# **ENTRY FUNCTION**

# 1. System Diagram

The certification ECU (smart key ECU assembly) controls the entry function. The system diagram below shows the main components that relate to system function.



# 2. Layout of Main Components



#### Multi-information Display





08E0BE14C



# 3. Function of Main Components

Component		Function
Key		The key consists of a mechanical key, the transmitter for the wireless door lock control and the transceiver for the entry and start system, and a transponder chip for the engine immobilizer control.
Certification ECU (Smart Key ECU Assembly)		<ul> <li>Controls the entry and start system in accordance with the signals from each oscillator, various switches, ECUs and key.</li> <li>Judges and certifies the ID code from the tuner.</li> <li>Transmits the engine immobilizer deactivation signal to the ID code box (immobilizer code ECU).</li> <li>Transmits steering unlock signals to the steering lock actuator assembly (steering lock ECU).</li> </ul>
Power Source Control ECU		<ul> <li>Controls the entry and start system in accordance with the signals from the various switches, ECUs and combination meter assembly.</li> <li>Transmits the key certification request signal to the certification ECU (smart key ECU assembly) in accordance with the engine switch signal, and turns the relays on and off.</li> </ul>
ID Code Box (Immobilizer Code ECU)		Receives a steering unlock or engine immobilizer deactivation signals from the certification ECU (smart key ECU assembly), certifies them, and transmits each deactivation signal to the steering lock actuator assembly (steering lock ECU) or ECM.
Main Body ECU RH (Cowl Side Junction Block RH)		<ul> <li>Receives the request signal from the certification ECU (smart key ECU assembly) and actuates the door lock motor to unlock or lock the door.</li> <li>Transmits each door condition to the certification ECU (smart key ECU assembly).</li> </ul>
Main Body ECU LH (Cowl Side Junction Block LH)		Receives the trunk lid open request signal from the trunk open switch and transmits it to the certification ECU (smart key ECU assembly).
	Antenna	Transmits the request signals.
	Touch Sensor	Detects when a person touches the inside of an outer door handle.
Outside Handle	Lock Switch	Transmits door lock request signals to the certification ECU (smart key ECU assembly).
	Door Oscillator • Front RH and LH	Receives the request signal from the certification ECU (smart key ECU assembly), and creates an actuation area around front door.
Room Oscillator • Front and Rear		Receives a request signal from the certification ECU (smart key ECU assembly), and forms the actuation area in the vehicle interior.
Trunk Oscillator • Inner		Receives a request signal from the certification ECU (smart key ECU assembly), and forms the actuation area in the trunk.
Trunk Oscillator • Outer		Receives a request signal from the certification ECU (smart key ECU assembly), and forms the actuation area around the trunk lid.
Tuner		<ul> <li>Receives the ID code from the key in the actuation area and transmits it to certification ECU (smart key ECU assembly).</li> <li>Receives the ID code from the key in the trunk (via the antenna) and transmits it to certification ECU (smart key ECU assembly).</li> </ul>
Trunk Antenna		Receives the ID code from the key in the trunk and transmits it to the tuner.

(Continued)

Component		Function	
Outside Rear View Mirror	Foot Lights	When the key enters the exterior actuation area, the foot lights are illuminated in accordance with the request signals of the certification ECU (smart key ECU assembly).	
Trunk Open Switch		Transmits a trunk lid open request signal to the main body ECU LH (cowl side junction block LH).	
Stop Light Switch		Outputs the state of the brake pedal to the power source control ECU.	
Wireless Door Lock Buzzer		Sounds as an answer back for entry lock or unlock to inform the driver.	
		When the certification ECU (smart key ECU assembly) detects human	
Combination Meter Assembly	Multi-information Display	lock buzzer, illuminating the multi-information display and sounding the buzzer in accordance with the request signal from the ECU. <b>Example:</b>	
	Buzzer	<ul><li>The key is taken outside the vehicle at an inappropriate time.</li><li>The driver gets out (with the key) while the engine is still running.</li><li>The driver gets out while the shift lever is in a position other than "P".</li></ul>	

# 4. Construction and Operation

# Key (Mechanical Key)

The key consists of a mechanical key, a transmitter function for the wireless door lock control and a transceiver for the entry and start system, and a transponder chip for the engine immobilizer control.

- The transceiver function of the key receives the signals from the oscillators and returns the ID code to the tuner.
- The transmitter function for the wireless door lock control has a lock button, unlock button, and trunk button.
- The transponder chip in the key for the engine immobilizer control returns a signal to the engine switch as a response to the radio wave it received from the engine switch.
- This mechanical key operates the driver door lock cylinder, trunk storage extension lock cylinder and glove box lock cylinder, but cannot be used to start the engine.

A total of 7 keys can be registered. For details, see the Service Bulletin of the engine immobilizer system.



# Oscillator (Driver and Front Passenger Doors, Front and Rear of Interior, Trunk Inner, Trunk Outer)

Each oscillator transmits based on a request signal from the certification ECU (smart key ECU assembly), and creates a key actuation area that is used to detect the presence of a key.

The actuation area formed by front door oscillators and trunk outer oscillator is approximately 0.7 to 1.0 m (2.3 to 3.3 ft.) from the outside door handle of front door, or the center of the rear bumper.

- The actuation area of front door oscillator is formed by transmitting a request signal every 0.25 seconds while the engine switch is off and each door is locked. In this way it detects the proximity of a key. When locking the door using the lock switch on the outside door handle, the actuation area is formed when the lock switch is pressed.
- The actuation area of the trunk outer oscillator is formed when the trunk open switch is on (pressed). It is formed twice to allow the key to be verified.
- The actuation area of the front and rear room oscillators is formed when the any door is opened or closed, when the engine switch is pressed, when a warning is activated, or when the lock switch is on.
- The actuation area of the trunk inner oscillator forms when the trunk lid is closed or the trunk open switch is pressed, and is formed twice to allow the key to be verified.

# 5. Entry Function Operation

# General

The entry function has the following functions.

Function	Outline	
Mechanical Key [See page BE-163]	The operation is the same as a conventional mechanical key.	
Wireless Door Lock Remote Control [See page BE-166]	This function is convenient for locking and unlocking all the doors or trunk, at a distance. The operation is the same as wireless door lock control system.	
Entry Illumination [See page BE-167]	When a key enters any actuation area of the front door oscillators, the foot light, the front interior light, and engine switch illumination illuminate.	
Entry Unlock [See page BE-167]	When a key is located in any actuation area of the front door oscillators, the door will unlock after touching of the inside of an outside door handle.	
Entry Unlock Mode Switching [See page BE-168]	<ul><li>Allows selecting one of two modes that can be operated with the entry unlock function.</li><li>Driver Door Mode</li><li>All Door Mode</li></ul>	
Entry Lock [See page BE-169]	When a key is located in the actuation area of either front door oscillator and the engine switch is off, the doors will be locked by merely pressing the lock switch on the outside door handle.	
Trunk Open [See page BE-170]	When a key is in the actuation area of the trunk outer oscillator, the trunk opens by merely pressing the trunk open switch.	
Memory Call [See page BE-171]	This function operates the driving position memory system in accordance with key ID.	
Prevention of Key Confinement [See page BE-175]	<ul> <li>Prevents the confinement of the key in the vehicle if the door is locked from the outside door handle while the key is still inside the vehicle.</li> <li>If the trunk lid is closed while the key is still in the luggage compartment, the warning buzzer sounds for 2 seconds. If the trunk open switch is operated the trunk lid can be opened.</li> </ul>	
Warning [See page BE-177]	<ul> <li>When any of the situations below occur, the entry and start system causes the certification ECU (smart key ECU assembly) to sound the buzzer in the combination meter assembly and the wireless door lock buzzer, and illuminate the multi-information display in order to the alert the driver.</li> <li>An exit warning if the shift lever is in a position other than P and the engine switch is in a mode other than off.</li> <li>An exit warning if the shift lever is in P and the engine switch is in a mode other than off.</li> <li>An exit warning if the occupant leaves with the key in inappropriate circumstances.</li> <li>A warning if the engine switch is operated while the key is outside the actuation area.</li> <li>A warning if the entry lock button on the outside door handle is operated while the key is inside the vehicle.</li> <li>A warning if the key battery is weak.</li> </ul>	

(Continued)

Function	Outline	
Battery Saving [See page BE-189]	If the key remains within the actuation area of the front door oscillators, the system maintains periodic communication with key. Therefore, if the vehicle remains parked in that state for a long time, the key battery and the vehicle battery could be drained.	
Key Cancel [See page BE-190]	<ul> <li>The following key functions can be cancelled by following certain procedures.</li> <li>Entry Unlock / Lock</li> <li>Trunk Open</li> <li>Memory Call</li> <li>Prevention of Key Confinement</li> <li>Warning</li> </ul>	
Key Code Registration [See page BE-190]	A total of 7 keys can be registered. Enables the registering (writing and storing) of transmitter recognition codes in the EEPROM that is contained in the certification ECU (smart key ECU assembly).	

# Service Tip

Immediately after the battery is reinstalled, the entry function may not operate normally. Lock and unlock the doors using the transmitter.

# **Wireless Door Lock Control Function**

Function	Outline	Customizable
All Doors Lock	Pressing the lock button of the transmitter (key) locks all doors.	_
All Doors Unlock	Pressing the unlock button of the transmitter (key) unlocks all doors.	-
All Doors Unlock (2-step Unlock)	Pressing the unlock button of the transmitter (key) once unlocks the driver's door, and pressing it again within three seconds unlocks all the doors.	*1
Trunk Opener	Keeping the trunk button of the transmitter (key) pressed longer than about 0.8 of a second opens the trunk lid.	*2
Answer Back	The hazard light flashes once when locking, and flashes twice when unlocking, to inform that the operation has been completed.	*5
Automatic Lock	If none of the doors are opened within 30 seconds after they are unlocked using wireless door lock control, all the doors will be locked again automatically.	*3
Door Ajar Warning	If a door is open or ajar, pressing the lock button of the transmitter (key) will cause the wireless door lock buzzer to sound for about 10 seconds.	*5
Repeat	If a door is not locked in response to the locking operation of the transmitter (key), the integration relay will output another lock signal after approximately 1 second.	_
Illuminated Entry	When all the doors are locked, pressing the unlock button causes the interior lights to illuminate simultaneously with the unlock operation.	*4
Security	Sends an operation signal as a rolling code.	_

Wireless door lock control has the following functions:

\*1: Default setting is off: The setting can be changed using the customized function. For details, see page BE-18.

\*<sup>2</sup>: Default setting is 0.8 seconds: The following can be selected from 1 time/2 times/0.8 seconds/OFF. For details, see page BE-18.

\*<sup>3</sup>: Default setting is 30 seconds: The following can be selected from 30/60/120 seconds. For details, see page BE-18.

\*<sup>4</sup>: Default illumination time is 15 seconds: The following can be selected from 7.5/15/30 seconds. For details, see page BE-18.

\*<sup>5</sup>: Default setting is on: The setting can be changed using the customized function. For details, see page BE-18.

# **Entry Unlock**

- a) When a key enters the actuation area of one of the front door oscillators, the certification ECU (smart key ECU assembly) judges and certifies the key ID code received from the tuner.
- b) After the key certification OK is confirmed, the certification ECU (smart key ECU assembly) transmits an unlock stand-by signal to the touch sensor of the relevant door.
- c) At the same time, the certification ECU (smart key ECU assembly) transmits a lighting signal for each illumination (foot lights of the outside rear view mirrors, engine switch illumination and front interior light), and turns these lights on. (Entry Illumination Function)
- d) If the touch sensor is touched when this condition is present, the certification ECU (smart key ECU assembly) transmits a door unlock signal to the main body ECU RH (cowl side junction block RH), and unlocks the door. The main body ECU RH (cowl side junction block RH) blinks the hazard warning light twice as an answer back for entry unlock.



Column & Door Bus)

08E0BE23C

# **Entry Unlock Mode Switching**

- a) When the engine switch is off, press the lock button and any of the other buttons on the key at the same time for approximately five seconds while the key is in the actuation area.
- b) The certification ECU (smart key ECU assembly) receives this signal from the tuner and switches the entry unlock mode (touch switch unlocking function).
- c) The certification ECU (smart key ECU assembly) sounds the wireless door lock buzzer and the buzzer of the combination meter assembly to inform the user that the mode has been switched.
- d) If the entry unlock mode needs to be switched again, push the lock button and any of the other buttons on the key at the same time for approximately five seconds after the LED of the key goes off.



08E0BE31C

Mode	Wireless Door Lock Buzzer	Buzzer in Combination	Multi-info Disp	ormation olay
		Meter	LHD	RHD
Driver Door (Customized)	Sounds three times	Sounds once	0151BE57C	0151BE58C
All Doors (Default)	Sounds twice	Sounds once		0151BE59C

#### NOTE

The function only switches the entry unlock function of the entry and start system. It does not change the unlocking that occurs using the wireless door lock remote control.

## **Entry Lock Function**

- a) This signal is transmitted to the certification ECU (smart key ECU assembly) when the driver (who has the key in their possession), exits the vehicle and presses the lock switch on the outside door handle.
- b) The certification ECU (smart key ECU assembly) transmits a request signal for all door and room oscillators to form actuation areas.
- c) The key receives this signal and returns the ID code to the tuner.
- d) The certification ECU (smart key ECU assembly) judges and certifies the ID code from the tuner. It then checks the location of the key, and if all doors are closed, the ECU transmits a door lock signal to the main body ECU RH (cowl side junction block RH).
- e) The main body ECU RH (cowl side junction block RH) receives this signal and actuates the door lock motors to lock the doors. As this time, the hazard warning lights blink once.



08E0BE24C

## **Trunk Open Function**

- a) This signal is transmitted to the certification ECU (smart key ECU assembly) when the driver (who has the key in their possession) pushes the trunk open switch on the outside of the trunk lid.
- b) The certification ECU (smart key ECU assembly) transmits a request signal for all the room, trunk inner and outer oscillators to form actuation areas.
- c) The key receives this signal and returns the ID code to the tuner.
- d) The certification ECU (smart key ECU assembly) judges and certifies the ID code, and checks the location of the key. The ECU transmits a trunk open signal to the main body ECU RH (cowl side junction block RH).
- e) The main body ECU RH (cowl side junction block RH) receives this signal and actuates the luggage door unlock motor to open the trunk.



08E0BE25C

# **Memory Call Function**

# 1) General

The key linked memory call function uses the ID of a key to automatically restore the seat position (using the driving position memory system), and outside rear view mirror position, increasing driver convenience.

Condition	Outline
Memory Registration	<ul> <li>When all the following conditions are met, the key ID is recorded.</li> <li>The engine switch mode is off.</li> <li>The driver door is closed.</li> <li>The memory No. (1, 2 or 3) button is pressed and held.</li> <li>The lock or unlock button on the key is pressed and held.</li> </ul>
Memory Call Operation	After the door is unlocked using the entry and start system or wireless door lock control function, when the driver door is opened, the memory call function operates.
Memory Call Cancel	<ul> <li>When all the following conditions are met, the memory call function can be disabled.</li> <li>The engine switch is off.</li> <li>The driver door is closed.</li> <li>The SET button is pressed and held.</li> <li>The lock or unlock button on the key is pressed and held.</li> </ul>

BE

## 2) Memory Registration

- a) The driver seat ECU (power seat switch) enters the key ID registration mode (linking mode), if the seat memory No.1, No.2 or No.3 button is pressed with the engine switch off and driver door closed.
- b) In this condition, when the lock or unlock button on the key is pressed, the key ID is transmitted from the certification ECU (smart key ECU assembly) to the driver seat ECU.
- c) The driver seat ECU records the key ID and each position into memory.
- d) When the driver seat ECU completes recording, it beeps the buzzer in the driver seat ECU once as an answer back.



08E0BE26C

#### **3) Memory Call Operation**

- a) When the unlock button on the key is pressed or the key enters the actuation area, the key ID is sent to the certification ECU (smart key ECU assembly) through the tuner.
- b) The certification ECU (smart key ECU assembly) transmits the key ID to the driver seat ECU.
- c) If the driver door is opened, the driver seat ECU outputs a key ID memory restoration signal from certification ECU (smart key ECU assembly) to each ECU and activates the drive seat motors.
- d) When each ECU receives this signal, it activates its respective actuator.



08E0BE27C

# **BE-174 BODY ELECTRICAL** — ENTRY AND START SYSTEM

# 4) Memory Call Cancel

- a) If the SET button is pressed when the engine switch is off and the driver door is closed, the driver seat ECU enters the memory call cancel mode.
- b) In this condition, when the lock or unlock button on a key is pressed, the key ID is transmitted from the certification ECU (smart key ECU assembly) to the driver seat ECU.
- c) If the key ID has already been registered, the driver seat ECU will cancel the key ID memory call function. To use the key ID memory call function again, it is necessary to re-register the key ID.
- d) When the driver seat ECU completes switching, it beeps the buzzer in the driver seat ECU twice as an answer back.



08E0BE28C

# **Prevention of Key Confinement**

## 1) General

This function has two system operations: interior (cabin) and inside luggage compartment.

## 2) Interior

- a) When the door is locked from the outside door handle while the key is still inside the vehicle, the certification ECU (smart key ECU assembly) receives this signal and transmits a request signal for the front and rear room oscillators to form an actuation area.
- b) The key receives this signal and returns the ID code to the tuner.
- c) The certification ECU (smart key ECU assembly) judges and certifies the ID code, and checks the location of the key. The ECU transmits a door unlock signal to the main body ECU RH (cowl side junction block RH).
- d) The main body ECU RH (cowl side junction block RH) receives the signal and operates each door lock motor to unlock the doors.
- e) The main body ECU RH (cowl side junction block RH) sounds the wireless door lock buzzer and the buzzer of the combination meter assembly as an answerback for the unlock function that was performed.



#### 3) Inside Luggage Room

- a) When the trunk lid is closed while the key is still inside the luggage room (trunk) and all doors are locked, the certification ECU (smart key ECU assembly) recognizes that a trunk lid close condition has occurred based on signals from the main body ECU RH (cowl side junction block RH).
- b) The certification ECU (smart key ECU assembly) receives this signal, and transmits a request signal for the trunk inner oscillator to form an actuation area.
- c) The key receives this signal and returns the ID code to the tuner.
- d) The certification ECU (smart key ECU assembly) judges and certifies the ID code, and checks the location of the key. The ECU sounds the wireless door lock buzzer for two seconds to inform the user.
- e) If the trunk open switch is turned on (pressed) while the key is inside the luggage room, the certification ECU (smart key ECU assembly) sends another request signal for the trunk inner oscillator to form an actuation area. The ECU judges and certifies the key and checks its location, before transmitting a trunk open signal to the main body ECU RH (cowl side junction block RH).
- f) The main body ECU RH (cowl side junction block RH) receives the signal and operates the luggage door unlock motor to open the trunk.



08D0BE97C

# Warning

## 1) General

When any of the situations below occur, the entry and start system causes the certification ECU (smart key ECU assembly) to sound a buzzer in the combination meter assembly and the wireless door lock buzzer, and illuminate the multi-information display in order to alert the driver.

Situation	Condition		
А	The engine is left running and the shift lever is in a position other than P when the driver gets out of the vehicle.		
В	The key reminder sounds.		
C	The engine is left running and the shift lever is in the P position when the driver gets out of the vehicle.		
D	A door is ajar.		
Е	The engine is left running when a passenger gets out of the vehicle holding the key.		
F	The key is not within the actuation areas.		
G	The key is left in the cabin.		
Н	The key is left in the luggage room.		
Ι	The key battery is weak.		
J	Steering lock does not release.		
K	The steering lock mechanism is malfunctioning.		
L	The power source control ECU is malfunctioning.		
М	An engine start method is displayed.		
N	Emergency operation support (a backup function is used).		

# 2) Situation: A

There are two patterns for situation A.

- Pattern 1: When the engine is left running and the shift lever is in a position other than P, the driver opens the door and attempts to get out of the vehicle.
- Pattern 2: Under the conditions of pattern 1, the driver closes the door and attempts to leave the vehicle holding the key.

In these situations, the following control is performed:

Possible Effects without Warning		Sudden vehicle start, Vehicle theft, Vehicle roll-away
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The engine switch is in a mode other than off.</li> <li>The shift lever is in any position except P.</li> <li>The vehicle speed is 0 mph (0 km/h).</li> <li>The driver door is opened.</li> </ul>
Buzzer		Sounds continuously
Combination Meter Assembly	Multi-information Display	The following warnings are alternately displayed: SHIFT TO P RANGE 0140BE187C
	Master Warning Light	_
Wireless Door Lock Buzzer		_
Engine Switch Illumination		_
Warning Stop Condition		<ul> <li>The warning is stopped when one of the following conditions is met:</li> <li>The engine switch is off.</li> <li>The shift lever is in the P position.</li> <li>The vehicle speed is above 0 mph (0 km/h).</li> <li>The driver door is closed.</li> </ul>

# Pattern 2.

Possible Effects without Warning		Sudden vehicle start, Vehicle theft, Vehicle roll-away
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The shift lever is in any position except P.</li> <li>The engine switch is in a mode other than "OFF".</li> <li>The vehicle speed is 0 mph (0 km/h).</li> <li>The key is not in the vehicle.</li> <li>The driver door is opened → closed.</li> </ul>
	Buzzer	Sounds continuously
Combination Meter Assembly	Multi-information Display	The following warnings are alternately displayed: SHIFT TO P RANGE 0140BE187C BETECTED 0140BE186C
	Master Warning Light	Flashes
Wireless Door Lock Buzzer		Sounds continuously
Engine Switch Illumination		_



#### 3) Situation: B

There are two patterns for situation B.

- Pattern 1: When the driver's door is open, the driver changes the engine switch to on (ACC) and attempts to leave the vehicle.
- Pattern 2: When the driver's door is open, the driver changes the engine switch mode from on (IG) to off and attempts to leave the vehicle.

In these situations, the following control is performed:

#### Pattern 1. and Pattern 2.

Possible Effects without Warning		Vehicle theft
Warning Trigger		<ul> <li>The warning is activated when one of the following conditions are met:</li> <li>The engine switch is on (ACC) mode and the driver door is opened.</li> <li>The engine switch is off, the steering is unlocked, and the driver door is opened.</li> </ul>
	Buzzer	Continues to sound at short and even intervals
Combination Meter Assembly	Multi-information Display	_
	Master Warning Light	_
Wireless Door Lock Buzzer		_
Engine Switch Illumination		_
Warning Stop Condition		<ul> <li>The warning is stopped when one of the following conditions is met:</li> <li>The engine switch is changed to on (IG).</li> <li>The driver door is closed.</li> <li>The engine switch is changed to off and the steering is locked.</li> </ul>

# 4) Situation: C

There are two patterns for situation C.

- Pattern 1: When the engine is left running and the shift lever is in the P position, the driver closes the driver's door and attempts to leave the vehicle holding the key.
- Pattern 2: Under the conditions of pattern 1, the driver presses the lock switch on the door outside handle.

In these situations, the following control is performed:

Possible Effects without Warning		Vehicle theft, Engine cannot be restarted, Discharged battery
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions have been met:</li> <li>The shift lever is in the P position.</li> <li>The engine switch is in a mode other than off.</li> <li>The key is not in the vehicle.</li> <li>The driver door is opened → closed.</li> </ul>
	Buzzer	Sounds once
Combination Meter Assembly	Multi-information Display	KEY IS NOT DETECTED 0140BE186C
	Master Warning Light	Flashes
Wireless Door Lock Buzzer		Sounds three times
Engine Switch Illumination		-
Warning Stop Condition		<ul><li>The warning is stopped when one of the following conditions is met:</li><li>The engine switch is changed to off.</li><li>The key is returned to the vehicle.</li></ul>

#### Pattern 2.

Possible Effects without Warning		Vehicle theft, Discharged battery
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The shift lever is in the P position.</li> <li>The engine switch is in a mode other than off.</li> <li>All doors are closed.</li> <li>The key is outside the vehicle (within one of the actuation areas).</li> <li>The lock switch on the outer door handle is on (pressed).</li> </ul>
	Buzzer	_
Combination Meter Assembly	Multi-information Display	_
	Master Warning Light	_
Wireless Door	Lock Buzzer	Sounds for 60 seconds
Engine Switch Illumination		_
Warning Stop Condition		<ul><li>The warning is stopped when one of the following conditions is met:</li><li>The engine switch is changed to off and the key is not within the actuation areas.</li><li>The key is returned to the vehicle.</li></ul>

# 5) Situation: D

The lock switch on the door outside handle is pressed to perform entry lock with a door open. In this situation, the following control is performed:

Possible Effects without Warning		Vehicle theft
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The engine switch is off.</li> <li>Any door is opened.</li> <li>The lock switch on the outer door handle is on (pressed).</li> </ul>
	Buzzer	-
Combination Meter Assembly	Multi-information Display	_
	Master Warning Light	_
Wireless Door	Lock Buzzer	Sounds continuously
Engine Switch Illumination		-
Warning Stop Condition		<ul> <li>The warning is stopped when one of the following conditions is met:</li> <li>The engine switch is changed to a mode other than off.</li> <li>All doors are closed.</li> <li>An unlock operation is performed using the wireless door lock remote function.</li> <li>The touch sensor on the inside of an outer door handle is used to perform entry unlock.</li> <li>10 seconds have elapsed after the wireless door lock buzzer was activated.</li> </ul>

# 6) Situation: E

When the engine is left running, a passenger leaves the vehicle holding the key. In this situation, the following control is performed:

Possible Effects without Warning		Engine cannot be restarted
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The engine switch is in a mode other than off.</li> <li>A door other than the driver door is opened → closed.</li> <li>The vehicle speed is 0 mph (0 km/h).</li> <li>The key is not in the vehicle.</li> </ul>
	Buzzer	Sounds once
Combination Meter Assembly	Multi-information Display	KEY IS NOT DETECTED 0140BE186C
	Master Warning Light	Flashes
Wireless Door Lock Buzzer		Sounds three times
Engine Switch Illumination		-
Warning Stop Condition		<ul><li>The warning is stopped when one of the following conditions is met:</li><li>The engine switch is changed to off.</li><li>The key is returned to the vehicle.</li></ul>

# 7) Situation: F

When the key is not in the cabin or the key battery is dead, the driver attempts to start the engine or change the engine switch to on (IG).

In this situation, the following control is performed:

Possible Effects without Warning		Confuses the user
Warning Trigger		<ul><li>The warning is activated when all of the following conditions are met:</li><li>The engine switch is pushed.</li><li>The key is not in the vehicle.</li></ul>
	Buzzer	Sounds once
Combination Meter Assembly	Multi-information Display	KEY IS NOT DETECTED Displayed for 10 seconds (and then automatically turned off)
	Master Warning Light	Flashes
Wireless Door Lock Buzzer		_
Engine Switch Illumination		_
Warning Stop Condition		Check if the key is in the detection area. If the key is in the detection area, press the wireless door lock switch and confirm that the indicator comes on. If the indicator does not come on, replace the key battery with a new one.

#### 8) Situation: G

The lock switch on the door outside handle is pressed to perform entry lock with the key left in the cabin. In this situation, the following control is performed:

Possible Effects without Warning		Vehicle theft
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The engine switch is off.</li> <li>All doors are closed.</li> <li>The key is in the vehicle.</li> <li>The lock switch on the outer door handle is on (pressed).</li> </ul>
	Buzzer	_
Combination Meter Assembly	Multi-information Display	_
	Master Warning Light	_
Wireless Door Lock Buzzer		Sounds for two seconds
Engine Switch Illumination		_

# 9) Situation: H

The luggage door is closed with the key left in the luggage room (trunk). In this situation, the following control is performed:

Possible Effects without Warning		Key Confinement
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The vehicle speed is 0 mph (0 km/h).</li> <li>All doors are closed.</li> <li>The trunk open function is available.</li> <li>The key is in the luggage room (trunk).</li> <li>The luggage door is opened → closed.</li> </ul>
	Buzzer	_
Combination Meter Assembly	Multi-information Display	_
	Master Warning Light	_
Wireless Door Lock Buzzer		Sounds for two seconds
Engine Switch Illumination		_

# 10) Situation: I

The vehicle is driven using a key that has a low battery. In this situation, the following control is performed:

Possible Effects without Warning		Smart access system does not function
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The engine switch (power source mode) changes to off after being left on (IG) for over 20 minutes.</li> <li>The key battery voltage is low.</li> <li>The key is in the vehicle.</li> </ul>
Buzzer		Sounds once
Combination Meter Assembly	Multi-information Display	LOW KEY BATTERY Displayed for 10 seconds (and then automatically turned off)
	Master Warning Light	Flashes
Wireless Door Lock Buzzer		_
Engine Switch Illumination		_

# 11) Situation: J

The steering lock cannot be released.

In this situation, the following control is performed:

Possible Effects without Warning		Steering usability function
Warning Trigger		The steering lock cannot be released, thus the engine is prevented from starting.
	Buzzer	-
Combination Meter Assembly	Multi-information Display	S/T IS NOT UNLOCKED Displayed for 15 seconds (and then automatically turned off)
	Master Warning Light	-
Wireless Door Lock Buzzer		-
Engine Switch Illumination		The green indicator blinks at 1-second intervals (goes off automatically after 15 seconds).
Warning Stop Condition		The engine switch is pressed while the steering wheel is turned left and right, and the steering lock successfully disengages.

## 12) Situation: K

A malfunction of the steering lock actuator assembly (steering lock ECU) is detected. In this situation, the following control is performed:

Possible Effects without Warning		Malfunction detection
Warning Trigger		A malfunction of the steering lock actuator assembly (steering lock ECU) is detected.
	Buzzer	_
Combination Meter Assembly	Multi-information Display	CHECK S/T LOCK 0140BE185C
	Master Warning Light	Flashes
Wireless Door Lock Buzzer		_
Engine Switch Illumination		The amber indicator blinks at 2-second intervals.
Warning Stop Condition		The steering lock actuator assembly (steering lock ECU) returns to normal.

## 13) Situation: L

A malfunction of the power source control ECU is detected. In this situation, the following control is performed:

Possible Effects without Warning		Malfunction detection
Warning Trigger		A malfunction in the power source control ECU is detected.
Combination Meter Assembly	Buzzer	-
	Multi-information Display	_
	Master Warning Light	_
Wireless Door Lock Buzzer		_
Engine Switch Illumination		The amber indicator blinks at 2-second intervals.
Warning Stop Condition		The power source control ECU returns to normal.

# 14) Situation: M

There are two patterns for situation M.

- Pattern 1: A warning message appears on the multi-information display when the driver does not follow the proper procedure to start the vehicle.
- Pattern 2: A message indicating how to start the engine appears on the multi-information display when a key with a dead battery is held close to the engine switch in order to start the engine.

In these situations, the following control is performed:

# Pattern 1.

Possible Effects without Warning		Usability function
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The engine switch is in a mode other than on (IG).</li> <li>Any door is closed → opened.</li> <li>The engine switch is changed from off to on (ACC) more than once with the engine off and brake pedal not depressed.</li> </ul>
	Buzzer	Sounds once
Combination Meter Assembly	Multi-information Display	WHEN STARTING THE ENGINE, DEPRESS THE BRAKE PEDAL 0140BE191C
	Master Warning Light	_
Wireless Door Lock Buzzer		_
Engine Switch Illumination		_
Warning Stop Condition		<ul><li>The warning is stopped when one of the following conditions is met:</li><li>10 seconds have elapsed after a warning message was displayed.</li><li>The engine switch is pushed with the brake pedal depressed.</li></ul>

#### Pattern 2.

Possible Effects without Warning		Usability function
Warning Trigger		The key is held close to the engine switch when the key battery is dead.
	Buzzer	Sounds once
Combination Meter Assembly	Multi-information Display	TO START, DEPRESS THE BRAKE PEDAL, AND PUSH THE ENGINE SWITCH 07T0NF02C
	Master Warning Light	_
Wireless Door Lock Buzzer		-
Engine Switch Illumination		_
Warning Stop Condition		<ul> <li>The warning is stopped when one of the following conditions is met:</li> <li>10 seconds have elapsed after a warning message was displayed.</li> <li>The engine is started.</li> <li>The key is detected.</li> </ul>

#### 15) Situation: N

There are two patterns for situation N.

- Pattern 1: After stopping the engine, the driver cannot restart the engine due to a dead key battery or electrical interference.
- Pattern 2: The driver attempts to start the engine after performing a driver door key linked unlock operation.

In these situations, the following control is performed:

Pattern 1	L.
-----------	----

Possible Effects without Warning		Usability function
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>The immobilizer system is set.</li> <li>The engine switch is pressed.</li> <li>The key is not detected in the vehicle.</li> <li>After the warning indicating that the key is not in the detection area, none of the following conditions are met:</li> <li>The immobilizer system certification result is OK.</li> <li>Key certification in the cabin is OK.</li> <li>The driver door is opened and closed.</li> </ul>
	Buzzer	Sounds once
Combination Meter Assembly	Multi-information Display	DEPRESS THE BRAKE PEDAL, AND TOUCH THE ENGINE SWITCH WITH THE KEY 07T0NF01C
	Master Warning Light	_
Wireless Door Lock Buzzer		_
Engine Switch Illumination		_
Warning Stop Condition		<ul> <li>The warning is stopped when one of the following conditions is met:</li> <li>60 seconds have elapsed after a warning message was displayed.</li> <li>The immobilizer system certification result is OK.</li> <li>The key is detected in the cabin or luggage compartment.</li> <li>Key certification in the cabin has stopped either because 30 seconds have passed after any of the doors is opened and closed, or because the brake pedal is depressed.</li> </ul>

# Pattern 2.

Possible Effects without Warning		Usability function
Warning Trigger		<ul> <li>The warning is activated when all of the following conditions are met:</li> <li>A driver door key linked unlock operation is performed.</li> <li>The immobilizer system is set.</li> <li>The engine switch is pressed.</li> <li>The key is not detected in the vehicle.</li> </ul>
	Buzzer	Sounds once
Combination Meter Assembly	Multi-information Display	DEPRESS THE BRAKE PEDAL, AND TOUCH THE ENGINE SWITCH WITH THE KEY 07TONF01C
	Master Warning Light	-
Wireless Door Lock Buzzer		-
Engine Switch Illumination		-
Warning Stop Condition		<ul> <li>The warning is stopped when one of the following conditions is met:</li> <li>60 seconds have elapsed after a warning message was displayed.</li> <li>The immobilizer system certification result is OK.</li> <li>The key is detected in the cabin or luggage compartment.</li> <li>Key certification in the cabin has stopped either because 30 seconds have passed after any of the doors is opened and closed, or because the brake pedal is depressed.</li> </ul>

# **Battery Saving**

#### 1) Vehicle Battery Saving Function

In the smart access system with push button start, signals are emitted outside of the vehicle at a prescribed interval (250 ms) when the doors are locked. Therefore, the vehicle battery could be drained if the vehicle remains parked for a long time. For this reason, the controls listed below are used.

Condition	Control
First 9 days	Signal transmission interval is 250 ms.
No response from key for 10 to 14 days	Signal transmission interval is extended from 250 ms to 750 ms.
No response from key for 15 to 30 days	Signal transmission interval is extended from 750 msec. to 2250 msec.
No response from key for more than 31 days	Automatically deactivates the smart access system.

#### Reinstatement Conditions

- A wireless door lock control signal (lock, unlock, or trunk lid open) is input and the ID matches.
- A user who has the key in their possession pushes a lock switch signal for the outside door handle.
- A door is locked or unlocked using the mechanical key.

#### 2) Key Battery and Vehicle Battery Saving Function

In the entry and start system, if the key is constantly kept (stored) in the exterior actuation area of the doors, the system will maintain periodic communication with the key. Therefore, if the vehicle remains parked in that state for a long time, the key battery and the vehicle battery could be drained. For this reason, if this state continues for longer than 10 minutes, the entry and start system will automatically deactivate.

#### Reinstatement Conditions

- A wireless door lock control signal (lock, unlock, or trunk lid open) is input and the ID matches.
- A user who has the key in their possession pushes a lock switch signal on an outside door handle.
- A door is locked or unlocked using the mechanical key.

# **Key Cancel**

Key cancel is operated when certain operations are performed with the vehicle in the following conditions.

- Engine switch is off.
- Driver door is closed.
- Driver door is unlocked.

The procedure is as follows:

- 1) Unlock once with the unlock button of the key.
- 2) Open the driver door within 5 seconds.
- 3) Unlock twice with the unlock button of the key within 5 seconds.
- 4) Repeat open → close twice for the driver door within 30 seconds, and open again.
   (Driver Door: Open → Close → Open → Close → Open)
- 5) Unlock twice with the unlock button of the key within 30 seconds.
- 6) Repeat open → close once for the driver door within 30 seconds, and open again. (Driver Door: Open → Close → Open)
- 7) Close the driver door within five seconds.

When key cancel is successfully activated, the wireless door lock buzzer sounds twice.

To return to the original condition, perform the procedure again. When key cancel is re-enabled, the wireless door lock buzzer sounds once.

# **Key Code Registration Function**

The table below shows the 4 special ID code registration function modes through which up to 7 different codes can be registered. The codes are electronically registered (written to and stored) in the EEPROM. For details of the recognition code registration procedure, refer to the Service Bulletin of the engine immobilizer system.

Mode	Function
Rewrite	Erases all previously registered codes and registers only the newly received codes. This mode is used whenever a transmitter or the certification ECU (smart key ECU assembly) is replaced.
Add	Adds a newly received code while preserving previously registered codes. This mode is used when adding a new transmitter. If the number of codes exceeds 7, the oldest registered code is erased first (oldest code will be "bumped").
Confirm	Confirms how many codes are currently registered. When adding a new code, this mode is used to check how many codes already exist.
Prohibit	To delete all the registered codes and to prohibit the wireless door lock function. This mode is used when a transmitter (key) is lost.