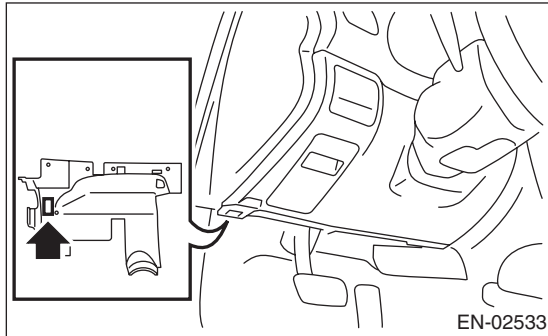


8. General Scan Tool

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)-80, 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, MPH |
| \$0E | Ignition timing advance | ° |
| \$0F | Intake air temperature | °C or °F |
| \$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 (Bank 1 Sensor 2) | V and % |
| \$1C | Supporting OBD system | — |
| \$1F | Elapsed time after starting the engine | sec |
| \$21 | Travel distance after the malfunction indicator light illuminates | km |
| \$24 | A/F value and A/F sensor output voltage (Bank 1 Sensor 1) | — and V |
| \$2C | Target EGR | % |
| \$2D | EGR deviation | % |
| \$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 (Bank 1 Sensor 1) | — and mA |
| \$3C | Catalyst 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 while malfunction indicator lit | 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).

General Scan Tool

ENGINE (DIAGNOSTICS)

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 (Bank 1 Sensor 1) | % |
| \$07 | Long term fuel trim (Bank 1 Sensor 1) | % |
| \$0B | Intake manifold absolute pressure | kPa |
| \$0C | Engine speed | rpm |
| \$0D | Vehicle speed | km/h, MPH |
| \$0E | Ignition timing advance | ° |
| \$0F | Intake air temperature | °C or °F |
| \$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 (Bank 1 Sensor 2) | V and % |
| \$1C | Supporting OBD 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 | 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 "List of Diagnostic Trouble Code (DTC)" for information about data denoting emission-related powertrain DTC. <Ref. to EN(H4SO)(diag)-80, 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.

| OBDMID | TID | SID | Diagnostic item |
|--------|------|------|--|
| \$01 | \$81 | \$0A | A/F sensor continuity 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 deterioration 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 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 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 | |

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.).