

# PRODEMAND

YMMS: 2018 Subaru BRZ Premium

Aug 20, 2022

Engine: 2.0L Eng

License:

VIN:

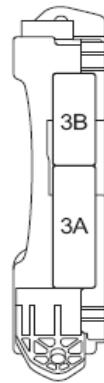
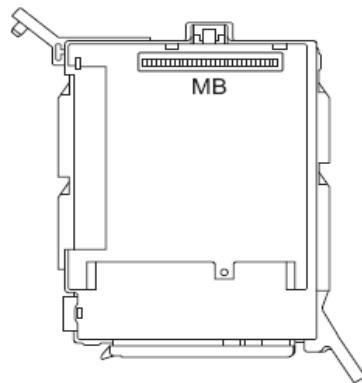
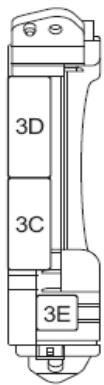
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## ECM Terminal Arrangement [ Auto Alarm System ]

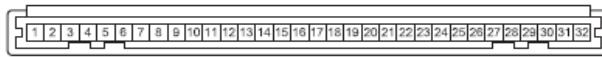
1. Inspection of instrument panel junction block ASSY and main body ECM (multiplex network body ECM)



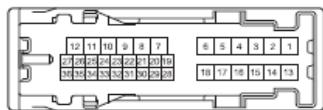
\*1



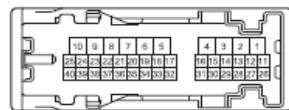
(MB)



(3D)



(3C)



(3E)



(3B)



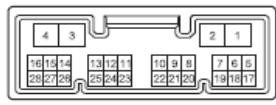
(3A)



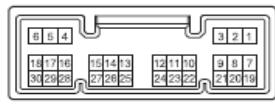
\*2



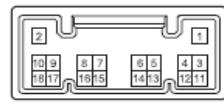
(A73)



(D5)



(D6)



\*1 Instrument panel junction block ASSY

\*2 Main body ECM (multiplex network body ECM)

Courtesy of SUBARU OF AMERICA, INC.

1. Remove the main body ECM (multiplex network body ECM) from the instrument panel junction block ASSY.
2. Measure the voltage and resistance according to the following table.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition

MB-1 - chassis ground	Battery power supply	Always	1 for less
MB-8 - Chassis ground	Engine switch power supply	Engine switch is ON (IG)	11 to 14V
		The engine switch is OFF.	1 V or less
MB-9 - Chassis ground	ACC power supply	ACC	11 to 14V
		The engine switch is OFF.	1 V or less
MB-11 - chassis ground	Ground	Always	11 to 14V
MB-32 - chassis ground	Battery power supply	Always	11 to 14V
D6-1 - Chassis ground	Ground	Always	1 for less
A73-4 - chassis ground	Ground	Always	1 for less

If you cannot get the specified result, there could be a problem in the wiring harnesses.

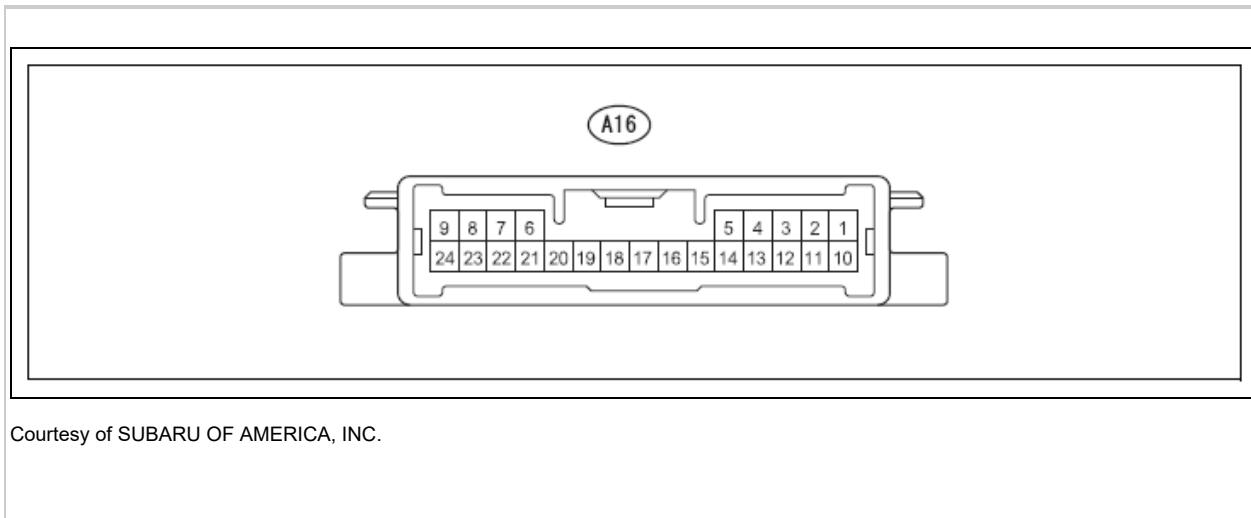
3. Install the main body ECM (multiplex network body ECM) on the instrument panel junction block ASSY
4. Refer to the value shown in table below and measure the voltage and waveform.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
3A-28 - chassis ground	Driver's side courtesy light switch	Driver's door is open.	1 V or less
		Driver's door is closed	Pulse generation
3B-13 - chassis ground	Passenger's side courtesy light switch	The passenger's door is open.	1 V or less
		The passenger's door is closed.	Pulse generation
3B-22 - chassis ground	Security indicator light signal	Security indicator light illuminates (only for 30 (5) seconds in Alarm sounding state (flashes when the system is in Armed state))	3 to 10V
3D-26 - chassis ground	Trunk courtesy light switch	The trunk is open.	1 V or less
		Change the power mode to IG OFF, close the door, and close the trunk.	11 to 14V
3D-31 - chassis ground	Vehicle horn signal	Vehicle horn operates (Anti-theft system is in Alarm sounding state)	Pulse generation
		Vehicle horn does not operate (Anti-theft system is in Alarm sounding state)	11 to 14V
3B-2 -	Door lock motor lock	Driver's door control switch is not pressed	1 V or less

chassis ground	drive output (driver's side)	Driver's door control switch is not pressed to lock side	11 to 14V
3B-3 - chassis ground	Door lock motor lock drive output (passenger's side)	Driver's door control switch is not pressed	1 V or less
		Driver's door control switch is not pressed to lock side	11 to 14V
3B-1 - chassis ground	Door lock motor unlock drive output (driver's side)	Driver's door control switch is not pressed	1 V or less
		Driver's door control switch is not pressed to unlock side	11 to 14V
3B-4 - chassis ground	Door lock motor unlock drive output (passenger's side)	Driver's door control switch is not pressed	1 V or less
		Driver's door control switch is not pressed to unlock side	11 to 14V
D6-11 - chassis ground	Driver's door unlock detection switch input	The driver's door is locked.	1 V or less
		Change the power mode to IG OFF, close all doors, and lock the driver's door.	Pulse generation
D6-12 - chassis ground	Passenger's door unlock detection switch input	Passenger's door is unlocked	1 V or less
		Change the power mode to IG OFF, close all doors, and lock the passenger's door.	Pulse generation

## ECM Terminal Arrangement [ Auto Leveling System ]

### 1. Headlight leveling computer ASSY



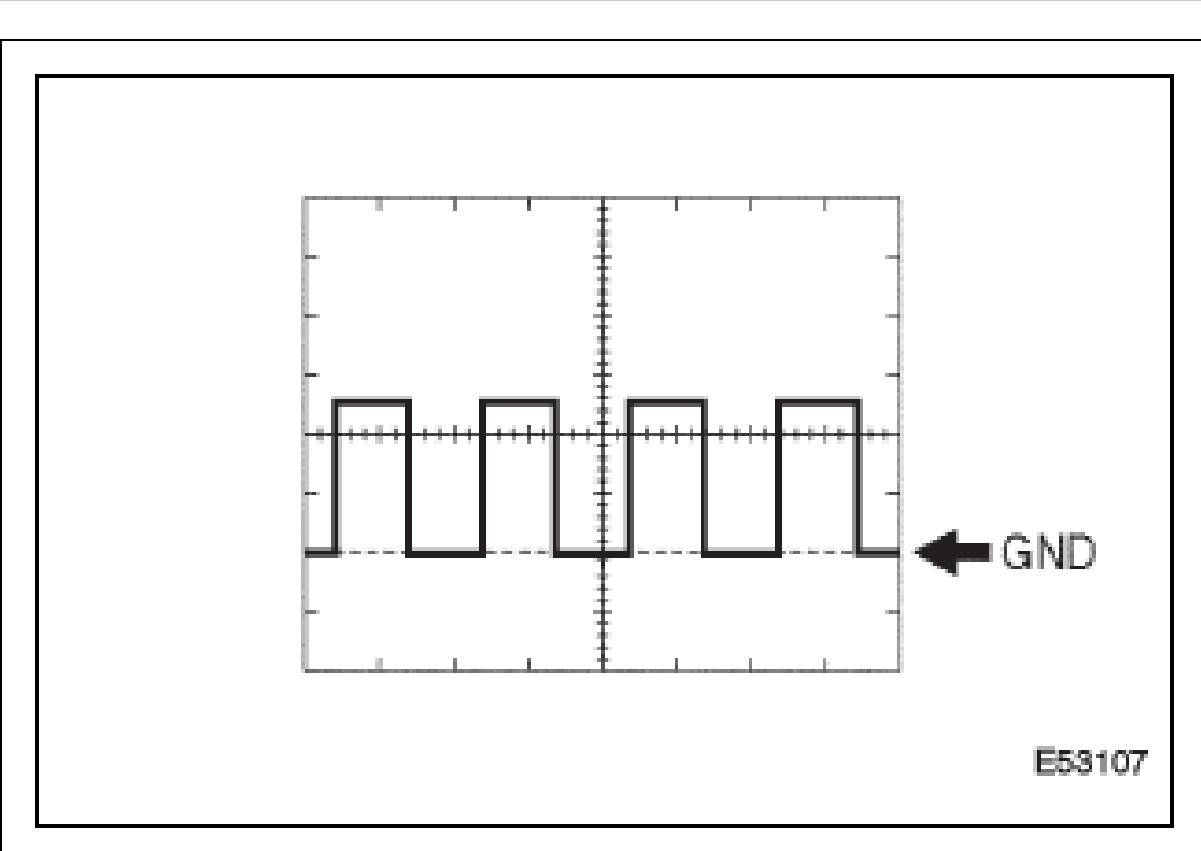
### STANDARD VALUE SPECIFICATION

Inspection terminals (Terminal symbol)	Measuring conditions	Standard value
A16-1 (IG) ↔ A16-9 (SHR)	IG ON	11 to 14 V
A16-3 (HDLP)	Headlights off → on	5 V or more → 1.5 V

$\longleftrightarrow$ A16-9 (SHR)		or less
A16-5 (INIT) $\longleftrightarrow$ A16-9 (SHR)	Always (Initialization signal input terminal)	Approx. 5 V
A16-6 (WNG) $\longleftrightarrow$ A16-9 (SHR)	After IG ON, 3 seconds (warning light on) → After 3 seconds (warning light off)	Less than 1 V → 11 to 14 V
A16-9 (SHR) $\longleftrightarrow$ Chassis ground	Always	Less than 1 Ω
A16-10 (RH1) $\longleftrightarrow$ A16-9 (SHR)	IG ON	11 to 14 V
A16-11 (LH1) $\longleftrightarrow$ A16-9 (SHR)	IG ON	11 to 14 V
A16-12 (SBR) $\longleftrightarrow$ A16-21 (SGR)	IG ON	4.75 to 5.25 V
A16-16 (SPDR) $\longleftrightarrow$ A16-9 (SHR)	Driving at approx. 20 km/h	Pulse generation (Waveform 1)
A16-17 (RH2) $\longleftrightarrow$ A16-9 (SHR)	Headlights off → on Headlights on with no change in vehicle height → Change the vehicle height and maintain for 3 seconds or more	Less than 1 V → 1.0 to 14.4 V (17 seconds)
A16-18 (LH2) $\longleftrightarrow$ A16-9 (SHR)	Headlights off → on, Headlights on with no change in vehicle height → Change the vehicle height and maintain for 3 seconds or more	Less than 1 V → 1.0 to 14.4 V (17 seconds)
A16-19 (SHR) $\longleftrightarrow$ A16-21 (SGR)	IG ON (No passengers, no luggage, vehicle is stationary)	Approx. 2.5 V <sup>(1)</sup>
A16-21 (SGR) $\longleftrightarrow$ A16-9 (SHR)	Always	Less than 1 Ω
A16-23 (RH3) $\longleftrightarrow$ A16-9 (SHR)	Always	Less than 1 Ω
A16-24 (LH3) $\longleftrightarrow$ A16-9 (SHR)	Always	Less than 1 Ω
(1) Values change depending on the vehicle status.		

## 1. Waveform

Item	Contents
Inspection terminals (Terminal symbol)	A16-16 (SPDR) $\longleftrightarrow$ Chassis ground
Equipment setting	2 V/DIV, 2 ms/DIV
Measuring conditions	Drive at 30 km/h



E53107

Courtesy of SUBARU OF AMERICA, INC.

## ECM Terminal Arrangement [ CAN Communication System ]

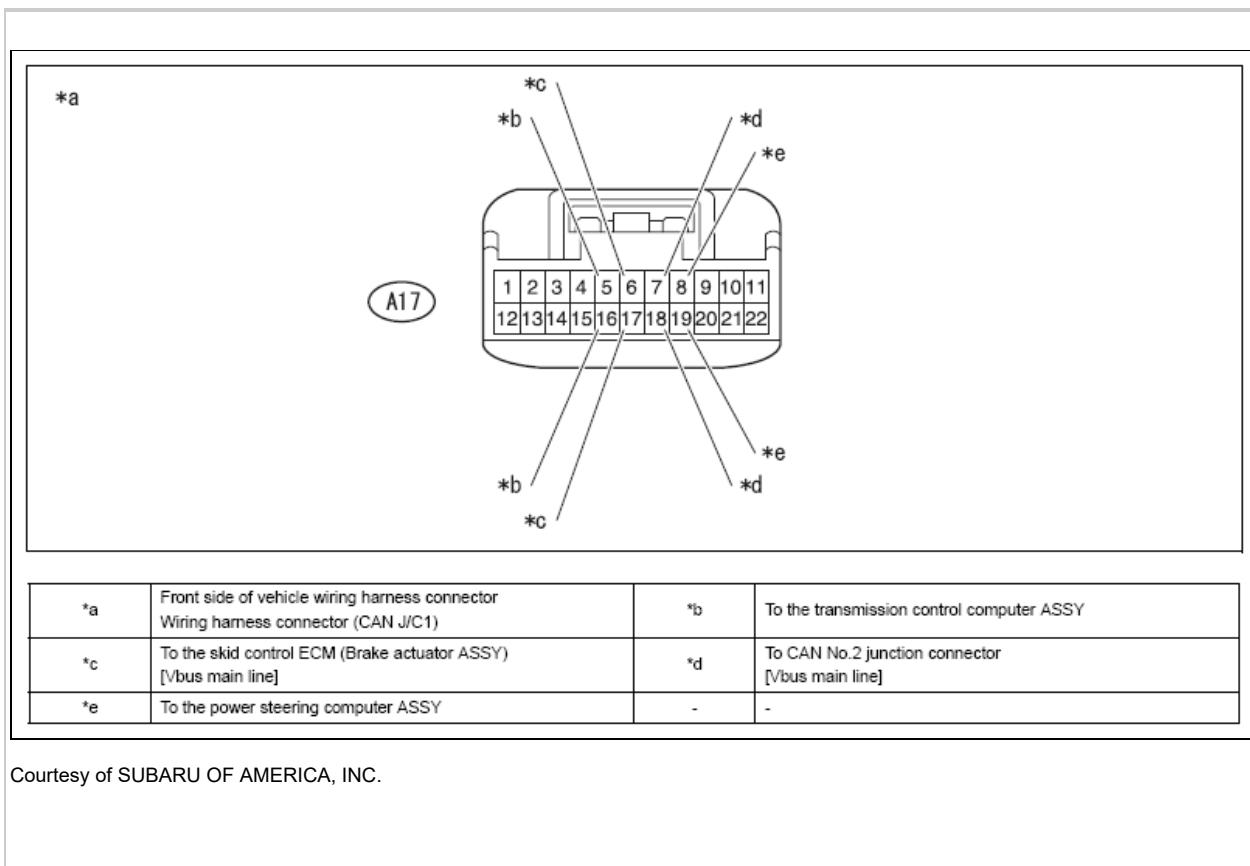
### **CAUTION:**

- Before measuring the resistance of CAN bus, turn the ignition OFF and leave the vehicle as is for at least one minute without operating keys, switches, and doors. Disconnect the auxiliary battery and wait for another one minute or more.
- After IG OFF, you may need to wait for some time before disconnecting the auxiliary battery terminal. Before starting the troubleshooting, refer to the procedure for disconnecting the auxiliary battery terminals. (Refer to WORKING PRECAUTIONS AND NOTES )

**NOTE:** CAN communication system (ECM and sensor) may contain customized settings due to optional configuration. Before starting the procedure, make sure what type of systems (ECM and sensor) are implemented on the vehicle.

## 1. Wiring harness connector (CAN J/C1)

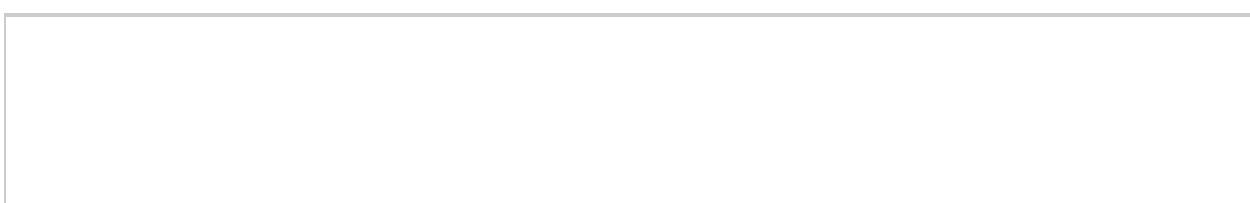
### 1. Wiring harness connector AN J/C1) (Instrument panel wire on right side of the vehicle) (Vbus)

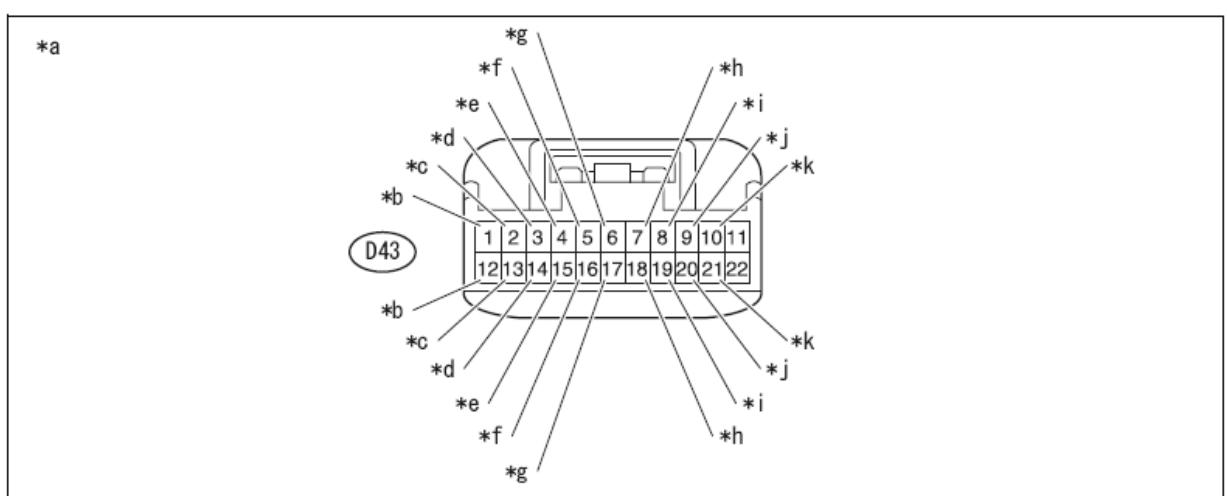


ECM/sensor connection	Terminal No.	Wiring color
Transmission control computer ASSY	A17-5	B-W
	A17-16	L
Skid control ECM (Brake actuator ASSY) [Vbus main line]	A17-6	BR
	A17-17	B-R
CAN No. junction connector [Vbus main line]	A17-7	W-B
	A17-18	R-Y
Power steering computer ASSY	A17-8	B
	A17-19	W

## 2. Wiring harness connector (CAN J/C2)

### 1. Wiring harness connector (CAN J/C2) (Instrument panel wire on left side of the vehicle) (Vbus)



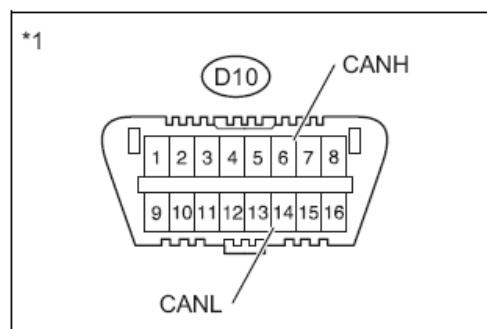


*a	Front side of vehicle wiring harness connector Wiring harness connector (CAN J/C2)	*b	To the wiring harness connector (CAN J/C1) [Vbus main line]
*c	To the combination meter ASSY	*d	To the main body ECM (Multiplex network body computer)
*e	To the collation ECM (Smart key computer ASSY)	*f	To the data link connector
*g	To the steering angle sensor (Spiral cable SUB-ASSY)	*h	To PSP (Accessory bus buffer)
*i	To the airbag sensor ASSY	*j	To the engine control computer [Vbus main line]
*k	To the air conditioner amplifier ASSY	-	-

Courtesy of SUBARU OF AMERICA, INC.

ECM/sensor connection	Terminal No.	Wiring color
CAN No. 1 junction connector [Vbus main line]	D43-1	W-B
	D43-12	R-Y
Combination meter ASSY	D43-2	BR
	D43-13	BR-W
Main body ECM (Multiplex network body computer)	D43-3	P
	D43-14	LG
Collation ECM (Smart key computer ASSY)	D43-4	G
	D43-15	R
Data link connector	D43-5	B-Y
	D43-16	LG
Spiral cable SUB-ASSY	D43-6	G-W
	D43-17	G
PSP (Accessory bus buffer)	D43-7	P
	D43-18	L
Airbag sensor ASSY	D43-8	P-L

	D43-19	R-W
Engine control computer [Vbus main line]	D43-9	O
	D43-20	B-P
Air conditioner amplifier ASSY	D43-10	L-W
	D43-21	L-Y



\*1 Data link connector

Courtesy of SUBARU OF AMERICA, INC.

### 3. Data link connector

#### 1. Inspection of data link connector (Vbus sub-line)

- a. Disconnect the battery ground terminal.
- b. Measure the resistance between the terminals.

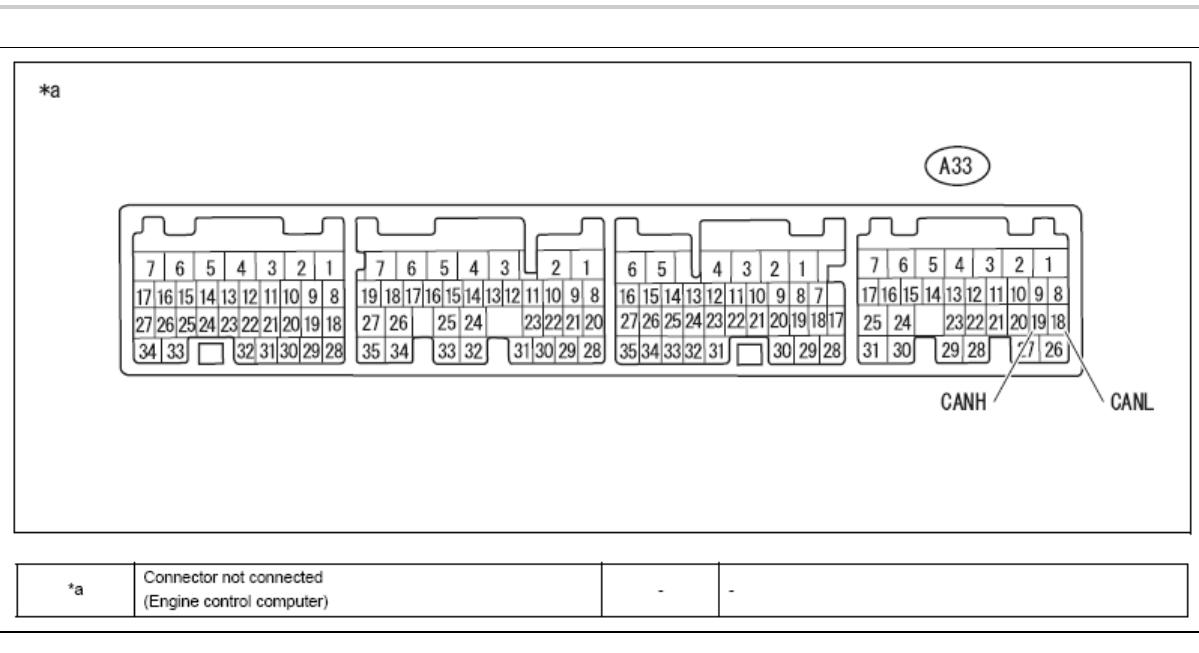
Resistance

#### STANDARD VALUE SPECIFICATION - VBUS SUB-LINE

Inspection terminals	Inspection conditions	Standard value
D10-6← →D10-14	Disconnection of the battery ground terminal	57 to 63 Ω
D10-6← →GND	Disconnection of the battery ground terminal	200 Ω or more
D10-14← →GND	Disconnection of the battery ground terminal	200 Ω or more
D10-6< >+B	Disconnection of the battery ground terminal	6 kΩ or more
D10-14← →+B	Disconnection of the battery ground terminal	6 kΩ or more

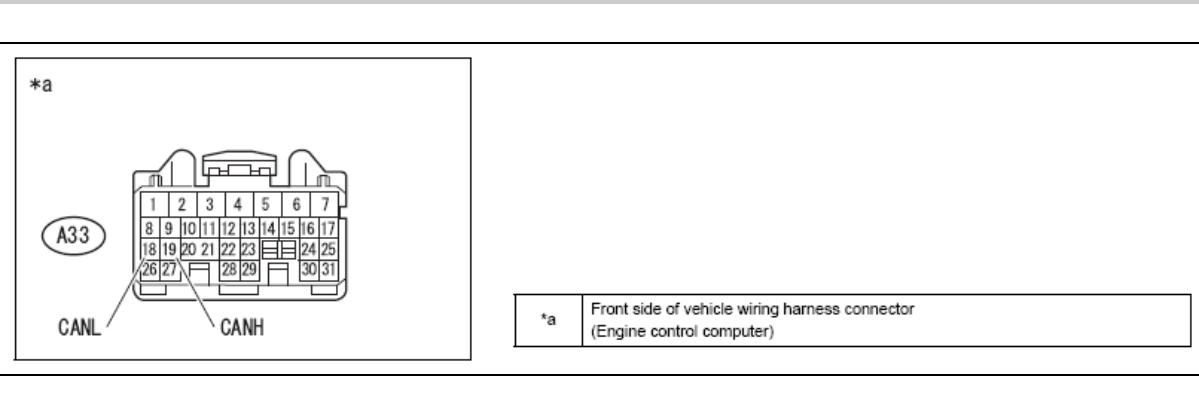
### 4. Engine control computer

## 1. Terminal arrangement



Courtesy of SUBARU OF AMERICA, INC.

Terminal No.	terminal symbol
A33-19	-
A33-18	-



Courtesy of SUBARU OF AMERICA, INC.

## 2. Inspection of vehicle harness of engine control computer (Vbus main line)

- Disconnect the battery ground terminal, and then disconnect the vehicle harness connector A33 from the engine control computer.
- Measure the resistance between the terminals.

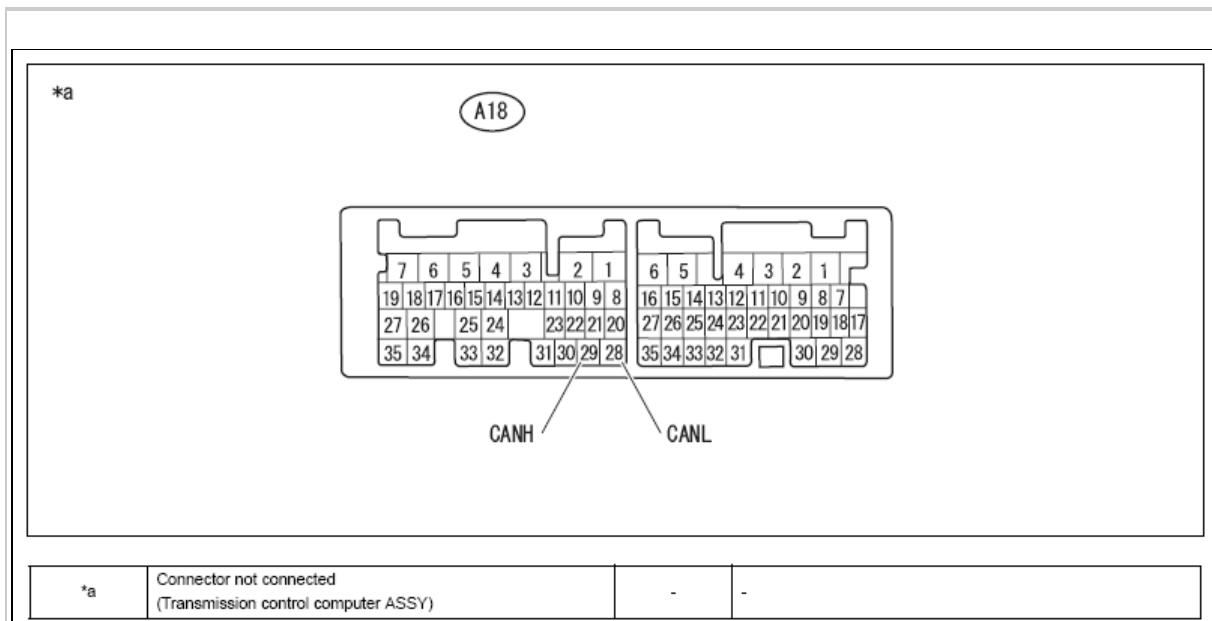
Resistance

**STANDARD VALUE SPECIFICATION - VBUS MAIN LINE**

Inspection terminals	Inspection conditions	Standard value
A33-19← →A33-18	Disconnection of the battery ground terminal	114 to 126 Ω
A33-19← →GND	Disconnection of the battery ground terminal	200 Ω or more
A33-18← →GND	Disconnection of the battery ground terminal	200 Ω or more
A33-19← →+B	Disconnection of the battery ground terminal	6 kΩ or more
A33-18← →+B	Disconnection of the battery ground terminal	6 kΩ or more

## 5. Transmission control computer ASSY (Transmission A/T)

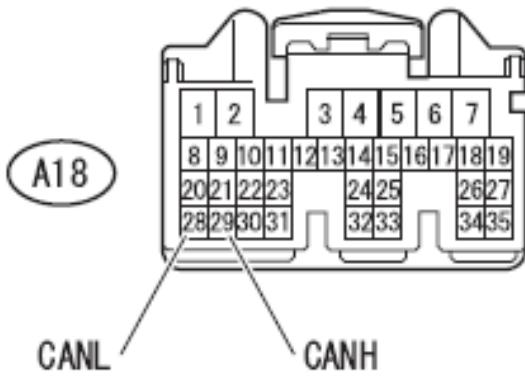
### 1. Terminal arrangement



Courtesy of SUBARU OF AMERICA, INC.

Terminal No.	terminal symbol
A18-29	-
A18-28	-

\*a



\*a

Front side of vehicle wiring harness connector  
(Transmission control computer ASSY)

Courtesy of SUBARU OF AMERICA, INC.

## 2. Inspection of vehicle harness of transmission control computer ASSY (Vbus sub-line)

- Disconnect the battery ground terminal, and then disconnect the vehicle harness connector A18 from the transmission control computer ASSY.
- Measure the resistance between the terminals.

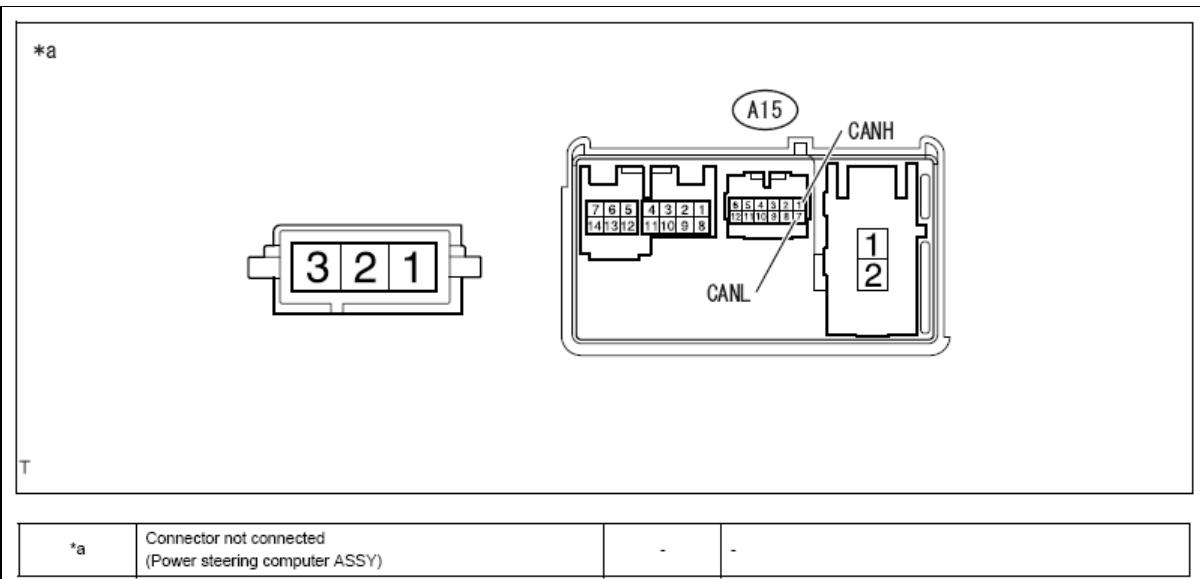
Resistance

### **STANDARD VALUE SPECIFICATION - VBUS SUB-LINE**

Inspection terminals	Inspection conditions	Standard value
A18-29← →A18-28	Disconnection of the battery ground terminal	57 to 63 Ω
A18-29← →GND	Disconnection of the battery ground terminal	200 Ω or more
A18-28← →GND	Disconnection of the battery ground terminal	200 Ω or more
A18-29← →+B	Disconnection of the battery ground terminal	6 kΩ or more
A18-28← →+B	Disconnection of the battery ground terminal	6 kΩ or more

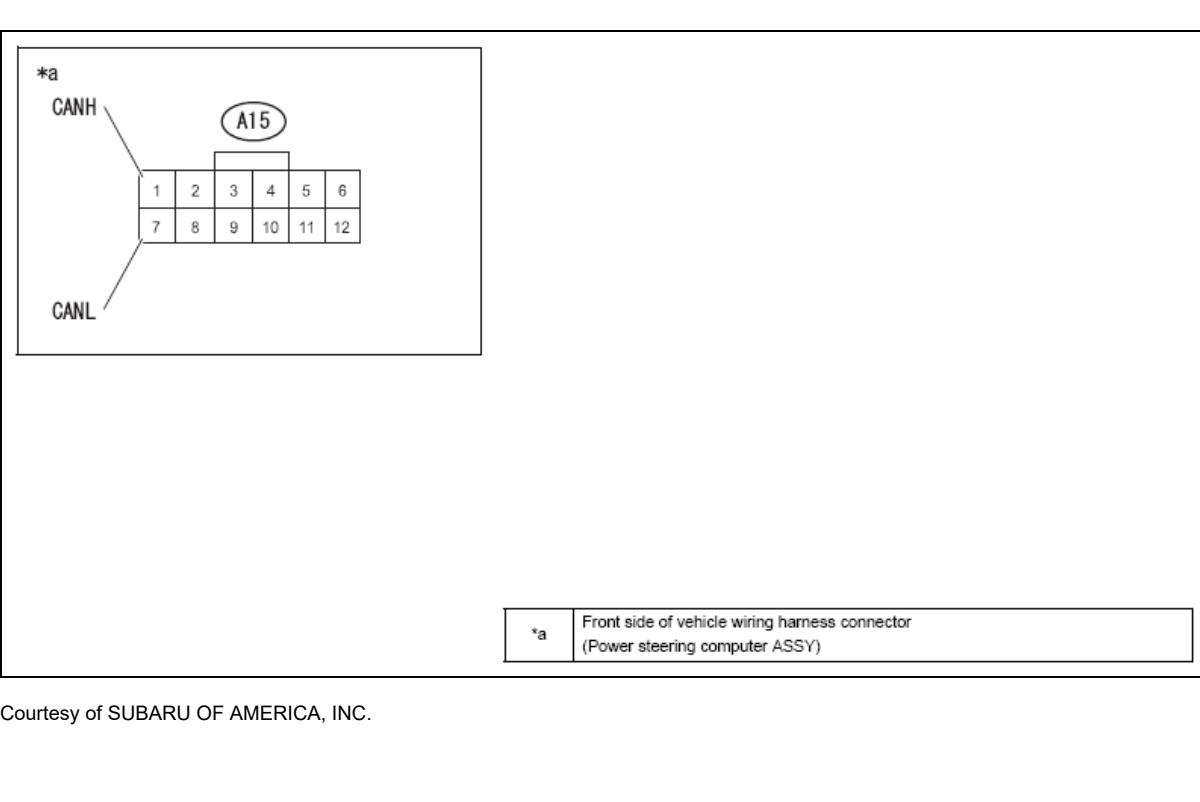
## 6. Power steering computer ASSY

### 1. Terminal arrangement



Courtesy of SUBARU OF AMERICA, INC.

Terminal No.	terminal symbol
A15-1	-
A15-7	-



Courtesy of SUBARU OF AMERICA, INC.

## 2. Inspection of vehicle harness of power steering computer ASSY (Vbus sub-line)

a. Disconnect the battery ground terminal, and then disconnect the vehicle harness connector A15 from the power steering computer ASSY.

b. Measure the resistance between the terminals.

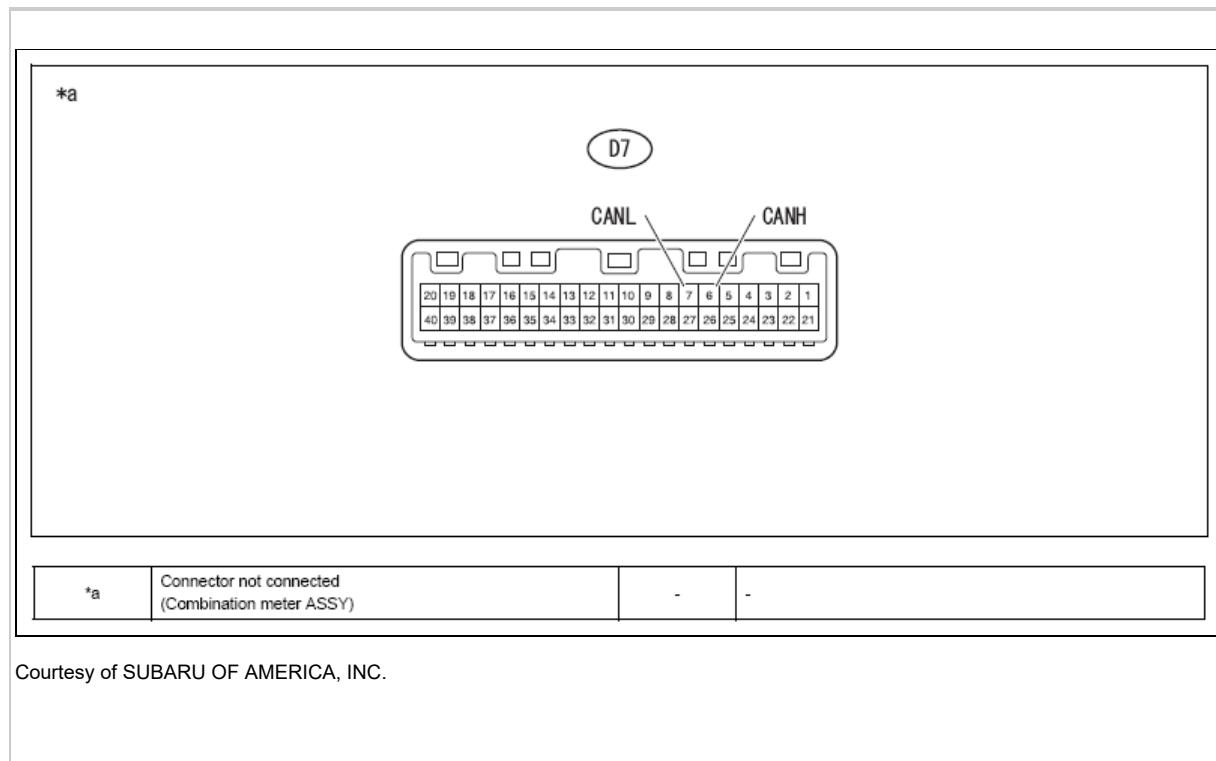
Resistance

#### STANDARD VALUE SPECIFICATION - VBUS SUB-LINE

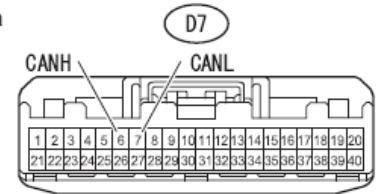
Inspection terminals	Inspection conditions	Standard value
A15-1← →A15-7	Disconnection of the battery ground terminal	57 to 63 Ω
A15-1← →GND	Disconnection of the battery ground terminal	200 Ω or more
A15-7← →GND	Disconnection of the battery ground terminal	200 Ω or more
A15-1← →+B	Disconnection of the battery ground terminal	6 kΩ or more
A15-7← →+B	Disconnection of the battery ground terminal	6 kΩ or more

#### 7. Combination meter ASSY

##### 1. Terminal arrangement



Terminal No.	terminal symbol
D7-6	-
D7-7	-



\*a Front side of vehicle wiring harness connector  
(Combination meter ASSY)

Courtesy of SUBARU OF AMERICA, INC.

## 2. Inspection of vehicle harness of combination meter ASSY (Vbus sub-line)

- Disconnect the battery ground terminal, and then disconnect the vehicle harness connector D7 from the combination meter ASSY.
- Measure the resistance between the terminals.

Resistance

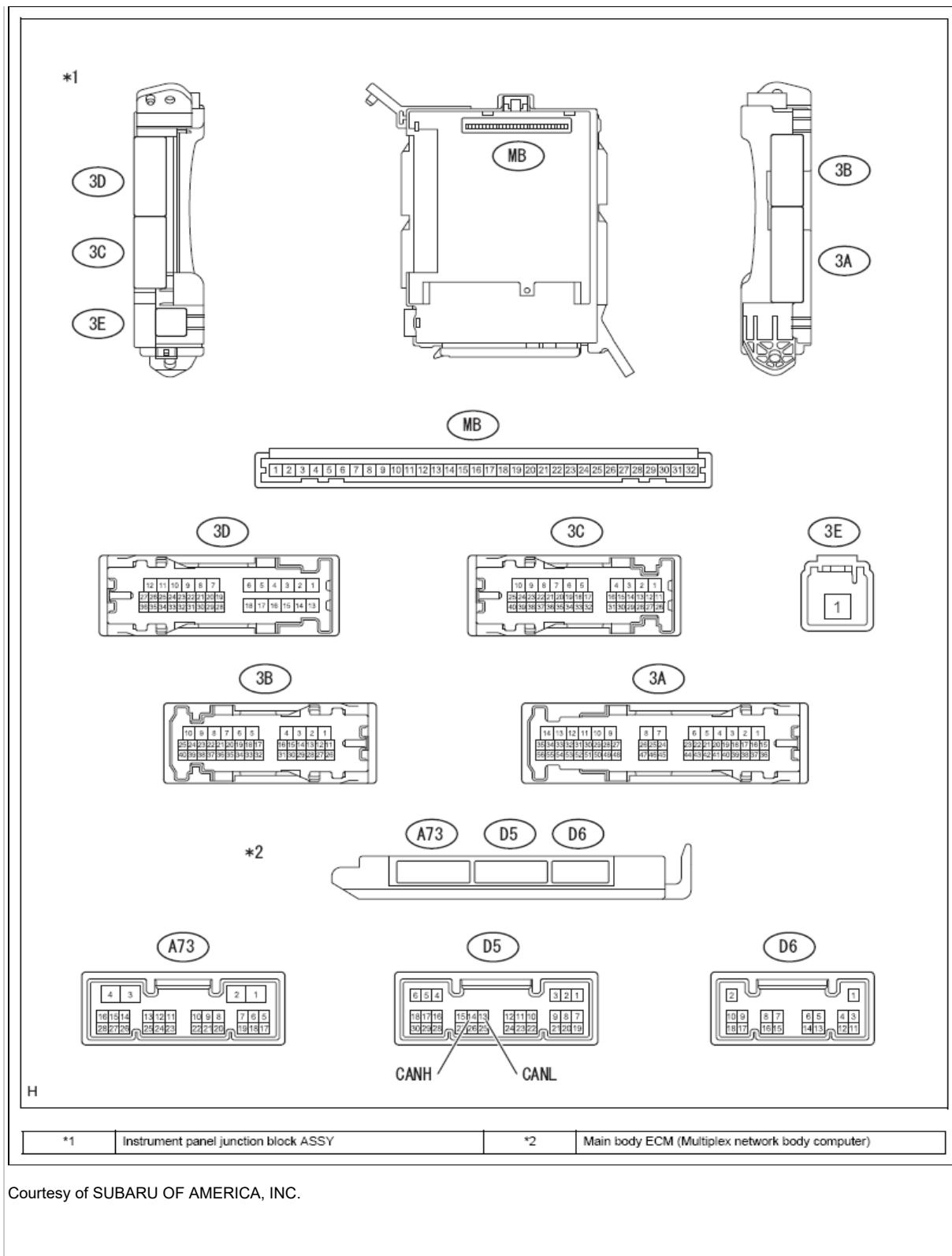
### **STANDARD VALUE SPECIFICATION - VBUS SUB-LINE**

Inspection terminals	Inspection conditions	Standard value
D7-6← →D7-7	Disconnection of the battery ground terminal	57 to 63 Ω
D7-6← →GND	Disconnection of the battery ground terminal	200 Ω or more
D7-7← →GND	Disconnection of the battery ground terminal	200 Ω or more
D7-6← →+B	Disconnection of the battery ground terminal	6 kΩ or more
D7-7← →+B	Disconnection of the battery ground terminal	6 kΩ or more

## 8. Main body ECM (Multiplex network body computer)

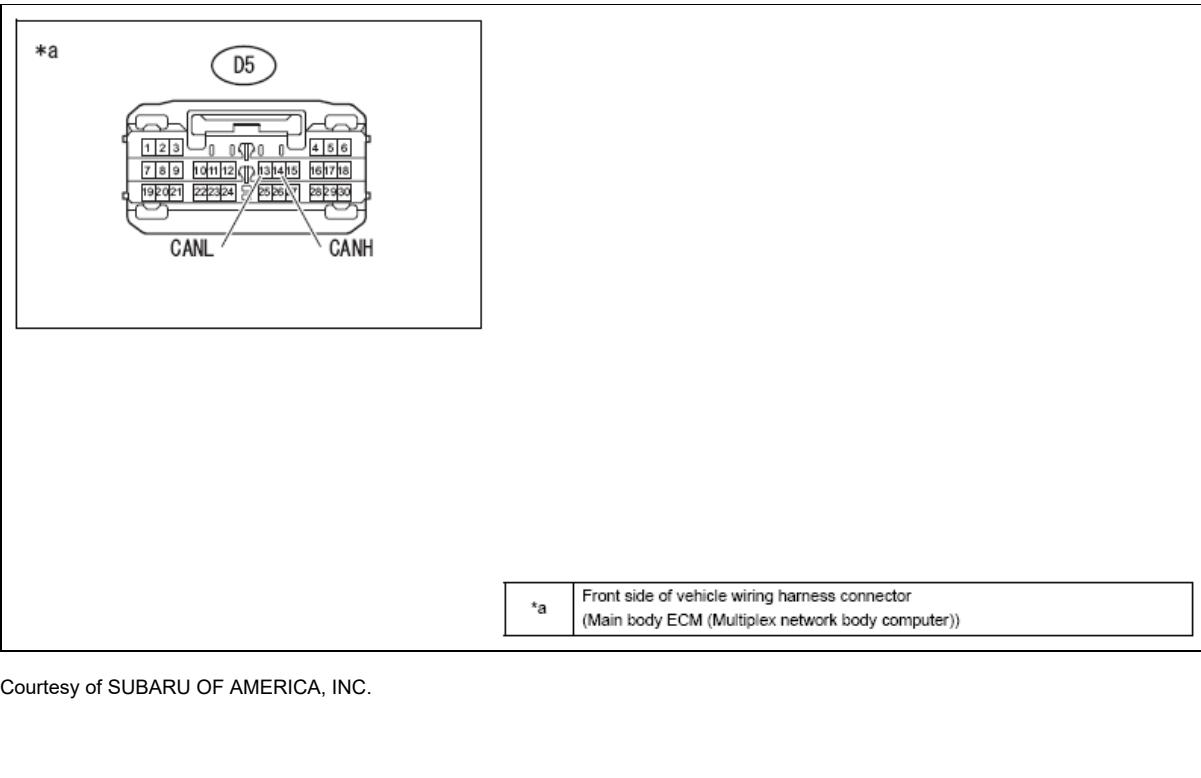
### 1. Terminal arrangement





Courtesy of SUBARU OF AMERICA, INC.

Terminal No.	terminal symbol
D5-14	-
D5-13	-



Courtesy of SUBARU OF AMERICA, INC.

## 2. Inspection of vehicle harness of main body ECM (Multiplex network body computer) (Vbus sub-line)

- Disconnect the battery ground terminal, and then disconnect the vehicle harness connector D5 from the main body ECM (Multiplex network body computer).
- Measure the resistance between the terminals.

Resistance

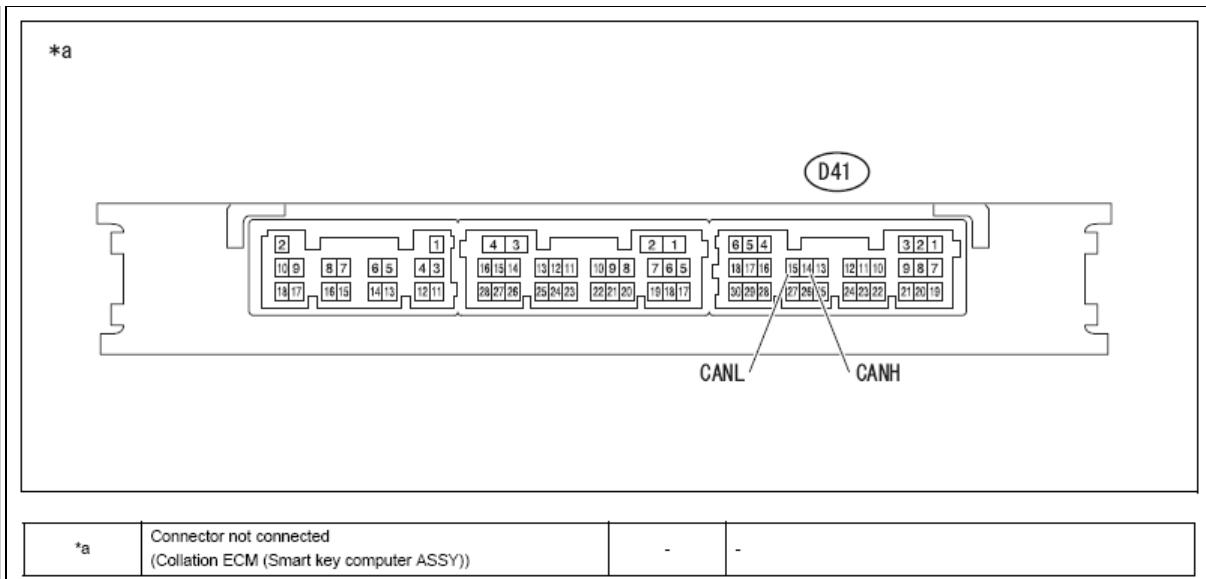
### **STANDARD VALUE SPECIFICATION - VBUS SUB-LINE**

Inspection terminals	Inspection conditions	Standard value
D5-14← →D5-13	Disconnection of the battery ground terminal	57 to 63 Ω
D5-14← →GND	Disconnection of the battery ground terminal	200 Ω or more
D5-13← →GND	Disconnection of the battery ground terminal	200 Ω or more
D5-14← →+B	Disconnection of the battery ground terminal	6 kΩ or more
D5-13← →+B	Disconnection of the battery ground terminal	6 kΩ or more

## 9. Collation ECM (Smart key computer ASSY) (with smart entry)

### 1. Terminal arrangement





Courtesy of SUBARU OF AMERICA, INC.

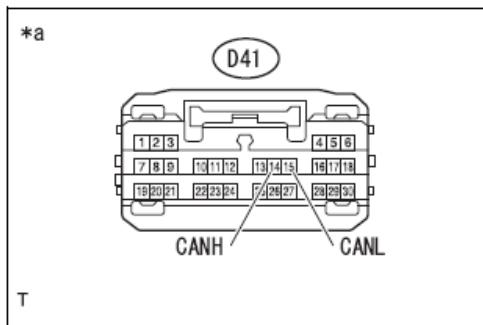
Terminal No.	terminal symbol
D41-14	-
D41-15	-

## 2. Inspection of vehicle harness of collation ECM (Smart key computer ASSY) (Vbus sub-line)

- Disconnect the battery ground terminal, and then disconnect the vehicle harness connector D41 from the collation ECM (Smart key computer ASSY).
- Measure the resistance between the terminals.

Resistance





\*a Front side of vehicle wiring harness connector  
(Collation ECM (Smart key computer ASSY))

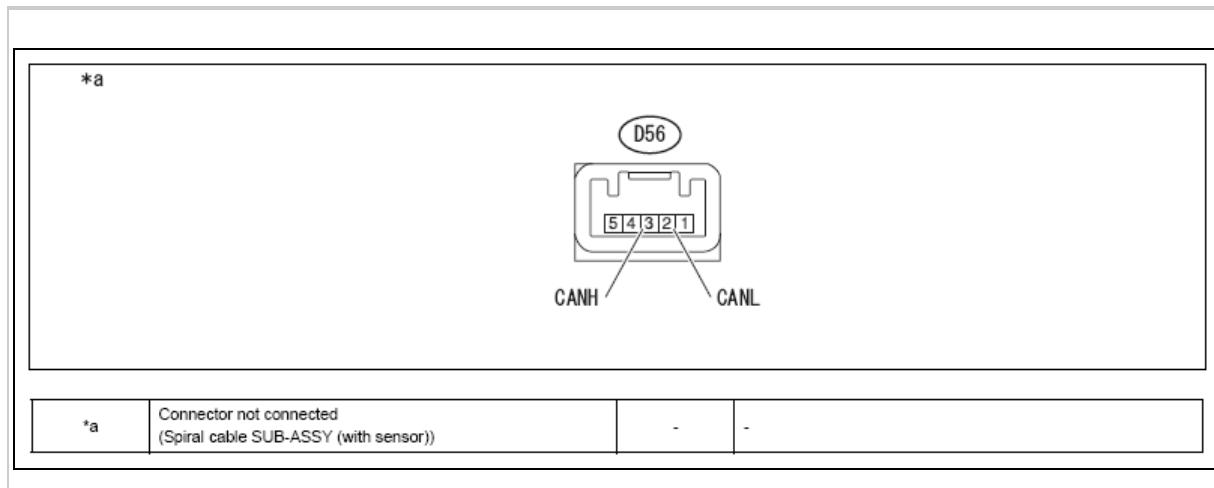
Courtesy of SUBARU OF AMERICA, INC.

### STANDARD VALUE SPECIFICATION - VBUS SUB-LINE

Inspection terminals	Inspection conditions	Standard value
D41-14← →D41-15	Disconnection of the battery ground terminal	57 to 63 Ω
D41-14← →GND	Disconnection of the battery ground terminal	200 Ω or more
D41-15← →GND	Disconnection of the battery ground terminal	200 Ω or more
D41-14← →+B	Disconnection of the battery ground terminal	6 kΩ or more
D41-15← →+B	Disconnection of the battery ground terminal	6 kΩ or more

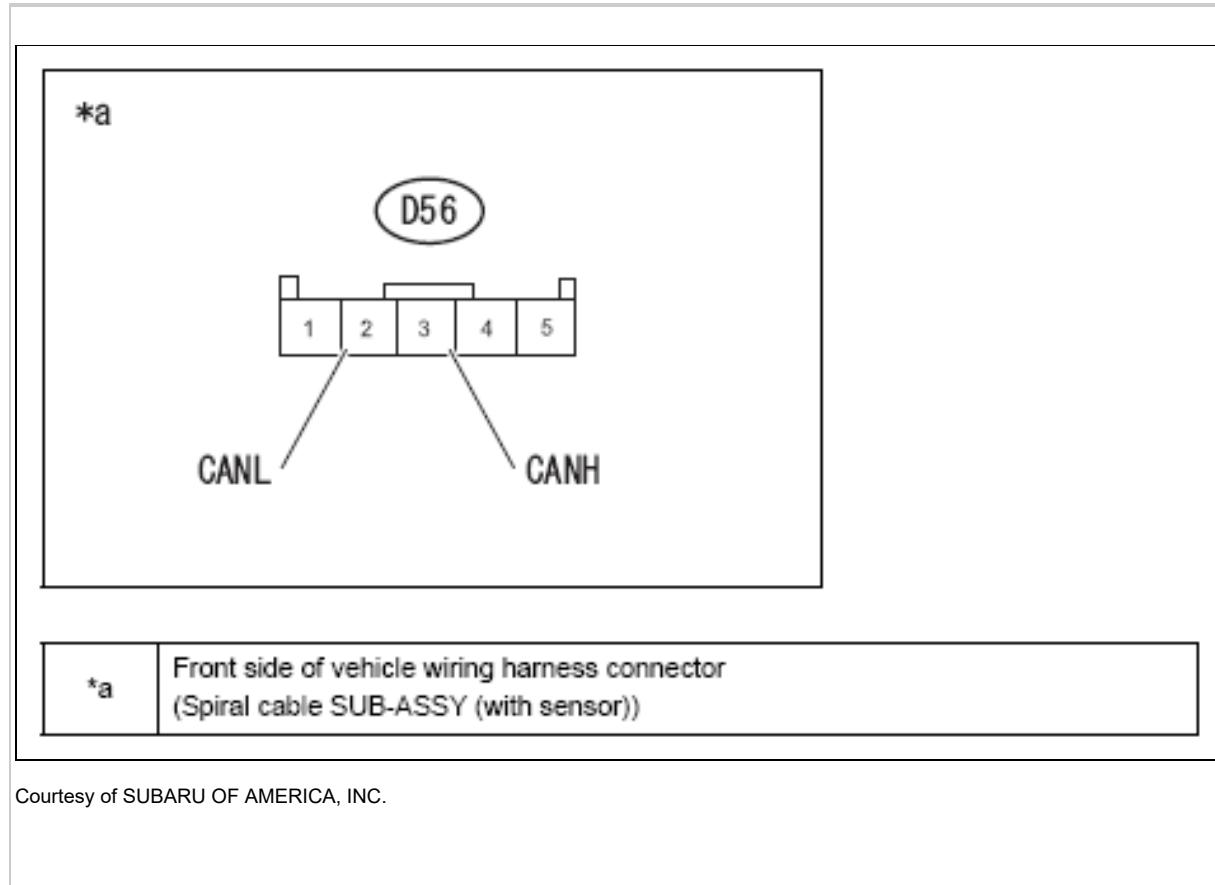
### 10. Spiral cable SUB-ASSY (with sensor)

#### 1. Terminal arrangement



Courtesy of SUBARU OF AMERICA, INC.

Terminal No.	terminal symbol
D56-3	-
D56-2	-



Courtesy of SUBARU OF AMERICA, INC.

## 2. Inspection of vehicle harness of spiral cable SUB-ASSY (with sensor) (Vbus sub-line)

- Disconnect the battery ground terminal, and then disconnect the vehicle harness connector D56 from the spiral cable SUB-ASSY (with sensor).
- Measure the resistance between the terminals.

Resistance

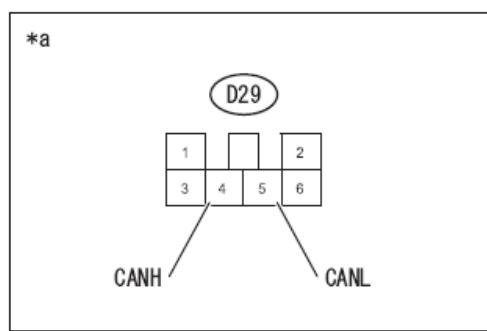
### **STANDARD VALUE SPECIFICATION - VBUS SUB-LINE**

Inspection terminals	Inspection conditions	Standard value
D56-3← →D56-2	Disconnection of the battery ground terminal	57 to 63 Ω
D56-3← →GND	Disconnection of the battery ground terminal	200 Ω or more
D56-2← →GND	Disconnection of the battery ground terminal	200 Ω or more
D56-3← →+B	Disconnection of the battery ground terminal	6 kΩ or more

D56-2← →+B

Disconnection of the battery ground terminal

6 kΩ or more



\*a Front side of vehicle wiring harness connector  
(PSP (Accessory bus buffer))

Courtesy of SUBARU OF AMERICA, INC.

## 11. PSP (Accessory bus buffer)

### 1. Inspection of PSP (Accessory bus buffer) (Vbus sub-line)

- Disconnect the battery ground terminal.
- Measure the resistance between the terminals.

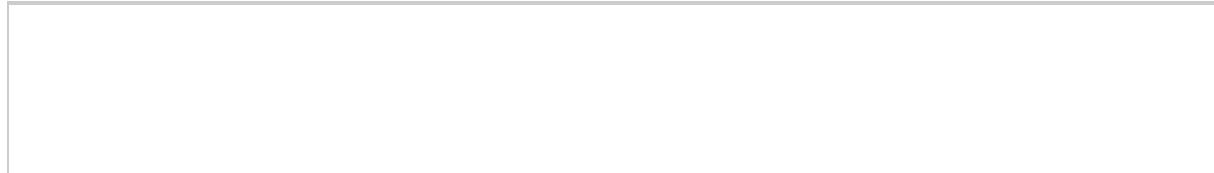
Resistance

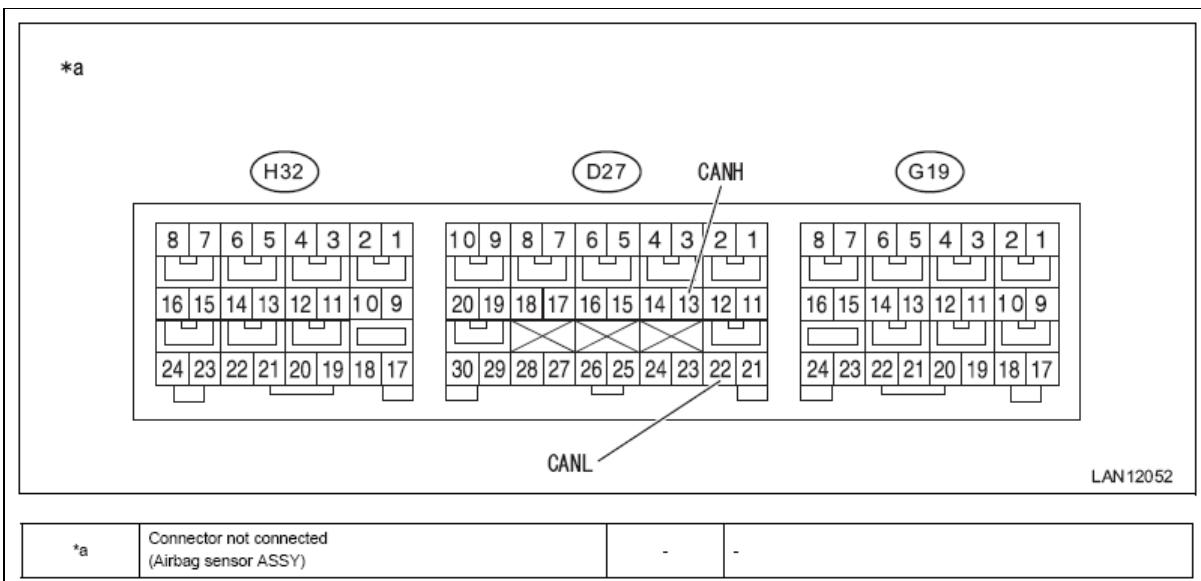
#### **STANDARD VALUE SPECIFICATION - VBUS SUB-LINE**

Inspection terminals	Inspection conditions	Standard value
D29-4← →D29-5	Disconnection of the battery ground terminal	57 to 63 Ω
D29-4← →GND	Disconnection of the battery ground terminal	200 Ω or more
D29-5← →GND	Disconnection of the battery ground terminal	200 Ω or more
D29-4← →+B	Disconnection of the battery ground terminal	6 kΩ or more
D29-5← →+B	Disconnection of the battery ground terminal	6 kΩ or more

## 12. Airbag sensor ASSY

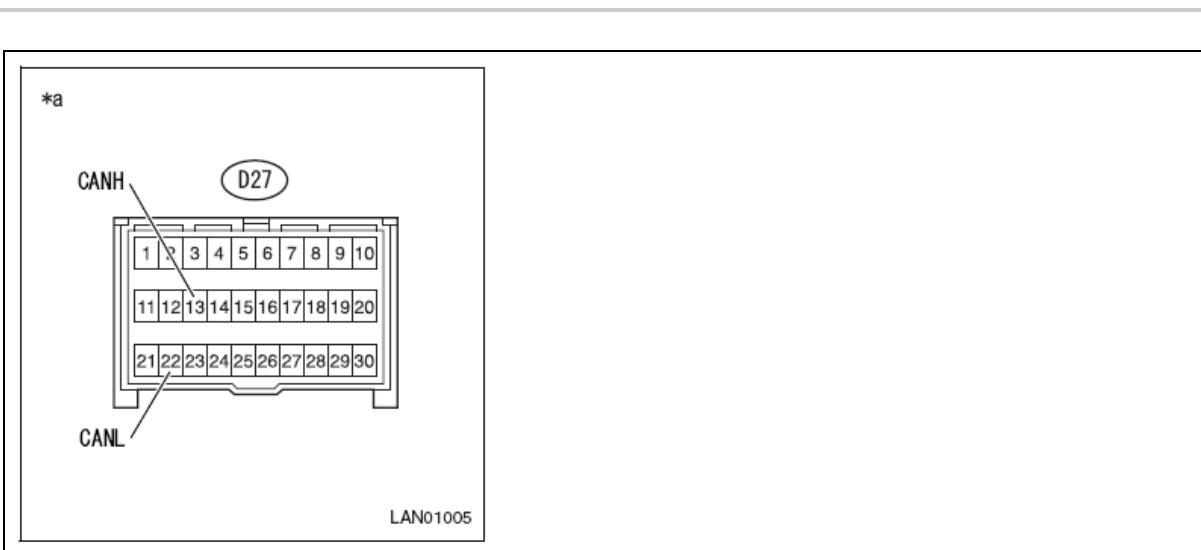
### 1. Terminal arrangement





Courtesy of SUBARU OF AMERICA, INC.

Terminal No.	terminal symbol
D27-13	-
D27-22	-



Courtesy of SUBARU OF AMERICA, INC.

## 2. Inspection of vehicle harness of airbag sensor ASSY (Vbus subline)

a. Disconnect the battery ground terminal, and then disconnect the vehicle harness connector D27 from the airbag sensor ASSY.

b. Measure the resistance between the terminals.

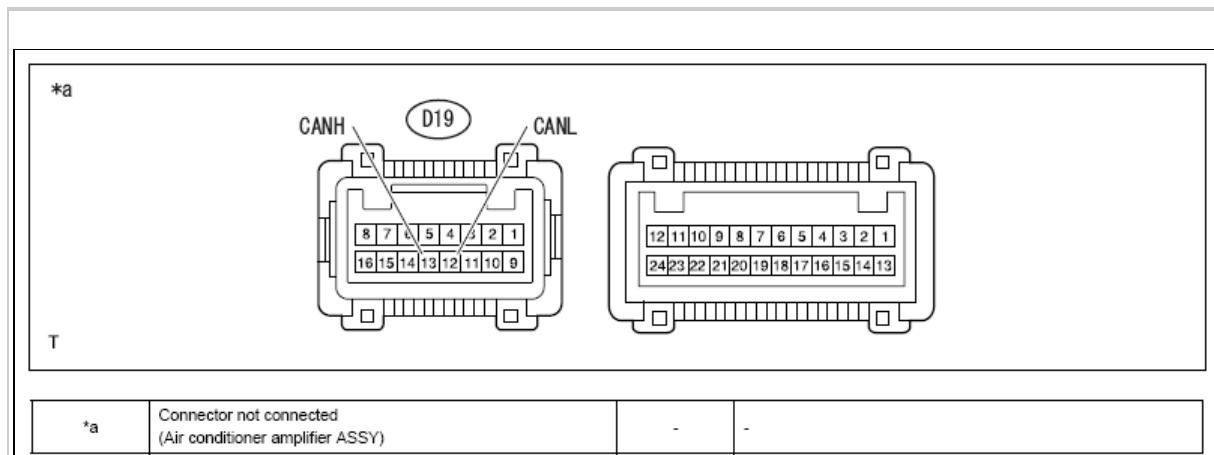
Resistance

#### STANDARD VALUE SPECIFICATION - VBUS SUB-LINE

Inspection terminals	Inspection conditions	Standard value
D27-13← →D27-22	Disconnection of the battery ground terminal	57 to 63 Ω
D27-13← →GND	Disconnection of the battery ground terminal	200 Ω or more
D27-22← →GND	Disconnection of the battery ground terminal	200 Ω or more
D27-13← →+B	Disconnection of the battery ground terminal	6 kΩ or more
D27-22← →+B	Disconnection of the battery ground terminal	6 kΩ or more

#### 13. Air conditioner amplifier ASSY (Automatic air conditioning system)

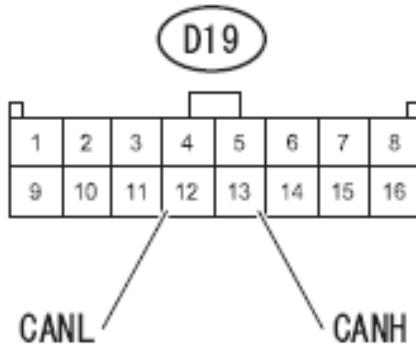
##### 1. Terminal arrangement



Courtesy of SUBARU OF AMERICA, INC.

Terminal No.	terminal symbol
D19-13	-
D19-12	-

\*a



\*a

Front side of vehicle wiring harness connector  
(Air conditioner amplifier ASSY)

Courtesy of SUBARU OF AMERICA, INC.

## 2. Inspection of vehicle harness of air conditioner amplifier ASSY (Vbus sub-line)

- Disconnect the battery ground terminal, and then disconnect the vehicle harness connector D19 from the air conditioner amplifier ASSY.
- Measure the resistance between the terminals.

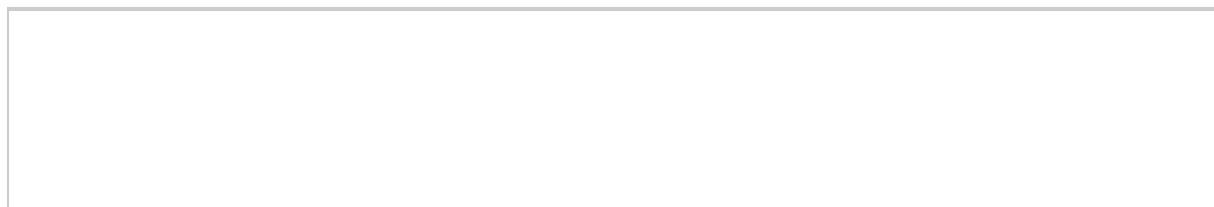
Resistance

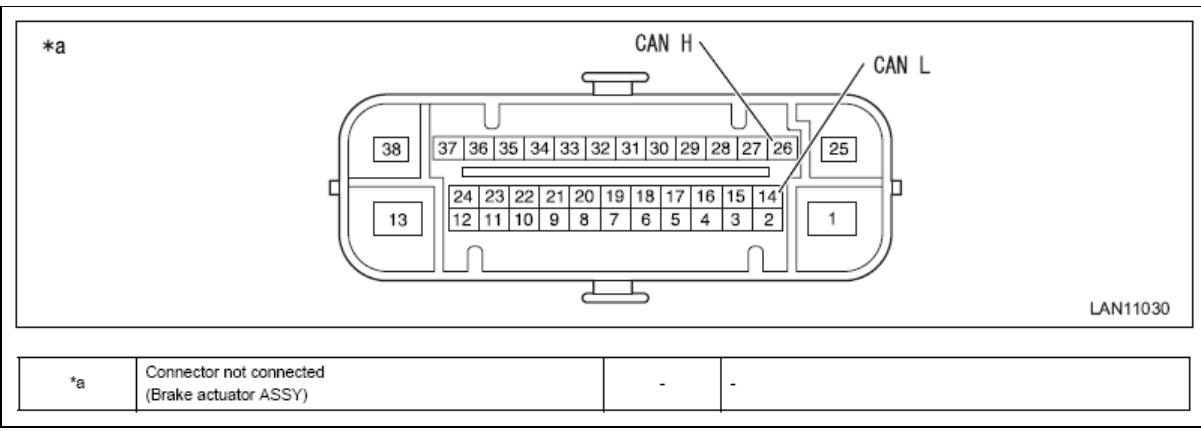
### **STANDARD VALUE SPECIFICATION - VBUS SUB-LINE**

Inspection terminals	Inspection conditions	Standard value
D19-13← →D19-12	Disconnection of the battery ground terminal	57 to 63 Ω
D19-13← →GND	Disconnection of the battery ground terminal	200 Ω or more
D19-12← →GND	Disconnection of the battery ground terminal	200 Ω or more
D19-13← →+B	Disconnection of the battery ground terminal	6 kΩ or more
D19-12← →+B	Disconnection of the battery ground terminal	6 kΩ or more

## 14. Brake actuator ASSY

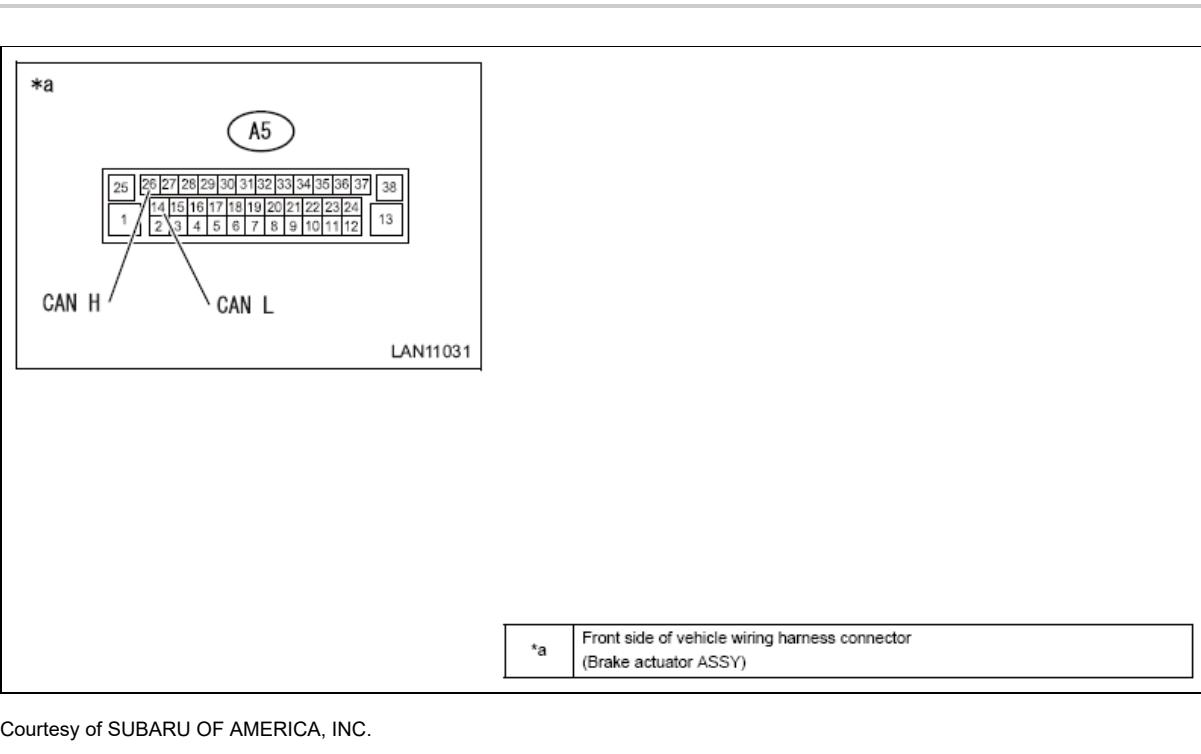
### 1. Terminal arrangement





Courtesy of SUBARU OF AMERICA, INC.

Terminal No.	terminal symbol
A5-26	-
A5-14	-



Courtesy of SUBARU OF AMERICA, INC.

## 2. Inspection of vehicle harness of brake actuator ASSY (Vbus main line)

- Disconnect the battery ground terminal, and then disconnect the vehicle harness connector A5 from the brake actuator ASSY.
- Measure the resistance between the terminals.

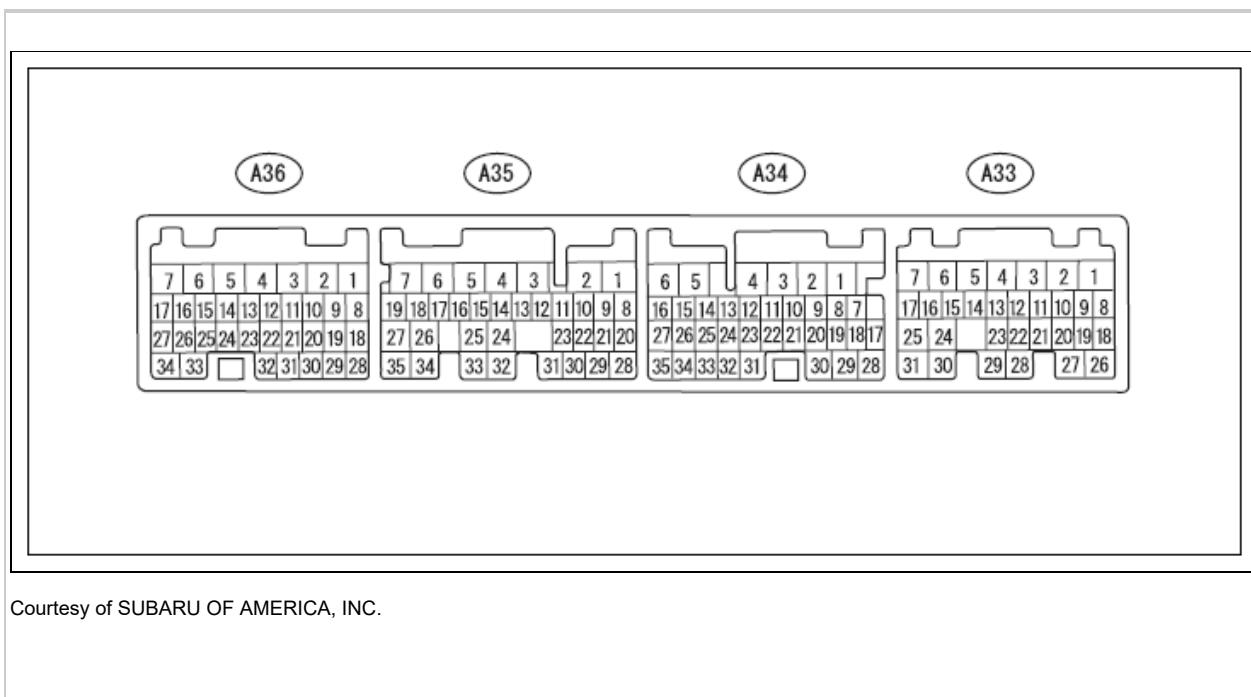
Resistance

**STANDARD VALUE SPECIFICATION - VBUS MAIN LINE**

Inspection terminals	Inspection conditions	Standard value
A5-26← →A5-14	Disconnection of the battery ground terminal	114 to 126 Ω
A5-26← →GND	Disconnection of the battery ground terminal	200 Ω or more
A5-14← →GND	Disconnection of the battery ground terminal	200 Ω or more
A5-26← →+B	Disconnection of the battery ground terminal	6 kΩ or more
A5-14← →+B	Disconnection of the battery ground terminal	6 kΩ or more

## ECM Terminal Arrangement [ Charging System (FA20) ]

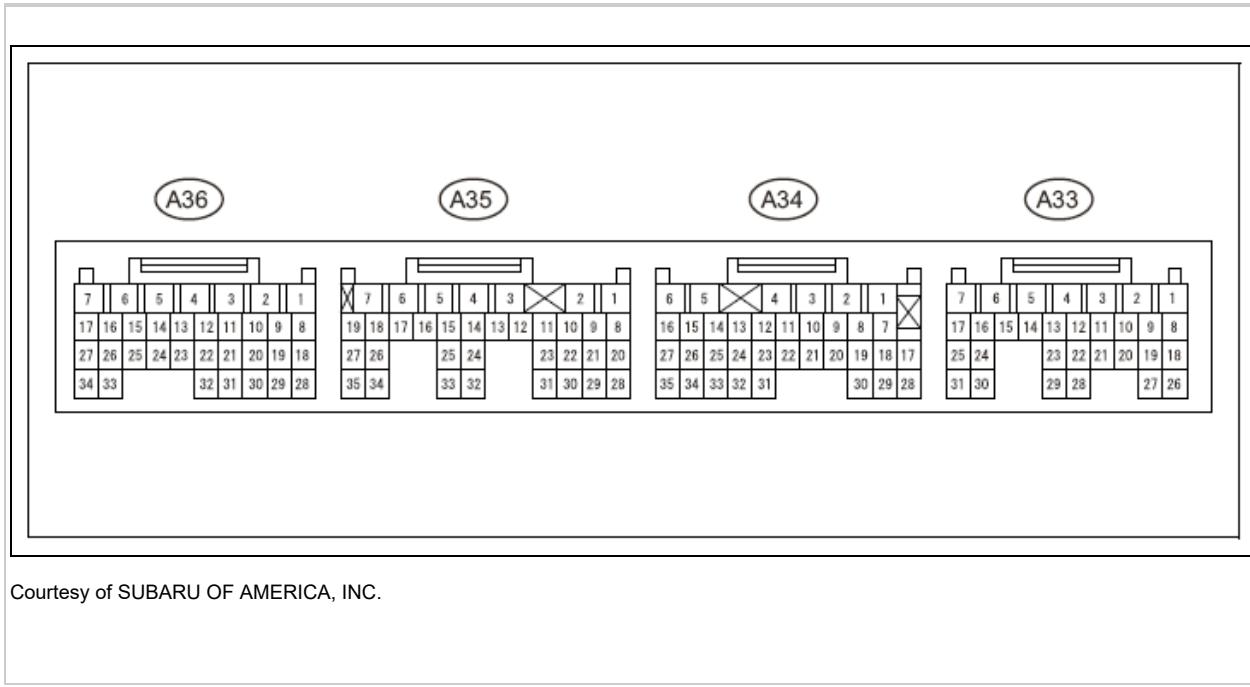
### 1. Engine control computer



Terminal No. (Terminal symbol)	Input Output	Measuring condition	Standard value
A35-22 (VCP2)← →A35-30 (EPA2)	Output	IG ON	4.5 - 5.5 V
A33-11 (IB)← →A35-30 (EPA2)	Input	IG ON	0.5 - 4.5 V
A33-24 (THB)← →A35-30 (EPA2)	Input	IG ON (Battery temperature sensor surrounding temperature of 20 to 50°C {68 to 122°F})	1.1 - 2.4 V
A34-1 (E03)← →AChassis ground	Ground	Always (Resistance check)	Less than 1 Ω
A33-2 (BATT)← →A34-1 (E03)	Input	Always	11 to 14 V
A35-18 (ALT)←	Input	Idling	Pulse generation

## ECM Terminal Arrangement [ Cruise Control System ]

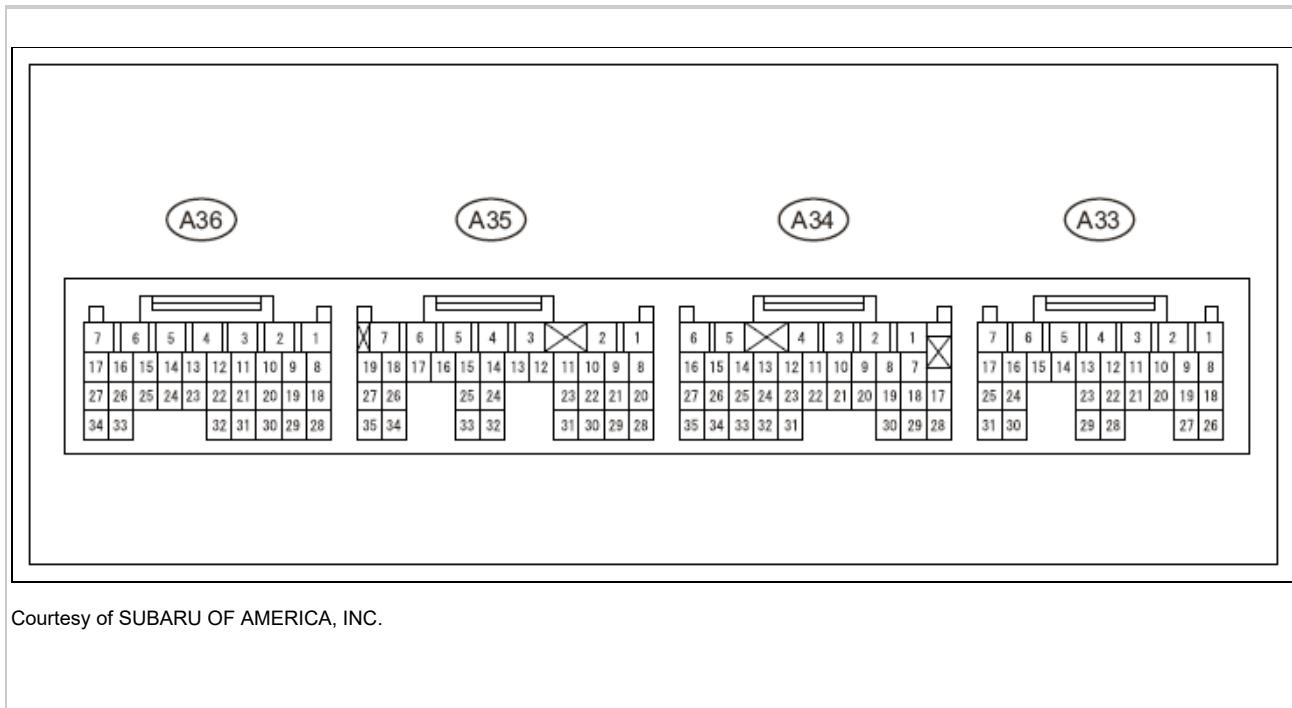
1. Check ECM.



Terminal No. (. symbol)	Wiring color	Terminal description	Condition	Standard value
A33-3 (BRK2) - A33-4 (GNDBY)	BRB - BL	Stop light signal	IG ON, brake pedal depressed	11 to 14 V
			IG ON, brake pedal released	Less than 1 V
A33-7 (BRK1) - A33-4 (GNDBY)	R - BL	Brake signal	IG ON, brake pedal depressed	Less than 1 V
			IG ON, brake pedal released	11 to 14 V
A33-15 (CLT) <sup>(1)</sup> - A33-4 (GNDBY)	RY - BL	Clutch switch circuit	IG ON, clutch pedal depressed	Less than 1 V
			IG ON, clutch pedal released	11 to 14 V
A33-30 (CCMD) - A33-4(GNDBY)	WL - BL	Cruise control main switch circuit	All switch OFF released	1 MΩ or more
			Cruise ON/OFF switch ON	Less than 1 Ω
			+/RES switch ON	235 to 245 Ω
			-/SET Switch ON	617 to 643

		$\Omega$
CANCEL switch ON	1509 to 1571 $\Omega$	
(1) For manual transmission		

## ECM Terminal Arrangement [ DTC Table ]



**NOTE:** The standard voltages specified for ECM terminals are listed below. Appropriate conditions required for inspection of each terminal are also described. Compare the inspection result with the value in "Standard value." Refer to the figure shown above, and locate the position of the ECM terminal.

Terminal No. (symbol)	Terminal description	Inspection conditions	Standard value
A33-1 (+B2) - A36-4 (E01)	ECM power supply	IG ON	12 to 14 V
A33-2 (BATT) - A36-4 (E01)	Battery (Prepared for battery voltage measurement, and for ECM memory)	Always	10 to 13 V
A33-3 (ST1-) - A36-4	Stop light switch	Brake pedal is depressed Brake pedal is released	11 to 14 V 0 to 1 V

(E01)			
A33-7 (STP) - A36-4 (E01) <sup>(1)</sup>	Stop light switch	Brake pedal is depressed	0 to 1 V
		Brake pedal is released	11 to 14 V
A33-8 (ACP) - A36-4 (E01)	Air conditioner pressure sensor	IG ON, A/C ON	0 to 1 V
		Idling, A/C OFF	12 to 14 V
A33-12 (THA) - A36- 29 (E1)	Intake air temperature sensor (Integrated into the intake air flow meter SUB-ASSY)	IG ON	0.3 to 4.6 V
A33-14 (STS2) - A36-4 (E01) <sup>(3)</sup>	Starter signal	IG ON	0 to 1 V
		Cranking	6 to 13 V
A33-15 (CLSW) - A36-4 (E01) <sup>(2)</sup>	Clutch switch	IG ON, clutch pedal depressed	0 to 1 V
		IG ON, clutch pedal depressed	10 to 13 V
A33-16 (NSW) - A36- 4 (E01)	Neutral switch signal	With IG ON, the shift lever is at P or N position. <sup>(1)</sup> With IG ON, the shift lever is at N position. <sup>(2)</sup>	0 to 1 V
		With IG ON, the shift lever is except at P or N position. <sup>(1)</sup> With IG ON, the shift lever is except at N position. <sup>(2)</sup>	10 to 13 V
A33-17 (STS2) - A36-4 (E01)	Starter signal <sup>(3)(4)</sup>	IG ON	0 to 1 V
		Cranking <sup>(3)</sup>	More than 6 V
		Cranking <sup>(4)</sup>	6 to 13 V
A33-18 (CANL) - A36-4 (E01)	CAN communication line	IG ON	Pulse generation (Refer to waveform 1.)
A33-19 (CANH) - A36-4 (E01)	CAN communication line	IG ON	Pulse generation (Refer to waveform 2.)
A33-20 (HB) - A36-4 (E01) <sup>(9)</sup>	Blower relay	With IG ON, the blower fan switch is turned to ON.	0 to 1 V
		With IG ON, the blower fan switch is turned to OFF.	10 to 13 V
A33-22 (VG) - A33-29 (E2G)	Intake air flow meter SUB-ASSY	Idling, warm-up operation of engine	0.9 to 4.5 V
A33-27	IG2 relay	IG ON	10 to 13 V

(IGSW) - A36-4 (E01)			
A34-5 (HA1A) - A36-4 (E01)	Air/fuel ratio sensor (bank 1 sensor 1) heater	Idling, cool-down operation of engine	Pulse generation (Refer to waveform 3.)
A34-6 (+B) - A36-4 (E01)	ECM power supply	IG ON	12 to 14 V
A34-9 (FUEL P1) - A36-29 (E1)	Fuel pressure sensor	Idling, warm-up operation of engine	1.0 to 1.7 V
A34-7 (FUEL P2) - A36-29 (E1)	Fuel pressure sensor (sub)	Idling, warm-up operation of engine	
A34-11 (IJF1) - A36-4 (E01)	Confirmation signal for direct injection of injector	Idling	Pulse generation (Refer to waveform 4.)
A34-13 (FPF) - A36-4 (E01)	High pressure side fuel pump (spill valve)	Idling	Pulse generation (Refer to waveform 5.)
A34-14 (EV1+) - A36-4 (E01)	Variable valve timing (VVT) sensor (exhaust side (bank 1))	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 6.)
A34-15 (W2+) - A36-4 (E01)	Variable valve timing (VVT) sensor (intake side (bank 2))	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 7.)
A34-16 (NE+) - A34-27 (NE-)	Crankshaft position sensor	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 6 or 7.)
A34-17 (KNK2) - A36-29 (E1)	Knock control sensor	IG ON	Approx. 2.5 V
A34-18 (A1A-) - A36-4 (E01)	Air/fuel ratio sensor	IG ON	2.4 to 2.7 V
A34-19 (A1A+) - A36-4 (E01)	Air/fuel ratio sensor	IG ON	2.8 to 3.2 V
A34-20 (PIM) - A36-29 (E1)	Intake manifold pressure sensor	Idling, warm-up operation of engine	1.1 to 2.0 V
A34-21 (OX1B) - A34-8 (E01)	Oxygen sensor	Idling, warm-up operation of engine	0 to 0.9 V
A34-25	Variable valve timing (VVT)	Idling, warm-up operation of	Pulse generation

(EV2+) - A36-4 (E01)	sensor (exhaust side (bank 2))	engine	(Refer to waveform 6.)
A34-26 (W1+) - A36-4 (E01)	Variable valve timing (VVT) sensor (intake side (bank 1))	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 7.)
A34-28 (KNK1) - A36-29 (E1)	Knock control sensor	IG ON	Approx. 2.5 V
A34-31 (IJF2) - A36-4 (E01)	Confirmation signal for direct injection of injector	Idling	Pulse generation (Refer to waveform 4.)
A34-32 (FPD) - A36-4 (E01)	High pressure side fuel pump (spill valve)	Idling	Pulse generation (Refer to waveform 5.)
A34-34 (VCV) - A36-4 (E01)	Camshaft timing oil control valve (OCV) ground	IG ON	0 to 1 V
A35-1 (VPMP) - A36-4 (E01)	Vent valve (integrated into canister pump module)	IG ON	10 to 13 V
A35-5 (IREL) - A36-4 (E01)	IINJ relay	Idling	10 to 13 V
		IG ON	0 to 1 V
A35-7 (+BM) - A36-4 (E01)	ETCS relay	IG ON	10 to 13 V
A35-8 (MPMP) - A36-4 (E01)	Leak detection pump (integrated into canister pump module)	IG ON	10 to 13 V
		Leak detection pump ON	0 to 1 V
A35-10 (DI) - A36-4 (E01)	Fuel pump control (Detects malfunction in fuel pump control.)	IG ON	10 to 12 V
A35-11 (FAN1) - A36-4 (E01)	Fan No. 3 relay <sup>(5)</sup> Fan No. 1 relay <sup>(6)</sup>	IG ON Cooling fan is not operating.	10 to 13 V
		Cooling fan operates at idling speed, A/C ON or high engine coolant temperature. <sup>(5)</sup>	0 to 0.5 V
		Cooling fan operates at high engine coolant temperature. <sup>(6)</sup>	0 to 0.5 V
A35-12 (FAN2) - A36-4 (E01) <sup>(5)</sup>	Fan No. 2 relay	IG ON	10 to 13 V
		Cooling fan operates at idling speed, A/C ON or high engine coolant temperature. <sup>(5)</sup>	0 to 0.5 V
A35-13	EFI MAIN1 relay	IG ON	0 to 1 V

(SSHUT) - A36-4 (E01)			
A35-15 (TACH) - A36-4 (E01) (3)	Engine Speed	Hold the engine speed at 1500 r/min.	Pulse generation (Refer to waveform 8.)
A35-17 (MCR) - A36-4 (E01)	ETCS relay	IG ON	0 to 1 V
A35-19(FPC) - A36-4 (E01)	Fuel pump control	IG ON	Pulse generation (Refer to waveform 9.)
A35-20 (PPMP) - A36-4 (E01)	Canister pressure sensor (integrated into canister pump module)	IG ON	1.5 to 4.0 V
A35-21 (VCPA) - A36-4 (E01)	Accelerator pedal position sensor power supply	IG ON	4.5 to 5.5 V
A35-22 (VCP2) - A36-4 (E01)	Accelerator pedal position sensor power supply	IG ON	4.5 to 5.5 V
A35-23 (VPA) - A35-29 (EPA)	Accelerator pedal position sensor (engine control)	With IG ON, the accelerator pedal is fully open.	Approx. 0.7 V
		With IG ON, the accelerator pedal is fully closed.	Approx. 3.1 V
A35-26 (STA) - A36-4 (E01)	ST relay	IG ON	10 to 13 V
		Cranking	0 to 1 V
A35-31 (VPA2) - A35-30 (EPA2)	Accelerator pedal position sensor (for detection of sensor malfunction)	With IG ON, the accelerator pedal is fully open.	Approx. 0.7 V
		With IG ON, the accelerator pedal is fully closed.	Approx. 3.1 V
A35-32 (ACCR) - A36-4 (E01) (3)	Request for accessory cutoff	IG ON	0 to 0.5 V
		Cranking	12 to 14 V
A35-34 (STAR) - A36-4 (E01) (3)	ST Cut Relay	IG ON	0 to 0.5 V
		Cranking	8 to 13 V
A35-35 (AC) - A36-4 (E01)	HEATER relay	Idling, A/C ON	0 to 0.5 V
		Idling, A/C OFF	12 to 14 V
A36-1 (M-) -	Throttle actuator	Idling, warm-up operation of	Pulse generation

A36-4 (E01)		engine	(Refer to waveform 10.)
A36-2 (M+) - A36-4 (E01)	Throttle actuator	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 10.)
A36-5 (OE2) - A36-4 (E01)	Camshaft timing oil control valve (OCV) (exhaust side (bank 2))	IG ON Idling, warm-up operation of engine	11 to 14 V Pulse generation (Refer to waveform 11.)
A36-6 (HT1B) - A36-4 (E01)	Oxygen sensor heater	IG ON Idling, cool-down operation of engine	11 to 14 V Pulse generation (Refer to waveform 12.)
A36-7 (OE1) - A36-4 (E01)	Camshaft timing oil control valve (OCV) (exhaust side (bank 1))	IG ON Idling, warm-up operation of engine	11 to 14 V Pulse generation (Refer to waveform 11.)
A36-8 (IGT4) - A36-4 (E01)	Ignition coil (ignition signal)	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 13.)
A36-10 (IGT2) - A36-4 (E01)	Ignition coil (ignition signal)	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 13.)
A36-11 (PRG) - A36-4 (E01)	Purge VSV	When one of the following conditions is met: <ul style="list-style-type: none"><li>• IG ON</li><li>• Idling, warm-up operation of engine, purge control in progress</li></ul>	Pulse generation (Refer to waveform 14.)
A36-12 (#10) - A36-4 (E01)	Injector for port injection	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 15.)
A36-13 (#40) - A36-4 (E01)	Injector for port injection	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 15.)
A36-14 (#1) - A36-4 (E01)	Injector for direct injection	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 4.)
A36-16 (OC2) - A36-4 (E01)	Variable valve timing (VVT) sensor (intake side (bank 2))	IG ON	11 to 14 V
		Idling, warm-up operation of engine	Pulse generation (Refer to waveform 11.)

A36-17 (OC1) - A36-4 (E01)	Variable valve timing (VVT) sensor (intake side (bank 1))	IG ON  Idling, warm-up operation of engine	11 to 14 V  Pulse generation (Refer to waveform 11.)
A36-18 (VTA1) - A36-29 (E1)	Throttle position sensor (engine control)	With IG ON, the accelerator pedal is fully open.	Approx. 0.6 V
		With IG ON, the accelerator pedal is fully closed.	Approx. 4.2 V
A36-19 (VC) - A36-29 (E1)	Sensor power supply (voltage)	IG ON	4.5 to 5.5 V
A36-20 (OT) - A36-29 (E1)	Oil temperature sensor	Idling	0.5 to 1.4 V
A36-21 (IGT1) - A36-4 (E01)	Ignition coil (ignition signal)	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 13.)
A36-22 (#20) - A36-4 (E01)	Injector for port injection	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 15.)
A36-23 (#4) - A36-4 (E01)	Injector for direct injection	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 4.)
A36-24 (#3) - A36-4 (E01)	Injector for direct injection	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 4.)
A36-25 (#2) - A36-4 (E01)	Injector for direct injection	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 4.)
A36-28 (VTA2) - A36-29 (E1)	Throttle position sensor (for detection of sensor malfunction)	With IG ON, the accelerator pedal is fully open.	Approx. 1.5 V
		With IG ON, the accelerator pedal is fully closed.	Approx. 4.3 V
A36-30 (THW) - A36-29 (E1)	E.F.I. water temperature sensor	Idling, engine coolant temperature at 60 to 120°C {140 to 248°F}	0.8 to 1.8 V
A36-31 (IGT3) - A36-4 (E01)	Ignition coil (ignition signal)	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 13.)
A36-32 (#30) - A36-4 (E01)	Injector for port injection	Idling, warm-up operation of engine	Pulse generation (Refer to waveform 15.)
A33-4 (EC) -	Ground	Always	Less than 1 Ω

chassis ground			
A33-28 (SLE2) - chassis ground	Shielded wire	Always	Less than 1 Ω
A34-1 (EC3) - chassis ground	Ground	Always	Less than 1 Ω
A34-2 (EC4) - chassis ground	Ground	Always	Less than 1 Ω
A34-3 (E05) - chassis ground	Ground	Always	Less than 1 Ω
A34-29 (EKNK) - chassis ground	Shielded wire	Always	Less than 1 Ω
A34-30 (SLE1) - chassis ground	Shielded wire	Always	Less than 1 Ω
A34-35 (SLE3) - chassis ground	Shielded wire	Always	Less than 1 Ω
A36-3 (E02) - chassis ground	Ground	Always	Less than 1 Ω
A36-4 (E01) - chassis ground	Ground	Always	Less than 1 Ω
A35-29 (EPA) - A36-4 (E01)	Ground	IG ON	0 to 1 V
A35-30 (EPA2) - A36-4 (E01)	Ground	IG ON	0 to 1 V
(1) Automatic transmission			
(2) Manual transmission			
(3) Models with smart entry & start system			

(4) Models without smart entry & start system

(5) Models with air conditioner

(6) Models without air conditioner

(7) Models with ID code box

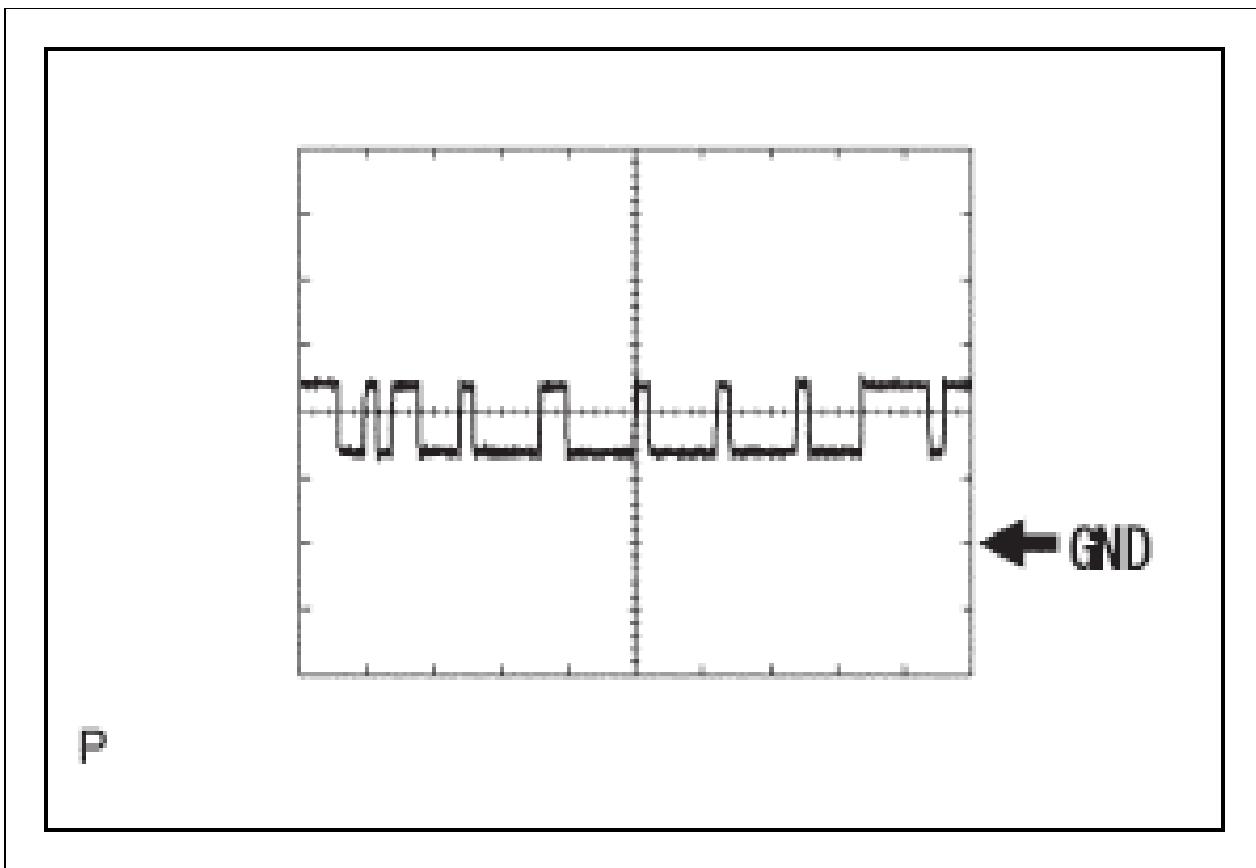
(8) Models without ID code box

(9) Manual air conditioning system

## 1. Waveform

**NOTE:** Oscilloscope waveforms shown below are just the reference, and the waveforms for noise and chattering are omitted.

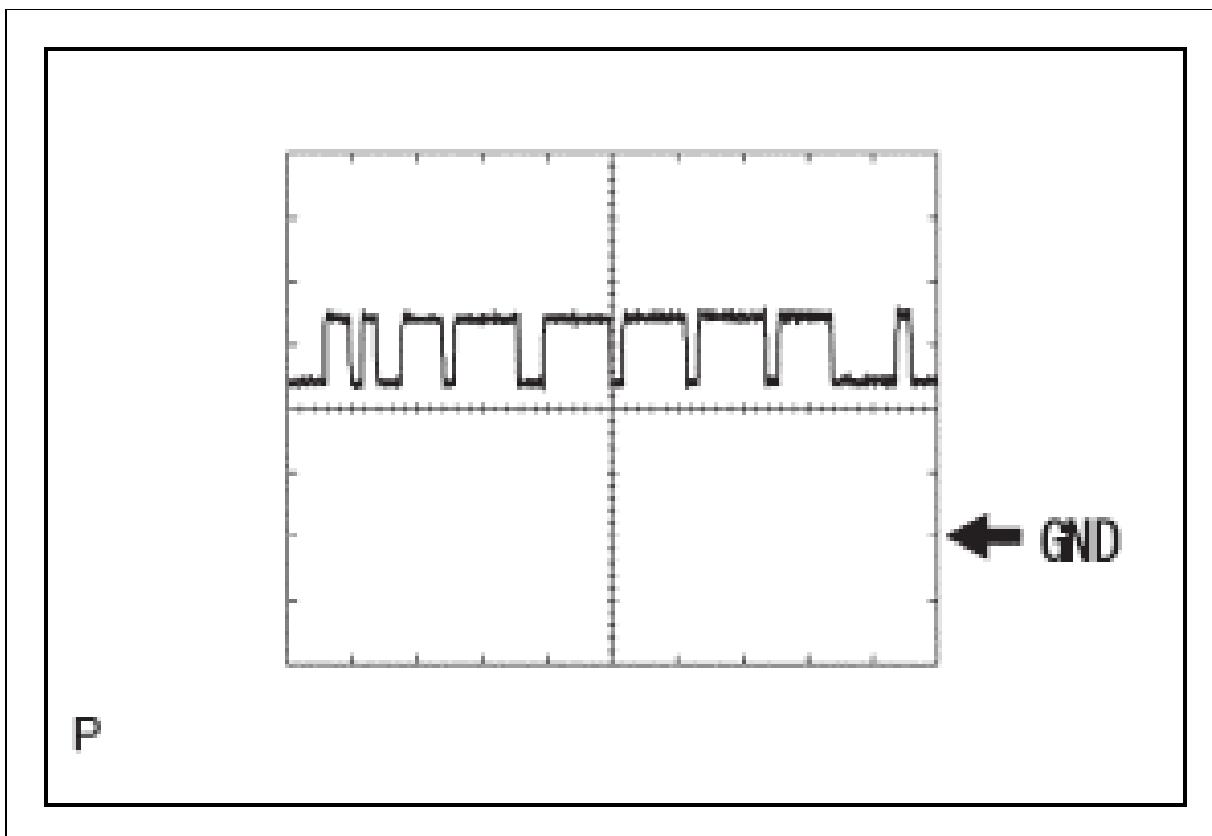
Fig 1: Waveform 1



## 1. Waveform 1

Item	Contents
Measuring terminal	CANL $\leftarrow \rightarrow$ E01
Equipment setting	1 V/DIV, 10 $\mu$ s/DIV
Condition	Engine stop, IG ON

Fig 2: Waveform 2

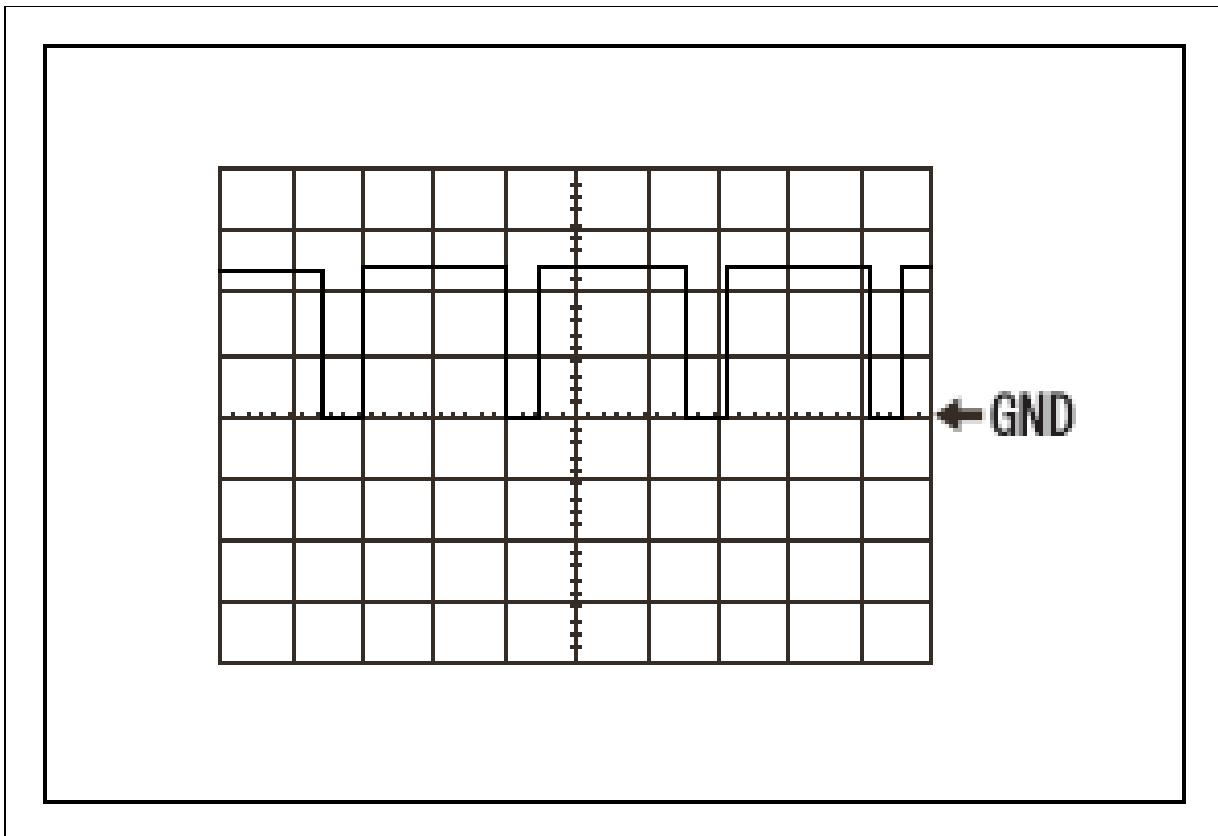


Courtesy of SUBARU OF AMERICA, INC.

## 2. Waveform 2

Item	Contents
Measuring terminal	CANH $\leftarrow \rightarrow$ E01
Equipment setting	1 V/DIV, 10 $\mu$ s/DIV
Condition	Engine stop, IG ON

Fig 3: Waveform 3

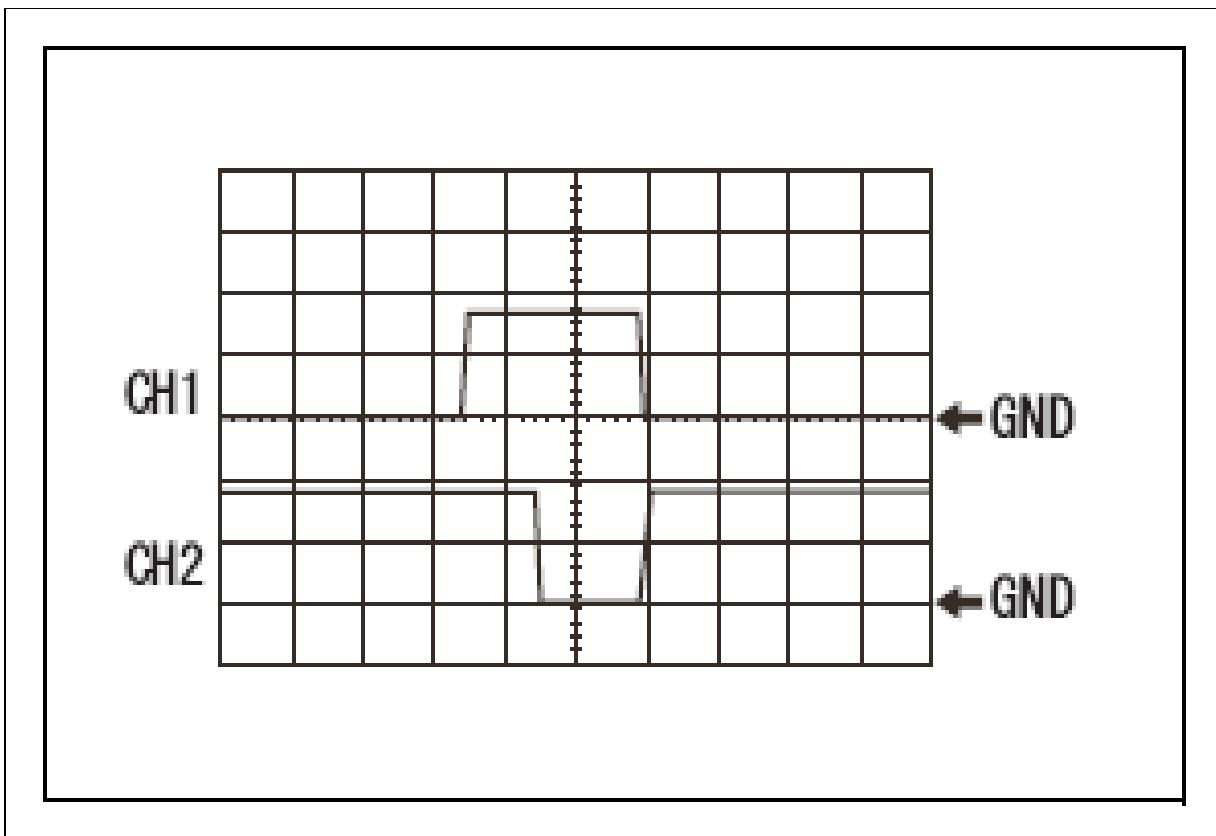


Courtesy of SUBARU OF AMERICA, INC.

### 3. Waveform 3

Item	Contents
Measuring terminal	HA1A ← →E01
Equipment setting	5 V/div, 50 ms/div
Condition	While engine idling before warming up air/fuel ratio sensor

Fig 4: Waveform 4

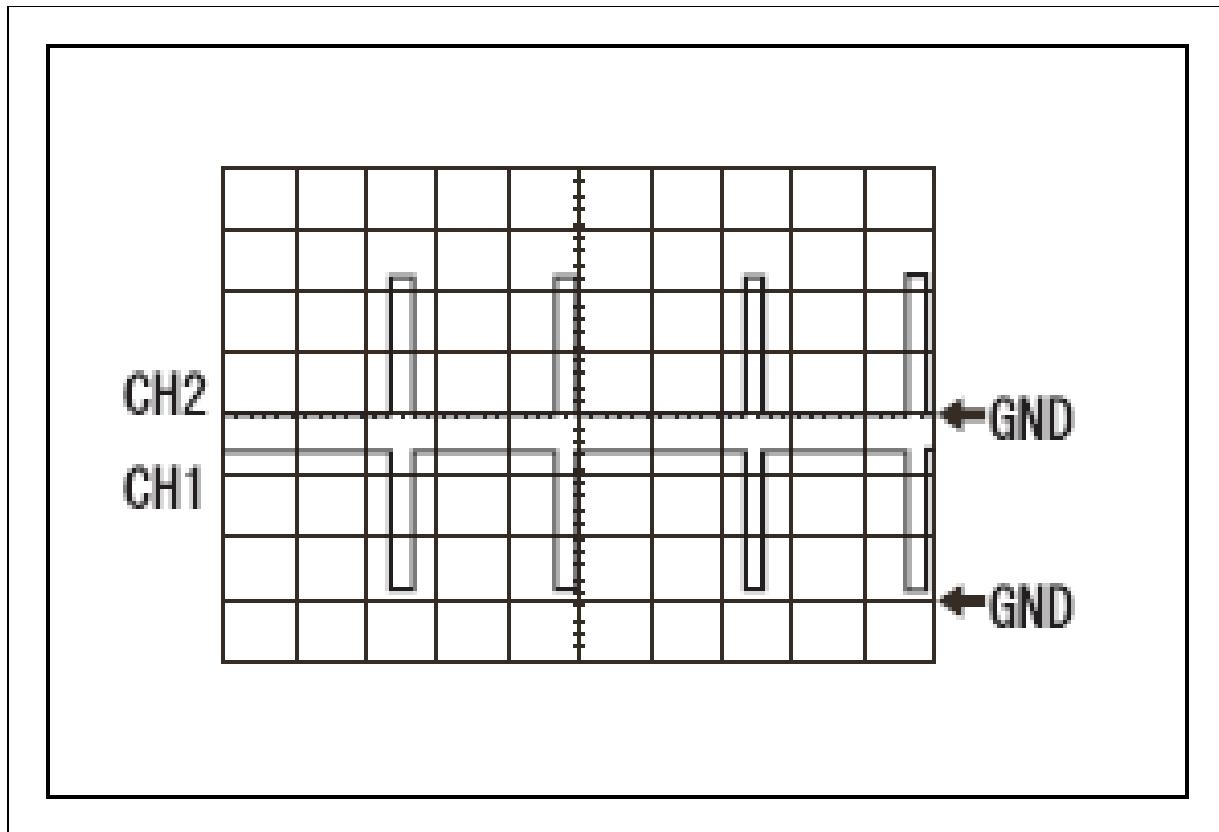


Courtesy of SUBARU OF AMERICA, INC.

#### 4. Waveform 4

Item	Contents
Measuring terminal	CH1: #1, #2, #3, #4 ← → E01 CH2: IJF1, IJF2 ← → E01
Equipment setting	2 V/div, 40 µs/div
Condition	After warm-up, during idling

Fig 5: Waveform 5

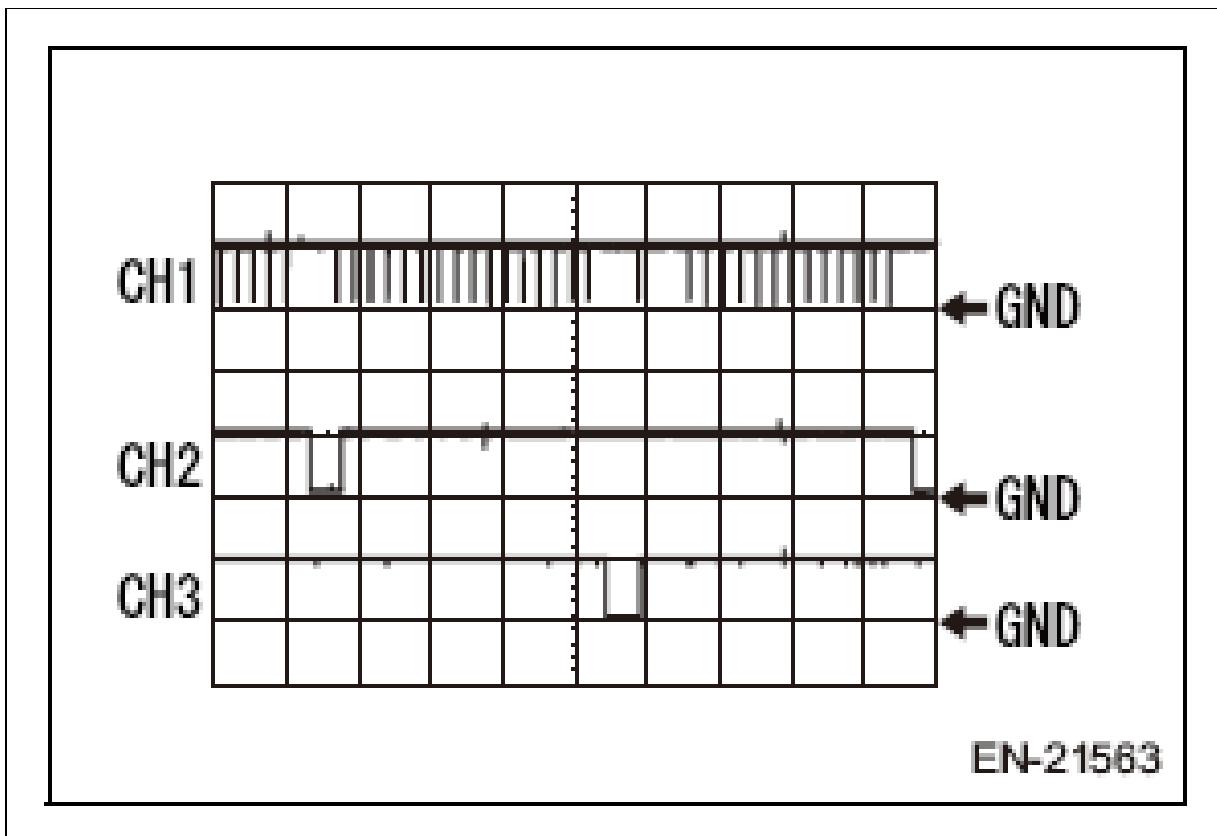


Courtesy of SUBARU OF AMERICA, INC.

### 5. Waveform 5

Item	Contents
Measuring terminal	CH1: FPD ← → E01 CH2: FPF ← →E01
Equipment setting	2 V/div, 20 ms/div
Condition	After warm-up, during idling

Fig 6: Waveform 6

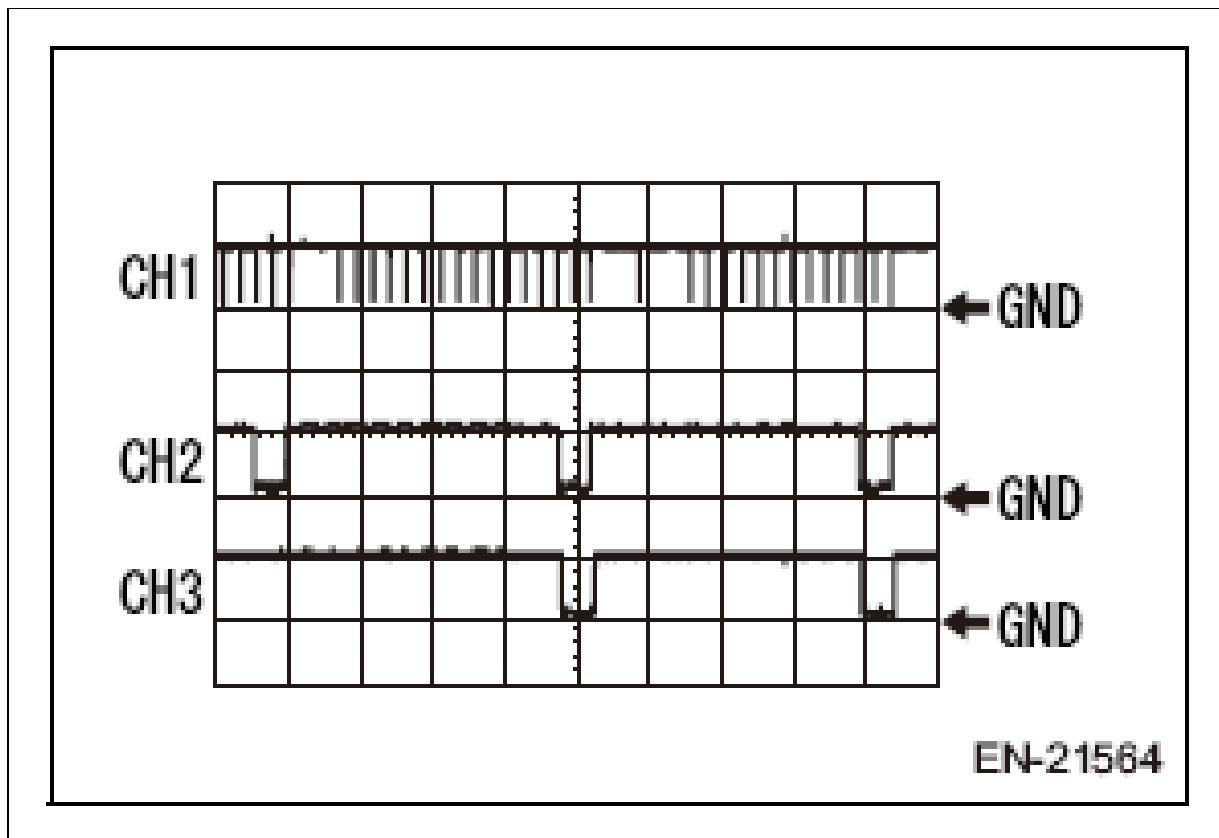


Courtesy of SUBARU OF AMERICA, INC.

## 6. Waveform 6

Item	Contents
Measuring terminal	CH1: NE+ ← → NE- CH2: EV1+ ← → E01 CH3: EV2+ ← → E01
Equipment setting	5 V/div, 10 ms/div
Condition	After warm-up, during idling

Fig 7: Waveform 7

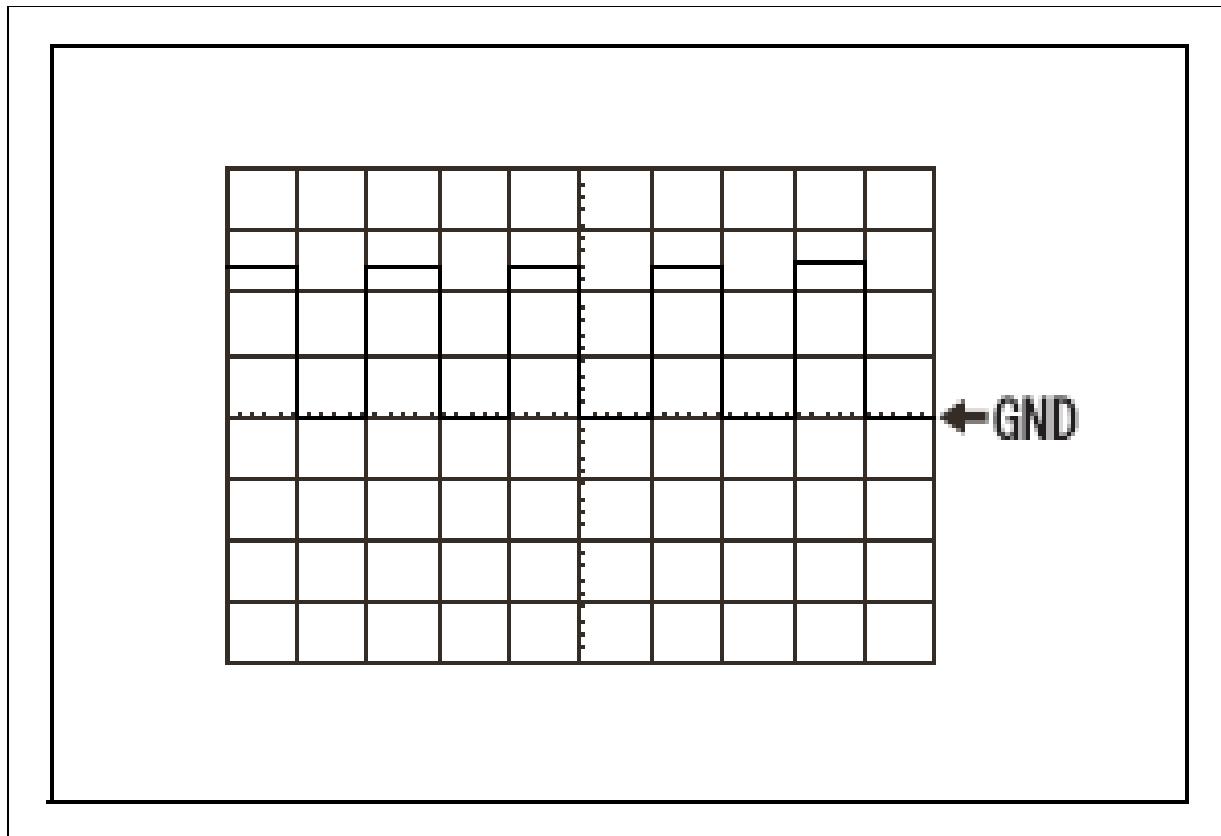


Courtesy of SUBARU OF AMERICA, INC.

### 7. Waveform 7

Item	Contents
Measuring terminal	CH1: NE+ ← → NE- CH2: VV1+ ← → E01 CH3: VV2+ ← → E01
Equipment setting	5 V/div, 10 ms/div
Condition	After warm-up, during idling

Fig 8: Waveform 8

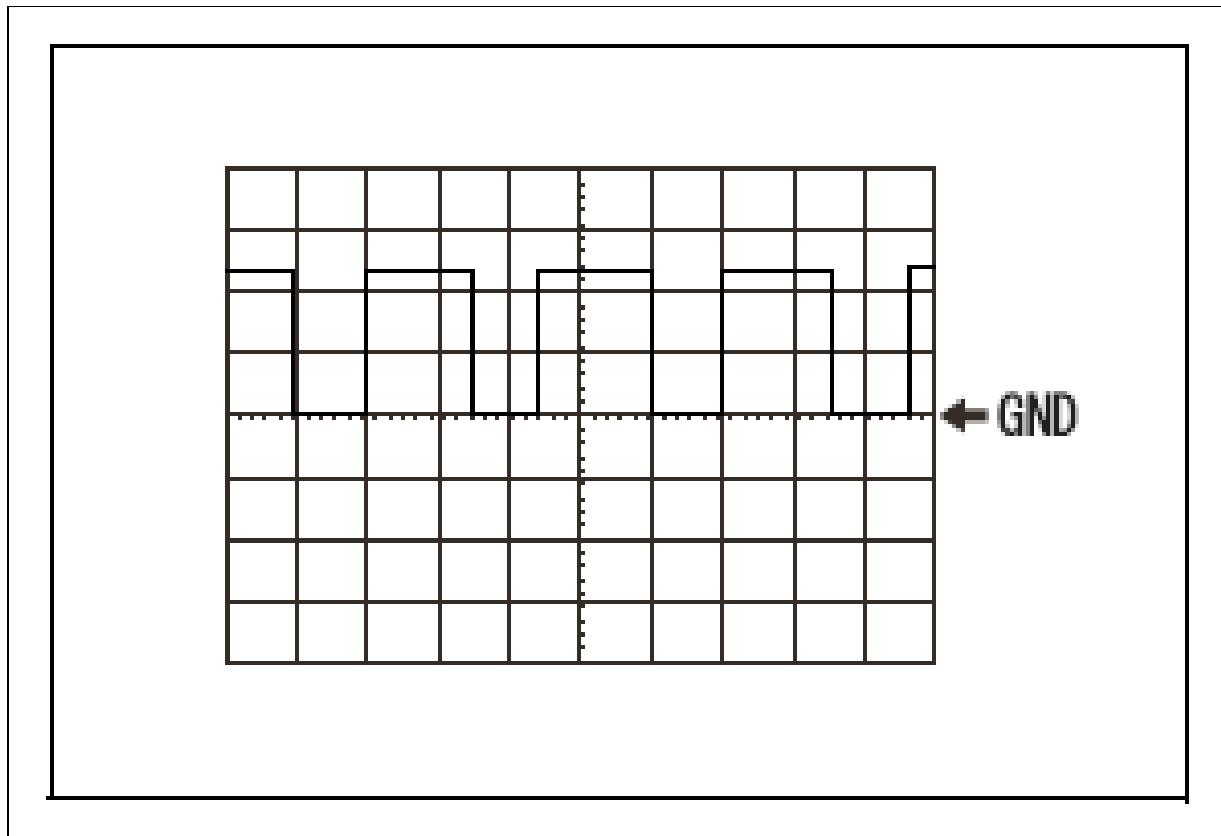


Courtesy of SUBARU OF AMERICA, INC.

#### 8. Waveform 8

Item	Contents
Measuring terminal	TACH ← →E01
Equipment setting	5 V/div, 10 ms/div
Condition	Hold at engine speed of 1500 r/min.

Fig 9: Waveform 9

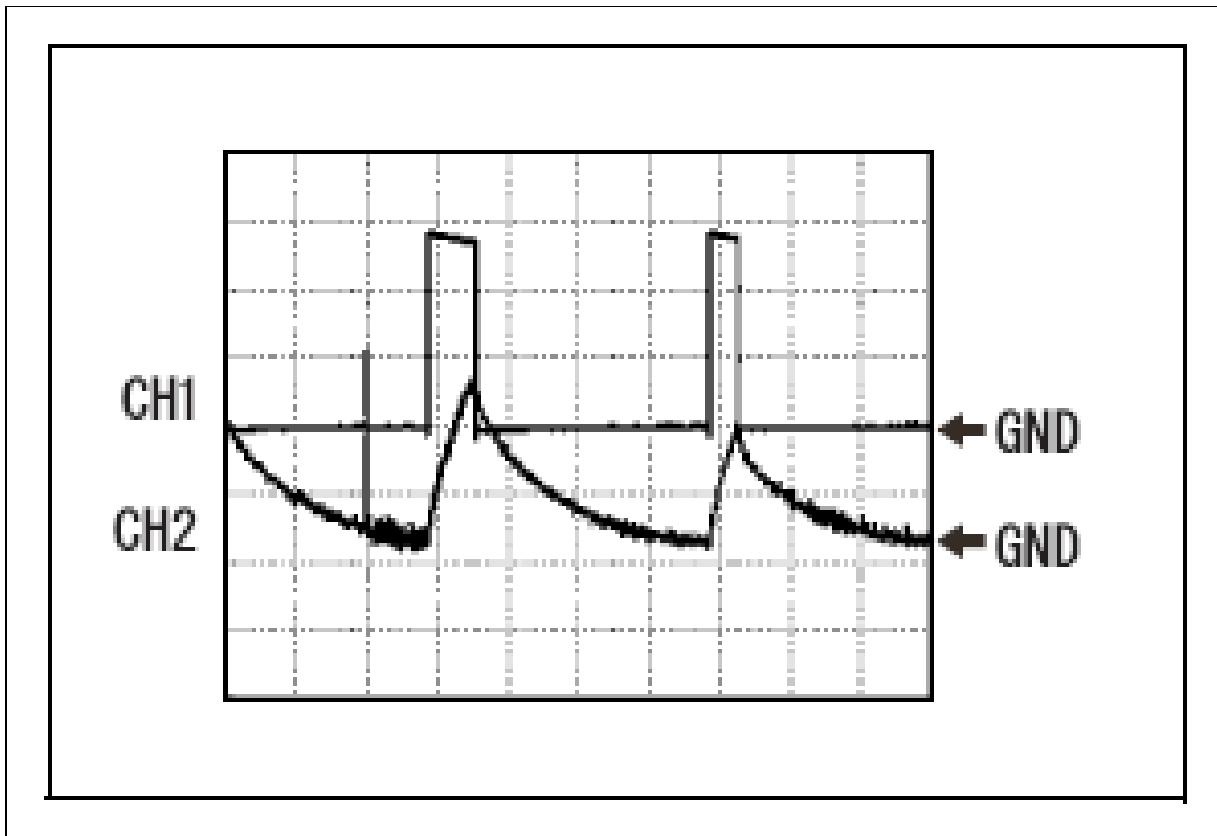


Courtesy of SUBARU OF AMERICA, INC.

### 9. Waveform 9

Item	Contents
Measuring terminal	FPC ← →E01
Equipment setting	5 V/div, 5 ms/div
Condition	IG ON

Fig 10: Waveform 10

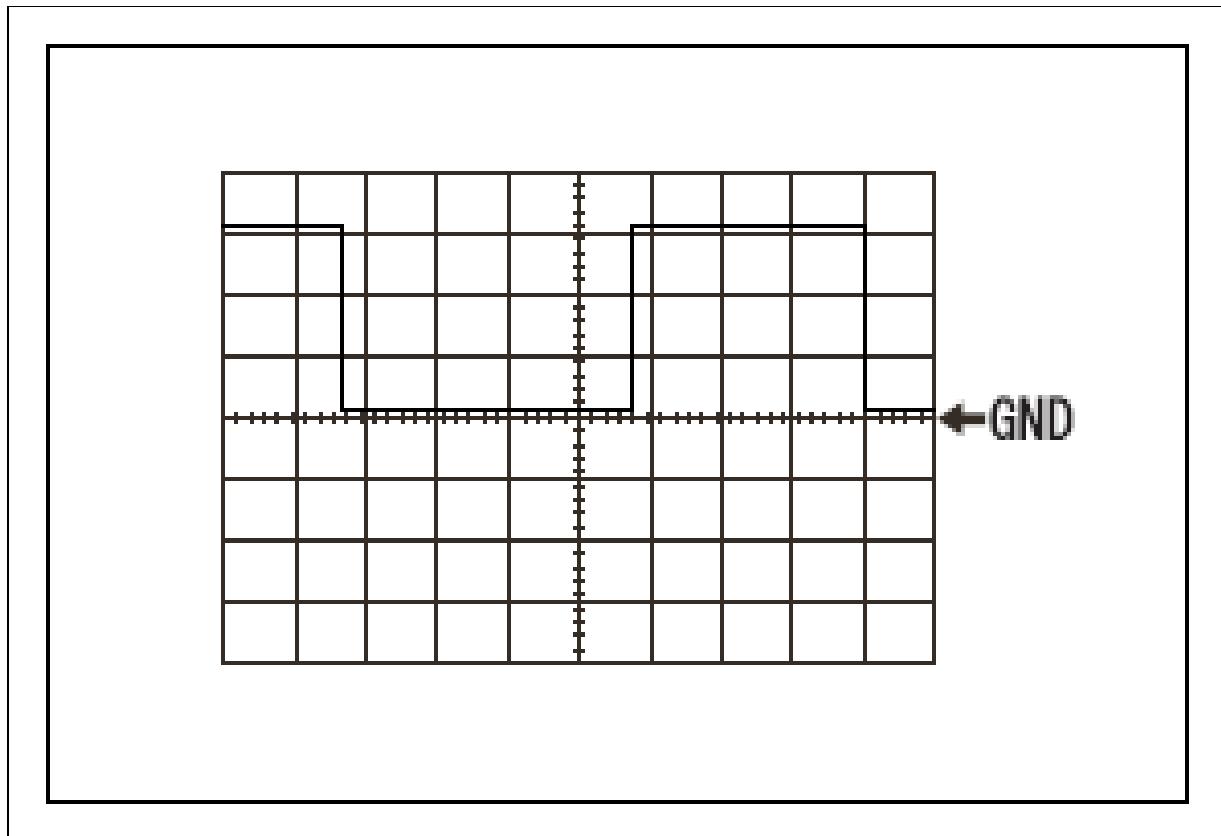


Courtesy of SUBARU OF AMERICA, INC.

#### 10. Waveform 10

Item	Contents
Measuring terminal	CH1: M+ ← → E01 CH2: M- ← →E01
Equipment setting	CH1: 5 V/div, 500 µs/div CH2: 200 mV/div, 500 µs/div
Condition	After warm-up, during idling

Fig 11: Waveform 11

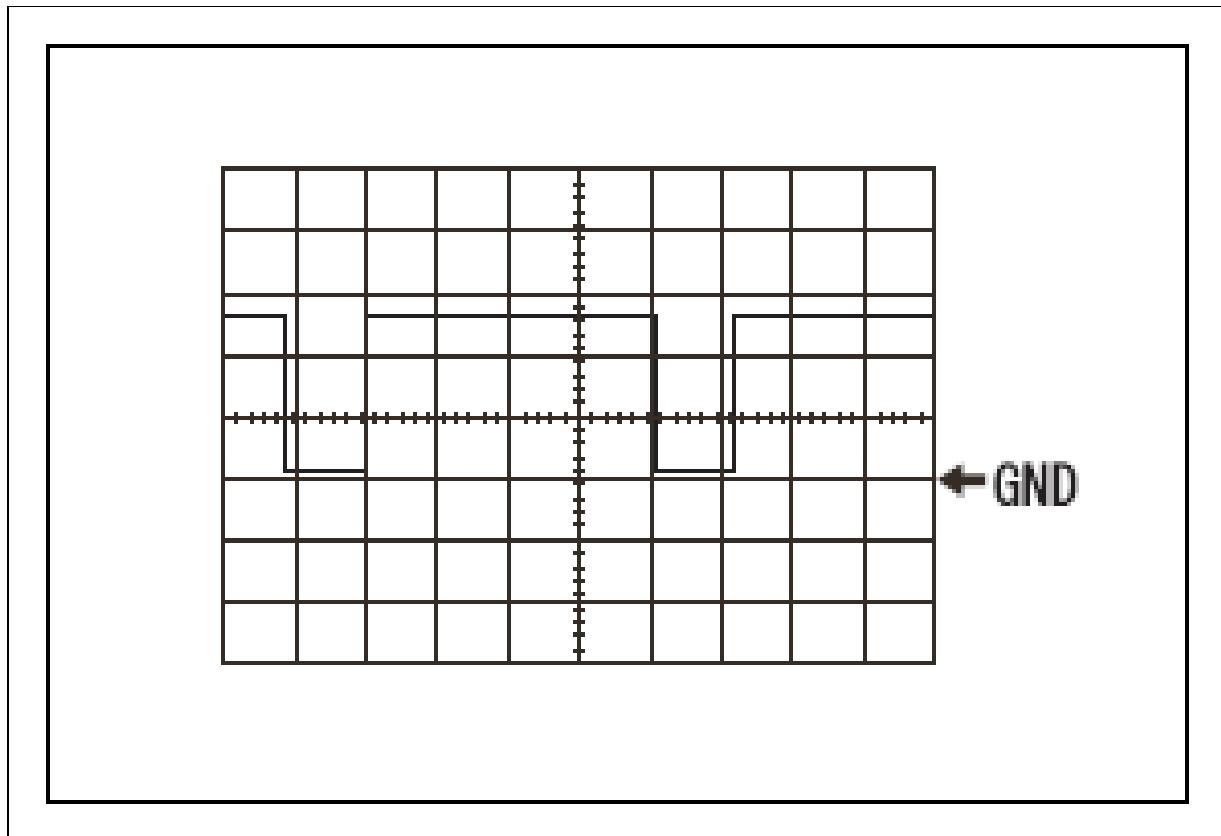


Courtesy of SUBARU OF AMERICA, INC.

### 11. Waveform 11

Item	Contents
Measuring terminal	OC1 $\leftarrow \rightarrow$ E01 OC2 $\leftarrow \rightarrow$ E01 OE1 $\leftarrow \rightarrow$ E01 OE2 $\leftarrow \rightarrow$ E01
Equipment setting	5 V/div, 1 ms/div
Condition	After warm-up, during idling

Fig 12: Waveform 12

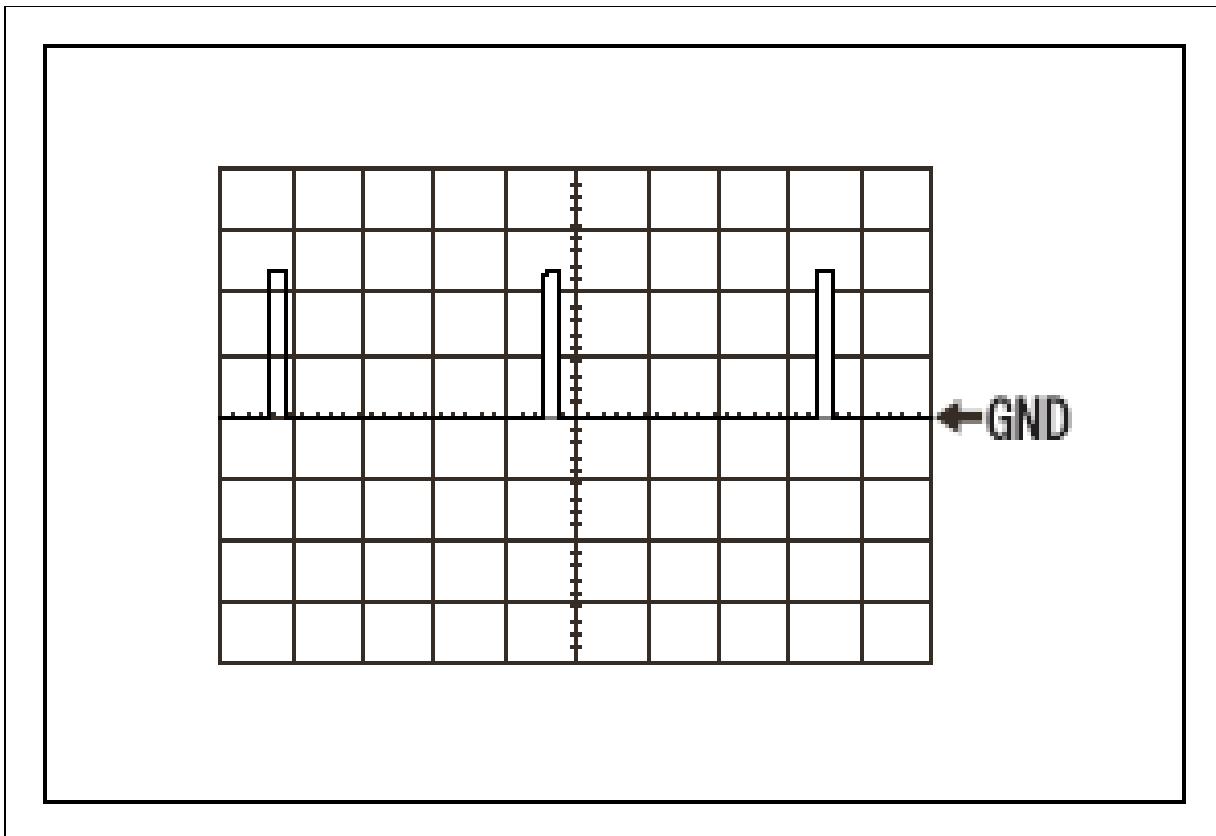


Courtesy of SUBARU OF AMERICA, INC.

### 12. Waveform 12

Item	Contents
Measuring terminal	HT1B ← →E01
Equipment setting	5 V/div, 50 ms/div
Condition	While engine is idling before warming up the oxygen sensor

Fig 13: Waveform 13

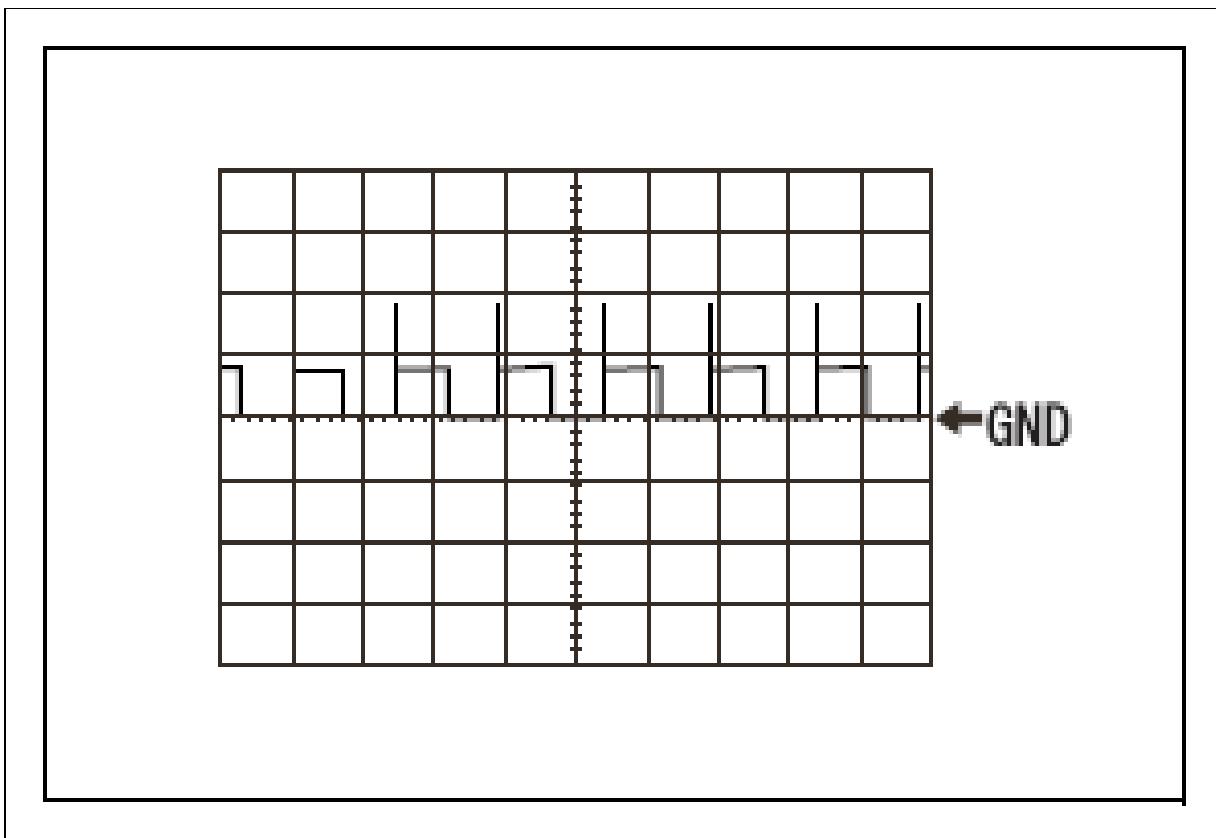


Courtesy of SUBARU OF AMERICA, INC.

### 13. Waveform 13

Item	Contents
Measuring terminal	IGT1 ↔ E01 IGT2 ↔ E01 IGT3 ↔ E01 IGT4 ↔ E01
Equipment setting	2 V/div, 20 ms/div
Condition	After warm-up, during idling

Fig 14: Waveform 14

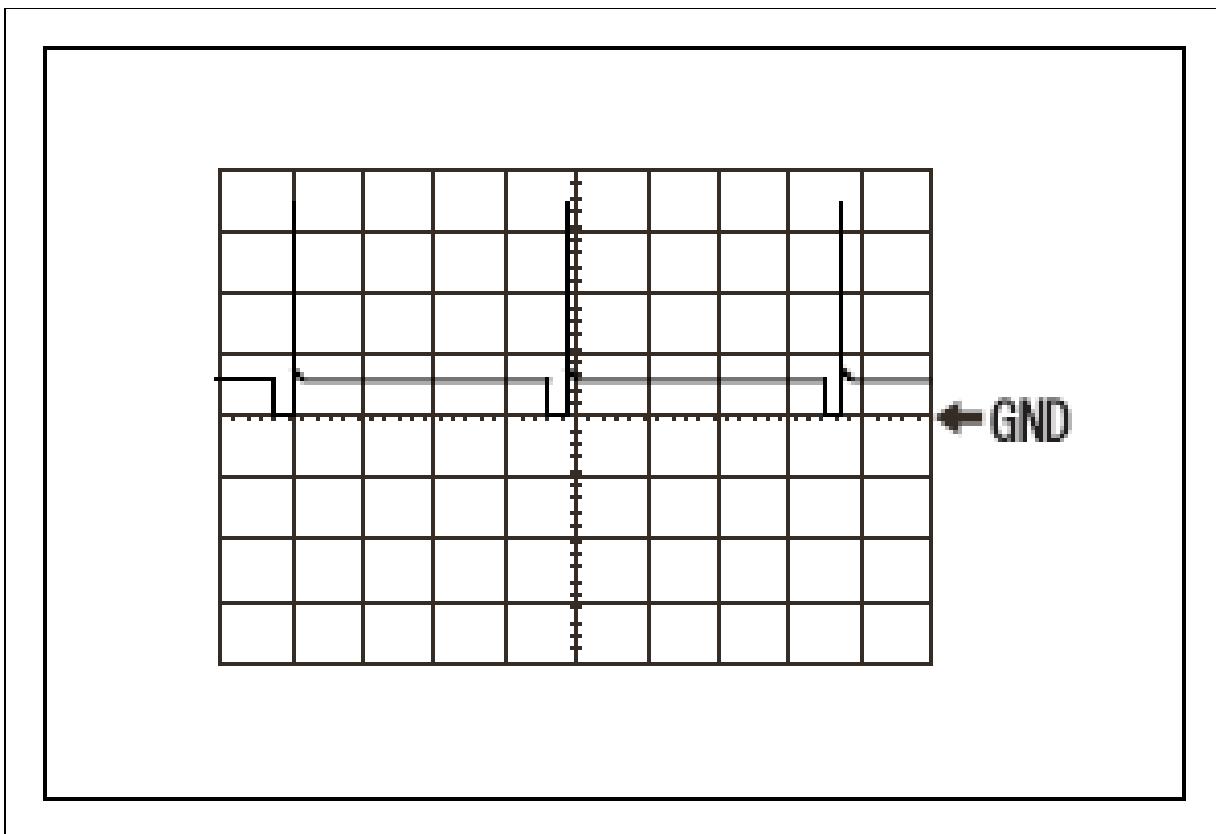


Courtesy of SUBARU OF AMERICA, INC.

#### 14. Waveform 14

Item	Contents
Measuring terminal	PRG ← →E01
Equipment setting	10 V/div, 2 s/div
Condition	After warming up, while engine idling, during purge control, or IG ON

Fig 15: Waveform 15



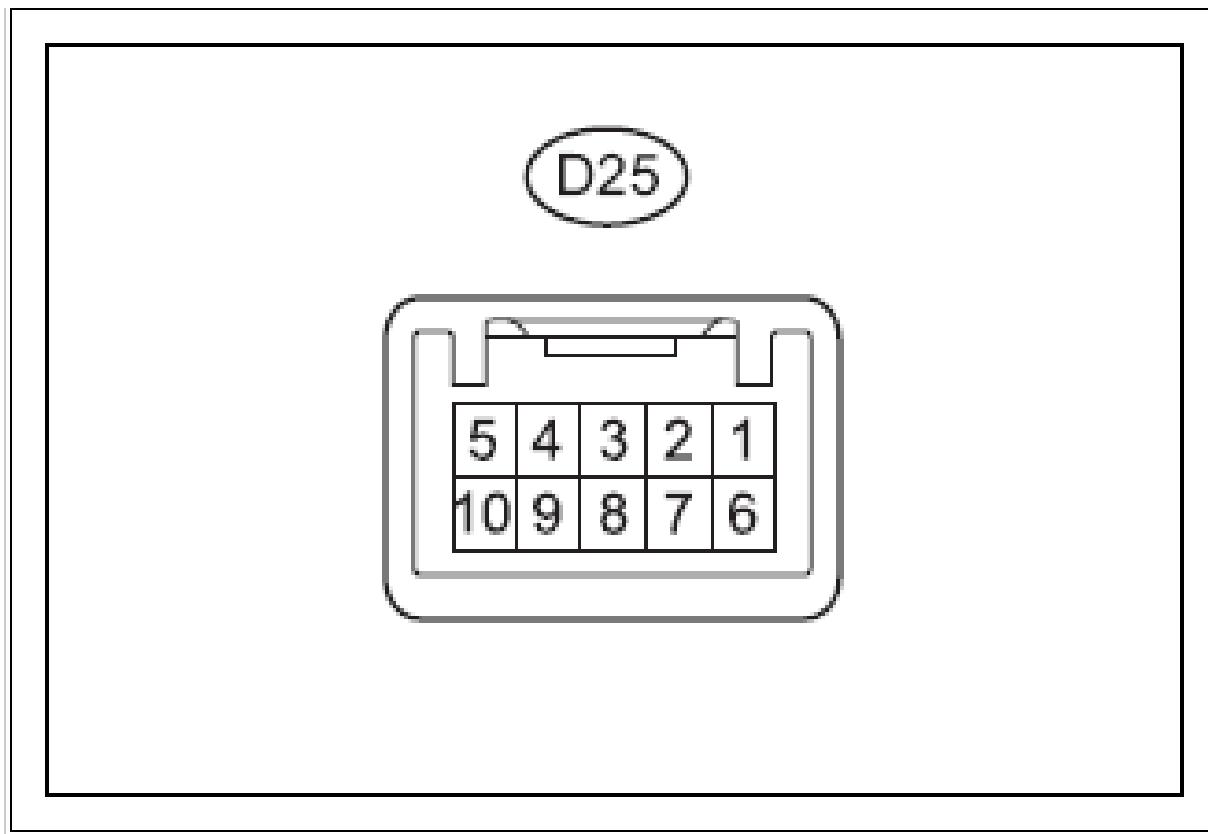
Courtesy of SUBARU OF AMERICA, INC.

### 15. Waveform 15

Item	Contents
Measuring terminal	#10 ← → E01 #20 ← → E01 #30 ← → E01 #40 ← → E01
Equipment setting	20 V/div, 20 ms/div
Condition	After warm-up, during idling

## ECM Terminal Arrangement [ Engine Immobilizer System (With Entry & Start System) ]

1. Check the engine switch.
  1. Measure the resistance and voltage based on the following table.



Courtesy of SUBARU OF AMERICA, INC.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item/DTC
D25-6 (AGND) - Chassis ground	-	Transponder key amplifier GND-output short	Always	1Ω or less	-
D25-7 (TXCT) - D25-6 (AGND)	Input	Clock signal	When IG OFF, and the brake pedal <sup>(1)</sup> or clutch pedal <sup>(2)</sup> is depressed, and after 30 seconds or more have passed after the driver opens and closes the door.	1 V or less	-
D25-8 (CODE) - D25-6 (AGND)	Input/output	Dual directional data communication	When IG OFF, and the brake pedal <sup>(1)</sup> or clutch pedal <sup>(2)</sup> is depressed, and after 30 seconds or more have passed after the driver opens and closes the door.	1 V or less	-
D25-10 (VC5) -	Input	Transponder key amplifier power supply	When IG OFF, and the brake pedal <sup>(1)</sup> or clutch pedal <sup>(2)</sup> is depressed, and after 30 seconds	1 V or less	-

D25-6 (AGND)			or more have passed after the driver opens and closes the door.	
(1) With automatic transmission				
(2) With manual transmission				

2. Confirm the pulse based on the following table.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item/DTC
D25-7 (TXCT) - D25-6 (AGND)	Input	Clock signal	IG is turned OFF, the key is brought outside the vehicle, and within 30 seconds after the engine switch is pushed.	Pulse generation (Refer to waveform 1, see Fig 16)	1. BCC fault 2. Abnormal condition 3. Different encryption code 4. Different serial code
D25-8 (CODE) - D25-6 (AGND)	Output	Dual directional data communication	IG is turned to OFF, the key is held above the engine switch, and the engine switch is pushed*.	Pulse generation (Refer to waveform 2, see Fig 17)	<b>NOTE:</b> If the immobilizer key code collation communication is not operated correctly, the fault may be displayed in one or several items listed in the [Data monitor] described above.
D25-10 (VC5) - D25-6 (AGND)	Input	Transponder key amplifier power supply	IG is turned OFF, the key is brought outside the vehicle, and within 30 seconds after the engine switch is pushed.	Pulse generation (Refer to waveform 3, see Fig 18)	

**NOTE:** \*: Before performing this inspection, remove the transmitter battery.

3. Inspect using an oscilloscope.

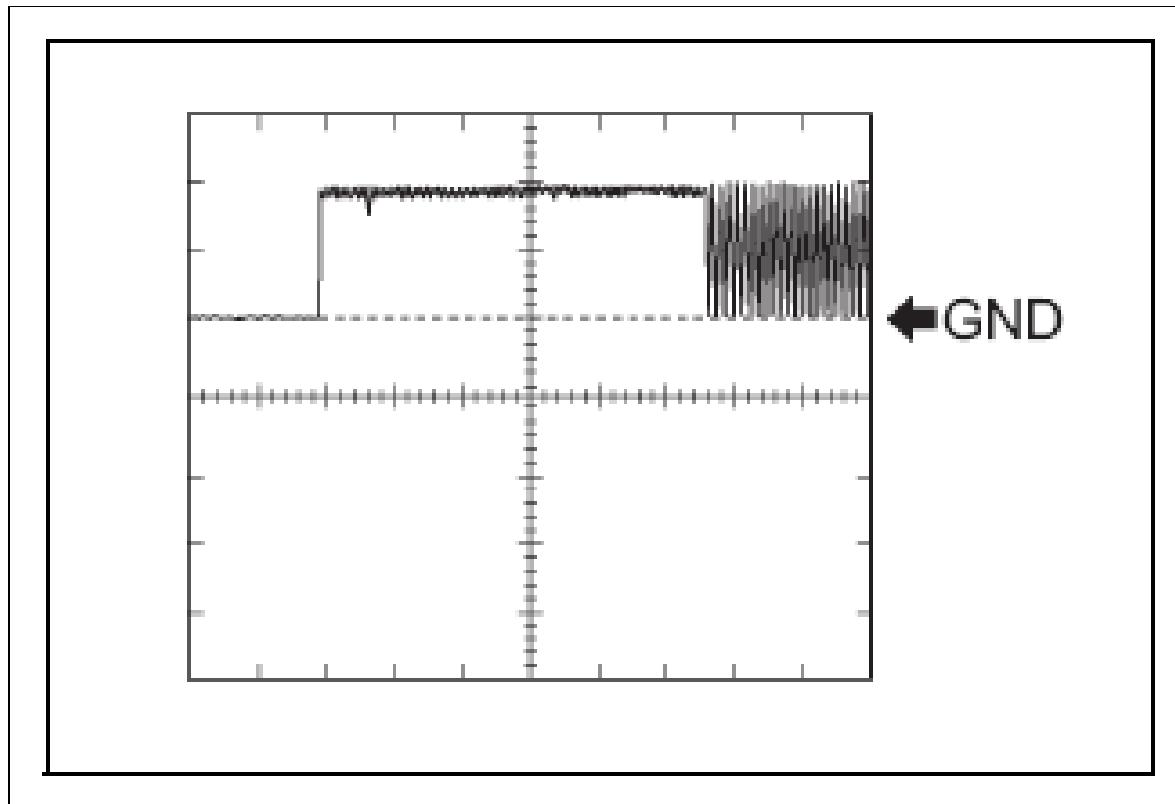
**CAUTION:** The waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

a. Waveform 1 (reference)

**PART DESCRIPTION - MEASURING CONDITIONS**

Item	Contents
Tester connection	D25-7 (TXCT) - D25-6 (AGND)
Tool setting	2V/DIV., 200ms./DIV.
Conditions	IG is turned OFF, the key is brought outside the vehicle, and within 30 seconds after the engine switch is pushed.

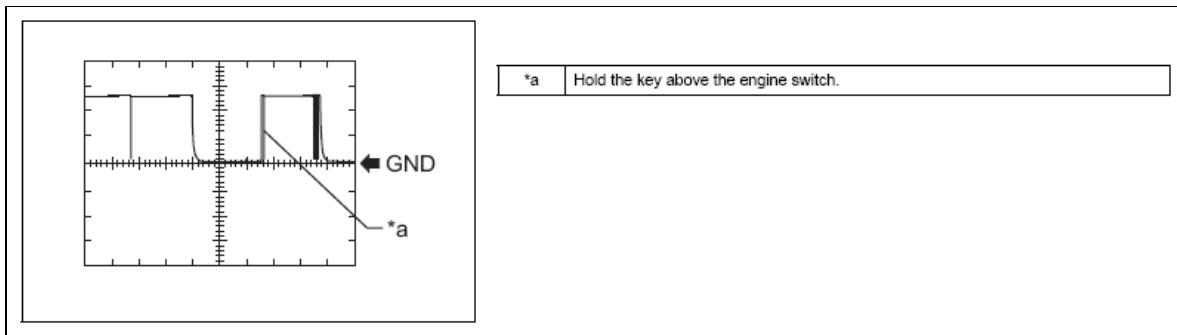
Fig 16: Waveform 1



Courtesy of SUBARU OF AMERICA, INC.

b. Waveform 2 (reference)

Fig 17: Waveform 2



Courtesy of SUBARU OF AMERICA, INC.

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D25-8 (CODE) - D25-6 (AGND)
Tool setting	2V/DIV., 200ms./DIV.
Conditions	IG is turned to OFF, the key is held above the engine switch, and the engine switch is pushed*.

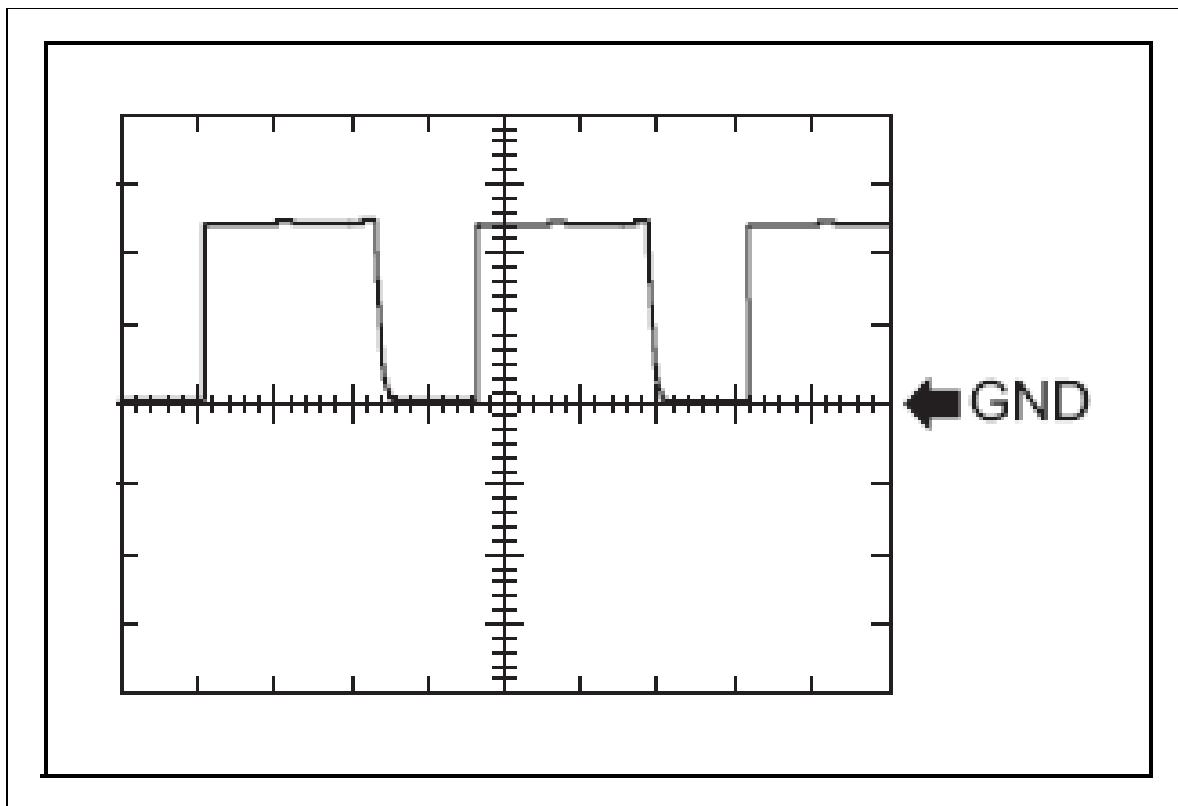
**NOTE:** \*: Before performing this inspection, remove the transmitter battery.

#### c. Waveform 3 (reference)

#### PART DESCRIPTION - MEASURING CONDITIONS

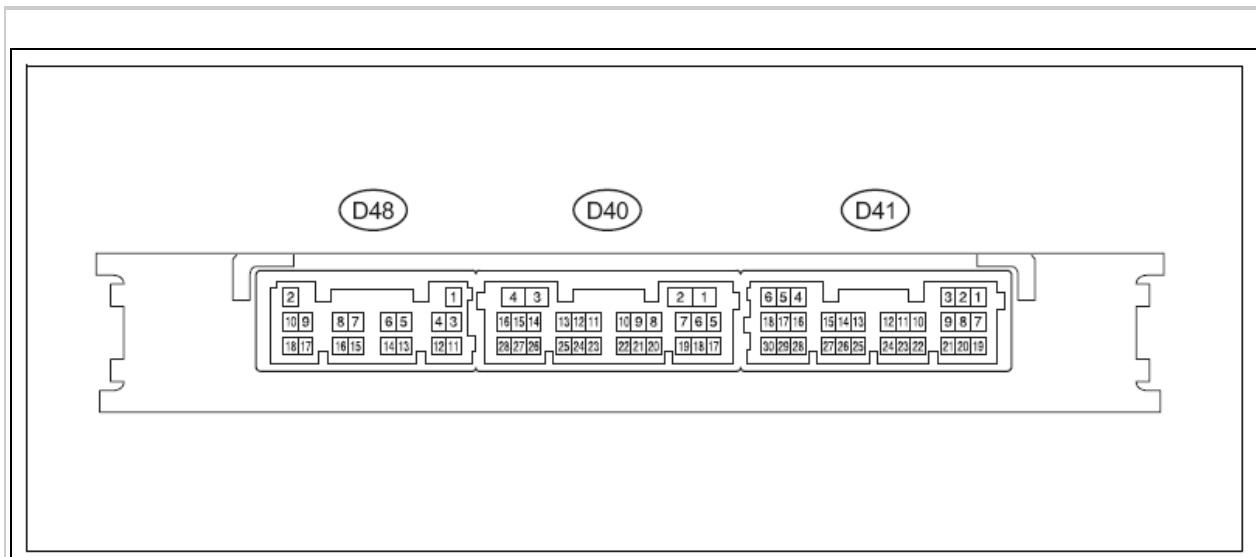
Item	Contents
Tester connection	D25-10 (VC5) - D25-6 (AGND)
Tool setting	2V/DIV., 200ms./DIV.
Conditions	IG is turned OFF, the key is brought outside the vehicle, and within 30 seconds after the engine switch is pushed.

Fig 18: Waveform 3



Courtesy of SUBARU OF AMERICA, INC.

2. Check the collation ECM (smart key ECM ASSY).



Courtesy of SUBARU OF AMERICA, INC.

1. Disconnect the D48 collation ECM (smart key ECM ASSY) connector.
2. Measure the resistance and voltage based on the following table.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item/DTC
D48-2 (+B) - D48- 11 (GND)	Input	+B power supply	Always	11 to 14 V	-
D48-11 (GND) - Chassis ground	-	Ground	Always	1 Ω or less	-

3. Reconnect the D48 connector of the collation ECM (smart key ECM ASSY).

4. Measure the resistance and voltage based on the following table.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item/DTC
D41-5 (IG2) - D48-11 (GND)	Input	Engine switch power supply	Engine switch OFF →ON (IG)	1V or less →11 to 14V	[Ignition]
D41-9 (TXCT) - D41-24 (AGND)	Output	Clock signal	When IG OFF, and the brake pedal <sup>(1)</sup> or clutch pedal <sup>(2)</sup> is depressed, and after 30 seconds or more have passed after the driver opens and closes the door.	1 V or less	
D41-7 (CODE) - D41-24 (AGND)	Input	Signal input from transponder key amplifier power	When IG OFF, and the brake pedal <sup>(1)</sup> or clutch pedal <sup>(2)</sup> is depressed, and after 30 seconds or more have passed after the driver opens and closes the door.	1 V or less	1. BCC fault 2. Abnormal condition 3. Different encryption code 4. Different serial code
D41-1 (VC5) - D41-24 (AGND)	Output	Transponder key amplifier power supply	When IG OFF, and the brake pedal <sup>(1)</sup> or clutch pedal <sup>(2)</sup> is depressed, and after 30 seconds or more have passed after the driver opens and closes the door.	1 V or less	
D41-24 (AGND) - chassis ground	-	Transponder key amplifier GND- out-put short	Always	1Ω or less	
D48-13 (EFIO) - D48-11 (GND) <sup>(3)</sup>	Input/output	EFI communication signal (from collation ECM	IG ON	11 to 14V	1. B1571 2. B1572 3. Engine start

	(smart key ECM ASSY) to ECM)		request 4. EFI code reception
(1)	With automatic transmission		
(2)	With manual transmission		
(3)	Without ID code box		

5. Confirm the pulse based on the following table.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item/DTC
D41-9 (TXCT) - D41-24 (AGND)	Output	Clock signal	IG is turned OFF, the key is brought outside the vehicle, and within 30 seconds after the engine switch is pushed.	Pulse generation (Refer to waveform 1, see Fig 19)	
D41-7 (CODE) - D41-24 (AGND)	Input	Signal input from transponder key amplifier power	IG is turned to OFF, the key is held above the engine switch, and the engine switch is pushed <sup>(1)</sup> .	Pulse generation (Refer to waveform 2, see Fig 20)	1. BCC fault 2. Abnormal condition 3. Different encryption code 4. Different serial code
D41-1 (VC5) - D41-24 (AGND)	Output	Transponder key amplifier power supply	IG is turned OFF, the key is brought outside the vehicle, and within 30 seconds after the engine switch is pushed.	Pulse generation (Refer to waveform 3, see Fig 21)	
D48-13 (EFIO) - D48-11 (GND) <sup>(2)</sup>	Input/output	EFI communication signal (from collation ECM (smart key ECM ASSY) to ECM)	Engine switch OFF →ON (IG)	Pulse generation (Refer to waveform 4, see Fig 22)	1. B1571 2. B1572 3. Engine start request 4. EFI code reception

(1) Before performing this inspection, remove the transmitter battery.

(2) Without ID code box

6. Inspect using an oscilloscope.

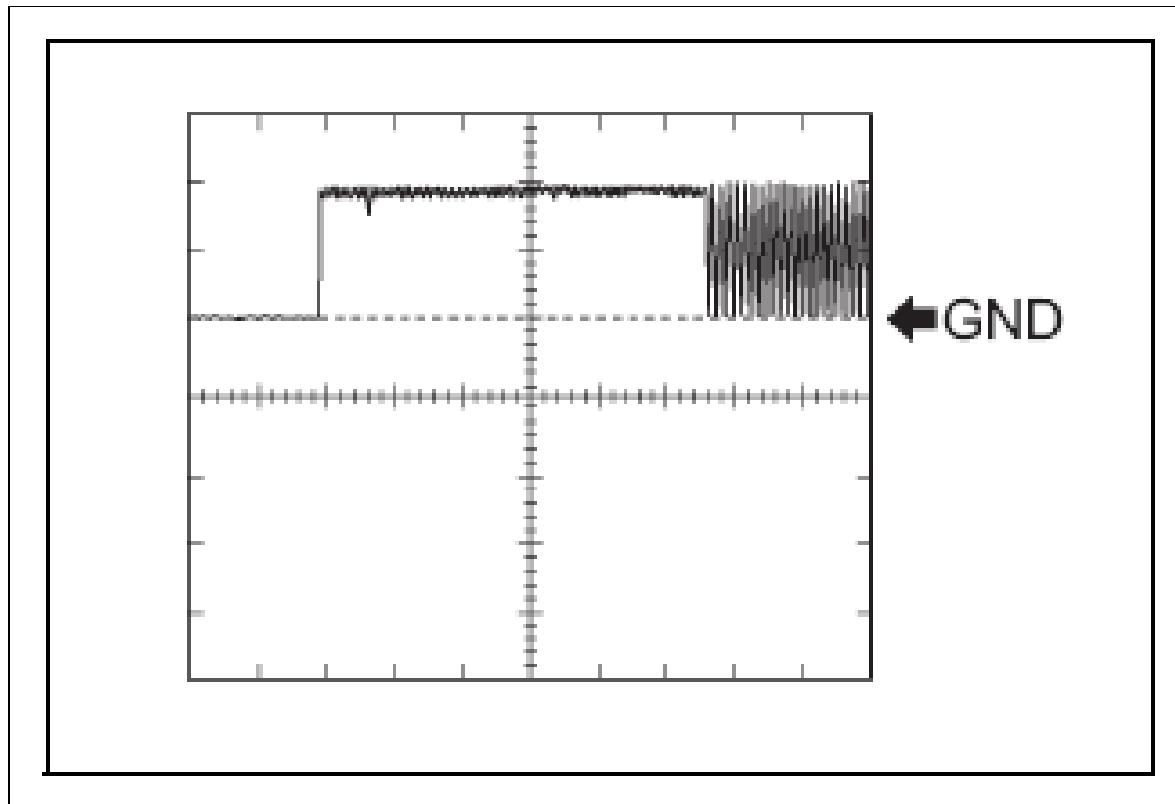
**CAUTION:** The waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

a. Waveform 1 (reference)

**PART DESCRIPTION - MEASURING CONDITIONS**

Item	Contents
Tester connection	D41-9 (TXCT) - D41-24 (AGND)
Tool setting	2V/DIV., 200ms./DIV.
Conditions	IG is turned OFF, the key is brought outside the vehicle, and within 30 seconds after the engine switch is pushed.

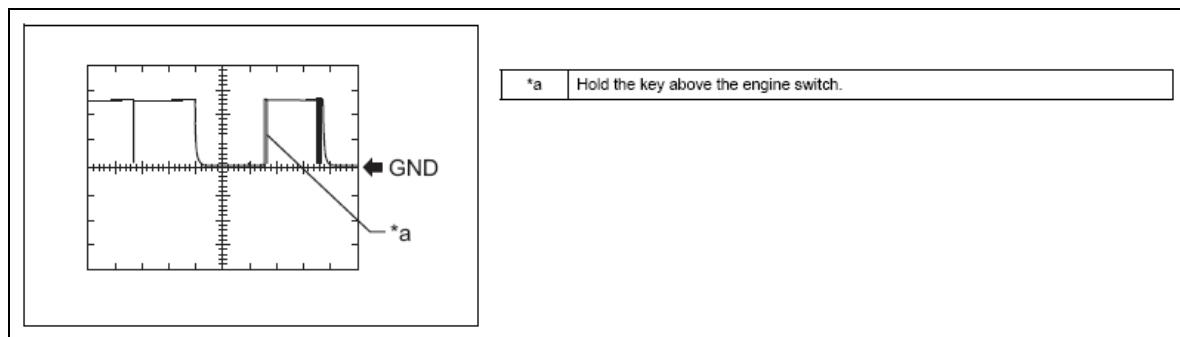
Fig 19: Waveform 1



Courtesy of SUBARU OF AMERICA, INC.

b. Waveform 2 (reference)

Fig 20: Waveform 2



Courtesy of SUBARU OF AMERICA, INC.

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D41-7 (CODE) - D41-24 (AGND)
Tool setting	2V/DIV., 200ms./DIV.
Conditions	IG is turned to OFF, the key is held above the engine switch, and the engine switch is pushed*.

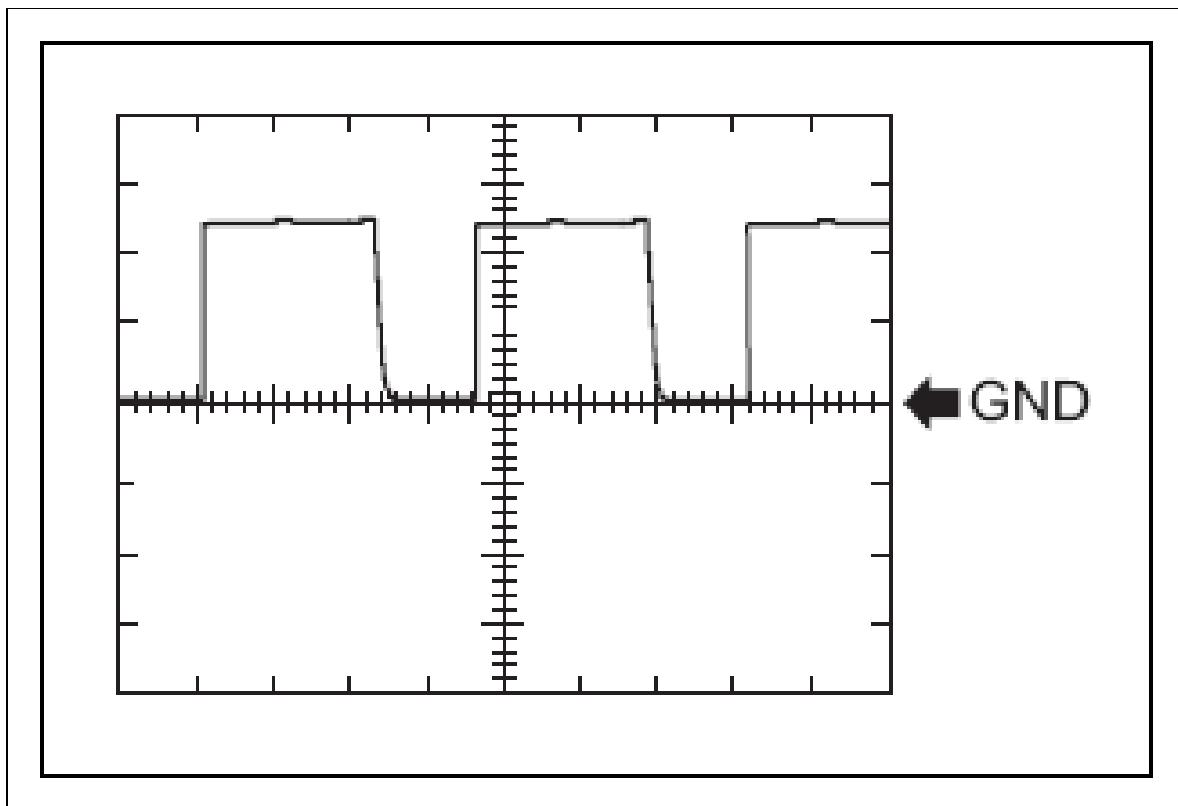
**NOTE:** \*: Before performing this inspection, remove the transmitter battery.

#### c. Waveform 3 (reference)

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D41-1 (VC5) - D41-24 (AGND)
Tool setting	2V/DIV., 200ms./DIV.
Conditions	IG is turned OFF, the key is brought outside the vehicle, and within 30 seconds after the engine switch is pushed.

Fig 21: Waveform 3



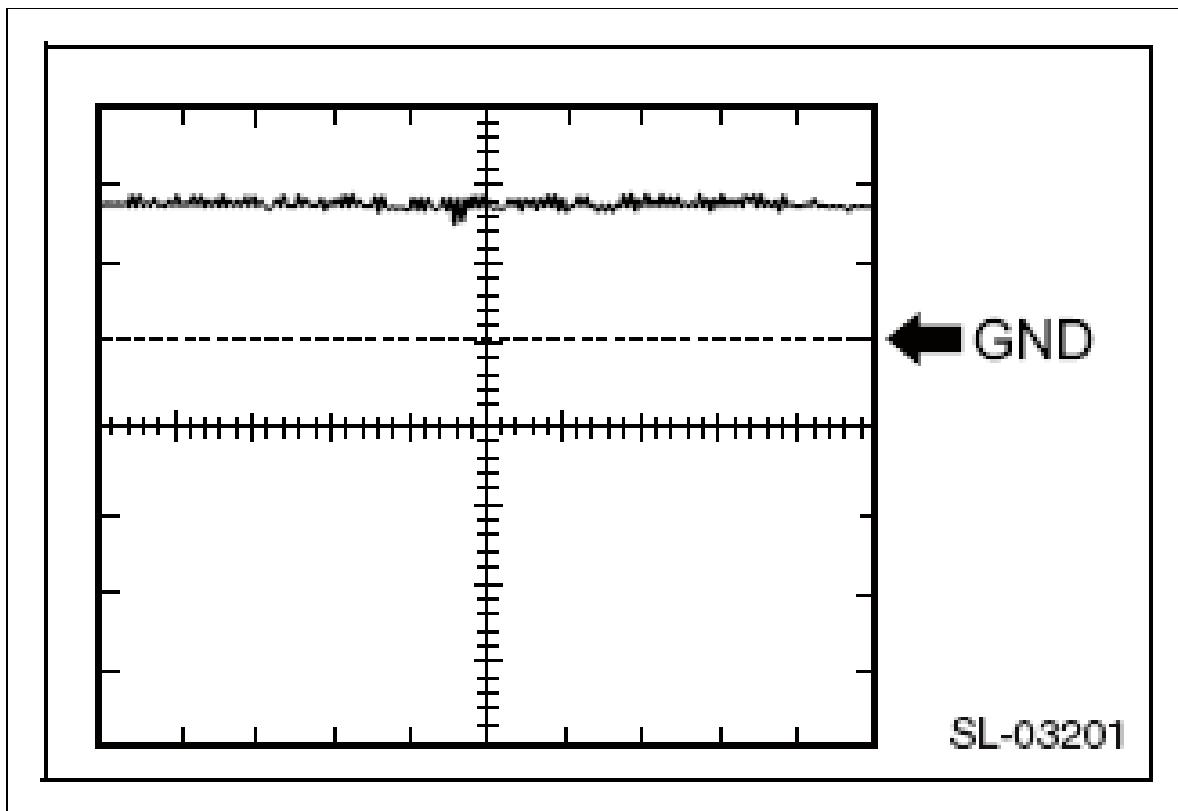
Courtesy of SUBARU OF AMERICA, INC.

d. Waveform 4 (reference)

**PART DESCRIPTION - MEASURING CONDITIONS**

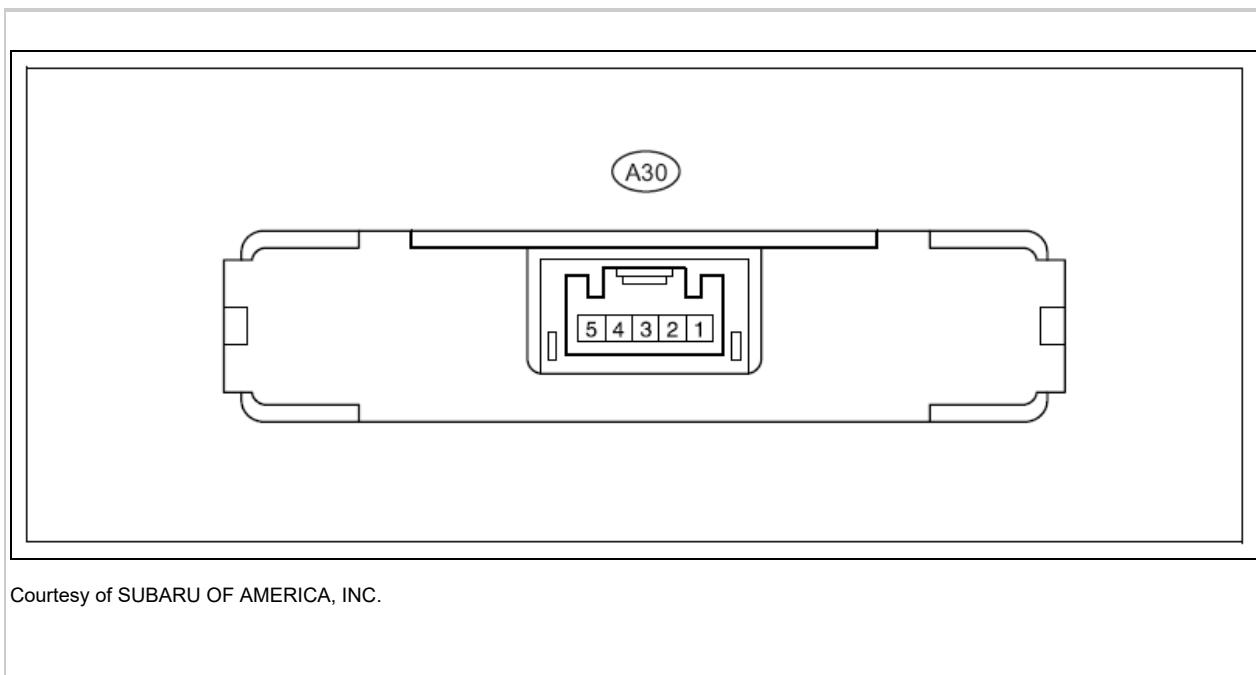
Item	Contents
Tester connection	D48-13 (EFIO) - D48-11 (GND)
Tool setting	5 V/DIV., 100 ms./DIV.
Conditions	Within 3 seconds after engine start, or within 3 seconds from engine switch ON (IG) after battery cable disconnection and reconnection

Fig 22: Waveform 4



Courtesy of SUBARU OF AMERICA, INC.

3. Confirm the ID code box (immobilizer code ECM) (with ID code box).



Courtesy of SUBARU OF AMERICA, INC.

1. Disconnect the connector A30 of the ID code box (immobilizer code ECM).
2. Measure the resistance and voltage based on the following table.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item/DTC
A30-1 (+B) - A30- 5 (GND)	Input	+B power supply	Always	11 to 14V	-
A30-5 (GND) - Chassis ground	-	Ground	Always	1Ω or less	-

If the specified result is not obtained, there may be the defect in the wire harness side.

3. Reconnect the connector A30 of the ID code box (immobilizer code ECM).

4. Refer to the table below and measure the voltage and check for a pulse.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item/DTC
A30-4 (IMO1) - A30-5 (GND)	Input/output	EFI communication signal (from ID code box (immobilizer code ECM) to ECM)	IG OFF	11 to 14V	1. B1571 2. B1572 3. Engine start request 4. EFI code reception
		EFI communication signal (from ID code box (immobilizer code ECM) to ECM)	IG OFF → IG ON	Pulse generation (Refer to waveform 1, see Fig 23)	

5. Inspect using an oscilloscope.

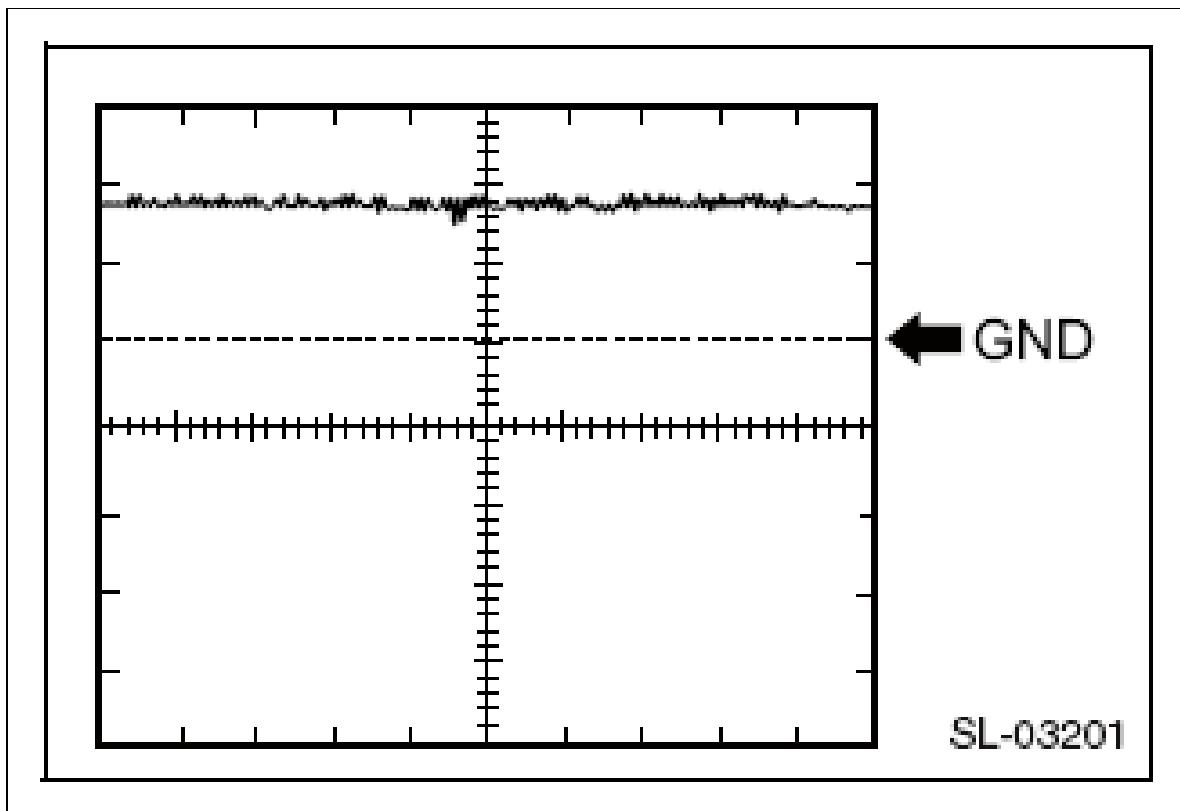
**CAUTION:** The waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

a. Waveform 1 (reference)

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	A30-4 (IMO1) - A30-5 (GND)
Tool setting	5 V/DIV., 100 ms./DIV.
Conditions	IG OFF →IG ON

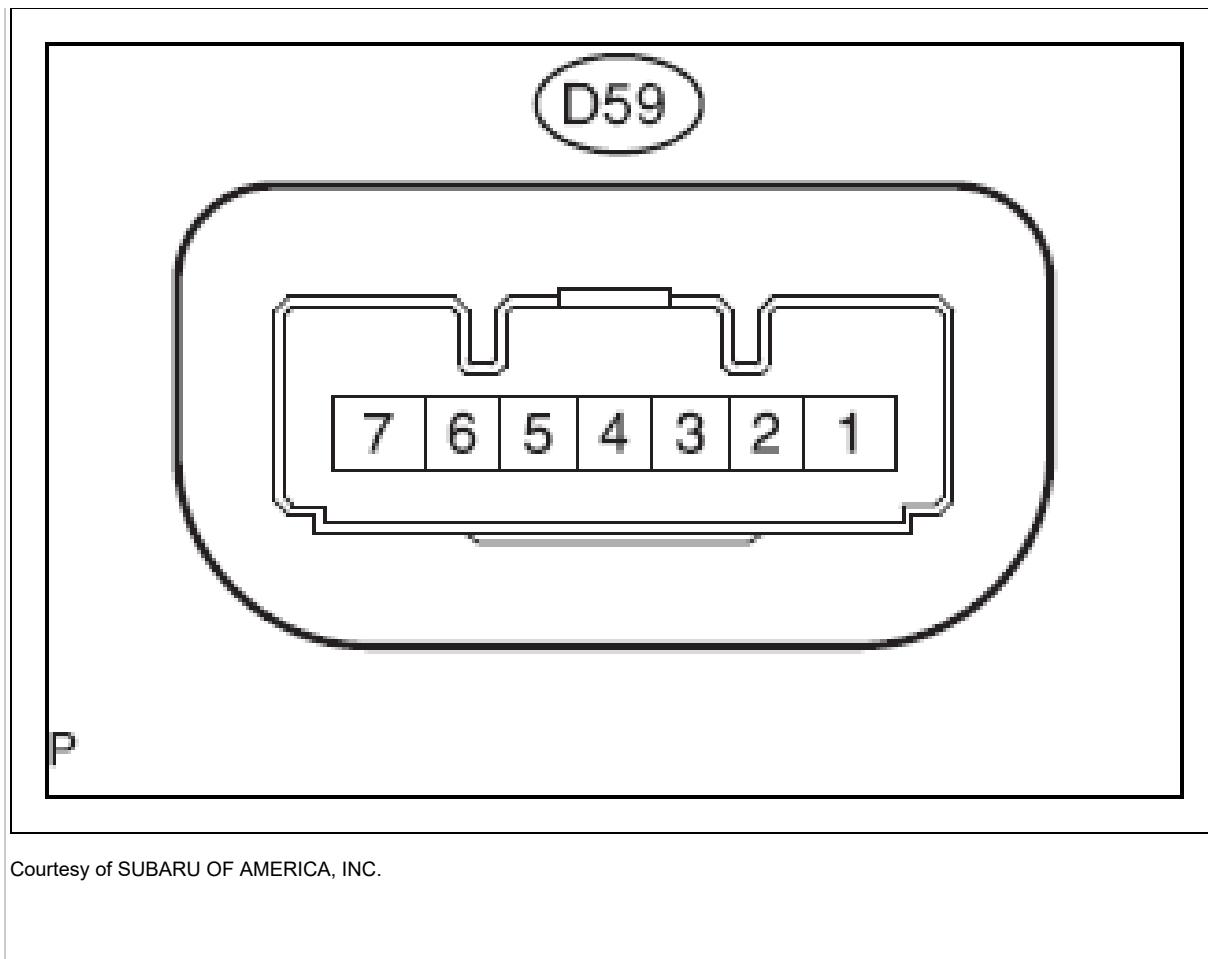
Fig 23: Waveform 1



Courtesy of SUBARU OF AMERICA, INC.

4. Confirm the steering lock actuator ASSY (steering lock ECM).

1. Refer to the table below and measure the resistance and the voltage and check for a pulse.



Courtesy of SUBARU OF AMERICA, INC.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item/DTC
D59-1 (GND) - Chassis ground	-	Ground	Always	1Ω or less	-
D59-3 (SLR+) - Chassis ground	Input	Motor drive command signal sent from the steering lock motor drive command signal (collation ECM (smart key ECM ASSY))	<p>After establishing the necessary conditions, the steering lock motor operates when any one of the doors opens.</p> <p>1. Shift lever positioned in P<sup>(1)</sup> or N<sup>(2)</sup></p> <p>2. The key is held in hand and engine switch is ON (IG), and steering lock is unlocked beforehand.</p>	<p>Pulse generation (Refer to waveform 1, see Fig 24)</p>	<p>1. Power supply short</p> <p>2. Unlock request reception</p> <p>3. Lock request reception</p>

			3. If the above conditions are met turn off the engine switch.		
D59-4 (SLR) - Chassis ground	Output	Steering lock bar position signal (output signal from steering unlock sensor)	Steering lock →unlock <sup>(3)</sup>	11 to 14 V →1.2 V or less	1. Push button start error 2. Sensor value
D59-6 (IGN1) - Chassis ground	Input	Power supply mode signal (IG2 power supply input for all steering lock actuator ASSY)	Engine switch OFF →ON (IG)	1V or less →11 to 14V	1. B2788 2. IG
D59-7 (B) - Chassis ground	Input	Power supply	Always	11 to 14V	B2788

(1) With automatic transmission

(2) With manual transmission

**NOTE:**

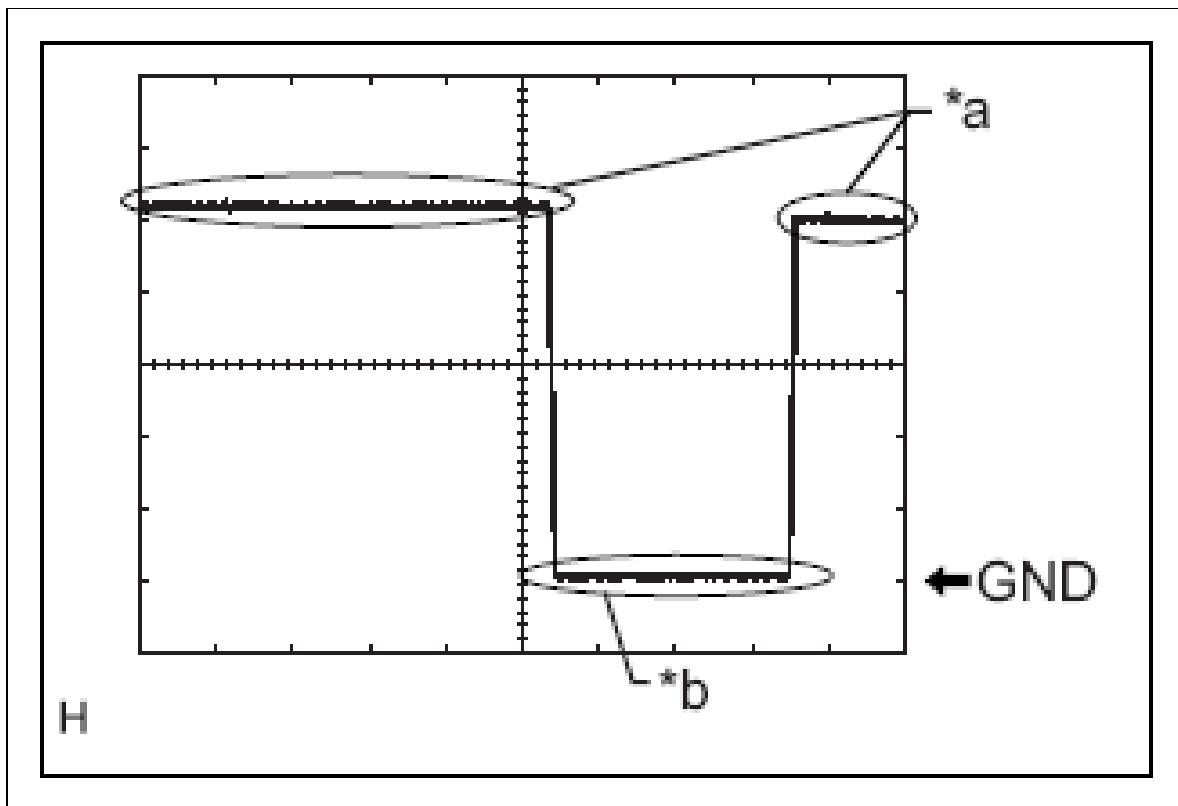
- With shift lever positioned in P (for automatic transmission), if any one of the doors opens, the steering is locked and IG is turned OFF. With ACC ON, the steering is unlocked.
- (3) 1.

2. Inspect using an oscilloscope.

**CAUTION:** The waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

a. Waveform 1 (reference)

Fig 24: Waveform 1



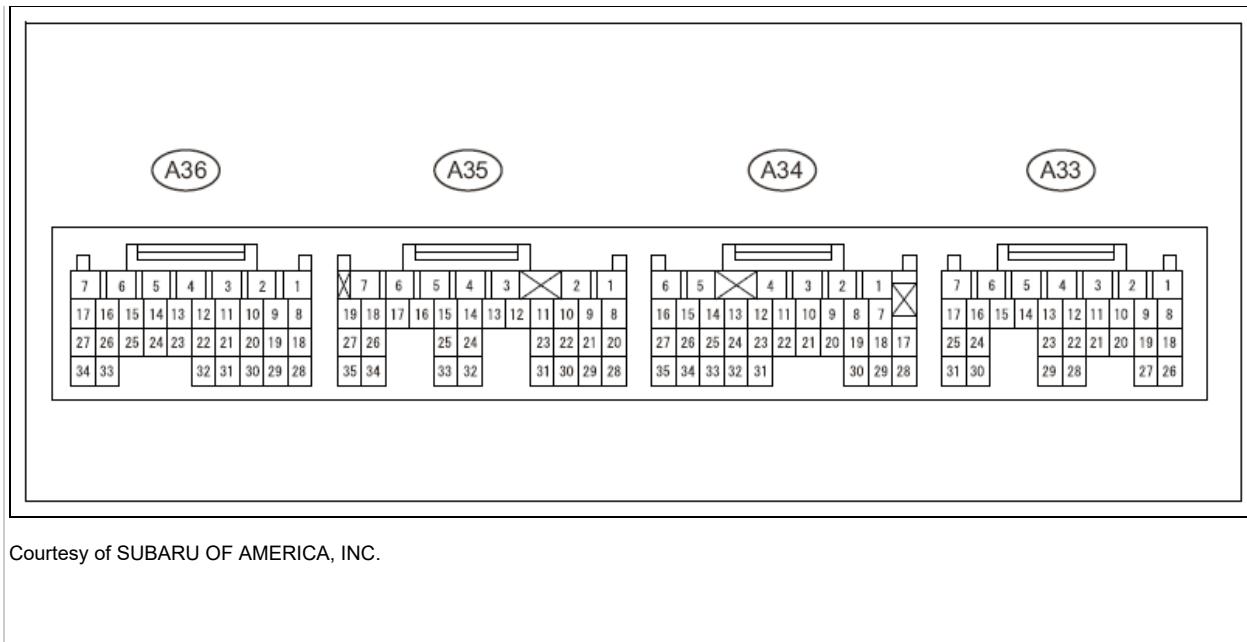
Courtesy of SUBARU OF AMERICA, INC.

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D59-3 (SLR+) - D59-1 (GND)
Tool setting	2V/DIV., 200ms./DIV.
Conditions	If both conditions are met, the steering motor operates and door opens: a. Shift lever positioned in P* b. The key is held in hand and engine switch is ON (IG), and steering lock is unlocked beforehand. c. If the above conditions are met turn off the engine switch.

\*1: With automatic transmission

#### 5. CHECK ECM



Courtesy of SUBARU OF AMERICA, INC.

- Refer to the table below and measure the resistance and the voltage and check for a pulse.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item/DTC
A36-4 (GNDEG1) - Chassis ground	-	Ground	Always	1Ω or less	-
A33-2 (BATT) - A36-4 (GNDEG1)	Input	+B power supply	Always	11 to 14 V	-
A33-1 (VBEC2) - A36-4 (GNDEG1)	Input	+B power supply	IG ON	11 to 14 V	-
A34-6 (VBEC1) - A36-4 (GNDEG1)	Input	+B power supply	IG ON	11 to 14 V	-
A35-25 (IMO1) - A36-4 (GNDEG1)	Input	ID code box (immo-bilizer code ECM) <sup>(1)</sup> or the collation ECM (smart key ECM ASSY) communication ID code box (immobilizer code ECM) communication input	IG OFF	11 to 14 V	-
			IG ON	Pulse generation (Refer to waveform 1, see Fig 25)	-

(1) With ID code box

If you cannot get the specified result, there could be a problem in the ECM.

2. Inspect using an oscilloscope.

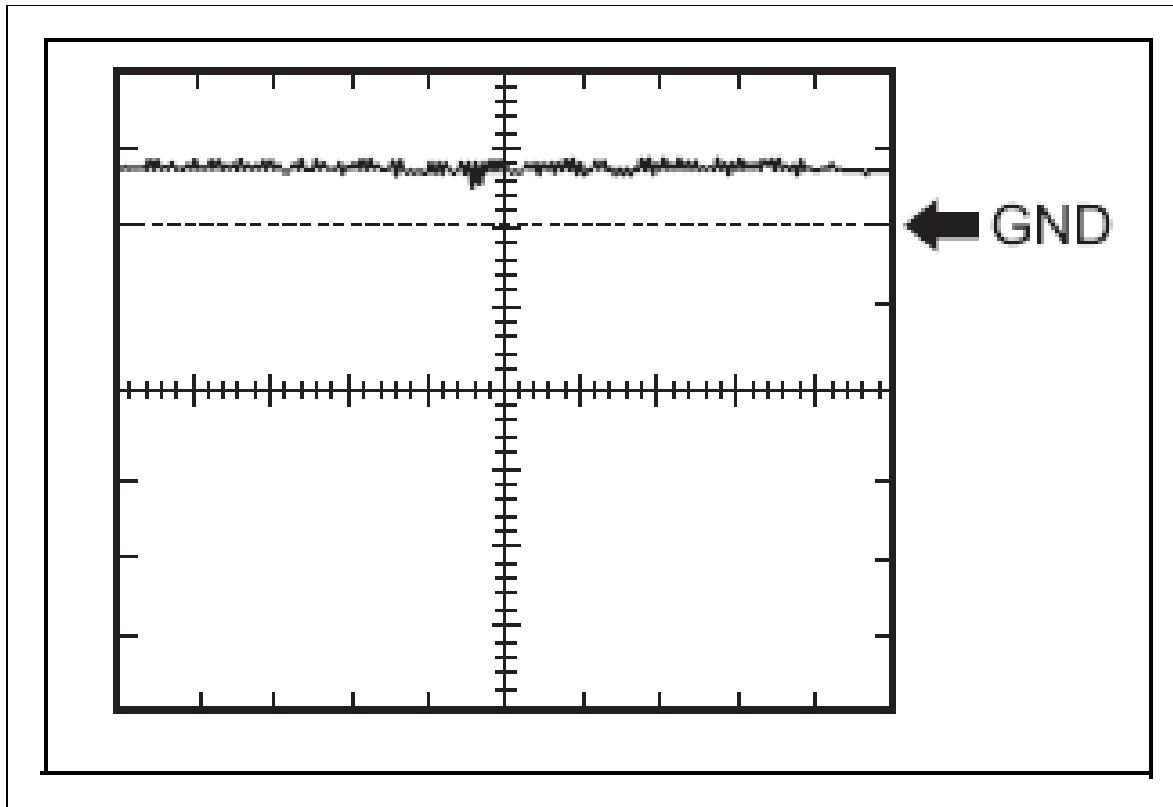
**CAUTION:** The waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

a. Waveform 1 (reference)

**PART DESCRIPTION - MEASURING CONDITIONS**

Item	Contents
Tester connection	A30-4 (IMO1) - A30-5 (GND)
Tool setting	2V/DIV., 500ms./DIV.
Conditions	IG OFF → IG ON

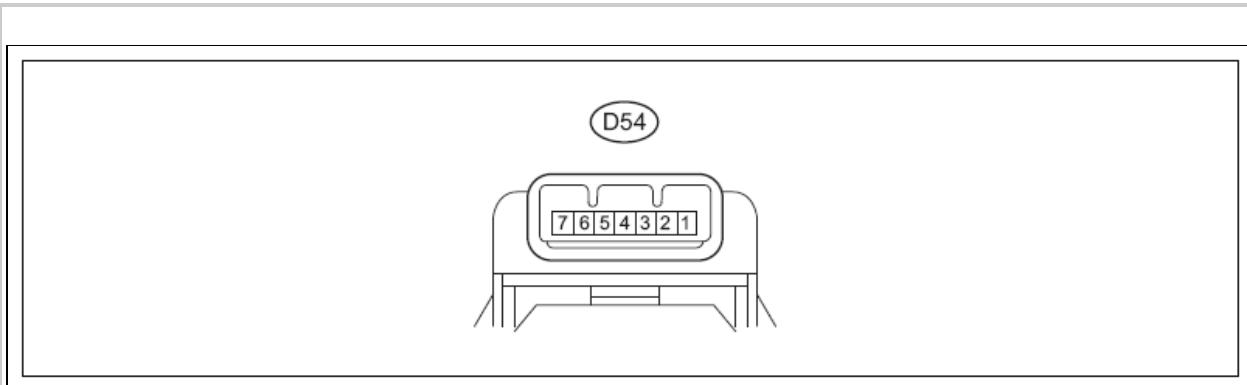
Fig 25: Waveform 1



Courtesy of SUBARU OF AMERICA, INC.

**ECM Terminal Arrangement [ Engine Immobilizer System (Without Entry & Start System) ]**

1. Check the transponder key amplifier.



Courtesy of SUBARU OF AMERICA, INC.

1. Disconnect the D54 transponder key amplifier connector.
2. Refer to the table below and measure the resistance and the voltage and check for a pulse.

Terminal No. (symbol)	Input/output	Wiring color	Terminal description	Conditions	Specified condition
D54-7 (AGND) - Chassis ground	-	GR - Chassis ground	Ground	Always	1 Ω or less

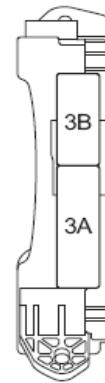
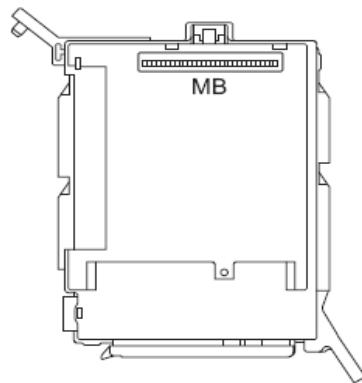
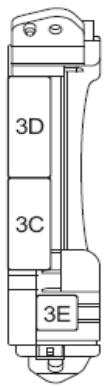
3. Reconnect the D54 transponder key amplifier connector.
4. Refer to the table below and measure the voltage and check for a pulse.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition
D54-1 (VC5) - D54-7 (AGND)	Input	Transponder key amplifier power supply	Key is not inserted to the ignition key cylinder.	1 V or less
			Key is inserted to the ignition key cylinder.	4.5 to 5.5V
D54-4 (CODE) - D54-7 (AGND)	Output	Key code data revision signal	Key is not inserted to the ignition key cylinder.	1 V or less
			Key is inserted to the ignition key cylinder.	Pulse generation
D54-5 (TXCT) - D54-7 (AGND)	Output	Key code output signal	Key is not inserted to the ignition key cylinder.	1 V or less
			Key is inserted to the ignition key cylinder.	Pulse generation

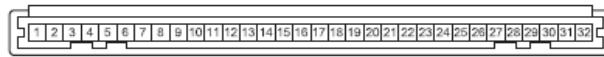
2. Check the main body ECM (multiplex network body ECM).



\*1



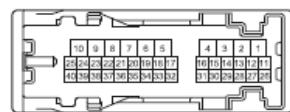
(MB)



(3D)



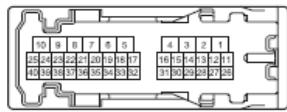
(3C)



(3E)



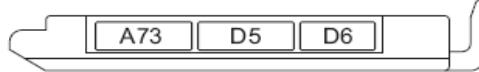
(3B)



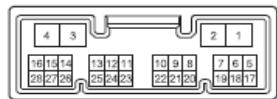
(3A)



\*2



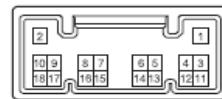
(A73)



(D5)



(D6)



\*1 Instrument panel junction block ASSY

\*2 Main body ECM (multiplex network body ECM)

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1. Remove the main body ECM (multiplex network body ECM) from the instrument panel junction block ASSY.
2. Disconnect the connectors D5, D6, and A73 of the main body ECM (multiplex network body ECM).
3. Measure the resistance and voltage based on the following table.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition
MB-1 - chassis ground	Input	Battery power supply	Always	11 to 14 V
MB-8 - chassis ground	Input	IG SW power supply	IG SW ON	11 to 14 V
			IG SW Off	1 V or less
MB-9 - chassis ground	Input	ACC power supply	IG SW ACC	11 to 14 V
			IG SW Off	1 V or less
MB-11 - chassis ground	-	Ground	Always	1 Ω or less
MB-32 - chassis ground	Input	Battery power supply	Always	11 to 14 V
D5-22 - chassis ground	Input	Unlock warning switch input	Key is not inserted to the ignition key cylinder (OFF).	1 V or less
			Key is inserted to the ignition key cylinder (ON).	11 to 14 V
D6-1 - Chassis ground	-	Ground	Always	1 Ω or less
A73-4 - chassis ground	-	Ground	Always	1 Ω or less

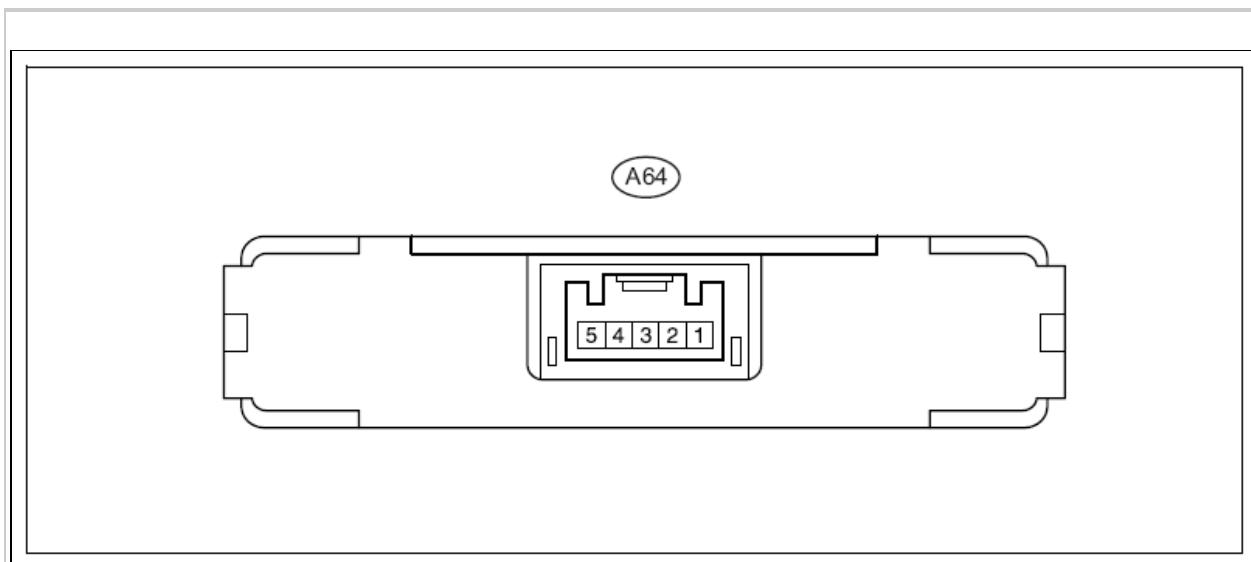
4. Reconnect the connector D5, D6, and A73 of the main body ECM (multiplex network body ECM).
5. Install the main body ECM (multiplex network body ECM) to the instrument panel junction block ASSY
6. Refer to the table below and measure the resistance and the voltage and check for a pulse.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition
A73-5 - chassis ground	Output	Key code data revision signal	Key is not inserted to the ignition key cylinder.	1 V or less
			Key is inserted to the ignition key cylinder.	Pulse generation
A73-9 - chassis ground	Input/output	EFI communication	IG SW Off	1 V or less
			IG SW ON	Pulse generation
A73-8 - chassis ground	Output	Transponder key amplifier power supply	Key is not inserted to the ignition key cylinder.	1 V or less
			Key is inserted to the ignition key cylinder.	4.5 to 5.5V
A73-15 -	Input	Key code output signal	Key is not inserted to the	1 V or less

chassis ground			ignition key cylinder.	
			Key is inserted to the ignition key cylinder.	Pulse generation
A73-16 - chassis ground	-	Transponder key amplifier GND-output short	Always	1 Ω or less
A73-17 - chassis ground	Input/output	Transponder key ECM communication	IG SW Off	1 V or less
			IG SW ON	Pulse generation

\*: with transponder key ECM ASSY

### 3. Check the transponder key ECM ASSY.



Courtesy of SUBARU OF AMERICA, INC.

1. Disconnect the D64 transponder ECM ASSY connector.
2. Measure the resistance and voltage based on the following table.

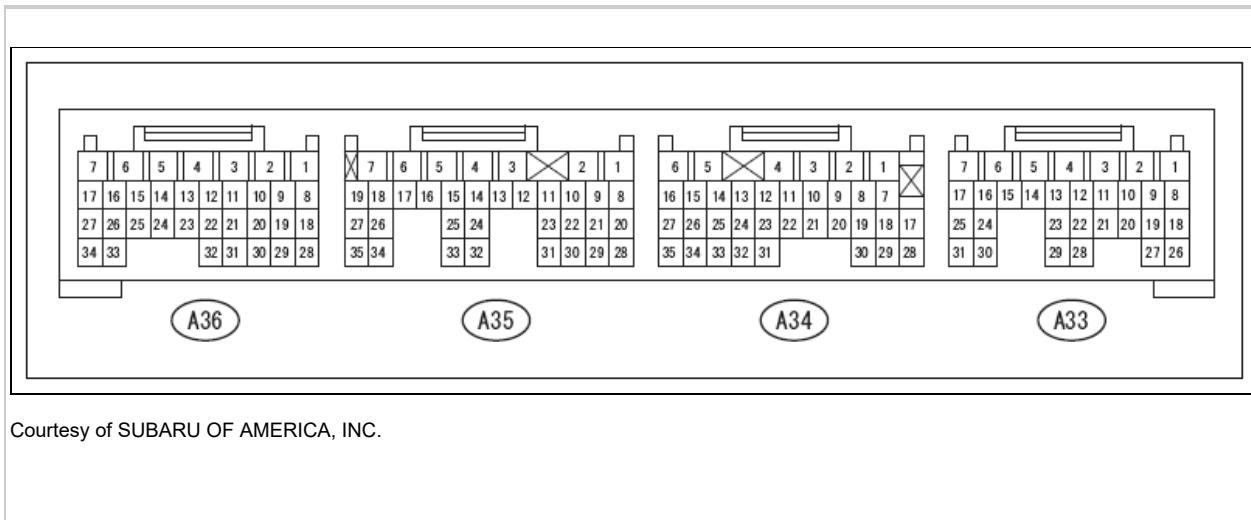
Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition
A64-1 (+B) - Chassis ground	Input	Battery power supply	Always	11 to 14 V
A64-5 (GND) - Chassis ground	-	Ground	Always	1 Ω or less

3. Reconnect the D64 transponder ECM ASSY connector.
4. Refer to the table below and measure the voltage and check for a pulse.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition

A64-3 (UART) - A64-5 (GND)	Input/output	Main body ECM communication	IG SW Off	1 V or less
			IG SW ON	Pulse generation

#### 4. CHECK ECM

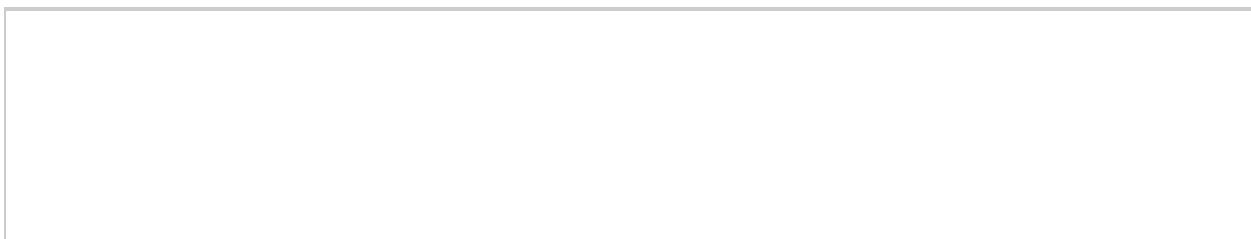


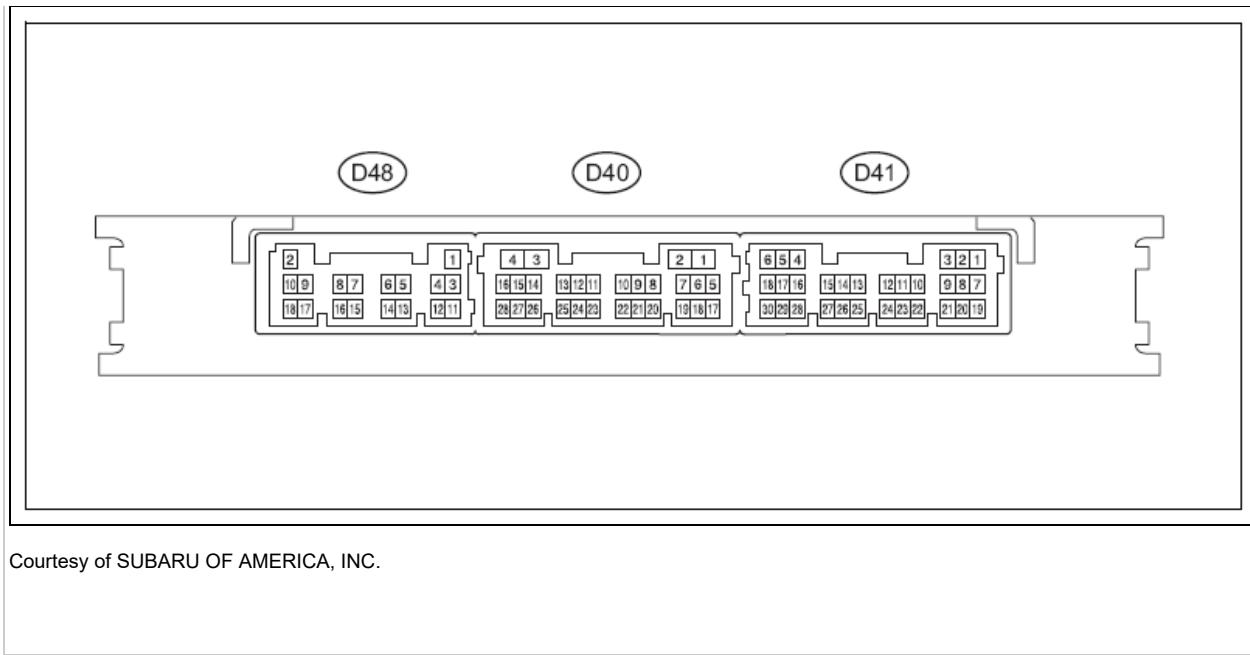
1. Refer to the table below and measure the resistance and the voltage and check for a pulse.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition
A33-1 (VBEC2) - A36-4 (GNDEG1)	Input	Battery power supply	IG SW Off	1 V or less
			IG SW ON	11 to 14 V
A33-2 (BATT) - A36-4 (GNDEG1)	Input	Battery power supply	Always	11 to 14 V
A34-6 (VBEC1) - A36-4 (GNDEG1)	Input	Battery power supply	IG SW Off	1 V or less
			IG SW ON	11 to 14 V
A35-25 (IMO1) - A36-4 (GNDEG1)	Input/output	Main body ECM communication	IG SW Off	1 V or less
			IG SW ON	Pulse generation
A36-4 (GNDEG1) - chassis ground	-	Ground	Always	1 Ω or less

#### ECM Terminal Arrangement [ Entry & Start System (Entry Function) ]

1. 1. Check the collation ECM (smart key ECM ASSY).





1. Disconnect the D41 and D48 collation ECM (smart key ECM ASSY) connectors.
2. Measure the voltage and resistance according to the following table.

**NOTE:** Remove the connectors and measure the voltage and resistance of the wiring harness side.

Inspection terminals	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item
D48-2 (+B) - D48-11(GND)	Input	+B power supply	Always	9.5 - 16V	-
D48-11 (GND) - chassis ground	-	Ground	Always	1 Ω or less	-

If you cannot obtain the specified result, you have to suspect a defect in the wiring harness side. Otherwise, you have to remove the fuse.

3. Reconnect the D41 and the D48 connectors of the collation ECM (smart key ECM ASSY).
4. Measure the voltage according to the following table.

**NOTE:**

1. Ensure that the entry cancel function (one of the customize setting available for the entry & start system) is not enabled. (Refer to CUSTOMIZE PARAMETERS)
2. Check the customize setting available for the entry & start system as well as the "ignition available area". (Refer to CUSTOMIZE PARAMETERS)

Inspection terminals	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item
D41-5 (IG2) - D48-11 (GND)	Input	IG power supply	Engine switch OFF → ON (IG)	1 V or less → 11 - 14 V	IG
D41-12 (CLG1) - D48-11 (GND)	Output	Output to the driver's side electrical key antenna (the collation ECM (smart key ECM ASSY) sends a request signal (challenge) to the door electrical key antenna to create a detection area).	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>3. All doors are closed.</li> <li>4. The electrical key transmitter SUB-ASSY is not inside the vehicle.</li> <li>5. The electrical key transmitter SUB-ASSY is inside the detection area<sup>(1)</sup>.</li> <li>6. All doors are locked by a wireless operation.</li> </ol>	Pulse generation (Refer to waveform 1)	[Overhead + Driver Side] ([Keyless access system check])

			<ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>3. All doors are closed.</li> <li>4. The electrical key transmitter SUB-ASSY is not inside the vehicle.</li> <li>5. The electrical key transmitter SUB-ASSY is outside the detection area<sup>(2)</sup>.</li> <li>6. All doors are locked by a wireless operation.</li> </ol>	waveform 2)	([Keyless access system check])
D41-13 (CG1B) - D48-11 (GND)	Output	Output to the driver's door electrical key antenna (terminals located on a component opposite from the CLG1 output terminal)	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>3. All doors are closed.</li> </ol>	Pulse generation (Refer to waveform 2)	[Overhead + Driver Side] ([Keyless access system check])

			<p>4. The electrical key transmitter SUB-ASSY is not inside the vehicle.</p> <p>5. All doors are locked by a wireless operation.</p>		
D41-11 (CLG2) - D48-11 (GND)	Output	<p>Output to the passenger's side electrical key antenna (the collation ECM (smart key ECM ASSY) sends a request signal (challenge) to the door electrical key antenna to create a detection area).</p>	<p>Procedure:</p> <p>1. The engine switch is OFF.</p> <p>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</p> <p>3. All doors are closed.</p> <p>4. The electrical key transmitter SUB-ASSY is not inside the vehicle.</p> <p>5. The electrical key transmitter SUB-ASSY is inside the detection area<sup>(1)</sup>.</p> <p>6. All doors are locked by a wireless operation.</p>	<p>Pulse generation (Refer to waveform 1)</p>	[Overhead + Passenger Side] ([Keyless access system check])

			<p>1. The engine switch is OFF.</p> <p>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</p> <p>3. All doors are closed.</p> <p>4. The electrical key transmitter SUB-ASSY is not inside the vehicle.</p> <p>5. The electrical key transmitter SUB-ASSY is outside the detection area<sup>(2)</sup>.</p> <p>6. All doors are locked by a wireless operation.</p>	generation (Refer to waveform 2)	+ Passenger Side] ([Keyless access system check])
D41-10 (CG2B) - D48-11 (GND)	Output	Output to the passenger's door electrical key antenna (terminals located on a component opposite from the CLG2 output terminal)	<p>Procedure:</p> <p>1. The engine switch is OFF.</p> <p>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</p> <p>3. All doors are closed.</p>	Pulse generation (Refer to waveform 2)	[Overhead + Passenger Side] ([Keyless access system check])

			<p>4. The electrical key transmitter SUB-ASSY is not inside the vehicle.</p> <p>5. All doors are locked by a wireless operation.</p>		
D41-3 (CLG5) - D48-11 (GND)	Output	Output to the indoor electrical key antenna ASSY no. 1 (front floor)	<p>Procedure:</p> <p>1. The engine switch is OFF.</p> <p>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</p> <p>3. A door is open.</p> <p>4. A door is closed.</p> <p>5. Within 30 seconds</p>	Pulse generation (Refer to waveform 3)	[Overhead + Front Room] ([Keyless access system check])
D41-2 (CG5B) - D48-11 (GND)	Output	Output to the indoor electrical key antenna ASSY no. 1 (front floor) (terminals located on a component opposite from the CLG5 output terminal)	<p>Procedure:</p> <p>1. The engine switch is OFF.</p> <p>2. The electrical key transmitter SUB-ASSY is not inside the vehicle.</p> <p>3. A door is open.</p> <p>4. A door is closed.</p>	Pulse generation (Refer to waveform 3)	[Overhead + Front Room] ([Keyless access system check])

			5. Within 30 seconds		
D41-20 (TSW1) - D48-11 (GND)	Input	Driver's door lock sensor signal input (a signal is sent from the door lock sensor on the front door outer handle ASSY to the collation ECM (smart key ECM ASSY). The collation ECM (smart key ECM ASSY) sends out a 12 V pulse waveform from the terminal TSW every 40 milliseconds. Once the door lock sensor is touched, the pulse is shorted to the ground.)	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>3. All doors are closed.</li> <li>4. Driver's door lock sensor, not touched →touched</li> </ol>	Pulse generation (Refer to waveform 4)	[D-Door Trigger Switch]
D41-8 (TSW2) - D48-11 (GND)	Input	Passenger's door lock sensor signal input (a signal is sent from the door lock sensor on the front door outer handle ASSY to the collation ECM (smart key ECM ASSY). The collation ECM (smart key ECM ASSY) sends out a 12 V pulse waveform from the terminal TSW every 40 milliseconds. Once the door lock sensor is touched, the pulse is shorted to the ground.)	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>3. All doors are closed.</li> <li>4. Passenger's door lock sensor, not touched →touched</li> </ol>	Pulse generation (Refer to waveform 4)	[P-Door Trigger Switch]
D41-22 (SEN1) - D48-11 (GND)	Input	Driver's door unlock sensor signal input (if you touch the touch sensor when the system is in unlock standby mode, the door electrical key antenna sends a touch sensor input signal (detection signal) to the	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> </ol>	Pulse generation (Refer to waveform 4)	[D-Door Touch Sensor]

		collation ECM (smart key ECM ASSY)).	<p>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</p> <p>3. All doors are locked.</p> <p>4. The electrical key transmitter SUB-ASSY is not in the appropriate range from the vehicle.</p> <p>5. Driver's door unlock sensor, not touched →touched</p>		
D41-23 (SEN2) - D48-11 (GND)	Input	Passenger's door unlock sensor signal input (if you touch the touch sensor when the system is in unlock standby mode, the door electrical key antenna sends a touch sensor input signal (detection signal) to the collation ECM (smart key ECM ASSY)).	<p>Procedure:</p> <p>1. The engine switch is OFF.</p> <p>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</p> <p>3. All doors are locked.</p> <p>4. The electrical key transmitter SUB-ASSY is not in the appropriate range from the vehicle.</p>	Pulse generation (Refer to waveform 4)	[P-Door Touch Sensor]

			5. Passenger's door unlock sensor, not touched →touched		
D40-27 (TSW5) - D48-11 (GND)	Input	Trunk opening switch signal input	Trunk opening switch ASSY, OFF →ON	Pulse generation (Refer to waveform 4)	[Tr/B-Door Unlock SW]
D40-11 (CLG6) - D48-11 (GND)	Output	Output to the indoor electrical key antenna ASSY no. 2 (rear floor)	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is not inside the vehicle.</li> <li>3. A door is open.</li> <li>4. A door is closed.</li> <li>5. Within 30 seconds</li> </ol>	Pulse generation (Refer to waveform 3)	[Overhead + Rear Room] ([Keyless access system check])
D40-10 (CG6B) - D48-11 (GND)	Output	Output to the indoor electrical key antenna ASSY no. 2 (rear floor) (terminals located on a component opposite from the CLG6 output terminal).	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is not inside the vehicle.</li> <li>3. A door is open.</li> <li>4. A door is closed.</li> </ol>	Pulse generation (Refer to waveform 3)	[Overhead + Rear Room] ([Keyless access system check])

			5. Within 30 seconds		
D40-9 (CLG7) - D48-11 (GND)	Output	Output to the indoor electrical key antenna ASSY no. 3 (antenna located inside the trunk)	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is not inside the vehicle.</li> <li>3. A door is open.</li> <li>4. A door is closed.</li> <li>5. Within 30 seconds</li> </ol>	Pulse generation (Refer to waveform 3)	[Overhead + Trunk] ([Keyless access system check])
D40-8 (CG7B) - D48-11 (GND)	Output	Output to the indoor electrical key antenna ASSY no. 3 (antenna located inside the trunk) (terminals located on a component opposite from the CLG7 output terminal)	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is not inside the vehicle.</li> <li>3. A door is open.</li> <li>4. A door is closed.</li> <li>5. Within 30 seconds</li> </ol>	Pulse generation (Refer to waveform 3)	[Overhead + Trunk] ([Keyless access system check])
D41-19 (POS1) - D48-11 (GND)	Output	Driver's door unlock sensor power (12 v (the voltage drops once the engine switch is turned ON (IG))).	Engine switch OFF → ON (IG)	9 - 14 V → 2 V or less	-
D41-21 (POS2) to	Output	Passenger's door unlock sensor power (12 v (the	Engine switch OFF → ON (IG)	9 - 14 V → 2 V or less	-

D48-11 (GND)		voltage drops once the engine switch is turned ON (IG))).		
D40-5 (RCO) - D48-11 (GND)	Output	<p>Output to the door control receiver (power for the door control receiver. When the receiver initiates operation, the collation ECM (smart key ECM ASSY) outputs 5 V).</p>	<p>Procedure:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>3. The electrical key transmitter SUB-ASSY is outside the detection area<sup>(2)</sup>.</li> <li>4. Lock/unlock button on the electrical key transmitter SUB-ASSY, not pressed →pressed</li> </ol>	Pulse generation (Refer to waveform 5)
D40-17 (RDA) - D48-11 (GND)	Input	<p>The door control receiver checks the data transmitted from the electrical key transmitter SUB-ASSY. The door control receiver then transmits the data to the ECM and intermittently shorts the 12 V signal sent from the collation ECM (smart key ECM ASSY) to the ground.</p>	<p>Description:</p> <ol style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. All doors are locked.</li> <li>3. The electrical key transmitter SUB-ASSY is outside the detection area<sup>(2)</sup> and</li> </ol>	Pulse generation (Refer to waveform 6)

			inside the indoor wireless function operating range*3.  4. Lock/unlock button on the electrical key transmitter SUB-ASSY, not pressed →pressed		
D40-19 (RSSI) - D48-11 (GND)	Input	Communication channel switching circuit	Description:  1. The engine switch is OFF.  2. All doors are locked.  3. The electrical key transmitter SUB-ASSY is outside the detection area <sup>(2)</sup> and inside the indoor wireless function operating range*3.  4. Lock/unlock button on the electrical key transmitter SUB-ASSY, not pressed →pressed	Pulse generation (Refer to waveform 7)	-
D40-2 (CLG8) -	Output	Output to the electrical key antenna (trunk exterior antenna)	Procedure:	Pulse generation (Refer to	[Overhead + Trunk] ([Keyless

D48-11 (GND)			<ul style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>3. All doors are closed.</li> <li>4. Trunk opening switch ASSY, OFF →ON</li> </ul>	waveform 8)	access system check])
D40-1 (CG8B) - D48-11 (GND)	Output	Output to the electrical key antenna (trunk exterior antenna) (terminals located on a component opposite from the CLG8 output terminal)	<p>Procedure:</p> <ul style="list-style-type: none"> <li>1. The engine switch is OFF.</li> <li>2. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>3. All doors are closed.</li> <li>4. Trunk opening switch ASSY, OFF →ON</li> </ul>	Pulse generation (Refer to waveform 8)	[Overhead + Trunk] ([Keyless access system check])
(1) For a detailed description about the inside of the entry function detection area, refer to [Operation check]. (Refer to OPERATION CHECK)					
(2) For a detailed description about the outside of the entry function detection area, refer to [Operation check]. (Refer to OPERATION CHECK)					

5. Using an oscilloscope, check waveform 1.

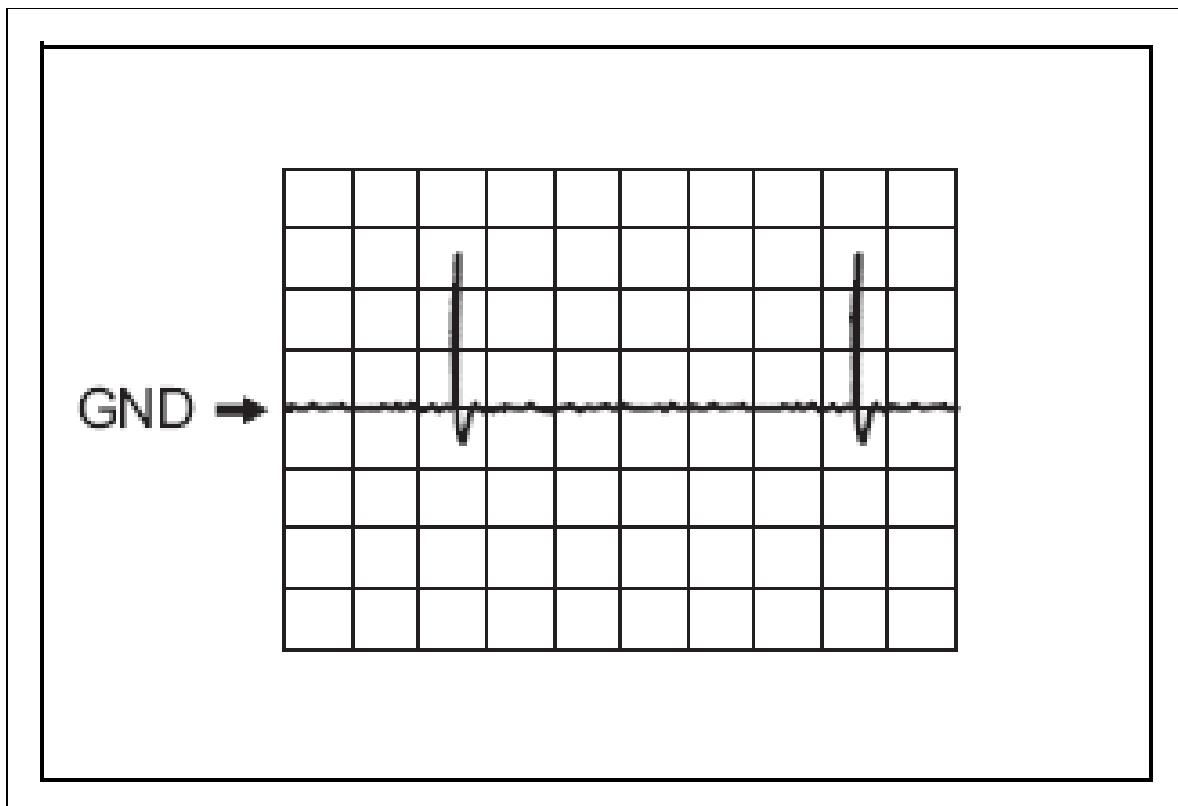
**NOTE:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

a. Waveform 1 (reference)

**PART DESCRIPTION - MEASURING CONDITIONS**

Item	Contents
Tester connection	a. D41-12 (CLG1) - D48-11 (GND) b. D41-11 (CLG2) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
Conditions	Procedure:  a. The engine switch is OFF. b. The electrical key transmitter SUB-ASSY is outside the vehicle. c. All doors are closed. d. The electrical key transmitter SUB-ASSY is not inside the vehicle. e. The electrical key transmitter SUB-ASSY is inside the detection area <sup>(1)</sup> . f. All doors are locked by a wireless operation.
(1)	For a detailed description on inside the entry function detection area, refer to "Operation check". (Refer to OPERATION CHECK)

Fig 26: Waveform 1



Courtesy of SUBARU OF AMERICA, INC.

6. Using an oscilloscope, check waveform 2.

**NOTE:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

a. Waveform 2 (reference)

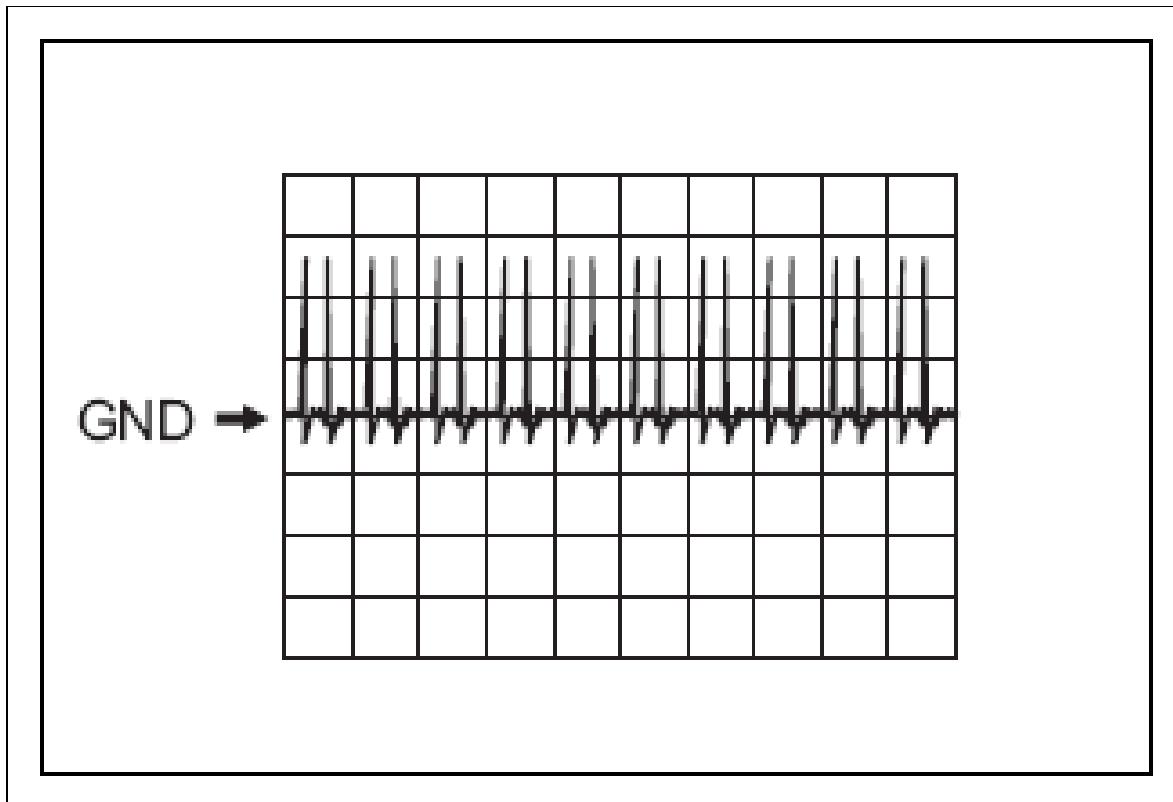
**PART DESCRIPTION - MEASURING CONDITIONS**

Item	Contents
Tester connection	a. D41-12 (CLG1) - D48-11 (GND) b. D41-11 (CLG2) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
Conditions	Procedure:  a. The engine switch is OFF.  b. The electrical key transmitter SUB-ASSY is outside the vehicle.

- |    |  |
|----|--|
| c. | All doors are closed.  |
| d. | The electrical key transmitter SUB-ASSY is not inside the vehicle.                     |
| e. | The electrical key transmitter SUB-ASSY is outside the detection area <sup>(1)</sup> . |
| f. | All doors are locked by a wireless operation.  |

<sup>(1)</sup> For a detailed description on inside the entry function detection area, refer to "Operation check". (Refer to OPERATION CHECK)

Fig 27: Waveform 2



Courtesy of SUBARU OF AMERICA, INC.

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	a. D41-13 (CG1B) - D48-11 (GND) b. D41-10 (CG2B) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
Conditions	Procedure:  a. The engine switch is OFF.

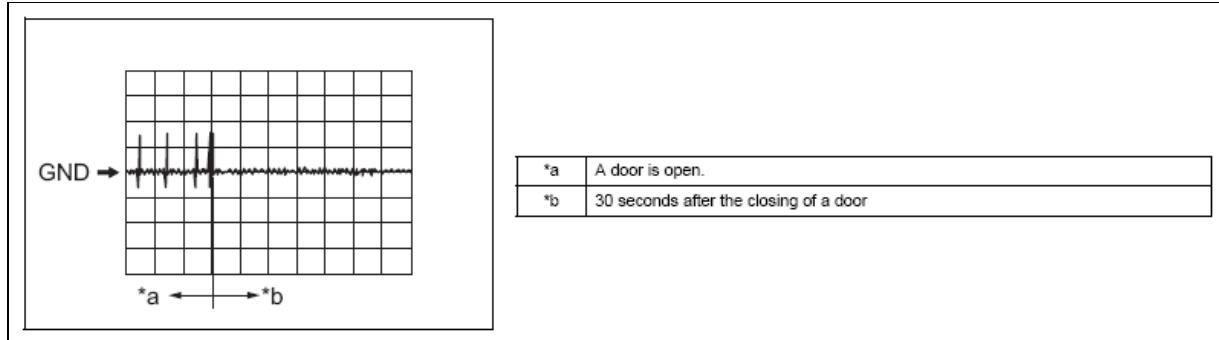
- |  |   |
|--|---|
|  | b. The electrical key transmitter SUB-ASSY is outside the vehicle.    |
|  | c. All doors are closed.  |
|  | d. The electrical key transmitter SUB-ASSY is not inside the vehicle. |
|  | e. All doors are locked by a wireless operation.                      |

\*: For a detailed description on inside the entry function detection area, refer to "Operation check". (Refer to OPERATION CHECK)

#### 7. Using an oscilloscope, check waveform 3.

**NOTE:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

Fig 28: Waveform 3



Courtesy of SUBARU OF AMERICA, INC.

#### a. Waveform 3 (reference)

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	a. D41-3 (CLG5) - D48-11 (GND) b. D41-2 (CG5B) - D48-11 (GND) c. D40-11 (CLG6) - D48-11 (GND) d. D40-10 (CG6B) - D48-11 (GND) e. D40-9 (CLG7) - D48-11 (GND) f. D40-8 (CG7B) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
Conditions	Procedure:  a. The engine switch is OFF.  b. The electrical key transmitter SUB-ASSY is not inside the vehicle.

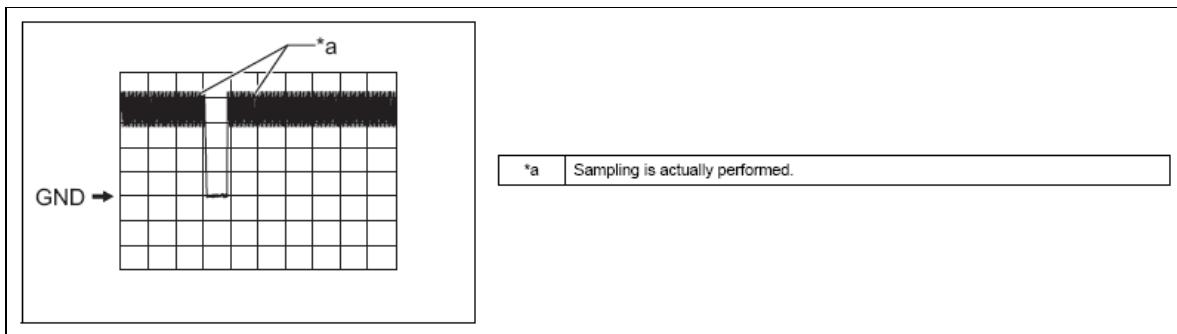
- |    |                   |
|----|-------------------|
| c. | A door is open.   |
| d. | A door is closed. |
| e. | Within 3 seconds  |

8. Using an oscilloscope, check waveform 4.

**NOTE:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

- a. Waveform 4 (reference)

Fig 29: Waveform 4



Courtesy of SUBARU OF AMERICA, INC.

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D41-20 (TSW1) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
	Procedure:
Conditions	<ul style="list-style-type: none"> <li>a. The engine switch is OFF.</li> <li>b. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>c. All doors are closed.</li> <li>d. Driver's door lock sensor, not touched → touched</li> </ul>

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D41-8 (TSW2) - D48-11 (GND)

Tool setting	2 V/DIV., 500 ms/DIV.
	Procedure:
Conditions	<ul style="list-style-type: none"> <li>a. The engine switch is OFF.</li> <li>b. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>c. All doors are closed.</li> <li>d. Passenger's door lock sensor, not touched →touched</li> </ul>

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D41-22 (SEN1) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
	Procedure:
Conditions	<ul style="list-style-type: none"> <li>a. The engine switch is OFF.</li> <li>b. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>c. All doors are locked.</li> <li>d. The electrical key transmitter SUB-ASSY is not in the appropriate range from the vehicle.</li> <li>e. Driver's door lock sensor, not touched →touched</li> </ul>

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D41-23 (SEN2) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
	Procedure:
Conditions	<ul style="list-style-type: none"> <li>a. The engine switch is OFF.</li> <li>b. The electrical key transmitter SUB-ASSY is outside the vehicle.</li> <li>c. All doors are locked.</li> <li>d. The electrical key transmitter SUB-ASSY is not in the appropriate range from the vehicle.</li> <li>e. Passenger's door unlock sensor, not touched →touched</li> </ul>

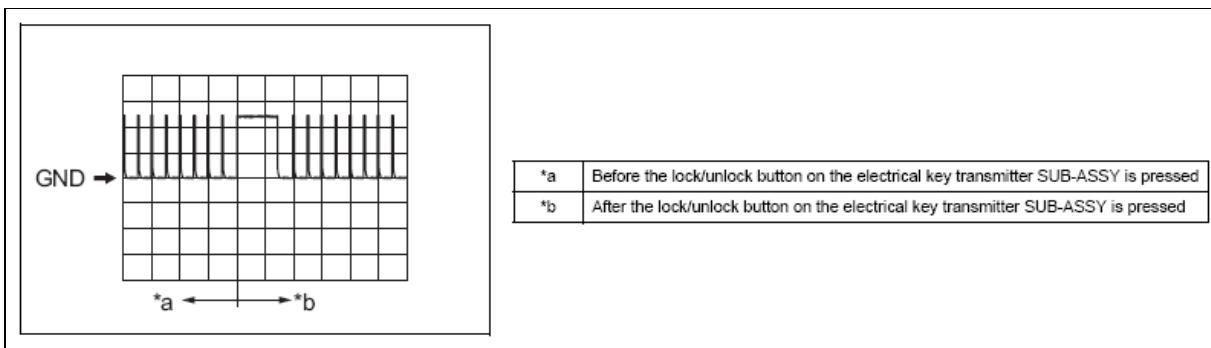
## PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D40-27 (TSW5) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
Conditions	Trunk opening switch ASSY, OFF → ON

9. Using an oscilloscope, check waveform 5.

**NOTE:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

Fig 30: Waveform 5



Courtesy of SUBARU OF AMERICA, INC.

a. Waveform 5 (reference)

## PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D40-5 (RCO) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
Conditions	<p>Procedure:</p> <p>a. The engine switch is OFF.</p> <p>b. The electrical key transmitter SUB-ASSY is outside the vehicle.</p> <p>c. The electrical key transmitter SUB-ASSY is outside the detection area<sup>(1)</sup> and inside the indoor wireless function operating range<sup>(2)</sup>.</p>

- d. Lock/unlock button on the electrical key transmitter SUB-ASSY, not pressed  
→pressed

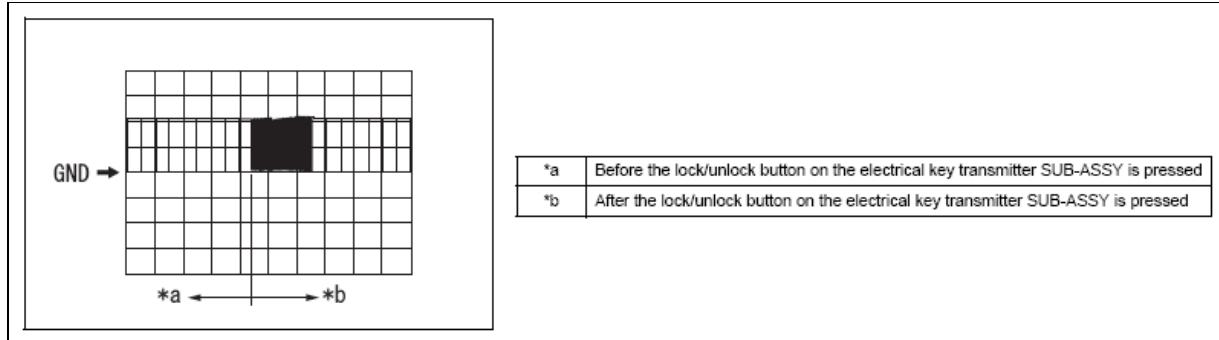
(1) For a detailed description about the outside of the entry function detection area, refer to [Operation check]. (Refer to OPERATION CHECK)

(2) For a detailed description about the inside of the wireless function operating range, refer to [Operation check]. (Refer to OPERATION CHECK)

## 10. Using an oscilloscope, check waveform 6.

**NOTE:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

Fig 31: Waveform 6



Courtesy of SUBARU OF AMERICA, INC.

### a. Waveform 6 (reference)

### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	D40-17 (RDA) - D48-11 (GND)
Tool setting	5V/DIV., 500 ms/DIV.
Conditions	<p>Procedure:</p> <p>a. The engine switch is OFF.</p> <p>b. All doors are locked.</p> <p>c. The electrical key transmitter SUB-ASSY is outside the detection area<sup>(1)</sup> and inside the indoor wireless function operating range<sup>(2)</sup>.</p>

d. Lock/unlock button on the electrical key transmitter SUB-ASSY, not pressed  
→pressed

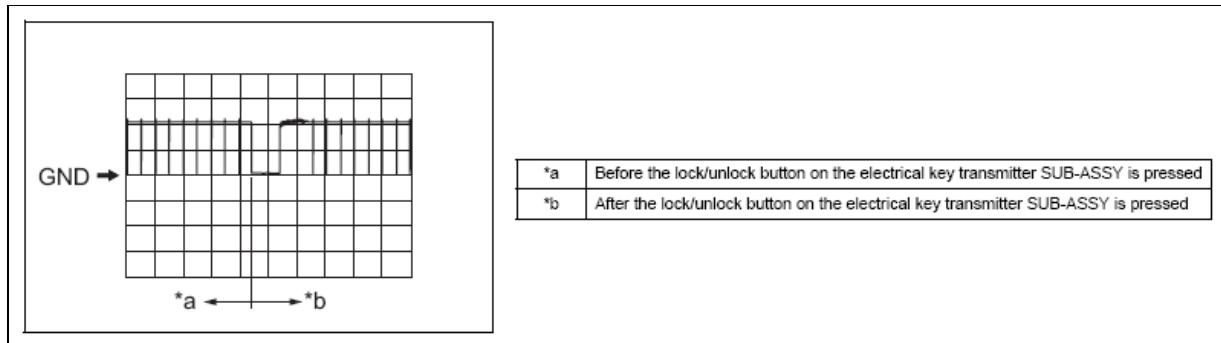
(1) For a detailed description about the outside of the entry function detection area, refer to [Operation check]. (Refer to OPERATION CHECK)

(2) For a detailed description on inside the wireless function operating range, refer to "Operation check". (Refer to OPERATION CHECK)

## 11. Using an oscilloscope, check waveform 7.

**NOTE:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

Fig 32: Waveform 7



Courtesy of SUBARU OF AMERICA, INC.

### a. Waveform 7 (reference)

### PART DESCRIPTION - MEASURING CONDITIONS

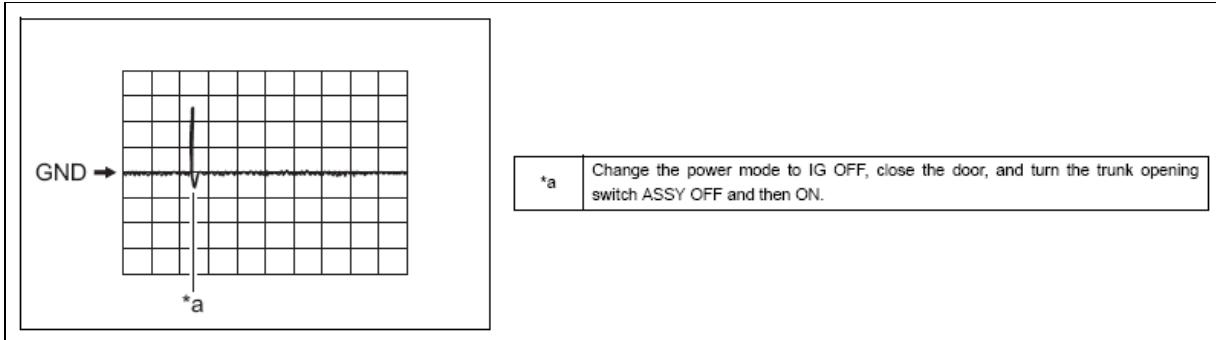
Item	Contents
Tester connection	D40-19 (RSSI) - D48-11 (GND)
Tool setting	5V/DIV., 500 ms/DIV.
Conditions	<p>Procedure:</p> <p>a. The engine switch is OFF.</p> <p>b. All doors are locked.</p> <p>c. The electrical key transmitter SUB-ASSY is outside the detection area<sup>(1)</sup> and inside the indoor wireless function operating range<sup>(2)</sup>.</p>

	d. Lock/unlock button on the electrical key transmitter SUB-ASSY, not pressed →pressed
(1)	For a detailed description about the outside of the entry function detection area, refer to [Operation check]. (Refer to OPERATION CHECK)
(2)	For a detailed description about the inside of the wireless function operating range, refer to [Operation check]. (Refer to OPERATION CHECK)

12. Using an oscilloscope, check waveform 8.

**NOTE:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

Fig 33: Waveform 8



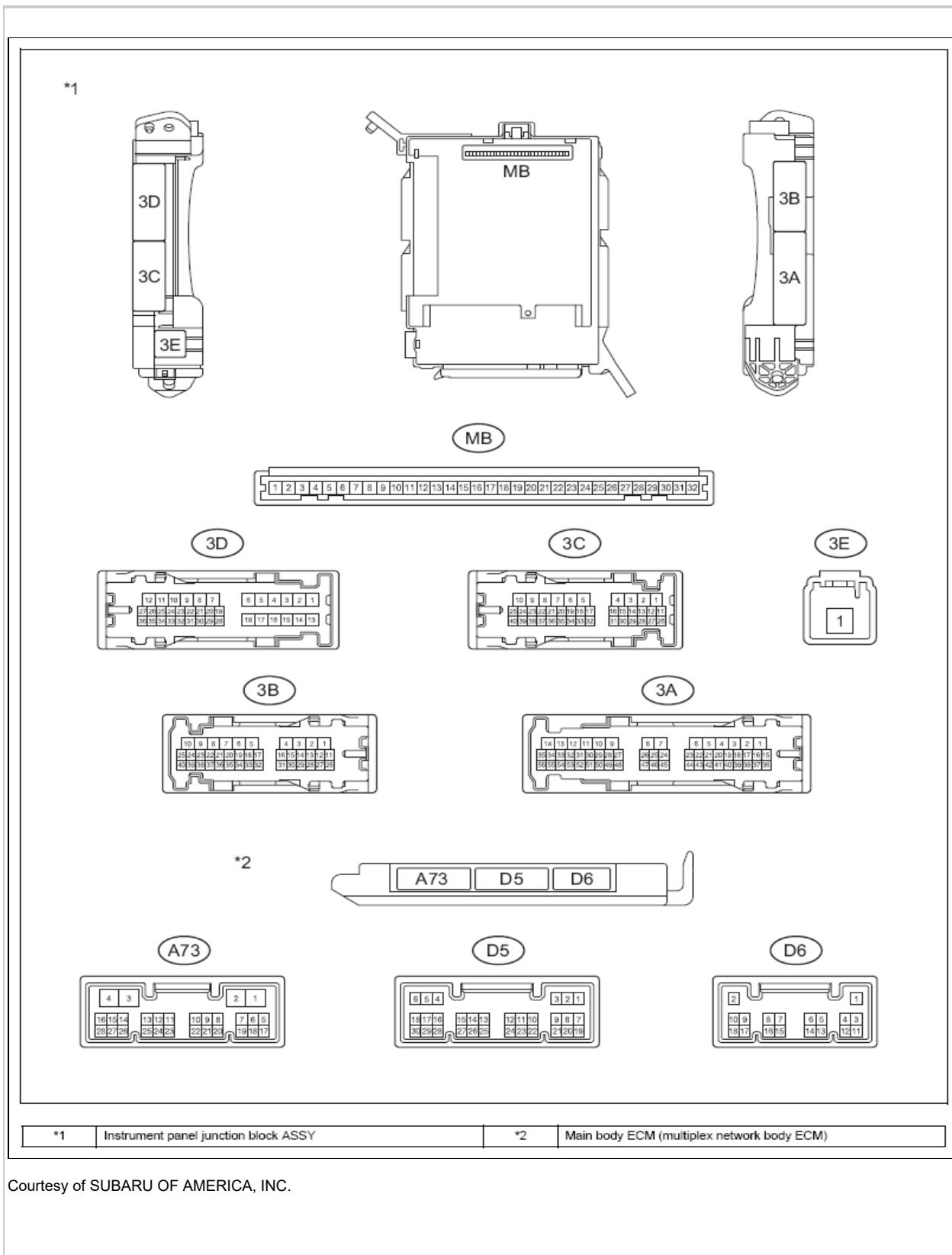
Courtesy of SUBARU OF AMERICA, INC.

a. Waveform 8 (reference)

#### PART DESCRIPTION - MEASURING CONDITIONS

Item	Contents
Tester connection	a. D40-2 (CLG8) - D48-11 (GND) b. D40-1 (CG8B) - D48-11 (GND)
Tool setting	2 V/DIV., 500 ms/DIV.
Conditions	Procedure:  a. The engine switch is OFF. b. The electrical key transmitter SUB-ASSY is outside the vehicle. c. All doors are closed. d. Trunk opening switch ASSY, OFF →ON

2. Check the instrument panel junction block ASSY and the main body ECM (multiplex network body ECM).



Courtesy of SUBARU OF AMERICA, INC.

1. Remove the main body ECM (multiplex network body ECM) from the instrument panel junction block ASSY.
2. Measure the voltage and resistance according to the following table.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item
MB-1 - chassis ground	Input	Battery power supply	Always	11 - 14 V	-
MB-8 - chassis ground	Input	Engine switch power supply	Engine switch is ON (IG)	11 - 14 V	[Ignition]
			The engine switch is OFF.	1 V or less	
MB-9 - Chassis ground	Input	ACC power supply	The engine switch is on (ACC).	11 - 14 V	[ACC SW]
			The engine switch is OFF.	1 V or less	
MB-11 - chassis ground	Input	Ground	Always	1 Ω or less	-
MB-32 - Chassis ground	Input	Battery power supply	Always	11 - 14 V	-
D6-1 - Chassis ground	-	Ground	Always	1 Ω or less	-
A73-4 - Chassis ground	-	Ground	Always	1 Ω or less	-

If you cannot get the specified result, there could be a problem in the wiring harnesses.

3. Install the main body ECM (multiplex network body ECM) to the instrument panel junction block ASSY (Refer to REMOVAL )
4. Refer to the value shown in table below and measure the voltage and waveform.

Terminal No. (symbol)	Input/output	Terminal description	Conditions	Specified condition	Related [Data monitor] item
3A-28 - chassis ground	Input	Driver's side courtesy light switch	Driver's door is open.	1 V or less	[D Door Courtesy SW]
			Driver's door is closed	Pulse generation	
3B-13 - chassis ground	Input	Passenger's side courtesy light switch	The passenger's door is open.	1 V or less	[Door Courtesy SW]
			The passenger's door is closed.	Pulse generation	
3D-26 - chassis ground	Input	Trunk courtesy light switch	The trunk is open.	1 V or less	[Luggage Courtesy SW]
			Change the power mode to IG OFF, close the door, and close	11 - 14 V	

			the trunk.		
3B-2 - chassis ground	Output	Door lock motor lock drive output (driver's side)	The driver's side control switch is not pressed, and the driver's door key cylinder is in the neutral position*1.	1 V or less	-
			The driver's door control switch is pushed to the lock position, or the driver's door key cylinder is in the lock position*1.	11 - 14 V	
3B-3 - chassis ground	Output	Door lock motor lock drive output (passenger's side)	The driver's side control switch is not pressed, and the driver's door key cylinder is in the neutral position*1.	1 V or less	-
			The driver's door control switch is pushed to the lock position, or the driver's door key cylinder is in the lock position*1.	11 - 14 V	
3B-6 - chassis ground	Output	Door lock motor lock drive output (trunk)	The trunk open button on the electrical key transmitter SUB-ASSY is not pressed.	1 V or less	The trunk is open.
			The trunk open button on the electrical key transmitter SUB-ASSY is pressed.	11 - 14 V	
3B-1 - chassis ground	Output	Door lock motor unlock drive output (driver's side)	The driver's side control switch is not pressed, and the driver's door key cylinder is in the neutral position <sup>(1)</sup> .	1 V or less	-
			The driver's door control switch is pushed to the unlock position, or the driver's door key cylinder is in the unlock position <sup>(1)</sup> .	11 - 14 V	
3B-4 - chassis ground	Output	Door lock motor unlock drive output (passenger's side)	The driver's side control switch is not pressed, and the driver's door key cylinder is in the neutral position <sup>(1)</sup> .	1 V or less	-
			The driver's door control switch is pushed to the unlock position, or the driver's door key cylinder is in the unlock position <sup>(1)</sup> .	11 - 14 V	
D6-11 - Chassis ground	Input	Driver's door unlock detection switch input	Driver's door is locked.	1 V or less	[D-Door Lock Pos SW]
			Change the power mode to IG OFF, close all doors, and lock the driver's door.	Pulse generation (Refer to waveform 1)	

				or waveform 2)	
D6-12 - Chassis ground	Input	Passenger's door unlock detection switch input	Passenger's door is unlocked	1 V or less	
			Change the power mode to IG OFF, close all doors, and lock the passenger's door.	Pulse generation (Refer to waveform 1 or waveform 2)	[P-Door Lock Pos SW]
(1) w/key link switch					

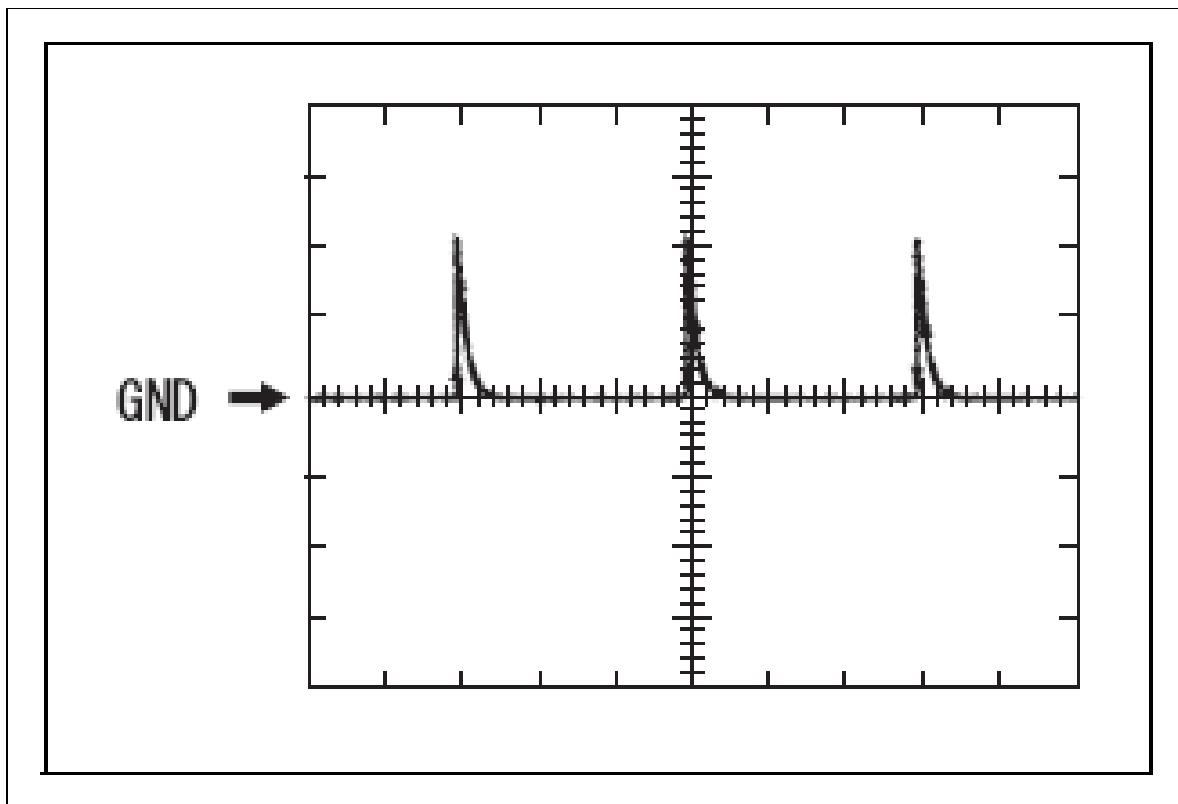
5. Inspect using an oscilloscope.

**CAUTION:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

a. Waveform 1 (reference)

Item	Contents
Measuring terminal	D6-11 (LSFD) ↔ Chassis ground
Equipment setting	5 V/DIV., 20 ms/DIV.
Measuring conditions	IG OFF, all doors closed, driver's door locked
Measuring terminal	D6-12 (LSFP) ↔ Chassis ground
Equipment setting	5 V/DIV., 20 ms/DIV.
Measuring conditions	IG OFF, all doors closed, passenger's door locked

Fig 34: Waveform 1

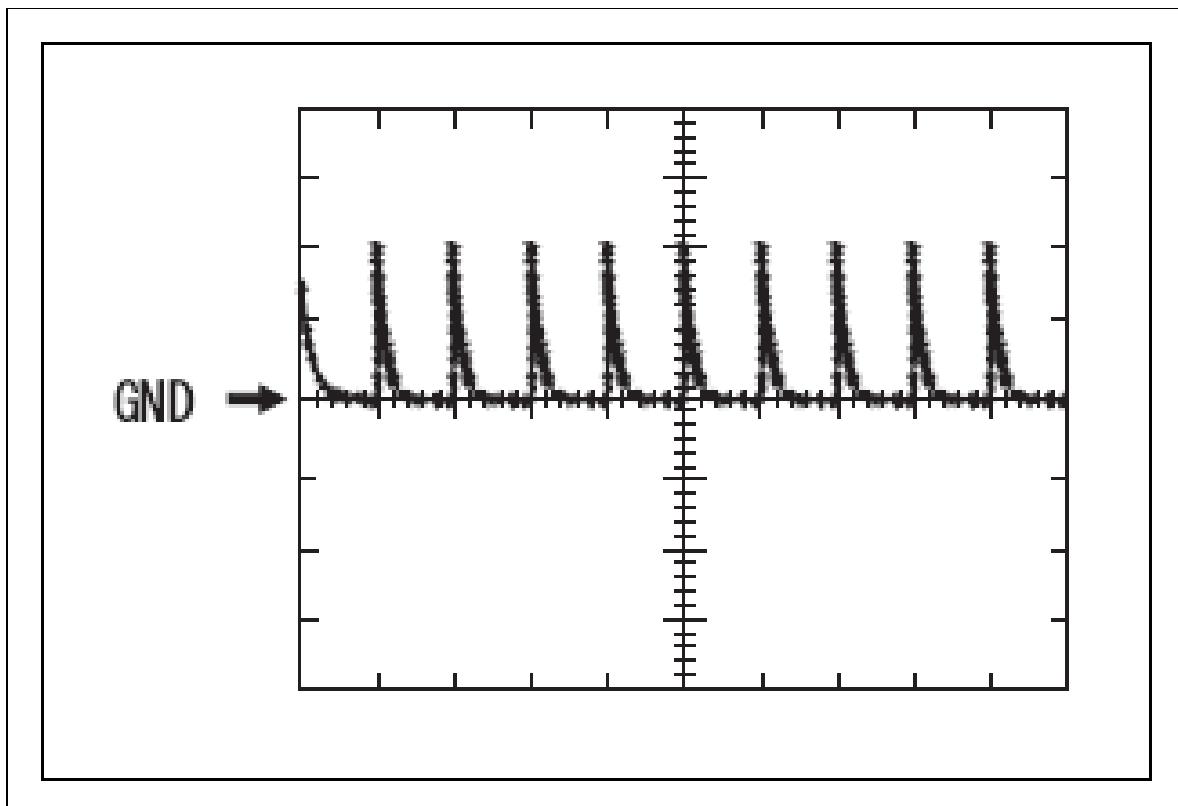


Courtesy of SUBARU OF AMERICA, INC.

b. Waveform 2 (reference)

Item	Contents
Measuring terminal	D6-11 (LSFD) ↔ Chassis ground
Equipment setting	5 V/DIV., 20 ms/DIV.
Measuring conditions	IG OFF, all doors closed, driver's door locked
Measuring terminal	D6-12 (LSFP) ↔ Chassis ground
Equipment setting	5 V/DIV., 20 ms/DIV.
Measuring conditions	IG OFF, all doors closed, passenger's door locked

Fig 35: Waveform 2



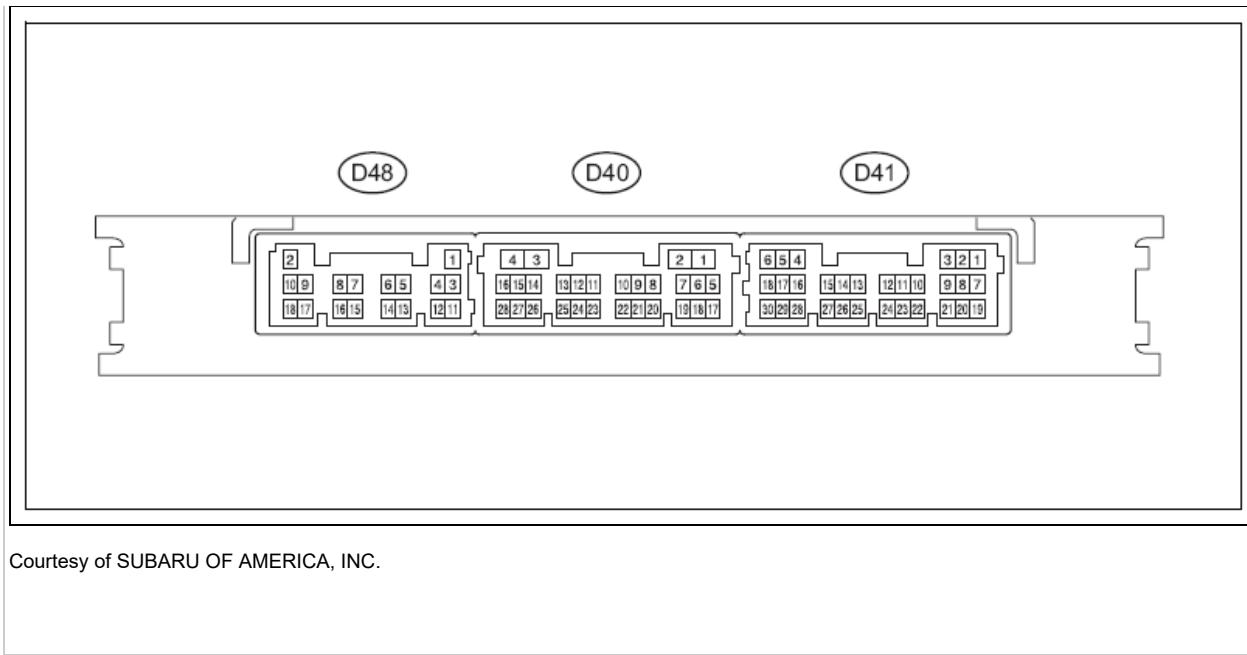
Courtesy of SUBARU OF AMERICA, INC.

## ECM Terminal Arrangement [ Entry & Start System (Start Function) ]

### NOTE:

- Regarding the collation ECM (smart key ECM ASSY) (entry function related), refer to the following. (Refer to ECM TERMINAL ARRANGEMENT )
- Regarding the ID code box (immobilizer code ECM), refer to the following. (Refer to ECM TERMINAL ARRANGEMENT )
- Regarding the steering lock actuator ASSY (steering lock ECM), refer to the following. (Refer to ECM TERMINAL ARRANGEMENT )

1. Check the collation ECM (smart key ECM ASSY).



1. Remove the D41 and the D48 connectors of the collation ECM (smart key ECM ASSY).
2. Measure the voltage and resistance according to the following table.

Terminal No. (Terminal symbol)	Input/Output	Terminal description	Conditions	Specified condition	Related [Data monitor] item
D41-4 (ACCD) - chassis ground	Output	ACC signal	20°C (68°F)	81.49 to 118.98 Ω	[ACC relay monitor]
D41-6 (IG1D) - chassis ground	Output	IG1 signal	20°C (68°F)	40.74 to 54.49 Ω	[IG1 relay monitor (outside)]
D41-25 (P) - D48-11 (GND) (1)	Input	Shift lever P position signal	The shift lever is in the P position → the shift lever is not in the P position	40 kΩ or more → 200 Ω or less	[Shift P Signal]
D41-26 (SLP) - D48-11 (GND)	Input	Steering lock bar position signal	Always	10 kΩ or more	[Steering unlock SW]
D41-27 (SPD) - chassis ground	Input	Vehicle speed signal	Always	30 kΩ or more	[Vehicle Speed]
D41-28 (SSW1) -	Input	SSW1 contact signal	The engine switch is being pushed → the engine switch	1 Ω or less → 10	[Start switch1]

chassis ground			is not being pushed	kΩ or more	
D41-30 (SSW2) - chassis ground	Input	SSW2 contact signal (Back-up for SSW1, and works in the same way as SSW1)	The engine switch is being pushed →the engine switch is not being pushed	1 Ω or less →10 kΩ or more	[Start switch2]
		<b>NOTE:</b> Backup of SSW1. Works in the same way as SSW1.			
D48-11 (GND) - Chassis ground	-	Ground	Always	1 Ω or less	-
D48-5 (N-SW) - chassis ground <sup>(1)</sup>	Input	Neutral switch signal	Shift position P or N →Other than P or N	1V or less →9 V or more	[Neutral SW/Clutch SW]
D48-10 (CLUT) - chassis ground <sup>(2)</sup>	Input	Clutch switch signal	Except for when the engine in cranking, perform the following operations: remove your foot from the clutch pedal →depress the clutch pedal	1V or less →9 V or more	[Neutral SW/Clutch SW]
D48-9 (IG2D) - chassis ground	Output	IG2 signal	20°C (68°F)	74.15 to 460.88 Q	[IG2 relay monitor (outside)]
D48-2 (+B) - chassis ground	Input	+B power supply	Always	11 to 14 V	-
D48-17 (TACH) - chassis ground	Input	Engine speed signal	Always	10 kΩ or more	[Engine conditions]
D48-18 (STP1) -	Input	Stop light switch signal	Remove your foot from the brake pedal →depress the	1V or more	[Stop Light Switch 1]

chassis ground <sup>(1)</sup>		brake pedal	→9V or less	
<sup>(1)</sup> With automatic transmission				
<sup>(2)</sup> Manual transmission				

If you cannot get the specified result, there could be a problem in the wiring harnesses.

3. Reconnect the D41 and the D48 connectors of the collation ECM (smart key ECM ASSY).

4. Refer to the table below and measure the voltage and check for a pulse.

Terminal No. (Terminal symbol)	Input/Output	Terminal description	Conditions	Specified condition	Related [Data monitor] item
D41-25 (P) - D48-11 (GND) <sup>(1)</sup>	Input	Shift lever P position signal	The shift lever is in the P position →the shift lever is not in the P position	1.5V or more →9V or less	[Shift P Signal]
D41-4 (ACCD) - D48-11 (GND)	Output	ACC signal	Engine switch off →Engine switch on (ACC)	1V or less →8.5V or more	[ACC relay monitor]
D41-6 (IG1D) - D48-11 (GND)	Output	IG1 signal	Engine switch on (ACC) →Engine switch on (IG)	1V or less →9 V or more	[IG1 relay monitor (outside)]
D41-26 (SLP) - D48-11 (GND)	Input	Steering lock bar position signal	Steering wheel lock →Steering wheel unlock <sup>(3)</sup>	11 to 14 V →1.2 V or less	[Steering unlock SW]
D41-27 (SPD) - D48-11 (GND)	Input	Vehicle speed signal	The engine switch on (IG), the vehicle running at approx. 5 km/h {3 MPH}	Pulse generation (Refer to waveform 1, see Fig 36)	[Vehicle Speed]
D41-28 (SSW1) - D48-11 (GND)	Input	Engine switch signal	The engine switch is not being pushed →the engine switch is being pushed	9 V or more →1 V or less	[Start switch1]
D41-29 (SLR+) - D48-11 (GND)	Output	Steering lock motor drive command (motor drive permission signal sent from the	Steering lock motor is operated →steering lock motor does not operate →steering lock motor operates *4	Pulse generation (Refer to waveform	-

		collation ECM (smart key ECM ASSY))		2, see Fig 37)	
D41-30 (SSW2) - D48-11 (GND)	Input	SSW2 contact signal  <b>NOTE:</b> Backup of SSW1. Works in the same way as SSW1.	The engine switch is not being pushed → the engine switch is being pushed	9 V or more → 1 V or less	[Start switch2]
D48-7 (STSW) - D48-11 (GND)	Output	Starter request signal	Depress the brake pedal (1) or the clutch pedal (2) and press the engine switch (starter on) → After approx. 1 second, the engine switch is released (starter off)	2V or less → 9 V or more	Starter request signal
D48-5 (N-SW) - chassis ground (1)	Input	Neutral switch signal	Shift position P or N → Other than P or N	1V or less → 9 V or more	[Neutral SW/Clutch SW]
D48-10 (CLUT) - chassis ground (2)	Input	Clutch switch signal	Except for when the engine is cranking, perform the following operations: remove your foot from the clutch pedal → depress the clutch pedal	1V or less → 9 V or more	[Neutral SW/Clutch SW]
D40-28 (ACCR) - D48-11 (GND)	Input	ACC Relay Cut Signal	Depress the brake pedal (1) or the clutch pedal (2) and press the engine switch (starter on) → After approx. 1 second, the engine switch is released (starter off)	2V or less → 9 V or more	ACC Relay Cut Signal
D48-17 (TACH) - D48-11 (GND)	Input	Clutch shift position sensor signal	Idle revolutions after the engine is warmed up	Pulse generation (Refer to waveform 3, see Fig 38)	[Engine conditions]
D48-9 (IG2D) -	Output	IG2 signal	Engine switch on (ACC) → Engine switch on (IG)	1V or less → 9 V or more	[IG2 relay monitor (outside)]

D48-11 (GND)					
D48-18 (STP1) - D48-11 (GND) <sup>(1)</sup>	Input	Stop light switch signal	Remove your foot from the brake pedal →depress the brake pedal	1V or less →9 V or more	[Stop Light Switch 1]
(1) With automatic transmission					
(2) With manual transmission					
(3) When the shift lever is in P (with automatic transmission), if a door is opened or closed with the engine switch off, the steering is locked. If the key is in the vehicle interior and the engine switch is on (ACC) or on (IG), the steering is unlocked.					
(4) If the following conditions are met, the steering lock motor operates and door opens.					

1. The shift lever is in P (for automatic transmission).
2. Holding the electrical key transmitter SUB-ASSY, turn the engine switch on (IG), and after  
unlocking the steering, turn the engine switch off.
5. Using an oscilloscope, check the ECM waveform.

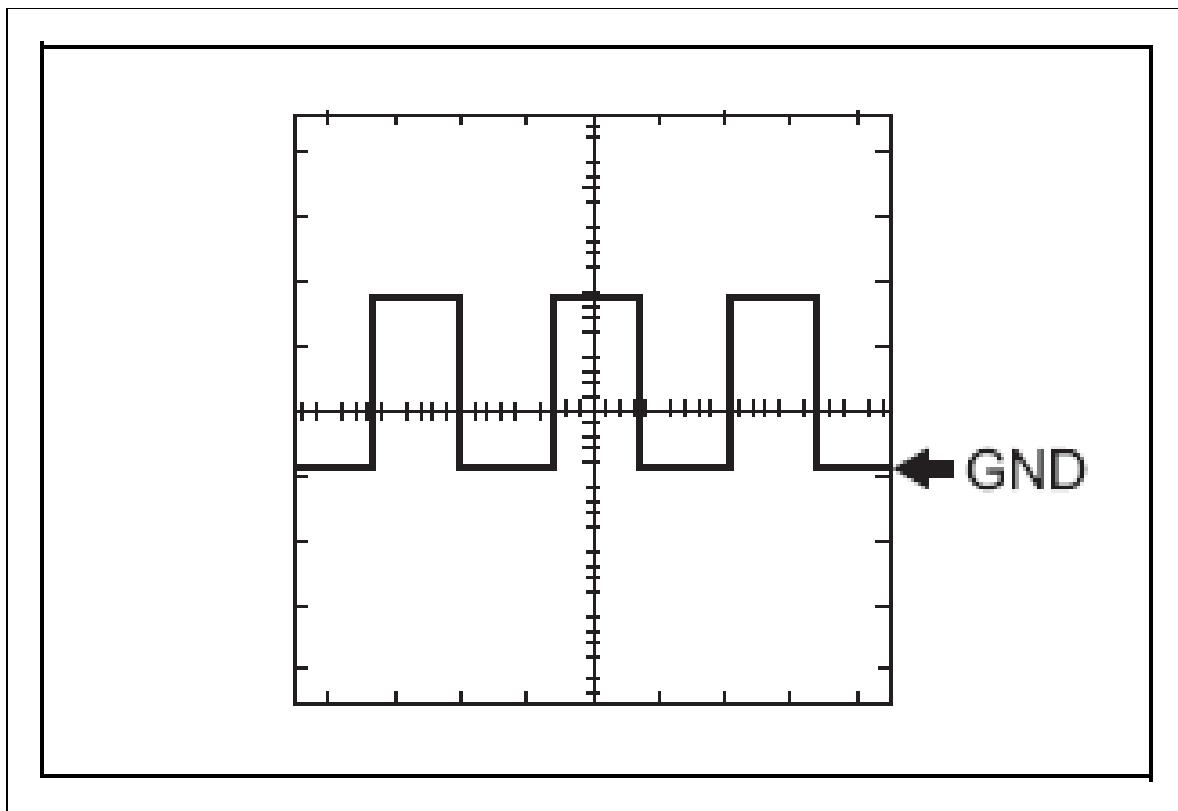
**CAUTION:** The oscilloscope waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

a. Waveform 1 (reference)

Item	Contents
Tester connection	D41-27 (SPD) - D48-11 (GND)
Tool setting	5 V/DIV., 100 ms./DIV.
Conditions	The engine switch on (IG), the vehicle running at approx. 5 km/h {3 MPH}

**NOTE:** The faster the vehicle speed, the shorter the wavelength becomes.

Fig 36: Waveform 1

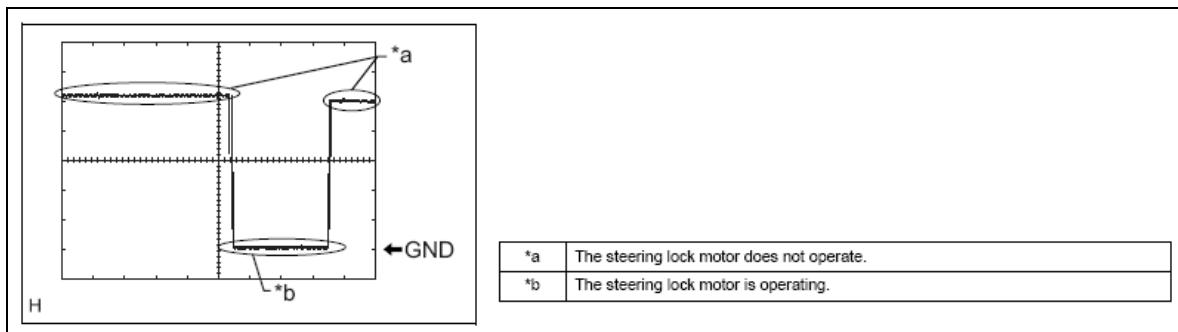


Courtesy of SUBARU OF AMERICA, INC.

b. Waveform 2 (reference)

Item	Contents
Tester connection	D41-29 (SLR+) - D48-11 (GND)
Tool setting	2V/DIV., 200ms./DIV.
Conditions	Steering lock motor is operated → steering lock motor does not operate → steering lock motor operates *1

Fig 37: Waveform 2



Courtesy of SUBARU OF AMERICA, INC.

**NOTE:** \*1: If all the following conditions are met, the steering lock motor operates when a door is opened.

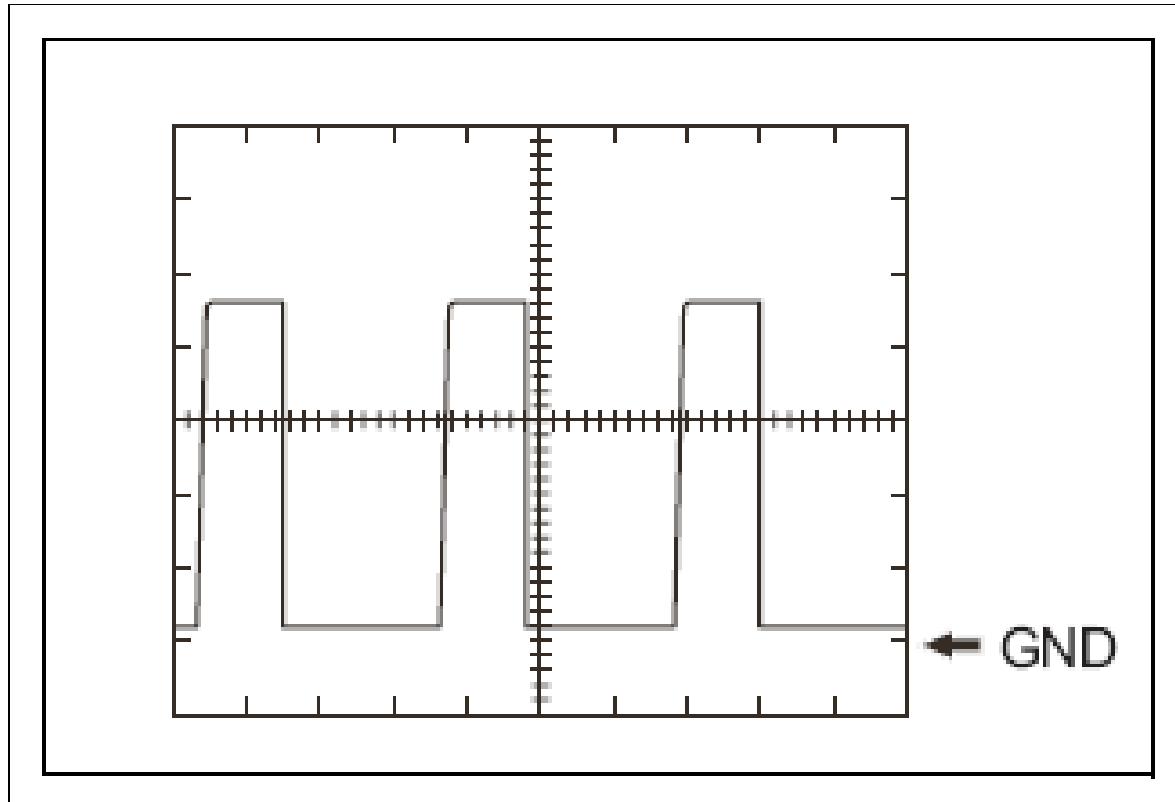
- a. The shift lever is in P.\*
  - a. \*: for automatic transmission
- b. When you turn the engine switch on (IG) holding the electrical key transmitter SUB-ASSY, the handle is unlocked.
- c. The engine switch is off.

c. Waveform 3 (reference)

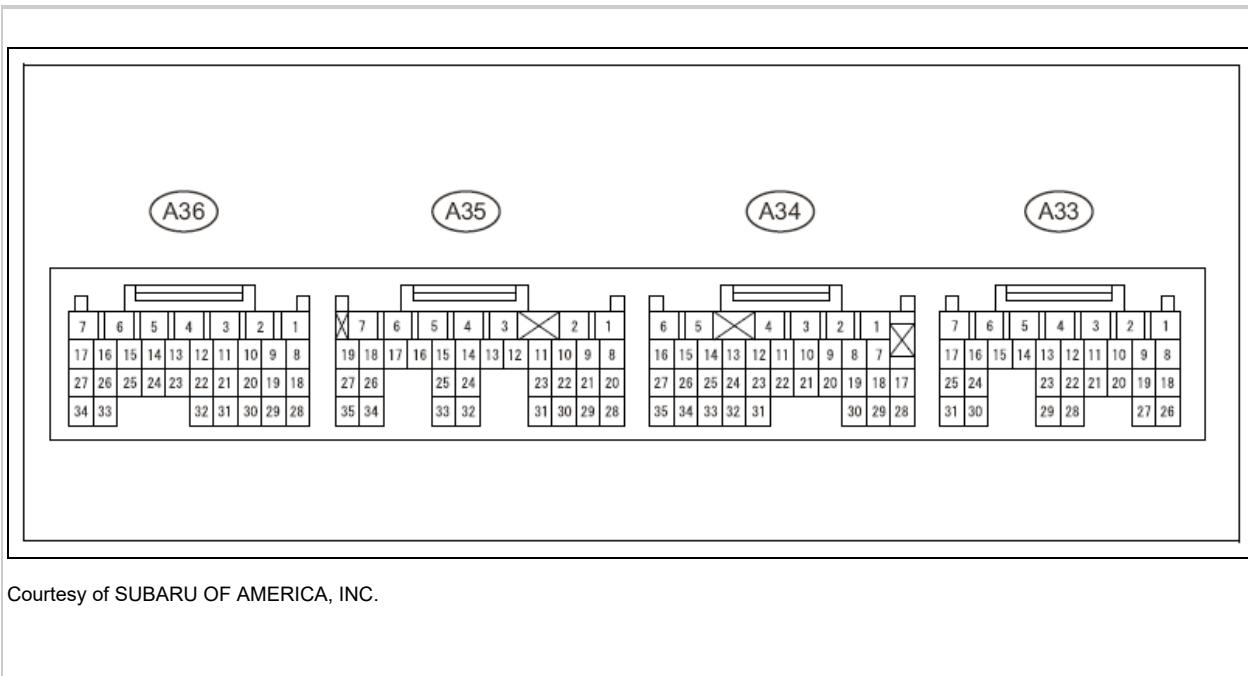
Item	Contents
Tester connection	D48-17 (TACH) - D48-11 (GND)
Tool setting	2 V/DIV., 2 ms./DIV.
Conditions	Idle revolutions after the engine is warmed up

**NOTE:** The faster the engine speed, the shorter the wavelength becomes.

Fig 38: Waveform 3



## 2. CHECK ECM



1. Refer to the table below and measure the resistance and the voltage and check for a pulse.

Terminal No. (Terminal symbol)	Input/Output	Terminal description	Conditions	Specified condition	Related [Data monitor] item
A36-4 (GNDEG1) - chassis ground	-	Ground	Always	1 Ω or less	-
A33-14 (STSW2) - A36-4 (GNDEG1)	Input	Starter switch signal	Engine switch is ON (IG)	1 V or less	[Starter control]
			Cranking	6 to 13V	
A33-16 (NEUT) - A36-4 (GNDEG1)	Input	Neutral switch signal	The engine switch is on (IG), the shift lever is not in P or N.	10 to 13V	-
			The engine switch is on (IG), the shift lever is in P or N.	1 V or less	
A33-17 (START) - A36-4 (GNDEG1)	Input	Starter request signal	Engine switch is ON (IG)	1 V or less	-
			Cranking	6V or more	
A35-15 (TACHO) -A36-4 (GNDEG1)	Output	Engine speed signal	Idle revolutions after the engine is warmed up	Pulse generation (Refer to waveform 1, see Fig 39)	Engine speed
A35-26 (STRLY)	Output	Starter	Engine switch is ON	11 to 14 V → 1V	[Starter]

-A36-4 (GNDEG1)		relay signal	(IG)	or less	signal]
			Cranking	1 V or less	
A35-32 (ACCR) -A36-4 (GNDEG1)	Output	ACC Relay Cut Signal	Engine switch is ON (IG)	10 to 13V	-
			Cranking	1 V or less	
A35-34 (STCTRLY) - A36-4 (GNDEG1)	Output	Starter relay cut signal	Engine switch is ON (IG)	10 to 13V	[Starter cut relay]
			Cranking	1 V or less	

If you cannot get the specified result, there could be a problem in the ECM.

## 2. Inspect using an oscilloscope.

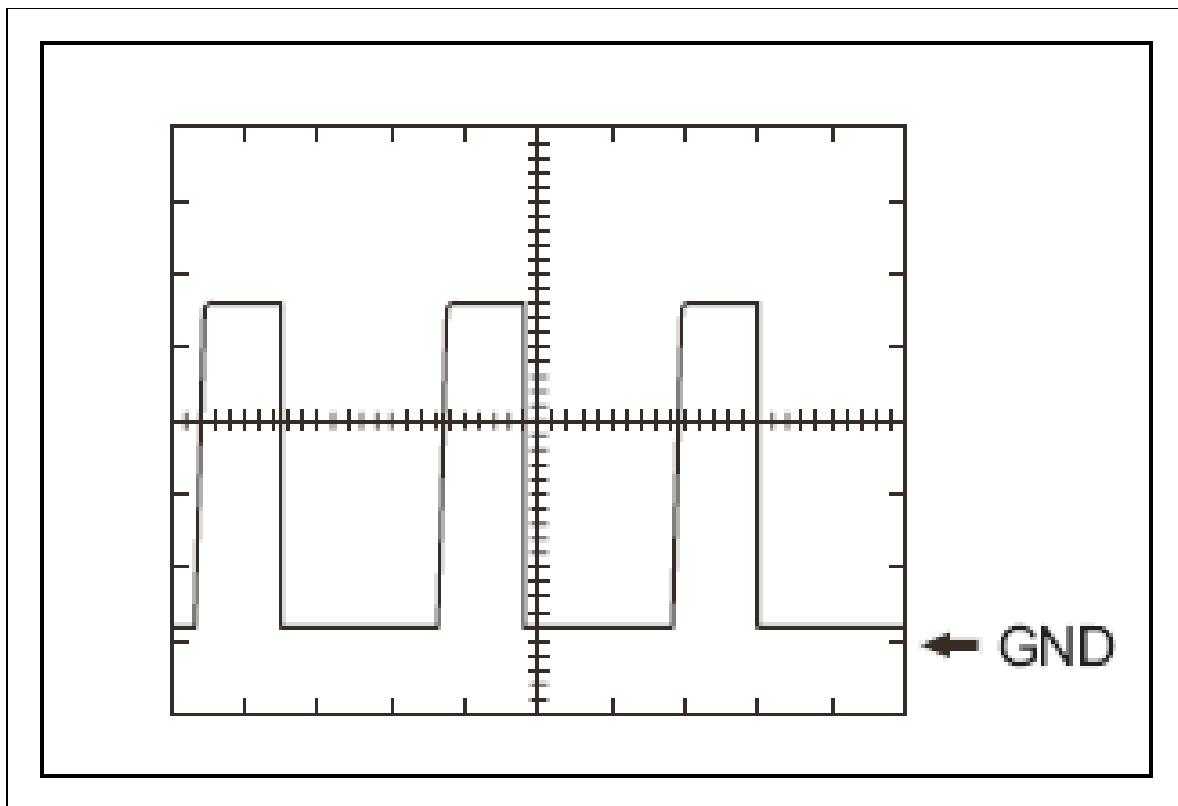
**CAUTION:** The waveform shown in the figure is an example for reference. The noise and chattering are not shown in the figure.

### a. Waveform (reference)

Item	Contents
Tester connection	A35-15 (TACHO) - A36-4 (GNDEG1)
Tool setting	2 V/DIV., 2 ms./DIV.
Conditions	Idle revolutions after the engine is warmed up

**NOTE:** The faster the engine speed, the shorter the wavelength becomes.

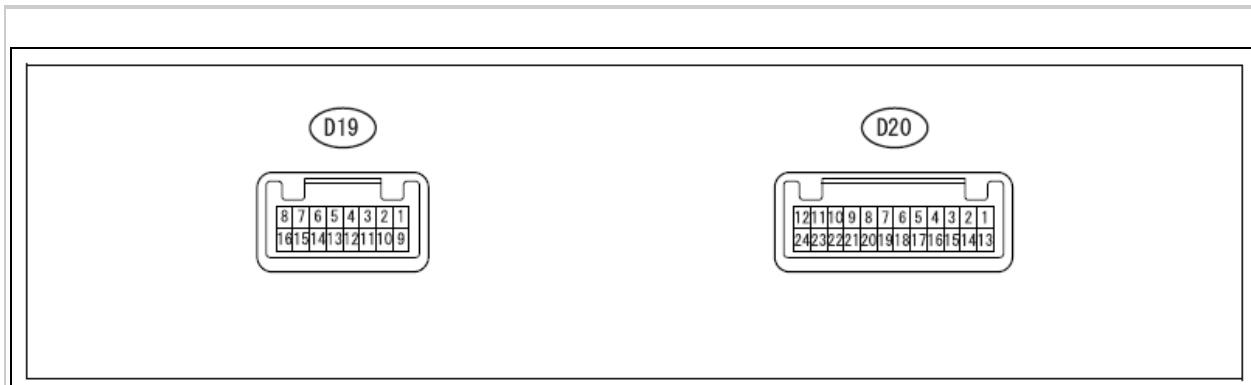
Fig 39: Waveform 1



Courtesy of SUBARU OF AMERICA, INC.

### ECM Terminal Arrangement [ Heater & Air Conditioner System (For Automatic Air Conditioning System) ]

#### 1. Air conditioner control ASSY



Courtesy of SUBARU OF AMERICA, INC.

Standard value

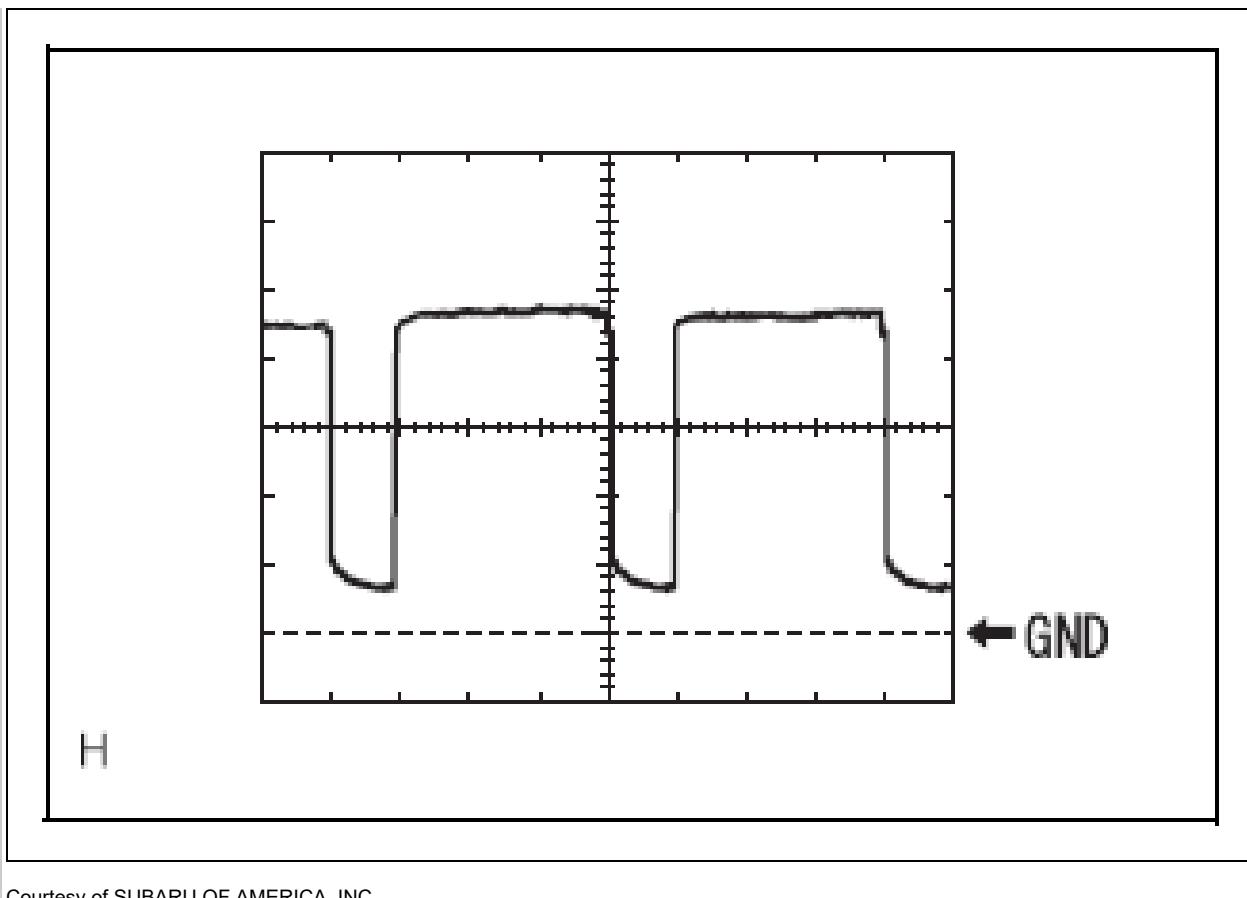
#### STANDARD VALUE SPECIFICATION - CONNECTOR D19

Terminal No. (Terminal symbol)	Input/Output	Item	Measuring conditions	Standard value
--------------------------------	--------------	------	----------------------	----------------

D19-1 (ACC)↔D19-16 (GND)	Input	Voltage	IG ACC	10 to 16 V
D19-2 (PSW)↔D19-6 (SG)	Input	Waveform	When refrigerant pressure is normal	10 to 16 V
			When refrigerant pressure is abnormal	Less than 1 V
D19-6 (SG) ↔Chassis ground	-	Resistance	Always	Less than 1 Ω
D19-8 (HR)↔D19-16 (GND)	Input	Voltage	IG ON Blower switch OFF →LO	Less than 1 V →10 to 16 V
D19-9 (+B)↔D19-16 (GND)	Input	Voltage	Always	10 to 16 V
D19-10 (IG)↔D19-16 (GND)	Input	Voltage	IG ON	10 to 16 V
D19-11 (ILL+)↔D19-16 (GND)	Input	Voltage	Night illumination ON	10 to 16 V
			Night illumination OFF	Less than 1 V
D19-12 (CANL)↔D19-16 (GND)	Input/Output	Waveform	IG ON	Pulse generation
D19-13 (CANH)↔D19-16 (GND)	Input/Output	Waveform	IG ON	Pulse generation
D19-14 (BLW)↔D19-16 (GND)	Output	Waveform	IG ON Blower switch LO	Pulse generation (waveform 1)
D19-15 (ILL-)↔D19-16 (GND)	Input	-	IG ON Rheostat	10 to 16 V
D19-16 (GND) ↔Chassis ground	-	Resistance	Always	Less than 1 Ω

#### STANDARD VALUE SPECIFICATION - CONNECTOR D20

Terminal No. (Terminal symbol)	Input/Output	Item	Measuring conditions	Standard value
D20-2 (TSD) ↔Chassis ground	Input	Voltage	IG ON Put sunlight or light to the sunload sensor.	0.8 to 4.3 V (The voltage varies depending on the light strength.)
D20-29 (S5)↔16 (GND)	Output	Voltage	IG ON	4.75 V to 5.25 V



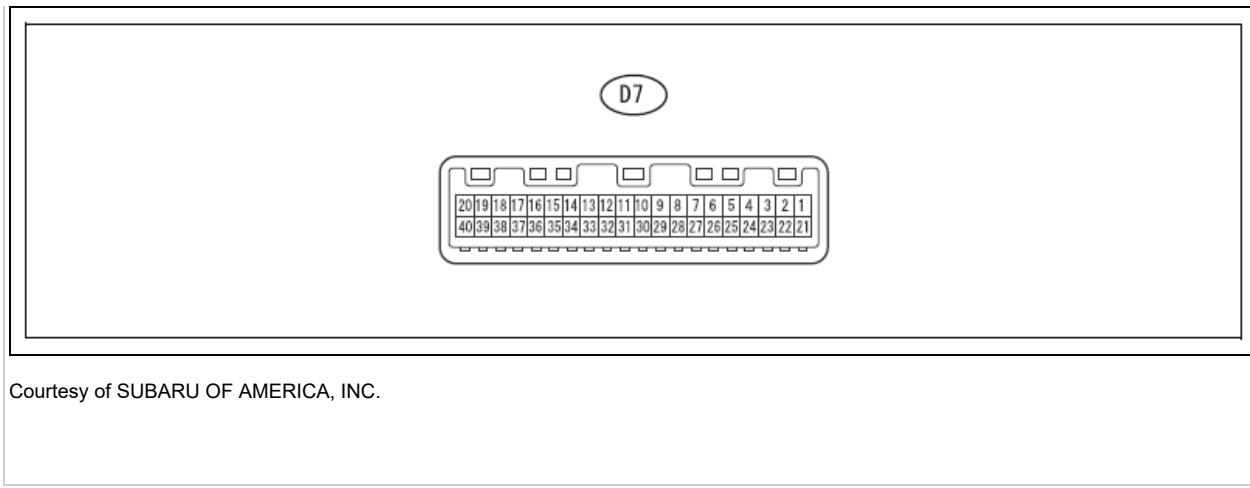
Courtesy of SUBARU OF AMERICA, INC.

### 1. Waveform 1

Item	Contents
Measuring terminal	D19-14 (BLW) - D19-16 (GND)
Equipment setting	1 V/DIV, 500 µs/DIV
Measuring conditions	IG ON, Blower switch: LO, A/C switch: ON

**NOTE:** As the blower level is high (increase of air flow),  
the duty ratio is changed.

### 2. Combination meter ASSY

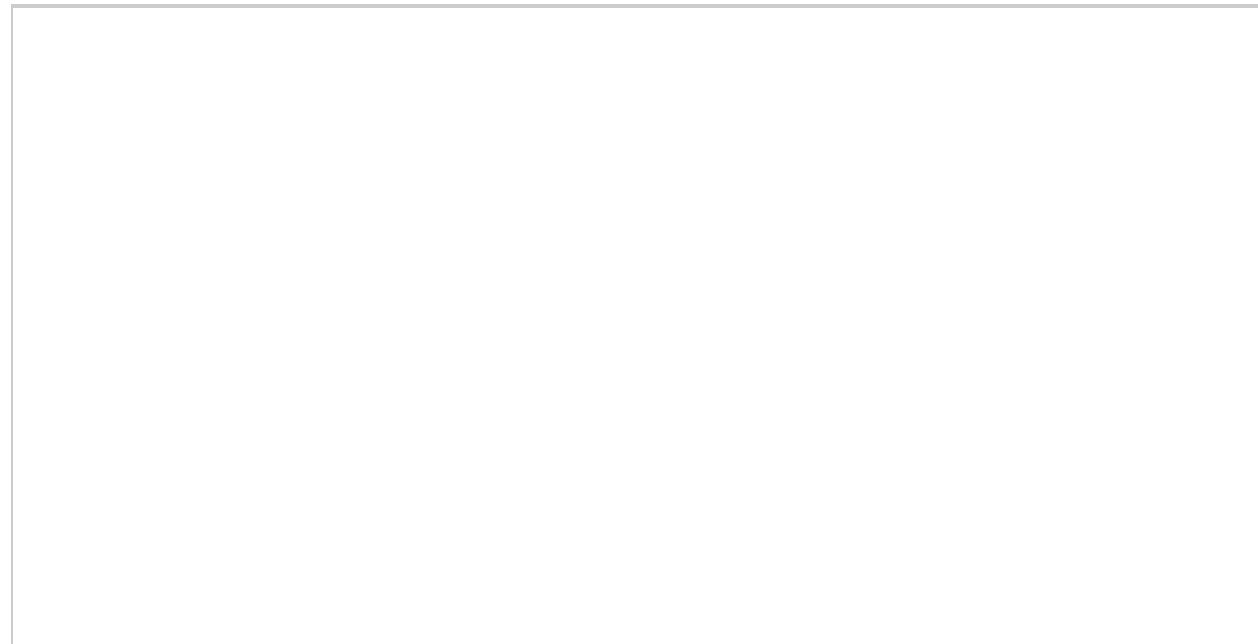


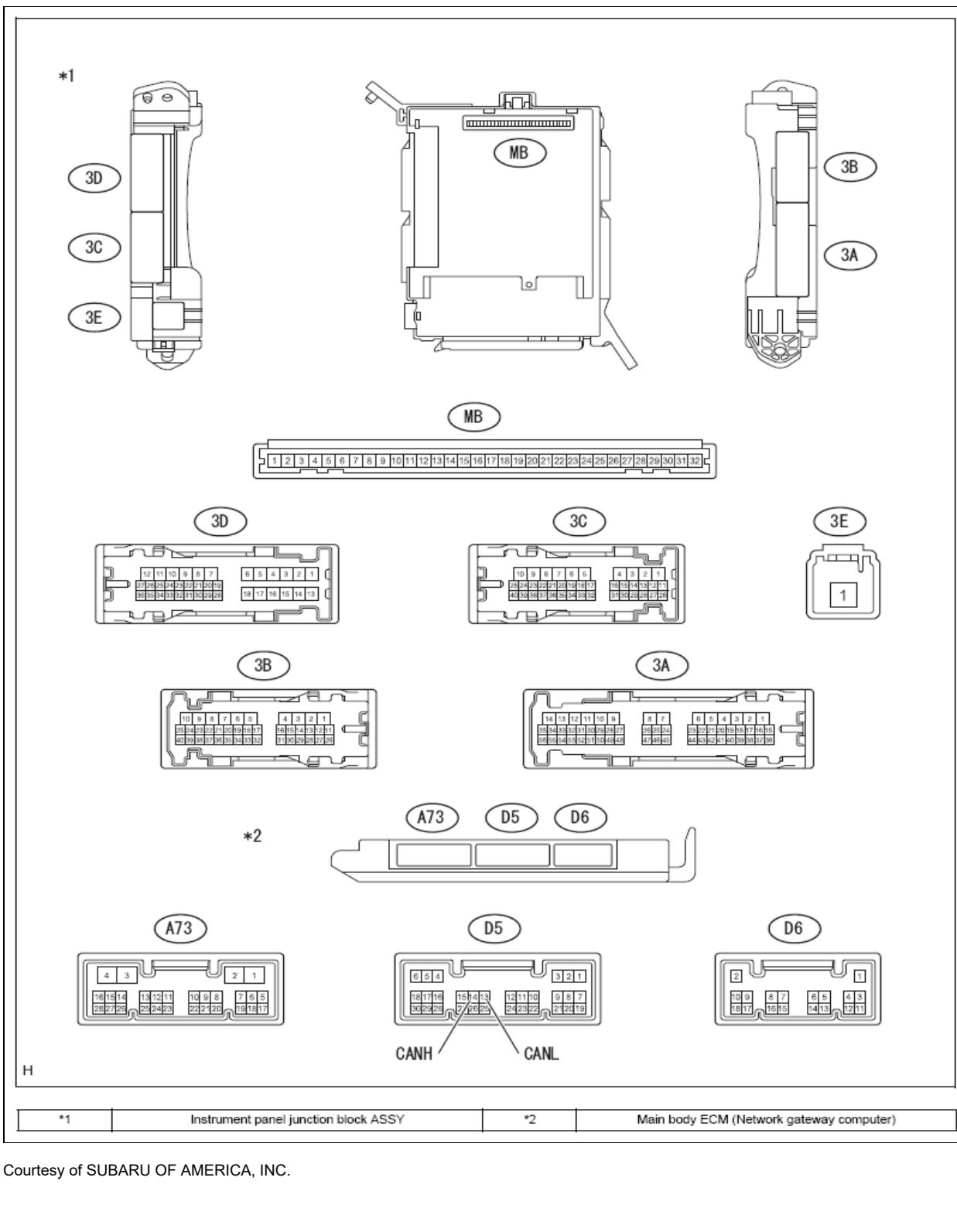
Standard value

### **STANDARD VALUE SPECIFICATION - CONNECTOR D7**

Terminal No. (Terminal symbol)	Input/Output	Item	Measuring conditions	Standard value
D7-24 (TAM) ←→ D7-25 (SG-)	Input	Voltage	IG ON External temperature 25°C (77°F)	1.4 to 1.6V
			IG ON External temperature 50°C (122°F)	0.7 to 0.9V
D7-6 (CANH) ←→ Chassis ground	Input/Output	Waveform	IG ON	Pulse generation
D7-7 (CANL) ←→ Chassis ground	Input/Output	Waveform	IG ON	Pulse generation

### **3. Instrument panel junction block ASSY, main body ECM (Network gateway computer)**





Courtesy of SUBARU OF AMERICA, INC.

1. Inspection of instrument panel junction block ASSY and main body ECM (network gateway computer)
  - a. Remove the main body ECM (network gateway computer) from the instrument panel junction block ASSY.
  - b. Check the resistance and voltage between the instrument panel junction block ASSY connector terminals.

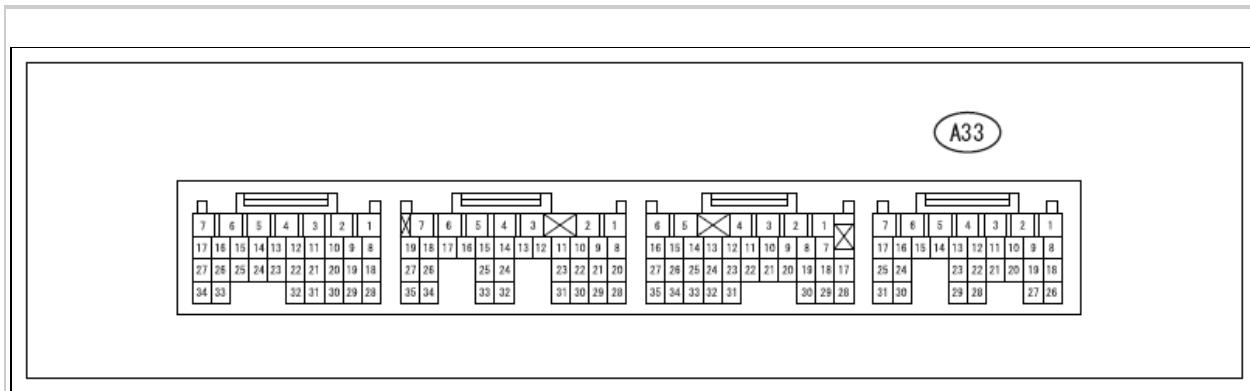
Standard value

## **STANDARD VALUE SPECIFICATION - CONNECTOR MB**

Terminal No. (Terminal symbol)	Input/Output	Item	Measuring conditions	Standard value
MB8 ←→ Chassis ground	Input	Voltage	IG ON	11 to 14 V
MB9 ←→ Chassis ground	Input	Voltage	IG ACC	11 to 14 V
MB11 ←→ Chassis ground	-	Resistance	Always	Less than 1 Ω

**NOTE:** If it is out of the standard value, it can be judged as malfunction of the vehicle.

#### 4. Engine control computer



Courtesy of SUBARU OF AMERICA, INC.

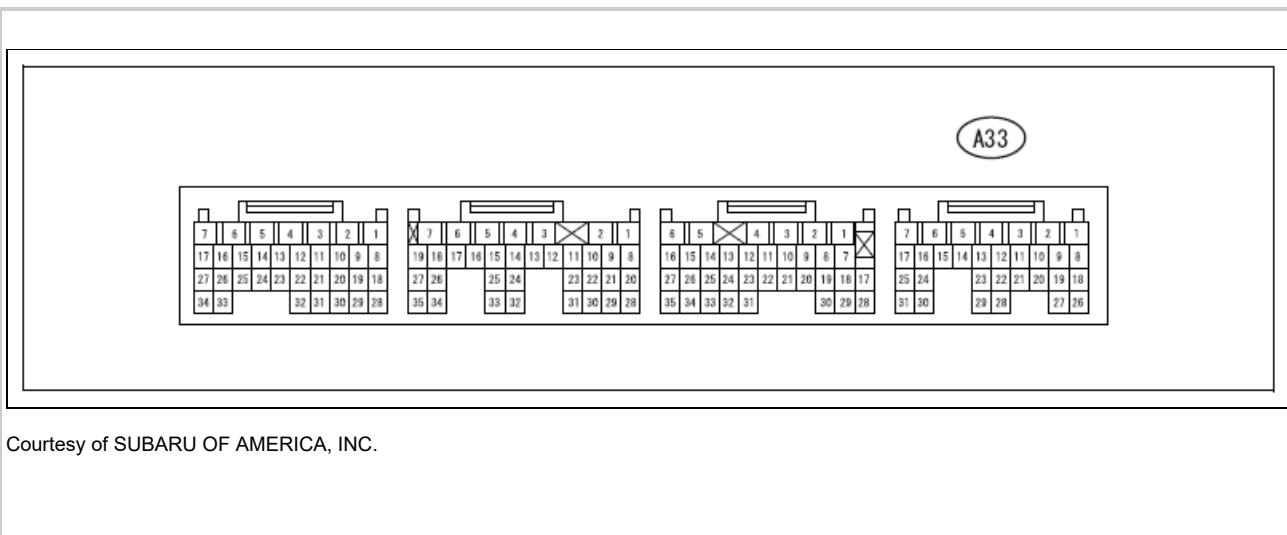
Standard value

## **STANDARD VALUE SPECIFICATION - CONNECTOR A33**

Terminal No. (Terminal symbol)	Input/Output	Item	Measuring conditions	Standard value
A33-8 (ACP) ←→ Chassis ground	Input	Voltage	When refrigerant pressure is normal	0.63 to 4.73V
A33-18 (CANL) ←→ Chassis ground	Input/Output	Waveform	IG ON	Pulse generation
A33-19 (CANH) ←→ Chassis ground	Input/Output	Waveform	IG ON	Pulse generation

## **ECM Terminal Arrangement [ Heater & Air Conditioner System (For Manual Air Conditioning System) ]**

1. Engine control computer



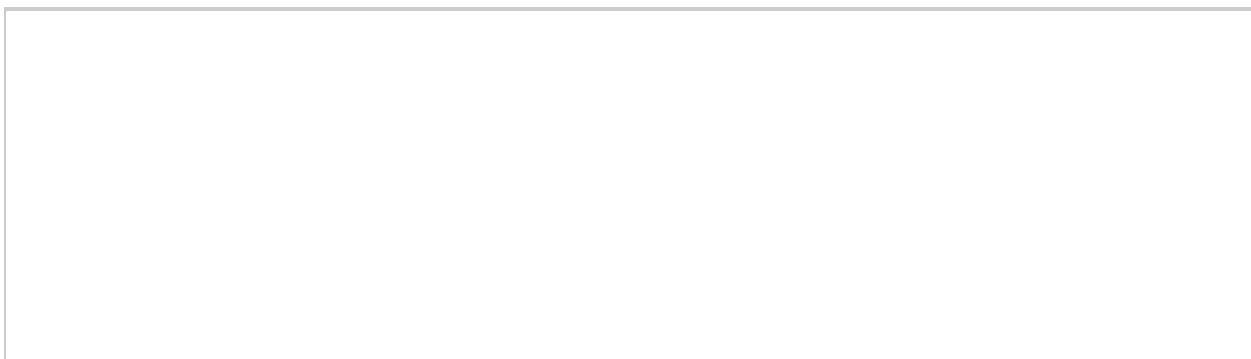
Standard value

**STANDARD VALUE SPECIFICATION - CONNECTOR F42**

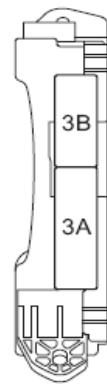
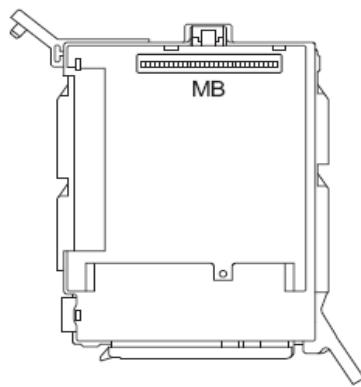
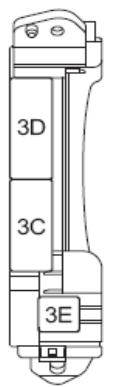
Terminal No. (Terminal symbol)	Input/Output	Item	Measuring conditions	Standard value
A33-8 ←→ chassis ground	Input	Voltage	When refrigerant pressure is normal	10 to 16 V
			When refrigerant pressure is abnormal Less than 0.196 MPa {2.0 kgf/cm <sup>2</sup> } or refrigerant pressure of 3.14 MPa {32 kgf/cm <sup>2</sup> } or more	Less than 1 V
A33-18 ←→ chassis ground	Input	Waveform	IG ON	Pulse generation
A33-19 ←→ chassis ground	Input	Waveform	IG ON	Pulse generation

**ECM Terminal Arrangement [ Key Warning System ]**

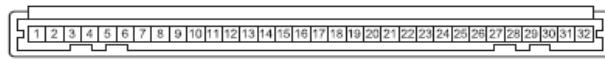
1. Check the instrument panel junction block ASSY and the main body ECM (multiplex network body ECM).



\*1



(MB)



(3D)



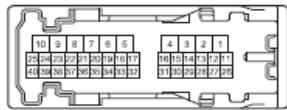
(3C)



(3E)



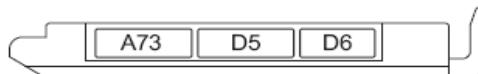
(3B)



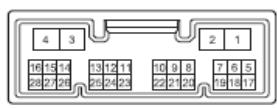
(3A)



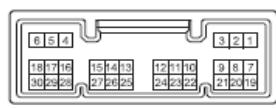
\*2



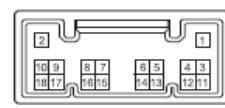
(A73)



(D5)



(D6)



\*1 Instrument panel junction block ASSY

\*2 Main body ECM (multiplex network body ECM)

Courtesy of SUBARU OF AMERICA, INC.

1. Remove the main body ECM (multiplex network body ECM) from the instrument panel junction block ASSY.
2. Disconnect the connectors D5, D6, and A73 of the main body ECM (multiplex network body ECM).
3. Measure the voltage and resistance according to the following table.

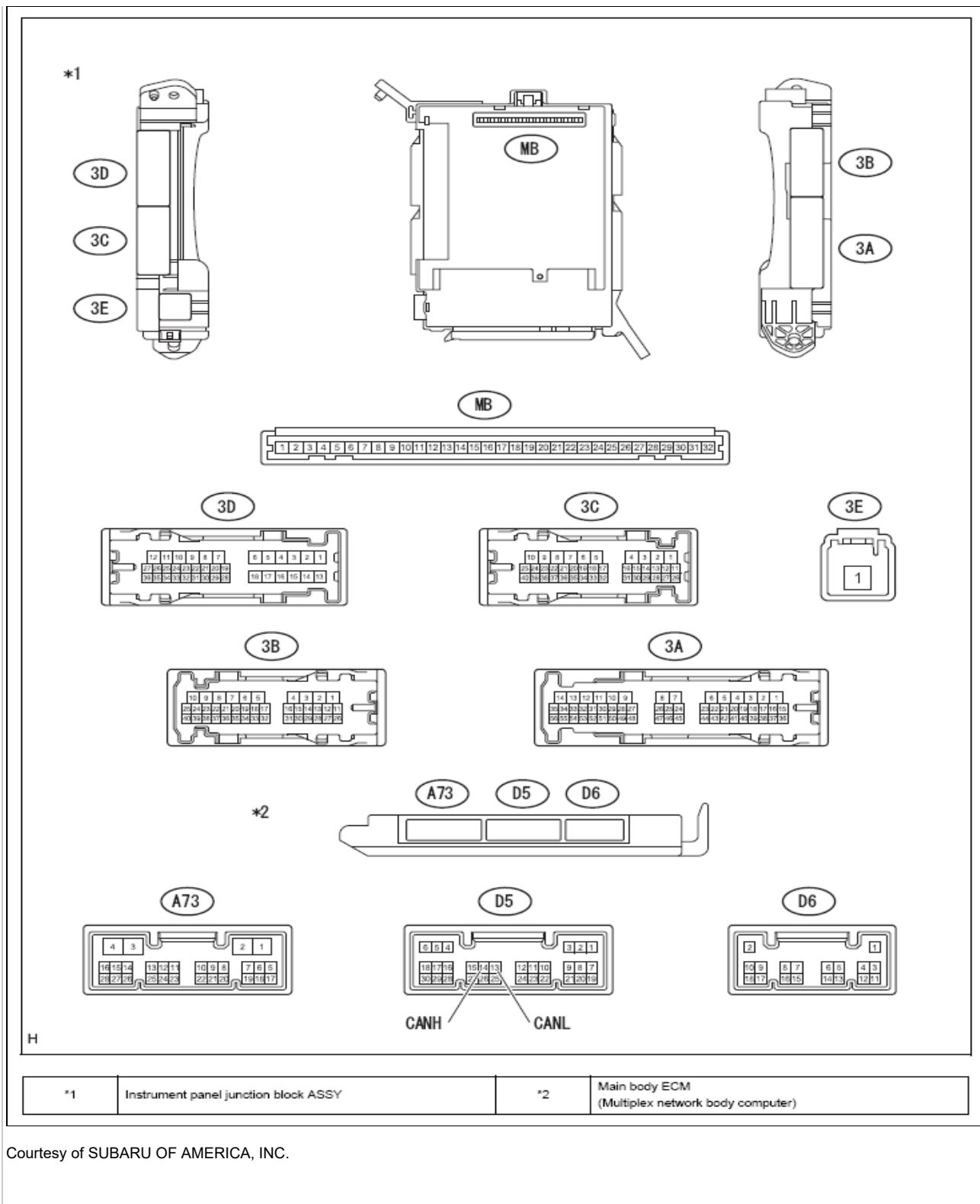
Terminal No. (symbol)	Terminal description	Conditions	Specified condition
MB-1 - chassis ground	Battery power supply	Always	11 to 14 V
MB-8 - chassis ground	IG SW power supply	IG SW ON	11 to 14 V
		IG SW OFF	1 V or less
MB-9 - chassis ground	ACC power supply	IG SW ACC	11 to 14 V
		IG SW OFF	1 V or less
MB-11 - chassis ground	Ground	Always	1 Ω or less
MB-32 - chassis ground	Battery power supply	Always	11 to 14 V
D5-22 - chassis ground	Unlock warning switch input	Key is not inserted in ignition key cylinder (OFF)	1 V or less
		Key is inserted to the ignition key cylinder (ON).	11 to 14 V
D6-1 - Chassis ground	Ground	Always	1 Ω or less
A73-4 - chassis ground	Ground	Always	1 Ω or less

4. Reconnect the connector D5, D6, and A73 of the main body ECM (multiplex network body ECM).
5. Install the main body ECM (multiplex network body ECM) to the instrument panel junction block ASSY.
6. Measure the voltages and pulses according to the values indicated in the table below.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
3A-28 - chassis ground	Driver's side courtesy light switch	Driver's door is open.	1 V or less
		Driver's door is closed	Pulse generation

### ECM Terminal Arrangement [ Large-Scale Multiplex Communication System For Vehicle Body [LIN] ]

1. Instrument panel junction block ASSY, Main body ECM (multiplex network body computer)



Courtesy of SUBARU OF AMERICA, INC.

1. Check the main body ECM (multiplex network body computer)

- Remove the main body ECM (Multiplex network body computer). (Refer to REMOVAL )
- Measure the voltage and resistance between terminals.

**STANDARD VALUE SPECIFICATION**

Terminal No.	Item	Inspection conditions	Standard value
MB-1 - chassis ground	Voltage	Always	11 to 14V
MB-8 - chassis ground	Voltage	IG ON	11 to 14V
MB-11 - chassis ground	Resistance	Always	Less than 1 Ω
MB-32 - chassis ground	Voltage	Always	11 to 14V

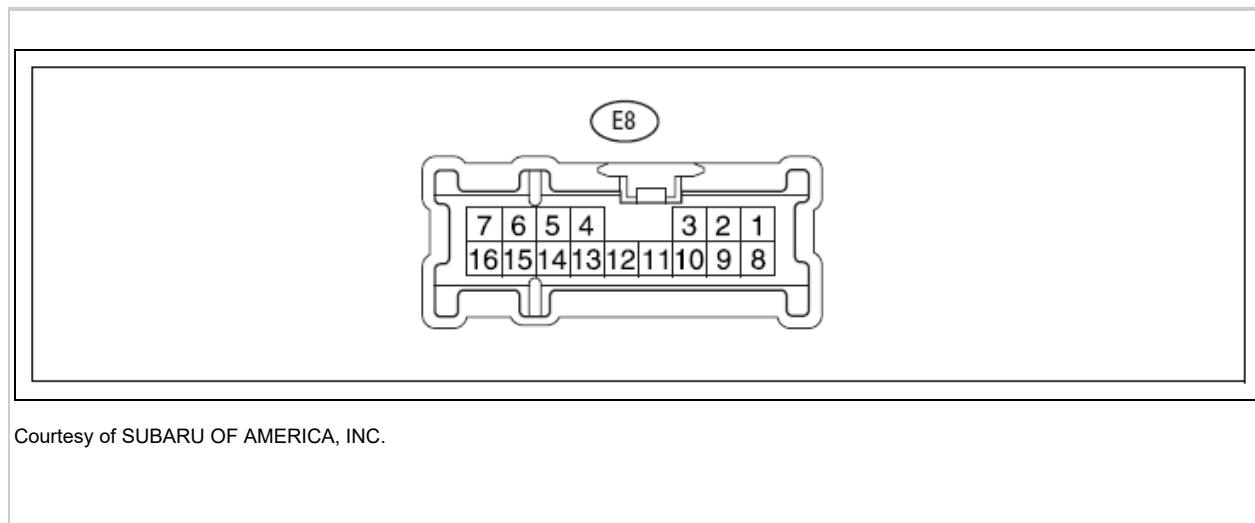
c. Install the main body ECM (Multiplex network body computer).

d. Measure the waveform between terminals using an oscilloscope.

#### **STANDARD VALUE SPECIFICATION**

Terminal No.	Item	Inspection conditions	Standard value
D5-4 (LIN) - D6-1 (GND)	Waveform	IG ON	Pulse generation

2. Power window regulator master switch ASSY



1. Check the power window regulator master switch ASSY

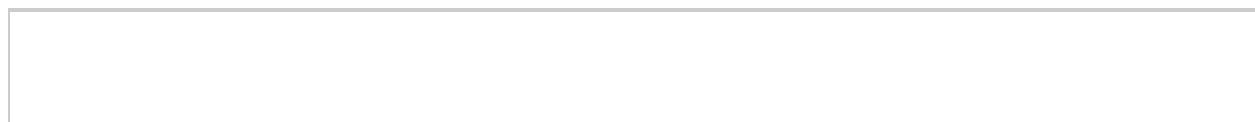
a. Disconnect the connector E8 from the power window regulator master switch ASSY.

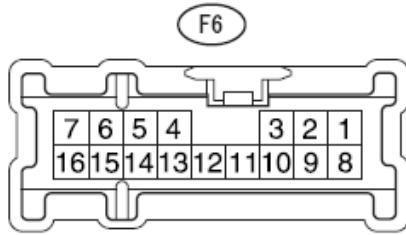
b. Measure the voltage and resistance between terminals.

#### **STANDARD VALUE SPECIFICATION**

Terminal No.	Item	Inspection conditions	Standard value
E8-5 - chassis ground	Resistance	Always	Less than 1 Ω
E8-12 - E8-5	Voltage	Always	11 to 14V

3. Power window regulator switch ASSY





Courtesy of SUBARU OF AMERICA, INC.

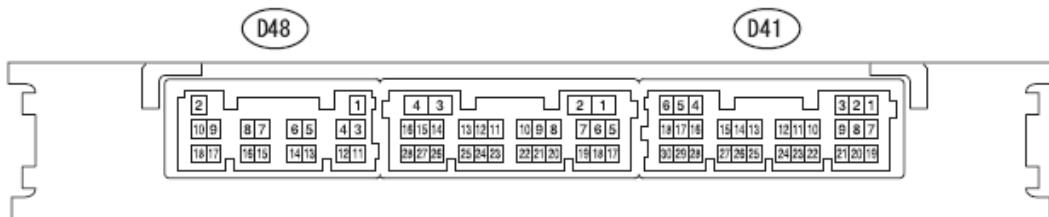
#### 1. Inspection of the power window regulator switch assy

- Disconnect the connector F6 of power window regulator switch ASSY.
- Measure the voltage and resistance between terminals.

#### **STANDARD VALUE SPECIFICATION**

Terminal No.	Item	Inspection conditions	Standard value
F6-5 - Chassis ground	Resistance	Always	Less than 1 Ω
F6-12 - F6-5	Voltage	Always	11 to 14V

#### 4. Collation ECM (Smart key computer ASSY) (with smart entry)



Courtesy of SUBARU OF AMERICA, INC.

#### 1. Check the collation ECM (Smart key computer ASSY)

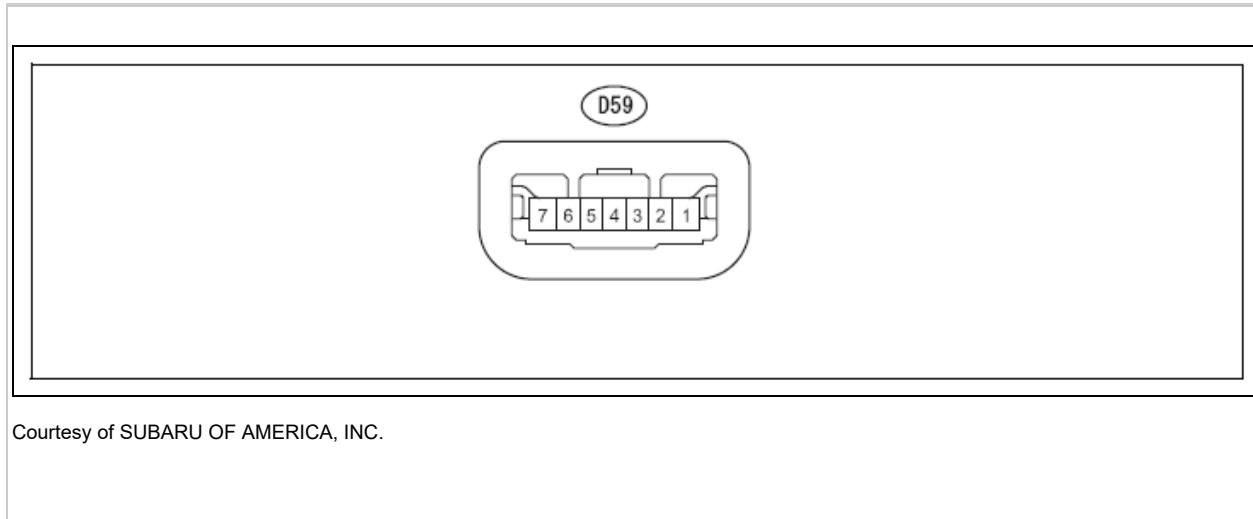
- Disconnect the connectors D41 and D48 from the collation ECM (Smart key computer ASSY).

b. Measure the voltage and resistance between terminals.

**STANDARD VALUE SPECIFICATION**

Terminal No.	Item	Inspection conditions	Standard value
D41-5 - D48-11	Voltage	IG ON	11 to 14V
D48-2 - D48-11	Voltage	Always	11 to 14V
D48-11 - chassis ground	Resistance	Always	Less than 1 Ω

5. Steering lock actuator ASSY (with smart entry)



1. Check the steering lock actuator ASSY

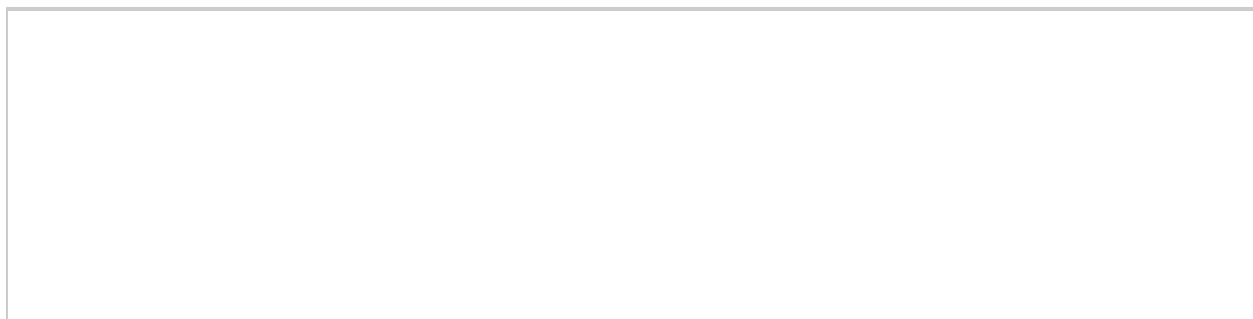
a. Disconnect the connector D59 from the steering lock actuator ASSY.

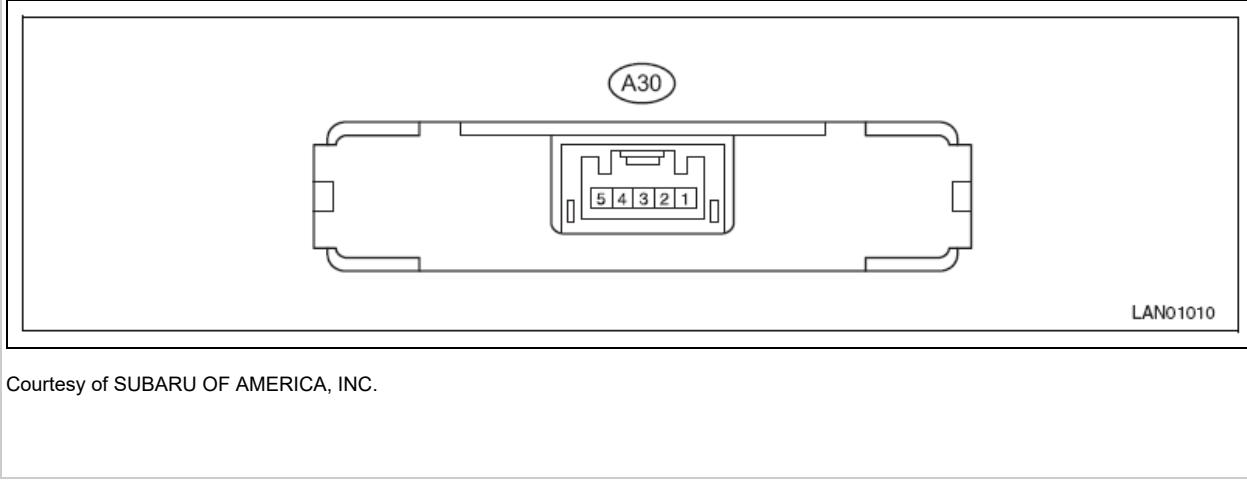
b. Measure the voltage and resistance between terminals.

**STANDARD VALUE SPECIFICATION**

Terminal No.	Item	Inspection conditions	Standard value
D59-1 - chassis ground	Resistance	Always	Less than 1 Ω
D59-6 - D59-1	Voltage	IG ON	11 to 14V
D59-7 - D59-1	Voltage	Always	11 to 14V

6. ID code box (Immobilizer code ECM) (with ID code box)





1. Check the ID code box

- a. Disconnect the connector A30 of the ID code box.
- b. Measure the voltage and resistance between terminals.

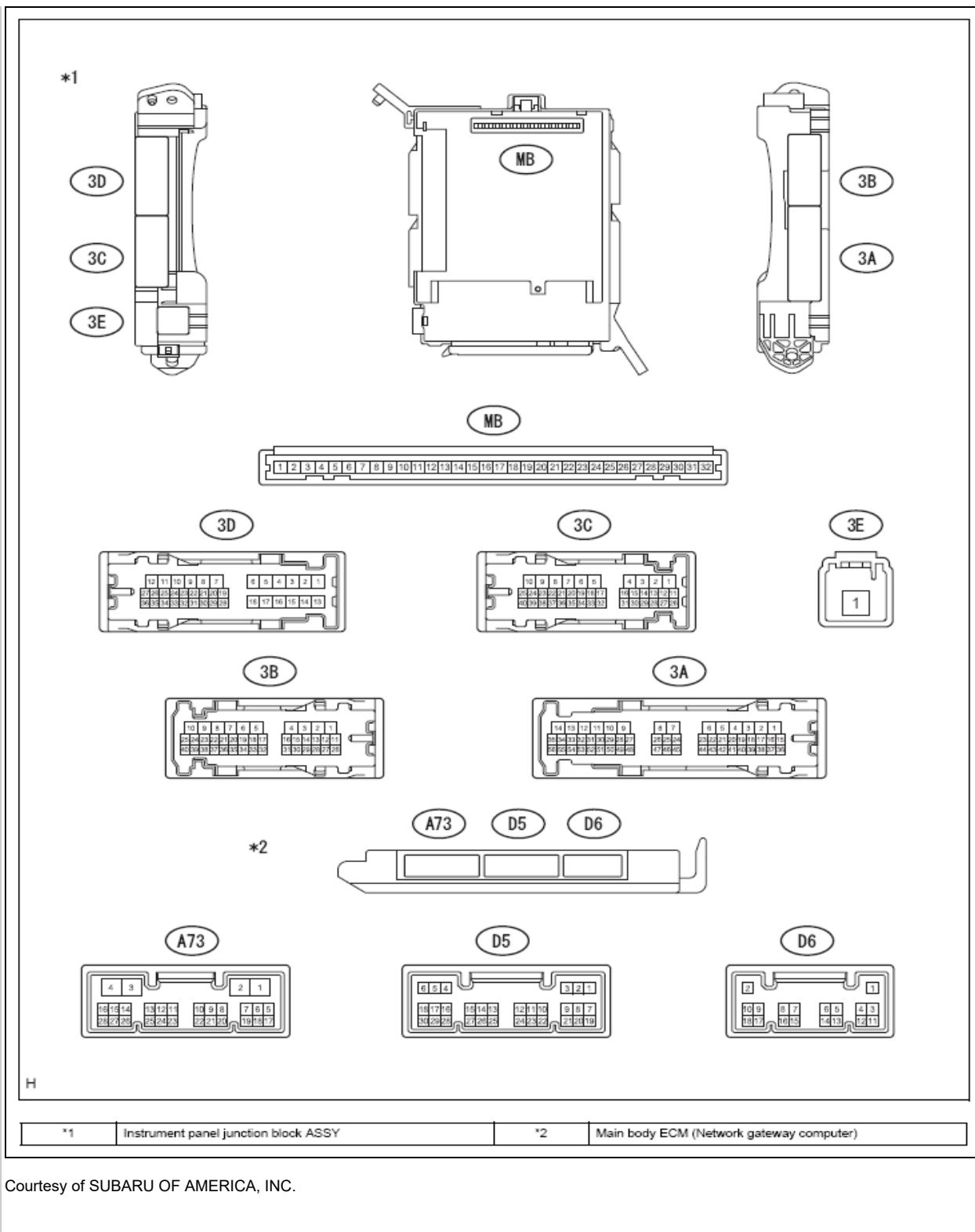
**STANDARD VALUE SPECIFICATION**

Terminal No.	Item	Inspection conditions	Standard value
A30-1 - A30-5	Voltage	Always	11 to 14V
A30-5 - chassis ground	Resistance	Always	Less than 1 Ω

**ECM Terminal Arrangement [ LIGHTING SYSTEM (EXTERIOR) : Lighting System ]**

1. Main body ECM (network gateway computer), instrument panel junction block ASSY





Courtesy of SUBARU OF AMERICA, INC.

1. Inspection of the instrument panel junction block ASSY and the main body ECM (network gateway computer)
  - a. Remove the main body ECM (network gateway computer) from the instrument panel junction block ASSY.
  - b. Measure the voltage and resistance between terminals.

#### **STANDARD VALUE SPECIFICATION**

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
A73-2 (HRLY) ←→ Chassis ground	Always	11 to 14 V
A73-4 (GND) ←→ Chassis ground	Always	Less than 1 Ω
A73-23 ←→ Chassis ground	Always	11 to 14 V
MB-30 (FFGO) ←→ Chassis ground	When the tail lights are on	11 to 14 V
D6-1 (GND) ←→ Chassis ground	Always	Less than 1 Ω
3C-4 ←→ Chassis ground	IG ON	11 to 14 V
3C-7 ←→ Chassis ground	Always	11 to 14 V
3E-1 ←→ Chassis ground	Always	11 to 14 V

**NOTE:** If it is outside the standard values, the vehicle is defective.

c. Install the main body ECM (network gateway computer) on the instrument panel junction block ASSY

d. Measure the resistance between the terminals.

#### **STANDARD VALUE SPECIFICATION**

Terminal No.	Inspection conditions	Standard value
D6-13 (CLTE) <sup>(1)</sup> ←→ Chassis ground	Always	Less than 1 Ω
(1) When there is auto light control		

e. Measure the voltage between the terminals.

#### **STANDARD VALUE SPECIFICATION**

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
A73-11 (DIM) ←→ Chassis ground	When in key SW OFF, IG OFF, or ACC OFF, light control switch OFF → HEAD	Less than 1 V → 11 to 14 V
A73-12 ←→ Chassis ground	IG ON, light control switch OFF → HEAD	11 to 14 V → Less than 1 V
D5-2 (HEAD) ←→ Chassis	Key SW ON, light control switch OFF → HEAD <sup>(1)</sup>	11 to 14 V → Less than 1 V

ground	ACC ON, light control switch OFF →HEAD <sup>(2)</sup>	
D5-23 (A) <sup>(3)</sup> ←→Chassis ground	Light control switch OFF →AUTO	11 to 14 V →Less than 1 V
D5-24 (FFOG) ←→Chassis ground	Front fog light switch OFF →ON	11 to 14 V →Less than 1 V
D5-25 (TAIL) ←→Chassis ground	Light control switch OFF →TAIL	11 to 14 V →Less than 1 V
D6-14 (CLTS) <sup>(3)</sup> ←→Chassis ground	IG ON, light control switch is AUTO, automatic control sensor is covered by something that doesn't let light through →exposed	Pulse generation (changes according to the light) (waveform 1)
D6-15 (CLTB) <sup>(3)</sup> ←→Chassis ground	IG ON	11 to 14 V
MB-18 (HF) ←→Chassis ground	Headlight dimmer switch (flashing) OFF→ON	11 to 14 V →Less than 1 V
MB-21 (HU) ←→Chassis ground	When the light control switch is set to HEAD, LO beam →HI beam	11 to 14 V →Less than 1 V

(1) Without smart entry & start system

(2) With smart entry & start system

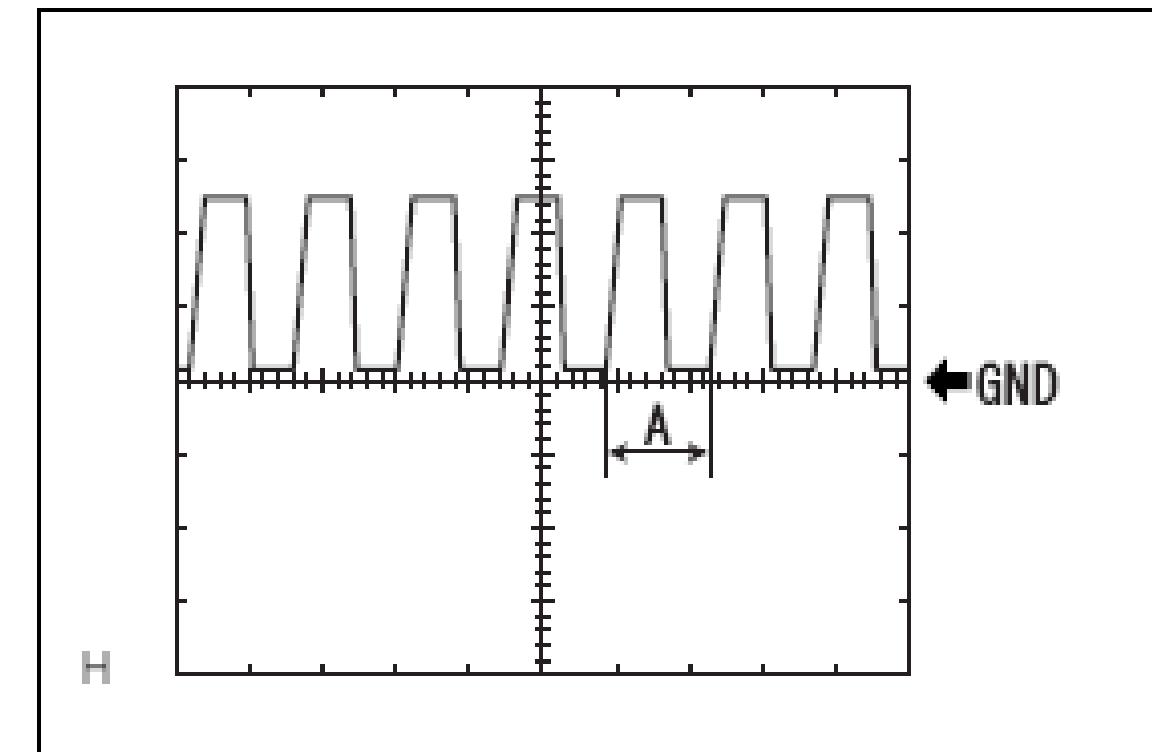
(3) With auto light control

## 2. Waveform 1

Item	Contents
Inspection terminals	D6-14 ←→Chassis ground
Equipment setting	5V/DIV, 5ms/DIV
Inspection conditions	IG ON, light control switch is AUTO, automatic control sensor is covered by something that doesn't let light through →exposed

\*: When there is auto light control

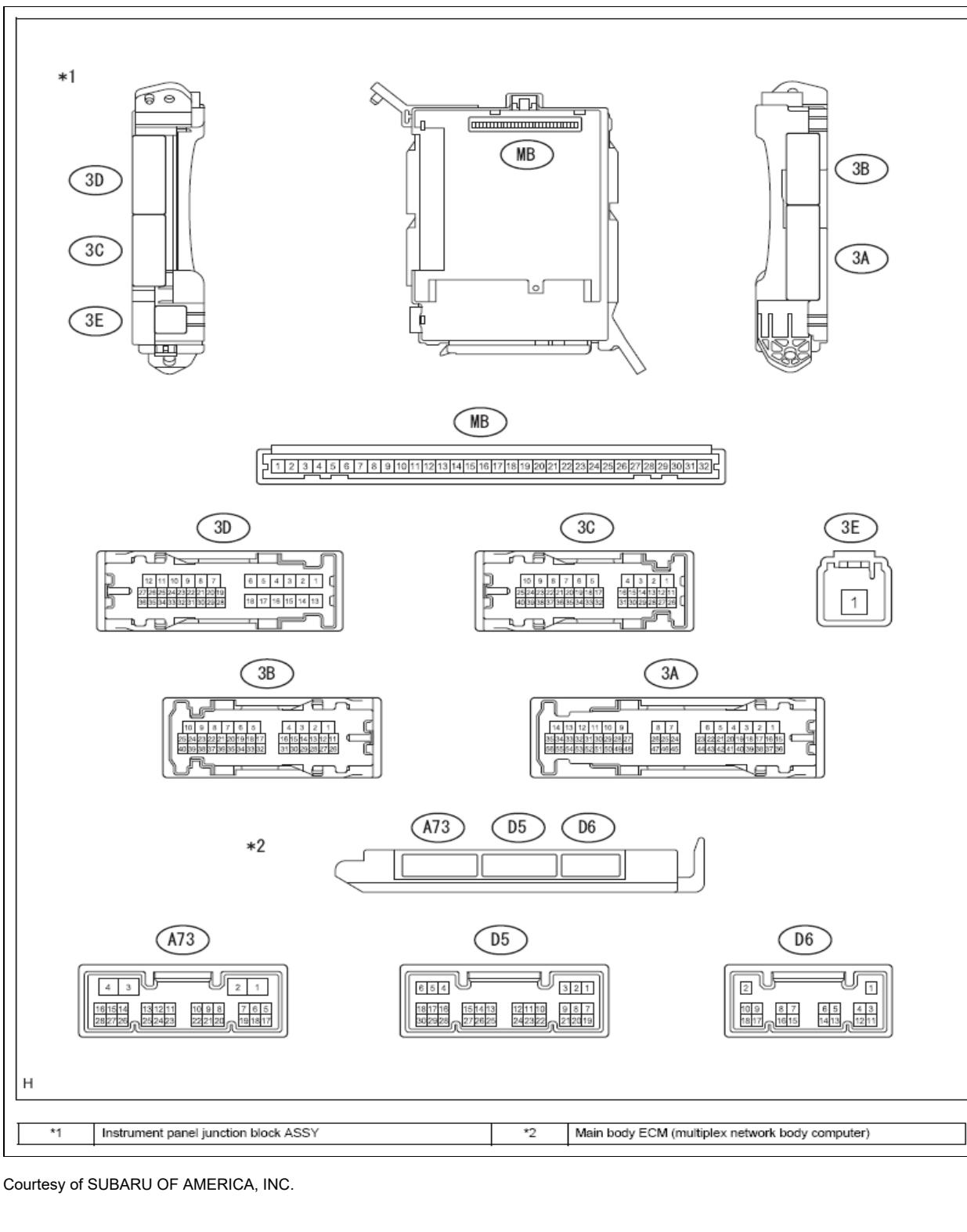
**NOTE:** The brighter the area becomes, the shorter the A interval becomes.



Courtesy of SUBARU OF AMERICA, INC.

### ECM Terminal Arrangement [ LIGHTING SYSTEM (INTERIOR) : Lighting System ]

1. Main body ECM (multiplex network body computer)



Courtesy of SUBARU OF AMERICA, INC.

1. Inspection of the main body ECM (multiplex network body computer) and the instrument panel junction block ASSY
  - a. Disconnect the connector of the main body ECM (multiplex network body computer).
  - b. Measure the voltage between the connector terminals on the vehicle wiring harness side.  
Standard value

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
D5-22 (ACC) ←→ chassis ground <sup>(1)</sup>	ACC ON	11 to 14V
(1) With smart entry & start system		

**NOTE:** If it is out of the standard value, it can be judged as malfunction of the vehicle.

- c. Disconnect the connector of the instrument panel junction block ASSY.
- d. Measure the voltage and resistance between the connector terminals on the vehicle wiring harness side.

Standard value

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
3A-12 ←→ chassis ground	Always	Less than 1 Ω
3A-13 ←→ chassis ground	Always	Less than 1 Ω
3A-15 ←→ chassis ground	IG ON	11 to 14V
3A-20 ←→ chassis ground	ACC ON	11 to 14V
3A-27 ←→ chassis ground	Always	11 to 14V
3C-19 ←→ chassis ground	Always	11 to 14V
3E-1 ←→ chassis ground	Always	11 to 14V
A73-4 (GND) ←→ chassis ground	Always	Less than 1 Ω
D6-1 (GND) ←→ chassis ground	Always	Less than 1 Ω

**NOTE:** If it is out of the standard value, it can be judged as malfunction of the vehicle.

- e. Connect the connectors of the main body ECM (multiplex network body computer) and the instrument panel junction block ASSY.
- f. Measure the voltage or waveform between the connector terminals.

Standard value

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
3B-13 ←→ chassis ground	With driver's door closed →opened	11 to 14V → Less than 1V
3A-28 ←→ chassis ground	With passenger's door closed →opened	11 to 14V → Less than 1V

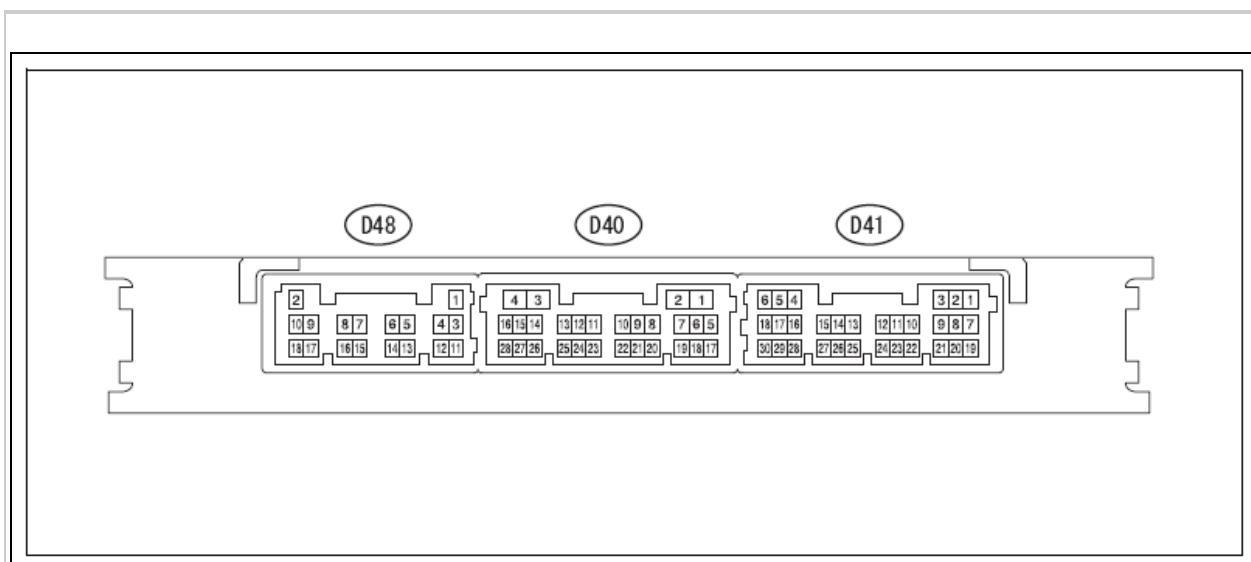
3D-26 ←→ chassis ground	With trunk closed →opened	11 to 14V →Less than 1V
D5-5 (FLCL) ←→ chassis ground	Driver's side courtesy light ON →OFF	11 to 14V →Less than 1V
D5-6 (FRCL) ←→ chassis ground	Passenger's side courtesy light ON →OFF	11 to 14V →Less than 1V
D5-7 (DOMR) ←→ chassis ground	Map light ASSY OFF →ON	Less than 1 V →11 to 14 V
D5-28 (ILL) ←→ chassis ground <sup>(2)</sup>	Transponder key amplifier (key cylinder light) ON →OFF	Less than 1 V →11 to 14 V
D6-11 (LSFD) ←→ chassis ground <sup>(1)</sup>	Driver's side door locked →unlocked	Pulse generation →less than 1 V
D6-12 (LSFP) ←→ chassis ground <sup>(1)</sup>	Passenger's side door locked →unlocked	Pulse generation →less than 1 V

(1) With smart entry & start system

(2) Without smart entry & start system

**NOTE:** If the measured value is not within the range of the standard value, it can be determined that the main body ECM (multiplex network body computer) has a fault.

## 2. Smart key computer ASSY (collation ECM)



Courtesy of SUBARU OF AMERICA, INC.

1. Inspection of the smart key computer ASSY (collation ECM)

- Disconnect the connector D48 of the smart key computer ASSY (collation ECM).
  - Measure the voltage and resistance between the connector terminals of the smart key computer ASSY (collation ECM) on the vehicle side.
- Standard value

Terminal No. (Terminal symbol)	Input/Output	Item	Inspection conditions	Standard value
D48-2 (+B) ←→ D48-11	Input	Voltage	Always	11 to 14V
D48-11 (GND) ←→ chassis ground	-	Resistance	Always	Less than 1 Ω

**NOTE:** If it is out of the standard value, it can be judged as malfunction of the vehicle.

- Connect the connector D48 of the smart key computer ASSY (collation ECM).

- Measure the voltage between the connector terminals.

Standard value

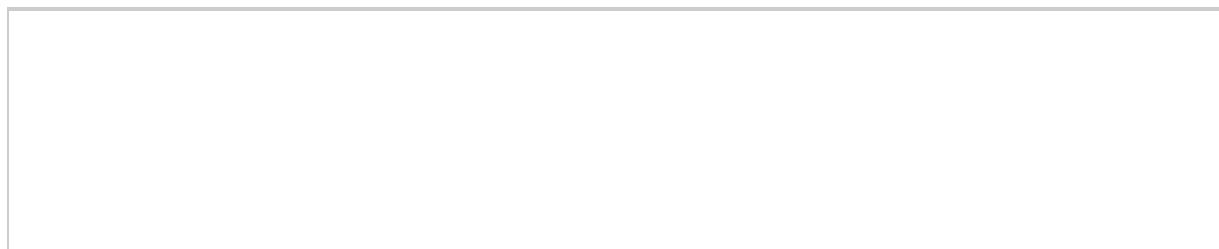
Terminal No. (Terminal symbol)	Input/Output	Item	Inspection conditions	Standard value
D41-16 (SWIL) ←→ D41-24 (AGND)	Output	Voltage	Push button start switch ON → OFF	11 to 14V → Less than 1V
D41-5 (IG2) ←→ Chassis ground	Input	Voltage	IG ON	11 to 14V

**NOTE:** If the measured value is not within the range of the standard value, it can be determined that the smart key computer ASSY (collation ECM) has a fault.

## ECM Terminal Arrangement [ Meter & Gauge System ]

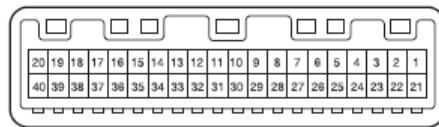
1. Combination meter ASSY

1. Input/output signal check



\*a

D7



Courtesy of SUBARU OF AMERICA, INC.

- a. With the connector connected, check each terminal by applying the tester probe from the back of the vehicle wiring harness connector.

#### **STANDARD VALUE SPECIFICATION**

Terminal No. (Terminal symbol)	Input/Output	Item	Inspection conditions	Standard value
D7-1 (B) ←→ Chassis ground	Input	Voltage	Always	10 to 14 V
D7-2 (IG) ←→ Chassis ground	Input	Voltage	IG OFF → ON	1 V or less → 10 to 14 V
D7-6 (CANH) ←→ Chassis ground	Input/Output	Waveform	Engine stop, IG ON	Pulse generation
D7-7 (CANL) ←→ Chassis ground	Input/Output	Waveform	Engine stop, IG ON	Pulse generation
D7-9 (ILL-) ←→ Chassis ground	Output	Voltage	IG ON, Light control rheostat OFF → ON	1 V or less → 10 to 14 V
D7-13 (P/SB) ←→ Chassis ground	Output	Voltage	IG ON, Passenger's seat occupied and seat belt not buckled → buckled	1 V or less → 10 to 14 V
D7-14 (S) ←→ Chassis ground	Input	Voltage	IG ON, Engine pressure warning light ON → OFF	1 V or less → 10 to 14 V
D7-17 (LBL) ←→ Chassis ground	Input	Voltage	IG ON, Brake fluid level warning light ON → OFF	1 V or less → 10 to 14 V
D7-18 (ILL+) ←→ Chassis ground	Input	Voltage	IG ON, Security indicator light Blinking → OFF	1 V or less → 10 to 14 V
D7-19 (LVWG) ←→ Chassis ground	Input	Voltage	IG ON, Head light leveling warning light ON → OFF	1 V or less → 10 to 14 V

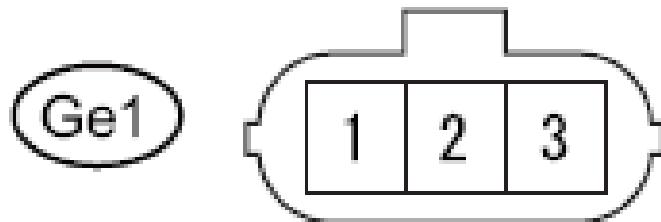
D7-20 (ES1) ↔Chassis ground	-	Resistance	Always	Less than 1 Ω	
D7-21 (LR) ↔Chassis ground	Input	Voltage	IG ON, Turn signal light RH blinking → Turn signal light RH OFF	1 V or less ↔ 10 to 14 V → 1 V or less	
D7-22 (LL) ↔Chassis ground	Input	Voltage	IG ON, Turn signal light LH ON → Turn signal light LH OFF	1 V or less ↔ 10 to 14 V → 1 V or less	
D7-23 (+DP) ↔ D7- 29 <sup>(2)</sup>	Input	Resistance	ENTER switch BACK switch	All OFF	Approx. 100000 Ω
			ENTER switch	ON	Less than 3 Ω
			BACK switch	ON	1000Ω
D7-24 (TAM) ↔ D7- 25	Input	Voltage	IG ON, Ambient temperature 25°C	1.35 to 1.75 V	
D7-26 (+DP2) ↔ D7- 29 <sup>(2)</sup>	Input	Resistance	↑↔↓	All OFF	Approx. 100000 Ω
			↑	ON	Approx. 330 Ω
			←	ON	Less than 3 Ω
			→	ON	Approx. 31000 Ω
			↓	ON	Approx. 1000 Ω
D7-27 (L) ↔ D7-28	Input	Voltage	Fuel F → E	1 V or less → 4.5 to 9 V	
D7-29 (TFT SW GND) ↔ Chassis ground <sup>(2)</sup>	-	Resistance	Always	Less than 1 Ω	
D7-30 (E) ↔ Chassis ground	-	Resistance	Always	Less than 1 Ω	
D7-31 (TR) ↔ Chassis ground	-	Resistance	Light control rheostat upper fully open → Light control rheostat lower fully open	510Ω → 100 Ω	
D7-32 (T) ↔ Chassis ground	-	Voltage	IG OFF → ON	1 V or less → 10 to 14 V	
D7-33 (TC) ↔ Chassis ground	-	Resistance	Light control rheostat upper fully open → Light control rheostat lower fully open	Less than 1 Ω → 10 kΩ or more	
D7-34 (DISP) ↔ Chassis ground <sup>(1)</sup>	-	Resistance	DISP switch ON → OFF	Less than 1 Ω → 10 kΩ or more	
D7-35 (CS)	Input	Resistance	Speed unit display	Less than 1	

←→Chassis ground			changeover switch ON: km/h OFF: MPH	$\Omega \rightarrow 10 \text{ k}\Omega$ or more
D7-36 (TRIP) ←→Chassis ground	-	Resistance	ODO/TRIP switch ON → OFF	Less than 1 $\Omega \rightarrow 10 \text{ k}\Omega$ or more
D7-37 (DBKL) ←→Chassis ground	Input	Voltage	IG ON, driver's seat belt not buckled → Buckled	1 V or less → 10 to 14 V
D7-38 (PBKL) ←→Chassis ground	Input	Voltage	IG ON, passenger's seat occupied, and seat belt not buckled → buckled	1 V or less → 11 to 14 V
D7-40 (ES2) ←→Chassis ground	-	Resistance	Always	Less than 1 $\Omega$
(1) Normal meter				
(2) TFT meter				

## ECM Terminal Arrangement [ Occupant Detection System ]

**CAUTION:** The occupant detection control module, occupant detection sensor and the seat frame are handled as one unit, so never attempt to remove them.

1. Connector between the airbag rear harness and the seat harness.

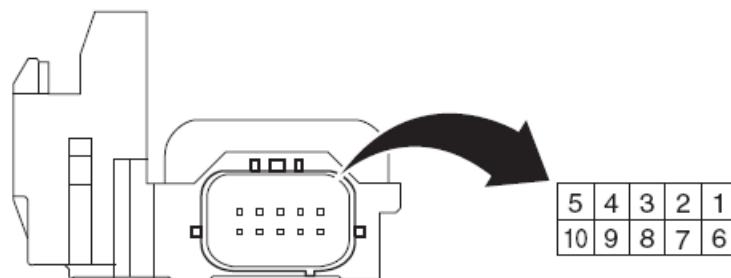


AB-10993

Courtesy of SUBARU OF AMERICA, INC.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
Ge1-2 - Ge1-3	Airbag sensor ASSY communication line	IG ON	Pulse generation
Ge1-1 - chassis ground	Power supply	IG ON	11 to 14V

## 2. Occupant detection control module



AB-03321

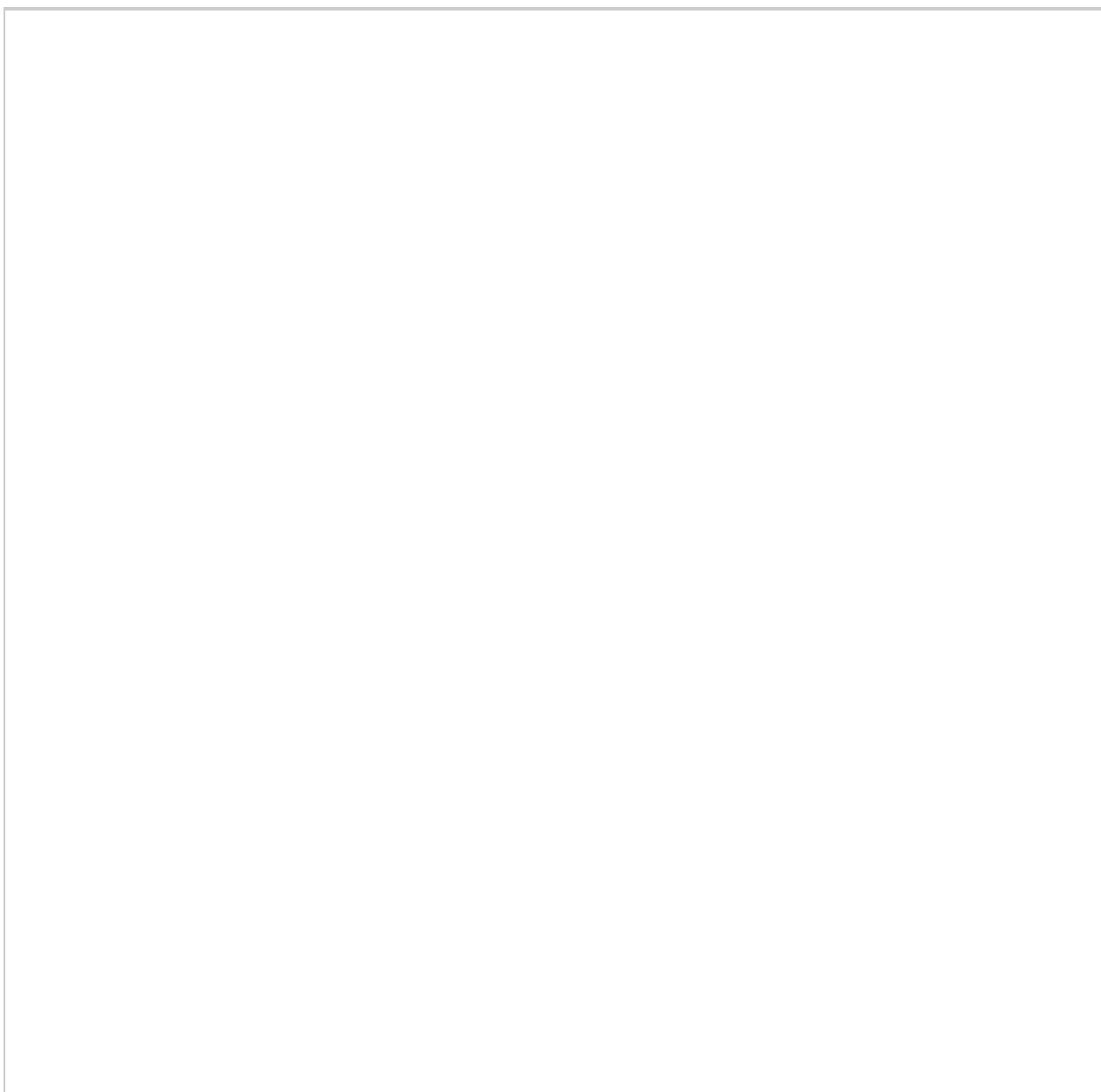
Courtesy of SUBARU OF AMERICA, INC.

Terminal No. (symbol)	Terminal description	Input/output value	Reference
1	Airbag CM communication (+)	-	Communication line

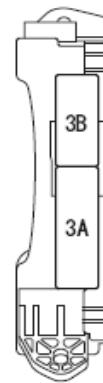
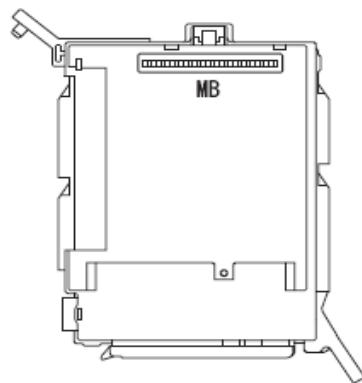
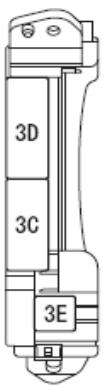
2	Not used	-	-
3	Not used	-	-
4	Buckle switch (-)	0V	Switch ground
5	Not used	-	-
6	IG power supply	8 - 16V	IG ON
7	Not used	-	-
8	Buckle switch (+)	0 - IG voltage	IG voltage when SW ON
9	Airbag CM communication (-)	0V	GND
10	Not used	-	-

### **ECM Terminal Arrangement [ Power Control System ]**

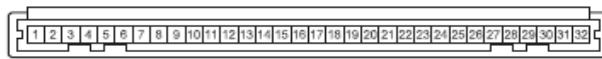
1. Instrument panel junction block ASSY, main body ECM (Network gateway computer).



\*1



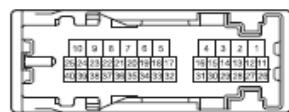
MB



3D



3C



3E



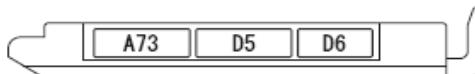
3B



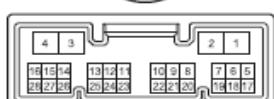
3A



\*2



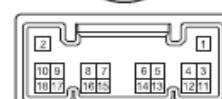
A73



D5



D6



\*1      Instrument panel junction block ASSY

\*2      Main body ECM (Network gateway computer)

Courtesy of SUBARU OF AMERICA, INC.

1. Measure the voltage and resistance between terminals.

**NOTE:** This inspection is performed from the back side  
of the connector with the connector in a connected state.

Terminal No. (Terminal code)	Input/Output	Item	Measuring condition	Criteria
3A-15 ←→ chassis ground	Input	Voltage	IG ON	11 to 14V
3A-20 ←→ chassis ground	Input	Voltage	IG ON	11 to 14V
3A-27 ←→ chassis ground	Input	Voltage	Always	11 to 14V
3C-19 ←→ chassis ground	Input	Voltage	Always	11 to 14V
3E-1 ←→ chassis ground	Input	Voltage	Always	11 to 14V
3A-12 ←→ chassis ground	-	Resistance	Always	Less than 1 Ω
3A-13 ←→ chassis ground	-	Resistance	Always	Less than 1 Ω
3B-18 ←→ chassis ground	-	Resistance	Always	Less than 1 Ω
D6-1 (GND) ←→ chassis ground	-	Resistance	Always	Less than 1 Ω
A73-4 (GND) ←→ chassis ground	-	Resistance	Always	Less than 1 Ω

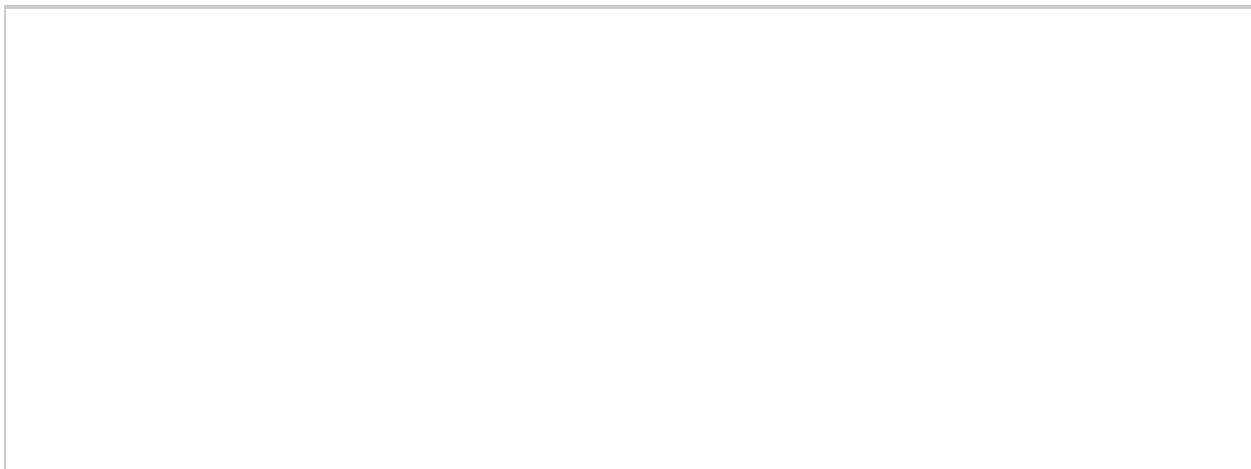
2. Remove the main body ECM (network gateway computer) from the instrument panel junction block ASSY.

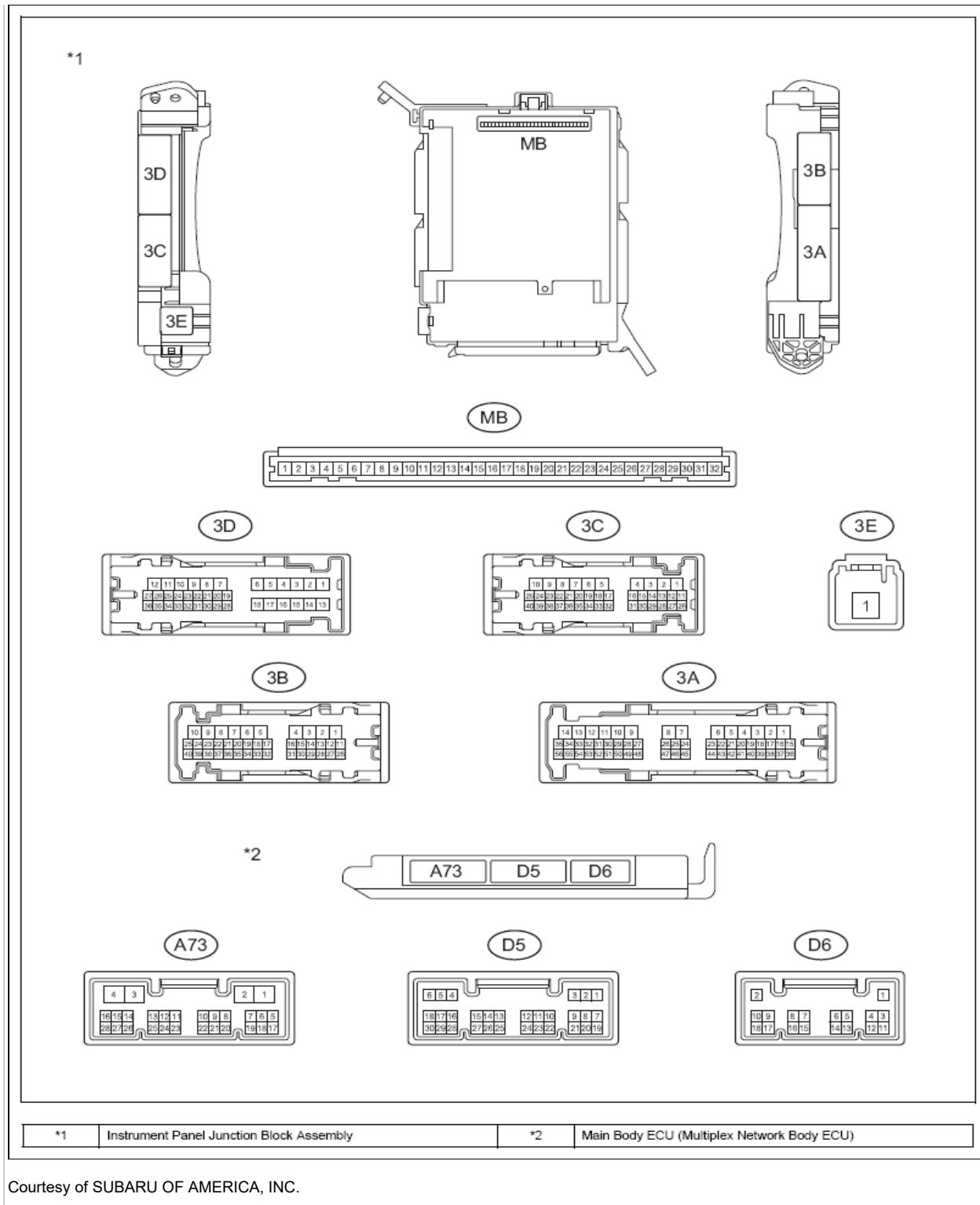
3. Measure the voltage and resistance between terminals.

Terminal No. (Terminal code)	Input/Output	Item	Measuring condition	Criteria
MB-1 (BECU) ←→ chassis ground	Input	Voltage	Always	11 to 14V
MB-8 (IG) ←→ chassis ground	Input	Voltage	IG ON	11 to 14V
MB-9 (ACC) ←→ chassis ground	Input	Voltage	ACC ON	11 to 14V
MB-32 (BMPX) ←→ chassis ground	Input	Voltage	Always	11 to 14V
MB-11 (GND) ←→ chassis ground	-	Resistance	Always	Less than 1 Ω

### ECM Terminal Arrangement [ Power Door Lock Control System ]

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (MULTIPLEX NETWORK BODY ECU)





Courtesy of SUBARU OF AMERICA, INC.

1. Remove the main body ECU (multiplex network body ECU) from the instrument panel junction block assembly.
  2. Disconnect the D5, D6 and A73 main body ECU (multiplex network body ECU) connectors.
  3. Measure the resistance and voltage between each terminal of the wire harness side connectors and body ground.

Terminal No.	Terminal Description	Condition	Specified Condition
MB-1 - Body ground	Battery power supply	Always	11 to 14 V
MB-8 - Body ground	Ignition switch power supply	Ignition switch ON	11 to 14 V
		Ignition switch off	Below 1 V
MB-9 - Body ground	ACC power supply	Ignition switch ACC	11 to 14 V
		Ignition switch off	Below 1 V
MB-11 - Body ground	Ground	Always	Below 1 Ω
MB-32 - Body ground	Battery power supply	Always	11 to 14 V
D5-22 - Body ground	Unlock warning switch input	No key in ignition key cylinder (off)	Below 1 V
		Key inserted ignition key cylinder (on)	11 to 14 V
D6-1 - Body ground	Ground	Always	Below 1 Ω
A73-4 - Body ground	Ground	Always	Below 1 Ω

4. Reconnect the D5, D6 and A73 main body ECU (multiplex network body ECU) connectors.
5. Install the main body ECU (multiplex network body ECU) to the instrument panel junction block assembly.
6. Measure the voltage and resistance, check for pulse according to the valve(s) in the table below.

Terminal No.	Terminal Description	Condition	Specified Condition
3A-28 - Body ground	Driver side door courtesy light switch input	Driver side door open	Below 1 V
		Driver side door closed	Pulse generation
3B-13 - Body ground	Passenger side door courtesy light switch input	Passenger side door open	Below 1 V
		Passenger side door closed	Pulse generation
3B-2 - Body ground	Door lock motor lock drive output (for driver side)	Door control switch not pushed	Below 1 V
		Lock side of door control switch pushed	11 to 14 V
3B-3 - Body ground	Door lock motor lock drive output (for passenger side)	Door control switch not pushed	Below 1 V

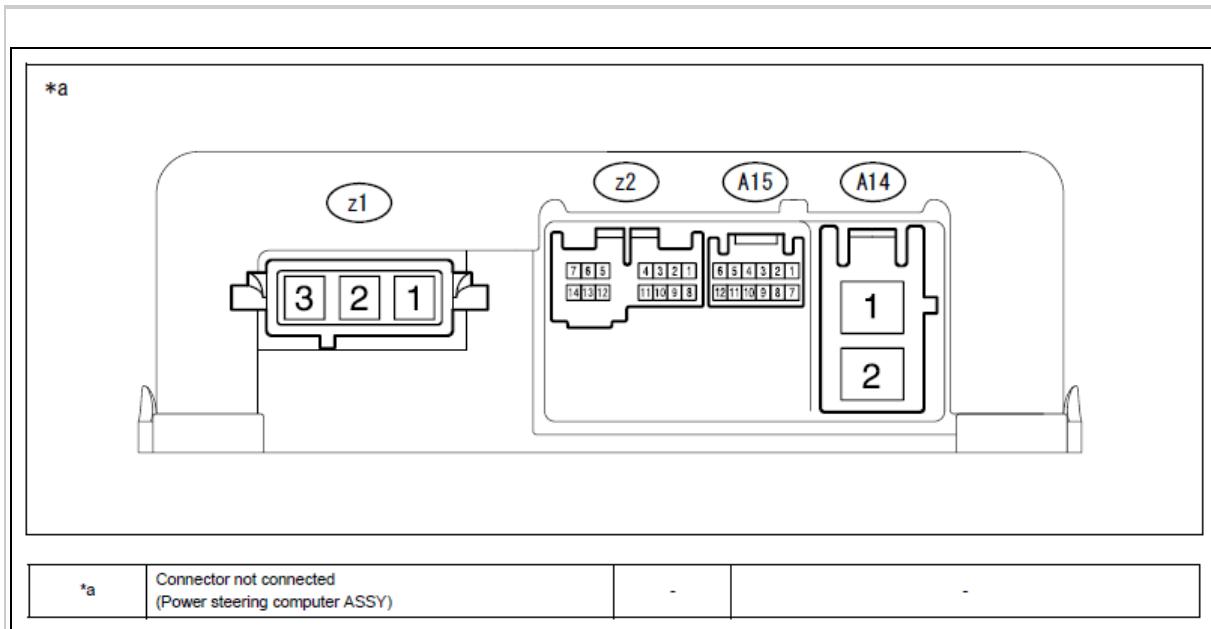
		Lock side of door control switch pushed	11 to 14 V
3B-1 - Body ground	Door lock motor unlock drive output (for driver side)	Door control switch not pushed	Below 1 V
		Lock side of door control switch pushed	11 to 14 V
3B-4 - Body ground	Door lock motor unlock drive output (for passenger side)	Door control switch not pushed	Below 1 V
		Lock side of door control switch pushed	11 to 14 V
3D-26 - Body ground	Luggage compartment door courtesy light switch input	Door control switch not pushed	Below 1 V
		Lock side of door control switch pushed	11 to 14 V

## ECM Terminal Arrangement [ Power Steering System ]

### 1. Inspection of the power steering computer ASSY

1. Check the voltage or resistance between each terminal, as well as between the chassis ground and each terminal.

**CAUTION:** This check is performed from the back side of the connector, with the connector hooked up to the computer.



Courtesy of SUBARU OF AMERICA, INC.

## TERMINAL DESCRIPTION - CRITERIA

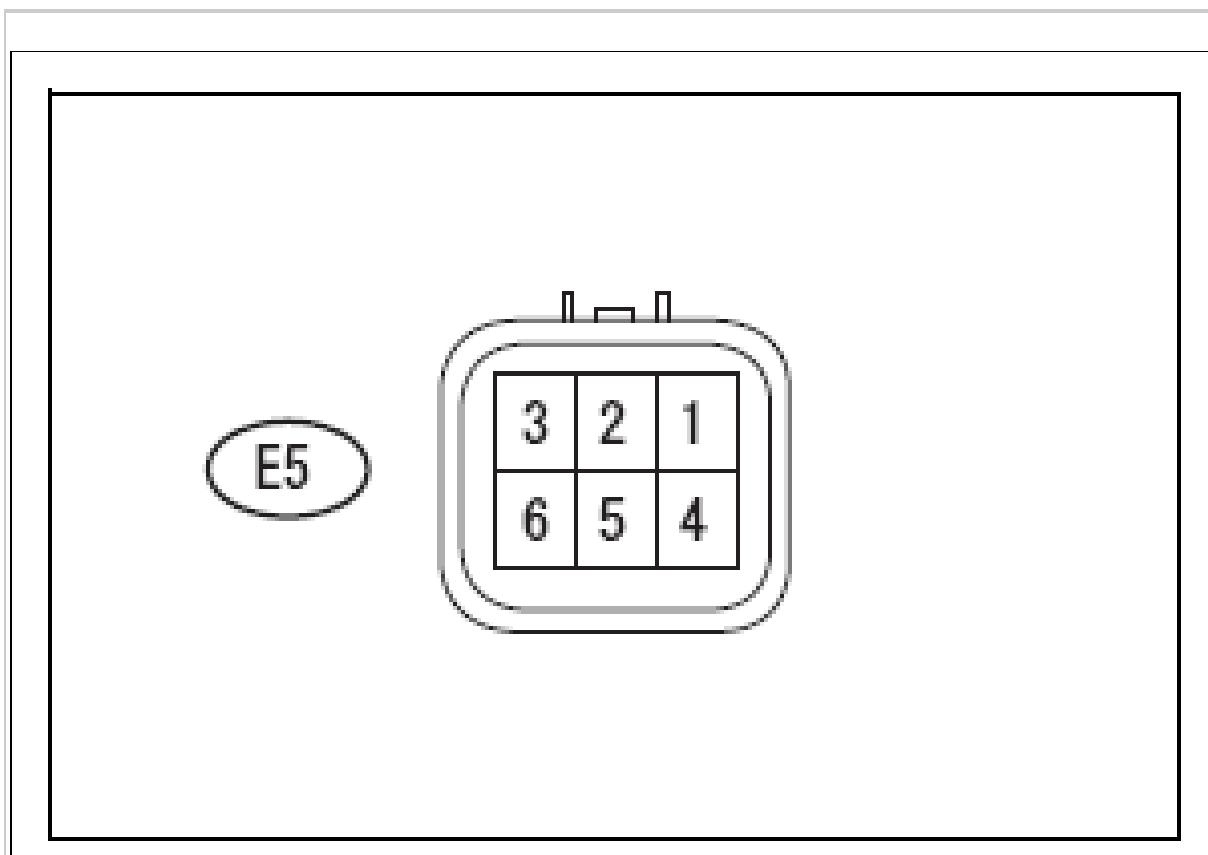
Terminal No. (Symbol)	Terminal description	Condition	Special conditions
z1-1 (V) [ <sup>(1)</sup> ]	V phase motor output	-	-
z1-2 (U) [ <sup>(1)</sup> ]	U phase motor output	-	-
z1-3 (W) [ <sup>(1)</sup> ]	W phase motor output	-	-
A14-1 (PIG) - A14-2 (PGND)	Motor power supply	Always	9 to 16 V
A14-2 (PGND) - Chassis ground	Power supply ground	Always	1 Ω or less
A15-6 (IG) - A14- 2 (PGND)	IG power supply	IG SW ON	9 to 16 V
z2-5 (RZV) - A14- 2 (PGND)	Rotation angle sensor excitation output signal	During engine start, steering operation	0.68 to 4.42 V
z2-7 (RZG) - A14- 2 (PGND)	Rotation angle sensor excitation circuit GND	Always	1 Ω or less
z2-13 (RZCS) - A14-2 (PGND)	Rotation angle sensor COS phase input signal	During engine start, steering operation	0.68 to 4.42 V
z2-14 (RZSN) - A14-2 (PGND)	Rotation angle sensor SIN phase input signal	During engine start, steering operation	0.68 to 4.42 V
z2-8(TRQ1) - z2- 11(TRQG)	Torque sensor signal 1	During engine start, no steering load (neutral position)	2.3 to 2.7 V
		During engine start, steering to the right (When the vehicle is stopped)	2.3 to 3.8 V
		During engine start, steering to the left (When the vehicle is stopped)	1.2 to 2.7 V
z2-9(TRQV) - z2- 11(TRQG)	Torque sensor power supply	IG SW ON	4.5 to 5.5 V
z2-10(TRQ2) - z2- 11(TRQG)	Torque sensor signal 2	During engine start, no steering load (neutral position)	2.3 to 2.7 V
		During engine start, steering to the right (When the vehicle is stopped)	1.2 to 2.7 V
		During engine start, steering to the left (When the vehicle is stopped)	2.3 to 3.8 V
z2-11(TRQG) - Chassis ground	Torque sensor ground	Always	1 Ω or less

**NOTE:**

- (1) As connector z1 is equipped with a lock lever, it is not possible to check each terminal while the connector is hooked up to the power steering computer ASSY.

### **ECM Terminal Arrangement [ Power Window System ]**

1. Power window regulator motor ASSY LH (driver's seat)
  1. Disconnect the connector E5 of power window regulator motor ASSY LH (driver's seat).
  2. Measure the resistance and voltage between terminals.



Courtesy of SUBARU OF AMERICA, INC.

Standard value

#### **STANDARD VALUE SPECIFICATION**

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
E5-5 (VCC)	Always	11 to 14 V

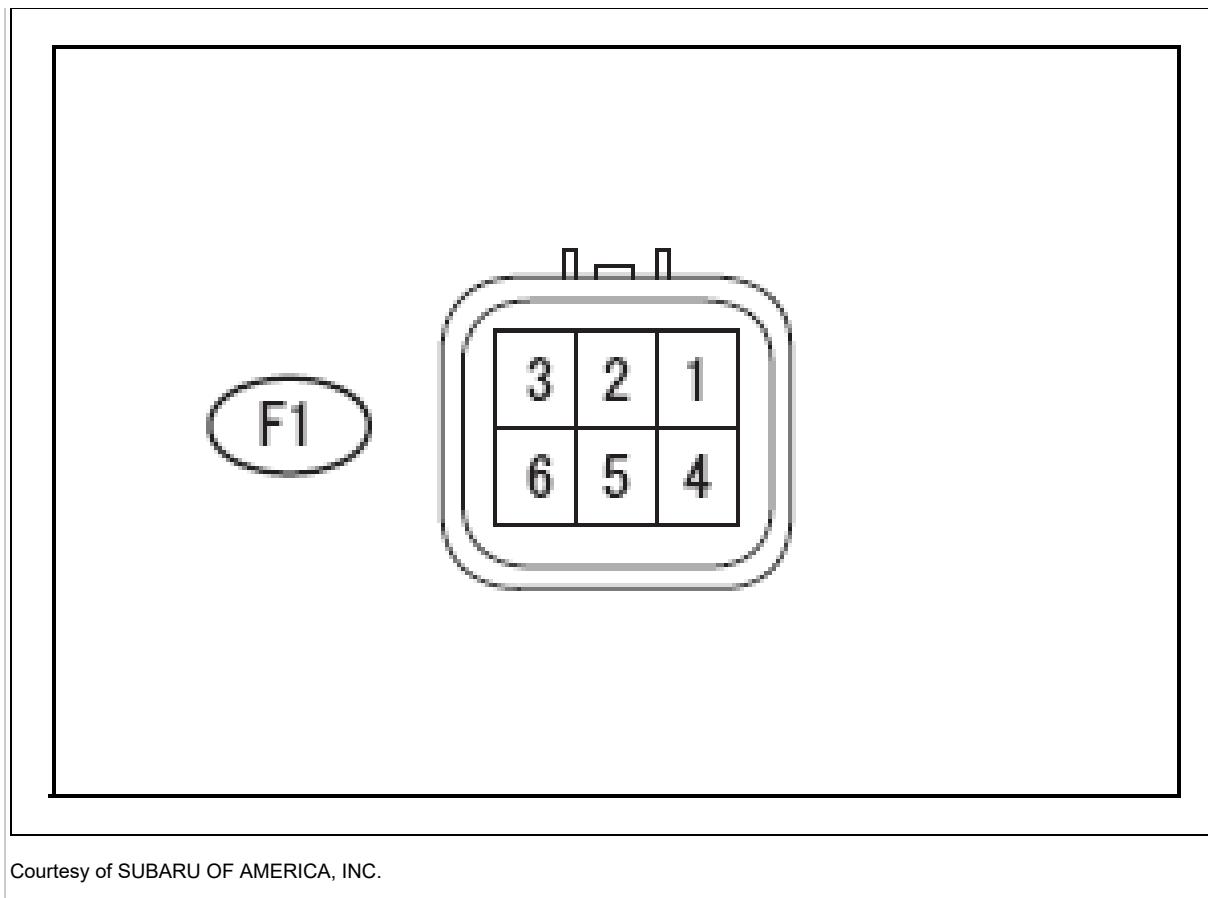
←→E5-4 (SGD)		
E5-4 (SGD) ←→Chassis ground	Always	Less than 1 Ω
E5-1 (WU) ←→E5-4 (SGD)	IG ON, master switch OFF→UP (manual operation)	11 to 14 V→Less than 1 V
E5-1 (WU) ←→E5-4 (SGD)	IG ON, driver's seat door glass full open→master switch UP (automatic operation)→door glass fully closed	11 to 14 V→less than 1 V→11 to 14 V
E5-3 (WD) ←→E5-4 (SGD)	IG ON, master switch OFF→DOWN (manual operation)	11 to 14 V→Less than 1 V
E5-3 (WD) ←→E5-4 (SGD)	IG ON, driver's seat door glass fully closed→master switch DOWN (automatic operation)→door glass full open	11 to 14 V→less than 1 V→11 to 14 V

**NOTE:** If it is outside the standard values, the vehicle is defective.

3. Connect the connector E5 of power window regulator motor ASSY LH (driver's seat).
4. Measure the voltage between the terminals.

**NOTE:** If it is not within the standard, failure exists in power window regulator motor ASSY LH (driver's seat).

2. Power window regulator motor ASSY RH (passenger's seat)
  1. Disconnect the connector F1 of power window regulator motor ASSY RH (passenger's seat).
  2. Measure the resistance and voltage between terminals.



Courtesy of SUBARU OF AMERICA, INC.

Standard value

#### **STANDARD VALUE SPECIFICATION**

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
F1-5 (VCC) ←→ F1-4 (SGD)	Always	11 to 14 V
F1-4 (SGD) ←→ Chassis ground	Always	Less than 1 Ω

**NOTE:** If it is outside the standard values, the vehicle is defective.

3. Connect the connector F1 of power window regulator motor ASSY RH (passenger's seat).
4. Measure the voltage between the terminals.

Standard value

#### **STANDARD VALUE SPECIFICATION**

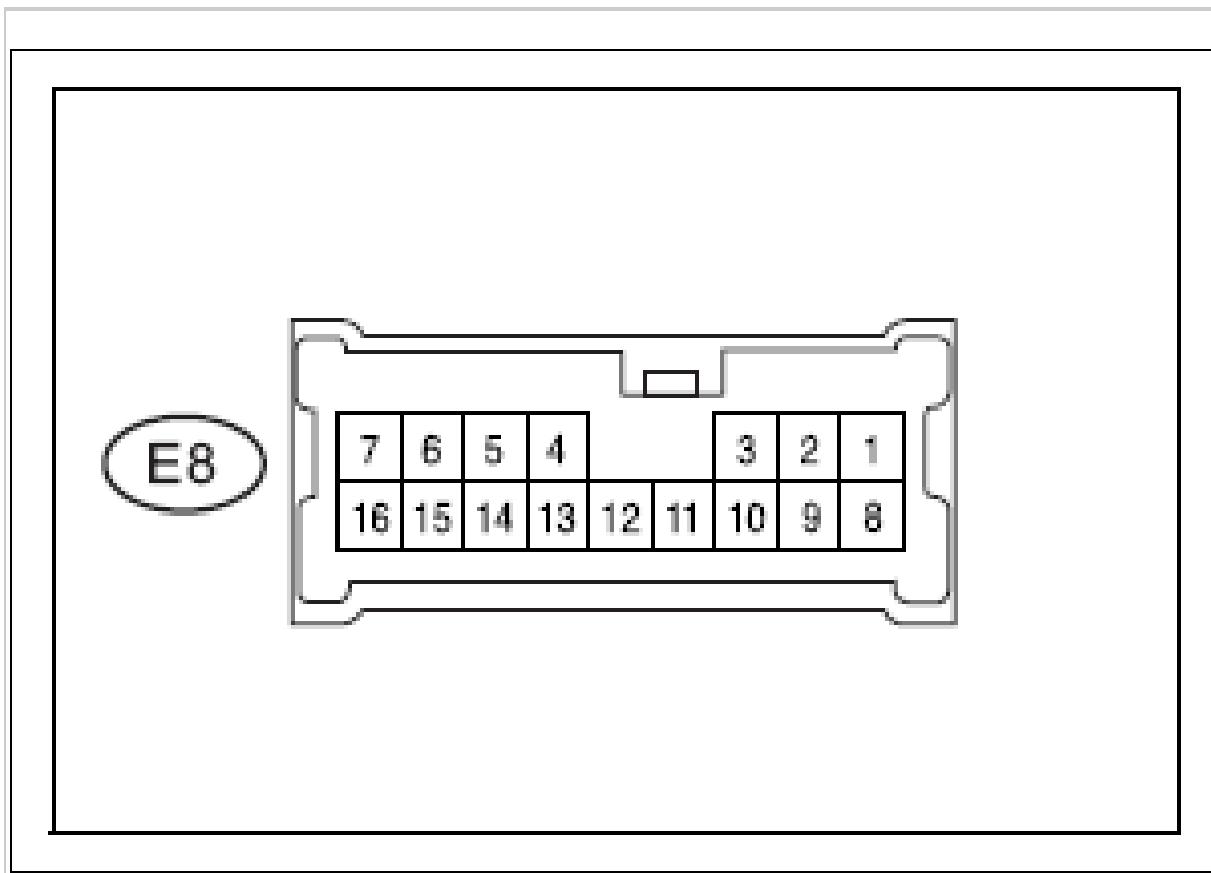
Terminal No. (Terminal symbol)	Inspection conditions	Standard value

F1-1 (WU) ↔F1-4 (SGD)	IG ON, regulator switch OFF→UP (manual operation)	11 to 14 V→Less than 1 V
F1-1 (WU) ↔F1-4 (SGD)	IG ON, passenger's seat door glass full open→regulator switch UP (automatic operation)→door glass fully closed	11 to 14 V→less than 1 V→11 to 14 V
F1-3 (WD) ↔F1-4 (SGD)	IG ON, regulator switch OFF→DOWN (manual operation)	11 to 14 V→Less than 1 V
F1-3 (WD) ↔F1-4 (SGD)	IG ON, passenger's seat door glass fully closed→regulator switch DOWN (automatic operation)→door glass full open	11 to 14 V→less than 1 V→11 to 14 V

**NOTE:** If it is not within the standard, failure exists in power window regulator motor ASSY RH (passenger's seat).

### 3. Power window regulator master switch ASSY

1. Disconnect the connector E8 of power window regulator master switch ASSY.
2. Measure the resistance and voltage between terminals.



Courtesy of SUBARU OF AMERICA, INC.

Standard value

## STANDARD VALUE SPECIFICATION

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
E8-12 (+B) $\longleftrightarrow$ E8-5 (GND)	Always	11 to 14 V
E8-5 (GND) $\longleftrightarrow$ chassis ground	Always	Less than 1 $\Omega$

**NOTE:** If it is outside the standard values, the vehicle is defective.

3. Connect the connector E8 of power window regulator master switch ASSY.
4. Measure the voltage between the terminals.

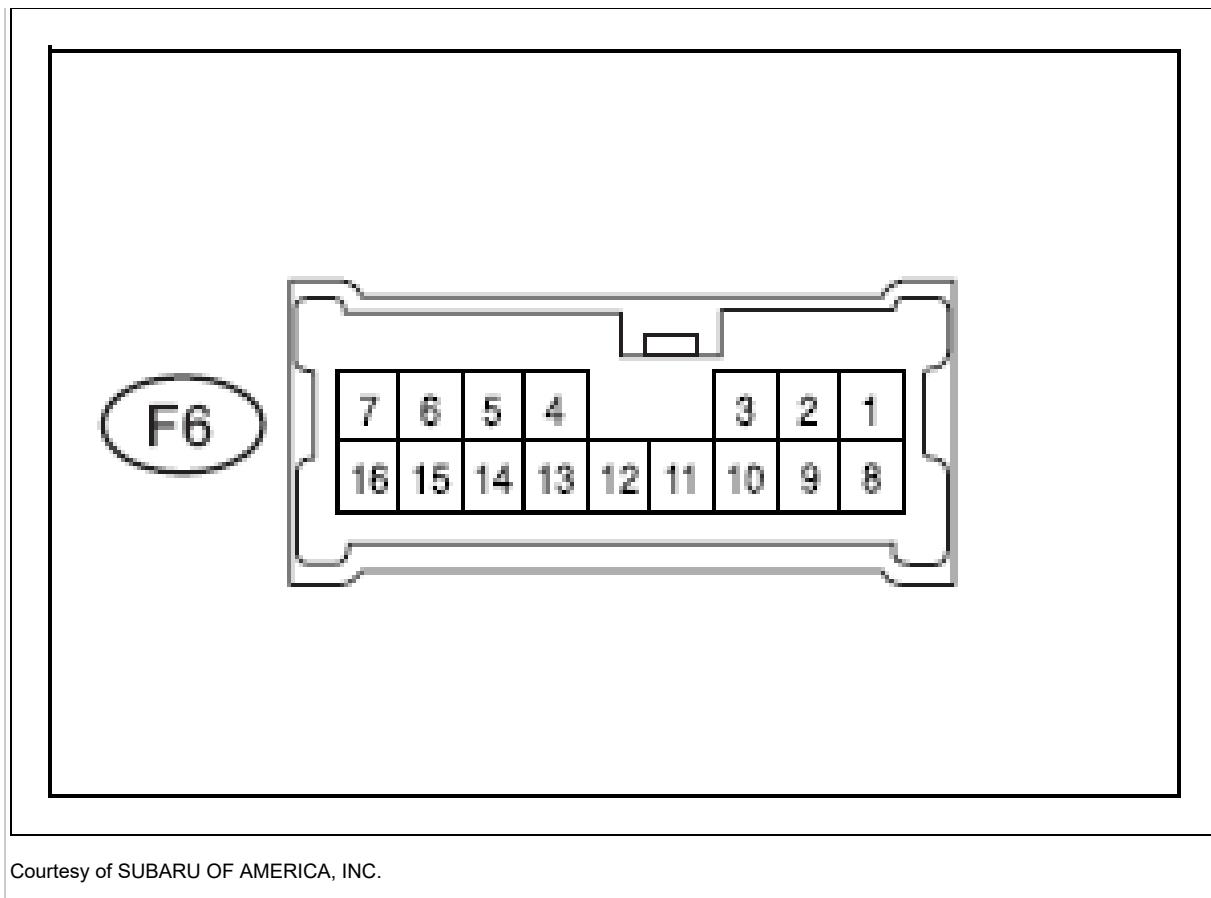
Standard value

## STANDARD VALUE SPECIFICATION

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
E8-6 (WU) $\longleftrightarrow$ E8-5 (GND)	IG ON, master switch OFF $\rightarrow$ UP (manual operation)	11 to 14 V $\rightarrow$ Less than 1 V
E8-6 (WU) $\longleftrightarrow$ E8-5 (GND)	IG ON, driver's seat door glass full open $\rightarrow$ master switch UP (automatic operation) $\rightarrow$ door glass fully closed	11 to 14 V $\rightarrow$ less than 1 V $\rightarrow$ 11 to 14 V
E8-7 (WD) $\longleftrightarrow$ E8-5 (GND)	IG ON, master switch OFF $\rightarrow$ DOWN (manual operation)	11 to 14 V $\rightarrow$ Less than 1 V
E8-7 (WD) $\longleftrightarrow$ E8-5 (GND)	IG ON, driver's seat door glass fully closed $\rightarrow$ master switch DOWN (automatic operation) $\rightarrow$ door glass full open	11 to 14 V $\rightarrow$ less than 1 V $\rightarrow$ 11 to 14 V

**NOTE:** If it is not within the standard, failure exists in power window regulator master switch ASSY.

4. Power window regulator switch ASSY
  1. Disconnect the connector F6 of power window regulator switch ASSY.
  2. Measure the resistance and voltage between terminals.



Courtesy of SUBARU OF AMERICA, INC.

Standard value

#### **STANDARD VALUE SPECIFICATION**

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
F6-12 (+B) ←→ F6-5 (GND)	Always	11 to 14 V
F6-5 (GND) ←→ chassis ground	Always	Less than 1 Ω

**NOTE:** If it is outside the standard values, the vehicle is defective.

3. Connect the connector F6 of power window regulator switch ASSY.

4. Measure the voltage between the terminals.

Standard value

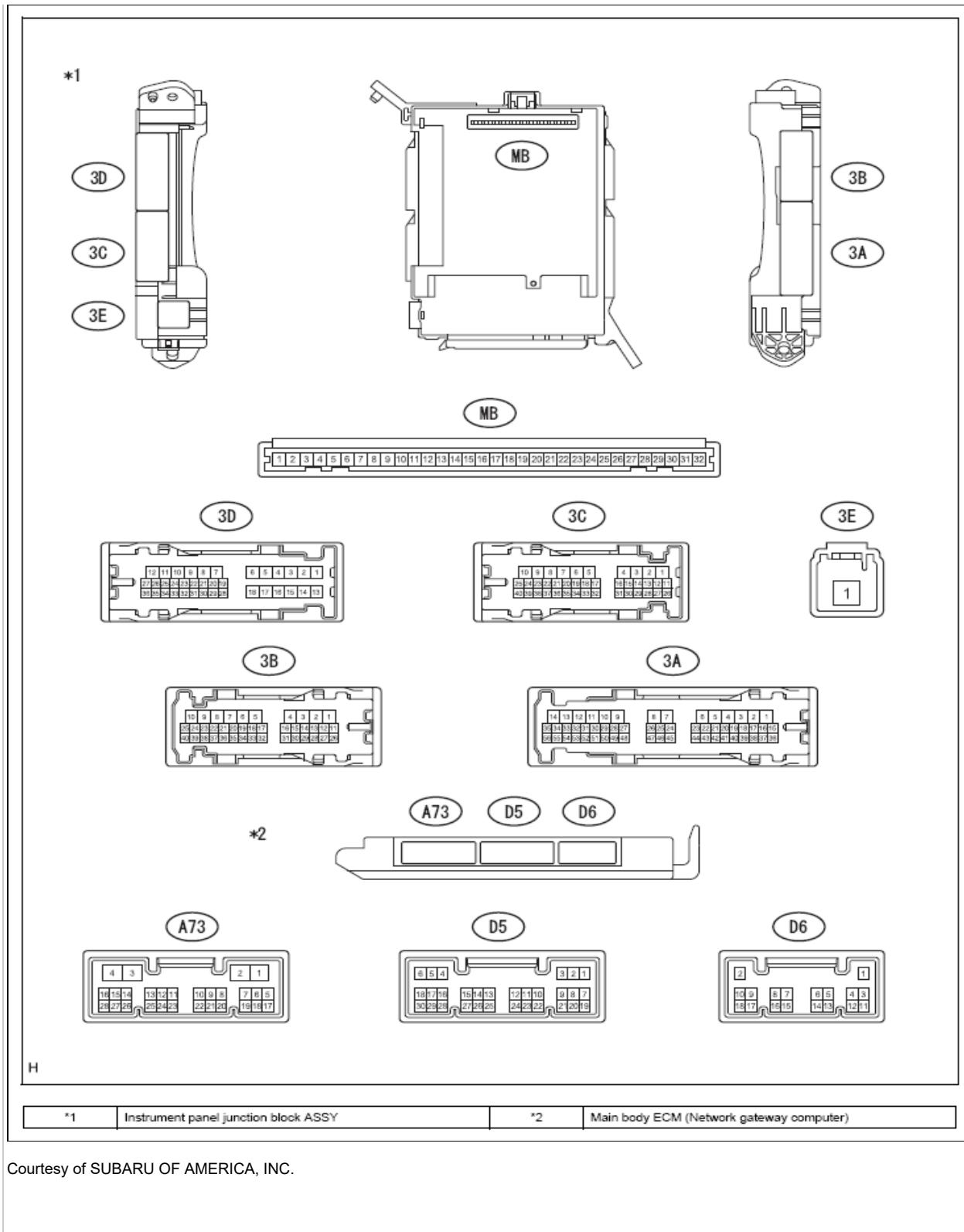
#### **STANDARD VALUE SPECIFICATION**

Terminal No. (Terminal symbol)	Inspection conditions	Standard value

F6-6 (WU) ↔F6-5 (GND)	IG ON, passenger's switch OFF→UP (manual operation)	11 to 14 V →Less than 1 V
F6-6 (WU) ↔F6-5 (GND)	IG ON, passenger's seat door glass full open→passenger's seat switch UP (automatic operation)→door glass fully closed	11 to 14 V→less than 1 V→11 to 14 V
F6-7 (WD) ↔F6-5 (GND)	IG ON, passenger's switch OFF→DOWN (manual operation)	11 to 14 V →Less than 1 V
F6-7 (WD) ↔F6-5 (GND)	IG ON, passenger's seat door glass fully closed→passenger's seat switch DOWN (automatic operation)→door glass full open	11 to 14 V→less than 1 V→11 to 14 V

**NOTE:** If it is not within the standard, failure exists in power window regulator switch ASSY.

## 5. Instrument panel junction block ASSY, main body ECM (Network gateway computer)



Courtesy of SUBARU OF AMERICA, INC.

1. Inspection of the instrument panel junction block ASSY and the main body ECM (network gateway computer)
  - a. Remove the main body ECM (network gateway computer) from the instrument panel junction block ASSY.
  - b. Measure the voltage and resistance between terminals.  
Standard value

## STANDARD VALUE SPECIFICATION

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
MB-1 (BECU) ←→chassis ground	Always	11 to 14 V
MB-8 (IG) ←→chassis ground	IG OFF →IG ON	Less than 1 V →11 to 14 V
MB-9 (ACC) ←→chassis ground	IG OFF →ACC ON	Less than 1 V →11 to 14 V
MB-11 (GND) ←→chassis ground	Always	Less than 1 Ω
D5-22 (ACC) ←→chassis ground <sup>(1)</sup>	IG OFF →ACC ON	Less than 1 V →11 to 14 V

**NOTE:**

<sup>(1)</sup> With smart entry & start system

**NOTE:** If it is outside the standard values, the vehicle is defective.

- c. Install the main body ECM (network gateway computer) on the instrument panel junction block ASSY.
- d. Measure the voltage between the terminals.

Standard value

## STANDARD VALUE SPECIFICATION

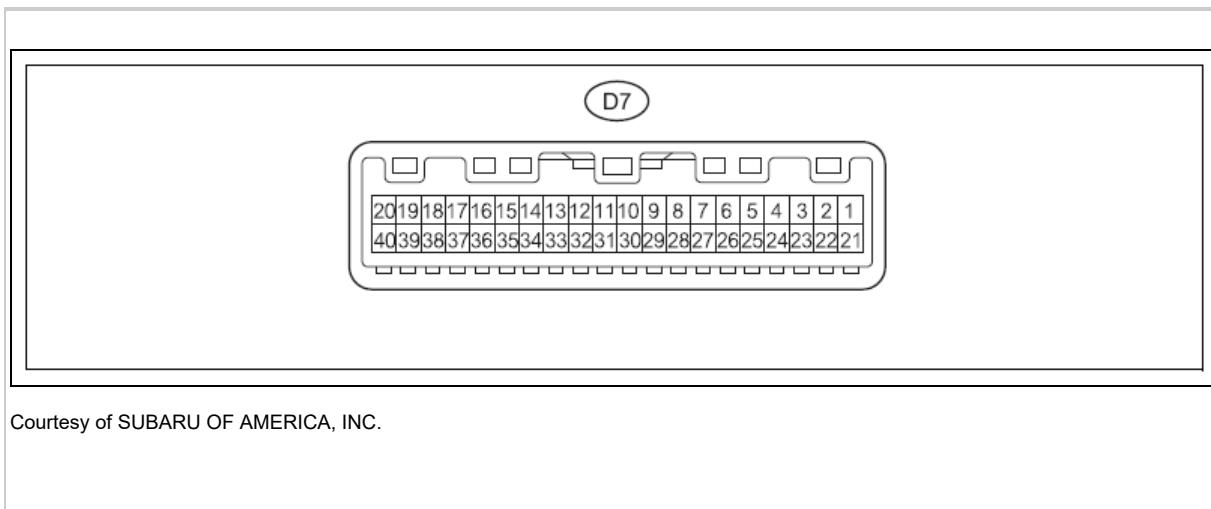
Terminal No. (Terminal symbol)	Inspection conditions	Standard value
D5-4 ←→chassis ground	IG ON	Pulse generation
D5-5 (FRCL) ←→chassis ground	With driver's door closed →opened	11 to 14 V →Less than 1 V
D5-6 (FLCL) ←→chassis ground	With passenger's door closed →opened	11 to 14 V →Less than 1 V

**NOTE:** If it is outside the standard values, the main body ECM (network gateway computer) is defective.

## ECM Terminal Arrangement [ Seat Belt Warning System ]

1. CHECK COMBINATION METER ASSEMBLY

1. Disconnect the D7 combination meter assembly connector.



2. Measure the resistance and voltage according to the value(s) in the table below.

**NOTE:** Measure the values on the wire harness side with the connector disconnected.

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D7-1 (+B)- Body ground	R-W - Body ground	Combination meter +B line	Always	11 to 14 V
D7-2 (IG+)- Body ground	W-G - Body ground	Combination meter IG line	Ignition switch ON	11 to 14 V
			Ignition switch off	Below 1 V
D7-20 (ES1)- Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω
D7-37 (DBKL)- Body ground	R-B - Body ground	Driver seat belt signal	Driver seat belt fastened	10 kΩ or higher
			Driver seat belt unfastened	Below 1 Ω
D7-40 (ES2)- Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω

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

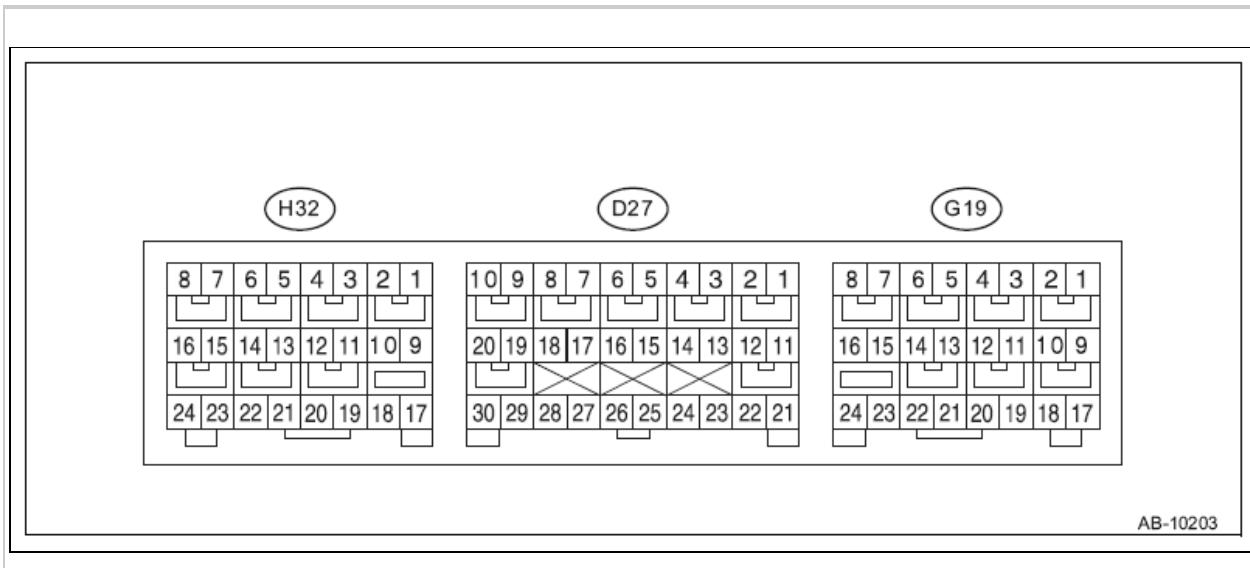
3. Reconnect the D7 combination meter assembly connector.
4. Measure the voltage according to the value(s) in the table below.

Tester Connection	Wiring Color	Terminal Description	Condition	Specified Condition
D7-13 (P/SB)-	BR-R -	Front passenger seat	Front passenger seat	Below 1 V

Body ground	Body ground	belt warning signal	occupied, seat belt fastened Front passenger seat occupied, seat belt unfastened	
				11 to 14 V

If the result is not as specified, the combination meter assembly may have a malfunction.

## 2. Check the airbag control module

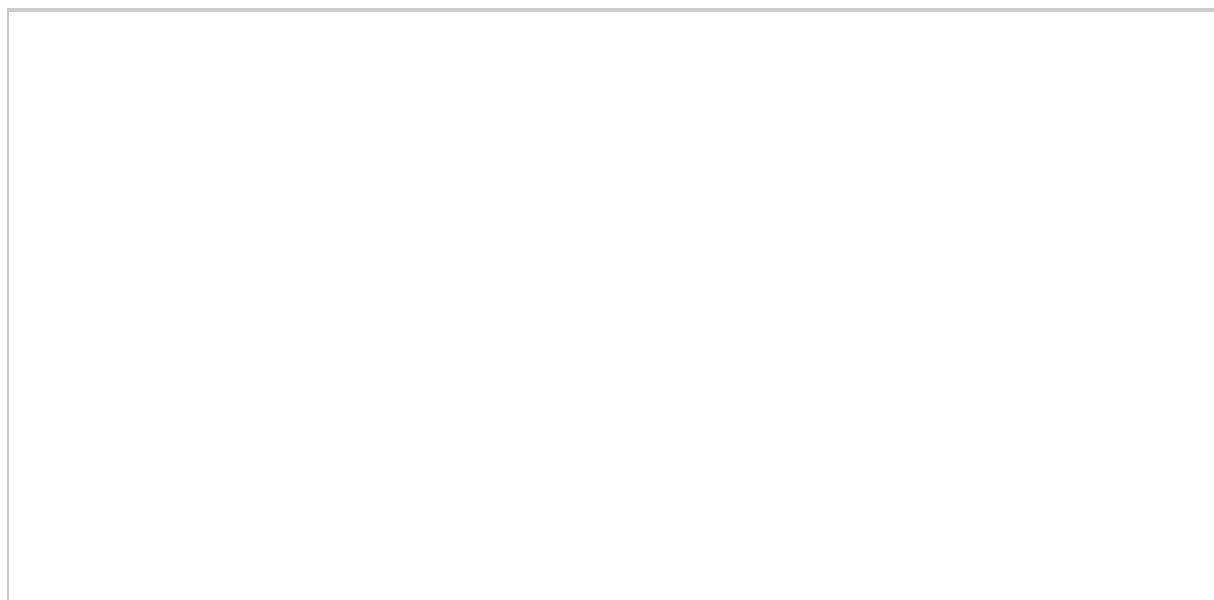


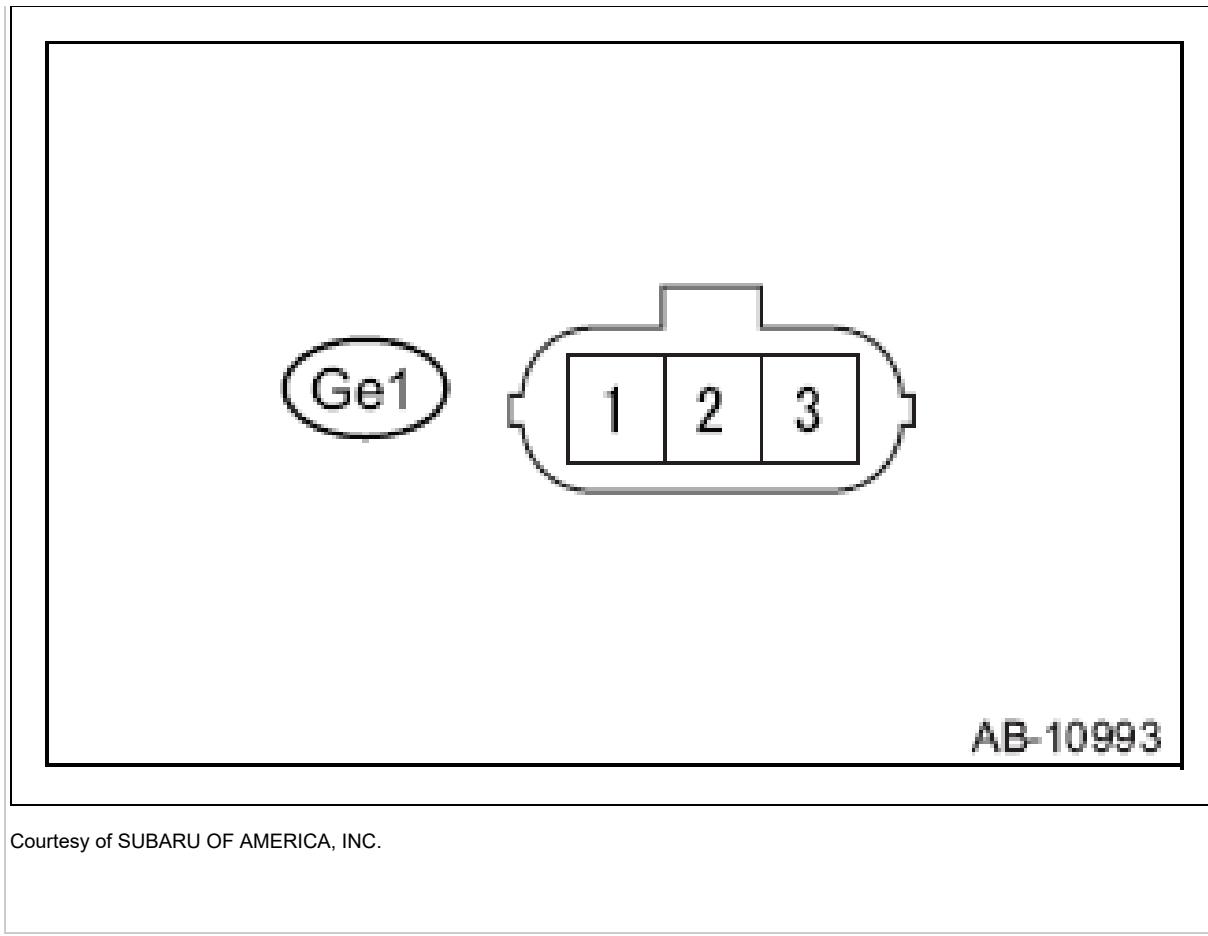
Courtesy of SUBARU OF AMERICA, INC.

Terminal No.	Terminal Symbol	Destination
G19-16	FSR+	Occupant detection ECU
G19-24	FSR-	Occupant detection ECU

## 3. CHECK OCCUPANT DETECTION ECU

- Measure the voltage according to the value(s) in the table below.



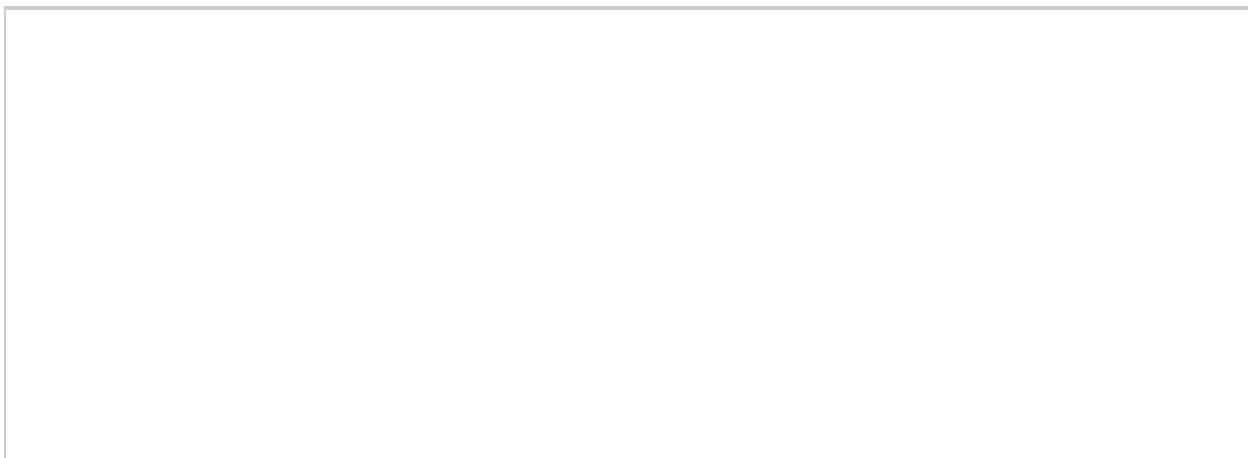


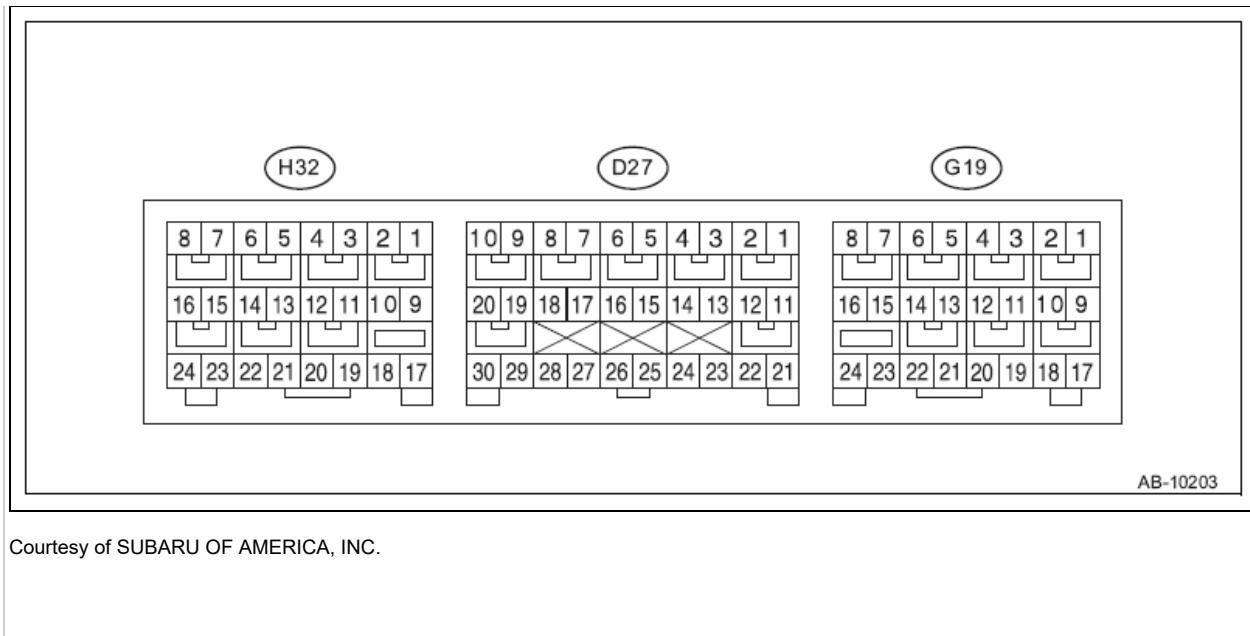
Tester Connection	Wiring Color	Terminal Description	Condition	Specification
Ge1-1 - Body ground	G - Body ground	Occupant detection ECU IG line	Ignition switch ON	11 to 14 V
Ge1-2 - Ge1-3	Y-G - Y	Air bag control module communication line	Ignition switch ON	Pulse generation

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

### ECM Terminal Arrangement [ SRS Airbag System ]

#### 1. Airbag ECM terminal arrangement





Courtesy of SUBARU OF AMERICA, INC.

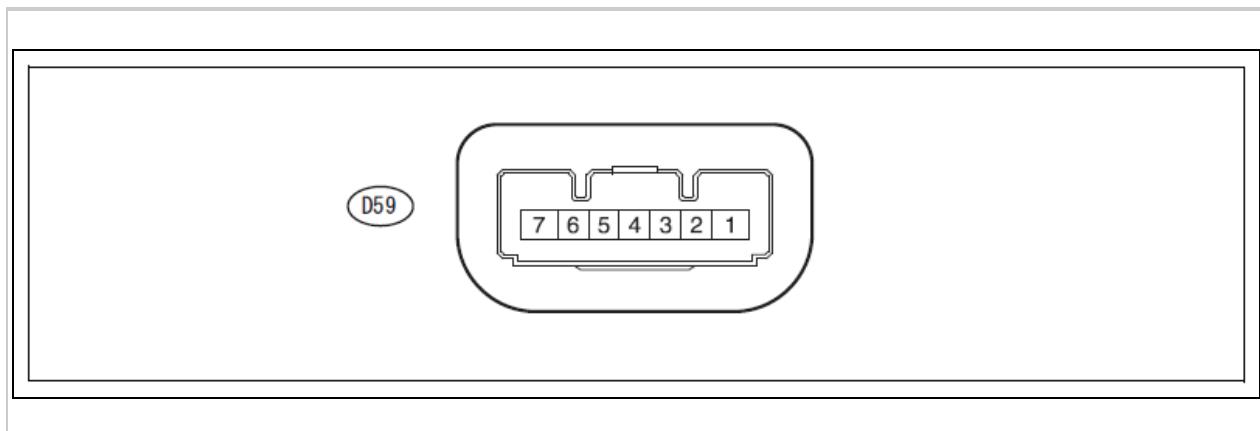
1. Terminal numbers in airbag control module connector are shown in the figure.
2. The airbag warning light illuminates when the connector is removed from the airbag control module.

Item		Terminal No.
Ignition power supply	Dedicated fuse	D27 - 21
Passenger's airbag module - 1st step	+	D27 - 4
	-	D27 - 3
Passenger's airbag module - 2nd step	+	D27 - 1
	-	D27 - 2
Driver's airbag module - 1st step	+	D27 - 5
	-	D27 - 6
Driver's airbag module - 2nd step	+	D27 - 8
	-	D27 - 7
CAN-H		D27 - 13
CAN-L		D27 - 22
Front sub sensor LH	+	D27 - 30
	-	D27 - 28
Front sub sensor RH	+	D27 - 29
	-	D27 - 27
Ground line (GND)		D27 - 25
		D27 - 26

Passenger's airbag OFF indicator		D27 - 17
Passenger's airbag ON indicator		D27 - 23
Passenger's seat belt warning		D27 - 15
Side airbag sensor LH Curtain airbag sensor LH Front door impact sensor LH	+	H32 - 24
	-	H32 - 23
Side airbag module LH	+	H32 - 1
	-	H32 - 2
Curtain airbag module LH	+	H32 - 4
	-	H32 - 3
Seat belt pretensioner LH	+	H32 - 5
	-	H32 - 6
Satellite safing sensor	+	H32 - 20
	-	H32 - 19
Seat belt pretensioner RH	+	G19 - 4
	-	G19 - 3
Side airbag sensor RH Curtain airbag sensor RH Front door impact sensor RH	+	G19 - 17
	-	G19 - 18
Side airbag module RH	+	G19 - 8
	-	G19 - 7
Curtain airbag module RH	+	G19 - 5
	-	G19 - 6
Occupant detection control module	+	G19 - 16
	-	G19 - 24

### ECM Terminal Arrangement [ Steering Lock System ]

1. Steering lock actuator ASSY (Steering lock ECM)



## 1. Measure the voltage, resistance, and waveform.

Terminal No. (Terminal symbol)	Input/Output	Terminal description	Inspection conditions	Standard value	Related data monitor
D59-1 (GND) ← → Chassis ground	-	GND	Always	Less than 1 Ω	-
D59-3 (SLR+) ← → D59-1 (GND)	Input	Steering lock motor drive permission signal	When all of the following conditions are met and the doors are closed → open, the steering lock motor is driven. 1. The steering lock is unlocked 2. IG & ACC OFF 3. The shifter is in the P position (Transmission A/T)	Pulse generation (waveform 1)	Check 1. Motor power supply short circuit history 2. Unlock request reception state 3. Lock request reception state
D59-4 (SLP) ← → D59-1 (GND)	Output	Steering lock bar position	Steering lock → ering unlock	11 to 14 V → V or less	Check 1. Push button start malfunction history 2. Sensor malfunction history (Steering lock)
D59-5 (LIN) ← → D59-1 (GND)	Input/Output	LIN communication line	-	-	Check 1. Communication allowed state (Steering lock)
D59-6 (IGN1) ← → D59-1 (GND)	Input	IG2 input power supply	IG OFF → IG ON	Less than 1 V → 11 to 14 V	Check 1. IG SW
D59-7 (B) ← → Chassis ground	Input	Power supply	Always	11 to 14 V	-

**CAUTION:** The steering lock actuator ASSY (Steering lock ECM) is incorporated with one motor and two sensors.

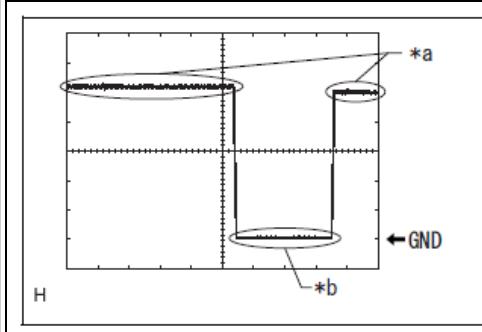
**NOTE:**

1. When performing measurements while the steering lock actuator motor is stopped, measurements can be made without any special operation.
2. When performing measurements while the steering lock actuator motor is running, the following operations are necessary.
  1. To unlock the steering, bring the electrical key transmitter SUB-ASSY (Electronic key) into the vehicle and turn the ignition to ACC ON or IG ON.
  2. To lock the steering, open a door while the vehicle is set to IG OFF & ACC OFF, and the shifter is in the P position (Transmission A/T).

2. Oscilloscope waveform.

a. Waveform 1

Item	Contents
Measuring terminal	D59-3 (SLR+) ← → D59-1 (GND)
Equipment setting	2 V/DIV, 200 ms/DIV
Measuring condition	Steering lock actuator motor stopped → Steering lock actuator motor running → Steering lock actuator motor stopped

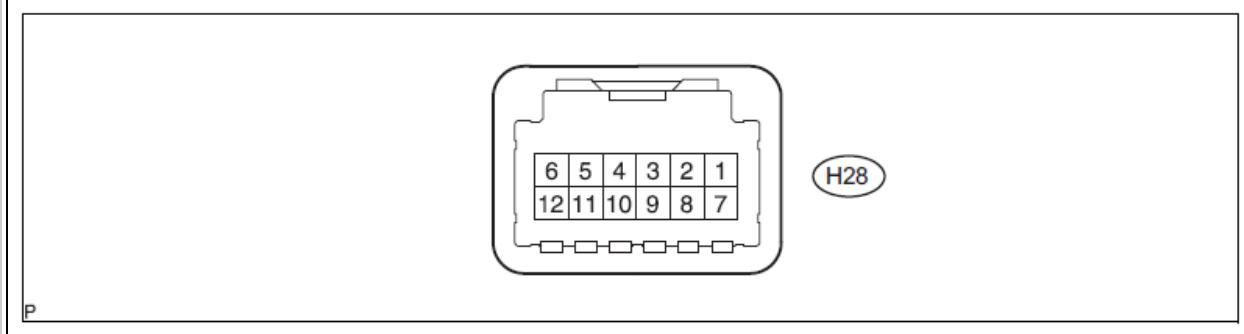


*a	Steering lock actuator motor stopped
*b	Steering lock actuator motor running

## ECM Terminal Arrangement [ Tire Pressure Warning System ]

1. Check tire pressure warning ECM/receiver.

**NOTE:** Check from the back side of the connector, with the connector connected.



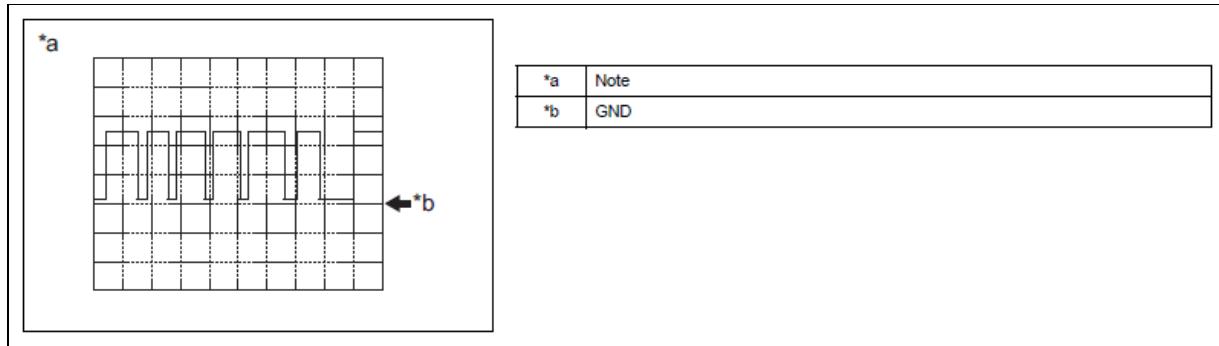
Courtesy of SUBARU OF AMERICA, INC.

1. Measure the voltage and resistance according to the following table. If it is out of standard value, it is possible that the ECM is faulty.

Terminal No. (terminal symbol)	Terminal description	Condition	Specific condition
H28-1 (IG) - H28-12 (GND)	IG power supply	IG SW ON	11 to 14 V
H28-4 (RDA) - H28-12 (GND)	Output signal	IG SW ON	Pulse generation (refer to waveform 1, see Fig 40)
H28-5 (PRG) - H28-12 (GND)	Input signal	IG SW ON	Pulse generation (refer to waveform 1, see Fig 40)
H28-7 (+B) - H28-12 (GND)	Power supply	Always	11 to 14 V
H28-12 (GND) - chassis ground	Ground	Always	1 Ω or less

2. Check the waveform 1 using oscilloscope.

Fig 40: Waveform 1



Courtesy of SUBARU OF AMERICA, INC.

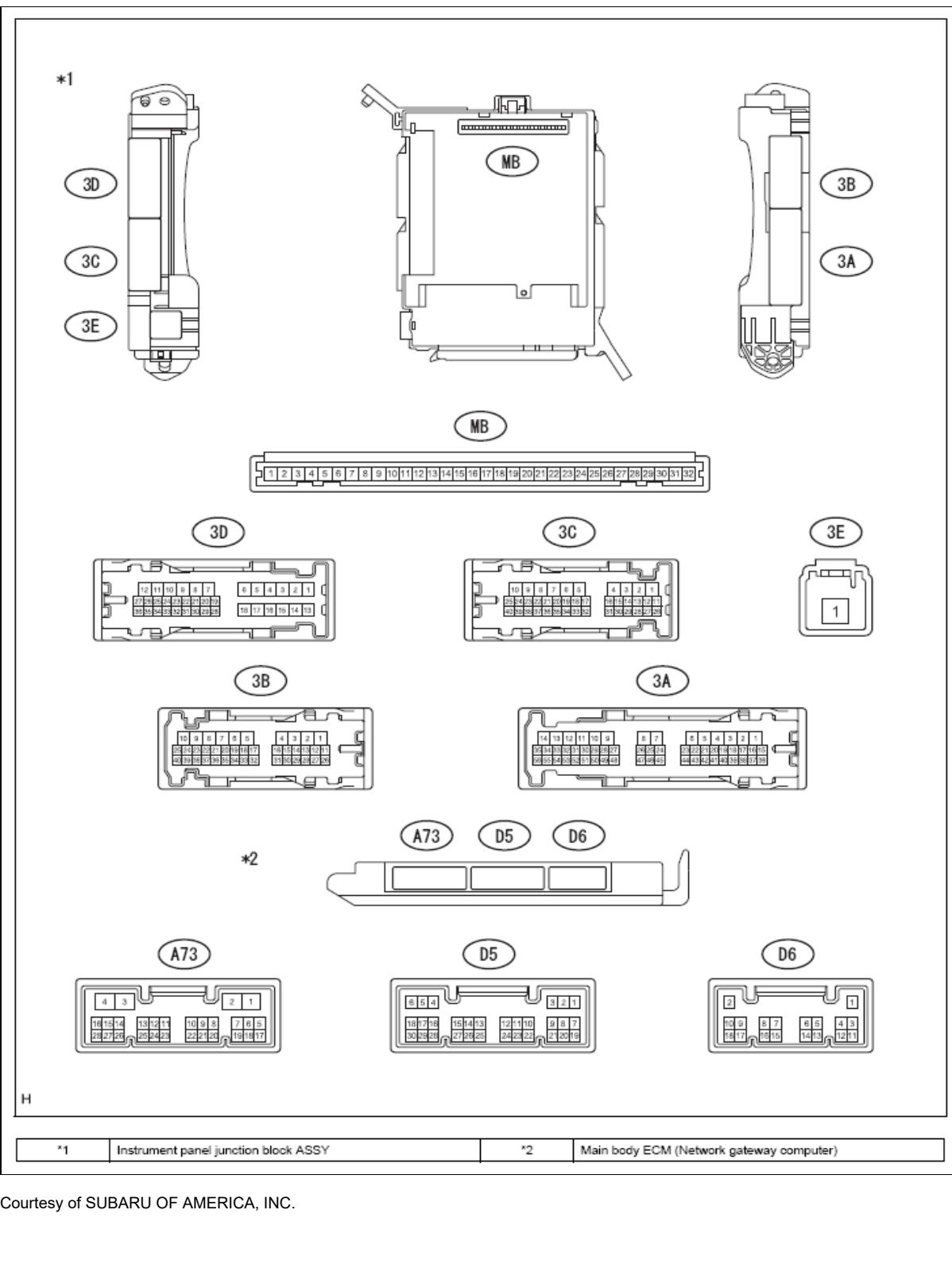
### TERMINALS DESCRIPTION - WAVEFORM 1

Item	Contents
Terminals	H28-4 (RDA) - H28-12 (GND) H28-5 (PRG) - H28-12 (GND)
Equipment setting	5 V/DIV, 50 µs./DIV.
Inspection conditions	IG SW ON

**NOTE:** Waveform shown in the figure is for reference. If the waveform changing HIGH and LOW alternately is shown, it is judged that the tire pressure warning ECM/receiver is normal (HIGH indicates the voltage between IG power supply voltage and the voltage that is 2.2 V lower than A, and LOW indicates the voltage between 0 and 1.2V).

### ECM Terminal Arrangement [ Trunk Opener System ]

1. Main body ECM (network gateway computer), instrument panel junction block ASSY
1. Inspection of the main body ECM (network gateway computer), instrument panel junction block ASSY



Courtesy of SUBARU OF AMERICA, INC.

- Remove the main body ECM (network gateway computer) from the instrument panel junction block ASSY.

- Measure the voltage and resistance between terminals.

#### STANDARD VALUE SPECIFICATION

Terminal No. (Terminal)	Inspection conditions	Standard value
-------------------------	-----------------------	----------------

symbol)		
MB-1 (BECU) ←→chassis ground	Always	11 to 14 V
MB-8 (IG) ←→chassis ground	IG OFF →IG ON	Less than 1 V →11 to 14 V
MB-9 (ACC) ←→chassis ground	ACC OFF →ACC ON	Less than 1 V →11 to 14 V
MB-11 (GND) ←→chassis ground	Always	Less than 1 Ω
D5-22 (ACC) ←→chassis ground <sup>(1)</sup>	ACC OFF →ACC ON	Less than 1 V →11 to 14 V
D6-16 (TSW) ←→chassis ground	Trunk opening switch ASSY OFF →ON	10 kΩ or more →less than 1 Ω

(1) With smart entry & start system

**NOTE:** If it is outside the standard values, the vehicle is defective.

- c. Install the main body ECM (network gateway computer) on the instrument panel junction block ASSY
- d. Measure the voltage between the terminals.

#### STANDARD VALUE SPECIFICATION

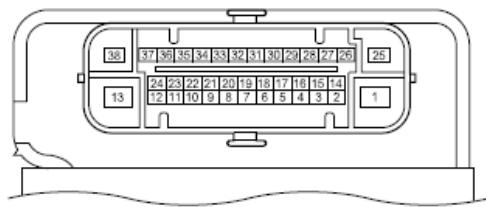
Terminal No. (Terminal symbol)	Inspection conditions	Standard value
D6-16 (TSW) ←→chassis ground	Trunk opening switch ASSY OFF →ON	Pulse generation →less than 1 V
3B-6 ←→chassis ground	Trunk opening switch ASSY OFF →ON	Less than 1 V →11 to 14 V →less than 1 V

**NOTE:** If it is outside the standard values, the main body ECM (network gateway computer) is defective.

#### ECM Terminal Arrangement [ Vehicle Stability Control System ]

1. Skid control computer (brake actuator ASSY) terminal arrangement

\*a



*a	Connector not connected (Skid control computer (brake actuator ASSY))	-	-
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Courtesy of SUBARU OF AMERICA, INC.

**NOTE:**

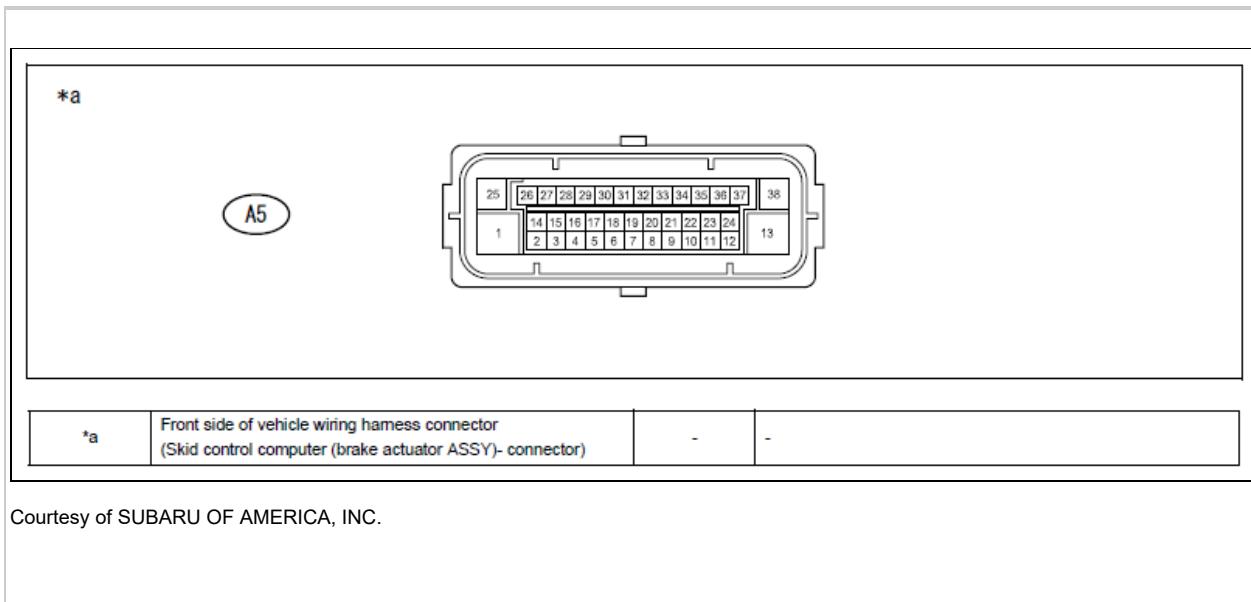
1. The skid control computer is integrated into the brake actuator ASSY and uses water-proof connectors. Therefore, voltage check and oscilloscope waveform checks for each terminal cannot be performed with the computer installed in the vehicle.
2. For the operation check and communication check of the skid control computer (brake actuator ASSY), use the data monitor and active test in the SSM4. (Refer to DATA MONITOR)

**TERMINAL DESCRIPTION - SKID CONTROL COMPUTER (BRAKE ACTUATOR ASSY)  
TERMINAL ARRANGEMENT**

Terminal No.	terminal symbol	Terminal name
1	+BM	Motor relay drive power supply
2	SPD	Vehicle speed signal output
4	FR-	Speed sensor FR RH signal input
8	FL-	Speed sensor FR LH signal input
9	CSW2	TRACK switch input
12	CSW1	Vehicle stability control OFF switch input
13	GND2	Actuator pump motor GND
14	CANL	CAN communication input/output
16	FR+	Speed sensor FR RH power supply output
17	RR+	Speed sensor RR RH power supply output
18	RL-	Speed sensor RR LH signal input

19	FL+	Speed sensor FR LH power supply output
25	+BS	Solenoid relay drive power supply
26	CANH	CAN communication input/output
28	IG1	IG power supply (ECM power supply) input
29	RR-	Speed sensor RR RH signal input
30	STP	Stop light switch input
31	RL+	Speed sensor RR LH power supply output
38	GND1	Skid control computer GND

2. Skid control computer (brake actuator ASSY), wiring harness side connector check



1. Disconnect the connector from the skid control computer (brake actuator ASSY).
2. Check the voltage and resistance between chassis ground and each terminal of the connector on the wiring harness side of the skid control computer (brake actuator ASSY).

Criteria

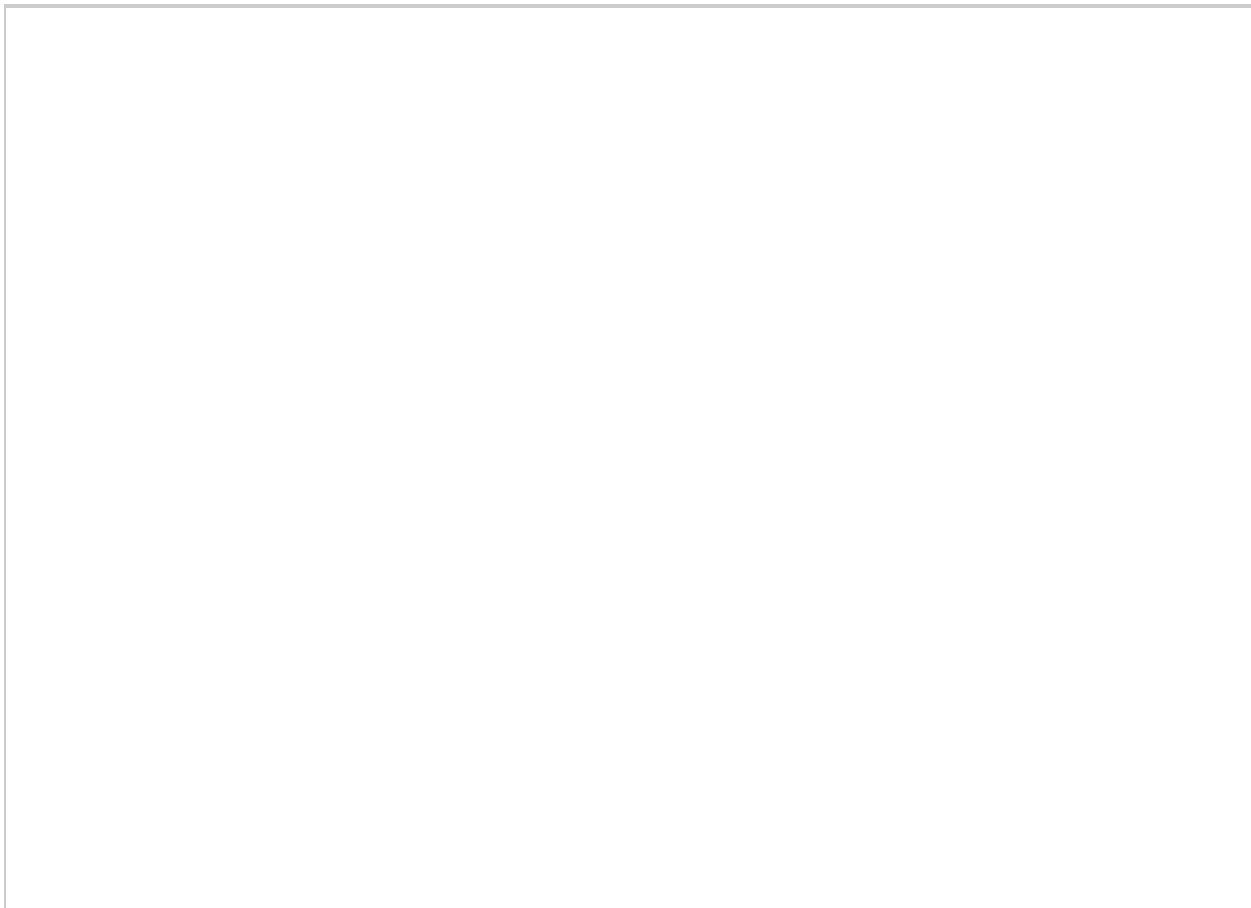
#### TERMINAL DESCRIPTION

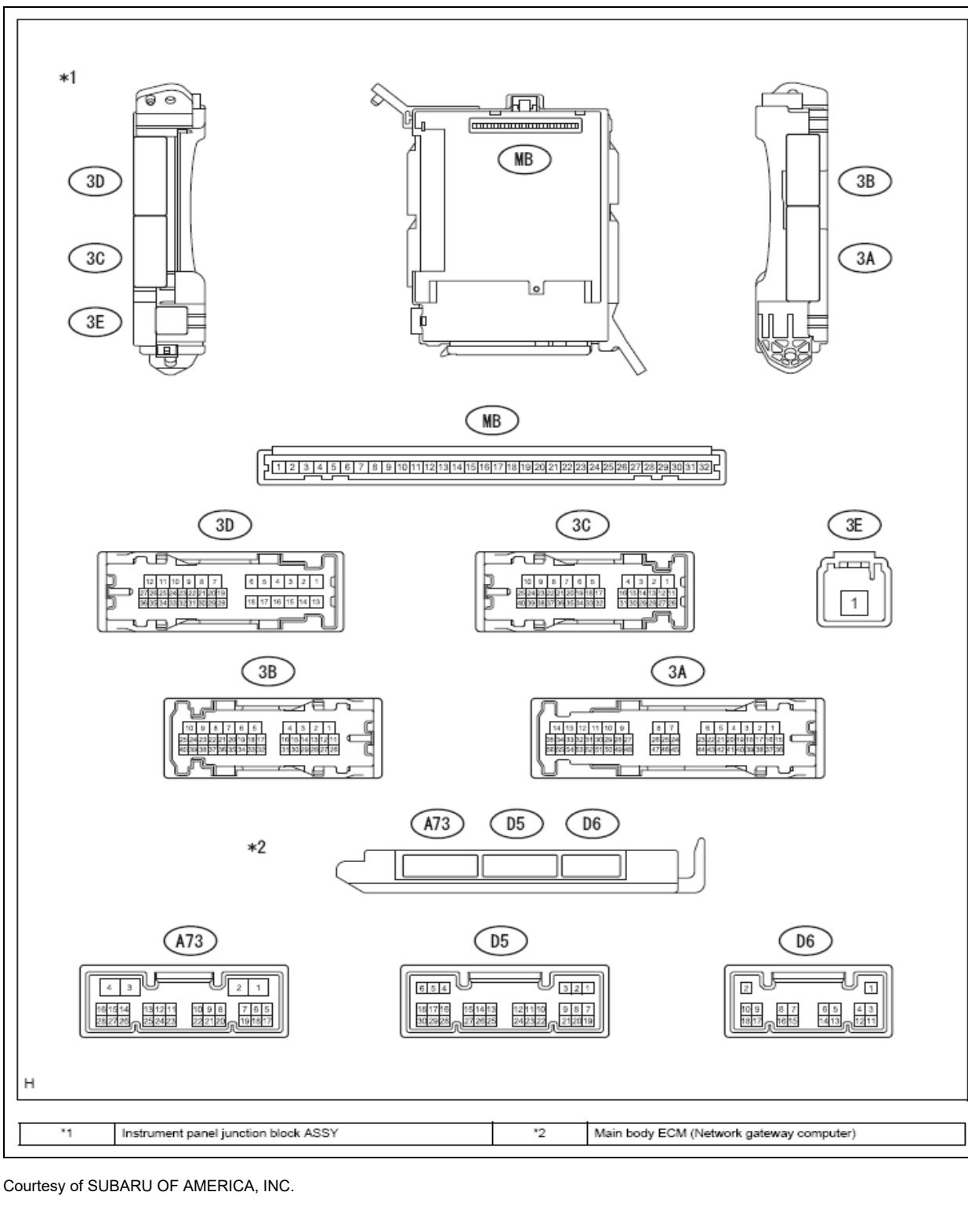
Terminal No. (terminal symbol)	Terminal description	Measuring condition	Standard value
A5-1 (+BM)←→chassis ground	Motor relay drive power supply	Always	11 to 14V
A5-12 (CSW1)←→chassis ground	Vehicle stability control OFF switch input	Press and hold Vehicle stability control OFF switch.	Less than 1 Ω
		Release Vehicle stability control OFF.	10 k Ω or more

A5-13 (GND2)←→chassis ground	Actuator pump motor GND	Always	Less than 1 Ω
A5-25 (+BS)←→chassis ground	Solenoid relay drive power supply	Always	11 to 14V
A5-9 (CSW2)←→chassis ground	TRACK switch input	Press and hold TRACK switch.	Less than 1 Ω
		Release TRACK switch.	10 kΩ or more
A5-28 (IG1)←→chassis ground	IG power supply (ECM power supply) input	IG ON	11 to 14V
A5-30 (STP)←→chassis ground	Stop light switch input	Brake pedal, depressed	8 to 14V
		Brake pedal, released	Less than 1.5 V
A5-38 (GND1)←→chassis ground	Skid control computer GND	Always	Less than 1 Ω

### ECM Terminal Arrangement [ Window Defogger System ]

1. Instrument panel junction block ASSY, main body ECM (Network gateway computer)





Courtesy of SUBARU OF AMERICA, INC.

1. Inspection of the instrument panel junction block ASSY and the main body ECM (network gateway computer)

- a. Measure the voltage between the terminals.

Standard value

#### STANDARD VALUE SPECIFICATION

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
A73-24 ←→ chassis ground	IG ON	11 to 14 V
D5-22 (ACC) ←→ chassis ground <sup>(1)</sup>	ACC ON	11 to 14 V

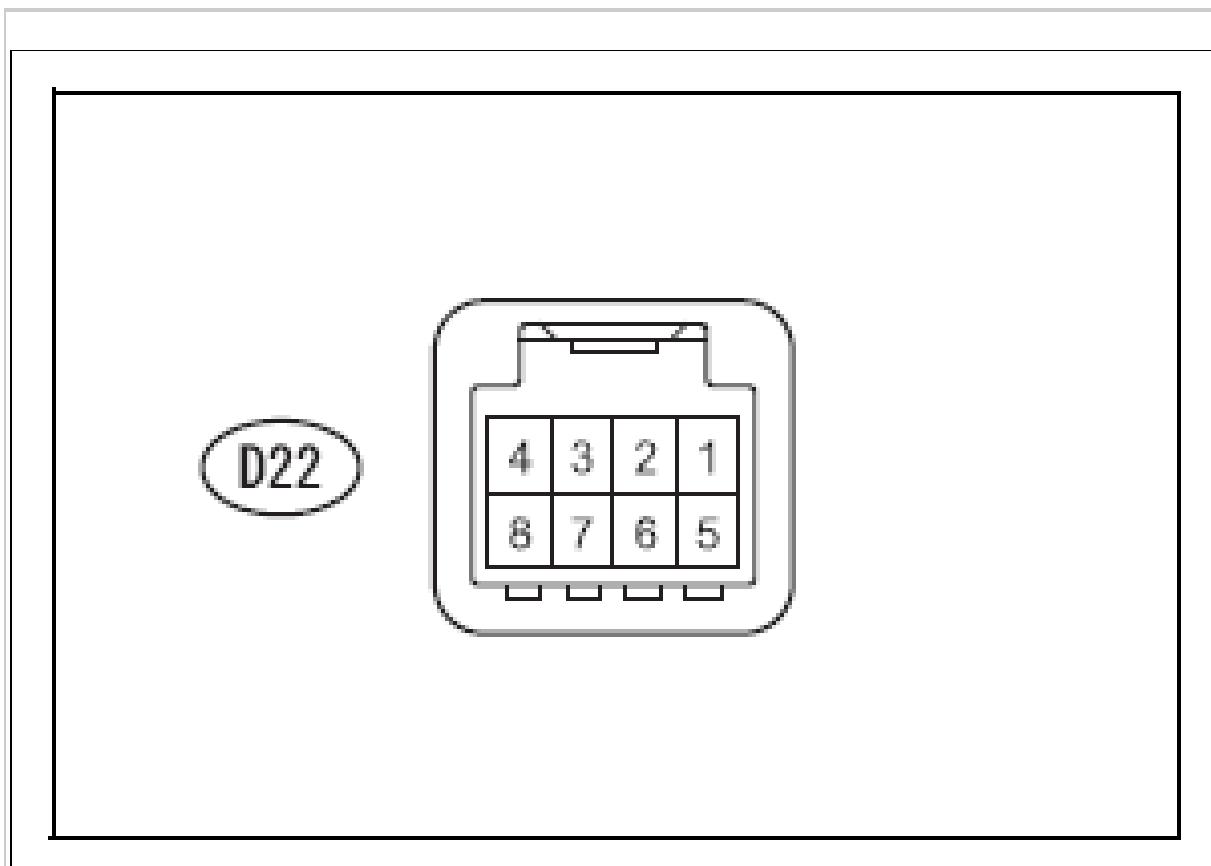
**NOTE:**

<sup>(1)</sup> When there is a smart entry & start system

**NOTE:** If it is outside the standard values, the vehicle is defective.

2. Heater control SUB-ASSY (Rear window defogger switch) (except for automatic air conditioning system)

1. Disconnect the connector D22 of the heater control SUB-ASSY (Rear window defogger switch).
2. Measure the voltage and resistance between terminals.



Standard value

### **STANDARD VALUE SPECIFICATION**

Terminal No. (Terminal symbol)	Inspection conditions	Standard value
D22-2 (IND+) ←→ D22-4 (RDEF-)	Always	11 to 14 V
D22-4 (RDEF-) ←→ chassis ground	Always	Less than 1 Ω

3. Connect the connector D22 of the heater control SUB-ASSY (Rear window defogger switch).
4. Measure the voltage between the terminals.

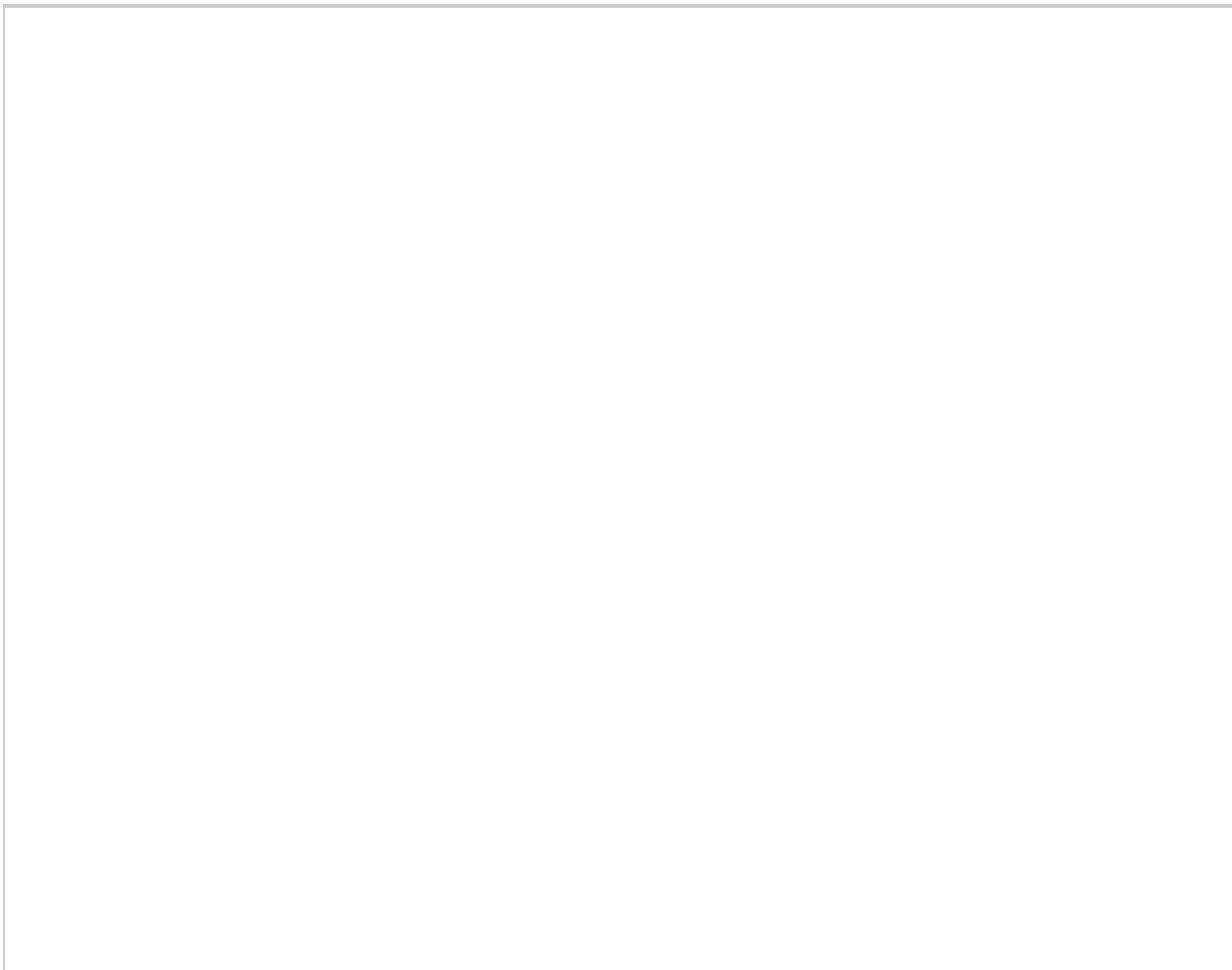
Standard value

### **STANDARD VALUE SPECIFICATION**

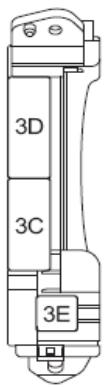
Terminal No. (Terminal symbol)	Inspection conditions	Standard value
D22-6 (IND+) ←→ D22-4 (RDEF-)	IG ON Defogger switch OFF → ON	11 to 14 V → 1 V or less

### **ECM Terminal Arrangement [ Wireless Door Lock Control System (With Entry & Start System) ]**

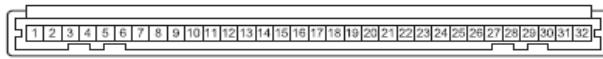
1. Check the instrument panel junction block ASSY and main body ECM (multiplex network body ECM).



\*1



(MB)



(3D)



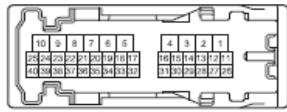
(3C)



(3E)



(3B)



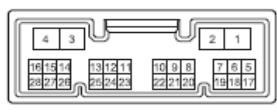
(3A)



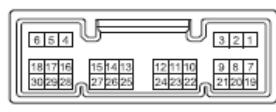
\*2



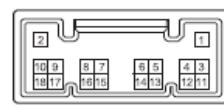
(A73)



(D5)



(D6)



\*1 Instrument panel junction block ASSY

\*2 Main body ECM (multiplex network body ECM)

Courtesy of SUBARU OF AMERICA, INC.

1. Remove the main body ECM (multiplex network body ECM) from the instrument panel junction block ASSY.
2. Disconnect the main body ECM (multiplex network body computer) connectors D6 and A73.
3. Measure the resistance and voltage based on the following table.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
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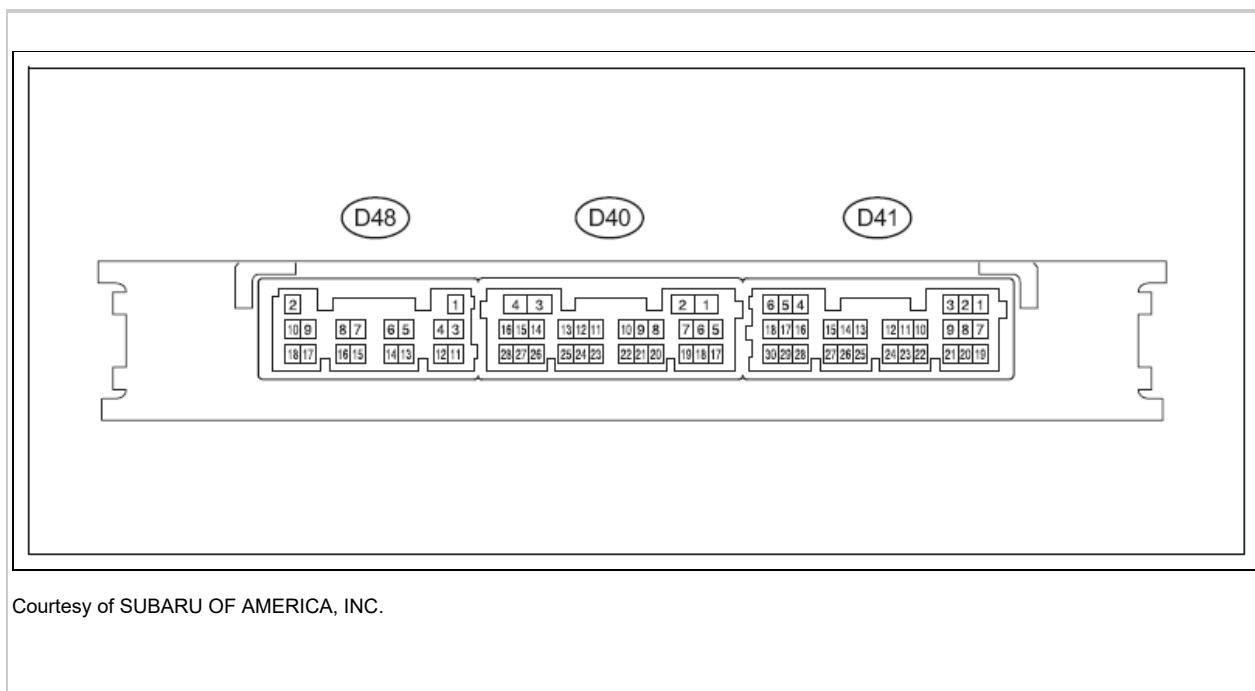
MB-11 - chassis ground	Ground	Always	1 Ω or less
MB-1 - chassis ground	Battery power supply	Always	11 to 14V
MB-32 - chassis ground	Battery power supply	Always	11 to 14V
MB-8 - chassis ground	Engine switch power supply	Engine switch ON	11 to 14V
		Engine switch OFF	1 V or less
MB-9 - Chassis ground	ACC power supply	Engine switch ACC	11 to 14V
		Engine switch OFF	1 V or less
D6-1 - Chassis ground	Ground	Always	1 Ω or less
A73-4 - chassis ground	Ground	Always	1 Ω or less

4. Connect the main body ECM (multiplex network body computer) connectors D6 and A73.
5. Install the main body ECM (multiplex network body ECM) to the instrument panel junction block ASSY
6. Measure the voltages and pulses according to the values indicated in the table below.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
3A-28 - chassis ground	Driver's side courtesy light switch	Driver's door is open.	1 V or less
		Driver's door is closed	Pulse generation
3B-13 - chassis ground	Passenger's side courtesy light switch	The passenger's door is open.	1 V or less
		The passenger's door is closed.	Pulse generation
3D-26 - chassis ground	Trunk courtesy light switch	The trunk is open.	1 V or less
		The trunk is closed.	11 to 14V
3B-2 - chassis ground	Door lock motor lock drive output	Door control switch is not pressed	1 V or less
		Lock side of door control switch is not pressed	11 to 14V
3B-3 - chassis ground	Door lock motor lock drive output	Door control switch is not pressed	1 V or less
		Lock side of door control switch is not pressed	11 to 14V
3B-6 - chassis ground	Door lock motor lock drive output (trunk)	The trunk open button on the electrical key transmitter SUB-ASSY is not pressed.	11 to 14V
		The trunk open button on the electrical key transmitter SUB-ASSY is pressed.	1 V or less
3B-1 - Chassis ground	Door lock motor unlock drive output	Door control switch is not pressed	1 V or less
		Unlock side of door control switch is not	11 to 14V

		pressed	
3B-4 - chassis ground	Door lock motor unlock drive output	Door control switch is not pressed	1 V or less
		Unlock side of door control switch is not pressed	11 to 14V
D6-11 - chassis ground	Driver's door unlock detection switch input	The driver's door is locked.	1 V or less
		Engine switch is OFF, all doors are closed, and driver's door is locked	Pulse generation
D6-12 - chassis ground	Driver's door unlock detection switch input	Passenger's door is unlocked	1 V or less
		Engine switch OFF, all doors closed, and passenger's door locked	Pulse generation

## 2. Check the collation ECM (smart key computer ASSY).



1. Remove the D48 connector of the collation ECM (smart key ECM ASSY).
  2. Measure the voltage and resistance according to the following table.

**NOTE:** Measure the wire harness side values with the connector disconnected.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
D48-2 - D48-11	+B power supply	Always	11 to 14V
D48-11 - Chassis ground	Ground	Always	1 Ω or less

If you cannot get the specified result, there could be a problem in the wiring harnesses.

3. Reconnect the D48 connector of the collation ECM (smart key ECM ASSY).

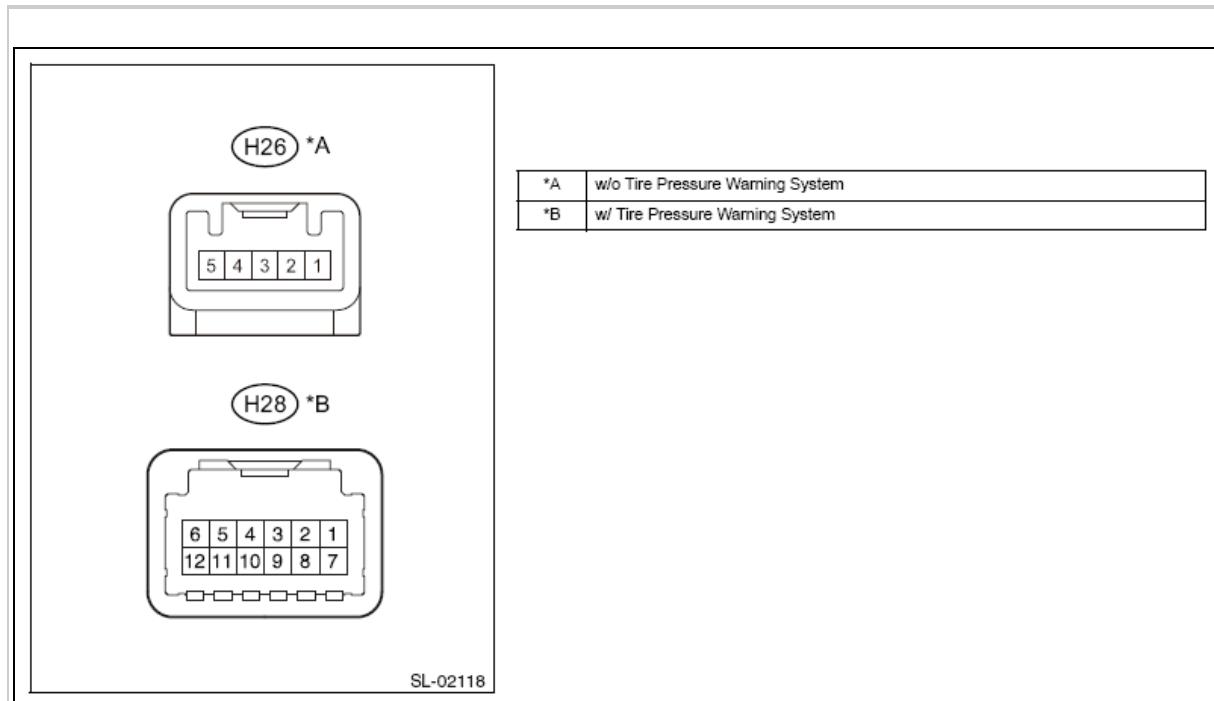
4. Measure the voltage according to the following table.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
D41-5 - D48-11	IG power supply	Engine switch OFF → ON (IG)	1V or less → 11 to 14V
D40-5 - D48-11	Entry door control receiver power source	Engine switch OFF, all doors closed, electrical key transmitter SUB-ASSY switch not pressed → Electrical key transmitter SUB-ASSY switch is pressed	1V or less → 4.5 to 5.5V
D40-17 - D48-11	Entry door control receiver data input signal	Engine switch OFF, all doors closed, electrical key transmitter SUB-ASSY switch not pressed → Electrical key transmitter SUB-ASSY switch is pressed	11 to 14 V pulse generates at equal intervals
D40-19 - D48-11	Entry door control receiver radio wave signal present	All doors locked, all doors closed, electrical key switch ON	11 to 14 V → 2V or less

3. Inspect the door control receiver.

1. Disconnect the door control receiver connector H26 or H28.

2. Measure the resistance according to the following table.



Courtesy of SUBARU OF AMERICA, INC.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
H26-1 - Chassis ground <sup>(1)</sup> H28-12 - Chassis ground <sup>(2)</sup>	Ground	Always	1 or less
(1)	w/o Tire Pressure Warning System		
(2)	w/Tire Pressure Warning System		

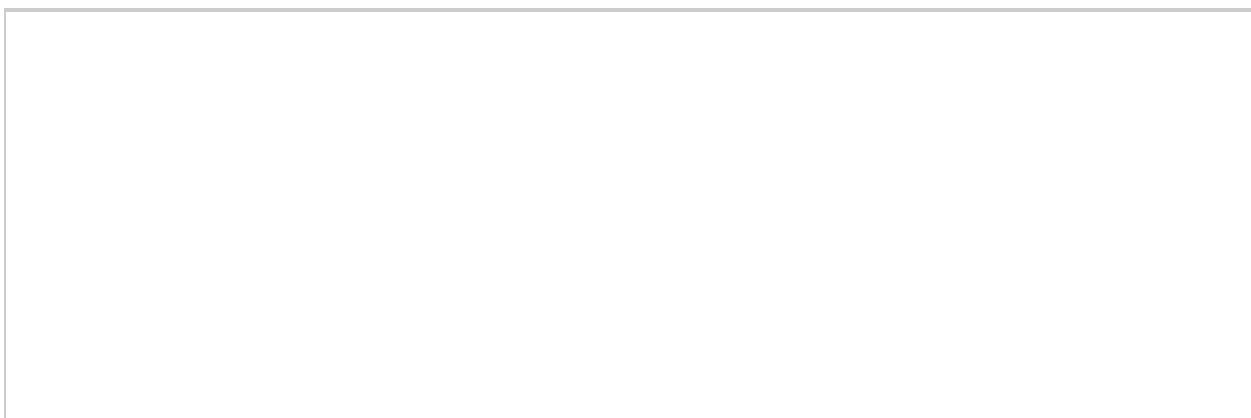
3. Reconnect the H26 or H28 door control receiver connector.

4. Measure the voltage according to the following table.

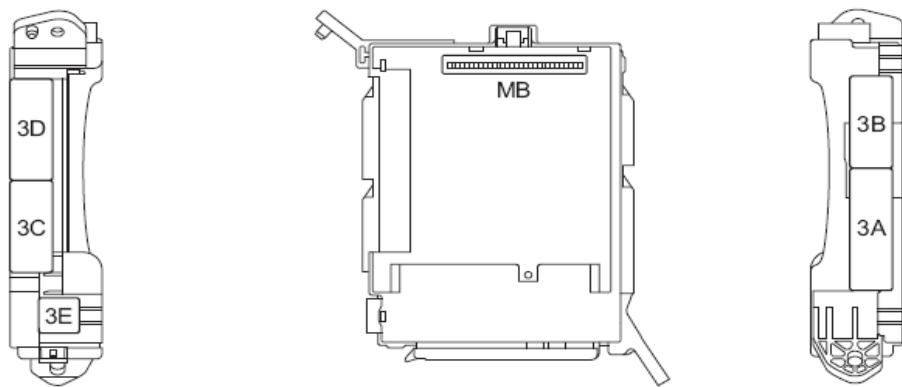
Terminal No. (symbol)	Terminal description	Conditions	Specified condition
H26-2 - H26-1 <sup>(1)</sup> H28-6 - H28-12 <sup>(2)</sup>	Entry door control receiver radio wave signal present	All doors locked, all doors closed, electrical key switch ON	11 to 14 V → 2 V or less
H26-5 - H26-1 <sup>(1)</sup> H28-9 - H28-12 <sup>(2)</sup>	Entry door control receiver data input signal	Engine switch OFF	11 to 14 V pulse generates at equal intervals
H26-4 - H26-1 <sup>(1)</sup> H28-10 - H28-12 <sup>(2)</sup>	Entry door control receiver power source	Engine switch OFF, all doors closed, electrical key transmitter SUB-ASSY switch not pressed → Electrical key transmitter SUB-ASSY switch is pressed	1 V or less → 4.5 to 5.5 V
(1)	w/o Tire Pressure Warning System		
(2)	w/Tire Pressure Warning System		

### ECM Terminal Arrangement [ Wireless Door Lock Control System (Without Entry & Start System) ]

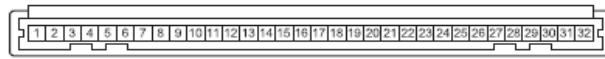
1. Check the instrument panel junction block ASSY and main body ECM (multiplex network body ECM).



\*1



(MB)



(3D)



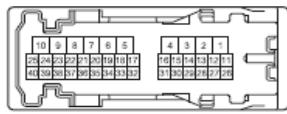
(3C)



(3E)



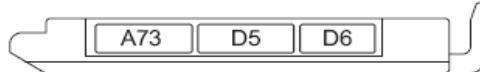
(3B)



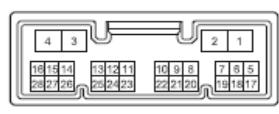
(3A)



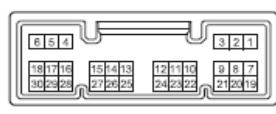
\*2



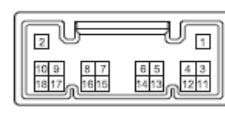
(A73)



(D5)



(D6)



\*1 Instrument panel junction block ASSY

\*2 Main body ECM (multiplex network body ECM)

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1. Remove the main body ECM (multiplex network body ECM) from the instrument panel junction block ASSY.
2. Disconnect the connectors D5, D6, and A73 of the main body ECM (multiplex network body ECM).
3. Measure the resistance and voltage at the terminals between the wiring harness side connector and a chassis ground.

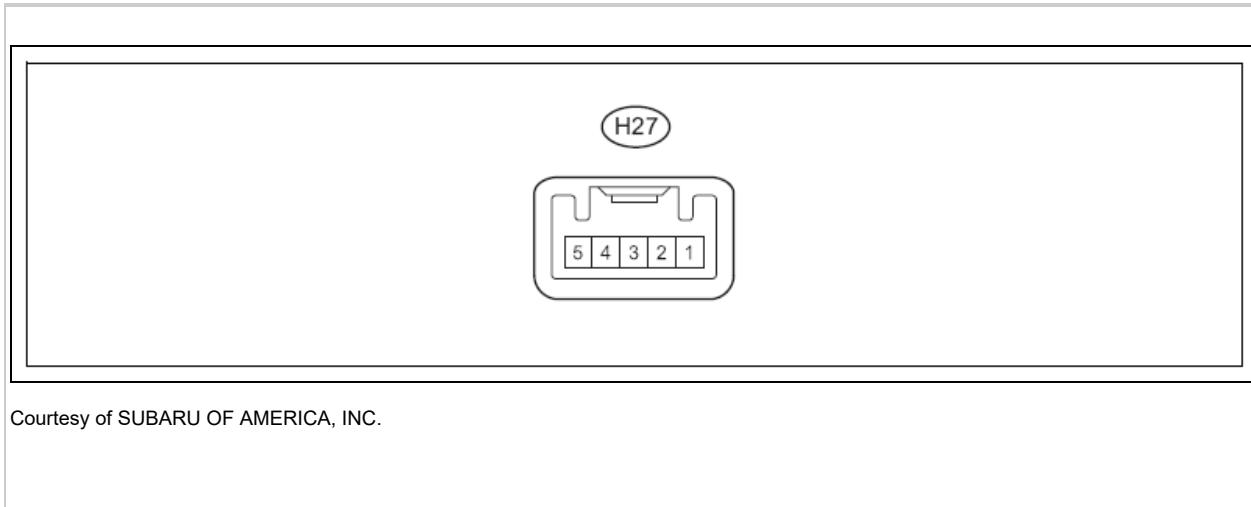
Terminal No. (symbol)	Terminal description	Conditions	Specified condition
MB-1 - chassis ground	Battery power supply	Always	11 to 14V
MB-8 - chassis ground	IG SW power supply	IG SW ON	11 to 14V
		IG SW OFF	1 V or less
MB-9 - Chassis ground	ACC power supply	IG SW ACC	11 to 14V
		IG SW OFF	1 V or less
MB-11 - chassis ground	Ground	Always	1 Ω or less
MB-32 - chassis ground	Battery power supply	Always	11 to 14V
D5-22 - chassis ground	Unlock warning switch input	Key is not inserted in ignition key cylinder (OFF)	1 V or less
		Key is inserted to the ignition key cylinder (ON).	11 to 14V
D6-1 - Chassis ground	Ground	Always	1 Ω or less
A73-4 - chassis ground	Ground	Always	1 Ω or less

4. Reconnect the connector D5, D6, and A73 of the main body ECM (multiplex network body ECM).
5. Install the main body ECM (multiplex network body ECM) to the instrument panel junction block ASSY
6. Measure the voltages and resistances according to the values indicated in the table below.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
3A-28 - chassis ground	Driver's side courtesy light switch	Driver's door is open.	1 V or less
		Driver's door is closed	Pulse generation
3B-13 - chassis ground	Passenger's side courtesy light switch	The passenger's door is open.	1 V or less
		The passenger's door is closed.	Pulse generation
3D-26 - chassis ground	Trunk courtesy light switch	The trunk is open.	1 V or less
		The trunk is closed.	11 to 14V
3B-2 - chassis ground	Door lock motor lock drive output (driver's side)	Door control switch is not pressed	1 V or less
		Lock side of door control switch is not	11 to 14V

		pressed	
3B-3 - chassis ground	Door lock motor lock drive output (passenger's side)	Door control switch is not pressed	1 V or less
		Lock side of door control switch is not pressed	11 to 14V
3D-11 - chassis ground	Door lock motor unlock drive output (driver's side)	Door control switch is not pressed	1 V or less
		Unlock side of door control switch is not pressed	11 to 14V
3B-4 - chassis ground	Door lock motor unlock drive output (passenger's side)	Door control switch is not pressed	1 V or less
		Unlock side of door control switch is not pressed	11 to 14V
A73-1 - chassis ground	Wireless door lock buzzer signal	Wireless door lock buzzer OFF	1 V or less
		Wireless door lock buzzer ON	Pulse generation
D6-6 - chassis ground	Output signals to door control receiver	Key is inserted in ignition key cylinder →Key is removed from ignition key cylinder	11 to 14 V →Pulse generation →11 to 14 V
D6-7 - Chassis ground	Input signals from door control receiver	Ignition switch is OFF, all doors are closed, no transmitter switch is pressed	11 to 14V
		Ignition switch is OFF, all doors are closed, transmitter switch is pressed	Pulse generation

## 2. CHECK DOOR CONTROL RECEIVER (without TPMS)



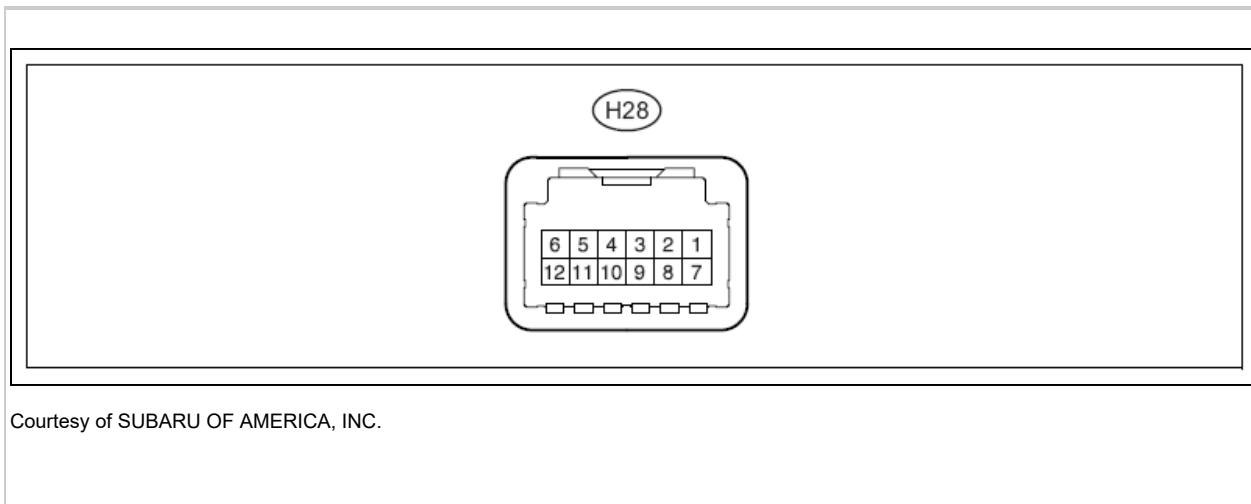
1. Disconnect the H27 door control receiver connector.
2. Measure the resistance and voltage according to the value(s) in the table below.

Terminal No. (Symbol)	Terminal Description	Condition	Specified Condition
H27-5 - Body ground	Battery power supply	Always	11 to 14 V
H27-1 - Body ground	Ground	Always	Below 1Ω

3. Reconnect the H27 door control receiver connector.
4. Measure the voltage according to the value(s) in the table below.

Terminal No. (Symbol)	Terminal Description	Condition	Specified Condition
H27-3 - Body ground	Signal input from main body ECU (multiplex network body ECU)	Key inserted in ignition key cylinder → Key pulled out of ignition key cylinder	11 to 14 V → Pulse generation → 11 to 14 V
H27-2 - Body ground	Signal output to main body ECU (multiplex network body ECU)	Ignition switch off, all doors closed and door control transmitter switch not pressed	11 to 14 V
		Ignition switch off, all doors closed and door control transmitter switch pressed	Pulse generation

3. Inspect the door control receiver (with TPMS).



1. Disconnect the door control receiver connector H28.
2. Measure the resistance and voltage based on the following table.

Terminal No. (symbol)	Terminal description	Conditions	Specified condition
H28-1 - Chassis ground	IG SW power supply	IG SW ON	11 to 14V
		IG SW OFF	1 V or less
H28-7 - chassis ground	Battery power supply	Always	11 to 14V
H28-12 - chassis ground	Ground	Always	1 Ω or less

3. Reconnect the door control receiver connector H28.
4. Measure the voltage according to the following table.

Terminal	Terminal description	Conditions	Specified

No. (symbol)			condition
H28-5 - chassis ground	Input signals from main body ECM (multiplex network body computer)	Key is inserted in ignition key cylinder →Key is removed from ignition key cylinder	11 to 14 V →Pulse generation →11 to 14 V
H28-4 - chassis ground	Output signals to main body ECM (multiplex network body computer)	Ignition switch is OFF, all doors are closed, no door control transmitter switch is pressed	11 to 14V
		Ignition switch is OFF, all doors are closed, door control transmitter switch is pressed	Pulse generation