2. Combination Meter System

A: WIRING DIAGRAM

1. COMBINATION METER

<Ref. to WI-150, WIRING DIAGRAM, Combination Meter.>

2. OUTSIDE TEMPERATURE INDICATOR

<Ref. to WI-158, WIRING DIAGRAM, Outside Temperature Display System.>

B: INSPECTION

CAUTION:
When measuring the voltage and resistance of the ECM, TCM and 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	NOTE
Combination meter assembly does not operate.	1. Power supply 2. Ground distribution	<Ref. to IDI-4, CHECK POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, Combination Meter System.>
Speedometer does not operate.	1. Vehicle speed sensor (MT model) TCM (AT model) 2. Harness 3. Speedometer	MT model: <Ref. to IDI-5, CHECK VEHICLE SPEED SENSOR, INSPECTION, Combination Meter System.>
		AT model: <Ref. to IDI-6, INSPECTION OF THE TRANSMISSION CONTROL MODULE (TCM), INSPECTION, Combination Meter System.>
Tachometer does not operate.	1. ECM 2. Harness 3. Tachometer	<Ref. to IDI-6, 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.>
Engine coolant temperature gauge does not operate.	1. Engine coolant temperature sensor 2. Harness 3. Engine coolant 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-9, CHECK OUTSIDE TEMPERATURE INDICATOR, INSPECTION, Combination Meter System.>

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.> 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 the 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 the 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 faster 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 ← → 5 V?	Check the speedometer. <Ref. to IDI-12, 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 the speed sensor connector and the 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 the 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 the speed sensor connector and the engine ground. ***Connector & terminal*** ***(B17) No. 2 — Engine ground:***	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 the speed sensor harness connector and combination meter. ***Connector & terminal*** ***(B17) No. 1 — (i10) No. 12:***	Is the resistance less than 10 Ω?	Replace the vehicle speed sensor.	Repair the wiring harness.

4. INSPECTION OF THE 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. ***Connector & terminal*** ***(B54) No. 21 (+) — Chassis ground (–):***	Is the voltage 1 ← → 5 V?	Go to step **2**.	Check the TCM. <Ref. to 4AT(D)(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK THE HARNESS BETWEEN TCM AND COMBINATION METER.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and combination meter. 3) Measure the resistance between TCM harness connector and combination meter harness connector. ***Connector & terminal*** ***(B54) No. 21 — (i10) No. 12:***	Is the resistance less than 10 Ω?	Check the speedometer. <Ref. to IDI-12, REMOVAL, Speedometer.>	Repair the wiring harness.

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*** ***(B135) No. 27 (+) — Engine ground (–):*** ***Turbo model*** ***(B135) No. 26 (+) — Engine ground (–):***	Is the voltage 0← →14 V?	Go to step **2**.	Inspect the ECM. <Ref. to EN(H4SO)(diag)-2, Basic Diagnostic Procedure.> <Ref. to EN(H4DOTC)(diag)-2, Basic Diagnostic 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*** ***(B135) No. 27 — (i10) No. 12:*** ***Turbo model*** ***(B135) No. 26 — (i10) No. 12:***	Is the resistance less than 10 Ω?	Check the tachometer. <Ref. to IDI-13, REMOVAL, 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)-54, REMOVAL, Fuel Level Sensor.> 2) Measure the resistance between fuel level sensor terminals when the float is in FULL or EMPTY position. ***Terminals*** ***No. 2 — No. 3:***	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)-55, REMOVAL, Fuel Sub Level Sensor.> 2) Measure the resistance between fuel sub level sensor terminals when the float is in FULL or 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 the 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.
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. 2 — Chassis ground:***	Is the resistance less than 10 Ω?	Inspect the fuel gauge. <Ref. to IDI-14, REMOVAL, 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)(diag)-2, Basic Diagnostic 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 the engine coolant temperature sensor and combination meter. 3) Measure the resistance between the 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 ENGINE COOLANT TEMPERATURE GAUGE CIRCUIT.** Measure the resistance between the combination meter harness connector terminal and chassis ground. ***Connector & terminal*** ***(i11) No. 9 — Chassis ground:***	Is the resistance less than 10 Ω?	Inspect the engine coolant temperature gauge. <Ref. to IDI-15, REMOVAL, Engine Coolant 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 ambient sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between ambient 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**.
2	**CHECK HARNESS BETWEEN AMBIENT TEMPERATURE SENSOR AND COMBINATION METER.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from combination meter. 3) Measure the resistance between the ambient temperature 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 resistance less than 10 Ω?	Replace the combination meter printed circuit.	Repair the wiring harness.
3	**CHECK AMBIENT SENSOR.** 1) Remove the ambient temperature sensor. 2) Check the ambient temperature sensor. <Ref. to IDI-16, INSPECTION, Ambient Sensor.>	Is the ambient temperature sensor 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 the terminals of ambient sensor harness connector. 3) Turn the ignition switch to ON and check the outside temperature indicator display.	Is the outside temperature indicator indicating 25°C (77°F)?	Repair the poor contact of ambient temperature sensor harness connector.	Replace the combination meter print circuit.