2. Diagnostic Trouble Code (DTC) Detecting Criteria

A: DTC P0506 IDLE AIR CONTROL SYSTEM RPM LOWER THAN EXPECTED

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of ISC.

Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12V battery system voltage	\geq 10.9 V
Measured lambda	≥ 0.85
	and < 1.151
Vehicle speed	= 0 mph
Engine Auto Stop command by HPCM	False
SOC of hybrid battery	≤ 44%
CVT secondary pulley shaft speed	≥ 100 rpm
Accelerator pedal position	= 0%

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
(Actual engine speed) – (Target engine speed)	< – 100 rpm

Time Needed for Diagnosis: 15 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
(Actual engine speed) – (Target engine speed)	≥ – 100 rpm

B: DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of ISC. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12V battery system voltage	≥ 10.9 V
Measured lambda	≥ 0.85
	and
	< 1.151
Vehicle speed	= 0 mph
Engine Auto Stop command by HPCM	False
SOC of hybrid battery	≤ 44%
CVT secondary pulley shaft speed	≥ 100 rpm
Accelerator pedal position	= 0%

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
(Actual engine speed) – (Target engine speed)	> 200 rpm

Time Needed for Diagnosis: 15 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
(Actual engine speed) – (Target engine speed)	≤ 200 rpm

C: DTC P0572 BRAKE SWITCH "A" [STOP LAMP SWITCH] CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect brake pedal SW-A ON/OFF stuck. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Brake switch B signal from ECM	OFF
(Brake pedal)	(Not Pressed)
(Current BPP sensor 1 angle) – (BPP sensor 1 angle that was stored when the brake switch B status has been changed from ON to OFF)	\leq –0.69 deg
(Brake pedal)	(Not Pressed)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch A signal from ECM	OFF
(Brake pedal)	Pressed
NOTE: For a normal system, when applying the brakes switch B will go from ON to OFF immediately, and from switch B OFF, switch A will go OFF to ON after 0.69 degrees of travel in the direction of decreasing the val- ue of the brake pedal angle.	

Time Needed for Diagnosis: 1 s x 5 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as OK. Do not clear NG during hybrid system activated.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch A signal from ECM	ON
(Brake pedal)	Not Pressed
NOTE: For a normal system, when applying the brakes switch B will go from ON to OFF immediately, and from switch B OFF, switch A will go OFF to ON after 0.69 degrees of travel in the direction of decreasing the val- ue of the brake pedal angle.	

D: DTC P0573 BRAKE SWITCH "A" [STOP LAMP SWITCH] CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect brake pedal SW-A ON/OFF stuck. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	\geq 0.2 s
Brake switch B signal from ECM	ON
(Brake pedal)	(Pressed)
(Current BPP sensor 1 angle) – (BPP sensor 1 angle that was stored when the brake switch B status has been changed from OFF to ON)	≥ +0.69 deg
(Brake pedal)	(Pressed)
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	\geq 0.2 s
(Current BPP sensor 1 angle) – (Minimum BPP sensor 1 angle that has experienced from ignition switch: ON)	≥ +3.5 deg
(Brake pedal)	(Pressed)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Brake switch A signal from ECM	ON
(Brake pedal)	Not pressed
NOTE:	
For a normal system, when applying the brakes switch B will go from	
OFF to ON immediately, and from switch B ON, switch A will go ON to	
of the brake pedal angle.	
NOTE:	
For a normal system, switch A will go ON to OFF within 3.5 degrees of	
travel in the direction of increasing the value of the brake pedal angle	
from initial brake pedal position.	

Time Needed for Diagnosis: 1 s x 5 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as OK. Do not clear NG during hybrid system activated.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch A signal from ECM	OFF
(Brake pedal)	Pressed
NOTE: For a normal system, when applying the brakes switch B will go from OFF to ON immediately, and from switch B ON, switch A will go ON to OFF after 0.69 degrees of travel in the direction of increasing the value of the brake pedal angle.	
For a normal system, switch A will go ON to OFF within 3.5 degrees of travel in the direction of increasing the value of the brake pedal angle from initial brake pedal position.	

E: DTC P057B BRAKE PEDAL POSITION SENSOR CIRCUIT RANGE/PERFOR-MANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of brake stroke sensor 1 and 2. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Current BPP sensor 1 angle – Min (BPP sensor 1 angle)	\geq 1 deg
	or
Current BPP sensor 2 angle – Min (BPP sensor 2 angle)	\geq 1 deg

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Max (BPP sensor 1 angle) – Current BPP sensor 1 angle	< 0.5 deg and
Max (BPP sensor 2 angle) – Current BPP sensor 2 angle	≥ 2 deg
	or
Max (BPP sensor 1 angle) – Current BPP sensor 1 angle	\ge 2 deg and
Max (BPP sensor 2 angle) – Current BPP sensor 2 angle	< 0.5 deg
Diagnosis 2	
BPP sensor 1 voltage + BPP sensor 2 voltage	\leq 3.5 V
NOTE: The sum should be 5 V for typical sensors	or ≥ 6.5 V

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear NG when continuous time when the following conditions are met is predetermined time or more (diagnosis 1 and diagnosis 2).

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Max (BPP sensor 1 angle) – Current BPP sensor 1 angle	\geq 0.5 deg
Max (BPP sensor 2 angle) – Current BPP sensor 2 angle	\geq 2 deg
Max (BPP sensor 1 angle) – Current BPP sensor 1 angle	≥ 2 deg
Max (BPP sensor 2 angle) – Current BPP sensor 2 angle	≥ 0.5 deg
Diagnosis 2	
BPP sensor 1 voltage + BPP sensor 2 voltage	> 3.5 V
NOTE: The sum should be 5 V for typical sensors	or < 6.5 V

F: DTC P057C BRAKE PEDAL POSITION SENSOR CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of brake stroke sensor 1 and ground short. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1	\leq 0.25 V
(Mechanical pedal angle)	(≤ –11.25 deg)

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1	> 0.25 V
(Mechanical pedal angle)	(>-11.25 deg)

G: DTC P057D BRAKE PEDAL POSITION SENSOR CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the power supply short of brake stroke sensor 1. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1	\geq 3.4 V
(Mechanical pedal angle)	(≥ 36 deg)

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1	< 3.4 V
(Mechanical pedal angle)	(< 36 deg)

H: DTC P05DD BRAKE PEDAL POSITION SENSOR "B" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of brake stroke sensor 2 and ground short. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 2	\leq 1.5 V
(Mechanical pedal angle)	(≥ 37.5 deg)

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1	> 1.5 V
(Mechanical pedal angle)	(< 37.5 deg)

I: DTC P05DE BRAKE PEDAL POSITION SENSOR "B" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the power supply short of brake stroke sensor 2. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 2	\geq 4.7 V
(Mechanical pedal angle)	(≤ –10.5 deg)

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Brake Pedal Position Sensor 1	< 4.7 V
(Mechanical pedal angle)	(> -10.5 deg)

J: DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

HYBRID POWERTRAIN CONTROL SYSTEM

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer (RAM). Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
The written data in the whole area of RAM	≠ The read data

Time Needed for Diagnosis: Immediately

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
The written data in the whole area of RAM	The read data

Time Needed for Diagnosis: Immediately DRIVE MOTOR CONTROL SYSTEM

4. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor control module.

Judge as NG when the malfunction is detected at the peripheral function of drive motor control module microcomputer.

5. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	OFF to ON (ON = Run or crank) (OFF \neq Run or crank)

6. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Written data in RAM	≠ The read data

Time Needed for Diagnosis: Immediately Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Written data in RAM	Read data

Time Needed for Diagnosis: Immediately BATTERY ENERGY CONTROL SYSTEM

7. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer RAM.

8. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Open

9. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Inconsistency between the write and read to RAM within the BECM Main CPU	Detected

Time Needed for Diagnosis: Less than 0.01 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Inconsistency between the write and read to RAM within the BECM Main CPU	Not Detected

Time Needed for Diagnosis: Less than 0.01 second

K: DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR

HYBRID POWERTRAIN CONTROL SYSTEM

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer (ROM). Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Checksum (ROM)	Error

Time Needed for Diagnosis: Immediately

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	≠ Error

Time Needed for Diagnosis: Immediately DRIVE MOTOR CONTROL SYSTEM

4. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor control module.

Judge as NG when the malfunction is detected at the peripheral function of drive motor control module microcomputer.

5. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	OFF to ON
	(ON = Run or crank)

6. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Checksum (ROM)	Error

Time Needed for Diagnosis: Immediately Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	≠ Error

Time Needed for Diagnosis: Less than 1 second BATTERY ENERGY CONTROL SYSTEM

7. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer FlashROM.

8. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and < 17 V
BECM precharge contactor command	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

9. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Checksum error of Flash EEPROM within the BECM Main CPU (Program area)	Detected

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum error of Flash EEPROM within the BECM Main	Not Detected
CPU (Program area)	

Time Needed for Diagnosis: Less than 2 second

L: DTC P0719 BRAKE SWITCH "B" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect brake pedal SW-B ON/OFF stuck. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	\geq 0.2 s
Brake switch B signal from ECM	OFF
(Brake pedal)	(Pressed)
(Current BPP sensor 1 angle) – (BPP sensor 1 angle that was stored when the brake switch A status has been changed from ON to OFF)	\ge +0.69 deg
(Brake pedal)	(Pressed)
(Current BPP sensor 1 angle) – (Minimum BPP sensor 1 value that has experienced from ignition switch: ON)	≥ +3.5 deg
(Brake pedal)	(Pressed)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Brake switch B signal from ECM	OFF
(Brake pedal)	Not pressed
NOTE: For a normal system, when applying the brakes switch A will go from ON to OFF immediately, and from switch A OFF, switch B will go OFF to ON after 0.69 degrees of travel in the direction of increasing the val- ue of the brake pedal angle. NOTE: For a normal system, switch B will go OFF to ON within 3.5 degrees of travel in the direction of increasing the value of the brake pedal angle	

Time Needed for Diagnosis: 1 s x 5 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as OK. Do not clear NG during hybrid system activated.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch B signal from ECM	ON
(Brake pedal)	Pressed
NOTE: For a normal system, when applying the brakes switch A will go from ON to OFF immediately, and from switch A OFF, switch B will go OFF to ON after 0.69 degrees of travel in the direction of increasing the val- ue of the brake pedal angle. NOTE: For a normal system, switch B will go OFF to ON within 3.5 degrees of travel in the direction of increasing the value of the brake pedal angle from initial brake pedal position.	

M: DTC P0724 BRAKE SWITCH "B" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect brake pedal SW-B ON/OFF stuck. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s
Brake switch B signal from ECM	ON
(Brake pedal)	(Not pressed)
(Current BPP sensor 1 angle) – (BPP sensor 1 angle that was stored when the brake switch A status has been changed from OFF to ON)	\leq –0.69 deg
(Brake pedal)	(Not pressed)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch B signal from ECM	ON
(Brake pedal)	Pressed
NOTE: For a normal system, when applying the brakes switch A will go from OFF to ON immediately, and from switch A ON, switch B will go ON to OFF after 0.69 degrees of travel in the direction of decreasing the val- ue of the brake pedal angle.	

Time Needed for Diagnosis: 1 s x 5 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as OK. Do not clear NG during hybrid system activated.

Judgment Value

Malfunction Criteria	Threshold Value
Brake switch B signal from ECM	OFF
(Brake pedal)	Pressed
NOTE: For a normal system, when applying the brakes switch A will go from OFF to ON immediately, and from switch A ON, switch B will go ON to OFF after 0.69 degrees of travel in the direction of decreasing the val- ue of the brake pedal angle.	

N: DTC P0A1D HYBRID POWERTRAIN CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of hybrid powertrain control module. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Internal Hardware module error	Detected
	or
Exception interrupt by the HPCM CPU	Detected

Time Needed for Diagnosis: Immediately

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Internal Hardware module error	≠ Detected and
Exception interrupt by the HPCM CPU	≠ Detected

Time Needed for Diagnosis: Immediately

O: DTC P1C16 IDLE CONTROL SYSTEM RPM LOWER THAN EXPECT-ED(HPCM)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0506. <Ref. to GD(HEV)-11, DTC P0506 IDLE AIR CONTROL SYSTEM RPM LOWER THAN EXPECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

P: DTC P1C17 IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECT-ED(HPCM)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0507. <Ref. to GD(HEV)-12, DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Q: DTC P2158 VEHICLE SPEED SENSOR "B"

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the wheel speed of rear wheels. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 0.2 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Vehicle speed (Rear) from Vehicle Dynamics	≥ 186.4 MPH
NOTE: The VDC controller detects malfunction if one of the speed sensors does not output a signal and the other vehicle speed sensor output sig- nal is above 7.46 MPH.	

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Wheel speed of rear wheel (either left or right) and	< 186 MPH
Wheel speed of rear wheel (both left and right)	> 0 MPH

R: DTC P0A2A DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor. Judge as NG when the value of drive motor temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
PWM output to the drive motor inverter	ON
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 15 s
Generated energy of drive motor	≥ Map1
Assist energy of drive motor	≥ Map2

Map 1

Hybrid battery temperature and Drive motor inverter temperature either lower temperature (°C (°F))	-30 (-22)	-10 (14)	0 (32)	10 (50)	30 (86)	40 (104)
Generated energy of drive motor (Wh)	630	320	200	130	0	0

Map 2

Hybrid battery temperature and Drive motor inverter temperature either lower temperature (°C (°F))	-30 (-22)	-10 (14)	0 (32)	10 (50)	30 (86)	40 (104)
Assist energy of drive motor (Wh)	270	130	75	50	0	0

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Output voltage	> 4.5 V
(Temperature equivalent)	< –3.4°C (25.9°F)

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	\leq 4.5 V
(Temperature equivalent)	≥ -3.4°C (25.9°F)

S: DTC P0A2C DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor. Judge as NG when the value of drive motor temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Output voltage	< 0.23 V
(Temperature equivalent)	> 234°C (453.2°F)

Time Needed for Diagnosis: 1 second Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	\geq 0.23 V
(Temperature equivalent)	≤ 234°C (453.2°F)

T: DTC P0A2D DRIVE MOTOR "A" TEMPERATURE SENSOR CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor. Judge as NG when the value of drive motor temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Output voltage	> 4.6 V
(Temperature equivalent)	(< −55°C (−67°F))

Time Needed for Diagnosis: 1 second Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	\leq 4.6 V
(Temperature equivalent)	(≥ -55°C (–67°F))

U: DTC P0A3C DRIVE MOTOR "A" INVERTER OVER TEMPERATURE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter temperature. Judge as NG when the value of drive motor inverter temperature is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Malfunction signal (over temperature) from IC in the drive motor inverter	ON

Time Needed for Diagnosis: 0.2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal (over temperature) from IC in the drive motor inverter	OFF

V: DTC P0A3F DRIVE MOTOR "A" POSITION SENSOR CIRCUIT

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the drive motor rotation angle sensor. Judge as NG when the malfunction of drive motor rotation angle sensor is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
Ignition state	OFF to ON
	(ON = Run or crank)
	(OFF ≠ Run or crank)
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from the resolver to digital (R/D) converter	Parity error
Diagnosis 2	
R/D converter error output (Internal tracking error)	Detected

Time Needed for Diagnosis:

- Diagnosis 1: 0.0002 s
- **Diagnosis 2:** 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from the resolver to digital (R/D) converter	≠ Parity error
Diagnosis 2	
R/D converter error output (Internal tracking error)	Not detected

Time Needed for Diagnosis:

- **Diagnosis 1:** Immediately
- Diagnosis 2: 0.02 s

W: DTC P0A40 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT RANGE/PER-FORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the drive motor rotation angle sensor.

Judge as NG when the detected angle of drive motor rotation angle sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
Resolver initialization	Completed
NOTE: It is defined that "Resolver initialization=Completed", if all of the following conditions are satisfied: 1. The communication between the R/D converter and DMCM is established. 2. The R/D converter succeed to recognize the first motor position (angle) after power-up.	

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured drive motor angle	> 180.5 deg
Diagnosis 2	
Measured drive motor angle (When the reference pulse occurs)	< 179.5 deg and
NOTE: Diagnosis will be performed only when the reference pulse is generated	> 0.5 deg

Time Needed for Diagnosis: 0.0003 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured drive motor angle	≤ 180.5 deg
Diagnosis 2	
Measured drive motor angle (When the reference pulse occurs)	≥ 179.5 deg and ≤ 0.5 deg

X: DTC P0A43 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT INTERMIT-TENT

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the drive motor rotation angle sensor.

Judge as NG when the angle detected by drive motor rotation angle sensor is not continuous.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Resolver initialization	Completed
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

ABS (Difference between the current and previous values > 11.25 deg of Measured drive motor angle) NOTE:	Malfunction Criteria	Threshold Value
 ABS: Absolute value Sampling time = 0.001 s 	 ABS (Difference between the current and previous values of Measured drive motor angle) NOTE: ABS: Absolute value Sampling time = 0.001 s 	> 11.25 deg

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Difference between the current and previous values of Measured drive motor angle)	\leq 11.25 deg

Y: DTC P0A44 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT OVERSPEED

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor rotation count. Judge as NG when the rotation count of drive motor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Resolver initialization	Completed
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥1s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (Motor speed)	> 7000 rpm
NOTE:	
ABS: Absolute value	

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Motor speed)	≤ 7000 rpm
NOTE:	
ABS: Absolute value	

Z: DTC P0A5D DRIVE MOTOR "A" PHASE U CURRENT

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current flowing in drive motor. Judge as NG when the current flowing in drive motor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
PWM output to the drive motor inverter	ON

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (lu)	> 350 A
NOTE:	
ABS: Absolute value	
Iu: U phase current	

Time Needed for Diagnosis: 0.0003 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (lu)	≤ 350 A

AA:DTC P0A60 DRIVE MOTOR "A" PHASE V CURRENT

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current flowing in drive motor. Judge as NG when the current flowing in drive motor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
PWM output to the drive motor inverter	ON

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (Iv)	> 350 A
NOTE:	
ABS: Absolute value	
Iv: V phase current	

Time Needed for Diagnosis: 0.0003 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iv)	≤ 350 A

AB:DTC P0A63 DRIVE MOTOR "A" PHASE W CURRENT

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current flowing in drive motor. Judge as NG when the current flowing in drive motor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
PWM output to the drive motor inverter	ON

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (Iw)	> 350 A
NOTE:	
ABS: Absolute value	
Iw: W phase current	

Time Needed for Diagnosis: 0.0003 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Iw)	≤ 350 A

AC:DTC P0A78 DRIVE MOTOR "A" INVERTER PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter.

Judge as NG when the malfunction is detected in the internal circuit of drive motor inverter.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Malfunction signal (internal data) from IC in the drive motor	ON
inverter	

Time Needed for Diagnosis: 0.03 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal (internal data) from IC in the drive motor inverter	OFF

AD:DTC P0A82 HYBRID/EV BATTERY PACK COOLING FAN 1 PERFORMANCE/ STUCK OFF

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery cooling fan.

Judge as NG when the performance of high voltage battery cooling fan is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Commanded cooling fan duty	≥ 20%
12V battery system voltage	> 9.3 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Measured cooling fan speed	< Map

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Commanded cooling fan duty (%)	20	40	60	80	100
Measured inverter cooling fan motor speed (rpm)	300	700	1050	1200	1200

Time Needed for Diagnosis: 20 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured cooling fan speed	≥Map

AE:DTC P0A83 HYBRID/EV BATTERY PACK COOLING FAN 1 STUCK ON

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery cooling fan. Judge as NG when the performance of high voltage battery cooling fan is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Commanded cooling fan duty	= 0%
12V battery system voltage	> 9.3 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Measured cooling fan speed	> 300 rpm

Time Needed for Diagnosis: 20 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured cooling fan speed	\leq 300 rpm

AF:DTC P0A90 DRIVE MOTOR "A" PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor.

Judge as NG when the performance of drive motor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: PWM output to the drive motor inverter	ON
b: ABS (Commanded motor output power)	> 5 kW
NOTE: ABS: Absolute value	
c: Motor speed	> 1000 rpm and < 3500 rpm
Continuous time of a, b and c	> 0.5 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
(Estimated motor output power / Commanded motor output power) \times 100	< 40%
NOTE: • Estimated motor output power = $(V \times I)$ • Commanded motor output power = $(N \times T \times 2 \times \pi) / 60$ • V: Commanded motor voltage • I: Measured motor current • N: Motor speed • T: Commanded motor torque	

Time Needed for Diagnosis: 1 second Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
(Estimated motor output power / Commanded motor output	≥ 40%
power) × 100	

AG:DTC POAED DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIR-CUIT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter temperature sensor.

Judge as NG when the value of drive motor inverter temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Received

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Not received
AH:DTC POAEE DRIVE MOTOR INVERTER TEMPERATURE SENSOR "A" CIR-CUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter temperature sensor.

Judge as NG when the characteristic of drive motor inverter temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N⋅m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N⋅m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
ABS (Variation of inverter temperature median)	> 20°C (68°F)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria Threshold Value **Diagnosis 1** ABS (Inverter temperature A - Inverter temperature median) > 30°C (54°F) **Diagnosis 2** ABS ((Variation of Inverter temperature A) - (Variation of > 10°C (18°F) Inverter temperature median)) NOTE: • Variation of Inverter temperature A = Max (Inverter temperature A) – Min (Inverter temperature A) • Variation of Inverter temperature median = Max (Inverter temperature median) – Min (Inverter temperature median) · Max: The maximum value of the experience in the current driving cycle · Min: The minimum value of the experience in the current driving cycle

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear NG when continuous time when the following conditions are met is predetermined time or more (diagnosis 1 and diagnosis 2).

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
ABS (Inverter temperature A – Inverter temperature median)	≤ 30°C (54°F)
Diagnosis 2	
ABS ((Variation of Inverter temperature A) – (Variation of	≤ 10°C (18°F)
Inverter temperature median))	

Time Needed for Diagnosis: 20 seconds

AI: DTC P0AF2 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIR-CUIT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter temperature sensor.

Judge as NG when the value of drive motor inverter temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Received

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Not received

Time Needed for Diagnosis: 2 seconds

AJ:DTC P0AF3 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "B" CIR-CUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter temperature sensor.

Judge as NG when the characteristic of drive motor inverter temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE:	
ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N⋅m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE:	
temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE:	
ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N⋅m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE:	
temperature sensor A. B and C	
First SCI data from drive motor inverter	Received
ABS (Variation of inverter temperature median)	> 20°C (68°F)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
ABS (Inverter temperature B – Inverter temperature median)	> 30°C (54°F)
Diagnosis 2	
ABS ((Variation of Inverter temperature B) – (Variation of Inverter temperature median))	> 10°C (18°F)
 NOTE: Variation of Inverter temperature B = Max (Inverter temperature B) – Min (Inverter temperature B) Variation of Inverter temperature median = Max (Inverter temperature median) – Min (Inverter temperature median) Max: The maximum value of the experience in the current driving cycle Min: The minimum value of the experience in the current driving cycle 	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear NG when continuous time when the following conditions are met is predetermined time or more (diagnosis 1 and diagnosis 2).

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
ABS (Inverter temperature B – Inverter temperature median)	≤ 30°C (54°F)
Diagnosis 2	
ABS ((Variation of Inverter temperature B) – (Variation of	≤ 10°C (18°F)
Inverter temperature median))	

Time Needed for Diagnosis: 20 seconds

AK:DTC P0BD1 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIR-CUIT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter temperature sensor.

Judge as NG when the value of drive motor inverter temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Received

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Fault data (temperature sensor) from IC in the drive motor inverter	Not received

Time Needed for Diagnosis: 2 seconds

AL:DTC P0BD2 DRIVE MOTOR INVERTER TEMPERATURE SENSOR "C" CIR-CUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter temperature sensor.

Judge as NG when the characteristic of drive motor inverter temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N⋅m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N⋅m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Inverter temperature median	> 30°C (86°F)
NOTE: Inverter temperature median: The median value of the Inverter temperature sensor A, B and C	
First SCI data from drive motor inverter	Received
ABS (Variation of inverter temperature median)	> 20°C (68°F)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria **Threshold Value Diagnosis 1** ABS (Inverter temperature C - Inverter temperature median) > 30°C (54°F) **Diagnosis 2** ABS ((Variation of Inverter temperature C) - (Variation of > 10°C (18°F) Inverter temperature median)) NOTE: • Variation of Inverter temperature C = Max (Inverter temperature C) – Min (Inverter temperature C) • Variation of Inverter temperature median = Max (Inverter temperature median) – Min (Inverter temperature median) · Max: The maximum value of the experience in the current driving cycle · Min: The minimum value of the experience in the current driving cycle

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear NG when continuous time when the following conditions are met is predetermined time or more (diagnosis 1 and diagnosis 2).

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
ABS (Inverter temperature C – Inverter temperature median)	≤ 30°C (54°F)
Diagnosis 2	
ABS ((Variation of Inverter temperature C) – (Variation of	≤ 10°C (18°F)
Inverter temperature median))	

Time Needed for Diagnosis: 20 seconds

AM:DTC P0BE6 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor circuit.

Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
PWM output to the drive motor inverter	OFF

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (U phase average offset current)	> 31 A
NOTE: ABS: Absolute value	

Time Needed for Diagnosis: 0.01 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (U phase average offset current)	≤ 31 A

Time Needed for Diagnosis: 0.01 seconds

AN:DTC P0BE7 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor. Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

	Secondary Parameters	Enable Conditions
Ignition state		Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
U phase current sensor output voltage	\leq 0.5 V
(Current equivalent)	≤-400 A

Time Needed for Diagnosis: 0.03 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
U phase current sensor output voltage	> 0.5 V
(Current equivalent)	>-400 A

Time Needed for Diagnosis: 0.06 seconds

AO:DTC P0BE8 DRIVE MOTOR "A" PHASE U CURRENT SENSOR CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor. Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

	Secondary Parameters	Enable Conditions
Ignition state		Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
U phase current sensor output voltage	\geq 4.5 V
(Current equivalent)	\geq 400 A

Time Needed for Diagnosis: 0.03 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
U phase current sensor output voltage	< 4.5 V
(Current equivalent)	< 400 A

Time Needed for Diagnosis: 0.06 seconds

AP:DTC P0BEA DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor circuit.

Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
PWM output to the drive motor inverter	OFF

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (V phase average offset current)	> 31 A
NOTE: ABS: Absolute value	

Time Needed for Diagnosis: 0.01 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (V phase average offset current)	≤ 31 A

Time Needed for Diagnosis: 0.01 seconds

AQ:DTC POBEB DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor. Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

	Secondary Parameters	Enable Conditions
Ignition state		Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
V phase current sensor output voltage	\leq 0.5 V
(Current equivalent)	≤-400 A

Time Needed for Diagnosis: 0.03 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
V phase current sensor output voltage	> 0.5 V
(Current equivalent)	>-400 A

Time Needed for Diagnosis: 0.06 seconds

AR:DTC POBEC DRIVE MOTOR "A" PHASE V CURRENT SENSOR CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor. Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

	Secondary Parameters	Enable Conditions
Ignition state		Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
V phase current sensor output voltage	\geq 4.5 V
(Current equivalent)	\geq 400 A

Time Needed for Diagnosis: 0.03 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
V phase current sensor output voltage	< 4.5 V
(Current equivalent)	< 400 A

Time Needed for Diagnosis: 0.06 seconds

AS:DTC P0BEE DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor circuit.

Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
PWM output to the drive motor inverter	OFF

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (W phase average offset current)	> 31 A
NOTE: ABS: Absolute value	

Time Needed for Diagnosis: 0.01 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (W phase average offset current)	≤ 31 A

Time Needed for Diagnosis: 0.01 seconds

AT:DTC P0BEF DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor. Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

	Secondary Parameters	Enable Conditions
Ignition state		Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
W phase current sensor output voltage	\leq 0.5 V
(Current equivalent)	≤ - 400 A

Time Needed for Diagnosis: 0.03 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
W phase current sensor output voltage	> 0.5 V
(Current equivalent)	>-400 A

Time Needed for Diagnosis: 0.06 seconds

AU:DTC P0BF0 DRIVE MOTOR "A" PHASE W CURRENT SENSOR CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor inverter amperage sensor. Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

	Secondary Parameters	Enable Conditions
Ignition state		Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
W phase current sensor output voltage	\geq 4.5 V
(Current equivalent)	\geq 400 A

Time Needed for Diagnosis: 0.03 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
W phase current sensor output voltage	< 4.5 V
(Current equivalent)	< 400 A

Time Needed for Diagnosis: 0.06 seconds

AV:DTC P0BFD DRIVE MOTOR "A" PHASE U-V-W CURRENT SENSOR CORRE-LATION

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor circuit.

Judge as NG when the value of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

	Secondary Parameters	Enable Conditions
Ignition state		Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (lu + lv + lw)	> 45 A
NOTE: • ABS: Absolute value • Iu: U phase current • Iv: V phase current • Iw: W phase current	

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (lu + lv + lw)	≤ 45 A

Time Needed for Diagnosis: 2 seconds

AW:DTC P0C05 DRIVE MOTOR "A" PHASE U-V-W CIRCUIT/OPEN

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current flowing in drive motor. Judge as NG when the current flowing in drive motor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
PWM output to the drive motor inverter	ON
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 1 s
c: ABS (Motor speed)	≥ 125 rpm
NOTE:	and
ABS: Absolute value	≤ 1500 rpm
Continuous time of c	≥ 0.12 s
d: ABS (Commanded motor torque)	\geq 7 N·m (0.7 kgf-m, 5.2
	ft-lb)
Continuous time of d	≥ 0.13 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Tu1 – Tu2	\geq 0.3 s
or	
Tv1 – Tv2	
or	
Tw1 – Tw2	
NOTE:	
• Tu1: Integrated time that ABS (Iu) is less than or equal to 13.5 A	
 Tu2: Integrated time that ABS (Iu) is greater than 13.5 A 	
 Tv1, Tw1: Similar to Tu1 	
 Tv2, Tw2: Similar to Tu2 	
Iu: U phase current	
Iv: V phase current	
Iw: W phase current	

Time Needed for Diagnosis: Immediately

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Tu1 – Tu2	< 0.3 s
and	
Tv1 – Tv2	
and	
Tw1 – Tw2	

Time Needed for Diagnosis: 0.6 seconds

AX:DTC P0C0C DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of high voltage battery cooling fan and drive motor inverter power supply relay.

Judge as NG when the drive signal of high voltage battery cooling fan and drive motor inverter power supply relay circuit is abnormal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
a: Ignition state	Run or crank
Continuous time of a	≥ 0.142 s
DMCM commanded inverter power supply relay	Open
b: DMCM measured inverter power supply relay	Closed
Continuous time of b	≥ 0.051 s
Diagnosis 2	
c: 12V battery system voltage	\geq 8 V
Continuous time of c	≥ 1 s
DMCM commanded inverter power supply relay	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from drive motor Inverter	Not received
Diagnosis 2	
DMCM measured inverter power supply relay	Open

Time Needed for Diagnosis:

- Diagnosis 1: 0.0104 s
- Diagnosis 2: 0.04 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from drive motor Inverter	Received
Diagnosis 2	
DMCM measured inverter power supply relay	Closed

Time Needed for Diagnosis:

- Diagnosis 1: 0.0104 s
- **Diagnosis 2:** 0.08 s

AY:DTC P0C0D DRIVE MOTOR "A" INVERTER POWER SUPPLY CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of high voltage battery cooling fan and drive motor inverter power supply relay.

Judge as NG when the drive signal of high voltage battery cooling fan and drive motor inverter power supply relay circuit is abnormal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
a: Ignition state	Run or crank
Continuous time of a	≥ 0.142 s
DMCM commanded inverter power supply relay	Open
b: DMCM measured inverter power supply relay	Open
Continuous time of b	≥ 0.051 s
Diagnosis 2	
a: Ignition state	Run or crank
Continuous time of a	≥ 0.142 s
DMCM commanded inverter power supply relay	Open
b: DMCM measured inverter power supply relay	Closed
Continuous time of b	≥ 0.051 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
SCI message from the drive motor Inverter	Received

Time Needed for Diagnosis: 0.0104 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
SCI message from the drive motor Inverter	Not received

Time Needed for Diagnosis: 0.0104 seconds

AZ:DTC P0C52 DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "A" LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor rotation angle sensor.

Judge as NG when the voltage of drive motor rotation angle sensor terminal (S1) is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Resolver S13 circuit error	Detected

Time Needed for Diagnosis: 0.01 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver S13 circuit error	Not Detected

Time Needed for Diagnosis: 0.01 seconds

BA:DTC P0C5C DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "B" LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor rotation angle sensor.

Judge as NG when the voltage of drive motor rotation angle sensor terminal (S2) is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Resolver S24 circuit error	Detected

Time Needed for Diagnosis: 0.01 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver S24 circuit error	Not Detected

Time Needed for Diagnosis: 0.01 seconds

BB:DTC P0C79 DRIVE MOTOR "A" INVERTER VOLTAGE TOO HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter input voltage. Judge as NG when the input voltage value of drive motor inverter is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria Threshold Value Inverter voltage ≥ 155 V

Time Needed for Diagnosis: Immediately

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Inverter voltage	< 155 V

Time Needed for Diagnosis: 0.02 seconds

BC:DTC P0CDC DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor rotation angle sensor.

Judge as NG when the voltage of drive motor rotation angle sensor terminal (R1, R2) is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Resolver R12 circuit error	Detected

Time Needed for Diagnosis: 0.01 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver R12 circuit error	Not Detected

Time Needed for Diagnosis: 0.01 seconds

BD:DTC P0CDD DRIVE MOTOR "A" POSITION SENSOR CIRCUIT "C" HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor rotation angle sensor.

Judge as NG when the voltage of drive motor rotation angle sensor terminal (R1, R2) is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 9 V
Continuous time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Resolver R12 circuit error	Detected

Time Needed for Diagnosis: 0.01 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Resolver R12 circuit error	Not Detected

Time Needed for Diagnosis: 0.05 seconds

BE:DTC P0DA8 HYBRID/EV BATTERY VOLTAGE/DRIVE MOTOR "A" INVERT-ER VOLTAGE CORRELATION

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter input voltage.

Judge as NG when the difference between the input voltage value of drive motor inverter and the total voltage of high voltage battery is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 1 s
HPCM contactor request	Closed
BECM pre-charge contactor command	Open
BECM positive contactor command	Closed
BECM negative contactor command	Closed
First SCI data from drive motor inverter	Received

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (Inverter voltage – Battery pack voltage)	> 20 V
NOTE:	
ABS: Absolute value	

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Inverter voltage – Battery pack voltage)	\leq 20 V

Time Needed for Diagnosis: 4 seconds

BF:DTC P1C20 DRIVE MOTOR "A" INVERTER VOLTAGE TOO LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter input voltage. Judge as NG when the input voltage value of drive motor inverter is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
First SCI data from drive motor inverter	Received
HPCM contactor request	Closed
BECM pre-charge contactor command	Open
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Inverter voltage	\leq 70 V

Time Needed for Diagnosis: Immediately

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Inverter voltage	> 70 V

Time Needed for Diagnosis: 0.02 seconds

BG:DTC P1C24 DRIVE MOTOR "B" TEMPERATURE SENSOR CIRCUIT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor. Judge as NG when the value of drive motor temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
PWM output to the drive motor inverter	ON
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 15 s
Generated energy of drive motor	> Map1
Assist energy of drive motor	> Map2
First SCI data from drive motor inverter	Received

Map 1

Hybrid battery temperature and Drive motor inverter temperature either lower temperature (°C (°F))	-30 (-22)	-10 (14)	0 (32)	10 (50)	30 (86)	40 (104)
Generated energy of drive motor (Wh)	630	320	200	130	0	0

Map 2

Hybrid battery temperature and Drive motor inverter temperature either lower temperature (°C (°F))	-30 (-22)	-10 (14)	0 (32)	10 (50)	30 (86)	40 (104)
Assist energy of drive motor (Wh)	270	130	75	50	0	0

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Output voltage	> 4.5 V
(Temperature equivalent)	< –3.4°C (25.9°F)

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	\leq 4.5 V
(Temperature equivalent)	≥ –3.4°C (25.9°F)

Time Needed for Diagnosis: 4 seconds

BH:DTC P1C25 DRIVE MOTOR "B" TEMPERATURE SENSOR CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor. Judge as NG when the value of drive motor temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Output voltage	< 0.23 V
(Temperature equivalent)	> 234°C (453.2°F)

Time Needed for Diagnosis: 1 second Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	\geq 0.23 V
(Temperature equivalent)	≤ 234°C (453.2°F)

Time Needed for Diagnosis: 2 seconds

BI: DTC P1C26 DRIVE MOTOR "B" TEMPERATURE SENSOR CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of drive motor temperature sensor. Judge as NG when the value of drive motor temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Output voltage	> 4.6 V
(Temperature equivalent)	< −55°C (−67°F)

Time Needed for Diagnosis: 1 second Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	\leq 4.6 V
(Temperature equivalent)	≥ –55°C (–67°F)

Time Needed for Diagnosis: 2 seconds

BJ:DTC P1C27 DRIVE MOTOR "A" AND "B" TEMPERATURE SENSOR CORRE-LATION

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor temperature sensor.

Judge as NG when the characteristic of drive motor temperature sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N⋅m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Drive motor temperature A	> 30°C (86°F)
	and
	< 140°C (284°F)
or	
Drive motor temperature B	> 30°C (86°F)
	< 140°C (284°F)
Diagnosis 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 10 V
Continuous time of a and b	≥ 240 s
c: ABS (Drive motor speed)	> 125 rpm
NOTE: ABS: Absolute value	
or	
d: ABS (Commanded motor torque)	< 15 N⋅m (1.5 kgf-m, 11.1 ft-lb)
Continuous time of c or d	≥ 240 s
Drive motor temperature A	> 30°C (86°F)
	and
	< 140°C (284°F)
or	
Drive motor temperature B	> 30°C (86°F)
	< 140°C (284°F)
Variation of motor temperature A	> 25°C (77°F)
or	· · · ·
Variation of motor temperature B	

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
ABS (Motor temperature A – Motor temperature B)	> 20°C (36°F)
NOTE:	
ABS: Absolute value	
Diagnosis 2	
ABS (Variation of motor temperature A – Variation of motor temperature B)	> 20°C (36°F)
NOTE:	
• Variation of motor temperature A = Max (Motor tempera-	
ture A) – Min (Motor temperature A)	
• Variation of motor temperature B = Max (Motor tempera-	
ture B) – Min (Motor temperature B)	
• Max: The maximum value of the experience in the current	
driving cycle	
• Min: The minimum value of the experience in the current	
driving cycle	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	≤ 20°C (36°F)
ABS (Motor temperature A – Motor temperature B)	
Diagnosis 2	
ABS (Variation of motor temperature A – Variation of motor temperature B)	≤ 20°C (36°F)

Time Needed for Diagnosis: 20 seconds

BK:DTC P1C30 LOST COMMUNICATION WITH DRIVE MOTOR INVERTER

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of serial communication with drive motor inverter. Judge as NG when the serial data from drive motor inverter is not received.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
Inverter power supply relay control signal	ON

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
SCI data from drive motor inverter	Lost

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
SCI data from drive motor inverter	Received

Time Needed for Diagnosis: 1 second

BL:DTC P1C31 INVALID DATA RECEIVED FROM DRIVE MOTOR INVERTER

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of serial communication with drive motor inverter. Judged as NG when incorrect serial data is received from drive motor inverter.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1 and 2	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
SCI data from drive motor inverter	Received
Diagnosis 3	
a: Ignition state	Run or crank
b: 12 V battery system voltage	> 8 V
Continuous time of a and b	≥ 1 s
SCI data from drive motor inverter	Received
SCI data from drive motor inverter	≠ Parity error
SCI data from drive motor inverter	≠ Framing error

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from drive motor inverter	Parity error
Diagnosis 2	
SCI data from drive motor inverter	Framing error
Diagnosis 3	
SCI data from drive motor inverter	Checksum error

Time Needed for Diagnosis: 0.015 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
SCI data from drive motor inverter	≠ Parity error
Diagnosis 2	
SCI data from drive motor inverter	≠ Framing error
Diagnosis 3	
SCI data from drive motor inverter	≠ Checksum error

Time Needed for Diagnosis: 0.03 seconds

BM:DTC P0A1B DRIVE MOTOR "A" CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor control module.

Judge as NG when the malfunction is detected at the peripheral function of drive motor control module microcomputer.

2. ENABLE CONDITIONS

	Secondary Parameters	Enable Conditions
Ignition state		Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Internal Hardware module error	Detected
Diagnosis 2	
Exception interrupt by the DMCM CPU	Detected

Time Needed for Diagnosis: Immediately

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Internal Hardware module error	Not detected
Diagnosis 2	
Exception interrupt by the DMCM CPU	Not detected

Time Needed for Diagnosis: Immediately
BN:DTC P06B1 SENSOR POWER SUPPLY "A" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor power supply circuit. Judge as NG when the power supply voltage of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Measured sensor power supply output voltage at DMCM	≤ 4.536 V

Time Needed for Diagnosis: 1 second Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured sensor power supply output voltage at DMCM	> 4.536 V

Time Needed for Diagnosis: 2 seconds

BO:DTC P06B2 SENSOR POWER SUPPLY "A" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of drive motor inverter amperage sensor power supply circuit. Judge as NG when the power supply voltage of drive motor inverter amperage sensor is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Measured sensor power supply output voltage at DMCM	> 5.418 V

Time Needed for Diagnosis: 1 second Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured sensor power supply output voltage at DMCM	\leq 5.418 V

Time Needed for Diagnosis: 2 seconds

BP:DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer DataFlashROM.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Open

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Checksum error of Flash EEPROM within the BECM Main CPU (Data area)	Detected

Time Needed for Diagnosis: Immediately

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum error of Flash EEPROM within the BECM Main CPU (Data area)	Not Detected

Time Needed for Diagnosis: Less than 0.01 second

BQ:DTC P0A1F BATTERY ENERGY CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of microcomputer AD converter.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
Diagnosis 2 and 3	
Ignition state	OFF to ON (Run or crank)
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Open

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Power sustain circuit monitor signal	High (Power ON)
Diagnosis 2	
Power sustain circuit monitor signal	Low (Power OFF)
Diagnosis 3	
Elapsed time of A / D conversion	\leq 0.0002 s

Time Needed for Diagnosis: Less than 0.05 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Power sustain circuit monitor signal	≠ High
	(Power ON)
Diagnosis 2	
Power sustain circuit monitor signal	≠ Low
	(Power OFF)
Diagnosis 3	
Elapsed time of A / D conversion	> 0.0002 s

Time Needed for Diagnosis: Less than 0.05 second



BR:DTC P0A7D HYBRID BATTERY PACK STATE OF CHARGE LOW

1. OUTLINE OF DIAGNOSIS

Detect high voltage battery SOC low. Judge as NG when the high voltage battery SOC is at the specified value or less.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
SOC	≤ 5%
NOTE:	
SOC: State Of Charge	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	
SOC	> 5%	

Time Needed for Diagnosis: 10 seconds

BS:DTC P0A7E HYBRID BATTERY PACK OVER TEMPERATURE

1. OUTLINE OF DIAGNOSIS

Detect high temperature abnormality of high voltage battery. Judge as NG when the high voltage battery temperature is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Maximum temperature of hybrid battery	> 63°C (145.4°F)

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Maximum temperature of hybrid battery	≤ 63°C (145.4°F)

Time Needed for Diagnosis: 1 second

BT:DTC P0A7F HYBRID BATTERY PACK DETERIORATION

1. OUTLINE OF DIAGNOSIS

Detect the low output (longevity) of high voltage battery. Judge as NG when the internal resistance value of high voltage battery is at the specified value or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Condition #1	
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
Hybrid battery current x Hybrid battery voltage	≥ Map1 ×0.1 kw
NOTE:	< Map1 kw
Hybrid battery current < 0: Discharge	
or	
Hybrid battery current x Hybrid battery voltage	\geq Map2 ×0.1 kw
NOTE:	< Map2 kw
Hybrid battery current \geq 0: Discharge	
HPCM contactor request	Closed
Condition #2	
NOTE:	
During a 60 second block the following conditions must be satisfied:	
Number of the Hybrid battery current and the Hybrid battery voltage data that satisfies Condition #1	≥ 50 counts
Number of the Hybrid battery current and Hybrid battery voltage data that satisfies the following:	≥ 1 count
Hybrid battery current x Hybrid battery voltage	≥ Map1 ×0.5 kw
Number of the Hybrid battery current and Hybrid battery voltage data that satisfies the following:	≥ 1 count
Hybrid battery current x Hybrid battery voltage	\geq Map2 ×0.5 kw
The highest value among the Hybrid battery temperature A, B and C	≥-5.0°C (23°F))
	and
	≤ 45°C (113°F)
Change of the highest value among the Hybrid battery temperature A, B and C	$\leq 2.0^{\circ}C$ (35.6°F)/60 s

Map 1

Maximum discharge Power		SOH (%)			
	(KVV)	100	62.5	25	
	-10 (14)	4.7	3.3	1.9	
	0 (32)	7.0	4.7	2.7	
Battery Temperature (°C (°F))	10 (50)	10.4	6.3	3.6	
	15 (59)	11.7	7.2	4.1	
	25 (77)	13.5	9.9	5.5	
	30 (86)	14.0	9.9	5.5	
	45 (113)	14.0	9.9	5.5	

Map 2

Maximum charge power		SOH (%)			
	(KVV)	100	62.5	25	
	-10 (14)	4.6	3.5	2.2	
	0 (32)	7.1	5.0	3.0	
Battery Temperature (°C (°F))	10 (50)	10.1	6.7	4.0	
	15 (59)	11.6	7.5	4.4	
	25 (77)	13.4	10.5	6.0	
	45 (113)	13.4	10.5	6.0	

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnostic Value (DV)	> Map 3 Ω
(Hybrid battery internal resistance)	

Map 3

Minimum hybrid battery temperature	-5	0	5	20	25	45
(°C (°F))	(23)	(32)	(41)	(68)	(77)	(113)
Hybrid battery internal resistance (Ω)	1.21	0.97	0.79	0.46	0.43	0.36

Time Needed for Diagnosis: 60 s x 10 times

NOTE:

Failure count can increment over multiple driving cycles until cleared by passing result **Malfunction Indicator Light Illumination:** Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic Value (DV)	\leq Map 3 Ω
(Hybrid battery internal resistance)	

Time Needed for Diagnosis: depends on driving (charge/discharge amount)

BU:DTC P0A95 HIGH VOLTAGE FUSE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the fuse. Judge as NG when the fuse is open.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Any two of following conditions are satisfied	
Hybrid battery voltage "C"	< –25 mV
Hybrid battery voltage "D"	< –25 mV

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Any two of following conditions are satisfied	
Hybrid battery voltage "C"	≥ –25 mV
Hybrid battery voltage "D"	≥ –25 mV

Time Needed for Diagnosis: 0.1 seconds

BV:DTC P0A9C HYBRID BATTERY TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 1. Judge as NG when the deviation of high voltage battery temperature is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature A – Hybrid battery temperature B	> 20°C (68°F)
Hybrid battery temperature A – Hybrid battery temperature C	> 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature B – Hybrid battery temperature A	> 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature A	> 20°C (68°F)

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature A – Hybrid battery temperature B	≤ 20°C (68°F)
Hybrid battery temperature A – Hybrid battery temperature C	≤ 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature B – Hybrid battery temperature A	≤ 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature A	\leq 20°C (68°F)

Time Needed for Diagnosis: 10 seconds

BW:DTC P0A9D HYBRID BATTERY TEMPERATURE SENSOR "A" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 1.

Judge as NG when the high voltage battery temperature 1 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery temperature A	< 0.49 V
sensor output voltage (temperature equivalent)	(> 95°C (203°F))

Time Needed for Diagnosis: 8 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature A	\geq 0.49 V
sensor output voltage (temperature equivalent)	(≤ 95°C (203°F))

Time Needed for Diagnosis: 8 seconds

BX:DTC P0A9E HYBRID BATTERY TEMPERATURE SENSOR "A" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 1.

Judge as NG when the high voltage battery temperature 1 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery temperature A	> 4.82 V
sensor output voltage (temperature equivalent)	(< −45°C (−49°F))

Time Needed for Diagnosis: 8 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature A	$\leq 4.82 \text{ V}$
sensor output voltage (temperature equivalent)	(≥ –45°C (–49°F))

Time Needed for Diagnosis: 8 seconds

BY:DTC P0AAD HYBRID BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the intake air temperature sensor.

Judge as NG when the deviation of high voltage battery temperature is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V
Soak time from ECM	≥ 6.0 h

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic Value (DV)	> 16°C (60.8°F)
NOTE: The smallest value among follows Hybrid Battery Pack Air Temperature – Hybrid battery temperature A	
Hybrid Battery Pack Air Temperature – Hybrid battery temperature B Hybrid Battery Pack Air Temperature – Hybrid battery temperature C	

Time Needed for Diagnosis: 15 seconds

Malfunction Indicator Light Illumination: detects when malfunction occurs in 2 continuous driving cycles. (Single engine startup is counted as one drive cycle.)

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic Value (DV)	≤ 16°C (60.8°F)
NOTE: The smallest value among follows Hybrid Battery Pack Air Temperature – Hybrid battery temperature A Hybrid Battery Pack Air Temperature – Hybrid battery temperature B Hybrid Battery Pack Air Temperature – Hybrid battery temperature C	

Time Needed for Diagnosis: 15 seconds

BZ:DTC P0AAE HYBRID BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the intake air temperature sensor. Judge as NG when the intake air temperature is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery pack air temperature	< 0.49 V
sensor output voltage (temperature equivalent)	(> 95°C (203°F))

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack air temperature	≥ 0.49 V
sensor output voltage (temperature equivalent)	(≤ 95°C (203°F))

Time Needed for Diagnosis: 10 seconds

CA:DTC P0AAF HYBRID BATTERY PACK AIR TEMPERATURE SENSOR "A" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the intake air temperature sensor. Judge as NG when the intake air temperature is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery pack air temperature	> 4.82 V
sensor output voltage (temperature equivalent)	(< −45°C (−49°F))

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack air temperature sensor output voltage (temperature equivalent)	≤ 4.82 V (≥ –45°C (–49°F))

Time Needed for Diagnosis: 10 seconds

CB:DTC P0ABF HYBRID BATTERY PACK CURRENT SENSOR "A" CIRCUIT

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of the current sensor circuit.

Judge as NG when the high voltage battery current value is below the specified value under the condition that the motor operates at overload.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
(Commanded Drive Motor Torque	› 15 Nm
Measured Drive Motor Speed)	› 125 rpm
or	
(Commanded Drive Motor Torque	< –40 Nm
Measured Drive Motor Speed)	› 1700 rpm

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	< 1 A

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	\geq 1 A

Time Needed for Diagnosis: 1 second

CC:DTC P0AC0 HYBRID BATTERY PACK CURRENT SENSOR "A" CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the offset malfunction of high voltage battery current sensor.

Judge as NG when the high voltage battery current offset is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
Continuous time of a	≤ 0.2 s
12V battery system voltage	\geq 6.5 V
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	> 1 A

Time Needed for Diagnosis: 0.01 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	≤ 1 A

Time Needed for Diagnosis: 0.01 seconds

CD:DTC P0AC1 HYBRID BATTERY PACK CURRENT SENSOR "A" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery current sensor.

Judge as NG when the high voltage battery current value is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery pack current	< –1.91 V
sensor output voltage (current equivalent)	(< –240 A)

Time Needed for Diagnosis: 0.4 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current	≥-1.91 V
sensor output voltage (current equivalent)	(≥ <i>−</i> 240 A)

Time Needed for Diagnosis: 0.4 seconds

CE:DTC P0AC2 HYBRID BATTERY PACK CURRENT SENSOR "A" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery current sensor.

Judge as NG when the high voltage battery current value is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery pack current	> 1.91 V
sensor output voltage (current equivalent)	(> 240 A)

Time Needed for Diagnosis: 0.4 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current	≤ 1.91 V
sensor output voltage (current equivalent)	(≤ 240 A)

Time Needed for Diagnosis: 0.4 seconds

CF:DTC P0AC3 HYBRID BATTERY PACK CURRENT SENSOR "A" CIRCUIT IN-TERMITTENT/ERRATIC

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery current sensor.

Judge as NG when the stuck of high voltage battery current sensor value is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V
Hybrid battery voltage D (Actual state: discharge)	< –120 mV
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed
Diagnosis 2	
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V
Hybrid battery voltage D (Actual state: discharge)	> 120 mV
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery pack current	≥ 10 A
(Detected state: charge)	≤ 110 A
NOTE: (The system should be discharging, but a charge condition is detected.)	
Diagnosis 2	
Hybrid battery pack current	≤-10 A
(Detected state: discharge)	≥-190 A
NOTE: (The system should be charging, but a discharge condition is detected.)	

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery pack current	≤ - 10 A
(Detected state: discharge)	≥ –190 A
Diagnosis 2	
Hybrid battery pack current	≥ 10 A
(Detected state: charge)	≤ 110 A

Time Needed for Diagnosis: 1 second

CG:DTC P0AC6 HYBRID BATTERY TEMPERATURE SENSOR "B" CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 2. Judge as NG when the deviation of high voltage battery temperature is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature B – Hybrid battery temperature A	> 20°C (68°F)
Hybrid battery temperature B – Hybrid battery temperature C	> 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature A – Hybrid battery temperature B	> 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature B	> 20°C (68°F)

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature B – Hybrid battery temperature A	≤ 20°C (68°F)
Hybrid battery temperature B – Hybrid battery temperature C	≤ 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature A – Hybrid battery temperature B	≤ 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature B	≤ 20°C (68°F)

Time Needed for Diagnosis: 10 seconds

CH:DTC P0AC7 HYBRID BATTERY TEMPERATURE SENSOR "B" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 2.

Judge as NG when the high voltage battery temperature 2 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery temperature B	< 0.49 V
sensor output voltage (temperature equivalent)	(> 95°C (203°F))

Time Needed for Diagnosis: 8 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature B	\geq 0.49 V
sensor output voltage (temperature equivalent)	(≤ 95°C (203°F))

Time Needed for Diagnosis: 8 seconds

CI: DTC P0AC8 HYBRID BATTERY TEMPERATURE SENSOR "B" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 2.

Judge as NG when the high voltage battery temperature 2 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery temperature B	> 4.82 V
sensor output voltage (temperature equivalent)	(< −45°C (−49°F))

Time Needed for Diagnosis: 8 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature B	\leq 4.82 V (> -45°C (-49°E))

Time Needed for Diagnosis: 8 seconds

CJ:DTC P0ACB HYBRID BATTERY TEMPERATURE SENSOR "C" CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 3. Judge as NG when the deviation of high voltage battery temperature is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature C – Hybrid battery temperature B	> 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature A	> 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature A – Hybrid battery temperature C	> 20°C (68°F)
Hybrid battery temperature B – Hybrid battery temperature C	> 20°C (68°F)

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery temperature C – Hybrid battery temperature B	≤ 20°C (68°F)
Hybrid battery temperature C – Hybrid battery temperature A	≤ 20°C (68°F)
Diagnosis 2	
Hybrid battery temperature A – Hybrid battery temperature C	≤ 20°C (68°F)
Hybrid battery temperature B – Hybrid battery temperature C	\leq 20°C (68°F)

Time Needed for Diagnosis: 10 seconds

CK:DTC P0ACC HYBRID BATTERY TEMPERATURE SENSOR "C" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 3.

Judge as NG when the high voltage battery temperature 3 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery temperature C	< 0.49 V
sensor output voltage (temperature equivalent)	(> 95°C (203°F))

Time Needed for Diagnosis: 8 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature C	≥ 0.49 V
sensor output voltage (temperature equivalent)	(≤ 95°C (203°F))

Time Needed for Diagnosis: 8 seconds

CL:DTC P0ACD HYBRID BATTERY TEMPERATURE SENSOR "C" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery temperature 3.

Judge as NG when the high voltage battery temperature 3 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery temperature C	> 4.82 V
sensor output voltage (temperature equivalent)	(< −45°C (−49°F))

Time Needed for Diagnosis: 8 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery temperature C	\leq 4.82 V
sensor output voltage (temperature equivalent)	(≥ –45°C (–49°F))

Time Needed for Diagnosis: 8 seconds

CM:DTC P0AD9 HYBRID BATTERY POSITIVE CONTACTOR CONTROL CIR-CUIT/OPEN

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of +side contactor drive signal line.

Judge as NG when the open circuit of +side contactor drive signal line is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
Measured Positive contactor control signal (BECM main CPU output)	Closed

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Measured Positive contactor control signal (BECM output)	Open

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Positive contactor control signal	Closed
(BECM output)	

Time Needed for Diagnosis: 0.5 seconds

CN:DTC P0ADB HYBRID BATTERY POSITIVE CONTACTOR CONTROL CIR-CUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the short circuit of +side contactor drive signal line.

Judge as NG when the short circuit of +side contactor drive signal line is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
HPCM contactor request	Open
BECM positive contactor command	Open
Measured Positive contactor control signal (BECM main CPU output)	Open
Diagnosis 2	
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and ≤ 17 V
HPCM contactor request	Open
BECM positive contactor command	Open

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured Positive contactor control signal (BECM output)	Closed
Diagnosis 2	
Measured Positive contactor control signal	Closed

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured Positive contactor control signal (BECM output)	Open
Diagnosis 2	
Measured Positive contactor control signal	Open

Time Needed for Diagnosis: 0.1 seconds

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CO:DTC P0ADD HYBRID BATTERY NEGATIVE CONTACTOR CONTROL CIR-CUIT/OPEN

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of -side contactor drive signal line.

Judge as NG when the open circuit of -side contactor drive signal line is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
HPCM contactor request	Closed
BECM negative contactor command	Closed
Measured negative contactor control signal (BECM main CPU output)	Closed

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Measured Negative contactor control signal (BECM output)	Open

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Negative contactor control signal	Closed
(BECM output)	

Time Needed for Diagnosis: 0.5 seconds

CP:DTC P0AE4 HYBRID BATTERY PRECHARGE CONTACTOR CONTROL CIR-CUIT

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of precharge contactor drive signal line.

Judge as NG when the open circuit of precharge contactor drive signal line is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and ≤ 17 V
Request contractors from HPCM	Closed
Precharge contactor command	Closed
Precharge contactor control circuit monitor signal	High
(Drive control circuit output)	(Closed)

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Precharge contactor control signal (BECM main CPU output)	High (Open)

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Precharge contactor control signal (BECM main CPU output)	Low (Close)

Time Needed for Diagnosis: 0.5 seconds

CQ:DTC P0B25 HYBRID BATTERY "A" VOLTAGE LOW

1. OUTLINE OF DIAGNOSIS

Detect that the high voltage battery voltage is below the lowest voltage. Judge as NG when the high voltage battery voltage value is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery pack voltage	< 73.6 V

Time Needed for Diagnosis: 5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack voltage	\geq 73.6 V

Time Needed for Diagnosis: 5 seconds

CR:DTC P0B26 HYBRID BATTERY "A" VOLTAGE HIGH

1. OUTLINE OF DIAGNOSIS

Detect that the high voltage battery voltage exceeds the highest voltage. Judge as NG when the voltage value of high voltage battery is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery pack voltage	> 136.4 V

Time Needed for Diagnosis: 5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack voltage	\leq 136.4 V

Time Needed for Diagnosis: 5 seconds

CS:DTC P0B37 HIGH VOLTAGE SERVICE DISCONNECT OPEN

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of service disconnect plug. Judge as NG when service disconnect plug unplugs or service disconnect plug SW is open.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Interlock switch signal	Open

Time Needed for Diagnosis: 0.05 seconds Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Interlock switch signal	Closed

Time Needed for Diagnosis: 0.05 seconds

CT:DTC P0B3C HYBRID BATTERY VOLTAGE SENSE "A" CIRCUIT RANGE/ PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 0. Judge as NG when the stuck of high voltage battery voltage 0 is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage A	> 96.0 V ≤ 98.54 V (High side)
Diagnosis 2	
Hybrid battery voltage A	≥ –98.54 V < 9.60 V (Low side)

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage A	≤ 96.0 V > 98.54 V (High side)
Diagnosis 2	
Hybrid battery voltage A	< -98.54 V ≥ 9.60 V (Low side)

Time Needed for Diagnosis: 1 second
CU:DTC P0B3D HYBRID BATTERY VOLTAGE SENSE "A" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 0.

Judge as NG when the high voltage battery voltage 0 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage A	< –98.54 V

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage A	\geq -98.54 V

CV:DTC P0B3E HYBRID BATTERY VOLTAGE SENSE "A" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 0. Judge as NG when the high voltage battery voltage 0 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage A	> 98.54 V

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage A	\leq 98.54 V

CW:DTC P0B41 HYBRID BATTERY VOLTAGE SENSE "B" CIRCUIT RANGE/ PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 1. Judge as NG when the stuck of high voltage battery voltage 1 is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage B	> 64.0 V
	\leq 66.27 V
	(High side)
Diagnosis 2	
Hybrid battery voltage B	≥ –66.27 V
	< 6.40 V
	(Low side)

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage B	≤ 64.0 V > 66.27 V (High side)
Diagnosis 2	
Hybrid battery voltage B	< -66.27 V ≥ 6.40 V (Low side)

CX:DTC P0B42 HYBRID BATTERY VOLTAGE SENSE "B" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 1.

Judge as NG when the high voltage battery voltage 1 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage B	<-66.27 V

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage B	\geq -66.27 V

CY:DTC P0B43 HYBRID BATTERY VOLTAGE SENSE "B" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 1.

Judge as NG when the high voltage battery voltage 1 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	< 17 V

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage B > 66.27 V	

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage B	\leq 66.27 V

CZ:DTC P0B46 HYBRID BATTERY VOLTAGE SENSE "C" CIRCUIT RANGE/ PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 2. Judge as NG when the stuck of high voltage battery voltage 2 is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage C	> 32.0 V
	\leq 56.34 V
	(High side)
Diagnosis 2	
Hybrid battery voltage C	≥-56.34 V
	< 3.20 V
	(Low side)

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage C	≤ 32.0 V > 56.34 V (High side)
Diagnosis 2	
Hybrid battery voltage C	< -56.34 V ≥ 3.20 V (Low side)

DA:DTC P0B47 HYBRID BATTERY VOLTAGE SENSE "C" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 2.

Judge as NG when the high voltage battery voltage 2 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage C	<-56.34 V

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage C	\geq -56.34 V

DB:DTC P0B48 HYBRID BATTERY VOLTAGE SENSE "C" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 2. Judge as NG when the high voltage battery voltage 2 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage C	> 56.34 V

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage C	\leq 56.34 V

DC:DTC P0B4A HYBRID BATTERY VOLTAGE SENSE "D" CIRCUIT

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 3.

Judge as NG when the open circuit of high voltage battery voltage sensor 3 is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
Elapsed time of a	≤ 0.2 s
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Status fault flag for 'Voltage Sense "D" Circuit'	Open
as determined by the BECIN Sub CPU	

Time Needed for Diagnosis: 0.01 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Status fault flag for 'Voltage Sense "D" Circuit' as determined by the BECM Sub CPU	Close

DD:DTC P0B4B HYBRID BATTERY VOLTAGE SENSE "D" CIRCUIT RANGE/ PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 3. Judge as NG when the stuck of high voltage battery voltage 3 is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage D	> 2.10V ≤ 76.2V (High side)
Diagnosis 2	
Hybrid battery voltage C	≥ -76.2 V < -2.10V (Low side)

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage C	≤ 2.10 V > 76.2 V (High side)
Diagnosis 2	
Hybrid battery voltage C	< -76.2 V ≥ -2.10V (Low side)

DE:DTC P0B4C HYBRID BATTERY VOLTAGE SENSE "D" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 3.

Judge as NG when the high voltage battery voltage 3 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage D	< –76.20 V

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage D	> -76.20 V

DF:DTC P0B4D HYBRID BATTERY VOLTAGE SENSE "D" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 3. Judge as NG when the high voltage battery voltage 3 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage D	> 76.20 V

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage D	\leq 76.20 V

DG:DTC P0B50 HYBRID BATTERY VOLTAGE SENSE "E" CIRCUIT RANGE/ PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 4. Judge as NG when the stuck of high voltage battery voltage 4 is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage E	>-1.60V
	\leq 23.03 V
	(High side)
Diagnosis 2	
Hybrid battery voltage E	≥-23.03 V
	< -16.00 V
	(Low side)

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage E	≤ −1.60 V > 23.03 V (High side)
Diagnosis 2	
Hybrid battery voltage E	< -23.03 V ≥ -16.00 V (Low side)

DH:DTC P0B51 HYBRID BATTERY VOLTAGE SENSE "E" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 4. Judge as NG when the high voltage battery voltage 4 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage E	< –23.03 V

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage E	\geq -23.03 V

DI: DTC P0B52 HYBRID BATTERY VOLTAGE SENSE "E" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 4. Judge as NG when the high voltage battery voltage 4 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage E	> 23.03 V

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage E	\leq 23.03 V

DJ:DTC P0B55 HYBRID BATTERY VOLTAGE SENSE "F" CIRCUIT RANGE/PER-FORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 5.

Judge as NG when the stuck of high voltage battery voltage 5 is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage F	>-4.80 V
	\leq 98.54 V
	(High side)
Diagnosis 2	
Hybrid battery voltage F	≥-98.54 V
	<-48.00 V
	(Low side)

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage F	≤ -4.80 V > 98.54 V (High side)
Diagnosis 2	
Hybrid battery voltage F	< -98.54 V ≥ -48.00 V (Low side)

DK:DTC P0B56 HYBRID BATTERY VOLTAGE SENSE "F" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 5.

Judge as NG when the high voltage battery voltage 5 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage F	< –98.54 V

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage F	\geq -98.54 V

DL:DTC P0B57 HYBRID BATTERY VOLTAGE SENSE "F" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 5. Judge as NG when the high voltage battery voltage 5 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage F	> 98.54 V

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage F	\leq 98.54 V

DM:DTC P0B5A HYBRID BATTERY VOLTAGE SENSE "G" CIRCUIT RANGE/ PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 6. Judge as NG when the stuck of high voltage battery voltage 6 is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage G	> –7.20 V
	\leq 98.54 V
	(High side)
Diagnosis 2	
Hybrid battery voltage G	≥-98.54 V
	< –72.00 V
	(Low side)

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery voltage G	≤ –7.20 V
	> 98.54 V
	(High side)
Diagnosis 2	
Hybrid battery voltage G	<-98.54 V
	≥-72.00 V
	(Low side)

DN:DTC P0B5B HYBRID BATTERY VOLTAGE SENSE "G" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 6. Judge as NG when the high voltage battery voltage 6 is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage G	< –98.54 V

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage G	\geq -98.54 V

DO:DTC P0B5C HYBRID BATTERY VOLTAGE SENSE "G" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of high voltage battery voltage sensor 6. Judge as NG when the high voltage battery voltage 6 is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery voltage G	> 98.54 V

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery voltage G	\leq 98.54 V

DP:DTC P0BB8 HYBRID BATTERY VOLTAGE SENSE "Z" CIRCUIT

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage battery GND. Judge as NG when the high voltage battery GND is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Status fault flag for 'Voltage Sense "Z" Circuit' as determined by the BECM Sub CPU	Open

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Status fault flag for 'Voltage Sense "Z" Circuit' as determined by the BECM Sub CPU	Close

DQ:DTC P0C30 HYBRID BATTERY PACK STATE OF CHARGE HIGH

1. OUTLINE OF DIAGNOSIS

Detect high voltage battery SOC high. Judge as NG when the high voltage battery SOC is at the specified value or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
SOC	≥ 95%
NOTE:	
SOC: State Of Charge	

Time Needed for Diagnosis: 60 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
SOC	< 95%

DR:DTC P0C78 HYBRID BATTERY SYSTEM PRECHARGE TIME TOO LONG

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of high voltage circuit open and precharge resistance.

Judge as NG when the difference between the total voltage value of high voltage battery when contactor is close and the inverter voltage is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
HPCM contactor request	Closed
BECM precharge contactor command	Closed
BECM positive contactor command	Open
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
ABS (Hybrid battery pack voltage – Inverter voltage)	> 20 V
NOTE:	
ABS: Absolute value	

Time Needed for Diagnosis: 0.6 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ABS (Hybrid battery pack voltage – Inverter voltage)	\leq 20 V
NOTE: ABS: Absolute value	

DS:DTC P0CA6 HYBRID BATTERY CHARGING CURRENT HIGH

1. OUTLINE OF DIAGNOSIS

Detect that the high voltage battery current exceeds the rated charging current. Judge as NG when the current value (charging) is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery pack current	> 110 A
(Detected state: charge)	
NOTE:	
(Detected state: charge)	

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current	≤ 110 A
(Detected state: charge)	
NOTE:	
(Detected state: charge)	

DT:DTC P0CA7 HYBRID BATTERY DISCHARGING CURRENT HIGH

1. OUTLINE OF DIAGNOSIS

Detect that the high voltage battery current exceeds the rated charging current. Judge as NG when the current value (discharging) is above the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	\leq 17 V
HPCM contactor request	Closed
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Hybrid battery pack current	< –190 A
(Detected state: discharge)	

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Hybrid battery pack current	≥-190 A
(Detected state: discharge)	

DU:DTC P1C40 HYBRID BATTERY POSITIVE CONTACTOR OR PRE-CHARGE CONTACTOR CIRCUIT STUCK CLOSED

1. OUTLINE OF DIAGNOSIS

Detect the adhesion of +side contactor and precharge contactor.

Judge as NG when the difference between the total voltage value of high voltage battery when contactor is open and the inverter voltage is at the specified value or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and ≤ 17 V
HPCM contactor request	Open
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Inverter voltage / Hybrid battery pack voltage	\geq 0.8 V

Time Needed for Diagnosis: 1.3 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Inverter voltage / Hybrid battery pack voltage	< 0.8 V

DV:DTC P1C41 HIGH VOLTAGE CIRCUIT SHORT

1. OUTLINE OF DIAGNOSIS

Detect the short circuit of high voltage line + and –. Judge as NG when the current at contactor close is at the specified value or more. Judge as NG when the high voltage battery voltage value at close is below the specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	≤ 17 V
HPCM contactor request	Closed
BECM precharge contactor command	Closed
BECM positive contactor command	Open
BECM negative contactor command	Closed
Diagnosis 2	
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	\leq 17 V
HPCM contactor request	Closed
BECM precharge contactor command	Open
BECM positive contactor command	Closed
BECM negative contactor command	Closed

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery pack discharge current	> 1.75 A
Diagnosis 2	
Hybrid battery pack voltage	< 48 V

Time Needed for Diagnosis:

- Diagnosis 1: less than 0.6 s
- Diagnosis 2: 0.1 s
- Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.
- Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Hybrid battery pack discharge current	≤ 1.75 A
Diagnosis 2	
Hybrid battery pack voltage	\geq 48 V

Time Needed for Diagnosis: 0.6 s after engine start



DW:DTC P1C42 HIGH VOLTAGE CIRCUIT OPEN

1. OUTLINE OF DIAGNOSIS

Detect the high voltage circuit open at driving.

Judge as NG both when the difference between the high voltage battery voltage value and the inverter voltage value is at the specified value or more, and when the high voltage battery current value is within specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	≤ 17 V
HPCM contactor request	Closed
Measured Positive contactor control signal (BECM main CPU output)	Closed
Measured Positive contactor control signal (BECM output)	Closed
Measured Negative contactor control signal (BECM main CPU output)	Closed
Measured Negative contactor control signal (BECM output)	Closed
Measured contactor power supply control signal	ON
Measured contactor power supply voltage	\geq 4 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	≤ 1 A
Inverter voltage / Hybrid battery voltage	≤ 0.8

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value of hybrid battery pack current	> 1 A
Inverter voltage / Hybrid battery voltage	> 0.8

DX:DTC P1C43 HYBRID BATTERY CONTACTOR POWER SUPPLY CIRCUIT

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of power supply instantaneous interruption detection circuit and power supply circuit of contactor.

Judge as NG when the open circuit of power supply instantaneous interruption detection circuit and power supply circuit of contactor is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
BECM positive contactor command	Closed
	or
BECM negative contactor command	Closed
	or
BECM precharge contactor command	Closed
Diagnosis 2	
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
Measured Contactor power supply monitoring signal	Power on

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured Contactor power supply monitoring signal	Power off
Diagnosis 2	
Measured contactor power supply voltage dropped signal	ON

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured contactor power supply monitoring signal	Power on
Diagnosis 2	
Measured contactor power supply voltage dropped signal	Off

Time Needed for Diagnosis: 0.5 seconds

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DY:DTC P1C44 SUB CPU IN BECM

1. OUTLINE OF DIAGNOSIS

Detect the communication failure of MAINCPU and SubCPU. Judge as NG when data is not received from SubCPU.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	≤ 17 V

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value	
Diagnosis 1		
Serial communication between BECM Main CPU and BECM Sub CPU is lost (no message received)	Detected	
Diagnosis 2		
Hybrid Battery voltage input circuit error for BECM Sub CPU	Detected	
Diagnosis 3		
A/D Converter failure for BECM Sub CPU	Detected	
Diagnosis 4		
Multiplex connection error for BECM Sub CPU	Detected	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	
Diagnosis 1		
Serial communication between BECM Main CPU and BECM Sub CPU is lost (no message received)	Not detected	
Diagnosis 2		
Hybrid Battery voltage input circuit error for BECM Sub CPU	Not detected	
Diagnosis 3		
A/D Converter failure for BECM Sub CPU	Not detected	
Diagnosis 4		
Multiplex connection error for BECM Sub CPU	Not detected	

DZ:DTC P1C45 HYBRID BATTERY BLOCK 1 BALANCING PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the cell malfunction of high voltage battery block 1. Judge as NG when the deviation of high voltage battery block voltage is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N	> 1.2 V
N=4	
NOTE:	
This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 1.	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N $N=4$	≤ 1.2 V
NOTE: This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 1.	

EA:DTC P1C46 HYBRID BATTERY BLOCK 2 BALANCING PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the cell malfunction of high voltage battery block 2. Judge as NG when the deviation of high voltage battery block voltage is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N	> 1.2 V
N=4	
NOTE:	
This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 2.	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4	≤ 1.2 V
NOTE: This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 2.	

EB:DTC P1C47 HYBRID BATTERY BLOCK 3 BALANCING PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of voltage deviation between high voltage battery cells. Judge as NG when the deviation of high voltage battery block voltage is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	< 17 V

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N	> 1.2 V
N=4	
NOTE:	
This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 3.	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4	≤ 1.2 V
NOTE: This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 3.	

EC:DTC P1C48 HYBRID BATTERY BLOCK 4 BALANCING PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of voltage deviation between high voltage battery cells. Judge as NG when the deviation of high voltage battery block voltage is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	≥ 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N	> 1.2 V
N=2	
NOTE:	
This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 4.	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=2	≤ 1.2 V
NOTE: This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 4.	

ED:DTC P1C49 HYBRID BATTERY BLOCK 5 BALANCING PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of voltage deviation between high voltage battery cells. Judge as NG when the deviation of high voltage battery block voltage is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and
	< 17 V

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N	> 1.2 V
N=4	
NOTE:	
This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 5.	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=4	≤ 1.2 V
NOTE: This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 5.	
EE:DTC P1C4A HYBRID BATTERY BLOCK 6 BALANCING PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the abnormality of voltage deviation between high voltage battery cells. Judge as NG when the deviation of high voltage battery block voltage is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	$\geq 6.5 \text{ V}$
	and
	< 17 V

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N	> 1.2 V
N=3	
NOTE:	
This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 6.	

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnostic value = (Adjusted average module voltage – Min. module voltage) x N N=3	≤ 1.2 V
NOTE: This DTC will be stored only if the "Min. module voltage" equal to the average module voltage of Block 6.	

EF:DTC P1C5E HYBRID BATTERY BLOCK VOLTAGE TOO LOW

1. OUTLINE OF DIAGNOSIS

Detect high voltage battery block voltage low. Judge as NG when the high voltage battery block voltage is less than specified value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition state	Run or crank
12V battery system voltage	\geq 6.5 V
	and ≤ 17 V
HPCM contactor request	Open
BECM precharge contactor command	Open
BECM positive contactor command	Open
BECM negative contactor command	Open

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Minimum average module voltage of block	< Map4

Map 4

Minimum Hybrid battery temperature (°C (°F))	40 (40)	-20 (-4)	-10 (14)	0 (32)	10 (50)	25 (77)	35 (95)	45 (113)	50 (122)
Minimum average module voltage of block (V)	4.485	4.365	4.340	4.320	4.290	4.230	4.195	4.170	4.170

Time Needed for Diagnosis: 0.1 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Minimum average module voltage of block	≥ Map4

EG:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

1. OUTLINE OF DIAGNOSIS

Detect the bus error of CAN channel 1. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	\geq 10.9 V
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value		
CAN bus condition	Bus off		

Time Needed for Diagnosis: 0.48 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

EH:DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF

1. OUTLINE OF DIAGNOSIS

Detect the bus error of CAN channel 2. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value		
CAN bus condition	Bus off		

Time Needed for Diagnosis: 0.48 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

EI: DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF HYBRID POWERTRAIN CONTROL SYSTEM

1. OUTLINE OF DIAGNOSIS

Detect the CAN failure and bus error of HEV-CAN. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: Less than 0.48 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

Time Needed for Diagnosis: 0 seconds DRIVE MOTOR CONTROL SYSTEM

4. OUTLINE OF DIAGNOSIS

Detect the serial communication failure with inverter. Judge as NG when the data from inverter is not received correctly.

5. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: 12 V battery system voltage	≥ 10 V
Continuous time of a	≥ 1 s

6. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: Immediately Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

Time Needed for Diagnosis: Immediately BATTERY ENERGY CONTROL SYSTEM

7. OUTLINE OF DIAGNOSIS

Detect CAN bus off error.

8. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: (Ignition state	Run or crank
12 V battery system voltage)	\ge 9 V
	and
	\leq 17 V
Continuous time of a	≥1 s

9. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 0.2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Bus off

EJ:DTC U0100 LOST COMMUNICATION WITH ECM/PCM "A"

1. OUTLINE OF DIAGNOSIS

Detect the engine data not received. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	≠ Lost

EK:DTC U0101 LOST COMMUNICATION WITH TCM

1. OUTLINE OF DIAGNOSIS

Detect the transmission data not received. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from TCM	Lost

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	≠ Lost

EL:DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MOD-ULE "A"

HYBRID POWERTRAIN CONTROL SYSTEM

1. OUTLINE OF DIAGNOSIS

Detect the motor control module data not received.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from DMCM	Lost

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	≠ Lost

Time Needed for Diagnosis: 0 seconds BATTERY ENERGY CONTROL SYSTEM

4. OUTLINE OF DIAGNOSIS

Detect the malfunction of CAN data not received from drive motor control module.

5. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: (Ignition state	Run or crank
12 V battery system voltage)	\ge 9 V
	and
	\leq 17 V
Continuous time of a	≥1 s

6. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from DMCM	Lost

Time Needed for Diagnosis: 1 second Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Received

EM:DTC U0111 LOST COMMUNICATION WITH BATTERY ENERGY CONTROL MODULE

HYBRID POWERTRAIN CONTROL SYSTEM

1. OUTLINE OF DIAGNOSIS

Detect the battery energy control module data not received. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from BECM	Lost

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BECM	≠ Lost

Time Needed for Diagnosis: 0 seconds DRIVE MOTOR CONTROL SYSTEM

4. OUTLINE OF DIAGNOSIS

Detect the serial communication failure with inverter. Judge as NG when the data from inverter is not received correctly.

5. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: 12 V battery system voltage	\geq 10 V
Continuous time of a	≥ 1 s

6. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from BECM	Lost

Time Needed for Diagnosis: 0.5 seconds Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BECM	Received

EN:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

Detect the VDC data not received. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	≠ Lost

EO:DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM "A"

1. OUTLINE OF DIAGNOSIS

Detect the engine data error.

Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	Parity error
Diagnosis 2	
CAN data from ECM	Did not change

Time Needed for Diagnosis:

- Diagnosis 1: 0.15 s
- Diagnosis 2: 2.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	≠ Parity error
Diagnosis 2	
CAN data from ECM	≠ Did not change

EP:DTC U0402 INVALID DATA RECEIVED FROM TCM

1. OUTLINE OF DIAGNOSIS

Detect the transmission data error. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from TCM	Parity error
Diagnosis 2	
CAN data from TCM	Did not change

Time Needed for Diagnosis:

- Diagnosis 1: 0.15 s
- Diagnosis 2: 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from TCM	≠ Parity error
Diagnosis 2	
CAN data from TCM	≠ Did not change

EQ:DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"

HYBRID POWERTRAIN CONTROL SYSTEM

1. OUTLINE OF DIAGNOSIS

Detect the data error of drive motor control module. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from DMCM	Checksum error
Diagnosis 2	
CAN data from DMCM	Did not change

Time Needed for Diagnosis:

- Diagnosis 1: 0.3 s
- Diagnosis 2: 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from DMCM	∠ Checksum error
Diagnosis 2	
CAN data from DMCM	≠ Did not change

Time Needed for Diagnosis: 0 seconds BATTERY ENERGY CONTROL SYSTEM

4. OUTLINE OF DIAGNOSIS

Detect the CAN data stuck failure from drive motor control module.

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5. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
a: (Ignition state	Run or crank
12 V battery system voltage)	\geq 9 V
	and ≤ 17 V
Continuous time of a	≥ 1 s
Diagnosis 2	
a: (Ignition state	Run or crank
12 V battery system voltage)	\ge 9 V
	and ≤ 17 V
Continuous time of a	≥ 1 s
CAN data from DMCM	Changed

6. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from DMCM	Did not change
Diagnosis 2	
CAN data from DMCM	Checksum error

Time Needed for Diagnosis:

- Diagnosis 1: 0.5 s
- Diagnosis 2: 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from DMCM	change
Diagnosis 2	
CAN data from DMCM	≠ Checksum error

ER:DTC U0412 INVALID DATA RECEIVED FROM BATTERY ENERGY CON-TROL MODULE

HYBRID POWERTRAIN CONTROL SYSTEM

1. OUTLINE OF DIAGNOSIS

Detect the data error of battery energy control module. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from BECM	Checksum error
Diagnosis 2	
CAN data from BECM	Did not change

Time Needed for Diagnosis:

- Diagnosis 1: 0.3 s
- Diagnosis 2: 20 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from BECM	∠ Checksum error
Diagnosis 2	
CAN data from BECM	Changed

Time Needed for Diagnosis: 0 seconds DRIVE MOTOR CONTROL SYSTEM

4. OUTLINE OF DIAGNOSIS

Detect the communication error with battery energy control module. Judge as NG when the data from battery energy control module is not received correctly.

5. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
CAN data from BECM	Received
CAN data from BECM	≠ Checksum error
a: 12 V battery system voltage	\geq 10 V
Continuous time of a	≥ 1 s
Diagnosis 2	
CAN data from BECM	Received
a: 12 V battery system voltage	\geq 10 V
Continuous time of a	≥1 s

6. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from BECM	Did not change
Diagnosis 2	
CAN data from BECM	Checksum error

Time Needed for Diagnosis:

- Diagnosis 1: 0.6 s
- Diagnosis 2: 0.03 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from BECM	Changed
Diagnosis 2	
CAN data from BECM	≠ Checksum error

Time Needed for Diagnosis:

- Diagnosis 1: 2.2 s
- Diagnosis 2: 0.6 s

ES:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CON-TROL MODULE

1. OUTLINE OF DIAGNOSIS

Detect the VDC data error.

Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from Vehicle Dynamics Control Module	Parity error
Diagnosis 2	
CAN data from Vehicle Dynamics Control Module	Did not change

Time Needed for Diagnosis:

• Diagnosis 1: 0.06 s

• **Diagnosis 2:** 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from Vehicle Dynamics Control Module	≠ Parity error
Diagnosis 2	
CAN data from Vehicle Dynamics Control Module	≠ Did not change

ET:DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN

1. OUTLINE OF DIAGNOSIS

Detect the engine PU-CAN data not received. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥ 1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	≠ Lost

EU:DTC U1101 LOST COMMUNICATION WITH TCM PU-CAN

1. OUTLINE OF DIAGNOSIS

Detect the transmission PU-CAN data not received. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from TCM	Lost

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from TCM	≠ Lost

EV:DTC U1290 LOST COMMUNICATION WITH HYBRID POWERTRAIN CON-TROL MODULE HEV-CAN

DRIVE MOTOR CONTROL SYSTEM

1. OUTLINE OF DIAGNOSIS

Detect the communication error with hybrid powertrain control module. Judge as NG when the data from hybrid powertrain control module is not received correctly.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: 12 V battery system voltage	\geq 10 V
Continuous time of a	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from HPCM	Lost

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Received

Time Needed for Diagnosis: 2 seconds BATTERY ENERGY CONTROL SYSTEM

4. OUTLINE OF DIAGNOSIS

Detect the malfunction of CAN data not received from hybrid powertrain control module.

5. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: (Ignition state	Run or crank
12 V battery system voltage)	\ge 9 V
	and
	\leq 17 V
Continuous time of a	≥ 1 s

6. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
CAN data from HPCM	Lost

Time Needed for Diagnosis: 0.5 seconds Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Received

EW:DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN

1. OUTLINE OF DIAGNOSIS

Detect the engine PU-CAN data error. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	Checksum error
Diagnosis 2	
CAN data from ECM	Did not change

Time Needed for Diagnosis:

- Diagnosis 1: 0.03 s
- Diagnosis 2: 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	≠ Checksum error
Diagnosis 2	
CAN data from ECM	≠ Did not change

EX:DTC U1402 INVALID DATA RECEIVED FROM TCM PU-CAN

1. OUTLINE OF DIAGNOSIS

Detect the transmission PU-CAN data error. Judge as NG when the detection result is out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
a: Ignition state	Run or crank
b: 12 V battery system voltage	≥ 10.9
Elapsed time of a and b	≥1 s

3. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from TCM	Checksum error
Diagnosis 2	
CAN data from TCM	Did not change

Time Needed for Diagnosis:

- Diagnosis 1: 0.03 s
- Diagnosis 2: 0.5 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from TCM	≠ Checksum error
Diagnosis 2	
CAN data from TCM	≠ Did not change

EY:DTC U1591 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CON-TROL MODULE HEV-CAN

Drive motor control module

1. OUTLINE OF DIAGNOSIS

Detect the CAN communication error with hybrid powertrain control module. Judge as NG when the data from hybrid powertrain control module is not received correctly.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
CAN data from HPCM	Received
CAN data from HPCM	≠ Checksum error
a: 12 V battery system voltage	\geq 10 V
Continuous time of a	≥ 1 s
Diagnosis 2	
CAN data from HPCM	Received
a: 12 V battery system voltage	≥ 10 V
Continuous time of a	≥ 1 s

3. DIAGNOSTIC METHOD

Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from HPCM	Did not change
Diagnosis 2	
CAN data from HPCM	Checksum error

Time Needed for Diagnosis:

- Diagnosis 1: 0.6 s
- **Diagnosis 2:** 0.03 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	
Diagnosis 1		
CAN data from HPCM	Changed	
Diagnosis 2		
CAN data from HPCM	≠ Checksum error	

Time Needed for Diagnosis:

- Diagnosis 1: 2.2 s
- Diagnosis 2: 0.3 s

Battery energy control module

4. OUTLINE OF DIAGNOSIS

Detect the CAN data stuck failure from hybrid powertrain control module.

5. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions	
Diagnosis 1		
a: (Ignition state	Run or crank	
12 V battery system voltage)	\ge 9 V	
	and ≤ 17 V	
Continuous time of a	≥ 1 s	
Diagnosis 2		
a: (Ignition state	Run or crank	
12 V battery system voltage)	\geq 9 V	
	and \leq 17 V	
Continuous time of a	≥ 1 s	
CAN data from HPCM	Changed	

6. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG. **Judgment Value**

Malfunction Criteria	Threshold Value	
Diagnosis 1		
CAN data from HPCM	Did not change	
Diagnosis 2		
CAN data from HPCM	Checksum error	

Time Needed for Diagnosis:

- Diagnosis 1: 0.5 s
- Diagnosis 2: 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	
Diagnosis 1		
CAN data from HPCM	Changed	
Diagnosis 2		
CAN data from HPCM	≠ Checksum error	

Time Needed for Diagnosis:

- Diagnosis 1: 0.5 s
- Diagnosis 2: 0.5 s

PEDESTRIAN ALERT SYSTEM

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