

## WIPER AND WASHER SYSTEM

7810-00/7810-01/7810-04/7810-07/7820-00/7820-01/7820-01/  
7820-22/7820-35/7830-00/7830-01/8530-02/8610-09/

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# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## WIPER AND WASHER SYSTEM

7810-00

### GENERAL INFORMATION

#### 1. WIPER CONTROL

- ▶ Wiper mist & washer coupled wiper
- ▶ Auto washer coupled wiper
- ▶ Rain sensor coupled wiper operation (LIN)
- ▶ Speed sensitive intermittent wiper
- ▶ Wiper low/high control

#### 2. CAUTIONS ON RAIN SENSOR

- When the wiper switch is in the AUTO position, the wiper will operate for 1 cycle if the initial engine start is made. This may cause the wiper blades to wear prematurely. Therefore, other than rainy days, set the switch to the OFF position. Especially during the winter time, check if the wiper blades are not frozen to the windshield.

Operating the wiper with the blades frozen can damage the wiper motor.

- If you operate the wipers when the windshield is dry without spraying washer fluid, the windshield can be scratched and the wiper blades can wear prematurely. Use the wiper with the washer fluid when the windshield is dry.
- When it does not rain, turn the wiper switch to the OFF position.
- Turn the wiper switch to the OFF position before any car wash to avoid unwanted operation of the wipers.

#### WARNING

When cleaning the windshield over the sensor with damp clothes, the wiper may operate suddenly. It could cause serious injury. Make sure to place the wiper switch to the OFF position and ignition switch OFF when not in use.

#### ▶ Irregular operation (abrupt operation)

- Check if the sensor is off the position.
- Check if the rain sensor cover is securely installed.
- Check if the customer is familiar to how to control the wiper sensitivity.  
Check if the wiper sensitivity control is set to the FAST side (step 5).
- Check the wiper blade for wear.
- If the wiper blade cannot wipe the glass uniformly and clearly, it may cause the rain sensor to work irregularly. Therefore, in this case, replace the wiper blade with a new one.

Modification basis	
Application basis	
Affected VIN	

## OVERVIEW AND OPERATING PROCESS

### 1. WIPER AND WASHER SYSTEM

#### 1) AUTO Washer Coupled Wiper Function



If you press the AUTO washer switch briefly with the ignition key ON and INT-AUTO switch "OFF", the washer motor is operated for about 2 seconds to spray washer fluid once after the switch is turned ON and the wiper relay is turned ON for 4 cycles. After that, the washer motor is operated for about 2 seconds to spray the washer fluid again and the relay is turned ON for 3 cycles and then the relay is turned OFF.

#### 2) Rear Washer Fluid Supply System

The front washer fluid reservoir supplies the rear washer fluid without additional washer fluid reservoir.



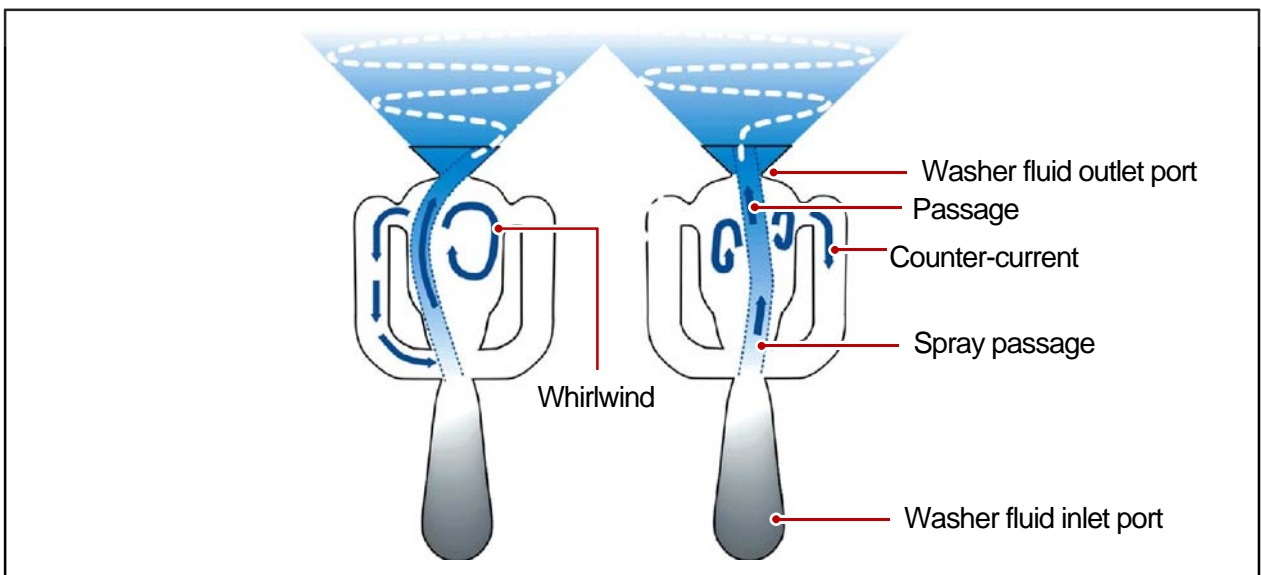


### 3) Fluidic Washer Nozzle

This vehicle has the fluidic washer nozzle, which is designed to use fluid movement occurring in the washer fluid spraying process.



The inside of the nozzle is designed in a fan shape to change the spray direction continuously based on the time the fluid is sprayed. Refer to the figure below.

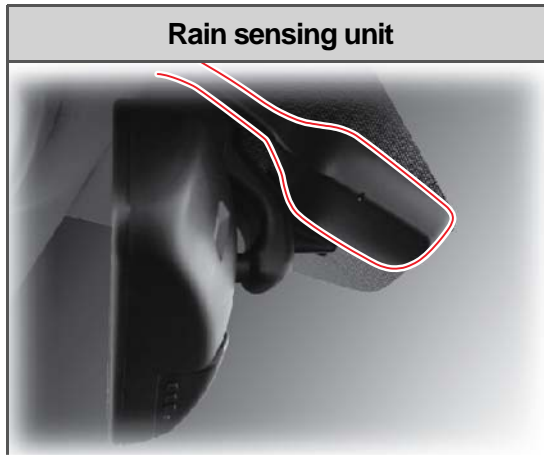


The spray direction is changed by means of the whirlwind and back flow generated while the washer fluid is passing through the nozzle.

Modification basis	
Application basis	
Affected VIN	

## 2. RAIN SENSING SYSTEM

In the rain sensing wiper operation system, the rain sensing unit only sends the information about the amount of rain drops to the BCM, and it does not operate the wiper directly. The wiper and washer are controlled by the BCM according to the driver's choice.



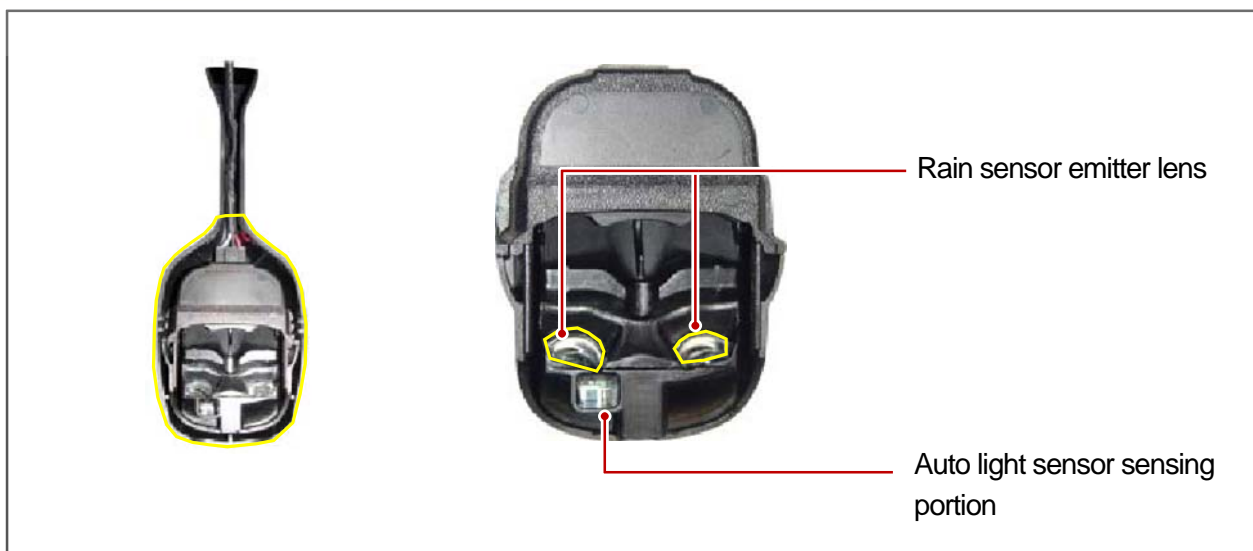
This sensor emits infrared rays through LED and then detects the amount of rain drops by receiving the rays reflected off the sensing section (rain sensor mounting section on the windshield) with photodiode.

AUTO: Wiper operates automatically by rain sensor

FAST <-----> SLOW:

Auto delay/auto speed control.

A position that can control the sensitivity for the amount of rains on the windshield and transmit the wiping request signal accordingly.



### ► BCM

The rain sensor detects the amount of rain drops and sends the operating request signal to the BCM, which drives the wiper directly. At this moment, the BCM also sends the information on whether the wiper is in operation mode or whether the multifunction wiper switch is in AUTO position to the rain sensor.



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ELECTRO  
NIC

FUSE

BCM

SKM

INSTRUM  
ENTINSTRUM  
ENT

SWITCH

LAMP

WIPER  
AND

PAS

AUDIO  
SYSTEM

Modification basis	
Application basis	
Affected VIN	

### 3. SYSTEM LAYOUT (INCLUDING RAIN SENSOR)

Wiper and washer switch



Rain sensor unit



Wiper

Front wiper



Rear wiper



Rear washer hose and nozzle

For vehicles with rear spoiler



For vehicles without rear spoiler





## BCM



## Front nozzle assembly



## Washer fluid reservoir assembly



## Washer motor



Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

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## 4. WIPER AND WASHER OPERATION

### 1) Windshield Wiper Control Function

#### MIST

If you move the wiper switch to "MIST" position and release it, the windshield wipers operate one wiping cycle. The wipers will operate continuously if the switch is held in this position.

#### OFF

Wipers are not in operation.

#### AUTO

Operates automatically according to the vehicle speed and amount of rainfall.

#### LO

Continuous wipe, slow operation

#### HI

Continuous wipe, fast operation

#### Front auto washer switch

When you press this switch with the front wiper switch in "OFF" position, washer fluid will be sprayed and the wiper will automatically operate 4 times. Then, the fluid will be sprayed again and the wiper will automatically operate 3 times.



#### Front automatic wiping speed control switch

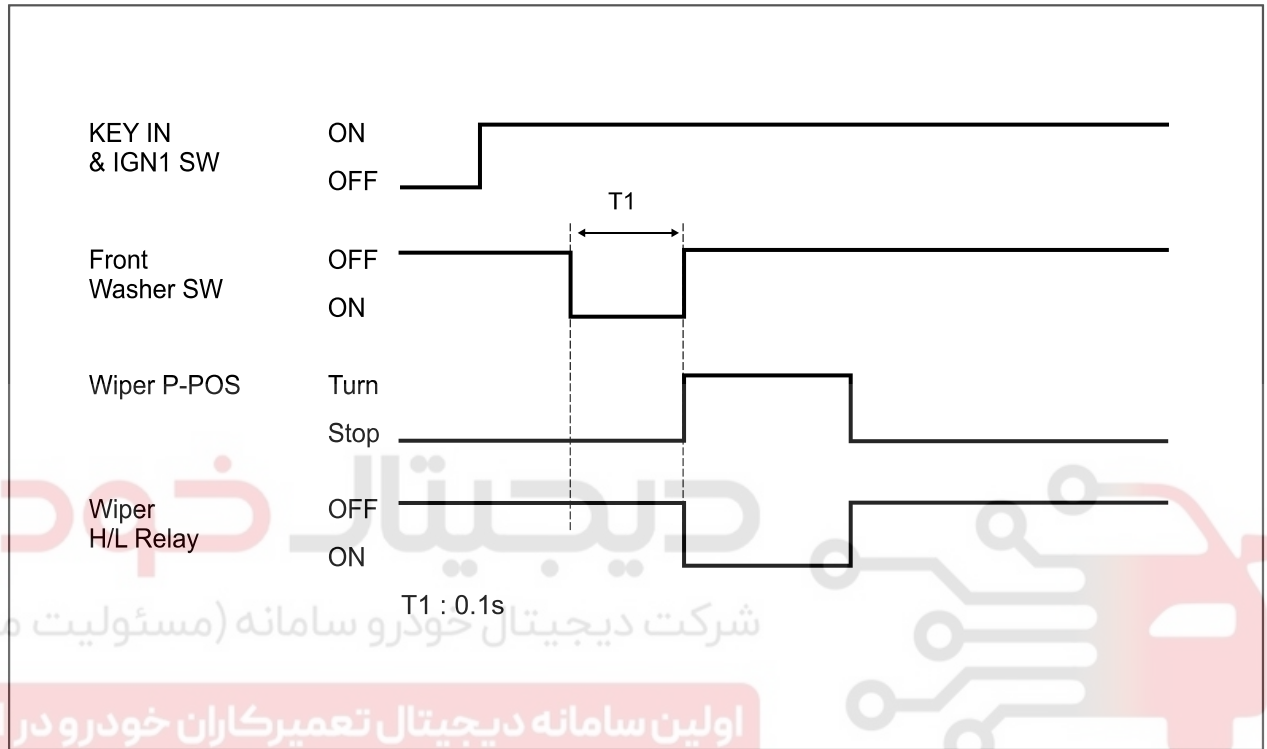
turning the control knob upward or downward when the windshield wiper switch is in AUTO position.

Fast: Fast interval

Slow: Slow interval

**(1) Wiper mist**

1. When the multifunction switch is pushed to the MIST position for 0.1 sec. or more with the IGN1 ON, the wiper relay is turned on after 0.1 sec. has passed. When the wiper returns to the park position, the wiper relay is turned off.
2. When the MIST switch signal is input the wiper is operated at high speed. When the switch is release from the MIST position, the wiper is operated at low speed.



Modification basis	
Application basis	
Affected VIN	



## (2) Wiper LO/HI control

1. The wiper LOW relay is turned on when the multifunction wiper switch is at the LO position. The wiper HIGH relay is turned on when the wiper switch is at the HI position. When the wiper switch is at the HI position, both the LOW relay (constant operation) and HIGH relay are operated.

The wiper motor returns to parking position and stops, even when turning off the ignition switch during wiper operation.

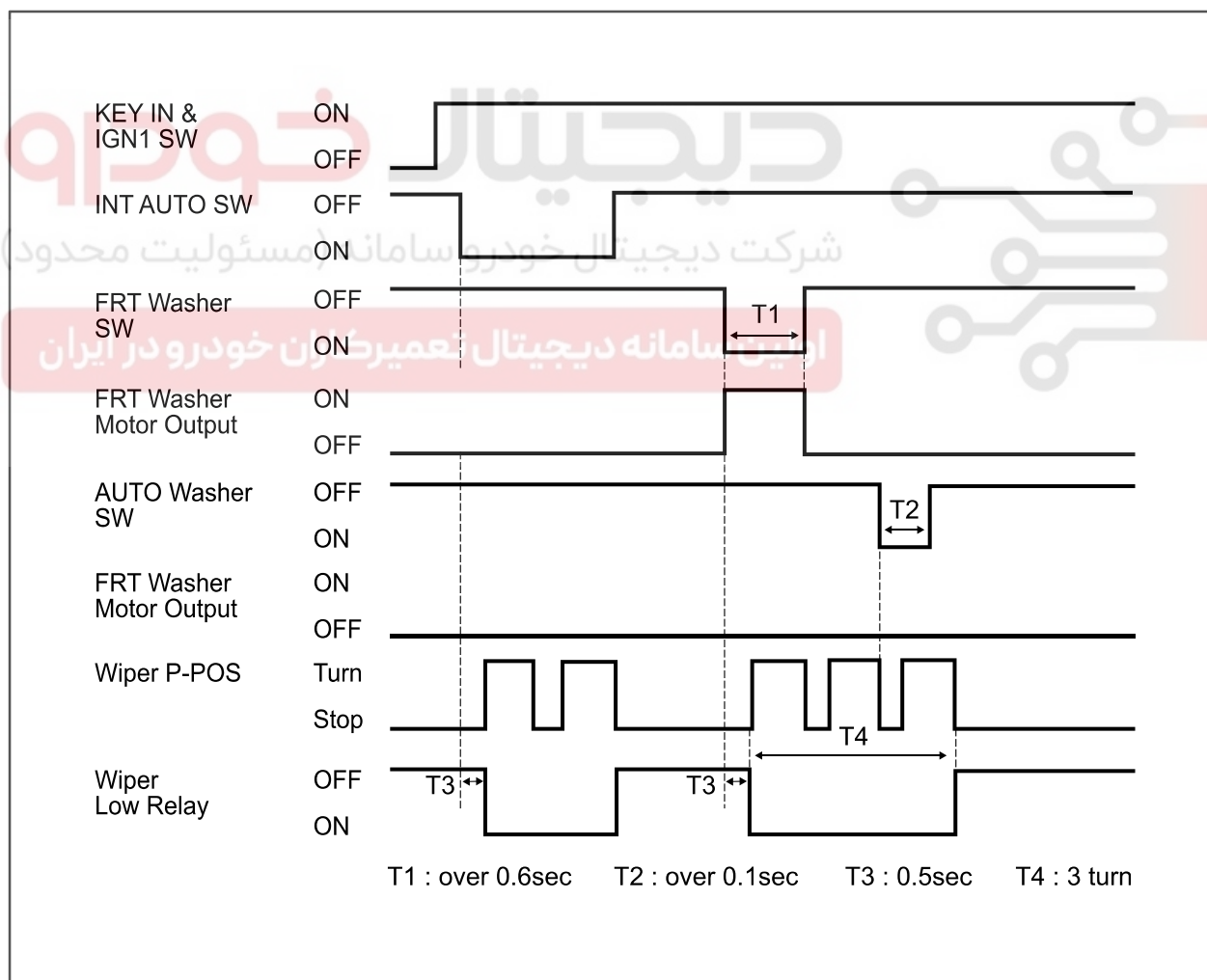
2. wiper operation.

The wiper relay should stay ON in low/high wiper operation mode even if the parking signal for the wiper motor is not received. In INT/AUTO wiper operation mode, the wiper relay should be turned OFF after 5 seconds if there is no parking signal for the wiper for 3 seconds and informs the driver of parking position signal abnormality.

While the wiper operates at low/high speed, the front/rear washer switch can be operated but the auto washer switch cannot.

4. washer switch cannot.

The wiper motor returns to parking position and stops when turning off the ignition switch during wiper operation in high mode.



## 2) Windshield Washer Control Function

### (1) Windshield washer coupled wiper



#### Wiper and Washer Coupled Operation

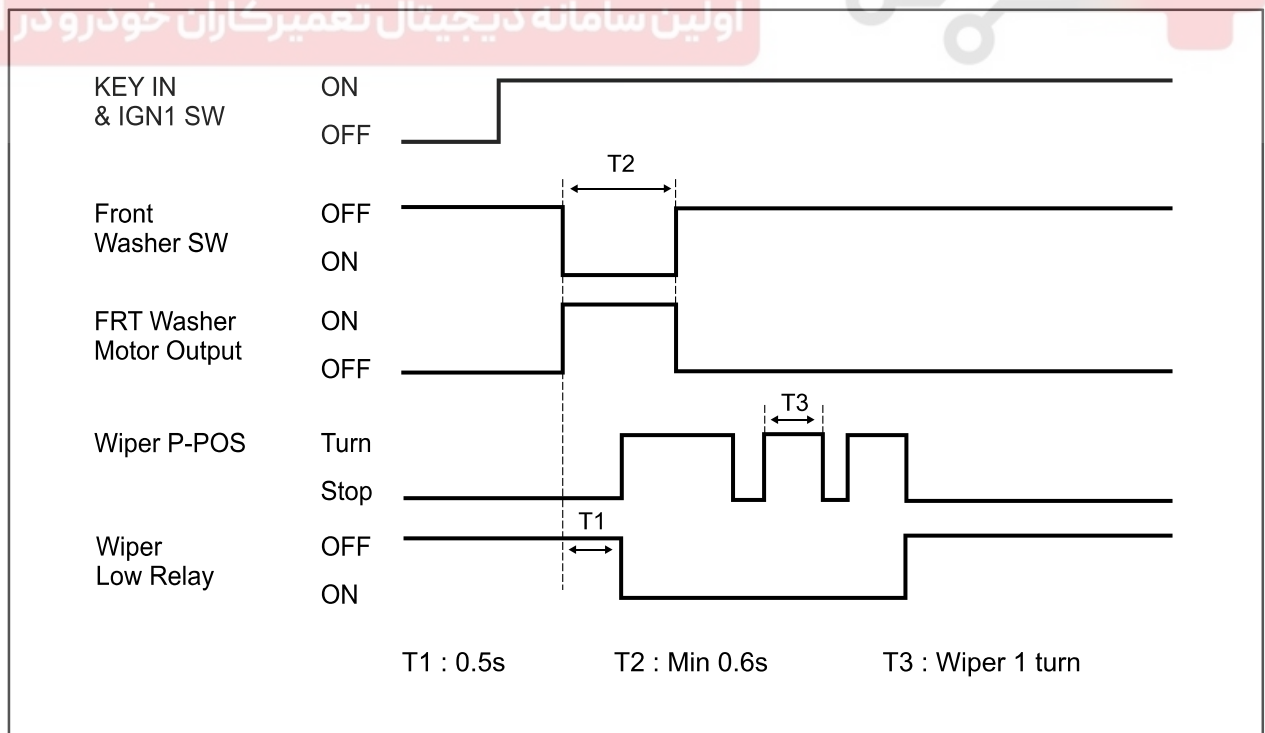
Pull the switch briefly (for less than 0.6 sec.)

: One wiping cycle

Pull and hold the switch for more than 0.6 sec.

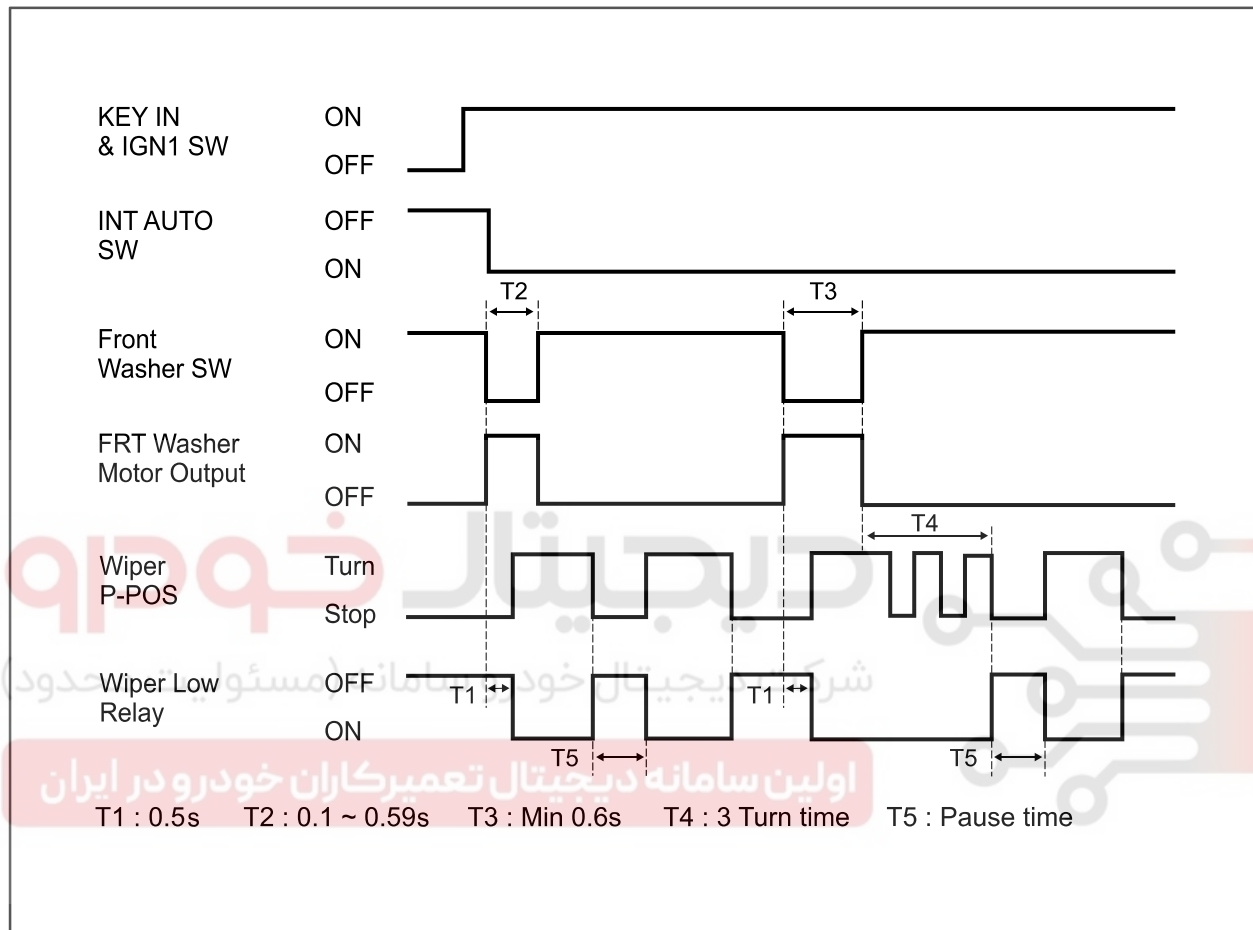
: Three wiping cycles with washer fluid spray

1. When holding the front washer switch at ON position for more than 0.6 seconds with IGN ON, the wiper relay is activated 0.5 seconds after. The wiper stops after three more wipes since that the washer switch is turned to "OFF" position.



Modification basis	
Application basis	
Affected VIN	

2. When holding the front washer switch at ON position for 0.1 to 0.59 seconds during the wiper operation by the intermittent/automatic wiper switch, the wiper will operate only once. When holding the washer switch for more than 0.6 seconds, the wiper relay is activated 0.5 seconds after. The wiper stops after three more wipes since that the washer switch is turned to "OFF" position.

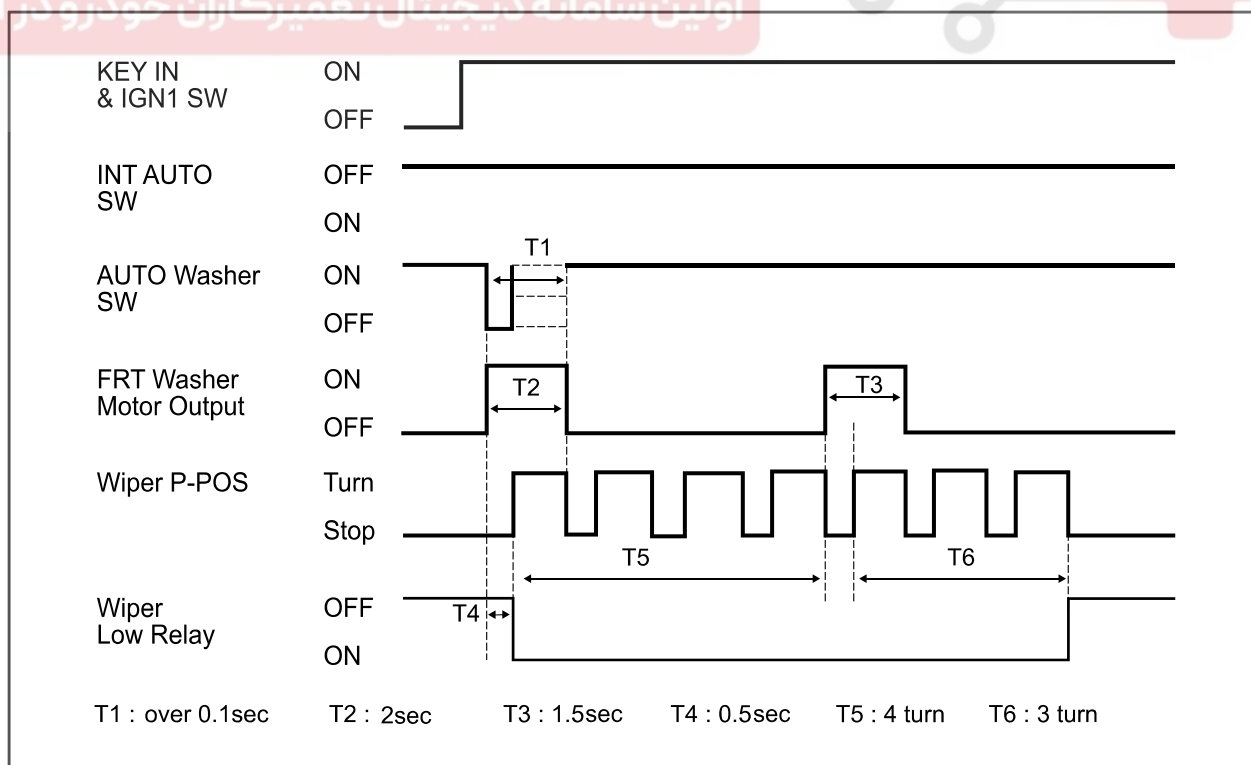


**(2) AUTO washer coupled wiper****Auto washer switch**

If pressing the switch when the wiper switch turns to the "OFF" position, washer fluid is sprayed once and wiper operates 4 times.

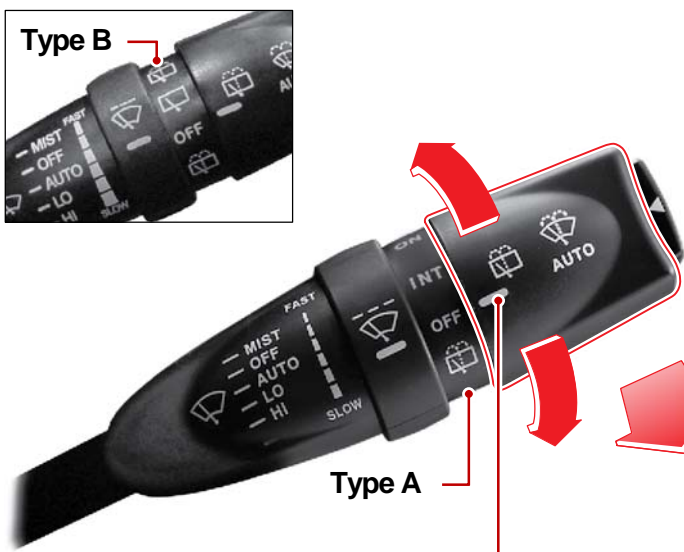
After a while, washer fluid is sprayed once more and the wiper operates 3 times.

1. When the AUTO washer switch is operated with IGN ON and the INT/AUTO switch OFF, the washer motor is operated for 2 sec. and the wiper continues to cycle 4 times. And then the washer motor is operated for 2 sec. and the wiper continues to cycle 3 times before returning to park position.
2. The auto washer switch signal is overridden during speed sensitive intermittent wiper, washer coupled wiper or auto washer coupled wiper operation.
3. When turning the wiper switch to AUTO position during the operation of auto washer, the auto washer stops its operation and the intermittent/automatic wiping mode will be started.
4. The front and rear washer switch signal are overridden during the operation of auto washer. The input from the switch during the AUTO washer coupled wiper operation also is ignored.
- 5.



Modification basis	
Application basis	
Affected VIN	

### 3) Rear Wiper Control Function



**Type B**

**Type A**

**Rear wiper switch**

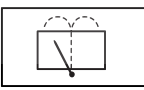
**Windshield Washer Operation**

In the “OFF” position, pull the lever toward you to spray washer fluid on the windshield and to operate the wipers 1~3 cycles. Pull the lever briefly (for less than 0.6 seconds): One wiping cycle with washer spray  
Pull and hold the lever for more than 0.6 seconds: Three wiping cycles with washer spray  
The spray and wiper operation will continue until you release the lever.

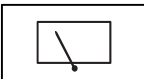
**TYPE A**

<b>ON</b>	Rear wiper operation (Normal Speed)	<b>INT</b>	Rear wiper operation (Intermittent)
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**TYPE B**



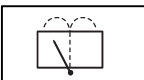
When the switch is fully turned, washer fluid will be sprayed onto the rear window glass and the wiper will also operate. When the switch is released, it will return to the Rear Wiper Operation mode and only the wiper will keep operating.



Rear wiper operation

**OFF**

Rear wiper is not in operation.



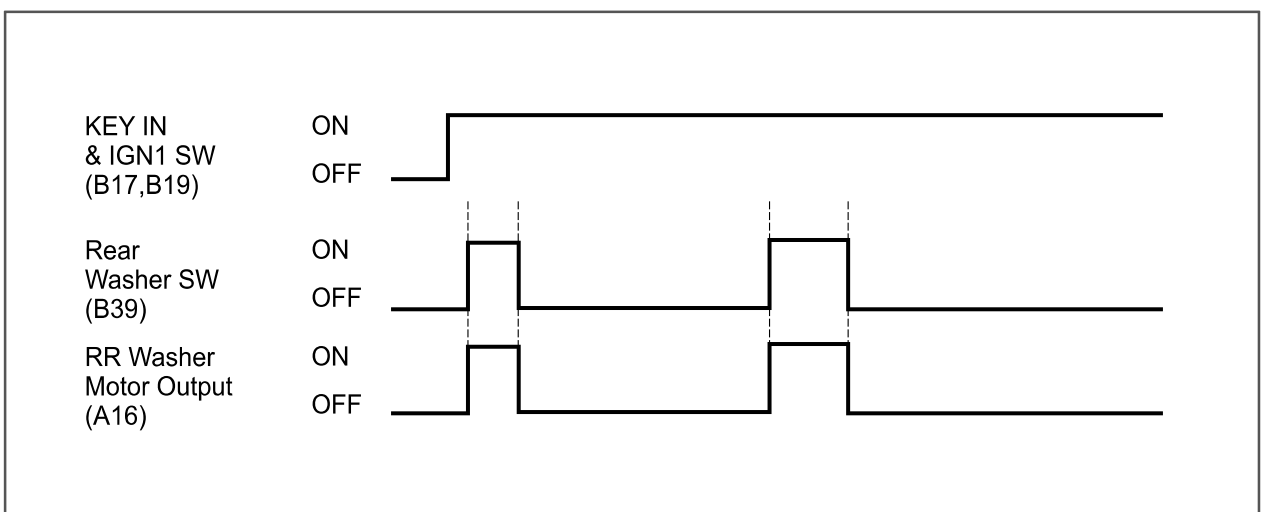
When the switch is fully turned, washer fluid will be sprayed onto the rear window glass and the wiper will also operate. When the switch is released, it will return to the “OFF” position and turn off the wiper and washer.

#### 4) Rear Washer Control Function



##### ► Rear washer motor control

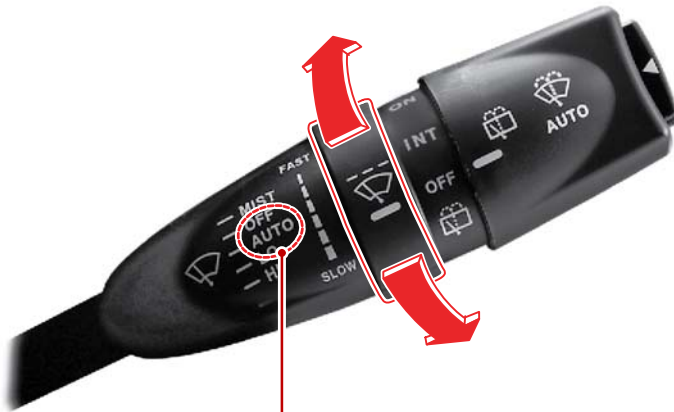
1. The rear washer motor is operated only when the rear washer switch is activated with the ignition key ON.
2. If the front washer or automatic washer switch signal is received during the rear washer switch operation, the washer motor stops and the front washer or automatic washer motor begins to operate.



Modification basis	
Application basis	
Affected VIN	

## 5) Rain Sensor Coupled Wiper Control Function

### AUTO operation and sensitivity control



AUTO: Wiper operates automatically by rain sensor

FAST <----> Auto delay/auto speed control

A position that can control sensitivity against rains on the windshield and transmits wiping demand signal accordingly.

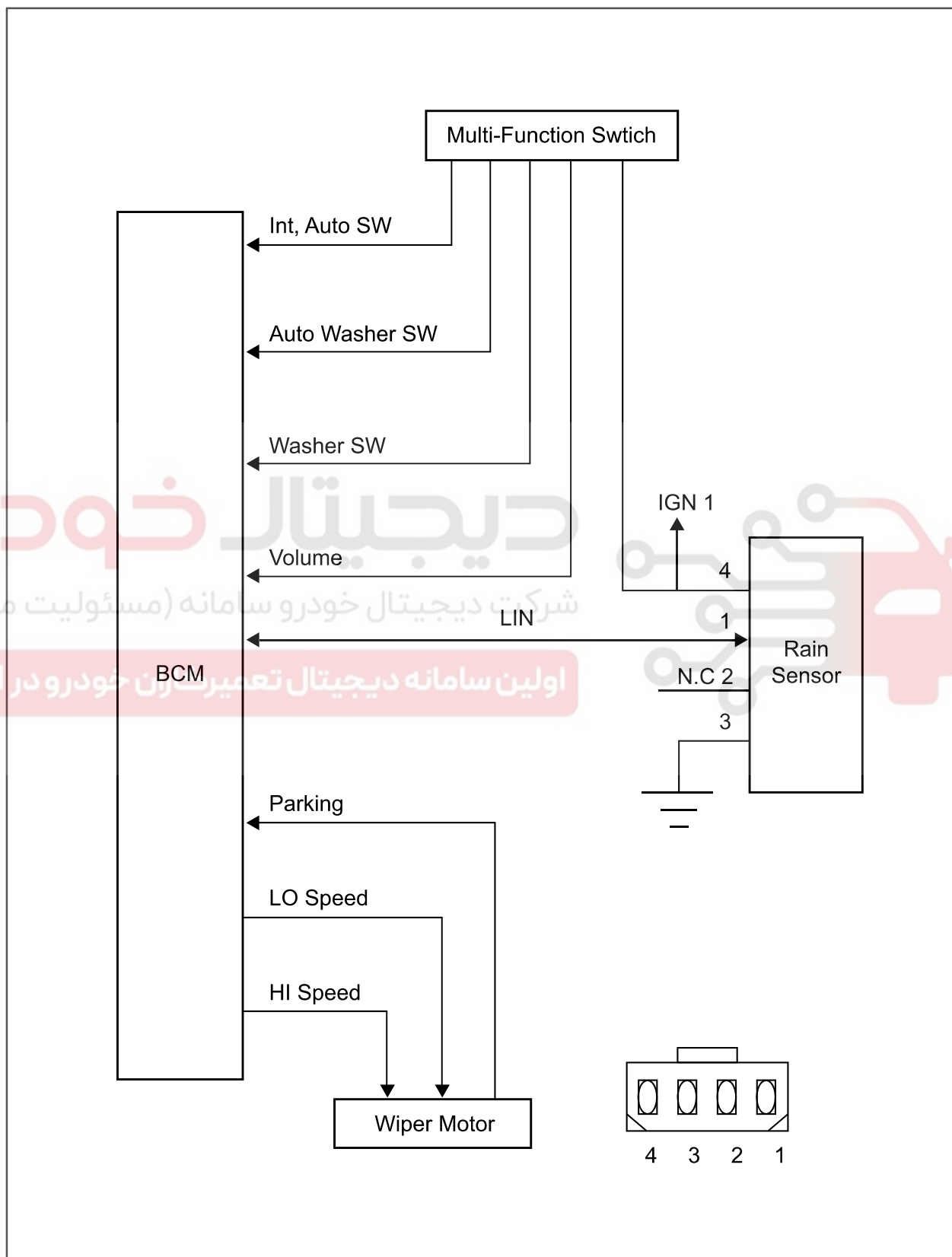
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## (1) Rain sensor coupled wiper operation (LIN)

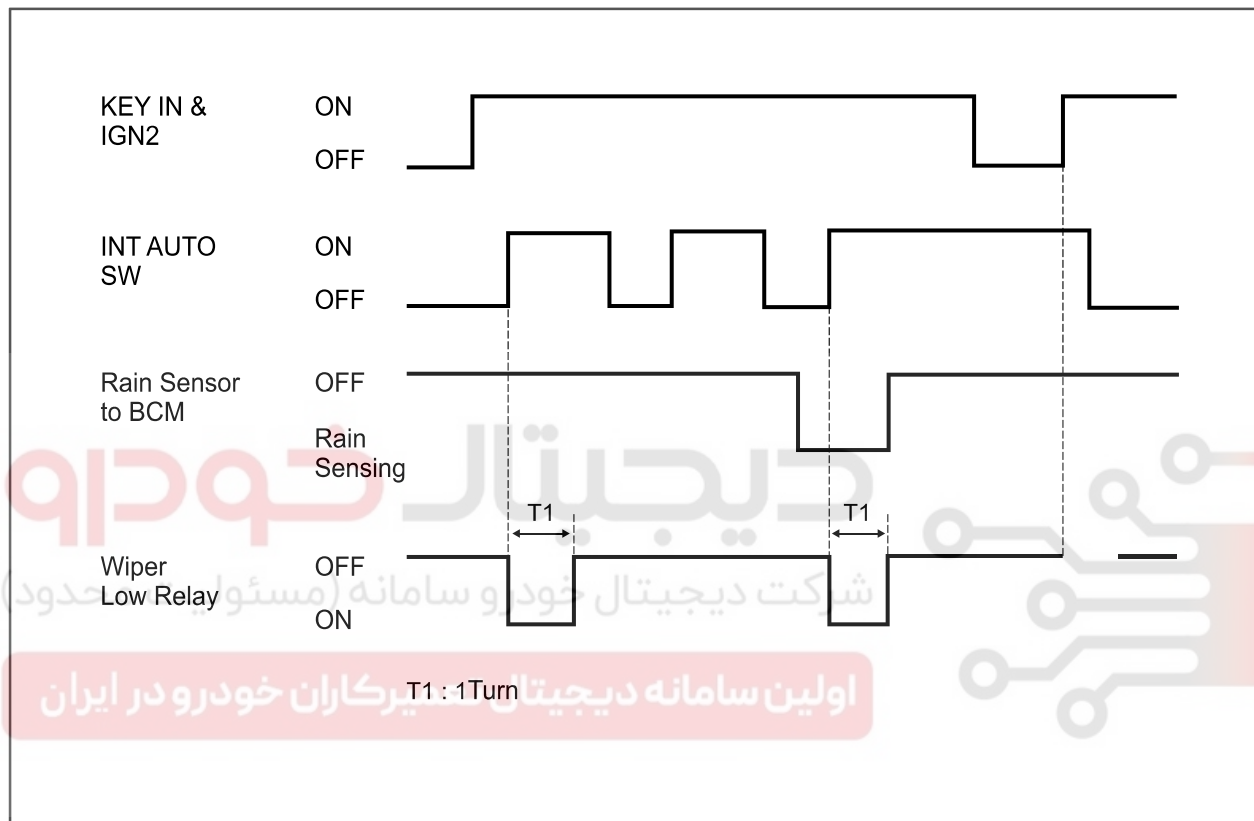
## ► System layout



Modification basis	
Application basis	
Affected VIN	

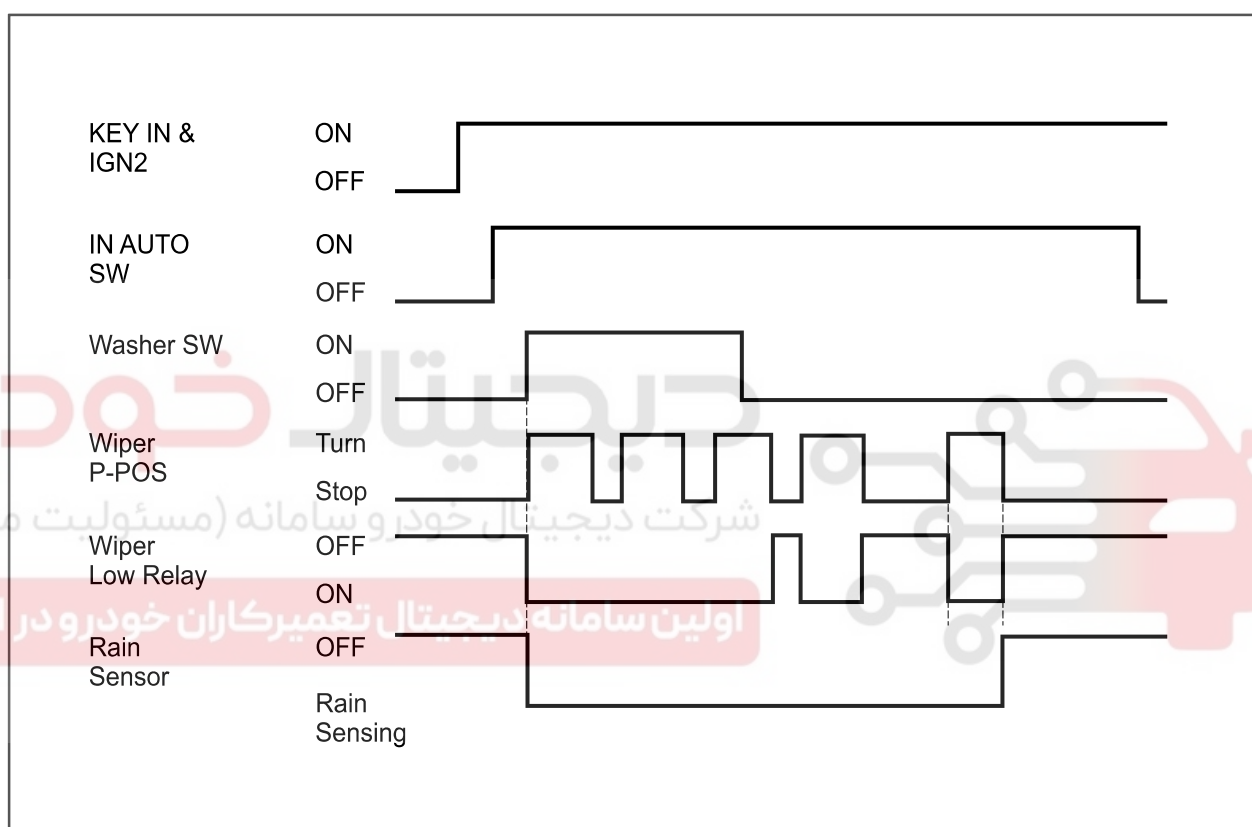
## (2) Power-up reminder wiper

1. If the intermittent/automatic wiper switch is in "ON" position, the wiper motor does not operate even when turning the ignition switch to ON from OFF position.
2. When the INT/AUTO wiper switch is turned on from off with the ignition switch ON, the wiper is operated at low speed for the 1st cycle regardless of the rain sensor signals. After that, if the INT/AUTO wiper switch is turned on from off, the wiper cycles one time at low speed only when the rain sensor detects the presence of rain.



### (3) Washer coupled wiper operation during rain sensor coupled operation

1. When the washer switch signal is received during intermittent operation coupled with rain sensor with IGN ON and intermittent/automatic washer switch operation, the wipers operate in washer coupled mode regardless of the communication with the rain sensor. However, if the washer switch signal is received the washer relay is activated and wiper relay remains activated, when the data coupled with rain sensor indicates continuous wiper operation.
2. Even though the wiping system is in washer coupled wiper mode, the operating data are sent to rain sensor.



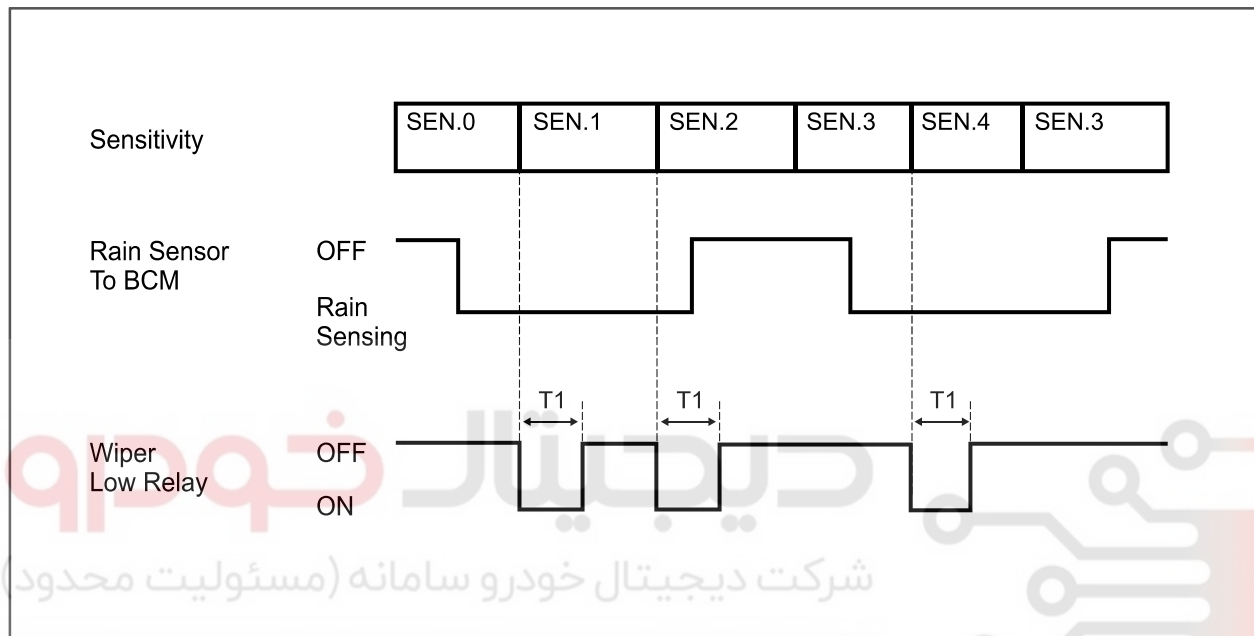
Modification basis	
Application basis	
Affected VIN	

#### (4) Sensitivity control (instant wiping)

1. When the wiping speed control switch is turned to "FAST" with IGN2 ON, intermittent/automatic wiper switch in "ON" position and wiper motor stop (parking position), the wiper motor operates one cycle at low speed.

(only when the rain sensor detects raindrops)

- \* If the wiping speed control switch is changed more than 2 stages within 2 seconds, the wiper motor operates only one cycle.

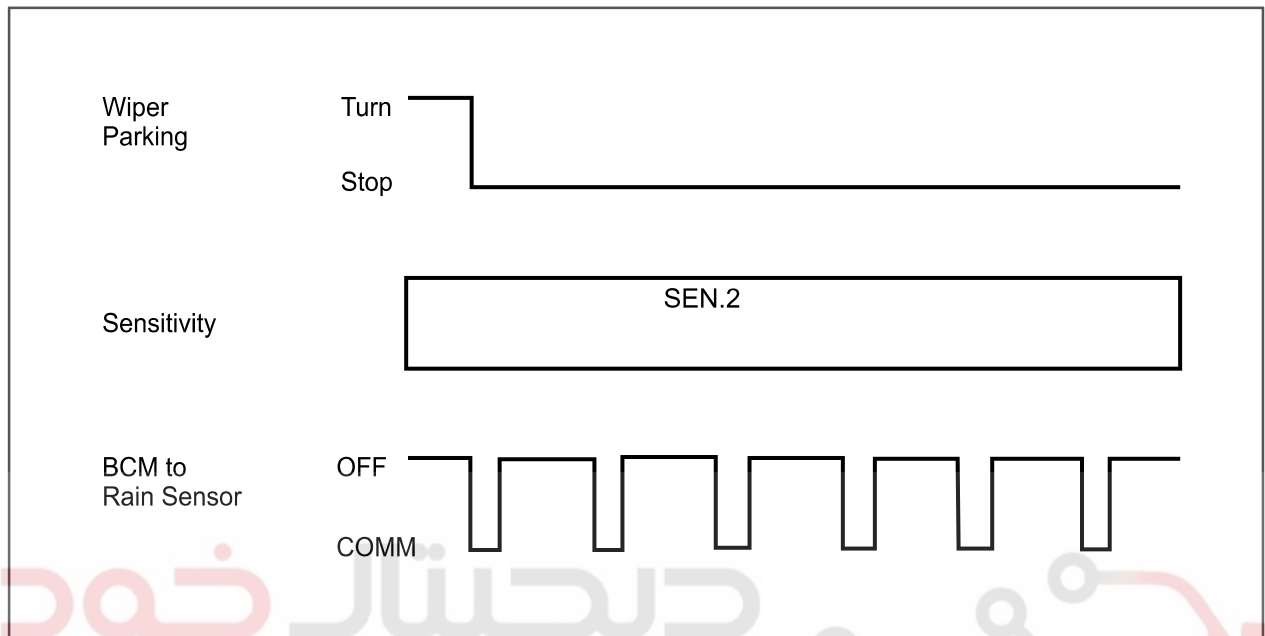


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**(5) For abnormal wiper parking signal**

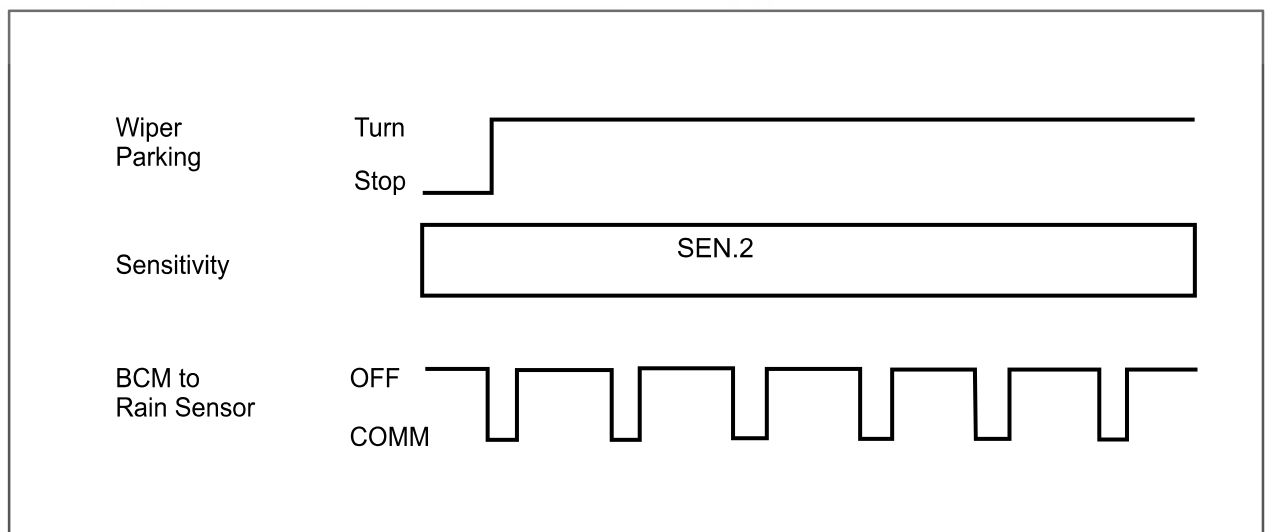
1. The wiper system sends continuously the signal for current status when the wiper parking terminal is shorted to ground with IGN2 ON and intermittent wiper switch in "ON" position.

\* The wiper motor is operated only when there is a request from the rain sensor.



2. When the parking terminal is shorted to power with IGN2 ON and intermittent wiper switch in "ON" position, the wiper system sends the signal for current wiping status for 2 seconds. After that, it sends the current signal for parking status continuously.

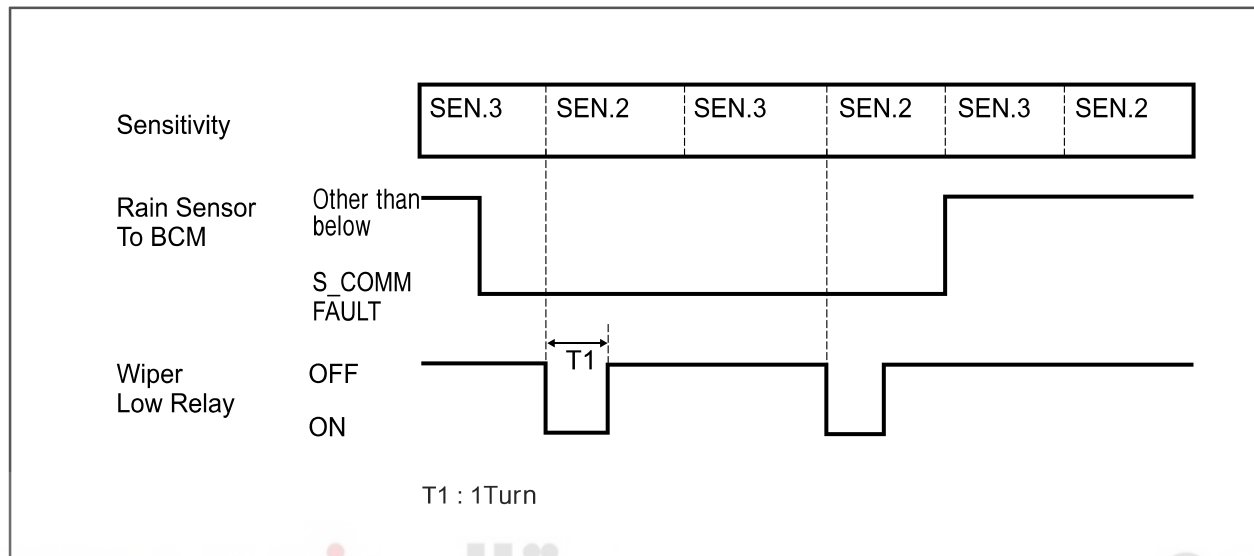
\* The wiper motor is operated only when there is a request from the rain sensor.



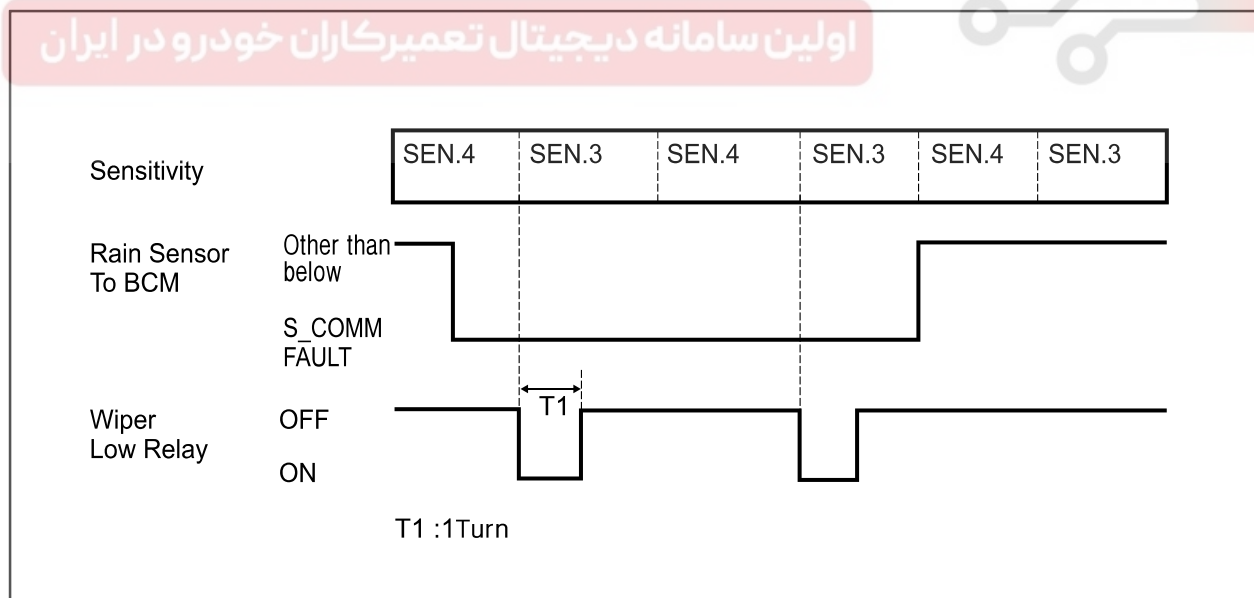
Modification basis	
Application basis	
Affected VIN	

**(6) For faulty rain sensor**

1. When the wiper speed control switch is turned to step 2 from step 3 the wiper motor cycles one time at low speed, provided that the BCM receives a faulty sensor signal from the rain sensor unit with IGN ON and the INT/AUTO switch ON.



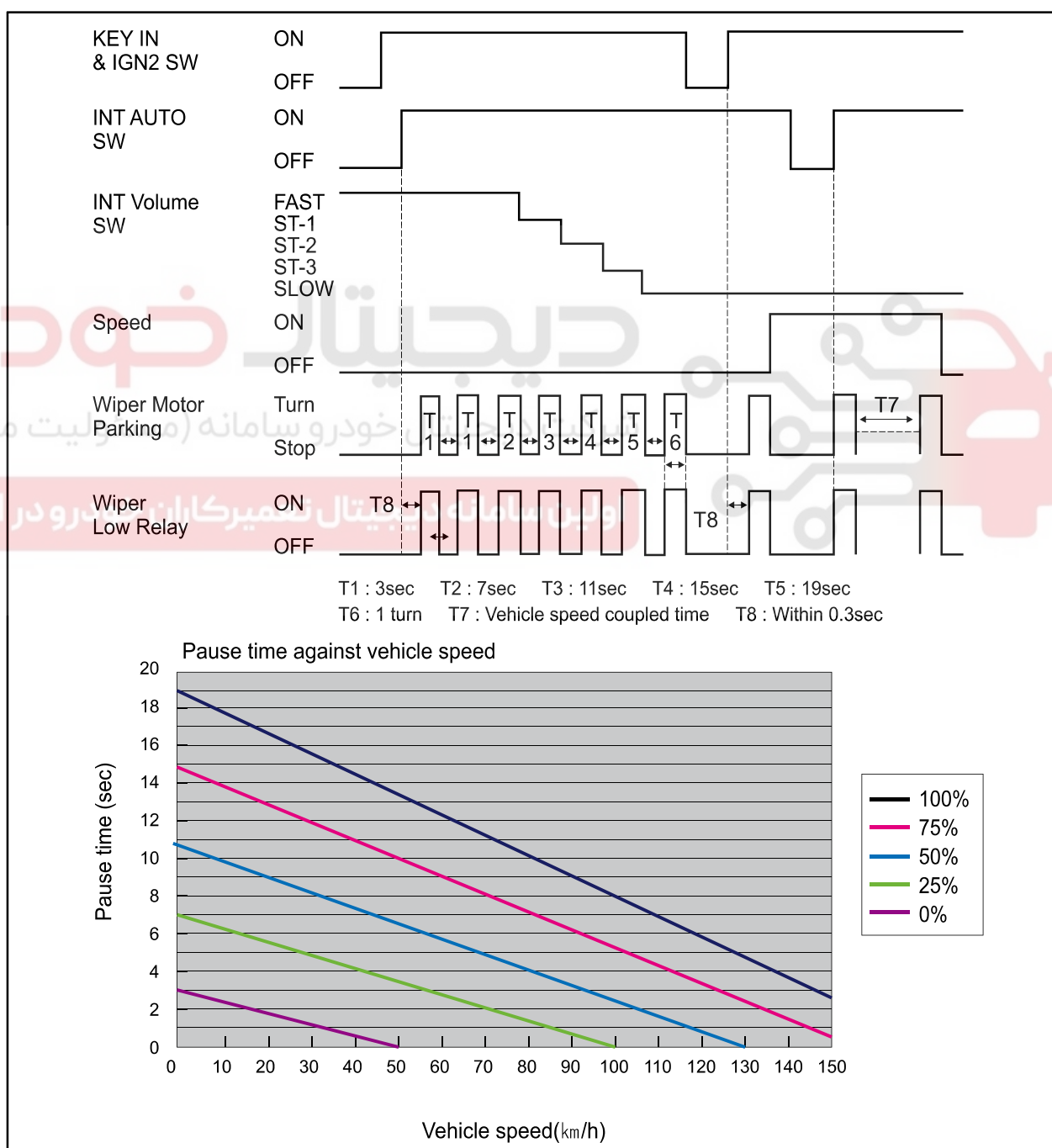
2. When the wiper speed control switch is turned to step 3 from step 4 the wiper motor cycles one time at low speed, provided that the BCM receives a communication error signal from the rain sensor unit with IGN ON and the INT/AUTO switch ON.



## (7) Speed sensitive intermittent wiper

For the vehicles without rain sensor, the BCM operates the wiper as follows:

1. When turning the ignition switch to ON from OFF position with the intermittent wiper switch in "ON" position, the wipers do not operate.
2. When turning the wiper switch to ON from OFF position after turning the ignition switch to ON position, the wipers operate one cycle.
3. The wiper's operation cycle depends on the vehicle speed (CAN communication with instrument cluster) and wiping speed the side fascia panel.
  - Wiping cycle:  $3 \pm 0.5$  sec. (FAST) to  $19 \pm 2$  sec. (SLOW)



Modification basis	
Application basis	
Affected VIN	



09-26 7810-07

korando

## ► Speed sensitive intermittent wiper interval

SPEED VIR	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
100%	19.00	17.90	16.80	15.70	14.60	13.50	12.40	11.30	10.20	9.10	8.00	6.90	5.80	4.70	3.60	2.50
75%	15.00	14.03	13.06	12.09	11.13	10.16	9.19	8.22	7.26	6.29	5.32	4.35	3.39	2.42	1.45	0.45
50%	11.0	10.16	9.33	8.49	7.66	6.82	5.99	5.15	4.32	3.48	2.65	1.81	0.98	0.14	0.00	0.00
25%	7.00	6.29	5.59	4.89	4.19	3.48	2.78	2.08	1.38	0.67	0.02	0.00	0.00	0.00	0.00	0.00
0%	3.0	2.43	1.86	1.29	0.72	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

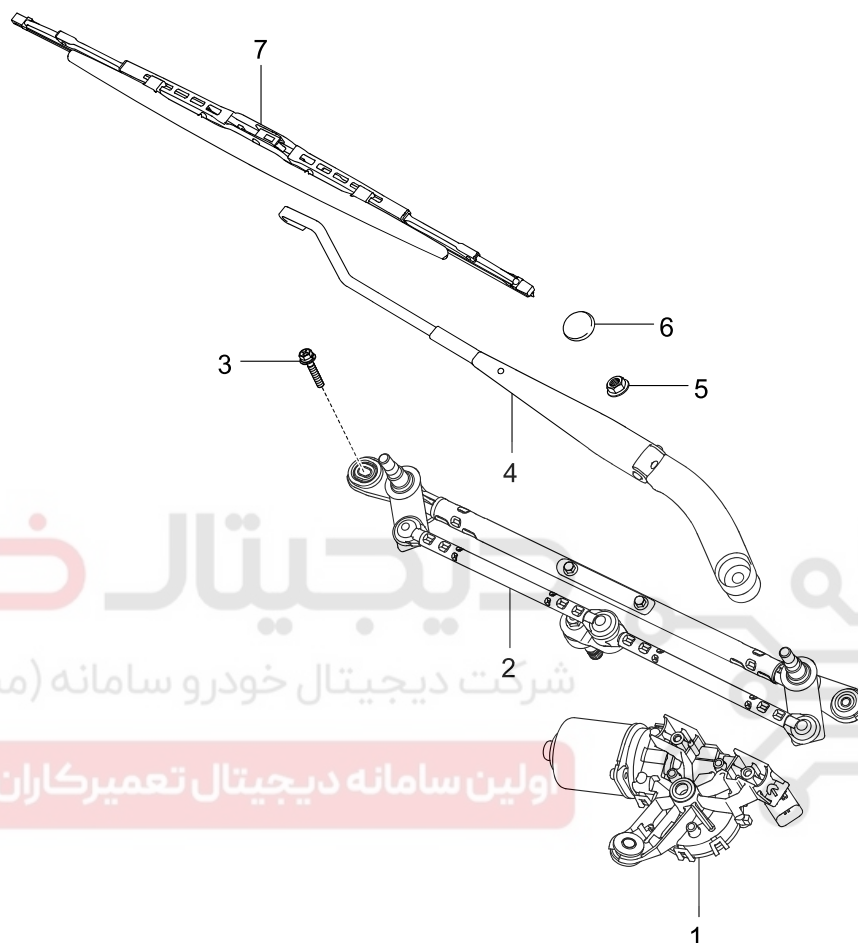
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Modification basis	
Application basis	
Affected VIN	

## CONFIGURATION AND FUNCTION

## 7810-00 WINDSHIELD WIPER



1. Windshield wiper motor assembly
2. Windshield wiper motor assembly
3. Bolt
4. Windshield wiper arm assembly
5. Nut
6. Wiper arm cap
7. Windshield wiper blade assembly

Modification basis	
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Affected VIN	

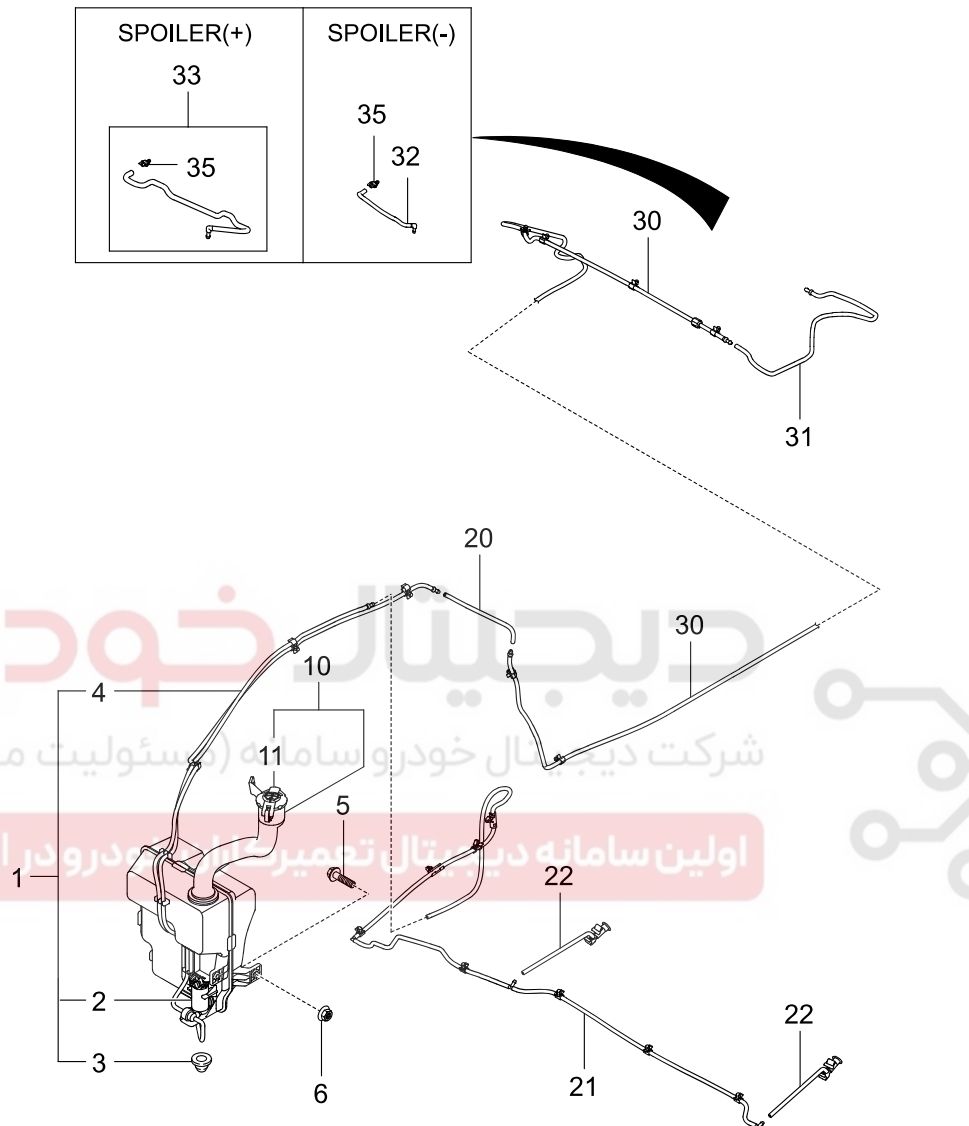
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7820-00

KORANDO

S.G.N.

## 7820-00 WINDSHIELD WASHER



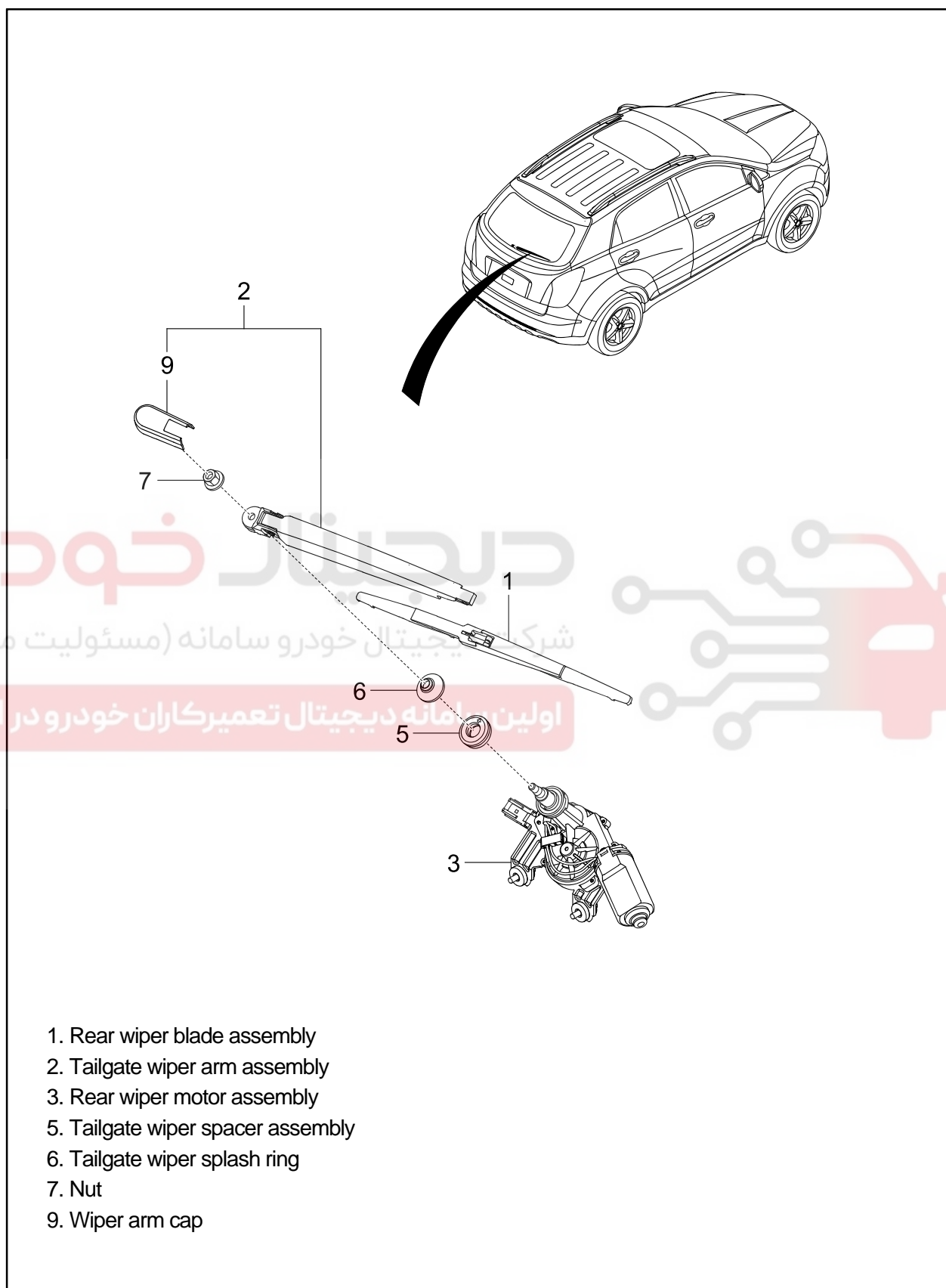
1. Washer fluid reservoir assembly
2. Washer pump motor assembly
3. Pump packing
4. Washer fluid reservoir hose assembly
5. Screw
6. Nut
10. Washer fluid reservoir guide assembly
11. Washer fluid reservoir cap

20. Washer hose assembly
21. Windshield washer hose assembly
22. Windshield washer nozzle assembly
30. Tailgate washer front hose assembly
31. Tailgate washer hose assembly
32. Tailgate washer hose assembly - with spoiler
33. Tailgate washer nozzle assembly - with spoiler
35. Tailgate washer nozzle - with spoiler

Modification basis	
Application basis	
Affected VIN	

S.G.N.

## 7830-00 REAR WIPER



Modification basis	
Application basis	
Affected VIN	

S.G.N.

**8530-02 MULTIFUNCTION WIPER ASSEMBLY****1) Windshield Wiper Switch****► Mounting location****► Front wiper switch function****MIST**

If you move the wiper switch to "MIST" position and release it, the windshield wipers operate one wiping cycle. The wipers will operate continuously if the switch is held in this position.

**OFF**

Wipers are not in operation.

**AUTO**

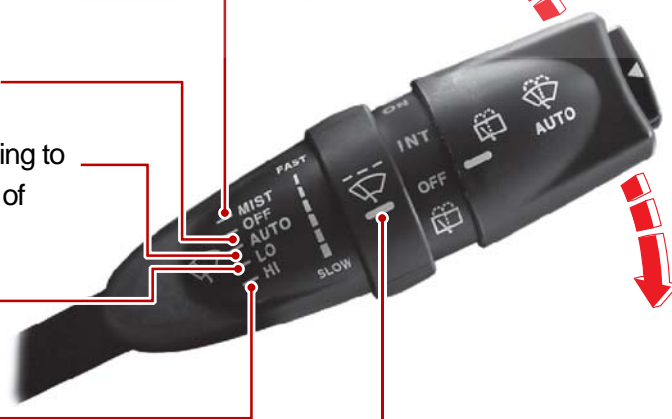
Operates automatically according to the vehicle speed and amount of rainfall.

**LO**

Continuous wipe, slow operation

**HI**

Continuous wipe, fast operation

**Front automatic wiper speed control switch**

The interval of wiping speed can be adjusted by turning the control knob upward or downward when the windshield wiper switch is in AUTO position.

Fast: Fast interval

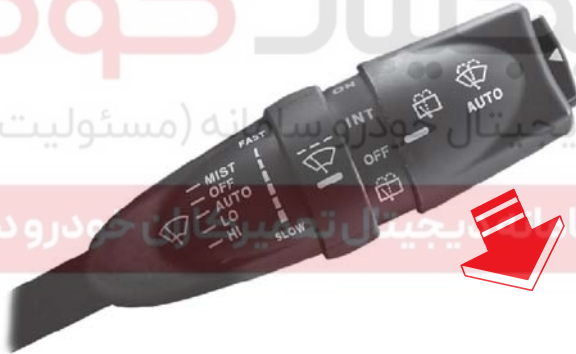
Slow: Slow interval

Modification basis	
Application basis	
Affected VIN	

## 2) Front Washer Switch

### (1) Washer wiper





**Wiper Washer Fluid Coupled Function**

Pull the lever briefly (below 0.6 seconds): One wiping cycle without washer spray

Pull and hold the switch for more than 0.6 sec.: Three wiping cycles with washer fluid spray with washer spray



**Front auto washer switch**

When the front wiper switch is off and this switch is pressed, washer fluid will be sprayed and the wiper will automatically operate 4 times. Then, the fluid will be sprayed again and the wiper will automatically operate 3 times.

Modification basis	
Application basis	
Affected VIN	



### 3) Rear Wiper Switch

#### ► Mounting location



#### ► Rear wiper switch function

##### Rear wiper switch

**ON**

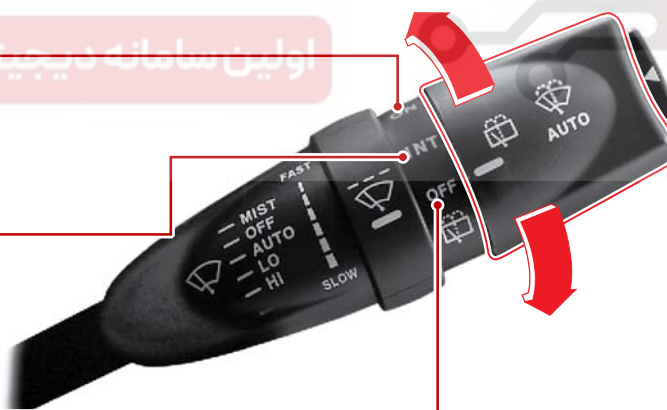
Rear wiper operation (Normal Speed)

**INT**

Rear wiper operation (Intermittent)

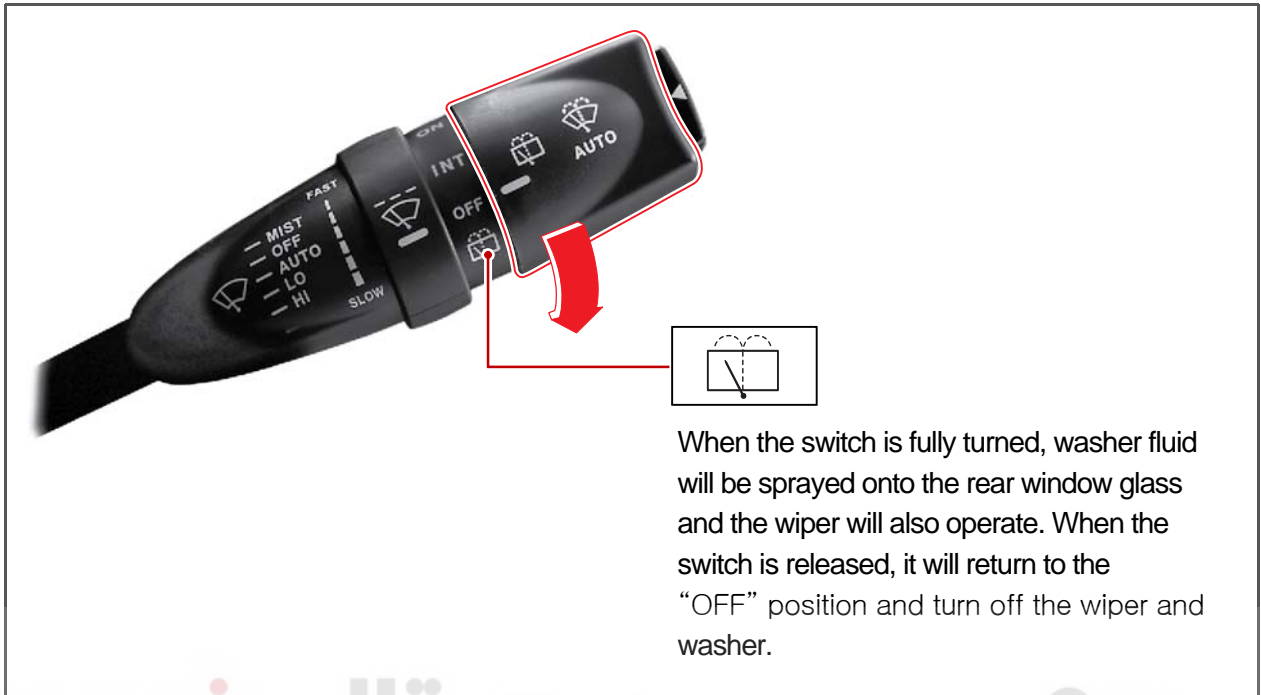
**OFF**

Wipers are not in operation.





#### 4) Rear Washer Switch



#### 5) Connector Pin Description

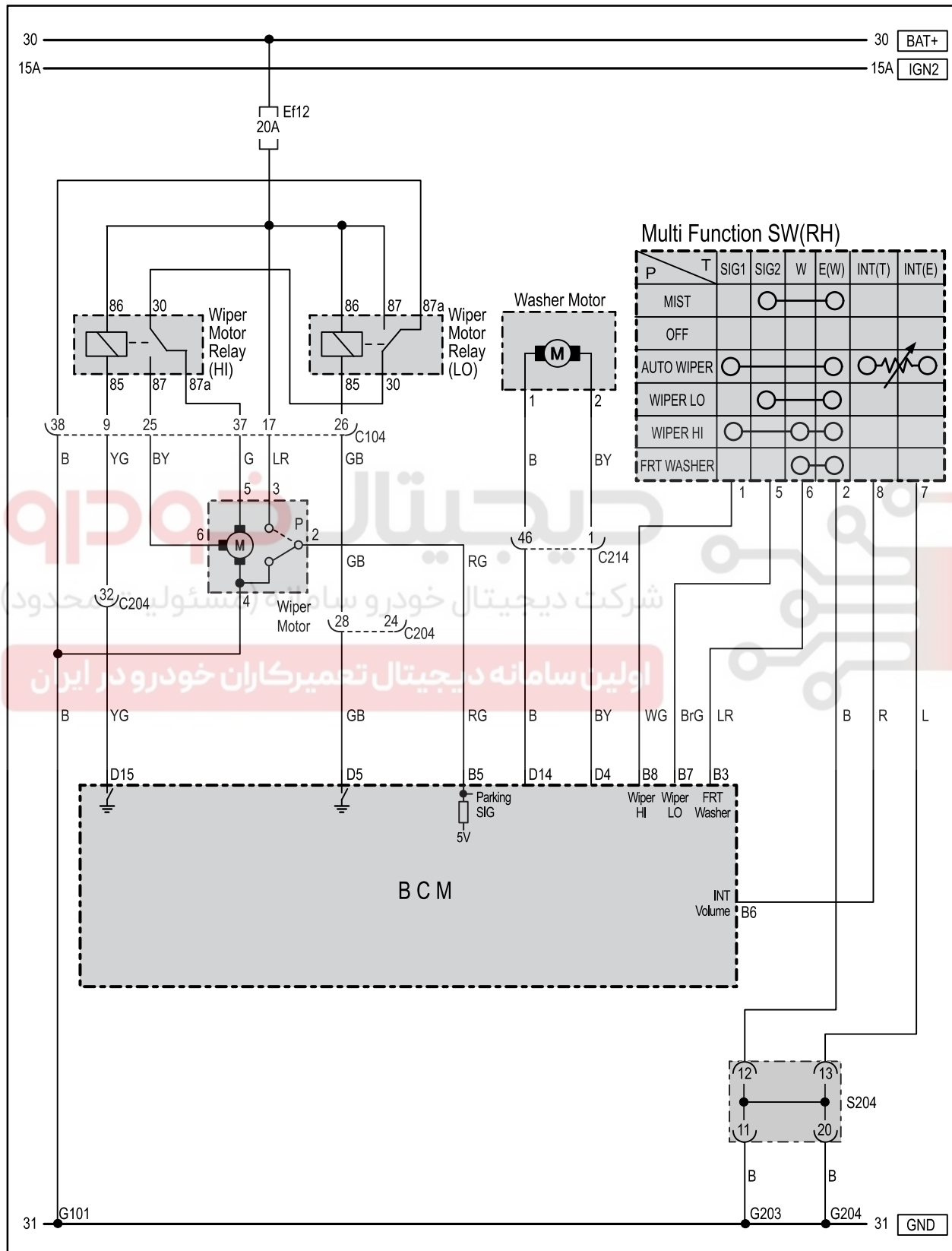


Pin No.	Function
1	Wiper signal 1
2	Wiper signal ground
3	-
4	-
5	Wiper signal 2
6	Rear washer
7	INT volume ground
8	INT volume signal
9	Auto washer
10	Rear wiper, AUTO washer Rear washer ground
11	Rear wiper signal
12	Windshield washer signal

Modification basis	
Application basis	
Affected VIN	

## 6) Circuit Diagram

► **Front wiper/washer**

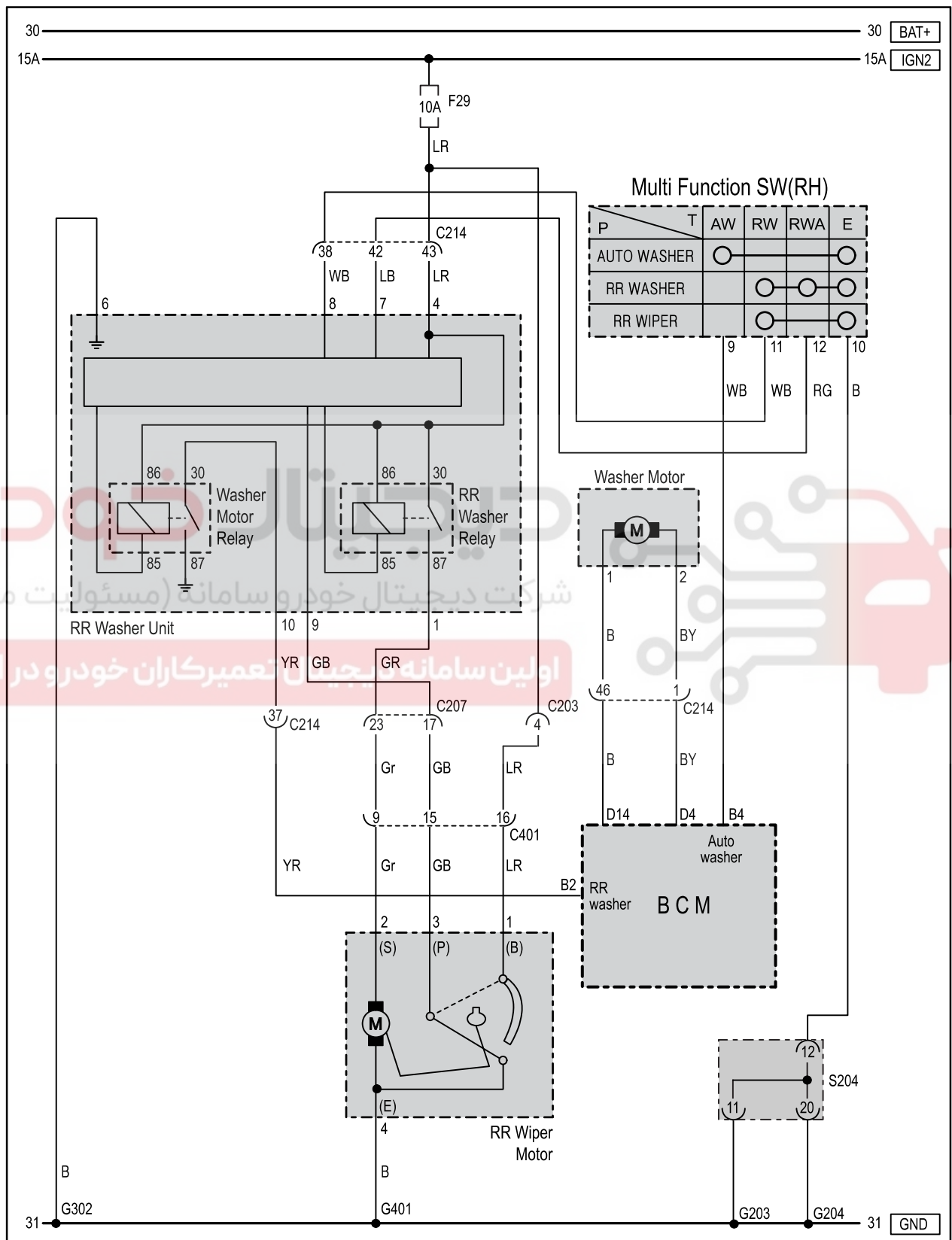


## WIPER AND WASHER SYSTEM

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Modification basis	
Application basis	
Affected VIN	

► **Rear wiper/washer**



Modification basis	
Application basis	
Affected VIN	

## WIPER AND WASHER SYSTEM

KORANDO 2013.08

S.G.N.

**7810-01 WIPER MOTOR****1) Mounting Location****Front wiper motor****Rear wiper motor****2) Specifications**

Pin No.	Specification
Rated voltage	12 V
Operating voltage	10 V to 15 V
Min. operating voltage	Max. 8 V

### 3) Connector Functions

#### ► Front wiper



Pin No.	Function
1	-
2	Wiper parking
3	B+
4	Ground
5	Wiper LOW
6	Wiper HIGH

#### ► Rear wiper



Pin No.	Function
1	B+
2	Wiper switch
3	Wiper parking
4	Ground

Modification basis	
Application basis	
Affected VIN	

S.G.N.

**7810-01 REAR WIPER UNIT****1) Mounting Location**

شرکت دیجیتال خودرو (مسئولیت محدود)

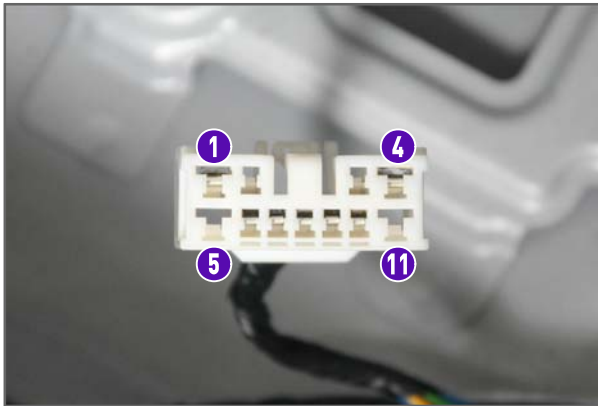
**2) Specifications**

Item	Specification
Rated voltage	DC 12V
Operating voltage range	DC 9V - 16V
Operating temperature range	-30°C ~ +80°C
Storage temperature	-40°C ~ +85°C
Rated load	Wiper motor: 3.2A
Insulation resistance	DC 500V MEGGER 1MΩ

Modification basis	
Application basis	
Affected VIN	



### 3) Functions



Pin No.	Function
1	RR WIPER RLY CONTROL
2	-
3	-
4	IGN
5	-
6	GND
7	RWA SW
8	RW SW
9	PARKING SIGNAL
10	RR WASHER SIGNAL
11	-

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

ELECTRO  
NIC

FUSE

BCM

SKM

INSTRUM  
ENTINSTRUM  
ENT

SWITCH

LAMP

WIPER  
AND

PAS

AUDIO  
SYSTEM

Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

KORANDO 2013.08

09-40

7810-04

KORANDO

S.G.N.

**7810-04 WINDSHIELD WIPER ARM AND BLADE****1) Mounting Location****Front wiper****Rear wiper**

WIPER AND WASHER SYSTEM

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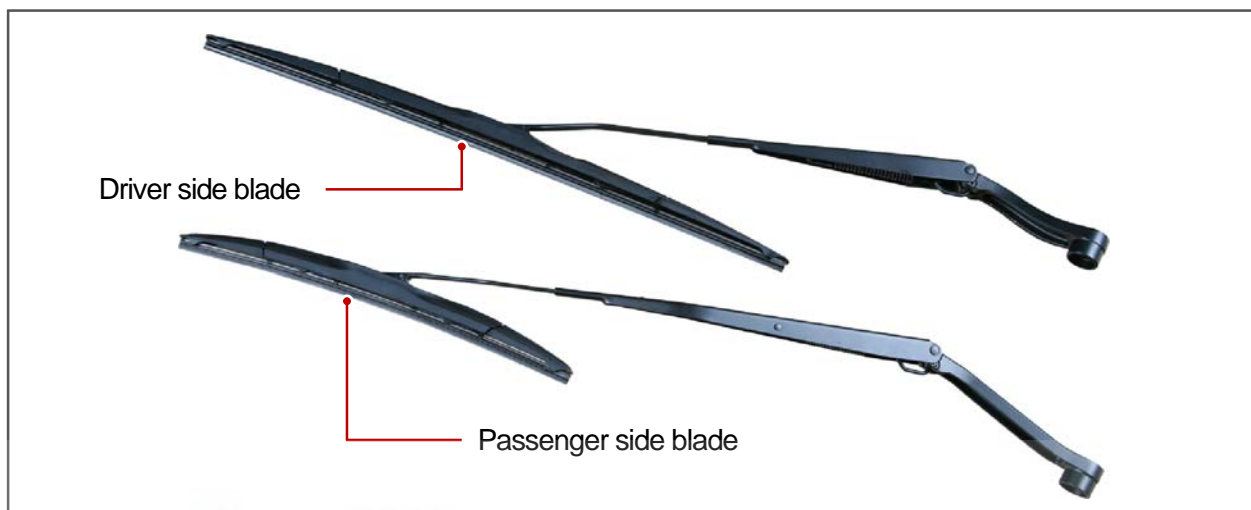
Modification basis	
Application basis	
Affected VIN	



## 2) Specifications

### (1) Windshield wiper

- ▶ Driver side blade: 600 mm (24 in)
- ▶ Passenger side blade: 400 mm (16 in)



### (2) Rear wiper

- ▶ Rear side blade: 350 mm (14 in)



Modification basis	
Application basis	
Affected VIN	

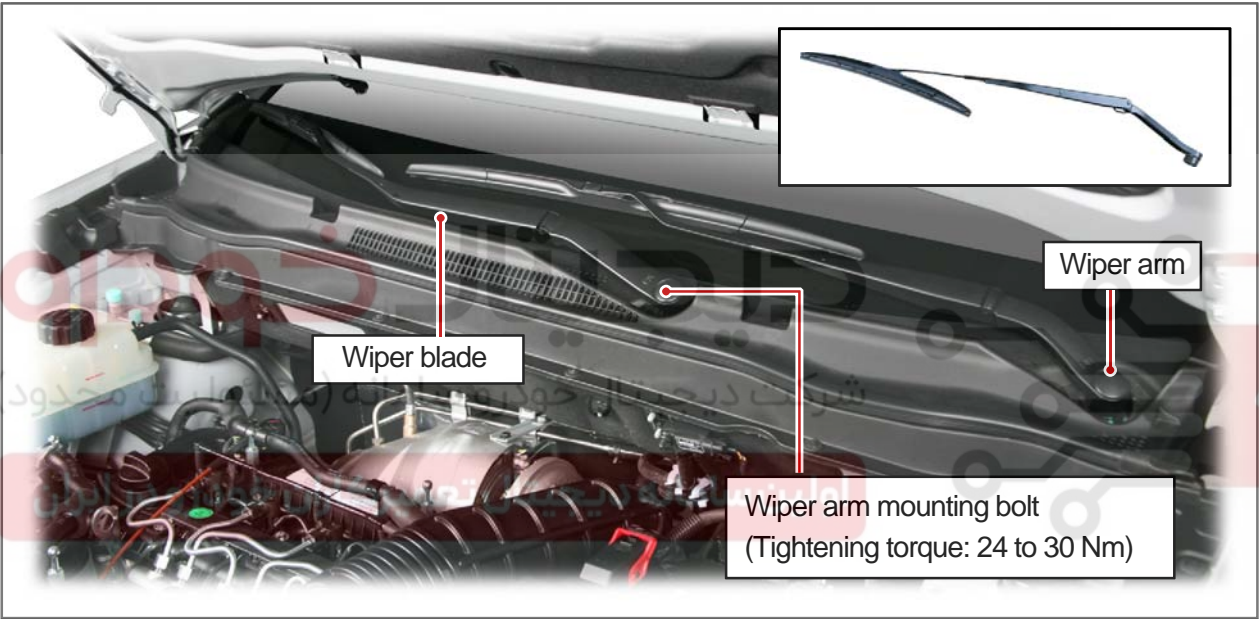
### 3) How To Adjust Windshield Wiper Arm Angle

#### (1) Overview

The wiper blade should be replaced depending on its material and usage. However, poor tightening torque for the mounting bolt of the wiper arm or deformed wiper arm may cause the change interval to be shortened or the wiper not to wipe the windshield evenly.

It is important for these vehicles to measure the attack angles of the windshield glass and wiper blade (including movement angle of wiper arm) to adjust the wiper arm angle with a separate adjuster (see illustration below) by using the following procedures.

However, it would be extremely rare to correct the angle using the adjuster, since the most wiper arms are installed to the vehicle by considering the angle for the windshield glass. Please refer to the following information on mounting angle to check the wiper for abnormal wiping.



#### CAUTION

1. Note that the wiper may not operate properly with normal angle and wiper arm if the wiper blade has been worn or the windshield glass is coated, before measuring the wiper arm's attach angle.  
The following wiper attack angle and return angle are based on the angle for the windshield glass
2. line, as viewed from the pivot center line.

Modification basis	
Application basis	
Affected VIN	

## (2) How To Adjust


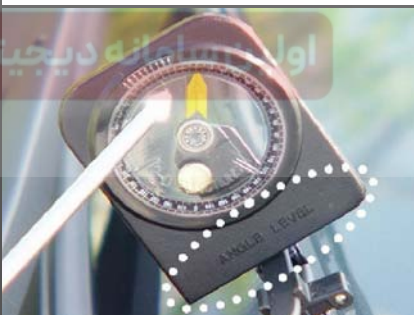

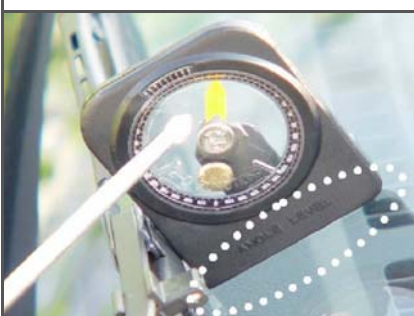
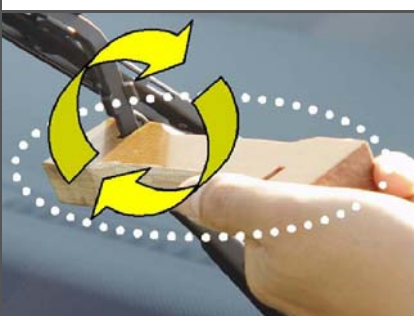

The following are how to measure and adjust the wiper arm angle.

### ► Tools

Protractor	Adjustor	Adjustor
		<p>Work position</p>  <p>Work direction</p> <p>Wiper arm</p> <p>Windshield glass</p> <p>Blade</p>

- How to read a protractor: Read the measurements in counterclockwise direction after zeroing.
- Wiper arm angle specification: Driver side – 5.4° / Passenger side – 4.9°

### ► How to adjust

1. Install the protractor (end part of shield (end of the wiper arm)).	2. Zero the protractor after installation. (Install the protractor to the windshield glass)	3. Install the protractor set to "0°" on the upper side of the wiper arm and check the mounting angle.
		
4. Check if the angle is within the specified range. (Install it to the upper part of the wiper arm)	5. If the angle is out of the specified value, the specified range, adjust it using the JIG.	6. Deliver the vehicle after adjusting the customer after adjustment specification.
		

Modification basis	
Application basis	
Affected VIN	

S.G.N.

**7820-01 WASHER FLUID RESERVOIR ASSEMBLY****1) Mounting Location**

Modification basis	
Application basis	
Affected VIN	



S.G.N.

**8610-09 AUTO LIGHT AND RAIN SENSOR MODULE**

The rain sensor is attached to the specific heat treated windshield with adhesive called SOTEPa. The windshield glass has minimum 13% of transmission rate with the specified intensity of radiation. It communicates with the BCM and activates the wiper automatically in the rain sensing mode (multifunction switch wiper: AUTO mode). This sensor module emits infrared rays through the windshield glass and then detects the amount of rain drops by receiving the rays reflected off the sensing section (rain sensor mounting section on the windshield) with photodiode.



**Wiper switch  
(AUTO operation)**



**Automatic light and rain sensor**



The communication through LIN communication is established regardless of the ignition key position. When the AUTO wiper switch is activated, the value of the AUTO wiper sensor is used.

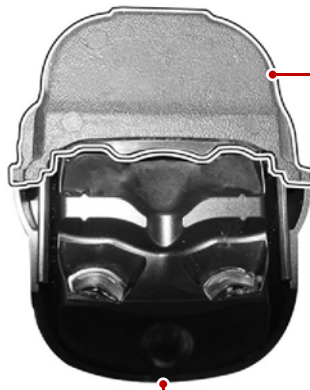
Modification basis	
Application basis	
Affected VIN	

## Components

Rain sensor module



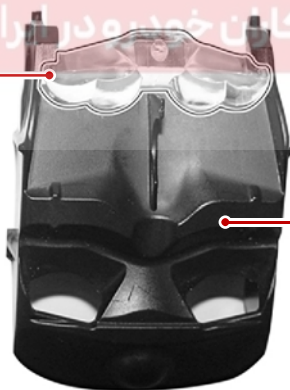
Inner view of rain sensor module



Unit latch



Housing and receiver lens



Receiver lens

The receiver lens guides the reflected infrared rays from the windshield to the photodiode.

Housing and PCB



PCB assembly and Emitter lens



Emitter lens

The LED, which emits the infrared rays, is located at bottom and the lens guides the infrared rays to target point.

Modification basis	
Application basis	
Affected VIN	

## 1) Related Circuit

The rain sensor has one connector with 4 pins and each pin has following function as shown in the circuit diagram. However, in this vehicle, the terminal No. 1 and No. 2 are for communications between BCM and the rain sensor; the No. 1 terminal sends the detected value from the rain sensor to BCM then the STICS drives wiper motor.

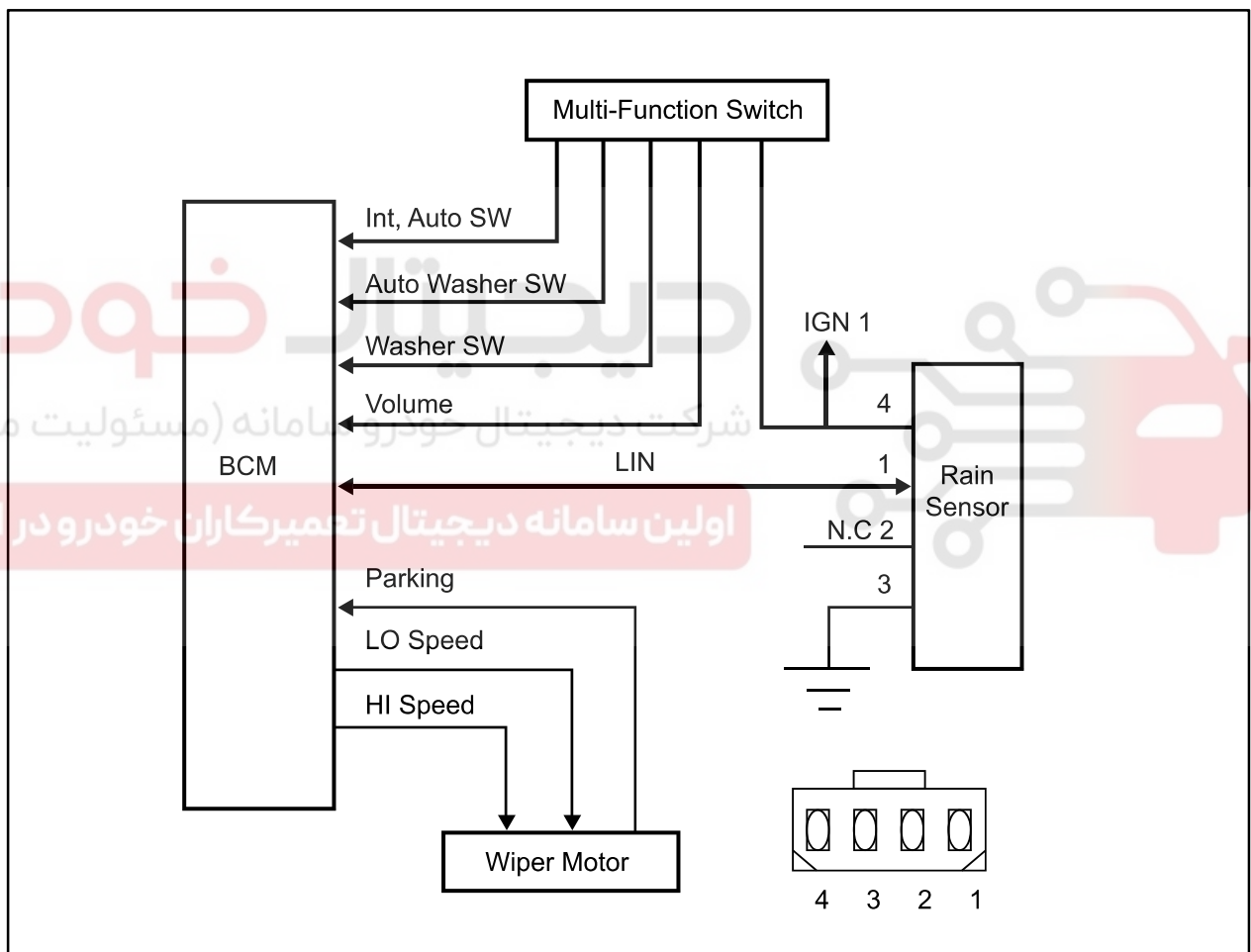
No. 2 terminal sends the wiper and washer operation information such as

**washer operation mode,**

**wiper relay, or**

**multifunction wiper switch is in AUTO wiper position**

to the rain sensor to recognize whether it is actual rain or it is in rain sensing wiper operation mode.



Modification basis	
Application basis	
Affected VIN	



## 2) Rain Sensor Function

### (1) Windshield glass and coupler attachment

Check the outer windshield surface of the sensing area for excessive wear, damage or scratch. The sensor is able to compensate the wear up to a specific level. Check if there are too many air pockets left between the surfaces of the coupler and windshield. If the porosity exists, the sensor cannot function properly.



#### NOTE

If the installed wiper blade is not as specified (size and length), the wiper cannot wipe the rain sensing area clearly.

In this case, the sensitivity of the rain sensor could be decreased and the wiper could be malfunctioning.

### (2) Recognition of AUTO wiper mode

1. When the engine is started with the wiper switch "AUTO" position, the wiper operates one cycle to remind a driver that the wiper switch is in "AUTO" position.
2. The wiper also cycles one time when the multifunction wiper switch is turned from OFF to AUTO. This wiper operation is performed only for the first time. If the switch is turned from OFF to AUTO again, the wiper is operated only when raining to prevent the wiper blade from wearing. However, the wiper operates up to 3 minutes after rain stops.  
(If this function does not occur, check No. 2 terminal on the rain sensor. If any defective cannot be found, check the wiper relay (LOW) for defective.



#### NOTE

As described above, the BCM recognizes the wiper switch AUTO position

If there is no problem, enter the diagnostic mode for BCM, check the terminal which receives the signals from the wiper, or check the communication line between the rain sensor unit and BCM.

### (3) Instant wiping

Each time the speed control of the multifunction wiper switch is turned by one step from LOW to HIGH, the wiper cycles one time.

As with power-up function described above, the wiper continues works if it's rainy or for up to 3 minutes after the rain stops.



#### NOTE

The wiper also cycles one time when the variable resistance knob is turned straight from the 0 to step 4, from 0 to step 1, from step 1 to step 2, and from step 2 to step 3.

#### (4) Washer coupled wiper operation

Check the washer coupled wiper operation by pressing the washer switch.

#### (5) Irregular operation (abrupt operation)

- Check the rain sensor is correctly positioned.
- Check if the rain sensor cover is securely installed.
- Check if the customer is familiar with how to control the wiper sensitivity.

Check that the customer can select the sensitivity by selecting the variable resistance value (stage 1 to stage 5), that is, the wiper sensitivity control value. And, also check whether the sensitivity is selected to the highest value of FAST (stage 5).

- Check the wiper blade for wear.

If the wiper blade cannot wipe the glass uniformly and clearly, it may cause the rain sensor to work irregularly. Therefore, in this case, replace the wiper blade with a new one.

#### (6) Self diagnosis

##### ► Poor sensing

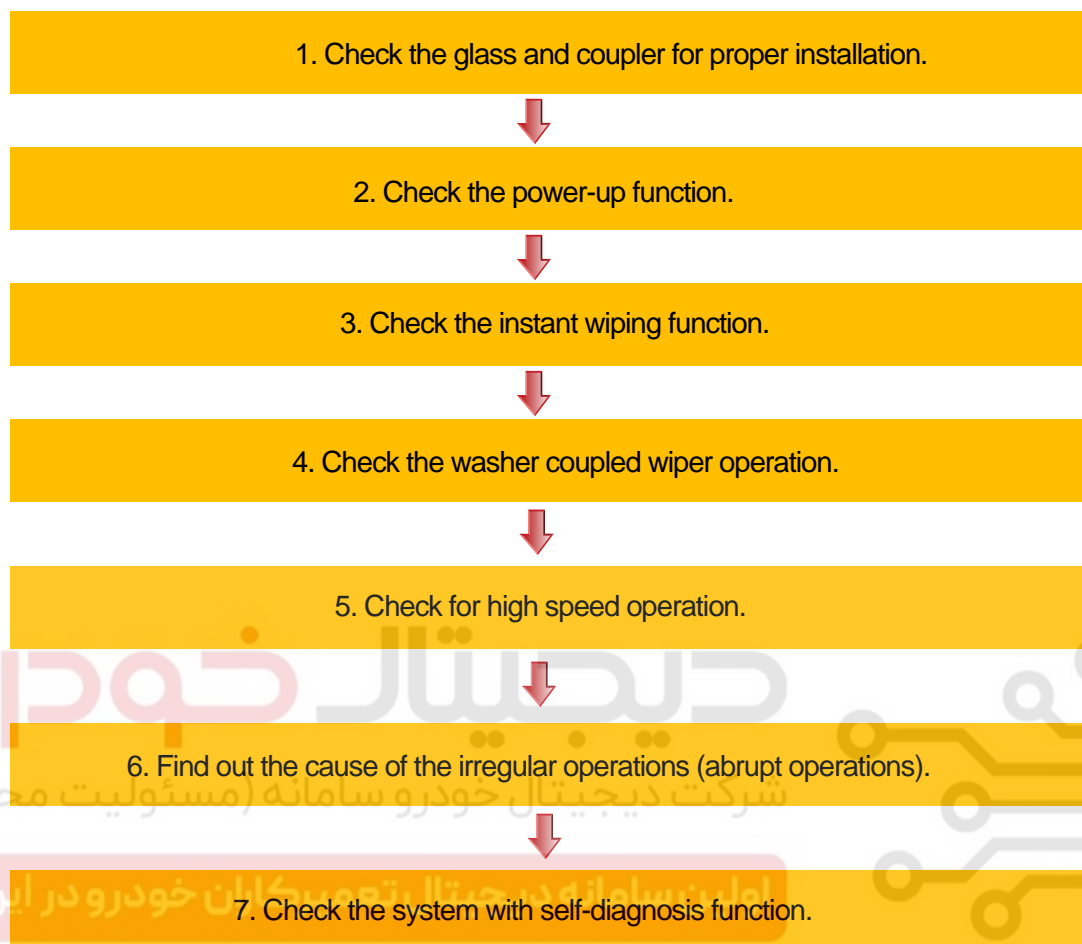
If the BCM is received the signal for sensor malfunction from the rain sensor unit when turning the wiping speed control switch to 2 from 3 stage with IGN ON and intermittent/automatic wiper switch in "ON" position, the wiper motor operates one cycle at low speed.

##### ► Poor sensor

If the BCM is received the signal for communication error from the rain sensor unit when turning the wiping speed control switch to 3 from 4 stage with IGN ON and intermittent/automatic wiper switch in "ON" position, the wiper motor operates one cycle at low speed.

Modification basis	
Application basis	
Affected VIN	

### 3) System Troubleshooting Procedures



#### ► TROUBLESHOOTING

Symptom 1. The wiper does not cycle one time when turning the multifunction wiper switch from OFF to AUTO position or when starting the engine with the multifunction wiper switch in AUTO position.

- When starting the engine with the multifunction wiper switch in AUTO position, the wiper always cycles one time to remind the driver of system in AUTO mode.  
The wiper also cycles one time when the multifunction wiper switch is turned from OFF to AUTO. This wiper operation is performed only for the first time. If the switch is turned from OFF to AUTO again, the wiper is operated only when raining to prevent the wiper blade from wearing. The wiper cycles once when the multifunction wiper switch is turned from OFF to AUTO position during 5 minutes after the rain stops. If the wiper does not work as specified, check the pin no. 8. If the pin is intact, check the terminals related to the wiper relay.

Symptom 2. It rains but the system does not work in "AUTO" position.

1. Check whether the wiper switch is in "AUTO" position.
2. Check the power to the sensor. That is, check the pin no. 3 (ground) and pin no. 4 (IGN).
3. Check the wiper relay.

Symptom 3. The wiper cycles 3 or 4 times at high speed abruptly.

Check if the variable resistance knob of the multifunction wiper switch is set to the FAST side (step 5). The sensitivity is highest in FAST position. Therefore, the wiper can be easily operated for the small change of the rain drops. To avoid this, adjust the knob to lower the sensitivity level.

Symptom 4. The wiper continues work even if the windshield glass is dry.

1. Check the wiper blade for wear. If the wiper blade cannot wipe the glass uniformly and clearly, this problem could occur. In this case, replace the wiper blade with a new one.
2. Check if the variable resistance knob of the multifunction wiper switch is set to the FAST side (step 5). The sensitivity is highest in FAST position. Therefore, the wiper can be easily operated for very small of water. To avoid this, adjust the knob to lower the sensitivity level.

Symptom 5. The wiper does not work at high speed during heavy rain.

You should check the pin no. 1 and no. 2 unless the wiper cycles at higher speed during heavy rain.

The wiper should cycle at high speed if the pins no. 1 and no. 2 are grounded.

Symptom 6. The wiper responses are too fast or slow.

Check if the variable resistance knob of the wiper switch is set to the FAST or SOW side. Inform the customer that the desired sensitivity can be set by using the variable resistance. And select a proper step for the customer.

Modification basis	
Application basis	
Affected VIN	

## REMOVAL AND INSTALLATION

S.G.N.

### 7810-00 WINDSHIELD WIPER

#### Preceding work

- Disconnect the negative battery cable.
- Open the engine hood.

1. Remove the mounting nut cap of the wiper blade assembly and unscrew the mounting nut to remove the cowl molding (A).



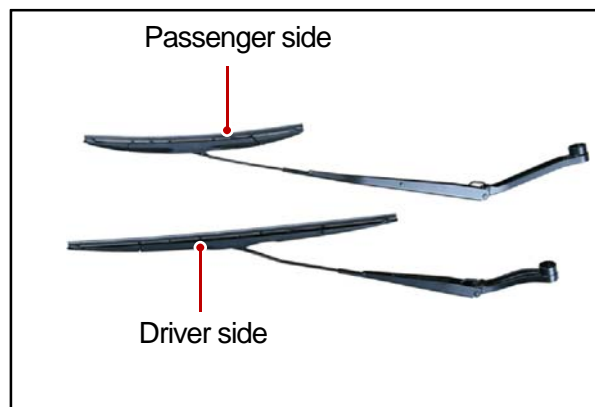
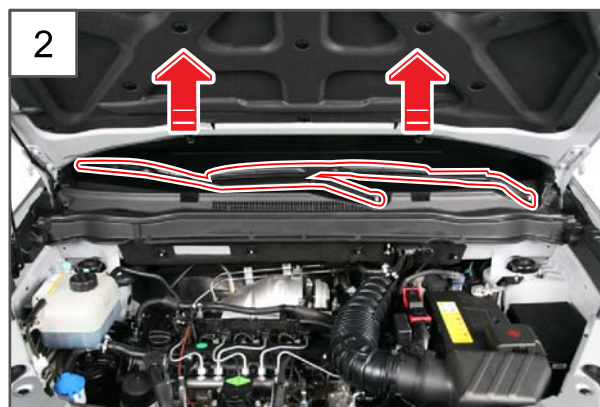
Removing mounting nut cap



Removing mounting nut

Tightening torque 24~30Nm

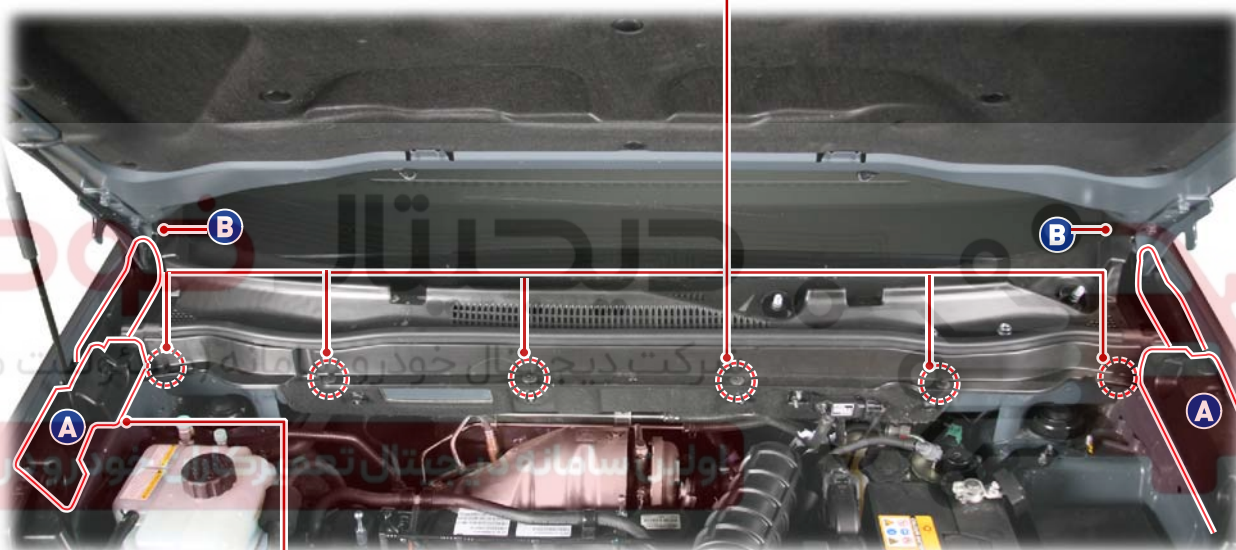
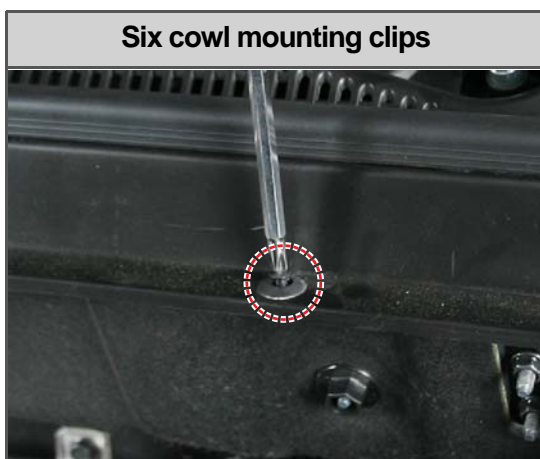
2. Remove the wiper blade assembly.



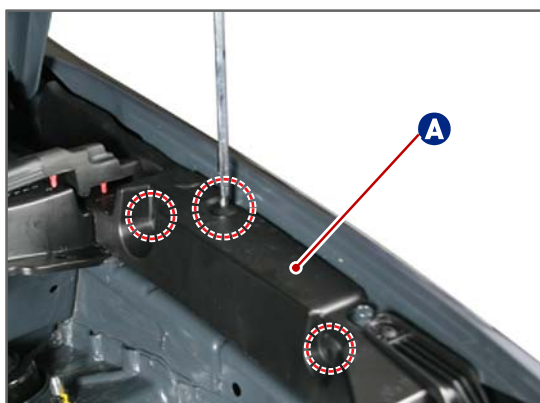
Modification basis	
Application basis	
Affected VIN	



3. Remove the 6 mounting clips for the cowl.



4. Disengage the 3 lower mounting clips on both sides of the cowl grille extension.



5. Separate the upper part (B) of the cowl grille extension on both sides with a flat-bladed screwdriver.



Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

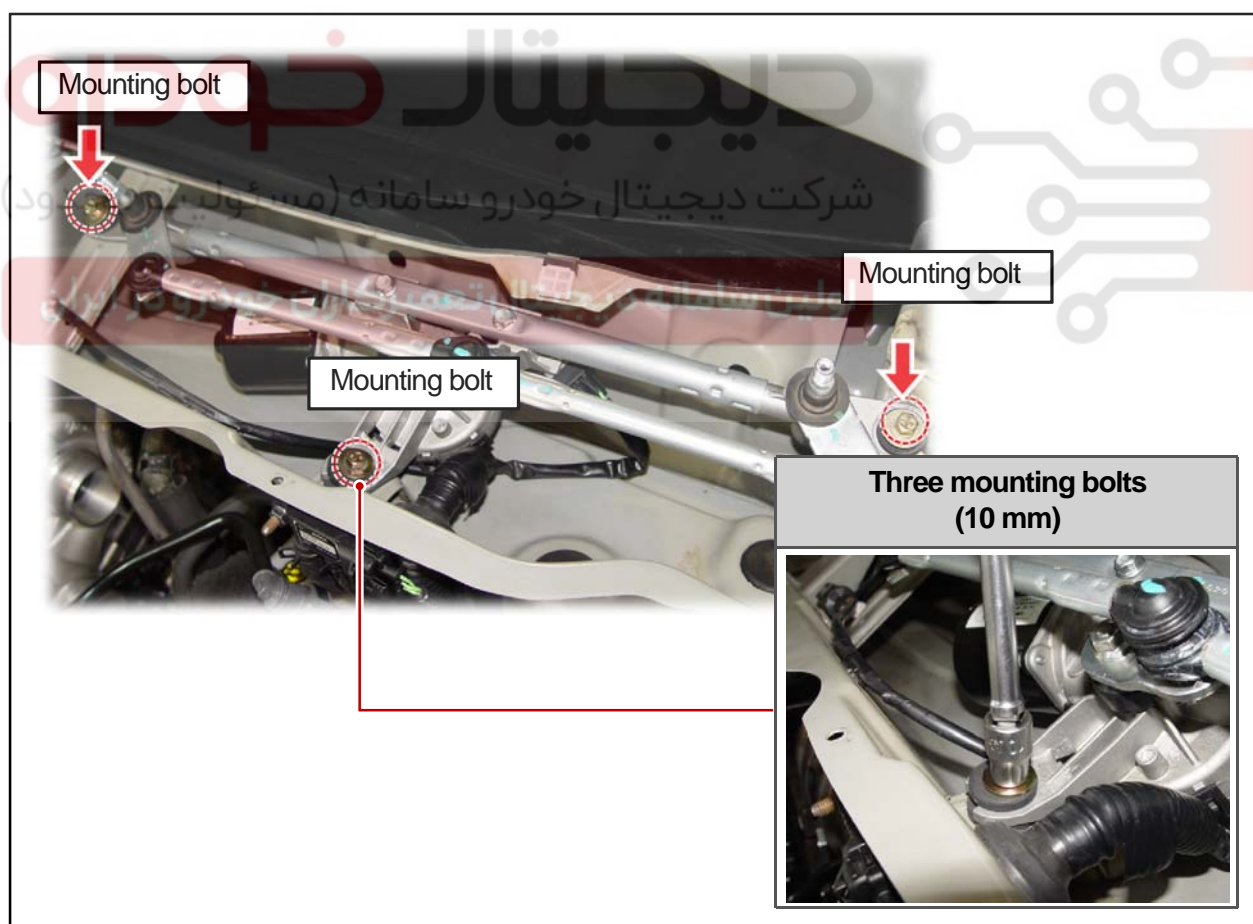
KORANDO 2013.08



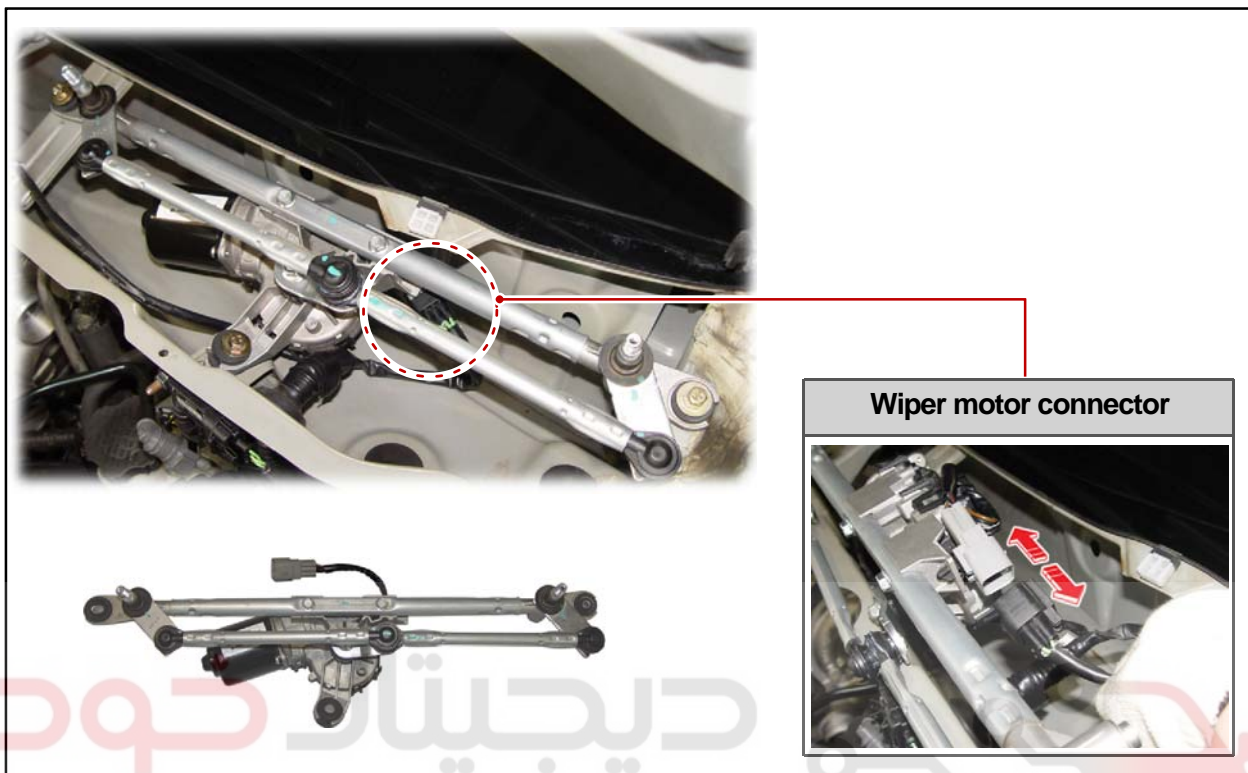
6. Remove the cowl molding assembly.



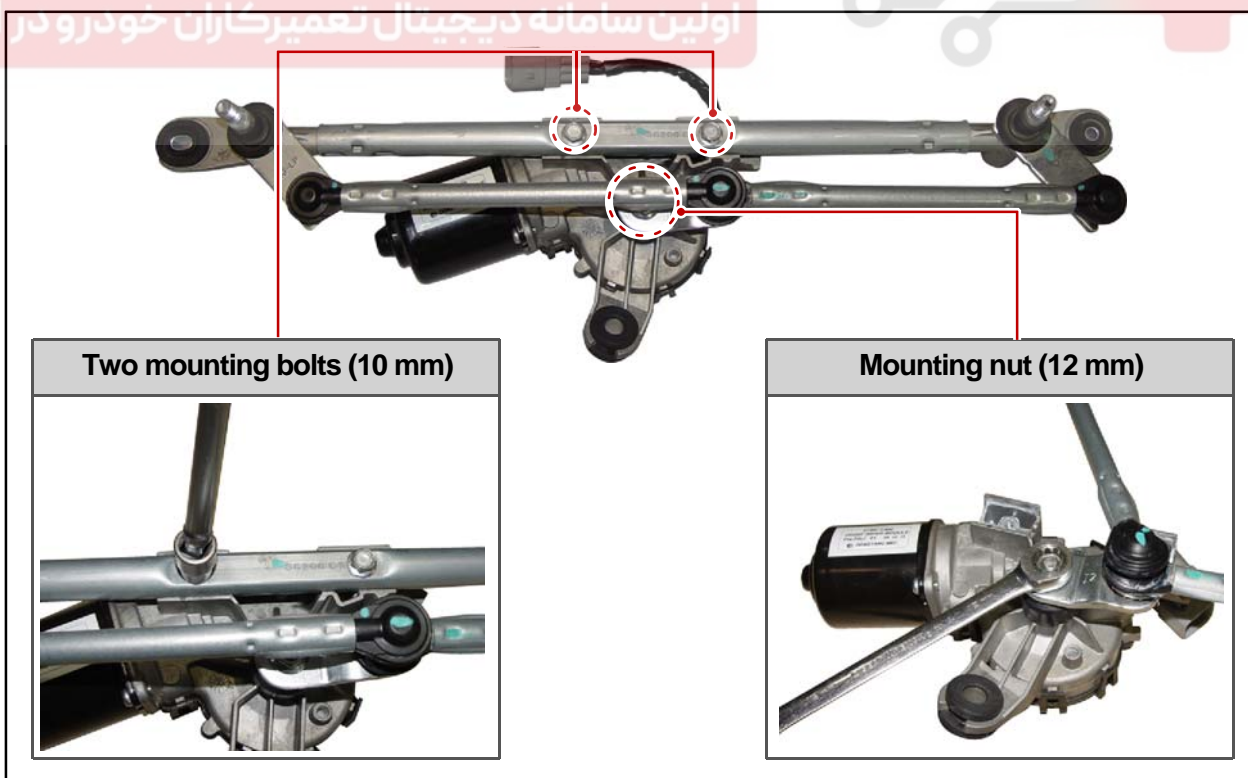
7. Unscrew the 3 mounting bolts (10 mm) for the wiper link assembly.



8. Disconnect the wiper motor connector to the wiper link assembly and remove the wiper link assembly.



9. Unscrew the two mounting bolts (10 mm) and the mounting nut (12 mm) for the wiper motor from the removed wiper link assembly to remove the wiper motor.



Modification basis	
Application basis	
Affected VIN	

## Layout of Front Wiper Assembly



## Wiper Motor Assembly



## Connector





S.G.N.

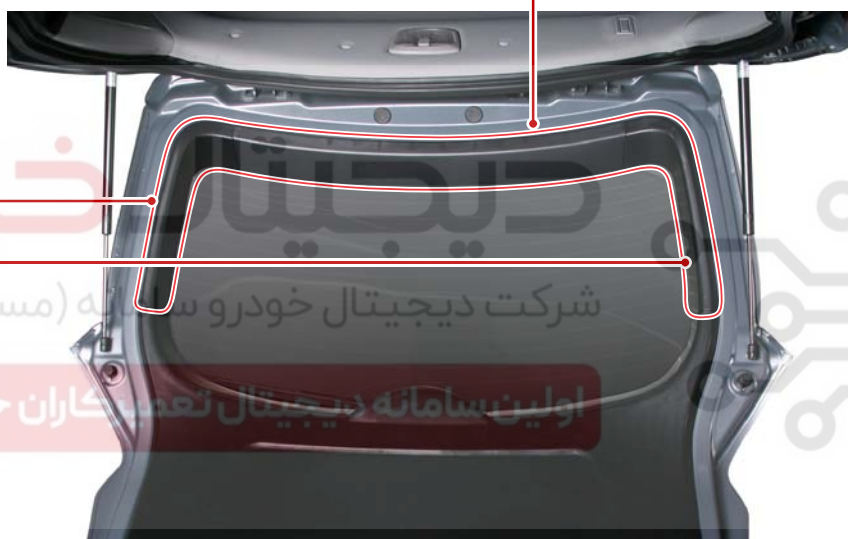
## 7830-00 REAR WIPER

Preceding work

- Disconnect the negative battery cable.



1. Remove the tailgate upper trim.



2. Unscrew the tailgate upper trim mounting screws one on each side.



3. Remove the tailgate upper trim carefully inwards.



Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

KORANDO 2013.08

4. Unscrew the two tailgate lower trim upper mounting screws.



5. Unscrew the two tailgate lower trim lower mounting screws.



6. Unscrew the two mounting bolts (10 mm) securing the inside handle to the tailgate.



7. Unscrew the tailgate lower trim lower mounting clip.



8



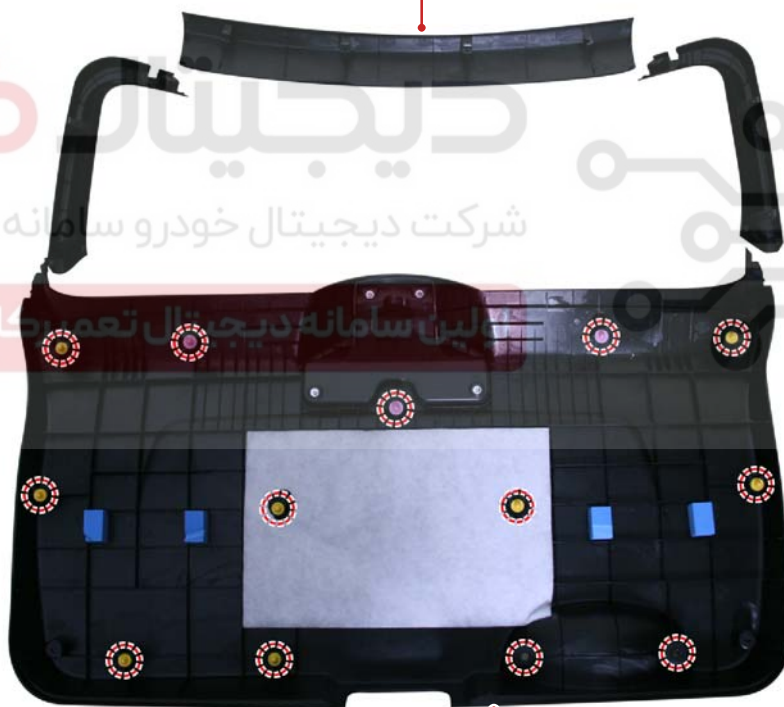
8. Remove the tailgate trim from below.



## Lower trim mounting screw rivets

Upper trim

Lower trim

ELECTRO  
NIC

FUSE

BCM

SKM

INSTRUM  
ENTINSTRUM  
ENT

SWITCH

LAMP

WIPER  
AND

PAS

AUDIO  
SYSTEM

Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

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9. Close the tailgate and remove the wiper blade assembly.



Remove the cap.



Unscrew the mounting nut (12 mm).



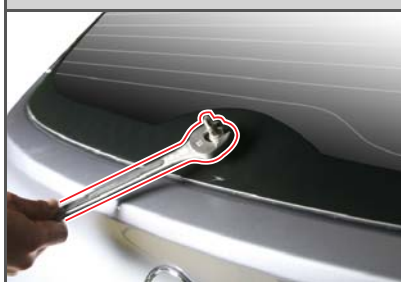
10. Remove the wiper blade and remove the wiper motor cap, mounting nut and cover.



Wiper motor cap



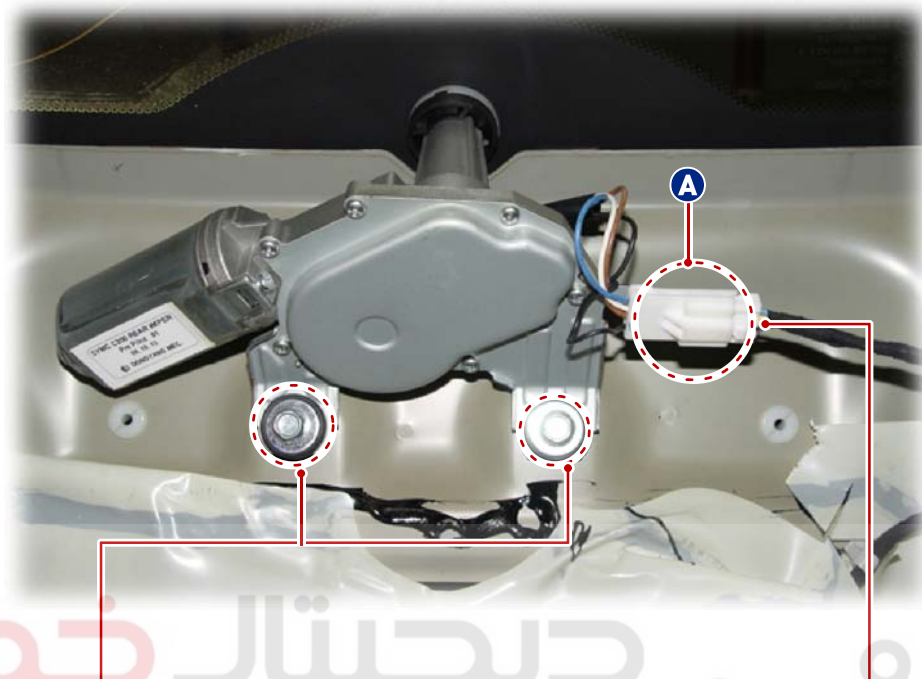
Mounting nut (24 mm)



Cover



11. Open the tailgate, remove the wiper motor connector (A) and two mounting bolts (10 mm) to remove the rear wiper motor assembly.



Two mounting bolts (10 mm)



A Disconnect the connector



Modification basis	
Application basis	
Affected VIN	

## Rear wiper



Rear wiper motor-front view

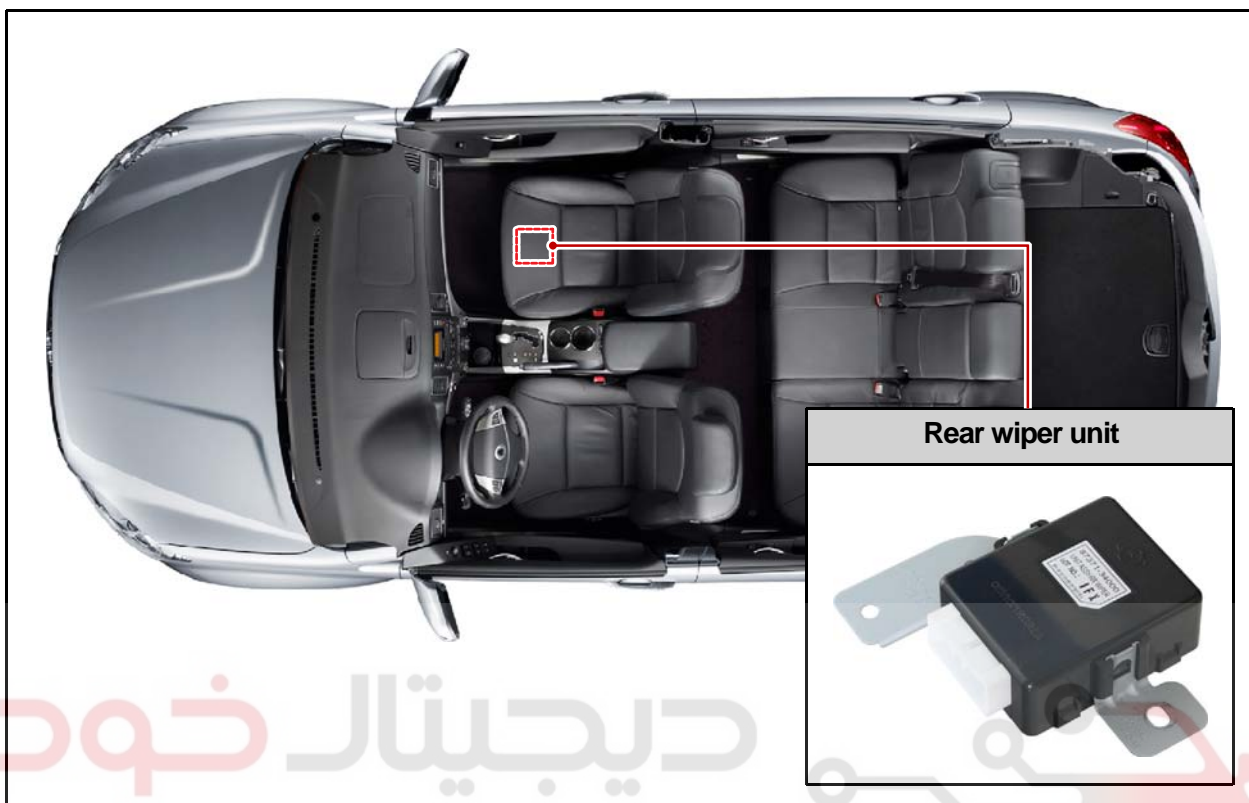


Rear wiper motor-rear view



S.G.N.

## 7810-01 REAR WIPER UNIT



دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

تأسیسات و تجهیزات تعمیراتی خودرو در ایران



1. Remove the passenger seat assembly and lift off the floor carpet.

**NOTE**

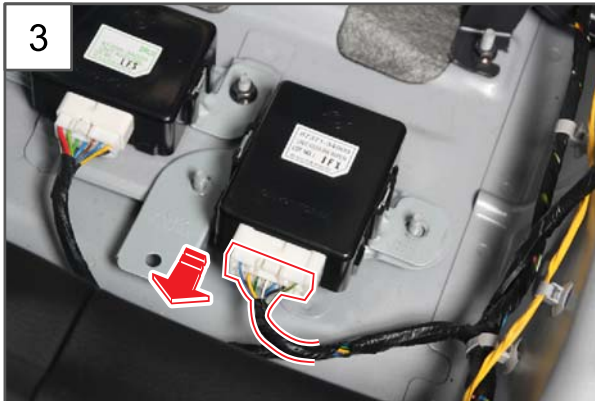
Refer to "PASSENGER SEAT ASSEMBLY" under "REMOVAL AND INSTALLATION" in "SEAT" chapter.



2. Unscrew the two rear wiper unit mounting nuts (A, 10 mm).

Modification basis	
Application basis	
Affected VIN	





3. Disconnect the connector and remove the rear wiper unit.



4. Install in the reverse order of removal.



دیجیتال خودرو  
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

7820-01

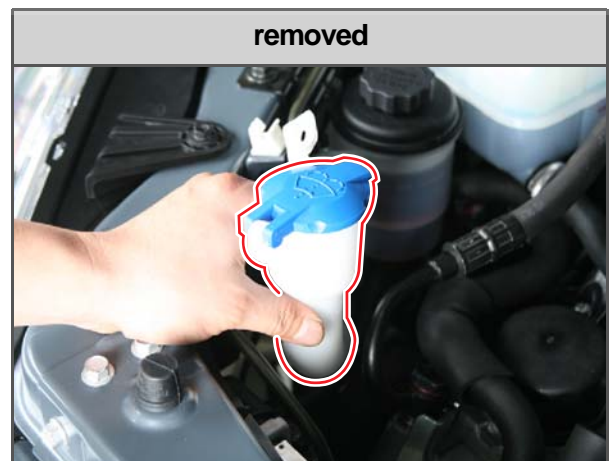
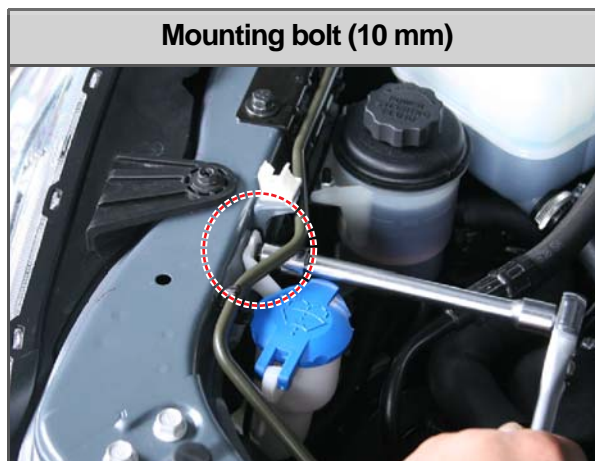
## WASHER FLUID RESERVOIR ASSEMBLY

## Preceding work

- Disconnect the negative battery cable.
- Remove the front bumper.



1. Unscrew the mounting bolt for the filler of the washer fluid reservoir in the engine compartment and remove the reservoir filler.



**CAUTION**

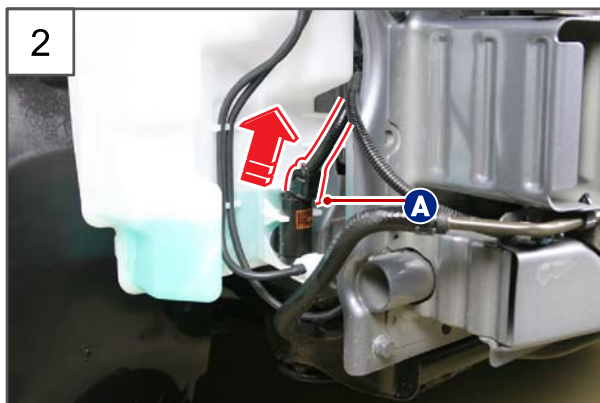
Drain the washer fluid into a suitable container since the washer fluid leaks out when removing the reservoir filler.

Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

KORANDO 2013.08

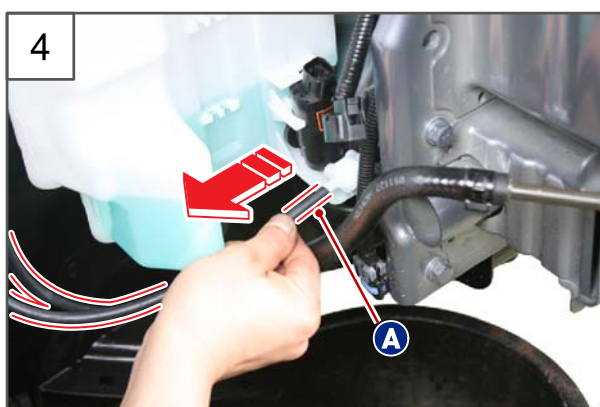
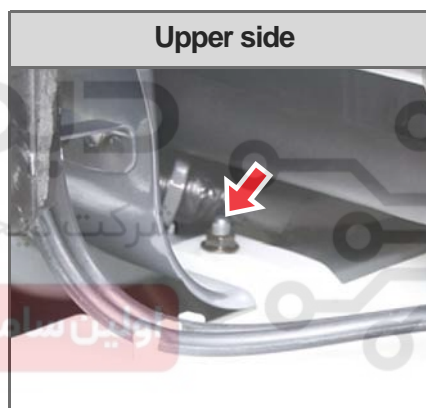




2. Disconnect the washer motor connector (A).



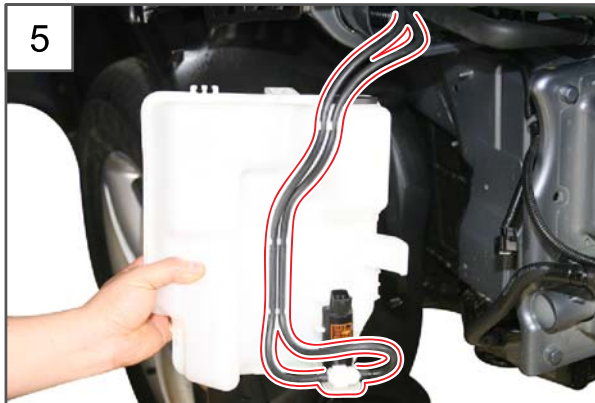
3. Unscrew the 3 mounting bolts (10 mm) on the reservoir.



4. Disconnect the washer hose (A) of the reservoir to drain the washer fluid.

**CAUTION**

Make sure that the washer fluid does not come into contact with components.



5. Disconnect the washer hose while lowering the reservoir and remove the reservoir assembly.



6. Installation is in the reverse order of removal.

#### Washer fluid reservoir assembly



#### CAUTION

Make sure that the O-ring on the filler is not damaged when fitting the filler.

#### Washer motor



Modification basis	
Application basis	
Affected VIN	

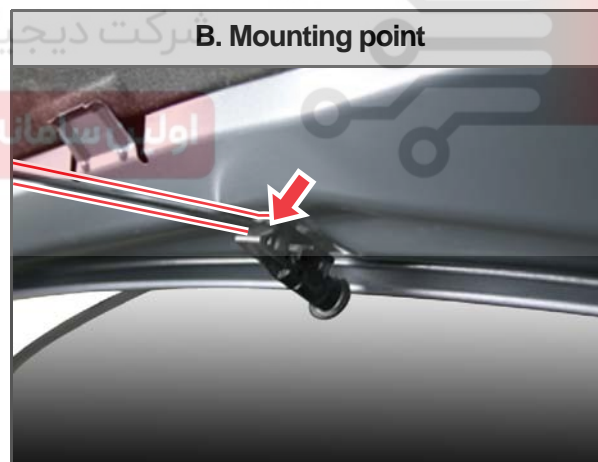
S.G.N.

7820-22

## WINDSHIELD WASHER NOZZLE ASSEMBLY



1. Open the engine hood and remove the windshield washer nozzle using a flat-bladed screwdriver.



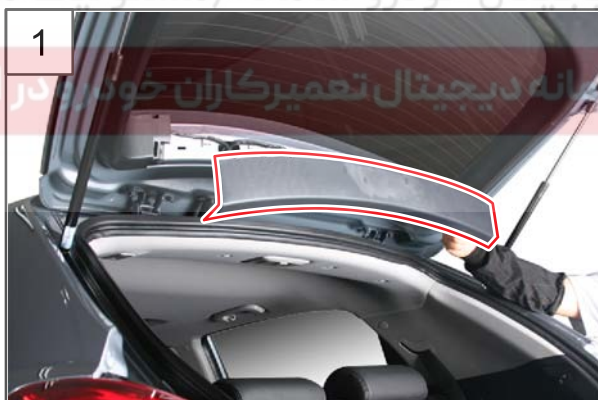
2. Disconnect the washer hose (A) from the windshield washer nozzle to remove the washer nozzle.

3. Installation is in the reverse order of removal.

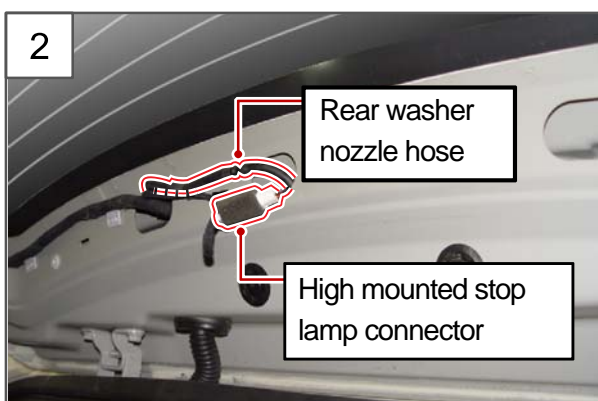
Modification basis	
Application basis	
Affected VIN	



S.G.N.

**7820-35 REAR WASHER NOZZLE ASSEMBLY****1) For Vehicles With Rear Spoiler**

1. Remove the upper trim of the tailgate.



2. Disconnect the high mounted stop lamp connector and nozzle hose.

Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

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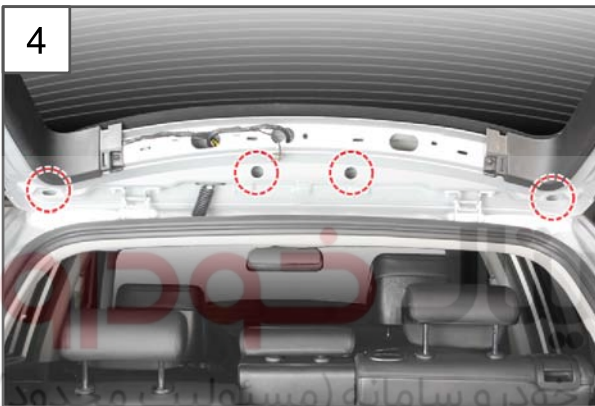
3



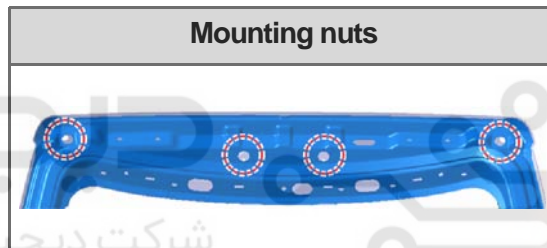
3. Remove the 4 rubber caps.



4



4. Remove the 4 mounting nuts (10 mm) for the rear spoiler assembly.



5

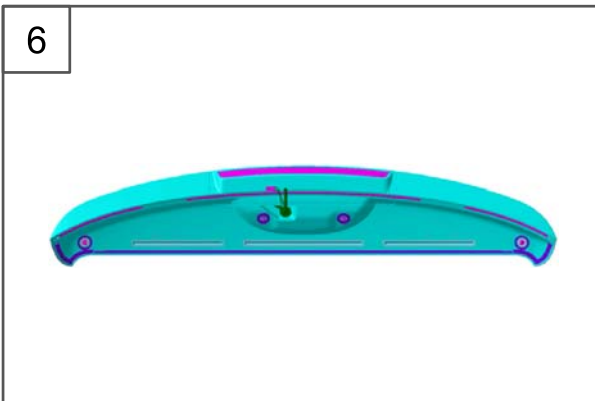


5. Disassemble rear spoiler.

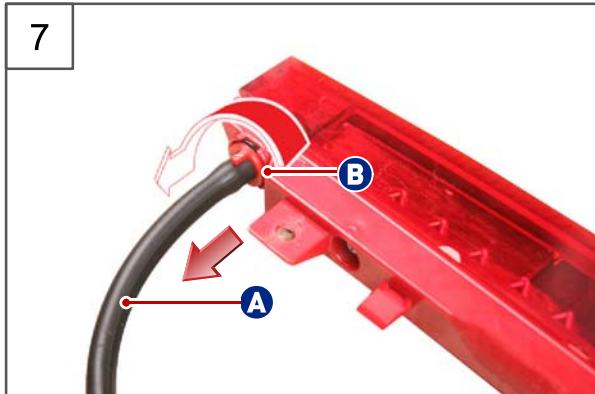
**CAUTION**

Make sure that the painted surface and the wirings are not damaged when removing.

6



6. Remove the high mounted cover from the rear spoiler.



7. Disconnect the rear washer hose (A) and remove the rear washer nozzle (B) by turning it in the direction of the arrow after applying lubricant to it as shown in the figure.

**CAUTION**

- Take care not to damage the lamp and nozzle when removing the washer nozzle.



8. Installation is in the reverse order of removal.

**CAUTION**

- Take care not to damage the lamp and nozzle when removing the washer nozzle. The nozzle hose should be fitted to the
- high mounted stop lamp groove when assembling.

Modification basis	
Application basis	
Affected VIN	



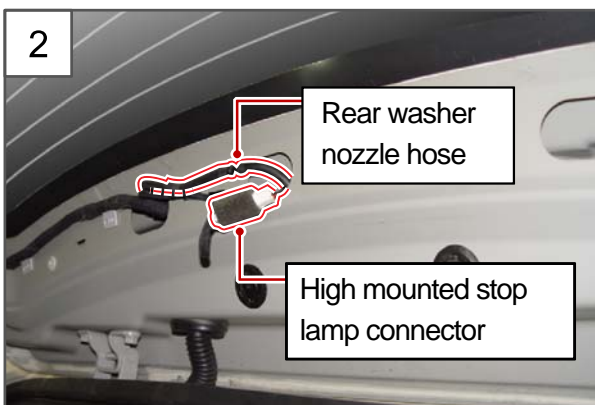
## 2) For Vehicles Without Rear Spoiler



شرکت دیجیتال خودرو (مسئولیت محدود)



1. Remove the upper trim of the tailgate.



2. Disconnect the high mounted stop lamp connector and nozzle hose.



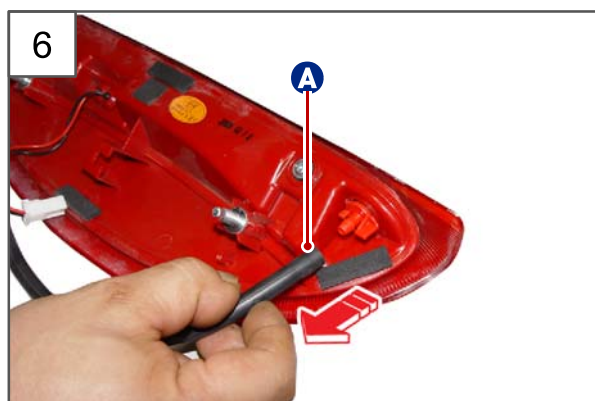
3. Remove the two rubber caps.



4. Unscrew the two mounting bolts (10 mm).



5. Remove the high mounted stop lamp.



6. Disconnect the rear washer nozzle hose (A) attached to the high mounted stop lamp.

Modification basis	
Application basis	
Affected VIN	



7. Remove the rear washer nozzle (A) by turning it carefully in the direction of the arrow after applying lubricant to it.

**CAUTION**

- Take care not to damage the lamp and nozzle when removing the washer nozzle.



8. Installation is in the reverse order of removal.

**CAUTION**

- Take care not to damage the lamp and nozzle when removing the washer nozzle.
- The nozzle hose should be fitted to the stop lamp groove when assembling.

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

S.G.N.

**8610-09 AUTO LIGHT AND RAIN SENSOR MODULE****Preceding work**

- Disconnect the negative battery cable.

**Automatic light and rain sensor**

1. Remove the rain sensor cover by inserting a small flat-blade screwdriver into the service holes on both sides as shown in the figure.

**CAUTION**

Otherwise, the cover or rain sensor components could be damaged.



2. Disconnect the connector connected to the rain sensor unit on the windshield glass.

Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

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3. Pry off the upper and lower rain sensor covers by inserting a small flat-blade screwdriver into service holes at both sides.

**NOTE**

Pry off the auto light unit cover through the service holes on both sides to remove the cover. Otherwise, the cover or components could be damaged.



4. Separate it from the windshield glass.



5. Installation is in the reverse order of removal.

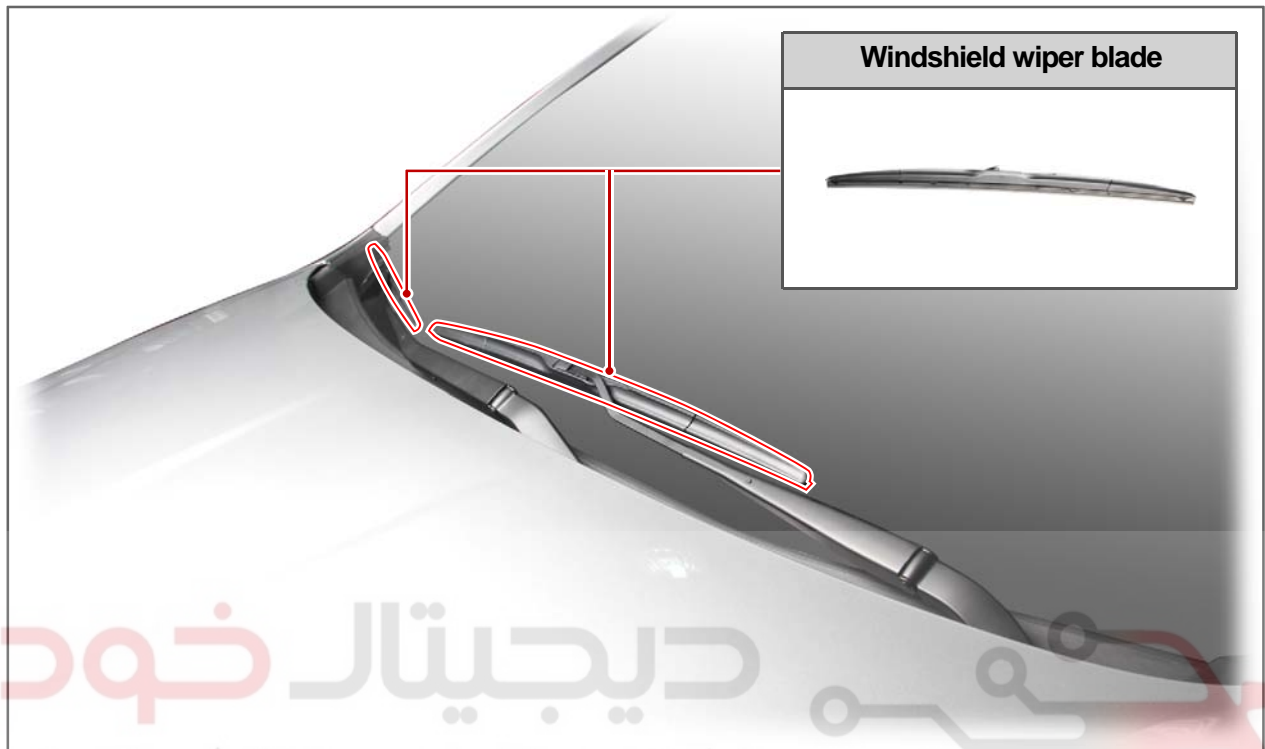
S.G.N.

7810-07

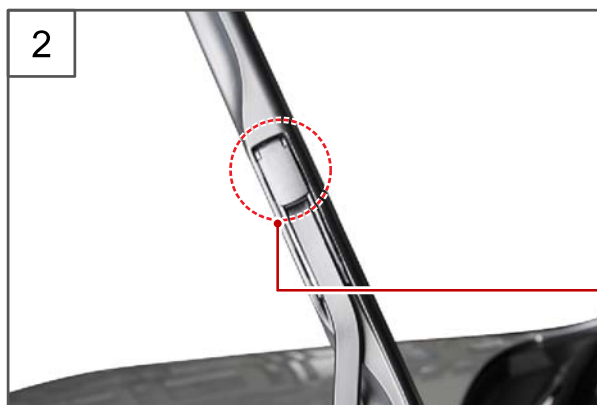
## WINDSHIELD WIPER BLADE

Preceding work

- Turn the wiper switch to the OFF position.



1. Lift up the wiper arm from the windshield.



2. Swing up the mounting clip for the wiper blade.



Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

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3. Pull the wiper blade downward while holding it.



4. Rotate the wiper blade so that it is perpendicular to the wiper arm.



5. Remove the wiper blade from the wiper arm. Use the same procedures for the passenger side.



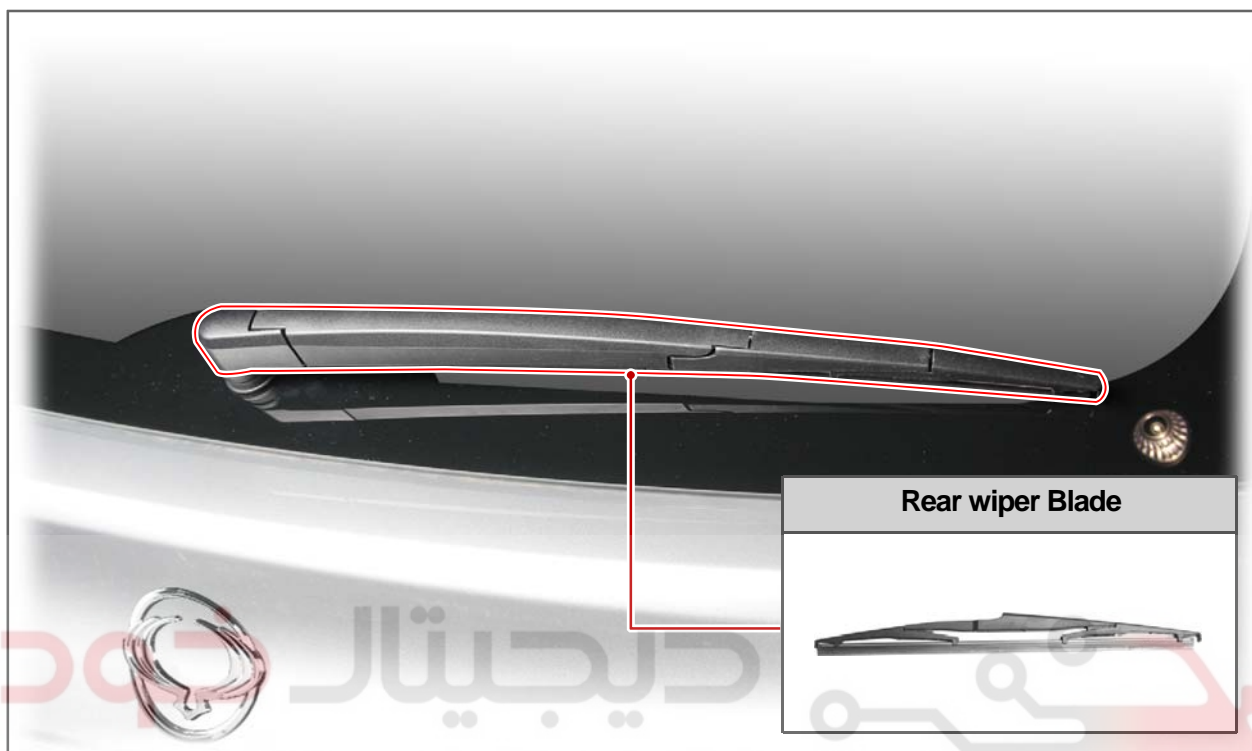
6. Installation is in the reverse order of removal.

S.G.N.

**7830-01 REAR WIPER BLADE**

Preceding work

- Turn the wiper switch to the OFF position.



1. Lift up the wiper arm from the windshield.



2. Rotate the wiper blade so that it is perpendicular to the wiper arm.

Modification basis	
Application basis	
Affected VIN	

WIPER AND WASHER SYSTEM

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3. Remove the wiper blade in the direction of the arrow.



4. Installation is in the reverse order of removal.



دیجیتال خودرو  
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