12.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC C2511 TORQUE SENSOR FAILURE 1 (MAIN)

DTC DETECTING CONDITION:

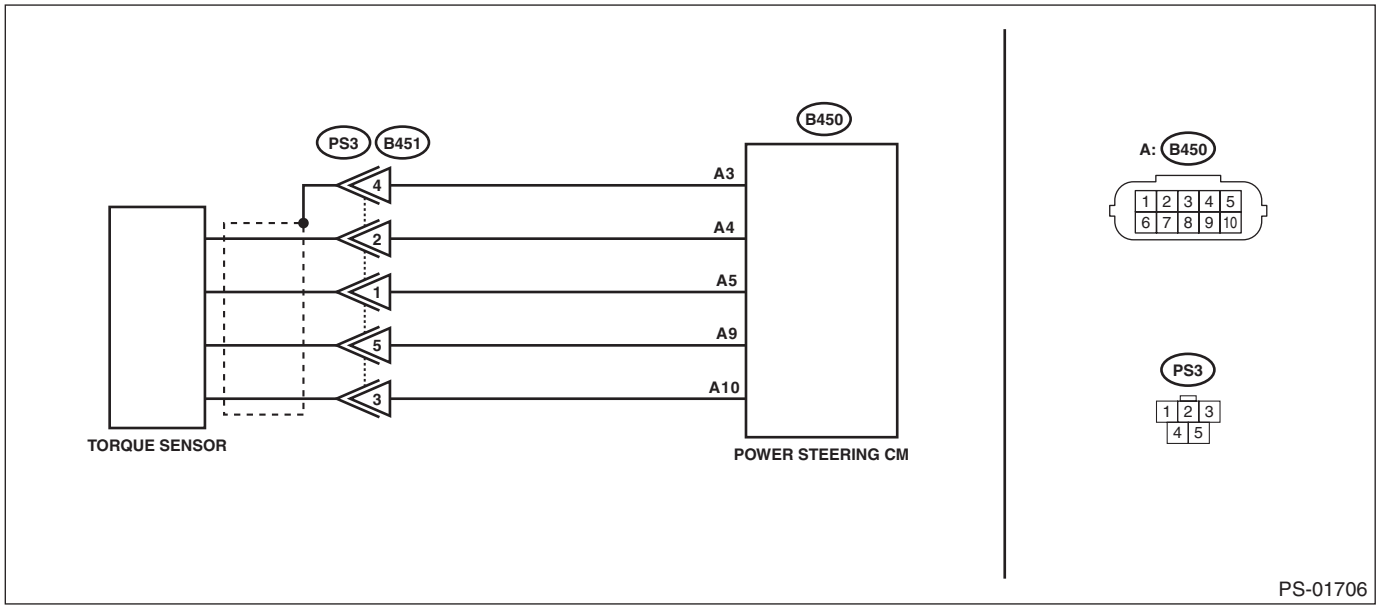
When torque sensor main output voltage failure is detected after the ignition switch is to ON.

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

WIRING DIAGRAM:

Electric power steering system <Ref. to WI-159, Electric Power Steering System.>



Step		Check	Yes	No
1	**CHECK TORQUE SENSOR SIGNAL.** 1) Display the current data of the power steering control module using the Subaru Select Monitor. 2) Check the voltage of «Torque sensor main output», «Torque sensor sub output» and «Torque sensor power supply voltage».	Are the voltage of «Torque sensor main output» and «Torque sensor sub output» 2.5±0.1 V? Is the voltage of «Torque sensor power supply voltage» 5±0.3 V?	Check for poor contact of the connector, and check the conditions again. If the condition recur, go to the next step. Go to step **2**. If it does not recur, complete the inspection.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors (B450, B451). 3) Using a tester and test harness, check the internal resistance of the harness terminals. ***Connector & terminal*** ***(B450) No. 4 — (B451) No. 2:*** ***(B450) No. 5 — (B451) No. 1:*** ***(B450) No. 9 — (B451) No. 5:*** ***(B450) No. 10 — (B451) No. 3:***	Is the resistance less than 10 Ω?	Go to step **3**.	Repair or replace the harness.

	Step	Check	Yes	No
3	**CHECK POWER STEERING CONTROL MODULE.** 1) Connect the connector (B450) to the power steering control module. 2) Turn the ignition switch to ON. 3) Short the circuit between connector (B451) terminals. ***Terminals*** ***No. 3 — No. 1:*** ***No. 3 — No. 2:*** 4) Using the Subaru Select Monitor, check the voltages of «Torque sensor main output» and «Torque sensor sub output».	Is the voltage of «Torque sensor main output» 2.5±0.3 V, and the voltage of «Torque sensor sub output» 0±0.1 V before the circuit is shorted? Are the voltages of «Torque sensor main output» and «Torque sensor sub output» after you short the circuit 5±0.3 V?	Replace the steering gearbox. <Ref. to PS-56, Electric Power Steering Gearbox.>	Replace the power steering control module. <Ref. to PS-84, Power Steering Control Module.>

B: DTC C2512 TORQUE SENSOR FAILURE 2 (SUB)

DTC DETECTING CONDITION:

When torque sensor sub output voltage failure is detected after the ignition switch is to ON.

NOTE:
For the diagnostic procedures, refer to “DTC 2511 TORQUE SENSOR FAILURE 1 (MAIN)”. <Ref. to PS(diag)-24, DTC C2511 TORQUE SENSOR FAILURE 1 (MAIN), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

C: DTC C2513 TORQUE SENSOR FAILURE 3 (MUCH TOLERANCE)

DTC DETECTING CONDITION:

When torque sensor main/sub output voltage failure is detected after the ignition switch is to ON.

NOTE:
For the diagnostic procedures, refer to “DTC 2511 TORQUE SENSOR FAILURE 1 (MAIN)”. <Ref. to PS(diag)-24, DTC C2511 TORQUE SENSOR FAILURE 1 (MAIN), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

D: DTC C2514 TORQUE SENSOR POWER SUPPLY FAILURE

DTC DETECTING CONDITION:

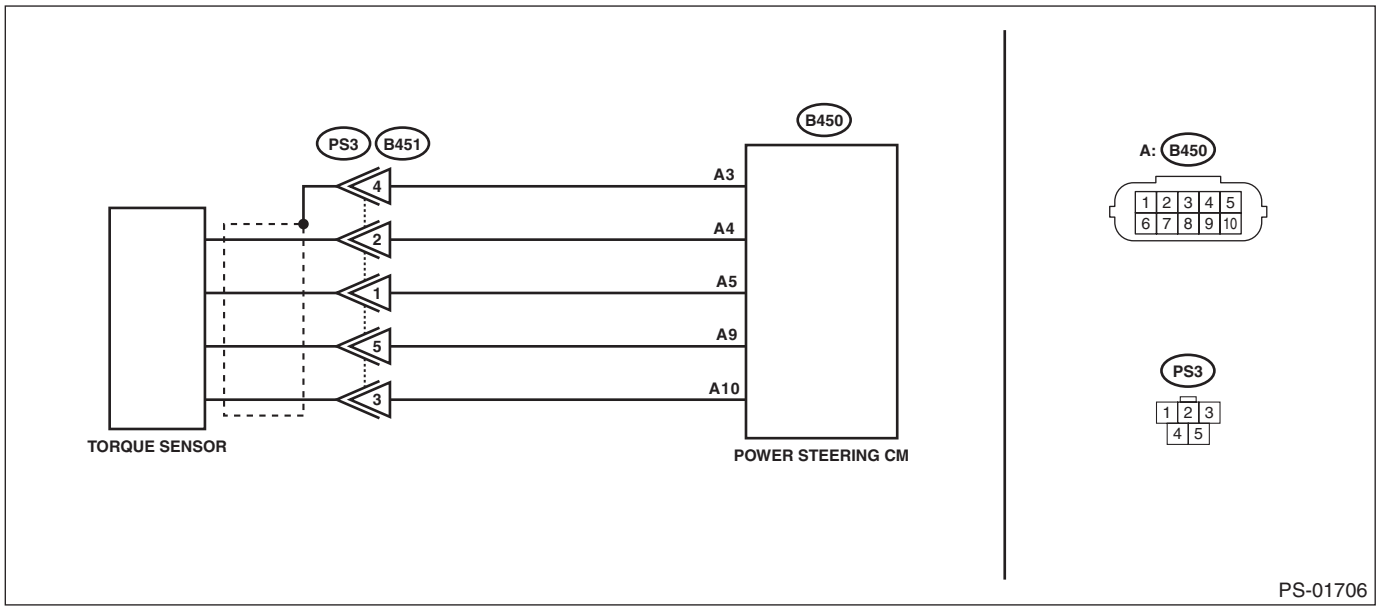
When torque sensor power supply voltage failure is detected after the ignition switch is to ON.

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

WIRING DIAGRAM:

Electric power steering system <Ref. to WI-159, Electric Power Steering System.>



	Step	Check	Yes	No
1	**CHECK TORQUE SENSOR SIGNAL.** 1) Display the current data of the power steering control module using the Subaru Select Monitor. 2) Check the voltage of «Torque sensor main output», «Torque sensor sub output» and «Torque sensor power supply voltage».	Are the voltage of «Torque sensor main output» and «Torque sensor sub output» 2.5±0.1 V? Is the voltage of «Torque sensor power supply voltage» 5±0.3 V?	Check for poor contact of the connector, and check the conditions again. If the condition recur, go to the next step. Go to step **2**. If it does not recur, complete the inspection.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (B451). 3) Using a tester and test harness, check the internal resistance of the harness terminals. ***Connector & terminal*** ***(B450) No. 4 — (B451) No. 2:*** ***(B450) No. 5 — (B451) No. 1:*** ***(B450) No. 9 — (B451) No. 5:*** ***(B450) No. 10 — (B451) No. 3:***	Is the resistance less than 10 Ω?	Replace the power steering control module. <Ref. to PS-84, Power Steering Control Module.>	Repair or replace the harness.

E: DTC C2521 MOTOR FAILURE 1 (MOTOR)

DTC DETECTING CONDITION:

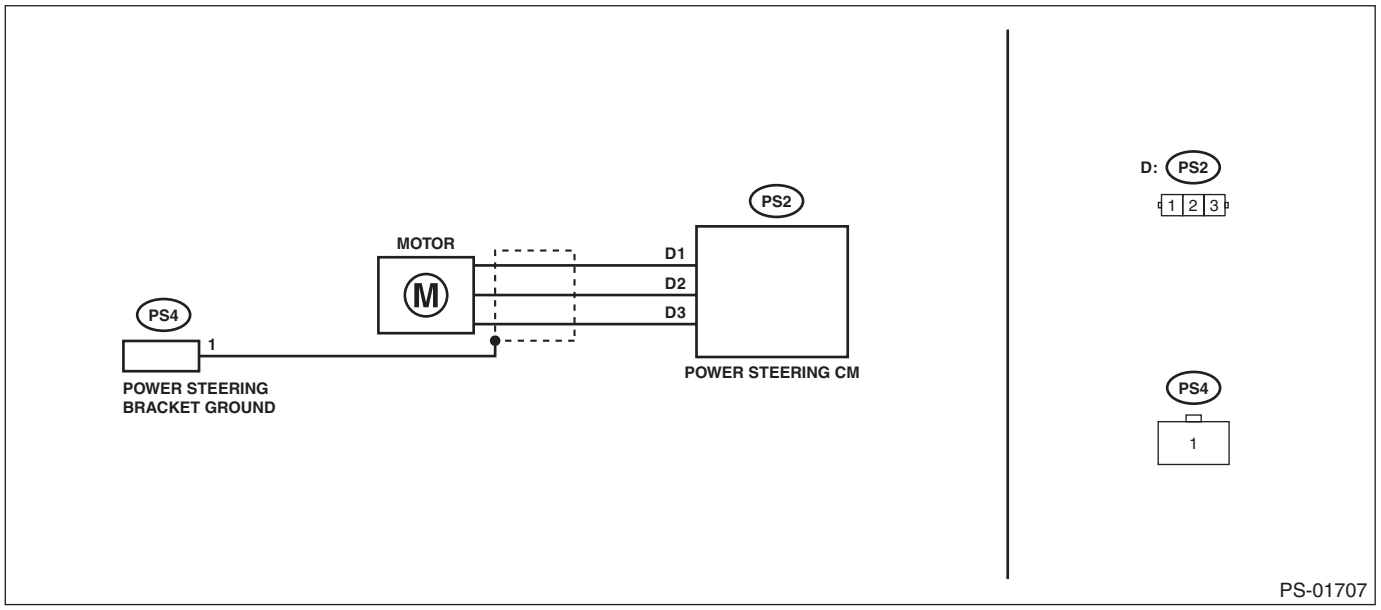
- When motor driving element malfunction is detected after assist starts with 500 rpm engine speed reception.
- When motor current failure is detected after assist starts with 500 rpm engine speed reception.
- When motor voltage failure is detected after assist starts with 500 rpm engine speed reception.

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

WIRING DIAGRAM:

Electric power steering system <Ref. to WI-159, Electric Power Steering System.>



	Step	Check	Yes	No
1	**CHECK HARNESS AND CONNECTOR.** Check the connection status of the power steering control module and motor harness (PS2).	Are the harness and connector firmly installed?	Go to step **2**.	Check the connection of connectors/terminals/harnesses and perform inspection again.
2	**CHECK MOTOR UNIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (PS2) from the power steering control module. 3) Use a tester to check for continuity in the motor. ***Connector & terminal*** ***(PS2) No. 1 — No. 2:*** ***(PS2) No. 1 — No. 3:*** ***(PS2) No. 2 — No. 3:***	Is there continuity?	Go to step **3**.	Replace the steering gearbox. <Ref. to PS-56, Electric Power Steering Gearbox.>
3	**CHECK MOTOR INSULATION.** Use a tester to check for short circuits in the motor. ***Connector & terminal*** ***(PS2) No. 1 — Steering gearbox body:*** ***(PS2) No. 2 — Steering gearbox body:*** ***(PS2) No. 3 — Steering gearbox body:***	Is the resistance 1 MΩ or more?	Replace the power steering control module. <Ref. to PS-84, Power Steering Control Module.>	Replace the steering gearbox. <Ref. to PS-56, Electric Power Steering Gearbox.>

F: DTC C2522 MOTOR FAILURE 2 (ANGLE ABNORMAL)

DTC DETECTING CONDITION:

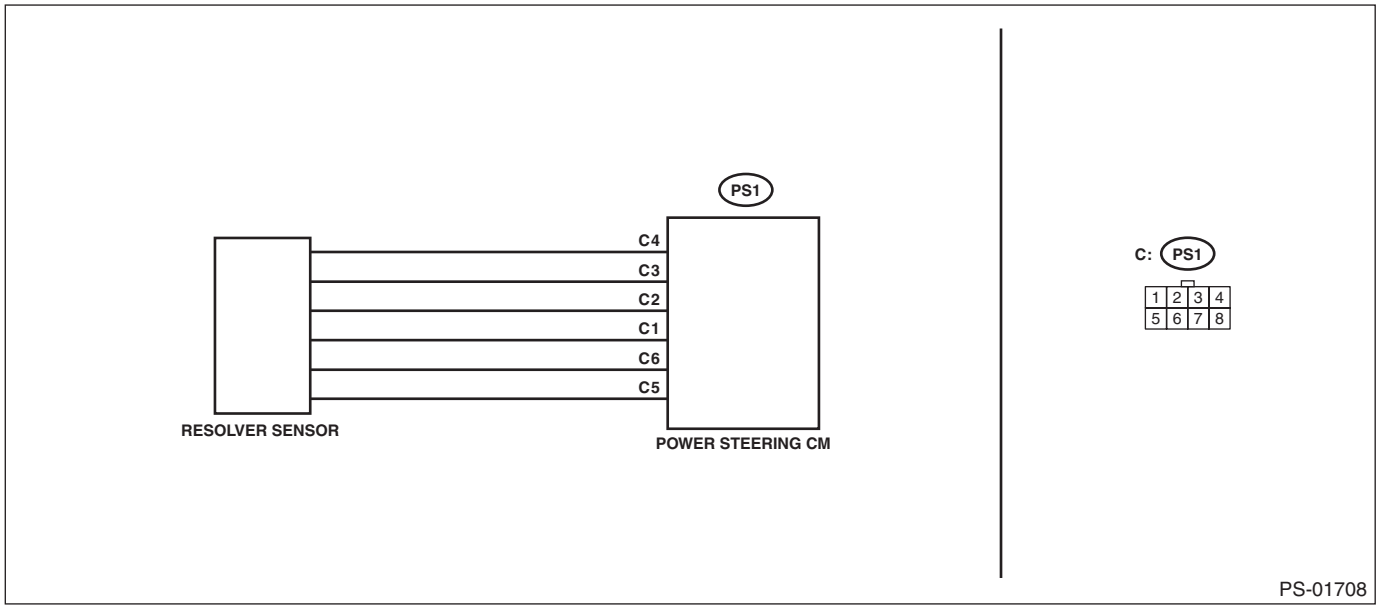
When resolver signal output voltage failure is detected after assist starts with 500 rpm engine speed reception.

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

WIRING DIAGRAM:

Electric power steering system <Ref. to WI-159, Electric Power Steering System.>



	Step	Check	Yes	No
1	**CHECK HARNESS AND CONNECTOR.** Check the connection status of the power steering control module and resolver sensor harness (PS1).	Are the harness and connector firmly installed?	Go to step **2**.	Check the connection of connectors/terminals/harnesses and perform inspection again.
2	**PERFORM UNIT CHECK OF RESOLVER SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (PS1) from the power steering control module. 3) Use a tester to check for continuity in the resolver sensor. ***Connector & terminal*** ***(PS1) No. 1 — No. 2 :*** ***(PS1) No. 3 — No. 4 :*** ***(PS1) No. 5 — No. 6 :***	Is there continuity?	Go to step **3**.	Replace the steering gearbox. <Ref. to PS-56, Electric Power Steering Gearbox.>
3	**CHECK RESOLVER SENSOR INSULATION.** Using a tester, check for short circuits in the resolver sensor. ***Connector & terminal*** ***(PS1) No. 1 — Steering gearbox body:*** ***(PS1) No. 2 — Steering gearbox body:*** ***(PS1) No. 3 — Steering gearbox body:*** ***(PS1) No. 4 — Steering gearbox body:*** ***(PS1) No. 5 — Steering gearbox body:*** ***(PS1) No. 6 — Steering gearbox body:***	Is the resistance 1 MΩ or more?	Replace the power steering control module. <Ref. to PS-84, Power Steering Control Module.>	Replace the steering gearbox. <Ref. to PS-56, Electric Power Steering Gearbox.>

G: DTC C2531 ECU FAILURE 1 (CPU FAILURE)

DTC DETECTING CONDITION:
When microcomputer malfunction is detected after the ignition switch is to ON.
TROUBLE SYMPTOM:
- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

NOTE:
When this code is displayed, replace the power steering control module with new parts. <Ref. to PS-84, Power Steering Control Module.>

H: DTC C2532 ECU FAILURE 2 (PERIPHERAL CIRCUIT FAILURE)

DTC DETECTING CONDITION:
- When torque sensor peripheral circuit malfunction inside the power steering control module is detected after assist starts with 500 rpm engine speed reception.
- When storage medium IC malfunction inside the power steering control module is detected at initial check.
- When motor drive circuit malfunction is detected after assist starts with 500 rpm engine speed reception.
- When motor driving element driver malfunction is detected after the ignition switch is ON.
- When intercommunication error of the power steering control module is detected after the ignition switch is ON.

TROUBLE SYMPTOM:
- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

NOTE:
When this code is displayed, replace the power steering control module with new parts. <Ref. to PS-84, Power Steering Control Module.>

I: DTC C2533 ECM FAILURE 3 (BOARD TEMPERATURE SENSOR FAILURE)

DTC DETECTING CONDITION:
When thermistor malfunction is detected after the ignition switch is ON.
TROUBLE SYMPTOM:
The steering wheel operation feels heavy.

NOTE:
When this code is displayed, replace the power steering control module with new parts. <Ref. to PS-84, Power Steering Control Module.>

J: DTC C2541 VEHICLE SPEED FAILURE(SENSOR FAILURE)

DTC DETECTING CONDITION:
When VDCCM reception failure (related to vehicle speed sensor) is detected after the ignition switch is ON.
TROUBLE SYMPTOM:
The steering wheel operation feels heavy.

	Step	Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, read all DTCs.	Is a DTC related to VDC system or vehicle speed signal system detected?	Perform the diagnosis according to the DTC. <Ref. to VDC(diag)-42, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system using the Subaru Select Monitor. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>	Is a DTC related to CAN communication detected?	Perform the diagnosis according to the DTC. <Ref. to LAN(diag)-70, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK VEHICLE SPEED SIGNAL.** 1) Display the current data «Vehicle Speed» of the power steering control module using the Subaru Select Monitor. 2) Lift up the vehicle (so that the wheels turn freely), start the engine, and raise engine speed in gear. **CAUTION:** **Be careful that no one is near the spinning tires and nothing gets caught in them.** 3) Check for whether the data changes according to vehicle speed.	Is the data in sync with the vehicle speed?	It is possible that temporary poor communication occurs. Perform memory clear.	Replace the power steering control module. <Ref. to PS-84, Power Steering Control Module.>

K: DTC C2543 ERROR PASSIVE STATUS

DTC DETECTING CONDITION:
When send/receive failure of CAN communication is detected after the ignition switch is ON.
TROUBLE SYMPTOM:
The steering wheel operation feels heavy.

	Step	Check	Yes	No
1	**CHECK PERIPHERALS.** Check the data link connector.	Is any other electrical part connected to the data link connector or harness?	Disconnect the connection of electrical parts and perform inspection again.	Go to step **2**.
2	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system using the Subaru Select Monitor. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>	Is a DTC related to CAN communication detected?	Perform the diagnosis according to the DTC. <Ref. to LAN(diag)-70, List of Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK DTC.** Read the DTC of the power steering control module using the Subaru Select Monitor. <Ref. to PS(diag)-16, Read Diagnostic Trouble Code (DTC).>	Is DTC C2543 a current malfunction?	Go to step **4**.	System is normal. Temporary interference from noise is a possible cause.
4	**CHECK CONNECTOR.** Check the connecting condition of connector.	Is the connector firmly installed?	Go to step **5**.	Install the connector, and check again.
5	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector (B450).	Is there crimped or spread portion in connector terminal on vehicle harness side and power steering control module side?	Repair or replace faulty parts.	Go to step **6**.
6	**CHECK HARNESS.** Check the harness related to CAN communication system.	Is there any fault in the harness?	Repair or replace the harness.	Replace the power steering control module. <Ref. to PS-84, Power Steering Control Module.>

L: DTC C2548 VEHICLE DYNAMICS CONTROL MODULE ABNORMAL

DTC DETECTING CONDITION:

When error flag from VDCCM is detected for 2 seconds after the ignition switch is ON.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of VDC system using the Subaru Select Monitor.	Is a DTC related to VDC system (sensors) detected?	Perform the diagnosis according to the DTC. <Ref. to VDC(diag)-42, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK DTC.** Using the Subaru Select Monitor, read all DTCs.	Is a DTC related to CAN communication detected?	Perform the diagnosis according to the DTC. <Ref. to LAN(diag)-70, List of Diagnostic Trouble Code (DTC).>	Replace the power steering control module. <Ref. to PS-84, Power Steering Control Module.>

M: DTC C2551 POWER SUPPLY RELAY FAILURE

DTC DETECTING CONDITION:

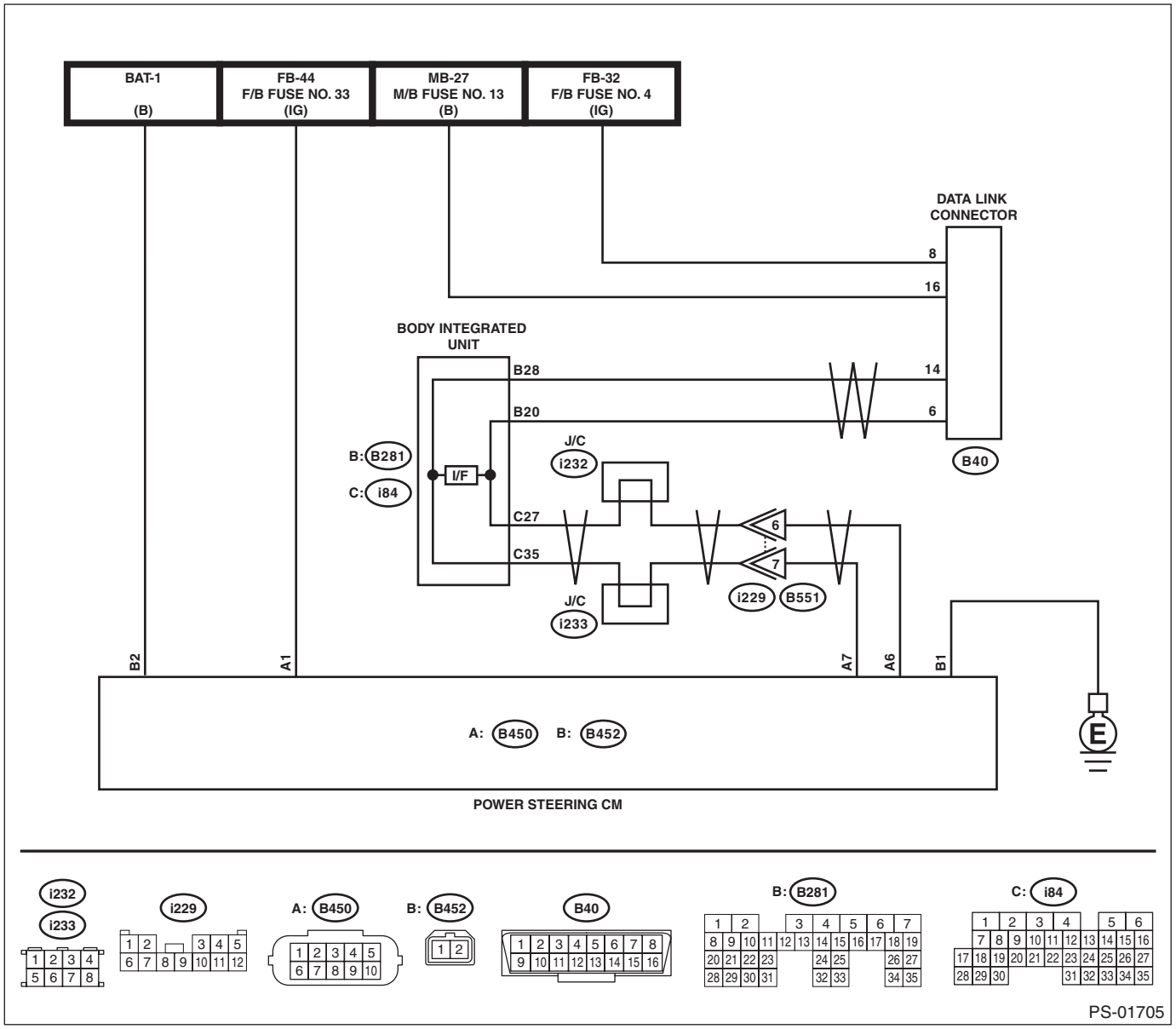
- When contact deposit malfunction of power supply relay is detected at initial check.
- When power supply voltage failure is detected after the ignition switch is ON.
- When power supply voltage drop is detected with 500 rpm engine speed reception.

TROUBLE SYMPTOM:

- The steering wheel operation feels heavy.
- STEERING warning light illuminates.

NOTE:
If power supply voltage failure exists at the vehicle side, the warning light goes off if the normal voltage returns.

WIRING DIAGRAM:
Electric power steering system <Ref. to WI-159, Electric Power Steering System.>



PS-01705

	Step	Check	Yes	No
1	**CHECK BATTERY AND FUSE.** Check the battery and fuse.	Is the voltage 12 V or more? Is the specific gravity 1.260 or more? Is the battery terminal installed properly? Is the fuse OK?	Go to step **2**.	Repair or replace faulty parts.
2	**CHECK WIRING HARNESS.** 1) Disconnect the connector of the power steering control module. 2) Turn the ignition switch to ON. 3) Using a tester and test harness, check the voltage between terminals. ***Connector & terminal*** ***(B452) No. 2 (+) — Chassis ground (–):***	Is the voltage 12 V or more?	Go to step **3**.	Repair the open circuit of harness or the poor contact of connector between the power steering control module and the battery.
3	**CHECK GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Using a tester and test harness, check the resistance between terminals. ***Connector & terminal*** ***(B452) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Check for poor contact of terminals in the power steering control module, and if there are no malfunctions, replace the power steering control module. <Ref. to PS-84, Power Steering Control Module.>	Repair the open circuit or poor contact of the harness between the power steering control module and chassis ground.

N: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

O: DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

P: DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

Q: DTC U0126 LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

R: DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

S: DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

T: DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

BODY SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)	AC
HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)	AC(diag)
AIRBAG SYSTEM	AB
AIRBAG SYSTEM (DIAGNOSTICS)	AB(diag)
OCCUPANT DETECTION SYSTEM (DIAGNOSTICS)	OD(diag)
SEAT BELT SYSTEM	SB
LIGHTING SYSTEM	LI
AUTO HEADLIGHT BEAM LEVELER SYSTEM (DIAGNOSTICS)	AL(diag)
WIPER AND WASHER SYSTEMS	WW
ENTERTAINMENT	ET
COMMUNICATION SYSTEM	COM
GLASS/WINDOWS/MIRRORS	GW
BODY STRUCTURE	BS
INSTRUMENTATION/DRIVER INFO	IDI
INSTRUMENTATION/DRIVER INFO (DIAGNOSTICS)	IDI(diag)
SEATS	SE
SECURITY AND LOCKS	SL

BODY SECTION

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)	SR
EXTERIOR/INTERIOR TRIM	EI
EXTERIOR BODY PANELS	EB
CRUISE CONTROL SYSTEM	CC
CRUISE CONTROL SYSTEM (DIAGNOSTICS)	CC(diag)
IMMOBILIZER (DIAGNOSTICS)	IM(diag)
LAN SYSTEM (DIAGNOSTICS)	LAN(diag)
KEYLESS ACCESS WITH PUSH BUTTON START SYSTEM (DIAGNOSTICS)	KPS(diag)
BODY CONTROL SYSTEM (DIAGNOSTICS)	BC(diag)

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

AC

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