

# 17. Charging System/Alternator

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## Service Information

### ▲ WARNING

- The battery gives off explosive gases; keep sparks, flames, and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous. If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.
- KEEP OUT OF REACH OF CHILDREN.

- Always turn off the ignition switch before disconnecting any electrical component.

### CAUTION

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.

### NOTE

- The maintenance free battery must be replaced when it reaches the end of its service life.

### CAUTION

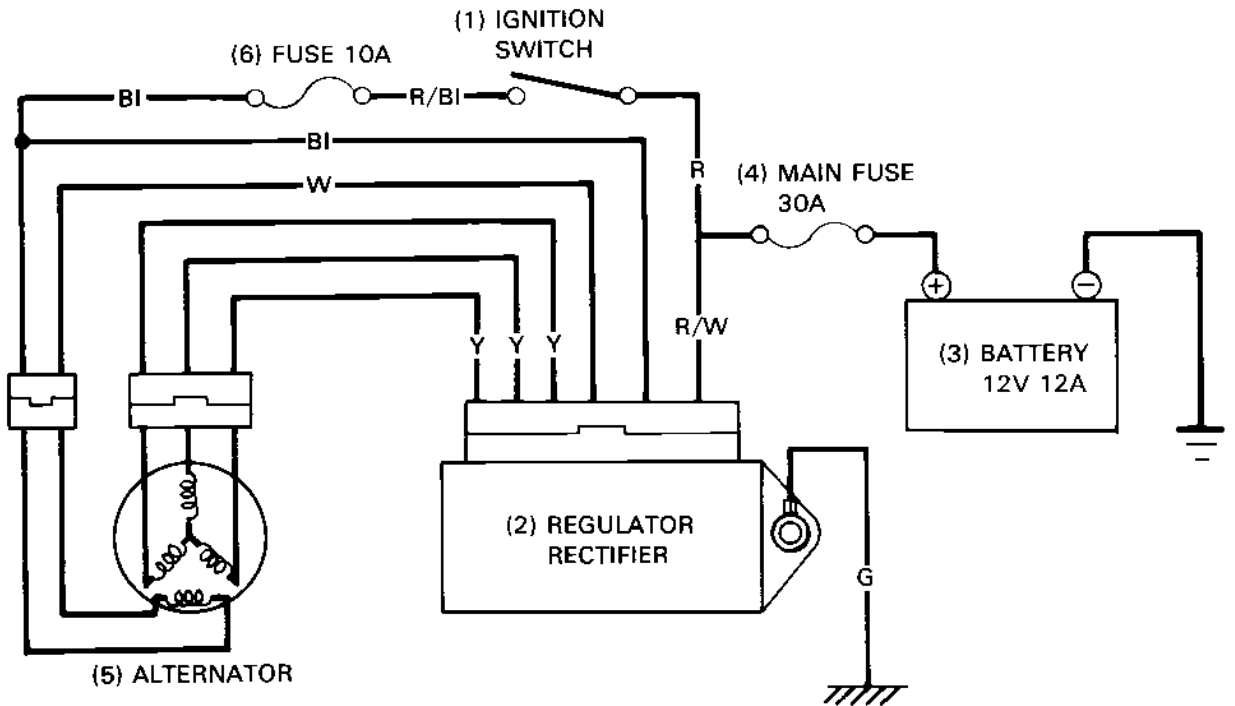
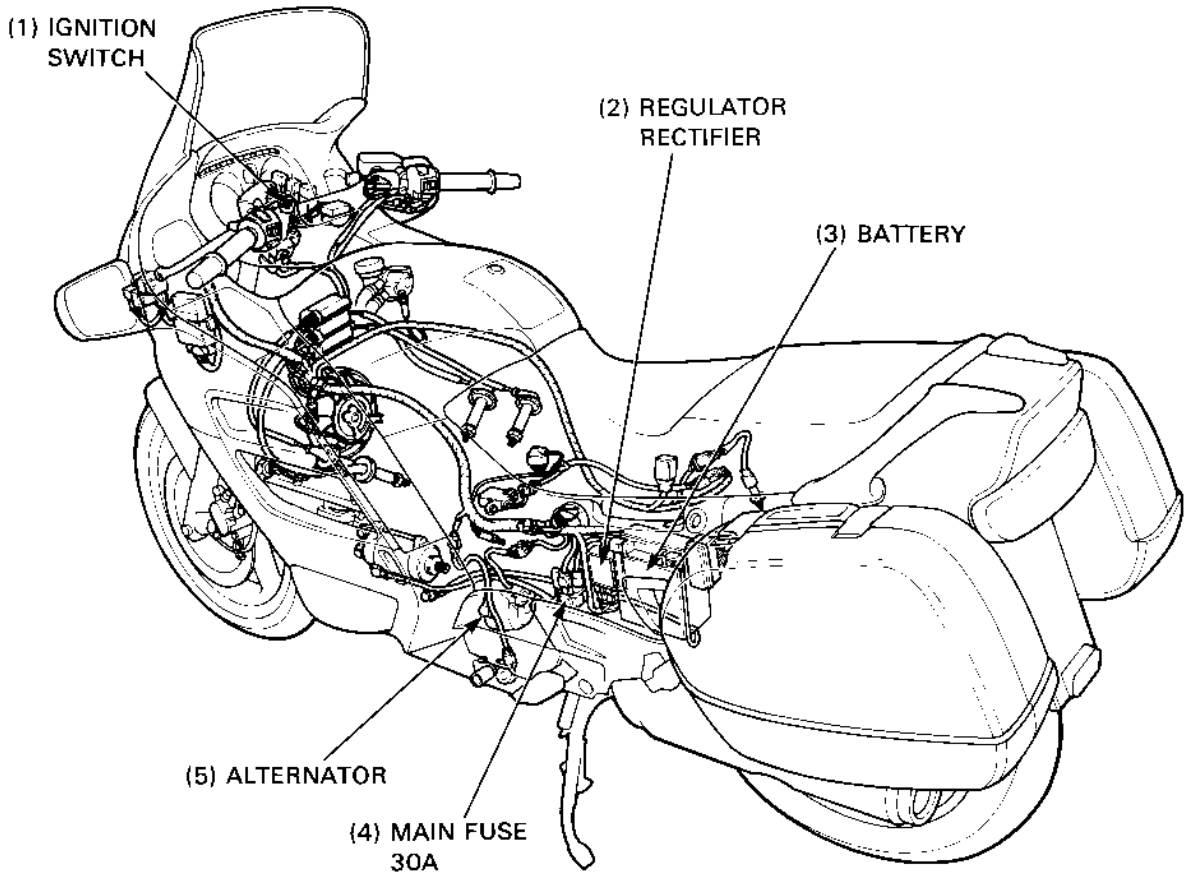
- The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.

- Battery can be damaged if overcharged or undercharged, or if left to discharge for long periods. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of a battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected to be the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharge symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from forming.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initial-charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 17-4).
- For battery testing/charging, refer to section 22 of the Common Service Manual.
- For charging system location, see page 17-2.

# System Location

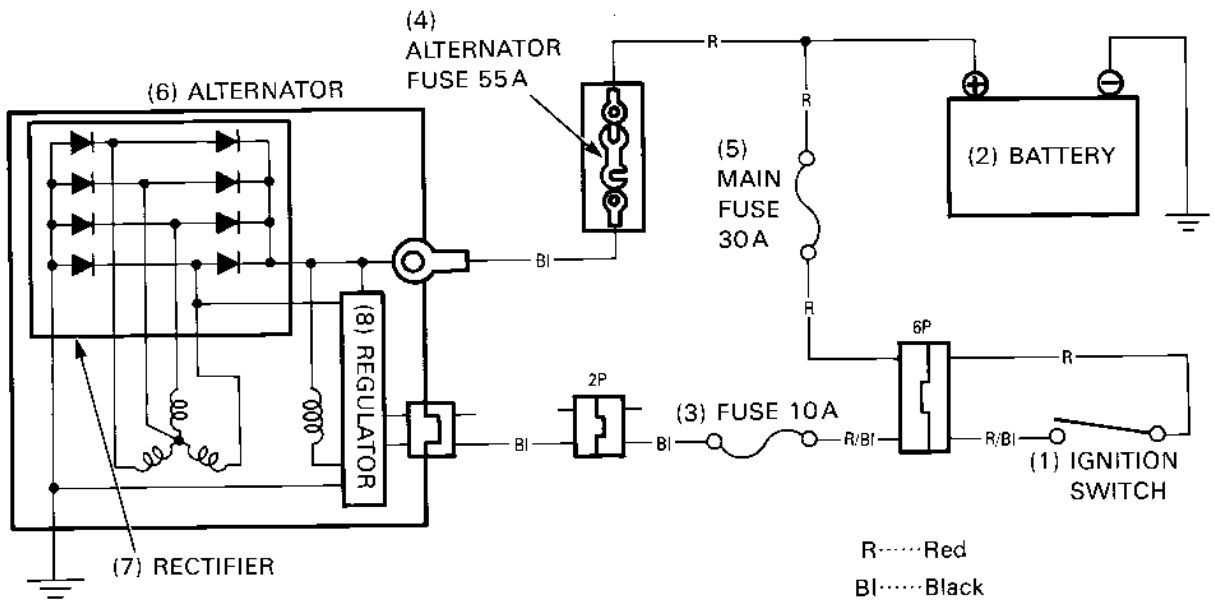
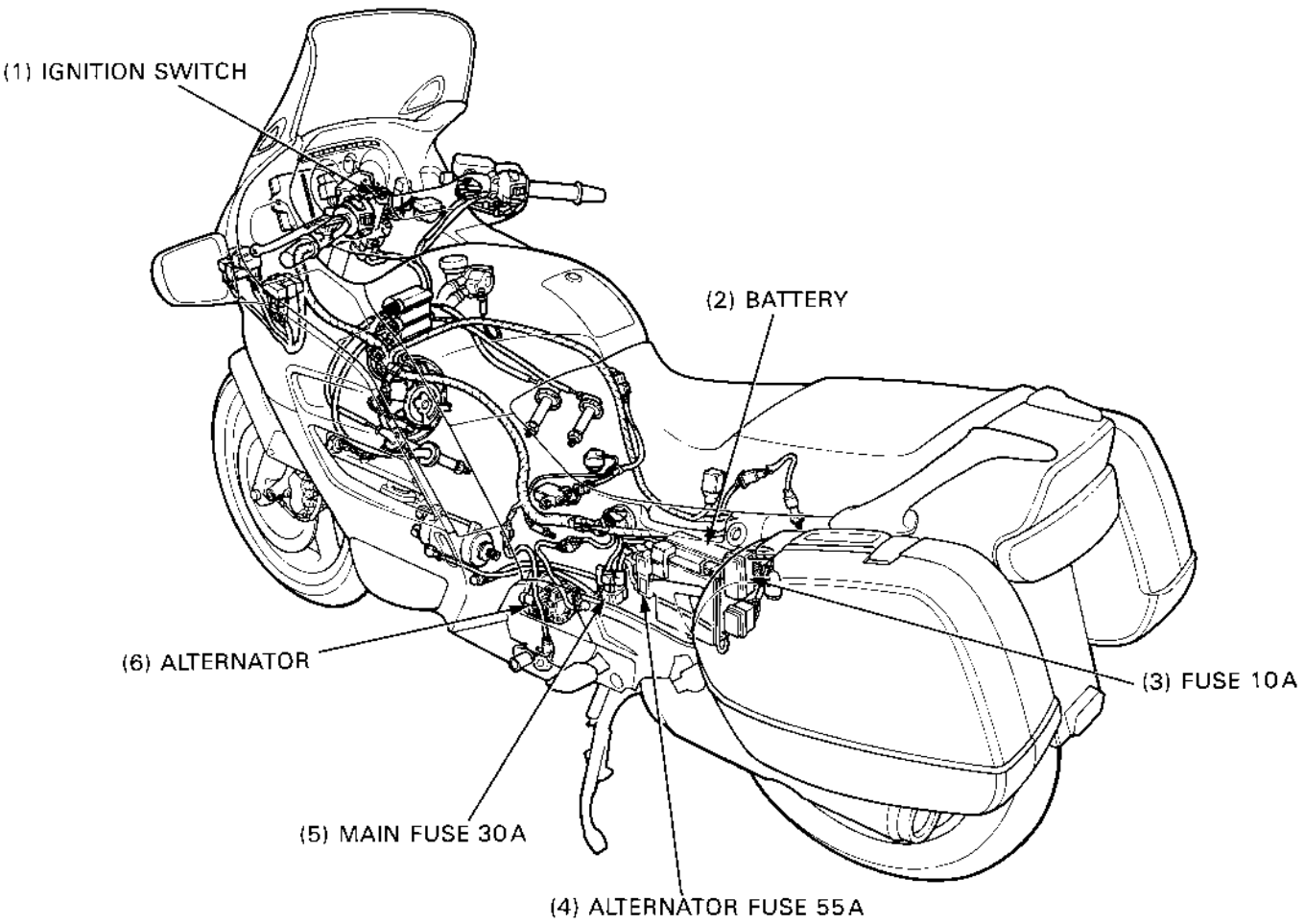
'91-'95

Standard model shown:



After '95

LBS-ABS/TCS model shown:



# Troubleshooting

'91-'95

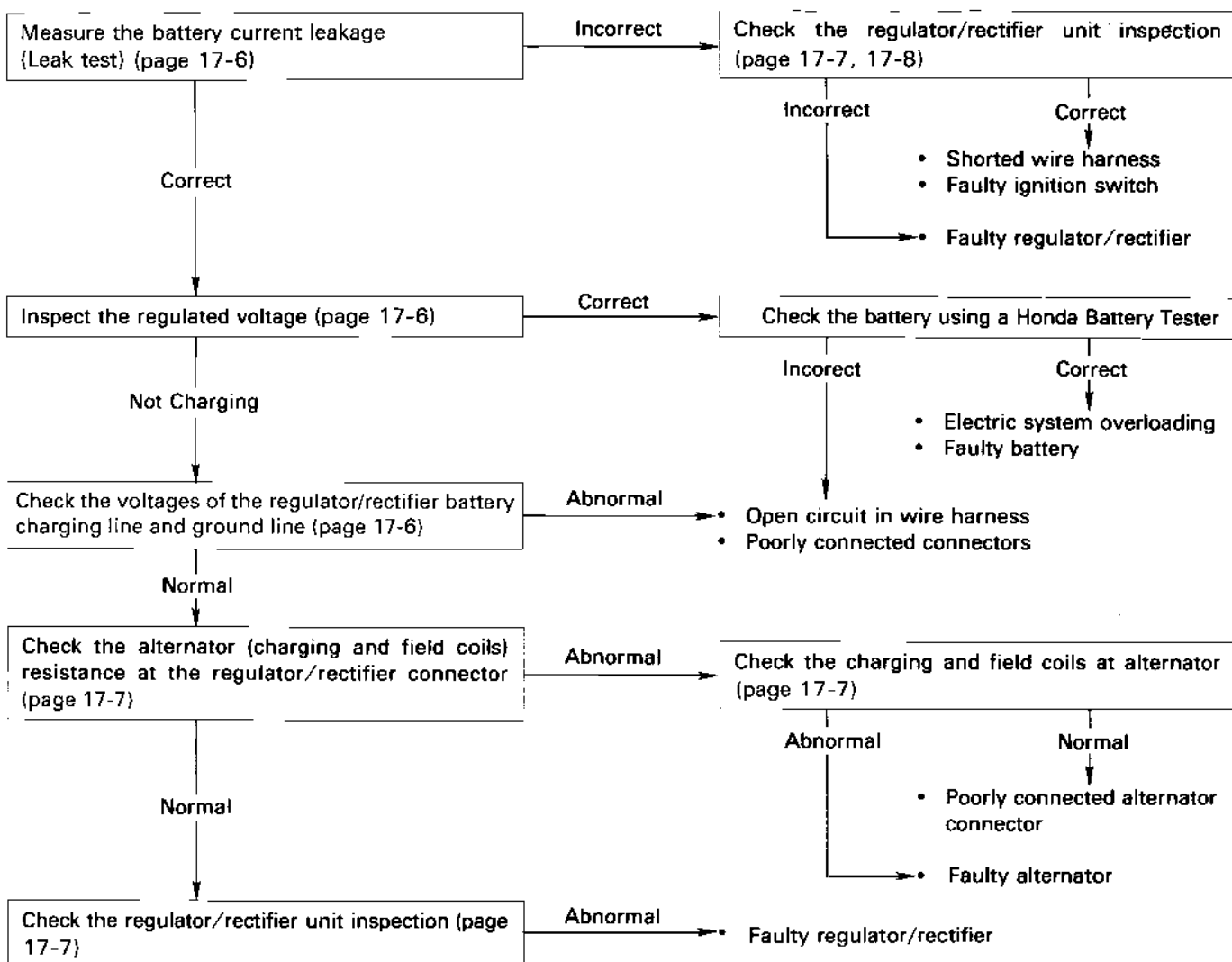
## Battery Overcharging

- Faulty regulator/rectifier

## Battery Undercharging

### NOTE

- In order to obtain accurate test readings when checking the charging system, the battery must be fully charged and in good condition. See Common Service Manual section 22 for checking the battery condition.

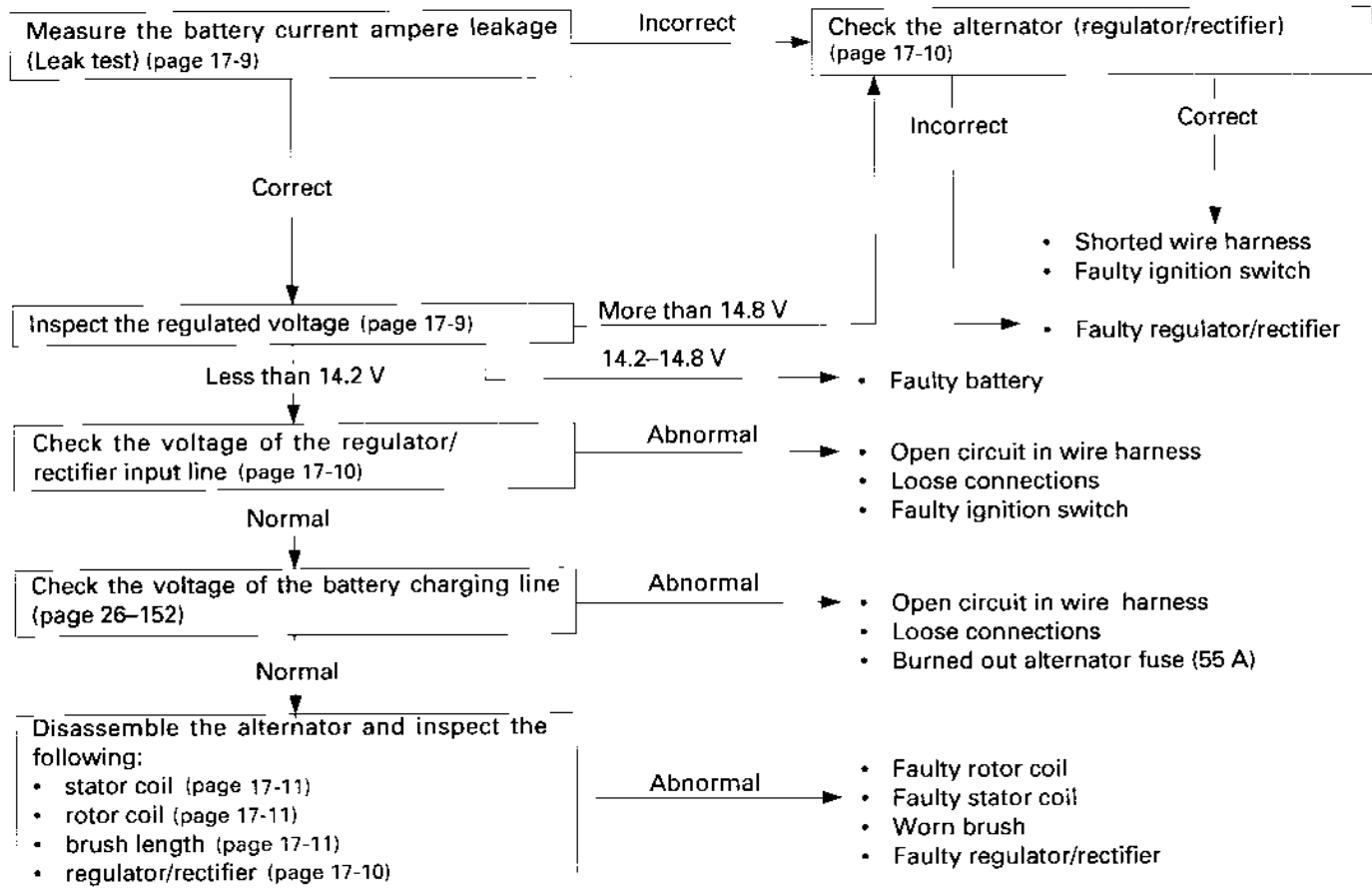


After '95

- Inspect the following before diagnosis the system.
  - discharged battery
  - loose or corroded terminals of the connectors

NOTE

- In order to obtain accurate test readings when charging system, the battery must be fully charged and in good condition. See Common Service Manual section 22 for checking the battery condition.



## Charging System Inspection ('91-'95)

### Current Leakage Test

Turn off the ignition switch, and disconnect the ground (-) cable from the battery.

Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery (-) terminal.

With the ignition switch off, check for current leakage.

#### NOTE

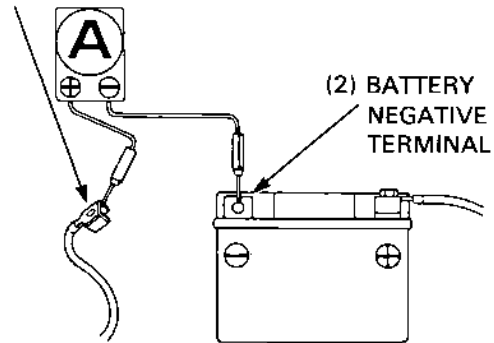
- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow larger than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

**Specified Current Leakage: 3 mA max.**

If current leakage exceeds the specified value, a short circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

(1) BATTERY GROUND CABLE



### Regulated Voltage/Ampere Inspection

#### NOTE

- Before performing this test, be sure that the battery is fully charged and that the voltage between its terminals is greater than 12.6 V.

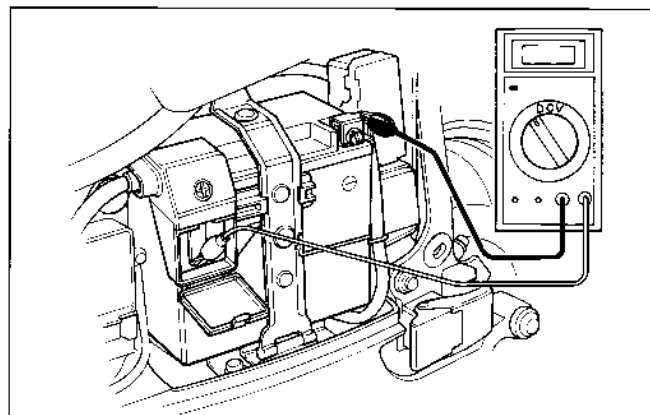
Remove the left side cover (page 2-2).

Start the engine and warm it up to operating temperature, then turn the ignition switch OFF.

#### ▲ WARNING

- If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

Connect a voltmeter between the battery terminals.



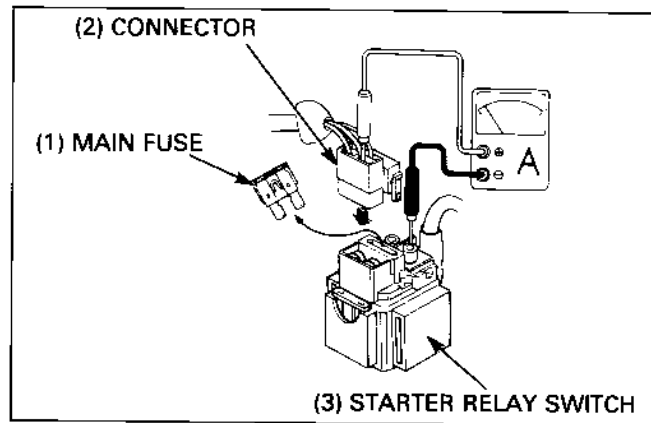
Disconnect the starter relay switch connector and remove the main fuse.

Reconnect the connector securely.

Connect the ammeter as shown.

**CAUTION**

- Be careful not to short any tester probes.
- Although the current could be measured when the ammeter is connected between the battery positive terminal and the positive cable, a sudden surge of current to the starter motor could damage the ammeter.
- Always turn the ignition off when conducting the test. Disconnecting the ammeter or wires when current is flowing may damage the ammeter.



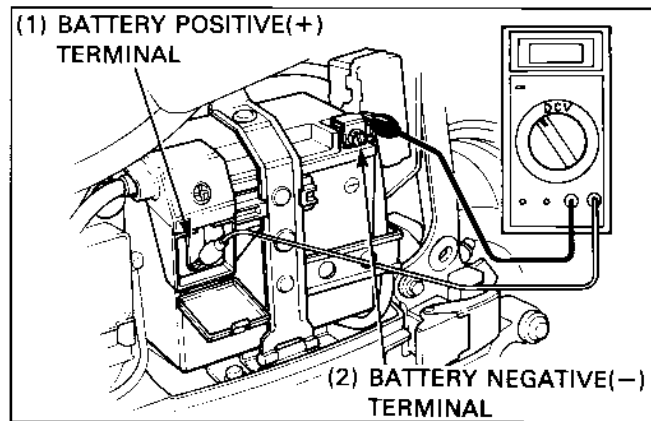
**NOTE**

- Before making this test, all the lights and the other electrical equipment should be OFF.
- Use fully charged battery to make this test for correct measurement.

Start the engine and increase the engine speed gradually.

**Regulated Voltage:** 12.6–15.0 V/5,000 rpm

**Charging Current:** 0–1.0 A/5,000 rpm



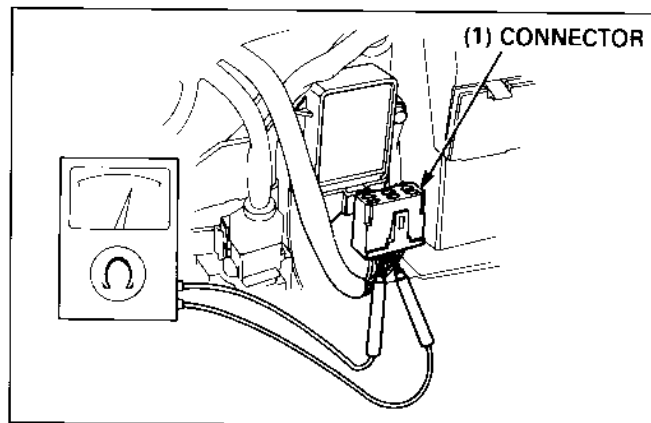
## Regulator/Rectifier ('91-'95)

### Wire Harness Inspection

Remove the left side cover (page 2-2).

Disconnect the regulator/rectifier 6P connector and check the connector for loose or corroded terminals.

Measure the following between the connectors of the wire harness side.



Item	Terminals	Specification
Battery charging line	Red/White (+) and ground	Battery voltage should register.
Charging coil line	Yellow and Yellow	0–1.0Ω (20°C/68° F)
Field coil line	White and Black	0–4.0Ω (20°C/68° F)

## Charging System/Alternator

### Unit Inspection

Unit: k $\Omega$

Provided the circuits on the wire harness side are normal and there are no loose connections at the connector, inspect the regulator/rectifier unit by measuring the resistance between the terminals.

#### NOTE

- You'll get false readings if the probes touch your fingers.
- Use the specified multimeters. Using other equipment may not allow you to obtain the correct results. This is due to the characteristic of semiconductors, which have different resistance values depending on the applied voltage.

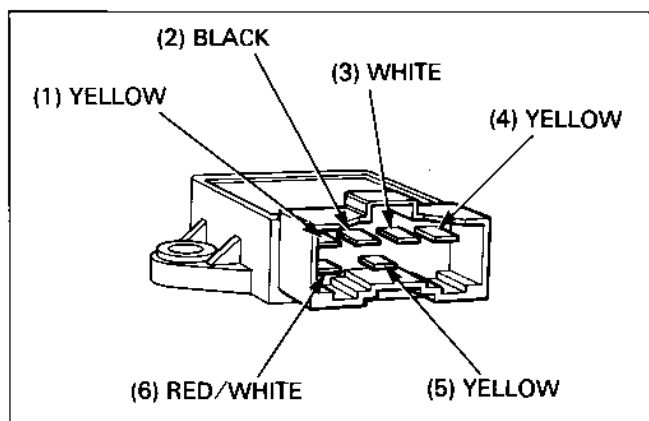
#### Specified Multimeter :

— SP—15D (SANWA Analogue type)  
— TH—5H (KOWA Analogue type)

- Select the following range :  
SANWA : k $\Omega$   
KOWA : X100
- An old battery stored in the multimeter could cause inaccurate readings. Check the battery if the multimeter resistance is incorrect.

Replace the regulator/rectifier unit if the resistance value between the terminals is abnormal.

+ Probe - Probe	Red/ White	Yellow 1	Yellow 2	Yellow 3	White
Red/White		$\infty$	$\infty$	$\infty$	$\infty$
Yellow 1	7.5		$\infty$	$\infty$	$\infty$
Yellow 2	7.5	$\infty$		$\infty$	$\infty$
Yellow 3	7.5	$\infty$	$\infty$		$\infty$
White	60	28	28	28	



## Alternator Inspection ('91-'95)

#### NOTE

- It is not necessary to remove the stator coil to make this test.

Remove the left side cover (page 2-2) and disconnect the alternator 3P (Red) and 2P (Black) connectors.

Measure the resistance between the yellow wire terminals and check for no continuity between each terminal and ground.

**Yellow terminal-Yellow terminal: 0—1.0 $\Omega$**

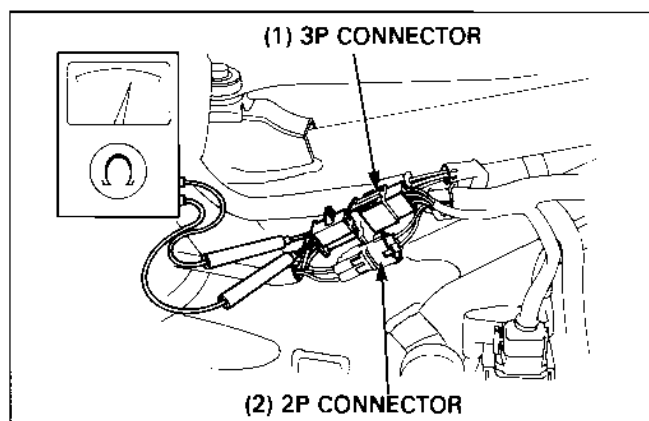
**Yellow terminal-White terminal: No continuity**

**Yellow terminal-Red/white terminal: No continuity**

Measure the resistance between the white and black terminals and check for continuity between the 2P connector terminals.

**Standard: 0—4.0 $\Omega$  (20°C/68° F)**

Replace the stator if the resistance is out of specification or if there is continuity between any terminal and ground.





## Charging System Inspection (After '95)

### Current Leakage Test

Remove the left side cover (page 2-2).  
Turn off the ignition switch, and disconnect the ground (-) cable from the battery.

Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery (-) terminal.

With the ignition switch off, check for current leakage.

#### NOTE

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow larger than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

**Specified Current Leakage: 2 mA max.**

If current leakage exceeds the specified value, a short circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

### Regulated Voltage Inspection

#### NOTE

- Before performing this test, be sure that the battery is fully charged and that voltage between its terminals is greater than 12.6 V.

Start the engine and warm it up to operating temperature, then turn the ignition switch OFF.

#### ▲ WARNING

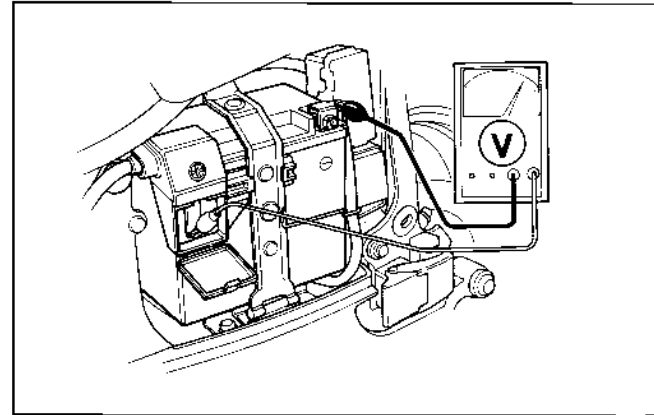
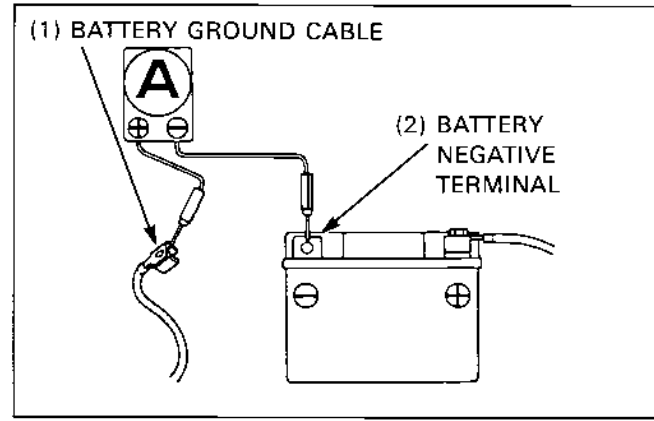
- If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

#### CAUTION

- Be careful not to short any tester probes.

Connect a voltmeter between the battery terminals.  
Turn the headlight ON (High beam) and start the engine.  
Gradually increase the engine speed and check that the voltage is regulated.

**Regulated Voltage: 14.2–14.8 V/5,000 min<sup>-1</sup> (rpm)**



**Wire Harness Inspection**

Disconnect the battery negative (-) cable.

**⚠ WARNING**

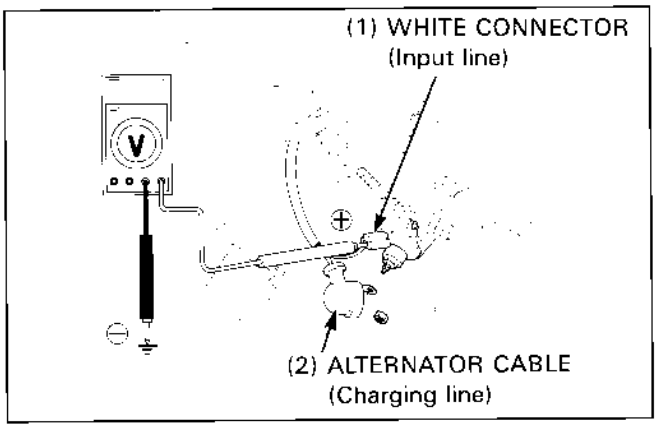
• **Disconnect the battery negative cable from the battery to prevent sparking when disconnecting the alternator cable.**

Disconnect the alternator cable and White connector from the alternator.

Connect the battery negative (-) cable onto the battery.

Measure the voltage between each wire (wire harness side) and ground as indicated on the chart.

Disconnect the battery negative (-) cable to avoid sparking which would otherwise occur when connecting each wire to the alternator.



ITEM	TERMINALS	SPECIFICATION
Battery charging line	Alternator cable terminal (+) and ground (-)	Battery voltage should register.
Battery voltage input line	White connector terminal (+) and ground (-)	Battery voltage should register with the ignition switch ON.

**Alternator Inspection (After '95)**

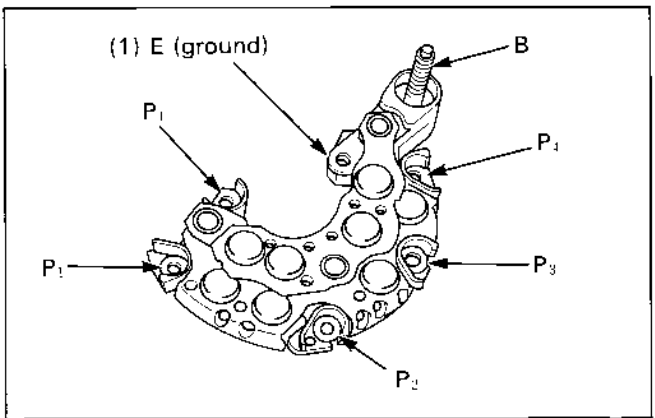
Disassemble the alternator (page 17-16)

**Rectifier**

Before inspecting, the rectifier must be separated from the regulator.

**NOTE**

• The diodes are designed to allow current to pass in one direction while blocking it in the opposite direction. Since the alternator rectifier is made up of eight diodes, each diode must be tested for continuity in both directions that has diode checking capability; a total of 16 checks.



Check for continuity in each direction between  
 - B and P (P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub>) terminals.  
 - E (ground) and P (P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub>) terminals.

All diodes should have continuity in only one direction.

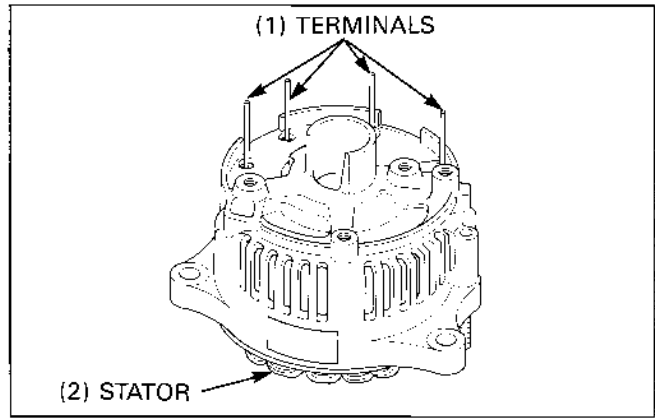
If any of the diodes fails, replace the rectifier assembly. (Diodes are not available separately.)

### Stator

Check the resistance between each pair of terminals. There should be minimal resistance.

**Standard:** 0.22 – 0.26  $\Omega$  (20°C/68°F)

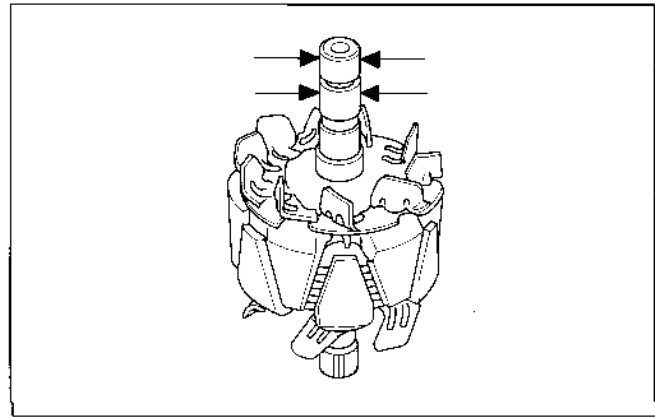
Check for continuity between each terminal and the coil core. There should be no continuity.



### Rotor Coil

Check the slip rings for stepped wear. Measure the O.D. of each slip ring.

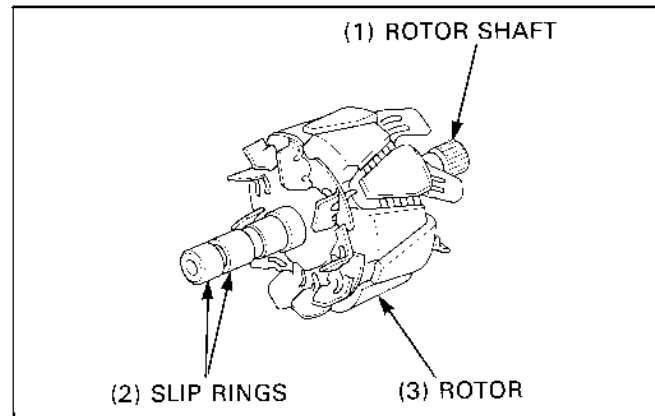
**Service Limit:** 12 mm (0.5 in)



Measure the resistance between the slip rings.

**Standard:** 2.6 – 3.2  $\Omega$  (20°C/68°F)

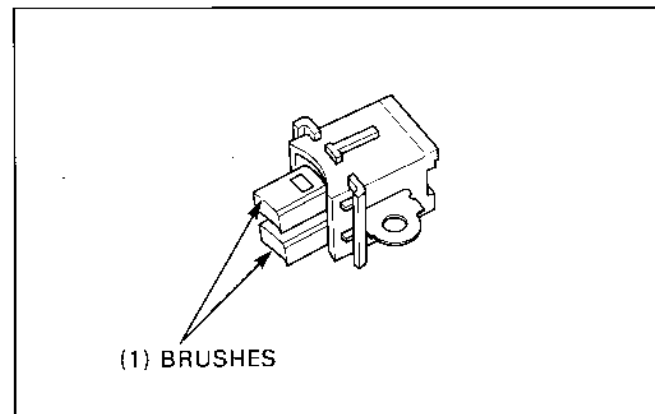
Check for continuity between the slip ring and the rotor or rotor shaft. There should be no continuity.



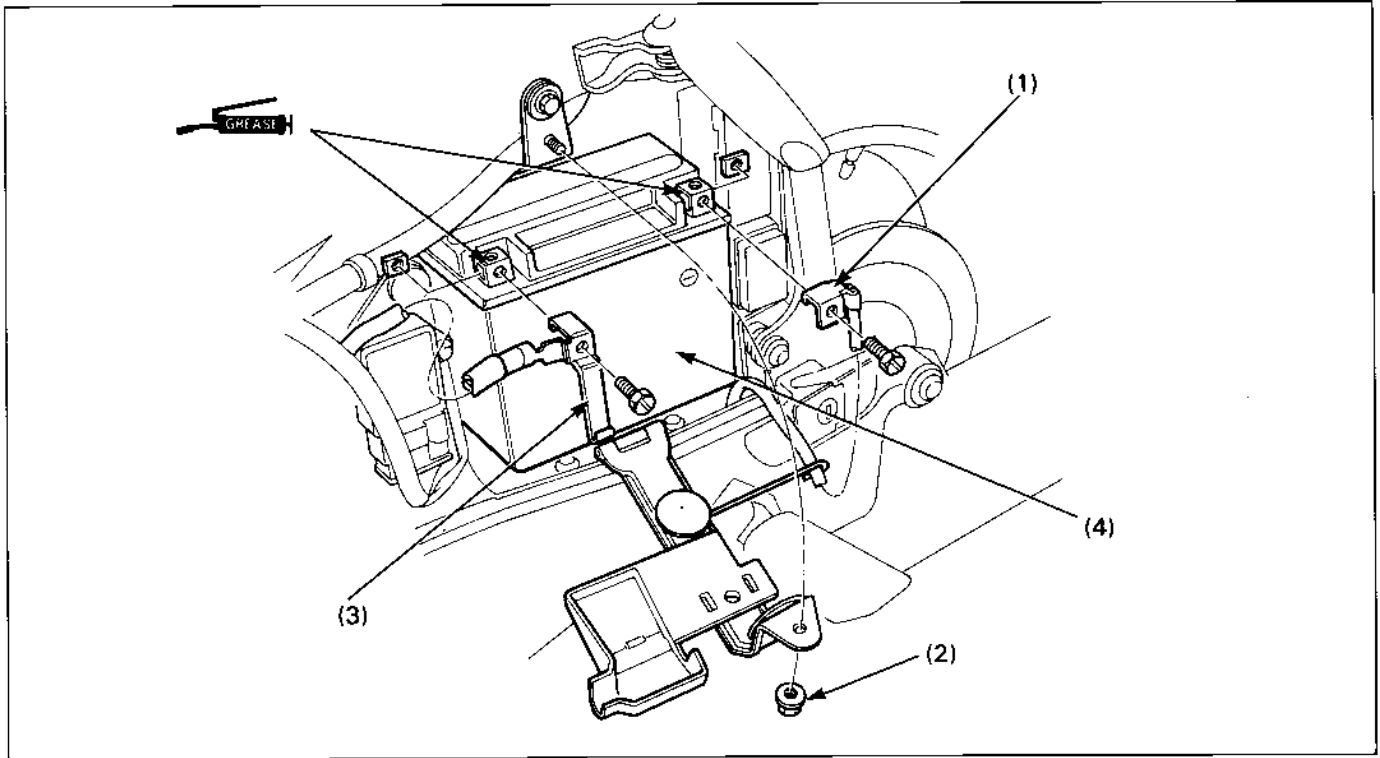
### Brushes

Measure each brush length.

**Service Limit:** 4.7 mm (0.19 in)



## Battery Removal/Installation

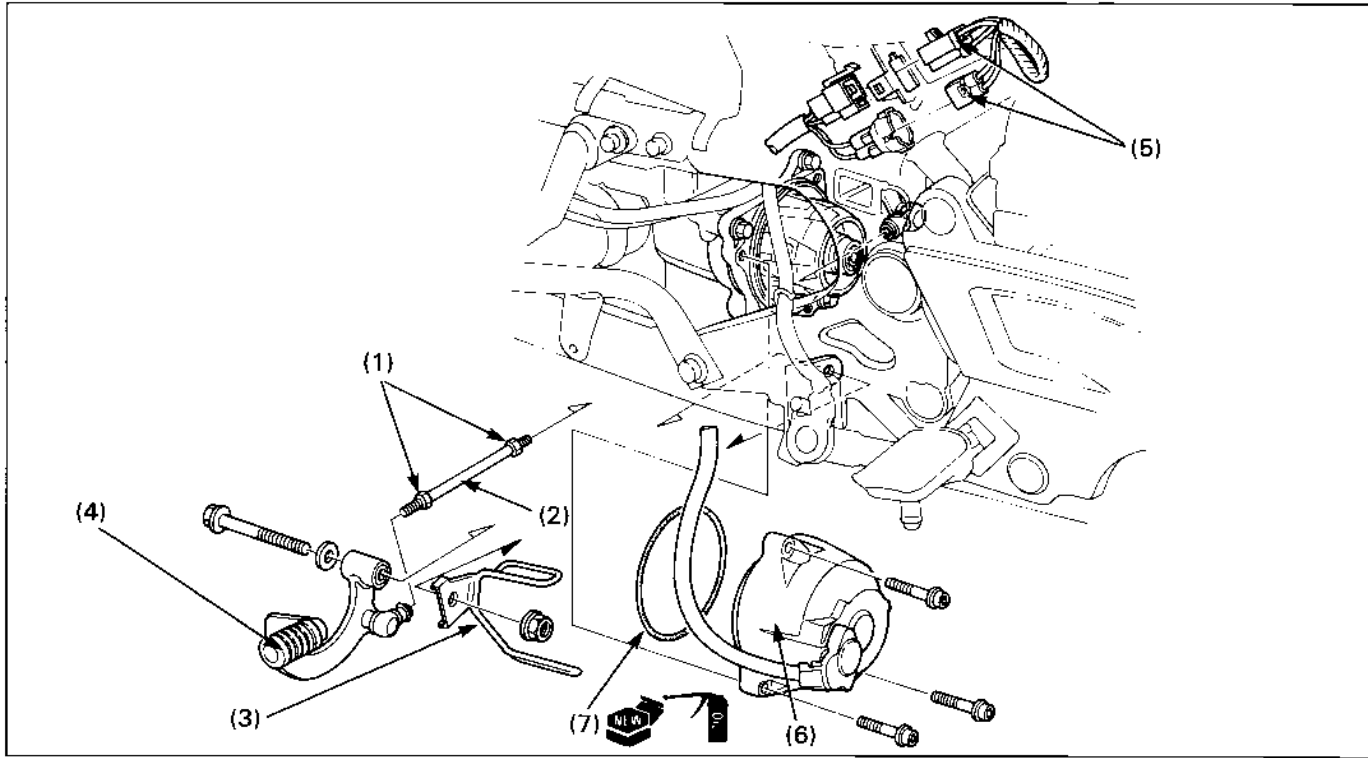


### Requisite Service

- Left side cover removal/installation (page 2-2)
- With the ignition switch "OFF", disconnect the negative (-) cable first, then the positive (+) cable.

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Battery negative (-) cable	1	
(2) Battery holder nut	1	After removing, open the battery holder.
(3) Battery positive (+) cable	1	
(4) Battery	1	

## Stator Coil Removal/Installation ('91-'95)



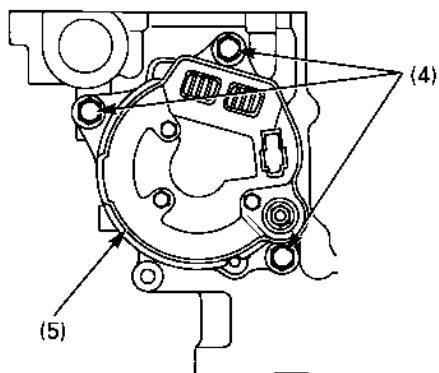
## Requisite Service

- Swingarm removal/installation (page 14-8)

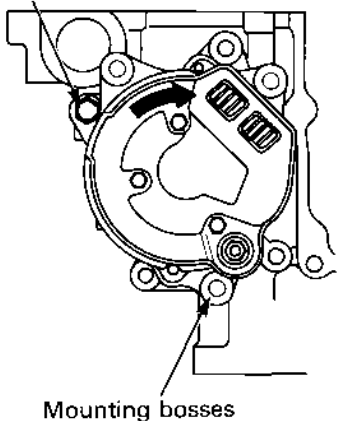
Procedure	Q'ty	Remarks
<b>Removal Order</b>		
(1) Lock nut	2	Installation is in the reverse order of removal. It is not necessary to remove, just loosen.  After installation, route the tubes correctly (page 1-25).
(2) Gearshift pedal connecting rod	1	
(3) Tube holder	1	
(4) Gearshift pedal	1	
(5) Alternator connector	2	
(6) Stator assembly	1	
(7) O-ring	1	

# Alternator Removal/Installation (After '95)

View from rear:

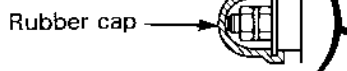


Secure with a 8mm bolt



8mm bolt

Rubber cap



(5)

(3)

(6)

(4)

(1)

(2)

0.8 (8, 5.8)

Alternator base

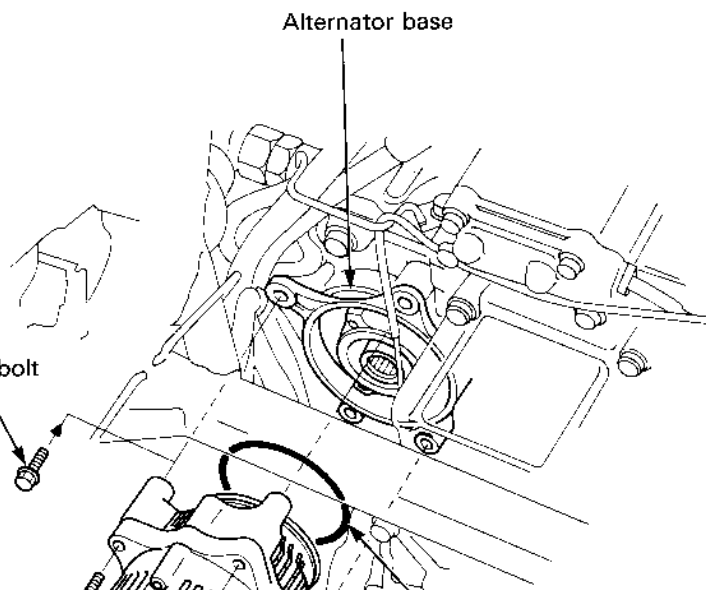
(6)

Mounting bosses

(4)

(5)

Alternator shaft assembly



**▲ WARNING**

- Before servicing, disconnect the battery negative cable from the battery to prevent sparking when disconnecting the alternator cable.

**Requisite Service**

- Fuel tank removal/installation (page 2-12)
- Swingarm removal/installation (page 14-8)
- Left pivot cover removal/installation (page 2-5)

Procedure		Q'ty	Remarks
<b>Removal Order</b>			Installation is in the reverse order of removal.
(1)	2P (White) connector	1	
(2)	Terminal nut	1	After tightening the terminal nut, install the terminal cap to the terminal flange securely.
(3)	Alternator cable	1	
(4)	Mounting bolt	3	<b>NOTE</b> <ul style="list-style-type: none"> <li>• Before removing the alternator, turn the alternator clockwise and temporarily secure the alternator base with a 8 mm bolt as shown. If the alternator base is not secured, it will cause the alternator shaft to come out with the alternator. If this occurs, oil pan removal will be necessary when reinstalling (page 17-18).</li> </ul>
(5)	Alternator	1	Pry the mounting bosses of the alternator using a screwdriver. Disassembly/assembly (page 17-16)
(6)	O-ring	1	





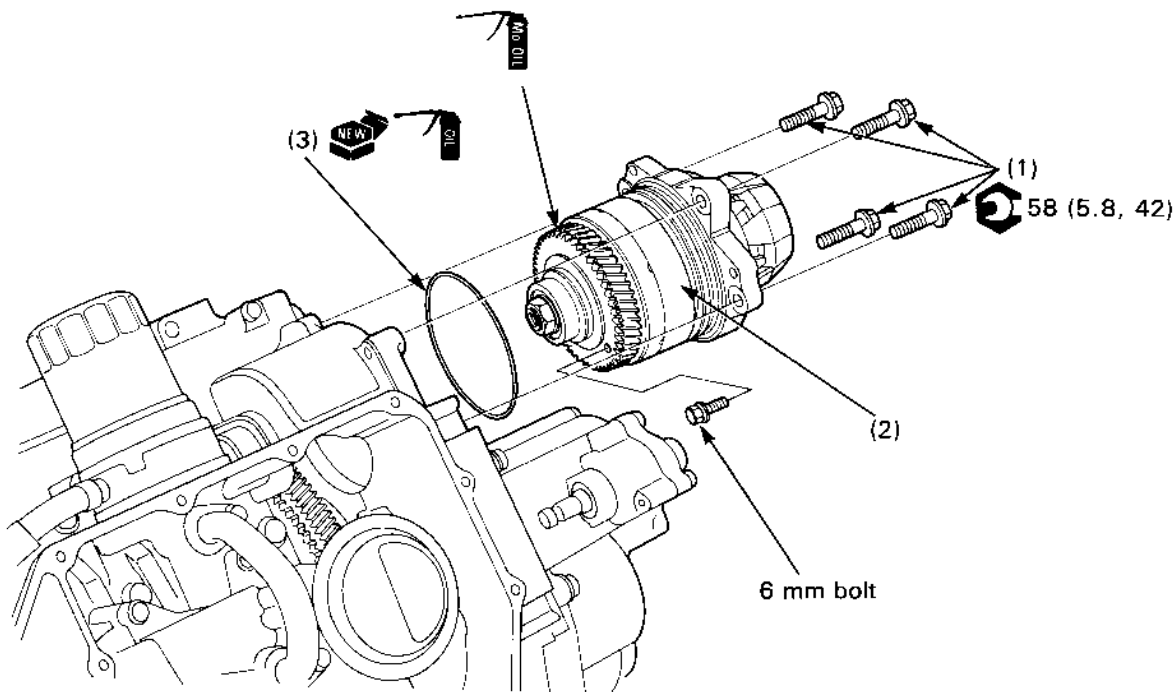
## Requisite Service

- Alternator removal/installation (page 17-14)

Procedure		Q'ty	Remarks
	<b>Disassembly or der</b>		Assembly is in the reverse order of disassembly.
(1)	End cover screw	3	
(2)	Nut/terminal insulator	1/1	
(3)	Rear end cover	1	
(4)	Terminal screw (pan-head)	2	
(5)	Terminal screw (flange)	3	
(6)	Regulator	1	
(7)	Brush assembly/holder insulator	1/1	
(8)	Terminal screw (flange)	4	
(9)	Rectifier	1	
(10)	Housing nut	2	
(11)	Rear housing	1	Before installing, clean the slip rings thoroughly.
(12)	Rotor	1	NOTE: • Use a hydraulic press. Do not strike the slip ring of the rotor shaft.
(13)	Oil seal	1	
(14)	Retainer screw	4	
(15)	Bearing retainer	1	
(16)	Front bearing (6202)/washer	1/1	
(17)	Spacer ring/rear bearing (6002)	1/1	

# Alternator Shaft Removal/Installation

'91-'95

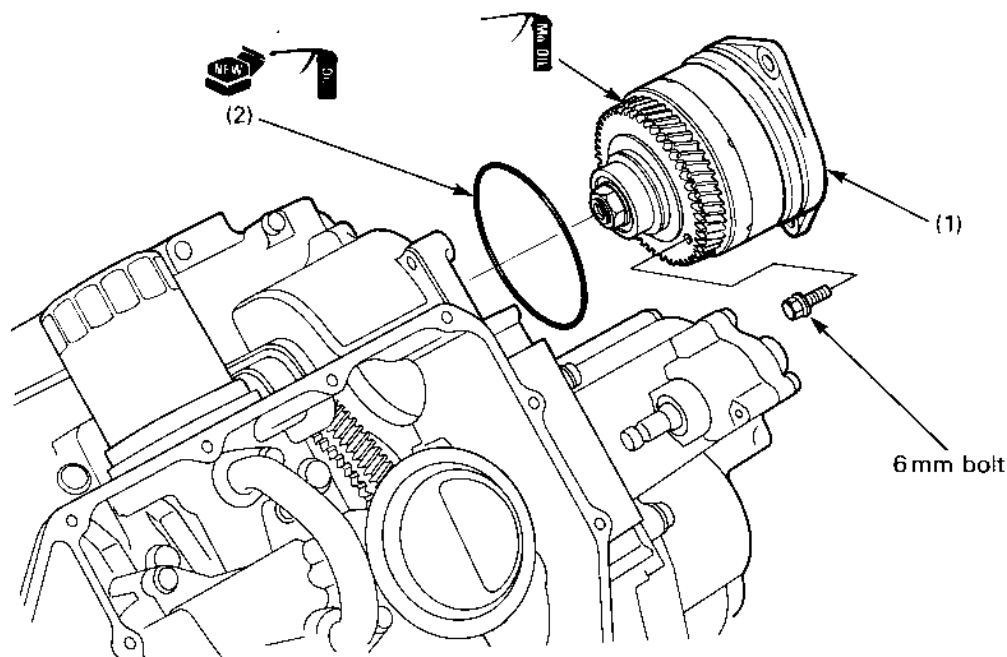


## Requisite Service

- Engine removal/installation (page 7-2)
- Oil pan removal/installation (page 4-6)
- Stator coil removal/installation (page 17-13)

Procedure	Q'ty	Remarks
(1) <b>Removal Order</b> Alternator shaft bolt	4	Installation is in the reverse order of removal. NOTE Before removing, insert a 6 mm bolt in the holes in the alternator shaft driven gears for easy alternator shaft assembly installation. After installing, do not forget to remove the bolt.
(2) Alternator shaft assembly	1	NOTE Before installing, apply molybdenum disulfide grease to the alternator shaft driven gears. Disassembly/assembly (page 17-20)
(3) O-ring	1	

After '95



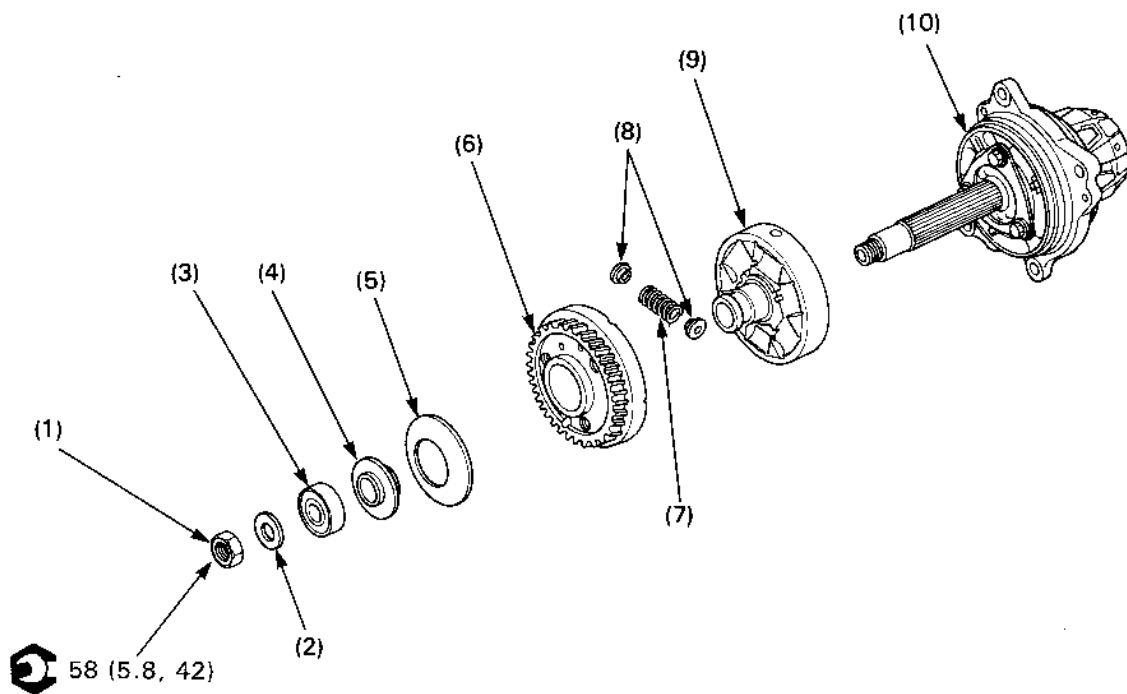
### Requisite Service

- Oil pan removal/installation (page 4-6)
- Alternator removal/installation (page 17-14)

Procedure	Q'ty	Remarks
<b>Removal Order</b>		Installation is in the reverse order of removal.
(1) Alternator shaft assembly	1	NOTE • Before removing, insert a 6 mm bolt into the holes in the alternator shaft driven gears for easy alternator shaft assembly installation. After installing, do not forget to remove the 6 mm bolt.
(2) O-ring	1	NOTE • Before installing, apply molybdenum oil solution to the alternator shaft driven gears. Disassembly/assembly (page 17-21)

# Alternator Shaft Disassembly/Assembly

'91-'95

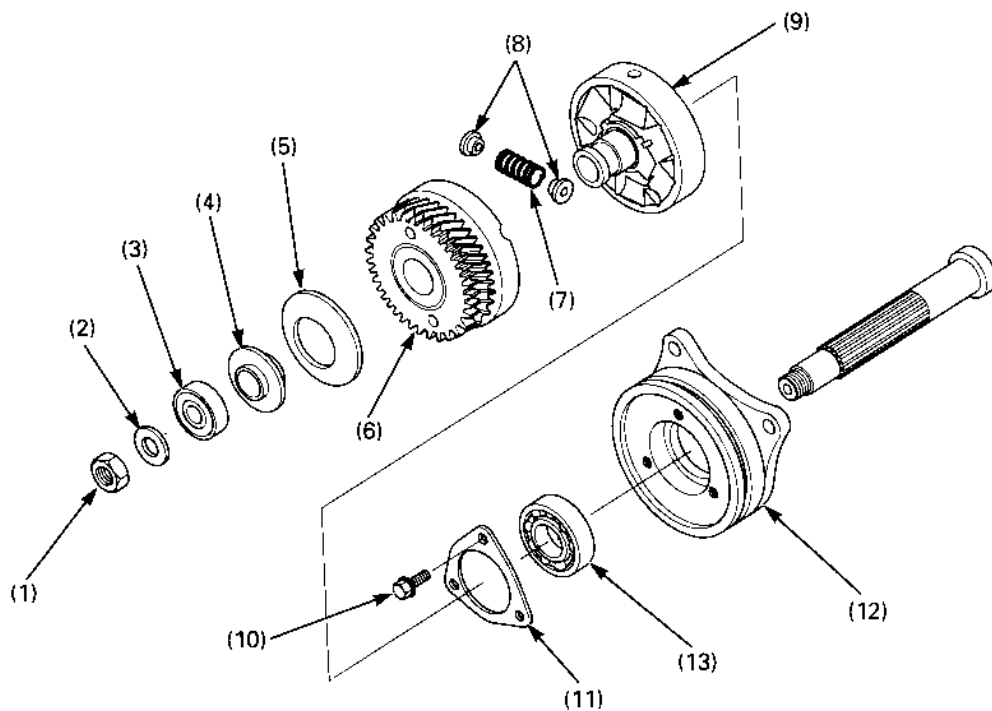


## Requisite Service

- Alternator shaft removal/installation (page 17-18).

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		
(1) Alternator shaft nut	1	Assembly is in the reverse order of disassembly.
(2) Washer	1	
(3) Bearing	1	
(4) Shaft collar	1	
(5) Cone washer	1	
(6) Alternator shaft driven gear	1	Install the washer with the tapered side facing to the shaft nut.
(7) Damper spring	6	
(8) Spring seat	12	
(9) Flywheel	1	
(10) Alternator shaft assembly	1	

After '95

















**Requisite Service**

- Alternator shaft removal/installation (page 17-19)

Procedure	Q'ty	Remarks
<b>Disassembly Order</b>		Assembly is in the reverse order of disassembly.
(1) Alternator shaft nut	1	
(2) Washer	1	
(3) Bearing (6003)	1	
(4) Shaft collar	1	
(5) Cone washer	1	Install the washer with the tapered side facing to the shaft nut.
(6) Alternator shaft driven gear	1	
(7) Damper spring	4	
(8) Spring seat	8	
(9) Flywheel	1	
(10) Bolt	3	
(11) Retainer plate	1	
(12) Alternator base	1	
(13) Bearing (20 x 47 x 10.5)	1	

# Symbols

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it would be explained specifically in the text without the use of the symbols.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use special tool</p>
	<p>Use optional tool. Use the same procedure you use to order parts.</p>
 <p>10 (1.0, 7.2)</p>	<p>Torque specification.    10 N·m (1.0 kg-m, 7.2 ft-lb)</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)</p>
	<p>Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent)          Example: Molykote® BR-2 plus manufactured by Dow Corning, U.S.A.          Multi-purpose M-2 manufactured by Mitsubishi Oil Japan</p>
	<p>Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent)          Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A.          Honda Moly 60 (U.S.A. only)          Rocol ASP manufactured by Rocol Limited, U.K.          Rocol Paste manufactured by Sumico Lubricant, Japan</p>
	<p>Use silicone grease</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant</p>
	<p>Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>