

# Subaru Select Monitor

## ENGINE (DIAGNOSTICS)

### 9. Subaru Select Monitor

#### A: OPERATION

##### 1. HOW TO USE SUBARU SELECT MONITOR

NOTE:

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

##### 2. DISPLAY CURRENT ENGINE DATA

NOTE:

- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
- A list of the support data is shown in the following table.
- \*: For models without cruise control, the brake switch signal does not change.

Content	Display	Note (at idling)	Unit of measure
Engine speed signal	Engine Speed	650 rpm	rpm
Intake air amount	Mass Air Flow	2.5 g/s	g/s or lb/m
Vehicle speed signal	Vehicle Speed	0 km/h	km/h or MPH
Throttle position signal	Throttle Opening Angle	13%	%
Acceleration opening angle signal	Accel opening angle	0.0%	%
A/F sensor output lambda 1	A/F Sensor #1	1.00	—
#1 Cylinder ignition timing	Ignition timing adv. #1	15.5°	°
Engine coolant temperature signal	Coolant Temp.	96°C	°C or °F
Injection 1 pulse width	Fuel Injection #1 Pulse	2.56 ms	ms
Short term fuel trim by front oxygen (A/F) sensor (bank 1)	Short term fuel trim B1	0.8%	%
Long term fuel trim by front oxygen (A/F) sensor (bank 1)	Long term fuel trim B1	1.6%	%
Learned value of ignition timing	Learned Ignition Timing	0.0 deg	deg
Intake manifold absolute pressure signal	Mani. Absolute Pressure	32 kPa	kPa, mmHg, inHg or psig
Oxygen sensor (bank 1 sensor 2)	Oxygen sensor #12	0.7 V	V
AVCS advance angle amount RH	VVT Adv. Ang. Amount R	0 deg	deg
AVCS advance angle amount LH	VVT Adv. Ang. Amount L	0 deg	deg
Intake AVCS specified position learning value (bank 1)	VVT Initial Position Learning Value #1	60°CA	°CA
Intake AVCS specified position learning value (bank 2)	VVT Initial Position Learning Value #2	60°CA	°CA
ECM power supply voltage	ECU ACC	14.176 V	V
Target engine speed	Target engine speed	650 rpm	rpm
A/F target lambda	Target Equivalence Ratio	0.996	—
Engine oil temperature signal	Oil Temperature	96°C	°C or °F
Intake air temperature signal	Intake Air Temp.	50°C	°C or °F
Ambient temperature	Ambient Temperature	Ambient Temp for A/C	°C or °F
Engine load data	Calculated load value	15.3%	%
Absolute load	Absolute Load Value	14.9%	%
Atmospheric pressure signal	Atmospheric pressure	101 kPa	kPa, mmHg, inHg or psig
Intake manifold relative pressure	Mani. Relative Pressure	(Air intake absolute pressure – Atmospheric pressure)	kPa, mmHg, inHg or psig
Target throttle opening angle	Target Throttle Opening Angle	16 deg	deg
Actual throttle opening angle	Actual Throttle Opening Angle	16 deg	deg
Target throttle opening angle	Target Throttle Opening Angle	0.0%	%

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Content	Display	Note (at idling)	Unit of measure
Relative throttle opening angle	Relative Throttle Pos.	1.6%	%
Electronic throttle control motor voltage	Throttle Motor Voltage	14.2 V	V
Main throttle position sensor voltage	Main-Throttle Sensor	0.66 V	V
Sub throttle position sensor voltage	Sub-Throttle Sensor	1.52 V	V
Throttle motor duty	Throttle Motor Duty	-14%	%
Main accelerator opening angle	Main Accelerator Pedal Position	0.0%	%
Sub accelerator opening angle	Sub Accelerator Pedal Position	0.0%	%
Main accelerator pedal position sensor voltage	Main-Accelerator Sensor	0.66 V	V
Sub accelerator pedal position sensor voltage	Sub-Accelerator Sensor	0.66 V	V
Mass air flow voltage	Air Flow Sensor Voltage	1.2 V	V
Fuel level signal	Fuel Level	—	%
Fuel level sensor resistance	Fuel level resistance	—	Ω
Evaporative purge	Evap Purge	0%	%
Purge control solenoid duty ratio	CPC Valve Duty Ratio	0%	%
Generator duty ratio	ALT Duty	67%	%
Alternator control mode	Alternator control mode	High/Mid/Low	—
Battery current value	Battery current value	10 A	A
Battery temperature signal	Battery temperature	29°C	°C or °F
Knock sensor correction	Knocking Correction	0.0 deg	deg
Air fuel ratio control system for bank 1	Fuel system for Bank 1	CI_normal	—
A/F sensor current value 1	A/F Sensor #1 Current	0.00 mA	mA
A/F sensor resistance value 1	A/F Sensor #1 Resistance	50 Ω	Ω
A/F correction #3	A/F Correction #3	0.00%	%
Number of EGR steps	No. of EGR steps	0 STEP	STEP
Target EGR	Commanded EGR	0%	%
EGR error	EGR Error	0%	%
Oil control solenoid duty ratio RH	OCV Duty R	55.3%	%
Oil control solenoid duty ratio LH	OCV Duty L	56.1%	%
Oil control solenoid current RH	OCV Current R	736 mA	mA
Oil control solenoid current LH	OCV Current L	768 mA	mA
#1 cylinder roughness monitor	Roughness Monitor #1	0	—
#2 cylinder roughness monitor	Roughness Monitor #2	0	—
#3 cylinder roughness monitor	Roughness Monitor #3	0	—
#4 cylinder roughness monitor	Roughness Monitor #4	0	—
Total number of ignition switch ON	IGN Counter	—	times
Count	Count	Common	—
Elapsed time after ignition switch ON	past time after IG on	—	ms
Elapsed time after engine start	Time Since Engine Start	—	sec
Travel distance after DTC clear	Meter since DTC cleared	—	km/mile
Engine operating time while malfunction indicator light lit	Time while MIL lighted	—	min
Elapsed time after DTC clear	Time since DTC cleared	—	min
Number of warm ups after DTC clear	Number of warm-ups	—	times
Travel distance after the malfunction indicator light illuminates	Lighted MI lamp history	—	km/mile
Odometer	Odometer	—	km

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Content	Display	Note (at idling)	Unit of measure
Learning value of main accelerator sensor at fully closed position	Main Accelerator Sensor Learning Value at Closed Position	4.96 deg	deg
Learning value of sub accelerator sensor at fully closed position	Sub Accelerator Sensor Learning Value at Closed Position	4.56 deg	deg
Memory vehicle speed	Memorized Cruise Speed	0 km/h	km/h or MPH
Catalyst temperature #1	Catalyst temperature #11	305.1°C	°C or °F
Type of fuel	Type of fuel	GAS	—
Neutral condition	AT drive status / MT gear status	NEUT	—
X mode (CVT model)	X Mode	OFF	—
Neutral position switch signal	Neutral switch	Neutral	—
Electronic throttle control motor relay signal	ETC Motor Relay	ON	—
Clutch switch signal	Clutch switch	OFF	—
Stop light switch signal	Stop Light Switch	OFF (when OFF)	—
Brake switch signal*	Brake Switch	OFF (when OFF)	—
Soft idle switch signal	Idle Switch Signal	Idle	—
Ignition switch signal	Ignition switch	ON	—
Air conditioner middle pressure switch signal	A/C Mid Pressure Switch	OFF (when OFF)	—
Air conditioner compressor relay output signal	A/C Compressor Signal	OFF (when OFF)	—
Radiator fan relay 1 signal	Radiator Fan Relay #1	OFF (when OFF)	—
Radiator fan relay 2 signal	Radiator Fan Relay #2	OFF (when OFF)	—
Air conditioning switch signal	A/C Switch	OFF (when OFF)	—
Starter switch signal	Starter Switch	OFF	—
Rear defogger switch signal	Rear Defogger SW	OFF (when OFF)	—
Blower fan switch signal	Blower Fan SW	OFF (when OFF)	—
Light switch signal	Light Switch	OFF (when OFF)	—
Wiper switch signal	Wiper Switch	OFF (when OFF)	—
Tumble generator valve output signal	TGV Output	OFF	—
Tumble generator valve driving signal	TGV Drive	Close	—
AT/MT identification terminal	AT Vehicle ID Signal	ON/OFF	—
Delivery mode terminal	Delivery Mode Connector	OFF	—
Rear oxygen monitor	Rear O2 Rich Signal	ON/OFF	—
Knocking signal	Knocking Signal	OFF	—
Crankshaft position sensor signal	Crankshaft Position Sig.	ON	—
Camshaft position sensor signal	Camshaft Position Sig.	ON	—
AT coordinate retard angle demand signal	Retard Signal from AT	OFF	—
AT coordinate fuel cut demand signal	Fuel Cut signal from AT	OFF	—
Vehicle dynamics control (VDC) torque down prohibition output	Ban of Torque Down	ON	—
Vehicle dynamics control (VDC) torque down demand	Request Torque Down VDC	OFF	—
Permission signal in coordination with AT	Torque Permission Signal	ON (OFF on MT vehicles)	—
SET/COAST switch signal	SET/COAST Switch	OFF (when OFF)	—
RES/ACC switch signal	RESUME/ACCEL Switch	OFF (when OFF)	—
Main switch signal	Main switch	OFF (when OFF)	—
Distance change switch (model with EyeSight)	distance change SW	OFF (when OFF)	—
Cruise control cancel switch signal	CC Cancel SW	OFF (when OFF)	—
Fuel pump relay signal	Fuel Pump Relay	ON	—

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Content	Display	Note (at idling)	Unit of measure
All cylinders fuel cut	All Cylinders Fuel cut	OFF	—
Request for shift pattern during low water temperature	Shift Pattern Demand for Low Water Temperature	OFF	—
Oil level switch signal	Oil level switch	HIGH level	—
ELCM switching valve drive signal	ELCM switching valve	Open	—
ELCM vacuum pump drive signal	ELCM pump	OFF	—
Condition of malfunction indicator light	MI(MIL)	OFF	—
Number of diagnosis code	Number of DTCs	0	—
A/F correction (bank 1 sensor 2)	Short term fuel trim #12	0.0%	%
Front oxygen (A/F) sensor (bank 1 sensor 1)	Oxygen sensor #11	Support	—
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	Support	—
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	2.193 V	V
A/F lambda signal (Bank 1 Sensor 1)	A/F Sensor #11	1.001	—
A/F sensor current (Bank 1 Sensor 1)	A/F Sensor #11	0.00	mA
Absolute throttle opening angle 2	Absolute Throttle Pos.#2	30.6%	%
Absolute accelerator opening angle 1	Accelerator Pedal Pos.#1	13.3%	%
Absolute accelerator opening angle 2	Accelerator Pedal Pos.#2	13.3%	%
Relative acceleration opening angle	Relative Accelera. Pos.	0%	%
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)	NO	—
Test of evaporative emission purge control system	Evaporative purge system(Rdy)	N/A	—
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	O2 Heater Diagnosis(Supp)	YES	—
Test of oxygen sensor heater	O2 Heater Diagnosis(Rdy)	YES	—
Test of EGR system	EGR system(Supp)	YES	—
Test of EGR system	EGR system(Rdy)	NO	—
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	—

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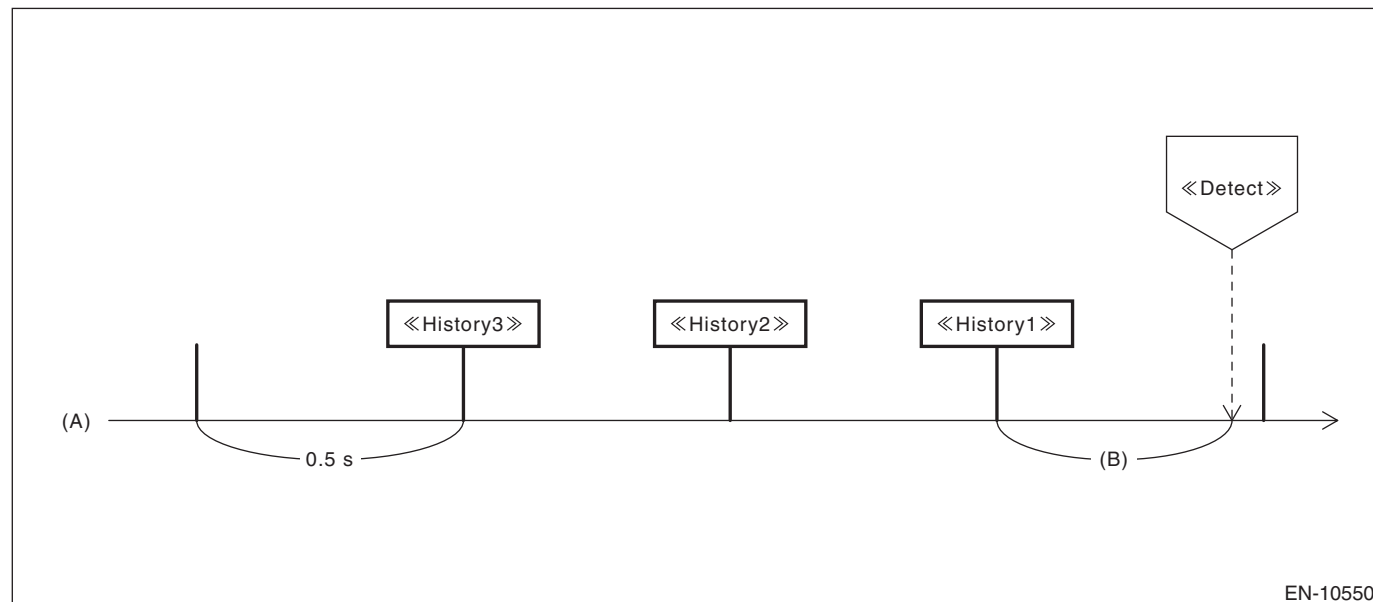
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Content	Display	Note (at idling)	Unit of measure
Monitoring test of comprehensive component	Component monitoring(Enable)	YES	—
Monitoring test of comprehensive component	Component monitoring(Comp)	NO	—
Test of catalyst	Catalyst Diagnosis(Enable)	YES	—
Test of catalyst	Catalyst Diagnosis(Comp)	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)	N/A	—
Test of evaporative emission purge control system	Evaporative purge system(Comp)	N/A	—
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	—
Test of oxygen sensor	Oxygen sensor(Enable)	YES	—
Test of oxygen sensor	Oxygen sensor(Comp)	NO	—
Test of oxygen sensor heater	O2 Heater Diagnosis(Enable)	YES	—
Test of oxygen sensor heater	O2 Heater Diagnosis(Comp)	NO	—
Test of EGR system	EGR system(Enable)	YES	—
Test of EGR system	EGR system(Comp)	NO	—
Number of counts for denominator of diagnosis frequency	General Denominator	—	times
Number of counts for ignition cycle	IG counter	—	times
On-board diagnostic system	OBD System	OBD/OBD2	—

### 3. DISPLAY OF ENGINE FREEZE FRAME DATA

#### NOTE:

- ECM captures the freeze frame data every 0.5 seconds and always keeps the latest three cords. Time-series freeze frame data includes the latest three freeze frame data and the freeze frame data when the DTC is detected.
- In the time-series freeze frame data, the following freeze frame data are displayed: «Detect», «History1», «History2», and «History3».
- Time lag between the freeze frame data of «Detect» and the freeze frame data of «History1» changes within the range of 0 — 0.5 seconds. This is because the freeze frame data of «Detect» is recorded when the DTC is actually detected, while the freeze frame data of «History1» is updated every 0.5 seconds.



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(A) 0.5 seconds timer

(B) Changes within the range of 0 — 0.5 seconds, depending on the timing of DTC detection.

- When more than one DTCs are recorded, the time-series freeze frame data is recorded only for the first-detected DTC, and for the next DTC, just the freeze frame data of «Detect» is recorded. And for the subsequent DTCs, no freeze frame data is recorded.
- When performing diagnosis, you can utilize the time-series freeze frame data to guess the vehicle status when the DTC was detected.
- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

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

Contents	Display	Unit of measure
Total number of ignition switch ON	IGN Counter	times
Count	Count	—
Elapsed time after ignition switch ON	IG-ON Elapsed Time	ms
Air fuel ratio control system for bank 1	Fuel system for Bank 1	—
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	V
A/F correction (Bank 1 Sensor 2)	Short term fuel trim #12	%
Front oxygen (A/F) sensor (Bank 1 Sensor 1)	Oxygen sensor #11	—
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	—
Neutral condition	AT drive status	—
Engine load data	Calculated load value	%
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	%
Intake manifold absolute pressure signal	Mani. Absolute Pressure	kPa, mmHg, inHg or psig
Engine speed signal	Engine Speed	rpm
Vehicle speed signal	Vehicle Speed	km/h or MPH
#1 Cylinder ignition timing	Ignition timing adv. #1	°
Intake air temperature signal	Intake Air Temp.	°C or °F
Intake air amount	Mass Air Flow	g/s or lb/m
Throttle position signal	Throttle Opening Angle	%
On-board diagnostic system	OBD System	—
Elapsed time after engine start	Time Since Engine Start	sec
Target EGR	Commanded EGR	%
EGR error	EGR Error	%
Evaporative purge	Evap Purge	%
Fuel level signal	Fuel Level	%
Atmospheric pressure signal	Atmosphere Pressure	kPa, mmHg, inHg or psig
ECM power supply voltage	ECU ACC	V
Absolute load	Absolute Load Value	%
A/F target lambda	Target Equivalence Ratio	—
Relative throttle opening angle	Relative Throttle Pos.	%
Ambient temperature	Ambient Temperature	°C or °F
Absolute throttle opening angle 2	Absolute Throttle Pos.#2	%
Absolute accelerator opening angle 1	Accelerator Pedal Pos.#1	%
Absolute accelerator opening angle 2	Accelerator Pedal Pos.#2	%
Target throttle opening angle	Target Throttle Opening Angle	%
Actual throttle opening angle	Actual Throttle Opening Angle	deg

## 4. V.I.N REGISTRATION

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