ON-BOARD DIAGNOSTIC SYSTEM FUNCTION

id030200108300

Malfunction Detection Function

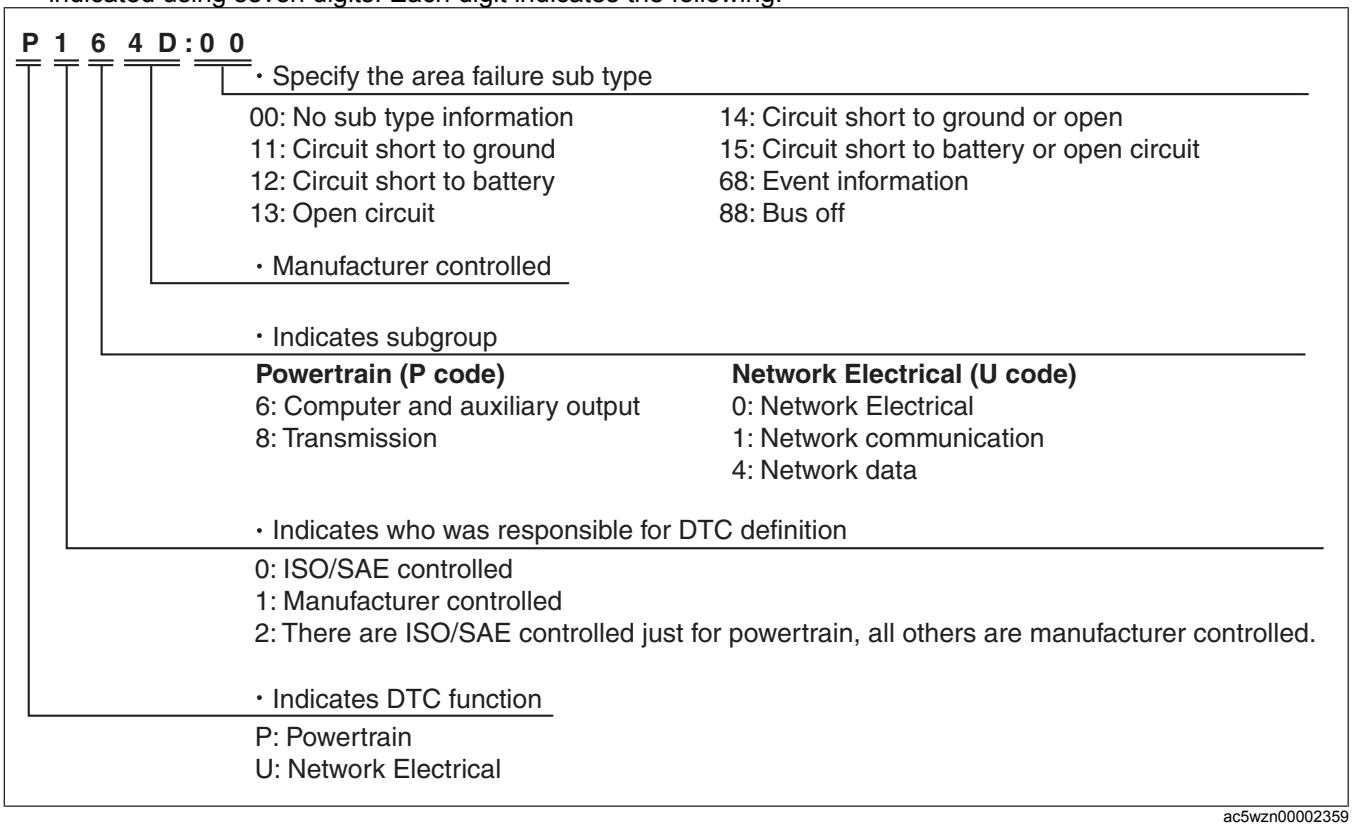
- The failure detection function detects malfunctions in the input/output signal systems of the 4-wheel drive (4WD) control module (CM) and displays them when the ignition switch is at the ON position.
- When the ignition switch is turned to the ON position, the 4WD CM system begins operation, and the 4WD warning light illuminates for 3 seconds while the function checks for open circuits. At the same time the function monitors the condition of the power supply voltage and checks for internal malfunctions (Without TFT LCD display).
- Then, once the system is running, the function checks the operating conditions of the 4WD solenoid and the differential oil temperature sensor at regular intervals to determine whether there is any malfunction.
- If any malfunction is detected during these diagnostic tests, the warning light illuminates according to the malfunction to alert the driver. Also, a DTC is output to DLC-2 via the CAN line. Also, at the same time the failure detection result is sent to the memory and fail-safe functions.

Memory Function

- The memory function stores DTCs of malfunctions in input/output signal systems. With this function, once a DTC is stored it is not cleared after the ignition has been switched off, even if the malfunctioning signal system has returned to normal.
- Since the 4WD CM has a built-in non-volatile memory, DTCs are not cleared even if the battery is removed. Therefore, it is necessary to clear the memory after performing repairs. Refer to the Workshop Manual for the DTC clearing procedure.

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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DTC Table

- When the failure detection function determines that there is a malfunction, the 4WD warning light illuminates to alert the driver. At this time, the fail-safe function suspends control or takes other measures to ensure that driving stability is not lost.

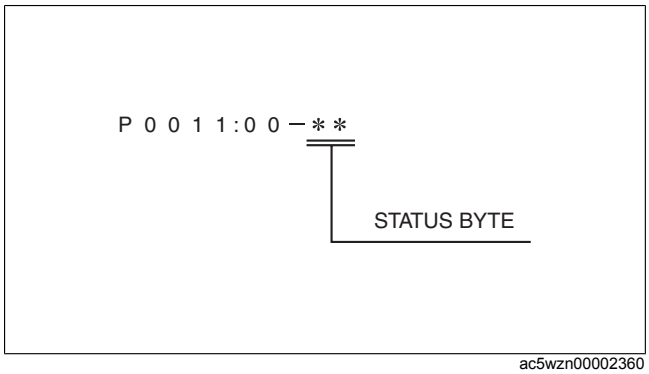
X: Available
—: Not applicable

DTC	Malfunction location	4WD warning light condition	Fail-safe	Drive cycle	Self test type*1	Memory function
P164D:00	4WD CM configuration	Illuminated	X	—	C	X
P182F:00	4WD CM	Flashed	X	—	C	X
P1886:00	4WD CM	Illuminated	X	—	C	X
P1887:11	4WD solenoid circuit	Illuminated	X	—	C	X
P1887:12	4WD solenoid circuit	Illuminated	X	—	C	X
P1887:13	4WD solenoid circuit	Illuminated	X	—	C	X
P1887:14	4WD solenoid circuit	Illuminated	X	—	C	X
P187B:00	4WD solenoid circuit	Illuminated	X	—	C	X
P1888:11	Differential oil temperature sensor circuit	Illuminated	X	—	C	X
P1888:15	Differential oil temperature sensor circuit	Illuminated	X	—	C	X
P188A:00	4WD CM	Flashed	X	—	C	X
U0001:88	CAN system communication error	—	X	—	C	X
U0100:00	Communication error to PCM	—	X	—	C	X
U0101:00	CAN system communication error	—	X	—	C	X
U0121:00	CAN system communication error	—	X	—	C	X
U0401:68	Signal error from PCM	—	X	—	C	X
U0402:68	Signal error from TCM	—	X	—	C	X
U0415:68	Signal error from DSC HU/CM	—	X	—	C	X
U2100:00	4WD CM configuration	Illuminated	X	—	C	X

*1 : C: CMDTC self test

Status Byte for DTC

- The status byte is the two-digit code (two digits after hyphen (-)) after the 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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Fail-safe Function

- When the failure detection function determines that there is a malfunction, the 4WD warning light illuminates to alert the driver. At this time, the fail-safe function suspends control or takes other measures to ensure that driving stability is not lost.

DTC	Fail-safe control status
P164D:00	4WD operates by the specified data
P182F:00	4WD protection condition (4WD control paused)
P1886:00	Control disabled
P1887:11	Control disabled
P1887:12	Control disabled
P1887:13	Control disabled
P1887:14	Control disabled
P187B:00	Control disabled
P1888:11	Control disabled
P1888:15	Control disabled
P188A:00	4WD protection condition (4WD control paused)
U0001:88	Control disabled
U0100:00	4WD operates by the specified data
U0101:00	Lost gear position signal: 4WD operates by the specified data Except above: Control disabled
U0121:00	Control disabled

DTC	Fail-safe control status
U0401:68	• Gear position signal error (MTX) — 4WD operates by the specified data • Except for gear position signal error — Control disabled
U0402:68	4WD operates by the specified data
U0415:68	Control disabled
U2100:00	4WD operates by the specified data

Snapshot Data Table

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

—: Not applicable

Snapshot data item	Unit		Data contents	Data read/use method	Corresponding data monitor items
AAT	°C	°F	Ambient temperature	—	—
IC_VPWR	V		Instrument cluster power supply voltage	• The 4WD CM 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 4WD CM records the power supply voltage of the instrument cluster when the DTC was detected, and it is displayed in the M-MDS.	VPWR*1
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 4WD CM 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 4WD CM 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 4WD CM constantly receives the ignition switch status sent via CAN signal from the instrument cluster. • If a DTC is detected, the 4WD CM records the ignition switch status when the DTC was detected, and it is displayed in the M-MDS.	—

Snapshot data item	Unit		Data contents	Data read/use method	Corresponding data monitor items
TOTAL_DIST	km	Miles	Accumulated total traveled distance from completion of vehicle until 4WD CM detects DTC (Odometer value in instrument cluster)	The total traveled distance from which the 4WD CM 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.	—
TOTAL_TIME	hh:mm:ss*2		Accumulated total elapsed time since vehicle completion until 4WD CM 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 4WD CM 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

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

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

External Tester Communication Function

- This function allows for the storing and clearing of DTCs due to a communication link between the 4WD CM and an external tester.