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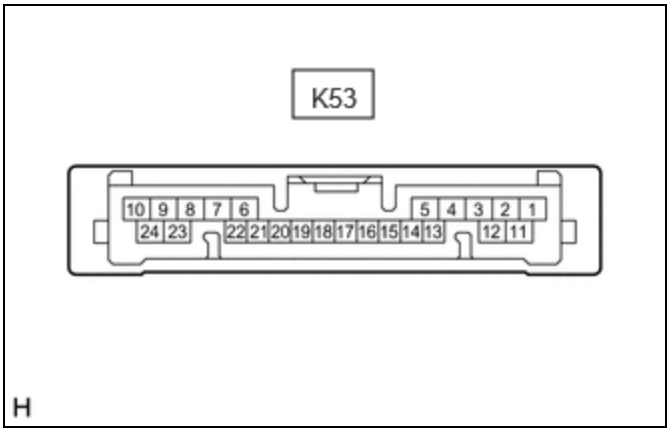
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: PA10/PB10/PB12 (HYBRID TRANSMISSION / TRANSAXLE): ELECTRONIC SHIFT LEVER SYSTEM: TERMINALS OF ECU; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

TERMINALS OF ECU

SHIFT CONTROL ECU (TRANSMISSION FLOOR SHIFT ASSEMBLY)



TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
K53-1 (IGP) - K53-9 (E1)	Shift control ECU start signal	Ignition switch ON	11 to 14 V
K53-2 (BATT) - K53-9 (E1)	Auxiliary battery supply power (normal supply power)	Always	11 to 14 V
K53-3 (IGCT) - K53-9 (E1)	Shift control ECU start signal	Ignition switch ON	11 to 14 V
K53-4 (BL) - K53-9 (E1)	Back-up light relay operation signal	Shift state R	11 to 14 V
		shift state other than R	Below 1 V
K53-5 (WAKE) - K53-9 (E1)	Shift actuator ECU start signal	Ignition switch ON	11 to 14 V
K53-6 (CA3L) - K53-9 (E1)	CAN communication signal (Battery ECU local bus)	Ignition switch ON	Pulse generation (Waveform 1)
K53-7 (PPOS) - K53-9 (E1)	Shift state signal	Ignition switch ON, shift state P	Pulse generation (Waveform 2)
K53-9 (E1) - Body ground	Ground	Always	Below 1 Ω
K53-10 (CA4L) - K53-9 (E1)	CAN communication signal (SBW local bus)	Ignition switch ON	Pulse generation (Waveform 3)
K53-11 (STP) - K53-9 (E1)	Stop light switch signal	Stop light switch ON (Brake pedal depressed)	7 V or higher
		Stop light switch OFF (Brake pedal released)	Below 2 V

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
K53-13 (BUB) - K53-9 (E1)	Integrated capacitor (integration control supply) power supply	Ignition switch ON	8 to 14 V
K53-14 (FS) - K53-9 (E1)	Shift control actuator fail-safe signal	Ignition switch ON	Pulse generation (Waveform 4)
K53-15 (CA1H) - K53-9 (E1)	CAN communication signal (Powertrain Bus)	Ignition switch ON	Pulse generation (Waveform 5)
K53-16 (CA1L) - K53-9 (E1)	CAN communication signal (Powertrain Bus)	Ignition switch ON	Pulse generation (Waveform 5)
K53-17 (BUBI) - K53-9 (E1)	Integrated capacitor (integration control supply) communication signal	Ignition switch ON	Pulse generation (Waveform 6)
K53-19 (SBFS) - K53-9 (E1)	Fail-safe signal	Ignition switch ON	Pulse generation (Waveform 7)
K53-20 (BUBO) - K53-9 (E1)	Integrated capacitor (integration control supply) communication signal	Ignition switch ON	Pulse generation (Waveform 8)
K53-21 (CA3H) - K53-9 (E1)	CAN communication signal (Battery ECU local bus)	Ignition switch ON	Pulse generation (Waveform 1)
K53-23 (E12) - Body ground	Ground	Always	Below 1 Ω
K53-24 (CA4H) - K53-9 (E1)	CAN communication signal (SBW local bus)	Ignition switch ON	Pulse generation (Waveform 3)

HINT:

As the above standard values are based on the specified condition when the auxiliary battery voltage is between 11 and 14 V, the values may vary depending on the actual auxiliary battery condition.

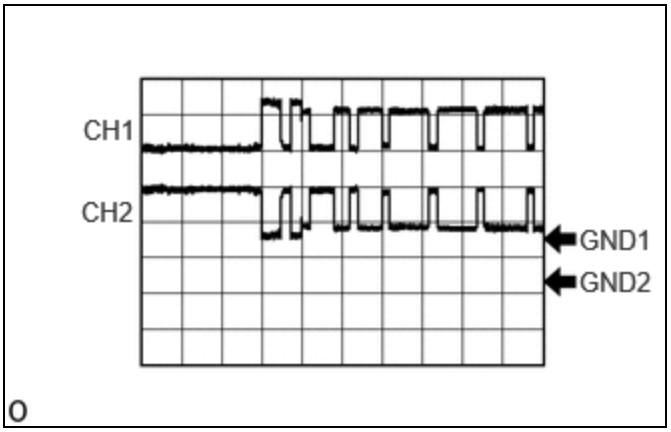
(a) Oscilloscope waveforms

HINT:

Oscilloscope waveform samples are provided here for informational purposes. Noise and fluttering waveforms have been omitted.

(1) Waveform 1 (CAN communication signal)

ITEM	CONTENT
Terminal	CH1: K53-21 (CA3H) - K53-9 (E1) CH2: K53-6 (CA3L) - K53-9 (E1)
Equipment Setting	1 V/DIV., 10 μs/DIV.
Condition	Ignition switch ON

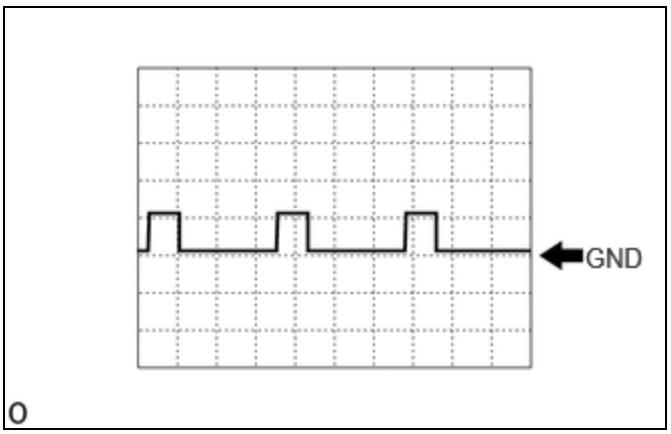


HINT:

The waveform will vary depending on the content of the digital communication (digital signal).

(2) Waveform 2 (Shift state signal)

ITEM	CONTENT
Terminal	K53-7 (PPOS) - K53-9 (E1)
Equipment Setting	10 V/DIV., 10 ms/DIV.
Condition	Ignition switch ON, shift state P

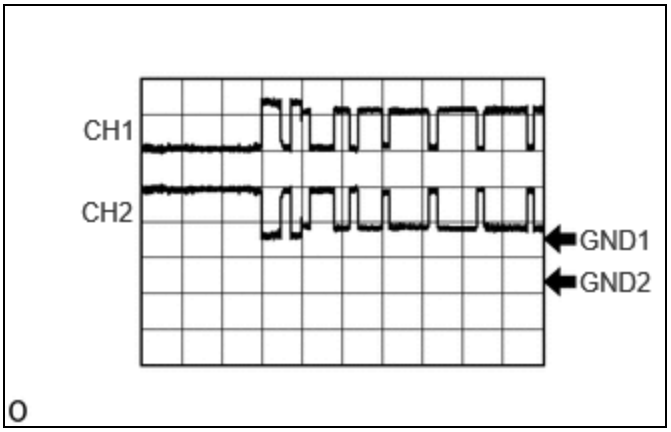


HINT:

The waveform differs depending on the shift state.

(3) Waveform 3 (CAN communication signal)

ITEM	CONTENT
Terminal	CH1: K53-24 (CA4H) - K53-9 (E1) CH2: K53-10 (CA4L) - K53-9 (E1)
Equipment Setting	1 V/DIV., 10 μs/DIV.
Condition	Ignition switch ON

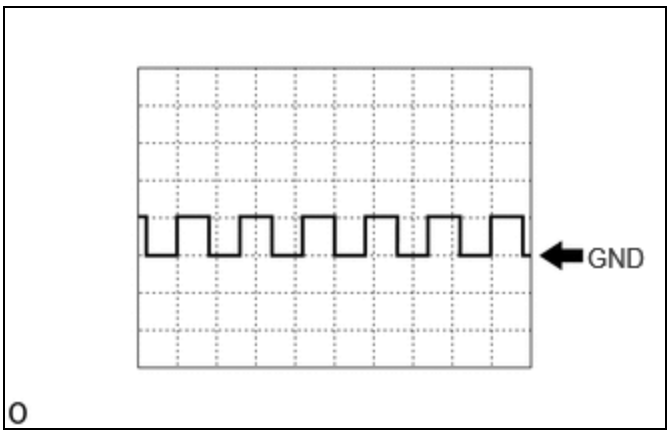


HINT:

The waveform will vary depending on the content of the digital communication (digital signal).

(4) Waveform 4 (Shift control actuator fail-safe signal)

ITEM	CONTENT
Terminal	K53-14 (FS) - K53-9 (E1)
Equipment Setting	10 V/DIV., 20ms/DIV.
Condition	Ignition switch ON

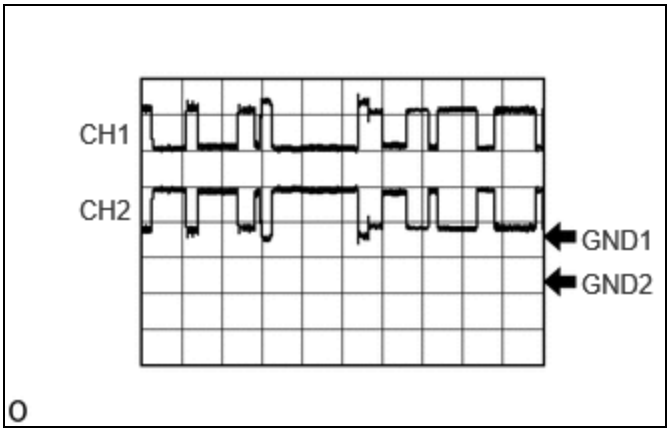


HINT:

The waveform will differ when the shift control ECU is malfunctioning.

(5) Waveform 5 (CAN communication signal)

ITEM	CONTENT
Terminal	CH1: K53-15 (CA1H) - K53-9 (E1) CH2: K53-16 (CA1L) - K53-9 (E1)
Equipment Setting	1 V/DIV., 10 μs/DIV.
Condition	Ignition switch ON

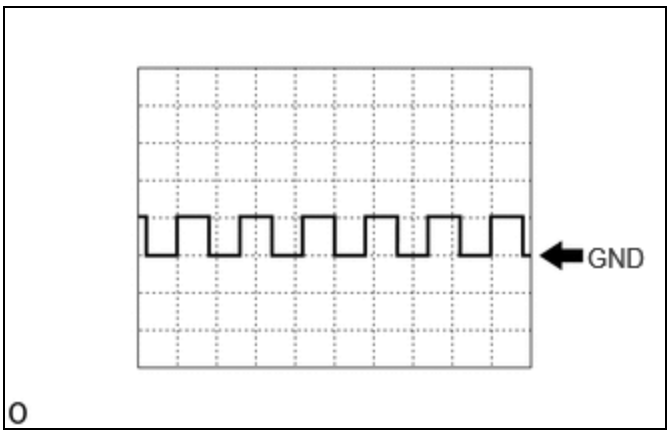


HINT:

The waveform will vary depending on the content of the digital communication (digital signal).

(6) Waveform 6 (Integrated capacitor (integration control supply) communication signal)

ITEM	CONTENT
Terminal	K53-17 (BUBI) - K53-9 (E1)
Equipment Setting	10 V/DIV., 10 ms/DIV.
Condition	Ignition switch ON

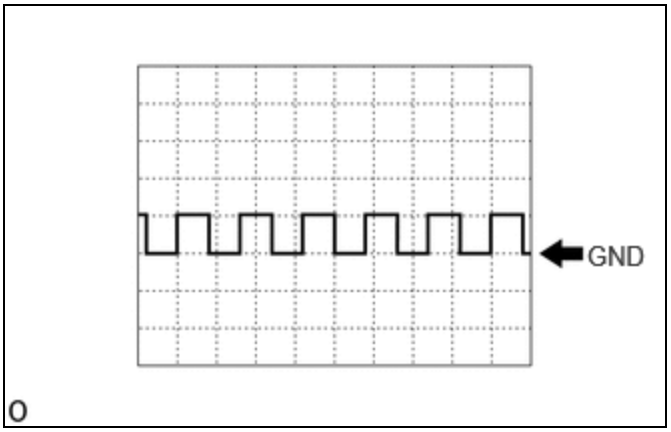


HINT:

The duty ratio may differ depending on the communication contents of the integrated capacitor.

(7) Waveform 7 (Fail-safe signal)

ITEM	CONTENT
Terminal	K53-19 (SBFS) - K53-9 (E1)
Equipment Setting	10 V/DIV., 20ms/DIV.
Condition	Ignition switch ON

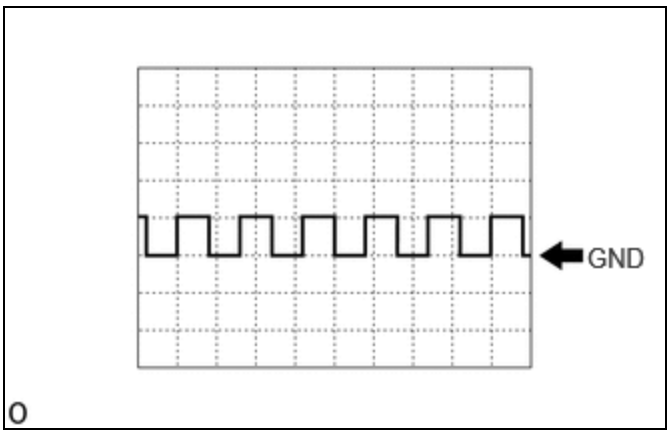


HINT:

The waveform will differ when the shift control ECU is malfunctioning.

(8) Waveform 8 (Integrated capacitor (integration control supply) communication signal)

ITEM	CONTENT
Terminal	K53-20 (BUBO) - K53-9 (E1)
Equipment Setting	10 V/DIV., 10 ms/DIV.
Condition	Ignition switch ON



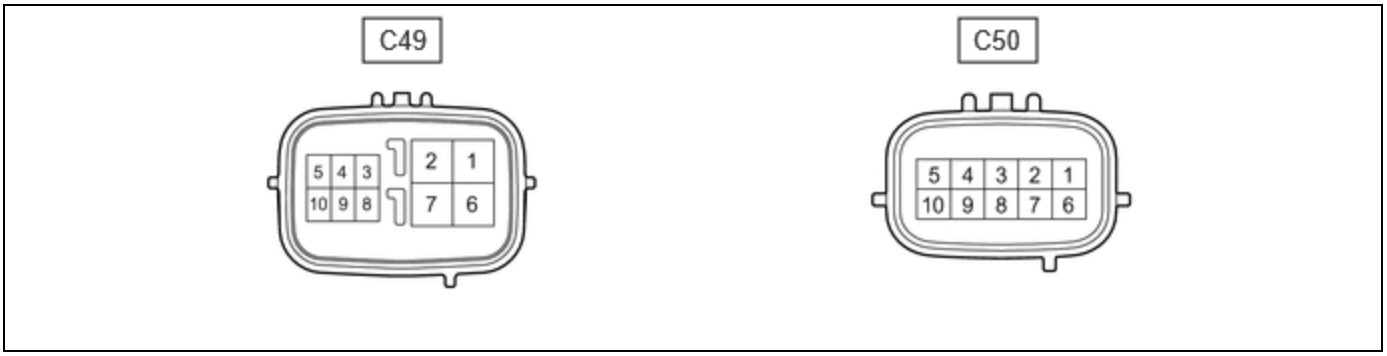
HINT:

The duty ratio may differ depending on the communication contents of the integrated capacitor.

HINT:

As the shift actuator ECU (shift control actuator assembly) uses a waterproof connector, inspection of the resistance, voltage and waveform cannot be performed.

SHIFT ACTUATOR ECU (SHIFT CONTROL ACTUATOR ASSSEMBLY)



TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
C49-1 (MA1) - C49-2 (E01)	Motor supply power (normal supply power)	Always	11 to 14 V
C49-2 (E01) - Body ground	Ground	Always	Below 1 Ω
C49-3 (CA3L) - C49-2 (E01)	CAN communication signal (Battery ECU local bus)	Ignition switch ON	Pulse generation (Waveform 1)
C49-4 (CA3H) - C49-2 (E01)	CAN communication signal (Battery ECU local bus)	Ignition switch ON	Pulse generation (Waveform 1)
C49-5 (IGC1) - C49-2 (E01)	Shift actuator ECU start signal	Ignition switch ON	11 to 14 V
C49-6 (MA2) - C49-2 (E01)	Motor supply power (integrated capacitor supply power)	Ignition switch ON	8 to 14 V
C49-7 (E02) - Body ground	Ground	Always	Below 1 Ω
C49-8 (BUB1) - C49-2 (E01)	Integrated capacitor (integration control supply) power supply	Ignition switch ON	8 to 14 V
C50-3 (CA4L) - C49-2 (E01)	CAN communication signal (SBW local bus)	Ignition switch ON	Pulse generation (Waveform 2)
C50-4 (CA4H) - C49-2 (E01)	CAN communication signal (SBW local bus)	Ignition switch ON	Pulse generation (Waveform 2)
C50-5 (WAKE) - C49-2 (E01)	Shift actuator ECU start signal	Ignition switch ON	11 to 14 V
C50-6 (FS) - C49-2 (E01)	Shift control actuator fail-safe signal	Ignition switch ON	Pulse generation (Waveform 3)
C50-8 (BAT1) - C49-2 (E01)	Auxiliary battery supply power (normal supply power)	Always	11 to 14 V

HINT:

As the above standard values are based on the specified condition when the auxiliary battery voltage is between 11 and 14 V, the values may vary depending on the actual auxiliary battery condition.

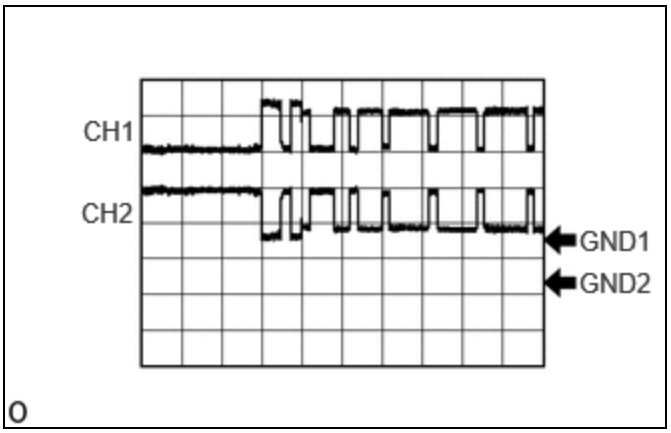
(a) Oscilloscope waveforms

HINT:

Oscilloscope waveform samples are provided here for informational purposes. Noise and fluttering waveforms have been omitted.

(1) Waveform 1 (CAN communication signal)

ITEM	CONTENT
Terminal	CH1: C49-4 (CA3H) - C49-2 (E01) CH2: C49-3 (CA3L) - C49-2 (E01)
Equipment Setting	1 V/DIV., 10 µs/DIV.
Condition	Ignition switch ON

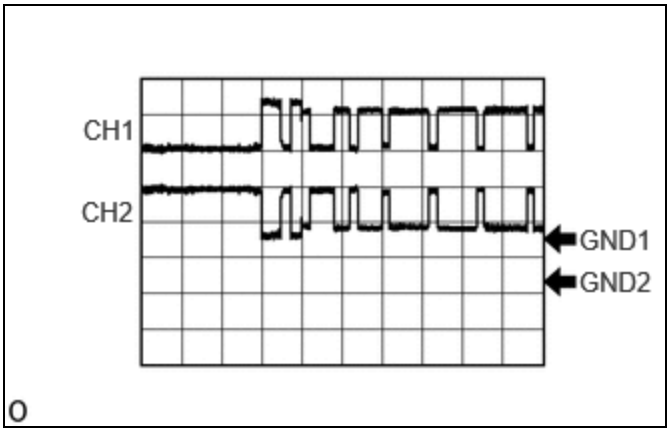


HINT:

The waveform will vary depending on the content of the digital communication (digital signal).

(2) Waveform 2 (CAN communication signal)

ITEM	CONTENT
Terminal	CH1: C50-4 (CA4H) - C49-2 (E01) CH2: C50-3 (CA4L) - C49-2 (E01)
Equipment Setting	1 V/DIV., 10 µs/DIV.
Condition	Ignition switch ON

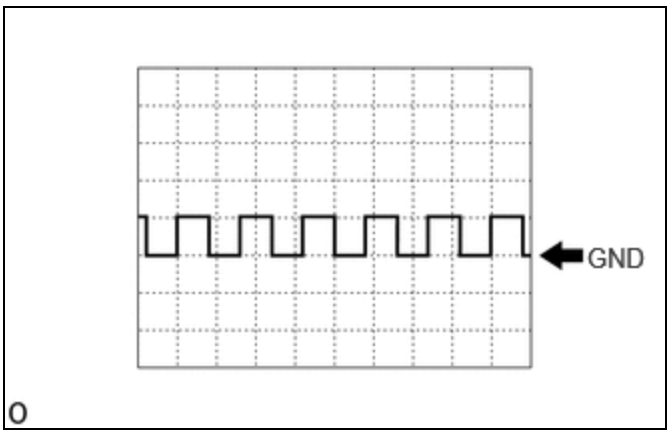


HINT:

The waveform will vary depending on the content of the digital communication (digital signal).

(3) Waveform 3 (Shift control actuator fail-safe signal)

ITEM	CONTENT
Terminal	C50-6 (FS) - C49-2 (E01)
Equipment Setting	5 V/DIV., 20 ms/DIV.
Condition	Ignition switch ON



HINT:

The waveform will differ when the shift actuator ECU is malfunctioning.