INSTRUMENTATION/DRIVER INFO

IDI

1. General Description

A: SPECIFICATIONS

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
	CHECK ENGINE warning light (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 TOOLS

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

2. Combination Meter System

A: SCHEMATIC

1. COMBINATION METER

<Ref. to WI-108, SCHEMATIC, Combination Meter.>

2. OUTSIDE TEMPERATURE INDICATOR

<Ref. to WI-191, SCHEMATIC, Outside Temperature Display System.>

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) Vehicle speed sensor (AT) Transmission control module (2) Harness (3) Speedometer	MT: <Ref. to IDI-6, CHECK VEHICLE SPEED SENSOR, INSPECTION, Combination Meter System.>
		AT: <Re. to IDI-<Ref. to IDI-7, CHECK TRANSMISSION CONTROL MODULE, INSPECTION, Combination Meter System.>
Tachometer does not operate.	(1) Engine control module (2) Harness (3) Tachometer	<Ref. to IDI-8, CHECK ENGINE CONTROL MODULE, INSPECTION, Combination Meter System.>
Fuel gauge does not operate.	(1) Fuel level sensor (2) Harness (3) Fuel gauge	<Ref. to IDI-9, 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-10, 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-11, CHECK OUTSIDE TEMPERATURE INDICATOR, INSPECTION, Combination Meter System.>

2. CHECK POWER SUPPLY AND GROUND CIRCUIT

	Step	Value	Yes	No
1	**CHECK POWER SUPPLY FOR COMBINATION METER.** 1)Remove the combination meter. <Ref. to IDI-12, 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 measured value more than specified value?	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 measured value more than specified value?	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 measured value less than specified value?	10 Ω	Replace the combination meter printed circuit.	Repair the wiring harness.

3. CHECK VEHICLE SPEED SENSOR

	Step	Value	Yes	No
1	**CHECK VEHICLE SPEED SENSOR.** 1)Lift-up the vehicle and support it with safety stands. 2)Remove the combination meter with harness connector. **Warning:** **Be careful not to get caught in the running wheels.** 3)Drive the vehicle at a speed greater than 20 km/h (12 MPH). 4)Measure the voltage between combination meter connector and chassis ground. ***Connector & terminal*** ***(i10) No. 12 (+) — Chassis ground (–):*** Is the measured value as same as specified value?	0 ←→ 5 V	Check the speedometer. <Ref. to IDI-15, REMOVAL, 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 measured value more than specified value?	10 V	Go to step **3.**	Check the harness for open or short between ignition switch and vehicle speed sensor.
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. ***Connector & terminal*** ***(B17) No. 2 — Engine ground:*** Is the measured value less than specified value?	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. ***Connector & terminal*** ***(B17) No. 1 — (i10) No. 12:*** Is the measured value less than specified value?	10 Ω	Replace the vehicle speed sensor.	Repair the wiring harness.

4. CHECK TRANSMISSION CONTROL MODULE

	Step	Value	Yes	No
1	**CHECK TRANSMISSION CONTROL MODULE SIGNAL.** 1)Lift-up the vehicle and support it with safety stands. **Warning:** **Be careful not to get caught in the running wheels.** 2)Drive the vehicle faster than 10 km/h (6 MPH). 3)Measure the voltage between transmission control module connector and chassis ground. ***Connector & terminal*** ***(B56) No. 17 (+) — Chassis ground (–):*** Is the measured value as same as specified value?	0 ←→ 5 V	Go to step **2.**	Check the transmission control module. <Ref. to AT-2, Basic Diagnostic Procedure.>
2	**CHECK HARNESS BETWEEN TRANSMISSION CONTROL MODULE AND COMBINATION METER.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from transmission control module and combination meter. 3)Measure the resistance between transmission control module harness connector and combination meter harness connector. ***Connector & terminal*** ***(B56) No. 17 — (i10) No. 12:*** Is the measured value less than specified value?	10 Ω	Check the speedometer. <Ref. to IDI-15, REMOVAL, Speedometer.>	Repair the wiring harness.

5. CHECK ENGINE CONTROL MODULE

	Step	Value	Yes	No
1	**CHECK ENGINE CONTROL MODULE SIGNAL.** 1)Start the engine. 2)Measure the voltage between engine control module connector and engine ground. ***Connector & terminal*** ***Turbo model*** ***(B136) No. 9 (+) — Engine ground (–):*** ***Non-turbo model*** ***(B134) No. 10 (+) — Engine ground (–):*** Is the measured value as same as specified value?	0 ←→ 14 V	Go to step **2.**	Check the engine control module. <Ref. to EN(SOHC)-2, Basic Diagnostic Procedure.> or <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>
2	**CHECK HARNESS BETWEEN COMBINATION METER AND ENGINE CONTROL MODULE.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from engine control module and combination meter. 3)Measure the resistance between engine control module harness connector and combination meter harness connector. ***Connector & terminal*** ***Turbo model*** ***(B136) No. 9 — (i10) No. 11:*** ***Non-turbo model*** ***(B134) No. 10 — (i10) No. 11:*** Is the measured value less than specified value?	10 Ω	Check the tachometer. <Ref. to IDI-16, REMOVAL, Tachometer.>	Repair the wiring harness.

6. CHECK FUEL LEVEL SENSOR

	Step	Value	Yes	No
1	**CHECK FUEL LEVEL SENSOR.** 1)Remove the fuel level sensor. <Ref. to FU(TURBO)-61, REMOVAL, Fuel Level Sensor.> or <Ref. to FU(SOHC)-59, 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 measured value within specified value range?	FULL: 0.5 — 2.5 Ω EMPTY: 50 — 52 Ω	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(TURBO)-62, REMOVAL, Fuel Sub Level Sensor.> or <Ref. to FU(SOHC)-60, 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 measured value within specified value range?	FULL: 0.5 — 2.5 Ω EMPTY: 42 — 44 Ω	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 measured value less than specified value?	10 Ω	Go to step **4.**	Repair the wiring harness.
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 measured value less than specified value?	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 measured value less than specified value?	10 Ω	Check the fuel gauge. <Ref. to IDI-17, REMOVAL, Fuel Gauge.>	Repair the wiring harness.

7. CHECK ENGINE COOLANT TEMPERATURE SENSOR

	Step	Value	Yes	No
1	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** Check the engine coolant temperature sensor. <Ref. to EN(SOHC)-2, Basic Diagnostic Procedure.> or <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.> Is the engine coolant temperature sensor OK ?	Engine coolant temperature sensor is 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 measured value less than specified value?	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 measured value less than specified value?	10 Ω	Check the water temperature gauge. <Ref. to IDI-18, REMOVAL, Water Temperature Gauge.>	Repair the wiring harness.

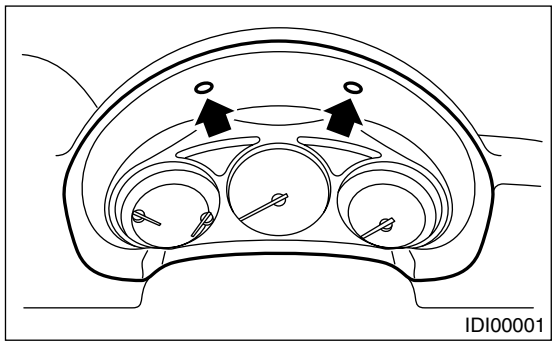
8. CHECK OUTSIDE TEMPERATURE INDICATOR

	Step	Value	Yes	No
1	**CHECK POWER SUPPLY FOR AMBIENT SENSOR.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from outside temperture sensor. 3)Turn the ignition switch to ON. 4)Measure the voltage between outside temperture sensor herness connector terminal and chassis ground. ***Connector & terminal*** ***(F78) No. 2 (+) — Chassis ground (–):*** Is the measured value more than specified value?	4V	Go to step **3.**	Go to step **2.**
2	**CHECK HARNESS BETWEEN AMBIENT SENSOR AND COMBINATION METER.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from combination meter. 3)Measure the resistance between ambient sensor harness connector terminal and combination meter harness connector terminal. ***Connector & terminal*** ***(F78) No. 1 — (i10) No. 25:*** ***(F78) No. 2 — (i10) No. 24:*** Is the measured value less than specified value?	10 Ω	Replace the combination meter printed circuit.	Repair the wiring harness.
3	**CHECK AMBIENT SENSOR.** 1)Remove the ambient sensor. 2)Check the ambient sensor. <Ref. to IDI-19, INSPECTION, Ambient Sensor.> Is the ambient sensor OK?	Ambient sensor is OK.	Go to step **4.**	Replace the ambient sensor.
4	**CHECK OUTSIDE TEMPERATURE INDICATOR.** 1)Connect the combination meter harness connector. 2)Connect a resistor (3 kΩ) between terminals of ambient sensor harness connector. 3)Turn the ignition switch to ON and check the outside temperature indicator display. Does the indicator indicate specified value?	25°C (77°F)	Repair the poor contact of ambient sensor harness connector.	Replace the combination meter printed circuit.

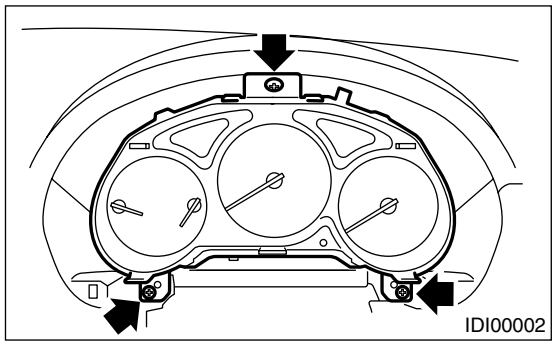
3. Combination Meter Assembly

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

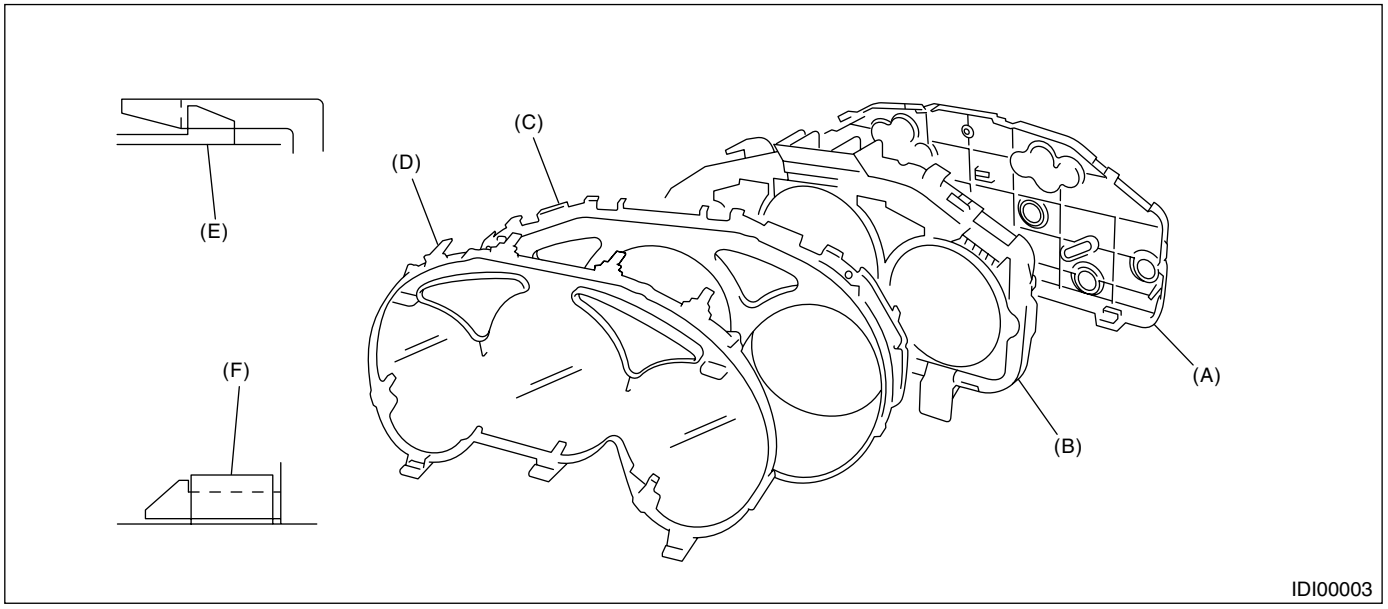
Install in the reverse order of removal.

CAUTION:
• Make sure that electrical connector is connected securely.
• Make sure that each meter operates normally.

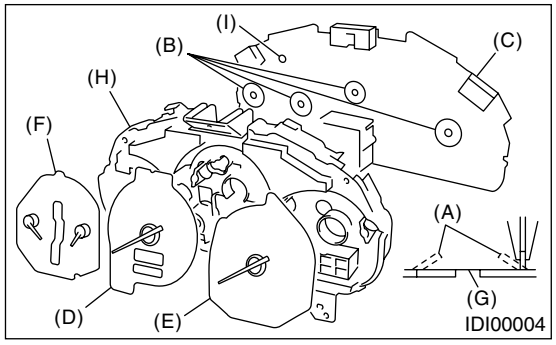
C: DISASSEMBLY

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.

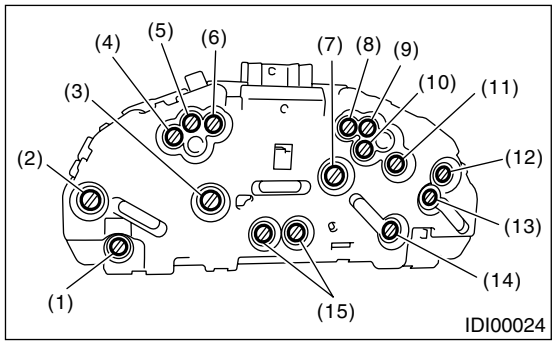


3) Pull up the claw (A) in portion (B) of combination meter printed circuit (C) with combination pliers. Push out the speedometer (D), tachometer (E) and fuel gauge and water temperature gauge assembly (F) using hole (G).
4) Pull up the claw in center of combination meter printed circuit (C), and remove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



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

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

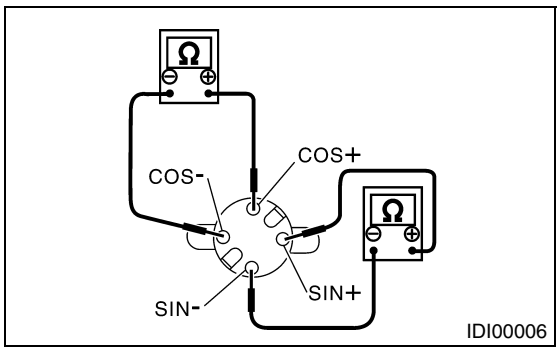
Disassemble the combination meter, and then remove the speedometer. <Ref. to IDI-13, DISASSEMBLY, Combination Meter Assembly.>

B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Measure the speedometer resistance.



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

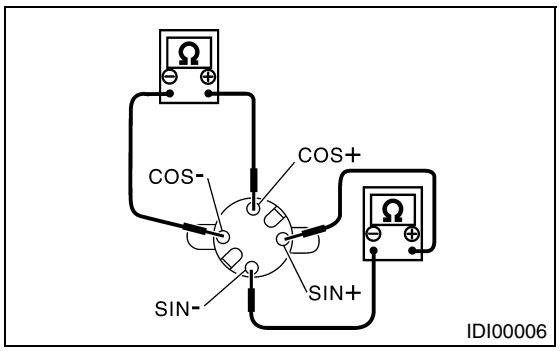
Disassemble the combination meter, and then remove the tachometer. <Ref. to IDI-13, DISASSEMBLY, Combination Meter Assembly.>

B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Measure the tachometer resistance.



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

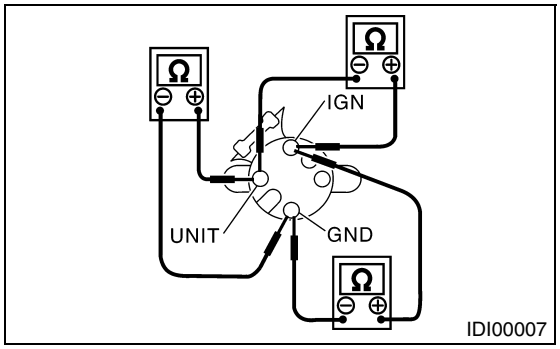
Disassemble the combination meter, and then remove the water temperature gauge and fuel gauge assembly. <Ref. to IDI-13, DISASSEMBLY, Combination Meter Assembly.>

B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Measure the fuel gauge resistance.



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.

7. Water Temperature Gauge

A: REMOVAL

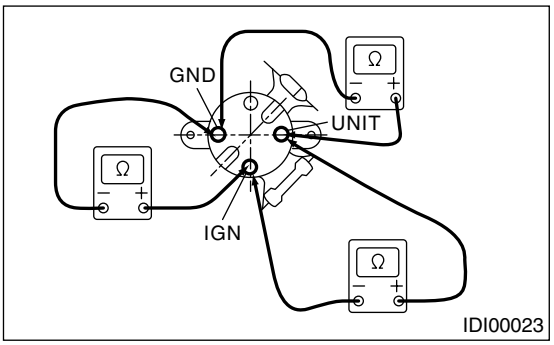
Disassemble the combination meter, and then remove the water temperature gauge and fuel gauge assembly. <Ref. to IDI-13, DISASSEMBLY, Combination Meter Assembly.>

B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Measure the water temperature gauge resistance.



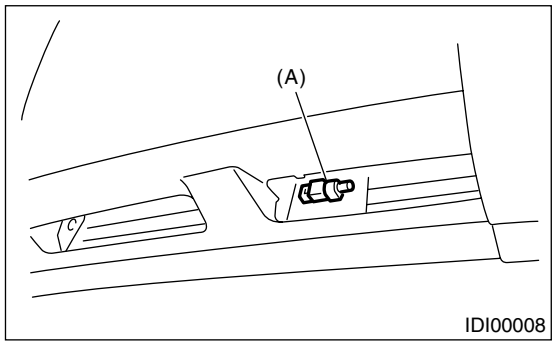
Terminal	Resistance
Terminals IGN and GND	208±10 Ω
Terminals IGN and UNIT	56±10 Ω
Terminals UNIT and GND	264±10 Ω

If NG, replace the water temperature gauge and 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.

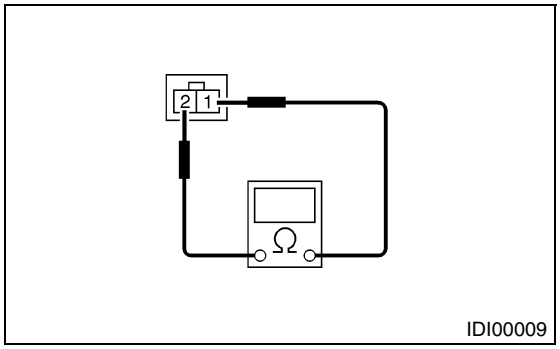


B: INSTALLATION

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.