ON-BOARD DIAGNOSTIC [BLIND SPOT MONITORING (BSM) SYSTEM]

id092200021846

Outline

- The on-board diagnostic function consists of the following functions: a malfunction detection function, which detects overall malfunctions in the BSM control module-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 BSM control module (RH) records the malfunction as a DTC. A recorded DTC can be read by the Mazda Modular Diagnostic System (M-MDS).

DTC table

BSM control module (LH)

×: Applicable
—: Not applicable

DTC No.	BSM OFF indicator light	Description	Fail-safe function	Drive cycle	Self test type*1	Memory function
B118C:11	Flash	BSM indicator light (LH) circuit malfunction	×	—	C, D	×
B118C:15	Flash	BSM indicator light (LH) circuit malfunction	×	—	C, D	×
U0001:88	Flash	Module communication error (HS-CAN)	×	—	C	×
U0100:00	Flash	Communication error with PCM	×	—	C	×
U0131:00	Flash	Communication error with EPS control module	×	—	C	×
U0155:00	Flash	Communication error with instrument cluster	×	—	C	×
U0214:00	Flash	Communication error with start stop unit	×	—	C	×
U0233:00	Flash	Communication error with BSM control module (RH)	×	—	C	×
U0401:68	Flash	Error signal received from PCM	×	—	C	×
U0420:68	Flash	Error signal received from EPS control module	×	—	C	×
U0423:68	Flash	Error signal received from instrument cluster	×	—	C	×
U0515:68	Flash	Error signal received from start stop unit	×	—	C	×
U0534:68	Flash	Error signal received from BSM control module (RH)	×	—	C	×
U3000:01	Flash	Electrical malfunction inside BSM control module	×	—	C, D	×
U3000:09	Flash	BSM control module internal malfunction	×	—	C, D	×
U3000:4A	—	BSM control module (LH) assembly malfunction	—	—	C	×
U3000:97	—	Radar performance malfunction	—	—	C	×
U3003:16	Flash	BSM control module (LH) low power supply voltage input	×	—	C, D	×
U3003:17	Flash	BSM control module (LH) high power supply voltage input	×	—	C, D	×

*1 : C: CMDTC self test, D:ODDTC self test

BSM Control Module (RH)

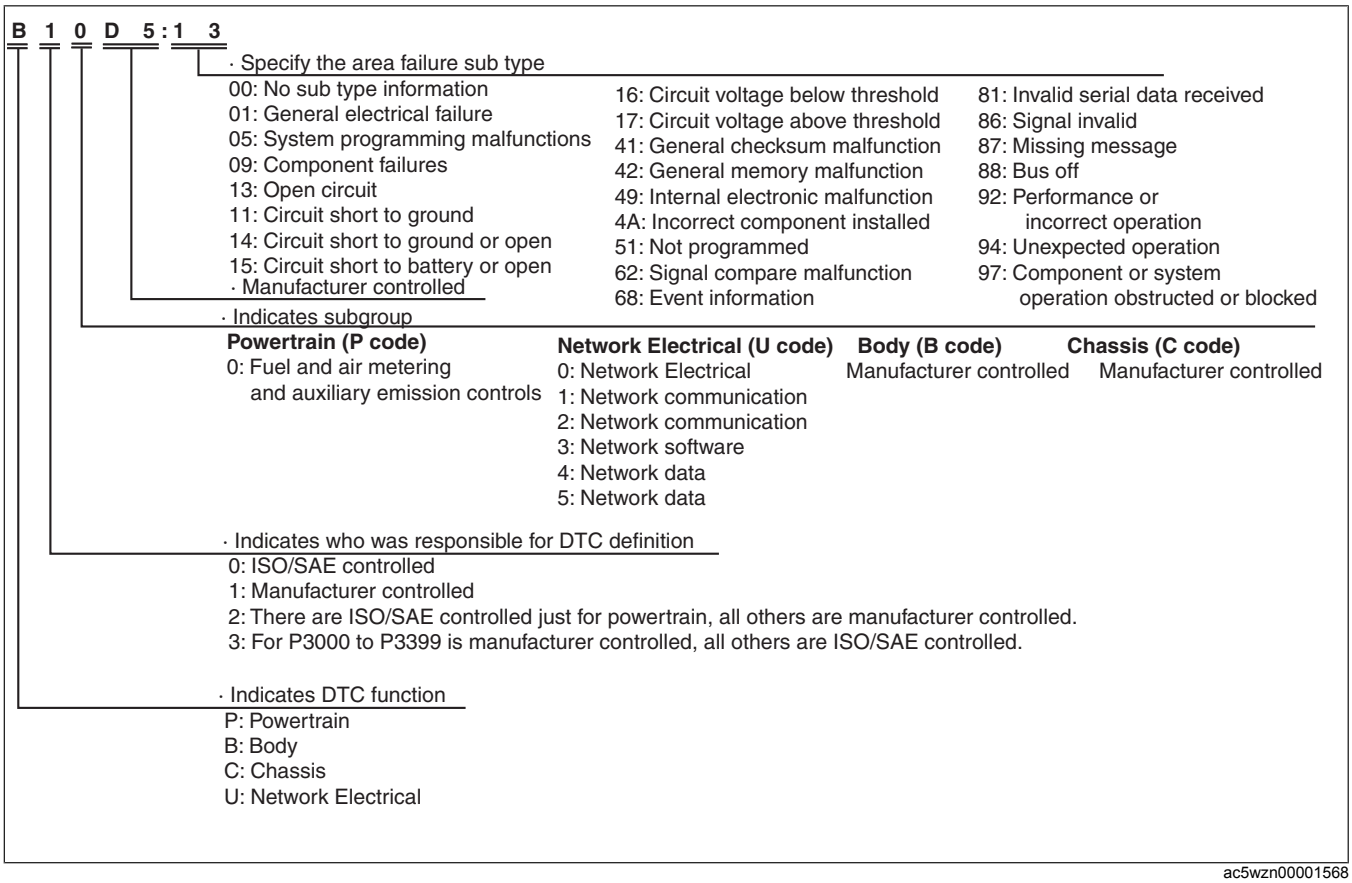
×: Applicable
—: Not applicable

DTC No.	BSM OFF indicator light	Description	Fail-safe function	Drive cycle	Self test type*1	Memory function
B118D:11	Flash	BSM indicator light (RH) circuit malfunction	×	—	C, D	×
B118D:15	Flash	BSM indicator light (RH) circuit malfunction	×	—	C, D	×
U0001:88	Flash	Module communication error (HS-CAN)	×	—	C	×
U0100:00	Flash	Communication error with PCM	×	—	C	×
U0131:00	Flash	Communication error with EPS control module	×	—	C	×
U0155:00	Flash	Communication error with instrument cluster	×	—	C	×
U0214:00	Flash	Communication error with start stop unit	×	—	C	×
U0232:00	Flash	Communication error with BSM control module (LH)	×	—	C	×
U0401:68	Flash	Error signal received from PCM	×	—	C	×
U0420:68	Flash	Error signal received from EPS control module	×	—	C	×
U0423:68	Flash	Error signal received from instrument cluster	×	—	C	×
U0515:68	Flash	Error signal received from start stop unit	×	—	C	×
U0533:68	Flash	Error signal received from BSM control module (LH)	×	—	C	×
U3000:01	Flash	Electrical problem inside BSM control module	×	—	C, D	×
U3000:09	Flash	BSM control module internal malfunction	×	—	C, D	×
U3000:4A	—	BSM control module (RH) assembly malfunction	—	—	C	×
U3000:97	—	Radar performance malfunction	—	—	C	×
U3003:16	Flash	BSM control module (RH) low power supply voltage input	×	—	C, D	×
U3003:17	Flash	BSM control module (RH) high power supply voltage input	×	—	C, D	×

*1 : C: CMDTC self test, D:ODDTC self test

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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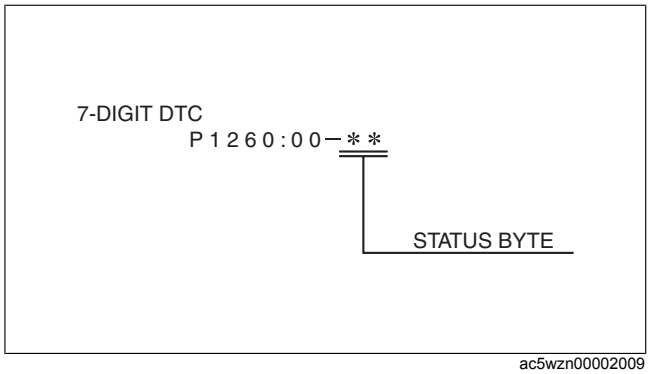
Status byte for DTC

- The status byte is the two digits (two digits after hyphen (-)) after the 7-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 Mazda Modular Diagnostic System (M-MDS) when reading the DTC.



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Detection condition for the applicable DTC

BSM control module (LH)

DTC No.	System malfunction location	Detection condition
B118C:11	BSM indicator light (LH) circuit malfunction	While the BSM indicator light (LH) is operated, the BSM control module (LH) monitors the BSM indicator light (LH) load voltage. Increase in the monitored BSM indicator light (LH) load voltage is the specified value or more, and the BSM control module (LH) determined that there is a short to ground in the BSM indicator light (LH) circuit.
B118C:15	BSM indicator light (LH) circuit malfunction	While the BSM indicator light (LH) is operated, the BSM control module (LH) monitors the BSM indicator light (LH) load voltage. Decrease in the BSM indicator light (LH) load voltage is the specified value or less, and the BSM control module (LH) determined that there is a short to power supply or an open circuit in the BSM indicator light (LH) circuit.
U0001:88	Module communication error (HS-CAN)	The BSM control module detected a CAN bus communication line (HS-CAN) malfunction.
U0100:00	Communication error with PCM	The BSM control module could not receive a CAN signal from the PCM.

DTC No.	System malfunction location	Detection condition
U0131:00	Communication error with EPS control module	The BSM control module could not receive a CAN signal from the EPS control module.
U0155:00	Communication error with instrument cluster	The BSM control module could not receive a CAN signal from the instrument cluster.
U0214:00	Communication error with start stop unit	The BSM control module could not receive a CAN signal from the start stop unit.
U0233:00	Communication error with BSM control module (RH)	The BSM control module (LH) could not receive a CAN signal from the BSM control module (RH).
U0401:68	Error signal received from PCM	The BSM control module received an error signal from the PCM.
U0420:68	Error signal received from EPS control module	The BSM control module received an error signal from the EPS control module.
U0423:68	Error signal received from instrument cluster	The BSM control module received an error signal from the instrument cluster.
U0515:68	Error signal received from start stop unit	The BSM control module received an error signal from the start stop unit.
U0534:68	Error signal received from BSM control module (RH)	The BSM control module (LH) received an error signal from the BSM control module (RH).
U3000:01	Electrical malfunction inside BSM control module	An electrical malfunction inside BSM control module is detected.
U3000:09	BSM control module internal malfunction	The BSM control module detected a malfunction inside the voltage control oscillator.
U3000:4A	BSM control module assembly malfunction	The left and right BSM control modules are installed in reverse, or an open circuit is detected in the BSM control module circuit.
U3000:97	Radar performance malfunction	• BSM control module internal radar sensor sensitivity is decreased. • BSM control module internal radar sensor axis is deviated.
U3003:16	BSM control module low power supply voltage input (less than 9 V)	BSM control module power supply voltage of less than 9 V is detected for 10 s or more.
U3003:17	BSM control module high power supply voltage input (16 V or more)	BSM control module power supply voltage of 16 V or more is detected for 10 s or more.

BSM Control Module (RH)

DTC No.	System malfunction location	Detection condition
B118D:11	BSM indicator light (RH) circuit malfunction	While the BSM indicator light (RH) is operated, the BSM control module (RH) monitors the BSM indicator light (RH) load voltage. Increase in the monitored BSM indicator light (RH) load voltage is the specified value or more, and the BSM control module (RH) determined that there is a short to ground in the BSM indicator light (RH) circuit.
B118D:15	BSM indicator light (RH) circuit malfunction	While the BSM indicator light (RH) is operated, the BSM control module (RH) monitors the BSM indicator light (RH) load voltage. Decrease in the BSM indicator light (RH) load voltage is the specified value or less, and the BSM control module (RH) determined that there is a short to power supply or an open circuit in the BSM indicator light (RH) circuit.
U0001:88	Module communication error (HS-CAN)	The BSM control module detected a CAN bus communication line (HS-CAN) malfunction.
U0100:00	Communication error with PCM	The BSM control module could not receive a CAN signal from the PCM.
U0131:00	Communication error with EPS control module	The BSM control module could not receive a CAN signal from the EPS control module.
U0155:00	Communication error with instrument cluster	The BSM control module could not receive a CAN signal from the instrument cluster.
U0214:00	Communication error with start stop unit	The BSM control module could not receive a CAN signal from the start stop unit.

DTC No.	System malfunction location	Detection condition
U0232:00	Communication error with BSM control module (LH)	The BSM control module (RH) could not receive a CAN signal from the BSM control module (LH).
U0401:68	Error signal received from PCM	The BSM control module received an error signal from the PCM.
U0420:68	Error signal received from EPS control module	The BSM control module received an error signal from the EPS control module.
U0423:68	Error signal received from instrument cluster	The BSM control module received an error signal from the instrument cluster.
U0515:68	Error signal received from start stop unit	The BSM control module received an error signal from the start stop unit.
U0533:68	Error signal received from BSM control module (LH)	The BSM control module (RH) received an error signal from the BSM control module (LH).
U3000:01	Electrical malfunction inside BSM control module	An electrical malfunction inside BSM control module is detected.
U3000:09	BSM control module internal malfunction	The BSM control module detected a malfunction inside the voltage control oscillator.
U3000:4A	BSM control module assembly malfunction	The left and right BSM control modules are installed in reverse, or an open circuit is detected in the BSM control module circuit.
U3000:97	Radar performance malfunction	• BSM control module internal radar sensor sensitivity is decreased. • BSM control module internal radar sensor axis is deviated.
U3003:16	BSM control module low power supply voltage input (less than 9 V)	BSM control module power supply voltage of less than 9 V is detected for 10 s or more.
U3003:17	BSM control module high power supply voltage input (16 V or more)	BSM control module power supply voltage of 16 V or more is detected for 10 s or more.

Data Monitor Function

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

PID/data monitor table

BSM control module (LH)

—: Not applicable

PID name	Unit/Status	Data contents	Inspection item(s)
BSM_ST	On/Off	• On: BSM is operated • Off: BSM is not operated	BSM control module (LH)
DTC_CNT	—	Number of DTCs stored in the BSM control module (LH) is displayed.	BSM control module (LH)
SHIFT_R	Not_R/R	ATX: • Not_R: Selector lever is in position other than R • R: Selector lever is in R position MTX: • Not_R: Shift lever is in position other than reverse • R: Shift lever is in reverse position	ATX: • Selector lever MTX: • Shift lever

PID name	Unit/Status	Data contents	Inspection item(s)
SWA_POS	° (deg)	Displays steering angle signal (estimated 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	• Perform the DTC inspection for the PCM, DSC HU/CM, and EPS CM, and if any DTC is displayed, repair the malfunctioning part according to the applicable DTC troubleshooting. • After performing the DTC inspection, perform the following procedures: — Switch the ignition off, and after **2 min or more** have elapsed, switch the ignition ON (engine off or on). — Start the engine and drive the vehicle **10 m {33 ft} or more** in a straight line at a speed of **10 km/h {6.2 mph} or more**. — Stop the vehicle with the wheels in the straight-ahead position. — Verify the operation condition of STR_AB_ANG using the M-MDS. • If an abnormal value is indicated again, replace the EPS CM.
TURN_SW_L	On/Off	• On: Turn switch is in LH position • Off: Turn switch is in position other than LH	Turn switch
TURN_SW_R	On/Off	• On: Turn switch is in RH position • Off: Turn switch is in position other than RH	Turn switch
VPWR_IG1	V	BSM control module (LH) power supply voltage is displayed.	• BSM control module (LH) • IG1 relay • Battery
VSPD	KPH, MPH	Vehicle speed is displayed.	—
WRN_IND_L	Off/On	• Off: BSM indicator light (LH) is not illuminated • On: BSM indicator light (LH) is illuminated	BSM indicator light (LH)

BSM control module (RH)

—: Not applicable

PID name	Unit/Status	Data contents	Inspection item(s)
BSM_OFF_IL	On/Off	• On: BSM OFF indicator light is illuminated • Off: BSM OFF indicator light is not illuminated	• BSM OFF switch • Instrument cluster
BSM_ST	On/Off	• On: BSM is operated • Off: BSM is not operated	BSM control module (RH)
Buzzer	On/Off	• On: BSM buzzer is operated • Off: BSM buzzer is not operated	• BSM control module • Instrument cluster
DTC_CNT	—	Number of DTCs stored in the BSM control module (RH) is displayed.	BSM control module (RH)
SHIFT_R	Not_R/R	ATX: • Not_R: Selector lever is in position other than R • R: Selector lever is in R position MTX: • Not_R: Shift lever is in position other than reverse • R: Shift lever is in reverse position	ATX: • Selector lever MTX: • Shift lever

PID name	Unit/Status	Data contents	Inspection item(s)
SWA_POS	° (deg)	Displays steering angle signal (estimated 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	• Perform the DTC inspection for the PCM, DSC HU/CM, and EPS CM, and if any DTC is displayed, repair the malfunctioning part according to the applicable DTC troubleshooting. • After performing the DTC inspection, perform the following procedures: — Switch the ignition off, and after **2 min or more** have elapsed, switch the ignition ON (engine off or on). — Start the engine and drive the vehicle **10 m {33 ft} or more** in a straight line at a speed of **10 km/h {6.2 mph} or more**. — Stop the vehicle with the wheels in the straight-ahead position. — Verify the operation condition of STR_AB_ANG using the M-MDS. • If an abnormal value is indicated again, replace the EPS CM.
TURN_SW_L	On/Off	• On: Turn switch is in LH position • Off: Turn switch is in position other than LH	Turn switch
TURN_SW_R	On/Off	• On: Turn switch is in RH position • Off: Turn switch is in position other than RH	Turn switch
VPWR_IG1	V	BSM control module (RH) power supply voltage is displayed.	• BSM control module (RH) • IG1 relay • Battery
VSPD	KPH, MPH	Vehicle speed is displayed.	—
WRN_IND_L	Off/On	• Off: BSM indicator light (RH) is not illuminated • On: BSM indicator light (RH) is illuminated	BSM indicator light (RH)

Active Command Modes Function

- The active command modes are shown below.

BSM control module (LH)

Command name	Unit/ Operation	Data contents	Output part name
VSPD	OFF/ON	• OFF: Does not input vehicle speed. • ON: Inputs vehicle speed of 34 km/h {21 mph}.	BSM control module (LH)
WRN_IND_L	Off/On	• Off: Turns off BSM indicator light (LH). • On: Illuminates BSM indicator light (LH).	BSM indicator light (LH)

BSM control module (RH)

Command name	Unit/ Operation	Data contents	Output part name
BSM_OFF_IL	On/Off	• On: Illuminates BSM OFF indicator light. • On: Turns off BSM OFF indicator light.	BSM OFF indicator light (instrument cluster)
Buzzer	On/Off	• On: Operates BSM buzzer. • Off: Stops BSM buzzer.	BSM buzzer (instrument cluster)
VSPD	OFF/ON	• OFF: Does not input vehicle speed. • ON: Inputs vehicle speed of 34 km/h {21 mph}.	BSM control module (RH)
WRN_IND_L	Off/On	• Off: Turns off BSM indicator light (RH). • On: Illuminates BSM indicator light (RH).	BSM indicator light (RH)