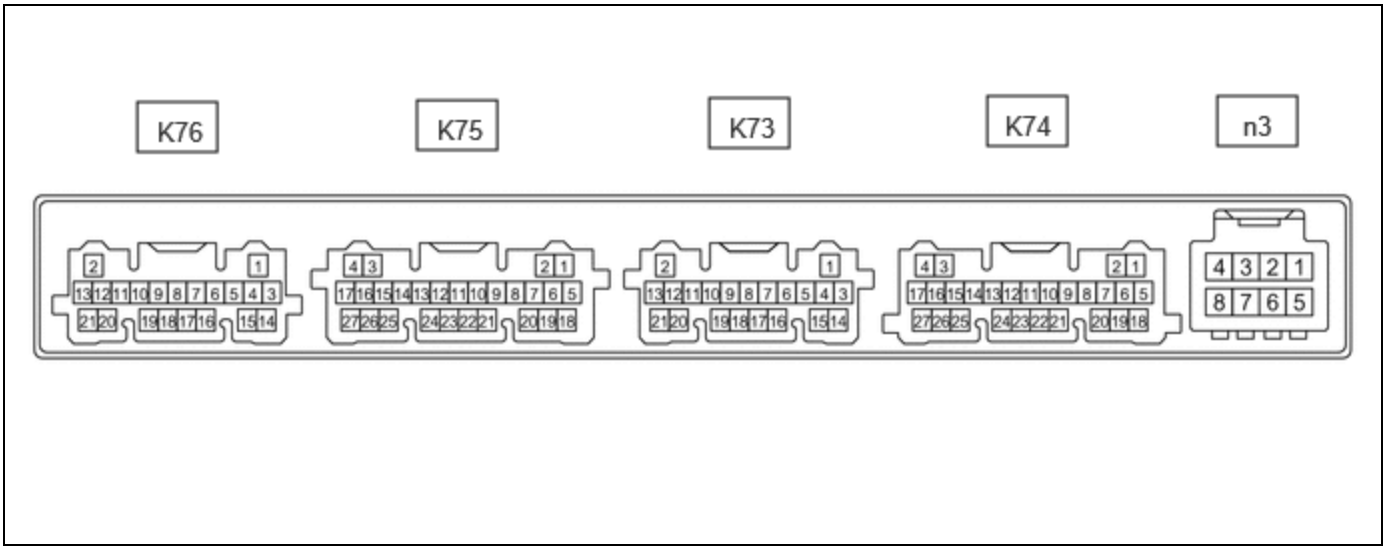
Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002AQO8
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): TERMINALS OF ECU; 2023 - 2024 MY Prius Prime [03/2023 -]		

TERMINALS OF ECU

CHECK AIR CONDITIONING AMPLIFIER ASSEMBLY



HINT:

Make sure to wait at least 2 minutes after turning the ignition switch off before performing an ECU terminal inspection.

Channel 1 (n3)

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
n3-2 (BUSG) - Body ground	Ground for BUS IC	Always	Below 1 Ω
n3-3 (BUS) - n3-2 (BUSG)	BUS IC control signal	Ignition switch ON	Pulse generation (See waveform "Servo LIN communication")
n3-4 (BUSB) - n3-2 (BUSG)	Power supply for BUS IC	Ignition switch off	11 to 14 V
n3-5 (SG-3) - Body ground	Ground for evaporator temp. sensor (No. 1 cooler thermistor)	Always	Below 1 Ω
n3-6 (TE) - n3-5 (SG-3)	Evaporator temp. sensor (No. 1 cooler thermistor) signal	• Ignition switch ON • Evaporator temperature: 0°C (32°F)	1.7 to 2.1 V
		• Ignition switch ON • Evaporator temperature: 15°C	0.9 to 1.3 V

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
		(59°F)	

Channel 2 (K74)

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
K74-2 (CANH) - K74-1 (CANL)	CAN communication system	Ignition switch ON	Pulse generation
K74-5 (B) - K74-17 (GND)	Power source (Back-up)	Ignition switch off	11 to 14 V
K74-6 (IG+) - K74-17 (GND)	Power source (IG)	Ignition switch ON	11 to 14 V
		Ignition switch off	Below 1 V
K74-7 (LIN1) - K74-17 (GND)	LIN communication signal (air conditioning control assembly)	Ignition switch ON	Pulse generation (See waveform "Control panel LIN communication")
K74-17 (GND) - Body ground	Ground for main power supply	Always	Below 1 Ω
K74-21 (BLW) - K74-17 (GND)	Blower motor speed control signal	• Ignition switch ON • Blower switch: LO	Pulse generation (See waveform "Blower")

Channel 3 (K73)

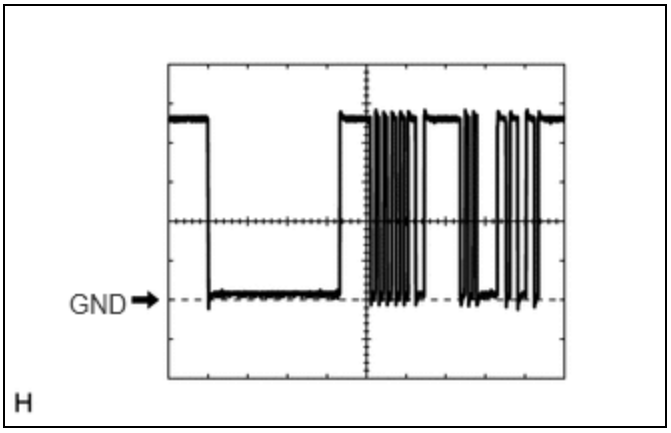
TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
K73-1 (TAM) - K73-14 (SG-2)	Ambient temp. sensor (thermistor assembly) signal	• Ignition switch ON • Ambient temperature: 25°C (77°F)	1.05 to 1.45 V
		• Ignition switch ON • Ambient temperature: 40°C (104°F)	0.64 to 0.87 V
K73-3 (SG-1) - Body ground	Ground for room temp. sensor (cooler thermistor)	Always	Below 1 Ω
K73-5 (TR) - K73-3 (SG-1)	Room temp. sensor (cooler thermistor) signal	• Ignition switch ON • Cabin temperature: 25°C (77°F)	1.05 to 1.45 V
		• Ignition switch ON • Cabin temperature: 40°C (104°F)	0.64 to 0.87 V

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
K73-6 (PRE) - K73-15 (SG-4)	Air conditioning pressure sensor signal	• Ignition switch ON (READY) • Air conditioning system operating • Refrigerant pressure: Normal pressure	0.74 to 4.61 V
K73-11 (S5-3) - K73-15 (SG-4)	Power supply for air conditioning pressure sensor	Ignition switch ON	4.75 to 5.25 V
		Ignition switch off	Below 1 V
K73-14 (SG-2) - Body ground	Ground for ambient temp. sensor (thermistor assembly)	Always	Below 1 Ω
K73-15 (SG-4) - Body ground	Ground for air conditioning pressure sensor	Always	Below 1 Ω

Channel 4 (K75)

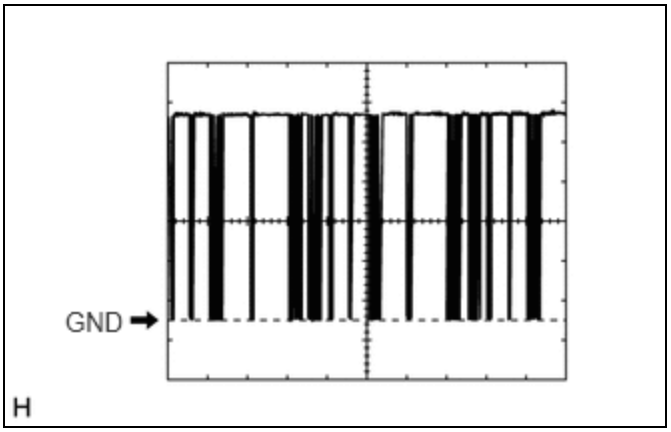
TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
K75-5 (SIG1) - Body ground	IGB relay power source operation input	Ignition switch off → Ignition switch ON	Below 1 V → 11 to 14 V
K75-11 (CANP) - K75-12 (CANN)	CAN communication signal (heat pump ECU assembly)	Ignition switch ON	Pulse generation

(a) Waveform "Servo LIN communication":



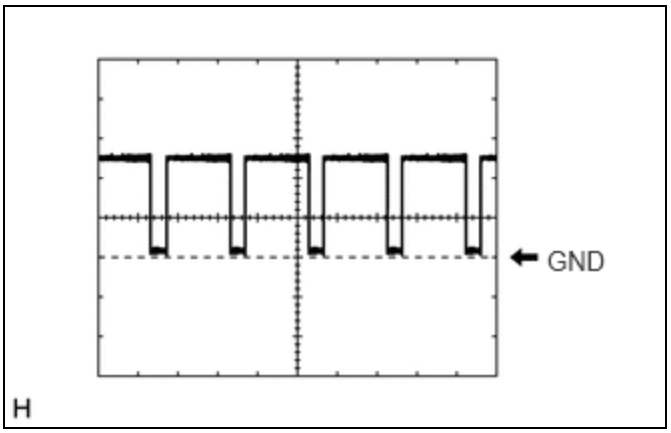
ITEM	CONTENT
Terminal No.	n3-3 (BUS) - n3-2 (BUSG)
Tool Setting	2 V/DIV., 2 ms./DIV.
Condition	Ignition switch ON

(b) Waveform "Control panel LIN communication":



ITEM	CONTENT
Terminal No.	K74-7 (LIN1) - K74-17 (GND)
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Ignition switch ON

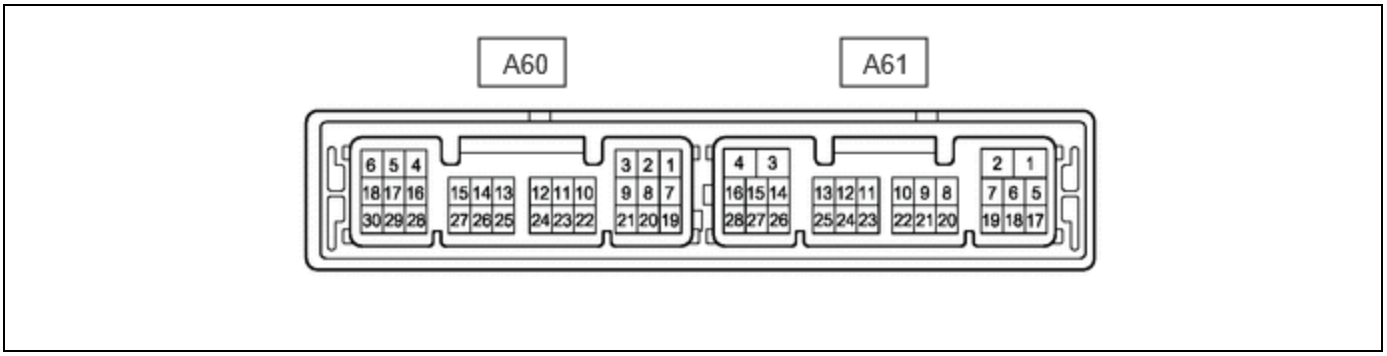
(c) Waveform "Blower":



ITEM	CONTENT
Terminal No.	K74-21 (BLW) - K74-17 (GND)
Tool Setting	2 V/DIV., 1 ms./DIV.
Condition	• Ignition switch ON • Blower switch: LO

HINT:

The waveform varies with the blower speed.



Channel 1 (A61)

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A61-1 (+B2) - Body ground	Power source	Ignition switch off	11 to 14 V
A61-5 (IGBD) - Body ground	Power source (IG)	Ignition switch off → Ignition switch ON	Below 1 V → 11 to 14 V
A61-3 (GND2) - Body ground	Ground	Always	Below 1 Ω
A61-4 (RGND) - Body ground	Ground	Always	Below 1 Ω
A61-8 (CANP) - A61-9 (CANN)	CAN communication line (air conditioning amplifier assembly)	Ignition switch ON	Pulse generation
A61-11 (HEB2) - Body ground	Heating electric expansion valve (magnet valve assembly) B phase 2CH	• Ignition switch ON • Set temperature: MAX HOT • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI • Air vent damper position: FOOT	Pulse generation (See waveform "Heating electric expansion valve operation")
A61-12 (HEB1) - Body ground	Heating electric expansion valve (magnet valve assembly) B phase 1CH	• Ignition switch ON • Set temperature: MAX HOT • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI • Air vent damper position: FOOT	Pulse generation (See waveform "Heating electric expansion valve operation")
A61-13 (CEA1) - Body ground	Cooling electric expansion valve (cooler expansion valve) A phase 1CH	• Ignition switch ON • Set temperature: MAX COLD • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI	Pulse generation (See waveform "Cooling electric expansion valve operation")

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
		• Air vent damper position: FACE	
A61-14 (CEB1) - Body ground	Cooling electric expansion valve (cooler expansion valve) B phase 1CH	• Ignition switch ON • Set temperature: MAX COLD • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI • Air vent damper position: FACE	Pulse generation (See waveform "Cooling electric expansion valve operation")
A61-23 (HEA2) - Body ground	Heating electric expansion valve (magnet valve assembly) A phase 2CH	• Ignition switch ON • Set temperature: MAX HOT • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI • Air vent damper position: FOOT	Pulse generation (See waveform "Heating electric expansion valve operation")
A61-24 (HEA1) - Body ground	Heating electric expansion valve (magnet valve assembly) A phase 1CH	• Ignition switch ON • Set temperature: MAX HOT • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI • Air vent damper position: FOOT	Pulse generation (See waveform "Heating electric expansion valve operation")
A61-25 (CEA2) - Body ground	Cooling electric expansion valve (cooler expansion valve) A phase 2CH	• Ignition switch ON • Set temperature: MAX COLD • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI • Air vent damper position: FACE	Pulse generation (See waveform "Cooling electric expansion valve operation")
A61-26 (CEB2) - Body ground	Cooling electric expansion valve (cooler expansion valve) B phase 2CH	• Ignition switch ON • Set temperature: MAX COLD • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI • Air vent damper position: FACE	Pulse generation (See waveform "Cooling electric expansion valve operation")

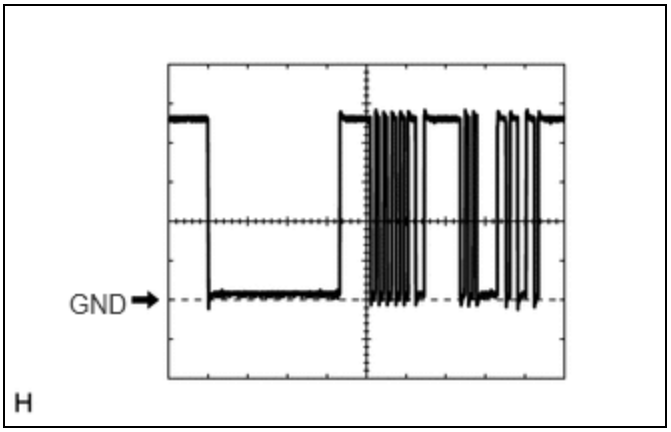
Channel 2 (A60)

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A60-5 (TDCG) - A60-25 (SG-4)	Refrigerant outlet sensor (discharge temperature sensor) signal	• Ignition switch ON • Refrigerant outlet sensor (discharge temperature sensor) ambient temperature 20°C (68°F)	4.34 to 4.89 V
		• Ignition switch ON • Refrigerant outlet sensor (discharge temperature sensor) ambient temperature 40°C (104°F)	3.83 to 4.49 V
A60-6 (TSCL) - A60-25 (SG-4)	Internal condenser temperature sensor signal	• Ignition switch ON • Internal condenser temperature sensor ambient temperature 20°C (68°F)	3.80 to 4.34 V
		• Ignition switch ON • Internal condenser temperature sensor ambient temperature 40°C (104°F)	2.95 to 3.51 V
A60-10 (HPMV) - Body ground	High pressure magnetic valve (No. 2 magnet valve assembly) operation signal	• Ignition switch ON • High pressure magnetic valve (No. 2 magnet valve assembly) operating	11 to 14 V → Below 1 V
A60-11 (LPMV) - Body ground	Low pressure magnetic valve (No. 3 magnet valve assembly) operation signal	• Ignition switch ON • Low pressure magnetic valve (No. 3 magnet valve assembly) operating	11 to 14 V → Below 1 V
A60-12 (EVMV) - Body ground	Evaporator front magnetic valve (No. 1 magnet valve assembly) operation signal	• Ignition switch ON • Evaporator front magnetic valve (No. 1 magnet valve assembly) operating	11 to 14 V → Below 1 V
A60-17 (TSHT) - A60-26 (SG-5)	Evaporator refrigerant temperature sensor (No. 2 air conditioning thermistor assembly) signal	• Ignition switch ON • Evaporator refrigerant temperature sensor (No. 2 air conditioning thermistor assembly) ambient temperature 20°C (68°F)	1.77 to 2.29 V
		• Ignition switch ON	1.03 to 1.45 V

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
		• Evaporator refrigerant temperature sensor (No. 2 air conditioning thermistor assembly) ambient temperature 40°C (104°F)	
A60-18 (TSUC) - A60-26 (SG-5)	Outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) signal	• Ignition switch ON • Outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) ambient temperature 20°C (68°F)	1.38 to 1.85 V
		• Ignition switch ON • Outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) ambient temperature 40°C (104°F)	0.76 to 1.11 V
A60-25 (SG-4) - Body ground	Internal condenser temperature sensor and refrigerant outlet sensor (discharge temperature sensor) ground	Always	Below 1 Ω
A60-26 (SG-5) - Body ground	Outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) and evaporator refrigerant temperature sensor (No. 2 air conditioning thermistor assembly) ground	Always	Below 1 Ω

HEAT PUMP ECU ASSEMBLY

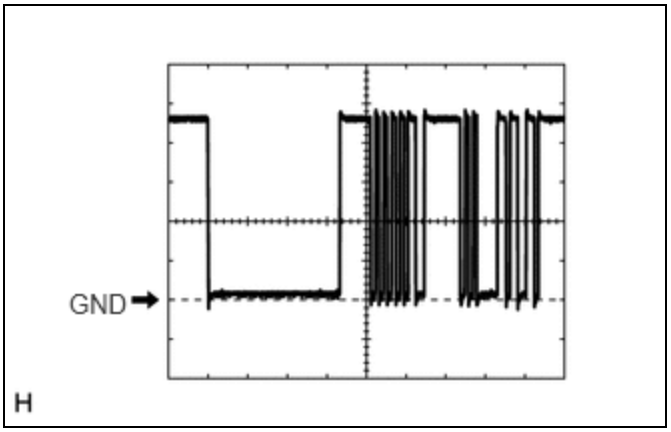
(a) Waveform "Heating electric expansion valve operation":



ITEM	CONTENT
Terminal No.	A61-11 (HEB2) - Body ground A61-12 (HEB1) - Body ground

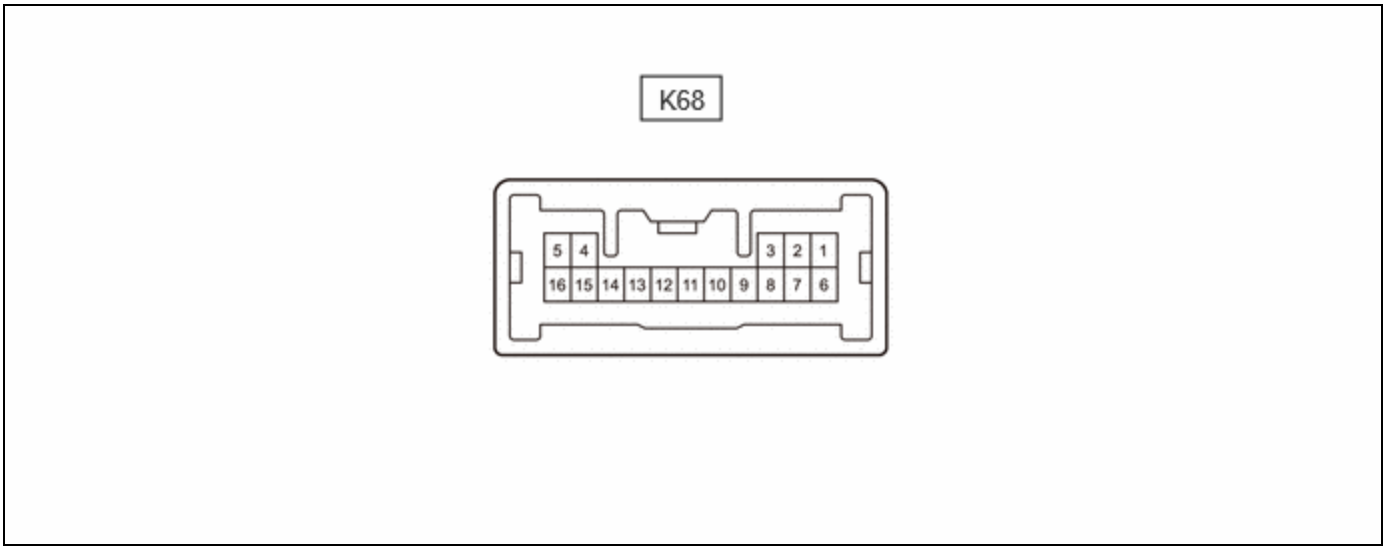
ITEM	CONTENT
	A61-23 (HEA2) - Body ground A61-24 (HEA1) - Body ground
Tool Setting	2 V/DIV., 2 ms./DIV.
Vehicle Condition	• Ignition switch ON • Set temperature: MAX HOT • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI • Air vent damper position: FOOT

(b) Waveform "Cooling electric expansion valve operation":



ITEM	CONTENT
Terminal No.	A61-13 (CEA1) - Body ground A61-14 (CEB1) - Body ground A61-25 (CEA2) - Body ground A61-26 (CEB2) - Body ground
Tool Setting	2 V/DIV., 2 ms./DIV.
Vehicle Condition	• Ignition switch ON • Set temperature: MAX COLD • Recirculation/fresh control damper position: Recirculation position • Blower switch: HI • Air vent damper position: FACE

CHECK AIR CONDITIONING CONTROL ASSEMBLY



TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
K68-1 (IG+) - K68-16 (GND)	Power source (IG)	Ignition switch off	Below 1 V
		Ignition switch ON	11 to 14 V
K68-14 (LIN1) - Body ground	LIN communication signal	Ignition switch ON	Pulse generation (See waveform)
K68-16 (GND) - Body ground	Ground for air conditioning control assembly	Always	Below 1 Ω

(a) Waveform:

ITEM	CONTENT
Terminal No.	K68-14 (LIN1) - Body ground
Tool Setting	2 V/DIV., 20 ms./DIV.
Condition	Ignition switch ON