CHARGING SYSTEM

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FOR ALTERNATOR WITH IC REGULATOR

Fig. 11-3

Fig. 11-4
ON-VEHICLE INSPECTION

1. Inspect the following system components:
   Drive belt tension at 10 kg (22 lb):
   8 – 12 mm
   (0.3 – 0.5 in.)

2. Fuses
   ENGINE fuse 15A
   GAUGE fuse 15A

3. Installed condition of wiring for alternator and regulator.

4. Battery terminal and fusible link
   Loose
   Corroded
   Burnt
5. Alternator on-vehicle condition
   Abnormal noise from alternator when engine is running.

6. Specific gravity 1.25 – 1.27
   Connect the voltmeter and ammeter as shown in the figure.

PERFORMANCE TEST USING VOLT-METER & AMMETER
1. Disconnect the wire from terminal B of the alternator and connect the wire to the negative terminal of the ammeter.
2. Connect the test lead from the positive terminal of the ammeter to terminal B of the alternator.
3. Connect the positive lead of the voltmeter to terminal B of the alternator.
4. Connect the negative lead of the voltmeter to ground.

– Note –
Be careful not to cause a short.

No-load Performance Test
Regulated voltage: 13.8 – 14.8V
Current: Less than 10A
Engine speed: Idling to 2,000 rpm
Load Performance Test
1. Crank the engine with ignition coil high tension cord disconnected for about 5 to 10 seconds.
2. Turn on headlights and accessories.

Fig. 11-14
3. Start engine, and run it at approximately 2,000 rpm.
   Regulated voltage: 12V
   Current: More than 30A

WITH IC REGULATOR TYPE
No-load Performance Test
   Regulated voltage: 14.0 - 14.7V
   Current: Less than 10A
   Engine speed: Idling to 2,000 rpm

Load Performance Test
1. Run engine at 2,000 rpm.
2. Turn on headlights and all accessories.
   Regulated voltage: 14.0 - 14.7V
   Current: More than 30 A
PERFORMANCE TEST BY ALTERNATOR CHECKER

SST [09081-00011]

1. Unplug the alternator regulator connector and plug in the checker connector.
   Push 20V switch.

2. Check B terminal voltage.
   Push B switch.
   Raise engine speed from idling to 2,000 rpm.
   **Standard voltage:** 13.8 - 14.8V
   If not within standard, probable cause is the alternator regulator.

3. Check F terminal voltage.
   Push F switch.
   Gradually raise engine speed. The checker reading should gradually decrease from 12 to 3 volts.
   If decrease is not registered, probable cause is alternator regulator.

4. Check N terminal voltage.
   Push N switch.
   Maintain engine speed at approximately 1,500 rpm. The pointer should be at a half of B terminal voltage.
   **Standard voltage:** 6.9 - 7.4V
   If the voltage is higher, the cause will be (+) rectifier.
   If the voltage is lower, the cause will be (−) rectifier.
ADJUST OUTPUT VOLTAGE

If not within the output voltage, adjust by bending the adjusting arm.

Voltage: 13.8 – 14.8V
Engine speed: Idling to 2,000 rpm
ALTERNATOR INSPECTION

1. Negative side rectifier short test.
   Connect an ohmmeter (−) lead to N terminal and (+) lead to E terminal.
   Meter should indicate infinity.

2. Positive side rectifier short test.
   Connect an ohmmeter (−) lead to B terminal and (+) lead to N terminal.
   Meter should indicate infinity.

3. Check rotor coil resistance.
   Resistance: 5 – 9 Ω

4. Turn the ignition switch to ON position, and check to see if there is battery voltage at F terminal. If not, check the ENGINE fuse.
ALTERNATOR
CUTAWAY VIEW

Fig. 11-26
For ALTERNATOR WITH IC REGULATOR
DISASSEMBLY
Disassemble the parts in the numerical order shown in the figure.

Fig. 11-28

1. Drive End Frame Assembly
2. Pulley & Fan
3. Rotor
4. Rear Bearing
5. Front Bearing
6. Drive End Frame
Disassemble the parts in the numerical order shown in the figure.

Fig. 11-29

7. Nut, Insulator & Dust Cover
8. Stator Coil, Rectifier Holder & Insulator
9. Brush Holder & Rectifier Holder
10. Brush Holder
11. Lead Wire
12. Rectifier Holder
Disassemble the parts in the numerical order shown in the figure.

1. Drive End Frame Assembly
2. Pulley & Fan
3. Rotor
4. Rear Bearing
5. Front Bearing
6. Drive End Frame
Disassemble the parts in the numerical order shown in the figure.

Fig. 11-31

7. Nut, Insulator & Dust Cover
8. Stator Coil, Rectifier Holder & Insulator
9. Brush Holder & Rectifier Holder
10. Brush Holder
11. Rectifier Holder
For Alternator with IC Regulator
Disassemble the parts in the numerical order shown in the figure.

1. Drive End Frame Assembly
2. Pulley & Fan
3. Rotor
4. Rear Bearing
5. Front Bearing
6. Drive End Frame
Disassemble the parts in the numerical order shown in the figure.

Fig. 11-33

7. Nut, Insulator & Dust Cover
8. IC Regulator
9. Stator Coil & Rectifier Holder
10. Rectifier Holder with Brush
Fig. 11-34
Pry the drive end frame from the stator and tap it off.

Fig. 11-35
Remove the rotor from the drive end frame with a press.

Fig. 11-36
Remove the rotor shaft rear bearing with SST. SST(09286-46011)

Fig. 11-37
Remove the brush holder assembly with a 10 mm socket wrench and vise.
INSPECTION & REPAIR

Rotor
1. Open circuit test
   Standard resistance: 4.1 – 4.3 Ω

2. Ground test
   Meter should indicate infinity.

3. Check slip ring for being dirt or burn.

Bearing
Check bearing for wear or roughness.
**Stator**

1. Open circuit test
   Test all four leads for continuity.

**Brush & Brush Holder**

1. Check the exposed brush length.
   
   Minimum exposed length: 5.5 mm  
   (0.22 in.)

2. When replacing the brushes, assemble them as shown in the figure.

   Exposed length: 12.5 mm  
   (0.49 in.)

   with IC regulator
   16.5 mm  
   (0.65 in.)
Rectifier

1. Rectifier holder positive side
   Connect an ohmmeter (+) lead to the rectifier holder, and the (−) lead of the meter to the rectifier terminal. If there is no continuity, rectifier assembly must be replaced.

2. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.

3. Rectifier holder negative side
   Connect an ohmmeter (+) lead to the rectifier terminal, and the (−) lead of the meter to the rectifier holder. If there is no continuity, rectifier assembly must be replaced.

4. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.
Rectifier (for Alternator with IC Regulator)

1. Rectifier holder positive side
   Connect an ohmmeter (+) lead to the rectifier holder, and the (−) lead of the meter to the rectifier terminal. If there is no continuity, rectifier assembly must be replaced.

2. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.

3. Rectifier holder negative side
   Connect an ohmmeter (+) lead to the rectifier terminal, and the (−) lead of the meter to the rectifier holder. If there is non continuity, rectifier assembly must be replaced.

4. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.
Field Diodes (for Alternator with IC Regulator)
1. Connect an ohmmeter (+) lead to the rectifier holder, and the (−) lead of the meter to the field diode terminal. If there is no continuity, rectifier assembly must be replaced.

2. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.

Diode (for Alternator with IC Regulator)
1. Connect an ohmmeter (+) lead to the resistor side, and the (−) lead of the meter to the diode other side. If there is no continuity, rectifier assembly must be replaced.

2. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.
Resistor (for Alternator with IC Regulator)

Connect an ohmmeter (+) lead to the diode side, and the (−) lead of the meter to the (−) rectifier side. If there is no continuity, rectifier assembly must be replaced.

Resistance: 2.8 – 3.0 Ω
ASSEMBLY

Assemble the parts in the numerical order shown in the figure.

1. Rectifier Holder & Lead Wire
2. Brush Holder
3. Brush Holder & Rectifier Holder
4. Stator Coil, Rectifier Holder & Insulator
5. Dust Cover, Insulator & Nut
Assemble the parts in the numerical order shown in the figure.

6. Rear Bearing
7. Front Bearing & Drive End Frame
8. Rotor
9. Pulley & Fan
10. Drive End Frame Assembly
Assemble the parts in the numerical order shown in the figure.

1. Brush Holder & Rectifier
2. Brush Holder, Rectifier Holder & Stator Coil
3. Stator Coil, Rectifier Holder & Insulator
4. Dust Cover & Insulator
Assemble the parts in the numerical order shown in the figure.

5. Rear Bearing
6. Front Bearing & Drive End Frame
7. Rotor
8. Pulley & Fan
9. Drive End Frame Assembly, Stator Coil & End Frame
For Alternator with IC Regulator
Assemble the parts in the numerical order shown in the figure.

1. Rectifier Holder with Brush
2. Stator Coil, Rectifier Holder & Insulator
3. Dust Cover, Insulator & Nut
4. IC Regulator
Assemble the parts in the numerical order shown in the figure.

5. Rear Bearing
6. Front Bearing & Drive End Frame
7. Rotor
8. Pulley & Fan
9. Drive End Frame Assembly
Fig. 11-65

[With 8 rectifier]
Solder negative side rectifiers.

Fig. 11-66

Insert insulator between the positive rectifier holder and brush holder.

Fig. 11-67

Install the brush holder onto the rectifier holder with a socket wrench and vise.

Fig. 11-68

[With 8 rectifier]
Connect stator coil N lead onto (+) rectifier terminal and brush holder terminal.
Fig. 11-69

⚠️ [With 6 rectifier]
Solder each lead wire onto rectifier or terminal as shown in the figure.

Fig. 11-70

⚠️ [With 8 rectifier]
Solder each lead wire onto rectifier or terminal as is shown in the figure.

Fig. 11-71

⚠️ [with IC regulator]
Solder each lead wire onto rectifier or terminal as is shown in the figure.

Fig. 11-72

➡️ Assemble the rear end frame and rectifier holder with insulators.
Assemble the rear end cover with the insulators.

If there is danger of the stator coil terminal wiring contacting the frame or rotor, correct by bending the wiring.

Press the rear bearing onto the rotor shaft, with a press.

Press and drive the end frame assembly onto the rotor shaft with SST. SST (09612-22010)
Fig. 11-77
Install the collars as shown in the figure.

Fig. 11-78
Tighten the nut to specified torque.

Tightening torque: 5.0 – 6.5 kg-m
(37 – 47 ft-lb)

Fig. 11-79
Push in brushes and temporarily lock them in place with a wire inserted through the access hole in end frame.
Position lead wires to clear rotor.

Fig. 11-80
Remove locking wire from the rear end frame and make sure the rotor rotates smoothly.
Seal the brush service hole.

ALTERNATOR REGULATOR

Check the connector fitting condition before inspecting the regulator.
Always be sure to have the regulator connector pulled out when inspecting and adjusting.

Inspect each point surface for burn or excessive damage. Replace if defective.

Voltage adjustment
To adjust, bend the voltage regulator adjusting arm.

Regulated voltage: \(13.8 - 14.8V\)

Resistance measurement between terminals.

\[
\begin{array}{|c|c|}
\hline
\text{Voltage regulator} & \text{At rest} & 0 \, \Omega \\
\hline
\text{Pulled in approx.} & 11 \, \Omega \\
\hline
\end{array}
\]
Fig. 11-88

Voltage relay

<table>
<thead>
<tr>
<th>At rest</th>
<th>0 Ω</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulled in approx.</td>
<td>100 Ω</td>
</tr>
</tbody>
</table>

Fig. 11-89

Voltage relay

<table>
<thead>
<tr>
<th>At rest</th>
<th>infinity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulled in approx.</td>
<td>100 Ω</td>
</tr>
</tbody>
</table>

Fig. 11-90

Voltage relay

<table>
<thead>
<tr>
<th>At rest</th>
<th>infinity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulled in</td>
<td>0 Ω</td>
</tr>
</tbody>
</table>

Fig. 11-91

Voltage relay

<table>
<thead>
<tr>
<th>Approx.</th>
<th>25 Ω</th>
</tr>
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