
SEAT

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54.1 Warnings and Precautions

1 Precautions

Precautions for Seat Assembly

- (1) The whole set of seat fabric has no obvious wrinkles and wear caused by installation;
- (2) It is not necessary to remove the plastic protective film provided by the seat during the assembly process so as to protect the seat;
- (3) Assembly methods of driver seat and front passenger seat are the same, and there is no difference in the assembly methods of all configured seats. It should be noted that the wire harness installation methods are different in each configuration.

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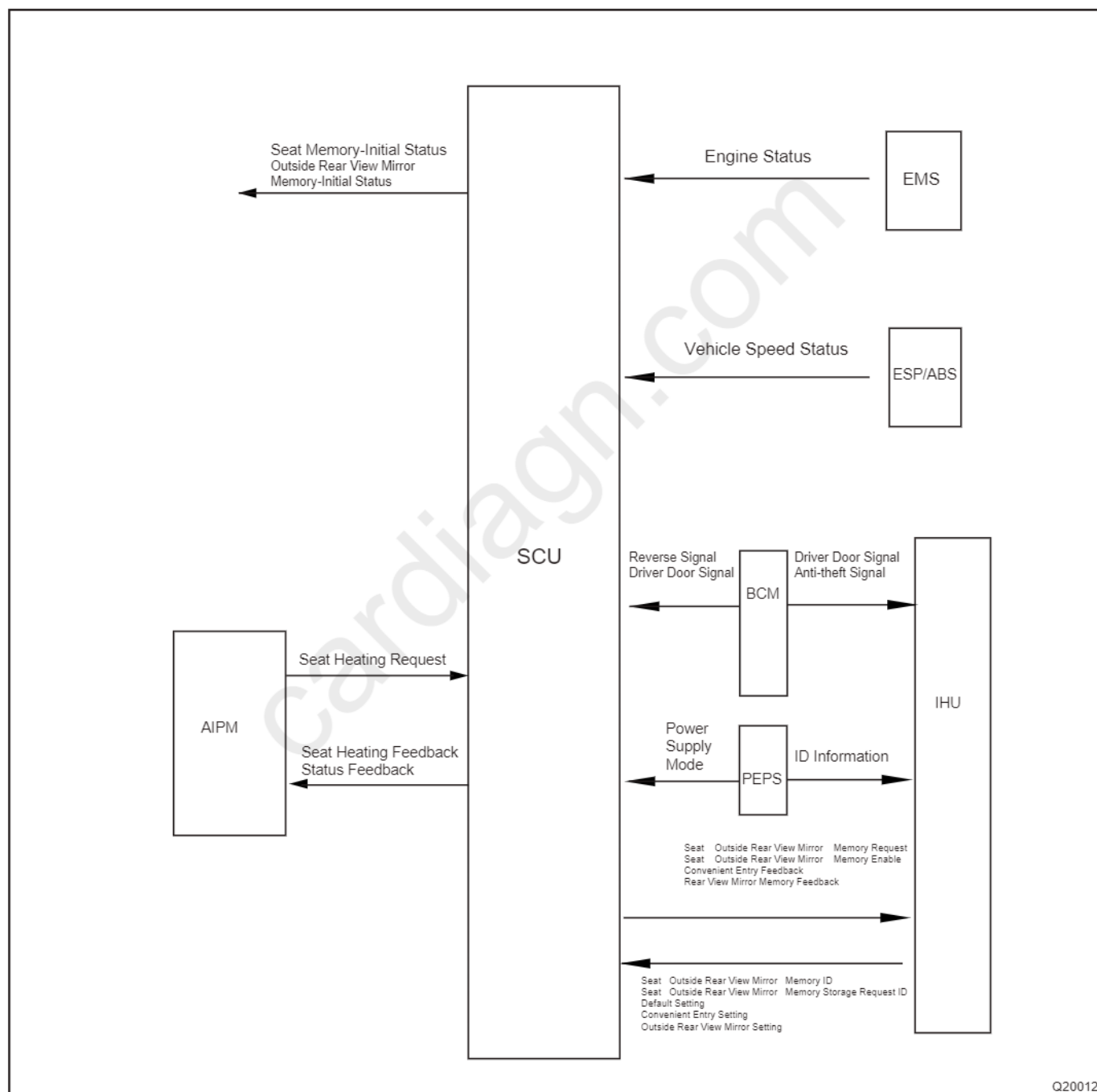
54.2 System Overview

1 System Description

Front seat assembly can be moved forward and backward by front-back adjustment switch, and can be moved upward and downward by seat height adjustment switch (for driver side power seat), and seatback inclination angle can be adjusted by seatback adjustment switch.

Rear seat position is not adjustable; however, rear seatback can be folded forward by pulling seatback unlock mechanism assembly, to help increase the storage space of luggage compartment.

2 System Schematic Diagram



3 System Components Diagram

Driver Seat Assembly



Q20010

1	Front Headrest Assembly	9	Front Left Seat Outside Side Panel
2	Front Headrest Guide Sleeve Free End	10	Driver Seat Side Panel Trim Cover
3	Front Headrest Guide Sleeve Lock End	11	Lumbar Support Switch
4	Front Seat Trim Fabric	12	Seatback Adjustment Button
5	Front Seat Belt Buckle	13	Seat Height and Front-back Adjustment Button
6	Front Left Seat Inside Side Panel	14	Front Left Seat Assembly Front Inner Leg Cover Assembly
7	Front Seat Cushion Sleeve	15	Driver Seat Frame
8	Front Left Seat Adjustment Switch Assembly		

Rear Seat Assembly



Q20020

1	Rear Outside Headrest Assembly	11	Rear Center Seat Belt Outlet Cover Plug
2	Rear Headrest Sleeve Free End	12	Rear Seat Armrest Buckle Cover Plate
3	Front Headrest Guide Sleeve Lock End	13	Rear Left Seatback Assembly
4	Rear Seat Armrest Buckle Cover Plate	14	Child Seat Upper Anchor Cover Plug
5	Rear Center Headrest Assembly	15	Child Seat Upper Anchor Cover Plug
6	Rear Headrest Sleeve Free End	16	Rear Seat Armrest Assembly
7	Front Headrest Guide Sleeve Lock End	17	Rear Right Seatback Assembly

8	Rear Outside Headrest Assembly	18	ISOFIX Bracket - Rear Seatback to Body
9	Rear Headrest Sleeve Free End	19	Rear Seat Cushion Assembly
10	Front Headrest Guide Sleeve Lock End		

4 Power Seat Adjustment

No.	Test Case Description	Step Description	Note
1	Horizontal manual adjustment of seat	Battery voltage is 9 to 16 V. Pressing to adjust the seat horizontally forward is continuously effective	Seat moves forward and stops when the switch is released
		Battery voltage is 9 to 16 V. Pressing to adjust the seat horizontally backward is continuously effective	Seat moves backward and stops when the switch is released
		Battery voltage is too high or too low. Press seat front-back adjustment button	Seat does not operate
		Start the vehicle during seat adjustment	Seat stops during vehicle start-up
2	Vertical manual adjustment of seat	Battery voltage is 9 to 16 V. Pressing to adjust the seat upward is continuously effective	Seat moves upward and stops when the switch is released
		Battery voltage is 9 to 16 V. Pressing to adjust the seat downward is continuously effective	Seat moves downward and stops when the switch is released
		Battery voltage is too high or too low. Press seat up/down adjustment button	Seat does not operate
		Start the vehicle during seat adjustment	Seat stops during vehicle start-up
3	Manual adjustment of seatback	Battery voltage is 9 to 16 V. Pressing to adjust the seatback forward is continuously effective	Seatback moves forward and stops when the switch is released
		Battery voltage is 9 to 16 V. Pressing to adjust the seatback backward is continuously effective	Seatback moves backward and stops when the switch is released
		Battery voltage is too high or too low. Press seatback front-back adjustment button	Seat does not operate
		Start the vehicle during seat adjustment	Seat stops during vehicle start-up

No.	Test Case Description	Step Description	Note
4	Manual initialization of seat in horizontal direction	Battery voltage is 9 to 16 V, adjust the seat forward until it reaches mechanical blocking stop position, blockage occurs; adjust the seat backward until it reaches mechanical blocking stop position, blockage occurs	Initialization is completed in the horizontal direction and soft stop range is automatically generated
		After completion of initialization, the seat will stop when it reaches the soft stop position. If the switch is operated again to move it in the same direction, the seat can exceed the soft stop action range	When the seat reaches the mechanical stop position, it will block and stop
5	Manual initialization of seat in vertical direction	Battery voltage is 9 to 16 V, adjust the seat upward until it reaches mechanical blocking stop position, blockage occurs; adjust the seat downward until it reaches mechanical blocking stop position, blockage occurs	Initialization is completed in the vertical direction and soft stop range is automatically generated
		After completion of initialization, the seat will stop when it reaches the soft stop position. If the switch is operated again to move it in the same direction, the seat can exceed the soft stop action range	When the seat reaches the mechanical stop position, it will block and stop
6	Manual initialization of seatback	Battery voltage is 9 to 16 V, adjust the seatback forward until it reaches mechanical blocking stop position, blockage occurs;	Initialization is completed in the seatback direction and soft stop range is automatically generated, and the backward soft stop position is obtained through calibration
		After completion of initialization, the seat will stop when it reaches the soft stop position. If the switch is operated again to move it in the same direction, the seat can exceed the soft stop action range	When the seat reaches the mechanical stop position, it will block and stop

No.	Test Case Description	Step Description	Note
7	Diagnostic initialization	Initialization is completed by issuing diagnostic instructions from the diagnostic tester	After completion of initialization, the seat will stop when it reaches the soft stop position. If the switch is operated again to move it in the same direction, the seat can exceed the soft stop action range, when it reaches the mechanical stop position, it will block and stop

5 Seat Adjustment Function

6 or 8 directions adjustment for driver seat: Including seat horizontal front-back adjustment, seat height up-down adjustment, seatback angle front-back adjustment, cushion angle adjustment.

6 Seat Horizontal/Height/Seatback/Cushion Angle Manual Adjustment

(1) Manual adjustment operating conditions

- Power supply is not in start gear;
- Normal operating voltage (9-16 V);

(2) Stop conditions

- Seat manual adjustment function stops when the motor is stalling.
- Seat manual adjustment function stops when releasing the switch.
- When the starter starts: Stop the seat manual adjustment function; If the switch input is still detected after the starter starts, it will continue to work.
- Stop the seat manual adjustment function when the seat fails (abnormal voltage, abnormal current, timeout output). When the output is stopped, the Hall signal caused by inertia will be recorded in the seat travel coordinates within 500ms after the output is stopped. The direction of travel counting is the same direction as the last seat output. At this time, Hall signal does not make abnormal judgment and only detects the number of Hall pulses within 500 ms.

(3) Blocking judgment

- Current blocking judgment
- In the process of SCU output, after starting the output for 100 ms (avoiding starting current), the starting current is blocked and detected. When the output current is greater than 75% of the starting current and lasts for 500ms, the current is blocked.
- Motor blocks: Current blocking and Hall blocking occur at the same time, it determines that system has a motor blocking. (All blocks mentioned in the functional specification satisfy this condition unless otherwise specified).
- The 4-axis motor cannot be blocked or started at the same time.

(4) Action delay

- When the seat moves in one direction and the switch state changes to the switch input in the opposite direction, the SCU will not immediately perform action in reverse direction and the reverse direction output action needs to be delayed by 500 ms.

(5) Position recording strategy

- When the seat moves, the position is not recorded to the EEPROM; When the seat stops, the current position information is written to the EEPROM; When the seat moves, it loses its position when the power cuts off.

(6) Shaft action priority

- Height and level adjustments cannot be made at the same time. Front seat cushion and seaback adjustments cannot be made at the same time. Seaback or front seat cushion adjustments can be made at the same time with height or level adjustments.

- 2 shafts are not allowed to start at the same time: In order to avoid excessive starting current at the same time, when the two shafts are started at the same time, the drive output interval is 200ms, and the priority is the seatback shaft/front seat cushion shaft > horizontal shaft/height shaft.
- Blocking current in 2 shafts are not allowed at the same time: In order to avoid excessive blocking current at the same time, when the two shafts are blocked at the same time (height + seatback or horizontal + seatback), stop the output of shaft with low priority. After the shaft with high priority completes the blocking judgment and stops output, resume the action of the other shaft and continue to complete the blocking judgment. The priority is the seatback shaft/front cushion shaft > horizontal shaft/height shaft.

(7) Seat adjustment soft stop function

- In order to prevent the seat from moving to the mechanical stop position frequently, the SCU has a soft stop function when the seat adjustment is initialized. The specific soft stop position is calibrated according to the real vehicle. The seat will stop when it reaches the soft stop position. If the switch is operated again to move it in the same direction, the seat can exceed the soft stop action range.

7 Failure Mode and Malfunction Handling

(1) Current detection

- If the monitored output current is greater than 75% of the starting current and exceeds 500ms (10ms*50), it is considered to be blocked and the output is cut off at this time.

(2) Voltage inspection

- During operation, if the voltage is lower than 9 V or higher than 16 V for more than 500 ms, the default voltage is abnormal, and the output is stopped while the switch input is shielded. After the voltage returns to normal range ($9 < V < 16$), if the working conditions are still satisfied, the operation will continue.

(3) Timeout detection

- The maximum output time of seat front-back/height/seatback/seat cushion is manually adjusted. When the switch continues to be effective, the output will stop after the maximum continuous output time of 30s.

(4) Seat adjustment failed state output

- When a fault (abnormal voltage, abnormal current, abnormal Hall signal) is detected, the seat module sends the ID of corresponding fault mode to CAN network until the fault is eliminated and the transmission stops.

8 Seat Initialization (Learning)

■ Definition information description during initialization

(1) Mechanical stop position

- Height, front/back shaft and cushion shaft:
During initialization, blocking point is reached forward, SCU takes this point as 0 and the maximum forward stroke position; or blocking point is reached backward, SCU will take this point as the end point and the maximum backward stroke position (height shaft: forward corresponds to up, backward corresponds to down).
- Seatback shaft:
During initialization, blocking point is reached forward, SCU takes this point as 0 and the maximum forward stroke position.

(2) Mechanical stop fault-tolerant range

- After the SCU records 0 and end point, when blocking occurs again, the reasonable difference between the current blocking point and the already recorded 0 or end point.

(3) Soft stop

- In order to protect the motor and seat system, it is necessary to define the motor action range within the software scope, and the soft stop is within the mechanical stop coordinate range. The soft stop interval can be initialized and automatically generated during initialization. The soft stop position is defined as follows:
Height shaft: From 0 or end point.
Front/back shaft: From 0 or end point.
Seatback shaft: From 0 or end point.

9 Manual Initialization

- (1) Initialization conditions
 - Normal operating voltage (9-16 V).
 - Power supply is not in start gear.
- (2) Front-back adjustment initialization:
 - The seat is adjusted forward until it reaches the mechanical blocking stop position. The blocking has occurred and the current point is taken as 0 point.
 - The seat is adjusted backwards until it reaches the mechanical blocking stop position. The blocking has occurred, the coordinate travel and end point are recorded.
 - Automatically generates a soft stop range with a distance of 30 Hall units from the mechanical stop (0 or end point).
- (3) Height adjustment initialization
 - The seat is adjusted upward until it reaches the mechanical blocking stop position. The blocking has occurred and the current point is taken as 0 point.
 - The seat is adjusted downwards until it reaches the mechanical blocking stop position. The blocking has occurred, the coordinate travel and end point are recorded.
 - Automatically generates a soft stop range with a distance of 30 Hall units from the mechanical stop (0 or end point).
- (4) Seatback angle initialization:
 - The seatback is adjusted forward until it reaches the mechanical blocking stop position. The blocking has occurred and the current point is taken as 0 point.
 - Automatically generates a forward soft stop range with a distance of 30 Hall units from the mechanical stop (0 point).
 - Automatically generates a backward soft stop range, and the backward soft stop position is obtained through calibration.
- (5) Seat cushion angle initialization:
 - The seat cushion is adjusted upward until it reaches the mechanical blocking stop position. The blocking has occurred and the current point is taken as 0 point.
 - The seat cushion is adjusted downwards until it reaches the mechanical blocking stop position. The blocking has occurred, the coordinate travel and end point are recorded.
 - Automatically generates a forward soft stop range with a distance of 30 Hall units from the mechanical stop (0 point).

10 Diagnostic Initialization

- (1) Through the diagnostic tester, the front and back adjustment shafts are automatically learned. The seat automatically moves forward to the blocking position and then backward to the blocking position to complete the initialization of the front and rear shafts.
- (2) Through the diagnostic tester, the height adjustment shaft is automatically learned. The seat automatically moves upward to the blocking position and then downward to the blocking position to complete the initialization of the height shaft.
- (3) Through the diagnostic tester, the seatback angle shaft is automatically learned. The seatback automatically moves forward to the blocking position to complete the initialization of the seatback shaft.
- (4) Through the diagnostic tester, the front seat cushion shaft is automatically learned. The front seat cushion automatically moves upward to the blocking position and then downward to the blocking position to complete the initialization of the front seat cushion shaft.
- (5) Through the diagnostic tester, all adjustment shafts are automatically learned; The seat automatically completes 4-shaft initialization.

11 Clearing Initialization

SCU can clear all shafts or single shaft initialized content, as long as there is one shaft clear is initialized, the current shaft is in manual mode.

- (1) Initialize and delete the following information:

- Mechanical stop position (0 and end point).
- Coordinate travel.
- Soft stop position.
- The fault-tolerant range of 0 or end point from the coordinate axis when stopping mechanically.
- Memory positions in all IDs and modes (single shaft clear initialization, clear all shafts memory position).

(2) Trigger clear initialization

- Clear all shafts initializations with the diagnostic tester.
- CAN signal received from IHU is set to the default value = 0x1: Personalization is set to the default value, 0x4: When all is set to the default value, memory positions in IDs and modes will be deleted; After deleting the memory position, set all memory positions under the current ID to the default position.

12 Seat Memory and Recall

No.	Test Case Description	Step Description
1	Seat position memory enabling	Enable conditions: Normal operating voltage is 9 to 16 V . Vehicle speed is lower than 5 kph. Power supply is in OFF/ACC/IG ON . If engine starts, gear position is in P or N, SCU initialization is completed. Seat/rear view mirror will not move by manual control. Gear position is not in R. Vehicle is involved in a collision.
2	Seat position memory recall	Memory: If the user adjusts the seat or the outside rear view mirror through the switch in non-R mode, and does not operate the adjustment switch in the next 3 seconds, and seat and rear view mirror do not move, SCU will send a request for seat memory, and IHU will pop up a dialog box. Recall: When receiving the IHU recall demand, SCU drives the seat to the memory position in the corresponding mode. If there is no memory position before, SCU drives the seat to the default position.
3	Seat convenient access function	Activate this function in IHU interface Power supply is in OFF or remote start condition, when driver door is opened, SCU drives the seat back for a certain distance.

13 Seat Position Memory

The seat control module needs to support the storage of 15 groups of seat position information of different postures. The module shall preset the initialization values in memory mode for all seat positions when the vehicle leaves the factory.

- (1) Seat position memory conditions
 Seat module SCU needs to send out the seat memory enabling signal when all the following conditions are met, otherwise the seat module does not meet the position storage conditions:
 - Normal operating voltage is 9 to 16 V.
 - SCU initialization is completed.
 - SCU adjustment switch is not pressed.
 - Vehicle speed is lower than 3 Km/h and vehicle signal is valid. (No judgment when power supply is in OFF or ACC).
 - Rear view mirror switch is not pressed (Determine the signal based on the configuration).
- (2) Seat position memory
 - SCU receives memory request signal via CAN, when receiving CAN signal memory request of IUH (- including requested ID and mode number = 0x0, 0x1, 0x2, 0x3, 0x4, 0x5, 0x6, 0x7, 0x8, 0x9, 0xA, 0xB, 0xC, 0xD, 0xE, 0xF) (0x0 is no action, others correspond to 15 groups of positions).
 - SCU stores the current 4-shaft position to the EEPROM. SCU assigns the EEPROM to store 15 sets of position: 5 IDs, each of which has 3 modes corresponding to the ID and MODE number in the memory request. When the current position storage is completed, the seat module feedbacks CAN signal STAT_ seat memory position = "done", otherwise "failed" is feedback.
- (3) Clearing and covering memory position
 - When the seat module receives the CAN bus: SET_ default = 0X01 and judges the enabling signal of the seat memory at the same time, it sets 3 groups of memory position information under the current ID to the initial default position, non memory position of other ID do not change (the current ID is determined by the ID identified by IHU).
 - When the seat module receives the CAN bus: SET_ default = 0X04 and judges the enabling signal of the seat memory at the same time, it sets all ID for 15 groups of memory position information to the initial default position.
 - When there is memory information in the stored ID and mode, the memory request in this ID and mode is received again, and the current 4-shaft position overwrites the previous memory information.
- (4) Position storage status feedback (Rear view mirror storage status signal is determined according to the configuration).
 - After the seat position is successfully stored and the rear view mirror storage success signal is received, three frames of success signals are sent to CAN.
 - If the seat position storage fails or the rear view mirror storage failure signal is received, three frames of failure signals will be sent to CAN.
 - When the transmission of 3 frames is completed or there is no storage action, the feedback signal is sent to CAN all the time.

14 Seat Memory Position Recall

- (1) Seat memory position recall conditions
 - Seat memory enabling signal.
 - When STAT_ terminal is ON, two conditions of engine condition is "engine running" and transmission gear is "P" do not occur simultaneously.
 - Engine status = starter starts.
- (2) Position recall:
 - When receiving CAN REQ_ seat position = 0x0, 0x1, 0x2, 0x3, 0x4, 0x5, 0x6, 0x7, 0x8, 0x9, 0xA, 0xB, 0xC, 0xD, 0xE, 0xF (0x0 is no action, others correspond to 15 groups of position).
 - When the SCU receives the recall position, it determines whether there is a storage position:
 There is a storage position: Drive the seat to the position remembered in the corresponding mode.
 No storage position: Drive the seat to default position.
- (3) SCU stops driving when the call action reaches the target position:
 - When the output is stopped, the Hall signal caused by inertia will be recorded in the seat travel coordinates within 500ms after the output is stopped. The direction of travel counting is the same direction as the last seat output. At this time, Hall signal does not make abnormal judgment and only detects the number of Hall pulses within 500 ms.

(4) Motor runs:

- Height and front-back adjustments cannot be made at the same time. Seatback and seat cushion angle adjustments cannot be made at the same time. Seatback angle or front seat cushion adjustments can be made at the same time with height or front-back adjustments. When the memory position is recalled, after the height shaft and seatback shaft complete the recall action, the front-back shaft and cushion angle shaft actions are performed after 500ms. And you need to avoid simultaneous startup and simultaneous blocking.

(5) Repeat recall:

- In the process of memory recall, a new memory recall command is received again, stop for 500 ms, and a new recall action is executed again. If there are several new recall commands within 500ms pause time, the last recall command is regarded as the execution command after suspension.

(6) Recall action termination conditions:

- When the single shaft reaches the memory information position, the single shaft action terminates (- applicable to all shafts).
- Any manual adjustment switch input of 4-shaft, stop recall action of all shafts.
- Single shaft detects the short circuit and overcurrent of the relevant drive motor, and stops recall action of all shafts.
- Single shaft reaches maximum output time and stops recall action of all shafts.
- Low voltage or overvoltage (9-16 V is the normal operating voltage), stop recall action of all shafts.
- Memory recall again, stop last recall action and perform this memory recall.
- Pause recall action of all shafts while starting. If the start status is not satisfied, recall action continues to be executed until the recall action meets the termination conditions.

15 Power On Automatic Position Recall:

When the power gear switches from non-OFF to OFF, SCM stores the current each shaft position of seat (6 or 8 shafts according to configuration); In the future, each time the power gear switches from non-OFF to OFF, it covers the position of last memory. This group of position exists independently, which is different from 15 groups of storage positions. When the power gear is switched from OFF to ACC or IGN ON and the seat memory enabling signal is automatically recalled to storage position of seat when power off.

Condition 1 of automatic memory when power on:

- (1) After switching the IGN status from OFF to ACC or ON, the delay time is 300 ms to determine that the vehicle is in normal mode.

Condition 2 of automatic memory when power on:

- (1) After switching the IGN status from OFF to ACC or ON, the delay time is 300 ms to determine that the vehicle is switched from remote mode to normal mode.
- (2) IGN status is kept in ON.
- (3) The engine is kept running and gear position is in P.

16 Position Recall Status Feedback (Rear View Mirror Storage Status Signal is Determined according to Configuration):

- The seat always sends a signal to CAN during the position call or when it receives a rear view mirror signal.
- When engine starts during position recall of seat, pause the recall action. Still sent during pause (continue).
- The seat reaches the recall position and receives the rear view mirror signal, three frames of success signals are sent to CAN.
- The seat does not reach the recall position or receive the rear view mirror signal, three frames of failed signals are sent to CAN.
- When the transmission of 3 frames is completed or there is no recall action, the feedback signal is sent to CAN all the time.

17 Seat Position Recall Function Interrupted:

If any of the following conditions is met, the seat will be interrupted during the position recall, and function of position recall will not be resumed even if the conditions are not met.

- (1) Manual adjustment has high priority, manual adjustment can interrupt automatic adjustment, automatic adjustment can not be recalled in manual adjustment.
- (2) In the process of memory recall, a new memory recall command is received again, and a new recall action is executed again. If there are several new recall commands, the last recall command is regarded as the execution command after suspension. But it is still in the process of a position recall, always sends a signal (cancel signal) to CAN.
- (3) Gear shifts from P when engine is running.
- (4) CAN signal is received when pressing rear view mirror adjustment switch.
- (5) CAN signal is received when rear view mirror position recall is abnormal.

18 Seat Position Instant Memory Request Management

If the user adjusts the seat using switch, the seat does not move and the rear view mirror does not move for the next 5 seconds, SCU will send a 3-frame seat request to IHU.

19 Seat Comfortable Entry And Exit:

The driver seat comfortable entry and exit function allows the driver to get in and out of the vehicle more conveniently through the seat automatic retreat function. The comfortable entry and exit function only needs to be adjusted in the front and back direction of seat, which can be activated or turned off in the IHU interface.

- (1) Driver seat comfortable entry and exit conditions
 - Normal operating voltage is 9 to 16 V.
 - Initialization is completed.
 - Last time for comfortable entry and exit is 0x1: ON or current is 0x1: ON, comfortable entry and exit of SCU system status is 0x1: ON.
 - No manual adjustment action and memory recall action.
- (2) Seat comfortable entry and exit function logic
 - Power supply is in OFF condition, when driver door is opened, SCU drives the seat to move toward the rear shaft to a predefined easy entry position.
 - Power supply is in non-OFF condition, when driver door is opened, power gear changes from non-OFF to OFF, SCU drives the seat to move toward the rear shaft to a predefined convenient entry position.
- (3) Easy Entry termination conditions
 - Reach the target position.
 - Any manual adjustment switch input.
 - Reach blocking or soft stop position.
 - Short circuit, overcurrent of relating drive motor is detected.
 - Reach the maximum output time of 30 seconds.
 - Low voltage or overvoltage.

20 Seat Position Action Status Output

The seat module will store the ID in E2 after receiving the ID signal of IHU setting personal data. The previously stored ID will always be fed back to IHU before receiving the ID signal.

21 Seat Position Action Status Output

- (1) If the seat motor does not operate, SCU sends a CAN signal to the bus.
- (2) If seat motor causes action by pressing the switch, SCU sends CAN signal STAT_SeatMovement = "Movingby switch" (0x01) to bus.
- (3) If the seat motor causes action by position recall, SCU sends CAN signal STAT_SeatMovement = "Movingby recall" (0x02) to bus.

- (4) If the seat motor is interrupted during the position recall, SCU sends three frames of CAN signal STAT_SeatMovement = "Moving by recall interrupt" to bus.
- (5) If the seat motor causes action by Easy Entry, SCU sends CAN signal STAT_SeatMovement = "Moving by recall" (0x02) to bus.

22 Seat Heating

No.	Test Case Description	Step Description	Note
1	Activate driver and front passenger seat heating function by heating switch	Operating conditions: Power supply voltage is 9 to 16 V ; No seat action (can not operate with seat at the same time) ; Driver/front passenger seat heating switch is activated	Driver and front passenger seat heating function does not output
		Press driver and front passenger seat heating switch once	SCM feedbacks heating in 2nd gear
		Press driver and front passenger seat heating switch once again (- second time)	SCM feedbacks heating in 1st gear
		Press driver and front passenger seat heating switch once again (third time)	Heating off
		If the seat heating function has been turned on, seat heating function will continue to work when the ENGINE START STOP switch is turned off; If the seat heating function is not turned on, operate the heating switch when the ENGINE START STOP switch is turned off, and the seat heating function will not work	
		Adjust seat during driver/ front passenger seat heating	Heating is off during seat movement . Heating signal will be sent without interruption during seat movement stops and heating recovery
2	Temperature detection	After the seat heating function is turned on, the seat heating is turned off when the target temperature is reached, and the seat heating is turned on when the temperature is lower than target temperature according to the	Seat heating output is off KEEP Can bus temperature feedback

		temperature feedback from temperature sensor	
		Currently set heating in 2nd gear	High gear is 42°C and low gear is 37°C (This value is still under calibration and may be adjusted in the future)
3	Remote heating function	Operating conditions: Power supply voltage is 9 to 16 V Seat does not move Receiving CAN signal for remote heating in high gear	Driver/front passenger seat heating turns on SCM feedback heating gear position is 2nd gear
		Power supply voltage is 9 to 16 V Seat does not move Receiving CAN signal for remote heating in low gear	Driver/front passenger seat heating turns on SCM feedback heating gear position is 1st gear
		Driver/front passenger seat heating turns on SCM feedback heating gear position is 1st gear Receiving CAN signal for turning off remote heating	Driver/front passenger seat heating turns off
		Driver/front passenger seat heating turns on SCM feedback heating gear position is 2nd gear Receiving CAN signal for remote heating in low gear	Driver/front passenger seat heating turns on SCM feedback heating gear position is 1st gear
		Driver/front passenger seat heating turns on SCM feedback heating gear position is 1st gear Receiving CAN signal for remote heating in high gear	Driver/front passenger seat heating turns on SCM feedback heating gear position is 2nd gear
4	Voice heating function	Operating conditions: Power supply voltage is 9 to 16 V Seat does not move	
		Receiving driver/front passenger seat heating CAN signal via IHU voice	SCM controls driver/front passenger seat heating to the corresponding gear position and feedback the current heating gear signal
5	Heating function interruption	During seat action	Heating interrupts
6	Termination of heating function	If any of the following conditions is satisfied, heating function is terminated.	

		The voltage is not in the normal operating range (9-16 V). When the NTC temperature detects abnormal heating output overcurrent (heating wire is short).	Heating stops
--	--	--	---------------

23 Realization of Seat Heating

(1) Seat heating conditions

- Normal operating voltage is 9 to 16 V.
- Engine is running.
- Start and stop function off: Engine starts;
- No seat action (can not operate with seat at the same time).

(2) Heating gear

- There are 2 gears, low gear (level 1) is 37°, high gear (level 2) is 42°.
- The temperature detects NTC temperature feedback, and the input is resistance value (see the NTC impedance feedback table for details). The high gear corresponds to 48 °C in the NTC resistance temperature table, and the low gear corresponds to 38 °C in the NTC resistance temperature table.
- CAN signal provides enabling signal, 2 heating gears, which needs to collect external NTC feedback, maintain the temperature, each temperature feedback from driver seat and front passenger seat, feedback output of seatback and cushion heating according the same seat NTC temperature is consistent.

(3) LEVEL 0 mode

- Driver seat heating:
After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output of gear 2 is effective; Set to 2.
After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output of gear 1 is effective; Set to 1.
After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output is turned off; Set to 0.
After receiving CAN signal, the heating hard switch is pressed exceeding 2 seconds or soft switch is pressed exceeding 2 seconds. Directly turn off the output regardless of the current state; Set to 0.
- Front passenger seat heating:
After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output of gear 2 is effective; Set to 2.
After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output of gear 1 is effective; Set to 1.
After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output is turned off; Set to 0.
After receiving CAN signal, the heating hard switch is pressed exceeding 2 seconds or soft switch is pressed exceeding 2 seconds. Directly turn off the output regardless of the current state; Set to 0.

(4) LEVEL 1 mode

- Driver seat heating:
After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output of gear 1 is effective; Set to 1.
After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output of gear 1 is effective; Set to 1.
After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output is turned off; Set to 0.
After receiving CAN signal, the heating hard switch is pressed exceeding 2 seconds or soft switch is pressed exceeding 2 seconds. Directly turn off the output regardless of the current state; Set to 0.
- Front passenger seat heating:
After receiving CAN signal, the heating hard switch is pressed once or the soft switch is pressed once, and the output of gear 1 is effective; Set to 1.

After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output of gear 1 is effective; Set to 1.

After receiving CAN signal, the heating hard switch is pressed again or the soft switch is pressed again, and the output is turned off; Set to 0.

After receiving CAN signal, the heating hard switch is pressed exceeding 2 seconds or soft switch is pressed exceeding 2 seconds. Directly turn off the output regardless of the current state; Set to 0.

- (5) LEVEL 2 mode
Turn off the heating function.
- (6) LEVEL 3 mode
Turn off the heating function.

24 Heating Hard Switch And Soft Switch Signal Priority

Both hard switch and soft switch belong to local switch mode. If both hard switch and soft switch signals are received, SCU will only respond once. If the time of latter switch signal is less than 300 ms compared to the previous switch signal, the latter switch operation is ignored.

25 TBOX Remote Heating Function Logic

LEVEL 0 mode

- (1) Driver seat heating:
Receiving CAN signal for remote heating in high gear, gear 2 output is valid; Set to 2.
Receiving CAN signal for remote heating in low gear, gear 1 output is valid; Set to 1.
Receiving CAN signal for remote heating invalid signal, output is turned off; Set to 0.
- (2) Front passenger seat heating:
Receiving CAN signal for remote heating in high gear, gear 2 output is valid; Set to 2.
Receiving CAN signal for remote heating in low gear, gear 1 output is valid; Set to 1.
Receiving CAN signal for remote heating invalid signal, output is turned off; Set to 0.

26 LEVEL 1 mode

- (1) Driver seat heating:
Receiving CAN signal for remote heating in high gear, gear 2 output is valid; Set to 1.
Receiving CAN signal for remote heating in low gear, gear 1 output is valid; Set to 1.
Receiving CAN signal for remote heating invalid signal, output is turned off; Set to 0.
- (2) Front passenger seat heating:
Receiving CAN signal for remote heating in high gear, gear 2 output is valid; Set to 2.
Receiving CAN signal for remote heating in low gear, gear 1 output is valid; Set to 1.
Receiving CAN signal for remote heating invalid signal, output is turned off; Set to 0.
- (3) LEVEL 2 mode
Turn off the heating function.
- (4) LEVEL 3 mode
Turn off the heating function.

27 Heating Logic Processing When Starting And Stopping

- When StartStop is not 0, it is determined that the start and stop function is turned on, and then it is determined that engineState is not 03, as a condition to turn off the heating, when StartStop is not 0, it is determined that the start and stop function is turned on, at this time EngineState is not 03, as a condition to turn on the heating, when StartStop switch is stopped, Auto Stopping and Operation, heating is turned on.
- During heating, if ESS signal indicates that stopping automatically is received (StartStop=Auto Stopping or Stopped), heating function needs to be maintained.
- When not heating, the heating function can be enabled normally when in auto stopping condition (StartStop=Auto Stopping or Stopped).
- During heating, if ESS signal indicates that stopping automatically is received (StartStop=Auto Stopping or Stopped), heating function needs to be maintained. When the engine start signal is received (EngineState=activation starter power stage), the actual heating output needs to be turned off, but the bus signal remains in the previous state. After starting, the previous heating output will be restored.
- During heating, it is in start and stop mode and becomes standby after receiving ESS signal. The heating function needs to be turned off.

28 Seat Heating Termination Conditions

- (1) One of driver seat heating and seat ventilation functions can only be turned on at a time, and the latter operation takes precedence; When driver seat heating function is working, the activation ventilation function is satisfied. Driver seat heating is off, and front passenger seat heating is not affected. Seat heating does not activate even if the ventilation function is turned off again.
- (2) One of front passenger seat heating and seat ventilation functions can only be turned on at a time, and the latter operation takes precedence; When front passenger heating function is working, the activation ventilation function is satisfied. Front passenger seat heating is off, and driver seat heating is not affected. Seat heating does not activate even if the ventilation function is turned off again.
- (3) Start and stop function turns off and engine is running.
- (4) Start and stop function turns on and ESS signal changes to standby.

29 Failure Mode and Malfunction Handling

- (1) Seat adjustment failed state output:
When a fault (abnormal voltage, abnormal current) is detected, the seat module sends the ID of corresponding fault mode to CAN network until the fault is eliminated and the transmission stops.

30 Seat Heating Interruption

- (1) When the voltage is not within the normal operating range (9-16 V) and the seat heating is interrupted, set the seat heating driver feedback and SeatHeatpsSNGFeedbackSTS to 0. Heating function will resume when voltage returns to normal range.
- (2) When NTC temperature detection is abnormal (within normal temperature change, there is no normal temperature rise or no temperature change after output), the seat heating is interrupted and SeatHeatDriverFeedbackSts and SeatHeatPsngFeedbackSts are set to 0. Heating function will resume after NTC power returns to normal range.
- (3) When the seat moves, seat heating is interrupted. The heating function is resumed after the seat stops moving, and the signal is still maintained during interruption.
- (4) When start and stop function turns off (StartStopState = Auto Stopping or Stopped), seat heating is interrupted during startup, and heating function is resumed after startup. Signal is still maintained during interruption.
- (5) Current diagnostic value exceeds threshold, it is considered overcurrent, seat heating is interrupted. Set SeatHeatDriverFeedbackSts and SeatHeatPsngFeedbackSts to zero at the same time. Heating function will resume after current returns to normal range.
- (6) During the heating interruption, heating function can receive CAN signal to turn off, but it cannot receive CAN signal to turn on, and it can not receive CAN signal to change heating gear.

31 Seat Heating Priority

Seat local heating, seat remote heating, seat voice heating operation is preferred.

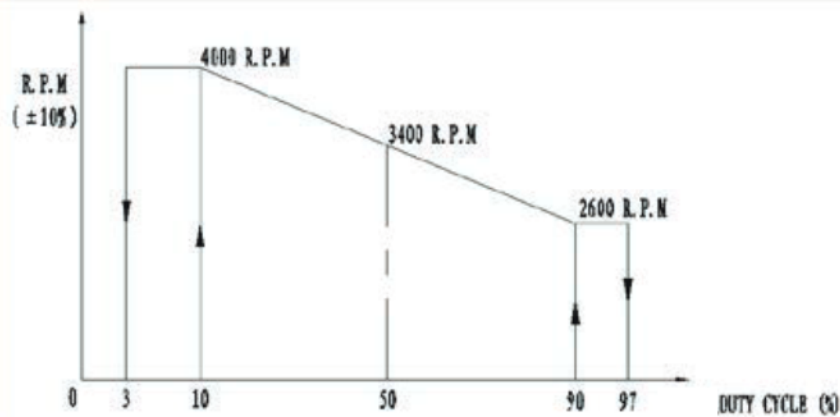
32 Seat Ventilation Function

■ Realization of seat ventilation

- (1) Seat ventilation conditions
 - Normal operating voltage is 9 to 16 V.
 - Engine is running.
 - Start and stop function turns off: Engine starts; start and stop function turns on: StartStop=stopped, Auto Stopping, Operation.
 - No seat action (can not operate with seat at the same time).
- (2) Ventilation strategy
 - There are 2 ventilation gears, low gear (level 1) is 2800 rpm, high gear (level 2) is 4000 rpm.
 - Low gear (level 1) 2800 rpm corresponds to 80% duty cycle, and high gear (level 2) 4000 rpm corresponds to 10% duty cycle.
 - Fan speed is related to PWM.

Voltage: 13.5 V

Frequency: 100 Hz



Relationship Between Fan Speed And Duty Cycle

Duty cycle	0-10%	10%	20%	30%	40%	50%	60%	70%	80%	90%	90%-100%
Speed (rpm)	0	4000 ±10%	3850 ±10%	3700 ±10%	3650 ±10%	3400 ±10%	3200 ±10%	3000 ±10%	2800 ±10%	2600 ±10%	0

Q20011

33 Local Ventilation Function Logic

■ LEVEL 0 mode:

- Driver seat ventilation:
After receiving CAN signal, the ventilation hard switch is pressed once or the soft switch is pressed once, and the output of gear 2 is effective; Set to 2.
After receiving CAN signal, the ventilation hard switch is pressed again or the soft switch is pressed again, and the output of gear 1 is effective; Set to 1.
After receiving CAN signal, the ventilation hard switch is pressed again or the soft switch is pressed again, and the output is turned off; Set to 0.
After receiving CAN signal, the ventilation hard switch is pressed exceeding 2 seconds or soft switch is pressed exceeding 2 seconds. Directly turn off the output regardless of the current state; Set to 0.
- Front passenger seat ventilation:
After receiving CAN signal, the ventilation hard switch is pressed once or the soft switch is pressed once, and the output of gear 2 is effective; Set to 2.
After receiving CAN signal, the ventilation hard switch is pressed again or the soft switch is pressed again, and the output of gear 1 is effective; Set to 1.
After receiving CAN signal, the ventilation hard switch is pressed again or the soft switch is pressed again, and the output is turned off; Set to 0.
After receiving CAN signal, the ventilation hard switch is pressed exceeding 2 seconds or soft switch is pressed exceeding 2 seconds. Directly turn off the output regardless of the current state; Set to 0.

■ LEVEL 1 mode:

- Driver seat ventilation:
After receiving CAN signal, the ventilation hard switch is pressed once or the soft switch is pressed once, and the output of gear 1 is effective; Set to 1.
After receiving CAN signal, the ventilation hard switch is pressed again or the soft switch is pressed again, and the output of gear 1 is effective; Set to 1.

After receiving CAN signal, the ventilation hard switch is pressed again or the soft switch is pressed again, and the output is turned off; Set to 0.

After receiving CAN signal, the ventilation hard switch is pressed exceeding 2 seconds or soft switch is pressed exceeding 2 seconds. Directly turn off the output regardless of the current state; Set to 0.

- Front passenger seat ventilation:
After receiving CAN signal, the ventilation hard switch is pressed once or the soft switch is pressed once, and the output of gear 1 is effective; Set to 1.
After receiving CAN signal, the ventilation hard switch is pressed again or the soft switch is pressed again, and the output of gear 1 is effective; Set to 1.
After receiving CAN signal, the ventilation hard switch is pressed again or the soft switch is pressed again, and the output is turned off; Set to 0.
After receiving CAN signal, the ventilation hard switch is pressed exceeding 2 seconds or soft switch is pressed exceeding 2 seconds. Directly turn off the output regardless of the current state; Set to 0.
- LEVEL 2 mode
Turn off the ventilation function.
- LEVEL 3 mode
Turn off the ventilation function.

34 Ventilation Hard Switch And Soft Switch Signal Priority

Both hard switch and soft switch belong to local switch mode. If both hard switch and soft switch signals are received, SCM will only respond once. If the time of latter switch signal is less than 300 ms compared to the previous switch signal, the latter switch operation is ignored.

35 Seat Ventilation Termination Conditions

- (1) One of driver seat ventilation and driver seat heating functions can only be turned on at a time, and the latter operation takes precedence; When driver seat ventilation function is working, the activation heating function is satisfied. Driver seat ventilation is off, and front passenger seat ventilation is not affected. Seat ventilation does not activate even if the heating function is turned off again.
- (2) One of front passenger seat ventilation and front passenger seat heating functions can only be turned on at a time, and the latter operation takes precedence; When front passenger seat ventilation function is working, the activation heating function is satisfied. Front passenger seat ventilation is off, and driver seat ventilation is not affected. Seat ventilation does not activate even if the heating function is turned off again.
- (3) Start and stop function turns on (StartStop $\neq$ 0) and ESS signal changes to standby.
- (4) Start and stop function turns off (StartStop=0) and EngineState ! = "engine running" .

36 Seat Ventilation Interruption

- (1) When the voltage is not within the normal operating range (9-16 V) and the seat ventilation function is interrupted, set STAT_SeatVentPassenger and STAT_SeatVentDriver to 0. Ventilation function will resume when voltage returns to normal range.
- (2) When the seat moves, seat ventilation function is interrupted. The ventilation function is resumed after the seat stops moving, and the signal is still maintained during interruption. 3) When start and stop function turns off, seat heating function is interrupted when starting engine, and heating function is resumed after Cranking, and the signal is still maintained during interruption.

37 Seat Ventilation Priority

Seat local ventilation, seat remote ventilation, seat voice ventilation operation is preferred.

■ Impedance feedback form

T/ °C	Rmin/K Ω	Rcen/K Ω	Rmax/K Ω
25	9.900	10.000	10.100
26	9.535	9.634	9.734
27	9.184	9.284	9.384
28	8.849	8.948	9.048
29	8.527	8.626	8.725

T/ °C	Rmin/KΩ	Rcen/KΩ	Rmax/KΩ
30	8.219	8.318	8.416
31	7.924	8.021	8.119
32	7.640	7.737	7.835
33	7.368	7.465	7.561
34	7.108	7.203	7.299
35	6.857	6.952	7.047
36	6.617	6.711	6.805
37	6.387	6.479	6.572
38	6.165	6.257	6.349
39	5.953	6.043	6.134
40	5.748	5.838	5.928
41	5.552	5.640	5.730
42	5.364	5.451	5.539
43	5.182	5.268	5.355
44	5.008	5.093	5.179
45	4.841	4.924	5.009
46	4.680	4.762	4.846
47	4.525	4.606	4.688
48	4.376	4.456	4.537
49	4.232	4.311	4.391
50	4.094	4.172	4.251
51	3.961	4.037	4.115
52	3.832	3.907	3.984
53	3.708	3.783	3.858
54	3.598	3.662	3.736
55	3.475	3.546	3.619
56	3.364	3.435	3.506

38 Seat Adjustment Data

38.1 Front seat

The whole stroke for forward and backward adjustment is 240 mm. The seat is adjustable from 180 mm forward and 60 mm backward; The designed seatback angle is 72° and it is adjustable within 22° forward and 50° backward; (Only for driver seat); The whole stroke for height adjustment is 55 mm. The seat is adjustable from 25 mm upward and 30 mm downward.

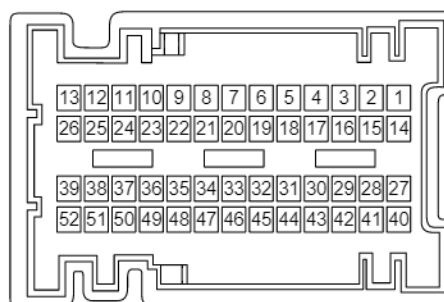
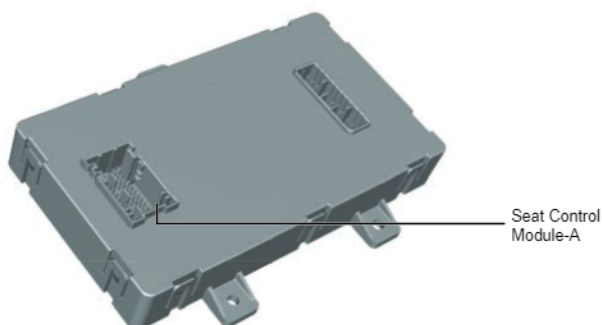
38.2 Rear seat

The designed seatback angle is 10° and it is adjustable within 6° forward and 4° backward.

54.3 System Circuit Diagram

1 Module Terminal Definition

Seat control module-A



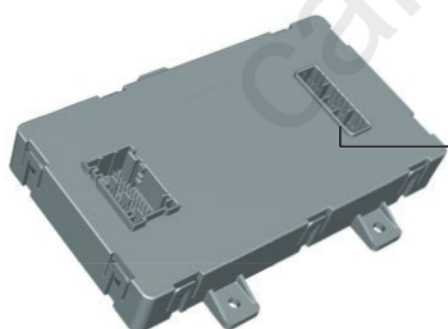
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Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Positive (+) of Multimeter	Negative (-) of Multimeter			
A1	Body ground	15 power detection	Power supply "ON"	13 V
A2	Body ground	Front left seat height adjustment switch	Power supply "ON"	12 V when not adjusted; 2.8 V for upward adjustment and 6.9 V for downward adjustment
A3	Body ground	Front left seat front-back adjustment switch	Power supply "ON"	11 V when not adjusted; 6.9 V for forward adjustment and 2.9 V for backward adjustment
A4	Body ground	Front left seatback adjustment switch	Power supply "ON"	12 V when not adjusted; 2.7 V for forward adjustment and 6.9 V for backward adjustment
A5	Body ground	Front left seat cushion adjustment switch	Power supply "ON"	12 V when not adjusted; 2.7 V for downward adjustment and 6.9 V for upward adjustment
A6	/	/	/	/
A7	/	/	/	/
A8	/	/	/	/
A9	/	/	/	/
A10	/	/	/	/

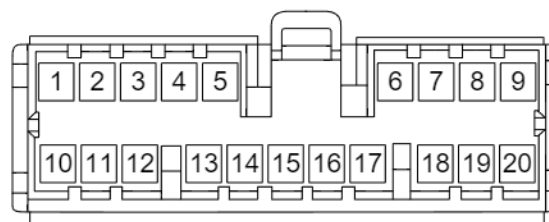
Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Positive (+) of Multimeter	Negative (-) of Multimeter			
A11	/	/	/	/
A12	/	/	/	/
A13	/	/	/	/
A14	/	/	/	/
A15	/	/	/	/
A16	Body ground	Front right seat NTC feedback	Power supply "ON"	6 V
A17	Body ground	Front left seat NTC feedback	Power supply "ON"	6 V
A18	/	/	/	/
A19	Body ground	Switch ground	Power supply "ON"	0 V
A20	/	/	/	/
A21	/	/	/	/
A22	/	/	/	/
A23	/	/	/	/
A24	/	/	/	/
A25	/	/	/	/
A26	/	/	/	/
A27	/	/	/	/
A28	/	/	/	/
A29	/	/	/	/
A30	/	/	/	/
A31	/	/	/	/
A32	/	/	/	/
A33	Body ground	Seat height HALL signal	Power supply "ON"	Changes between 4.1 V (lowest) and 7.1 V (highest)
A34	Body ground	Seat horizontal HALL signal	Power supply "ON"	Changes between 4.1 V (foremost) and 6.9 V (rearmost)
A35	Body ground	Seatback HALL signal	Power supply "ON"	Changes between 4.6 V (foremost) and 6.9 V (rearmost)
A36	Body ground	Seat cushion HALL signal	Power supply "ON"	6.9 V
A37	/	/	/	/
A38	/	/	/	/

Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Positive (+) of Multimeter	Negative (-) of Multimeter			
A39	/	/	/	/
A40	Body ground	Front left seatback ventilation	Power supply "ON"	-
A41	Body ground	Front right seatback ventilation	Power supply "ON"	-
A42	Body ground	Front left seat cushion ventilation	Power supply "ON"	12 V when unventilated
A43	Body ground	Front right seat cushion ventilation	Power supply "ON"	12 V when unventilated
A44	Body ground	Seat HALL signal ground	Power supply "ON"	0 V
A45	Body ground	Front left seat NTC ground	Power supply "ON"	0 V
A46	Body ground	Front right seat NTC ground	Power supply "ON"	0 V
A47	Body ground	CANH	Power supply "ON"	2.68 V
A48	Body ground	CANL	Power supply "ON"	2.36 V
A49	/	/	/	/
A50	/	/	/	/
A51	/	/	/	/
A52	/	/	/	/

Seat control module- B



Seat Control Module- B

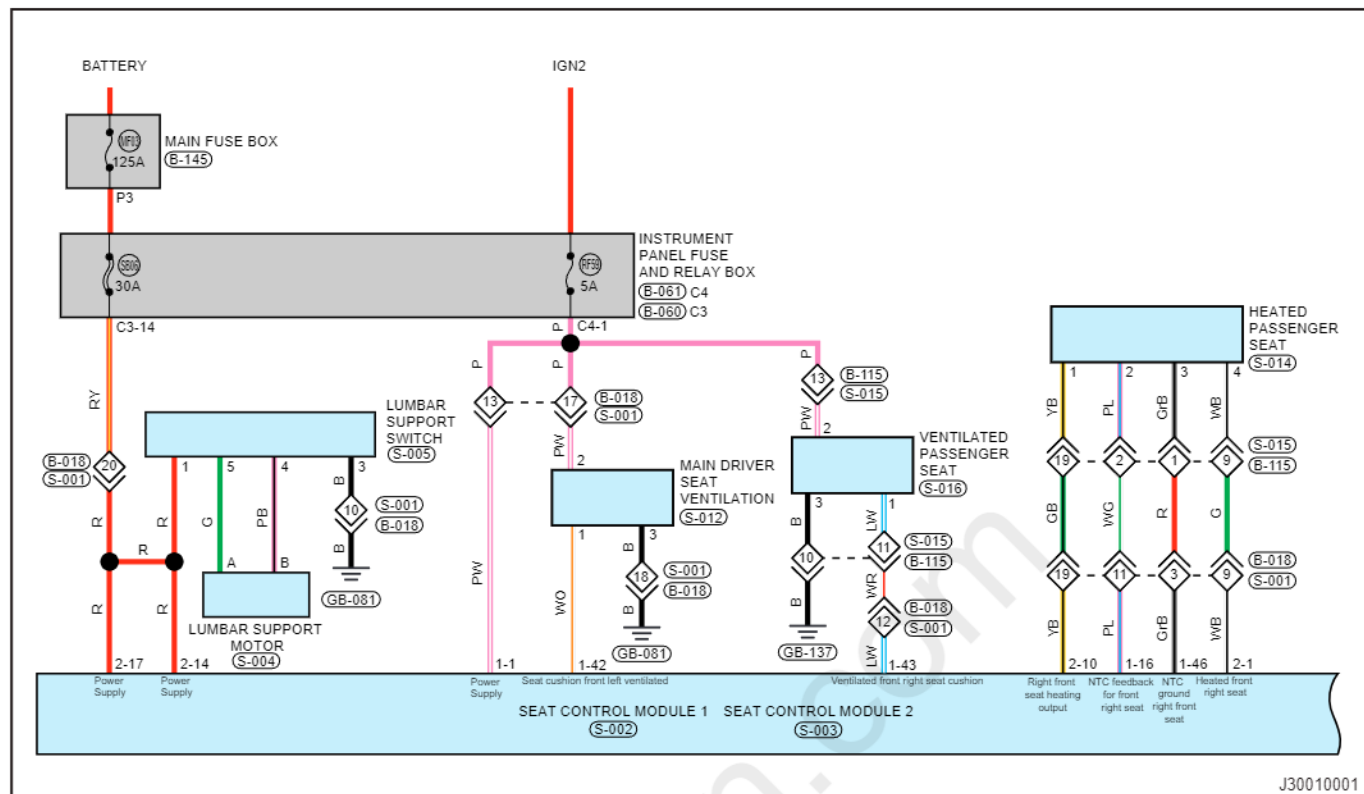


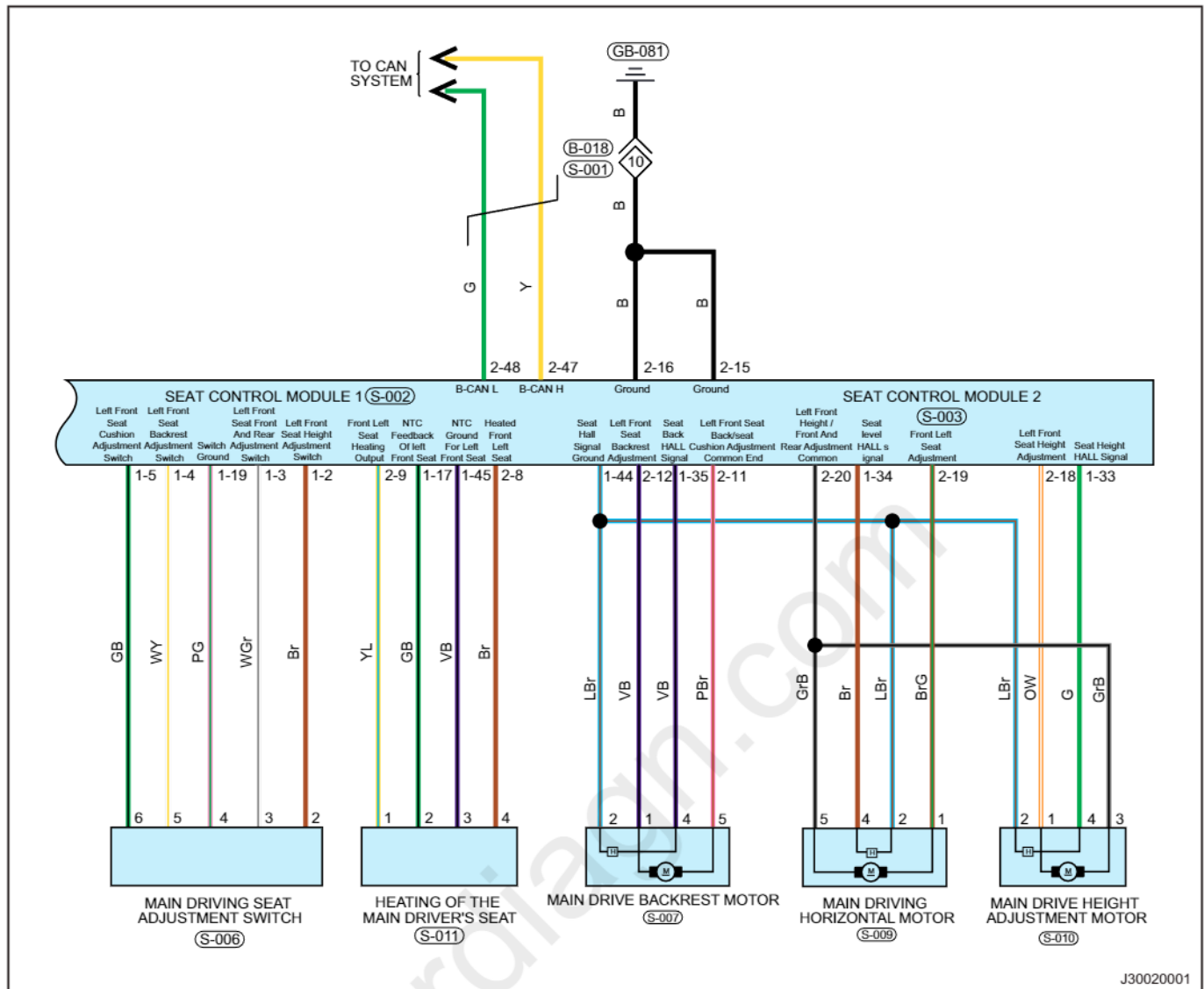
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Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Positive (+) of Multimeter	Negative (-) of Multimeter			
B1	Body ground	Front right seat heating ground	Power supply "ON"	0 V
B2	/	/	/	/

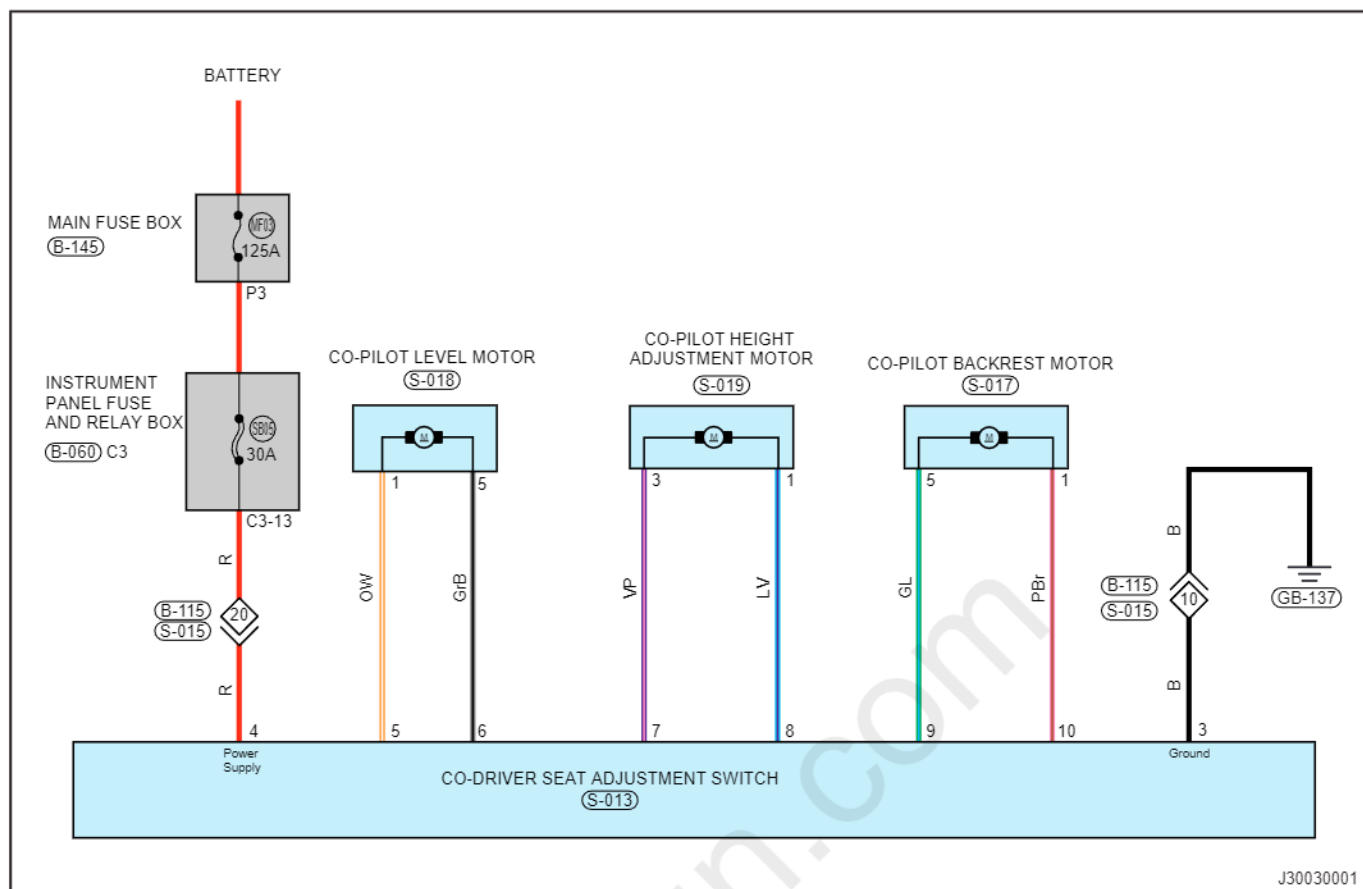
Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Positive (+) of Multimeter	Negative (-) of Multimeter			
B3	/	/	/	/
B4	/	/	/	/
B5	/	/	/	/
B6	/	/	/	/
B7	/	/	/	/
B8	Body ground	Front left seat heating ground	Power supply "ON"	0 V
B9	Body ground	Front left seat heating output	Power supply "ON"	0 V when not heated
B10	Body ground	Front right seat heating output	Power supply "ON"	0 V when not heated
B11	Body ground	Front left seatback/cushion adjustment common terminal	Power supply "ON"	12 V
B12	Body ground	Front left seatback adjustment	Power supply "ON"	12 V when not adjusted; 0 V when adjusted forward
B13	Body ground	Front left seat cushion adjustment	Power supply "ON"	12 V when not adjusted; 0 V when adjusted downward
B14	Body ground	VBAT	Power supply "ON"	12 V
B15	Body ground	GND	Power supply "ON"	0 V
B16	Body ground	GND	Power supply "ON"	0 V
B17	Body ground	VBAT	Power supply "ON"	12 V
B18	Body ground	Front left seat height adjustment	Power supply "ON"	12 V when not adjusted; 0 V when adjusted downward
B19	Body ground	Front left seat front-back adjustment	Power supply "ON"	12 V when not adjusted; 0 V when adjusted forward
B20	Body ground	Front left height/ front-back adjustment common terminal	Power supply "ON"	12 V

2 Circuit Diagram





J30020001



54.4 Diagnostic Information and Steps

1 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
Seat positions cannot be memorized and portable functions are disabled	Manual learning seat position
	Seat module assembly
	Wire harness connector
Seat position cannot be adjusted	Fuse
	Wire harness or connector
	Switch
	Actuator motor

2 Diagnostic Help

- Connect diagnostic tester (the latest software) to diagnostic interface, and make it communicate with vehicle electronic module through data network.
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be deleted, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all system grounds related to the latest DTCs.
- If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

3 DTC Confirmation Procedure

■ Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in the system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and check the DTCs in system again.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

4 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.
- 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 reset.
- Look for data that has changed or DTC to reset during wiggle test.
- Look for broken, bent, protruded or corroded terminals.

- Inspect the mounting areas of instrument cluster, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- Remove instrument cluster from malfunctioning vehicle, then install it to a new vehicle and perform a test. If this DTC cannot be cleared, instrument cluster is malfunctioning. If DTC can be cleared, reinstall instrument cluster to original vehicle.
- 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.

5 Ground Inspection

Groundings are very important to entire circuit system, which are normal or not can seriously affect the entire circuit system. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) and oxidation may increase load resistance. This case will seriously affect normal operation of circuit. Check the ground points as follows:

- Remove ground bolt or nut.
- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- 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.

6 Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the system.

1 Vehicle brought to workshop

Next

2 Check battery voltage

Check if battery voltage is normal.

Standard Condition

Standard voltage: Not less than 12 V.

Result

NG

Replace the battery.

OK

3 Customer problem analysis

Result

Result	Go to
No DTC	A
DTC is output	B

A

Perform troubleshooting procedure without DTCs according to malfunction symptom

B

4

Troubleshoot according to DTCs troubleshooting procedure

Result

Result	Go to
Problem is not resolved	A
Problem is resolved	B

A

Return to procedure 1 and troubleshoot the process again

B

5

According to seat system malfunction repair completion inspection and delivery, confirm if malfunction is resolved.

Result

Result	Go to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A

Return to procedure 1 and troubleshoot the process again

B

6

Finished

7 Diagnostic Trouble Code (DTC) Chart

■ Description

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1B70 - 16	Power Supply Circuit Voltage Below Threshold	The voltage is less than 8.5V for 5s, which is stored as current fault.	Power supply is not stable, and some loads may decrease suddenly.	- Check battery voltage; - Check alternator power supply system; - Check wire harness connector.
B1B70-17	Power Supply Circuit Voltage Above Threshold	The voltage is less than 16.5V for 5s, which is stored as current fault.	Power supply is not stable, and load fails suddenly.	

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1B71 - 18	Abnormal Driver Seat Heating Current - Low Current of Driver Seat Heating Control Circuit	When output is activated, detected current is lower than 1A for 250 ms, stores as current fault.	Load is open or abnormal.	- Check wire harness connector; - Check heating load.
B1B71 - 19	Abnormal Driver Seat Heating Current - High Current of Driver Seat Heating Control Circuit	When output is activated, detected current is higher than 9A for 250 ms, stores as current fault.	Load is short or abnormal.	
B1B72 - 18	Abnormal Front Passenger Seat Heating Current - Low Current of Front Passenger Seat Heating Control Circuit	When output is activated, detected current is lower than 1A for 250 ms, stores as current fault.	Load is open or abnormal	- Check wire harness connector for open; - Check if heating load is normal.
B1B72-19	Abnormal Front Passenger Seat Heating Current - High Current of Front Passenger Seat Heating Control Circuit	When output is activated, detected current is higher than 9A for 250 ms, stores as current fault.	Load is short or abnormal	- Check wire harness connector for short; - Check if heating load is normal.
B1B73 - 18	Abnormal Seat Height and Horizontal Adjustment Control Circuit - Low Current of Height Adjustment Control Circuit	When output is activated, detected current is lower than 0.3A for 1000 ms, stores as current fault.	Motor is open or abnormal	- Check wire harness connector for open; - Check if motor load is normal.
B1B73-19	Abnormal Seat Height and Horizontal Adjustment Control Circuit - High Current of Height Adjustment Control Circuit	When output is activated, detected current is higher than 16A for 1000 ms, stores as current fault.	Motor is blocked or short	- Check whether there is a foreign body stuck in the seat, which causes the motor to stall; - Check wire harness connector for short.
B1B74 - 18	Abnormal Seat Height and Horizontal Adjustment Control Circuit - Low Current of Horizontal Adjustment Control Circuit	When output is activated, detected current is lower than 0.3A for 1000 ms, stores as current fault.	Motor is open or abnormal	- Check wire harness connector for open; - Check if motor load is normal.
B1B74-19	Abnormal Seat Height and Horizontal	When output is activated, detected current is higher	Motor is blocked or short	Check whether there is a foreign body stuck in the

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
	Adjustment Control Circuit - High Current of Horizontal Adjustment Control Circuit	than 16A for 1000 ms, stores as current fault.		seat, which causes the motor to stall; Check wire harness connector for short.
B1B75 - 49	Abnormal Seat Height and Horizontal Adjustment Control Circuit - Seat Height and Horizontal Adjustment Control Circuit Internal Failure	When output is invalid, it detects that circuit output current is higher than 2A for 5000 ms, stores as current fault.	Actuator stuck or feedback circuit fault	- Check wire harness connector for fault; - Check module (- internal relay fault).
B1B76 - 18	Abnormal Seatback Adjustment Control Circuit - Low Current of Seatback Adjustment Control Circuit	When output is activated, detected current is lower than 0.3A for 1000 ms, stores as current fault.	Motor is open or abnormal	- Check wire harness connector for open; - Check if motor load is normal.
B1B76-19	Abnormal Seatback Adjustment Control Circuit - High Current of Seatback Adjustment Control Circuit	When output is activated, detected current is higher than 16A for 1000 ms, stores as current fault.	Motor is blocked or short	- Check whether there is a foreign body stuck in the seat, which causes the motor to stall; - Check wire harness connector for short.
B1B77 - 18	Abnormal Seatback Adjustment Control Circuit - Low Current of Cushion Adjustment Control Circuit	When output is activated, detected current is lower than 0.3A for 1000 ms, stores as current fault.	Motor is open or abnormal	- Check wire harness connector for open; - Check if motor load is normal.
B1B77-19	Abnormal Seatback Adjustment Control Circuit - High Current of Cushion Adjustment Control Circuit	When output is activated, detected current is higher than 16A for 1000 ms, stores as current fault.	Motor is blocked or short	- Check whether there is a foreign body stuck in the seat, which causes the motor to stall; - Check wire harness connector for short.
B1B7A - 49	Abnormal Seatback Adjustment Control Circuit - Seatback and Cushion	When output is invalid, it detects that circuit output current is higher than 2A for 5000 ms,	Actuator stuck or feedback circuit fault	Check wire harness connector fault;

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
	Adjustment Control Circuit Inside Fault	stores as current fault.		Check module (- internal relay fault).
B1B80 - 1A	Abnormal Heating NTC Input Feedback Value - Driver Seat Heating NTC Input Feedback Value too Small	When output is activated for 25 minutes, it detects that NTC input resistance is lower than 500 Ω for 250 ms, stores as current fault.	Resistance is short	Check if resistance of seat heating NTC is normal.
B1B80 - 1B	Abnormal Driver Heating NTC Input Value - Driver Heating NTC Input Value too Large	/	Resistance is abnormal	- Check if resistance of seat heating NTC is normal; - Check if wire harness connector is normal.
B1B80 - 1E	Abnormal Heating NTC Input Feedback Value - Driver Seat Heating NTC Input Feedback Value no Change	When output is activated for 25 minutes, it detects that NTC input resistance is lower than 100 Ω for 1 minute, stores as current fault.	Resistance is abnormal	Check if resistance of seat heating NTC is normal.
B1B81 - 1A	Abnormal Heating NTC Input Feedback Value - Front Passenger Seat Heating NTC Input Feedback Value too Small	When output is activated for 25 minutes, it detects that NTC input resistance is lower than 500 Ω for 250 ms, stores as current fault.	Resistance is short	Check if resistance of seat heating NTC is normal.
B1B81 - 1B	Abnormal Passenger Heating NTC Input Value - Passenger Seat Heating NTC Input Value too Large	/	Resistance is abnormal	- Check if resistance of seat heating NTC is normal; - Check if wire harness connector is normal.
B1B81 - 1E	Abnormal Heating NTC Input Feedback Value - Front Passenger Seat Heating NTC Input Feedback Value no Change	When output is activated for 25 minutes, it detects that NTC input resistance is lower than 100 Ω for 1 minute, stores as current fault.	Resistance is abnormal	Check if resistance of seat heating NTC is normal.

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1B82 - 29	Abnormal HALL Input Signal - Height Adjustment HALL Input Signal Missing	When the output is activated, the number of Hall received within 2 seconds is less than 90% of the normal value, stores as current fault.	Motor is abnormal or HALL unit is damaged.	- Check if height adjustment motor is normal. - Check if height adjustment Hall sensor is normal.
B1B83 - 29	Abnormal HALL Input Signal - Front-back Adjustment HALL Input Signal Missing	When the output is activated, the number of Hall received within 2 seconds is less than 90% of the normal value, stores as current fault.	Motor is abnormal or HALL unit is damaged.	- Check if front-back adjustment motor is normal. - Check if front-back adjustment Hall sensor is abnormal.
B1B84 - 29	Abnormal HALL Input Signal - Seatback Adjustment HALL Input Signal Missing	When the output is activated, the number of Hall received within 2 seconds is less than 90% of the normal value, stores as current fault.	Motor is abnormal or HALL unit is damaged.	- Check if seatback adjustment motor is normal. - Check if seatback adjustment Hall sensor is normal.
B1B85 - 29	Abnormal HALL Input Signal - Cushion Adjustment HALL Input Signal Missing	When the output is activated, the number of Hall received within 2 seconds is less than 90% of the normal value, stores as current fault.	Motor is abnormal or HALL unit is damaged.	- Check if cushion adjustment motor is normal. - Check if cushion adjustment Hall sensor is normal.
B1B85-54	No Learning by Seat	When learning matching of module and seat in any shaft of height shaft, horizontal shaft, seatback shaft is not performed or learning is not successful, stores as current fault.	Learning is not performed	Perform seat self-learning.
U134F-88	CAN Bus Off	Short circuit and grounding occur in vehicle CAN, this DTC will be generated when disconnecting, and this DTC is cleared after resuming.	- Control module is damaged; - Wire harness is broken.	Refer to CAN Network System for troubleshooting

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U1160 - 87	Lost Communication With AIPM	If the AIPM message is not received within 10 ms, this DTC will be generated. If the AIPM message is received for 3 consecutive times, the DTC will be cleared.		
U0140-87	Lost Communication With BCM	If the BCM message is not received within 10 ms, this DTC will be generated. If the BCM message is received for 3 consecutive times, the DTC will be cleared.		
U0199-87	Lost Communication With DCM	If the DCM message is not received within 10 ms, this DTC will be generated. If the DCM message is received for 3 consecutive times, the DTC will be cleared.		
U0100-87	Lost Communication With EMS	If the EMS message is not received within 10 ms, this DTC will be generated. If the EMS message is received for 3 consecutive times, the DTC will be cleared.		
U0122-87	Lost Communication With ESC	If the ESC message is not received within 10 ms, this DTC will be generated. If the ESC message is received for 3 consecutive times, the DTC will be cleared.		
U0245-87	Lost Communication With IHU	If the IHU message is not received within 10 ms, this DTC will be generated. If the IHU message is received for 3 consecutive times, the DTC will be cleared.		

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U0248-87	Lost Communication with PEPS	If the PEPS message is not received within 10 ms, this DTC will be generated. If the PEPS message is received for 3 consecutive times, the DTC will be cleared.		
U0101-87	Lost Communication With TCU	If the TCU message is not received within 10 ms, this DTC will be generated. If the TCU message is received for 3 consecutive times, the DTC will be cleared.		
U1471-81	Invalid Data from AIPM	This DTC will be generated when the data received by AIPM is incorrect. This DTC will be cleared after the data is normal.		
U0422-81	Invalid Data from BCM	This DTC will be generated when the data received by BCM is incorrect. This DTC will be cleared after the data is normal.		
U049A-81	Invalid Data from DCM	This DTC will be generated when the data received by DCM is incorrect. This DTC will be cleared after the data is normal.		
U0401-81	Invalid Data from EMS	This DTC will be generated when the data received by EMS is incorrect. This DTC will be cleared after the data is normal.		

8 DTC Diagnosis Procedure

DTC	DTC Definition
B1B70 - 16	Power Supply Circuit Voltage Below Threshold
B1B70-17	Power Supply Circuit Voltage Above Threshold

Hint:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

1 Check fuse

(a) Check if fuses MF03, SB06 and RF59 are blown out.

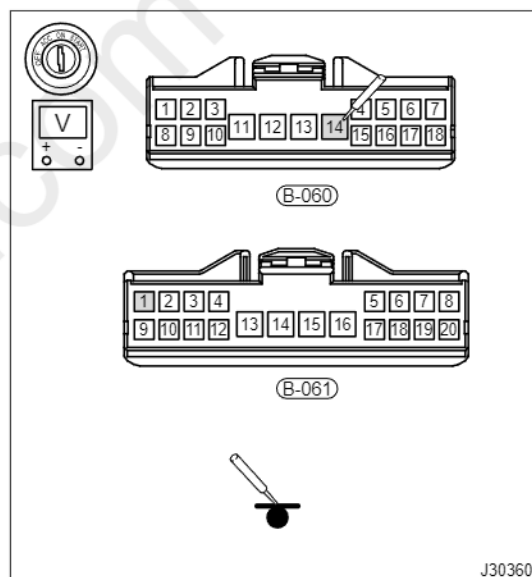
NG**Replace fuse****OK****2 Check instrument panel fuse and relay box output voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Disconnect instrument panel fuse and relay box connectors B-061 and B-060.

(c) Using a digital multimeter, measure voltage between connectors B-061 (1), B - 060 (14) and body ground.

Multimeter Connection	Condition	Operating Voltage
B-061 (1) - Body ground	ENGINE START STOP switch "ON"	$\leq 12V$
B-060 (14) - Body ground	ENGINE START STOP switch "ON"	$\leq 12V$

**NG****Replace instrument panel fuse and relay box assembly****OK****3 Check wire harness for open**

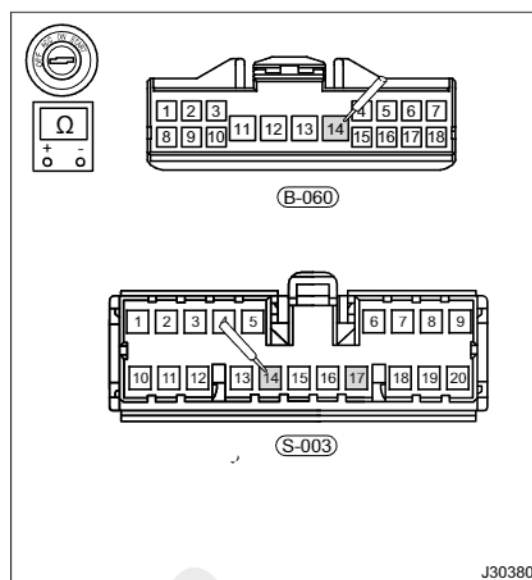
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect seat control module connectors S-002, S-003, instrument panel fuse and relay box connectors B-061 and B-060.

- (d) Using digital multimeter, measure resistance among S-002 (1) - B-061 (1), S-003 (14) - B-060 (14) and S-003 (17) - B-060 (14) to check if the resistance is normal, so as to check wire harness for open.

Multimeter Connection	Condition	Specified Condition
S-002 (1) - B-061 (1)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
S-003 (14) - B-060 (14)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
S-003 (17) - B-060 (14)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$



J30380

OK	Replace seat control module assembly
NG	Handle and repair related wire harness

DTC	DTC Definition
B1B71 - 18	Abnormal Driver Seat Heating Current - Low Current of Driver Heating Control Circuit
B1B72 - 18	Abnormal Front Passenger Seat Heating Current - Low Current of Front Passenger Heating Control Circuit
B1B73 - 18	Abnormal Seat Adjustment Height and Horizontal Control Circuit - Low Current of Height Adjustment Control Circuit
B1B74 - 18	Abnormal Seat Adjustment Height and Horizontal Control Circuit - Low Current of Horizontal Adjustment Control Circuit
B1B76 - 18	Abnormal Seatback Adjustment Control Circuit - Low Current of Seatback Adjustment Control Circuit
B1B77 - 18	Abnormal Seatback Adjustment Control Circuit - Low Current of Cushion Adjustment Control Circuit

Hint:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

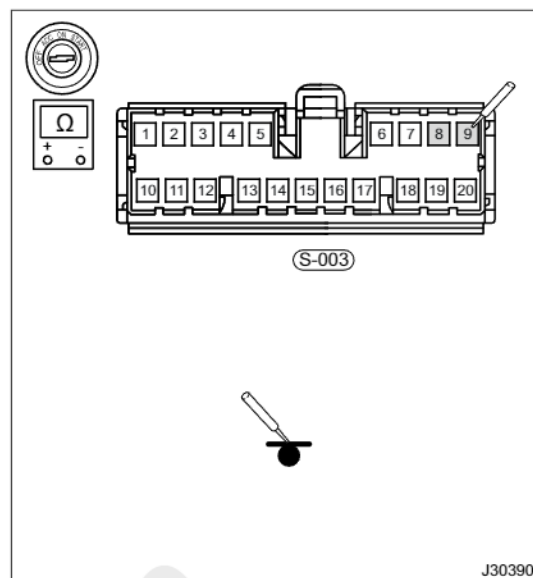
If the seat control module has similar faults, please refer to "Abnormal Driver Seat Heating Current - Low Current of Driver Seat Heating Control Circuit" for troubleshooting.

1	Driver seat heating control circuit low current
---	---

- (a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.
- (b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.
- (c) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.
- (d) Disconnect the seat control module connector S-003.

(e) Using resistance band of multimeter, detect S-003 (8) - ground and S-003 (9) - ground separately.

Multimeter Connection	Condition	Specified Condition
S-003 (8) - Ground	ENGINE START STOP switch "OFF"	∞
S-003 (9) - Ground	ENGINE START STOP switch "OFF"	∞



OK

Replace seat control module assembly

NG

Handle and repair related wire harness

DTC	DTC Definition
B1B71 - 19	Abnormal Driver Seat Heating Current - High Current of Driver Heating Control Circuit
B1B72-19	Abnormal Front Passenger Seat Heating Current - High Current of Front Passenger Heating Control Circuit
B1B73-19	Abnormal Seat Adjustment Height and Horizontal Control Circuit - High Current of Height Adjustment Control Circuit
B1B74-19	Abnormal Seat Adjustment Height and Horizontal Control Circuit - High Current of Horizontal Adjustment Control Circuit
B1B76-19	Abnormal Seatback Adjustment Control Circuit - High Current of Seatback Adjustment Control Circuit
B1B77-19	Abnormal Seatback Adjustment Control Circuit - High Current of Cushion Adjustment Control Circuit

Hint:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

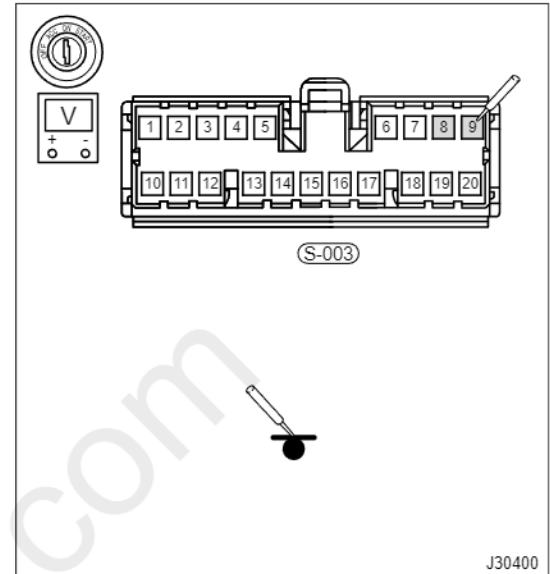
If the seat control module has similar faults, please refer to "Abnormal Driver Seat Heating Current - High Current of Driver Heating Control Circuit" for troubleshooting.

1

Driver seat heating control circuit high current

- (a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.
- (b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.
- (c) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.
- (d) Disconnect the seat control module connector S-003.
- (e) Turn ENGINE START STOP switch to ON and make all accessories operate.
- (f) Using voltage band of multimeter, detect S-003 (8) - ground and S-003 (9) - ground separately.

Multimeter Connection	Condition	Operating Voltage
S-003 (8) - Ground	ENGINE START STOP switch "ON"	0 V
S-003 (9) - Ground	ENGINE START STOP switch "ON"	0 V



OK	Replace seat control module assembly
NG	Handle and repair related wire harness

DTC	DTC Definition
B1B75 - 49	Abnormal Seat Adjustment Height and Horizontal Control Circuit - Seat Adjustment Height and Horizontal Control Circuit Inside Fault
B1B7A - 49	Abnormal Seatback Adjustment Control Circuit - Seatback and Cushion Adjustment Control Circuit Inside Fault

Hint:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

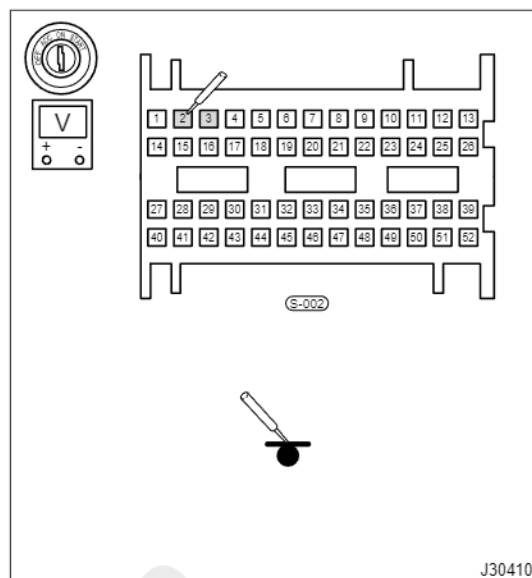
If the seat control module has similar faults, please refer to "Abnormal Seat Height and Horizontal Adjustment Control Circuit - Seat Adjustment Height and Horizontal Control Circuit Internal Failure" for troubleshooting.

1	Driver seat heating control circuit high current
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- (a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.
- (b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.
- (c) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.
- (d) Disconnect the seat control module connector S-002.
- (e) Turn ENGINE START STOP switch to ON and make all accessories operate.

- (f) Using voltage band of multimeter, detect S-002 (2) - ground and S-002 (3) - ground separately.

Multimeter Connection	Condition	Operating Voltage
S-002 (2) - Ground	ENGINE START STOP switch "ON"	12 V
S-002 (3) - Ground	ENGINE START STOP switch "ON"	12 V



OK

Replace seat control module assembly

NG

Handle and repair related wire harness

DTC	DTC Definition
B1B80 - 1A	Abnormal Heating NTC Input Feedback Value - Driver Heating NTC Input Feedback Value too Small
B1B81 - 1A	Abnormal Heating NTC Input Feedback Value - Front Passenger Heating NTC Input Feedback Value too Small
B1B80 - 1B	Abnormal Driver Heating NTC Input Value - Driver Heating NTC Input Value too Large
B1B81 - 1B	Abnormal Passenger Heating NTC Input Value - Passenger Heating NTC Input Value too Large
B1B80 - 1E	Abnormal Heating NTC Input Feedback Value - Driver Heating NTC Input Feedback Value No Change
B1B81 - 1E	Abnormal Heating NTC Input Feedback Value - Front Passenger Heating NTC Input Feedback Value No Change

Hint:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

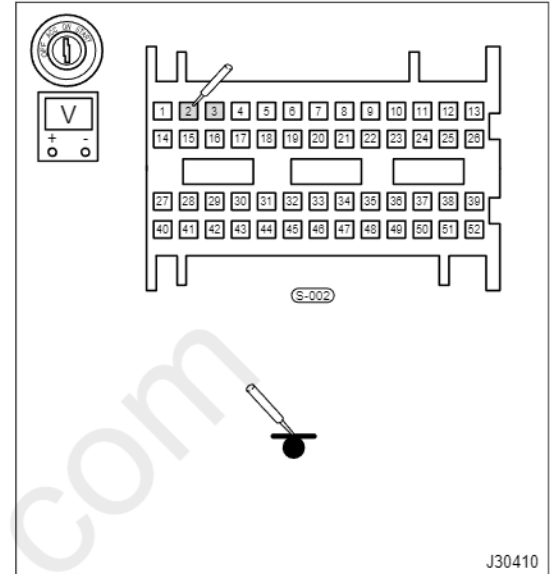
If the seat control module has similar faults, please refer to "Abnormal Heating NTC Input Feedback Value - Driver Heating NTC Input Feedback Value too Small" for troubleshooting.

1

Driver seat heating NTC input feedback value is too small

- (a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.
- (b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.
- (c) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.
- (d) Disconnect the seat control module connector S-002.
- (e) Turn ENGINE START STOP switch to ON and make all accessories operate.
- (f) Using resistance band of multimeter, detect S-002 (17) - ground and S-002 (45) - ground separately.

Multimeter Connection	Condition	Specified Condition
S-002 (17) - Ground	ENGINE START STOP switch "OFF"	∞
S-002 (45) - Ground	ENGINE START STOP switch "OFF"	∞



OK	Replace seat control module assembly
NG	Handle and repair related wire harness

DTC	DTC Definition
B1B82 - 29	Abnormal HALL Signal Input Signal - Height Adjustment HALL Input Signal Missing
B1B83 - 29	Abnormal HALL Signal Input Signal - Front-back Adjustment HALL Input Signal Missing
B1B84 - 29	Abnormal HALL Signal Input Signal - Seatback Adjustment HALL Input Signal Missing
B1B85 - 29	Abnormal HALL Signal Input Signal - Cushion Adjustment HALL Input Signal Missing

Hint:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

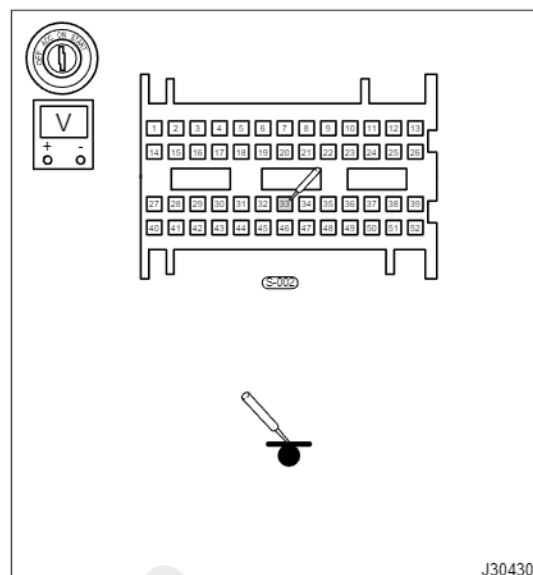
If the seat control module has similar faults, please refer to "Abnormal HALL Input Signal - Height Adjustment HALL Input Signal Missing" for troubleshooting.

1	Height adjustment HALL input signal is missing
---	--

- (a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.
- (b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.
- (c) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.
- (d) Disconnect the seat control module connector S-002.
- (e) Turn ENGINE START STOP switch to ON and make all accessories operate.

(f) Using voltage band of multimeter, detect S-002 (33) - ground.

Multimeter Connection	Condition	Operating Voltage
S-002 (33) - Ground	ENGINE START STOP switch "ON"	6 V



J30430

OK

Replace seat control module assembly

NG

Handle and repair related wire harness

DTC	DTC Definition
B1B85-54	No Learning by Seat
1	Seat self-learning

(a) Perform self-learning with diagnostic tester.

OK

Perform running test after clearing DTCs

DTC	DTC Definition
U134F-88	CAN Bus Off
U1160 - 87	Lost Communication With AIPM
U0140-87	Lost Communication With BCM
U0199-87	Lost Communication With DCM
U0100-87	Lost Communication With EMS
U0122-87	Lost Communication With ESC
U0245-87	Lost Communication With IHU
U0248-87	Lost Communication with PEPS
U0101-87	Lost Communication With TCU
U1471-81	Invalid Data from AIPM
U0422-81	Invalid Data from BCM
U049A-81	Invalid Data from DCM
U0401-81	Invalid Data from EMS
U0416-81	Invalid Data from ESC

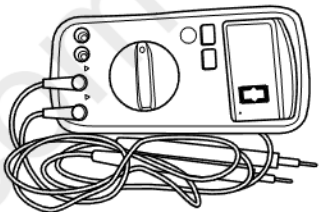
U0546-81	Invalid Data from IHU
U0426-81	Invalid Data from PEPS
U0402-81	Invalid Data from TCU
U1300-55	Software Configuration Error

1	Refer to “CAN COMMUNICATION” for troubleshooting
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54.5 ON-VEHICLE SERVICE

1 Tools

Tool Name	Tool Drawing
Diagnostic Tester	 S00001
Digital Multimeter	 S00002

2 Replace Front Seat Assembly

2.1 Removal

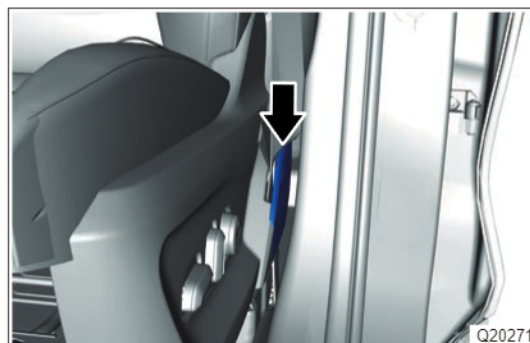
Caution

- When removing driver seat assembly, be sure to wear safety equipment to prevent accidents.
- When removing driver seat assembly, appropriate force should be applied. Be careful not to operate roughly.
- **DO NOT** scratch interior and body paint when removing driver seat assembly.

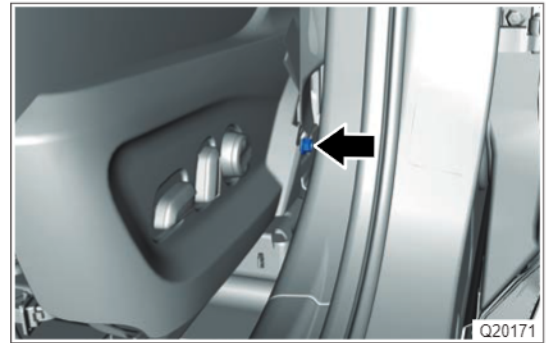
Hint:

- Removal method of front right seat and front left side is same. Take the left side as an example.

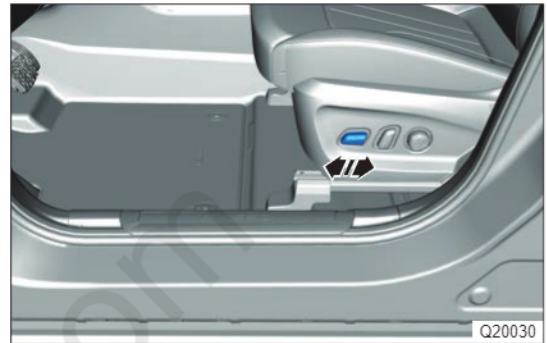
- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Using an interior crow plate, pry off side panel trim cover carefully.



- (4) Remove 1 fixing bolt from seat belt lower end plate (14# socket wrench).



- (5) Press power seat front-back adjustment switch, and move seat assembly to rearmost position.



- (6) When the seatback is adjusted to a higher angle backward, press the release button of seat headrest guide at the same time, and remove driver seat headrest assembly.



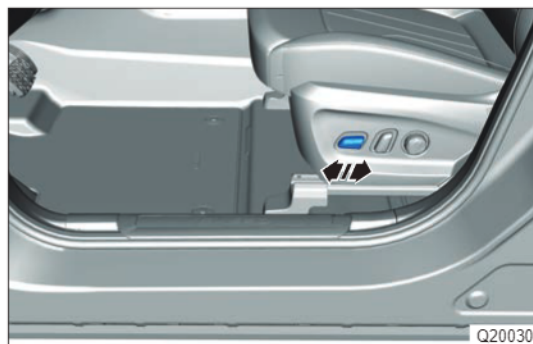
- (7) Remove 2 inner leg cover assemblies from front part of seat assembly.



- (8) Remove 2 fixing bolts from front part of seat assembly.



- (9) Press power seat front-back adjustment switch, and move seat assembly to foremost position.



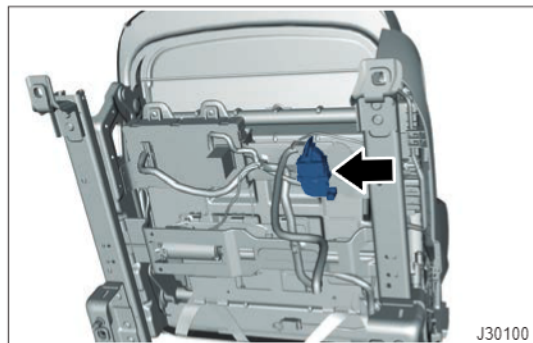
- (10) Remove 2 inner leg cover assemblies from rear part of seat assembly with a flat tip screwdriver.



- (11) Remove 3 fixing bolts from rear part of seat assembly.



- (12) Disconnect the wire harness connector associated with driver seat assembly, and remove the driver seat assembly.



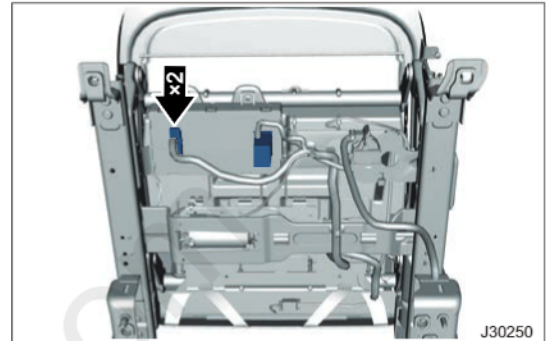
- (13) Using a screwdriver wrapped with protective tape, remove seat height front-back adjustment button, seatback adjustment button.



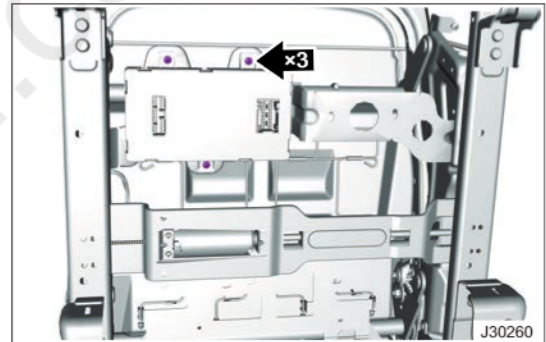
- (14) Using an interior crow plate, pry off front left seat outside side panel.



- (15) Disconnect the driver seat control module wire harness.



- (16) Remove 3 fixing bolts from driver seat control module.



2.2 Inspection

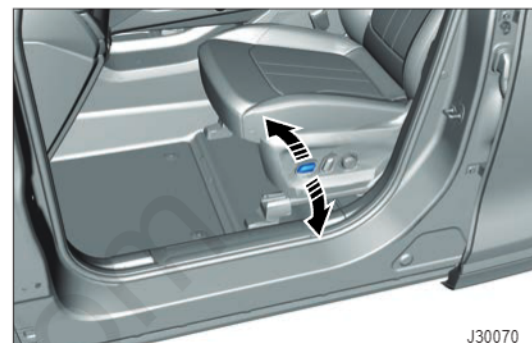
- (1) Installation of driver seat and front passenger seat should be firm and reliable. Driver seat belt and front passenger seat belt should be complete and effective.
- (2) Check the old and new degree of the seat, the seat surface should be flat, clean and free from damage. After installation of seat assembly is completed, check the basic functions of seat assembly, and confirm that the following functions operate normally:
 - (1) When sliding seat to the foremost and rearmost positions by pressing the power seat adjustment switch, check if the following malfunctions of seat occur: heavy operation, high sliding resistance, stuck and motor noise. If above conditions occur, repair or replace in time.



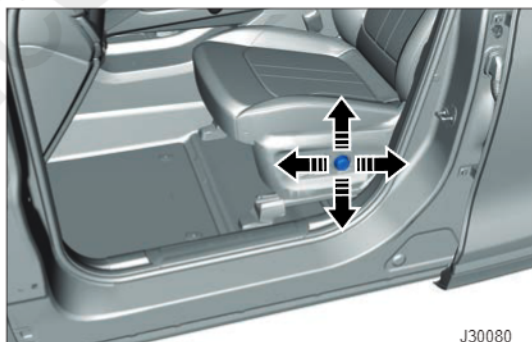
- (2) Adjust the seat reclining to the maximum and minimum angles by pressing the power seat reclining adjustment switch, to check if seatback is heavily turned over and stuck, motor noise, etc. If above conditions occur, repair or replace in time.



- (3) Adjust seat to the highest position and the lowest position by pressing power seat height adjustment switch (for driver side), to check if the operation of seat is heavy and stuck, and motor noise, etc. If above conditions occur, repair or replace in time.



- (4) Press 4-way lumbar support adjustment switch (for driver side) to adjust seat to the limit positions of up, down, left and right to check if lumbar support stretches or retracts difficultly, air pocket is leaked and there is abnormal sound in air pump, etc. If above conditions occur, repair or replace in time.



- (5) Turn power switch to ON, seat belt reminder warning light on instrument cluster should be illuminated, after inserting the front seat belt tab into front seat belt buckle, seat belt reminder warning light should go off (only for seat with Seat Belt Unfasten Reminder (SBR)).
- (6) For front passenger seat with SBR, when a passenger is detected in front passenger seat but the seat belt is not fastened, warning light on instrument cluster should be illuminated, after inserting the seat belt tab into seat belt buckle, seat belt reminder warning light should go off.
- (7) Check the seat occupancy sensor (for front passenger side).
- (8) Measure the resistance of occupancy sensor with a digital multimeter, standard resistance is shown in the table below:

Multimeter Connection	Condition	Specified Condition
Terminal 1 and Terminal 2	Occupied	< 100 Ω
Terminal 1 and Terminal 2	No occupied	> 400 Ω



2.3 Installation

Caution

- **Be sure to wear safety equipment to prevent accidents, when installing front left seat assembly.**
- **When installing front left seat assembly, be careful not to damage the body paint surface.**
- **Try to prevent carpet from being scratched or damaged, when installing front left seat assembly.**

- (1) Install 3 fixing bolts of driver seat control module.
Torque: $2.5 \pm 0.5 \text{ N}\cdot\text{m}$
- (2) Install the driver seat control module wire harness.
- (3) Install the driver seat assembly outside side panel.
- (4) Install seat height front-back adjustment button, seatback adjustment button.
- (5) Install driver seat assembly, connect wire harness connector associated with driver seat assembly.
- (6) Push front-back adjustment button forward, and pull the left and right slide rails to foremost end, so that the positioning pin at the rear fixing point of the seat track is aligned with the positioning pin hole on the body floor. First, pre-screw the bolt into the front installation hole of the seat track, and then tighten 2 bolts at the rear installation point to install the seat rear inner leg protector assembly.
Torque: $50 \pm 5 \text{ N}\cdot\text{m}$
- (7) Slide the seat to the rearmost position, first pre-screw the bolt into the front installation hole of the seat track, and then tighten 2 bolts at the rear installation point. (Note: For manual seats, adjust the seat forward or backward and the seatback angle by adjusting the seat release lever).
Torque: $50 \pm 5 \text{ N}\cdot\text{m}$
- (8) Connect the negative battery cable.
- (9) Connect EXEED special diagnostic tester, read and clear DTCs.

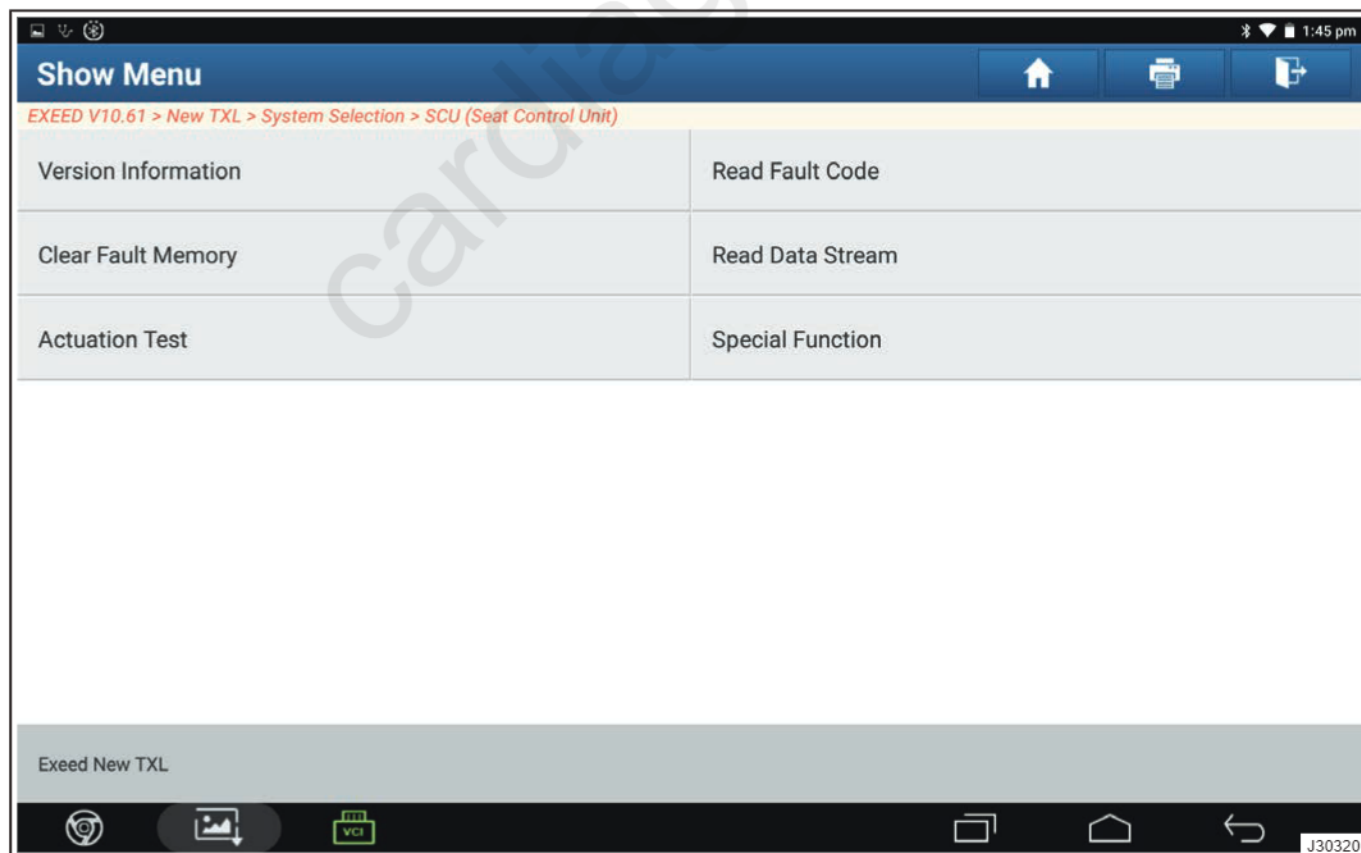
2.4 Self-learning

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect the diagnostic tester (the latest software).
- (3) Turn ENGINE START STOP switch to ON.
- (4) Click "Traditional Diagnosis" .
- (5) Click "New TXL" .

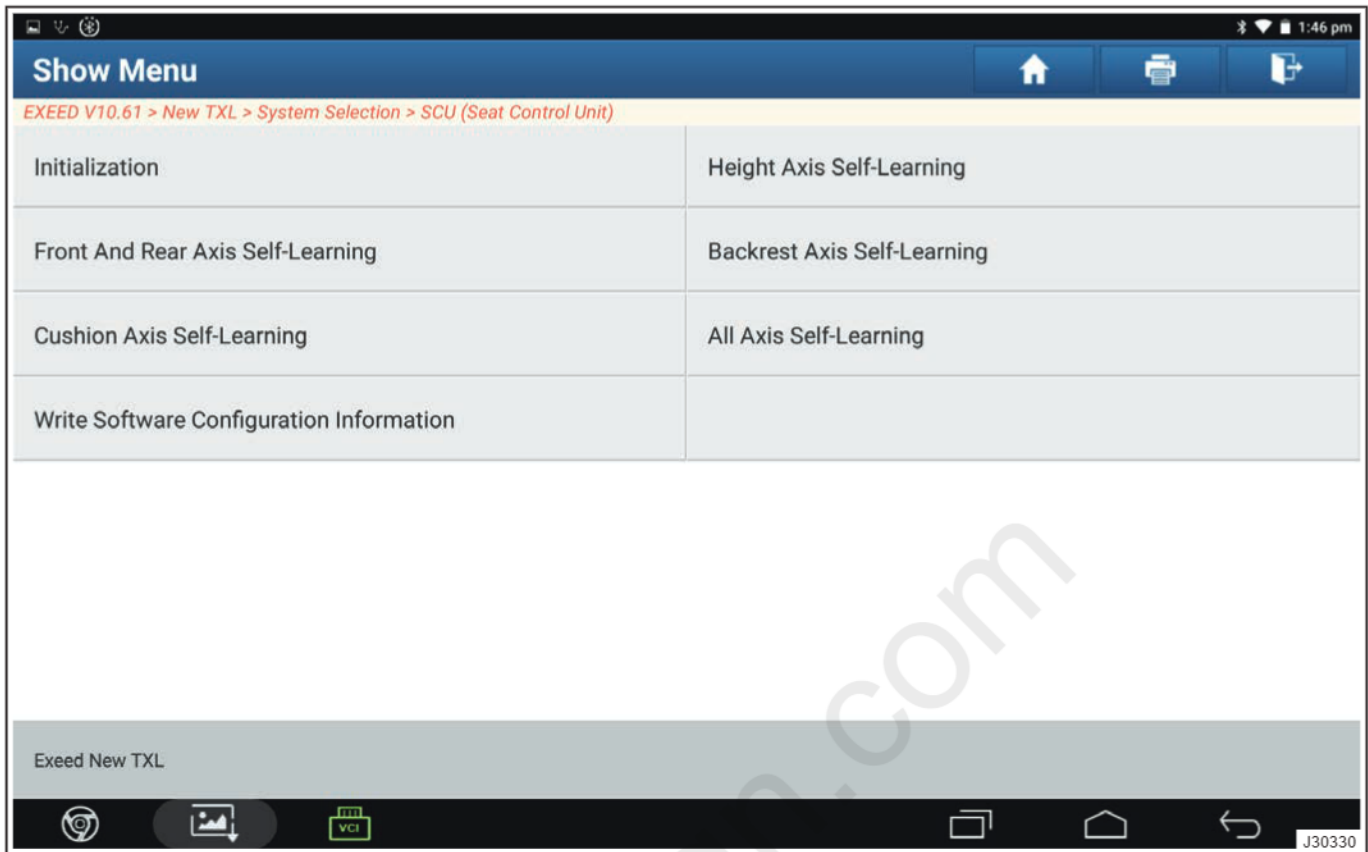
(6) Click “SCU (Seat Control Unit)” .



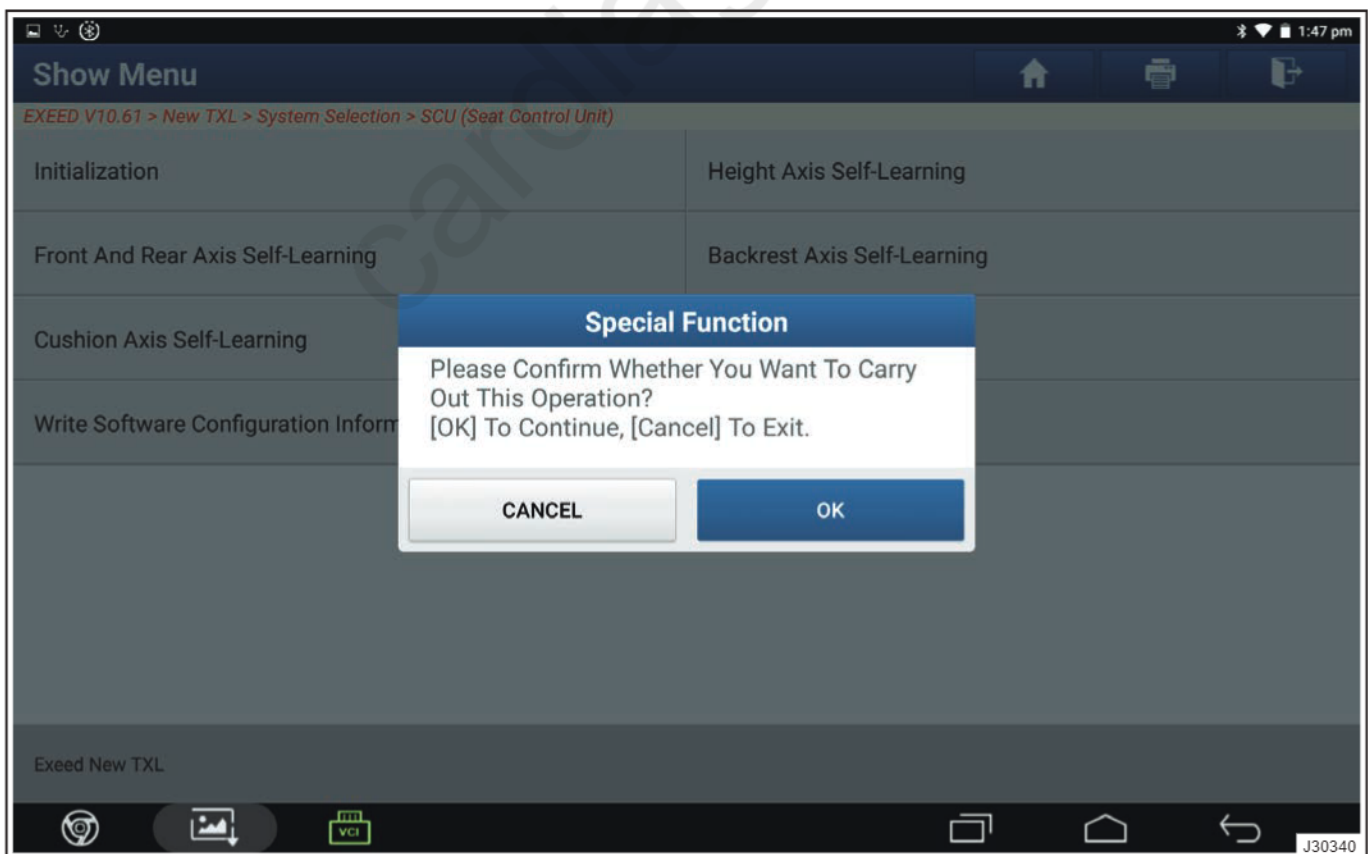
(7) Click “Special Function” .



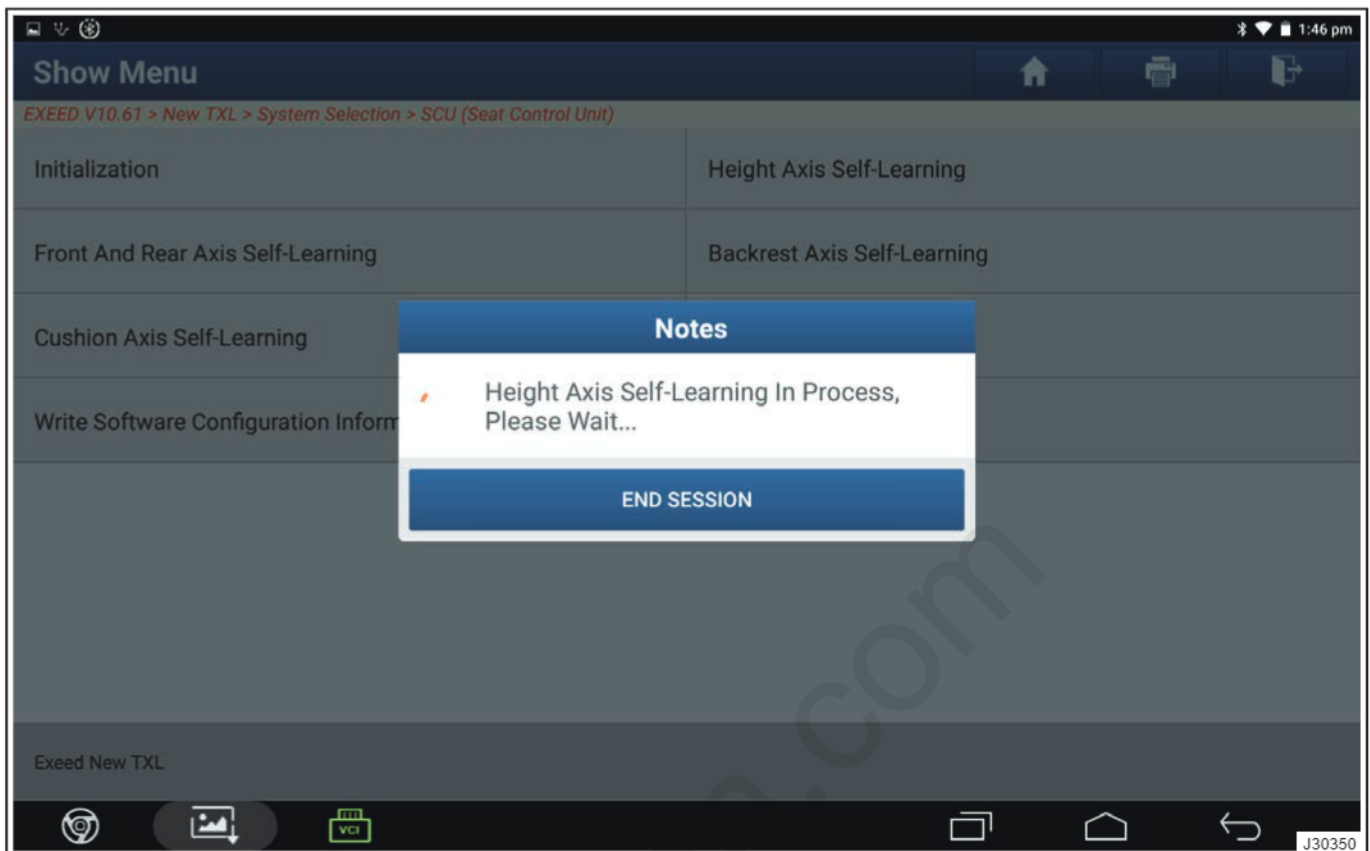
(8) Click “Height Axis Self Learning” .



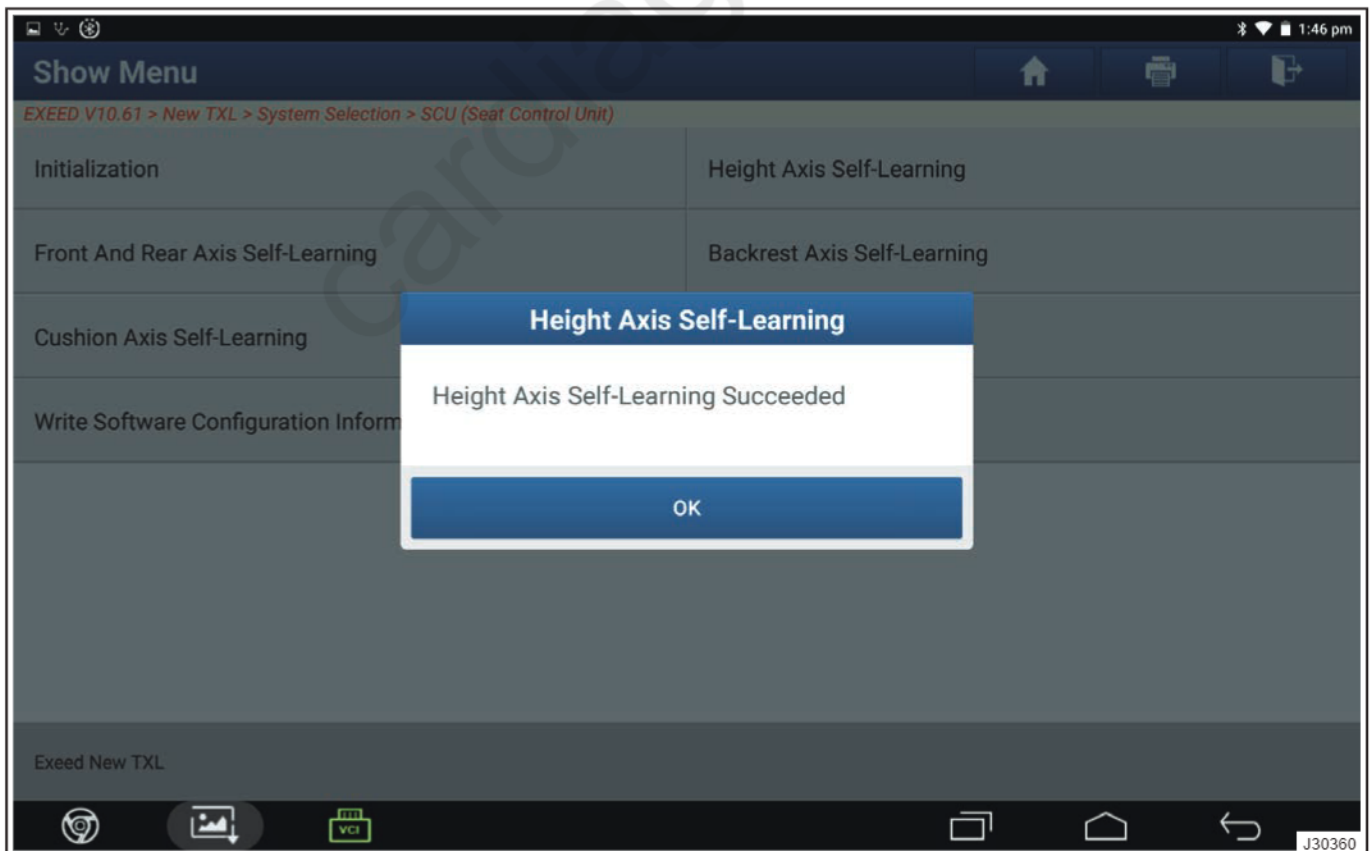
(9) “Please Confirm Whether You Want To Carry Out This Operation? OK To Continue, Cancel To Exit” is displayed on the screen. Click “OK” .



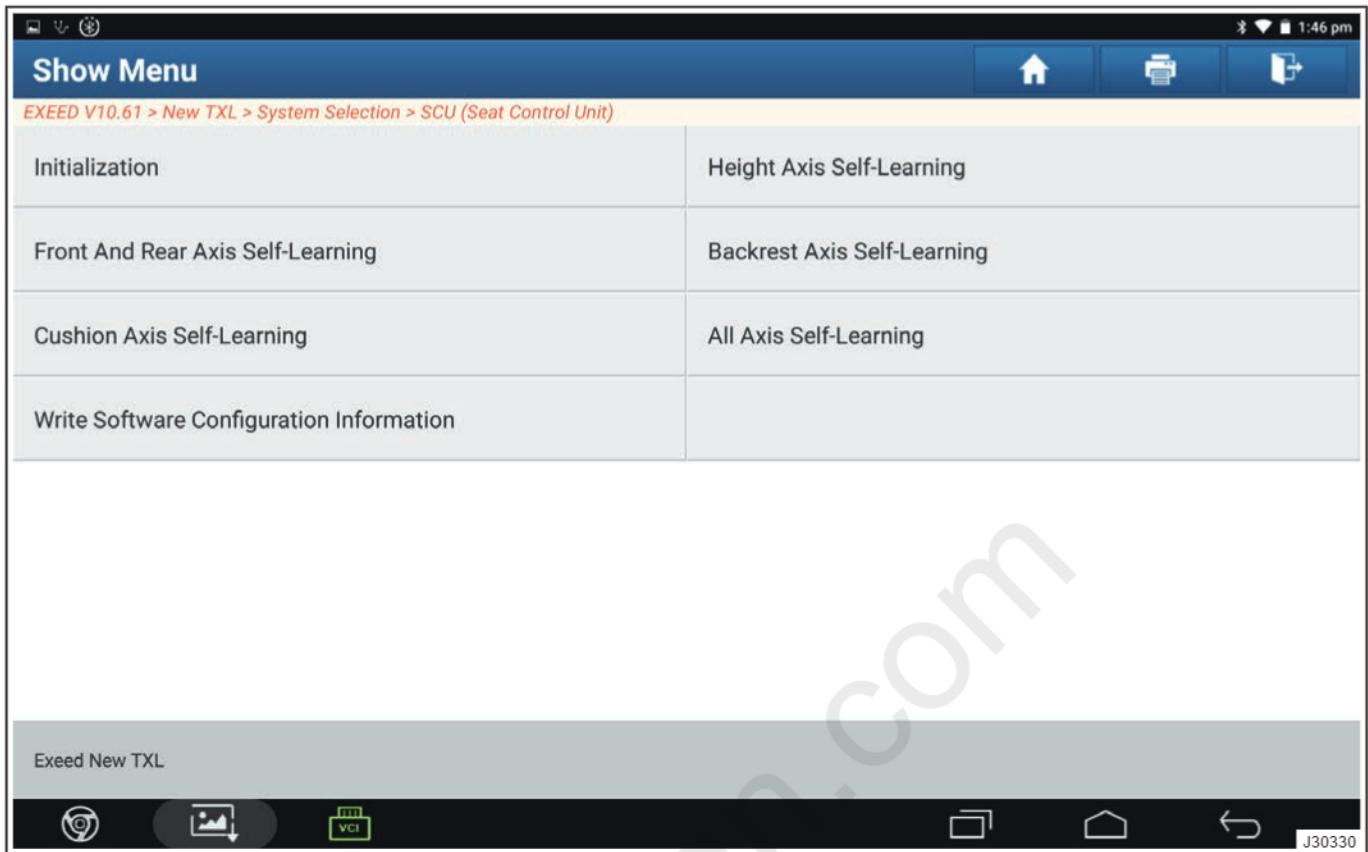
(10) Height Axis Self Learning In Process, Please Wait.



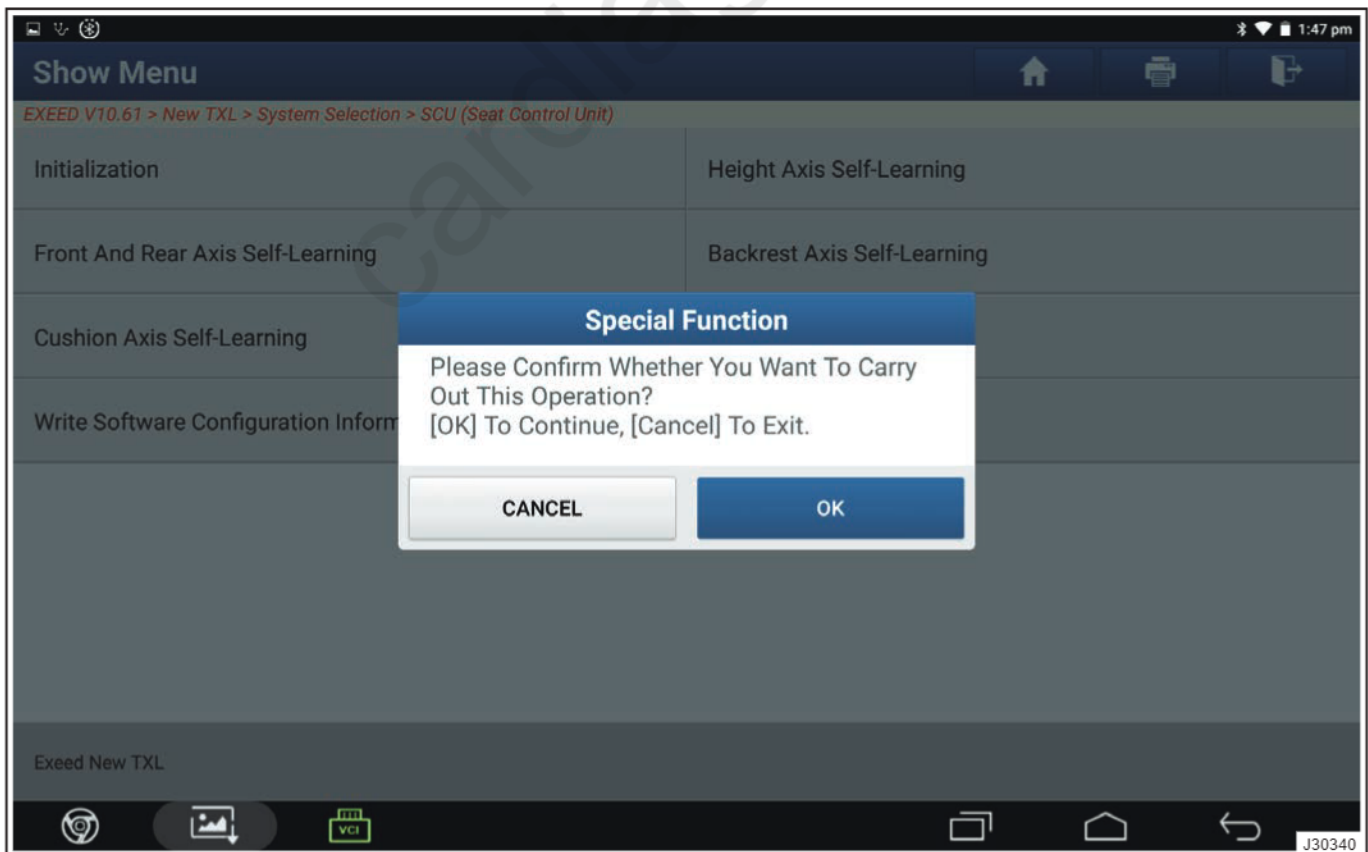
(11) Height Axis Self Learning Succeeded.



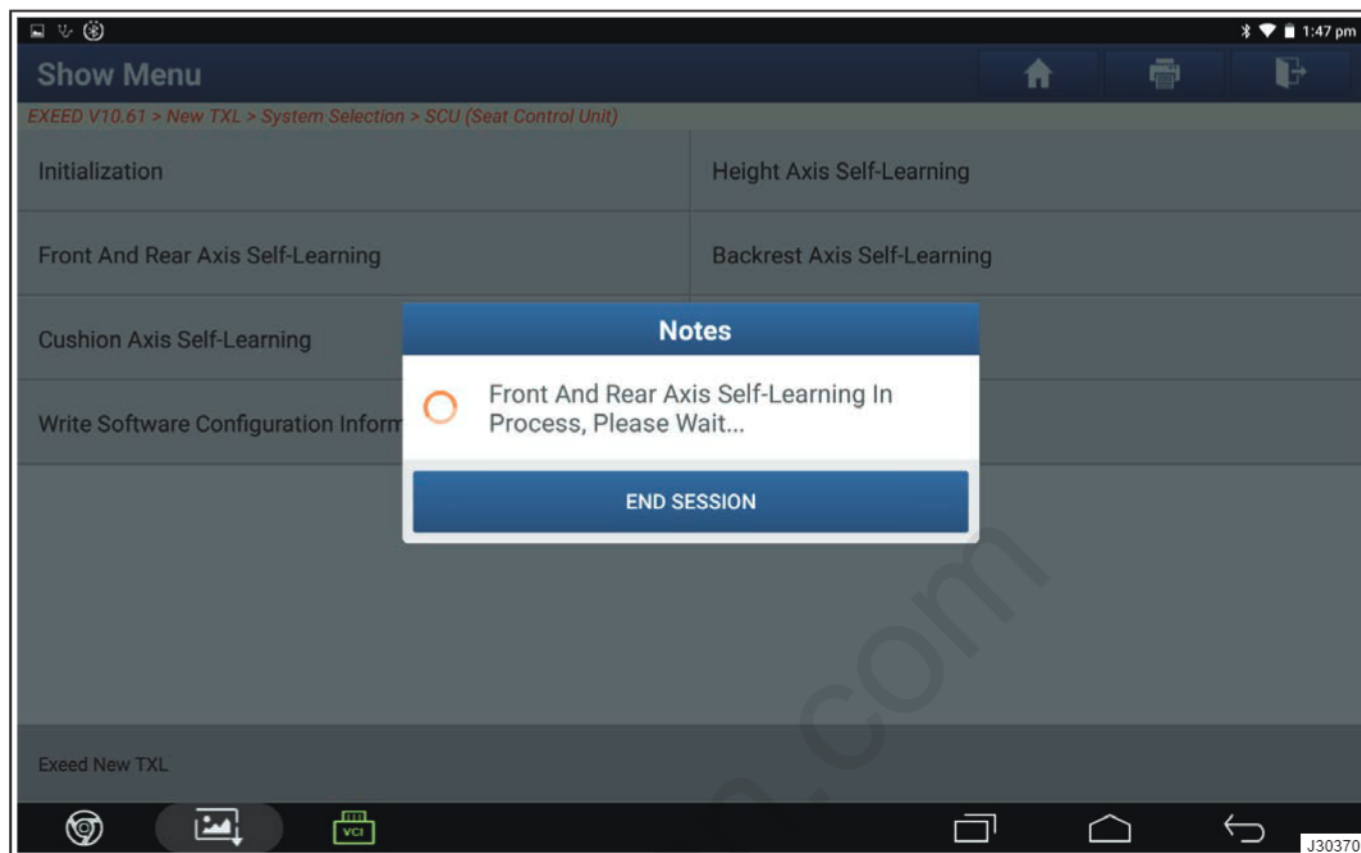
(12) Return and click “Front And Rear Axis Self Learning” .



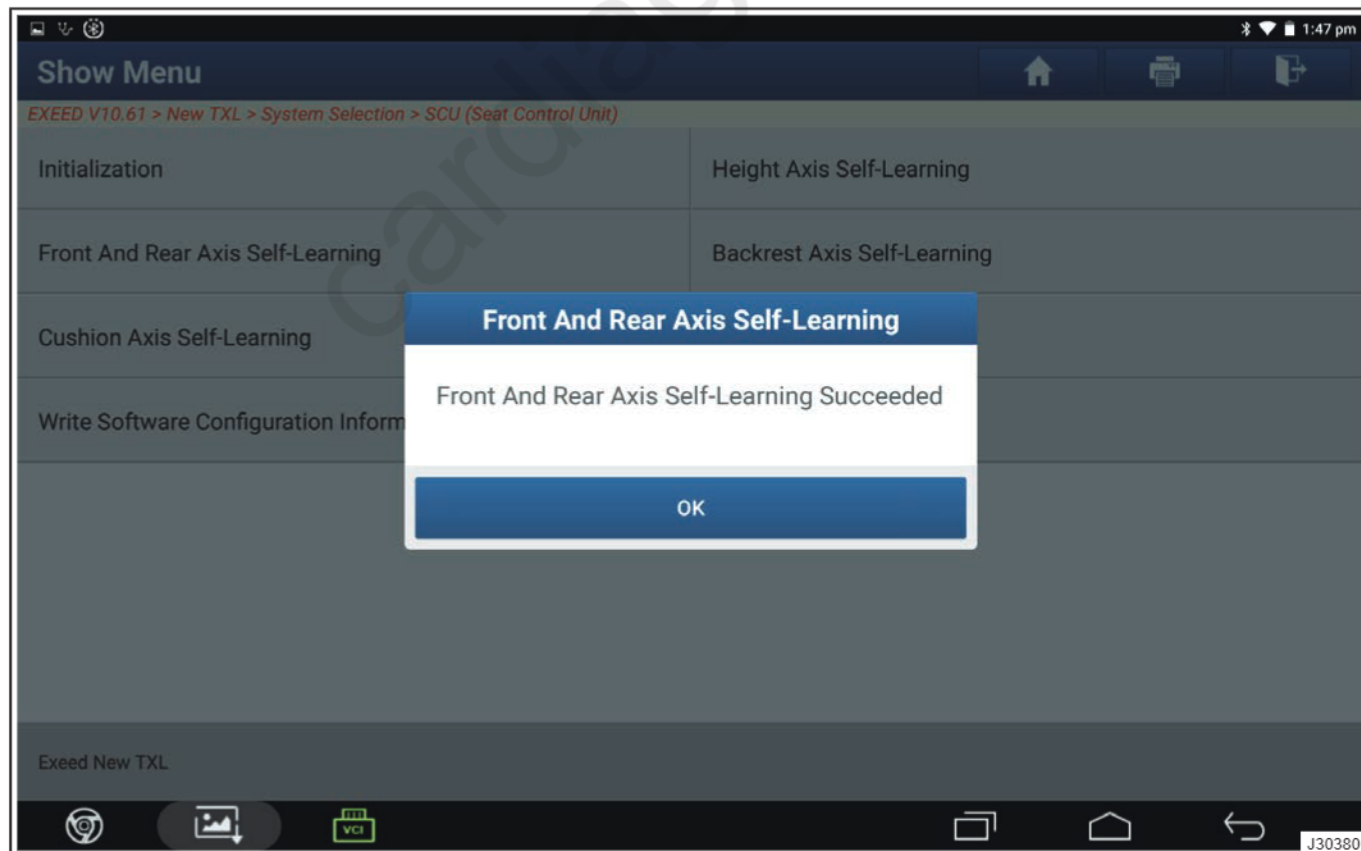
(13) “Please Confirm Whether You Want To Carry Out This Operation? OK To Continue, Cancel To Exit” is displayed on the screen. Click “OK” .



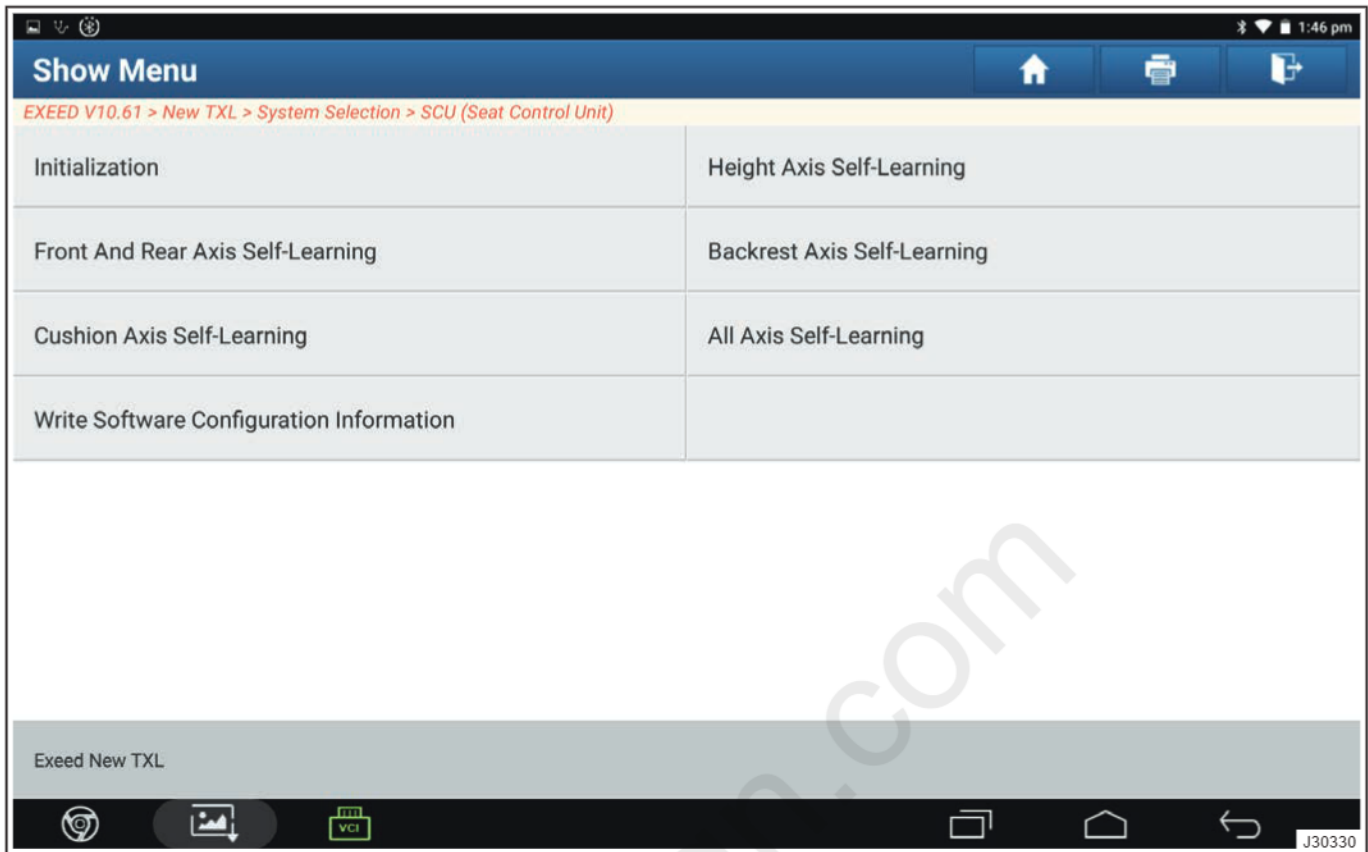
(14) Front And Rear Axis Self Learning In Process, Please Wait.



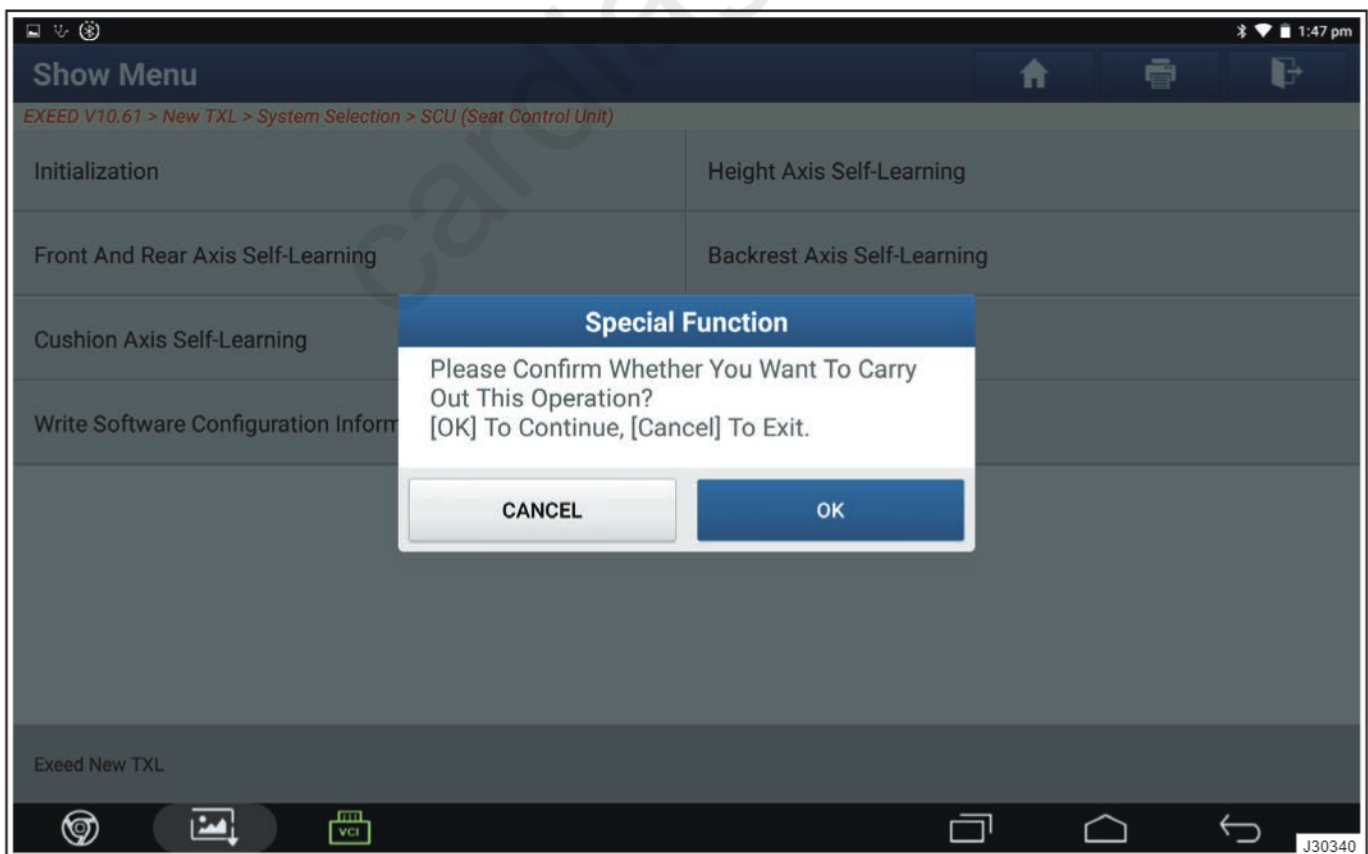
(15) Front And Rear Axis Self Learning Succeeded.



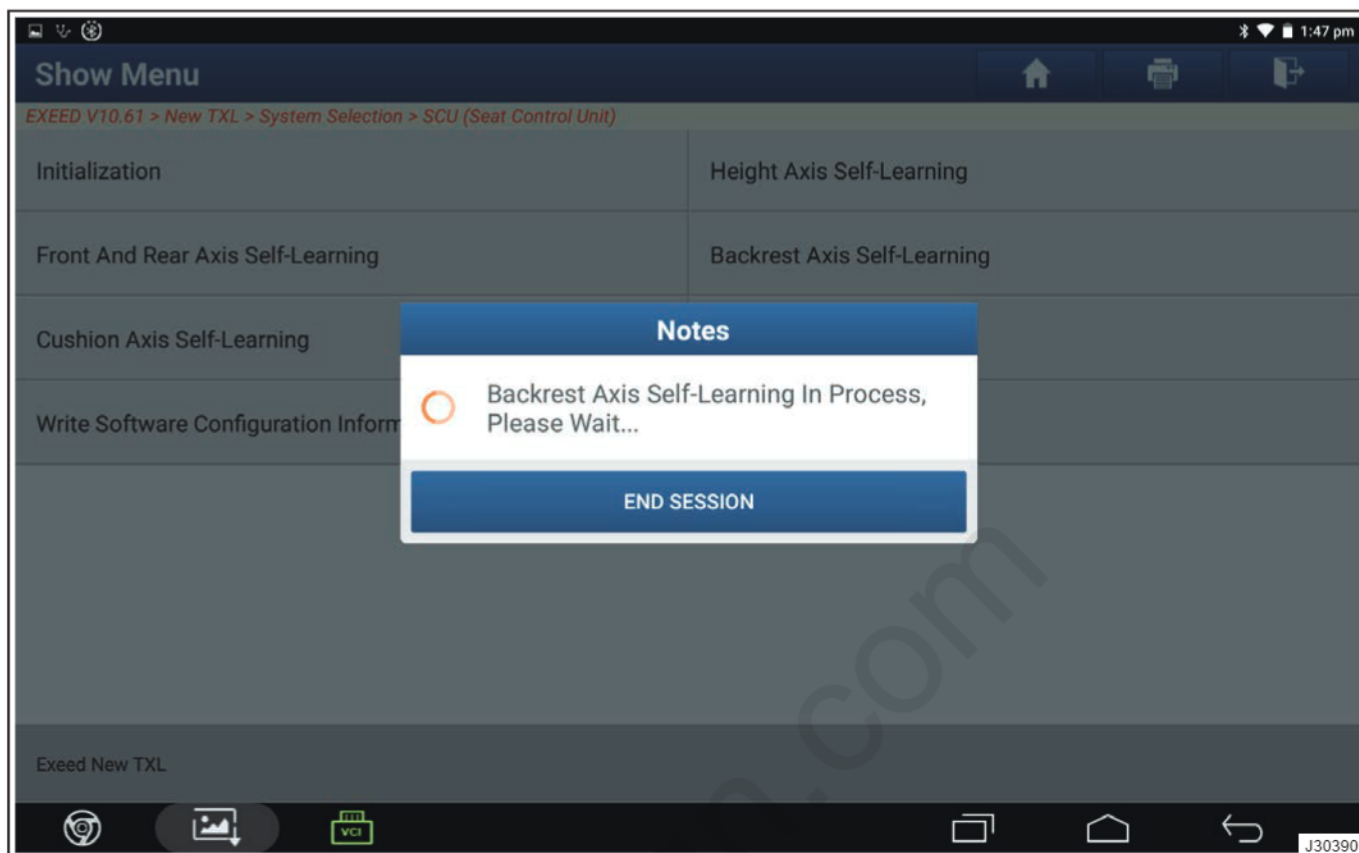
(16) Return and click “Backrest Axis Self Learning” .



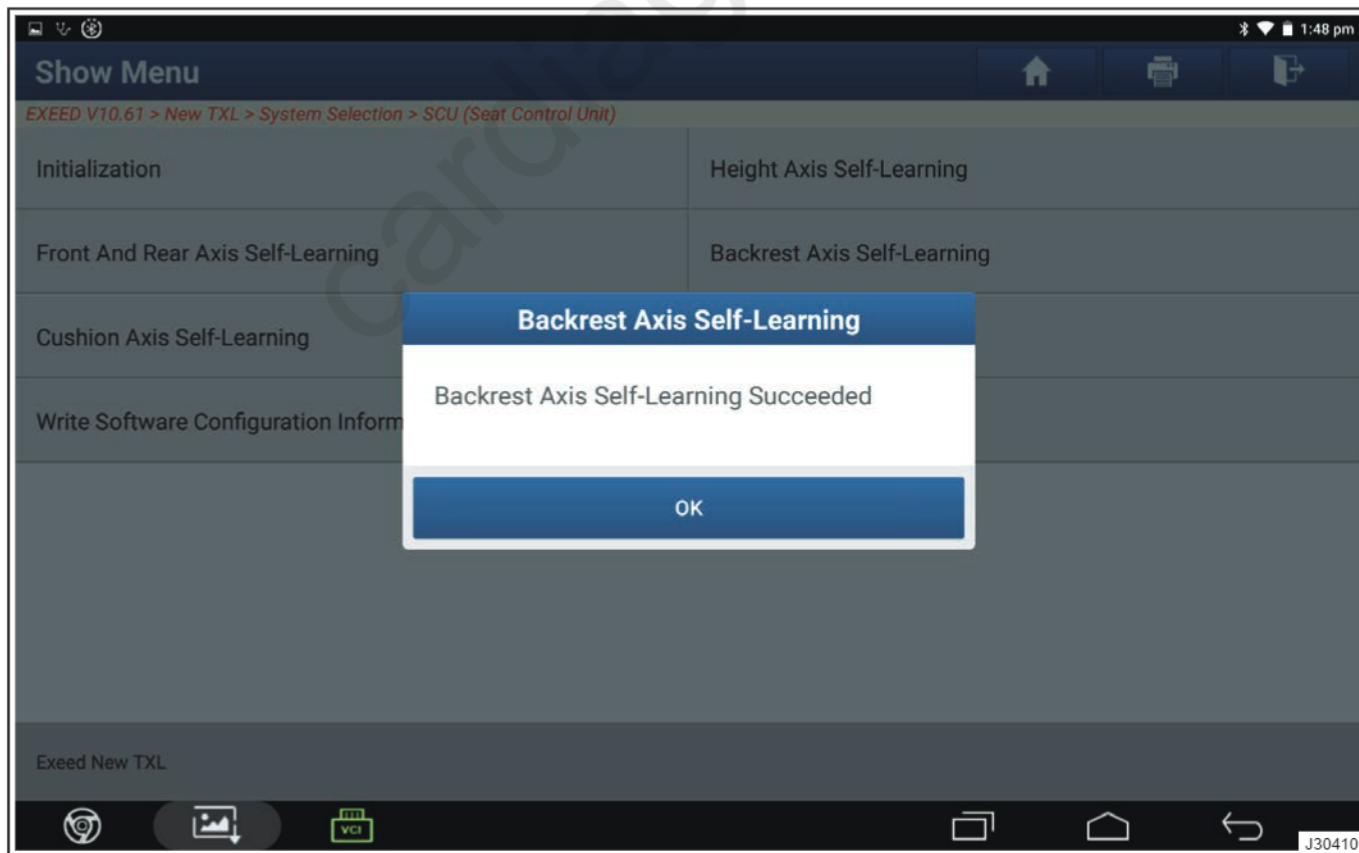
(17) “Please Confirm Whether You Want To Carry Out This Operation? OK To Continue, Cancel To Exit” is displayed on the screen. Click “OK” .



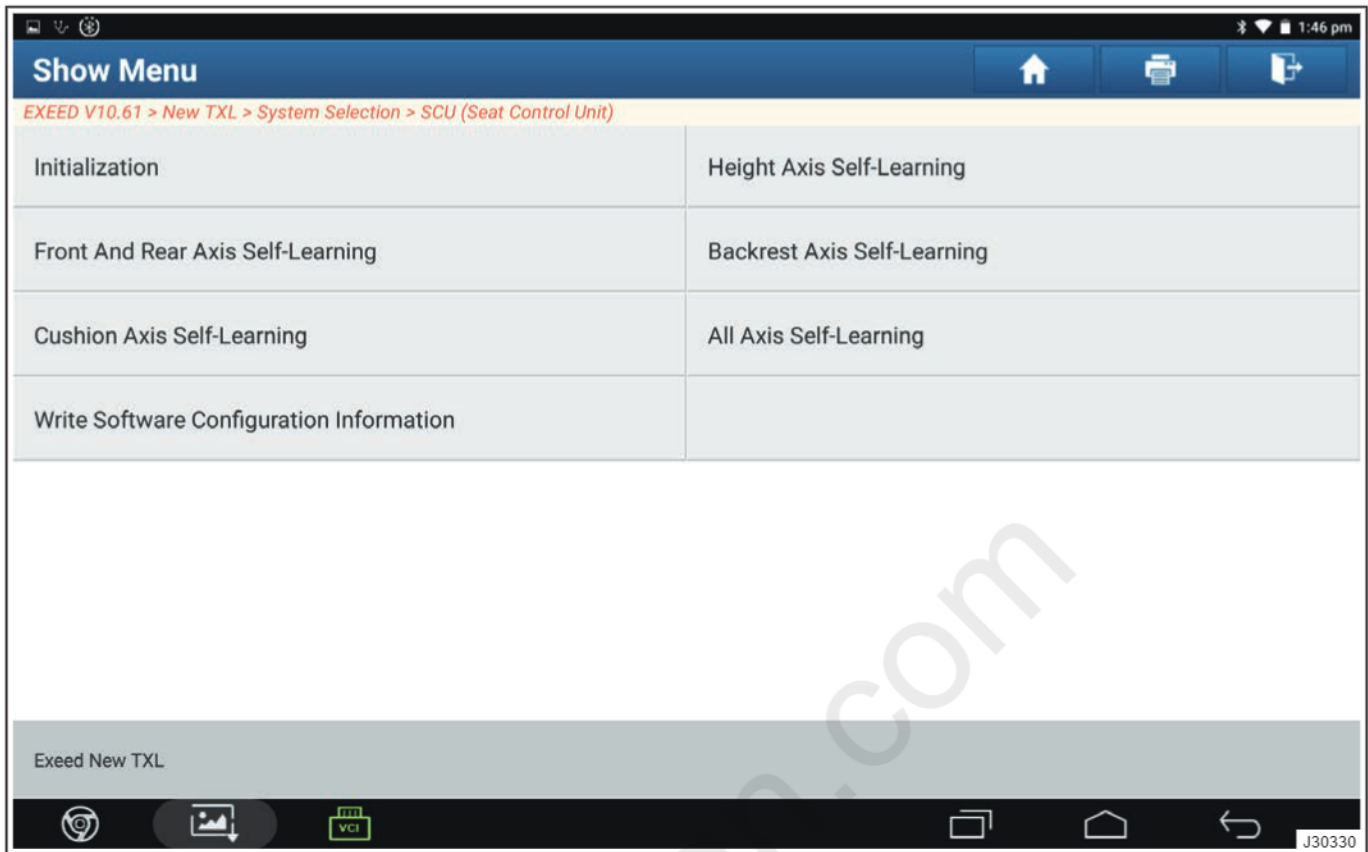
(18) Backrest Axis Self Learning In Process, Please Wait.



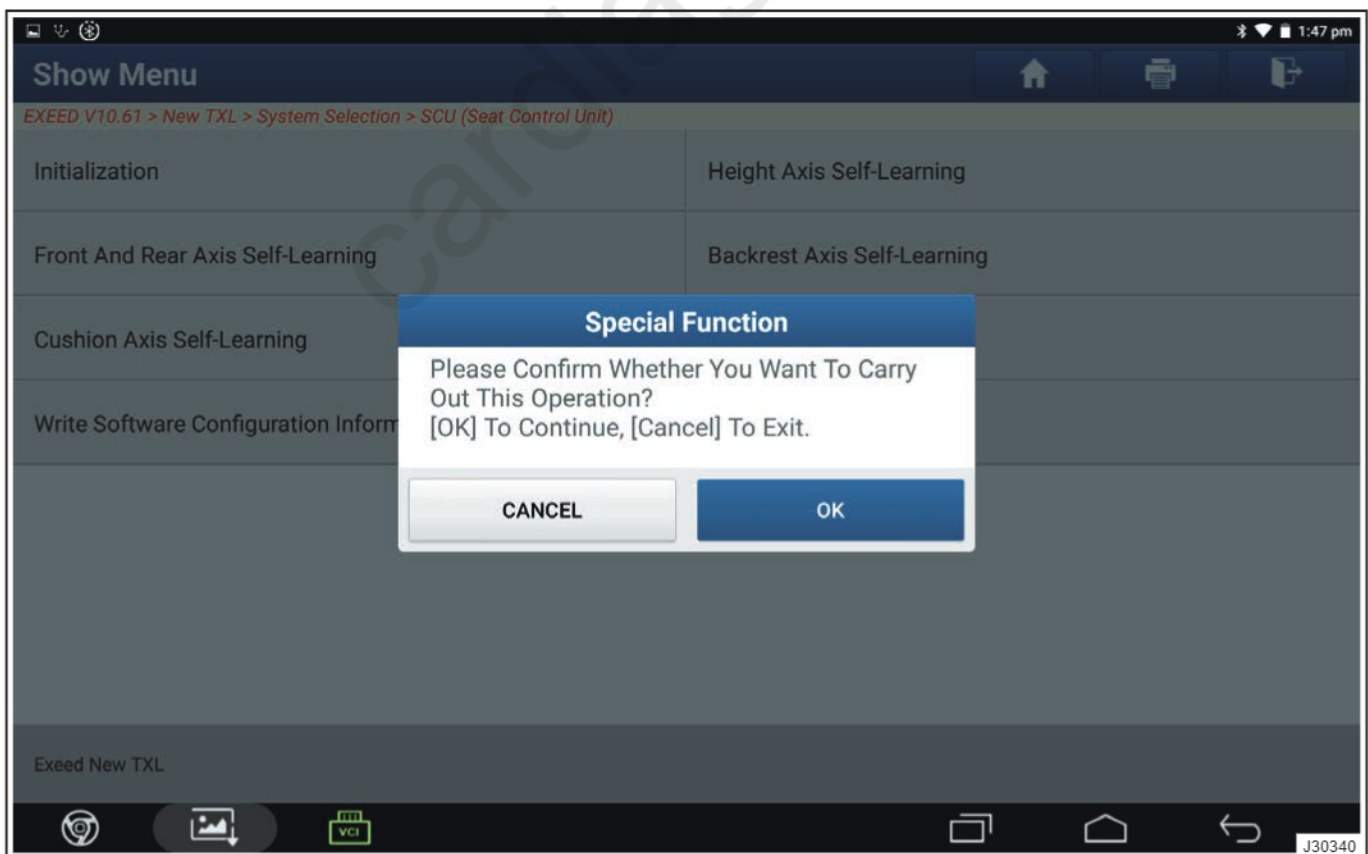
(19) Backrest Axis Self Learning Succeeded.



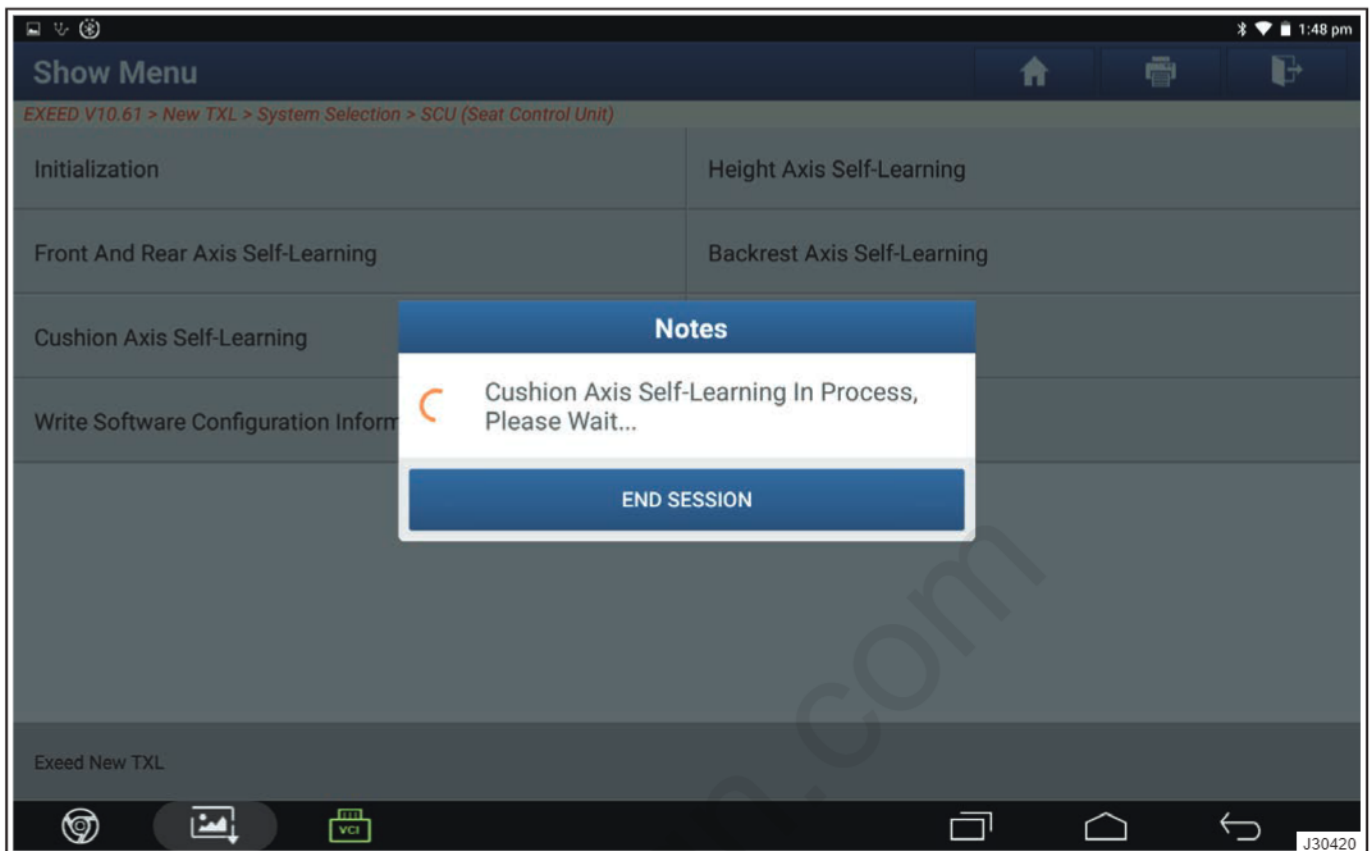
(20) Return and click “Cushion Shaft Auto Learning” .



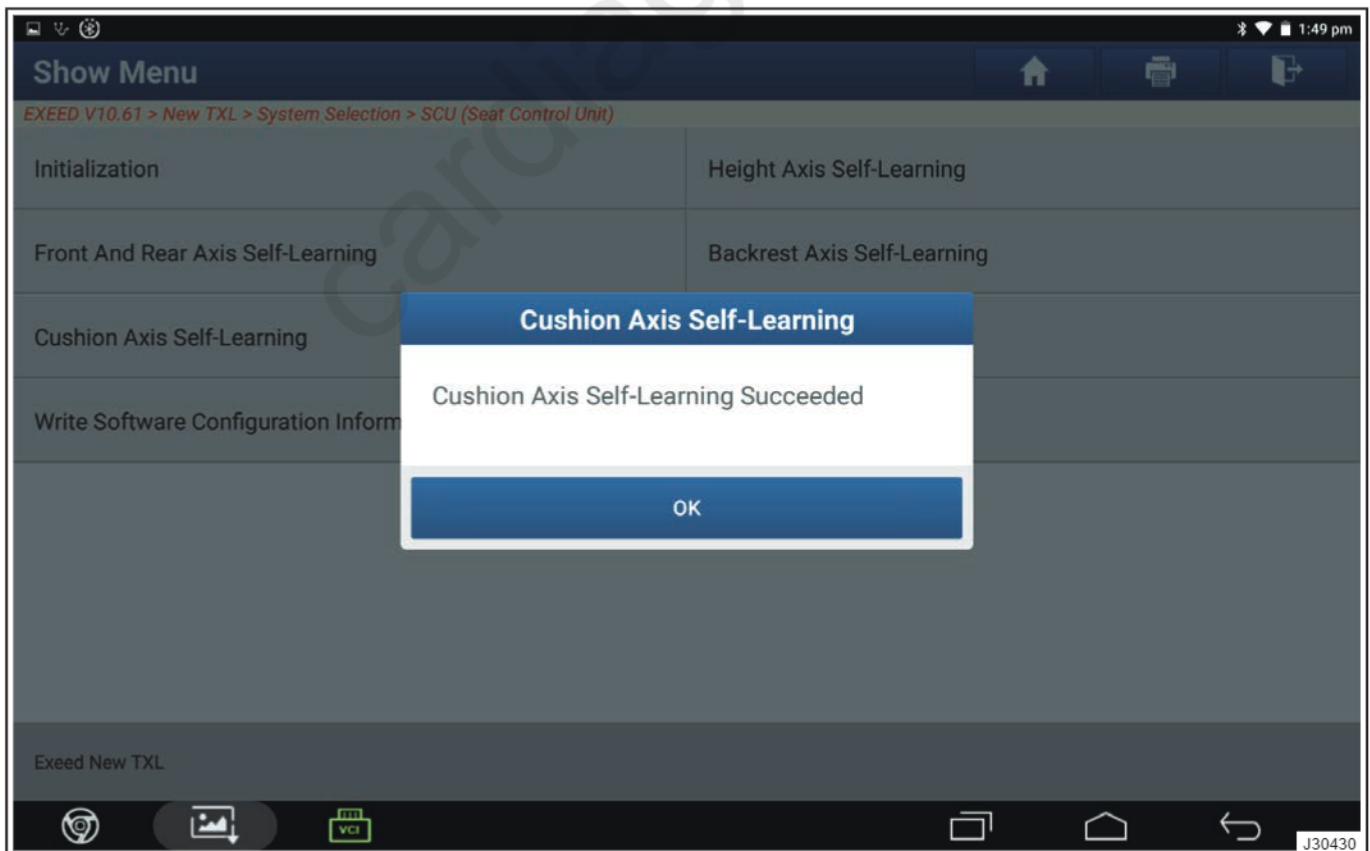
(21) “Please Confirm Whether You Want To Carry Out This Operation? OK To Continue, Cancel To Exit” is displayed on the screen. Click “OK” .



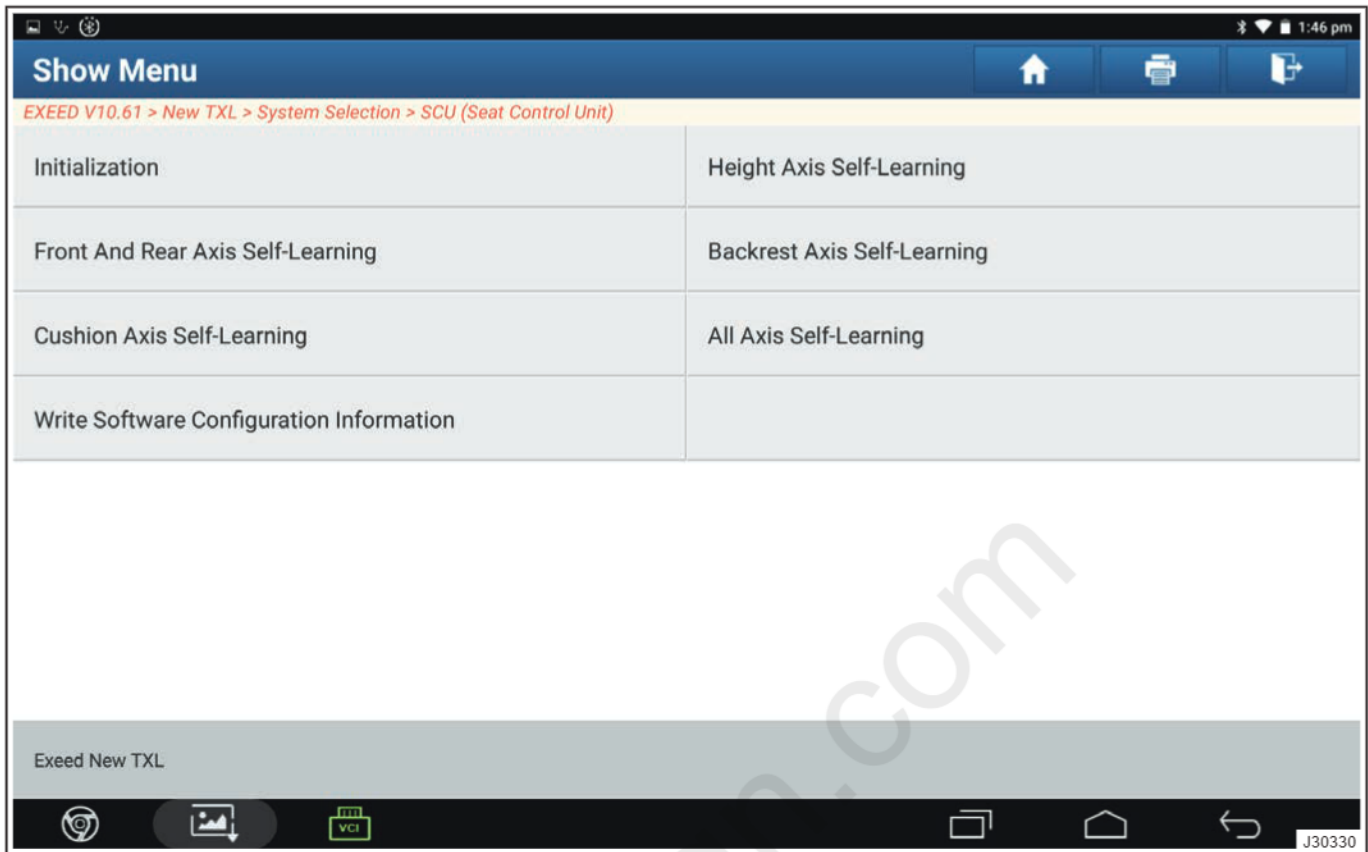
(22) Cushion Axis Self-learning In Process, Please Wait.



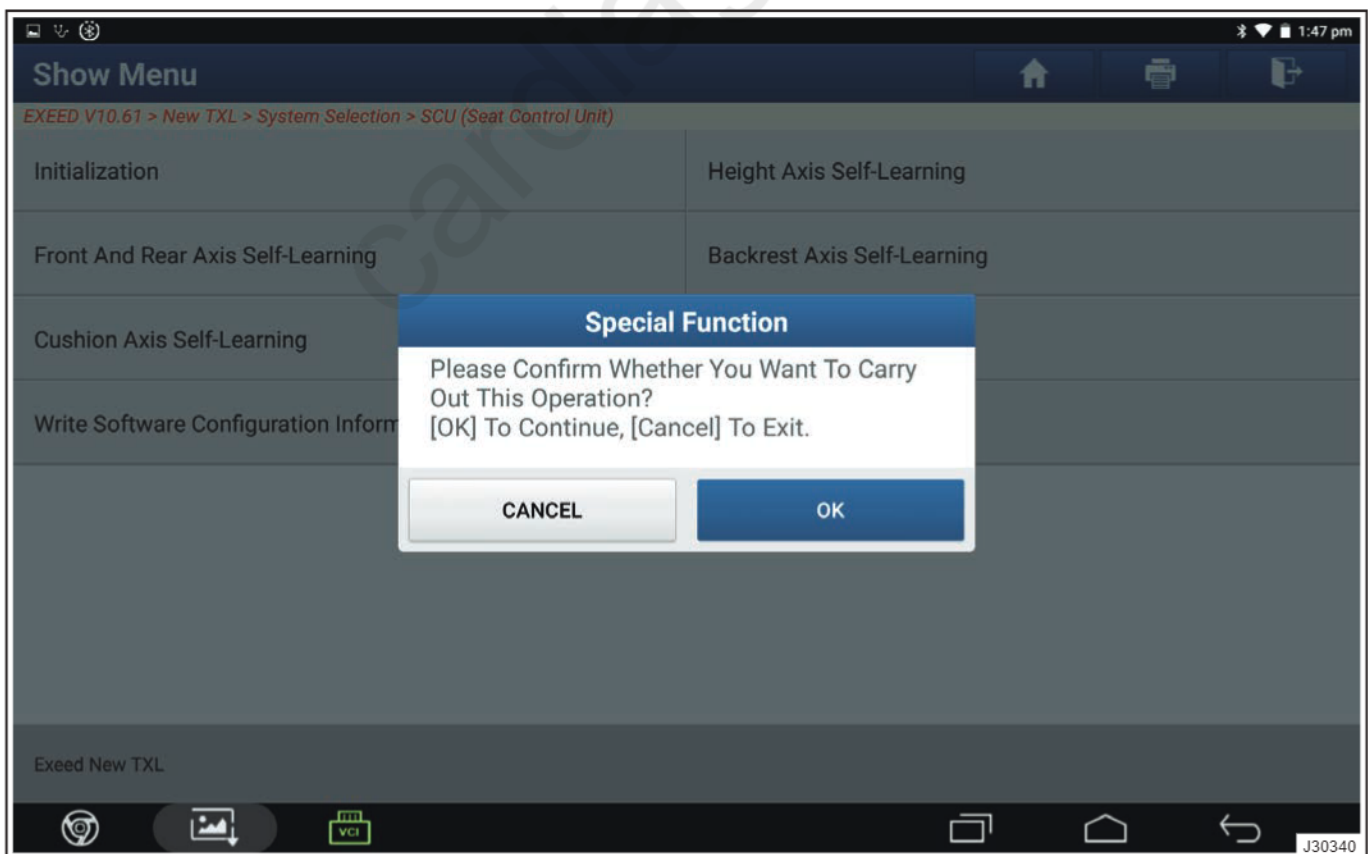
(23) Cushion axis auto learning is successful.



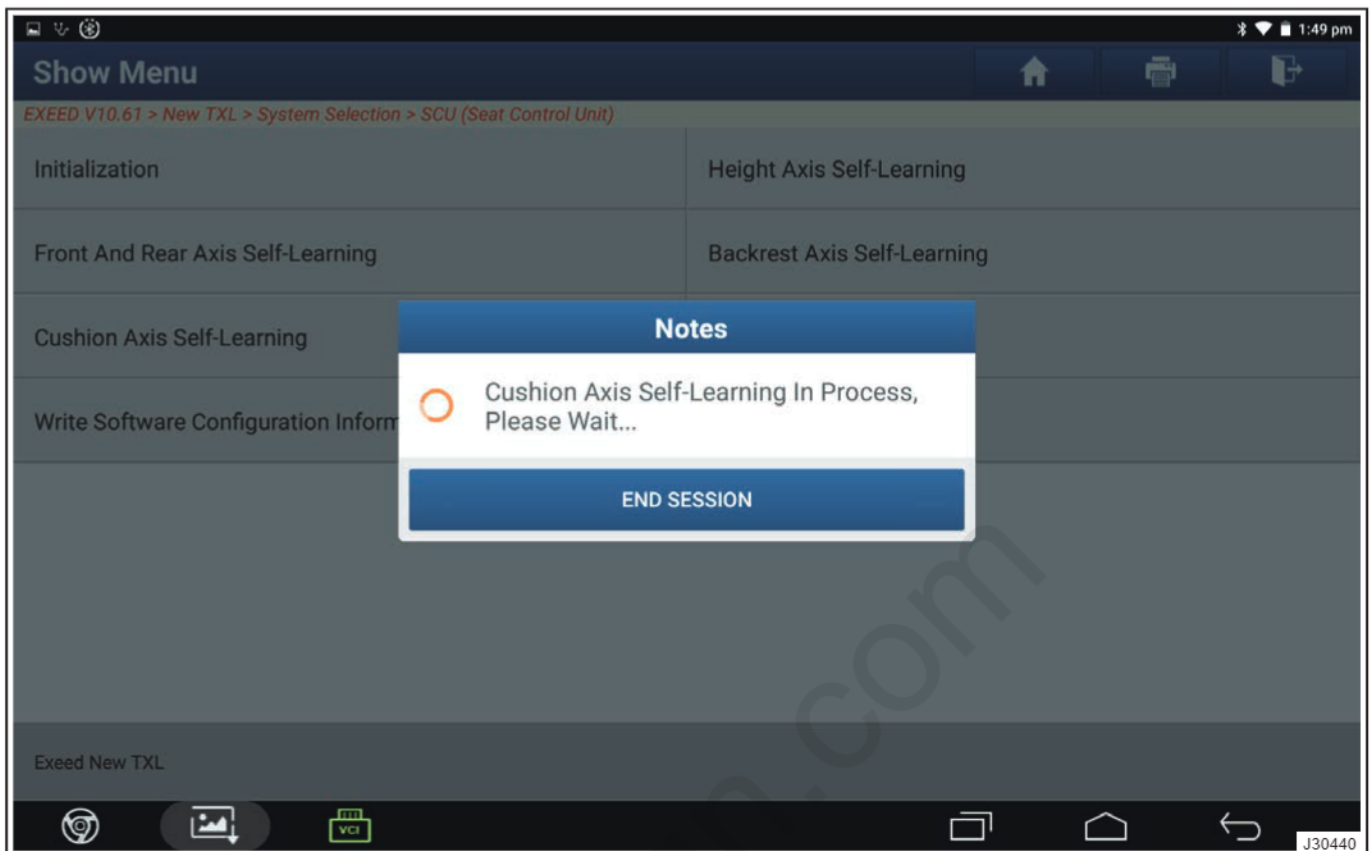
(24) Return and click “All Axis Auto Learning” .



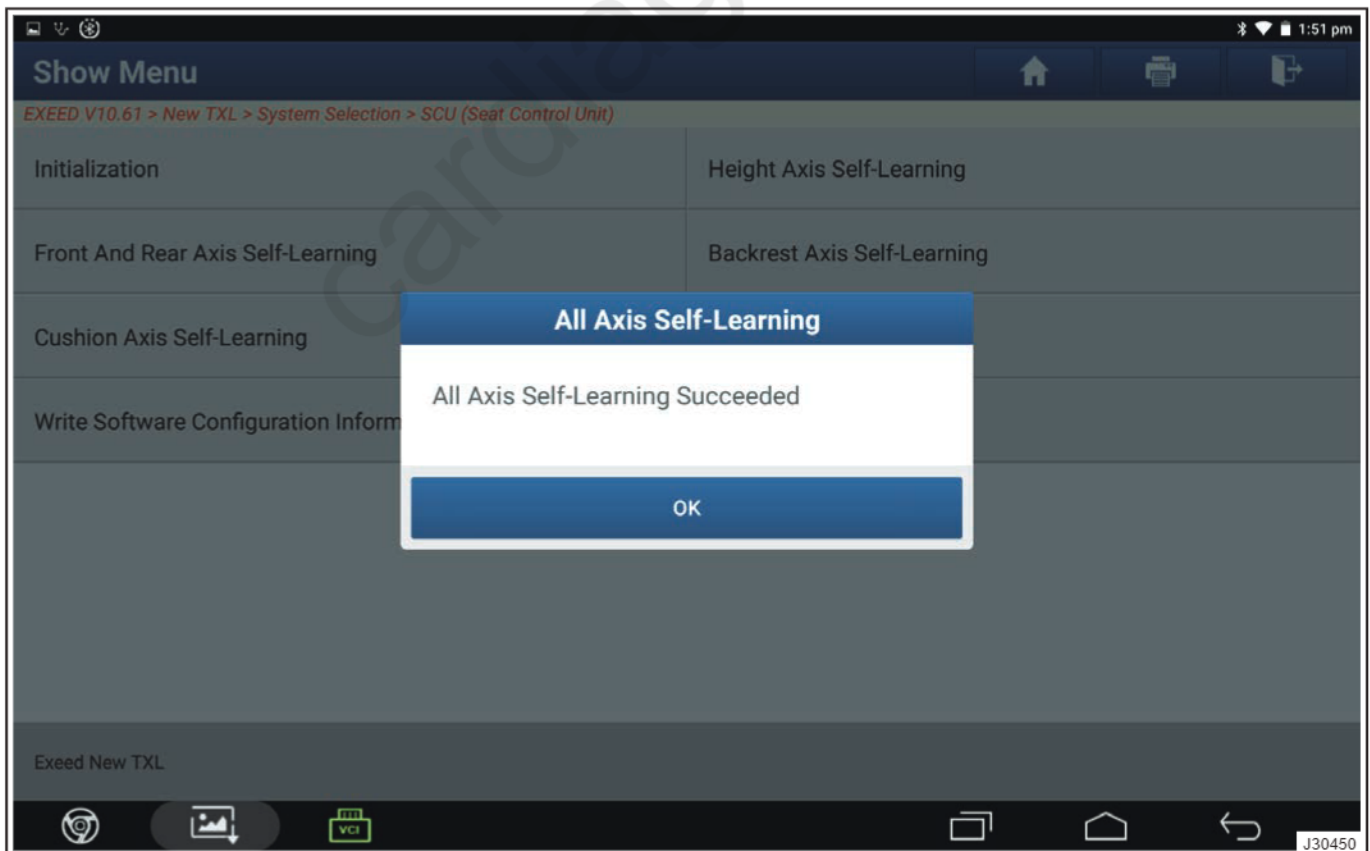
(25) “Please Confirm Whether You Want To Carry Out This Operation? OK To Continue, Cancel To Exit” is displayed on the screen. Click “OK” .



(26) Performing all shafts auto learning, please wait.



(27) All shafts auto learning is successful.



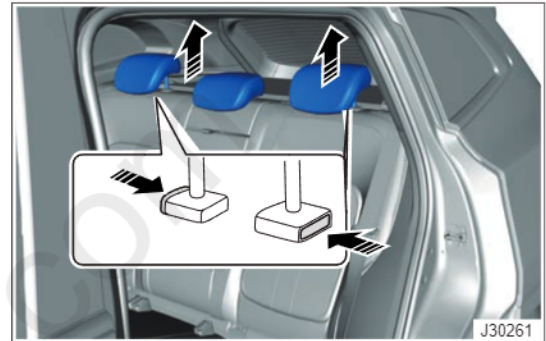
3 Replacement of Rear Seat Assembly

3.1 Removal

Caution

- **Be sure to wear safety equipment to prevent accidents, when removing rear seat assembly.**
- **Appropriate force should be applied, when removing rear seat assembly. Be careful not to operate roughly.**
- **Try to prevent interior and body paint surface from being scratched, when removing rear seat assembly.**

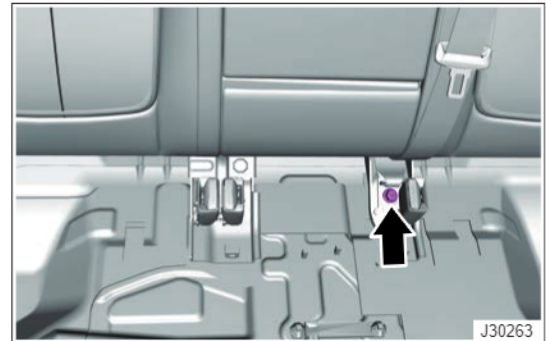
- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) As shown in the illustration, press the release button of seat headrest guide (w/ button), and remove rear seat headrest assembly.



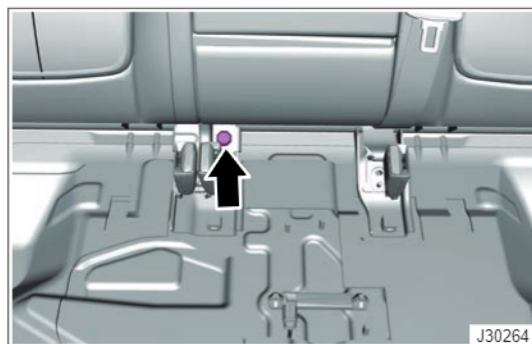
- (4) Detach rear seat cushion holder in direction of arrow and remove cushion as shown in illustration.



- (5) Remove center rear seat belt lower fixing bolt, and detach seat belt buckle.



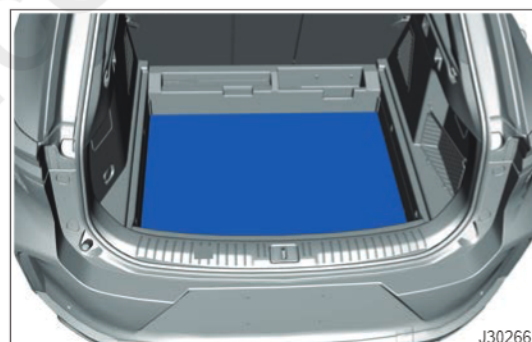
(6) Remove fixing bolt from rear seatback bracket.



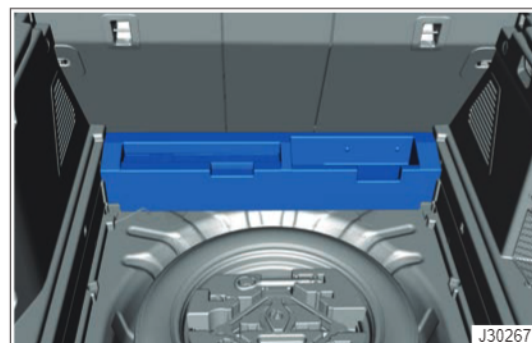
(7) Remove the luggage compartment carpet assembly.



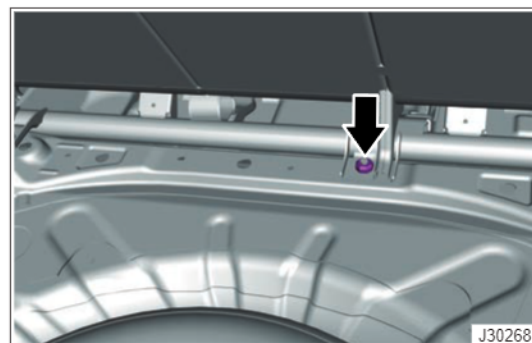
(8) Remove the spare tire cover plate assembly.



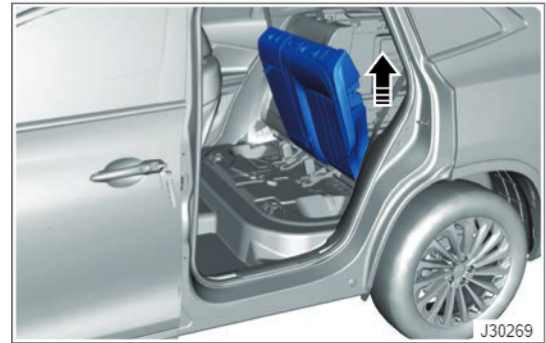
(9) Remove the luggage compartment front storage box.



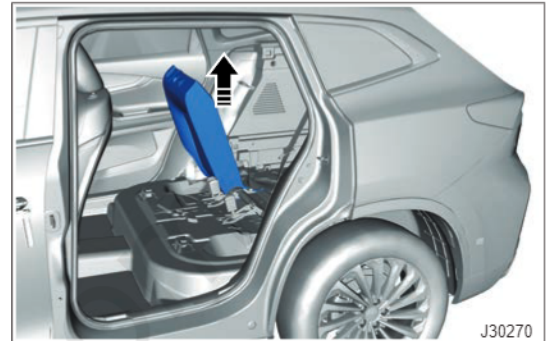
(10) Remove fixing nut from rear seatback bracket.



- (11) Remove 60% of rear left seatback shaft from body groove and remove 60% of rear left seatback in the direction of arrow.



- (12) Remove 40% of rear right seatback shaft from body groove and remove 40% of rear right seatback in the direction of arrow.



3.2 Inspection

- (1) Installation of rear seats should be firm and reliable, and seat belts should be complete and effective.
- (2) Check the old and new degree of the seat, the seat surface should be flat, clean and free from damage.

3.3 Installation

Caution

- **Be sure to wear safety equipment to prevent accidents, when installing rear seat assembly.**
- **When installing rear seat assembly, be careful not to damage the body paint surface.**
- **When installing rear seat assembly, try to prevent carpet from being scratched or damaged.**

- (1) Install the rear left seatback assembly.
- (2) Install the rear right seatback assembly.
- (3) Install fixing nut to rear seatback bracket.
- (4) Install the luggage compartment front storage box.
- (5) Install the spare tire cover plate assembly.
- (6) Install the luggage compartment carpet assembly.
- (7) Install fixing bolt to rear seatback bracket.
- (8) Install seat belt buckle and fixing bolt.
Torque: $50 \pm 5 \text{ N}\cdot\text{m}$
- (9) Install the rear seat cushion.
- (10) Install the rear seat headrest assembly.
- (11) Connect the negative battery cable.

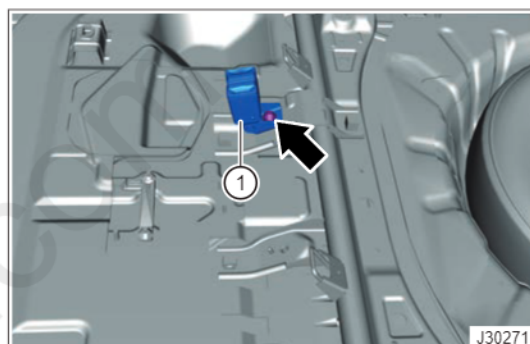
4 Rear Seat Bracket

4.1 Removal

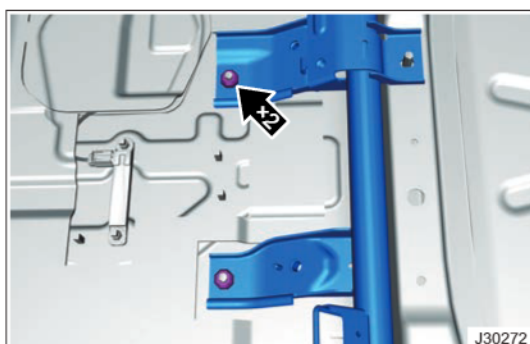
Caution

- **Be sure to wear safety equipment to prevent accidents, when removing rear seat bracket.**
- **Appropriate force should be applied, when removing rear seat bracket. Be careful not to operate roughly.**
- **Try to prevent interior and body paint surface from being scratched, when removing rear seat bracket.**

- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the rear seat cushion assembly.
- (4) Remove the rear seatback assembly.
- (5) Remove fixing bolt from rear double-lock buckle bracket, and remove the rear double-lock buckle assembly (1).



- (6) Remove 2 fixing nuts from rear seat bracket.



- (7) Remove 2 fixing bolts from rear seat bracket.



- (8) Remove the rear seat bracket.

4.2 Installation

Caution

- **Be sure to wear safety equipment to prevent accidents, when installing rear seat bracket.**
- **When installing rear seat bracket, be careful not to damage the body paint surface.**
- **When installing rear seat bracket, try to prevent carpet from being scratched or damaged.**

- (1) Install rear seat bracket to a proper position in vehicle.
- (2) Install 2 fixing bolts to rear seat bracket.
Torque: $50 \pm 5 \text{ N}\cdot\text{m}$
- (3) Install 2 fixing nuts to rear seat bracket.
Torque: $50 \pm 5 \text{ N}\cdot\text{m}$
- (4) Install rear double-lock buckle assembly to a proper position of body, and install 1 fixing bolt.
Torque: $50 \pm 5 \text{ N}\cdot\text{m}$
- (5) Install the rear seatback assembly.
- (6) Install the rear seat cushion assembly.
- (7) Connect the negative battery cable.