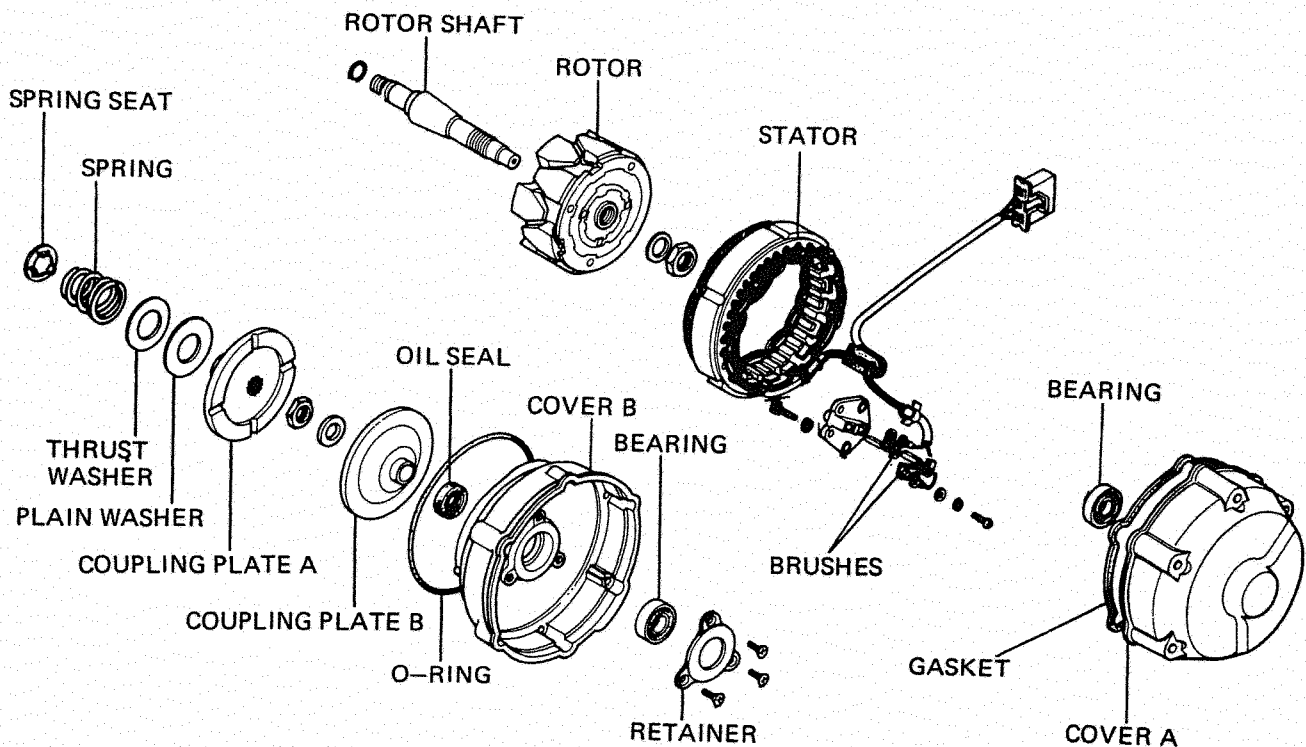


BATTERY/CHARGING SYSTEM



A.C. GENERATOR



SERVICE INFORMATION	16-1
TROUBLESHOOTING	16-2
BATTERY	16-3
CHARGING SYSTEM	16-4
A. C. GENERATOR REMOVAL/ INSTALLATION	16-5
VOLTAGE REGULATOR	16-9

SERVICE INFORMATION

WORKING PRACTICE

Battery fluid level should be checked regularly and filled with distilled water when necessary.

When charging the battery, quick-charging should only be done in an emergency; slow-charging is preferred.

Remove the battery from the motorcycle for charging. If battery must be charged on the motorcycle, disconnect the battery cables.

Keep flames or sparks away from a charging battery because it produces hydrogen.

All charging system components can be tested on the motorcycle.

SPECIAL TOOLS

Common tools

Bearing Driver Handle	07749-0010000
Bearing Driver (32 x 35)	07746-0010100
Bearing Driver (37 x 40)	07746-0010200

SPECIFICATIONS

Battery	Capacity	12V 18AH		
	Specific gravity	1.28/20° C (68° F)		
	Charging rate	1.8 amperes maximum		
A. C. generator	Capacity	1000 rpm	1500 rpm	5000 rpm
		5A min.	12A min.	24A min.
Voltage regulator		Transistorized non-adjustable regulator		



TROUBLESHOOTING

No Power — Key Turned On:

1. Dead battery
 - Low fluid level
 - Low specific gravity
 - Charging system failure
2. Disconnected battery cable
3. Main fuse burned out
4. Faulty ignition switch

Low Power — Key Turned On:

1. Weak battery
 - Low fluid level
 - Low specific gravity
 - Charging system failure
2. Loose battery connection

Low Power — Engine Running:

1. Battery undercharged
 - Low fluid level
 - One or more dead cells
2. Charging system failure

Intermittent Power:

1. Loose battery connection
2. Loose charging system connection
3. Loose starting system connection
4. Loose connection or short circuit in ignition system
5. Loose connection or short circuit in lighting system

Charging System Failure:

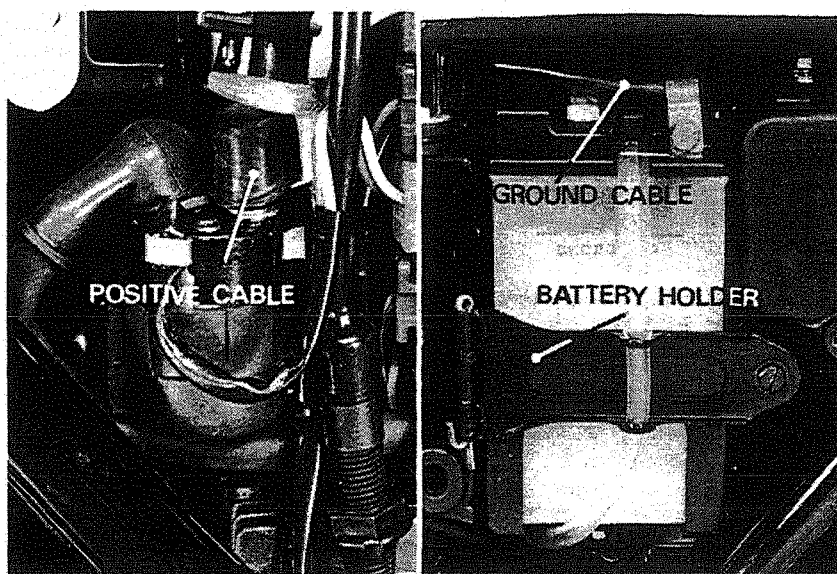
1. Loose, broken, or shorted wire or connection
2. Faulty voltage regulator
3. Faulty silicon rectifier
4. Faulty A.C. generator



BATTERY

REMOVAL

Remove the right and left side covers.
Disconnect the ground cable at the battery terminal.
Disconnect the positive cable at the magnetic switch terminal.
Remove the battery holder.



TESTING SPECIFIC GRAVITY

Test each cell with a hydrometer.

SPECIFIC GRAVITY:
(20°C, 68°F)

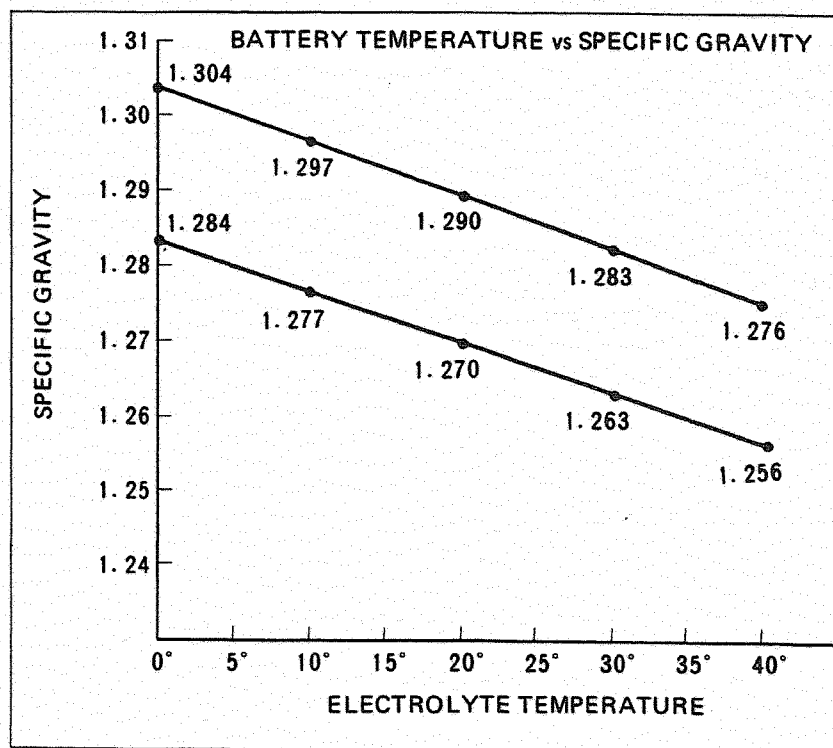
1.27–1.29	Fully charged
Below 1.26	Undercharged

NOTE

- The battery must be recharged if the specific gravity is below 1.23.
- The specific gravity varies with the temperature as shown in the accompanying table.
- Replace the battery if sulfation is evident.
- The battery must be replaced if there are pastes settled on the bottom of each cell.

WARNING

*The battery contains sulfuric acid.
Avoid contact with skin, eyes, or clothing.
Antidote: Flush with water and get prompt medical attention.*



Specific gravity changes by 0.007 for every 10°C.



BATTERY CHARGING

Connect the charger positive (+) cable to the battery positive (+) terminal.

Connect the charger negative (–) cable to the battery negative (–) terminal.

Charging current:

1.8 amperes max.

Charging:

Charge the battery until specific gravity is 1.27–1.29 at 20°C (68°F).

WARNING

- Before charging a battery, remove the cap from each cell.
- Keep flames and sparks away from a charging battery.
- Turn power ON/OFF at the charger, not at the battery terminals.
- Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).

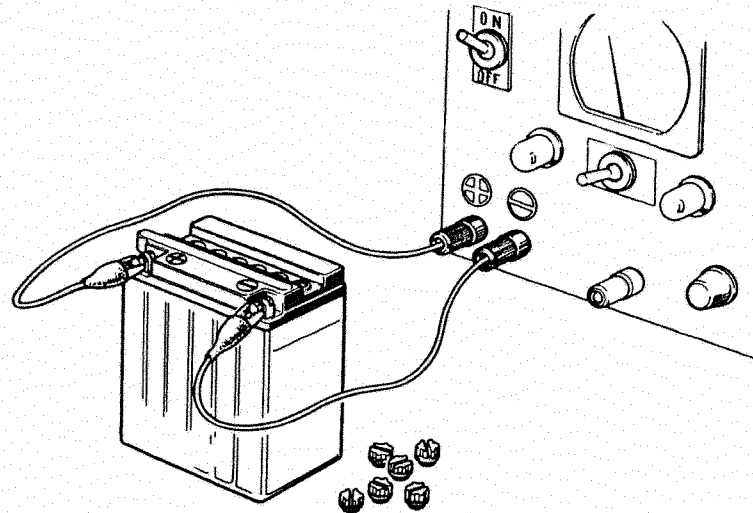
CAUTION

Quick-charging should only be done in an emergency; slow-charging is preferred.

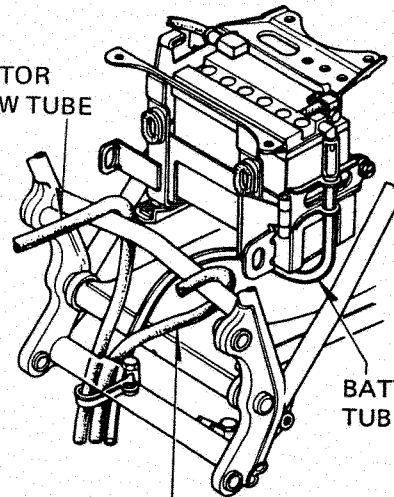
After installing the battery, coat the terminals with clean grease.

CAUTION

Route the breather tube as shown on the battery caution label.



CARBURETOR
OVERFLOW TUBE



BATTERY BREATHER
TUBE

AIR CLEANER DRAIN TUBE

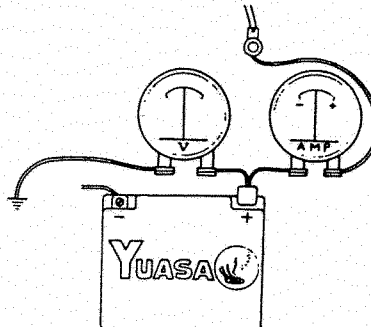
CHARGING SYSTEM

CHARGING OUTPUT TEST

Warm up the engine before taking readings. Connect a voltmeter and an ammeter to check charging system output.

NOTE

Use a fully charged battery to check the charging system output.



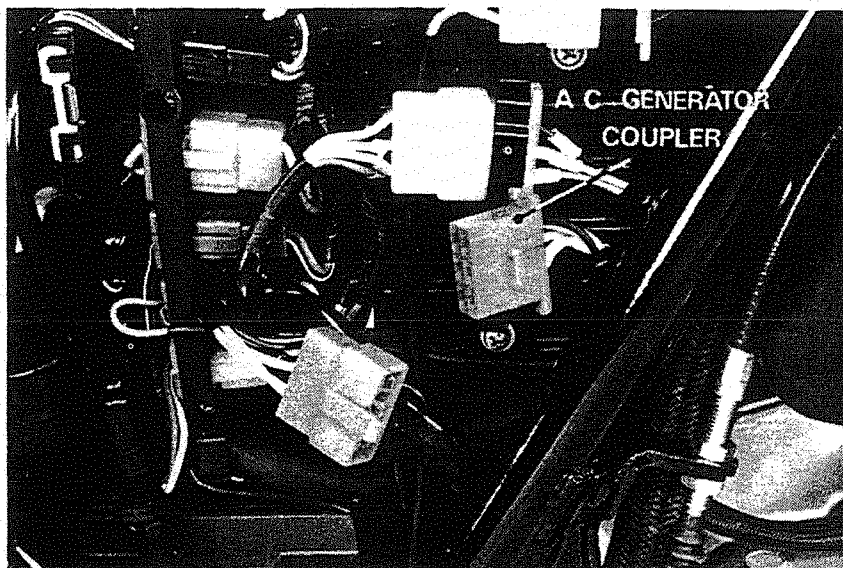
TECHNICAL DATA

MAIN SWITCH	LIGHTING SWITCH	INITIAL CHARGING	AT 5,000 RPM
ON	ON (High beam)	1,050 rpm	0 amperes minimum/14 volts

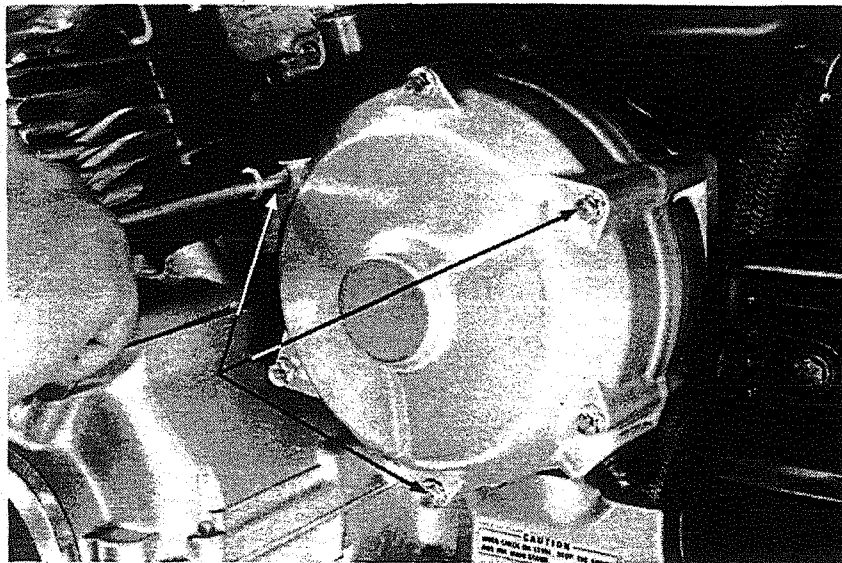


A.C. GENERATOR REMOVAL/ INSTALLATION

Remove the right side cover and disconnect the A.C. generator coupler.

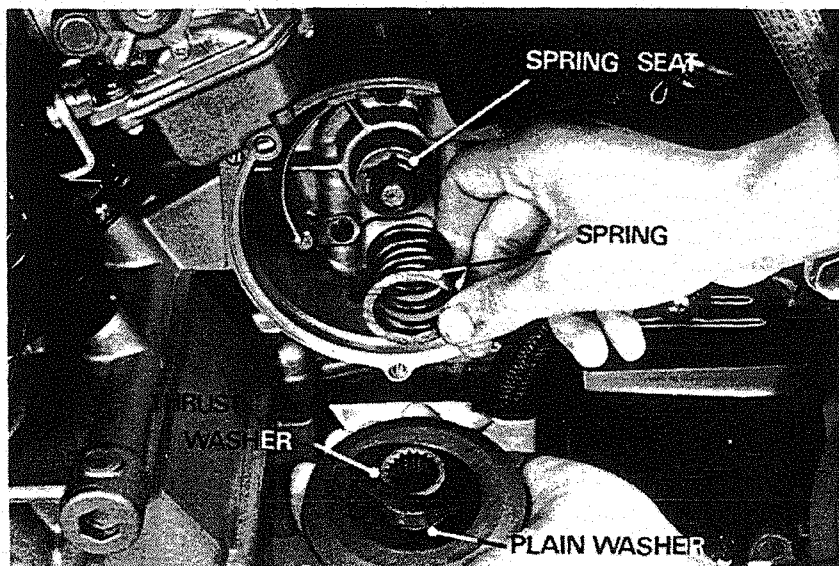


Remove the A.C. generator by loosening three screws.



Remove the A.C. generator clutch spring and washer.

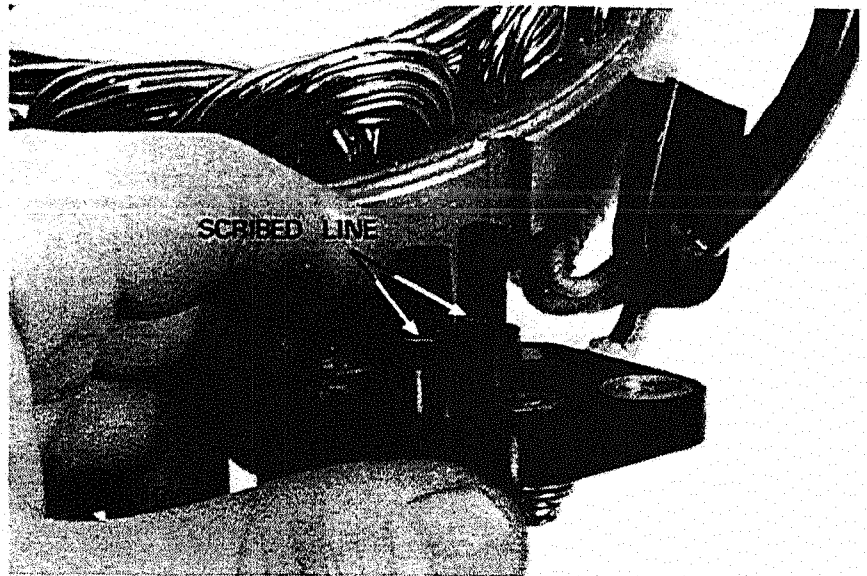
Loosen three bolts and disassemble the A.C. generator. (See page 16-0)



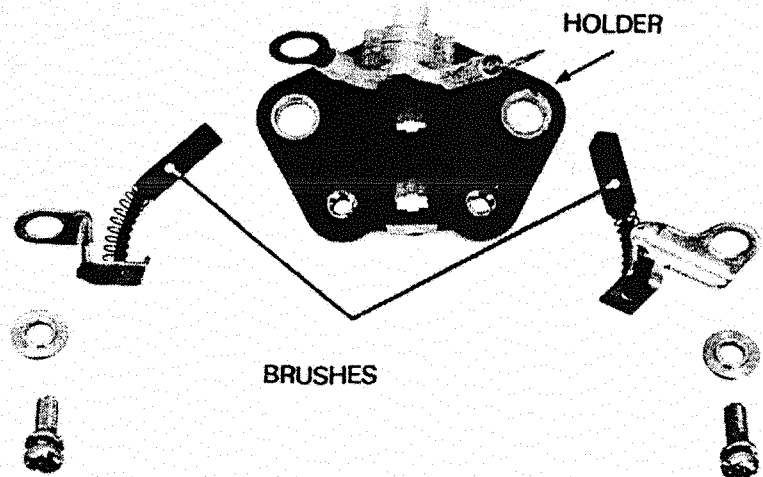
**INSPECTION**

Inspect the length of each brush as shown.
If it shows wear to the scribed service limit line, replace the brush.

SERVICE LIMIT: Scribed line



Remove and replace the brushes by removing the mounting screws.





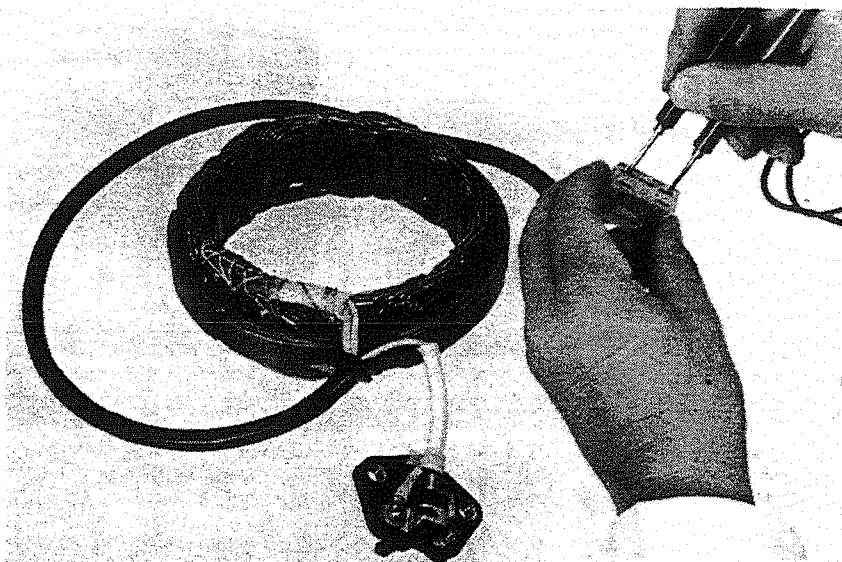
STATOR COIL CONTINUITY TEST

NOTE

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

Check the yellow leads to the A.C. generator stator for continuity with each other. Replace the stator if any yellow lead is not continuous with the others, or if any lead has continuity to ground.

SPECIFIED RESISTANCE: 0.32–0.40Ω

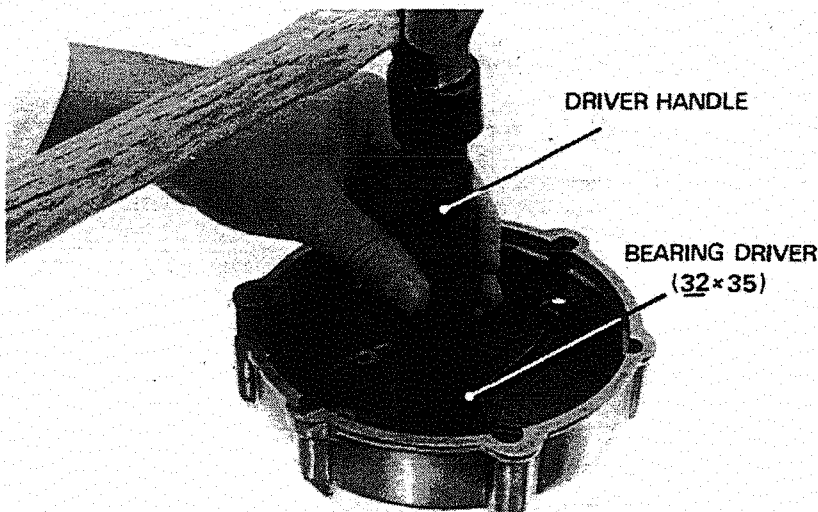


INSTALLATION

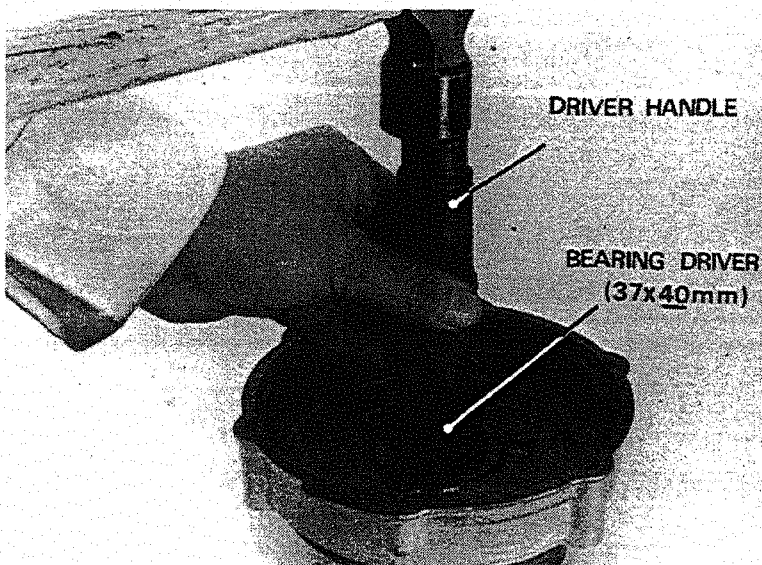
Install a new ball bearing with the bearing driver.

NOTE

Drive the outer race evenly.

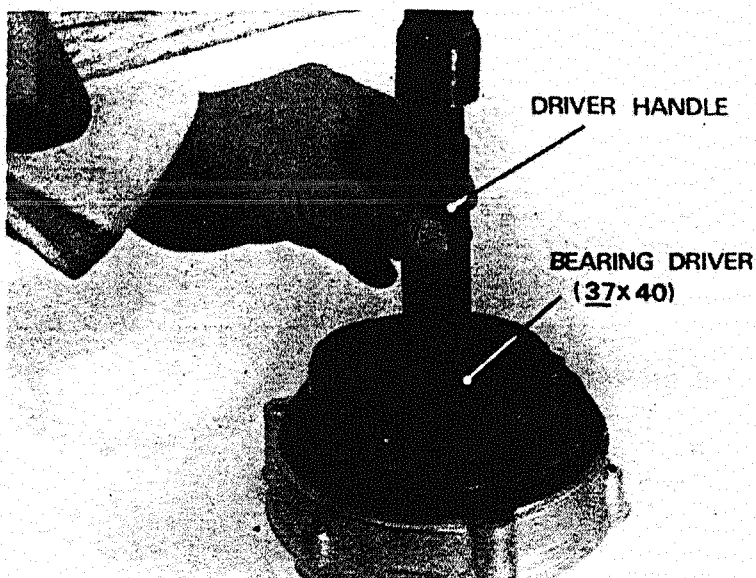


Install a new bearing into A.C. generator housing with the bearing driver.





Install a new oil seal with the bearing driver.

**CAUTION**

When installing the A. C. generator, apply molybdenum disulfide grease to sliding surface of the couplings of the A. C. generator.



VOLTAGE REGULATOR

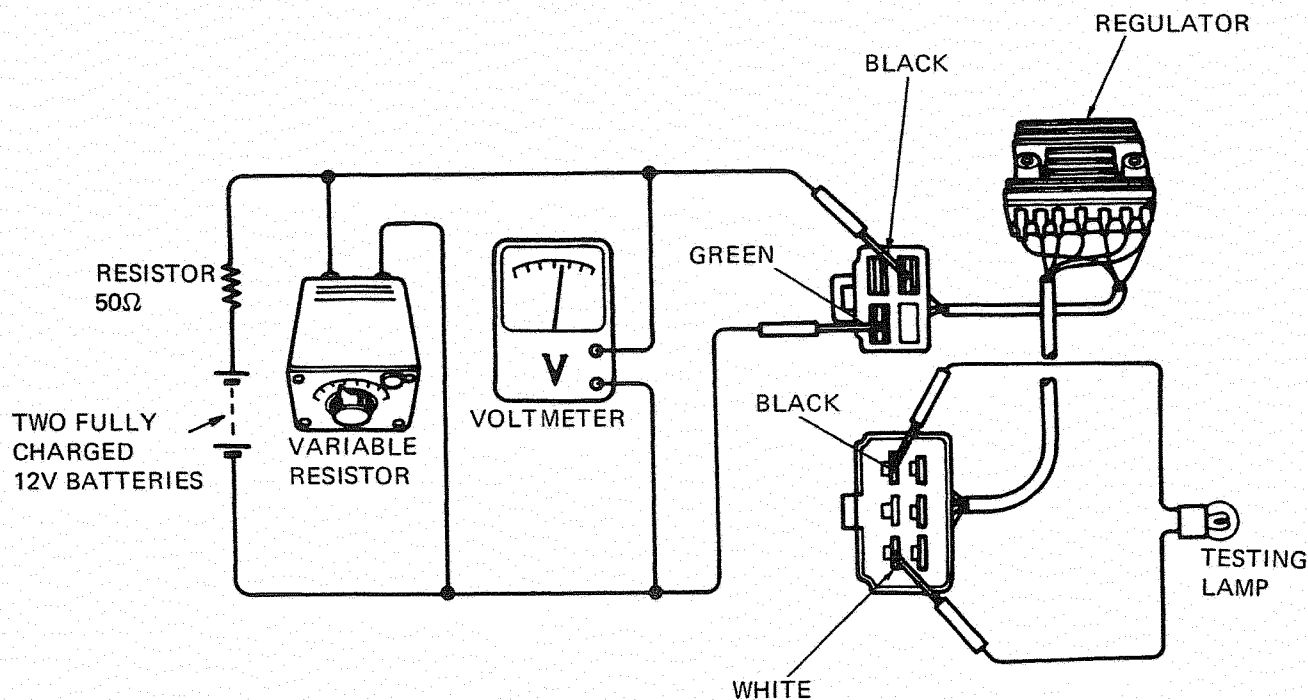
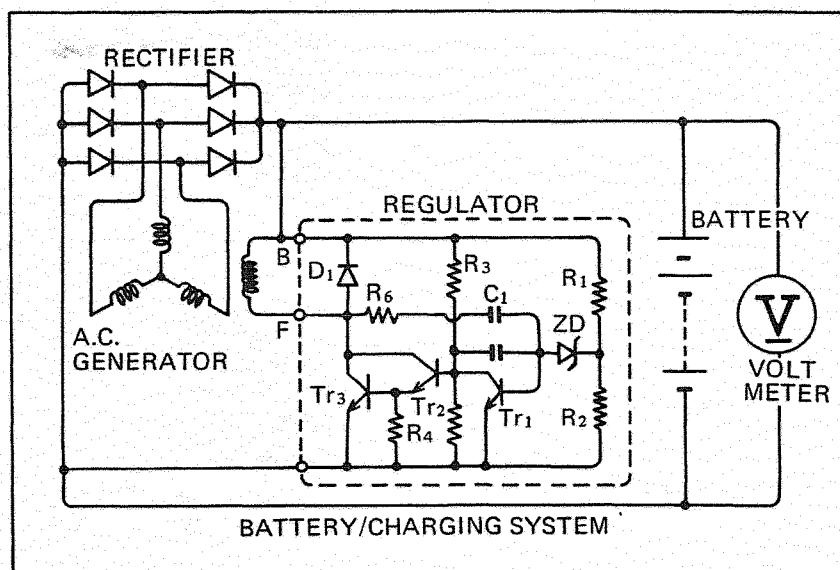
VOLTAGE REGULATOR PERFORMANCE TEST

a. Testing with a voltmeter

Connect a voltmeter across the battery.
Check regulator performance with the engine running.
Regulator must cut off the field coil current
when battery voltage reaches 14–15V.

b. Testing with a variable resistor

Connect two 12V batteries in series.
Connect a variable resistor (0–100 Ω) across
the battery with a 50 Ω resistor in between.
Test lamp must go out when voltage reaches
14–15V on the voltmeter by adjusting the
variable resistor.



**VOLTAGE REGULATOR/
RECTIFIER TEST**

Check the resistance between the leads with an ohmmeter.

RESISTANCE IN NORMAL DIRECTION:

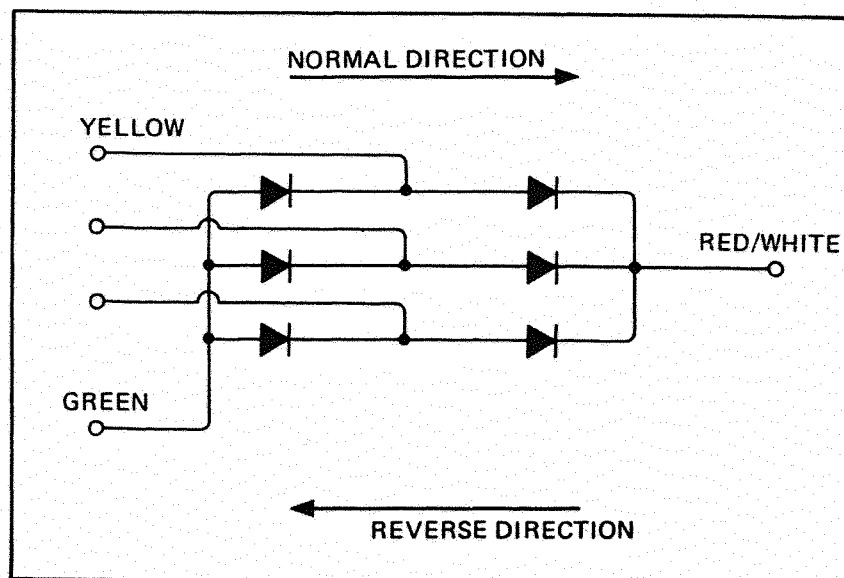
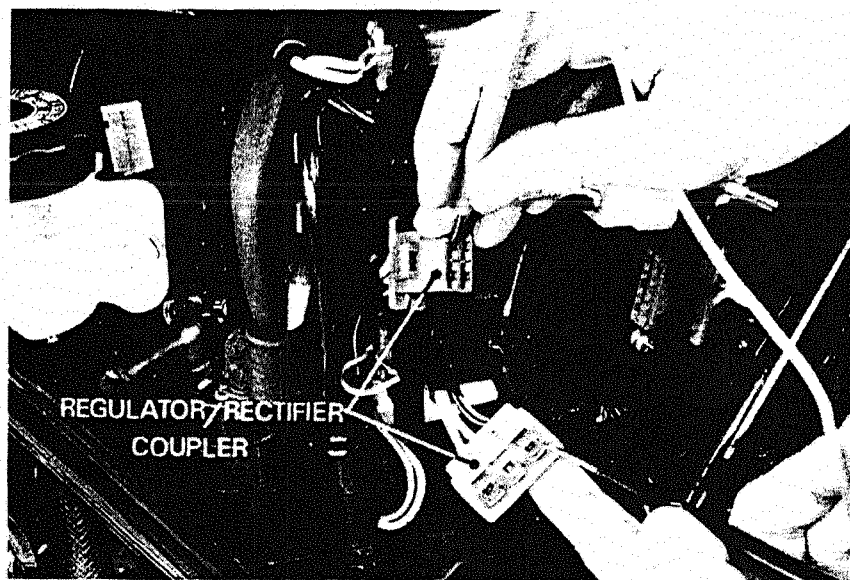
Green lead and any
yellow lead: $5-40\Omega$

Red/white lead and any
yellow lead: $5-40\Omega$

RESISTANCE IN REVERSE DIRECTION:

Red/white lead and any
yellow lead: $2000\Omega \text{ min.}$

Green lead and any
yellow lead: $2000\Omega \text{ min.}$





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SERVICE INFORMATION	17-1
TROUBLESHOOTING	17-2
IGNITION COIL	17-3
TRANSISTORIZED IGNITION SYSTEM (Pulser Generator, Spark Unit)	17-4

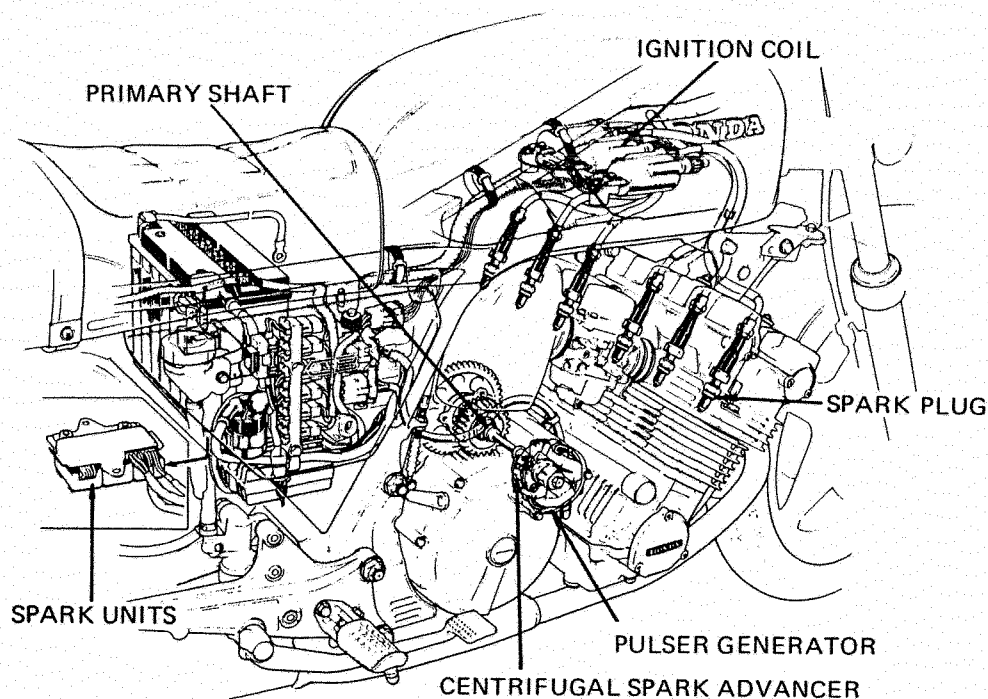
SERVICE INFORMATION

WORKING PRACTICE

A TRANSISTORIZED IGNITION SYSTEM is used and no adjustments are to be made unless the pulser generator screws are loosened. If these screws are loosened, ignition timing for either the No. 1 or No. 6 cylinder must be adjusted. For spark plug information, see page 3-4.

SPECIFICATIONS

Spark plug U.S.A. only		For cold climate (below 5° C)	Standard	For extended high speed riding
	ND	X22ES-U	X24ES-U	X27ES-U
	NGK	D7EA	D8EA	D9EA
Spark plug (Canada model)	ND, X24ESR-U NGK DR8ES-L			
Spark plug gap	0.6-0.7 mm (0.024-0.028 in)			
Ignition timing	At idle rpm	10° (BTDC)		
	Partial advance/rpm	23.5°/2500		
	Full advance/rpm	31°/8000		
Ignition coil	3-point spark test	6 mm (0.24 in) minimum		



TROUBLESHOOTING

NOTE

The ignition system is broken down into three sub-systems; one for No. 1 and No. 6 cylinders, one for No. 2 and No. 5 cylinders and one for No. 3 and No. 4 cylinders. First localize the trouble to one of these sub-systems, then proceed to the more detailed tests as described below.

Engine cranks but will not start

- Engine stop switch OFF.
- No spark at plugs
- Faulty transistorized spark unit
- Faulty pulser generator

No spark at plug

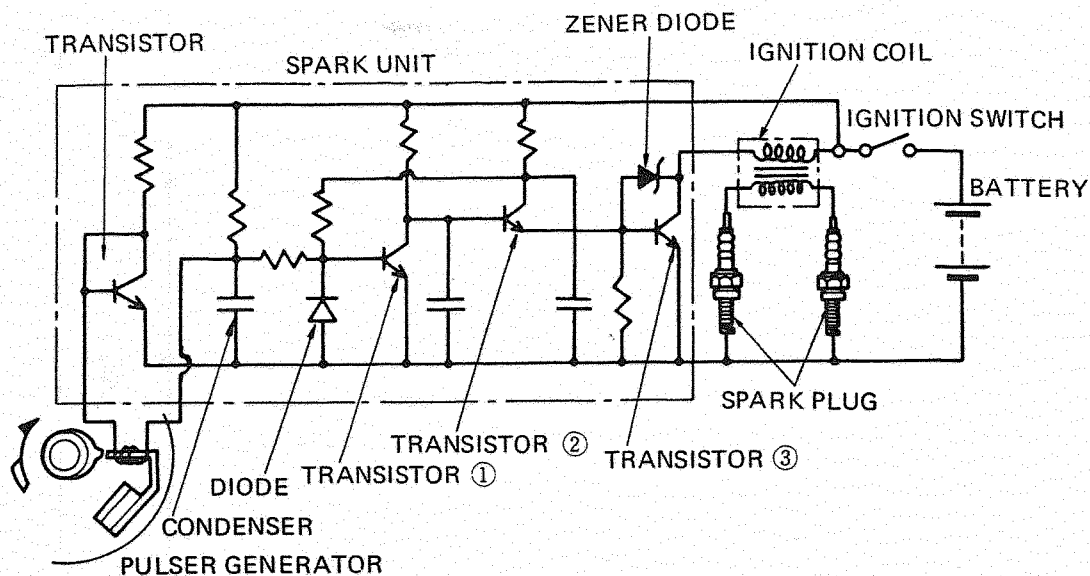
- Engine stop switch OFF
- Poorly connected, broken or shorted wires
 - Between ignition switch and engine stop switch
 - Between spark unit and engine stop switch
 - Between spark unit and ignition coil
 - Between ignition coil and plug
 - Between spark unit and pulser generator
- Faulty ignition coil
- Faulty ignition switch
- Faulty spark unit
- Faulty pulser generator

Engine starts but runs poorly

- Ignition primary circuit
 - Faulty ignition coil
 - Loose or bare wire
 - Intermittent short circuit
- Secondary circuit
 - Faulty plug
 - Faulty high tension cord

Timing advance incorrect

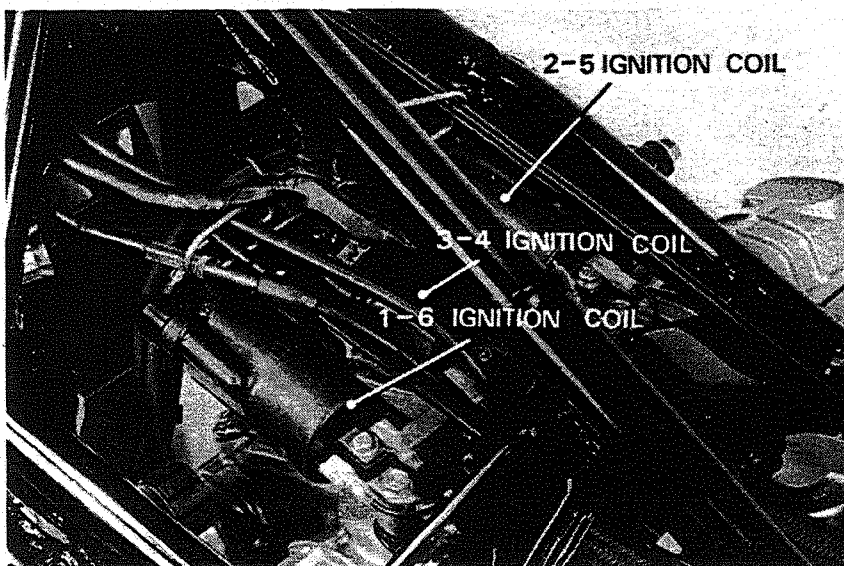
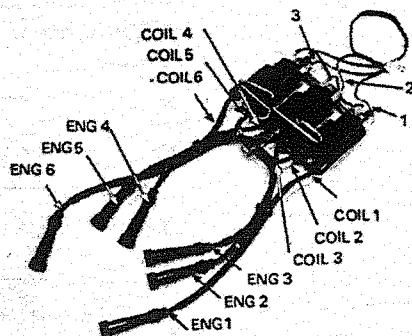
- Centrifugal advancer faulty



IGNITION COIL

REMOVAL

Remove the fuel tank.
Disconnect the wire leads.
Remove the coils by removing the attaching bolts.



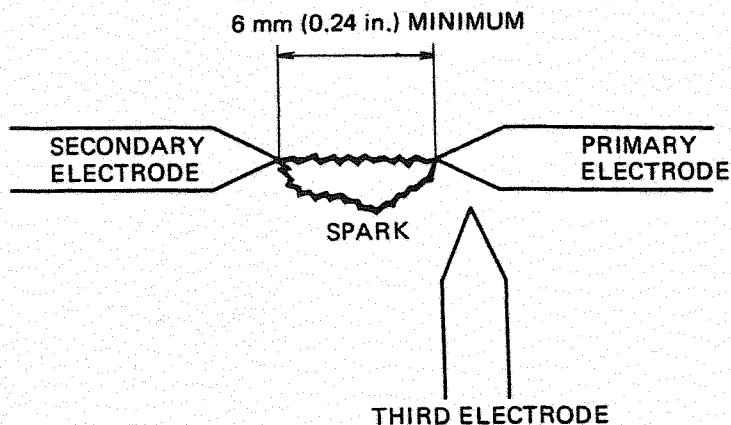
PERFORMANCE TEST

Perform the 3-point spark test with a coil tester.

SERVICE LIMIT: 6 mm (0.24 in) min

NOTE

For wire connection, follow the instructions supplied with the coil tester.





TRANSISTORIZED IGNITION SYSTEM

INSPECTION

System

Disconnect the No. 4, 5 and 6 spark plugs.
Hold each plug against any convenient engine ground.

Turn the ignition switch on.

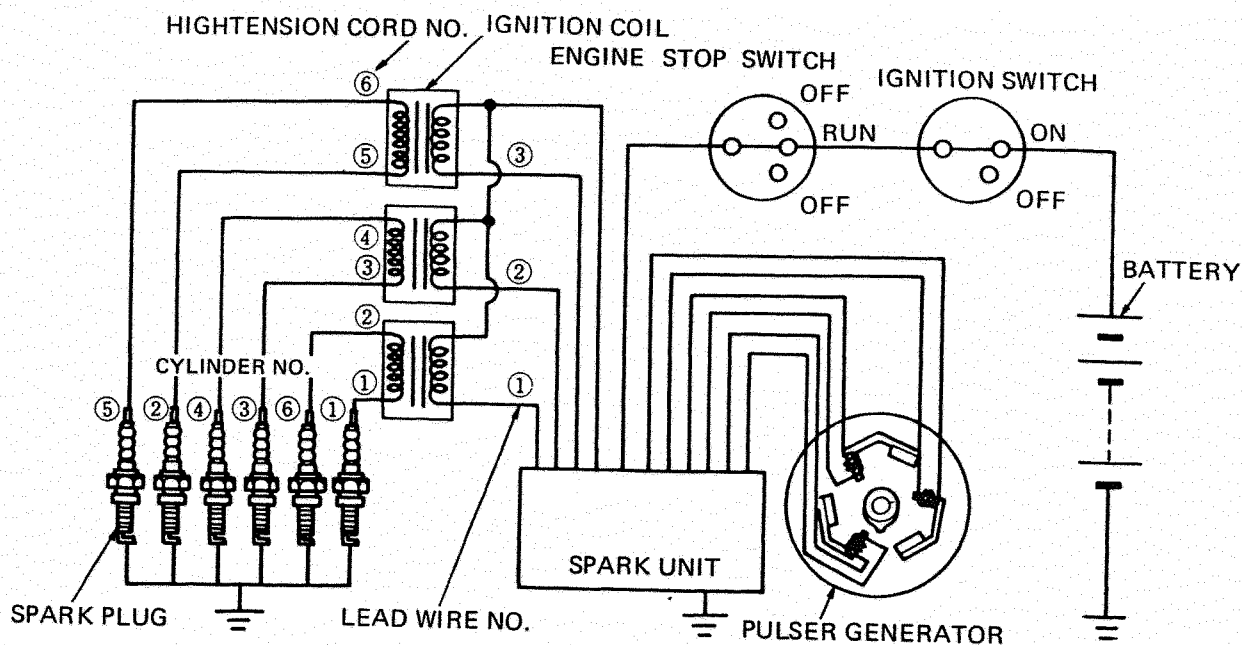
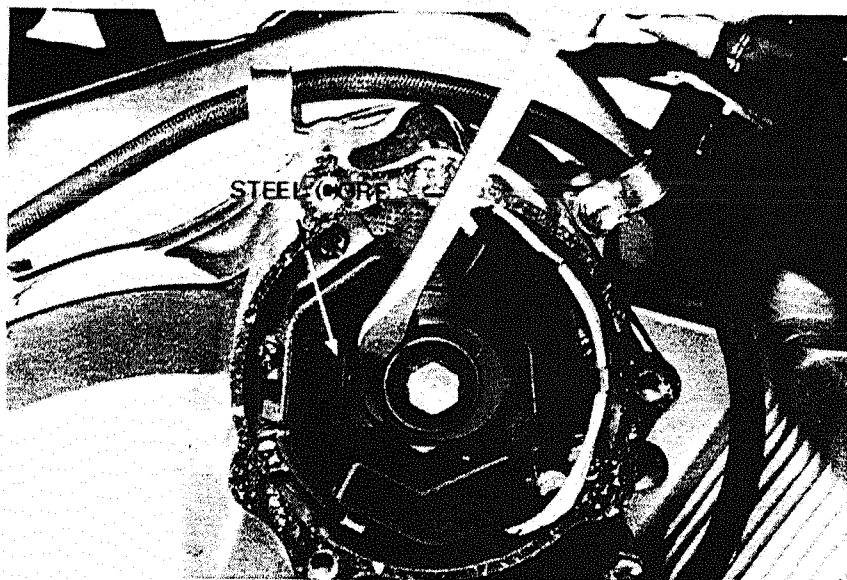
Remove the pulser cover.

Touch the end of a screwdriver to the rotor and one pulser generator steel core.

Repeat this operation several times.

A good spark to the plug means that the ignition system for that cylinder is in good shape.

Repeat the above for the other two pulsers.

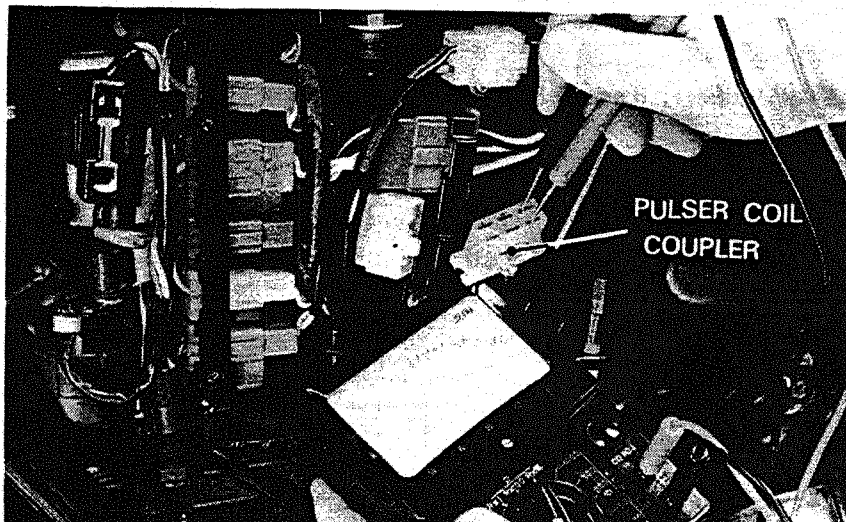


Pulser generator

Measure the coil resistance.

COIL RESISTANCE: $530 \pm 50\Omega$ (20°C , 68°F)

- Between pink leads (3, 4 cylinders)
- Between yellow leads (2, 5 cylinders)
- Between blue leads (1, 6 cylinders)

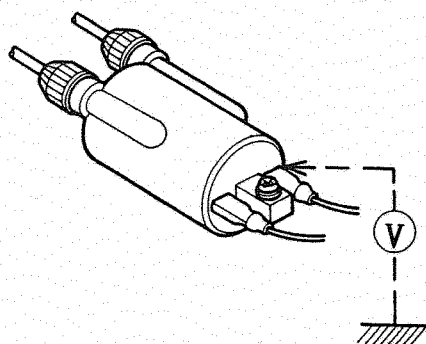
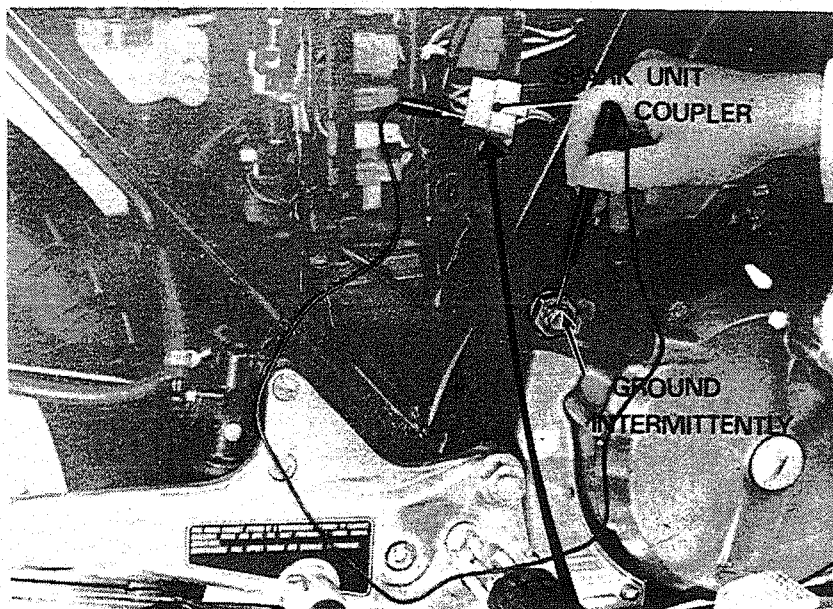




SPARK UNIT

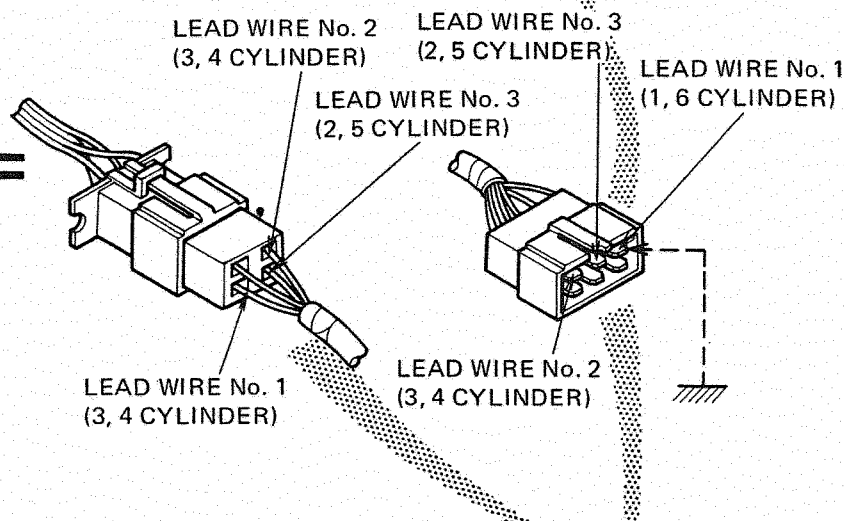
Disconnect the wirings at the 6-pole coupler.

Attach the positive lead of a voltmeter to each of the three 4-pole coupler terminals (1.6, 2.5 and 3.4). Attach the negative lead to any convenient ground. Turn the ignition switch on.



Ground each corresponding terminal of the 6-pole coupler intermittently (1.6, 2.5 and 3.4).

The transistor unit is normal if the voltage indicated by the voltmeter changes from 12V to 0V in each test.



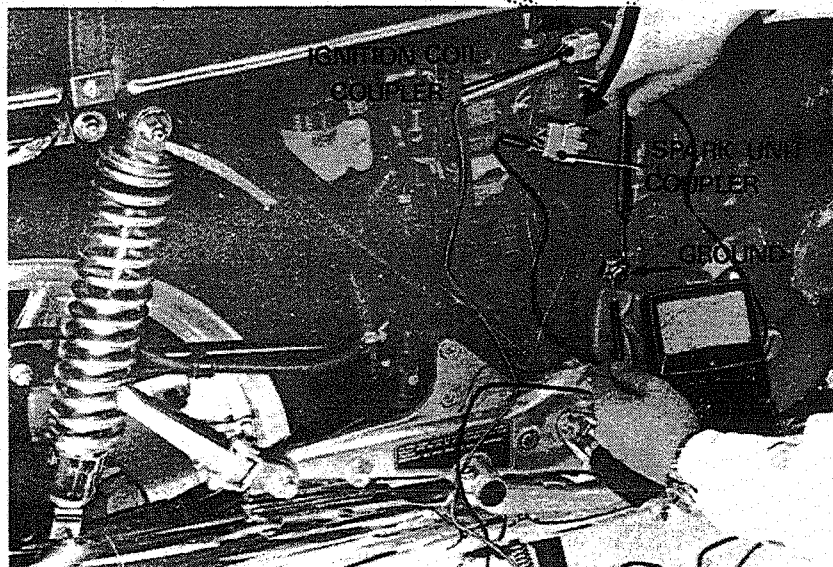
SPARK ADVANCER/ PULSER REMOVAL

For advancer/pulser removal, see Page 8-2.
For advancer function test, see Page 3-6.

ADVANCER VISUAL INSPECTION

Check the mechanical advancer cam for sticking.

Lubricate the sliding surfaces, and check the spring for loss of tension and advancer pin for excessive wear if the advancer fails to return.





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CB X

MEMO



SERVICE INFORMATION	18-1
TROUBLESHOOTING	18-1
STARTER MOTOR	18-2
MAGNETIC SWITCH	18-6

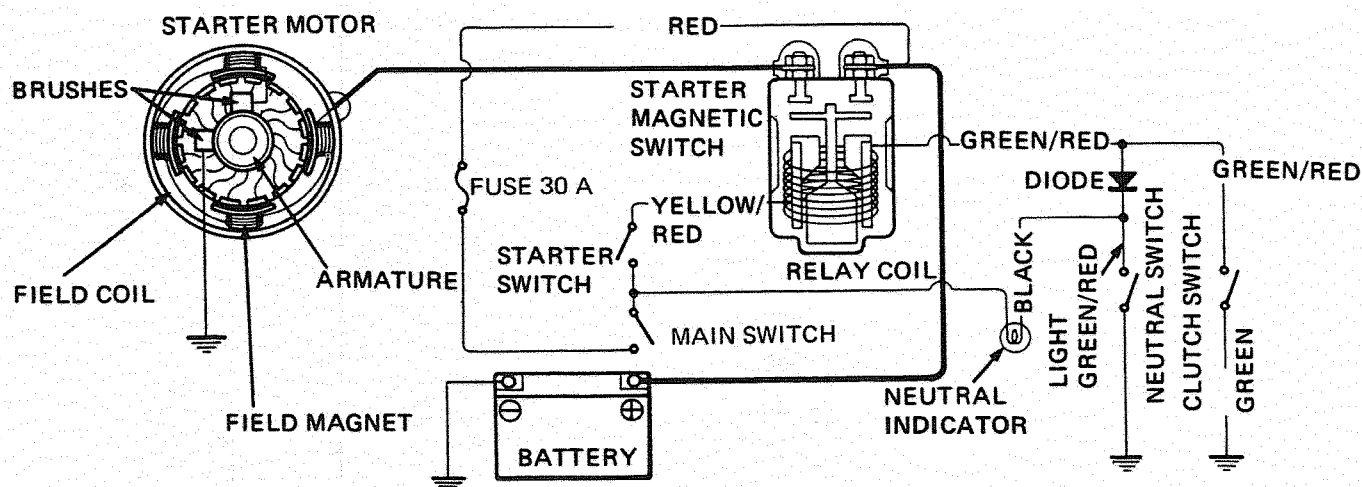
SERVICE INFORMATION

WORKING PRACTICE

The starter motor can be removed with the engine in the frame.

SPECIFICATION

Starter motor		STANDARD	SERVICE LIMIT
	Brush spring tension	560 g–680g (19.75–23.89 oz)	560 g (19.75 oz)
	Brush length	12.0–13.0 mm (0.47–0.51 in)	7.5 mm (0.03 in)



TROUBLESHOOTING

Starter Motor Will Not Turn:

- Battery discharged
- Faulty ignition switch
- Faulty start switch
- Faulty neutral switch
- Faulty starter magnetic switch
- Loosen or disconnected wire or cable
- Neutral diode open

Starter Motor Turns Engine Slowly

- Low specific gravity
- Excessive resistance in circuit
- Binding in starter motor

Starter Motor Turns, But Engine Does Not Turn:

- Faulty starter clutch
- Faulty starter motor gears
- Faulty starter motor or idle gear

Starter Motor and Engine Turns, But Engine Does Not Start

- Faulty ignition system
- Engine problems



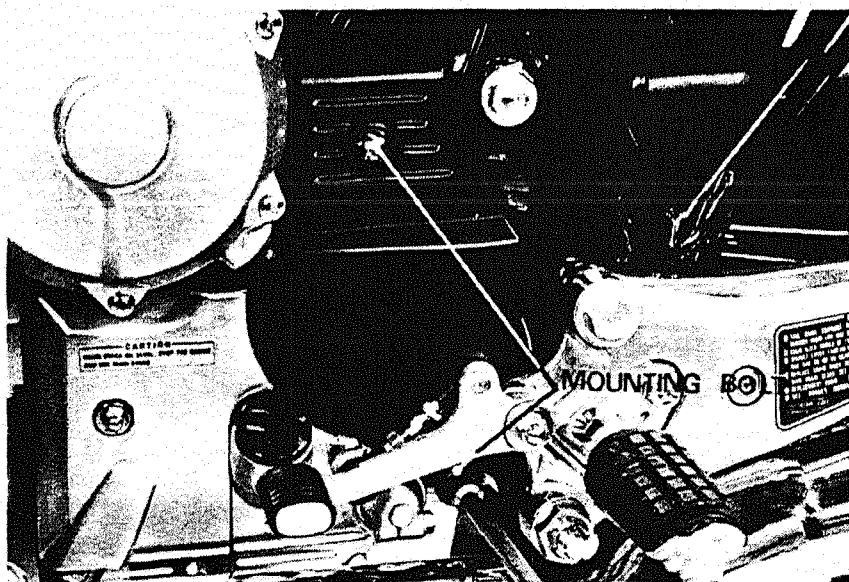
STARTER MOTOR

REMOVAL

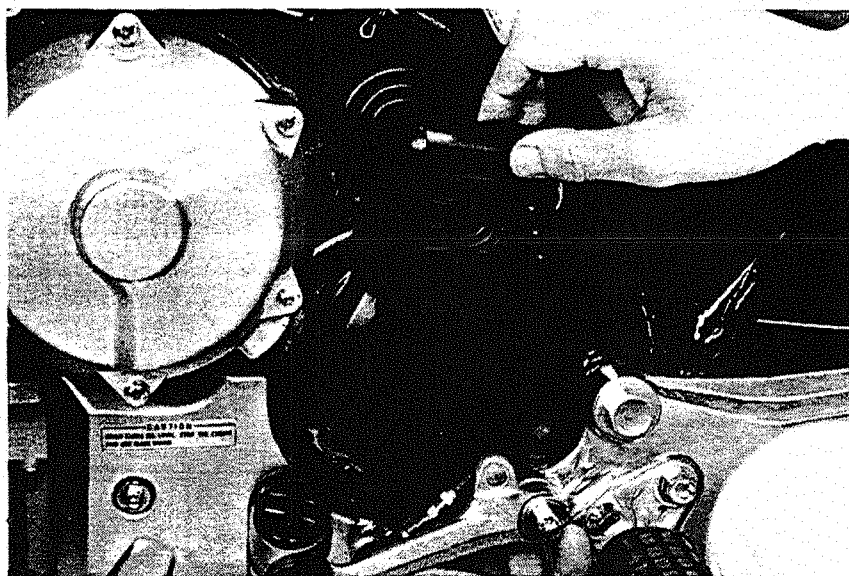
WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

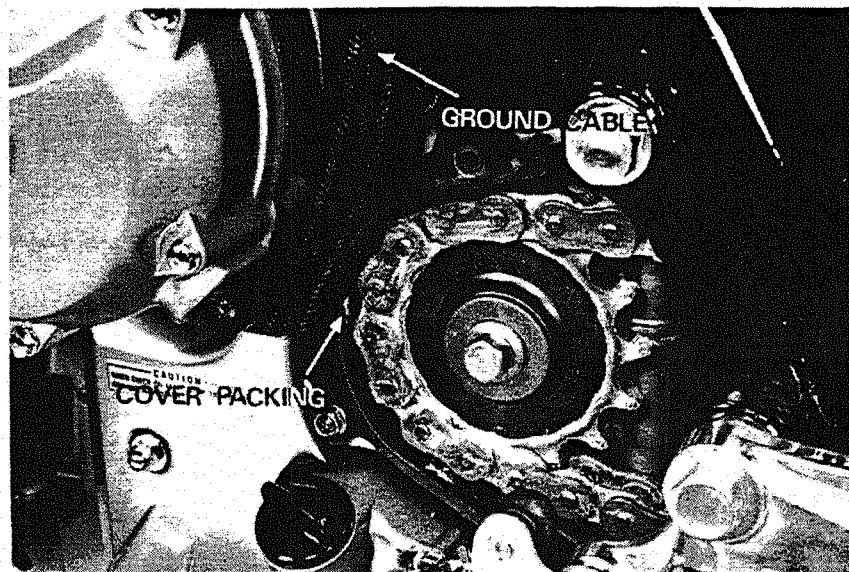
Loosen the drive sprocket cover mounting bolts.



Remove the drive sprocket cover, and pull back and to the right.

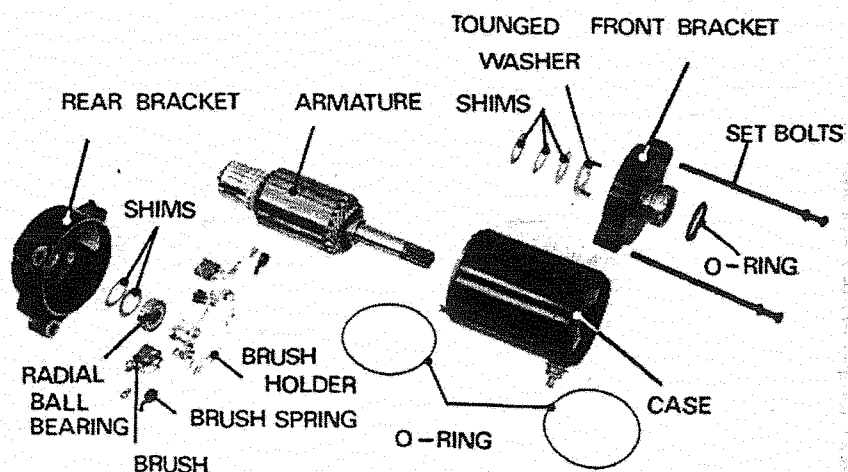
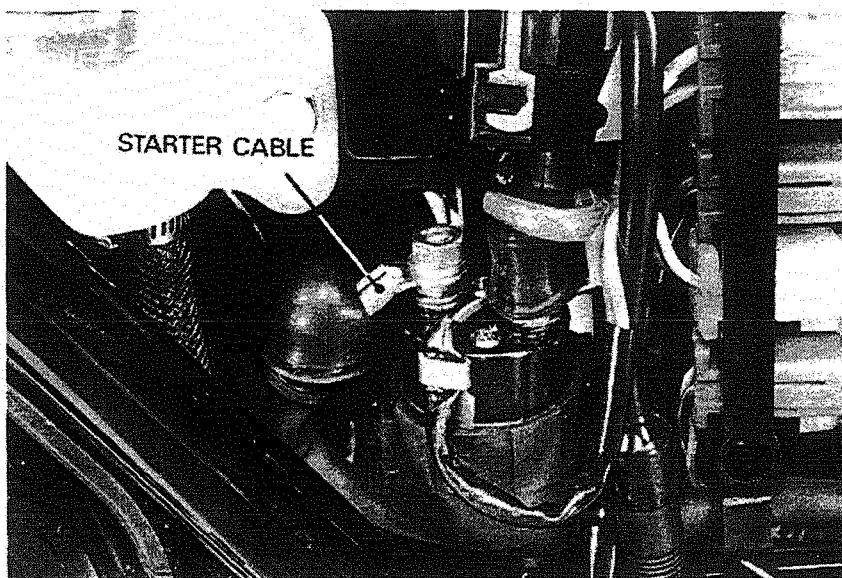


Remove the starter motor ground cable and the drive sprocket cover packing.





Remove the right side cover and disconnect the starter cable at the magnetic switch.
Remove the starter motor.

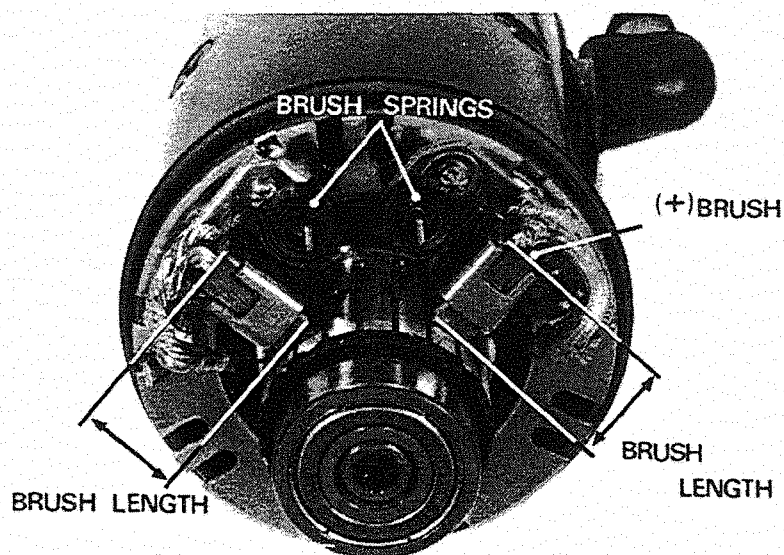


BRUSH INSPECTION

Remove the starter motor case screws.
Inspect the brushes and measure the brush length.
Measure brush spring tension with a spring scale.

SERVICE LIMITS:

Brush length: 7.5 mm (0.30 in)
Brush spring tension: 560 g



**COMMUTATOR INSPECTION**

Remove the starter motor case.

NOTE

Record the location and number of the thrust washers.

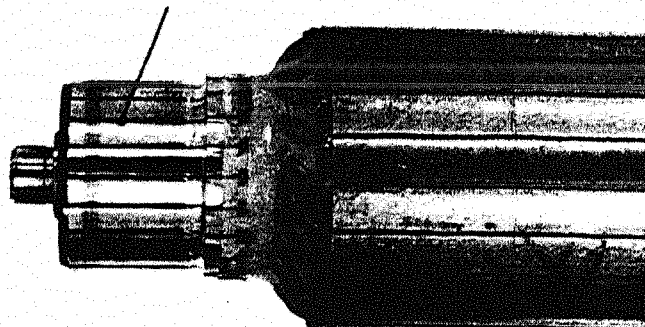
Inspect the commutator bars for discoloration.

Bars discolored in pairs indicate grounded armature coils.

NOTE

Do not use emery or sand paper on the commutator.

COMMUTATOR



Check for continuity between pairs of commutator bars, and also between commutator bars and armature shaft.

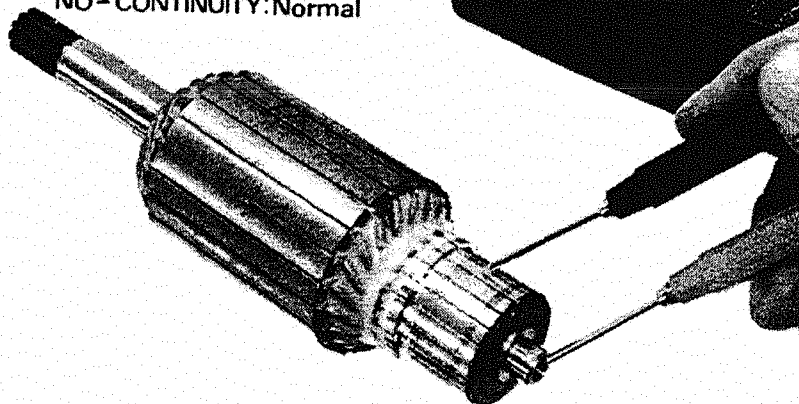
Replace the starter motor if armature coils are open, or shorted to the armature shaft.

COMMUTATOR BAR PAIRS

CONTINUITY: Normal

ARMATURE - SHAFT

NO - CONTINUITY: Normal

**FIELD COIL INSPECTION**

Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire.

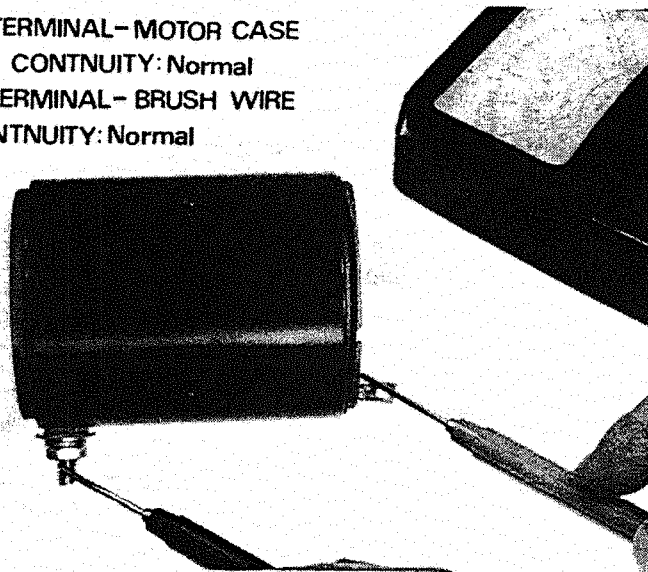
Replace the starter motor if the field coil is not continuous or if it is shorted to the motor case.

CABLE TERMINAL - MOTOR CASE

NO CONTNUITY: Normal

CABLE TERMINAL - BRUSH WIRE

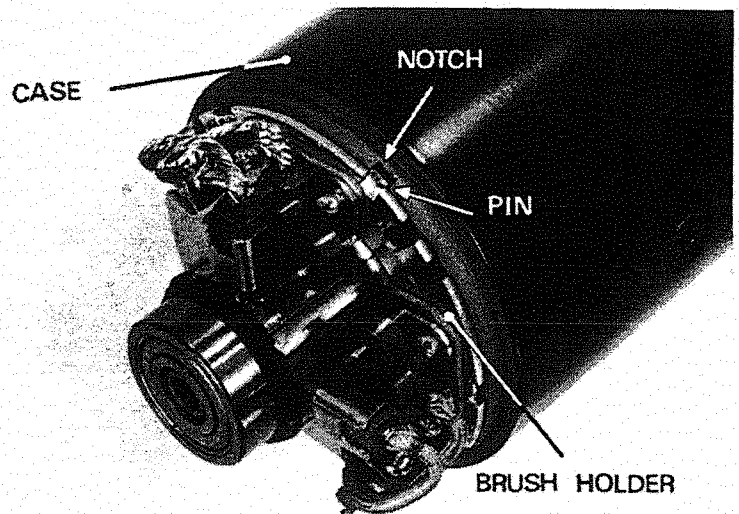
CONTNUITY: Normal



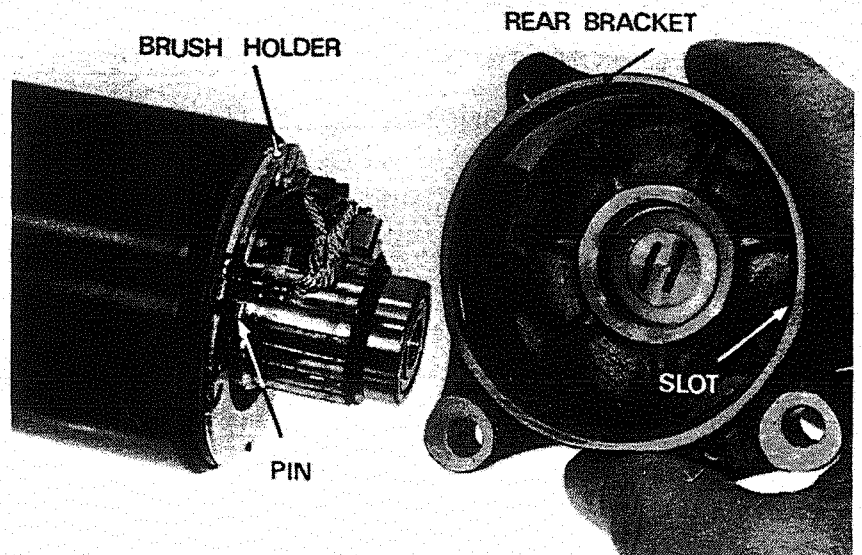


ASSEMBLY/INSTALLATION

Assemble the starter motor.
Align the case notch with the brush holder pin.



Install the rear bracket aligning its slot with the brush holder pin.



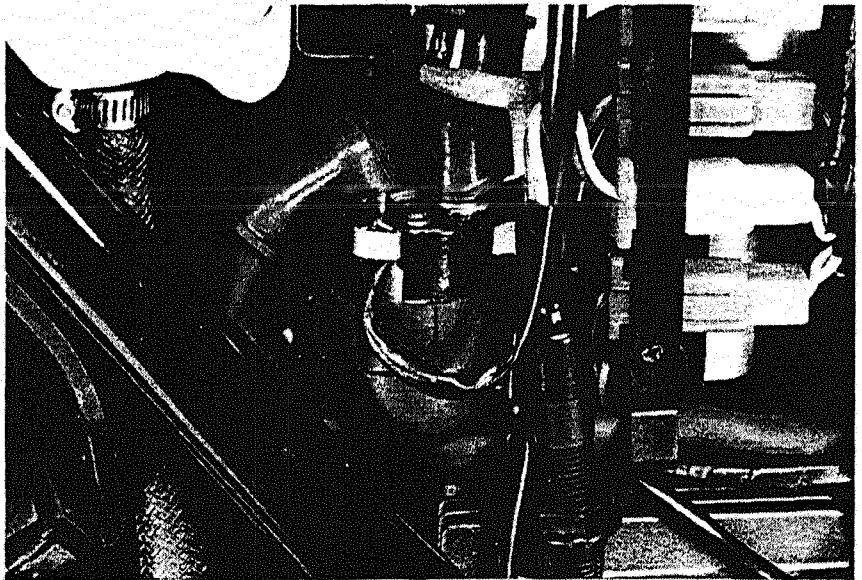


MAGNETIC SWITCH

INSPECTION

Depress the starter switch button with the ignition ON.

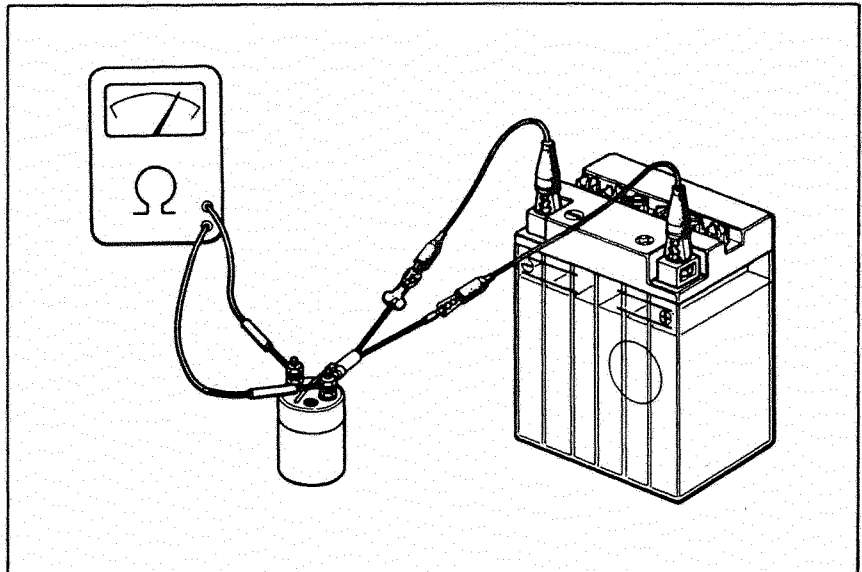
The coil is normal if the magnetic switch clicks.



Connect an ohmmeter to the magnetic switch terminals.

Connect a 12 V battery to the switch cable terminals.

The switch is normal if there is continuity.





SERVICE INFORMATION	19-1	HANDLEBAR SWITCHES	19-3
OIL PRESSURE WARNING SWITCH	19-2	IGNITION SWITCH	19-4
BRAKE SWITCHES	19-2	CLUTCH SWITCH	19-4
NEUTRAL SWITCH	19-2		

SERVICE INFORMATION

WORKING PRACTICE

All electrical wires and connectors are color-coded. When two or more different colored wires are connected, a colored tube that matches the significant color appears on the other wire near the connector. Observe the color codes before disconnecting any wires.

All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.

The following color codes used are indicated throughout this section and on the wiring diagram.

B = Blue	LG = Light Green
Bk = Black	O = Orange
Br = Brown	P = Pink
G = Green	R = Red
Gr = Grey	W = White
LB = Light Blue	Y = Yellow

In order to isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle — by simply disconnecting the wires and connecting a continuity tester or volt-ohmmeter to the terminals or connections.

A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. If the quality of the circuit is important, as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections, an ohmmeter is needed.

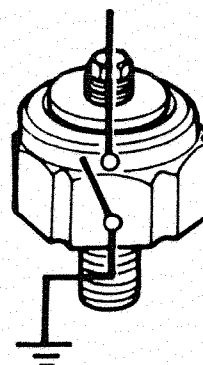


OIL PRESSURE WARNING SWITCH

Check for continuity while applying pressure to the switch.

Replace the switch if necessary.

CONTINUITY; BELOW 2.8 psi



NO CONTINUITY; ABOVE 2.8–5.6 psi

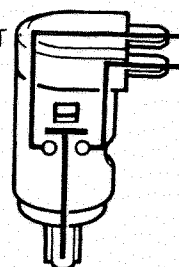
BRAKE SWITCHES

Check the rear brakelight switch for continuity with the rear brake applied.

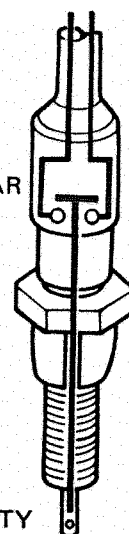
Check the front brakelight switch for continuity with the front brake applied.

Replace the switches if necessary.

FRONT



REAR



BRAKE APPLIED: CONTINUITY
BRAKE NOT APPLIED: NO CONTINUITY

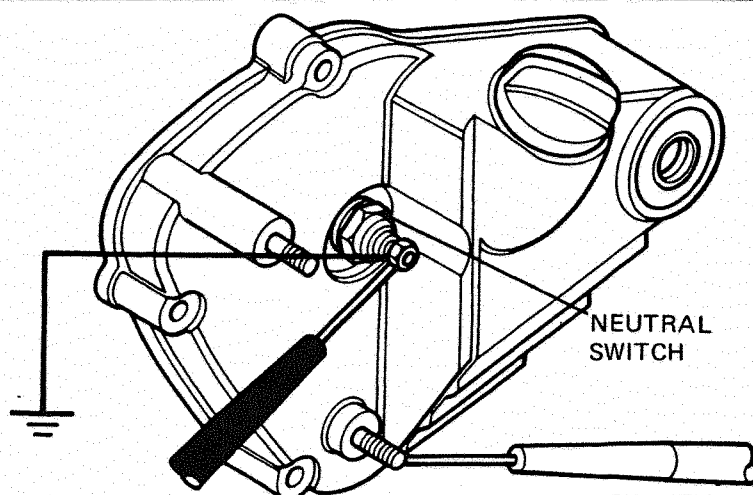
NEUTRAL SWITCH

Check the switch for continuity between the switch terminal (wire removed) and ground with the transmission in neutral and with the transmission in any gear.

NOTE

To replace the neutral switch, remove the left muffler and oil hose cover.

Replace the neutral switch if necessary.



IN NEUTRAL: CONTINUITY
IN ANY GEAR: NO CONTINUITY



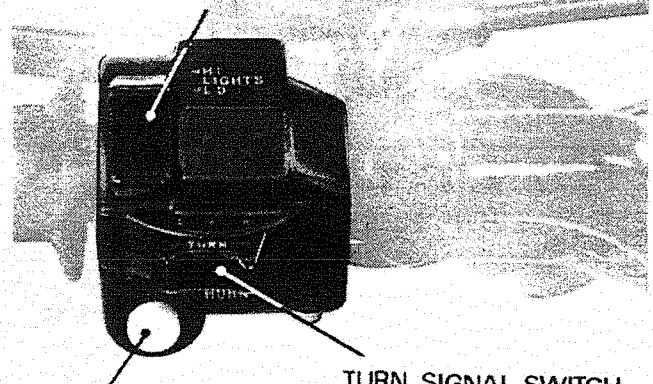
HANDLEBAR SWITCHES

The handlebar cluster switches (lights, turn signals, horn, start and stop) must be replaced as assemblies.

Continuity tests for the components of the handlebar cluster switches follow:

Continuity should exist between the color coded wires on each chart.

HEAD LIGHT
HI-LO SWITCH



TURN SIGNAL SWITCH

HORN BUTTON

HEADLIGHT HI-LOW SWITCH

HI: B/W to B
MIDDLE (N): B/W to W to B
LO: B/W to W

Headlight Hi-Low Switch

	HL	HB	LB
Hi	○	○	
(N)	○	○	○
Lo	○		○
Code color	B/W	B	W

TURN SIGNAL SWITCH

LEFT: Gr to O, Br/W to LB/W
OFF: Br/W to O/W to LB/W
RIGHT: Gr to LB, Br/W to O/W

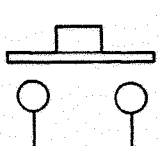
Turn Signal Switch

	TR	LT	RT	P	PL	PR
LEFT	○	○		○		○
OFF				○	○	○
RIGHT	○		○	○	○	
Code color	Gr	O	LB	Br/W	O/W	LB/W

HORN BUTTON

LG to G with button depressed
No continuity with button released

Horn Button

	HO	E
		
Code color	LG	G

Starter Button

	BAT5	HL	BAT2	ST
FREE	○	○		
START			○	○
Code color	Bk/R	B/W	Bk	Y/R

STARTER BUTTON

Bk/R to B/W with button released
Bk to Y/R with button depressed

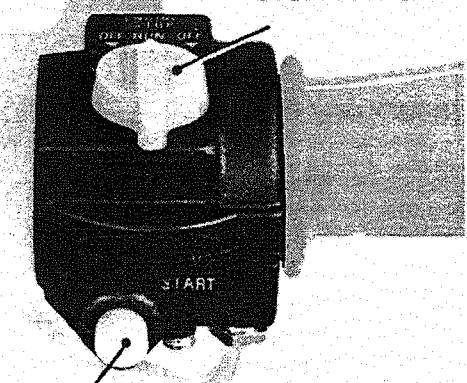
Engine Stop Switch

	BAT2	IG
OFF		
RUN	○	○
OFF		
Code color	Bk	Bk/W

ENGINE STOP SWITCH

RUN: Bk to Bk/W
OFF: No continuity

STOP SWITCH



STARTER BUTTON



SWITCHES

IGNITION SWITCH

Remove the instrument cluster and disconnect the plug.
Remove the ignition switch.

NOTE

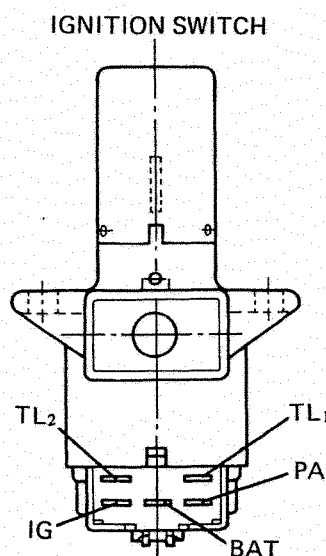
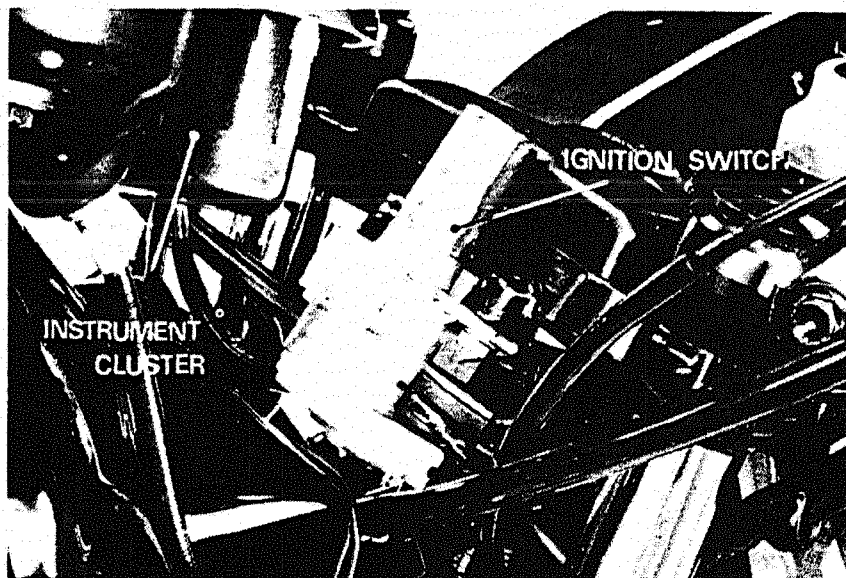
Identify the wire colors at the connector. There are no colors on the switch.

Check continuity of terminals on the ignition switch in each switch position.

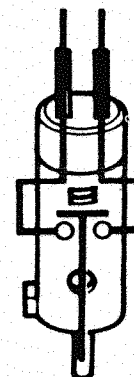
SWITCH POSITION

LOCK: No continuity
OFF: No continuity
ON: BAT to IG, TL to TL
PARK: PA to BAT

Terminal Position	PA	BAT	IG	TL ₁	TL ₂
P	○—○				
ON		○—○	○—○	○—○	
OFF					
LOCK					



CLUTCH SWITCH



CLUTCH APPLIED: CONTINUITY
CLUTCH RELEASED: NO CONTINUITY

CLUTCH SWITCH

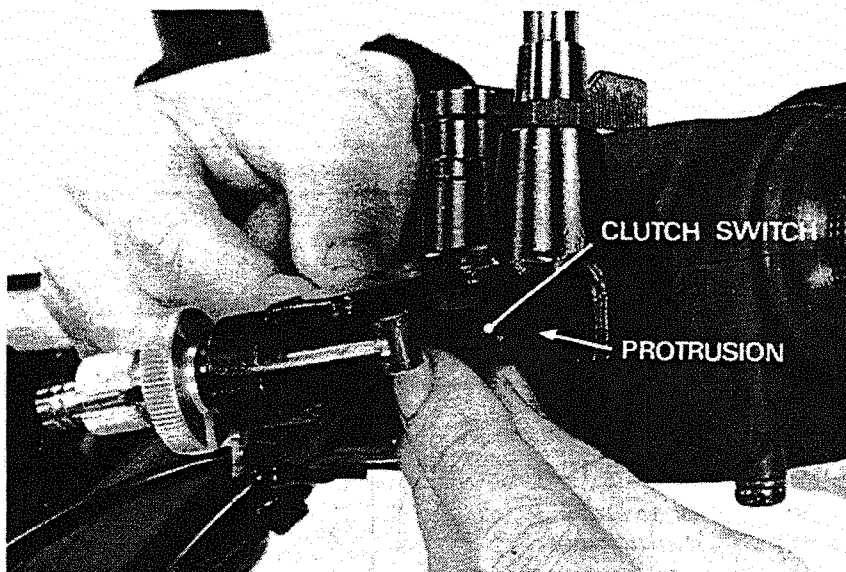
Check continuity of the clutch lever (safety) switch with the clutch released and applied.
Replace if necessary.

REMOVAL

Unplug the wires.
Remove the clutch lever and cable.
Remove the switch.

NOTE

The switch case has a small protrusion that must point toward the handlebar when installed.



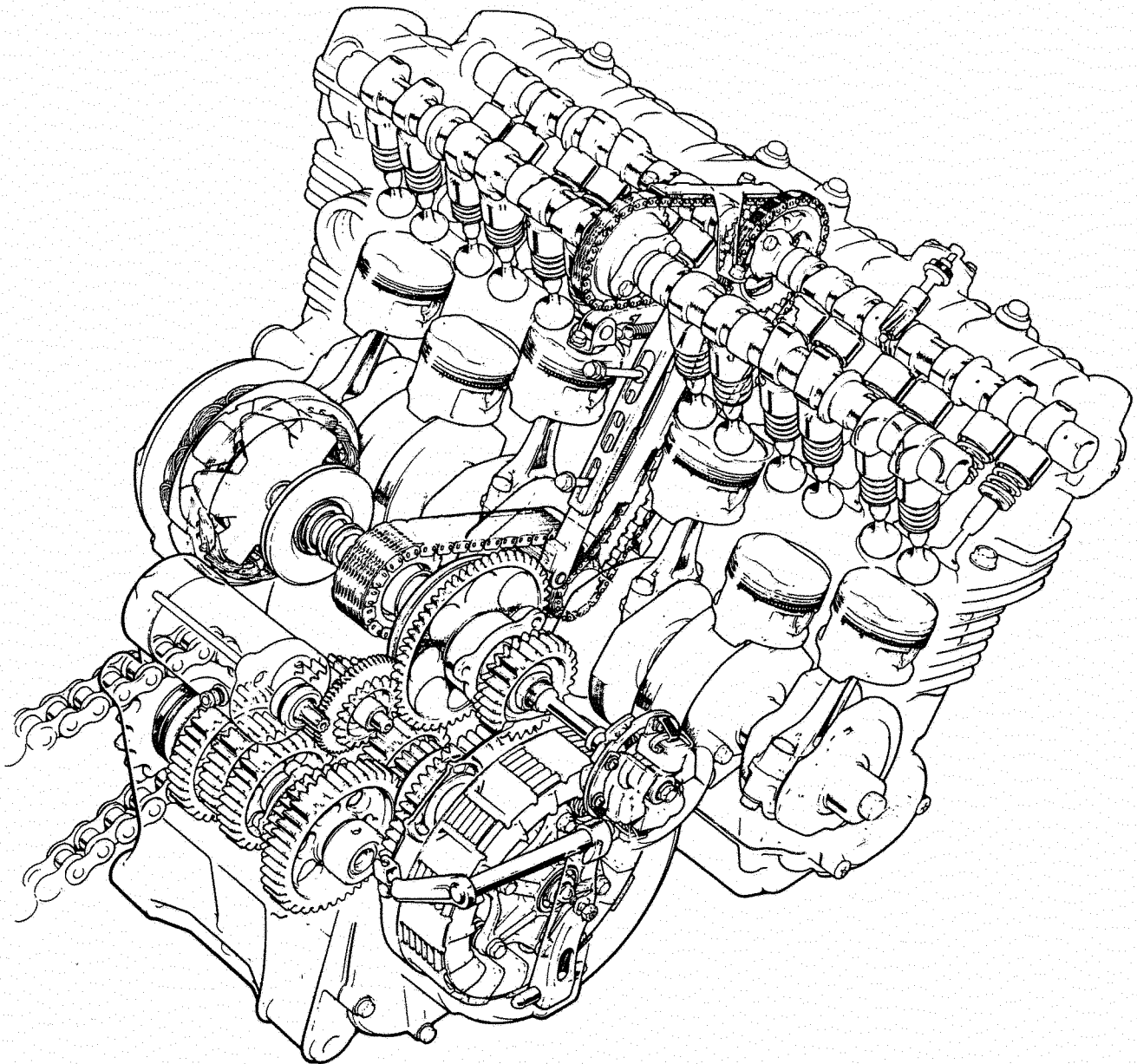


HONDA
CB X

MEMO



ENGINE CONSTRUCTION





DUAL CAM CHAINS

Dual cam chains drive the camshafts. Drive is transmitted from the crankshaft to the exhaust camshafts and from there to the intake camshafts. This eliminates a diagonal chain path through the rear of the engine, reducing the distance between the carburetors and cylinders.

The narrow air cleaner and canted carburetors eliminate interference with the rider's legs.

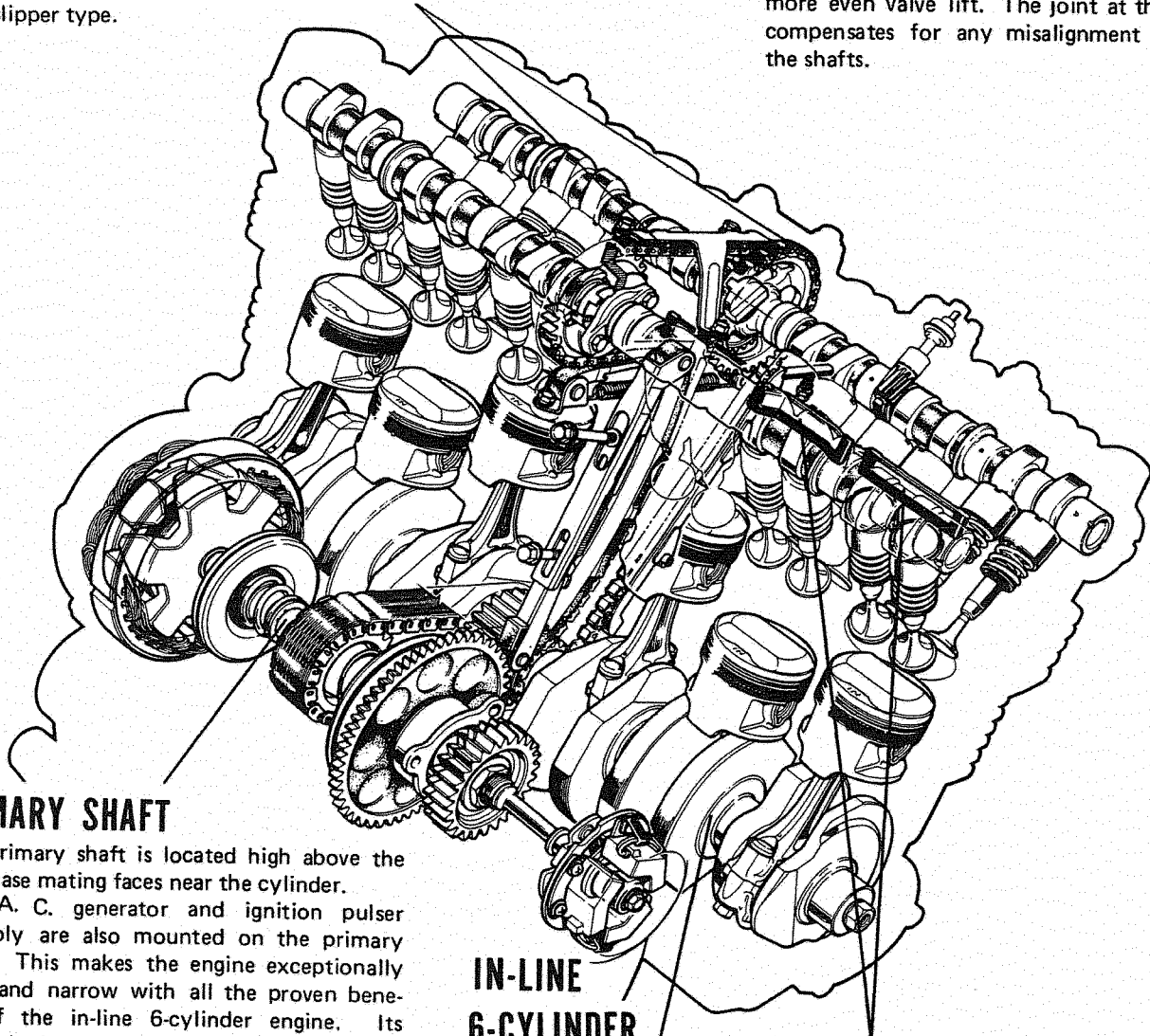
The cam chains are durable silent type.

Each chain has a guide. Chain tensioners are the slipper type.

24 VALVES, SEPARATED CAMSHAFTS

Each cylinder has two intake and two exhaust valves. The arrangement insures effective breathing at high speed without valve float. Four valves instead of two allow a large overall port area with a low reciprocating weight for each valve spring.

The camshafts are of a two-piece forging. The separated shafts provide rigidity with more even valve lift. The joint at the center compensates for any misalignment between the shafts.



PRIMARY SHAFT

The primary shaft is located high above the crankcase mating faces near the cylinder.

The A. C. generator and ignition pulser assembly are also mounted on the primary shaft. This makes the engine exceptionally short and narrow with all the proven benefits of the in-line 6-cylinder engine. Its physical size is equal to the standard in-line 4-cylinder motorcycles in its cc class.

IN-LINE 6-CYLINDER ARRANGEMENT

The in-line ultra short 53.4 mm stroke 6-cylinder arrangement reduces the vehicle's height. It also reduces piston speed and minimizes wear.

CAMSHAFT OIL POOL PLATES

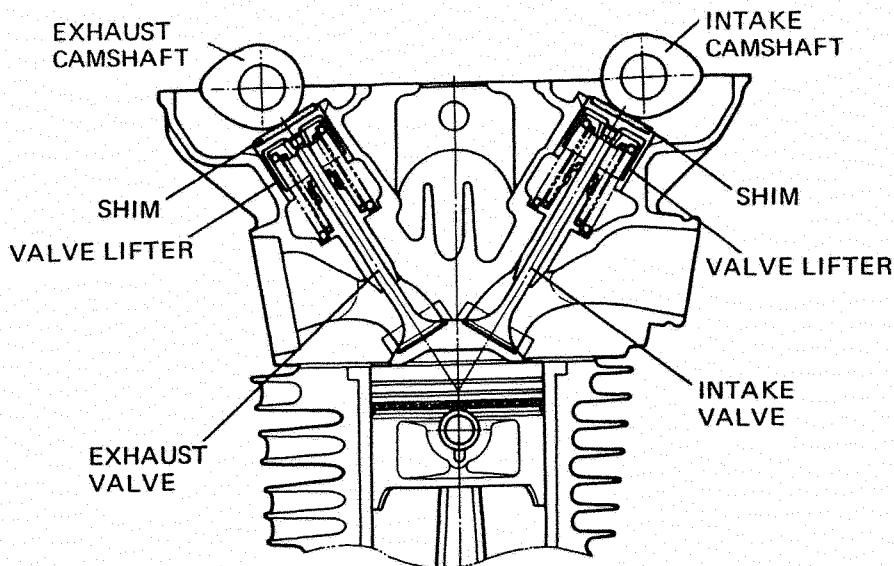
The engine oil is collected in the camshaft troughs by oil pool plates for positive lubrication of the valve lifters and cams.

The plates also contribute to quieter valve operation.



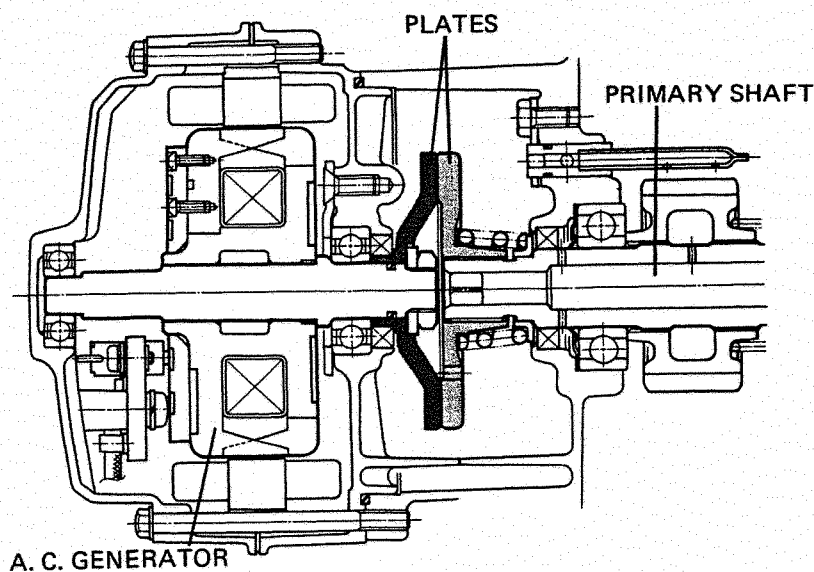
VALVE MECHANISM

The valves are operated by the cams through the valve lifters. The shims can be removed and installed easily without removing the camshafts by pushing down on the lifters with a special tool.



A.C. GENERATOR COUPLING

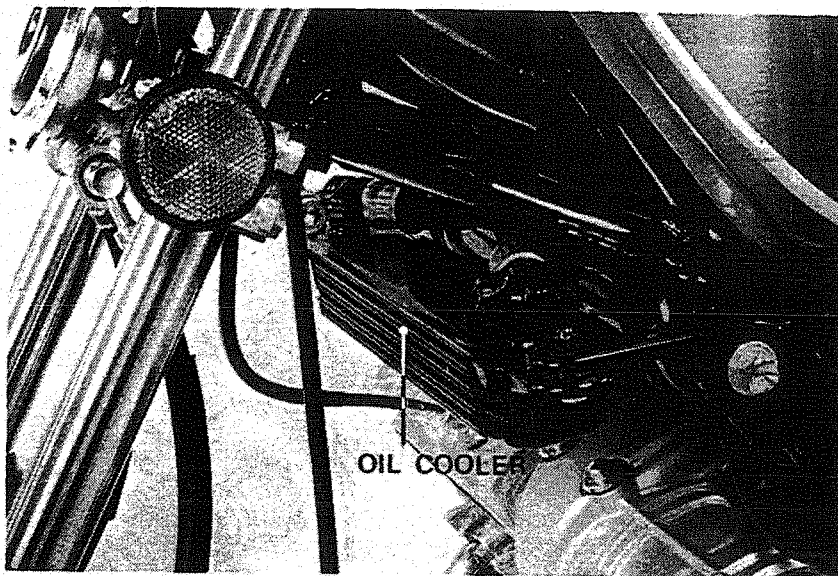
Power from the primary shaft is transmitted to the generator through a frictional coupling. The coupling consists of two steel discs pressed against each other by a spring. Relative movement between the discs prevents excessive inertia from being transmitted directly from the generator to the primary chain when snapping.





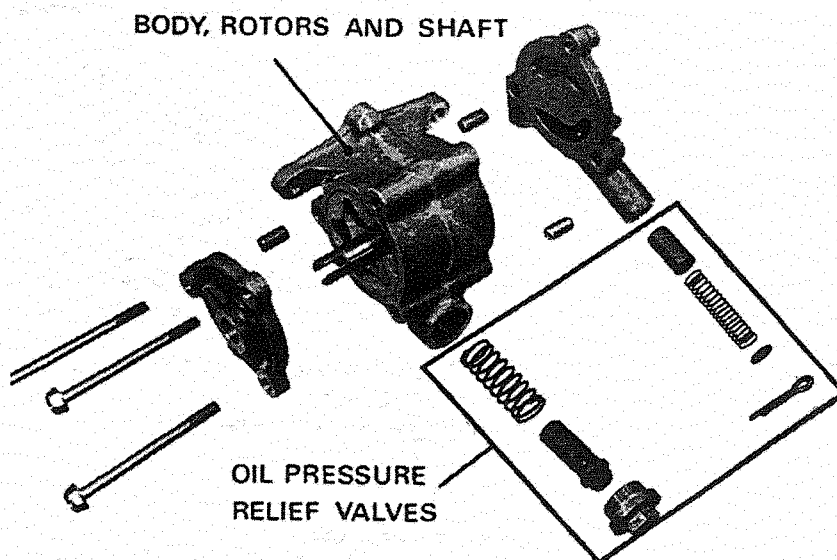
OIL COOLER, OIL PUMP

The lubricating system uses a wet sump with the sump at the crankcase bottom. The oil is cooled by an oil cooler.

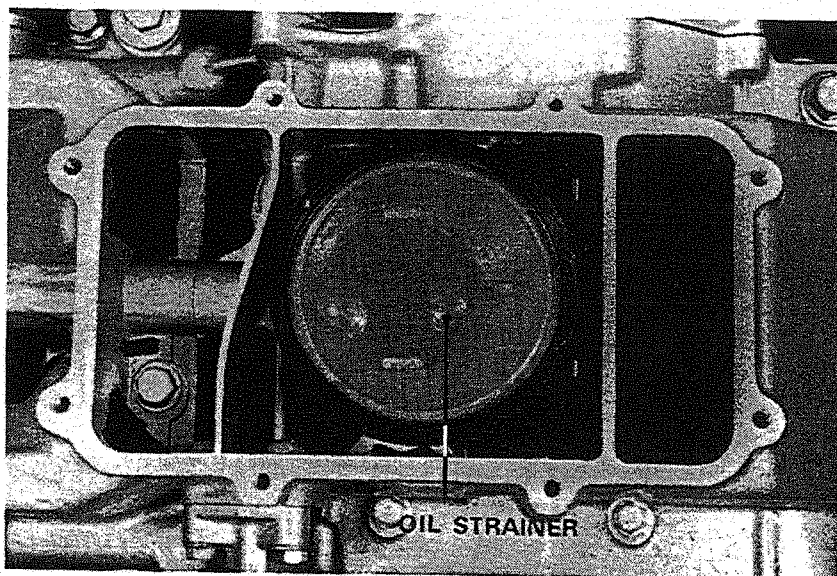


A tandem trochoid pump supplies oil to the bearings and other moving parts of the engine. Oil from the oil sump is forced by the main pump into the crankshaft and cylinder head.

The auxiliary pump feeds oil to the primary shaft and transmission. The oil cooler is in the auxiliary pump circuit and cools the oil drawn from the sump by the auxiliary pump. The oil damper in the primary chain receives oil from this pump circuit.



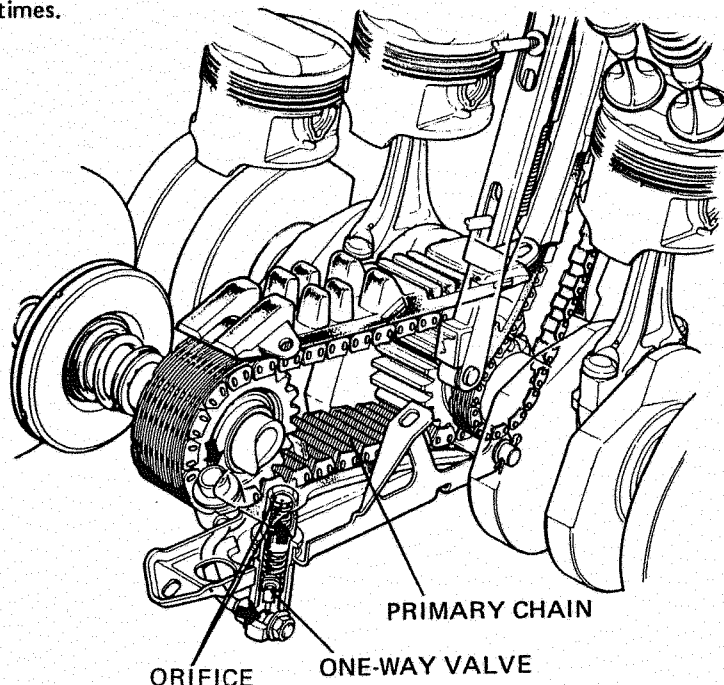
Oil from the sump must pass through a strainer before it enters the pumps.





OIL DAMPER TYPE PRIMARY CHAIN TENSIONER

Primary chain tension is controlled by an oil dampened chain tensioner. It consists of a one-way check valve using a steel ball, a spring and a tension bar. The bar has an oil chamber with small orifices at its end. Oil in the chamber compensates for cavitation, assuring positive damper action at all times.



TRANSISTORIZED IGNITION

The engine uses a transistorized ignition. A pulser generator and transistorized spark unit supply current to the primary circuit. The system is free from problems that occur in mechanical breaker systems. It produces stable secondary energy and eliminates periodic adjustments and maintenance services. There are three independent systems; one for 1 & 6, 2 & 5, and 3 & 4 cylinders.

The generator rotor is connected to the primary shaft so they turn as a unit as the shaft rotates. Three generating coils are spaced evenly on the base plate, 120 degrees apart.

When the rotor turns, pulses are generated as it passes over the coils. Adjusting timing for 1 & 6 cylinders automatically adjusts the other cylinders.

