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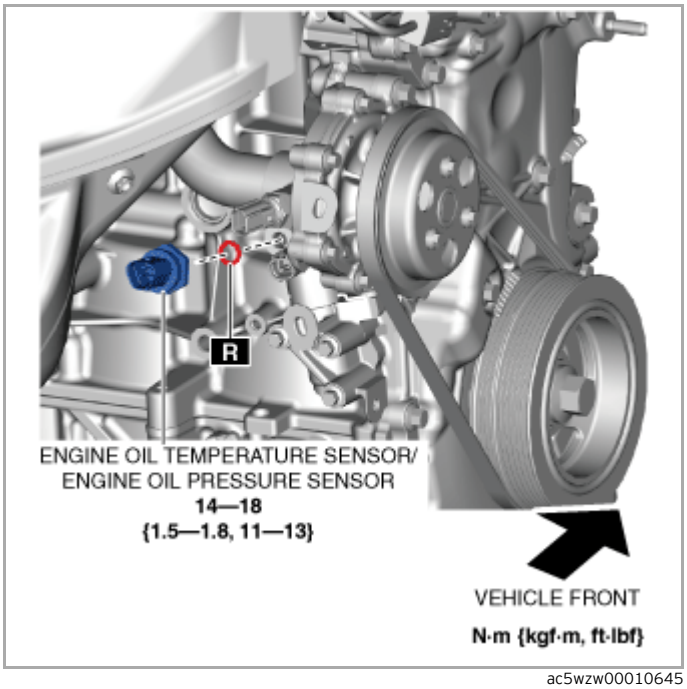
2009 MAZDA RX-8 OEM Service and Repair Workshop Manual

Go to manual page



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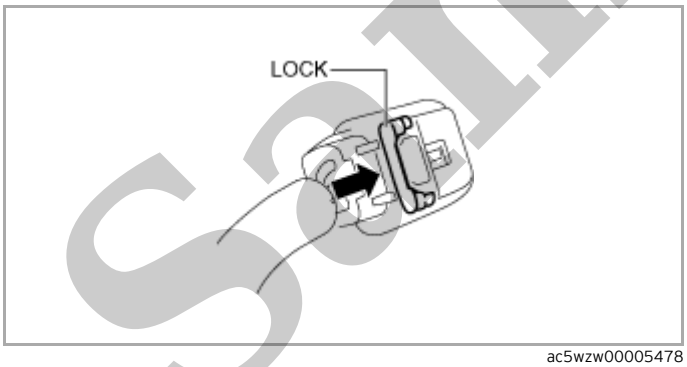
6.Install in the reverse order of removal.

Engine Oil Temperature Sensor/Engine Oil Pressure Sensor Connector Connection Note

1.Connect the connector for the engine oil temperature sensor/engine oil pressure sensor and press it in the lock direction of the arrow.



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ENGINE OIL PRESSURE SENSOR INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)]

SM2897750

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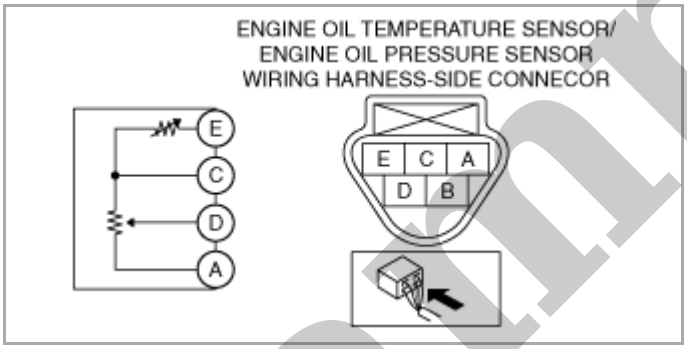
Voltage Inspection

Note

• The engine oil temperature sensor and engine oil pressure sensor cannot be removed as a single unit. When replacing the engine oil temperature sensor or engine oil pressure sensor, replace the engine oil temperature sensor/engine oil pressure sensor.

1.Switch the ignition ON (engine off).

2.Measure the voltage at the engine oil temperature sensor/engine oil pressure sensor terminal D.



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• If the voltage is within the specification, go to the next step.
• If the voltage is not within the specification, replace the engine oil temperature sensor/engine oil pressure sensor. (See ENGINE OIL TEMPERATURE SENSOR/ENGINE OIL PRESSURE SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)

Specification

Approx. 0.5 V

3.Connect the M-MDS to the DLC-2.

4.Start the engine.

5.Access the PID/DATA monitor item "EOP" using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].)

6.Measure the voltage at the engine oil temperature sensor/engine oil pressure sensor terminal D when the EOP PID increases.

4.Select [Vehicle Status Monitor] on the center display.

5.Select [Schedule Maintenance] or [Maintenance] on the center display.

6.Select [Oil Change] on the center display.

7.Select [Reset] on the center display.

ENGINE OIL LEVEL SENSOR INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)]

SM2897754

id0140h353800

PID/DATA Monitor Inspection

1. Verify that there is no engine oil leakage.

    • If there is any malfunction, repair or replace the malfunctioning part according to the inspection results.

2.Inspect the engine oil level. (See ENGINE OIL LEVEL SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)

3.Connect the M-MDS to the DLC-2.

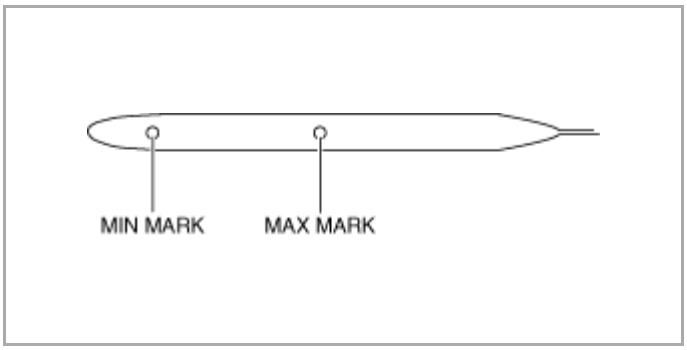
4.Switch the ignition ON (engine off).

5.Access the PID/DATA monitor item EOL using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].)

6.Verify that the PID EOL value and the engine oil amount measured using the dipstick are same.

Engine oil level sensor output value (Reference)

PID EOL value		Measurable upper limit value of engine oil level sensor
Dipstick level: MIN	Dipstick level: MAX	
Approx. 55 mm {2.2 in}	Outside of measurable range (Reference: Approx. 78 mm {3.1 in})	74 mm {2.9 in}



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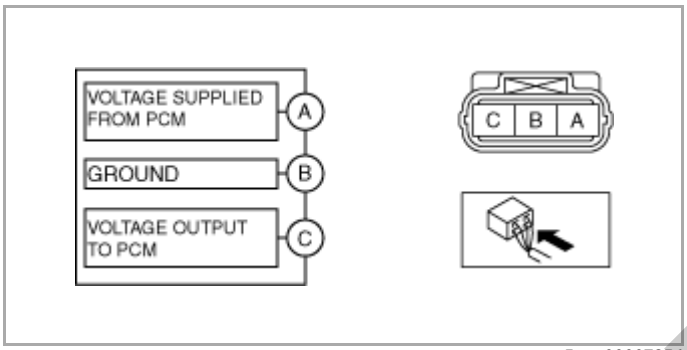
• If the wiring harnesses or waterproof connectors are damaged, water penetrating the connector will cause a sensor malfunction. To prevent this, be careful not to damage wiring harnesses or waterproof connectors.

1.Idle the engine.

2.Measure the output voltage wave pattern between CKP sensor terminals C and B using an oscilloscope.

• If not as specified, replace the CKP sensor. (See CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)



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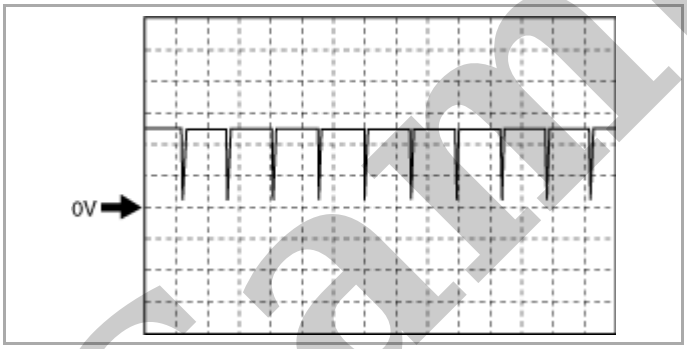
• Specification

4.5 V or more (Maximum value of wave pattern)
0.8 V or less (Minimum value of wave pattern)

Wave pattern (reference)



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Oscilloscope setting

• 2 V/DIV (Y), 1 ms/DIV (X), DC range

Vehicle condition

• Idle (after warm up)

MASS AIR FLOW (MAF) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)]

SM2897804

id0140s380070

Visual inspection

1.Disconnect the negative battery terminal. (See NEGATIVE BATTERY TERMINAL DISCONNECTION/CONNECTION.)

2.Disconnect the MAF sensor/IAT sensor No.1 connector.

3.Remove the MAF sensor/IAT sensor No.1. (See MASS AIR FLOW (MAF) SENSOR/INTAKE AIR TEMPERATURE (IAT) SENSOR NO.1 REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

4.Visually inspect the MAF sensor for the following:

- Damage, cracks, soiling
- Rusted sensor terminal
- Bent sensor terminal

— If there is any malfunction, repair or replace the MAF sensor/IAT sensor No.1. (See MASS AIR FLOW (MAF) SENSOR/INTAKE AIR TEMPERATURE (IAT) SENSOR NO.1 REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

Function inspection

1.Connect the M-MDS to the DLC-2.

2.Switch the ignition ON (engine off).

3.Display the PID MAF. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) (See PCM INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

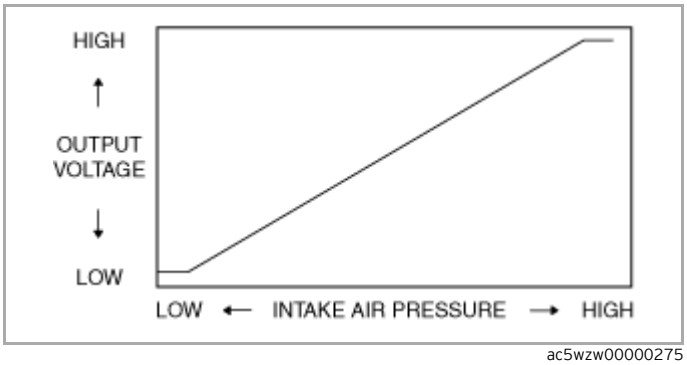
4.Compare the voltage and flow rate indications for the PID MAF with the standard in the table indicated below.

- If they do not match the standard, replace the MAF sensor/IAT sensor No.1. (See MASS AIR FLOW (MAF) SENSOR/INTAKE AIR TEMPERATURE (IAT) SENSOR NO.1 REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

Standard

• If not within the specification, replace the MAP sensor/IAT sensor No.2. (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/INTAKE AIR TEMPERATURE (IAT) SENSOR NO.2 REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

Specification



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FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)]

SM2897808

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Note

• The fuel pressure sensor cannot be removed as a single unit. When replacing the fuel pressure sensor, replace it together with the fuel distributor as a single unit.

Function Inspection

1.Connect the M-MDS to the DLC-2.

2.Switch the ignition ON (engine off).

3.Display the PID FUEL_PRES. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) (See PCM INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

4.Compare the voltage and fuel value indications for the PID FUEL_PRES with the standard in the table indicated below.

• If they do not match the standard, perform the voltage inspection. (See Voltage Inspection.)

Standard (without coolant control valve)

FUEL_PRES	
V	MPa {kgf/cm^2, psi}
Approx. 0.9	3.0 {31, 435}

Standard (with coolant control valve)

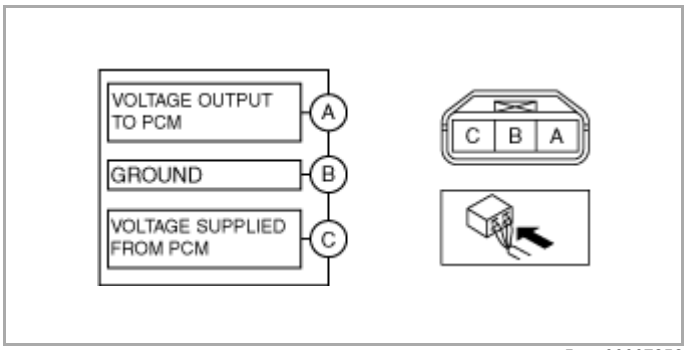
FUEL_PRES	
V	MPa {kgf/cm^2, psi}
Approx. 1.4	10 {102, 1450}

Voltage Inspection

1.Idle the engine.

2.Measure the output voltage wave pattern between intake CMP sensor terminals A and B using an oscilloscope.

• If not as specified, replace the intake CMP sensor. (See CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)



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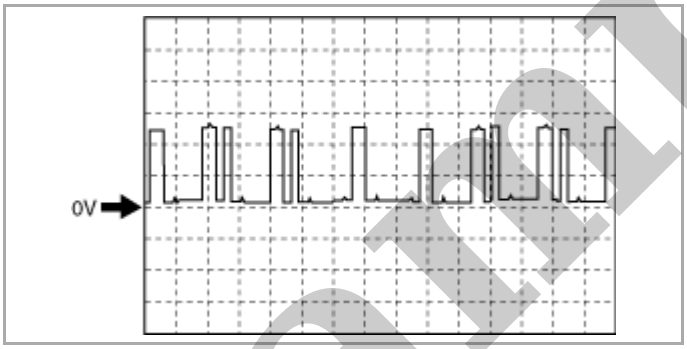
• Specification

4.8 V or more (Maximum value of wave pattern)
0.8 V or less (Minimum value of wave pattern)

Wave pattern (reference)



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Oscilloscope setting

• 2 V/DIV (Y), 20 ms/DIV (X), DC range

Vehicle condition

• Idle (after warm up)

Exhaust CMP Sensor

Visual inspection

Caution

• When replacing the CMP sensor, make sure there is no foreign matter on it such as metal shavings. If it is installed with foreign matter, the sensor output signal will malfunction resulting from fluctuation in magnetic flux and cause a deterioration in engine control.

1.Disconnect the negative battery terminal. (See NEGATIVE BATTERY TERMINAL DISCONNECTION/CONNECTION.)