Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM1000000028PG6
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: FREEZE FRAME DATA; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

FREEZE FRAME DATA

FREEZE FRAME DATA

NOTICE:

- It is difficult to show the specified values (judgment values) clearly because freeze frame data values change significantly due to differences in measurement conditions, surroundings, or vehicle conditions. For this reason, there may be a problem even when the values are within specification.
- Turn the ignition switch to ON and park the vehicle on level ground. Check the freeze frame data by using the GTS.

(a) Turn the ignition switch off.

(b) Connect the GTS to the DLC3.

(c) Turn the ignition switch to ON.

(d) Turn the GTS on.

(e) Check the freeze frame data on the GTS.

Chassis > EMPS

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Total Distance Traveled	Total distance traveled	Min.: 0, Max.: 16777215	-	-
Total Distance Traveled - Unit	Total Distance Traveled unit	km / mile	-	-
Vehicle Speed	Vehicle speed from speedometer	Min.: 0.0 km/h (0.0 MPH) Max.: 300.0 km/h (186.4 MPH)	• 0 km/h (0 MPH): Ignition switch ON (READY) and vehicle stopped • No significant fluctuation: Ignition switch ON (READY) and vehicle driven at a constant speed	-
Engine Revolution	Engine speed	Min.: 0 rpm Max.: 12800 rpm	No significant fluctuation	Engine running at a constant speed
Ready Status	Ready status	OFF or ON	-	-

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Battery Voltage	Auxiliary battery voltage	Min.: 0.00 V Max.: 25.00V	11 to 14 V	-
Steering Wheel Torque	Steering wheel torque	Min.: -25.000 Nm Max.: 25.001 Nm	Value changes in proportion to steering effort - Ignition switch ON (READY) and steering wheel being turned	-
Steering Angle Velocity	Steering angle speed	Min.: -32768 deg/s Max.: 32767 deg/s	Value changes in proportion to steering effort - Ignition switch ON (READY) and steering wheel being turned	-
Steering Angle	Steering angle	Min.: -3072.0 deg Max.: 3070.5 deg	-	-
Status of Vehicle Power (IGP PT2)	State of IGP power source(PT2)	OFF or ON	OFF: Ignition switch off ON: Ignition switch ON	-
Status of Vehicle Power (IGP PT1)	State of IGP power source(PT1)	OFF or ON	OFF: Ignition switch off ON: Ignition switch ON	-
Status of Vehicle Power (IGP PDC)	State of IGP power source(PDC)	OFF or ON	OFF: Ignition switch off ON: Ignition switch ON	-
Status of Vehicle Power (IGR PDC)	State of IGR power source(PDC)	OFF or ON	OFF: Ignition switch off ON: Ignition switch ON	-
IG Power Supply	IG power source voltage	Min.: 0.00 V Max.: 25.00 V	8 to 16 V	Ignition switch ON
PIG Power Supply	PIG power source voltage	Min.: 0.00 V Max.: 25.00 V	9 to 16 V	Ignition switch ON (READY) and steering wheel being turned
Thermistor Temperature	ECU substrate temperature	Min.: -50.0 °C (-58.0 °F) Max.: 200.0 °C (392.0 °F)	-50 °C to 200 °C (-58 °F to 392 °F)	-

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Power Source	Operating state of hybrid system	Operating State or Stopped State	Operating State: READY ON Stopped State: READY OFF	-
PS Assist Signal	Status of the record of power steering assist signal	Assist Stop or Under an Assist	OFF: Assist stop ON: Under an assist	-
Synchronization Status of PWM	Modulation synchronization state of the motor pulse wave duty ratio	Synchronization State or Non-Synchronization State	Synchronization State: Synchronized Non-Synchronization State: Not synchronized	*1
Cooperation Control State	Power steering operation control state	Power steering operation control state	Cooperation Control: Cooperation control Other than Cooperation Control: Other than cooperation control	*1
Middle Voltage of Other Systems	Middle voltage of other systems	Min.: 0.00 V Max.: 25.00 V	-	*1
Torque Sensor 1 Output	Torque sensor 1 output value	Min.: -25.000 Nm Max.: 25.001 Nm	-	-
Torque Sensor 2 Output	Torque sensor 2 output value	Min.: -25.000 Nm Max.: 25.001 Nm	-	-
Torque Sensor 3 Output	Torque sensor 3 output value	Min.: -25.000 Nm Max.: 25.001 Nm	-	-
Torque Sensor 4 Output	Torque sensor 4 output value	Min.: -25.000 Nm Max.: 25.001 Nm	-	-
Motor 1 U Phase Current	Motor 1 terminal current (U phase)	Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	Ignition switch ON (READY) and steering wheel being turned
Motor 1 V Phase Current	Motor 1 terminal current (V phase)	Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	Ignition switch ON (READY) and steering wheel being turned

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Motor 1 W Phase Current	Motor 1 terminal current (W phase)	Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	Ignition switch ON (READY) and steering wheel being turned
Motor 1 U Phase Duty	Motor 1 U phase duty	Min.: 0.00% Max.: 100.00%	-	-
Motor 1 V Phase Duty	Motor 1 V phase duty	Min.: 0.00% Max.: 100.00%	-	-
Motor 1 W Phase Duty	Motor 1 W phase duty	Min.: 0.00% Max.: 100.00%	-	-
Motor 1 U Phase Terminal Voltage	Motor 1 terminal voltage (U phase)	Min.: 0.00 V Max.: 100.00 V	-	*1
Motor 1 V Phase Terminal Voltage	Motor 1 terminal voltage (V phase)	Min.: 0.00 V Max.: 100.00 V	-	*1
Motor 1 W Phase Terminal Voltage	Motor 1 terminal voltage (W phase)	Min.: 0.00 V Max.: 100.00 V	-	*1
Motor 1 Power Supply	Power supply voltage to active motor 1	Min.: 0.00 V Max.: 25.00 V	9 to 16 V	Ignition switch ON (READY) and steering wheel being turned
Motor 2 U Phase Current	Motor 2 terminal current (U phase)	Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	Ignition switch ON (READY) and steering wheel being turned
Motor 2 V Phase Current	Motor 2 terminal current (V phase)	Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	Ignition switch ON (READY) and steering wheel being turned
Motor 2 W Phase Current	Motor 2 terminal current (W phase)	Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	Ignition switch ON (READY) and steering wheel being turned
Motor 2 U Phase Duty	Motor 2 U phase duty	Min.: 0.00% Max.: 100.00%	-	-

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Motor 2 V Phase Duty	Motor 2 V phase duty	Min.: 0.00% Max.: 100.00%	-	-
Motor 2 W Phase Duty	Motor 2 W phase duty	Min.: 0.00% Max.: 100.00%	-	-
Motor 2 U Phase Terminal Voltage	Motor 2 terminal voltage (U phase)	Min.: 0.00 V Max.: 100.00 V	-	*1
Motor 2 V Phase Terminal Voltage	Motor 2 terminal voltage (V phase)	Min.: 0.00 V Max.: 100.00 V	-	*1
Motor 2 W Phase Terminal Voltage	Motor 2 terminal voltage (W phase)	Min.: 0.00 V Max.: 100.00 V	-	*1
Motor 2 Power Supply	Power supply voltage to active motor 2	Min.: 0.00 V Max.: 25.00 V	9 to 16 V	Ignition switch ON (READY) and steering wheel being turned
Motor Rotation Angle 1	Motor rotation angle 1	Min.: 0.0 deg Max.: 360.1 deg	Value changes from 0 to 360°	• Ignition switch ON (READY) and steering wheel being turned • *1
Motor Rotation Angle 2	Motor rotation angle 2	Min.: 0.0 deg Max.: 360.1 deg	Value changes from 0 to 360°	• Ignition switch ON (READY) and steering wheel being turned • *1
Motor Rotation Angle 3	Motor rotation angle 3	Min.: 0.0 deg Max.: 360.1 deg	-	*1
Motor Rotation Angle 4	Motor rotation angle 4	Min.: 0.0 deg Max.: 360.1 deg	-	*1

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Motor Rotation Angle Sensor 1 Sin Voltage	Rotation angle sensor Sin1 output voltage used for rotation angle calculation	Min.: 0.00 V Max.: 5.00 V	-	-
Motor Rotation Angle Sensor 1 Cos Voltage	Rotation angle sensor Cos1 output voltage used for rotation angle calculation	Min.: 0.00 V Max.: 5.00 V	-	-
Motor Rotation Angle Sensor 2 Sin Voltage	Rotation angle sensor Sin2 output voltage used for rotation angle calculation	Min.: 0.00 V Max.: 5.00 V	-	-
Motor Rotation Angle Sensor 2 Cos Voltage	Rotation angle sensor Cos2 output voltage used for rotation angle calculation	Min.: 0.00 V Max.: 5.00 V	-	-
Motor Rotation Angle Sensor 3 Sin Voltage	Rotation angle sensor Sin3 output voltage used for rotation angle calculation	Min.: 0.00 V Max.: 5.00 V	-	-
Motor Rotation Angle Sensor 3 Cos Voltage	Rotation angle sensor Cos3 output voltage used for rotation angle calculation	Min.: 0.00 V Max.: 5.00 V	-	-
Turn Counter 1	Turn counter 1	Min.: 0 Max.: 1024	-	*1
Turn Counter 2	Turn counter 2	Min.: 0 Max.: 1024	-	*1
Absolute Angle (Pinion Angle)	Absolute angle (pinion angle)	Min.: -32.768 rad Max.: 32.768 rad	-	*1

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Steering Angle for the Steering Assembly	Steering angle for the steering assembly	Min.: -1877.5 deg Max.: 1877.6 deg	-	*1
Motor Actual Current (Q Axis)	Detected current flow to motor (detected current of axis q)	Min.: -327.68 A Max.: 327.67 A	-	-
Command Value Current (Q Axis)	Target current flow to motor (requested current of axis q)	Min.: -327.68 A Max.: 327.67 A	-	-
Motor Actual Current 2 (D Axis)	Detected current flow to motor (detected current of axis d)	Min.: -327.68 A Max.: 327.67 A	-	-
Command Value Current 2 (D Axis)	Target current flow to motor (requested current of axis d)	Min.: -327.68 A Max.: 327.67 A	-	-
Motor Rotation Angle	Motor rotation angle (detected by rotation sensor)	Min.: 0.0 deg Max.: 360.1 deg	During steering operation, motor rotation angle value changes from 0 to 360°	Ignition switch ON (READY) and steering wheel being turned
Final Motor Current Limited (Q Axis)	Final motor current set limit (request current of axis q)	Min.: 0.00 A Max.: 327.67 A	-	-
Steering Angle Sensor Signal State	State of steering angle sensor signal	Usable, Unlearned, Sensor Fault, Communication Fault	-	-
CAN Vehicle Speed (Speed Sensor RR)	Speed sensor RR value sent via CAN	Min.: 0 km/h (0.0 MPH) Max.: 255 km/h (158 MPH)	• 0 km/h (0.0 MPH): Engine running and vehicle stopped • No significant fluctuation: Ignition switch ON (READY) and vehicle driven at a constant speed	-

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
CAN Vehicle Speed (Speed Sensor RL)	Speed sensor RL value sent via CAN	Min.: 0 km/h (0.0 MPH) Max.: 255 km/h (158 MPH)	• 0 km/h (0.0 MPH): Engine running and vehicle stopped • No significant fluctuation: Ignition switch ON (READY) and vehicle driven at a constant speed	-
CAN Vehicle Speed (SP1)	Vehicle speed input value sent via CAN (equal to value indicated on speedometer)	Min.: 0.0 km/h (0.0 MPH) Max.: 300.0 km/h (186.4 MPH)	• 0 km/h (0.0 MPH): Engine running and vehicle stopped • No significant fluctuation: Ignition switch ON (READY) and vehicle driven at a constant speed	-
CAN Steering Angle Speed (SSAV)	Steering wheel turning speed value sent via CAN	Min.: -32768 deg/s Max.: 32767 deg/s	-	-
Control State Information	Control statusinformation	Min.: 0 Max.: 65535	-	-
ASIC State Information	Integrated circuitstate information	Min.: 0 Max.: 65535	-	-
ECU Overheat Prevention Part	Internal component of ECU for which overheat protection control is performed	No Target Part, Inverter MOS, Power Supply Relay MOS, Custom IC, Choke Coil, H Bridge MOS, Motor Relay MOS, Around Microcomputer or DBC	-	-

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
ECU Estimate Temperature of Overheat Prevention Part	Estimated temperature of internal component of ECU for which overheat protection control is performed	Min.: -50.0 °C (-58.0 °F) Max.: 200.1 °C (392.2 °F)	-	-
Motor Overheat Prevention Part	Internal component of motor for which overheat protection control is performed	No Target Part, Motor	-	-
Motor Estimate Temperature of Overheat Prevention Part	Estimated temperature of internal component of motor for which overheat protection control is performed	Min.: -50.0 °C (-58.0 °F) Max.: 200.1 °C (392.2 °F)	-	-
Battery Voltage (System 2)	Battery voltage (system 2)	Min.: 0.00 V Max.: 25.00 V	-	*1
IG Power Supply (System 2)	IG power supply (system 2)	Min.: 0.00 V Max.: 25.00 V	-	*1
PIG Power Supply (System 2)	PIG power supply (system 2)	Min.: 0.00 V Max.: 25.00 V	-	*1
Thermistor Temperature (System 2)	Thermistor temperature (system 2)	Min.: -50.0 °C (-58.0 °F) Max.: 200.0 °C (392.1 °F)	-	*1
Middle Voltage of Other Systems (System 2)	Middle voltage of other systems (system 2)	Min.: 0.00 V Max.: 25.00 V	-	*1
Motor Actual Current (Q Axis) (System 2)	Motor Actual Current (Q Axis) (System 2)	Min.: -327.68 A Max.: 327.67 A	-	*1
Command Value Current (Q Axis) (System 2)	Command Value Current (Q Axis) (System 2)	Min.: -327.68 A Max.: 327.67 A	-	*1

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Motor Actual Current 2 (D Axis) (System 2)	Motor actual current 2 (D axis) (system 2)	Min.: -327.68 A Max.: 327.67 A	-	*1
Command Value Current 2 (D Axis) (System 2)	Command value current 2 (D axis) (system 2)	Min.: -327.68 A Max.: 327.67 A	-	*1
Motor Rotation Angle (System 2)	Motor rotation angle (system 2)	Min.: 0.0 deg Max.: 360.0 deg	-	*1
Final Motor Current Limited (Q Axis) (System 2)	Final motor current limited (Q axis) (system 2)	Min.: 0 A Max.: 327.67 A	-	*1
ASIC State Information (System 2)	ASIC state information (system 2)	Min.: 0 Max.: 65535	-	*1

HINT:

*1: Depending on the vehicle, this item may not be displayed.