ON-BOARD DIAGNOSIS SYSTEM [START STOP UNIT]

id091400111235

Outline

- The on-board diagnostic function consists of the following functions: A malfunction detection function, which detects overall malfunctions in the start stop unit-related parts; a memory function, which stores detected DTCs; a display function, which indicates malfunction locations and status via DTC output; and a PID/data monitoring function, which reads out specific input/output signals and verifies the input/output condition.
- Using the Mazda Modular Diagnostic System (M-MDS), DTCs can be read out and deleted, and the PID/data monitoring function can be activated.

Malfunction detection function

- Detects malfunctions in input/output signals.
- If a malfunction occurs, the start stop unit records the malfunction as a DTC. A recorded DTC can be read by the Mazda Modular Diagnostic System (M-MDS).

×: Applicable
—: Not applicable

DTC No.	KEY warning indicator light (red)	Push button indicator light (amber)	Description	Fail-safe function	Drive cycle	Self test type*1	Memory function
B1026:49*2	—	Flash	Steering lock malfunction	×	—	C	×
B1026:96*2	—	Flash	Steering lock malfunction	—	—	C	×
B108B:23	—	Flash	Push button start switch No.1 circuit malfunction	×	—	C	×
B108B:24	—	Flash	Push button start switch No.1 circuit malfunction	—	—	C	×
B108C:23	—	Flash	Push button start switch No.2 circuit malfunction	×	—	C	×
B108C:24	—	Flash	Push button start switch No.2 circuit malfunction	—	—	C	×
B10AC:13*3	—	—	Cruise control switch circuit malfunction	—	—	C	×
B10AC:23*3	—	—	Cruise control switch circuit malfunction	—	—	C	×
B10C6:1F*4	On	—	Keyless antenna (exterior, rear) circuit malfunction	×	—	C, D	×
B10C7:1F*4	On	—	Keyless antenna (interior, rear) circuit malfunction	×	—	C, D	×
B10C9:1F	On	—	Keyless antenna (interior, center) circuit malfunction (with keyless entry system)	—	—	C, D	×
	On	—	Keyless antenna (interior, front) circuit malfunction (with advanced keyless entry system)	×	—	C, D	×
B10D1:23*4	On	—	Request switch (LF) circuit malfunction	—	—	C	×
B10D3:23*4	On	—	Request switch (RF) circuit malfunction	—	—	C	×
B10D9:87	—	Flash	Communication error with coil antenna (built into push button start)	—	—	C	—
B10DA:51	—	—	Communication error with PCM (data send failure)	—	—	C	—
B10DA:62	—	—	Communication error with PCM (data mis-matched)	—	—	C	—
B10E7:11	—	Flash	IG1 relay circuit malfunction	—	—	C	×
B10E7:12	—	Flash	IG1 relay circuit malfunction	—	—	C	×
B10E7:16	—	Flash	IG1 relay circuit malfunction	—	—	C	×
B10E7:17	—	Flash	IG1 relay circuit malfunction	×	—	C	×
B112A:11	—	Flash	IG2 relay circuit malfunction	—	—	C	×
B112A:12	—	Flash	IG2 relay circuit malfunction	—	—	C	×

DTC No.	KEY warning indicator light (red)	Push button indicator light (amber)	Description	Fail-safe function	Drive cycle	Self test type*1	Memory function
B1140:29*5	—	—	i-stop control error signal received	—	—	C	×
B11C4:23*4	On	—	Request switch (liftgate) circuit malfunction	—	—	C	×
B11FD:1F*4	On	—	Keyless antenna (exterior, LF) malfunction	×	—	C, D	×
B1210:1F*4	On	—	Keyless antenna (outside vehicle, RF) malfunction	×	—	C, D	×
B124C:56	—	—	Turn switch circuit malfunction	—	—	C	×
B13C3:04*4	On	—	LF control unit internal malfunction	×	—	C	×
B13C3:09*4	On	—	LF control unit malfunction	×	—	C	×
B13C3:16*4	On	—	LF control unit power supply voltage (+B1) low input	×	—	C	×
B13C3:29*4	On	—	Communication error with LF control unit	×	—	C	×
B13D3:05	—	—	Key ID number program error	—	—	C	—
B13D3:16	On	—	Low remote transmitter battery voltage	—	—	C	×
B13D3:4A	On	—	Remote transmitter assembly malfunction	—	—	C	×
B13D3:51	—	Flash	Key code not programmed	—	—	C	—
B13D3:94	—	—	Communication error with remote transmitter	—	—	C	—
B13D3:97	—	—	Remote transmitter registration work not completed	—	—	C	×
B13D4:00	On	—	Insufficient key code programming number	—	—	C	—
B1C53:13	—	—	Windshield wiper switch circuit malfunction	—	—	C	×
C0040:23*7	—	Flash	Brake switch (No.1 signal) circuit malfunction	×	—	C	×
C0040:24*7	—	Flash	Brake switch (No.1 signal) circuit malfunction	×	—	C	×
C0051:95*6	—	—	Steering angle sensor assembly malfunction	—	—	C	×
C0051:2F*6	—	—	Steering angle sensor signal error	—	—	C	×
C0052:14*6	—	—	Steering angle sensor A signal circuit malfunction	—	—	C	×
C0052:2F*6	—	—	Steering angle sensor A signal malfunction	—	—	C	×
C0053:14*6	—	—	Steering angle sensor B signal circuit malfunction	—	—	C	×
C0053:2F*6	—	—	Steering angle sensor B signal malfunction	—	—	C	×
C2003:13*6	—	—	Open circuit in steering switch	—	—	C	×
P0560:16*2	—	Flash	Start stop unit power supply voltage (+B3) low input	—	—	C	×
P0615:11	—	Flash	Starter relay circuit malfunction	—	—	C	×
P0615:12	—	Flash	Starter relay circuit malfunction	×	—	C	×
P0615:13	—	Flash	Starter relay circuit malfunction	—	—	C	×
P0615:16	—	Flash	Starter relay circuit malfunction	—	—	C	×
P0616:23	—	—	Circuit malfunction on downstream side of starter relay	—	—	C	×
P0616:24	—	—	Circuit malfunction on downstream side of starter relay	—	—	C	×
P0616:29	—	—	Starter relay signal malfunction	—	—	C	×

DTC No.	KEY warning indicator light (red)	Push button indicator light (amber)	Description	Fail-safe function	Drive cycle	Self test type*1	Memory function
P081C:23*7	—	Flash	NOT P position switch circuit malfunction	×	—	C	×
P081C:24*7	—	Flash	NOT P position switch circuit malfunction	×	—	C	×
P081D:29*8	—	Flash	Neutral switch error signal received	×	—	C	×
P081D:2F*8	—	Flash	Neutral switch signal mismatch	×	—	C	×
P0830:23*8	—	Flash	CPP switch circuit malfunction	×	—	C	×
P0850:23*7	—	Flash	TCM circuit malfunction	×	—	C	×
P0850:24*7	—	Flash	TCM circuit malfunction	×	—	C	×
P0930:71*7	—	—	Shift-lock solenoid circuit malfunction	×	—	C	×
P1708:24*8	—	Flash	Starter interlock switch circuit malfunction	×	—	C	×
P1708:29*8	—	Flash	Starter interlock switch circuit or CPP switch circuit malfunction	×	—	C	×
P1794:16	—	Flash	Start stop unit power supply voltage (+B2) low input	—	—	C	×
U0001:88	On	Flash	Module communication error (HS-CAN)	×	—	C	×
U0028:87	On	—	Communication error with rear body control module (RBCM)	—	—	C	×
U0100:00	On	Flash	Communication error with PCM	×	—	C	×
U0100:87	—	—	Communication error with PCM (no response)	—	—	C	—
U0101:00*7	—	Flash	Communication error with TCM	×	—	C	×
U0121:00	On	Flash	Communication error with DSC HU/CM	×	—	C	×
U0121:87	On	Flash	Communication error with DSC HU/CM	×	—	C	×
U0131:00	—	—	Communication error with EPS control module	×	—	C	×
U0140:00	—	—	Communication error with front body control module (FBCM)	×	—	C	×
U0146:00	On	Flash	Communication error with instrument cluster	—	—	C	×
U0151:00	On	Flash	Communication error with SAS control module	×	—	C	×
U0155:00	On	Flash	Communication error with instrument cluster	×	—	C	×
U0447:86	On	Flash	Error signal received from instrument cluster	—	—	C	×
U201F:11	On	—	Keyless receiver circuit malfunction	—	—	C	×
U201F:12	On	—	Keyless receiver circuit malfunction	—	—	C	×
U2100:00	On	—	Start stop unit configuration not completed	×	—	C	×
U2300:00	—	—	Configuration data not received from instrument cluster	×	—	C	×
U3000:01*6	—	—	Start stop unit internal malfunction	—	—	C	×
U3000:49	On	Flash	Start stop unit internal malfunction	×	—	C	×
U3000:96	On	Flash	Start stop unit malfunction	×	—	C	×
U3003:16	On	—	Start stop unit power supply voltage (+B1) low input	×	—	C	×
U3004:11	—	Flash	ACC relay circuit malfunction	—	—	C	×
U3004:12	—	Flash	ACC relay circuit malfunction	×	—	C	×
U3004:16	—	—	ACC relay circuit malfunction	—	—	C	×

DTC No.	KEY warning indicator light (red)	Push button indicator light (amber)	Description	Fail-safe function	Drive cycle	Self test type*1	Memory function
U3004:17	—	—	ACC relay circuit malfunction	×	—	C	×

*1 : C: CMDTC self test, D: ODDTC self test
*2 : With steering lock
*3 : With cruise control system
*4 : With advanced keyless entry system
*5 : With i-stop
*6 : With AFS (adaptive front lighting system), smart city brake support (SCBS), or park assist system
*7 : ATX
*8 : MTX

Snap shot data

- The data for all DTCs currently detected is stored.

Snap shot data table

—: Not applicable

Snapshot data item	Unit		Data contents	Data read/use method	Corresponding data monitor items
AAT	°C	°F	Ambient temperature	—	—
APP_STATUS	Accelerator Pedal Off/ Under20%/ Over20%/FAIL		Accelerator pedal position status	—	—
CFG_STATUS	Config Complete/Not Configured/ Config Error		Instrument cluster configuration status	—	—
ECT_STATUS	Under 0 degrees C/0 - Under 80 degrees C/Over 80 degrees C/ FAIL		Engine coolant temperature status	—	—
IC_VPWR	V		Instrument cluster power supply voltage	• The start stop unit constantly receives the power supply voltage value of the instrument cluster sent via CAN signal from the instrument cluster. • If a DTC is detected, the start stop unit records the power supply voltage of the instrument cluster when the DTC was detected, and it is displayed in the M-MDS.	VPWR*1

Snapshot data item	Unit		Data contents	Data read/use method	Corresponding data monitor items
IG-ON_TIMER	hh:mm:ss*2		Elapsed time since ignition was switched ON (engine off or on) **Note** • The instrument cluster records the elapsed time since the ignition was switched ON (engine off or on).	• The start stop unit constantly receives the elapsed time since the ignition was switched ON (engine off or on) sent via CAN signal from the instrument cluster. • If a DTC is detected, the start stop unit records the elapsed time since the ignition was switched ON (engine off or on) when the DTC was detected, and it is displayed in the M-MDS.	—
PWR_MODE_KEY	Key Out/Key Recently Out (Position 0)/ Accessory (Position 1)/ Post Ignition (Position 2)/ Ignition On (Position 2)/ Running (Position 2)/ Running - Starting		• Key Out: Ignition switched off • Key Recently Out (Position 0): Elapsed time **within 3 s** since ignition was switched off • Accessory (Position 1): Ignition is switched to ACC • Post Ignition (Position 2): Elapsed time **within 3 s** since ignition was switched ON (engine off or on) • Ignition On (Position 2): Ignition switched ON (engine off) • Running (Position 2): Ignition switched ON (engine on) • Running - Starting: Cranking condition	• The start stop unit constantly receives the ignition switch status sent via CAN signal from the instrument cluster. • If a DTC is detected, the start stop unit records the ignition switch status when the DTC was detected, and it is displayed in the M-MDS.	—
RPM_STATUS	Engine Stop/ Under1500rpm/ Over1500rpm/ FAIL		Engine speed status	• The start stop unit constantly receives the engine speed sent via CAN signal from the instrument cluster. • If a DTC is detected, the start stop unit records the engine speed when the DTC was detected, and it is displayed in the M-MDS.	TACHOMTR*1
SHIFT_STATUS	P/N/D/R/FAIL		Selector lever position status	• The start stop unit constantly receives the selector lever position sent via CAN signal from the instrument cluster. • If a DTC is detected, the start stop unit records the selector lever position when the DTC was detected, and it is displayed in the M-MDS.	—
TOTAL_DIST	km	Miles	Accumulated total traveled distance from completion of vehicle until start stop unit detects DTC (Odometer value in instrument cluster)	The total traveled distance from which the start stop unit detects DTCs to the present can be calculated by performing the following procedure. 1. Verify the odometer value in the instrument cluster. 2. Verify the snapshot data item TOTAL_DIST. 3. Subtract 2 from 1.	—

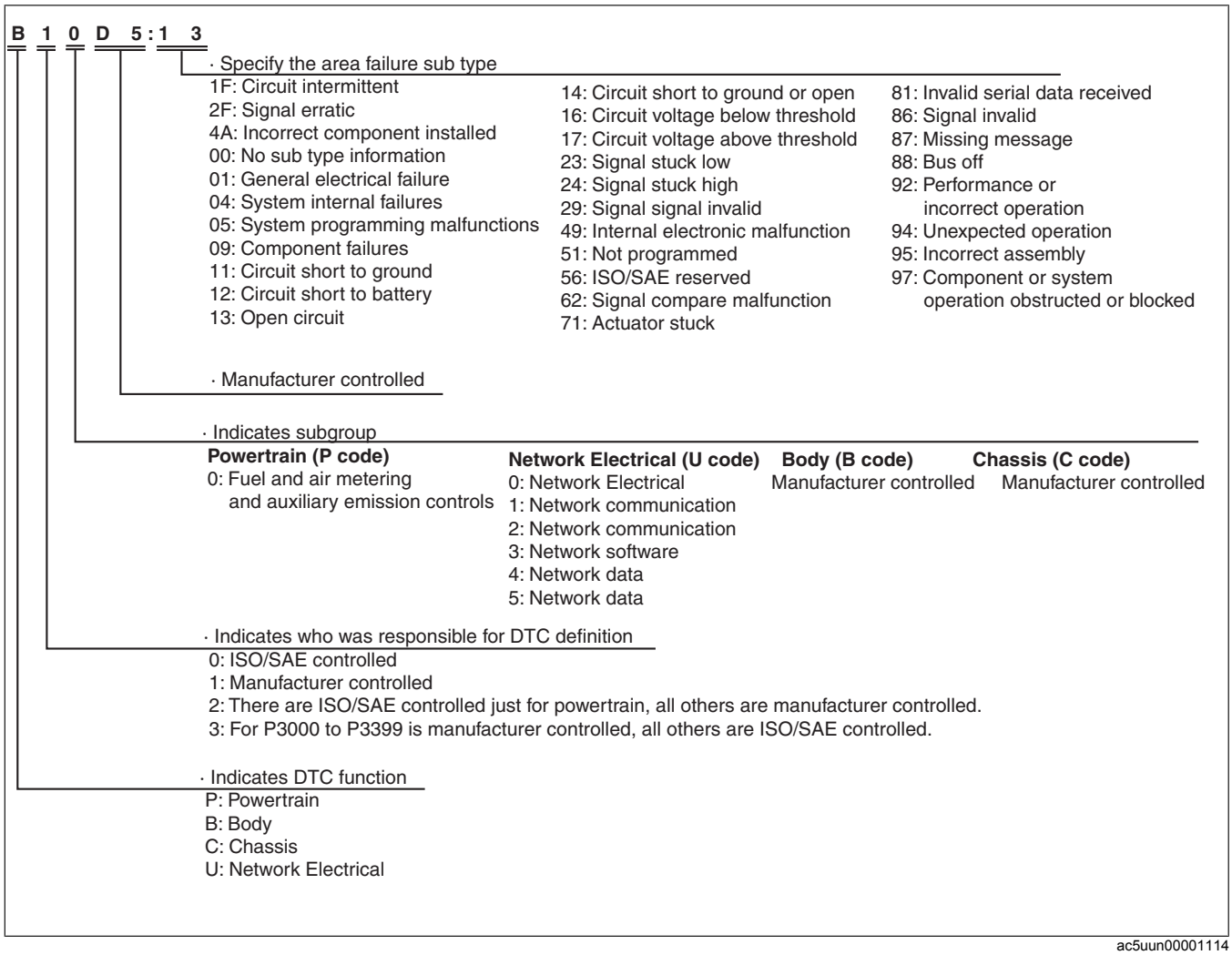
Snapshot data item	Unit	Data contents	Data read/use method	Corresponding data monitor items
TOTAL_TIME	hh:mm:ss*2	Accumulated total elapsed time since vehicle completion until start stop unit detects a DTC **Note** • When the ROOM fuse is removed, and the ignition is switched off, the time is not included in the elapsed time.	The elapsed time from which the start stop unit detects DTCs to the present can be calculated by performing the following procedure. 1. Verify the instrument cluster PID item TOTAL_TIME. 2. Verify the snapshot data item TOTAL_TIME. 3. Subtract 2 from 1.	TOTAL_TIME*1
TRNS_NUM_L	Initial/No.1/No.2/No.3/No.4/No.5/No.6	Registration number of the remote transmitter	If the start stop unit detects DTC B13D3:16 (Low remote transmitter battery voltage), inspect the remote transmitter in which the malfunction is occurring using the following procedure to display the registration number of the remote transmitter that was operated. 1. Verify the registration number of the remote transmitter in the snapshot data. 2. Display the start stop unit PID item RF_TRNS_NUM and inspect the battery voltage of the remote transmitter having the same registration number as the recorded remote transmitter registration number.	—
VPWR	V	Start stop unit power supply voltage	—	VPWR_B2
VPWR_B1	V	Start stop unit power supply voltage (ROOM fuse)	—	VPWR_B1
VSPD_STATUS	Stop/0-10km/h/Over10km/h/FAIL	Vehicle speed status	• The start stop unit constantly receives the vehicle speed sent via CAN signal from the instrument cluster. • If a DTC is detected, the start stop unit records the vehicle speed when the DTC was detected, and it is displayed in the M-MDS.	SPEEDOMTR*1

*1 : Instrument cluster PID (See ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER].)

*2 : The seconds may be indicated after the decimal point.

DTC 7-digit code definition

- When related systems or components have failed, the CM stores the DTC of the malfunctioning part in the CM memory, and allows for the retrieval of the store data using scanning tool when necessary. The DTCs are indicated using seven digits. Each digit indicates the following.



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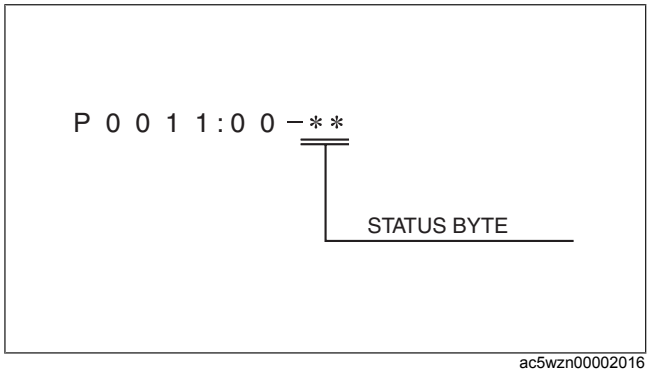
Status byte for DTC

- The status byte is the two digits (two digits after hyphen (-)) after the seven-digit DTC.
- The status byte is a code which indicates the pending code, current/past malfunction status, or warning illumination status.
- The status byte can be read by performing a CMDTC self-test using the Mazda Modular Diagnostic System (M-MDS).
- For details on the status byte, refer to the explanation on the M-MDS when reading the DTC.



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Detection condition for the applicable DTC

DTC	System malfunction location	Detection condition
B1026:49* 5	Steering lock malfunction	Start stop unit detects a serious malfunction in the steering lock of the internal start stop unit.
B1026:96* 5	Steering lock malfunction	Start stop unit detects malfunction in the steering lock of the internal start stop unit.
B108B:23	Push button start switch 1 circuit malfunction	Start stop unit detects push button start switch 1 ON stuck for 120 s or more.
B108B:24	Push button start switch 1 circuit malfunction	The start stop unit detects that push button start switch 1 is kept in an off condition 5 times or more even though push button start switch 2 is on.
B108C:23	Push button start switch 2 circuit malfunction	Start stop unit detects push button start switch 2 ON stuck for 120 s or more.

DTC	System malfunction location	Detection condition
B108C:24	Push button start switch 2 circuit malfunction	The start stop unit detects that push button start switch 2 is kept in an off condition 5 times or more even though push button start switch 1 is on.
B10AC:13*1	Cruise control switch circuit malfunction	The start stop unit detected an open circuit in the cruise control switch circuit for 5 s or more with the ignition switched ON (engine off or on).
B10AC:23*1	Cruise control switch circuit malfunction	The start stop unit detects any cruise control switch stuck on for 2 min or more with the ignition switched ON (engine off or on).
B10C9:1F	Keyless antenna (interior, center) circuit malfunction	The start stop unit detects an open circuit in the keyless antenna (interior, center) or a short to ground with the ignition switched off.
B10E7:11	IG1 relay circuit malfunction	The ignition is switched ON (engine off or on) and the starter stop unit detects voltage from IG1 relay output monitor as less than 2.5 V for 0.5 s or more while the engine is not being cranked.
B10E7:12	IG1 relay circuit malfunction	The start stop unit detects IG1 relay output monitor voltage of 2.5 V or more for 0.5 s or more with the ignition switched off or ACC.
B10E7:16	IG1 relay circuit malfunction	The ignition is switched ON (engine off or on) and the starter stop unit detects voltage from IG1 monitor as less than 2.5 V for 1 s or more while the engine is not being cranked.
B10E7:17	IG1 relay circuit malfunction	The start stop unit detects IG1 monitor voltage of 2.5 V or more for 1 s or more with the ignition switched off or ACC.
B112A:11	IG2 relay circuit malfunction	With the ignition switched ON (engine off or on), the start stop unit detects IG2 relay circuit voltage of 2.5 V or less for 0.5 s or more.
B112A:12	IG2 relay circuit malfunction	With the ignition switched off or to ACC, the start stop unit detects IG2 relay circuit voltage of 2.5 V or more for 0.5 s or more.
B1140:29*6	i-stop control error signal received	The starter ground circuit does not turn on even though the PCM detects an engine restart request while the engine is stopped under i-stop control, or the condition whereby an open circuit is detected for a continuous 12 s or more for a total of five times or more.
B124C:56	Turn switch circuit malfunction	The start stop unit detects that turn switches LH and RH are turned on simultaneously for 5 s or more.
B13D3:16	Low remote transmitter battery voltage	Start stop unit detects low remote transmitter battery voltage in any of the programmed transmitters 3 times continuously.
B13D3:4A	Remote transmitter assembly malfunction	The start stop unit detects a remote transmitter different from the one equipped to the vehicle.
B13D3:97	Remote transmitter registration work not completed	The start stop unit detects that the registration of a remote transmitter has not been completed.
B1C53:13	Windshield wiper switch circuit malfunction	The start stop unit detects an open circuit, short to ground, or short to power supply in the windshield wiper switch circuit for 5 s or more with the ignition switched ON (engine off or on).
C0040:23*3	Brake switch (No.1 signal) circuit malfunction	With the ignition switched ON (engine off or on), the start stop unit detects that the brake switch No.1 signal is in the off condition for 3 s or more continuously for a continuous 5 times even though brake switch No.2 signal changes.
C0040:24*3	Brake switch (No.1 signal) circuit malfunction	With the ignition switched ON (engine off or on), the start stop unit detects that the brake switch No.1 signal is in the on condition for 3 s or more continuously for a continuous 5 times even though brake switch No.2 signal changes.
C0051:2F*2	Steering angle sensor signal error	The start stop unit detects steering angle sensor signal error for 5 s or more with the ignition switched ON (engine off or on).
C0051:95*2	Steering angle sensor assembly malfunction	• The start stop unit receives the following signals with the ignition switched ON (engine off or on). — Steering angle sensor assembly malfunction from EPS control module for 1 s or more — Improper assembly of steering angle sensor at 360° — Steering wheel angle of 720 or more for 0.048 s or more

DTC	System malfunction location	Detection condition
C0052:14*2	Steering angle sensor A signal circuit malfunction	The start stop unit detects an open circuit or a short to ground in steering angle sensor A signal circuit for.
C0052:2F*2	Steering angle sensor A signal malfunction	• The start stop unit detected sudden change in steering angle sensor A signal. • The start stop unit detected that steering angle sensor A signal is stuck with the ignition switched ON (engine off or on).
C0053:14*2	Steering angle sensor B signal circuit malfunction	The start stop unit detects an open circuit or a short to ground in steering angle sensor B signal circuit.
C0053:2F*2	Steering angle sensor B signal malfunction	• The start stop unit detects sudden change in steering angle sensor B signal. • The start stop unit detects that steering angle sensor B signal is stuck with the ignition switched ON (engine off or on).
C2003:13	Open circuit in steering switch	The start stop unit detects an open circuit in the steering switch circuit for 5 s or more with the ignition switched ON (engine off or on).
P0560:16	Start stop unit power supply voltage (+B3) low input	Start stop unit power supply circuit (+B3) voltage of less than 8.5 V is detected for 5 s or more.
P0615:11	Starter relay circuit malfunction	The start stop unit detects starter relay monitor circuit voltage of less than 2.2 V for 1 s or more with the ignition switched off.
P0615:12	Starter relay circuit malfunction	The start stop unit detects starter relay circuit voltage of specification or more for 1 s or more with the ignition switched off.
P0615:13	Starter relay circuit malfunction	The start stop unit detects an open circuit in the starter relay circuit for 1 s or more with the ignition switched off.
P0615:16	Starter relay circuit malfunction	The start stop unit detects starter relay circuit voltage that is less than the specification for 1 s or more during cranking.
P0616:23	Circuit malfunction on downstream side of starter relay	The start stop unit detects a short to ground in the starter relay downstream circuit continuously for 0.5 s or more for a continuous 5 times.
P0616:24	Circuit malfunction on downstream side of starter relay	The start stop unit detects an open circuit in the starter relay downstream circuit continuously for 0.5 s or more for a continuous 5 times.
P0616:29	Starter relay signal malfunction	• If the following CAN signals are unmatched for 0.5 s or more continuously, and this condition is detected for a continuous 5 or more times. — Transaxle range sensor (ATX) or starter interlock switch (MTX) condition — Starter relay downstream circuit condition — PCM control result — CAN signal condition output from PCM
P081C:23*3	NOT P position switch circuit malfunction	The start stop unit detects NOT P position switch is stuck on for 5 s or more for a continuous 5 times with the ignition switched ON (engine off or on).
P081C:24*3	NOT P position switch circuit malfunction	The start stop unit detects NOT P position switch is stuck off for 5 s or more for a continuous 5 times with the ignition switched ON (engine off or on).
P081D:29*4	Neutral switch error signal received	The start stop unit receives neutral switch signal error signal from the PCM for 1 min or more with the ignition switched ON (engine off or on).
P081D:2F*4	Neutral switch signal mismatch	With the ignition switched ON (engine off or on), the start unit detects that the vehicle speed changes from 0 km/h {0 mph} to 10 km/h {6.2 mph} for a continuous 5 or more times even though the neutral signal from the PCM is being received.
P0830:23*4	CPP switch circuit malfunction	Start stop unit detects clutch switch is stuck on for 10 s or more.
P0850:23*3	TCM circuit malfunction	With the ignition switched ON (engine off or on), it is detected that the transaxle range sensor CAN signal is P or N position for 1 s or more continuously for a continuous 5 or more times even though the TCM CAN signal is other than P and N position.

DTC	System malfunction location	Detection condition
P0850:24* 3	TCM circuit malfunction	With the ignition switched ON (engine off or on), it is detected that the transaxle range sensor CAN signal is other than P and N position for 1 s or more continuously for a continuous 5 or more times even though the TCM CAN signal is other than P or N position.
P0930:71* 3	Shift-lock solenoid circuit malfunction	The start stop unit detects shift-lock solenoid is stuck on for 30 s or more with the ignition switched ON (engine off or on).
P1708:24* 4	Starter interlock switch circuit malfunction	The start stop unit detects an open circuit in the starter interlock switch circuit for 1 s or more for a continuous 5 times with the ignition switched ON (engine off or on).
P1708:29* 4	Starter interlock switch circuit or CPP switch circuit malfunction	The start stop unit detects that the start interlock switch circuit is stuck on for 0.2 s or more, or the CPP switch circuit is stuck off for 0.25 s or more.
P1794:16	Start stop unit power supply voltage (+B2) low input	Start stop unit power supply circuit (+B2) voltage of less than 6.5 V is detected for 5 s or more.
U0001:88	Module communication error (HS-CAN)	The start stop unit detects CAN bus communication line (HS-CAN) malfunction 10 times continuously.
U0028:87	Communication error with rear body control module (RBCM)	Start stop unit detects communication error with rear body control module (RBCM) 10 times continuously.
U0100:00	Communication error with PCM	The start stop unit could not receive CAN signal from the PCM for 1 s or more.
U0101:00* 3	Communication error with TCM	The start stop unit could not receive CAN signal from the TCM for 1 s or more.
U0121:00	Communication error with DSC HU/CM	The start stop unit could not receive CAN signal from the DSC HU/CM for 1 s or more.
U0121:87	Communication error with DSC HU/CM	The start stop unit could not receive CAN signal from the DSC HU/CM for 10 s or more.
U0131:00	Communication error with EPS control module	The start stop unit could not receive CAN signal from the EPS control module for 1.2 s or more.
U0140:00	Communication error with front body control module (FBCM)	The start stop unit could not receive CAN signal from the front body control module (FBCM) for 5 s or more.
U0146:00	Communication error with instrument cluster	The start stop unit cannot receive gateway signals from the instrument cluster for 5 s or more with the ignition switched ON (engine off or on).
U0151:00	SAS control module communication error	The start stop unit could not receive CAN signal from the SAS control module for 1 s or more.
U0155:00	Communication error with instrument cluster	The start stop unit could not receive CAN signal from the instrument cluster for 5 s or more.
U0447:86	Error signal received from instrument cluster	The start stop unit receives error signals from the instrument cluster for 5 s or more with the ignition switched ON (engine off or on).
U201F:11	Keyless receiver circuit malfunction	Start stop unit detects keyless receiver circuit voltage of less than 3.4 V for 0.5 s or more.
U201F:12	Keyless receiver circuit malfunction	Start stop unit detects keyless receiver circuit voltage of 6.2 V or more for 0.5 s or more.
U2100:00	Start stop unit configuration not completed	Start stop unit configuration not completed.
U2300:00	Configuration data not received from instrument cluster	The start stop unit cannot receive configuration data from the instrument cluster for 1 s or more with the ignition switched ON (engine off or on).
U3000:01* 2	Start stop unit internal malfunction	Malfunction inside start stop unit detected.
U3000:49	Start stop unit internal malfunction	Malfunction inside start stop unit detected.
U3000:96	Start stop unit internal malfunction	Malfunction inside start stop unit detected.
U3003:16	Start stop unit power supply voltage (+B1) low input	Start stop unit power supply circuit (+B1) voltage of 5V or more, less than 8.5 V is detected for 5 s or more.
U3004:11	ACC relay circuit malfunction	With the ignition switched to ACC or ON (engine off or on), the start stop unit detects ACC relay output monitor voltage of less than specification for 0.05 s or more.
U3004:12	ACC relay circuit malfunction	The start stop unit detects ACC relay output monitor voltage of 2.5 V or more for 0.5 s or more with the ignition switched off.

DTC	System malfunction location	Detection condition
U3004:16	ACC relay circuit malfunction	With the ignition switched to ACC or ON (engine off or on), the start stop unit detects ACC monitor voltage of less than 2.5 V for 1 s or more.
U3004:17	ACC relay circuit malfunction	The start stop unit detects ACC monitor voltage of 2.5 V or more for 5 s or more with the ignition switched off.

*1 : With cruise control system
*2 : With AFS (adaptive front lighting system), smart city brake support (SCBS), or park assist system
*3 : ATX
*4 : MTX
*5 : With steering lock
*6 : With i-stop

Data monitor function

- With the PID/data monitor function, input/output signal monitor items set in the start stop unit can be selected and read out in real-time.

PID	Unit/ Operation	Data contents	Data read/use method	Inspection item(s)
BRAKE_SW1*1	Off/On	• Off: Brake switched is off. • On: Brake switch is on.	—	Brake switch
CLUT_CUT_SW*2	Off/On	• Off: Starter interlock switch is off. • On: Starter interlock switch is on.	—	Starter interlock switch
CLUTCH_SW*2	Off/On	• Off: CPP switch is off. • On: CPP switch is on.	—	CPP switch
COMM_ST_TSP	Off/On	Displays operation condition of the immobilizer system key code read function • Off: Key code read function not performed • On: Code read function is performed and coil antenna reads key code from remote transmitter transponder.	Key code reading function of immobilizer system is performed and when a brake switch, clutch switch, or push button start signal is input, the coil antenna reads the key code from the transponder of the remote transmitter, and displays On while the key code is being sent to the start stop unit.	Start stop unit
CRU_CON_SW*3	Not_Pressed/On/Off/ Cancel/ Resume/ Fault/Set (+)/Set (-)	• Not_Pressed: Each switch of cruise control switch is not pressed. • On: Cruise ON switch is pressed. • Off: Cruise OFF switch is pressed. • Cancel: CANCEL switch is pressed. • Resume: RESUME switch is pressed. • Fault: Cruise control switch has a malfunction. • Set (+): SET (+) switch is pressed. • Set (-): SET (-) switch is pressed.	—	Cruise control switch
ES_UL_SW	Not_Unlock/ Unlock	• Not_Unlock: Steering lock unlock switch is off. • Unlock: Steering lock unlock switch is on.	—	Start stop unit
ES_UL_SW_M	Not_Unlock/ Unlock	• Not_Unlock: Memory value of steering lock unlock switch is not unlocked. • Unlock: Memory value of steering lock unlock switch is unlocked.	—	Start stop unit
ES_ULL_SW	Off/On	• Not_Unlock: Steering lock unlock/lock switch is off. • Unlock: Steering lock unlock/lock switch is on.	—	Start stop unit
ES_ULL_SW_M	Off/On	• Not_Unlock: Memory value of steering lock unlock/lock switch is not unlocked. • Unlock: Memory value of steering lock unlock/lock switch is unlocked.	—	Start stop unit

PID	Unit/ Operation	Data contents	Data read/use method	Inspection item(s)
F_FOG_SW	Off/On	• Off: Fog light switch is not in F.FOG position. • On: Fog light switch is in F.FOG position.	—	Front fog light switch
H/L_SW_HI	Off/On	• Off: Light switch is not in HI position. • On: Light switch is in HI position.	—	Light switch
H/L_SW_LOW	Off/On	Displays dimmer switch position of the light switch that is being input to the start stop unit • Off: Dimmer switch of light switch is not in LO position • On: Dimmer switch of light switch is in LO position	Verify if the monitor value switches when the dimmer switch of the light switch is switched between LO and HI positions. If the dimmer switch operation and monitor values do not match, inspect the light switch.	Light switch
H/L_SW_OFF	Off/On	• Off: Light switch is not in OFF position. • On: Light switch is in OFF position.	—	Light switch
H/L_SW_PASS	Off/On	• Off: Light switch is not in passing position. • On: Light switch is in passing position.	—	Light switch
H/L_SW_TNS	Off/On	• Off: Light switch is not in TNS position. • On: Light switch in TNS position.	—	Light switch
HAZARD_SW	Off/On	• Off: Hazard warning switch is off. • On: Hazard warning switch is on.	—	Hazard warning switch
IG_POSITION	OFF/ACC/ ON/CRANK	Displays power status controlled by the start stop unit • OFF: Start stop unit controls ignition switch off • ACC: Start stop unit controls ignition switch ACC • ON: Start stop unit controls ignition switch ON (engine off) • CRANK: Start stop unit controls cranking at ignition switch ON	• When the push button start is operated, the start stop unit performs power source switching and displays the PID value of the power source position in which control was performed. • If the push button start operation and PID value do not match, and a power source status of another unit differs from the PID value, inspect the input power source of the other unit because the power source control of the start stop unit is normal.	Ignition switch
INFO_SW	Off/ SW1_On/ SW2_On/ SW3_On/ Unknown/ Invalid	• Off: Steering switch UP/DOWN/INFO switch is not pressed. • SW1_On: UP switch is pressed. • SW2_On: DOWN switch is pressed. • SW3_On: INFO switch is pressed. • Unknown: Steering switch UP/DOWN/INFO switch signal is not determined. • Invalid: Steering switch malfunction is received.	Displays INFO switch position of steering switch input to start stop unit. Steering switch signal is input to start stop unit via clock spring.	Steering switch
INHIBIT_SW*1	Off/On	• Off: Selector lever is not in P and N positions. • On: Selector lever is in P or N position.	—	Transaxle range sensor
LG/T_LK_SW*5	Off/On	• Off: Request switch (liftgate) is off. • On: Request switch (liftgate) is on.	—	Request switch (liftgate)
LG/T_UNL_SW	Off/On	• Off: Liftgate opener switch is off. • On: Liftgate opener switch is on.	—	Liftgate opener switch
LL_SW_D_LK	Off/On	• Off: Front door lock-link switch (driver's side) is in unlock. • On: Front door lock-link switch (driver's side) is in lock.	—	Front door lock-link switch (driver's door)
NUM_TRNSMIT	—	Displays the number of the remote transmitters programmed to the start stop unit.	—	Start stop unit

PID	Unit/ Operation	Data contents	Data read/use method	Inspection item(s)
P_RANGE_SW*1	Off/On	• Off: NOT P position switch is off. • On: NOT P position switch is on.	—	NOT P position switch
R_FOG_SW	Off/On	• Off: Fog light switch is not in R.FOG position. • On: Fog light switch is in R.FOG position.	—	Rear fog light switch
RELAY_ACC	Off/On	• Off: ACC relay drive is off. • On: ACC relay drive is on.	—	ACC relay
RELAY_IG1	Off/On	• Off: IG1 relay drive is off. • On: IG1 relay drive is on.	—	IG1 relay
RELAY_IG2	Off/On	• Off: IG2 relay drive is off. • On: IG2 relay drive is on.	—	Front body control module (FBCM)
RF_RECEP_ST	Initial/ Transmitter/ RF_Response	Displays radio reception status from the remote transmitter • Initial: Signal from remote transmitter is not received by start stop unit • Transmitter: Signal by button operation on remote transmitter is received by start stop unit • RF_Response: During remote transmitter authorization, response signal from remote transmitter is received by start stop unit	When verifying the PID value while operating the remote transmitter buttons, if “Transmitter” is displayed it can be determined that the transmission between the remote transmitter, keyless receiver, and start stop unit is normal.	Keyless receiver
RF_TRNS_NUM	Initia/No.1/ No.2/No.3/ No.4/No.5/ No.6	When pressing the unlock button of the remote transmitter, the registration number of the remote transmitter sending radio waves to the start stop unit is displayed. • Initial: Registration number of remote transmitter cannot be received • No.1: Registration number No.1 remote transmitter is received • No.2: Registration number No.2 remote transmitter is received • No.3: Registration number No.3 remote transmitter is received • No.4: Registration number No.4 remote transmitter is received • No.5: Registration number No.5 remote transmitter is received • No.6: Registration number No.6 remote transmitter is received	When DTC B13D3:16 (Low remote transmitter battery voltage) is detected, the registration number of the remote transmitter in which the battery voltage has decreased is displayed in the snapshot data item TRNS_NUM_L. Display the registration number of the remote transmitter using the PID, verify the remote transmitter with the low battery voltage, and inspect the battery condition of the target remote transmitter.	Keyless receiver
RQ_SW_LF*4	Off/On	• Off: Request switch (LF) is off. • On: Request switch (LF) is on.	—	Request switch (LF)
RQ_SW_RF*4	Off/On	• Off: Request switch (RF) is off. • On: Request switch (RF) is on.	—	Request switch (RF)
SECURITY_I	Off/On	• Off: Security indicator light is turned off. • On: Security indicator light is illuminated.	—	Instrument cluster
SFT_LK_SOL*1	Off (Lock)/ On (Unlock)	• Off (Lock): Shift-lock is operated. • On (Unlock): Shift-lock is released.	—	Selector lever component
SSB_1	Off/On	• Off: Push button start switch 1 is off. • On: Push button start switch 1 is on.	—	Push button start
SSB_2	Off/On	• Off: Push button start switch 2 is off. • On: Push button start switch 2 is on.	—	Push button start
SSB_AMBER	Off/On	• Off: Push button start indicator light (amber) is turned off. • On: Push button start indicator light (amber) is illuminated.	—	Push button start
SSB_GREEN	Off/On	• Off: Push button start indicator light (green) is turned off. • On: Push button start indicator light (green) is illuminated.	—	Push button start
SSB_ILLMI	Off/On	• Off: START/STOP/ENGINE indicator light is turned off. • On: START/STOP/ENGINE indicator light is illuminated.	—	Push button start

PID	Unit/ Operation	Data contents	Data read/use method	Inspection item(s)
START_RLY_1	V	Voltage at start stop unit terminal 2V is displayed.	—	Starter relay
START_RLY_2	V	Voltage at start stop unit terminal 1D is displayed.	—	Starter relay
STR_A_ANG_A*5	° (deg)	Steering angle sensor A signal aiming angle is displayed.	—	Steering angle sensor
STR_A_ANG_B*5	° (deg)	Steering angle sensor B signal aiming angle is displayed.	—	Steering angle sensor
STR_AB_ANG*5	° (deg)	Displays steering angle signal (absolute angle) • Steering wheel in neutral position: Near **0 degrees** • Steering wheel turned to left: Changes from **0 degrees** to positive • Steering wheel turned to right: Changes from **0 degrees** to negative	—	Steering angle sensor
STR_ANG_S*5	Without/ With	• Without: Steering angle sensor is not equipped. • With: Steering angle sensor is equipped.	—	Steering angle sensor
STR_ANG_S_A*5	V	Voltage at the steering angle sensor A signal is displayed.	—	Steering angle sensor
STR_ANG_S_B*5	V	Voltage at the steering angle sensor B signal is displayed.	—	Steering angle sensor
STR_ANG_S_V*5	V	Steering angle sensor power supply voltage is displayed.	—	Steering angle sensor
TURN_SW_L	Off/On	• Off: Turn switch is in position other tha.n LH. • On: Turn switch is in LH position	—	Turn Switch
TURN_SW_R	Off/On	• Off: Turn switch is in position other than RH. • On: Turn switch is in RH position.	—	Turn Switch
VPWR_ACC	V	Displays ACC power supply voltage input to start stop unit	If there is a malfunction in the ACC power supply voltage input to the start stop unit, the keyless entry system and push button start system do not operate normally because PID item VPWR_ACC is used for ACC power on/off determination.	• Start stop unit • ACC relay • Battery
VPWR_B1	V	Displays B+ power supply (ROOM fuse) voltage input to start stop unit	If there is a malfunction in the B+ power supply (ROOM fuse) voltage input to the start stop unit, the keyless entry system does not operate normally because PID item VPWR_B1 is used for determining whether or not there is a ROOM fuse inserted.	• Start stop unit • Battery
VPWR_B2	V	Displays B+ power supply (AT fuse) voltage input to start stop unit	When the ROOM fuse is removed, the B+ power supply (AT fuse) is the start stop unit power supply. If there is a malfunction in the B + power supply (AT fuse) voltage input to the start stop unit when the ROOM fuse is removed, the push button start system does not operate normally.	• Start stop unit • Battery
VPWR_B3	V	Voltage at start stop unit terminal 2X (+B3 power supply) is displayed.	—	• Start stop unit • Battery

PID	Unit/ Operation	Data contents	Data read/use method	Inspection item(s)
VPWR_IG1	V	Displays IG1 power supply voltage input to start stop unit	If there is a malfunction in the IG1 power supply voltage input to the start stop unit, the keyless entry system and the push button start system do not operate normally because PID item VPWR_IG1 is used for IG1 power on/off determination.	• Start stop unit • IG1 relay • Battery
WASHER_F	Off/On	• Off: Windshield washer switch is in OFF position. • On: Windshield washer switch is in ON position.	—	Windshield washer switch
WASHER_R	Off/On	• Off: Rear washer switch is not in ON position. • On: Rear washer switch is in ON position.	—	Rear washer switch
WIP_F_INT	Off/On	• Off: Windshield wiper switch is not in INT and AUTO positions. • On: Windshield wiper switch is in INT or AUTO position.	—	Windshield wiper switch
WIP_F_LOW	Off/On	• Off: Windshield wiper switch is not in LO position. • On: Windshield wiper switch is in LO position.	—	Windshield wiper switch
WIP_INT_E_A	Low/High	• Low: Windshield wiper switch INT encoder A value is low. • High: Windshield wiper switch INT encoder A value is high.	—	Windshield wiper and washer switch
WIP_INT_E_B	Low/High	• Low: Windshield wiper switch INT encoder B value is low. • High: Windshield wiper switch INT encoder B value is high.	—	Windshield wiper and washer switch
WIP_INT_E_C	Low/High	• Low: Windshield wiper switch INT encoder C value is low. • High: Windshield wiper switch INT encoder C value is high.	—	Windshield wiper and washer switch
WIP_R_INT	Off/On	• Off: Rear wiper switch is not in INT position. • On: Rear wiper switch is in INT position.	—	Rear wiper switch
WIP_R_ON	Off/On	• Off: Rear wiper switch is not in ON position. • On: Rear wiper switch is in ON position.	—	Rear wiper switch

*1 : ATX
*2 : MTX
*3 : With cruise control system
*4 : With advanced keyless entry system
*5 : With AFS (adaptive front lighting system), smart city brake support (SCBS), or park assist system