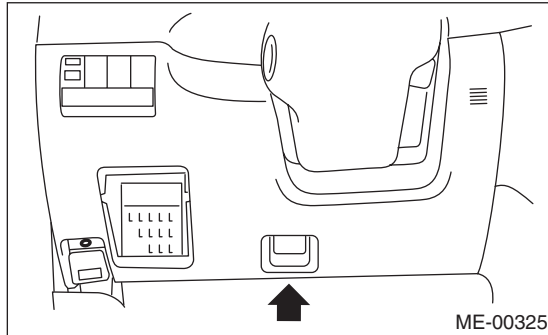


## 8. General Scan Tool

### A: OPERATION

#### 1. HOW TO USE GENERAL SCAN TOOL

- 1) Prepare a scan tool (general scan tool) required by SAE J1978.
- 2) Open the cover and connect the general scan tool to the data link connector located in the lower portion of instrument panel (on the driver's side).



- 3) Using the general scan tool, call up DTC and freeze frame data.

General scan tool functions consist of:

- (1) MODE \$01: Current powertrain diagnostic data
- (2) MODE \$02: Powertrain freeze frame data
- (3) MODE \$03: Emission-related powertrain DTC
- (4) MODE \$04: Clear/Reset emission-related diagnostic information
- (5) MODE \$06: Request on-board monitoring test results for intermittently monitored systems
- (6) MODE \$07: Request on-board monitoring test results for continuously monitored systems
- (7) MODE \$09: Request vehicle information

Read out the data according to repair procedures.  
(For detailed operation procedure, refer to the general scan tool instruction manual.)

#### NOTE:

For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO)(diag)-67, List of Diagnostic Trouble Code (DTC).>

# General Scan Tool

## ENGINE (DIAGNOSTICS)

### 2. MODE \$01 (CURRENT POWERTRAIN DIAGNOSTIC DATA)

Refer to data denoting the current operating condition of analog input/output, digital input/output or the powertrain system.

A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
01	Number of emission-related powertrain DTC and malfunction indicator light status and diagnosis support information	—
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim	%
07	Long term fuel trim	%
0B	Intake manifold absolute pressure	kPa
0C	Engine speed	rpm
0D	Vehicle speed	km/h
0E	Ignition timing advance	°
0F	Intake air temperature	°C
10	Air flow rate from mass air flow sensor	g/sec
11	Throttle valve absolute opening angle	%
13	Check whether oxygen sensor is installed.	—
15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor	V and %
1C	Supporting OBD system	—
24	A/F value and A/F sensor output voltage	— and V
34	A/F value and A/F current	— and mA
\$1F	Elapsed time after starting engine	sec
\$21	Elapsed time after MIL illuminates	km
\$2C	Target EGR	%
\$2D	EGR deviation	%
\$2E	Evaporative purge	%
\$2F	Fuel level	%
\$30	Engine speed for warm up after DTC clear	—
\$31	Travel distance after DTC clear	km
\$32	Tank pressure	mmHg
\$33	Atmospheric pressure	mmHg
\$3C	Catalytic temperature #1	°C
\$41	Diagnostic monitor of each DC	—
\$42	ECM power voltage	V
\$43	Absolute load	%
\$44	A/F target lambda	—
\$45	Relative throttle opening angle	%
\$46	Ambient temperature	°C
\$47	Absolute throttle opening angle 2	%
\$49	Absolute accelerator opening angle 1	%
\$4A	Absolute accelerator opening angle 2	%
\$4C	Target throttle opening angle	%
\$4D	Engine operating time during MIL illuminates	min
\$4E	Elapsed time after DTC clear	min
\$51	Fuel used	—
\$5A	Relative accelerator opening angle	%

**NOTE:**

Refer to general scan tool manufacturer's instruction manual to access generic OBD-II PIDs (MODE \$01).

### 3. MODE \$02 (POWERTRAIN FREEZE FRAME DATA)

Refer to data denoting the operating condition when trouble is detected by on-board diagnosis system. A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
02	DTC that caused the freeze frame data storage required by CARB	—
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim	%
07	Long term fuel trim	%
0B	Intake manifold absolute pressure	kPa
0C	Engine speed	rpm
0D	Vehicle speed	km/h
0E	Ignition timing advance	°
0F	Intake air temperature	°C
10	Air flow rate from mass air flow sensor	g/sec
11	Throttle valve absolute opening angle	%
15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor	V and %
1C	Supporting OBD system	—
\$1F	Elapsed time after starting engine	sec
\$2C	Target EGR	%
\$2D	EGR deviation	%
\$2E	Evaporative purge	%
\$2F	Fuel level	%
\$13	Air fuel ratio sensor	—
\$32	Tank pressure	mmHg
\$33	Atmospheric pressure	mmHg
\$42	ECM power voltage	V
\$43	Absolute load	%
\$44	A/F target lambda	—
\$45	Relative throttle opening angle	%
\$46	Ambient temperature	°C
\$47	Absolute throttle opening angle 2	%
\$49	Absolute accelerator opening angle 1	%
\$4A	Absolute accelerator opening angle 2	%
\$4C	Target throttle opening angle	%

**NOTE:**

Refer to general scan tool manufacturer's instruction manual to access freeze frame data (MODE \$02).

### 4. MODE \$03 (EMISSION-RELATED POWERTRAIN DTC)

Refer to "Read Diagnostic Trouble Code (DTC)" for information about data denoting emission-related powertrain DTC. <Ref. to EN(H4SO)(diag)-67, List of Diagnostic Trouble Code (DTC).>

### 5. MODE \$04 (CLEAR/RESET EMISSION-RELATED DIAGNOSTIC INFORMATION)

Refer to the mode used to clear or reset emission-related diagnostic information (OBD-II trouble diagnostic information).

**NOTE:**

Refer to general scan tool manufacturer's instruction manual to clear the emission-related diagnostic information (MODE \$04).

# General Scan Tool

## ENGINE (DIAGNOSTICS)

### 6. MODE \$06

Refer to the test value of troubleshooting and data of test specification on the support data bit sequence table. A list of the support data is shown in the following table.

OBDMID	TID	SID	Test value & Test specification
\$01	\$81	\$0A	A/F sensor conduction abnormal (B1S1)
	\$82	\$8D	
	\$83	\$14	
	\$84	\$1E	A/F sensor range abnormal (B1S1)
	\$85	\$1E	A/F sensor response (B1S1)
	\$86	\$20	
\$02	\$87	\$0B	Oxygen sensor circuit abnormal (B1S2)
	\$88	\$0B	
	\$07	\$0B	Oxygen sensor drop abnormal (B1S2)
	\$08	\$0B	
	\$A5	\$0B	
	\$05	\$10	Oxygen sensor response abnormal (B1S2)
	\$06	\$10	
\$21	\$89	\$20	Catalyst degradation diagnosis (Bank 1)
\$31	\$8A	\$FD	EGR system diagnosis
\$39	\$93	\$FE	Evaporative emission control system (Cap off)
\$3B	\$94	\$FE	Evaporative emission control system (0.04)
	\$95	\$FE	
\$3C	\$96	\$FE	Evaporative emission control system (0.02)
	\$97	\$FE	
\$3D	\$98	\$FE	Evaporative emission control system (Purge flow)
\$41	\$99	\$24	A/F sensor heater abnormal (B1S1)
	\$9A	\$24	
	\$9B	\$14	A/F sensor heater performance abnormal (B1S1)
\$42	\$9C	\$24	Oxygen sensor heater abnormal (B1S2)
	\$9D	\$24	
\$A1	\$0B	\$24	Misfire monitoring (All cylinders)
	\$0C	\$24	
\$A2	\$0B	\$24	Misfire monitoring (#1 cylinder)
	\$0C	\$24	
\$A3	\$0B	\$24	Misfire monitoring (#2 cylinder)
	\$0C	\$24	
\$A4	\$0B	\$24	Misfire monitoring (#3 cylinder)
	\$0C	\$24	
\$A5	\$0B	\$24	Misfire monitoring (#4 cylinder)
	\$0C	\$24	

### 7. MODE \$07

Refer to the data of DTC (pending code) for troubleshooting result about emission in the first time.

### 8. MODE \$09

Refer to data of vehicle specification (V.I.N., calibration ID, diagnosis frequency etc.).