ON-BOARD DIAGNOSTIC

id080200001500

Outline

- The air bag system has an on-board diagnostic function to facilitate the system diagnosis.
- The on-board diagnostic function consists of the following functions: a malfunction detection function, which detects overall malfunctions in the air bag system-related parts; a memory function, which stores detected DTCs; a display function, which indicates system malfunctions by DTC display; a PID/data monitoring function, which reads out specific input/output signals.
- Using the Mazda Modular Diagnostic System (M-MDS), DTCs can be read out and deleted, and the PID/data monitoring function can be activated.
- The system has a fail-safe function to prevent the accidental activation of the air bags in case of an air bag system malfunction.

Function

Self-diagnostic function

Malfunction detection function

- Detects overall malfunctions in the air bag system-related parts.

Memory function

- Stores malfunctions detected in the air bag system-related parts using the malfunction detection function, and the stored malfunction contents are not cleared even if the ignition is switched off or the negative battery cable is disconnected.

Display function

- When the malfunction detection function detects a malfunction, the air bag system warning light illuminates to advise the driver. Using the external tester communication function, DTCs can be output to the DLC-2 via the CAN.

X: Applicable
−: Not applicable

DTC				System malfunction location	Fail safe	Drive cycle	Self test type* 1	Memory function
Mazda Modular Diagnostic System (M-MDS) display	Air bag system warning light							
	Flashing pattern		Priority ranking					
B0001:11	19		15	Driver-side air bag module circuit short to body ground	—	—	C, D	×
B0001:12				Driver-side air bag module circuit short to power supply	—	—	C, D	×
B0001:13				Driver-side air bag module circuit open circuit or resistance high	—	—	C, D	×
B0001:19				Short circuit to driver-side air bag module and other air bag module circuits	—	—	C, D	×
B0001:1A				Driver-side air bag module circuit resistance low	—	—	C, D	×
B0001:55				Configuration setting error (driver-side air bag module structural malfunction)	—	—	C, D	×
B0003:53	—	Flashing	4	Operation (deployment) inhibited due to configuration setting	—	—	C, D	×

DTC				System malfunction location	Fail safe	Drive cycle	Self test type* 1	Memory function
Mazda Modular Diagnostic System (M-MDS) display	Air bag system warning light							
	Flashing pattern		Priority ranking					
B0010:11	21		14	Passenger-side air bag module circuit short to body ground	—	—	C, D	×
B0010:12				Passenger-side air bag module circuit short to power supply	—	—	C, D	×
B0010:13				Passenger-side air bag module circuit open circuit or resistance high	—	—	C, D	×
B0010:19				Short circuit to passenger-side air bag module and other air bag module circuits	—	—	C, D	×
B0010:1A				Passenger-side air bag module circuit resistance low	—	—	C, D	×
B0010:55				Configuration setting error (passenger-side air bag module structural malfunction)	—	—	C, D	×
B0094:11	42		9	Driver-side crash zone sensor circuit short to body ground	—	—	C, D	×
B0094:13				Driver-side crash zone sensor circuit open circuit or short to power supply	—	—	C, D	×
B0094:87				Signal reception error from driver-side crash zone sensor	—	—	C, D	×
B0094:96				Driver-side crash zone sensor internal malfunction	—	—	C, D	×
B0094:55				Configuration setting error (driver-side crash zone sensor structural malfunction)	—	—	C, D	×
B00D2:01	14		5	Air bag system warning light malfunction	—	—	C, D	×
B00D2:29				Invalid signal to air bag system warning light	—	—	C, D	×
B00D5:01	18		22	PAD OFF indicator circuit open circuit or short to power supply	—	—	C, D	×
B00D5:29				PAD OFF indicator communication error	—	—	C, D	×
B1011:95	58		7	SAS control module connectors are poorly connected	—	—	C, D	×

DTC				System malfunction location	Fail safe	Drive cycle	Self test type* 1	Memory function
Mazda Modular Diagnostic System (M-MDS) display	Air bag system warning light							
	Flashing pattern		Priority ranking					
B10FD:11	43		11	Driver-side side air bag sensor No.1 circuit short to power supply or body ground	—	—	C, D	×
B10FD:13				Driver-side side air bag sensor No.1 circuit open circuit or resistance high	—	—	C, D	×
B10FD:87				Signal reception error from driver-side side air bag sensor No.1	—	—	C, D	×
B10FD:96				Driver-side side air bag sensor No.1 internal malfunction	—	—	C, D	×
B10FD:55				Configuration setting error (driver-side side air bag sensor No.1 structural malfunction)	—	—	C, D	×
B10FE:11	44		10	Passenger-side side air bag sensor No.1 circuit short to power supply or body ground	—	—	C, D	×
B10FE:13				Passenger-side side air bag sensor No.1 circuit open circuit or resistance high	—	—	C, D	×
B10FE:87				Signal reception error from passenger-side side air bag sensor No.1	—	—	C, D	×
B10FE:96				Passenger-side side air bag sensor No.1 internal malfunction	—	—	C, D	×
B10FE:55				Configuration setting error (passenger-side side air bag sensor No.1 structural malfunction)	—	—	C, D	×

DTC				System malfunction location	Fail safe	Drive cycle	Self test type* 1	Memory function
Mazda Modular Diagnostic System (M-MDS) display	Air bag system warning light							
	Flashing pattern		Priority ranking					
B1126:11	22		19	Driver-side side air bag module circuit short to body ground	—	—	C, D	×
B1126:12				Driver-side side air bag module circuit short to power supply	—	—	C, D	×
B1126:13				Driver-side side air bag module circuit open circuit or resistance high	—	—	C, D	×
B1126:19				Short circuit to driver-side side air bag module and other air bag module circuits	—	—	C, D	×
B1126:1A				Driver-side side air bag module circuit resistance low	—	—	C, D	×
B1126:55				Configuration setting error (driver-side side air bag module structural malfunction)	—	—	C, D	×
B1127:11	23		18	Passenger-side side air bag module circuit short to body ground	—	—	C, D	×
B1127:12				Passenger-side side air bag module circuit short to power supply	—	—	C, D	×
B1127:13				Passenger-side side air bag module circuit open circuit or resistance high	—	—	C, D	×
B1127:19				Short circuit to passenger-side side air bag module and other air bag module circuits	—	—	C, D	×
B1127:1A				Passenger-side side air bag module circuit resistance low	—	—	C, D	×
B1127:55				Configuration setting error (passenger-side side air bag module structural malfunction)	—	—	C, D	×

DTC				System malfunction location	Fail safe	Drive cycle	Self test type* 1	Memory function
Mazda Modular Diagnostic System (M-MDS) display	Air bag system warning light							
	Flashing pattern		Priority ranking					
B1128:11	24		21	Driver-side curtain air bag module circuit short to body ground	—	—	C, D	×
B1128:12				Driver-side curtain air bag module circuit short to power supply	—	—	C, D	×
B1128:13				Driver-side curtain air bag module circuit open circuit or resistance high	—	—	C, D	×
B1128:19				Short circuit to driver-side curtain air bag module and other air bag module circuits	—	—	C, D	×
B1128:1A				Driver-side curtain air bag module circuit resistance low	—	—	C, D	×
B1128:55				Configuration setting error (driver-side curtain air bag module structural malfunction)	—	—	C, D	×
B1129:11	25		20	Passenger-side curtain air bag module circuit short to body ground	—	—	C, D	×
B1129:12				Passenger-side curtain air bag module circuit short to power supply	—	—	C, D	×
B1129:13				Passenger-side curtain air bag module circuit open circuit or resistance high	—	—	C, D	×
B1129:19				Short circuit to passenger-side curtain air bag module and other air bag module circuits	—	—	C, D	×
B1129:1A				Passenger-side curtain air bag module circuit resistance low	—	—	C, D	×
B1129:55				Configuration setting error (passenger-side curtain air bag module structural malfunction)	—	—	C, D	×
B1193:00	13		3	SAS control module operation (deployment)	—	—	C, D	×

DTC				System malfunction location	Fail safe	Drive cycle	Self test type* 1	Memory function
Mazda Modular Diagnostic System (M-MDS) display	Air bag system warning light							
	Flashing pattern		Priority ranking					
B1196:11	45		13	Driver-side side air bag sensor No.2 circuit short to body ground	—	—	C, D	×
B1196:13				Driver-side side air bag sensor No.2 circuit open circuit or short to power supply	—	—	C, D	×
B1196:87				Signal reception error from driver-side side air bag sensor No.2	—	—	C, D	×
B1196:96				Driver-side side air bag sensor No.2 internal malfunction	—	—	C, D	×
B1196:55				Configuration setting error (driver-side side air bag sensor No.2 structural malfunction)	—	—	C, D	×
B1197:11	46		12	Passenger-side side air bag sensor No.2 circuit short to body ground	—	—	C, D	×
B1197:13				Passenger-side side air bag sensor No.2 circuit open circuit or short to power supply	—	—	C, D	×
B1197:87				Signal reception error from passenger-side side air bag sensor No.2	—	—	C, D	×
B1197:96				Passenger-side side air bag sensor No.2 internal malfunction	—	—	C, D	×
B1197:55				Configuration setting error (passenger-side side air bag sensor No.2 structural malfunction)	—	—	C, D	×
B1202:01	18		22	PAD ON indicator circuit open circuit or short to power supply	—	—	C, D	×
B1206:00	—	—	—	SAS control module operation (deployment) (fuel cut signal output)	—	—	C, D	×

DTC				System malfunction location	Fail safe	Drive cycle	Self test type* 1	Memory function
Mazda Modular Diagnostic System (M-MDS) display	Air bag system warning light							
	Flashing pattern		Priority ranking					
B1211:11	38		17	Driver-side pre-tensioner seat belt circuit short to body ground	—	—	C, D	×
B1211:12				Driver-side pre-tensioner seat belt circuit short to power supply	—	—	C, D	×
B1211:13				Driver-side pre-tensioner seat belt circuit open circuit or resistance high	—	—	C, D	×
B1211:19				Short circuit to driver-side pre-tensioner seat belt and other air bag module circuits	—	—	C, D	×
B1211:1A				Driver-side pre-tensioner seat belt circuit resistance low	—	—	C, D	×
B1211:55				Configuration setting error (driver-side pre-tensioner seat belt structural malfunction)	—	—	C, D	×
B1214:11	39		16	Passenger-side pre-tensioner seat belt circuit short to body ground	—	—	C, D	×
B1214:12				Passenger-side pre-tensioner seat belt circuit short to power supply	—	—	C, D	×
B1214:13				Passenger-side pre-tensioner seat belt circuit open circuit or resistance high	—	—	C, D	×
B1214:19				Short circuit to passenger-side pre-tensioner seat belt and other air bag module circuits	—	—	C, D	×
B1214:1A				Passenger-side pre-tensioner seat belt circuit resistance low	—	—	C, D	×
B1214:55				Configuration setting error (passenger-side pre-tensioner seat belt structural malfunction)	—	—	C, D	×

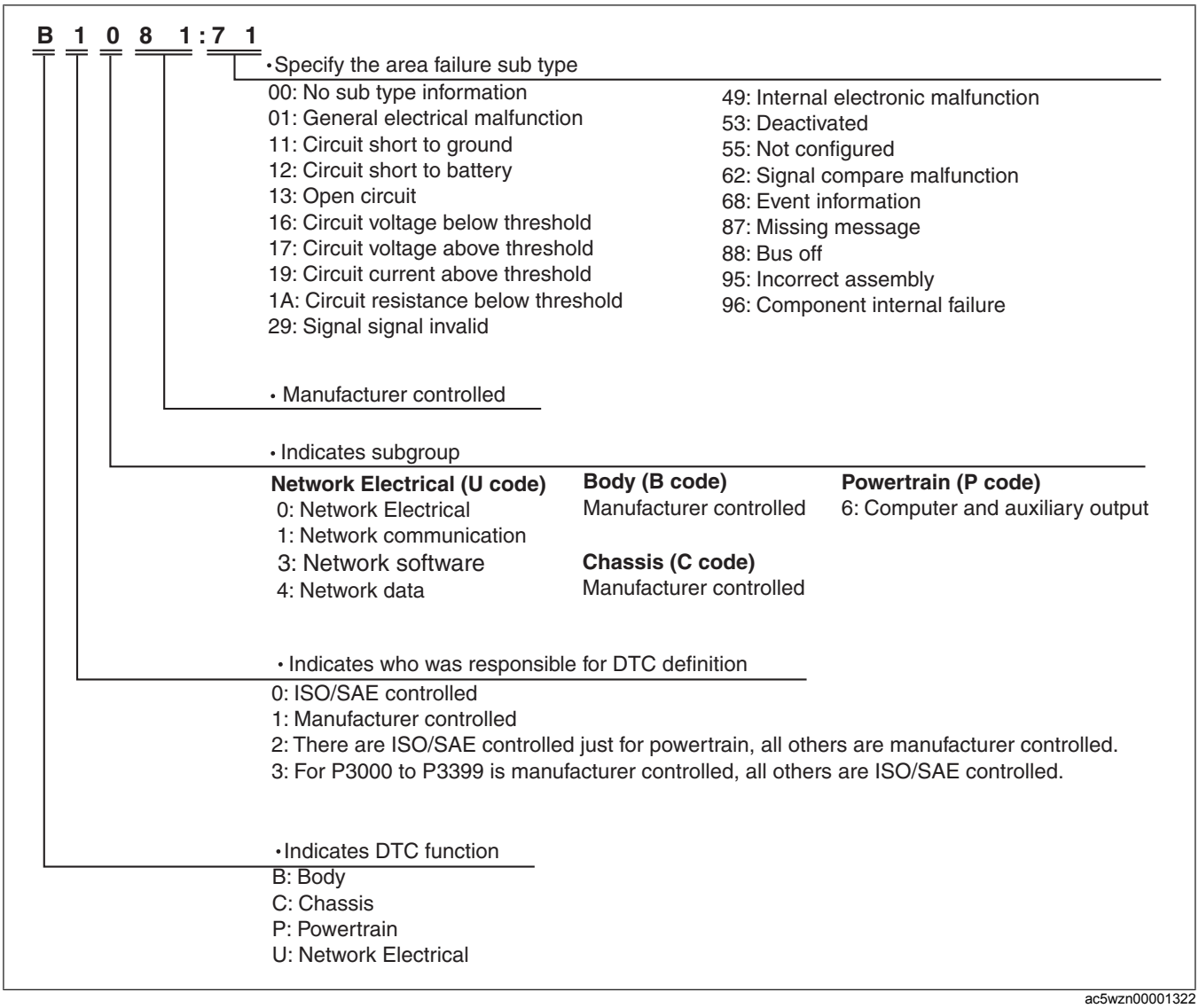
DTC				System malfunction location	Fail safe	Drive cycle	Self test type* 1	Memory function
Mazda Modular Diagnostic System (M-MDS) display	Air bag system warning light							
	Flashing pattern		Priority ranking					
B1417:11	41		8	Passenger-side crash zone sensor circuit short to body ground	—	—	C, D	×
B1417:13				Passenger-side crash zone sensor circuit open circuit or short to power supply	—	—	C, D	×
B1417:87				Signal reception error from passenger-side crash zone sensor	—	—	C, D	×
B1417:96				Passenger-side crash zone sensor internal malfunction	—	—	C, D	×
B1417:55				Configuration setting error (passenger-side crash zone sensor structural malfunction)	—	—	C, D	×
B1D75:55	56		23	Configuration setting error (PAD switch structural malfunction)	—	—	C, D	×
B1D75:62				PAD switch circuit open circuit or short to body ground	—	—	C, D	×
C0061:29	—	—	—	Low-G sensor (lateral-G) in SAS control module (internal circuit disabled)	—	—	C, D	×
C0062:29				Low-G sensor (forward-G) in SAS control module (internal circuit disabled)	—	—	C, D	×
C0063:29				Yaw rate sensor in SAS control module (internal circuit disabled)	—	—	C, D	×
P0666:29				Temperature sensor in SAS control module (internal circuit disabled)	—	—	C, D	×
U0001:88	14		5	CAN communication error	—	—	C, D	×
U0028:88	—	—	—	DSC HU/CM communication fault	—	—	C, D	×
U0155:00	14		5	Instrument cluster communication error	—	—	C, D	×
U2005:68				PCM communication error (vehicle speed signal)	—	—	C, D	×
U0300:00	54		6	Configuration setting invalid	—	—	C, D	×
U2100:00				Configuration not set	—	—	C, D	×

DTC				System malfunction location	Fail safe	Drive cycle	Self test type* 1	Memory function
Mazda Modular Diagnostic System (M-MDS) display	Air bag system warning light							
	Flashing pattern		Priority ranking					
U2107:00	—	—	—	SAS control module operation (deployment) signal output	—	—	C, D	×
U3000:49	12		2	SAS control module internal malfunction	—	—	C, D	×
U3000:55				Configuration error (SAS control module internal malfunction)	—	—	C, D	×
U3003:16	—	Continuously illuminated	1	SAS control module power supply voltage decreases (**less than 8 V**).	—	—	C, D	×
U3003:17				SAS control module power supply voltage increases (**18 V or more**)	—	—	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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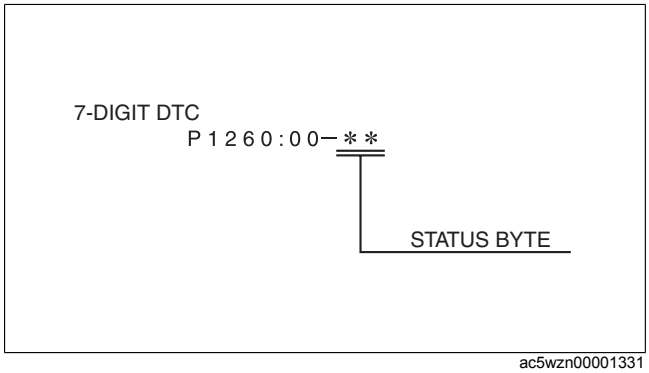
Status byte for DTC

- The status byte is the two digits (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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Snapshot data

- The data for all DTCs currently detected is stored.

Note

- Snapshot data items are not displayed, according to detected DTC.

—: Not applicable

Snapshot data item	Unit	Definition	Data read/use method	Corresponding PID data monitor item
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	—	—
FAULT_CNT	—	Number of malfunction detections	—	—
FIRST_DET_IG	hh:mm:ss*2	Time when initial malfunction occurs (IG-ON counter) • Elapsed time from when ignition is switched ON (engine off or on) until SAS control module detects first malfunction (See Snapshot counter pattern.)	—	—
IC_VPWR	V	Instrument cluster power supply voltage	• The SAS control module 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 SAS control module records the power supply voltage of the instrument cluster when the DTC was detected, and it is displayed in the Mazda Modular Diagnostic System (M-MDS).	VPWR*1
IG-ON_TIMER	hh:mm:ss*2	Elapsed time since ignition was switched ON **Note** • The instrument cluster records the elapsed time since the ignition was switched ON.	• The SAS control module constantly receives the elapsed time since the ignition was switched ON sent via CAN signal from the instrument cluster. • If a DTC is detected, the SAS control module records the elapsed time since the ignition was switched ON when the DTC was detected, and it is displayed in the Mazda Modular Diagnostic System (M-MDS).	—
LAST_CLR	hh:mm:ss*2	Repair time for last malfunction (B+ counter) • Elapsed time from when battery is connected until SAS control module detects that last malfunction is repaired (See Snapshot counter pattern.)	—	—

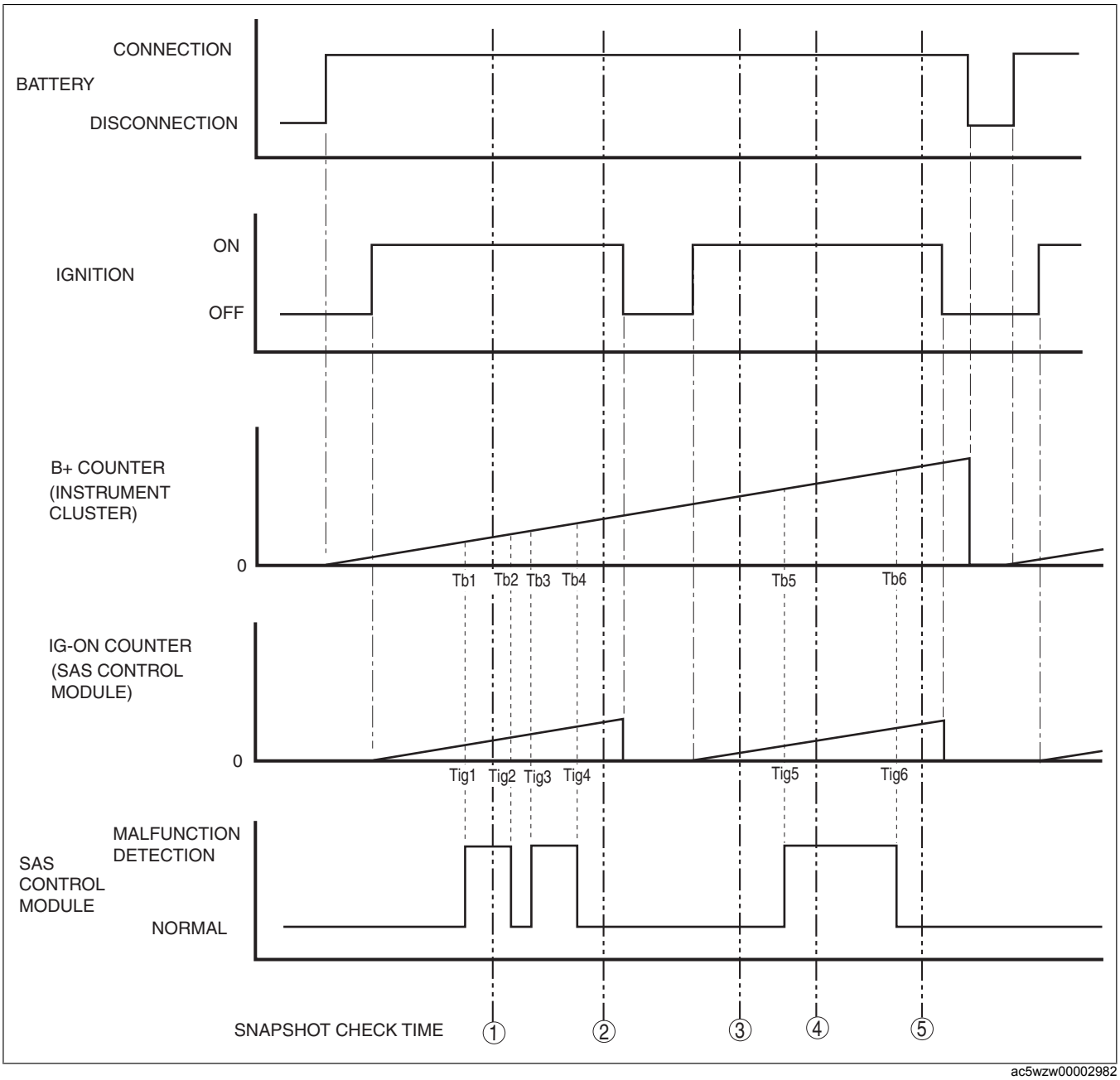
Snapshot data item	Unit	Definition	Data read/use method	Corresponding PID data monitor item
LAST_CLR_IG	hh:mm:ss*2	Repair time for last malfunction (IG-ON counter) • Elapsed time from when ignition is switched ON (engine off or on) until SAS control module detects that last malfunction is repaired (See Snapshot counter pattern.)	—	—
LAST_DET	hh:mm:ss*2	Time when last malfunction occurs (B+ counter) • Elapsed time from when battery is connected until SAS control module detects last malfunction (See Snapshot counter pattern.)	—	—
LAST_DET_IG	hh:mm:ss*2	Time when last malfunction occurs (IG-ON counter) • Elapsed time from when ignition is switched ON (engine off or on) until SAS control module detects last malfunction (See Snapshot counter pattern.)	—	—
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 to off • Key Recently Out (Position 0): Elapsed time **within 3 s** since ignition was switched to off • Accessory (Position 1): Ignition is switched to ACC • Post Ignition (Position 2): Elapsed time **within 3 s** since ignition was switched ON • Ignition On (Position 2): Ignition switched ON (engine off) • Running (Position 2): Ignition switched ON (engine on) • Running - Starting: Cranking condition	• The SAS control module constantly receives the ignition switch status sent via CAN signal from the instrument cluster. • If a DTC is detected, the SAS control module records the ignition switch status when the DTC was detected, and it is displayed in the Mazda Modular Diagnostic System (M-MDS).	—
RPM_STATUS	Engine Stop/ Under1500rpm/ Over1500rpm/ FAIL	Engine speed status	• The SAS control module constantly receives the engine speed sent via CAN signal from the instrument cluster. • If a DTC is detected, the SAS control module records the engine speed when the DTC was detected, and it is displayed in the Mazda Modular Diagnostic System (M-MDS).	TACHOMTR*1
SHIFT_STATUS	P/N/ D/ R/ FAIL	Selector lever position status	• The SAS control module constantly receives the selector lever position sent via CAN signal from the instrument cluster. • If a DTC is detected, the SAS control module records the selector lever position when the DTC was detected, and it is displayed in the Mazda Modular Diagnostic System (M-MDS).	—

Snapshot data item	Unit		Definition	Data read/use method	Corresponding PID data monitor item
TOTAL_TIME	hh:mm:ss*2		Accumulated total elapsed time since vehicle completion until SAS control module detects a DTC **Note** • When the ROOM removed, and the ignition is switched to off, the time is not included in the elapsed time.	The elapsed time when the SAS control module detected a DTC can be calculated by performing the following procedure. 1. Verify the PID item TOTAL_TIME of the instrument cluster. 2. Verify the snap shot data item TOTAL_TIME. 3. Subtract 2 from 1.	TOTAL_TIME*1
TOTAL_DIST	km	miles	Accumulated total traveled distance from completion of vehicle until SAS control module detects DTC (Odometer value in instrument cluster)	The distance traveled when the SAS control module detected a DTC can be calculated by performing the following procedure. 1. Verify the odometer value in the instrument cluster. 2. Verify the snap shot data item TOTAL_DIST. 3. Subtract 2 from 1.	—
VPWR	V		SAS control module power supply malfunction	—	VPWR_IGA
VSPD_STATUS	Stop/ 0-10km/h/ Over10km/h/ FAIL		Vehicle speed status	• The SAS control module constantly receives the vehicle speed sent via CAN signal from the instrument cluster. • If a DTC is detected, the SAS control module records the vehicle speed when the DTC was detected, and it is displayed in the Mazda Modular Diagnostic System (M-MDS).	SPEEDOMTR*1

*1 : Instrument cluster PID

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

Snapshot counter pattern



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Snap-shot check time	FAULT_CNT	FIRST_DET_IG	LAST_CLR	LAST_CLR_IG	LAST_DET	LAST_DET_IG	TOTAL_TIME
	Number of malfunction detections	Time when initial malfunction occurs (IG-ON counter)	Repair time for last malfunction (B+ counter)	Repair time for last malfunction (IG-ON counter)	Time when last malfunction occurs (B+ counter)	Time when last malfunction occurs (IG-ON counter)	Time when first malfunction occurs (B+ counter)
1	1	Tb1	-	-	Tb1	Tig1	Tig1
2	2	Tb1	Tb4	Tig4	Tb3	Tig3	Tig1
3	2	Tb1	Tb4	Tig4	Tb3	Tig3	Tig1
4	3	Tb1	Tb4	Tig4	Tb5	Tig5	Tig1
5	3	Tb1	Tb6	Tig6	Tb5	Tig5	Tig1

PID/Data monitoring function

- By using the PID/data monitoring function, the monitored item of the input/output signal, as set on the SAS control module, can be freely selected and read out in real-time.
- The Mazda Modular Diagnostic System (M-MDS) is used to read out PID/data monitor information.

PID/data monitor table

PID name (definition)	Unit/ Operation	Operation Status (Reference)	
AB_WL (Air bag system warning light status)	Lamp_Off/ Lamp_On/ Plant_Mode/ Unknown	• Air bag system warning light off: Lamp_Off • Air bag system warning light on: Lamp_On • Air bag system warning light status: Plant_Mode • Air bag system warning light status: Unknown	
P_SEAT_M_S (Occupancy sensor)	Off/On	• Not occupant seated in passenger-side front seat: Off • Occupant seated in passenger-side front seat: On	
PAD_SW_FLT (PAD switch malfunction status)	O.K./FAULT	• PAD switch is normal: O.K. • PAD switch is abnormal: FAULT	
RES_C_AB_D (Driver-side curtain air bag module resistance nominal)	ohm	Continuous: 0.81–6.42 ohms	
RES_C_AB_P (Passenger-side curtain air bag module resistance nominal)	ohm	Continuous: 0.81–6.42 ohms	
RES_F_AB1_D (Driver-side air bag module resistance nominal)	ohm	Continuous: 0.99–6.42 ohms	
RES_F_AB1_P (Passenger-side air bag module resistance nominal)	ohm	Continuous: 0.81–6.42 ohms	
RES_PCD_BAR (Poorly connected detector bar terminals resistance nominal (all of SAS control module connector))	ohm	• Normal connected: 100 ohm or less • Poor connected: 20 kilohm or more	
RES_S_AB_D (Driver-side side air bag module resistance nominal)	ohm	Continuous: 0.81–9.85 ohms	
RES_S_AB_P (Passenger-side side air bag module resistance nominal)	ohm	Continuous: 0.81–9.85 ohms	
RES_SB_P_D (Driver-side pre-tensioner seat belt resistance nominal)	ohm	Continuous: 0.81–6.42 ohms	
RES_SB_P_P (Passenger-side pre-tensioner seat belt resistance nominal)	ohm	Continuous: 0.81–6.42 ohms	
SEAT_B_D (Driver-side buckle switch status)	Unbuckled/ Buckled	• Driver-side front seat belt fastened (Driver-side buckle switch off): Buckled • Driver-side front seat belt not fastened (Driver-side buckle switch on): Unbuckled	
SEAT_B_P (Passenger-side buckle switch status)	Unbuckled/ Buckled	Occupant seated in passenger-side front seat: On	• Passenger-side front seat belt fastened (Passenger-side buckle switch off): Buckled • Passenger-side front seat belt not fastened (Passenger-side buckle switch on): Unbuckled
VPWR_IGA (SAS control module power voltage)	V	Ignition switch is at ON: IG1 voltage	