7010-06/8610-18/8710-01/8710-09/8710-13/8712-28/

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BCM (BODY CONTROL MODULE) 4170-34

GENERAL INFORMATION

1. SPECIFICATIONS

Item	Conditions	Description
Rated voltage	13.5 V	
Operating voltage	9.0 V to 16.0 V (CAN communication: 7.0 V to 18.0 V)	Should be operated normally within this range.
Operating temperature	−30℃ ~ +80℃	Should be operated normally within this range.
Storage temperature	−40℃ to +85℃	
Max. operating humidity	95%	
Dark current	BCM without SKM: 7.0 mA or less BCM with SKM: 4.0 mA or less	All switches turned OFF, Key removed, entering sleep mode after all doors are locked

2. INPUT SIGNALS

NO	Input signal	Logic
1	IGN1	ON = Battery voltage (IGN ON or START)
2	IGN2	ON = Battery voltage (IGN ON)
3	Alternator	ON = Battery voltage (engine running)
4	Key reminder switch	IN = Battery voltage (key inserted)
5	Driver door LOCK detecting switch	LOCK = GND, UNLOCK = OPEN
6	Driver door UNLOCK detecting switch	LOCK = OPEN, UNLOCK = GND
7	Passenger door LOCK detecting switch	LOCK = GND, UNLOCK = OPEN
8	Passenger door UNLOCK detecting switch	LOCK = OPEN, UNLOCK = GND
9	Rear door LOCK detecting switch	LOCK = OPEN, UNLOCK = GND
10	Puddle lamp	ON = (-) OUTPUT
11	Driver door open switch	OPEN = GND, CLOSE = OPEN
12	Passenger door open switch	OPEN = GND, CLOSE = OPEN
13	Rear LH door open switch	OPEN = GND, CLOSE = OPEN
14	Rear RH door open switch	OPEN = GND, CLOSE = OPEN
15	Tailgate switch	OPEN = GND, CLOSE = OPEN
16	Hood switch	OPEN = GND, CLOSE = OPEN
17	Sunroof switch	OPEN = GND, CLOSE = OPEN
18	headlamp switch	ON = GND, OFF = OPEN
19	Folding/unfolding switch	ON = GND, OFF = OPEN
20	Crash door LOCK/UNLOCK switch	ON = GND, OFF = OPEN
21	Crash sensor (air bag)	ON = 200 ms Low signal, OFF = OPEN
22	Front defogger (heated wire) switch	ON = GND, OFF = OPEN
23	Rear defogger (heated wire) switch	ON = GND, OFF = OPEN
24	Wiper switch 1	ON = GND, OFF = OPEN
25	Wiper switch 2	ON = GND, OFF = OPEN
26	Driver seat belt switch	Unbuckled = GND, Fastened = OPEN
27	Passenger seat belt switch (only EU)	Unbuckled = GND, Fastened = OPEN
28	Rain & AUTO light sensor	LIN communication

Modification basis	
Application basis	
Affected VIN	

NO	Input signal	Logic
29	Intermittent wiper speed control switch	0 Ω to 51 KΩ
30	Wiper motor parking signal	Stop = GND, Rotation = VCC (5 V)
31	AUTO washer switch	ON = IGN, OFF = OPEN
32	Windshield washer switch	ON = IGN, OFF = OPEN
33	Rear washer switch	ON = IGN, OFF = OPEN
34	AUTO light switch	OPEN = GND, CLOSE = OPEN
35	Tail lamp switch	ON = GND, OFF = OPEN
36	AUTO hazard warning lamp switch	ON = GND, OFF = OPEN
37	Left turn signal lamp switch	ON = GND, OFF = OPEN
38	Right turn signal lamp switch	ON = GND, OFF = OPEN
39	Hazard warning lamp switch	ON = GND, OFF = OPEN
40	DRL switch	ON = GND, OFF = OPEN
41	Rear fog lamp switch	ON = IGN, OFF = OPEN

Modification basis	
Application basis	
Affected VIN	

3. MAJOR FUNCTIONS

	Item	Function	w/o SKM	w/ SKM
1	WIPER CONTROL	Wiper MIST and washer coupled wiper	O	O
		AUTO washer coupled wiper operation	O	O
		Rain sensor coupled wiper (LIN)	O	O
		Speed sensitive intermittent wiper	O	O
		Wiper LO/HI control	O	O
2	Ignition key warning lamp	Ignition key reminder warning	O	X
		Ignition key reminder	O	X
		External buzzer control	X	O
		Door LOCK prevention function when a door is ajar	O	O
3	Tail lamp control	Tail lamp switch ON warning	O	O
		Tail lamp warning display	X	O
		Tail lamp AUTO switching off	O	O
4	Door ajar warning	Door ajar control	X	O
		Door ajar warning	O	O
5	Seat belt control	Seat belt warning	O	O
		Seat belt reminder	O	O
6	Sunroof warning	Sunroof warning	O	O
		Sunroof warning display	X	O
7	Room lamp control	Door coupled room lamp dim control	O	O
		Room lamp AUTO switching off	O	O
		Room lamp control display	X	O
8	Ignition key hole lamp	Ignition key hole lamp control	O	X
9	Defogger (heated wire) control	Front defogger (heated wire) control	O	O
		Rear defogger (heated wire) control	O	O

Modification basis	
Application basis	
Affected VIN	

	Item	Function	w/o SKM	w/ SKM
10	Ignition key remote control function	Transmitter function	O	X
		Remote control door LOCK	O	X
		Remote control door UNLOCK	O	X
		Remote control panic	O	X
		Remote control escort	O	X
		AUTO door LOCK after 30 seconds	O	X
11	Door LOCK/UNLOCK control	Door LOCK/UNLOCK control by door knob switch	O	O
		Door LOCK/UNLOCK control by center door LOCK switch	O	O
		Door LOCK/UNLOCK control by REKES key signal	O	X
		Door LOCK/UNLOCK control by smart key	X	O
		Door LOCK/UNLOCK control by door handle switch (passive entry)	X	O
		AUTO door LOCK control	O	O
		AUTO UNLOCK upon receiving air bag deployment signal	O	O
12	Panic alarm	Panic alarm control by REKES key signal	O	X
		Panic alarm control by smart key signal	X	O
13	Tailgate control	Tailgate open control (for vehicles without SKM)	O	X
		Tailgate open control (for vehicles with SKM)	X	O
14	Theft deterrent alarm control	Theft deterrent alarm control (for vehicles without SKM)	O	X
		Theft deterrent alarm control (for vehicles with SKM)	X	O
15	Time lag window control	Time lag power window control	O	O

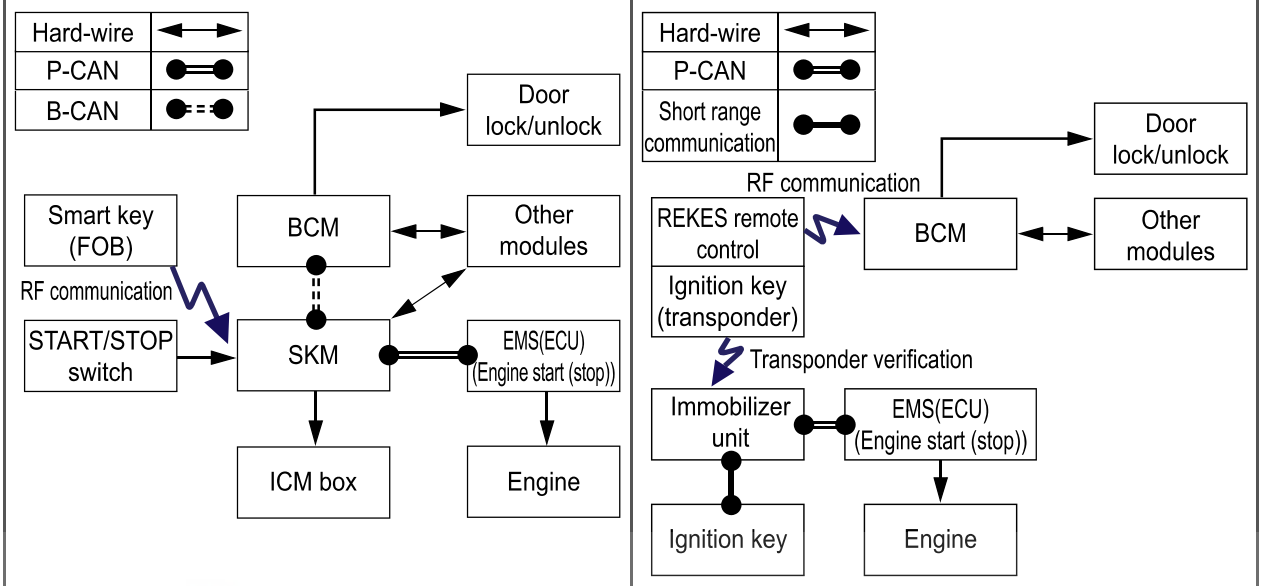
Modification basis	
Application basis	
Affected VIN	

	Item	Function	w/o SKM	w/ SKM
16	System power sleep mode	System power sleep mode control	O	O
17	Flasher unit control	Left turn signal lamp control	O	O
		Right turn signal lamp control	O	O
		Hazard warning lamp control	O	O
		AUTO hazard warning lamp control	O	O
		Emergency hazard warning flasher control	O	O
18	Fog lamp control	Fog lamp control	O	O
19	Immobilizer function	Key coding	O	X
		CHALLENGE	O	X
		CAN information	O	X
20	Folding/unfolding control	Folding/unfolding control	O	O
		AUTO folding/unfolding control	O	O
21	Approach lamp control	Approach lamp control (for vehicles without SKM)	O	X
		Approach lamp control (for vehicles with SKM)	X	O
22	SKM warning control	SKM buzzer control	X	O

Modification basis	
Application basis	
Affected VIN	

4. WITH SKM VS. WITHOUT SKM

BCM (BODY CONTROL MODULE)



BCM (Body Control Module) inputs/outputs data from various switches, sensors, and other modules through the hard wire and CAN communication, and controls the body and electronic system of the vehicle.

For the vehicles with SKM, the SKM unit communicates with BCM through B-CAN. It sends the door LOCK/UNLOCK signal by smart key, theft deterrent mode signal, and passive entry signal, etc. to the BCM to control each module. The signals for engine running and stopping controls are sent to the EMS (ECU) through the P-CAN.

For the vehicles without SKM, the BCM receives door LOCK/UNLOCK signal by smart key, theft deterrent mode signal, and passive entry signal, etc. directly from the modules to control them. The BCM controls the engine running and stopping by sending the corresponding signals to the EMS (ECU) after verifying the ignition key. The controls for other modules may vary depending on the vehicle specifications.

5. CODING ITEMS FOR ELECTRICAL UNITS REPLACEMENT

▶ **Vehicles with SKM**

Category	EMS registration	Variant coding	Smart key & transponder coding	Remarks
When replacing ECU	carried out under SKM menu	-	-	
When replacing BCM	-	carried out under BCM menu	-	
When replacing smart key	-	-	carried out under SKM menu	The smart key is inserted into the slot.
When replacing SKM	carried out under SKM menu	-	carried out under SKM menu	

▶ **REKES Key**

Category	EMS registration	REKES Key coding	Transponder registration	Variant coding
When replacing ECU	carried out under BCM menu	-	-	-
When replacing REKES key	-	carried out under BCM menu	carried out under BCM menu	-
When replacing BCM	-	carried out under BCM menu	carried out under BCM menu	carried out under BCM menu

Modification basis	
Application basis	
Affected VIN	

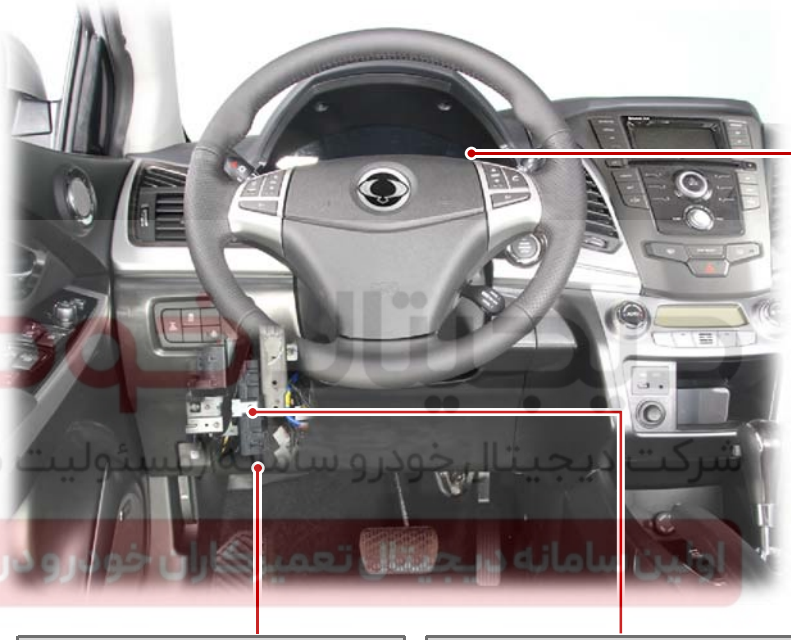
OVERVIEW AND OPERATING PROCESS

1. OVERVIEW

BCM (Body Control Module) is a module that inputs/outputs data from various switches, sensors, and other modules through the hard wire and CAN communication, and controls the body, electronic system, and chassis of the vehicle.

2. SYSTEM CONFIGURATION

1) Vehicles With SKM



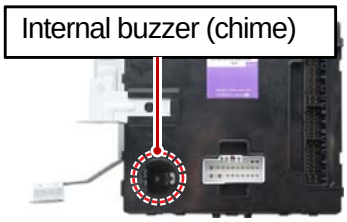
ICM box

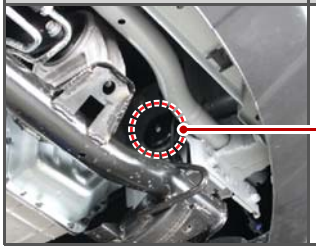
Smart key

SKM

BCM

Internal buzzer (chime)



Warning horn		External buzzer (SKM buzzer)	
Mounting location	Component	Mounting location	Component
			

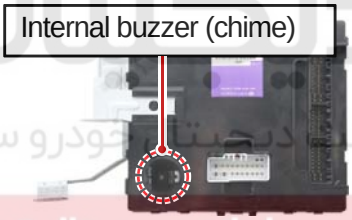
2) Without SKM

ICM box

Immobilizer

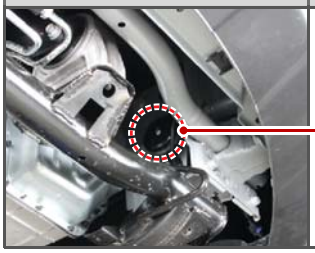
BCM

Internal buzzer (chime)



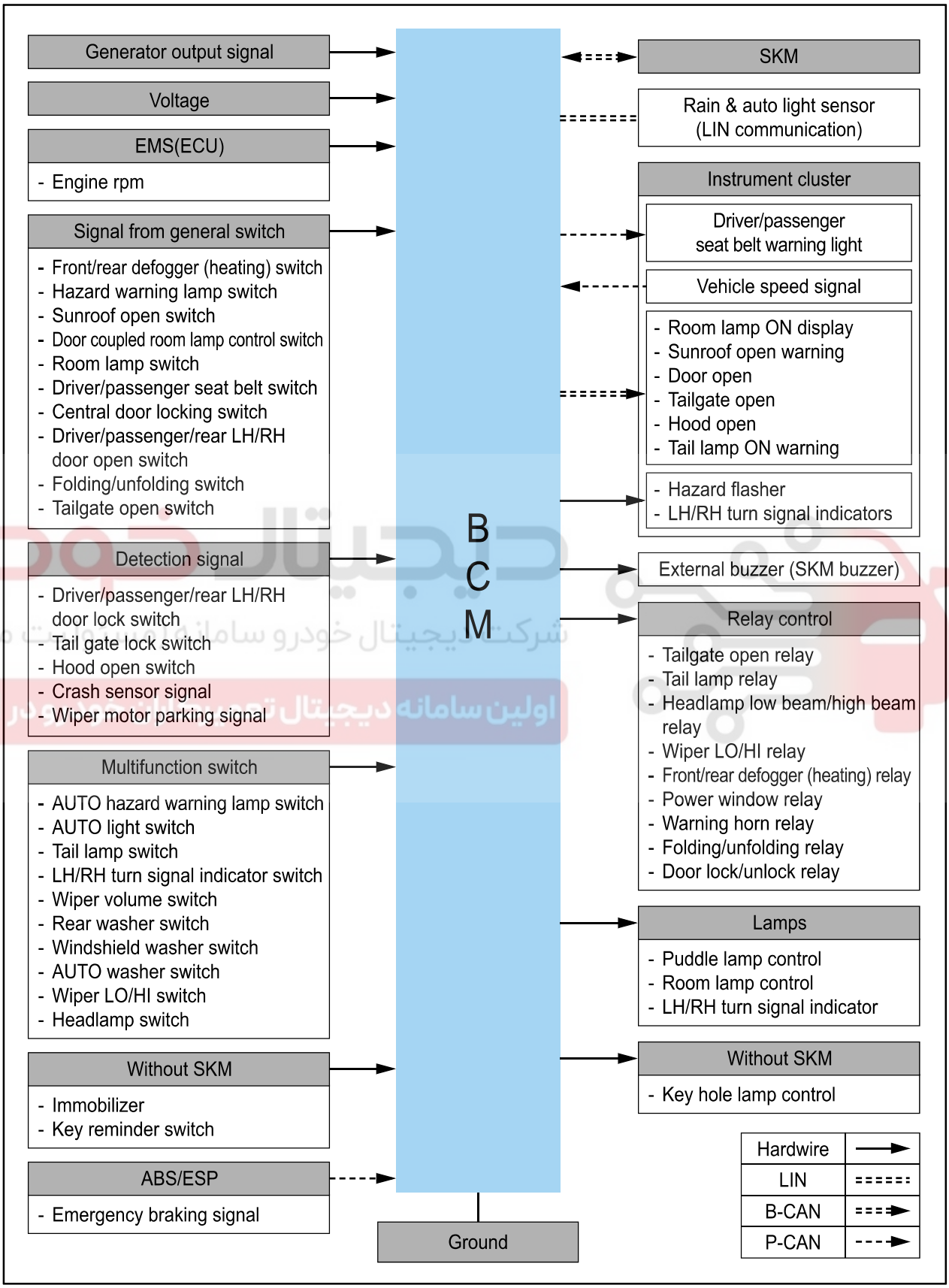
REKES key

Warning horn

Mounting location	Component
	

Modification basis	
Application basis	
Affected VIN	

3. INPUTS AND OUTPUTS

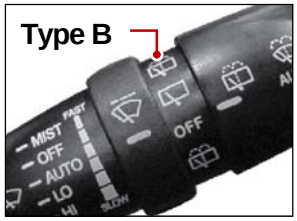


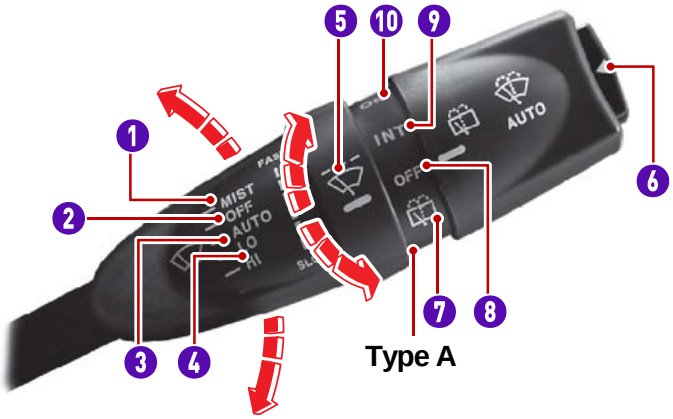
Modification basis	
Application basis	
Affected VIN	

4. WIPER CONTROL

The wiper system operates the wiper and washer using the signals from the multi-function switch, and receives rain sensing signal from the rain sensor unit.

▶ **Windshield wiper and washer switch function**





1. MIST

- When the wiper switch is pulled up and released, the wiper cycles once and then returns to the park position.

2. OFF

- Stops the windshield wiper operation.

3. AUTO

- When the wiper switch is set to the AUTO position, the wiper speed is adjusted automatically according to the amount of rain measured by the rain sensor mounted on the windshield.

4. LO/HI

- When the wiper switch is set to the LO position, the wiper speed is decreased. When the switch is set to the HI position, the wiper speed is increased.

5. Wiper speed control switch

- The wiper speed can be adjusted with this switch as follows when the wiper switch is in AUTO position.
  * FAST: increases wiper speed
  * SLOW: decreases wiper speed

6. AUTO washer switch

- When the AUTO washer switch is pressed, the washer fluid is sprayed once and the wiper is operate 4 times. Then, the fluid is sprayed once again with 3 wiping operations.

7.

- 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.

8. OFF

- Rear wiper is not in operation.

TYPE A

9. INT

- Rear wiper operation (Intermittent)

10. ON

- Rear wiper operation (Normal Speed)

TYPE B

9. Rear wiper operation

10. 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.

Modification basis	
Application basis	
Affected VIN	

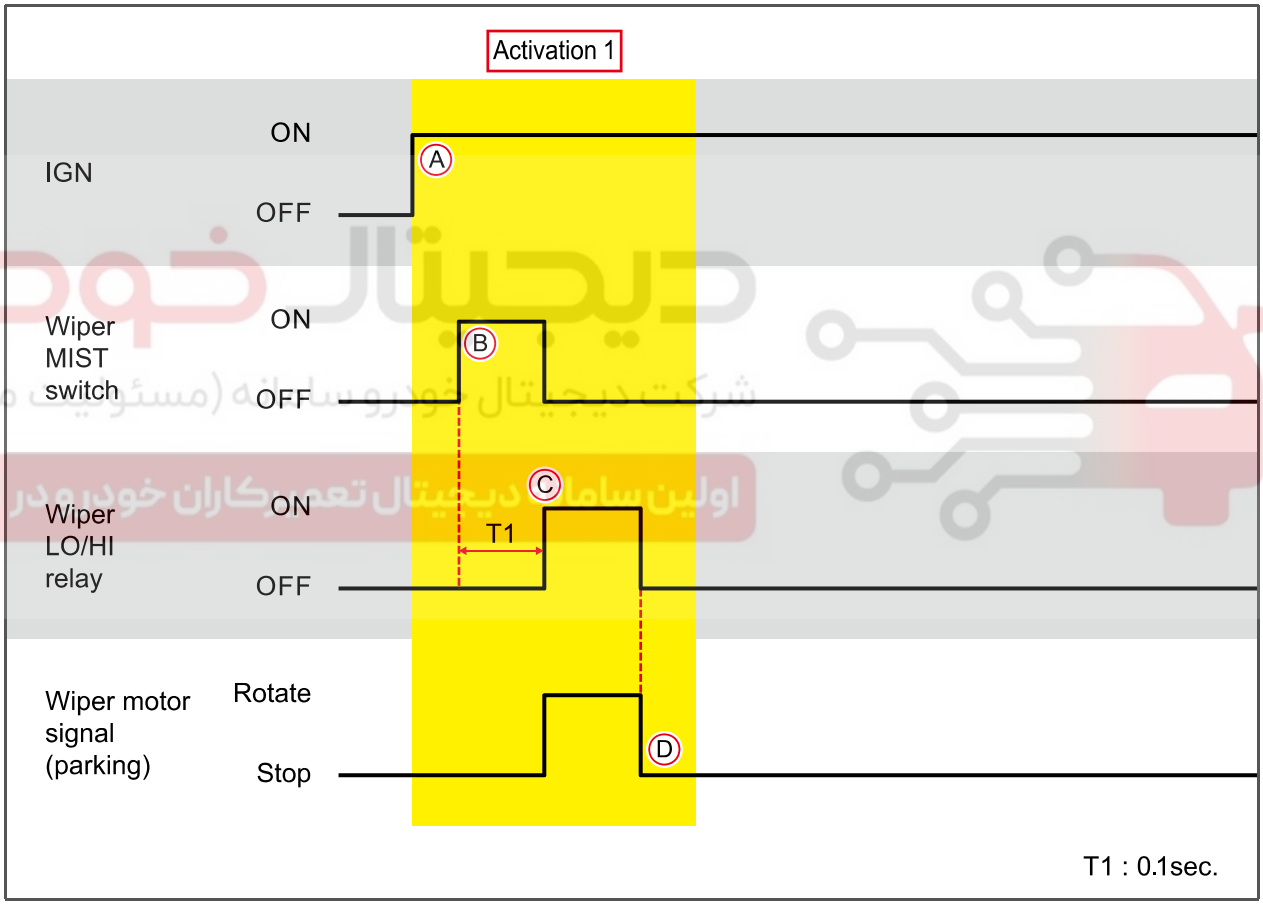
▶ Windshield wiper MIST operation

Operation 1.

A. The ignition is turned ON.
B. The MIST switch is turned ON for 0.1 seconds or more.
C. The wiper LO/HI relay is activated 0.1 seconds (T1) after the MIST switch is turned ON.
D. The wiper LO relay is deactivated when the MIST switch is turned OFF and the wiper motor parking signal is input.

NOTE

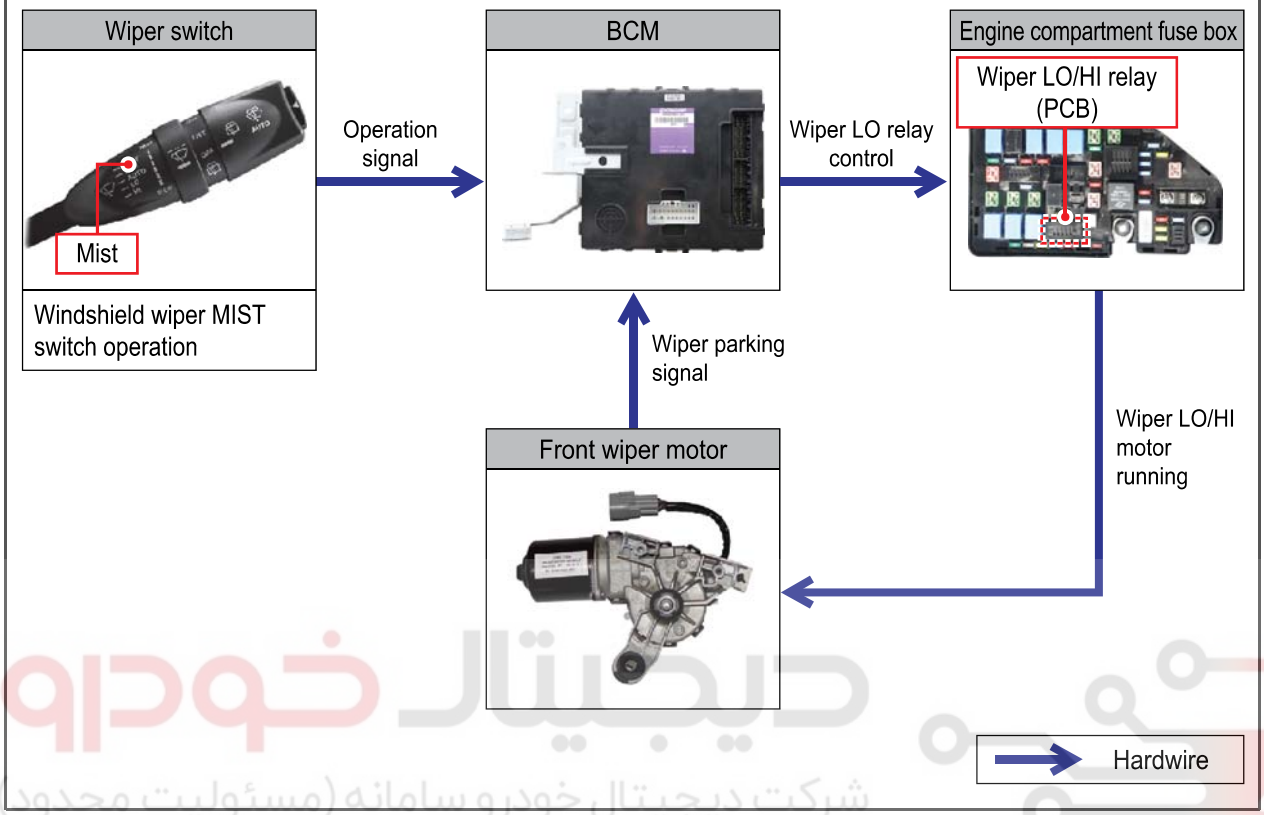
The wiper HI relay is activated when the MIST switch signal is input. If no signal from the MIST switch is input, the wiper LO relay is activated.



Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN ON

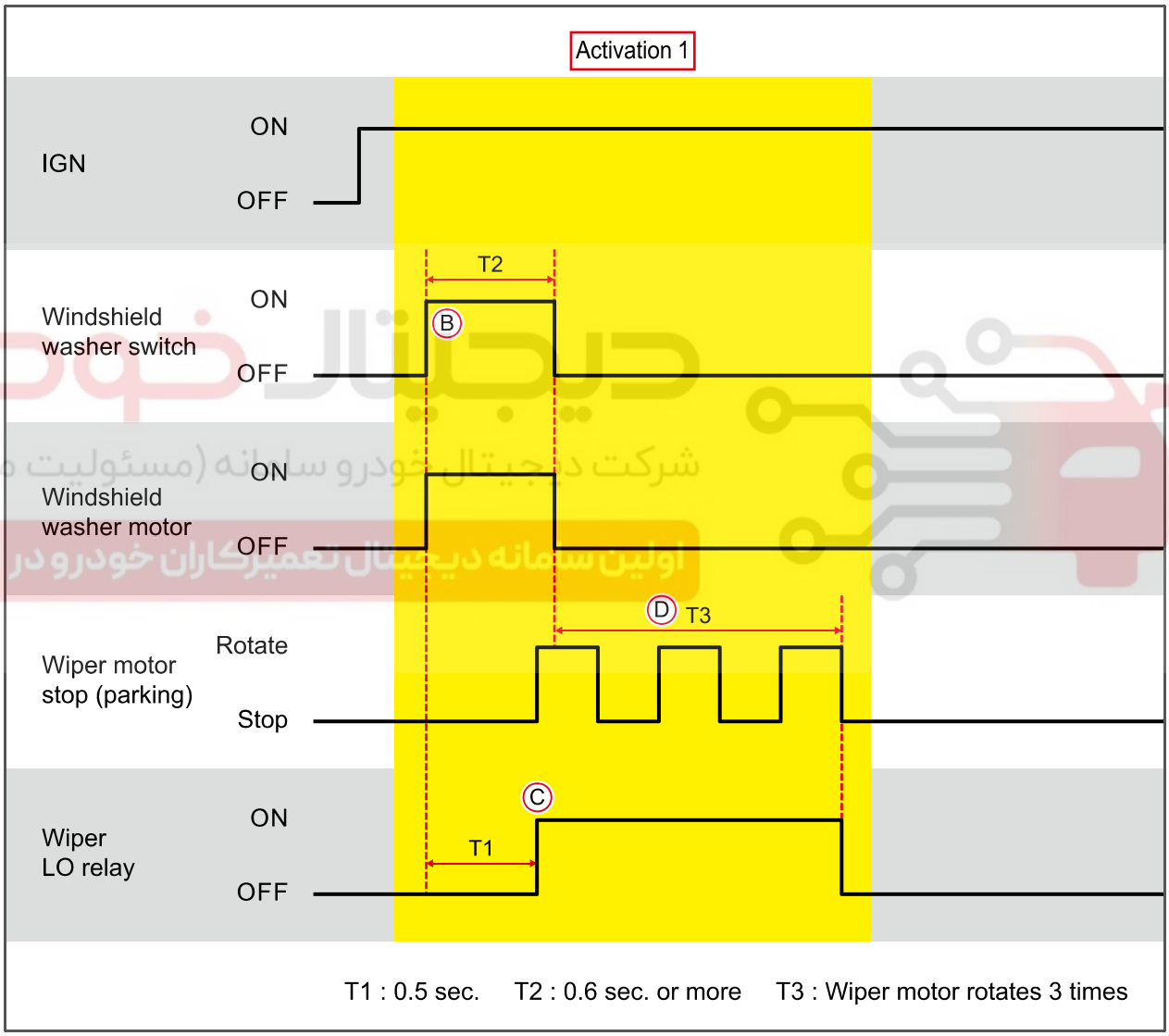


Modification basis	
Application basis	
Affected VIN	

▶ Windshield washer switch coupled windshield wiper operation

Operation 1. (washer switch pressed for 0.1 to 0.59 seconds)

A. The ignition is turned ON.
B. When the windshield washer switch is turned ON for 0.6 seconds or more (T2), the windshield washer motor is activated.
C. The windshield wiper LO relay is activated 0.5 seconds (T1) after the windshield washer switch is turned ON.
D. When the windshield washer switch is turned OFF, the windshield wiper LO relay is deactivated after the windshield wiper motor rotates 3 times (T3).



Modification basis	
Application basis	
Affected VIN	

▶ **Windshield washer switch coupled windshield wiper operation (during intermittent windshield wiper)**

Operation 1. (windshield washer switch pressed for 0.1 to 0.59 seconds)

A. The ignition is turned ON with the wiper AUTO switch ON.

B. The windshield wiper LO relay is activated 0.5 seconds (T1) after the windshield washer switch is turned ON for less than 0.6 seconds (T2).

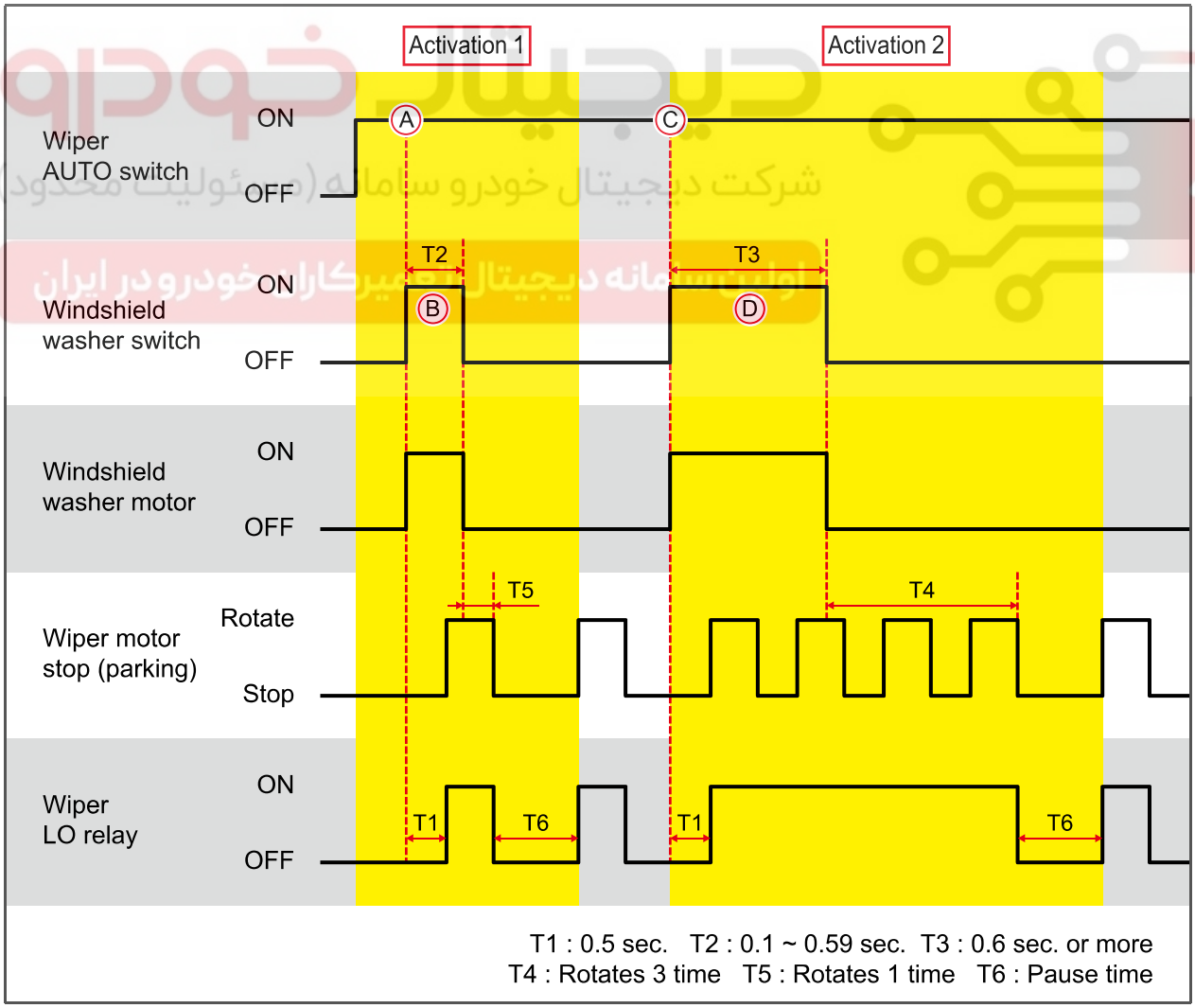
- When the windshield washer switch is turned OFF, the windshield wiper LO relay is deactivated after the windshield wiper motor rotates once (T5), and then the windshield wiper is operated intermittently after the rest time (T6).

Operation 2. (windshield washer switch pressed for 0.6 seconds or more)

C. The ignition is turned ON with the wiper AUTO switch ON.

D. The windshield wiper LO relay is activated 0.5 seconds (T1) after the windshield washer switch is turned ON for 0.6 seconds or more (T3).

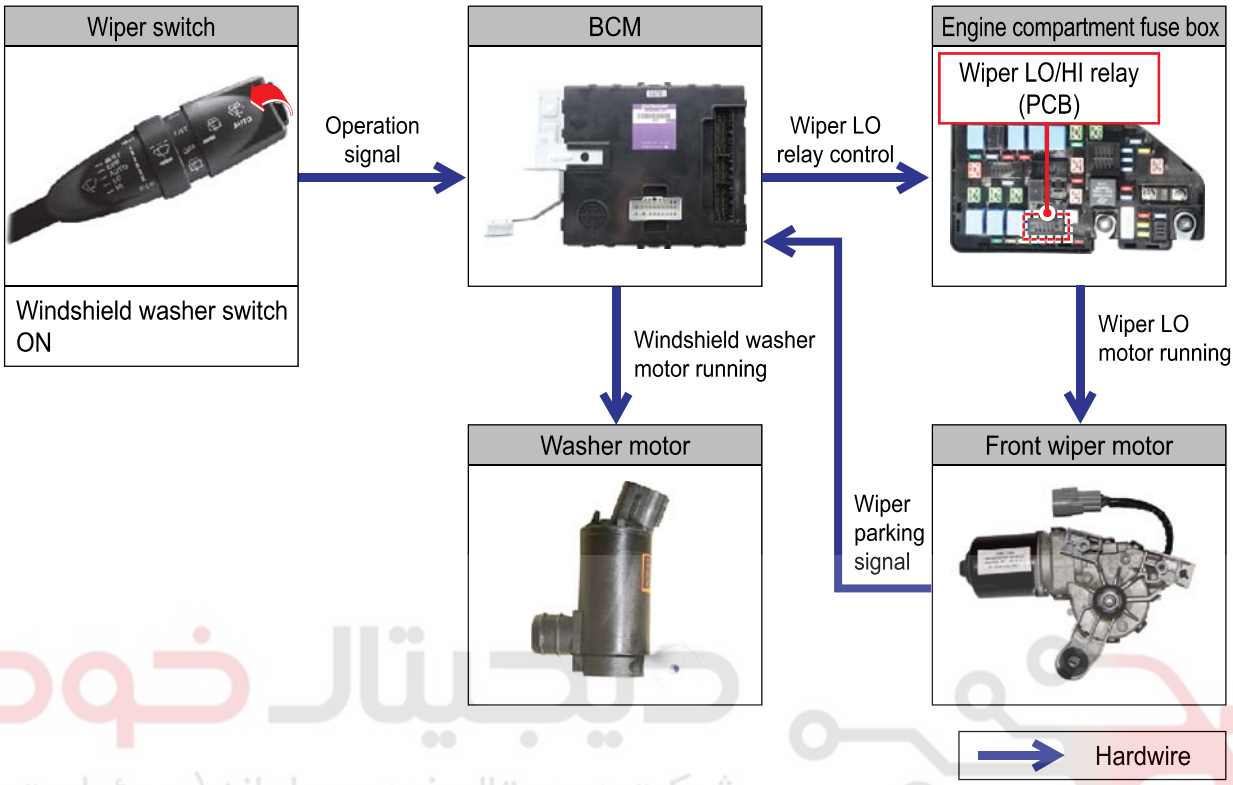
- When the windshield washer switch is turned OFF, the windshield wiper LO relay is deactivated after the windshield wiper motor rotates 3 times (T4), and then the windshield wiper is operated intermittently after the rest time (T6).



Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN ON and wiper AUTO switch in ON position



NOTE

Priority of operation:

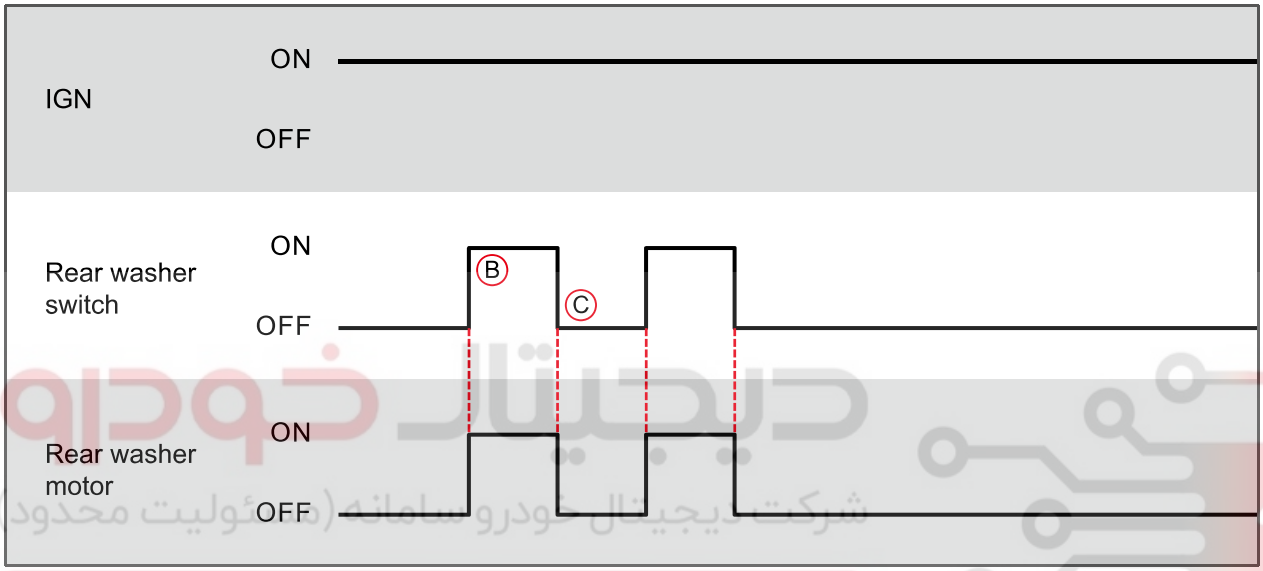
Windshield washer switch → Wiper AUTO switch

▶ Rear washer motor control

Operation 1.

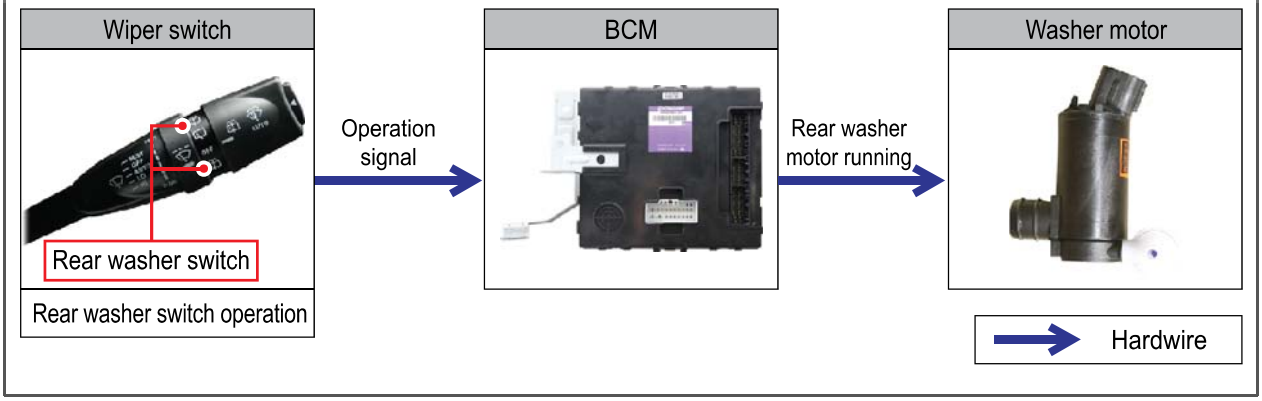
A. The ignition is turned ON.
B. The rear washer motor is activated when the rear washer switch is turned ON.
C. The rear washer motor is deactivated when the rear washer switch is turned OFF.

NOTE
Priority of operation: Windshield washer switch > Rear washer switch.



Operating process

- IGN ON



Modification basis	
Application basis	
Affected VIN	

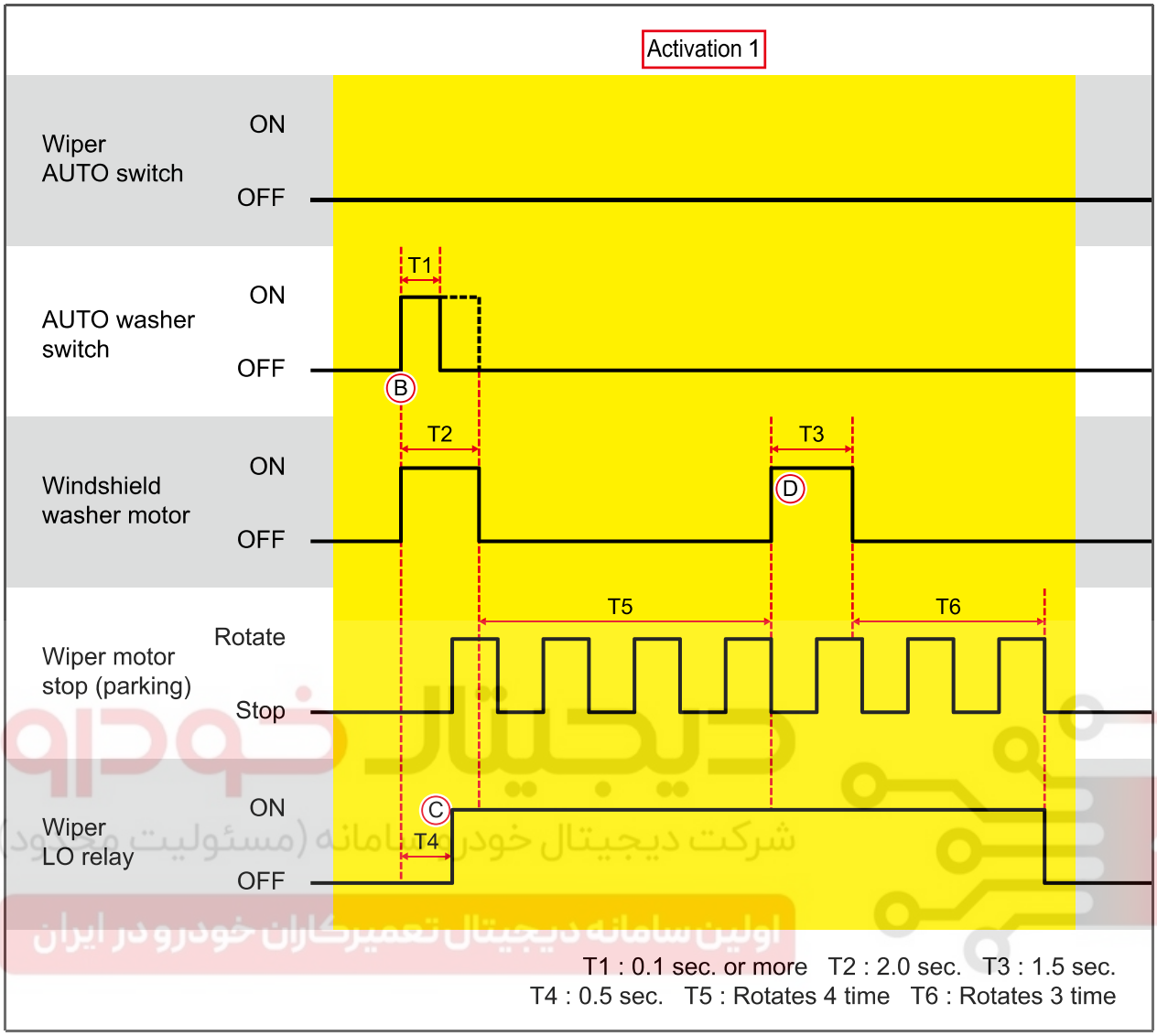
▶ AUTO washer switch coupled wiper operation

Operation 1.

A. The wiper AUTO switch is in the OFF position with IGN ON
B. When the AUTO washer switch is turned ON for 0.1 seconds or more (T1), the windshield washer motor is activated for 2 seconds (T2).
C. The windshield wiper LO relay is operated 4 times (T5) 0.5 seconds (T4) after the windshield washer motor has been activated.
D. And then the windshield wiper LO relay is deactivated 3 times (T6) of operation while the windshield washer motor is activated for 1.5 seconds (T3).

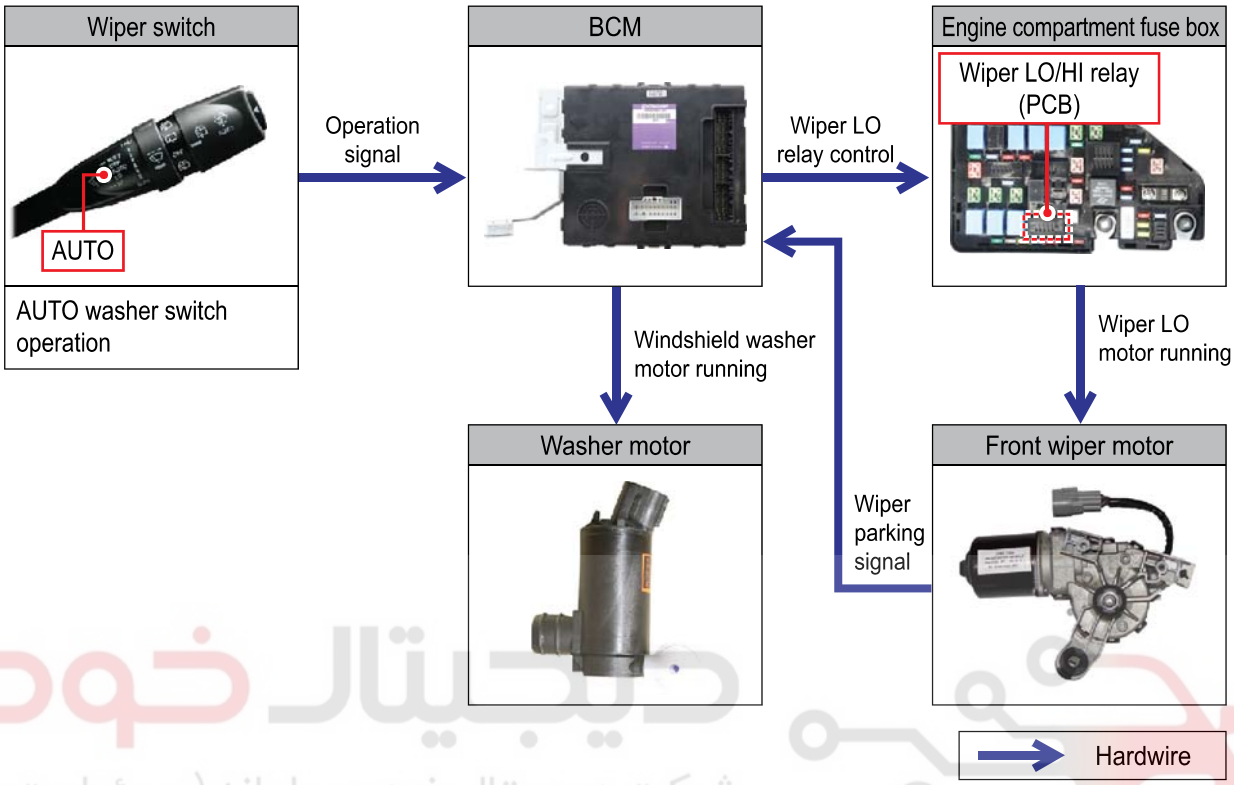
NOTE

- The input from the AUTO washer switch during the washer coupled wiper operation is overridden.
- The input from the AUTO washer switch during the AUTO washer coupled wiper operation is ignored.
- The input from the AUTO washer switch during the speed sensitive intermittent wiper operation is ignored.
- When the signal from the intermittent wiper switch is received during the AUTO washer operation, the AUTO washer doesn't operate any longer and the intermittent wiper operation will be performed. The input from the washer switch during the AUTO washer operation is ignored.
-



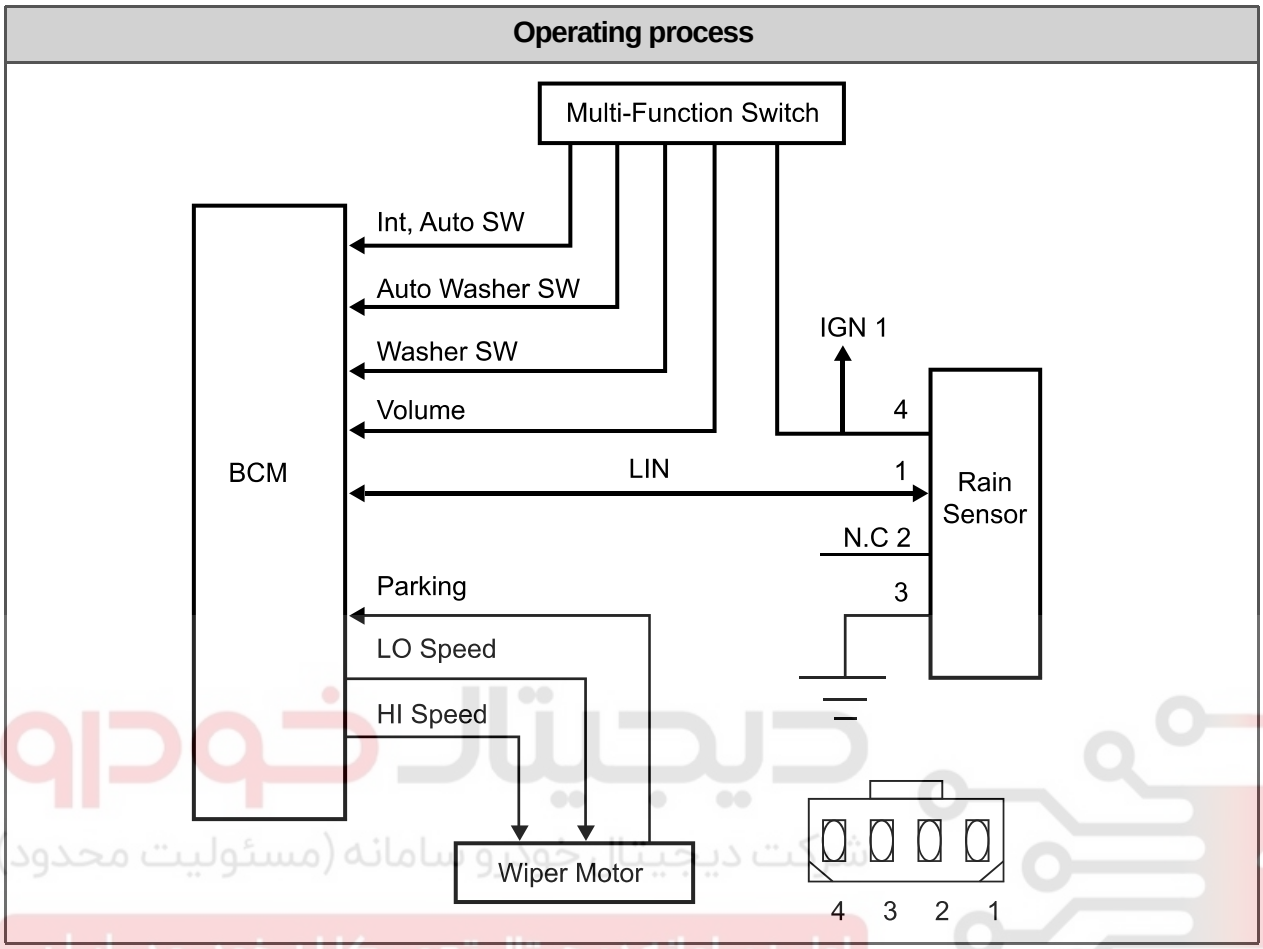
Operating process

- IGN ON and wiper AUTO switch in OFF position



Modification basis	
Application basis	
Affected VIN	

▶ **BCM and rain sensor system diagram**



Data recognition time

The LIN communication is established when the ignition is turned ON, regardless of the wiper and light switch operation. Then the function for the LIN data is carried out with the wiper AUTO switch or AUTO light switch in the AUTO position.
The data from the rain sensor is recognized as 2 consecutive data.

Operation when data is recognized

Data OFF: Lo/HI relay output OFF
Low speed signal: LO relay output ON (ON for at least 1 revolution), HI relay output OFF
High speed signal: HI relay output ON (ON for at least 1 revolution), LO relay output ON
The washer input is overridden during continuous operation of wiper. (washer coupled wiper operation during intermittent operation)

Modification basis	
Application basis	
Affected VIN	

▶ Power-up reminder wiper

Operation 1.

A. The wiper AUTO switch is in the ON position.
B. The ignition is turned ON, and then OFF, and then ON again.
C. The windshield wiper LO relay is not operated.

Operation 2.

D. The position of the wiper AUTO switch is changed to the ON from the OFF position with IGN ON.
E. The wiper motor rotates once (T1) initially when the windshield wiper LO relay is activated, regardless of the rain sensor communication.

Operation 3.

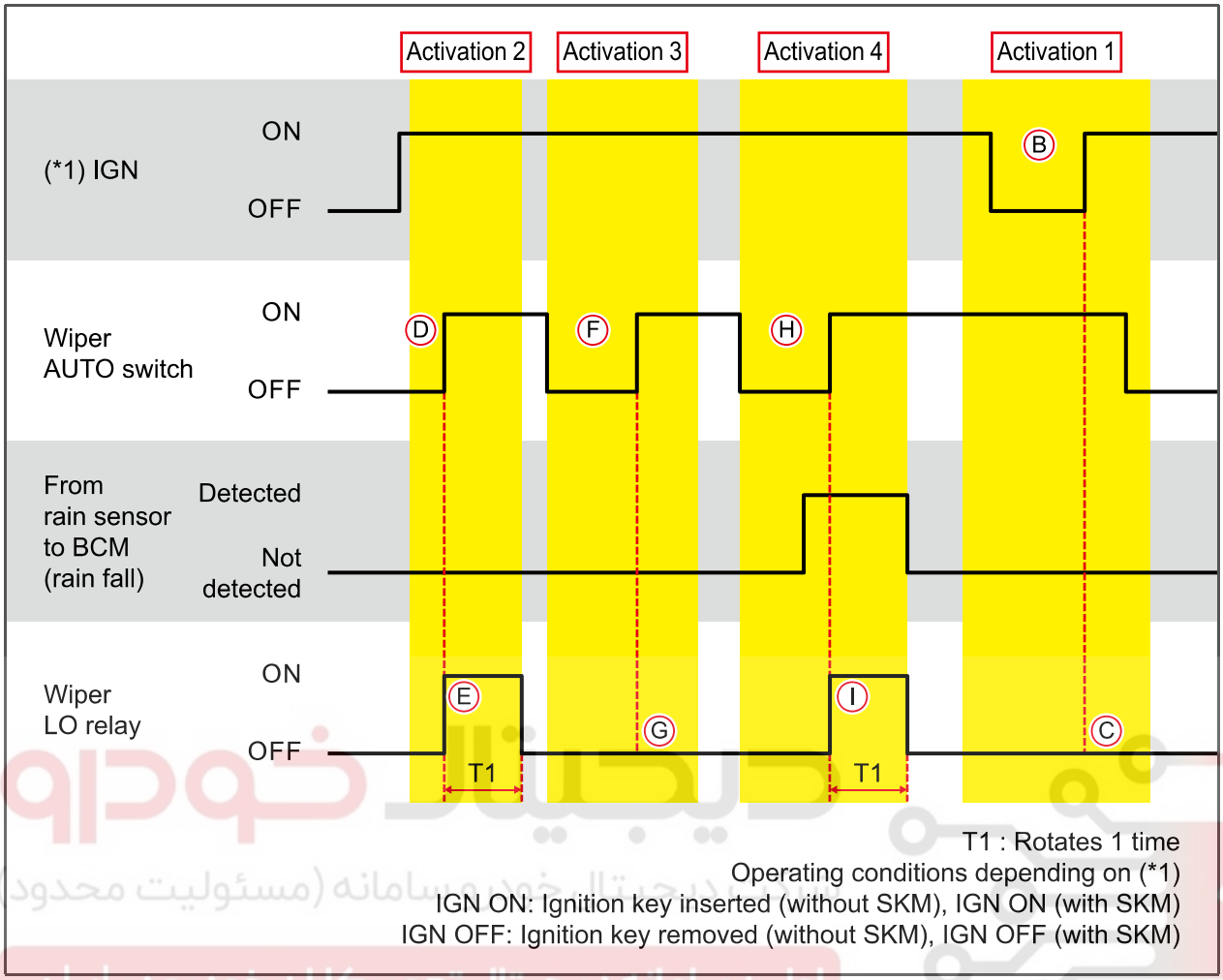
(The rain sensor did not detect rain drops after Operation 2.)

F. The ignition is turned ON with the wiper AUTO switch in the ON position.
G. The windshield wiper LO relay is not operated.

Operation 4.

(The rain sensor detects rain drops after Operation 2.)

H. The ignition is turned ON with the wiper AUTO switch in the ON position.
I. The windshield wiper LO relay is operated.

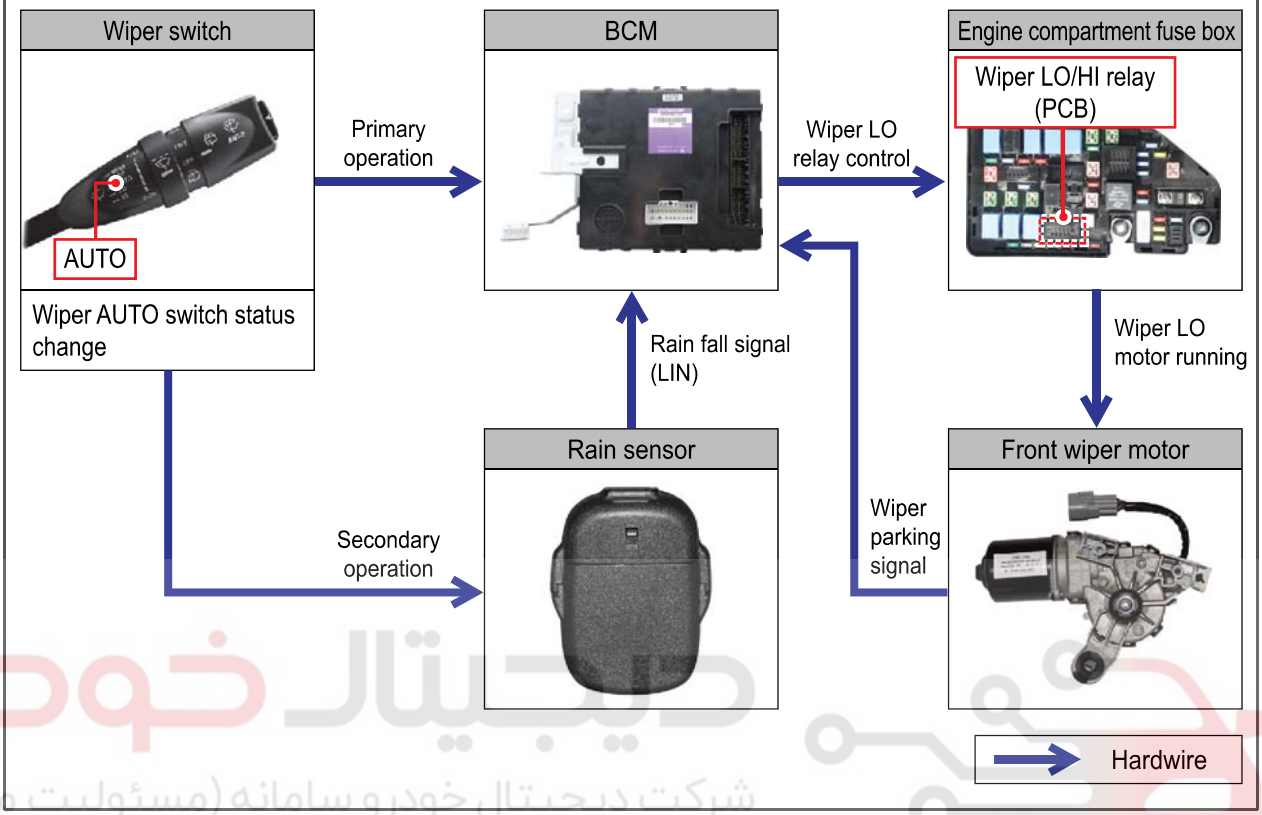


T1 : Rotates 1 time
Operating conditions depending on (*1)
IGN ON: Ignition key inserted (without SKM), IGN ON (with SKM)
IGN OFF: Ignition key removed (without SKM), IGN OFF (with SKM)

Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN ON



Modification basis	
Application basis	
Affected VIN	

▶ Washer switch input during rain sensor coupled operation

Basic conditions	Intermittent operation with IGN ON and wiper AUTO switch in ON position

Operation 1.

- The rain sensor coupled data is not continuous wiper operation.

A. The windshield washer switch is in the ON position.

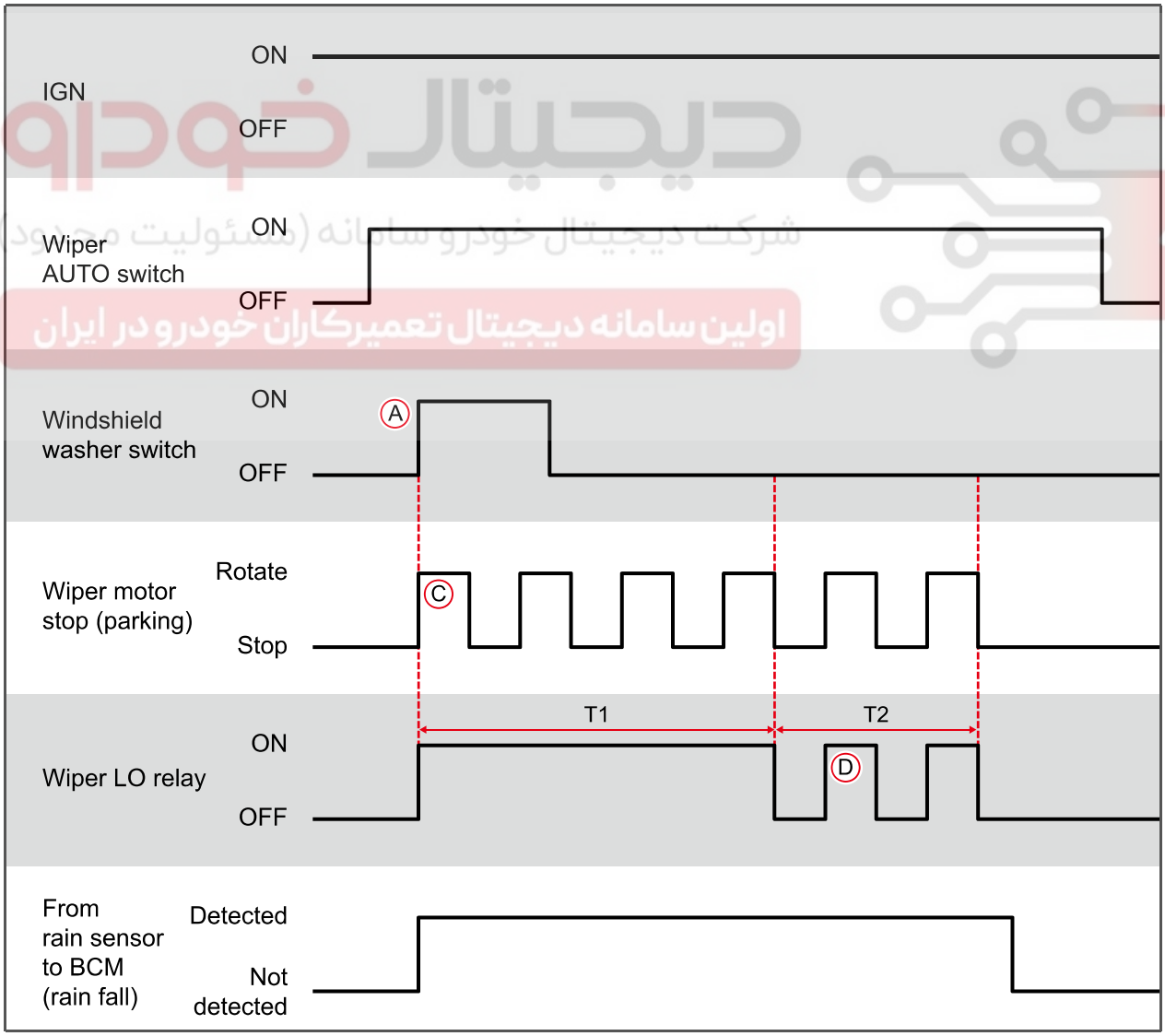
B. The communication with the rain sensor is ignored. (can misread washer fluid as rain drops)

C. The washer coupled wiper operation is activated (T1).

D. After that, the wiper is operated by rain sensor coupled operation (T2).
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.

NOTE

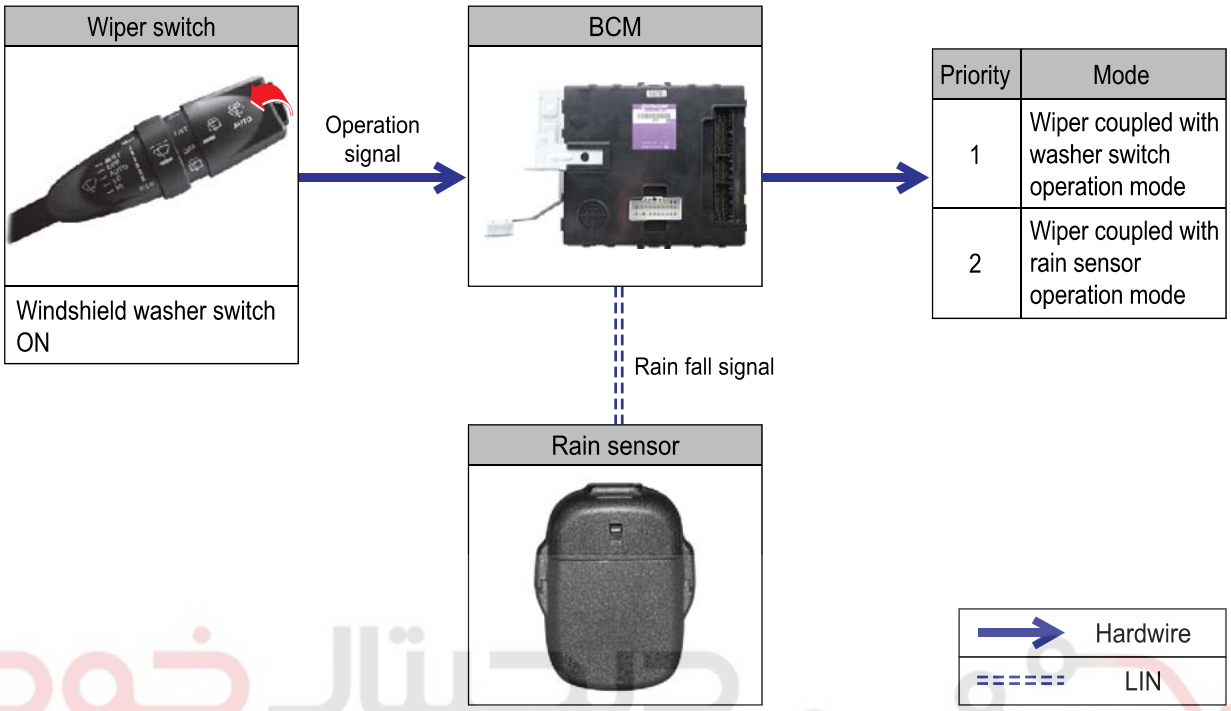
Even though the wiping system is in washer coupled wiper mode, the operating data are sent to rain sensor from the BCM.



Modification basis	
Application basis	
Affected VIN	

Operating process

- Intermittent operation with IGN ON and wiper AUTO switch in ON position



Modification basis	
Application basis	
Affected VIN	

▶ Wiper speed control

Basic conditions	IGN ON/Wiper AUTO switch ON/Wiper motor in parking position

Operation 1.

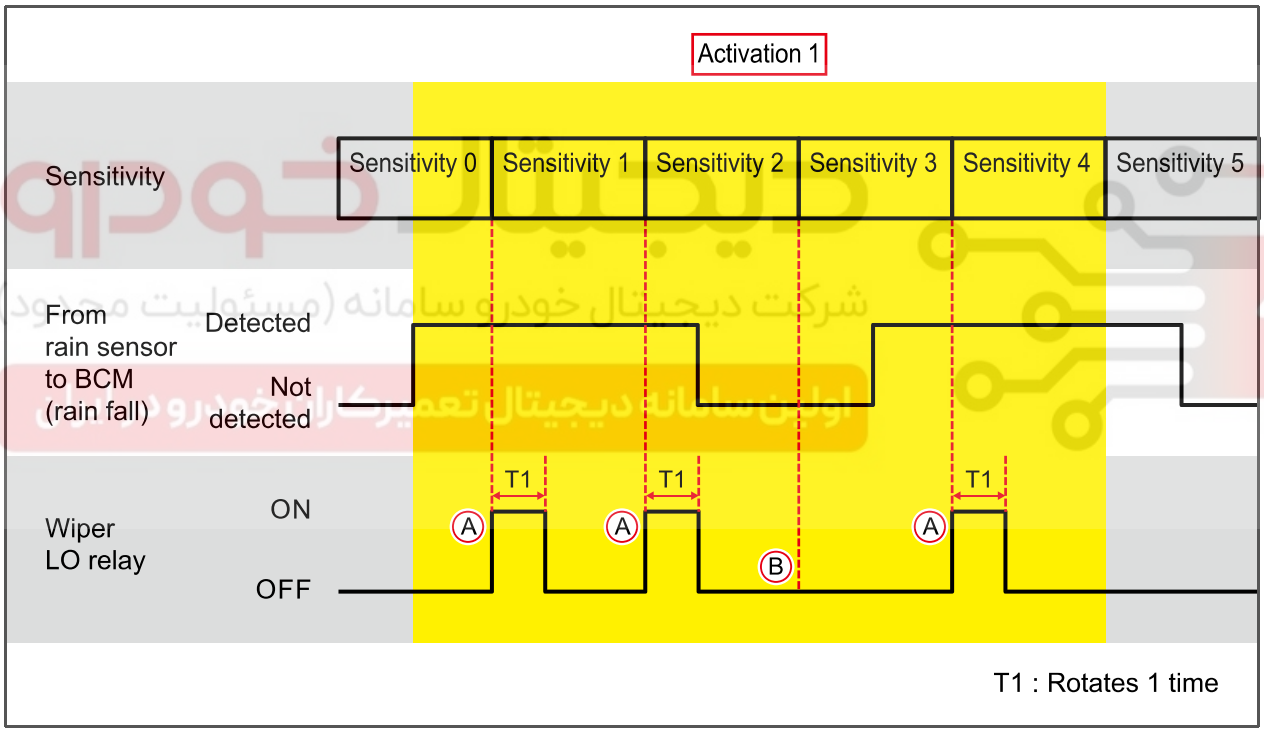
– Increasing the speed level (ex: speed level 0 → level 1)

A. The amount of rain is detected by the rain sensor.
The windshield wiper LO relay is operated once (T1).

B. The amount of rain is not detected by the rain sensor.
The windshield wiper LO relay is not operated.

NOTE

If the speed level is changed more than 1 stage within 2 seconds, the windshield wiper motor runs only one cycle.



Modification basis	
Application basis	
Affected VIN	

Operating process

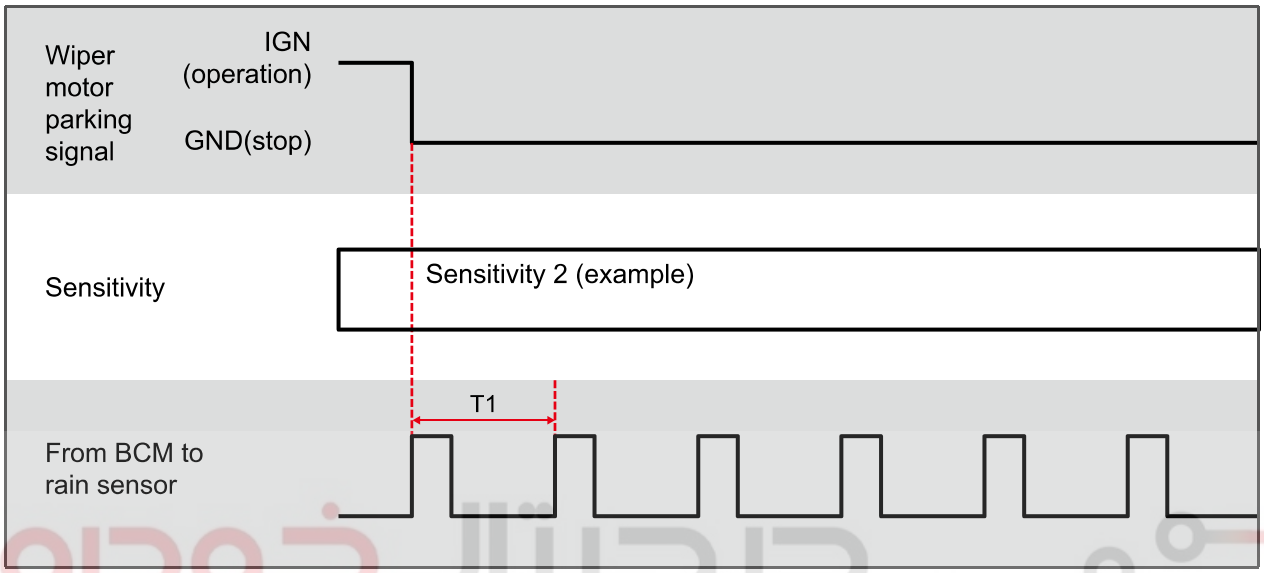
- IGN ON/Wiper AUTO switch ON/Wiper motor in parking position

Modification basis	
Application basis	
Affected VIN	

▶ Abnormal wiper parking signal stop (GND)

Operation 1. (When the wiper motor parking signal stopped at GND)

A. The wiper system sends the corresponding signal of current status with IGN ON and wiper AUTO switch ON. (The wiper motor is operated only when the request signal from the rain sensor is received.)

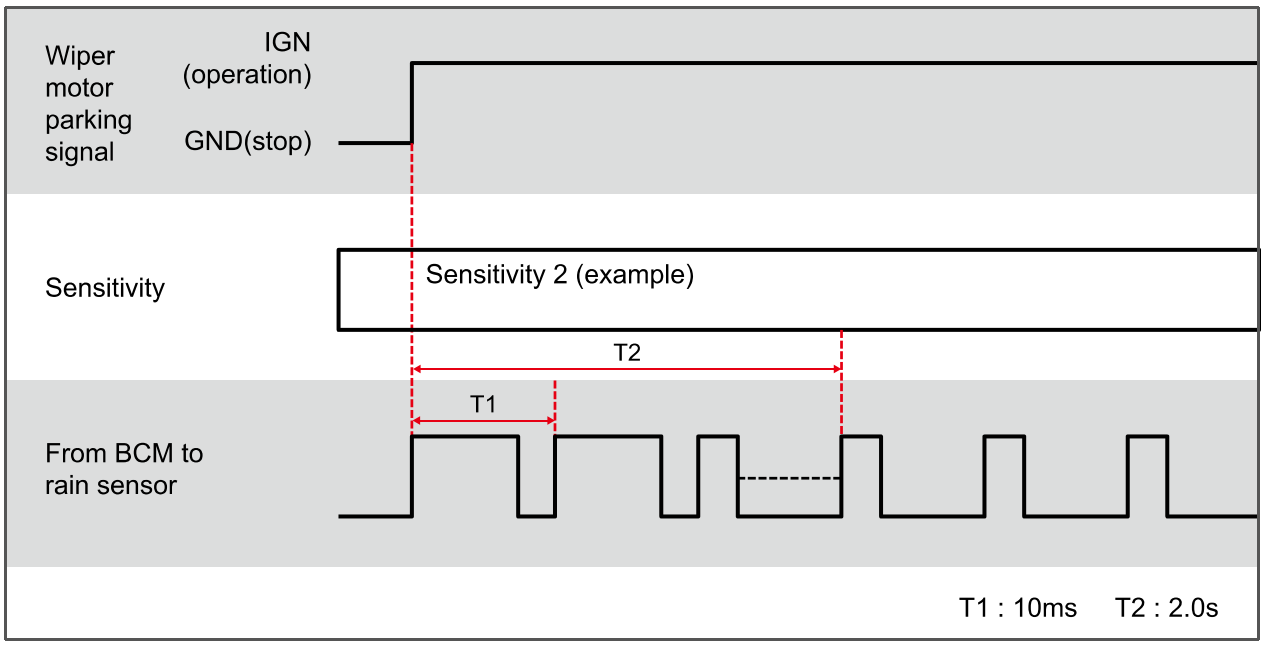


▶ Abnormal wiper parking signal stop (IGN)

Operation 1. (When the wiper motor parking signal stopped at ING)

A. The wiper system sends the corresponding signal of current status for 2 seconds (T2) with IGN ON and wiper AUTO switch ON.

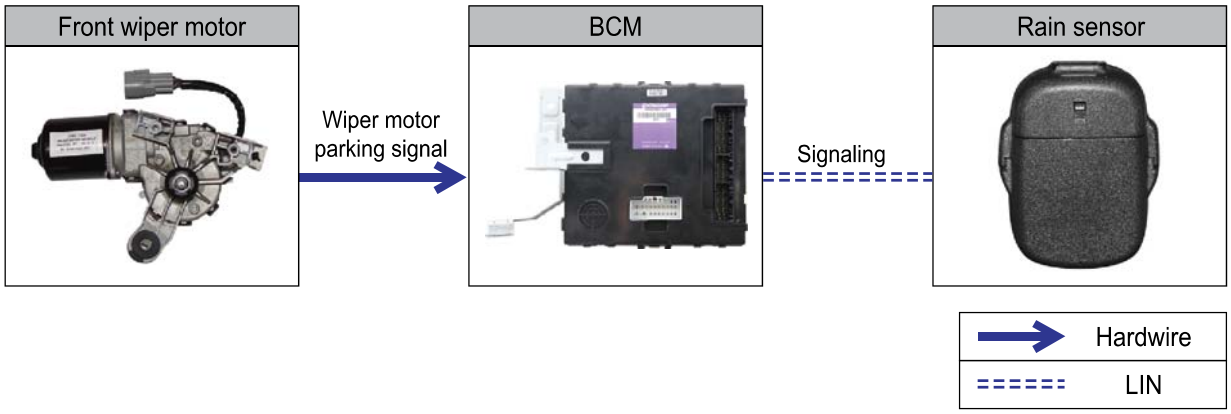
B. After the 2 seconds (T2), the system outputs the signal of the stopped status. (The wiper motor is operated only when the request signal from the rain sensor is received.)



Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN ON/Wiper AUTO switch ON/Wiper motor in parking position



Modification basis	
Application basis	
Affected VIN	

▶ Rain sensor malfunction (rain sensor external malfunction)

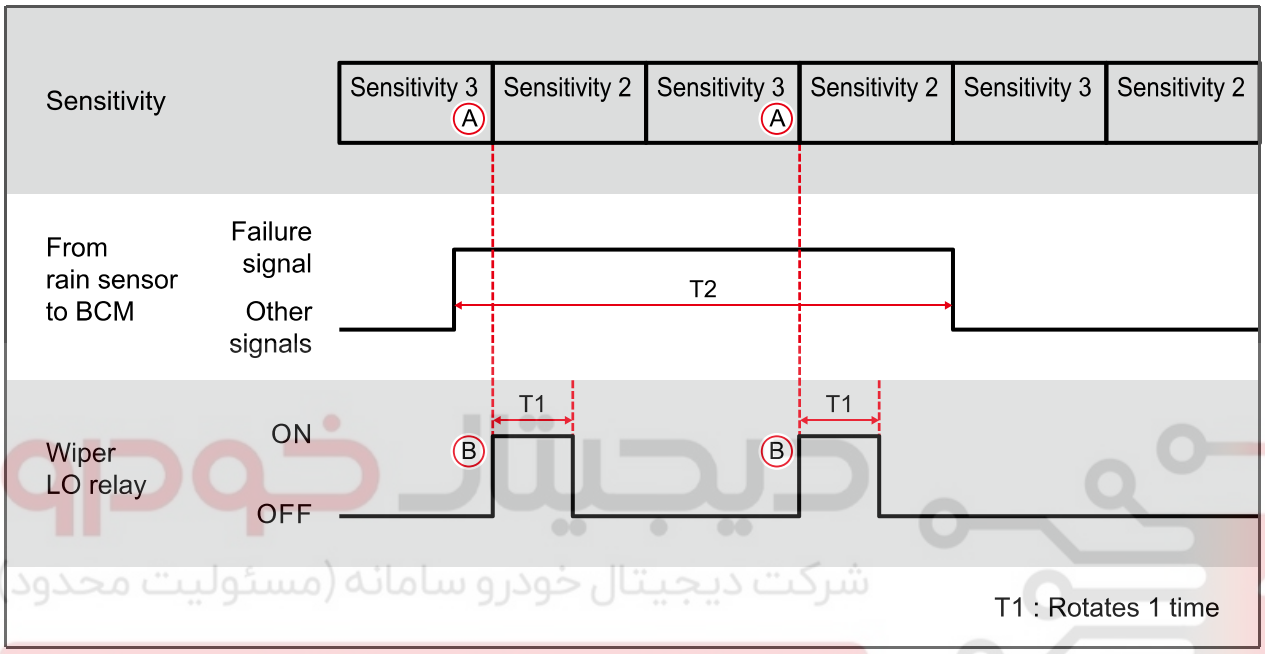
Basic conditions	IGN ON and wiper AUTO switch in ON position

Operation 1.

("rain sensor installed improperly" signal received from the rain sensor)

A. The wiper AUTO switch speed level is adjusted (speed level 3 → level 2)

B. The wiper LO relay is operated once (T1).



Modification basis	
Application basis	
Affected VIN	

▶ Rain sensor malfunction (no rain sensor signal)

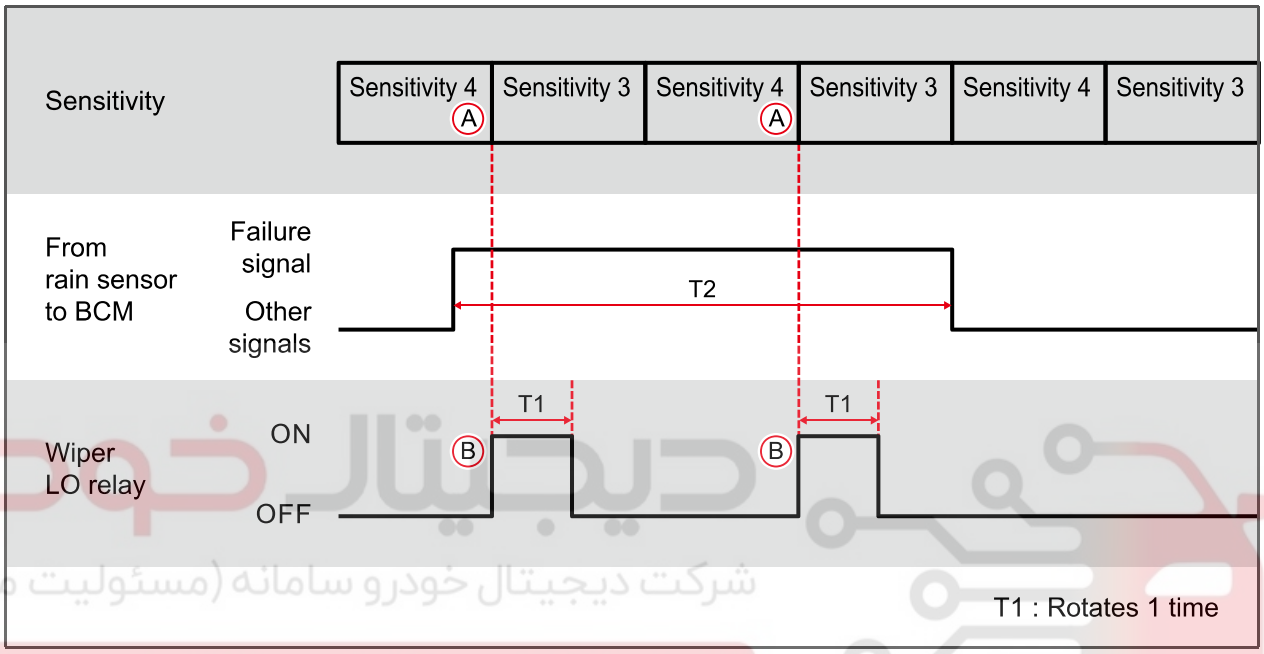
Basic conditions	IGN ON and AUTO switch ON

Operation 1.

("no signal detected" signal received from the rain sensor)

A. The AUTO switch speed level is adjusted (ex: speed level 4 → level 3)

B. The wiper LO relay is operated once (T1).



Operating process

- IGN ON/Wiper AUTO switch ON

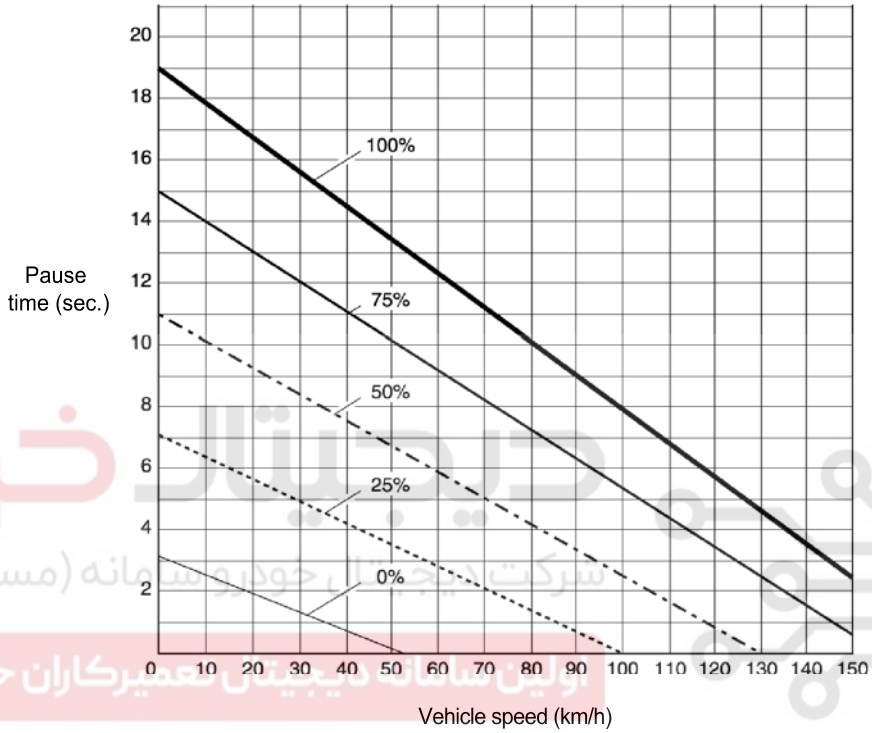
Modification basis	
Application basis	
Affected VIN	

▶ Speed sensitive AUTO wiper

The speed sensitive AUTO wiper is operated as follows for the vehicles without rain sensor or the vehicles without rain sensor coupled wiper operation because of faulty rain sensor.

- Intermittent wiper operation by the values from vehicle speed and speed level of the wiper speed control.

Speed sensitivity AUTO switch rest time



AUTO switch level		
Level	**Resistance**	**Remarks**
0%	3 kΩ or less	FAST
25%	8 kΩ to 13 KΩ	
50%	18 kΩ to 30 KΩ	
75%	35 kΩ to 43 KΩ	
100%	45 kΩ or more	SLOW

There are HYSTERISIS ranges between the levels.

NOTE

- The wiper remains activated for the time remaining when the AUTO switch is turned OFF during the speed sensitive wiper operation.
- The intermittent operation is reactivated when the AUTO switch is turned ON with IGN ON.
- The intermittent operation is reactivated when the AUTO switch is turned ON with IGN ON.

▶ Wiper troubleshooting

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

1. When starting the engine with the multi-function wiper switch in AUTO position, the wiper always cycles one time to remind the driver of system in AUTO mode.
2. This wiper operation is performed only for the first time when turning the multi-function wiper switch from OFF to AUTO position with IGN ON. If the switch is turned from OFF to AUTO again after that, the wiper is operated only when raining to prevent the wiper blade from wearing.

NOTE

The wiper also cycles one time when the multi-function wiper switch is turned from OFF to AUTO position during 5 minutes after the rain stops.

Symptom 2. It rains but the wiper does not work with the wiper switch in AUTO position.

1. Check if the multi-function wiper switch is in AUTO position.
2. Check the power to the rain sensor. That is, check the pin no. 3 (GND) and pin no. 4 (IGN).
3. Check that the wiper relay is intact.

Symptom 3. The wiper operates 3 or 4 times with high speed abruptly.

Check if the wiper speed control switch is set to the fast side.
The fast stage has the highest sensitivity and is very sensitive to the small change of amount of rain drops. Therefore, 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 wiper speed control switch is set to the fast side.

The fast stage has the highest sensitivity and is very sensitive to the small change of amount of rain drops. Therefore, adjust the knob to lower the sensitivity level.

Symptom 5. The overall wiper response is too fast or slow.

Check if the wiper speed control switch is set to the fast or slow side.
Notify that the user can select the sensitivity by selecting the variable resistance value. And, select a proper stage.

Modification basis	
Application basis	
Affected VIN	

▶ Wiper LO/HI control

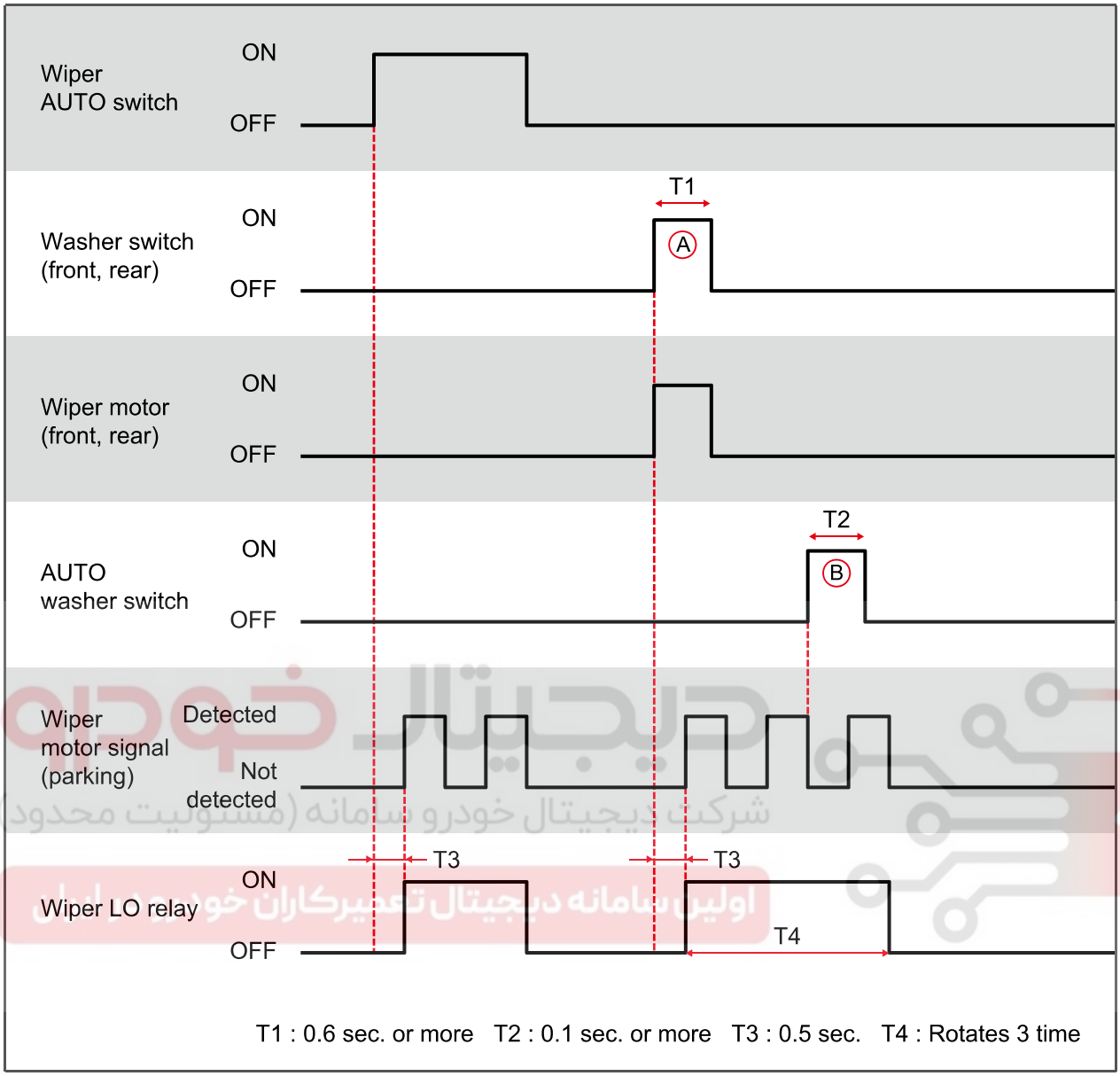
Operation 1.

A. When front or rear washer signal is input during the wiper LO/HI operation, the front or rear washer motor is activated.

B. The AUTO washer input is overridden during wiper LO/HI operation.

NOTE

- When the signal from the wiper LO/HI switch is received, the wiper LO/HI relay is turned ON/OFF. (The wiper LO relay is always activated when the HI relay is activated.)
- If the ignition turned OFF while the wiper is operated, the wiper stops operating when the wiper motor parking signal is input.
- If no wiper motor parking signal is input during the wiper LO/HI operation, the wiper relay continues working. (If no wiper parking signal is input for 3 seconds of wiper AUTO operation, wiper relay is deactivated after 5 seconds - failure notification)
- When the ignition is turned OFF during the wiper HI operation, the wiper is operated in LO mod and then returns to the parking position.



5. IGNITION KEY REMINDER

▶ **Internal buzzer (chime) operation for ignition key reminder**

Operation 1.

A. When the driver door is opened with the ignition key inserted, the internal buzzer (chime) is operated for 10 seconds at intervals of 0.02 sec. ON/1.38 sec. OFF.

Operation 2.

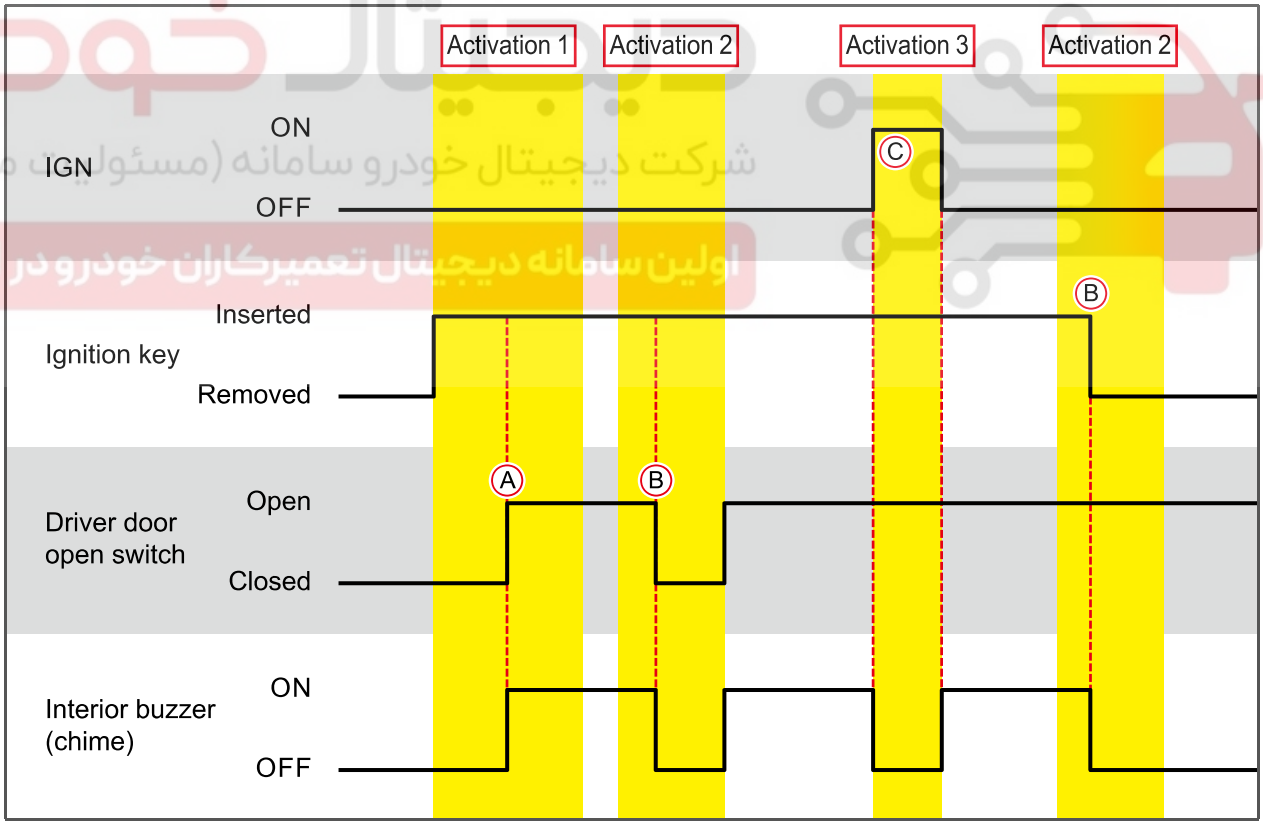
B. When the ignition key is removed or the driver door is closed while the internal buzzer (chime) is activated for up to 10 seconds, the buzzer is deactivated.

Operation 3.

C. The 2 operations stated above are not available after the ignition is turned ON.

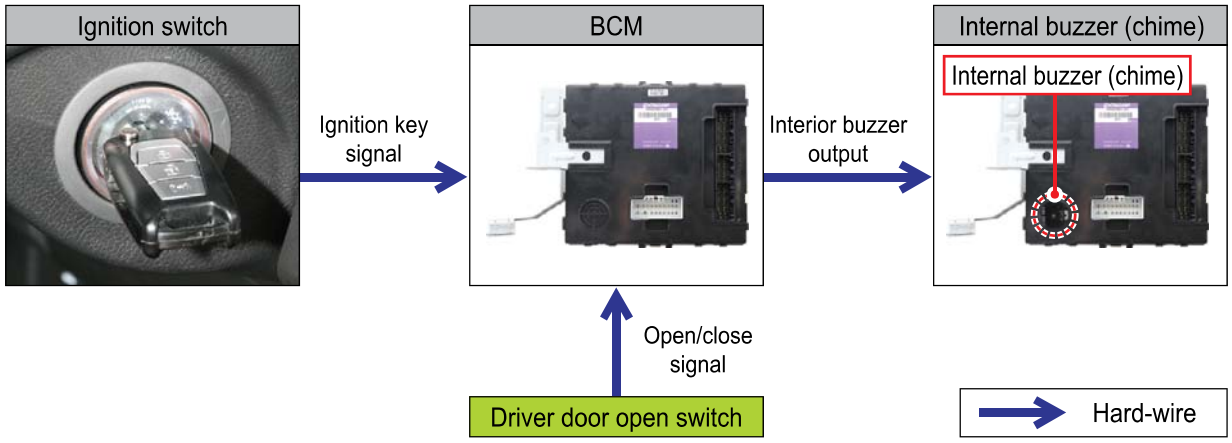
NOTE

This function overrides the tail lamp switch warning function.

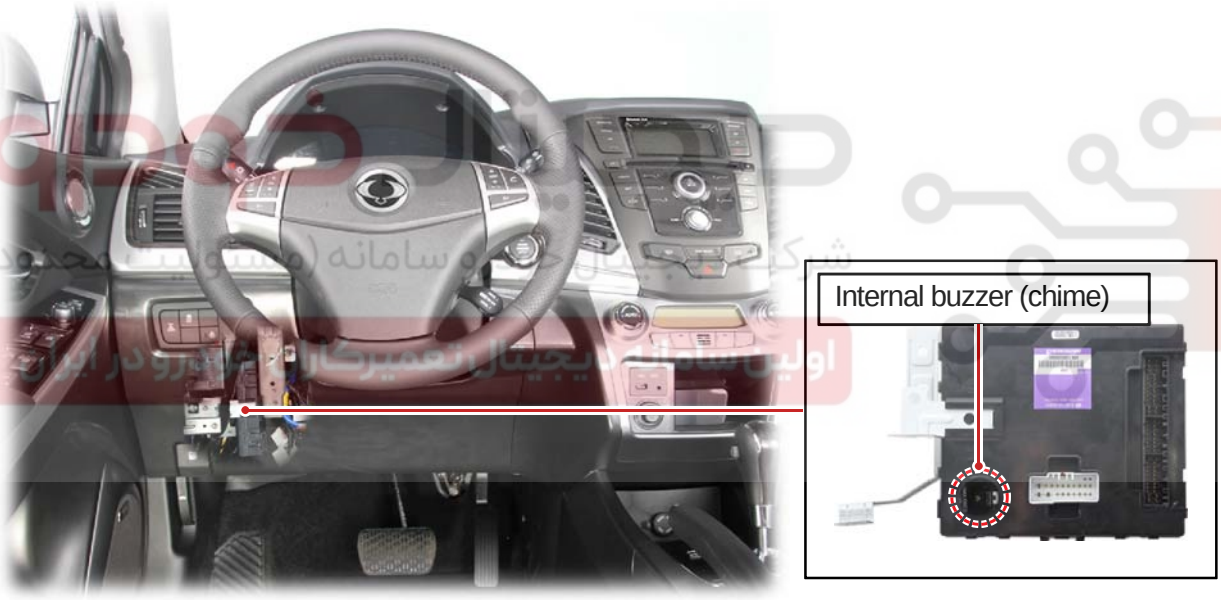


Modification basis	
Application basis	
Affected VIN	

Operating process



Mounting location for internal buzzer (chime)



NOTE

The internal buzzer (chime) is fitted inside the BCM.

Modification basis	
Application basis	
Affected VIN	

▶ Ignition key reminder operation

Operation 1.

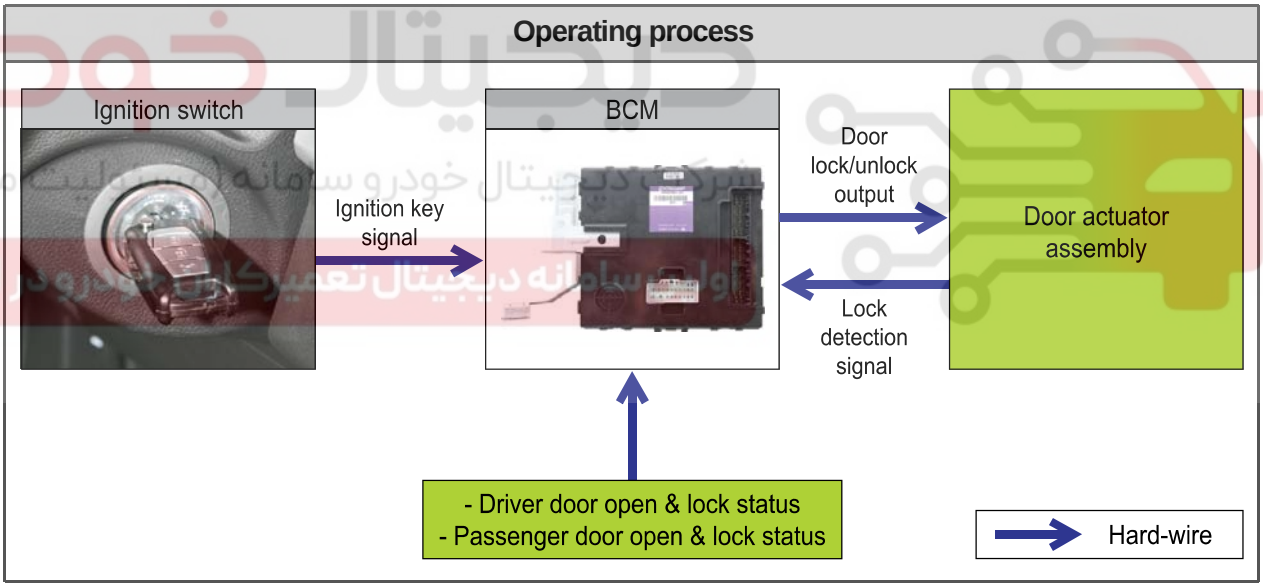
A. The door LOCK switch is in LOCK position after the driver door is opened with the ignition key inserted.
B. The UNLOCK signal is output for 0.5 seconds (T2) immediately after the LOCK signal output.

Operation 2.

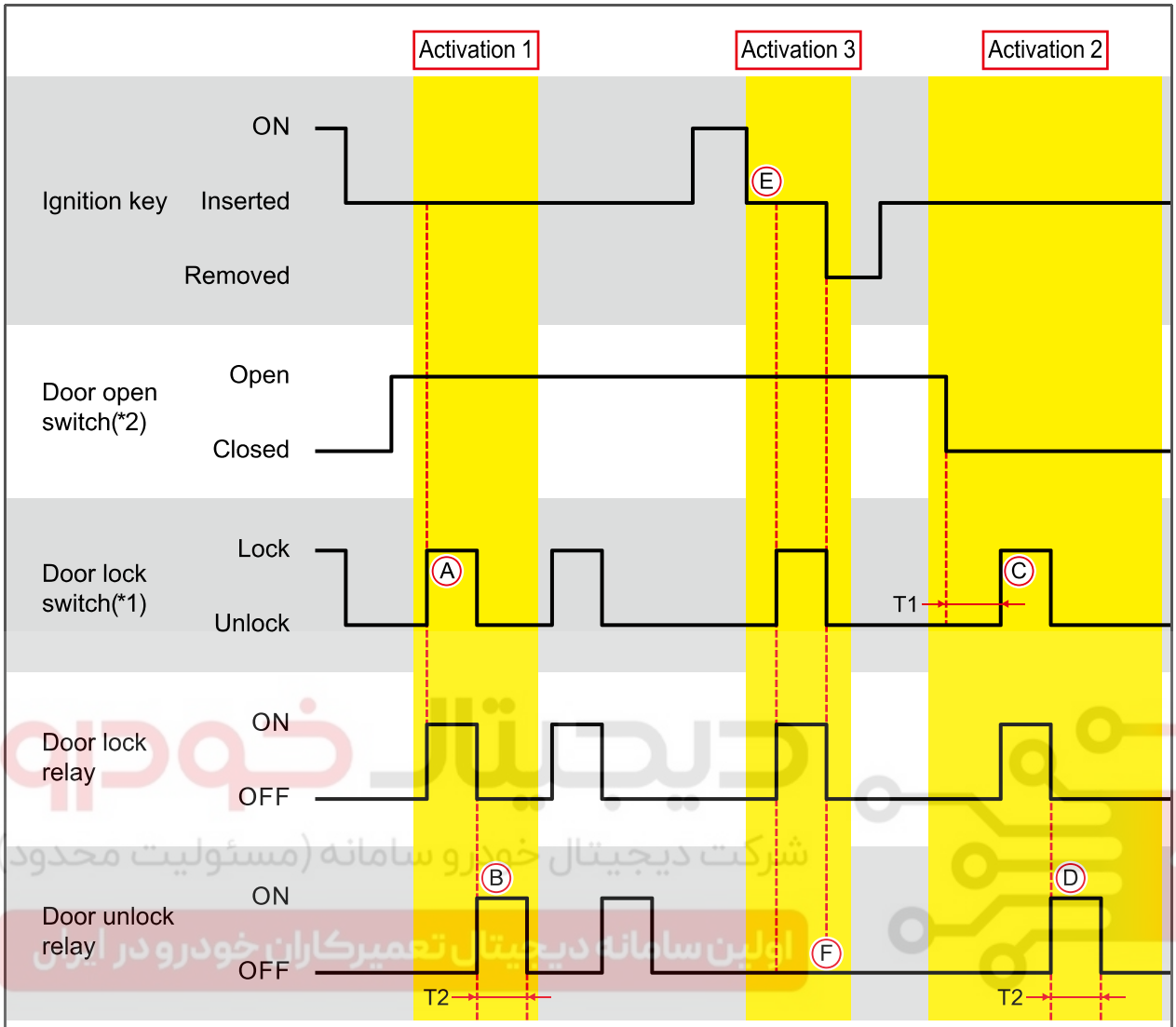
C. The door LOCK switch is in LOCK position within 0.5 seconds (T1) after the door is closed with the ignition key inserted.
D. The UNLOCK signal is output for 0.5 seconds (T2) immediately after the LOCK signal output.

Operation 3.

E. The door LOCK switch is in LOCK position after the driver door is opened with the ignition key inserted.
F. The door UNLOCK signal is not output when the ignition key is removed during the door LOCK output.



Modification basis	
Application basis	
Affected VIN	



T1 : Within 0.5 sec. T2 : 0.5 sec.
Operating conditions depending on *1 and *2
*1) Driver and passenger door lock switches
*2) Driver and passenger door open switches

NOTE

The door LOCK/UNLOCK relay is installed inside the actuator.

Modification basis	
Application basis	
Affected VIN	

▶ All doors LOCK prevention function

Operation 1.

A. When the LOCK signal is input with the doors (driver/passenger/rear) open and the ignition key removed or IGN ON).
B. The UNLOCK signal is output for 0.5 seconds (T1) immediately after the LOCK signal output.
- Except tailgate and hood

Operation 2.

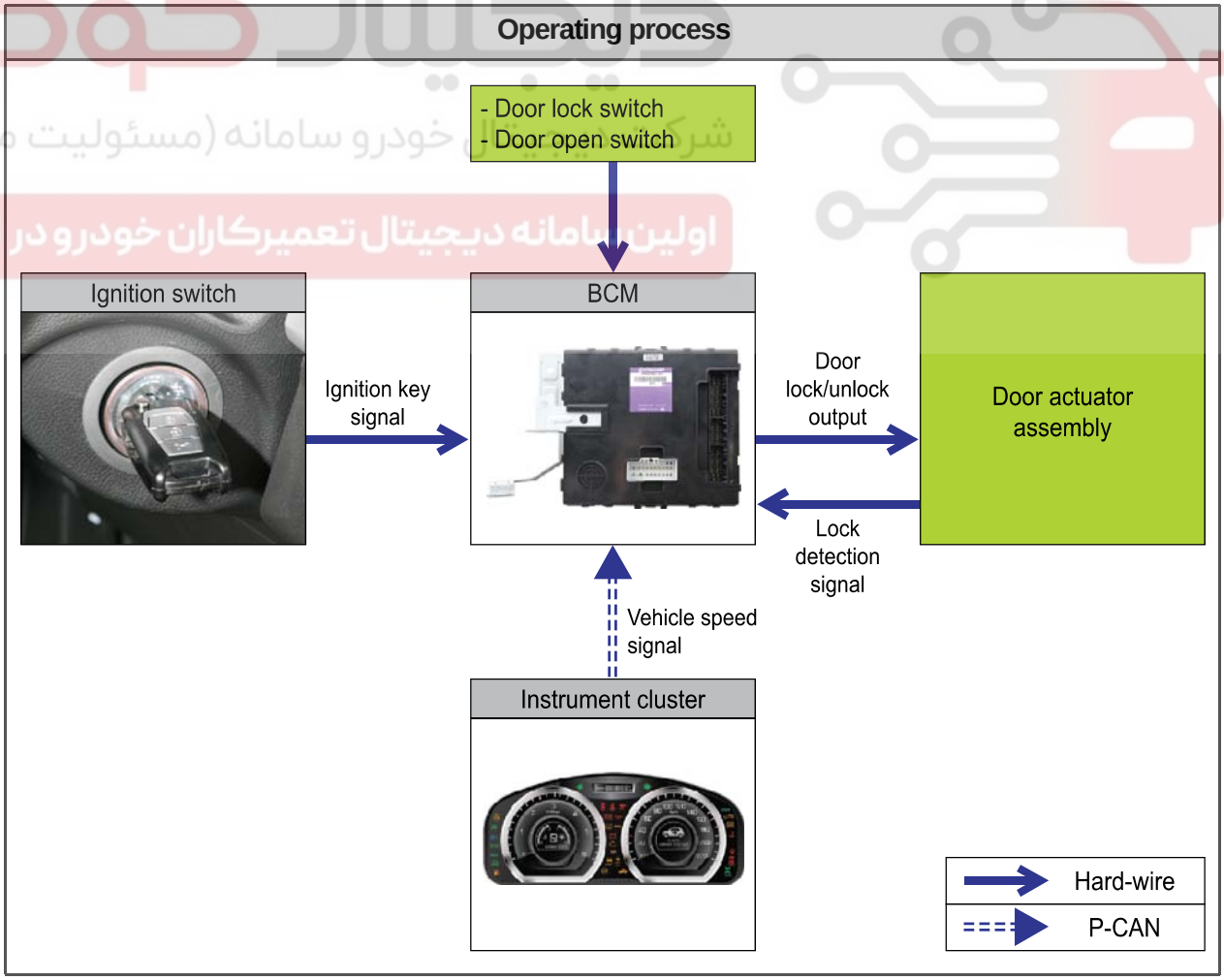
C. All doors are closed during the UNLOCK output.
D. The UNLOCK output continues.

Operation 3.

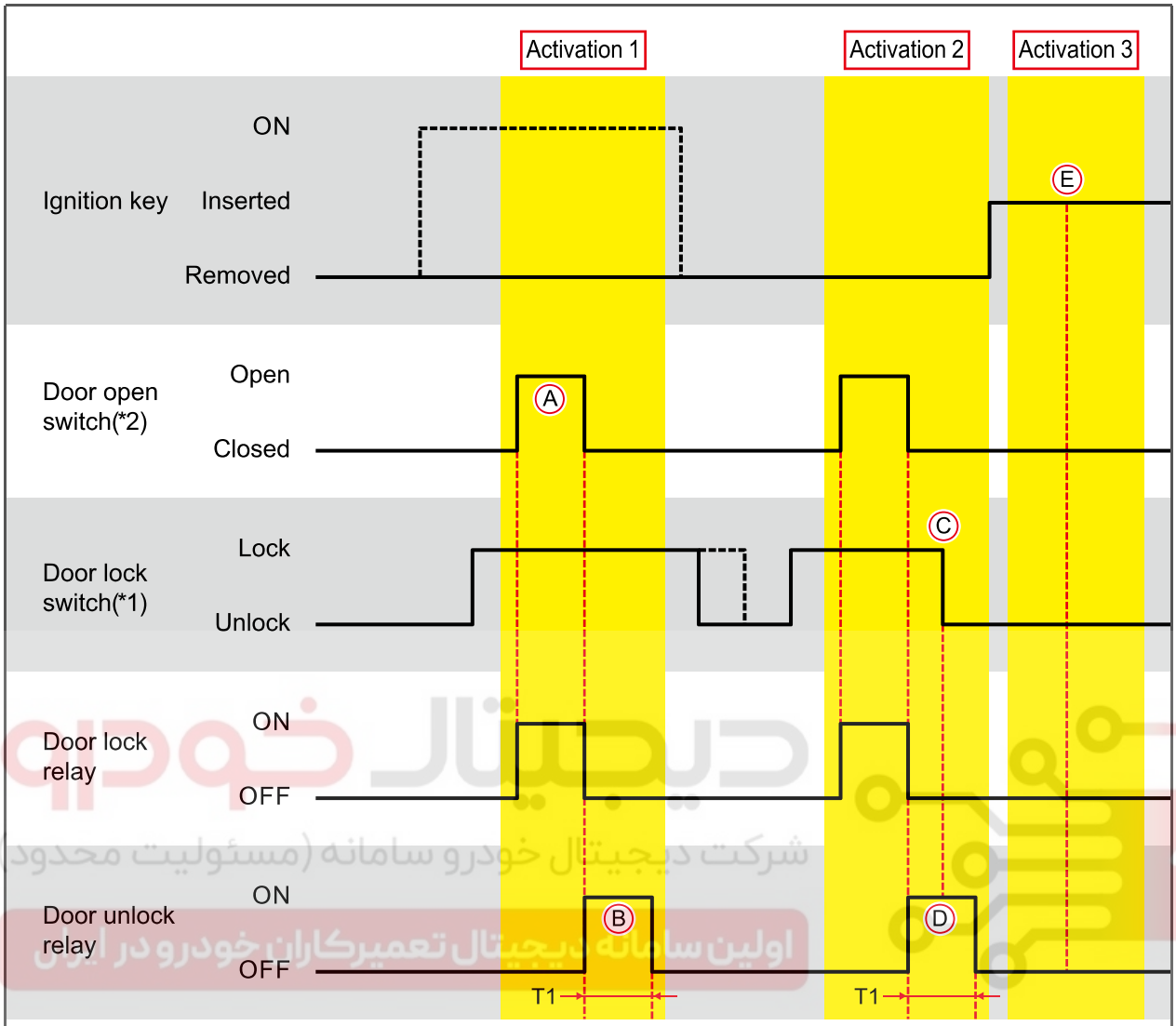
E. When the ignition key is inserted, the ignition key reminder is operated.

NOTE

This function does not work if the vehicle speed is over 10 km/h.



Modification basis	
Application basis	
Affected VIN	



T1 : 0.5 sec.
Operating conditions depending on *1 and *2
*1) Driver/passenger/rear LH/RH door lock switch
*2) Driver/passenger/rear LH/RH door open switch

NOTE

The door LOCK/UNLOCK relay is installed inside the actuator.

Modification basis	
Application basis	
Affected VIN	

6. TAIL LAMP CONTROL

▶ **Tail lamp ON warning**

Operation 1.

A. The driver door is opened with the tail lamp ON and ACC or IGN OFF (ignition key removed).
B. The internal buzzer (chime) sounds for 10 seconds (T2) at intervals of 1.4 seconds (T1).

Operation 2.

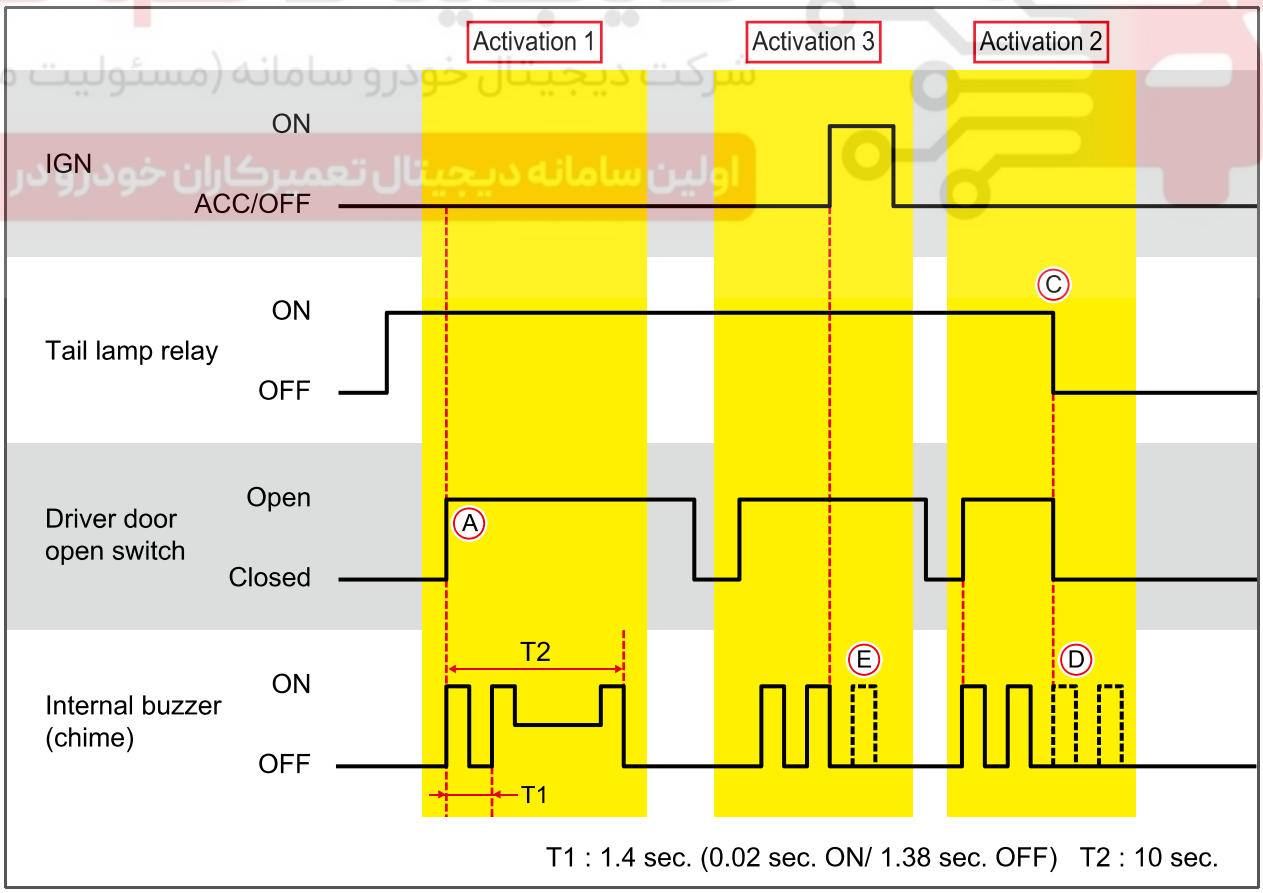
C. The tail lamp switch is turned OFF while the internal buzzer (chime) is activated, or the driver door is closed.
D. The internal buzzer (chime) is deactivated immediately.

Operation 3.

E. The 2 operations stated above are not available after the ignition is turned ON.

NOTE

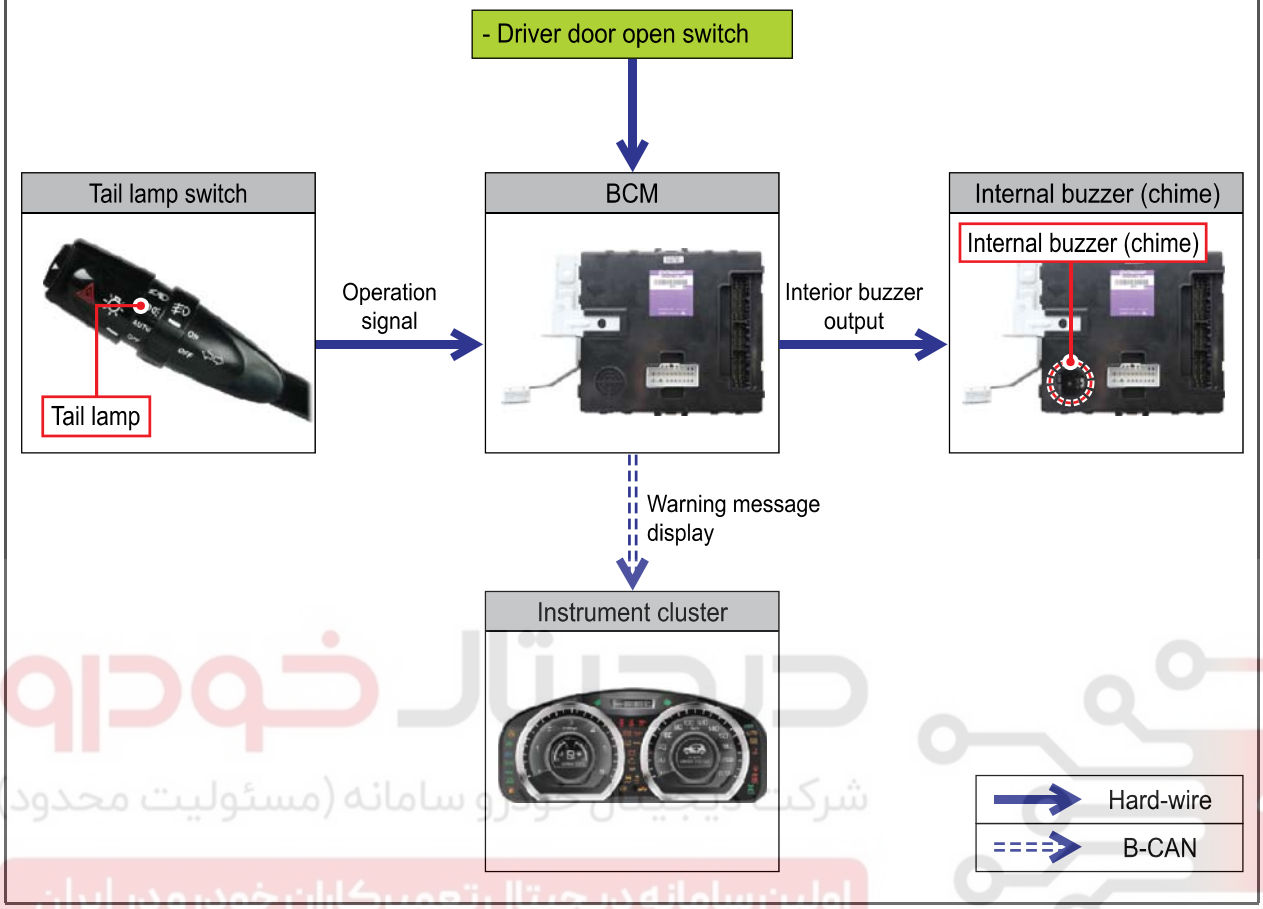
- The sunroof and ignition key reminder warnings override this function.
- If the tail lamp switch is turned ON from OFF while the internal buzzer (chime) is activated, the buzzer sounds again.



Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN OFF (ignition key removed)



Modification basis	
Application basis	
Affected VIN	

▶ Tail lamp AUTO switching off

Operation 1.

A. The tail lamp relay is turned ON or OFF according to the ON/OFF operation of the tail lamp switch.

Operation 2.

B. When the ignition is turned OFF or the ignition key is turned to the ACC ON position (ignition key removed) with the tail lamp switch ON.

C. After this, the tail lamp relay is turned OFF automatically when the driver door is opened and then closed. (with tail lamp switch ON)

Operation 3.

D. When the ignition is turned ON (ignition key inserted) after the operation 2, the tail lamp relay is turned ON.

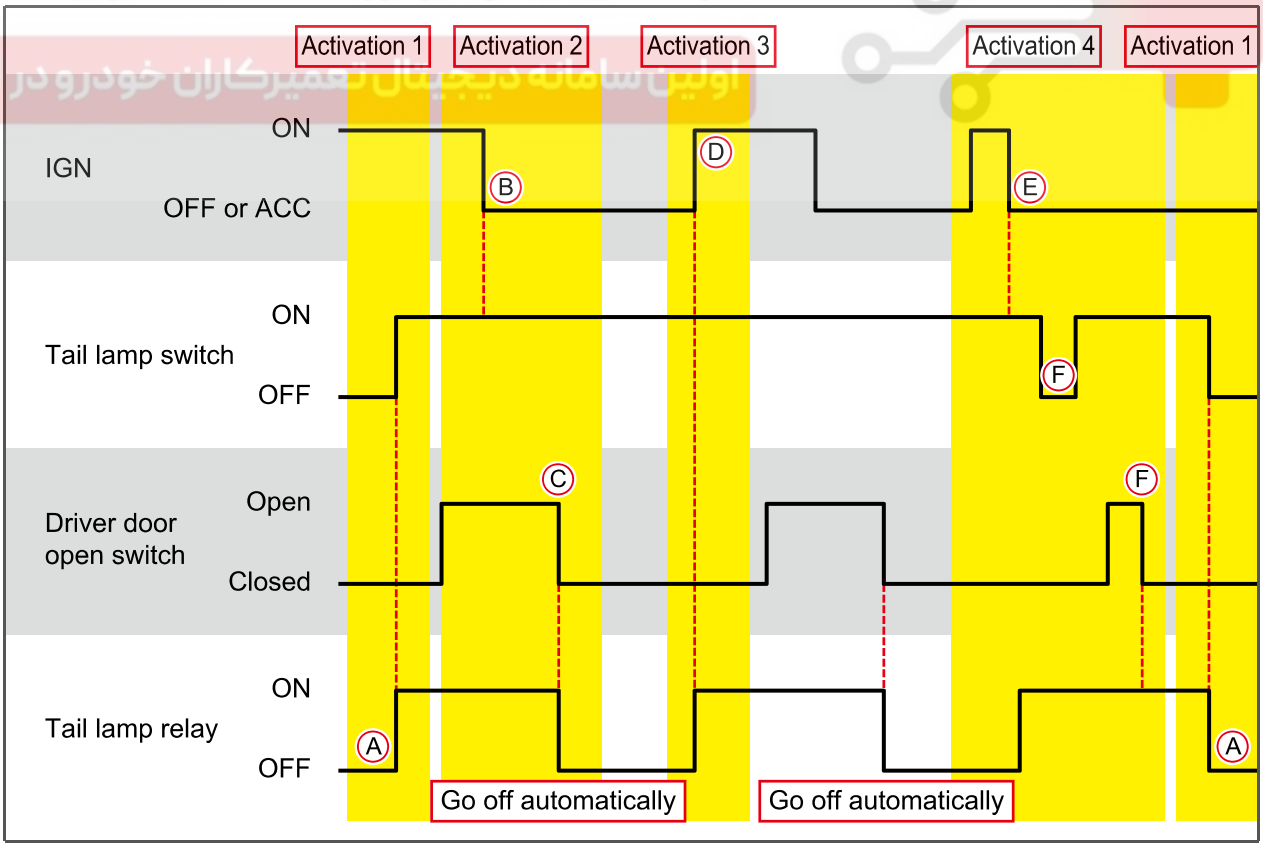
Operation 4.

E. The ignition is turned OFF or the ACC is turned ON (ignition key removed).

F. After the tail lamp is turned ON, the lamp relay is not turned OFF automatically when the driver door is opened and then closed. (with tail lamp switch ON)

NOTE

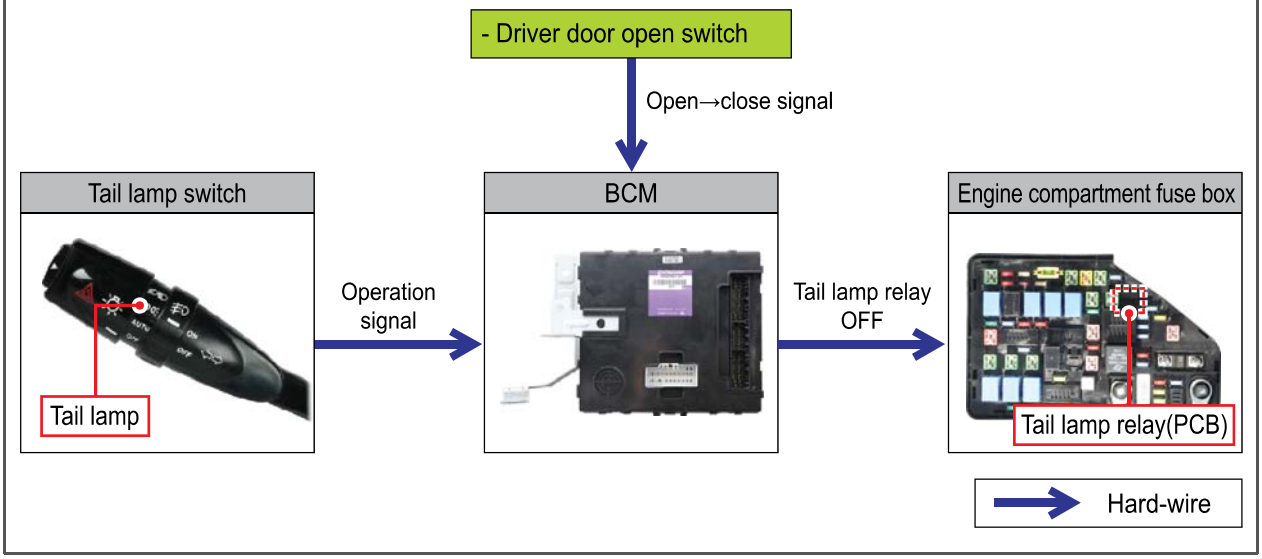
To reset, turn the ignition ON (ignition key inserted)



Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN OFF (ignition key removed)



Modification basis	
Application basis	
Affected VIN	

7. DOOR AJAR WARNING LAMP CONTROL

▶ **Door ajar warning lamp**

Operation 1.

A. When the door ajar signal is input while the vehicle is driven at 10 km/h or less (V2).
B. The door ajar warning lamp comes on.
- The door ajar warning lamp goes out when the open door is closed under the condition stated above.

Operation 2.

C. The door ajar warning lamp is ON.
D. The vehicle is driven at 10 km/h or more (V1) for 2 seconds or longer (T1).
E. The door ajar warning lamp starts to flash.

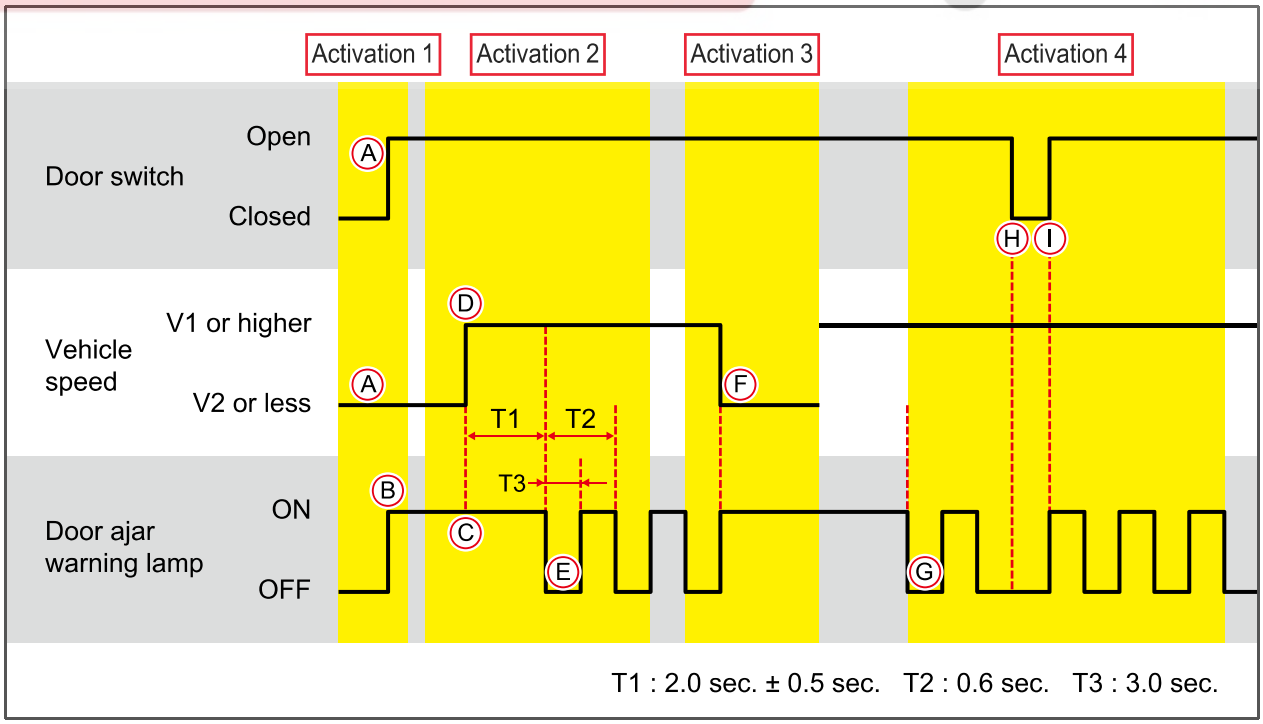
Operation 3.

(The warning lamp flashes under the condition of operation 2.)

F. The warning lamp remains on when the vehicle speed decreases to 10 km/h or less (V2).
- The door ajar warning lamp goes out when the open door is closed under the condition stated above.

Operation 4.

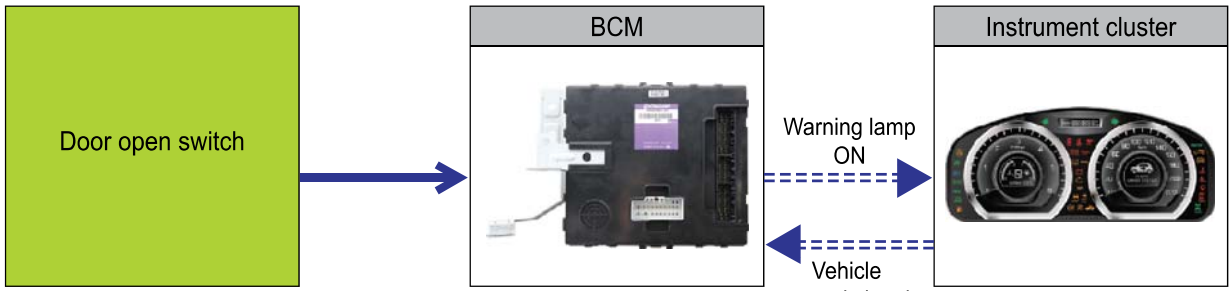
G. The door ajar warning lamp flashes.
H. The lamp goes out when the open door is closed.
I. The lamp flashes again whenever a door is opened.



Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN ON



Modification basis	
Application basis	
Affected VIN	

8. SEAT BELT CONTROL

▶ **Seat belt internal buzzer (chime) and warning lamp**

Operation 1.

A. The ignition is turned ON from OFF with the driver and passenger seat belts unbuckled.
B. The internal buzzer (chime) sounds and the warning lamp comes on for 6 seconds (T2).
(internal buzzer controlled by BCM, warning lamp controlled by instrument cluster)

Operation 2.

C. The ignition is turned ON from OFF with the driver and passenger seat belts unbuckled.
D. The internal buzzer (chime) does not sound but the warning lamp comes on for 6 seconds (T2).
(The seat belt reminder is operated when the vehicle is driven at 10 km/h (for EU), 25 km/h (for GEN))

Operation 3.

E. When the fastened driver seat belt is unbuckled with IGN ON.
F. The internal buzzer (chime) sounds and the driver seat belt warning lamp comes on for T2 again.

Operation 4.

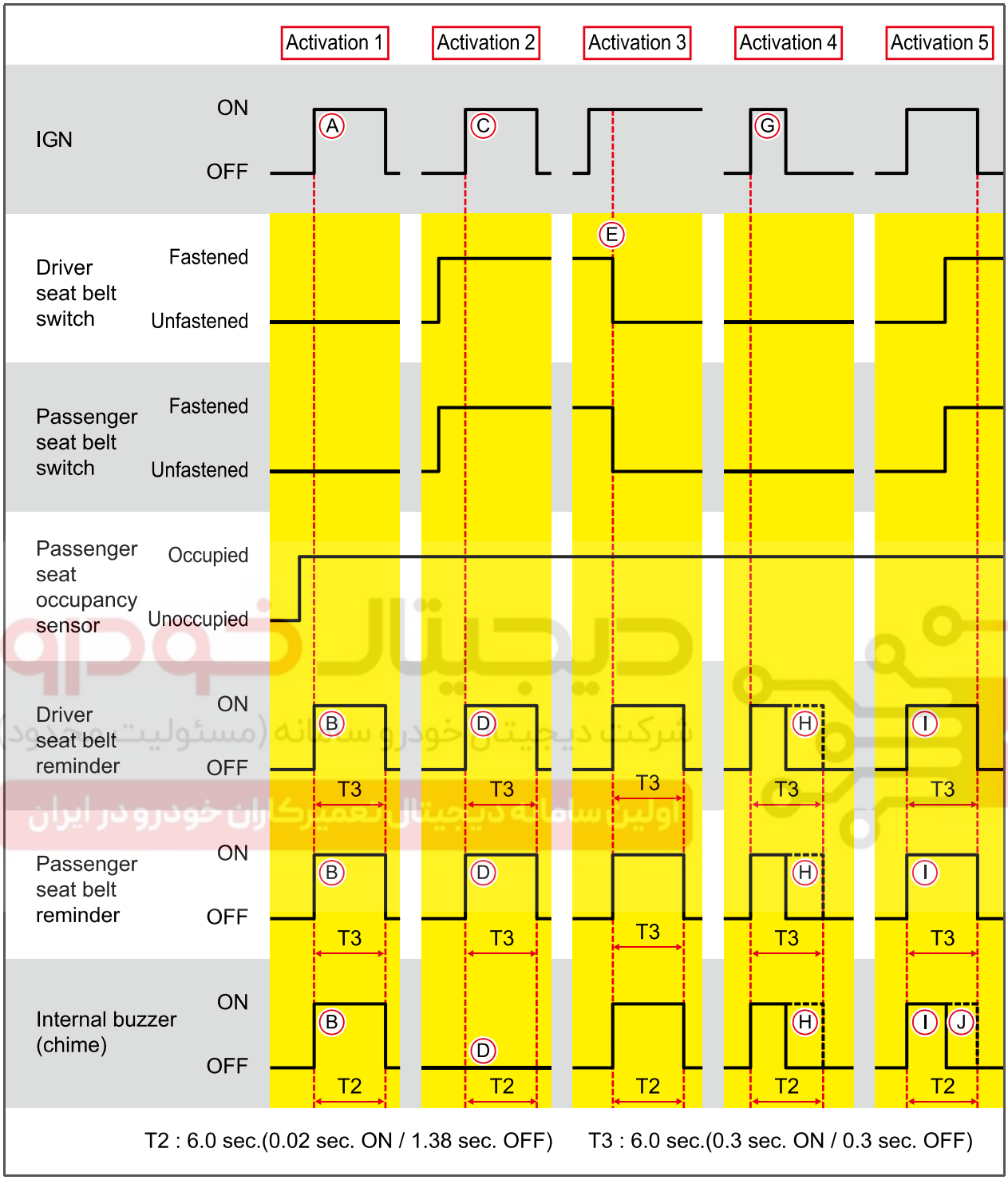
G. The ignition is turned OFF while the internal buzzer (chime) and seat belt warning lamp are activated.
The internal buzzer (chime) and seat belt warning lamp are deactivated.
H.

Operation 5.

I. The driver seat belt is fastened while the internal buzzer (chime) and seat belt warning lamp are activated.
J. The internal buzzer (chime) does not sound but the warning lamp comes on for the time remaining.

NOTE

- When the seat belt reminder operation conditions are met during the warning, the seat belt reminder is operated after stopping the warning output.
- For the passenger seat, however, the system detects if the passenger seat is empty or occupied and operates the warning lamp only for the first time. After that, the only seat belt reminder detects if the passenger seat is occupied.



Modification basis	
Application basis	
Affected VIN	

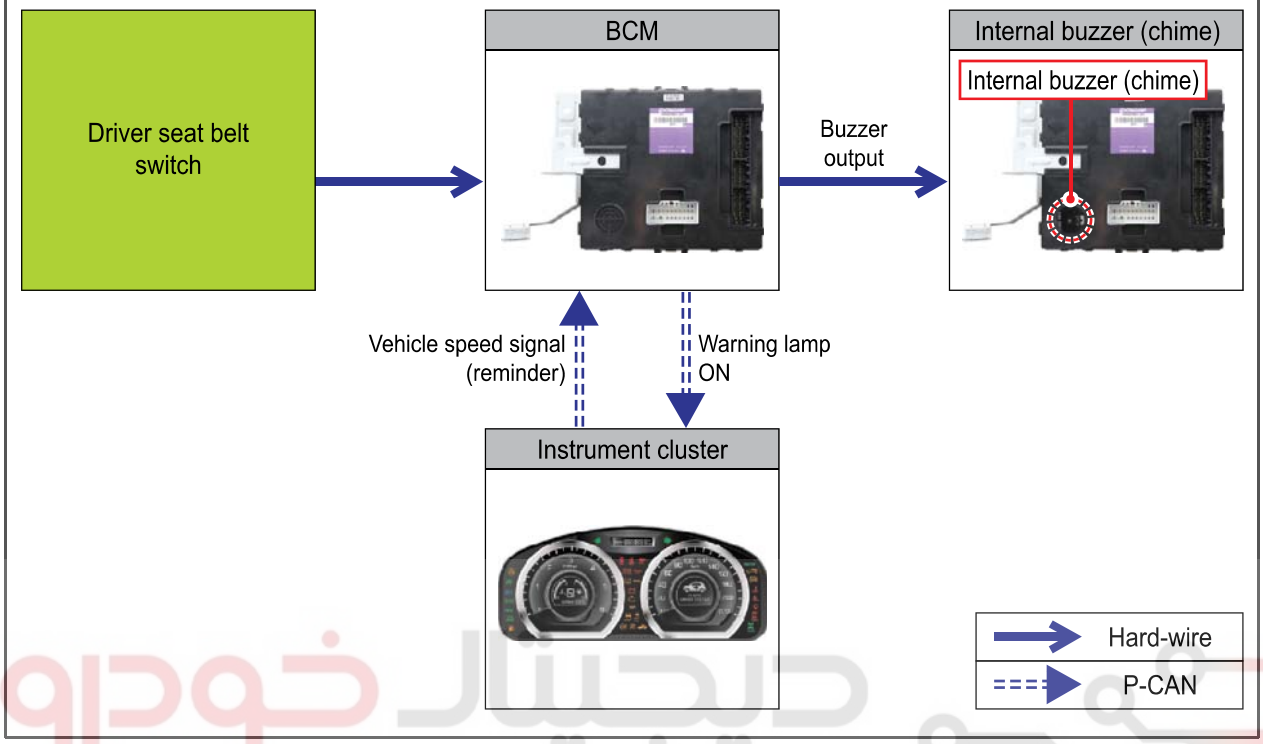
▶ Seat belt reminder operation

A	▶ **Only EU** If the driver and passenger seat belts are not fastened with the ignition switch ON, engine running, vehicle speed above 10 km/h and any passenger occupied, the seat belt reminder is activated. In addition, even though the vehicle speed reduces to below 10 km/h after the reminder is activated at speed of 10 km/h or higher, it will remain activated.	▶ **GEN** The seat belt reminder is operated when the vehicle is driven at 25 km/h or more with IGN ON and alternator in High status (engine running), and driver seat belt is not fastened. If the vehicle speed is decreased to less than 25 km/h within 5 minutes after the seat belt reminder is activated, the internal buzzer (chime) is turned off. If the vehicle speed is increased to 25 km/h or more, the buzzer signal is output for 5 minutes.
B	If the seat belt is fastened after the seat belt reminder is activated, the output of the reminder is turned OFF immediately. The reminder will be operated again whenever the seat belt is unbuckled.	
C	When the seat belt reminder is activated initially with the seat belt unbuckled, the internal buzzer (chime) is turned ON for 0.02 seconds and then turned OFF for 1.18 seconds (this cycle continues for 5 minutes) and the driver seat belt warning lamp on the instrument cluster remains on.	
D	When the seat belt reminder is activated with the seat belt unbuckled, the internal buzzer (chime) is turned ON for 0.02 seconds and then turned OFF for 1.18 seconds (this cycle continues for 5 minutes) and the passenger seat belt warning lamp on the instrument cluster remains on, after detecting that the passenger seat is occupied through the input value of the passenger seat occupancy sensor.	
E	When the vehicle speed is changed while the seat belt reminder is turned on, the internal buzzer (chime) is operated as follows:	
F	Priority of internal buzzer (chime) operation (Seat belt reminder > ignition key reminder > sunroof warning > tail lamp warning > hazard warning flasher on > turn signal indicator)	

Vehicle speed	Function		Remarks
	Interior buzzer	Instrument cluster	
25 Km/h to 49 Km/h (10km/h~49km/h)	0.02 sec. ON / 1.18 sec. OFF	Remains on	(Only EU)
50 Km/h to 99 Km/h	0.02 sec. ON / 0.98 sec. OFF	Remains on	
100 km/h or more	0.02 sec. ON / 0.78 sec. OFF	Remains on	

Operating process

- IGN ON



Modification basis	
Application basis	
Affected VIN	

9. SUNROOF WARNING LAMP CONTROL

Operation 1.

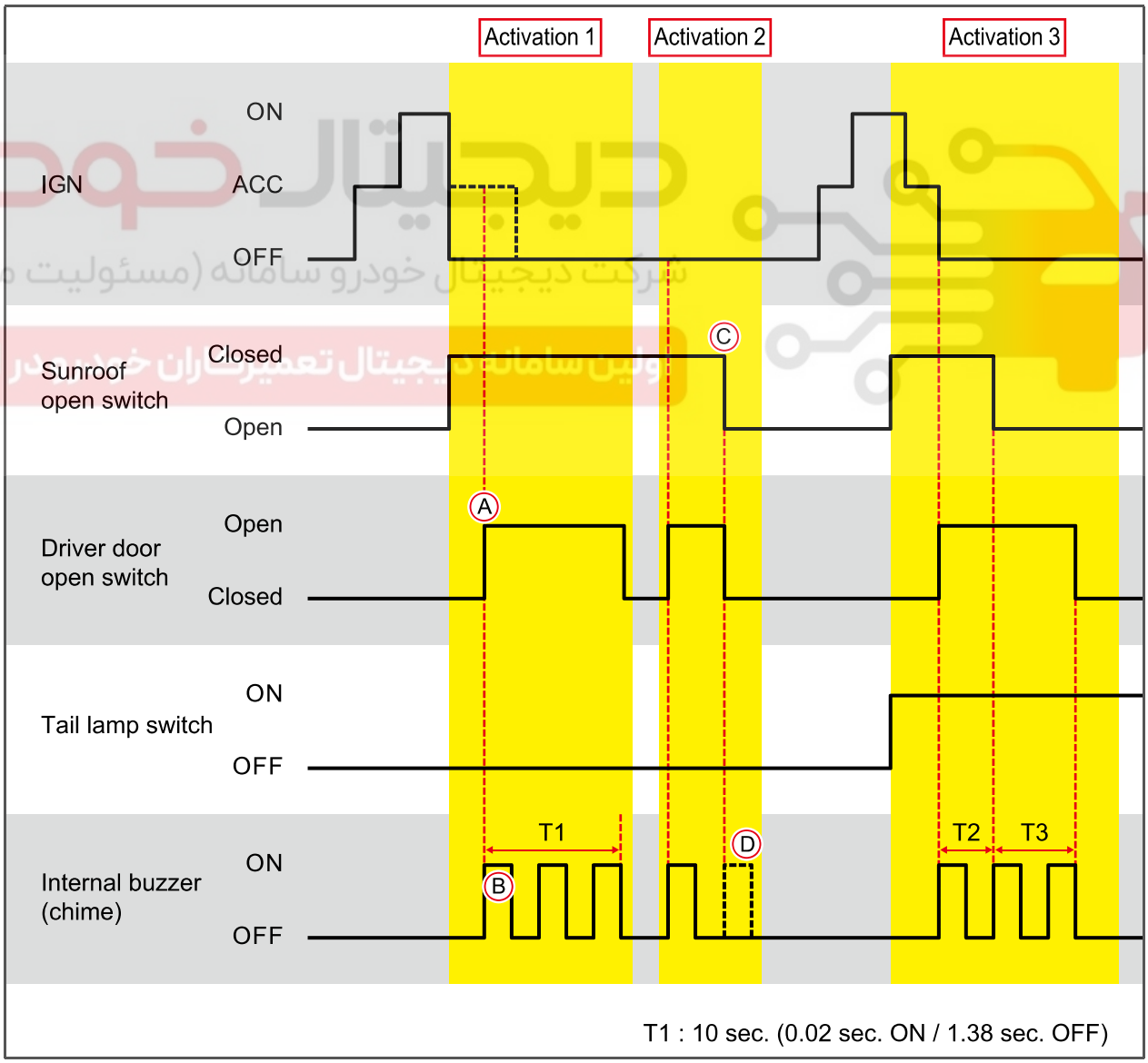
A. The driver door is opened with the sunroof open and IGN OFF and ACC ON (ignition key removed).
B. The internal buzzer (chime) sounds for 10 seconds (T1).

Operation 2.

C. The driver door and sunroof is closed while the internal buzzer (chime) is activated.
D. The internal buzzer (chime) is deactivated.
(The internal (chime) buzzer is not activated again after the operation 1, and it is activated again when the operation 1 is performed after the ignition is turned ON)

Operation 3.

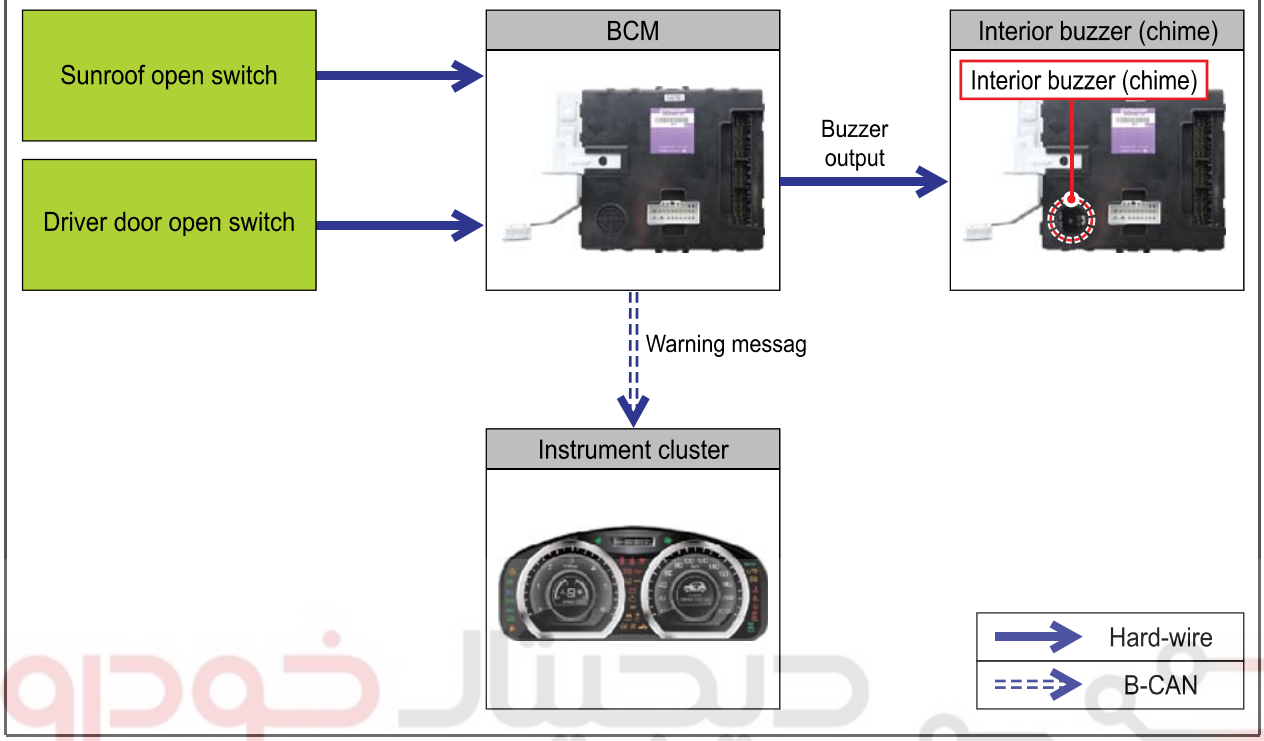
E. The sunroof open warning (T2) overrides the tail lamp ON warning (T3).



Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN OFF (ignition key removed)



Modification basis	
Application basis	
Affected VIN	

10. KEY HOLE LAMP CONTROL

Operation 1.

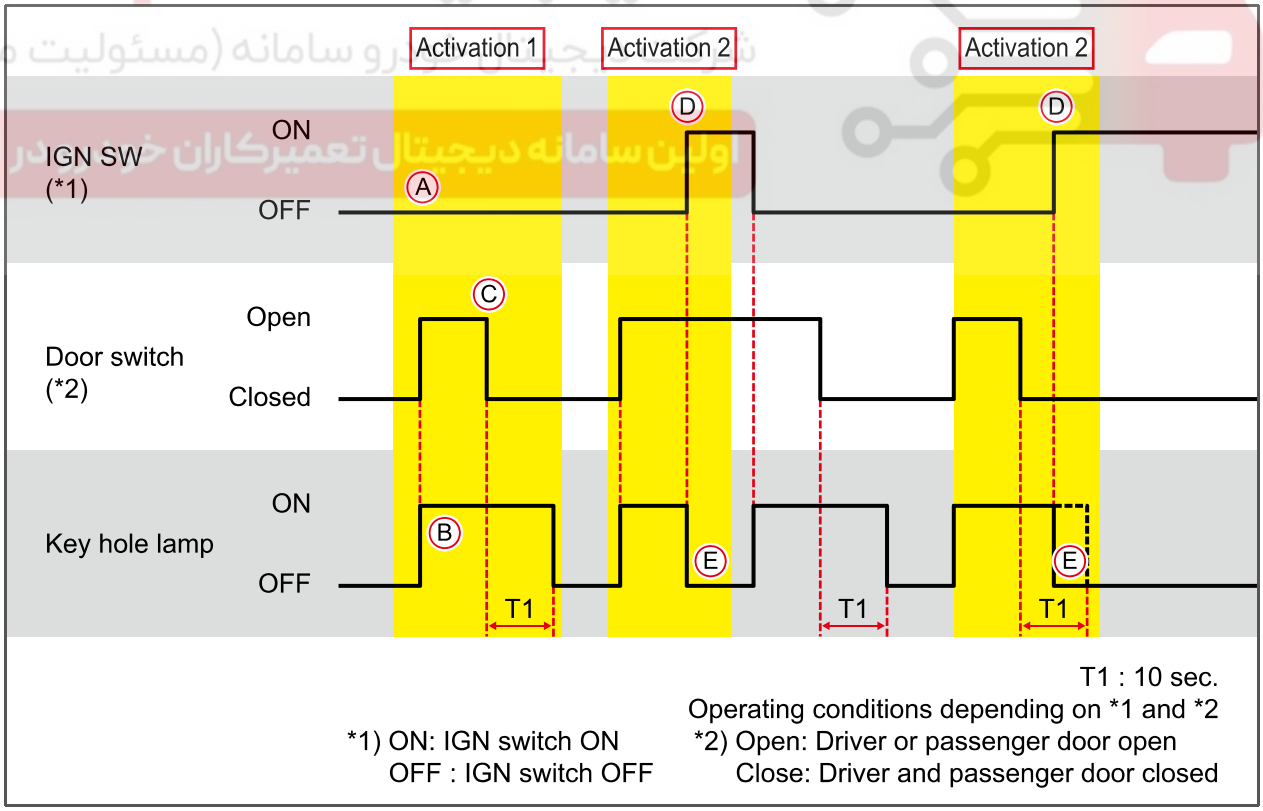
A. Door is opened with IGN OFF.
B. The key hole lamp comes on.
C. The key hole lamp comes on for 10 seconds (T1) when the door is closed.

Operation 2.

D. The ignition is turned ON with the key hole lamp ON.
E. The key hole lamp goes out.

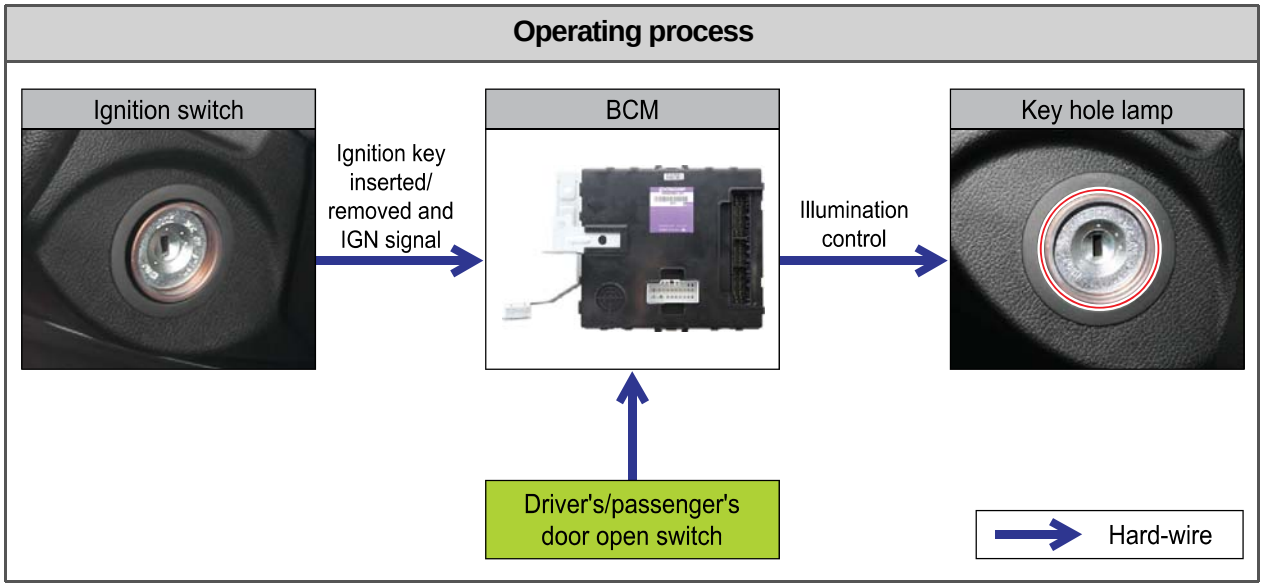
NOTE

- The key hole lamp goes out when the REKES LOCK signal is received (in theft deterrent mode).
- When the key hole lamp and immobilizer signals are received simultaneously, the immobilizer signal overrides the key hole lamp signal.
- When the immobilizer confirmation is failed, regardless of the key hole lamp operation condition, it flashes for 11 seconds at intervals of 0.5 sec. ON/0.5 sec. OFF.
- When the ignition is turned ON in virgin status, the key hole lamp flashes for 8 seconds at intervals of 0.5 sec. ON/0.5 sec. OFF.



T1 : 10 sec.
Operating conditions depending on *1 and *2
*1) ON: IGN switch ON
OFF : IGN switch OFF
*2) Open: Driver or passenger door open
Close: Driver and passenger door closed

Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	

11. DEFOGGER (HEATED WIRE) TIMER CONTROL

▶ **Front defogger (heated wire) timer control**

Operation 1.

A. The front defogger (heated wire) switch is turned ON.
B. The front defogger (heated wire) is activated for 12 minutes (T1).

Operation 2.

C. Turning on the front defogger (heated wire) switch again when the defogger is activated turns off the fog lamp output.

Operation 3.

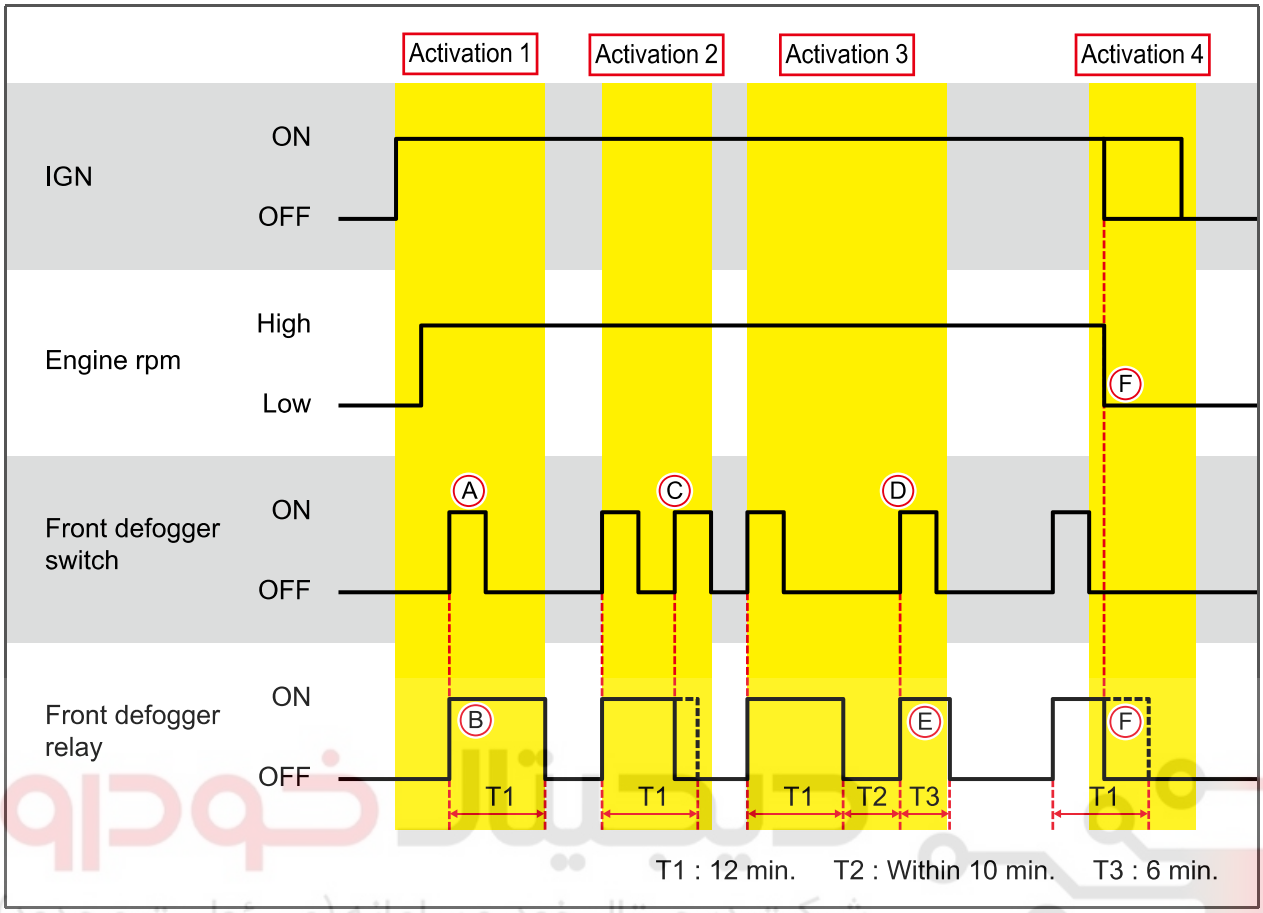
D. Within 10 minutes (T2) after the output of the front defogger (heated wire) for 12 minutes (T1).
E. When the front defogger (heated wire) switch is turned ON, the front defogger is activated for only 6 minutes (T3).
(This operation is not available when the front defogger is turned off by turning off engine, IGN OFF, or front defogger (heated wire) switch).

Operation 4.

F. If the engine is running at low speed with IGN OFF or IGN ON, the front defogger (heated wire) is deactivated.

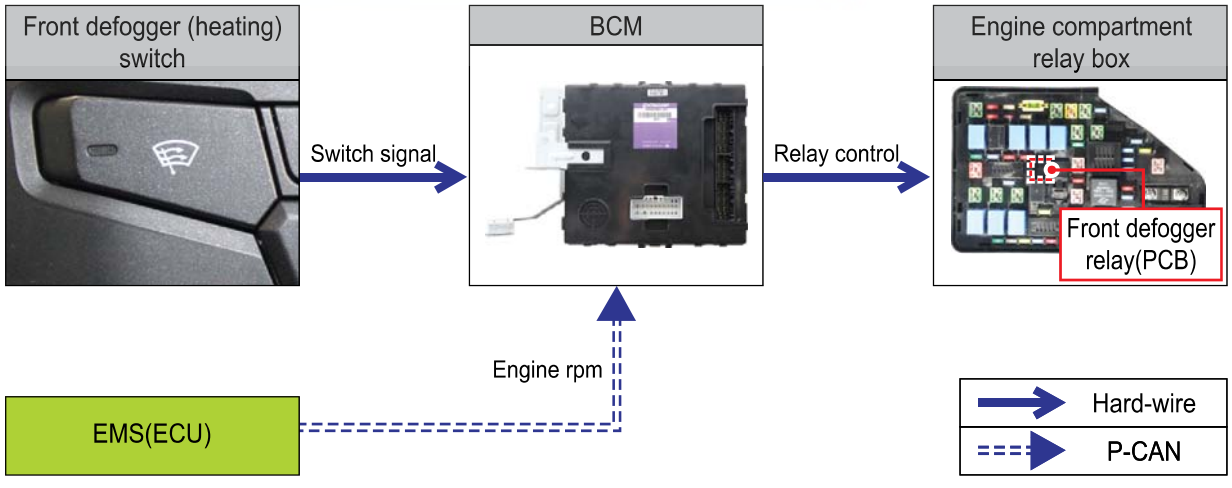
reference

The front defogger is turned OFF when the ignition is turned OFF or engine is not running.



Operating process

- Engine running (Alternator: High)



Modification basis	
Application basis	
Affected VIN	

Front defogger (heated wire) switch

Modification basis	
Application basis	
Affected VIN	

▶ Rear defogger (heated wire) timer control

Operation 1.

A. The rear defogger (heated wire) switch is turned ON.
B. The rear defogger (heated wire) is activated for 12 minutes (T1).

Operation 2.

C. Turning on the rear defogger (heated wire) switch again when the defogger is activated turns off the fog lamp output.

Operation 3.

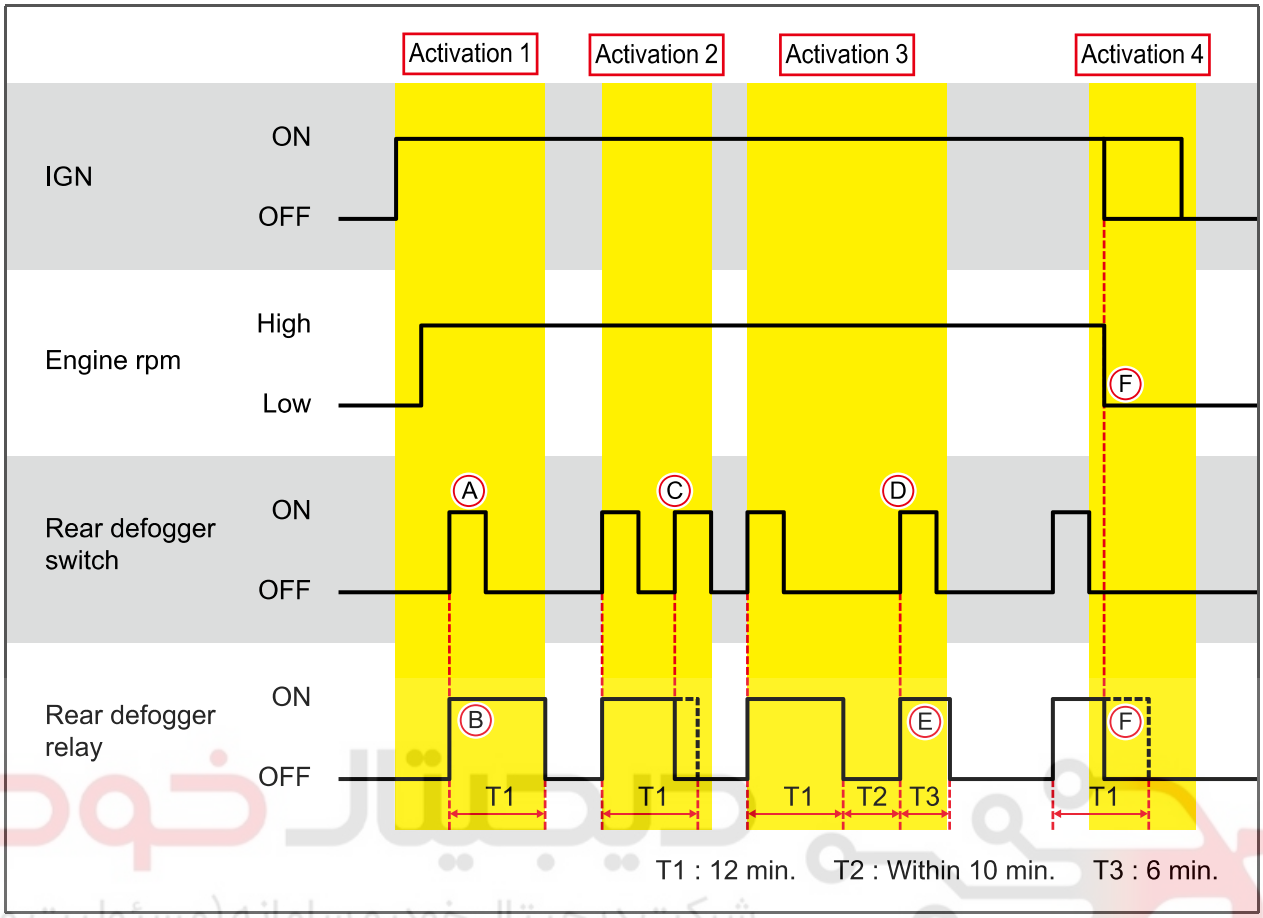
D. Within 10 minutes (T2) after the output of the rear defogger (heated wire) for 12 minutes (T1).
E. When the rear defogger (heated wire) switch is turned ON, the front defogger is activated for only 6 minutes (T3).
(This operation is not available when the rear defogger is turned off by turning off engine, IGN OFF, or front defogger (heated wire) switch)

Operation 4.

F. If the engine is running at low speed with IGN OFF or IGN ON, the rear defogger (heated wire) is deactivated.

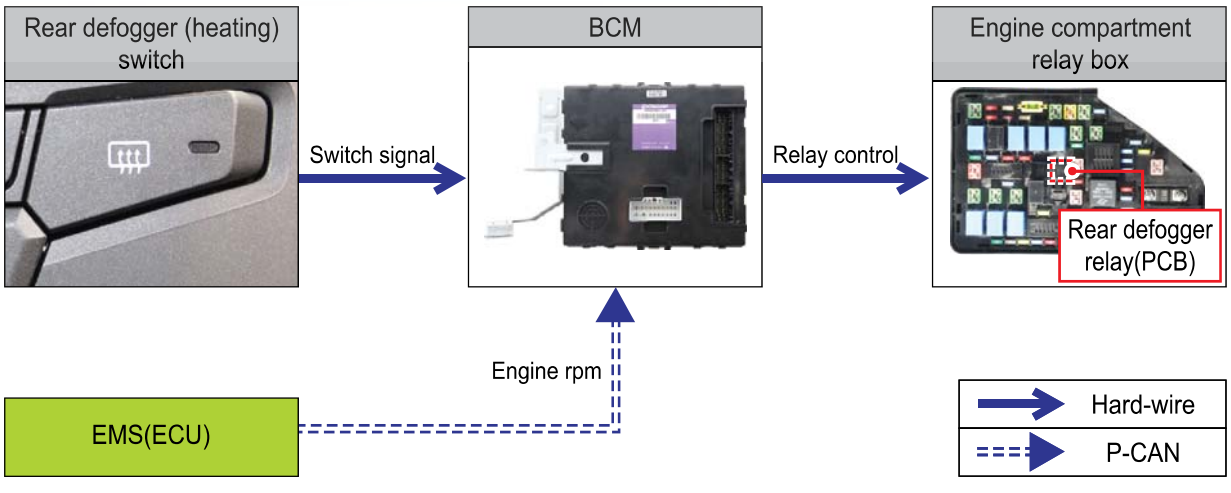
reference

The rear defogger is turned OFF when the ignition is turned OFF or engine is not running.



Operating process

- Engine running (Alternator: High)



Modification basis	
Application basis	
Affected VIN	

Rear defogger (heated wire) switch

Modification basis	
Application basis	
Affected VIN	

12. ROOM LAMP CONTROL

- When the room lamp switch is in the door coupled position and the driver/passenger/rear door is opened, the room lamp comes on.
- The room lamp goes out automatically after 10 minutes of illumination when the ignition is turned OFF (ignition key is removed) and a door is open.
- The sleep mode is deactivated when the door status is changed or UNLOCK signal is received after automatic switching off.

▶ Door coupled room lamp control

Operation 1.

A. When all doors are closed with IGN ON, the room lamp goes out immediately.

Operation 2.

B. All doors are closed with IGN OFF.
C. The room lamp stays on for 2 seconds (T1) and then fades out over 3 seconds (T2) and goes off.
- When the ignition is turned ON while the room lamp is fading out, the lamp goes out immediately.

Operation 3.

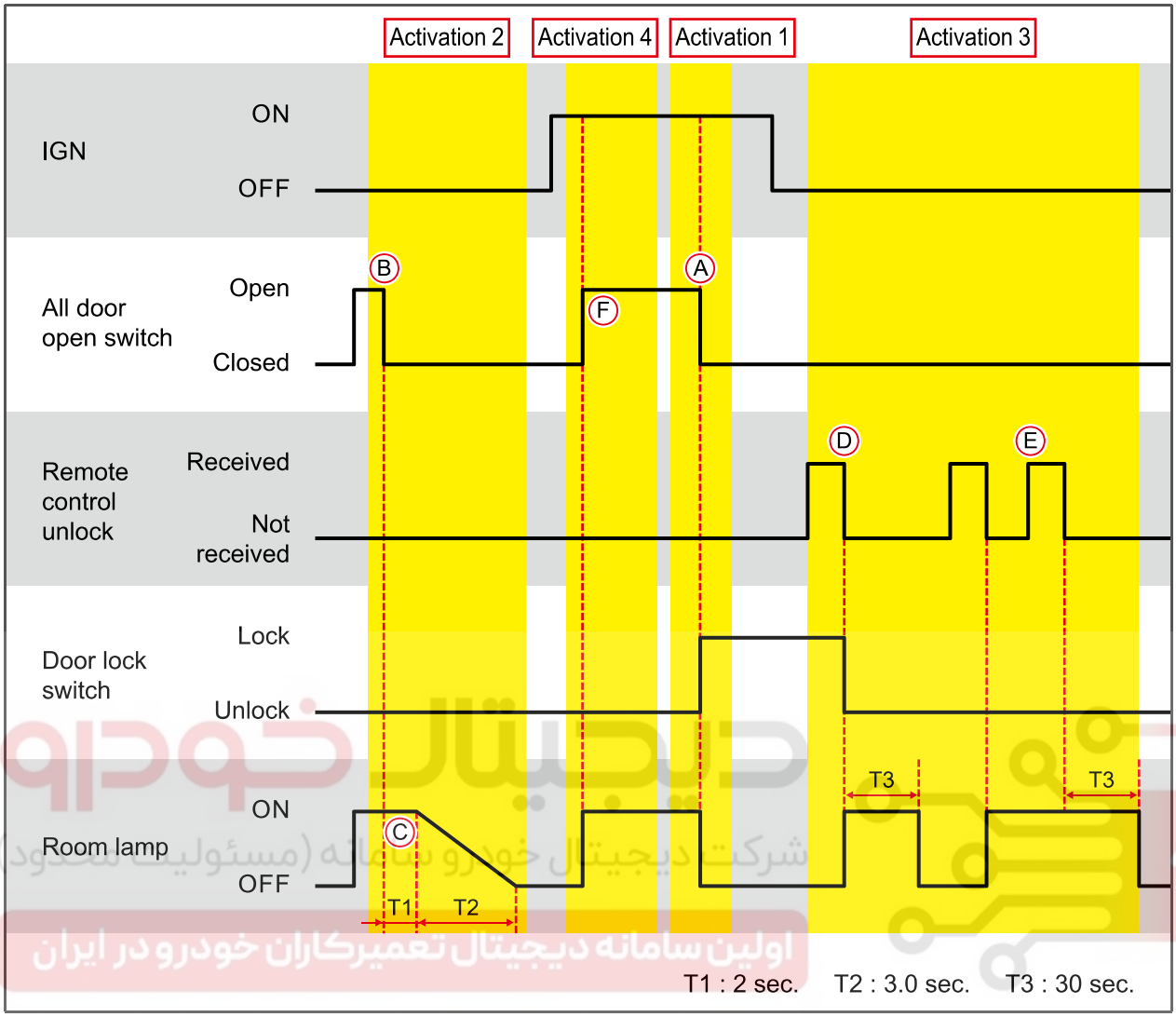
D. When UNLOCK signal by the smart key (REKES key) is received with IGN OFF (ignition key removed) and all doors closed, the room lamp remains ON for 30 seconds (T3).
E. When UNLOCK signal is received again while the room lamp is ON, the lamp stays on for 30 seconds more. The room lamp lighting is extended when UNLOCK signal by the REKES key is received.

Operation 4.

F. The room lamp stays on when a door is opened during fading out.
The lamp goes out or fades out when the door is closed.

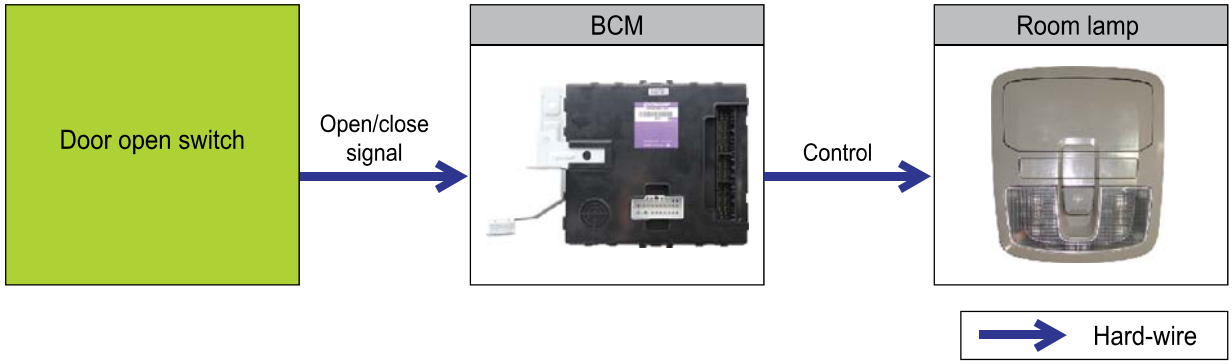
NOTE

- When the open driver/passenger/rear door is closed, the room lamp fades out. When the system enters the theft deterrent mode, the room lamp goes out immediately.
- In puddle lamp coupled room lamp mode, the room lamp comes on when the puddle lamp operation signal is received.



Operating process

- Door coupled front room lamp switch in ON position



Modification basis	
Application basis	
Affected VIN	

▶ Room lamp cut off control

Operation 1.

A. The lamp is turned off when entering sleep mode or in alarming status.

Operation 2. (preventing battery discharge)

B. When the ignition is turned OFF (ignition key removed) with the room lamp switch ON, the room lamp comes on for 10 minutes and then goes out automatically.

C. When the room lamp is turned off automatically, the room lamp automatic switching off signal is sent to the instrument cluster before entering sleep mode.

Operation 3.

D. When the ACC is turned ON or ignition is turned ON with the ignition key inserted, the room lamp is activated.

NOTE

- When the room lamp cut off operation is activated, the BCM sends cut off operation signal to the instrument cluster through B-CAN to prevent the battery discharge.

Modification basis	
Application basis	
Affected VIN	

13. REMOTE KEYLESS ENTRY SYSTEM (REKES)

▶ REKES key (Transmitter)

When the user operates the switch of the REKES key, the vehicle control message formatted by the remote controller CPU is sent to the main part via radio transmission. The CPU of the main part controls the vehicle and the main part controls the vehicle operations.

▶ REKES key switch description

1. Door LOCK (locks the doors and tailgate when pressed briefly)
   - All doors and the tailgate are locked and the theft deterrent mode is activated.
   - When the theft deterrent mode is activated, the hazard warning lamp flashes twice. When this button is pressed once more within 4 seconds, the hazard warning lamp flashes twice and the buzzer sounds once.

NOTE

The escort function is activated with the headlamp ON for 20 seconds when the door LOCK button is pressed for 0.5 seconds or more in the theft deterrent mode. If the door LOCK button is pressed briefly or the ignition is turned ON during the escort operation, the escort is deactivated.

2. Door UNLOCK (unlocks the doors and tailgate when pressed briefly)
   - If this button is pressed briefly, all doors and the tailgate are unlocked and the theft deterrent mode is deactivated.
   - When the theft deterrent mode is deactivated, the hazard warning lamp flashes once.
   - In theft deterrent mode, if a door, tailgate or engine hood is not opened within 30 seconds after the door is unlocked by a remote controller, the doors are locked with the hazard warning lamp and buzzer activated (lamp flashes twice and buzzer sounds once, the theft deterrent mode is activated again).
3. Panic (Press and hold for 2 seconds or more)
   - If this button is pressed for 2 seconds or more, the hazard warning lamp flashes while the buzzer sounds for approx. 30 seconds.
   - If the door LOCK button or panic button is pressed, this function is deactivated.

Modification basis	
Application basis	
Affected VIN	

14. CENTRAL DOOR LOCKING SYSTEM CONTROL

- For BCM with SKM, sleep mode is deactivated by receiving the status signals from the driver door knob switch, passenger door knob switch, rear LH/RH door knob switch, and central door LOCK/UNLOCK switch through the wiring.
- If all doors are unlocked 5 times within 1 minute after door LOCK signal output, because of faulty door knob switch and door open switch, the doors are forced to lock and not allowed to unlock. However, the UNLOCK conditions are met, the UNKLOCK signal is input normally.

▶ Door LOCK/UNLOCK control by door knob switch

Operation 1.

A. The driver and passenger door LOCK knob switches are in the LOCK position from UNLOCK position.
B. The door LOCK relay is activated for 0.5 seconds (T1).

Operation 2.

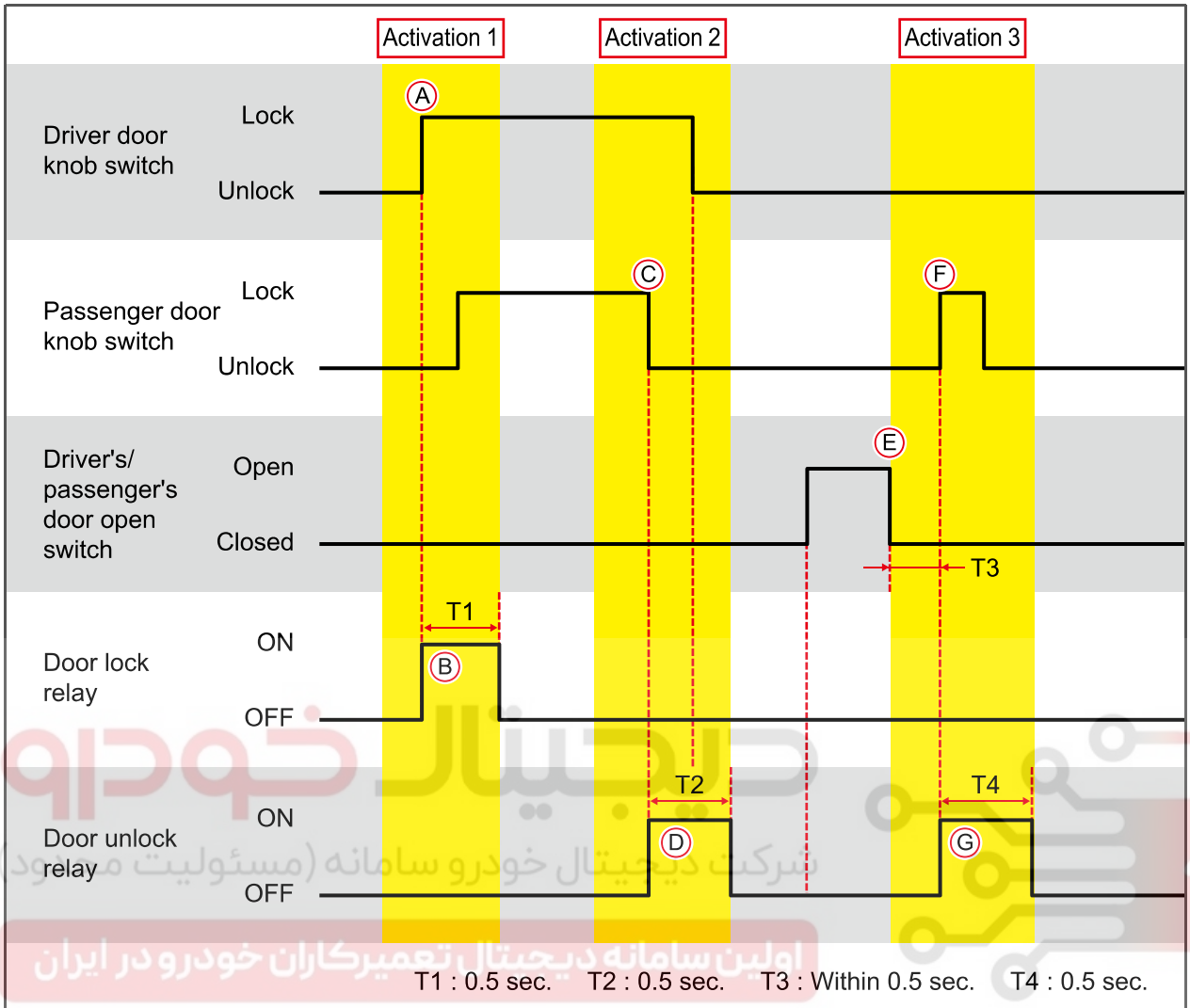
C. The driver and passenger door LOCK knob switches are in the UNLOCK position from LOCK position.
D. The door UNLOCK relay is activated for 0.5 seconds (T2).
   - The door lock/unlock system does not work regardless of the door LOCK/UNLOCK switch position, when reconnecting the battery. (to reset, turn the ignition ON)

Operation 3.

E. All open doors are closed.
F. The LOCK signal is input within 0.5 seconds (T3).
G. The UNLOCK signal for all doors is output once for 0.5 seconds (T4).

NOTE

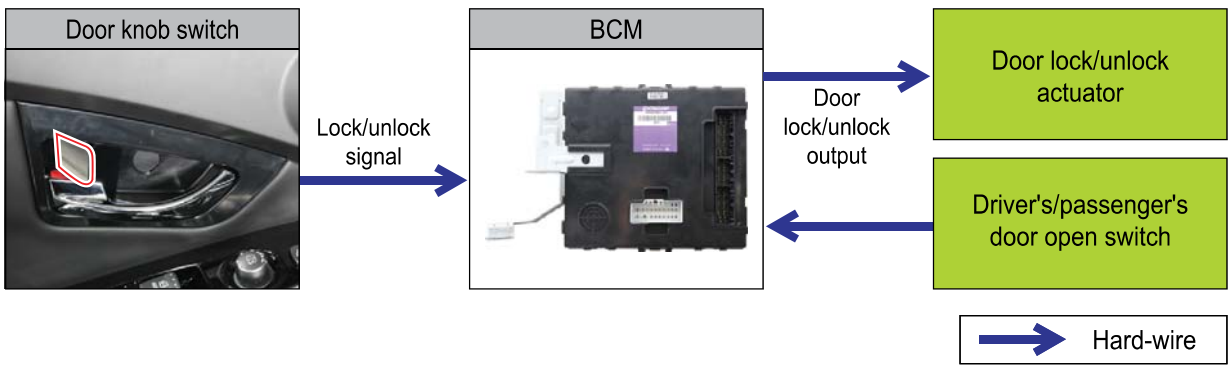
- The signal change from UNLOCK to LOCK is ignored during LOCK/UNLOCK output by the central door LOCK switch, REKES key, and door handle switch.
- If LOCK signal from the switch is input within 0.5 seconds after any door is closed, UNLOCK signal is output.



NOTE

The door LOCK/UNLOCK relay is installed inside the actuator.

Operating process



Modification basis	
Application basis	
Affected VIN	

▶ Door LOCK/UNLOCK control by central door LOCK switch

Operation 1.

A. The central door LOCK switch is turned ON.
B. The door LOCK/UNLOCK relay is activated for 0.5 seconds (T1, T2).

Operation 2.

C. The central door switch signal is ignored in the theft deterrent mode.

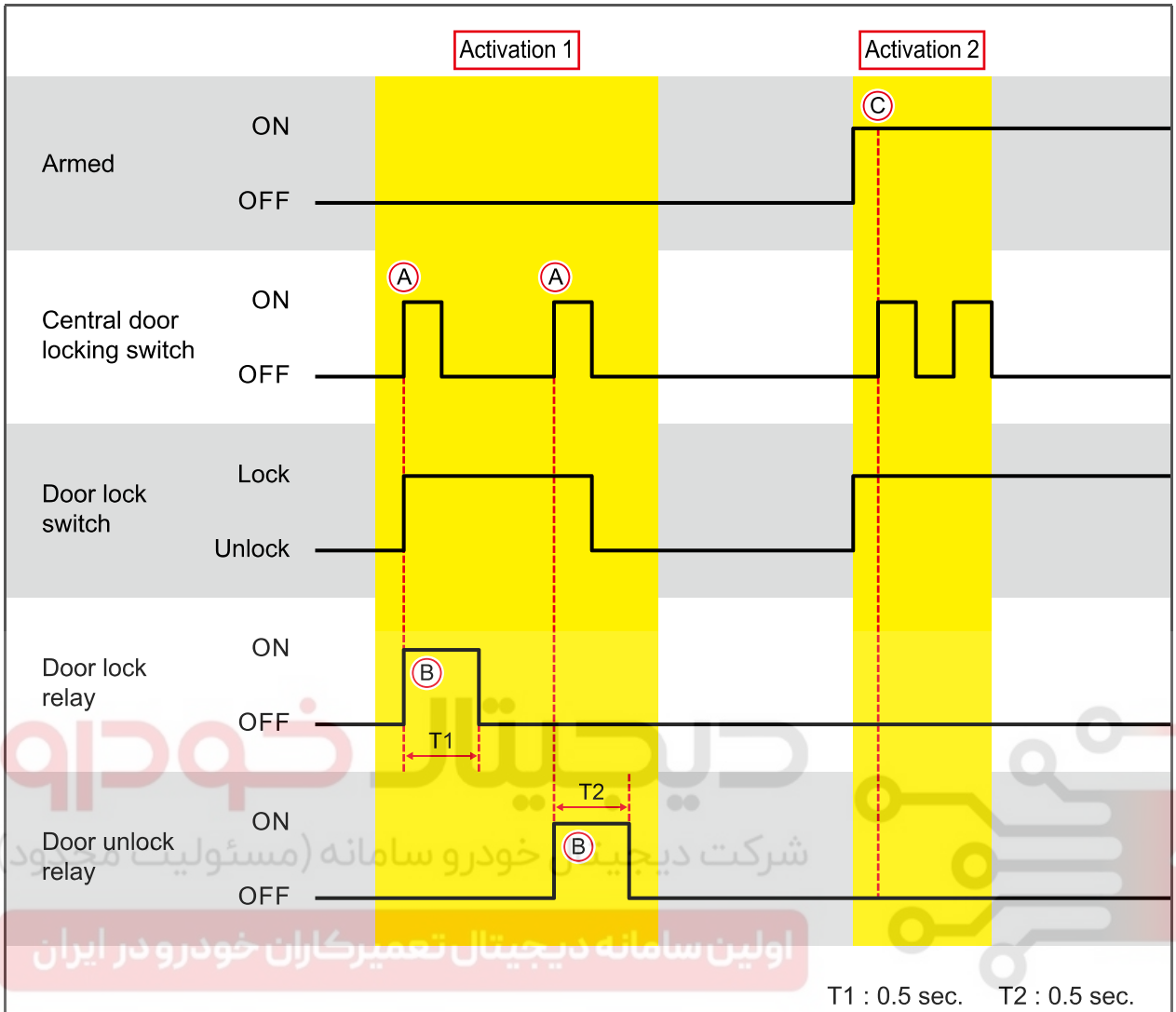
NOTE

- When one of the door LOCK detection switches* is in LOCK position with the ignition turned OFF, all doors are unlocked automatically.
- When the central door switch LOCK is operated with all doors unlocked and any door ajar, the door LOCK relay is activated followed by UNLOCK relay to prevent the door LOCK by misoperation.

* Door LOCK detection switch: The switch is installed inside the door actuator and detects the door LOCK status.

Central door LOCK switch (driver door side)

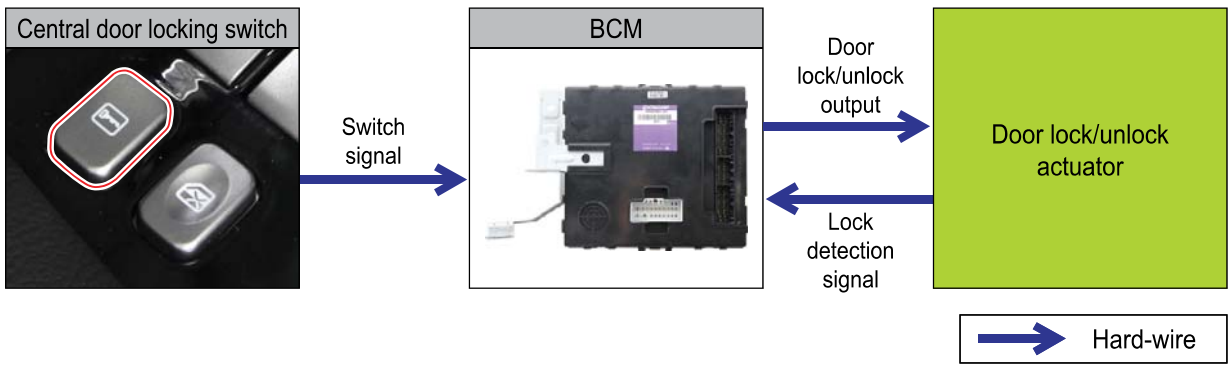
Modification basis	
Application basis	
Affected VIN	



NOTE

The door LOCK/UNLOCK relay is installed inside the actuator.

Operating process



Modification basis	
Application basis	
Affected VIN	

▶ Door LOCK/UNLOCK by REKES key

Operation 1.

A. When the REKES LOCK switch is pressed less than 0.5 seconds (T1), the door LOCK relay is activated for 0.5 seconds (T2).

B. All of following conditions are met within 0.2 seconds (T4) after the chattering time (T3):

- All doors closed
- Hood closed
- Tailgate closed
- Door LOCK detection switch in LOCK state

C. The turn signal lamp flashes 2 times at intervals of 0.5 sec. ON/0.5 sec. OFF.

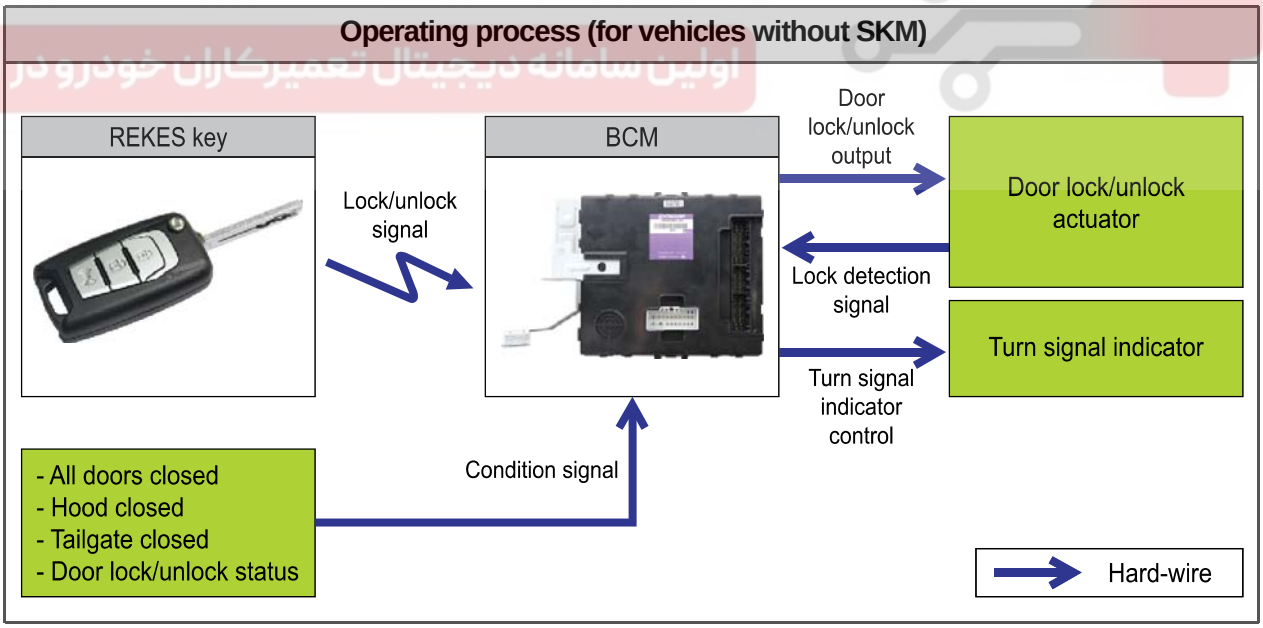
Operation 2.

D. When the REKES UNLOCK switch is pressed less than 2 seconds (T5), the door UNLOCK relay is activated for 0.5 seconds (T2).

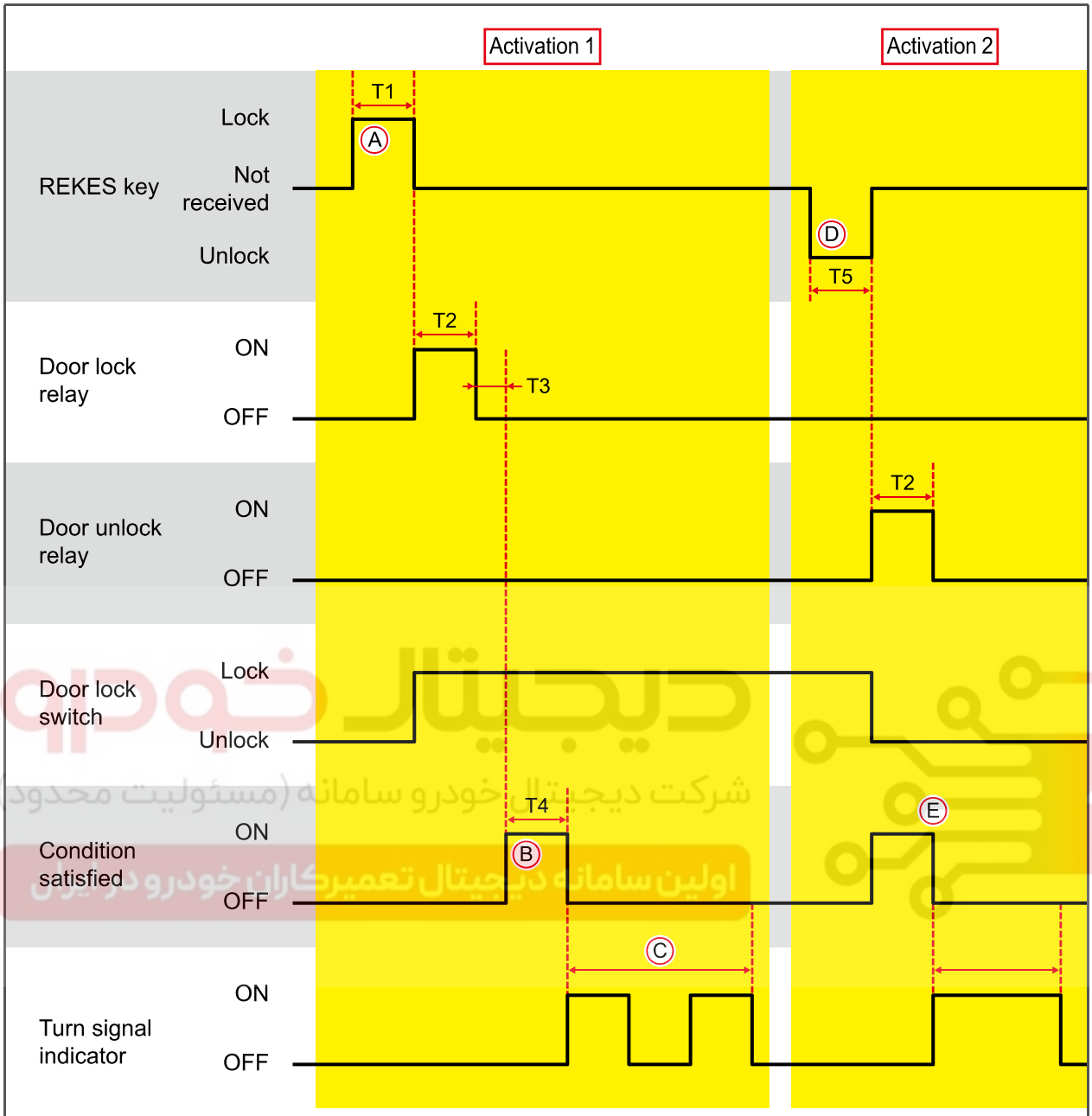
E. The door UNLOCK conditions are met, the turn signal lamp is operated once for 1 second.

NOTE

- Do not operate the REKES key with the ignition key inserted or for 1 second after the ignition key is removed. (to prevent the remote controller switch malfunction)
- When one of the LOCK switches is unlocked after the door LOCK, all doors will be unlocked.



Modification basis	
Application basis	
Affected VIN	



T1 : 0.5 sec. T2 : 0.5 sec. T3 : Chattering time T4 : 0.2 sec. T5 : Below 2.0 sec.

NOTE

The door LOCK/UNLOCK relay is installed inside the actuator.

Modification basis	
Application basis	
Affected VIN	

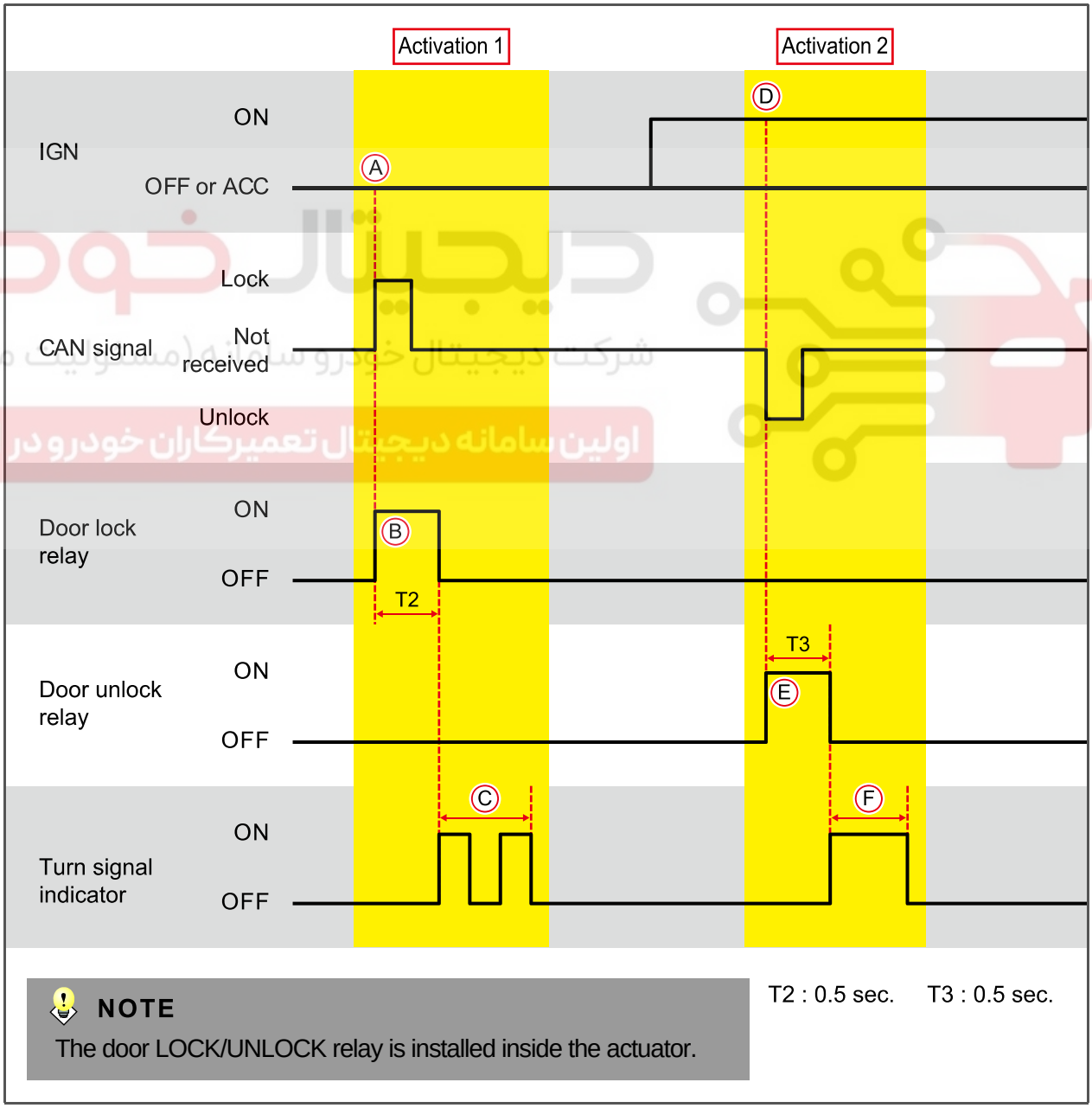
▶ Door LOCK/UNLOCK control by smart key

Operation 1.

A. The SKM receives LOCK signal through B-CAN with IGN OFF or ACC ON.
B. The BCM outputs LOCK relay signal for 0.5 seconds (T2).
C. The turn signal lamp is turned ON for 0.5 seconds and then turned OFF for 0.5 seconds, and this operation is repeated 2 times.

Operation 2.

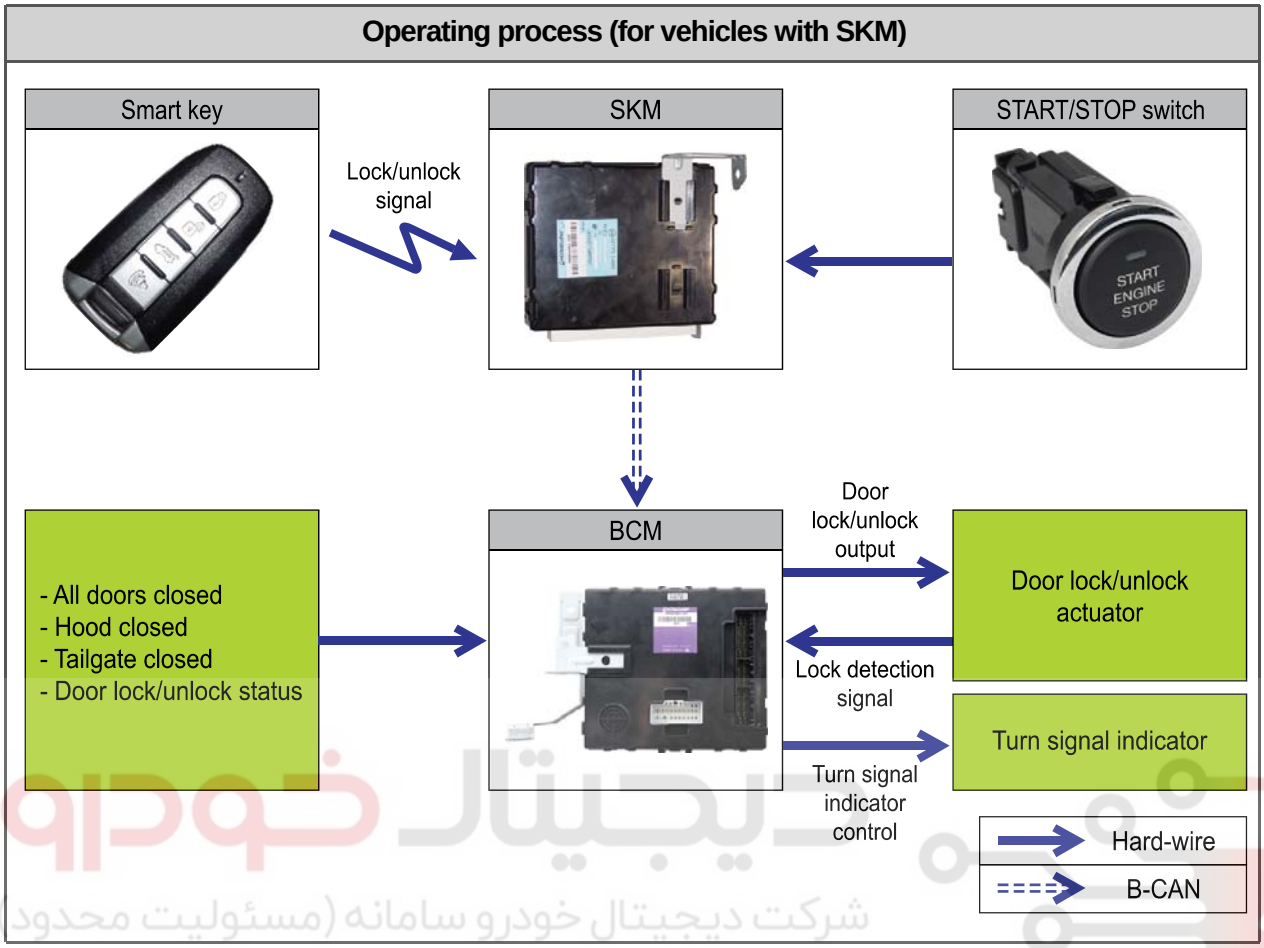
D. SKM receives UNLOCK signal through B-CAN with IGN ON, IGN OFF, or ACC ON.
E. BCM outputs UNLOCK relay signal for 0.5 seconds (T3).
F. The turn signal lamp is operated once for 1 second.



NOTE
The door LOCK/UNLOCK relay is installed inside the actuator.

T2 : 0.5 sec. T3 : 0.5 sec.

Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	

▶ Door LOCK/UNLOCK control by door handle switch

Operation 1. (when driver door locked)

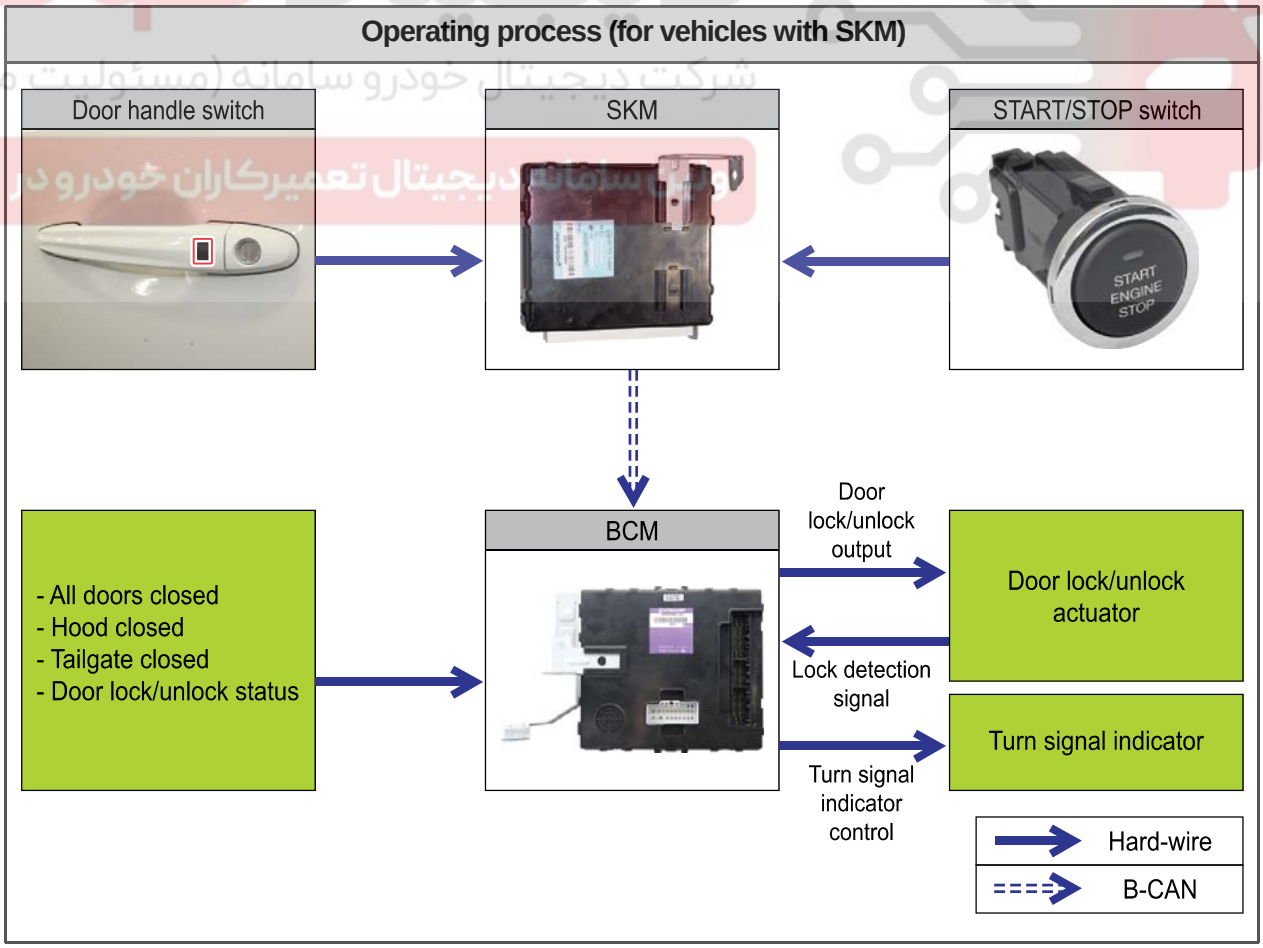
A. The ignition is turned ON or OFF, or the ACC is turned ON.
B. When the door handle switch is operated, the door LOCK/UNLOCK signal is sent to the BCM through B-CAN.
C. The SKM operates the turn signal lamp once for 1 second after 0.5 seconds (T3) of door UNLOCK relay operation.

Operation 2. (when driver's door unlocked)

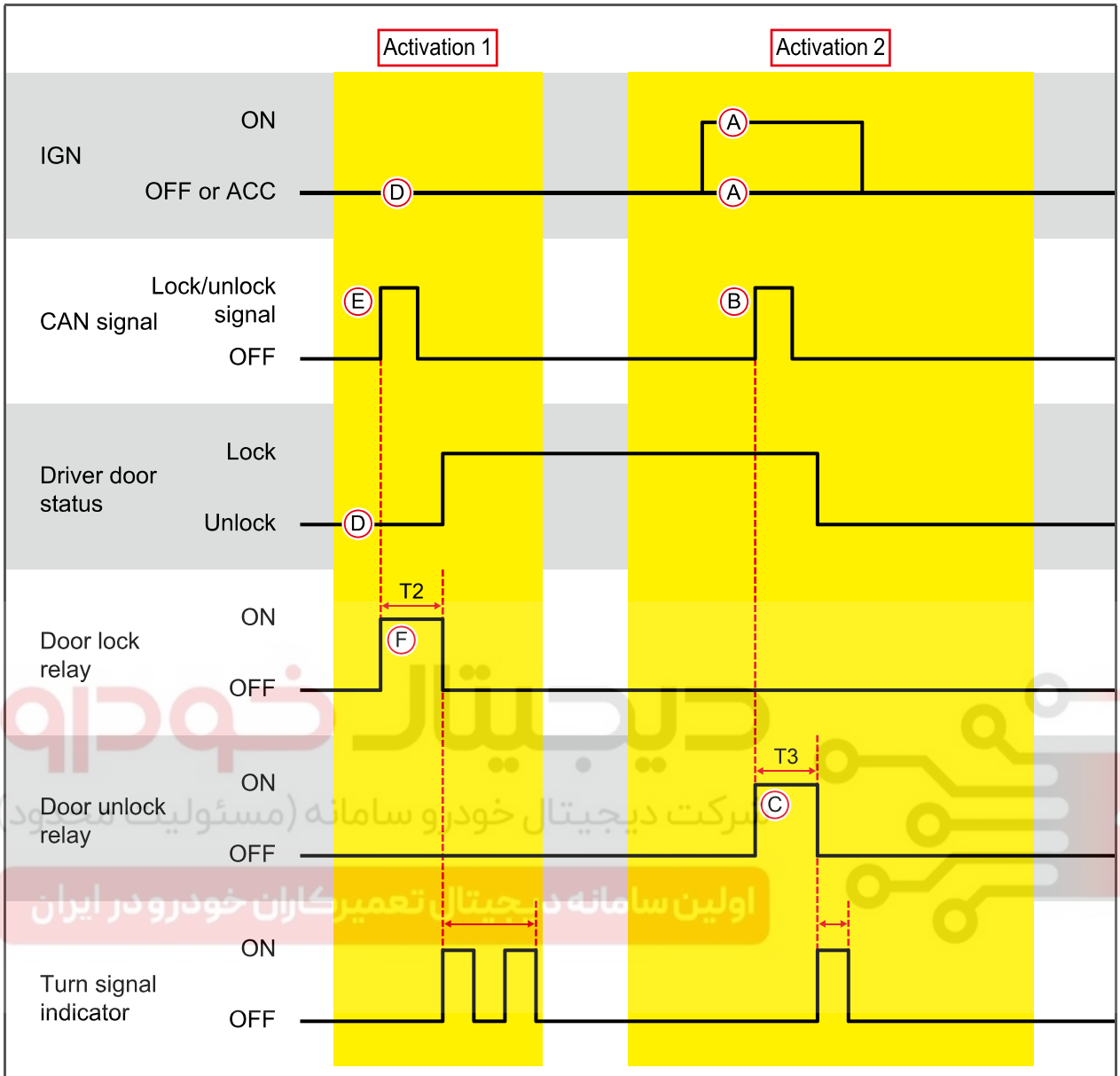
D. The ignition is turned OFF or ACC is turned ON.
E. When the door handle switch is operated, the door LOCK/UNLOCK signal is sent to the BCM through B-CAN.
F. The SKM operates the turn signal lamp twice at intervals of 0.5 sec. ON/0.5 sec. OFF after 0.5 seconds (T2) of door LOCK relay operation.

NOTE

When the driver door is unlocked after passive UNLOCK signal is received with IGN ON, the door is not locked.



Modification basis	
Application basis	
Affected VIN	



T2 : 0.5 sec. T3 : 0.5 sec.

NOTE

The door LOCK/UNLOCK relay is installed inside the actuator.

Modification basis	
Application basis	
Affected VIN	

▶ AUTO door LOCK control

Operation 1.

A. REKES LOCK
B. The vehicle is driven at 30 km/h or more.
C. The door LOCK relay is activated for 0.5 seconds (T2).
The door LOCK relay is not activated when all doors (except tailgate) are locked or door malfunction signal is input.

Operation 2. (after operation 1)

D. A door is unlocked.
E. The door LOCK signal is output 5 times (T3) except the door LOCK carried out in operation 1.

NOTE

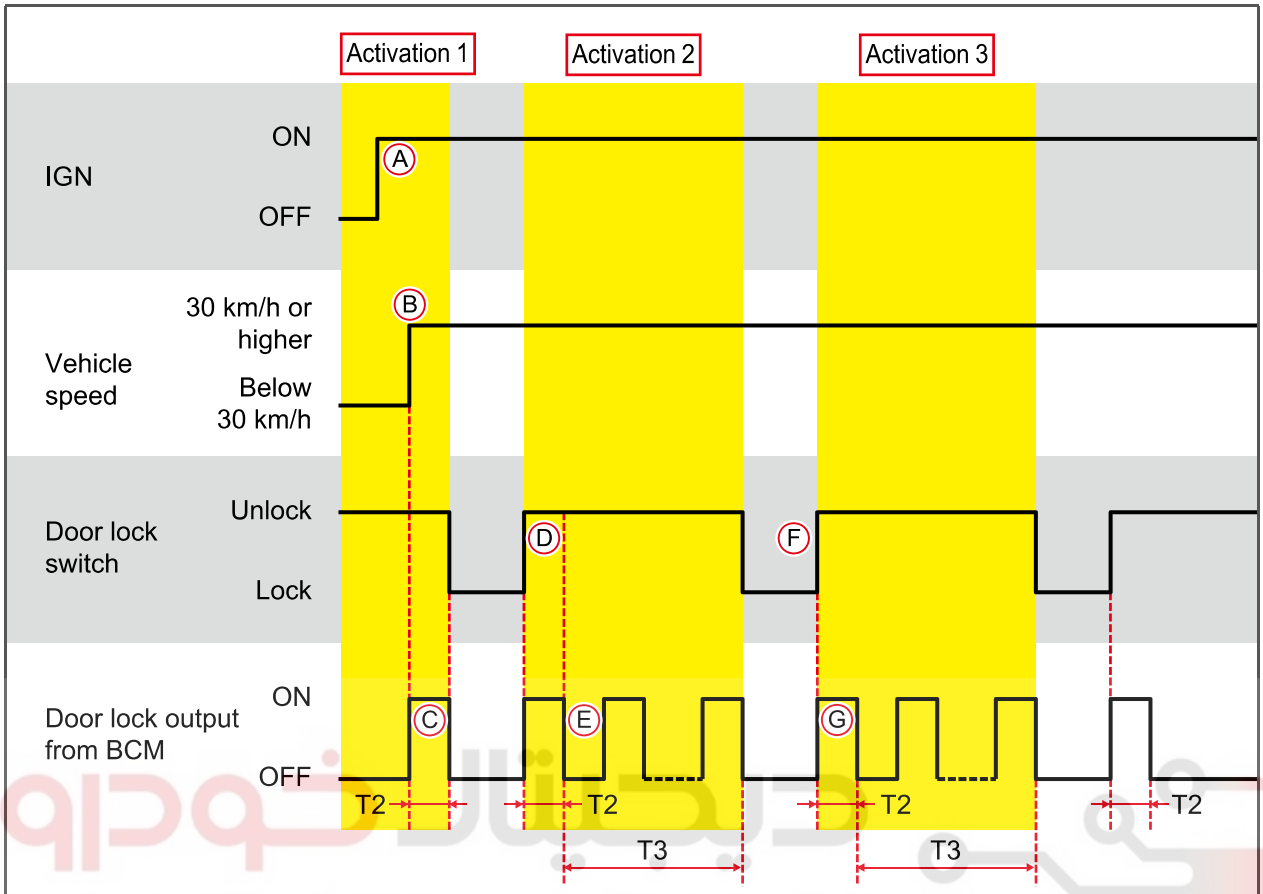
- If a door is unlocked after the 5 times of LOCK output, the door is regarded as malfunctioning.
- If there is a malfunctioning door, the AUTO door LOCK is not activated but the LOCK operation by the central door LOCK switch is available.
- If a malfunction occurs when the vehicle is driven at 30 km/h or more, the AUTO door LOCK will not be activated even when the vehicle speed decreases to 30 km/h or less and then increases to 30 km/h or more.
- The faulty door will be reset when the unlocked malfunctioning door is locked.

Operation 3. (during operation 2)

F. The UNLOCK signal by other switch is received.
G. The door LOCK signal is output 5 times for the switch.
- The door LOCK system outputs UNLOCK signal automatically when the LOCK output conditions are met by this function or the ignition is turned ON to OFF. (even when there is no LOCK output while the vehicle is driven at over 30 km/h under LOCK condition).

NOTE

- The faulty door will be reset when the ignition is turned OFF.
- When one of the door LOCK switches is in LOCK position with the ignition turned OFF, all doors are unlocked.



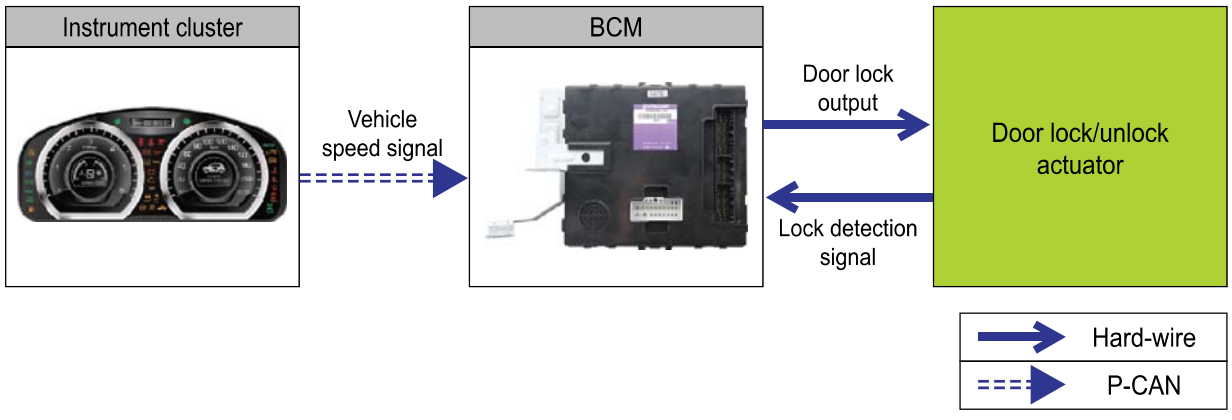
T1 : 0.5 sec. T2 : 0.3 sec. T3 : Outputs door lock 5 times

Lock: Driver, passenger, rear & tailgate door lock switch = LOCK
Unlock: Driver, passenger, rear & tailgate door lock switch = UNLOCK

NOTE

The door LOCK/UNLOCK relay is installed inside the actuator.

Operating process (for vehicles without SKM)



Modification basis	
Application basis	
Affected VIN	

▶ AUTO UNLOCK upon receiving air bag deployment signal

Operation 1.

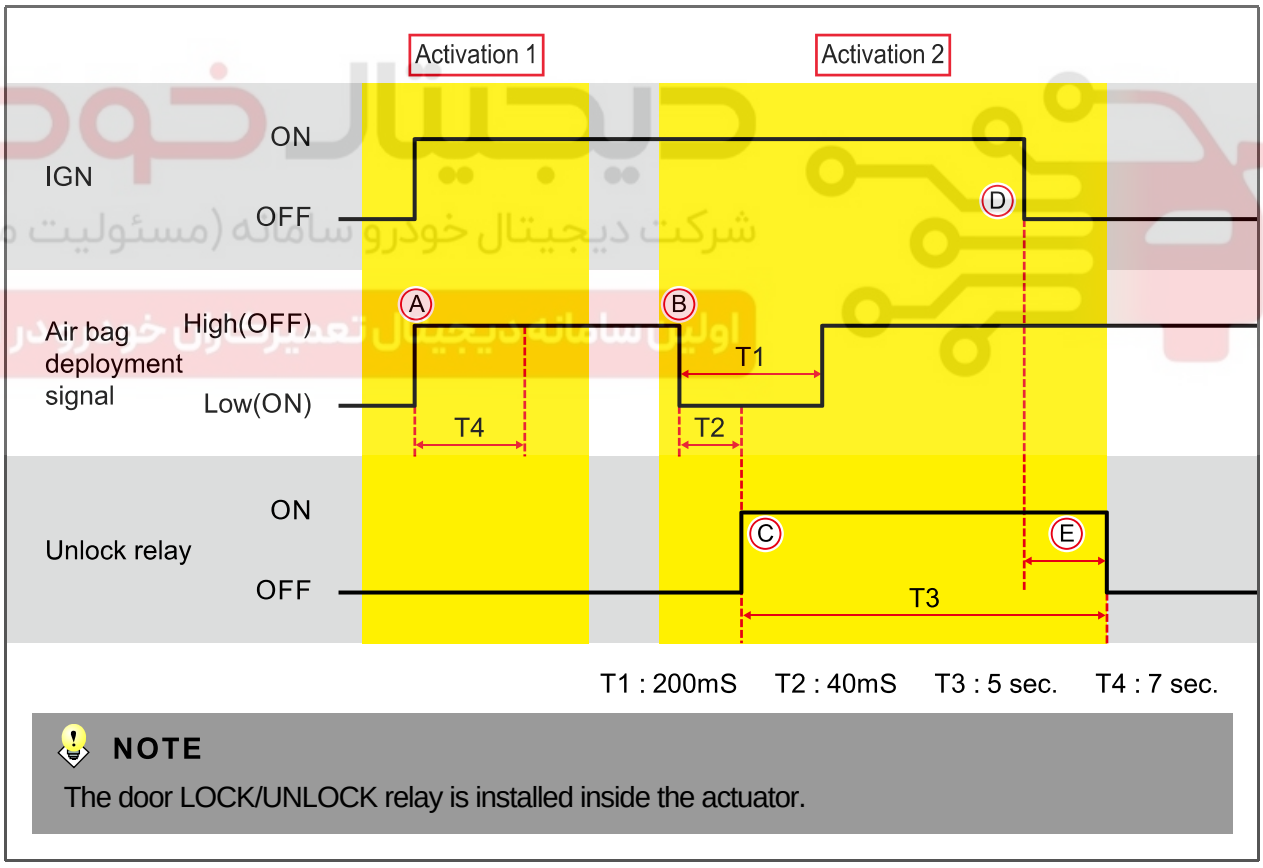
A. Air bag deployment signal is not input for initial 7 seconds (T4) after IGN ON

Operation 2.

B. When air bag deployment signal (OFF→ON) is input 7 seconds (T4) after IGN ON
C. Signal from unlock relay is output for 5 seconds (T3) after 40 ms (T2)
D. When turning IGN OFF during 5 seconds (T3) of unlock relay signal output
E. Signal from unlock relay is input for the rest of the time

NOTE

- The room lamp comes on when the air bag deployment signal is input except when the room lamp switch is turned off.
- The hazard warning lamp flashes when the air bag deployment signal is input.
- Resetting the auto door unlock function turns off the battery (cutting off BCM power).



NOTE

The door LOCK/UNLOCK relay is installed inside the actuator.

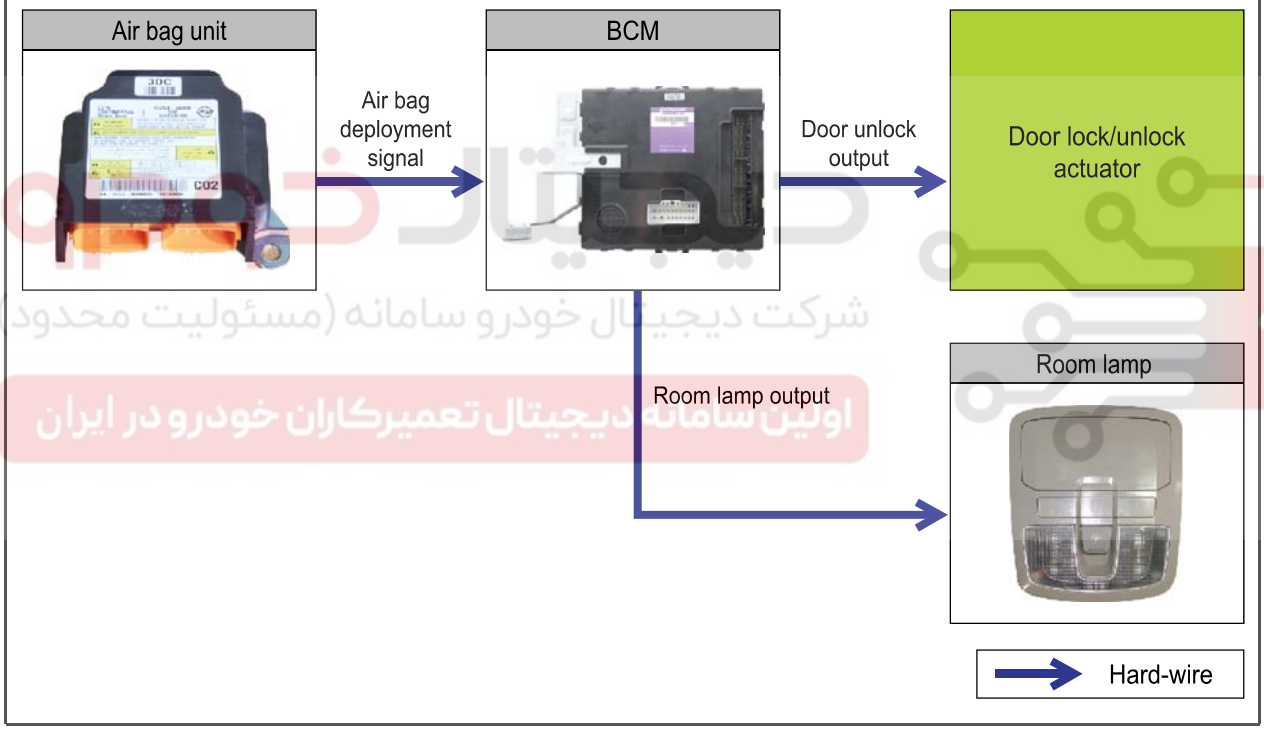
Modification basis	
Application basis	
Affected VIN	

CAUTION

1. The UNLOCK by the air bag deployment signal takes priority over the LOCK/UNLOCK control from other functions.
2. The LOCK/UNLOCK requests from other functions during or after the UNLOCK output by the air bag signal are ignored. However, the LOCK control is carried out when the ignition switch is turned to the "OFF" position.
3. The same request during the LOCK/UNLOCK output is ignored. However, the UNLOCK by the air bag deployment signal or operation by the smart key is carried out.
4. When LOCK and UNLOCK outputs occur at the same time, the LOCK output is carried out and UNLOCK is ignored.

Operating process

- IGN ON/Room lamp switch in any position other than OFF



Modification basis	
Application basis	
Affected VIN	

15. PANIC ALARM CONTROL

▶ **REKES key panic alarm (for vehicles without SKM)**

Operation 1.

A. The REKES key panic signal is received.
B. The hazard warning lamp and warning horn are activated for 30 seconds (T1) at intervals of 0.5 sec. ON/0.5 sec. OFF.

Operation 2.

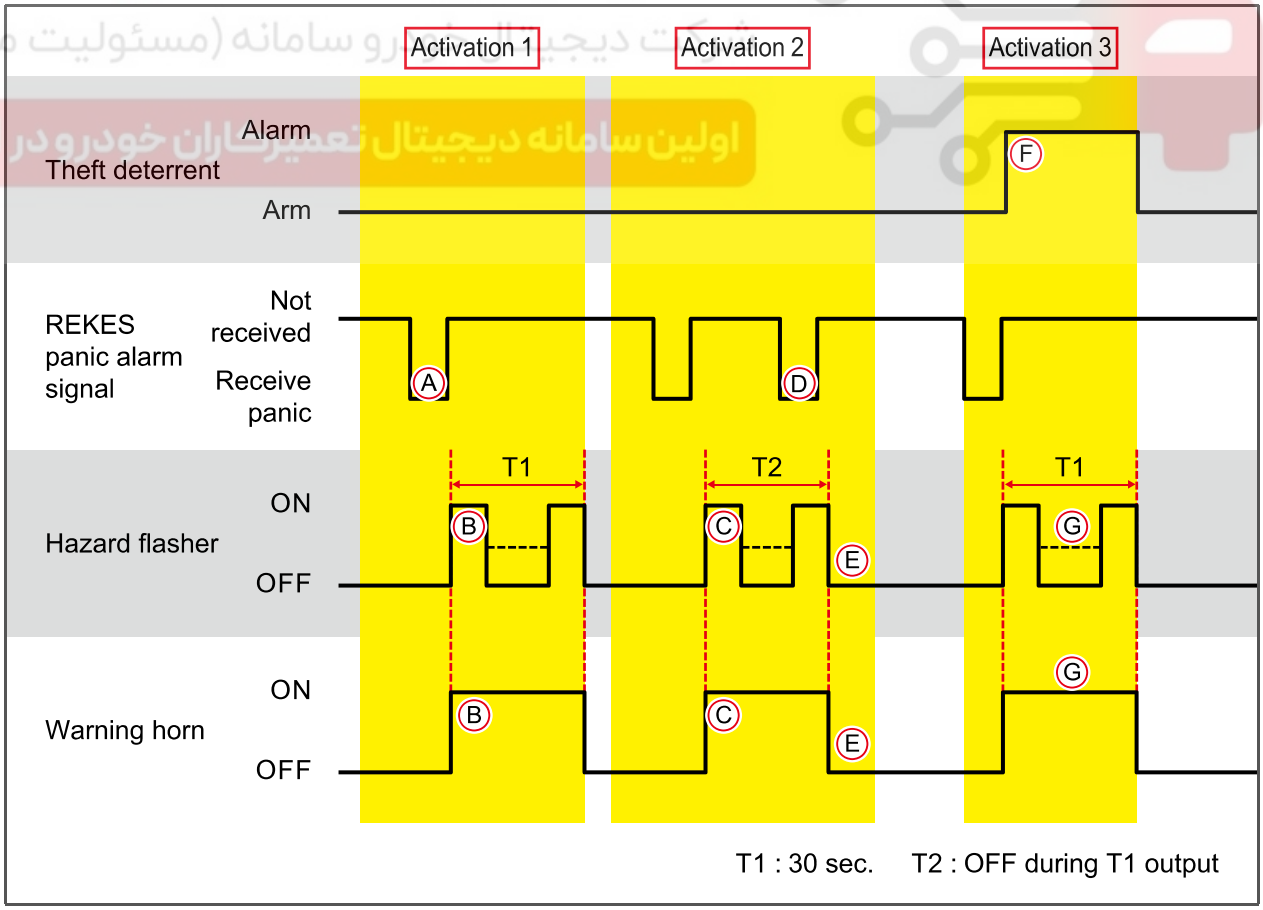
C. The hazard warning lamp and warning horn are activated by REKES panic function.
D. The REKES panic LOCK and panic signals are received.
E. The panic function is interrupted and other functions are activated by the corresponding command.

Operation 3. (during operation 1)

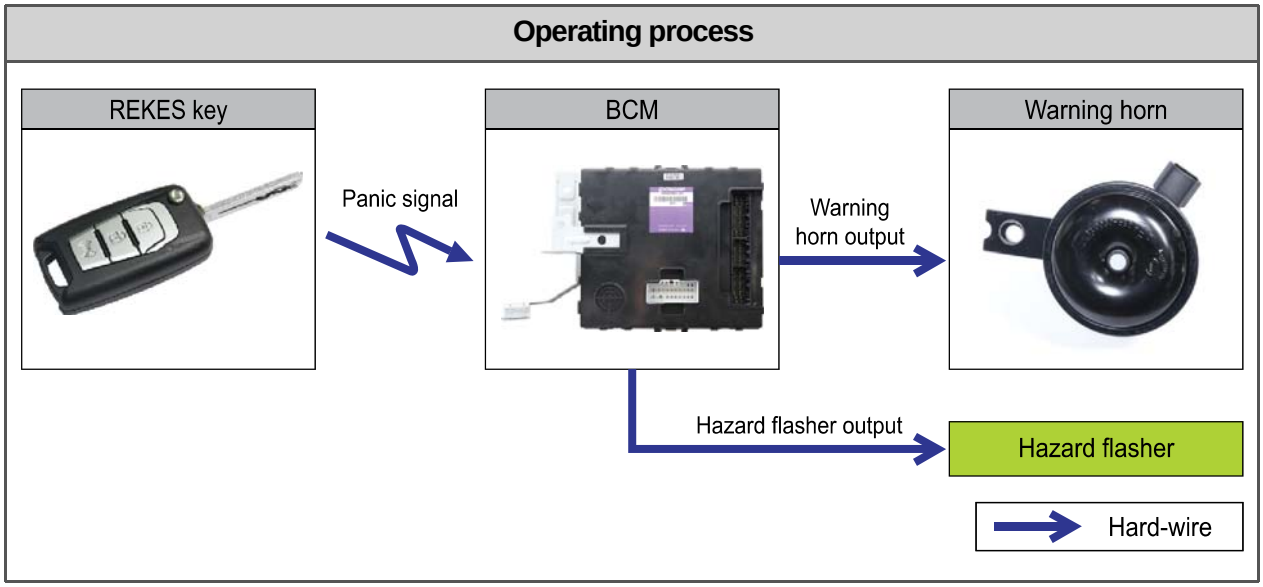
F. The theft deterrent alarm is activated.
G. The panic function is interrupted and theft deterrent alarm is set.

NOTE

- The panic alarm functions regardless of the ignition status.



Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	

▶ Smart key panic alarm (for vehicles with SKM)

Operation 1.

A. The ignition is turned ON or OFF, or the ACC is turned ON.
B. The smart key panic signal is received.
C. The hazard warning lamp and siren are activated for 30 seconds (T1) at intervals of 0.5 sec. ON/0.5 sec. OFF.

Operation 2.

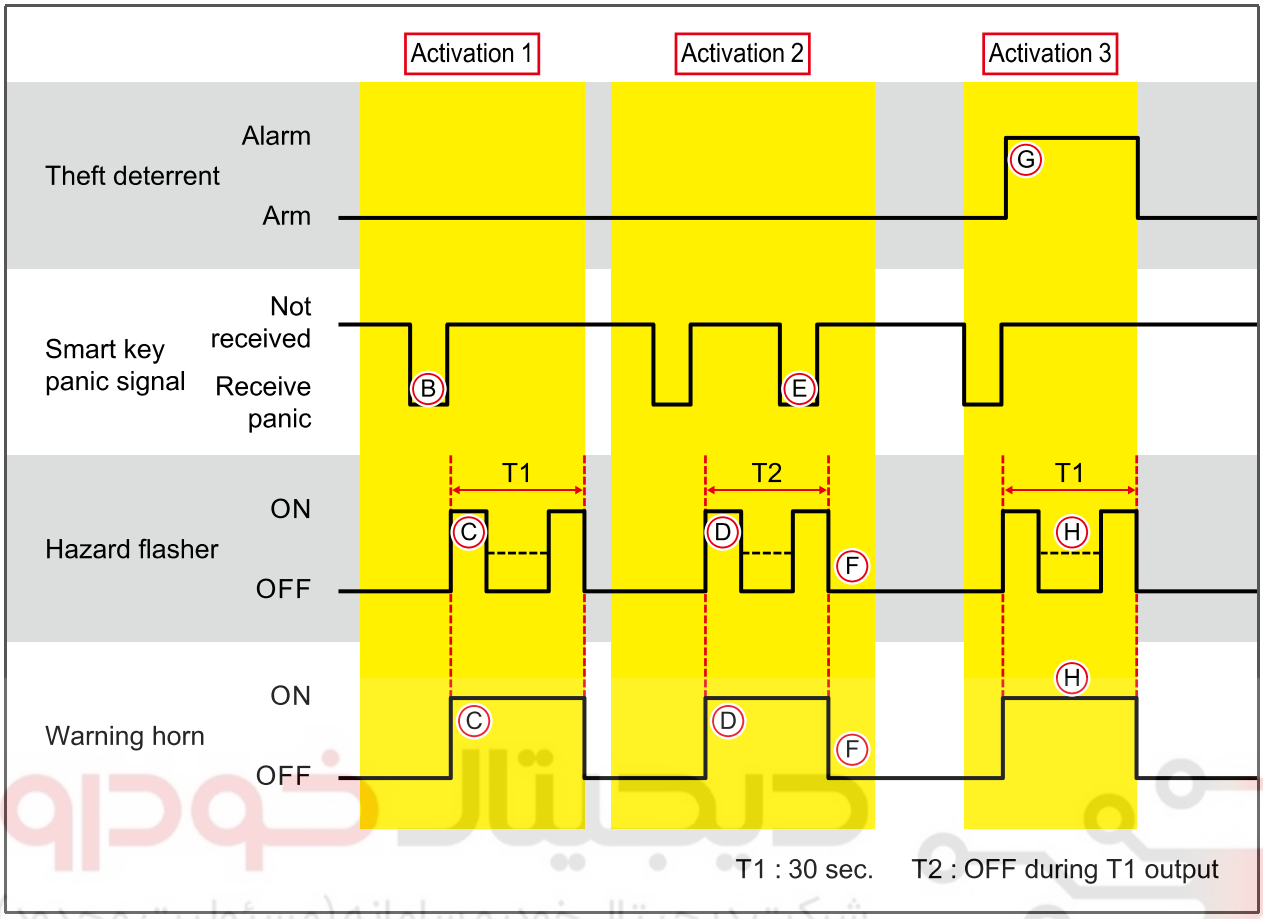
D. The hazard warning lamp and warning horn are activated by smart key panic function (operation 1). The followings occur:
E.
- The panic button of the smart key is pressed.
- When other function signal is received, the command is executed while the panic function is kept.

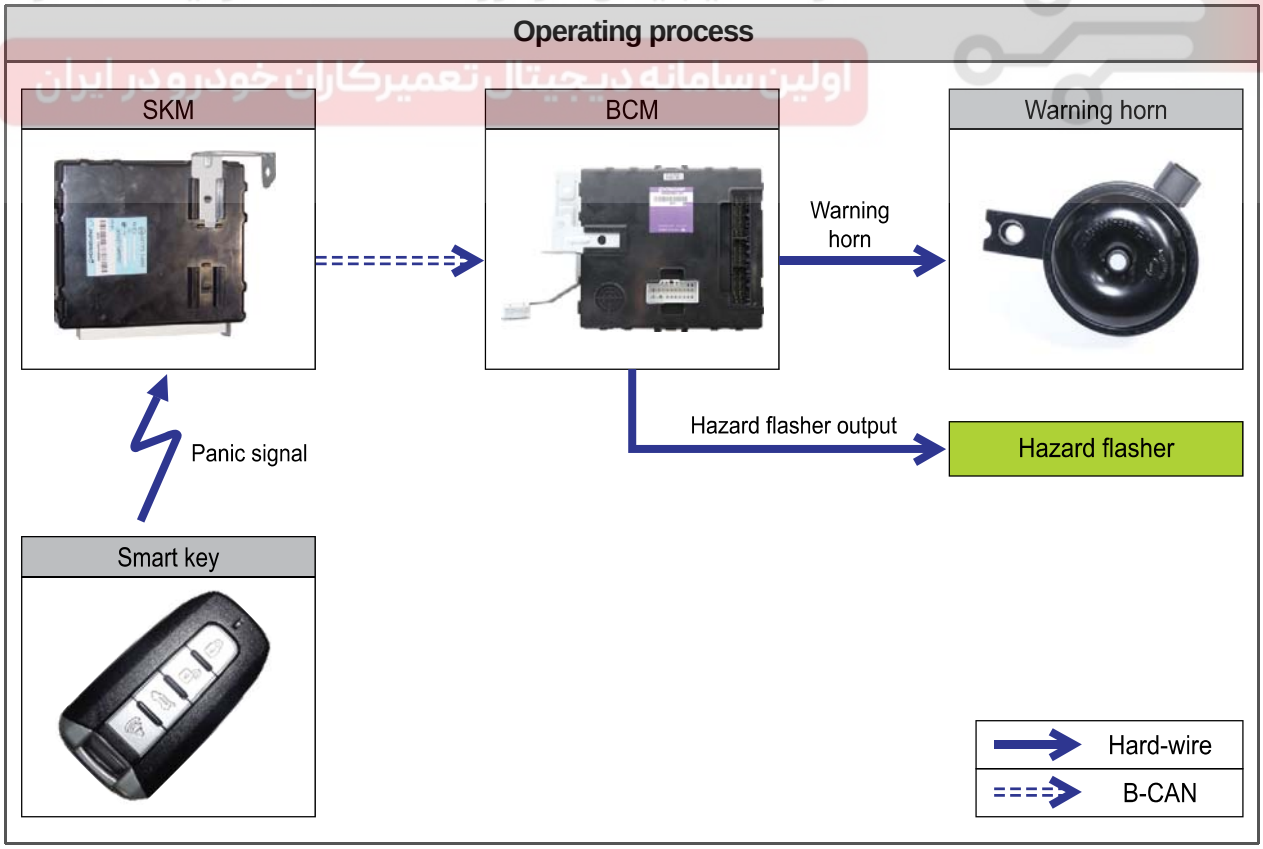
F. The panic function is interrupted and other functions are activated by the corresponding command.

Operation 3. (during operation 1)

G. The theft deterrent alarm is activated.
H. The panic function is interrupted and theft deterrent alarm is set.

reference The panic function is activated by the signals from SKM.





Modification basis	
Application basis	
Affected VIN	

16. TAILGATE OPEN CONTROL

▶ **Tailgate open control (for vehicles without SKM)**

Operation 1.

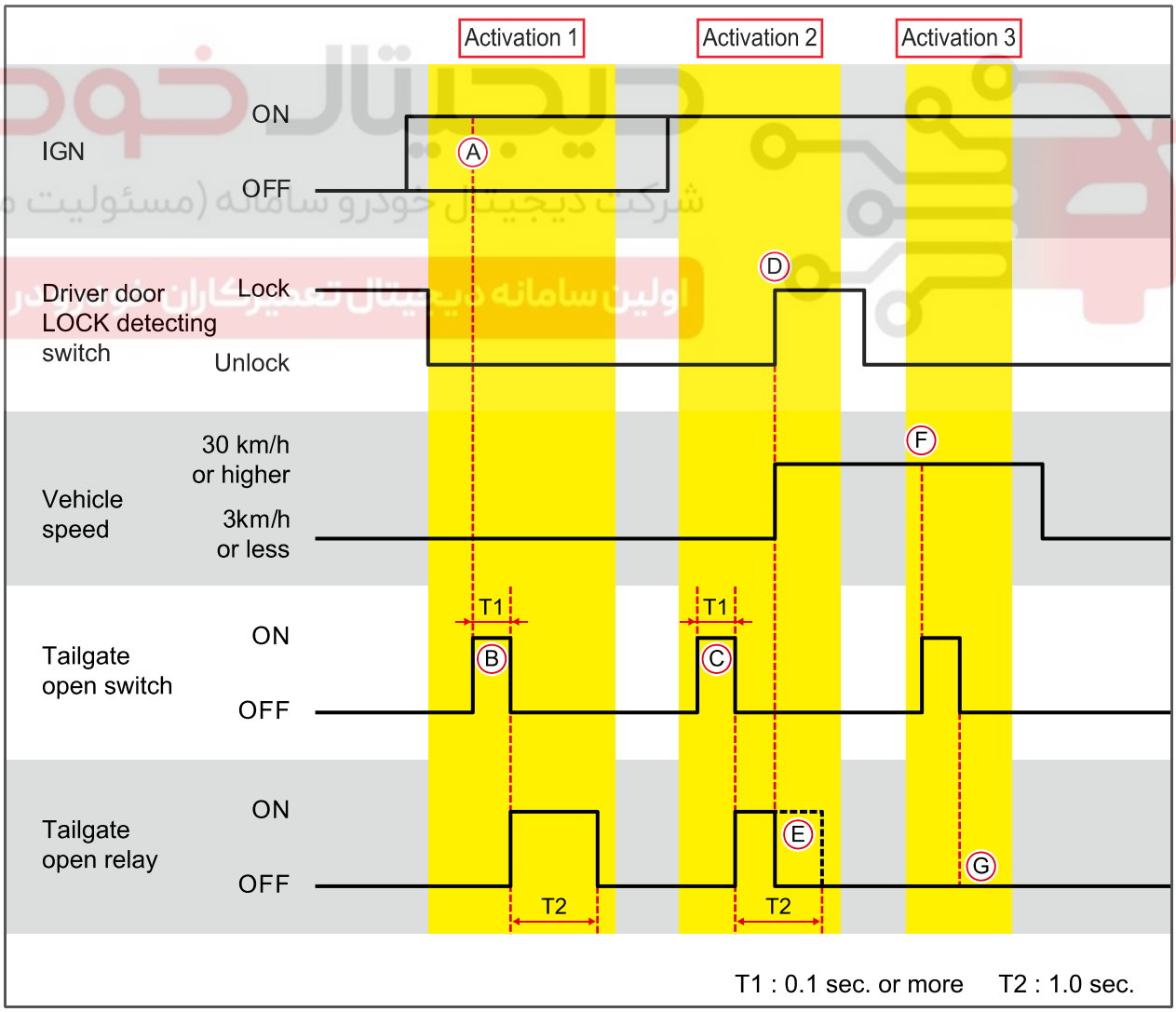
A. The ignition is turned OFF or ON, or ACC is turned ON with the driver door unlocked.
B. When the tailgate open switch is pressed for more than 0.1 seconds (T1), the tailgate open relay is activated for 1 second.

Operation 2.

C. The tailgate open relay is activated.
D. The vehicle is driven at 3 km/h or more with the driver door locked or IGN ON.
E. The tailgate open relay is deactivated immediately.

Operation 3.

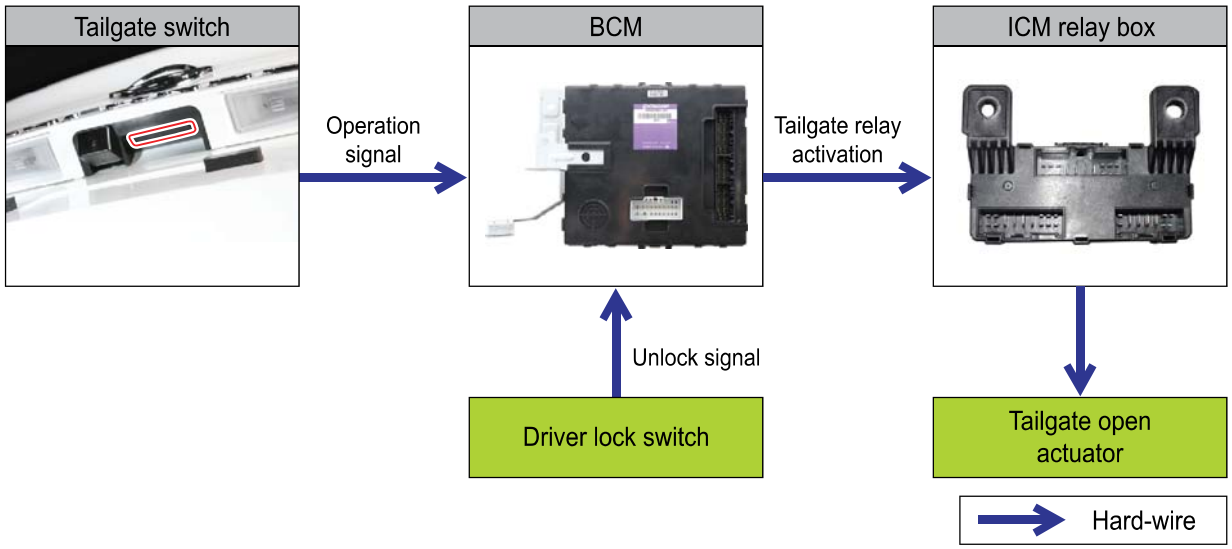
F. The vehicle is driven at 3 km/h or more with IGN ON.
G. The tailgate open relay is not activated when the tailgate open switch is pressed.



Modification basis	
Application basis	
Affected VIN	

Operating process

- When the driver door is unlocked with the power OFF, ACC ON, or IGN ON.



Modification basis	
Application basis	
Affected VIN	

▶ Tailgate open control (for vehicles with SKM)

Operation 1.

A. The ignition is turned OFF or ON, or ACC is turned ON with the driver door unlocked.
B. When the tailgate open switch is pressed for more than 0.1 seconds (T1), the tailgate open relay is activated for 1 second. With the ignition turned ON, the tailgate open relay is activated only when the vehicle is driven at 3 km/h or less.

Operation 2.

C. The tailgate open relay is activated.
D. The vehicle is driven at 3 km/h or more with the driver door locked or IGN ON.
E. The tailgate open relay is deactivated immediately.

Operation 3.

F. The vehicle is driven at 3 km/h or more with IGN ON.
G. The tailgate open relay is not activated when the tailgate open switch is pressed.

Operation 4.

- The ignition is turned OFF or ON, or ACC is turned ON with the driver door and tailgate door locked. The tailgate open switch is pressed for 0.1 seconds or more.
- The BCM sends the verification request to the SKM through B-CAN. The SKM verifies the smart key
- and sends the signal to the BCM through B-CAN.
  The BCM activates the tailgate open relay after the valid smart key verification.
- (In theft deterrent mode, only the theft deterrent for tailgate is deactivated.)

Operation 5.

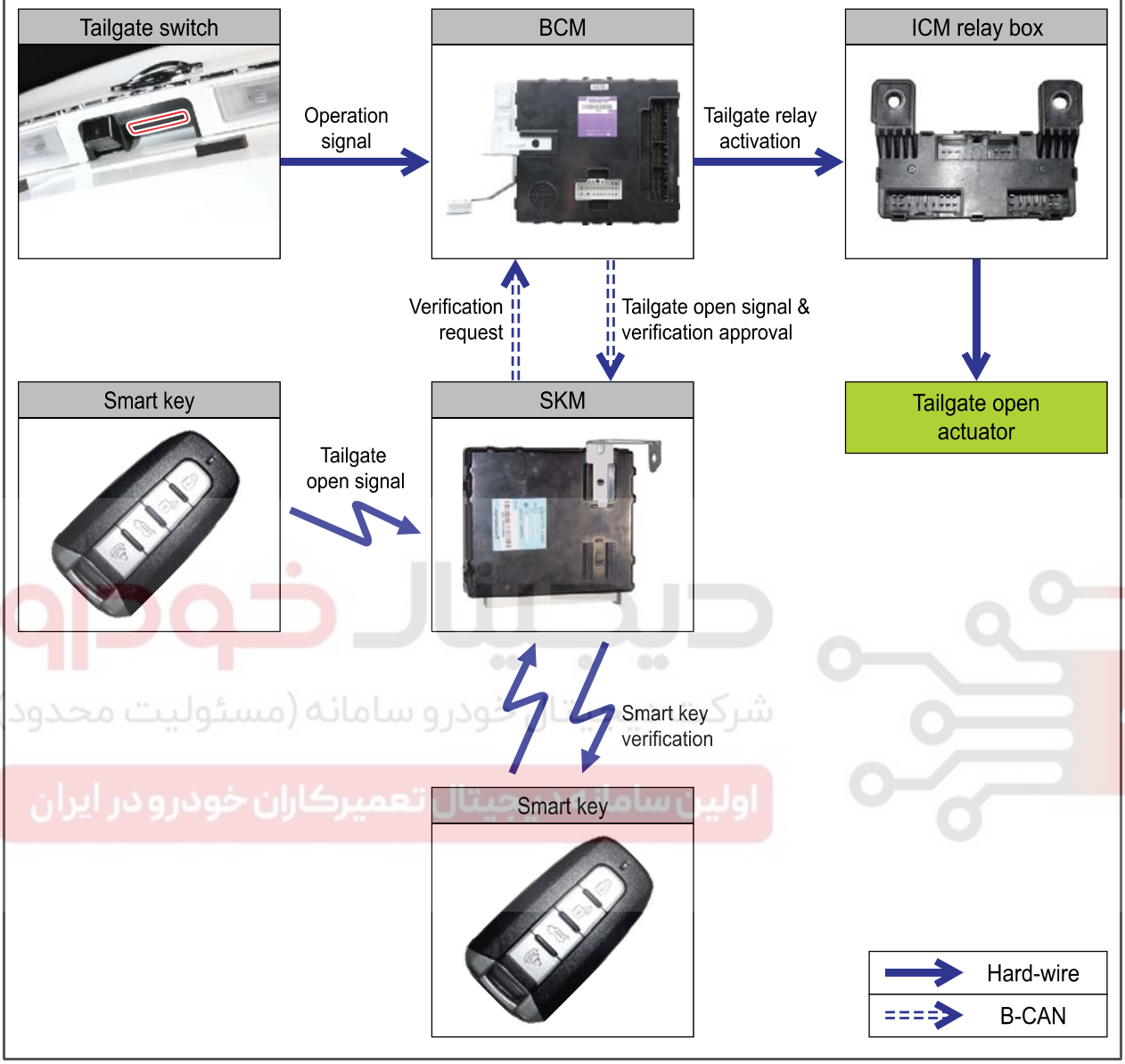
- The tailgate open signal is input by the smart key when the vehicle is not in stationary or the power is not turned OFF.
- The BCM keeps the tailgate open relay ready to operate for 30 seconds.
- If the signal from the tailgate open switch is input within this 30 seconds,
- The tailgate open relay is activated.
  If no signal is input within 30 seconds in theft deterrent mode, the mode remains on. The system enters the theft deterrent mode immediately when the LOCK signal from the smart key is input.

Operation 6.

- The tailgate closed signal is input in theft deterrent mode with power OFF.
- The BCM searches a verified smart key in the luggage compartment after 1 second.
- If a verified smart key is found in the luggage compartment, the BCM activates the external buzzer for 5 seconds.
- The driver presses the tailgate open switch to find the smart key.
- The BCM deactivates the tailgate LOCK function so that the tailgate can be opened even when the driver door is locked. (standby to operate without verification)

Operating process

- in theft deterrent mode



Modification basis	
Application basis	
Affected VIN	

17. THEFT DETTERENT FUNCTION

▶ **Theft deterrent mode entering by REKES key (for vehicles without SKM)**

Operation 1.

A. All doors (including hood and tailgate) are closed with the ignition key removed.
B. REKES LOCK signal is received.
C. The door LOCK relay is activated.
D. All doors (including hood and tailgate) are locked
E. The system enters the theft deterrent mode after operating the hazard warning lamp twice.

Operation 2.

F. REKES LOCK signal is received again within 4 seconds of theft deterrent mode activation.
G. The hazard warning lamp flashes twice and the warning horn is operated once in the theft deterrent mode.

Operation 3.

H. REKES LOCK signal is received with one or more doors open.
I. The LOCK relay is activated followed by activation of UNLOCK relay.

Operation 4.

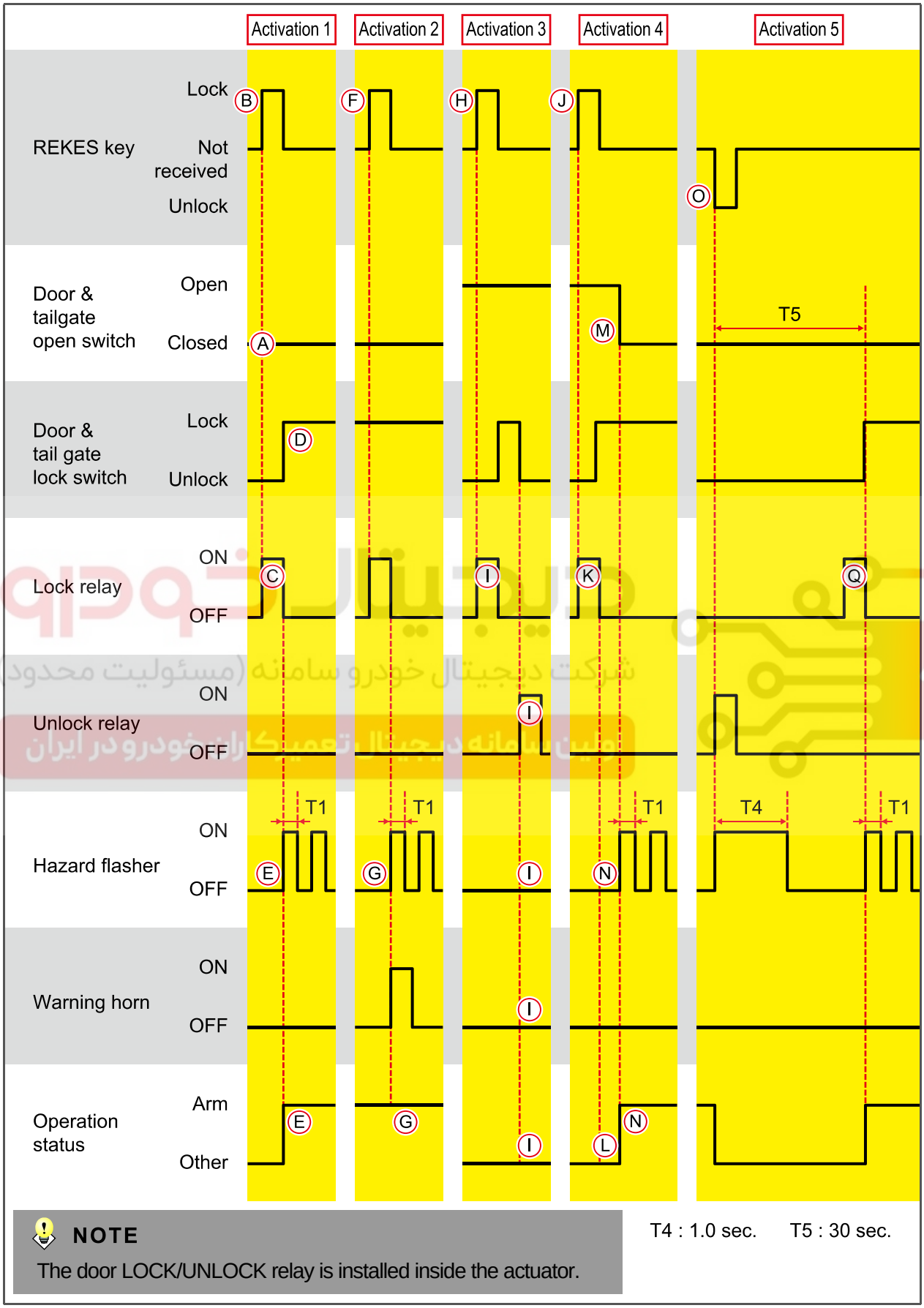
J. REKES LOCK signal is received with the tailgate and hood open.
K. Only the LOCK relays of the closed doors except hood and tailgate are activated.
L. The system does not enter theft deterrent mode.
M. If the open tailgate and hood are closed.
N. The system enters the theft deterrent mode after operating the hazard warning lamp twice.

Operation 5.

O. All doors are opened or the ignition key is not inserted within 30 seconds (T5) after the REKES UNLOCK signal is received.
P. The LOCK relay is activated and the system enters the theft deterrent mode after operating the hazard warning lamp twice.

NOTE

- The theft deterrent mode will not be activated when the door is locked by the door key.



NOTE

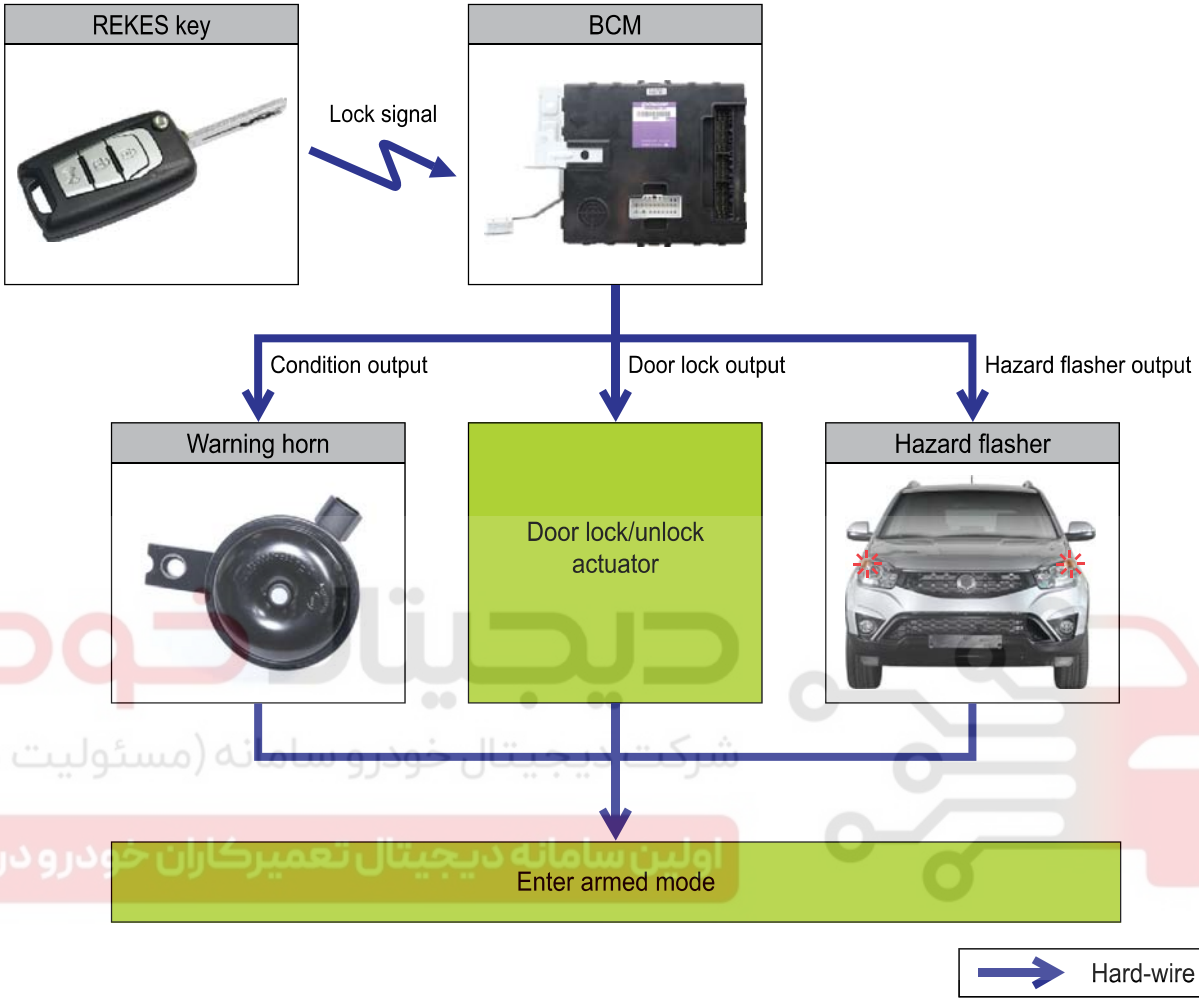
The door LOCK/UNLOCK relay is installed inside the actuator.

T4 : 1.0 sec. T5 : 30 sec.

Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN OFF/ACC ON
- All doors (including hood and tailgate) closed



Modification basis	
Application basis	
Affected VIN	

▶ Theft deterrent mode deactivation conditions (for vehicles without SKM)

- The REKES UNLOCK signal is input with IGN ON.
- When the REKES UNLOCK signal is input in the theft deterrent mode or with the theft deterrent mode deactivated, the hazard warning lamp is operated once and the theft deterrent mode is deactivated (without warning horn output).

▶ Theft deterrent mode (for vehicles without SKM)

The BCM monitors the following conditions continuously in theft deterrent mode.

- Battery power
- Front/rear door open
- Tailgate open
- 4 doors LOCK/UNLOCK
- Hood open

▶ Theft deterrent alarm activation (for vehicles without SKM)

- Any door including hood and tailgate is opened in theft deterrent mode.
- The LOCK switch of any door including tailgate is set to UNLOCK in theft deterrent mode.
- Any door except tailgate and hood is closed and then opened after 30 seconds of alarming.
- The hazard warning lamp and warning horn are activated for 30 seconds at intervals of 0.5 sec. ON/0.5 sec. OFF.

▶ Theft deterrent alarm deactivation conditions (for vehicles without SKM)

- Any signal from the REKES (LOCK, UNLOCK, Panic, Escort) deactivates the theft deterrent alarm.
- The theft deterrent alarm remain on for up to 30 seconds.
- When the theft deterrent alarm is activated in theft deterrent mode, turning the ignition ON immediately deactivates the mode. The alarm is deactivated 30 seconds (time remaining) after that. (For vehicles with immobilizer system, the alarm is deactivated once the key is verified after the ignition is turned ON)

Modification basis	
Application basis	
Affected VIN	

▶ Theft deterrent mode entering by smart key (for vehicles with SKM)

Operation 1.

A. The ignition is turned OFF or ACC is turned ON with all doors (including hood and tailgate) closed.
B. The door LOCK signal is received through B-CAN.
C. The door LOCK relay is activated.
(If ACC ON, the relay is activated after the power is turned OFF.)
D. All doors (including hood and tailgate) are locked
E. The system enters the theft deterrent mode after operating the hazard warning lamp twice and external buzzer (SKM buzzer) once.

Operation 2.

F. The door LOCK signal is received through B-CAN when one or more doors are open with driver door unlocked.
G. The LOCK relay is activated followed by activation of UNLOCK relay.
H. The hazard warning lamp and external buzzer (SKM buzzer) are not operated and the system does not enter the theft deterrent mode.

Operation 3.

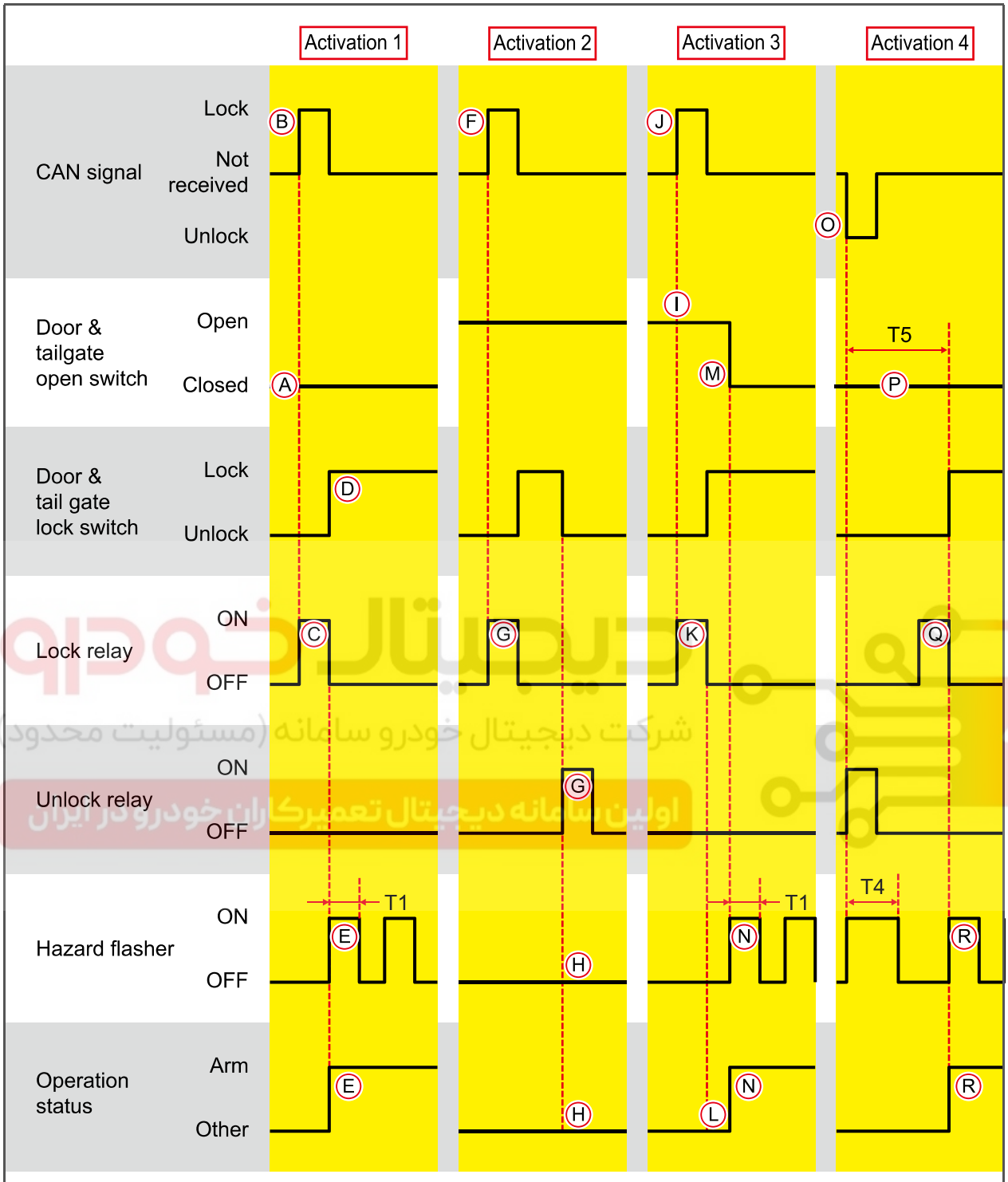
I. The tailgate and hood are open.
J. The door LOCK signal is received through B-CAN.
K. If all doors (including hood and tailgate) are closed, door LOCK relay is activated.
L. The system does not enter theft deterrent mode.
M. If the open tailgate and hood are closed.
N. The system enters the theft deterrent mode after operating the hazard warning lamp twice and external buzzer (SKM buzzer) once.

Operation 4.

O. The door UNLOCK signal is received through B-CAN.
P. All doors (including hood and tailgate) are not opened or the ignition is not turned ON within 30 seconds (T5).
Q. The door LOCK relay is activated.
R. The system enters the theft deterrent mode again after operating the hazard warning lamp twice and external buzzer (SKM buzzer) once.

NOTE

The procedure of entering theft deterrent mode by door handle switch LOCK is the same with the operation 3.
Ex) The theft deterrent mode will not be activated when the door is locked by the door key.



T1 : 0.5 sec. T4 : 1.0 sec. T5 : 30 sec.

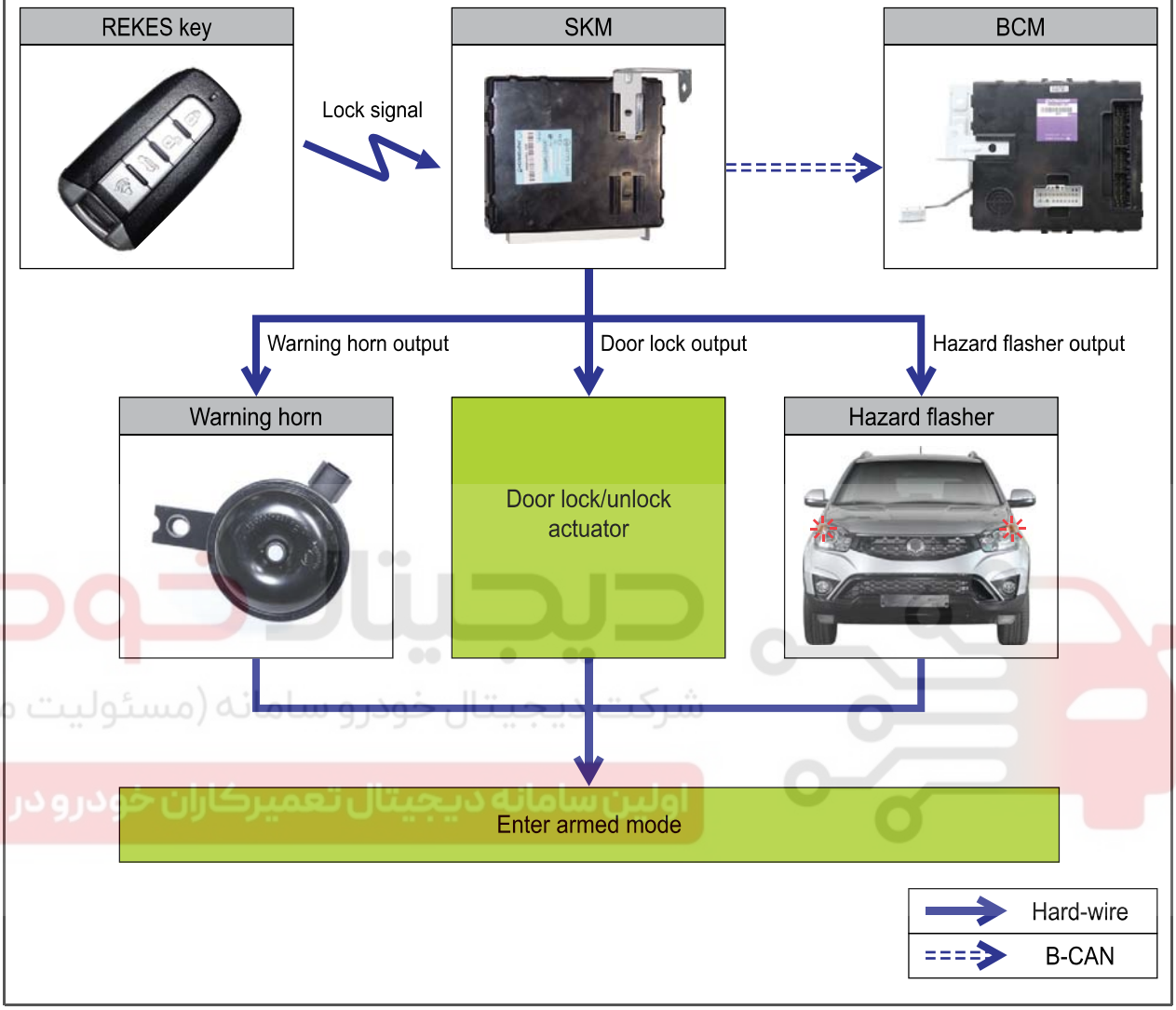
NOTE

The door LOCK/UNLOCK relay is installed inside the actuator.

Modification basis	
Application basis	
Affected VIN	

Operating process

- IGN OFF/ACC ON
- All doors (including hood and tailgate) closed



▶ **Theft deterrent mode deactivation conditions (for vehicles with SKM)**

- When UNLOCK signal by the smart key with IGN OFF or by the door handle switch with the door locked is received, the door UNLOCK signal is output and the theft deterrent mode is deactivated after the hazard warning lamp (once) and external buzzer (SKM buzzer) (twice) operations.
  If UNLOCK signal by the smart key is received after the deactivation of theft deterrent mode, the
- hazard warning lamp relay and external buzzer (SKM buzzer) are turned ON.
  When the tailgate open signal by the smart key or tailgate open switch is received, only the theft
- deterrent for tailgate is deactivated.
  The theft deterrent mode is deactivated when the ignition is turned ON.
-

Modification basis	
Application basis	
Affected VIN	

▶ Theft deterrent mode (for vehicles with SKM)

The BCM monitors the following conditions continuously in theft deterrent mode.

- Battery power
- Front/rear door open
- Tailgate open
- 4 doors LOCK/UNLOCK
- Hood open

▶ Theft deterrent alarm activation (for vehicles with SKM)

- Any door including hood and tailgate is opened in theft deterrent mode.
- The LOCK switch of any door including tailgate is set to UNLOCK in theft deterrent mode.
- Any door including tailgate and hood is closed and then opened after 30 seconds of alarming.
- The hazard warning lamp and warning horn are activated for 30 seconds at intervals of 0.5 sec. ON/0.5 sec. OFF.

▶ Theft deterrent alarm deactivation conditions (for vehicles with SKM)

- The theft deterrent alarm is deactivated in the following conditions. The theft deterrent mode is kept ON.
  a. Door LOCK/UNLOCK signal by smart key is received.
  b. Tailgate open signal by smart key is received.
  c. UNLOCK signal by door switch is received.
  d. Tailgate open switch signal is received.
  e. IGN ON signal is received.
  f. Panic function is activated.
- When the ignition is turned ON while the theft deterrent alarm is activated, the alarm is deactivated immediately.
- When the theft deterrent alarm is activated in theft deterrent mode, turning the ignition ON immediately deactivates the mode. The alarm is deactivated 30 seconds (time remaining) after that. If no deactivation command is received, the system enter the theft deterrent mode after the 30
- seconds.

▶ Theft deterrent mode re-activation after tailgate open (for vehicles with SKM)

All doors except the tailgate are in theft deterrent mode, the system searches for the smart key inside the vehicle 1 second after the tailgate is closed. If no smart key is found, the system enters the theft deterrent mode again.
The hazard warning lamp and warning horn are activated when the system enters the mode.

Modification basis	
Application basis	
Affected VIN	

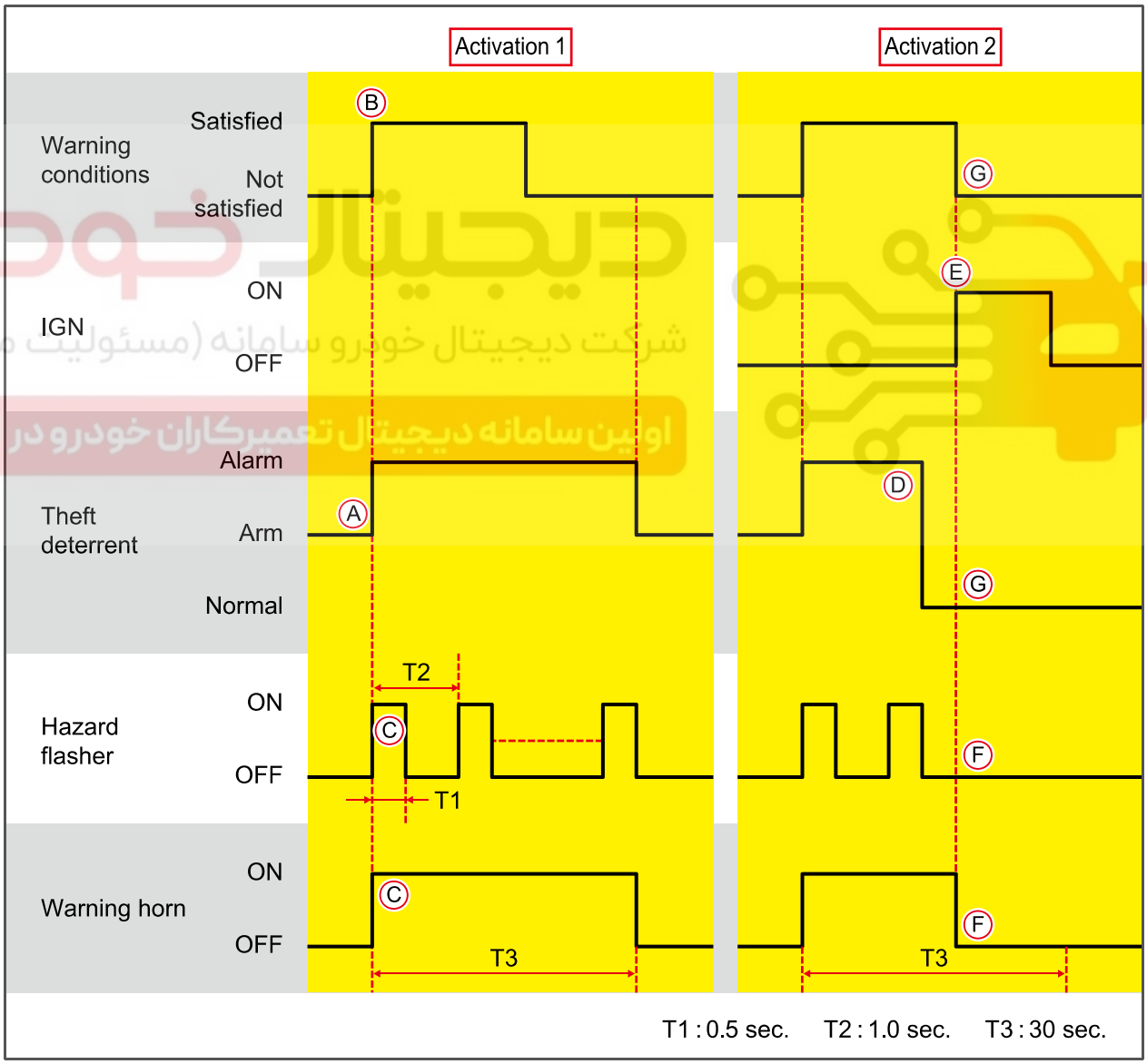
▶ Theft deterrent alarm deactivation (for vehicles with/without SKM)

Operation 1.

A. The system is in theft deterrent mode.
B. The conditions for theft deterrent alarm are met.
C. The hazard warning lamp flashes and the warning horn is activated.

Operation 2.

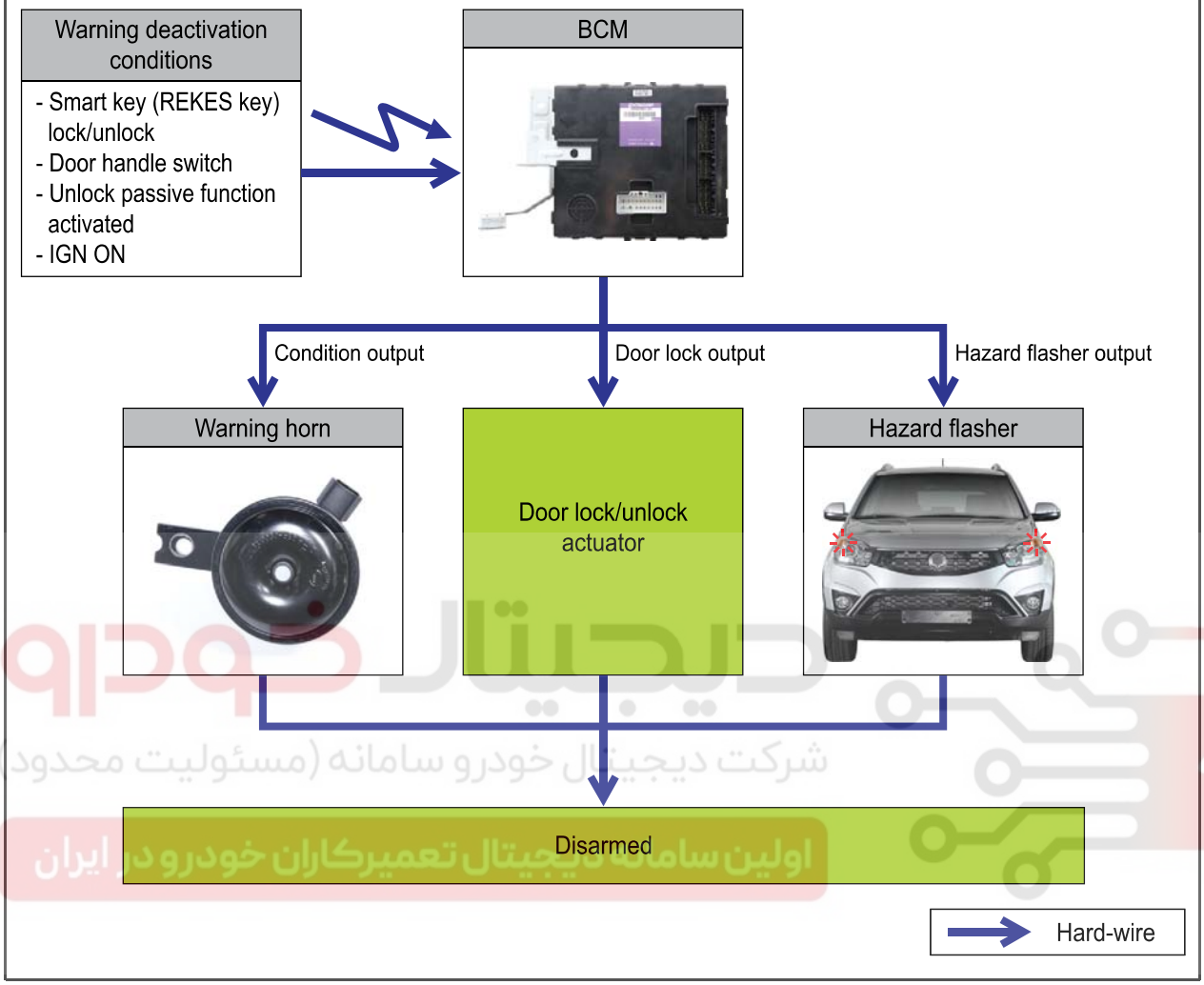
D. The theft deterrent alarm is activated.
E. The conditions for deactivation of theft deterrent alarm are met.
F. The hazard warning lamp and warning horn are deactivated.
G. The theft deterrent alarm is deactivated because the conditions are not met, and the system enters the theft deterrent mode.



Modification basis	
Application basis	
Affected VIN	

Operating process

- Theft deterrent alarm activated



Modification basis	
Application basis	
Affected VIN	

18. POWER WINDOW RELAY CONTROL

▶ **Time lag power window control**

Operation 1.

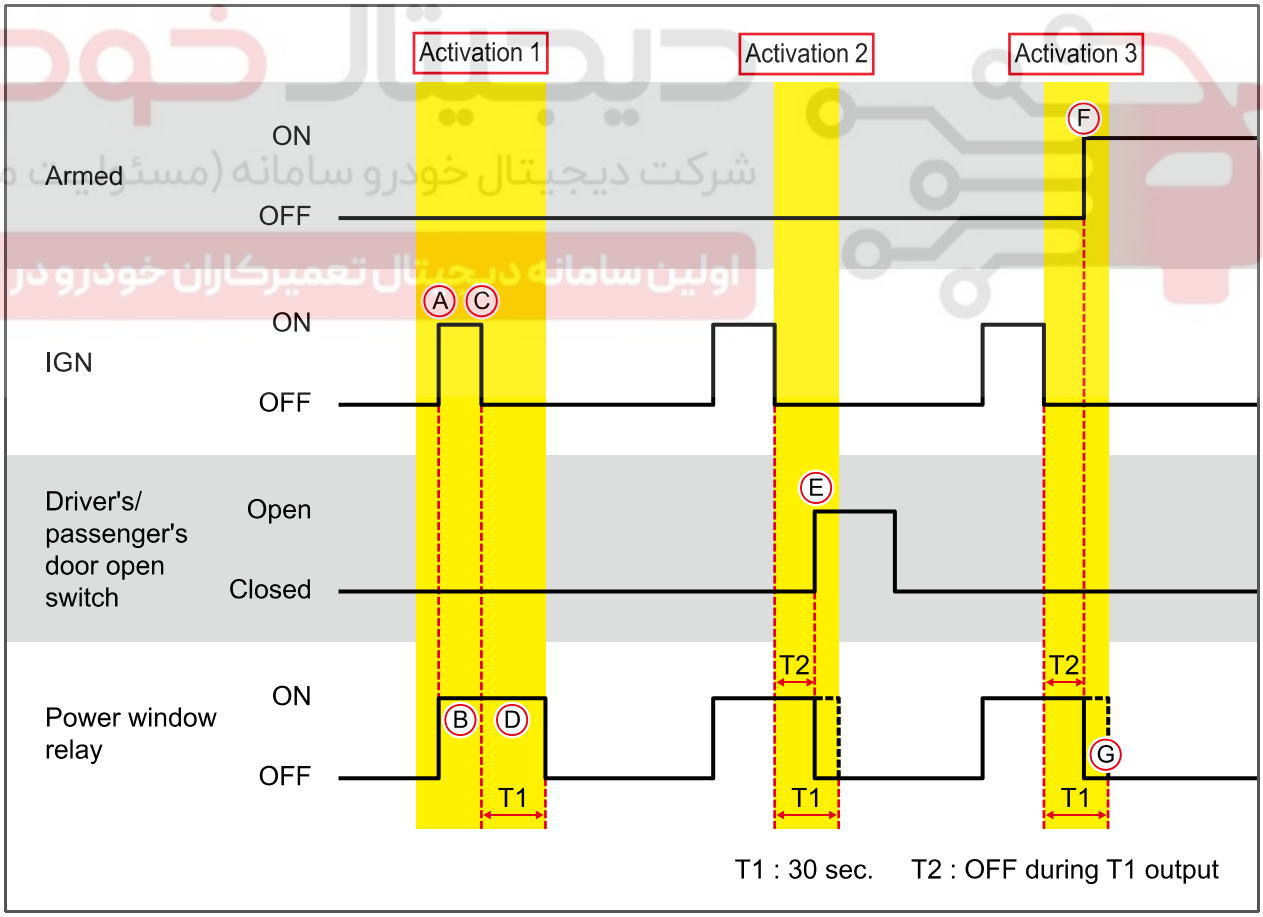
A. The ignition is turned ON.
B. The power window relay is activated.
C. The ignition is turned OFF.
D. The power window relay is turned ON for 30 seconds (T1).

Operation 2.
(during 30 seconds (T1) of power window relay ON).

E. The power window relay is turned OFF immediately when the driver/passenger door is opened.

Operation 3.

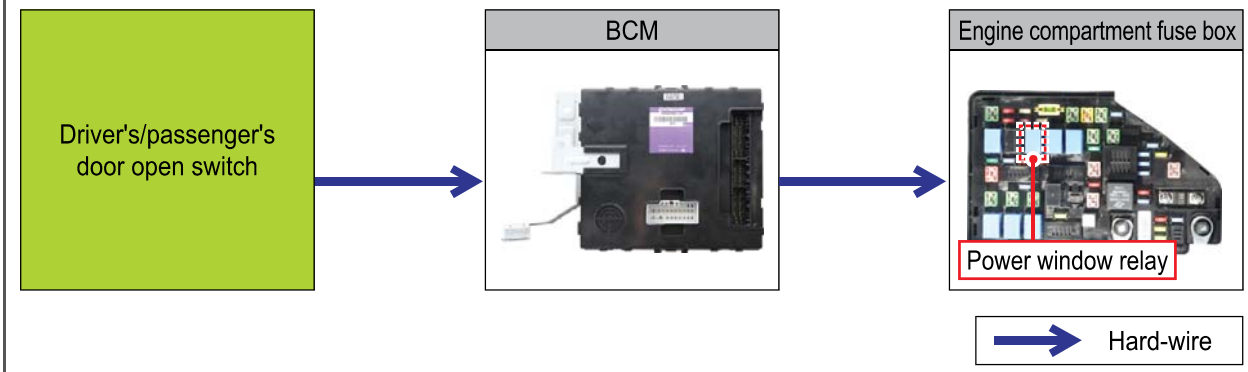
F. The system enters theft deterrent mode.
G. The power window relay is turned OFF immediately.



Modification basis	
Application basis	
Affected VIN	

Operating process

- The ignition is turned OFF.



19. SLEEP MODE

1. If the state of the LOCK switches of driver/passenger/rear doors and tailgate is not changed for 6 seconds with the all doors including tailgate closed and IGN OFF (ignition key removed), even if the state is not LOCK, the system enters the sleep mode to power down.
2. If any condition of the (1) is not met, the system enters the wake up mode immediately.
3. When the room lamp, key hole lamp, tail lamp, or power window is already activated, or all doors are closed for continuous 30 seconds after the door UNLOCK under the conditions stated in (1), the system waits in normal mode. If the lamps or power window is deactivated and no change is detected for 6 seconds after all doors are closed, the system enters the sleep mode.

4. When the front room lamp is ON, the system turns of the room lamp in 10 minutes and enters the sleep mode after 6 seconds.
5. If the coming home light is ON, the system enters the sleep mode when the coming home light switching off conditions are met.
6. The sleep mode is deactivated when a door is opened or key is inserted.

Modification basis	
Application basis	
Affected VIN	

20. FLASHER FUNCTION

▶ **LH/RH turn signal lamp control**

Operation 1.

A. The LH/RH turn signal lamp switch is turned ON with IGN ON.
B. The LH/RH turn signal lamp flashes 75 times per minute (T1), and the internal buzzer sounds at intervals of 0.4 sec. ON/0.4 sec. OFF.
C. The LH/RH turn signal lamp and internal buzzer are deactivated when the LH/RH turn signal lamp switch is turned OFF.

Operation 2.

D. Abnormal current (less than 3 A or more than 7 A) detection signal is input while the lamp is ON. The LH/RH turn signal lamp flashes 100 times per minute (T2), and the internal buzzer sounds at
E. intervals of 0.3 sec. ON/0.3 sec. OFF.

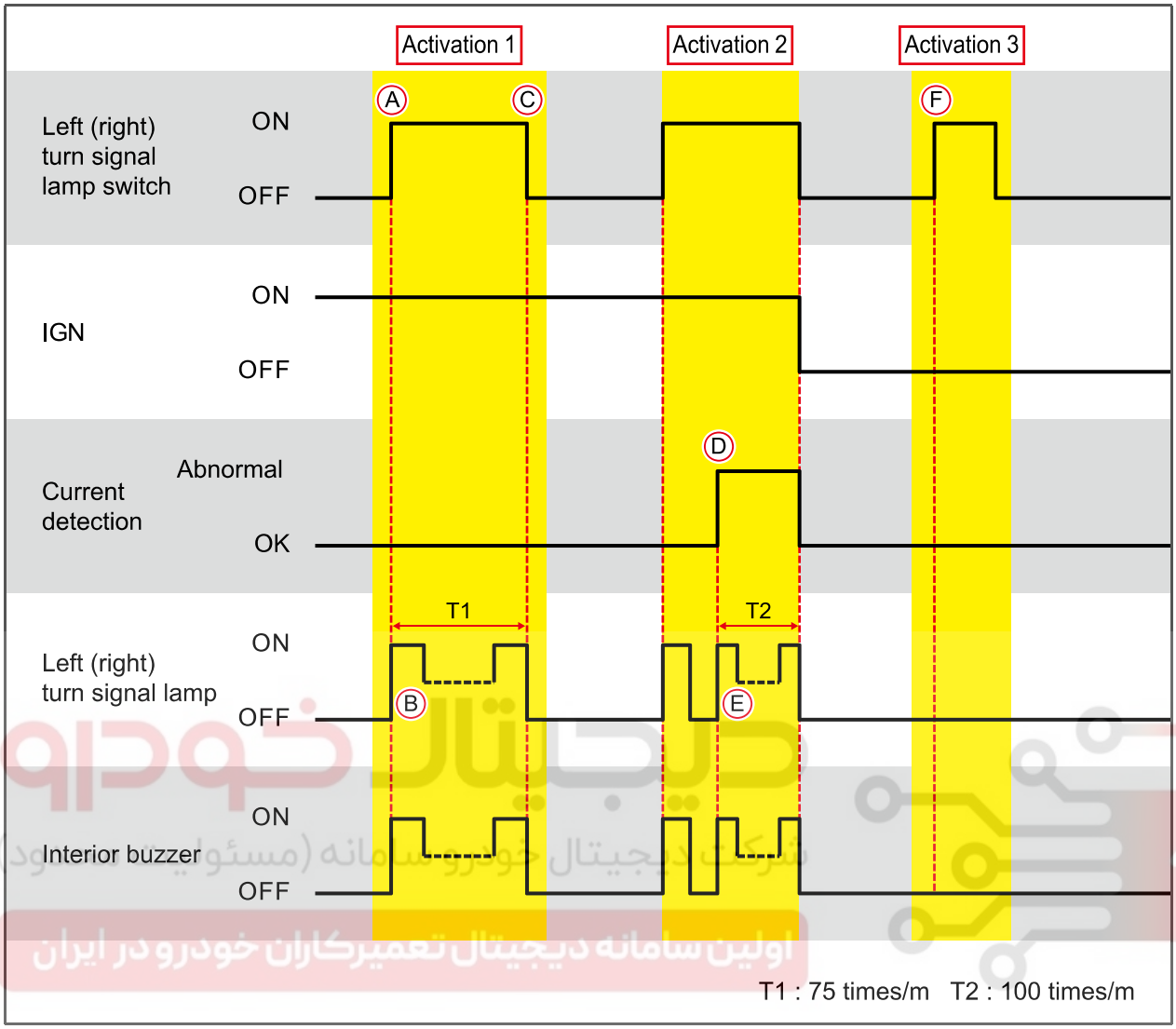
Operation 3.

F. The LH/RH turn signal lamp is activated only with IGN ON.

NOTE

The LH/RH turn signal lamp flashes 3 times once the corresponding lamp switch is turned ON.

- When the LH turn signal lamp switch is turned OFF during the 3 times flashing, the turn signal lamp goes out after the flashing operation.
- When the LH turn signal lamp switch is turned ON during the 3 times flashing, the turn signal lamp flashes 3 more times.
- When the RH turn signal lamp switch is turned ON during the 3 times flashing, the LH turn signal lamp goes out immediately and the RH turn signal lamp flashes 3 times before switching off.



Modification basis	
Application basis	
Affected VIN	

▶ Hazard warning lamp switch control

Operation 1.

A. The hazard warning lamp switch is turned ON with IGN ON or OFF.
B. The hazard warning lamp flashes 75 times per minute (T1), and the internal buzzer sounds at intervals of 0.4 sec. ON/0.4 sec. OFF.
C. The hazard warning lamp and internal buzzer are deactivated when the hazard warning lamp switch is turned OFF.

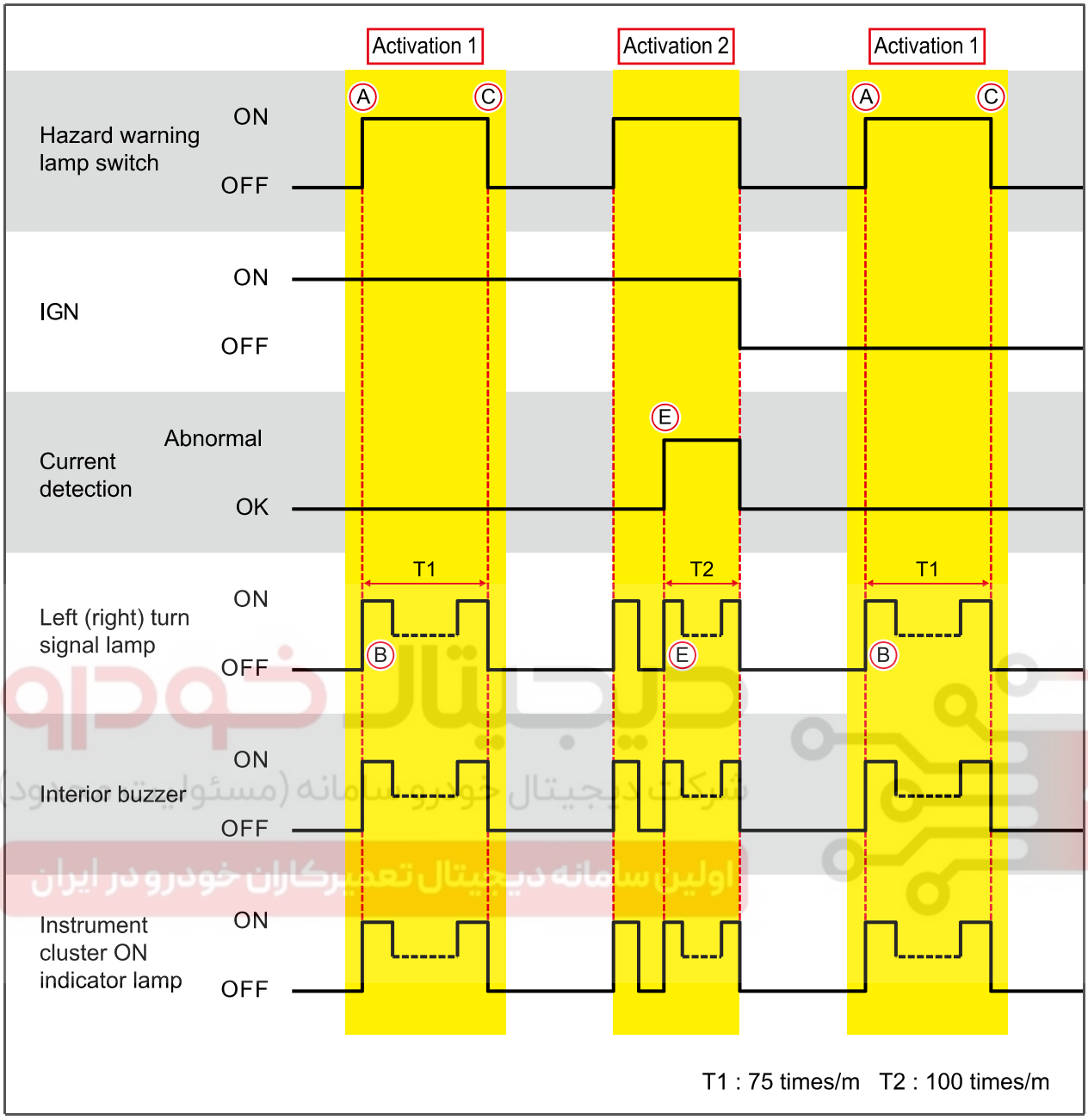
Operation 2.

D. Operation 1. Abnormal current (less than 3 A or more than 7 A) detection signal is input while the lamp is ON.
E. The hazard warning lamp flashes 100 times per minute (T2), and the internal buzzer sounds at intervals of 0.3 sec. ON/0.3 sec. OFF.

NOTE

- Hazard warning lamp functions at B+ or more.
- The allowed time difference between the LH and RH turn signal lamp operations is within 0.1 seconds.
- The hazard warning lamp overrides the turn signal lamp.
- Priority of internal buzzer (chime) operation while the hazard warning lamp is ON (Seat belt reminder > Ignition key reminder > Sunroof open > Tail lamp ON > Hazard warning lamp > Turn signal lamp)

Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	

▶ AUTO hazard warning flasher control

Operation 1.

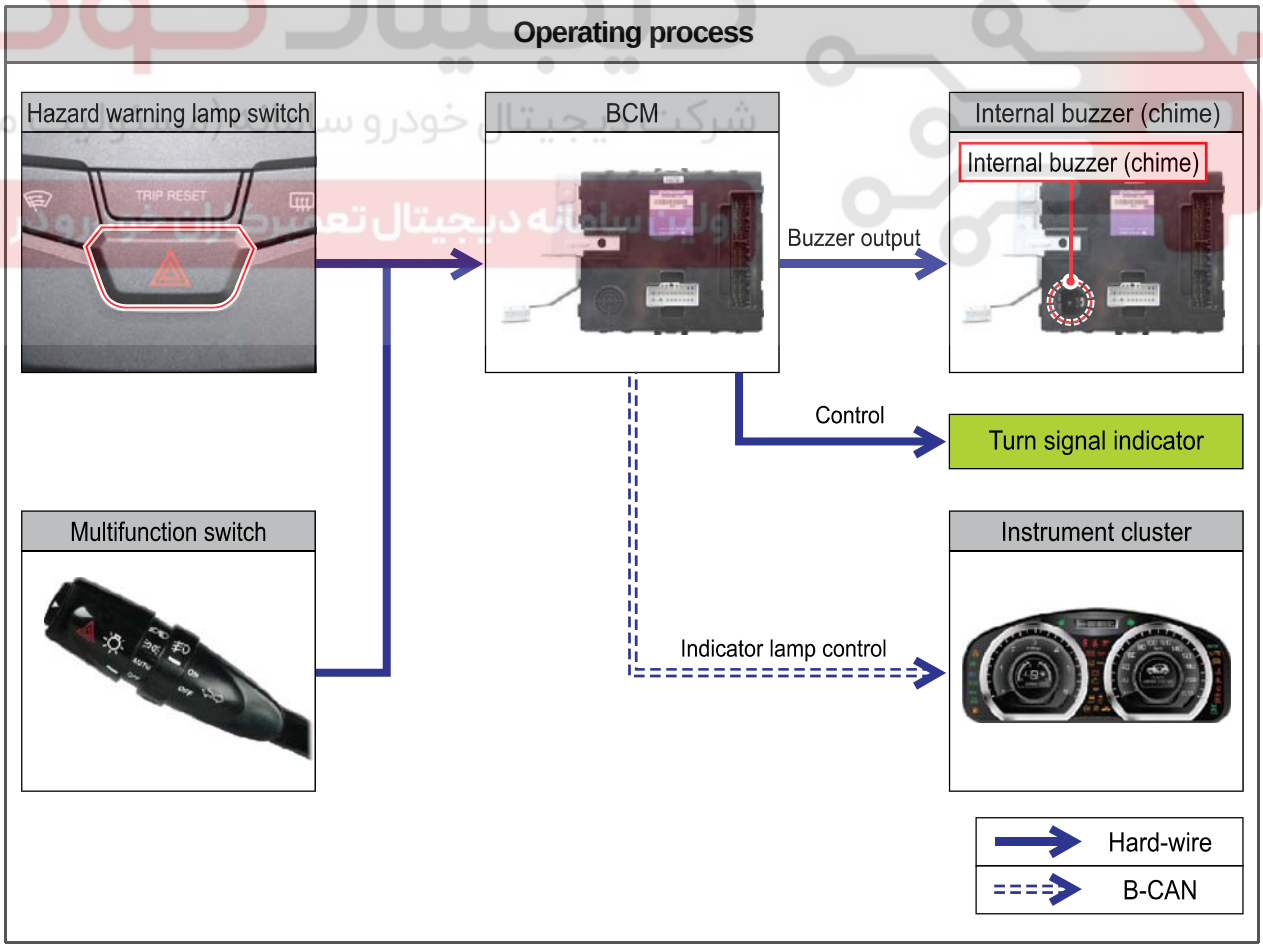
A. The hazard warning lamp comes on 3 times (T3) when the AUTO hazard warning lamp switch is pressed for less than 0.6 seconds (T1).

Operation 2.

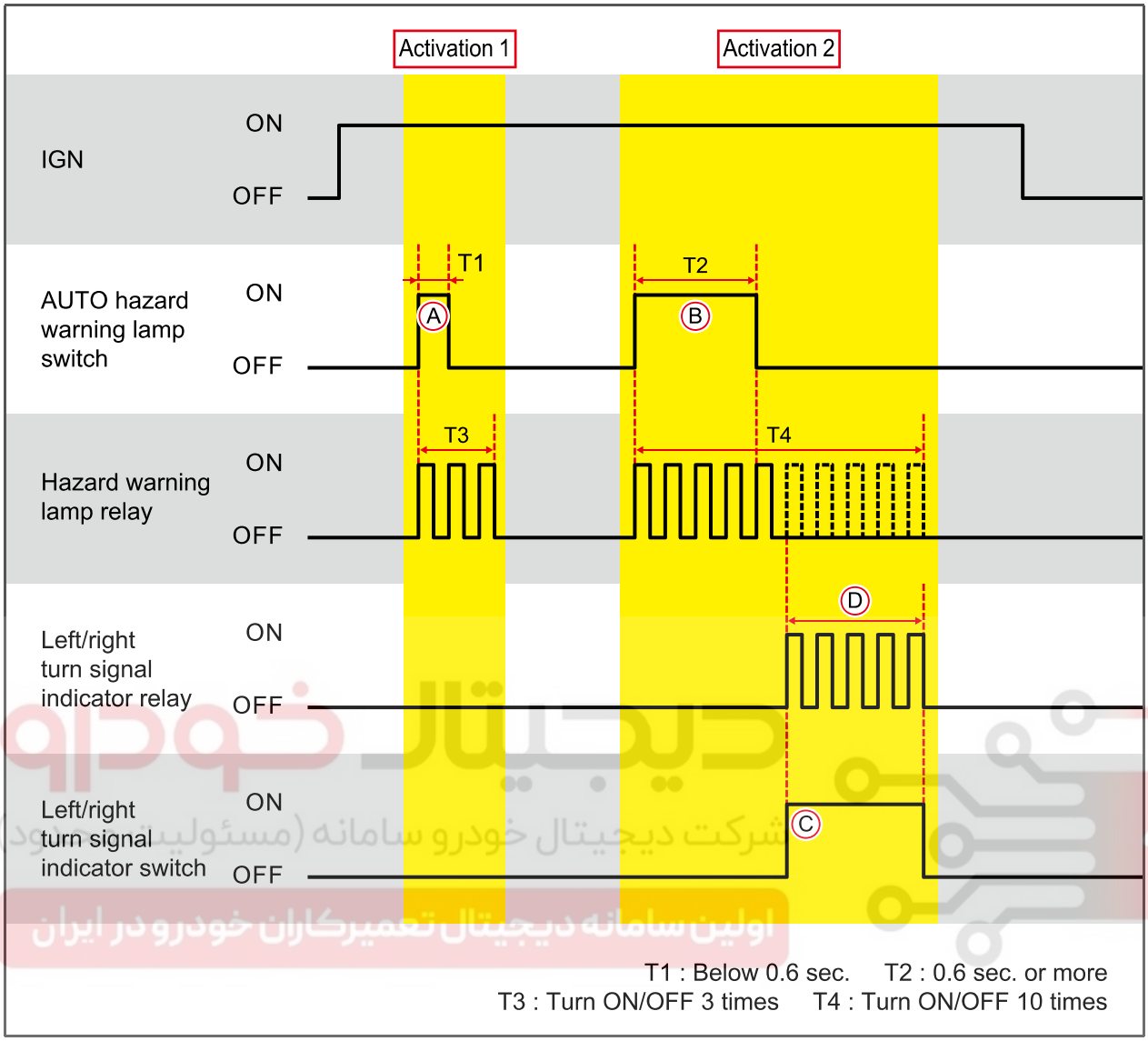
B. The hazard warning lamp comes on 10 times (T4) when the AUTO hazard warning lamp switch is pressed for 0.6 seconds or more (T2).
C. The turn signal lamp switch is pressed during the AUTO hazard warning lamp operation.
D. The corresponding turn signal lamp is activated after this AUTO hazard warning lamp operation.

NOTE

- The AUTO hazard warning lamp can be controlled only with IGN ON.
- The input from the AUTO hazard warning lamp switch is ignored during the turn signal lamp operation by the turn signal lamp switch.
- Priority of operation: (Hazard warning lamp switch > LH/RH turn signal lamp > AUTO hazard warning lamp switch)



Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	

▶ Emergency hazard warning lamp control (coupled with ABS)

The BCM activates emergency hazard warning lamp operation when receiving emergency braking signal from the ESP/ABS.

- Priority of operation
  (Manual operation of hazard warning lamp > Emergency stop signal > Emergency AUTO hazard warning lamp > AUTO hazard warning lamp)

Operation 1. (emergency stop signal)

A. The emergency stop signal is input from the ABS/ESP module with the vehicle driven at 50 km/h or more.
B. The hazard warning lamp flashes at 4 Hz (T1) and internal buzzer (chime) sounds at 1.25 Hz.

Operation 2. (Emergency stop signal → Emergency AUTO hazard warning lamp)

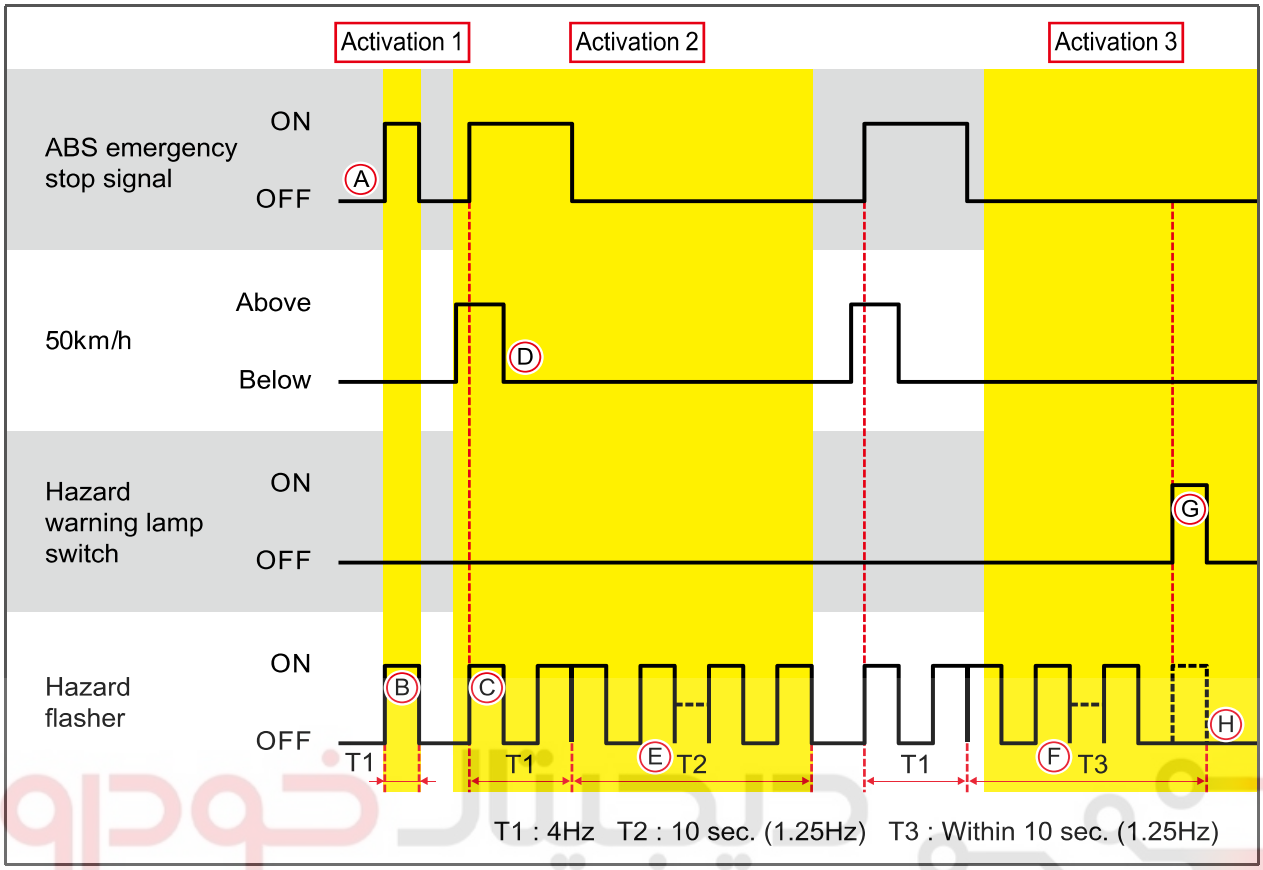
C. During operation 1 (emergency stop signal activated)
D. The vehicle speed decreased to 50 km/h or less
E. The hazard warning lamp flashes for 10 seconds (T2) at 1.25 Hz and then goes out.

Operation 3. (Emergency AUTO hazard warning lamp → Manual operation of hazard warning lamp)

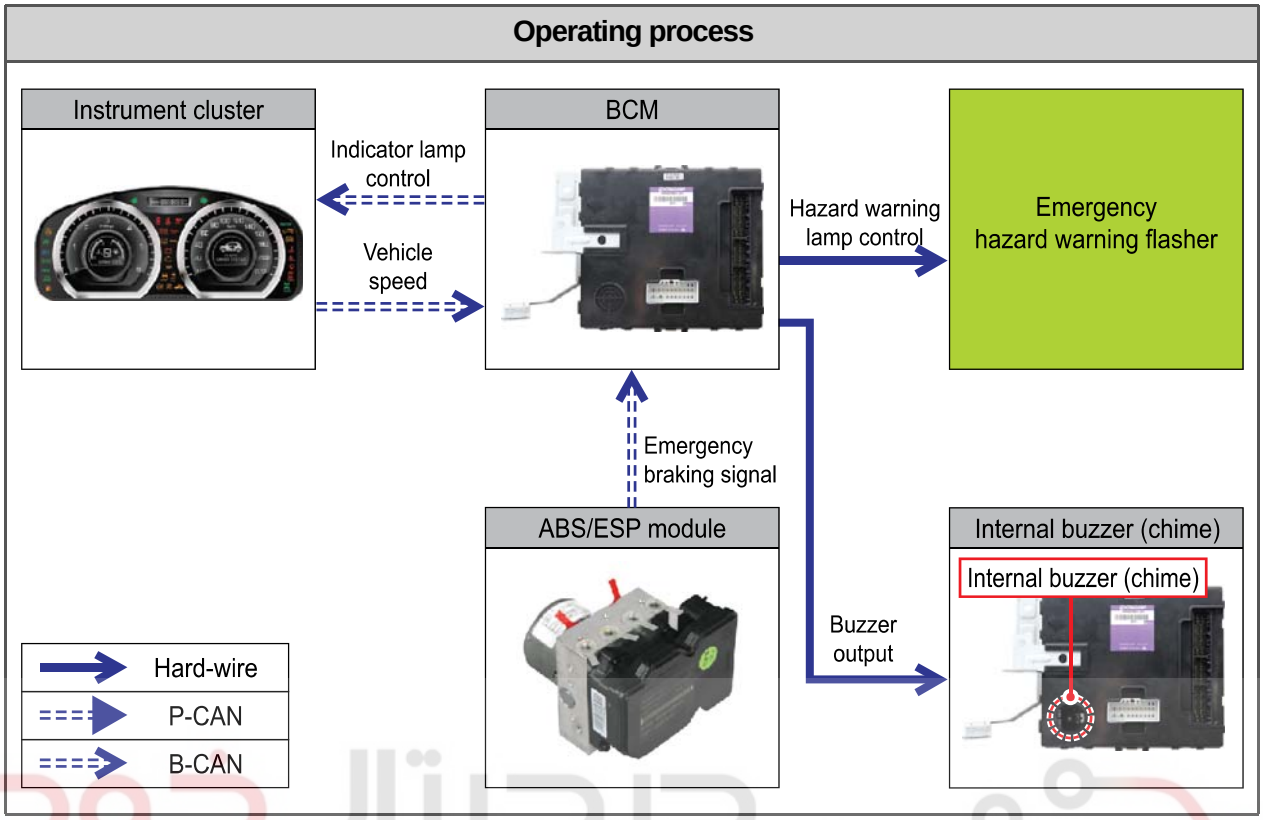
F. During operation 2 (emergency AUTO hazard warning lamp)
G. The hazard warning lamp switch is turned OFF.
H. The hazard warning lamp is turned OFF because the manual operation overrides the emergency AUTO operation.

NOTE

The emergency stop signal and emergency AUTO hazard warning lamp signal are switched off when the vehicle speed exceeds 10 km/h (if emergency stop signal is input).



Modification basis	
Application basis	
Affected VIN	



The BCM activates emergency hazard warning lamp operation when receiving emergency braking flasher ON signal from the ESP/ABS.
When the emergency stop signal is input through the P-CAN, the hazard warning lamp flashes with the frequency of 4 Hz and the internal buzzer sounds at 1.25 Hz.
P-CAN signal during operation: Emergency Stop=EBL_INFO=0*0=Hazard Warning Lamp unrequested

Modification basis	
Application basis	
Affected VIN	

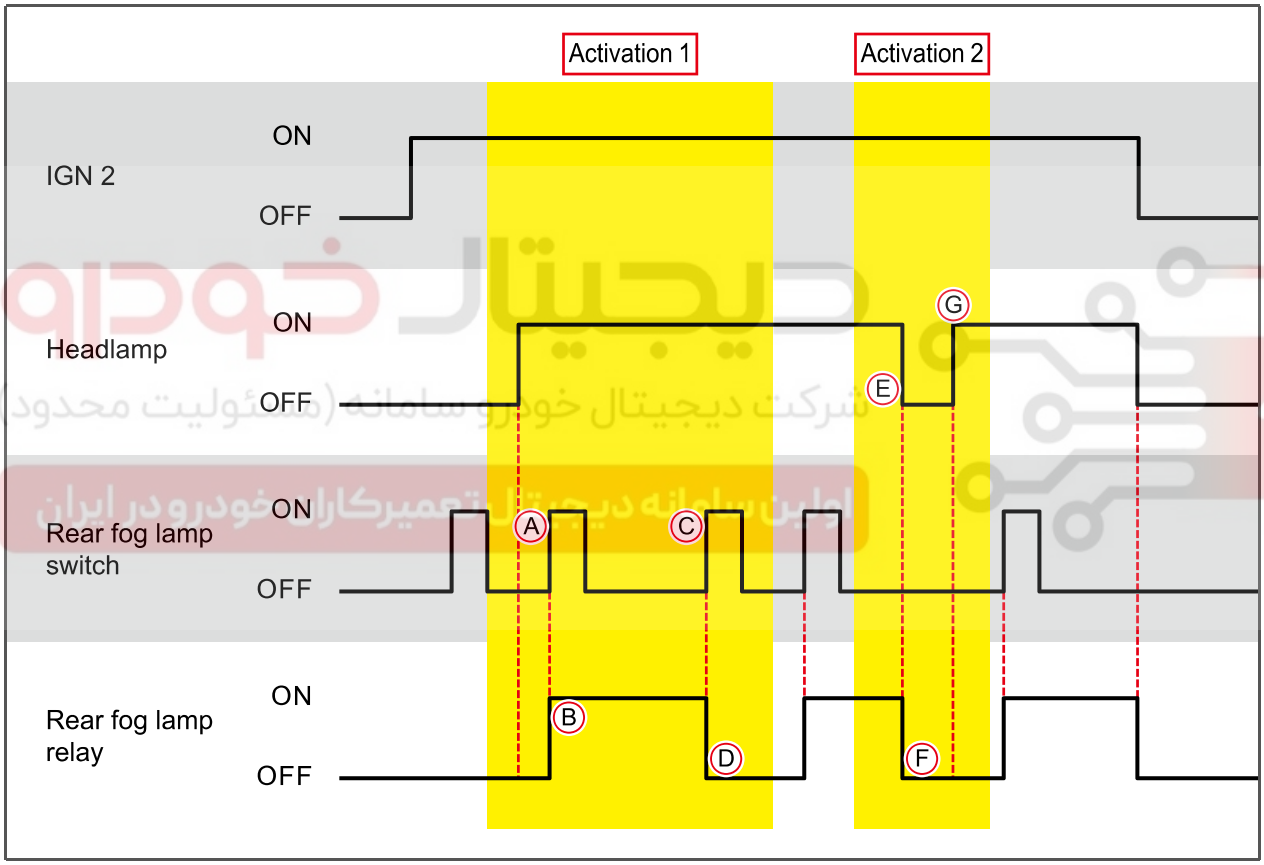
▶ Rear fog lamp control (only EU)

Operation 1.

A. When pressing the rear fog lamp switch with IGN2 ON (headlamp ON condition),
B. The rear fog lamps are turned on.
C. When pressing the rear fog lamp switch again during the operation,
D. The rear fog lamps are turned off.

Operation 2.

E. If the headlamp is turned off or IGN2 switch is turned to "OFF" position,
F. The rear fog lamps are turned off.
G. The rear fog lamps are not turned on automatically without operating the rear fog lamp switch.



Modification basis	
Application basis	
Affected VIN	

21. OUTSIDE REAR VIEW MIRROR FOLDING/UNFOLDING

▶ Folding/unfolding control

Operation 1.

A. The folding switch is turned ON.
B. The folding relay is activated for 16 seconds (T1).

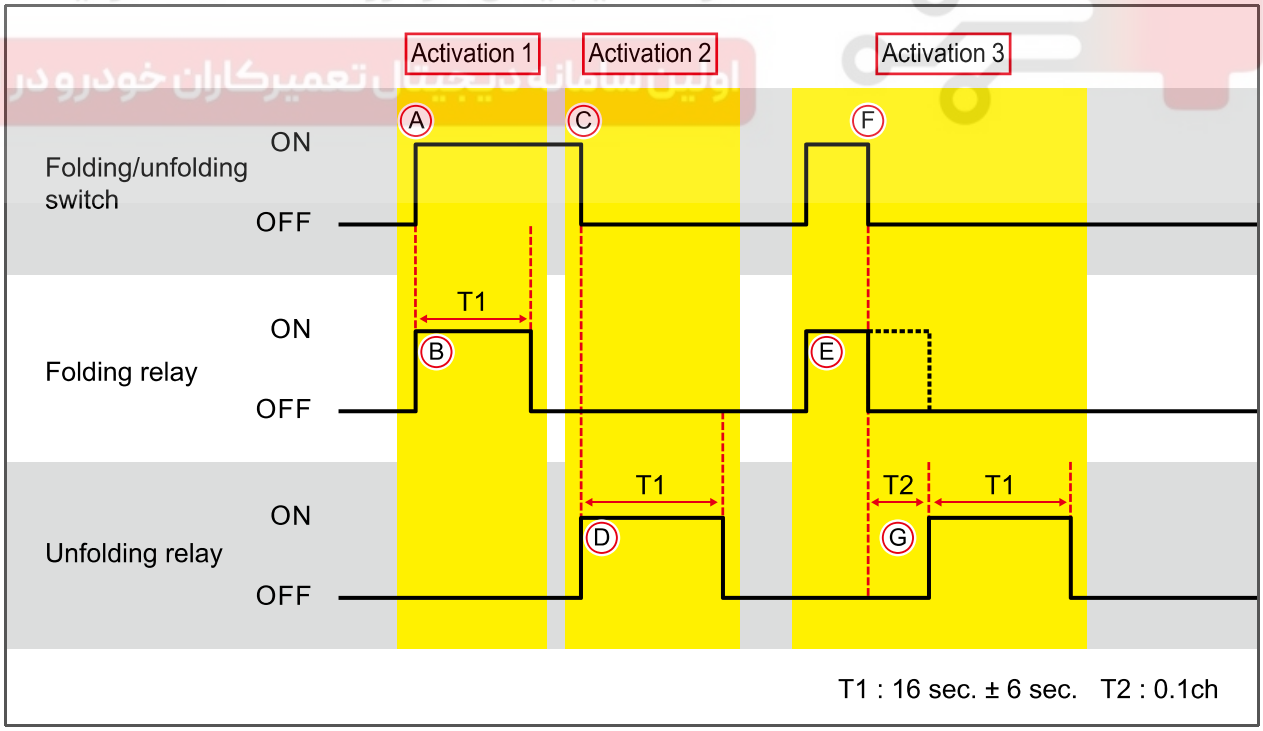
Operation 2.

C. The folding switch is turned OFF.
D. The unfolding relay is activated for 16 seconds (T1).

Operation 3.

E. The folding relay is activated by the folding switch.
F. The folding switch is turned OFF.
G. The unfolding relay is activated after 0.1 seconds (T2).
- The control logic is the same for folding to unfolding operation and unfolding to folding operation.

NOTE
- The AUTO folding/unfolding function is not available when the folding switch is ON.
- The AUTO folding/unfolding function is available when the folding switch is OFF.



Modification basis	
Application basis	
Affected VIN	

22. APPROACH (PUDDLE) LAMP

▶ **Approach lamp control (for vehicles without SKM)**

Operation 1. (Puddle lamp ON conditions)

A. The lamp is illuminated for 30 seconds when the REKES key UNLOCK signal is received in theft deterrent mode.
B. The lamp is illuminated when the driver door is opened after the ignition is turned OFF.

Operation 2. (Puddle lamp OFF conditions)

C. When the door LOCK signal is received with the lamp ON (the system enters the theft deterrent mode)
D. When the ignition is turned ON with the lamp ON.
E. Thirty seconds after the lamp ON

▶ **Approach lamp control (for vehicles with SKM)**

Operation 1. (Puddle lamp ON conditions)

A. The lamp is illuminated for 30 seconds when UNLOCK signal by the smart key or door handle switch is received in theft deterrent mode.
B. The lamp is illuminated when the driver door is opened after the ignition is turned OFF.

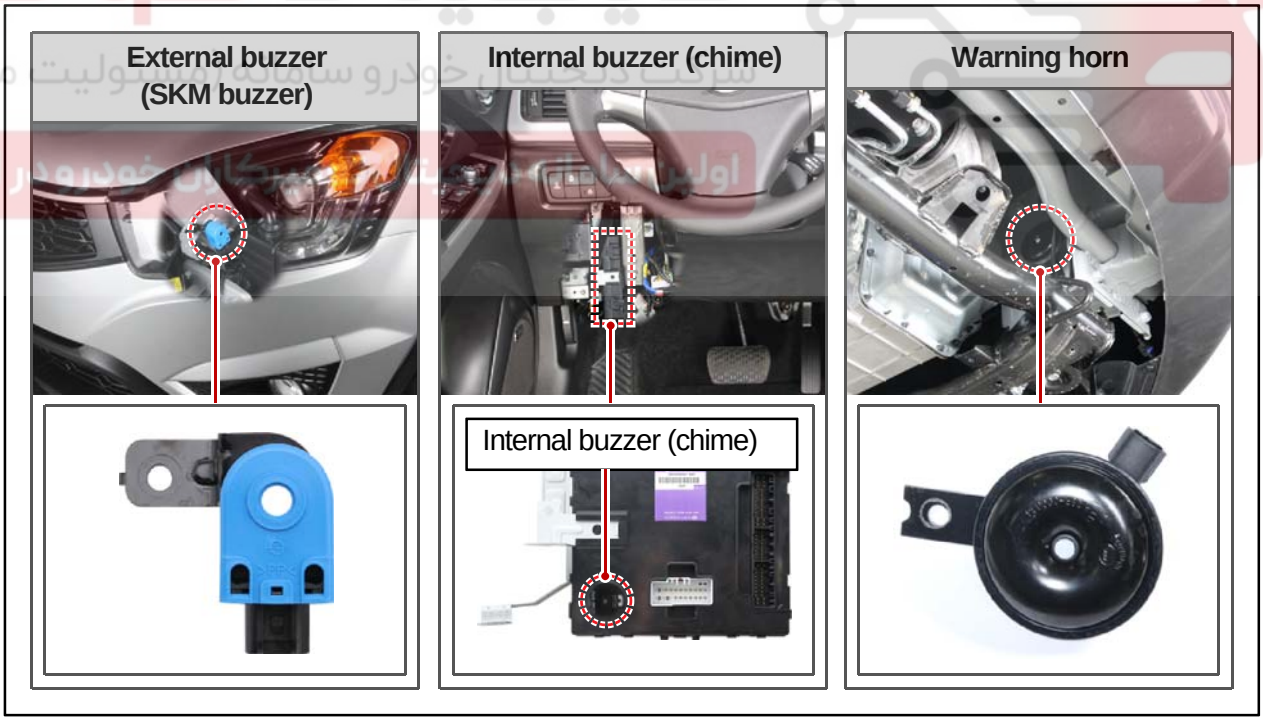
Operation 2. (Puddle lamp OFF conditions)

C. When the door LOCK signal is received with the lamp ON (the system enters the theft deterrent mode)
D. When the ignition is turned ON with the lamp ON.
E. Thirty seconds after the lamp ON

23. BUZZER CONTROL

▶ **Priority of BCM buzzer control**

Buzzer Priority in BCM					Warning command from SKM			
			For BCM without SKM	For BCM with SKM				For BCM with SKM
1	REKES lock alarm	Exterior	Horn	1	1	Key-OFF alarm	Exterior	1
2	REKES unlock alarm	Exterior			2	Smart key reminder warning	Exterior	
3	Panic alarm	Horn	2	2	3	Smart key verification failure warning	Interior	5
4	Theft deterrent alarm	Horn	1	1	4	Transponder verification failure warning	Interior	
5	Seat belt reminder alarm	Interior	3	1	5	Smart key battery discharge warning	Interior	
6	SWR alarm	Interior	4		6	Gear position warning	Interior	
7	sun roof alarm	Interior	6	2	7	SKM error warning	Interior	
8	Tail lamp alarm	Interior	7		8	Brake warning	Interior	
9	Hazard flasher alarm	Interior	8	4	9	Clutch warning	Interior	
10	Turn signal lamp alarm	Interior	9		10	Smart key holder reminder warning	Interior	3
11	Auto folding setting	Interior	10	6				
12	Key reminder	Interior	5	-				



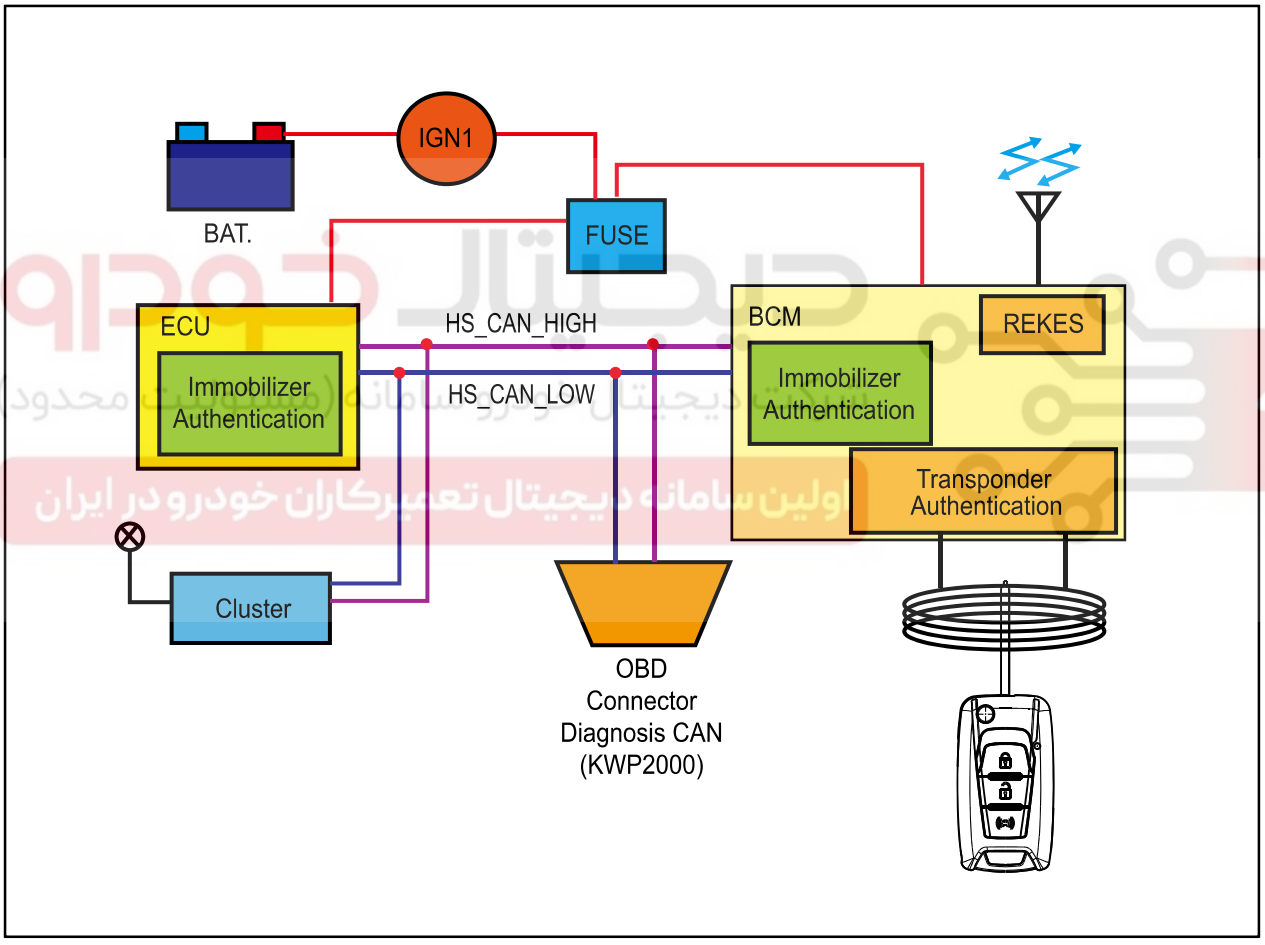
Modification basis	
Application basis	
Affected VIN	

24. IMMOBILIZER SYSTEM

1) System Description

The BCM without SKM communicates with the transponder in the REKES key and immobilizer unit in the key box through wireless communication. The immobilizer unit and BCM check the encrypted codes received through hard wire communication to start the engine.
Stays on: Communication failure between immobilizer and EMS (ECU)
Flashes: Immobilizer coding failure (once per second)

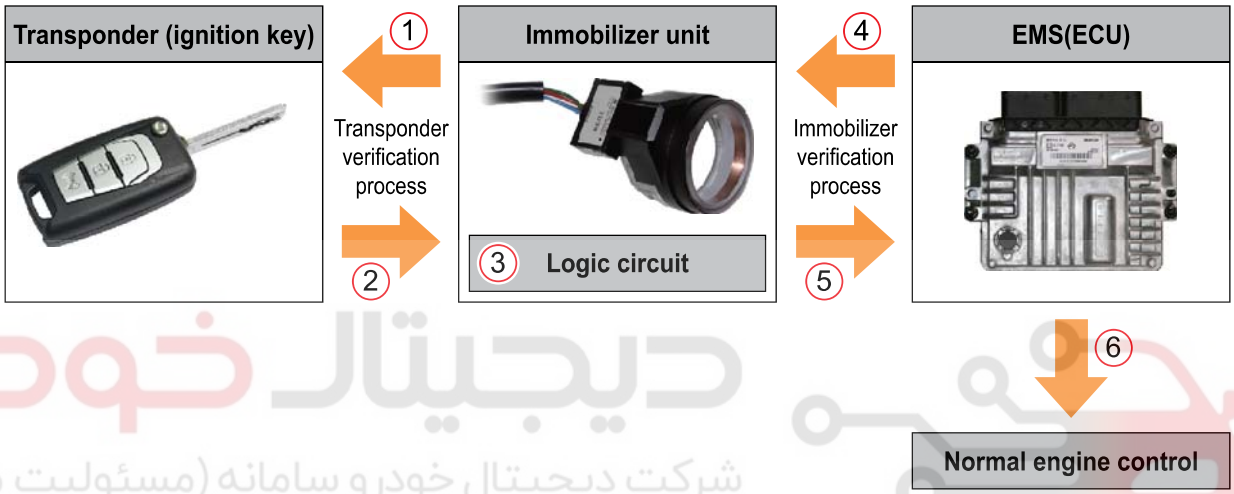
2) System Diagram



Modification basis	
Application basis	
Affected VIN	

3) Immobilizer Ignition Key Verification

When turning the ignition key to the ON position, the power is supplied to the immobilizer unit and EMS (ECU). The ECU communicates with the immobilizer unit to verify the key and transponder. If it is valid, the ECU starts to control the engine or immobilizer indicator (illumination or flashing) when the ignition key is turned to the START position.
Once the key is verified, valid key verification time is provided for 10 seconds and the engine can be started by turning the ignition key to the engine START position during this verification time. If the ignition key is turned to the START position again after the 10 seconds of verification time, the key verification should be reperformed.

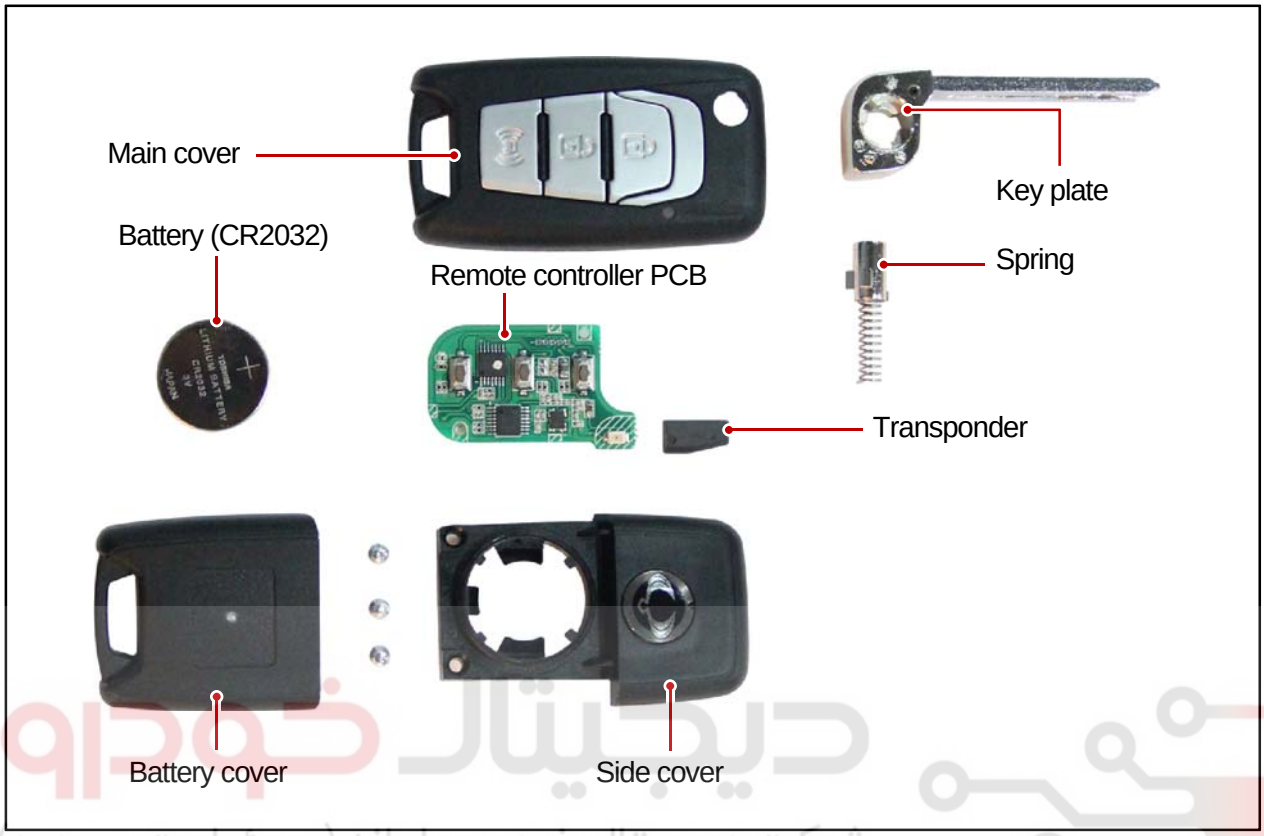


1. When the ignition key is inserted, the immobilizer unit requests the transponder verification through the antenna.
2. The transponder sends the encrypted message to the immobilizer control unit.
3. The immobilizer unit compares the encrypted message received from the transponder to the coded value through the logic circuit. If they are identical, it requests the transponder approval. When the ignition is turned ON, the EMS (ECU) requests immobilizer verification process through
4. the P-CAN.
   The immobilizer control unit sends the encrypted message to the EMS (ECU).
5. The EMS controls the engine normally when the coded value and the encrypted message sent
6. from the immobilizer are identical.

NOTE

When the immobilizer verification has failed, the verification signal is sent again 3 times for 2 seconds, and the verification procedure is carried out up to 3 times by turning the ignition ON within 10 seconds. If the three re-verifications fail, verification procedure is stopped and will be restarted after 10 seconds.

4) REKES Key Configuration



▶ **Battery replacement**

Remove the battery cover with a flat-bladed screwdriver to replace the battery.

▶ **Transponder replacement**

- Remove the battery cover to remove the battery.
- Remove the key plate after removing the rubber cover and screws.
- Remove the side cover and main cover.
- Replace the transponder

Modification basis	
Application basis	
Affected VIN	

5) Cautions for immobilizer

CAUTION

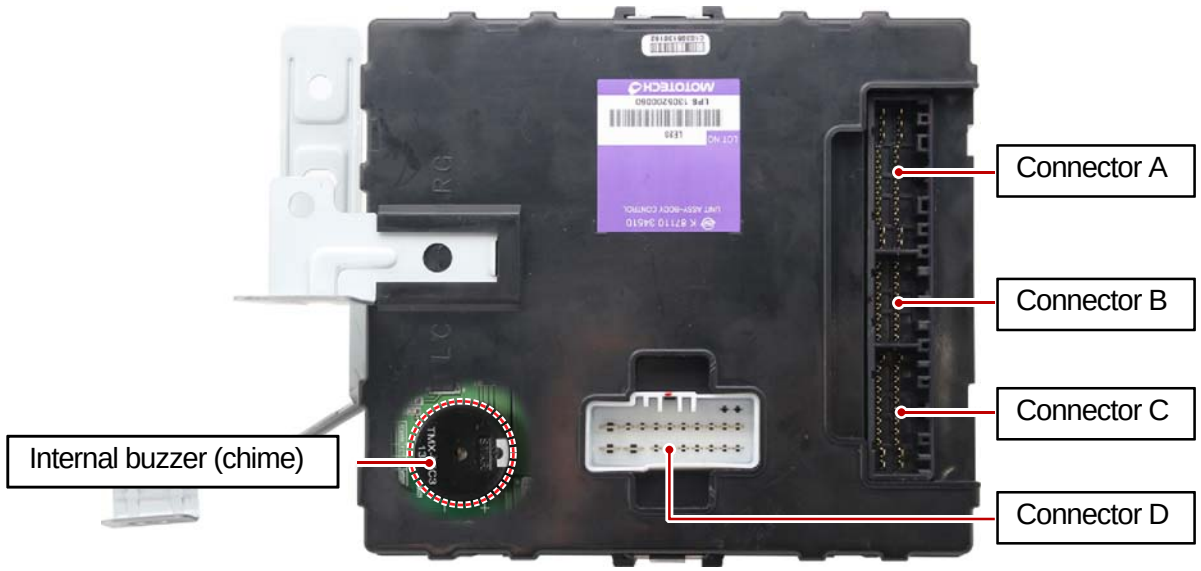
1. When deleting the old code of the transponder registering an extra ignition key, please attend on the site and observe the process personally.
2. In any cases, the immobilizer system cannot be removed from the vehicle. If you attempt to remove it and damage the system, starting will be impossible. So never attempt to remove, damage or modify it.
3. The remote engine starter cannot be installed to the vehicle equipped with the immobilizer system. Do not drop the key or subject it to impact the key, as it may damage the transponder inside the
4. key.
   The engine cannot be started using a key with damaged transponder.
5. In the following cases, you may experience starting problem or a system error can occur.
6.
   - When two or more ignition keys come into contact with (each) other(s), or the key is close to any device that sends/receives electromagnetic fields or waves.
   - When the ignition key is close to any electromagnetic device, such as lighting equipment, security keys or security cards.
   - When the key is close to a magnetic, metal object, or battery.

CONFIGURATION AND FUNCTIONS

S.G.N. 8710-01 BCM (BODY CONTROL MODULE)

1) Mounting Location

BCM



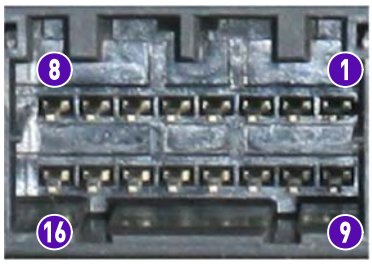
Modification basis	
Application basis	
Affected VIN	

2) Connector Pin Description

Connector A

Pin No.	Function	Pin No.	Function
1	Door coupled room lamp control switch	14	AUTO light & rain sensor
2	Driver side room lamp switch	15	Tail lamp relay
3	Passenger door UNLOCK switch	16	Rear door LH/RH UNLOCK switch
4	Passenger door LOCK switch	17	Puddle (approach) lamp
5	Driver door UNLOCK switch	18	Hood open switch
6	Driver door LOCK switch	19	Tailgate open switch
7	Charge signal (D+)	20	Rear RH door open switch
8	IGN2	21	Rear LH door open switch
9	IGN1	22	Passenger door open switch
10	Key reminder switch	23	Driver door open switch
11	-	24	Warning horn relay
12	Front defogger (heated wire) relay	25	Rear defogger (heated wire) relay
13	B+	26	Ground

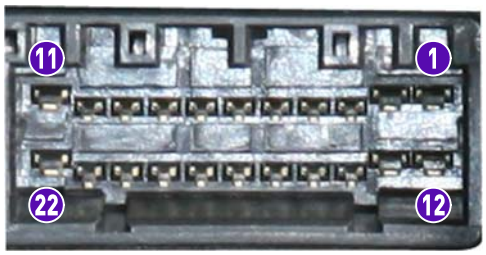
Modification basis	
Application basis	
Affected VIN	

Connector B


Pin No.	Function	Pin No.	Function
1	Immobilizer signal (+)	9	Immobilizer signal (-)
2	Rear washer switch	10	Ground
3	Windshield washer switch	11	Key hole lamp (+)
4	AUTO washer switch	12	Key hole lamp (-)
5	Wiper motor (parking)	13	Coming home
6	Wiper INT	14	Hazard warning lamp (instrument cluster)
7	Wiper switch 2	15	Folding/unfolding switch
8	Wiper switch 1	16	Tailgate open switch

Modification basis	
Application basis	
Affected VIN	

Connector C



Pin No.	Function	Pin No.	Function
1	P-CAN High	12	P-CAN Low
2	Door ajar warning lamp (Instrument cluster)	13	Ground
3	Central door LOCK/UNLOCK switch	14	-
4	Sunroof open switch	15	-
5	Rear defogger (heated wire) switch	16	Hazard warning lamp switch
6	Front defogger (heated wire) switch	17	Right turn signal lamp switch
7	Crash sensor (air bag)	18	Left turn signal lamp switch
8	-	19	AUTO hazard warning lamp switch
9	-	20	Tail lamp switch
10	Driver seat belt switch	21	AUTO light switch
11	B-CAN High	22	B-CAN Low

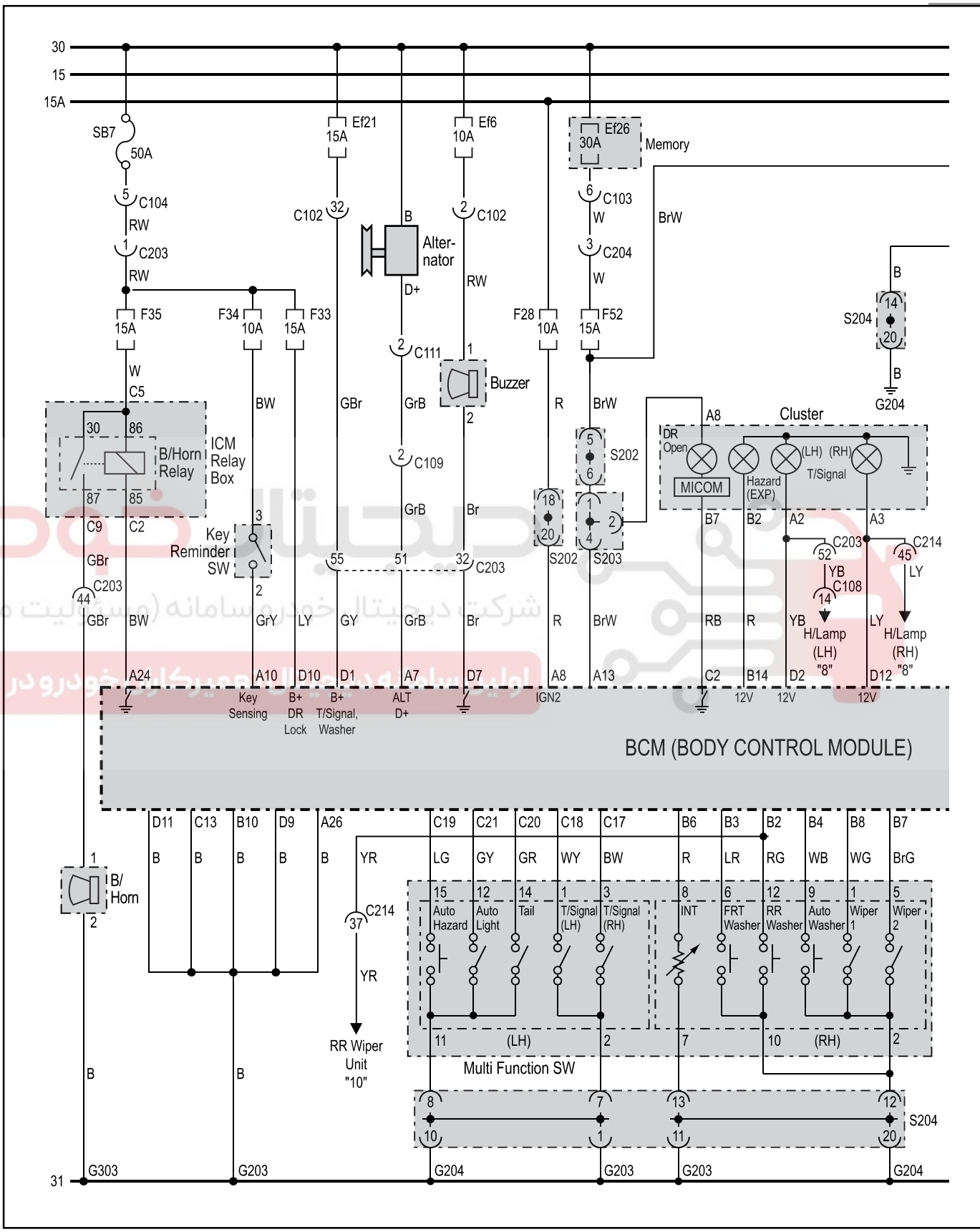
Modification basis	
Application basis	
Affected VIN	

Connector D


Pin No.	Function	Pin No.	Function
1	Turn signal lamp/ Washer motor power	11	Ground
2	Left turn signal lamp (+)	12	Right turn signal lamp (+)
3	Headlamp relay (+)	13	AUTO light power
4	Windshield washer motor (+)	14	Rear washer motor (+)
5	Wiper LO relay	15	Wiper HI relay
6	Tailgate relay	16	Unfolding relay
7	External buzzer (SKM buzzer)	17	Folding relay
8	Power window relay	18	Driver door UNLOCK actuator (+)
9	Ground	19	Driver door LOCK actuator (+)
10	LOCK/UNLOCK power		

Modification basis	
Application basis	
Affected VIN	

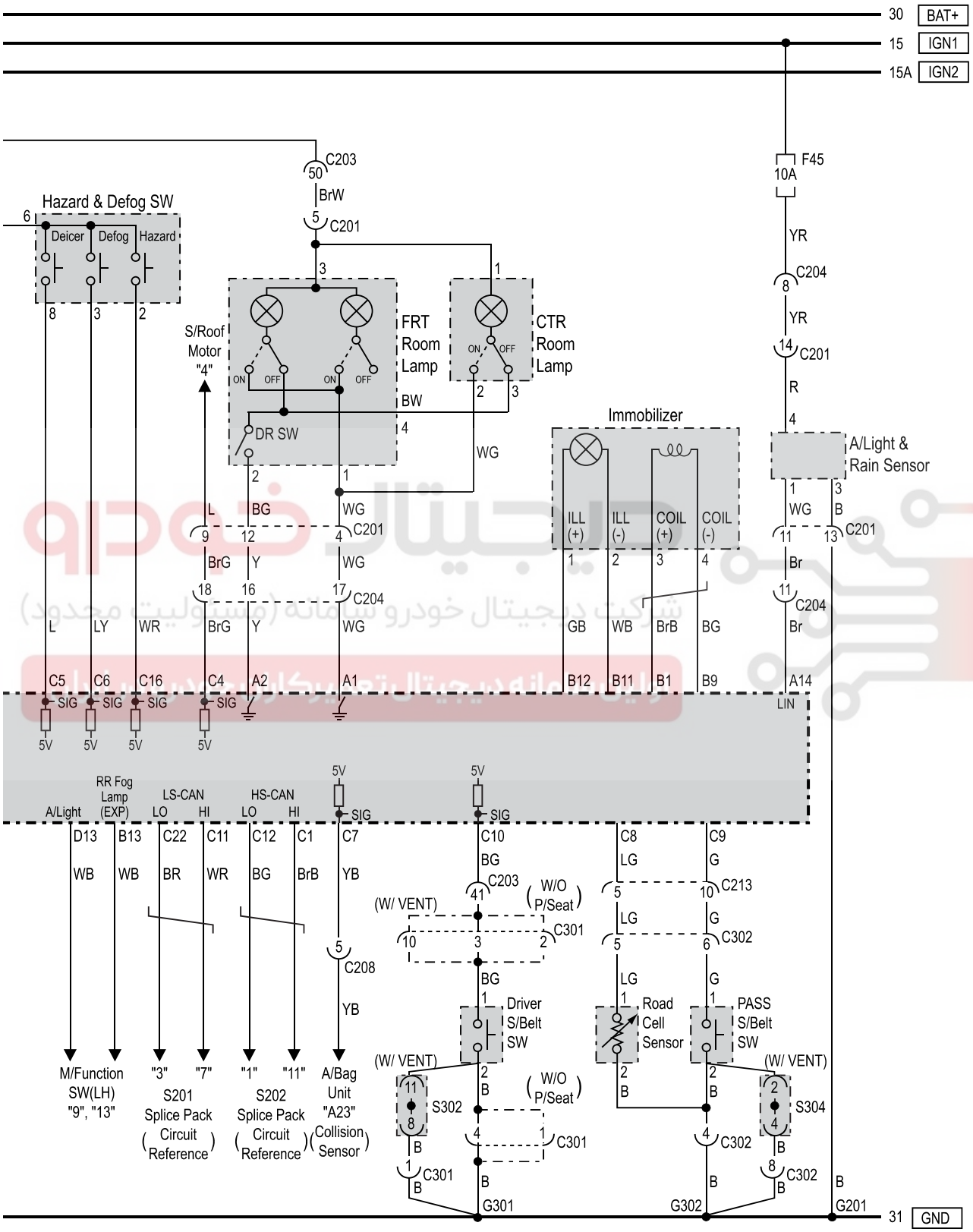
4) Circuit Diagram



Modification basis	
Application basis	
Affected VIN	

BCM

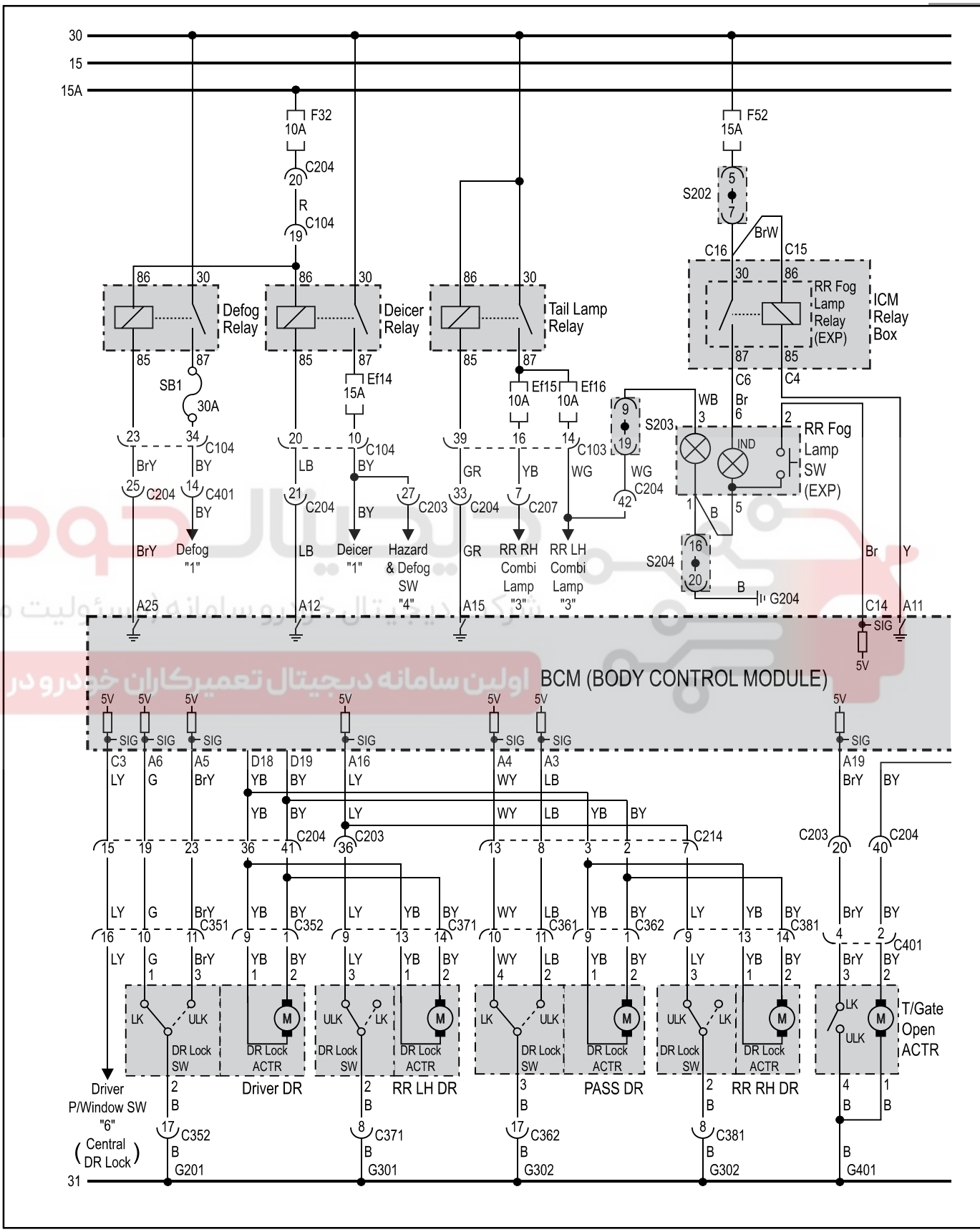
KORANDO 2015.01



BCM

KORANDO 2015.01

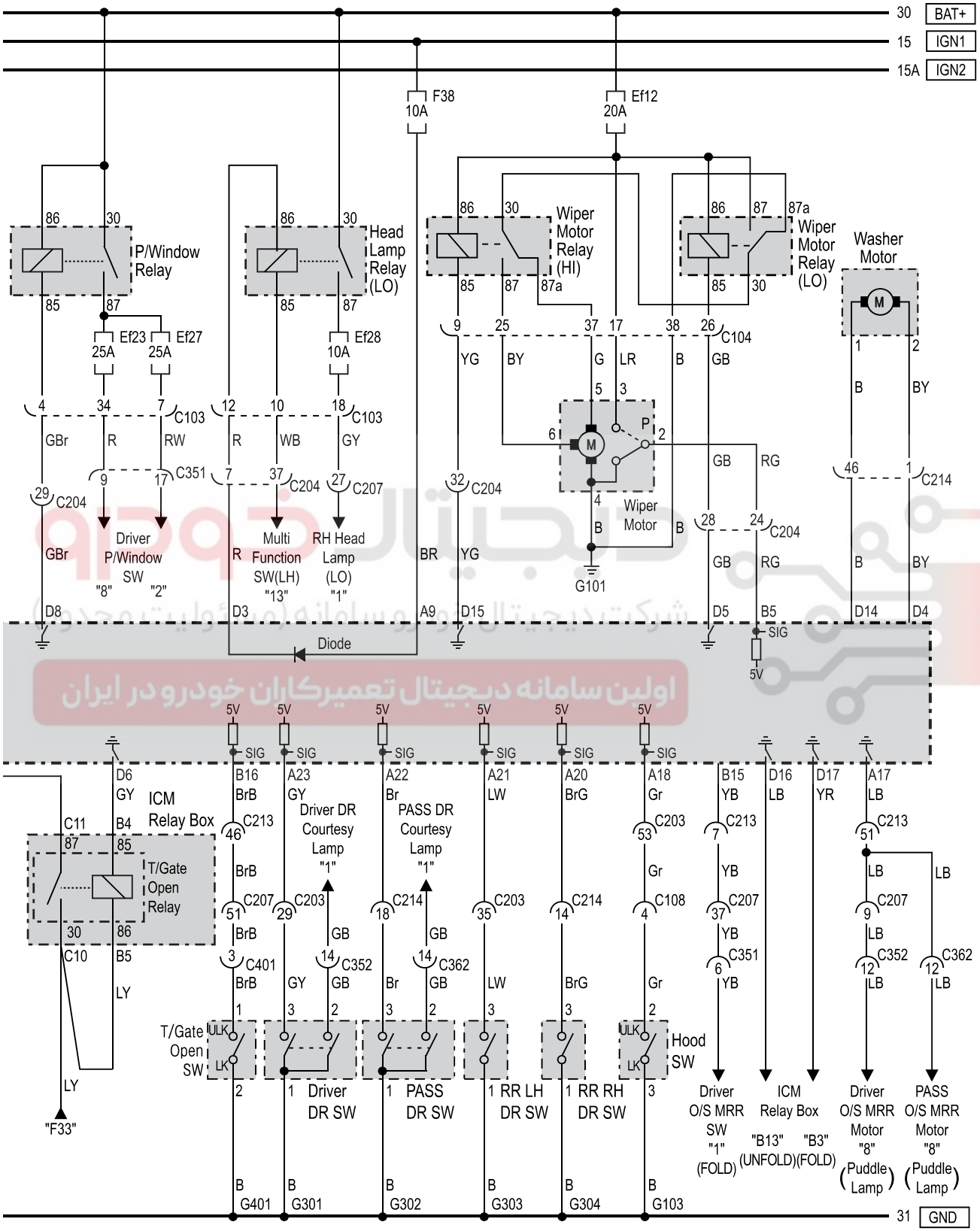
Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	

BCM

KORANDO 2015.01



BCM

KORANDO 2015.01

Modification basis	
Application basis	
Affected VIN	

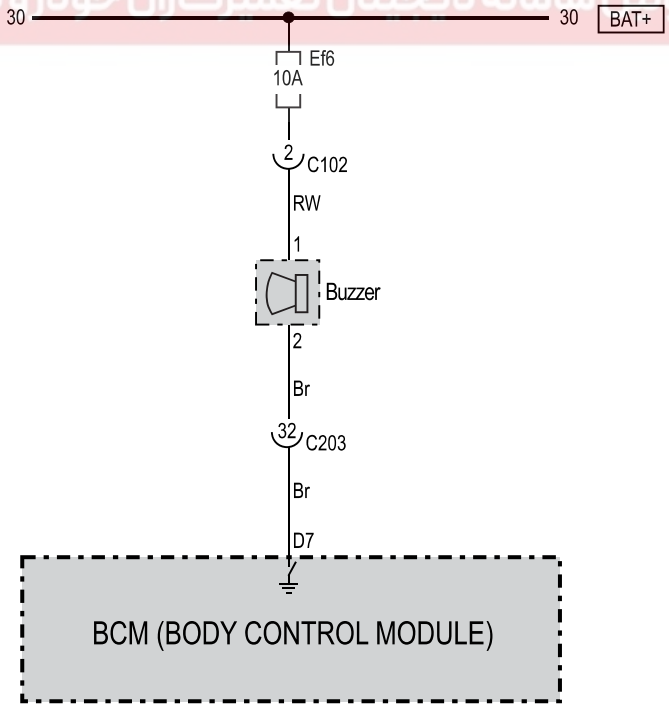
S.G.N. 8610-18

EXTERNAL BUZZER (SKM BUZZER)

1) Mounting Location

External buzzer (SKM buzzer)

2) Wiring Diagram



Connector to external buzzer

Connector to wiring

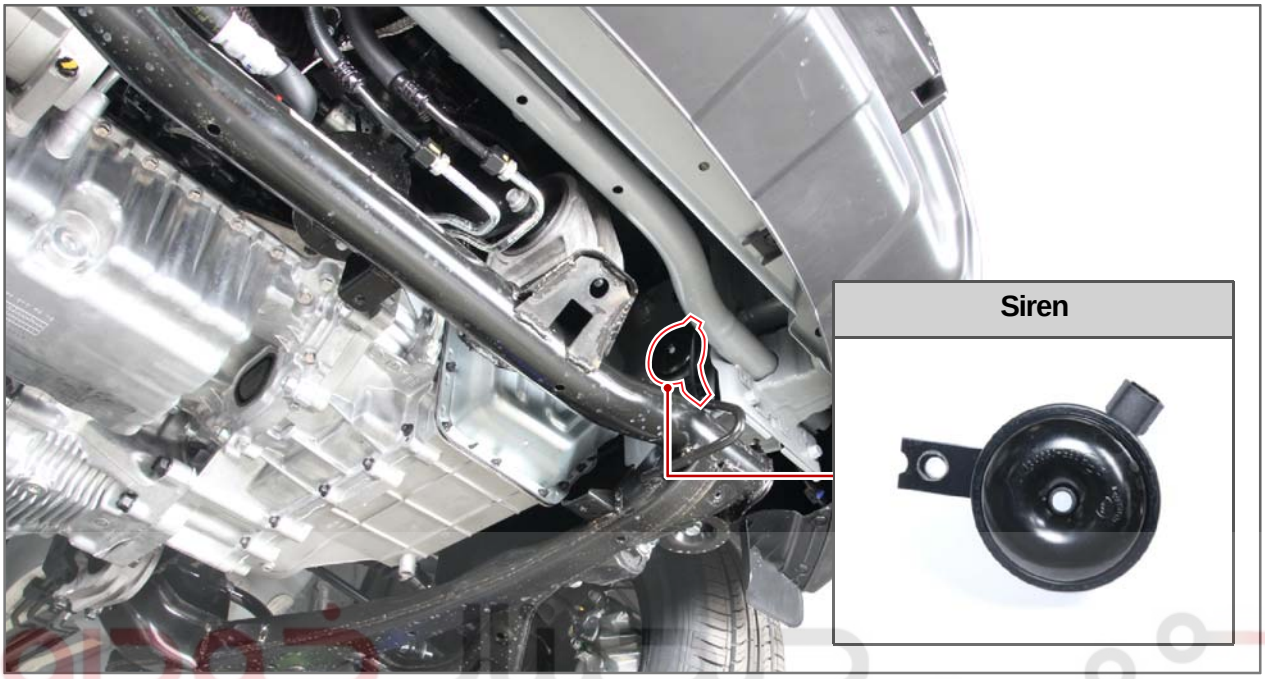
Pin No.	Function
1	12 V B+
2	External buzzer control BCM (Pin_D7)

Modification basis	
Application basis	
Affected VIN	

S.G.N. 8710-13

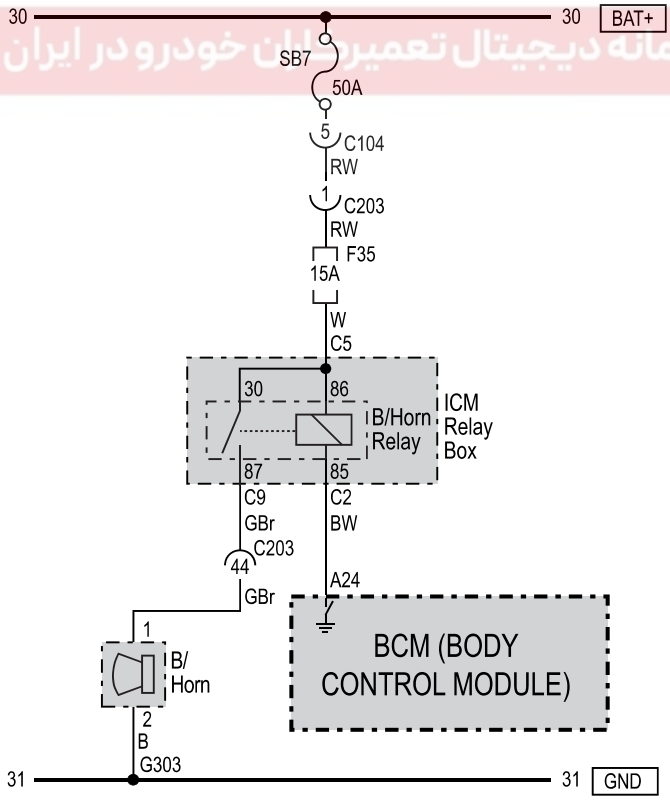
WARNING HORN

1) Mounting Location

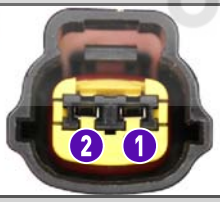


Siren

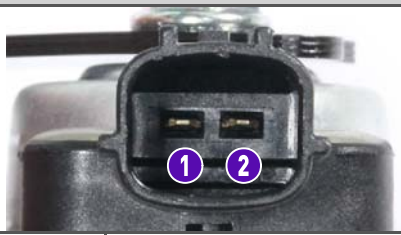
2) Wiring Diagram



Connector to warning horn



Connector to wiring



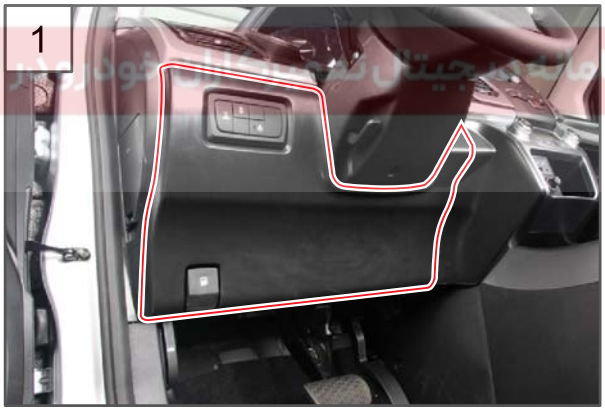
Pin No.	Function
1	Ground
2	Theft deterrent alarm siren relay connecting (87)

Modification basis	
Application basis	
Affected VIN	

REMOVAL AND INSTALLATION

S.G.N. 8712-28 **BCM**

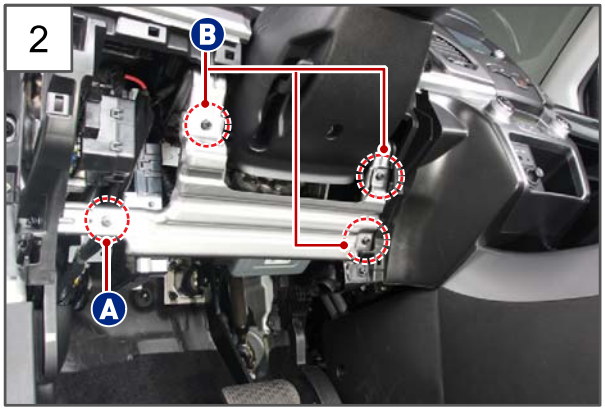
Preceding work - Disconnect the negative battery cable.



1. Remove the lower main panel assembly.

NOTE

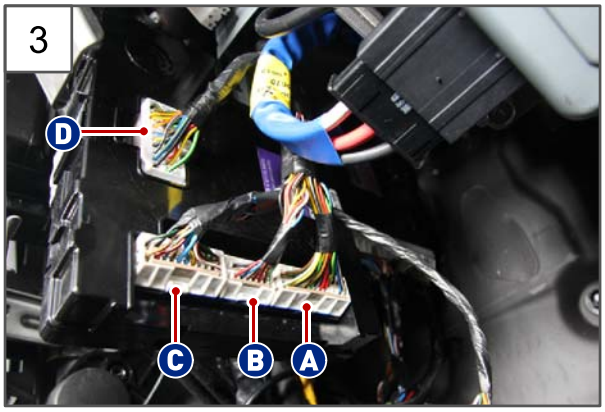
Refer to "Removal and Installation, Lower main panel" section of "Body Interior".



2. Unscrew the mounting nut(A, 10 mm) and 3 mounting bolts (B, 10 mm) for the IP sub frame to remove the IP sub frame.

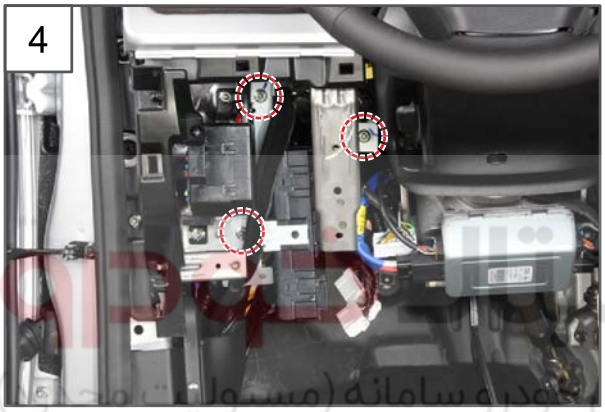
Modification basis	
Application basis	
Affected VIN	

3



3. Disconnect the BCM connectors A, B, C, and D.

4



4. Unscrew the 3 BCM mounting nuts (10 mm).

5

5. Disengage the wiring holder mountings (7 points) around the BCM bracket.

6

6. Remove the BCM.

Modification basis	
Application basis	
Affected VIN	

7

7. Install in the reverse order of removal.

CAUTION

The sharp cutting edge of the bracket may scratch or damage the wiring because the working space for removing is not enough.

NOTE

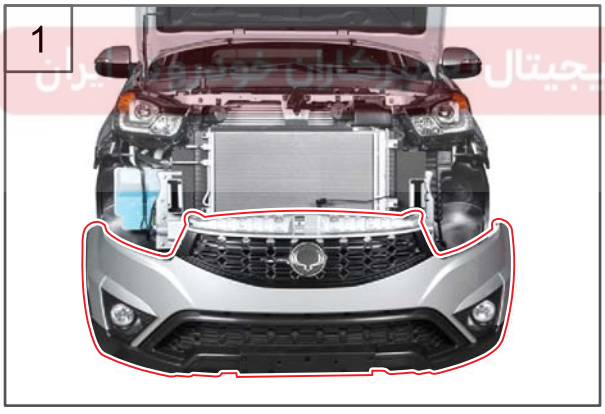
Check the variant coding and correct it, if needed, using a diagnostic program after replacing the BCM.

S.G.N. 8610-18

EXTERNAL BUZZER (SKM BUZZER)

Preceding work - Disconnect the negative battery cable.

1

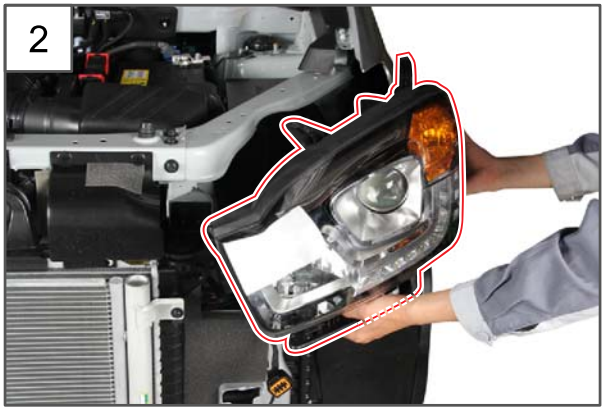


1. Remove the front bumper assembly.

NOTE

Refer to "Removal and installation, Front bumper assembly" section of "Body, Body Exterior".

2



2. Remove the driver side headlamp assembly.

NOTE

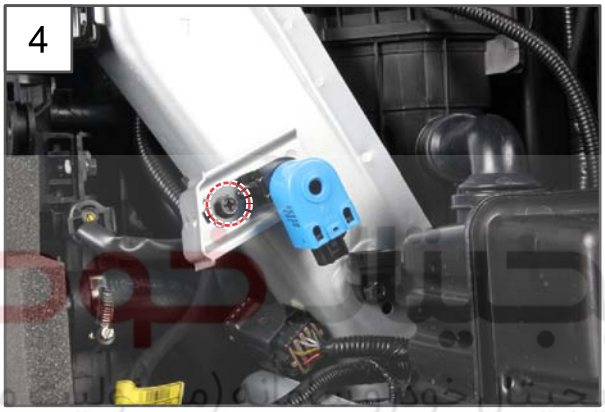
Refer to "Removal and installation, Headlamp" section of "Electronic, Lamp"

Modification basis	
Application basis	
Affected VIN	

3

3. Disconnect the external buzzer (SKM buzzer) connector.

4



4. Unscrew the mounting nut (10 mm) for the external buzzer (SKM buzzer).

5

5. Remove the external buzzer (SKM buzzer).

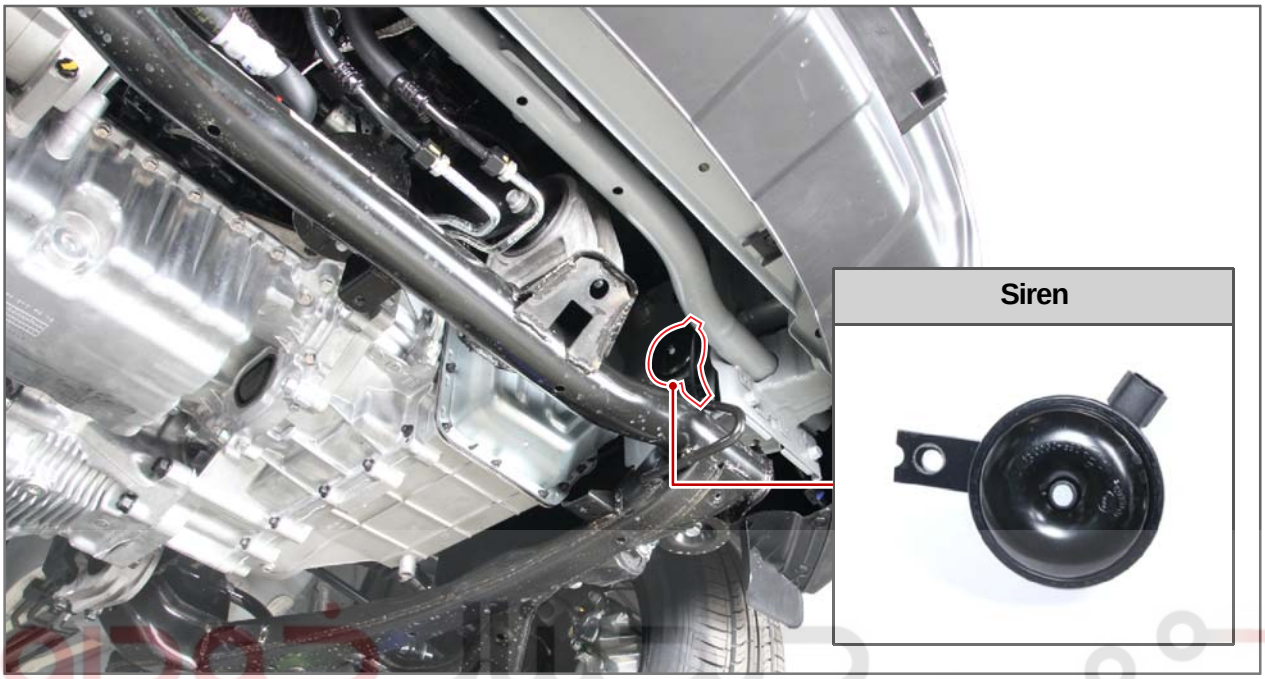
6

6. Install in the reverse order of removal.

Modification basis	
Application basis	
Affected VIN	

S.G.N.
8710-13 WARNING HORN

Preceding work - Disconnect the negative battery cable.



1. Disconnect the warning horn connector.

2. Unscrew the mounting nut (10 mm) for the warning horn.

Modification basis	
Application basis	
Affected VIN	

3

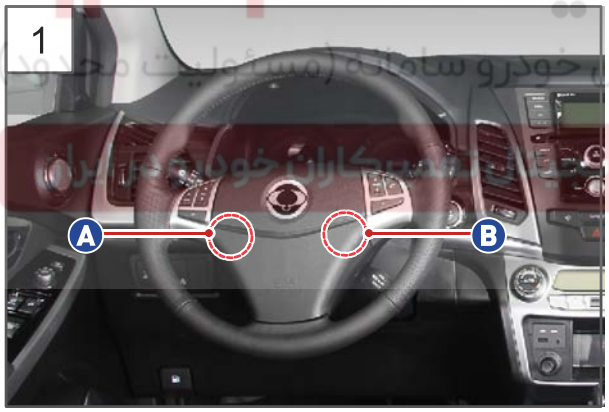
3. Remove the warning horn.

4

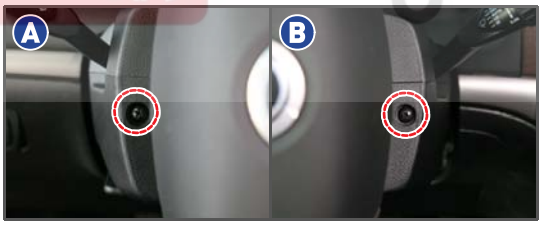
4. Install in the reverse order of removal.

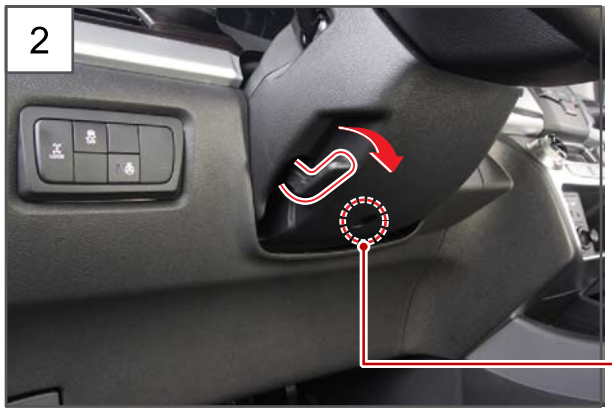
Modification basis	
Application basis	
Affected VIN	

S.G.N.
7010-06 IMMOBILIZER ANTENNA



1. Unscrew the 2 mounting screws for the shroud lower cover after rotating the steering wheel to make room for working.





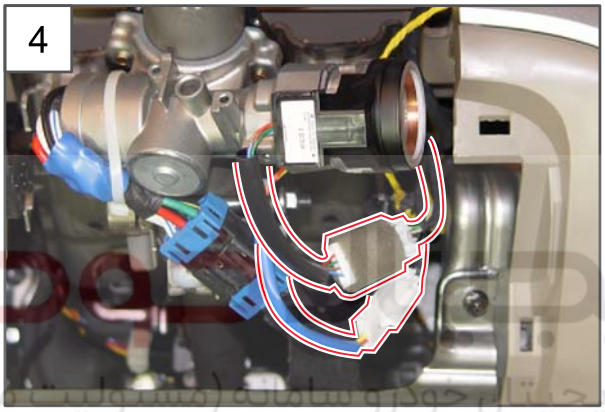
2. Unscrew the mounting screw for shroud lower cover under the steering wheel, and push down the steering column tilting lever in the direction of the arrow shown in the picture.

Modification basis	
Application basis	
Affected VIN	

3

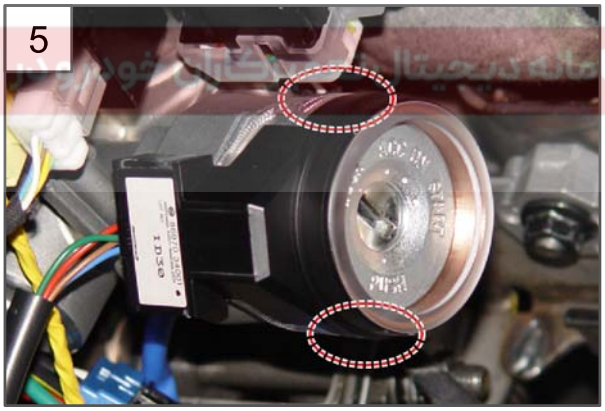
3. Unscrew the 2 mounting screws for the shroud lower cover after rotating the steering wheel to make room for working.

4



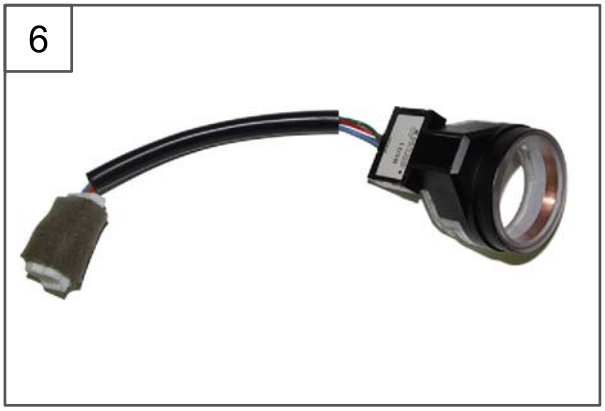
4. Disconnect the immobilizer antenna connector and disengage the wiring mounting clip.

5



5. Pry off the immobilizer antenna mountings using a flat bladed screwdriver to remove the antenna.

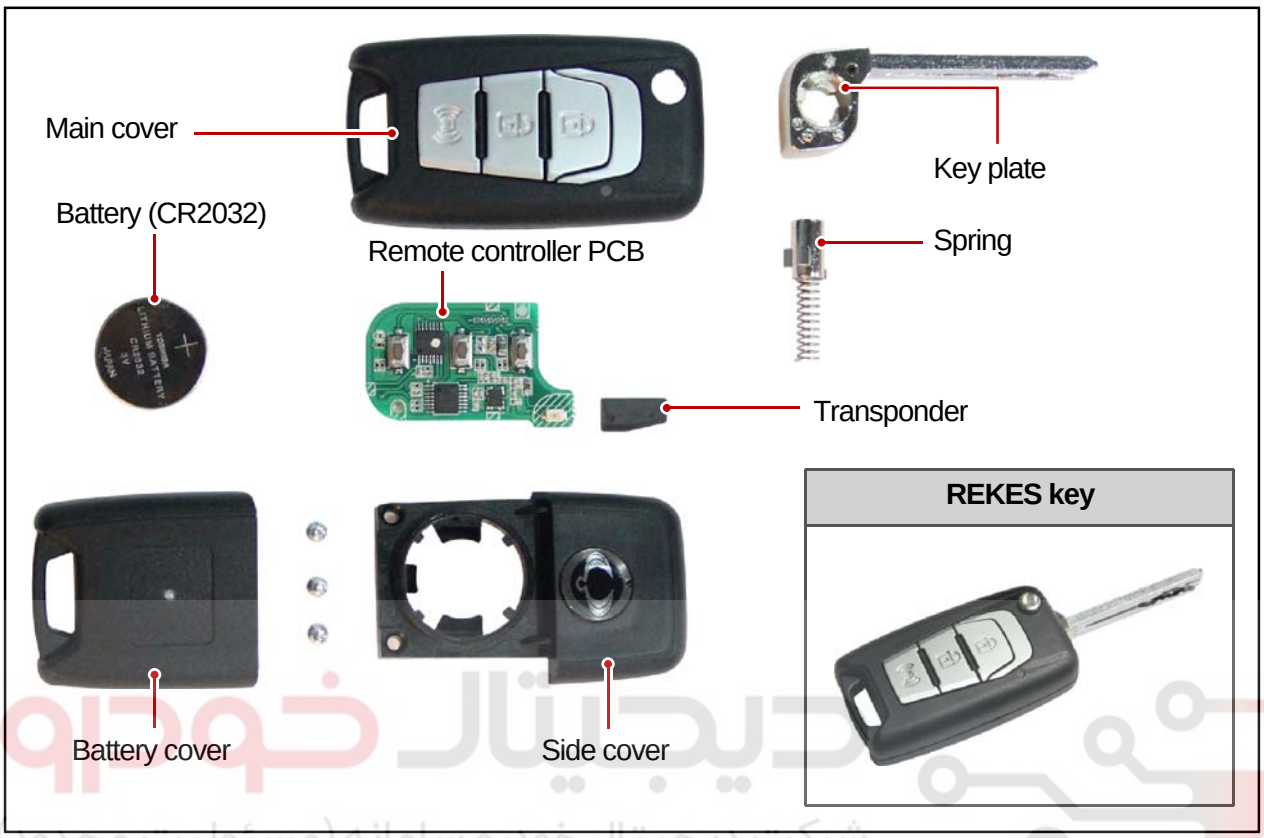
6



6. Install in the reverse order of removal.

Modification basis	
Application basis	
Affected VIN	

S.G.N.
8710-09 REKES KEY



1

1. Remove the REKES key battery cover in the direction of the arrow shown in the picture.

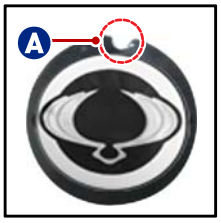
2

2. Remove the REKES key battery.

Modification basis	
Application basis	
Affected VIN	

3

3. Remove the SSANGYONG emblem in the upper side of the REKES key.



CAUTION

Align the groove (A) of the emblem with the protrusion of the side cover when fitting the emblem.

4

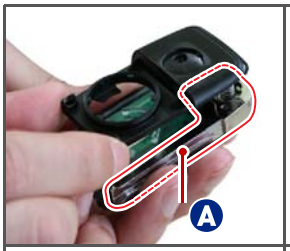
4. Unscrew the 3 mounting screws securing the REKES key side cover.

5

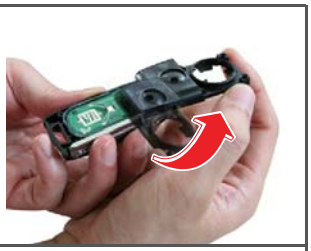
5. Remove the REKES key side cover.

NOTE

Refer to Cautions for installation.



Hold the key plate (A) by hand to disengage the side cover.



Rotate the side cover counterclockwise until the spring tension is release.

Modification basis	
Application basis	
Affected VIN	

6

6. Remove the spring pin.

NOTE

Refer to Cautions for installation.

7

7. Remove the key plate.

NOTE

Refer to Cautions for installation.

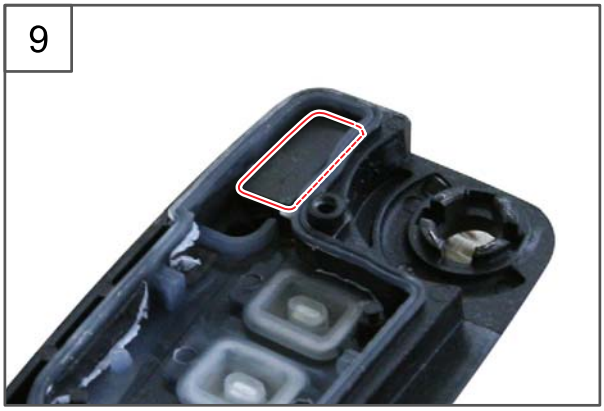
8

8. Disengage the mountings (A) and remove the PCB.

CAUTION

Do not apply excessive force to remove the PCB. Otherwise, it could be damaged.

9



9. Remove the transponder.

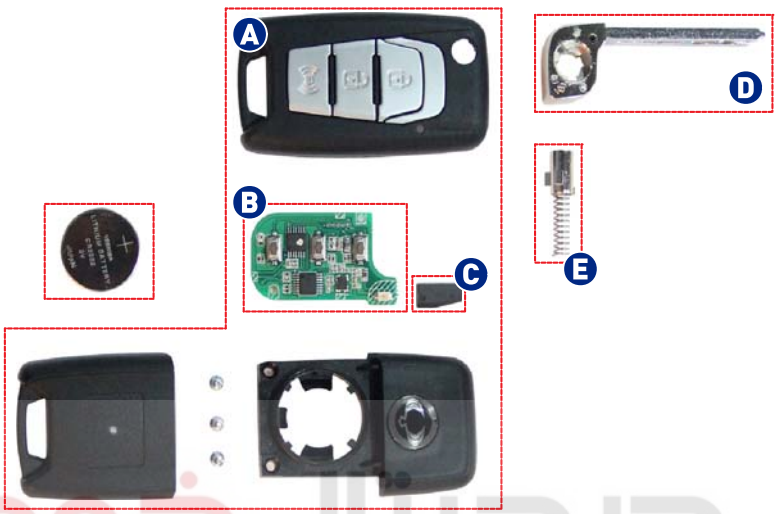
CAUTION

Install so that the transponder serial number is facing up.

Modification basis	
Application basis	
Affected VIN	

10.Install in the reverse order of removal.

10

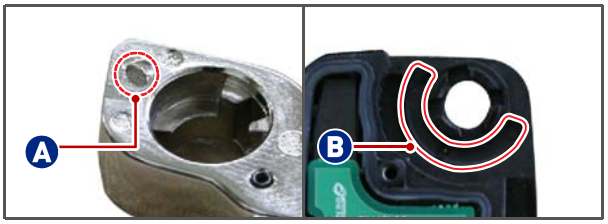


REKES key


SGN NO.	
A	8710-09
B	8710-10
C	8710-15
D	7010-05
E	7010-10

Modification basis	
Application basis	
Affected VIN	

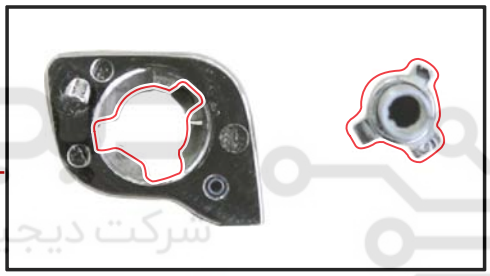
Cautions for key plate installation



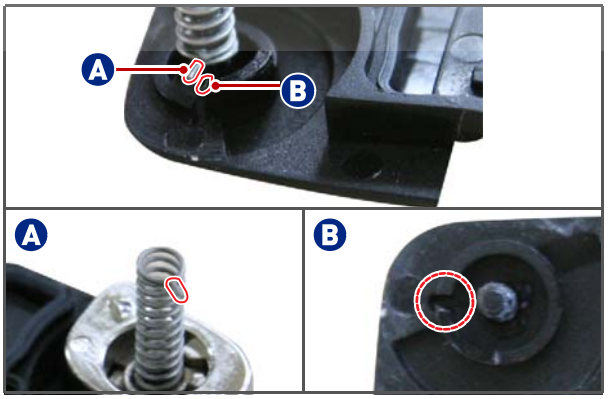
Install the key plate by aligning the protrusion (A) of the key plate to the groove (B) of the main cover.

Cautions for spring pin installation

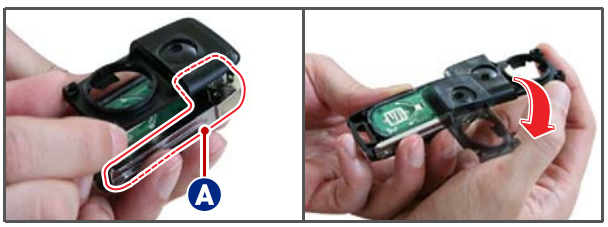
Install the spring pin by aligning the protrusions (A) of the spring pin to the grooves (B) of the key plate.



Cautions for side cover installation



Install the side cover by aligning the protrusion (A) at the end of the spring to the spring mounting hole (B) of the side cover.



Hold the key plate (A) by hand and rotate the side cover clockwise once to engage the side cover.

Modification basis	
Application basis	
Affected VIN	

CODING PROCESS

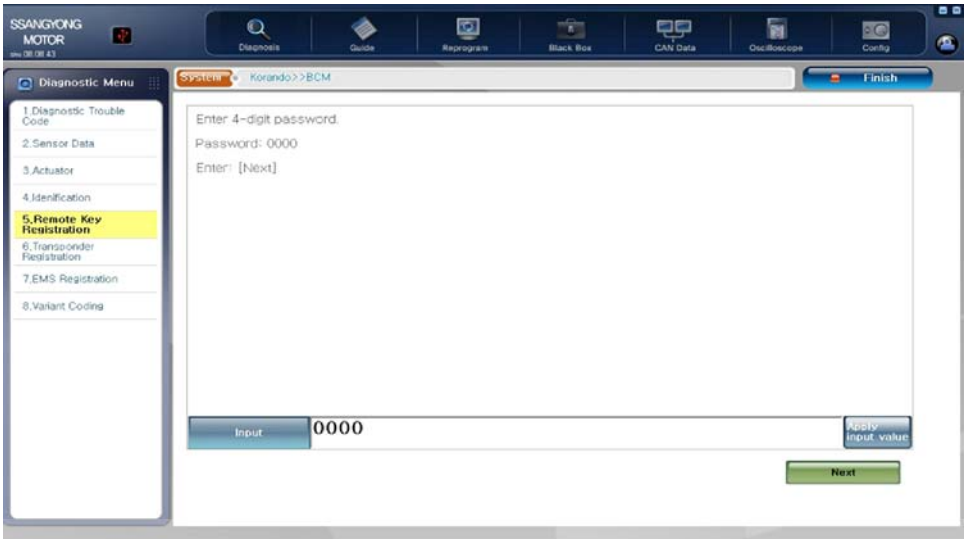
1. REKES KEY CODING

1. Insert the ignition key into the key cylinder and turn it to the ON position.

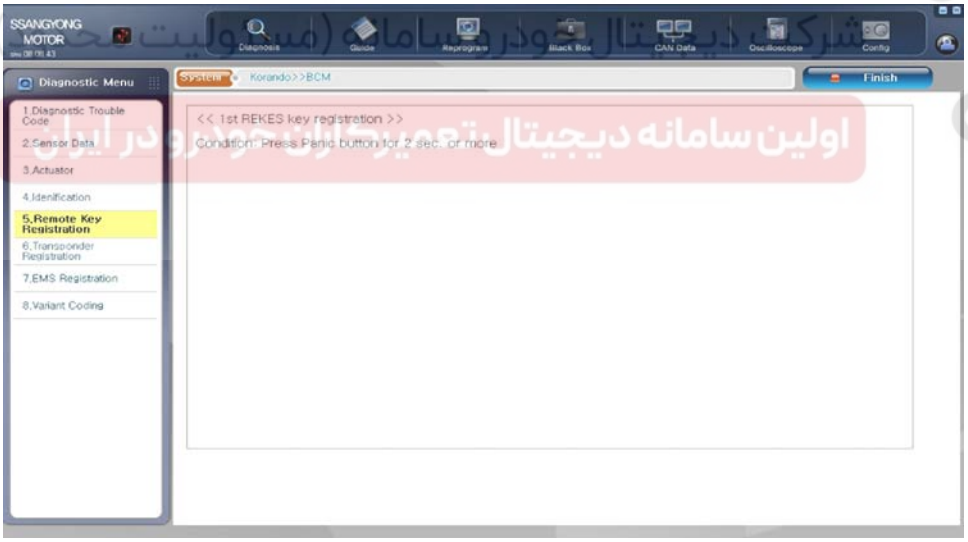
2. Select the vehicle type and system (BCM) on the diagnostic program and perform the diagnosis.

Modification basis	
Application basis	
Affected VIN	

3. Select "REKES key coding" menu and enter the password. (default value: "0000"). Click "Next".

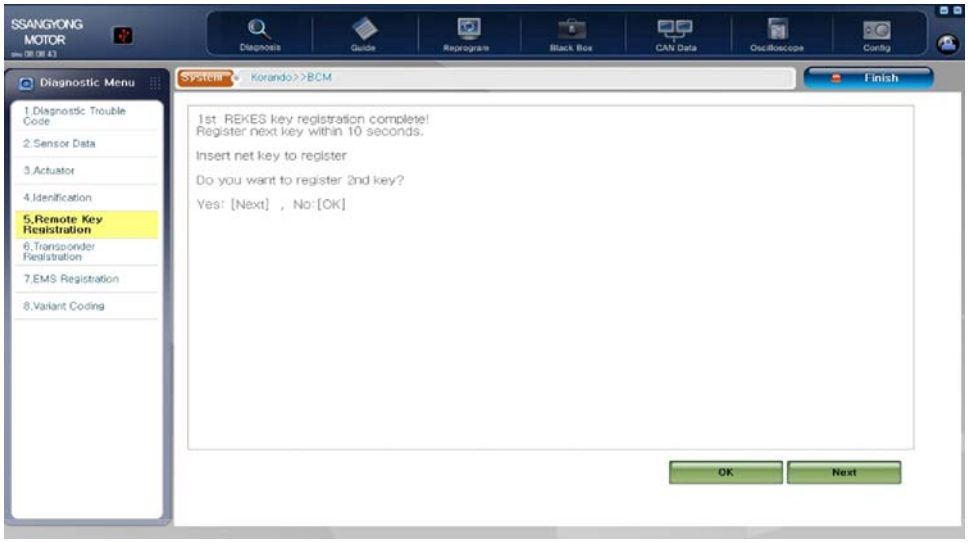


4. Press the panic button of the first REKES key for 2 seconds or longer.

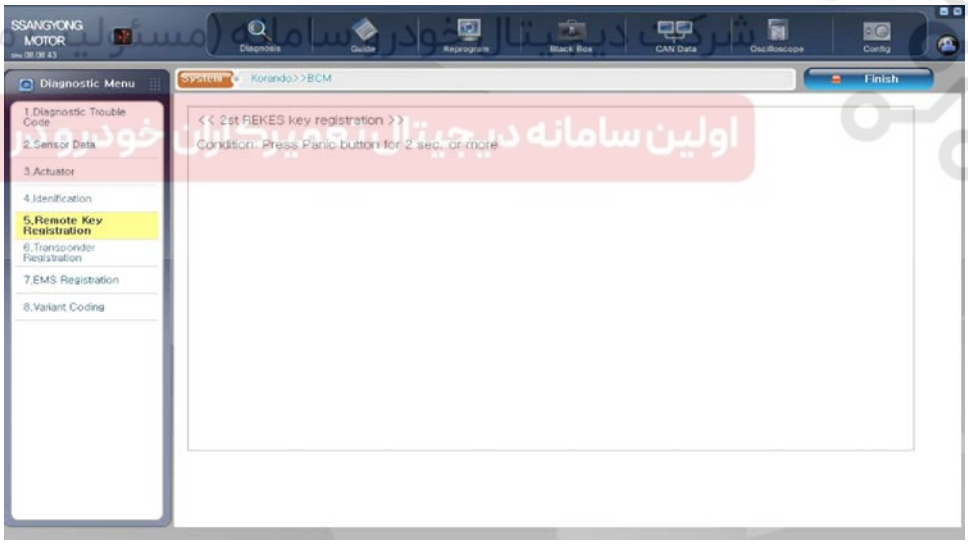


Modification basis	
Application basis	
Affected VIN	

5. Listen for the beep from the vehicle and proceed to the second REKES key coding.



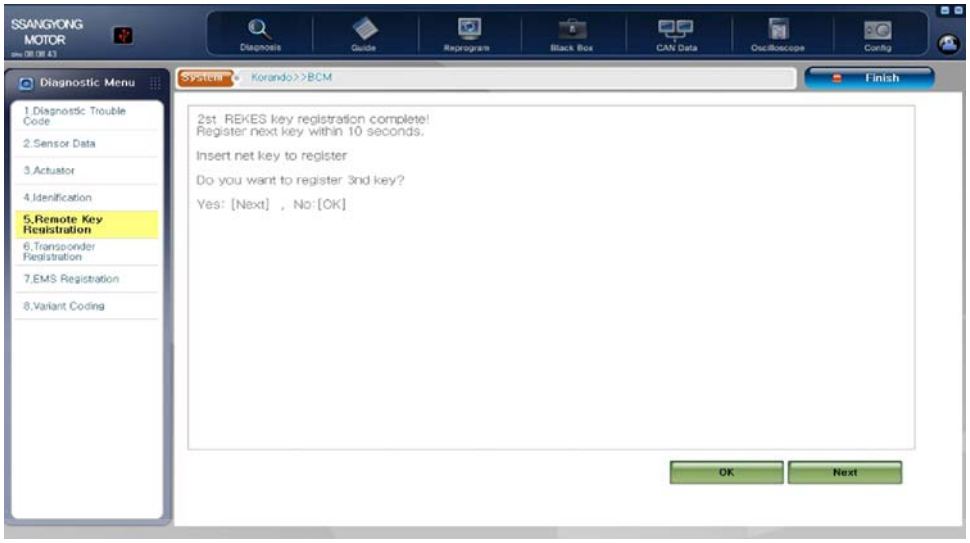
6. Operate the PANIC button on the second REKES key for more than 2 seconds.



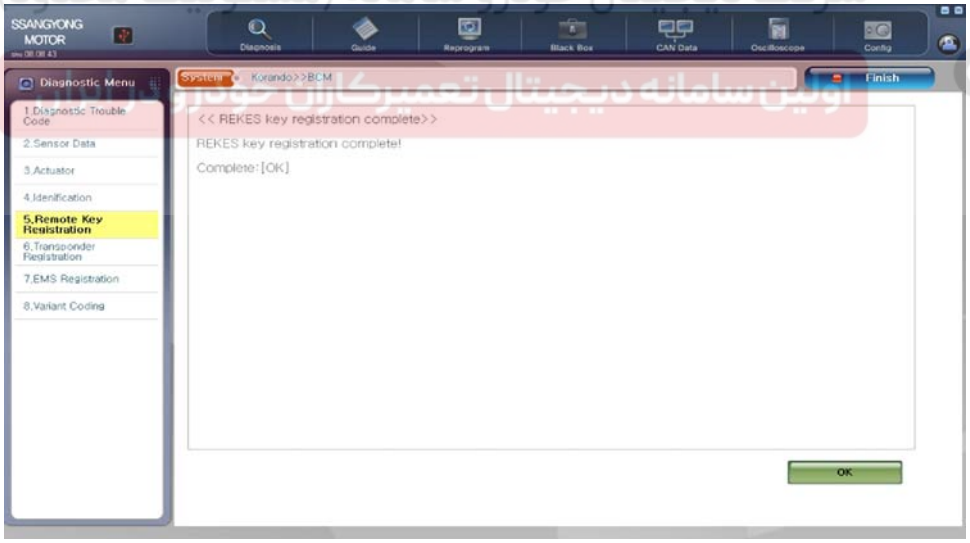
CAUTION

REKES key coding should be carried out with IGN ON. Therefore, do not change the ignition key inserted into the key cylinder after finishing the first REKES key coding. Just use the PANIC button on the REKES key for coding from the second time onward.

7. Listen for a beep from the vehicle.



8. When the registration is completed, click "OK" button.
   * Up to 5 REKES keys can be registered.



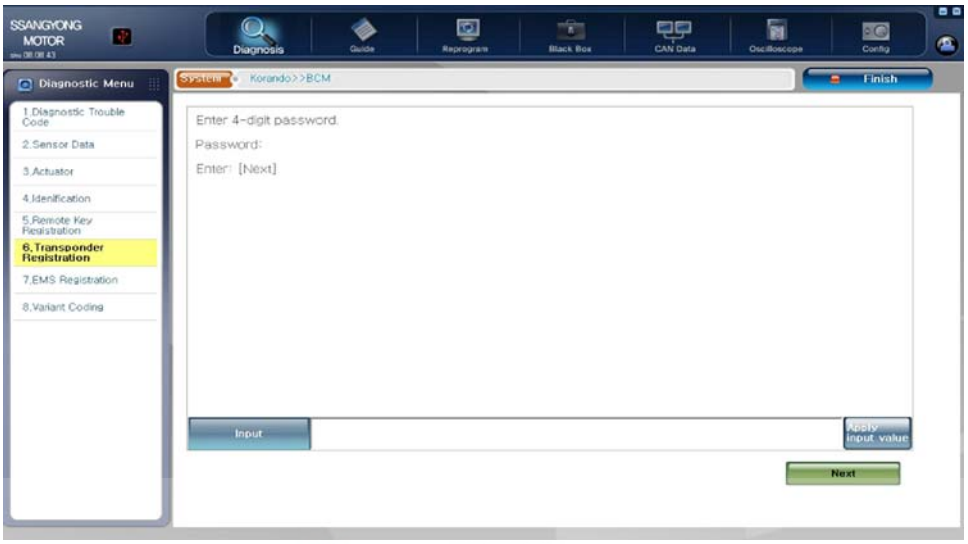
Modification basis	
Application basis	
Affected VIN	

2. TRANSPONDER CODING (BCM)

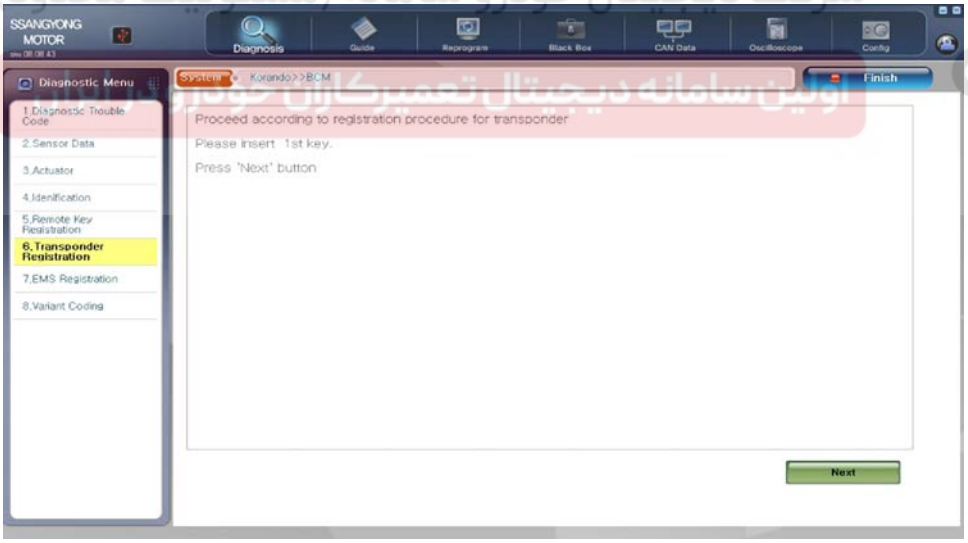
1. Insert the ignition key into the key cylinder and turn it to the ON position.

2. Select the vehicle type and system (BCM) on the diagnostic program and perform the diagnosis.

3. Select "Transponder registration" menu and enter the password. (default value: "0000"). Click "Next".

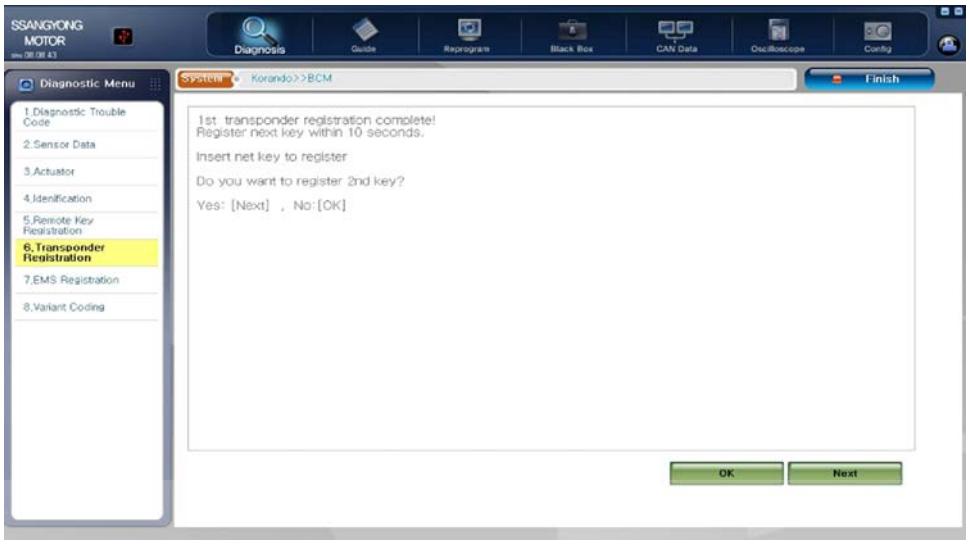


4. Click "Next" with the first key in the key box.

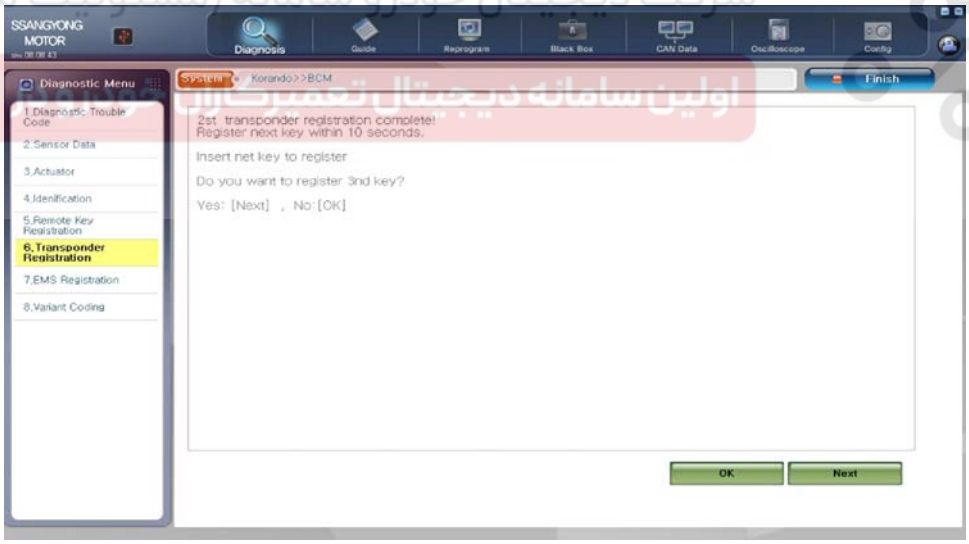


Modification basis	
Application basis	
Affected VIN	

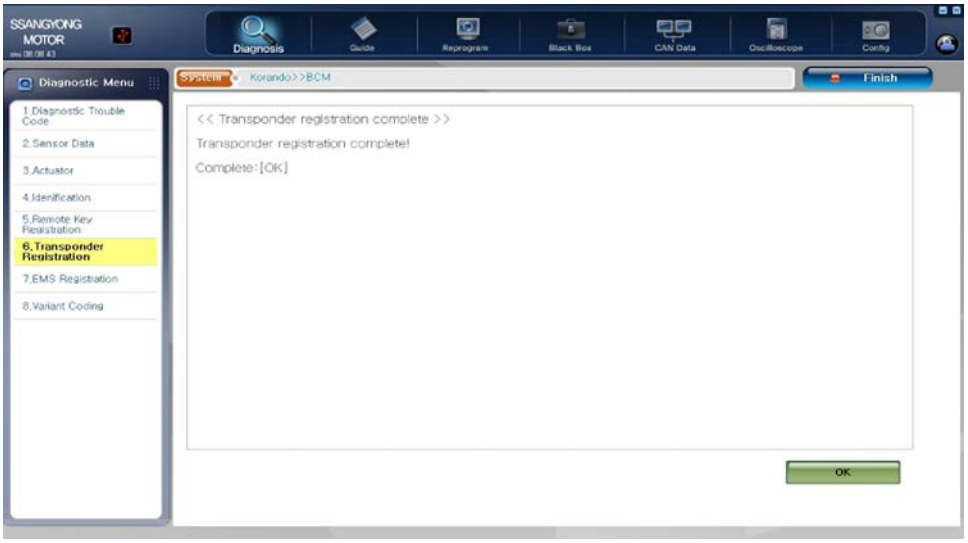
5. When the first transponder coding is completed, insert the second key into the key cylinder within 10 seconds, and click "Next".



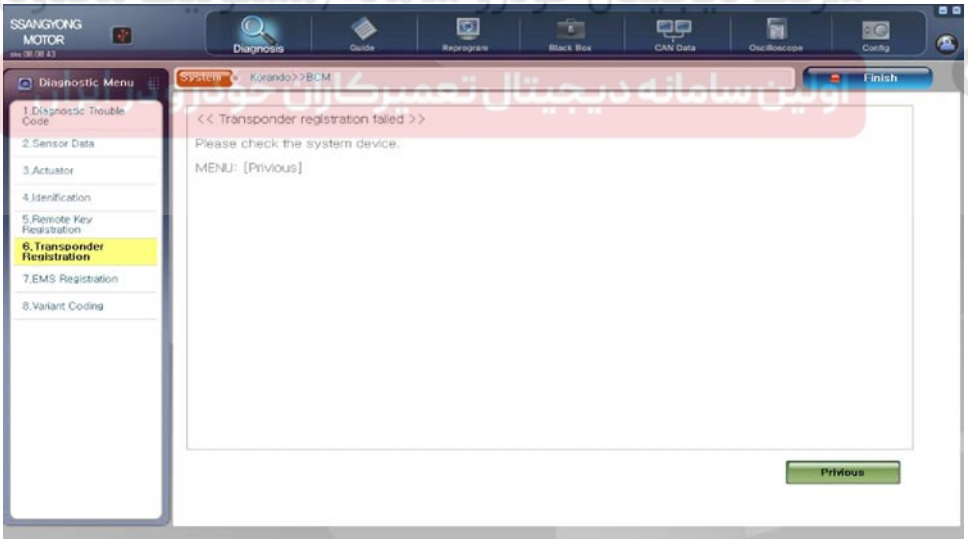
6. To perform coding for additional keys after completing the second transponder, insert other key into the key cylinder within 10 seconds, and click "Next". To finish the coding, click "Done".



7. When the registration is completed, click "OK" button.



8. When the transponder registration has failed, click "Previous" and proceed the transponder registration again.



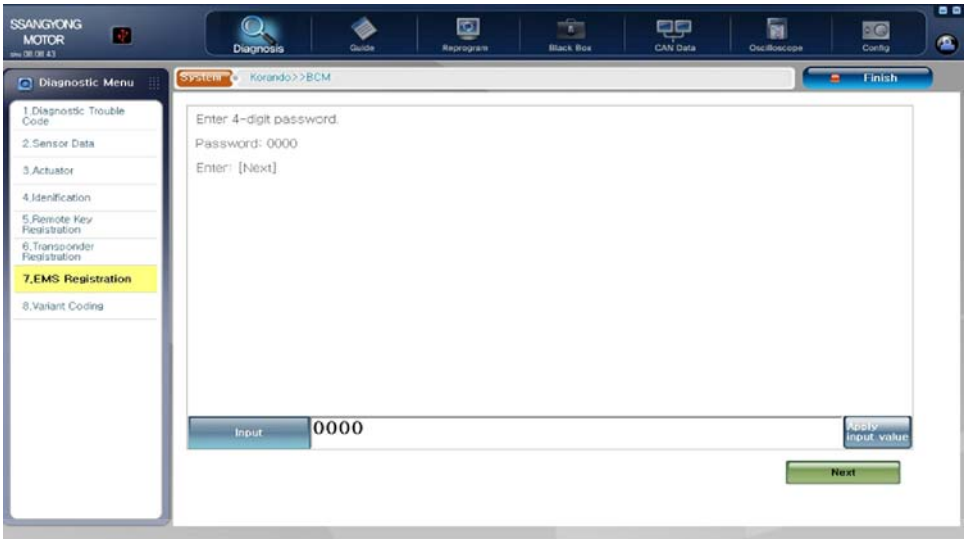
Modification basis	
Application basis	
Affected VIN	

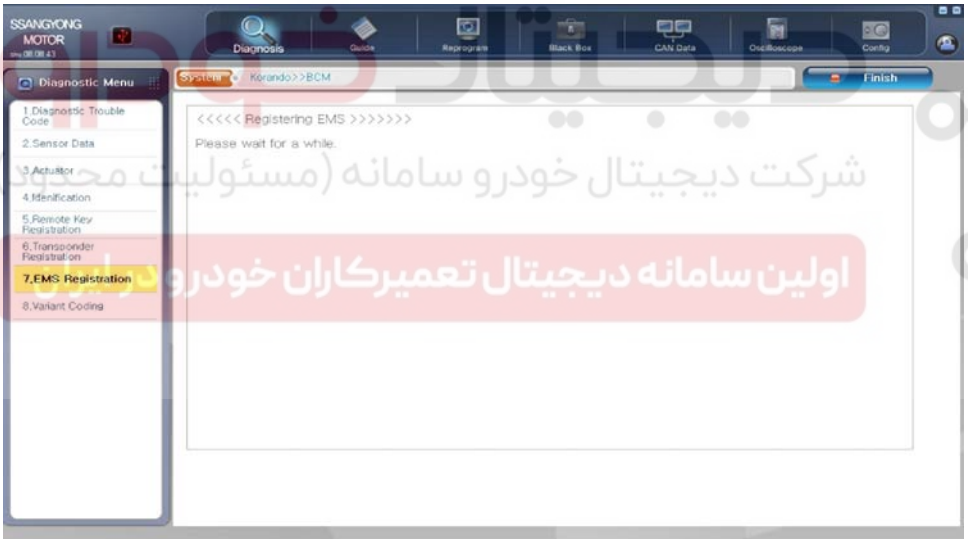
3. EMS REGISTRATION

1. Insert the ignition key into the key cylinder and turn it to the ON position.

2. Select the vehicle type and system (BCM) on the diagnostic program and perform the diagnosis.

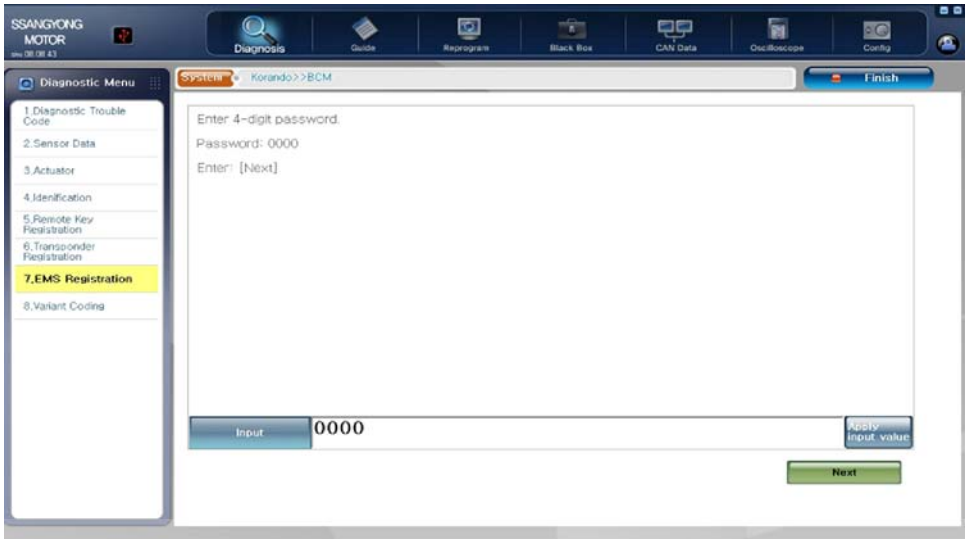
3. Select "EMS registration" menu and enter the password. (default value: "0000"). Click "Next".



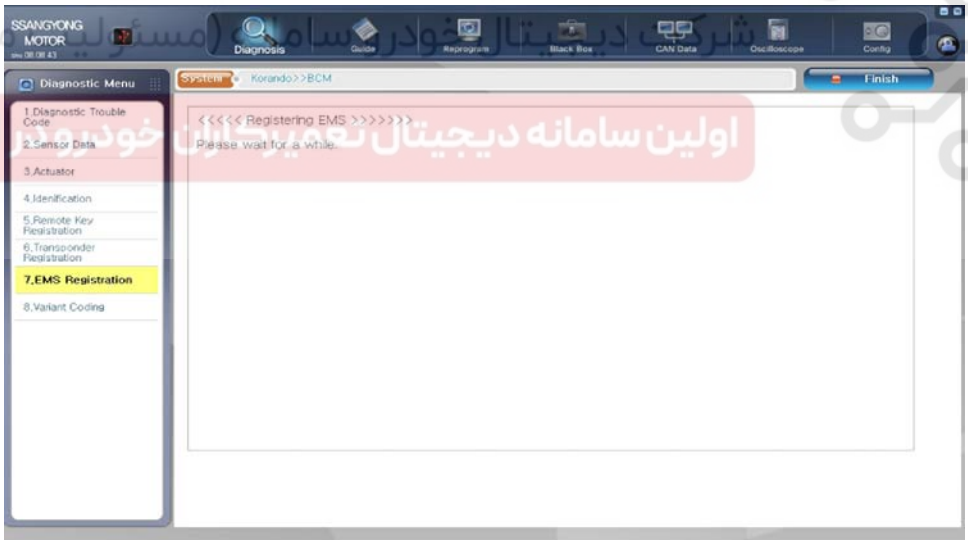


Modification basis	
Application basis	
Affected VIN	

4. Select "EMS registration" menu and enter the password. (default value: "0000"). Click "Next".

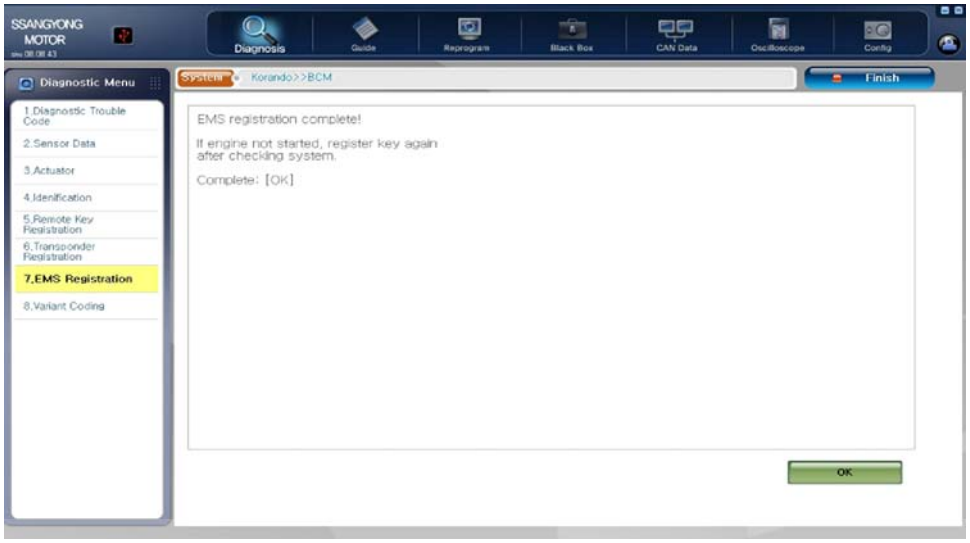


5. When the registration is completed, turn the ignition OFF and then click "OK" button.



Modification basis	
Application basis	
Affected VIN	

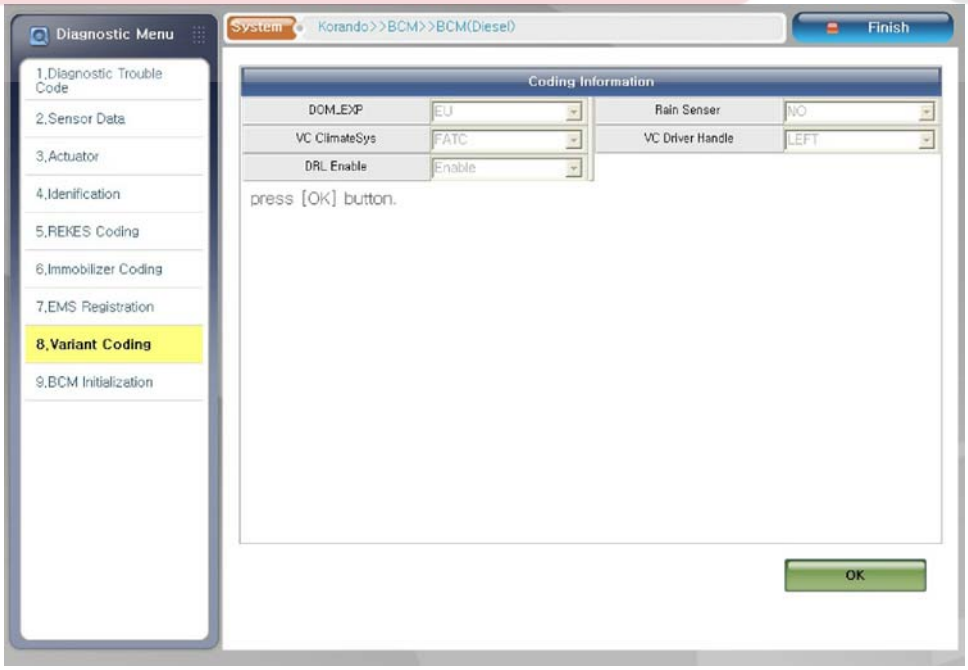
6. When the registration is completed, click "OK" button.



4. Variant coding

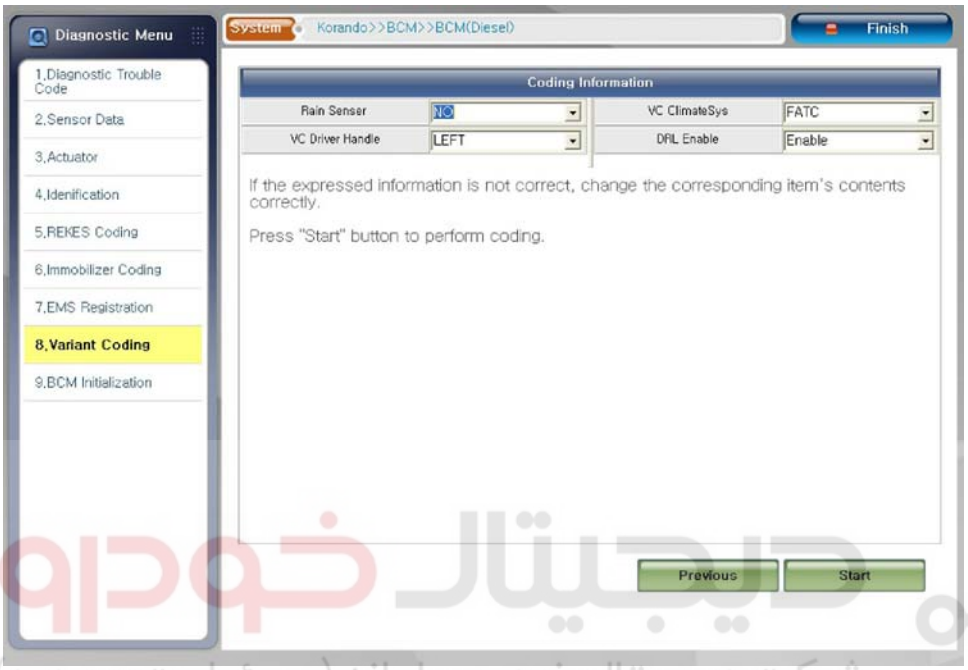
1. Turn the ignition ON and select vehicle type and system (BCM) on the diagnostic program for diagnosis.

2. When you select Variant coding menu and select "Variant check", the following confirmation window is displayed.
   If there is no change, press "OK" button.

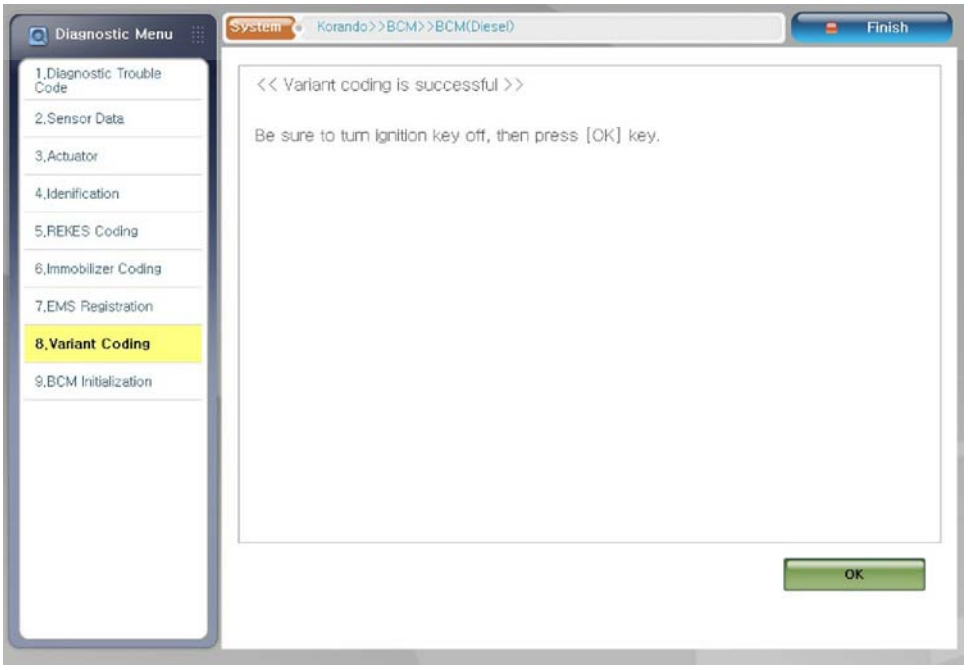


Modification basis	
Application basis	
Affected VIN	

3. If the variant coding needs to be corrected, press "Change variant" at the home screen for variant coding.
   Correct the variant coding and press "Start" button.

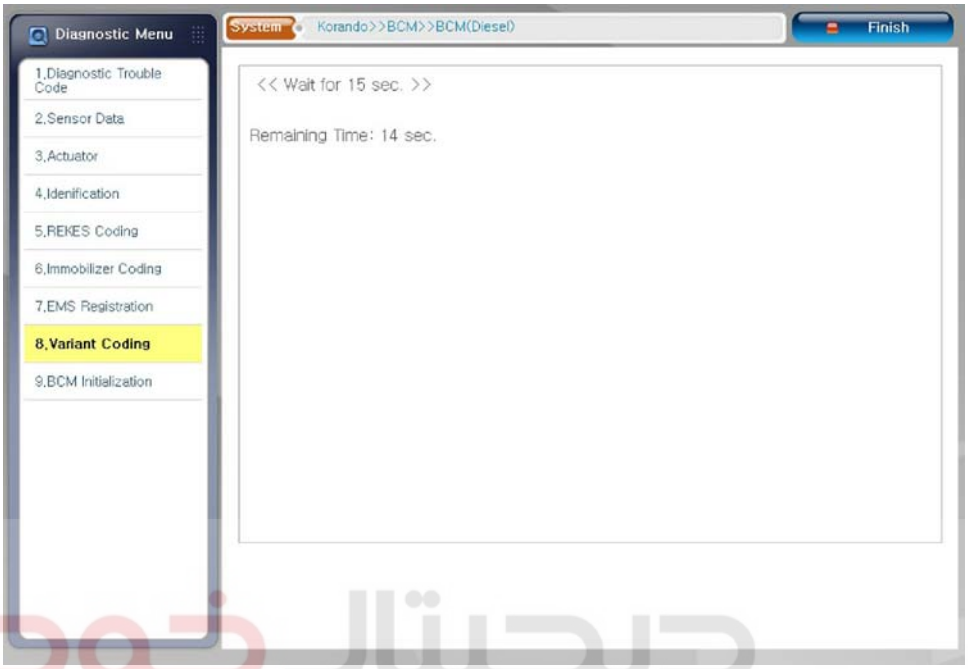


4. If the variant coding is completed successfully, turn the ignition OFF and press "OK" button as instructed in the screen.

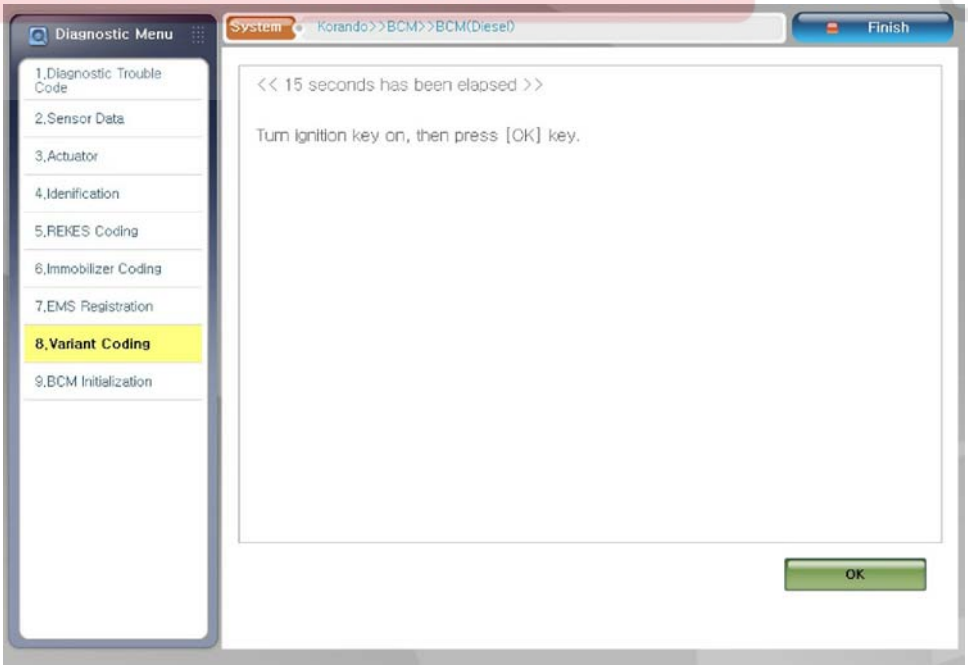


Modification basis	
Application basis	
Affected VIN	

5. Wait for 15 seconds.



6. Turn the ignition ON and press "OK" button.



Memo