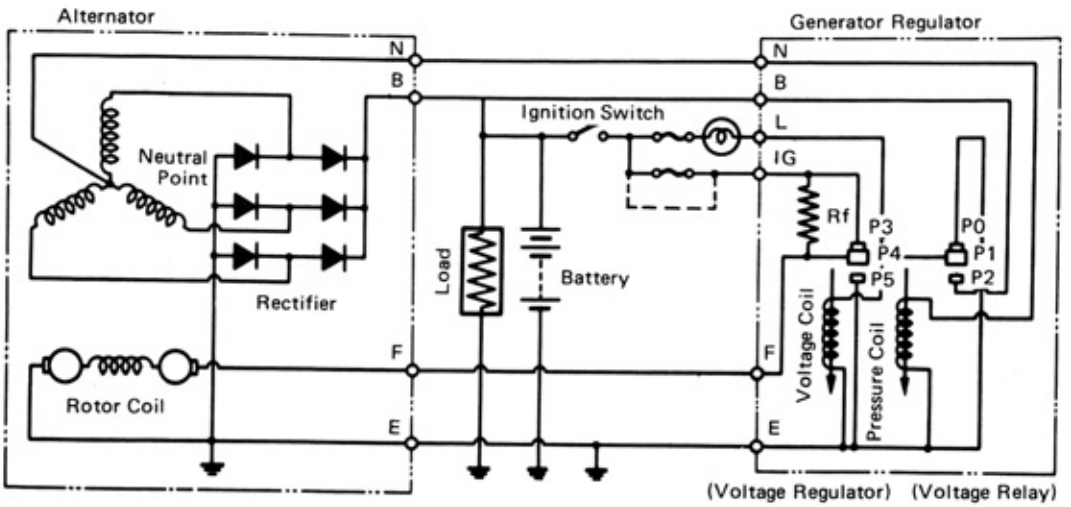
CHARGING SYSTEM
[Exc. ALTERNATOR W/IC REGULATOR]

CHARGING SYSTEM CIRCUIT

Fig. 9-1

Six Silicone Diode Type (50A)



Eight Silicone Diode Type (55A)

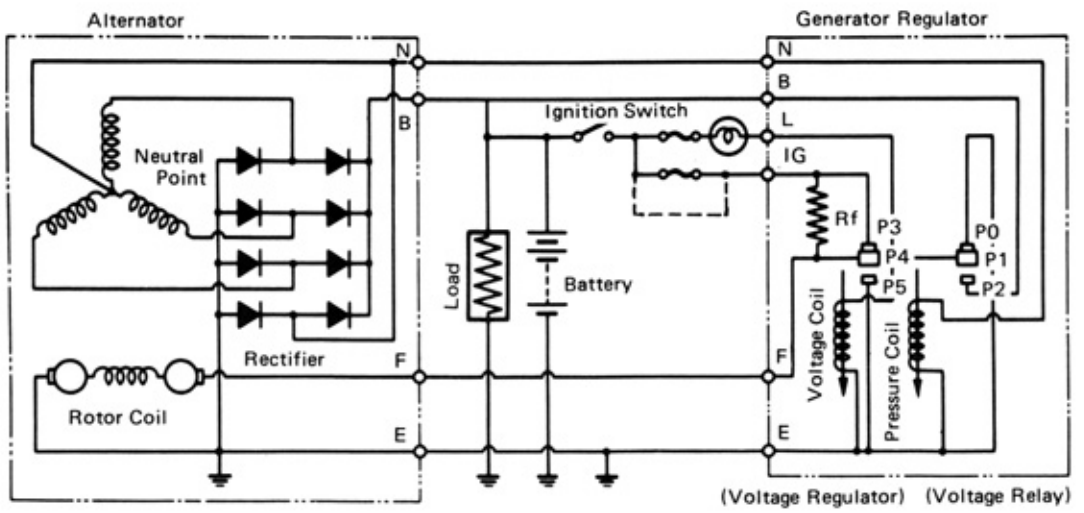
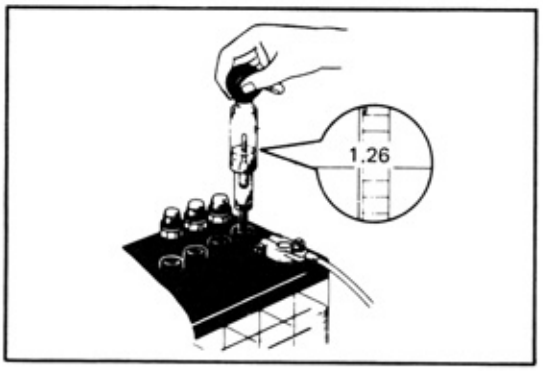


Fig. 9-2



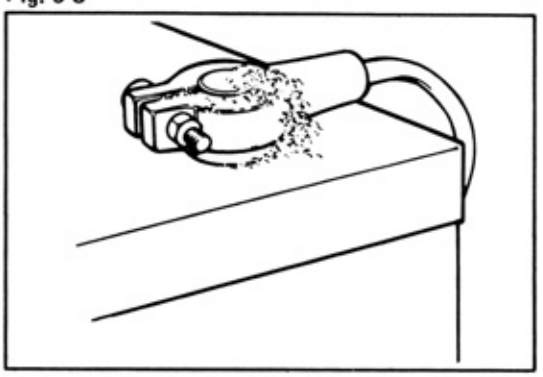
ON-VEHICLE INSPECTION

PARTS INSPECTION

Check on the following points.

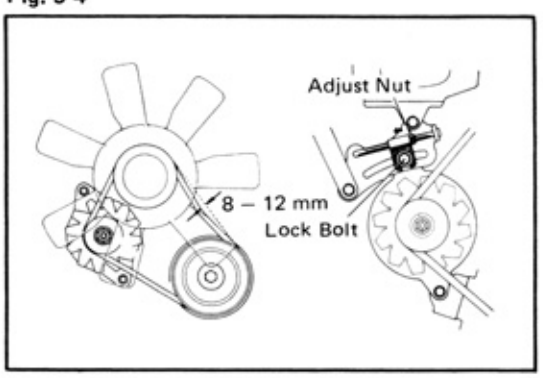
1. Battery gravity
   Standard **1.26 at 20°C (68.0°F)**

Fig. 9-3



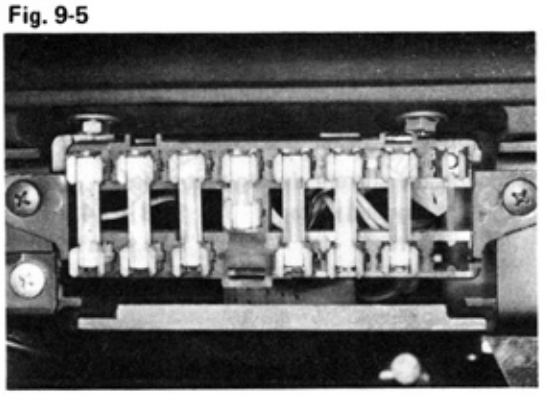
2. Battery terminal and fusible link
   Loose
   Corroded
   Burnt

Fig. 9-4



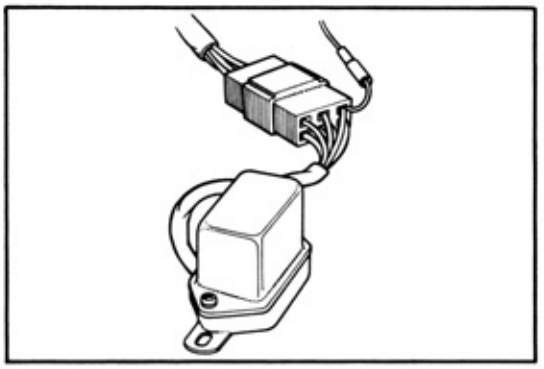
3. Drive belt tension
   When the belt is pressed down with a 10 kg (22 lb) force, the belt should deflect the specified amount.
   8 – 12 mm (0.31 – 0.47 in.)

Fig. 9-5



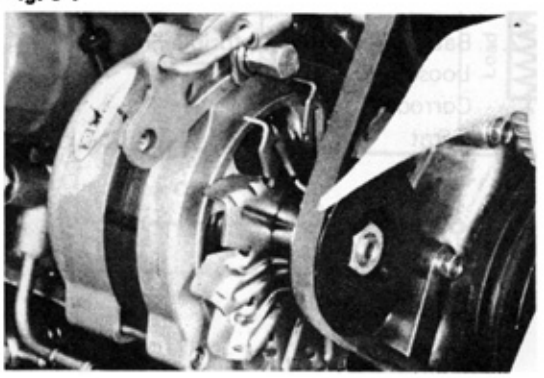
4. Fuse
   MX series – Back · Gauge fuse (15A)
   MS series – Engine fuse (15A)
   Gauge fuse (10A)

Fig. 9-6



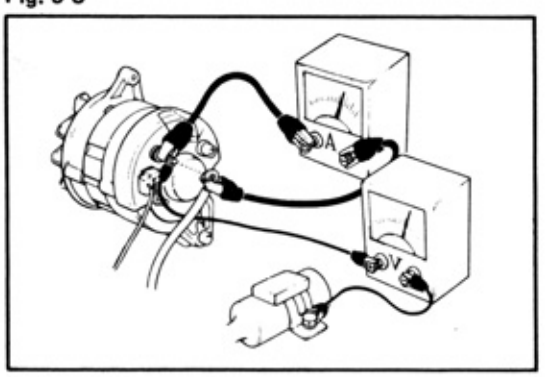
5. Installed condition of wiring for alternator and regulator.

Fig. 9-7



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

Fig. 9-8

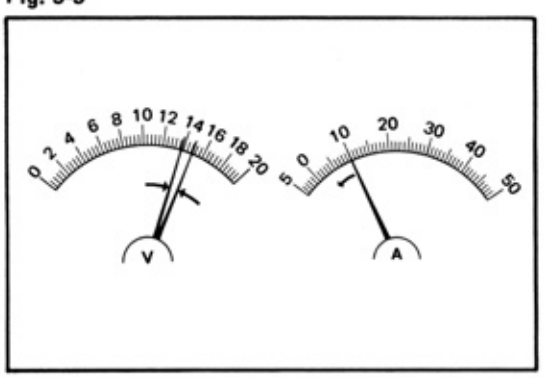


PERFORMANCE TEST USING VOLTMETER AND AMMETER

Wiring

Connect voltmeter and ammeter as illustrated.

Fig. 9-9



No-load Performance Test

1. Switch off all accesory parts.
2. Gradually raise the engine speed from idling to 2000 rpm, and read the voltage and the current during that time.

Standard voltage	**13.8 – 14.8 V**
Current	**Less than 10A**

Fig. 9-10

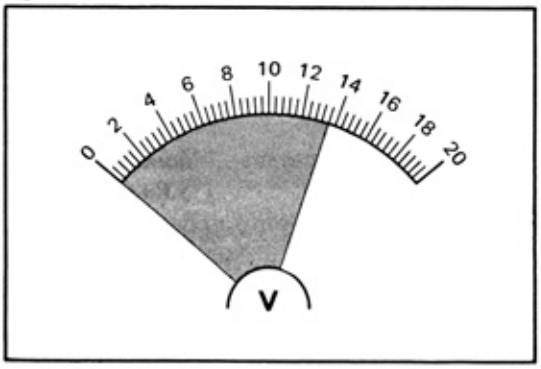


Fig. 9-11

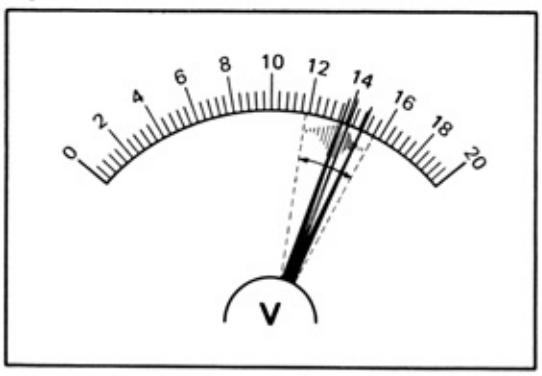


Fig. 9-12

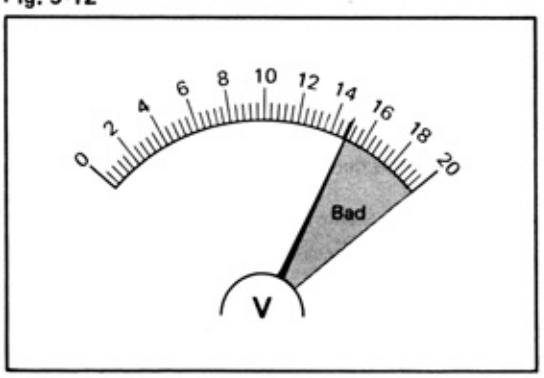
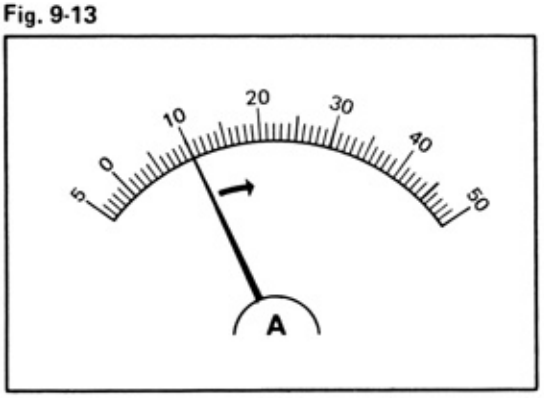


Fig. 9-13



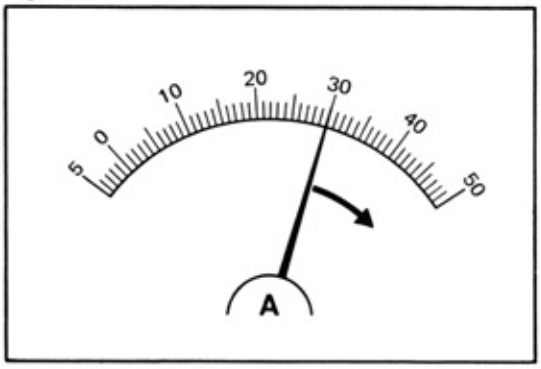
3. Diagnosis
   (1) If voltmeter reading is low:
      1) Voltage regulator armature point gap is too small.
      2) Point gap at high speed side is too small.
      3) Points at high speed side are fused.
      4) Point contacting pressure at low speed side is too weak.
      5) Defective contact at low speed side points.

   (2) If voltmeter pointer is unstable:
      1) Generator regulator points are dirty or slightly fused.
      2) Defective contact at F terminal.

   (3) If voltmeter reading is high:
      1) Voltage regulator armature point gap is too large.
      2) Point gap at high speed side is too large.
      3) Contact resistance of points at high speed side is too large.
      4) Open circujt in voltage regulator coil or voltage relay coil.
      5) Point contacting pressure at low speed side is too strong.
      6) Generator regulator ground is defective.
      7) Lead wires to regulator N and B terminals are broken.

   (4) If ammeter reading is over 10A:
      1) Battery is discharging.
      2) Battery has internal short.

Fig. 9-14



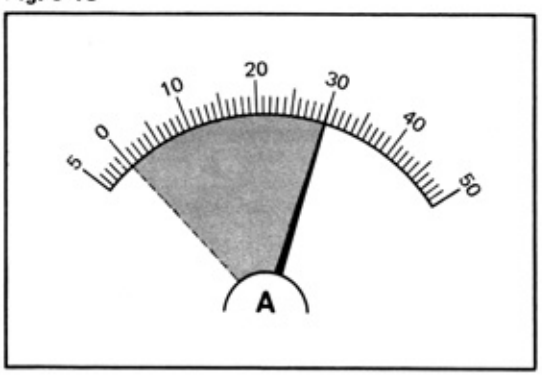
Load Performance Test

1. Switch on the headlights to high beam, and with the engine running at 1100 rpm,read the ammeter.

   Standard current **More than 30A (13.8 to 14.8V)**

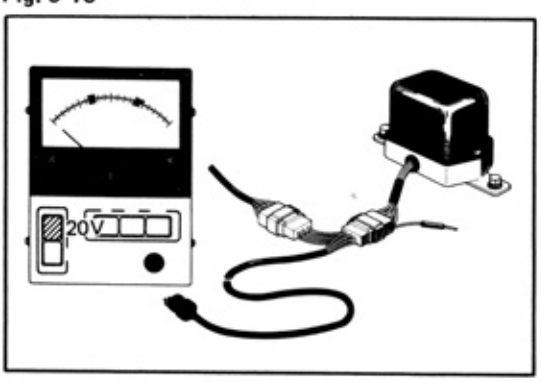
   If the battery seems to be in fully charged state, discharge it by disconnecting the cord from the ignition coil and running the starter for about 5 to 10 seconds.

Fig. 9-15



2. If ammeter reading is below 30A.
   (1) Open circuit in rectifiers.
   (2) Short circuit in rectifiers.
   (3) Open or short circuit in stator coil.

Fig. 9-16

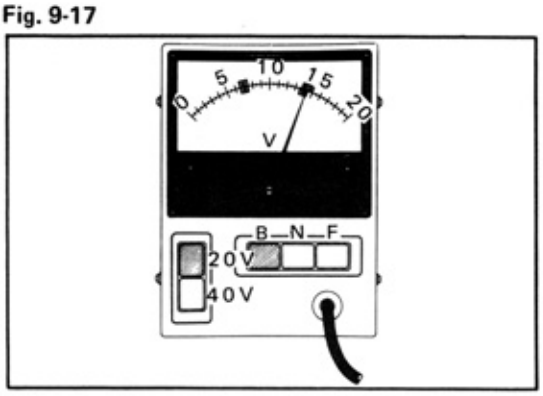


PERFORMANCE TEST BY ALTERNATOR CHECKER

Connection Method

1. Pull out the generator regulator connector and plug in the checker connectors.
2. Press the checker main switch (20V).

Fig. 9-17



Output Voltage (B Terminal Voltage) Measurement

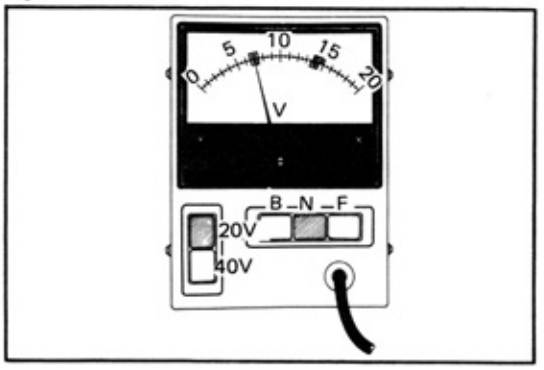
1. Press the checker [B] check switch.
2. Start the engine and gradually raise its speed from idling to 2300 rpm.

   Standard voltage **13.8 to 14.8V (green zone)**

– Note –

At high speed and at high temperature, slightly higher voltage will be indicated, but up to 15.5V is permissible in this case.

Fig. 9-18

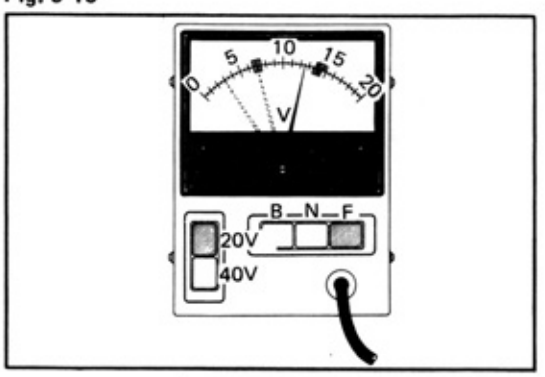


Neutral Voltage (N Terminal Voltage) Measurement

1. Press the checker [N] check switch.
2. Hold the engine speed around 1000 to 2000 rpm.

Standard voltage **6.9 to 7.4V (green zone)**

Fig. 9-19

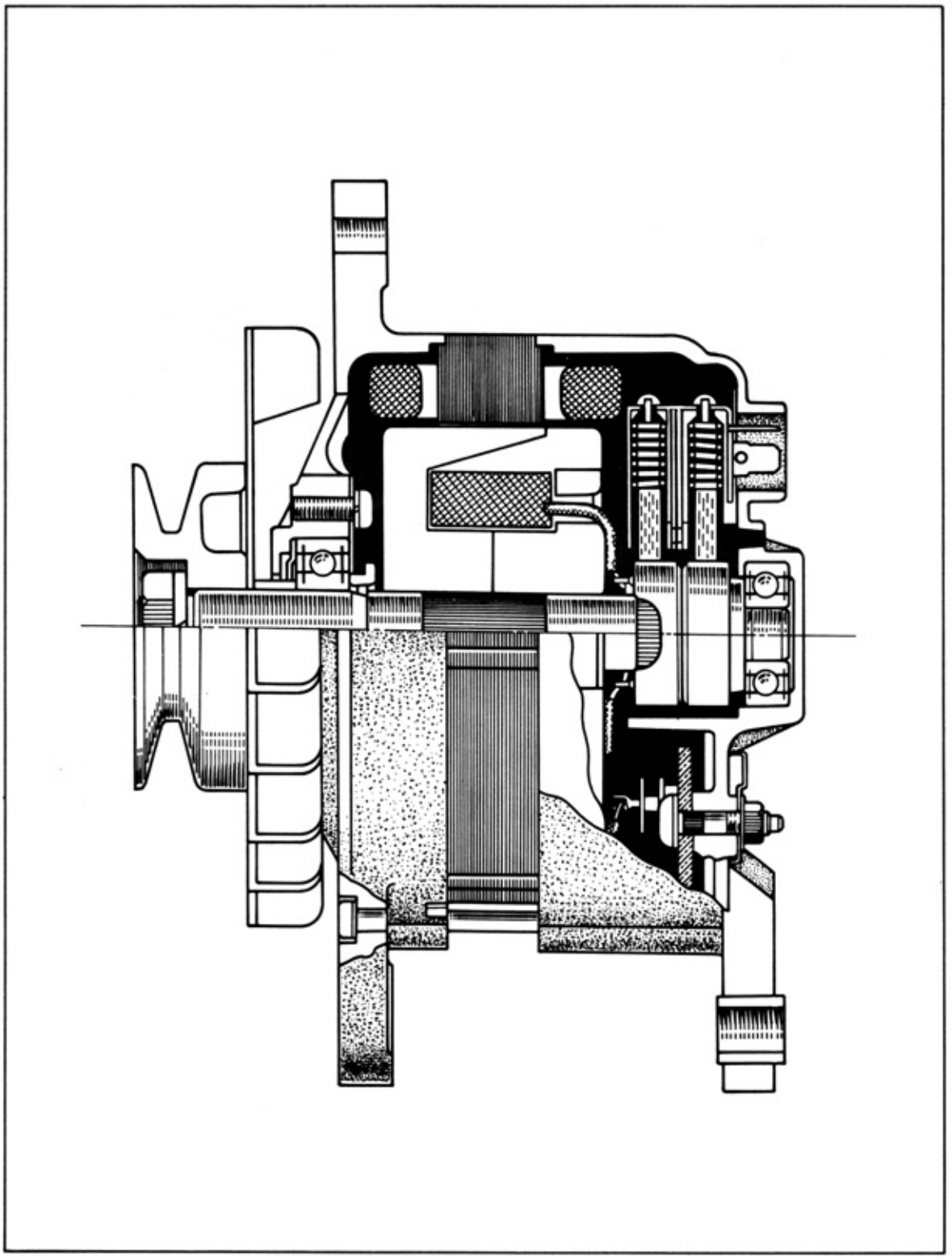


Field Coil Regulating Voltage (F Terminal Voltage) Measurement

1. Press the checker [F] check switch.
2. Gradually raise the engine speed from idling to 2300 rpm.
3. If the pointer moves in small steps, from about 12 to 7V → 4 to 6V → 1 to 3V, the regulator is functioning normally.

ALTERNATOR

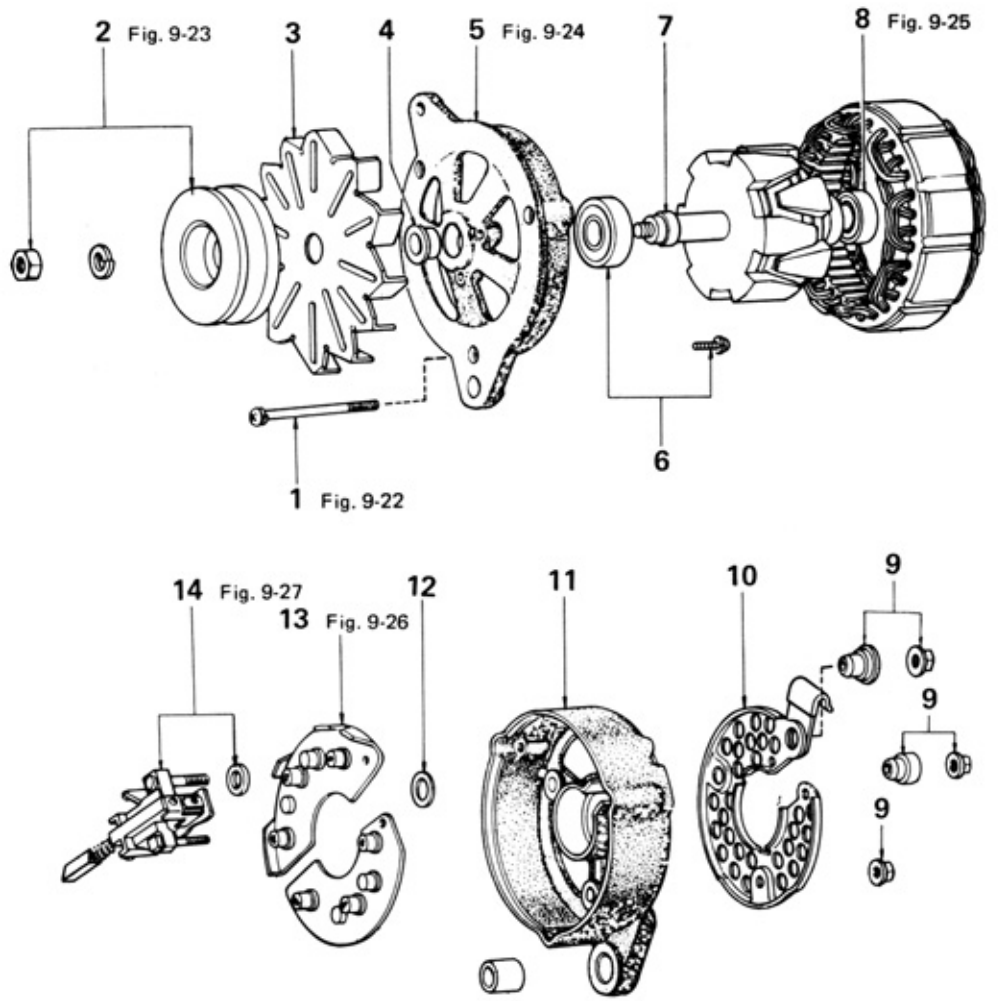
Fig. 9-20



DISASSEMBLY

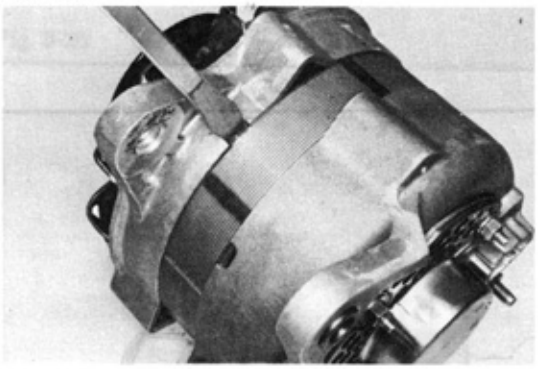
Disassemble in numerical order.

Fig. 9-21



1	Bolt	9	Insulator & Nut
2	Pulley	10	Rear End Cover
3	Fan	11	Rear End Flame
4	Space Collar	12	Insulator
5	Drive End Frame	13	Rectifier Holder
6	Front Bearing	14	Brush Holder & Insulator
7	Space Collar		
8	Rear Bearing		

Fig. 9-22

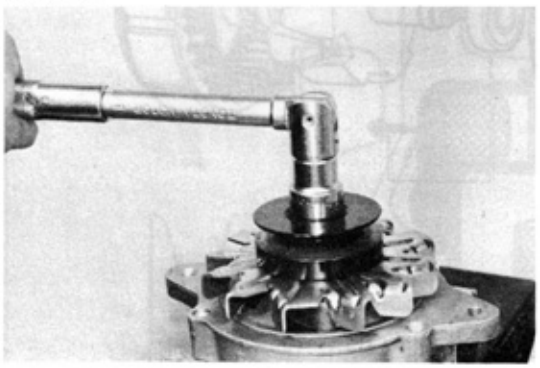


1. Unscrew three bolts.
2. Pry apart drive end frame from stator.

– Caution –

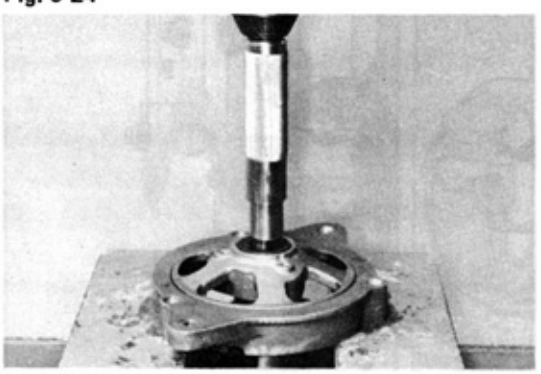
Do not pry coil wires.

Fig. 9-23



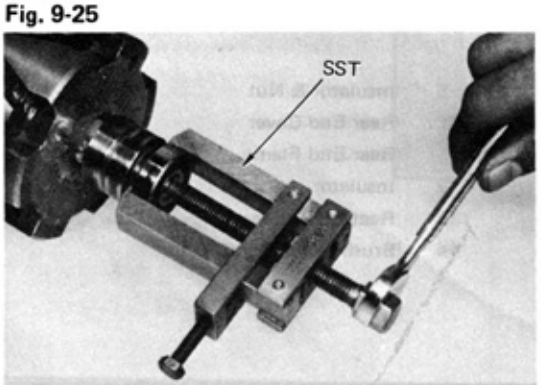
Using soft jaw vise, remove pulley nut, pulley, fan and spacer collar.

Fig. 9-24



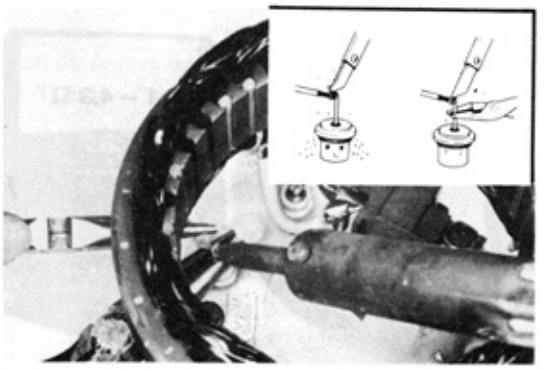
Remove rotor from drive end frame using a press.

Fig. 9-25



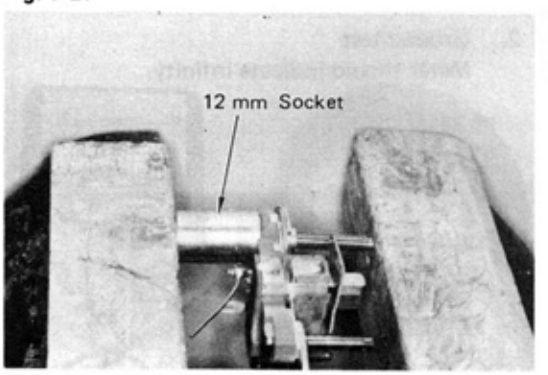
Remove the rotor shaft rear bearing using SST [09286-46011].

Fig. 9-26



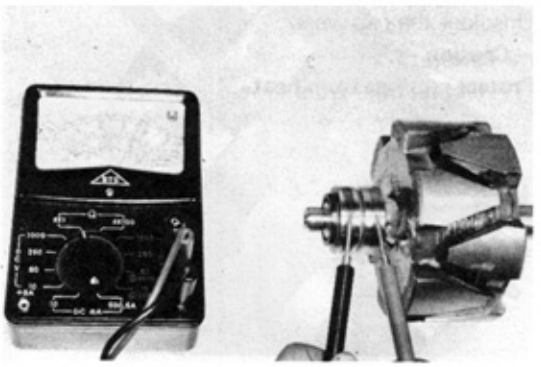
Unsolder the rectifiers.
– Caution –
Protect rectifier from heat.

Fig. 9-27



Remove brush holder assembly using a 12 mm socket wrench and vise.

Fig. 9-28

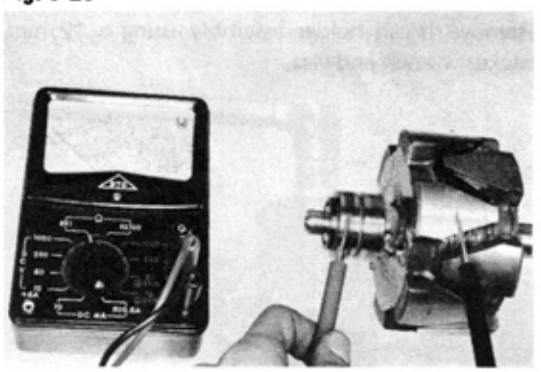


INSPECTION & REPAIR

Rotor

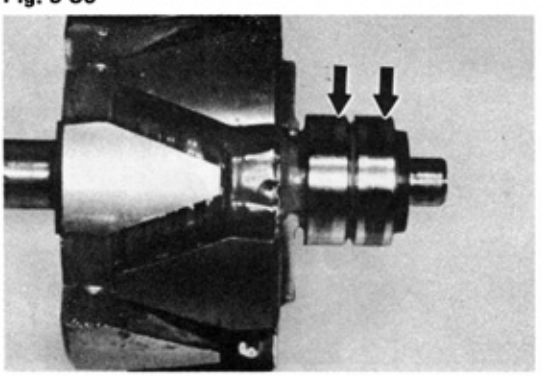
1. Open circuit test
   Standard resistance **4.1 – 4.3 Ω**

Fig. 9-29



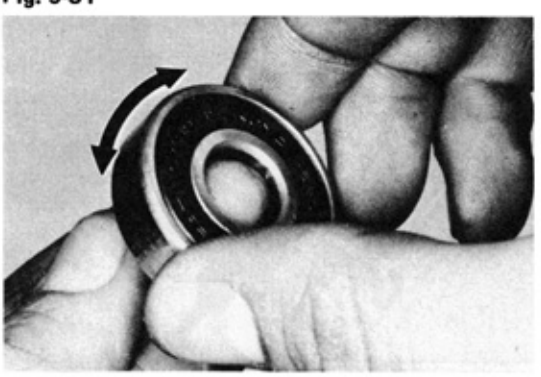
2. Ground test
   Meter should indicate infinity.

Fig. 9-30



3. Check slip ring for being dirty or burnt.

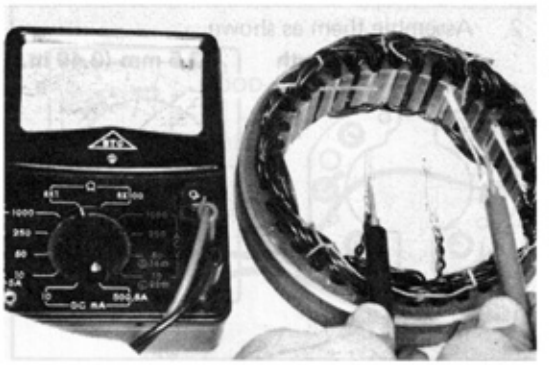
Fig. 9-31



Bearing

Check bearing for wear or roughness.

Fig. 9-32



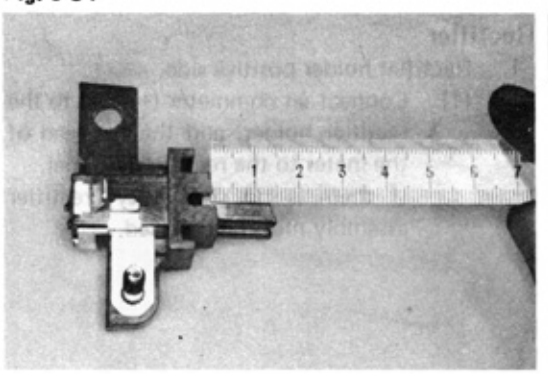
Stator

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

Fig. 9-33

2. Ground test
   Meter should indicate infinity.

Fig. 9-34

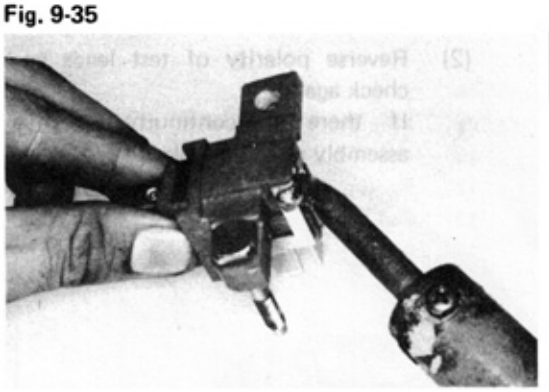


Brush & Brush Holder

Check exposed brush length.

Minimum **5.5 mm (0.217 in.)**

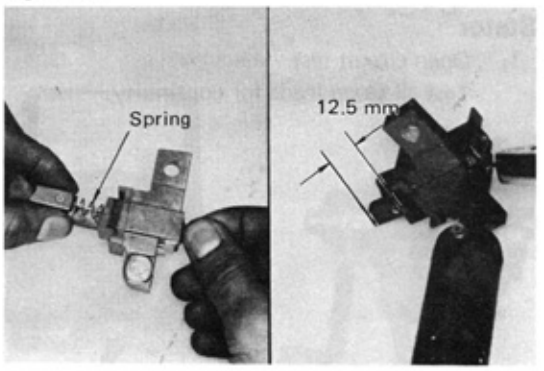
Fig. 9-35



Replace brush as follows.

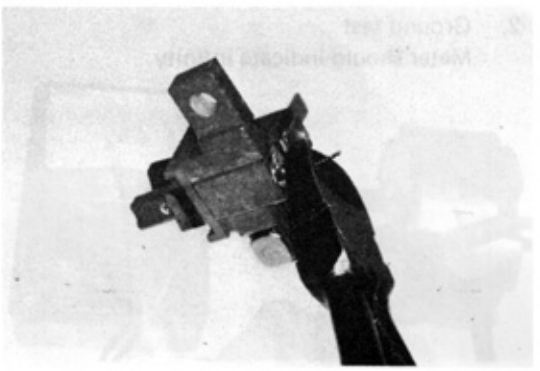
1. Unsolder and remove brush and spring.

Fig. 9-36



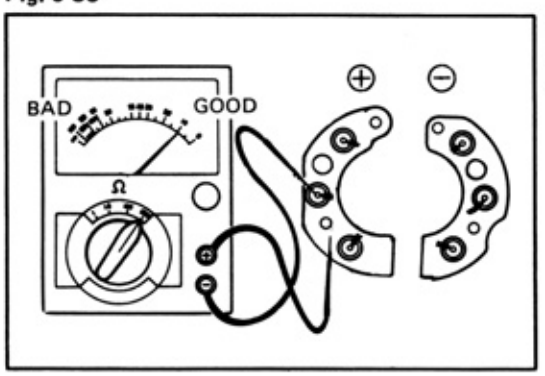
2. Assemble them as shown.
   Exposed length 12.5 mm (0.49 in.)

Fig. 9-37



3. Check brush for smooth movement in the brush holder and cut off excess wire.

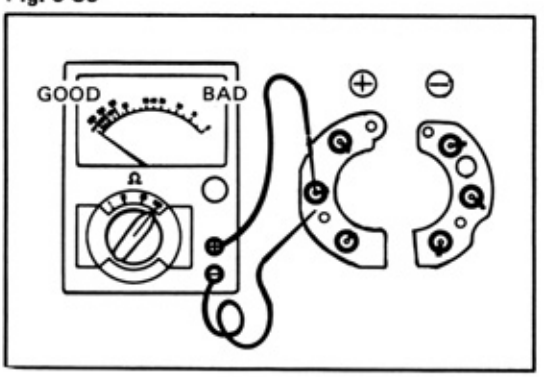
Fig. 9-38



Rectifier

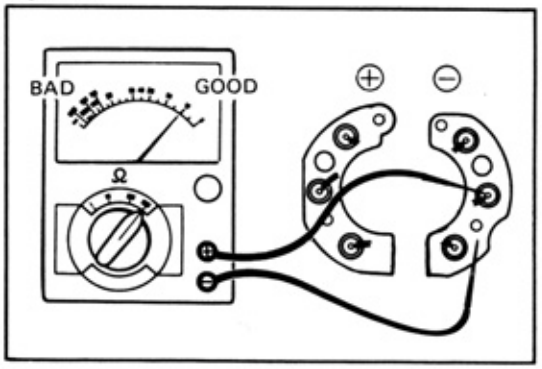
1. Rectifier holder positive side.
   (1) Connect an ohmmeter (+) lead to the rectifier holder, and the (–) lead of the meter to the rectifier terminal.
   If there is no continuity, rectifier assembly must be replaced.

Fig. 9-39



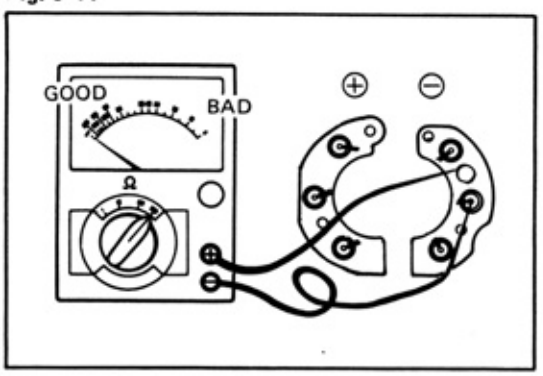
   (2) Reverse polarity of test leads and check again.
   If there is continuity, rectifier assembly must be replaced.

Fig. 9-40



2. Rectifier holder negative side.
   (1) 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. 9-41

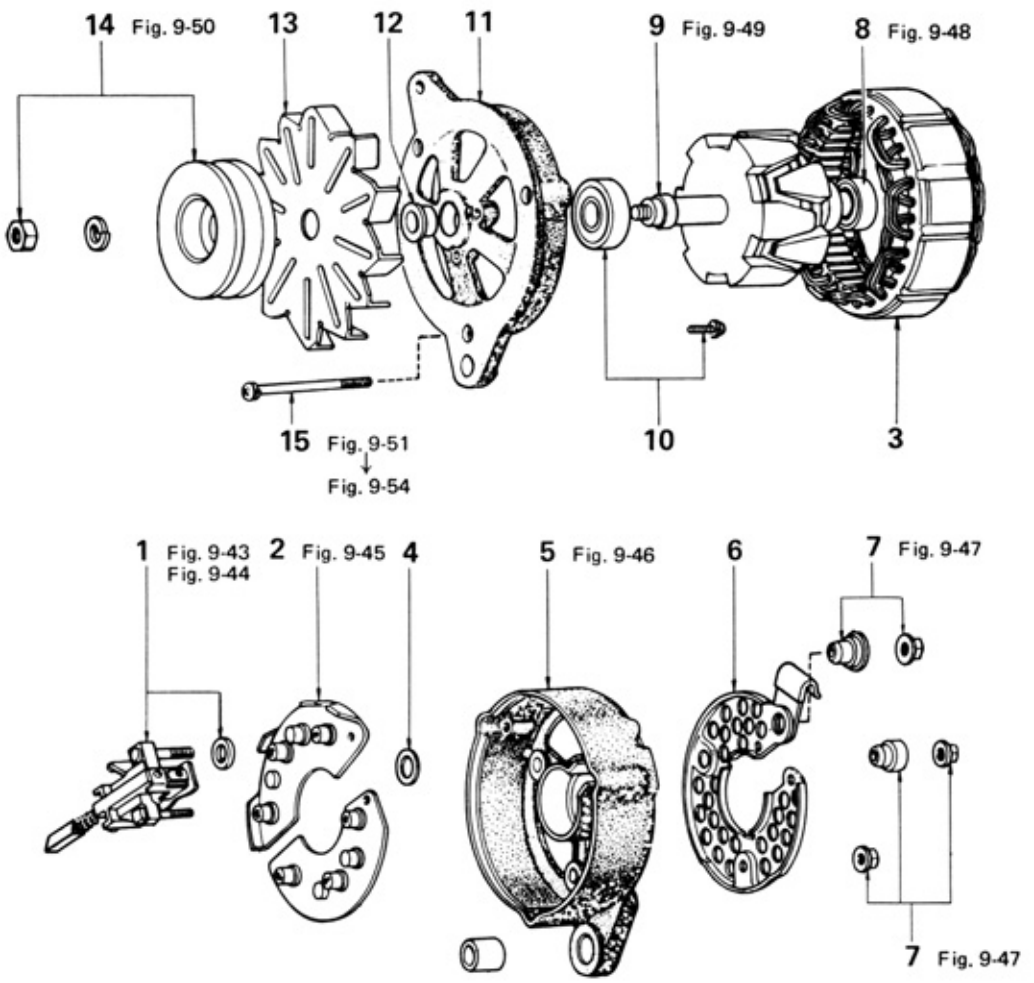


   (2) Reverse polarity of test leads and check again.
   If there is continuity, rectifier assembly must be replaced.

ASSEMBLY

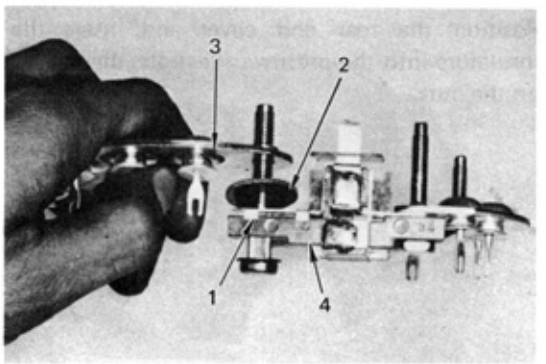
Assemble in numerical order.

Fig. 9-42



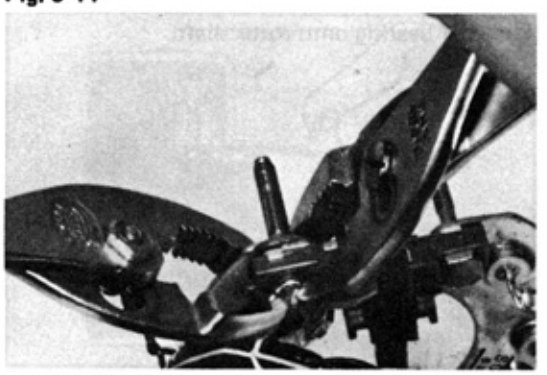
1	Brush Holder & Insulator	9	Space Collar
2	Rectifier Holder	10	Front Bearing
3	Stator Assembly	11	Drive End Frame
4	Insulator	12	Spece Collar
5	Rear End Frame	13	Fan
6	Rear End Cover	14	Pulley
7	Insulator & Nut	15	Bolt
8	Rear Bearing		

Fig. 9-43



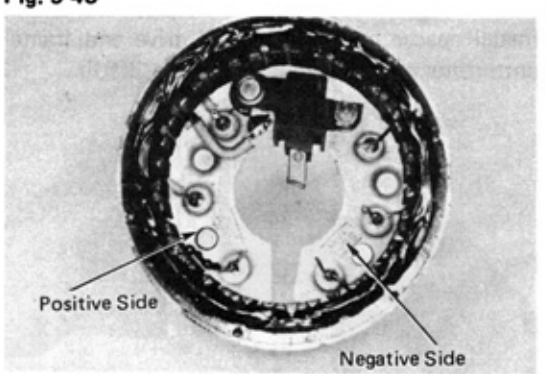
1. Insert "N" terminal (1) and insulator (2) between positive rectifier holder (3) and brush holder (4)

Fig. 9-44



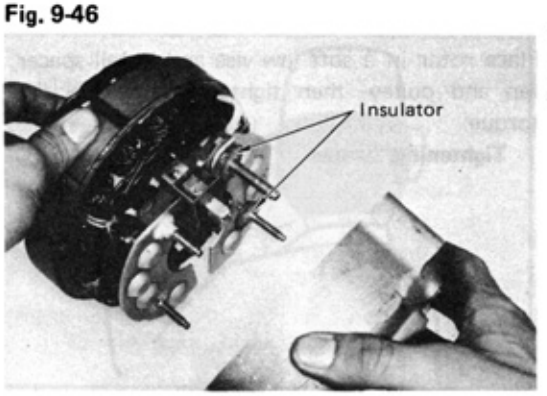
2. Install brush holder onto rectifier holder using pliers.

Fig. 9-45



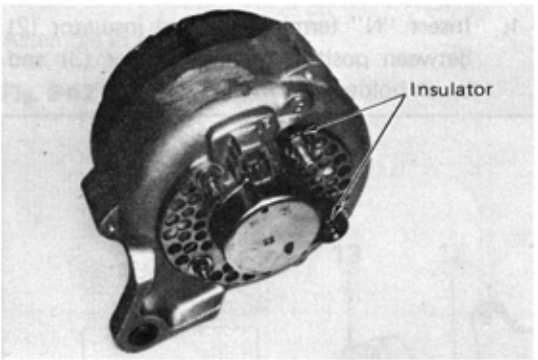
Solder each stator lead to rectifier.
– Caution –
Protect the rectifier from heat.

Fig. 9-46



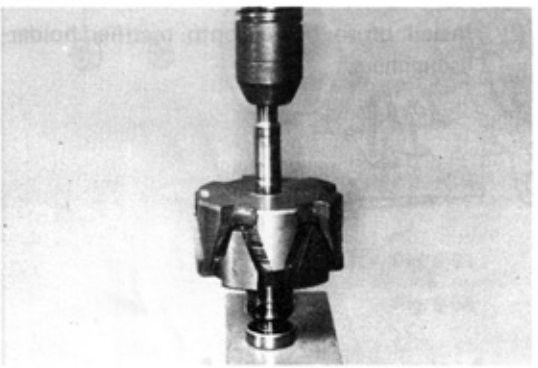
Assemble rear end frame and rectifier holder with insulators.

Fig. 9-47



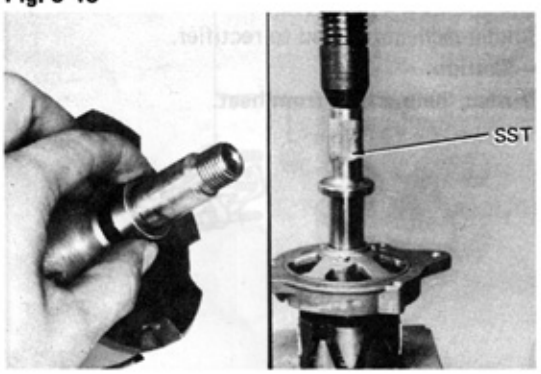
Position the rear end cover and insert the insulators into the positive side bolts, then screw on the nuts.

Fig. 9-48



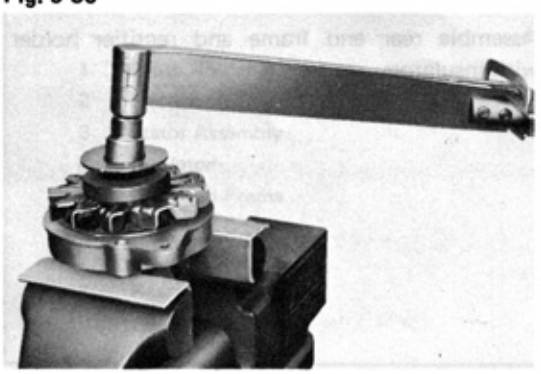
Press rear bearing onto rotor shaft.

Fig. 9-49



Install spacer collar and press drive end frame onto rotor shaft, using SST [09325-12010]

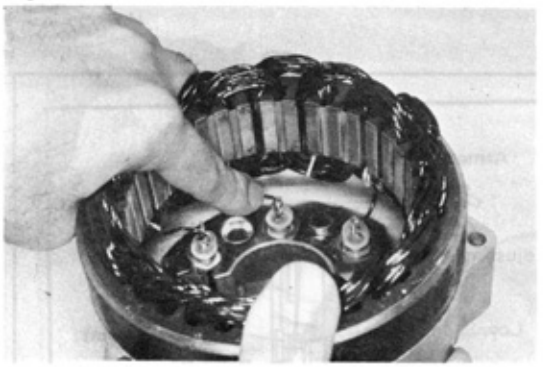
Fig. 9-50



Place rotor in a soft jaw vise and install spacer, fan and pulley, then tighten nut to specified torque.

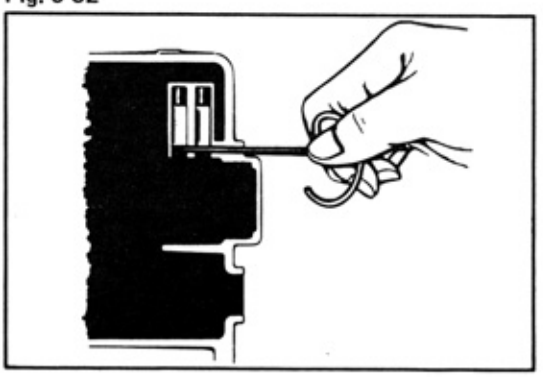
Tightening torque	**5 – 6.5 kg-m (36.2 – 47 ft-lb)**

Fig. 9-51



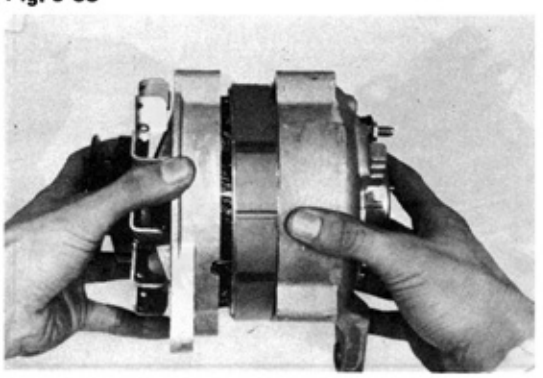
1. Bend lead wires to clear rotor.

Fig. 9-52



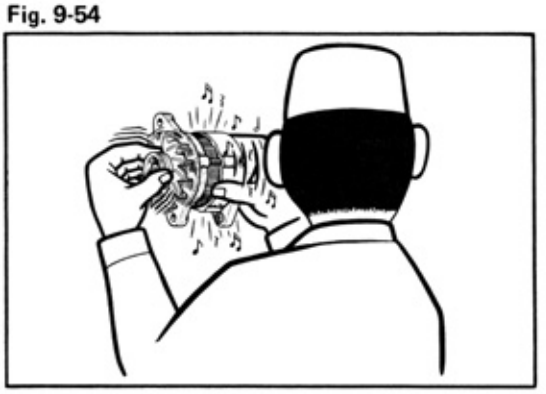
2. Push in brushes and temporarily lock in place with wire inserted through access hole in end frame.

Fig. 9-53



3. Assemble the drive end frame onto the rectifier end frame.
   Then remove the wire from the rear end frame.

Fig. 9-54



Make sure the rotor rotates smoothly.

ALTERNATOR REGULATOR

Fig. 9-55

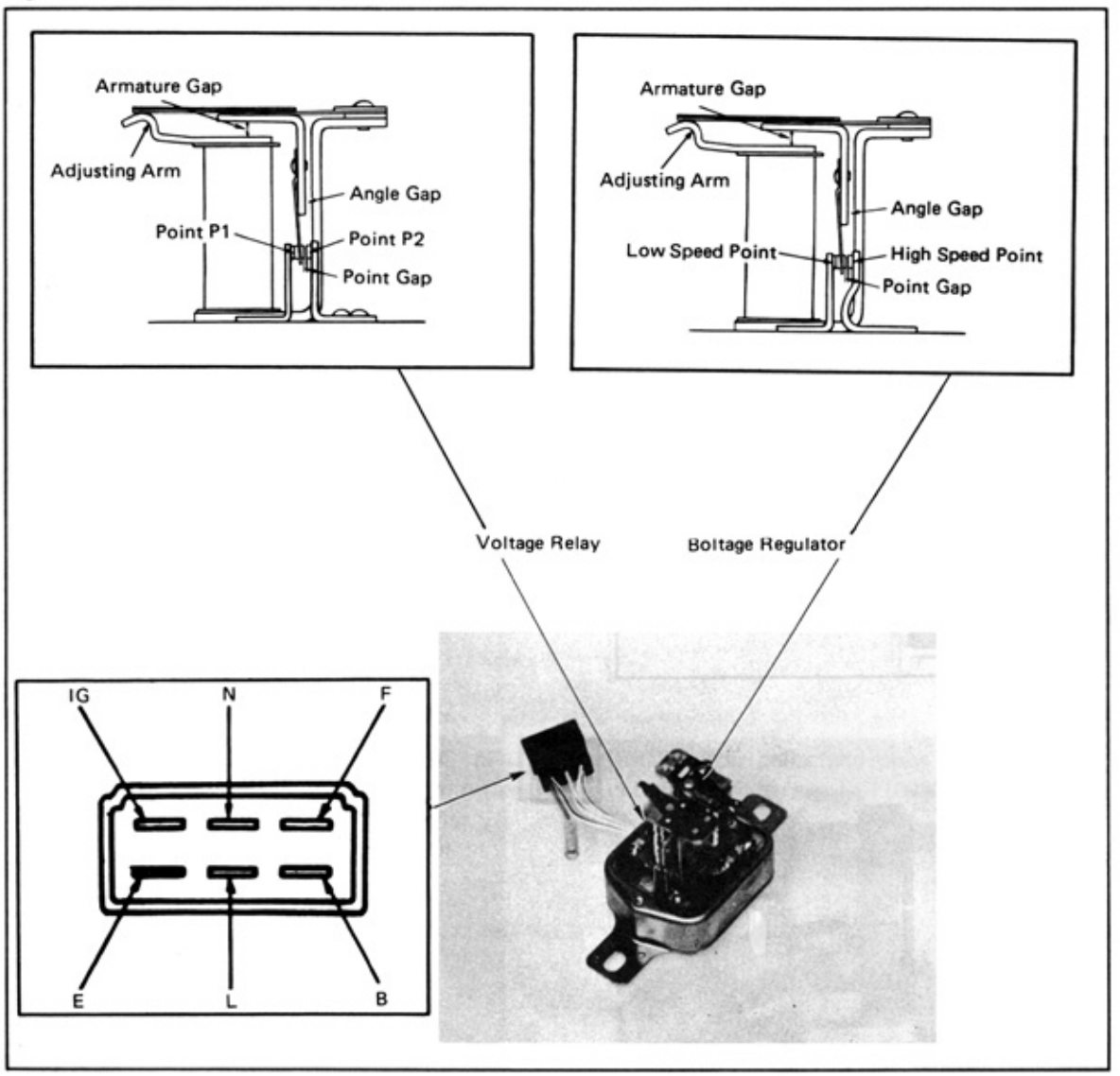
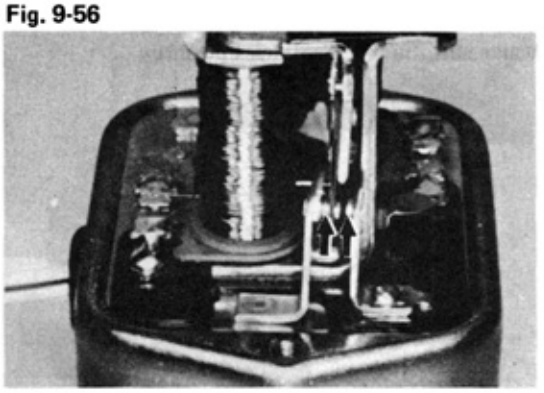


Fig. 9-56

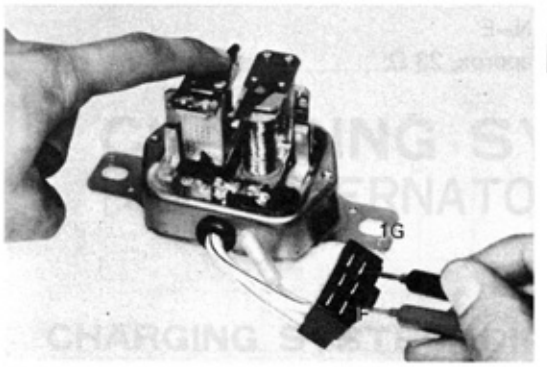


INSPECTION & ADJUSTMENT

Points

1. If the point surfaces are dirty, polish with sandpaper (AA400) and wash clean with trichloro-ethylene or similar solvent.
2. If the point surfaces are pitted or marred, correct with sandpaper (# 400 → AA400) and wash clean with trichloro-ethylene or similar solvent.
3. If the point surfaces are fused or badly damaged, replace the regulator.

Fig. 9-57

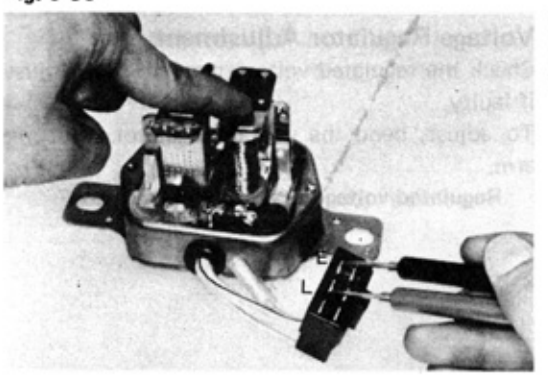


Resistance measurement between terminals.

IG–F

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

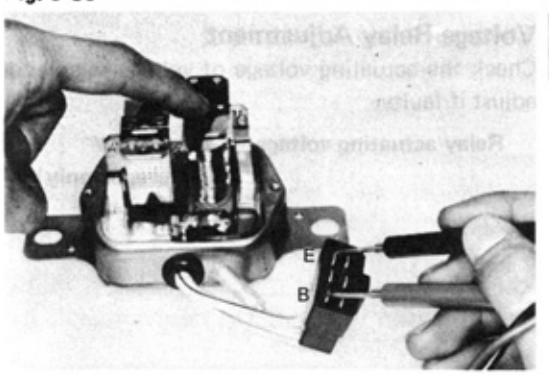
Fig. 9-58



L–E

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

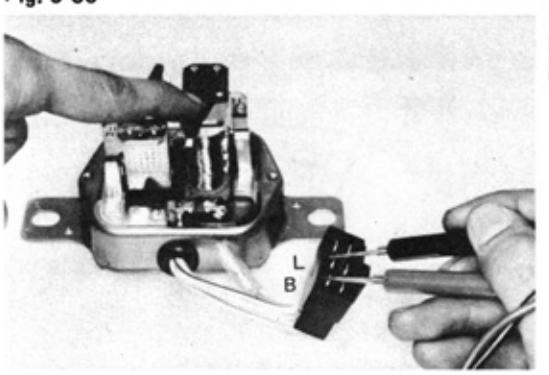
Fig. 9-59



B–E

Voltage Relay	At rest	infinity
	Pulled in approx.	100 Ω

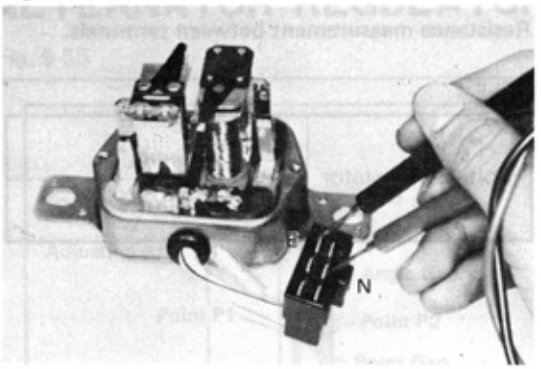
Fig. 9-60



B–L

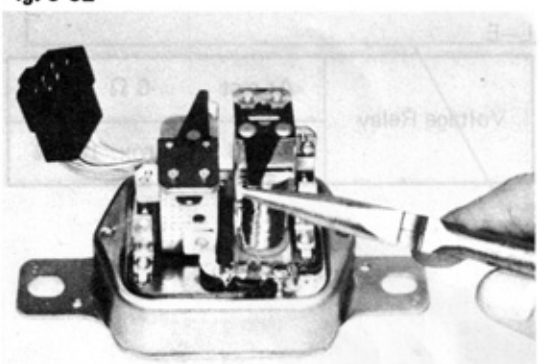
Voltage Relay	At rest	infinity
	Pulled in	0 Ω

Fig. 9-61



N–E
approx. 23 Ω

Fig. 9-62



Voltage Regulator Adjustment

Check the regulated voltage regulator and adjust if faulty.

To adjust, bend the voltage regulator adjusting arm.

Regulated voltage	**13.8 to 14.8V**

Fig. 9-63

Voltage Relay Adjustment

Check the actuating voltage of voltage relay and adjust if faulty.

Relay actuating voltage	**4.0 to 5.8V (Reference only)**