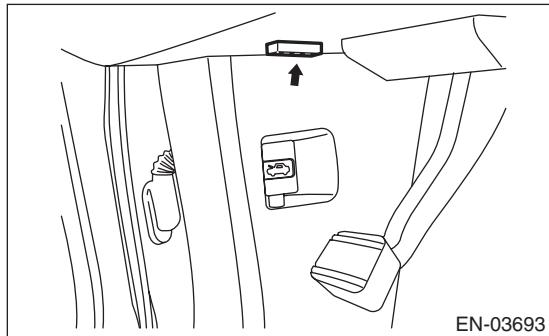


8. General Scan Tool

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 \$08: Request control for on-board system, test, and component
 - (8) 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)-88, List of Diagnostic Trouble Code (DTC).>

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	%

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PID	Data	Unit of measure
\$13	Air fuel ratio sensor	—
\$15	Oxygen sensor output voltage (Bank 1 Sensor 2)	V
\$15	Oxygen sensor correction (Bank 1 Sensor 2)	%
\$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	Travel 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	time
\$31	Travel distance after DTC clear	miles
\$33	Barometric 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	Catalyst temperature #1	°C
\$3D	Catalyst 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	%
\$49	Absolute accelerator opening angle 1	%
\$4A	Absolute accelerator 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	—
\$53	ELCM pressure	—
\$5A	Relative accelerator opening angle	%
\$5C	Engine oil temperature	°C
\$65	Neutral status	—

NOTE:

Refer to general scan tool manufacturer's operation manual to access current powertrain diagnostic data (MODE \$01).

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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 freeze frame data to be stored	—
\$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 1 Sensor 2)	%
\$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	%
\$33	Barometric 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 accelerator opening angle 1	%
\$4A	Absolute accelerator 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)-88, 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.

NOTE:

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

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6. MODE \$06

Refer to diagnostic 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.

NOTE:

Some items are not displayed according to the specifications.

OBDMID	TID	SID	Diagnostic item
\$01	\$84	\$1E	A/F sensor range failure (Bank 1 Sensor 1)
	\$85	\$1E	
	\$86	\$20	
	\$91	\$20	
	\$92	\$10	
	\$A3	\$20	
	\$A4	\$10	
	\$AC	\$10	
	\$AD	\$10	
	\$AE	\$10	
	\$AF	\$10	
	\$CD	\$20	
	\$CF	\$20	
	\$DF	\$10	
\$02	\$07	\$0B	Oxygen sensor drop failure (Bank 1 Sensor 2)
	\$08	\$0B	
	\$05	\$10	Oxygen sensor response failure (Bank 1 Sensor 2)
	\$06	\$10	
	\$BD	\$10	
	\$D1	\$10	Oxygen sensor delay failure (Bank 1 Sensor 2)
	\$D2	\$01	
\$05	\$84	\$1E	A/F sensor range failure (Bank 2 Sensor 1)
	\$85	\$1E	
	\$86	\$20	A/F sensor response failure (Bank 2 Sensor 1)
	\$91	\$20	
	\$92	\$10	
	\$A3	\$20	
	\$A4	\$10	
	\$AC	\$10	
	\$AD	\$10	
	\$AE	\$10	
	\$AF	\$10	
	\$CE	\$20	
	\$D0	\$20	
	\$DF	\$10	
\$06	\$07	\$0B	Oxygen sensor drop failure (Bank 2 Sensor 2)
	\$08	\$0B	
	\$05	\$10	Oxygen sensor response failure (Bank 2 Sensor 2)
	\$06	\$10	
	\$BD	\$10	
	\$D1	\$10	Oxygen sensor delay failure (Bank 2 Sensor 2)
	\$D2	\$01	
\$21	\$89	\$20	Catalyst deterioration diagnosis (Bank 1)
\$31	\$8A	\$FD	EGR system diagnosis

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OBDMID	TID	SID	Diagnostic item
\$35	\$8B	\$9D	VVT monitor (Bank 1)
	\$8C	\$9D	
	\$8D	\$9D	
	\$8E	\$9D	
	\$D3	\$9D	
	\$D4	\$9D	
	\$D5	\$9D	
	\$D6	\$9D	
\$36	\$8B	\$9D	VVT monitor (Bank 2)
	\$8C	\$9D	
	\$8D	\$9D	
	\$8E	\$9D	
	\$D3	\$9D	
	\$D4	\$9D	
	\$D5	\$9D	
	\$D6	\$9D	
\$3C	\$96	\$FE	Evaporative emission control system (0.02 inch leak)
	\$C1	\$FE	
	\$C2	\$FE	
	\$C3	\$FE	
	\$C4	\$FE	
	\$C5	\$FE	
	\$C6	\$35	
	\$C7	\$FE	
	\$C8	\$FE	
	\$C9	\$FE	
	\$CA	\$FE	
\$3D	\$98	\$FE	Evaporative emission control system (purge flow)
	\$CB	\$35	ELCM purge flow
	\$CC	\$FE	
\$41	\$9B	\$14	A/F sensor heater characteristics failure (Bank 1 Sensor 1)
\$42	\$A2	\$24	Oxygen sensor heater characteristics failure (Bank 1 Sensor 2)
\$45	\$9B	\$14	A/F sensor heater characteristics failure (Bank 2 Sensor 1)
\$46	\$A2	\$24	Oxygen sensor heater characteristics failure (Bank 2 Sensor 2)
\$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	

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7. MODE \$07

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

8. MODE \$08 (REQUEST CONTROL FOR ON-BOARD SYSTEM, TEST, AND COMPONENT)

Perform "Active Test" of the on-board system.

9. MODE \$09

Refer to the data of the vehicle specification.