

CUSTOMIZE PARAMETERS

HINT:

The items in the table on the next page can be customized.

NOTICE:

- When the customer requests a change in a function, first make sure that customization of the function(s) is possible.
- Be sure to record the current setting before customizing.
- When troubleshooting a function, first make sure that the function is not set to OFF.

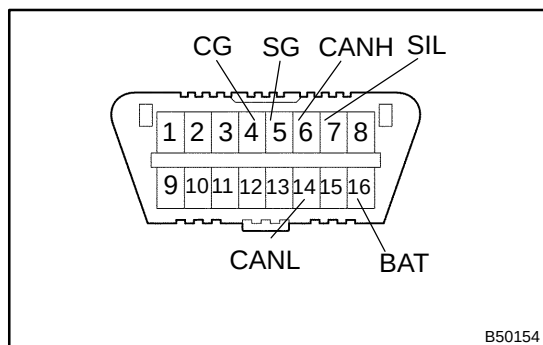
Smart Entry System:

Display (Item)	Default	Contents	Setting
SMART WARN 1 (Warn key is taken from D-door with P position)	ON	Function that warns driver that key is taken out from driver's door when shift position is in P and power switch is not OFF	ON/OFF
SMART WARN 2 (Warn key is taken from D-door without P position)	ON	Function that warns driver that key is taken out from driver's door when shift position is not in P and power switch is not OFF	ON/OFF
SMART WARN 3 (Warn key is taken out by other passengers)	ON	Function that warns driver that key is taken out from any door except driver's door by passenger when power switch is not OFF	ON/OFF
SMART BUZ NUM (Setting number of warning buzzer sounds)	3 TIMES	Function that sets number of warning buzzer sounds when key is taken out of vehicle	OFF/ 3TIMES/5TIMES/7TIMES
SMART WARN 4 (Warn locking door when Engine is idling)	2s	Function that sets warning time for locking doors while engine is idling	OFF/1s/2s
SMART WARN 5 (Warn when key is left in vehicle)	2s	Function that sets warning time for locking doors while key is inside vehicle	OFF/1s/2s
SMART WARN 6 (Warn starting E/G when key is out of detection range)	ON	Function that warns driver that smart ignition control is being attempted to be activated while key is out of detection range	ON/OFF
KEY LOW-BATT WRN (Warn when key battery becomes weak)	ON	Function that warns driver that key's battery power is low	ON/OFF
SMART UNLOCK (Smart door unlock mode)	EACH	Function that makes smart unlock operation available.	ALL/EACH/D-door
TRANSMIT INTVAL (Transmission interval)	300ms	Function that sets smart signal transmission intervals when vehicle is stopped and key is outside vehicle	150ms/300ms/450ms/ 600ms
PARK WAIT TIME (Wait time to permit opening door after locking)	3.0s	Function that sets waiting time to permit opening door after door is locked with smart lock function	0.5s/1.5s/2.5s/5s
SMART BACK DOOR (Backdoor opening operation when vehicle is locked)	LONG	Function that enables back door to open when key is inside luggage compartment	LONG/TWICE/OFF

DIAGNOSIS SYSTEM

1. DESCRIPTION

- (a) The smart ECU controls the function of the smart entry system on the vehicle. Data of the smart entry system and the Diagnostic Trouble Code (DTC) can be read in the Data Link Connector 3 (DLC3) of the vehicle. When the system seems to be malfunctioning, use the hand-held tester to check for a malfunction and perform repairs.

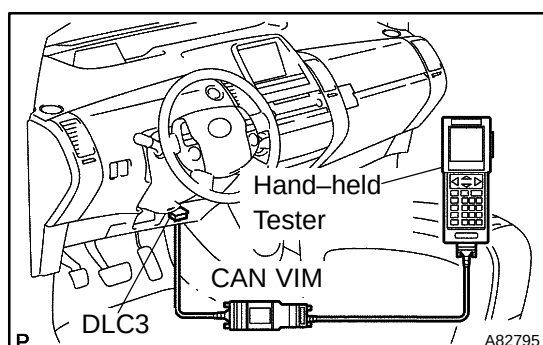


2. CHECK DLC3

The vehicle uses the ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

Symbol	Terminal No.	Name	Reference terminal	Result	Condition
SIL	7	Bus "+" line	5 – Signal ground	Pulse generation	During transmission
CG	4	Chassis ground	Body ground	Below 1 Ω	Constant
SG	5	Signal ground	Body ground	Below 1 Ω	Constant
BAT	16	Battery positive	Body ground	11 to 14 V	Constant
CANH	6	HIGH-level CAN bus line	CANL	54 to 69 Ω	Power switch's power mode OFF
CANH	6	HIGH-level CAN bus line	Battery positive	1 M Ω or higher	Power switch's power mode OFF
CANH	6	HIGH-level CAN bus line	CG	1 k Ω or higher	Power switch's power mode OFF
CANL	14	LOW-level CAN bus line	Battery positive	1 M Ω or higher	Power switch's power mode OFF
CANL	14	LOW-level CAN bus line	CG	1 k Ω or higher	Power switch's power mode OFF

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.



HINT:

Connect the cable of the hand-held tester (with CAN VIM) to the DLC3, turn the power switch ON (IG) and attempt to use the hand-held tester. If the screen displays UNABLE TO CONNECT TO VEHICLE, a problem exists in the vehicle side or tester side.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 of the original vehicle.
- If communication is still impossible when the tester is connected to another vehicle, the problem is probably in the tester itself. Consult the Service Department listed in the tester's instruction manual.

3. CHECK BATTERY VOLTAGE**Standard: 11 to 14 V**

If the voltage is below 11 V, replace the battery before proceeding.

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

Using the hand-held tester DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to shorten labor time.

- Connect the hand-held tester (with CAN VIM) to the DLC3.
- Turn the power switch ON (IG) and press the hand-held tester main switch ON.
- Read the DATA LIST according to the display on the tester.

Smart ECU:

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
D TOUCH SENSOR	D-door touch sensor/ ON or OFF	ON: Touch the touch sensor OFF: Do not touch the touch sensor	–
P TOUCH SENSOR	P-door touch sensor/ ON or OFF	ON: Touch the touch sensor OFF: Do not touch the touch sensor	–
D TRIGGER SW	D-door trigger switch/ ON or OFF	ON: Lock switch is pushed OFF: Lock switch is not pushed	–
P TRIGGER SW	P-door trigger switch/ ON or OFF	ON: Lock switch is pushed OFF: Lock switch is not pushed	–
TR/B-DOOR LOCK	Trunk/Back-door lock switch/ ON or OFF	ON: Back door lock switch is pushed OFF: Back door lock switch is not pushed	–
SMART CANCEL SW	Smart cancel switch/ ON or OFF	ON: Smart cancel switch is ON OFF: Smart cancel switch is OFF	–
KEY UNLK WRN SW	Key unlock warning switch/ ON or OFF	ON: Key is in key slot OFF: No key is in key slot	–
IG SW	Power switch/ ON or OFF	ON: Power switch is ON (IG) OFF: Power switch is OFF	–

2. ACTIVE TEST

HINT:

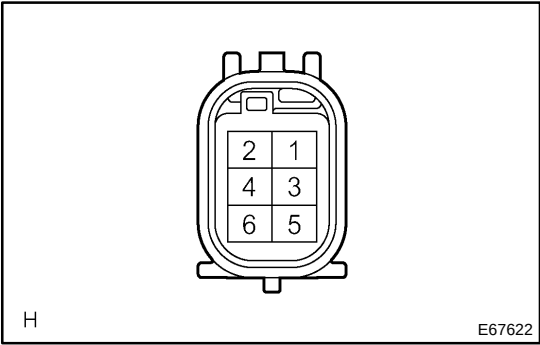
Performing the hand-held tester ACTIVE TEST allows relay, VSV, actuator and other items to be operated without parts removal. Performing the ACTIVE TEST early in troubleshooting is one way to shorten labor time. The DATA LIST can be displayed during the ACTIVE TEST.

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
- (b) Turn the power switch ON (IG) and press the hand-held tester main switch ON.
- (c) Perform the ACTIVE TEST according to the display on the tester.

Smart ECU:

Item	Test Details	Diagnostic Note
D TRANSMITTER	Driver Side Transmitter ON/OFF	–
P TRANSMITTER	Passenger Side Transmitter ON/OFF	–
FR TRANSMITTER	Front Transmitter ON/OFF	–
IN BDR TRNSMTTR	Back Door Inner Transmitter ON/OFF	–
BDOOR TRNSMTTR	Back Door Outer Transmitter ON/OFF	–
D SELECT SIG	Driver Side Select ON/OFF	–
P SELECT SIG	Passenger Side Select ON/OFF	–

INSPECTION

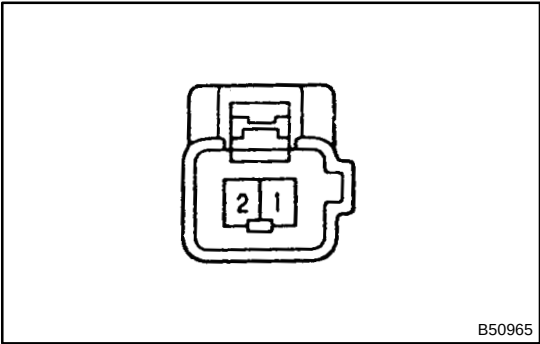


- 1. INSPECT OUTSIDE DOOR HANDLE**
- (a) Remove the outside door handle (see page 75-9).
 - (b) Check the resistance between the terminals of the connector when the switch is operated.

Standard:

Switch Condition	Tester Connection	Specified Condition
Switch pushed	1 – 3	Below 1 Ω
Switch not pushed	1 – 3	10 kΩ or higher

If the result is not as specified, replace the outside door handle.



- 2. INSPECT SMART KEY CANCEL SWITCH**
- (a) Remove the outside door handle.
 - (b) Check the resistance between the terminals of the connector when the switch is operated.

Standard:

Switch Condition	Tester Connection	Specified Condition
Switch pushed	1 – 2	Below 1 Ω
Switch not pushed	1 – 2	10 kΩ or higher

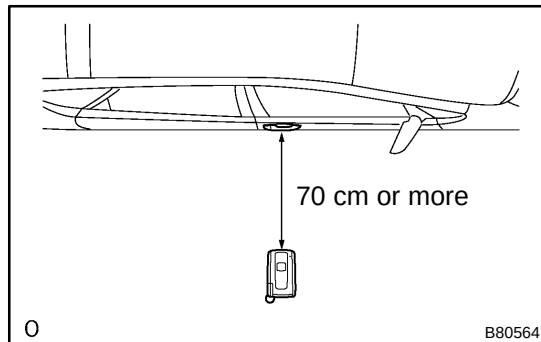
If the result is not as specified, replace the smart system cancel switch.

ON-VEHICLE INSPECTION

1. Smart Entry System Operation Inspection

(a) Inspect the smart door unlock function.

- (1) Use the wireless lock operation to lock front doors. With the smart key in your possession, touch a door's outside handle (touch sensor) and check that all doors unlock.

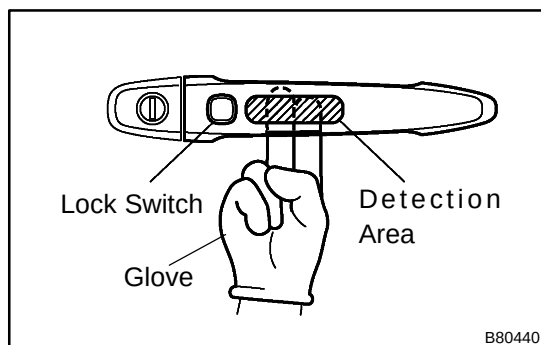


- (2) Inspect the smart door unlock operation's detection area. Hold the smart key at the same height as the door's outside handle (approximately 80 cm). Pay attention to the direction of the smart key in the illustration on the left. Check that when the smart key is brought within 70 to 100 cm (2.3 to 3.3 ft) of the vehicle, the system enters unlock standby mode. Unlock standby mode is signified by the smart key's red LED illuminating.
- (3) Once the system enters unlock standby mode, touch the outside handle's sensor within 3 seconds. Check that the door unlocks.

NOTICE:

The smart key cannot communicate with the system within a 20 cm radius of each outside handle.

- (4) Repeat steps (2) and (3) for the remaining doors.



- (5) Inspect the door oscillator's response sensitivity. Wear protective gloves, set the system to unlock standby mode, and check that touching the inner side of the outside handle (the highlighted area in the illustration) with your index finger causes the door to unlock.

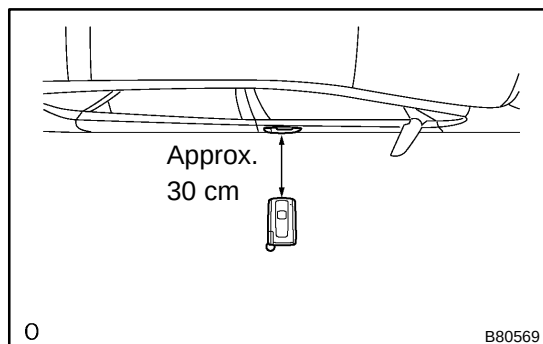
NOTICE:

When touching the highlighted area, tapping too quickly or having extended contact may not trigger the sensor. In such a case, the door will not unlock.

- (6) Repeat step (5) for the remaining doors.

(b) Inspect the smart door lock function.

- (1) Close all of the vehicle's doors and set the system to unlock standby mode. With the smart key in your possession outside of the vehicle, check that pressing the lock switch locks front doors.



- (2) Inspect the smart door lock operation's detection area and the vehicle interior's wireless door lock receiver for wave leaks. Hold the smart key at the same height of 1 m (10 cm above the lower edge of the window frame). Pay attention to the direction and position of the smart key in the illustration on the left. Check that when the smart key is approximately 30 cm (0.9 ft) from the vehicle and the lock switch is pressed, the front doors lock and the warning buzzer (for when the key is forgotten) does not sound.

NOTICE:

If the warning buzzer sounds, the vehicle interior's wireless door lock receiver may have a wave leak.

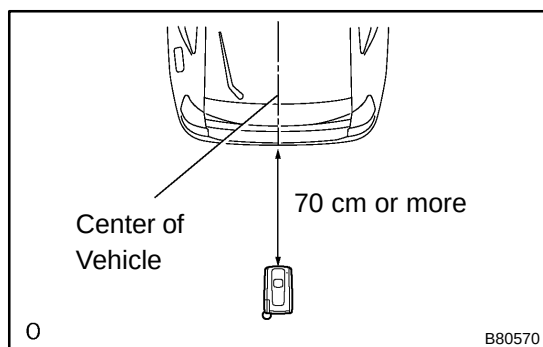
HINT:

Due to the smart key being unable to communicate with the system within a 20 cm distance from the outside handle, do not press the lock switch with the same hand that is holding the smart key. The doors will not lock.

- (3) Repeat steps (1) and (2) for the remaining doors.

- (c) Inspect the smart trunk open function.

- (1) Close the back door. With the smart key in your possession, check that pressing the luggage electrical key switch (trunk switch) opens the back door.



- (2) Inspect the smart trunk open operation's detection area. Hold the smart key at the same height as the luggage electrical key switch (trunk switch) (approximately 80 cm) and aligned with the center of the rear of the vehicle. Pay attention to the direction of the smart key in the illustration on the left. Check that when the smart key is brought within 70 to 100 cm (2.3 to 3.3 ft) of the vehicle, pressing the luggage electrical key switch (trunk switch) opens the back door.

- (d) Inspect the smart ignition function.

- (1) With the smart key in your possession, check that pressing the power switch will release the steering wheel lock. Then, check that turning the power switch from ON (ACC) to ON (IG) starts the hybrid control system.

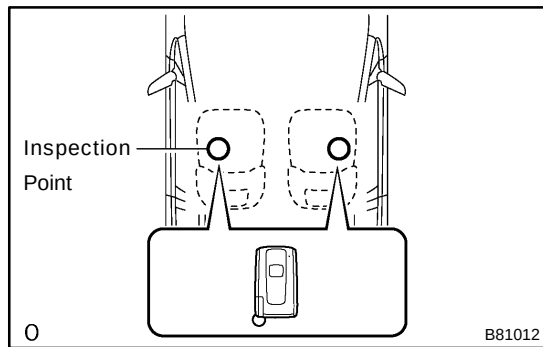
HINT:

The engine can be started only when the smart indicator is illuminated.

- (2) With the smart key in your possession, check that turning the power switch from ON (ACC) to ON (IG) to OFF stops the hybrid control system.

HINT:

The shift position must be in P to be able to turn the power switch from ON (ACC) to OFF.



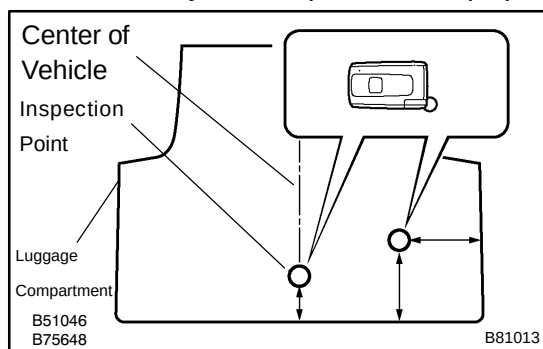
- (3) Inspect the smart ignition operation's detection area. Pay attention to the direction of the smart key in the illustration on the left. When the smart key is in either of the two locations in the illustration, check that the engine can start.

NOTICE:

The engine cannot be started when the smart key is on the instrument panel or package tray, or in the glove box.

- (e) Inspect the smart key lock-in prevention function.

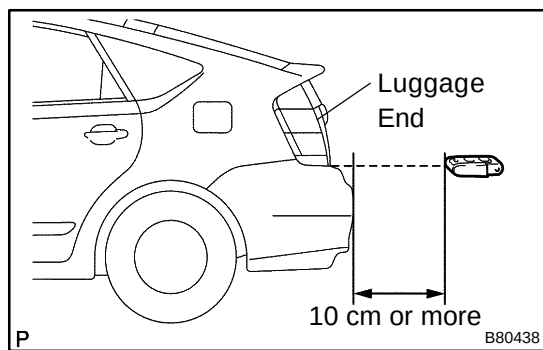
- (1) Place the smart key in the trunk. Check that: 1) closing the back door triggers the smart key's wireless buzzer (which lasts approximately 10 seconds), and 2) pressing the luggage electrical key switch (trunk switch) opens the back door.



- (2) Inspect the smart key lock-in prevention's detection area. Pay attention to the direction of the smart key in the illustration on the left. When the smart key is in either of the two locations in the illustration, check that: 1) closing the back door sounds the smart key's wireless buzzer, and 2) pressing the luggage electrical key switch (trunk switch) opens the back door.

NOTICE:

If the smart key is inside a metal briefcase, metal box or any other metal storage item, the smart key will not be able to be detected by the system.



- (3) Inspect the smart key lock-in prevention's detection area and the trunk interior's wireless door lock receiver for wave leaks. Hold the smart key at the same height as the lower edge of the back door and aligned with the center of the rear of the vehicle. Pay attention to the direction and position of the smart key in the illustration on the left. Check that when the smart key is over 10 cm (0.6 ft) from the vehicle's rear bumper, the smart key's wireless buzzer does not sound.

HINT:

If the warning buzzer sounds, the trunk interior's wireless door lock receiver may have a wave leak.

- (f) Inspect the smart key cancel function.

- (1) While the power switch is ON (IG), check that the smart trunk open switch is the only switch in the smart key system that can be operated.
- (2) While the keyless entry cancel switch (smart system cancel switch) is ON, check that all switches in the smart key system cannot be operated.

(g) Inspect the smart indicator function.

Condition	Indicator
Power switch is in ON (IG) mode and vehicle interior check is OK.	Illuminated
Power switch is in OFF mode and one of the doors is open.	Blinking
Power switch is in ON (ACC) / ON (IG) mode and all doors are locked.	Off

HINT:

In case where an illuminated condition and a blinking condition are both satisfied, the indicator will illuminate.

(h) Inspect the answer-back function (hazard warning lamp flashing and buzzer sounding).

Smart Operation	Hazard Warning Lamp	Buzzer
Smart Door Lock	flashes once	sounds once
Smart Door Unlock	flashes twice	sounds twice
Smart Trunk Open	does not flash	sounds once

SMART CANCEL SWITCH DOES NOT OPERATE

CIRCUIT DESCRIPTION

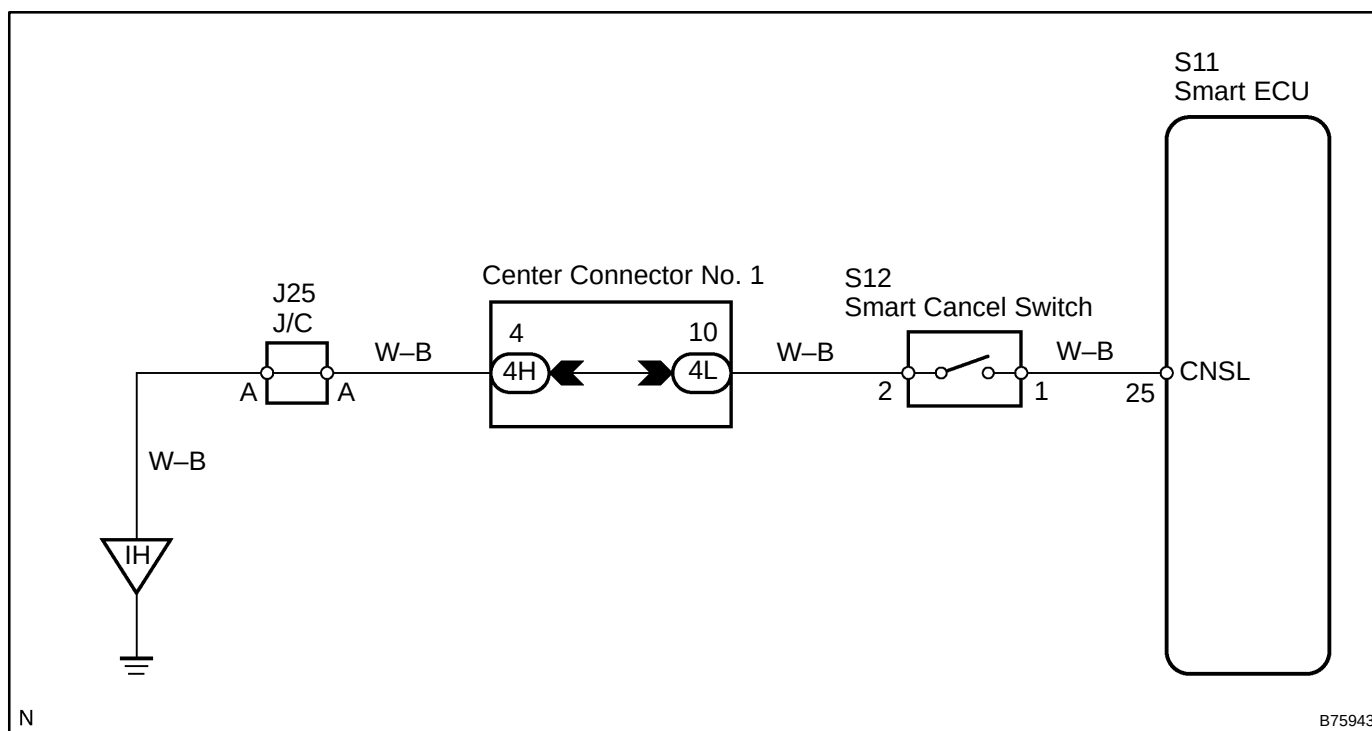
Smart unlock function:

When an outside oscillator receives a smart key output ID code and the smart ECU confirms the ID code, the smart ECU outputs a SEL signal (Lo when output) to the outside oscillator to change the touch sensor inside the door outside handle to unlock standby condition. When the touch sensor is touched, the outside oscillator outputs a SENS signal (Lo when output) to the smart ECU. Then, the smart ECU sends an unlock signal to the appropriate door lock assembly through the instrument panel J/B (multiplex network body ECU).

Smart lock function:

When the lock switch on the outside door handle is pressed, the smart ECU sends a request signal to an outside oscillator. The smart key receives this request and transmits its ID code. Upon receiving the ID code, the smart ECU determines that the smart key is outside the vehicle and sends a lock signal to the appropriate door lock assembly through the instrument panel J/B (multiplex network body ECU).

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK WIRELESS DOOR LOCK OPERATION

- (a) Check that the wireless door lock function operates normally.

OK: Wireless door lock function operates normally.

NG

**Go to WIRELESS DOOR LOCK CONTROL SYSTEM (w/ SMART ENTRY SYSTEM)
(See page 05-2228)**

OK

2 READ VALUE OF HAND-HELD TESTER

- Connect the hand-held tester (with CAN VIM) to the DLC3.
- Turn the power switch from OFF to ON (IG) and press the hand-held tester main switch ON.
- Select the items below in the DATA LIST and read the displays on the hand-held tester.

Smart ECU:

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
SMART CANCEL SW	Smart cancel switch/ ON or OFF	ON: Smart cancel switch is ON OFF: Smart cancel switch is OFF	–

OK: "OFF"(smart cancel switch is not pressed) appears on the screen.

NG

Go to step 3

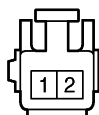
OK

REPLACE SMART ECU

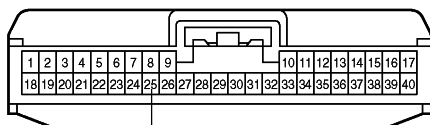
3 CHECK WIRE HARNESS (SMART CANCEL SWITCH – SMART ECU AND BODY GROUND)

Wire Harness Side

S12
Smart Cancel Switch



S11
Smart ECU



CNSL

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- Disconnect S12 switch connector.
- Disconnect S11 ECU connector.
- Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
S12-1 – S11-25 (CNSL)	Below 1 Ω
S12-2 – Body ground	Below 1 Ω
S12-1 – Body ground	10 k Ω or higher

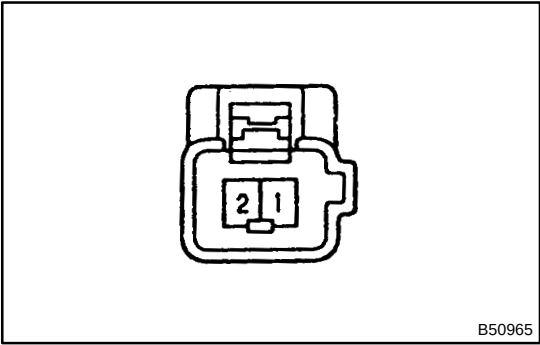
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4

INSPECT SMART CANCEL SWITCH



- (a) Remove the smart cancel switch.
- (b) Measure the switch resistance.

Standard:

Tester Connection	Condition	Specified Condition
1 – 2	Not pushed (OFF)	10 kΩ or higher
1 – 2	Pushed (ON)	Below 1Ω

NG

REPLACE SMART CANCEL SWITCH

OK

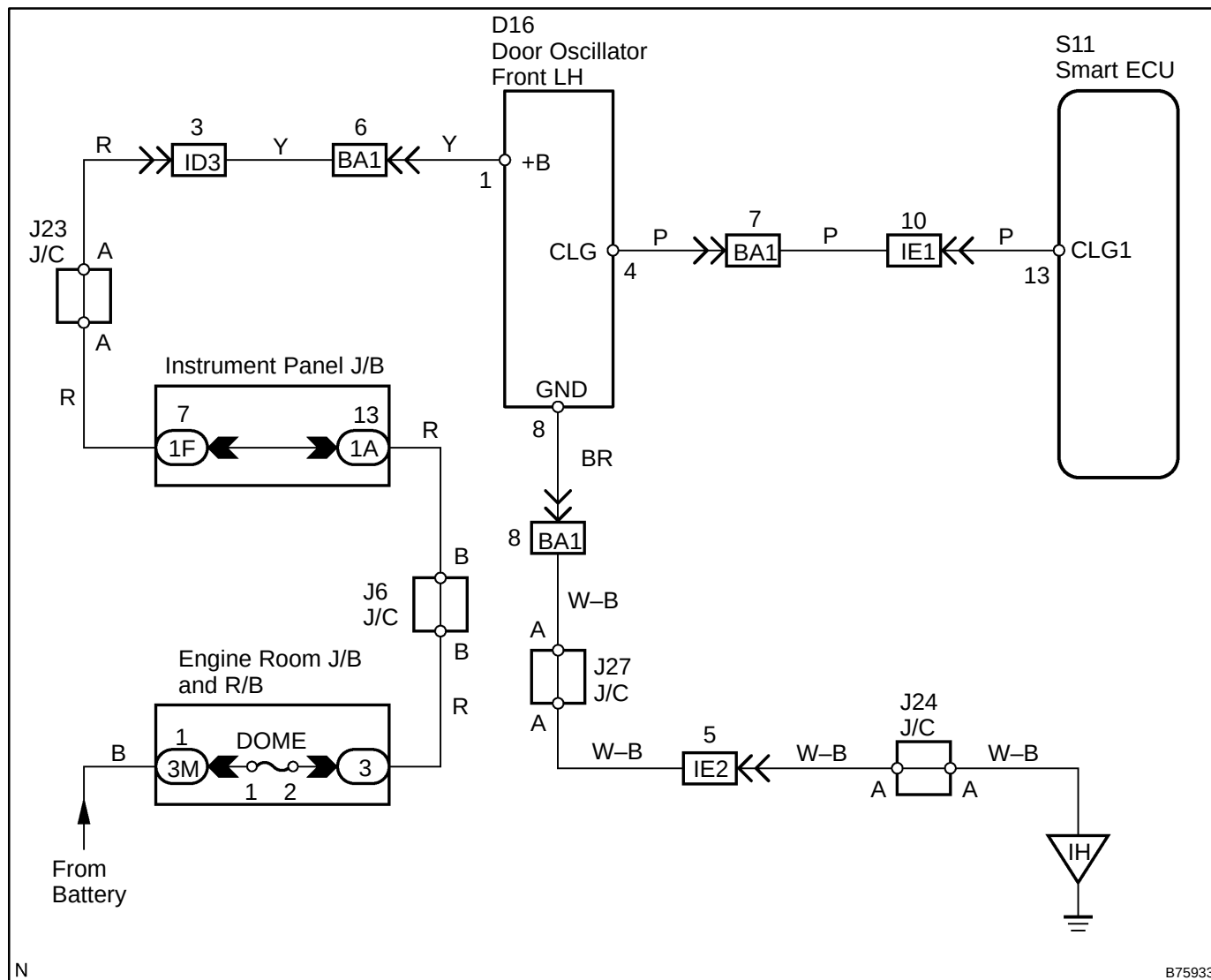
REPLACE SMART ECU

SMART LOCK AND UNLOCK FUNCTIONS DO NOT OPERATE ON DRIVER DOOR

CIRCUIT DESCRIPTION

Both the smart lock and unlock functions do not operate when: 1) nothing is output from the driver door outside oscillator, 2) the smart entry system is disabled through customization, or 3) the entire power door lock control system is malfunctioning.

WIRING DIAGRAM



INSPECTION PROCEDURE**1 CHECK MANUAL DOOR LOCK AND UNLOCK OPERATION**

- (a) Check that the manual door lock and unlock function operates normally.

OK: Manual door lock and unlock function operates normally.

NG

**Go to POWER DOOR LOCK CONTROL SYSTEM
(See page 05-2074)**

OK

2 PERFORM ACTIVE TEST USING HAND-HELD TESTER

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
(b) Turn the power switch ON (IG) and press the hand-held tester main switch ON.
(c) Select the items below in the ACTIVE TEST and then check that the oscillator operates.

Smart ECU:

Item	Test Details	Diagnostic Note
D TRANSMITTER	Driver Side Transmitter ON/OFF	–

OK: When the smart key is brought close to a door oscillator that is ON, the indicator on the smart key illuminates.

NG

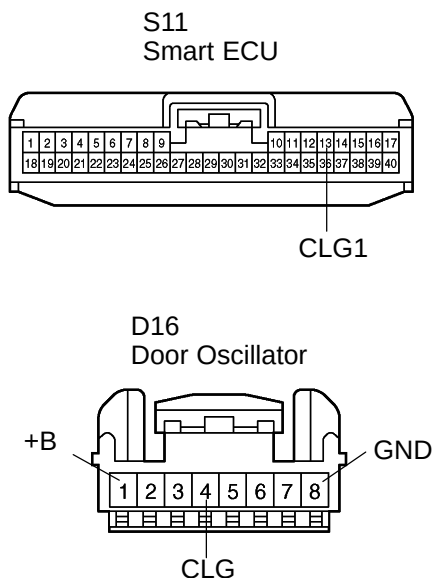
Go to step 3

OK

REPLACE SMART ECU

3 CHECK WIRE HARNESS (DOOR OSCILLATOR FRONT (DRIVER SIDE) – SMART ECU AND BODY GROUND)

Wire Harness Side



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- Disconnect the D16 oscillator connector.
- Disconnect the S11 ECU connector.
- Measure the resistance and voltage of the wire harness side connectors.

Standard:

Tester Connection	Condition	Specified Condition
D16-4 (CLG) – S11-13 (CLG1)	Constant	Below 1 Ω
D16-4 (CLG) – Body ground	Constant	10 k Ω or higher
D16-8 (GND) – Body ground	Constant	Below 1 Ω
D16-1 (+B) – Body ground	Constant	10 to 14 V

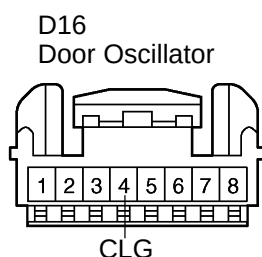
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4 CHECK DOOR OSCILLATOR (DRIVER SIDE)

Wire Harness Side



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- Measure the frequency between the terminals of the connector when the power switch is operated.

Standard:

Tester Connection	Condition	Specified Condition
D16-4 (CLG) – Body ground	Power switch OFF → ON (IG)	Some Hz → 0 Hz

NG

REPLACE DOOR OSCILLATOR ON DRIVER SIDE

OK

REPLACE SMART ECU

INSPECTION PROCEDURE**1 CHECK MANUAL DOOR LOCK AND UNLOCK OPERATION**

- (a) Check that the manual door lock and unlock function operates normally.

OK: Manual door lock and unlock function operates normally.

NG

**Go to POWER DOOR LOCK CONTROL SYSTEM
(See page 05-2074)**

OK

2 PERFORM ACTIVE TEST USING HAND-HELD TESTER

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
(b) Turn the power switch ON (IG) and press the hand-held tester main switch ON.
(c) Select the items below in the ACTIVE TEST and then check that the oscillator operates.

Smart ECU:

Item	Test Details	Diagnostic Notes
P TRANSMITTER	Passenger Side Transmitter ON/OFF	–

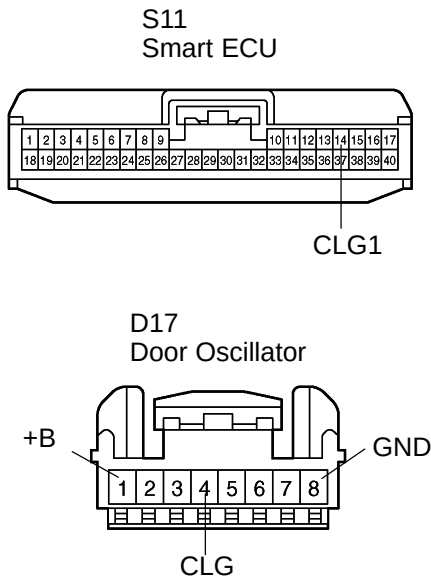
OK: When the smart key is brought close to a door oscillator that is ON, the indicator on the smart key illuminates.

NG

Go to step 3

OK

REPLACE SMART ECU

3**CHECK WIRE HARNESS (DOOR OSCILLATOR (FRONT RH) – SMART ECU AND BODY GROUND)****Wire Harness Side**

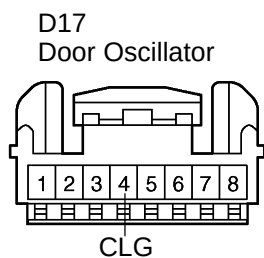
Y

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- Disconnect the D17 oscillator connector.
- Disconnect the S11 ECU connector.
- Measure the resistance and voltage of the wire harness side connectors.

Standard:

Tester Connection	Condition	Specified Condition
D17-4 (CLG) – S11-14 (CLG2)	Constant	Below 1 Ω
D17-4 (CLG) – Body ground	Constant	10 kΩ or higher
D17-8 (GND) – Body ground	Constant	Below 1 Ω
D17-1 (+B) – Body ground	Constant	10 to 14 V

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****4****CHECK DOOR OSCILLATOR (FRONT PASSENGER SIDE)****Wire Harness Side**

Y

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- Measure the frequency between the terminals of the connector when the power switch is operated.

Standard:

Tester Connection	Condition	Specified Condition
D17-4 (CLG) – Body ground	Power switch OFF → ON (IG)	Some Hz → 0 Hz

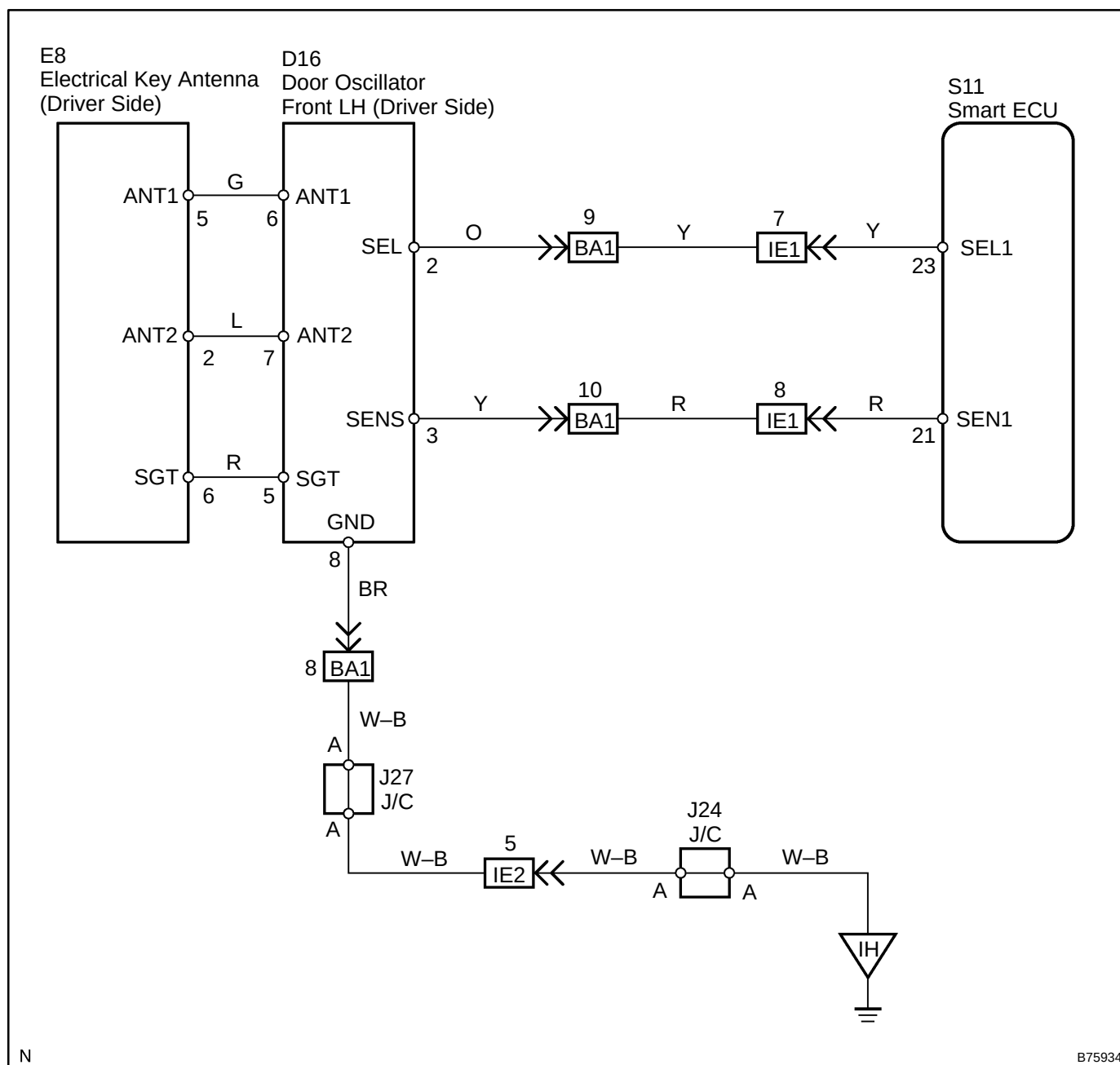
NG**REPLACE DOOR OSCILLATOR ON FRONT PASSENGER SIDE****OK****REPLACE SMART ECU**

SMART UNLOCK FUNCTION DOES NOT OPERATE ON DRIVER DOOR

CIRCUIT DESCRIPTION

When an ID code from the driver door outside oscillator matches an ID code from the smart key, the smart ECU outputs a SEL signal (Lo when output) to the driver door outside oscillator, activates the touch sensor inside the outside handle, and enters unlock standby condition. When the touch sensor is touched, the outside oscillator sends a SENS signal (Lo when output) to the smart ECU and the smart ECU sends an unlock signal to the driver door lock assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK MANUAL DOOR UNLOCK OPERATION

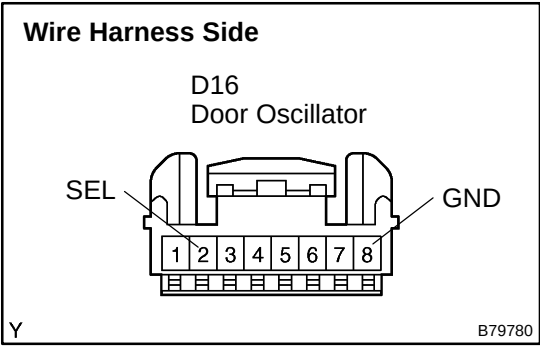
- (a) Check that the manual door unlock function operates normally.
OK: Manual door unlock function operates normally.

NG

Go to POWER DOOR LOCK CONTROL SYSTEM
(See page 05-2074)

OK

2 CHECK DOOR OSCILLATOR (DRIVER SIDE)



- (a) Measure the voltage between the terminals of the connector when the smart key is operated.
Standard:

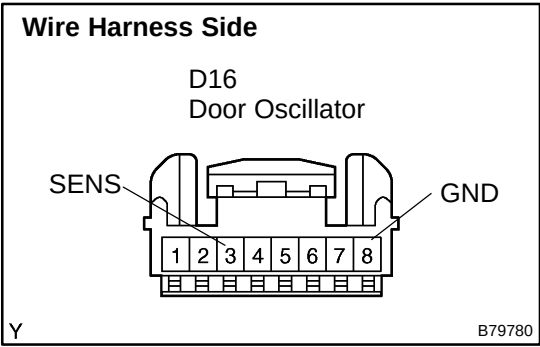
Tester Connection	Condition	Specified Condition
D16-2 (SEL) – D16-8 (GND)	Smart key at 5 m away from door → near door	10 to 14 V → Below 1 Ω

NG

Go to step 7

OK

3 CHECK DOOR OSCILLATOR (DRIVER SIDE)



- (a) Measure the voltage between the terminals of the connector when the outside door handle is touched.
Standard:

Tester Connection	Condition	Specified Condition
D16-3 (SENS) – D16-8 (GND)	Outside door handle not touched → touched	10 to 14 V → Below 1 Ω

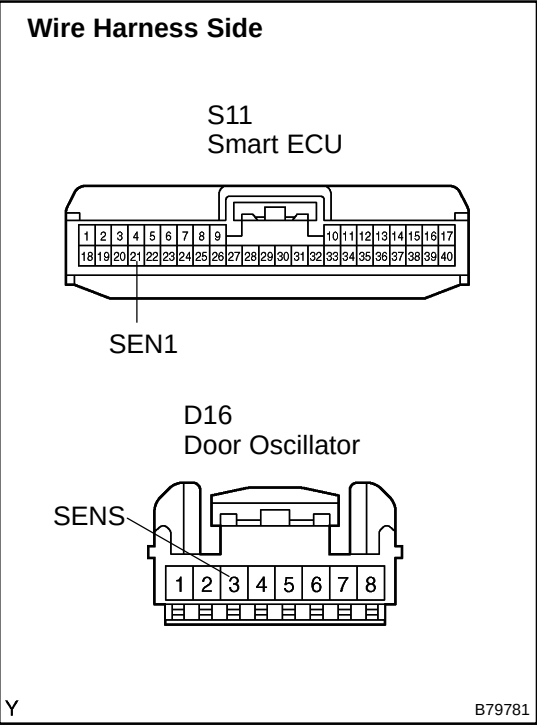
NG

Go to step 4

OK

Go to step 5

4 CHECK WIRE HARNESS (DOOR OSCILLATOR (DRIVER SIDE) – SMART ECU AND BODY GROUND)



- (a) Disconnect the D16 oscillator connector.
- (b) Disconnect the S11 ECU connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
D16-3 (SENS) – S11-21 (SEN1)	Below 1 Ω
D16-3 (SENS) – Body ground	10 k Ω or higher

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 CHECK OPERATION OF DOOR OSCILLATOR (DRIVER SIDE)

- (a) After replacing the door oscillator on the driver's side with a new one, check that the smart unlock function operates normally.

OK: Smart unlock function operates normally.

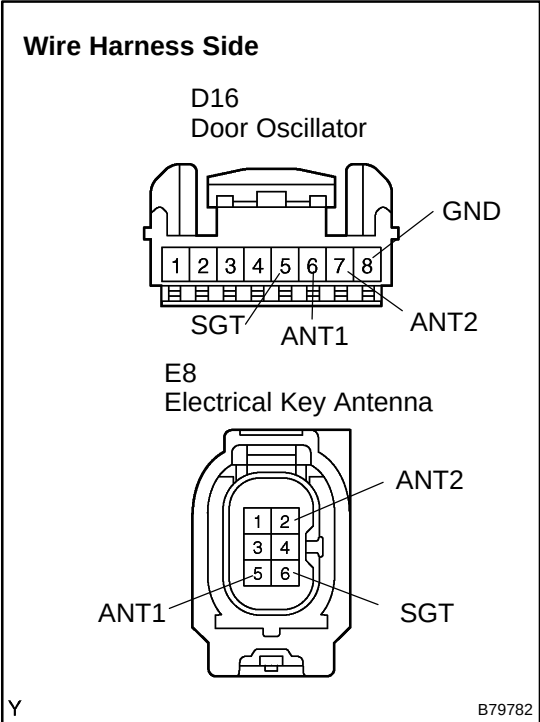
NG Go to step 6

OK

REPLACE DOOR OSCILLATOR (DRIVER SIDE)

6

CHECK WIRE HARNESS (DOOR OSCILLATOR (DRIVER SIDE) – ELECTRICAL KEY ANTENNA AND BODY GROUND)



- (a) Disconnect the D16 oscillator connector.
- (b) Disconnect the E8 antenna connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
D16-6 (ANT1) – E8-5 (ANT1)	Below 1 Ω
D16-7 (ANT2) – E8-2 (ANT2)	Below 1 Ω
D16-5 (SGT) – E8-6 (SGT)	Below 1 Ω
D16-8 (GND) – Body ground	Below 1 Ω
D16-6 (ANT1) – Body ground	10 kΩ or higher
D16-7 (ANT2) – Body ground	10 kΩ or higher
D16-5 (SGT) – Body ground	10 kΩ or higher

NG

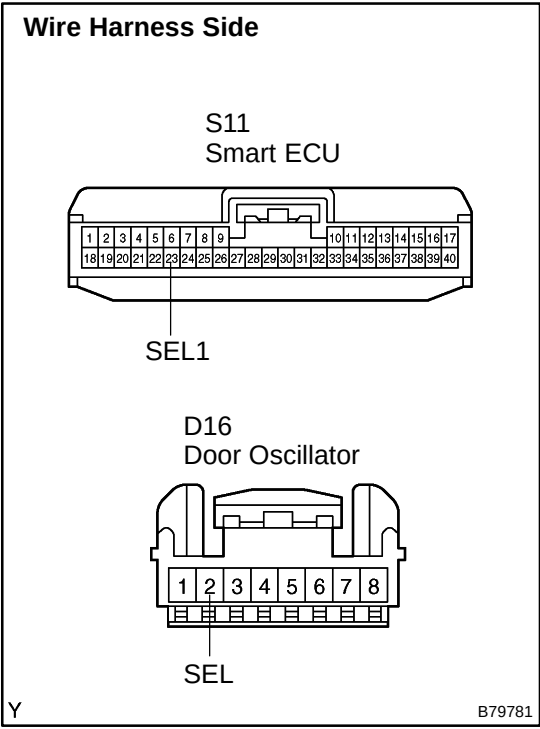
REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ELECTRICAL KEY ANTENNA

7

CHECK WIRE HARNESS (DOOR OSCILLATOR (DRIVER SIDE) – SMART ECU AND BODY GROUND)



- (a) Disconnect the D16 oscillator connector.
- (b) Disconnect the S11 ECU connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
D16-2 (SEL) – S11-23 (SEL1)	Below 1 Ω
D16-2 (SEL) – Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

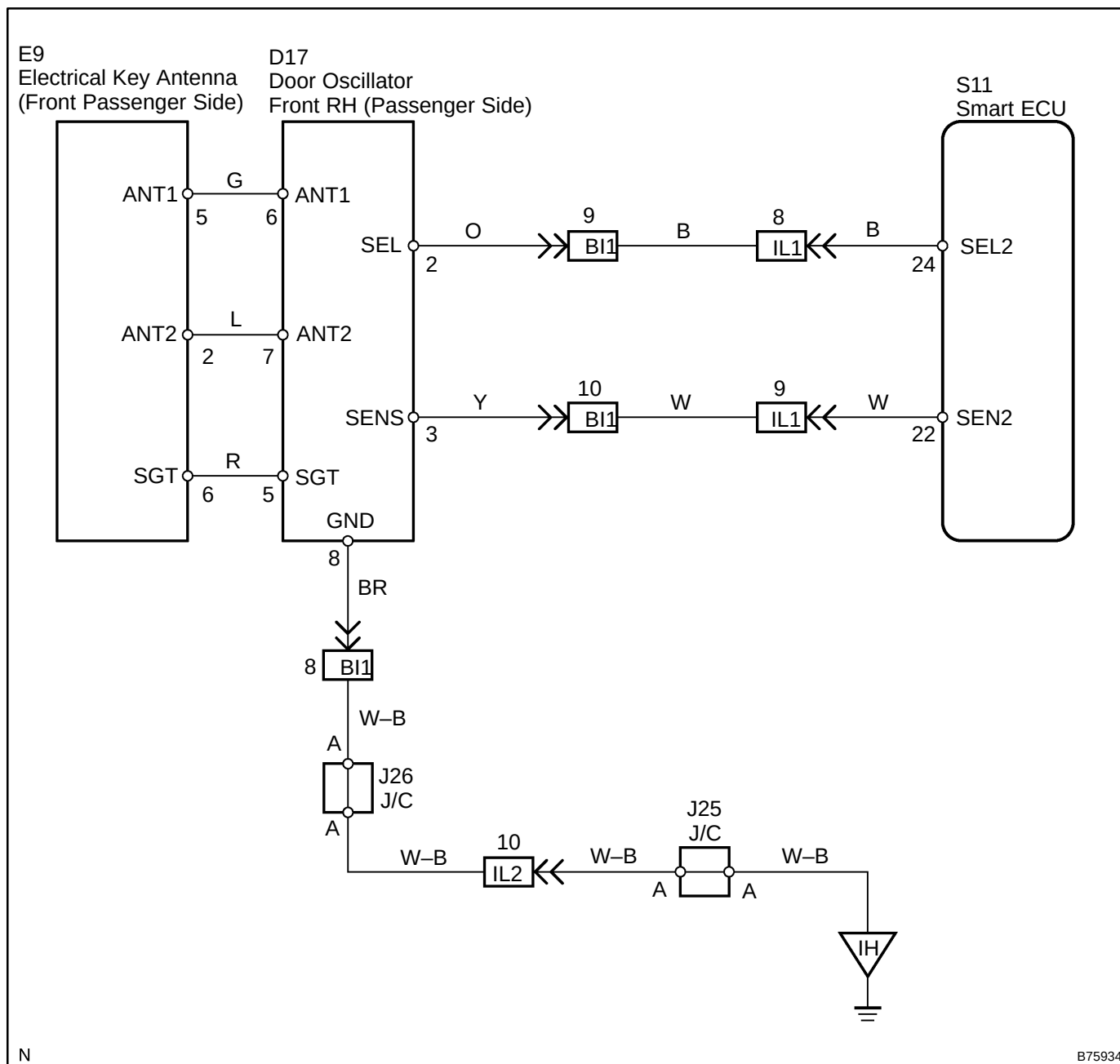
REPLACE SMART ECU

SMART UNLOCK FUNCTION DOES NOT OPERATE ON PASSENGER DOOR

CIRCUIT DESCRIPTION

When an ID code from the passenger door outside oscillator matches an ID code from the smart key, the smart ECU outputs a SEL signal (Lo when output) to the front passenger door outside oscillator, activates the touch sensor inside the outside handle, and enters unlock standby condition. When the touch sensor is touched, the outside oscillator sends a SENS signal (Lo when output) to the smart ECU and the smart ECU sends an unlock signal to the passenger door lock assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK MANUAL DOOR UNLOCK OPERATION

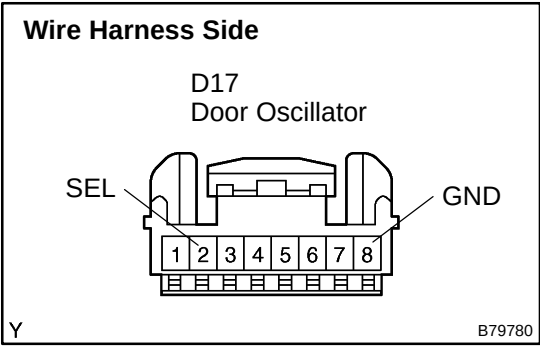
- (a) Check that the manual door unlock function operates normally.
OK: Manual door unlock function operates normally.

NG

Go to POWER DOOR LOCK CONTROL SYSTEM
(See page 05-2074)

OK

2 CHECK DOOR OSCILLATOR (FRONT PASSENGER SIDE)



- (a) Measure the voltage between the terminals of the connector when the smart key is operated.
Standard:

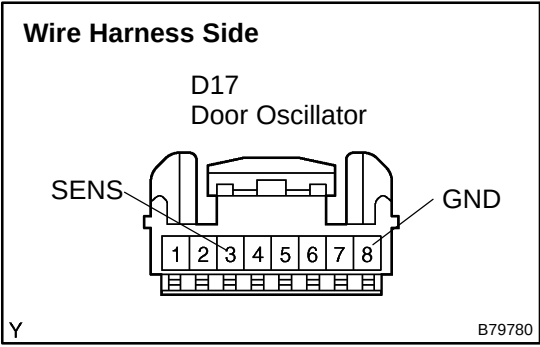
Tester Connection	Condition	Specified Condition
D17-2 (SEL) – D17-8 (GND)	Smart key at least 5 m away from door → near door	10 to 14 V → Below 1 Ω

NG

Go to step 7

OK

3 CHECK DOOR OSCILLATOR (FRONT PASSENGER SIDE)



- (a) Measure the voltage between the terminals of the connector when the outside door handle is touched.
Standard:

Tester Connection	Condition	Specified Condition
D17-3 (SENS) – D17-8 (GND)	Outside door handle not touched → touched	10 to 14 V → Below 1 Ω

NG

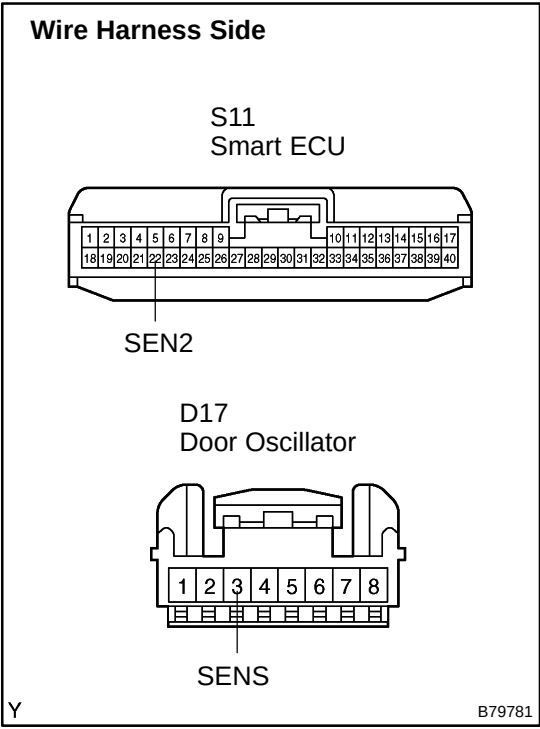
Go to step 4

OK

Go to step 5

4

CHECK WIRE HARNESS (DOOR OSCILLATOR (FRONT PASSENGER SIDE) – SMART ECU AND BODY GROUND)



- (a) Disconnect the D17 oscillator connector.
- (b) Disconnect the S11 ECU connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
D17-3 (SENS) – S11-22 (SEN2)	Below 1 Ω
D17-3 (SENS) – Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5

CHECK OPERATION OF DOOR OSCILLATOR (FRONT PASSENGER SIDE)

- (a) After replacing the door oscillator with a new one, check that the smart unlock function operates normally.

OK: Smart unlock function operates normally.

NG

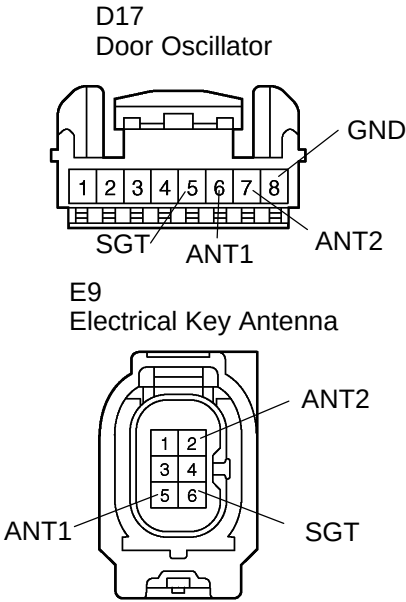
Go to step 6

OK

REPLACE DOOR OSCILLATOR (FRONT PASSENGER SIDE)

6 CHECK WIRE HARNESS (DOOR OSCILLATOR (FRONT PASSENGER SIDE) – ELECTRICAL KEY ANTENNA AND BODY GROUND)

Wire Harness Side



- (a) Disconnect the D17 oscillator connector.
- (b) Disconnect the E9 antenna connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
D17-6 (ANT1) – E9-5 (ANT1)	Below 1 Ω
D17-7 (ANT2) – E9-2 (ANT2)	Below 1 Ω
D17-5 (SGT) – E9-6 (SGT)	Below 1 Ω
D17-8 (GND) – Body ground	Below 1 Ω
D17-6 (ANT1) – Body ground	10 k Ω or higher
D17-7 (ANT2) – Body ground	10 k Ω or higher
D17-5 (SGT) – Body ground	10 k Ω or higher

NG

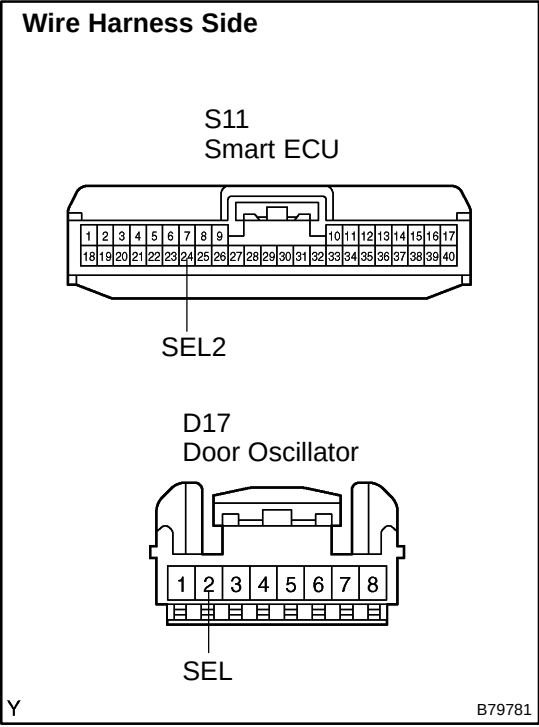
REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ELECTRICAL KEY ANTENNA

7

CHECK WIRE HARNESS (DOOR OSCILLATOR (FRONT PASSENGER SIDE) – SMART ECU AND BODY GROUND)



- (a) Disconnect the D17 oscillator connector.
- (b) Disconnect the S11 ECU connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
D17-2 (SEL) – S11-24 (SEL2)	Below 1 Ω
D17-2 (SEL) – Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

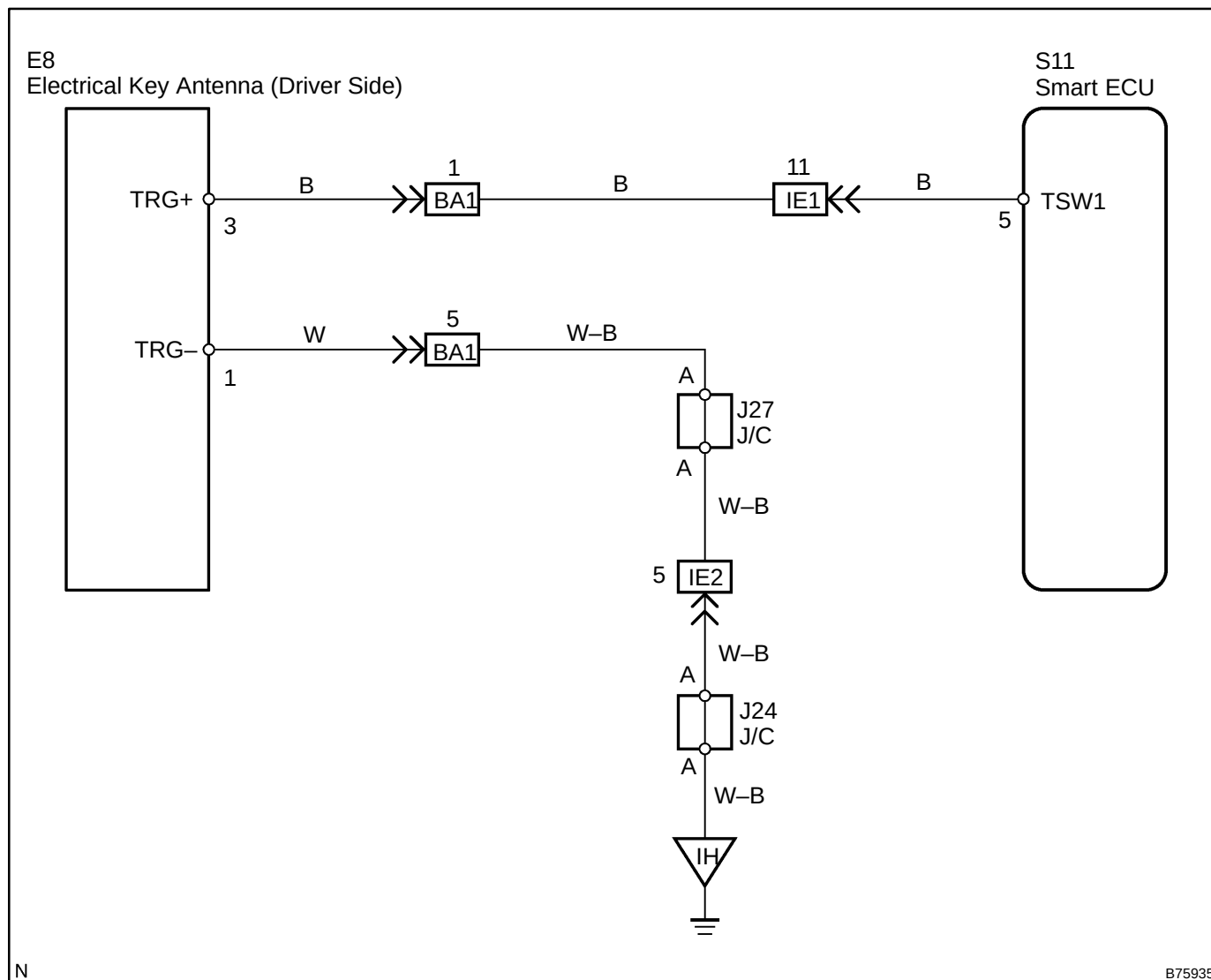
REPLACE SMART ECU

SMART LOCK FUNCTION DOES NOT OPERATE ON DRIVER DOOR

CIRCUIT DESCRIPTION

When the touch sensor inside the driver door outside handle is touched, the smart ECU sends a request signal to the driver door outside oscillator. The smart key receives this request and transmits its ID code. Upon receiving the ID code, the smart ECU determines that the smart key is outside the vehicle and sends a lock signal to the driver door lock assembly through the instrument panel J/B (multiplex network body ECU).

WIRING DIAGRAM



INSPECTION PROCEDURE**1 CHECK MANUAL DOOR LOCK OPERATION**

- (a) Check that the manual door lock function operates normally.

OK: Manual door lock function operates normally.

NG

**Go to POWER DOOR LOCK CONTROL SYSTEM
(See page 05-2074)**

OK

2 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
(b) Turn the power switch ON (IG) and press the hand-held tester main switch ON.
(c) Select the items below in the DATA LIST and read the displays on the hand-held tester.

Smart ECU:

Item		Normal Condition	Diagnostic Note
D TRIGGER SW	D-door trigger switch/ ON or OFF	ON: Lock switch is pushed OFF: Lock switch is not pushed	–

OK: "ON" (lock switch is pressed) appears on the screen.

NG

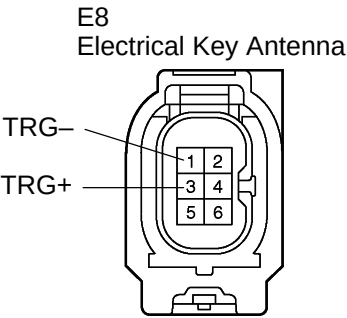
Go to step 3

OK

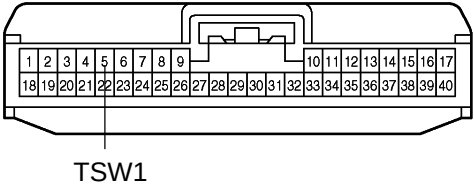
REPLACE SMART ECU

3 CHECK WIRE HARNESS (ELECTRICAL KEY ANTENNA – SMART ECU AND BODY GROUND)

Wire Harness Side



S11
Smart ECU



Y

B80378

- (a) Disconnect E8 antenna connector.
- (b) Disconnect S11 ECU connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard:

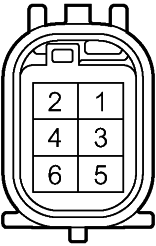
Tester Connection	Specified Condition
E8-3 (TRG+) – S11-5 (TSW1)	Below 1 Ω
E8-1 (TRG-) – Body ground	Below 1 Ω
E8-3 (TRG+) – Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4 INSPECT ELECTRICAL KEY ANTENNA



E67622

- (a) Remove the electrical key antenna.
- (b) Measure the antenna resistance.

Standard:

Tester Connection	Condition	Specified Condition
1 – 3	Switch pushed	10 k Ω or higher
1 – 3	Switch not pushed	Below 1 Ω

NG

REPLACE ELECTRICAL KEY ANTENNA

OK

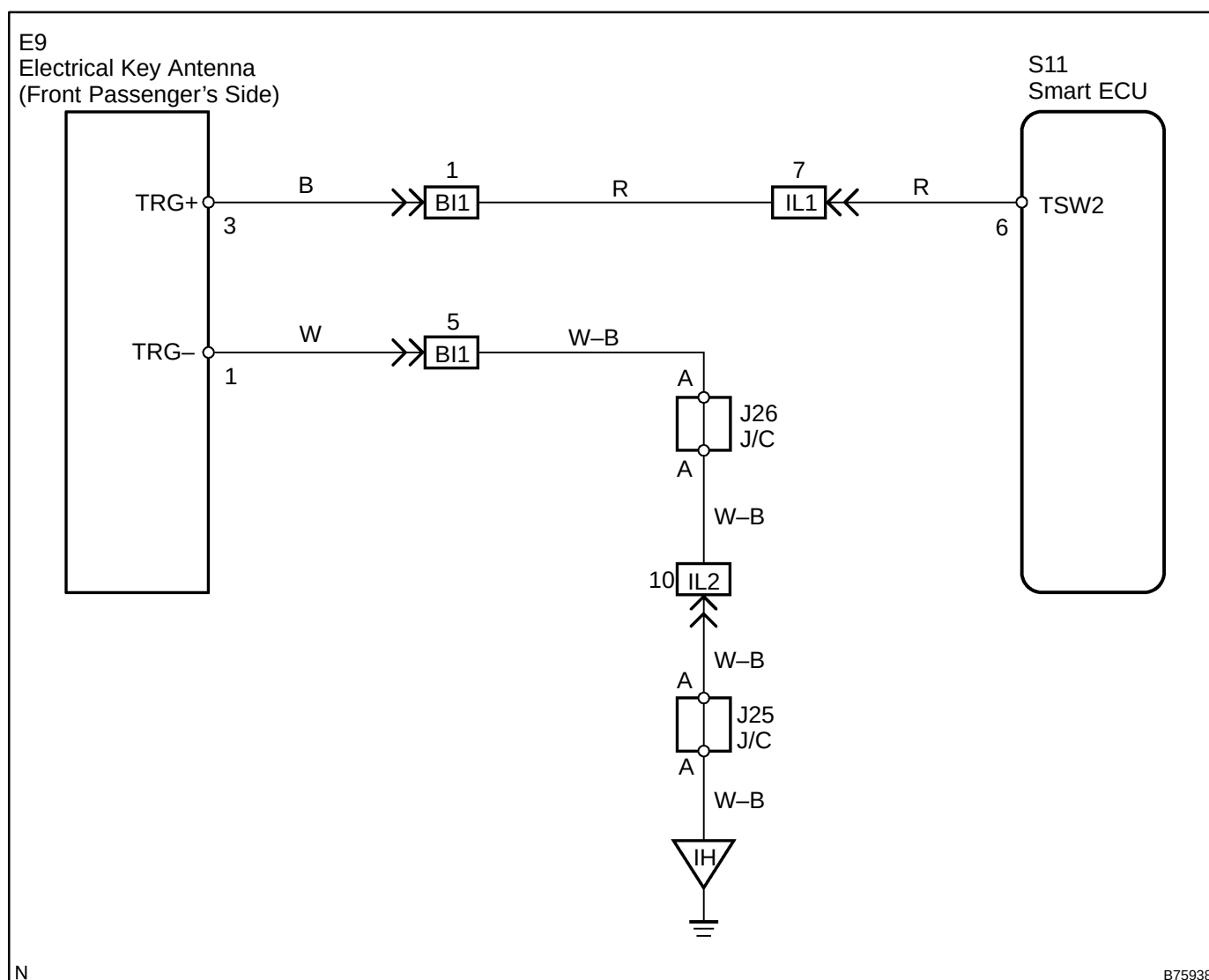
REPLACE SMART ECU

SMART LOCK FUNCTION DOES NOT OPERATE ON PASSENGER DOOR

CIRCUIT DESCRIPTION

When the touch sensor inside the front passenger door outside handle is touched, the smart ECU sends a request signal to the passenger door outside oscillator. The smart key receives this request and transmits its ID code. Upon receiving the ID code, the smart ECU determines that the smart key is outside the vehicle and sends a lock signal to the passenger door lock assembly through the instrument panel J/B (multiplex network body ECU).

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK MANUAL DOOR LOCK OPERATION

- (a) Check that the manual door lock function operates normally.

OK: Manual door lock function operates normally.

NG

**Go to POWER DOOR LOCK CONTROL SYSTEM
(See page 05-2074)**

OK

2 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
 (b) Turn the power switch ON (IG) and press the hand-held tester main switch ON.
 (c) Select the items below in the DATA LIST and read the displays on the hand-held tester.

Smart ECU:

Item		Normal Condition	Diagnostic Note
P TRIGGER SW	P-door trigger switch/ ON or OFF	ON: Lock switch is pushed OFF: Lock switch is not pushed	–

OK: "ON" (lock switch is pressed) appears on the screen.

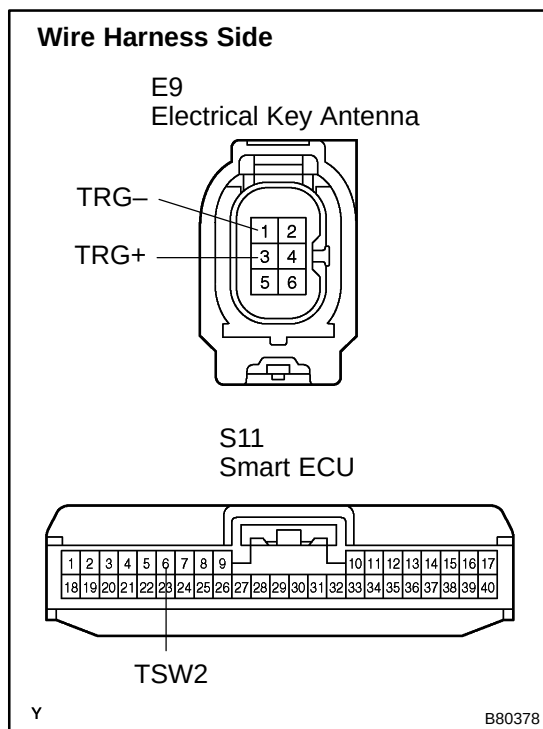
NG

Go to step 3

OK

REPLACE SMART ECU

3 CHECK WIRE HARNESS (ELECTRICAL KEY ANTENNA – SMART ECU AND BODY GROUND)



- Disconnect E9 antenna connector.
- Disconnect S11 ECU connector.
- Measure the resistance of the wire harness side connectors.

Standard:

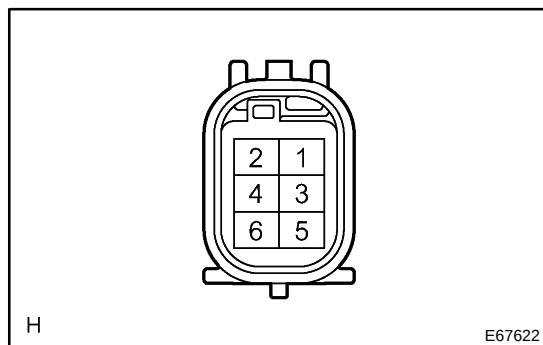
Tester Connection	Specified Condition
E9-3 (TRG+) – S11-6 (TSW2)	Below 1 Ω
E9-1 (TRG-) – Body ground	Below 1 Ω
E9-3 (TRG+) – Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4 INSPECT ELECTRICAL KEY ANTENNA



- Remove the electrical key antenna.
- Measure the antenna resistance.

Standard:

Tester Connection	Condition	Specified Condition
1 – 3	Switch pushed	10 k Ω or higher
1 – 3	Switch not pushed	Below 1 Ω

NG

REPLACE ELECTRICAL KEY ANTENNA

OK

REPLACE SMART ECU

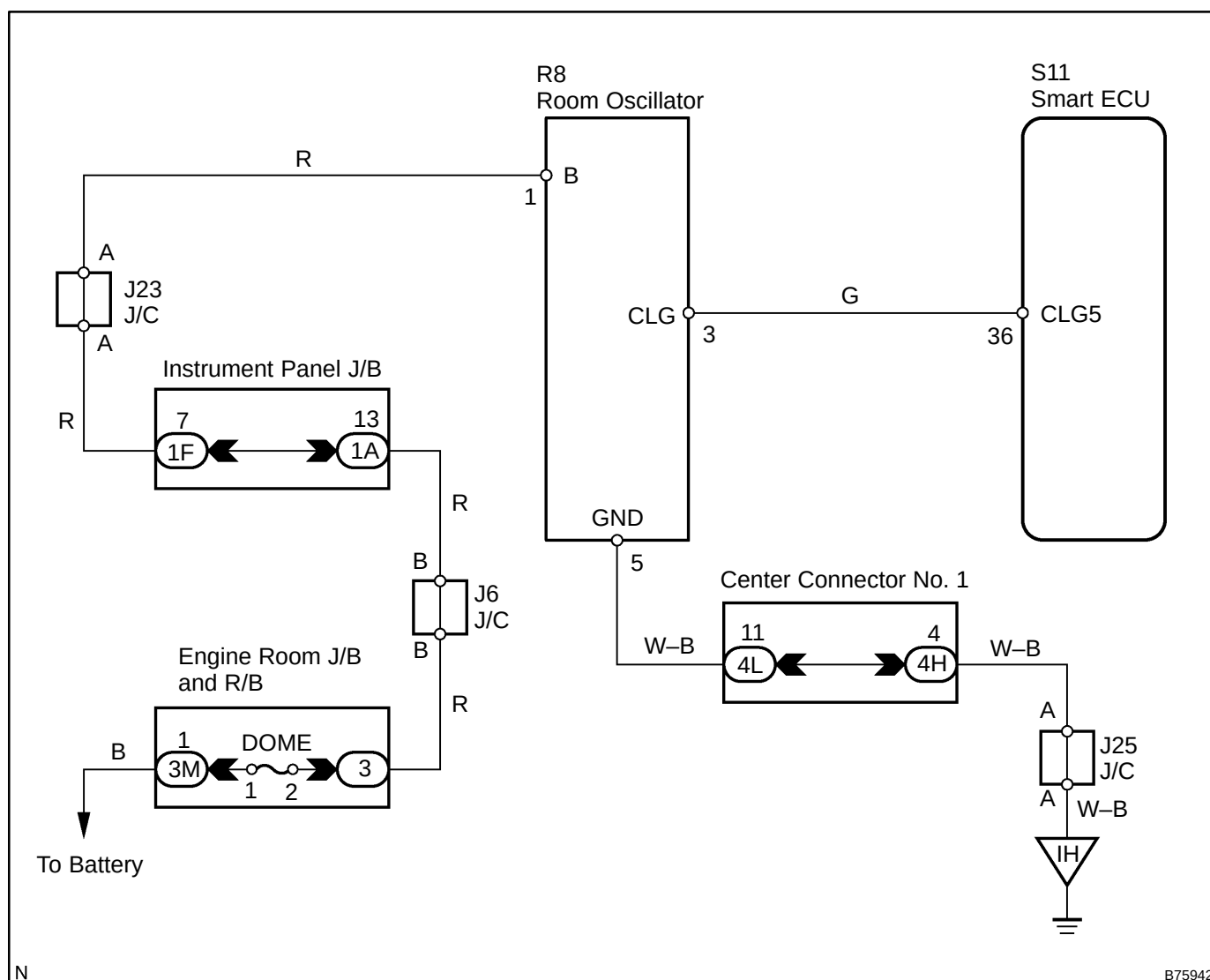
HYBRID VEHICLE CONTROL SYSTEM DOES NOT START USING SMART IGNITION FUNCTION (STARTS WHEN KEY IS INSERTED)

CIRCUIT DESCRIPTION

If the smart ignition function does not operate, insert the smart key into the key slot and check if the hybrid control system starts. If the hybrid control system starts (the transponder key ECU outputs a start permission to the hybrid control system and the hybrid control system starts), it is considered that only the smart ignition system is malfunctioning.

If the driver's door is opened and closed, the power switch changes from ON (ACC) to OFF, or the power switch is changed from OFF to ON, the smart ECU uses the wireless door lock receiver to send a request signal to the smart key. Then, the smart key transmits its ID code to the door control receiver. The ID code, which is then sent to the smart ECU, is verified by the smart ECU and the verification result is sent to the transponder key ECU. The transponder key ECU and the smart ECU communicate encryption codes each other using the multiplex communication line. When the return code from the smart ECU matches the ID code in memory, the transponder key ECU sends a hybrid control system start permission signal to the hybrid control ECU. Pressing the power switch then starts the hybrid control system. Turning the power switch from ON (ACC) to OFF stops the hybrid control system.

WIRING DIAGRAM



INSPECTION PROCEDURE**1 CHECK SMART LOCK AND UNLOCK OPERATION**

- (a) Check that the smart lock and unlock function operates normally.

OK: Smart lock and unlock function operates normally.

NG

OTHER PROBLEM (See page 05-2167)

OK

2 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
(b) Turn the power switch from OFF to ON (IG) and press the hand-held tester main switch ON.
(c) Select the items below in the DATA LIST and read the displays on the hand-held tester.

Smart ECU:

Item		Normal Condition	Diagnostic Note
KEY UNLK WRN SW	Key unlock warning switch/ ON or OFF	ON: Key is in key slot OFF: No key is in key slot	–

OK: "ON" (key is in key slot) appears on the screen.

NG

Go to PUSH BUTTON START SYSTEM (See page 05-2429)

OK

3 PERFORM ACTIVE TEST USING HAND-HELD TESTER

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
- (b) Turn the power switch from OFF to ON (IG) and press the hand-held tester main switch ON.
- (c) Select the item below in the ACTIVE TEST and then check that the oscillator operates.

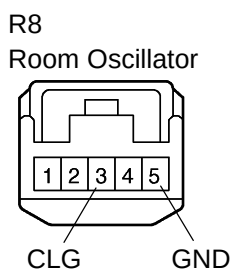
SMART ECU:

Item	Test Details	Diagnostic Note
FR TRANSMITTER	Front Transmitter ON/OFF	–

OK: "ON" (front transmitter) appears on the screen.

When the smart key is brought close to the the room oscillator, the oscillator is turned ON and the indicator on the smart key illuminates.

Wire Harness Side



- (d) Measure the frequency of the oscillator connector.

Standard:

Tester Connection	Condition	Specified Condition
R8-3 (CLG) – R8-5 (GND)	During ACTIVE TEST	Some Hz

NG

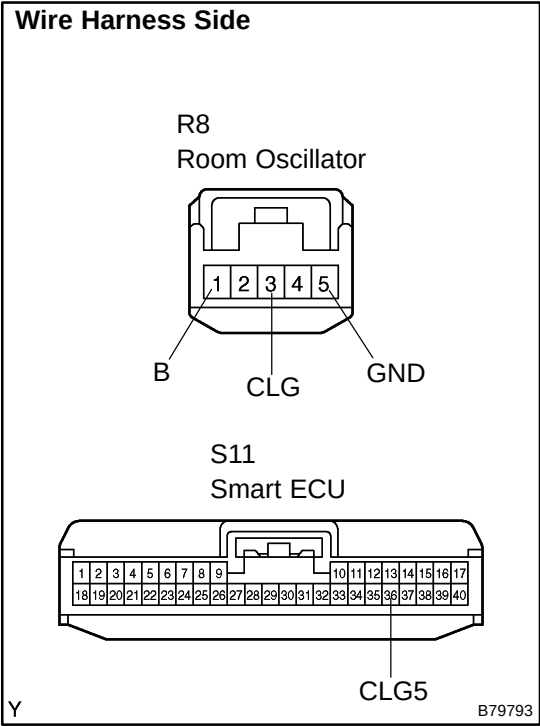
Go to step 4

OK

REPLACE ROOM OSCILLATOR

4

CHECK WIRE HARNESS (ROOM OSCILLATOR – SMART ECU AND BODY GROUND)



- (a) Disconnect the R8 oscillator connector.
- (b) Disconnect the S11 ECU connector.
- (c) Measure the voltage and resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
R8-1 (B) – Body ground	10 to 14 V
R8-5 (GND) – Body ground	Below 1 Ω
R8-3 (CLG) – S11-36 (CLG5)	Below 1 Ω
R8-3 (CLG) or S11-36 (CLG5) – Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CON-NECTOR

OK

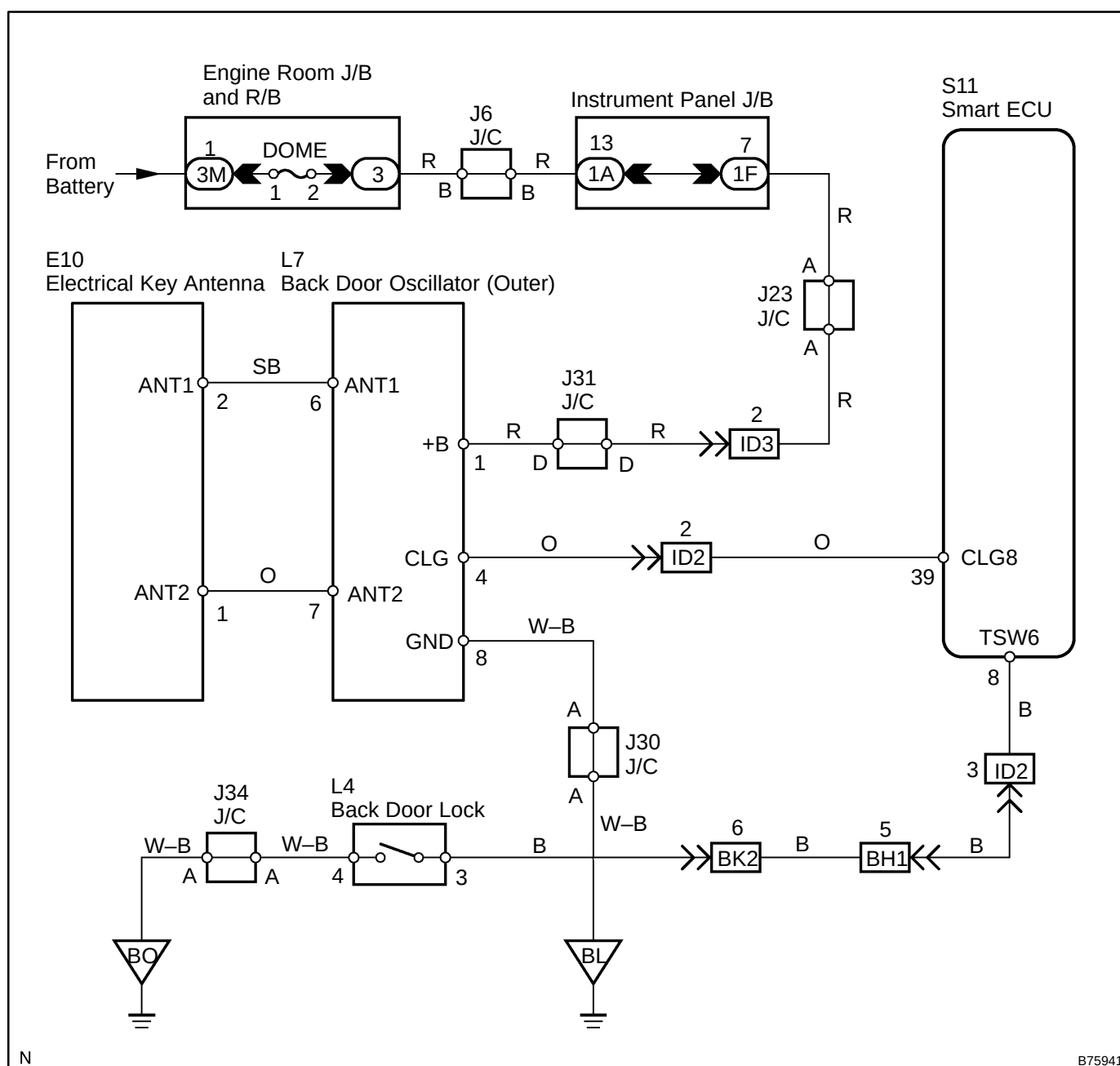
REPLACE SMART ECU

SMART BACK DOOR UNLOCK FUNCTION DOES NOT OPERATE WHEN SMART KEY IS OUTSIDE BACK DOOR

CIRCUIT DESCRIPTION

When the back door opener switch is turned ON, the smart ECU uses the back door oscillator (outer) and antenna to output a request signal to the outside of the vehicle for a distance of approximately 1.0 m from the back door. A smart key near the back door detects this request and transmits its ID code. The wireless door lock receiver receives the ID code and sends this ID code to the smart ECU. The smart ECU checks if the ID code is valid. If the ID code is verified, the smart ECU sends a back door open signal to the instrument panel J/B Assy (multiplex network body ECU) using the multiplex communication line and stops outputting request signals. The instrument panel J/B Assy (multiplex network body ECU) then unlocks the back door.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK SMART DOOR LOCK AND UNLOCK OPERATION

- (a) Check that the smart door lock and unlock function operates normally.

OK: Smart door lock and unlock function operates normally.

NG

OTHER PROBLEM (See page 05-2167)

OK

2 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
 (b) Turn the power switch from OFF to ON (IG) and press the hand-held tester main switch ON.
 (c) Select the items below in the DATA LIST and read the displays on the hand-held tester.

Smart ECU:

Item	Measurement / Display (Range)	Normal Condition	Diagnostic Note
TR/B-DOOR LOCK	Trunk/Back-door lock switch/ ON or OFF	ON: Back door lock switch is pushed OFF: Back door lock switch is not pushed	–

OK: "ON" (back-door lock switch is pushed) appears on the screen.

NG

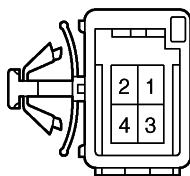
Go to step 3

OK

Go to step 5

3 INSPECT BACK DOOR LOCK SWITCH

L4
Back Door Lock Switch



Y

B79788

- (a) Disconnect the L4 switch connector.
 (b) Measure the resistance of the wire harness side connector.

Standard:

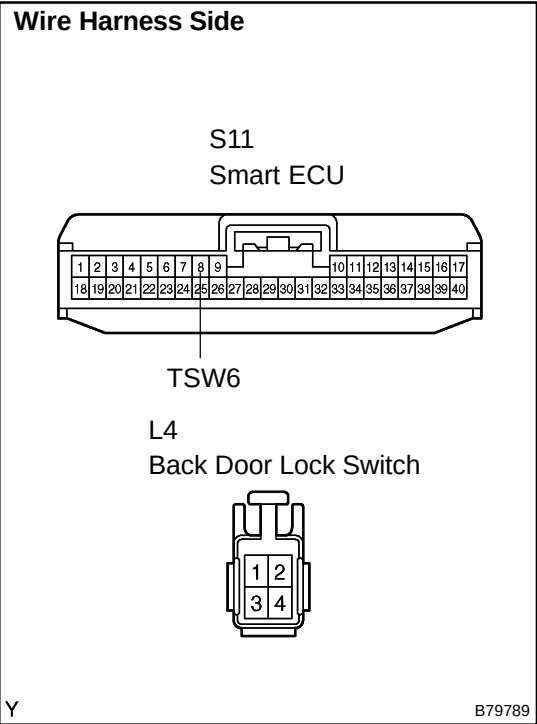
Tester Connection	Condition	Specified Condition
L4-3 – L4-4	Not pushed (OFF)	10 kΩ or higher
L4-3 – L4-4	Pushed (ON)	Below 1 Ω

NG

REPLACE BACK DOOR LOCK SWITCH

OK

4 CHECK WIRE HARNESS (SMART ECU – BACK DOOR LOCK SWITCH)



- (a) Disconnect the S11 ECU connector.
- (b) Disconnect the L4 switch connector.
- (c) Measure the resistance of the wire harness side connectors.

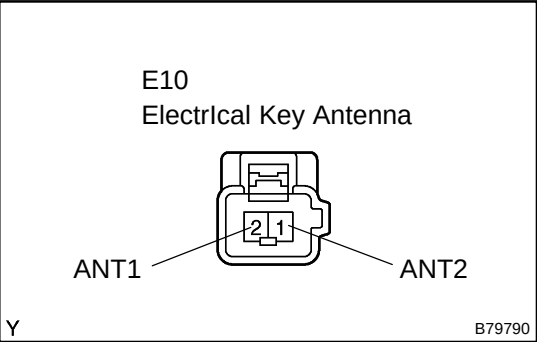
Standard:

Tester Connection	Specified Condition
S11-8 (TSW6) – L4-3	Below 1 Ω
L4-4 – Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 INSPECT ELECTRICAL KEY ANTENNA



- (a) Disconnect the E10 antenna connector.
- (b) Measure the resistance of the wire harness side connector.

Standard:

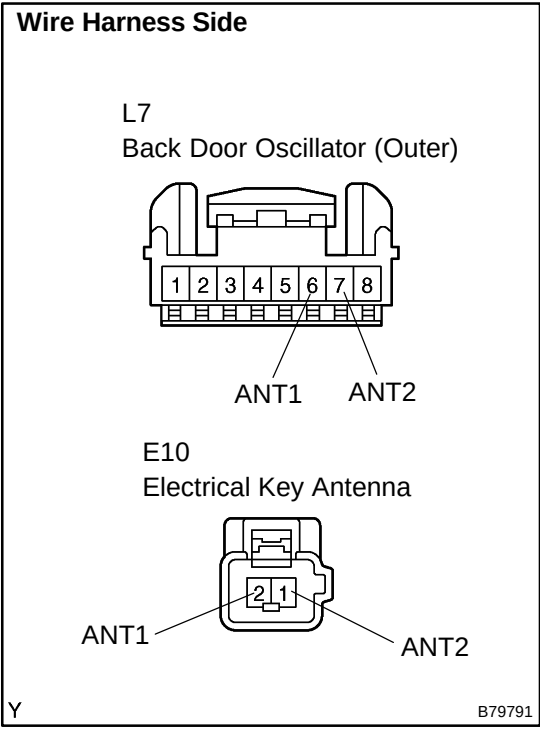
Tester Connection	Condition	Specified Condition
E10-2 (ANT1) – E10-1 (ANT2)	Back door lock switch touched	Below 1 Ω

NG REPLACE ELECTRICAL KEY ANTENNA

OK

6

CHECK WIRE HARNESS (BACK DOOR OSCILLATOR (OUTER) – ELECTRICAL KEY ANTENNA)



- (a) Disconnect the L7 and E10 ECU connectors.
- (b) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
L7-6 (ANT1) – E10-2 (ANT1)	Below 1 Ω
L7-7 (ANT2) – E10-1 (ANT2)	Below 1 Ω

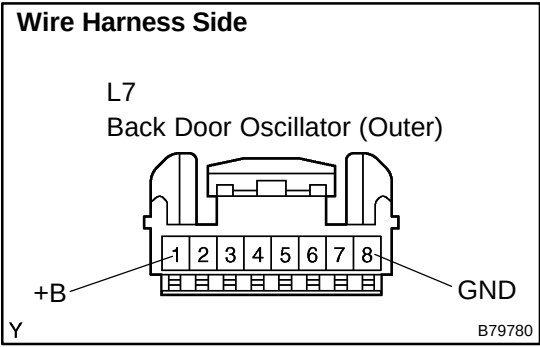
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

7

CHECK WIRE HARNESS (BACK DOOR OSCILLATOR (OUTER) – BODY GROUND)



- (a) Disconnect the L7 oscillator connector.
- (b) Measure the resistance and voltage of the wire harness side connector.

Standard:

Tester Connection	Specified Condition
L7-1 (+B) – Body ground	10 to 14 V
L7-8 (GND) – Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

8 PERFORM ACTIVE TEST USING HAND-HELD TESTER

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
- (b) Turn the power switch from OFF to ON (IG) and press the hand-held tester main switch ON.
- (c) Select the items below in the ACTIVE TEST and then check that the oscillator (outer) operates.

Smart ECU:

Item	Test Details	Diagnostic Note
BDOOR TRNSMTTR	Back Door Outer Transmitter ON/OFF	–

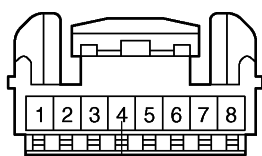
OK: "OFF" (back door outer transmitter) appears on the screen.

When the smart key is brought close to the back door, the oscillator (outer) is turned ON and the indicator on the smart key illuminates.

NG**Go to step 9****OK****REPLACE SMART ECU****9 CHECK BACK DOOR OSCILLATOR (OUTER)****Wire Harness Side**

L7

Back Door Oscillator (Outer)



Y

CLG

B79780

- (a) Remove the oscillator.
- (b) Measure the frequency of the connector.

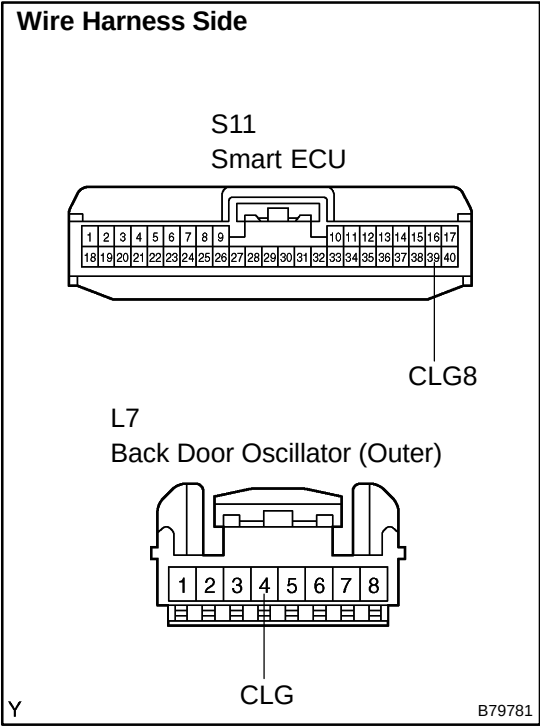
Standard:

Tester Connection	Condition	Specified Condition
L7-4 (CLG) – Body ground	Back door lock switch OFF → ON	0 Hz → Some Hz

NG**REPLACE BACK DOOR OSCILLATOR (OUTER)****OK**

10

CHECK WIRE HARNESS (SMART ECU – BACK DOOR OSCILLATOR (OUTER))



- (a) Disconnect the S11 ECU connector.
- (b) Disconnect the L7 oscillator connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
S11-39 (CLG8) – L7-4 (CLG)	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

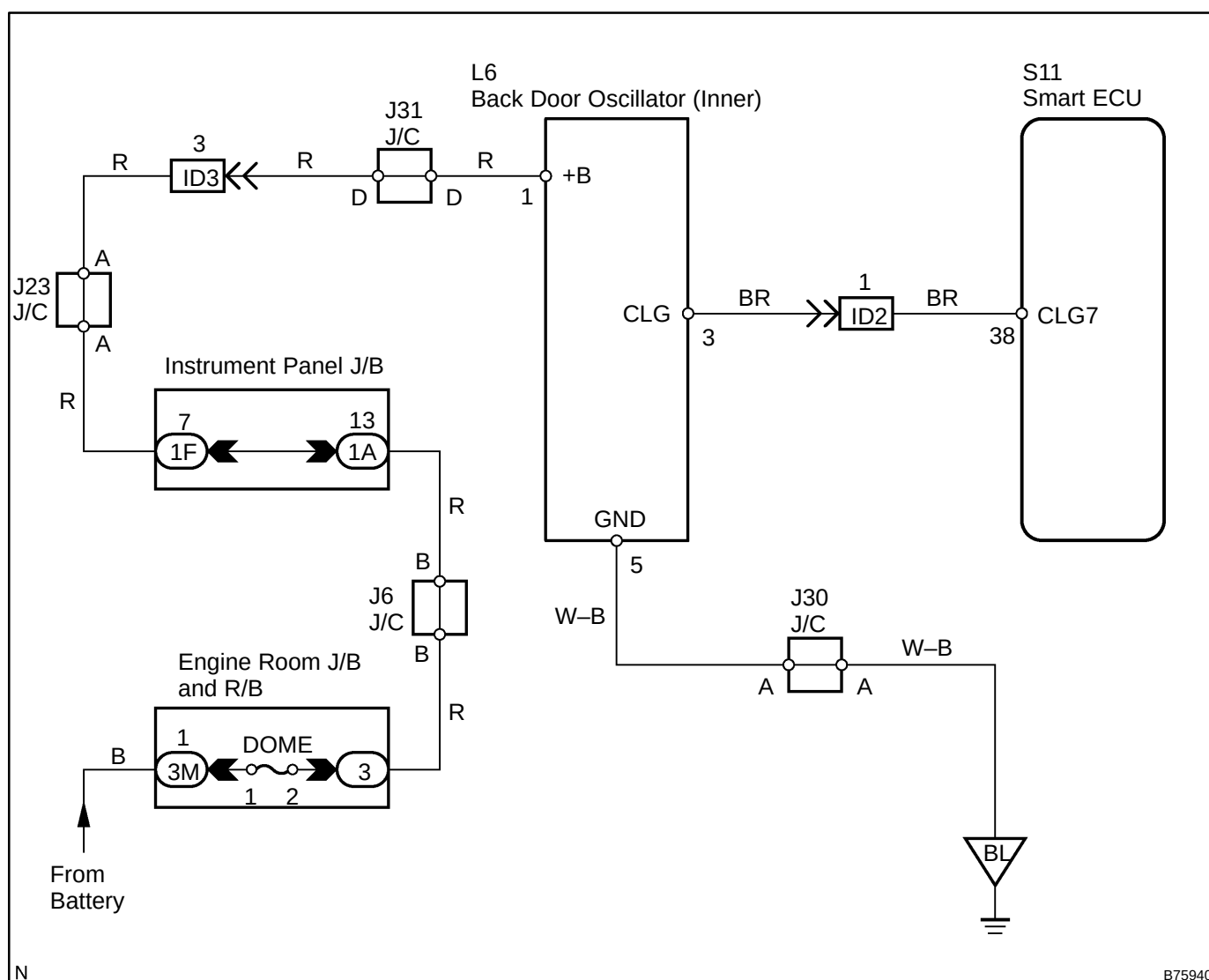
REPLACE SMART ECU

SMART KEY LUGGAGE COMPARTMENT LOCK-IN PREVENTION FUNCTION DOES NOT OPERATE

CIRCUIT DESCRIPTION

With the smart key inside the luggage compartment, press the back door opener switch. The smart ECU uses the back door oscillators (outer and inner) to output a request signal. The back door outer oscillator cannot verify an ID code in this situation. The smart key receives the request and transmits its ID code to the antenna. The ID code is then sent to the smart ECU through the back door inner oscillator in order to be confirmed by the smart ECU. If the ID code is verified, the smart ECU sends a back door open signal to the instrument panel J/B Assy (multiplex network body ECU) using the multiplex communication line and stops outputting request signals. The back door then can be opened.

WIRING DIAGRAM



INSPECTION PROCEDURE

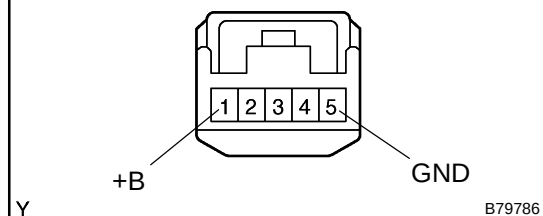
1 CHECK SMART BACK DOOR UNLOCK FUNCTION OPERATES

- (a) Check that the smart back door unlock function operates normally.

OK: Smart back door unlock function operates normally.**NG****OTHER PROBLEM (See page 05-2167)****NG****2 CHECK WIRE HARNESS (BACK DOOR OSCILLATOR (INNER) – BODY GROUND)****Wire Harness Side**

L6

Back Door Oscillator (Inner)



- (a) Disconnect the L6 connector.
 (b) Measure the resistance and voltage of the wire harness side connector.

Standard:

Tester Connection	Specified Condition
L6-1 (+B) – Body ground	10 to 14 V
L6-5 (GND) – Body ground	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****3 PERFORM ACTIVE TEST USING HAND-HELD TESTER**

- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
 (b) Turn the power switch from OFF to ON (IG) and press the hand-held tester main switch ON.
 (c) Select the items below in the ACTIVE TEST, and then check that the oscillator (inner) operates.

Smart ECU:

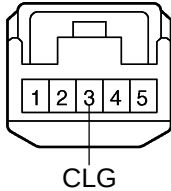
Item	Test Details	Diagnostic Note
IN BDR TRNSMTTR	Back Door Inner Transmitter ON/OFF	–

OK: "ON" (Transmitter is in luggage room) appears on the screen.**NG****Go to step 4****OK****REPLACE SMART ECU**

4 INSPECT BACK DOOR OSCILLATOR (INNER)

Wire Harness Side

L6
Back Door Oscillator (Inner)



Y B79786

- (a) Disconnect the L6 oscillator connector.
- (b) Measure the frequency of the connector.

Standard:

Tester Connection	Condition	Specified Condition
L6-3 (CLG) – Body ground	Back door lock switch OFF → ON	0 Hz → Some Hz

NG

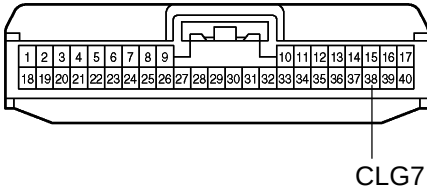
REPLACE BACK DOOR OSCILLATOR (INNER)

OK

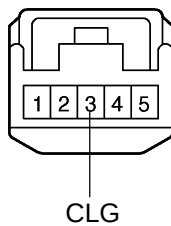
5 CHECK WIRE HARNESS (SMART ECU – BACK DOOR OSCILLATOR (INNER))

Wire Harness Side

S11
Smart ECU



L6
Back Door Oscillator (Inner)



Y B79787

- (a) Disconnect the S11 ECU connector.
- (b) Disconnect the L6 connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
S11-38 (CLG7) – L6-3 (CLG)	Below 1 Ω
S11-38 (CLG7) – L6-3 (CLG) – Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

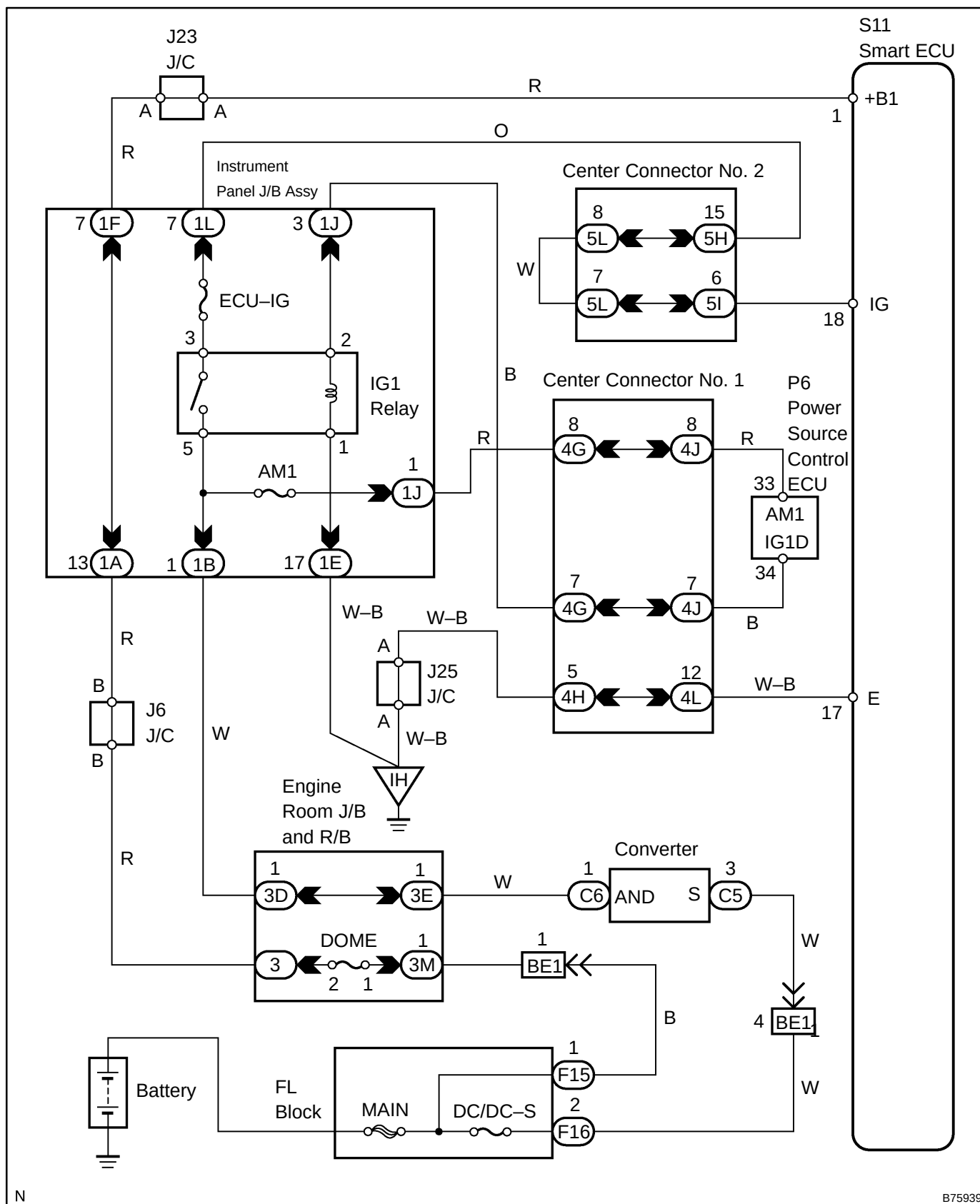
REPLACE SMART ECU

SMART FUNCTIONS DO NOT OPERATE AT ALL

CIRCUIT DESCRIPTION

When the smart functions do not operate at all, it is possible that the smart ECU is malfunctioning or that the wire harness leading to the smart ECU is short-circuited.

WIRING DIAGRAM



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INSPECTION PROCEDURE

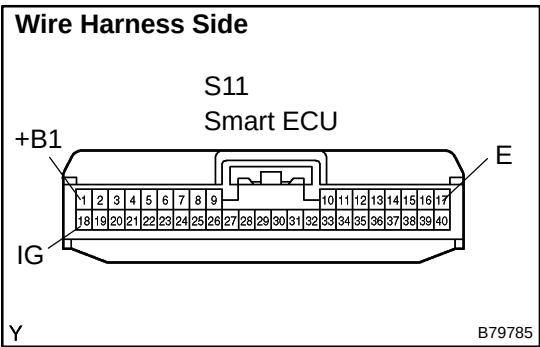
1 INSPECT FUSE (DOME)

- (a) Remove the DOME fuse from the engine room J/B and R/B.
(b) Measure the resistance.
Standard: Below 1 Ω

NG REPLACE FUSE

OK

2 CHECK WIRE HARNESS (SMART ECU – BODY GROUND)



- (a) Disconnect the S11 ECU connector.
(b) Measure the voltage and resistance of the wire harness side connector.
Standard:

Tester Connection	Condition	Specified Condition
S11-18 (IG) – Body ground	Power switch OFF → ON (IG)	0 V → 10 to 14 V
S11-1 (+B1) – Body ground	Constant	10 to 14 V
S11-17 (E) – Body ground	Constant	Below 1 Ω

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE SMART ECU

SYSTEM DESCRIPTION

1. SMART ENTRY SYSTEM DESCRIPTION

- In addition to the mechanical key function and the wireless door lock remote control function, this system provides the smart key with a bi-directional communication function. This function enables the smart ECU to recognize the presence of the smart key within several detection areas. The system can lock or unlock the doors, or start the hybrid system without key operation as long as the smart key is in the user's possession.
- This system consists of a smart key ECU, power source control ECU, transponder key ECU, body ECU, smart key, 5 oscillators, 5 antennas, 2 touch sensors, 3 lock switches, and a wireless door lock receiver. The smart ECU controls the system.
- The smart entry system operates in cooperation with the push button start system, the immobilizer system and the wireless door lock remote control system.

2. FUNCTION OF MAIN COMPONENTS

Components	Function
Smart Key	Receives signals from oscillators and returns ID code to wireless door lock receiver.
Door Oscillator (driver and front passenger doors)	Intermittently transmits key detection signals within detection area around each door upon receiving transmission request signal from smart ECU.
Room Oscillator	Transmits key detection signals within detection area in vehicle interior upon receiving transmission request signal from smart ECU.
Back Door Oscillator (inner)	Transmits key detection signals within detection area in luggage room upon receiving transmission request signal from smart ECU.
Back Door Oscillator (outer)	Transmits key detection signals within detection area around back door upon receiving transmission request signal from smart ECU.
Luggage Antenna	Transmits back door oscillator signal.
Door Outside Handle (driver and front passenger) (Touch Sensor)	Transmits door unlock request signal to smart ECU when inside of door outside handle is touched.
Door Outside Handle (driver and front passenger) (Antenna)	Transmits door oscillator signal.
Door Outside Handle (Driver and Front Passenger) (Lock Switch)	Transmits door lock request signal to smart ECU.
Back Door Lock Switch	Transmits door lock request signal to smart ECU.
Back Door Opener Switch	Transmits back door open request signal to smart ECU via body ECU.
Wireless Door Lock Receiver	Receives ID code from smart key and transmits it to smart ECU.
Power Switch	Switches vehicle power modes between four stages (OFF, ON (ACC), ON (IG), and ON (READY) in accordance with shift lever position, state of stoplight switch and check results of smart key.
Smart Key Cancel Switch	Turns smart entry system ON/OFF.
Stop Light Switch	Outputs state of brake pedal to power source control ECU.
Combination Meter (Smart Entry System Warning Light)	Smart ECU illuminates smart entry system warning light to prevent these conditions from occurring: Smart key is moved out of vehicle while hybrid system is in operation, door locks are operated, or smart key is left in vehicle.
Combination Meter (Buzzer)	Smart ECU sounds buzzer to prevent these conditions from occurring: Smart key is moved out of vehicle while hybrid system is in operation, door locks are operated, or smart key is left in vehicle.
Wireless Door Lock Buzzer	Smart ECU sounds wireless door lock buzzer to prevent these conditions from occurring: Smart key is moved out of vehicle while hybrid system is in operation, door locks are operated, or smart key is left in vehicle.
Smart ECU	- Identifies and checks ID codes from wireless door lock receiver, then transmits signals to ECUs if ID codes match. - Upon receiving signals from switches, smart ECU transmits intermittent transmission request signals to door oscillators and transmission request signals to other oscillators in accordance with conditions.
Power Source Control ECU	Main control of push button start system. It receives results of ID code check of smart key provided by smart ECU via transponder key ECU. When check results reveal that ID code is legitimate, power source control ECU authorizes transition of power modes through operation of power switch.
Transponder Key ECU	- Main control of immobilizer system. It transmits results of ID code check of smart key provided by smart ECU to power source control ECU. - Transmits hybrid system start authorization signal to hybrid vehicle control ECU.
Transmission Control ECU	- Actuates parking lock actuator upon receiving power switch OFF signal from power source control ECU. - Transmits state of parking lock operation (whether shift position is in P or some other position) to power source control ECU.

DIAGNOSTICS – SMART ENTRY SYSTEM

Components	Function
Hybrid Vehicle Control ECU	• Starts hybrid system upon receiving system start signal from power source control ECU (READY ON). • Receives hybrid system start authorization signal from transponder key ECU.
Multiplex Network Body ECU	• Transmits body control system signals (courtesy switch, door key lock/unlock switch, door lock position switch, halfway switch signals, etc.) to smart ECU via BEAN. • Receives door lock/unlock request signal from smart ECU via dedicated serial communication line (with local protocol), which is used between body ECU, smart ECU and wireless door lock receiver.

3. SYSTEM FUNCTION

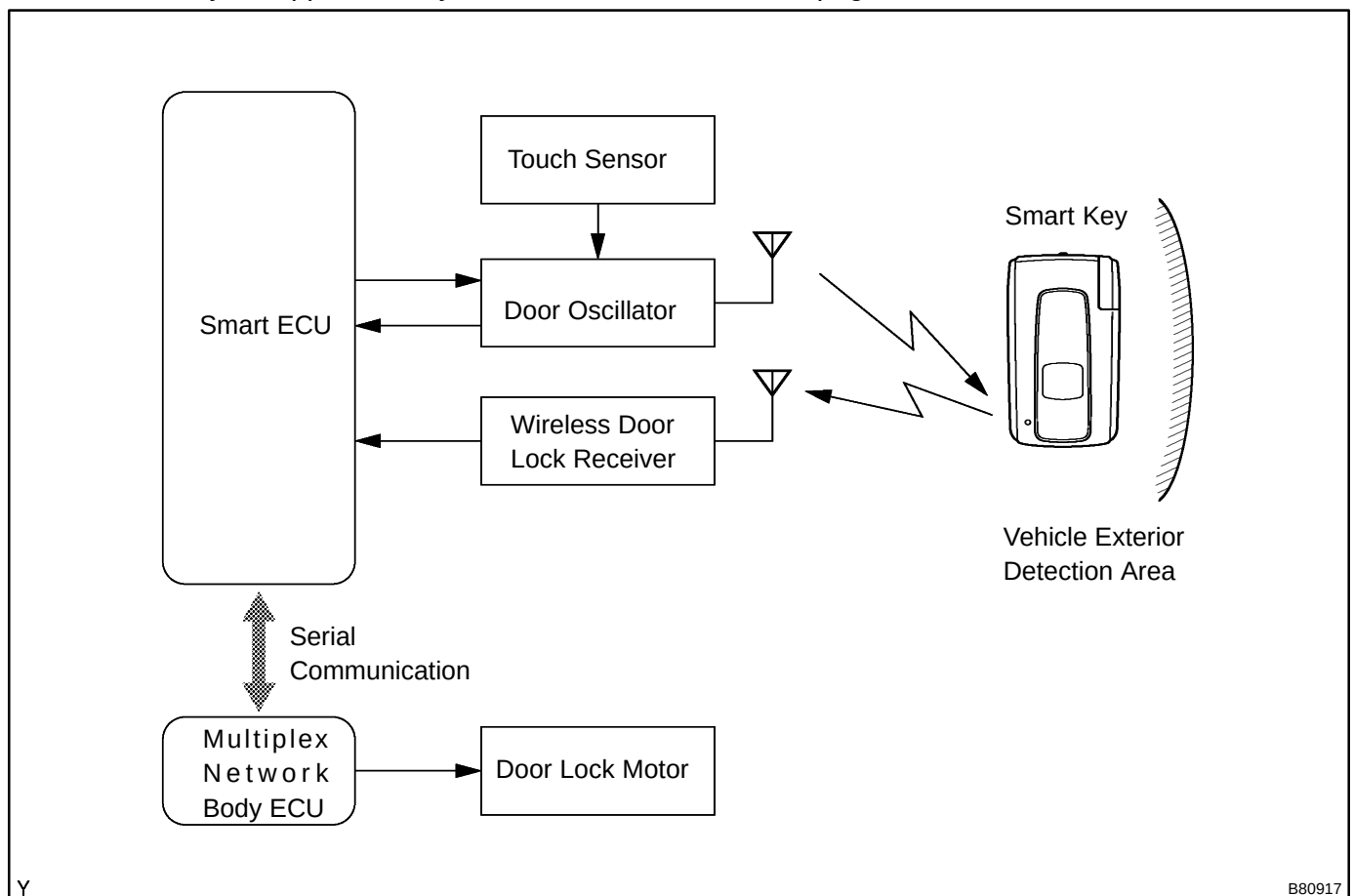
(a) Smart unlock

- For the system to be able to detect the location of the smart key, the vehicle doors must be locked. The door oscillators transmit key detection signals at prescribed intervals in order to form vehicle exterior detection areas (approximately 0.7 to 1.0 m (2.3 to 3.3 ft) around each front outside door handle).
- When the smart key is brought into a detection area, the system automatically checks the key's ID code. When this is completed, the door that has detected the smart key assumes the unlock standby condition. In this condition, if the touch sensor on the outside door handle is touched, all doors unlock.

Mode	Unlock Standby Door	Door to be Unlocked
Individual Door Unlock	Driver	Driver Door Only
Individual Door Unlock	Front Passenger	All Doors
Individual Door Unlock	Back Door	Back Door Only
All Door Unlock	Driver	All Doors
All Door Unlock	Front Passenger	All Doors
All Door Unlock	Back Door	All Doors
Driver's Door Unlock*	Driver	Driver Door Only
Driver's Door Unlock*	Front Passenger	All Doors
Driver's Door Unlock*	Back Door	All Doors

HINT:

*: This is the default setting. The smart unlock mode can be changed by pressing the lock and panic switch on the smart key for approximately 5 seconds. For details, see page [05-2165](#).

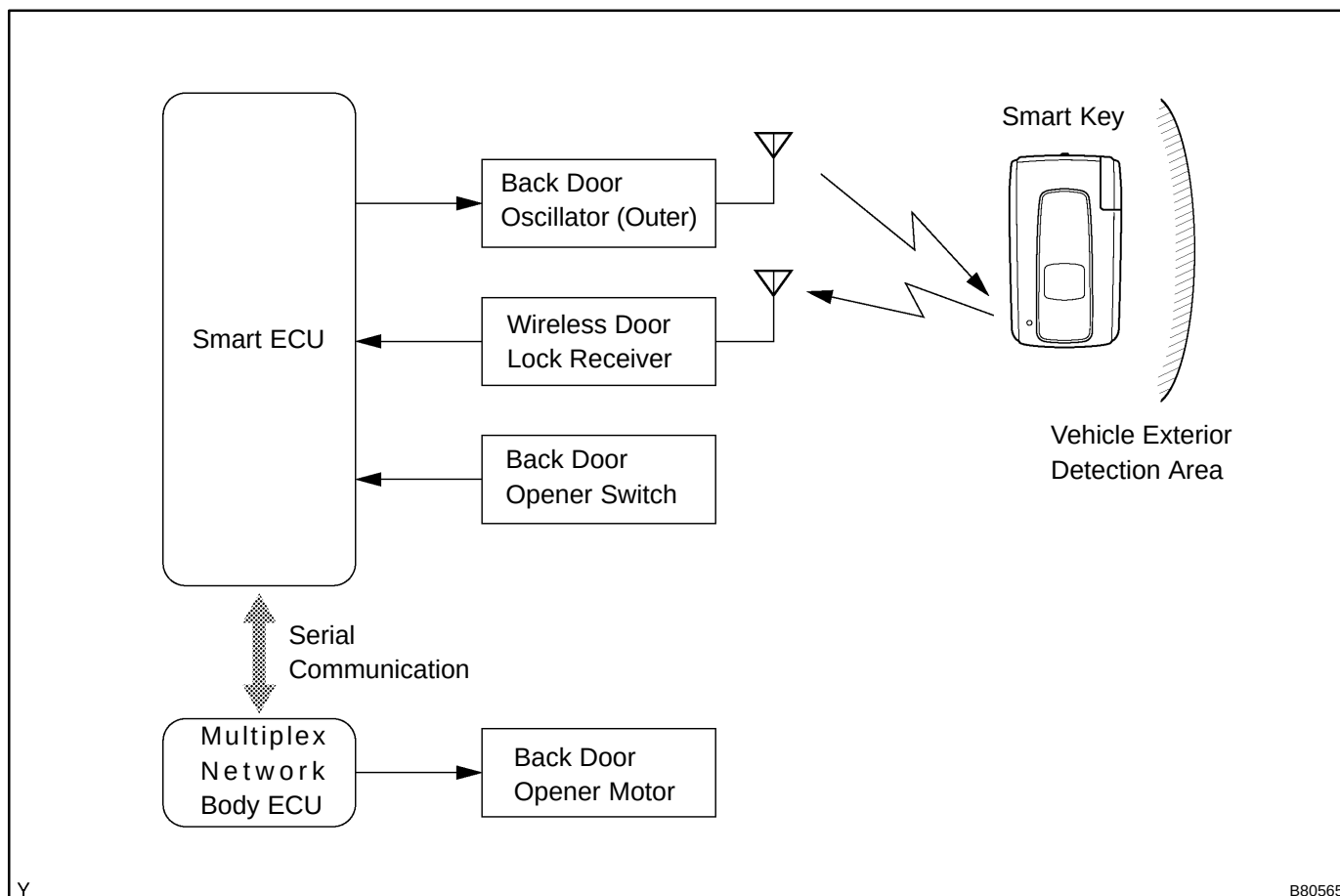


(b) Smart back door unlock

- With all doors locked, if the back door opener switch is pressed with the smart key in the user's possession, the back door oscillator (outer) outputs a smart key detection signal and the smart ECU checks the ID code. After the check is completed, the smart ECU unlocks* the back door via the body ECU. At this time, if the user continues to press the back door opener switch, the back door lock latch will be released.

HINT:

*: If smart unlock is set to individual door unlock mode, only the back door will be unlocked. If set to all door unlock mode, all doors will be unlocked.

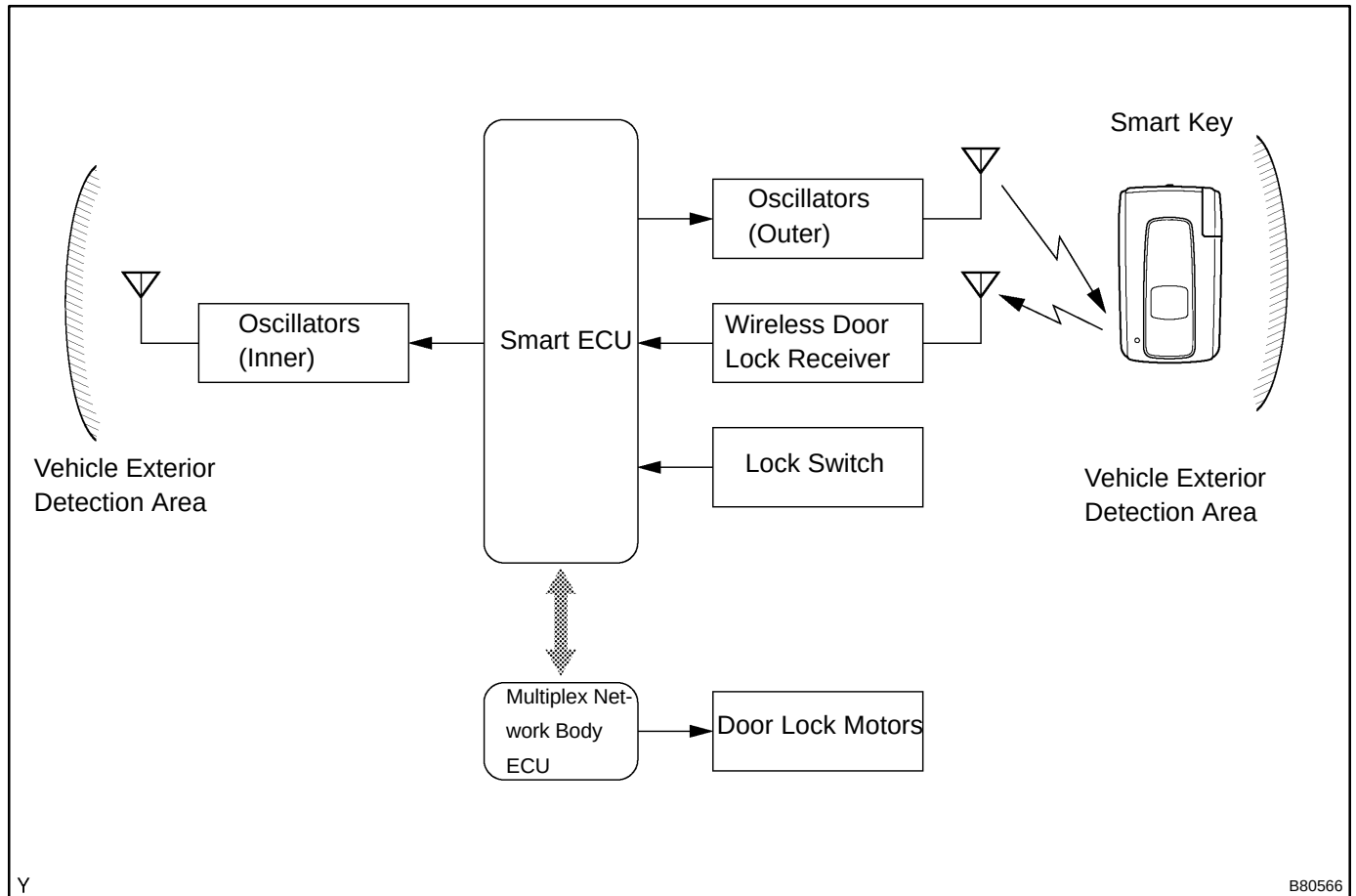
**NOTICE: Handling Precaution for Smart Back Door Unlock**

Smart back door unlock function may not operate if the smart key is placed near the center of the rear bumper.

(c) Smart lock

- When the smart key is located outside the vehicle and all the doors are closed, if the user presses the lock switch on the outside door handle or the lock switch on the back door, the smart ECU will activate all oscillators and start checking for the ID code of a smart key.
- At this time, if an oscillator outside of the vehicle (driver's/front passenger's door oscillator or back door outer oscillator) determines that the ID code of the smart key is legitimate, the smart ECU determines that the smart key has been taken outside the vehicle and locks the doors via the body ECU.
- A smart unlock operation will not be authorized for approximately 3 seconds* after the doors have been locked.

*: The setting of this duration can be changed using the customize function. For details, see page [05-2165](#).



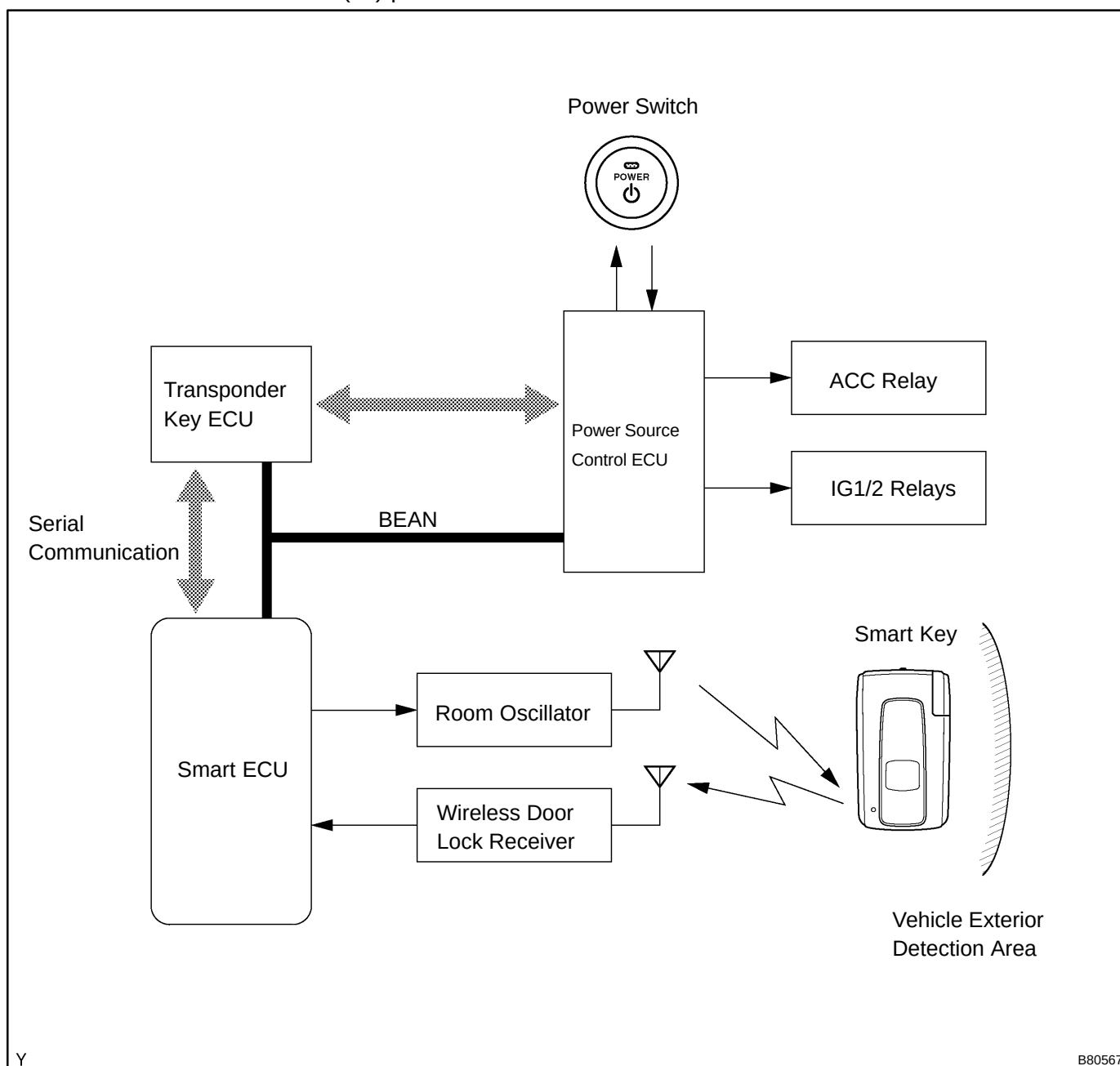
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(d) Smart ignition

OFF → ON (ACC) → ON (IG)

- If the driver presses the power switch once without depressing the brake pedal, the room oscillator, in accordance with the request signal received from the smart ECU, forms a smart key detection area inside the vehicle by emitting smart key detection signals. Accordingly, the smart key sends an ID code signal to the smart ECU via the wireless door lock receiver. The smart ECU checks the ID code of the smart key and transmits the check results to the transponder key ECU.
- The transponder key ECU transmits the check results to the power source control ECU. If the check results reveal that the ID code is legitimate, the power source control ECU will turn on the ACC relay and start the ACC power supply. At this time, the power source control ECU illuminates a green indicator light on the power switch in order to inform the driver of the ON (ACC) power mode.
- After the transition to the ON (ACC) power mode, if the driver presses the power switch again, the power source control ECU will turn on the IG1 and IG2 relays and start the IG power supply. At this time, the power source control ECU illuminates an amber indicator light on the power switch in order to inform the driver of the ON (IG) power mode.

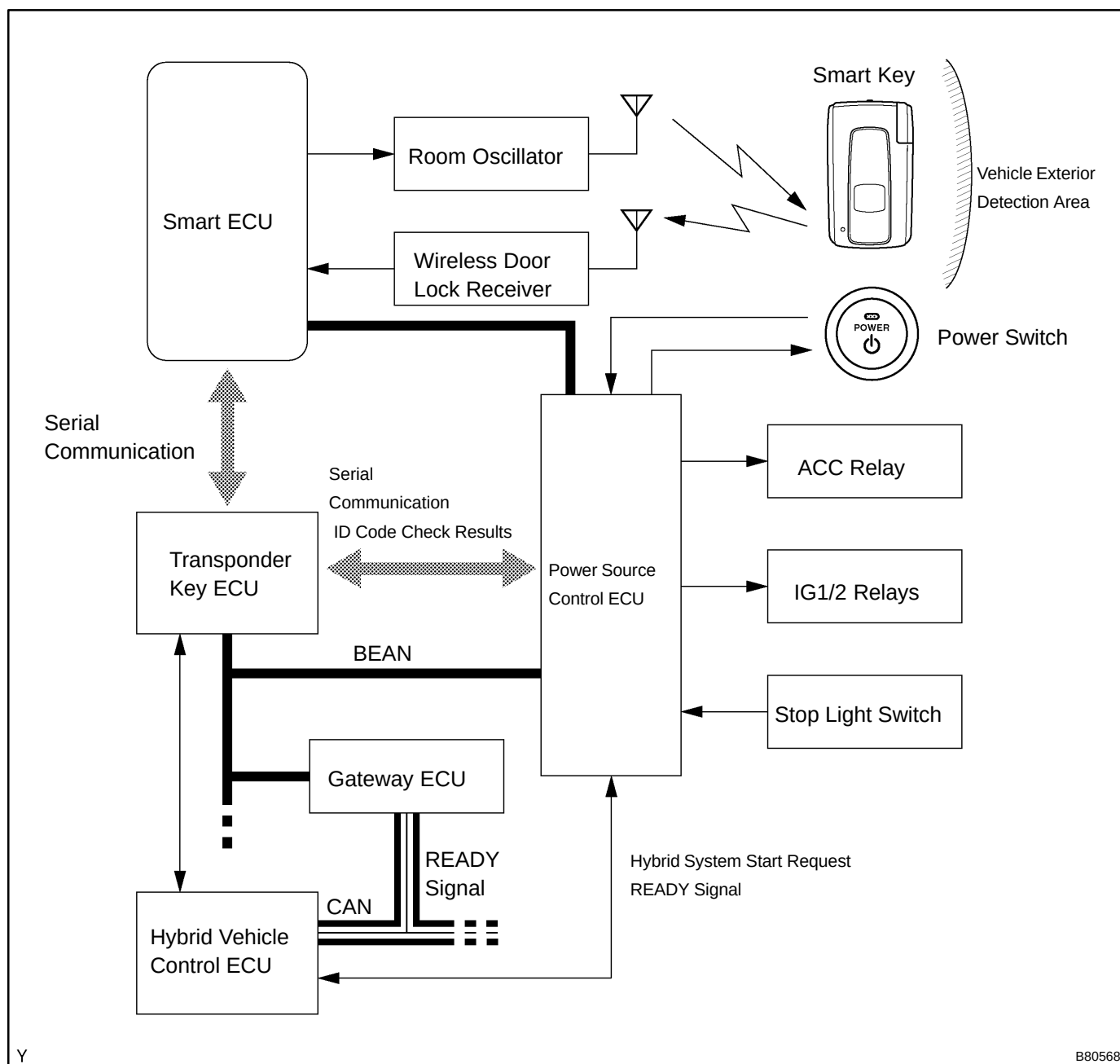


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OFF → ON (READY)

- If the driver presses the power switch once while depressing the brake pedal, the room oscillator, in accordance with the request signal received from the smart ECU, forms a smart key detection area inside the vehicle by emitting smart key detection signals. Accordingly, the smart key sends an ID code signal to the smart ECU via the wireless door lock receiver.
- The smart ECU checks the ID code of the smart key and transmits the check results to the transponder key ECU.
- The transponder key ECU transmits the check results to the power source control ECU. If the check results reveal that the ID code is legitimate, the power source control ECU will turn on the ACC, IG1 and IG2 relays and start the ACC and IG power supply.
- At this time, the power source control ECU illuminates an amber indicator light on the power switch in order to inform the driver of the ON (IG) power mode.
- After the indicator light has illuminated, the power source control ECU transmits a hybrid system start request signal to the hybrid vehicle control ECU.
- Upon receiving this signal, the hybrid vehicle control ECU verifies the check results of the smart key ID code provided by the transponder key ECU.
- If the check results reveal that the ID code is legitimate, the hybrid vehicle control ECU starts the hybrid system.
- At this time, the power source control ECU will turn off the indicator light on the power switch in order to inform the driver of the ON (READY) mode.



(e) Warning function

- General

The smart key system is equipped with a warning function to prevent problems resulting from errors in smart key usage. The smart key system works without any requirements from the driver other than having the key in one's possession. The driver, as a result, may become unaware of the presence or location of the key and make errors (listed below) that could lead to serious problems.

EXAMPLES:

1. The driver is unaware that the key has been taken out of the vehicle by a passenger.
2. The driver exits the vehicle with the hybrid system running.
3. The driver exits the vehicle with the shift position in a position other than P.

If the above situations occur, the hybrid system may be unable to be started once it has been turned off, the vehicle may be stolen, or other problems may follow. Warning function descriptions for several smart key usage errors are below.

- Warning against the driver taking the smart key outside the vehicle with its shift position in P.
- Warning against the driver taking the smart key outside the vehicle while the shift position is in a position other than P.
- Warning against a passenger taking the smart key outside the vehicle.
- Warning against operating the smart lock while the hybrid system is in operation.
- Warning against operating the door lock while the smart key remains inside the vehicle.
- Warning against low battery of the smart key.
- Warning against operating the smart ignition outside the detection area of the room oscillator.
- Warning against operating the door lock while any of the doors is open.

Warning against the driver taking the smart key outside the vehicle with its shift position in P:

Possible results without warning	Vehicle theft or inability to restart hybrid system
Detection conditions	If all conditions listed below are met and smart key ID code check result by room oscillator fails, warning will be issued: • Shift position is in P position • Power switch is OFF • Driver door is opened and closed
Warning (smart entry system warning light)	Illuminates upon detection and turns OFF if power switch is turned OFF or smart key ID code check result by room oscillator passes
Warning (buzzer (combination meter))	Sounds once upon detection. Sounds a second time if vehicle driven in this state
Warning (wireless door lock buzzer)*	Sounds 3 times upon detection and stops if power switch is turned OFF or smart key ID code check result by room oscillator passes

Warning against the driver taking the smart key outside the vehicle while the shift position is in a position other than P:

Possible results without warning	Vehicle theft or inability to restart hybrid system
Detection conditions	If all conditions listed below are met and smart key ID code check result by room oscillator fails, warning will be issued: • Shift position is in P position • Power switch is in ON (ACC), ON (IG) or ON (READY) position • Driver door is opened and closed
Warning (smart entry system warning light)	• Illuminates upon detection and turns OFF if power switch is turned OFF or smart key ID code check result by room oscillator passes • Warning message is displayed on multi-display
Warning (buzzer (combination meter))	Sounds continuously upon detection and stops if power switch is turned OFF, shift position is changed to P, or smart key ID code check result by room oscillator passes
Warning (wireless door lock buzzer)*	Sounds continuously upon detection and stops if power switch is turned OFF, shift position is changed to P, or smart key ID code check result by room oscillator passes

Warning against a passenger taking the smart key outside the vehicle:

Possible results without warning	Vehicle theft or inability to restart hybrid system
Detection conditions	If all conditions listed below are met and smart key ID code check result by room oscillator fails, warning will be issued: • Power switch is not OFF • Door other than driver door is opened and closed
Warning (smart entry system warning light)	Illuminates upon detection and turns OFF if power switch is turned OFF or smart key ID code check result by room oscillator passes
Warning (buzzer (combination meter))	Sounds once upon detection. Sounds a second time if vehicle is driven in this state
Warning (wireless door lock buzzer)*	Sounds 3 times upon detection and stops if power switch is turned OFF or smart key ID code check result by room oscillator passes

Warning against operating the smart lock while the hybrid system is in operation:

Possible results without warning	Vehicle theft or inability to restart hybrid system
Detection conditions	If all conditions listed below are met, smart key ID code check result by room oscillator fails, and smart key ID code check by door oscillator passes, warning will be issued: • Shift lever is in P position • Power switch is not OFF • All door are closed • Lock switch on outside door handle is ON
Warning (smart entry system warning light)	Illuminates upon detection and turns OFF if power switch is turned OFF or smart key ID code check result by room oscillator passes
Warning (buzzer (combination meter))	–
Warning (wireless door lock buzzer)*	Sounds for 2 seconds

Warning against operating the door lock while the smart key remains in the vehicle:

Possible results without warning	Vehicle theft
Detection conditions	If all conditions listed below are met and smart key ID code check result by room oscillator fails, warning will be issued: • Power switch is in OFF • All door are closed • Lock switch on outside door handle is ON
Warning (smart entry system warning light)	–
Warning (buzzer (combination meter))	–
Warning (wireless door lock buzzer)*	Sounds for 2 seconds

Warning against low battery of the smart key:

Possible results without warning	Smart control is suddenly disabled
Detection conditions	If condition listed below is met, and smart ECU receives code indicating voltage drop of smart key battery while room oscillator checks smart key ID code: • The power switch has been turned OFF after 20 or more minutes have elapsed after hybrid system has been started.
Warning (smart entry system warning light)	–
Warning (buzzer (combination meter))	Sounds once upon detecting
Warning (wireless door lock buzzer)*	–

Warning against operating the smart ignition outside the detection area of the room oscillator:

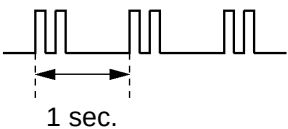
Possible results without warning	User is confused
Detection conditions	If condition listed below is met and smart key ID code check result by room oscillator fails, warning will be issued: • Power switch is pushed
Warning (smart entry system warning light)	Illuminates for 5 seconds upon detection
Warning (buzzer (combination meter))	Sounds once upon detecting
Warning (wireless door lock buzzer)*	–

Warning against operating the door lock while any of the doors is open:

Possible results without warning	Vehicle theft
Detection conditions	If all conditions listed below are met, warning will be issued: • Power switch is OFF • Any door is open • Lock switch on outside door handle is ON
Warning (smart entry system warning light)	–
Warning (buzzer (combination meter))	–
Warning (wireless door lock buzzer)	Sounds for 10 seconds and stops when 10 seconds have passed or if any door is closed

(f) Smart unlock mode selector function

- When the power switch is OFF, and the smart key's lock switch and panic switch remain pressed for approximately 5 seconds, the smart unlock mode can be changed between the following : individual door unlock, driver's door unlock, all door unlock and individual door unlock.
- The wireless door lock buzzer informs the user of the smart unlock mode, Refer to the chart be.

Unlock Mode	Wireless Door Lock Buzzer	Buzzer (in Combination Meter)
Individual Door		Sounds once
All Door		Sounds once
Driver's Door (Default Setting)		Sounds once

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NOTICE:

- This function only changes the unlocking modes of the smart entry system. It does not affect to the wireless door lock remote control system.**
- When changing modes, be sure to push the LOCK switch firmly or the panic alarm may active.**

(g) Power saving function

- When the doors are locked, the door oscillators emit signals to the outside of the vehicle at default intervals of 300 msec. To avoid depleting the auxiliary battery, the system has a battery saving function whereby: 1) after 5 days without a response from the smart key, the system extends door oscillator signal intervals to 600msec.; and 2) after 14 days without a response from the smart key, the system deactivates the smart entry system.
- When the doors are locked and the smart key is located within the vehicle exterior detection area, the smart key and door oscillators are maintaining communication and using power. To avoid depleting the smart key battery and auxiliary battery, if the smart key is located within the vehicle exterior detection area for longer than 10 minutes, the system deactivates the smart entry system.

Refer to the chart below for information on how to reinstate the smart entry system.

Condition	Control	Reinstatement Condition
Vehicle remains parked for a long time. • No response from smart key for more than 5 days	Signal transmission interval is extended from 300 msec. to 600 msec.	- Wireless door lock remote control signal (lock or unlock) is input and ID code matches - Lock switch signal is input - Door is locked or unlocked in unison with movement of mechanical key
Vehicle remains parked for a long time. • No response from smart key for more than 14 days	Automatically deactivates smart entry system	- Wireless door lock remote control signal (lock or unlock) is input and ID code matches - Lock switch signal is input - Door is locked or unlocked in unison with movement of mechanical key
Vehicle remains parked for a long time. • Smart key is located in vehicle exterior detection area for longer than 10 minutes	Automatically deactivates smart entry system	- Wireless door lock remote control signal (lock or unlock) is input and ID code matches - Lock switch signal is input - Door is locked or unlocked in unison with movement of mechanical key

4. SMART ENTRY SYSTEM OPERATION PRECAUTIONS

(a) General smart functions:

(1) Functions and operating ranges:

The functions will not operate if the smart key is not present within the detection areas described below. Furthermore, the functions may not operate or their operating range may decrease if the battery is depleted or in the presence of strong radiowaves or noise. There are also areas in which the functions may not operate properly due to the shape of the vehicle body.

- Smart lock and smart unlock:
Applicable within approximately 0.7 to 1.0 m (2.3 to 3.3 feet) radius of each front door handle. However, this function may not operate near the windows or door handles.
- Smart ignition:
Applicable within vehicle interior. This function may not operate if the smart key is placed on the instrument panel, on the rear tray, in the glove box, or on the floor. If the smart key is placed outside of the vehicle, this function may not operate if the smart key is placed near a window.
- Smart back door unlock:
Applicable within approximately 0.7 to 1.0 m (2.3 to 3.3 feet) radius of the back door opener switch. However, this function may not operate if the smart key is placed near the center of the rear bumper.

(2) The smart entry system uses very weak radiowaves:

The smart functions and the wireless door lock remote control functions may not operate properly (unable to operate the smart lock, unlock, ignition, and back door unlock functions, or a false alarm is issued) in the situations described below. In this case, use the enclosed mechanical key to lock or unlock the driver's door and insert the smart key to start the hybrid system.

- The presence of a facility that generates strong radiowaves nearby, such as a TV tower, electric power plant, or broadcasting station.
- The user has a wireless communication device such as a wireless transmitter or portable telephone along with the smart key.
- The smart key is covered with a metal object or is placed near a metal object.
- A radiowave type wireless door lock remote control is being used in the vicinity.
- When placing the smart key near electrical appliances.

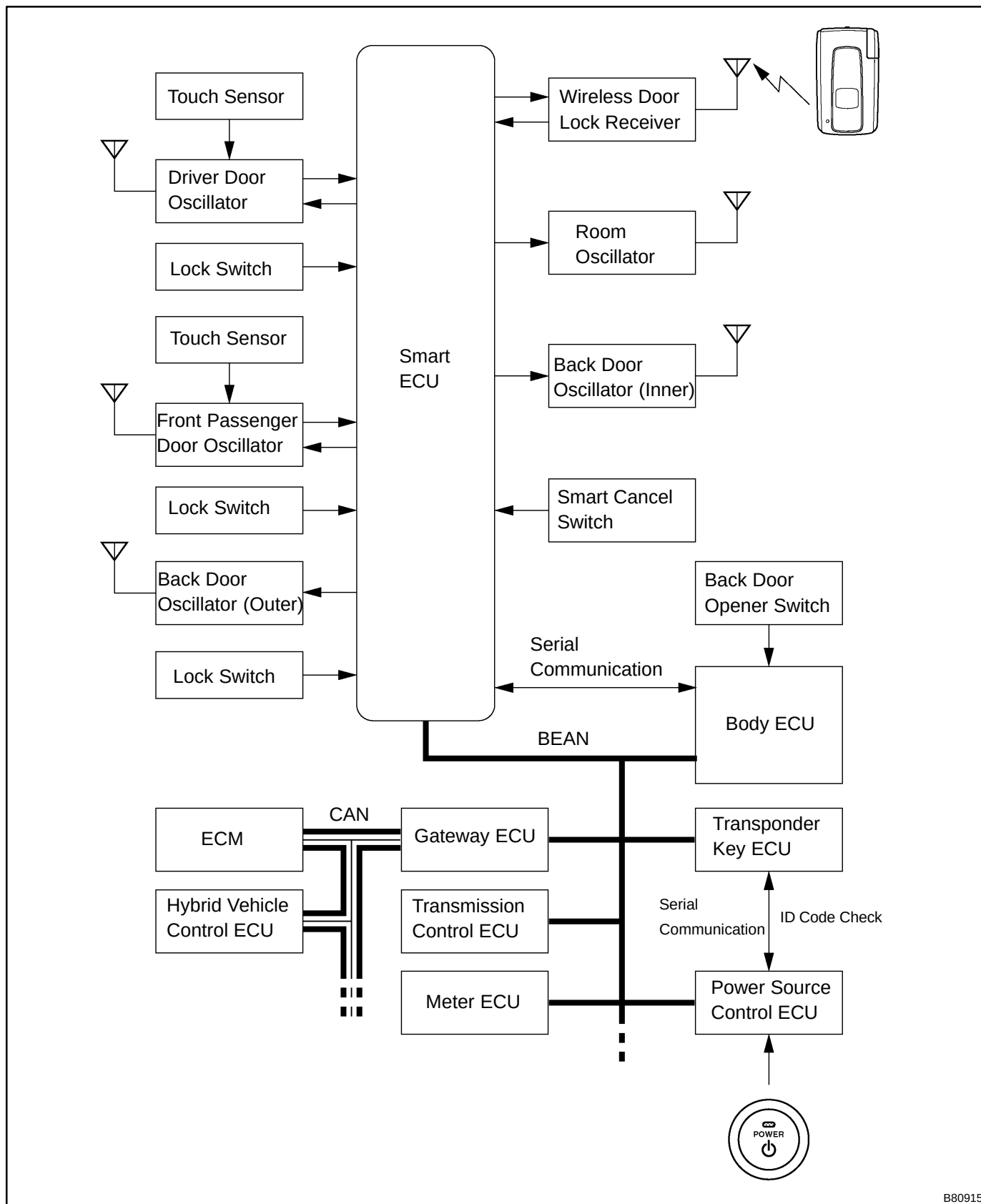
(b) Smart entry system inoperative conditions:

The smart function will not operate under the conditions listed below.

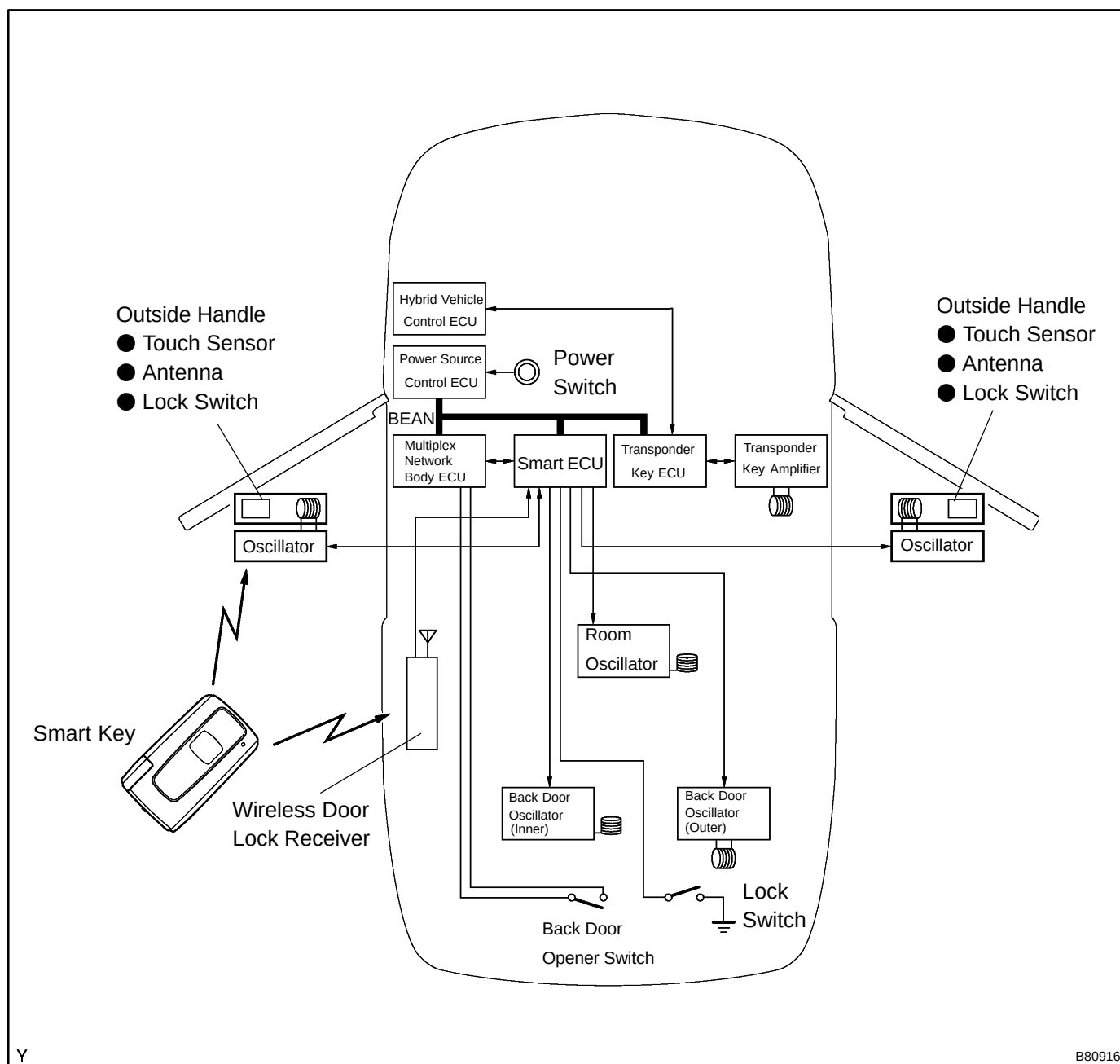
- The smart cancel switch provided below the driver's side instrument panel is turned on.
- The smart key is inserted into the key slot.
- The smart key has no battery (the indicator light does not flash even if the buttons on the smart key are pressed).

SYSTEM DIAGRAM

1. OVERVIEW OF PARTS LAYOUT



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Sender	Receiver	Signal	Line
Hybrid Vehicle Control ECU	Smart ECU	• Shift position signal	BEAN
Multiplex Network Body ECU	Smart ECU	• Driver door key-linked lock/unlock signal (smart lock/unlock control) • DTC erasure signal • Door lock position signal (D, P, rear doors) (smart lock/unlock control) • Electric back door status signal (smart back door control) • Courtesy switch signal (D, P, rear doors) (smart lock, unlock, warning control) • Vehicle specification signal (smart control change) • IG switch signal (entire smart control) • ACC switch signal (smart warning control) • Halfway switch signal (smart ignition control) • Back door switch signal (smart back door control) • All doors courtesy switch signal (smart lock, unlock, warning control)	BEAN
Transponder Key ECU	Smart ECU	• Smart control ON signal (smart ignition control) • Steering lock release activation signal (smart ignition control)	BEAN
Power Source Control ECU	Smart ECU	• Immobilizer ID verification request signal (smart ignition control) • Key slot status (w/ or w/o key) signal (smart ignition control) • Key code verification signal (wireless control)	BEAN
Smart ECU	Transponder Key ECU	• Smart control ON signal (smart ignition control) • Steering lock release activation signal (smart ignition control)	BEAN

REGISTRATION

1. DESCRIPTION OF REGISTRATION

HINT:

- Smart key code is the same as recognition codes for the wireless transmitter. Registering a smart key code enables both the smart key system and the wireless door lock control system to be operated.
 - Code registration is necessary when the smart ECU or smart key is replaced with a new one.
- (a) Select the operation mode from the following:
- New registration mode (when smart ECU is replaced):
New registration mode is used when the smart ECU is replaced with a new ECU.
 - Add mode:
Add mode is used when a new key is added.
 - Erasure mode:
Erasure mode is used to erase all the key codes except for the code for the master key that is used during erasure mode. Use this mode when a key is lost.
 - Reset mode:
Reset mode is used to reset all the key codes (including master key). Use this mode when all keys are lost.
- (b) Perform the code registration and the code erasure according to the flowcharts (see step 2 and 3).

HINT:

Up to 4 master keys can be registered in the smart ECU.

- (c) Register a new key number or change the key number according to the flowcharts (see step 4 and 5).
When the smart ECU is replaced or all the key cylinders are replaced, be sure to register a new key number or change the key number in the smart ECU.

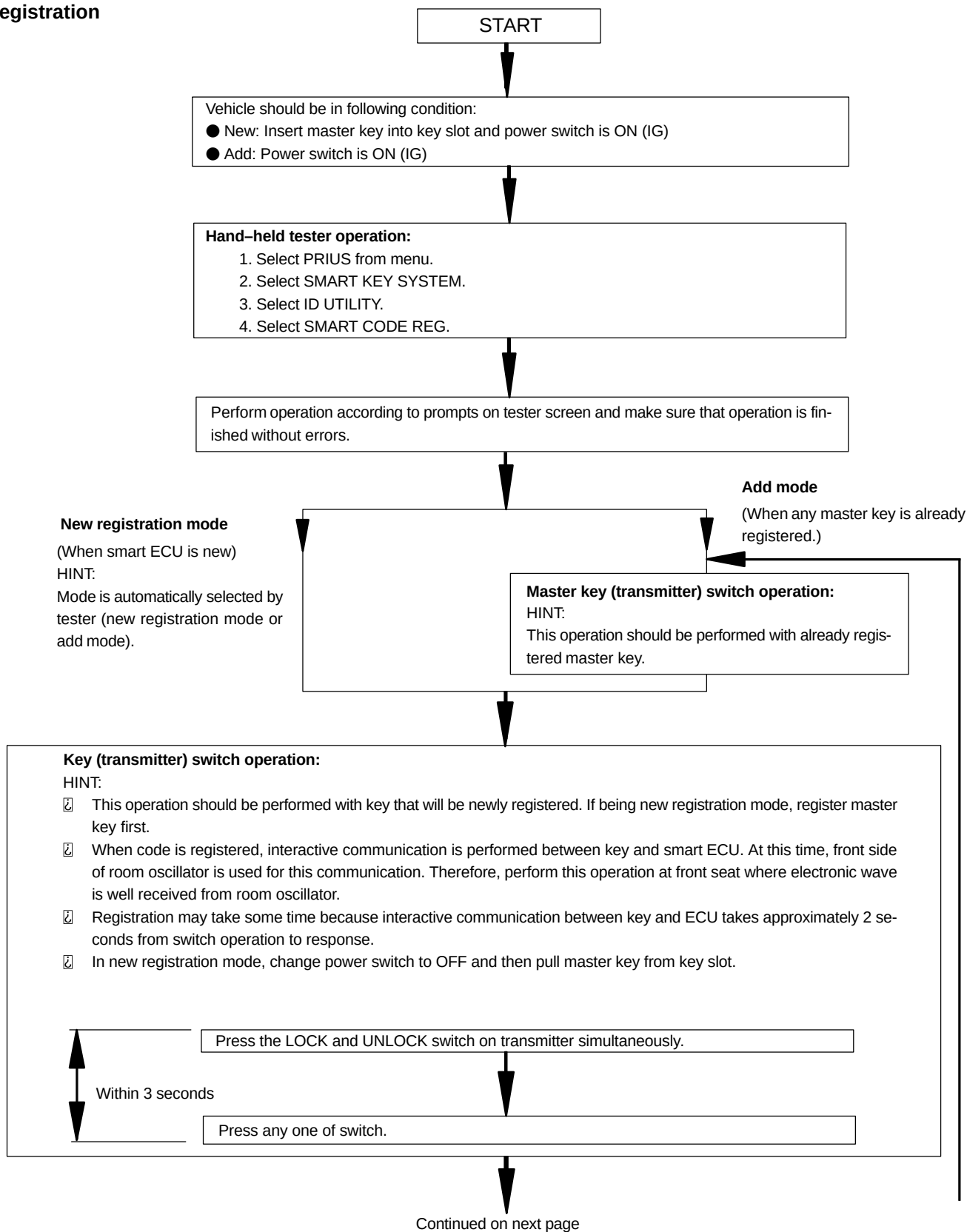
HINT:

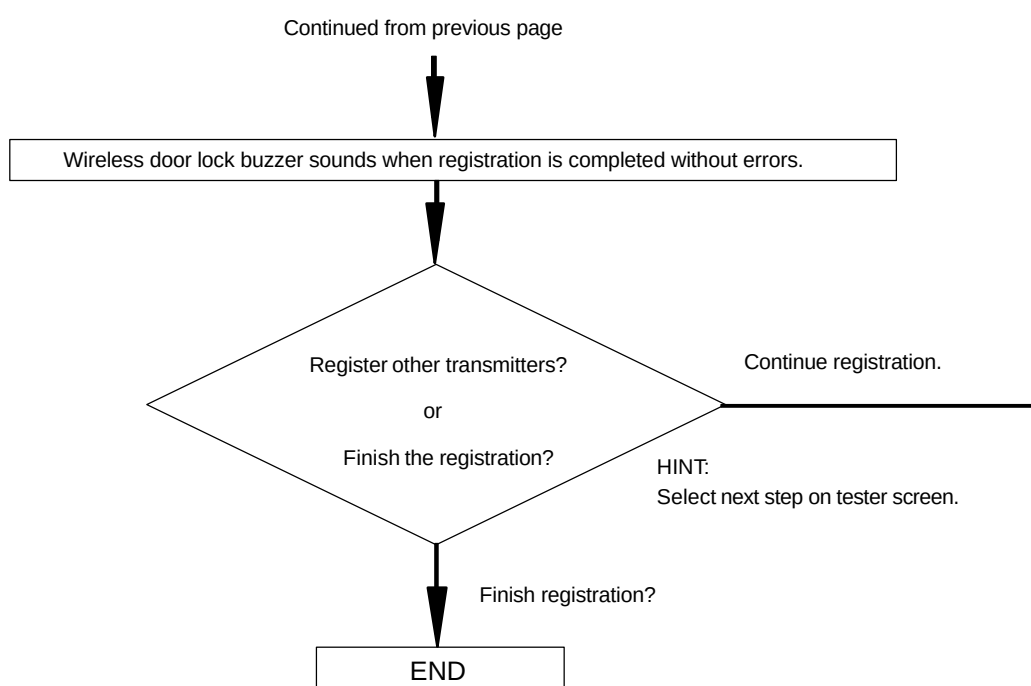
A key number is a 5 digit code stamped on the key number plate.

2. REGISTRATION OF NEW AND ADDITIONAL SMART KEY CODE

(a) Register a smart key code by using the hand-held tester.

Registration





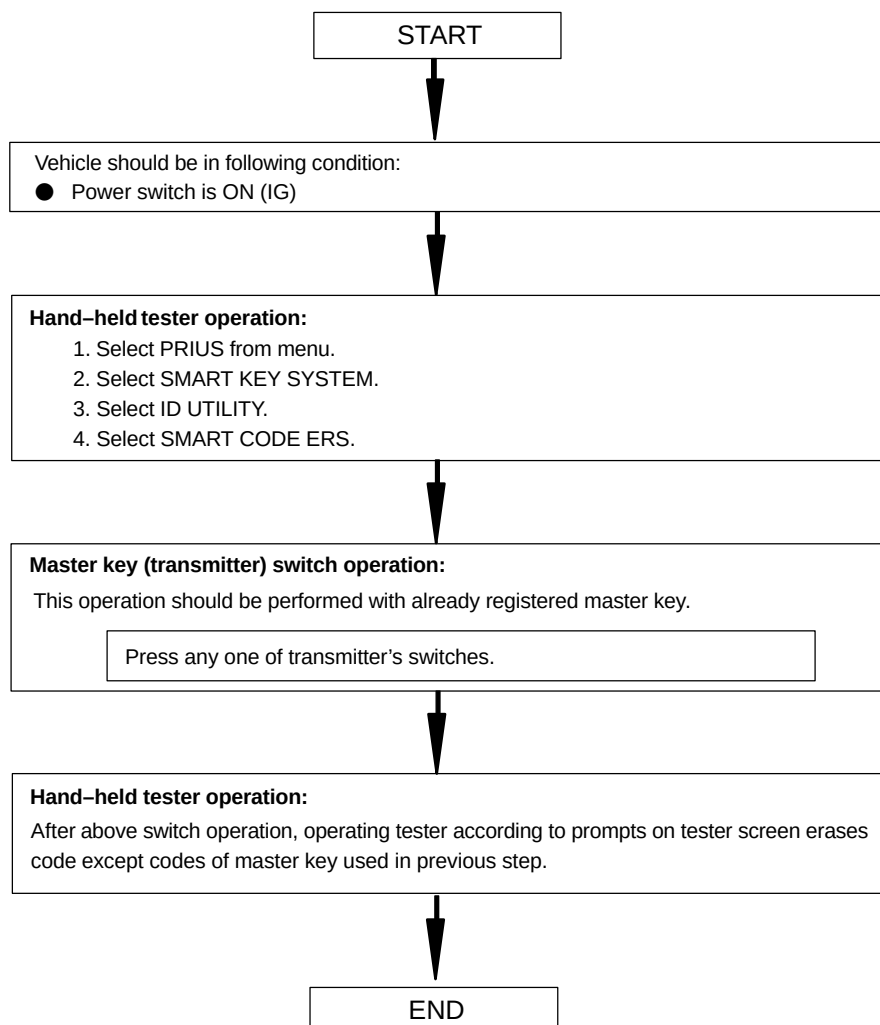
HINT:

- A brief outline of procedures for key code registration is shown on this page. For more detailed information, please refer to the hand-held tester screen's instructions.
- The number of currently registered codes can be checked on the first screen of the SMART CODE REG option.

3. ERASURE OF SMART KEY CODE

(a) Erase the smart key codes using the hand-held tester.

Erasure Flowchart



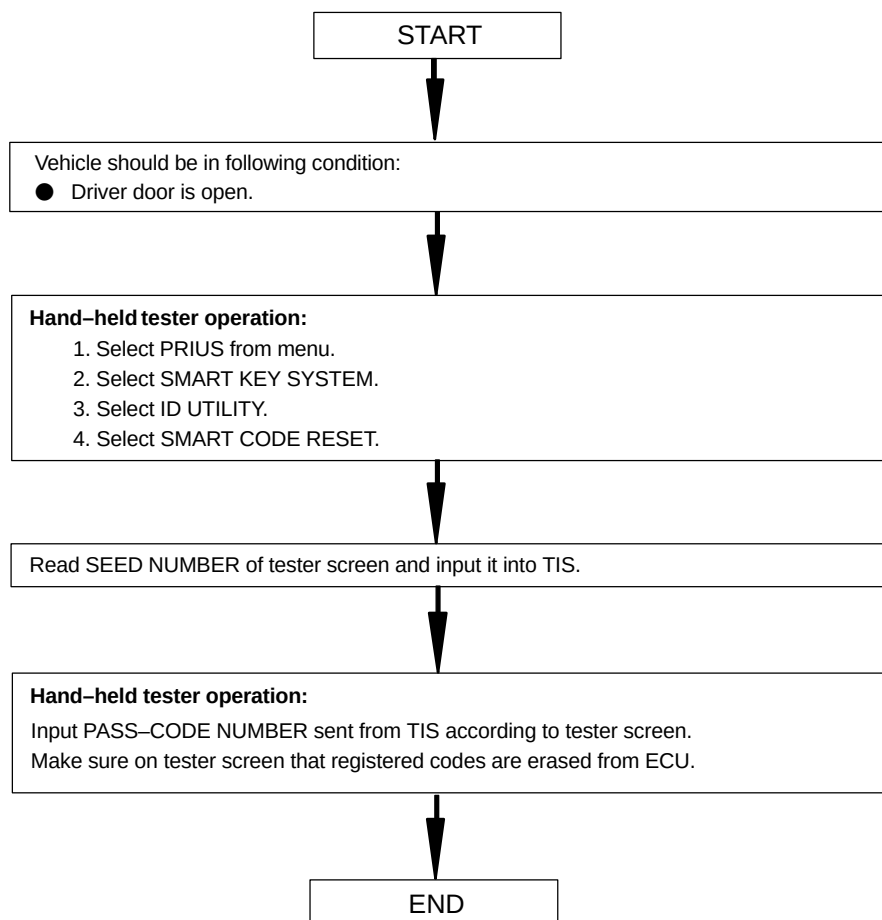
HINT:

A brief outline of procedures for key code erasure is shown on this page. For more detailed information, please refer to the hand-held tester screen's instructions.

4. RESET OF SMART KEY CODE

(a) Reset the smart key codes using the hand-held tester.

Reset Flowchart



HINT:

- A brief outline of procedures for key code reset is shown on this page. For more detailed information, please refer to the hand-held tester screen's instructions.
- SEED NUMBER is a 6 digit code.
- PASS-CODE NUMBER is a 6 digit code.
- Reset mode will take approximately 16 minutes to complete.

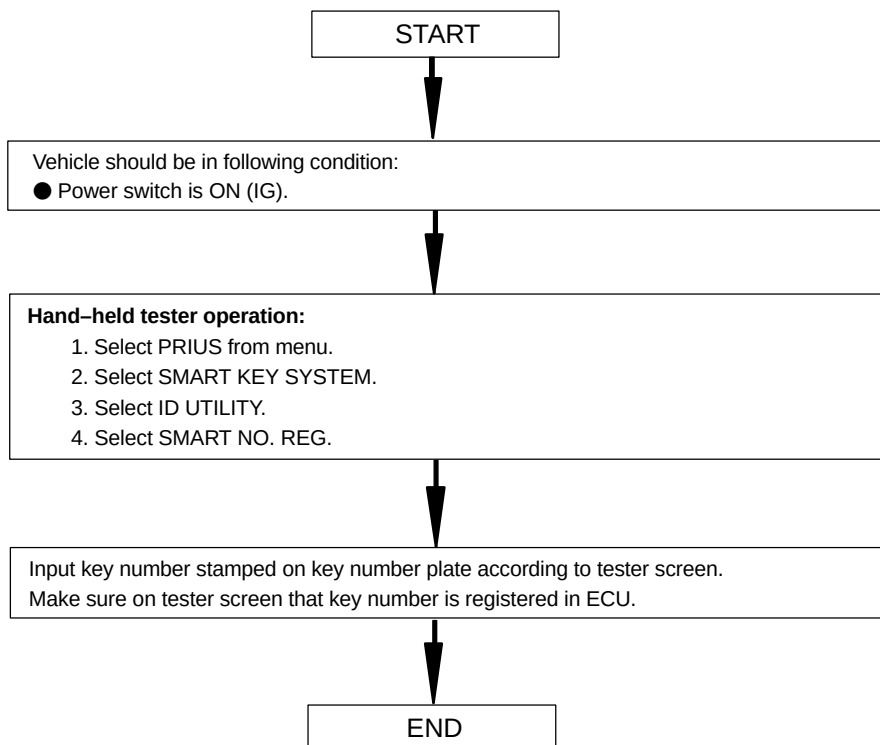
5. REGISTRATION OF KEY NUMBER

(a) Register a new key number using the hand-held tester.

HINT:

- Be sure to perform this operation when the smart ECU is replaced with a new ECU. This is for registering the vehicle's ID in the smart ECU.
- Key number is stamped on key number plate.

Key Number Registration Flowchart



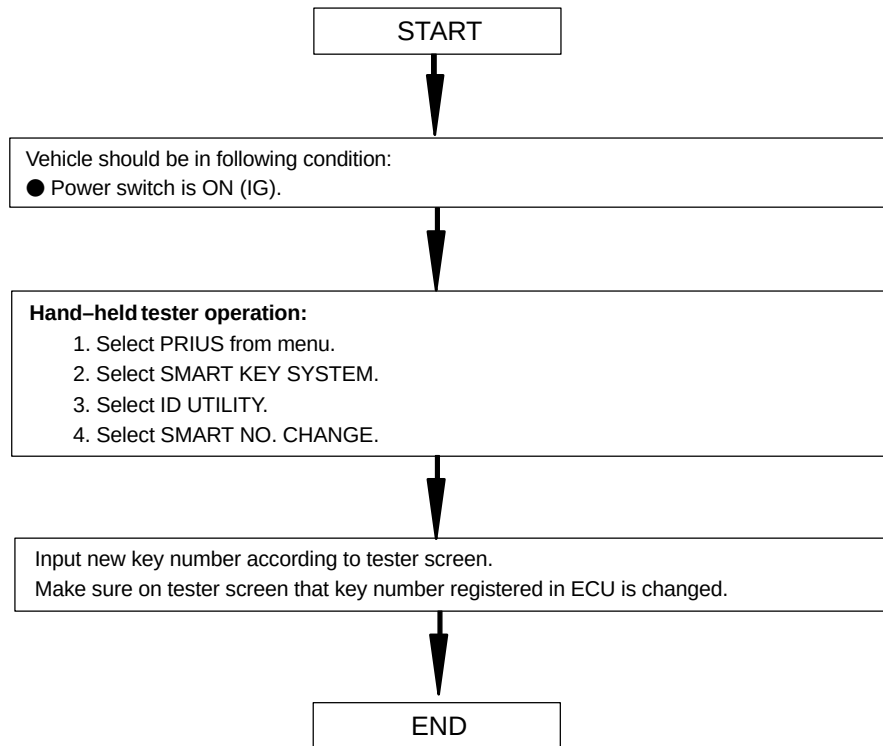
6. CHANGE OF KEY NUMBER

(a) Change the key number using the hand-held tester.

HINT:

- When all the key cylinders are replaced, the vehicle's key number is changed. Be sure to perform this operation to change the key number registered in the smart ECU.
- Key number is stamped on key number plate.

Key Number Change Flowchart



CUSTOMER PROBLEM ANALYSIS CHECK

SMART ENTRY SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		VIN	
		Production Date	
		License Plate No.	
Date Vehicle Brought in	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Constant ☐ Sometimes (times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	Weather ☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others
	Outdoor Temperature ☐ Hot ☐ Warm ☐ Cool ☐ Cold (°C [°F])

Malfunction Symptoms	☐ Smart lock and unlock functions do not operate on all doors
	☐ Smart lock function does not operate
	☐ Smart unlock function does not operate
	☐ Smart lock and unlock functions do not operate
	☐ All ☐ Driver side ☐ Passenger side
	☐ Smart ignition function does not start hybrid control system
	☐ Smart back door lock function does not operate
	☐ Smart key back door lock-in prevention function does not operate
Condition When Returned to Normal	☐ Power switch ON (IG) ☐ Hybrid vehicle control system started ☐ () Switch operated
Condition When Problem Occurred	Yes ☐ No ☐ ☐ Power switch OFF/ON (IG) ☐ () Switch operated ☐ Other ()

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the smart entry system.
- The hand-held tester should be used in steps 3 and 5.

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK (See page 05-2157)



3 INSPECT COMMUNICATION FUNCTION OF LARGE-SCALE MULTIPLEX COMMUNICATION SYSTEM (BEAN)

- (a) Use the hand-held tester to check for normal function of the multiplex communication system.
- (1) (ECU unconnected, communication stop, communication line malfunctioning)
Without code outputs, proceed to A.
 - (2) (ECU unconnected, communication stop, communication line malfunctioning)
With code outputs, proceed to B.

B

Go to MULTIPLEX COMMUNICATION SECTION
(See page 05-2558)

A

4 PROBLEM SYMPTOMS TABLE (See page 05-2167)

- (a) If the fault is not listed on the problem symptoms table, proceed to A.
- (b) If the fault is listed on the problem symptoms table, proceed to B.

B

Go to step 6

A

5 OVERALL ANALYSIS AND TROUBLESHOOTING

- (a) On vehicle inspection (see page 05-2218)
- (b) DATA LIST/ACTIVE TEST (see page 05-2175)
- (1) Inspection with the hand-held tester (DATA LIST).
 - (2) Inspection with the hand-held tester (ACTIVE TEST).
- (c) Terminals of ECU (see page 05-2168)



6 ADJUST, REPAIR OR REPLACEMENT

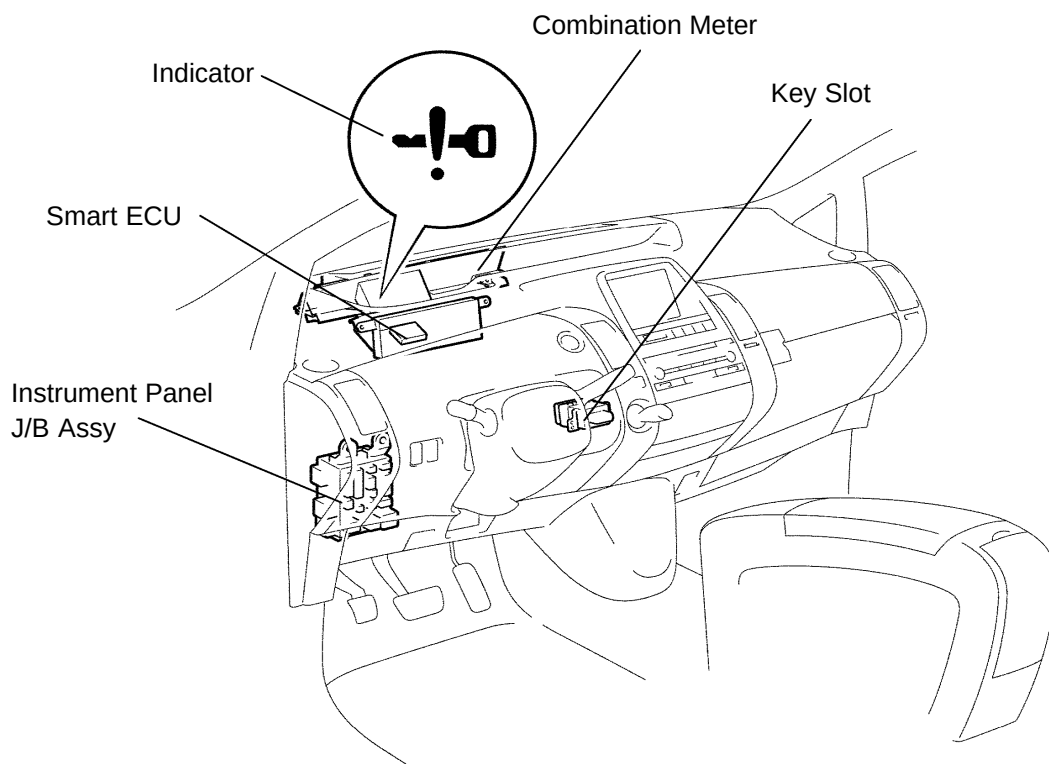


7	CONFIRMATION TEST
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END

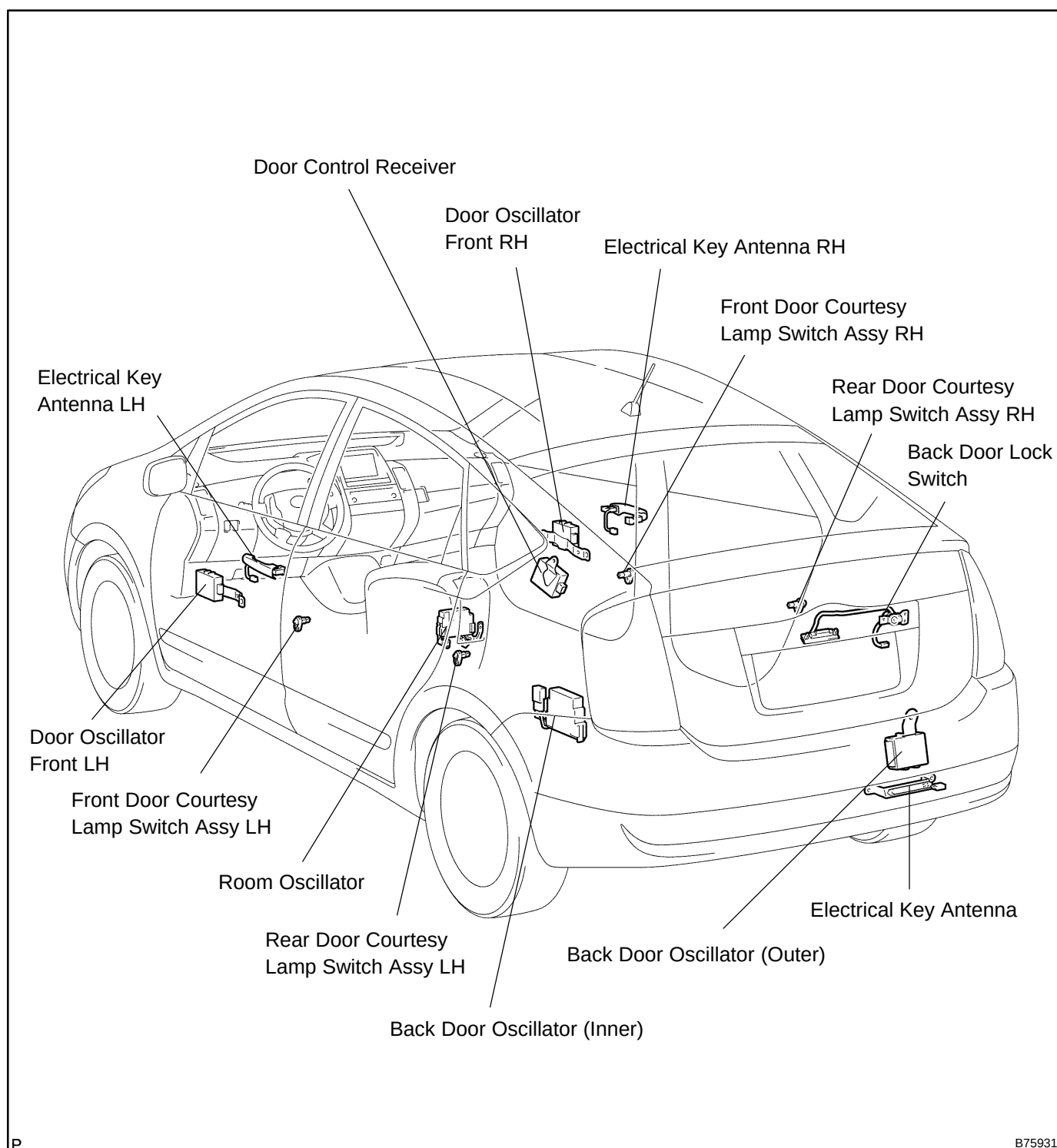
LOCATION



P

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SMART ENTRY SYSTEM

05J4U-01

PRECAUTION

NOTICE FOR INITIALIZATION:

When disconnecting the negative (–) battery terminal, initialize the following system(s) after the terminal is reconnected.

System Name	See Page
Power Window Control System	05-2028

NOTICE FOR HYBRID SYSTEM ACTIVATION:

When the warning lamp is illuminated or the battery has been disconnected and reconnected, pressing the power switch may not start the system on the first try. If so, press the power switch again.

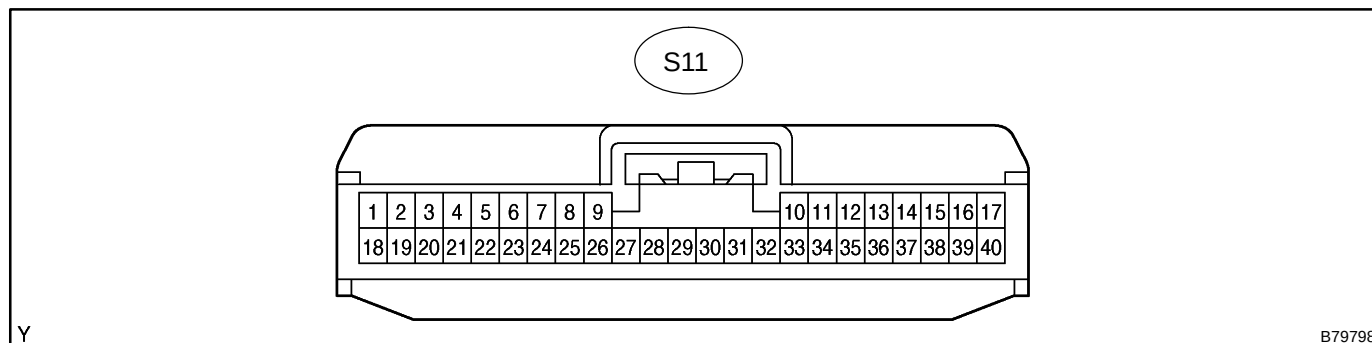
PROBLEM SYMPTOMS TABLE

Proceed to the reference page shown in the table below for each malfunction symptom and troubleshoot each circuit.

Symptoms	Suspected Area	See Page
Smart functions do not operate at all	5. Wireless door lock control system 6. Smart cancel switch 7. Smart ECU 8. Wire harness	05-2177
Smart cancel switch does not operate	1. Wireless door lock control system 2. Smart cancel switch 3. Smart ECU 4. Wire harness	05-2180
Smart cancel switch does not operate	1. Smart cancel switch 2. Smart ECU 3. Wire harness	05-2180
Smart unlock function does not operate on driver door	1. Power door lock control system 2. Door oscillator LH 3. Front door outside handle assy 4. Smart ECU 5. Wire harness	05-2189
Smart unlock function does not operate on passenger door	1. Power door lock control system 2. Door oscillator RH 3. Front door outside handle assy 4. Smart ECU 5. Wire harness	05-2194
Smart lock and unlock functions do not operate on driver door	1. Power door lock control system 2. Door oscillator LH 3. Smart ECU 4. Wire harness	05-2183
Smart lock and unlock functions do not operate on passenger door	1. Power door lock control system 2. Door oscillator RH 3. Smart ECU 4. Wire harness	05-2186
Smart lock function does not operate on driver door	1. Power door lock control system 2. Front door outside handle assy 3. Smart ECU 4. Wire harness	05-2199
Smart lock function does not operate on passenger door	1. Power door lock control system 2. Front door outside handle assy 3. Smart ECU 4. Wire harness	05-2202
Hybrid vehicle control system does not start using smart ignition function (starts when key is inserted)	1. Room oscillator 2. Smart ECU 3. Smart key 4. Wire harness	05-2205
Smart back door unlock function does not operate when key is outside back door	1. Back door oscillator (outer) 2. Back door opener switch 3. Luggage antenna 4. Smart ECU 5. Wire harness	05-2209
Smart key luggage compartment lock-in prevention function does not operate	1. Back door oscillator (inner) 2. Smart ECU 3. Wire harness	05-2215

TERMINALS OF ECU

1. CHECK SMART ECU



- (a) Disconnect the S11 ECU connector.
- (b) Measure the resistance and voltage of each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+B1 (S11-1) – Body ground	R – Body ground	+B power supply	Constant	10 to 14 V
IG (S11-18) – Body ground	B – Body ground	Ignition power supply	Power switch OFF → ON (IG)	0 V → 10 to 14 V
E (S11-17) – Body ground	W-B – Body ground	Ground	Constant	Below 1 Ω
TSW1 (S11-5) – Body ground	B – Body ground	Outside door handle LH lock switch signal	Lock switch OFF → ON	10 kΩ or higher → Below 1 Ω
TSW2 (S11-6) – Body ground	R – Body ground	Outside door handle RH lock switch signal	Lock switch OFF → ON	10 kΩ or higher → Below 1 Ω
TSW6 (S11-8) – Body ground	B – Body ground	Back door lock switch sig- nal	Back door lock switch OFF → ON	10 kΩ or higher → Below 1 Ω
CNSL (S11-25) – Body ground	W-B – Body ground	Smart entry system cancel switch signal	Cancel switch OFF → ON	10 kΩ or higher → Below 1 Ω

If the result is not as specified, there may be a malfunction on the wire harness side.

- (c) Reconnect the S11 ECU connector.
- (d) Measure the voltage and frequency of each terminal of the connector.

Standard:

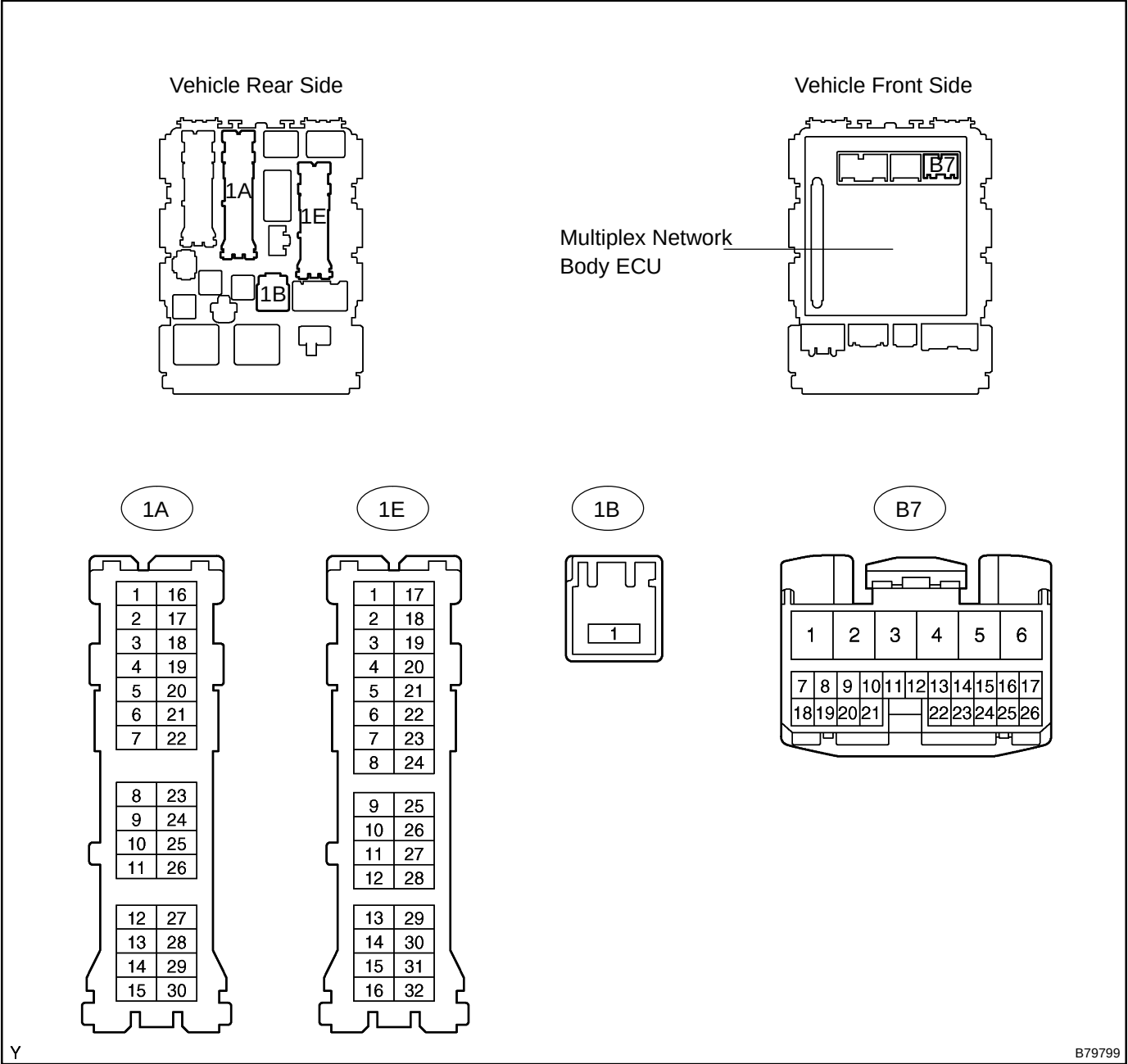
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
CLG1 (S11-13) – E (S11-17)	P – W-B	Driver door oscillator sen- sor signal	All doors locked by wire- less operation from outside vehicle and power switch OFF → ON (IG)	Some Hz → 0 Hz
CLG2 (S11-14) – E (S11-17)	R – W-B	Passenger door oscillator sensor signal	All doors locked by wire- less operation from outside vehicle and power switch OFF → ON (IG)	Some Hz → 0 Hz
CLG5 (S11-36) – E (S11-17)	G – W-B	Room oscillator sensor sig- nal	30 seconds after driver side door opened and closed, power switch OFF → ON (IG)	Some Hz → 0 Hz
CLG7 (S11-38) – E (S11-17)	BR – W-B	Luggage oscillator inner sensor signal	30 seconds after driver side door opened and closed, power switch OFF → ON (IG)	Some Hz → 0 Hz
CLG8 (S11-39) – E (S11-17)	O – W-B	Luggage oscillator outer sensor signal	Back door opener switch OFF → ON	Some Hz → 0 Hz

DIAGNOSTICS – SMART ENTRY SYSTEM

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
SEL1 (S11-23) – E (S11-17)	Y – W-B	Sensor detection signal	Smart key at least 3 m away from door → near outside door handle LH	10 to 14 V → 0 V
SEL2 (S11-24) – E (S11-17)	B – W-B	Sensor detection signal	Smart key at least 3 m away from door → near outside door handle RH	10 to 14 V → 0 V
SEN1 (S11-21) – E (S11-17)	R – W-B	Lock switch detection signal	Outside door handle LH touched → not touched	10 to 14 V → 0 V
SEN2 (S11-22) – E (S11-17)	W – W-B	Lock switch detection signal	Outside door handle RH touched → not touched	10 to 14 V → 0 V
RDA3 (S11-29) – E (S11-17)	L – W-B	Door control receiver input signal	With power switch OFF, no smart key and all doors closed, turn smart key switch OFF → ON	Below 1 V → Approx. 6 to 7 V
PRG (S11-28) – E (S11-17)	B – W-B	Door control receiver out- put signal	With power switch OFF, no smart key and all doors closed, turn smart key switch OFF → ON	Below 1 V → Approx. 6 to 7 V
RCO (S11-12) – E (S11-17)	L – W-B	Power source	With power switch OFF, no smart key and doors closed, turn smart key switch OFF → ON	0 to 5 V → 5 V
RSSI (S11-11) – E (S11-17)	V – W-B	Door control receiver out- put signal	Power switch OFF, all doors closed and smart key switch OFF → ON	0 to 5 V → Below 1 V
RDA (S11-10) – E (S11-17)	GR – W-B	Door control receiver input signal	With power switch OFF, no smart key and all doors closed, turn smart key switch OFF → ON	Below 1 V → Approx. 6 to 7 V
KSW (S11-4) – E (S11-17)	Y – W-B	Key unlock warning switch input signal	No key in key slot → Key inserted	10 to 14 V → 0 V

If the result is not as specified, the ECU may have a malfunction.

2. CHECK INSTRUMENT PANEL J/B ASSY (MULTIPLEX NETWORK BODY ECU)



- (a) Disconnect the 1A, 1B and 1E J/B connectors.
- (b) Measure the voltage and resistance between each terminal of the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
ECUB (1A-30) – Body ground	R – Body ground	+B (ECUB) power supply	Constant	10 to 14 V
ALTB (1B-1) – Body ground	W – Body ground	+B (power system, genera- tor system) power supply	Constant	10 to 14 V
GND (1E-17) – Body ground	W-B – Body ground	Ground	Constant	Below 1 Ω

If the result is not as specified, there may be a malfunction on the wire harness side.

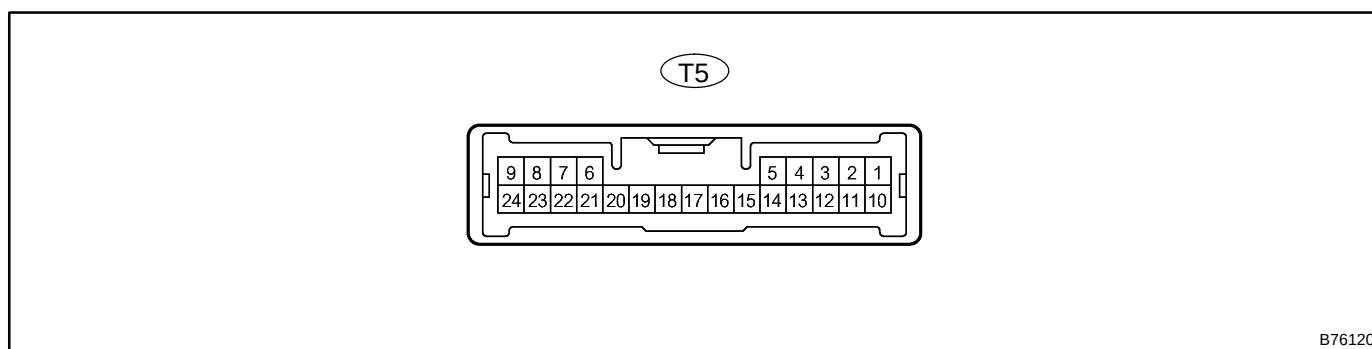
- (c) Reconnect the 1A, 1B and 1E J/B ECU connectors.
- (d) Measure the voltage between each terminal of the connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
PRG (B7-24) – GND (1E-17)	B – W-B	Door control receiver out- put signal	With power switch OFF, no smart key and all doors closed, turn smart key switch OFF → ON	0 to 5 V → 0 V
RDA (B7-23) – GND (1E-17)	L – W-B	Door control receiver input signal	With power switch OFF, no smart key and all doors closed, turn smart key switch OFF → ON	Below 1 V → Approx. 6 to 7 V

If the result is not as specified, the body ECU may have a malfunction.

3. CHECK TRANSPONDER KEY ECU



B76120

- (a) Disconnect the T5 ECU connector.
- (b) Measure the resistance and voltage of each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
CPUB (T5-3) – GND (T5-22)	L – W-B	Battery	Constant	10 to 14 V
IG (T5-4) – GND (T5-22)	O – W-B	Power switch (IG)	Power switch OFF → ON (IG)	0 V → 10 to 14 V
CUWS (T5-5) – GND (T5-22)	B – W-B	Unlock warning switch	No key in key slot → Key inserted	10 kΩ or higher → Below 1 Ω
AGND (T5-7) – GND (T5-22)	P – W-B	Ground	Constant	Below 1 Ω
GND (T5-22) – Body ground	W-B – Body ground	Ground	Constant	Below 1 Ω

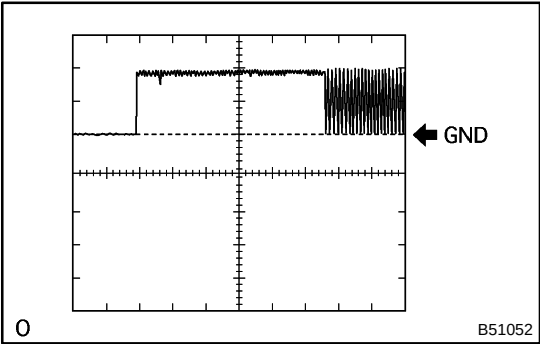
If the result is not as specified, there may be a malfunction on the wire harness side.

- (c) Reconnect the T5 ECU connector.
- (d) Measure the voltage of each terminal of the connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
CUWS (T5-5) – GND (T5-22)	B – W-B	Unlock warning switch	No key in key slot → Key inserted	10 to 14 V □ Below 1 V
VC5 (T5-20) – GND (T5-22)	Y – W-B	Power source	No key in key slot → Key inserted	0 V → 4.6 to 5.4 V
CODE (T5-21) – AGND (T5-7)	L – P	Transponder key ampli- fier communication signal	No key in key slot → Key inserted	Pulse generation (see waveform 1)
TXCT (T5-6) – AGND (T5-7)	LG – P	Transponder key ampli- fier communication signal	No key in key slot → Key inserted	Pulse generation (see waveform 2)
HEV0 (T5-19) – GND (T5-22)	W – W-B	Hybrid vehicle control ECU output signal	No key in key slot → Key inserted	Pulse generation (see waveform 3)
HEV1 (T5-18) – GND (T5-22)	R – W-B	Hybrid vehicle control ECU input signal	Constant	Pulse generation (see waveform 4)

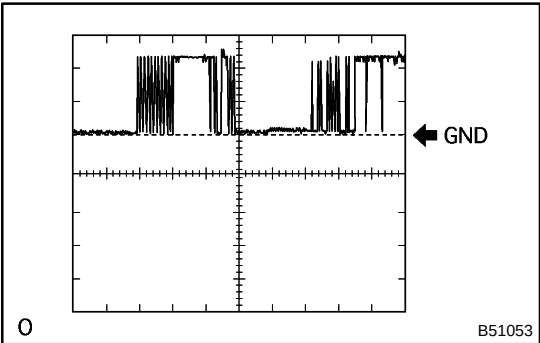
If the result is not as specified, the ECU may have a malfunction.



(e) Inspect using an oscilloscope.

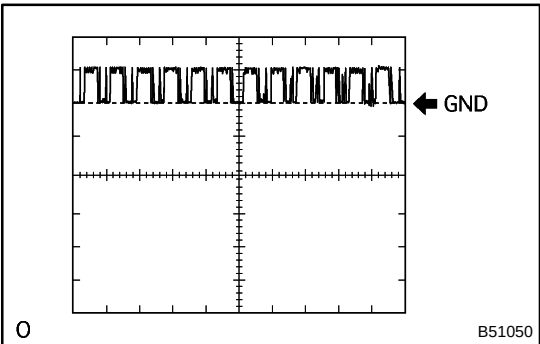
Waveform 1 (Reference):

Terminal	TXCT – GND
Tool Setting	2.5 V/DIV., 10 ms/DIV.
Condition	No key in key slot → Key inserted



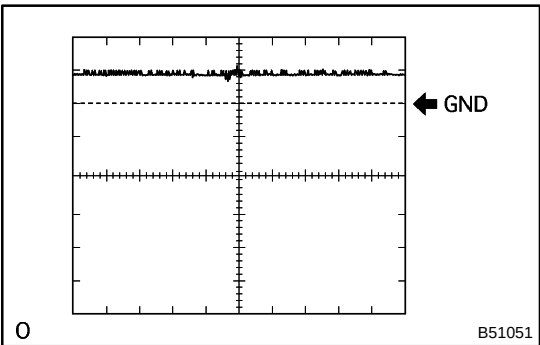
Waveform 2 (Reference):

Terminal	CODE – GND
Tool Setting	2.5 V/DIV., 20 ms/DIV.
Condition	No key in key slot → Key inserted



Waveform 3 (Reference):

Terminal	HEV0 – GND
Tool Setting	12 V/DIV., 100 ms/DIV.
Condition	No key in key slot → Key inserted



Waveform 4 (Reference):

Terminal	HEV1 – GND
Tool Setting	12 V/DIV., 100 ms/DIV.
Condition	Constant