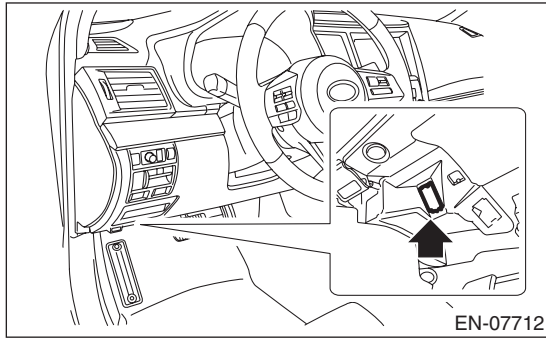# 8. General Scan Tool

## 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).



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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(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 | 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 and short term fuel trim associated with oxygen sensor | V and % |
| $1C | Supporting OBD system | — |
| $1F | Elapsed time after starting the engine | sec |
| $21 | Running distance after MIL turns on | miles |
| $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 | miles |
| $32 | Fuel tank pressure | Pa |
| $33 | Atmospheric pressure | kPa |
| $34 | A/F sensor λ value, current | – and mA |
| $3C | Catalytic temperature | °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 acceleration opening angle 1 | % |
| $4A | Absolute acceleration opening angle 2 | % |
| $4C | Target throttle opening angle | % |
| $4D | Engine operation time during MIL on | 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).

# General Scan Tool

## 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 | % |
| $07 | Long term fuel trim | % |
| $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 | Rear oxygen sensor voltage, compensation value | V and % |
| $1C | Supporting OBD system | — |
| $1F | Elapsed time after starting the engine | sec |
| $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 | % |
| $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(H4DOTC)(diag)-76, 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 | |
| $21 | $89 | $20 | Catalyst deterioration diagnosis (Bank 1) |
| $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 leak detected (Fuel filler cap off) |
| $3B | $94 | $FE | Evaporative emission control system (0.04 inch leak) |
| | $95 | $FE | |
| | $A6 | $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 | |
| $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 the data of vehicle specification (V.I.N., calibration ID, etc.).