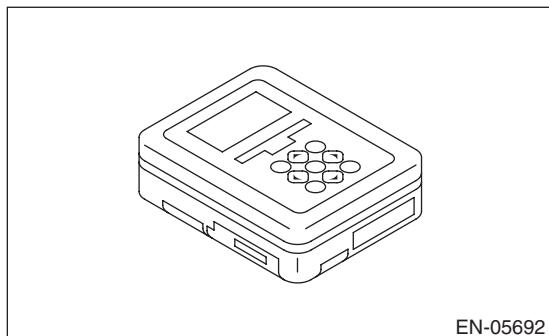


9. Subaru Select Monitor

A: OPERATION

1. HOW TO USE THE SUBARU SELECT MONITOR

- 1) Prepare the Subaru Select Monitor kit. <Ref. to EN(H6DO)(diag)-7, PREPARATION TOOL, General Description.>

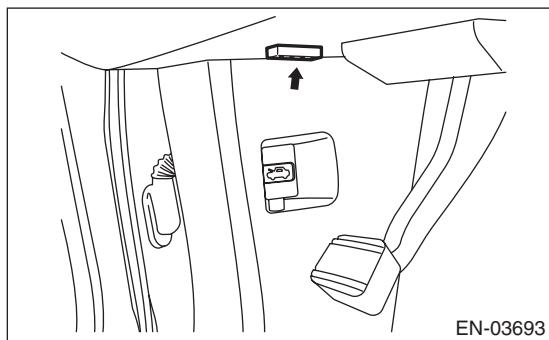


- 2) Prepare the personal computer which has been installed the Subaru Select Monitor.
- 3) Connect the USB cable between SDI (Subaru Diagnosis Interface) and USB port on the personal computer (dedicated port for the Subaru Select Monitor).

NOTE:

The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.

- 4) Connect the diagnosis cable to the SDI.
- 5) Connect the SDI to data link connector located in the lower portion of the instrument panel (on the driver's side).



CAUTION:

Do not connect the scan tools except for Subaru Select Monitor or general scan tool.

- 6) Start up the personal computer.
- 7) Turn the ignition switch to ON (engine OFF), and run the "PC application for Subaru Select Monitor".
- 8) Call up DTC and data, then record them.

NOTE:

For detailed operation procedure, refer to the "PC application help for Subaru Select Monitor".

2. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE (NORMAL MODE)

Refer to "Read Diagnostic Trouble Code" for information about how to indicate DTC. <Ref. to EN(H6DO)(diag)-43, Read Diagnostic Trouble Code (DTC).>

3. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE (OBD MODE)

Refer to "Read Diagnostic Trouble Code" for information about how to indicate DTC. <Ref. to EN(H6DO)(diag)-43, Read Diagnostic Trouble Code (DTC).>

4. READ CURRENT DATA FOR ENGINE (NORMAL MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check}.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System}.
- 3) Click the [OK] button after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display screen, select the {Current Data Display & Save}.
- 5) On the «Current Data Display & Save» display screen, select the {Normal Measurement}.
- 6) Using the scroll key, scroll the display screen up or down until the desired data is shown.

- A list of the support data is shown in the following table.

Description	Display	Unit of measure	Note (at idling)
Engine load	Engine load	%	2.4%
Engine coolant temperature signal	Coolant Temp.	°C or °F	≥ 85°C or 185°F (After engine is warmed-up.)
A/F correction 1	A/F Compensation 1	%	-10% — +10%
A/F learning 1	A/F learning 1	%	-10% — +10%
A/F correction 2	A/F Compensation 2	%	-10% — +10%
A/F learning 2	A/F learning 2	%	-10% — +10%
Intake manifold absolute pressure	Mani. Absolute Pressure	mmHg, kPa, inHg or psig	210 mmHg, 28 kPa, 8.3 inHg or 4.1 psig
Engine speed signal	Engine speed	rpm	600 — 800 rpm (After engine is warmed-up.)
Meter vehicle speed signal	Meter vehicle speed	km/h or MPH	0 km/h or 0 MPH
Ignition timing signal	Ignition timing	deg	13 — 15 deg
Intake air temperature signal	Intake air temperature	°C or °F	(Ambient air temperature)
Amount of intake air	Mass Air Flow	g/s or lb/m	2.5 g/s — 5.0 g/s or 0.31 lb/m — 0.71 lb/m
Throttle opening angle signal	Throttle valve angle	%	2%
Front oxygen sensor voltage value 1	Front oxygen sensor voltage value 1	V	0.900 V
Front oxygen sensor voltage value 2	Front oxygen sensor voltage value 2	V	0.900 V
Battery voltage	Battery Voltage	V	12 — 13 V
Mass air flow voltage	Mass air flow voltage	V	1.2 — 1.3 V
Injection 1 pulse width	Injection 1 pulse width	ms	2.5 ms — 3.5 ms
Injection 2 pulse width	Injection 2 pulse width	ms	2.5 ms — 3.5 ms
Atmospheric pressure signal	Atmospheric pressure	mmHg, kPa, inHg or psig	(Atmosphere pressure)
Intake manifold relative pressure	Intake manifold relative pressure	mmHg, kPa, inHg or psig	(Intake manifold absolute pres- sure — atmosphere pressure)
Ignition learning value	Ignition learning value	deg	+0.0 deg
Acceleration opening angle signal	Acceleration opening angle	%	0%
Fuel temperature signal	Fuel Temp.	°C or °F	+28°C or +82°F
Radiator fan output	Radiator fan output	%	0% (Water temperature 90°C (194°F) when air conditioner is OFF)
Purge control solenoid valve duty ratio	CPC Duty	%	18%
Number of EGR steps	No. of EGR Steps	STEP	0 STEP
Fuel pump duty	Fuel pump duty	%	33%
Variable valve timing advance angle amount R	VVT advance angle amount R	deg	+0 deg — +1 deg
Variable valve timing advance angle amount L	VVT advance angle amount L	deg	+0 deg — +1 deg
Oil flow control solenoid valve duty R	OCV duty R	%	9.4%

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Description	Display	Unit of measure	Note (at idling)
Oil flow control solenoid valve duty L	OCV duty L	%	9.4%
Oil flow control solenoid valve current R	OCV current R	mA	64 mA
Oil flow control solenoid valve current L	OCV current L	mA	64 mA
Front oxygen (A/F) sensor current value 1	A/F sensor current value 1	mA	0.0 mA
Front oxygen (A/F) sensor current value 2	A/F sensor current value 2	mA	0.0 mA
Front oxygen (A/F) sensor resistance value 1	A/F sensor resistance value 1	Ω	31 Ω
Front oxygen (A/F) sensor resistance value 2	A/F sensor resistance value 2	Ω	31 Ω
Front oxygen (A/F) sensor output lambda 1	A/F sensor output lambda 1	—	1.01
Front oxygen (A/F) sensor output lambda 2	A/F sensor output lambda 2	—	1.01
A/F correction 3	A/F Compensation 3	%	0% — 1%
A/F learning 3	A/F learning 3	%	0.0%
Throttle motor duty	Throttle motor duty	%	-20% — +20%
Throttle power supply voltage	Throttle power supply voltage	V	(Battery voltage)
Sub throttle sensor voltage	Sub throttle sensor voltage	V	1.4 V — 1.5 V
Main throttle sensor voltage	Main throttle sensor voltage	V	0.62 V — 0.70 V
Sub accelerator sensor voltage	Sub acceleration sensor voltage	V	1.0 V — 1.2 V
Main accelerator sensor voltage	Main acceleration sensor voltage	V	0.9 V — 1.1 V
Memory vehicle speed	Memory vehicle speed	km/h or MPH	0 km/h or 0 MPH
A/F correction 4	A/F Compensation 4	%	-1% — 1%
A/F learning 4	A/F learning 4	%	0.0%
Fuel level sensor resistance	Fuel level resistance	Ω	4 — 96 Ω
Engine oil temperature	Oil Temperature	°C or °F	≥ 85°C or 185°F (After engine is warmed-up.)
Exhaust variable valve timing retard angle amount R	Exh. VVT Retard Ang. R	deg	+0 deg — +1 deg
Exhaust variable valve timing retard angle amount L	Exh. VVT Retard Ang. L	deg	+0 deg — +1 deg
Exhaust oil flow control solenoid valve duty R	Exh. OCV Duty R	%	9.4%
Exhaust oil flow control solenoid valve duty L	Exh. OCV Duty L	%	9.4%
Exhaust oil flow control solenoid valve current R	Exh. OCV Current R	mA	64 mA
Exhaust oil flow control solenoid valve current L	Exh. OCV Current L	mA	64 mA
#1 cylinder roughness monitor	#1 cylinder roughness monitor	—	0
#2 cylinder roughness monitor	#2 cylinder roughness monitor	—	0
#3 cylinder roughness monitor	#3 cylinder roughness monitor	—	0
#4 cylinder roughness monitor	#4 cylinder roughness monitor	—	0
#5 cylinder roughness monitor	#5 cylinder roughness monitor	—	0
#6 cylinder roughness monitor	#6 cylinder roughness monitor	—	0
Knock sensor correction	Knock Correction	deg	0 deg
Fuel tank pressure signal	Fuel Tank Pressure	mmHg, kPa, inHg or psig	7.5 mmHg, 1 kPa, 0.3 inHg or 0.14 psi
AT/MT identification	AT/MT identification terminal	—	OFF

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Description	Display	Unit of measure	Note (at idling)
Delivery (test) mode terminal	Test mode terminal	—	U check
System operation check mode	D check request flag	—	OFF
Delivery (test) mode terminal	Delivery Mode Connector (Test Mode Connector)	—	OFF
Neutral position switch signal	Neutral SW	—	Neutral
Idle switch signal	Soft idle SW	—	At idle
Ignition switch signal	Ignition SW	—	ON input
Power steering switch signal	Power steering SW input signal	—	OFF input (when OFF)
Air conditioning switch signal	A/C SW	—	OFF input (when OFF)
Starter switch signal	Starter SW	—	OFF input
Front oxygen monitor 1	Front oxygen monitor 1	—	Rich, Lean
Front oxygen monitor 2	Front oxygen monitor 2	—	Rich, Lean
Knocking signal	Knock signal	—	None
Crankshaft position sensor signal	Crankshaft angle signal	—	Provided
Camshaft position sensor signal	Camshaft angle signal	—	Provided
Rear defogger switch signal	Rear defogger SW	—	OFF input (when OFF)
Blower fan switch signal	Blower fan SW	—	OFF input (when OFF)
Light switch signal	Light SW	—	OFF input (when OFF)
A/C middle pressure switch signal	A/C middle pressure SW	—	OFF input (when air conditioner is OFF)
A/C compressor relay signal	A/C compressor relay output	—	OFF output (when air conditioner is OFF)
Drain valve signal	Vent. Solenoid Valve	—	OFF output (when OFF)
AT coordinate retard angle demand signal	AT coordinate retard angle demand	—	None
AT coordinate fuel cut demand signal	AT coordinate fuel cut demand	—	None
Vehicle dynamics control (VDC) torque down prohibition output	Ban of Torque Down	—	Permission
Vehicle dynamics control (VDC) torque down demand	VDC torque down demand	—	None
AT cooperative permission signal	AT coordinate permission signal	—	Permission
Electronic throttle control motor relay signal	ETC motor relay	—	ON
Stop light switch signal	Stop Light Switch	—	OFF (when brake is OFF)
SET/COAST switch signal	SET/COAST SW	—	OFF (when levers are not operated)
RESUME/ACCEL switch signal	RESUME/ACCEL SW	—	OFF (when levers are not operated)
Brake switch signal	Brake SW	—	OFF (when brake is OFF)
Main switch signal	Main SW	—	OFF (when levers are not operated)
Body integrated unit data reception	Body Int. Unit Data	—	ON
Body integrated unit counter update	Body Int. Unit Count	—	ON
Cruise control cancel switch signal	CC Cancel SW	—	OFF (when levers are not operated)
Malfunction indicator light flag	MIL flag	—	Light OFF

NOTE:

For detailed operation procedure, refer to the "PC application help for Subaru Select Monitor".

5. READ CURRENT DATA FOR ENGINE (OBD MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check}.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System}.
- 3) Click the [OK] button after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display screen, select the {OBD System}.
- 5) On the «OBD Menu» display screen, select the {Current Data Display & Save}.
- 6) On the «Current Data Display & Save» display screen, select the {All Data Display}.
- 7) Using the scroll key, scroll the display screen up or down until the desired data is shown.

- A list of the support data is shown in the following table.

Description	Display	Referential value (at idling)	Unit of measure
Number of diagnosis code	Number of Diag. Codes:	0	—
Condition of malfunction indicator light	MI (MIL)	OFF	—
Monitoring test of misfire	Misfire monitoring (Supp)	YES	—
Monitoring test of misfire	Misfire monitoring (Rdy)	YES	—
Monitoring test of fuel system	Fuel System Monitoring (Supp)	YES	—
Monitoring test of fuel system	Fuel System Monitoring (Rdy)	YES	—
Monitoring test of comprehensive component	Component monitoring (Supp)	YES	—
Monitoring test of comprehensive component	Component monitoring (Rdy)	YES	—
Test of catalyst	Catalyst Diagnosis (Supp)	YES	—
Test of catalyst	Catalyst Diagnosis (Rdy)	NO	—
Test of heating-type catalyst	Heated catalyst (Supp)	NO	—
Test of heating-type catalyst	Heated catalyst (Rdy)	N/A	—
Test of evaporative emission purge control system	Evaporative purge system (Supp)	YES	—
Test of evaporative emission purge control system	Evaporative purge system (Rdy)	NO	—
Secondary air system test	Secondary air system (Supp)	NO	—
Secondary air system test	Secondary air system (Rdy)	N/A	—
Test of air conditioning system refrigerant	A/C system refrigerant (Supp)	NO	—
Test of air conditioning system refrigerant	A/C system refrigerant (Rdy)	N/A	—
Test of oxygen sensor	Oxygen sensor (Supp)	YES	—
Test of oxygen sensor	Oxygen sensor (Rdy)	NO	—
Test of oxygen sensor heater	Oxygen Heater Diagnosis (Supp)	YES	—
Test of oxygen sensor heater	Oxygen Heater Diagnosis (Rdy)	NO	—
Test of EGR system	EGR system (Supp)	YES	—
Test of EGR system	EGR system (Rdy)	NO	—
Air fuel ratio control system for bank 1	Fuel system for Bank 1	Normal CLOSE	—
Air fuel ratio control system for bank 2	Fuel system for Bank 2	Normal CLOSE	—
Engine load data	Load	21.0	%
Engine coolant temperature signal	Coolant Temp.	91	°C
Short term fuel trim by front oxygen (A/F) sensor (Bank 1)	A/F Compensation #1	17.2	%
Long term fuel trim by front oxygen (A/F) sensor (Bank 1)	A/F Learning #1	5.5	%
Short term fuel trim by front oxygen (A/F) sensor (Bank 2)	A/F Compensation #2	17.2	%
Long term fuel trim by front oxygen (A/F) sensor (Bank 2)	A/F Learning #2	5.5	%
Intake manifold absolute pressure signal	Mani. Absolute Pressure	233	mmHg
Engine speed signal	Engine speed	700	rpm
Vehicle speed signal	Vehicle speed	0	km/h
#1 Cylinder ignition timing	Ignition Timing #1	16.5	°
Intake air temperature signal	Intake Air Temp.	54	°C

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ENGINE (DIAGNOSTICS)

Description	Display	Referential value (at idling)	Unit of measure
Amount of intake air	Mass Air Flow	2.8	g/s
Throttle position signal	Throttle Opening Angle	13	%
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	0.1 — 0.7	V
A/F correction (Bank 1 Sensor 2)	Short term fuel trim #12	0.0	%
Oxygen sensor (Bank 2 Sensor 2)	Oxygen sensor #22	0.1 — 0.7	V
A/F correction (Bank 2 Sensor 2)	Short term fuel trim #22	0.0	%
On-board diagnostic system	OBD system	OBD/OBD2	—
Front oxygen (A/F) sensor (bank 1 sensor 1)	Oxygen sensor #11	Support	—
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	Support	—
Front oxygen (A/F) sensor (bank 2 sensor 1)	Oxygen sensor #21	Support	—
Oxygen sensor (Bank 2 Sensor 2)	Oxygen sensor #22	Support	—
Elapsed time after engine start	Elapsed time after starting the engine	—	sec
Driving distance after the malfunction indicator light illuminates	Elapsed time after MIL illuminating	—	km
A/F lambda signal (Bank 1 Sensor 1)	A/F sensor #11	1.001	—
A/F sensor output signal (Bank 1 Sensor 1)	A/F sensor #11	2.805	V
A/F lambda signal (Bank 2 Sensor 1)	A/F sensor #21	1.001	—
A/F sensor output signal (Bank 2 Sensor 1)	A/F sensor #21	2.805	V
Target EGR	Target EGR	0	%
EGR deviation	EGR Error	0.0	%
Evaporative purge	Evaporative purge	0	%
Fuel level signal	Fuel level	—	%
Number of warm ups after DTC clear	Number of warm ups after DTC clear	—	—
Travel distance after DTC clear	Travel distance after DTC clear	—	km
Fuel tank pressure signal	Tank pressure	8.8	mmHg
Barometric pressure signal	Atmospheric pressure	Atmospheric pressure	mmHg
A/F lambda signal (Bank 1 Sensor 1)	A/F sensor #11	0.999	—
A/F sensor current (Bank 1 Sensor 1)	A/F sensor #11	0.02	mA
A/F lambda signal (Bank 2 Sensor 1)	A/F sensor #21	0.999	—
A/F sensor current (Bank 2 Sensor 1)	A/F sensor #21	0.02	mA
Catalyst temperature #1	Catalyst Temperature #11	—	°C
Catalyst temperature #2	Catalyst Temperature #21	—	°C
Monitoring test of misfire	Misfire monitoring (Enable)	YES	—
Monitoring test of misfire	Misfire monitoring (Comp)	NO	—
Monitoring test of fuel system	Fuel system monitoring (Enable)	YES	—
Monitoring test of fuel system	Fuel system monitoring (Comp)	NO	—
Monitoring test of comprehensive component	Component monitoring (Enable)	YES	—
Monitoring test of comprehensive component	Component monitoring (Comp)	NO	—
Test of catalyst	Catalyst Diagnosis (Enable)	YES	—
Test of catalyst	Catalyst Diagnosis (Enable)	NO	—
Test of heating-type catalyst	Heated catalyst (Enable)	N/A	—
Test of heating-type catalyst	Heated catalyst (Comp)	N/A	—
Test of evaporative emission purge control system	Evaporative purge system (Enable)	NO	—
Test of evaporative emission purge control system	Evaporative purge system (Comp)	NO	—
Secondary air system test	Secondary air system (Enable)	N/A	—
Secondary air system test	Secondary air system (Comp)	N/A	—
Test of air conditioning system refrigerant	A/C system refrigerant (Enable)	N/A	—
Test of air conditioning system refrigerant	A/C system refrigerant (Comp)	N/A	—

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Description	Display	Referential value (at idling)	Unit of measure
Test of oxygen sensor	Oxygen sensor (Enable)	YES	—
Test of oxygen sensor	Oxygen sensor (Comp)	NO	—
Test of oxygen sensor heater	Oxygen sensor heater (Enable)	YES	—
Test of oxygen sensor heater	Oxygen sensor heater (Comp)	NO	—
Test of EGR system	EGR system (Enable)	YES	—
Test of EGR system	EGR system (Comp)	NO	—
ECM power voltage	ECM power voltage	13.789	V
Absolute load	Absolute load	22	%
A/F target lambda	A/F target lambda value	0.976	—
Relative throttle opening angle	Relative throttle opening angle	2	%
Ambient temperature	Ambient temperature	Ambient air temperature	°C
Absolute throttle opening angle 2	Absolute throttle opening angle 2	32	%
Absolute accelerator opening angle 1	Absolute accelerator opening angle 1	13	%
Absolute accelerator opening angle 2	Absolute accelerator opening angle 2	13	%
Target throttle opening angle	Target throttle opening angle	0	%
Engine operating time while malfunction indicator light lit	Engine operation time during MIL on	—	min
Elapsed time after DTC clear	Elapsed time after DTC clear	—	min
Fuel used	Used fuel	GAS	—
Relative accelerator opening angle	Relative throttle opening angle	0	%

NOTE:

For detailed operation procedure, refer to the “PC application help for Subaru Select Monitor”.

6. READ FREEZE FRAME DATA FOR ENGINE (OBD MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check}.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System}.
- 3) Click the [OK] button after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display screen, select the {OBD System}.
- 5) On the «OBD Menu» display screen, select the {Freeze Frame Data Display}.

- A list of the support data is shown in the following table.

Description	Display	Unit of measure
DTC of freeze frame data	Freeze frame data	DTC
Air fuel ratio control system for bank 1	Fuel system for Bank1	—
Air fuel ratio control system for bank 2	Fuel system for Bank2	—
Engine load data	Calculated load valve	%
Engine coolant temperature signal	Coolant Temp.	°C or °F
Short term fuel trim by front oxygen (A/F) sensor (Bank 1)	Short term fuel trim B1	%
Long term fuel trim by front oxygen (A/F) sensor (Bank 1)	Long term fuel trim B1	%
Short term fuel trim by front oxygen (A/F) sensor (Bank 2)	Short term fuel trim B2	%
Long term fuel trim by front oxygen (A/F) sensor (Bank 2)	Long term fuel trim B2	%
Intake manifold absolute pressure signal	Mani. Absolute Pressure	mmHg, kPa, inHg or psig
Engine speed signal	Engine Speed	rpm
Vehicle speed signal	Vehicle Speed	km/h or MPH
Ignition timing adv. #1	Ignition timing adv. #1	°
Intake air temperature	Intake Air Temp.	°C or °F
Amount of intake air	Mass Air Flow	g/s
Throttle opening angle	Throttle Opening Angle	%
Oxygen sensor #12	Oxygen sensor #12	V
A/F correction value #12	Short term fuel trim #12	%
Oxygen sensor #22	Oxygen sensor #22	V
A/F correction value #22	Short term fuel trim #22	%
On-board diagnostic system	On-board diagnostic system	OBD/OBD2
Oxygen sensor #11	Oxygen sensor #11	Support
Oxygen sensor #12	Oxygen sensor #12	Support
Oxygen sensor #21	Oxygen sensor #21	Support
Oxygen sensor #22	Oxygen sensor #22	Support
Elapsed time after engine start	Elapsed time after starting the engine	sec
Target EGR	Target EGR	%
EGR deviation	EGR Error	%
Evaporative purge	Evaporative purge	%
Fuel level signal	Fuel level	%
Fuel tank pressure signal	Tank pressure	mmHg, kPa, inHg or psig
Atmospheric pressure	Atmospheric pressure	mmHg, kPa, inHg or psig
ECM power voltage	ECM power voltage	V
Absolute load	Absolute load	%
A/F target lambda	A/F target lambda value	—
Relative throttle opening angle	Relative throttle opening angle	%
Ambient temperature	Ambient temperature	°C or °F
Absolute throttle opening angle 2	Absolute throttle opening angle 2	%
Absolute accelerator opening angle 1	Absolute accelerator opening angle 1	%
Absolute accelerator opening angle 2	Absolute accelerator opening angle 2	%
Target throttle opening angle	Target throttle opening angle	%

NOTE:

For detailed operation procedure, refer to the “PC application help for Subaru Select Monitor”.

7. V.I.N. REGISTRATION

- 1) On the «Main Menu» display screen, select the {Each System Check}.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System}.
- 3) Click the [OK] button after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display screen, select the {V.I.N. Registration}.
- 5) Perform the procedures shown on the display screen.

NOTE:

For detailed operation procedure, refer to the “PC application help for Subaru Select Monitor”.