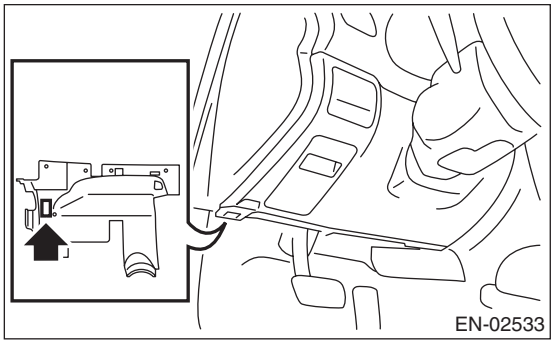
8. General Scan Tool

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

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(H6DO)(diag)-70, 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	ON/OFF
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C or °F
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 revolution	rpm
0D	Vehicle speed	km/h, MPH
0E	Ignition timing advance	°
0F	Intake air temperature	°C or °F
10	Air flow rate of manifold absolute pressure sensor	g/sec
11	Throttle valve opening angle	%
13	Check whether oxygen sensor is installed.	—
15	Oxygen sensor output voltage (Bank 1 Sensor 2)	V
15	Oxygen sensor compensation (Bank 1 Sensor 2)	%
19	Oxygen sensor output voltage (Bank 2 Sensor 2)	V
1C	On-board diagnostic system	—
24	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (bank 1)	V and %
28	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (bank 2)	V and %
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

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 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 CARB required freeze frame data storage	—
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	km/h
0E	Ignition timing advance	°
0F	Intake air temperature	°C or °F
10	Air flow rate of manifold absolute pressure sensor	g/sec
11	Throttle valve opening angle	%
15	Oxygen sensor output voltage (Bank 1 Sensor 2)	V
15	Oxygen sensor compensation (Bank 1 Sensor 2)	%
16	Oxygen sensor output voltage (Bank 2 Sensor 2)	V
16	Oxygen sensor compensation (Bank2 Sensor2)	%
1C	On-board diagnostic system	—

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 "List of Diagnostic Trouble Code (DTC)" for information about data denoting emission-related powertrain DTC. <Ref. to EN(H6DO)(diag)-70, 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).

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.

TID	CID	Test value and Test limit
$81	$01	Catalyst system efficiency
$83	$01	Evaporative emission control system (0.04 inch leak)
	$02	Evaporative emission control system (0.04 inch leak)
	$03	Evaporative emission control system (0.04 inch leak)
	$04	Evaporative emission control system (0.04 inch leak)
	$05	Evaporative emission control system (0.02 inch leak)
	$06	Evaporative emission control system (0.02 inch leak)
$84	$01	A/F sensor circuit slow response (Bank 1 Sensor 1)
$85	$01	O2 sensor circuit slow response (Bank 1 Sensor 2) (rich → lean)
	$02	O2 sensor circuit slow response (Bank 1 Sensor 2) (lean → rich)
$87	$01	A/F sensor circuit slow response (Bank 2 Sensor 1)
$88	$01	O2 sensor circuit slow response (Bank 2 Sensor 2) (rich → lean)
	$02	O2 sensor circuit slow response (Bank 2 Sensor 2) (lean → rich)
$41	$01	O2 sensor circuit no activity detected (Bank 1 Sensor 2)
	$02	O2 sensor circuit no activity detected (Bank 1 Sensor 2)
$43	$01	O2 sensor circuit no activity detected (Bank 2 Sensor 2)
	$02	O2 sensor circuit no activity detected (Bank 2 Sensor 2)

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.).