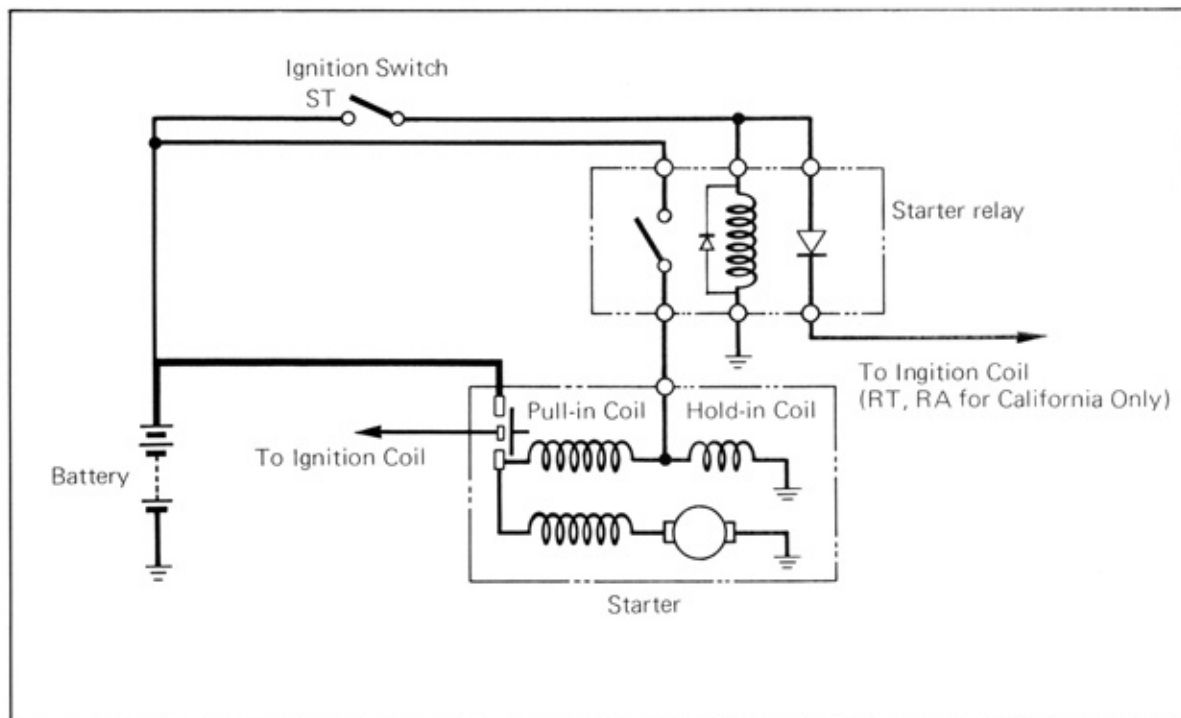


# ENGINE ELECTRICAL

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## STARTING SYSTEM



Starting System Circuit

## CONVENTIONAL TYPE STARTER

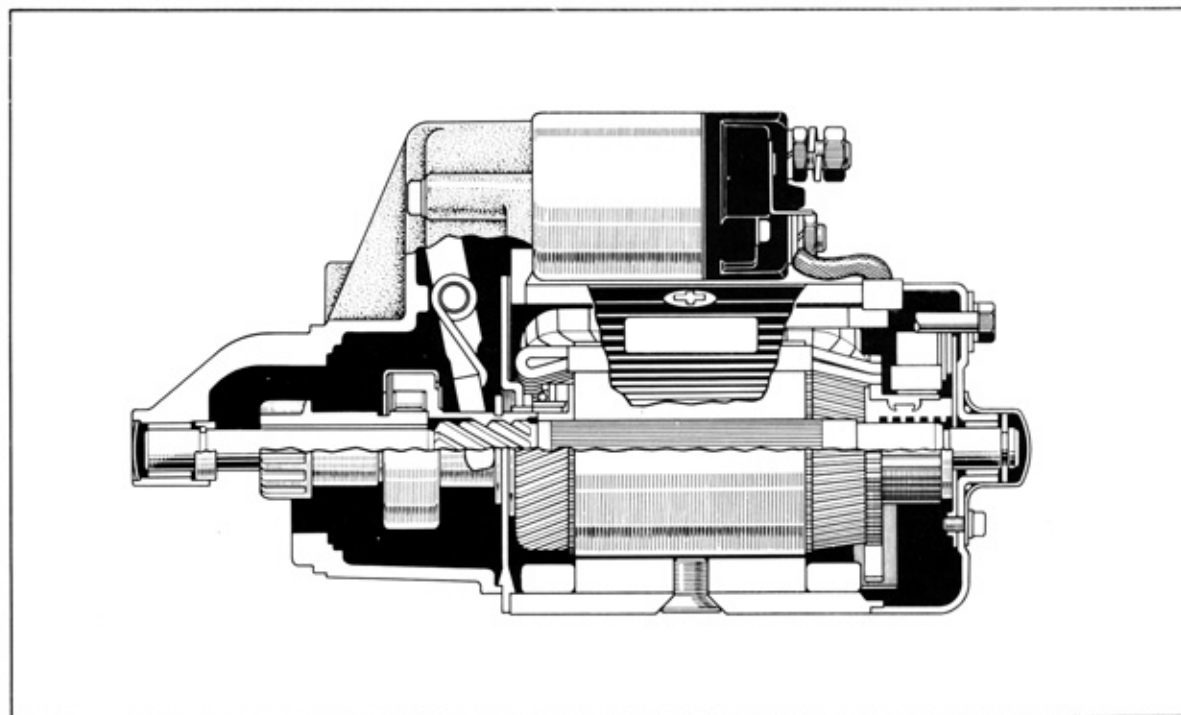
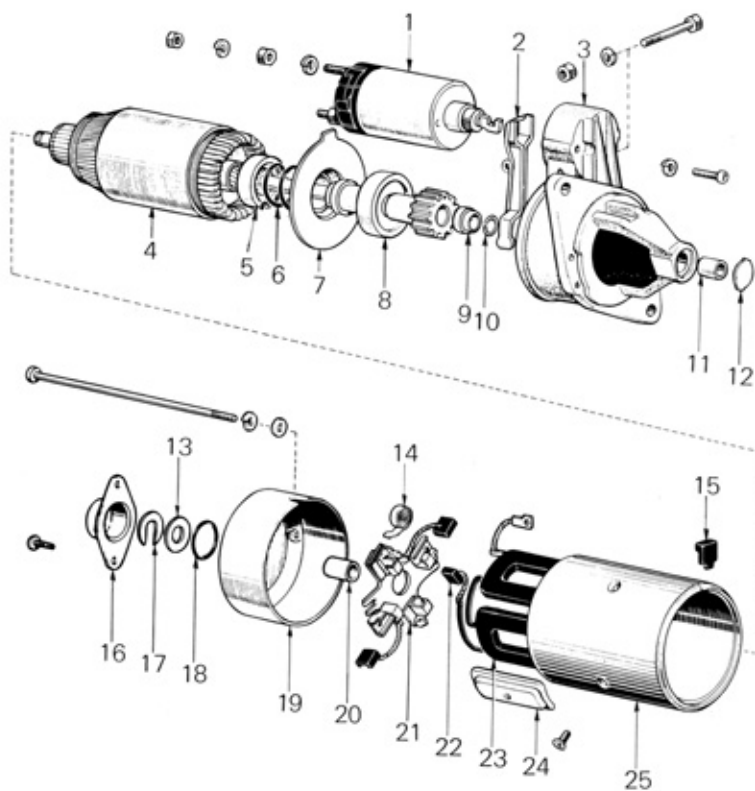


Fig. 8-1 Sectional View of Starter



- |                    |                          |
|--------------------|--------------------------|
| 1. Magnetic switch | 14. Brush spring         |
| 2. Drive lever     | 15. Rubber plate         |
| 3. Drive housing   | 16. End frame cap        |
| 4. Armature        | 17. Lock plate           |
| 5. Spring holder   | 18. O ring               |
| 6. Spring          | 19. Commutator end frame |
| 7. Center bearing  | 20. Bushing              |
| 8. Clutch assembly | 21. Brush holder         |
| 9. Collar          | 22. Brush                |
| 10. Snap ring      | 23. Field coil           |
| 11. Bushing        | 24. Pole shoe            |
| 12. Bushing cover  | 25. Field frame          |
| 13. Shim           |                          |

Fig. 8-2 Starter Parts



Fig. 8-3 Disconnect Lead Wire

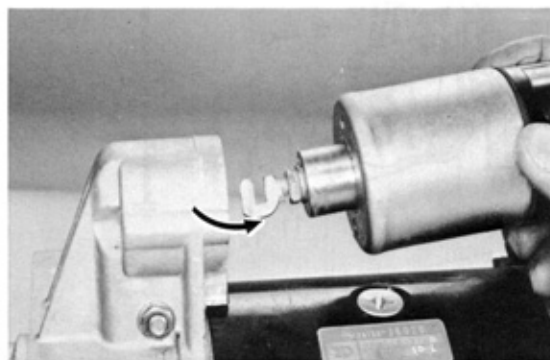


Fig. 8-4 Remove Magnetic Switch



Fig. 8-5 Remove Lock Plate

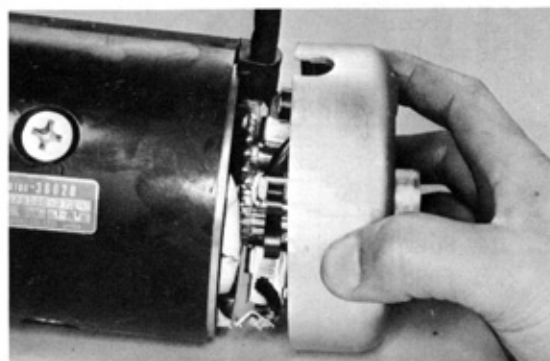


Fig. 8-6 Remove End Frame

**DISASSEMBLY**

1. Disconnect lead wire from magnetic switch terminal.
2. Loosen two screws, unhook the plunger from drive lever by tilting the switch.
3. Remove end frame cap and O ring. Remove the lock plate and shims (if any).
4. Remove through bolts and pull out commutator end frame.



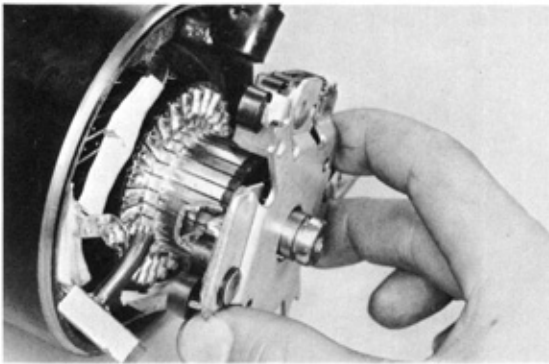


Fig. 8-7 Remove Brush Holder

5. Remove brushes and holder.

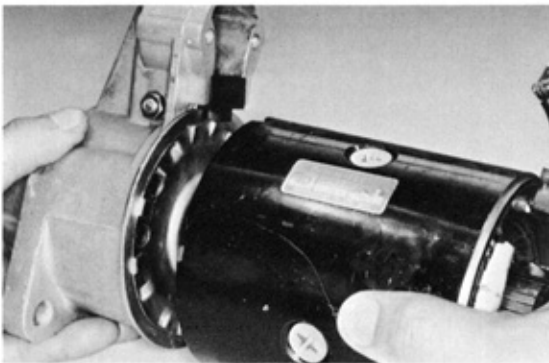


Fig. 8-8 Remove Field Frame

6. Remove field frame.

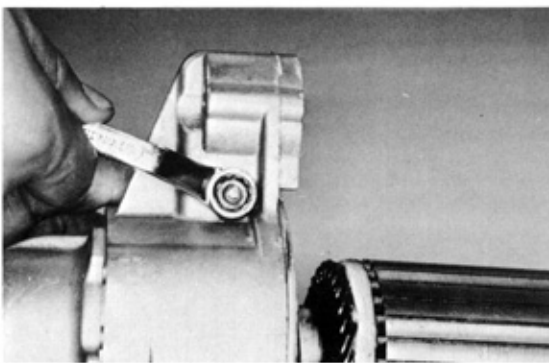


Fig. 8-9 Loosen Nut

7. Loosen nut, pull out drive lever pivot bolt.

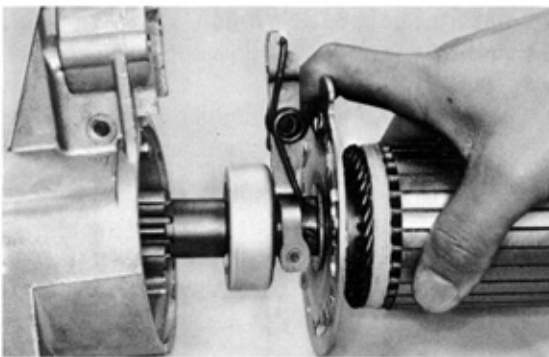


Fig. 8-10 Remove Armature

8. Remove armature.

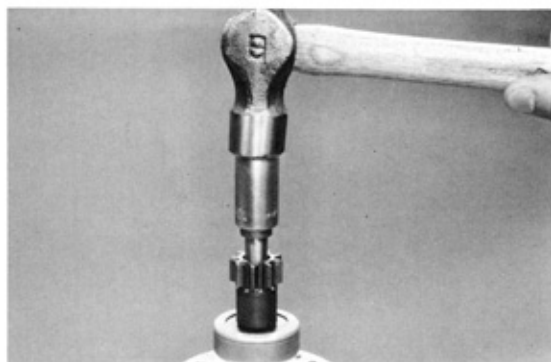


Fig. 8-11 Tap In Collar

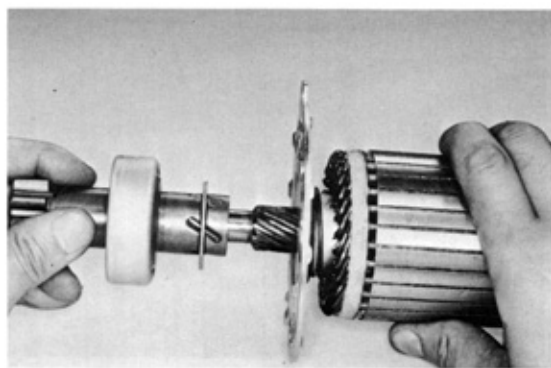


Fig. 8-12 Pull Out Pinion



Fig. 8-13 Clean Parts

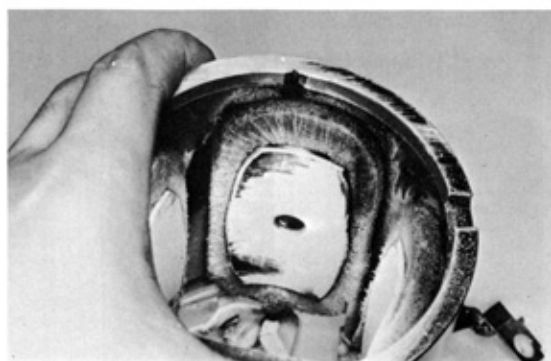


Fig. 8-14 Inspect Pole Shoe

9. Tap in stop collar, using a socket.

10. Pull out snap ring, collar, clutch, and center bearing.

### INSPECTION

Wipe off the dirt and grease from the disassembled parts.

### Armature Shaft & Bearings

1. Inspect armature and pole shoes for signs of contact.  
Replace drive housing bushing and end frame bushing if any contact suspected.

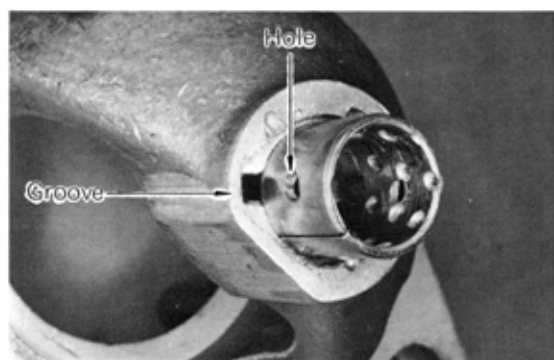


Fig. 8-15 Match Hole With Groove

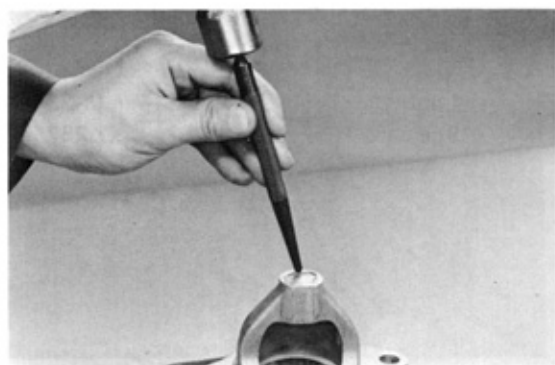


Fig. 8-16 Stake Housing

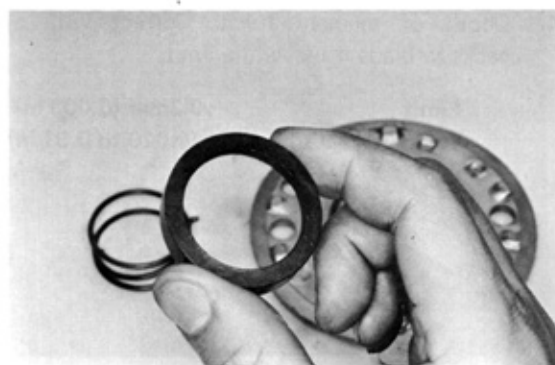


Fig. 8-17 Inspect Center Bearing

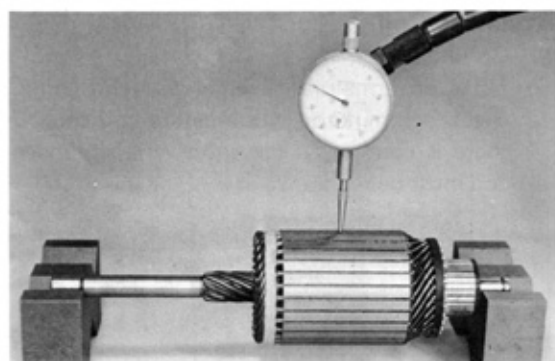


Fig. 8-18 Measure Armature Runout

## BUSHING REPLACEMENT

- (1) Pry out the bushing cover and press out the bushing.
- (2) Aligning the bushing hole with the housing groove, press in new bushing and ream to obtain the specified clearance

**Oil clearance            0.05mm (0.0020 in)**

- (3) Clean the bore, and install new bushing cover and stake the housing at four positions.

2. Inspect spring holder, spring and center bearing for cracks, wear or damage. Replace if necessary.

3. Inspect armature for runout. Replace if necessary.
4. Inspect shaft spline for wear. Replace if necessary.

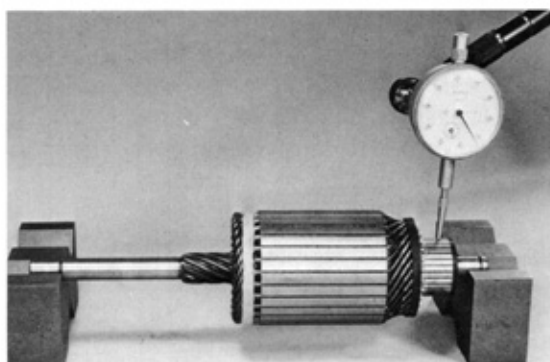


Fig. 8-19 Measure Commutator Runout

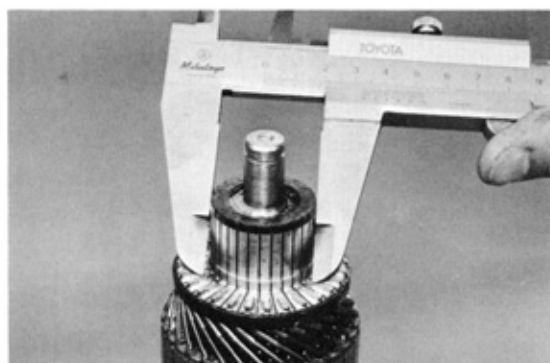


Fig. 8-20 Measure Commutator Diameter

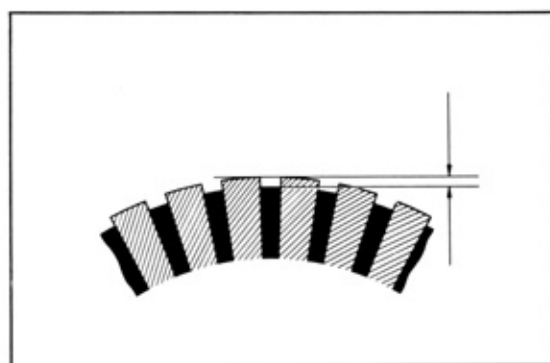


Fig. 8-21 Mica Depth

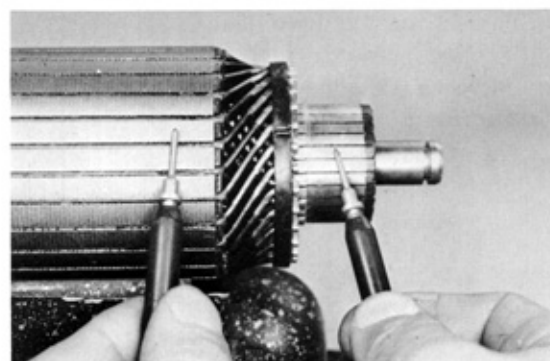


Fig. 8-22 Check Armature Coil Ground

### Commutator

Inspect the following items and repair or replace if necessary.

1. Dirty or burnt surface: Correct by lathe.
2. Runout: Correct on a lathe if exceeds the limit.

<b>Runout limit</b>	<b>0.3mm (0.012 in)</b>
<b>Standard</b>	<b>0.05mm (0.0020 in)</b>

3. Surface wear: If below the limit, replace armature.

<b>Limit</b>	<b>31mm (1.22 in)</b>
<b>Standard</b>	<b>32.7mm (1.287 in)</b>

4. Depth of segment mica: Correct with a hacksaw blade if below the limit.

<b>Limit</b>	<b>0.2mm (0.008 in)</b>
<b>Standard</b>	<b>0.5 to 0.8mm (0.020 to 0.31 in)</b>

### Armature Coil

1. Ground test

Using an armature tester or a circuit tester, check commutator and armature coil core. If there is continuity, the armature is grounded and must be replaced.

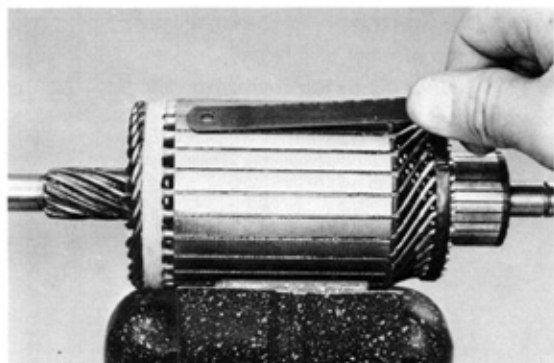


Fig. 8-23 Check Armature Coil Short-Circuit

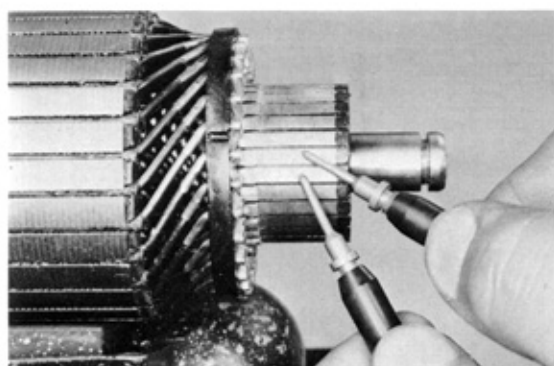


Fig. 8-24 Check Armature Coil Open-Circuit

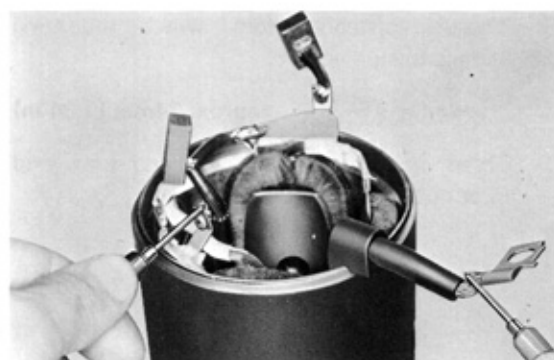


Fig. 8-25 Check Field Coil Open-Circuit

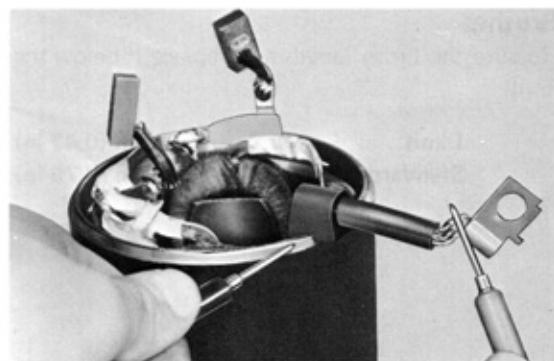


Fig. 8-26 Check Field Coil Ground

## 2. Short-circuit test

Place the armature on the armature tester and hold a hacksaw blade against the armature core while turning the armature. If the hacksaw blade is attracted or vibrates, the armature is shorted and must be replaced.

## 3. Open-circuit test

Using the armature tester or a circuit tester, check for continuity between the segments. If there is no continuity at any test point, there is an open-circuit and armature must be replaced.

**Field Coil**

## 1. Open-circuit test

Check for continuity between the lead wire and field coil brush soldered connection. If there is no continuity, there is an open-circuit in the field coil, and it should be replaced.

## 2. Ground test

Check for continuity between field coil end and field frame. If there is continuity, repair or replace the field coil.

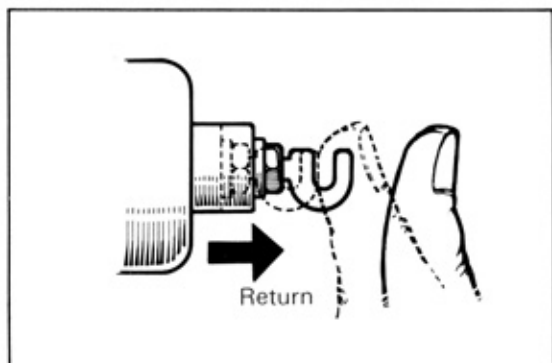


Fig. 8-27 Check Plunger

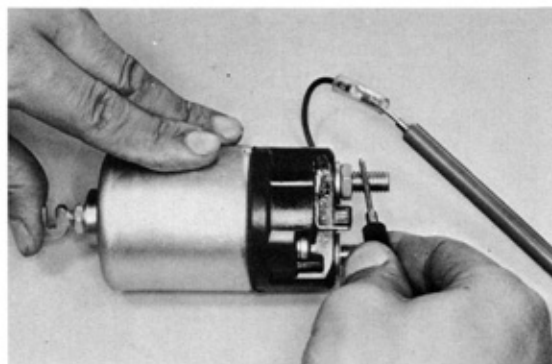


Fig. 8-28 Check Continuity

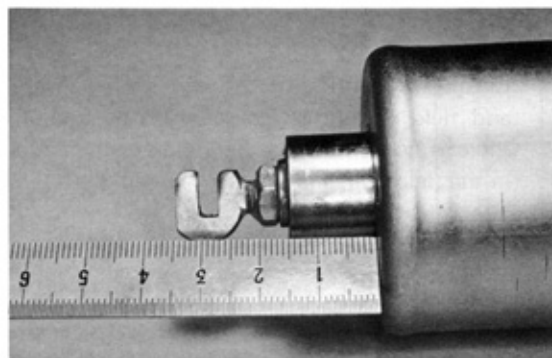


Fig. 8-29 Measure Distance

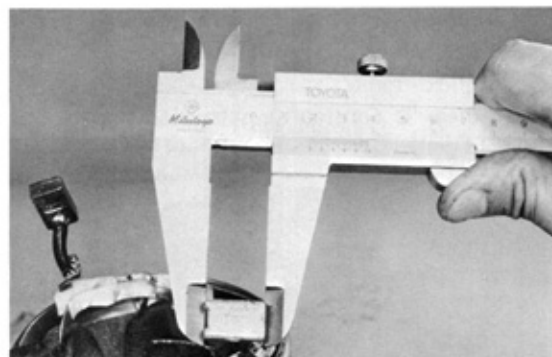


Fig. 8-30 Measure Brush Length

### Magnetic Switch

1. Push in plunger and release it.  
The plunger should return quickly to its original position.

2. Push in plunger until it stops.  
Check for continuity between main terminal and lead wire.  
If there is no continuity, replace the magnetic switch.

3. Measure distance from switch mounting surface to stud end.

**Standard**                      **approx. 34mm (1.34 in)**

To adjust, loosen the lock nut and screw stud in or out.

### Brushes

Measure the brush length and replace if below the limit.

<b>Limit</b>	<b>12mm (0.47 in)</b>
<b>Standard</b>	<b>19mm (0.75 in)</b>

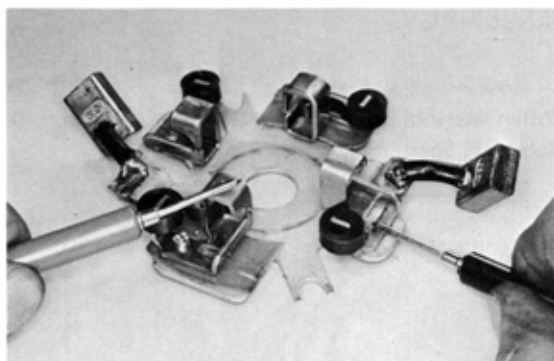


Fig. 8-31 Check Brush Holder Insulation

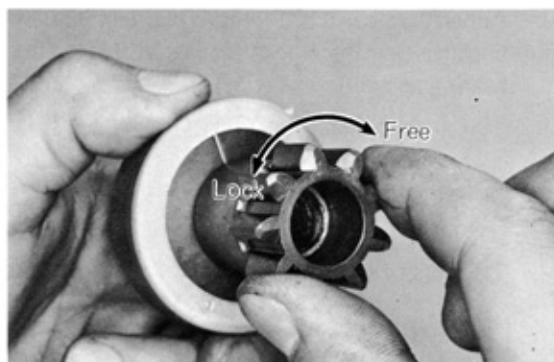


Fig. 8-32 Check Clutch

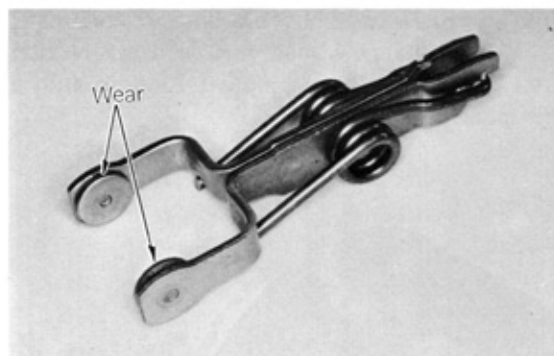


Fig. 8-33 Inspect Drive Lever

### Brush Holder

Check insulation between the (+) and (-) brush holders. Repair or replace if continuity is indicated.

### Starter Clutch

1. Inspect the pinion gear and spline teeth for wear and damage. Replace if damaged. If damaged, also inspect flywheel ring gear for same.
2. Rotate pinion. It should turn free in clockwise direction and lock when turned counter-clockwise.

### Drive Lever

Inspect the drive lever and spring for wear. Replace if necessary.

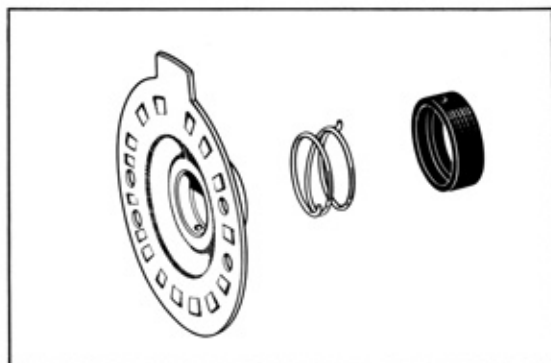


Fig. 8-34 Assemble Center Bearing

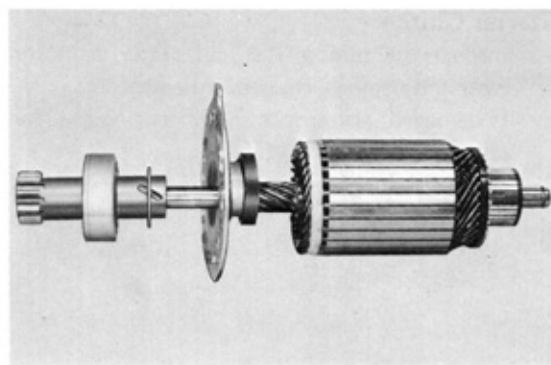


Fig. 8-35 Assemble Center Bearing and Clutch

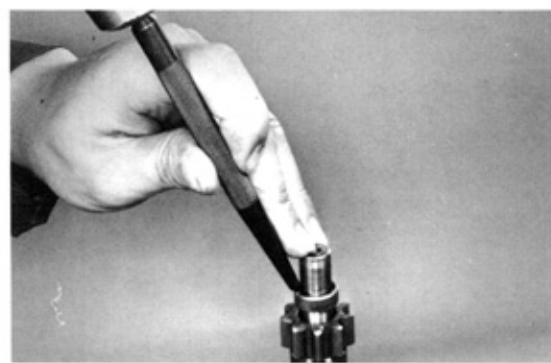


Fig. 8-36 Stake Stop Collar

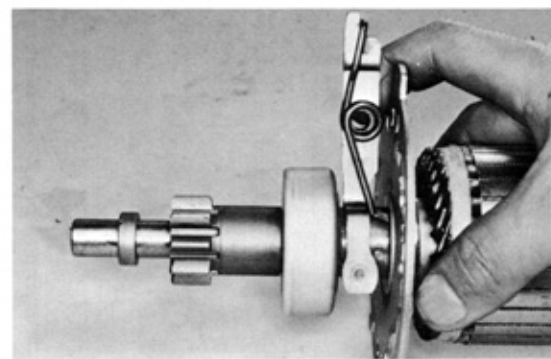


Fig. 8-37 Assemble Drive Lever

## ASSEMBLY

— Note —

**When assembling, use high temperature grease to lubricate bearings and sliding parts.**

1. Assemble spring and spring holder to the center bearing.
2. Apply grease on center bearing, clutch bushings and splines; assemble the center bearing and clutch to armature.
3. Insert new stop collar over the armature shaft, install the new snap ring, and secure stop collar by staking it at two positions with a punch.
4. Apply grease, and assemble drive lever as shown.



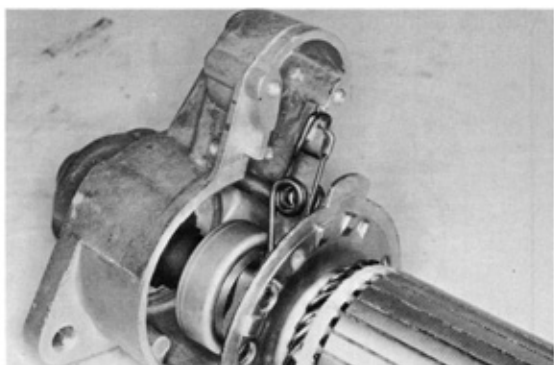


Fig. 8-38 Assemble Armature

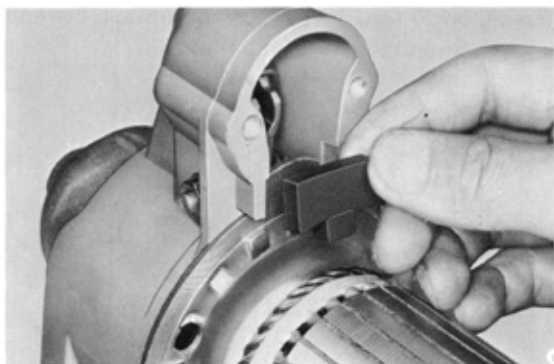


Fig. 8-39 Install Rubber Plate

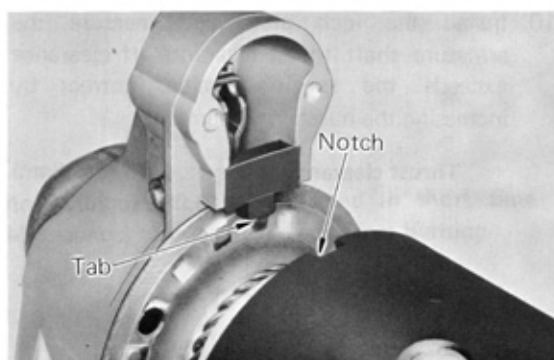


Fig. 8-40 Match Notch With Tab

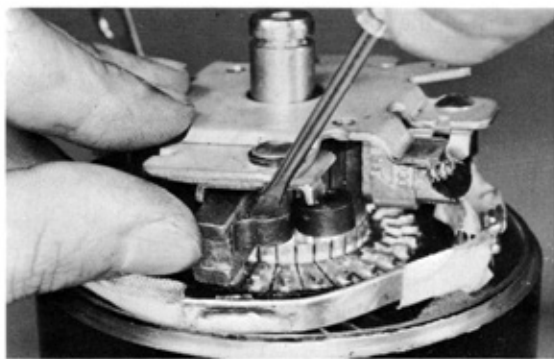


Fig. 8-41 Fit In Brush

5. Apply grease to the drive housing bushing. Assemble the armature into the drive housing, and insert the drive lever pivot bolt through the lever hole and screw on the nut.
6. Position the projection of the center bearing to the drive housing and install the rubber plate as shown.
7. Match notch in field frame with tab on rubber plate and assemble field frame with drive housing.
8. Install brush holder, and fit the four brushes into brush holder, checking that the (+) lead wires are not grounded.

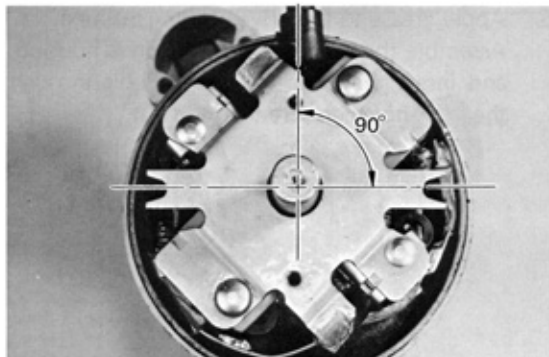


Fig. 8-42 Position Brush Holder

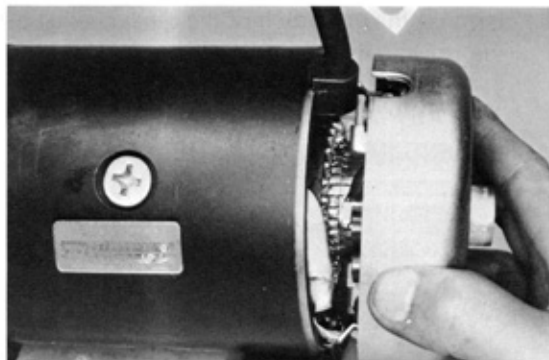


Fig. 8-43 Install End Frame

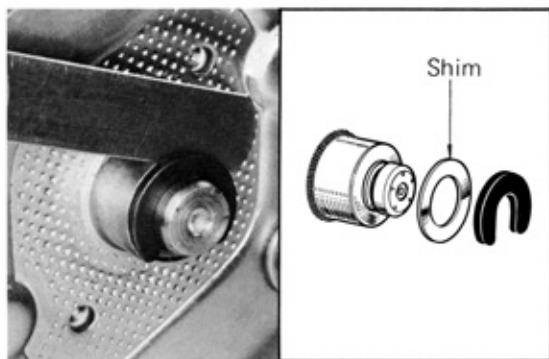


Fig. 8-44 Measure Thrust Clearance

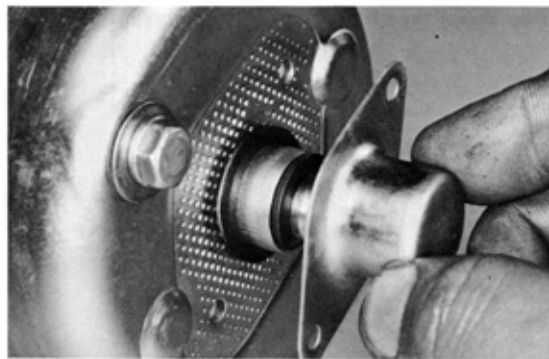


Fig. 8-45 Install Cap

After installation, position the holder as shown.

9. Apply grease in the bushing, install the end frame and the through bolts.

10. Install the lock plate and measure the armature shaft thrust clearance. If clearance exceeds the specified value, correct by increasing the number of shims.

<b>Thrust clearance</b>	<b>0.05 to 0.6mm</b>
	<b>(0.002 to 0.024 in)</b>

11. Install the O ring and the end frame cap not more than half full of grease.

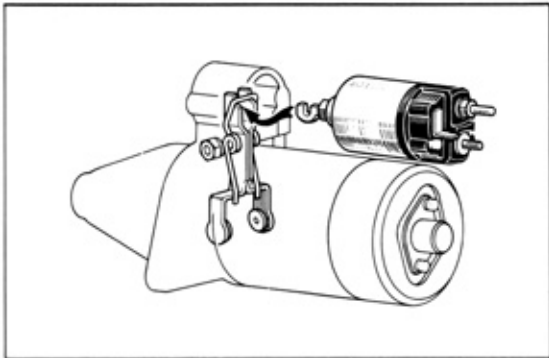


Fig. 8-46 Hook Magnetic Switch

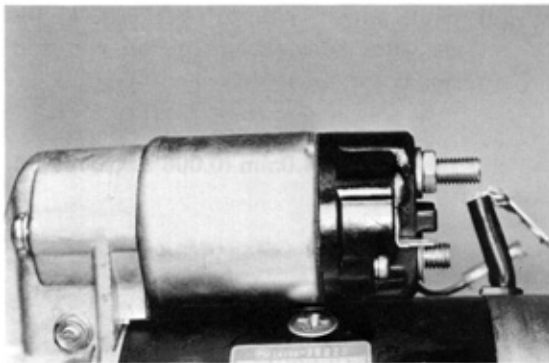


Fig. 8-47 Direction of Main Terminal

12. Hook the magnetic switch joint on the drive lever spring from the lower side.

13. Rotate to position smaller terminal next to field frame and install magnetic switch bolts.

14. Check the magnetic switch performance and pinion gap as follows:

— Precaution —

These tests must be performed in short time (3-5 seconds) to prevent the coil from burning.

- (1) Pull-in test

Connect 12V between the magnetic switch 50 terminal and lower side main terminal, and also switch body.

If the pinion is jumped out firmly, the pull-in coil is satisfactory. Replace if unsatisfactory.

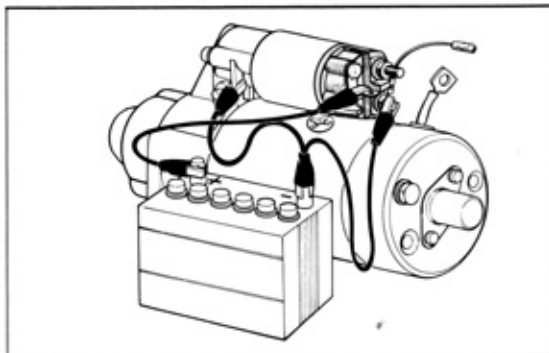


Fig. 8-48 Check Pull-in Coil

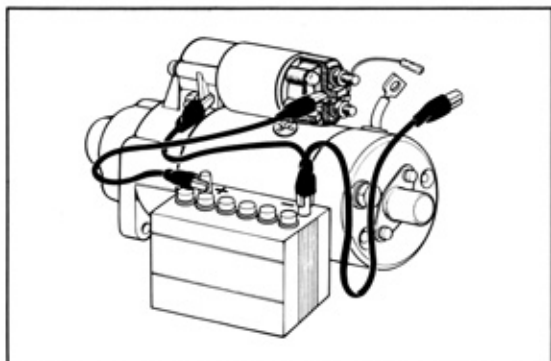


Fig. 8-49 Check Hold-in Coil

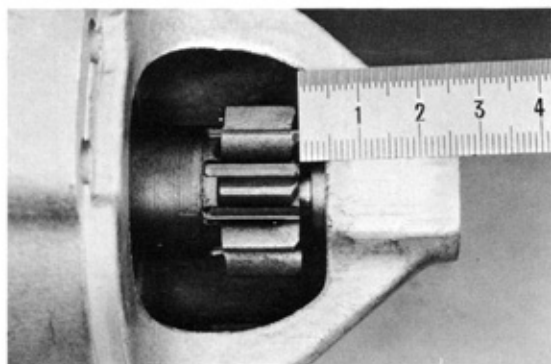


Fig. 8-50 Check Pinion Clearance



Fig. 8-51 Adjust Stud Length

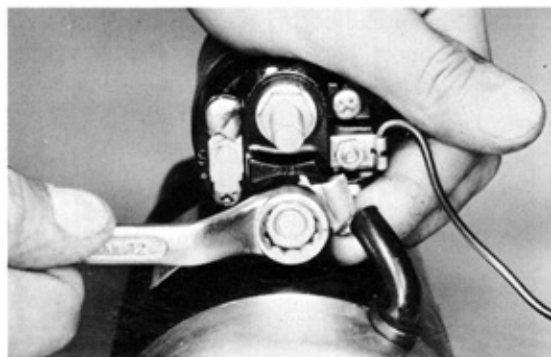


Fig. 8-52 Connect Lead Wire

## (2) Hold-in test

Next, disconnect the main terminal. The pinion should still be jumped out. If not, the hold-in coil is open and switch must be replaced.

- (3) With pinion jumped out, check the clearance between the pinion end and stop collar.

**Standard clearance**

**0.2 to 4.0mm (0.008 to 0.0157 in)**

Adjust if necessary after loosening lock nut.

<u>Clearance</u>	→	<u>Stud</u>
Too large	→	Screw in
Too small	→	Screw out

15. Connect the field coil lead to the main terminal, making sure that the lead wire is not grounded.

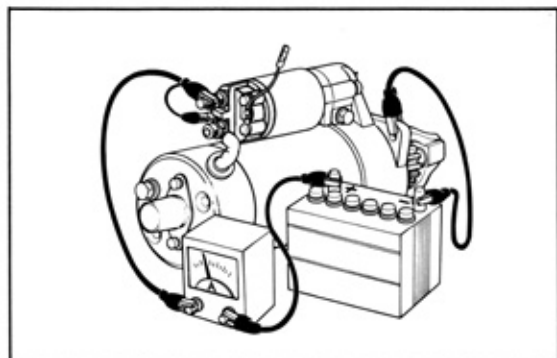


Fig. 8-53 Test Starter Performance

**PERFORMANCE TEST (No-load)**

Connect starter to battery. If the starter shows smooth and steady rotation with the pinion jumping out and draws less than specified current, it is satisfactory.

**Specified current****Less than 50A**

## REDUCTION TYPE STARTER

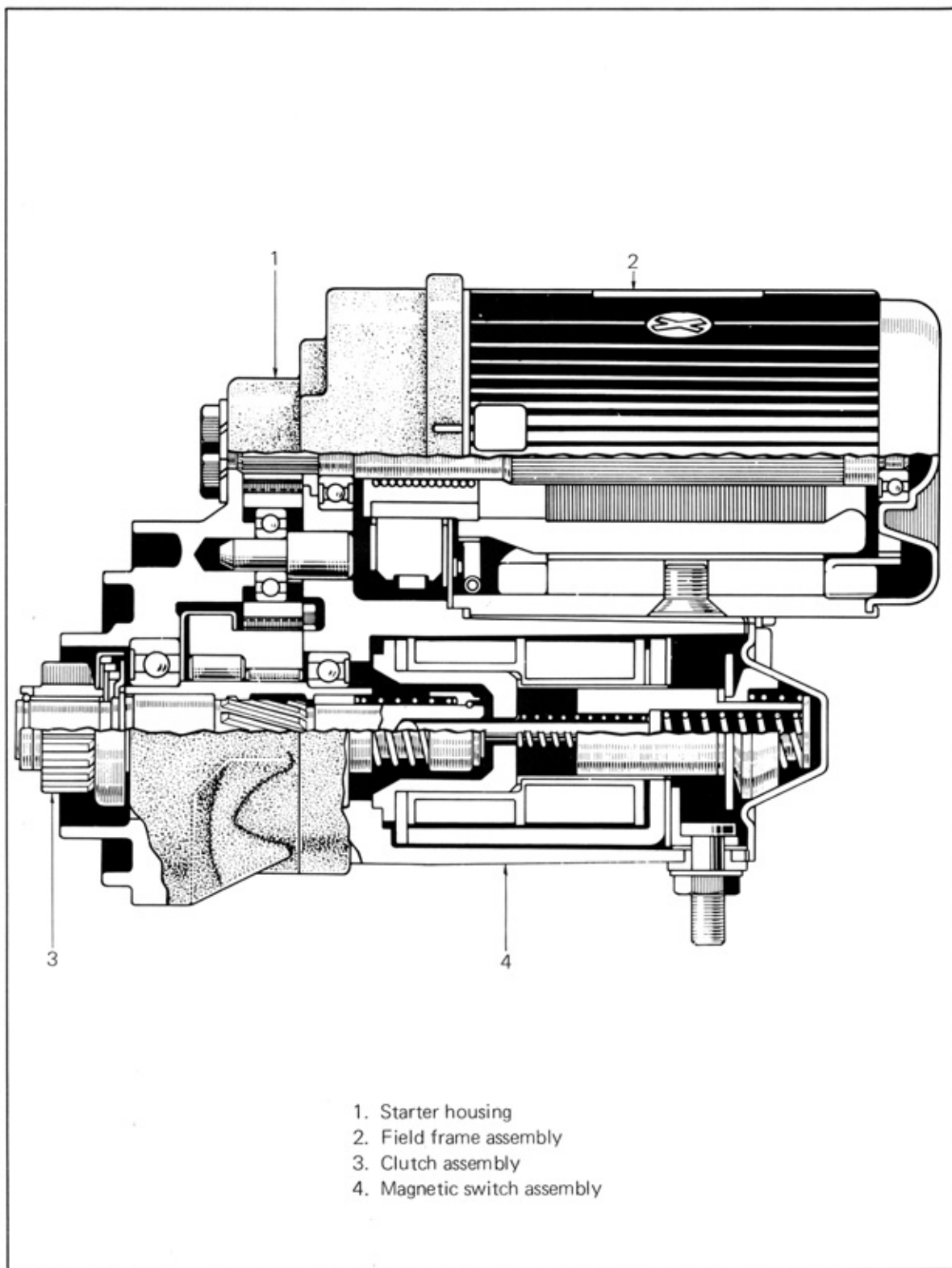
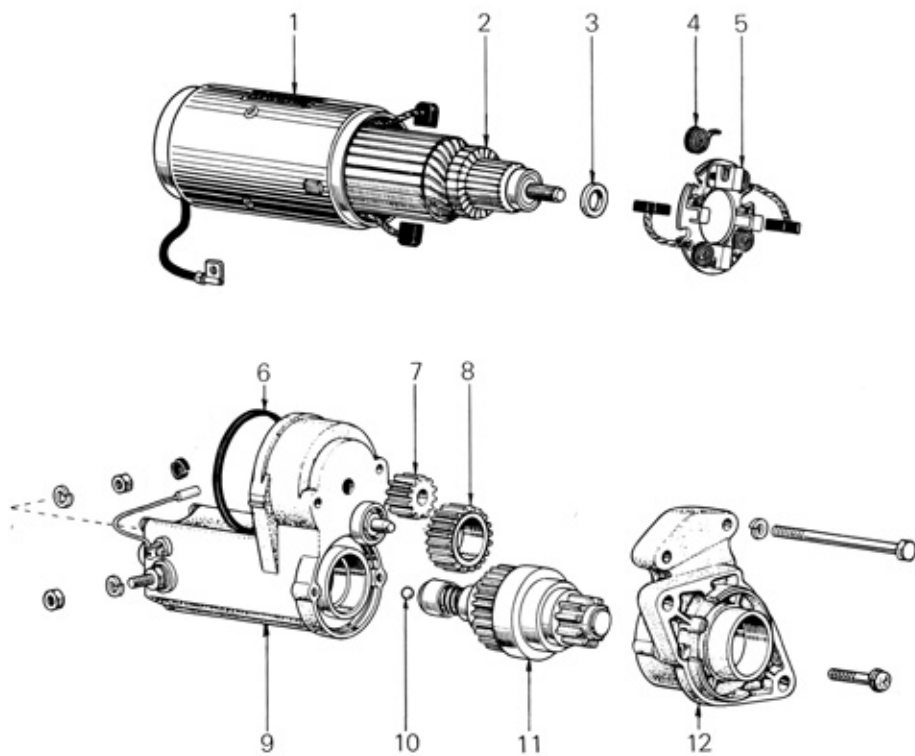


Fig. 8-54 Sectional View of Starter



- |                         |                             |
|-------------------------|-----------------------------|
| 1. Field frame assembly | 7. Pinion gear              |
| 2. Armature             | 8. Idler gear               |
| 3. Felt seal            | 9. Magnetic switch assembly |
| 4. Brush spring         | 10. Steel ball              |
| 5. Brush holder         | 11. Clutch assembly         |
| 6. O ring               | 12. Starter housing         |

Fig. 8-55 Starter Parts



Fig. 8-56 Disconnect Lead Wire



Fig. 8-57 Loosen Bolts

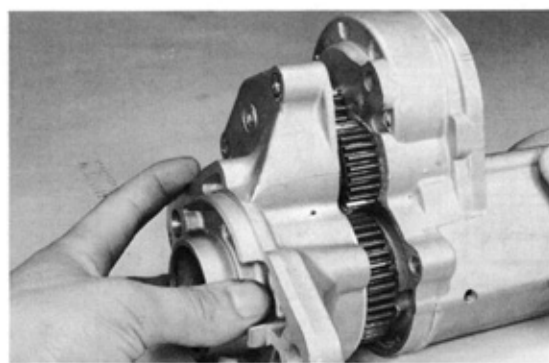


Fig. 8-58 Remove Starter Housing

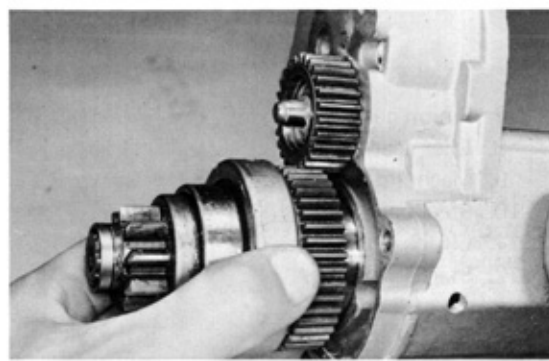


Fig. 8-59 Pull Out Clutch

**DISASSEMBLY**

1. Disconnect lead wires from magnetic switch.
2. Loosen two bolts and pull out field frame with armature from the magnetic switch.
3. Take off O ring and felt seal.
4. Loosen two screws and remove starter gear housing from magnetic switch.
5. Pull out clutch assembly and gears.





Fig. 8-60 Take Ball Out

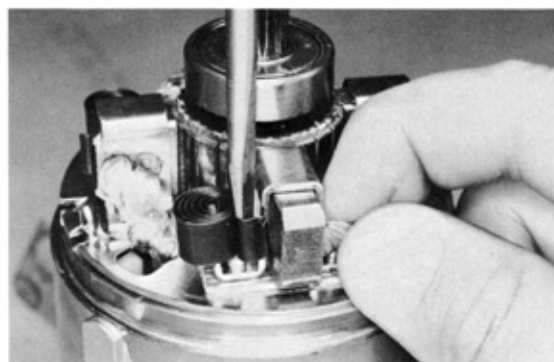


Fig. 8-61 Remove Brushes

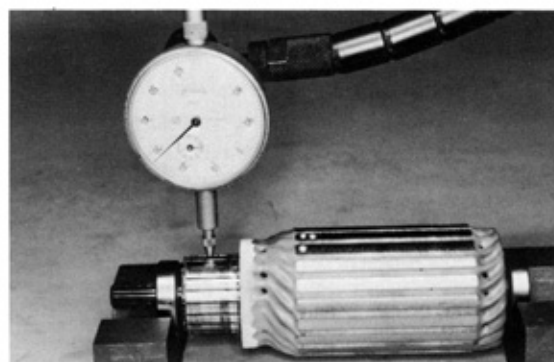


Fig. 8-62 Check Commutator Runout

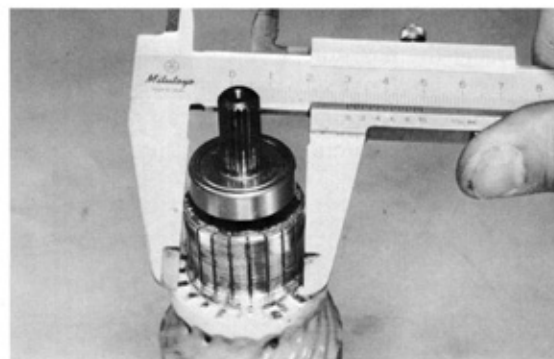


Fig. 8-63 Measure Commutator Diameter

6. Take ball out of clutch shaft hole or magnetic switch.

7. Remove brushes from brush holder, then pull out brush holder.
8. Pull armature out of the field frame.

### INSPECTION

Wipe off the dirt and grease from the disassembled parts.

#### Commutator

Inspect the following items and repair or replace if necessary.

1. Dirty or burnt surface: Correct by lathe. After correcting, check for runout.

**Standard**    **Less than 0.05mm (0.0020 in)**

2. Surface wear: If below the limit, replace armature.

<b>Diameter limit</b>	<b>29mm (1.14 in)</b>
<b>Standard</b>	<b>30mm (1.18 in)</b>

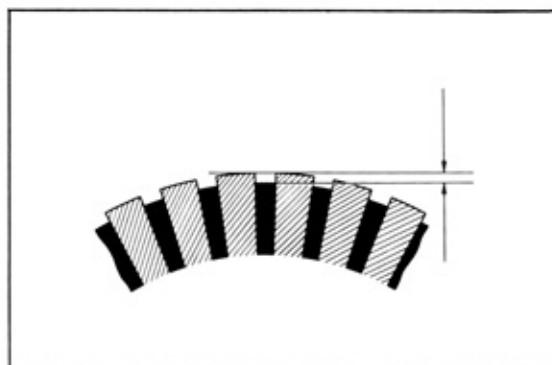


Fig. 8-64 Mica Depth

- Depth of segment: Correct with a hacksaw blade, if below the limit.

**Limit**  
**Standard**

**0.2mm (0.008 in)**  
**0.6 to 0.9mm**  
**(0.024 to 0.035 in)**

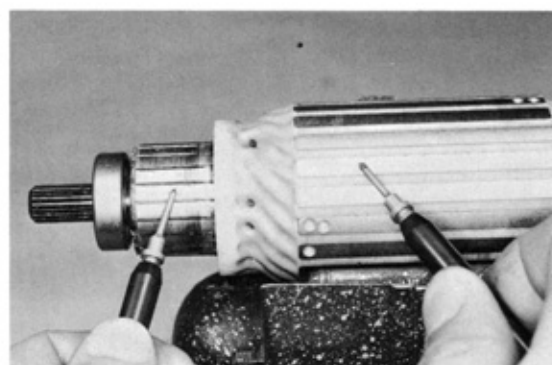


Fig. 8-65 Check Armature Coil Ground

### Armature Coil

- Ground test

Using an armature tester or a circuit tester, check commutator and armature coil core. If there is continuity, the armature is grounded and must be replaced.

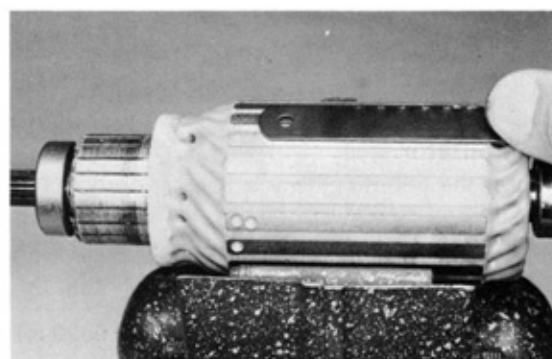


Fig. 8-66 Check Armature Coil Short-Circuit

- Short-circuit test

Place the armature on the armature tester and hold a hacksaw blade against the armature core while turning the armature. If the hacksaw blade is attracted or vibrates, the armature is shorted and must be replaced.

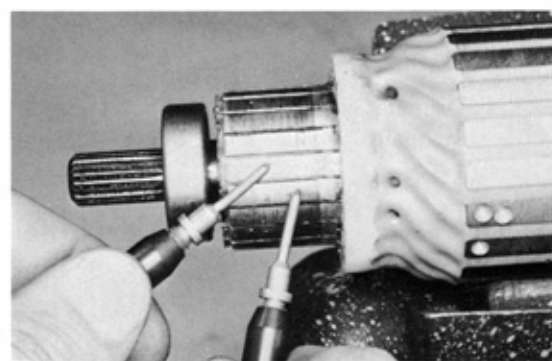


Fig. 8-67 Check Armature Coil Open-Circuit

- Open-circuit test

Using the armature tester or a circuit tester, check for continuity between the segments. If there is no continuity at any test point, there is an open-circuit and armature must be replaced.



Fig. 8-68 Check Field Coil Open-Circuit

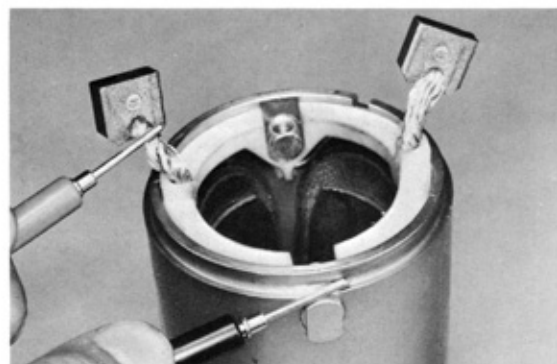


Fig. 8-69 Check Field Coil Ground

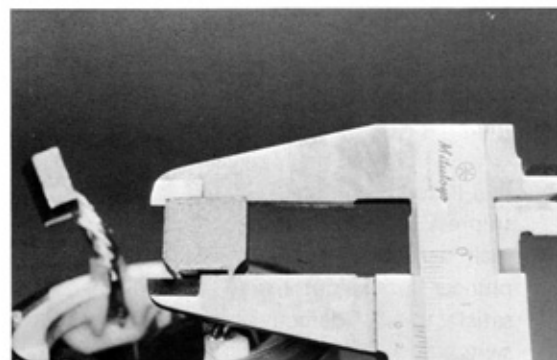


Fig. 8-70 Measure Brush Length

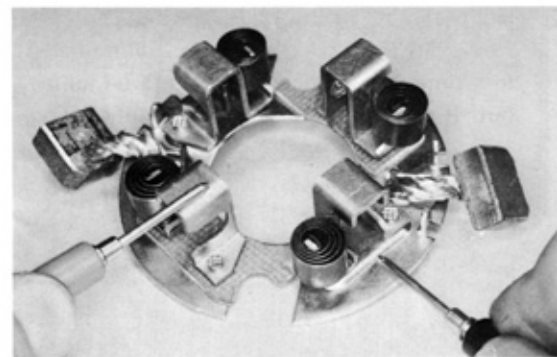


Fig. 8-71 Check Brush Holder Insulation

### Field Coils

1. Open-circuit test  
Check for continuity between the lead wire and field coil brush lead. If there is no continuity, there is an open-circuit in the field coil, and it should be replaced.
2. Ground test  
Check for continuity between field coil end and field frame.  
If there is continuity, repair or replace the field coil.

### Brushes

Measure the brush length. Replace if below the limit.

<b>Limit</b>	<b>10mm (0.39 in)</b>
<b>Standard</b>	<b>14.5mm (0.571 in)</b>

### Brush holder

Check insulation between the (+) and (-) brush holders. Repair or replace if continuity is indicated.

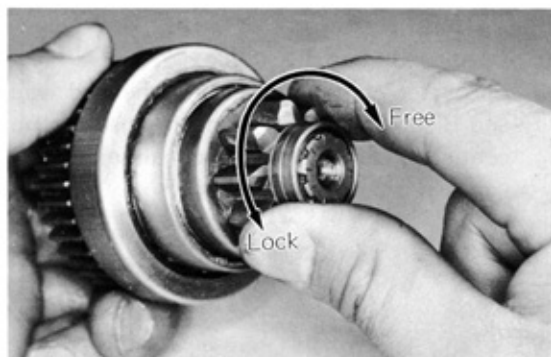


Fig. 8-72 Check Clutch

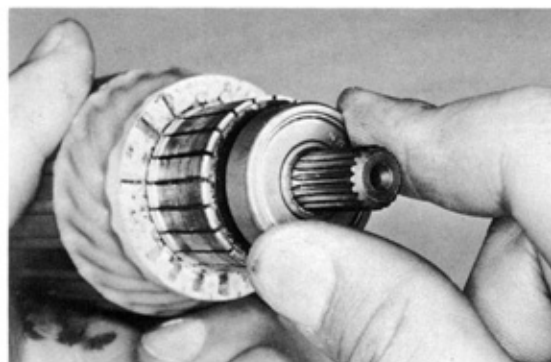


Fig. 8-73 Check Bearing

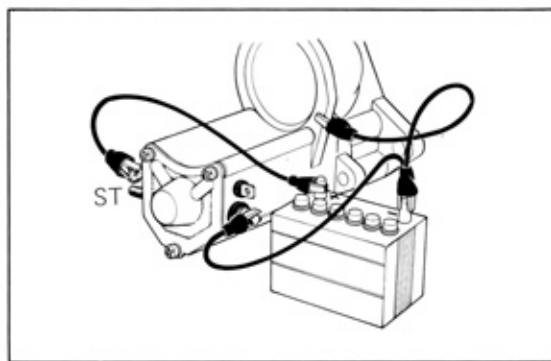


Fig. 8-74 Check Pull-in Coil

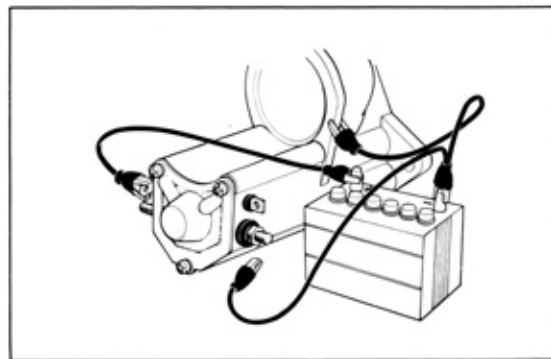


Fig. 8-75 Check Hold-in Coil

### Clutch & Gears

1. Inspect the gear teeth for wear and damage. Replace if damaged. If damaged, also inspect flywheel ring gear for same.
2. Rotate pinion. It should turn free in clockwise direction and lock when turned counter-clockwise.

### Bearings

Turn each bearing by hand while applying force. Replace if it offers abnormal resistance to the hand, or if it sticks.

### Magnetic Switch

#### — Caution —

**Pull-in and Hold-in tests must be performed in short time (3-5 seconds) to prevent the coil from burning.**

1. Pull-in test  
Impress 12V between magnetic switch ST and main terminals, and also switch body. If the plunger jumps out firmly, the pull-in coil is satisfactory. If defective, replace the magnetic switch.
2. Hold-in test  
Next, disconnect from the main terminal. At this time, the plunger should still be jumped out. If defective, replace the magnetic switch.

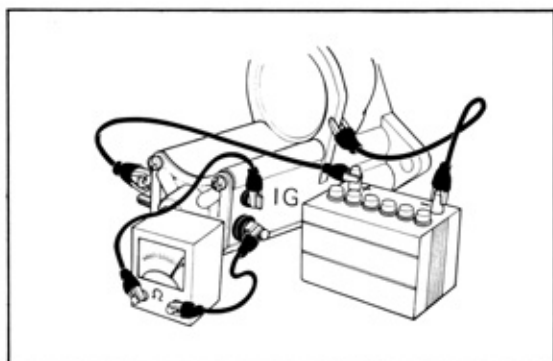


Fig. 8-76 Check Continuity



Fig. 8-77 Align Tab With Notch

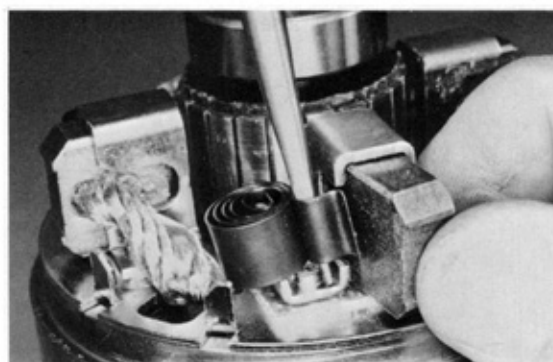


Fig. 8-78 Fit Brushes

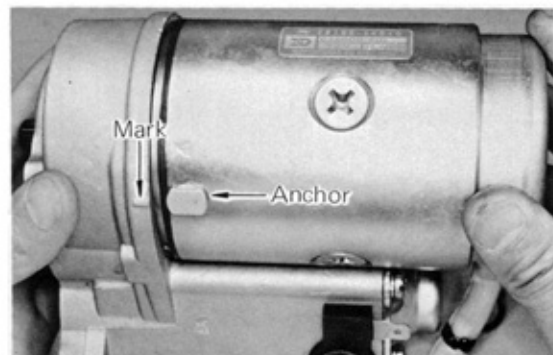


Fig. 8-79 Align Anchor With Mark

- At above state, check for continuity between the main and IG terminals. If there is no continuity, replace the magnetic switch.

## ASSEMBLY

### — Note —

When assembling, use high temperature grease to lubricate bearings and gears.

- Apply grease to armature rear bearing, insert the armature into field frame.
- Install brush holder, aligning its tab with notch in field frame.
- Fit four brushes into brush holder, using care not to damage them.

### — Note —

Check that the (+) lead wires are not grounded.

- Fit felt seal onto armature shaft, and O ring to field frame.
- Face the field coil lead wire towards the magnetic switch, and install the field frame with armature, aligning the bolt anchors with mark on the magnetic switch.

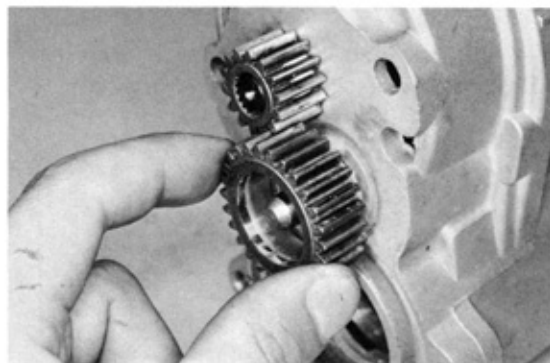


Fig. 8-80 Fit Gear

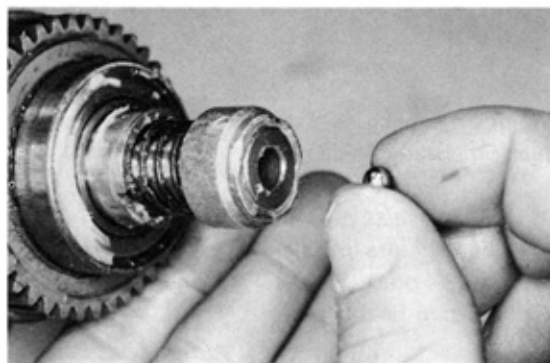


Fig. 8-81 Insert Ball

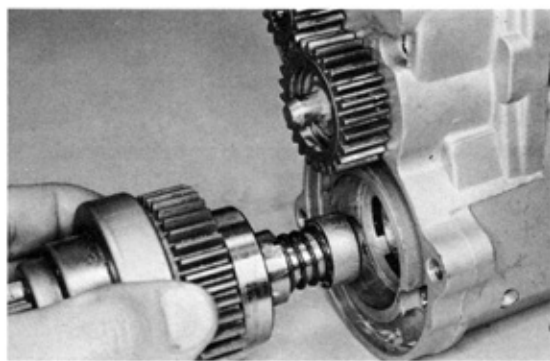


Fig. 8-82 Install Clutch Assembly

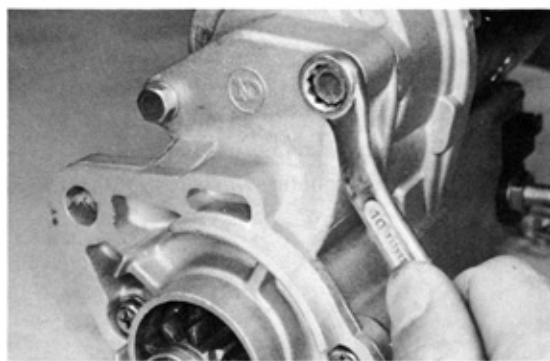


Fig. 8-83 Install Starter Housing

6. Apply grease to the bearing, and fit starter pinion and the idler gear.
7. Apply grease, insert the ball into the clutch shaft hole.
8. Install the clutch assembly to the magnetic switch.
9. After applying grease to the gears, install the starter housing.

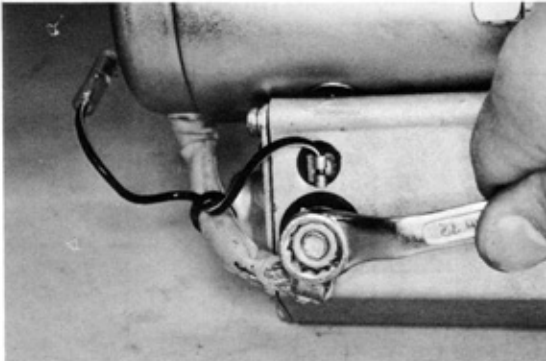


Fig. 8-84 Connect Lead Wire

10. Connect the lead wires.

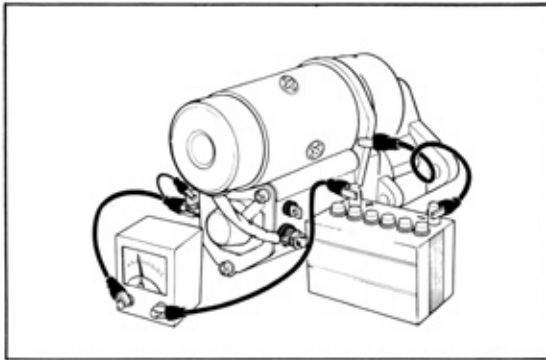


Fig. 8-85 Test Starter Performance

### PERFORMANCE TEST (No-load)

Connect starter to battery. If the starter shows smooth and steady rotation with pinion jumping out and draws less than specified current, it is satisfactory.

**Specified current**

**Less than 80A**

# IGNITION SYSTEM

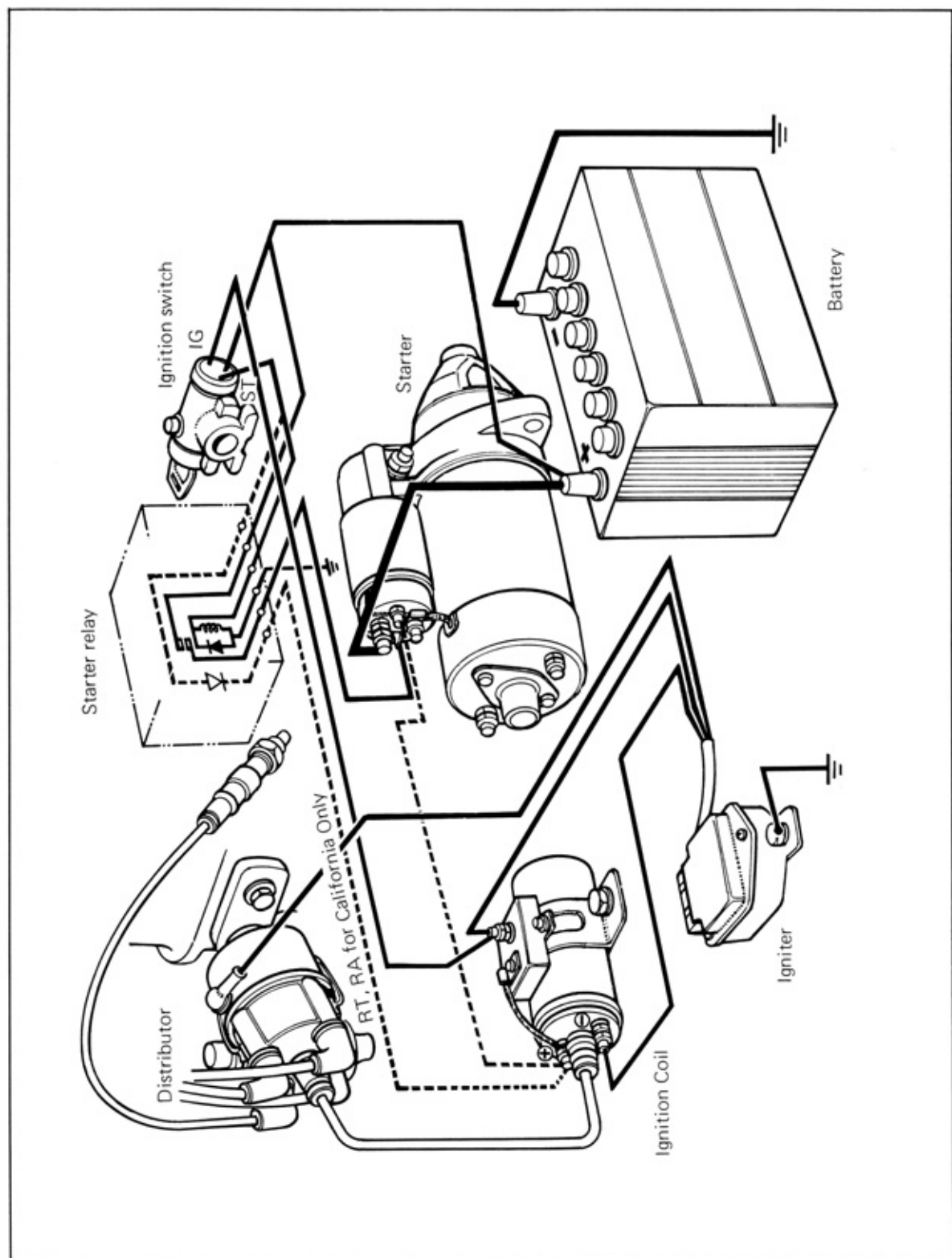


Fig. 8-86 Ignition System Circuit



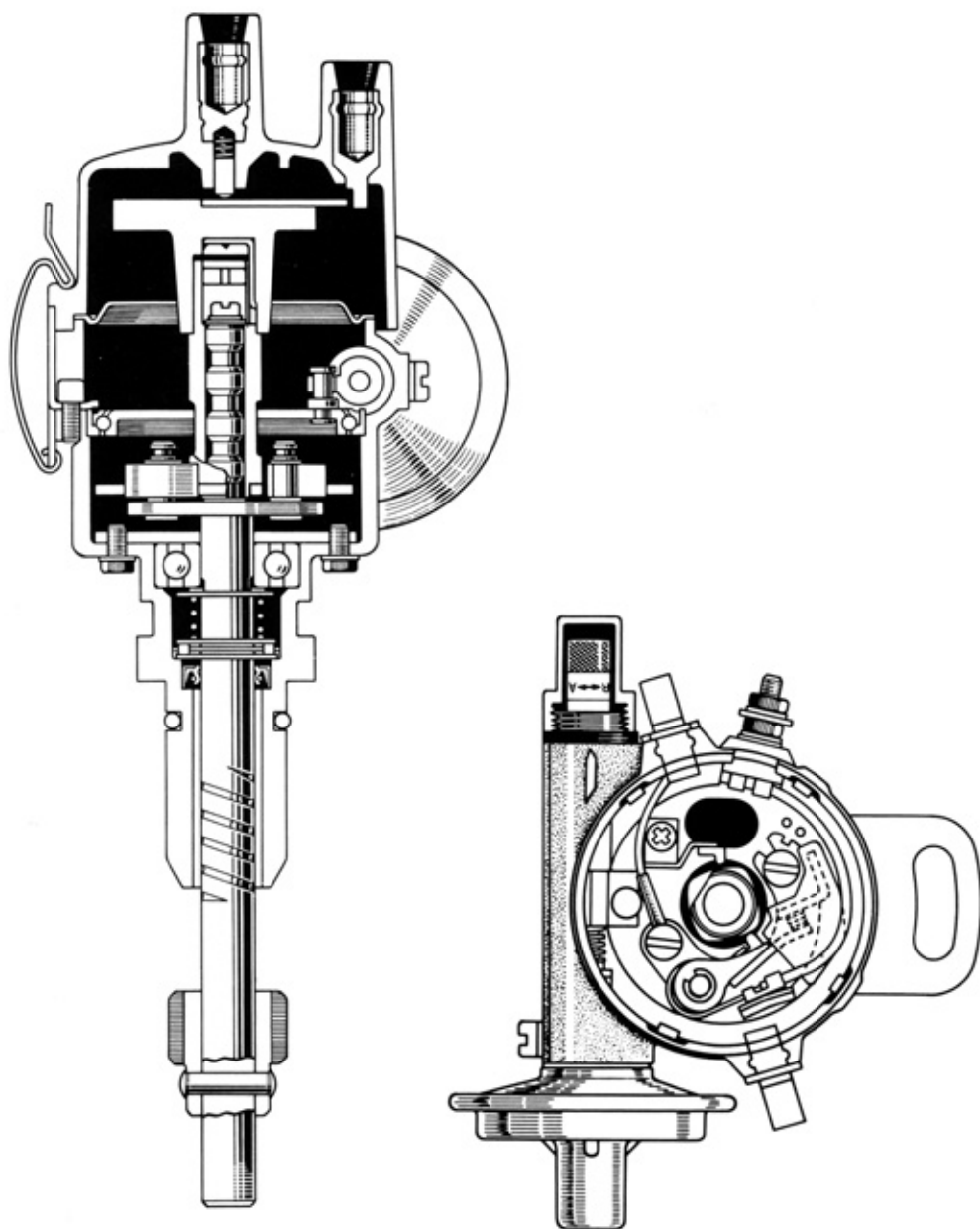
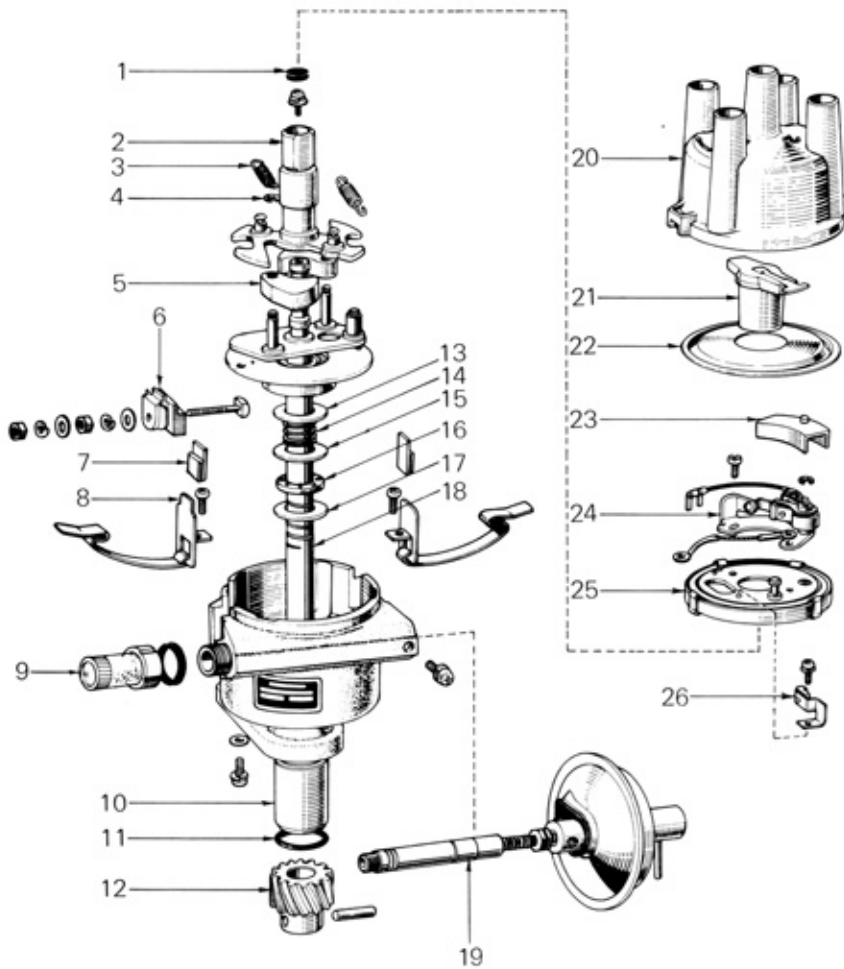
**DISTRIBUTOR**

Fig. 8-87 Sectional View of Distributor



- |                         |                     |
|-------------------------|---------------------|
| 1. Grease stopper       | 14. Spring          |
| 2. Cam                  | 15. Washer          |
| 3. Governor spring      | 16. Bearing         |
| 4. E ring               | 17. Washer          |
| 5. Governor weight      | 18. Governor shaft  |
| 6. Terminal insulator   | 19. Vacuum advancer |
| 7. Rubber plate         | 20. Distributor cap |
| 8. Hold-down clip       | 21. Rotor           |
| 9. Cap                  | 22. Dustproof cover |
| 10. Distributor housing | 23. Point cover     |
| 11. O ring              | 24. Breaker points  |
| 12. Gear                | 25. Breaker plate   |
| 13. Washer              | 26. Damping spring  |

Fig. 8-88 Component Parts

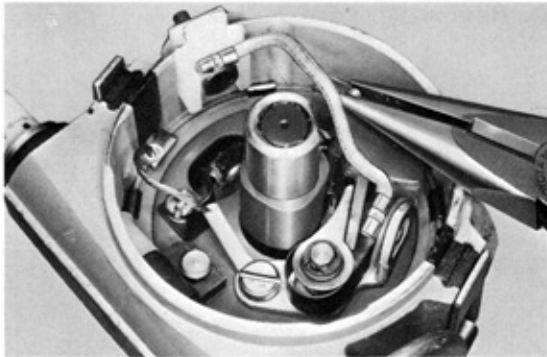


Fig. 8-89 Pull Out Point Cover

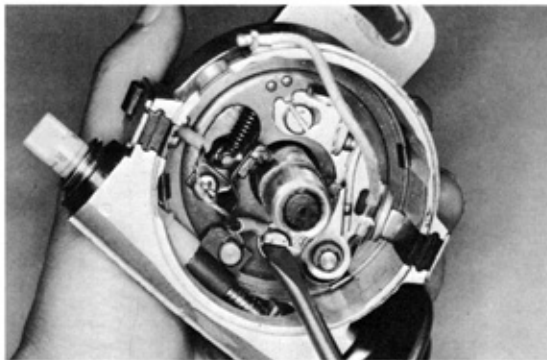


Fig. 8-90 Remove Points

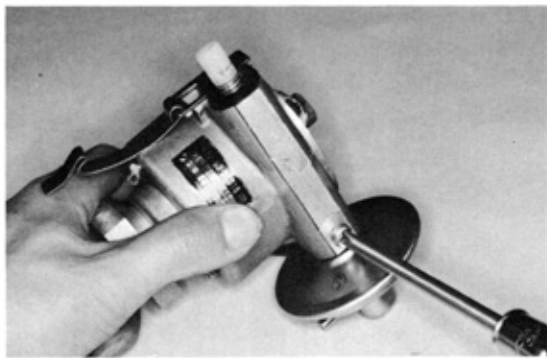


Fig. 8-91 Remove Vacuum Advancer

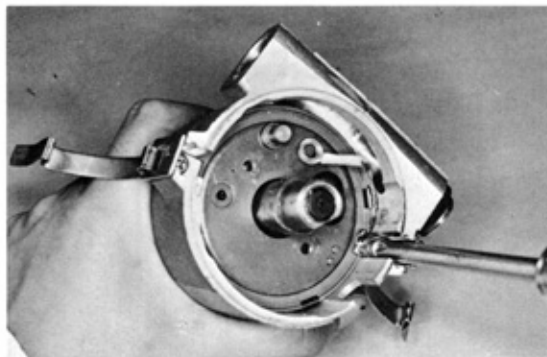


Fig. 8-92 Remove Hold-Down Clip

### DISASSEMBLY

1. Remove the distributor cap, rotor, and dustproof cover.
2. Remove the vacuum advancer adjuster cap.
3. Pull out the point cover.
4. Remove terminal.
5. Remove the breaker arm and points, and damping spring.
6. Loosen screw holding the vacuum advancer, and pull out the vacuum advancer.
7. Pull out rubber plates and remove the two hold-down clips and ground wire.

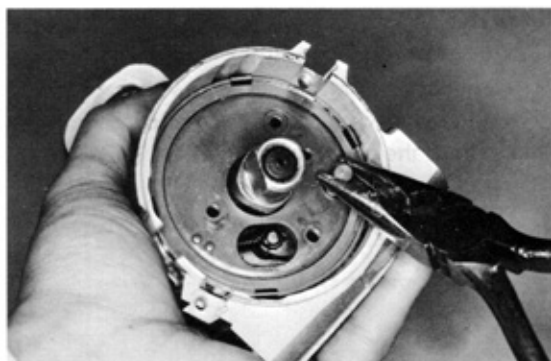


Fig. 8-93 Remove Breaker Plate



Fig. 8-94 Remove Governor Spring

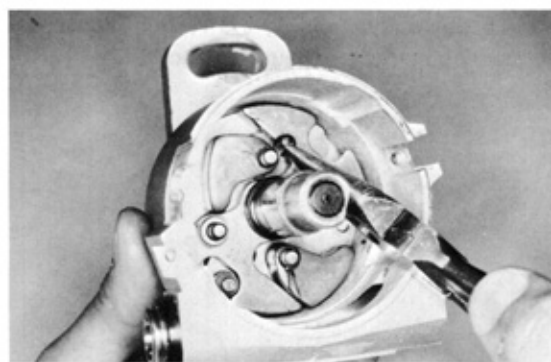


Fig. 8-95 Remove E ring

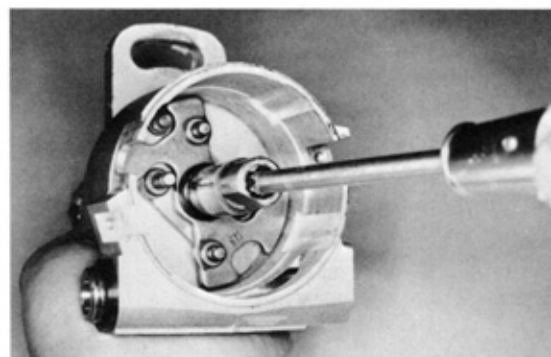


Fig. 8-96 Remove Cam

8. Remove the breaker plate.

9. Remove governor springs.

10. Remove E ring, take out the governor weights with bearings.

11. Take out grease stopper and loosen screw at end of governor shaft. Take out the cam.

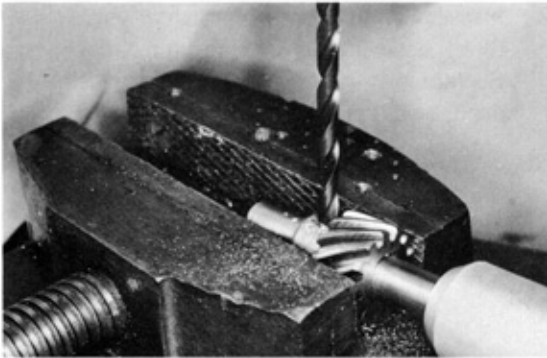


Fig. 8-97 Drill Pin

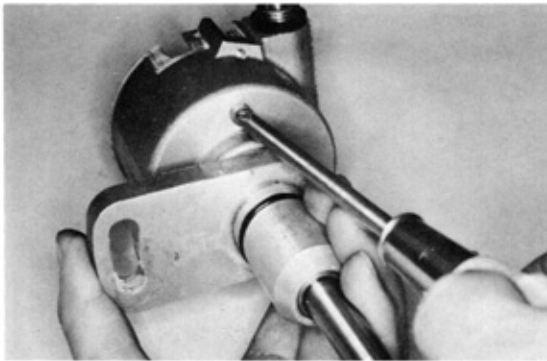


Fig. 8-98 Remove Governor Shaft

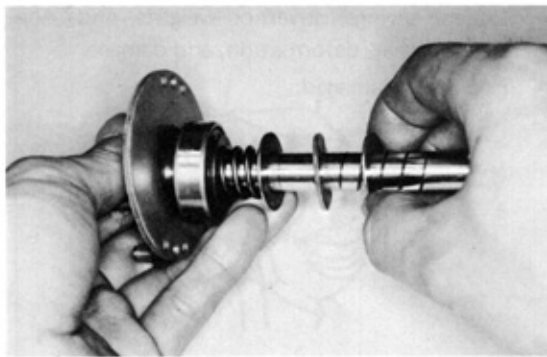


Fig. 8-99 Take Off Washer

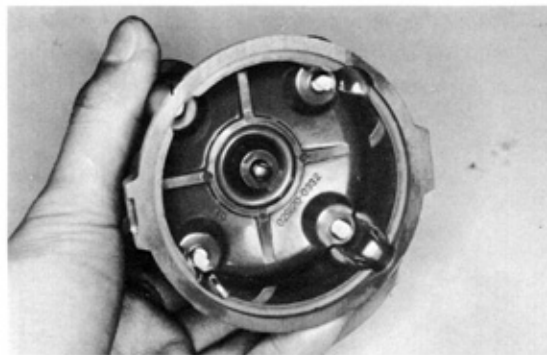


Fig. 8-100 Inspect Cap

12. Drill peened shaft pin and remove gear.

— Note —

Take care not to damage the shaft.

13. Loosen two screws and pull out governor shaft with bearing.

14. Take off bearing, spring, and plate washers.
15. Remove O ring from housing.

### INSPECTION

1. Inspect cap and rotor for cracks, carbon tracks, burnt or corroded terminals, and check center contact for wear. Replace if necessary.



Fig. 8-101 Inspect Breaker Plate

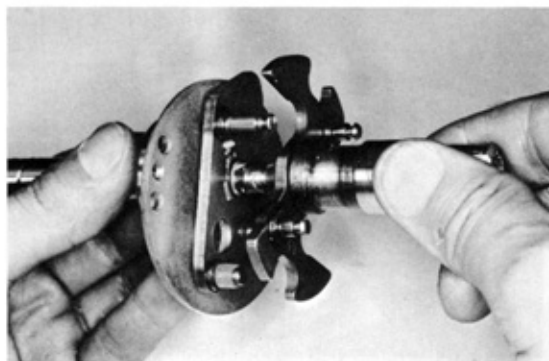


Fig. 8-102 Inspect Cam and Shaft

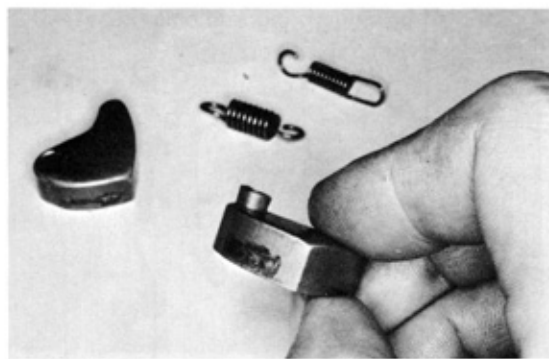


Fig. 8-103 Inspect Governor Weight



Fig. 8-104 Inspect Bearing

2. Inspect condition of breaker arm and points.
3. Check breaker plate for smooth rotation. Replace if it offers abnormal resistance to the hand, or if it sticks.
4. Inspect cam for wear, damage, and fit between cam and shaft. Replace if necessary.
5. Inspect springs, governor weights, and bearings for wear, deformation, and damage. Replace if damaged.
6. Inspect governor shaft and bearing for wear, sticking and damage. Check fit between shaft and housing. Replace if damaged.

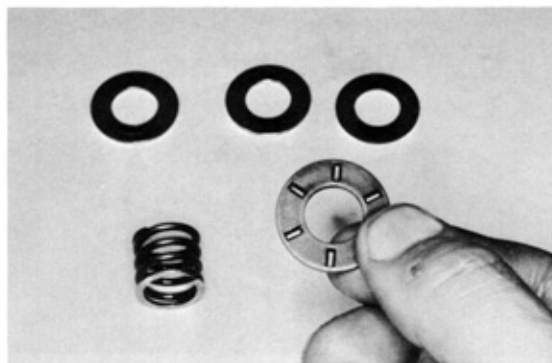


Fig. 8-105 Inspect Bearing

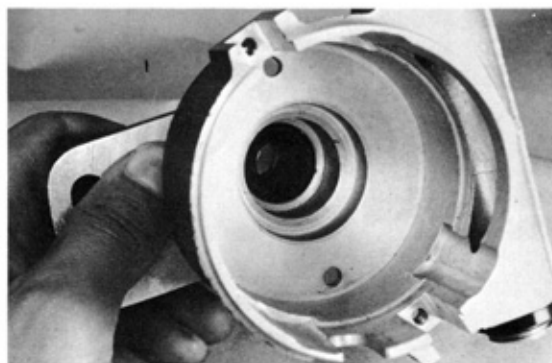


Fig. 8-106 Inspect Oil Seal

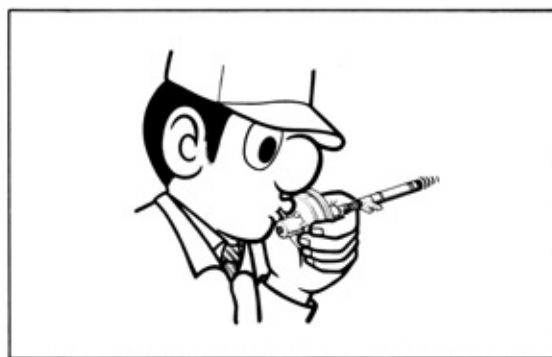


Fig. 8-107 Check Diaphragm Operation

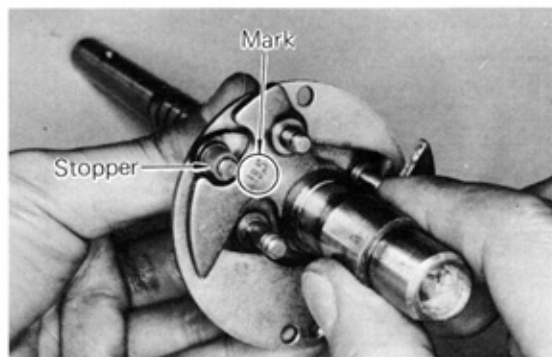


Fig. 8-108 Match Mark with Stopper

7. Inspect bearing, washers and spring for sticking, scoring and damage. Replace if damaged.

8. Inspect housing, oil seal, and O ring for cracks, deformation, and damage. Replace if necessary.

9. Check operation of vacuum advance diaphragm.  
Suck the tube with mouth. The diaphragm should move. If not, replace it.

## ASSEMBLY

1. Lightly coat shaft and cam inner surface with grease. Match 13.5 mark with stopper, fit on the cam and tighten with screw. Then apply grease and fit grease stopper.

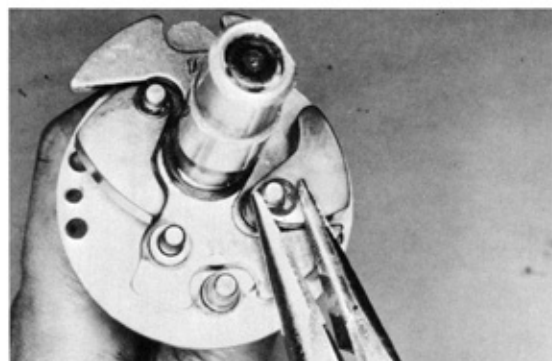


Fig. 8-109 Install E ring

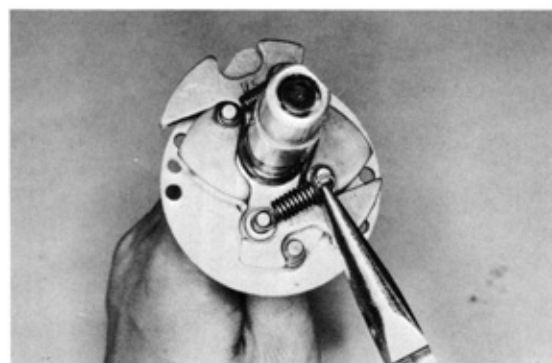


Fig. 8-110 Install Spring

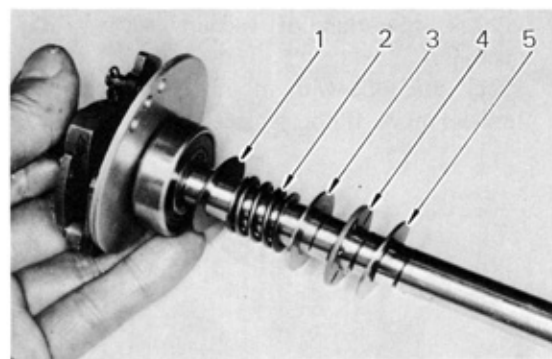


Fig. 8-111 Assemble Bearing and Washers



Fig. 8-112 Secure Plate

2. Assemble governor weights with bearings and lock with E rings.

3. Install springs.

4. Assemble following parts on shaft in numerical order.
  - (1) Washer (Blue)
  - (2) Spring
  - (3) Washer (Thinner)
  - (4) Bearing
  - (5) Washer (Thicker)

5. Clamp housing in a soft jaw vice and secure plate with two screws and fit O ring.



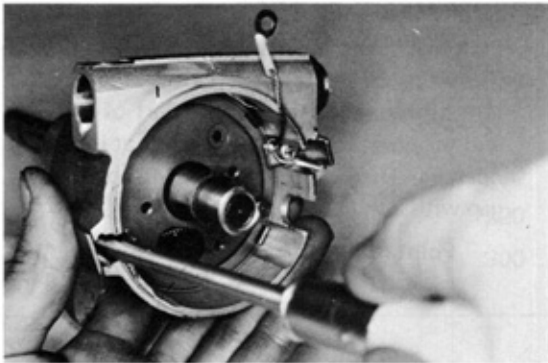


Fig. 8-113 Install Hold-Down Clip

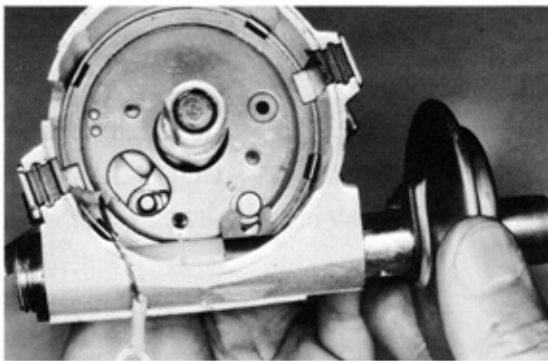


Fig. 8-114 Insert Vacuum Advancer

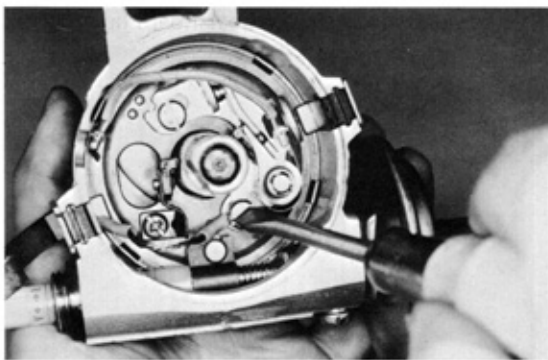


Fig. 8-115 Install Points

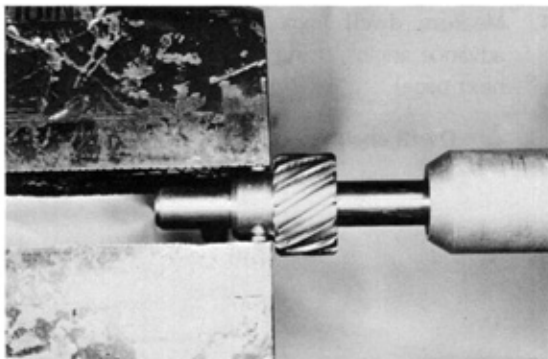


Fig. 8-116 Peen Pin

6. Install breaker plate.
7. Install hold-down clips and ground wire.  
Fit rubber plates.

— Note —

The hold-down clip with cap positioner must be installed at terminal side.

8. Insert vacuum advancer, mating its groove with plate pin and secure with screw.
9. Install damping spring, and breaker arm and points, securing together with the wire.
10. Install terminal insulator and connect point lead.
11. Install new gear and pin, and peen both ends.

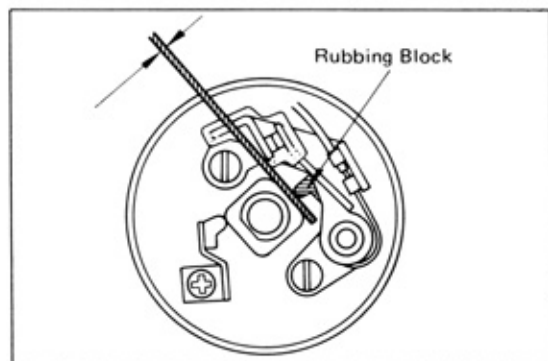


Fig. 8-117 Adjust Point Rubbing Block Gap

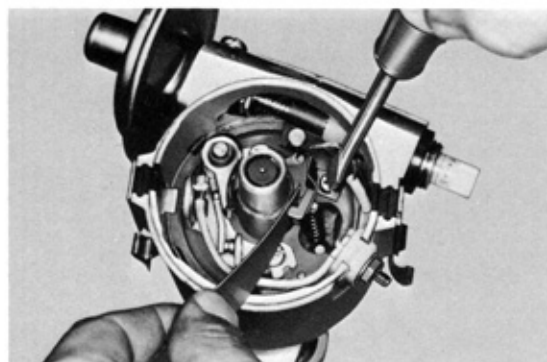


Fig. 8-118 Adjust Damping Spring Gap

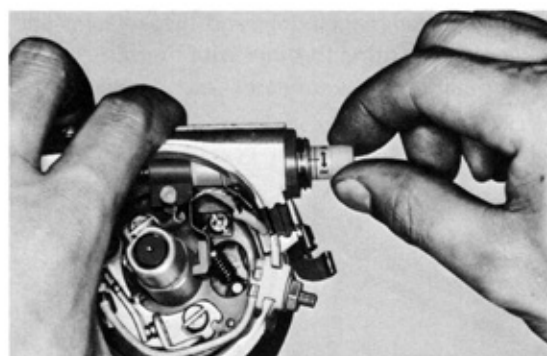


Fig. 8-119 Set Octane Selector

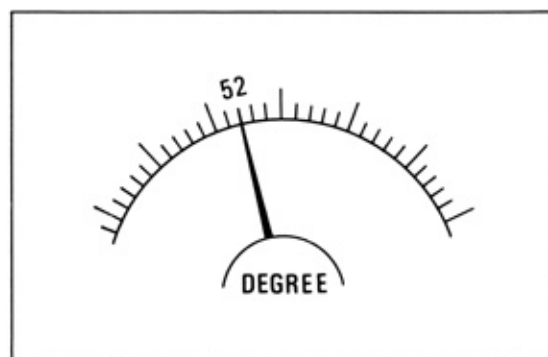


Fig. 8-120 Measure Dwell Angle

## ADJUSTMENT & TEST

1. Point rubbing block gap adjustment  
Turn the distributor shaft until the breaker arm heel faces to the lowest part of the cam and the point rubbing block gap is at its widest opening. Then check the point rubbing block gap with a thickness gauge.

**Point rubbing block gap**  
**0.45mm (0.018 in)**

2. Damping spring gap adjustment  
Adjust damping spring gap.

**Spring gap**  
**0.05 to 0.45mm**  
**(0.002 to 0.018 in)**

3. Set the octane selector at standard line.

4. Measure dwell angle, governor and vacuum advance angles, using a distributor tester. (See next page)

**Dwell angle**  
**50 to 54°**

## Advance characteristics

Distributor vacuum advance angle	Vacuum mmHg (inHg)		Dis. advance angle Degree
	86 to 114	(3.39 to 4.49)	Advance begins
	140	(5.51)	1.7 to 4.3
	220	(8.66)	6.5 to 7.5
	300	(11.81)	9 to 11
Distributor governor advance angle	Distributor rpm		Dis. advance angle Degree
	480 to 620		Advance begins
	1350		7.8 to 9.3
	2500		11.5 to 13.5
	3000		11.2 to 13.2

**INSTALLATION**

Refer to pages 3-25 and 26 in Valve Service Section.

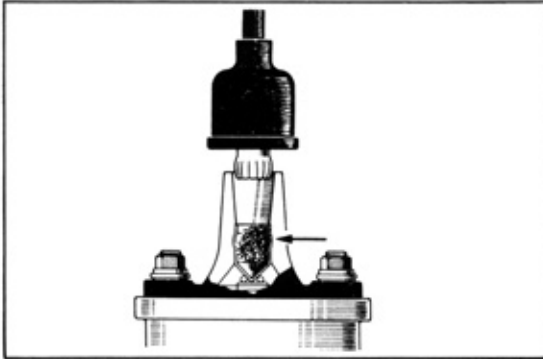


Fig. 8-121 Inspect Coil Hole



Fig. 8-122 Measure Primary Coil Resistance

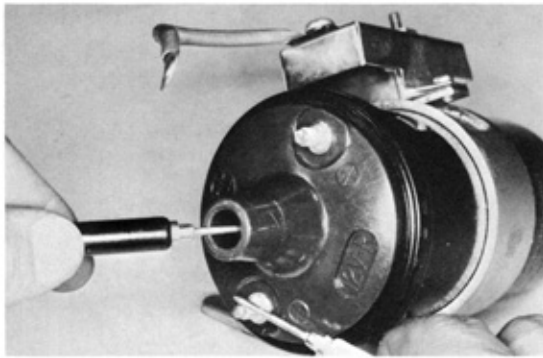


Fig. 8-123 Measure Secondary Coil Resistance

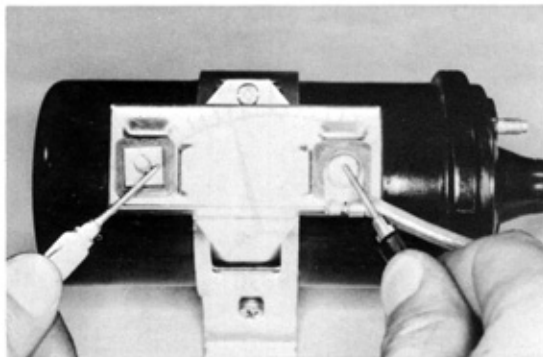


Fig. 8-124 Measure External Resistor Resistance

## IGNITION COIL

### INSPECTION

1. Clean the coil and inspect it for carbon paths (high tension grounds) around the terminals and over the outside body of the coil for cracks. If necessary, replace the coil.
2. Inspect the high tension cord insertion hole for carbon deposit or corrosion. If necessary, repair or replace the coil.

3. Measure the following resistances. If the reading is not within the specified resistance, replace coil.

**Primary coil resistance**  
1.3 to 1.5 $\Omega$

**Secondary coil resistance**  
6500 to 10500 $\Omega$

**External resistor resistance**  
1.3 to 1.7 $\Omega$

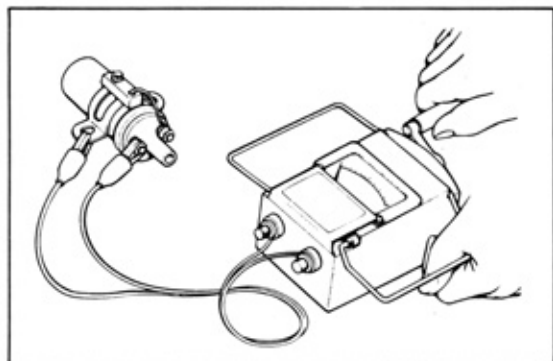


Fig. 8-125 Measure Insulation Resistance

**Insulation resistance at 500V  
Over 10 MΩ**



Fig. 8-126 Inspect Cord Terminal

## HIGH TENSION CORDS

— Caution —

1. Remove carefully high tension cords by pulling the rubber boot.
2. Do not bend cords so as to conductor from broken.

### INSPECTION

1. Check the condition of the cord terminal. If any terminal is corroded, clean it, and if it is broken or distorted, replace the cord.
2. Check the resistance of each cord between both ends. If the reading exceeds the limit, replace the cord.

**Resistance limit      Less than 25kΩ**

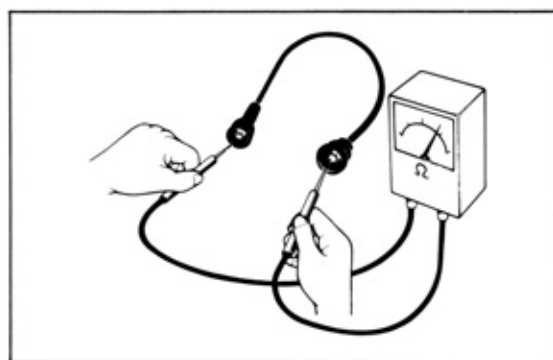


Fig. 8-127 Measure Resistance

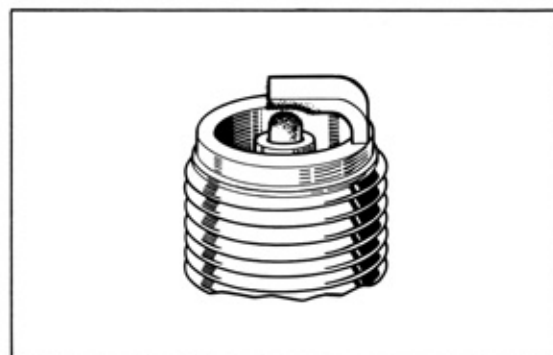


Fig. 8-128 Inspect Spark Plug

## SPARK PLUGS

### INSPECTION

Inspect for the following items. Clean or replace plugs if necessary.

1. Cracks or damages in the threads or insulator.
2. Wear in the electrodes.
3. Damaged or deteriorated gaskets.
4. Burnt condition of electrode and amount of carbon deposit.

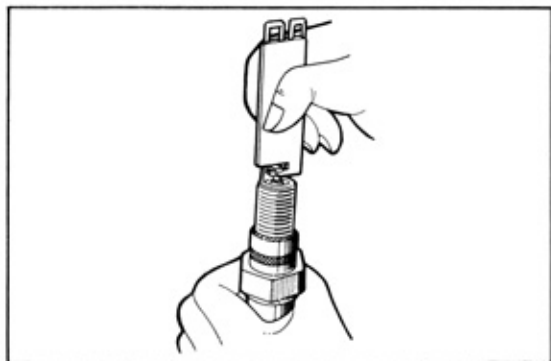


Fig. 8-129 Adjust Gap

## GAP ADJUSTMENT

Check the plug gap with plug gap gauge. If not to specified value, adjust by bending the ground (outer) electrode.

<b>Spark plug gap</b>	<b>0.8mm (0.031 in)</b>
<b>Recommended spark plug</b>	
<b>ND:</b>	<b>W16EP</b>
<b>NGK:</b>	<b>BP5ES-L</b>

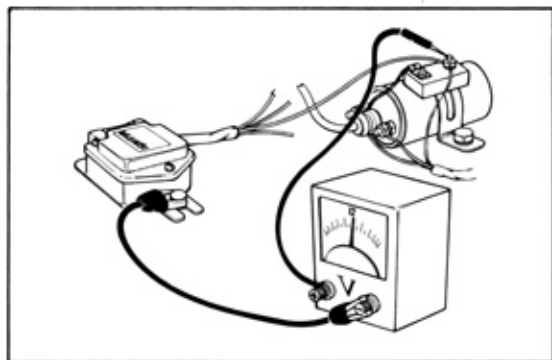


Fig. 8-130 Measure Terminal Voltage

## IGNITER

### INSPECTION

1. Inspect igniter beforehand.
2. Turn the ignition key to ON position.
3. Check if there is battery voltage at resistor terminal as shown. If not, check ignition key or wiring harness.
4. Disconnect primary ignition wire from distributor.
5. Make ON-OFF contacts with ground. Check if spark is produced at this time. Replace igniter, if spark is not produced.

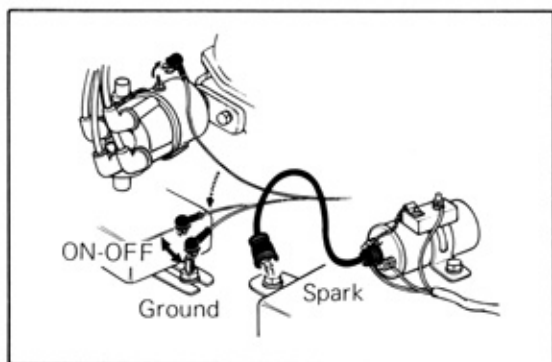


Fig. 8-131 Inspect Igniter

## FULLY TRANSISTORIZED IGNITION SYSTEM

### DESCRIPTION

The fully transistorized ignition system uses an ignition signal generating mechanism instead of distributor contact points. It consists of a timing rotor, a magnet and a pickup coil, all mounted in the distributor and an igniter.

The advantages of this system are:

- (1) There is no point arcing effect since points are not employed to interrupt the primary current. Starting and low speed performance are improved.
- (2) Contact point problems are eliminated.
- (3) Improved low speed performance reduces emission.
- (4) Special coil is required for the fully TRANSISTORIZED IGNITION SYSTEM.

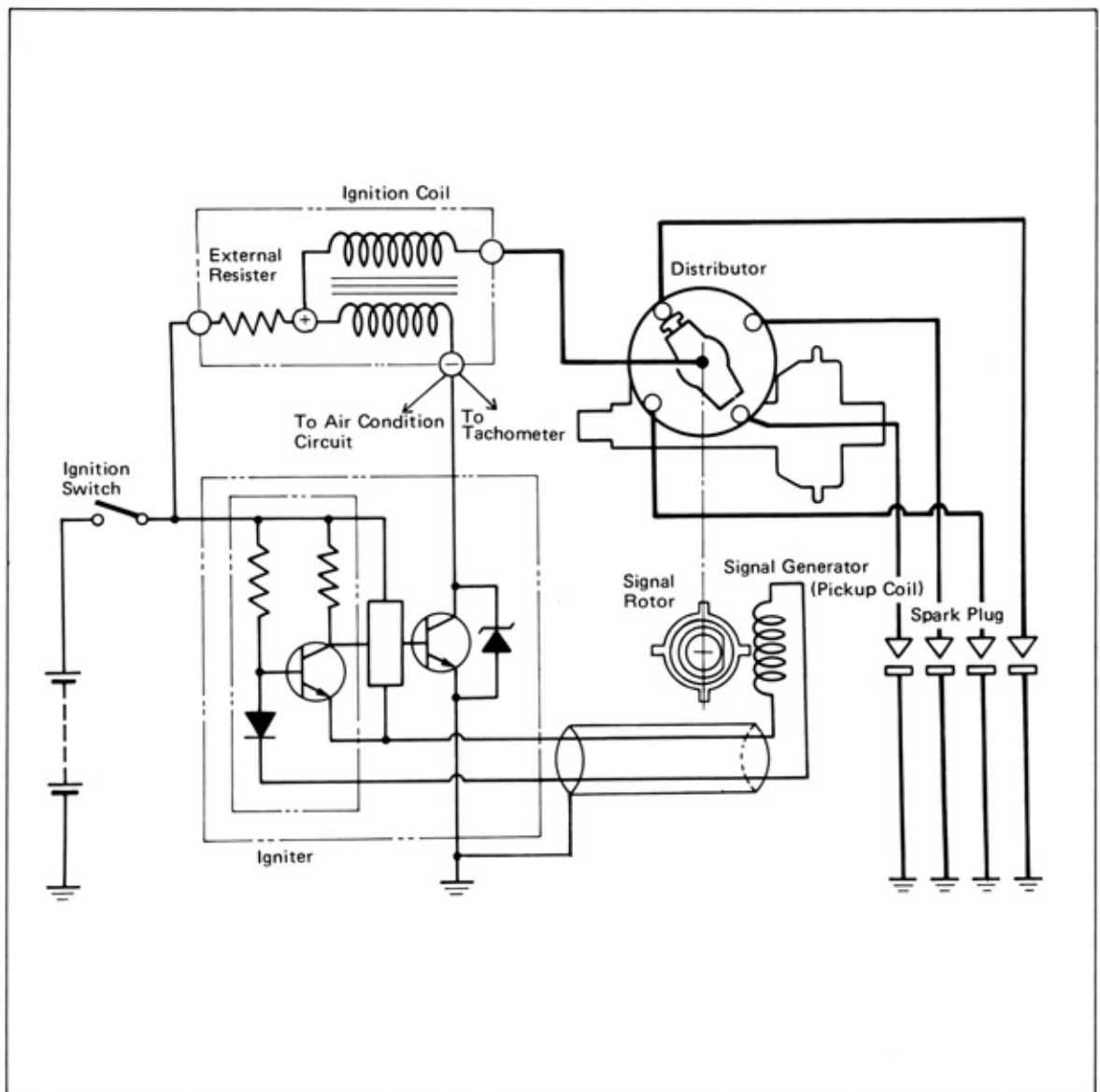


Fig. 8-132 System Circuit

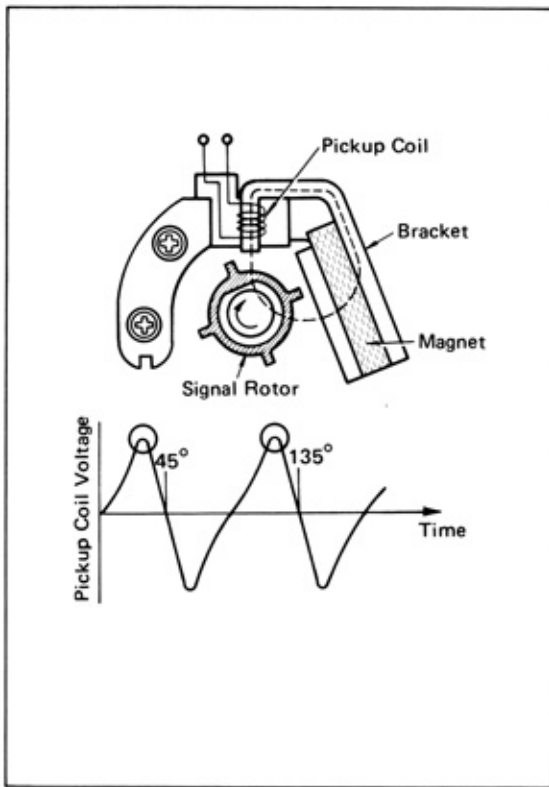


Fig. 8-133 When Generated Voltage is High

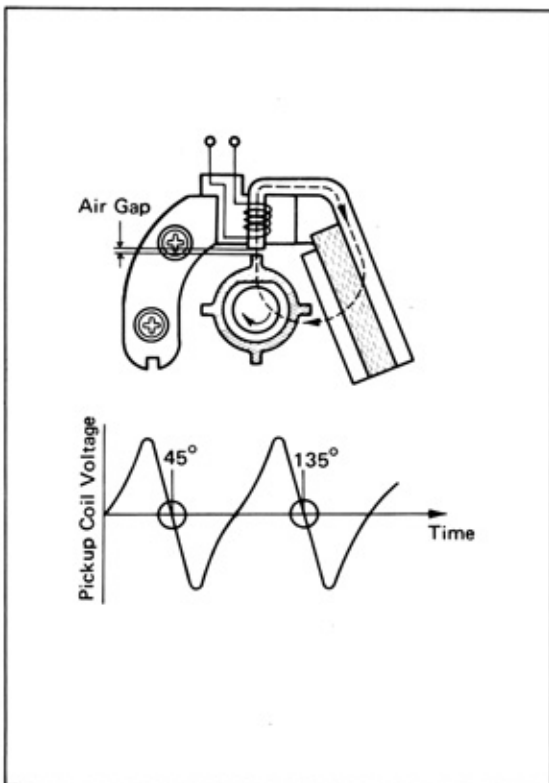
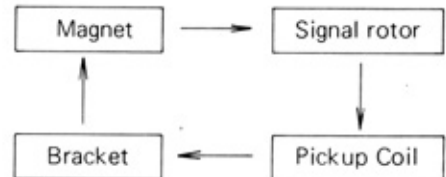


Fig. 8-134 When Generated Voltage is Zero

## OPERATION

1. Distributor Pickup Mechanism (Ignition Signal Generating Mechanism)  
The distributor pickup unit is made up of a signal rotor and a signal generator. As illustrated the flux from the magnet takes the following path:



The air gap in this magnetic path changes as the signal rotor turns, resulting in a varying amount of flux through the pickup coil.

Voltage depending on the amount of flux variation will be produced across the signal generator pickup coil terminals. The voltage will be high when the flux variation is large, and low with small flux variation. When the pickup coil projection and the signal rotor tooth are opposite each other, the amount of flux variation will be zero and the voltage generated will also be zero. Between rotor tooth the voltage will be highest.



## 2. Operation of System

When the distributor signal rotor is at the position shown in the figure below, the pickup coil generated voltage will be high and the current from the battery will not flow toward the pickup coil. The current flows through the igniter as shown in the figure below.

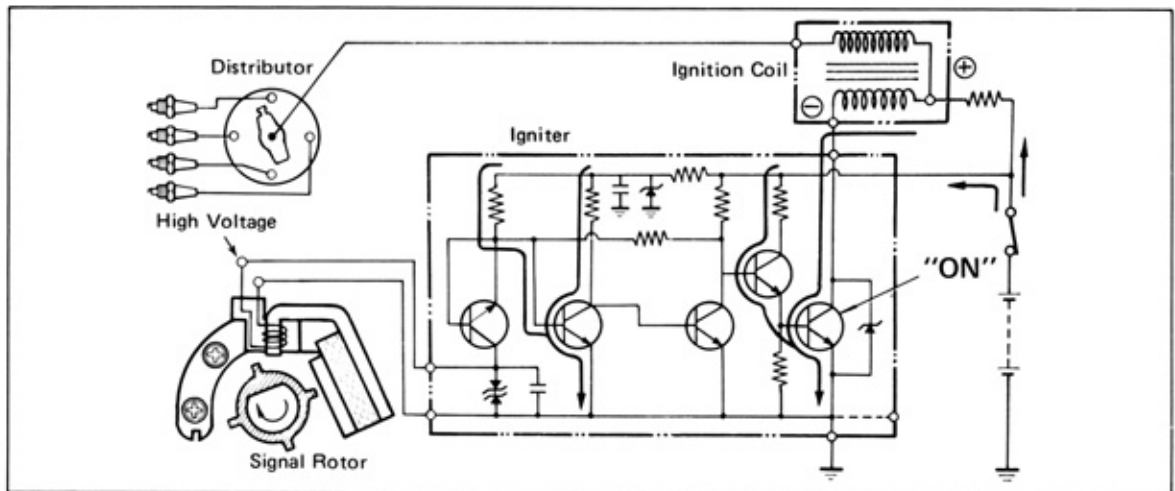


Fig. 8-135 Operation

- When the rotor turns and a tooth passes the pickup coil projection, the pickup coil generated voltage drops zero and allows the battery current to flow to the pickup coil. Ignition coil primary current is cut off by the igniter. At the same instant, high voltage is induced in the secondary coil and a spark is released to the spark plug.

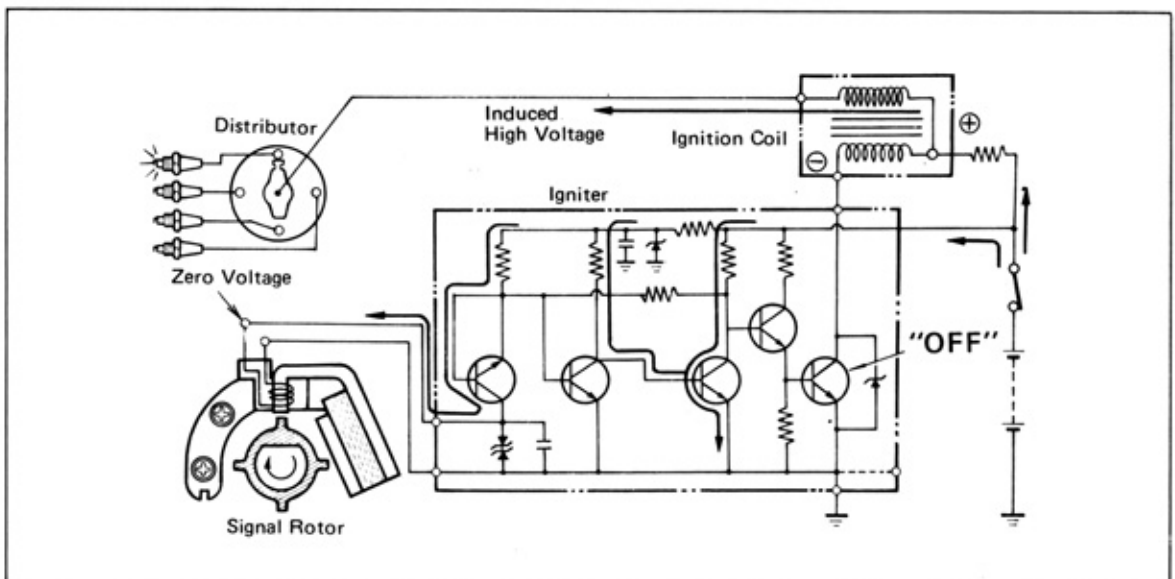


Fig. 8-136 Operation

## 3. Igniter

The igniter is the ignition signal sensing part. It is made up of an amplifying circuit and a power switch circuit, and by sensing the distributor ignition signal, it determines the ignition timing and ignition coil current passage time.

## PRECAUTIONS

- (1) This system is intended for use only on vehicles with 12-volt electrical system and (-) ground.
- (2) Care must be taken not to intermix the battery (+) and (-) terminals.
- (3) Do not disconnect the battery terminal when the engine is turning.
- (4) Make sure that the igniter is properly grounded to the body.
- (5) When washing the car, use care not to get water on the igniter or distributor.
- (6) Do not do anything that will produce abnormal pulses.  
Example: Disconnecting the lead wire from alternator B terminal and using it to produce sparks as means of checking charging condition.
- (7) Perform all wiring carefully so as not to make incorrect connections.
- (8) On apparatus utilizing pulses from breaker terminals (such as pulse type tachometer and air conditioning stabilizer relay), make sure to connect the pulse pickup wire to the ignition coil (-) terminal.

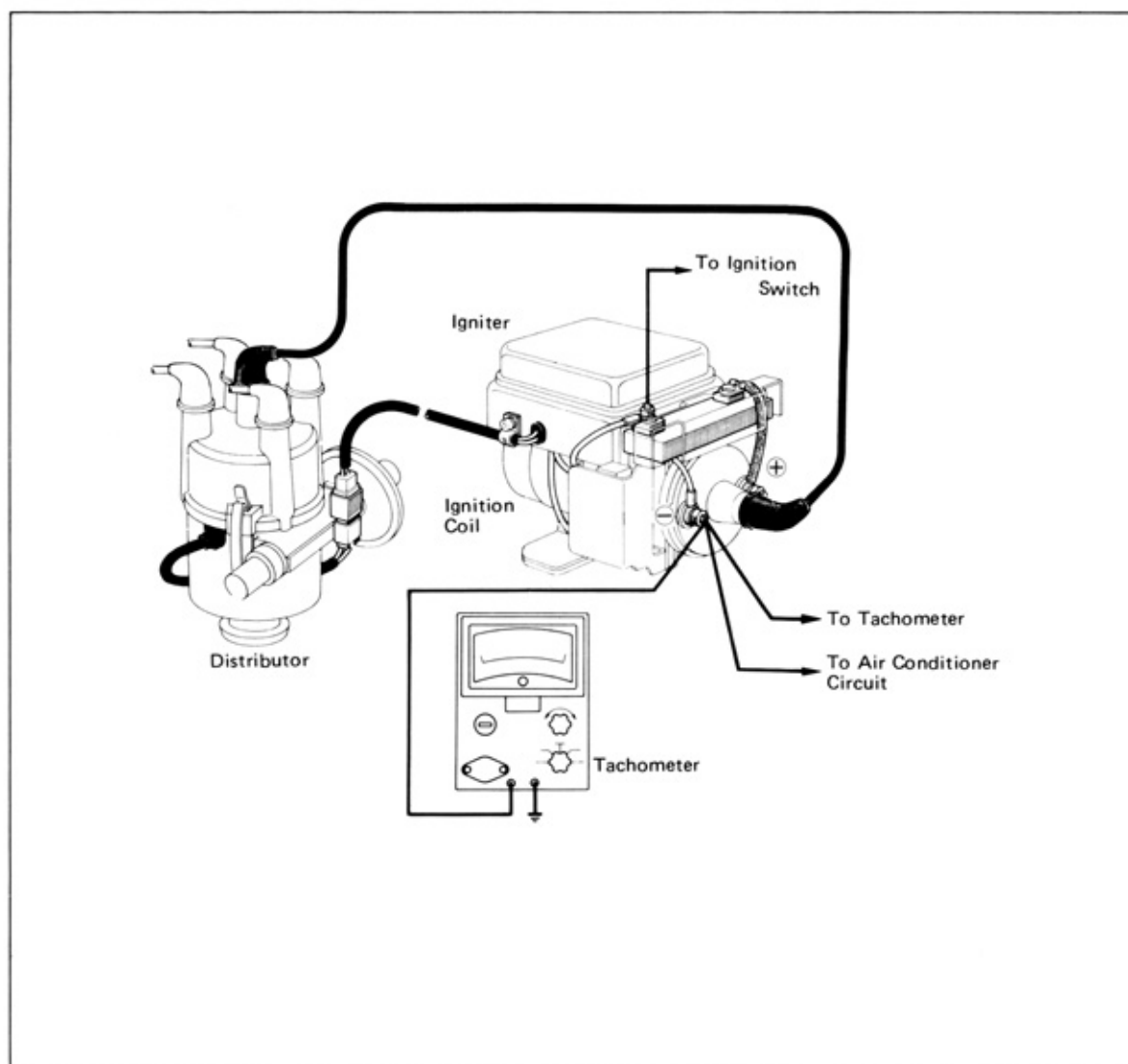


Fig. 8-137 Tachometer Connection Drawing

**INSPECTION**

If the ignition system seems to be the cause of poor engine performance, troubleshoot in the following order.

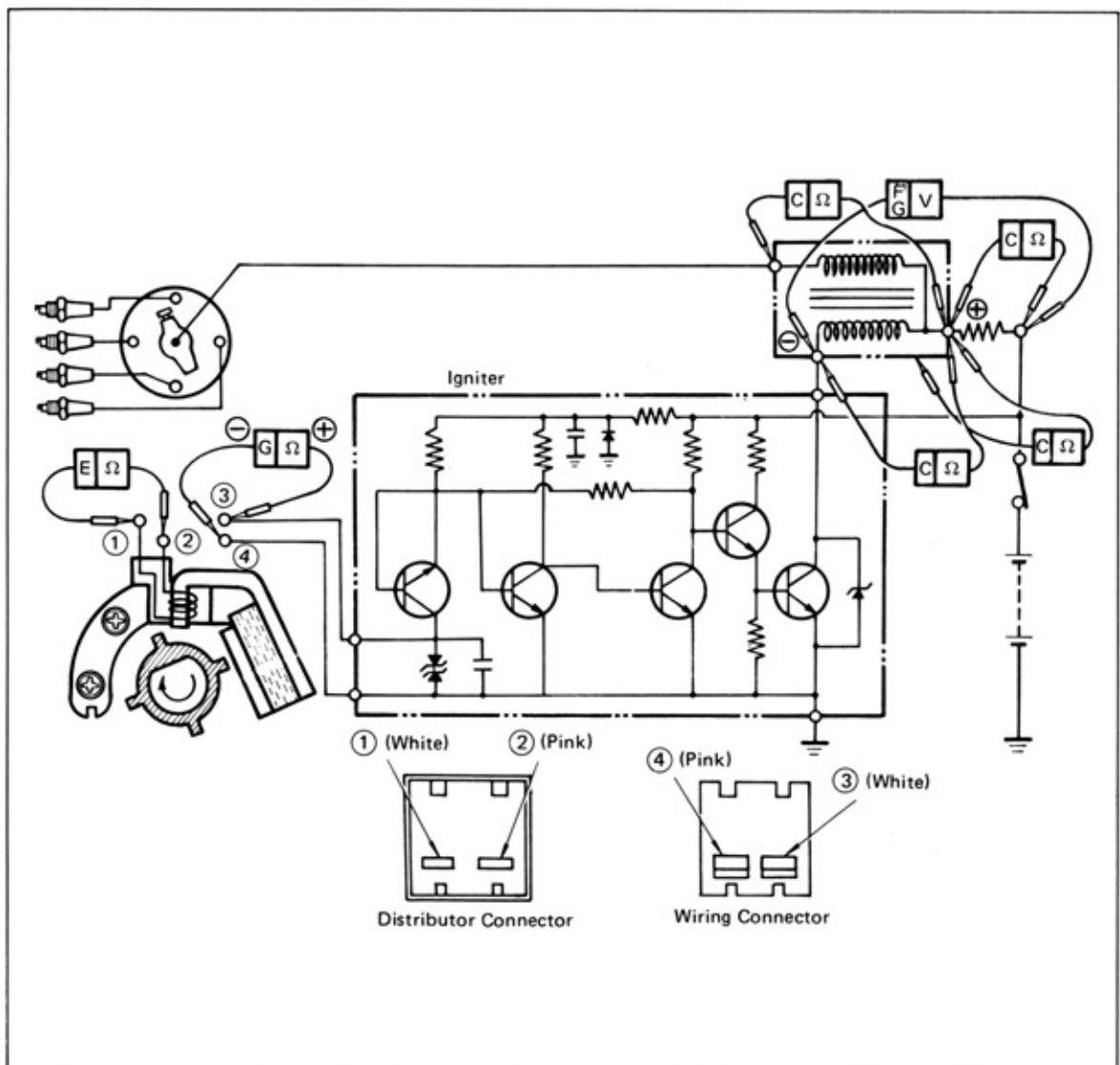
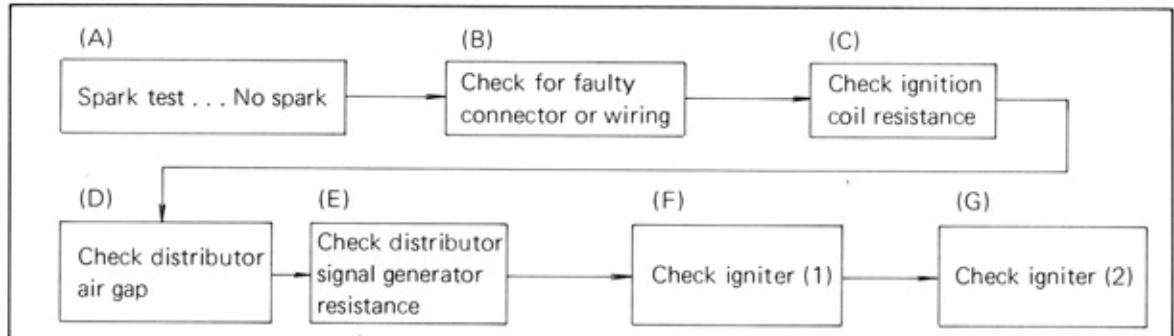


Fig. 8-138 Overall Inspection Circuit Diagram

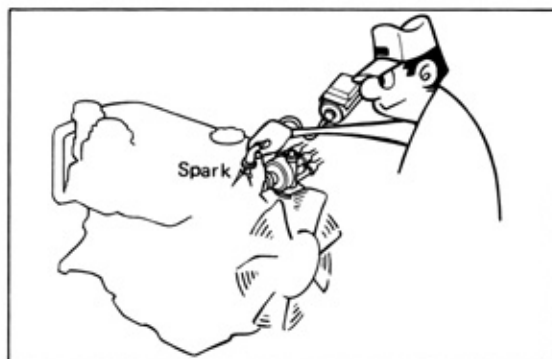


Fig. 8-139 Check Spark Condition

## (A) Spark Test

Pull the ignition coil-to-distributor resistive cord from the distributor and hold its end close to a ground. Then start the engine and check for spark.

– **Caution** –

**The check must be made for as short a time as possible.**



Fig. 8-140 Check Connector

## (B) Checking Connector and Wiring.

Check the connector and wiring.

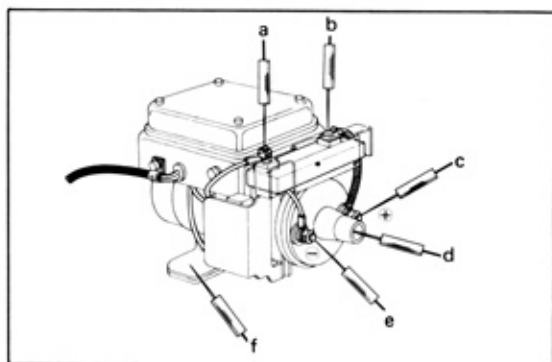


Fig. 8-141 Check Resistance

## (C) Checking Ignition Coil

Check the ignition coil resistance using an ohmmeter.

## Specifications and Service Standards

Item	Terminals Measured	Standard values
Primary coil resistance	c – e	1.35 – 1.65 ohm
Secondary coil resistance	c – d	12.8 – 15.2 Kilo-ohm
Resistor resistance	a – b	1.3 – 1.7 ohm
Insulation resistance	c – f	Infinity

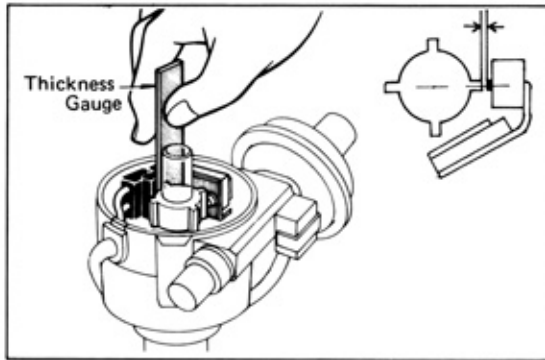


Fig. 8-142 Check Air Gap

- (D) **Checking The Air Gap**  
Check the air gap between the timing rotor and pick up coil projection by using a gauge feeler.

**Air Gap: 0.008–0.016 in (0.2–0.4 mm)**

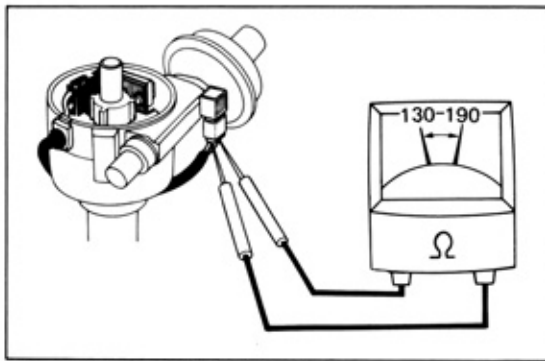


Fig. 8-143 Check Resistance

- (E) **Checking Signal Generator**  
Check the resistance of the signal generator by using an ohmmeter.

**Resistance: 130–190 ohm**

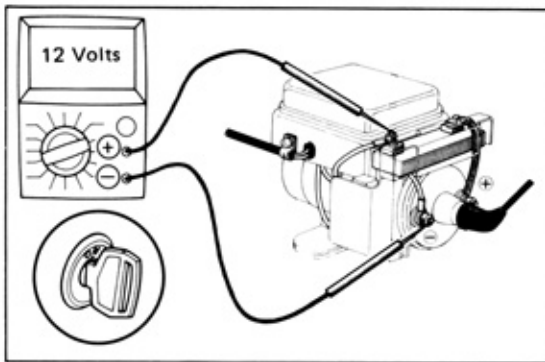


Fig. 8-144 Check Voltage

- (F) **Checking The Igniter (1)**  
1. Turn on the ignition switch.  
2. Check the voltage between the ignition coil (-) terminal and the resistor terminal using a volt-meter.

**Voltage: 12 Volts**

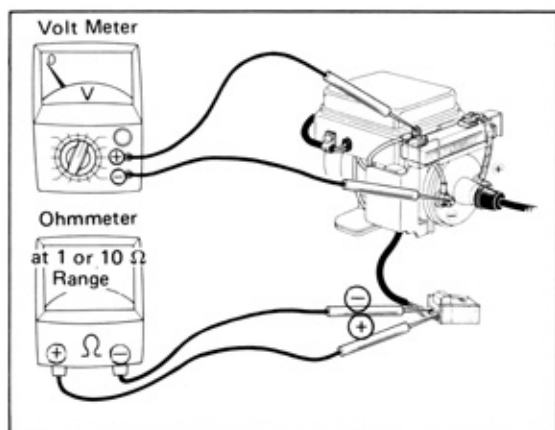


Fig. 8-145 Check Voltage

## (G) Checking The Igniter (2)

1. Disconnect the wiring connector from the distributor.
2. Select the  $1\Omega$  or  $10\Omega$  range on the ohmmeter.
3. Use the ohmmeter to provide resistance between the two terminals of the igniter as illustrated.

— Caution —

**Care must be taken not to intermix the (+) and (-) terminals of the ohmmeter.**

4. Turn on the ignition switch.
5. Check the voltage between the ignition coil (-) terminal and resistor terminal with the volt-meter.

**Voltage: nearly zero**

## DISTRIBUTOR

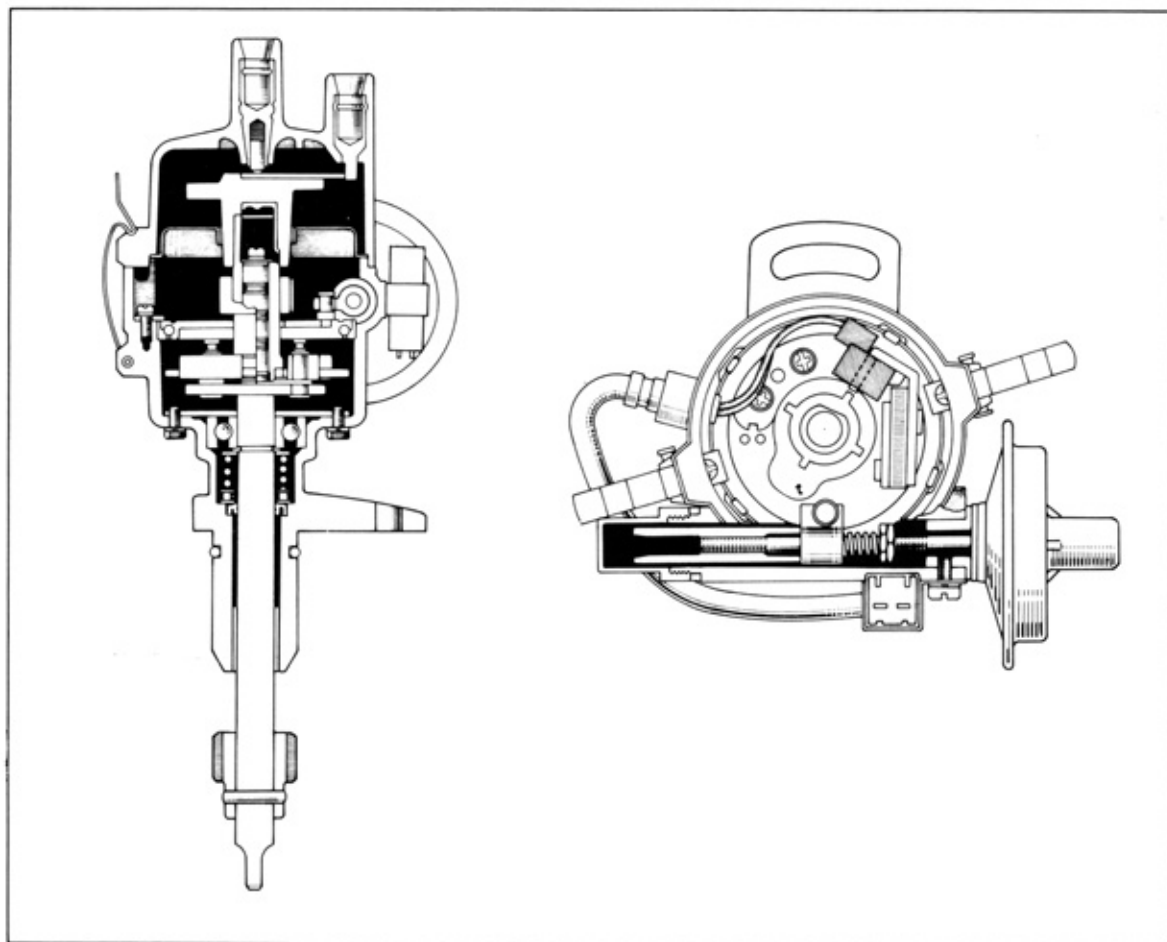
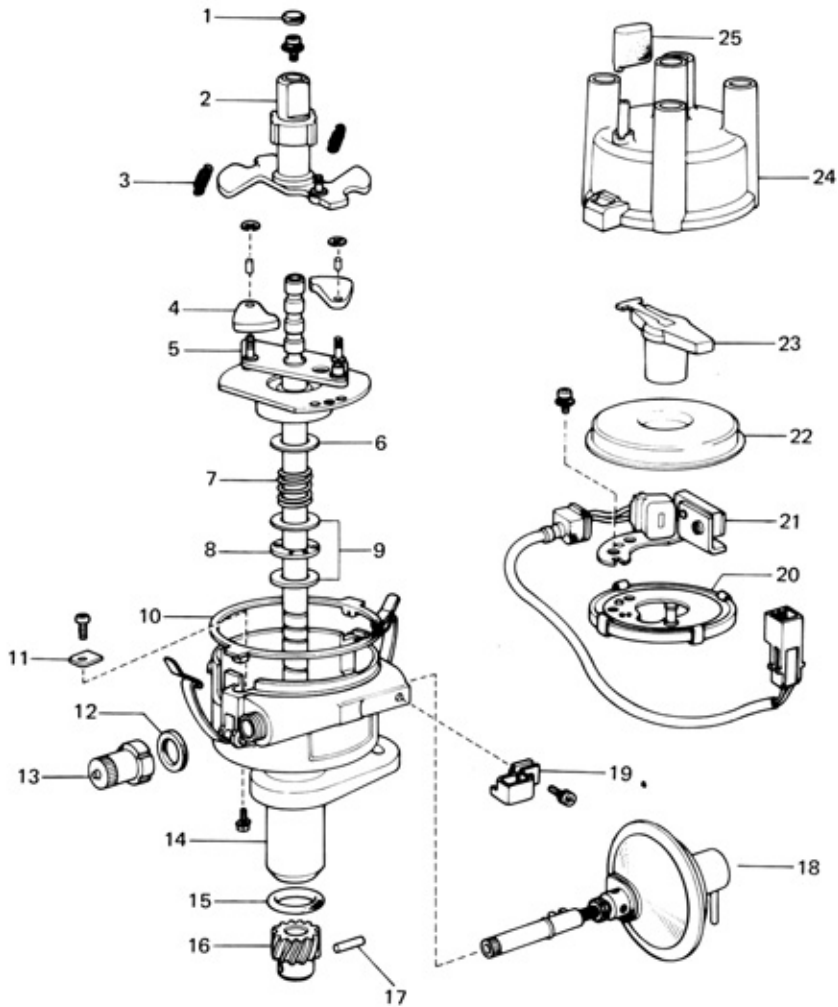


Fig. 8-146 Sectional View

## Specifications

Air gap	0.008–0.012 in (0.2–0.4 mm)	
Signal generator DC resistance	130–190 ohms	
Signal generator output voltage	Above 4.5 volts (peak to peak at 1500 rpm)	
Distributor vacuum advance angle	Vacuum inHg (mmHg)	Dis. Advance Angle
	3.94 (100)	Advance begins
	4.72 (120)	1.5°
	10.24 (260)	8.6°
	15.35 (390)	10.0°
Distributor governor advance angle	Dis. rpm	Dis. Advance Angle
	650	0.95°
	1000	4.7°
	1300	6.8°
	2200	9.45°
	3000	10.1°

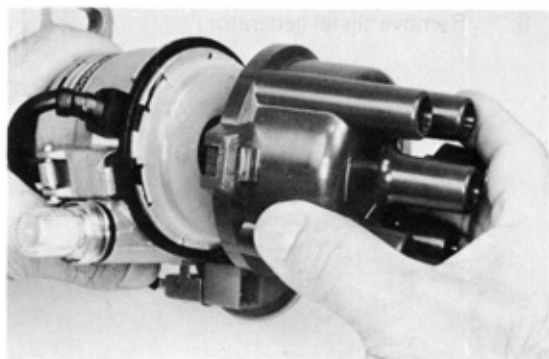
## COMPONENT PARTS



- |    |                         |    |                   |
|----|-------------------------|----|-------------------|
| 1  | Cam Grease Stopper      | 14 | Housing           |
| 2  | Signal Rotor            | 15 | O Ring            |
| 3  | Governor Spring         | 16 | Spiral Gear       |
| 4  | Governor Weight         | 17 | Pin               |
| 5  | Governor Shaft          | 18 | Vacuum Advancer   |
| 6  | Plate Washer            | 19 | Cord Clamp        |
| 7  | Compression Coil Spring | 20 | Breaker Plate     |
| 8  | Thrust Bearing          | 21 | Signal Generator  |
| 9  | Washer                  | 22 | Dustproof Cover   |
| 10 | Dustproof Packing       | 23 | Distributor Rotor |
| 11 | Steel Plate Washer      | 24 | Distributor Cap   |
| 12 | Rubber Washer           | 25 | Rubber Cap        |
| 13 | Octane Selector Cap     |    |                   |

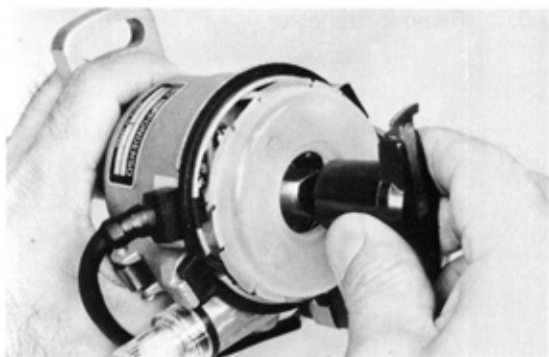
Fig. 8-147 Component Parts



**DISASSEMBLY**

1. Remove distributor cap.

Fig. 8-148



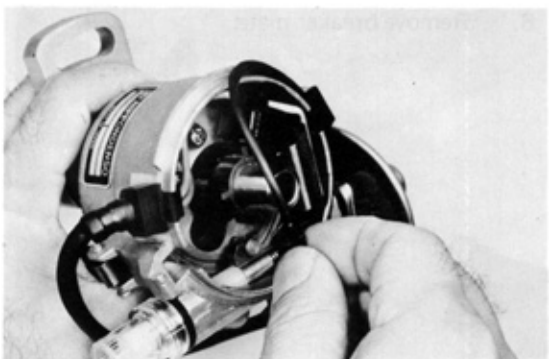
2. Remove rotor.

Fig. 8-149



3. Remove dustproof cover.

Fig. 8-150



4. Remove dustproof packing.

Fig. 8-151

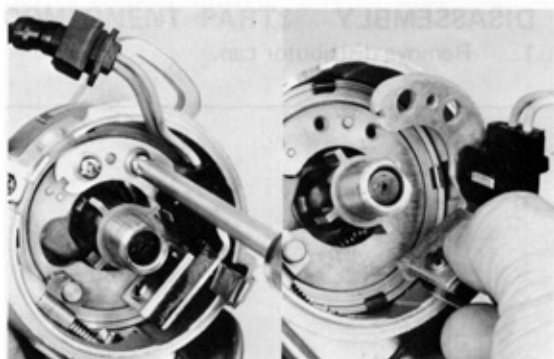


Fig. 8-152

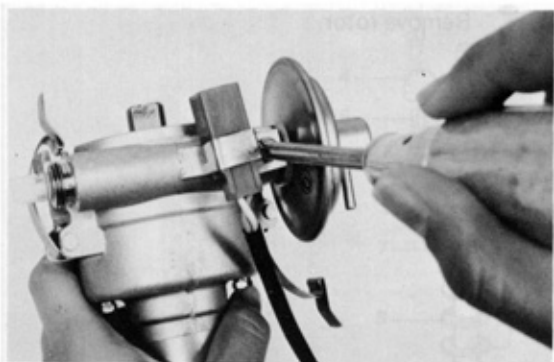


Fig. 8-153

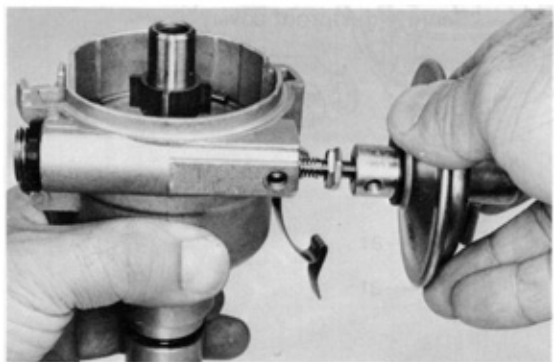


Fig. 8-154

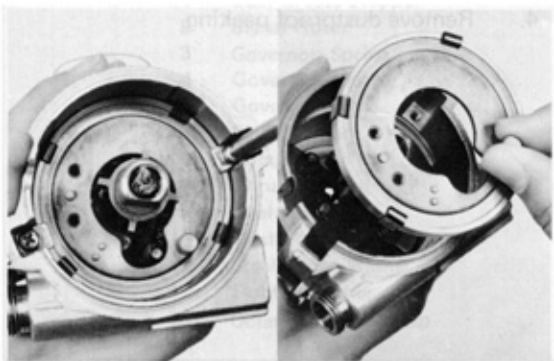


Fig. 8-155

5. Remove signal generator.

6. Remove connector.

7. Pull out vacuum advancer.

8. Remove breaker plate.

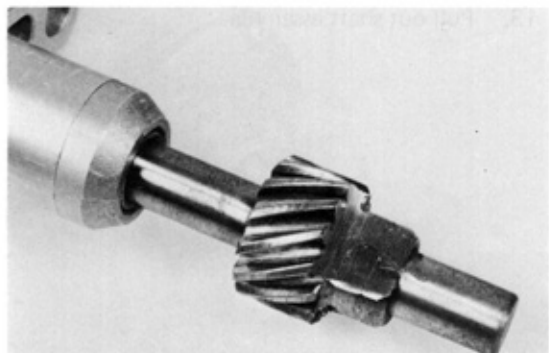


Fig. 8-156

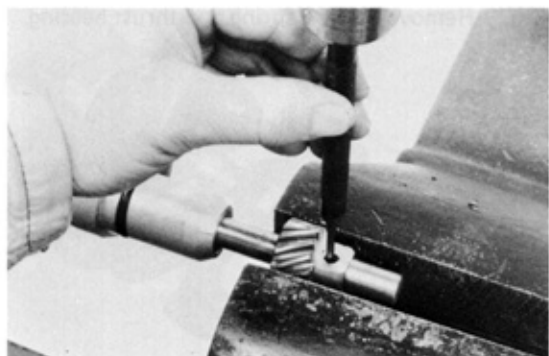


Fig. 8-157

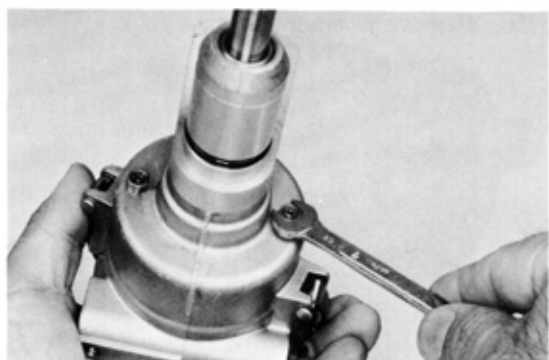


Fig. 8-158

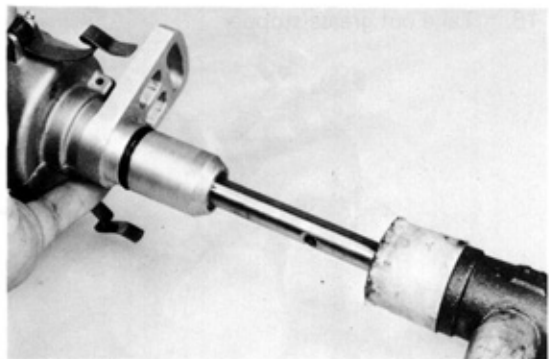


Fig. 8-159

9. Grind gear and pin as shown.  
— **Note** —  
**Take care not to damage shaft.**
  
10. Drive out pin with pin punch.  
Discard the drive gear.
  
11. Loosen two screws.
  
12. Carefully drive out shaft.  
A plastic hammer will prevent shaft damage.

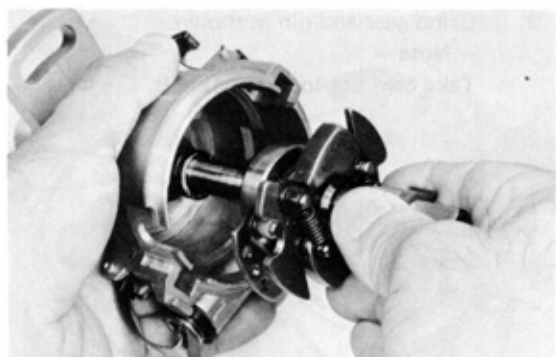


Fig. 8-160

13. Pull out shaft assembly.

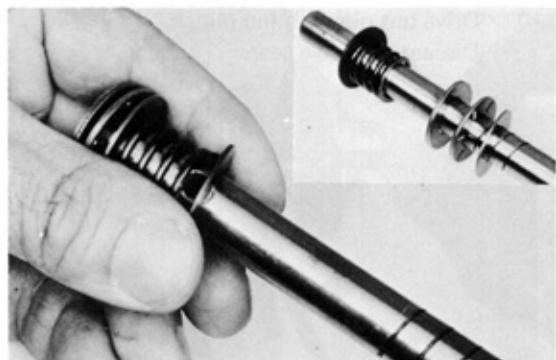


Fig. 8-161

14. Remove washer, spring and thrust bearing.



Fig. 8-162

15. Remove governor spring.

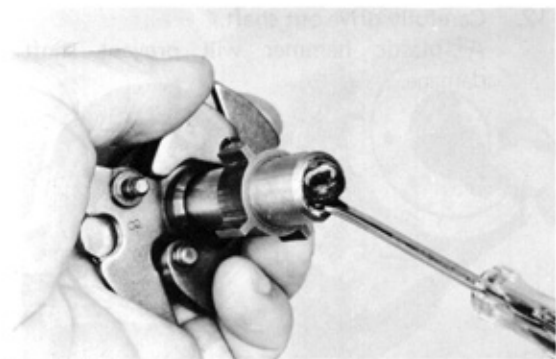


Fig. 8-163

16. Take out grease stopper.

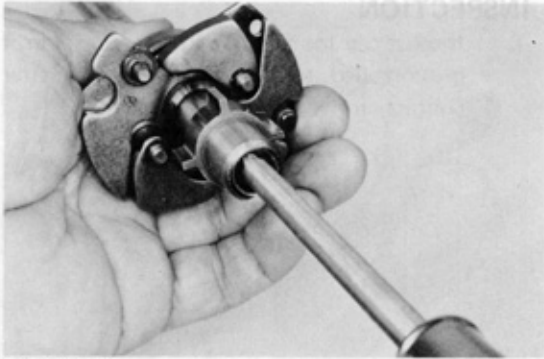


Fig. 8-164

17. Loosen screw at end of governor shaft.

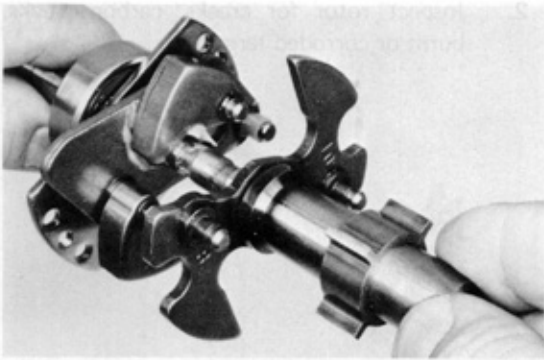


Fig. 8-165

18. Take out signal rotor.



Fig. 8-166

19. Remove governor weight snap ring.

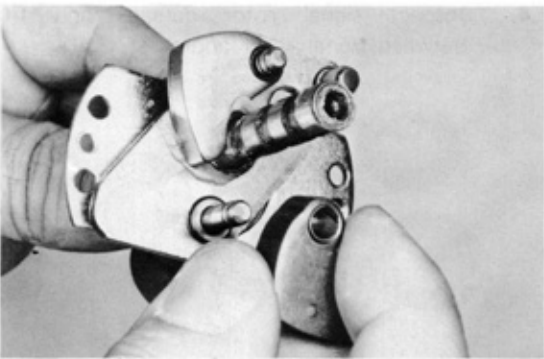


Fig. 8-167

20. Remove governor weight.

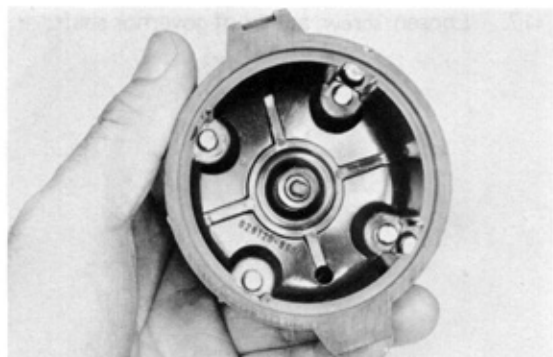


Fig. 8-168



Fig. 8-169

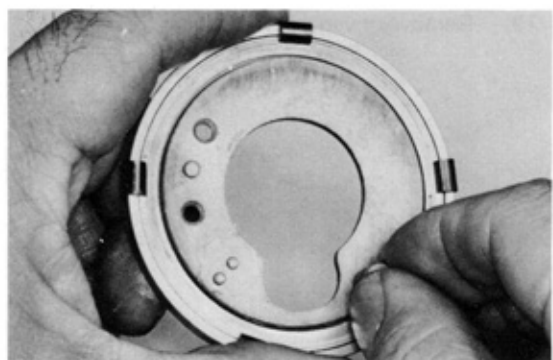


Fig. 8-170

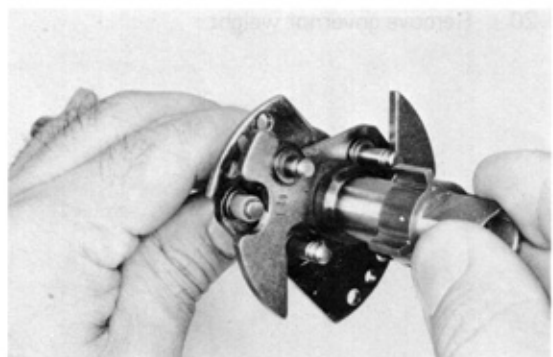


Fig. 8-171

### INSPECTION

1. Inspect cap for cracks, carbon tracks, burnt or corroded terminals, and check center contact for wear.
2. Inspect rotor for cracks, carbon tracks, burnt or corroded terminals.
3. Check breaker plate for smooth rotation. Replace if it offers abnormal resistance to the hand, or if it sticks.
4. Inspect signal rotor damage and fit between signal rotor and shaft.

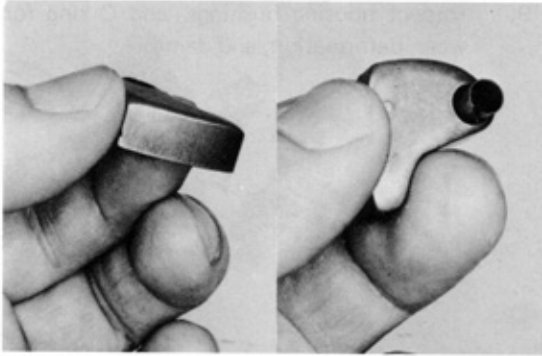


Fig. 8-172

5. Inspect springs, governor weights, and bearings for wear, deformation, and damage.

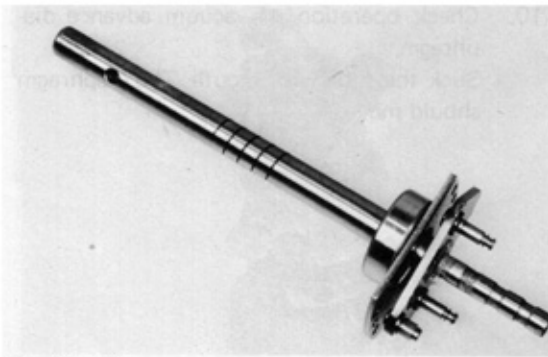
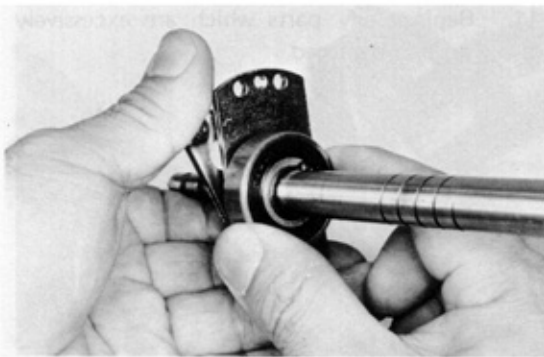


Fig. 8-173

6. Inspect governor shaft for wear and damage.



Fin 8-174

7. Inspect bearing for wear, sticking and damage. Check fit between shaft and housing.

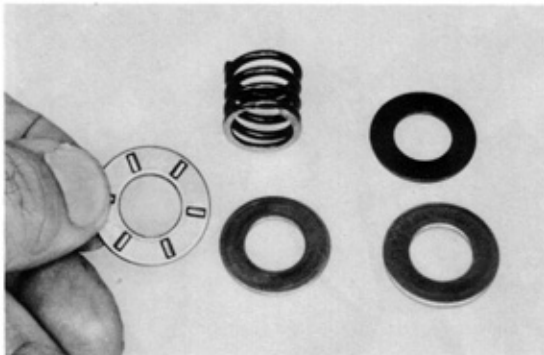


Fig. 8-175

8. Inspect bearing, washers and spring for sticking, scoring and damage.

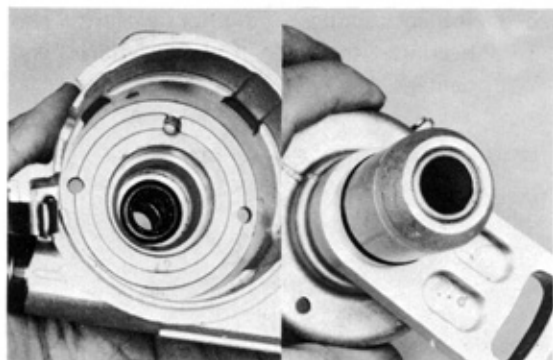


Fig. 8-176



Fig. 8-177

9. Inspect housing bushings, and O ring for wear, deformation, and damage.
  
  
  
  
  
  
  
  
  
  
10. Check operation of vacuum advance diaphragm.  
Suck the tube with mouth. The diaphragm should move.
  
  
  
  
  
  
  
  
  
  
11. Replace any parts which are excessively worn or damaged.



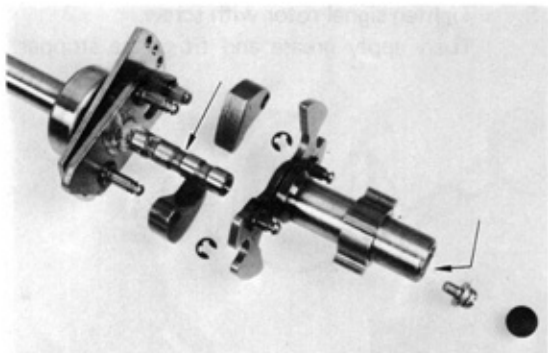


Fig. 8-178



Fig. 8-179

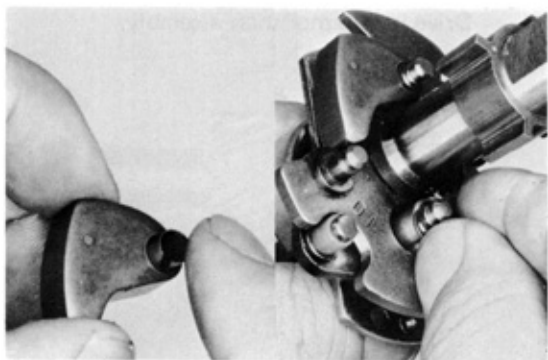


Fig. 8-180

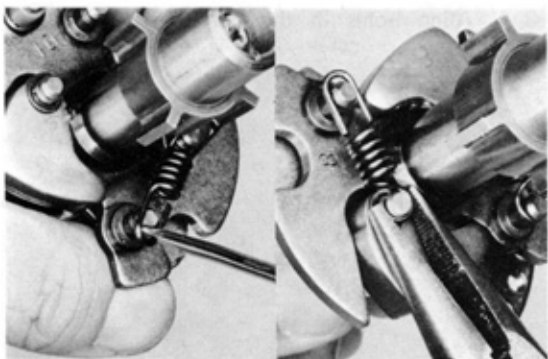


Fig. 8-181

**ASSEMBLY**

1. Lightly coat shaft and cam inner surface with grease.
2. Match 10 mark with stopper, fit on signal rotor.
3. Assemble governor weights with bearings and lock with clips.
4. Install springs.

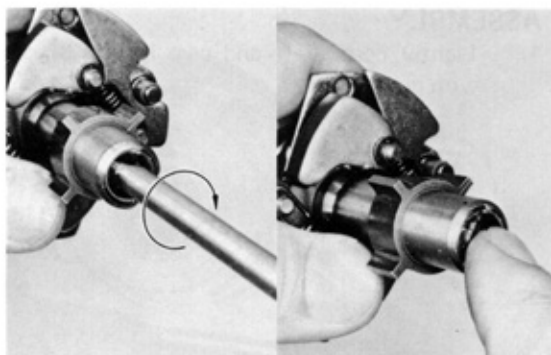


Fig. 8-182

5. Tighten signal rotor with screw.  
Then apply grease and fit grease stopper.

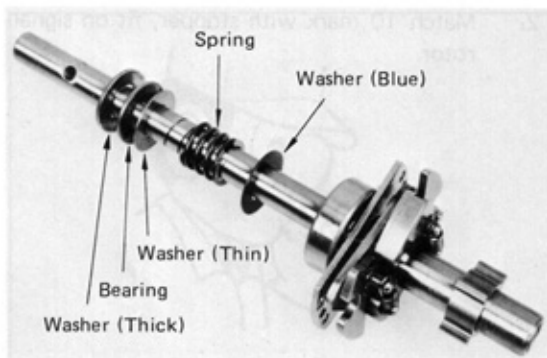


Fig. 8-183

6. Assemble following parts on shaft in numerical order.
  - (1) Washer (Blue)
  - (2) Spring
  - (3) Washer (Thin)
  - (4) Bearing
  - (5) Washer (Thick)

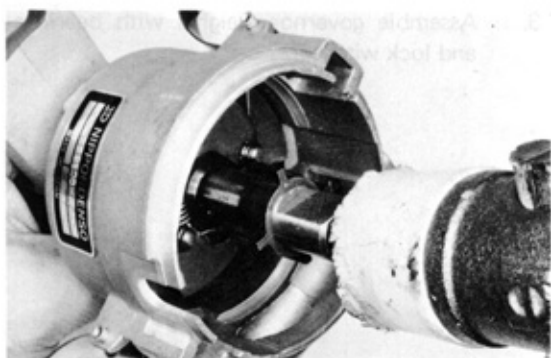


Fig. 8-184

7. Drive in governor shaft assembly.

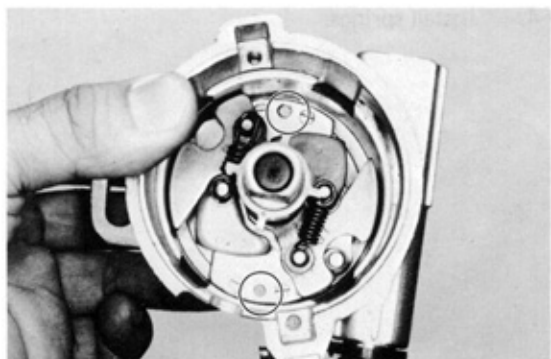


Fig. 8-185

8. Align holes in the bearing retainer and housing.

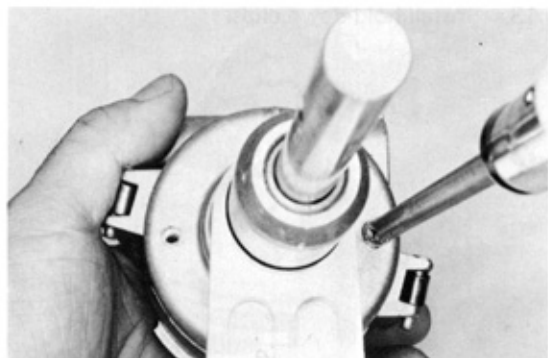


Fig. 8-186

9. Tighten the two bearing retainer screws.

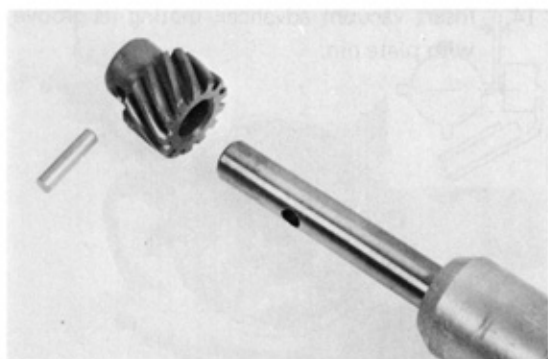


Fig. 8-187

10. Install the new gear and pin.

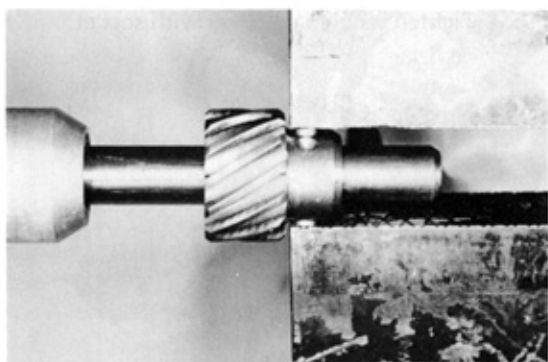


Fig. 8-188

11. Peen both ends in a vice.

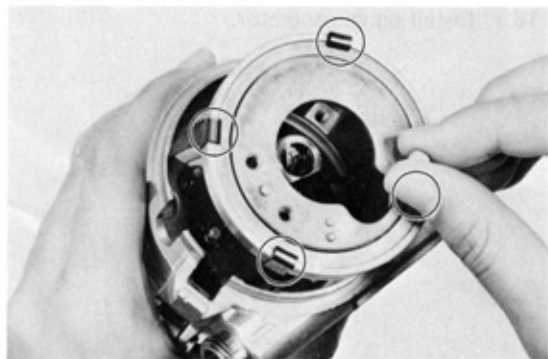


Fig. 8-189

12. Install breaker plate so its' four clips fit properly in housing slots.

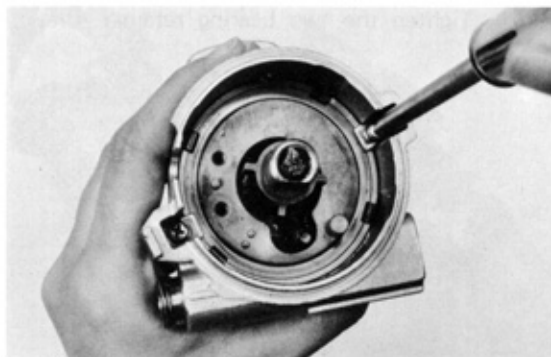


Fig. 8-190

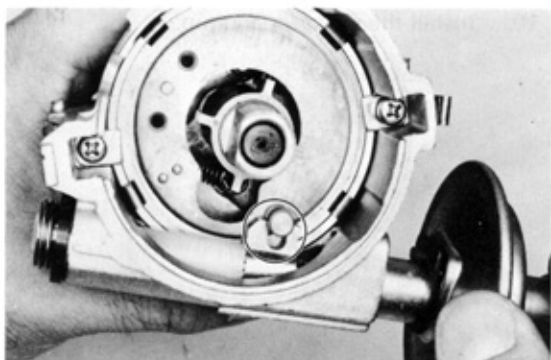


Fig. 8-191

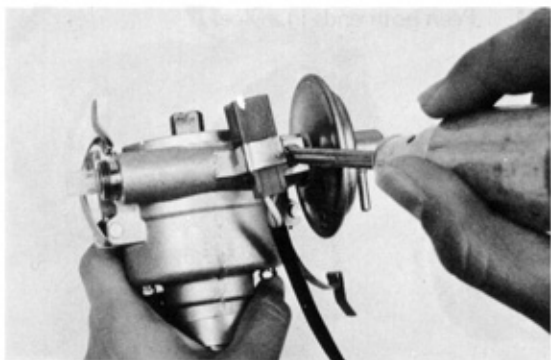


Fig. 8-192

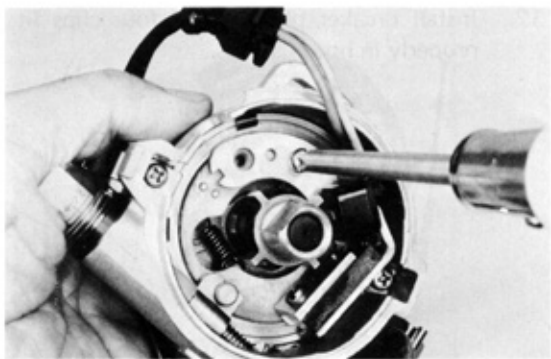


Fig. 8-193

13. Install hold-down clips.

14. Insert vacuum advancer, mating its groove with plate pin.

15. Tighten vacuum advancer with socket.

16. Install signal generator.



Fig. 8-194

17. Clamp signal wire grommet.

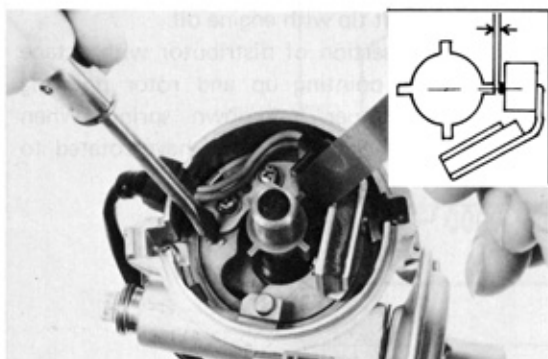


Fig. 8-195

18. Adjust air gap.

**Air Gap**

**0.008 – 0.016 in  
(0.2 – 0.4 mm)**

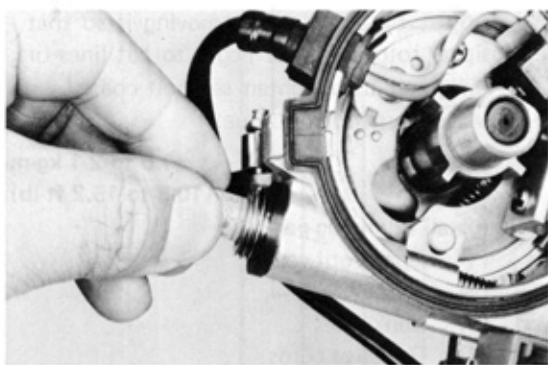


Fig. 8-196

19. Set the octane selector at standard line.

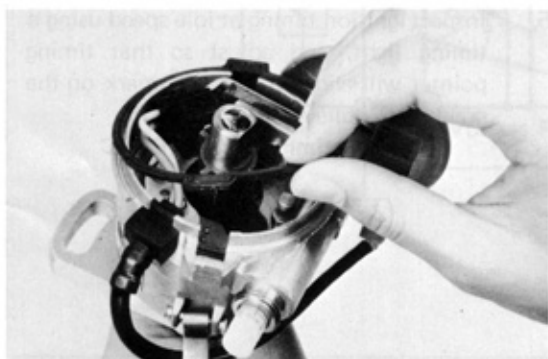


Fig. 8-197

20. Install dustproof cover gasket.

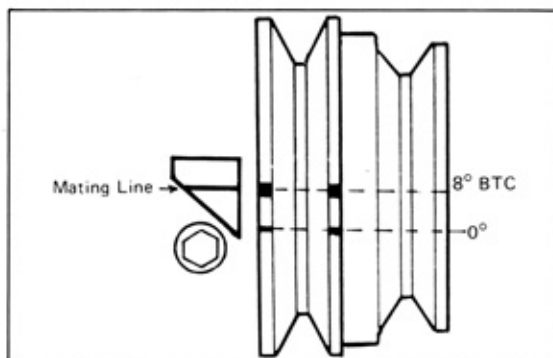


Fig. 8-198



Fig. 8-199

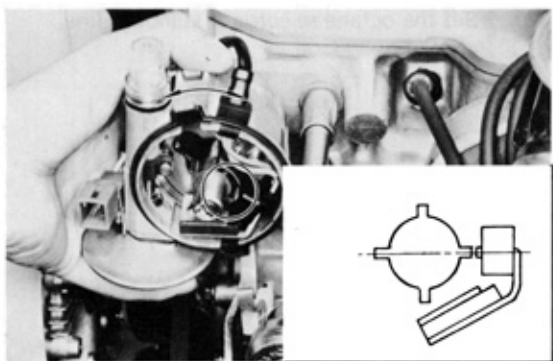


Fig. 8-200

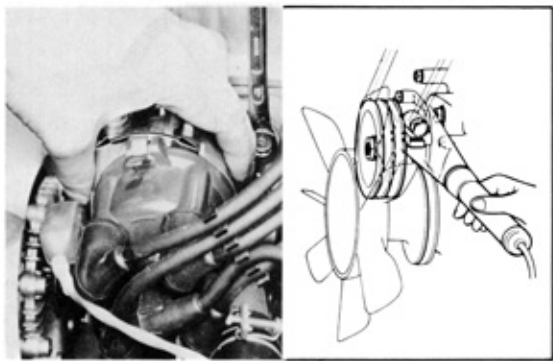


Fig. 8-201

## INSTALLATION

1. Set No. 1 cylinder to  $8^{\circ}$  BTDC. At this condition, rocker arms on No. 1 cylinder should be loose and rockers on No. 4 should be tight.
2. Coat shaft tip with engine oil. Begin insertion of distributor with octane selector pointing up and rotor pointing toward upper hold-down spring. When fully installed, rotor will have rotated to position shown.
3. Adjust the housing by moving it so that signal rotor will just begin to cut lines of flux, and then tighten set bolt coated with sealer to specified torque.
 

<b>Torque</b>	<b>1.5 to 2.1 kg-m</b>
	<b>(10.8 to 15.2 ft-lb)</b>
4. Install following parts.
  - (1) Dustproof cover
  - (2) Rotor
  - (3) Cap
  - (4) Resistive cords
  - (5) Vacuum hose
  - (6) Primary wire
5. Inspect ignition timing at idle speed using a timing light, and adjust so that timing pointer will align with the  $8^{\circ}$  mark on the crankshaft pulley.
 

<b>Ignition timing</b>	<b><math>8^{\circ}</math> BTDC</b>
------------------------	------------------------------------

# CHARGING SYSTEM

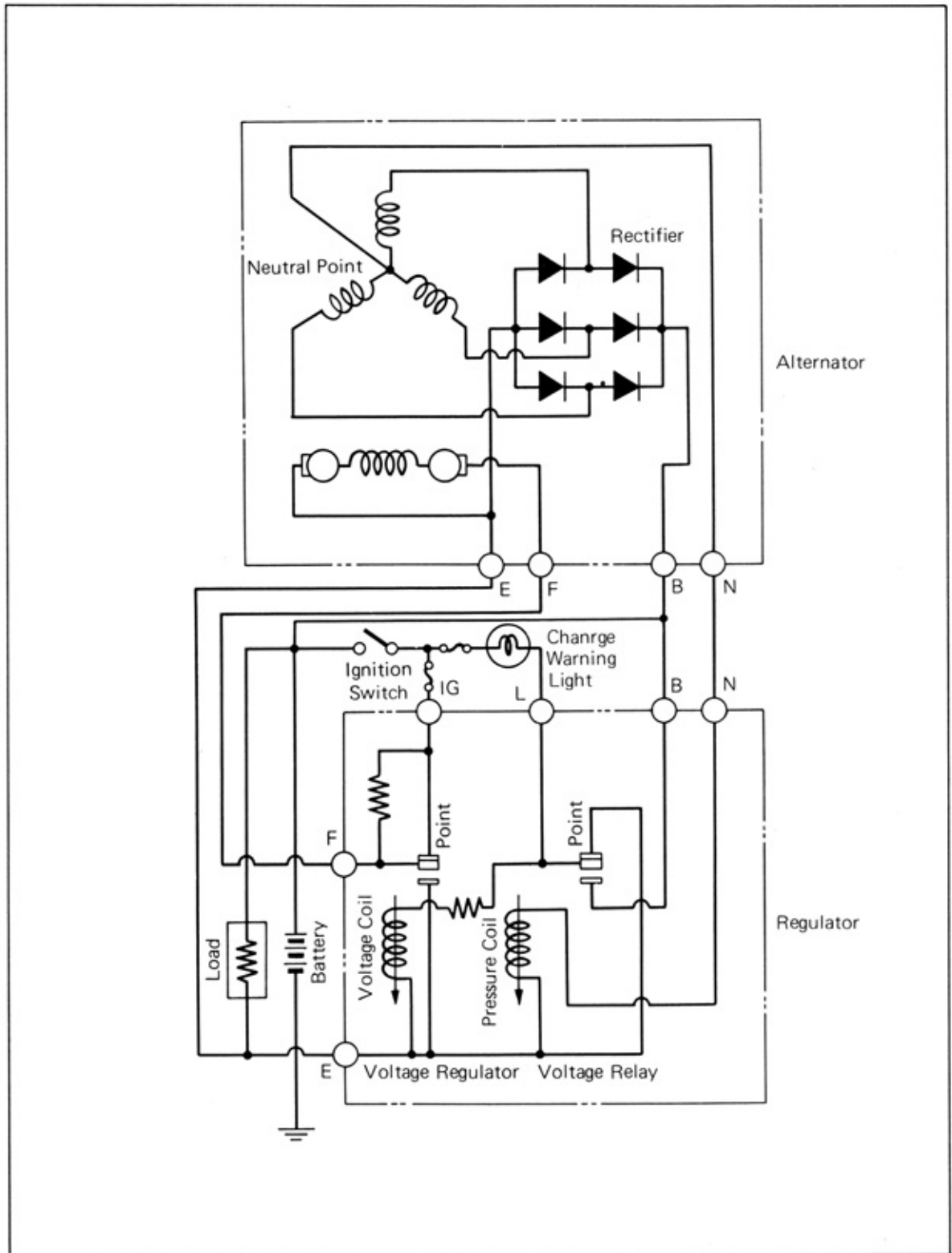


Fig. 8-202 Charging System Circuit

## ALTERNATOR

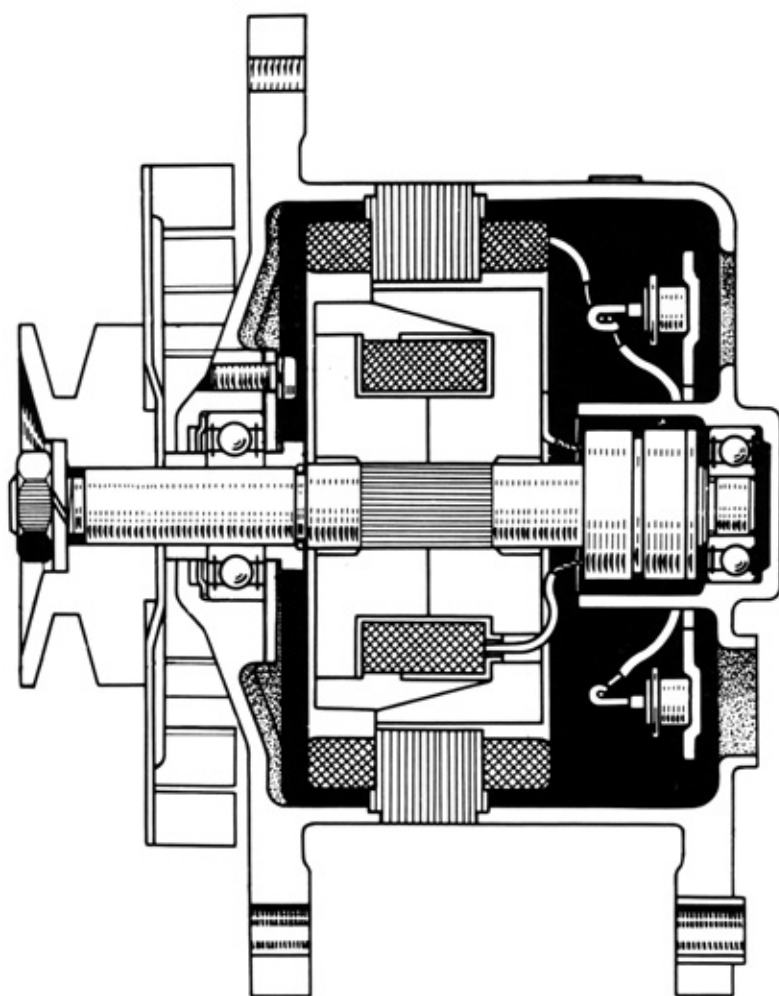
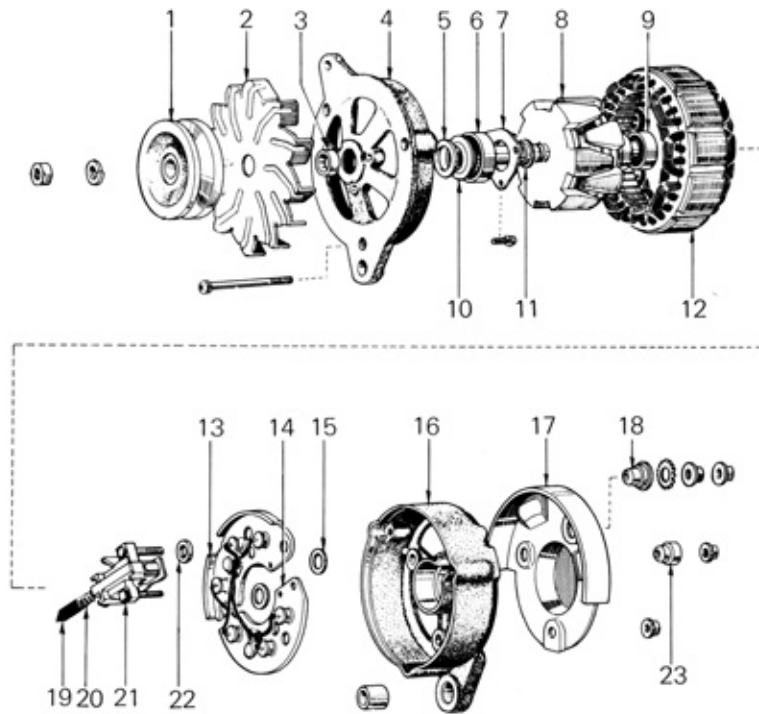


Fig. 8-203 Sectional View of Alternator





- |                     |                          |
|---------------------|--------------------------|
| 1. Pulley           | 13. (+) Rectifier holder |
| 2. Fan              | 14. (-) Rectifier holder |
| 3. Spacer collar    | 15. Insulator            |
| 4. Drive end frame  | 16. Rear end frame       |
| 5. Felt ring        | 17. Rear end cover       |
| 6. Bearing          | 18. Insulator            |
| 7. Bearing retainer | 19. Brush                |
| 8. Rotor            | 20. Brush spring         |
| 9. Bearing          | 21. Brush holder         |
| 10. Felt cover      | 22. Insulator            |
| 11. Spacer ring     | 23. Insulator            |
| 12. Stator assembly |                          |

Fig. 8-204 Component Parts

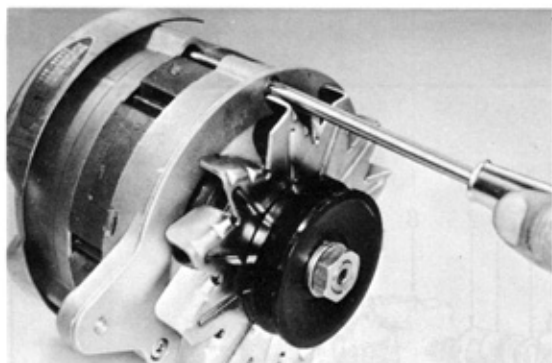


Fig. 8-205 Remove Body Screws

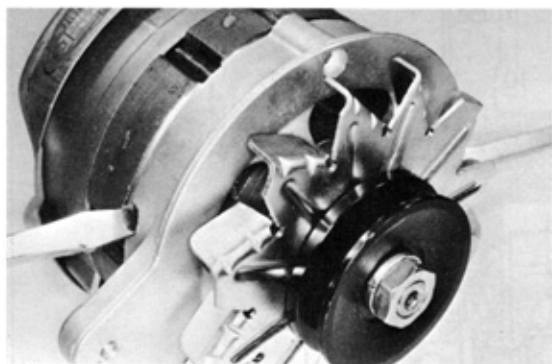


Fig. 8-206 Pry Drive End Frame

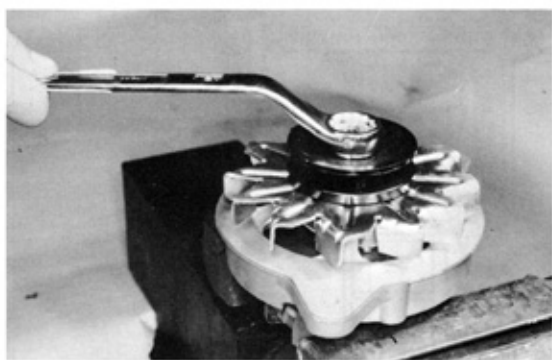


Fig. 8-207 Loosen Pulley Nut

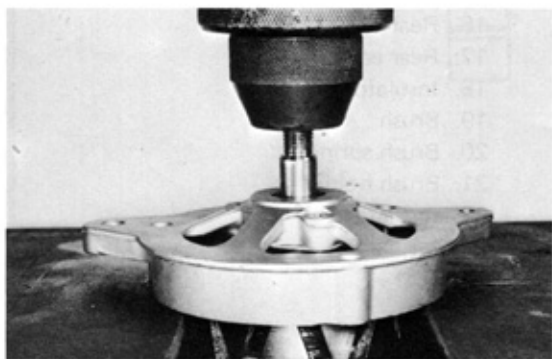


Fig. 8-208 Press Out Rotor

## DISASSEMBLY

1. Remove three body screws.

2. Pry drive end frame from stator.

— Note —

**Do not pry coil wires.**

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

4. Remove rotor from drive end frame using a press; then remove spacer ring.

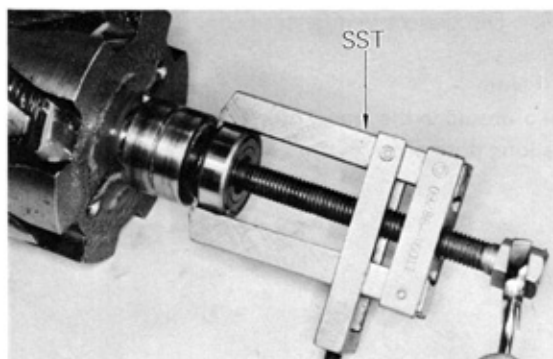


Fig. 8-209 Remove Bearing

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

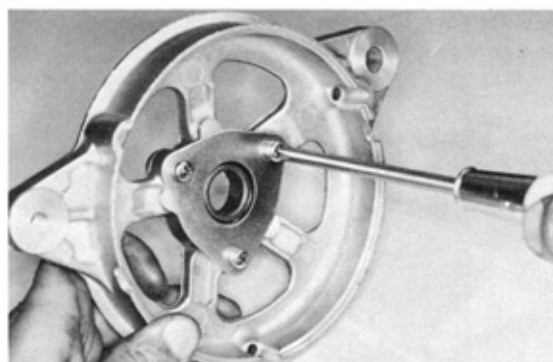


Fig. 8-210 Remove Bearing Retainer

6. Remove bearing retainer, bearing, felt cover and felt ring.

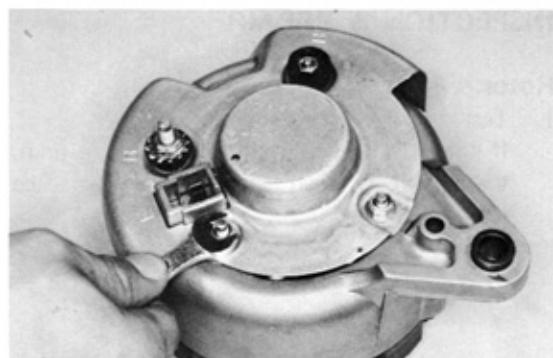


Fig. 8-211 Remove Rear End Cover

7. Remove four rectifier support nuts and terminal insulators, then rear end cover.



Fig. 8-212 Take Off Insulator Plates

8. Take off insulator plates.

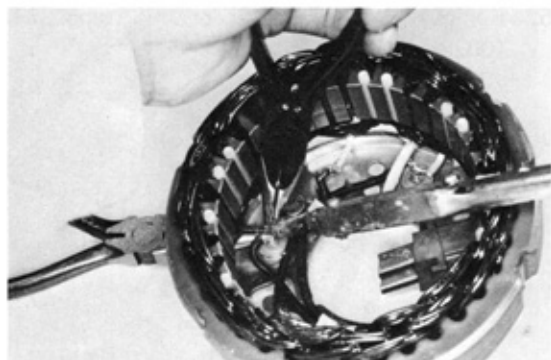


Fig. 8-213 Disconnect Rectifier

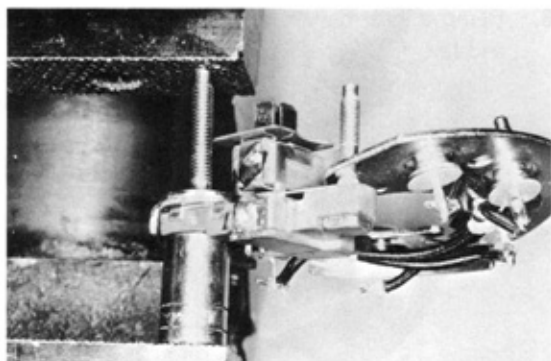


Fig. 8-214 Remove Brush Holder

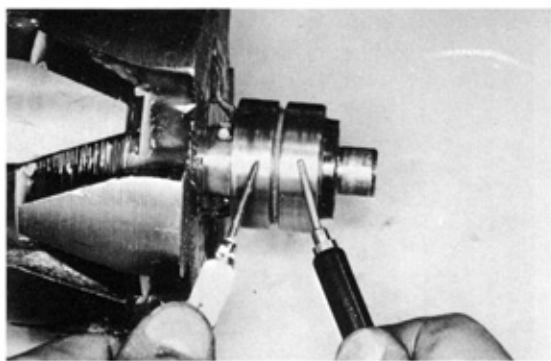


Fig. 8-215 Test Rotor for Open Circuit

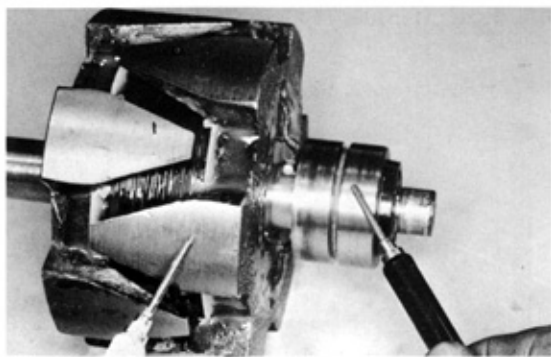


Fig. 8-216 Test Rotor for Ground

9. Disconnect rectifiers.

— Note —

To unsolder the leads, hold the rectifier lead with a long nose pliers to protect rectifier from heat.

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

## INSPECTION & REPAIR

### Rotor

1. Test rotor for open circuit.  
If there is no continuity between the rings, the circuit is open and the rotor must be replaced.
2. Test rotor for ground.  
If there is continuity between slip ring and rotor, the rotor is grounded and must be replaced.



Fig. 8-217 Check Bearing

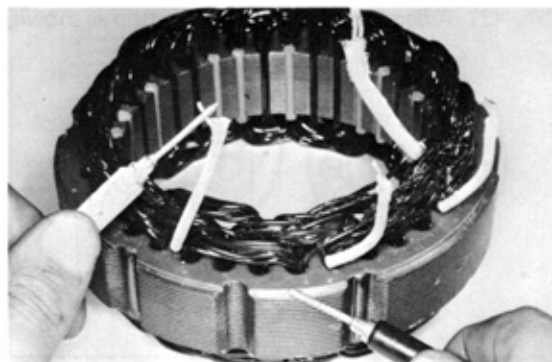


Fig. 8-218 Test Stator for Ground

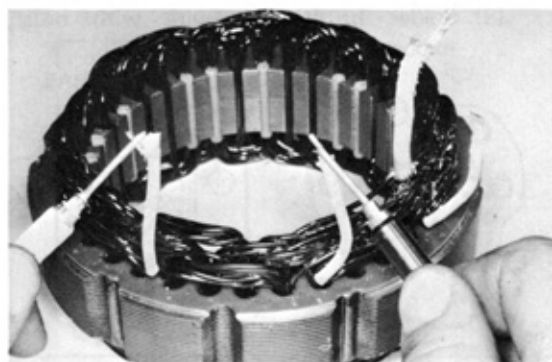


Fig. 8-219 Test Stator for Open Circuit

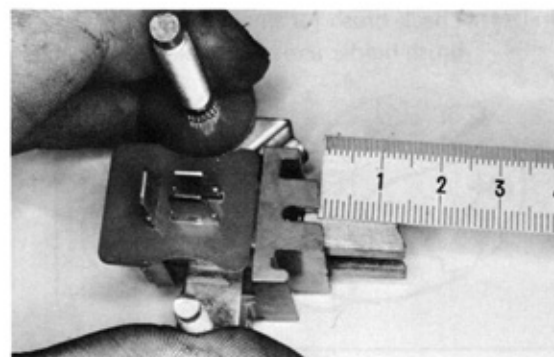


Fig. 8-220 Measure Brush Length

3. Check the bearing, and if worn or rough, replace.
4. Check the slip rings, and if rough or scored, replace the rotor.

### Stator

1. Test stator for ground.  
If there is continuity between stator core and stator coil lead, coil is grounded and stator assembly must be replaced.
2. Test stator for open circuit.  
Test all four leads for continuity. If there is no continuity, circuit is open and stator assembly must be replaced.

### Brush & Brush Holder

Check exposed brush length.

**Minimum exposed length 5.5mm (0.217 in)**

If below the limit, replace brush as follows;

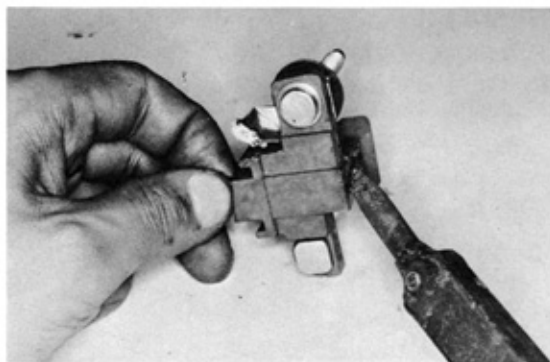


Fig. 8-221 Remove Brush

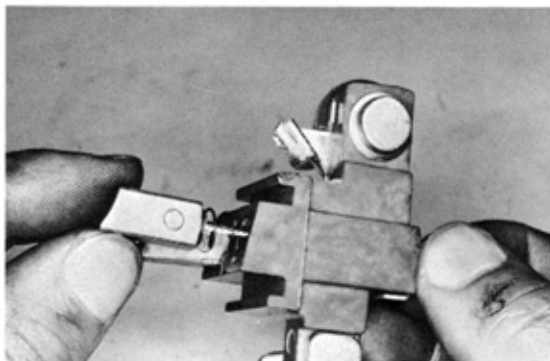


Fig. 8-222 Assemble Spring and Brush



Fig. 8-223 Solder Brush Lead

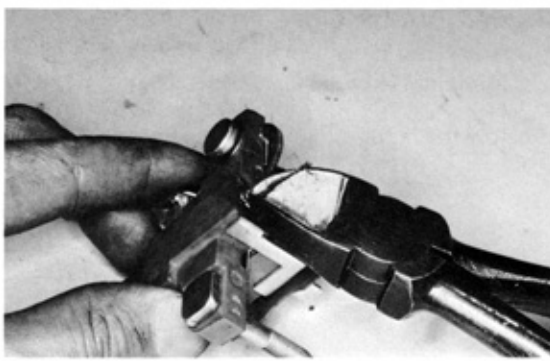


Fig. 8-224 Cut Off Excess Wire

(1) Unsolder and remove brush and spring.

(2) Assemble new brush and spring as shown.

(3) Solder brush lead wire with brush exposed about 12.5mm (0.492 in).

(4) Check brush for smooth movement in the brush holder and cut off excess wire.

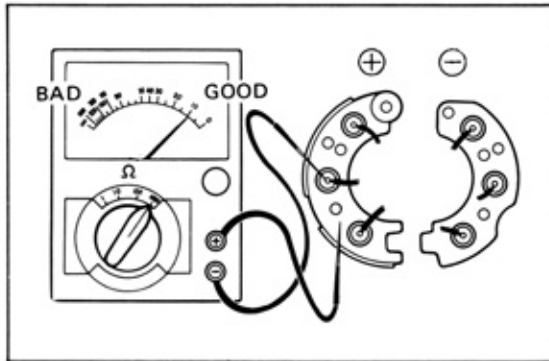


Fig. 8-225 Check Positive Rectifier

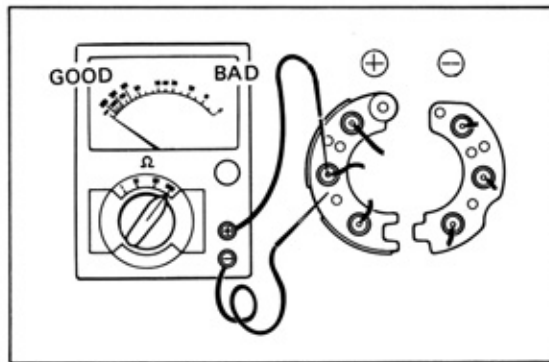


Fig. 8-226 Check Positive Rectifier

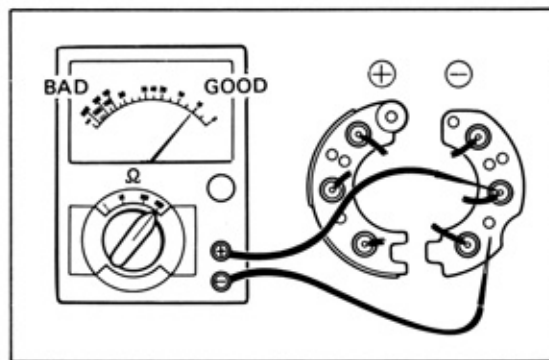


Fig. 8-227 Check Negative Rectifier

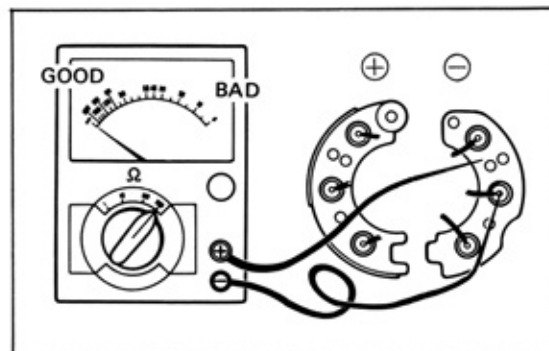


Fig. 8-228 Check Negative Rectifier

### 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.

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

2. 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.

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



Fig. 8-229 Solder Negative Side

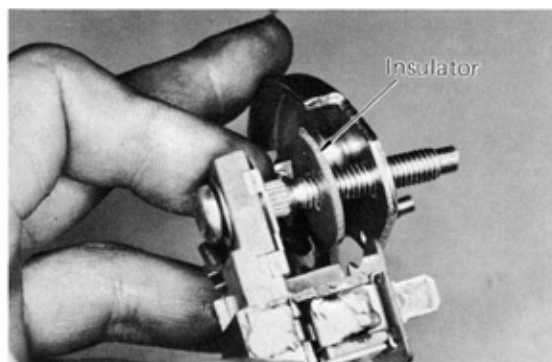


Fig. 8-230 Insert Insulator

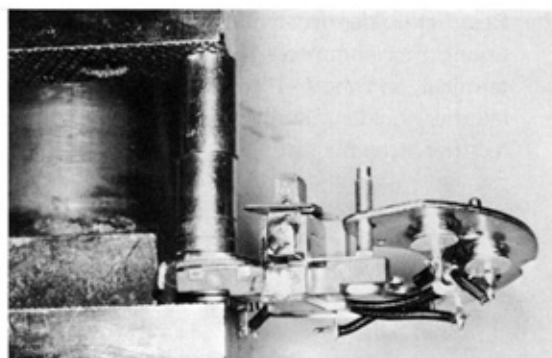


Fig. 8-231 Install Brush Holder

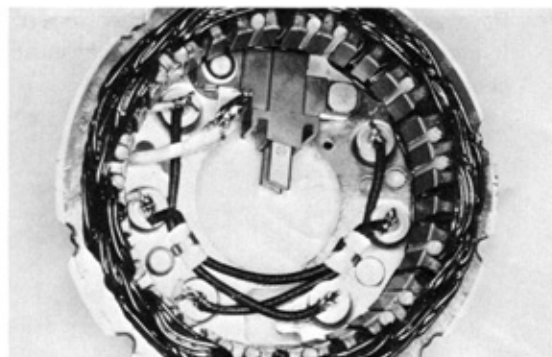


Fig. 8-232 Solder Each Lead

**ASSEMBLY**

1. Solder negative side rectifiers.

— Note —

When soldering the leads, hold the rectifier terminal with a long-nose pliers to protect the rectifier from heat.

2. Insert insulator between positive rectifier holder and brush holder.

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

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

— Note —

When soldering the leads, hold the rectifier terminal with a long-nose pliers to protect the rectifier from heat.



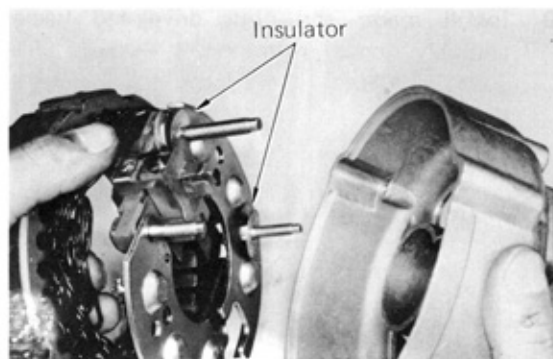


Fig. 8-233 Assemble Rear End Frame

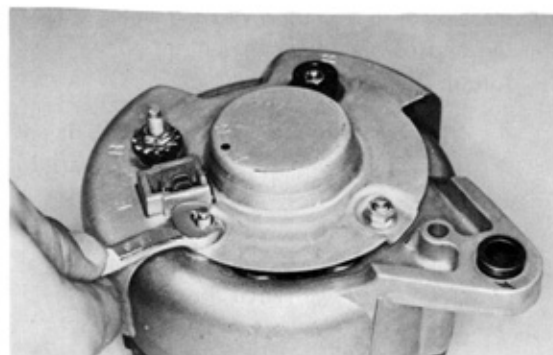


Fig. 8-234 Assemble End Cover

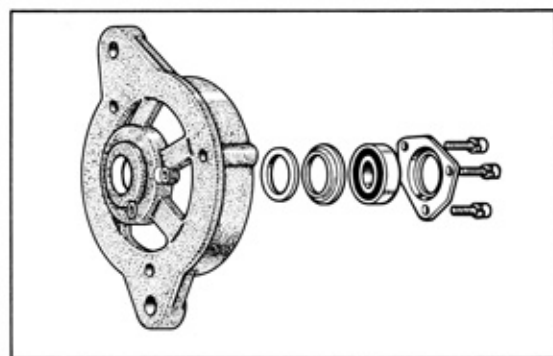


Fig. 8-235 Assemble Drive End Frame

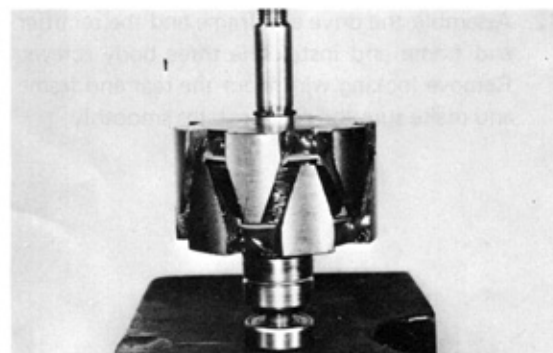


Fig. 8-236 Press Bearing

5. Assemble rear end frame and rectifier holder with insulators.

6. Assemble rear end cover with insulators.

7. Install felt ring, ring cover and bearing, and install bearing retaining plate to drive end frame.

8. Press bearing onto rotor shaft.

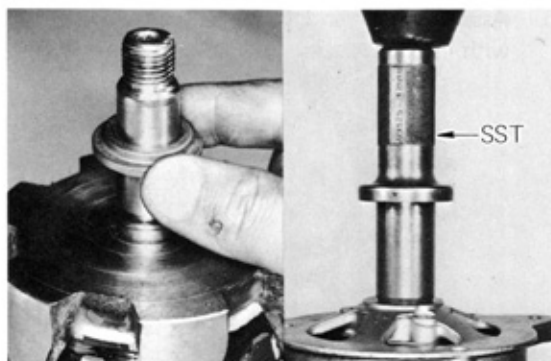


Fig. 8-237 Install Drive End Frame

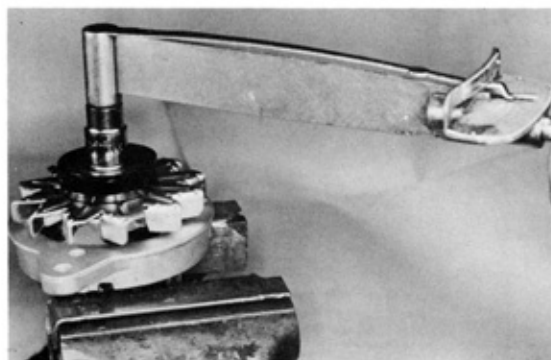


Fig. 8-238 Tighten Pulley Nut

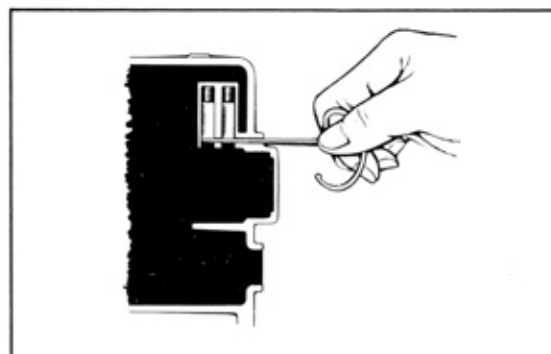


Fig. 8-239 Insert Wire

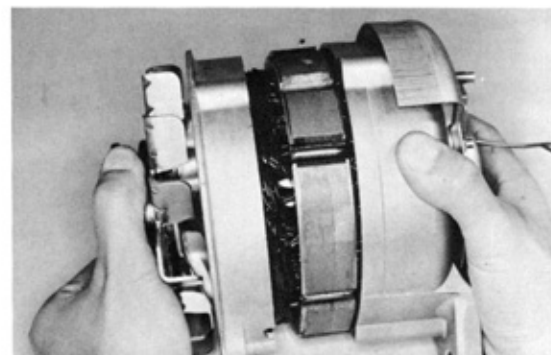


Fig. 8-240 Assemble Drive and Rear Frame

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

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

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

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

Position lead wires to clear rotor.

12. Assemble the drive end frame and the rectifier end frame and install the three body screws. Remove locking wire from the rear end frame and make sure the rotor rotates smoothly.



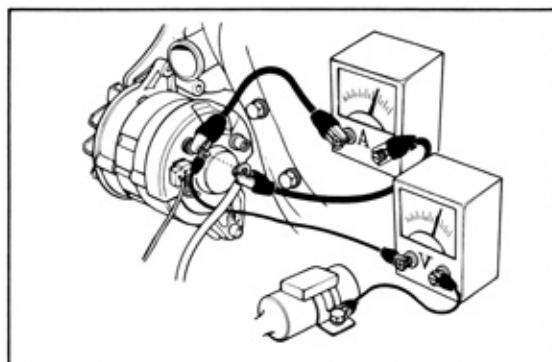


Fig. 8-244 Connect Voltmeter and Ammeter

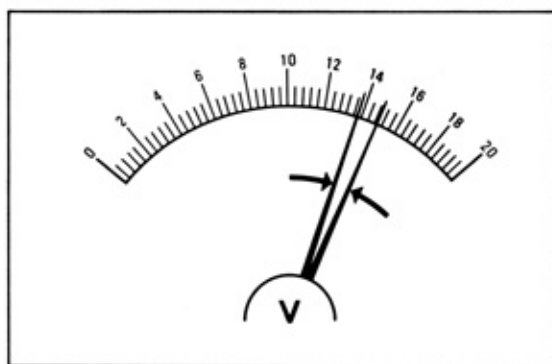


Fig. 8-245 Voltmeter Reading

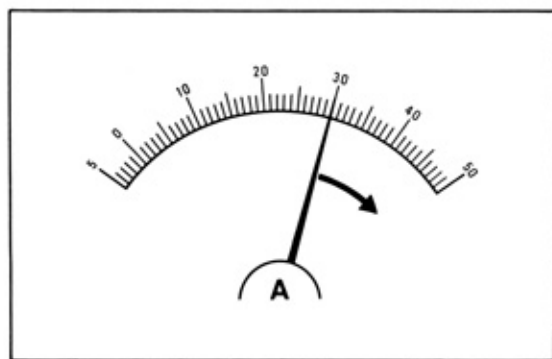


Fig. 8-246 Ammeter Reading

## PERFORMANCE TEST

1. Connect voltmeter and ammeter as illustrated.
2. Start the engine, and run it at approximately 2000 rpm with all lights and accessories turned on. The ammeter reading should be over 30 amperes with the voltage of 13.8 – 14.8 volts. If the battery is in fully charged state and the amperage reading is less than the specified amperage, it is recommended that the battery should be discharged by rotating the engine with the ignition coil high tension cord disconnected for about 5 – 10 seconds.