CHARGING SYSTEM

CHARGING SYSTEM CIRCUIT

Fig. 11-1

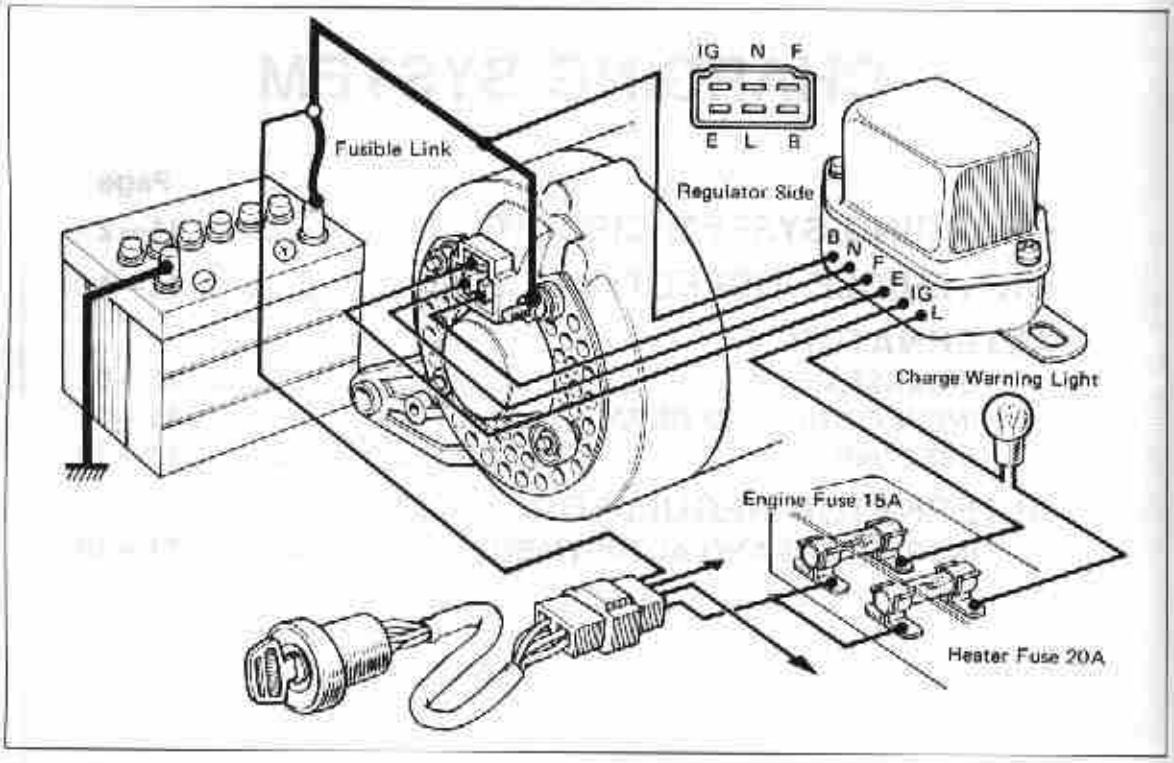
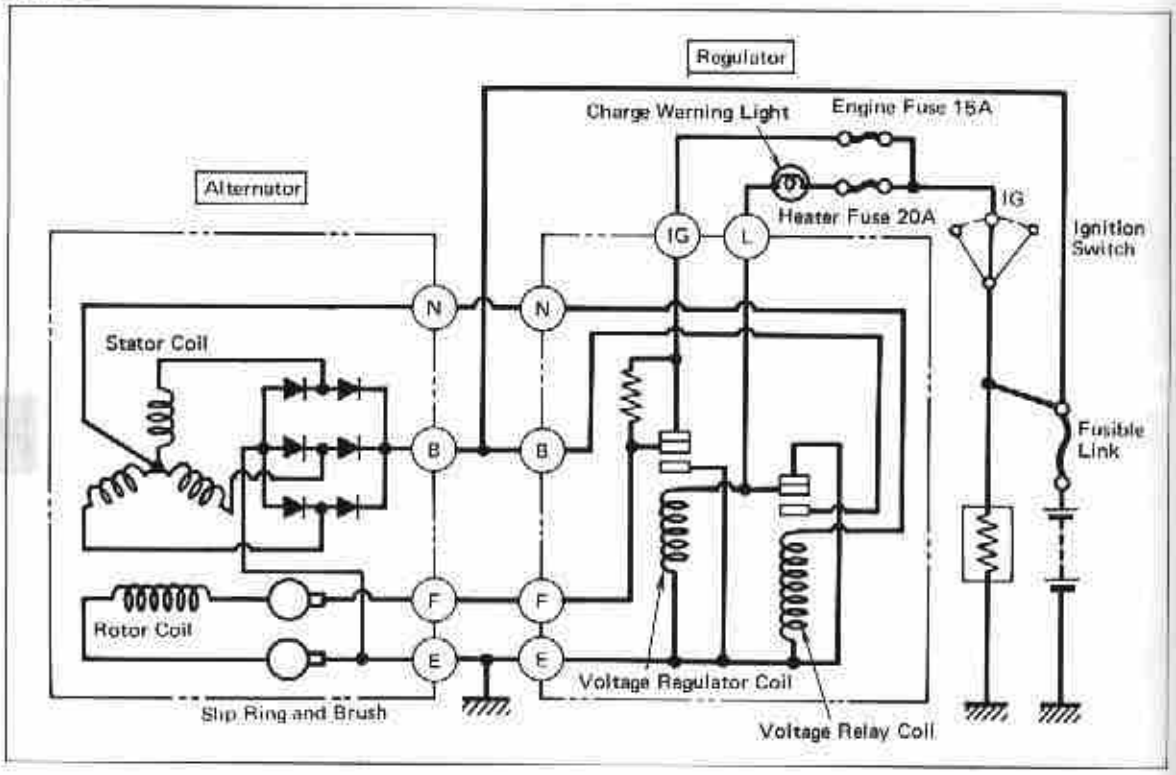


Fig. 11-2



FOR ALTERNATOR WITH IC REGULATOR

Fig. 11-3

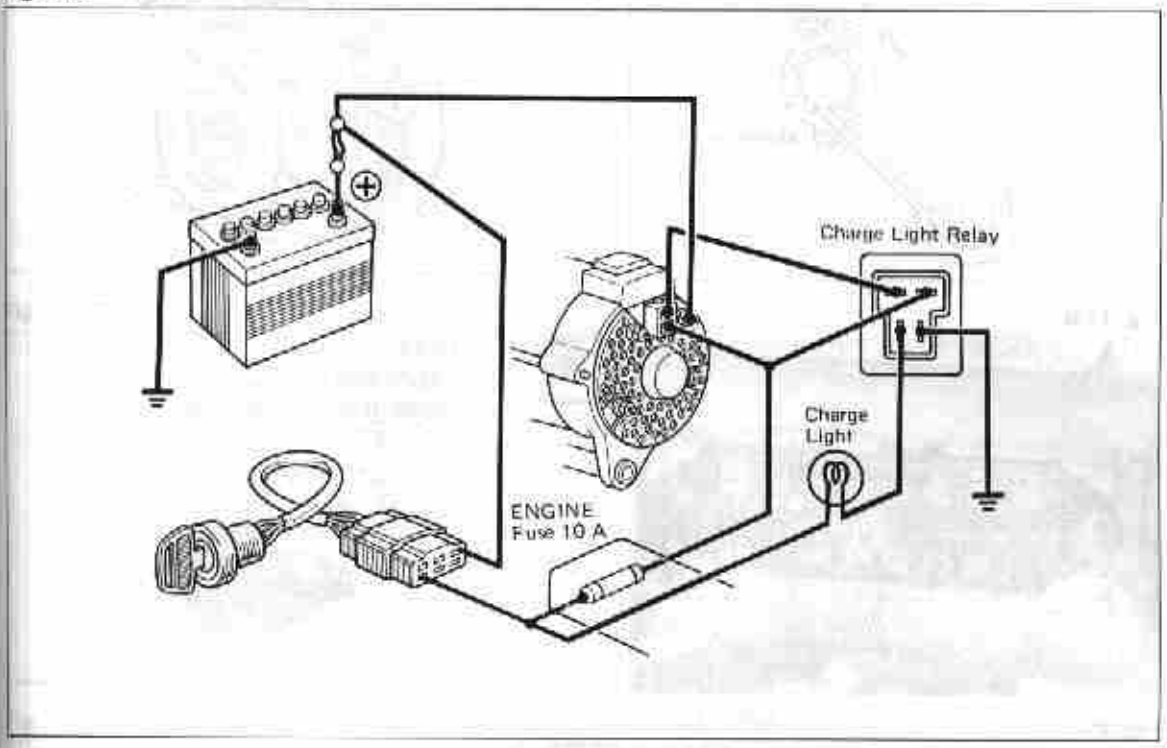
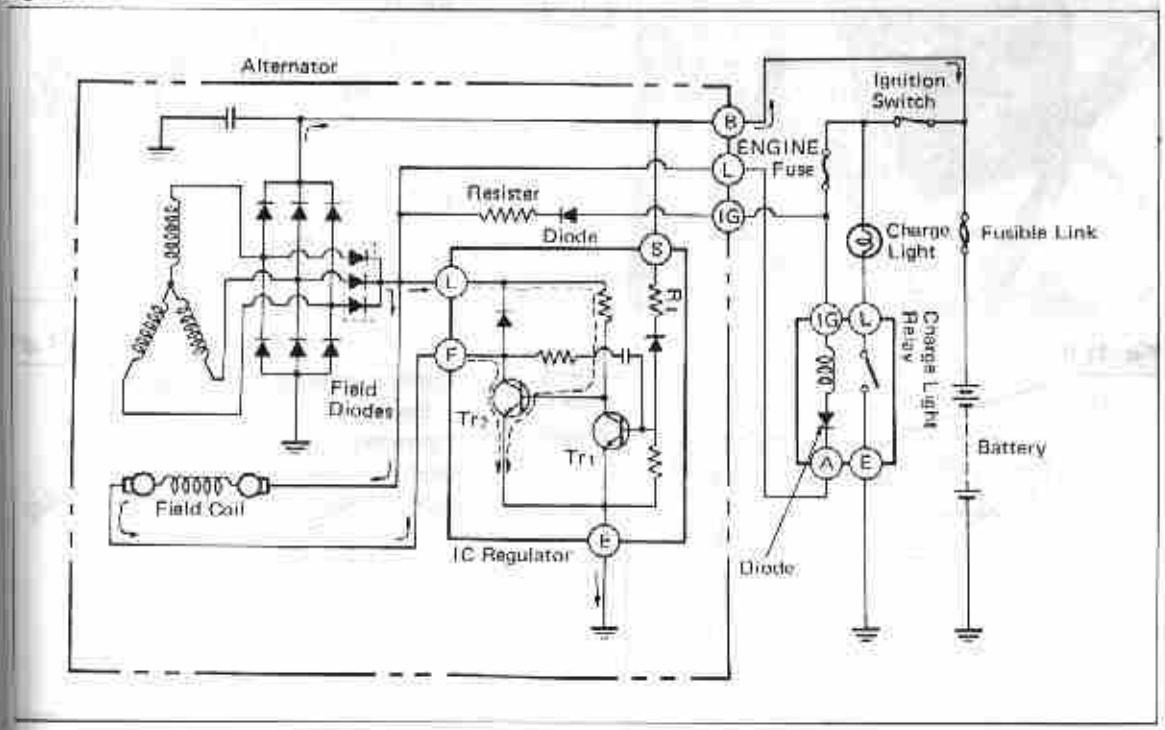
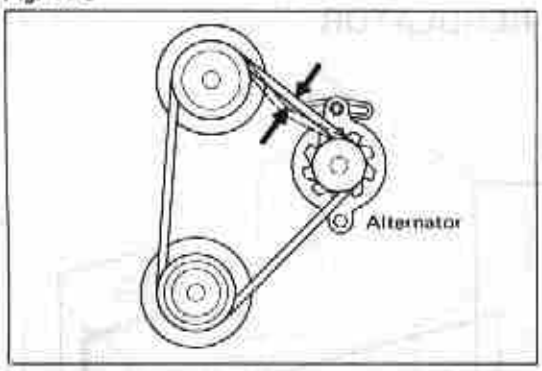


Fig. 11-4



ON-VEHICLE INSPECTION

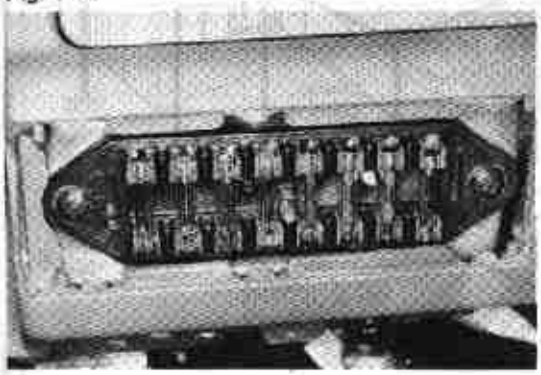
Fig. 11-5



Inspect the following system components.

1. Drive belt tension (at 10 kg)
   8 – 12 mm (0.32 – 0.47 in)

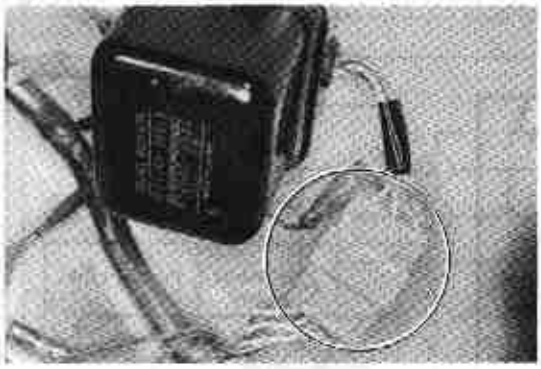
Fig. 11-6



2. Fuses

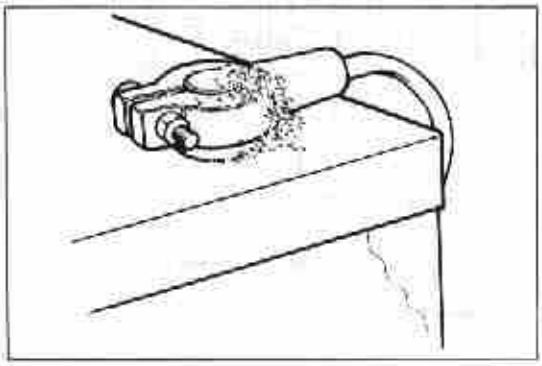
Engine fuse	15A
Heater fuse	20A

Fig. 11-7



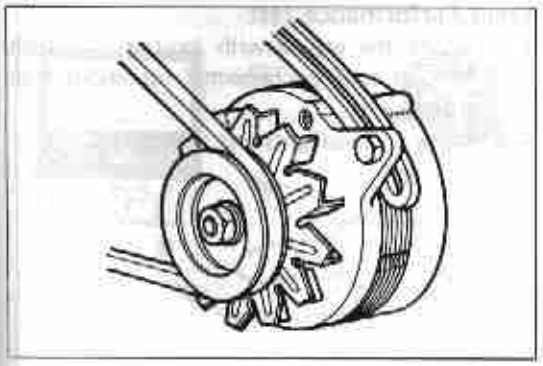
3. Installed condition of wiring for alternator and regulator.

Fig. 11-8



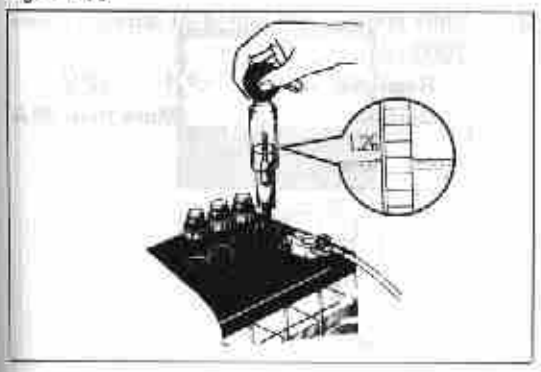
4. Battery terminal and fusible link
   Loose
   Corroded
   Burnt

Fig. 11-9



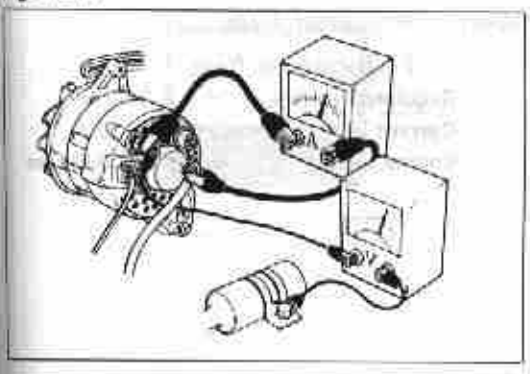
5. Alternator on-vehicle condition
Abnormal noise from alternator when engine is running.

Fig. 11-10



6. Specific gravity 1.25-1.27

Fig. 11-11



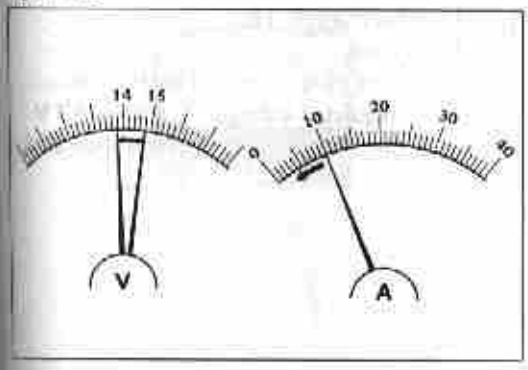
PERFORMANCE TEST USING VOLTMETER AND AMMETER

Connect the voltmeter and ammeter as shown in the figure.

— Note —

Be careful not to cause a short.

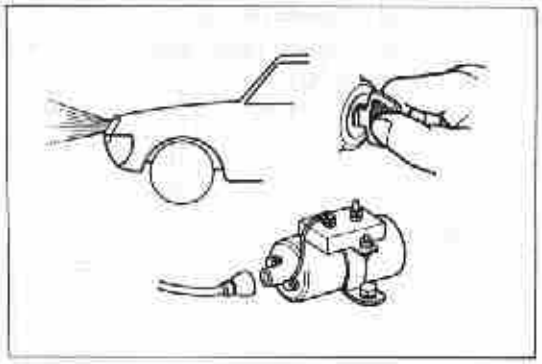
Fig. 11-12



No-load Performance test

Regulated voltage	**13.8 – 14.8 V**
Current	**Less than 10 A**
Engine speed	**Idling to 2000 rpm.**

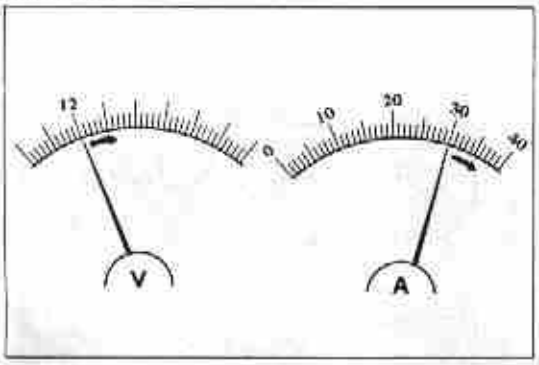
Fig. 11-13



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.

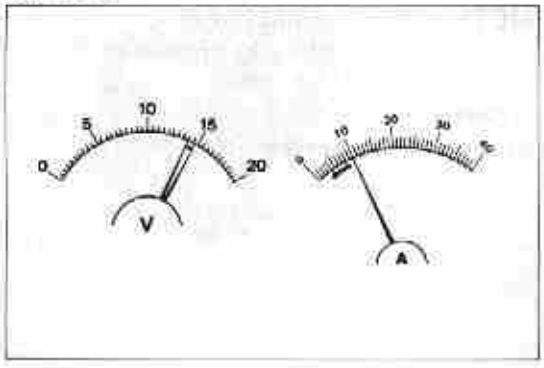
Fig. 11-14



3. Start engine, and run it at approximately 2000 rpm.

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

Fig. 11-15

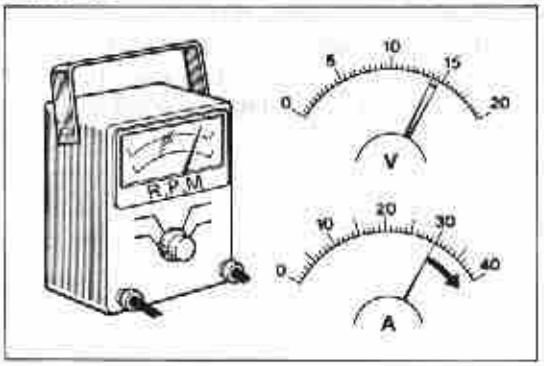


With IC Regulator Type

No-load Performance Test

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

Fig. 11-16

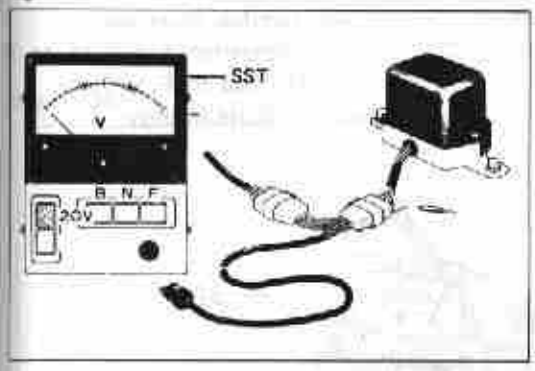


Load Performance Test

1. Run engine at 2,000 rpm.
2. Turn on headlights and all accessories.

Regulated voltage	**14.0 – 14.7 V**
Current	**More than 30 A**

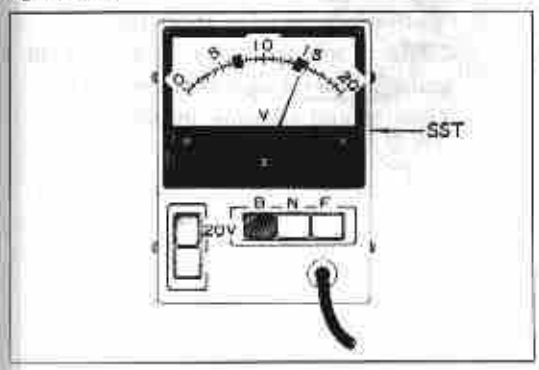
Fig. 11-17



PERFORMANCE TEST BY ALTERNATOR CHECKER

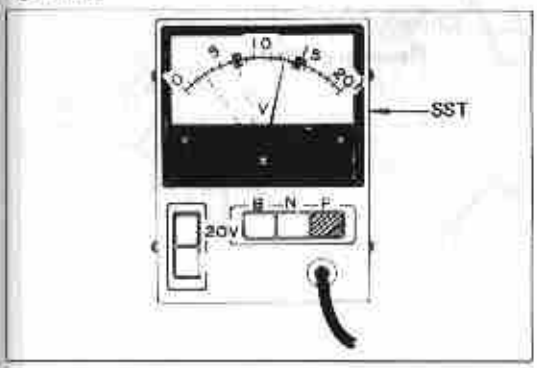
1. Unplug the alternator regulator connector and plug in the checker connector.
   SST [09081-00011]
   Push "20 V" switch.

Fig. 11-18



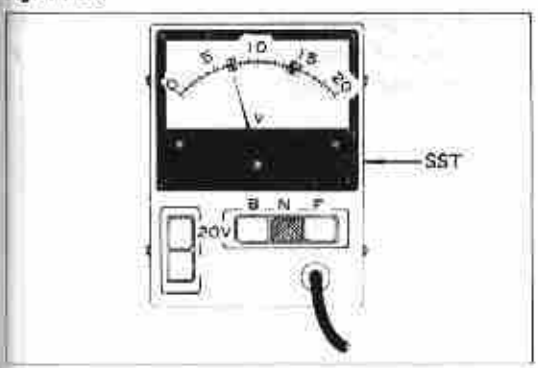
2. Check "B" terminal voltage.
   Push "B" switch.
   Raise engine speed from idling to 2000 rpm.
   SST [09081-00011]
   Standard voltage 13.8 – 14.8 V

Fig. 11-19



3. Check "F" terminal voltage.
   Push "F" switch.
   Gradually raise engine speed. The checker reading should gradually decrease from 12 volt to 3 volt.
   SST [09081-00011]

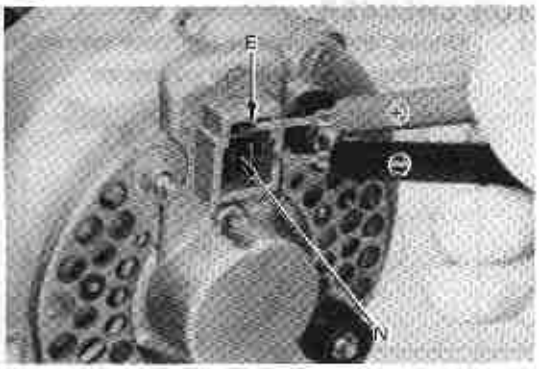
Fig. 11-20



4. Check "N" terminal voltage.
   Push "N" switch.
   Maintain engine speed at approx. 1500 rpm. The pointer should be at a half of "B" terminal voltage.
   SST [09081-00011]

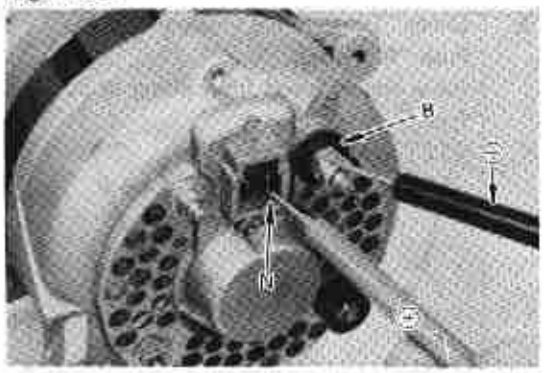
ALTERNATOR INSPECTION

Fig. 11-21



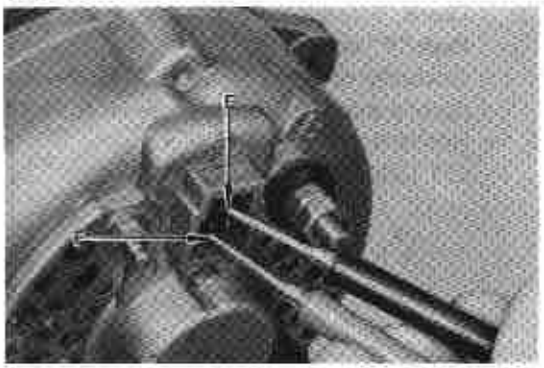
1. Negative side rectifier short test.
Connect an ohmmeter (—) lead to N terminal and (+) lead to E terminal.
Meter should indicate infinity.

Fig. 11-22



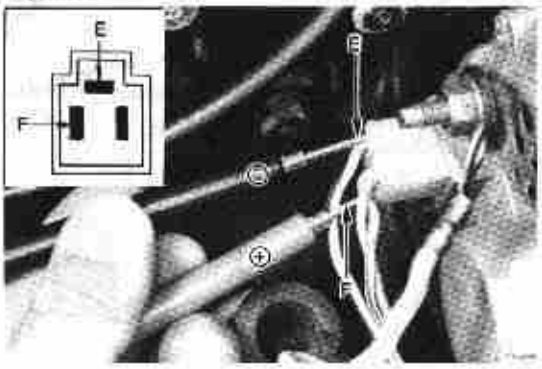
2. Positive side rectifier short test.
Connect an ohmmeter (—) lead to B terminal and (+) lead to N terminal.
Meter should indicate infinity.

Fig. 11-23



3. Check rotor coil resistance.
Resistance 5-9 Ω

Fig. 11-24



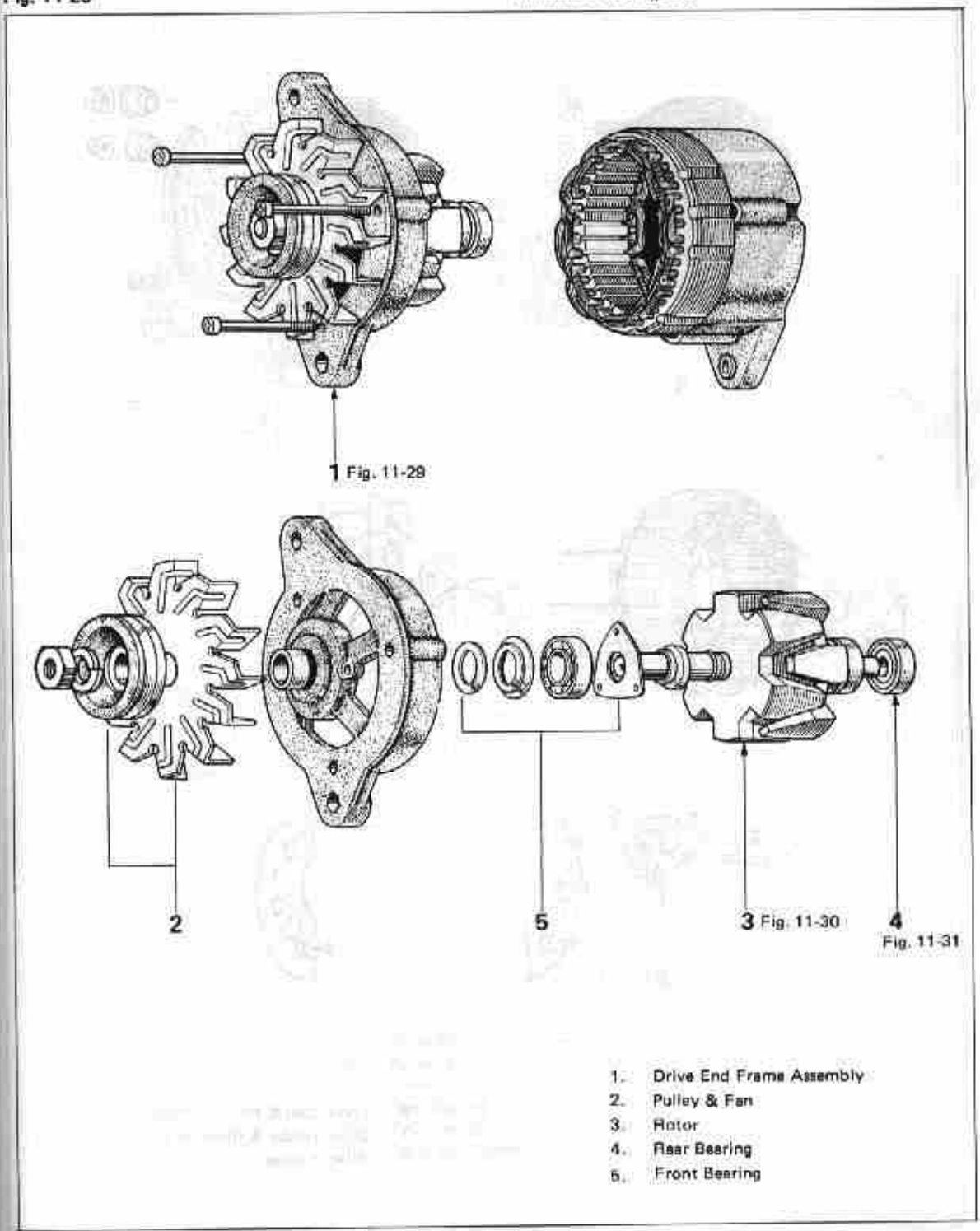
4. Turn ignition switch to ON position, and check if there is battery voltage at F terminal. If not, check ENGINE fuse.

ALTERNATOR

DISASSEMBLY

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

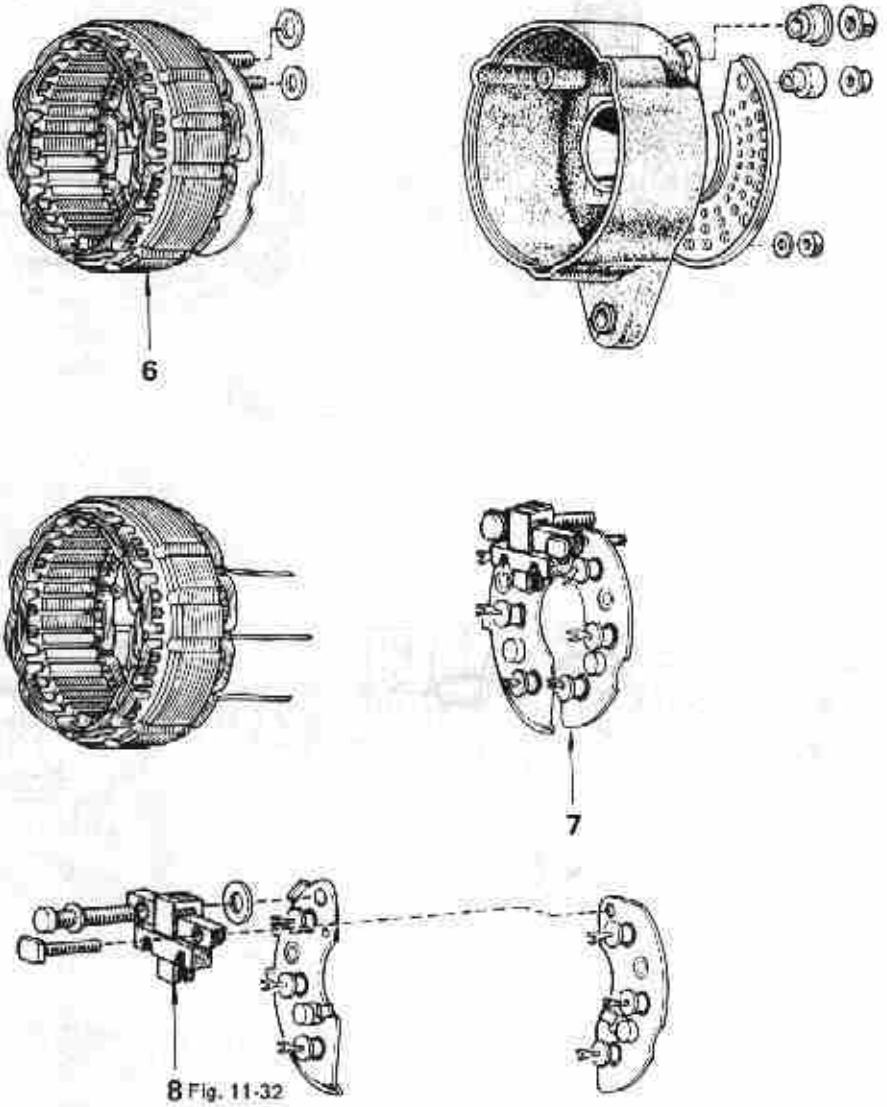
Fig. 11-25



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

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

Fig. 11-26

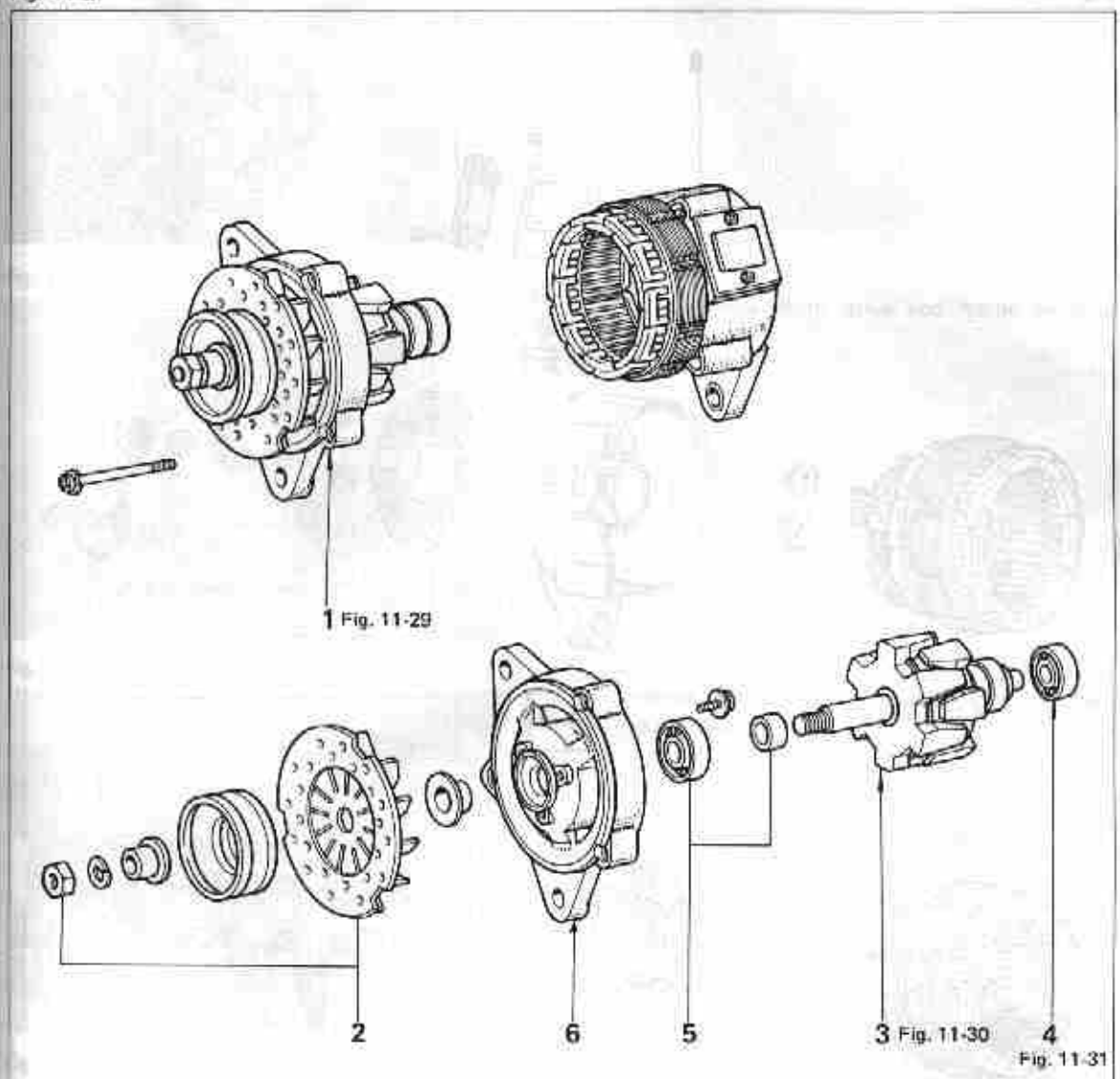


6. Stator Coil & Rectifier Holder
7. Brush Holder & Rectifier Holder
8. Brush Holder

For Alternator with IC Regulator

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

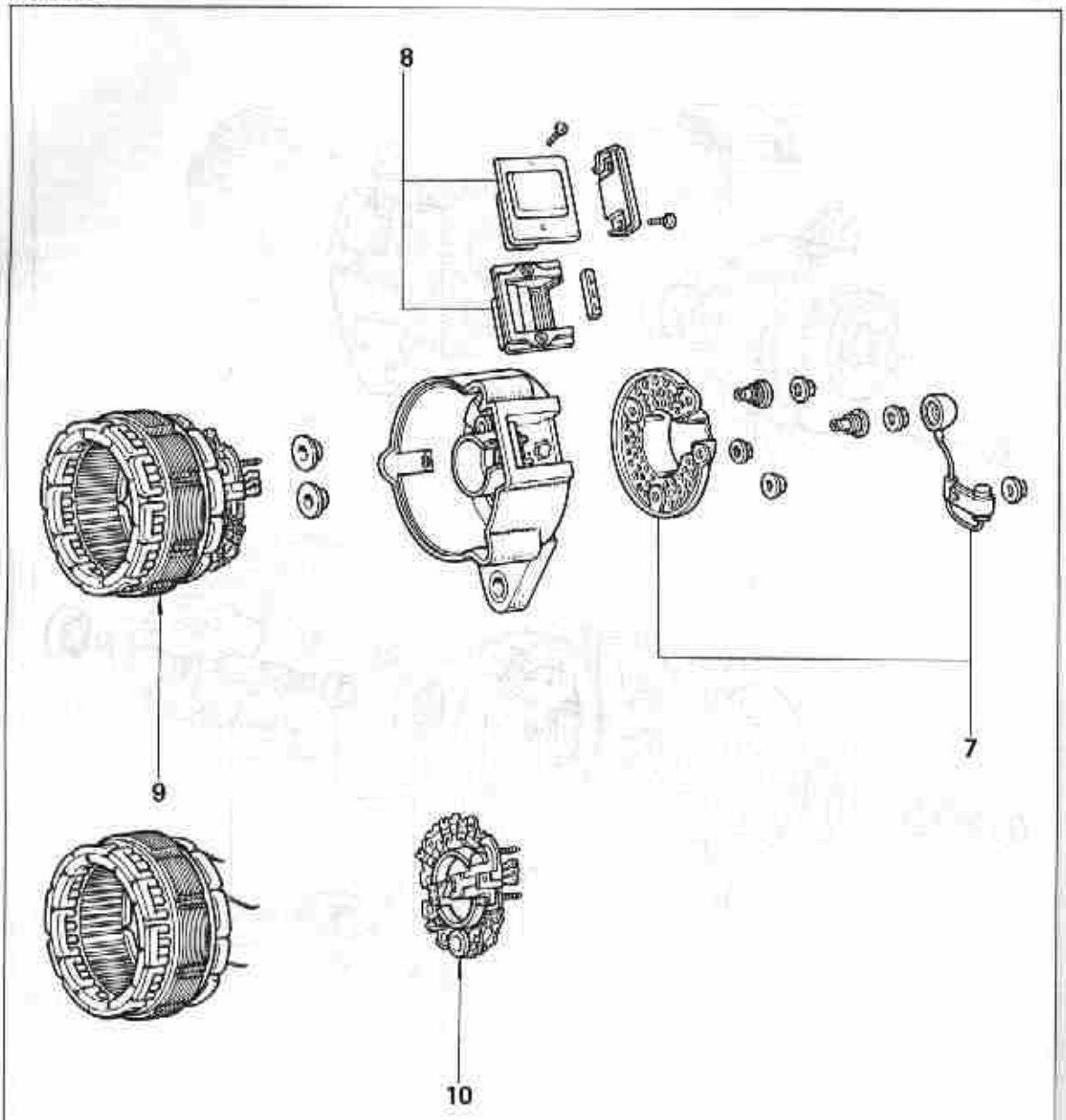
Fig. 11-27



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. 11-28

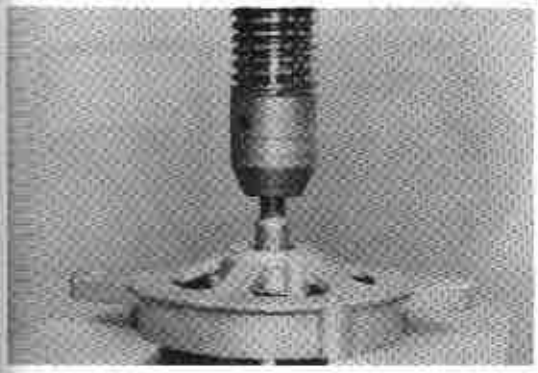


7. Nut, Insulator & Dust Cover
8. IC Regulator
9. Stator Coil & Rectifier Holder
10. Rectifier Holder with Brush

Fig. 11-29

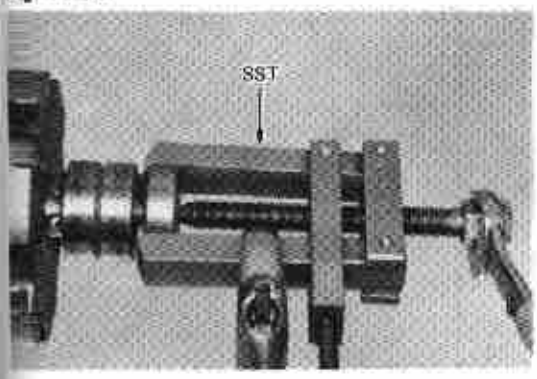
Pry drive end frame from stator.
Do not pry coil wires.

Fig. 11-30



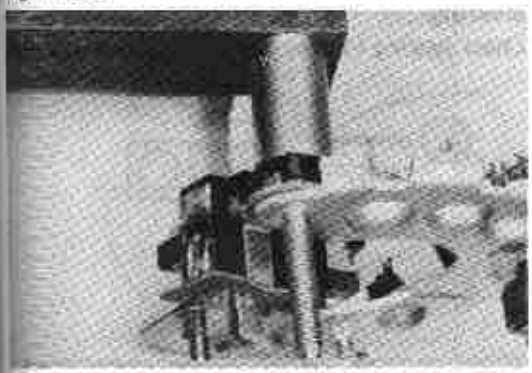
Remove rotor from drive end frame using a press.

Fig. 11-31



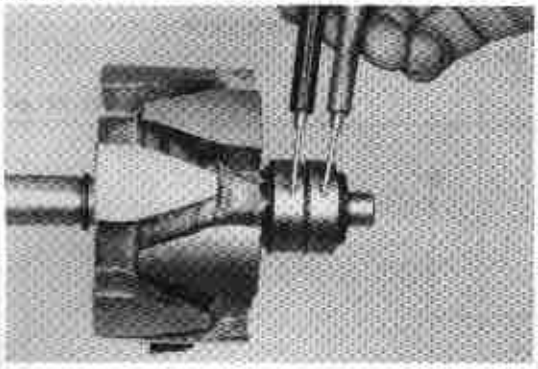
Remove rotor shaft rear bearing using SST [09286-46011].

Fig. 11-32



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

Fig. 11-33

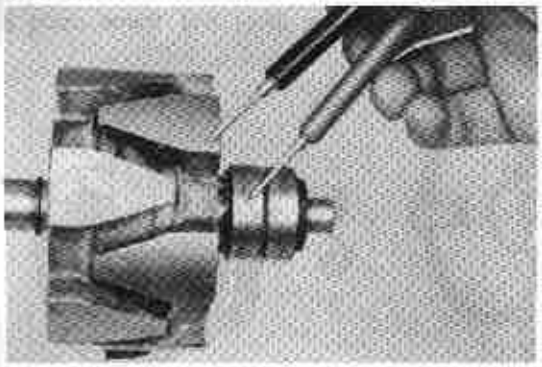


INSPECTION AND REPAIR

Rotor

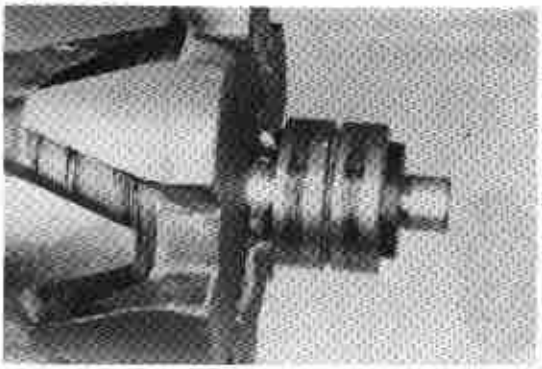
1. Open circuit test
   Standard resistance **4.1-4.3Ω**

Fig. 11-34



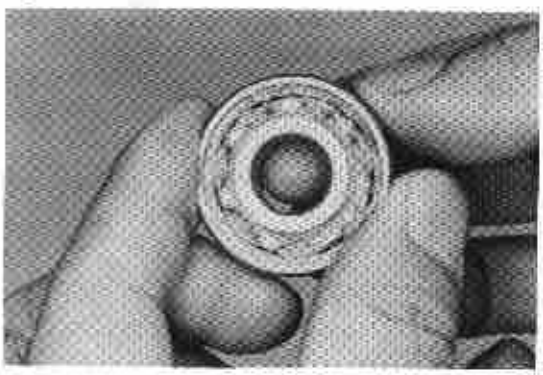
2. Ground test
   Meter should indicate infinity.

Fig. 11-35



3. Check slip ring for being dirty or burnt.

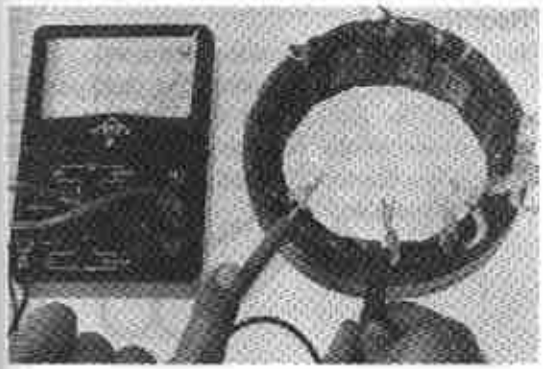
Fig. 11-36



Bearing

Check bearing for wear or roughness.

Fig. 11-37



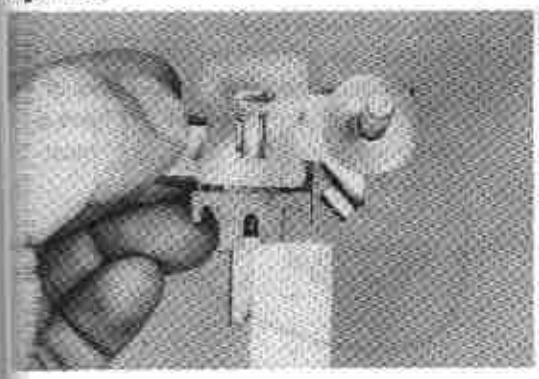
Stator

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

Fig. 11-38

2. Ground test
   Meter should indicate infinity.

Fig. 11-39

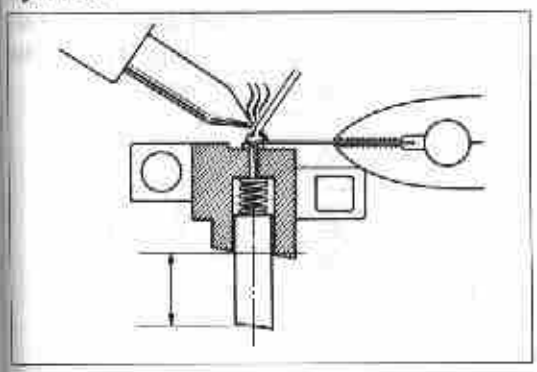


Brush and Brush Holder

Check exposed brush length.

Minimum exposed length	**5.5 mm (0.22 in)**

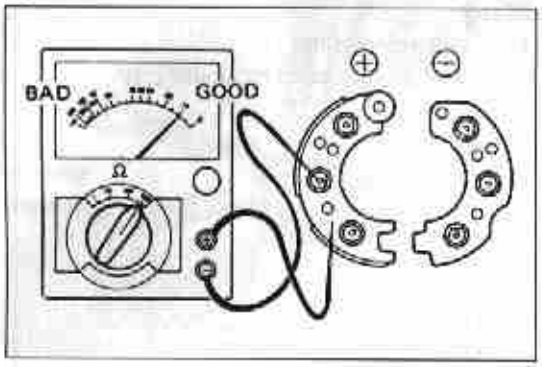
Fig. 11-40



When replacing brushes, assemble them as shown.

Exposed length	**12.5 mm (0.49 in)**
with IC regulator	**16.5 mm (0.650 in.)**

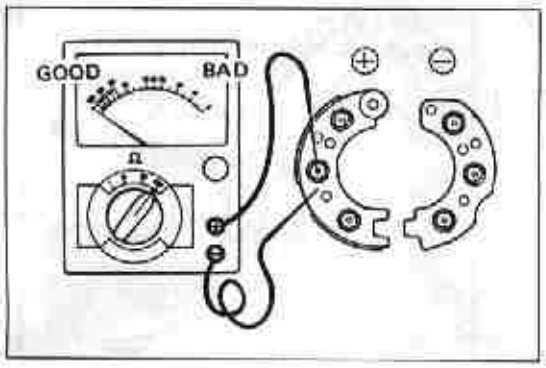
Fig. 11-41



Rectifier

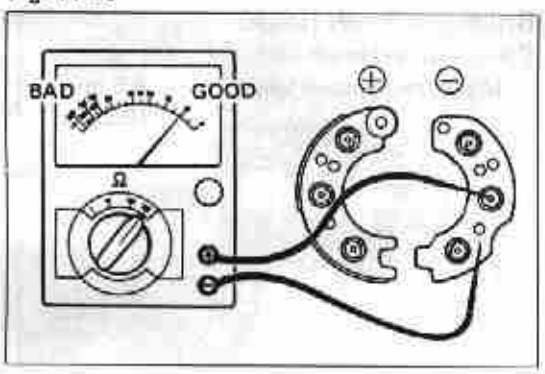
1. Rectifier holder positive side
Connect an ohmmeter (+) lead to the rectifier holder, and the (–) lead of the meter to the rectifier terminal. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-42



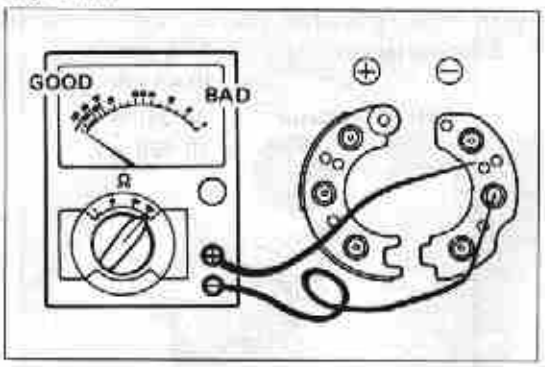
2. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.

Fig. 11-43



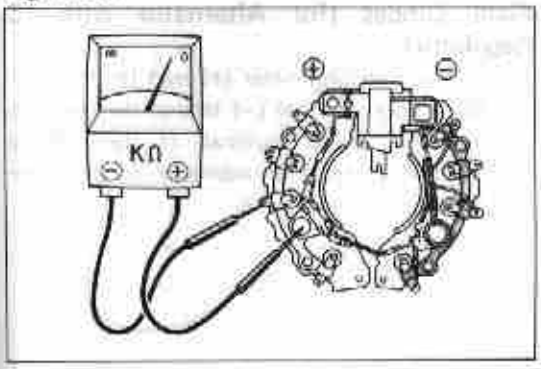
3. Rectifier holder negative side
Connect an ohmmeter (+) lead to the rectifier terminal, and the (–) lead of the meter to the rectifier holder. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-44



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

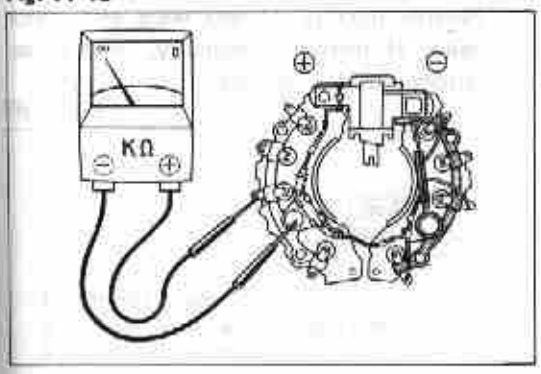
Fig. 11-45



Rectifier (for Alternator with IC Regulator)

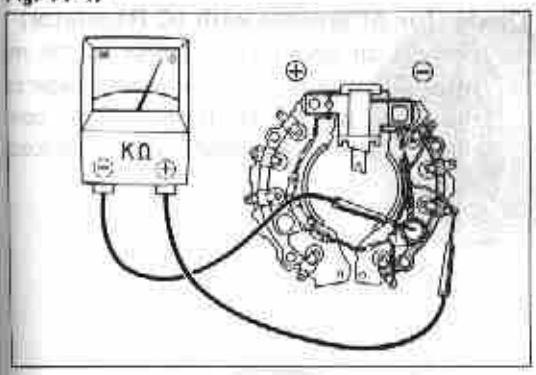
1. Rectifier holder positive side
Connect an ohmmeter (+) lead to the rectifier holder, and the (–) lead of the meter to the rectifier terminal. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-46



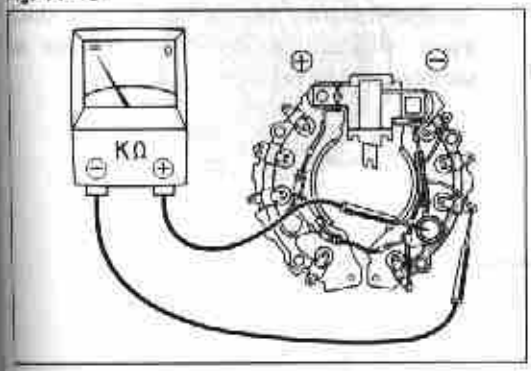
2. Reverse polarity of test leads and check again. If there is continuity, rectifier assembly must be replaced.

Fig. 11-47



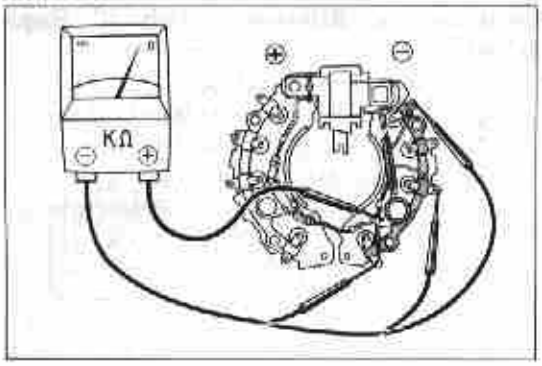
3. Rectifier holder negative side
Connect an ohmmeter (+) lead to the rectifier terminal, and the (–) lead of the meter to the rectifier holder. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-48



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

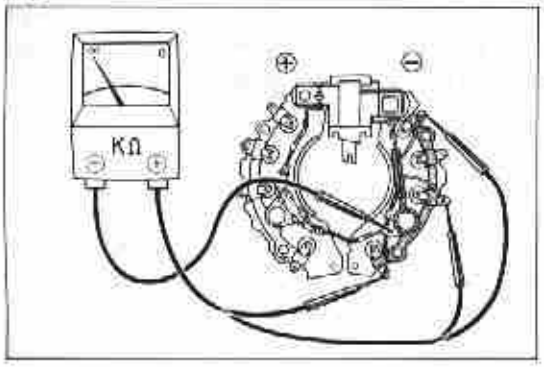
Fig. 11-49



Field Diodes (for Alternator with IC Regulator)

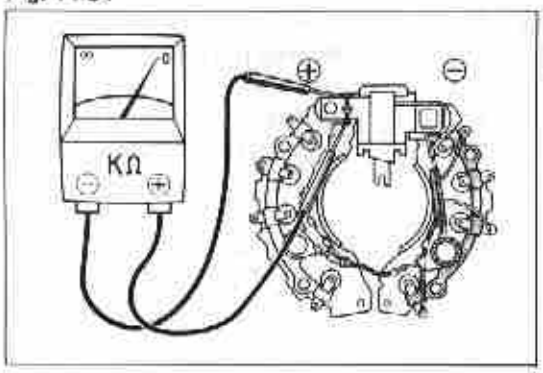
1. Connect an ohmmeter (+) lead to the rectifier holder, and the (–) lead of the meter to the field diode terminal. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-50



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

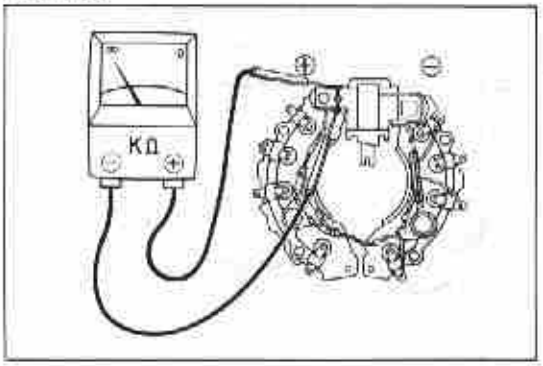
Fig. 11-51



Diode (for Alternator with IC Regulator)

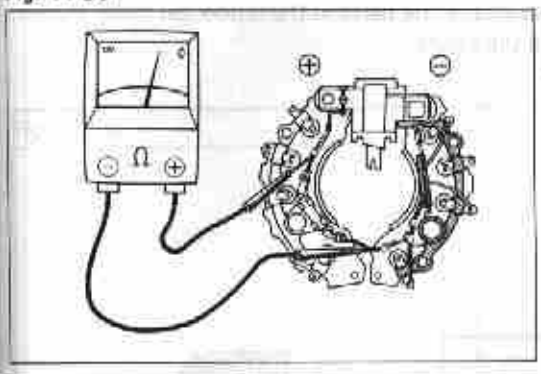
1. Connect an ohmmeter (+) lead to the resistor side, and the (–) lead of the meter to the diode other side. If there is no continuity, rectifier assembly must be replaced.

Fig. 11-52



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

Fig. 11-53



Resistor (for Alternator with IC Regulator)

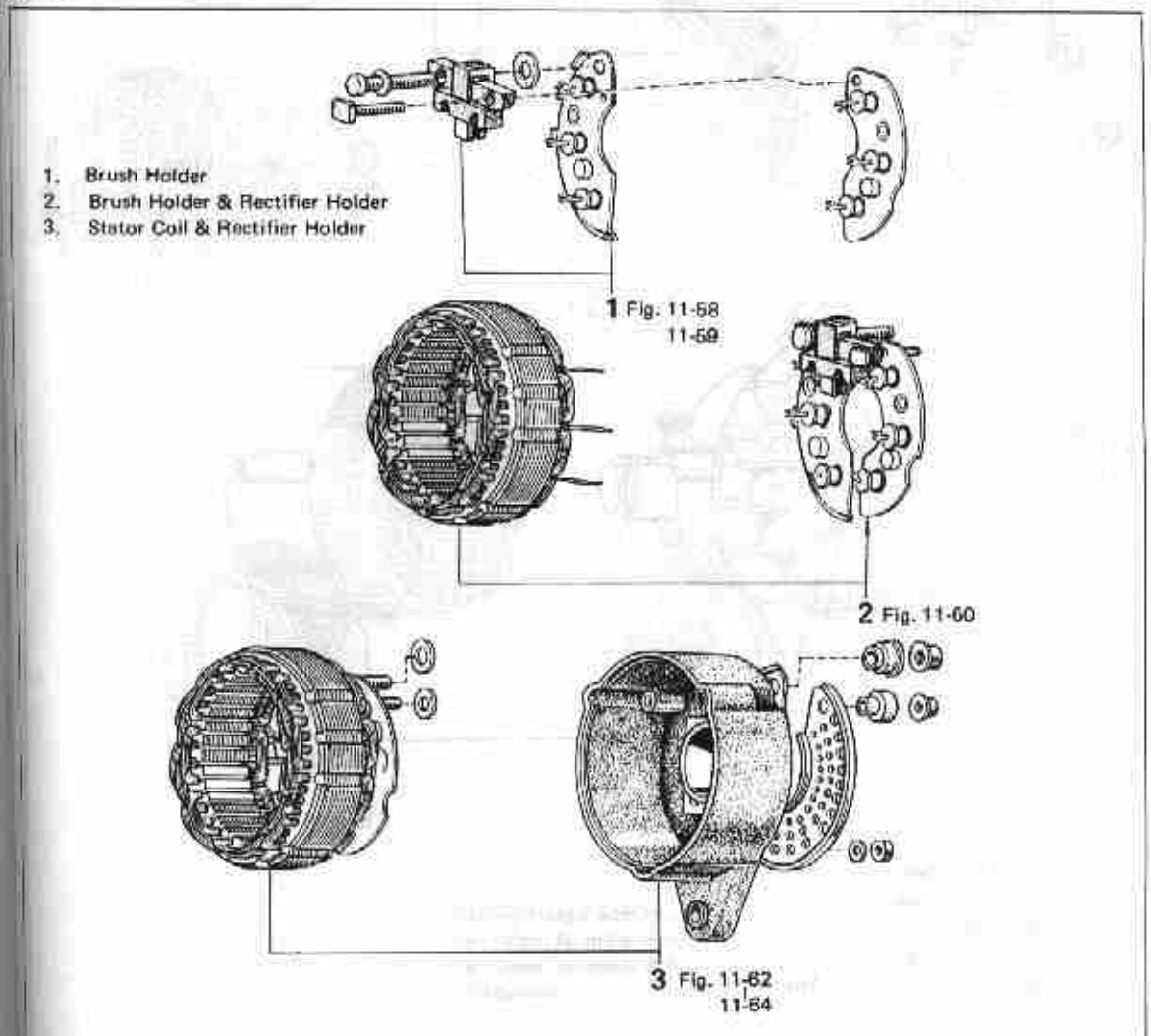
Connect an ohmmeter (+) lead to the diode side, and the (–) lead of the meter to the (–) rectifier side. If there is no continuity, rectifier assembly must be replaced.

Resistance 2.8 – 3.0Ω

ASSEMBLY

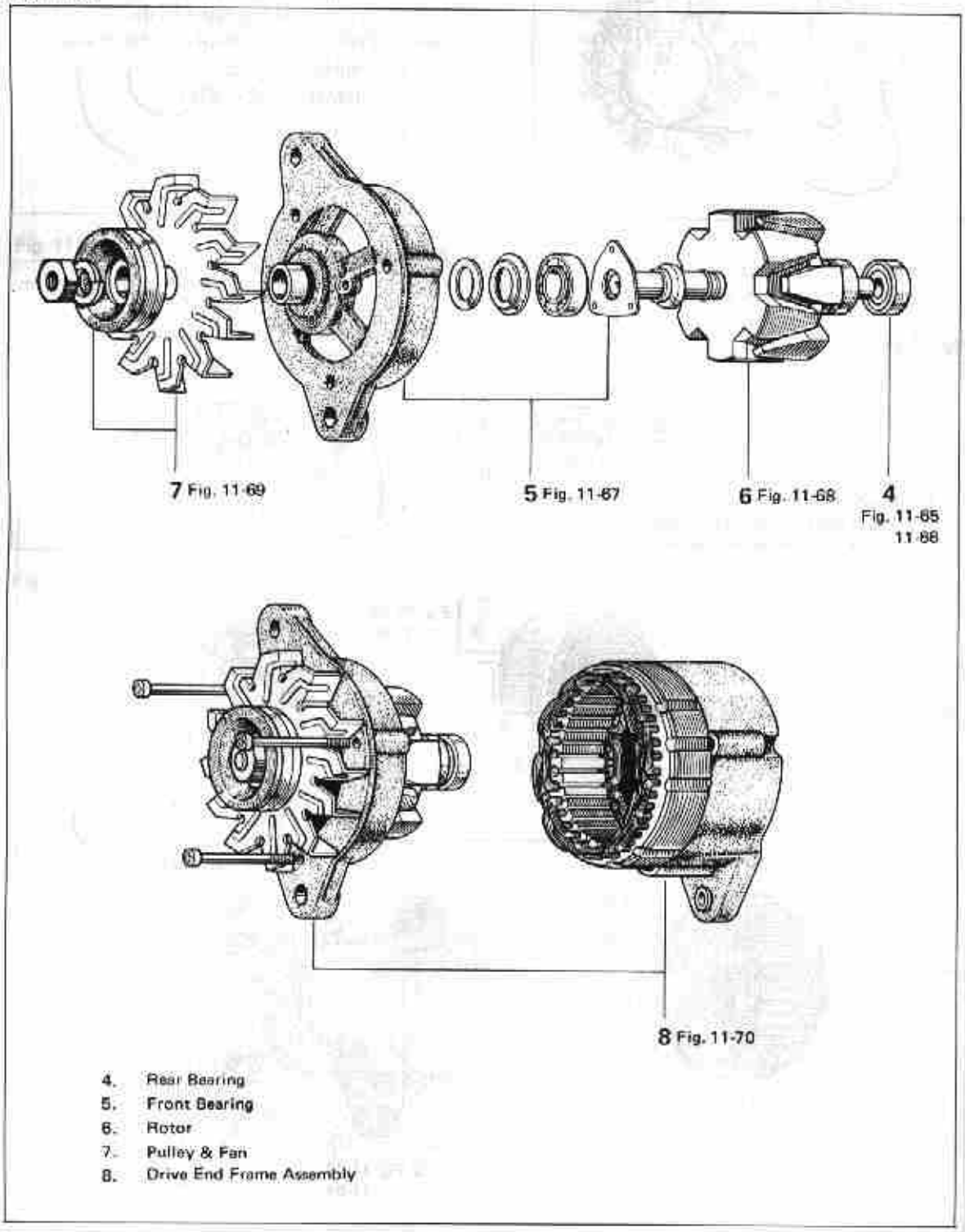
Assemble the parts in the numerical order shown in the figure.

Fig. 11-54



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

Fig. 11-55

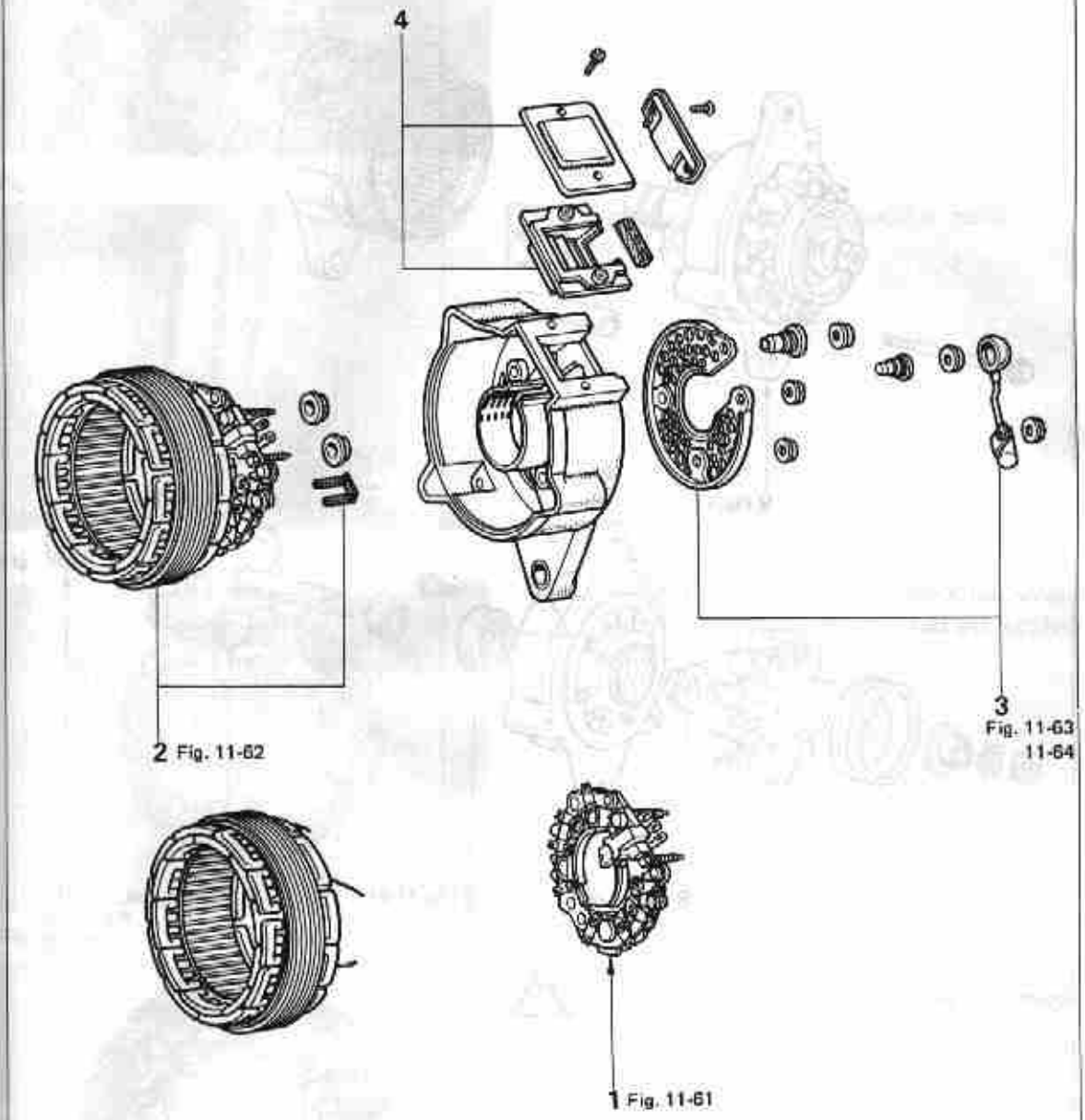


4. Rear Bearing
5. Front Bearing
6. Rotor
7. Pulley & Fan
8. Drive End Frame Assembly

For Alternator with IC Regulator

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

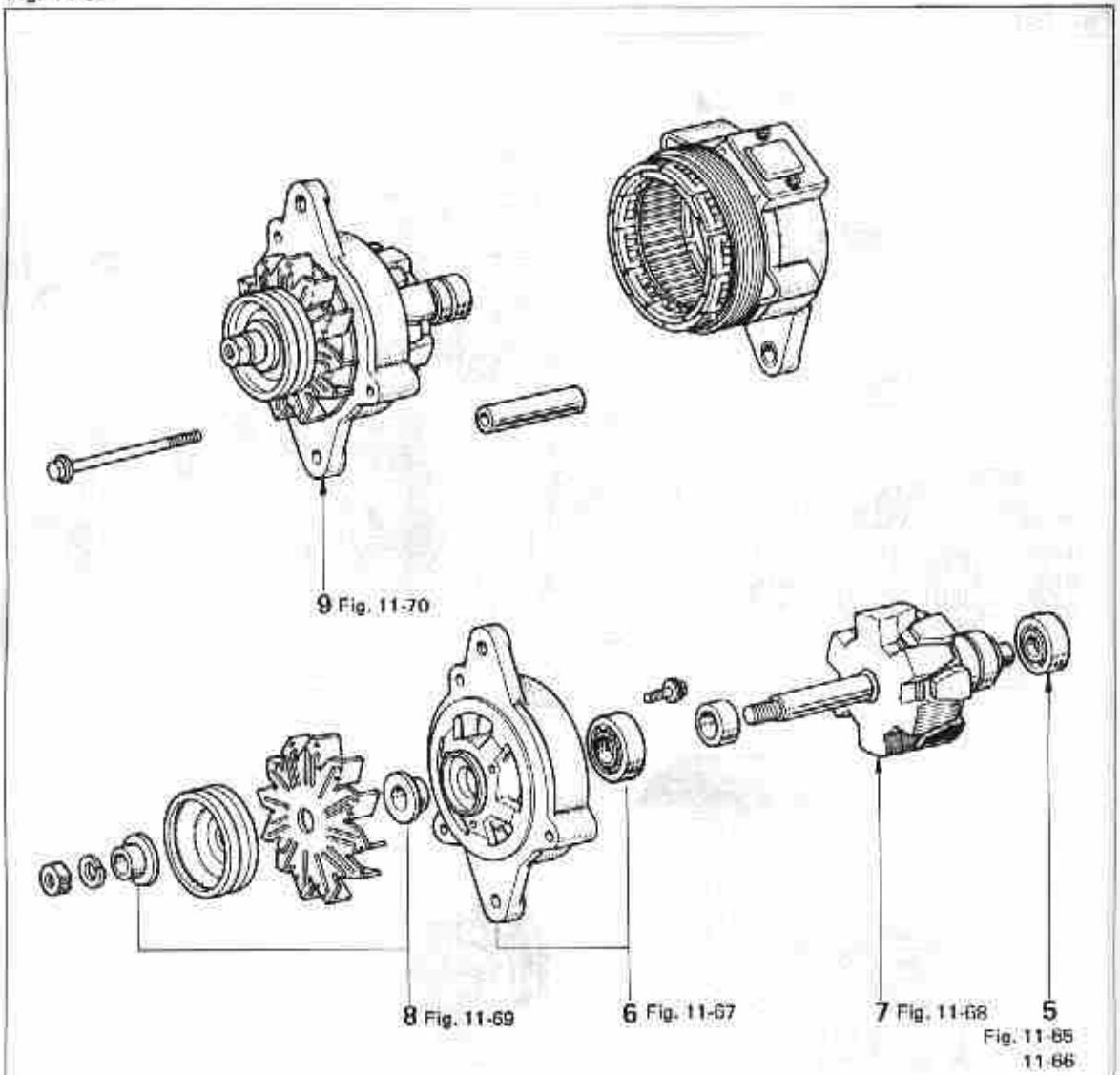
Fig. 11-66



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

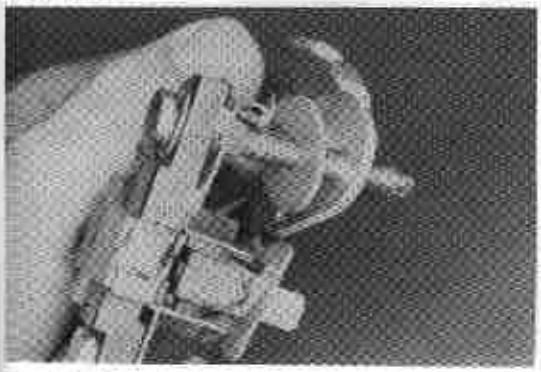
Assemble the parts in the numerical order shown in the figure.

Fig. 11-57



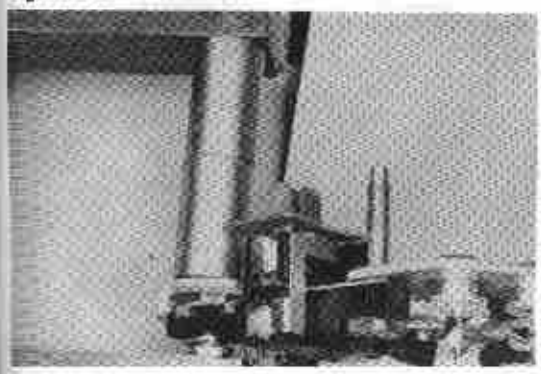
5. Rear Bearing
6. Front Bearing & Drive End Frame
7. Rotor
8. Pulley & Fan
9. Drive End Frame Assembly

Fig. 11-58



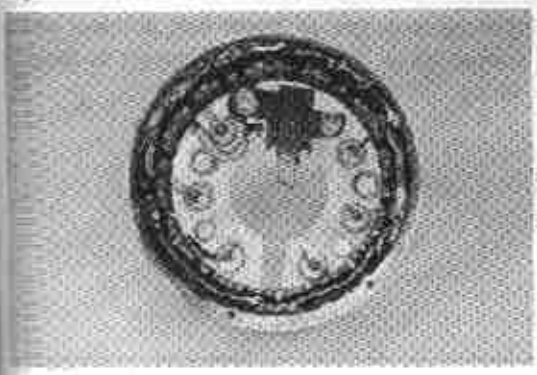
Insert insulator between positive rectifier holder and brush holder.

Fig. 11-59



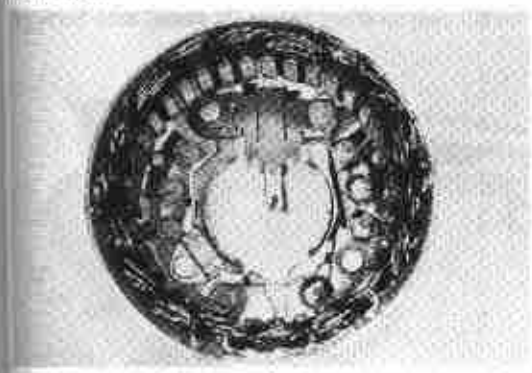
Install brush holder onto rectifier holder using socket wrench and a vise.

Fig. 11-60



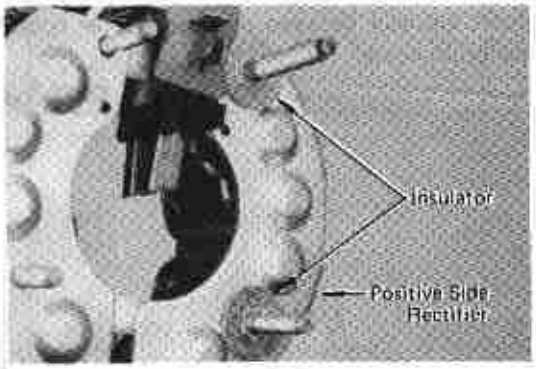
Connect stator coil "N" lead onto brush holder terminal, and solder each stator lead and rectifier lead to positive rectifier.

Fig. 11-61



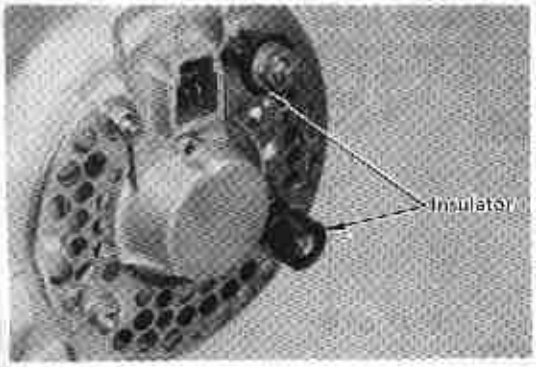
[with IC regulator]
Solder each lead wire onto rectifier or terminal as is shown in the figure.

Fig. 11-62



Assemble rear end frame and rectifier holder with insulators.

Fig. 11-63



Assemble rear end cover with insulators.

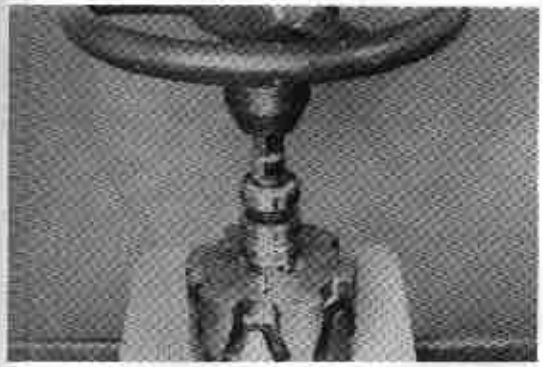
Fig. 11-64

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

Fig. 11-65

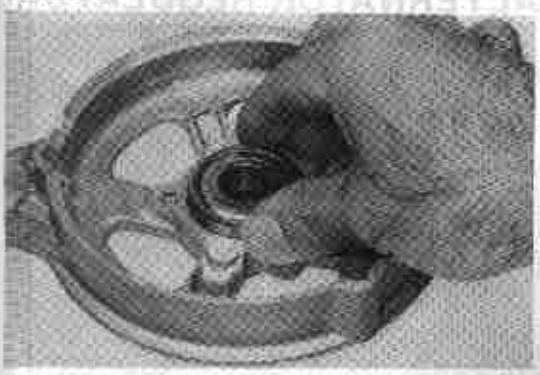
Install rear bearing facing its sealed side forward.

Fig. 11-66



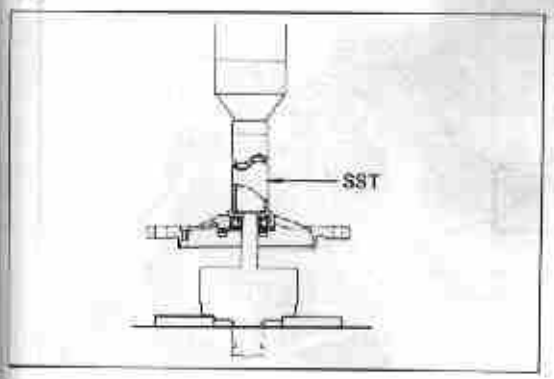
Press rear bearing onto rotor shaft, using a press.

Fig. 11-67



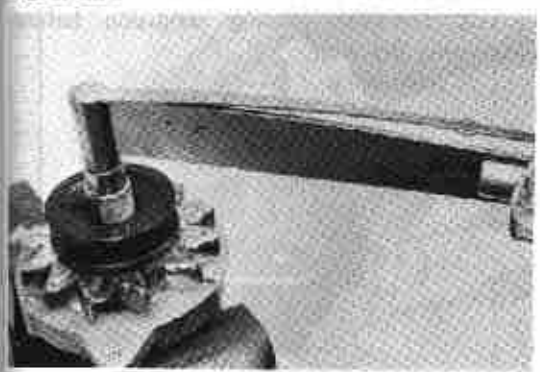
Install the front bearing facing its sealed side rearward.

Fig. 11-68



Press drive end frame assembly onto rotor shaft, using SST [09612-22010].

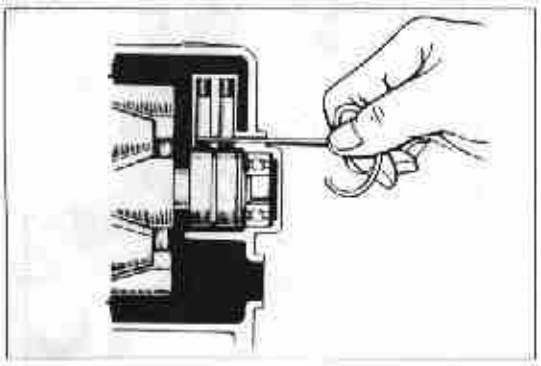
Fig. 11-69



Tighten nut to specified torque.

Torque 5 – 6.5 kg-m (36 – 47 ft-lb)

Fig. 11-70



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

ALTERNATOR REGULATOR

Fig. 11-71

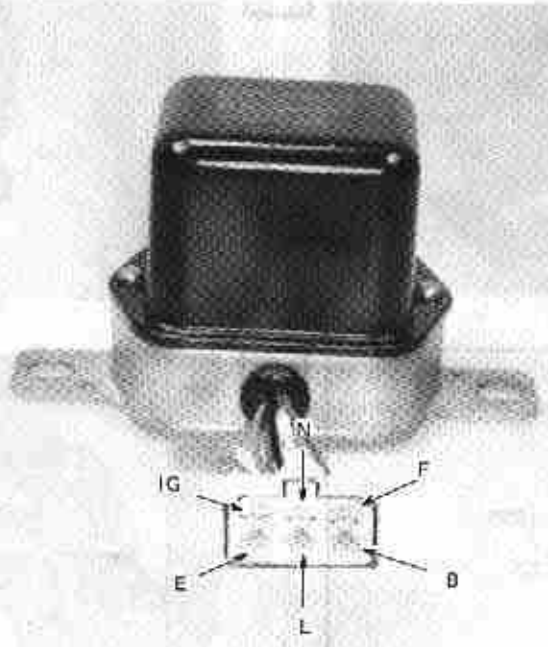
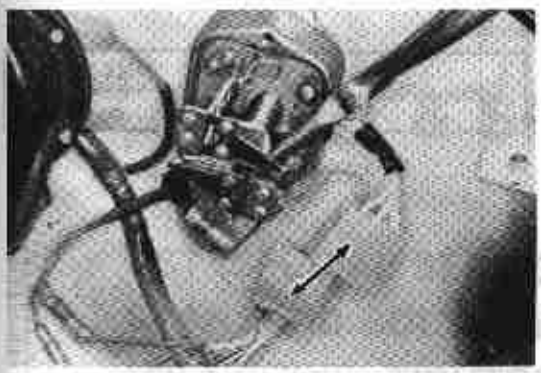


Fig. 11-72

INSPECTION AND ADJUSTMENT

Check connector fitting condition before inspecting regulator.

Fig. 11-73

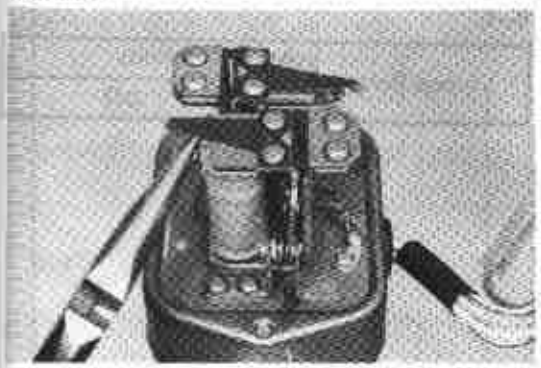


Always be sure to have the regulator connector pulled out when inspecting and adjusting.

Fig. 11-74

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

Fig. 11-75



Voltage adjustment

To adjust, bend the voltage regulator adjusting arm.

Regulated voltage **13.8-14.8V**

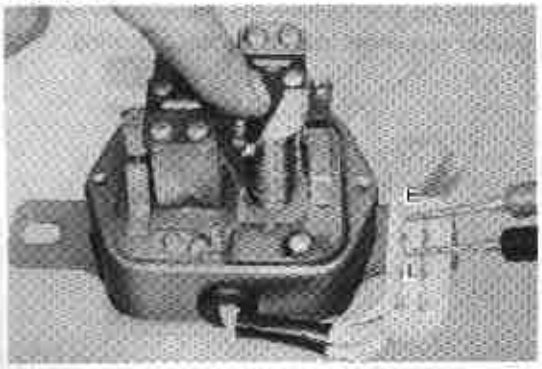
Fig. 11-76

Resistance measurement between terminals.

IG—F

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

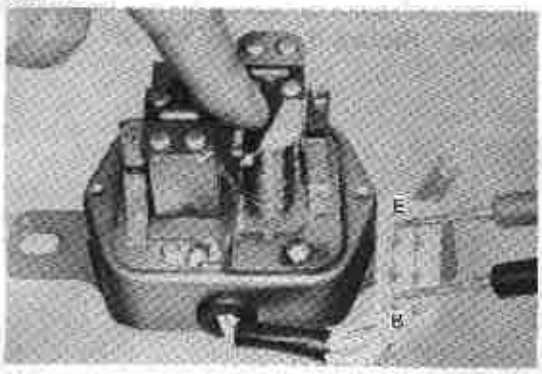
Fig. 11-77



L–E

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

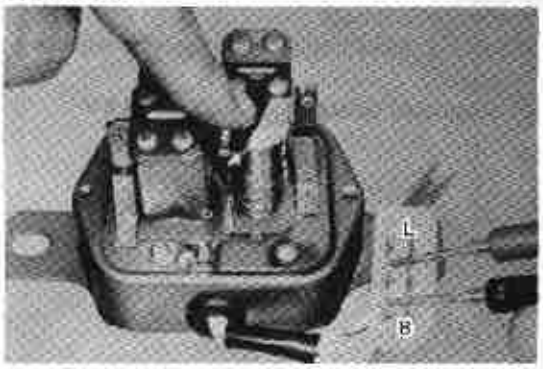
Fig. 11-78



B–E

Voltage Relay	At rest Infinity
	Pulled in approx. 100Ω

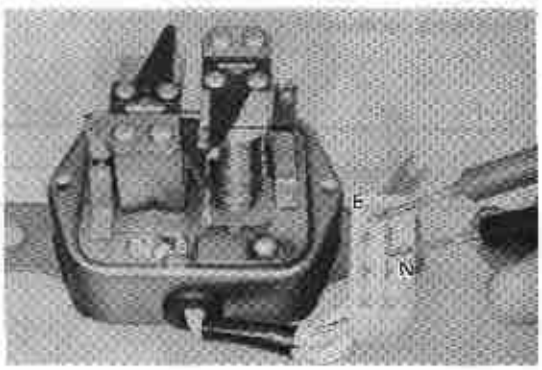
Fig. 11-79



B–L

Voltage Relay	At rest Infinity
	Pulled in 0Ω

Fig. 11-80



N–E

approx. 25Ω