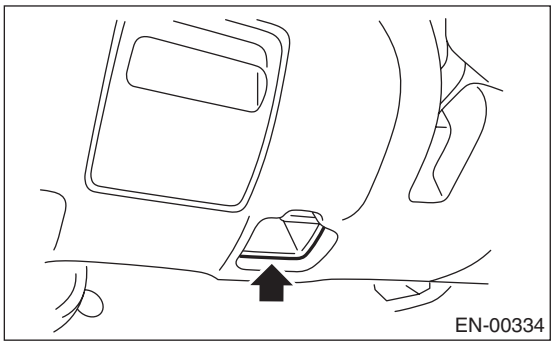
8. General Scan Tool

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 power train 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 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(H4DOTC)(diag)-76, 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 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	mmHg
$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	%
$12	Secondary air control status	—
$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	—
$1F	Elapsed time after starting engine	sec
$21	Travel distance after malfunction indicator light illuminating	km
$24	A/F value and A/F sensor output voltage	— and V
$2E	Evaporative purge	%
$2F	Fuel level	%
$30	Number of warm ups after DTC clear	—
$31	Travel distance after DTC clear	km
$32	Fuel tank pressure	mmHg
$33	Atmospheric pressure	mmHg
$34	A/F value and A/F sensor current	— and mA
$3C	Catalytic temperature #1	°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 during malfunction indicator 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 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	%
$07	Long term fuel trim	%
$0B	Intake manifold absolute pressure	mmHg
$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	%
$12	Secondary air control status	—
$13	Air fuel ratio sensor	—
$15	Oxygen sensor output voltage and oxygen sensor short term fuel trim	V and %
$1C	Supporting OBD system	—
$1F	Elapsed time after starting engine	sec
$2E	Evaporative purge	%
$2F	Fuel level	%
$32	Fuel 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(H4DOTC)(diag)-43, Read 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 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	Diagnostic item
$01	$81	$0A	A/F Sensor Conduction Abnormal (Bank 1 Sensor 1)
	$82	$8D	
	$83	$14	
	$84	$1E	A/F Sensor Range Abnormal (Bank 1 Sensor 1)
	$85	$1E	
	$86	$20	A/F Sensor Response Abnormal (Bank 1 Sensor 1)
$02	$87	$0B	Oxygen Sensor Circuit Abnormal (Bank 1 Sensor 2)
	$88	$0B	
	$07	$0B	Oxygen Sensor Drop Abnormal (Bank 1 Sensor 2)
	$08	$0B	
	$A5	$0B	
	$05	$10	Oxygen Sensor Response Abnormal (Bank 1 Sensor 2)
	$06	$10	
$21	$89	$20	Catalyst Degradation Diagnosis (Bank 1)
$39	$93	$FE	Evaporative Emission Control System Leak Detected (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 Leak Detected (purge flow)
$41	$99	$24	A/F Sensor Heater Abnormal (Bank 1 Sensor 1)
	$9A	$24	
	$9B	$14	A/F Sensor Heater Characteristics Abnormal (Bank 1 Sensor 1)
$42	$9C	$24	Oxygen Sensor Heater Abnormal (Bank 1 Sensor 1)
	$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	
$E1	$A6	$FE	Purge Control Solenoid Valve 2 Stock Closed

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, etc.).