CHARGING SYSTEM

CHARGING SYSTEM CIRCUIT

Fig. 11-1

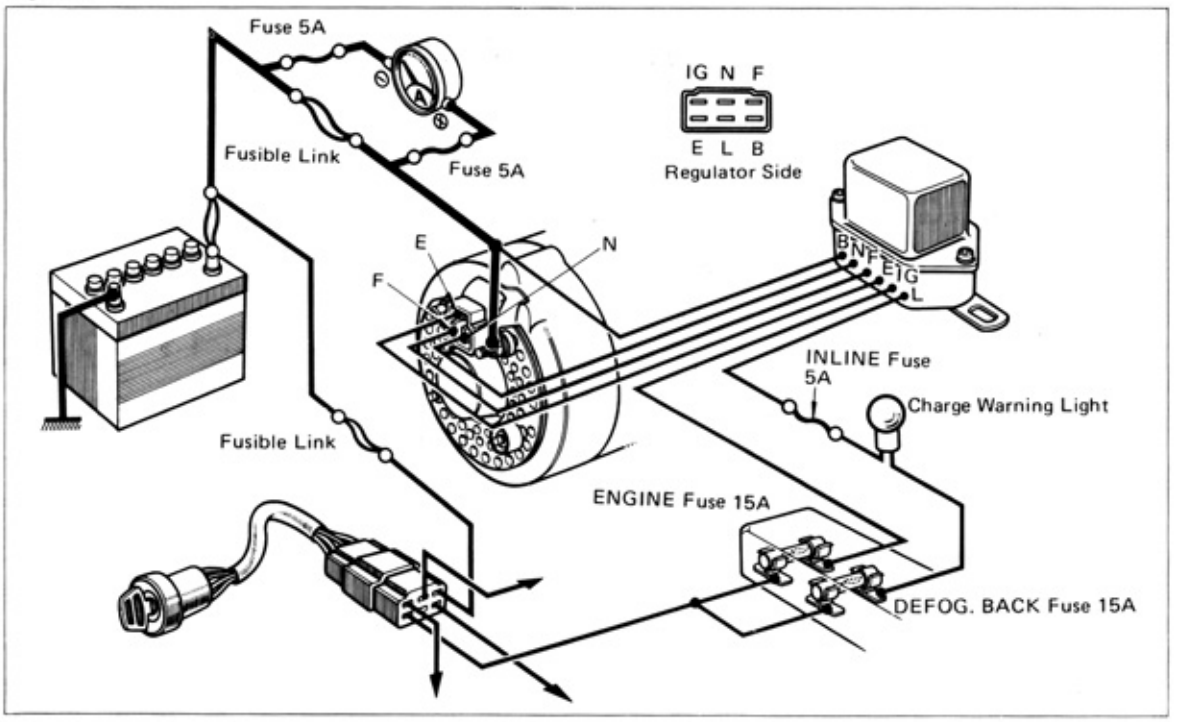
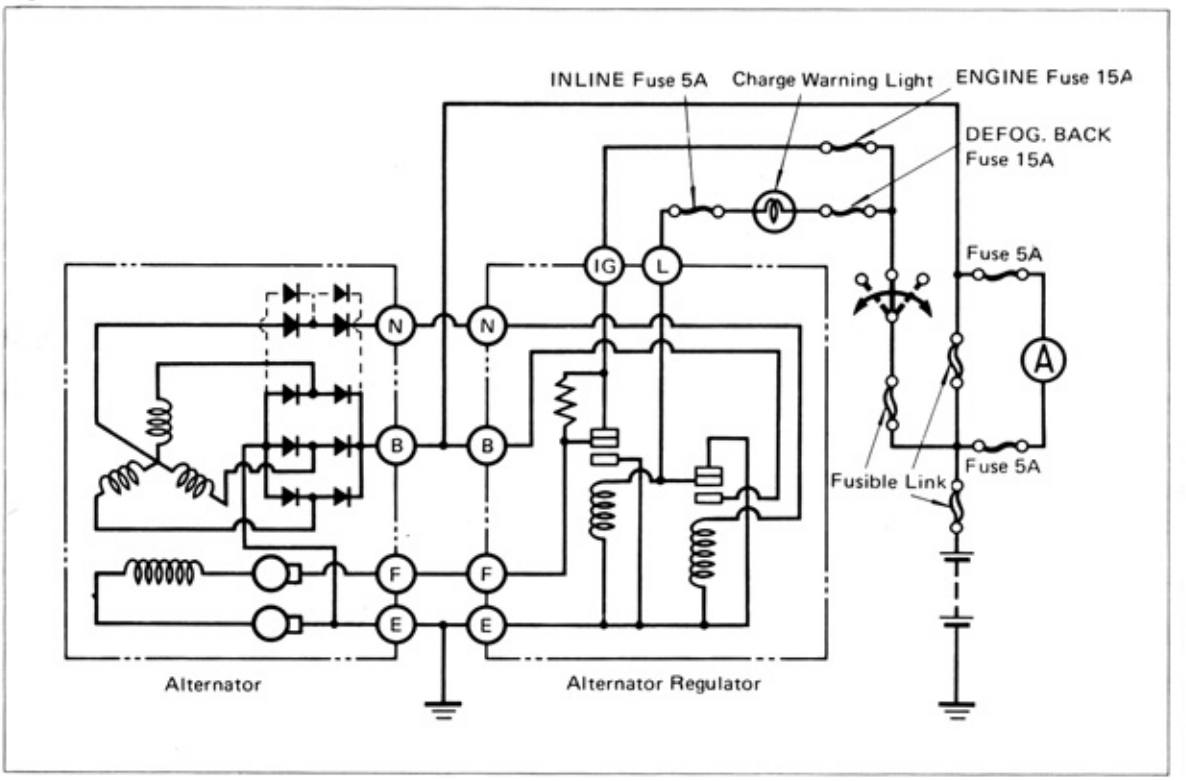


Fig. 11-2



FOR ALTERNATOR WITH IC REGULATOR

Fig. 11-3

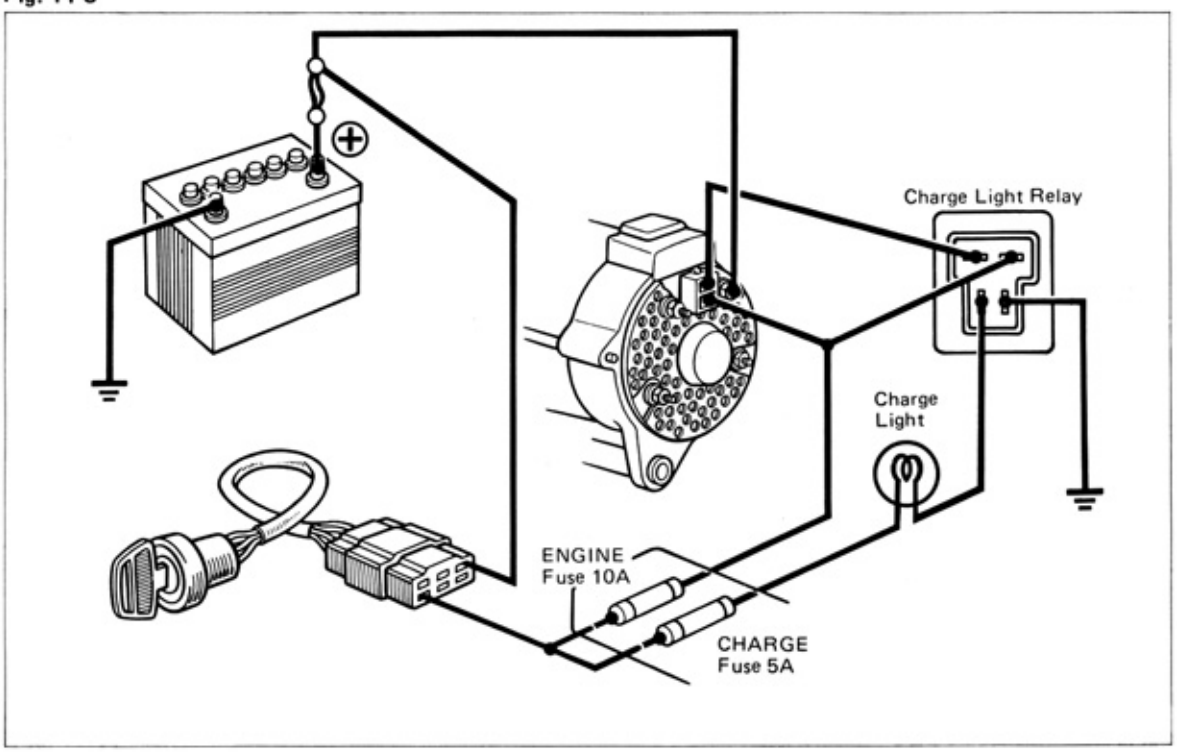
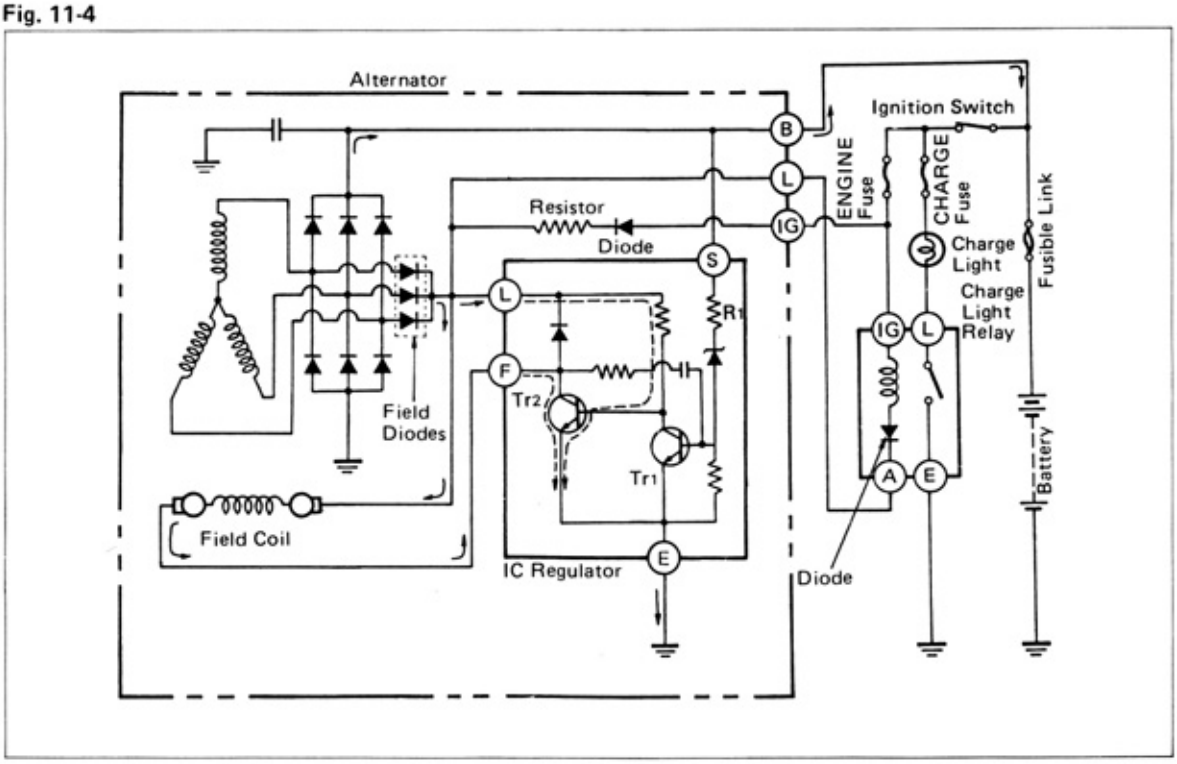
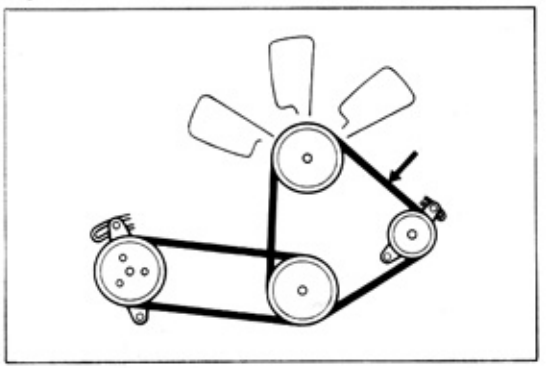


Fig. 11-4



ON-VEHICLE INSPECTION

Fig. 11-5



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

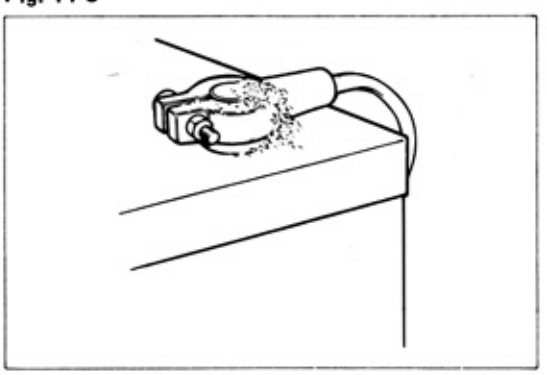
Fig. 11-6

2. Fuses
   ENGINE fuse 15A
   GAUGE fuse 15A

Fig. 11-7

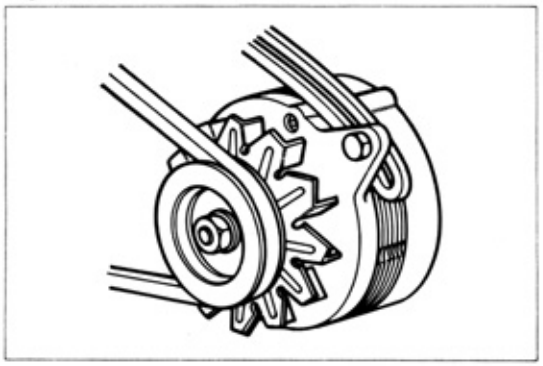
3. Installed condition of wiring for alternator and regulator.

Fig. 11-8



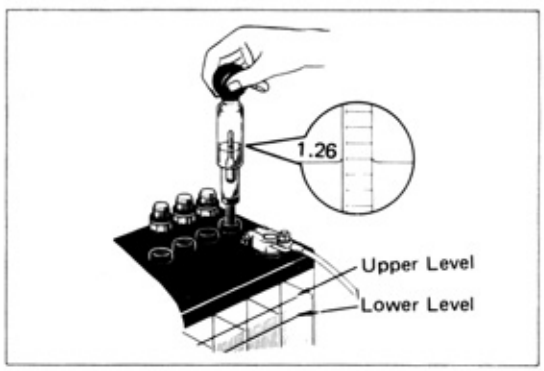
4. Battery terminal and fusible link
   Loose
   Corroded
   Burnt

Fig. 11-9



5. Alternator on-vehicle condition
Abnormal noise from alternator when engine is running.

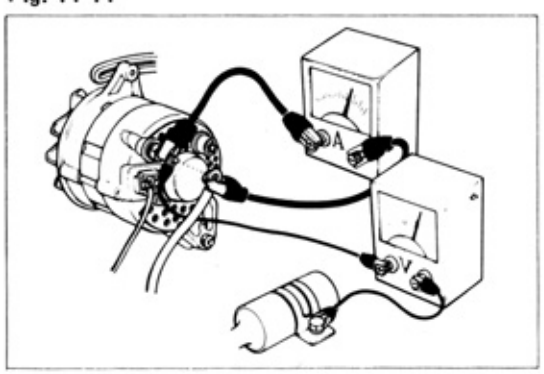
Fig. 11-10



6. Specific gravity 1.25 – 1.27

Connect the voltmeter and ammeter as shown in the figure.

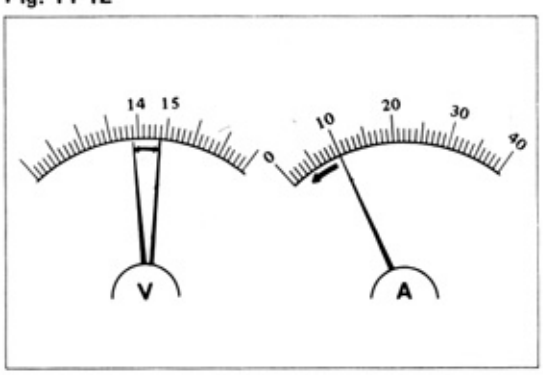
Fig. 11-11



PERFORMANCE TEST USING VOLTMETER & 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.

Fig. 11-12

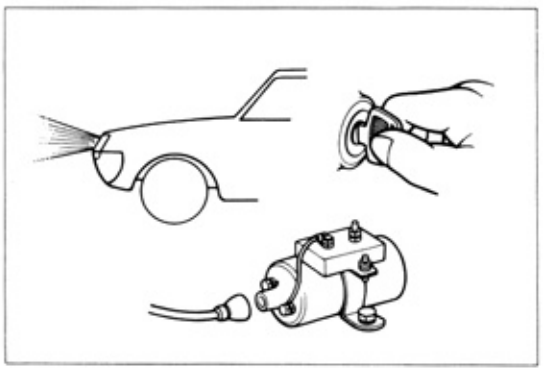


– Note –
Be careful not to cause a short.

No-load Performance Test

Regulated voltage:	**13.8 – 14.8V**
Current:	**Less than 10A**
Engine speed:	**Idling to 2,000 rpm**

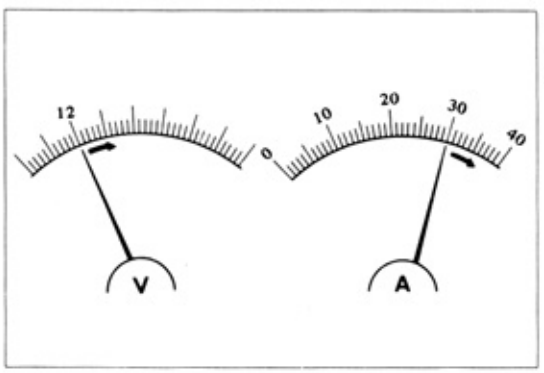
Fig. 11-13



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.

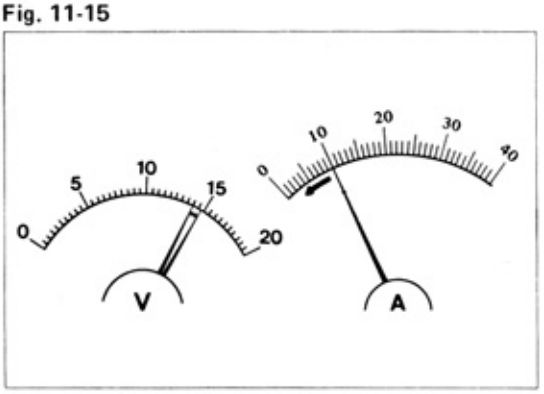
Fig. 11-14



3. Start engine, and run it at approximately 2,000 rpm.

Regulated voltage:	**12V**
Current:	**More than 30A**

Fig. 11-15

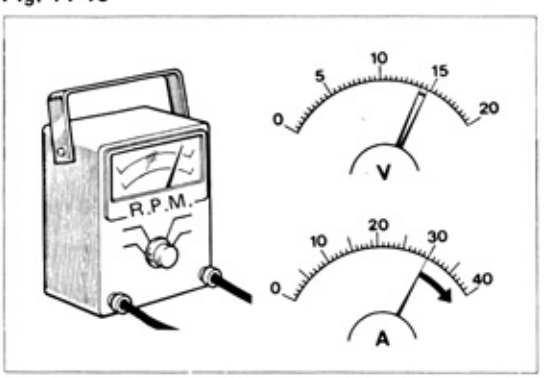


WITH IC REGURATOR TYPE

No-load Performance Test

Regulated voltage:	**14.0 – 14.7V**
Current:	**Less than 10A**
Engine speed:	**Idling to 2,000 rpm**

Fig. 11-16

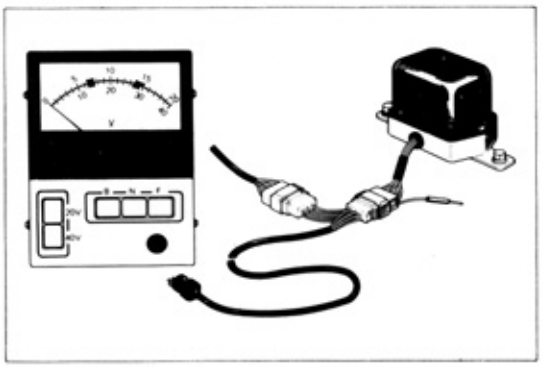


Load Performance Test

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**

Fig. 11-17

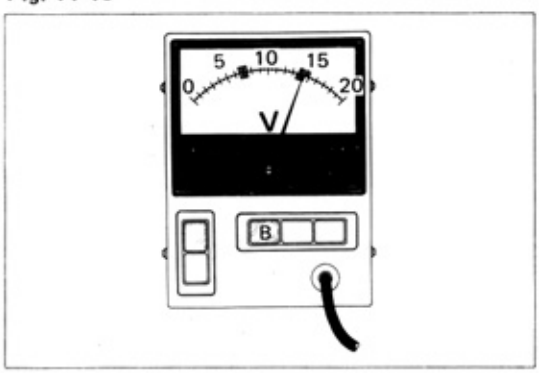


PERFORMANCE TEST BY ALTERNATOR CHECKER

SST [09081-00011]

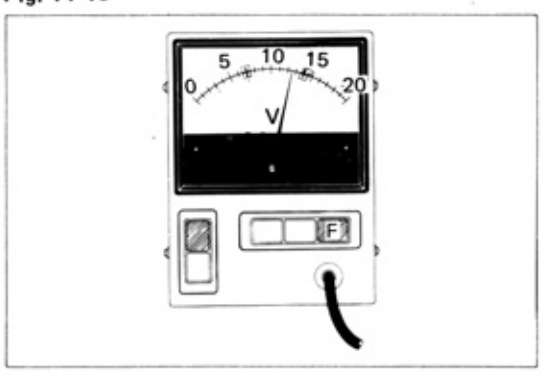
1. Unplug the alternator regulator connector and plug in the checker connector.
   Push 20V switch.

Fig. 11-18



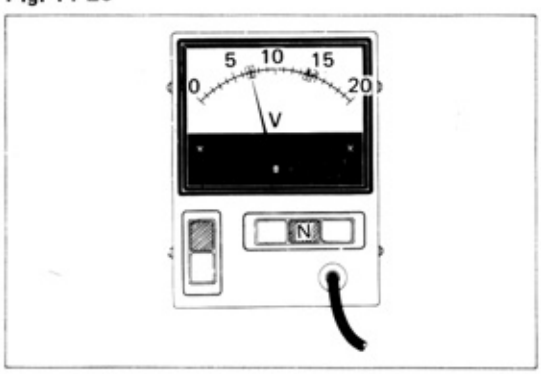
2. Check B terminal voltage.
   Push B switch.
   Raise engine speed from idling to 2,000 rpm.
   Standard voltage: 13.8 – 14.8V
   If not within standard, probable cause is the alternator regulator.

Fig. 11-19



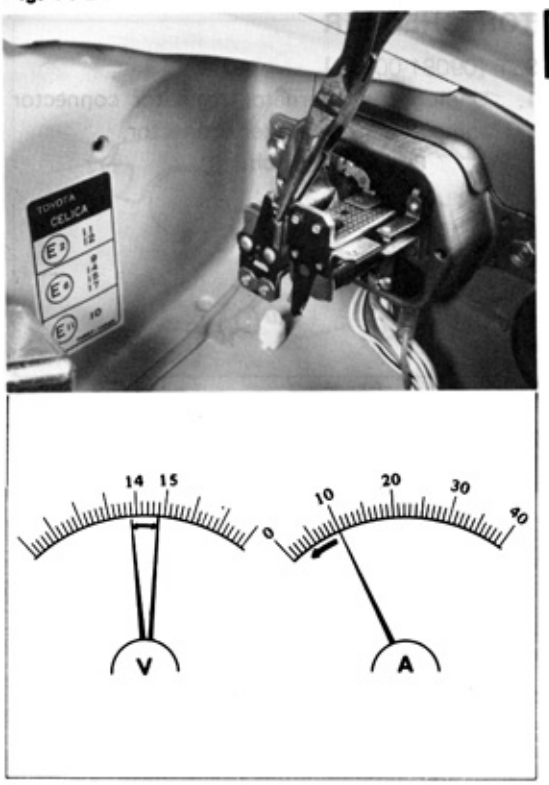
3. Check F terminal voltage.
   Push F switch.
   Gradually raise engine speed. The checker reading should gradually decrease from 12 to 3 volts.
   If decrease is not registered, probable cause is alternator regulator.

Fig. 11-20



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.

Fig. 11-21

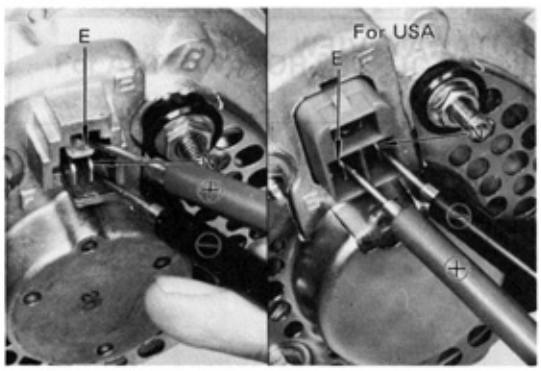


ADJUST OUTPUT VOLTAGE

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

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

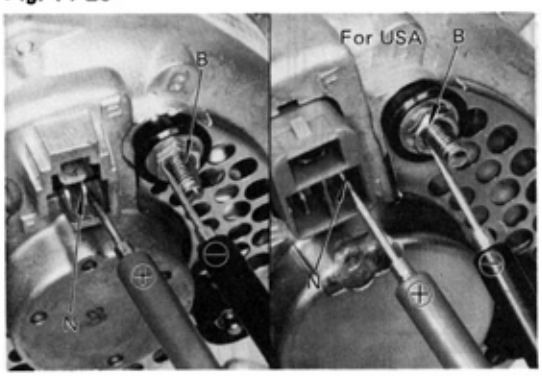
Fig. 11-22



ALTERNATOR INSPECTION

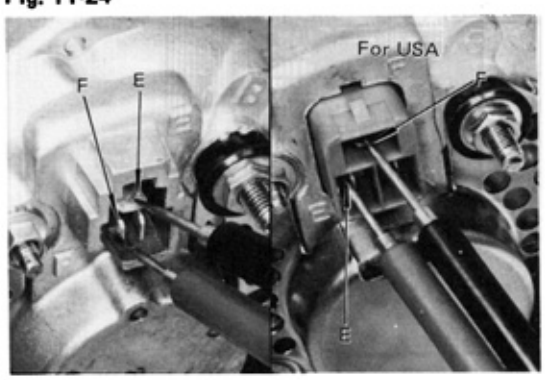
1. Negative side rectifier short test.
   Connect an ohmmeter (–) lead to N terminal and (+) lead to E terminal.
   Meter should indicate infinity.

Fig. 11-23



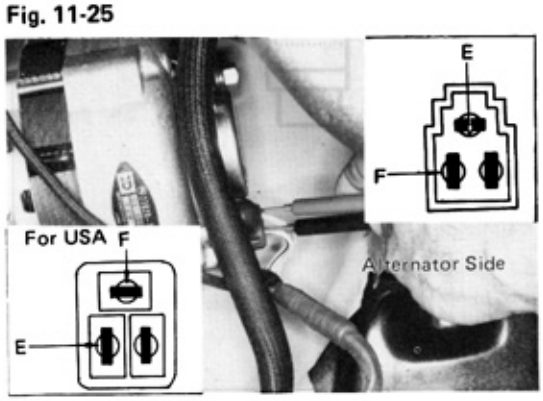
2. Positive side rectifier short test.
   Connect an ohmmeter (–) lead to B terminal and (+) lead to N terminal.
   Meter should indicate infinity.

Fig. 11-24



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

Fig. 11-25



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

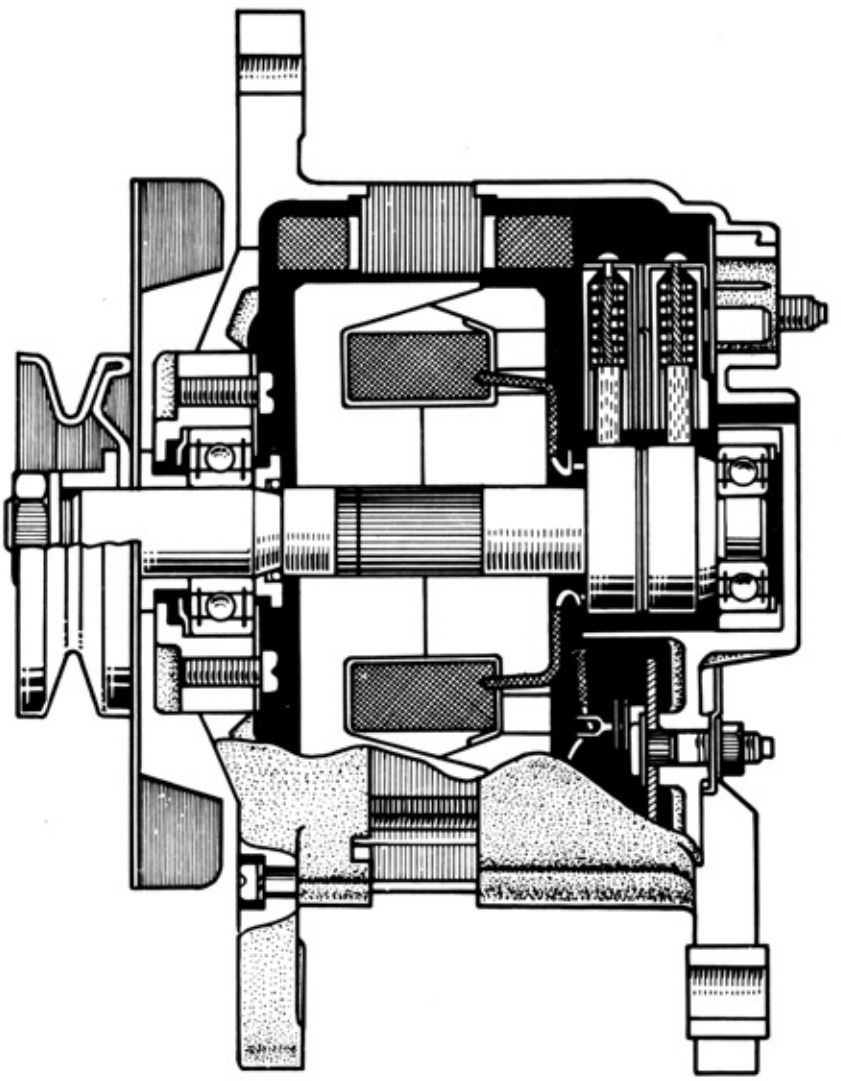
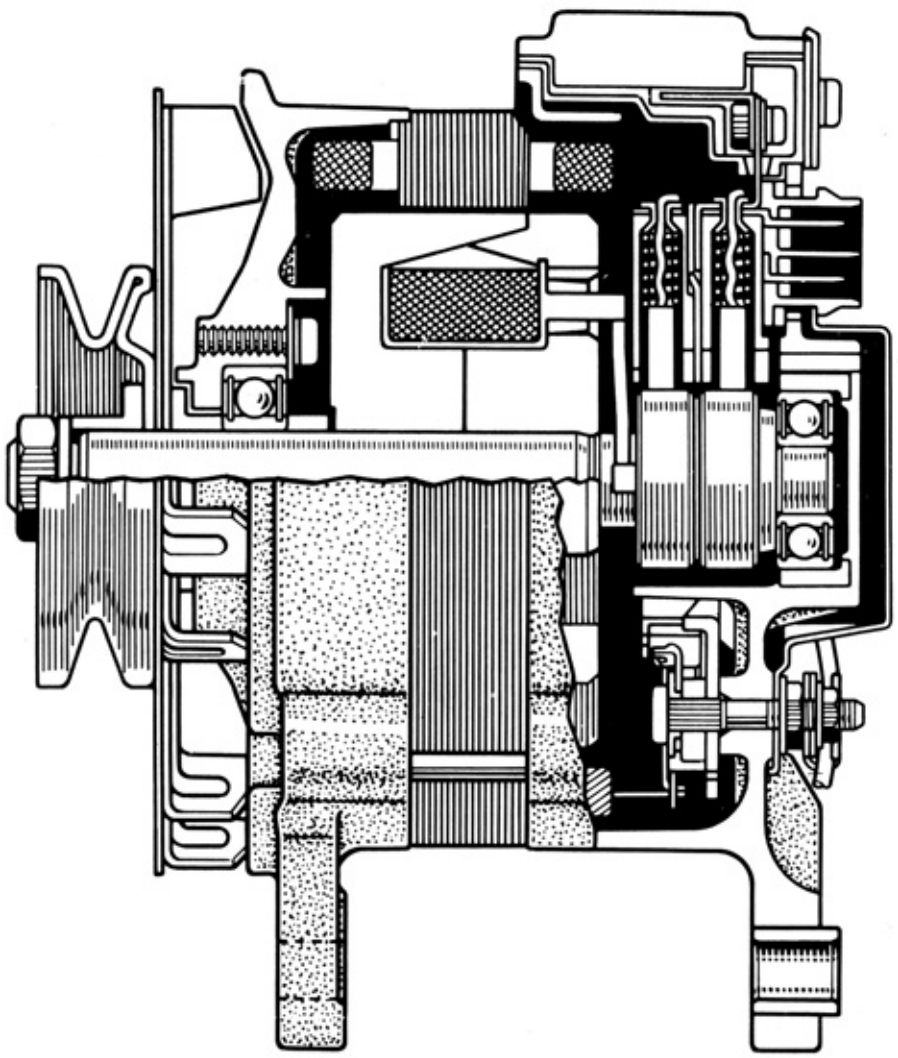


Fig. 11-27

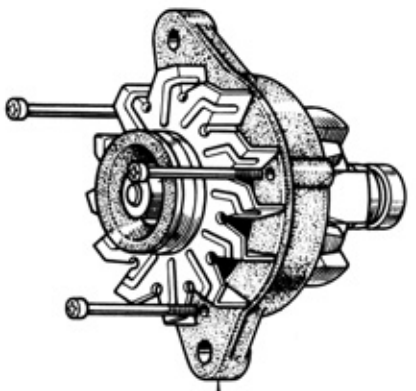
For ALTERNATOR WITH IC REGULATOR



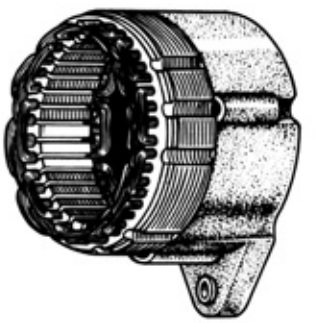
DISASSEMBLY

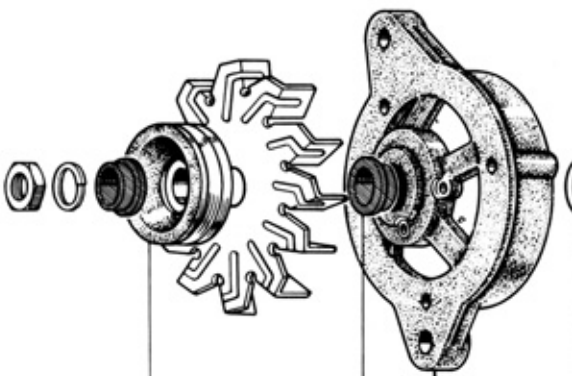
Disassemble the parts in the numerical order shown in the figure.

Fig. 11-28



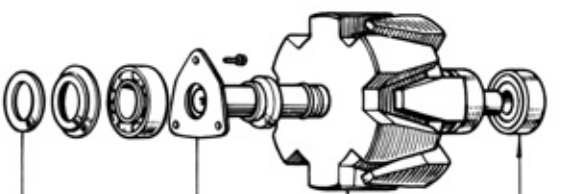
1 Fig. 11-34





2
Fig. 11-35

6



5

3

4
Fig. 11-36

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

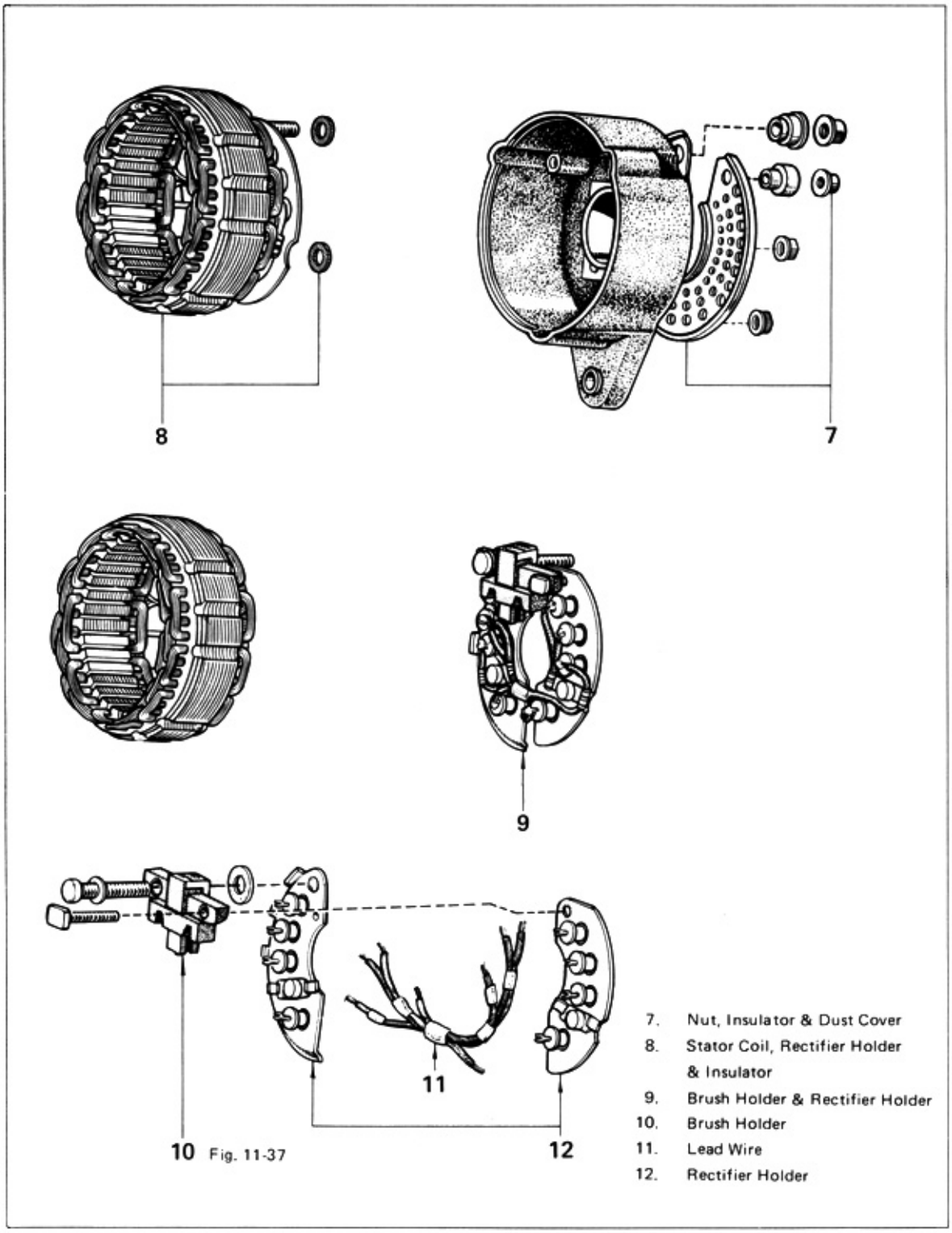


Fig. 11-37

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.

Fig. 11-30

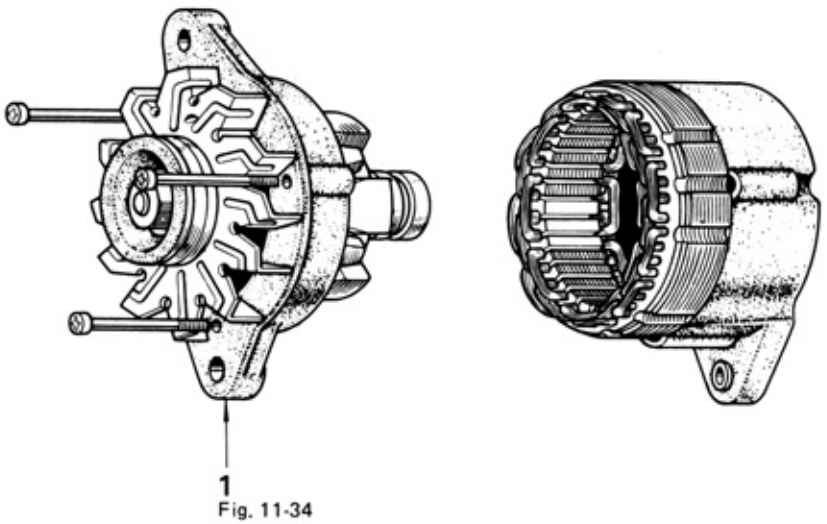


Fig. 11-34

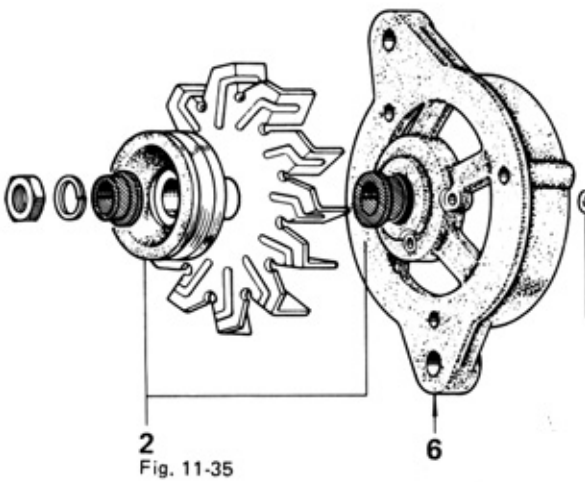


Fig. 11-35

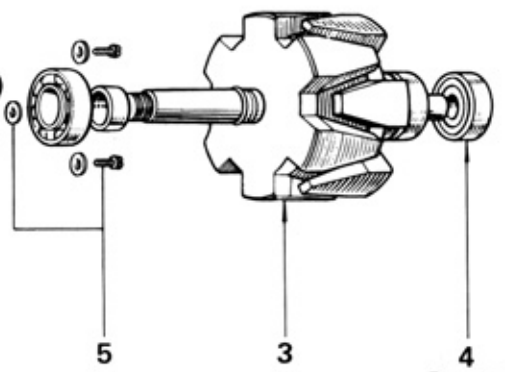


Fig. 11-36

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

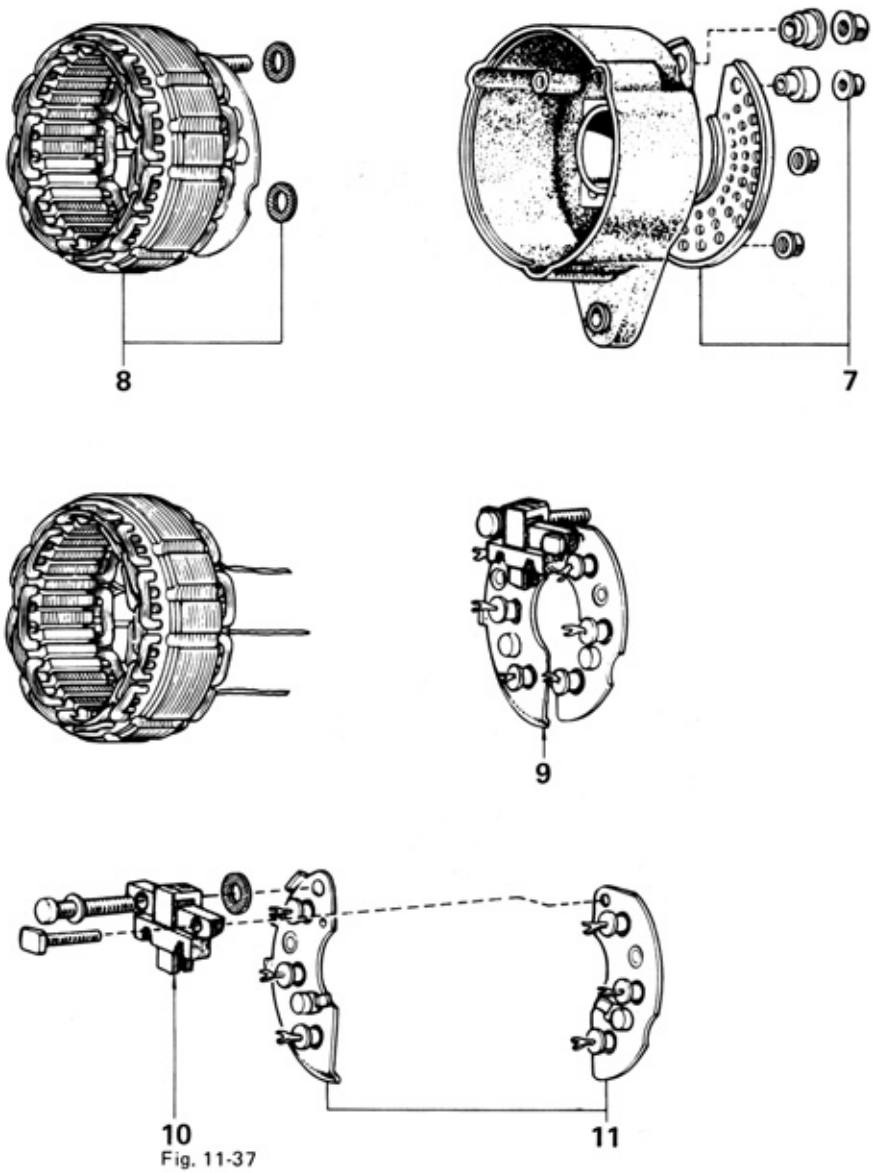


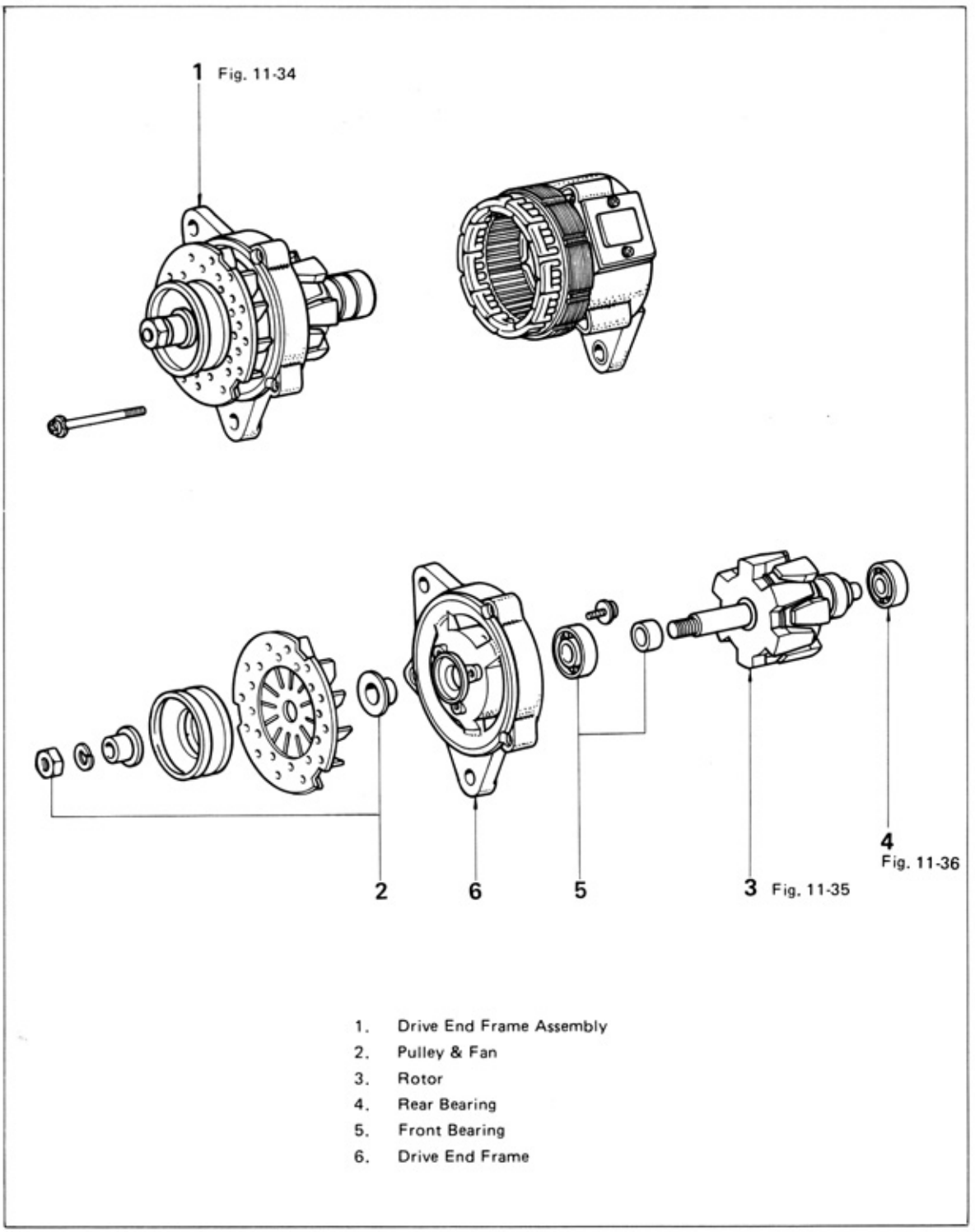
Fig. 11-37

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.

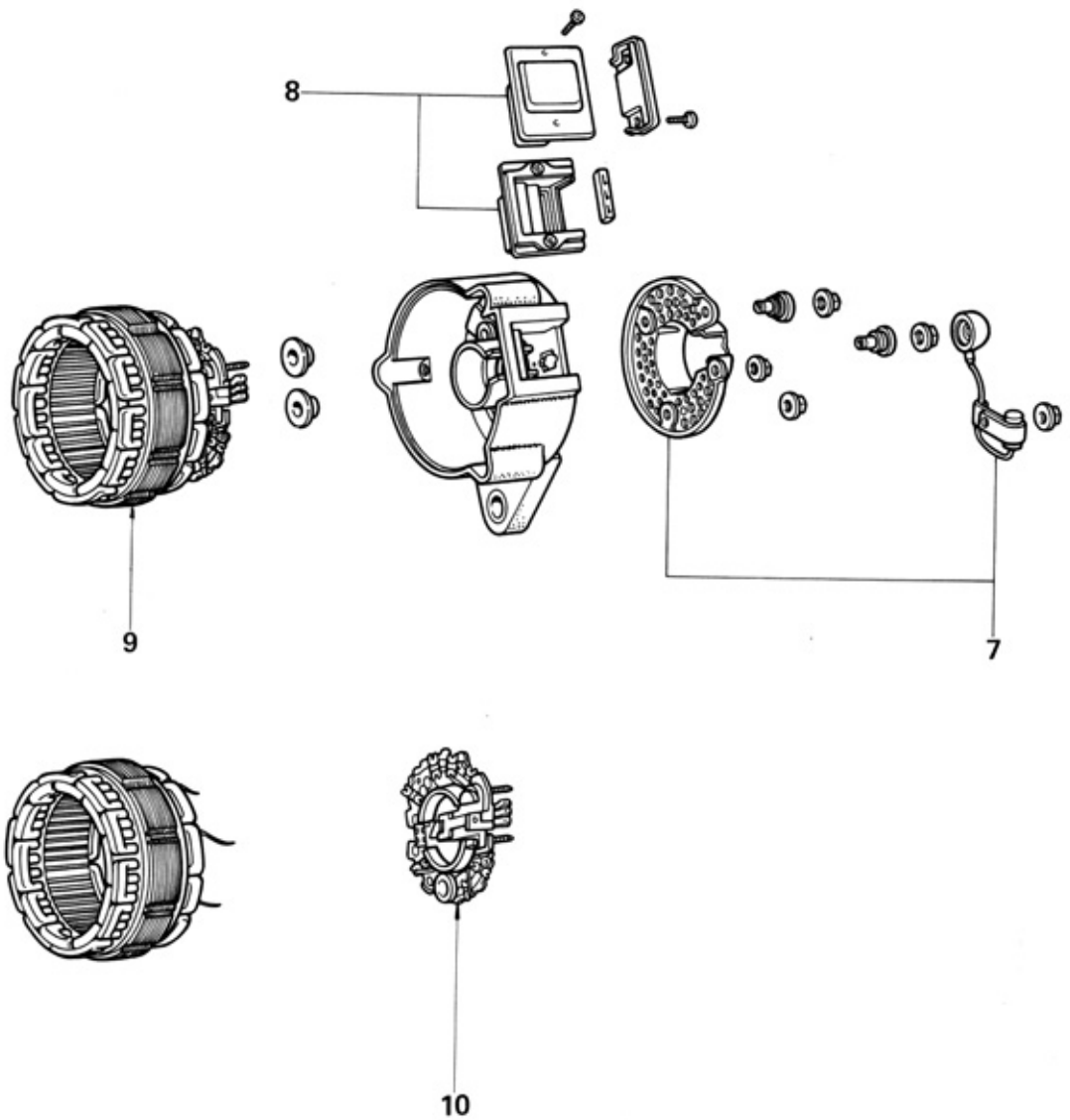
Fig. 11-32



1. Drive End Frame Assembly
2. Pulley & Fan
3. Rotor
4. Rear Bearing
5. Front Bearing
6. Drive End Frame

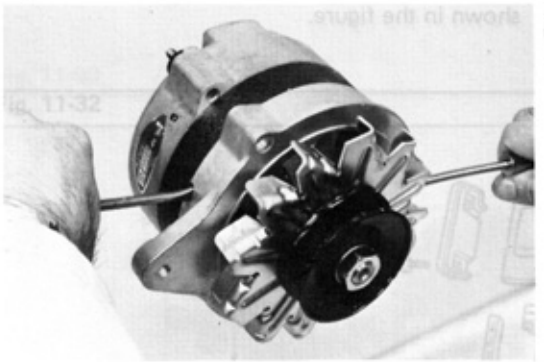
Disassemble the parts in the numerical order shown in the figure.

Fig. 11-33



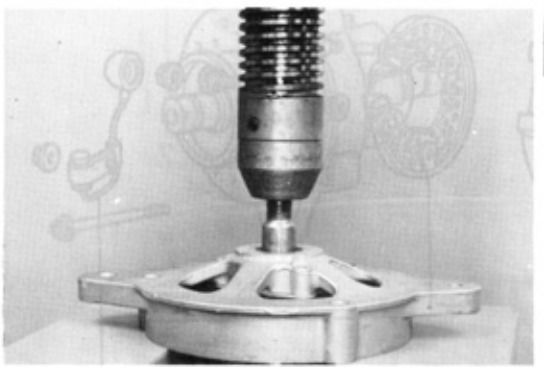
7. Nut, Insulator & Dust Cover
8. IC Regulator
9. Stator Coil & Rectifier Holder
10. Rectifier Holder with Brush

Fig. 11-34



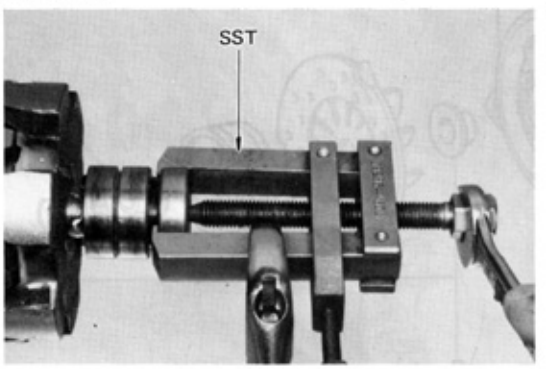
. Pry the drive end frame form the stator and tap it off.

Fig. 11-35



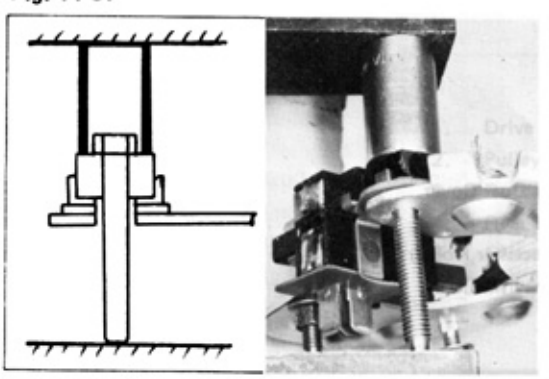
Remove the rotor from the drive end frame with a press.

Fig. 11-36



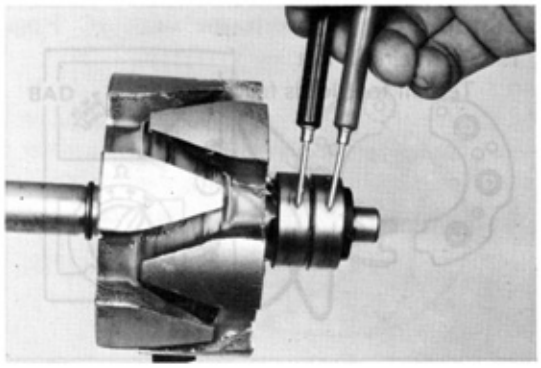
Remove the rotor shaft rear bearing with SST.
SST [09286-46011]

Fig. 11-37



Remove the brush holder assembly with a 10 mm socket wrench and vise.

Fig. 11-38

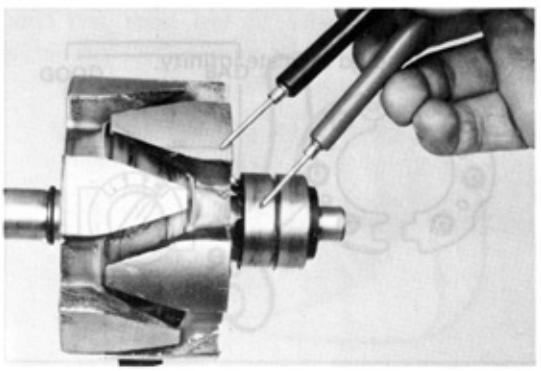


INSPECTION & REPAIR

Rotor

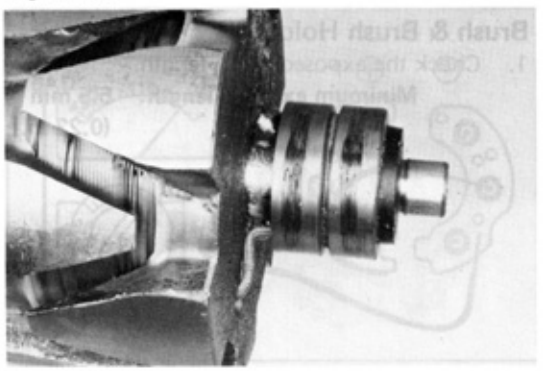
1. Open circuit test
   Standard resistance: 4.1 – 4.3 Ω

Fig. 11-39



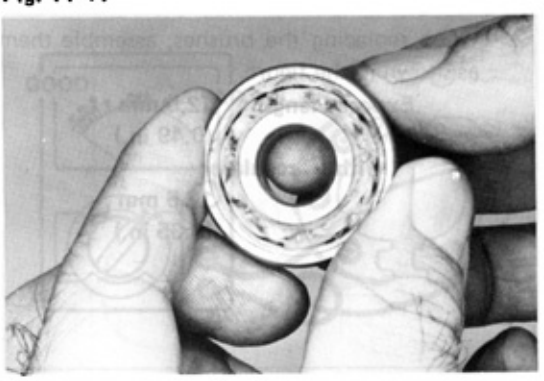
2. Ground test
   Meter should indicate infinity.

Fig. 11-40



3. Check slip ring for being dirt or burn.

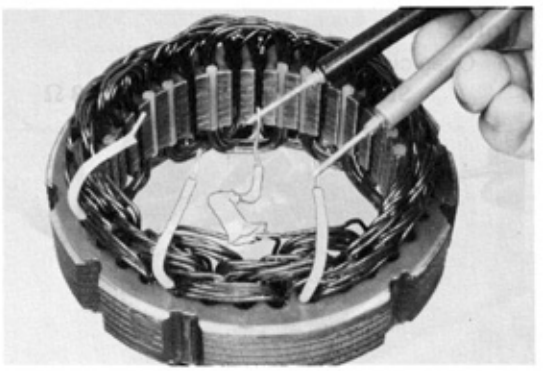
Fig. 11-41



Bearing

Check bearing for wear or roughness.

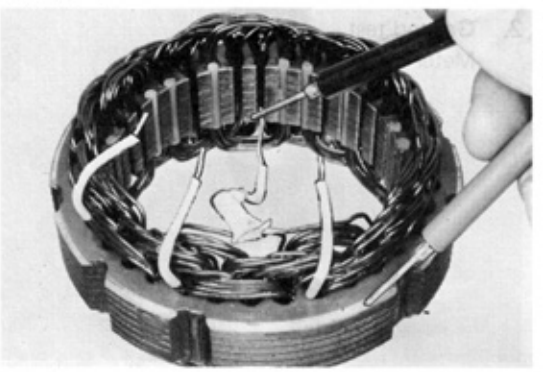
Fig. 11-42



Stator

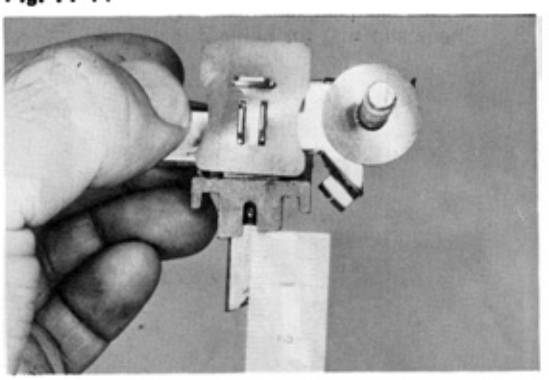
1. Open circuit test
   Test all four leads for continuity.

Fig. 11-43



2. Ground test
   Meter should indicate infinity.

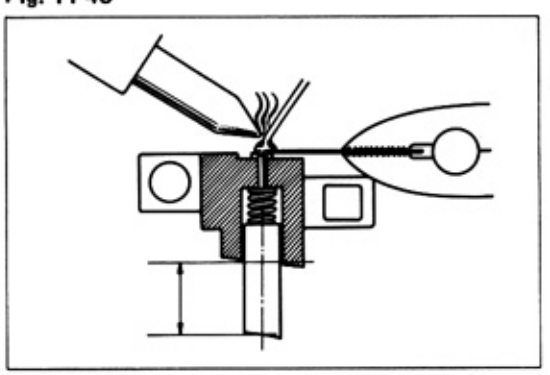
Fig. 11-44



Brush & Brush Holder

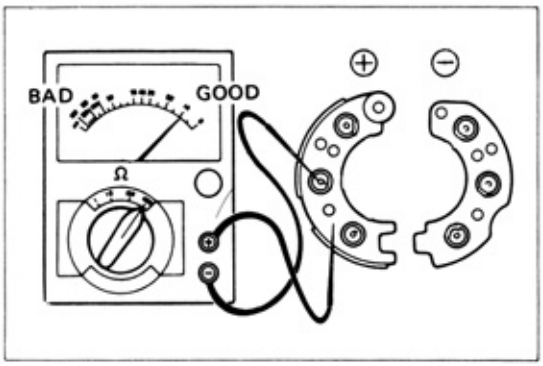
1. Check the exposed brush length.
   Minimum exposed length: 5.5 mm (0.22 in.)

Fig. 11-45



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.)

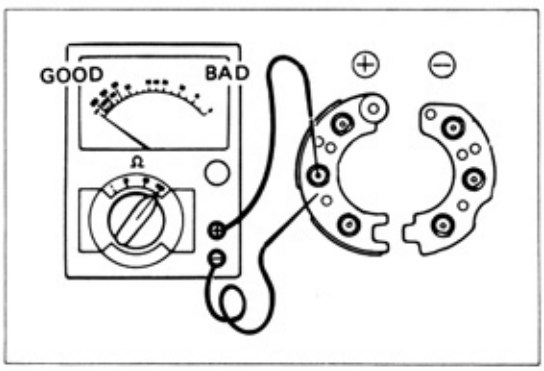
Fig. 11-46



Rectifier

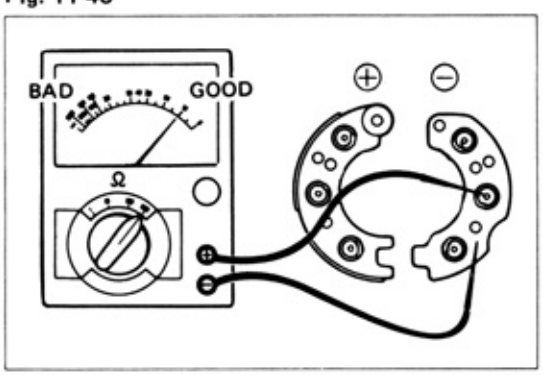
1. Rectifier holder positive side
   Connect an ohmmeter (+) lead to the rectifier holder, and the (–) lead of the meter to the rectifier terminal. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-47



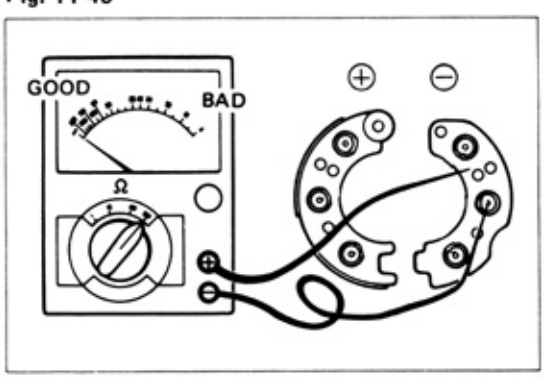
2. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.

Fig. 11-48



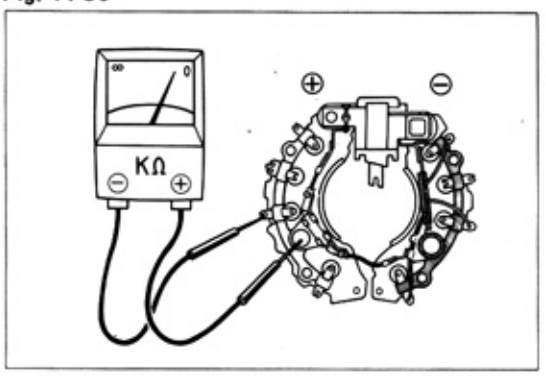
3. Rectifier holder negative side
   Connect an ohmmeter (+) lead to the rectifier terminal, and the (–) lead of the meter to the rectifier holder. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-49



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

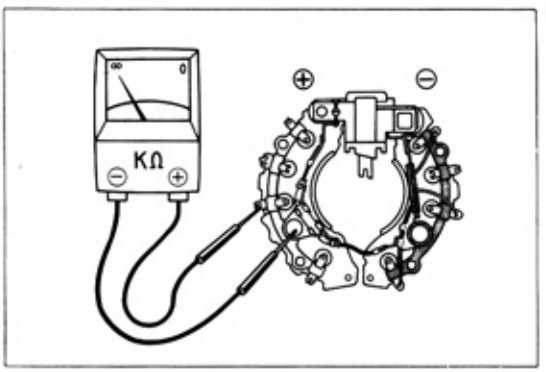
Fig. 11-50



Rectifier (for Alternator with IC Regulator)

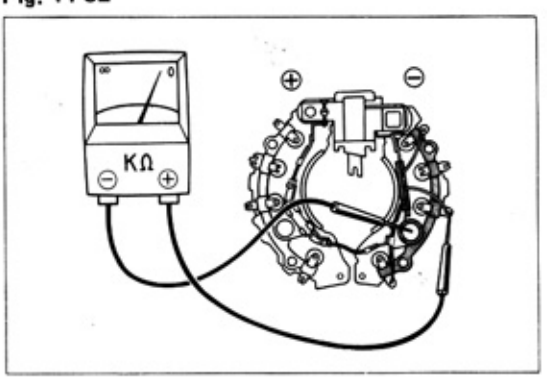
1. Rectifier holder positive side
   Connect an ohmmeter (+) lead to the rectifier holder, and the (–) lead of the meter to the rectifier terminal. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-51



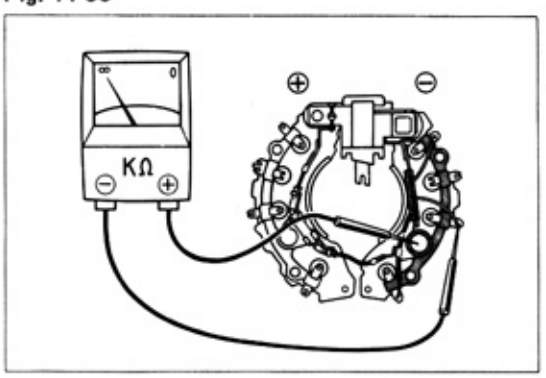
2. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.

Fig. 11-52



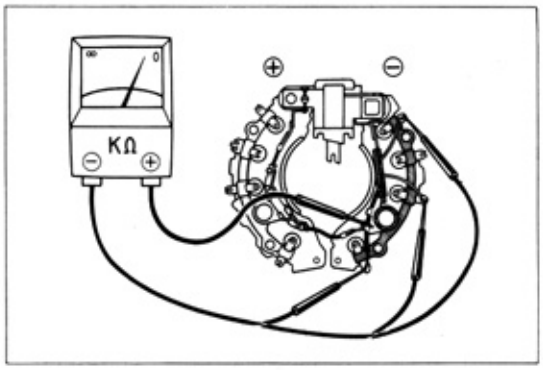
3. Rectifier holder negative side
   Connect an ohmmeter (+) lead to the rectifier terminal, and the (–) lead of the meter to the rectifier holder. If there is non continuity, rectifier assembly must be replaced.

Fig. 11-53



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

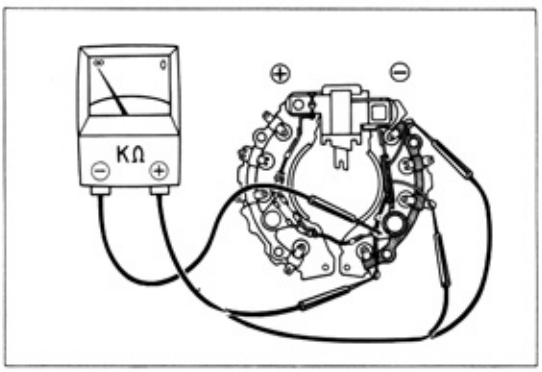
Fig. 11-54



Field Diodes (for Alternator with IC Regulator)

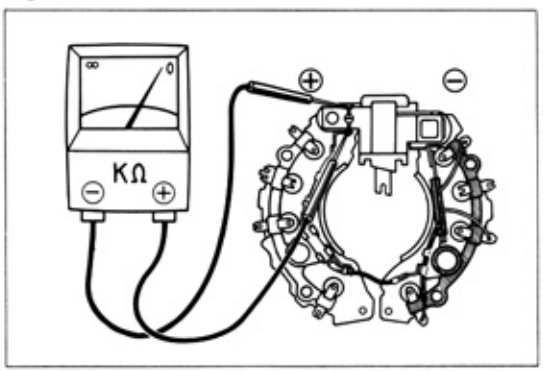
1. Connect an ohmmeter (+) lead to the rectifier holder, and the (–) lead of the meter to the field diode terminal. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-55



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

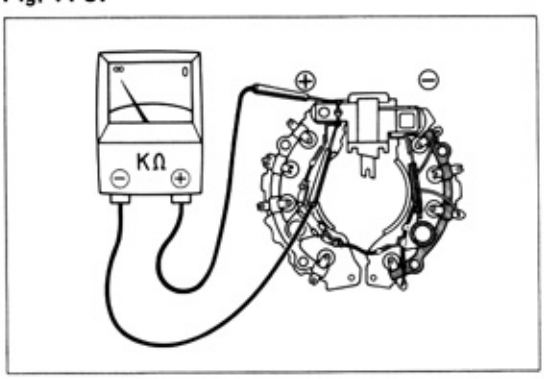
Fig. 11-56



Diode (for Alternator with IC Regulator)

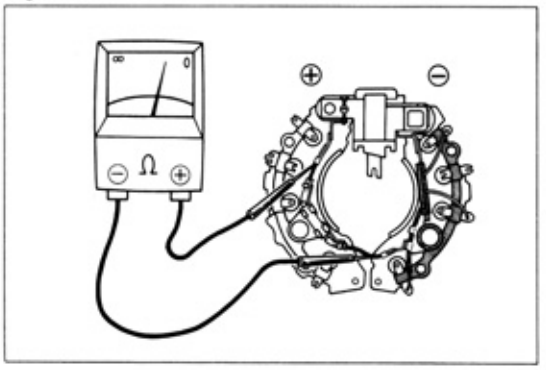
1. Connect an ohmmeter (+) lead to the resistor side, and the (–) lead of the meter to the diode other side. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-57



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

Fig. 11-58



Resistor (for Alternator with IC Regulator)

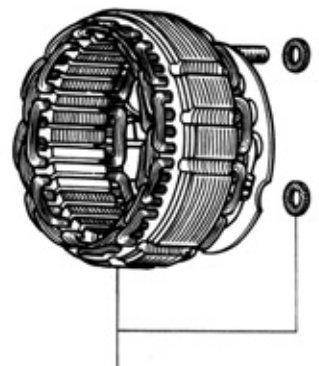
Connect an ohmmeter (+) lead to the diode side, and the (–) lead of the meter to the (–) rectifier side. If there is no continuity, rectifier assembly must be replaced.

Resistance: **2.8 – 3.0 Ω**

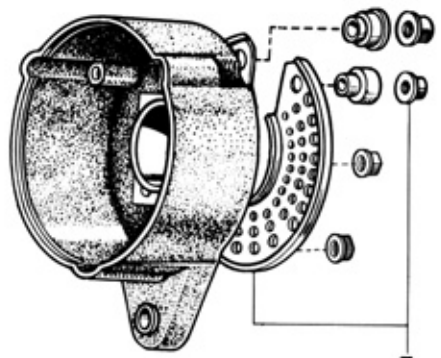
ASSEMBLY

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

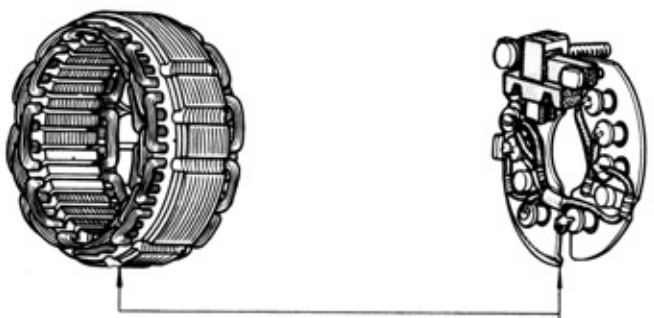
Fig. 11-59



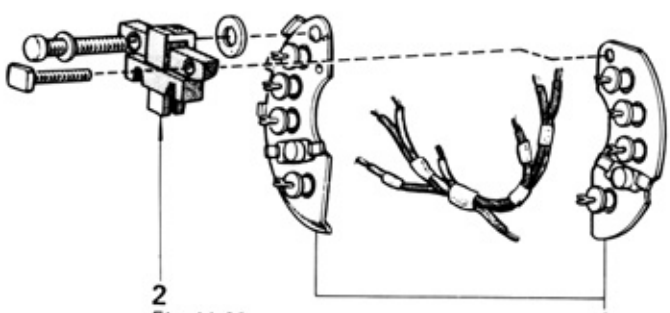
4
Fig. 11-70
11-72



5
Fig. 11-73
11-74



3 Fig. 11-68



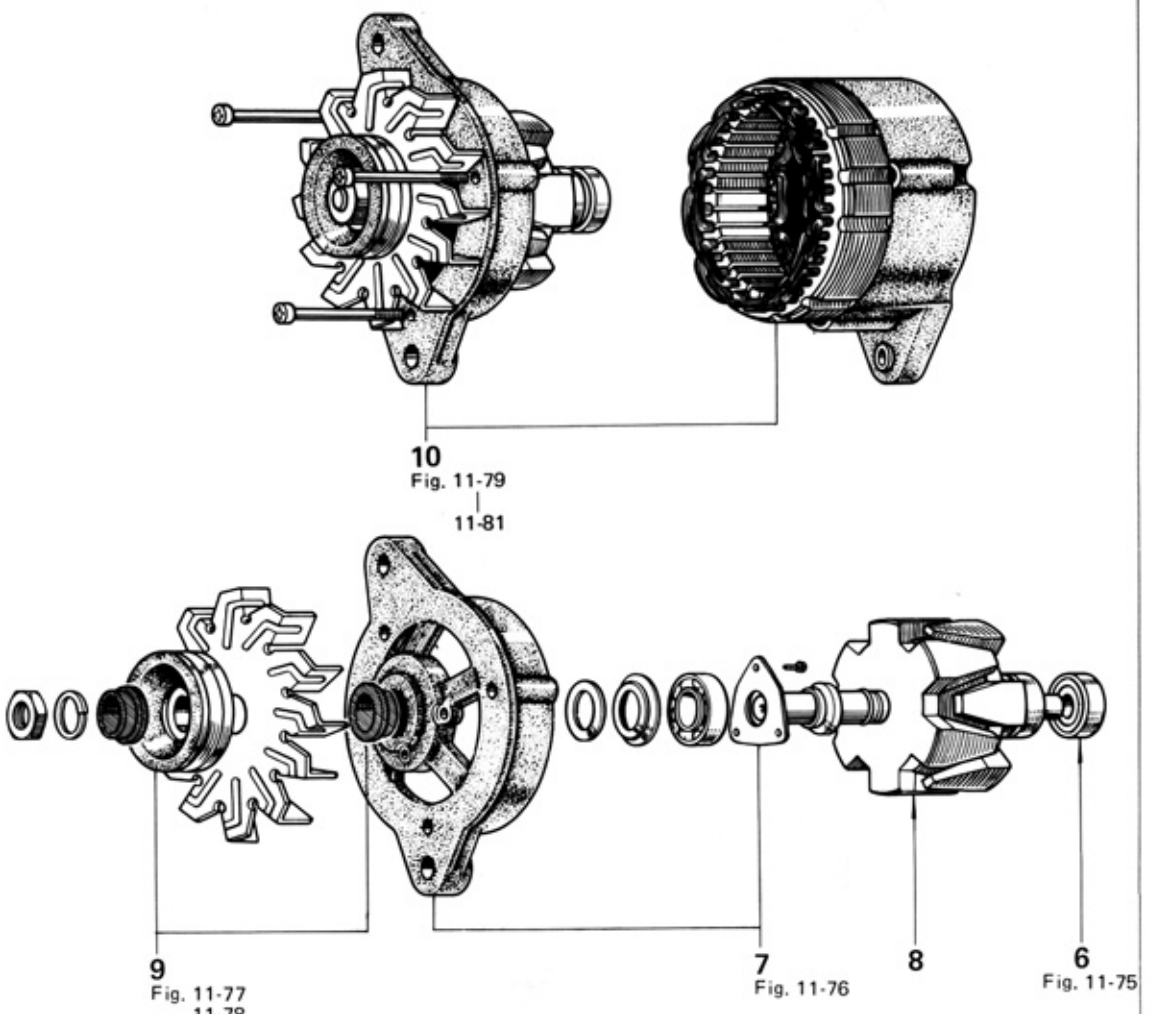
2
Fig. 11-66
11-67

1
Fig. 11-65

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.

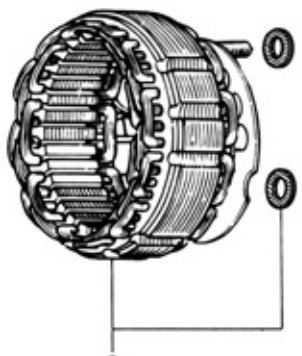
Fig. 11-60



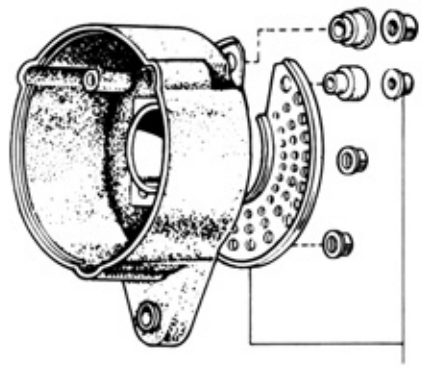
6. Rear Bearing
7. Front Bearing & Drive End Frame
8. Rotor
9. Pulley & Fan
10. Drive End Frame Assembly

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

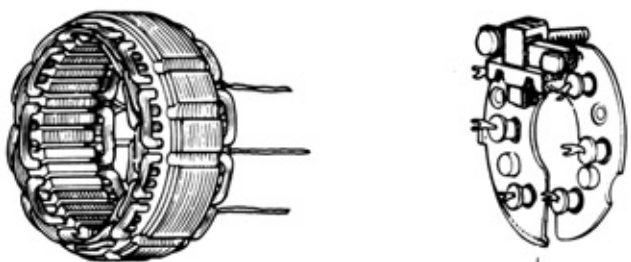
Fig. 11-61



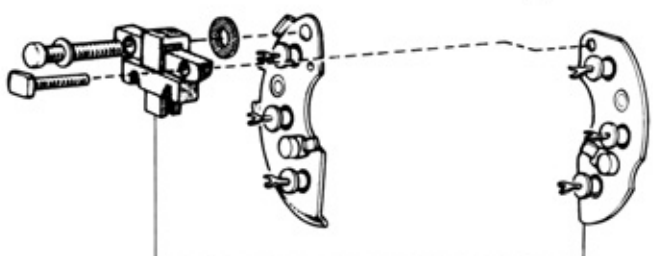
3
Fig. 11-72



4
Fig. 11-73
11-74



2
Fig. 11-69

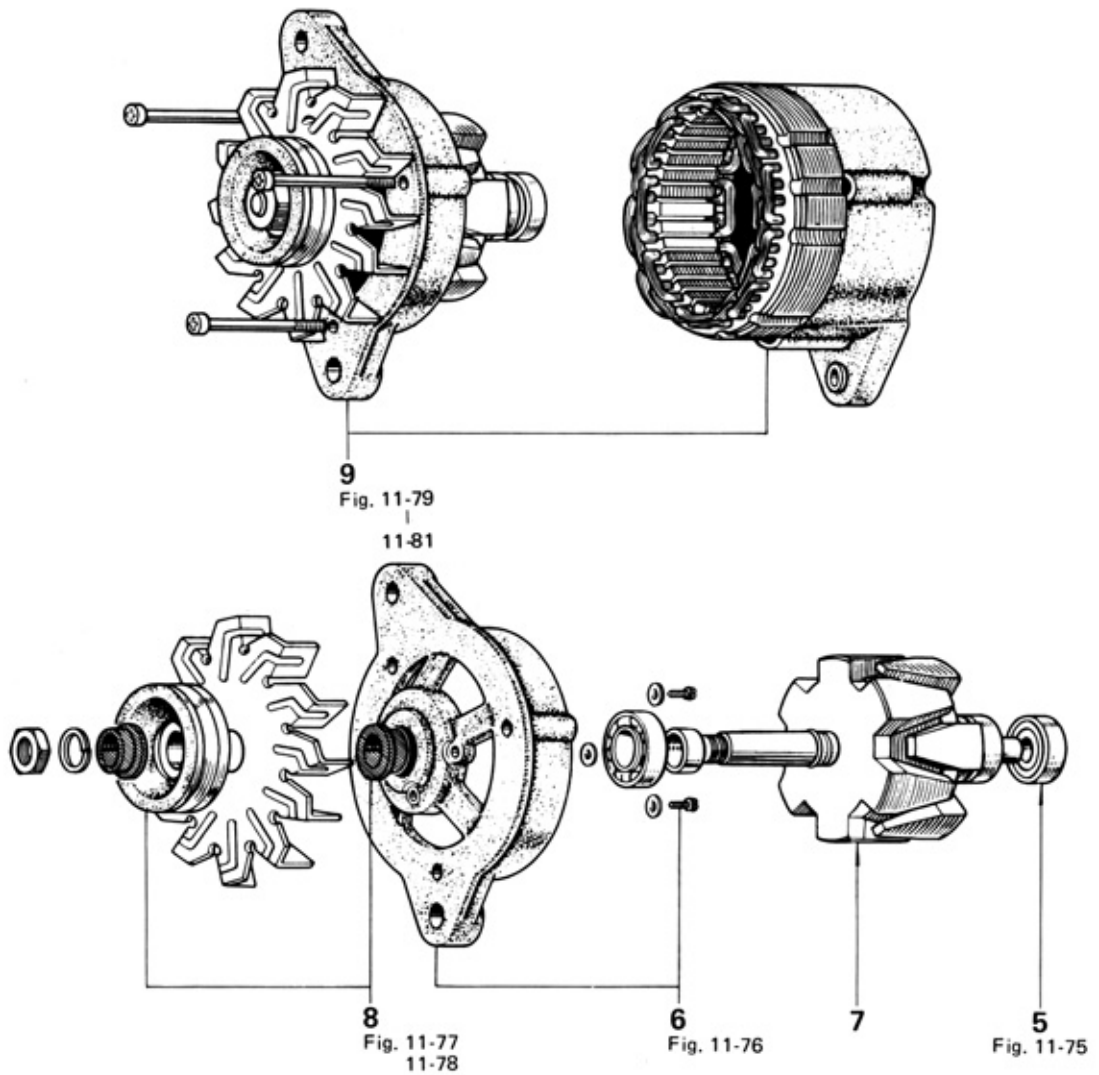


1
Fig. 11-66
11-67

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.

Fig. 11-62

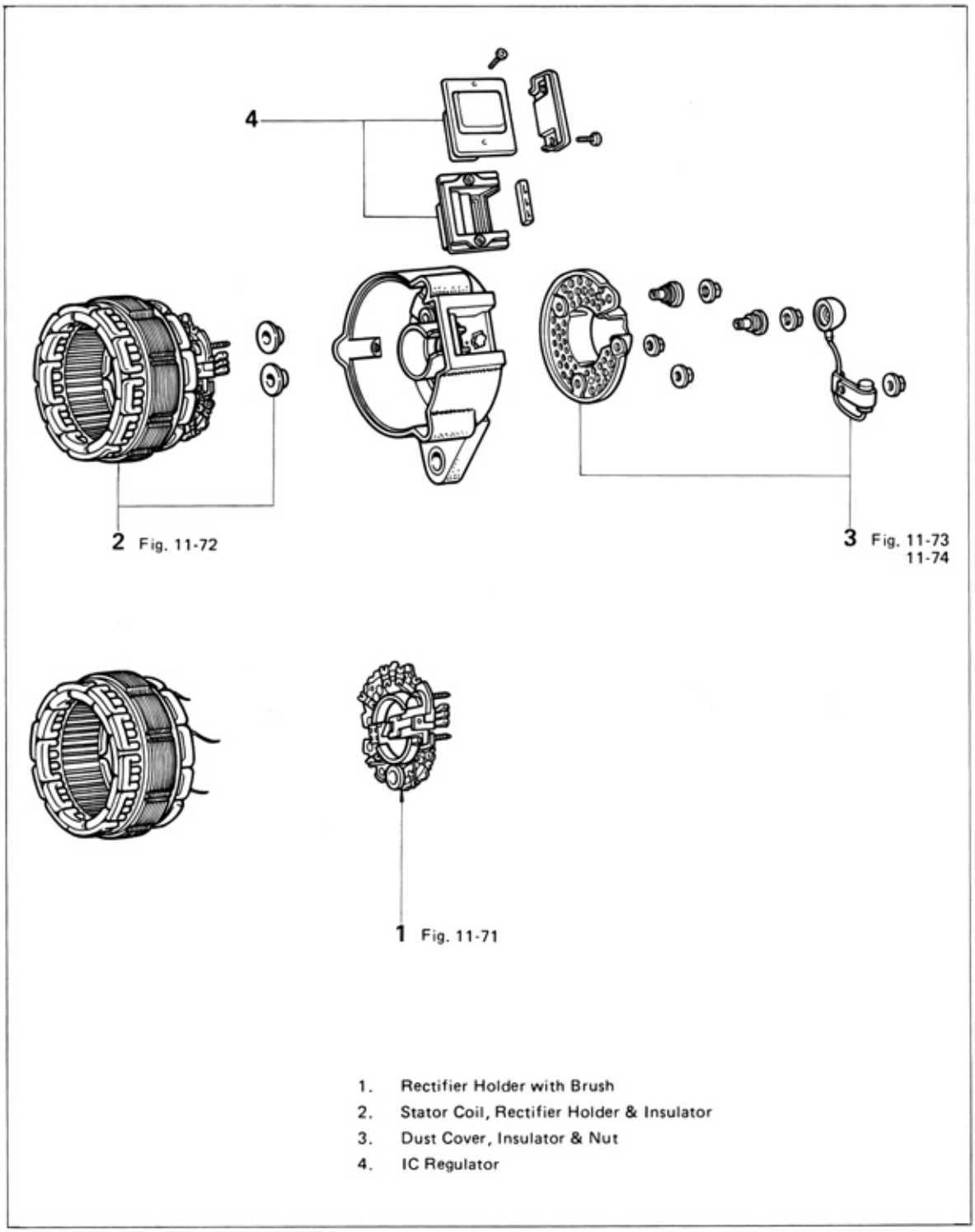


5. Rear Bearing
6. Front Bearing & Drive End Frame
7. Rotor
8. Pulley & Fan
9. Drive End Frame Assembly, Stator Coil & End Frame

For Alternator with IC Regulator

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

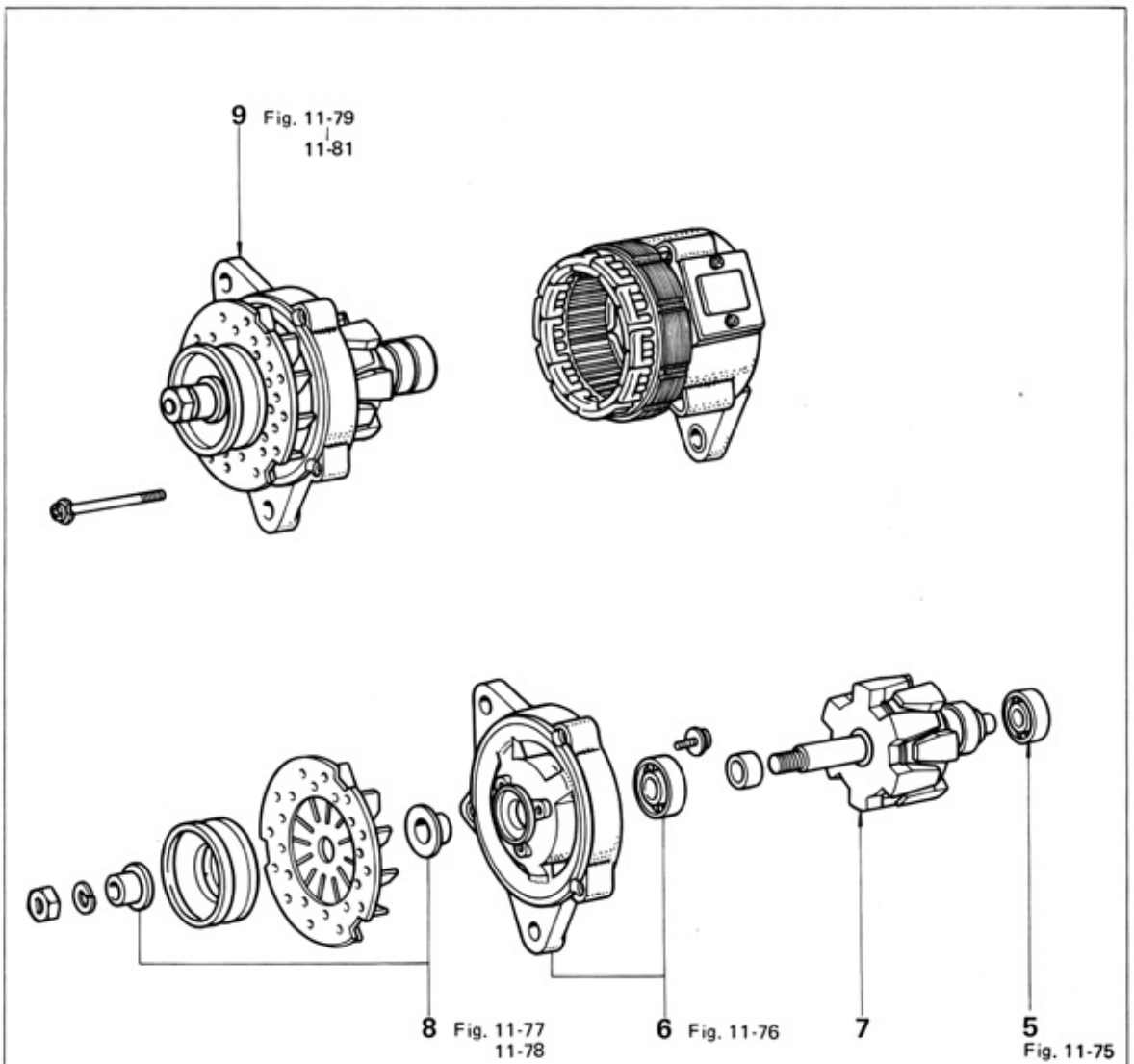
Fig. 11-63



1. Rectifier Holder with Brush
2. Stator Coil, Rectifier Holder & Insulator
3. Dust Cover, Insulator & Nut
4. IC Regulator

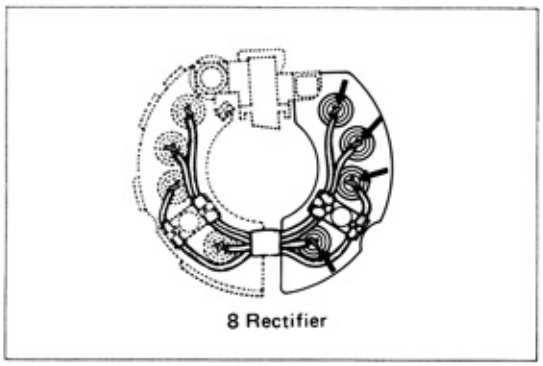
Assemble the parts in the numerical order shown in the figure.

Fig. 11-64



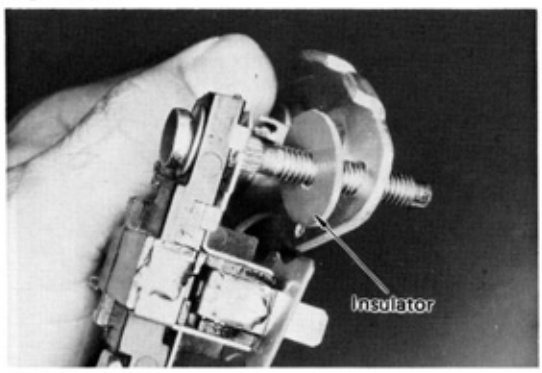
5. Rear Bearing
6. Front Bearing & Drive End Frame
7. Rotor
8. Pulley & Fan
9. Drive End Frame Assembly

Fig. 11-65



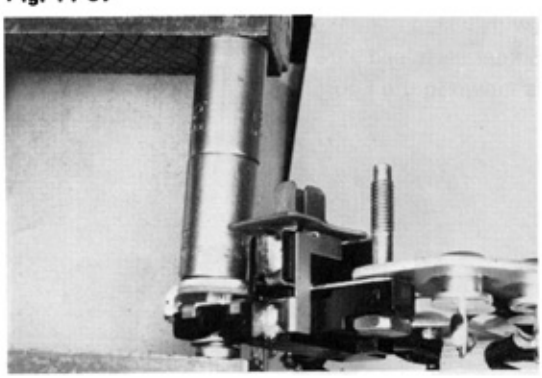
[With 8 rectifier]
Solder negative side rectifiers.

Fig. 11-66



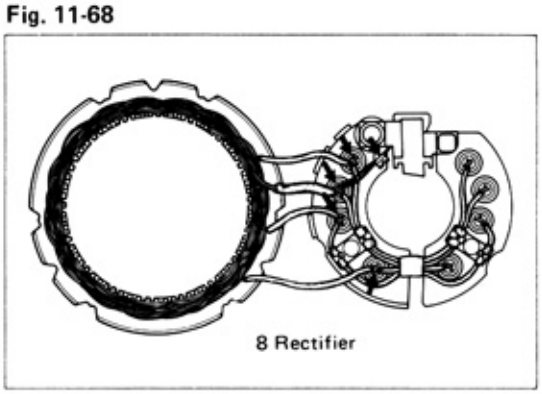
Insert insulator between the positive rectifier holder and brush holder.

Fig. 11-67



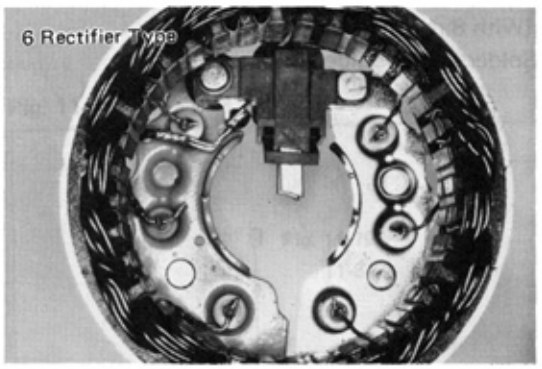
Install the brush holder onto the rectifier holder with a socket wrench and vise.

Fig. 11-68



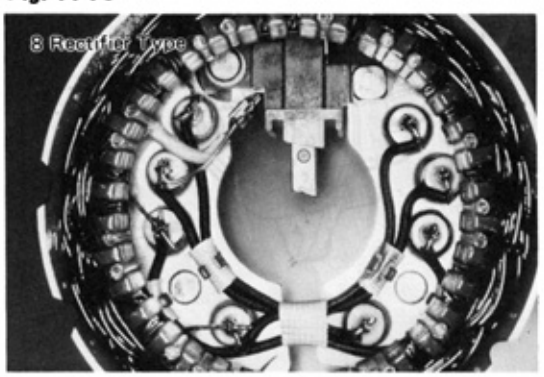
[With 8 rectifier]
Connect stator coil N lead onto (+) rectifier terminal and brush holder treminal.

Fig. 11-69



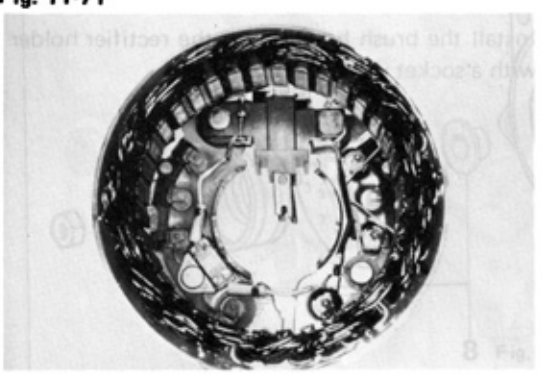
[With 6 rectifier]
Solder each lead wire onto rectifier or terminal as shown in the figure.

Fig. 11-70



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

Fig. 11-71

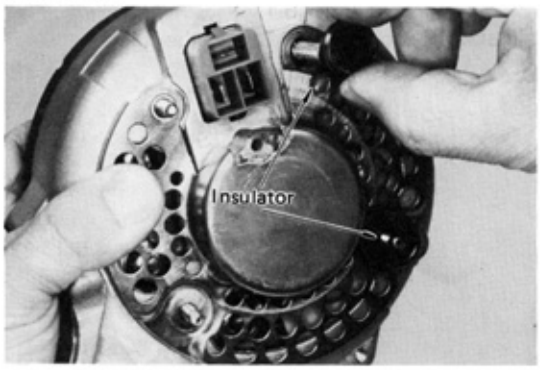


[with IC regulator]
Solder each lead wire onto rectifier or terminal as is shown in the figure.

Fig. 11-72

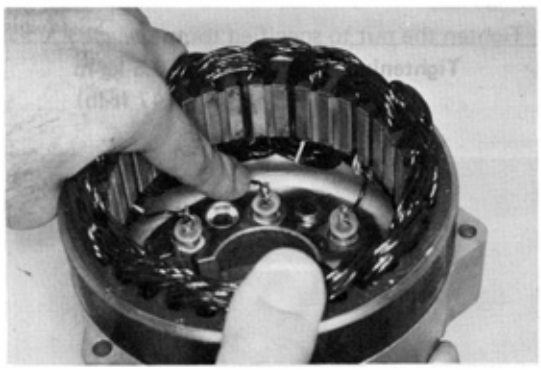
Assemble the rear end frame and rectifier holder with insulators.

Fig. 11-73



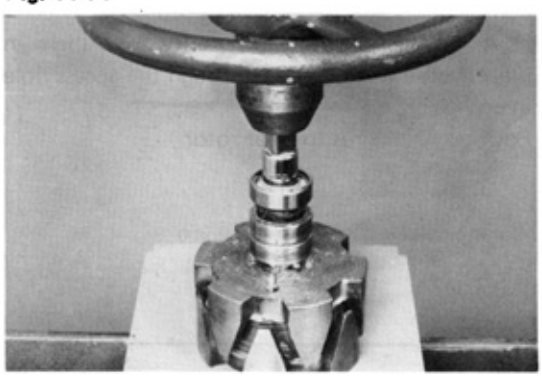
Assemble the rear end cover with the insulators.

Fig. 11-74



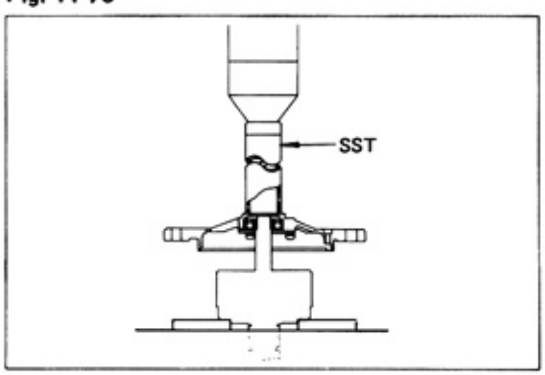
If there is danger of the stator coil terminal wiring contacting the frame or rotor, correct by bending the wiring.

Fig. 11-75



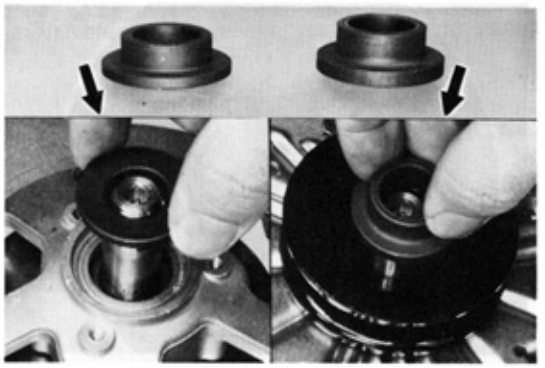
Press the rear bearing onto the rotor shaft, with a press.

Fig. 11-76



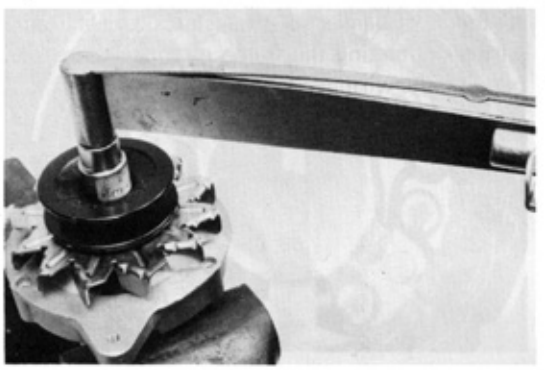
Press and drive the end frame assembly onto the rotor shaft with SST.
SST [09612-22010]

Fig. 11-77



Install the collars as shown in the figure.

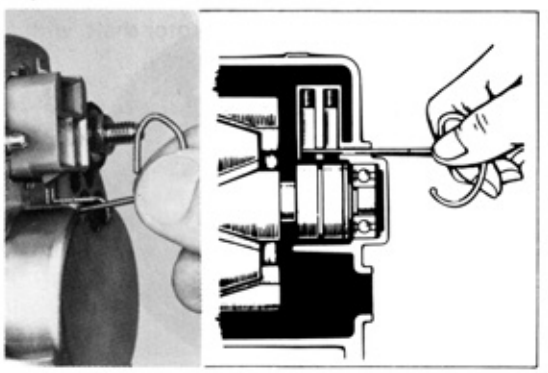
Fig. 11-78



Tighten the nut to specified torque.

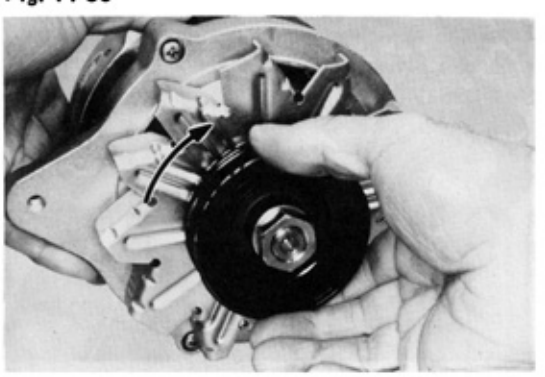
Tightening torque: 5.0 – 6.5 kg-m (37 – 47 ft-lb)

Fig. 11-79



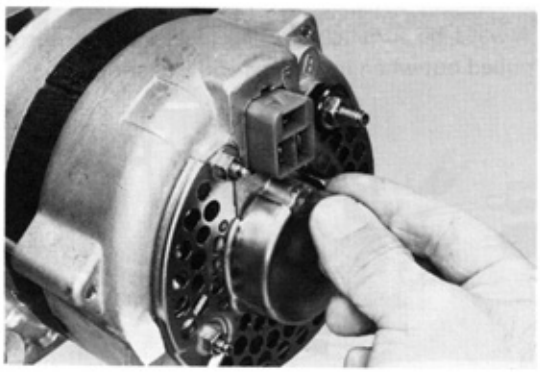
Push in brushes and temporarily lock them in place with a wire inserted through the access hole in end frame.
Position lead wires to clear rotor.

Fig. 11-80



Remove locking wire form the rear end frame and make sure the rotor rotates smoothly.

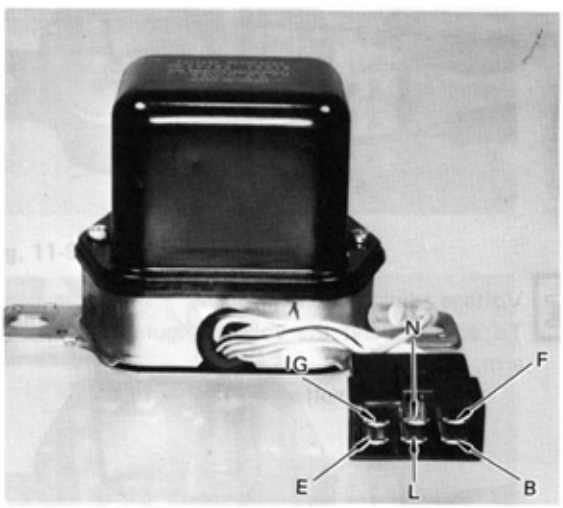
Fig. 11-81



Seal the brush service hole.

ALTERNATOR REGULATOR

Fig. 11-82



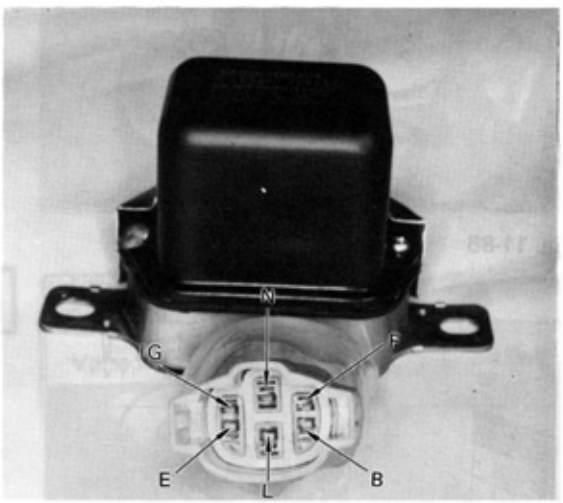
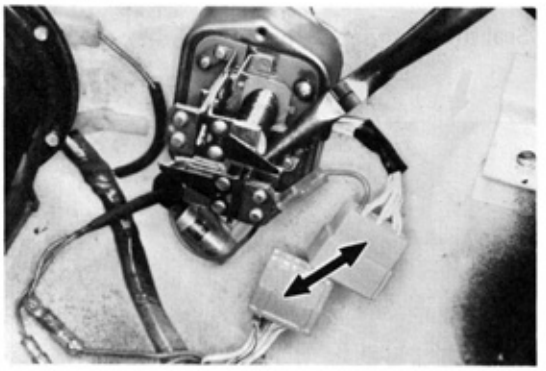


Fig. 11-83

INSPECTION & ADJUSTMENT

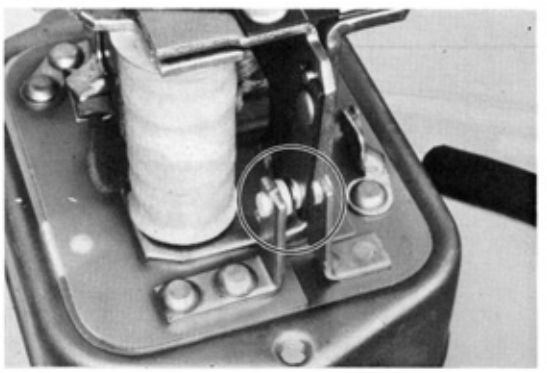
Check the connector fitting condition before inspecting the regulator.

Fig. 11-84



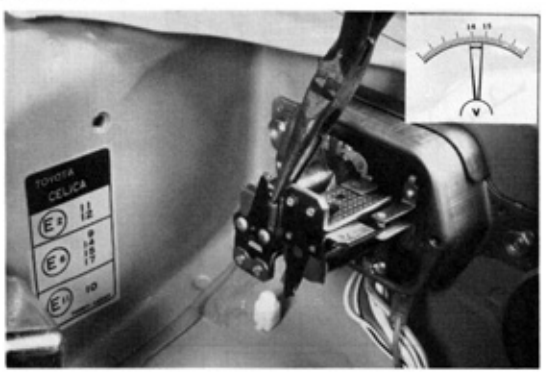
Always be sure to have the regulator connector pulled out when inspecting and adjusting.

Fig. 11-85



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

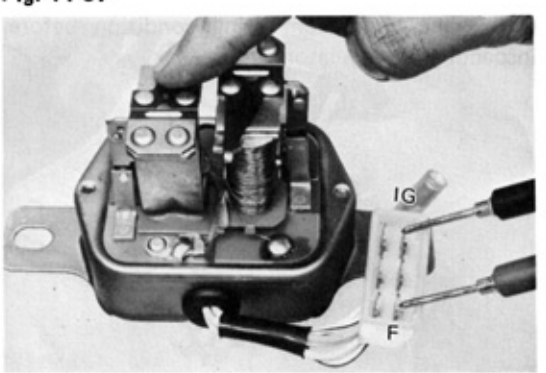
Fig. 11-86



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

Regulated voltage: 13.8 – 14.8V

Fig. 11-87

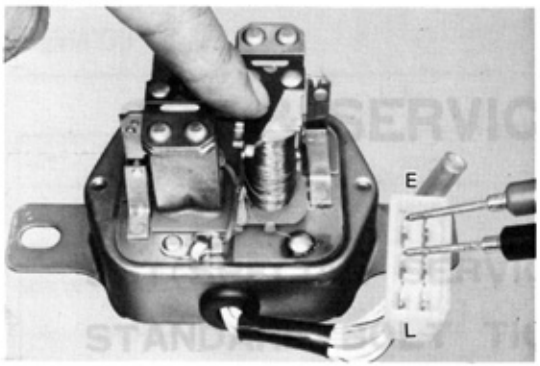


Resistance measurement between terminals.

IG – F

Voltage regulator	At rest 0 Ω
	Pulled in approx. 11 Ω

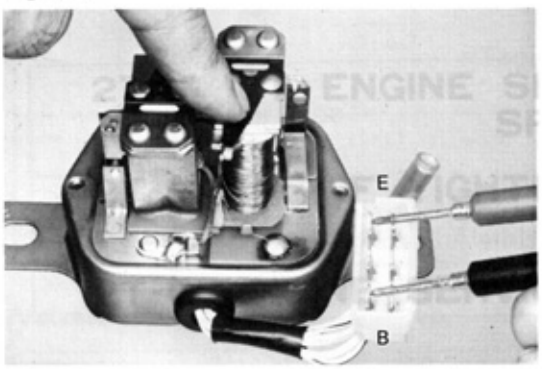
Fig. 11-88



L – E

Voltage relay	At rest 0 Ω
	Pulled in approx. 100 Ω

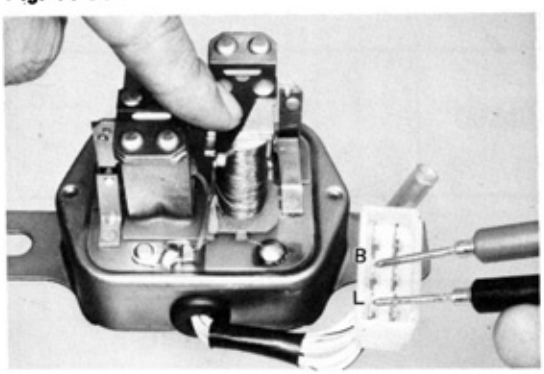
Fig. 11-89



B – E

Voltage relay	At rest infinity
	Pulled in approx. 100 Ω

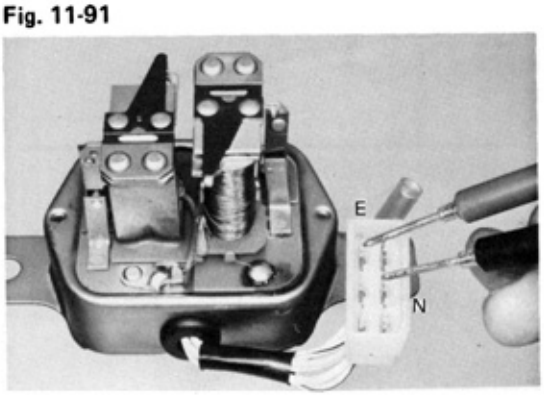
Fig. 11-90



B – L

Voltage relay	At rest infinity
	Pulled in 0 Ω

Fig. 11-91



N – E
Approx. 25 Ω