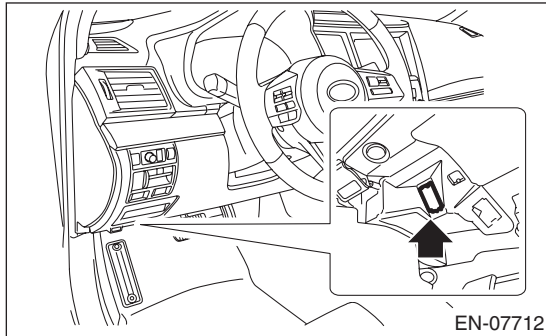


8. General Scan Tool

A: OPERATION

1. HOW TO USE GENERAL SCAN TOOL

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



- 3) Using the general scan tool, call up each 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

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

NOTE:

For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H6DO)(diag)-78, 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	—
\$03	Fuel system control status	—
\$04	Calculated engine load value	%
\$05	Engine coolant temperature	°C
\$06	Short term fuel trim (Bank 1)	%
\$07	Long term fuel trim (Bank 1)	%
\$08	Short term fuel trim (Bank 2)	%
\$09	Long term fuel trim (Bank 2)	%
\$0B	Intake manifold absolute pressure	kPa
\$0C	Engine speed	rpm
\$0D	Vehicle speed	MPH
\$0E	Ignition timing advance	°
\$0F	Intake air temperature	°C
\$10	Intake air amount	g/s
\$11	Throttle valve opening angle	%
\$13	Air fuel ratio sensor	—
\$15	Oxygen sensor output voltage (Bank 1 Sensor 2)	V
\$15	Oxygen sensor correction (Bank 2 Sensor 1)	%
\$19	Oxygen sensor output voltage (Bank 2 Sensor 2)	V
\$19	Oxygen sensor correction (Bank 2 Sensor 2)	%
\$1C	On-board diagnostic system	—
\$1F	Elapsed time after starting the engine	sec
\$21	Driving distance after the malfunction indicator light illuminates	miles
\$24	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (Bank 1)	– and V
\$28	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (Bank 2)	– and V
\$2C	Target EGR	%
\$2D	EGR deviation	%
\$2E	Evaporative purge	%
\$2F	Fuel level	%
\$30	Number of warm ups after DTC clear	—
\$31	Driving distance after DTC clear	miles
\$32	Fuel tank pressure	Pa
\$33	Atmospheric pressure	kPa
\$34	A/F sensor lambda value (Bank 1 Sensor 1)	—
\$34	A/F sensor current value (Bank 1 Sensor 1)	mA
\$38	A/F sensor lambda value (Bank 2 Sensor 1)	—
\$38	A/F sensor current value (Bank 2 Sensor 1)	mA
\$3C	Catalytic temperature #1	°C
\$3D	Catalytic temperature #2	°C
\$41	Diagnostic monitor of each drive cycle	—
\$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	%

General Scan Tool

ENGINE (DIAGNOSTICS)

PID	Data	Unit of measure
\$49	Absolute acceleration opening angle 1	%
\$4A	Absolute acceleration opening angle 2	%
\$4C	Target throttle opening angle	%
\$4D	Engine operating time while malfunction indicator light lit	min
\$4E	Elapsed time after DTC clear	min
\$51	Fuel used	—
\$5A	Relative acceleration opening angle	%
\$65	Neutral status	—

NOTE:

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

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

Refer to data denoting the operating condition when trouble is sensed by the 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 (Bank 1)	%
\$07	Long term fuel trim (Bank 1)	%
\$08	Short term fuel trim (Bank 2)	%
\$09	Long term fuel trim (Bank 2)	%
\$0B	Intake manifold absolute pressure	kPa
\$0C	Engine speed	rpm
\$0D	Vehicle speed	MPH
\$0E	Ignition timing advance	°
\$0F	Intake air temperature	°C
\$10	Intake air amount	g/s
\$11	Throttle valve opening angle	%
\$13	Air fuel ratio sensor	—
\$15	Oxygen sensor output voltage (Bank 1 Sensor 2)	V
\$15	Oxygen sensor correction (Bank 2 Sensor 1)	%
\$19	Oxygen sensor output voltage (Bank 2 Sensor 2)	V
\$19	Oxygen sensor correction (Bank 2 Sensor 2)	%
\$1C	On-board diagnostic system	—
\$1F	Elapsed time after starting the engine	sec
\$2C	Target EGR	%
\$2D	EGR deviation	%
\$2E	Evaporative purge	%
\$2F	Fuel level	%
\$32	Fuel tank pressure	Pa
\$33	Atmospheric pressure	kPa
\$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 acceleration opening angle 1	%

General Scan Tool

ENGINE (DIAGNOSTICS)

PID	Data	Unit of measure
\$4A	Absolute acceleration opening angle 2	%
\$4C	Target throttle opening angle	%
\$65	Neutral status	—

NOTE:

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

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

Refer to "List of Diagnostic Trouble Code (DTC)" for information about data denoting emission-related powertrain DTC. <Ref. to EN(H6DO)(diag)-78, 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).
- Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.

6. MODE \$06

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

OBDMID	TID	SID	Diagnostic item
\$01	\$81	\$0A	A/F sensor continuity failure (Bank 1 Sensor 1)
	\$82	\$8D	
	\$83	\$14	
	\$84	\$1E	A/F sensor range failure (Bank 1 Sensor 1)
	\$85	\$1E	
	\$86	\$20	A/F sensor response failure (Bank 1 Sensor 1)
\$02	\$87	\$0B	Oxygen sensor circuit failure (Bank 1 Sensor 2)
	\$88	\$0B	
	\$07	\$0B	Oxygen sensor drop failure (Bank 1 Sensor 2)
	\$08	\$0B	
	\$A5	\$0B	
	\$05	\$10	Oxygen sensor response failure (Bank 1 Sensor 2)
	\$06	\$10	
\$05	\$81	\$0A	A/F sensor continuity failure (Bank 2 Sensor 1)
	\$82	\$8D	
	\$83	\$14	
	\$84	\$1E	A/F sensor range failure (Bank 2 Sensor 1)
	\$85	\$1E	
	\$86	\$20	A/F sensor response failure (Bank 2 Sensor 1)
\$06	\$87	\$0B	Oxygen sensor circuit failure (Bank 2 Sensor 2)
	\$88	\$0B	
	\$07	\$0B	Oxygen sensor drop failure (Bank 2 Sensor 2)
	\$08	\$0B	
	\$A5	\$0B	
	\$05	\$10	Oxygen sensor response failure (Bank 2 Sensor 2)
	\$06	\$10	
\$21	\$89	\$20	Catalyst deterioration diagnosis (Bank 1)
\$31	\$8A	\$FD	EGR system diagnosis

General Scan Tool

ENGINE (DIAGNOSTICS)

OBDMID	TID	SID	Diagnostic item
\$35	\$8B	\$9D	VVT monitor bank 1
	\$8C	\$9D	
	\$8D	\$9D	
	\$8E	\$9D	
\$36	\$8B	\$9D	VVT monitor bank 2
	\$8C	\$9D	
	\$8D	\$9D	
	\$8E	\$9D	
\$39	\$93	\$FE	Evaporative emission control system (Cap off)
\$3B	\$94	\$FE	Evaporative emission control system (0.04 inch leak)
	\$95	\$FE	
\$3C	\$96	\$FE	Evaporative emission control system (0.02 inch leak)
	\$97	\$FE	
\$3D	\$98	\$FE	Evaporative emission control system (Purge flow)
\$41	\$99	\$24	A/F sensor heater failure (Bank 1 Sensor 1)
	\$9A	\$24	
	\$9B	\$14	A/F sensor heater characteristics failure (Bank 1 Sensor 1)
\$42	\$9C	\$24	Oxygen sensor heater failure (Bank 1 Sensor 2)
	\$9D	\$24	
\$45	\$99	\$24	A/F sensor heater failure (Bank 2 Sensor 1)
	\$9A	\$24	
	\$9B	\$14	A/F sensor heater characteristics failure (Bank 2 Sensor 1)
\$46	\$9C	\$24	Oxygen sensor heater failure (Bank 2 Sensor 2)
	\$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	
\$A6	\$0B	\$24	Misfire monitoring (#5 cylinder)
	\$0C	\$24	
\$A7	\$0B	\$24	Misfire monitoring (#6 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 the data of vehicle specification (V.I.N., calibration ID, diagnosis frequency, etc.).