

Last Modified: 7-13-2007		1.7 D
Service Category: Vehicle Interior	Section: Door Lock	
Model Year: 2008	Model: ES350	Doc ID: RM000000XUC01EX
Title: DOOR LOCK: SMART ACCESS SYSTEM WITH PUSH-BUTTON START: SYSTEM DESCRIPTION (2008 ES350)		

SYSTEM DESCRIPTION

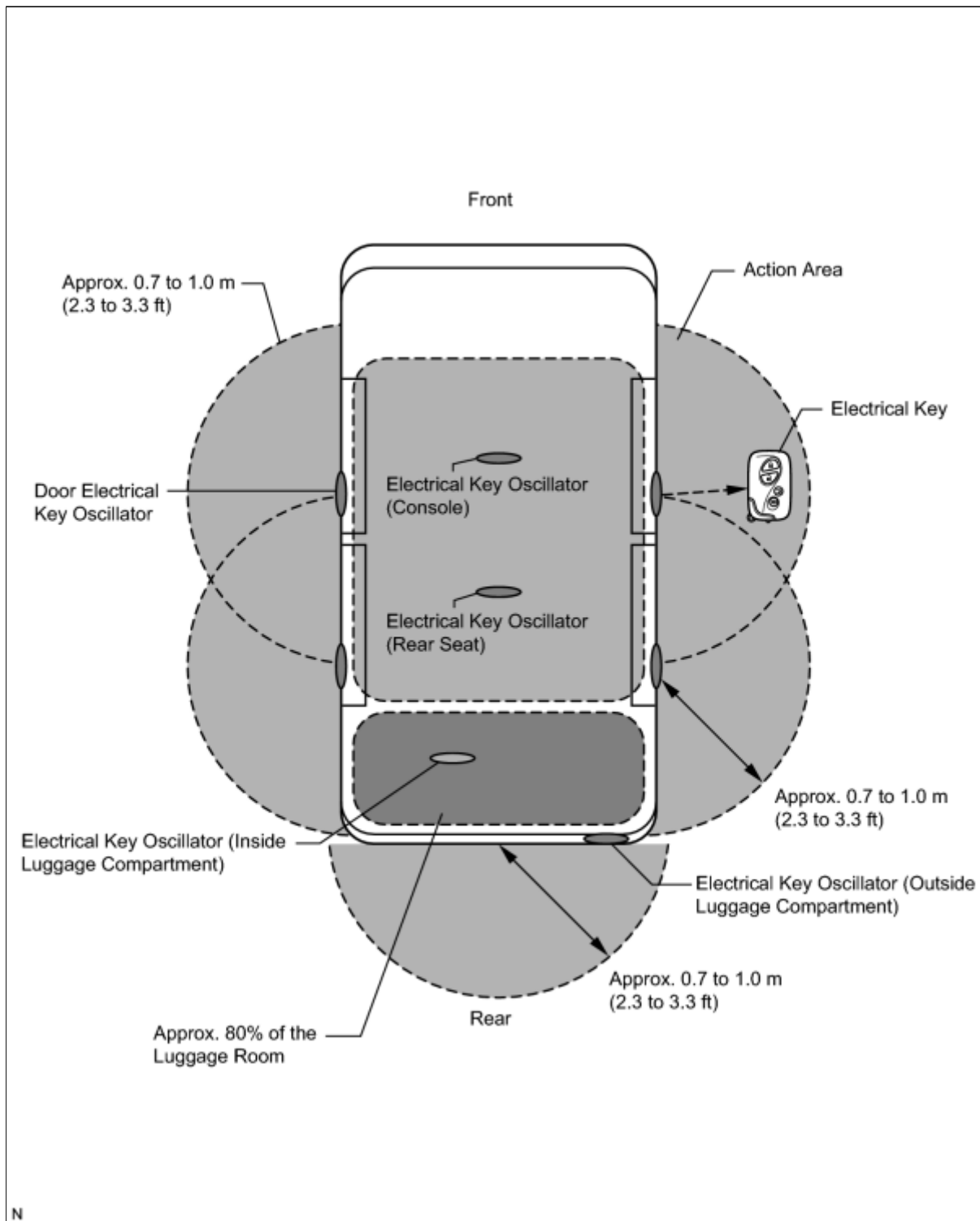
CAUTION:

If using a pacemaker, be sure to read the manual of the pacemaker before using the electrical key, because the radio waves of the electrical key may affect the pacemaker.

1. SMART ACCESS SYSTEM WITH PUSH-BUTTON START DESCRIPTION

- (a) In addition to conventional mechanical key and wireless door lock control functions, the smart access system with push-button start enables door locking/unlocking, steering lock releasing, engine starting and luggage compartment door opening without operating the electrical key. The only requirement is that the electrical key is in the user's possession.
- This system is controlled by the certification ECU. When the certification ECU detects the presence of the an electrical key in one of the detection areas, it identifies and checks the ID code, and outputs operation signals to the related ECU in accordance with their functions.
 - The detection areas are formed by 8 oscillators (4 door oscillators, 2 luggage compartment oscillators, and 2 cabin oscillators).

2. DETECTION AREA



(a) Precautions for the entire system:

- Be sure to carry the electrical key during inspection of the smart access system with push-button start.
- As weak radio waves are used to detect the electrical key, the electrical key detection area may decrease, or the electrical key may not be detected correctly in the following situations:
 - a. The electrical key battery is depleted.
 - b. Any facilities that generate strong radio waves, such as a TV tower, power plant, broadcast station, or gas station, are located near the inspection site.
 - c. A wireless device, such as a cellular phone, is carried with the electrical key.
 - d. The electrical key is in contact with or covered with metal.
 - e. Another wireless door lock control function is operated near the vehicle.
 - f. The electrical key is located near a device that generates high voltage or noise.

- The electrical key may be difficult to operate for a reason relating to the vehicle body shape.
- The electrical key may not be detected correctly if it is around the vehicle's windows, the door handle, or the center of the bumper even when it is in the detection area outside the vehicle.
- The electrical key may not be detected correctly if it is on the instrument panel, rear package tray, floor, or in the glove box even when it is in the detection area inside the vehicle.
- The engine cannot be started even when the electrical key is in the detection area inside the luggage compartment.
- The electrical key may not operate if the electrical key is not held properly.
- The smart access system with push-button start does not operate in the following conditions:
 - a. The smart access system with push-button start is canceled.
 - b. The electrical key battery is completely depleted (the indicator does not blink when pushing any of the buttons on the electrical key).

3. FUNCTION OF MAIN COMPONENTS

COMPONENT	FUNCTION
Electrical Key	Consists of mechanical key, transmitter for wireless door lock control and transceiver for smart access system with push-button start
Certification ECU	Controls smart access system with push-button start in accordance with signals from each oscillator, various switches, ECUs, and electrical key <ul style="list-style-type: none"> • Judges and certifies ID code from door control receiver • Transmits engine immobiliser unset signal to ID code box • Transmits steering unlock signal to steering lock ECU
Main Body ECU (Instrument Panel J/B)	Controls push button start function in accordance with signals from various switches, ECUs, and combination meter <ul style="list-style-type: none"> • Transmits electrical key verification request signal to certification ECU in accordance with engine switch signal, and turns relays ON and OFF • Receives request signal from certification ECU and actuates door lock motor to unlock or lock door • Transmits each door condition signal to certification ECU
ID Code Box	Receives steering unlock or engine immobiliser unset signals from certification ECU, certifies them, and transmits unset signals to steering lock ECU or ECM
Outside Door Handle (driver, passenger, rear doors) (antenna)	Transmits request signals
Outside Door Handle (driver, passenger, rear doors) (touch sensor)	Detects that person touches inside of outside handle
Outside Door Handle (driver, passenger, rear doors) (lock switch)	Transmits door lock request signals to certification ECU
Door Electrical Key Oscillator (driver, passenger, rear doors)	Receives request signal from certification ECU, and forms detection area around each door
Indoor Electrical Key Oscillator (console and rear seat)	Receives request signal from certification ECU, and forms detection area in vehicle interior
Luggage Compartment Electrical Key Oscillator (inner)	Receives request signal from certification ECU, and forms detection area in luggage compartment
Luggage Compartment Electrical Key Oscillator (outer)	Receives request signal from certification ECU, and forms detection area around luggage compartment door

Door Control Receiver	<ul style="list-style-type: none"> • Receives ID code from electrical key in detection area and transmits it to certification ECU • Receives ID code from electrical key in luggage compartment and transmits it to certification ECU
Electrical Key Antenna	Receives ID code from electrical key and transmits it to door control receiver
Outside Rear View Mirror <ul style="list-style-type: none"> • Foot Light 	When the key enters the exterior actuation area, the foot lights are illuminated in accordance with the request signals of the certification ECU
Luggage Compartment Opener Switch	Transmits luggage compartment door open request signal to certification ECU
Stop Light Switch	Outputs state of brake pedal to main body ECU
<ul style="list-style-type: none"> • Wireless Door Lock Buzzer • Combination Meter <ul style="list-style-type: none"> ○ Multi-information Display ○ Buzzer 	When certification ECU detects human errors such as those below, it warns driver by sounding wireless door lock buzzer, displaying information and sounding a buzzer in combination meter in accordance with request signal from ECU Example: <ul style="list-style-type: none"> • Electrical key is taken out of vehicle • Driver leaves vehicle while engine is still running • Driver leaves vehicle while shift lever is in any position other than P

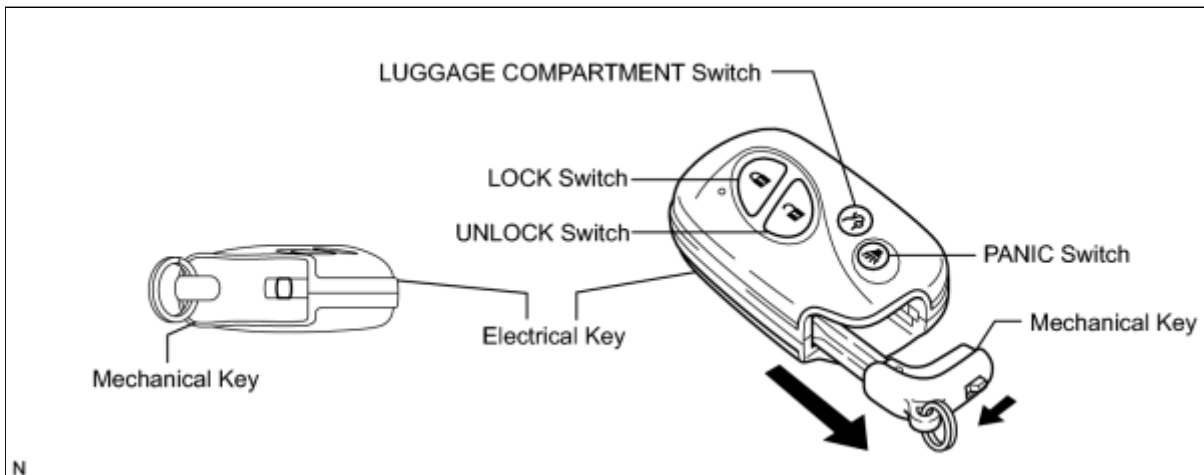
4. CONSTRUCTION AND OPERATION

(a) Electrical Key

The electrical key consists of a mechanical key, a transmitter for the wireless door lock control, and a transceiver for the smart access system with push-button start.

- The transceiver for the smart access system with push-button start receives signals from the oscillators and sends the ID code to the tuner.
- The transmitter for the wireless door lock control has a LOCK switch, UNLOCK switch, LUGGAGE COMPARTMENT switch, and PANIC switch.
- This mechanical key works for the driver door, luggage compartment door, and glove box, but cannot start the engine.

A total of 7 electrical keys can be registered.




(b) Oscillator (each door oscillator, front and rear indoor oscillator, luggage compartment inner oscillator, luggage compartment outer oscillator)


Each oscillator transmits the request signal received from the certification ECU, and forms an electrical key detection area to detect the presence of an electrical key. The detection area formed by each door oscillator and luggage compartment outer oscillator is approximately 0.7 to 1.0 m (2.3 to 3.3 ft) from the outside handle of each door or the center of the rear bumper.

- The detection area of each 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 an electrical key. During entry lock, the detection area is formed with the lock switch on.
- The detection area of the luggage compartment outer oscillator is formed when the power luggage door open switch is on.
- The detection area of the indoor oscillator (front and rear) is formed when the driver door is opened or closed, entry luggage compartment open, electrical key lock-in prevention during start ignition, when a warning is activated, or when the lock switch is on.
- The detection area of the luggage compartment inner oscillator is formed when the luggage compartment door is closed, entry luggage compartment open, electrical key lock-in prevention the luggage compartment open switch or lock switch is pressed.

5. ENTRY FUNCTION OPERATION

(a) The smart access system with push-button start has the following functions:

FUNCTION	OUTLINE
Mechanical Key	Operation is same as conventional mechanical key.
Wireless Door Lock Control	This function remotely locks and unlocks all doors or luggage compartment. Operation is same as wireless door lock control system. However, the receiver in certification ECU uses entry door control receiver to control locking and unlocking.
Entry Illumination	When person carrying electrical key enters detection area, door will enter unlock standby mode and front map light will illuminate.
Entry Unlock	When electrical key is located in detection area of door oscillator, door will unlock by touching inside of outside door handle.
Entry Unlock Mode Switching 	Changes doors that can be unlocked with entry unlock function between 2 modes. <ul style="list-style-type: none"> • Driver door mode • All door mode
Entry Lock	When electrical key is located in detection area of door oscillator and engine switch is off, door can be locked by pressing lock switch on outside door handle.
Entry Luggage Compartment Open	When electrical key is in detection area of luggage compartment outer oscillator, luggage compartment opens by pressing luggage compartment open switch.
Window Close	With the electrical key in the action area of any door oscillators, all open windows are closed when the lock switch on the door outside handle is pressed for 3 seconds or more.
Memory Call	This function operates driving position memory system in accordance with electrical key ID code.
Electrical Key Lock-in Prevention	<ul style="list-style-type: none"> • Prevents confinement of electrical key if door is locked using outside door handle while electrical key is still inside vehicle. • If all doors are locked and luggage compartment door is closed while electrical key is still in luggage compartment, warning buzzer sounds. If luggage compartment open switch is operated, luggage compartment door can be opened.
	<p>When any of situations below occur, smart access system with push-button start causes certification ECU to sound buzzer in combination meter and wireless door lock buzzer, and display information in order to alert driver.</p> <ul style="list-style-type: none"> • Exit warning if shift lever position is not P and power source mode is not off.

Warning	<ul style="list-style-type: none"> • Exit warning if shift lever position is P and power source mode is not off. • Warning if occupant leaves with electrical key. • Warning if engine switch is operated while electrical key is outside actuation area. • Warning if entry lock is operated while electrical key is inside vehicle. • Warning if electrical key battery is weak. • The electrical key is left in the vehicle. • A door ajar. • The electrical key is left in the luggage compartment. • Steering lock does not release. • The steering lock mechanism is malfunctioning. • The main body ECU is malfunctioning. • An engine start method is displayed.
Battery Saving	If electrical key is constantly located within actuation area of door oscillator, system maintains periodic communication with electrical key. Therefore, if vehicle remains parked in that state for a long time, electrical key battery and vehicle battery could be drained.
Key Cancel 	<p>Following electrical key functions can be cancelled by performing certain operations:</p> <ul style="list-style-type: none"> • Entry Unlock/Lock • Memory Call • Entry Luggage Compartment Open • Electrical key Lock-in Prevention • Warning
Electrical Key Code Registration	<p>The total number of electrical keys that can be registered is seven.</p> <p>Enables the registration (writing and storing) of transmitter recognition codes in the EEPROM that is contained in the certification ECU.</p>

6. WIRELESS DOOR LOCK AND UNLOCK AND LUGGAGE COMPARTMENT OPEN FUNCTION

Push the LOCK/UNLOCK/PANIC/LUGGAGE COMPARTMENT switch on the electrical key to operate each function. For details,



7. ENTRY UNLOCK FUNCTION

- (a) The detection area is formed by communication between a door oscillator and door control receiver when the door is locked in order to detect access of the person carrying the electrical key.
- (b) When the person carrying the electrical key enters the detection area around the vehicle, the matching of the ID codes for a door oscillator and electrical key will automatically be performed. After the matching is completed, the door will enter unlock standby mode.
- (c) In unlock standby mode, the antenna built into the outside handle starts sensing. If the outside handle is held (the back side of the handle is touched), the door unlock operation will be performed. At this time, the hazard warning light blinks twice and the wireless door lock buzzer sounds twice.
- (d) If any of the doors are not opened after a door unlock operation, all doors will automatically lock after 60 (only for U.S.A. and Canadian package models) or 30 (except U.S.A. and Canadian package models) seconds.

8. ENTRY LOCK FUNCTION

- (a) After leaving the vehicle carrying the electrical key, push the lock switch on the outside handle when all the doors are closed.
- (b) The certification ECU determines whether the electrical key is located inside or outside of the cabin based on the information from a door oscillator and room oscillator. Then matching of the ID codes is performed.
- (c) When the matching result shows that the ID codes of the electrical key and indoor antenna do not match and the ID codes of the electrical key and door oscillator match, the door lock function will operate. At this time, the hazard

warning lights blink once and the wireless door lock buzzer sounds once.

- (d) If the electrical key is located inside of the cabin, the door lock function will not operate and the alarm buzzer (beep sound) will sound for 2 seconds.

9. ENTRY LUGGAGE COMPARTMENT OPEN FUNCTION

Stand in front of the luggage compartment with the electrical key and push the power luggage compartment opener switch to start the matching of the ID codes for the electrical key oscillator (outside luggage compartment). If the ID codes match, luggage compartment door open operation will be performed.

10. PREVENTION OF ELECTRICAL KEY CONFINEMENT FUNCTION

- (a) If you attempt to lock the door through keyless operation (move the lock knob to the lock position and then close the door) with the electrical key in the cabin, the system determines that the electrical key is located in the cabin and unlocks the door.
- (b) If the luggage compartment is closed with the electrical key in it, the alarm will sound and the luggage compartment can be opened only when all the doors are locked in order to prevent electrical key confinement in the vehicle.

11. ENTRY ILLUMINATION FUNCTION

When a person carrying the electrical key enters the detection area, the door will enter unlock standby mode and the front map light will illuminate.

HINT:

The entry illumination function operates when the electrical key enters the vehicle exterior detection area from out of the detection area. If the electrical key remains in the detection area for 3 seconds or more, the illumination function does not operate.

12. MEMORY CALL FUNCTION

When the engine switch is off and the driver side door is closed, opening the door will operate the memory call function (the door will move to a previously recorded driving position). Using the electrical key, memory call, electrical key registration and electrical key cancellation can be performed.

13. WARNING FUNCTION

- (a) General

When any of the situations below occur, the smart access system with push-button start causes the certification ECU to sound the buzzer in the combination meter and the wireless door lock buzzer, and illuminate the combination meter's multi-information display in order to alert the driver.

WARNING FUNCTION OPERATION CONDITION	SITUATION
Exit warning if shift lever position is not P and power source mode is not off.	A
Exit warning if shift lever position is P and power source mode is not off.	B
Warning if occupant leaves with electrical key.	C
Warning if engine switch is operated while electrical key is outside detection area.	D
Warning if entry lock is operated while electrical key is inside cabin.	E
Warning if electrical key battery is weak.	F
The electrical key is left in the vehicle.	G

A door is ajar.	H
The electrical key is left in the luggage compartment.	I
Steering lock does not release.	J
The steering lock mechanism is malfunctioning.	K
The main body ECU is malfunctioning.	L
An engine start method is displayed.	M

(b) Situation A

There are 2 patterns for situation A.

Pattern 1: In situation A, the door is opened and the user tries to leave the vehicle.

Pattern 2: Then the user holds the electrical key and tries to move away from the vehicle.

In these situations, the following control is performed:

- Pattern 1

POSSIBLE EFFECTS WITHOUT WARNING	SUDDEN VEHICLE START, VEHICLE THEFT, VEHICLE ROLL-AWAY
Warning Condition	Certification ECU gives warning when all following conditions are satisfied: <ul style="list-style-type: none"> • Shift lever position is not P • Engine switch is not off • Driver side door is opened • Vehicle speed is 5 km/h (3.1 mph)
Combination Meter <ul style="list-style-type: none"> • Buzzer 	Warning: Continuous sound
Combination Meter <ul style="list-style-type: none"> • Multi-information Display 	-
Wireless Door Lock Buzzer	Warning: Sounds 3 times
Warning Stop Condition	Warning is stopped when one of following conditions is met: <ul style="list-style-type: none"> • Engine switch is off • Shift lever position is P • Driver side door is closed • Vehicle speed is above 5 km/h (3.1 mph)

- Pattern 2

POSSIBLE EFFECTS WITHOUT WARNING	SUDDEN VEHICLE START, VEHICLE THEFT, VEHICLE ROLL-AWAY
Warning Condition	Certification ECU gives warning when all following conditions are satisfied: <ul style="list-style-type: none"> • Shift lever position is not P • Engine switch is not off • Driver side door is opened and closed • Vehicle speed is 0 km/h (0 mph)

	<ul style="list-style-type: none"> • Electrical key is not in cabin or luggage compartment
<p>Combination Meter</p> <ul style="list-style-type: none"> • Buzzer 	<p>Warning: Continuous sound Warning is stopped when one of following conditions is met:</p> <ul style="list-style-type: none"> • Engine switch is off • Shift lever position is P • Electrical key is in cabin or luggage compartment • Vehicle speed is above 0 km/h (0 mph)
<p>Combination Meter</p> <ul style="list-style-type: none"> • Multi-information Display 	<p>Warning: Information below is displayed alternately on combination meter:</p> <ul style="list-style-type: none"> • "Shift to P Range" • "Key is not Detected" <p>"Key is not detected" warning is stopped when of following conditions is met:</p> <ul style="list-style-type: none"> • Engine switch is off • Electrical key is in vehicle <p>"Shift to P range" warning is stopped when one of following conditions is met:</p> <ul style="list-style-type: none"> • Engine switch is off • Vehicle speed is above 0 km/h (0 mph) • Shift lever position is P
<p>Wireless Door Lock Buzzer</p>	<p>Warning: Continuous sound Warning is stopped when one of following conditions is met:</p> <ul style="list-style-type: none"> • Engine switch is off • Shift lever position is P • Electrical key is in cabin or luggage compartment • Vehicle speed is above 0 km/h (0 mph)

(c) Situation B

There are 2 patterns for situation B.

Pattern 1: In situation B, the door is opened and the user tries to leave the vehicle.

Then the user holds the electrical key and tries to move away from the vehicle.

Pattern 2: Then the user tries to use the entry lock and presses the lock switch.

In these situations, the following control is performed:

- Pattern 1

POSSIBLE EFFECTS WITHOUT WARNING	VEHICLE THEFT, ENGINE CANNOT BE RESTARTED
<p>Warning Condition</p>	<p>Certification ECU gives warning when all following conditions are satisfied:</p> <ul style="list-style-type: none"> • Shift lever position is P • Engine switch is not off • Driver side door is opened and closed • Electrical key is not in cabin or luggage compartment

Combination Meter <ul style="list-style-type: none"> Buzzer 	Warning: Sounds once
Combination Meter <ul style="list-style-type: none"> Multi-information Display 	Warning: Information below is displayed on combination meter: <ul style="list-style-type: none"> "Key is not Detected" Warning is stopped when either of following conditions is met: <ul style="list-style-type: none"> Engine switch is off Electrical key is in cabin or luggage compartment
Wireless Door Lock Buzzer	Warning: Sounds 3 times Warning is stopped when either of following conditions is met: <ul style="list-style-type: none"> Engine switch is off Electrical key is in cabin or luggage compartment

• Pattern 2

POSSIBLE EFFECTS WITHOUT WARNING	VEHICLE THEFT
Warning Condition	Certification ECU gives warning when all following conditions are satisfied: <ul style="list-style-type: none"> Shift lever position is P Engine switch is not off All doors are closed Lock switch is "ON" Electrical key is not in cabin or luggage compartment
Combination Meter <ul style="list-style-type: none"> Buzzer 	-
Combination Meter <ul style="list-style-type: none"> Multi-information Display 	-
Wireless Door Lock Buzzer	-

(d) Situation C

In this situation, the following control is performed:

POSSIBLE EFFECTS WITHOUT WARNING	ENGINE CANNOT BE RESTARTED
Warning Condition	Certification ECU gives warning when all following conditions are satisfied: <ul style="list-style-type: none"> Engine switch is not off Door other than driver side door is opened and closed Vehicle speed is 0 km/h (0 mph) Electrical key is not in cabin or luggage compartment
Combination Meter <ul style="list-style-type: none"> Buzzer 	Warning: Sounds once
	Warning:

<p>Combination Meter</p> <ul style="list-style-type: none"> Multi-information Display 	<p>Information below is displayed on combination meter:</p> <ul style="list-style-type: none"> "Key is not Detected" <p>Warning is stopped when one of following conditions is met:</p> <ul style="list-style-type: none"> Engine switch is off Vehicle speed is above 0 km/h (0 mph) Electrical key is in cabin or luggage compartment
<p>Wireless Door Lock Buzzer</p>	<p>Warning:</p> <p>Sounds 3 times</p> <p>Warning is stopped when one of following conditions is met:</p> <ul style="list-style-type: none"> Engine switch is off Vehicle speed is above 0 km/h (0 mph) Electrical key is in cabin or luggage compartment

(e) Situation D

In this situation, the following control is performed:

POSSIBLE EFFECTS WITHOUT WARNING	CONFUSES THE USER
<p>Warning Condition</p>	<p>Certification ECU gives warning when both following conditions are satisfied:</p> <ul style="list-style-type: none"> Engine switch is not off Electrical key is not in cabin
<p>Combination Meter</p> <ul style="list-style-type: none"> Buzzer 	<p>Warning:</p> <p>Sounds once</p>
<p>Combination Meter</p> <ul style="list-style-type: none"> Multi-information Display 	<p>Warning:</p> <p>Information below is displayed on combination meter for 8 seconds (disappears after 8 seconds):</p> <ul style="list-style-type: none"> "Key is not Detected"
<p>Wireless Door Lock Buzzer</p>	<p>-</p>

(f) Situation E

In this situation, the following control is performed:

POSSIBLE EFFECTS WITHOUT WARNING	VEHICLE THEFT
<p>Warning Condition</p>	<p>Certification ECU gives warning when all following conditions are satisfied:</p> <ul style="list-style-type: none"> Engine switch is off All doors are closed Lock switch is "ON" Electrical key is in cabin
<p>Combination Meter</p> <ul style="list-style-type: none"> Buzzer 	<p>-</p>
<p>Combination Meter</p> <ul style="list-style-type: none"> Multi-information Display 	<p>-</p>
<p>Wireless Door Lock Buzzer</p>	<p>Warning:</p>

Sounds for 2 seconds

(g) Situation F

In this situation, the following control is performed:

POSSIBLE EFFECTS WITHOUT WARNING	SMART ACCESS SYSTEM WITH PUSH-BUTTON START DOES NOT FUNCTION
Warning Condition	Certification ECU gives warning when all following conditions are satisfied: <ul style="list-style-type: none"> • Engine switch is turned off after being left on (IG) for over 20 minutes • Electrical key battery voltage is low • Electrical key is in cabin or luggage compartment
Combination Meter <ul style="list-style-type: none"> • Buzzer 	Warning: Sounds once
Combination Meter <ul style="list-style-type: none"> • Multi-information Display 	Information below is displayed on combination meter: <ul style="list-style-type: none"> • "Low Key Battery"
Wireless Door Lock Buzzer	-

(h) Situation: G

There are two patterns for situation G.

- Pattern 1: When the driver's door is open, the driver changes the power source mode to ACC and attempts to leave the vehicle.
- Pattern 2: When the driver's door is open, the driver changes the power source mode from ON 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 Condition	The warning is activated when one of the following conditions is met: <ul style="list-style-type: none"> • Engine switch is on (ACC) and the driver door is opened. • Engine switch is off, the steering is unlocked, and the driver door is opened.
Combination Meter <ul style="list-style-type: none"> • Buzzer 	Continues to sound at short and even intervals
Combination Meter <ul style="list-style-type: none"> • Multi-information Display 	-
Wireless Door Lock Buzzer	-
Engine Switch Indicator Light	-
Warning Stop Condition	Warning is stopped when one of the following conditions is met: <ul style="list-style-type: none"> • Engine switch is not off. • Driver side door is closed. • Engine switch is off and the steering is locked

(i) Situation: H

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 Condition	The warning is activated when all of the following conditions are met: <ul style="list-style-type: none"> • Engine switch is off. • Any doors are opened. • Entry lock button on the outer door handle is operated.
Combination Meter <ul style="list-style-type: none"> • Buzzer 	-
Combination Meter <ul style="list-style-type: none"> • Multi-information Display 	-
Wireless Door Lock Buzzer	Warning: Continuous sound
Engine Switch Indicator Light	-
Warning Stop Condition	Warning is stopped when one of the following conditions is met: <ul style="list-style-type: none"> • Engine switch is off • All doors are closed. • Wireless door lock remote function is unlocked. • Entry unlock is operated. • 10 seconds have elapsed since the wireless door lock buzzer was activated.

(j) Situation: I

The luggage compartment door is closed with the electrical key left in the luggage compartment.

In this situation, the following control is performed:

POSSIBLE EFFECTS WITHOUT WARNING	KEY CONFINEMENT
Warning Condition	The warning is activated when all of the following conditions are met: <ul style="list-style-type: none"> • Vehicle speed is 5 mph (3.1 km/h). • All doors are closed. • Entry luggage compartment open function is available.
Combination Meter <ul style="list-style-type: none"> • Buzzer 	-
Combination Meter <ul style="list-style-type: none"> • Multi-information Display 	-
Wireless Door Lock Buzzer	Sounds for 2 seconds
Warning Stop Condition	The luggage compartment is opened using the entry luggage compartment open function and the electrical key is removed from the luggage compartment.

(k) Situation: J

The steering lock cannot be released.

In this situation, the following control is performed:

POSSIBLE EFFECTS WITHOUT WARNING	STEERING USABILITY FUNCTION
Warning Condition	The steering lock cannot be released, thus the engine is prevented from starting.
Combination Meter • Buzzer	-
Combination Meter • Multi-information Display	Warning: Information below is displayed alternately on combination meter: Displayed for 15 seconds (and then automatically turned off) "S/T IS NOT UNLOCKED"
Combination Meter • Master Warning Light	Flash
Wireless Door Lock Buzzer	-
Engine Switch Indicator Light	The green indicator blinks at 1-second intervals (goes off automatically in 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.

(l) Situation: K

A malfunction of the steering lock ECU is detected.

In this situation, the following control is performed:

POSSIBLE EFFECTS WITHOUT WARNING	MALFUNCTION DETECTION
Warning Condition	A malfunction of the steering lock ECU is detected.
Combination Meter • Buzzer	-
Combination Meter • Multi-information Display	Warning: Information below is displayed alternately on combination meter: "CHECK S/T OFF"
Combination Meter • Master Warning Light	Flash
Wireless Door Lock Buzzer	-
Engine Switch Indicator Light	The amber indicator blinks at 2-second intervals.
Warning Stop Condition	The steering lock ECU returns to normal.

(m) Situation: L

A malfunction of the main body ECU is detected.

In this situation, the following control is performed:

POSSIBLE EFFECTS WITHOUT WARNING	MALFUNCTION DETECTION
Warning Condition	A malfunction in the main body ECU is detected.
Combination Meter • Buzzer	-
Combination Meter	-

• Multi-information Display	
Combination Meter	-
• Master Warning Light	
Wireless Door Lock Buzzer	-
Engine Switch Indicator Light	The amber indicator blinks at 2-second intervals.
Warning Stop Condition	The main body ECU returns to normal.

(n) Situation: M

A warning message appears on the meter when the driver does not follow the proper procedure to start the vehicle.

In this situation, the following control is performed:

POSSIBLE EFFECTS WITHOUT WARNING	USABILITY FUNCTION
Warning Condition	The warning is activated when all of the following conditions are met: <ul style="list-style-type: none"> • Power source is in a mode other than "ON". • Any doors are closed and opened. • The power source is changed from OFF to ACC more than once with the engine off and brake pedal not depressed.
Combination Meter	-
• Buzzer	
Combination Meter	Warning: Information below is displayed alternately on combination meter: "WHEN STARTING THE ENGINE DEPRESS THE BRAKE PEDAL"
• Multi-information Display	
Combination Meter	-
• Master Warning Light	
Wireless Door Lock Buzzer	-
Engine Switch Indicator Light	-
Warning Stop Condition	The warning is stopped when one of the following conditions is met: <ul style="list-style-type: none"> • 10 seconds have elapsed since a warning message was displayed. • The engine switch is pushed with the brake pedal depressed.

14. BATTERY SAVING

(a) Vehicle Battery Saving Function

In the smart access system with push-button start, signals are emitted outside of the vehicle at a prescribed interval (0.25 seconds) 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 carried out:

CONDITION	CONTROL
Both conditions below are met for 5 days: <ul style="list-style-type: none"> • Electrical key is not in detection area • Touch sensor or lock switch operation is not performed 	Signal transmission interval is extended from 0.25 to 0.75 seconds

Both conditions below are met for 14 days:

- Electrical key is not in detection area
- Touch sensor or lock switch operation is not performed

Automatically deactivates the smart access system with push-button start

Reinstatement Conditions

- A wireless door lock control signal (lock, unlock) is input and the ID code matches.
- A user carries the electrical key and pushes a lock switch on an outside door handle.
- A door is locked or unlocked by the mechanical key.

(b) Electrical Key Battery and Vehicle Battery Saving Function

In the smart access system with push-button start, if the electrical key is constantly located within the vehicle exterior detection area of the doors, the system maintains periodic communication with the electrical key. Therefore, if the vehicle remains parked in that state for a long time, the electrical key battery and the vehicle battery could be drained. For this reason, if this state continues longer than 10 minutes, the smart access system with push-button start automatically becomes deactivated.

Reinstatement Conditions

- A wireless door lock control signal (lock, unlock) is input and the ID code matches.
- A user carries the electrical key and pushes a lock switch on an outside door handle.
- A door is locked or unlocked by the mechanical key.

