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Model Year: 2014	**Model:** RAV4 EV	**Prod Date Range:** [09/2013 -]
Title: THEFT DETERRENT / KEYLESS ENTRY: SMART KEY SYSTEM: DETAILS; 2014 MY RAV4 EV [09/2013 -]		

DETAILS

1. FUNCTION OF MAIN COMPONENTS

(a) The main components of the start function have the following functions:

COMPONENT	FUNCTION
Power Switch (Push Start Switch) - Transponder Key Amplifier	• Transmits power switch signals to the main body ECU. • Informs the driver of any power source or system abnormality through the illumination state of the indicator light. • Receives an ID code and transmits it to the certification ECU when the electrical key transmitter sub-assembly battery is too weak to respond to the tuner based on the indoor electrical oscillators.
Electrical Key Transmitter Sub-assembly	Receives signals from the oscillators and returns an ID code to the door control receiver.
Indoor Electrical Key Oscillator	Receives a request signal from the certification ECU assembly and forms the actuation area in the vehicle interior.
Door Control Receiver	Receives an ID code from the electrical key transmitter sub-assembly and transmits it to certification ECU.
Main Body ECU (Instrument Panel Junction Block Assembly)	• Controls switching the power source mode between off, on (ACC) and on (IG). • Controls the smart key system in accordance with signals received from the switches and each ECU.
Power Management Control ECU	• Receives electric vehicle control system start request signals from the main body ECU. • Receives immobiliser unset request signals from the ID code box. • Receives the above signals from the main body ECU and ID code box, and starts the electric vehicle control system. • Receives signals from the P position switch and sends P position request signals to the transmission control ECU.
Transmission Floor Shift Assembly - Shift Lever Position Sensor	Sends shift position state signals to the power management control ECU.
P Position Switch	Sends shift position P state signals to the power management control ECU.
Transmission Control ECU	Switches the shift position to P in accordance with signals from the power management control ECU.

COMPONENT	FUNCTION
Certification ECU (ECU Aggregation Box Assembly)	• Certifies the ID code received from the door control receiver and transmits the certification results to the ID code box and steering lock ECU. • Transmits steering lock/unlock request signals. • Transmits immobiliser set/unset request signals.
Stop Light Switch Assembly	Outputs the state of the brake pedal to main body ECU.
ID Code Box (Immobiliser Code ECU)	Receives steering lock/unlock or immobiliser set/unset request signals from the certification ECU, certifies them, and transmits each signal to the steering lock ECU or power management control ECU.
Steering Lock ECU	Receives steering unlock/lock request signals from the ID code box, and activates the steering lock motor.
Skid Control ECU	Transmits the vehicle speed signal.
Combination Meter Assembly - Multi-information Display - Buzzer - Master Warning Light	When the certification ECU detects human errors, it warns the driver by sounding the wireless door lock buzzer, illuminating the master warning light, displaying the multi-information display, and sounding the buzzer in the combination meter assembly in accordance with request signals from the ECU.

(b) The main components of the entry function have the following functions:

COMPONENT	FUNCTION
Electrical Key Transmitter Sub-assembly	• Outputs the information such as the key ID and vehicle ID when receiving request signals that are output by the room and door oscillators. • Outputs request signals when a driver pushes the lock, unlock or panic button on the electrical key transmitter sub-assembly. • Outputs the information such as the key ID and vehicle ID when receiving the radio wave that is output by the transponder key amplifier in the power switch. • Integrates the mechanical key in order to unlock the doors when the electrical key transmitter subassembly battery is low.
Main Body ECU (Instrument Panel Junction Block Assembly)	• Receives request signals from the certification ECU and actuates the door lock motor to unlock or lock all the doors and back door. • Transmits each door condition and back door condition to the certification ECU.
Certification ECU (ECU Aggregation Box Assembly)	• Certifies the ID code received from the door control receiver and transmits the certification results to the ID code box and steering lock ECU. • Controls the oscillators and the touch sensor.

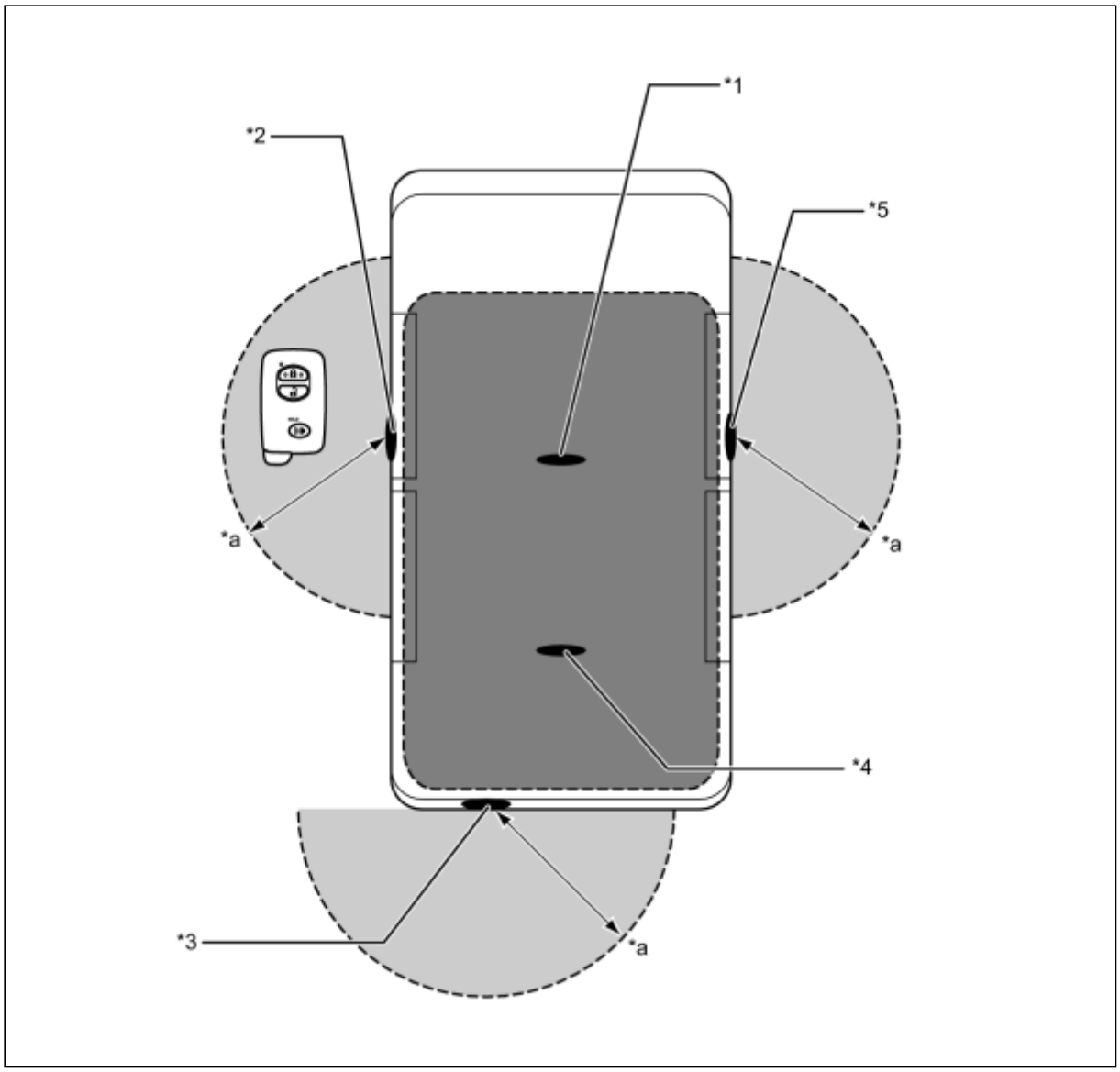
COMPONENT		FUNCTION
		• Transmits door lock/unlock request signals during the entry function.
Door Electrical Key Oscillators		Transmit request signals.
Outside Door Handle	Electrical Key Antenna	Receives request signals from the certification ECU, and forms an actuation area around the front door and back door.
	Lock Switch	Transmits door lock request signals to the certification ECU.
	Touch Sensor	Detects when a person touches the inside of an outside door handle.
Indoor Electrical Key Oscillators - Front, Rear		Receive request signals from the certification ECU and form an actuation area in the vehicle interior.
Door Control Receiver		Receives an ID code from the electrical key transmitter sub-assembly and transmits it to the certification ECU.
Wireless Door Lock Buzzer		Sounds as an answer back for entry lock or unlock to inform the driver.

2. OPERATING CONDITION

(a) The special functions of the smart key system only work when the electrical key transmitter subassembly is in the actuation area formed by the 5 oscillators.

(b) The front indoor electrical key oscillator and rear indoor electrical key oscillator form the actuation area of the start function.

(c) The door electrical key oscillators form the actuation area of the entry function.



Text in Illustration

*1	Front Indoor Electrical Key Oscillator	*2	Door Electrical Key Oscillator LH
*3	Door Electrical Key Oscillator (Back Door)	*4	Rear Indoor Electrical Key Oscillator
*5	Door Electrical Key Oscillator RH	-	-
*a	Approx. 0.7 m to 1.0 m (2.3 ft. to 3.3 ft.)	-	-
	Interior Actuation Area		Exterior Actuation Area

ACTUATION AREA	DETAILS
Interior	• The front indoor electrical key oscillator forms the actuation area in the upper sections of the driver seat and front passenger seat. • The rear indoor electrical key oscillator forms the actuation area in the upper section of the rear seat and in the luggage compartment.

ACTUATION AREA	DETAILS
Exterior	The exterior actuation area formed by the door electrical key oscillators is approx. 0.7 to 1.0 m (2.3 to 3.3 ft.) from the outside handle of the front doors or the left of the back door.
Around Front Door and Back Door	The exterior actuation area of the door electrical key oscillators is formed by transmitting a request signal every 0.25 seconds while the power switch is off and each door is locked. In this way, the proximity of an electrical key transmitter sub-assembly can be detected. When locking the door using the lock switch on the outside door handle, the actuation area is formed when the lock switch is pressed.

3. FUNCTION

(a) Start Function

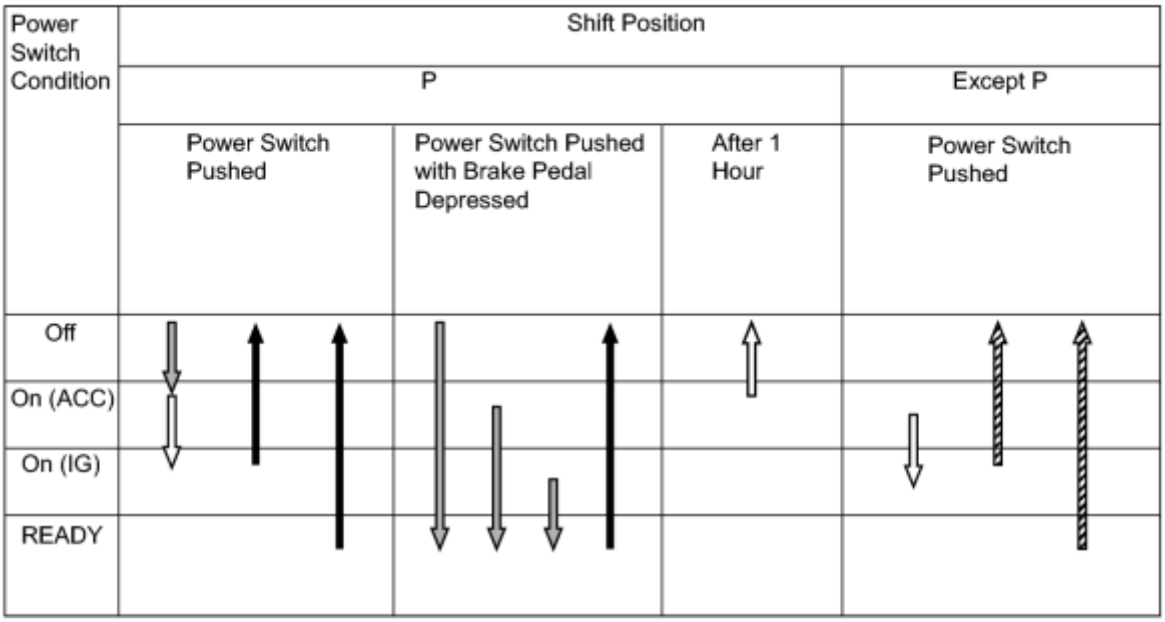
(1) The start function has different power source modes to suit the brake pedal condition and shift position.

(2) When a driver who is carrying an electrical key transmitter sub-assembly enters the vehicle while the power source mode is off, and presses the power switch without depressing the brake pedal, the power source mode turns on (ACC), causing the power switch indicator light to illuminate in amber. With each pressing of the power switch, the power source mode switches as follows: off → on (ACC) → on (IG) → off.

(3) When a driver who is carrying an electrical key transmitter sub-assembly enters the vehicle while the power source mode is off, and depresses the brake pedal, the power switch indicator light will illuminate in green. Pressing the power switch with the indicator light illuminated in green will cause the electric vehicle control system to start.

(4) When the vehicle is stopped and the shift position is in P while the electric vehicle control system is activated, pressing the power switch will turn off the power source mode. In addition, when the vehicle is stopped and the shift position is in a position other than P, pressing the power switch will automatically switch the shift position to P and turn off the power source mode.

Transition of Power Source Mode



: Transition

: Only when the key certification is OK

: Only when the vehicle is stopped

- If the power switch is pressed for 2 seconds or more or pressed 3 times or more in a row, the electric vehicle control system is stopped and the power source mode changes to on (ACC).

: Only when the vehicle is stopped

- Stop the electric vehicle control system without setting the shift position to P, the shift position will be changed to P automatically.

(5) Transition of the power source when the electrical key transmitter sub-assembly does not operate properly due to a depleted battery or radio jamming.

1. Unlock the door with the built-in mechanical key and get in the vehicle while carrying the electrical key transmitter sub-assembly.
2. Bring the electrical key transmitter sub-assembly ornament face into contact with the front face of the power switch with the brake pedal depressed.
3. Release the brake pedal within approximately 10 seconds after the buzzer in the combination meter sounds, and press the power switch.
4. Each time the power switch is pressed, the power source is turned from off to on (ACC), on (ACC) to on (IG), and then on (IG) to off.

(6) Electric vehicle control system start-up when the electrical key transmitter sub-assembly does not operate properly due to a depleted battery or radio jamming.

1. Unlock the door with the built-in mechanical key and get in the vehicle while carrying the electrical key transmitter sub-assembly.
2. Bring the electrical key transmitter sub-assembly ornament face into contact with the front face of the power switch with the brake pedal depressed when the shift position is in P.
3. Press the power switch with the brake pedal depressed within approximately 10 seconds after the buzzer in the combination meter sounds and the power switch indicator light turns green.
4. The electric vehicle control system starts when the power switch is pressed.

HINT:

- Normally, the operation of the power switch is disabled while the vehicle is being driven. However, if the electric vehicle control system must be stopped in an emergency while the vehicle is in motion, the driver can press the power switch either 3 times in rapid succession or for approximately 2 seconds or more to stop the electric vehicle control system.
- If the electric vehicle control system does not start due to any reason, the following operation may enable the electric vehicle control system to start. Press the power switch to turn the power source mode from off to on (ACC), and press the power switch again and hold it for 15 seconds or more.
- The above 2 operations must be carried out only in emergency situations. Under normal conditions, the electric vehicle control system must not be stopped by pressing the power switch during driving or started without depressing the brake pedal when the shift position is in any position other than P.

(b) Entry Function

(1) The entry function consists of the following functions:

FUNCTION	OUTLINE
Wireless Door Lock Control	This function is convenient for locking and unlocking all the doors and back door at a distance.
Entry Illumination	When an electrical key transmitter sub-assembly enters any actuation area of the door electrical key oscillators, the room light, foot light and power switch illumination are turned on.
Entry Unlock	When an electrical key transmitter sub-assembly is located in the exterior actuation area of any door electrical key oscillator, the door will unlock after the inside of either front outside door handle is touched. • The driver's outside door handle unlocks the driver's door. • The front passenger outside door handle or back door outside handle unlocks all doors and the back door.
Entry Unlock Mode Switching	Allows switching between 2 entry unlock function operation modes. • Driver Door Mode (Default Setting) • All Door Mode
Entry Lock	When an electrical key transmitter sub-assembly is located in the exterior actuation area of any door electrical key oscillator and the power switch is off, all doors can be locked by simply pressing the lock switch.
Prevention of Key Confinement	Prevents the doors and back door from being locked by the outside door handle while the electrical key transmitter sub-assembly is still inside the vehicle.
Warning	The smart key system causes the certification ECU to sound the buzzer in the combination meter assembly and uses the multi-information display in order to alert the driver.
Battery Saving	To prevent the electrical key transmitter sub-assembly battery and the vehicle battery from becoming discharged, the battery saving function activates when the vehicle remains unused for a long period of time or the electrical key transmitter sub-assembly has been detected in the exterior actuation area for more than 10 minutes.
Key Code Registration	Enables the registering (writing and storing) of transmitter recognition codes in the EEPROM that is contained in the certification ECU. A total

FUNCTION	OUTLINE
	of 7 keys can be registered.

(c) Wireless Door Lock Control Function

(1) The wireless door lock control function has the following functions:

FUNCTION	OUTLINE	CUSTOMIZABLE FUNCTION*1 (DEFAULT SETTING)
All Doors Lock	Pressing the lock button of the electrical key transmitter sub-assembly locks all the doors.	Standard (Not Customizable)
All Doors Unlock (2-step Unlock)	Pressing the unlock button of the electrical key transmitter sub-assembly once unlocks the driver door, and pressing it again within 3 seconds unlocks all the doors.	Default setting is on*2
All Doors Unlock (1-step Unlock)	Pressing the unlock button of the electrical key transmitter sub-assembly unlocks all the doors.	-
Answer Back	When the doors are being locked or unlocked through the operation of the electrical key transmitter sub-assembly, the wireless door lock buzzer sounds and the hazard lights blink once during locking and twice during unlocking. Also, the answer back function operates when the doors are locked by the auto relock function.	Default setting is on
Panic Alarm	Pressing and holding the panic button on the electrical key transmitter subassembly for approx. 0.8 seconds activates alarms. Pushing any button on the electrical key transmitter sub-assembly during the alarms cancels the alarms.	Default setting is on
Automatic Relock	If none of the doors are opened within 60 seconds after they are unlocked using the wireless door lock control, all the doors will be locked again automatically.	Default setting is on
Security	Sends a door lock/unlock operation request signal as a rolling code.	Standard (Not Customizable)
Door Ajar Warning	If any door is open or ajar, pressing the lock button of the electrical key transmitter sub-assembly will cause the wireless door lock buzzer to sound for approx. 10 seconds as a warning.	Standard (Not Customizable)

HINT:

*1: The customizable setting of each function can be changed. For details, refer to the Repair Manual.

*2: When the all door unlock function (2-step unlock) is turned off, the all door unlock function (1-step unlock) will automatically turn on.

(d) Entry Unlock Mode Switching

(1) The entry unlock mode can be switched between the following 2 modes in accordance with the driver's intention:

- All Door Mode
- Driver Door Mode (Default Setting)

(2) In all door mode, all doors are unlocked by touching the driver, front passenger or back door touch sensor. In driver door mode, only the driver door is unlocked by touching the driver side touch sensor, and all doors are unlocked by touching the front passenger or back door touch sensor.

(3) The switching of the entry unlock mode is performed when the power source mode is off and the electrical key transmitter sub-assembly indicator light is not illuminated. Within a distance range of 1 meter from the vehicle, press and hold both the unlock or panic button and lock button of the electrical key transmitter sub-assembly for approximately 5 seconds.

(4) In entry unlock mode, the wireless door lock buzzer, multi-information display, or the buzzer in combination meter assembly will sound to inform the driver of the state of the entry unlock mode.

Mode	Wireless Door Lock Buzzer	Buzzer in Combination Meter Assembly	Multi-information Display
Driver Door (Default)	 Sounds 3 times	Sounds once	
All Door	 Sounds 2 times	Sounds once	

o

(e) Entry Unlock Function

(1) When the electrical key transmitter sub-assembly is in the actuation area surrounding the driver seat, gripping the driver outside door handle will unlock the driver door only, and gripping the front passenger or back door outside door handle will unlock all doors.*

HINT:

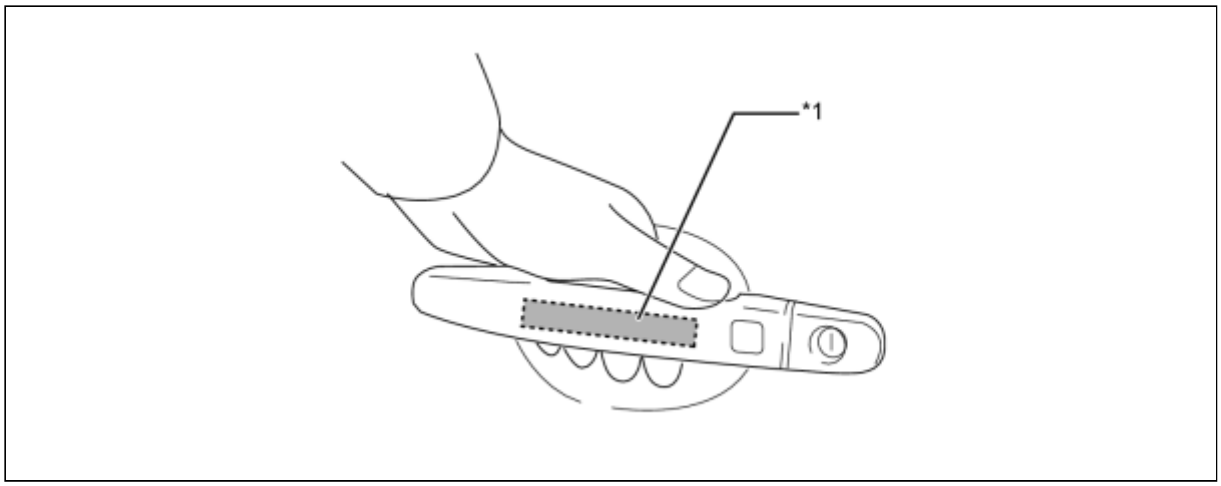
*: Driver door mode

(2) When the electrical key transmitter sub-assembly is in any of the exterior actuation areas, all doors are unlocked by gripping the driver, front passenger or back door outside door handle.*

HINT:

*: All door mode

(3) After all doors have been unlocked, the wireless door lock buzzer sounds twice as an answer back and the hazard lights flash twice at the same time.



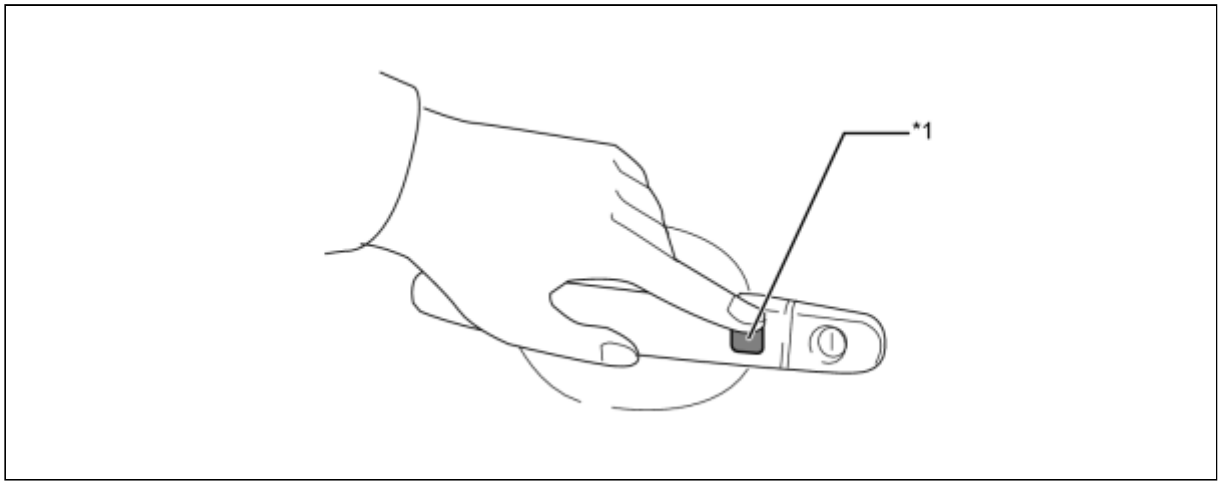
Text in Illustration

*1	Touch Sensor	-	-

(f) Entry Lock Function

(1) When the electrical key transmitter sub-assembly is in any of the exterior actuation areas, all doors are locked by pressing the lock switch of the driver, front passenger or back door outside door handle.

(2) After all doors have been locked, the wireless door lock buzzer sounds once as an answer back and the hazard lights flash once at the same time.



Text in Illustration

*1	Lock Switch	-	-

(g) Warning Function

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

SITUATION	CONDITION
A	The shift position is in a position other than P and the power source mode is in a mode other than off.
B	The driver door is opened while the steering is unlocked.
C	The shift position is in P and the power source mode is not off.
D	The entry lock is operated while any of the doors are open.

SITUATION	CONDITION
E	The occupant leaves with the electrical key transmitter sub-assembly.
F	The power switch is operated while the electrical key transmitter sub-assembly is outside the actuation area.
G	The entry lock is operated while the electrical key transmitter sub-assembly is inside the vehicle.
H	The electrical key transmitter sub-assembly battery is low.
I	The steering lock cannot be released.
J	A steering lock ECU malfunction has been detected.
K	A main body ECU malfunction has been detected.

(2) There are two patterns for situation A.

Pattern 1: The driver door is opened and the user tries to leave the vehicle:

<table>
<tr><td>Possible Effects without Warning</td><td colspan="3">Sudden vehicle start, Vehicle theft, Vehicle roll-away</td></tr>
<tr><td>Warning Condition</td><td colspan="3">The warning is activated when all of the following conditions are met:
Power source is in a mode other than off.
Shift position is in any position except P.
Vehicle speed is 0 km/h (0 mph).
Driver door is opened.</td></tr>
<tr><td rowspan="4">Warning Method</td><td rowspan="2">Combination Meter Assembly</td><td>Buzzer</td><td>Sounds continuously</td></tr>
<tr><td>Master Warning Light</td><td>-</td></tr>
<tr><td>Multi-information Display</td><td colspan="2">The following warning message is displayed:
Shift to P position</td></tr>
<tr><td>Wireless Door Lock Buzzer</td><td colspan="2">-</td></tr>
<tr><td>Power Switch Illumination</td><td colspan="2">-</td></tr>
<tr><td>Warning Stop Condition</td><td colspan="3">The warning is stopped when one of the following conditions is met:
Power source mode is turned off.
Shift position is in P.
Vehicle speed is above 0 km/h (0 mph).
Driver door is closed.</td></tr>
</table>

Pattern 2: In addition to pattern 1, the user holds the electrical key transmitter sub-assembly and tries to move away from the vehicle. In these situations, the following control is performed:

Possible Effects without Warning	Sudden vehicle start, Vehicle theft, Vehicle roll-away

<table>
<tr><td>Warning Condition</td><td colspan="3">The warning is activated when all of the following conditions are met:
Power source is in a mode other than off.
Shift position is in any position except P.
Vehicle speed is 0 km/h (0 mph).
Driver door is changed from open to closed.
Electrical key transmitter sub-assembly is not in the vehicle interior.</td></tr>
<tr><td rowspan="4">Warning Method</td><td rowspan="2">Combination Meter Assembly</td><td>Buzzer</td><td>Sounds continuously</td></tr>
<tr><td>Master Warning Light</td><td>Flashes</td></tr>
<tr><td>Multi-information Display</td><td colspan="2">The following warning messages are alternately displayed:
Shift to P position
Key Not Detected</td></tr>
<tr><td>Wireless Door Lock Buzzer</td><td colspan="2">Sounds continuously</td></tr>
<tr><td>Power Switch Illumination</td><td colspan="2">-</td></tr>
<tr><td>Warning Stop Condition</td><td colspan="3">The warning is stopped when one of the following conditions is met:
Power source mode is turned off.
All warning operations stop.
Vehicle speed rises above 0 km/h (0 mph).
Buzzer and wireless door lock buzzer stop sounding.
Multi-information display shows "Key not detected" only.
Master warning light turns off.
Electrical key transmitter sub-assembly returns to the vehicle interior.
Buzzer and wireless door lock buzzer stop sounding.
Multi-information display shows "Shift to P range" only.
Master warning light turns off.</td></tr>
</table>

(3) Situation B

In this situation, the following control is performed:

Possible Effects without Warning	Vehicle theft
Warning Condition	The warning is activated when one of the following conditions is met: • Power source mode is on (ACC) and the driver door is opened.

<table>
<tr><td></td><td colspan="3">• Power source mode is off, the steering is unlocked, and the driver door is opened.</td></tr>
<tr><td rowspan="4">Warning Method</td><td rowspan="2">Combination Meter Assembly</td><td>Buzzer</td><td>Continuously sounds at short and even intervals</td></tr>
<tr><td>Master Warning Light</td><td>-</td></tr>
<tr><td>Multi-information Display</td><td colspan="2">-</td></tr>
<tr><td>Wireless Door Lock Buzzer</td><td colspan="2">-</td></tr>
<tr><td></td><td>Power Switch Illumination</td><td colspan="2">-</td></tr>
<tr><td>Warning Stop Condition</td><td colspan="3">The warning is stopped when one of the following conditions is met:
• Power source mode is turned on (IG) or the driver door is closed.
• Power source mode is turned off and the steering is locked.</td></tr>
</table>

(4) There are 2 patterns for situation C.

Pattern 1: When the shift position is in P, the door is closed and the user holds the electrical key transmitter sub-assembly and tries to move away from the vehicle:

<table>
<tr><td>Possible Effects without Warning</td><td colspan="3">Vehicle theft, Electric vehicle control system cannot be restarted, Discharged auxiliary battery</td></tr>
<tr><td>Warning Condition</td><td colspan="3">The warning is activated when all of the following conditions are met:
• Power source is in a mode other than off.
• Shift position is in P.
• Electrical key transmitter sub-assembly is not in the vehicle interior.
• Driver door is changed fron open to closed.</td></tr>
<tr><td rowspan="4">Warning Method</td><td rowspan="2">Combination Meter Assembly</td><td>Buzzer</td><td>Sounds once</td></tr>
<tr><td>Master Warning Light</td><td>Flashes</td></tr>
<tr><td>Multi-information Display</td><td colspan="2">The following warning message is displayed:
• Key Not Detected</td></tr>
<tr><td>Wireless Door Lock Buzzer</td><td colspan="2">Sounds 3 times</td></tr>
<tr><td></td><td>Power Switch Illumination</td><td colspan="2">-</td></tr>
<tr><td>Warning Stop Condition</td><td colspan="3">The warning is stopped when one of the following conditions is met:
• Power source mode is turned off.
• Electrical key transmitter sub-assembly returns to the vehicle interior.</td></tr>
</table>

Pattern 2: In addition to pattern 1, the user tries to use the entry lock and presses the lock switch. In these situations, the following control is performed:

<table>
<tr><td>Possible Effects without Warning</td><td colspan="3">Vehicle theft, Discharged auxiliary battery</td></tr>
<tr><td>Warning Condition</td><td colspan="3">The warning is activated when all of the following conditions are met:
• Power source is in a mode other than off.
• Shift position is in P.
• All doors are closed.
• Lock switch is on.
• Electrical key transmitter sub-assembly is not in the vehicle interior (within one of the actuation areas).</td></tr>
<tr><td rowspan="5">Warning Method</td><td rowspan="2">Combination Meter Assembly</td><td>Buzzer</td><td>-</td></tr>
<tr><td>Master Warning Light</td><td>-</td></tr>
<tr><td>Multi-information Display</td><td colspan="2">-</td></tr>
<tr><td>Wireless Door Lock Buzzer</td><td colspan="2">Sounds for 60 seconds</td></tr>
<tr><td>Power Switch Illumination</td><td colspan="2">-</td></tr>
<tr><td>Warning Stop Condition</td><td colspan="3">The warning is stopped when one of the following conditions is met:
• Power source mode is turned off.
• Electrical key transmitter sub-assembly returns to the vehicle interior.
• Shift position is in any position except P.</td></tr>
</table>

(5) Situation D

In this situation, the following control is performed:

<table>
<tr><td>Possible Effects without Warning</td><td colspan="3">Vehicle theft</td></tr>
<tr><td>Warning Condition</td><td colspan="3">The warning is activated when all of the following conditions are met:
• Power source mode is off.
• Any door is opened.
• Lock switch is on.</td></tr>
<tr><td rowspan="5">Warning Method</td><td rowspan="2">Combination Meter Assembly</td><td>Buzzer</td><td>-</td></tr>
<tr><td>Master Warning Light</td><td>-</td></tr>
<tr><td>Multi-information Display</td><td colspan="2">-</td></tr>
<tr><td>Wireless Door Lock Buzzer</td><td colspan="2">Sounds continuously</td></tr>
<tr><td>Power Switch Illumination</td><td colspan="2">-</td></tr>
<tr><td>Warning Stop Condition</td><td colspan="3">The warning is stopped when one of the following conditions is met:
• Power source is turned to a mode other than off.
• All doors are closed.
• Wireless door unlock function is operated.
• Entry unlock is operated.</td></tr>
</table>

	• 10 seconds have elapsed after the wireless door lock buzzer was activated.

(6) Situation E

In this situation, the following control is performed:

Possible Effects without Warning	Confuses the user		
Warning Condition	The warning is activated when all of the following conditions are met: • Power source mode is not off. • The state of any door other than the driver door changed from open to closed. • Vehicle speed is 0 km/h (0 mph). • Electrical key transmitter sub-assembly is not inside the vehicle.		
Warning Method	Combination Meter Assembly	Buzzer	Sounds once
		Master Warning Light	Flashes
	Multi-information Display	The following warning message is displayed for 8 seconds (and then automatically turned off). • Key Not Detected	
	Wireless Door Lock Buzzer	Sounds for 3 seconds	
	Power Switch Illumination	-	
Warning Stop Condition	The warning is stopped when one of the following conditions is met: • Power source mode is off. • Electrical key transmitter sub-assembly returns to the vehicle interior. • Vehicle speed is above 0 km/h (0 mph).		

(7) Situation F

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: • Power switch is pushed. • Electrical key transmitter sub-assembly is not in the vehicle interior.

Warning Method	Combination Meter Assembly	Buzzer	Sounds once
		Master Warning Light	-
	Multi-information Display	-	
	Wireless Door Lock Buzzer	-	
	Power Switch Illumination	-	
Warning Stop Condition	The warning is stopped when one of the following conditions is met: • Power source mode is off. • Electrical key transmitter sub-assembly returns to the vehicle interior.		

(8) Situation G

In this situation, the following control is performed:

Possible Effects without Warning	Electrical key transmitter sub-assembly confinement		
Warning Condition	The warning is activated when all of the following conditions are met: • Power source mode is off. • All doors are closed. • Electrical key transmitter sub-assembly is inside the vehicle. • Lock switch is on.		
Warning Method	Combination Meter Assembly	Buzzer	-
		Master Warning Light	-
	Multi-information Display	-	
	Wireless Door Lock Buzzer	Sounds continuously	
	Power Switch Illumination	-	
Warning Stop Condition	The warning is stopped when one of the following conditions is met: • Power source mode is on (ACC) or on (IG). • Any door is open.		

(9) Situation H

In this situation, the following control is performed:

Possible Effects without Warning	Smart key system does not function
Warning Condition	The warning is activated when all of the following conditions are met: • Power source mode is turned off after being left in on (IG) for over 20 minutes. • Electrical key transmitter sub-assembly battery voltage is low. • Electrical key transmitter sub-assembly is in the vehicle interior.

Warning Method	Combination Meter Assembly	Buzzer	Sounds once
		Master Warning Light	Illuminated
	Multi-information Display	The following warning message is displayed for 5 seconds (and then automatically turned off): • Key Battery Low	
	Wireless Door Lock Buzzer	-	
	Power Switch Illumination	-	
Warning Stop Condition	The electrical key transmitter sub-assembly battery is replaced with a new one.		

(10) Situation I

In this situation, the following control is performed:

Possible Effects without Warning	Steering usability function		
Warning Condition	The steering lock does not release, thus the electric vehicle control system is prevented from starting.		
Warning Method	Combination Meter Assembly	Buzzer	-
		Master Warning Light	Flashes
	Multi-information Display	The following warning message is displayed for 15 seconds (and then automatically turned off). • Steering Lock Active	
	Wireless Door Lock Buzzer	-	
	Power Switch Illumination	The green indicator blinks at 1-second intervals (and goes off automatically).	
Warning Stop Condition	If the power switch is pressed again while the steering wheel is tuned left and right, and the steering lock successfully disengages, the warning will stop.		

(11) Situation J

In this situation, the following control is performed:

Possible Effects without Warning	Malfunction detection
Warning Condition	A malfunction in the steering lock ECU is detected.

Warning Method	Combination Meter Assembly	Buzzer	-
		Master Warning Light	Flashes
	Multi-information Display	The following warning message is displayed for 15 seconds (and then automatically turned off): • Check Steering Lock System	
	Wireless Door Lock Buzzer	-	
	Power Switch Illumination	The amber indicator blinks at 2-second intervals.	
Warning Stop Condition	The steering lock ECU returns to normal.		

(12) Situation K

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

(h) Battery Saving Function

(1) Vehicle Battery Saving

- Control
  - If the electric vehicle control system is not started for 5 days or longer, the signal transmission interval is extended from 250 msec. to 750 msec.
  - If the electric vehicle control system is not started for 14 days or longer, the smart key system is automatically deactivated.
- Revert Condition

  These controls are stopped when one of the following conditions is met:
  - A wireless door lock control signal of the electrical key transmitter sub-assembly is input and the ID matches.
  - A user carries the electrical key transmitter sub-assembly and pushes the lock switch.
  - A door is locked or unlocked using the mechanical key.

(2) Electrical Key Transmitter Sub-assembly Battery Saving

- Control
    - If an electrical key transmitter sub-assembly is located in the exterior actuation area for 10 minutes or longer, this function stops the request signals transmitted by the door electrical key oscillators.
- Revert Condition

  The control is stopped when one of the following conditions is met:

    - A wireless door lock control signal of the electrical key transmitter sub-assembly is input and the ID matches.
    - A user carries the electrical key transmitter sub-assembly and pushes the lock switch.
    - A door is locked or unlocked using the mechanical key.

(i) Key Code Registration Function

(1) The table below shows the 4 ID registration modes through which up to 4 different codes can be registered. The codes are electronically registered (written and stored) in the EEPROM. For details, refer to the Repair Manual.

MODE	FUNCTION
Rewrite	Erases all previously registered codes and registers only the newly received codes. This mode is used whenever a transmitter or the integration relay 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 4, the oldest registered code is erased first.
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	Deletes all the registered codes and prohibits the wireless door lock function. This mode is used when an electrical key transmitter sub-assembly is lost.

4. CONSTRUCTION

(a) Electrical Key Transmitter Sub-assembly

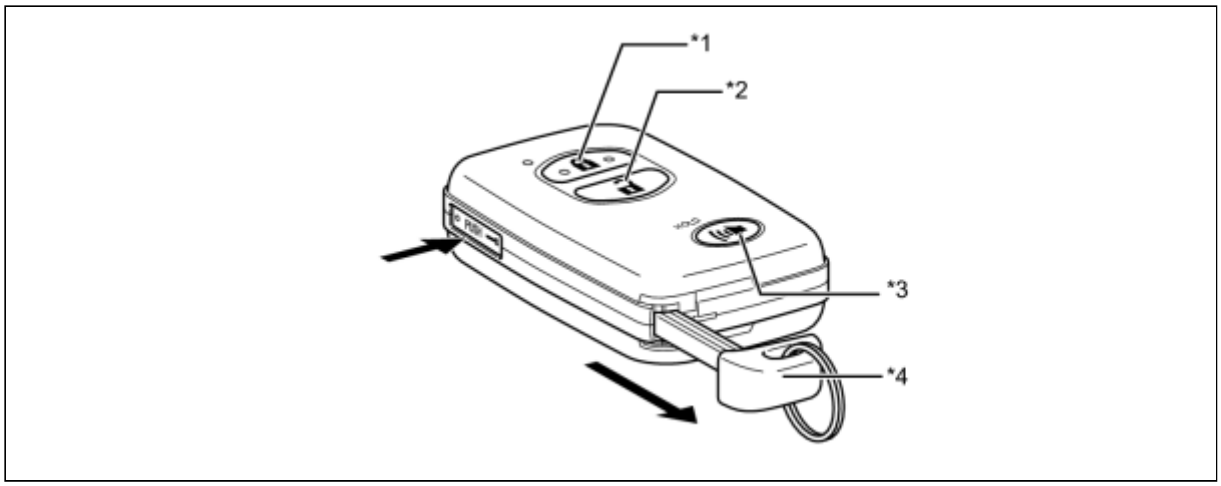
(1) The electrical key transmitter sub-assembly consists of a mechanical key, a transmitter for the wireless door lock control, a transceiver for the entry function, and a transponder chip for the immobiliser function.

(2) This mechanical key operates the driver door lock cylinder and glove box lock cylinder, but cannot be used to start the electric vehicle control system. When the mechanical key is used, the cap of the driver door lock cylinder must be removed.

(3) The transmitter for the wireless door lock control has a lock button, an unlock button and a panic button.

(4) The transceiver of the electrical key transmitter sub-assembly receives the signals from the oscillators and returns the ID code to the door control receiver.

(5) The transponder chip for the immobiliser function returns a signal to the power switch as a response to the radio wave it received from the power switch.



Text in Illustration

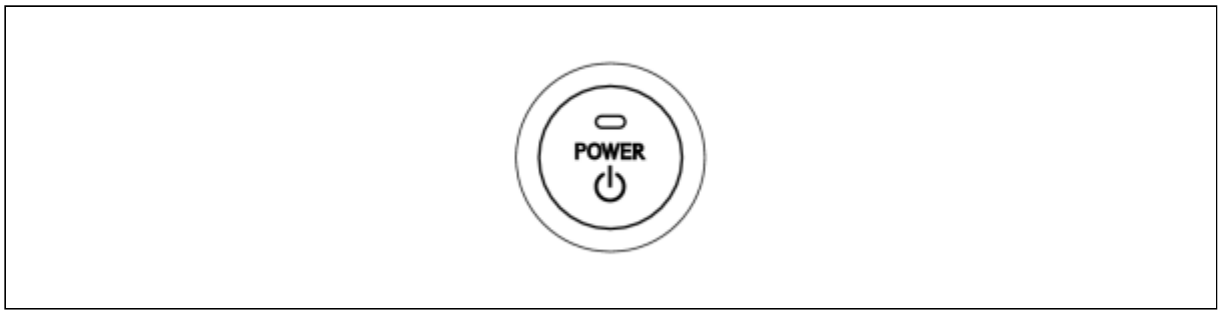
*1	Lock Button	*2	Unlock Button
*3	Panic Button	*4	Mechanical Key

(b) Power Switch

(1) The power switch consists of a momentary type switch, indicator light (amber and green color LEDs), illumination, antenna coil, and transponder key amplifier.

(2) The driver can determine the present power source and check whether the electric vehicle control system can start or not in accordance with the illumination state of the indicator light.

(3) If the main body ECU detects an abnormality with the smart key system, the ECU makes the amber indicator light flash. If the electric vehicle control system is stopped in this state, it might not be possible to restart it.



POWER SOURCE MODE/CONDITION	INDICATOR LIGHT CONDITION	
	BRAKE PEDAL NOT DEPRESSED	BRAKE PEDAL DEPRESSED WITH SHIFT POSITION IS P
Off	Off	On (Green)
On (ACC), On (IG)	On (Amber)	On (Green)
READY	Off	Off
Steering Lock not Unlocked	Flashes (Green) for 30 seconds	Flashes (Green) for 30 seconds
Smart Key System Malfunction	Flashes (Amber) for 15 seconds	Flashes (Amber) for 15 seconds

5. DIAGNOSIS

(a) The main body ECU and certification ECU can detect malfunctions in the smart key system when the power source is on (IG). When the ECUs detect a malfunction, the

amber indicator light of the power switch flashes to warn the driver. At the same time, the ECUs store 5-digit Diagnostic Trouble Codes (DTCs) in their memories.

(b) The indicator light warning continues for 15 seconds even after the power switch is turned off.

(c) The 5-digit DTCs can be read after connecting the Techstream to DLC3.

(d) The smart key system may not operate successfully if a malfunction occurs.