

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) (DIAGNOSTIC)	AC
AIRBAG SYSTEM	AB
AIRBAG SYSTEM (DIAGNOSTIC)	AB
SEAT BELT SYSTEM	SB
LIGHTING SYSTEM	LI
WIPER AND WASHER SYSTEM	WW
ENTERTAINMENT	ET
COMMUNICATION SYSTEM	COM
GLASS/WINDOW/MIRROR	GW
BODY STRUCTURE	BS
INSTRUMENTATION/DRIVER INFO	IDI
SEAT	SE
SECURITY AND LOCK	SL
SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)	SR
EXTERIOR/INTERIOR TRIM	EI
EXTERIOR BODY PANEL	EB

BODY SECTION

CRUISE CONTROL SYSTEM CC

CRUISE CONTROL SYSTEM (DIAGNOSTIC) CC(H4SO)

CRUISE CONTROL SYSTEM (DIAGNOSTIC) CC(H4DOTC)

CRUISE CONTROL SYSTEM (DIAGNOSTIC) CC(H4DOTC 2.5)

IMMOBILIZER (DIAGNOSTIC) IM

INSTRUMENTATION/DRIVER INFO



	Page
1. General Description	2
2. Combination Meter System	3
3. Combination Meter Assembly	10
4. Speedometer	13
5. Tachometer	14
6. Fuel Gauge	15
7. Water Temperature Gauge	16
8. Ambient Sensor	17

General Description

INSTRUMENTATION/DRIVER INFO

1. General Description

A: SPECIFICATION

Combination meter	Speedometer	Electric pulse type
	Temperature gauge	Cross coil type
	Fuel gauge	Cross coil type
	Tachometer	Electric pulse type
	Turn signal indicator light	14 V — 2 W
	Charge indicator light	14 V — 1.4 W
	Oil pressure indicator light	LED
	ABS warning light	14 V — 1.4 W
	Malfunction indicator light	LED
	HI-beam indicator light	14 V — 2 W
	Door open warning light	LED
	Seat belt warning light	LED
	Brake fluid and parking brake warning light	14 V — 2 W
	FWD indicator light	LED
	AIRBAG warning light	LED
	Meter illumination light	14 V — 3.4 W, 14 V — 2 W
	AT OIL TEMP. warning light	LED
	LO indicator light	LED
	HOLD indicator light	LED
	Immobilizer indicator light	LED
	Rear differential oil temperature warning light	14 V — 2 W
	Cruise indicator light	14 V — 1.4 W
	Rear fog light indicator light	14 V — 2 W
	POWER indicator light	14 V — 1.4 W
	Low fuel warning light	LED
	AT select lever position indicator light	14 V — 100 mA
	LCD back light	14 V — 1.4 W

B: CAUTION

- Be careful not to damage meters and instrument panel.
- Be careful not to damage meter glasses.
- Make sure that electrical connector is connected securely.
- After installation, make sure that each meter operates normally.
- Use gloves to avoid damage and getting fingerprints on the glass surface and meter surfaces.
- Do not apply excessive force to the printed circuit.
- Do not drop or otherwise apply impact.

C: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance and voltage.

2. Combination Meter System

A: WIRING DIAGRAM

1. COMBINATION METER

<Ref. to WI-106, WIRING DIAGRAM, Combination Meter.>

2. OUTSIDE TEMPERATURE INDICATOR

<Ref. to WI-236, WIRING DIAGRAM, Outside Temperature Display System.>

Combination Meter System

INSTRUMENTATION/DRIVER INFO

B: INSPECTION

CAUTION:

When measuring voltage and resistance of the ECM, TCM, or each sensor, use a tapered pin with a diameter of less than 0.64 mm (0.025 in) in order to avoid poor contact. Do not insert the pin more than 2 mm (0.08 in).

1. SYMPTOM CHART

Symptom	Repair order	Reference
Combination meter assembly does not operate.	(1) Power supply (2) Ground circuit	<Ref. to IDI-5, CHECK POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, Combination Meter System.>
Speedometer does not operate.	(1) (MT model) Vehicle speed sensor (AT model) TCM (2) Harness (3) Speedometer	MT model: <Ref. to IDI-5, CHECK VEHICLE SPEED SENSOR, INSPECTION, Combination Meter System.>
		AT model: <Ref. to IDI-6, CHECK TRANSMISSION CONTROL MODULE (TCM), INSPECTION, Combination Meter System.>
Tachometer does not operate.	(1) ECM (2) Harness (3) Tachometer	<Ref. to IDI-7, CHECK ENGINE CONTROL MODULE (ECM), INSPECTION, Combination Meter System.>
Fuel gauge does not operate.	(1) Fuel level sensor (2) Harness (3) Fuel gauge	<Ref. to IDI-7, CHECK FUEL LEVEL SENSOR, INSPECTION, Combination Meter System.>
Water temperature gauge does not operate.	(1) Engine coolant temperature sensor (2) Harness (3) Water temperature gauge	<Ref. to IDI-8, CHECK ENGINE COOLANT TEMPERATURE SENSOR, INSPECTION, Combination Meter System.>
Outside temperature indicator does not operate.	(1) Ambient sensor (2) Harness (3) Combination meter	<Ref. to IDI-8, CHECK OUTSIDE TEMPERATURE INDICATOR, INSPECTION, Combination Meter System.>

Combination Meter System

INSTRUMENTATION/DRIVER INFO

2. CHECK POWER SUPPLY AND GROUND CIRCUIT

Step	Check	Yes	No
1 CHECK POWER SUPPLY FOR COMBINATION METER. 1) Remove the combination meter. <Ref. to IDI-10, REMOVAL, Combination Meter Assembly.> 2) Disconnect the combination meter harness connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between combination meter connector and chassis ground. Connector & terminal (i10) No. 9 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 2.	Check the harness for open or short between ignition switch and combination meter.
2 CHECK POWER SUPPLY FOR COMBINATION METER. Measure the voltage between combination meter connector and chassis ground. Connector & terminal (i10) No. 8 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 3.	Check the harness for open or short between fuse and combination meter.
3 CHECK GROUND CIRCUIT OF COMBINATION METER. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between combination meter connector and chassis ground. Connector & terminal (i10) No. 10 — Chassis ground:	Is the resistance less than 10 Ω ?	Replace the combination meter printed circuit.	Repair the wiring harness.

3. CHECK VEHICLE SPEED SENSOR

Step	Check	Yes	No
1 CHECK VEHICLE SPEED SENSOR. 1) Lift-up the vehicle and support it with rigid racks. 2) Remove the combination meter with harness connector. 3) Drive the vehicle at a speed greater than 20 km/h (12 MPH). Warning: Be careful not to get caught in the running wheels. 4) Measure the voltage between combination meter connector and chassis ground. Connector & terminal (i10) No. 12 (+) — Chassis ground (-):	Is the voltage 1 V \leftarrow \rightarrow 5 V?	Check the speedometer. <Ref. to IDI-13, INSPECTION, Speedometer.>	Go to step 2.
2 CHECK VEHICLE SPEED SENSOR POWER SUPPLY. 1) Turn the ignition switch to OFF. 2) Disconnect the vehicle speed sensor harness connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between vehicle speed sensor connector and engine ground. Connector & terminal (B17) No. 3 (+) — Engine ground (-):	Is the voltage more than 10 V?	Go to step 3.	Check the harness for open or short between ignition switch and vehicle speed sensor.

Combination Meter System

INSTRUMENTATION/DRIVER INFO

Step	Check	Yes	No
3 CHECK HARNESS BETWEEN VEHICLE SPEED SENSOR AND ENGINE GROUND. 1) Turn the ignition switch to OFF. 2) Measure the resistance between vehicle speed sensor connector and engine ground. <i>Connector & terminal</i> <i>(B17) No. 2 — Engine ground:</i>	Is the resistance less than 10 Ω ?	Go to step 4.	Repair the wiring harness.
4 CHECK HARNESS BETWEEN VEHICLE SPEED SENSOR AND COMBINATION METER. 1) Disconnect the connector from combination meter. 2) Measure the resistance between vehicle speed sensor harness connector and combination meter harness connector. <i>Connector & terminal</i> <i>(B17) No. 1 — (i10) No. 12:</i>	Is the resistance less than 10 Ω ?	Replace the vehicle speed sensor.	Repair the wiring harness.

4. CHECK TRANSMISSION CONTROL MODULE (TCM)

Step	Check	Yes	No
1 CHECK TCM SIGNAL. 1) Lift-up the vehicle and support it with rigid racks. 2) Drive the vehicle faster than 10 km/h (6 MPH). Warning: Be careful not to get caught in the running wheels. 3) Measure the voltage between TCM connector and chassis ground. <i>Connector & terminal</i> <i>(B56) No. 17 (+) — Chassis ground (-):</i>	Is the voltage 1 V \leftarrow \rightarrow 5 V?	Go to step 2.	Check TCM. <Ref. to 4AT(H4SO)-2, Basic Diagnostic Procedure.>
2 CHECK HARNESS BETWEEN TCM AND COMBINATION METER. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and combination meter. 3) Measure the resistance between TCM harness connector and combination meter harness connector. <i>Connector & terminal</i> <i>(B56) No. 17 — (i10) No. 12:</i>	Is the resistance less than 10 Ω ?	Check the speedometer. <Ref. to IDI-13, INSPECTION, Speedometer.>	Repair the wiring harness.

Combination Meter System

INSTRUMENTATION/DRIVER INFO

5. CHECK ENGINE CONTROL MODULE (ECM)

Step	Check	Yes	No
1 CHECK ECM SIGNAL. 1) Start the engine. 2) Measure the voltage between ECM connector and engine ground. Connector & terminal Non-turbo model (B134) No. 10 (+) — Engine ground (-): Turbo model (B134) No. 23 (+) — Engine ground (-):	Is the voltage 0 V ← → 14 V?	Go to step 2.	Check ECM. <Ref. to EN(H4SO)-2, Basic Diagnostics Procedure.> <Ref. to EN(H4DOTC)-2, Basic Diagnostics Procedure.>
2 CHECK HARNESS BETWEEN COMBINATION METER AND ECM. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and combination meter. 3) Measure the resistance between ECM harness connector and combination meter harness connector. Connector & terminal Non-turbo model (B134) No. 10 — (i10) No. 11: Turbo model (B134) No. 23 — (i10) No. 11:	Is the resistance less than 10 Ω?	Check the tachometer. <Ref. to IDI-14, INSPECTION, Tachometer.>	Repair the wiring harness.

6. CHECK FUEL LEVEL SENSOR

Step	Check	Yes	No
1 CHECK FUEL LEVEL SENSOR. 1) Remove the fuel level sensor. <Ref. to FU(H4SO)-57, REMOVAL, Fuel Level Sensor.> 2) Measure the resistance between fuel level sensor terminals when setting the float to FULL and EMPTY position. Terminals No. 3 — No. 5:	Is the resistance 0.5 to 2.5 Ω (FULL) and 50 to 52 Ω (EMPTY)?	Go to step 2.	Replace the fuel level sensor.
2 CHECK FUEL SUB LEVEL SENSOR. 1) Remove the fuel sub level sensor. <Ref. to FU(H4SO)-58, REMOVAL, Fuel Sub Level Sensor.> 2) Measure the resistance between fuel sub level sensor terminals when setting the float to FULL and EMPTY position. Terminals No. 1 — No. 2:	Is the resistance 0.5 to 2.5 Ω (FULL) and 42 to 44 Ω (EMPTY)?	Go to step 3.	Replace the fuel sub level sensor.
3 CHECK HARNESS BETWEEN FUEL SUB LEVEL SENSOR AND COMBINATION METER. 1) Disconnect the connector from combination meter. 2) Measure the resistance between fuel sub level sensor harness connector terminal and combination meter harness connector terminal. Connector & terminal (R59) No. 1 — (i11) No. 1:	Is the resistance less than 10 Ω?	Go to step 4.	Repair the wiring harness.

Combination Meter System

INSTRUMENTATION/DRIVER INFO

Step	Check	Yes	No
4 CHECK HARNESS BETWEEN FUEL LEVEL SENSOR AND FUEL SUB LEVEL SENSOR. Measure the resistance between fuel level sensor harness connector terminal and fuel sub level sensor harness connector terminal. Connector & terminal (R58) No. 3 — (R59) No. 2:	Is the resistance less than 10 Ω ?	Go to step 5.	Repair the wiring harness.
5 CHECK FUEL LEVEL SENSOR GROUND CIRCUIT. Measure the resistance between fuel level sensor harness connector terminal and chassis ground. Connector & terminal (R58) No. 5 — Chassis ground:	Is the resistance less than 10 Ω ?	Check the fuel gauge. <Ref. to IDI-15, INSPECTION, Fuel Gauge.>	Repair the wiring harness.

7. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Step	Check	Yes	No
1 CHECK ENGINE COOLANT TEMPERATURE SENSOR. Check the engine coolant temperature sensor. <Ref. to EN(H4SO)-2, Basic Diagnostics Procedure.>	Is the engine coolant temperature sensor OK?	Go to step 2.	Replace the engine coolant temperature sensor.
2 CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND COMBINATION METER. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from engine coolant temperature sensor and combination meter. 3) Measure the resistance between engine coolant temperature sensor harness connector and combination meter harness connector. Connector & terminal (E8) No. 3 — (i11) No. 10:	Is the resistance less than 10 Ω ?	Go to step 3.	Repair the wiring harness.
3 CHECK WATER TEMPERATURE GAUGE GROUND CIRCUIT. Measure the resistance between combination meter harness connector terminal and chassis ground. Connector & terminal (i11) No. 9 — Chassis ground:	Is the resistance less than 10 Ω ?	Check the water temperature gauge. <Ref. to IDI-16, INSPECTION, Water Temperature Gauge.>	Repair the wiring harness.

8. CHECK OUTSIDE TEMPERATURE INDICATOR

Step	Check	Yes	No
1 CHECK POWER SUPPLY FOR AMBIENT SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from outside temperature sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between outside temperature sensor harness connector terminal and chassis ground. Connector & terminal (F78) No. 2 (+) — Chassis ground (-):	Is the voltage more than 4 V?	Go to step 3.	Go to step 2.

Combination Meter System

INSTRUMENTATION/DRIVER INFO

Step	Check	Yes	No
<p>2 CHECK HARNESS BETWEEN AMBIENT SENSOR AND COMBINATION METER.</p> <p>1) Turn the ignition switch to OFF.</p> <p>2) Disconnect the connector from combination meter.</p> <p>3) Measure the resistance between ambient sensor harness connector terminal and combination meter harness connector terminal.</p> <p>Connector & terminal (F78) No. 1 — (i10) No. 25: (F78) No. 2 — (i10) No. 24:</p>	<p>Is the resistance less than 10 Ω?</p>	<p>Replace the combination meter printed circuit.</p>	<p>Repair the wiring harness.</p>
<p>3 CHECK AMBIENT SENSOR.</p> <p>1) Remove the ambient sensor.</p> <p>2) Check the ambient sensor. <Ref. to IDI-17, INSPECTION, Ambient Sensor.></p>	<p>Is the ambient sensor OK?</p>	<p>Go to step 4.</p>	<p>Replace the ambient sensor.</p>
<p>4 CHECK OUTSIDE TEMPERATURE INDICATOR.</p> <p>1) Connect the combination meter harness connector.</p> <p>2) Connect a resistor (3 kΩ) between terminals of ambient sensor harness connector.</p> <p>3) Turn the ignition switch to ON and check the outside temperature indicator display.</p>	<p>Does the outside temperature indicator indicate 25°C (77°F)?</p>	<p>Repair the poor contact of ambient sensor harness connector.</p>	<p>Replace the combination meter printed circuit.</p>

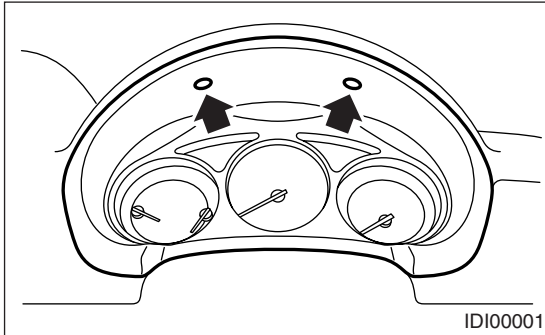
Combination Meter Assembly

INSTRUMENTATION/DRIVER INFO

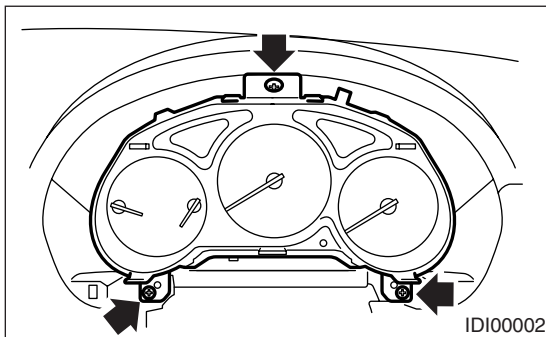
3. Combination Meter Assembly

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Set the tilt steering at lowest position.
- 3) Remove the screws and detach meter visor.



- 4) Remove the screws of combination meter and pull out the meter toward you.



- 5) Disconnect the connector in the upper area of combination meter to remove meter.

CAUTION:

- Be careful not to damage the meter or instrument panel.
- Pay particular attention to avoid damaging the meter glass.

B: INSTALLATION

Install in the reverse order of removal.

CAUTION:

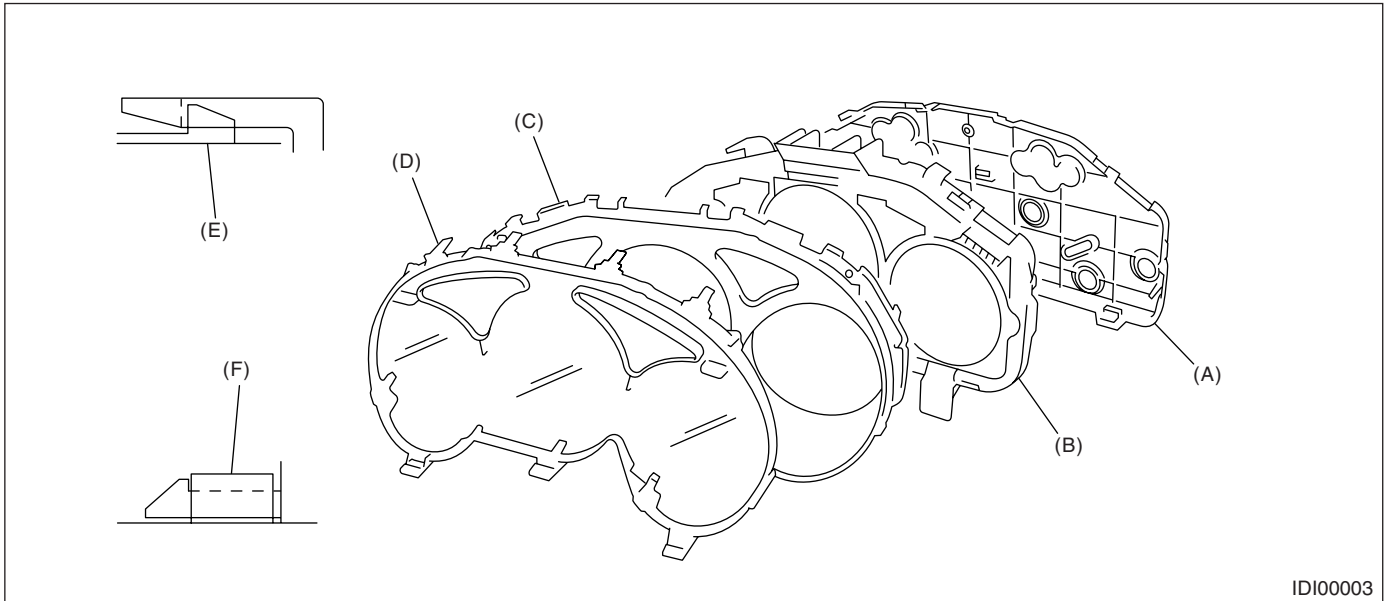
- Make sure that electrical connector is connected securely.
- Make sure that each meter operates normally.

C: DISASSEMBLY

CAUTION:

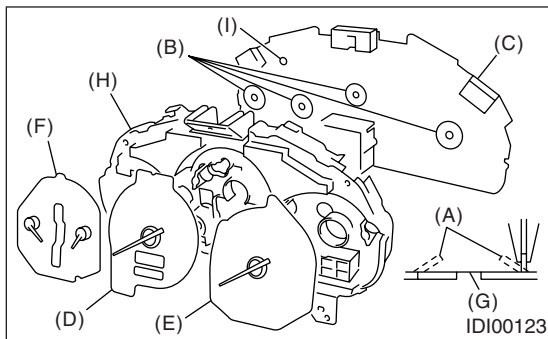
Use gloves to avoid damage and getting fingerprints on the glass surface and meter surfaces.

- 1) Disengage the claw (E) to remove case (B) from back cover (A).
- 2) Disengage the claw (F) to remove meter glass (D) and reflector (C) from inner case.



- 3) Pull up the claw (A) in portion (B) of combination meter printed circuit (C) with combination pliers. Push out the speedometer (D), tachometer (E) and fuel gauge & water temperature gauge assembly (F) using hole (G).

- 4) Pull up the claw in center of combination meter printed circuit (C), and remove the printed circuit from case (H).

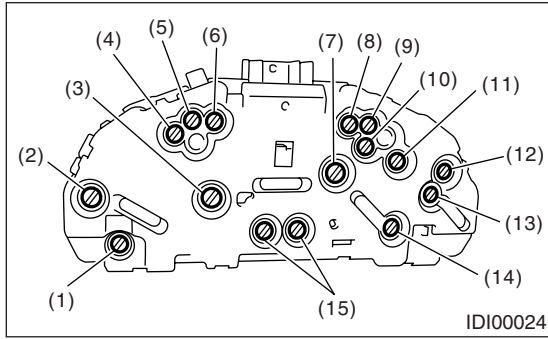


- 5) Remove the AT select indicator light (I) from printed circuit (C).

Combination Meter Assembly

INSTRUMENTATION/DRIVER INFO

1. BULB REPLACEMENT



- (1) Charge warning
- (2) Tachometer
- (3) Speedometer and tachometer
- (4) Rear fog light indicator light
- (5) HI-beam indicator
- (6) Turn signal indicator RH
- (7) Speedometer
- (8) Turn signal indicator LH
- (9) Cruise indicator light or rear differential oil temperature warning light
- (10) Brake warning
- (11) ABS warning
- (12) AT power mode indicator light
- (13) Fuel gauge
- (14) Temperature gauge
- (15) LCD (Outside temperature indicator, Odometer and tripmeter)

D: ASSEMBLY

Assemble in the reverse order of disassembly.

4. Speedometer

A: REMOVAL

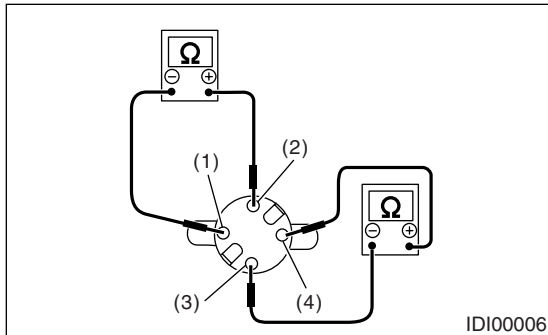
Disassemble the combination meter, and then remove the speedometer. <Ref. to IDI-11, DISASSEMBLY, Combination Meter Assembly.>

B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Measure the speedometer resistance.



- (1) COS-
- (2) COS+
- (3) SIN-
- (4) SIN+

Terminal	Resistance
Terminals SIN + and SIN-	200±8 Ω
Terminals COS + and COS-	200±8 Ω

If NG, replace the speedometer.

If OK, replace the combination meter printed circuit.

5. Tachometer

A: REMOVAL

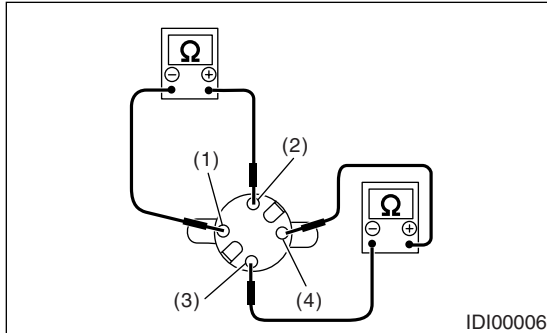
Disassemble the combination meter, and then remove the tachometer. <Ref. to IDI-11, DISASSEMBLY, Combination Meter Assembly.>

B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Measure the tachometer resistance.



- (1) COS-
- (2) COS+
- (3) SIN-
- (4) SIN+

Terminal	Resistance
Terminals SIN + and SIN-	200±8 Ω
Terminals COS + and COS-	200±8 Ω

If NG, replace the tachometer.

If OK, replace the combination meter printed circuit.

6. Fuel Gauge

A: REMOVAL

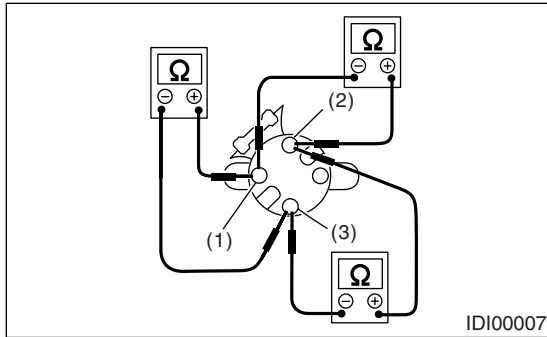
Disassemble the combination meter, and then remove the water temperature gauge and fuel gauge assembly. <Ref. to IDI-11, DISASSEMBLY, Combination Meter Assembly.>

B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Measure the fuel gauge resistance.



- (1) UNIT
- (2) IGN
- (3) GND

Terminal	Resistance
Terminals IGN and GND	170±10 Ω
Terminals IGN and UNIT	35±10 Ω
Terminals UNIT and GND	136±10 Ω

If NG, replace the water temperature gauge and fuel gauge assembly.

If OK, replace the combination meter printed circuit.

Water Temperature Gauge

INSTRUMENTATION/DRIVER INFO

7. Water Temperature Gauge

A: REMOVAL

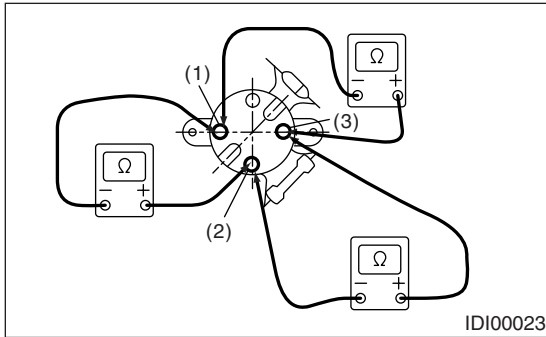
Disassemble the combination meter, and then remove the water temperature gauge and fuel gauge assembly. <Ref. to IDI-11, DISASSEMBLY, Combination Meter Assembly.>

B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Measure the water temperature gauge resistance.



- (1) GND
- (2) IGN
- (3) UNIT

Terminal	Resistance
Terminals IGN and GND	$208 \pm 10 \Omega$
Terminals IGN and UNIT	$56 \pm 10 \Omega$
Terminals UNIT and GND	$264 \pm 10 \Omega$

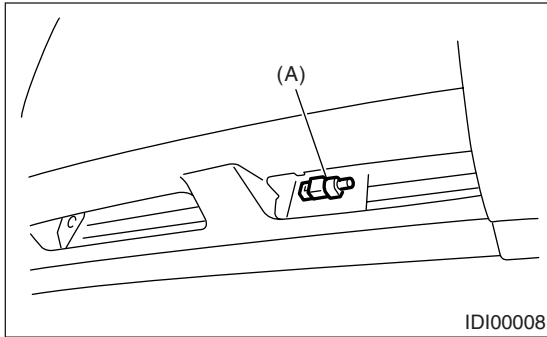
If NG, replace the water temperature gauge & fuel gauge assembly.

If OK, replace the combination meter printed circuit.

8. Ambient Sensor

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Disconnect the ambient sensor connector.
- 3) Remove the ambient sensor (A) from radiator lower panel.

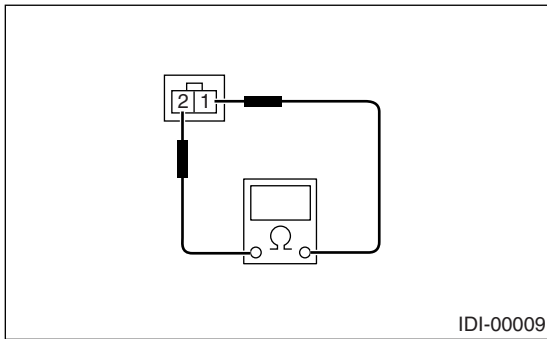


B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Measure the ambient sensor resistance.



Terminal	Resistance
1 and 2	3 kΩ/25°C (77°F)

If NG, replace the ambient sensor.

