

Appendix A

Engine Operating Conditions

The values given below for “Normal Condition” are representative values. A vehicle may still be normal even if its value varies from that listed below.

CARB Mandated Signals

Diagnostic Tester Display	Measurement Item	Normal Condition*
FUEL SYS #1	Fuel System Bank 1: OPEN: Air/Fuel ratio feedback stopped CLOSED: Air/Fuel ratio feedback operating	Idling after warming up: CLOSED
CALC LOAD	Calculated Load: Current intake air volume as a proportion of max. intake air volume	Idling: 5.4 - 19.2% Racing without load (2,250rpm): 6.9 - 16.2%
COOLANT TEMP	Engine Coolant Temp. Sensor Value	After warming up: 80 - 95°C (176 - 203°F)
SHORT FT #1	Short-term Fuel Trim Bank 1	0±20%
LONG FT #1	Long-term Fuel Trim Bank 1	0±20%
ENGINE SPD	Engine Speed	Idling: 1,000 rpm
VEHICLE SPD	Vehicle Speed	Vehicle Stopped: 0 km/h (0 mph)
IGN ADVANCE	Ignition Advance: Ignition Timing of Cylinder No.1	Idling: BTDC 7-15
INTAKE AIR	Intake Air Temp. Sensor Value	Equivalent to Ambient Temp.
MAF/AFM	Air Flow Rate Through Mass Flow Meter	Idling: 1.11 - 4.38 gm/sec. Racing without load (2,250 rpm): 3.38 - 7.88 gm/sec.
THROTTLE POS	Voltage Output of Throttle Position Sensor Calculated as a percentage: 0V->0%, 5V->100%	Throttle Fully Closed: 0 - 5% Throttle Fully Open: 90 - 100%
O2S B1, S1	Voltage Output of Heated O2 Sensor Bank 1, Sensor 1	Idling: 0.1 - 0.9V
O2FT B1, S1	Heated O2 Sensor Fuel Trim Bank 1, Sensor 1 (Same as SHORT FT #1)	0±20%
O2S B1, S2	Voltage Output of Heated O2 Sensor Bank 1, Sensor 2	Driving at 50 km/h (31 mph): 0.1 - 0.9V

*If no conditions are specifically stated for “Idling”, it means the shift lever is at P position, the A/C switch is OFF and all accessory switches are OFF.

TOYOTA Enhanced Signals

Diagnostic Tester Display	Measurement Item	Normal Condition*
MISFIRE RPM	Engine RPM for first misfire range	Misfire 0:0 rpm
MISFIRE LOAD	Engine load for first misfire range	Misfire 0:0 g/r
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.0 - 3.0 ms
CYL#1, CYL#2, CYL#3, CYL#4	Abnormal revolution variation for each cylinder	0%
IGNITION	Total number of ignition for every 1,000 revolutions	0-2,000
FUEL PUMP	Fuel Pump Signal	Idling: ON
EVAP (PURGE) VSV	EVAP VSV Signal	VSV operating: ON
VAPOR PRESS VSV	Vapor Pressure VSV Signal	VSV operating: ON
TOTAL FT B1	Total Fuel Trim Bank 1: Average value for fuel trim system of Bank 1	Idling: 0.8 - 1.2V
O2 LR B1, S1*	Heated O2 Sensor Lean Rich Bank 1, Sensor 1 response time for O2 Sensor output to switch from lean to rich.	Idling after warmed up: 0 - 1,000 msec.
O2 RL B1, S1*	Heated O2 Sensor Rich Lean Bank 1, Sensor 1 response time for O2 Sensor output to switch from rich to lean.	Idling after warmed up: 0 - 1,000 msec.
AF FT B1 S1	Short term fuel trim associated with the bank 1 sensor 1/ Min.: 0, Max: 19999	<ul style="list-style-type: none"> • Value less than 1 (0.000 to 0.999) = Lean • Stoichiometric air-fuel ratio = 1 • Value greater than 1 (1.001 to 1.999) = Rich
AFS B1 S1	A/F sensor output for bank 1 sensor 1/ Min.: 0, Max: 7.999	Idling 2.8 to 3.8V (Inspection Mode)

*If no conditions are specifically stated for "Idling", it means the shift lever is at P position, the A/C switch is OFF and all accessory switches are OFF.

Appendix B

Operation History Data List

Items	Count Condition	Example of Customer Concern	Actual Status
SHIFT BEF READY	The number of times of shift operation while the Ready lamp is flashing (just after turning to ST). Flashes if cooling water temp. is -10C or less. Illuminates if cooling water temperature is above -10C.	Engine starts and immediately stops in the morning. Couldn't drive the vehicle.	Engine was in cranking condition and Ready lamp was flashing, however, the customer judged the engine as running from the generator noise by mistake.
N RANGE CTRL 2	The number of times of shifting from R to D. (Shift into R range when driving D range or vice versa.)	Shifting into R range, but vehicle went ahead.	Shift lever was in N range while going ahead at 11km/h.
STEP ACCEL IN N	The number times of stepping on the accelerator pedal in N range. No driving force is supplied due to shift in N range condition at accelerator operation.	Sometimes power isn't generated when driving.	Stepping on the accelerator when in the N range. Because it is under N range control, torque is not generated.
AUX. BATT LOW	The number of times of N range control when voltage of the 12V auxiliary battery falls to 9.5V or less.	Acceleration didn't work suddenly.	
HV INTERMITTENT	Instantaneous open at IGSW terminal of HV control ECU.	Suddenly the vehicle stopped, but ran as usual after operating key again.	If HV ECU power supply line was disconnected, system itself stopped and power supply was shut down before fixing abnormal occurrence. Consequently, the DTC was not stored and it is impossible to judge what occurred. From this experience, system was modified so as to record momentary shutting down.
MG2 (NO1) TEMP HIGH	The number of times the water temperature warning lamp is ON due to MG2 temperature rise. Lamp illuminates if motor temperature rises above 174°C (345°F). DTC is not stored because it is not a problem even if warning lamp in ON.	Warning Lamp ON.	Specification if motor/generator/inverter temperature rises to illuminate turtle lamp ('01 - '03 Prius). It is difficult to identify what caused lamp illumination. From this experience, it is modified to record the number of times of symptoms occurrence by parts. It is also modified to assign a role of warning of such temperature rise to water temperature indicator.
MG2 (NO2) TEMP HIGH	The number of times the water temperature warning lamp turns ON due to MG1 temperature rise. Lamp illuminates transaxle fluid temperature rises above 162°C (324°F). DTC is not stored because it is not a problem even if warning lamp in ON.	Warning Lamp turns on.	

Appendix B

Items	Count Condition	Example of Customer Concern	Actual Status
MG2 INV TEMP HIGH	Motor inverter temperature rose above 111°C (232°F).		Specification if motor/generator/inverter temperature rises to illuminate turtle lamp. It is difficult to identify what caused lamp illumination. From this experience, it is modified to record the number of times of symptoms occurrence by parts. It is also modified to assign a role of warning of such temperature rise to water temperature indicator.
MG1 INV TEMP HIGH	The number of times the water temp warning lamp turns ON due to MG2 temperature sensor rise in the inverter. Lamp illuminates if MG2 temperature rises above 111°C (232°F) without storing any DTCs because of the problem.	Warning Lamp turns on.	
MAIN BATT LOW	Battery temperature rises to 57C and over or falls to -15C less. SOC becomes 35% or less in R range and WOUT is controlled to be 2000W.	Loss of power momentarily. (Turtle light turns ON '01 - 03 Prius.)	Battery output/input is controlled when battery temperature is abnormal and SOC is Lo. But as it is not a problem, indicate no DTC.
RESIST OVR HEAT	The number of times of heating up the resistance for SMR1. Limit resistor forecast temperature rose above 120°C (248°F).	Vehicle will not start.	Prohibits system starting to prevent from overheating SMR, which limits resistance due to repletion of system starting operation for a short time.
COOLANT HEAT	Inverter coolant forecast temperature rose above 65°C (149°F).	Limited power from vehicle.	
CONVERTER HEAT	Boost converter temperature rose above 111°C (232°F).	Limited power from vehicle.	
SHIFT P IN RUN	Shifted to Park while driving.	Vehicle went into Neutral.	Vehicle will automatically shift into Neutral when the Park button is pressed while driving over 3mph
BKWRD DIR SHIFT	Shifted to R while moving forward or to D or B while moving in reverse.	Vehicle went into Neutral.	Vehicle will automatically shift into Neutral when another shift position is selected while moving over 3mph.
PREVENT STAYING	Engine speed stays in resonance frequency band.		

Appendix C

Hybrid Control System Information

Similar to freeze frame data, information records operating condition of the HV system and components at the time of detection of a DTC.

- a) Select one which has an INF Code from among INFORMATION 1 to 5.
- b) Check the information of the DTC.

Information:

Hand-held Tester Display	Measurement Item/Range (Display)	Suspected Vehicle Status When Malfunction Occurs
INFORMATION N	Information code	Indication of system with malfunction
MG1 REV	MG1 revolution/ Min.: -16,384 rpm, Max.: 16,256 rpm	MG1 speed <ul style="list-style-type: none"> • Forward rotation appears as “+” • Backward rotation appears as “-”
MG2 REV	MG2 revolution/ Min.: -16,384 rpm, Max.: 16,256 rpm	MG2 speed (proportionate to vehicle speed) <ul style="list-style-type: none"> • Forward rotation appears as “+” • Backward rotation appears as “-” Moving direction of vehicle • Forward direction appears as “+” • Backward direction appears as “-”
MG1 TORQ	MG1 torque/ Min.: -512 Nm, Max.: 508 Nm	When MG1 rotation in + direction: <ul style="list-style-type: none"> • Torque appears as “+” while MG1 discharges • Torque appears as “-” while MG1 charges When MG1 rotation in - direction: <ul style="list-style-type: none"> • Torque appears as “-” while MG1 discharges • Torque appears as “+” while MG1 charges
MG2 TORQ	MG2 torque/ Min.: -512 Nm, Max.: 508 Nm	When MG2 rotation in + direction: <ul style="list-style-type: none"> • Torque appears as “+” while MG2 discharges • Torque appears as “-” while MG2 charges When MG2 rotation in -direction: <ul style="list-style-type: none"> • Torque appears as “-” while MG2 discharges • Torque appears as “+” while MG2 charges
INVERT TEMP-MG1	MG1 inverter temperature/ Min.: -50°C, Max.: 205°C	MG1 inverter temperature
INVERT TEMP-MG2	MG2 inverter temperature/ Min.: -50°C, Max.: 205°C	MG2 inverter temperature
MG2 TEMP (No2)	Transaxle fluid temperature/ Min.: -50°C, Max.: 205°C	Transaxle fluid temperature
MG2 TEMP (No1)	MG2 temperature/ Min.: -50°C, Max.: 205°C	MG2 temperature
POWER RQST	Request engine power/ Min.: 0 W, Max.: 255 kW	Engine power output requested to ECM
ENGINE SPD	Engine speed/ Min.: 0 rpm, Max.: 16,320 rpm	Engine speed
MCYL CTRL POWER	Master cylinder control torque/ Min.: -512 Nm, Max.: 508 Nm	Brake force requested by driver
SOC	Battery state of charge/ Min.: 0%, Max.: 100%	State of charge of HV battery
WOUT CTRL POWER	Power value discharge control/ Min.: 0 W, Max.: 81,600 W	Discharge amount of HV battery
WIN CTRL POWER	Power value charge control/ Min.: -40,800 W, Max.: 0 W	Charge amount of HV battery
DRIVE CONDITION	Drive condition ID <ul style="list-style-type: none"> • Engine stopped: 0 • Engine about to be stopped: 1 • Engine about to be started: 2 • Engine operated or operating: • Generating or loading movement: • Revving up with P position: 6 	Engine operating condition

Appendix C

Hand-held Tester Display	Measurement Item/Range (Display)	Suspected Vehicle Status When Malfunction Occurs
PWR RESOURCE VB	HV battery voltage/ Min.: 0 V, Max.: 510V	HV battery voltage
PWR RESOURCE IB	HV battery current/ Min.: -256 A, Max.: 254 A	Charging/discharging state of HV battery <ul style="list-style-type: none"> Discharging amperage indicated by a positive value Charging amperage indicated by a negative value
SHIFT POSITION	Shift position (P, R, N, D or B position)	Shift position
ACCEL SENSOR MAIN	Accelerator pedal position sensor main/ Min.: 0%, Max.: 100%	Idling, accelerating, or decelerating
AUX. BATT V	Auxiliary battery voltage/ Min.: 0 V, Max.: 20V	State of auxiliary battery
CONVERTER TEMP	Boost converter temperature/ Min.: -50°C, Max.: 205°C	Boost converter temperature
VL	High voltage before it is boosted/ Min.: 0 V, Max.: 510V	High voltage level before it is boosted
VH	High voltage after it is boosted/ Min.: 0 V, Max.: 765 V	High voltage level after it is boosted
IG ON TIME	The time after power switch ON (IG)/ Min.: 0 min, Max.: 255 min	Time elapsed with power switch ON (IG)
VEHICLE SPD-MAX	Maximum vehicle speed/ Min.: -256 km/h, Max.: 254 km/h	Maximum vehicle speed
A/C CONSMPT PWR	A/C consumption power/ Min.: 0 kW, Max.: 5 kW	A/C load
ENG STOP RQST	Engine stop request/ NO or YES	Presence of engine stop request
IDLING REQUEST	Engine idling request/ NO or YES	Presence of idle stop request
ENGINE FUEL CUT	Engine fuel cut request/ NO or YES	Presence of fuel cut request
HV BATT CH RQST	HV battery charging request/ NO or YES	Presence of HV battery charging request
ENG WARM UP RQT	Engine warming up request/ NO or YES	Presence of engine warm-up request
STOP SW COND	Stop lamp switch ON condition/ NO or YES	Brake pedal depressed or released
CRUISE CONTROL	Cruise control active condition/ NO or YES	Operation under cruise control ON or OFF
EXCLUSIVE INFO 1 to 7	Exclusive information (in form of numerical data)	Exclusive Information linked to Information
OCCURRENCE ORDER	Occurrence sequence of information	Occurrence sequence of information
INV TTMP-MG1 IG	MG1 inverter temperature after power switch ON (IG)/ Min.: -50°C, Max.: 205°C	MG1 inverter temperature soon after power switch ON (IG)
INVT TMP-MG2 IG	MG2 inverter temperature after power switch ON (IG)/ Min.: -50°C, Max.: 205°C	MG2 inverter temperature soon after power switch ON (IG)
MG2 TEMP IG	MG2 temperature after power switch ON (IG)/ Min.: -50°C, Max.: 205°C	MG2 temperature soon after power switch ON (IG)
CONVRTR TEMP IG	Boost converter temperature after power switch ON (IG)/ Min.: -50°C, Max.: 205°C	Boost converter temperature soon after power switch ON (IG)
SOC IG	Battery state of charge after power switch ON (IG)/ Min.: 0 %, Max.: 100 %	Battery state of charge soon after power switch ON (IG)
INVT TMP-MG1 MAX	MG1 inverter maximum temperature/ Min.: -50°C, Max.: 205°C	Overheating state of MG1 inverter
INVT TMP-MG2MAX	MG2 inverter maximum temperature/ Min.: -50°C, Max.: 205°C	Overheating state of MG2 inverter
MG2 TEMP MAX	MG2 maximum temperature/ Min.: -50°C, Max.: 205°C	Overheating state of MG2
CONVRTR TMP MAX	Boost converter maximum temperature/ Min.: -50°C, Max.: 205°C	Overheating state of boost converter
SOC MAX	Maximum status of charge/ Min.: 0 %, Max.: 100%	Over-charging of HV battery
SOC MIN	Minimum status of charge/ Min.: 0 %, Max.: 100%	Over-discharging of HV battery

Appendix D

Hybrid Control Data List

Using DATA LIST displayed by the hand-held tester, you can read the value of the switches, sensors, actuators and so on without parts removal. Reading DATA LIST as a first step of troubleshooting is one method to shorten diagnostic time.

- a) Connect the hand-held tester to the DLC3.
- b) Turn the power switch ON (IG).
- c) Turn the hand-held tester ON.
- d) On the hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / HV ECU / DATA LIST.
- e) According to the display on the tester, read DATA LIST.

NOTICE:

The values of DATA LIST could vary significantly with slight differences in measurement, differences in the environment in which the measurements are obtained, or the aging of the vehicle.

Definite standards or judgment values are unavailable. There may be a malfunction even if a measured value is within the reference range.

In case of intricate symptoms, collect sample data from another vehicle of the same model operating under identical conditions in order to reach an overall judgment by comparing all the items of DATA LIST.

Hand-held Tester Display	Measurement Item/Range (Display)	Reference Range	Diagnostic Note
COOLANT TEMP	Engine coolant temperature/ Min.: -40°C, Max.: 140°C	After warming up: 80 to 100°C (176 to 212°F)	<ul style="list-style-type: none"> • If the value is -40°C (-40°F): Open in sensor circuit • If the value is 140 °C (284 °F): Short in sensor circuit
VEHICLE SPD	Vehicle speed/ Min.: 0 km/h, Max.: 255 km/h	Vehicle stopped: 0 km/h (0 mph)	—
ENG RUN TIME	Elapsed time after starting engine/ Min.: 0 s, Max.: 65,535 s	—	—
+B	Auxiliary battery voltage/ Min.: 0 V, Max.: 65.535 V	Constant: Auxiliary battery voltage 3 V	—
ACCEL POS #1	Accelerator pedal position sensor No. 1/ Min.: 0 %, Max.: 100 %	Accelerator pedal depressed: Changes with accelerator pedal pressure	—
ACCEL POS #2	Accelerator pedal position sensor No. 2/ Min.: 0 %, Max.: 100 %	Accelerator pedal depressed: Changes with accelerator pedal pressure	—
AMBIENT TEMP	Ambient air temperature/ Min.: -40°C, Max.: 215°C	Power switch ON (IG): Same as ambient air temperature	—
INTAKE AIR TEMP	Intake air temperature/ Min.: -40 C, Max.: 140 C	Constant: Auxiliary battery voltage 3 V	—

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Hand-held Tester Display	Measurement Item/Range (Display)	Reference Range	Diagnostic Note
DTC CLEAR WARM	The number of times engine is warmed up after clearing DTCs/ Min.: 0, Max.: 255	MIL OFF, engine coolant temperature increases from below 22°C (71.6°F) before starting the engine to above 70°C (158°F) after starting the engine: Increases once	—
DTC CLEAR RUN	Drive distance after clearing DTCs/ Min.: 0 km, Max.: 65,535 km	—	—
DTC CLEAR MIN	Elapsed time after clearing DTCs/ Min.: 0 min, Max.: 65,535 min	—	—
MIL ON RUN DIST	Drive distance after malfunction occurrence/ Min.: 0 km, Max.: 65,535 km	—	—
MIL ON ENG TIME	Elapsed time after starting engine with MIL ON/ Min.: 0 min, Max.: 65,535 min	—	—
MIL Status	MIL status/ ON or OFF	MIL ON: ON	Constant ON: Repair in accordance with detected DTCs
MG2 REV	MG2 revolution/ Min.: -16,383 rpm, Max.: 16,383 rpm	—	—
MG2 TORQ	MG2 torque/ Min.: -500 Nm, Max.: 500 Nm	—	—
MG2 TRQ EXEC VAL	MG2 torque execution value/ Min.: -512 Nm, Max.: 508 Nm	After full-load acceleration with READY lamp ON and engine stopped: Less than ±20 % of MG2 TORQ	—
MG1 REV	MG1 revolution/ Min.: -16,383 rpm, Max.: 16,383 rpm	—	—
MG1 TORQ	MG1 torque/ Min.: -500 Nm, Max.: 500 Nm	—	—
MG1 TRQ EXEC VAL	MG1 torque execution value/ Min.: -512 Nm, Max.: 508 Nm	1 second has elapsed after the engine was started automatically with READY lamp ON, engine stopped, A/C fan Hi, head lamp ON and the P position: Less than ±20 % of MG1 TORQ	—
REGEN EXEC TORQ	Regenerative brake execution torque/ Min.: 0 Nm, Max.: 186 Nm	—	—
REGEN RQST TORQ	Regenerative brake request torque/ Min.: 0 Nm, Max.: 186 Nm	Vehicle speed 30 km/h (19 mph) and master cylinder hydraulic pressure -200 Nm: Changes with brake pedal pressure	—
MG1 INVERT TEMP	MG1 inverter temperature/ Min.: -50°C, Max.: 205°C	<ul style="list-style-type: none"> Undisturbed for 1 day at 25°C (77°F): 25°C (77°F) Street driving: 25 to 80°C (77 to 176°F) 	<ul style="list-style-type: none"> If the value is -50°C (-58°F): +B short in sensor circuit If the value is 205°C (401°F): Open or GND short in sensor circuit
MG2 INVERT TEMP	MG2 inverter temperature/ Min.: -50°C, Max.: 205°C	<ul style="list-style-type: none"> Undisturbed for 1 day at 25°C (77°F): 25°C (77°F) Street driving: 25 to 80°C (77 to 176°F) 	<ul style="list-style-type: none"> If the value is -50°C (-58°F): +B short in sensor circuit If the value is 205°C (401°F): Open or GND short in sensor circuit
MOTOR2 TEMP	Transaxle fluid temperature/ Min.: -50°C, Max.: 205°C	<ul style="list-style-type: none"> Undisturbed for 1 day at 25°C (77°F): 25°C (77°F) Street driving: 25 to 80°C (77 to 176°F) 	<ul style="list-style-type: none"> If the value is -50°C (-58°F): Open or +B short in sensor circuit If the value is 205°C (401°F): GND short in sensor circuit

Appendix D

Hand-held Tester Display	Measurement Item/Range (Display)	Reference Range	Diagnostic Note
MOTOR1 TEMP	MG2 motor temperature/ Min.: -50°C, Max.: 205°C	<ul style="list-style-type: none"> Undisturbed for 1 day at 25°C (77°F): 25°C (77°F) Street driving: 25 to 80°C (77 to 176°F) 	<ul style="list-style-type: none"> If the value is -50°C (-58°F): Open or +B short in sensor circuit If the value is 205°C (401°F): GND short in sensor circuit
CONVERTER TEMP	Boost converter temperature/ Min.: -50°C, Max.: 205°C	<ul style="list-style-type: none"> Undisturbed for 1 day at 25°C (77°F): 25°C (77°F) Street driving: 25 to 60°C (77 to 140°F) 	<ul style="list-style-type: none"> If the value is -50°C (-58°F): +B short in sensor circuit If the value is 205°C (401°F): Open or GND short in sensor circuit
ACCEL DEG	Accelerator pedal depressed angle/ Min.: 0%, Max.: 100%	Accelerator pedal depressed: Changes with accelerator pedal pressure	—
POWER RQST	Engine power output request value/ Min.: 0 W, Max.: 320,000 W	—	—
TARGET ENG SPD	Target engine speed/ Min.: 0 rpm, Max.: 8,000 rpm	—	—
ENGINE SPD	Engine speed/ Min.: 0 rpm, Max.: 8,000 rpm	Idling*: 950 to 1,050 rpm	—
VEHICLE SPD	Resolver vehicle speed/ Min.: -256 km/h, Max.: 254 km/h	Driving at 40 km/h (25 mph): 40 km/h (25 mph)	—
MCYL CTRL POWER	Braking torque that is equivalent to the master cylinder hydraulic pressure/ Min.: -512 Nm, Max.: 508 Nm	Brake pedal depressed: Changes with brake pedal pressure	—
SOC	Battery state of charge/ Min.: 0 %, Max.: 100 %	Constant: 0 to 100 %	—
WOUT CTRL POWER	Discharge control power value/ Min.: 0 W, Max.: 81,600 W	21,000 W or less	—
WIN CTRL POWER	Charge control power value/ Min.: -40,800 W, Max.: 0 W	-25,000 W or more	—
DCHG RQST SOC	Discharge request to adjust SOC/ Min.: -20,480 W, Max.: 20,320 W	<ul style="list-style-type: none"> Uniform on-board charging: -4,400 W Usually: 0 W 	—
PWR RESOURCE VB	HV battery voltage/ Min.: 0 V, Max.: 510 V	READY lamp ON and P position: 150 to 300 V	—
PWR RESOURCE IB	HV battery current/ Min.: -256 A, Max.: 254 A	—	—
VL	High voltage before it is boosted/ Min.: 0 V, Max.: 510 V	Power switch ON (READY): Practically the same as the HV battery voltage	<ul style="list-style-type: none"> If the value is 0 V: Open or GND short in sensor circuit If the value is 510 V: +B short in sensor circuit
VH	High voltage after it is boosted/ Min.: 0 V, Max.: 765 V	Engine revved up in P position: HV battery voltage to 500 V	<ul style="list-style-type: none"> If the value is 0 V: Open or GND short in sensor circuit If the value is 765 V: +B short in sensor circuit
RAIS PRES RATIO	Boost ratio/ Min.: 0%, Max.: 100%	The pre-boost voltage and the post-boost voltage are equal: 0 to 10 %	—
DRIVE CONDITION	Drive condition ID/ Min.: 0, Max.: 6	<ul style="list-style-type: none"> Engine stopped: 0 Engine about to be stopped: 1 Engine about to be started: 2 Engine operated or operating: 3 Generating or loading movement: 4 Revving up with P position: 6 	—

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Hand-held Tester Display	Measurement Item/Range (Display)	Reference Range	Diagnostic Note
M SHIFT SENSOR	Output voltage of the shift position sensor (main)/ Min.: 0 V, Max.: 5 V	<ul style="list-style-type: none"> Selector lever in home position: 2.0 to 3.0 V Shifting into R position: 4.0 to 4.8 V Shifting into B or D position: 0.2 to 1.0 V 	—
S SHIFT SENSOR	Output voltage of the shift position sensor (sub)/ Min.: 0 V, Max.: 5 V	<ul style="list-style-type: none"> Selector lever in home position: 2.0 to 3.0 V Shifting into R position: 4.0 to 4.8 V Shifting into B or D position: 0.2 to 1.0 V 	—
SM SHIFT SENSOR	Output voltage of the select position sensor (main)/ Min.: 0 V, Max.: 5 V	<ul style="list-style-type: none"> Selector lever in home position: 0.5 to 2.0 Shifting into R, N or D position: 3.0 to 4.85 V 	—
SS SHIFT SENSOR	Output voltage of the select position sensor (sub)/ Min.: 0 V, Max.: 5 V	<ul style="list-style-type: none"> Selector lever in home position: 0.5 to 2.0 V Shifting into R, N or D position: 3.0 to 4.85 V 	—
SHIFT POSITION	Shift position	P, R, N, D or B	—
CRANK POS	Crankshaft position/ Min.: -90 deg, Max.: 90 deg	—	—
A/C CONSMPT PWR	A/C consumption power/ Min.: 0 kW, Max.: 5 kW	—	—
DRIVE CONDITION	Driving condition	<ul style="list-style-type: none"> MG1 load: MG1 MG2 load: MG2 	—
SHORT WAVE HIGH	Waveform voltage in leak detection circuit in battery ECU/ Min.: 0 V, Max.: 5 V	READY lamp is left ON for 2 minutes, and the pre-boost voltage and the post-boost voltage are equal: 4 V or more	—
MG1 CTRL MODE	MG1 control mode/ ON or OFF	—	—
MG1 CARRIR FREQ	MG1 carrier frequency/ 5 kHz or 10 kHz	—	—
MG2 CTRL MODE	MG2 control mode/ ON or OFF	—	—
MG2 CARRIR FREQ	MG2 carrier frequency/ 1.25 kHz or 5 kHz	—	—
ECU TYPE	Type of ECU	HV ECU	—
CURRENT DTC	The number of current DTCs/ Min.: 0, Max.: 255	—	—
HISTORY DTC	The number of history DTCs/ Min.: 0, Max.: 255	—	—
CHECK MODE	Check mode/ ON or OFF	—	—
ENG STOP RQST	Engine stop request/ NO or RQST	Requesting engine stop: RQST	—
IDLING REQUEST	Engine idling request/ NO or RQST	Requesting idle: RQST	—
HV BATT CH RQST	HV battery charging request/ NO or RQST	Requesting HV battery charging: RQST	—
ENG STP INHIBIT	Engine stop inhibit request/ NO or RQST	Requesting engine intermittent prohibition: RQST	—
AIRCON REQUEST	Engine starting request from A/C amplifier/ NO or RQST	Requesting engine start from A/C amplifier: RQST	—
ENG WARM UP RQT	Engine warm-up request/ NO or RQST	Requesting engine warm-up: RQST	—
SMR CONT1	Operating condition of system main relay No. 1/ ON or OFF	Power switch ON (READY): OFF	—

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Hand-held Tester Display	Measurement Item/Range (Display)	Reference Range	Diagnostic Note
SMR CONT2	Operating condition of system main relay No. 2/ ON or OFF	Power switch ON (READY): ON	—
SMR CONT3	Operating condition of system main relay No. 3/ ON or OFF	Power switch ON (READY): ON	—
MG1 GATE	MG1 gate status/ ON or OFF	ON	—
MG2 GATE	MG2 gate status/ ON or OFF	Shutting down motor inverter: ON	—
CNV GATE	Boost converter gate status/ ON or OFF	Shutting down boost converter: ON	—
A/C GATE	A/C gate status/ ON or OFF	Shutting down A/C inverter: ON	—
SMARTKEY	Electronic key ID code check status/ ON or OFF	When electronic key ID code corresponds to ID code registered in ECU: ON	—
CNV CARRIER FREQ	Boost converter carrier frequency/ 5 kHz or 10 kHz	—	—

*: If no conditions are specifically stated for "Idling", it means the engine for inspection mode, the shift position is in P, the A/C switch is OFF, and accelerator pedal is not depressed.