

# Subaru Select Monitor

POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)

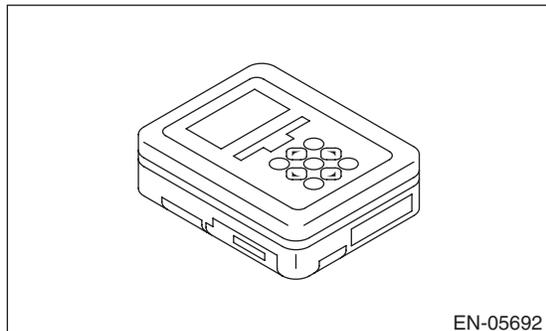
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## 6. Subaru Select Monitor

### A: OPERATION

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

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



2) Prepare PC with Subaru Select Monitor installed.

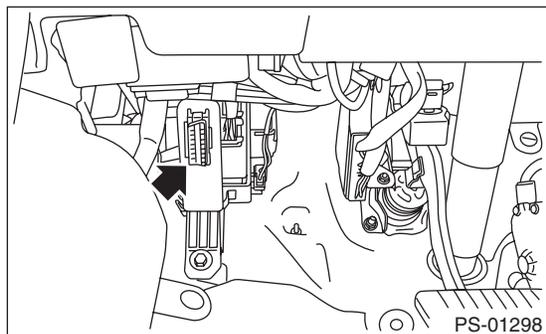
3) Connect the USB cable to SDI (Subaru Diagnosis Interface) and USB port on the personal computer (dedicated port for the Subaru Select Monitor).

#### 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 SDI.

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



#### CAUTION:

**Do not connect scan tools other than the Subaru Select Monitor.**

6) Start the PC.

7) Turn the ignition switch to ON (engine OFF) and run the "PC application for Subaru Select Monitor".

8) Record the DTC and data.

#### NOTE:

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

9) If the power steering control module and Subaru Select Monitor can not communicate, check the communication circuit. <Ref. to PS(diag)-14, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, INSPECTION, Subaru Select Monitor.>

# Subaru Select Monitor

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### 2. READ CURRENT DATA

- 1) On «Main Menu» display, select {Each System Check}.
- 2) On «System Selection Menu» display, select {Power Steering System}.
- 3) On «Power Steering Diagnosis» display, select {Current Data Display & Save}.
- 4) Using the scroll key, scroll the display screen up or down until the desired data is shown.

The list is indicated in the following table.

Display	Contents to be displayed	Range	Unit
Torque sensor main output	Main torque sensor output voltage is displayed.	0 — 5	V
Torque sensor sub output	Sub torque sensor output voltage is displayed.	0 — 5	V
Torque sensor reference voltage	Torque sensor standard voltage is displayed.	0 — 5	V
Power Supply Current	The current flowing to CM is displayed.	-128 — 127	A
Vehicle speed	Vehicle speed is displayed. (CAN communication data)	0 — 255	km/h
Engine Speed	Engine speed is displayed. (CAN communication data)	0 — 12750	rpm
Detection current at ECM	The current flowing to the motor relay is displayed.	-128 — 127	A
3-phase motor current (U-phase)	The U phase actual current value as calculated by the micro-computer from the torque sensor input is displayed.	-128 — 127	A
3-phase motor current (V-phase)	The V phase actual current value as calculated by the micro-computer from the torque sensor input is displayed.	-128 — 127	A
Motor angular speed	Data from the resolver sensor is displayed.	-4096 — 4064	rpm
CU Temperature	The thermistor temperature of the steering control module is displayed.	-50 — 205	°C
Power supply voltage	Battery voltage is displayed.	0 — 25.5	V
Torque sensor power supply voltage	The power supply voltage output to the torque sensor is displayed.	0 — 10.2	V
IG Voltage	The power supply voltage supplied to the ECM is displayed.	0 — 25.5	V
CAN Bus Status	Either Active/Passive/Bus Off is displayed.	—	—
EPS Status	Either Normal/Assist Stop/Assist Limitation is displayed.	—	—
Target Current at ECM	The motor target current value required for assist is displayed.	-128 — 127	A
Steering angle	Steering angle of steering wheel is displayed.	-640 — 635	deg
Reading assist MAP	Either MAP1/MAP2/MAP3 is displayed.	—	—
Overheating protection intervention history	Number of interventions to the overheat protection control (assist limitation for protecting the power steering from overheating)*1	0 — 250	times
IG Count after ECU Overheat Protection(latest)	Number of times the ignition switch is ON from the intervention to overheat protection control (most recent) until now*2	0 — 65000	times
IGN count from overheating protection (previous)	Number of times the ignition switch is ON from the intervention to overheat protection control (previous) until now*2	0 — 65000	times
IGN count from overheating protection (before previous)	Number of times the ignition switch is ON from the intervention to overheat protection control (before previous) until now*2	0 — 65000	times
Assist limit history (low voltage, high voltage)	Number of intervention to assist limit when the power supply voltage is low or high*1	0 — 250	times

#### NOTE:

- \*1 When the value exceeds the maximum of 250 times, 250 is displayed.
- \*2 When there is no intervention of the overheating protection control, “65535” is displayed. If an error such as control unit memory error, etc. occurs, “65534” is displayed.

### 3. FREEZE FRAME DATA

#### NOTE:

- Freeze frame data stored at the time of trouble occurrence is shown on the display.
- Each time a trouble occurs, the latest information is stored in the freeze frame data in memory.
- One freeze frame data will be stored.

# Subaru Select Monitor

POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)

## B: INSPECTION

### 1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

#### DETECTING CONDITION:

- Defective harness connector
- Defective power steering control module

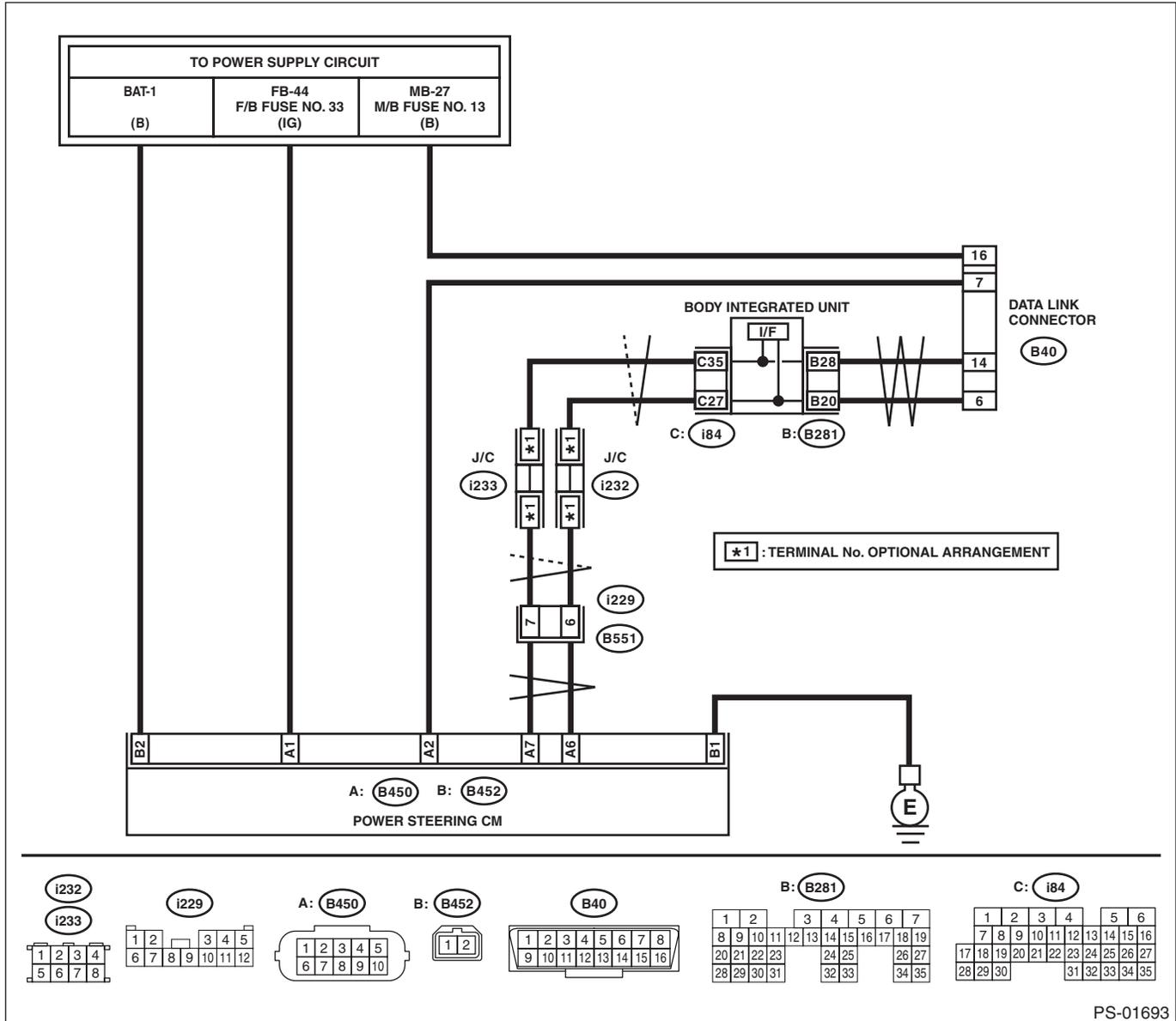
#### TROUBLE SYMPTOM:

- Communication is impossible between the power steering control module and Subaru Select Monitor.
- After starting the engine, the STEERING warning light does not illuminate but steering effort is heavy.

#### WIRING DIAGRAM:

- Gasoline engine model

Electric power steering system <Ref. to WI(w/o HEV)-97, Electric Power Steering System.>



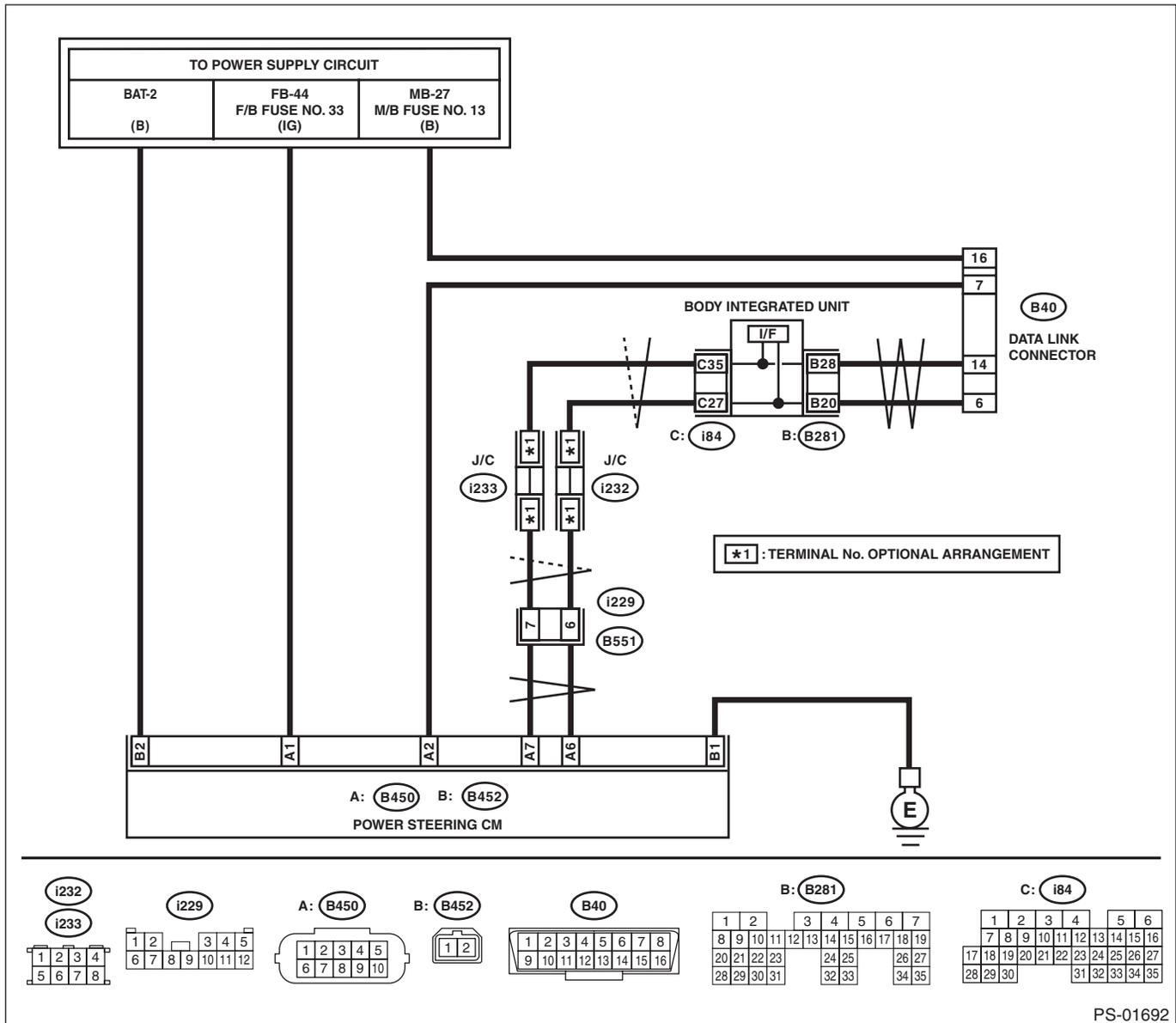
PS-01693

# Subaru Select Monitor

## POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)

- HEV model

Electric power steering system <Ref. to WI(HEV)-98, Electric Power Steering System.>



PS-01692

Step	Check	Yes	No
1	<b>CHECK IGNITION SWITCH.</b>		
	Is the ignition switch ON?	Go to step 2.	Turn the ignition switch to ON, and select the power steering mode using the Subaru Select Monitor.
2	<b>CHECK BATTERY.</b>		
	1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Is the voltage 12 V or more?	Go to step 3.
		Repair or tighten the battery terminal.	Charge or replace the battery.
3	<b>CHECK BATTERY TERMINAL.</b>		
	Is there poor contact at battery terminal?	Go to step 4.	

# Subaru Select Monitor

## POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)

Step	Check	Yes	No
<b>4 CHECK SUBARU SELECT MONITOR COMMUNICATION.</b> 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Go to step 8.	Go to step 5.
<b>5 CHECK SUBARU SELECT MONITOR COMMUNICATION.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the power steering control module connector. 3) Turn the ignition switch to ON. 4) Check whether communication to other systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Replace the power steering control module. <Ref. to PS-44, Power Steering Control Module.>	Go to step 6.
<b>6 CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND DATA LINK CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM, VDC CM, airbag CM and body integrated unit. <b>CAUTION:</b> <b>When disconnecting the connector from airbag CM, always follow the precautions on AB section. &lt;Ref. to AB-10, CAUTION, General Description.&gt;</b> 3) Measure the resistance between data link connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B40) No. 7 — Chassis ground:</i>	Is the resistance 1 M $\Omega$ or more?	Go to step 7.	Repair the short circuit to ground in harness and connector between each control module and data link connector.
<b>7 CHECK HARNESS CONNECTOR BETWEEN POWER STEERING CONTROL MODULE AND DATA LINK CONNECTOR.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage between the power steering control module and chassis ground. <i>Connector &amp; terminal</i> <i>(B40) No. 7 (+) — Chassis ground (-):</i>	Is the voltage less than 1 V?	Go to step 8.	Repair the short circuit to power supply in harness and connector between each control module and data link connector.
<b>8 CHECK HARNESS CONNECTOR BETWEEN POWER STEERING CONTROL MODULE AND DATA LINK CONNECTOR.</b> Measure the resistance between the power steering control module connector and the data link connector. <i>Connector &amp; terminal</i> <i>(B450) No. 2 — (B40) No. 7:</i>	Is the resistance less than 0.5 $\Omega$ ?	Go to step 9.	Repair the open circuit or poor contact of harness and connectors between the power steering control module and data link connector.
<b>9 CHECK POWER STEERING CONTROL MODULE CONNECTOR INSTALLATION.</b> Turn the ignition switch to OFF.	Is the power steering control module connector inserted into the power steering control module until the clamp locks?	Go to step 10.	Insert the power steering control module connector into the power steering control module.

# Subaru Select Monitor

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Step	Check	Yes	No
<b>10 CHECK POWER SUPPLY CIRCUIT.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the power steering control module connector (B452). 3) Turn the ignition switch to ON. (engine OFF) 4) Measure the ignition power supply voltage between the power steering control module connector and chassis ground. <b>Connector &amp; terminal</b> <b>(B450) No. 1 (+) — Chassis ground (-):</b> <b>(B452) No. 2 (+) — Chassis ground (-):</b>	Is the voltage 10 — 15 V?	Go to step 11.	Repair the open circuit of harness or the poor contact of connector between the power steering control module and the battery.
<b>11 CHECK HARNESS CONNECTOR BETWEEN POWER STEERING CONTROL MODULE AND CHASSIS GROUND.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the power steering control module. 3) Measure the resistance in the harness between the power steering control module and chassis ground. <b>Connector &amp; terminal</b> <b>(B452) No. 1 — Chassis ground:</b>	Is the resistance less than 0.5 $\Omega$ ?	Go to step 12.	Repair the open circuit or poor contact of the harness between the power steering control module and chassis ground.
<b>12 CHECK POOR CONTACT OF CONNECTOR.</b>	Is there poor contact of the power steering control module power supply, ground circuit line and data link connector?	Repair the connector.	Replace the power steering control module. <Ref. to PS-44, Power Steering Control Module.>

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## POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)

### 2. WITHOUT DTC

#### DETECTING CONDITION:

- Defective combination meter
- Open circuit of harness

#### TROUBLE SYMPTOM:

- The STEERING warning light will not turn off.
- “No diagnostic Code Present” will be displayed on the Subaru Select Monitor.

#### NOTE:

When the STEERING warning light is OFF and “No diagnostic Code Present” is displayed on Subaru Select Monitor when all DTCs are read, the system is operating properly.

	Step	Check	Yes	No
1	<b>CHECK LAN SYSTEM.</b> Perform the diagnosis for LAN system using the Subaru Select Monitor. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.> <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is DTC U0131 detected?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-64, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(HEV)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2	<b>CHECK COMBINATION METER.</b> Check the STEERING warning light when the ignition switch is turned from OFF to ON.	Does the STEERING warning light illuminate at ignition switch ON, and turn off two seconds after the engine is started?	Finish the diagnosis.	Replace the combination meter. <Ref. to IDI-20, Combination Meter.>