INDEX

GENERAL

OVERVIEW AND OPEARATION PROCESS

REMOVAL AND INSTALLATION

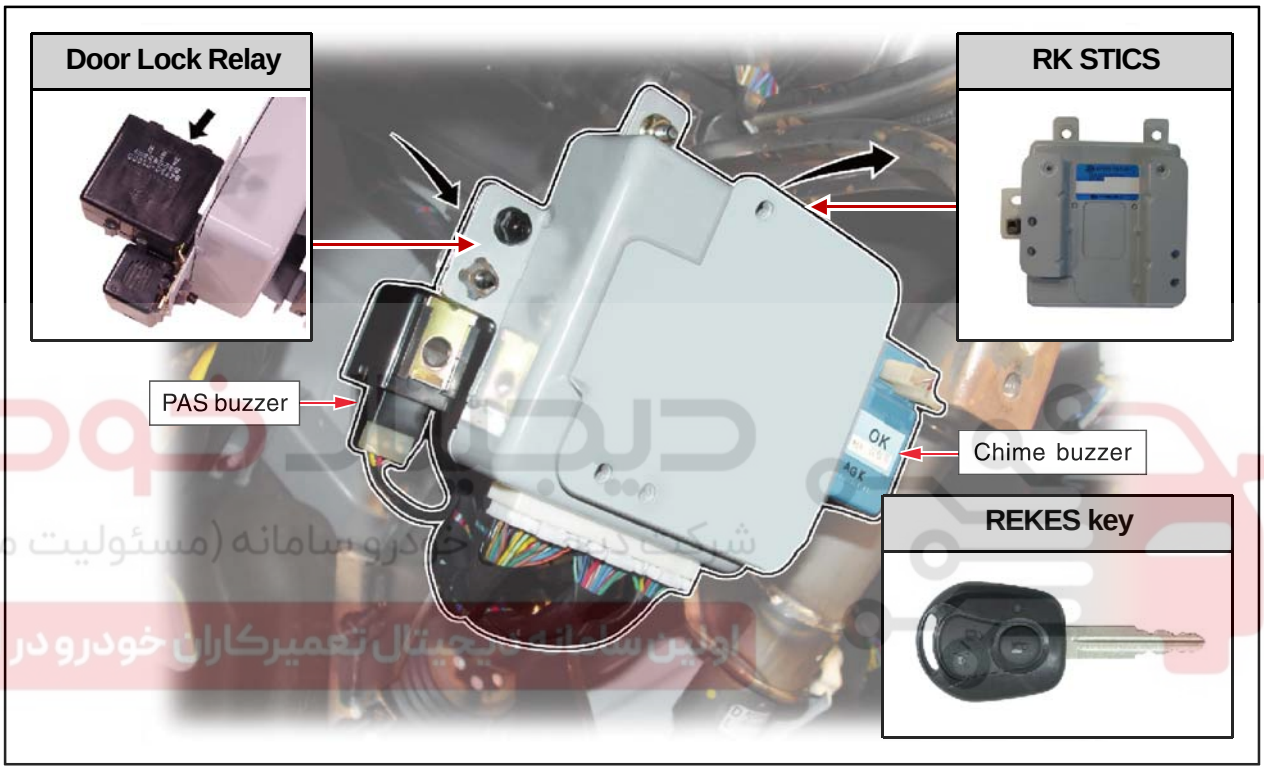
STICS

8710-01

GENERAL

1. OVERVIEW

RKSTICS (REKES + STICS (Super Time & Integrated Control System)), is almost the same as that of ACTYON in terms of its function and role. Due to the removal of tailgate opening switch and rear wiper and washer system, the circuit layout is slightly changed, compared to ACTYON.



Modification basis	
Application basis	
Affected VIN	

2. SPECIFICATIONS

1) Electrical Performance

▶ Electrical Performance

Item	Requirement	Remark
Rated voltage	DC 12.0 V	
Operating voltage	DC 9.0 V ~ 16.0 V	Should operate normally within this range. (9.5 V ~ 16.0 V only for auto hazard lamp function)
Operating temperature	-30°C ~ +80°C	Should operate normally within this range.
Reserved temperature	-40°C ~ +85°C	
Max. operating humidity	95%	
Resistible voltage	24 V	
Insulating resistance	No heat and fire due to the current leaks.	Confined with PCB, waterproof and coating that requires the insulation.
Dark current	below 7.0 mA	When initiating the sleep mode after removing ignition key and locking the doors
Voltage drop	below 1.5 V	Pin no. 72 and 2, 4, 7, 8, 9, 10, 11, 12, 19, 24, 27, 28, 29, 30, 31, 32, 33, 36, 56, 57, 58, 59, 60, 61, 70, 71
	below 1.8 V	Pin no. 72 and 5, 6, 16, 17, 18, 20, 21, 23, 35, 37, 39, 41, 42, 43, 44, 45, 62, 64, 65, 66, 67, 68, 69

▶ Characteristics of Radio Wave

1. Transmitting frequency: 447.800 ± 0.0125 MHz
2. Channel width: below 12.5 KHz
3. Frequency bandwidth: below 8.5 KHz
4. Modulation method: FSK (Frequency Shift Keying)
5. Receiving distance: Approx. 10 ~ 15 m (In case there are not obstacles around the system)

▶ Rated Load

NO.	Description	Rated Load
1	Chime bell / Buzzer	DC 12V 350 mA (Inductive load)
2	Front Room lamp	DC 12V 16W (Lamp load)
3	Rear Room lamp	DC 12V 8W (Lamp load)
4	Key hole illumination	DC 12V 1.2W (Lamp load)
5	Seat belt warning lamp	DC 12V 1.2W (Lamp load)
6	Parking brake warning lamp	DC 12V 1.2W (Lamp load)
7	Door ajar warning lamp	DC 12V 1.2W (Lamp load)
8	Door lock relay	DC 12V 200 mA (Inductive load)
9	Door unlock relay	DC 12V 200 mA (Inductive load)
10	Horn relay	DC 12V 200 mA (Inductive load)
11	Tail lamp relay	DC 12V 200 mA (Inductive load)
12	Hazard warning relay	DC 12V 200 mA (Inductive load)
13	Power window relay	DC 12V 200 mA (Inductive load)
14	Rear defogger relay	DC 12V 200 mA (Inductive load)
15	Wiper LOW relay	DC 12V 250 mA (Inductive load)
16	Wiper HIGH relay	DC 12V 250 mA (Inductive load)
17	Front washer motor	DC 12V 1.5A
18	Rear washer motor relay	DC 12V 500 mA (Inductive load)
19	Headlamp relay	DC 12V 750 mA (Inductive load)
20	Front defogger relay	DC 12V 200 mA (Inductive load)

▶ Input Signals

Dr: Driver's seat, Ps: Passenger's seat, Fr: Front seat, Rr: Rear seat

NO.	Input Signal Name	Logic Status
1	IGN1	ON = BAT (IGN ON or START)
2	IGN2	ON = BAT (IGN ON)
3	ALT_D	ON = BAT (engine running)
4	Key reminder (door ajar warning switch)	IGN = BAT (Key in)
5	Driver's door switch	OPEN = GND, CLOSE = OPEN
6	Passenger's door switch	OPEN = GND, CLOSE = OPEN
7	Rear door switch	- OPEN (one of rear seats) = GND - CLOSE (all rear seats) = OPEN
8	Tailgate switch	OPEN = GND, CLOSE = OPEN
9	Hood switch	OPEN = GND, CLOSE = OPEN
10	Driver's door lock/unlock switch	LOCK = OPEN, UNLOCK = GND
11	Passenger's door lock/unlock switch	LOCK = OPEN, UNLOCK = GND
12	Rear door lock/unlock switch	- UNLOCK (one of rear seats) = GND - LOCK (all rear seats) = OPEN
13	Tailgate lock/unlock switch	LOCK = OPEN, UNLOCK = GND
14	Rear defogger switch	ON = GND, OFF = OPEN
15	Seat belt switch	Unfastened = GND, Fastened = OPEN
16	Hazard warning flasher selection switch	ON = GND, OFF = OPEN (For export only)
17	Parking brake switch	ON = GND, OFF = OPEN
18	Air bag collision sensor	ON = 200 ms output (LOW), OFF = OPEN
19	Wiper motor (parking) switch	STOP = BAT VOLTAGE, ROTATING = GND
20	Washer switch	ON = BAT, OFF = OPEN
21	Intermittent auto switch	ON = BAT, OFF = OPEN
22	Auto washer switch	ON = BAT, OFF = OPEN
23	Intermittent resistance	0W ~ 51 KW (for intermittent wiper)
24	Speed sensor	ON = GND (PWM), OFF = OPEN
25	IDR (coding)	ON = BAT, OFF = OPEN
26	Front defogger switch	ON = GND, OFF = OPEN
27	Auto hazard switch	ON = GND, OFF = OPEN
28	Central door lock switch	ON = GND, OFF = OPEN
29	Rear washer switch	ON = GND, OFF = OPEN
30	Multifunction auto light switch	ON = GND, OFF = OPEN
31	Indicator lamp switch	ON = BAT/GND, OFF = OPEN (Approx. 5.1 V ~ 9.2 V)
32	Seat adjustment and switch memory unit	ON = GND (PWM), OFF = OPEN
33	Rain sensor	ON = GND (DATA), OFF = BAT
34	Diagnosis (SCAN-100)	ON = GND (DATA), OFF = BAT (KWP2000)
35	Rechargeable key and immobilizer	ON = GND (DATA), OFF = BAT (KWP2000)

Modification basis	
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▶ Chattering of Input Signals

- Vehicle speed input:
  The vehicle speed is the average value of 4 pulses among 6 pulse inputs regardless of the input for 1.0 second
  after IGI 1 ON. The time indicated in each function does not include the vehicle speed calculating time.
- 20 ms target input:
  Wiper motor A/S (parking) terminal
- 100 ms target input switch
  All switches except wiper motor A/S (parking) terminal

▶ Time Tolerance

- If not indicated, time tolerance will be ± 10%.
  However, if less than 500 ms, time tolerance will be ± 100 ms.
- The time indicated in each function does not include chattering processing time from switch input changing point.

OVERVIEW AND OPERATION PROCESS

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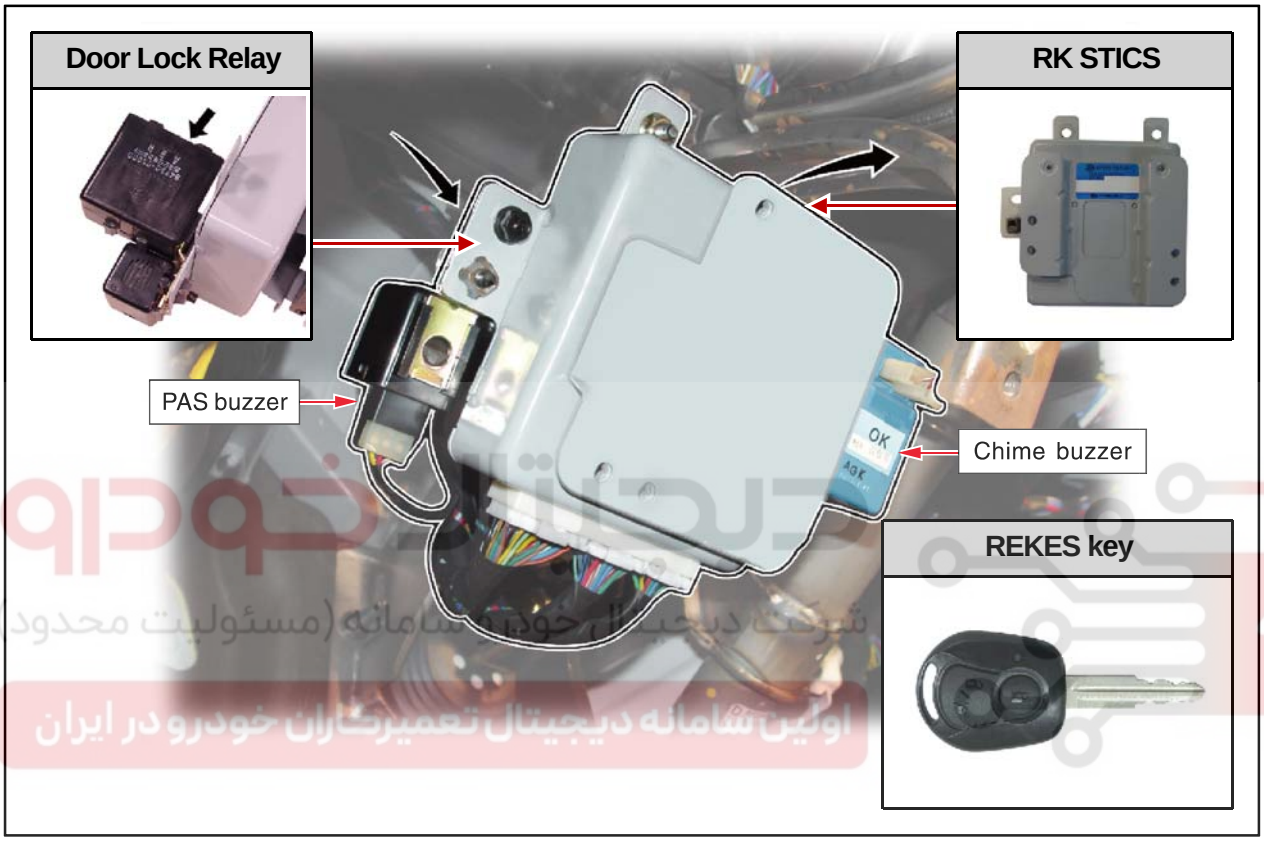


Modification basis	
Application basis	
Affected VIN	

2. FUNCTIONS AND SPECIFICATIONS

1) Wiper and Washer Operations

Front Automatic Wiping Speed Control Switch

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

Fast: Fast interval

Slow: Slow interval

Front wiper operation

MIST

When pulling up the lever, the wiper operates once and the wiper lever returns to the "OFF" position.

OFF

Stop the operation.

AUTO

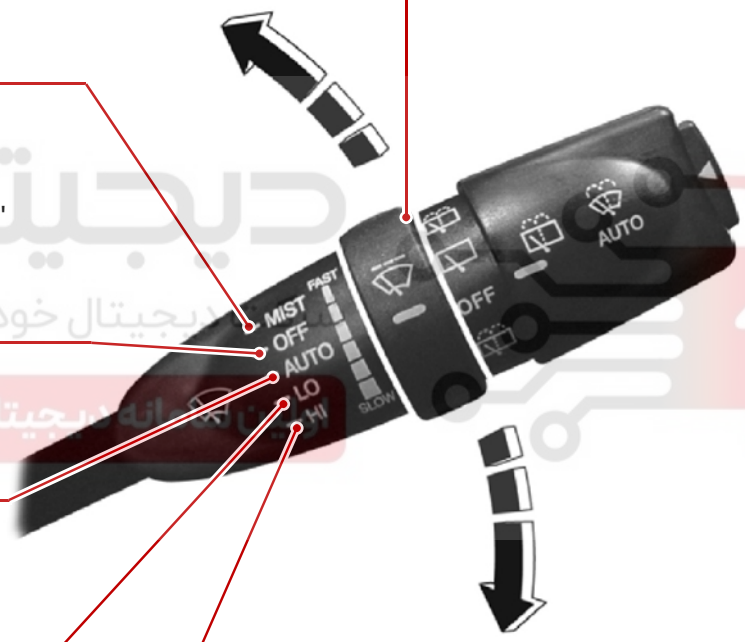
Operates automatically according to the vehicle speed or the amount of rain.

LO

Continuous wipe, slow operation.

HI

Continuous wipe, fast operation

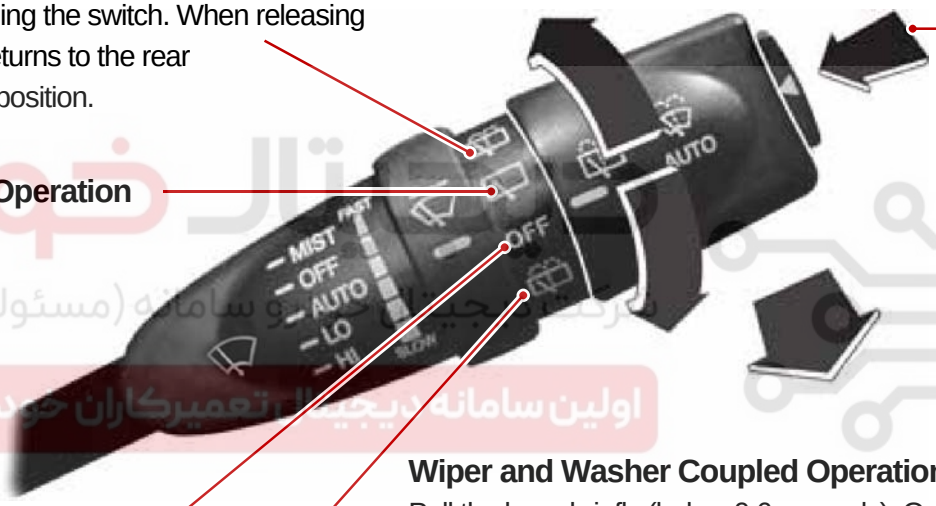


Modification basis	
Application basis	
Affected VIN	

Front Auto Washer and Wiper Switch
When pressing the auto washer switch with the wiper switch "OFF", the washer fluid is sprayed on the windshield and the wiper sweeps off 4 times, after then the washer fluid is sprayed and the wiper sweeps off 3 times again.

Rear Washer and Wiper
The rear washer and the wiper operate only while holding the switch. When releasing the switch, it returns to the rear wiper operate position.

Rear Wiper Operation



Wiper and Washer Coupled Operation
Pull the lever briefly (below 0.6 seconds): One wiping cycle
Pull and hold the lever for more than 0.6 seconds: Three wiping cycles with washer spray

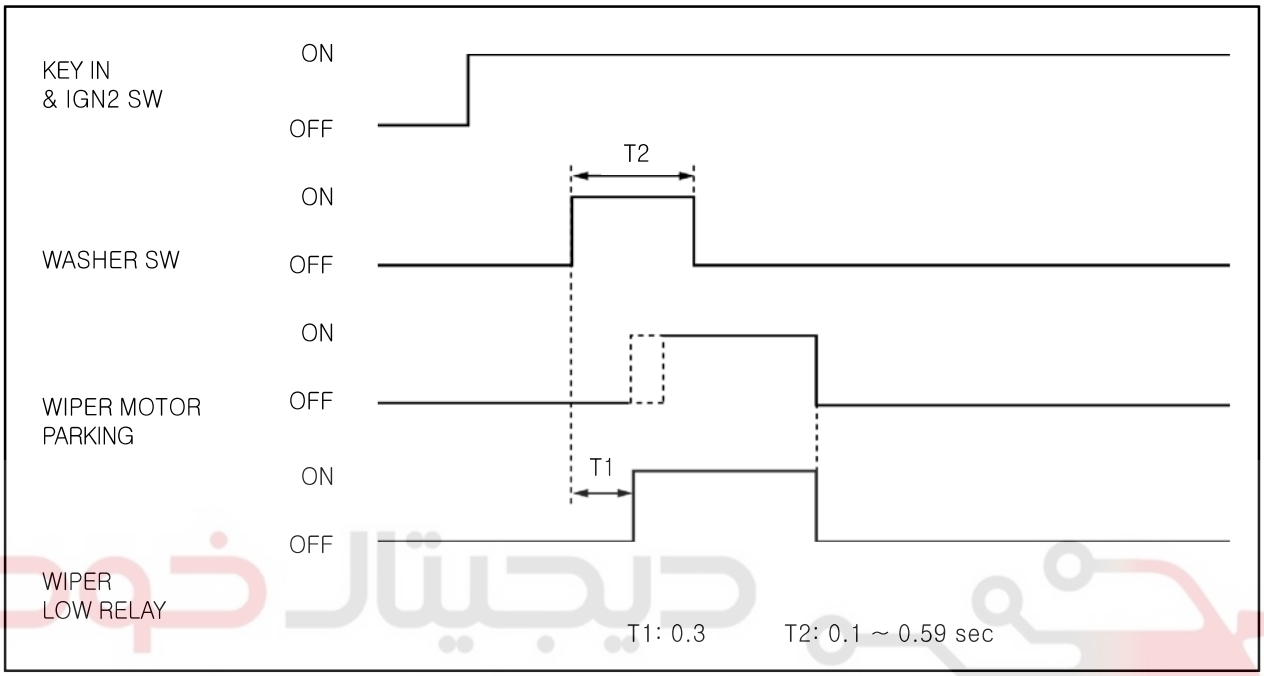
Rear Wiper Stops

Rear Washer and Wiper
The rear washer and the wiper operate only while holding the switch. When releasing the switch, it returns to "OFF" position.

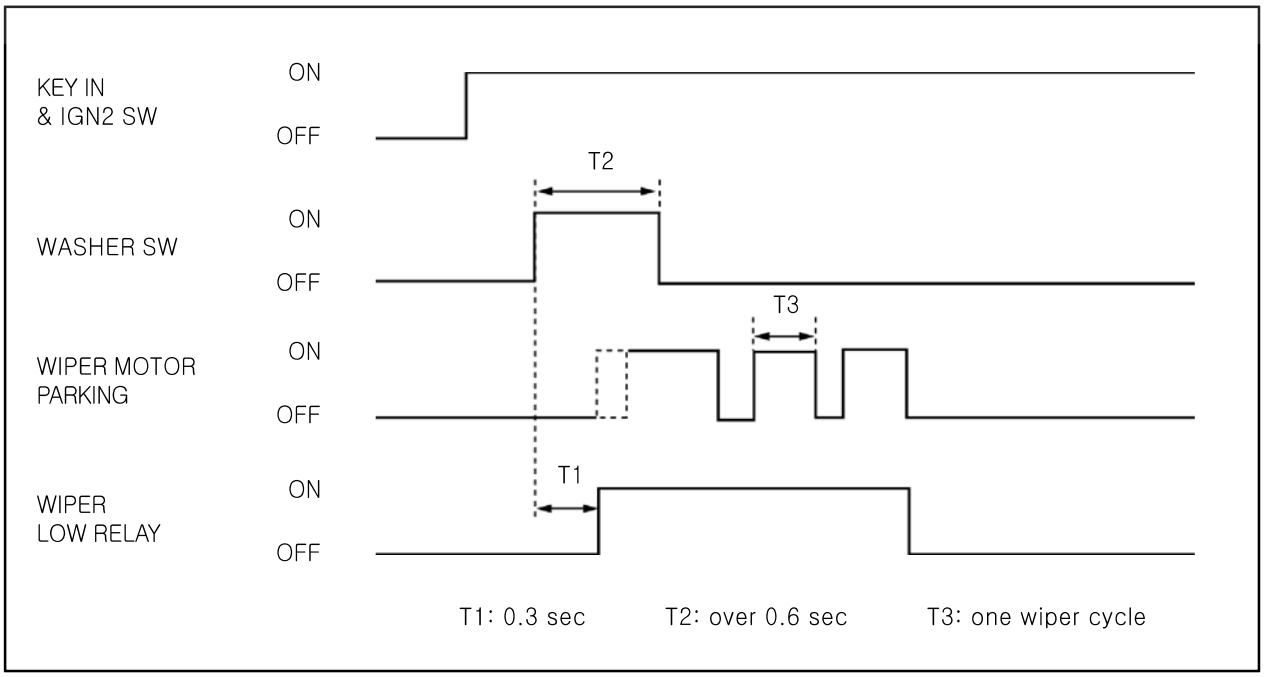
Modification basis	
Application basis	
Affected VIN	

2) Wiper MIST and Front Washer Coupled Wiper

1. The wiper relay is turned on at 0.3 seconds after from the time when the washer switch is turned on for 0.1 to 0.59 seconds (T2) with the ignition switch "ON". If the wiper parking terminal gets off, the wiper relay is turned off.

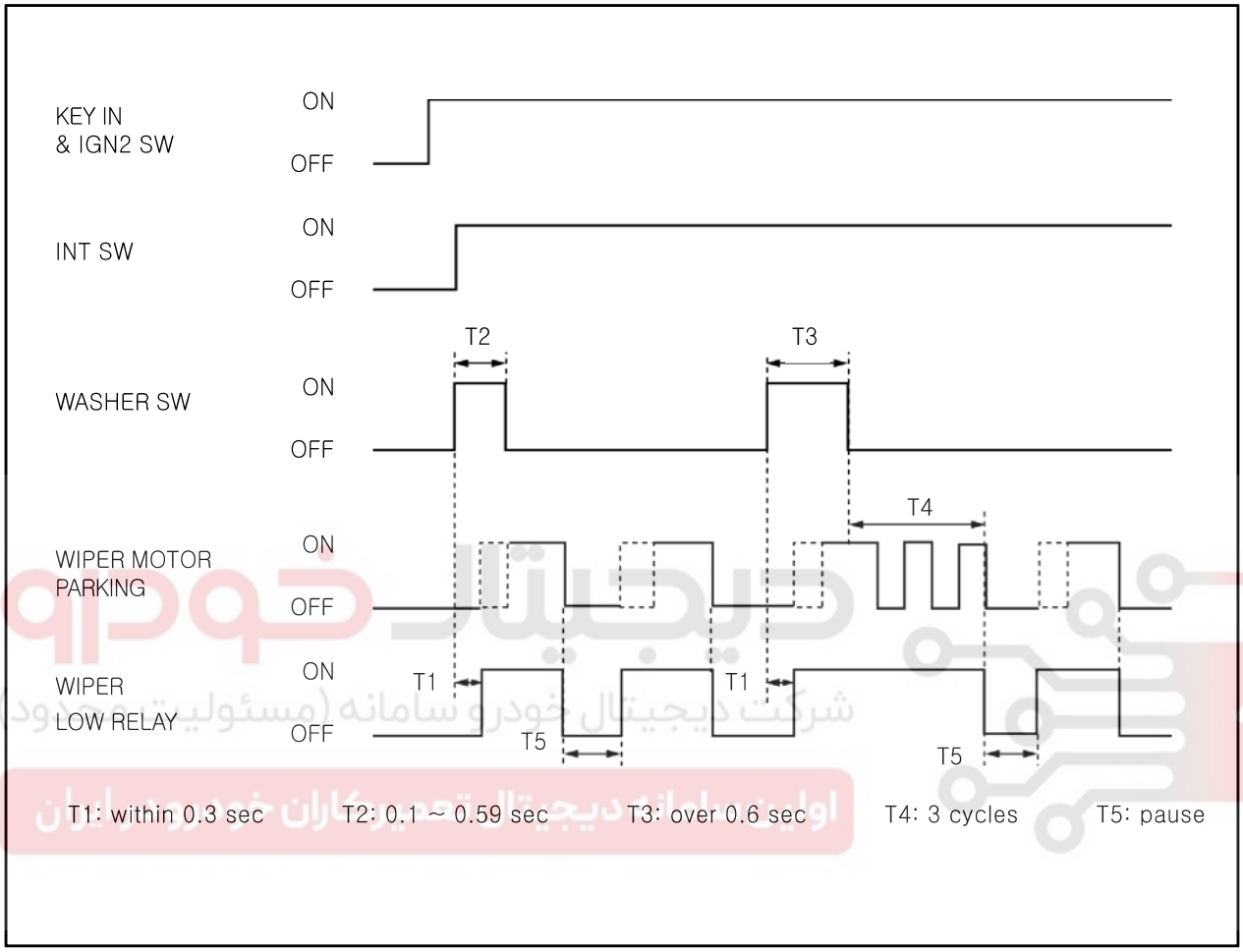


2. The wiper relay is turned on at 0.3 seconds (T1) after from the time when the washer switch is turned on for more than 0.6 seconds (T2) with the ignition switch "ON". The wiper relay gets on 3 times immediately after turning off the washer switch.



Modification basis	
Application basis	
Affected VIN	

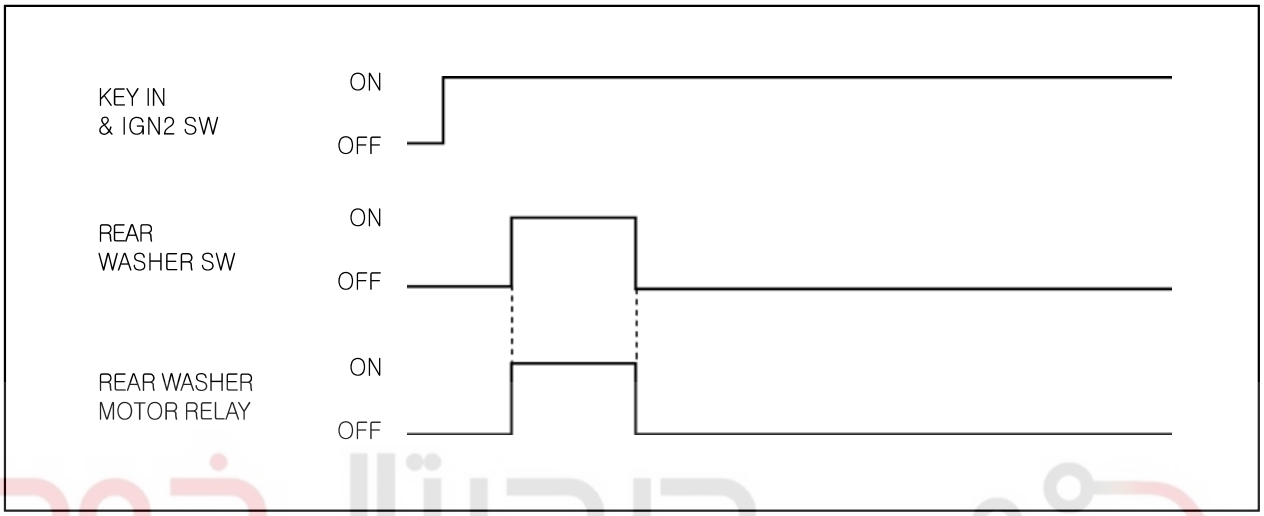
3. When the washer switch is turned on for more than 0.6 seconds during the wiper operation by INT switch, the operation in step (2) is performed. When it is turned on for a certain period of time (0.1 to 0.59 seconds), the operation in step (1) is performed.



Modification basis	
Application basis	
Affected VIN	

3) Rear Washer Motor Control

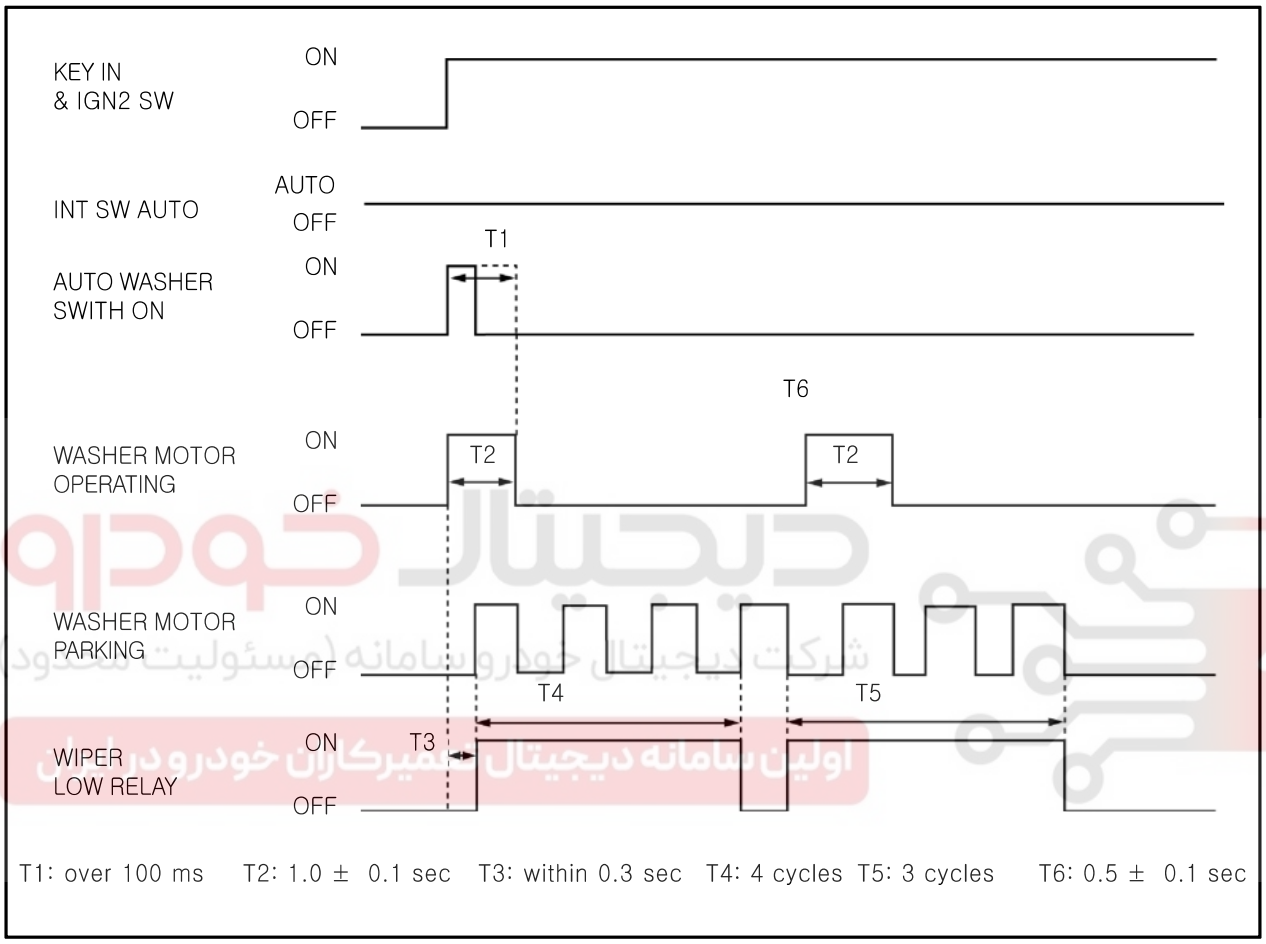
1. When the rear washer switch is turned on with the ignition switch "ON", the rear washer motor relay output gets ON from the time when the rear washer switch is turned on. It gets OFF when the rear washer switch is turned off.
2. This control is not available while the front washer switch or the auto washer and wiper (AFW: Advanced Fast Washer) is in operation.



Modification basis	
Application basis	
Affected VIN	

4) Auto Washer and Wiper Switch (AFW)

1. When the auto washer switch is turned on with the ignition switch "ON" and the INT switch "OFF", the washer motor output gets ON for 1 second. If the system recognizes the output signal, the wiper relay output gets ON during 4 cycles and the washer motor output gets ON for 1 second. Then, the wiper relay output gets OFF after 3 cycles.



Modification basis	
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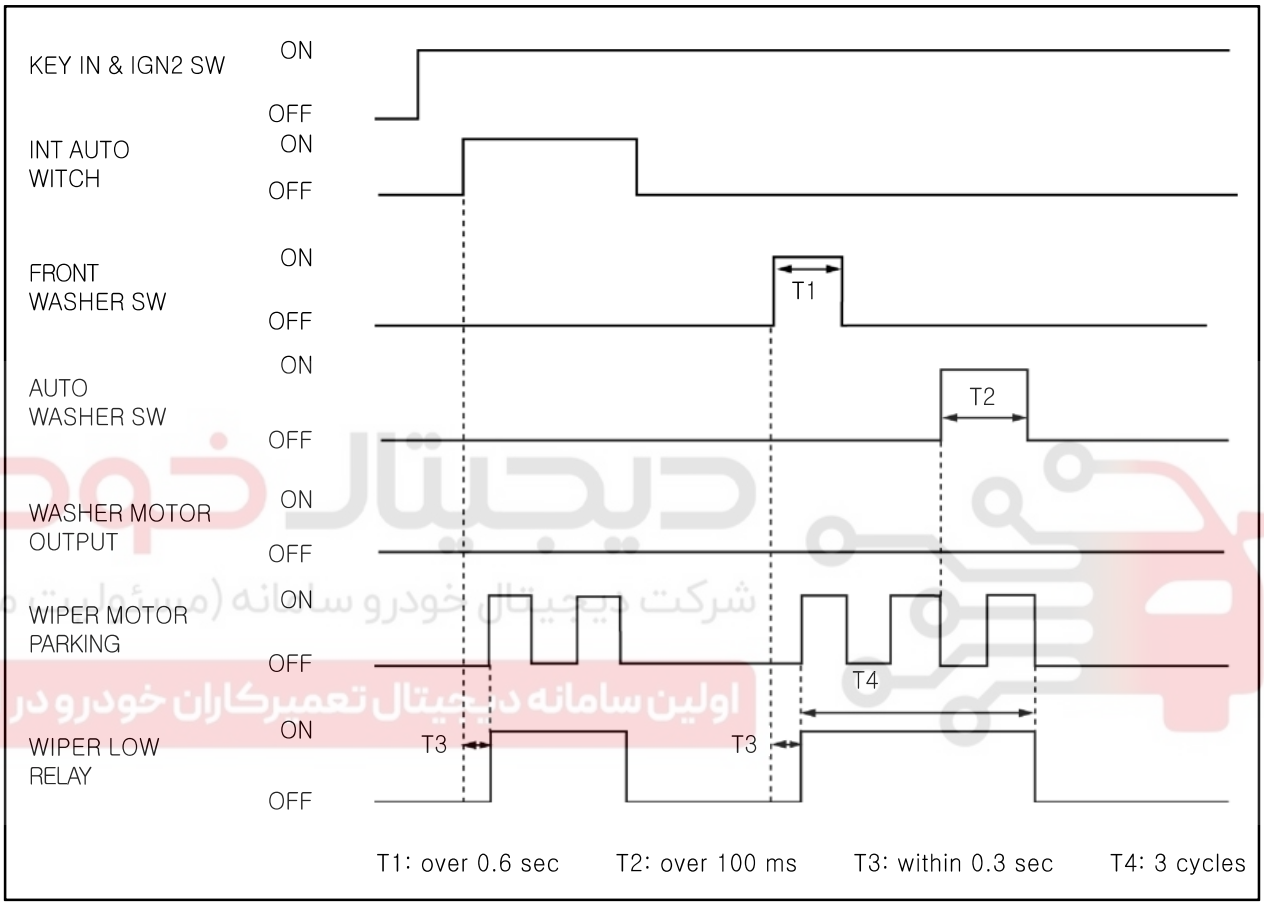
2. The auto washer switch output is overridden during the washer coupled wiper operation.
3. The auto washer switch input is overridden during the auto washer coupled wiper operation.
4. The auto washer switch input is overridden during the rain sensor coupled wiper or vehicle speed sensitive INT wiper operation.
5. When the auto INT switch input is received during the auto washer operation, the auto washer operation stops and the auto INT operation is activated.



Priorities in Washer Operations

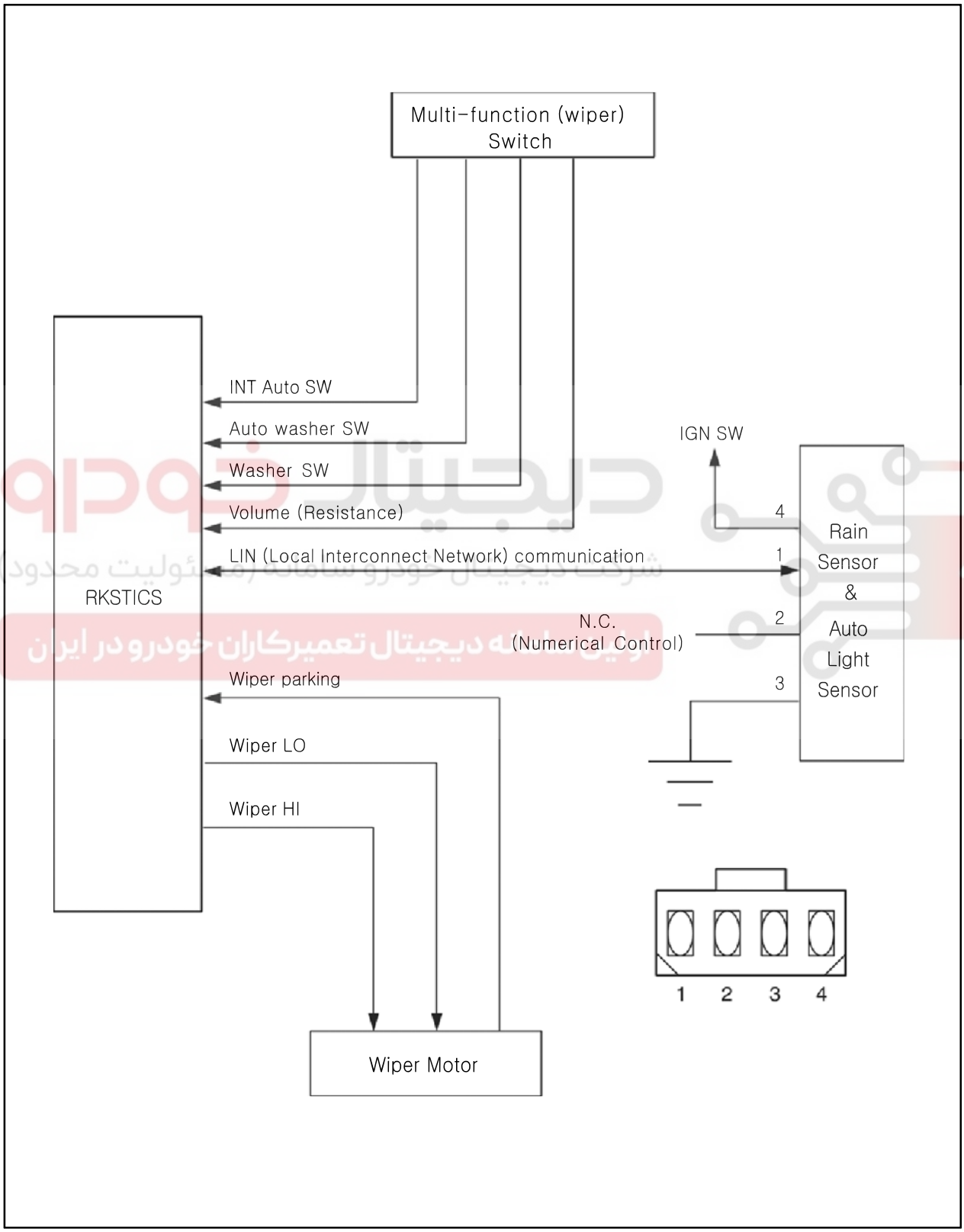
1. he rear washer switch input is overridden during the front washer operation.
2. The rear washer switch input is overridden during the auto washer and wiper (AFW) operation.
   The front washer switch input is overridden during the rear washer operation.
3. The auto washer switch input is overridden during the rear washer operation.
4. The front washer switch input is overridden during the auto washer and wiper (AFW) operation.
5. The auto washer switch input is overridden during the front washer operation.

6.

5) Rain Sensor Coupled Wiper and Auto Light Control

If equipped with RKSTICS rain sensor, it has following operation system.

▶ **System layout**



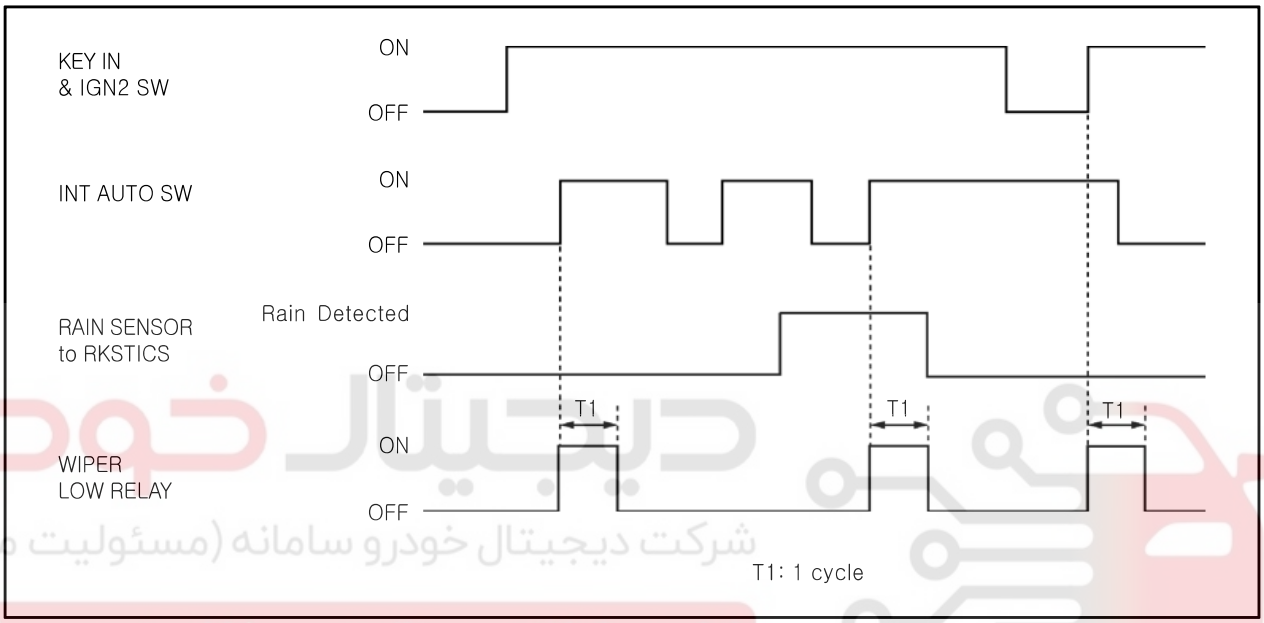
STICS

undefined

Modification basis	
Application basis	
Affected VIN	

6) INT Switch Auto Position Reminder (Power-Up Reminder Wiper)

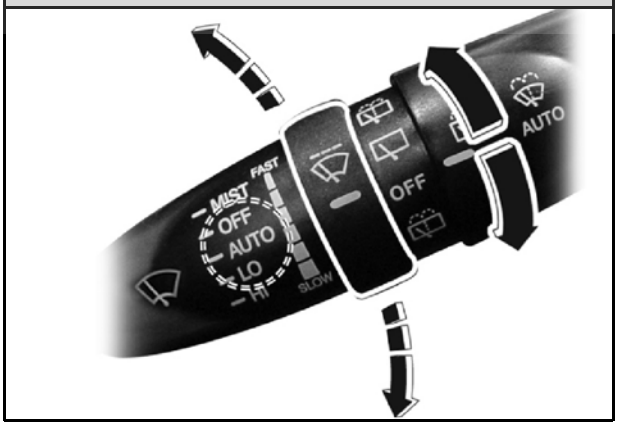
1. When turning off and on the auto INT switch, the system drives the wiper motor through LOW relay regardless of communication with rain sensor.
2. The wiper relay (LOW) is turned on and the wiper motor runs one cycle when changing the wiper switch to "AUTO" position from any other positions (while the ignition key is in the "ON" position). When the wiper switch is turned to the "ON" position again from other positions, the system drives the wiper motor through LOW relay one cycle only when the rain sensor detects the "Rain Detected" signal.



Rain sensing unit
(AUTO light integrated type)

A sensor that emits infrared rays through LED and then detects the amount of rain drops by receiving reflected rays against sensing section (rain sensor mounting section on the windshield) with photodiode (auto light sensor integrated type)

Multifunction wiper switch:
AUTO and sensitivity control



AUTO: Wiper operates automatically by rain sensor

FAST ↔ **SLOW**: Auto delay/Auto speed control. A position that can control sensitivity against rains in the windshield and transmits wiping demand signal accordingly

Modification basis	
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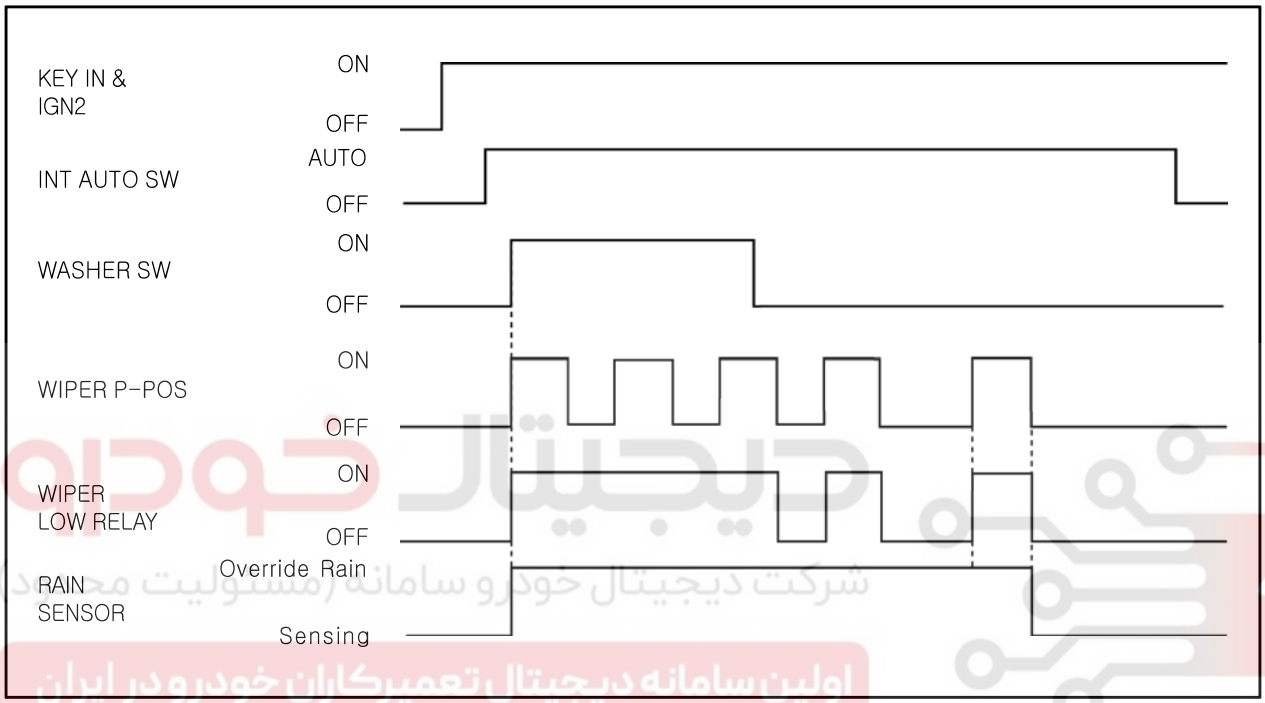
7) Washer Coupled Wiper in Rain Sensing Mode

1. The washer coupled wiper is operated when receiving the washer switch input with the ignition switch "ON" and the auto INT switch "ON" in the rain sensing mode. At this moment, the communication with the rain sensor is overridden. However, the washer switch input is overridden during the continuous operation.
2. The operation data is sent to the rain sensor even during the washer coupled wiper's operation.



Modification basis	
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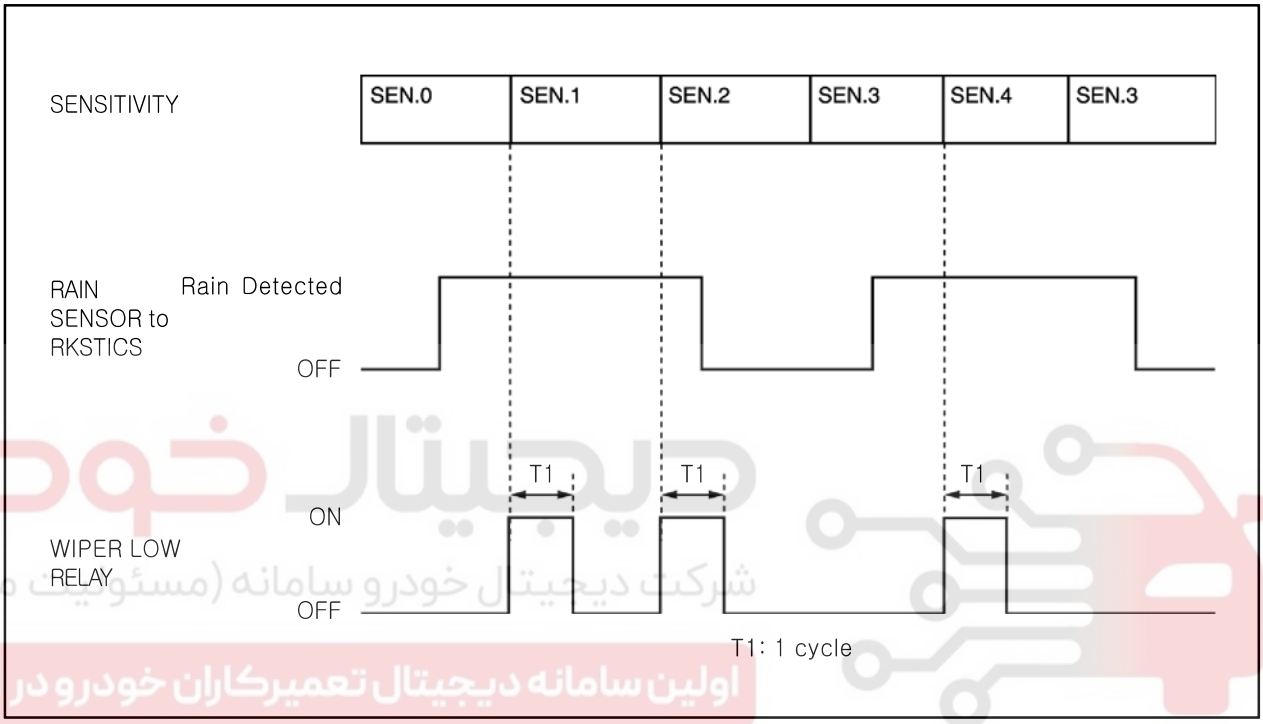
8) Rain Sensing Sensitivity Control

1. The wiper LOW relay is turned on and the wiper motor runs one cycle when the volume sensitivity is increased (while the ignition key is in the "ON" position, the wiper switch is in the "ON" position, and the wiper motor is in "Parked" position). However, the wiper motor can be operated only when the rain sensor detects the "Rain Detected" signal.
   * If the volume sensitivity is changed more than 2 stages within 2 seconds, the wiper motor runs only one cycle.



Modification basis	
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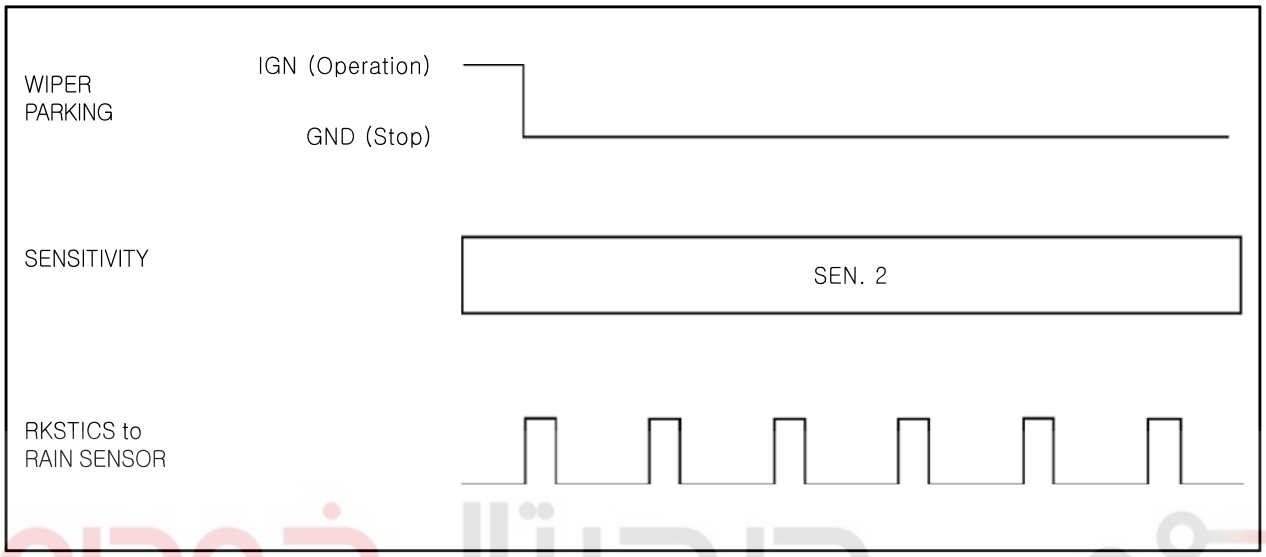
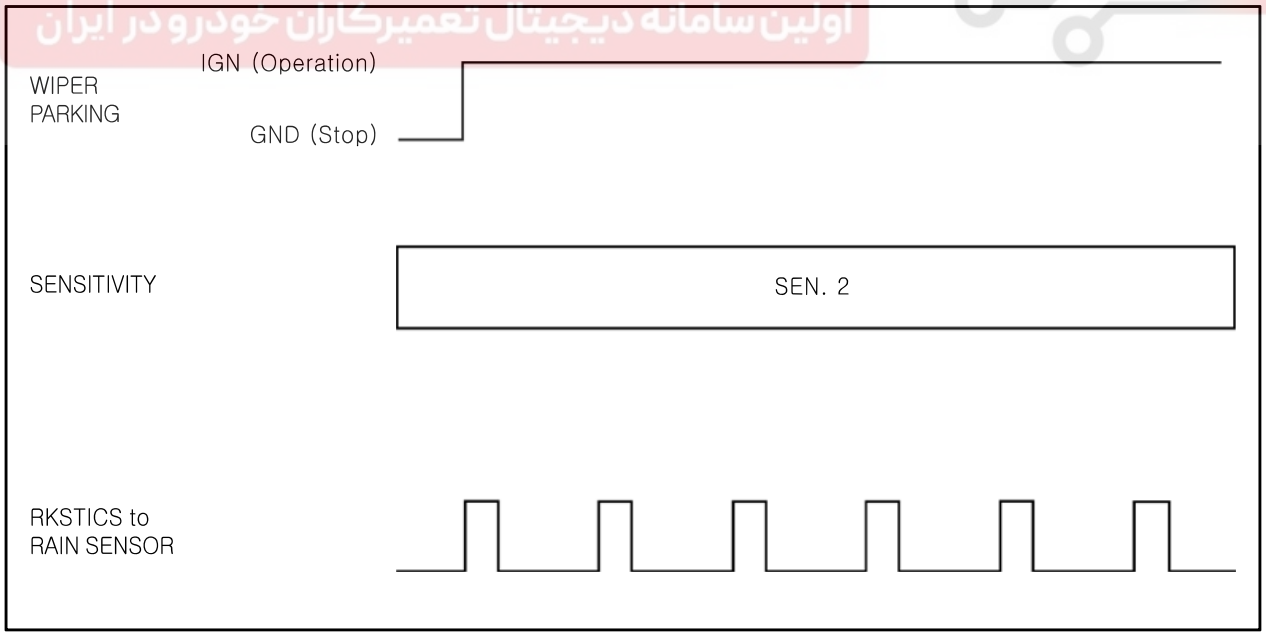
9) When the Wiper Parking Signal is abnormal

1. The wiper system continuously outputs the wiper parking signal when the wiper parking terminal is grounded
   (while the ignition key is in "ON" position and the wiper switch is in "ON" position).
   * The wiper motor runs only when the rain sensor requires the wiper operation.



2. When the parking terminal is fixed to IGN, the wiper system outputs the wiper operating signal for 2 seconds, then continuously outputs the wiper parking signal.
   * The wiper motor runs only when the rain sensor requires the wiper operation.



Modification basis	
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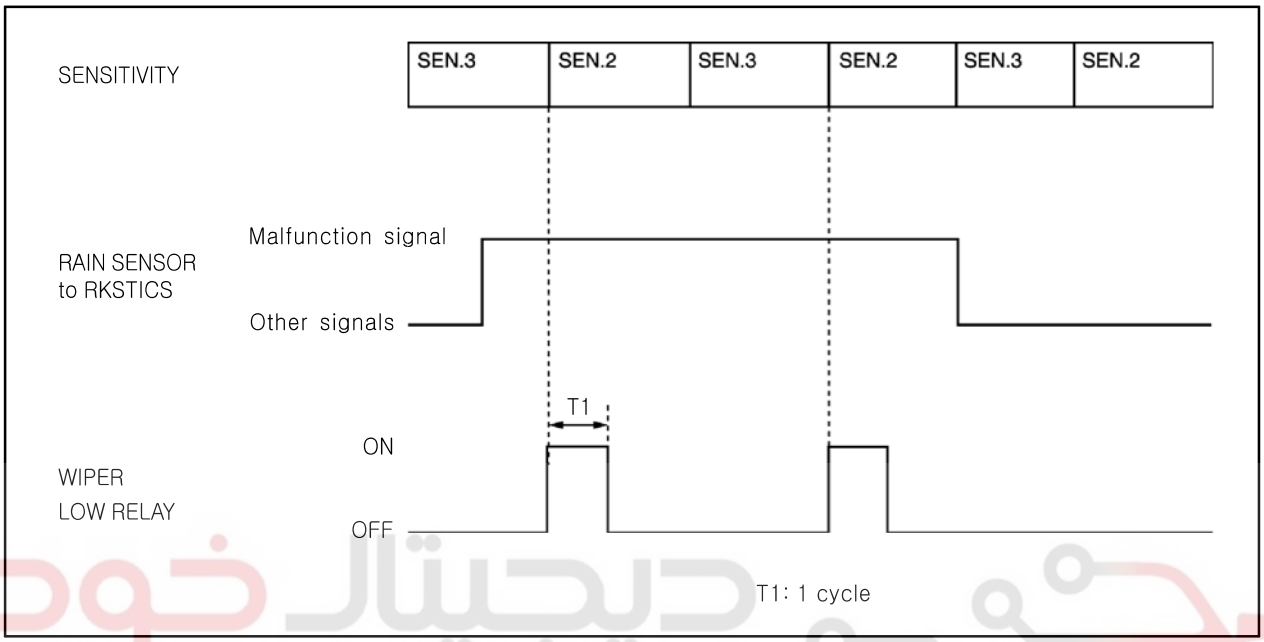
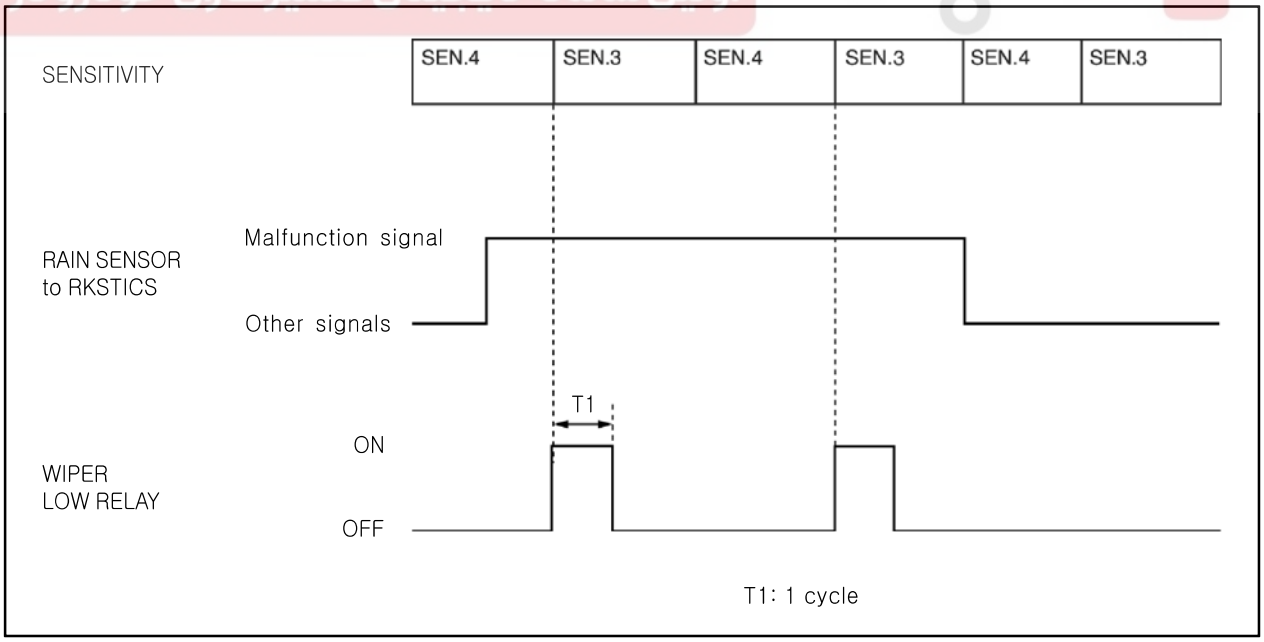
10) Defective Rain Sensor

1. The wiper relay (LOW) is turned on and the wiper motor runs one cycle when the volume sensitivity is changed to 2 from 3 during receiving the malfunction signal from the rain sensor (while the ignition key is in "ON" position and the wiper switch is in "ON" position).



2. The wiper relay (LOW) is turned on and the wiper motor runs one cycle when the volume sensitivity is changed to 3 from 4 during receiving the malfunction signal from the rain sensor (while the ignition key is in "ON" position and the wiper switch is in "ON" position).



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(1) Trouble shooting

Symptom 1.	The wiper does not operate one cycle when turning the multifunction wiper switch to the "AUTO" from the "OFF" position or starting the engine while the wiper switch is in the "AUTO" position.

- When starting the engine with the multifunction wiper switch in the "AUTO" position, the wiper operates one cycle to remind a driver that the wiper switch is in the "AUTO" position.
- When the wiper switch is turned to "AUTO" from "OFF", the wiper operates one cycle. It always operates one cycle for the initial operation, however, the wiper does not operate afterwards to prevent the wiper blade wear if not raining when turning the wiper switch to "AUTO" from "OFF". However, the wiper operates up to 5 minutes after rain stops. If this function does not occur, check No. 8 pin. If the pin is normal, check the wiper relay related terminals in the ICM box.

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

- Check whether the multifunction wiper switch is in the "AUTO" position.
- Check the power to the sensor. Check the conditions of the pin 3 (Ground) and the pin 4 (IGN).
- Check the wiper relay for defective.

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

- Check whether the variable resistance knob on the multifunction wiper switch is set in "FAST". The "FAST" is the highest stage of the sensitivity and very sensitive to small amount of rain drops. Therefore, change the knob to the low sensitivity.

Symptom 4.	The wiper operates continuously even on the dry glass.

- Check the wiper blade for wear. If the wiper blade cannot wipe the glass uniformly and clearly, this problem could be occurred. In this case, replace the wiper blade with a new one.
- Check whether the variable resistance knob on the multifunction wiper switch is set in "FAST". The "FAST" is the highest stage of the ensitivity and very sensitive to small amount of rain drops. Therefore, change the knob to the low sensitivity.

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Symptom 5.	The wiper does not operate at high speed even in heavy rain.

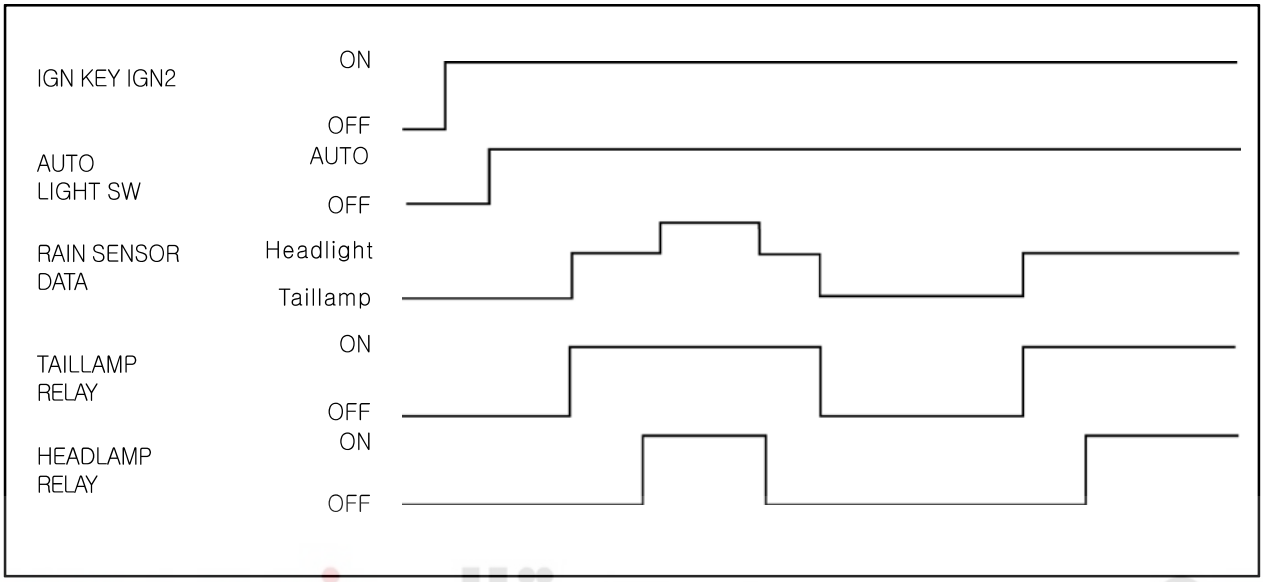
- Check if the wiper operates at high speed when grounding pin 1 and pin 2.

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

- Check whether the variable resistance knob on the wiper switch is set in "FAST" or "SLOW". Notify that the customer can select the sensitivity by selecting the variable resistance value. And, select a proper stage.

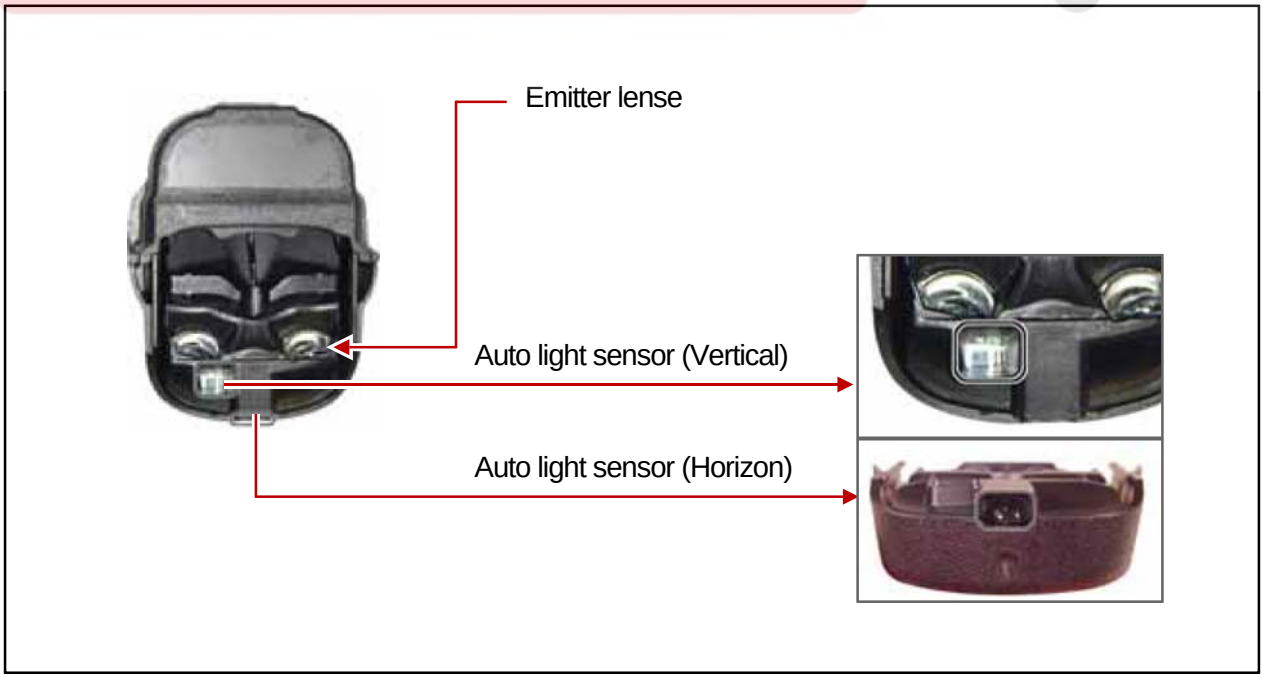
11) Auto Light Control

1. The tail lamps and headlamps can be controlled by the communication with the rain sensor only when the auto light switch is in "AUTO" position with the ignition switch "ON".



2. Rain detected headlamp: If it rains heavy which requires the highest INT speed, the headlamps are turned on automatically.

3. Night detected wiping: When the auto light control turns on the headlamps and the rain sensor detects the rain, the wiper sensitivity is automatically increased by one level. (i.e. the AUTO wiper switch is at the 3rd level, but the wiper operates at the 4th level.)



Modification basis	
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12) Speed Sensitive INT (Intermittent) Wiper

For RKSTICS without the rain sensor, perform the following operation:

▶ **Controls the wiper intermittent operation by the values from the vehicle speed and the volume.**

- Calculates and converts the Intermittent interval automatically by using the INT VOLUME when the ignition switch is in the "ON" position and the INT switch is in the "ON" position.
  The wipers are operated in vehicle speed sensitive mode when turning the INT switch to the
- "ON" position with the engine running or starting the engine with the INT switch positioned to "ON".
  Intermittent interval (at 0 km/h): 3 ± 0.5 ~ 19 ± 2 seconds
-

▶ **Vehicle speed calculation**

- [Input the vehicle speed]
  It is calculated by the numbers of input pulses for one second.

$$1\ [\text{PULSE/SEC}] = \frac{60\ [\text{km/h}] \times 60\ [\text{sec}]}{637 \times 4\ \text{PULSE}} \fallingdotseq 1.41\ [\text{km/h}]$$

▶ **VOLUME calculation**

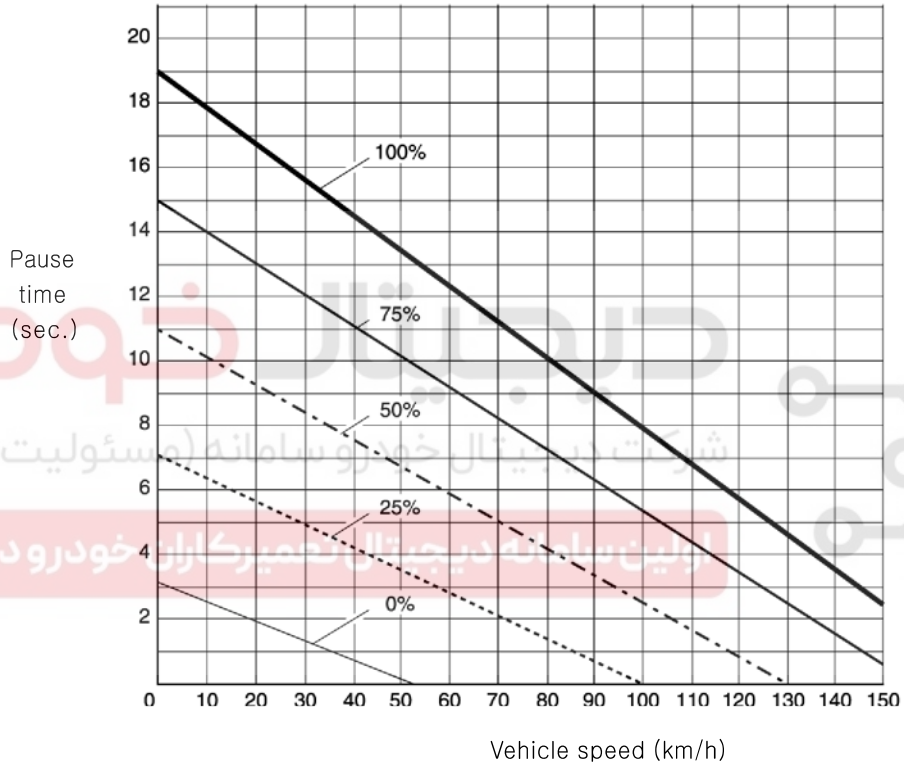
- The pause time of the vehicle speed sensitive INT wiper is calculated by the INT volume (input voltage). Each level has the hysteresis.

▶ **Pause time calculation**

- Pause time: the duration that wipers are stopped at parking position
- Elapsed time: the duration after the wiper motor started to operate from parking position
- The pause time is calculated by the vehicle speed and the VOLUME.
  · If the pause time is below 1.0 second, the wipers operate without pause.
  · If the pause time is over 1.5 seconds, the wipers operate intermittently

Pause time of vehicle speed sensitive INT wiper

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



CAUTION

▶ **Speed sensitive INT (intermittent) wiper**

- The wiper relay continues to output for remaining "ON" time even when the INT switch is turned off.
- IGN 2 switch "ON", INT switch "OFF": Resume the intermittent time when turning "ON"
- IGN 2 switch "OFF", INT switch "ON": Resume the intermittent time when turning "ON"

▶ **Controls when the wiper motor parking is defective**

- The wiper relay continues to output when the parking terminal is fixed at the ground or IGN while the wiperrelay is "ON" (INT switch = ON or Washer switch = ON) (The output stops immediately after turning off the switch) (The output stops immediately after turning OFF the switch.)

STICS

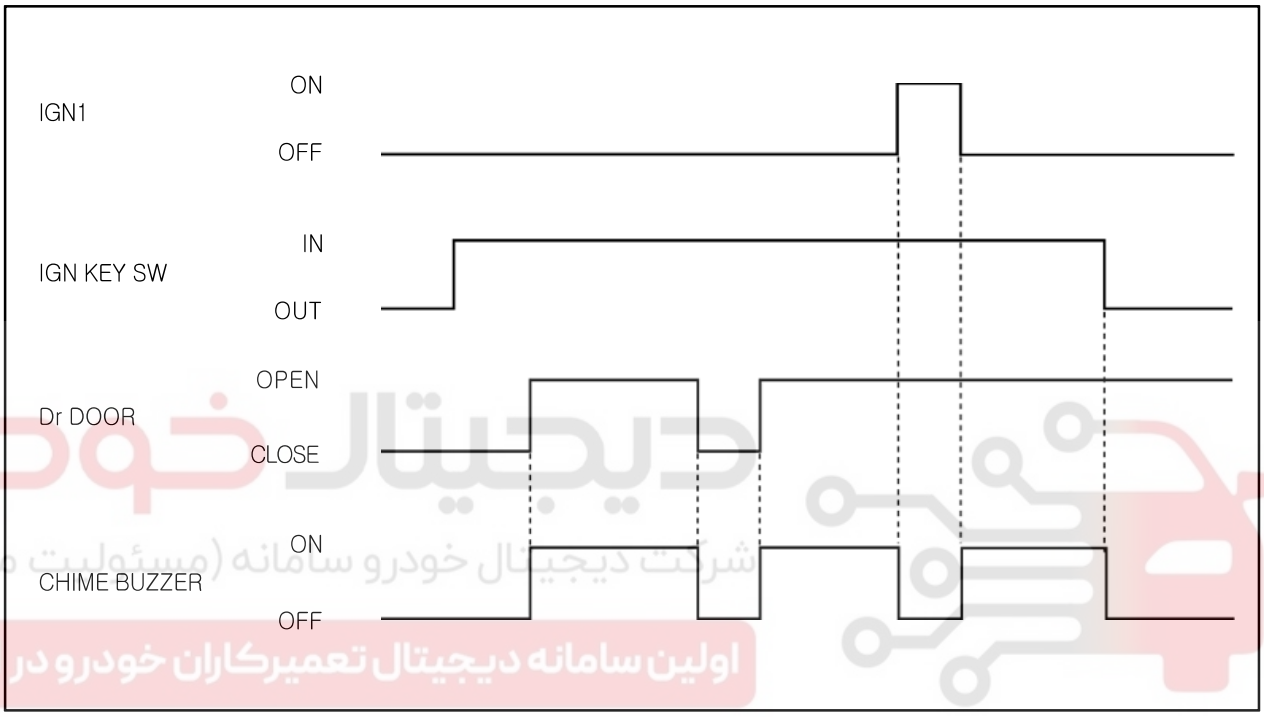
undefined

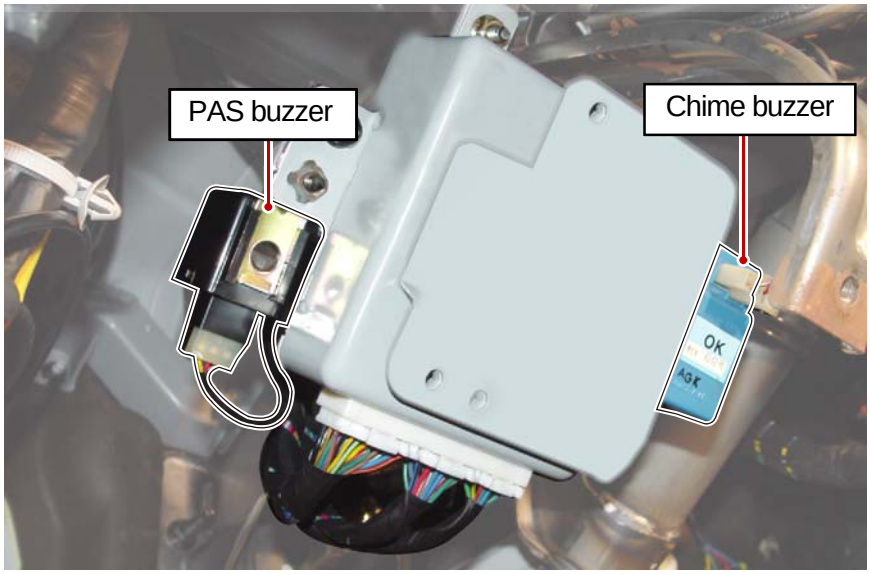
Modification basis	
Application basis	
Affected VIN	

13) Ignition Key Reminder Warning

(The ignition key reminder warning has priority over the "TAILLAMP ON WARNING".)

1. The chime buzzer sounds continuously when opening the driver's door while the ignition key is in ignition switch.
2. When removing the ignition key or closing the driver's door during chime buzzer operation, the buzzer stops.
3. This function is not available when the ignition switch is in "ON" position.

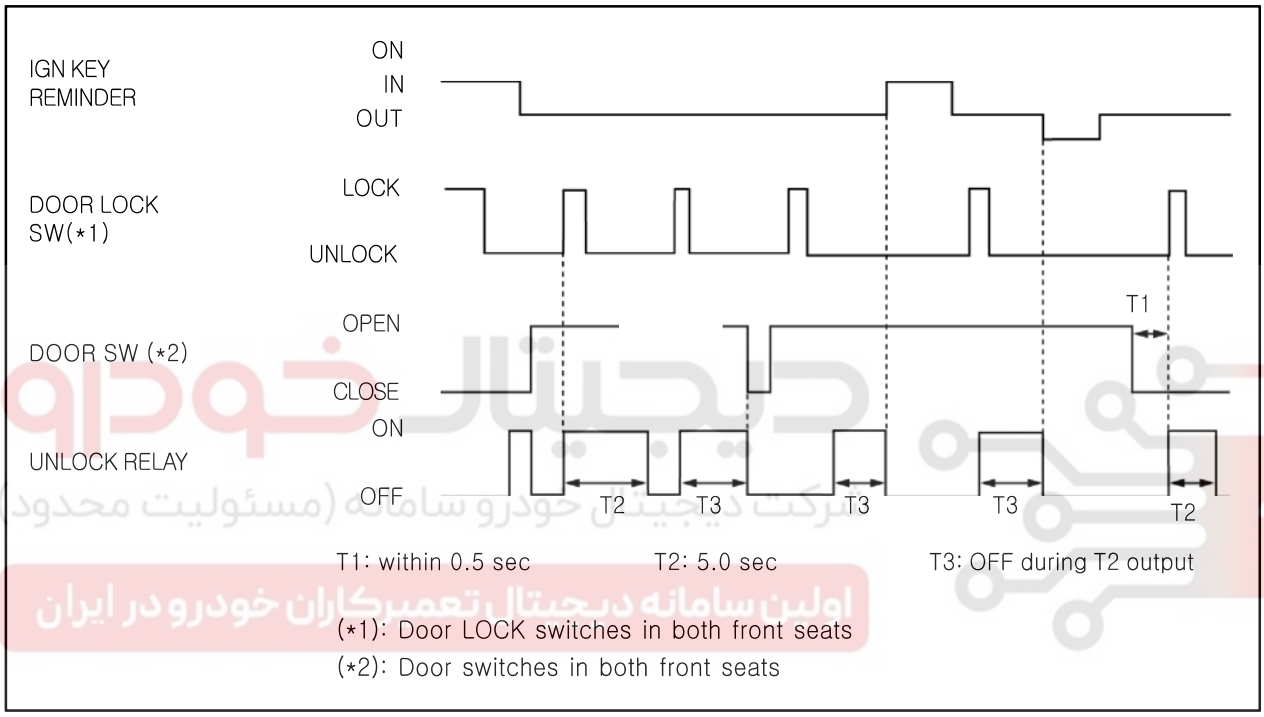




Modification basis	
Application basis	
Affected VIN	

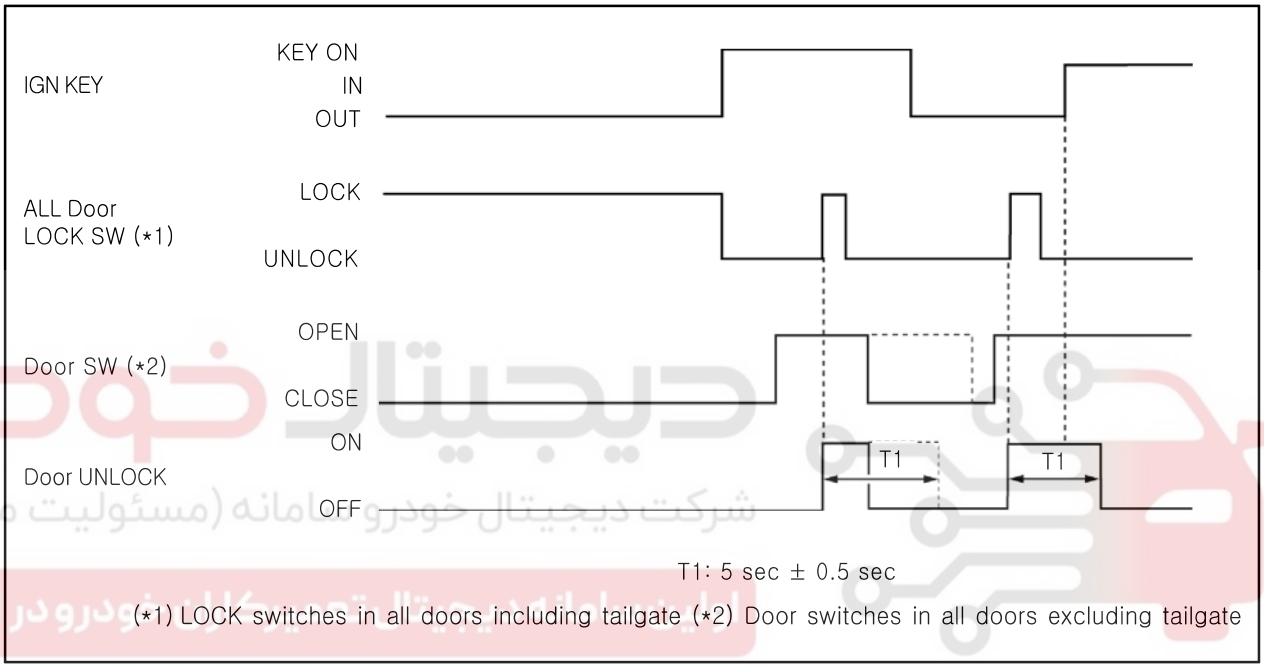
▶Ignition Key Reminder

1. The system outputs "UNLOCK" signal for 5 seconds after the driver's door is opened and the door lock switch is changed to "LOCK" (while the ignition key is in ignition switch).
2. The system outputs "UNLOCK" signal for 5 seconds (T2) when the door lock switch is changed to "LOCK" from "UNLOCK" and the driver's door is closed within 0.5 seconds (while the ignition key is in the ignition switch).
3. If the "UNLOCK" conditions are met, the system outputs "UNLOCK" signal unconditionally. However, if the ignition key is removed after the door lock switch is changed from "UNLOCK" to "LOCK", the system does not output "UNLOCK" signal.



14) All Door Lock Prevention Function when a Door is Open

1. All doors, except the tailgate and hood, output "UNLOCK" signal for 5 seconds when the "LOCK" signal is inputted (while the ignition key is removed and one of any doors is open).
2. When the door is closed during the UNLOCK output, the UNLOCK output stops immediately.
3. When the ignition key is inserted during the output, the output continues for approx. 5 seconds. If the ignition switch is in the "ON" position or the ignition switch is removed, the above steps are
4. performed. If the key is in the key cylinder, the ignition key reminder function is activated. This function does not work if the vehicle speed is over 10 km/h.
5.



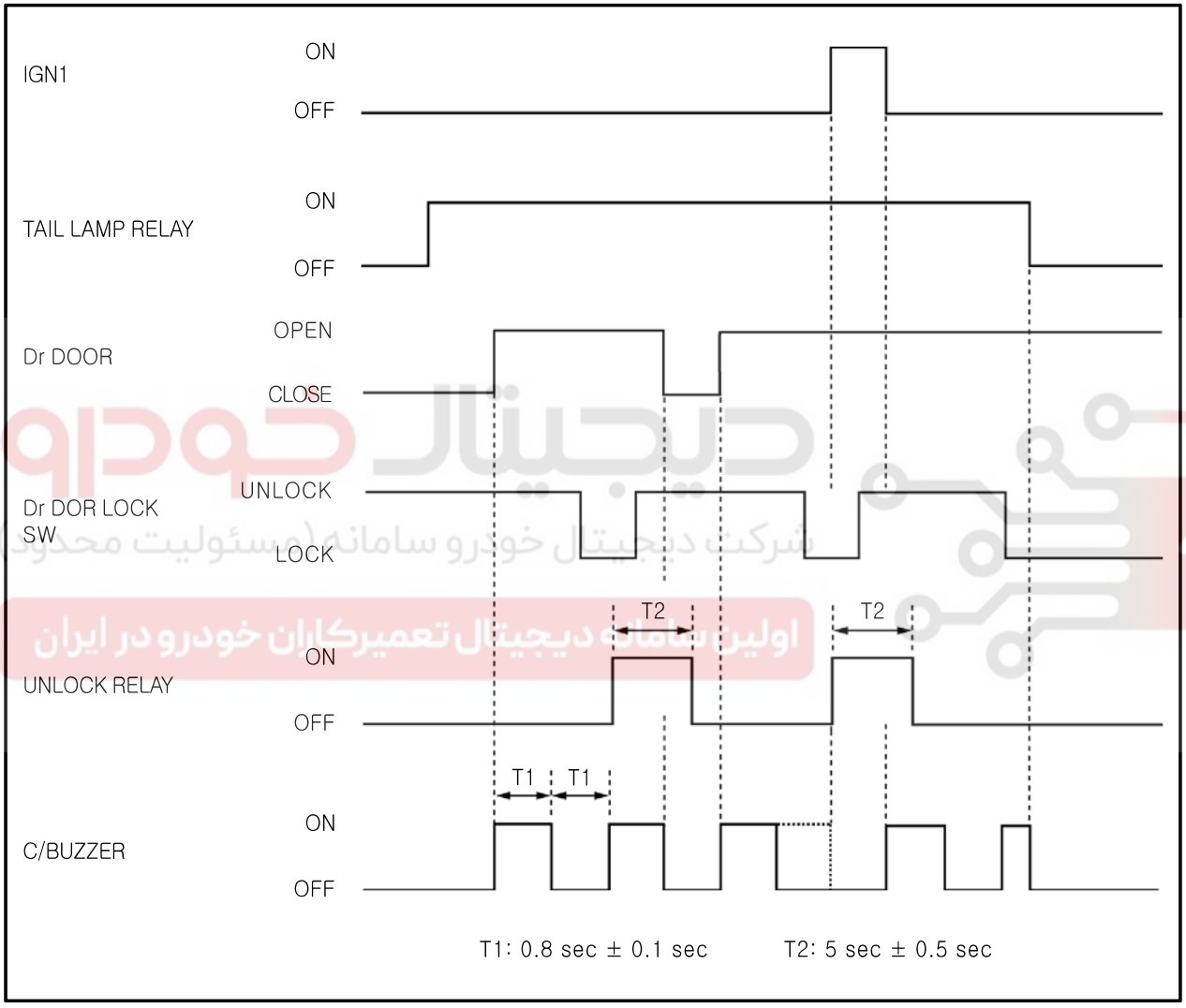
Modification basis	
Application basis	
Affected VIN	

STICS

undefined

15) Tail Lamp Left on Warning

1. The chime buzzer sounds with the interval of 0.8 second when opening the driver's door while the tail lamp is turned on and the ignition key is removed.
2. The chime/buzzer output stops when turning off the tail lamp and closing the driver's door.
3. The system outputs "UNLOCK" signal for 5 seconds when the driver's and passenger's door lock switch is locked (while the tail lamp is turned on and the driver's door is open).
4. This function is not available when the ignition key is in the "ON" position.



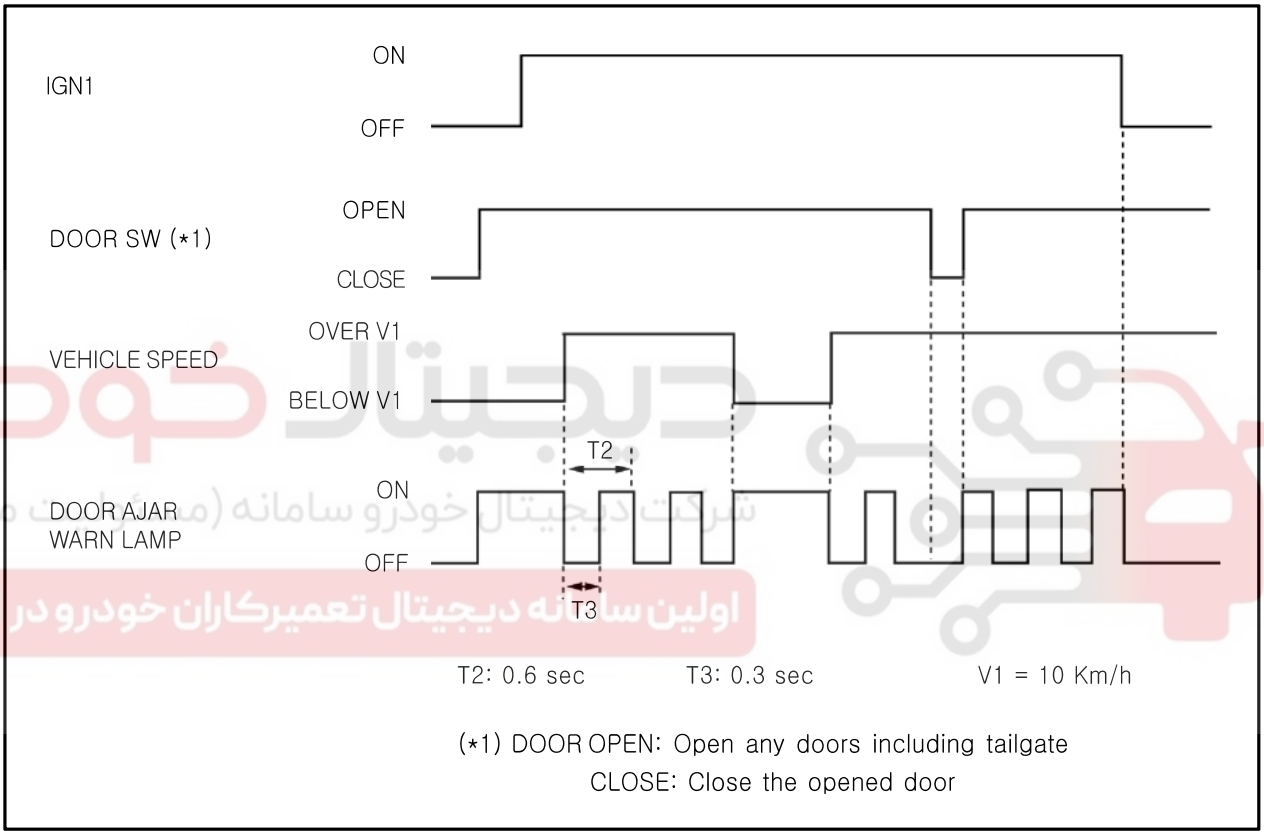
STICS

undefined

Modification basis	
Application basis	
Affected VIN	

16) Door Ajar Warning

1. The warning light in instrument panel comes on when opening any of doors including tailgate while the vehicle speed is below 10 km/h.
2. The warning light goes off when closing the door under step 1.
3. The warning light blinks when the vehicle speed is over 10 km/h while the warning light is turned on. The warning light blinks when a door is open while the vehicle speed is over 10 km/h.
4. The warning light goes off when closing the door under step 3.
5. The warning light comes on when the vehicle speed goes below 10 km/h under step 3.
6.

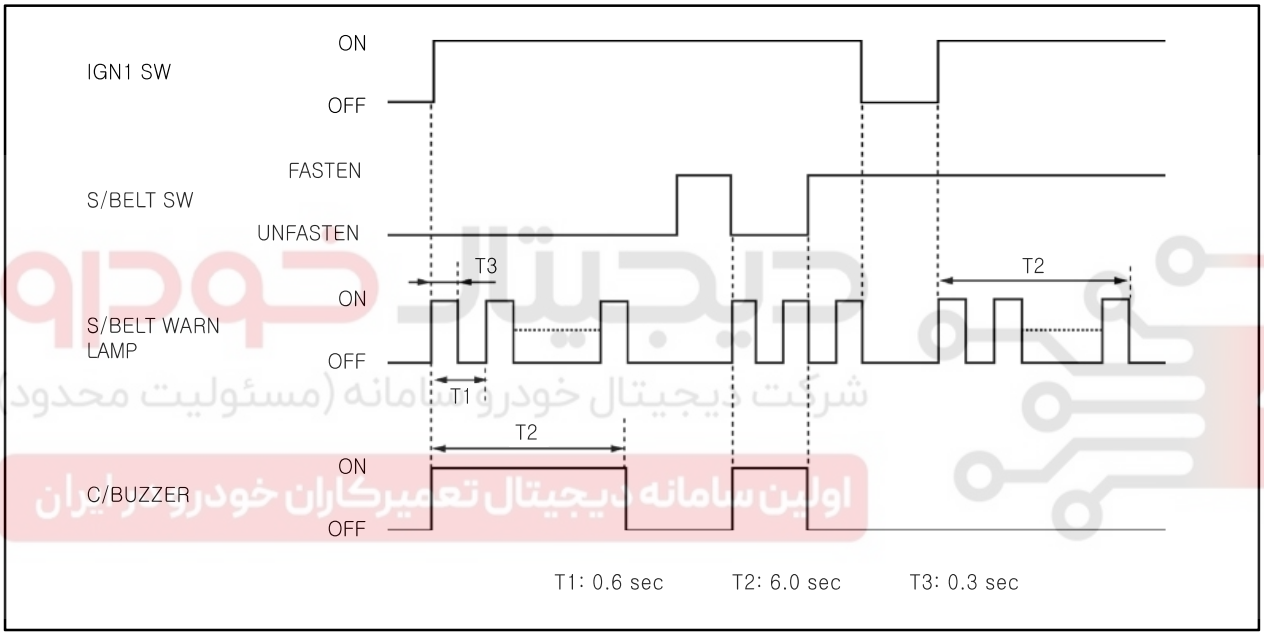


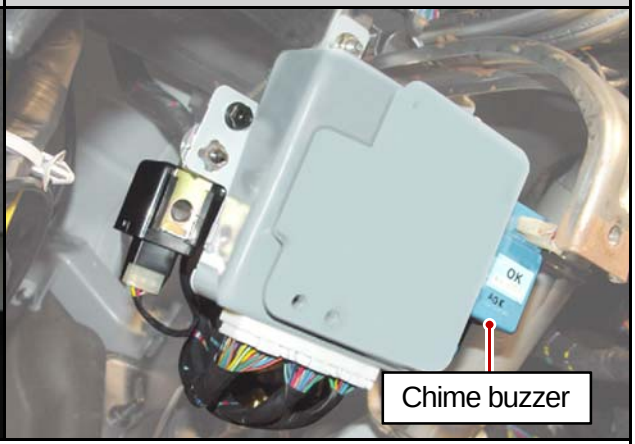
(*1) DOOR OPEN: Open any doors including tailgate
CLOSE: Close the opened door

Modification basis	
Application basis	
Affected VIN	

17) Seat Belt Warning

1. The seat belt warning light comes on and the chime buzzer sounds for 6 seconds when turning the ignition key to "ON" from "OFF".
2. If the seat belt is fastened before turning the ignition key to the the "ON" position, the warning light in the instrument panel blinks, however, the chime buzzer does not sound.
3. The seat belt warning light goes off and the chime buzzer stops when turning the ignition switch to the "OFF" position.
4. The chime buzzer stops and the seat belt warning light stays on for the specified period of time when fastening the seat belt during the warning operation.
   The seat belt warning light comes on and the chime buzzer sounds for 6 seconds again when unfastening the seat belt during fastening operation while the ignition key is "ON" position.



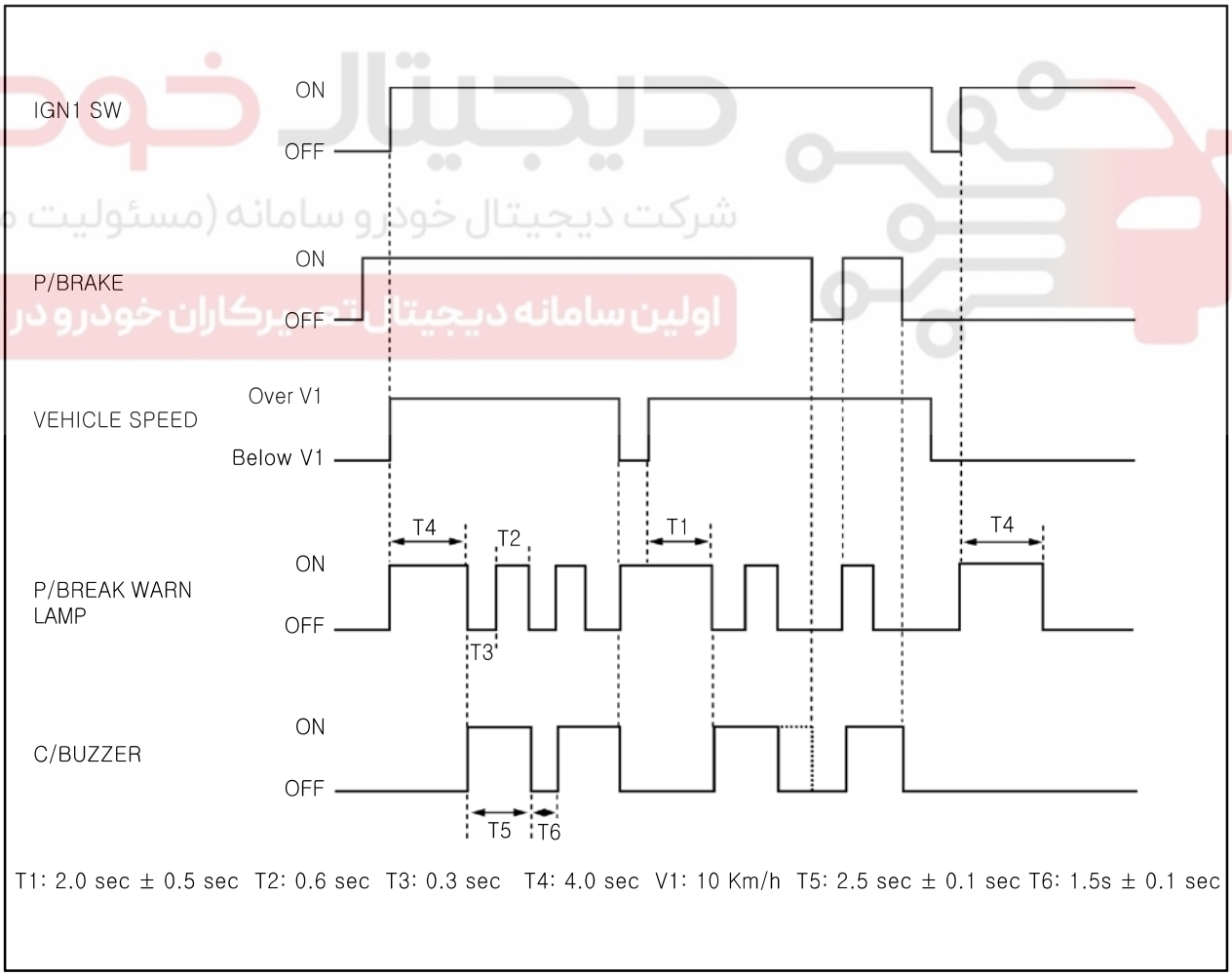
Seat Belt Warning Light	Chime Buzzer
	

The seat belt warning light comes on and the chime buzzer sounds for 6 seconds when turning the ignition key to "ON" from "OFF". After fastening the seat belt, the chime buzzer stops.

Modification basis	
Application basis	
Affected VIN	

18) Parking Brake Warning

1. The parking brake warning light comes on for approx. 4 seconds when turning the ignition key from the "OFF" to the "ON" position regardless of the vehicle speed and the parking brake switch position. After this 4 seconds, the warning lamp comes on, goes off or blinks according to the vehicle speed and the parking brake switch position.
2. The warning light comes on when the parking brake switch is turned on while the vehicle speed is below 10 km/h.
3. The warning light goes off when turning off the parking brake switch under step 2.
4. The warning light blinks and the chime buzzer in the ICM box sounds for 2.85 seconds and stops for 1.5 seconds when the vehicle speed is over 10 km/h for more than 2 seconds while the parking brake switch is turned on.
5. The warning light goes off and the chime buzzer stops when turning off the parking brake switch under step 4.
6. The warning light comes on and the chime buzzer stops when the vehicle speed goes down below 10 km/h under step 4.
7. This function is not available when the ignition key is turned to the "OFF" position.



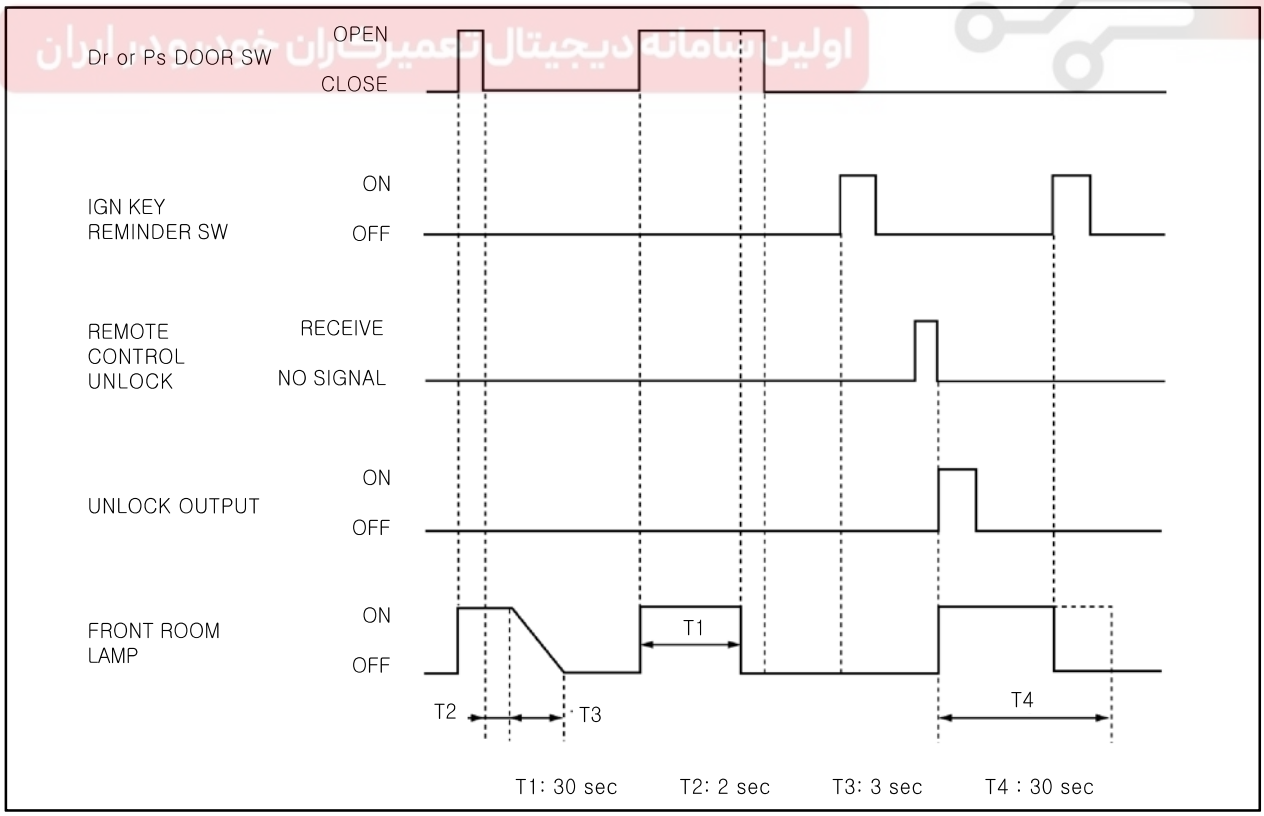
T1: 2.0 sec ± 0.5 sec T2: 0.6 sec T3: 0.3 sec T4: 4.0 sec V1: 10 Km/h T5: 2.5 sec ± 0.1 sec T6: 1.5s ± 0.1 sec

Modification basis	
Application basis	
Affected VIN	

19) Front/Center Room Lamp Control

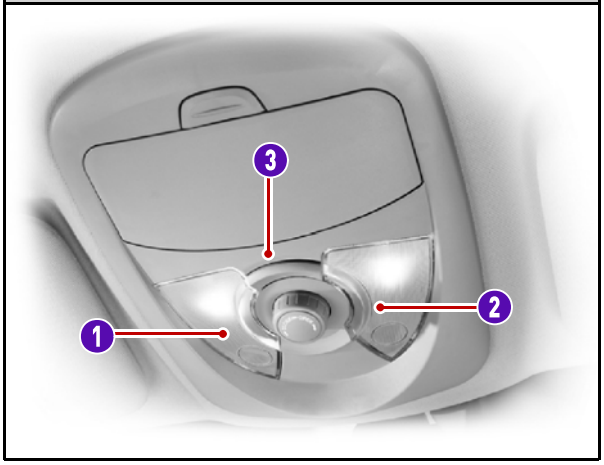
The overhead console lamp (front room lamp) and the center room lamp come on when opening the door while the center room lamp switch is at the coupled operating position and the key reminder switch is "OFF".

1. When the door (Driver's/Passenger's/Rear) is opened, the front and center room lamps come on and automatically go off after 30 seconds.
2. The room lamp stays on for 2 seconds and then dims through 3 seconds when closing the opened doors.
3. The dimming operation must have greater than 32 steps per one second.
4. The room lamp output should stop immediately after turning on the ignition key during the dimming operation.
5. The front room lamp and the center room lamp come on for 30 seconds when receiving the unlock signal from the remote control key while the doors are closed.
6. The front room lamp and the center room lamp output period is extended by 30 seconds when receiving the unlock signal from the remote control key again during output. (The lamp stays on when unlocked by the remote control key.)
7. When a door is opened during its extended period, the lamp stays on. If closed, operates as in step 2.
8. The room lamp output stops immediately after receiving the lock signal from door lock switches while all doors are closed or entering into the anti-theft mode by pushing LOCK button on the remote control key.
9. The luggage room lamp does not have a door coupled operating function. It shoulde be turned on and off by hand.



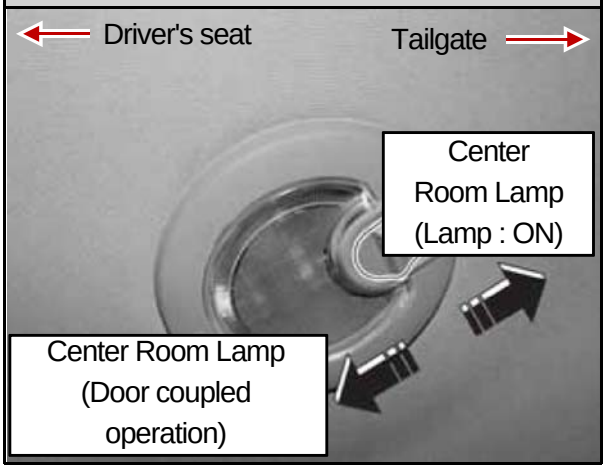
Modification basis	
Application basis	
Affected VIN	

Front Room Lamp: 12V / 8W - 2EA



Front room lamp (driver's or passenger's) is turned on and off when pressing the switch (1 or 2). However, it comes on when a door is opened and goes off when the door is closed. The front and center room lamps come on when pressing the room lamp main switch (3).

Center Room Lamp: 12V / 8W - 1EA



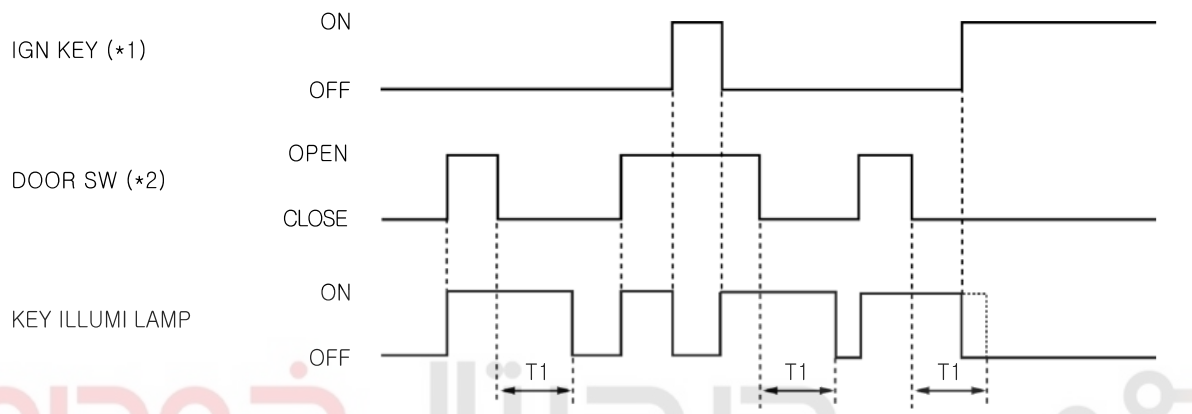
Center Room Lamp

If the switch is at the door coupled position, the center room lamp comes on when a door is opened. The lamp always comes on while the switch is at the other position.

Modification basis	
Application basis	
Affected VIN	

20) Ignition Key Hole Illumination

1. The ignition key hole illumination comes on when opening the driver's door or passenger's door while the ignition key is removed.
2. The ignition key hole illumination stays on for 10 seconds when closing the door after step 1.
3. The output stops when the ignition key is turned to the "ON" position.
4. The output stops when receiving the lock signal from the remote control key (under armed mode).



T1 : 10 sec

(*1) ON : IGN KEY = ON
OFF : IGN KEY = OFF

(*2) OPEN : Driver's or Passenger's door = OPEN
CLOSE : Driver's and Passenger's = CLOSE

Key cylinder with key hole illumination

For diesel and gasoline engine equipped vehicle	For diesel engine equipped vehicle	For gasoline engine equipped vehicle
		
Without immobilizer →With key hole illumination	With immobilizer →With key hole illumination	With immobilizer →With key hole illumination

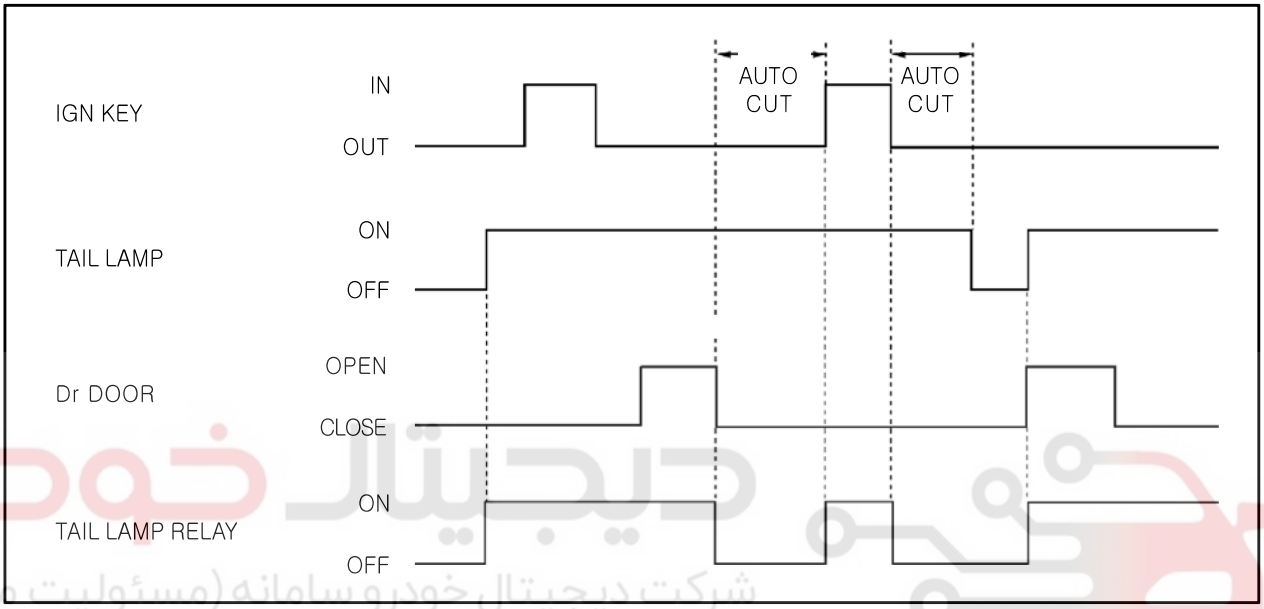
STICS

undefined

Modification basis	
Application basis	
Affected VIN	

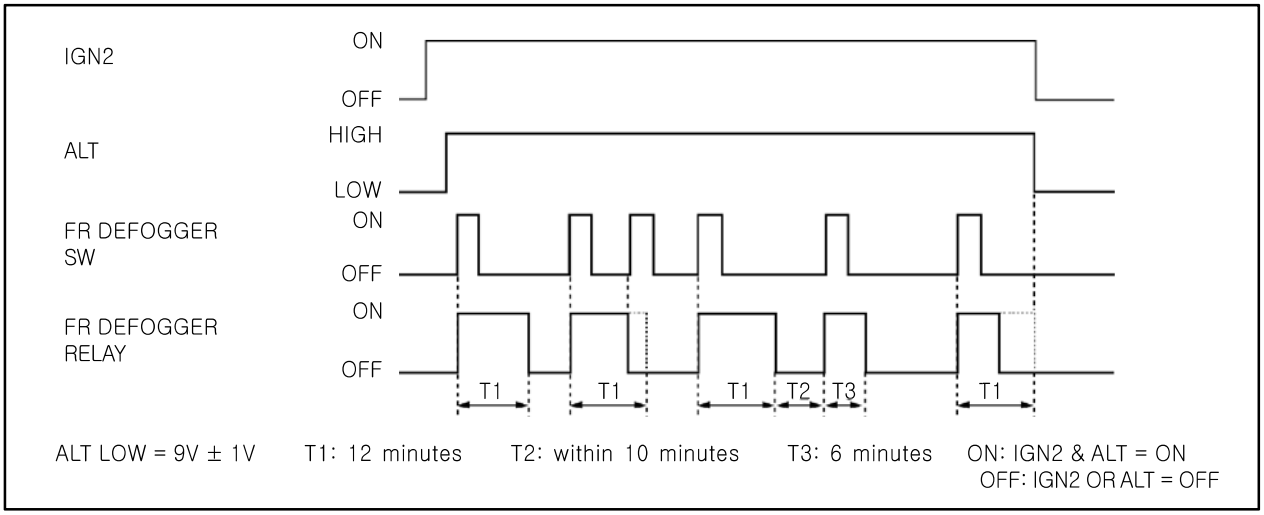
21) Tail Lamp Auto Cut (Battery Saver)

1. The tail lamp is turned on or off according to the operations of the tail lamp switch.
2. The tail lamp relay is turned off (auto cut) when opening and closing the driver's door after removing the ignition key without turning off the tail lamp.
3. The tail lamp relay is turned on when inserting the ignition key into the ignition switch.
4. The tail lamp relay is turned off (auto cut) when opening and closing the driver's door while the ignition key is removed and the tail lamp is turned on.



22) Front Defogger Timer

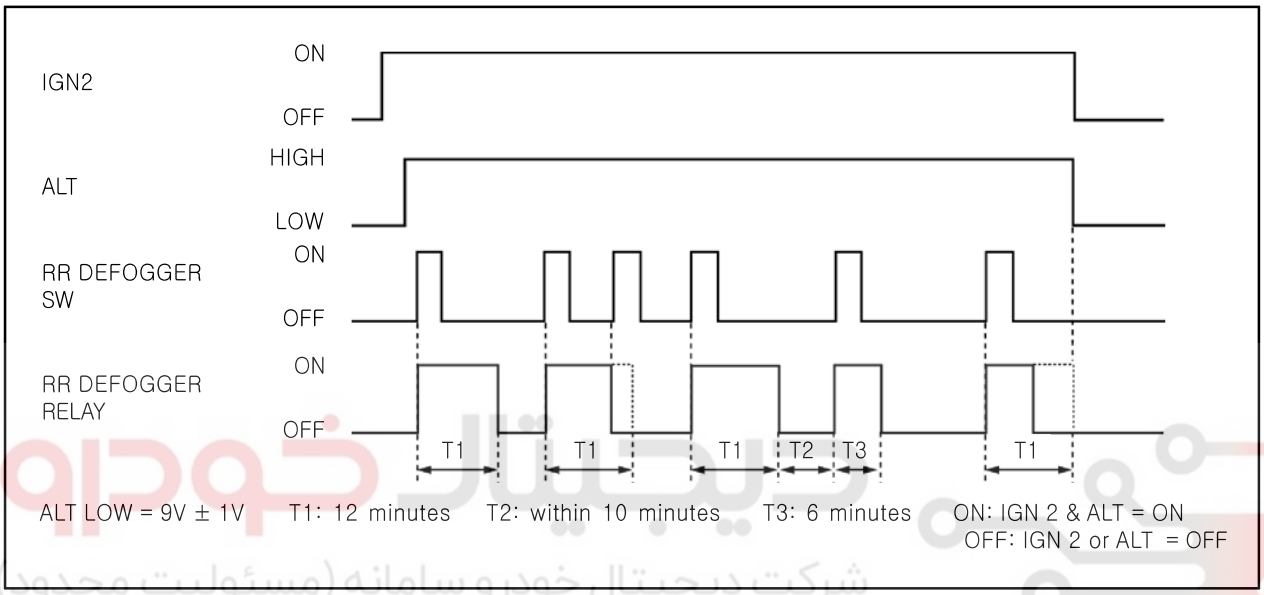
1. The front defogger output is "ON" when turning "ON" the front defogger switch while the ignition switch is "ON" (with engine running).
2. The output stops when turning on the defogger switch again during its operation.
3. The output is "ON" only for 6 minutes when turning "ON" the front defogger switch within 10 minutes after completion of output for 12 minutes. This can be done only once.
4. The output is "OFF" when the ignition switch is "OFF".



Modification basis	
Application basis	
Affected VIN	

23) Rear Defogger Timer

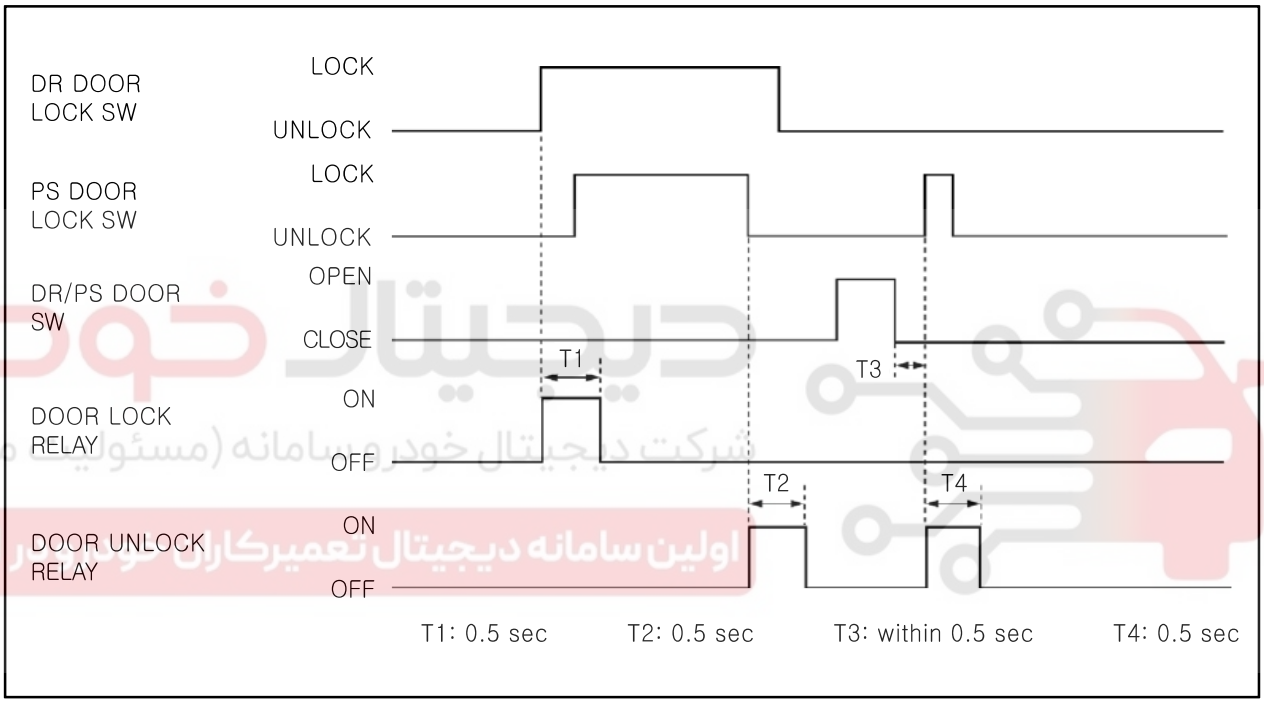
- The rear defogger output is "ON" when turning "ON" the rear defogger switch while the IGN 2 switch is "ON" (with engine running).
- The output is "OFF" when turning "ON" the rear defogger switch again during output.
- The output is "ON" only for 6 minutes when turning "ON" the rear defogger switch within 10 minutes after completion of output for 12 minutes. This can be done only once.
- The output is "OFF" when the IGN 2 switch is "OFF".



Modification basis	
Application basis	
Affected VIN	

24) Door Lock/Unlock Control by Door Lock Switch

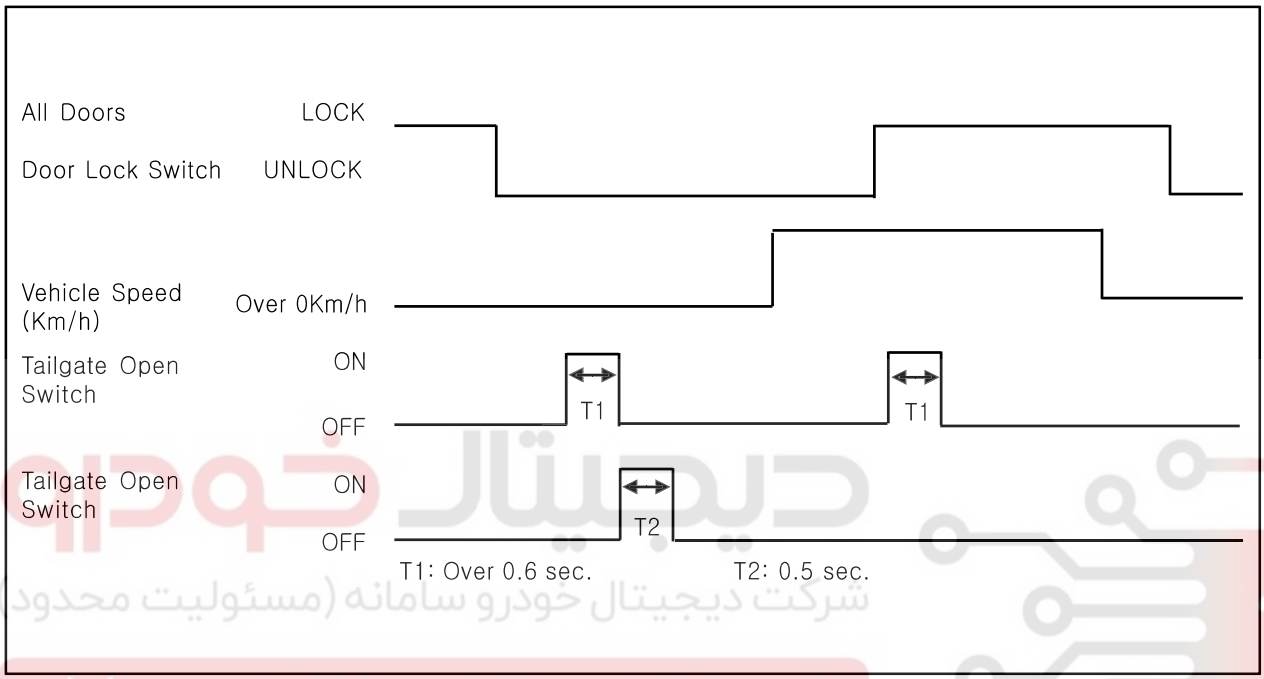
1. The door lock system outputs "LOCK" signal for 0.5 seconds when positioning the driver's or passenger's door lock switch to the lock position.
2. The door lock system outputs "UNLOCK" signal for 0.5 seconds when positioning the driver's or passenger's door lock switch to the unlock position.
3. "LOCK" or "UNLOCK" by the door lock switch is ignored when outputting the "LOCK" or "UNLOCK" signal by other functions.
4. All door lock signals are "UNLOCK" for 0.5 seconds just for once when receiving the "LOCK" signal within 0.5 seconds after closing the driver's or passenger's door while the ignition key is removed.



Modification basis	
Application basis	
Affected VIN	

25) Tailgate Open Control

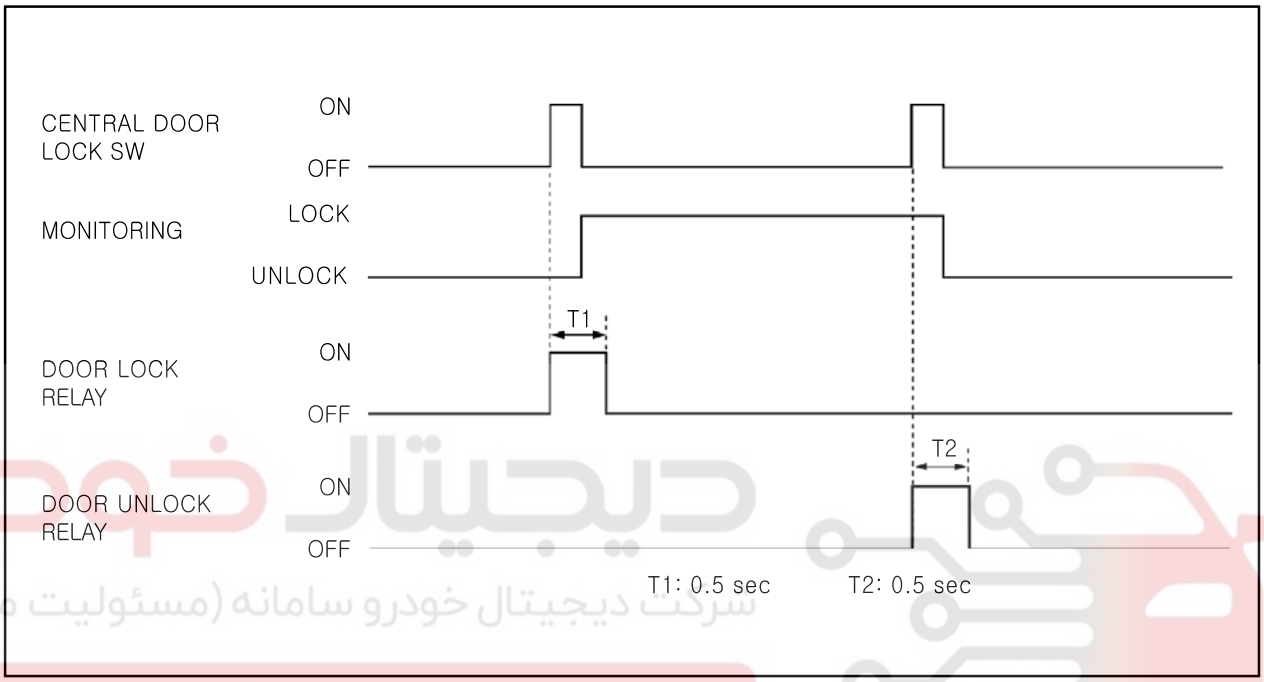
1. When pressing and holding the tailgate open switch for more than 0.6 seconds while LOCK switches in all doors are in UNLOCK position and the vehicle speed is 0 Km/h, STICS operates the tailgate relay for 0.5 seconds to unlock the tailgate.
2. If any LOCK switch is switched to LOCK position or vehicle speed exceeds 3 Km/h while operating the tailgate open relay, the output of the tailgate relay gets OFF.



Modification basis	
Application basis	
Affected VIN	

26) Door Lock/Unlock Control by Door Lock Switch

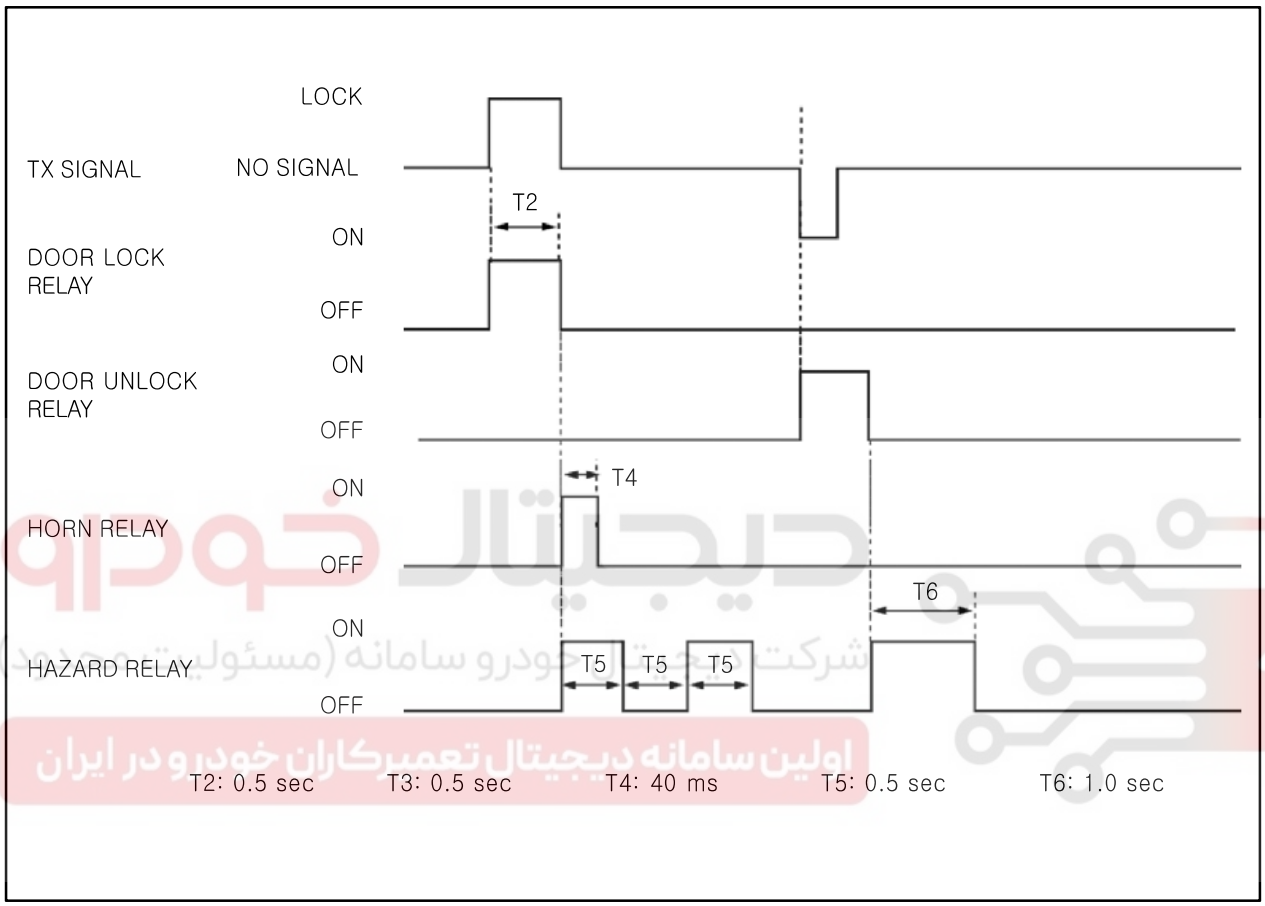
1. The door lock system outputs "LOCK/UNLOCK" signal for 0.5 seconds when operating the central door lock switch. (However, if the door lock switch (front doors) is at LOCK position, the system outputs UNLOCK signal, and vice versa.)
2. The "LOCK" or "UNLOCK" inputs from the central door lock switch in anti-theft mode are ignored.



Modification basis	
Application basis	
Affected VIN	

27) Door LOCK/UNLOCK by Remote Control Key

1. The door lock relay output is "ON" for 0.5 seconds when receiving the remote control lock signal.
   The door unlock relay output is "ON" for 0.5 seconds when receiving the remote control unlock signal.
2.



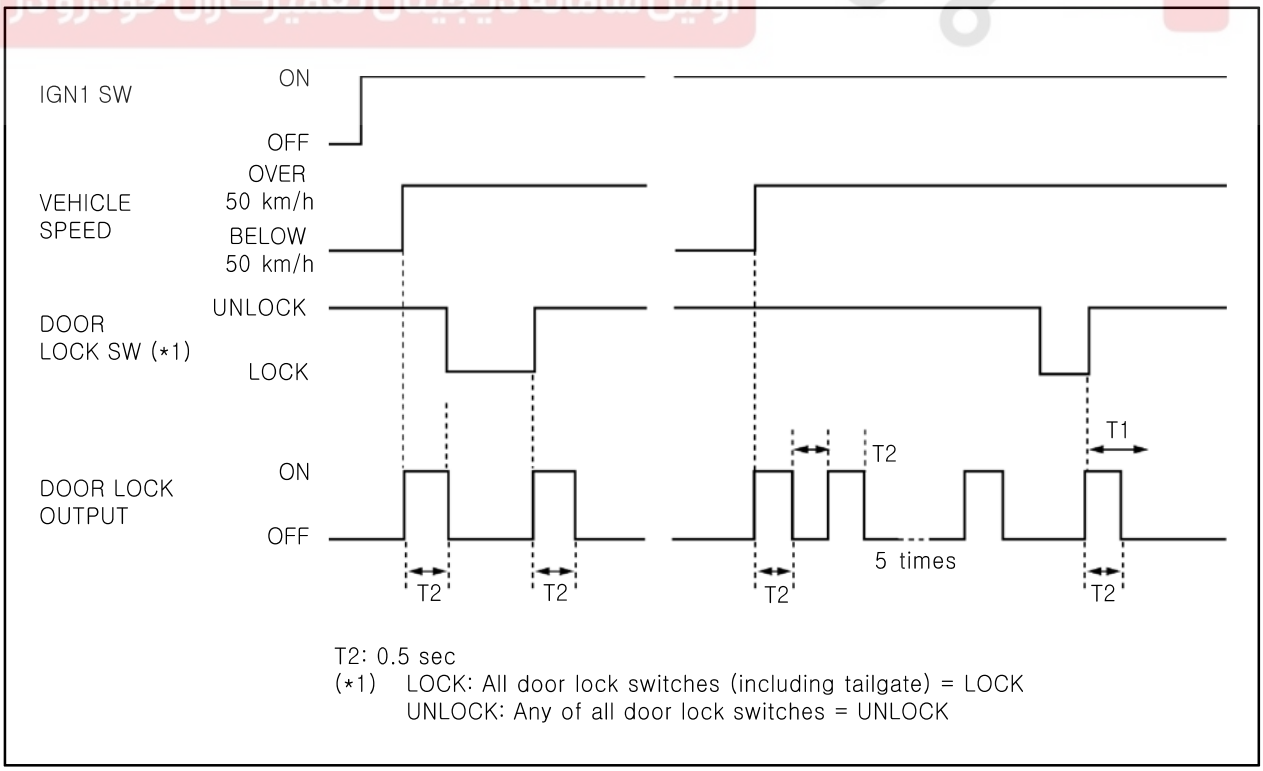
STICS

undefined

Modification basis	
Application basis	
Affected VIN	

28) Auto Door Lock

1. The door lock system outputs "LOCK" when the vehicle speed maintains over 50 km/h. However, it doesn't output "LOCK" when all doors are locked or failed.
2. If any of doors is unlocked after outputting "LOCK" in step 1, outputs "LOCK" up to 5 times (except step 1) at the interval of one second.
3. If any of doors is unlocked after 5 times of "LOCK" outputs, the door is regarded as "FAIL".
4. If the door that was regarded as fail changes (UNLOCK to LOCK) to unlock, only one "LOCK" output will be done.
5. If any door is regarded as FAIL, the auto door lock function does not work (if it is occurred when the vehicle speed is over 50 km/h, the auto door lock output does not occur even if the vehicle speed falls below 50 km/h and accelerates again to over 50 km/h.). Nonetheless, the central door lock function works properly.
6 When the system receives "UNLOCK" signal from a door switch, it outputs "LOCK" signals 5 times. If additional "LOCK" signal from another door switch is detected during the period, the system outputs five "LOCK" signals 5 times for the door.
7. The door lock system outputs "UNLOCK" automatically if the "LOCK" output conditions are established by this function or the key is cycled (IGN1=OFF) (even when there is no "LOCK" output while the vehicle speed maintains over 50 km/h under lock condition).
   (If the LOCK condition is established with the ignition switch ON, the system outputs UNLOCK signal unconditionally when turning the ignition switch to OFF position.)
   However, when the ignition key is turned to "OFF" position, the lock output conditions will be cancelled.
8. The "FAIL" condition of the door will be erased when the ignition key is turned to "OFF" position.

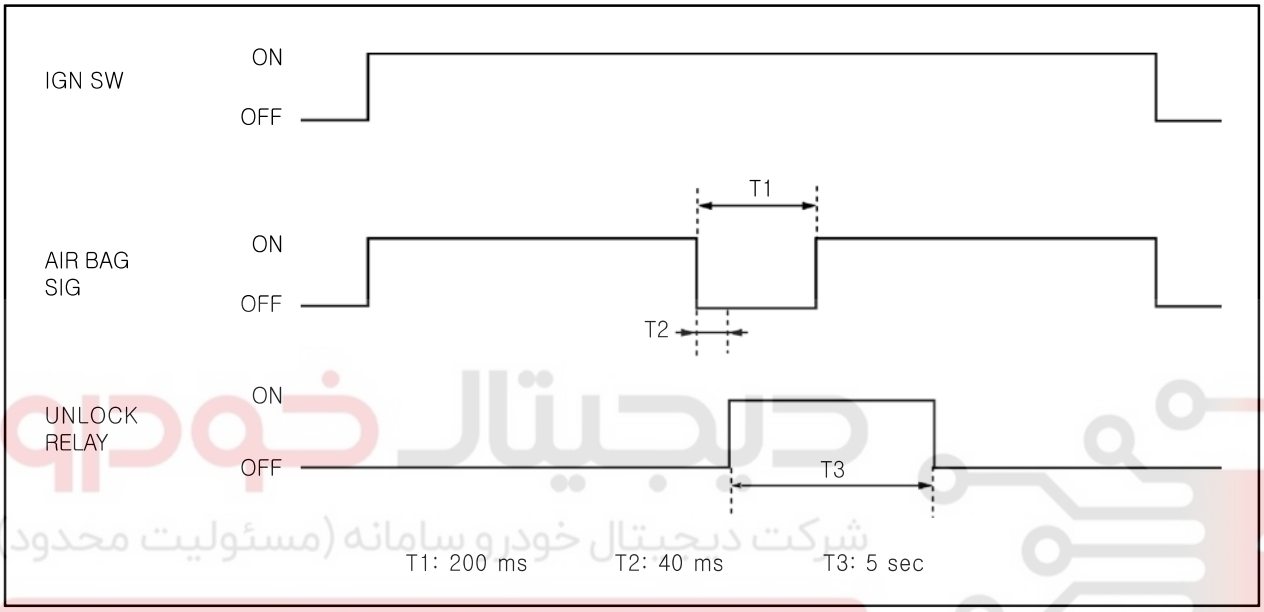


T2: 0.5 sec
(*1) LOCK: All door lock switches (including tailgate) = LOCK
UNLOCK: Any of all door lock switches = UNLOCK

Modification basis	
Application basis	
Affected VIN	

29) Auto Door Unlock (Crash Unlock)

1. The air bag collision signal input cannot be accepted within 7 seconds after turning the ignition key to "ON" position.
2. After this period, the door lock system outputs "UNLOCK" for all doors for 5 seconds from 0.4 seconds after receiving the air bag collision signal.
3. Even though the key is turned to "OFF" position during the output of "UNLOCK", the output continues on for remaining period.
4. The function is erased when turning "OFF" the IGN switch.



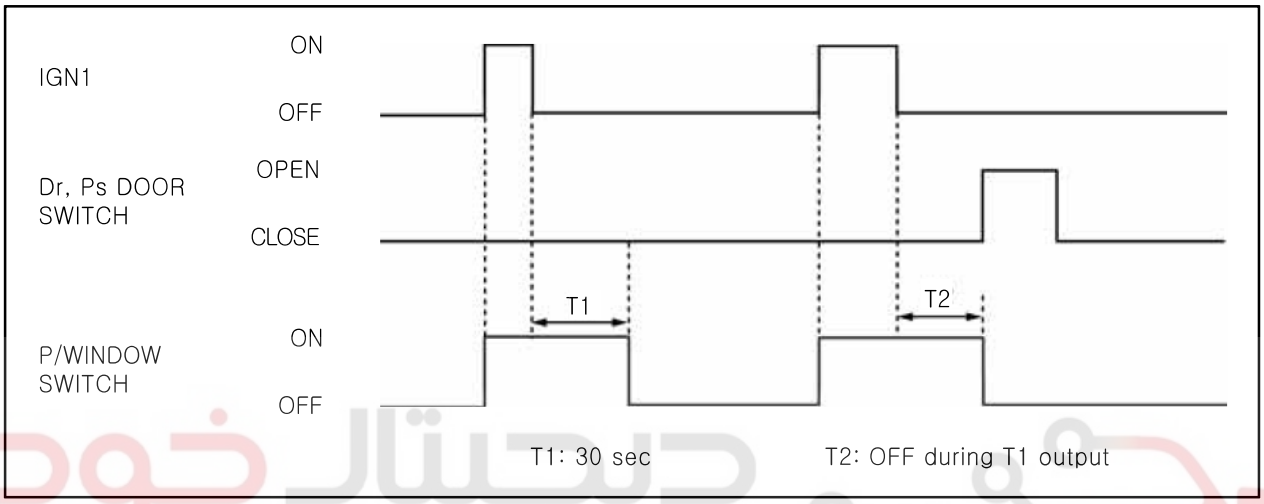
CAUTION

- The "Unlock" control by air bag signal prevails over any "LOCK" or "UNLOCK" control by other functions.
- The "LOCK/UNLOCK" request by other functions will be ignored after/during the output of "UNLOCK" by the air bag.
  However, the door lock is controlled by other functions when the ignition switch is "OFF".
- "LOCK" (or "UNLOCK") output is ignored if "LOCK" (or "UNLOCK") output is required while performing the output of "LOCK" (or "UNLOCK").
- If the door lock system outputs "LOCK" and "UNLOCK" simultaneously, only the "LOCK" output can be activated.

Modification basis	
Application basis	
Affected VIN	

30) Time Lag Power Window Control

1. The power window relay output is "ON" when turning on the ignition switch.
2. The power window relay output is "ON" for 30 seconds when turning off the ignition switch. The power window relay output is "OFF" when opening the driver's door or the passenger's door. The power window relay is turned "OFF" when receiving the remote control key lock signal (armed
3. mode) during its extended operation period of 30 seconds.



31) Definition of Terms

1. DOOR OPEN and DOOR CLOSE
   DOOR OPEN: Any of all door switches (including hood and tailgate) is in "OPEN" position.
   DOOR CLOSE: All door switches (including hood and tailgate) are in "CLOSE" position.

CAUTION
The door lock/unlock operation does not affect the engine hood.

2. DOOR LOCK: Indicates that all door lock switches (including tailgate) are in LOCK positions.
   DOOR UNLOCK: Indicates that any of all door lock switches (including tailgate) is in UNLOCK position.

Engine hood open warning lamp
The warning lamp comes on when the engine hood is open.

Modification basis	
Application basis	
Affected VIN	

32) Description of Theft Deterrent Function

1. Armed mode activation requirements

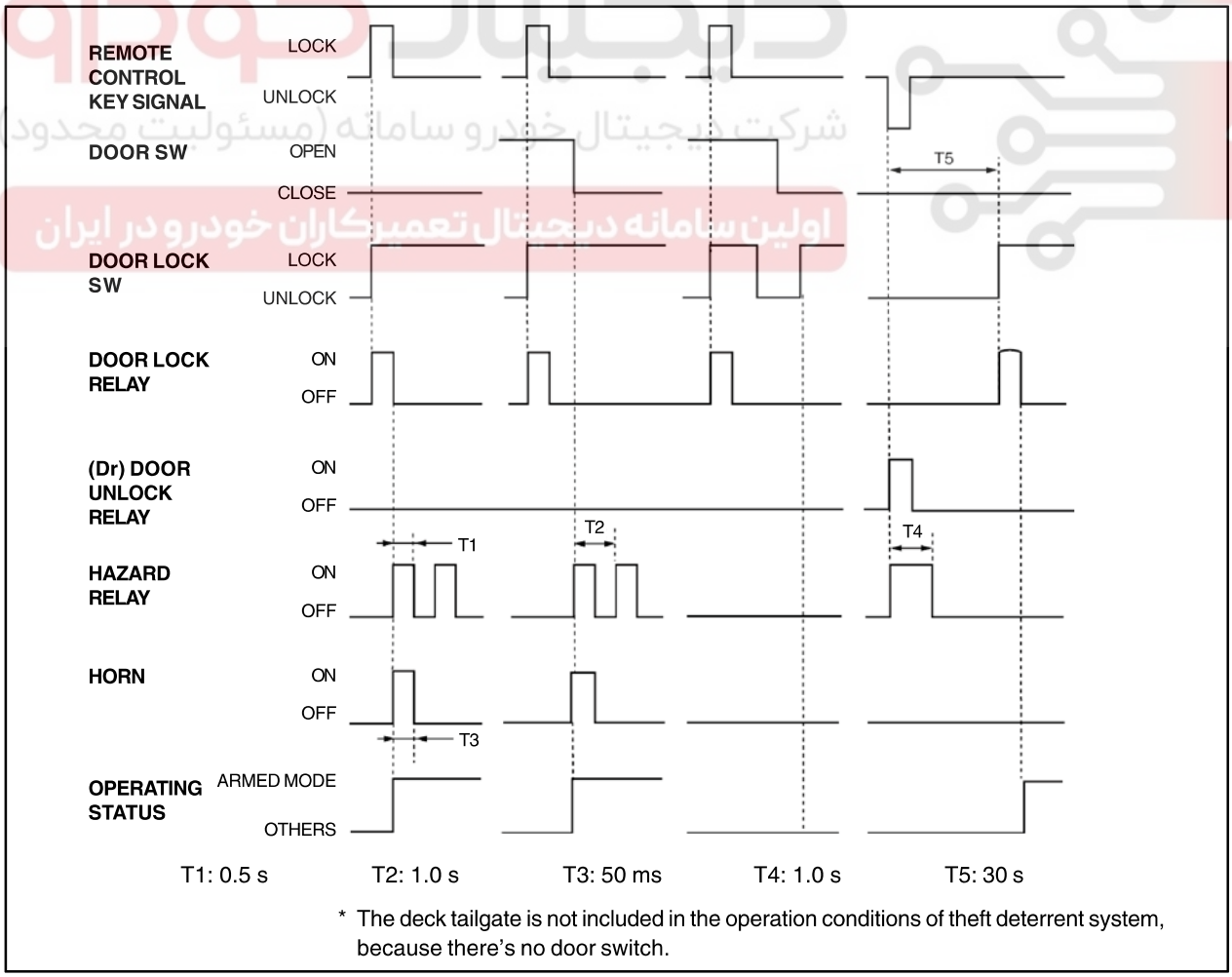
a. The "LOCK" output is "ON" when the "LOCK" signal is received from transmitter while the ignition key is removed and all doors are closed. The armed mode is activated when the door lock switch is locked (hazard warning flasher blink twice).

b. The armed mode is still activated and the hazard warning flasher blink twice when the "LOCK" signal is received from the remote control key again in armed mode.

c. When the "LOCK" signal is received from the remote control key while any of doors is not closed, only the "LOCK" output can be done and then activates the armed ready mode (without theft deterrent horn and hazard warning flasher). At this moment, if the ignition key is inserted or the door lock switch is unlocked, it cancels the armed mode and activates the normal mode.
When the door is opened or the ignition key is not inserted into ignition switch within 30 seconds

d. after receiving "UNLOCK" signal from the remote control key, it outputs "LOCK" and then activates armed mode (RELOCK operation). Also, at this moment, the system blinks hazard warning flasher twice.
The armed mode will not be activated except above conditions.

e. Ex) The armed mode will not be activated when the door is locked by the ignition key.



* The deck tailgate is not included in the operation conditions of theft deterrent system, because there's no door switch.

Modification basis	
Application basis	
Affected VIN	

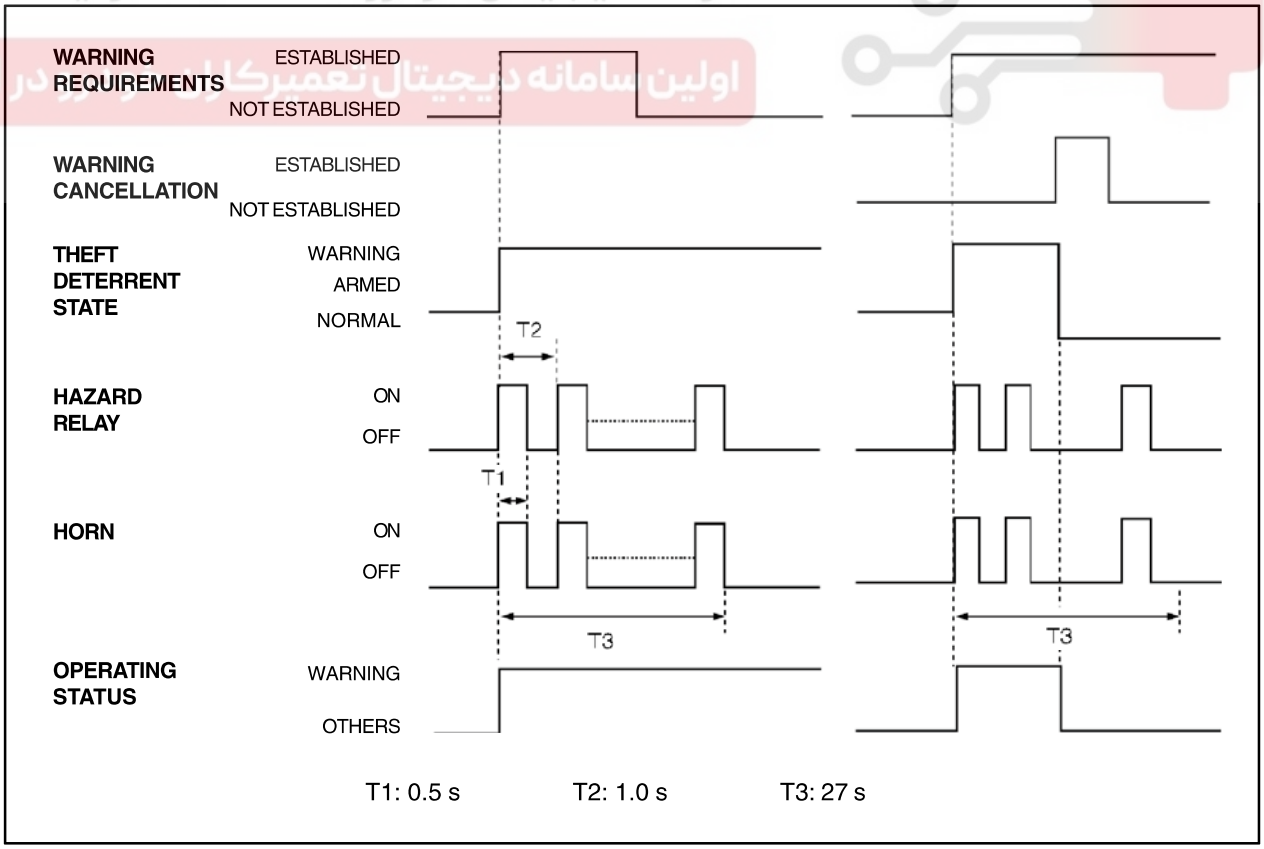
2. Armed mode cancellation requirements
   1) Receiving UNLOCK signal from the remote control key or starting the engine.

3. Warning operation requirements
   1) When opening the door in armed mode
   2) When unlocking the door lock switch in armed mode by other than the remote control key
   3) When closing and then opening the door after completion of warning (27 seconds)

4. Warning operation
   1) The theft deterrent horn and hazard warning flasher output is "ON" for 27 seconds at the interval of 1 second.

5. Warning cancellation requirements
   1) Cancels warning by using any signal from the remote control key (LOCK, UNLOCK, PANIC) during warning operation.
   2) Cancels warning after 27 seconds (remaining time) while the ignition key is turned to "ON" position.
   3) If the ignition switch is turned to ON position when the warning is activated in armed mode, the warning is cancelled immediately and the warning buzzer stops after 27 seconds (remaining time).

6. Operation when warning is cancelled
   1) The theft deterrent horn and hazard warning flasher outputs are "OFF".



Modification basis	
Application basis	
Affected VIN	

STICS
undefined

8. Operations when removing and installing the battery

Removed \ Installed	Normal	Armed	Warning	Remark
Normal	○			
Armed Ready	○			
Armed		○		
Warning			○	
Warning Completion	○	○	○	
RELOCK Ready	○			

If the system is in armed mode while installing a battery, the horn sounds and the emergency warning lamp blinks (Same operations with warning in armed mode).
RELOCK Operation It the door is not opened or the ignition key is not inserted into the key cylinder within 30 seconds after unlocking the door with remote control key, the system outputs "LOCK" signal and activates the armed mode.

33) Specifications of Remote Control Key

When any of switches on remote control key is pressed, the integrated CPU in remote control key sends the coded control message to the CPU in receiver to control the vehicle.

Switch Functions on Remote Control Key

Function		Switch Operation
Function	Door lock	Briefly press the switch briefly
	Door unlock	Press and hold the door switch
	PANIC	Briefly press the panic button

▶ **Door Unlock and Panic Function**

Briefly press (below 0.5 sec): Door unlock and theft deterrent mode is deactivated
Press and hold (over 2 sec): Panic function
1. Door unlock (Briefly press)
- If the unlock button on the remote control is pressed, the door will be opened and the theft deterrent mode will be activated. If the door coupled switch of front room lamp is pressed, the lamp will come on for 30 seconds. It will turn off immediately after the lock button of the remote control is pressed.

2. Panic function: activated in the theft deterrent mode
- If you press and hold the door unlock and panic buttons, the buzzer will sound for 27 seconds.
- The function is inactivated if any button of remote control is pressed.

LED flasher
Briefly press: blink once
Press and hold: blink twice

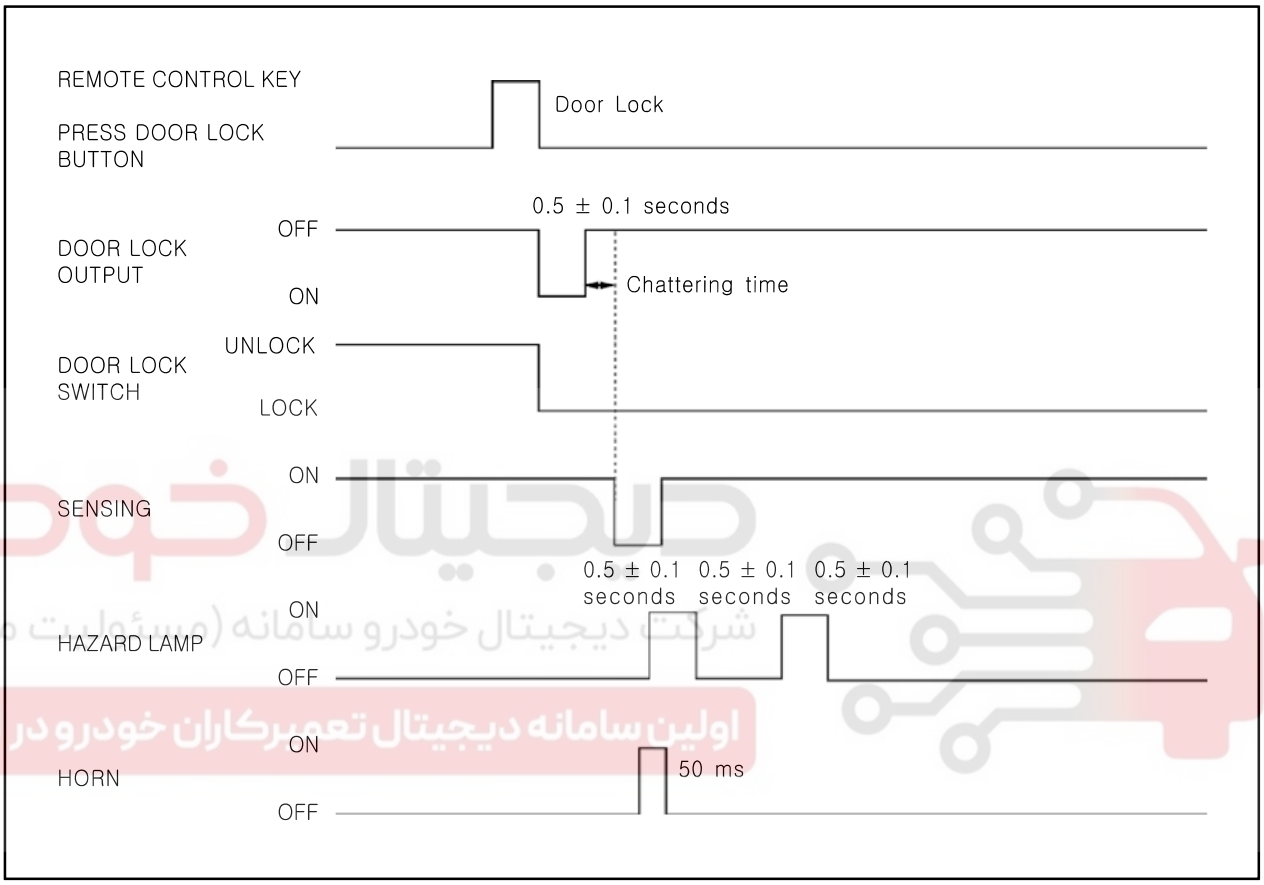
▶ **Door Lock Function**

Briefly press (below 0.5 sec): Door lock and theft deterrent mode is activated
Door lock (Briefly press)
- If you press this button locks all doors and activates the theft deterrent mode.

Modification basis	
Application basis	
Affected VIN	

34) Remote Door Lock

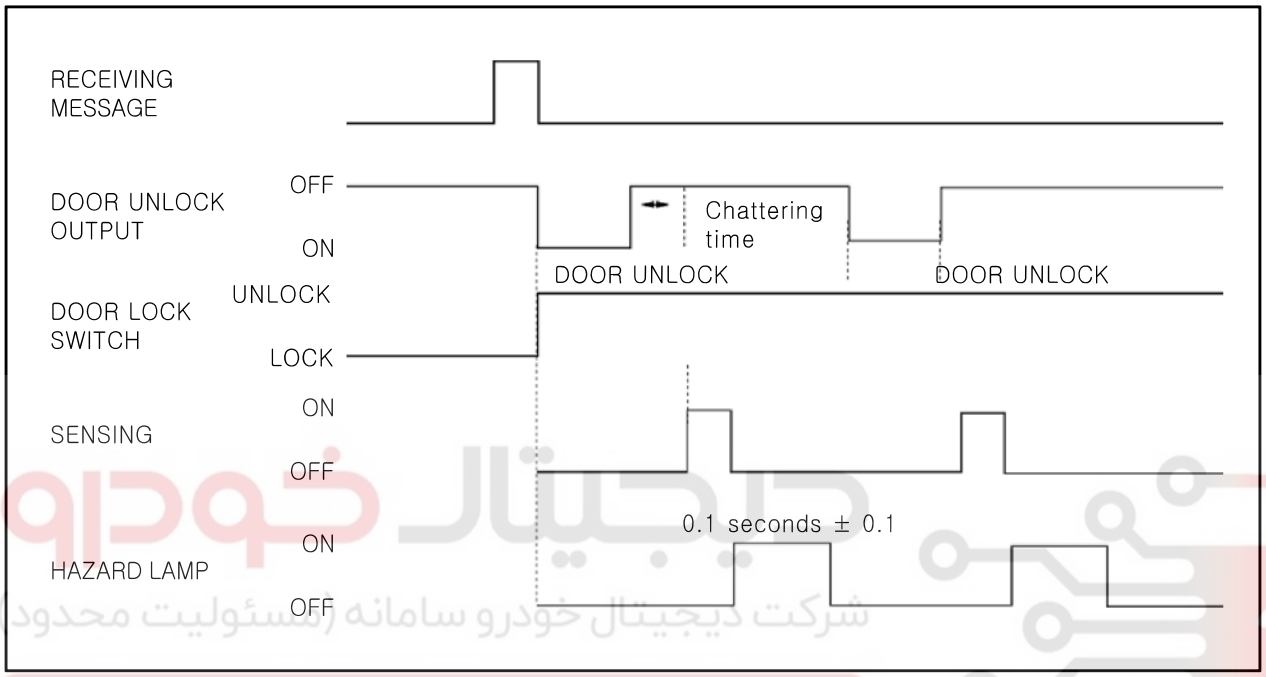
1. All doors are locked when briefly pressing the door LOCK switch on remote control key (less than 0.5 seconds).
2. The system outputs LOCK signal immediately after receiving the door lock message from the remote control key. The system activates the theft deterrent mode when all doors are locked while they are fully closed (the hazard warning lamps blink twice.).



Modification basis	
Application basis	
Affected VIN	

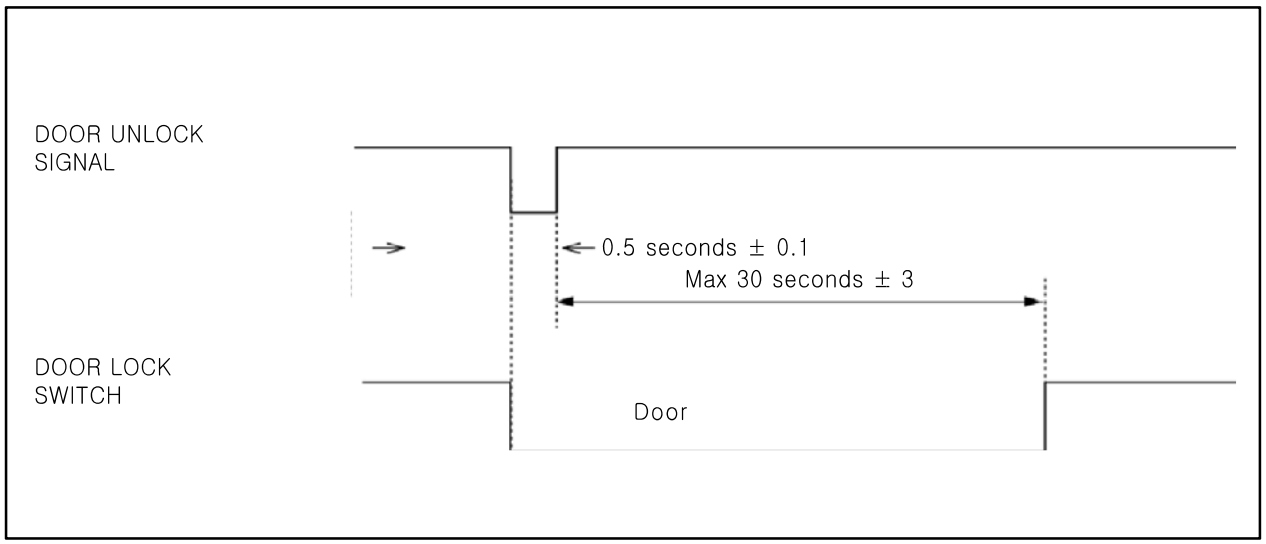
35) Door Unlock

1. The door unlock operates when pressing the door switch on the remote control key for longer than 0.5 seconds.
2. The door unlock relay is "ON" for 0.5 seconds when receiving the door unlock message from the remote control key.
3. The hazard warning lamps blink once only when all the doors unlocked.



36) Auto Door Lock in 30 Seconds after Pressing Door Unlock Button

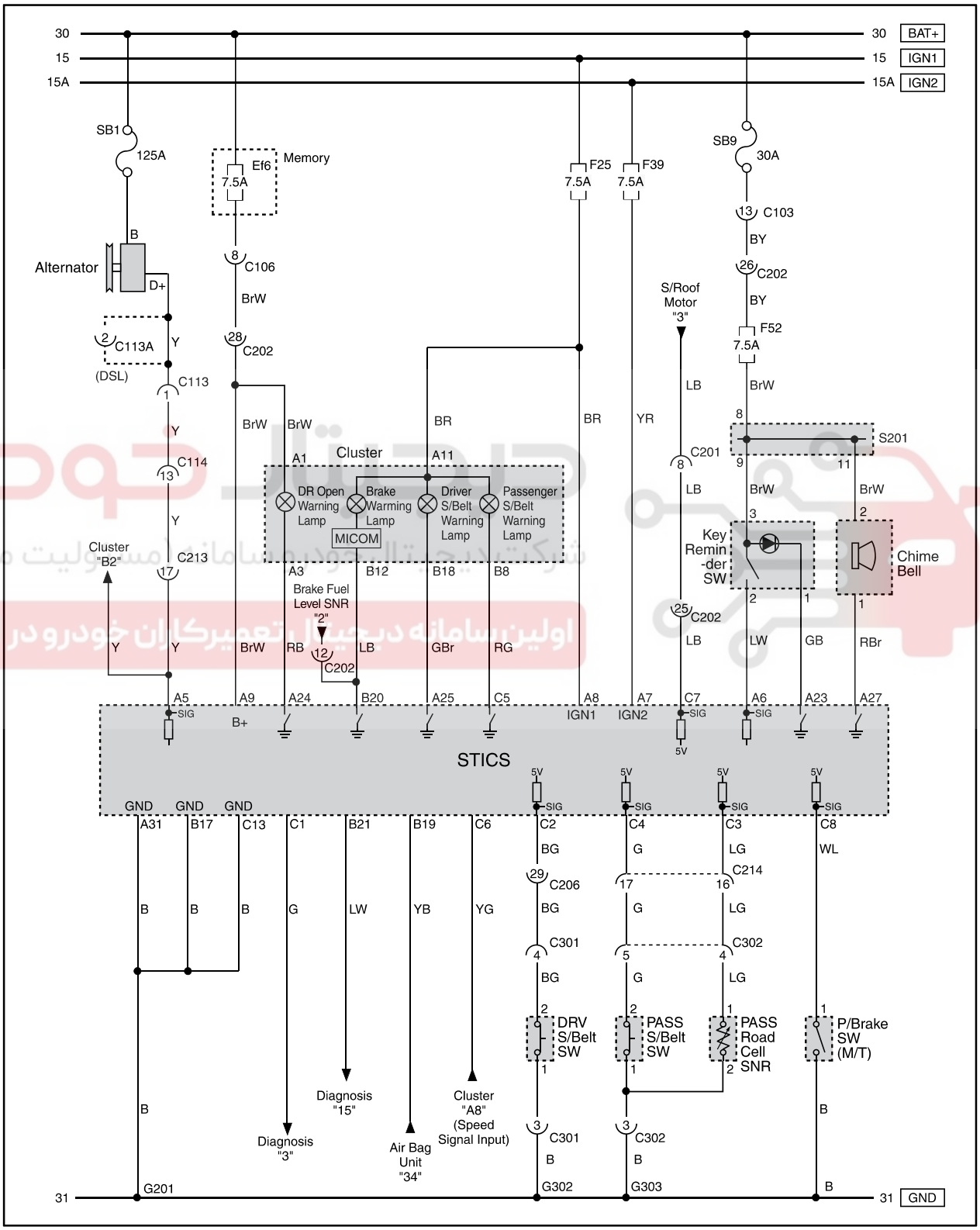
1. If no door is opened for 30 seconds after inputting remote door unlock, the doors are automatically locked and the armed mode of anti-theft system is activated again.



Modification basis	
Application basis	
Affected VIN	

3. CIRCUIT DIAGRAM

1) Power/Ground, Chime Bell, Buzzer Warning Lamp (Brake, Seat Belt, DR Open)

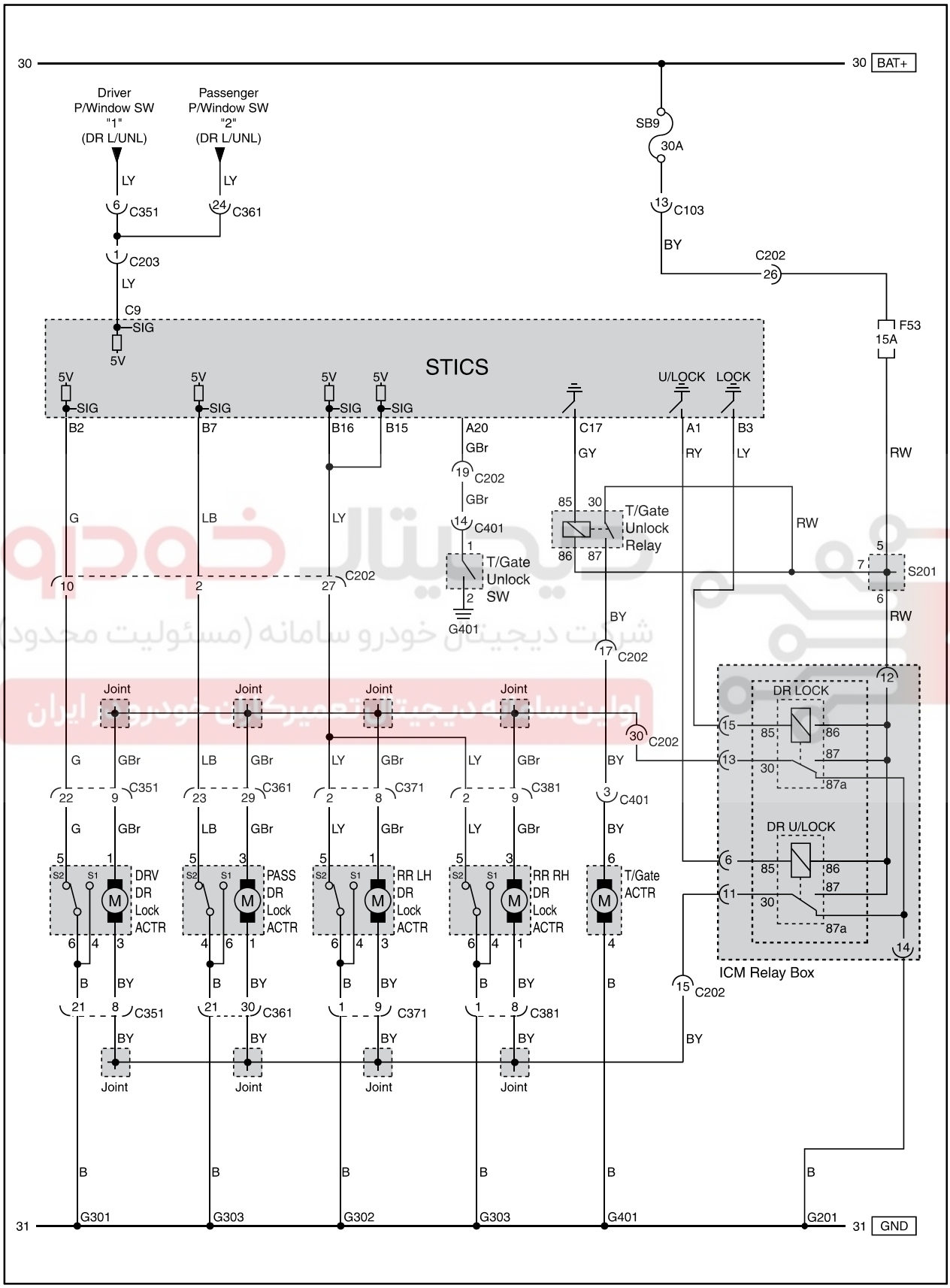


Modification basis	
Application basis	
Affected VIN	

STICS

undefined

2) Central Door Lock Circuit

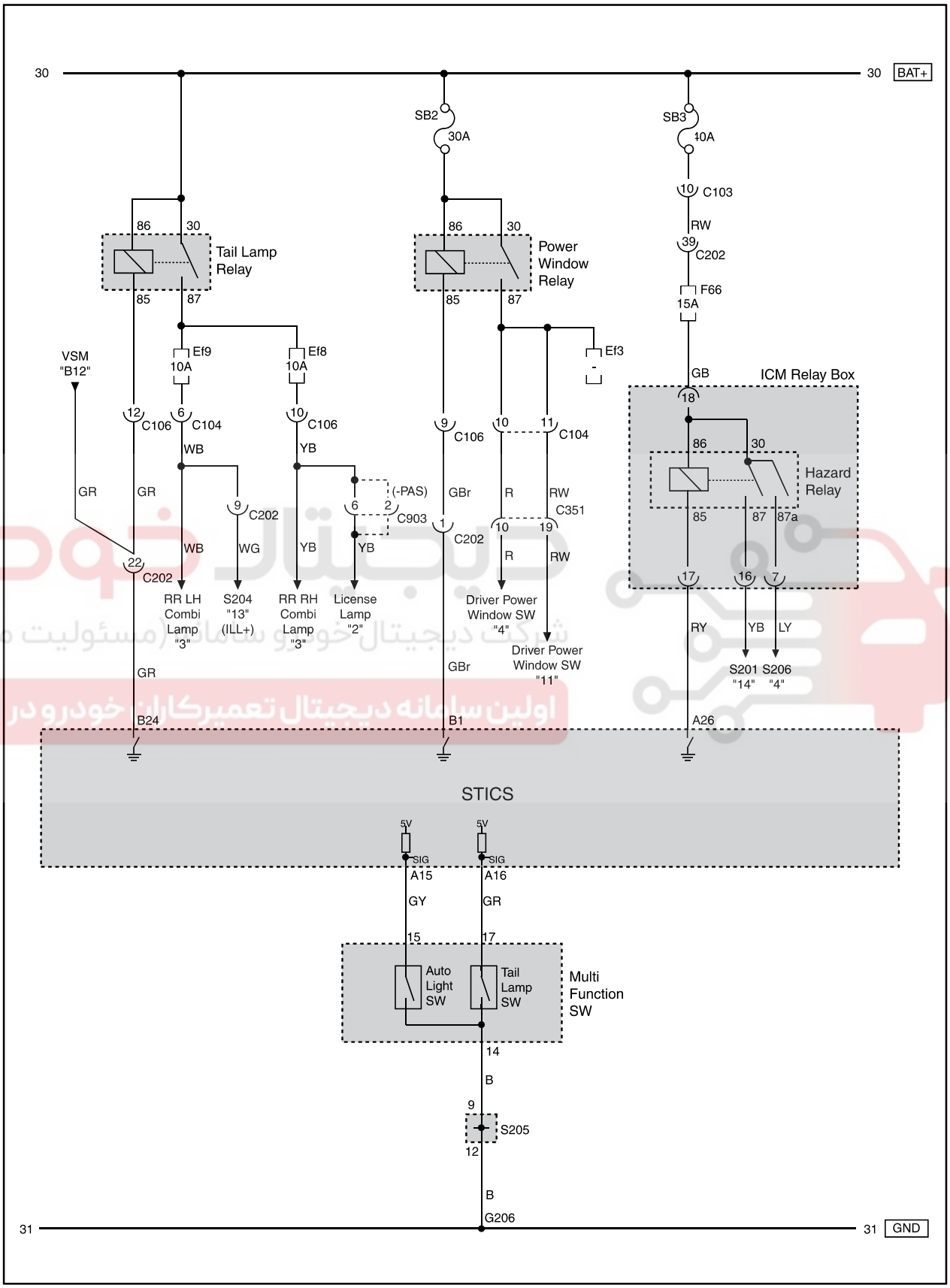


STICS

undefined

Modification basis	
Application basis	
Affected VIN	

3) Tail Lamp, Hazard, Power Window

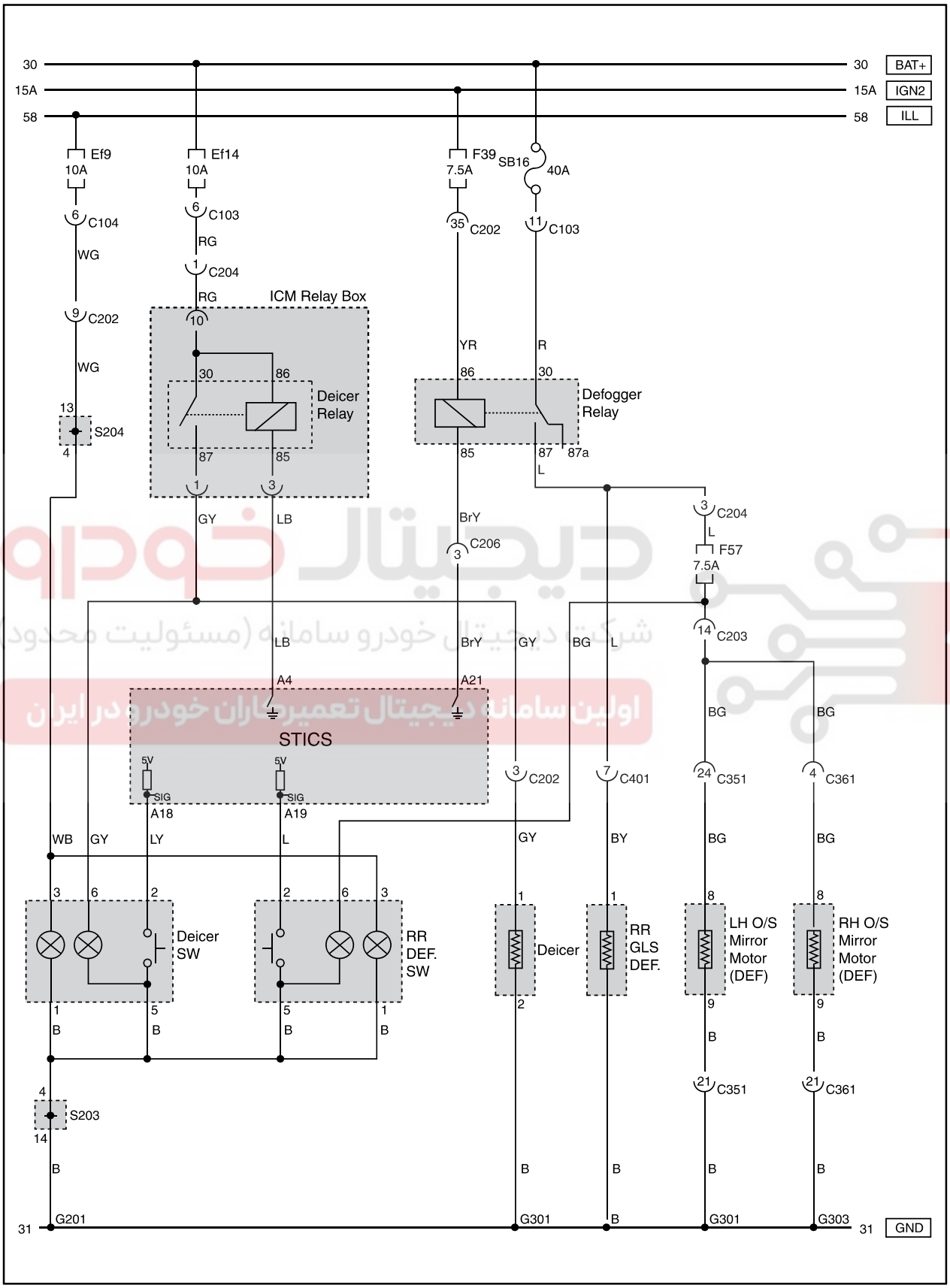


Modification basis	
Application basis	
Affected VIN	

STICS

undefined

4) Defogger

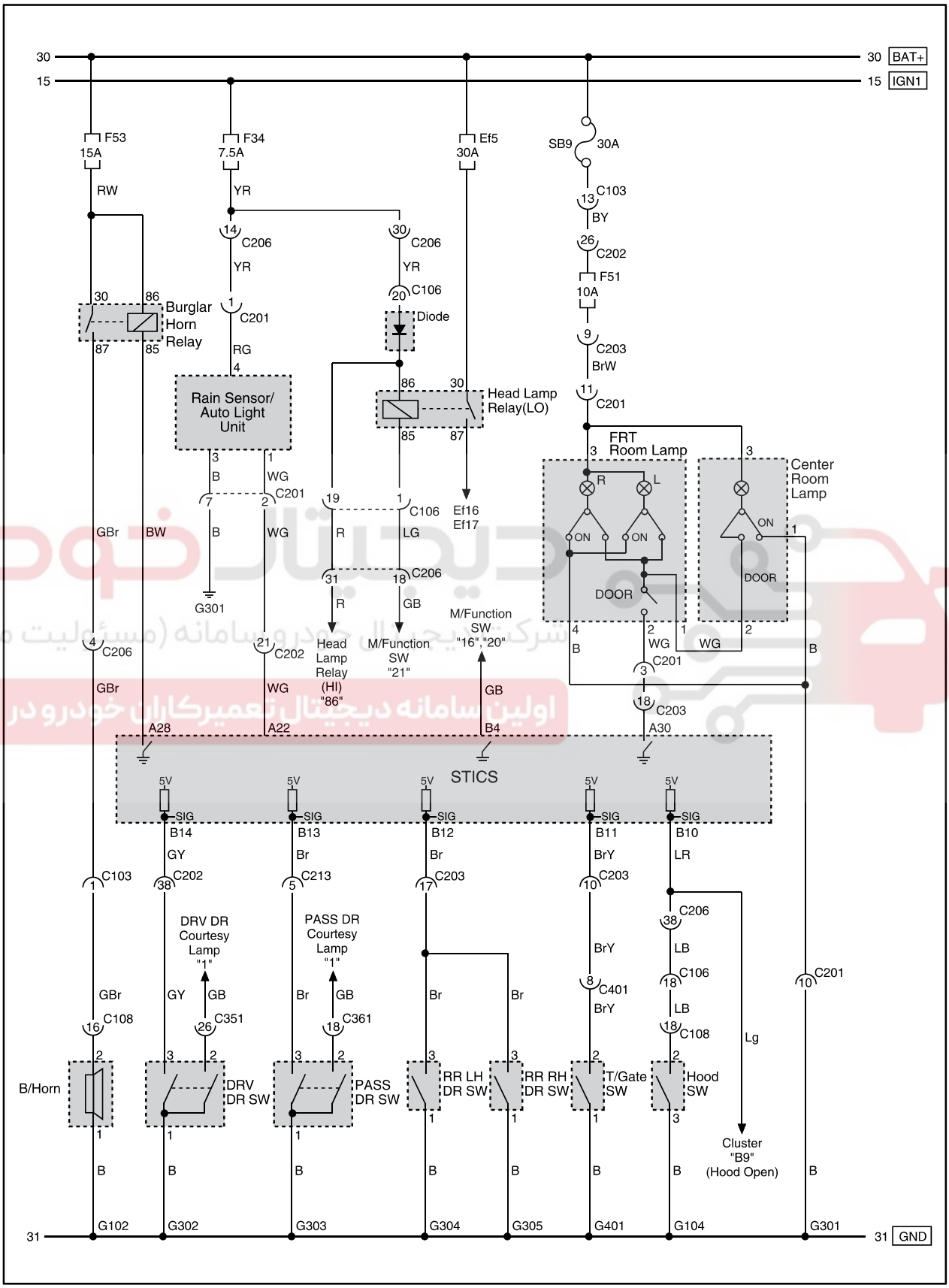


STICS

undefined

Modification basis	
Application basis	
Affected VIN	

5) Panic, Auto Light / Rain Sensing, Room Lamp

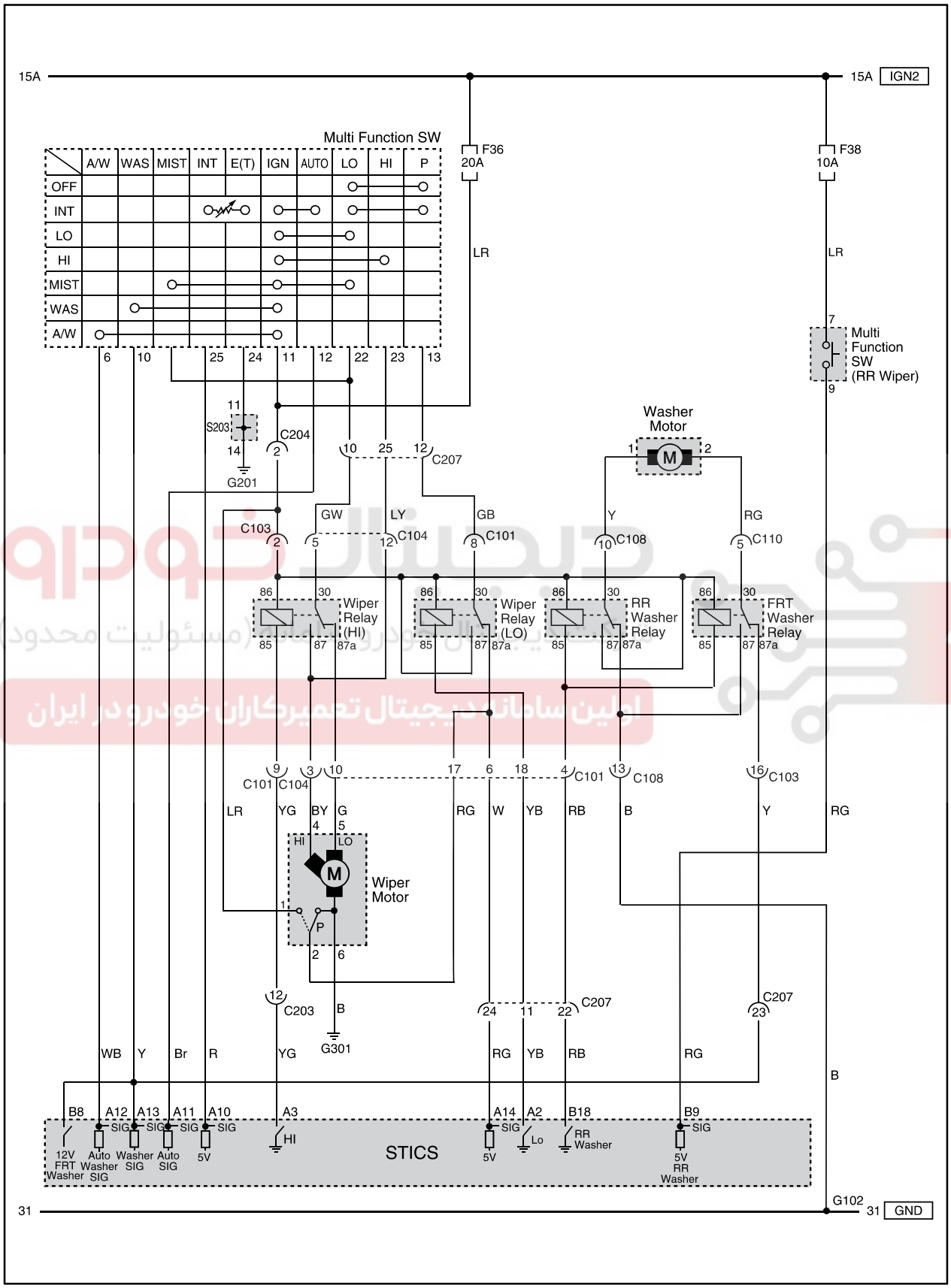


Modification basis	
Application basis	
Affected VIN	

STICS

undefined

6) FRT Wiper/Washer/ RR Washer

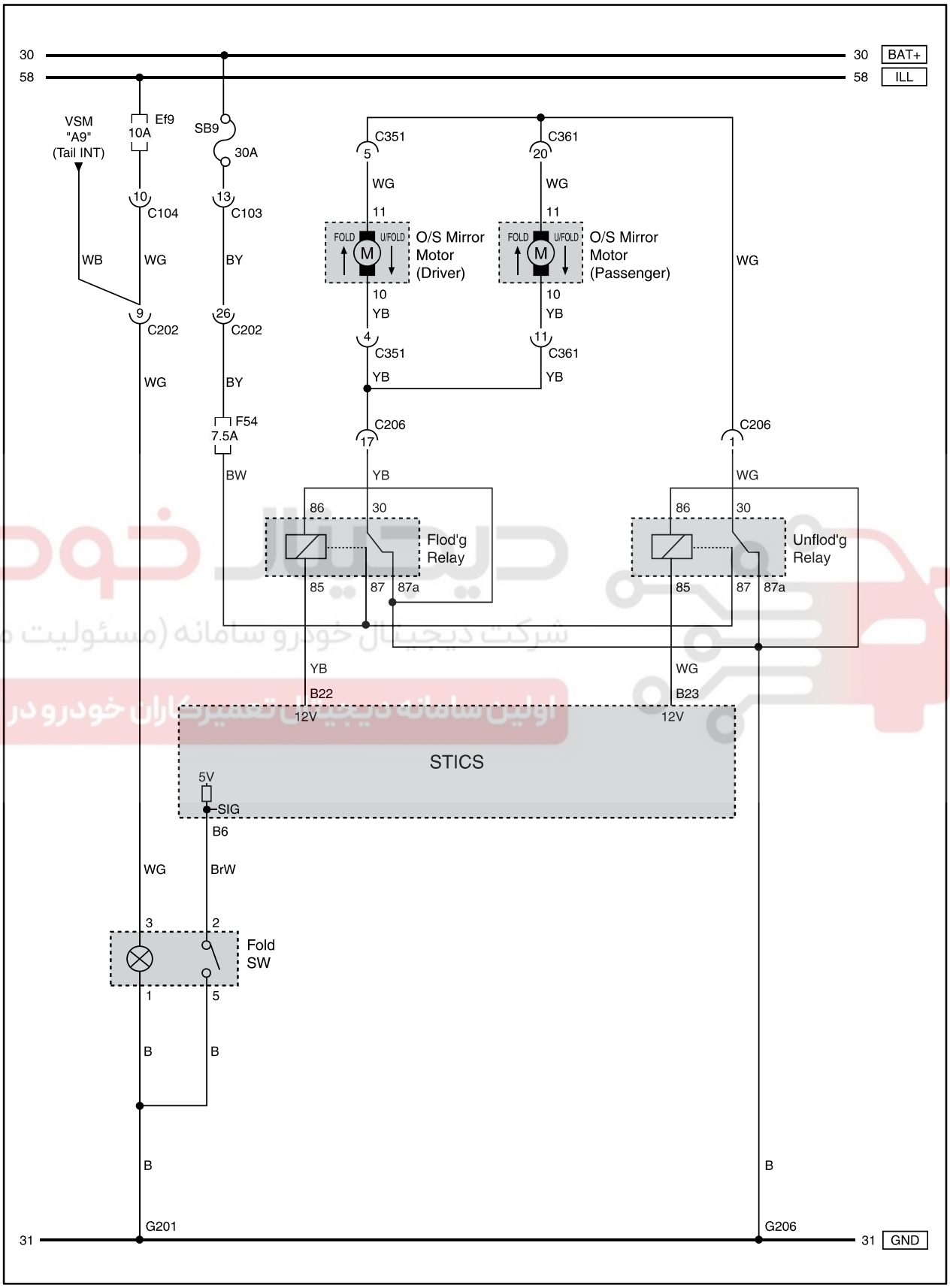


STICS

undefined

Modification basis	
Application basis	
Affected VIN	

7) Mirror Fold'g/Unfold'g, Fold SW



Modification basis	
Application basis	
Affected VIN	

STICS

undefined

REMOVAL AND INSTALLATION

S.G.N. 8710-01 REKES KEY CODING

1. Operating requirements
   IGN Key = OUT (removed)

2. Code registration requirement
   Codes can be registered only through SCAN-100.

3. Transmitter Code Registration

1) Up to five transmitter codes can be registered.
2) The received code cannot be output during the registration.
3) Both single REKES and dual REKES must be encoded through the SCAN tool.

Modification basis	
Application basis	
Affected VIN	

4) How to Code REKES Key

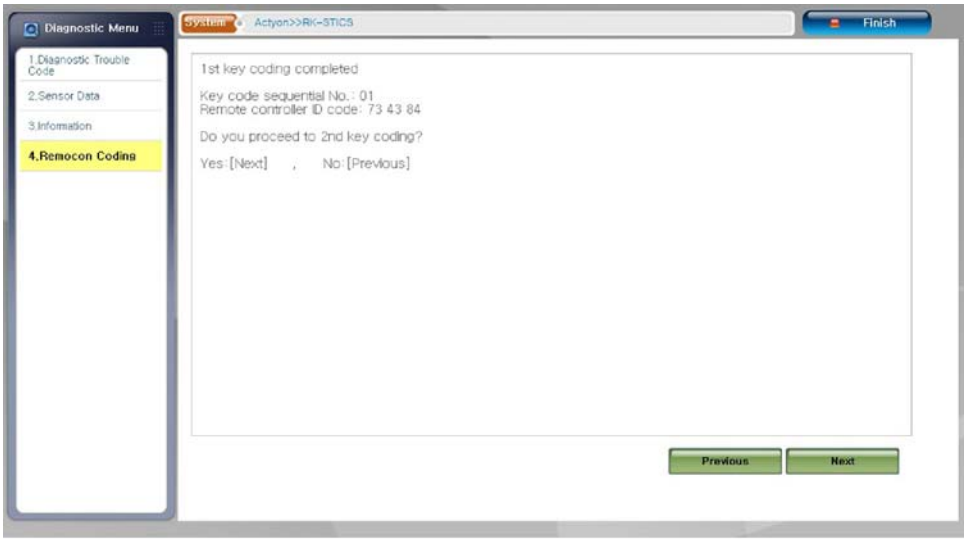
If you replace the REKES key or immobilizer & rechargeable key to new one, you should code the REKES key using the diagnostic device. (maximum 5)

1. Connect the diagnostic device to the vehilce and select the vehicle type and system (RK-STICS). When the following screen is displayed, select 'REMOCON CODING'.

2. Remove the remote control key from the ignition key box and press 'Next'. Press the door UNLOCK (PANIC) button on the remote control key once (for approx. 2 seconds or longer).

Modification basis	
Application basis	
Affected VIN	

3.The first key coding completion screen is displayed with beep sound as follows: Press 'Next' and perform the second remote control key coding in the same way.



4.When the second key coding is completed, the following screen is displayed. Finish the remote control key coding by pressing 'Previous'.

5.Exit the diagnostic screen, remove the device from the diagnostic connector and perform the function test for the remote control key. If it does not work well, perform the above procedures again.

CAUTION

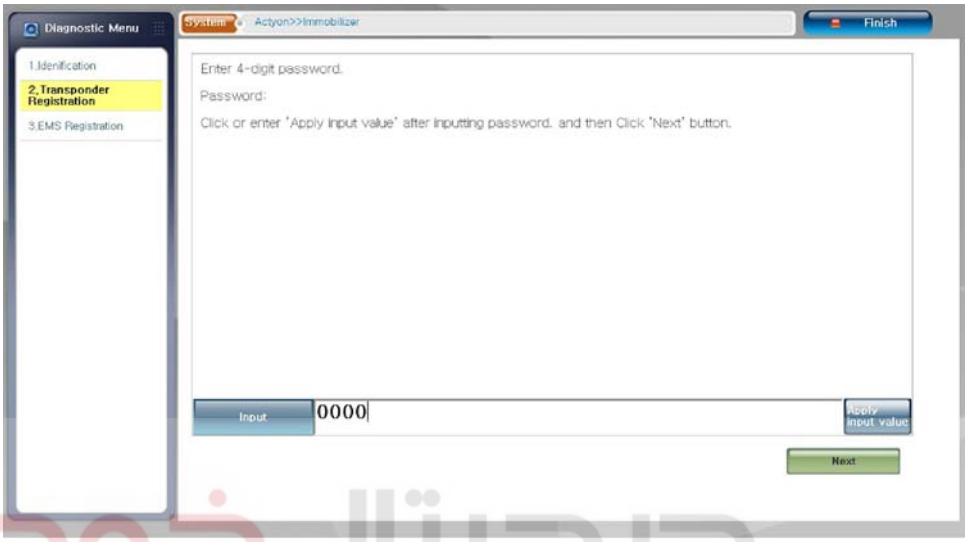
When you code newly purchased remote control key:

- When you lost the remote control key and purchase a new one, if you code only the newly purchased one, the existing remote control key becomes unavailable. You must code the newly purchased remote control key together with the existing one.

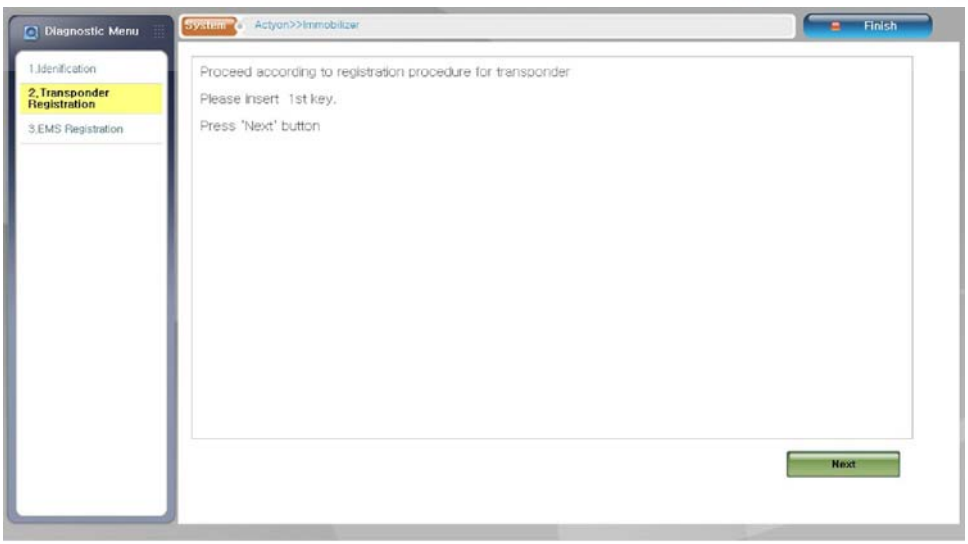
Modification basis	
Application basis	
Affected VIN	

5) How to Register Transponder

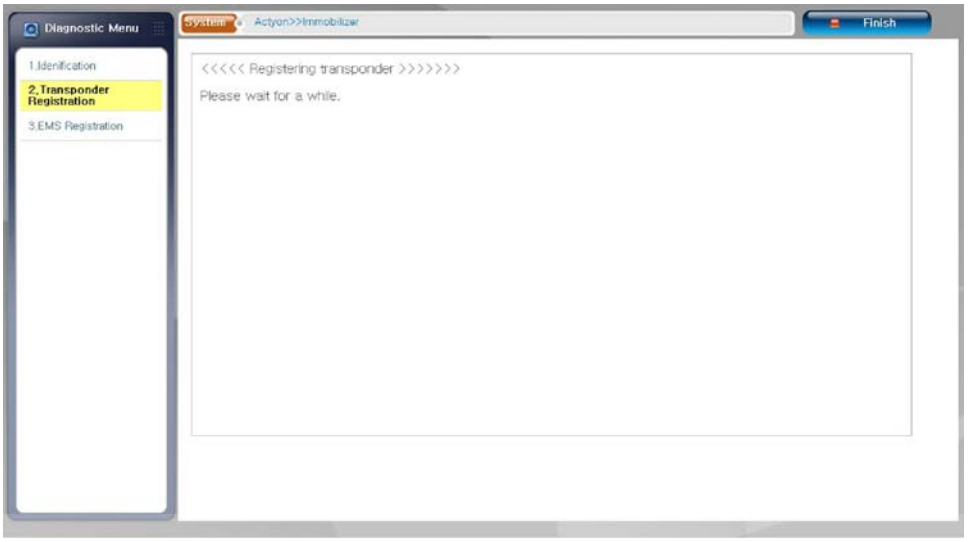
1. Insert the ignition key into the key cylinder and turn it to the "ON" position.
2. Select the vehicle type and system (immobilizer) on the diagnosis program.
3. Select the Transponder registration menu and enter the password. (initial value is "0000") Select "Next".



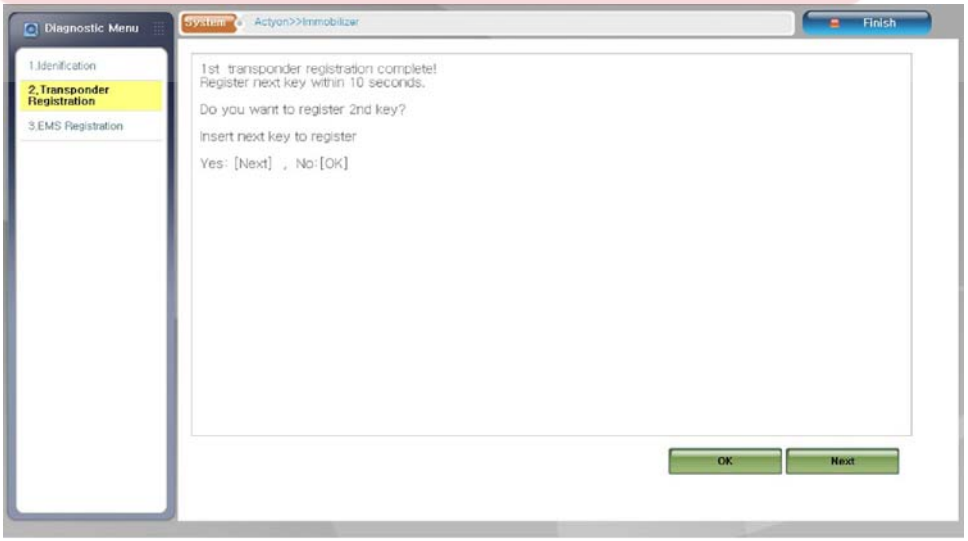
4. Press "Next" with the first key in key box.



5. Check the progress.



6. If another key should be registered additionally, insert the second key into the key cylinder and press "Next" within 10 seconds since the first transponder coding is complete.



Modification basis	
Application basis	
Affected VIN	

7. Press "OK" button when the registration is complete.

NOTE

If the registration fails, press "Previous" button and perform the registration procedures again.

Modification basis	
Application basis	
Affected VIN	

2) Pin Arrangement of Diagnostic Connector

Diagnosis connector is installed at the lower driver side instrument panel and it consists of 16 pins. REKES key coding should be done using the diagnostic device.

3) Pin Functions

Pin no. 1	-
Pin no. 2	-
Pin no. 3	STICS "C1"
Pin no. 4	Ground
Pin no. 5	Signal ground
Pin no. 6	CAN - HIGH
Pin no. 7	Engine ECU
Pin no. 8	ABS/ESP UNIT "2"
Pin no. 9	AIR BAG UNIT "9"
Pin no. 10	-
Pin no. 11	TCU "B12" (6-AT) "A18" (5-AT)
Pin no. 12	-
Pin no. 13	TCCU "21"
Pin no. 14	CAN - LOW
Pin no. 15	STICS "B21"
Pin no. 16	Battery +

Modification basis	
Application basis	
Affected VIN	

S.G.N. 8710-01

DIAGNOSIS TROUBLE CODE AND HELP TIPS

Fault Code	Malfunction	Descriptions
01	Dr Door Lock Knob	Driver's door lock knob is not operated when locking/unlocking doors.
02	Ps Door Lock Knob	Passenger's door lock knob is not operated when locking/unlocking doors.
03	Rr Door Lock Knob	Rear door lock knob is not operated when locking/unlocking doors.
04	T/Gate Lock Knob	Tailgate lock knob is not operated when locking/unlocking doors.
05	Door Lock Output	All door lock knob are not moved to lock position even when the door lock relay is activated.
06	Door Unlock Output	All door lock knob are not moved to unlock position even when the door unlock relay is activated.
07	C/DR Lock Output	Doors are locked by central door lock switch while the engine is running.
08	DR Lock Output	Doors are locked by driver's door lock switch while the engine is running.
09	PS Lock Output	Doors are locked by passenger's door lock switch while the engine is running.
10	Auto Door Lock Output	Door lock knob is not moved to lock position when the system outputs auto door lock signal while the ignition switch is in ON position and the vehicle speed is over 50 km/h.
11	Auto Door Unlock Output	Door lock knob is not moved to unlock position after receiving the output from collision sensor.
12	Wiper Output	The WIPER P-POS signal is not detected when the wiper relay is activated.
13	SPEED SIGNAL	The vehicle speed over 3 km/h is detected at the speed signal area while the ignition switch is in ON position and the alternator signal is "D" LOW.
14	INT WIPER Volume	The circuit is open (over 4.5 V) when changing the INT volume in the speed sensitive INT wiper (saved as history error).
15	SPEED SENSOR	The vehicle speed over 200 km/h is detected (saved as history error).
16	A/BAG COLLISION SENSOR INPUT	A signal is sent to the collision sensor input area while the ignition switch is in OFF position (saved as history error unconditionally).
17	A/BAG COLLISION SENSOR OUTPUT	The RKSTICS outputs UNLOCK signal after receiving collision sensor input while the ignition switch is in ON position (saved as history error).
18	A/BAG COLLISION MONITOR	The STICS outputs the Door Unlock signal due to the collision sensor and the feedback value is in proper range (saved as history error).
19	Door Ajar Warning IND	The door warning indicator blinks when the vehicle speed is over 10 km/h (saved as history error).
20	PARKING BRAKE IND	The parking brake indicator blinks when the vehicle speed is over 10 km/h (saved as history error).
21	Auto Washer Out	The auto washer output is not sent to the front washer (saved as history error).
22	WASHER RELAY	The front washer switch receives the input signal for more than 10 seconds (saved as history error).

Fault Code	Malfunction	Descriptions
23	REMOCON VOLTAGE CHECK	The voltage from remote control key is saved as history error.
24	SBR S/BELT SW (Only EU)	When the seat belt switch circuit is OPEN (HIGH) in KEY OUT & ARMED MODE, the system recognizes it as FAIL and saves it as History error (Normal Close (GND)).
25	SBR SENSOR (Only EU)	When the sensor value is recognized in KEY OUT & ARMED MODE, the system saves it as History error.
26	SBR CONNECTION (Only EU)	When the seat belt switch circuit maintains OPEN (HIGH) in KEY OUT & ARMED MODE while the vehicle speed is over 50 km/h, the system saves it as History error.

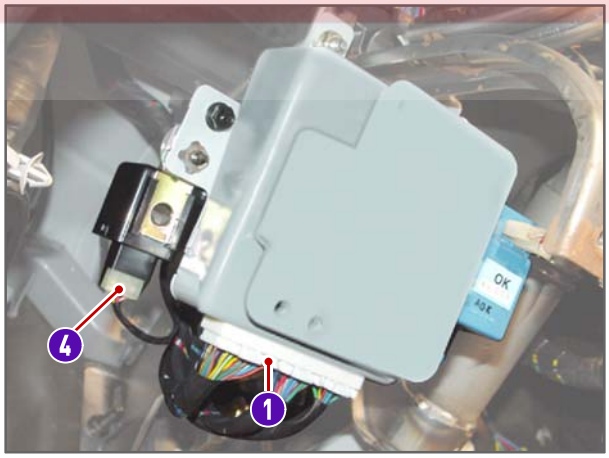
S.G.N. 8710-01

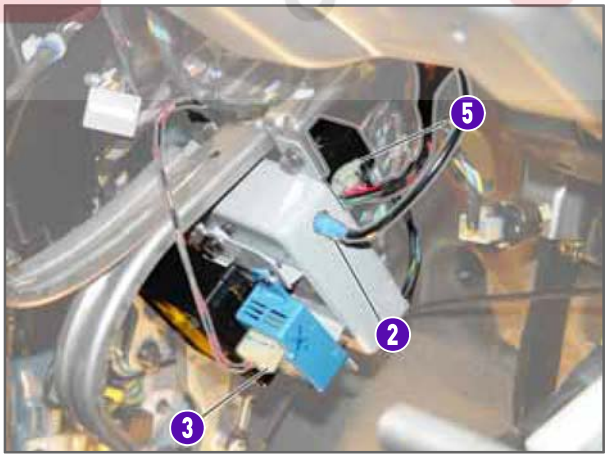
STICS

Preceding work

1. Disconnect the negative battery cable.
2. Remove the lower panel in front of driver's seat.
   (For details, refer to BODY section.)

1. Disconnect the connectors from STICS unit and chime buzzer and remove the RKSTICS antenna.

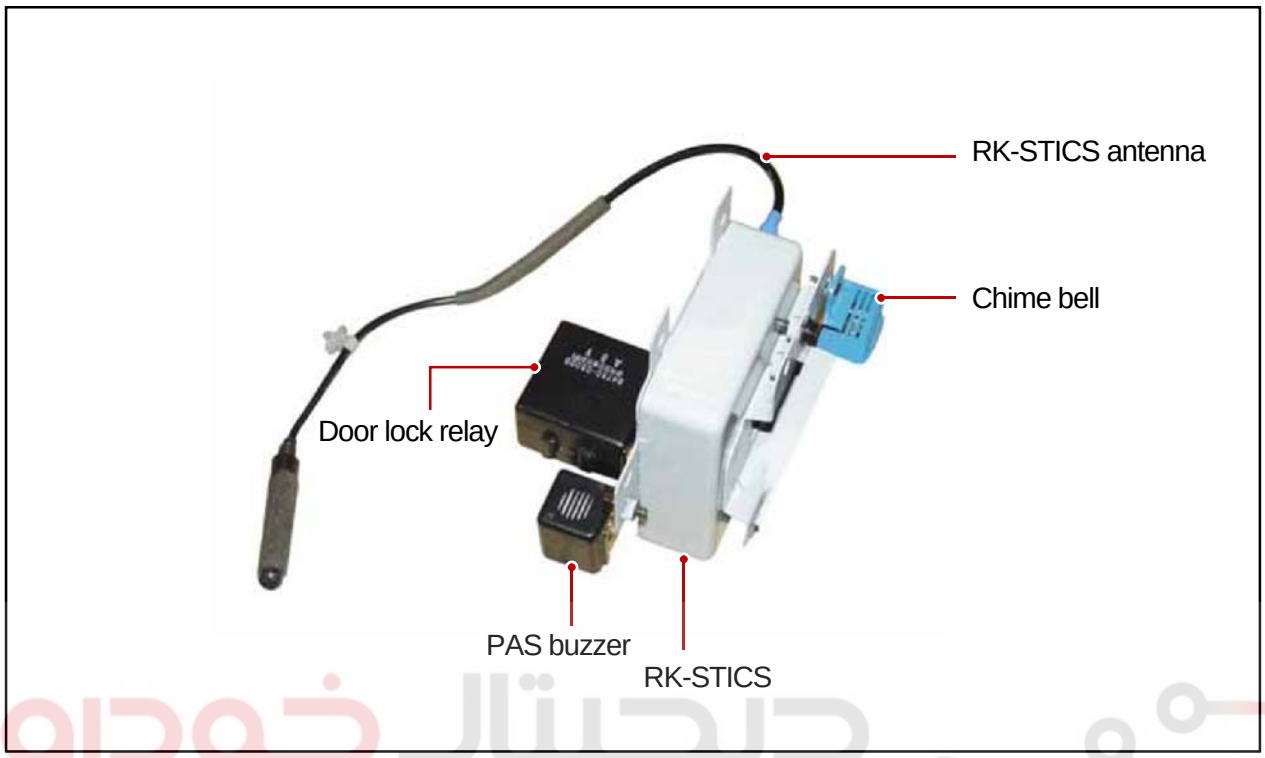




1. STICS connector
2. STICS antenna
3. Chime buzzer connector
4. PAS buzzer connector
5. Door lock/unlock relay connector

Modification basis	
Application basis	
Affected VIN	

2. Unscrew two mounting bolts (10 mm) and remove the STICS unit.



3. Separate the STICS unit.

STICS Unit

Modification basis	
Application basis	
Affected VIN	