GENERATOR INSPECTION [SKYACTIV-G 2.0]

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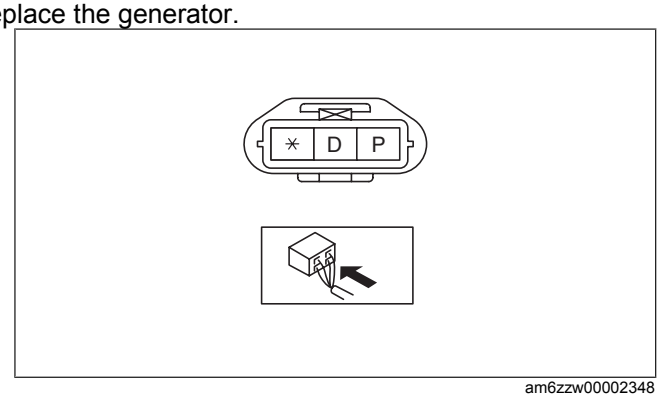
Caution
- **Do not apply direct battery positive voltage to generator terminal D, otherwise it could cause damage to the internal parts (power transistor) of the generator.**

Charging System Warning Light
1. Verify that the battery is fully charged.
2. Verify that the assembly condition of the drive belt is normal. (See DRIVE BELT INSPECTION [SKYACTIV-G 2.0].)
3. Switch the ignition to ON (engine off), verify that the charging system warning light illuminates.
   - If it does not illuminate, inspect the charging system warning light and the wiring harness.
     — If the charging system warning light and the wiring harness are normal, inspect the PCM.
4. Verify that the charging system warning light goes out after the engine is started.
   - If the charging system warning light does not go out, perform the DTC inspection, then perform troubleshooting according to the corresponding diagnostic procedure. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) (See DTC TABLE [SKYACTIV-G 2.0].)

Generator
Voltage
1. Verify that the battery is fully charged.
2. Verify that the assembly condition of the drive belt is normal. (See DRIVE BELT INSPECTION [SKYACTIV-G 2.0].)
3. Turn off all electrical loads.
4. Start the engine.
5. Verify that the generator rotates smoothly without any noise while the engine is running.
   - If there is any noise, find the cause and repair or replace the generator.
6. Measure the voltage at each terminal using a tester.
   - If it is not as specified, find the cause and repair or replace the applicable part.



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Generator standard voltage [IG-ON]
Terminal B: B+
Terminal P: Approx. 1 V or less
Terminal D: Approx. 0 V

Generator standard voltage [Idle, 20 °C {68 °F}]
Terminal B: 13—15 V
Terminal P: Approx. 3—8 V
Terminal D: Turn the electrical loads (headlights, blower motor, rear window defroster, brake lights, etc.) on and verify that the voltage reading increases.

Current

Note
- Since the charging current decreases rapidly after starting the engine, carry out the following procedure quickly, and read the maximum current value.

1. Verify that the battery is fully charged.
2. Verify that the assembly condition of the drive belt is normal. (See DRIVE BELT INSPECTION [SKYACTIV-G 2.0].)
3. Disconnect the negative battery cable.
4. Connect a tester, which can read **120 A or more**, between generator terminal B and the wiring harness.
5. Connect the negative battery cable. (See NEGATIVE BATTERY CABLE DISCONNECTION/CONNECTION [SKYACTIV-G 2.0].) (See NEGATIVE BATTERY CABLE DISCONNECTION/CONNECTION [SKYACTIV-G 2.0 (WITHOUT i-stop)])
6. Turn off all electrical loads.
7. Start the engine.
8. Increase engine speed to **2,500 rpm.** (Vehicle without i-stop)

Note
- When the electrical load on the vehicle is low, the specified current cannot be verified although the generator is normal. In this case, increase the electrical load (Leave the headlights turned on for a while, then discharge the battery, or use a similar method.) and recheck.
- When the generator itself or the ambient temperature are too high, the specified current also cannot be verified. In this case, cool down the generator and recheck.

9. With the electric loads such as headlights, blower motor, rear window defroster, brake lights turned on, verify that the current increases.
   — If it is not as specified, go to the PCM and generator shearing inspection. (See PCM and generator shearing inspection.)

Generator generated current minimum value (Vehicle without i-stop)
70% of the nominal output current (nominal output current: 100 A)
[Ambient temp. 20 °C {68 °F}, voltage 13.0—15.0 V, both engine and generator are hot]

Generator generated current (reference value) [Ambient temperature: 20 °C {68 °F}, Engine hot]
(Vehicle with i-stop)

Engine speed (rpm)	Terminal B voltage (V)	Generator output current (A)
1,000	**13**	**83**
1,000	**15**	**83**
2,000	**13**	**98**
2,000	**15**	**105**

*** Field coil current control signal 100%**

PCM and generator shearing inspection
1. Connect the M-MDS to the DLC-2.
2. Inspect as follows:

Step	Inspection	Results	Action
1	Measure the generator terminal B voltage when the electrical loads*1 are on and off.	15 V or more	Go to Step 2.
		13—15 V	Normal*2
		13 V or less	Go to Step 3.
2	Monitor the ALTT V PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) Is the value normal?	Yes	Go to Step 4.
		No	Inspect the following, then repair or replace as necessary. • If there is no malfunction, replace the PCM. 1. Wiring harness between PCM terminal 1AF-generator terminal P. 2. Wiring harness between PCM terminal 1BE-generator terminal D. 3. Generator inner parts. (See Generator Inner Parts.) • If that is not malfunction, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
3	Monitor the ALTT V PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) Is the value normal?	Yes	Go to Step 5.
		No	Inspect the following, then repair or replace as necessary. • If there is no malfunction, replace the PCM. 1. Wiring harness between PCM terminal 1AF-generator terminal P. 2. Wiring harness between PCM terminal 1BE-generator terminal D. 3. Generator inner parts. (See Generator Inner Parts.) • If that is not malfunction, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)

Step	Inspection	Results	Action
4	Monitor the ALTF PID using the M-MDS. Is the duty value 100%?	Yes	Replace PCM.
		No	Inspect the following, then repair or replace as necessary. • If there is no malfunction, replace the PCM. 1. Wiring harness between PCM terminal 1BE - generator terminal D. 2. Generator inner parts. (See Generator Inner Parts.) • If that is not malfunction, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
5	Monitor the ALTF PID using the M-MDS. Is the duty value 0%?	Yes	Replace PCM.
		No	Inspect the following, then repair or replace as necessary. • If there is no malfunction, replace the PCM. 1. Wiring harness between PCM terminal 1BE-generator terminal D. 2. Generator inner parts. (See Generator Inner Parts.) • If that is not malfunction, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)

*1 : Headlights, blower motor, rear window defroster, brake lights, etc.

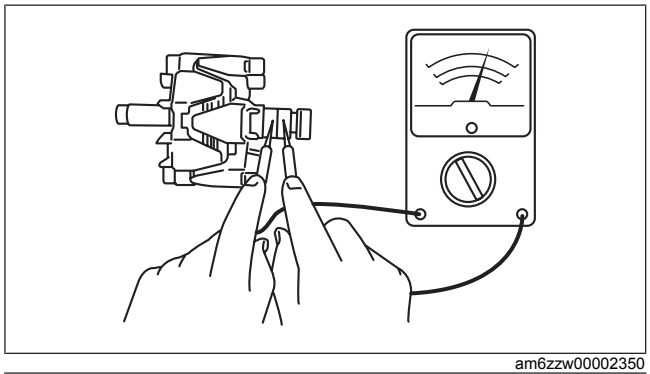
*2 : If the generator field coil duty value does not change when electrical loads (such as headlights, blower motor, rear window defroster, brake lights) are on or off, inspection with discharged battery is needed.

Generator Inner Parts

Rotor

1. Measure the resistance between the slip rings using a tester.
   - If not within specification, replace the rotor.

   Generator rotor resistance (between slip rings) [20 °C {68 °F}]
   1.8—2.1 ohms



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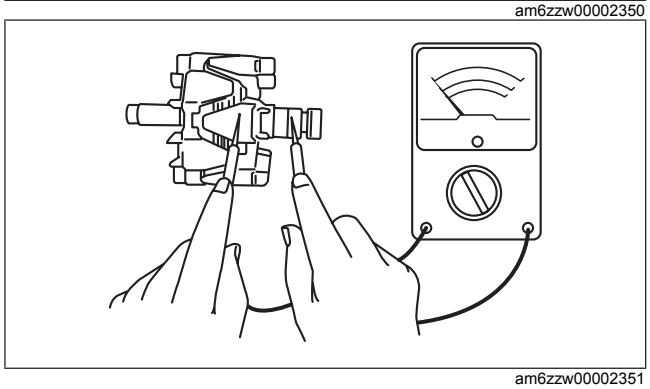
2. Verify that there is no continuity between the slip ring and core using a tester.
   - If there is continuity, replace the rotor.
3. Inspect the slip ring surface condition.
   - If the slip ring surface is rough, use a lathe or fine sandpaper to make it smooth.



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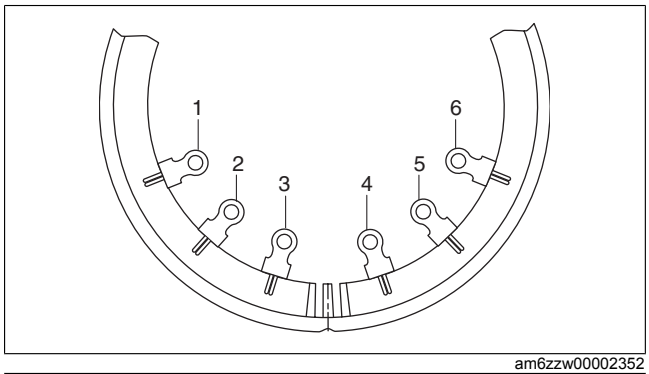
Stator coil

1. Verify that the continuity is as indicated in the table.



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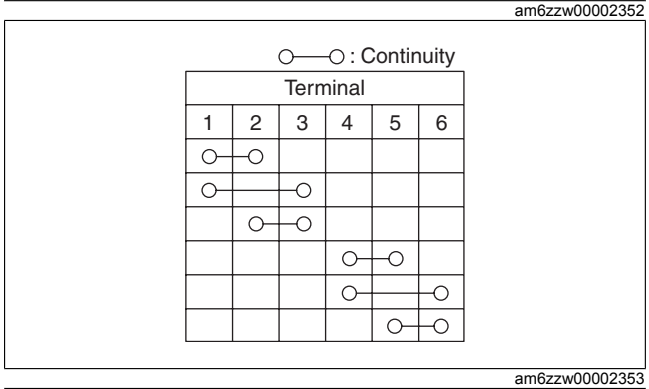
   - If there is any malfunction, replace the stator.



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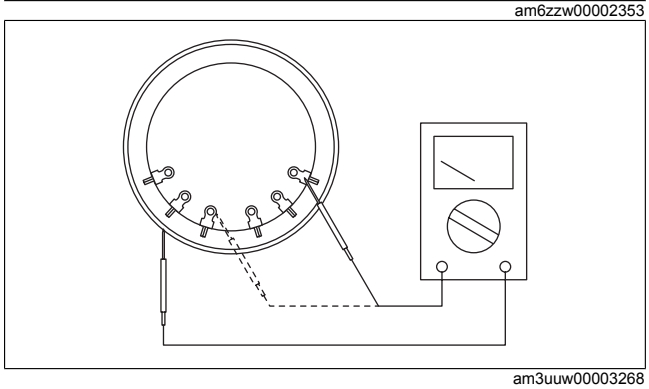
2. Verify that there is no continuity between the stator coil leads and core using a tester.
   - If there is continuity, replace the stator coil.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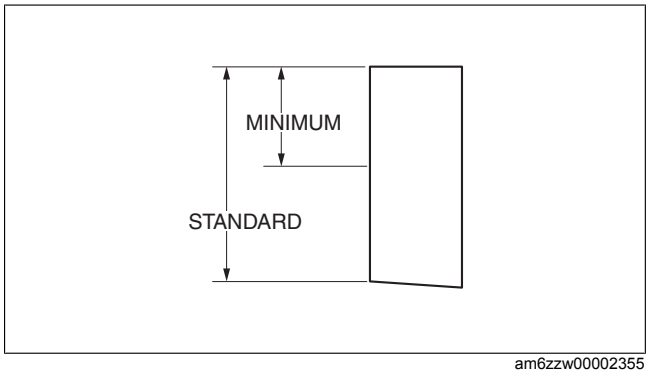
Brush

1. Inspect brushes for wear.
   - If any brush is worn almost to or beyond the limit, replace all of the brushes.

   Generator brush length
   Standard: 22.5 mm {0.886 in}
   Minimum: 5.0 mm {0.20 in}



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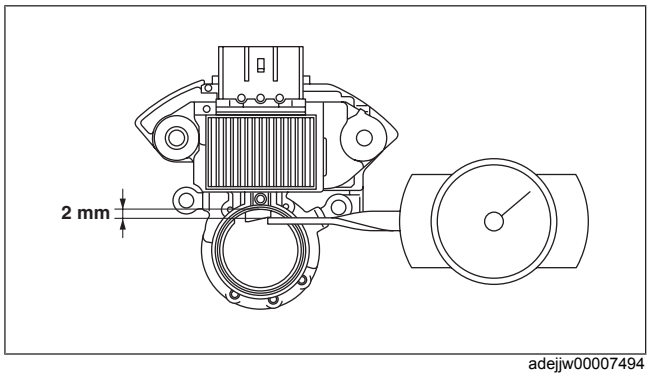
Brush spring

1. Measure the force of the brush spring using a spring pressure gauge.

2. Read the spring pressure gauge at the brush tip projection of **2 mm {0.08 in}.**
   - If not within specification, replace the brush spring.

   Generator brush spring force
   Standard: 4.1—5.3 N {0.42—0.54 kgf, 1.0—1.1 lbf}
   Minimum: 1.7 N {0.17 kgf, 0.38 lbf}



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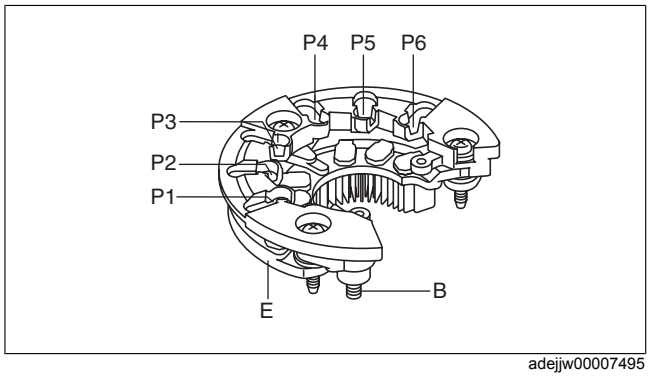
Rectifier (Using an analog circuit tester)
1. Inspect for continuity of the diodes using an analog circuit tester.
   - If not as specified, replace the rectifier.

Specification

Negative	Positive	Continuity
E	P1, P2, P3, P4, P5, P6	Yes
B		No
P1, P2, P3, P4, P5, P6	E	No
	B	Yes



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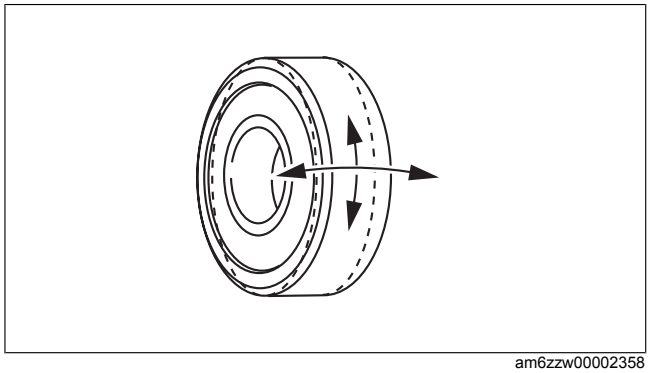
Rectifier (Using a digital circuit tester)
1. Inspect for continuity of the diodes using a digital circuit tester.
   - If not as specified, replace the rectifier.

Specification

Negative	Positive	Continuity
E	P1, P2, P3, P4, P5, P6	No
B		Yes
P1, P2, P3, P4, P5, P6	E	Yes
	B	No

Bearing
1. Inspect for abnormal noise, looseness, and sticking.
   - Replace the bearing if necessary.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