12- Electrical system

Power window

Technical specifications

General specifications

Name	Specification
Door glass lifter motor	Operating voltage: 12V

Torque Specifications

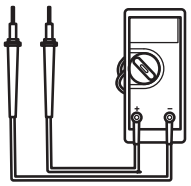
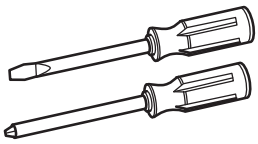
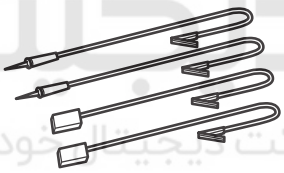
Name	Torque range	
	Metric (Nm)	British (lb-ft)
Connecting bolt between the glass and the lifter	9	7
Connecting bolt between the movable rail and the body	9	7

Precautions

1. If any circuit is required for removal and repair in the repair process, the negative battery connector must be first disconnected.
2. In the maintenance, if the door needs to be opened for removal, the door should be supported with a rod.
3. Do not remove the trim panels and other wearing parts with a sharp tool.

Preparation

General maintenance tools

No.	Tool name	Tool figure	Tool code	Remarks
1	Digital multimeter	 LFX60-SM-12128	-	Test the voltage, resistance
2	Screwdriver	 LFX60-SM-12129	-	Remove the screw and panel
3	Wiring group	 LFX60-SM-12130	-	Check the line

Operating Principle

Remote window opening function

When PEPS controller receives the remote control unlocking high frequency signal sent from the smart key for more than 2s, if all remote control window opening function conditions are met, PEPS controller will perform the window opening function and send the remote window opening message via CAN bus. All configurations are provided with this function by default, without need of the diagnosiss opening function.

Remote window opening function conditions (and):

1. The vehicle power supply is in OFF position;
2. The smart key ID is legal;
3. Received the remote unlocking signal for more than 2s.

Remote window opening stop conditions (or):

1. During the window opening process, receive a remote locking signal;
2. During the window opening process, receive a remote unlocking (door) signal;
3. During the window opening process, receive a remote unlocking (trunk) signal;
4. During the window opening process, the vehicle power supply is in non-OFF position.

The remote control window close stop function executes the action:

During the window opening process, if receiving the remote control unlocking or remote control locking or remote control trunk unlocking signal, the window opening stop function will be performed, and the door unlocking, locking and trunk unlocking functions will not be performed.

Power window switch closing and opening functions

Power window rise function

Power window rise function conditions (and):

1. The entire vehicle power is in ON gear;
2. The resistance between the power window signal input pins is 2940Ω ≤ R ≤ 3060Ω;

Actions: the corresponding window will perform the rise function.

Power window rise function stop conditions (or):

1. The power window rise signal will be in vain;
2. Detect the locking current (12A for individual window);
3. The glass lift single output time exceeds 8s.

Actions: the corresponding window will perfomr the rise stop function.

Power window automatic rise function

Power window automatic rise function conditions (and):

1. The entire vehicle power is in ON gear;
2. The resistance between the power window signal signal input pinns is 980Ω ≤ R ≤ 1020Ω.

Actions: the corresponding window will perform the automatic rise function.

Power window automatic rise function stop conditions:

1. Detect the locking current (12A for individual window);
2. The glass lift single output time exceeds 8s;
3. Detect the electric window switch up or down signal.

Actions: the corresponding window will perform the automatic rise stop function

Power window drop function

Power window drop function conditions (and):

1. The entire vehicle power is in ON gear;
2. The resistance btween the power window signal input pins is 325.36Ω ≤ R ≤ 343.64Ω.

Perfrom the actions: the corresponding window will perform the drop function.

Power window drop function stop conditions (or):

1. The power window drop signal is in vain;
2. Detect the locking current (12A for individual window);
3. The glass lift single output time exceeds 8s.

Perfrom the actions: the corresponding window will perform the drop stop function.

Power window automatic drop function

Power window automatic drop function conditions (and):

1. The entire vehicle power is in ON gear;
2. The resistance between the power window input signal pins is R ≤ 5Ω.

Actions: the corresponding window will perform the automatic drop function.

Power window automatic drop stop conditions:

1. Detect the locking current (12A for individual window);
2. The glass lift single output time exceeds 8s;

3. Detect the electric window switch up or down signal.

Actions: the corresponding window will perform the automatic drop stop function.

Power window locking function

Power door locking function opening conditions (and):

1. The entire vehicle power is in ON gear;
2. The power window locking function is under OFF status;
3. Detect the electric window locking input signal changes to low level from suspending (the locking switch is hold-to-run type).

Actions: Turn on the window lock switch operating indicator; monitor that the corresponding window action is performed via the driver armrest board switch signal and the window actions are not performed via other three armrest board signals.

Power window locking function closing conditions (and):

1. The entire vehicle power is in ON gear;
2. The power window locking function is in ON positon;
3. Detect the electric window locking input signal changes to low level from suspending (the locking switch is hold-to-run type).

Actions: Turn off the window lock switch operating indicator;

Monitor that the corresponding operations are performed via the driver armrest board switch signal and other three armrest board signals.

Note:

- **The default configuration is that the power window locking function is turned off.**
- **The controller is prvided with the memory function.**
- **When the power window locking function is under ON status, the power window lock operating indicator will be turned off after locking with remote control, PE, key and the second locking, and will be turned on after unlocking with remote control, PE and key.**
- **When the power supply is in OFF position and the power window locking function is under ON status, the operating indicator will be turned off after 8 min, for energy saving.**

Electric window operation delay function

Within a period of time since the vehicle power supply is switched from ON to ACC or OFF position, the power window switch can be operated to open or close the window.

Electric window operation delay function conditions (and)

1. Afer 60s since the vehicle power supply is switched from ON to ACC or OFF position;
2. The left front door and the right front door are under closed (vain) status.

Power window operation delay function stop conditions (or):

1. Afer 60s since the vehicle power supply is switched from ON to ACC or OFF position;
2. Within 60s after the vehicle power supply is switched from ON to ACC or OFF position and the left front door or right front door is swithced from OFF (vain) to ON (low level) status.

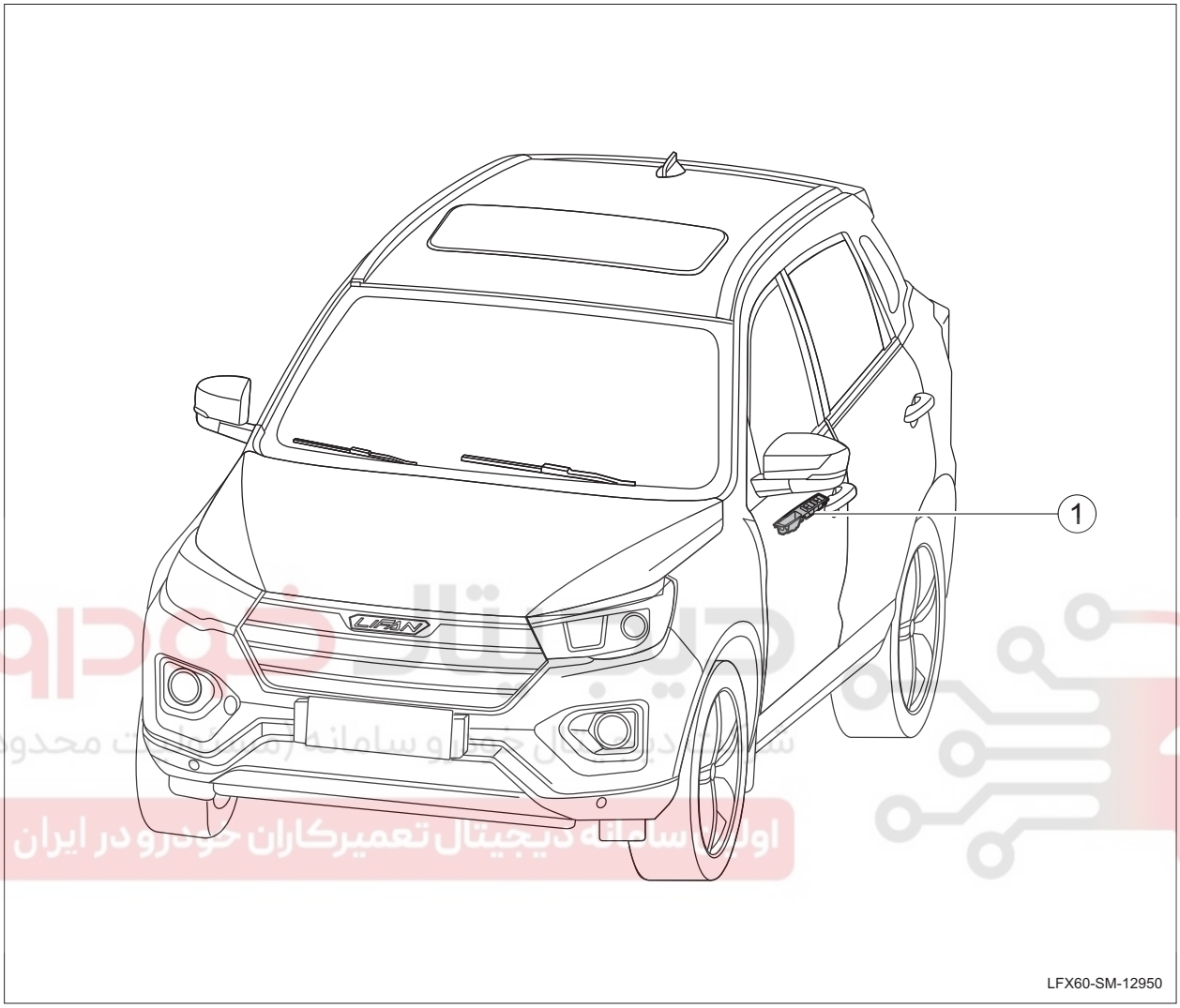
Note:

The power window lifter switch on the driver side must prevail.

Structure and installation location

Component Location Plan

Front left door window switch assembly



No.	Part name
1	Front left door window switch assembly

No.	Part name

Diagnosis information and procedures

Diagnosis instructions

Before the power window troubleshooting, must familiarize and understand its working principle, and then perform its diagnosis, which helps to determine the correct troubleshooting steps in case of a fault, and more importantly, to determine whether the situation descrived by the user is normal.

In any power window fault diagnosis, must first inspect it, and guide the maintenance staff to take the next logical steps for fault diagnosis. Comprehend and correctly use the diagnostic flow chart to shorten the diagnosis time and avoid the misjudgement.

General equipment

Digital multimeter
Diagnostic equipment of vehicle

Visual Inspection

1. Confirm the problem raised by the customer.
2. Check for the evident mechanical or electrical damage trace.

Visual inspection table

Electrical
• Fuse • Harness or plug • Dashboard fuse box • Window switch • Glass lifter motor • BCM

3. Check the system lines easy to see or can be seen.
4. If the observed or raised problem is the evident and the cause has been found, ensure to fix this fault before proceeding with the next step.
5. If for the problem, there are no obvious findings, then confirm the fault and refer to the symptom table.

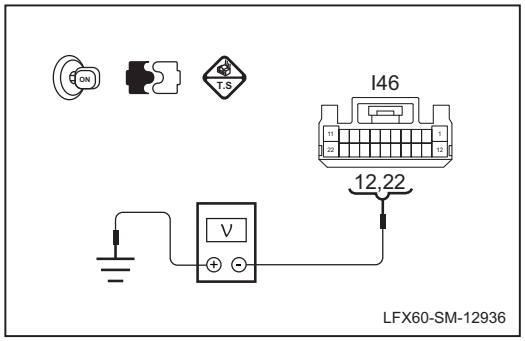
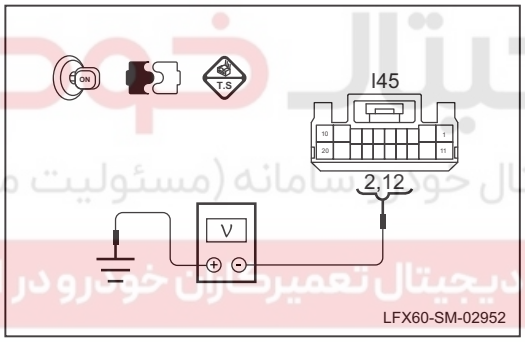
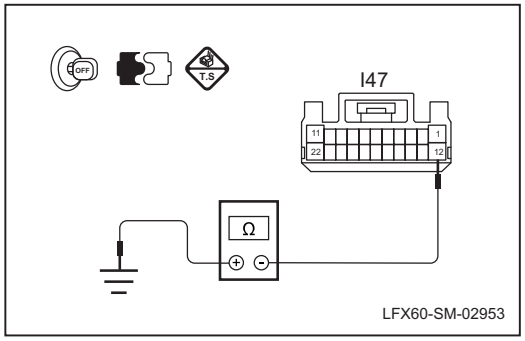
Fault symptoms table

Symptom	Possible Cause	Recommended measure
All power windows are not working	• Fuse	**Refer to: No electric window working diagnosis flow**
	• Harness or plug	
	• Dashboard fuse box	
	• Window switch	
	• BCM/PEPS ECU	
The power window on the driver side is not operated	• Fuse	**Refer to: Driver's side electric window not working diagnosis flow**
	• Harness or plug	
	• Dashboard fuse box	
	• Window switch	
	• Glass lift motor	
	• BCM/PEPS ECU	
The power windows on the passenger side is not operated	• Harness or plug	**Refer to: Passenger's side electric window not working diagnosis flow**
	• Window switch	
	• Glass lift motor	
	• BCM/PEPS ECU	
One button window drop function is faulty	• Harness or plug	• Repair or replace the harness plug
	• Window switch	• Replace the window switch
	• BCM/PEPS ECU	• Replace the BCM **Refer to: Replacement of BCM**
The window locking function is faulty	• Harness or plug	• Repair or replace the harness plug
	• Window switch	• Replace the window switch **Refer to: Replacement of driver's side glass lift switch**
	• BCM/PEPS ECU	• Replace the BCM **Refer to: Replacement of BCM**
The window switch backlight lamp is not turned on	• Harness or plug	• Repair or replace the harness plug
	• Window switch	• Replace the window switch
	• BCM	• Replace the BCM **Refer to: Replacement of BCM**

The window glass is operated slowly	• Battery voltage low	• Inspect and repair the charging system or replace the battery
	• Glass guide rail	• Repair or replace the glass guide rail
	• Glass chute	• Repair or replace the glass chute
	• Door	• Repair or replace the door
	• Glass lifter	• Repair or replace the glass lifter assembly

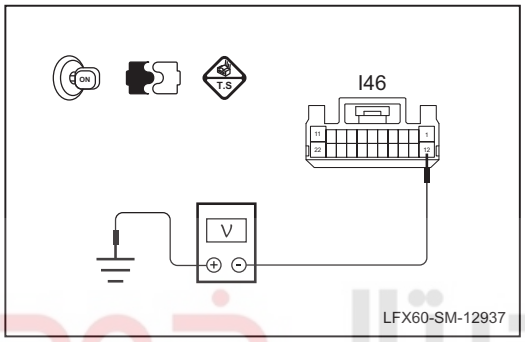
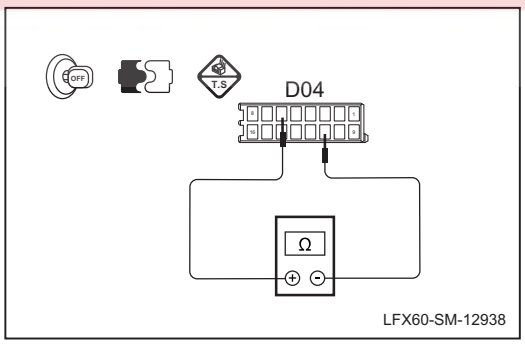
No electric window working diagnosis flow

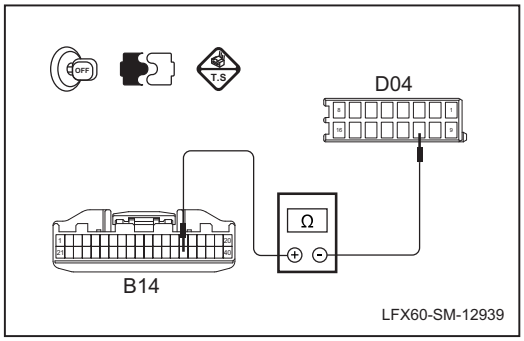
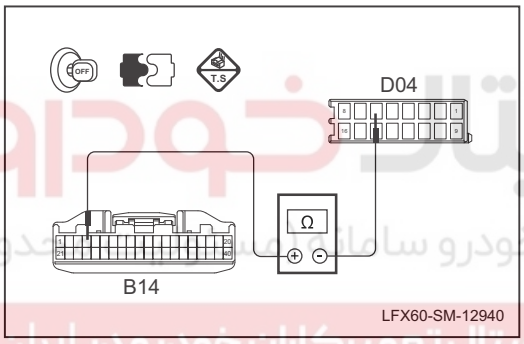
Test condition	Details/results/measures
1. General inspection.	
	A. Check the window switch and glass lift harness plug for looseness, aging or falling. Is it OK after checking? →**Yes** To step 2. →**No** Repair the fault position.
2. Inspect the glass lifter fuse.	
	A. Checkthe glass lifter fuse SB04. **Fuse rated capacity: 30 A** Is it OK after checking? →**Yes** To step 3. →**No** Replace the fuse.
3. Check the battery voltage.	
	A. Measure the battery voltage with a multimeter. **Standard value: 11 ~ 14 V** Is the voltage is OK? →**Yes** To step 4. →**No** Inspect and repair the charging system or replace the battery.

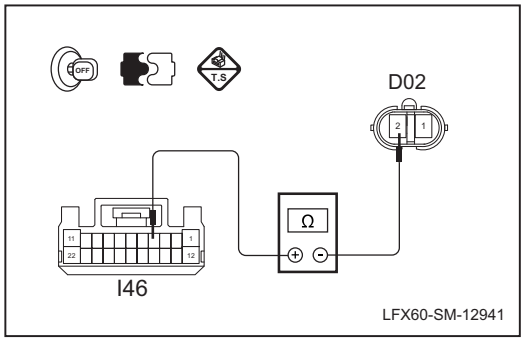
Test condition	Details/results/measures
4. Inspect BCM window glass lifter power supply.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the BCM harness plug I46. D. Connect the battery negative terminal. E. Operate the ignition switch to turn the power to ON state. F. Measure the voltage between Terminals 12 and 22 of BCM wiring harness connector I46 and the reliable grounding point with a multimeter. **Standard value: 11 ~ 14 V** Is the voltage is OK? →**Yes** To step 5. →**No** Inspect and repair BCM window glass lifter power supply line fault; if necessary, replace the dashboard wiring box.
5. Check the BCM power line.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the BCM harness plug I45. D. Connect the battery negative terminal. E. Operate the ignition switch to turn the power to ON state. F. Measure the voltage between the BCM harness plug I45 terminal 2, 12 and fixed ground point with the multimeter. **Standard value: 11 ~ 14 V** Is the voltage is OK? →**Yes** To step 6. →**No** Inspect and repair BCM power supply line fault; if necessary, replace the dashboard wiring box.
6. Check the BCM ground line.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the BCM harness plug I47. D. Measure the resistance between Terminal 12 of BCM wiring harness connector I47 and the grounding point with a multimeter. **Standard value: Less than 5Ω** Is the resistance normal? →**Yes** To step 7. →**No** Repair the BCM ground line fault and replace the harness if necessary.

Test condition	Details/results/measures
7. Check the BCM.	
	A. Replace BCM. **Refer to: Replacement of BCM** Confirm that troubleshooting is completed.

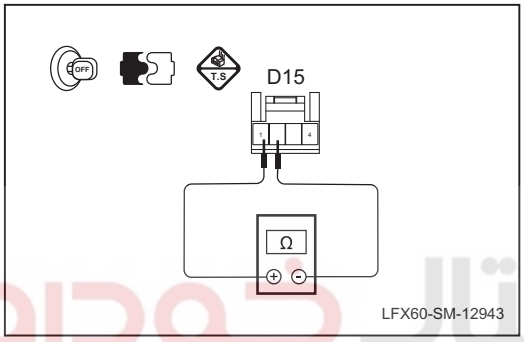
Driver's side electric window not working diagnosis flow

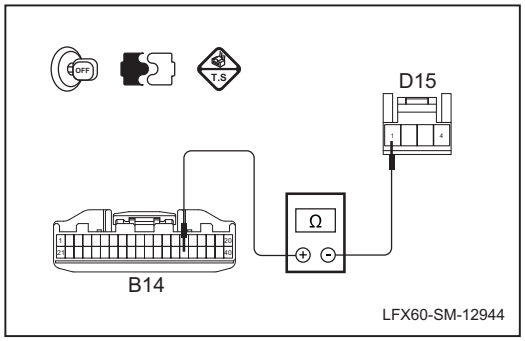
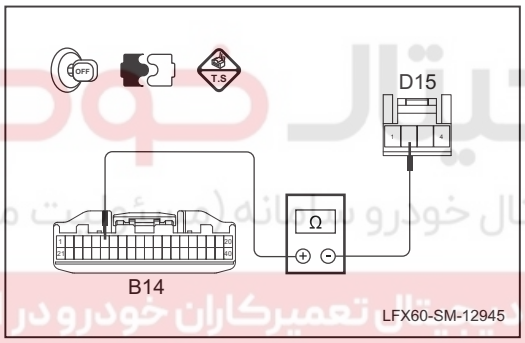
Test condition	Details/results/measures
1. General inspection.	
	A. Check the window switch and glass lift harness plug for looseness, aging or falling. Is it OK after checking? →**Yes** To step 2. →**No** Repair the fault position.
2. Inspect BCM left front window lifter power supply.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the BCM harness plug I46. D. Connect the battery negative terminal. E. Operate the ignition switch to turn the power to ON state. F. Measure the voltage between Terminal 12 of BCM wiring harness connector I46 and the reliable grounding point with a multimeter. **Standard value: 11 ~ 14 V** Is the voltage is OK? →**Yes** To step 3. →**No** Inspect and repair BCM left front window lifter power line fault; if necessary, replace the wiring harness.
3. Inspect the glass lifter switch on the driver side.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the driver's side glass lift switch harness plug D04. D. Operate glass lifter switch on the driver side up and down, and measure the resistance between Terminals 6 and 11 of the glass lifter switch on the driver side with a multimeter. **Standard value:** **Up: 3 KΩ** **Down: 332Ω** Is the resistance normal? →**Yes** To step 4. →**No** Replace the glass lifter switch on the driver side. **Refer to: Replacement of driver's side glass lift switch**

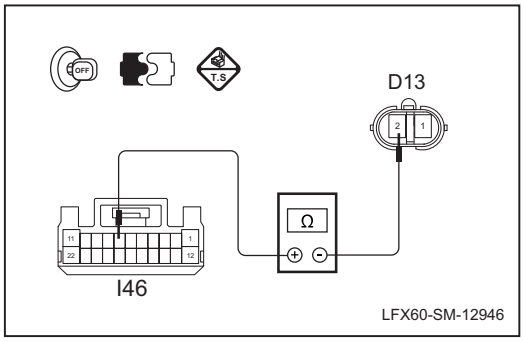
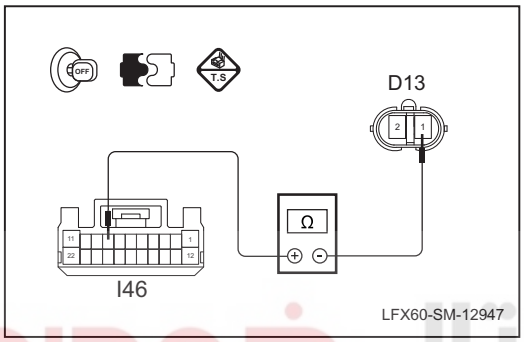
Test condition	Details/results/measures
4. Inspect the left front door analog grounding point.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the driver's side glass lift switch harness plug D04. D. Disconnect the BCM harness plug B14. E. Measure the resistance between the driver's side glass lift switch harness plug D04 terminal 11 and BCM harness plug B14 terminal 35 with the multimeter. **Standard value: Less than 5Ω** Is the resistance normal? →**Yes** To step 5. →**No** Inspect and repair the left front door analog grounding point fault; if necessary, replace the wiring harness.
5. Inspect the left front door glass lifter signal line.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the driver's side glass lift switch harness plug D04. D. Disconnect the BCM harness plug B14. E. Measure the resistance between the driver's side glass lift switch harness plug D04 terminal 6 and BCM harness plug B14 terminal 4 with the multimeter. **Standard value: Less than 5Ω** Is the resistance normal? →**Yes** To step 6. →**No** Inspect and repair the left front door glass lifter signal line fault; if necessary, replace the wiring harness.

Test condition	Details/results/measures
6. Inspect the left front door glass lifter motor line.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the left front door glass lifter motor wiring harness connector D02. D. Disconnect the BCM harness plug I46. E. Measure the resistance between Terminal 2 of the left front door glass lifter motor wiring harness connector D02 and Terminal 4 of BCM wiring harness connector I46 with a multimeter. **Standard value: Less than 5Ω** F. Measure the resistance between Terminal 1 of the left front door glass lifter motor wiring harness connector D02 and Terminal 5 of BCM wiring harness connector I46 with a multimeter. **Standard value: Less than 5Ω** Is the resistance normal? →**Yes** To step 7. →**No** Inspect and repair the left front door glass lifter motor line fault; if necessary, replace the wiring harness.
7. Inspect the left front door glass lifter motor.	
	A. Replace the left front door glass lifter motor. **Refer to: Replacement of front door electric lift** Is the troubleshooting successful? →**Yes** Replace the front left door glass lift. →**No** To step 8.
8. Check the BCM.	
	A. Replace BCM. **Refer to: Replacement of BCM** Confirm that troubleshooting is completed.

Diagnosis procedure about that the power window on the passenger side is not operated (with the right front door as an example)

Test condition	Details/results/measures
1. General inspection.	
	A. Check the window switch and glass lift harness plug for looseness, aging or falling. Is it OK after checking? →**Yes** To step 2. →**No** Repair the fault position.
2. Inspect the front door glass lifter switch.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the front right door glass lift switch harness plug D15. D. Operate the right front door glass lifter switch up and down, and measure the resistance between Terminals 1 and 2 of the front door glass lifter switch D15 with a multimeter. **Standard value:** **Up: 3 KΩ** **Down: 332Ω** Is the resistance normal? →**Yes** To step 3. →**No** Replace the front door glass lifter switch.
3. Inspect the window glass locking switch on the driver side.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the driver's side glass lift switch harness plug D04. D. Connect the battery negative terminal. E. Operate the ignition switch to turn the power to ON state. F. Operate the right front door glass lifter switch, and inspect whether the glass operating function is normal. Is it OK after checking? →**Yes** Replace the window glass locking switch on the driver side. **Refer to: Replacement of driver's side glass lift switch** →**No** To step 4.

Test condition	Details/results/measures
4. Inspect the window analog grounding point.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the front right door glass lift switch harness plug D15. D. Disconnect the BCM harness plug B14. E. Measure the resistance between Terminal 1 of the glass lifter switch wiring harness connector D15 on the driver side and Terminal 35 of BCM wiring harness connector B14 with a multimeter. **Standard value: Less than 5Ω** Is the resistance normal? →**Yes** To step 5. →**No** Inspect and repair the window analog grounding point fault; if necessary, replace the wiring harness.
5. Inspect the right front door glass lifter signal line.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the front right door glass lift switch harness plug D15. D. Disconnect the BCM harness plug B14. E. Measure the resistance between Terminal 2 of the front door glass lifter switch wiring harness connector D15 and Terminal 6 of BCM wiring harness connector B14 with a multimeter. **Standard value: Less than 5Ω** Is the resistance normal? →**Yes** To step 6. →**No** Inspect and repair the left front door glass lifter line fault; if necessary, replace the wiring harness.

Test condition	Details/results/measures
6. Inspect the right front door glass lifter motor line.	
 LFX60-SM-12946  LFX60-SM-12947	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the right front door glass lifter motor harness plug D13. D. Disconnect the BCM harness plug I146. E. Measure the resistance between right front door glass lifter motor harness plug D13 terminal 2 and BCM harness plug I46 terminal 7 with the multimeter. **Standard value: Less than 5Ω** F. Measure the resistance between right front door glass lifter motor harness plug D13 terminal 1 and BCM harness plug I46 terminal 8 with the multimeter. **Standard value: Less than 5Ω** Is the resistance normal? →**Yes** To step 7. →**No** Repair the right front door glass lifter motor line fault and replace the harness if necessary.
7. Inspect the right front door glass lifter motor.	
	A. Replace the right front door glass lifter motor. **Refer to: Replacement of front door electric lift** Is the troubleshooting successful? →**Yes** Replace the front left door glass lift. →**No** To step 8.
8 Inspect the BCM	
	A. Replace BCM. **Refer to: Replacement of BCM** Confirm that troubleshooting is completed.

Removal and Installation

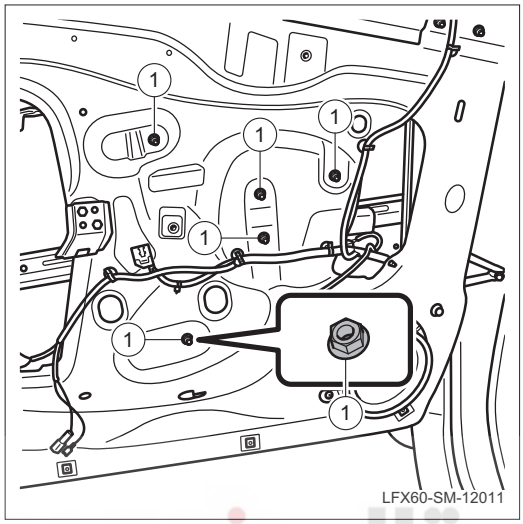
Replacement of front door power lifter

Removal

1. Remove the front door power lifter.

(a). Disconnect the battery negative connector.

(b). Remove the front door glass; **refer to: Replacement of Front Door Glass.**



(c). Disconnect the front door power lifter wiring harness connector.

(d). Remove the front door power lifter fixing nut 1.

(e). Remove the front door power lifter.

Installation

1. Install the front door power lifter.

(a). The installation sequence is the reverse of the disassembly order.

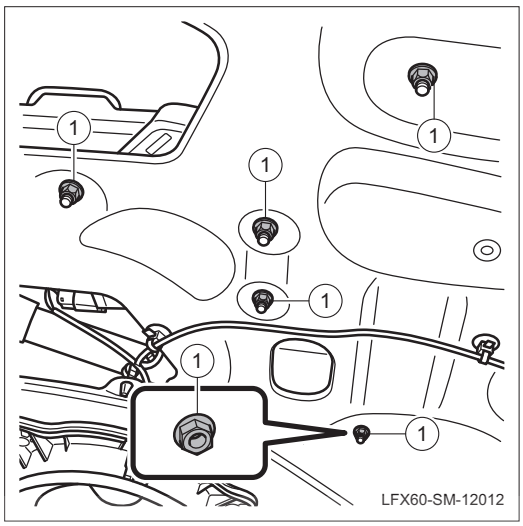
Replacement of rear door power lifter

Removal

1. Remove the rear door power lifter.

(a). Disconnect the battery negative connector.

(b). Remove the rear door glass; **refer to: Replacement of Rear Door Glass.**



(c). Disconnect the rear door power lifter wiring harness connector.

(d). Remove the rear door power lifter fixing nut 1.

(e). Remove the rear door power lifter.

Installation

1. Install the rear door power lifter.

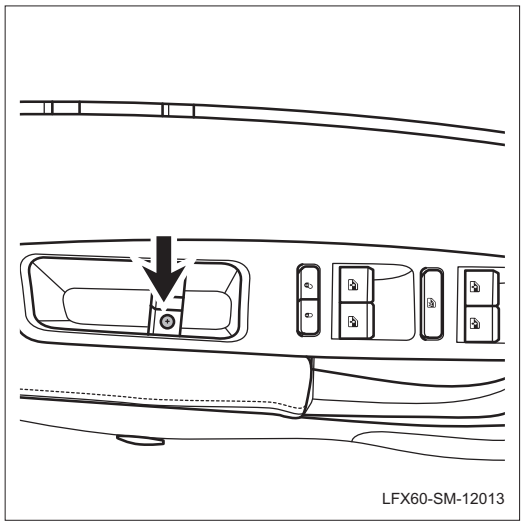
(a). The installation sequence is the reverse of the disassembly order.

Replacement of driver's side glass lift switch

Removal

1. Remove the glass lifter switch on the driver side.

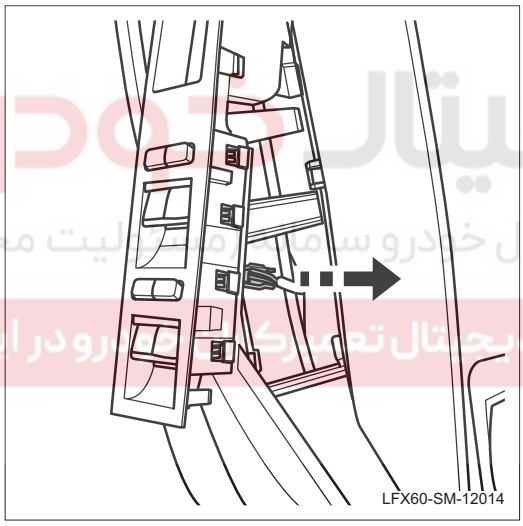
(a). Disconnect the battery negative connector.



(b). Remove the glass lifter switch fixing bolt trim pad on the driver side.

(c). Remove the glass lifter switch fixing bolt on the driver side.

(d). Remove the glass lifter switch on the driver side.



(e). Disconnect the glass lifter switch wiring harness connector on the driver side.

(f). Remove the glass lifter switch on the driver side.

Installation

1. Install the glass lifter switch on the driver side.

(a). The installation sequence is the reverse of the disassembly order.

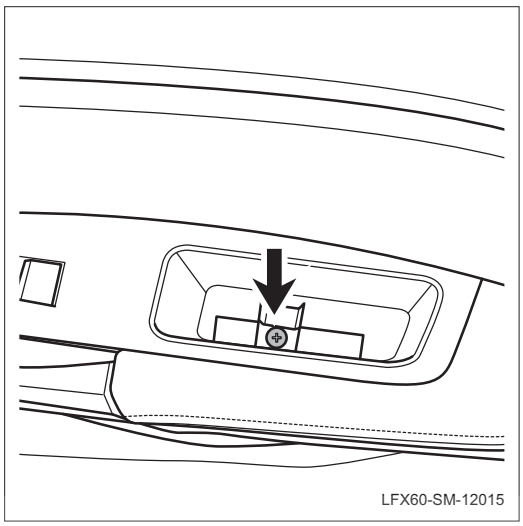
Replacement of the glass lifter switch on the passenger side

Removal

1. Remove the glass lifter switch on the passenger side.

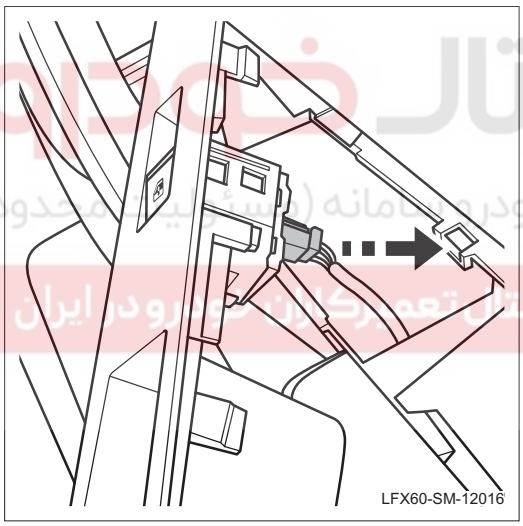
(a). Disconnect the battery negative connector.

(b). Remove the glass lifter switch fixing bolt trim pad on the passenger side.



(c). Remove theglass lifter switch fixing bolt on the passenger side.

(d). Remove the glass lifter switch on the passenger side.



(e). Disconnect the glass lifter switch wiring harness connector on the passenger side.

(f). Remove the glass lifter switch on the passenger side.

Installation

1. Install the glass lifter switch on the passenger side.

(a). The installation sequence is the reverse of the disassembly order.