Component Procedures: Keyless Entry

Table of Contents

Component Procedures: Keyless Entry

Parts and Labor (itype_189)

Parts

Qualifier	Part #	Name	Price	Note
Keyless Entry Components	95420F2000	Antenna	53.76	
Keyless Entry Components	95710C1000	Buzzer	66.11	
Keyless Entry Components > C?	95480F2070	Smart Key Module	483.29	
Keyless Entry Components > R?		Part Of Bcm Unit.	0.00	
Keyless Entry Components > R?		Part Of Body Control M?	0.00	
Keyless Entry Components > T?	95430F2300SSH	With Keyless Entry	161.19	
Keyless Entry Components > T?	95440F3002	Without Keyless Entry	404.65	

Labor

Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Replace	Keyless Entry Components > Receiver, R&R	B	0.4	0.0
Remove & Replace	Keyless Entry Components > Transmitter, R&R	B	0.2	0.0

Keyless Entry and Burglar Alarm - Description and Operation (Article 44800)

- Description

Burglar Alarm State [B/A State]

B/A State Description

DISARM In "DISARM" state, no vehicle start inhibition. So, when door, hood , or Tailgate is opened, there is no alarm sound and flashing. If the battery is disconnected while the state is not "ARM/ARMWAIT/ALARM/REARM", B/A state is set to "DISARM" state. In “DISARM” state, security indicator keeps blinking.

- In "DISARM" state, no vehicle start inhibition. So, when door, hood , or Tailgate is opened, there is no alarm sound and flashing.
- If the battery is disconnected while the state is not "ARM/ARMWAIT/ALARM/REARM", B/A state is set to "DISARM" state.
- In “DISARM” state, security indicator keeps blinking.

ARMWAIT In "ARMWAIT" state, when timer “30sec." is running, if this timer reaches “30sec”, state transits to "ARM" state. If the battery is disconnected while the state is "ARMWAIT", B/A state is set to "ARMWAIT" state and timer "30sec" is restarted. In “ARMWAIT” state, security indicator keeps on.

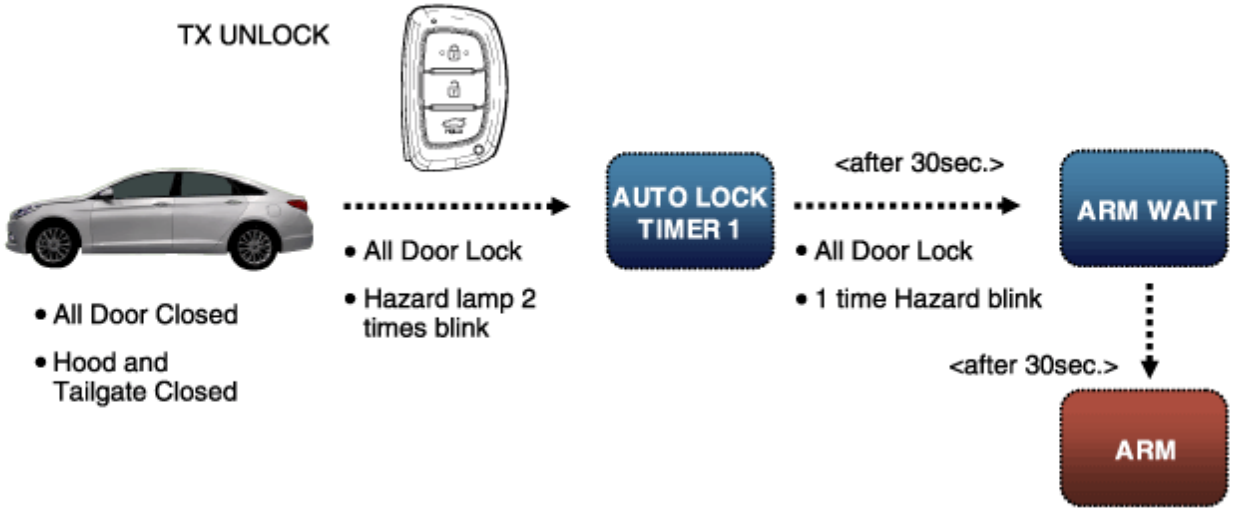
- In "ARMWAIT" state, when timer “30sec." is running, if this timer reaches “30sec”, state transits to "ARM" state.
- If the battery is disconnected while the state is "ARMWAIT", B/A state is set to "ARMWAIT" state and timer "30sec" is restarted.
- In “ARMWAIT” state, security indicator keeps on.

[ARM WAIT Procedure]

AUTO LOCK TIMER 1 In "AUTOLOCKTIMER1" state, timer “30sec."is running. If this timer expired, the auto lock command is generated “Lock command”. When “Lock command” operated, All Door changed lock and closed then B/A state changes “AUTOLOCKTIMER1” to “ARMWAIT In "AUTOLOCKTIMER1" state, Security Indicator keeps blinking. In "AUTOLOCKTIMER1" state, timer “30sec."is running. If this timer expired, the auto lock command is generated “Lock command”. When “Lock command” operated, All Door changed lock and closed then B/A state changes “AUTOLOCKTIMER1” to “ARMWAIT

- In "AUTOLOCKTIMER1" state, timer “30sec."is running. If this timer expired, the auto lock command is generated “Lock command”.
- When “Lock command” operated, All Door changed lock and closed then B/A state changes “AUTOLOCKTIMER1” to “ARMWAIT
- In "AUTOLOCKTIMER1" state, Security Indicator keeps blinking. In "AUTOLOCKTIMER1" state, timer “30sec."is running. If this timer expired, the auto lock command is generated “Lock command”. When “Lock command” operated, All Door changed lock and closed then B/A state changes “AUTOLOCKTIMER1” to “ARMWAIT

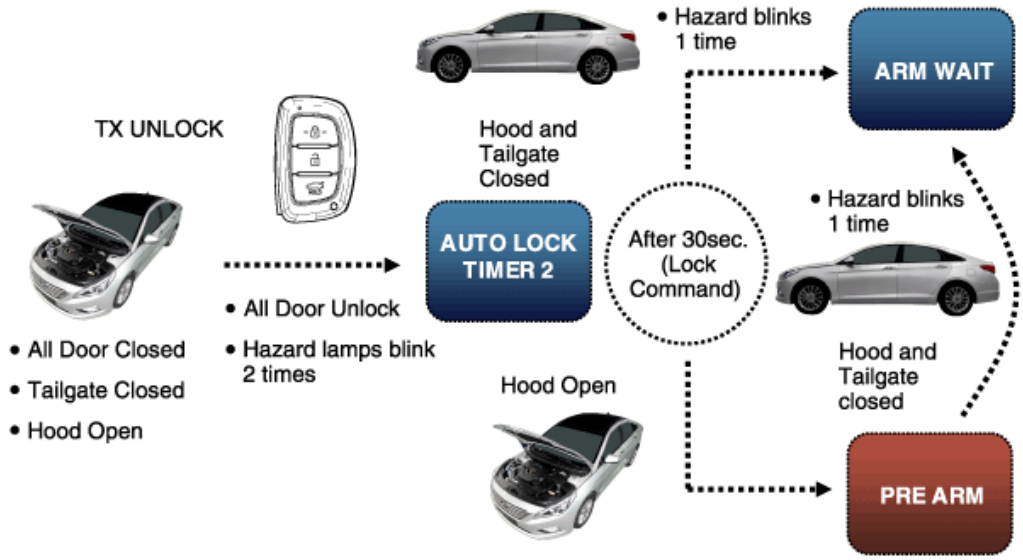
[AUTO LOCK TIMER 1 Procedure]



AUTO LOCK TIMER 2 In "AUTOLOCKTIMER2" state, when timer “30sec."is running, if this timer expired, the auto lock command is generated “Lock command”. All doors are Locked, Hood is closed and Tailgate is closed when “Lock command” operated, then B/A state changes to“AUTOLOCKTIMER2” when “Lock Command” generated with Hood open. When “Unlock command” operated on the condition of All Door closed and Hood open, B/A state changes to “AUTOLOCKTIMER2”. In "AUTOLOCKTIMER2" state, Security Indicator keeps blinking.

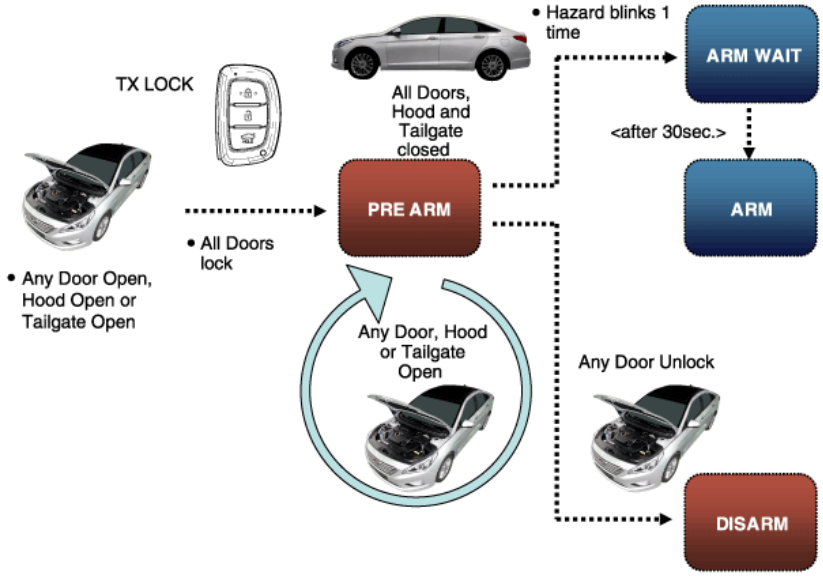
- In "AUTOLOCKTIMER2" state, when timer “30sec."is running, if this timer expired, the auto lock command is generated “Lock command”.
- All doors are Locked, Hood is closed and Tailgate is closed when “Lock command” operated, then B/A state changes to“AUTOLOCKTIMER2” when “Lock Command” generated with Hood open.
- When “Unlock command” operated on the condition of All Door closed and Hood open, B/A state changes to “AUTOLOCKTIMER2”.
- In "AUTOLOCKTIMER2" state, Security Indicator keeps blinking.

[AUTO LOCK TIMER 2 Procedure]



PRE ARM The "PREARM" state is when user try to change to arm but pre-condition are not satisfied (door open, tailgate open, or hood open). B/A state changes to “PREARM” when TX Lock command occurs with any door Open, Hood or Tailgate Open. B/A state changes to “PREARM” when “30sec.” timer expired in“AUTOLOCKTIMER2”with Hood or Tailgate Open The “PREAMR” state changes to “ARM” when all doors closed, All doors locked and Hood and Tailgate closed. The “PREAMR” state changes to “DISARM” when Any Door Unlock In this state, Security indicator keeps blinking.
- The "PREARM" state is when user try to change to arm but pre-condition are not satisfied (door open, tailgate open, or hood open).
- B/A state changes to “PREARM” when TX Lock command occurs with any door Open, Hood or Tailgate Open.
- B/A state changes to “PREARM” when “30sec.” timer expired in“AUTOLOCKTIMER2”with Hood or Tailgate Open
- The “PREAMR” state changes to “ARM” when all doors closed, All doors locked and Hood and Tailgate closed.
- The “PREAMR” state changes to “DISARM” when Any Door Unlock
- In this state, Security indicator keeps blinking.

[PRE ARM Procedure]



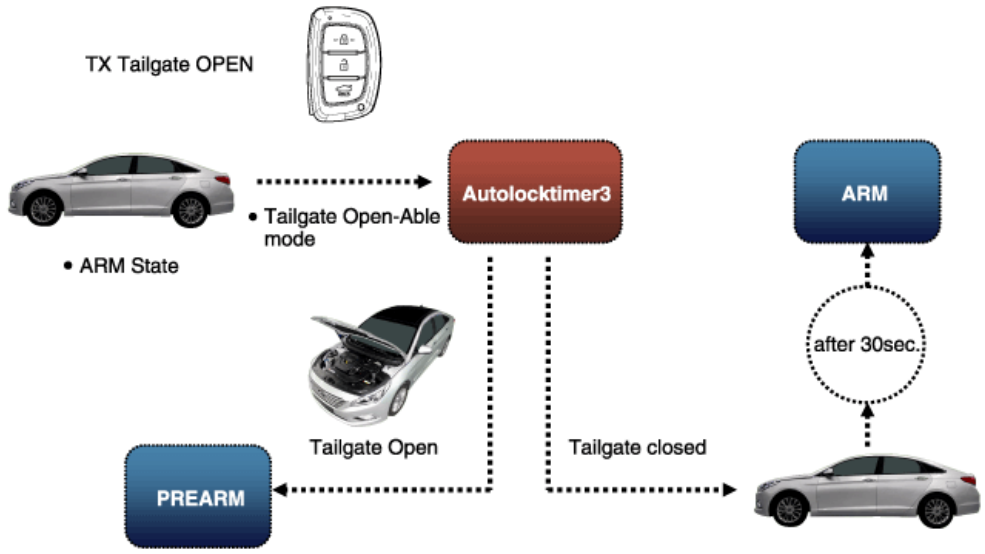
RE ARM In "REARM" state, if the vehicle intrusion is detected, flashing and sound is restarted, again and state transits to "ALARM" state. B/A state changes to “REARM” after the timer “27sec.” expires in “ALARM” state with All doors closed and lock. Security Indicator keeps blinking.

- In "REARM" state, if the vehicle intrusion is detected, flashing and sound is restarted, again and state transits to "ALARM" state.
- B/A state changes to “REARM” after the timer “27sec.” expires in “ALARM” state with All doors closed and lock.
- Security Indicator keeps blinking.

AUTOLOCK TIMER3 B/A state changes to “AUTOLockTIMER3”, when TX-Tailgate command operated. B/A state changes “AUTOLOCKTIMER3” to “ARMWAIT”, when the “30sec.” timer expires with all doors lock and closed. B/A state changes “AUTOLOCKTIMER3” to “DISARM”, when any door open. In "AUTOLOCKTIMER3" state, timer “30sec.“ timer is running. If this timer expired, state transits to "PREARM" state with Tailgate Open. In this state, Security indicator keeps blinking

- B/A state changes to “AUTOLockTIMER3”, when TX-Tailgate command operated.
- B/A state changes “AUTOLOCKTIMER3” to “ARMWAIT”, when the “30sec.” timer expires with all doors lock and closed.
- B/A state changes “AUTOLOCKTIMER3” to “DISARM”, when any door open.
- In "AUTOLOCKTIMER3" state, timer “30sec.“ timer is running. If this timer expired, state transits to "PREARM" state with Tailgate Open.
- In this state, Security indicator keeps blinking

[AUTOLOCKTIMER 3 Procedure]



ARM HOLD (Alarm hold : Trunk) ■Non-PTL option The ARM HOLD mode is similar to the trunk alarm hold mode for current cars. If the trunk is opened by a remote controller (including the smart key) in the ARM mode, the Hold mode will be turned on, in which the theft alarm is held for the trunk. As long as the trunk is opened, ARM HOLD mode continues. When the trunk is closed, the 30-second timer is activated. Since the ARM HOLD mode is on for 30 seconds, the theft alarm is not issued even though the trunk is opened. ARM mode is on as soon as 30 seconds after the trunk is closed. Even in ARM HOLD mode, the door and hood are in the ARM mode. They issue alarms normally when a theft occurs. The security indicator keeps flickering during ARM HOLD time.
- The ARM HOLD mode is similar to the trunk alarm hold mode for current cars.
- If the trunk is opened by a remote controller (including the smart key) in the ARM mode, the Hold mode will be turned on, in which the theft alarm is held for the trunk.
- As long as the trunk is opened, ARM HOLD mode continues.
- When the trunk is closed, the 30-second timer is activated. Since the ARM HOLD mode is on for 30 seconds, the theft alarm is not issued even though the trunk is opened.
- ARM mode is on as soon as 30 seconds after the trunk is closed.
- Even in ARM HOLD mode, the door and hood are in the ARM mode. They issue alarms normally when a theft occurs.
- The security indicator keeps flickering during ARM HOLD time.

RE ARM (ARM mode is on again) If the door, hood and trunk are all closed after the termination of ALARM mode, it means that the ARM mode is on again. At this time the actuator state (door lock/unlock) is neglected and ARM mode is kept until the remote control signal is received (normal ARM mode). The security indicator keeps flickering during this mode.
- If the door, hood and trunk are all closed after the termination of ALARM mode, it means that the ARM mode is on again.
- At this time the actuator state (door lock/unlock) is neglected and ARM mode is kept until the remote control signal is received (normal ARM mode).
- The security indicator keeps flickering during this mode.

RESET When the battery is removed in ALARM or RE ARM mode, RESET mode is on. When the battery is installed after RESET, the theft alarm operation resumes. (instead of remained output, 27 seconds ON/10 seconds OFF output in three times
- When the battery is removed in ALARM or RE ARM mode, RESET mode is on.
- When the battery is installed after RESET, the theft alarm operation resumes. (instead of remained output, 27 seconds ON/10 seconds OFF output in three times

KEY ON 30 second deactivation (Non-Smart Key option) For non-smart cars, a 30-second standby with the ignition key on during ALARM mode will deactivate the theft alarm status. Even before 3O seconds pass, if the engine starts (Alternator "L" terminal voltage is HI : sent from the cluster module to CAN data), the theft alarm is instantly deactivated.(no start proposition control: The immobilizer system is applied by default and the engine start by the registered immobilizer key is allowed though during alarming.) ■In a smart key vehicle, the alarm is deactivated instantly after the smart key authentication.
- For non-smart cars, a 30-second standby with the ignition key on during ALARM mode will deactivate the theft

alarm status.
- Even before 3O seconds pass, if the engine starts (Alternator "L" terminal voltage is HI : sent from the cluster module to CAN data), the theft alarm is instantly deactivated.(no start proposition control: The immobilizer system is applied by default and the engine start by the registered immobilizer key is allowed though during alarming.) ■In a smart key vehicle, the alarm is deactivated instantly after the smart key authentication.
When ARM mode is on, the trunk OPEN and central door unlock are not allowed. From the moment that the remote controller or smart key based all door lock is activated and ARM standby mode (ARM WAIT) is on, the central door unlock switch of the indoor trunk unlock switch or DDM & ADM (driver seat power window switch & passenger seat power window switch) is disabled. (theft prevention) ■This function works in the same in ARM WAIT, ARM, ALARM and RE ARM modes.
- From the moment that the remote controller or smart key based all door lock is activated and ARM standby mode (ARM WAIT) is on, the central door unlock switch of the indoor trunk unlock switch or DDM & ADM (driver seat power window switch & passenger seat power window switch) is disabled. (theft prevention) ■This function works in the same in ARM WAIT, ARM, ALARM and RE ARM modes.

Smart Key Module System - Service Tips (Article 42556)

Smart Key Module System **Service Tips (1)**

Circuit Description

The SMART KEY system allows the driver to access and operate a vehicle in a very convenient way. To access the vehicle, no traditional key or remote control unit is needed.

The driver carries a SMART KEY FOB which does not require any conscious actions by the driver (e.g. operate a RKE button). The SMART KEY system is triggered by pressing a push button in the door handle.

■ Role of Main Components

1. Smart Key Control Module :
   1) Controls Power Supply Relay (ACC, IG1, IG2, Start).
   2) Transmits Passive Lock/Unlock signal to BCM via B-CAN.
   3) Transmits Authorization information through serial communication with ECM/PCM (Engine Start Permission).
   4) Antenna operation & Smart Key Authorization.
   5) Diagnosis Function (Communicate with Diagnosis Tool through K-Line).
   6) Sets Engine status & Transmission specification automatically using C-CAN information.
   7) Verifies Immobilizer communication data and Authorize.
2. Smart Key Outside Handle :
   1) Detects Smart Key on the outside of door area (LF Antenna Built-in).
   2) Passive Lock / Unlock (Button Type).
3. Smart Key Bumper Antenna : Detects Smart Key on the outside of trunk area (LF Antenna Built-in).
4. Instrument Cluster : Immobilizer Indicator, Warning Buzzer Output, Warning Message.
5. Smart Key Antenna (Interior) : Detects Smart Key in interior area.
6. Smart Key Trunk Antenna : Detects Smart Key in trunk area.
7. Start Stop Button (SSB) : is used for the Engine Start Stop and Power transfer.
8. Power Distribution Relay : SMK's power distribution control relay (ACC, IG1, IG2, Start).
9. Smart Key : It transmits Unique ID and Remote Control Signal in wireless.
10. External Buzzer : It generates various warning alerts or confirmation alerts when passive lock / unlock operate.
11. ECM/PCM :
    1) It transmits Information (Engine OFF/ Cranking/ Engine Start/ ETC..) of Engine Status via C-CAN.
    2) It communicates Engine Start Authorization related information with Smart Key Control Module.
12. Trunk Lid Handle Switch : It inputs Switch Signal for Passive Trunk Open Control.

Smart Key System - Description and Operation (Article 44775)

- Description
- Passive unlock via 4 doors
- Passive locking via4 doors
- Passive start
- Passive access trunk via the trunk lid switch at the trunk
- Max. 2 fobs can be handled by the system
- Immobilizer backup antenna driver integrated into SSB for TP authentication (i.e. limp home mode)
- Communication with engine management system
- Communication with SRX
- LF-RF communication
- Passive unlock The system allows the user to access (unlock) the vehicle without performing any actions with the SMART KEY FOB.
- Passive locking The system allows the user to lock the vehicle by pushing a button on door handle with the SMART KEY FOB.
- Button start The system allows the user to switch the power modes (Off, Accessory, Ignition), as well as to start and stop the vehicle’s engine without performing any actions with the SMART KEY FOB. See Button Engine Start system specification.
- LIMP HOME Mode Additionally, the system offers so called “limp home mode”, which is the user can operate all vehicle functions by pushing the key into the SSB.

Smart Key ECU (SMK ECU)

- Power supply
- Microcontroller with FLASH Memory
- Single Line Interface to SRX
- Single Line Interface to EMS
- Input stage
- LF antenna amplifier/driver
- CAN communication with BCM

Smart Key FOB

- Passive functionality: receives LF-challenge and sends automatically RF response.
- Classic RKE function by action up to 4 push buttons.
- Transponder-functionality in case of a flat battery or a disturbed communication.

Antennas

- Emitting LF Antennas : Inductive antennas in and at the vehicle are used to transform the current, driven by the SMK ECU antenna driver, into a 125 (or 134.2) kHz magnetic field, which is the carrier for the SMART KEY challenge. Three antennas cover the vehicle's exterior: two antennas in the Door Handles (DS and PS) cover the area around the doors; one antenna in the rear bumper covers the area around the trunk or tailgate . Up to three antennas cover the vehicle's interior and the trunk or tailgate interior: two in the passenger compartment and one in the tailgate room or trunk.
- Bidirectional Immobilizer Antenna (for Limp Home) : The Immobilizer Backup Antenna is used for sending and receiving data: it emits a magnetic field (125 - 135 kHz challenge) and receives changes in the field strength (response of Transponder).
- Receiver The SMART KEY FOB's response is received via the RF receiver.

Door Handle

Push Button

- Operation

Passive Functions

Operating Range

Passive Access (Passive Entry)

Passive Locking (Exit)

- At least one door is unlocked and two_steps timer is not running or
- Two_steps timer is running and one of the push button except Front Left side is triggered

Passive Trunk Warning (Sedan Only)

A blind spot in the trunk similar to any RF disturbance may lead to no trunk warning. Due to the penetration of the bumper antenna into the trunk area the lid may open without an Identification Device outside. A blind spot in the trunk similar to any RF disturbance may lead to no trunk warning

- A blind spot in the trunk similar to any RF disturbance may lead to no trunk warning. Due to the penetration of the bumper antenna into the trunk area the lid may open without an Identification Device outside.
- A blind spot in the trunk similar to any RF disturbance may lead to no trunk warning

Smart Trunk

Function is set through the User Setting Mode (USM) in the Cluster.

- Rear bumper antenna detects valid Smart Key in the vicinity.
- When a valid Smart Key enters the rear bumper antenna range, alert buzzer and hazard lamp is activated 1 time to acknowledge detection. Smart Key Unit can detect a Smart Key within 0.7-1 m of the rear bumper. If the Smart Key stays inside the detection range, alert buzzer and hazard lamp is activated 1 time every second throughout the duration of the Smart Key remaining in the detection range.

Smart Key Unit can detect a Smart Key within 0.7-1 m of the rear bumper. If the Smart Key stays inside the detection range, alert buzzer and hazard lamp is activated 1 time every second throughout the duration of the Smart Key remaining in the detection range.

- Smart Key Unit can detect a Smart Key within 0.7-1 m of the rear bumper.

- If the Smart Key stays inside the detection range, alert buzzer and hazard lamp is activated 1 time every second throughout the duration of the Smart Key remaining in the detection range.
- If the Smart Key remains in the rear bumper detection range (antenna range) for over 3 seconds, alert buzzer and hazard lamp is activated 2 times and the trunk is opened.

Smart Key Reminder 1

- Preconditions : All terminals OFF & at least one door open & locking status is not locked checked by SMK periodically every 100ms, as long as CAN/LIN active.
- Event: At least 1 door knob status changed from unlock to lock.
- SMK actions : IF NO FOB-IN ACTIVE SMK performs a search for the fobs in the interior of the vehicle. The same LF-strategy has to be used as it is defined for the ID out warning (registering only, no authentication IF FOB-IN ACTIVE SMK search valid TP If no fob or no TP has been found, no action is required. If any valid fob or valid TP has been found, SMK unlocks the vehicle by sending a CAN Key Reminder unlock message with the fob number. If any valid fob has been found, SMK unlocks the vehicle by sending a CAN/LIN Key Reminder unlock message with the fob number.
- IF NO FOB-IN ACTIVE SMK performs a search for the fobs in the interior of the vehicle. The same LF-strategy has to be used as it is defined for the ID out warning (registering only, no authentication
- IF FOB-IN ACTIVE SMK search valid TP

Smart Key Reminder 2

- Preconditions : All terminals OFF & any door (including trunk) open & no FOB-IN & no locking status (checked by SMK periodically every 100ms, as long as CAN/LIN active)
- Vehicle action : Closing last door or trunk with knobs locked state, or with a locking in progress
- SMK actions : Before elapsing 500ms after the closing if all doors are locked then: IF NO FOB-IN ACTIVE SMK performs a search for the fobs in the interior of the vehicle. The same LF-strategy has to be used as it is defined for the ID out warning (registering only, no authentication) IF FOB-IN ACTIVE SMK search valid TP If no fob has been found, no action is required. If any valid fob or valid TP has been found, SMK sends unlock command via CAN and activates ext. buzzer warning. If any valid fob has been found, SMK sends unlock command via CAN/LIN and activates ext. buzzer warning.
- IF NO FOB-IN ACTIVE SMK performs a search for the fobs in the interior of the vehicle. The same LF-strategy has to be used as it is defined for the ID out warning (registering only, no authentication)

Smart Key Door Lock Warning

Door Lock Warning 1

- If terminal state is ACC or IGN and all doors are closed and that user triggers a SMK lock, a search is started at the exterior of the vehicle from the side of the trigger.
- If no valid Fob is found no action is required, but if a valid Fob is found then a Buzzer warning shall be started.
- If "b_Trunk Option == On" and "b_Trunk LockUnlockOption == On" are fullfilled, Lock warning is including tailgate as a door and tailgate lockunlock knob as a door unlock switch .

Door Lock Warning 2

- If terminal state is OFF and not all doors are closed and that user triggers a SMK lock, a search is started at the exterior of the vehicle from the side of the trigger.

Door Lock Warning 3

- If terminal state is OFF and ATWS is considered as Disarmed and all doors are closed and that user triggers a SMK lock, a search is started at the Interior of the vehicle;
- if no valid Fob is found the search for SMK locking will be started, but if a valid Fob is found then a Buzzer warning shall be started.
- If "b_Trunk Option == On" and "b_Trunk LockUnlockOption == On" are fullfilled, Lock warning is including tailgate as a door and tailgate lockunlock knob as a door unlock switch.

Smartkey Lamp Warning

- If terminal state is ACC or IGN and vehicle speed is less than 3km/h, a periodic search (every 3s) is done at the interior of the vehicle to check that the valid fob is still in the in the vehicle.
- If no valid Fob is found a Warning is started, but if a valid Fob is found then no action is started.

Failsafe Functions (Backup For Limp Home)

- Unlocking / locking of doors or trunk (or tailgate depending of the vehicle configuration): use of mechanical key

User Information Functions

ID OUT Warning

- Preconditions : (ACC or IGN1) & (any door open or trunk open)
- (ACC or IGN1) & (any door open or trunk open)
- Event: The last opened door is closed
- SMK action: SMK searches for a SMART KEY FOB in the interior. If no valid SMART KEY FOB is found, the SMK

activates external buzzer and also sends ID OUT warning via CAN (exterior buzzer warning and internal buzzer warning). If a door is opened and closed again during terminals on and inside valid fob, SMK re-enables the authentication and stops the warning. If the terminal is in ACC, SMK shall turn on immobilizer lamp.
- If no valid SMART KEY FOB is found, the SMK activates external buzzer and also sends ID OUT warning via CAN (exterior buzzer warning and internal buzzer warning).
- If a door is opened and closed again during terminals on and inside valid fob, SMK re-enables the authentication and stops the warning. If the terminal is in ACC, SMK shall turn on immobilizer lamp.
If there is a LF error (LF overheating or LF antenna failure), the system will have the same behavior as it is with no fob found.
- If there is a LF error (LF overheating or LF antenna failure), the system will have the same behavior as it is with no fob found.

Fob Battery Low Voltage Detection
Learning Description
Learning MODE
Teaching MODE
Teaching MODE Procedure Description (Step By Step)
- SMK replacement: SMK is not learnt and SMART FOB are already learnt with same PIN code
- Additional or new keys teaching: SMK are already learnt with same PIN code

Smart key teaching

Push the smart key #1 to SSB
↓
SMK start to learn
↓
Input the PIN code
↓
Smart key #1 learnt
↓
SMK learnt
↓
Pull out smart key #1
↓
Push the smart key #2 to SSB
↓
Smart key #2 learnt

- Smart key and transponder are programmed simultaneously.

<Smart key neutralization mode>

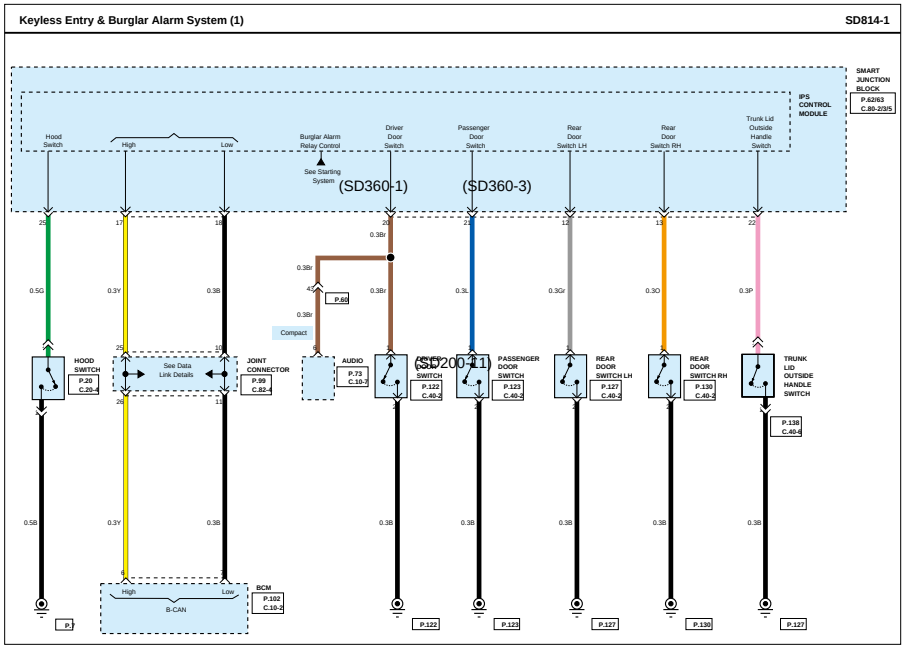
- Neutralization mode is for replacing Smart key unit, ECM easily.
- It is possible that smart key is learnt again, after neutralizing Smart key system.
- Virgin start (twice ignition) is impossible in neutralized condition

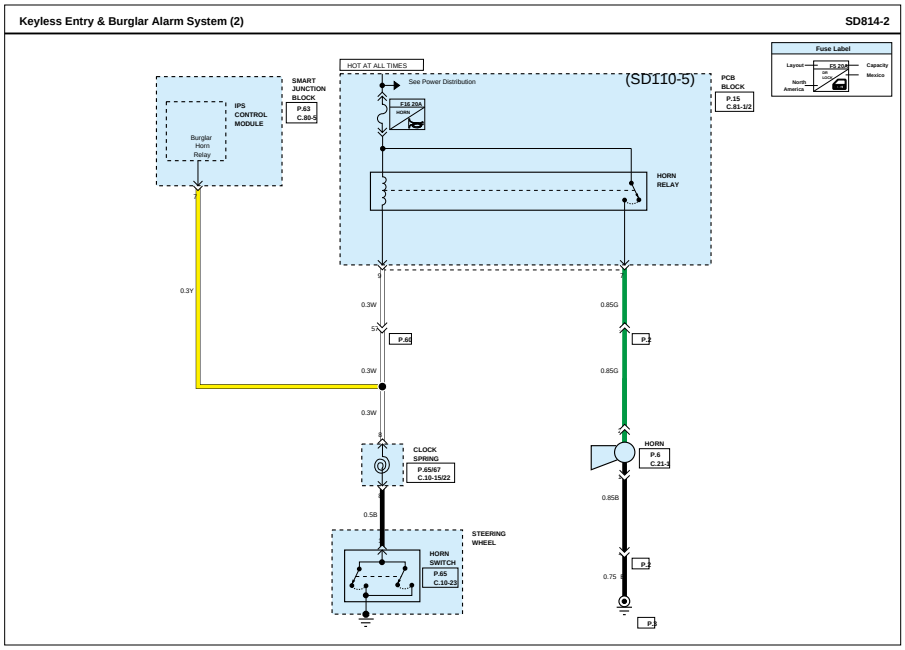
<Lock by timer>

- If PIN code is inputted over 3 times, it is impossible to learnt and neutralization during 1 hour.

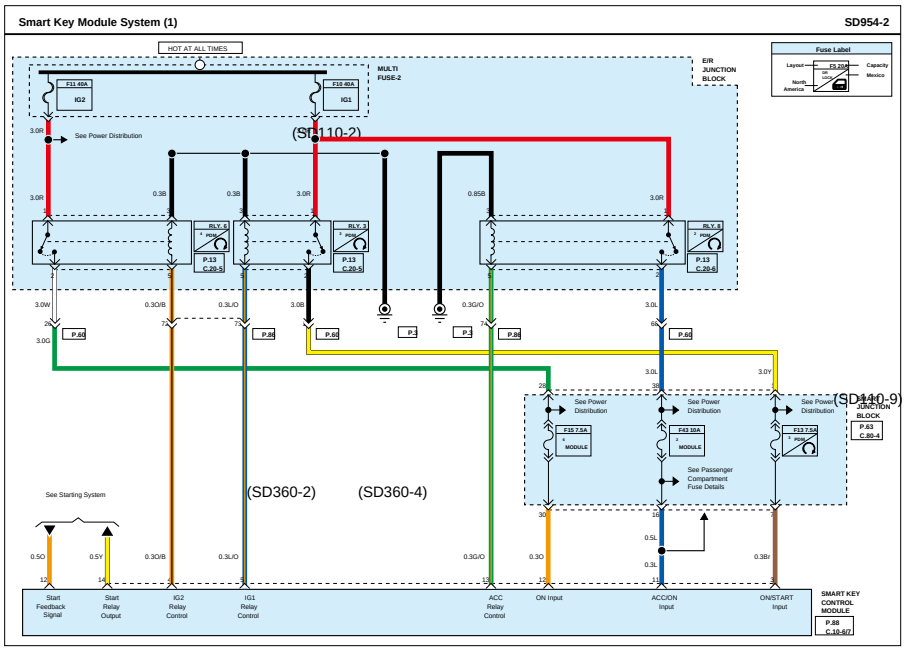
Starting After Replacing (Virgin Start)
- It is for starting at virgin condition
- All related parts are virgin condition (Smart key, ECM)
- Press brake pedal in P or N range
- Push the start button once with virgin smart key.

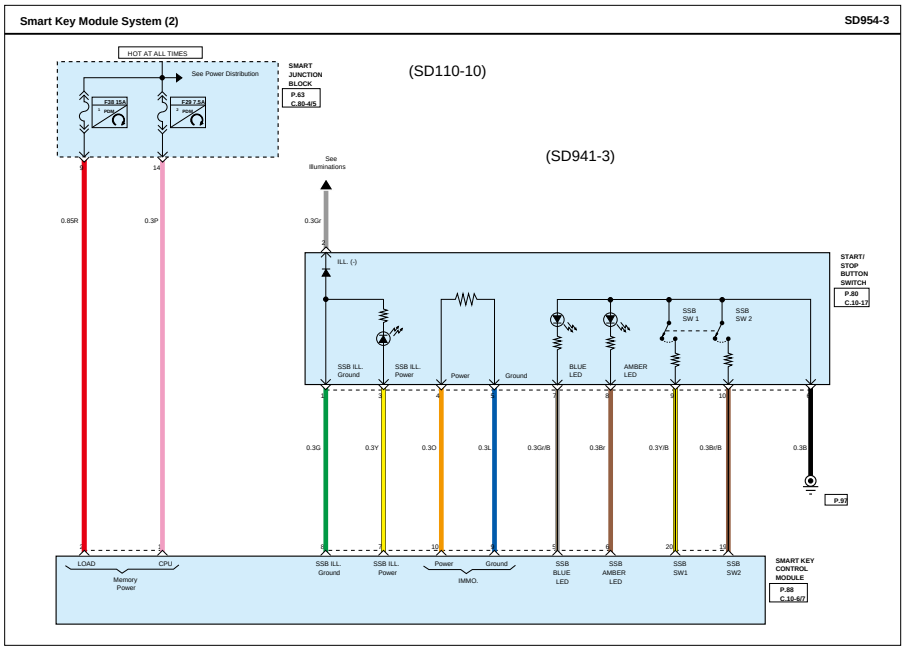
Keyless Entry & Burglar Alarm System - Schematic Diagrams (Article 42520)

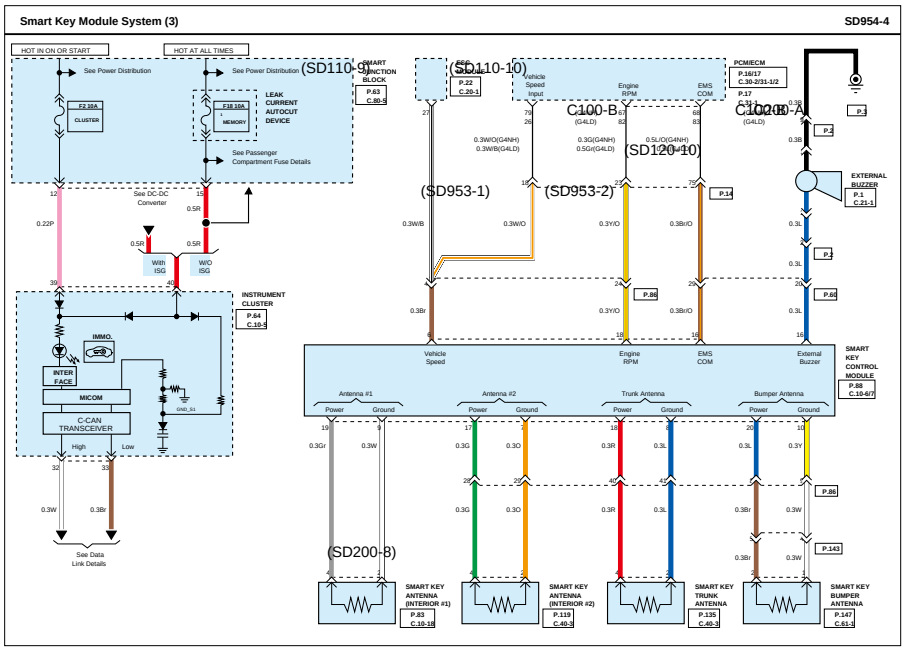


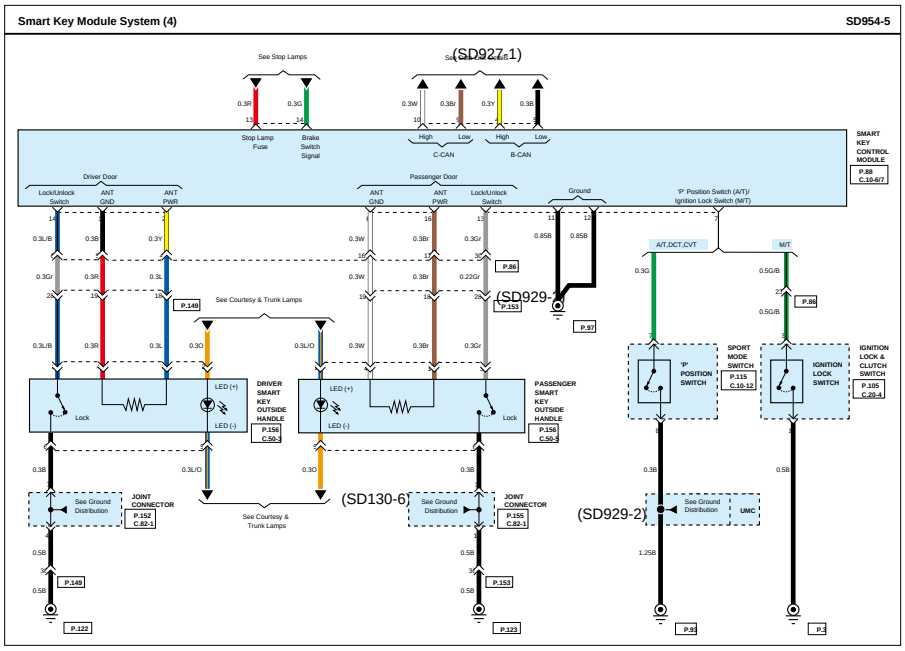


Smart Key Module System - Schematic Diagrams (Article 42549)


Smart Key Module System (1)
SD954-2
HOT AT ALL TIMES
MULTI FUSE-2
E/R JUNCTION BLOCK
Fuse Label
F11 40A
IG2
F10 40A
IG1
See Power Distribution
(SD110-2)
RLY 6
RLY 5
P.13 C.20-5
P.13 C.20-6
P.60
P.86
P.3
(SD110-9)
(SD110-9)
(SD110-9)
See Power Distribution
F15 7.5A
MODULE
F43 10A
F13 7.5A
See Passenger Compartment Fuse Details
J/B JUNCTION BLOCK
P.63 C.80-4
(SD120-1)
See Starting System
(SD360-2)
(SD360-4)
Start Feedback Signal
Start Relay Output
IG2 Relay Control
IG1 Relay Control
ACC Relay Control
ON Input
ACC/ON Input
ON/START Input
SMART KEY CONTROL MODULE
P.88 C.10-6/7


Smart Key Module System (2)
SD954-3
HOT AT ALL TIMES
See Power Distribution
SMART JUNCTION BLOCK
P.63 C.80-4/5
(SD110-10)
(SD941-3)
See Illuminations
ILL. (-)
START/ STOP BUTTON SWITCH
P.80 C.10-17
SSB SW 1
SSB SW 2
SSB ILL. Ground
SSB ILL. Power
Power
Ground
BLUE LED
AMBER LED
P.97
LOAD
CPU
Memory Power
IMMO.
SMART KEY CONTROL MODULE
P.88 C.10-6/7

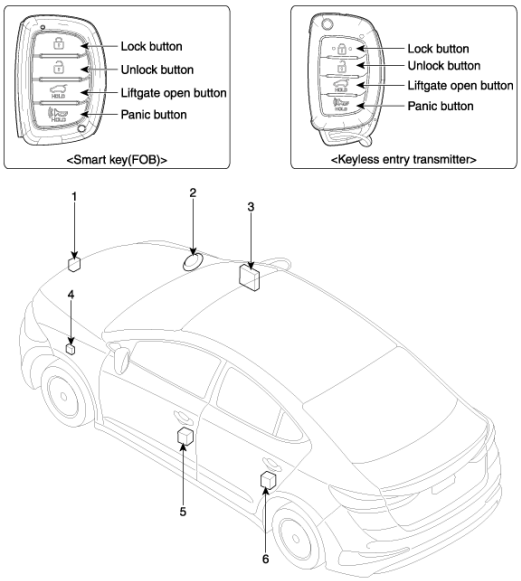




(SD130-2)

Keyless Entry and Burglar Alarm - Components and Components Location (Article 44798)

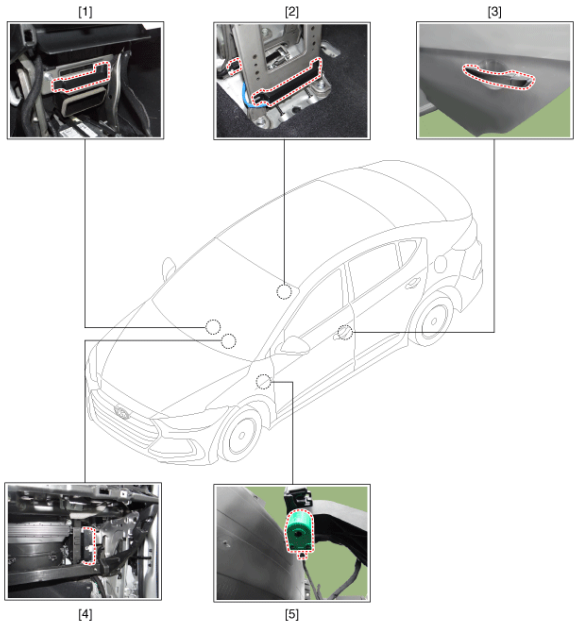
- Component Location



1. Hood switch 2. Burglar horn 3. BCM 4. Door lock / unlock buzzer 5. Front door switch 6. Rear door switch

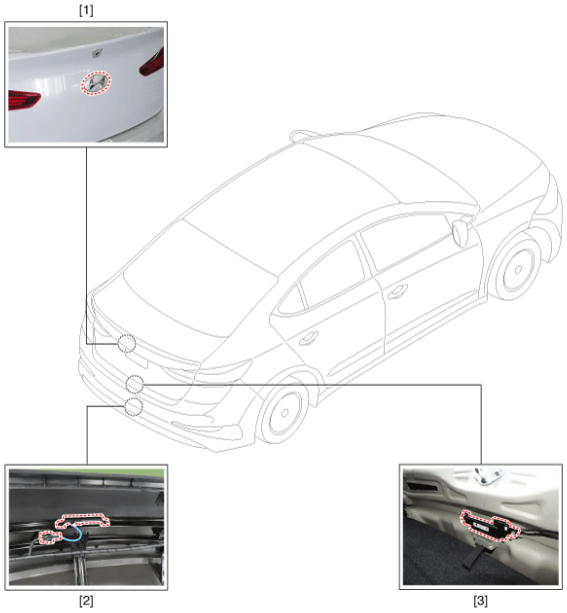
Smart Key System - Components and Components Location (Article 44772)

- Component Location (1)



1. Interior antenna 1 2. Interior antenna 2 3. Door outside handle 4. Smart key unit (SMK) 5. Buzzer

- Component Location (2)

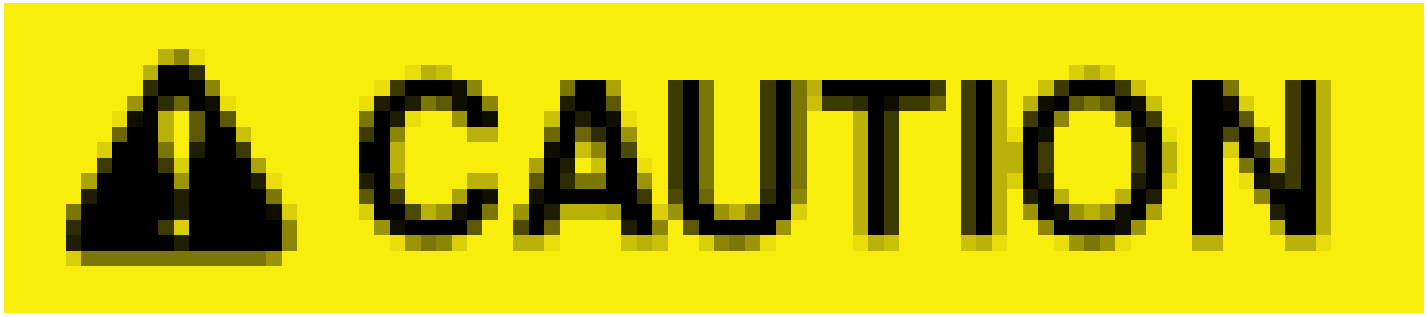


1. Trunk open switch 2. Bumper antenna 3. Trunk atenna

Keyless Entry and Burglar Alarm - Repair Procedures (Article 44802)

- Inspection

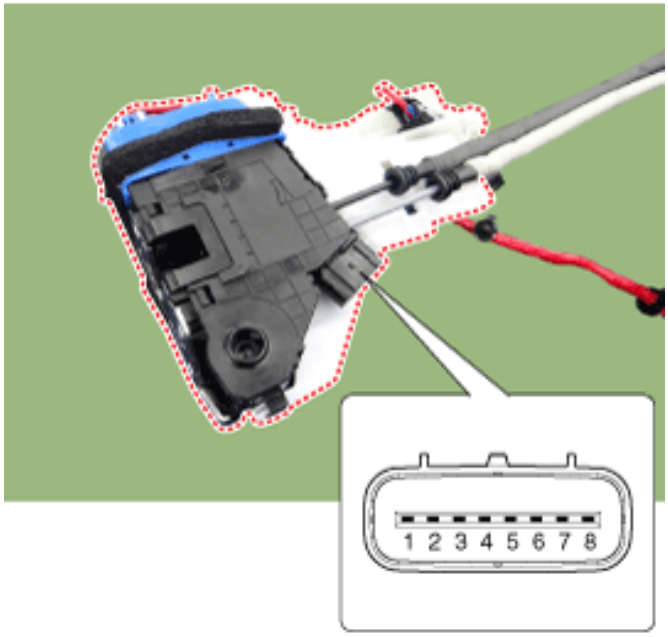
Wrap the protective tape on the tool to disassemble with the screwdriver or remover. Use caution in keeping and handling during disassembling/assembling because it is easily contaminated with lubricant and oil.



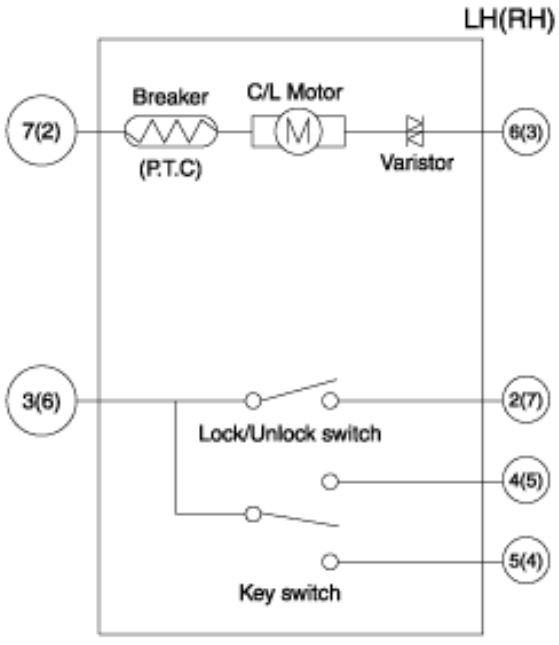
- Wrap the protective tape on the tool to disassemble with the screwdriver or remover.
- Use caution in keeping and handling during disassembling/assembling because it is easily contaminated with lubricant and oil.

Front Door Lock Module Inspection

- Remove the front door trim .
- Remove the front door module . (Refer to Body - "Front Door Module")
- Disconnect the connector from the actuator. No Pin Information LH RH 1 - - 2 Lock / Unlock switch Motor 2 3 COM Motor 3 4 Key Lock switch Key Unlock switch 5 Key Unlock switch Key Lock switch 6 Motor 3 COM 7 Motor 2 Lock / Unlock switch 8 - -



No Pin Information
LH RH
1 - -
2 Lock / Unlock switch Motor 2
3 COM Motor 3
4 Key Lock switch Key Unlock switch
5 Key Unlock switch Key Lock switch
6 Motor 3 COM
7 Motor 2 Lock / Unlock switch
8 - -
- Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

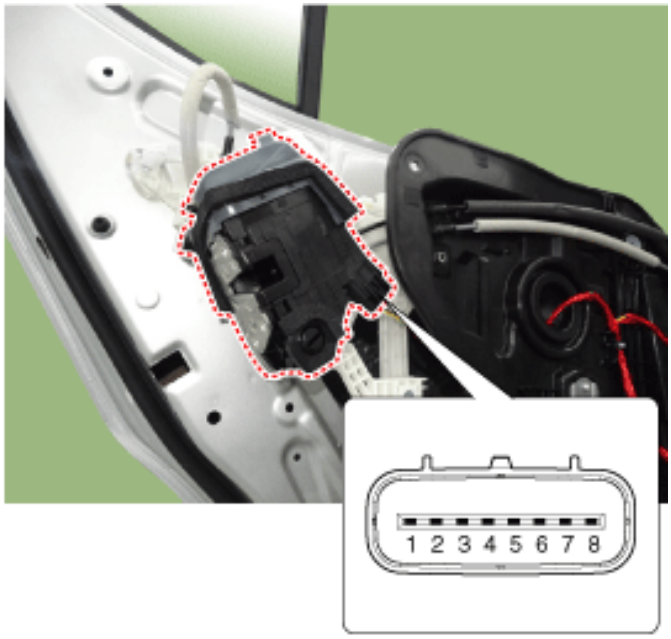


LH(RH)

Operation / Terminal	Central Lock	Central Unlock
7(2)	-	+
6(3)	+	-
3(6) & 2(7)	ON → OFF	OFF → ON

Rear Door Lock Module Inspection

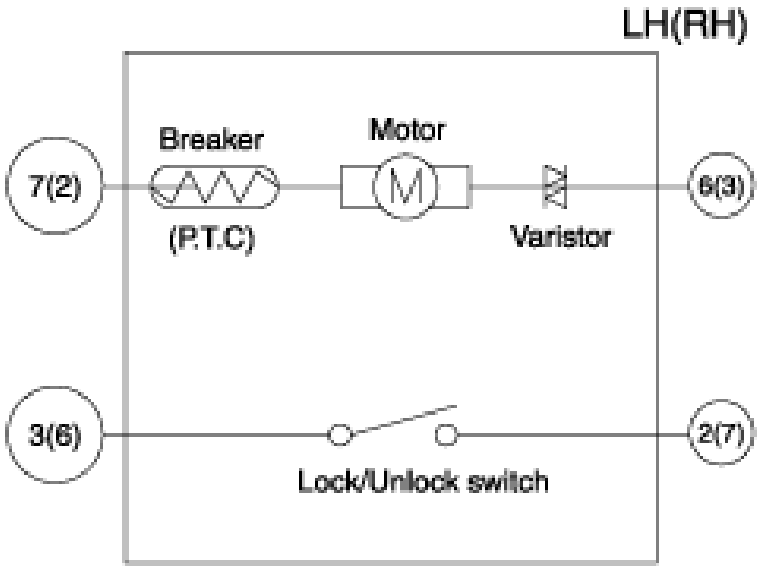
- Remove the rear door trim.
- Remove the rear door module. (Refer to Body - "Rear Door Module")
- Disconnect the connectors from the actuator. No Pin information LH RH 1 - - 2 Lock / Unlock switch Motor 2 3 COM Motor 3 4 - - 5 - - 6 Motor 3 COM 7 Motor 2 Lock / Unlock switch 8 - -



No Pin information

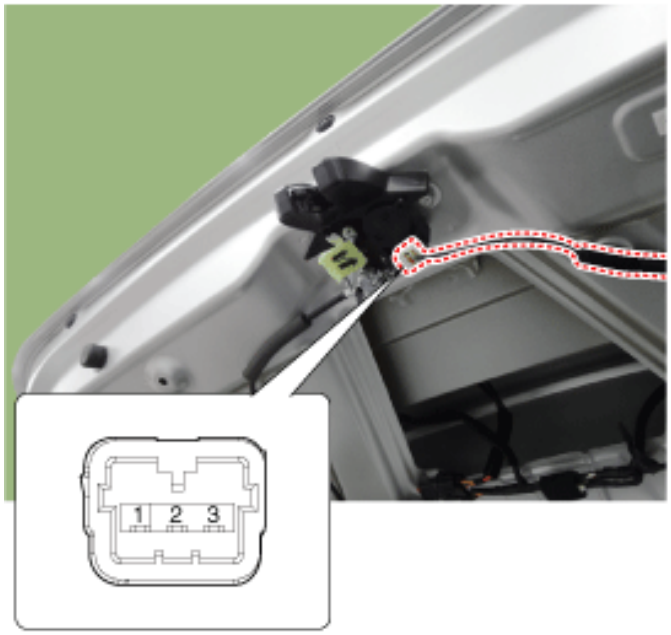
4 - -

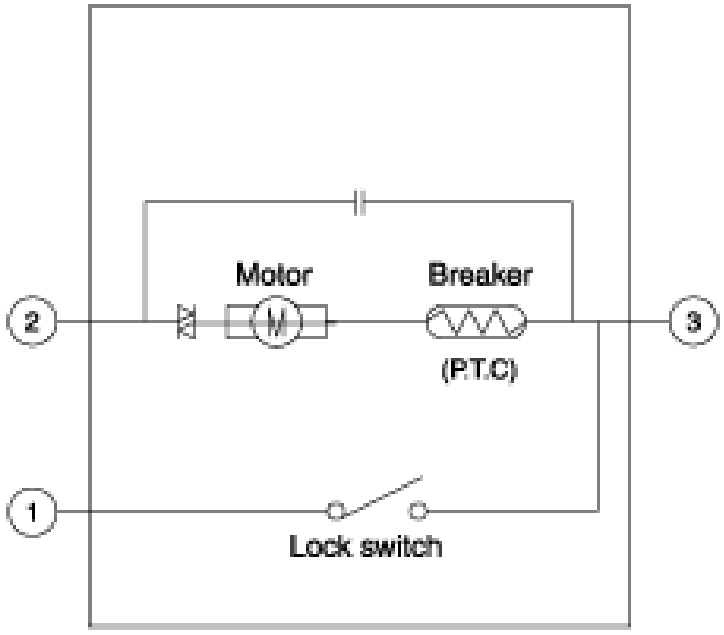
5 - -



Tailgate Lock Module Inspection

- Remove the trunk lid trim.
- Disconnect the connector from the actuator



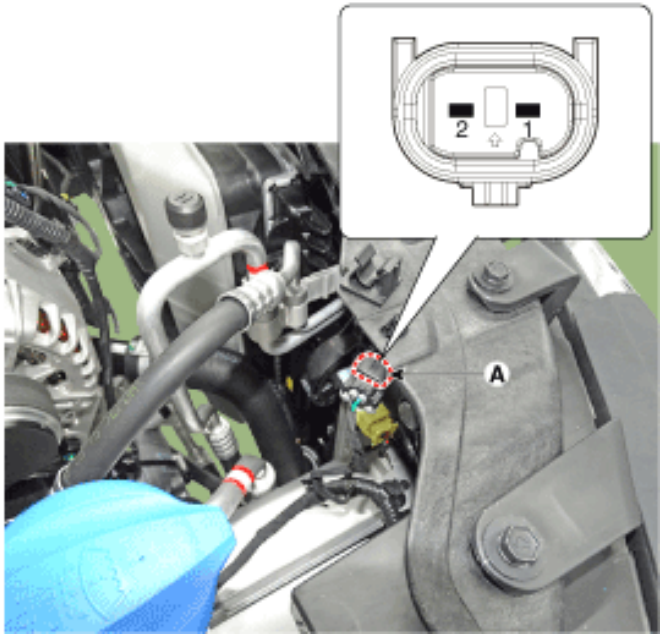


Terminal / Position	2	3
Unlock	⊕	⊖
Lock	-	-

- Checking the trunk of the vehicle power option power refers to the trunk module.

Hood Switch

- Disconnect the connector (A).

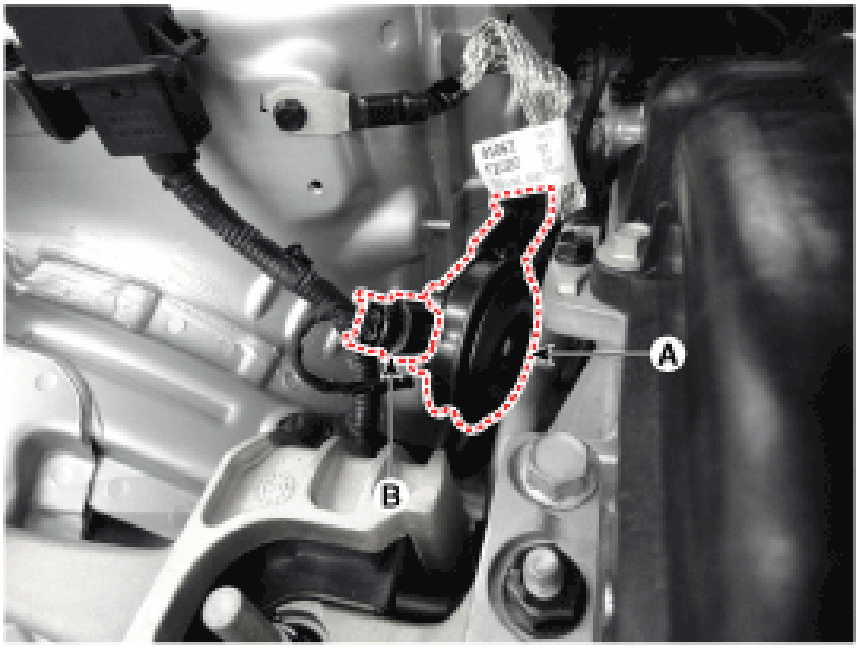


- Check for continuity between the terminals and ground according to the table (Refer to Body - "Hood Latch")

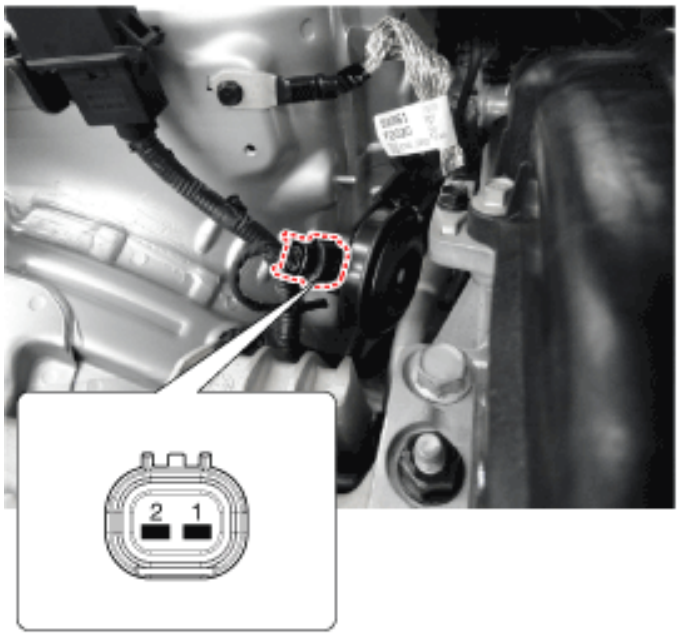
Terminal / Position	1	2
Open hood(Free)	○	○
Close hood(Push)		

Burglar Horn Inspection

- Remove the burglar horn (A) after loosening the mounting bolts and disconnecting the connector (B).



- Test the burglar horn by connecting battery power to the terminal 2 and ground the terminal 1.



Smart Key Diagnostic - Repair Procedures (Article 44793)

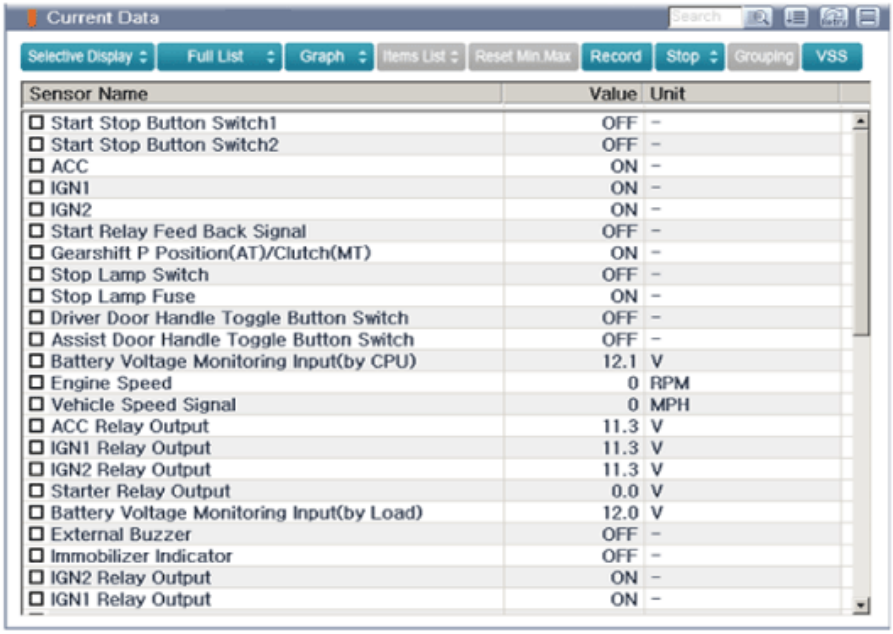
- Inspection

Self Diagnosis with Scan Tool

- Problem in SMART KEY unit input.
- Problem in SMART KEY unit.
- Problem in SMART KEY unit output.
- SMART KEY unit Input problem : switch diagnosis
- SMART KEY unit problem : communication diagnosis
- SMART KEY unit Output problem : antenna and switch output diagnosis

Switch Diagnosis

- Connect the cable of GDS to the data link connector in driver side crash pad lower panel, turn the power on GDS.
- Select the vehicle model and then SMART KEY system.
- Select the "SMART KEY Unit".
- After IG ON, select the "Current Data".



- You can see the situation of each switch on scanner after connecting the "current data" process. Display Description FL Toggle SW ON : Push button is ON in the driver door handle. FR Toggle SW ON : Push button is ON

in the assist door handle. Tailgate open SW ON : Tailgate button is ON. Gear P Position ON : Shift lever is P position. IGN 1 ON : IGN switch is IG position. ACC ON : IGN switch is ACC position. Brake SW ON : Brake switch is ON.

Display Description

FL Toggle SW ON : Push button is ON in the driver door handle.

FR Toggle SW ON : Push button is ON in the assist door handle.

Tailgate open SW ON : Tailgate button is ON.

Gear P Position ON : Shift lever is P position.

IGN 1 ON : IGN switch is IG position.

ACC ON : IGN switch is ACC position.

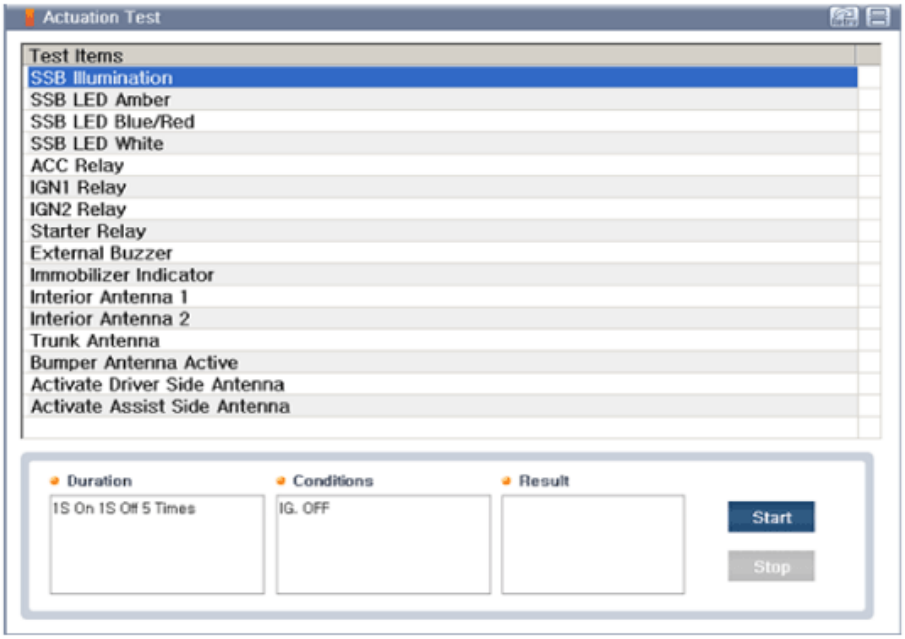
Brake SW ON : Brake switch is ON.

Communication Diagnosis with GDS (Self Diagnosis)

- Communication diagnosis checks that the each linked components operates normal.
- Connect the cable of GDS to the data link connector in driver side crash pad lower panel.
- After IG ON, select the "DTC".

Antenna Actuation Diagnosis

- After IG ON, select the "Actation Test".

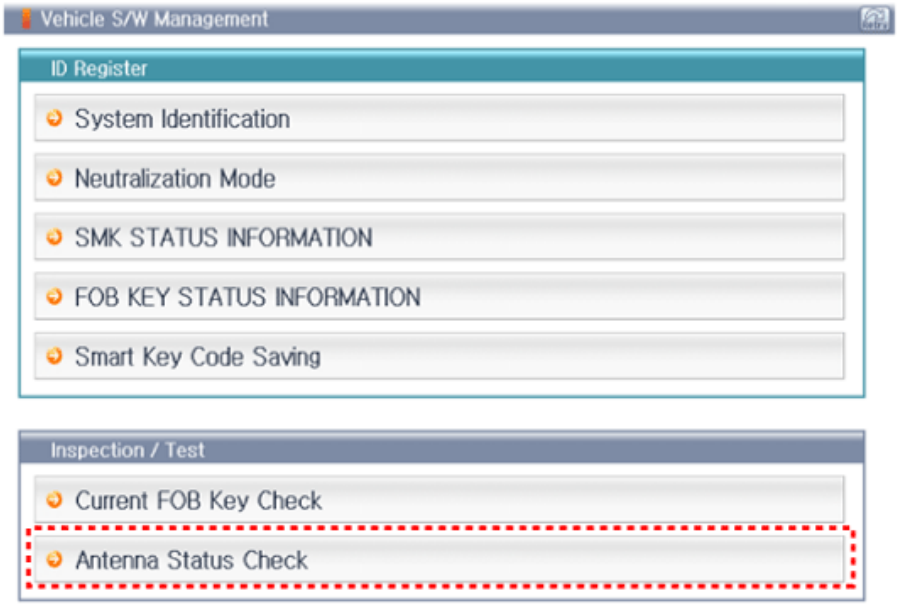


- Set the smart key near the related antenna and operate it with a GDS.
- If the LED of smart key is blinking, the smart key is normal.
- If the LED of smart key is not blinking, check the voltage of smart key battery.
- Antenna actuation INTERIOR Antenna 1 INTERIOR Antenna 2 Trunk antenna BUMPER / Trunk Antenna DRV_DR Antenna AST_DR Antenna

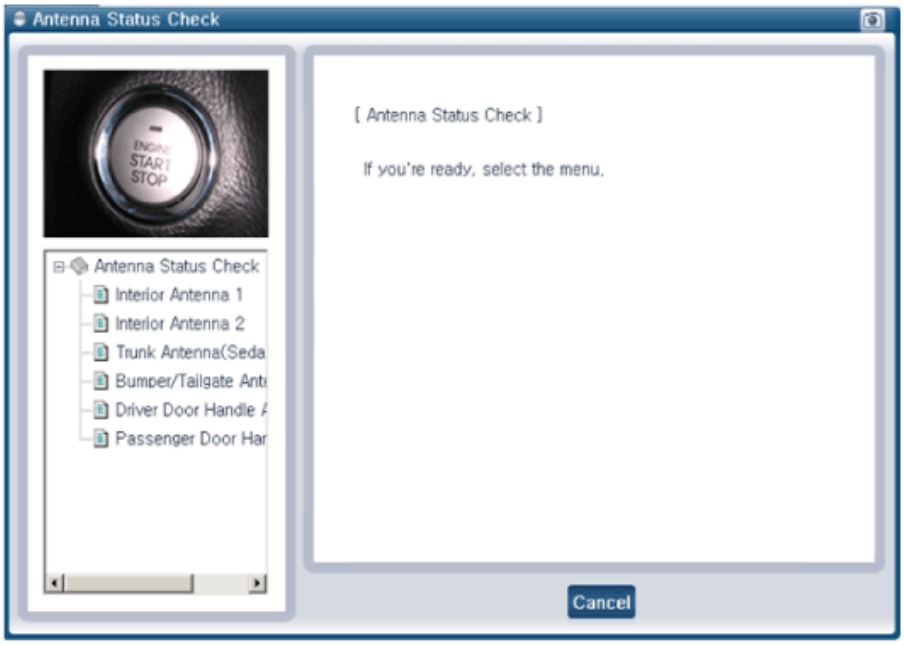
- INTERIOR Antenna 1
- INTERIOR Antenna 2
- Trunk antenna
- BUMPER / Trunk Antenna
- DRV_DR Antenna
- AST_DR Antenna

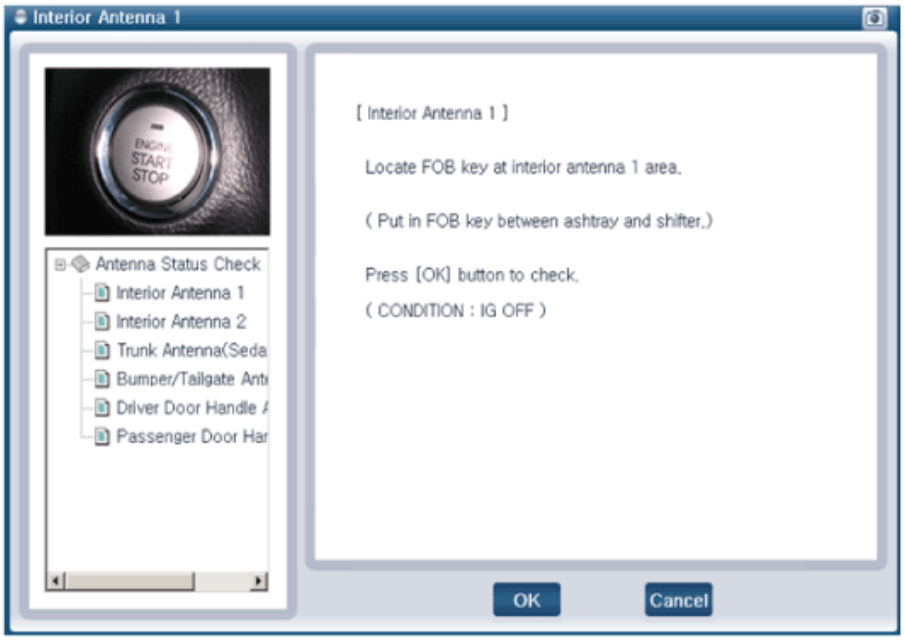
Antenna Status Check

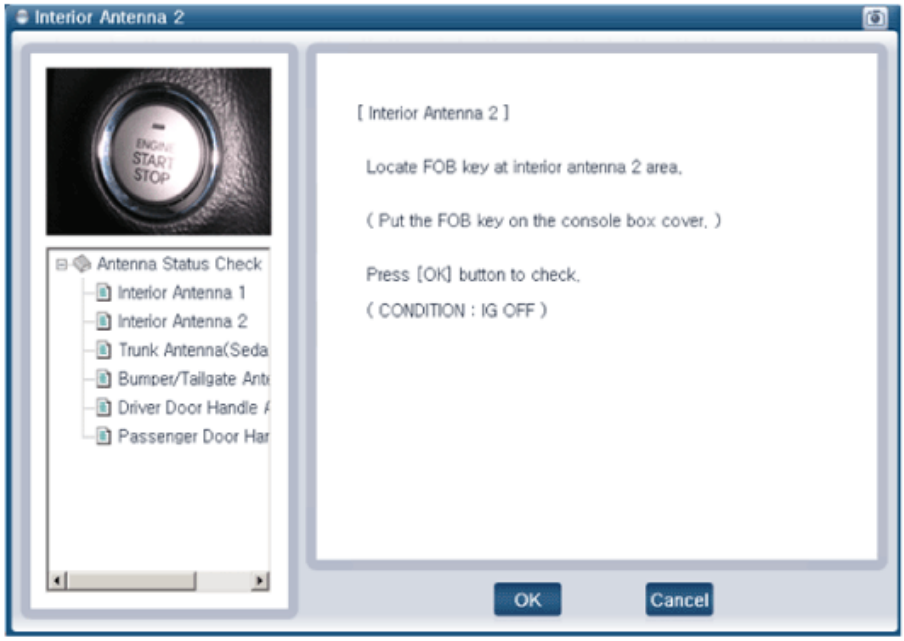
- Select the "Antenna Status Check".



- After IG ON, select the "Antenna Status Check".



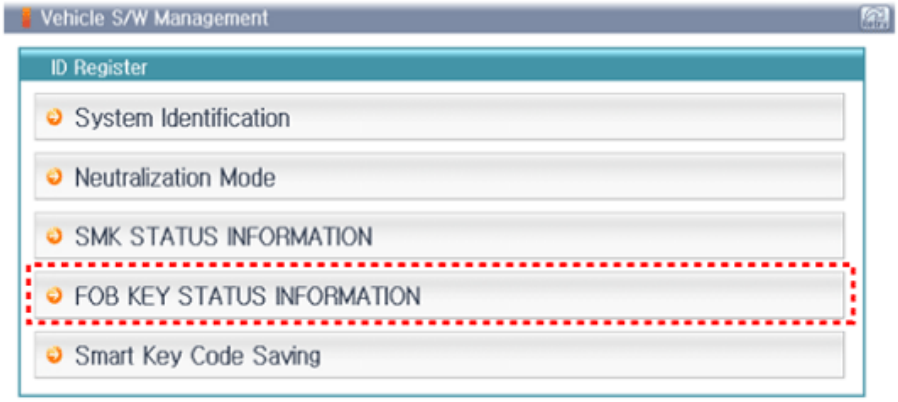


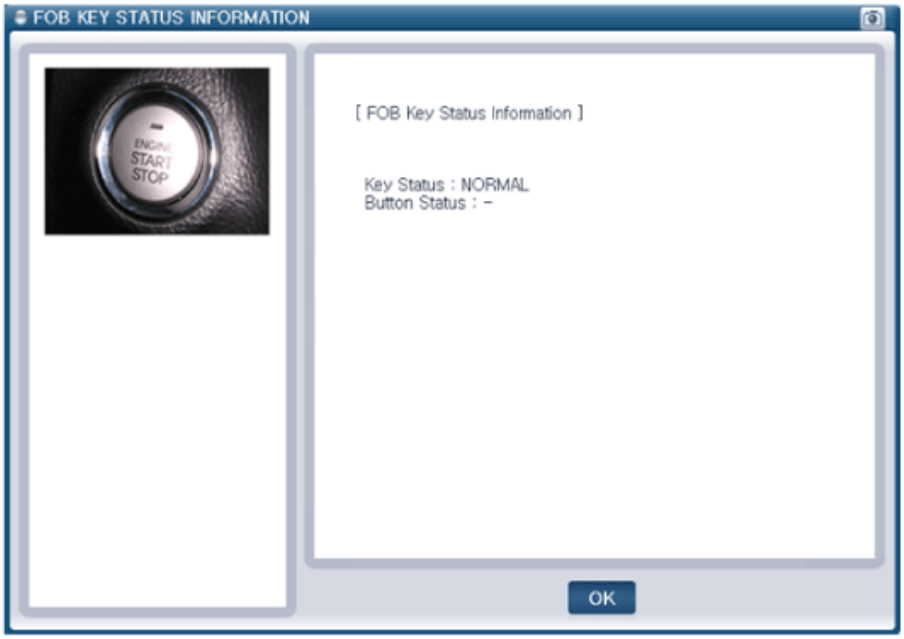


- If the smart key runs normal , the related antenna, smart key(transmission, reception) and exterior receiver are normal.
- Antenna status INTERIOR Antenna 1 INTERIOR Antenna 2 BUMPER/ Trunk Antenna DRV_DR Antenna AST_DR Antenna
- BUMPER/ Trunk Antenna

FOB Status Check

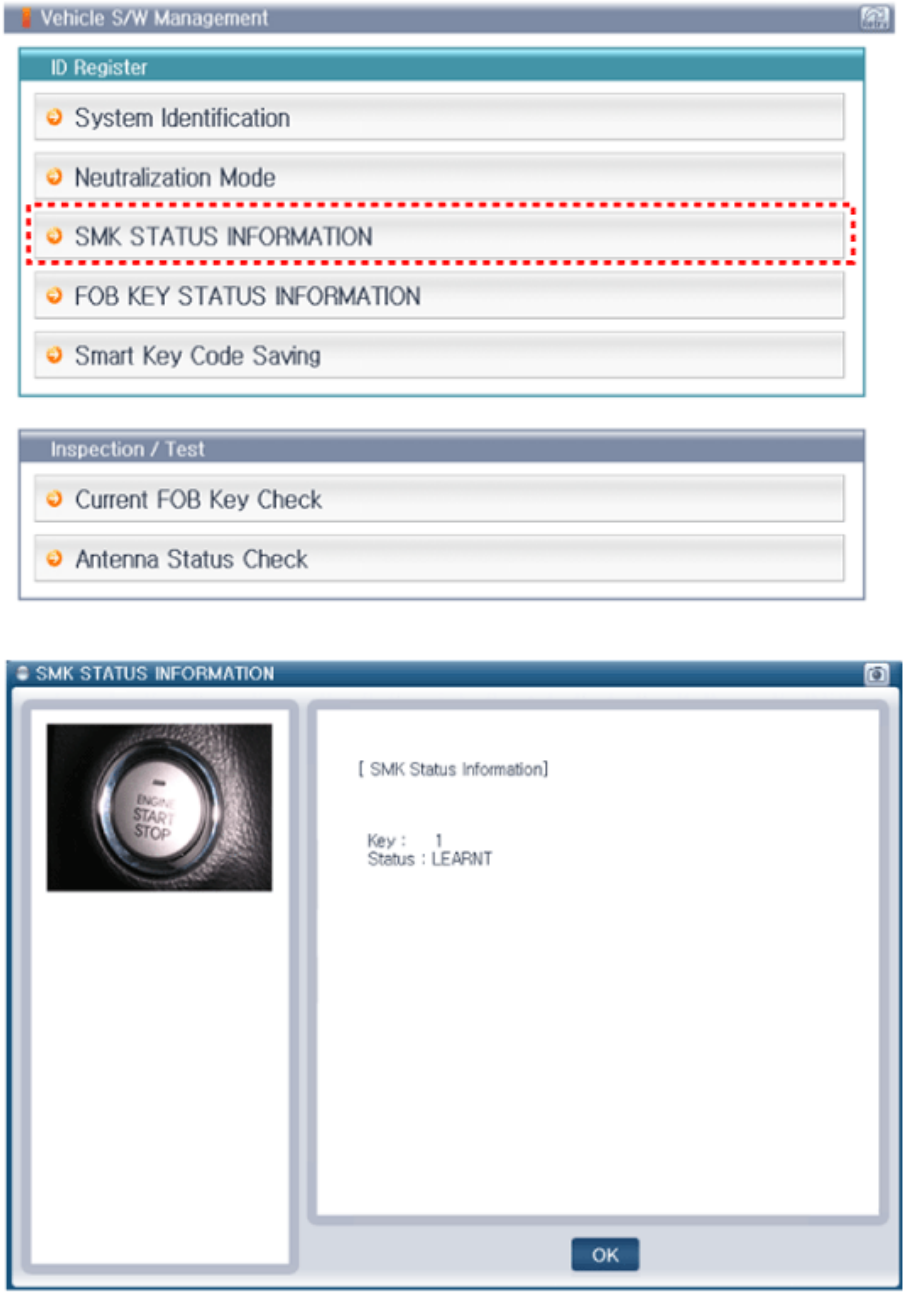
- After IG ON, select the "FOB KEY STATUS INFO".





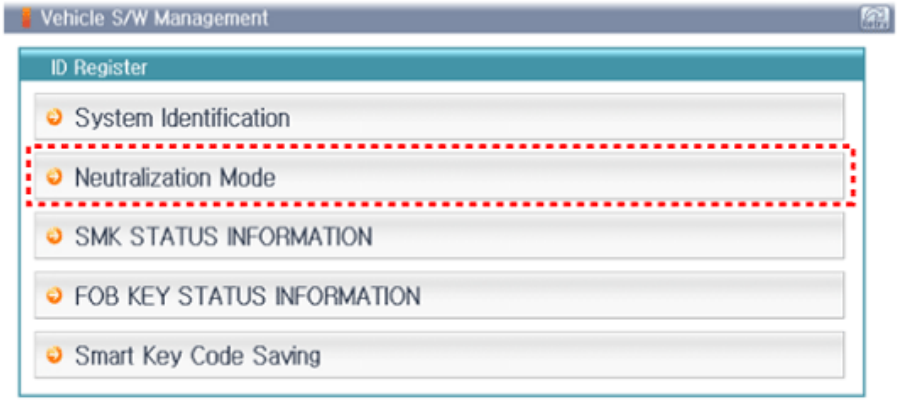
Smart Key Status Check

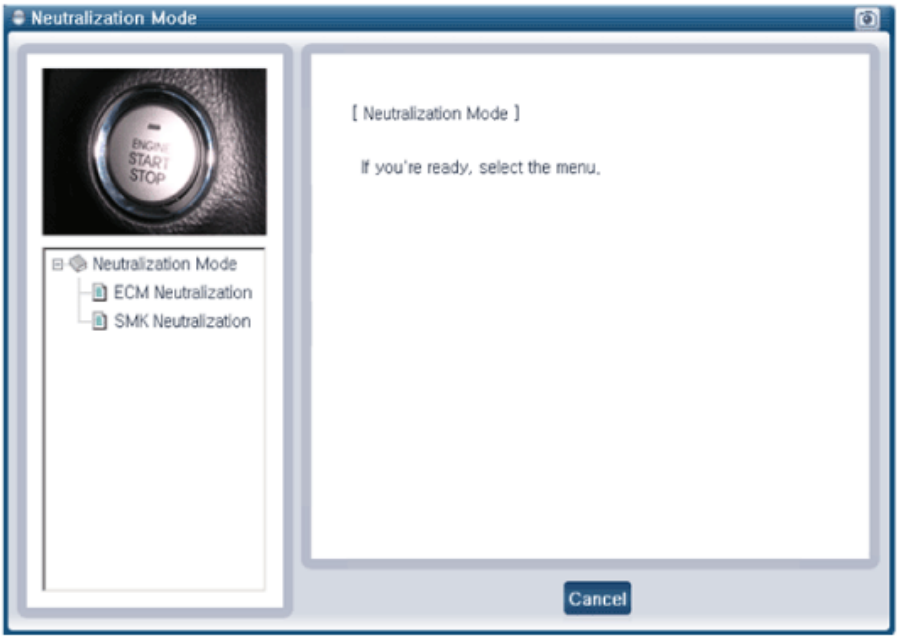
- After IG ON, select the "SMK STATUS INFO".

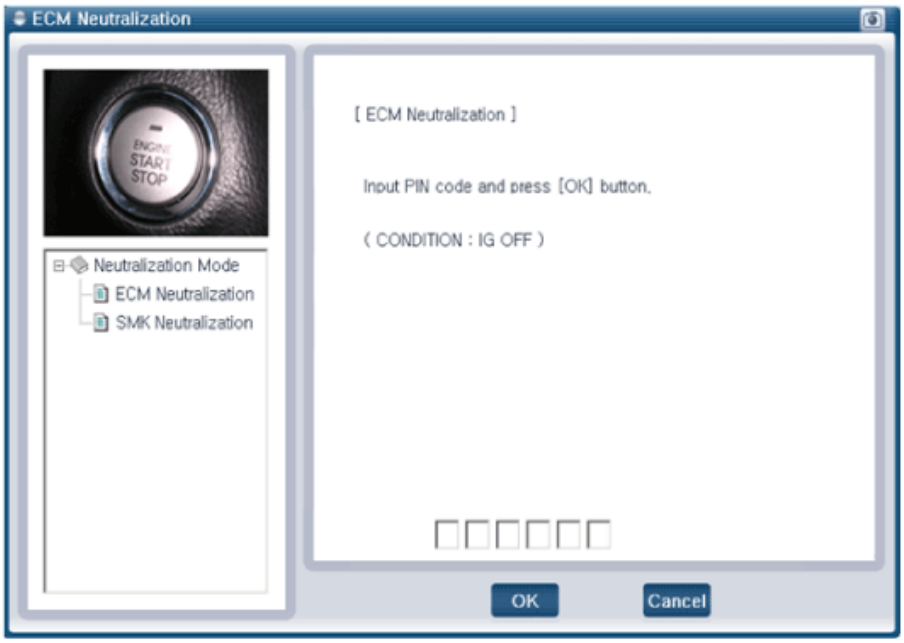


Neutralization Status Check

- After IG ON, select the "Neutralization mode".


Vehicle S/W Management
ID Register
System Identification
Neutralization Mode
SMK STATUS INFORMATION
FOB KEY STATUS INFORMATION
Smart Key Code Saving
Inspection / Test
Current FOB Key Check
Antenna Status Check


Neutralization Mode
ENGINE START STOP
Neutralization Mode
ECM Neutralization
SMK Neutralization
[Neutralization Mode]
If you're ready, select the menu.
Cancel



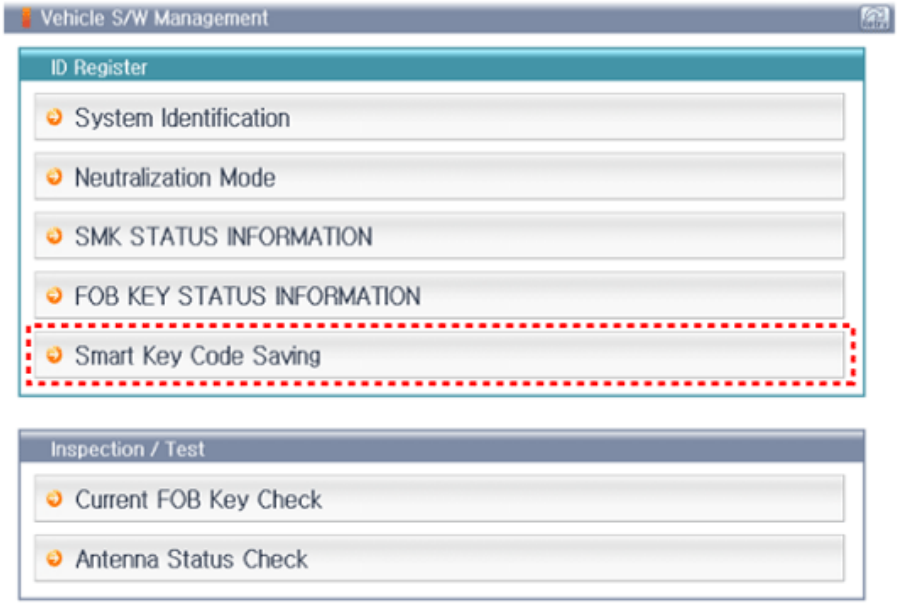
Smart Key System - Repair Procedures (Article 44778)

- Smart Key

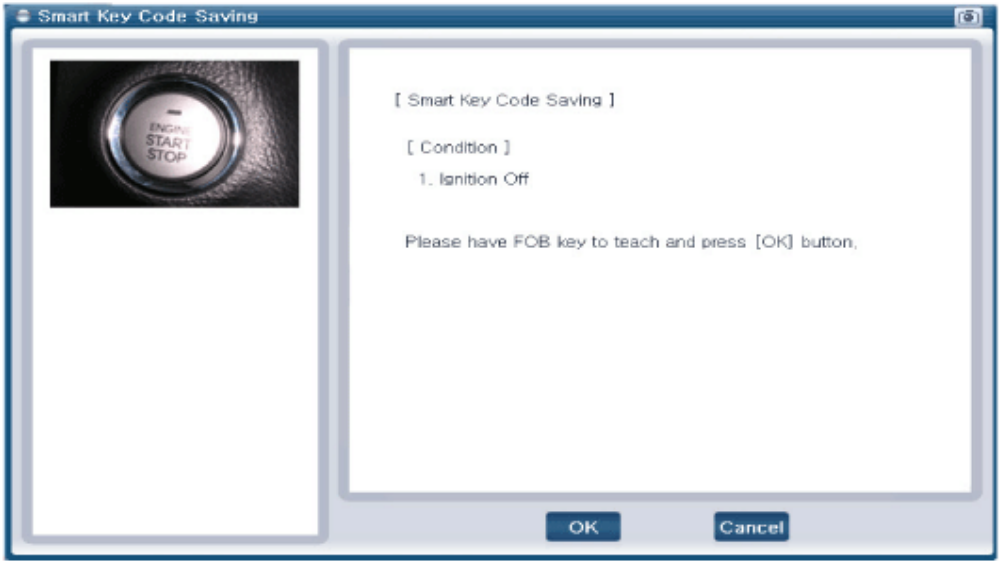
Smart Key Code Saving

- Connect the DLC cable of GDS to the data link connector (16 pins) in driver side crash pad lower panel, turn the power on GDS.

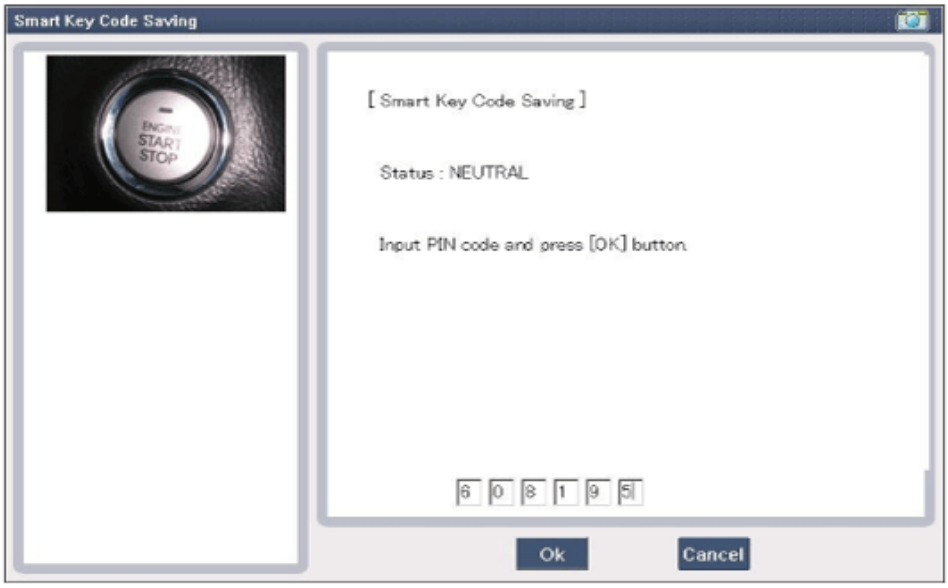
- Select the vehicle model and then do "Smart Key Code Saving".

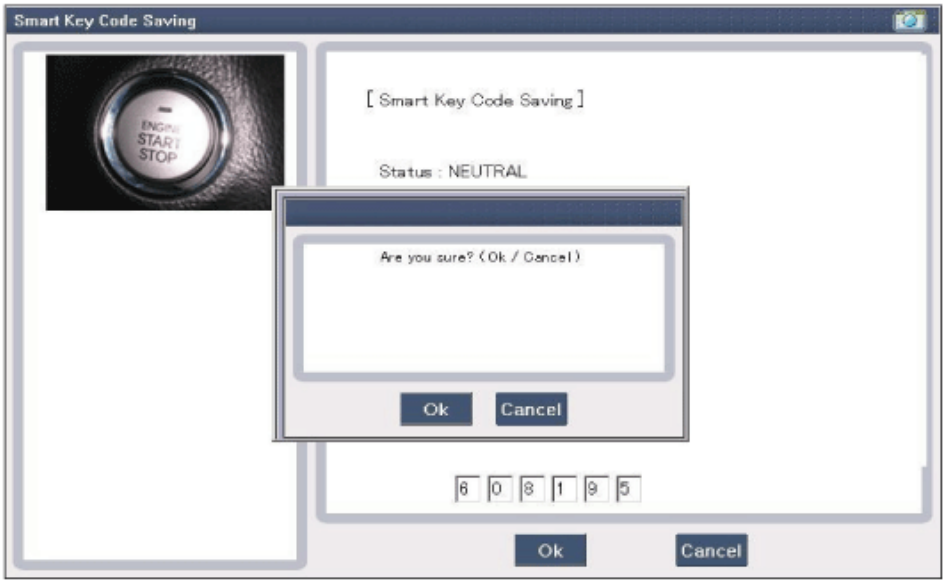


- After selecting "Smart Key Teaching" menu, push "Enter" key, then the screen will be shown as below.

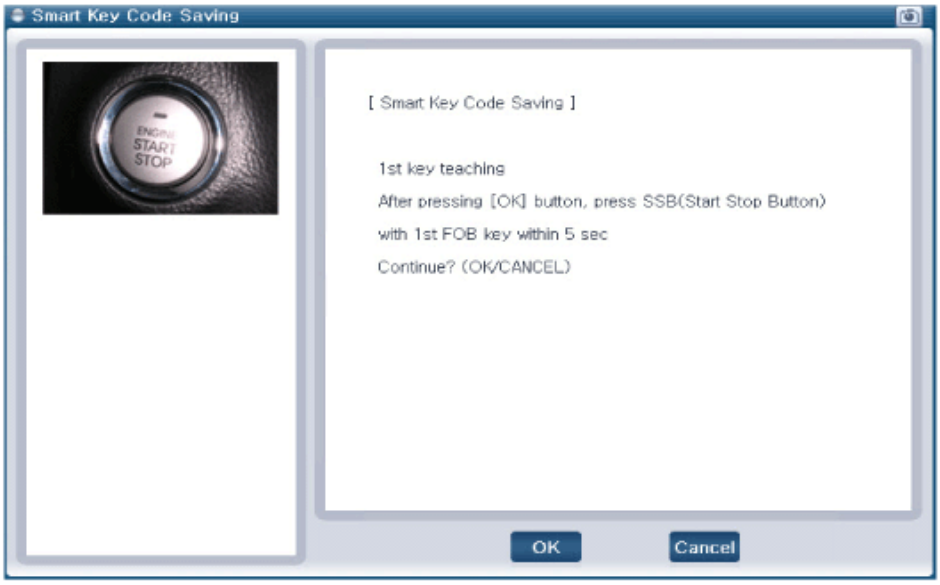


- After having the teaching smart key, push "Enter" key.
- Input the "Pin Code" for first key teaching.

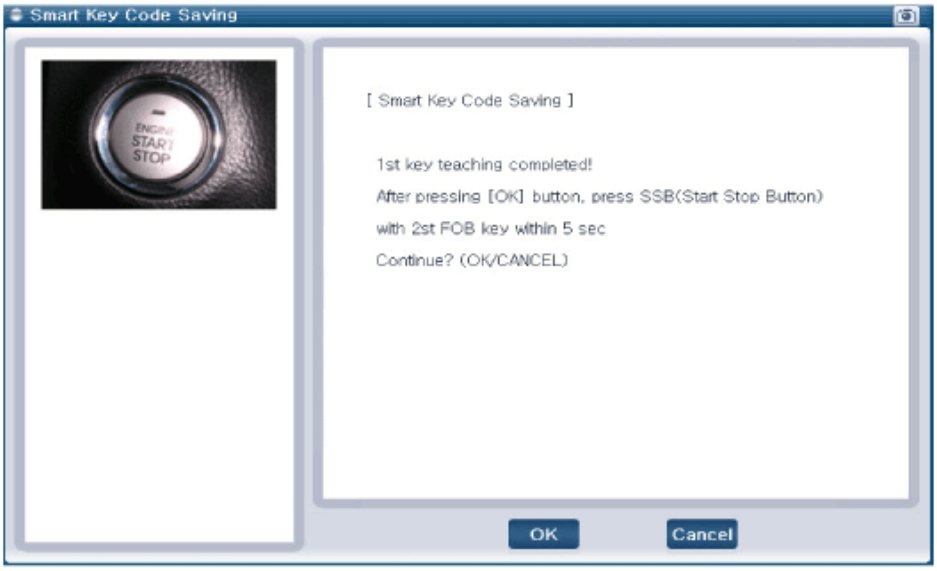




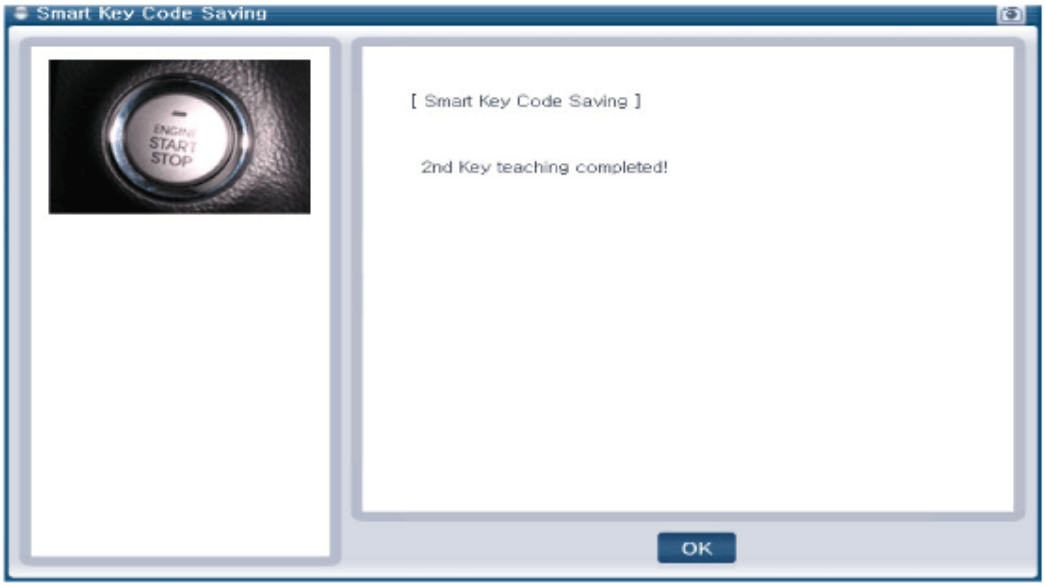
- Press the SSB with smart key within 5 sec after pressing "OK".



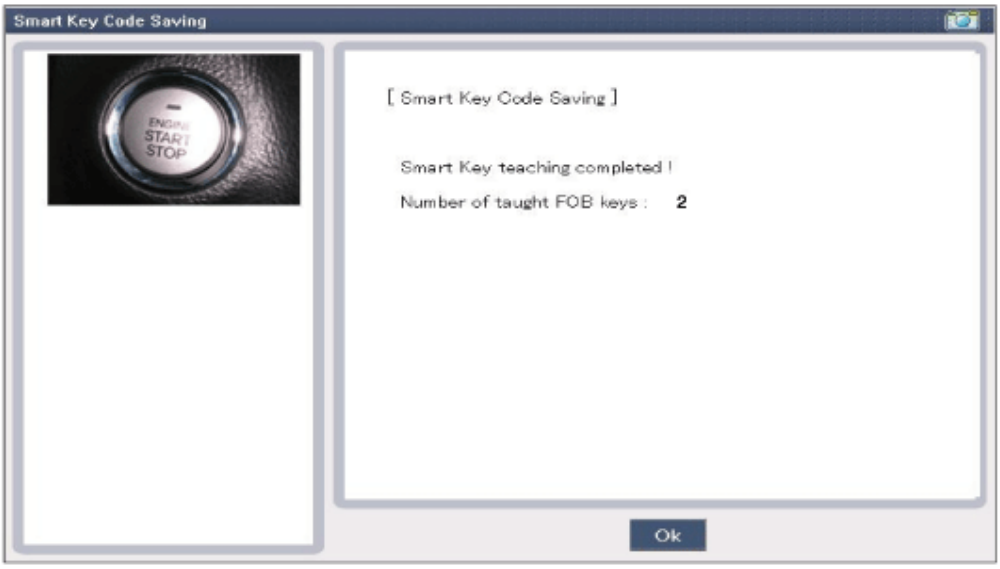
- Confirm the message "First key teaching completed".



- Confirm the message "Second key teaching completed".



- Then the screen will be shown as below when key teaching process is completed.



Keyless Entry and Burglar Alarm - Specifications (Article 44796)

- Specification

Item Specification
Power source 3V
Operating temperature -30°C to +75°C (-22°F to +167°F)
RF Modulation FSK
LF Modulation ASK
RF frequency 433.92 MHz
Button number 4
Function Door lock
Door unlock
Tailgate unlock

Smart Key System - Specifications (Article 44769)

- Specifications

Smart Key Unit
Items Specification
Rated voltage DC 12V
Operating voltage DC 9 - 16V
Operating temperature -22°F - 167°F (-30°C - 75°C)
Load Max. 4mA (When welcome light function off)
RF Receiver
Frequency 433.92 Mhz
Antenna type FSK (Frequency Shift Keying)
Smart Key Fob
Battery Lithium battery 3V 1EA
Distance 30m from vehicle, RF : 30m, Passive (LF) : 0.7m
Battery life More than 2 years (10 times / a day) An inappropriately disposed battery can be harmful to the environment and human health. Dispose the battery according to your local law(s) or regulation.
An inappropriately disposed battery can be harmful to the environment and human health. Dispose the battery according to your local law(s) or regulation.

- An inappropriately disposed battery can be harmful to the environment and human health.
- Dispose the battery according to your local law(s) or regulation.

Push buttons 4 (Door lock / unlock, Liftgate , Panic)
Frequency(Rx) 125 kHz
Frequency(Tx) 433.92 MHz
Numbers 2EA
Antenna
Frequency 125kHz
Numbers Interior (2EA), Door (2EA), Bumper (1EA), Trunk (1EA)

All Technical Service Bulletins (itype_100)

Tsbs

- IAU/IBU/BLE LEARNING AFTER PARTS REPLACEMENT (22-BE-004H, 2022/07/08)
- KEY FOB CODE SAVING/PROGRAMMING INFORMATION (19-BE-006H, 2019/03/25)
- OEM GENUINE HYUNDAI REMOTE START MODULE SOFTWARE UPDATE (23-BE-010H, 2023/08/17)

OEM Policies and Procedures (itype_120)

Tsbs

- IAU/IBU/BLE LEARNING AFTER PARTS REPLACEMENT (22-BE-004H, 2022/07/08)
- KEY FOB CODE SAVING/PROGRAMMING INFORMATION (19-BE-006H, 2019/03/25)