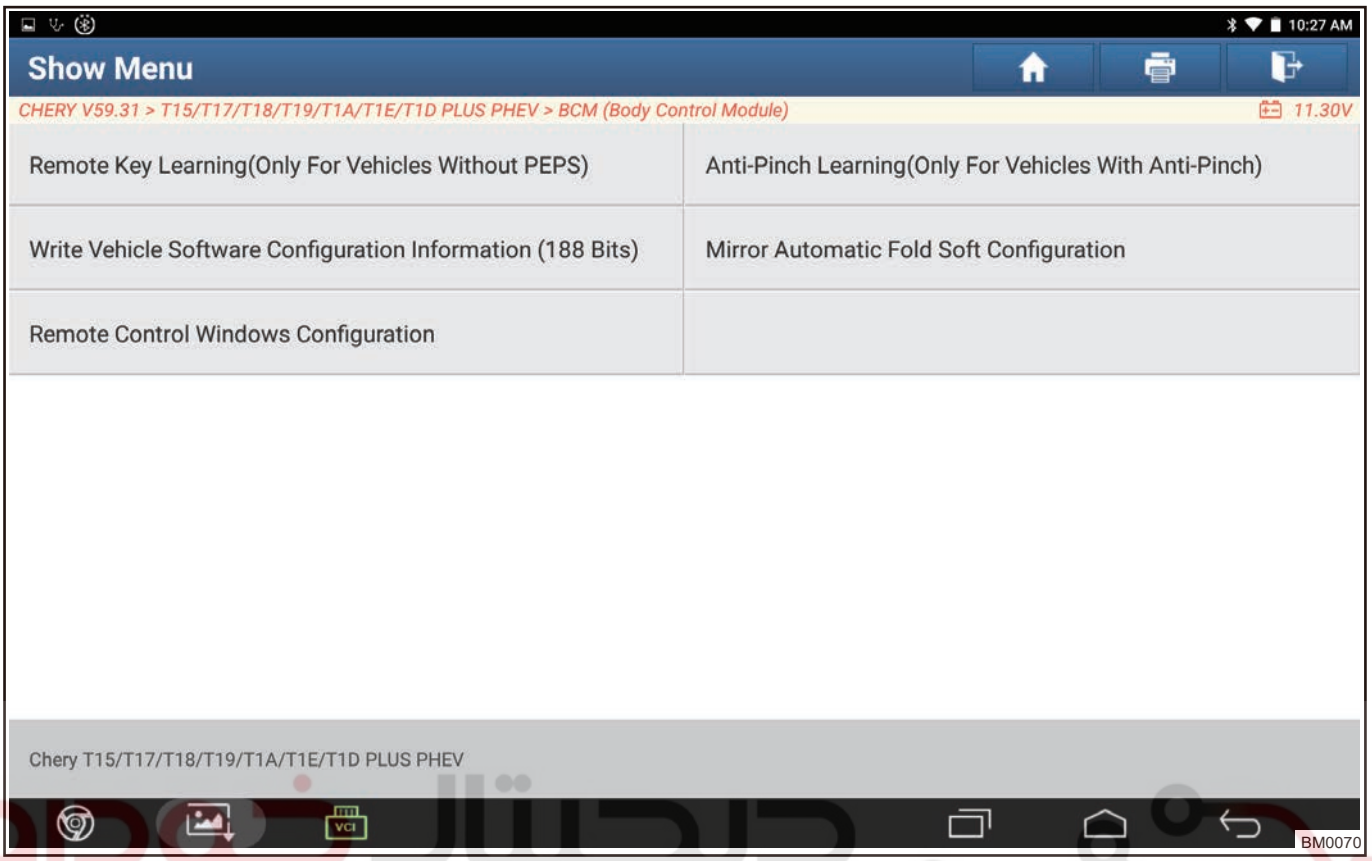
5. Enter software configuration information according to prompt, and click “OK”.



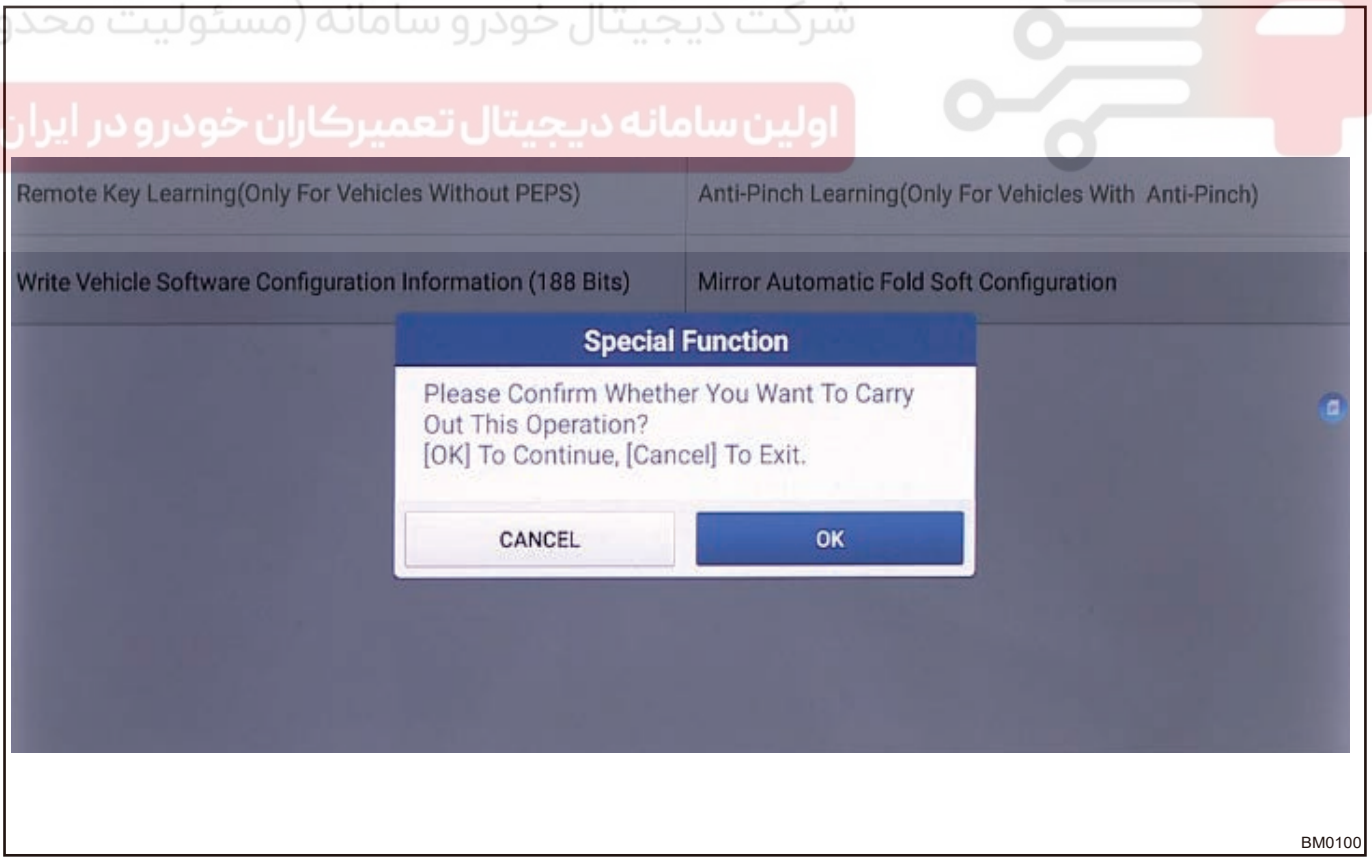
Jam Protection Learning

1. Use the diagnostic tester to connect the vehicle to enter the system. Click Body Control Module (BCM).
2. Click Special Function.

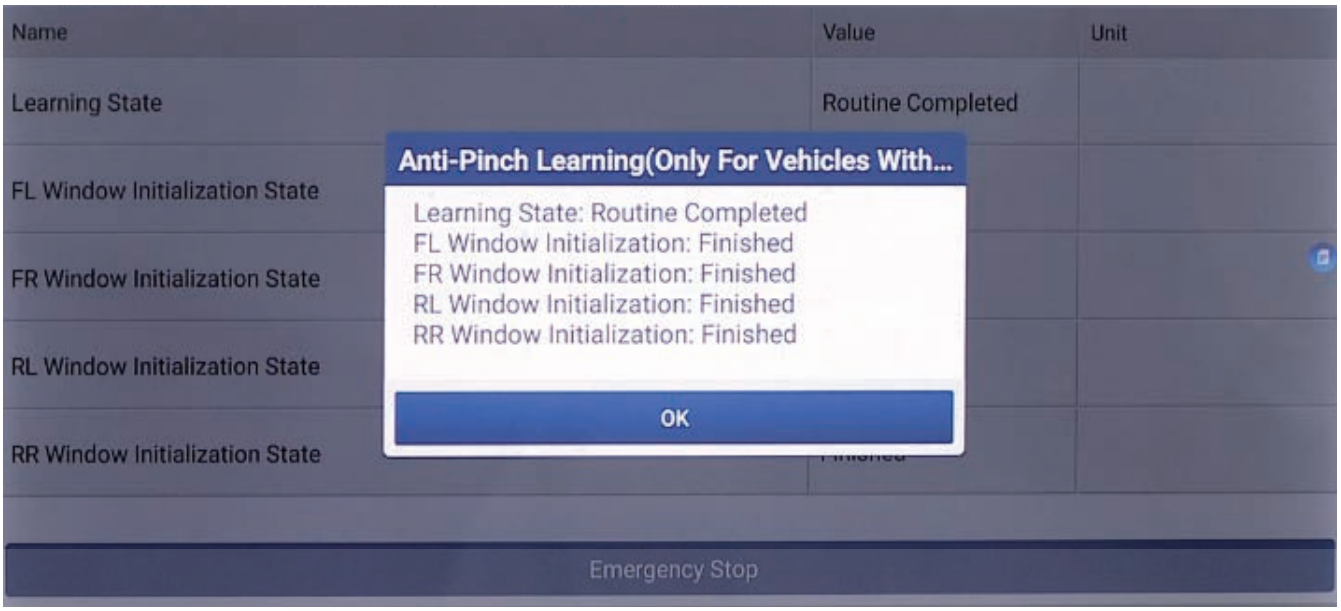
3. Click “Jam Protection Learning”.



4. Click “OK”.



5. After self-learning is finished, click “OK”.



BM0110

Problem Symptoms Table

Symptom	Probable Cause and Recommended Countermeasures
Remote controller failure or distance of remote control is close	(For PEPS model, remote controller failure has nothing to do with BCM. BCM cannot be replaced) • Battery voltage of remote controller is low - Replace the battery. (Voltage of new replaced battery should be more than 2.9 V), it needs to rematch • Metallic films are attached to windows, which causes signal to be shielded and vehicle is malfunctioning without any reason. Peel off the metallic films to solve the problem. • There is electromagnetic interference. Perform the test at another place. • If remote controller is damaged, replace and rematch it.
Rear defroster does not operate	Refer to operation principle (control logic). Check the input and output signal. For diagnosis, please refer to “Perform Diagnosis According to Symptoms”
Turn signal light does not come on	
Small light does not come on	
High beam light does not come on	
Fog light does not come on	

Symptom	Probable Cause and Recommended Countermeasures
Daytime running light does not come on	
Glass cannot raise up and down	
Door lock cannot lock/unlock/luggage compartment cannot open	
Wiper washer dose not operate or operate abnormally	
Only horn alarms or only turn signal light flashes when it fortifies	It can be set on DVD/navigation interface, refer to On-vehicle Service section

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect airbag components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- 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 operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously 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 contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnostic Trouble Code (DTC) Chart

DTC	Description	Fault Type
B1000-16	Power Supply	Power Supply Circuit Voltage Below Threshold
B1000-17		Power Supply Circuit Voltage Above Threshold
B1001-11	Left Side Turn Lamp Control Circuit	Output Short to Ground
B1001-13		Circuit Open
B1002-11	Right Side Turn Lamp Control Circuit	Output Short to Ground
B1002-13		Circuit Open
B1005-11	Front Park Light Output Control Circuit	Output Short to Ground
B1005-13		Circuit Open
B1006-11	Rear Park Light Output Control Circuit	Output Short to Ground
B1006-13		Circuit Open
B1008-11	Rear Fog Light Control Circuit	Output Short to Ground
B1008-13		Rear Fog Control Circuit Open
B1008-71		Actuator Stuck
B1009-71	Rear Wiper Control Circuit-Actuator Stuck	Actuator Stuck
B100C-13	Front Left Window Up Control Circuit-Actuator Stuck	Rear Fog Control Circuit Open
B100C-71		Actuator Stuck
B100D-13	Front Left Window Down Control Circuit-Actuator Stuck	Rear Fog Control Circuit Open
B100D-71		Actuator Stuck
B100E-13	Front Right Window Up Control Circuit-Actuator Stuck	Rear Fog Control Circuit Open
B100E-71		Actuator Stuck
B100F-13	Front Right Window Down Control Circuit-Actuator Stuck	Rear Fog Control Circuit Open
B100F-71		Actuator Stuck
B1010-13	Rear Left Window Up Control Circuit-Actuator Stuck	Rear Fog Control Circuit Open
B1010-71		Actuator Stuck
B1011-13	Rear Left Window Down Control Circuit-Actuator Stuck	Rear Fog Control Circuit Open
B1011-71		Actuator Stuck

DTC	Description	Fault Type
B1012-13	Rear Right Window Up Control Circuit-Actuator Stuck	Rear Fog Control Circuit Open
B1012-71		Actuator Stuck
B1013-13	Rear Right Window Down Control Circuit-Actuator Stuck	Rear Fog Control Circuit Open
B1013-71		Actuator Stuck
B1016-71	Rear Washer Control Circuit-Actuator Stuck	Actuator Stuck
B1017-71	Front Washer Control Circuit-Actuator Stuck	Actuator Stuck
B101D-11	Siren Output Control Circuit	Output Short to Ground
B1024-71	Trunk Lock Control Circuit	Actuator Stuck
B1027-11	Battery Saver Output Control Circuit	Output Short to Ground
B101E-11	L-DRL Control Circuit	Output Short to Ground
B101E-13		Circuit Open
B101F-11	R-DRL Control Circuit	Output Short to Ground
B101F-13		Circuit Open
B1035-11	Brake Light Control Circuit	Output Short to Ground
B1035-13		Circuit Open
B1036-11	H-Brake Light Control Circuit	Output Short to Ground
B1036-13		Circuit Open
B1021-17	Anti-pinch Module Power Supply	Circuit Voltage Above Threshold
B1021-16	Anti-pinch Module Power Supply	Circuit Voltage Below Threshold
B1022-71	FL Window Button-Actuator Stuck	Actuator Stuck
B1023-71	FR Window Button-Actuator Stuck	Actuator Stuck
B1033-71	RL Window Button-Actuator Stuck	Actuator Stuck
B1025-71	RR Window Button-Actuator Stuck	Actuator Stuck
B1026-71	Passenger FR Window Button-Actuator Stuck	Actuator Stuck
B1034-71	Passenger RL Window Button-Actuator Stuck	Actuator Stuck
B1028-71	Passenger RR Window Button Short-Actuator Stuck	Actuator Stuck
B1029-71	FL Window Relay-Actuator Stuck	Actuator Stuck

DTC	Description	Fault Type
B102A-71	FR Window Relay-Actuator Stuck	Actuator Stuck
B102B-71	RL Window Relay-Actuator Stuck	Actuator Stuck
B102C-71	RR Window Relay-Actuator Stuck	Actuator Stuck
B102D-96	Anti-pinch Module Controller-Component Internal Failure	Component Internal Failure
B102E-86	FL Window Motor Position Signal-Signal Invalid	Actuator Stuck
B102F-86	FR Window Motor Position Signal-Signal Invalid	Actuator Stuck
B1030-86	RL Window Motor Position Signal-Signal Invalid	Actuator Stuck
B1031-86	RR Window Motor Position Signal-Signal Invalid	Actuator Stuck
B1032-87	Lost Communication With Anti-pinch Module MCU-Missing Message	Network Malfunction
B1039-11	NTC Intput Circuit / Reversing Lamp Control Circuit	Output Short to Ground
B1039-13		Circuit Open
B103A-62	Signal Compare Failure	Network Malfunction

Malfunction Diagnosis Repair Flow

CAUTION
When reading DTCs, some DTCs are not related to trouble symptom. And these functions are normal and not affect vehicle use, clear them.

1. Check if DTC occurs again

- If malfunction does not occur, check and repair the suspected wire harness and electrical connector. Proceed to the next step if malfunction occurs again.

2. Check for DTCs

- Perform reading to check whether there is any DTC. Proceed to the diagnostic procedures based on malfunction symptoms when there is no DTC. Proceed to the next step when DTC is found:

3. Clear and read DTCs again

- Record DTCs and clear them. Perform test and read DTC again to check whether there is any DTC. Proceed to the diagnostic procedures based on malfunction symptoms when there is no DTC. Proceed to the next step when DTC related to malfunction symptom is found.

4. Deal with the malfunction symptom according to DTC
5. After inspection and repair, perform test again according to DTC strategy

- Check and repair it again if malfunction has not been solved.

6. After malfunction has been solved, prevent the malfunction from reoccurring according to malfunction causes.

7. Malfunction diagnosis ends.

Trouble Symptom Diagnosis

CAUTION
• If a function of BCM is failed, but there is no DTC, perform diagnosis according to trouble symptom. • This diagnosis needs to combine with control logic (see Operation section). Check input/output signal of BCM for normal operation. If input/output is normal, there is a malfunction in BCM. Otherwise, check the input or output part.

1. Check if DTC occurs again

• If malfunction does not occur, check and repair the suspected wire harness and electrical connector. Proceed to the next step if malfunction occurs again.

2. Check if power supply and ground of controller are normal

• If it is abnormal, repair the power supply and ground based on the electronic diagram. Proceed to the next step if it is normal.

3. According to the control logic, read related data stream with diagnostic tester and check if it is normal

• If it is abnormal, repair the related input signals based on the circuit diagram. Proceed to the next step if it is normal.

4. Perform operation test using diagnostic tester to see if there is any related operations performed by diagnostic tester.

• If it is normal, input part has no malfunction. Otherwise, proceed to the next step.

5. Check if actuator is normal.

• If result is abnormal, check and repair actuator.

6. If above diagnostic results are normal, replace BCM

ON-VEHICLE SERVICE

Body Control Module

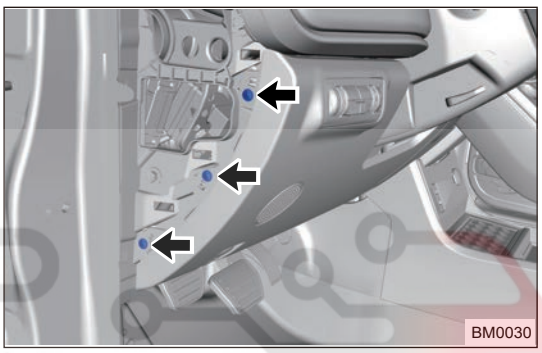
Removal

Hint:

- Before replacing BCM, read configurations of the original software. After replacing it, write the original configuration codes.

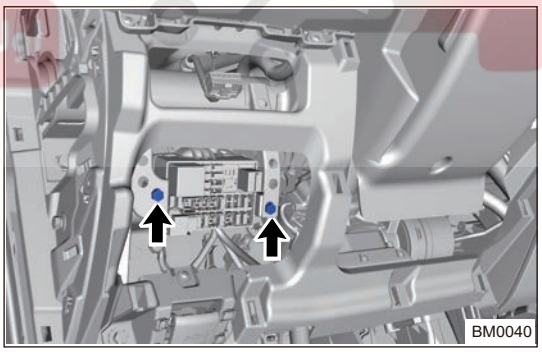
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the body control module.
   a. Remove the instrument panel left end panel assembly.
   b. Remove 3 fixing screws (arrow) from instrument panel lower left protector assembly.

Tightening Torque
1.5 ± 0.5 N m



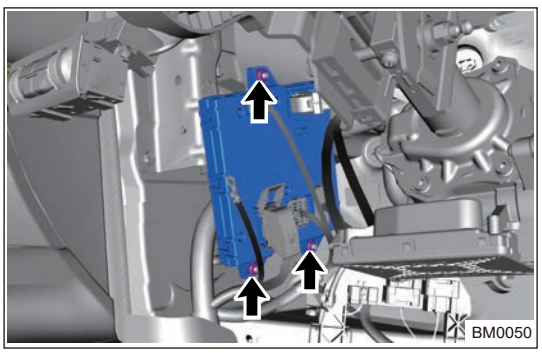
   c. Remove the instrument panel left lower protector assembly.
   d. Remove 2 bolts from instrument panel fuse and relay box, and move away instrument panel fuse and relay box.

Tightening Torque
7 ± 1 Nm



   e. Detach the BCM wire harness connector, remove bolts from BCM and then remove BCM.

Tightening Torque
5 ± 1 N·m



Installation

1. Installation is in the reverse order of removal.