RKSTICS

8710-08

GENERAL

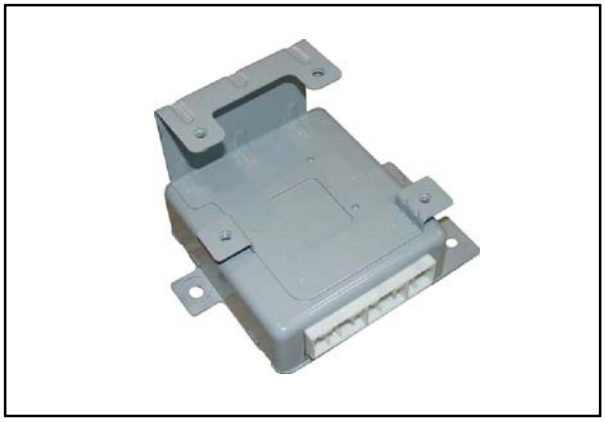
1. SPECIFICATIONS

1) Electrical Performance

Item	Requirement	Remark
Rated voltage	DC 12.0V	
Operating voltage	DC 9.0V ~ 16.0V	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	24V	
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 1.0V	Pin no. 72 and 2, 7, 8, 9, 10, 11, 19, 24, 27, 28, 29, 30, 31, 32, 33, 36, 56, 57, 58, 59, 60, 61, 70, 71
	below 1.5V	Pin no. 72 and 3, 6, 17, 18, 20, 21, 37, 39, 41, 42, 43, 44, 45, 62, 64, 65, 66, 67, 68, 69

2) 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
   Modulation method: FSK (Frequency Shift Keying)
4. Receiving distance: Approx. 10 ~ 15 m (In
5. case there are not obstacles around the system)



3) Rated Load

NO.	Description	Rated Load
1	Chime bell / Buzzer	DC 12V 350 mA / DC 12V 40 mA (Inductive load)
2	Front room lamp	DC 12V 16W (Lamp load)
3	Key hole illumination	DC 12V 1.2W (Lamp load)
4	Seat belt warning lamp	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	Siren	DC 12V 260 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)
21	SPWM easy access button illumination	DC 12V 1.2 W (Lamp load)

4) Input Signals

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 switch	IN = 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 seat) = 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 seat) = 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
17	Parking brake switch	ON = GND, OFF = OPEN
18	Air bag collision sensor	ON = 200 ms Low signal, OFF = OPEN
19	Wiper motor (parking) switch	STOP = BAT VOLTAGE, ROTATING = GND
20	Washer switch	ON = BAT, OFF = OPEN
21	Auto switch	ON = BAT, OFF = OPEN
22	Auto washer switch	ON = BAT, OFF = OPEN
23	Auto resistance	0W ~ 51KW (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	SPWM easy access button switch	ON = GND, OFF = OPEN
30	Multifunction auto light switch	ON = GND, OFF = OPEN
31	Indicator lamp switch	ON = BAT/GND, OFF = OPEN (Approx. 5.1V ~ 9.2V)
32	SPWM (Seat Position with Memory)	ON = GND (PWM), OFF = OPEN
33	Rain sensor	ON = GND (DATA), OFF = BAT
34	Diagnosis (SCAN-100)	ON = GND (DATA), OFF = BAT (KWP2000)
35	Immobilizer	ON = GND (DATA), OFF = BAT (KWP2000)
37	Driver/Passenger's door key cylinder switch	ON = GND, OFF = OPEN

5) Chattering of Input Signals

1. Vehicle speed input:
   The vehicle speed is the average value of 4 pulse 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.

2. 20 ms target input:
   Wiper motor A/S (parking) terminal

3. 100 ms target input switch
   All switches except wiper motor A/S (parking) terminal

6) Time Tolerance

1. If not indicated, time tolerance will be ± 10%.
   However, if less than 500 ms, time tolerance will be ± 100 ms.

2. The time indicated in each function does not include chattering processing time from switch input changing point.

Modification basis	
Application basis	
Affected VIN	

OVERVIEW AND OPERATION PROCESS

1. OVERVIEW

The RKSTICS (REKES + STICS (Super Time & Integrated Control System)) communicates with the transmitter (remote controller) and other electronic systems to transmit and receive the data.
The STICS also includes a diagnosis function that can inspect the error for related devices.

2. MAJOR CHANGES

Integration of Auto Light Sensor and Rain Sensor
The auto light sensor integrated rain sensor communicates with STICS.

Auto Washer Coupled Wiper
When pressing the auto washer switch, the washer fluid is sprayed on the windshield and the wiper sweeps off 4 times, and then the washer fluid is sprayed and the wiper sweeps off 3 times again.

Communication with SPWM
The communication with SPWM is added due to the introduction of easy access function to SPWM.

3. FUNCTIONS

▶ Wiper and Washer Operations

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

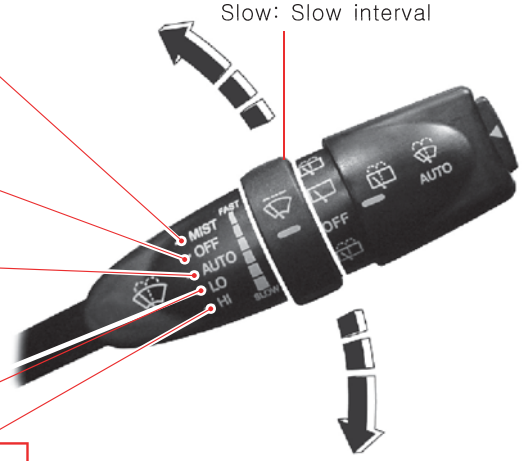
Continuous wipe, fast operation

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 the AUTO position.

Fast: Fast interval

Slow: Slow interval



Front Auto Washer and Wiper Switch

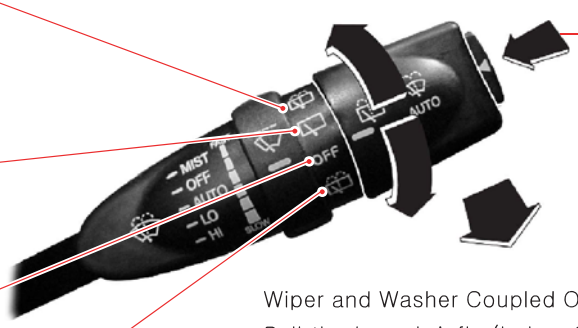
When pressing the auto washer switch with the wiper switch "OFF", the washer fluid is sprayed on the windshield and the wiper sweeps off 4 times, after then the washer fluid is sprayed and the wiper sweeps off 3 times again.

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

Rear Wiper Stops



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

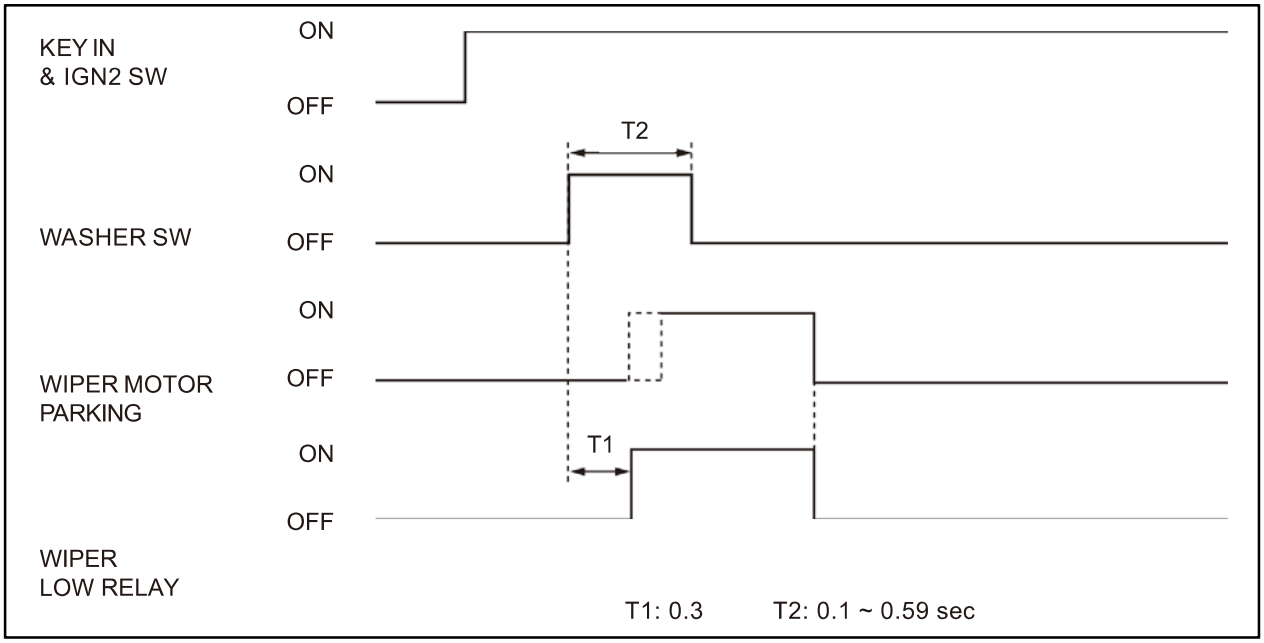
Rear Washer and Wiper

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

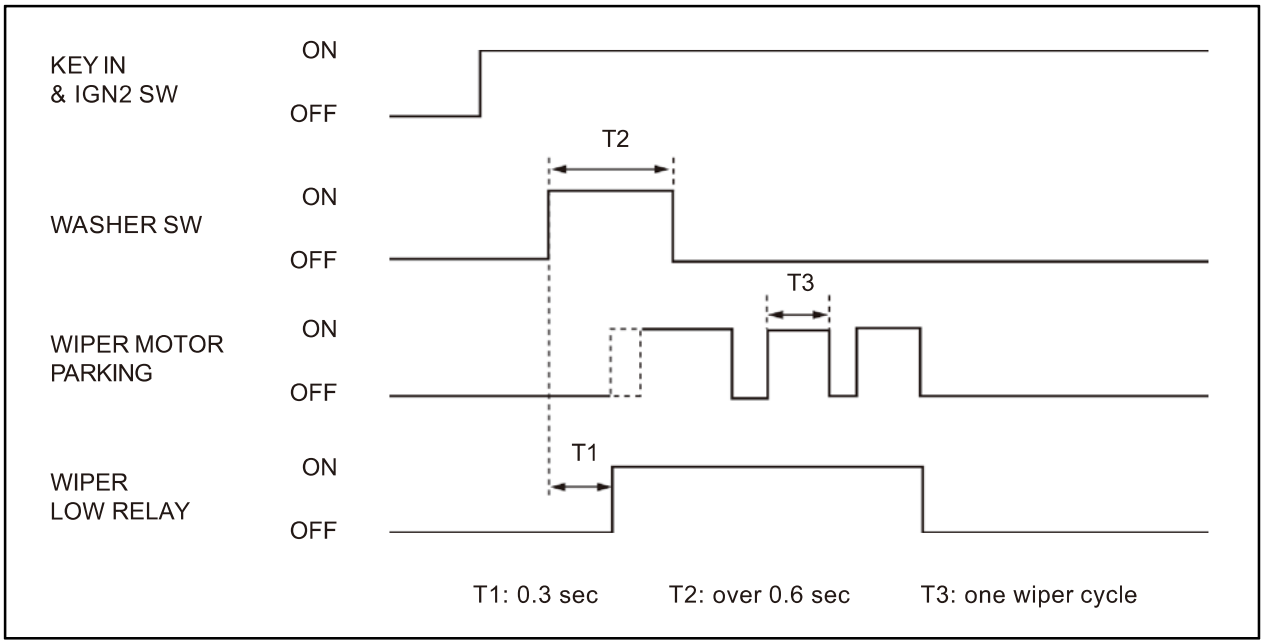
Modification basis	
Application basis	
Affected VIN	

▶ Wiper MIST and Front Washer Coupled Wiper

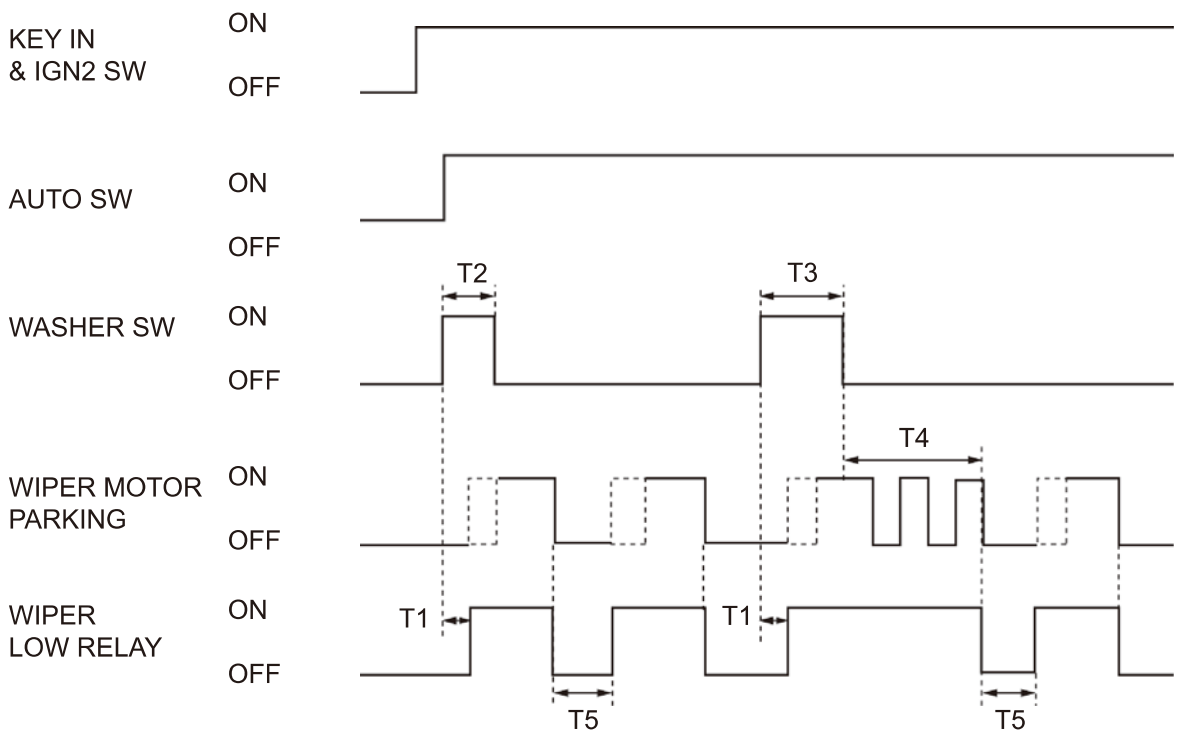
1. The wiper relay is turned on at 0.3 seconds after from the time when the washer switch is turned on for 0.1 to 0. 59 seconds (T2) with the ignition switch "ON", . If the wiper parking terminal gets off, the wiper relay is turned off.



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.



3. When the washer switch is turned on for more than 0.6 seconds during the wiper operation by AUTO switch, the wiper operates three times. When it is turned on for a certain period of time (0.1 to 0.59 seconds), the wiper operates once.

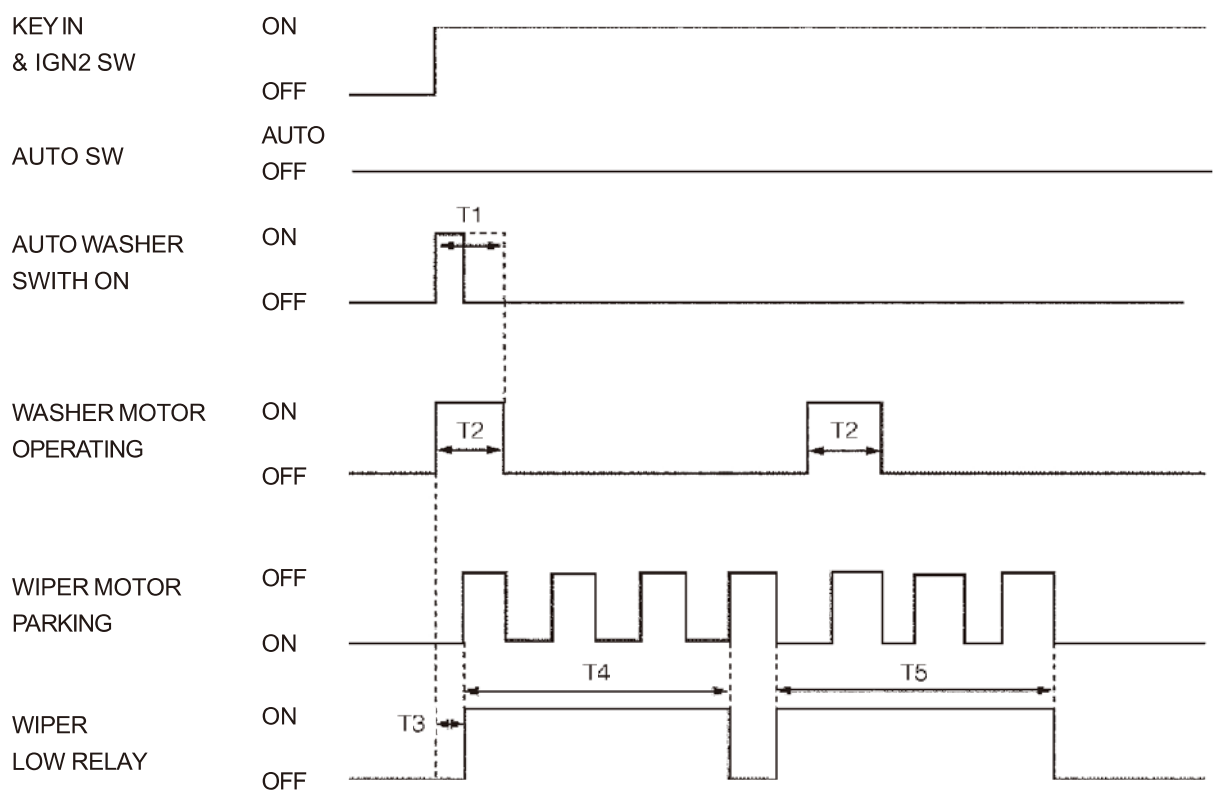


T1: within 0.3 sec T2: 0.1 ~ 0.59 sec T3: over 0.6 sec
T4: 3 cycles T5: pause

Modification basis	
Application basis	
Affected VIN	

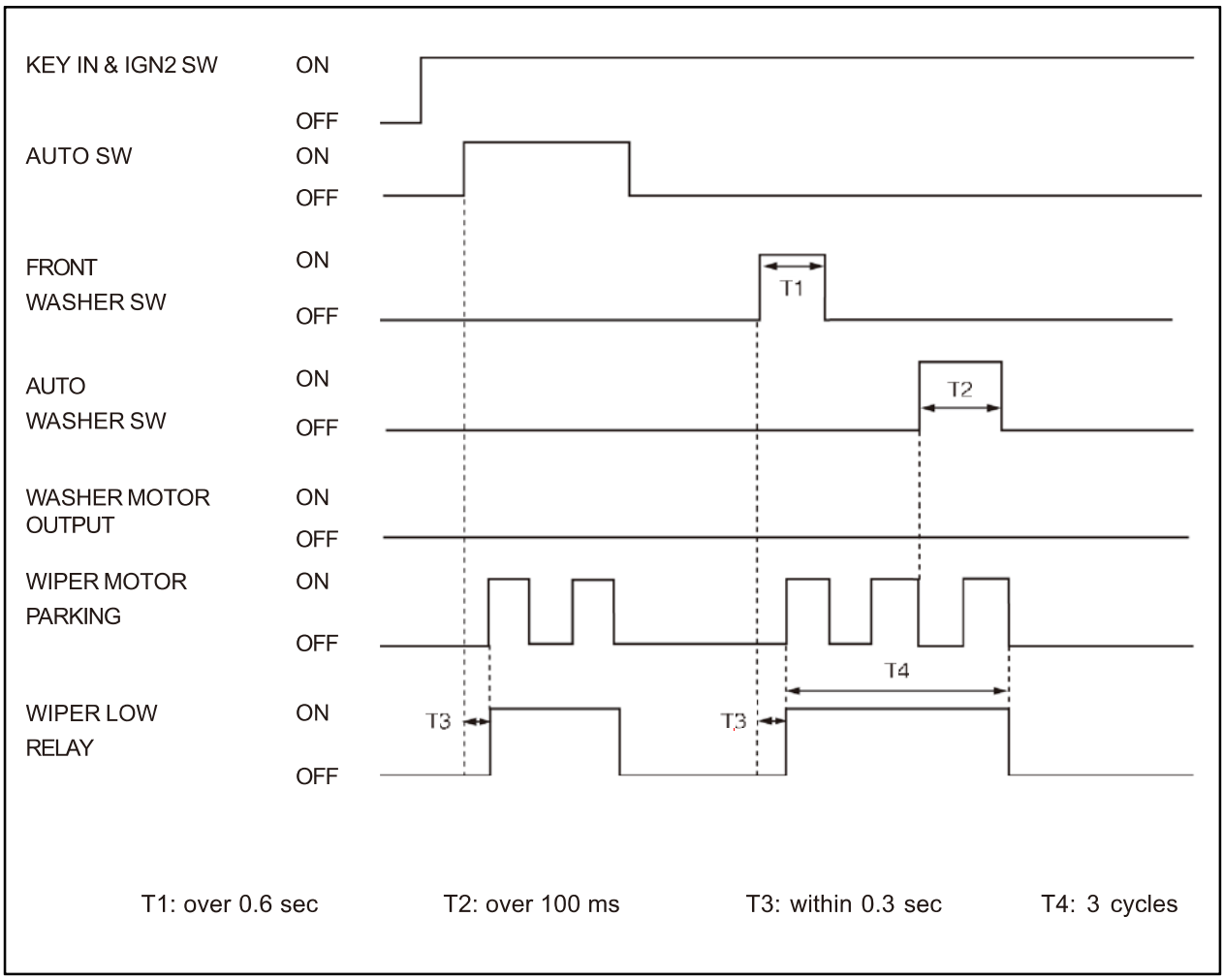
▶ Auto Washer and Wiper Switch

1. When the auto washer switch is turned on with the ignition switch "ON" and the AUTO 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.



T1: Over 100 ms T2: 1.0 ± 0.1 sec T3: within 0.3 sec
T4: 4 cycles T5: 3 cycles

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 AUTO wiper operation.
5. When the AUTO switch input is received during the auto washer operation, the auto washer operation stops and the auto INT operation is activated.

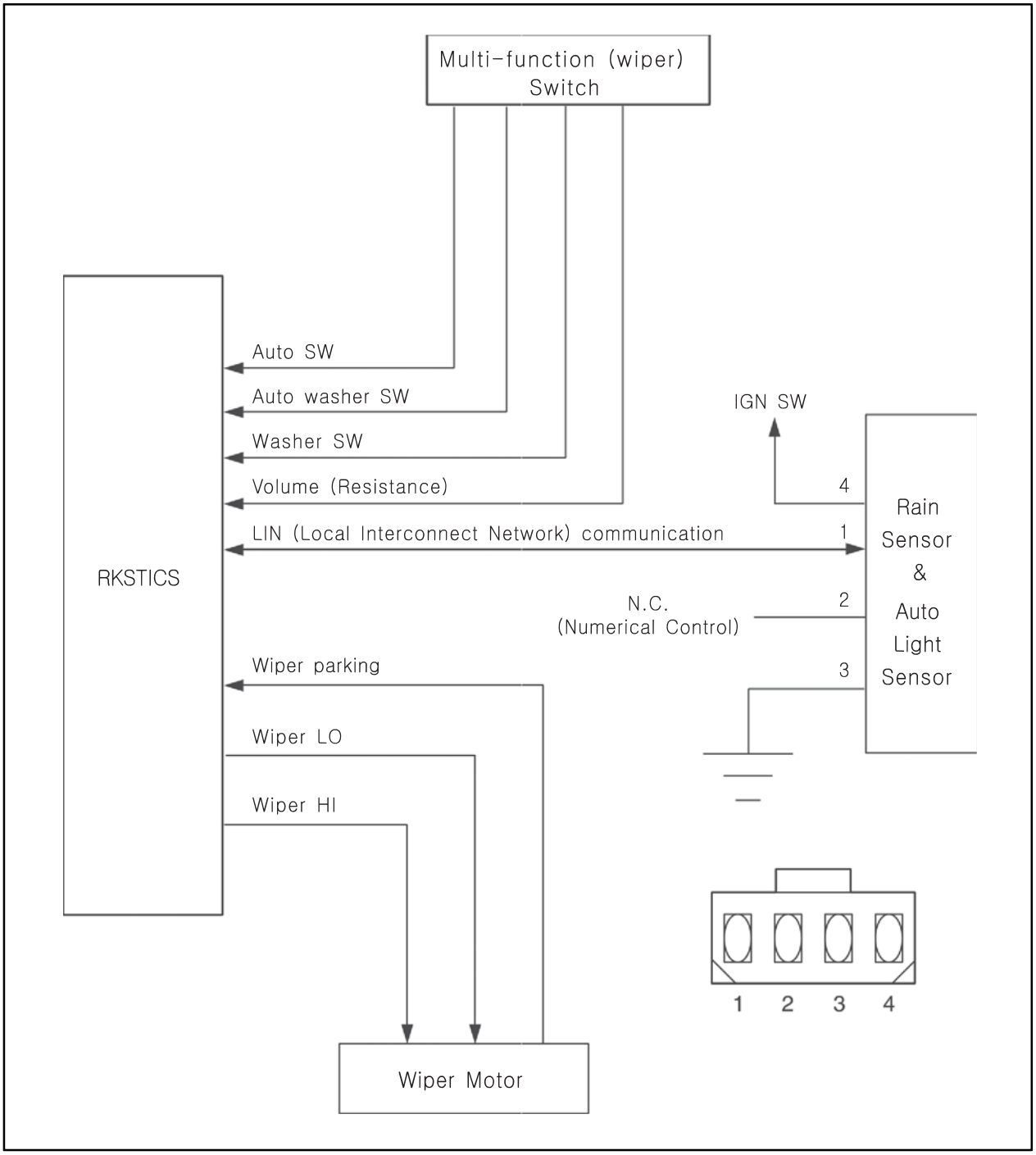


Modification basis	
Application basis	
Affected VIN	

▶ Rain Sensor Coupled Wiper and Auto Light Control

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

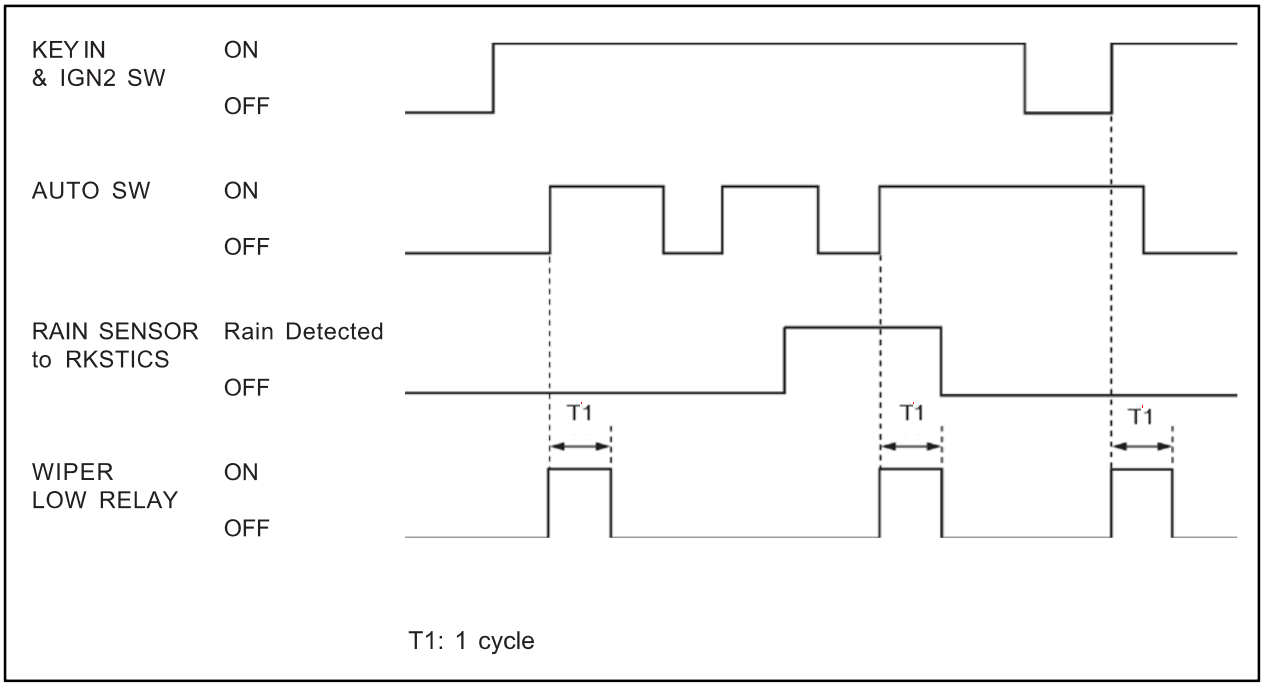
System layout



Modification basis	
Application basis	
Affected VIN	

▶ Auto Switch Position Reminder (Power-Up Reminder Wiper)

1. When turning off and on the IGN2 switch with the auto switch on, the system drives the wiper motor through LOW relay one cycle regardless of communication with rain sensor.
2. The wiper relay (LOW) is turned on and the wiper motor runs one cycle when changing the auto switch from "OFF" to "ON" position regardless of communication with rain sensor(while the ignition key is in the "ON" position).
   When the auto switch is turned to the "ON" position again from the "OFF" position, the system drives the wiper motor through LOW relay one cycle only when the rain sensor detects the "Rain Detected" signal.

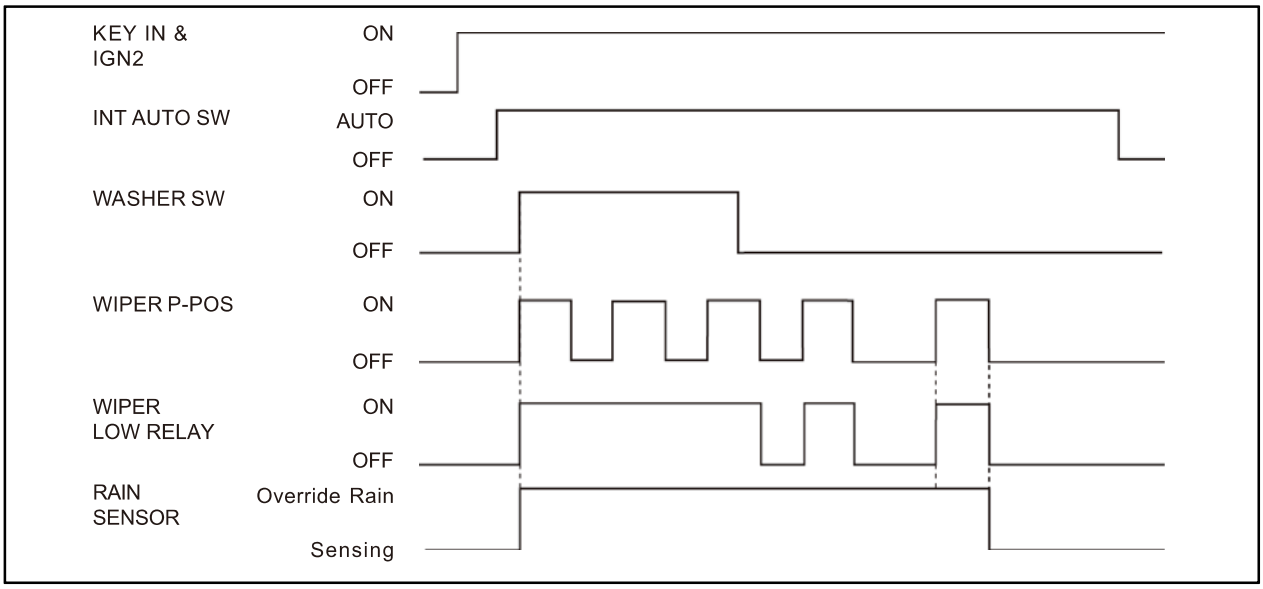


Modification basis	
Application basis	
Affected VIN	

Rain sensing unit (auto light integrated type)	Multifunction wiper switch: AUTO and sensitivity control
	
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)	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

▶ Washer Coupled Wiper in Rain Sensing Mode

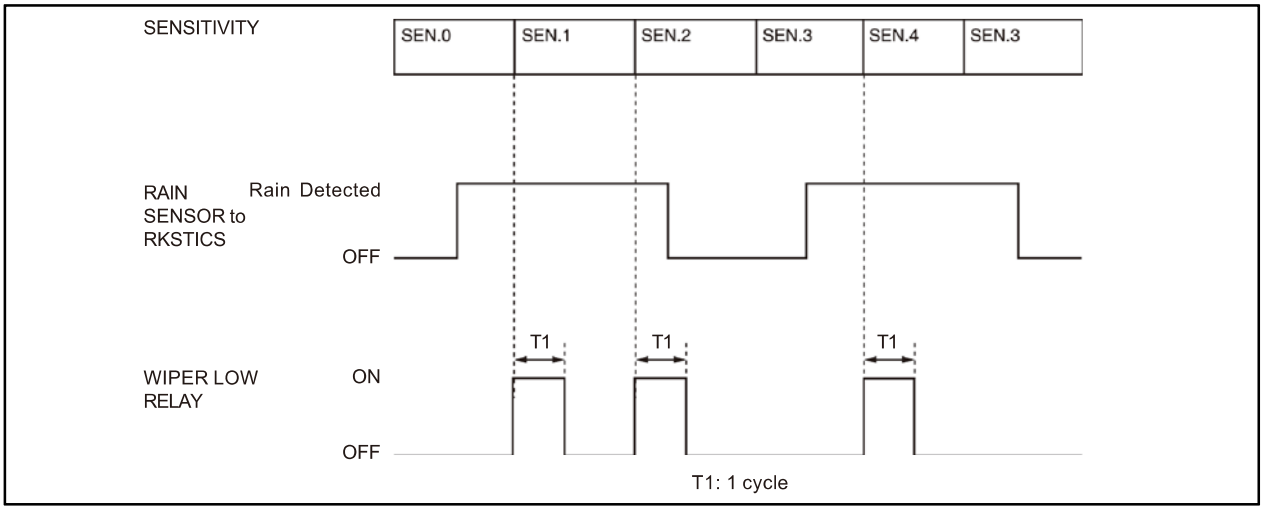
1. The washer coupled wiper is operated when receiving the washer switch input with the ignition switch "ON" and the AUTO switch "ON" in the rain sensing mode. At this moment, the communication with the rain sensor is overridden. However, the washer switch input is overridden during the continuous operation.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



▶ 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 AUTO 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.

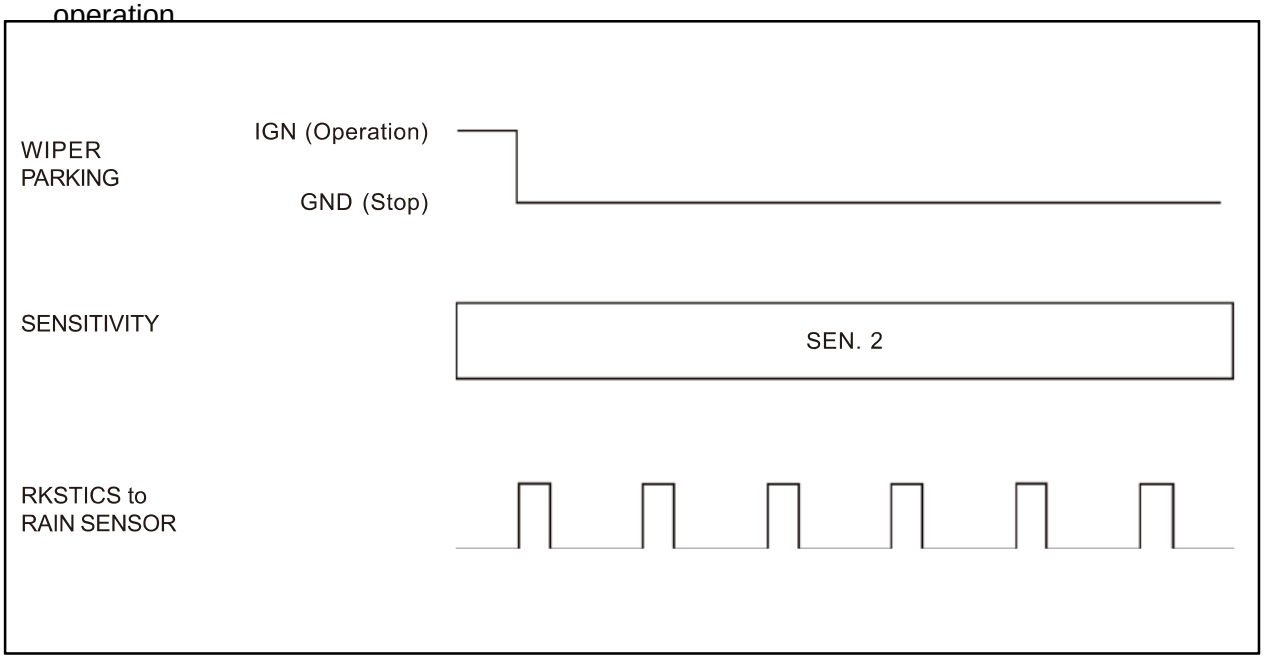
* If the volume sensitivity is changed more than 2 stages within 2 seconds, the wiper motor runs only one cycle.



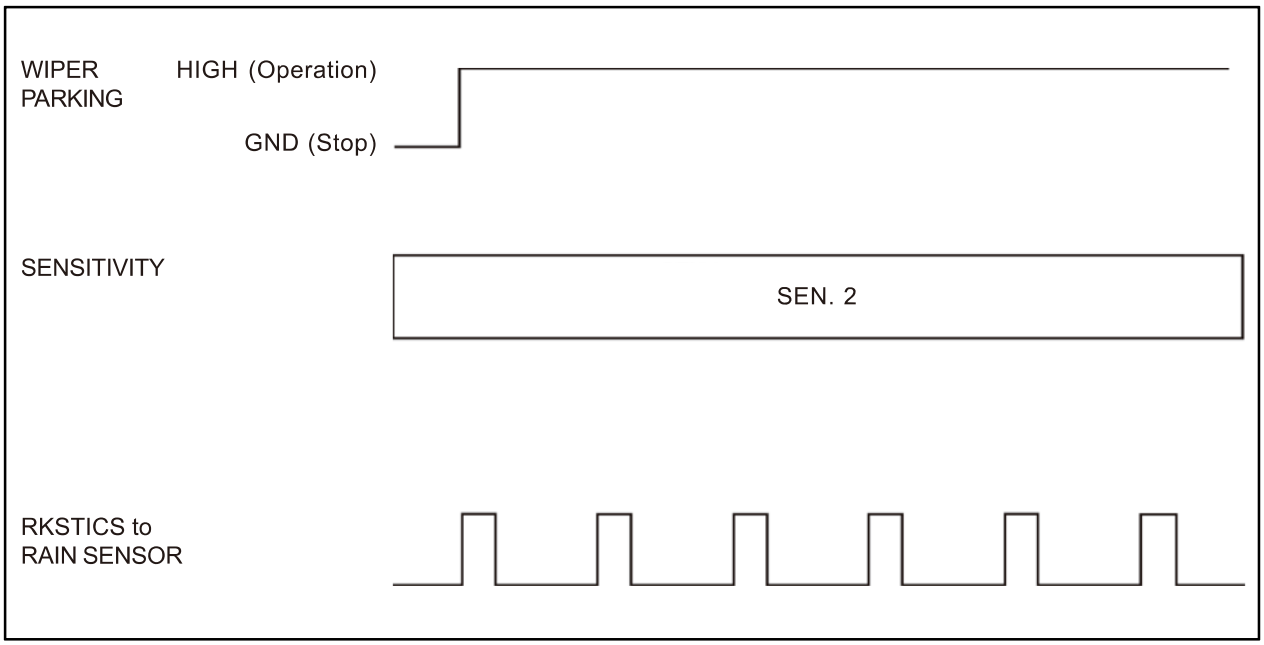
Modification basis	
Application basis	
Affected VIN	

▶ 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 AUTO switch is in "ON" position). * The wiper motor runs only when the rain sensor requires the wiper operation.

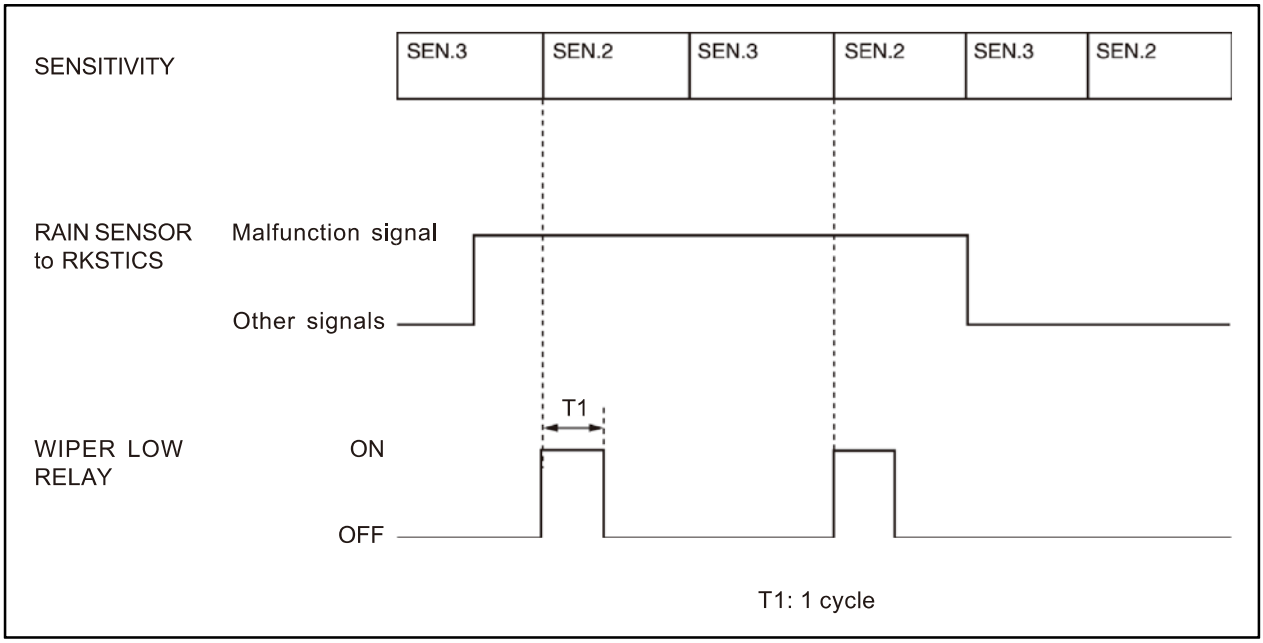


2. When the parking terminal is fixed to HIGH with the ignition key and the AUTO switch in "ON" position, the wiper system outputs the wiper operating signal for 2 seconds, then continuously outputs the wiper parking signal.
   * The wiper motor runs only when the rain sensor requires the wiper operation.

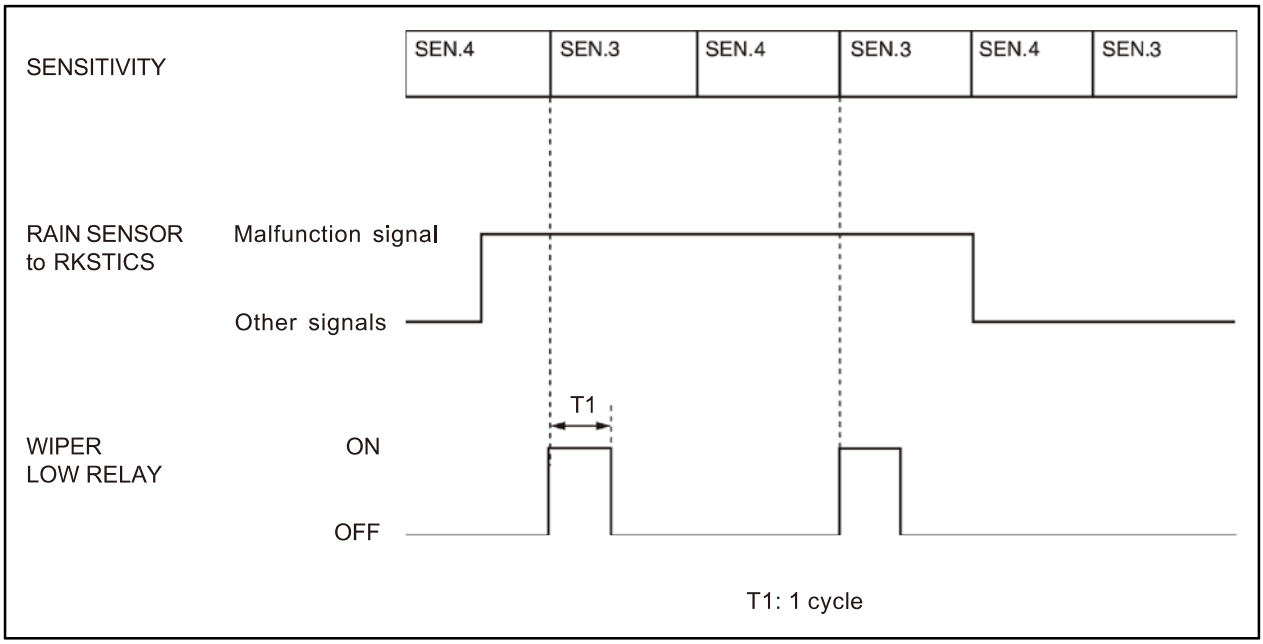


▶ Defective Rain Sensor

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 AUTO switch is in "ON" position).



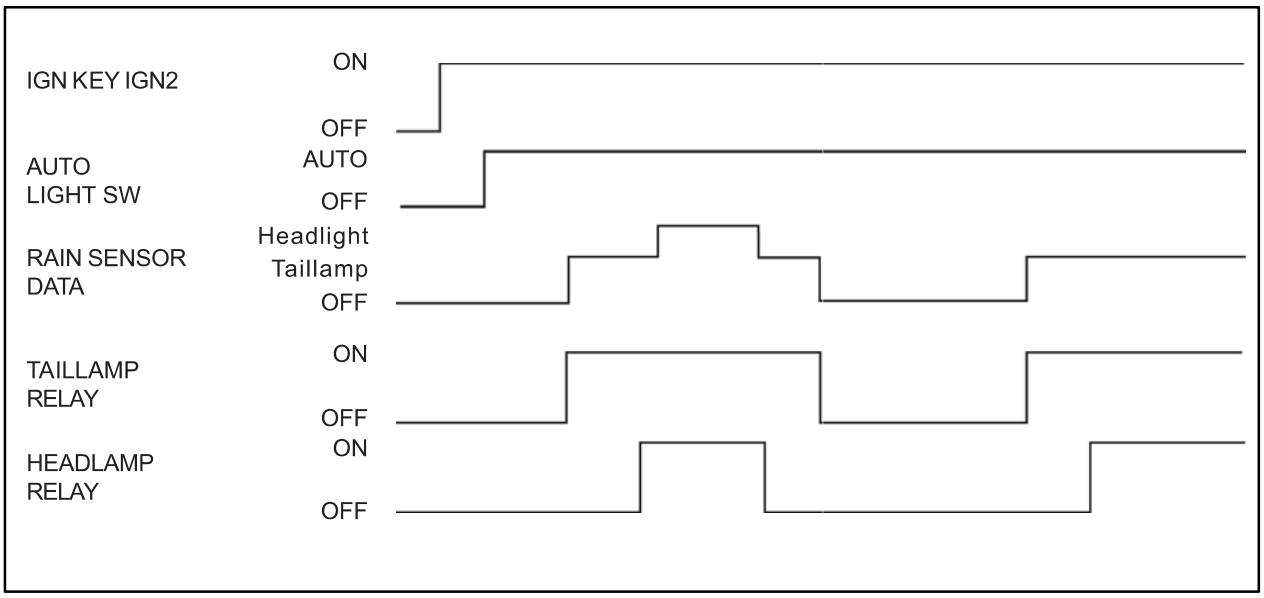
2. The wiper relay (LOW) is turned on and the wiper motor runs one cycle when the volume sensitivity is changed to 3 from 4 during receiving the malfunction signal from the rain sensor (while the ignition key is in "ON" position and the AUTO switch is in "ON" position).



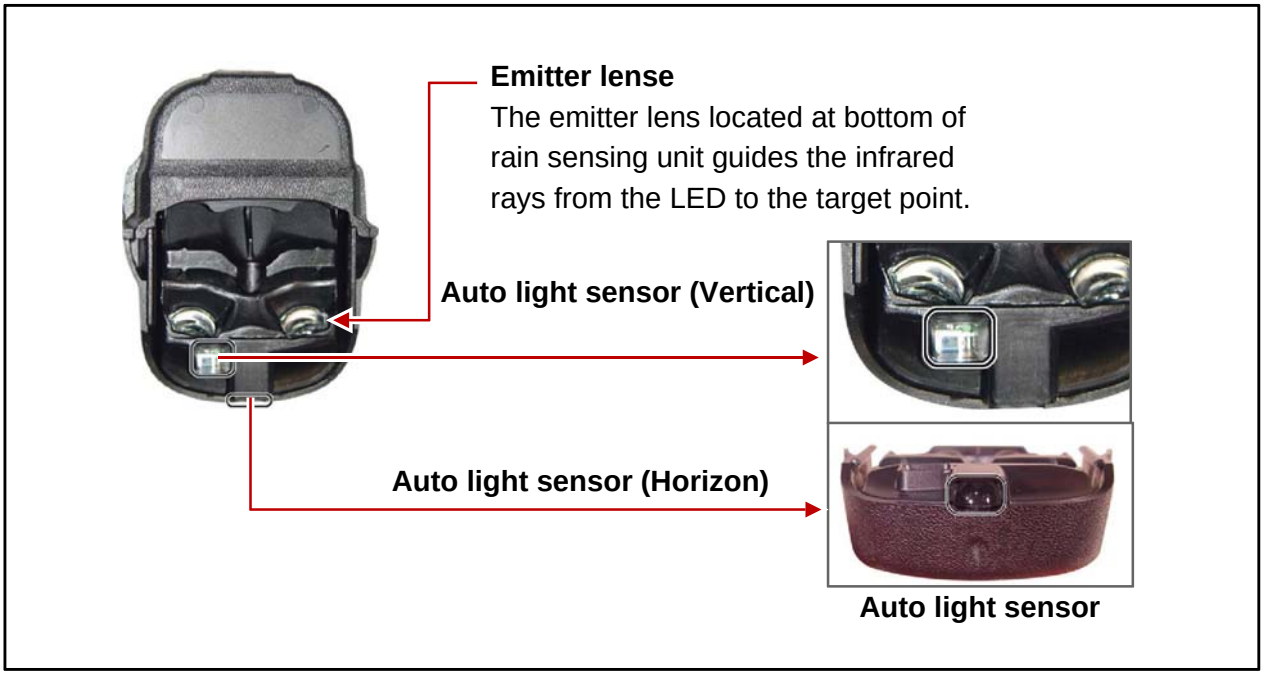
Modification basis	
Application basis	
Affected VIN	

▶ 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 AUTO speed, the headlamps are turned on automatically (while the light switch is in "AUTO" position and the wiper switch is in "AUTO" position).
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.)



▶ **Speed Sensitive AUTO Wiper**

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

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

2. Vehicle speed calculation

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

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

3. VOLUME calculation

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

4. 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.

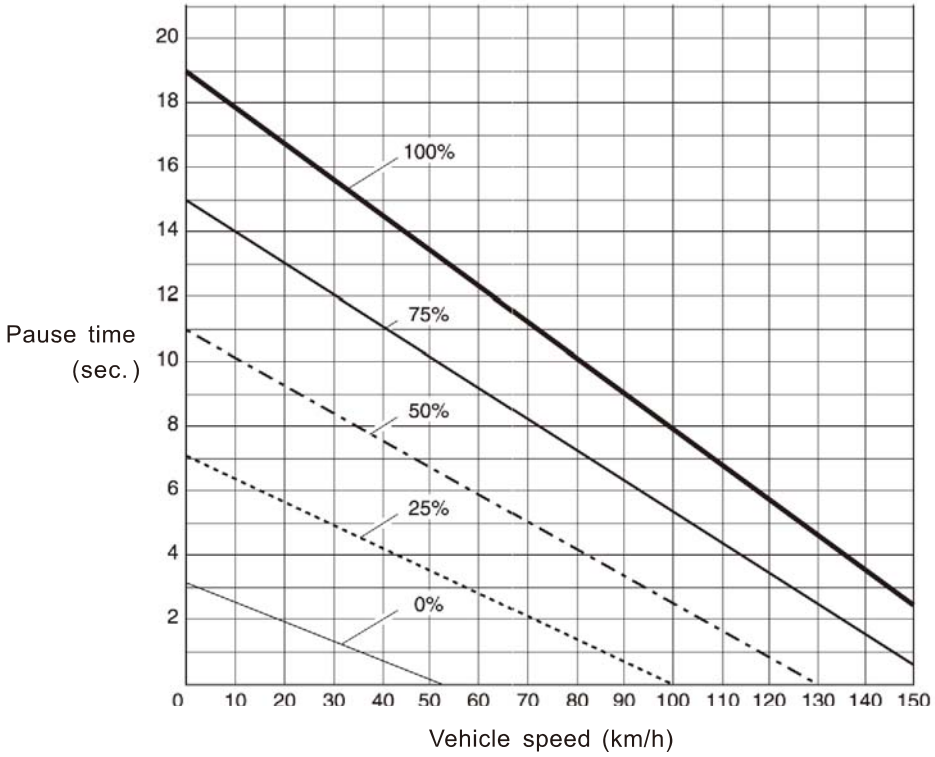
· If the pause time is below 1.0 second, the wipers operate without pause.
· If the pause time is over 1.5 seconds, the wipers operate intermittently.

Modification basis	
Application basis	
Affected VIN	

Pause time of vehicle speed sensitive INT wiper AUTO

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

Pause time



CAUTION

- Speed sensitive AUTO wiper

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

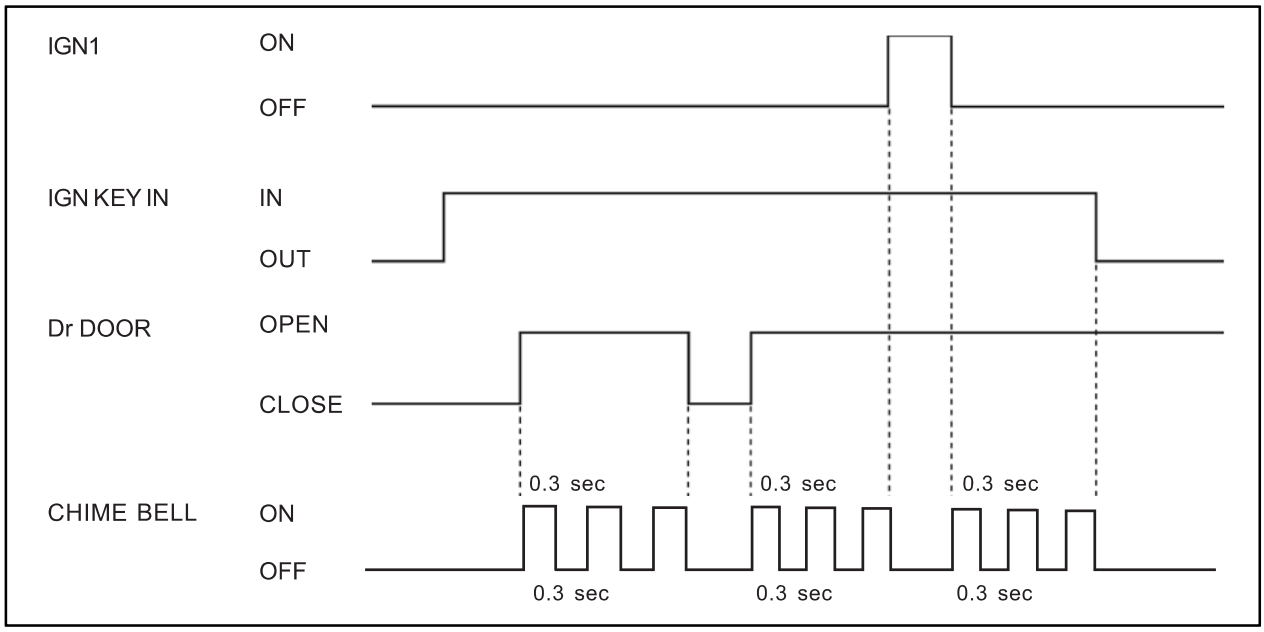
- Controls when the wiper motor parking is defective

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

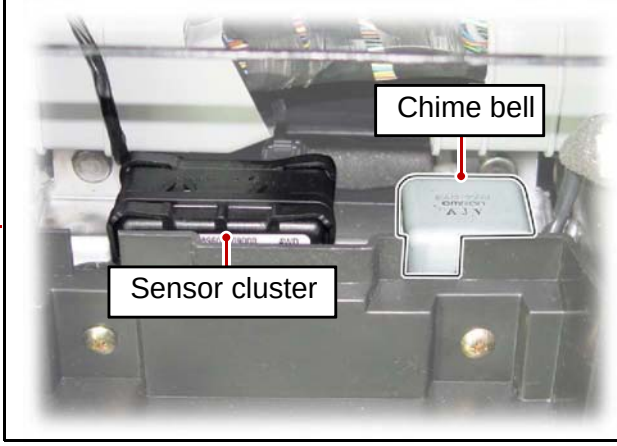
▶ Ignition Key Reminder Warning

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

1. The chime bell sounds continuously with the interval of 0.3 seconds 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.



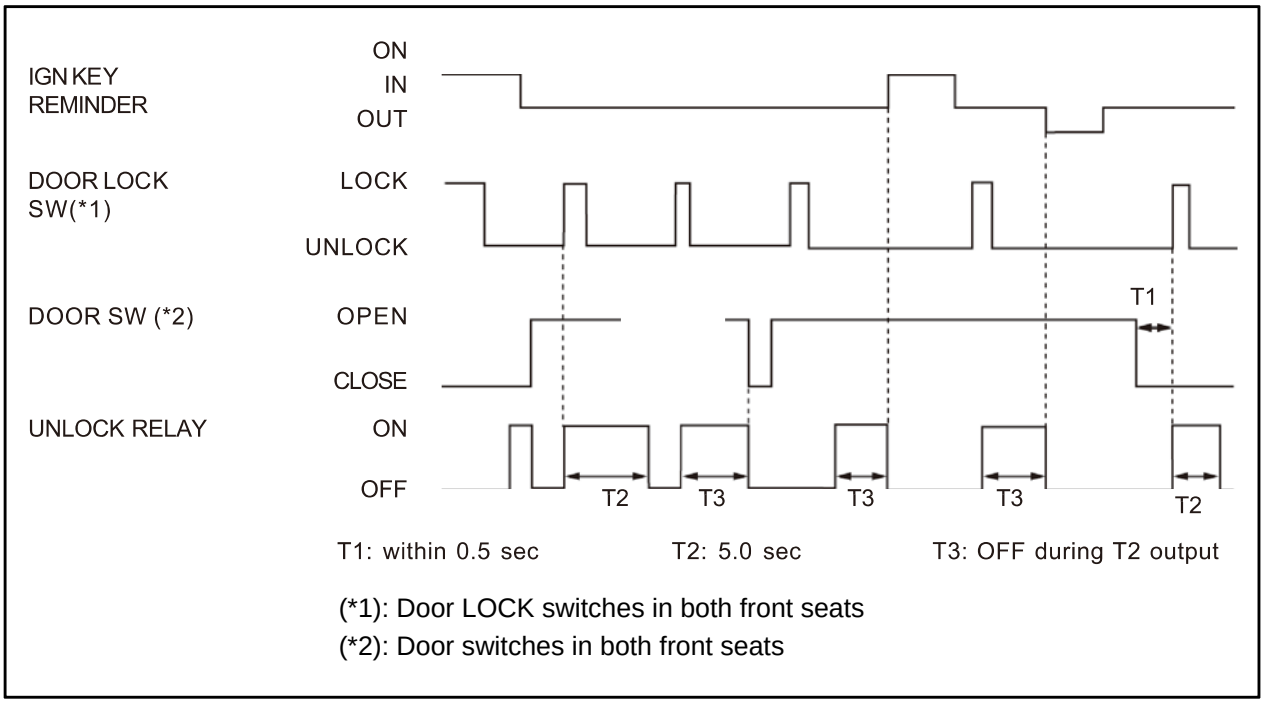
Chime bell location: bottom of audio unit (right to the sensor cluster)



Modification basis	
Application basis	
Affected VIN	

▶ Ignition Key Reminder

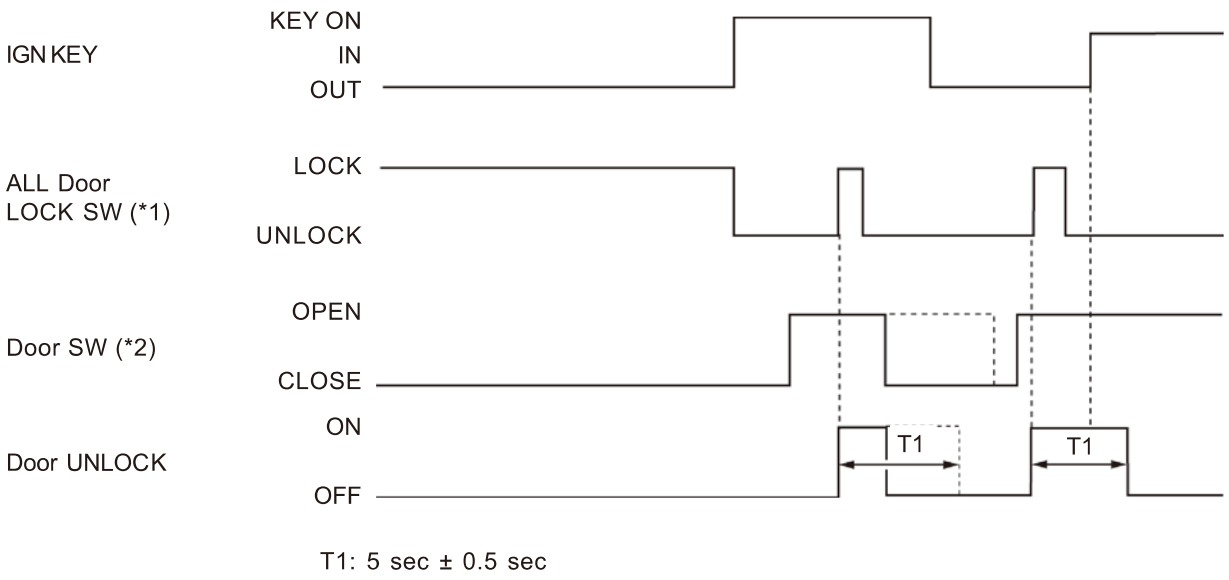
1. The system outputs "UNLOCK" signal for 5 seconds after the driver's door is opened and the door lock switch is changed to "LOCK" (while the ignition key is in ignition switch).
2. The system outputs "UNLOCK" signal for 5 seconds (T2) when the door lock switch is changed to "LOCK" from "UNLOCK" and 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.



(*1): Door LOCK switches in both front seats
(*2): Door switches in both front seats

▶ 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 UNLOCK output, the output continues for approx. 5 seconds.
4. If the ignition switch is in the "ON" position or the ignition switch is removed, the above steps are performed. If the key is in the key cylinder, the ignition key reminder function is activated.
5. This function does not work if the vehicle speed is over 10 km/h.

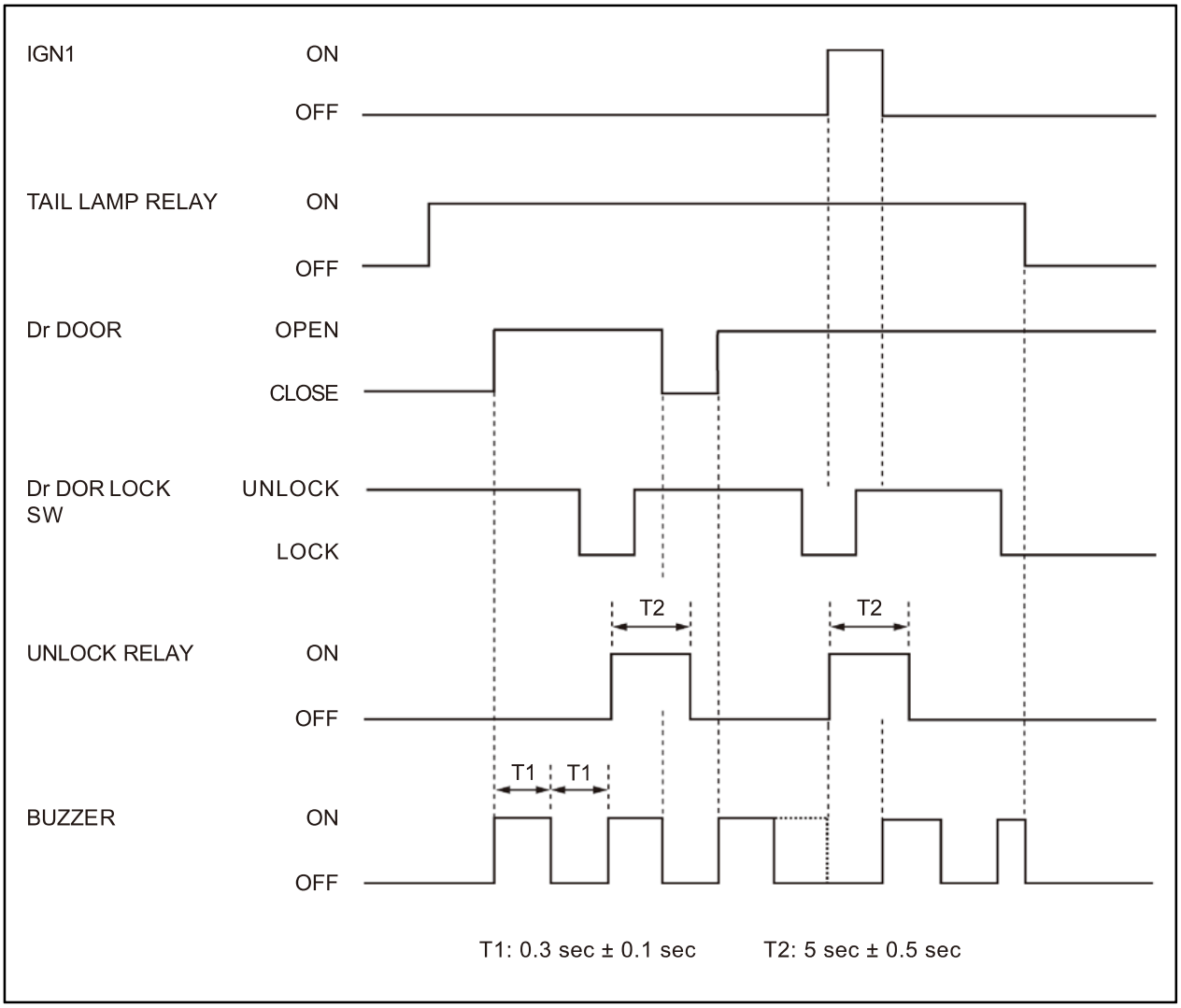


(*1) LOCK switches in all doors including tailgate (*2) Door switches in all doors excluding tailgate

Modification basis	
Application basis	
Affected VIN	

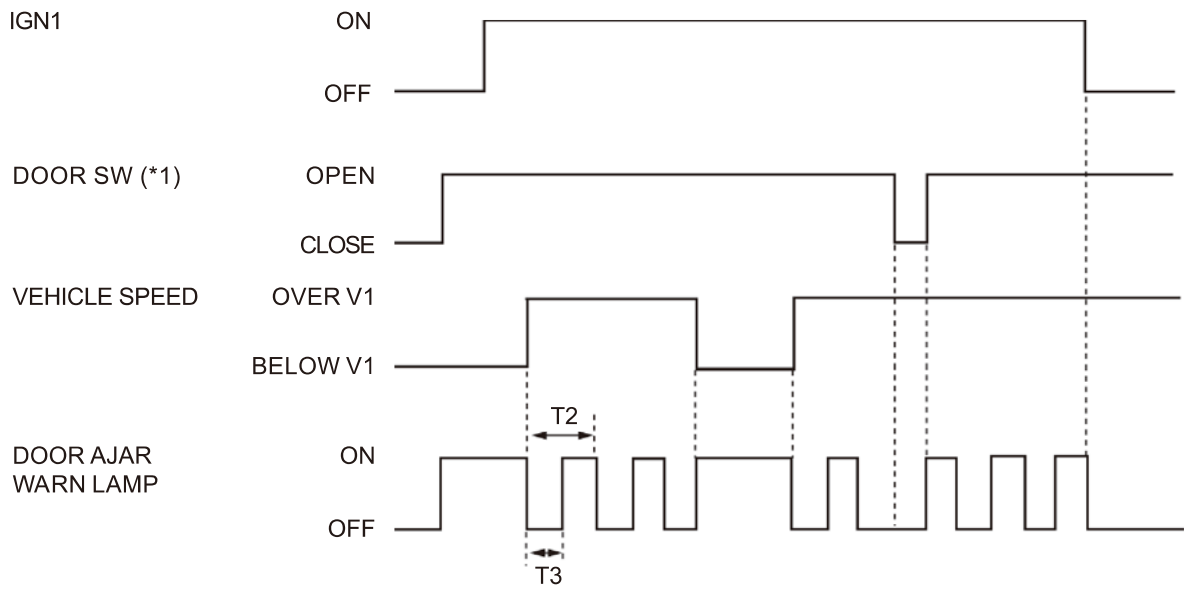
▶ Tail Lamp Left On Warning

1. The buzzer sounds with the interval of 0.3 second when opening the driver's door while the tail lamp is turned on and the ignition key is removed.
2. The 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.



▶ 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.
4. The warning light blinks when a door is open while the vehicle speed is over 10 km/h.
5. The warning light goes off when closing the door under step 3.
6. The warning light comes on when the vehicle speed goes below 10 km/h under step 3.



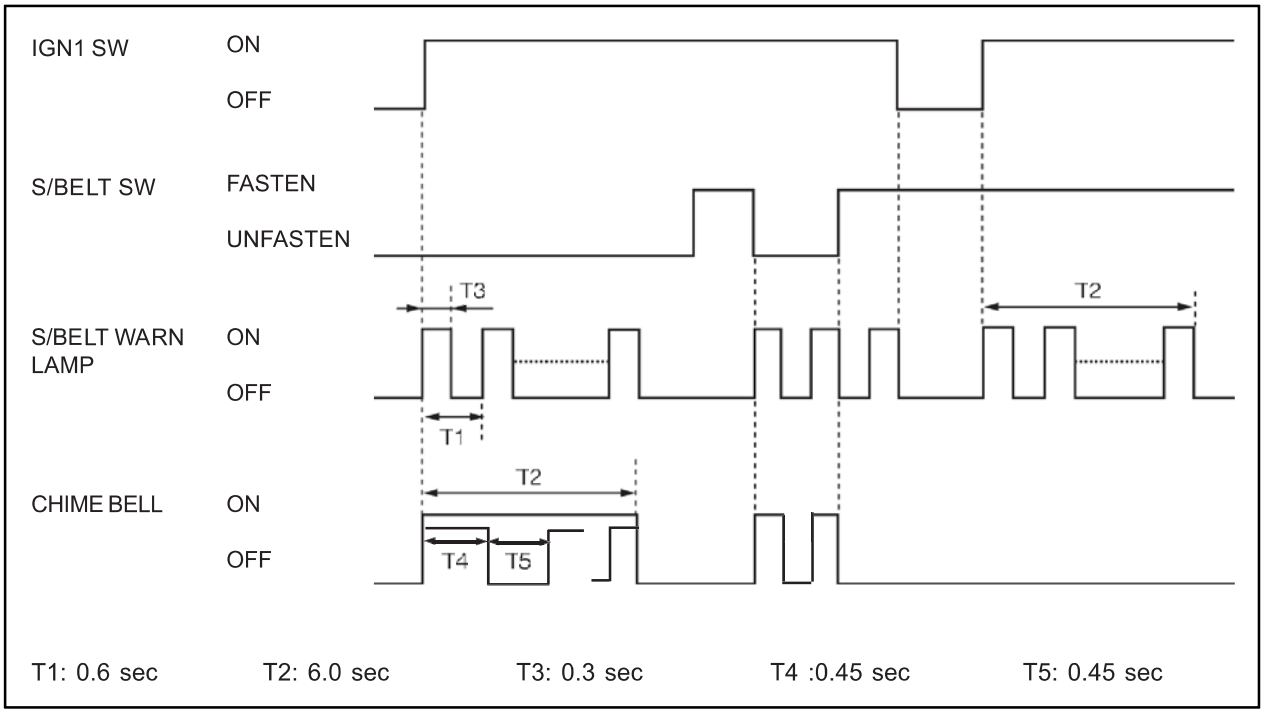
T2: 0.6 sec T3: 0.3 sec V1 = 10 Km/h

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

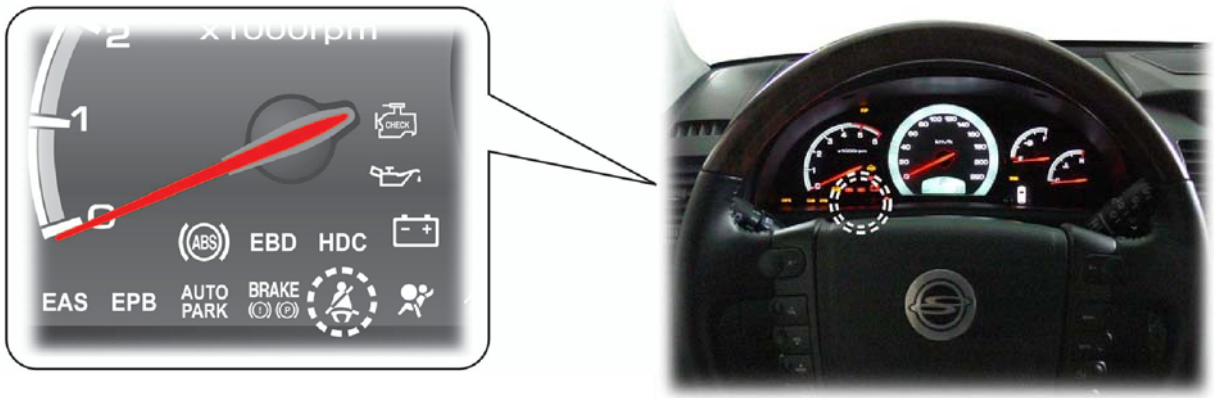
Modification basis	
Application basis	
Affected VIN	

▶ Seat Belt Warning

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



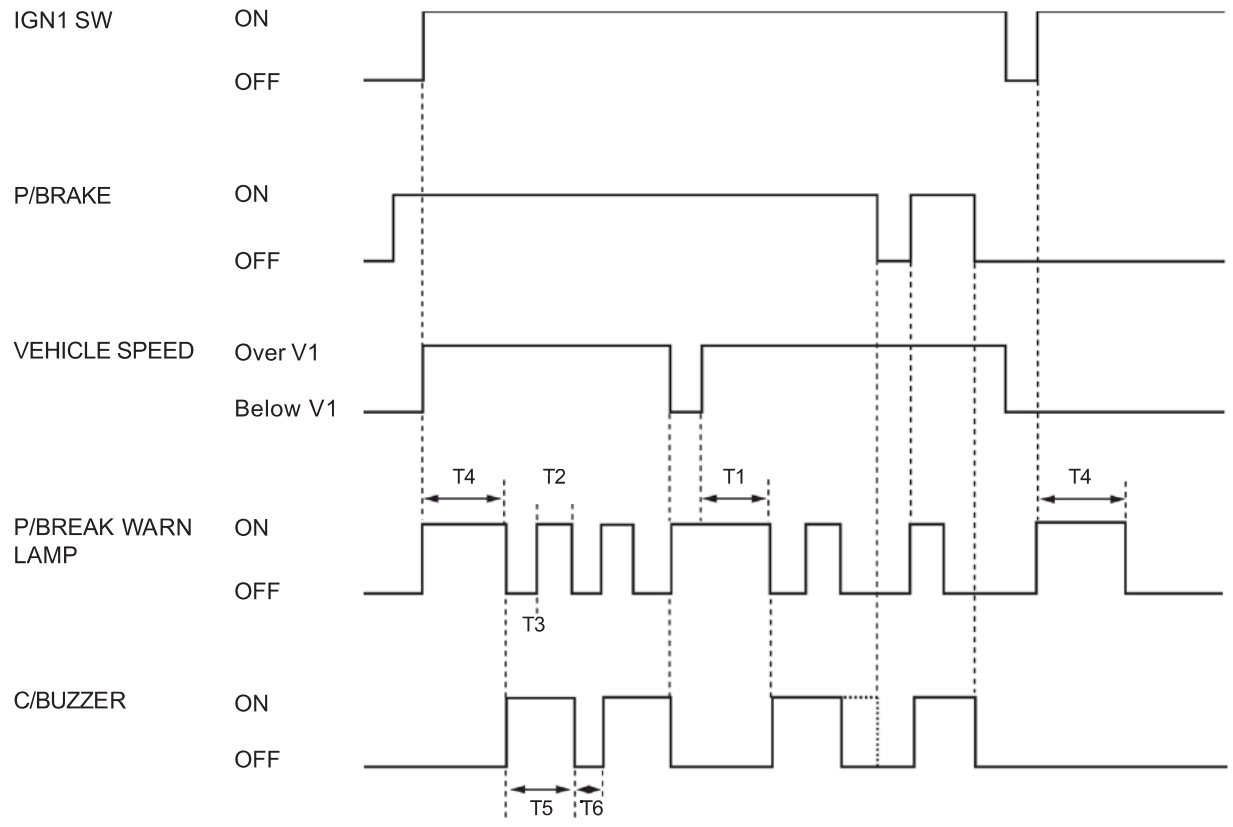
Seat Belt Warning Light



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 bell stops.

▶ 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 bell sounds for 0.6 seconds and stops for 0.3 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: 0.6 sec ± 0.1 sec T6: 0.3 sec ± 0.1 sec

Modification basis	
Application basis	
Affected VIN	

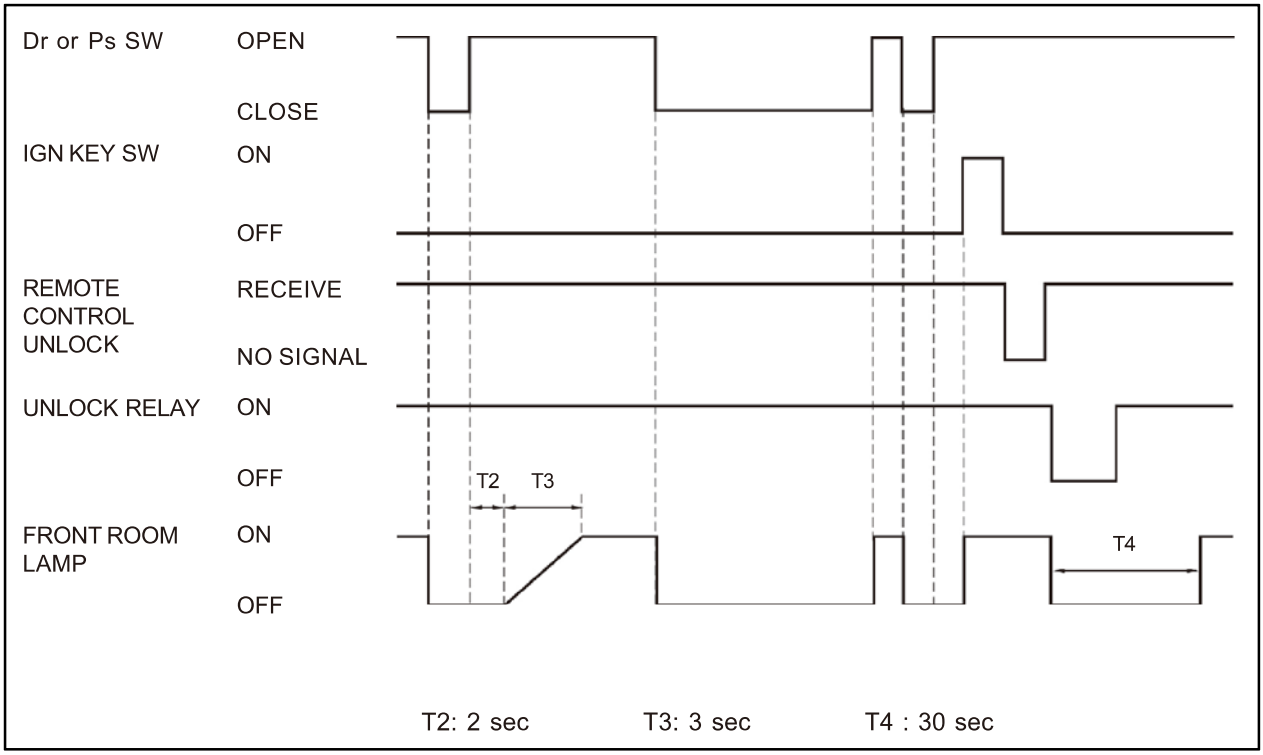
Vehicle with Hand Operated Type Parking Brake

Vehicle with EPB (Operates in EPB module with separate control logic)

▶ Front/Center Room Lamp Control

The overhead console lamp (front room lamp) comes on when opening the door(driver's/passenger's) while the door coupled front rooom lamp switch is at the coupled operating position and the key reminder switch is "OFF".

1. When the door (Driver's/Passenger's) is opened, the front room lamp comes on.
2. The room lamp stays on for 2 seconds and then dims out through 3 seconds when closing the opened door.
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 comes 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 driver's/passenger's door lock switches while the driver's and passenger's doors are closed or entering into the anti-theft mode by pushing LOCK button on the remote control key.
9. The front room lamp comes on when opening the driver's door or passenger's door and goes off when closing the opened door while the ignition key is in ON position.

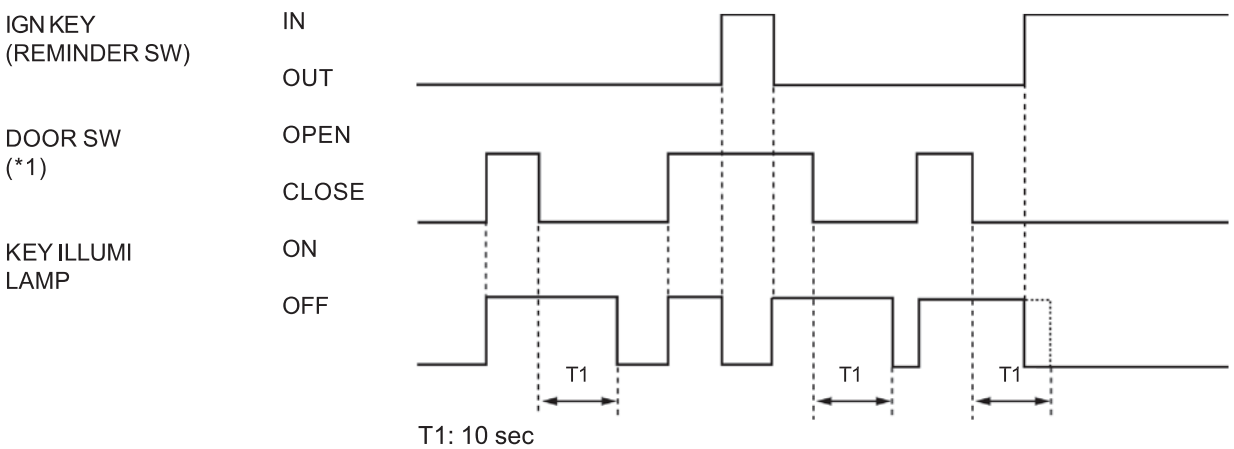


Modification basis	
Application basis	
Affected VIN	

Front Room Lamp	Center Room Lamp
	
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 room lamp comes on when opening any of front doors with the front door coupled switch (3) pressed in.	If the switch is at the door coupled position, the center room lamp comes on when a rear door is opened. The lamp always comes on while the switch is at the other position.

▶ Ignition Key Hole Illumination

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

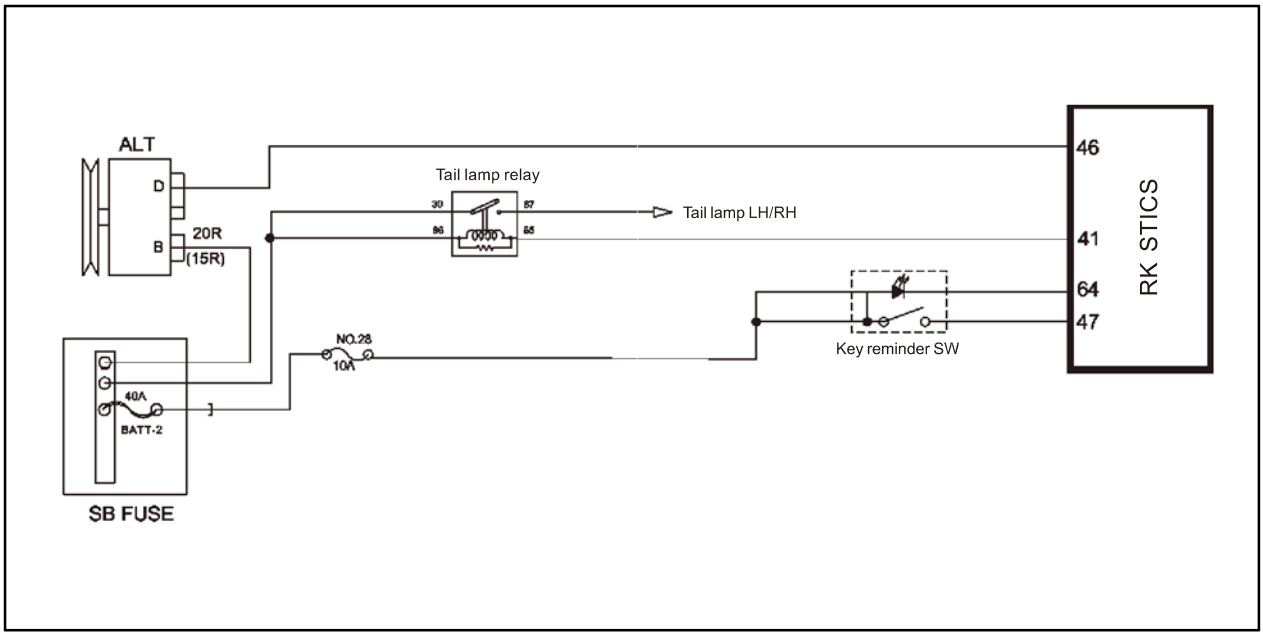


T1: 10 sec

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

Opening Driver's or Passenger's Door

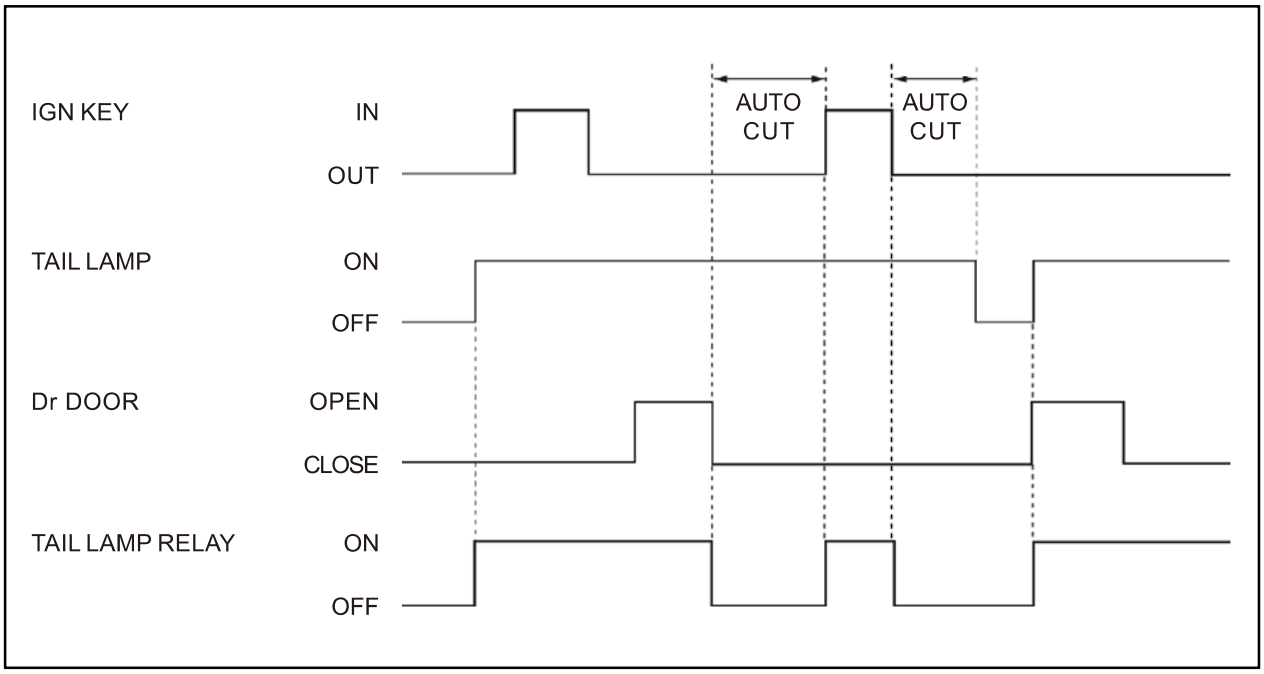
▶ Wiring Circuit of STICS (Related to Tail Lamp Auto Cut (Battery Saver))



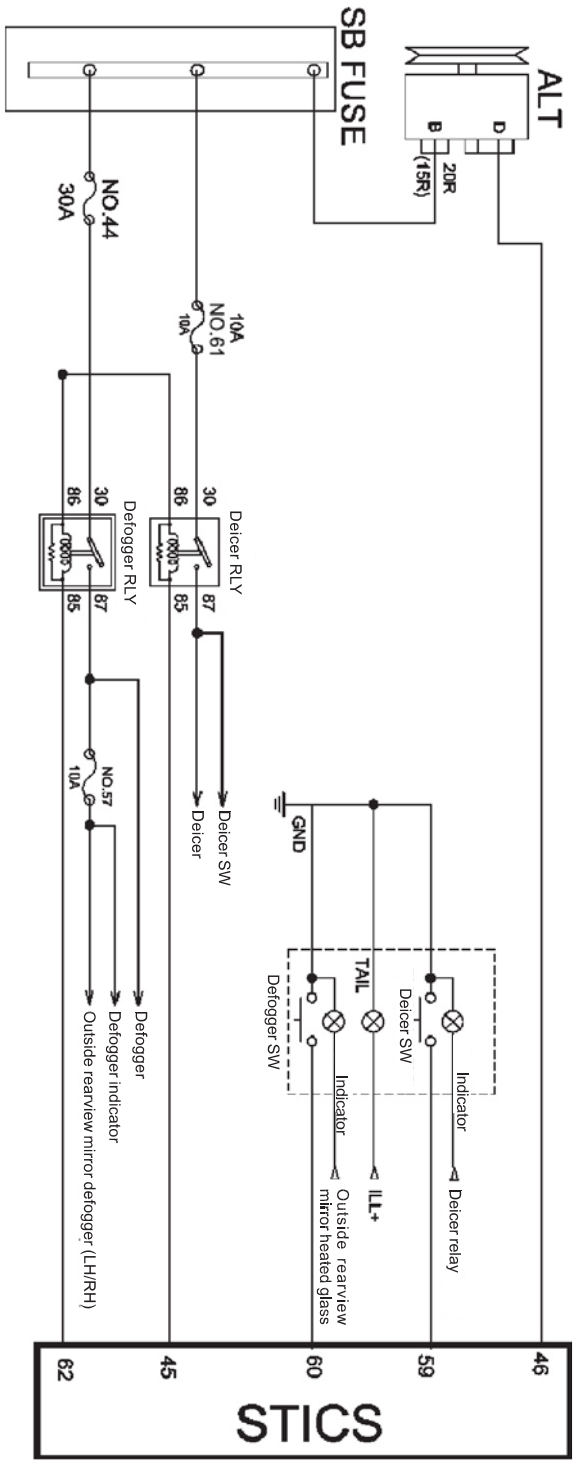
Modification basis	
Application basis	
Affected VIN	

▶ 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 not turned off automatically (auto cut) when opening and closing the driver's door while the ignition is removed and the tail lamp is turned on.

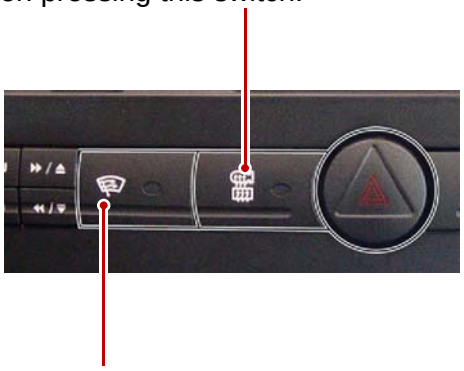


▶ Circuit Diagram of STICS (Related to Front/Rear Defogger Timer)



The defogger system defrosts or demists the window glass with the heated wire integrated in glass.
When operating the defogger switch, STICS controls the operating time only in IGN2 position.

Rear defogger switch
(Tailgate window and outside rearview mirror heated glass switch) The tailgate window and outside rearview mirror heated glass is turned on for 12 minutes when pressing this switch.

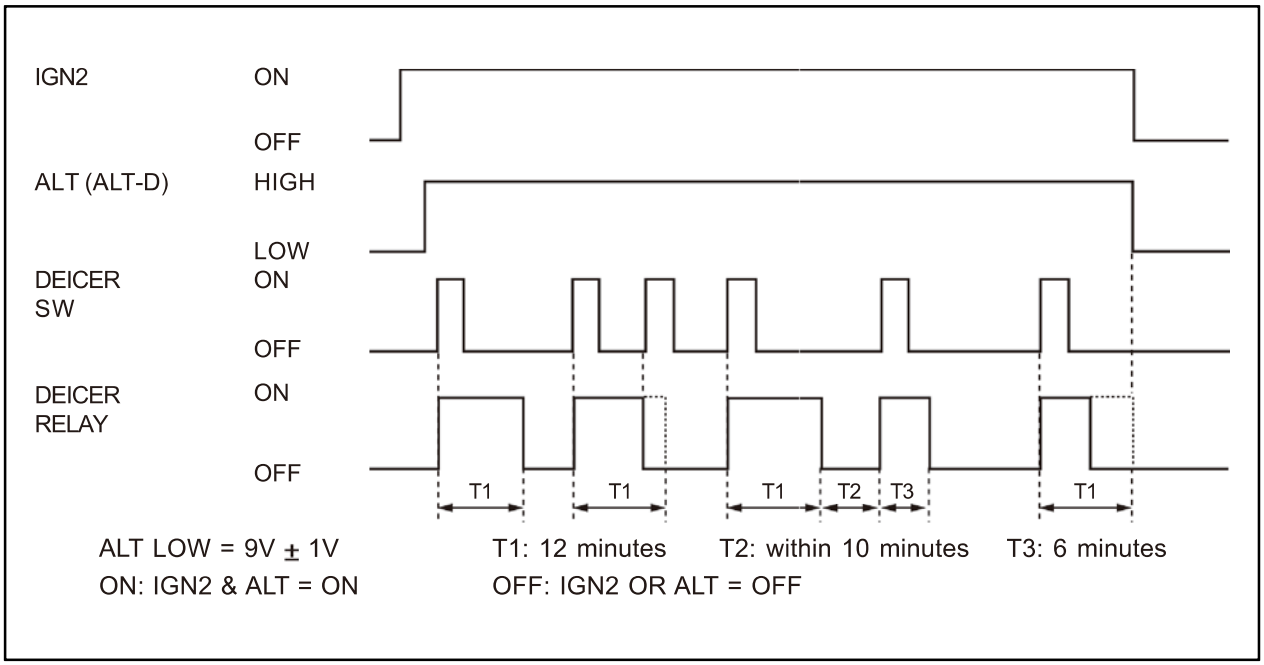


Windshield heated glass switch
The windshield heated glass is turned on for 12 minutes when pressing this switch.

Modification basis	
Application basis	
Affected VIN	

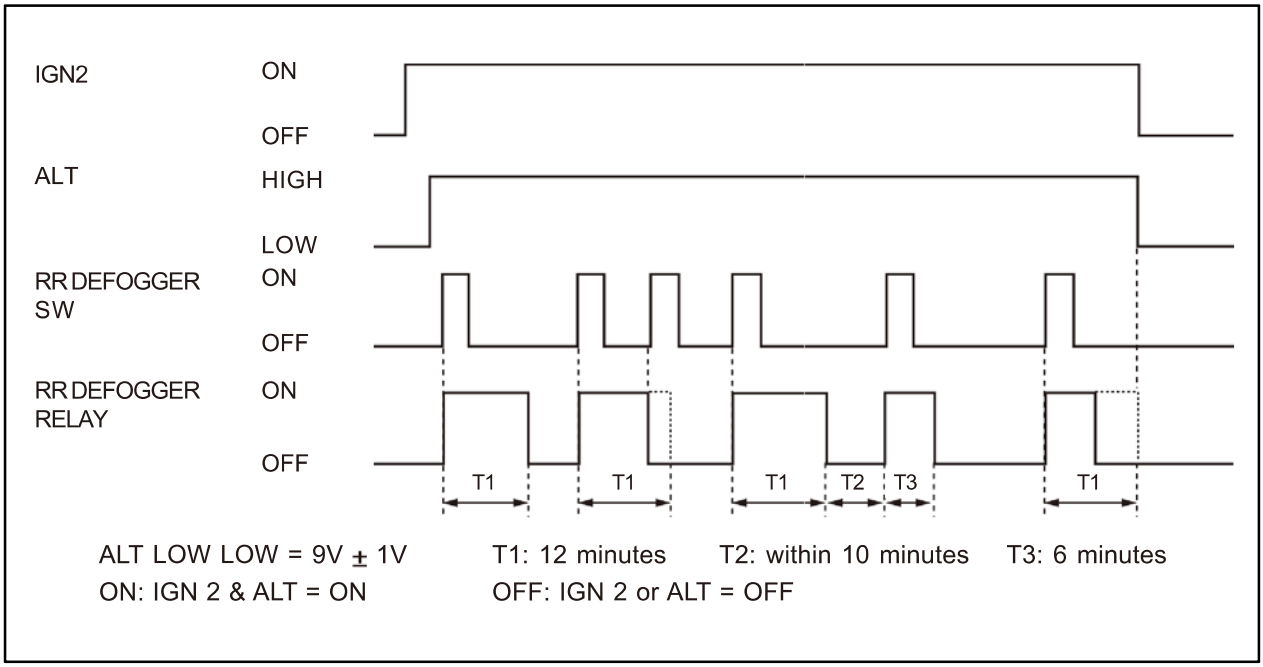
▶ Windshield heated glass (deicer) switch

1. The front defogger output is "ON" when turning "ON" the front defogger (heated glass) switch while the ignition switch is "ON" (with engine running).
2. The output stops when turning on the front defogger (heated glass) switch again during its operation.
3. The output is "ON" only for 6 minutes when turning "ON" the front defogger (heated glass) 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".



▶ Rear Defogger Timer

1. The rear defogger output is "ON" when turning "ON" the rear defogger switch while the IGN 2 switch is "ON" (with engine running).
2. The output is "OFF" when turning "ON" the rear defogger switch again during output.
3. 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.
4. The output is "OFF" when the IGN 2 switch is "OFF".

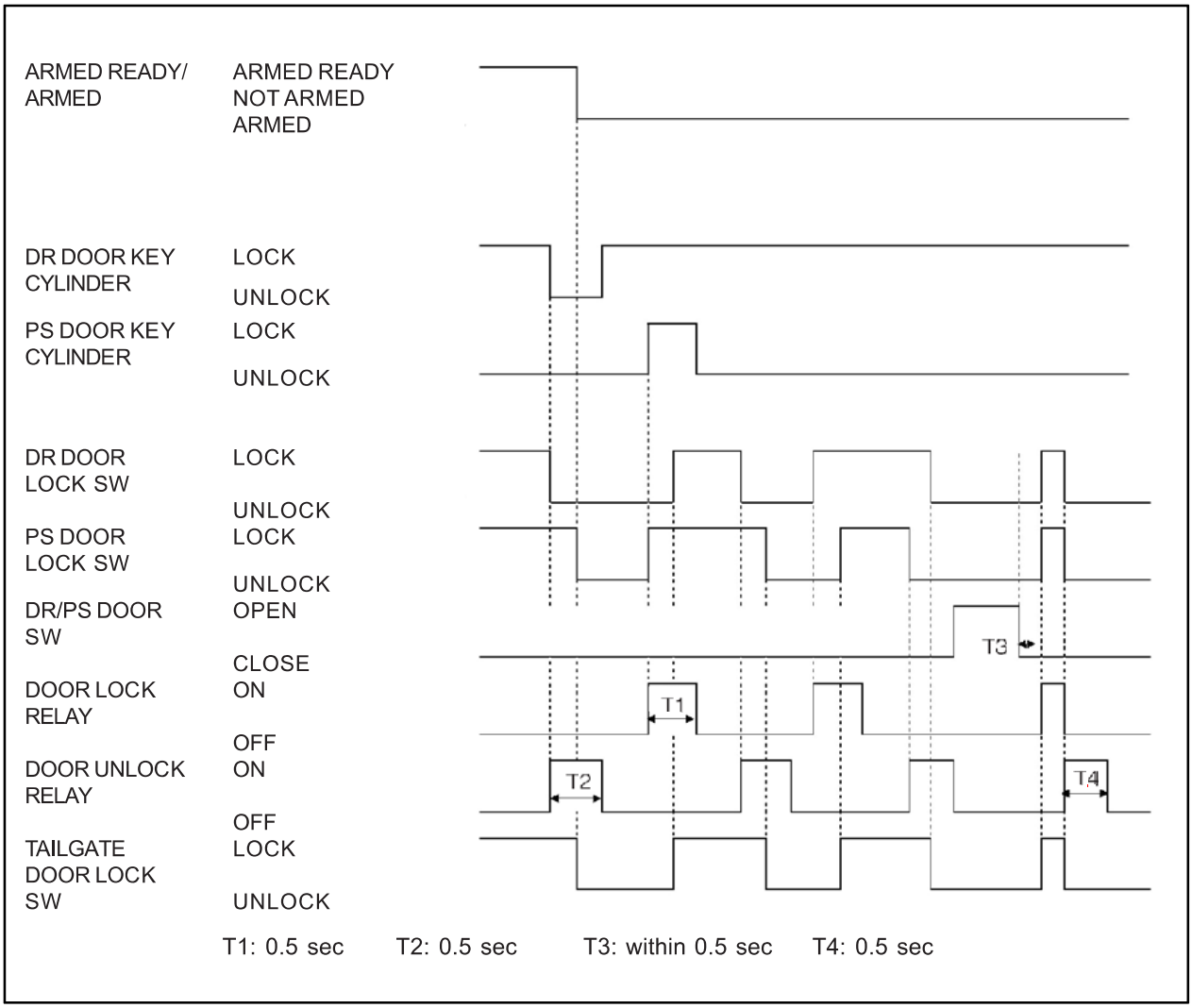


ALT LOW LOW = 9V ± 1V T1: 12 minutes T2: within 10 minutes T3: 6 minutes
ON: IGN 2 & ALT = ON OFF: IGN 2 or ALT = OFF

Modification basis	
Application basis	
Affected VIN	

▶ 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. The door lock system outputs "LOCK" signal for 0.5 seconds when switching from LOCK to UNLOCK by the driver's or passenger's door key cylinder.
4. The door lock system outputs "UNLOCK" signal for 0.5 seconds when switching from UNLOCK to LOCK by the driver's or passenger's door key cylinder.
5. The alarm will not be activated when switched to UNLOCK by driver's or passenger's door key cylinder switch in theft deterrent mode.
6. It does not occur abnormal operation when reconnecting the battery after disconnecting the battery cable.
7. 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.

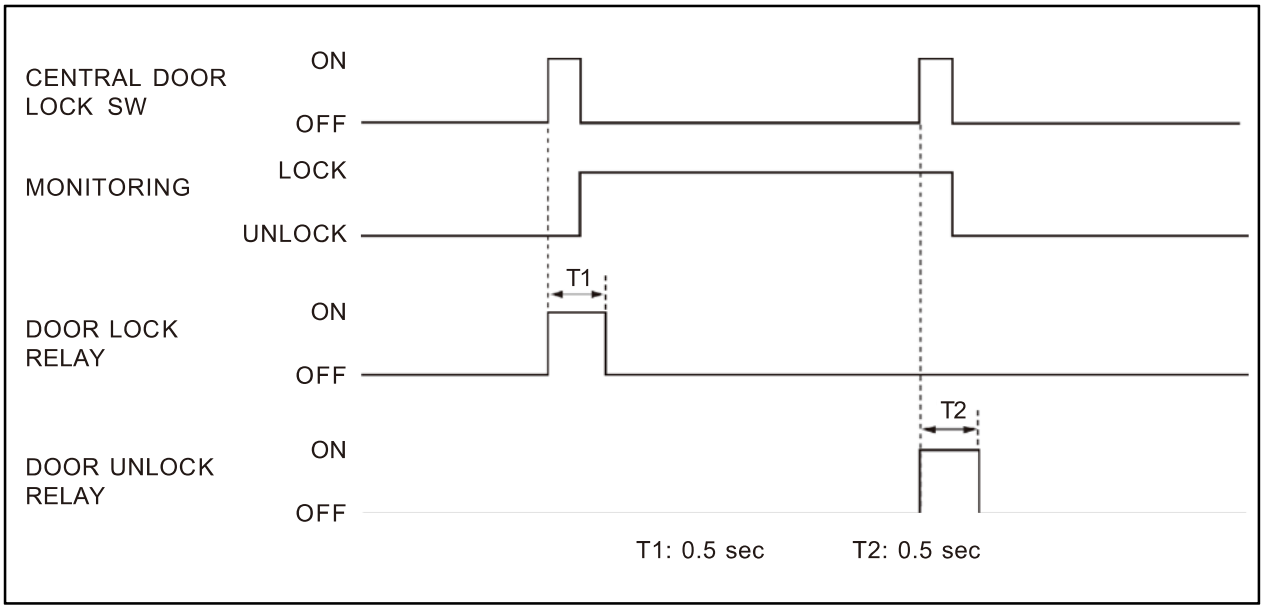


Driver's door lock/unlock switch

Passenger's door lock/unlock switch

▶ Door Lock/Unlock by Central Door Lock Switch

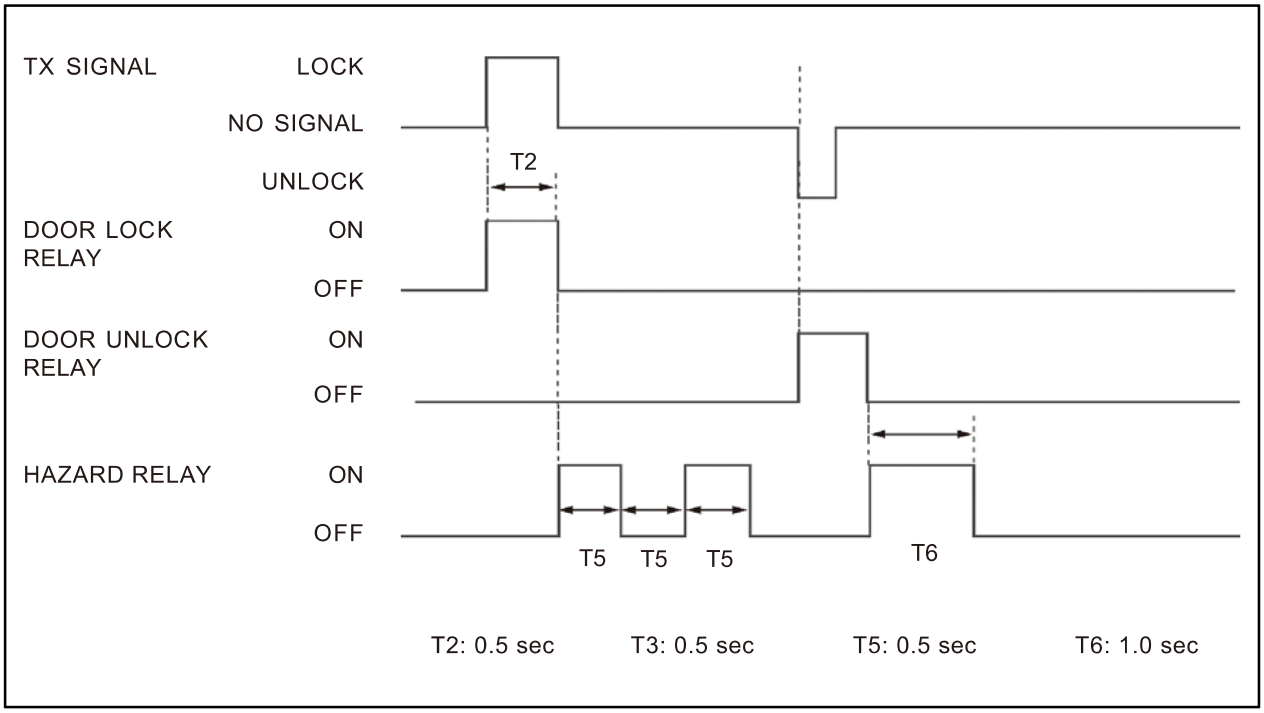
1. The door lock system outputs "LOCK/UNLOCK" signal for 0.5 seconds when operating the central door lock switch. (However, if the door lock switch (front doors) is at LOCK position, the system outputs UNLOCK signal, and vice versa.)
2. The "LOCK" or "UNLOCK" inputs from the central door lock switch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



Modification basis	
Application basis	
Affected VIN	

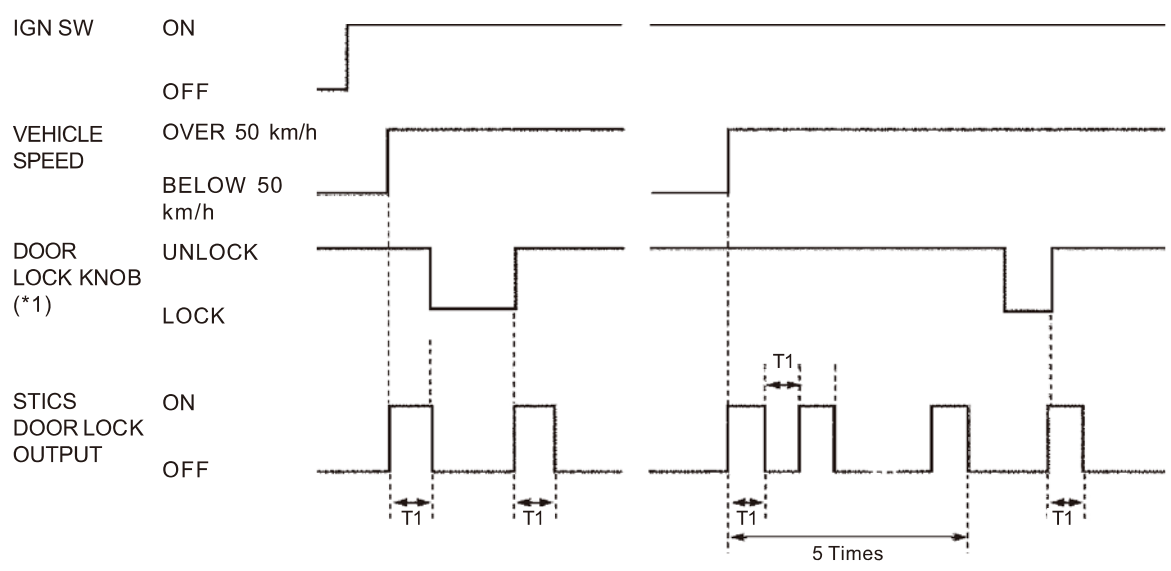
▶ Door LOCK/UNLOCK by Remote Control Key

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



▶ 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 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.



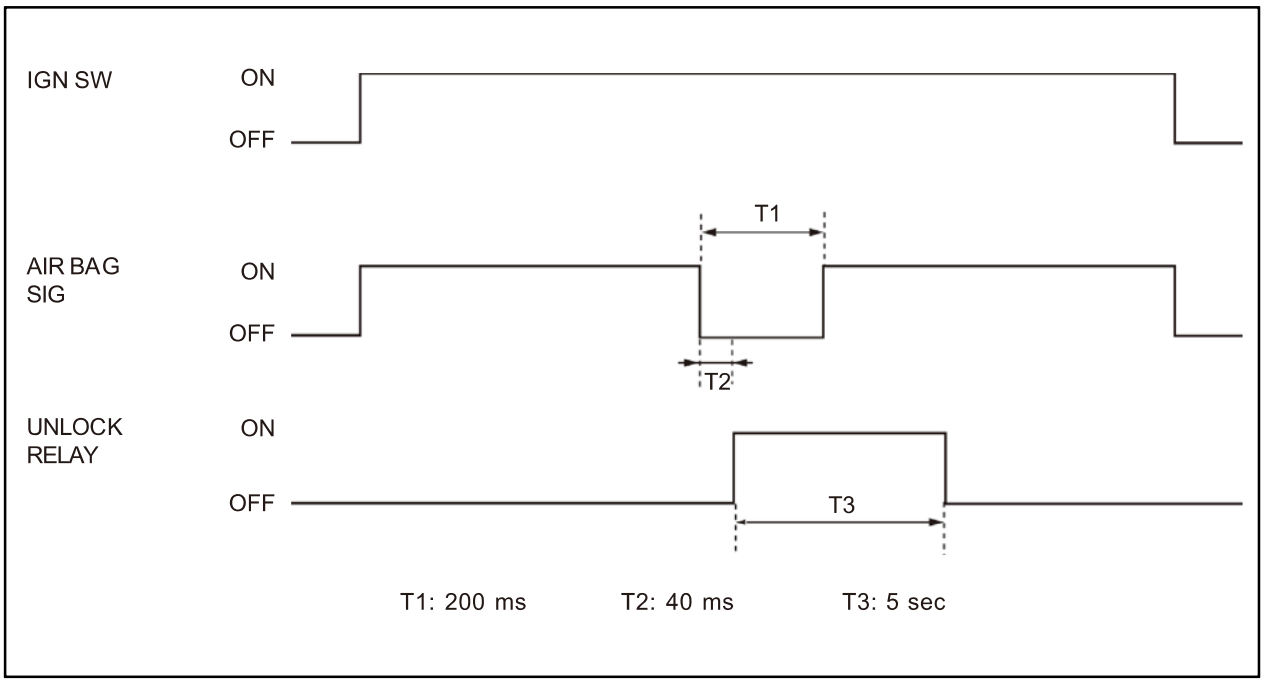
T1: 0.5 sec

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

Modification basis	
Application basis	
Affected VIN	

▶ 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 40ms 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.

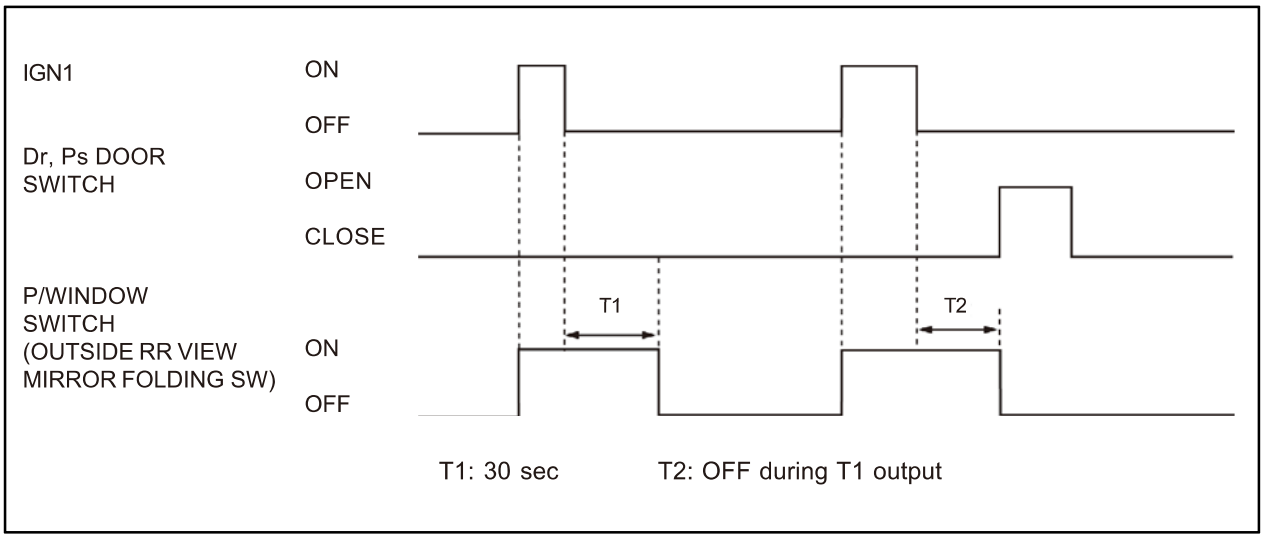


CAUTION

- 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.

▶ 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.
3. The power window relay is turned "OFF" when receiving the remote control key lock signal (armed mode) during its extended operation period of 30 seconds.



▶ 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.

Modification basis	
Application basis	
Affected VIN	

▶ Power Sleep Mode

1. Entering Condition

1) When all the doors including the hood are closed.
2) When the ignition key is in "OFF" position.
3) When there is no key in the driver's/passenger's door key cylinder.
4) The system enters into the sleep mode for saving power if there is any change for 6 seconds while the driver's/passenger's/rear doors and tailgate are locked with the above three conditions met.

2. The sleep mode is deactivated immediately if any of them is out of the specified conditions (wake-up mode).

Also, the sleep mode is deactivated when receiving the UNLOCK signal from the remote control key.

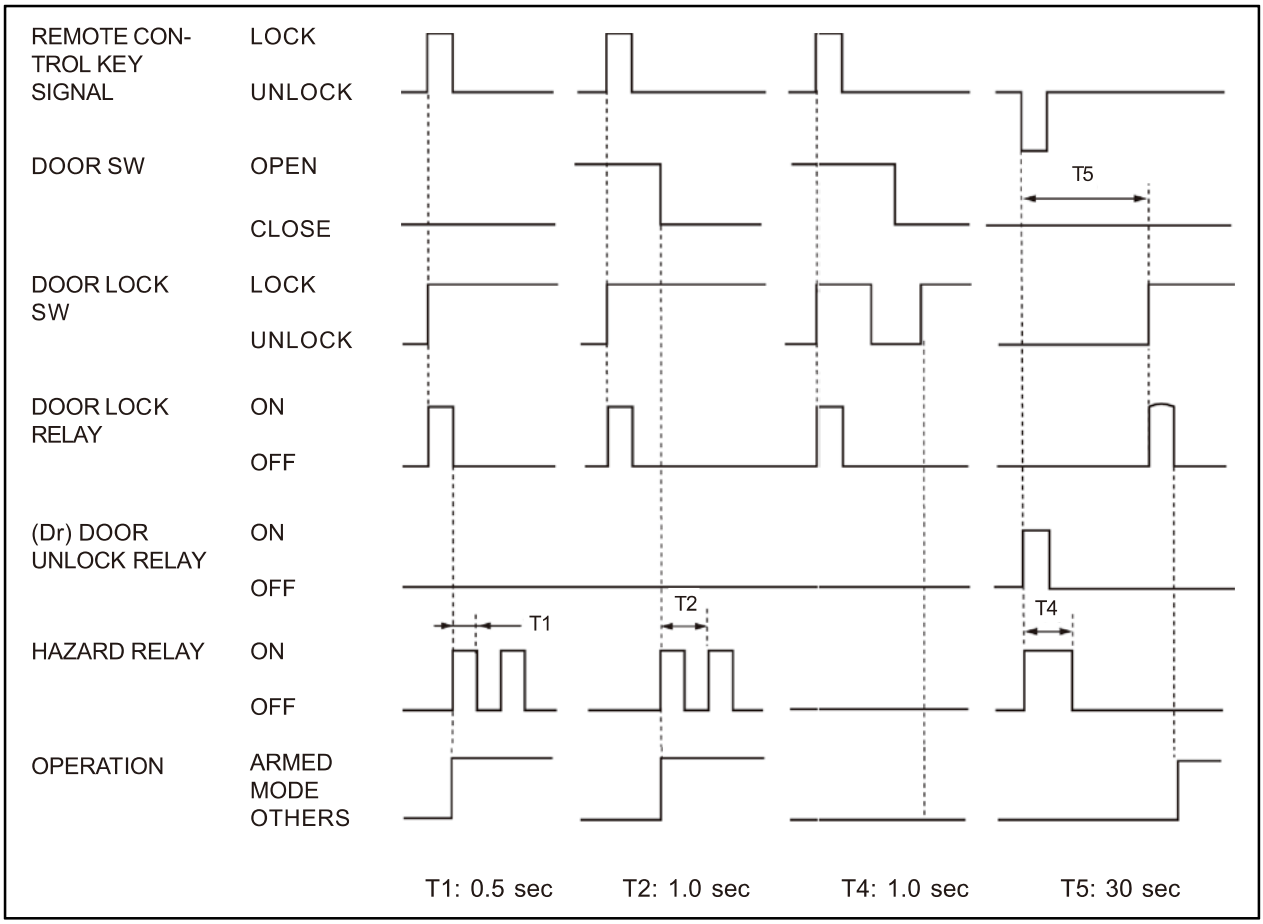
3. During the sleep mode, the sleep mode is deactivated for 30 seconds when room lamp, key hole illumination, tail lamp or power window is operated or after the system receives the UNLOCK signal from the remote control key.

However, if the lamps and power window mentioned above are "OFF" and the conditions in item (1) are met, the system enters into the sleep mode again.

▶ Description of Burglar Alarm Function

1. Armed mode activation requirements

1) The "LOCK" output is "ON" when receiving the "LOCK" signal 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 relay output: twice).
2) The theft deterrent horn and hazard relay outputs are "ON" when receiving the "LOCK" signal from the remote control key again in armed mode (hazard relay output: twice).
3) When receiving "LOCK" signal 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 hazard warning flasher). At this moment, if the ignition key is in the ignition switch, the door unlock switch is turned "ON" or the door lock switch is unlocked, it cancels the armed mode and activates the normal mode. However, when closing and locking the opened door, the hazard warning lamps flash twice.
4) When the door is not opened or the ignition key is not inserted into ignition switch for 30 seconds after receiving "UNLOCK" signal, it outputs "LOCK" and then activates armed mode (RELOCK operation). Also, at this moment, the system outputs the hazard warning flasher twice.
5) The armed mode will not be activated except above conditions.
Ex) The armed mode will not be activated when the door is locked by the ignition key.



Modification basis	
Application basis	
Affected VIN	

2. Armed mode cancellation requirements

1) Unlocking by remote control key
2) Door unlocking by the driver's and passenger's key cylinder switch
3) The armed mode is cancelled when turning the ignition key "ON". The siren is deactivated in 27 seconds.

3. Warning operation requirements

1) When opening the door in armed mode
2) When unlocking the door lock switch in armed mode
3) When closing and then opening the door after completion of warning (27 seconds)

4. Warning operation

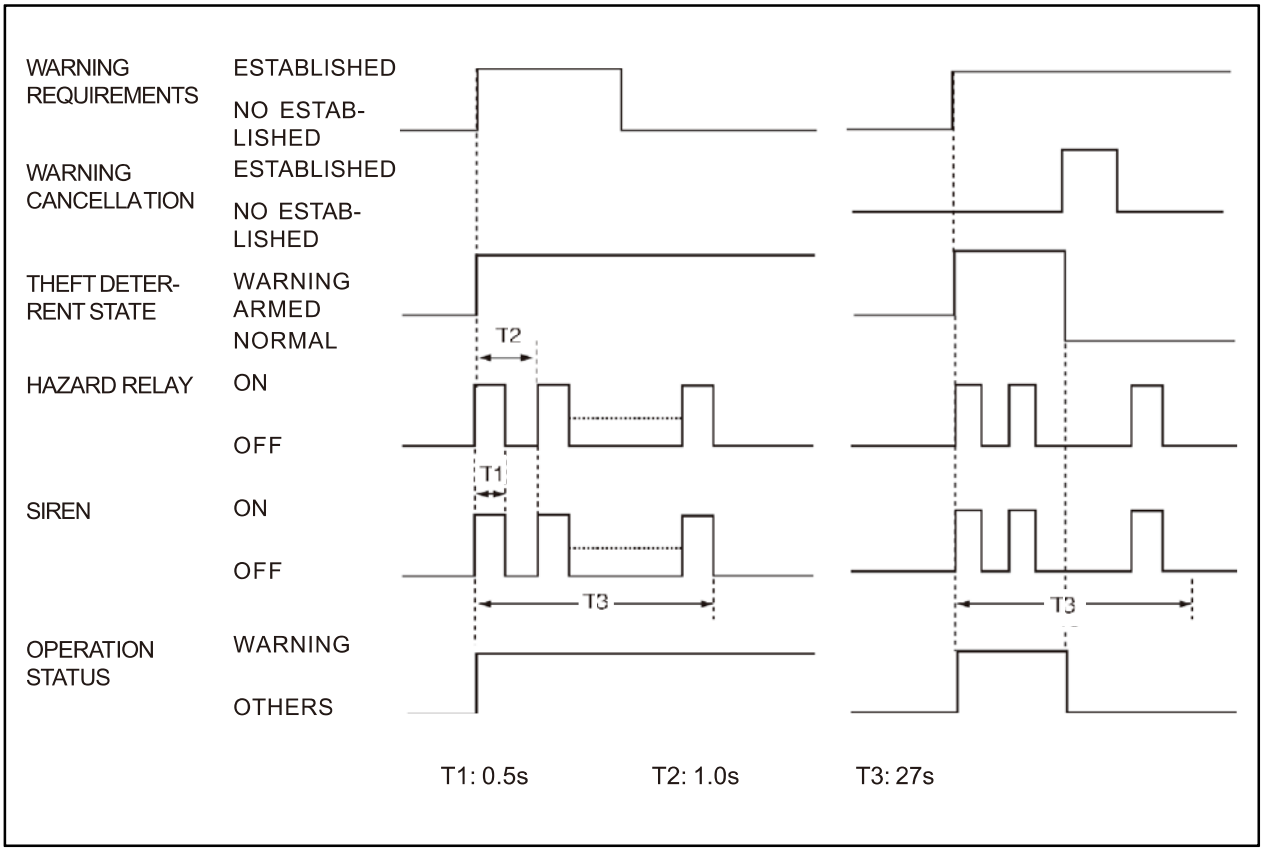
1) The siren and hazard warning flasher output is "ON" for 27 seconds with the interval of 1 second.

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 period) 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 canceled immediately and the warning buzzer stops after 27 seconds (remaining time).
4) When unlocking the doors by the driver's/passenger's door key cylinder in armed mode, the armed mode is cancelled.

6. Operation when warning is cancelled

1) The siren and hazard warning flasher outputs are "OFF".



7. 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 siren sounds and the emergency warning lamp blinks.
(Same operations with warning in armed mode).

CAUTION

- 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.

Modification basis	
Application basis	
Affected VIN	

▶ 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

Door Lock Button

Lock (briefly press)

- If you press this button 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 flashers blink twice.

Door Unlock/Panic Button

1. Unlock (briefly press)

- If you press this button briefly, all doors and the tail gate are unlocked and the theft deterrent mode is deactivated.
- When the deterrent mode is deactivated, hazard warning flashers blink once.

Panic Button
(operative only when the ignition key is inserted)

2. Panic function (press and hold)

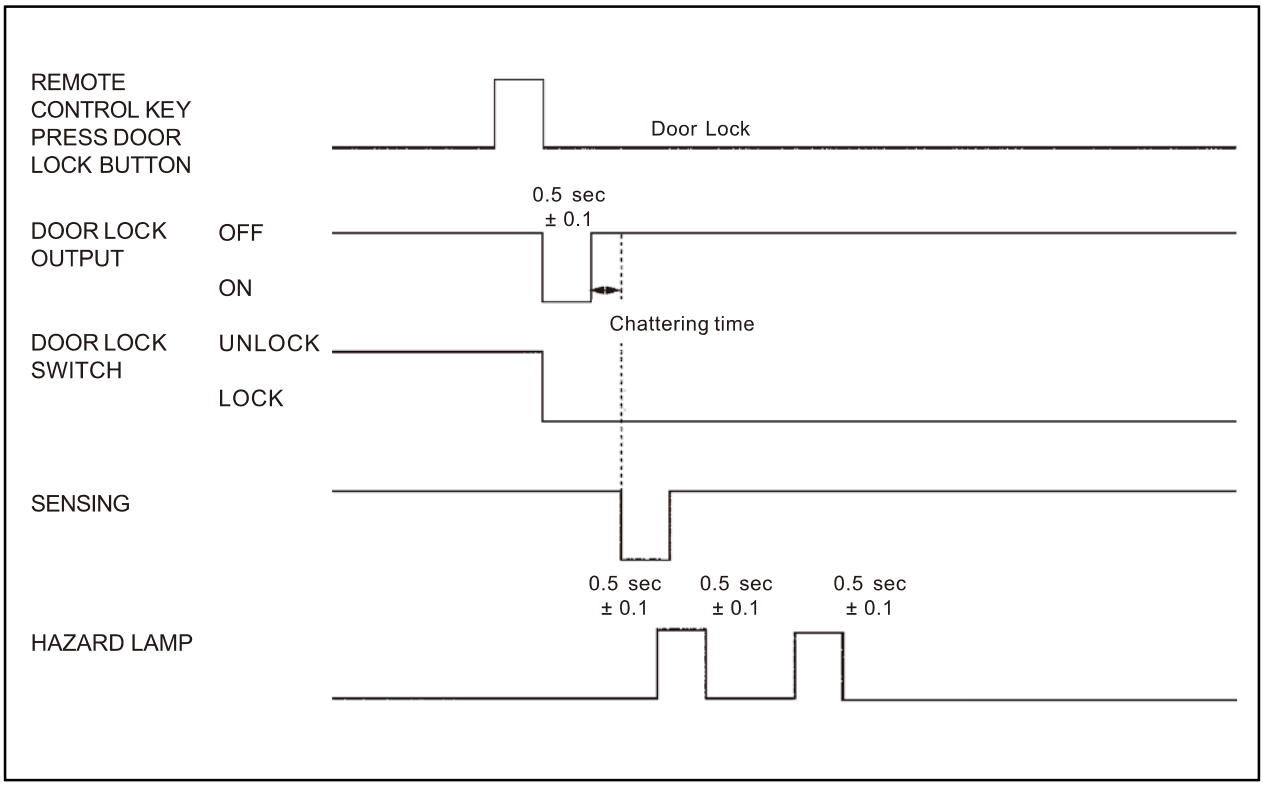
- If you are in your vehicle and feel threatened while the ignition key is inserted into the key switch, you may activate the alarm to call attention. If you press this button, the warning siren will sound for approx. 27 seconds.
- The panic function will stop when any of the buttons on the remote control key is pressed.

CAUTION

The coding signal is transmitted only if pressing the door unlock button long (approx. 2 seconds) when coding the remote control key.

▶ Remote Door Lock

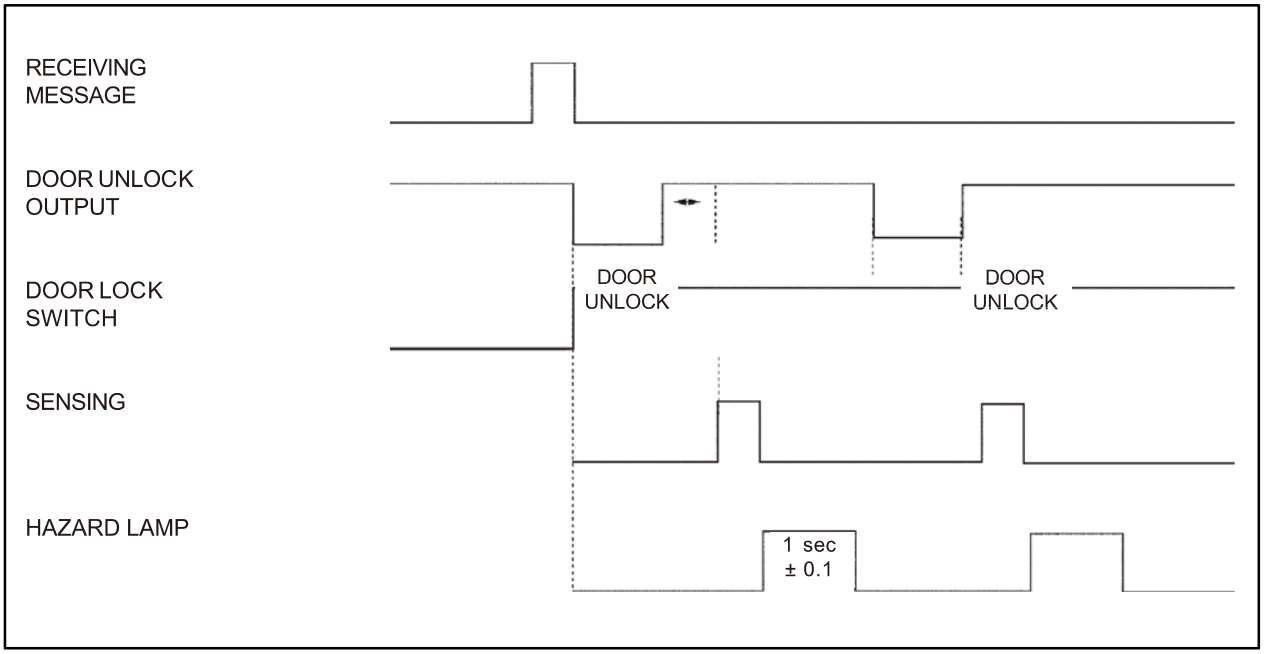
1. All doors are locked when briefly pressing the door LOCK switch on remote control key (less than 0.5 seconds).
2. The system outputs LOCK signal immediately after receiving the door lock message from the remote control key. The system activates the theft deterrent mode when all doors are locked while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



Modification basis	
Application basis	
Affected VIN	

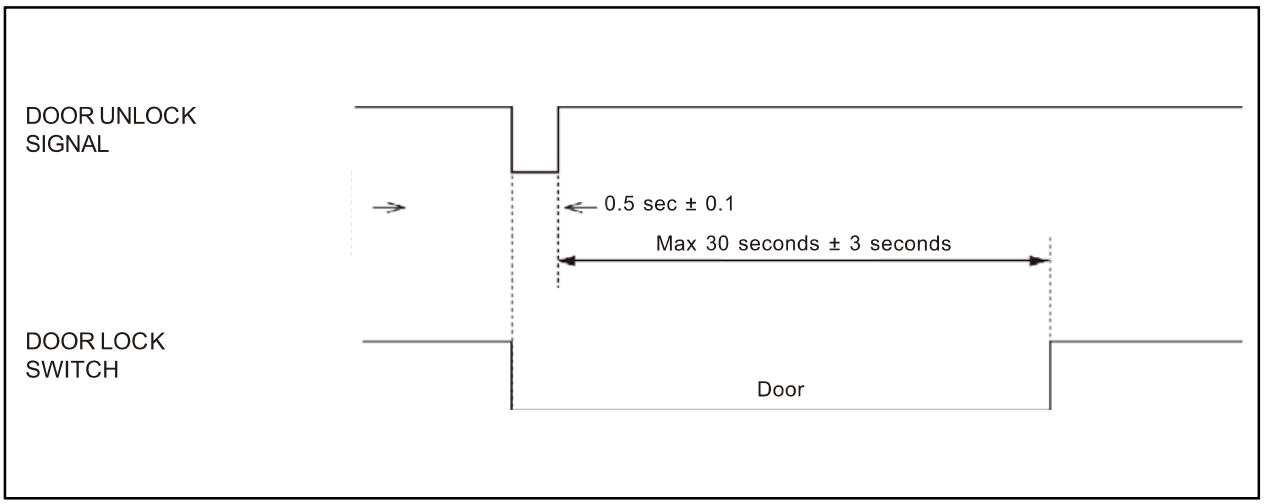
▶ Door Unlock

1. The door unlock operates when pressing the door unlock switch on the remote control key for less 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.

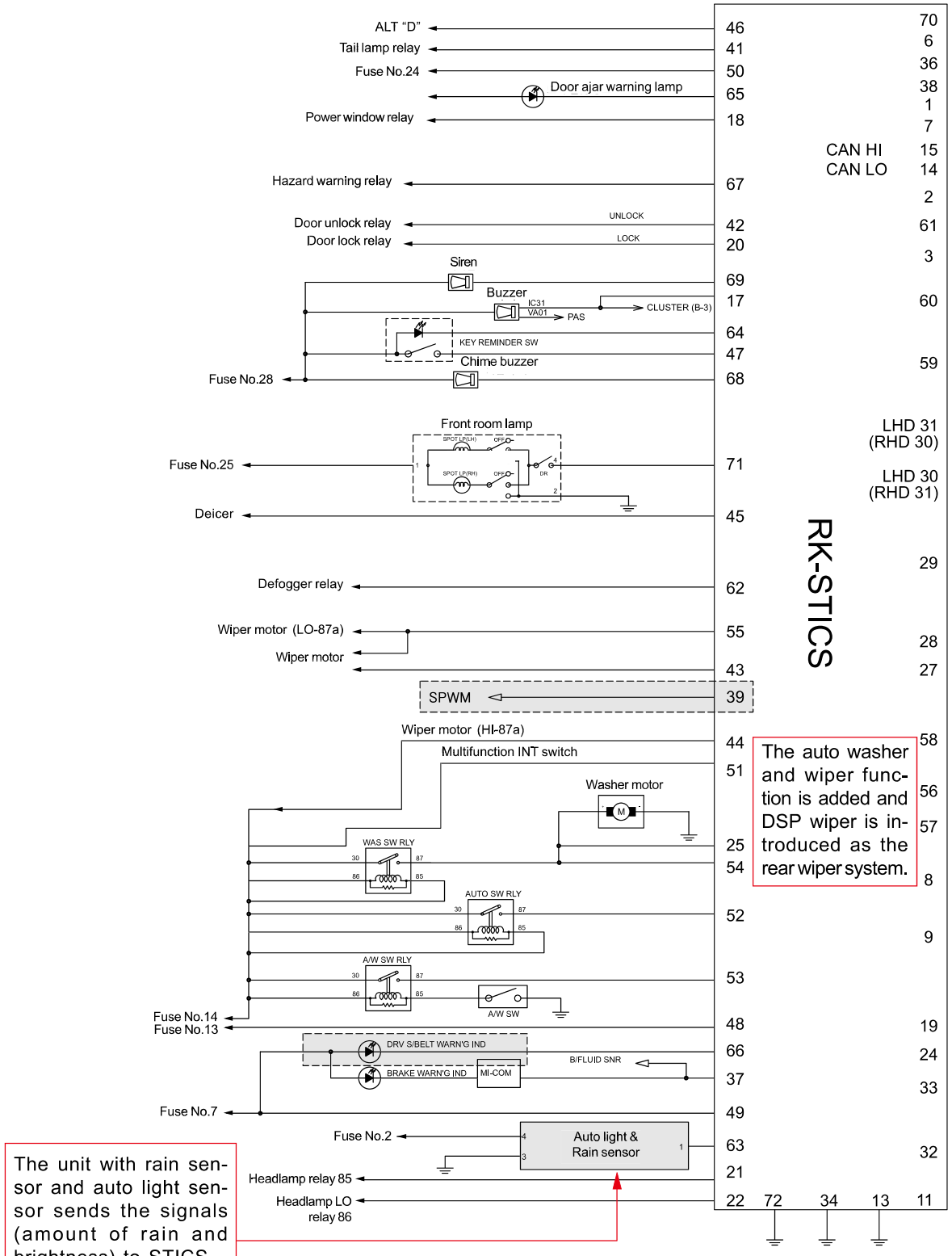


▶ Auto Door Lock in 30 Seconds after Pressing Door Unlock Button

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.

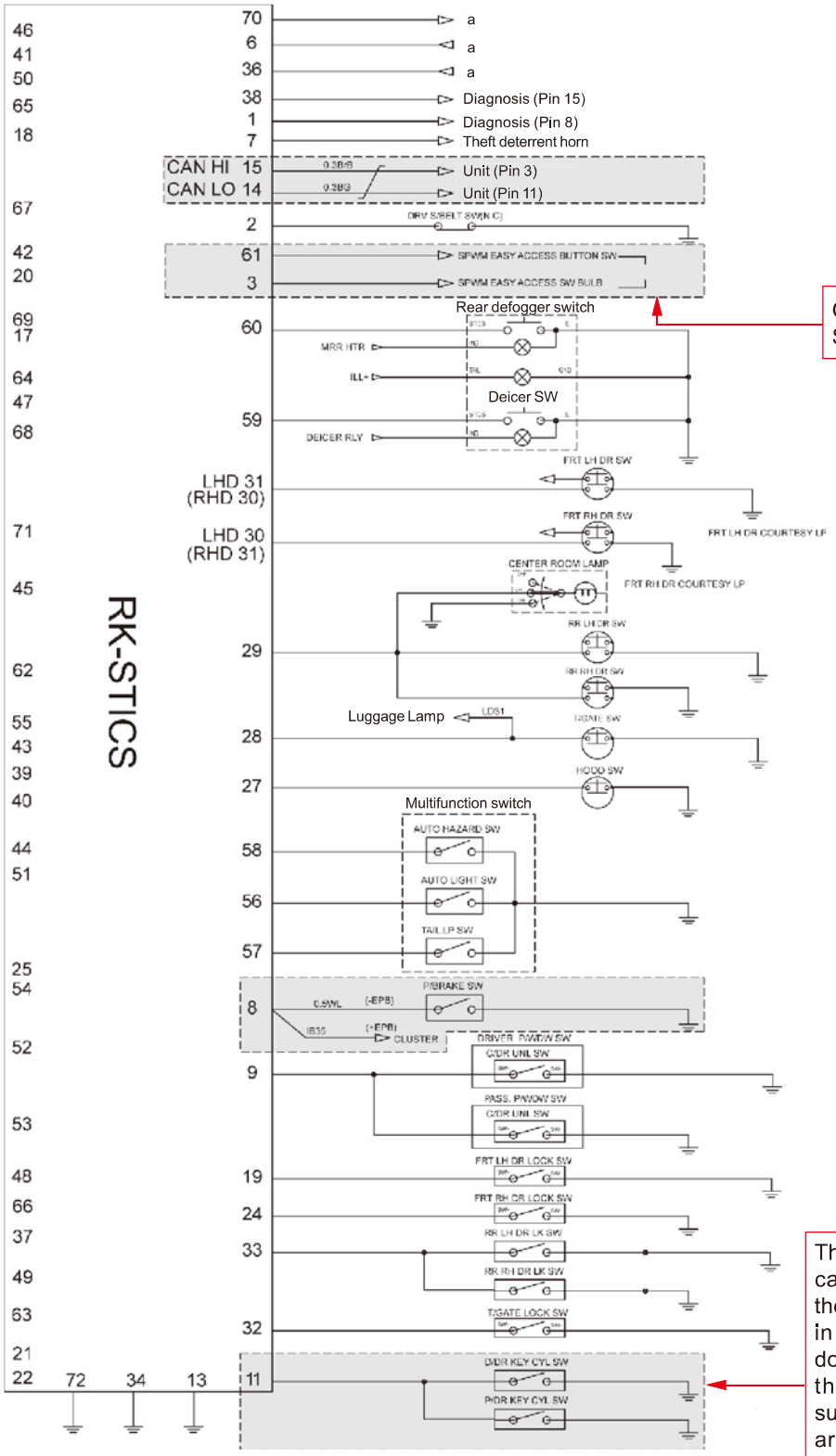


4. CIRCUIT DIAGRAM OF STICS



Modification basis	
Application basis	
Affected VIN	

▶ Output Signals (except STICS)



Only for the model with SPWM unit.

The theft deterrent mode is cancelled when unlocking the doors by the ignition key in driver's or passenger's door key cylinder. However, the mode cannot be resumed even when the doors are locked by the ignition key.

Modification basis	
Application basis	
Affected VIN	