

ELECTRICAL SYSTEM

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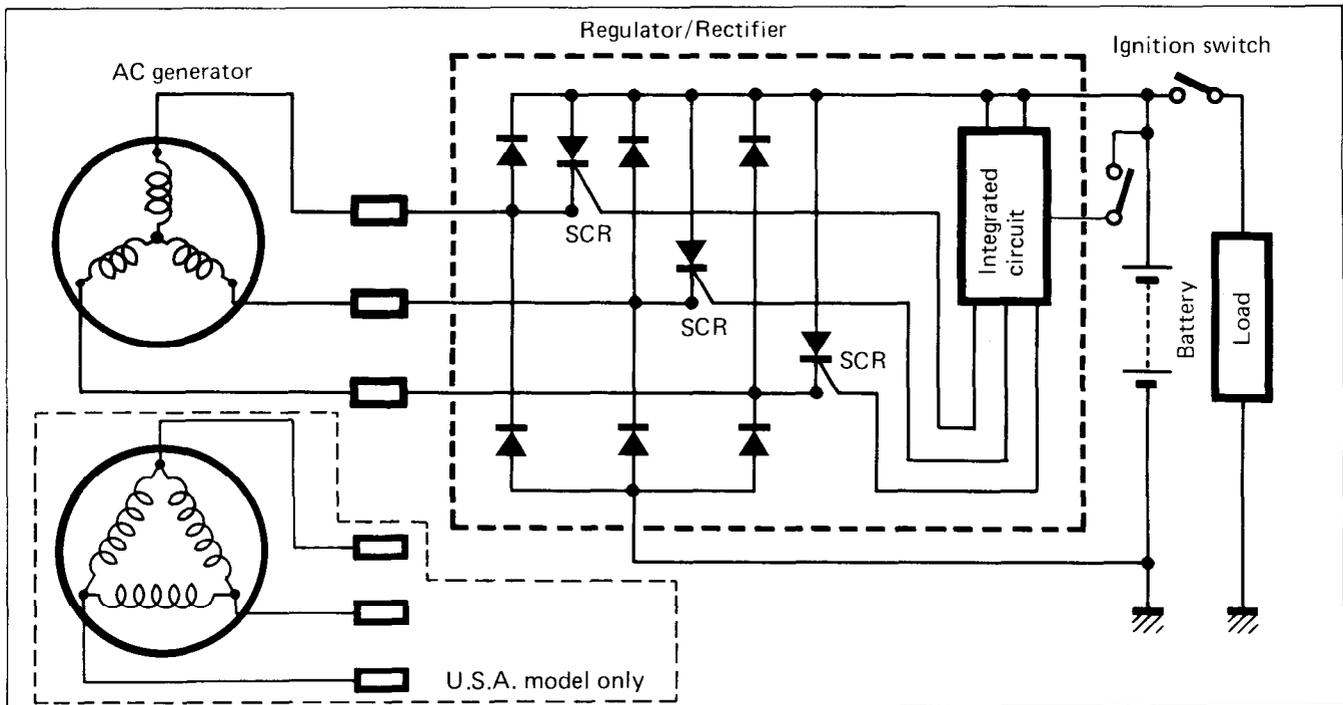
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CHARGING SYSTEM

DESCRIPTION

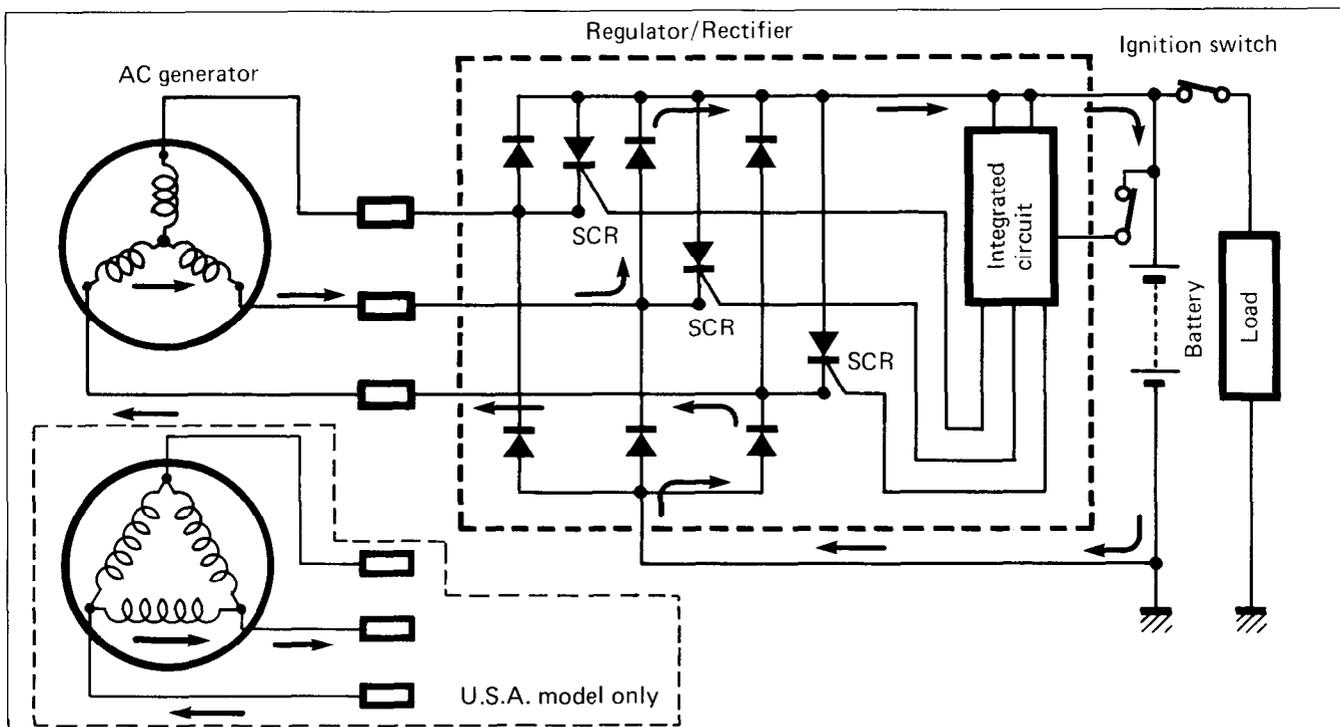
The circuit of the charging system is indicated in the figure, which is composed of an AC generator, regulator/rectifier unit and battery.

The AC current generated from the AC generator is rectified by the rectifier and is turned into DC current, then it charges the battery.



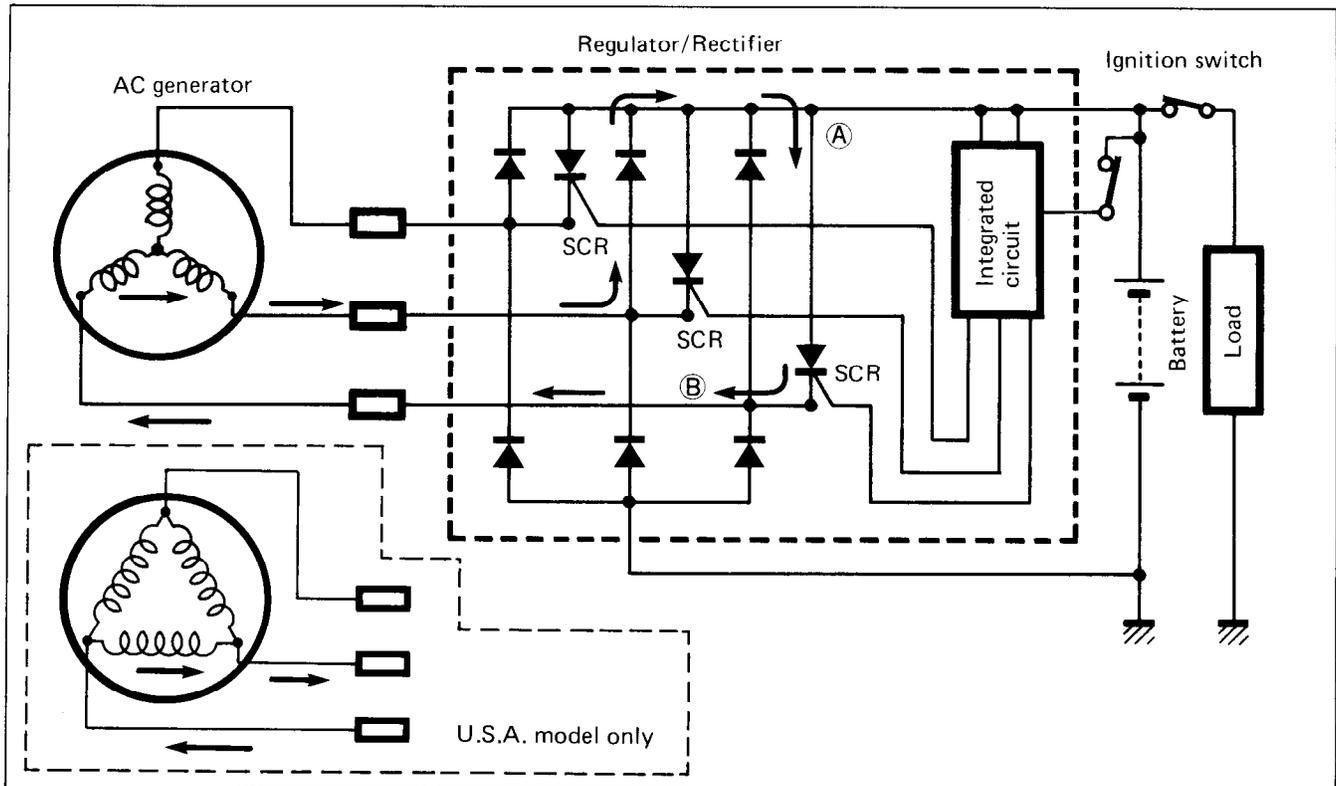
FUNCTION OF REGULATOR

While the engine r/min is low and the generated voltage of the AC generator is lower than the adjusted voltage of regulator, the regulator does not function. However, the generated current charges the battery directly at this time.



When the engine r/min becomes higher, the generated voltage of the AC generator also becomes higher and the voltage between the battery terminals becomes high accordingly. When it reaches the adjusted voltage of the I.C. (Integrated Circuit) and it is turned "ON", a signal will be sent to the SCR (Thyristor) gate probe and the SCR will be turned "ON".

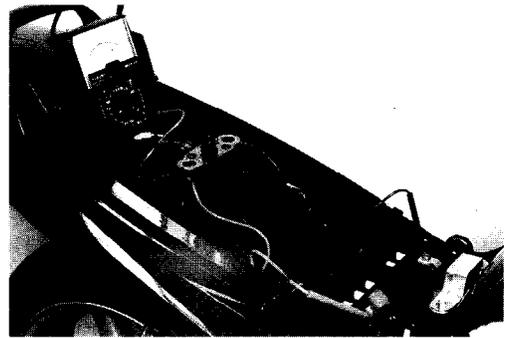
Then, the SCR becomes conductive in the direction from point (A) to point (B). At this time, the current generated from the AC generator gets through the SCR without charging the battery and returns to AC generator again. At the end of this state, since the AC current generated from AC generator flows to point (B), the reverse current tends to flow to SCR. Then, the circuit of SCR turns to the OFF mode and begins to charge the battery again. Thus these repetitions maintain charging voltage and current to the battery constant and protect it from overcharging.



INSPECTION

CHARGING OUTPUT CHECK

- Remove the seat.
- Start the engine and keep it running at 5 000 r/min with lighting switch turned ON and dimmer switch turned HI position.
- Using the pocket tester, measure the DC voltage between the battery terminals, ⊕ and ⊖ .
If the tester reads under 13.5V or over 15.5V, check the AC generator no-load performance and regulator/rectifier.

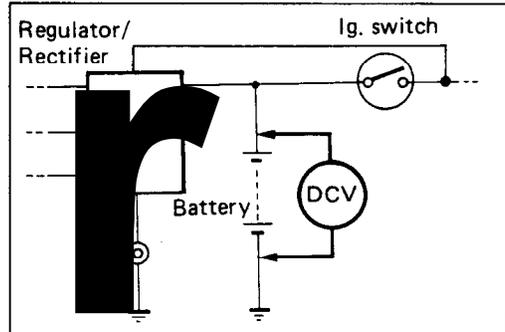


NOTE:

When making this test, be sure that the battery is fully-charged condition.

STD charging output : 13.5 – 15.5V (DC) at 5 000 r/min

09900-25002 : Pocket tester



AC GENERATOR NO-LOAD PERFORMANCE

- Remove the seat and lift the backside of fuel tank.
- Disconnect the AC generator lead wire coupler.
- Start the engine and keep it running at 5 000 r/min.
- Using the pocket tester, measure the AC voltage between the three lead wires.
If the tester reads under the specified voltage, the AC generator is faulty.

For U.S.A. model

STD no-load performance: More than 65V (AC) at 5000 r/min (When engine cold.)

For the other models

STD no-load performance: More than 75V (AC) at 5000 r/min (When engine cold.)

09900-25002 : Pocket tester

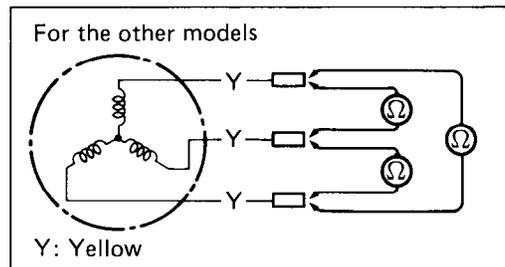
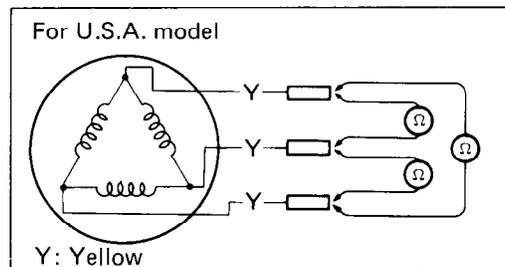
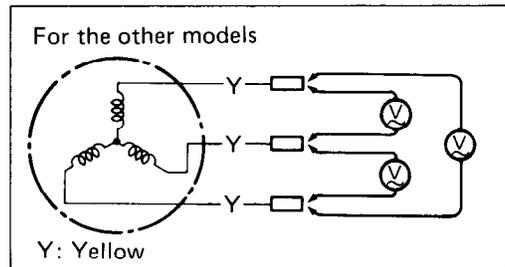
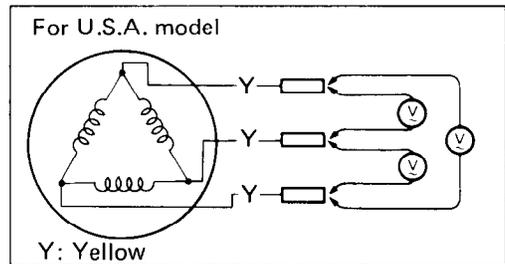
AC GENERATOR CONTINUITY CHECK

- Using the pocket tester, check the continuity between the three lead wires.
Check that there is no continuity between the lead wires and ground.

09900-25002 : Pocket tester

NOTE:

When making above test, it is not necessary to remove the AC generator.



REGULATOR/RECTIFIER

- Remove the seat and lift the backside of fuel tank.
- Using the pocket tester (x 1 k Ω range), measure the resistance between the lead wires in the following table.
If the resistance checked is incorrect, replace the regulator/rectifier.

09900-25002 : Pocket tester

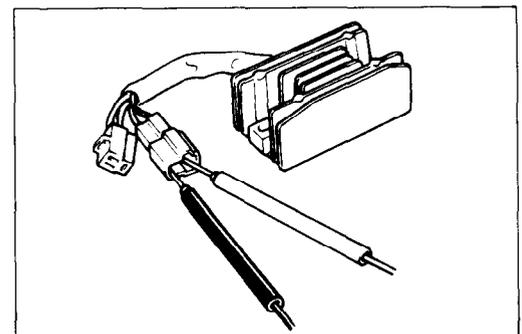
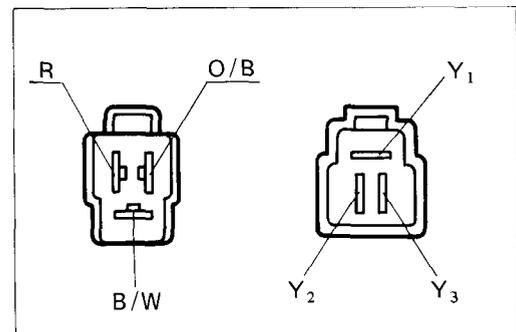
Unit: Approx. k Ω

		⊕ Probe of tester to:					
		Y ₁	Y ₂	Y ₃	R	O/B	B/W
⊖ Probe of tester to:	Y ₁		∞	∞	3.0	∞	∞
	Y ₂	∞		∞	3.0	∞	∞
	Y ₃	∞	∞		3.0	∞	∞
	R	∞	∞	∞		∞	∞
	O/B	40	40	40	60		28
	B/W	3.0	3.0	3.0	7.5	6	

Y: Yellow, R: Red, O/B: Orange with Black tracer, B/W: Black with White tracer, ∞ : Infinity

NOTE:

As transistors, capacitors, Zener diodes, etc. are used inside this regulator/rectifier, the resistance values will differ when an ohmmeter other than the SUZUKI pocket tester is used.

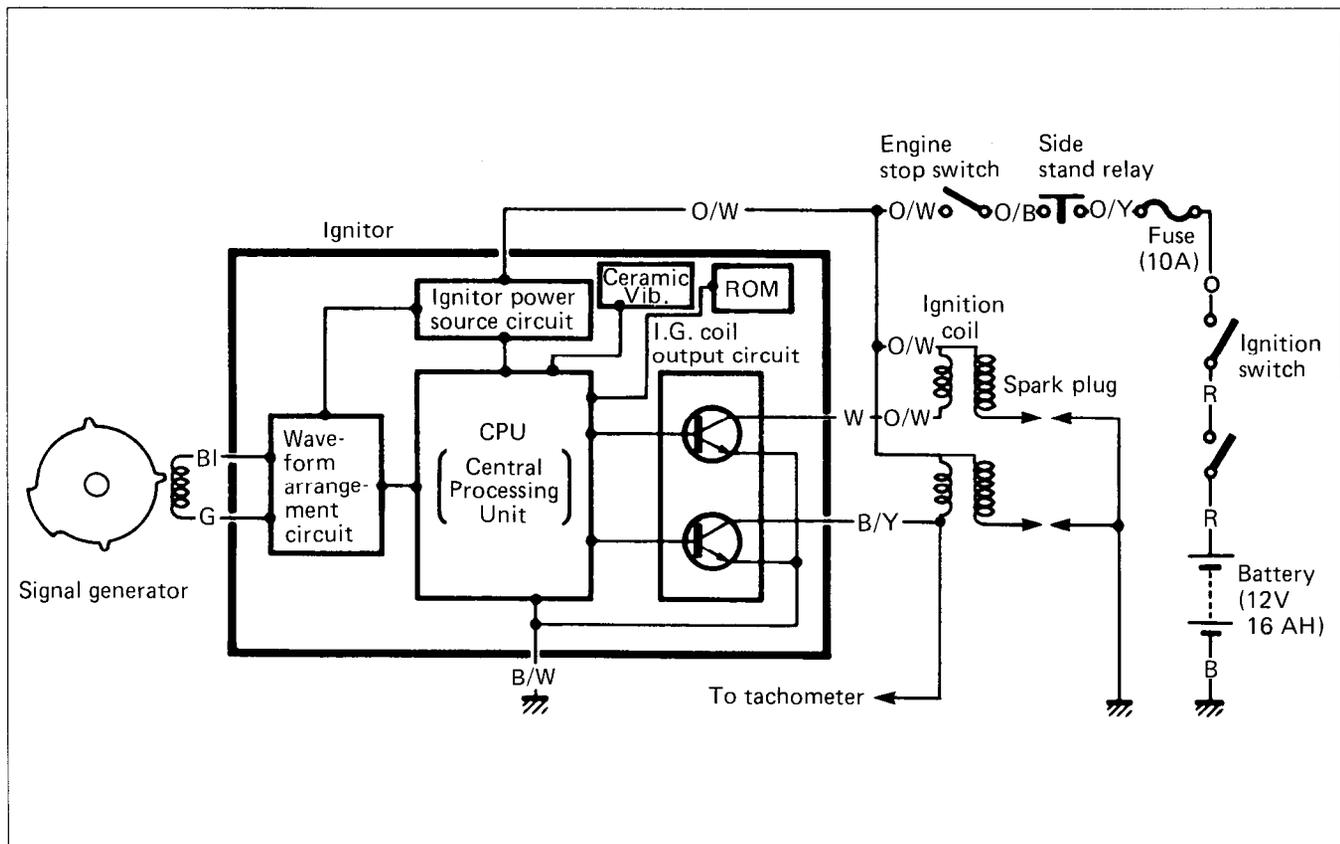


IGNITION SYSTEM

DESCRIPTION

The fully transistorized ignition system consists of a signal generator, ignitor, ignition coils, and spark plugs. The signal generator comprises rotor tip and pick-up coil.

The signal generator is mounted at the generator and rotor. The induced signal in the signal generator is sent to wave-form arrangement circuit, and CPU receives this signal and calculates the best ignition timing from the signal of ceramic vibrator and data stored in the ROM. The CPU outputs signal to the transistor of the I.G. coil output circuit which is connected to the primary windings of the ignition coil which is turned OFF and ON accordingly, thus it induces the secondary current on the ignition coil secondary windings and produce the spark between spark plug gaps.



NOTE:

The ignition cut-off circuit is not incorporated in this ignitor unit.

INSPECTION

IGNITION COIL (Checking with Electro Tester)

- Remove the ignition coils from the frame.
- Using the electro tester, test each ignition coil for sparking performance. The test connection is as indicated. Make sure that the three-needle sparking distance is at least 8 mm. If no sparking or orange color sparking occurs with this much gap, then it is defective and must be replaced.

09900-28106 : Electro tester

STD Spark performance : 8 mm (0.3 in)

IGNITION COIL (Checking with Pocket Tester)

- A SUZUKI pocket tester or an ohmmeter may be used, instead of the electro tester. In either case, the ignition coil is to be checked for continuity in both primary and secondary windings. Exact ohmic readings are not necessary, but, if the windings are in sound condition, their continuity will be noted with these approximate ohmic values.

09900-25002 : Pocket tester

Ignition coil resistance

Primary : ⊕ tap – ⊖ tap 2 – 6 Ω
Tester range: (x 1 Ω)

Secondary : ⊕ tap – Plug cap 19 – 27 k Ω
Tester range: (x 1 k Ω)

SIGNAL GENERATOR (Checking with Pocket Tester)

- Remove the seat and left frame cover.
- Measure the resistance between lead wires. If the resistance is infinity or less than the specification, the signal generator must be replaced.

09900-25002 : Pocket tester

(For U.S.A. model)

Signal coil resistance : (G – BI)
Approx. 117 Ω
Tester range: (x 100 Ω)

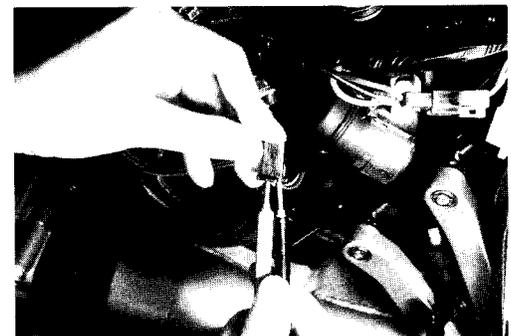
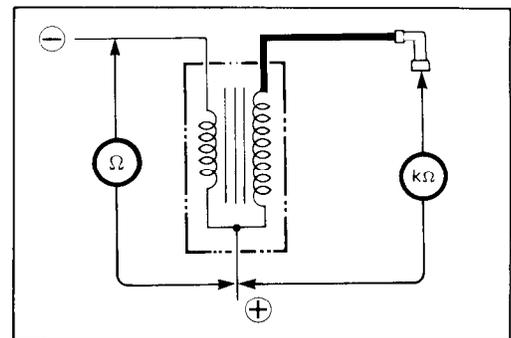
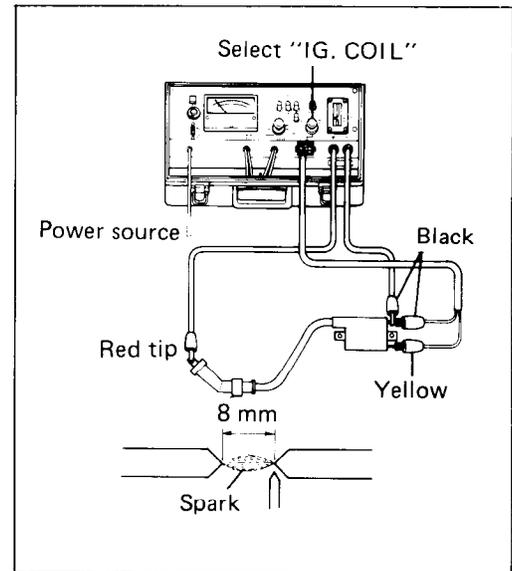
(For the other models)

Signal coil resistance : (G – BI)
Approx. 230 Ω
Tester range: (x 100 Ω)

Wire color

G : Green

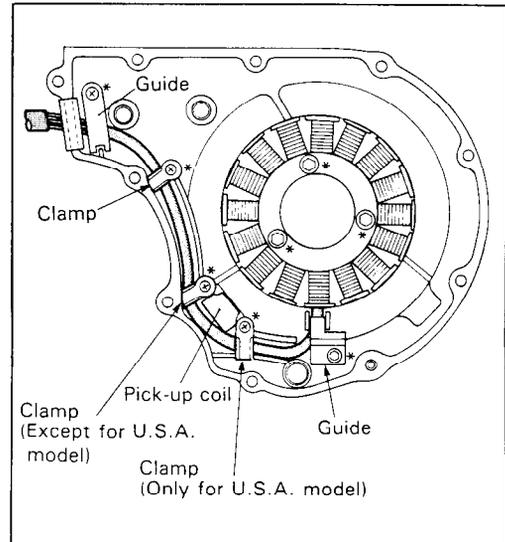
BI : Blue



CAUTION:

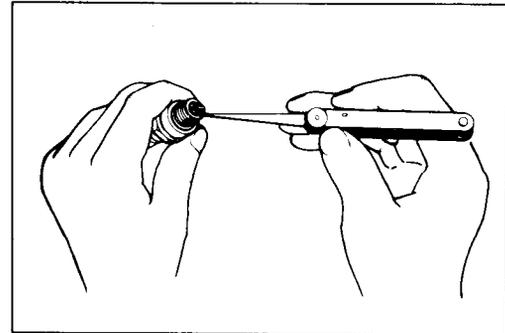
When replacing the generator coil, apply a small quantity of **THREAD LOCK "1342"** to its mounting bolts and lead wire guide screws.

99000-32050 : THREAD LOCK "1342"



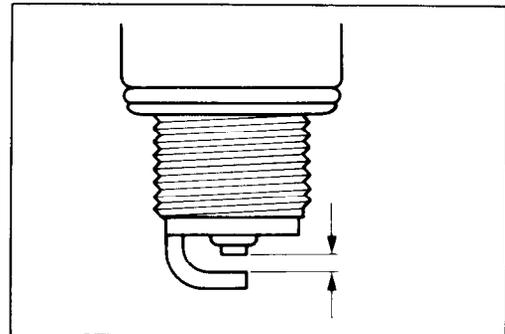
SPARK PLUG

- Clean the plug with a wire brush and pin. Use the pin to remove carbon, taking care not to damage the porcelain.



- Check the gap with a thickness gauge.

Spark plug gap : 0.8 – 0.9 mm (0.031 – 0.035 in)



Recommended spark plug

- ND: X24EPR-U9 Standard
- ND: X22EPR-U9 Hot type
- ND: X27EPR-U9 Cold type
- NGK: DPR8EA-9 Standard
- NGK: DPR7EA-9 Hot type
- NGK: DPR9EA-9 Cold type

NOTE:

"R" type spark plug is installed for some specifications. "R" type spark plug has a resistor located at the center electrode to prevent radio noise.

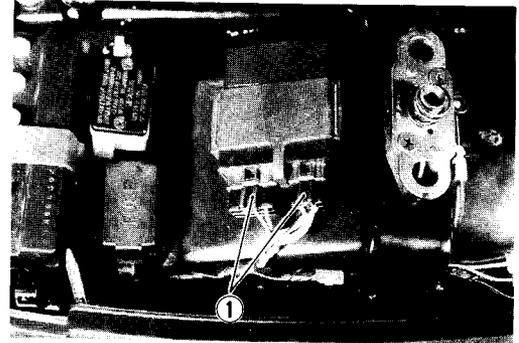
IGNITOR UNIT (Checking with Digital Ignitor Checker)

This section explains the checking procedure for the ignitor unit using Digital Ignitor Checker (special tool). With this checker, the ignitor unit can be checked either on the machine or off the machine. The following explains the checking procedure on the machine.

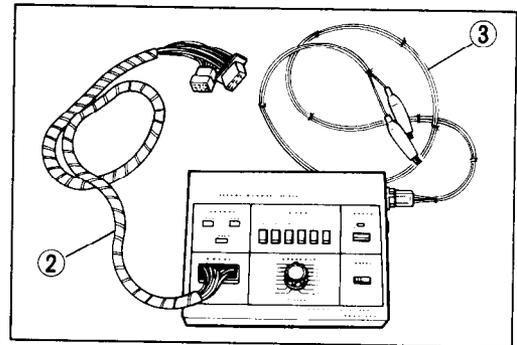
09931-94430 : Digital ignitor checker

WIRING PROCEDURE:

- Remove the seat.
- Disconnect two ignitor lead wire couplers ① at the ignitor unit.



- Prepare the ignitor checker lead wire "MODE 1" ② which comes supplied with the ignitor checker and connect its end to the ignitor unit and another end to the checker.
- Connect the power source leads ③ to the battery.



CAUTION:

- * Be sure that the **BLACK** lead is connected to the battery \ominus terminal and **RED** lead to the \oplus terminal.
- * Before connecting the power source leads, make sure that both "POWER" button and "START" switch are in "off" position (POWER button not depressed).

NOTE:

Be sure that the battery used is in fully-charged condition.

CHECK PROCEDURE:

With all the lead wires properly connected, check the ignitor unit in the following three steps.

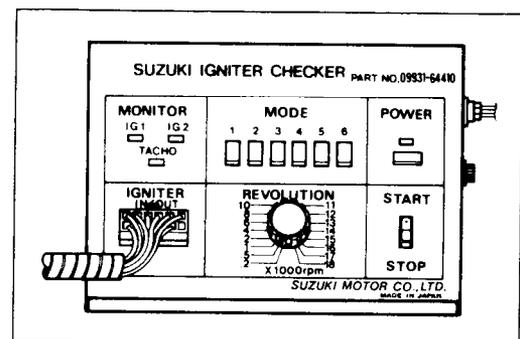
First Step:

Depress "MODE 6" button then "POWER" button. This time, "POWER" lamp should come on, if not, battery is under-charged.

NOTE:

Only for U.S.A. model

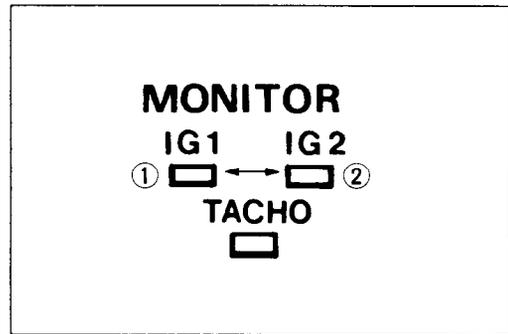
Be sure to depress "MODE 1" button.



Second Step:

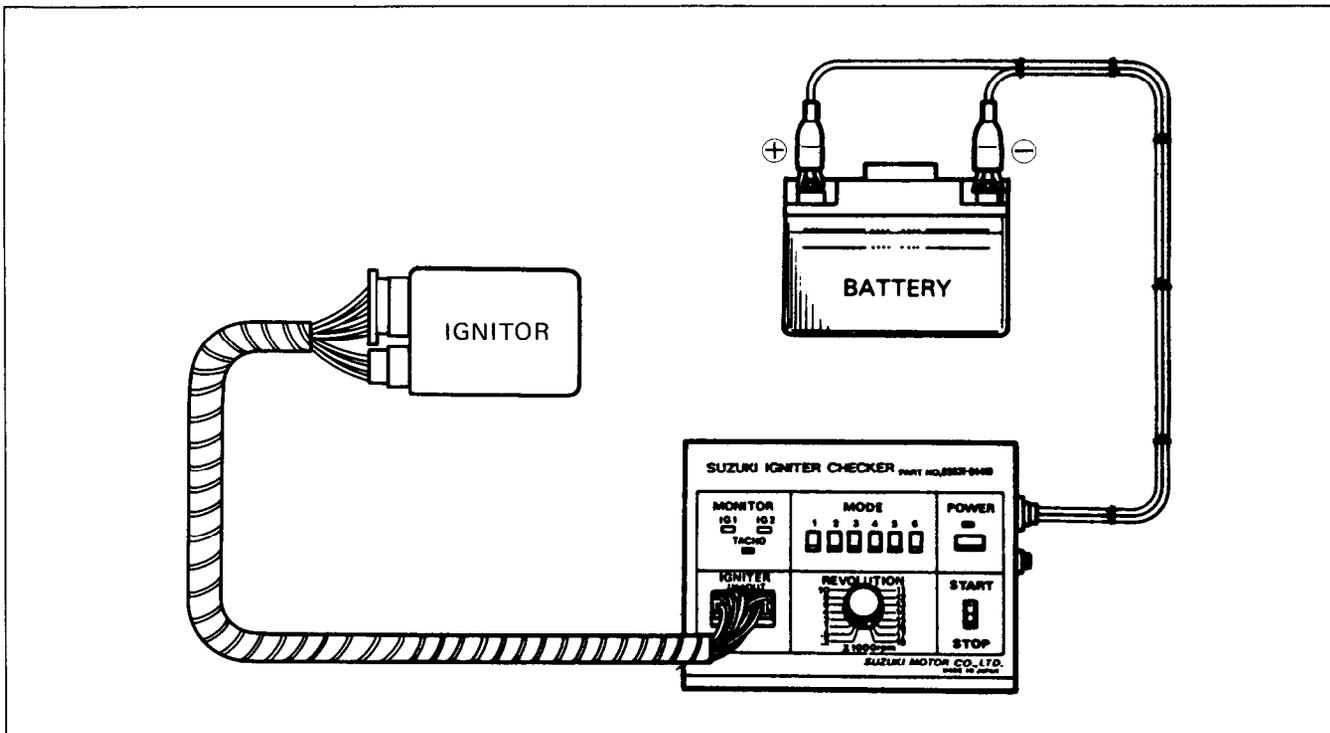
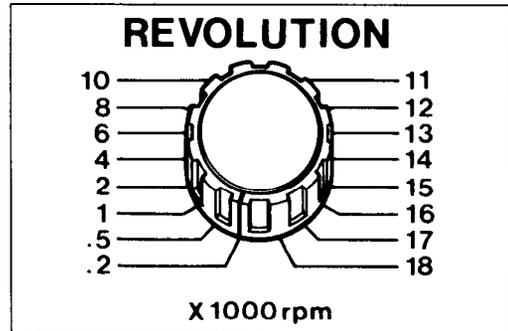
Set "REVOLUTION" dial pointer to ".2" position in which the checker produces the ignition primary current pulses simulating 200 r/min of engine revolution when "START" switch is turned on. With "START" switch is turned to ON position, check that two "MONITOR" lamps turn on and off in slow frequency in order of ① - ② as illustrated.

If these lamps do not turn on and off, the ignitor unit should be replaced.



Third Step:

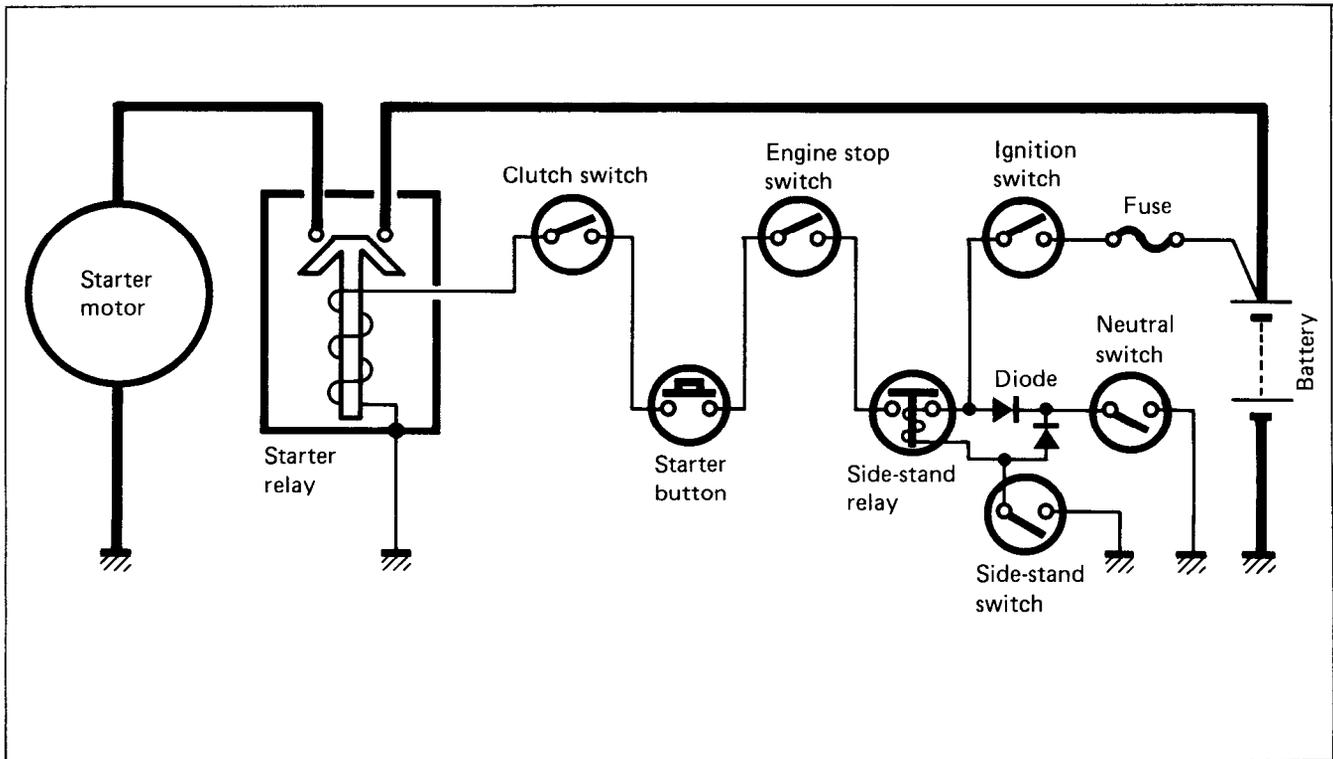
Turn "REVOLUTION" Dial up gradually (assuming the engine is gradually revved up) and check that the MONITOR lamps flash frequency as explained in the second step above increases. As the dial pointer passes beyond the graduation "4" (4 000 r/min), the two lamps should show continuously lighted. If the lamps go off at the graduation below "10", the engine can not perform properly and therefore the ignitor unit must be replaced.



STARTER SYSTEM

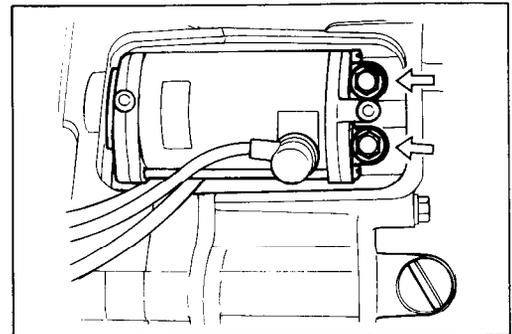
DESCRIPTION

The starter system is shown in the diagram below: namely, the starter motor, starter relay, side stand relay, clutch switch, starter button, engine stop switch, side stand switch, IG switch and battery. Depressing the starter button (on the right handlebar switch box) energizes the relay, causing the contact points to close which connects the starter motor to the battery. The motor draws about 80 amperes to start the engine.



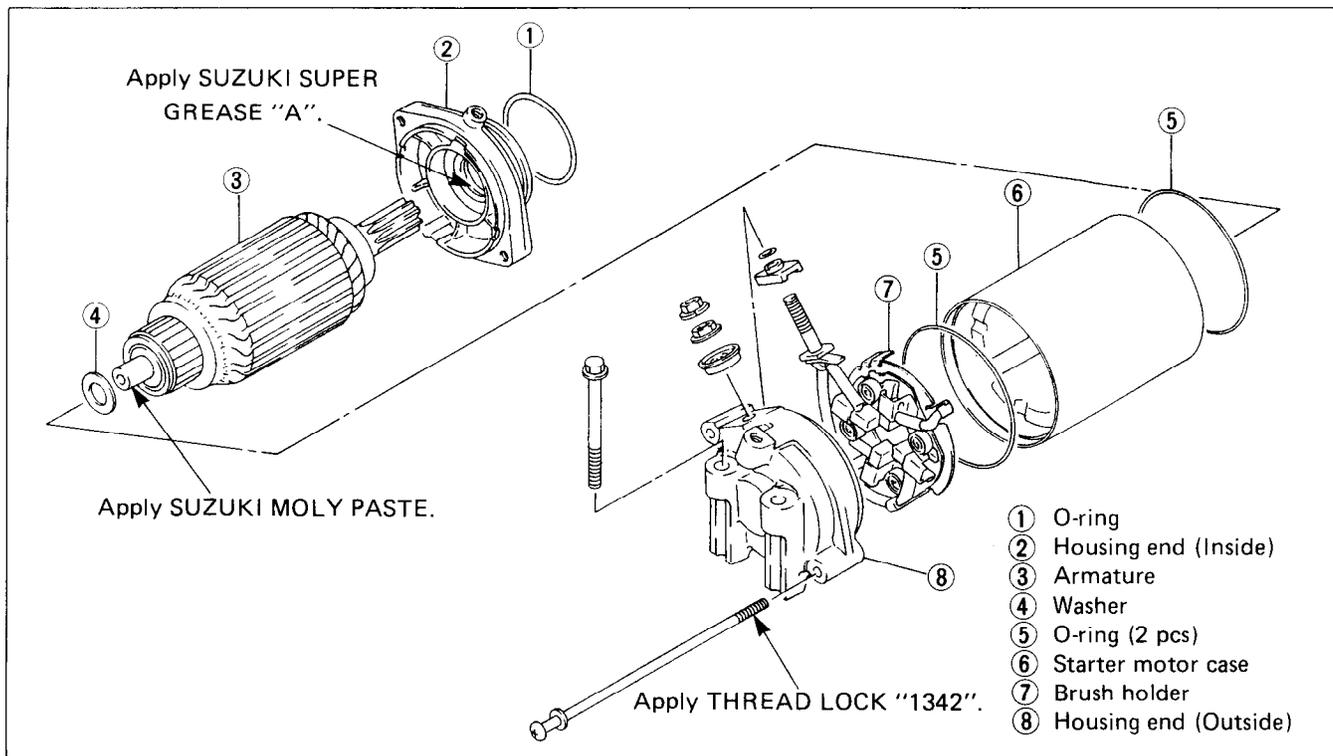
REMOVAL AND DISASSEMBLY

- Remove the water pipe. (See page 3-7.)
- Remove the starter motor cover.
- Disconnect the starter motor lead wire and remove the starter motor. (Refer to page 3-12.)



7-11 ELECTRICAL SYSTEM

- Disassemble the starter motor as shown in the illustration.



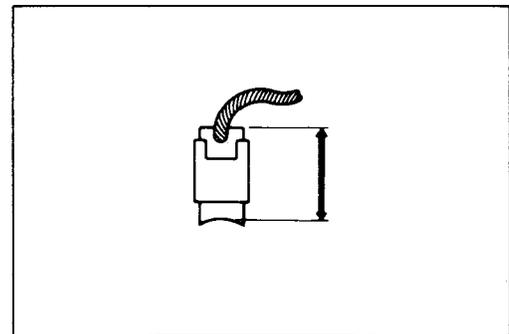
INSPECTION

CARBON BRUSH

When the brushes are worn, the motor will be unable to produce sufficient torque, and the engine will be difficult to turn over. To prevent this, periodically, measure the length of the brushes with a vernier calipers, replacing them when they are too short or chipping.

09900-20102 : Vernier calipers (200 mm)

Brush length	Service Limit
	9 mm (0.35 in)



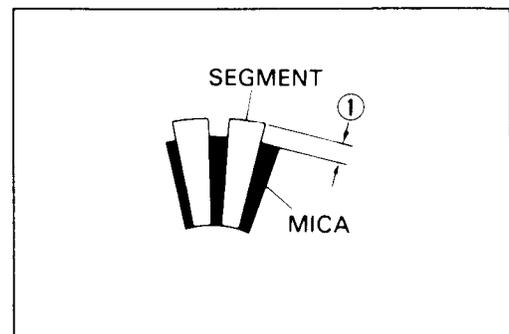
COMMUTATOR

If the commutator surface is dirty, starting performance decreases. Polish the commutator with # 400 or similar fine emery paper when it is dirty. After polishing it, wipe the commutator with a clean dry cloth.

Measure the commutator undercut ① with a vernier calipers.

09900-20102 : Vernier calipers (200 mm)

Commutator undercut	Service Limit
	0.2 mm (0.008 in)



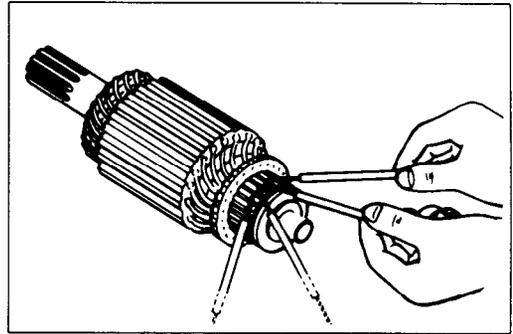
ARMATURE COIL

Using a pocket tester, check the coil for open and ground by placing probe pins on each commutator segment and rotor core (to test for ground) and on any two segments at various places (to test for open), with the brushes lifted off the commutator surface.

If the coil is found to be open-circuited or grounded replace the armature. Continuous use of a defective armature will cause the starter motor to suddenly fail.

09900-25002 : Pocket tester

Tester knob indication : $\times 1\Omega$ range

**OIL SEAL**

Check the seal lip for damage or oil leakage. If any damage is found, replace it.

REASSEMBLY

Reassemble the starter motor in the reverse order of disassembly. Pay attention to the following points:

O-RING**CAUTION:**

Replace the O-rings with new ones to prevent oil leakage and moisture.

HOUSING END (Inside)

- Apply grease to the lip of oil seal. (Refer to page 7-11.)

(For U.S.A. model)

99000-25030 : SUZUKI SUPER GREASE "A"

(For the other models)

99000-25010 : SUZUKI SUPER GREASE "A"

HOUSING END (Outside)

- Apply a small quantity of SUZUKI MOLY PASTE to the armature end. (Refer to page 7-11.)

99000-25140 : SUZUKI MOLY PASTE

- Apply a small quantity of THREAD LOCK "1342" to the starter motor housing screws. (Refer to page 7-11.)

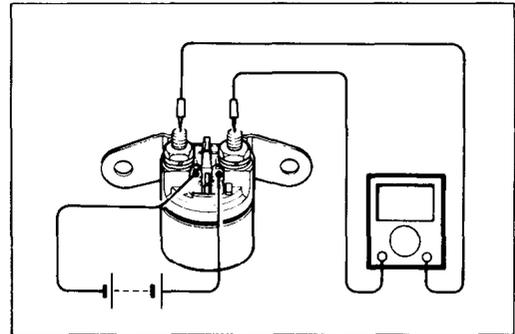
99000-32050 : THREAD LOCK "1342"

STARTER RELAY INSPECTION

- Disconnect the lead wire of starter motor at starter relay which is located battery holder of left side.
- Turn on the ignition switch, inspect the continuity between the terminals, positive and negative, when squeezing the clutch lever and pushing the starter button.
If the starter relay is in sound condition, continuity is found.

09900-25002 : Pocket tester

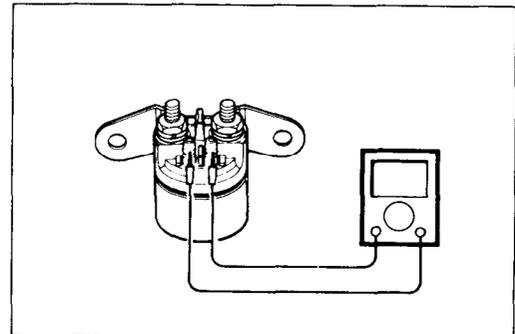
Tester knob indication : $\times 1\Omega$ range



- Disconnect the lead wires from the starter relay.
- Check the coil for "open", "ground" and ohmic resistance.
The coil is in good condition if the resistance is as follows.

09900-25002 : Pocket tester

Tester knob indication : $\times 1\Omega$ range

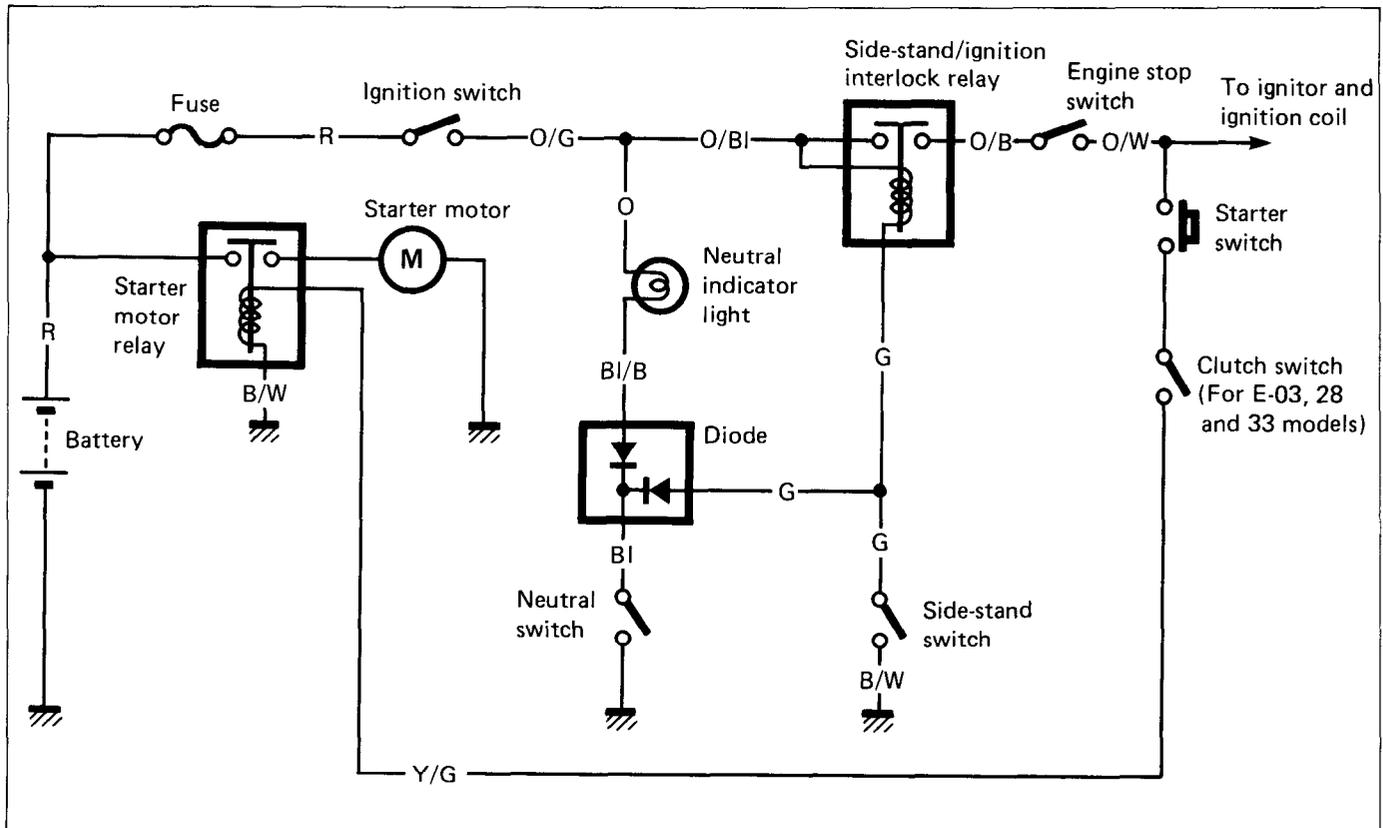


Starter relay resistance	Standard
	2 - 6 Ω

SIDE-STAND/IGNITION INTERLOCK SYSTEM

DESCRIPTION

This side-stand/ignition interlock system is to prevent starting the motorcycle with the side-stand left down. The system is operated by an electric circuit provided between the battery and ignition coil.

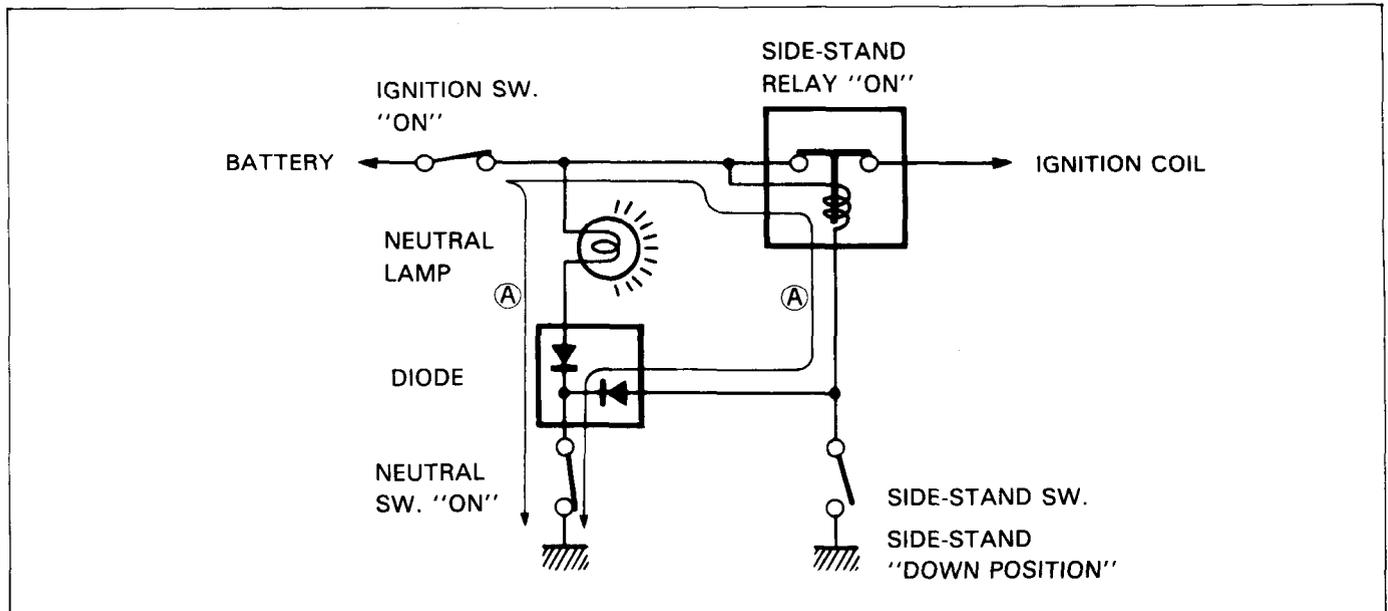


The circuit consists of relay, lamp, diode and switches and decides to live the ignition coil depending on the position of the TRANSMISSION and SIDE-STAND with the neutral and side-stand switches working mutually.

The ignition coil lives only in two situations as follows:

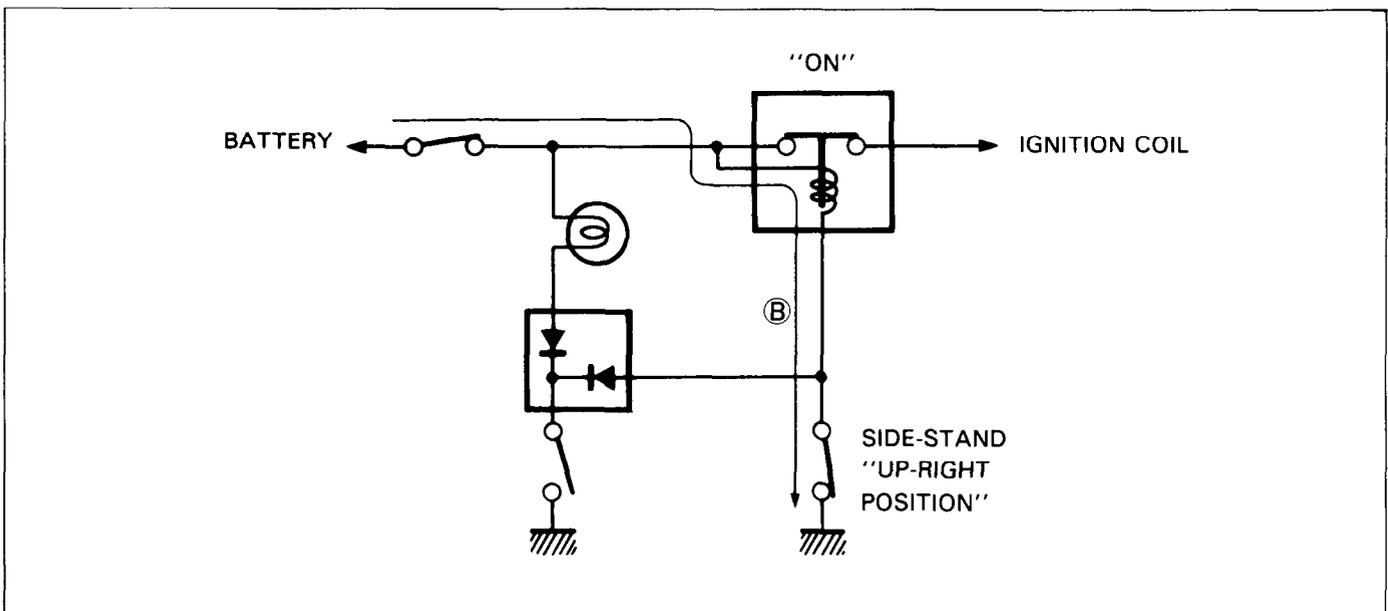
1. Transmission: "NEUTRAL (ON)" Side-stand: "DOWN (OFF)"

The current flow **(A)** turns "ON" the relay and the ignition coil lives even the side-stand is kept down. This is for warming up the engine.



2. Side-stand: "UP-RIGHT (ON)"

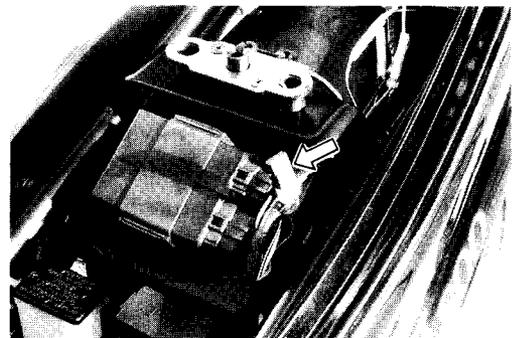
The current flow **(B)** turns "ON" the relay and the ignition coil lives. The engine can be easily started at any transmission position.



INSPECTION

If the interlock system does not operate properly, check each component. If any abnormality is found, replace the component with a new one.

09900-25002 : Pocket tester

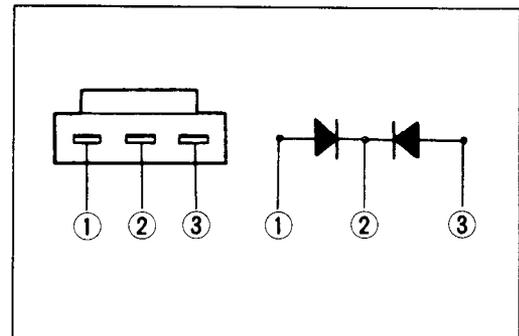


Diode

The diode is located behind the ignitor unit.

The diode can pass current only in one direction.

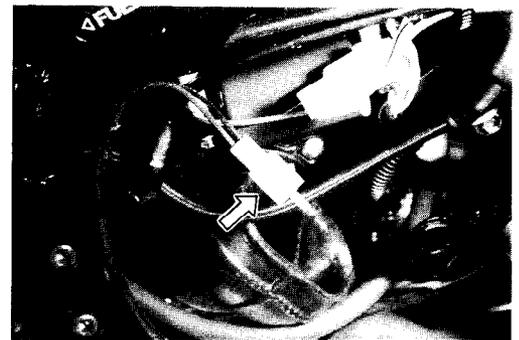
- Check the continuity between ① and ②. If one way continuity the diode is in good condition.
- Also check the continuity between ② and ③ as required.



Neutral switch

The neutral lead wire coupler is located behind the left frame cover.

- Disconnect the neutral switch lead and check the continuity between BI and ground with the transmission in "NEUTRAL".



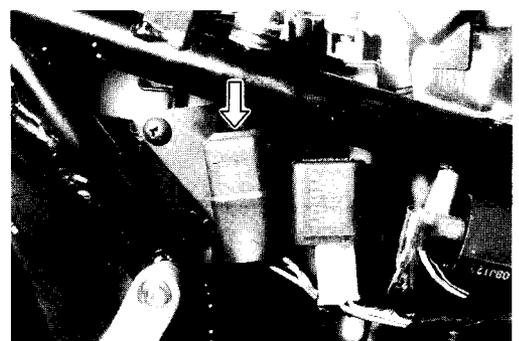
Side-stand switch

	G	B/W
ON (UP-right position)	○ ——— ○	
OFF (Down position)		



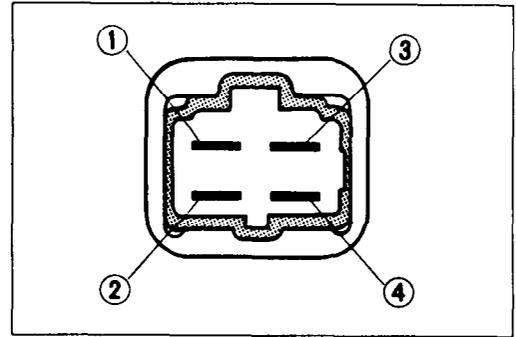
Side-stand/ignition interlock relay

The side-stand/ignition interlock relay is located battery holder of the right side.



First, check the insulation between ① and ② terminals with pocket tester. Then apply 12 volts to ③ and ④ terminals, \oplus to ③ and \ominus to ④, and check the continuity between ① and ②.

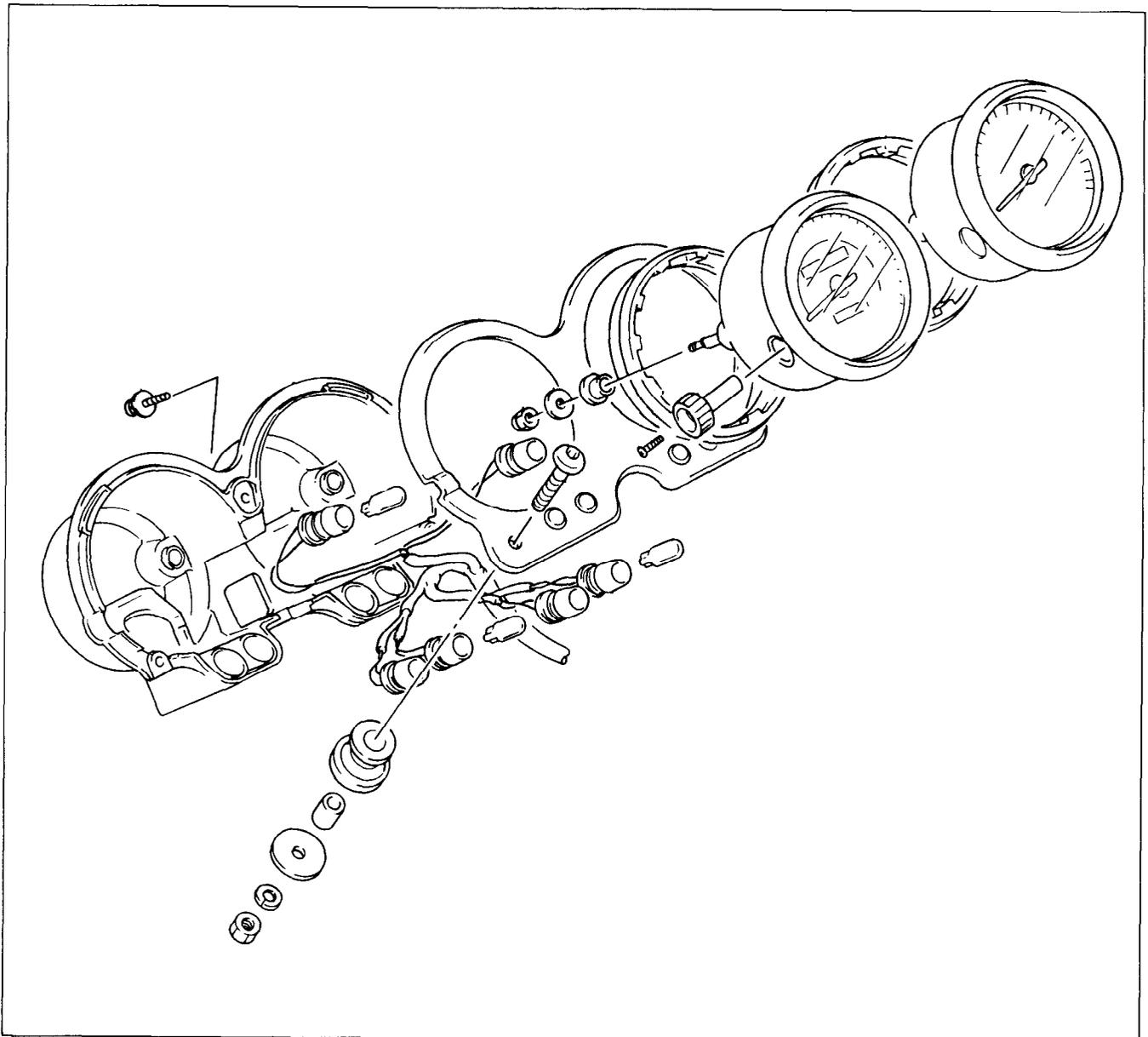
If there is no continuity, replace it with a new one.



COMBINATION METER

REMOVAL AND DISASSEMBLY

- Disassemble the combination meter as follows.



INSPECTION

Using the pocket tester, check the continuity between lead wires in the diagram as shown below.

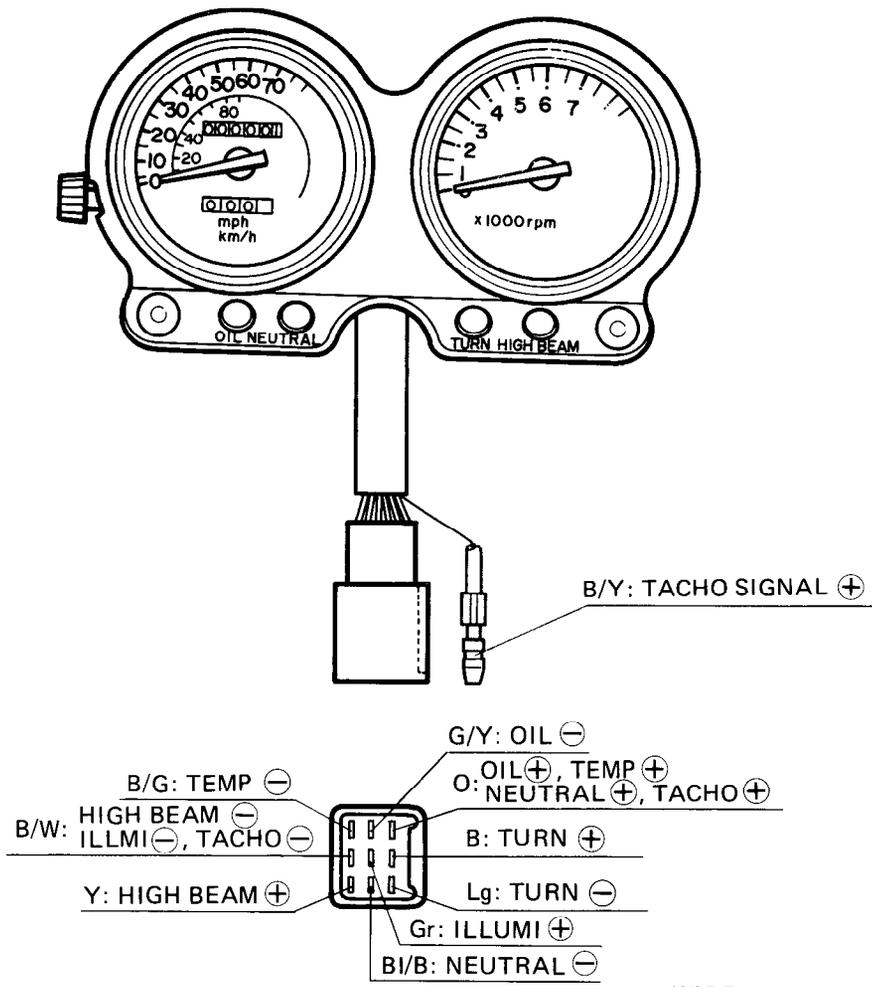
If the continuity measured is incorrect, replace the respective parts.

09900-25002 : Pocket tester

Tester knob indication : $\times 1\Omega$ range

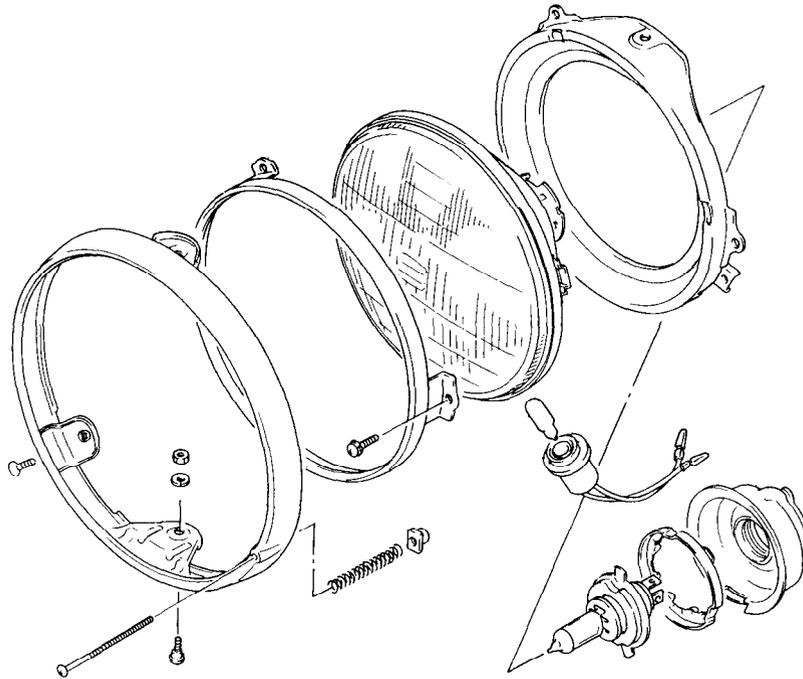
NOTE:

When making this test, it is not necessary to remove the combination meter.

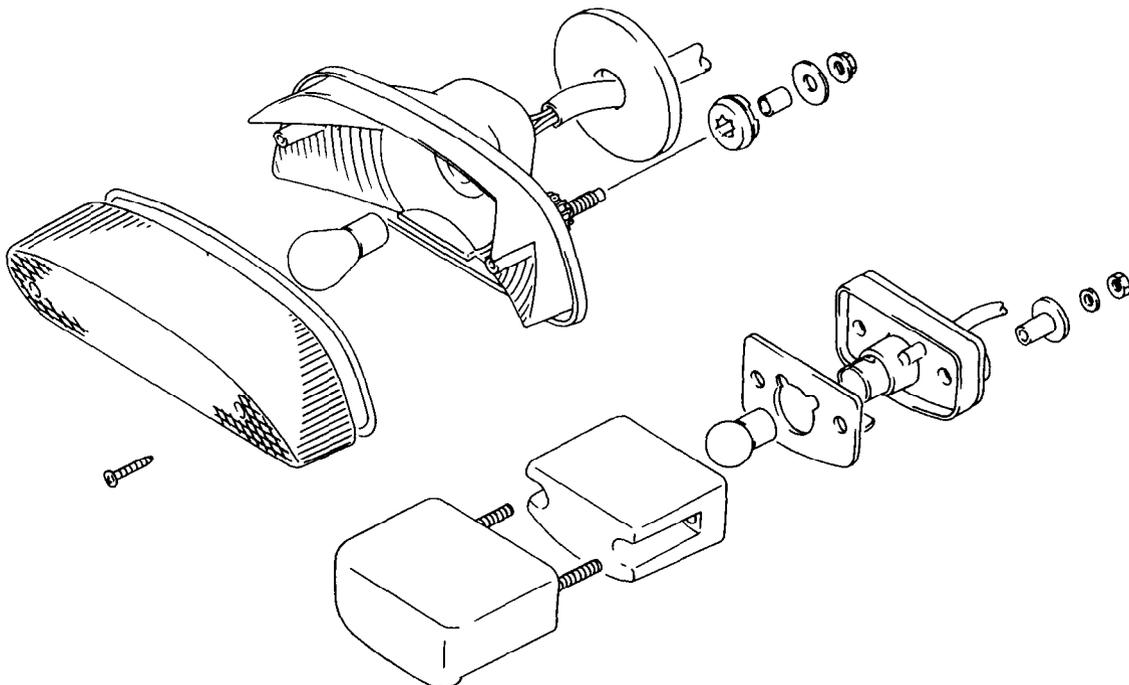


ITEM	⊕ Probe of tester to:	⊖ Probe of tester to:
TURN SIGNAL	B	Lg
ILLUMI.	Gr	B/W
HIGH BEAM	Y	B/W
OIL	O	G/Y
NEUTRAL	O	BI/B
TEMP	O	B/G
TACHO	O and B/Y	B/W

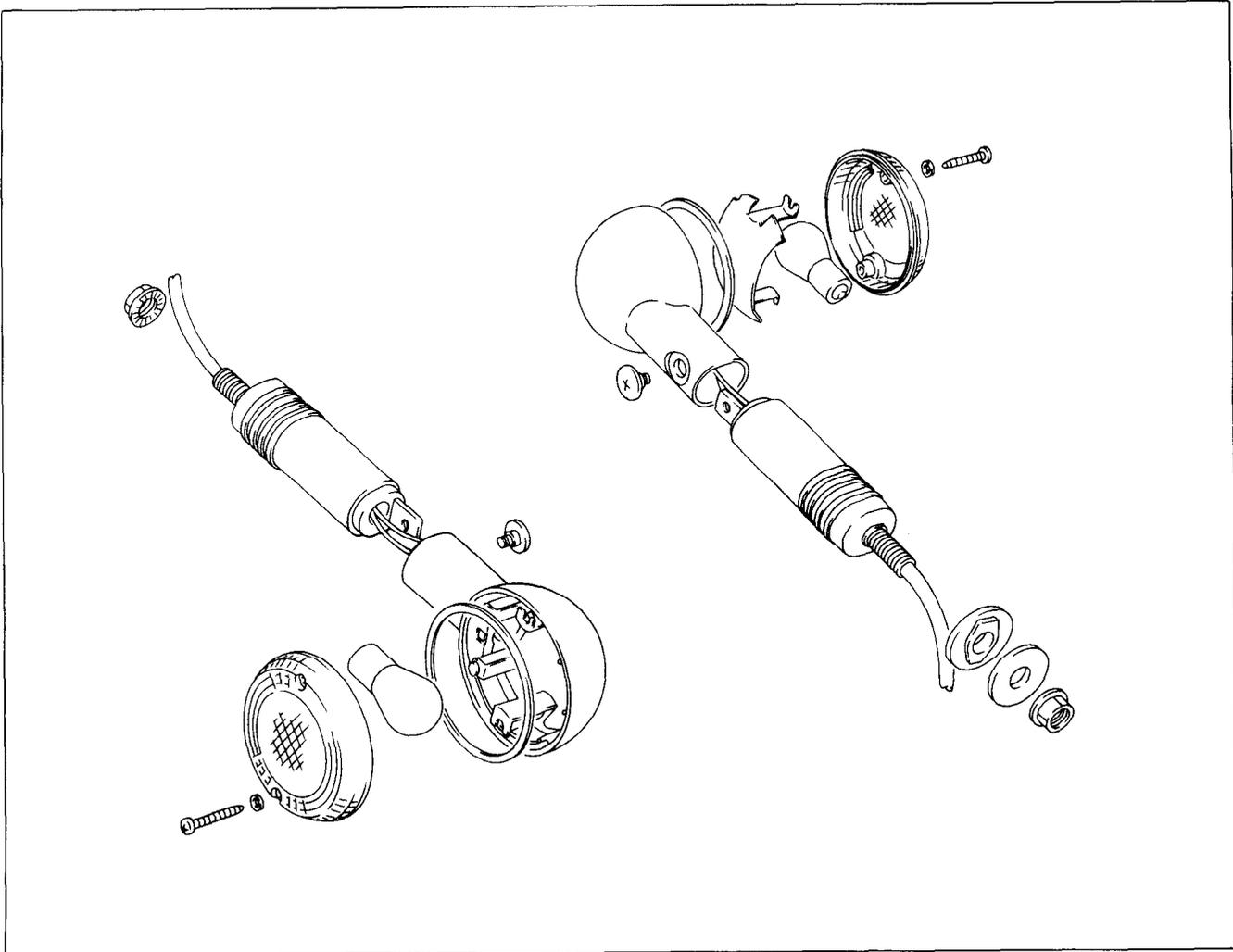
- WIRE COLOR**
- B : Black
 - Lg : Light green
 - O : Orange
 - Gr : Gray
 - Y : Yellow
 - BI/B: Blue with Black tracer
 - B/W: Black with White tracer
 - B/G: Black with Green tracer
 - B/Y: Black with Yellow tracer
 - G/Y: Green with Yellow tracer

LAMPS**HEADLIGHT**

NOTE:
Adjust the headlight, both vertical and horizontal, after reassembling.

TAIL/BRAKE LIGHT

TURN SIGNAL LIGHT



SWITCHES

Inspect each switch for continuity with the pocket tester referring to the wiring diagram. If any abnormality is found, replace the respective switch assemblies with new ones. (Refer to the chapter 9 of wiring diagram.)

09900-25002 : Pocket tester

Tester knob indication : $\times 1\Omega$ range

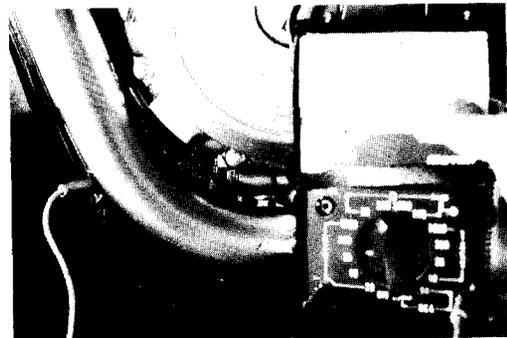
OIL PRESSURE SWITCH

- Continuity, when engine is stopped.
- No continuity, when engine is running.

	B	Ground
ON	○	○
OFF		

NOTE:

Before inspecting the oil pressure switch, check if the engine oil level is enough.



RELAY

STARTER RELAY

The starter relay is located on the battery holder of left side.
(Refer to page 7-13 for details.)

SIDE-STAND RELAY

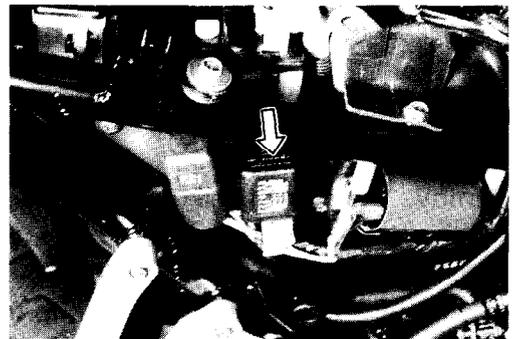
The side-stand relay is located behind the right frame cover.
(Refer to page 7-13 for details.)

TURN SIGNAL RELAY

The turn signal relay is located behind the right frame cover.
If the turn signal light does not light, inspect the bulb or repair the circuit connection.
If the bulb and circuit connection checked are correct, the turn signal relay may be faulty, replace it with a new one.

NOTE:

Be sure that the battery used is in fully-charged condition.

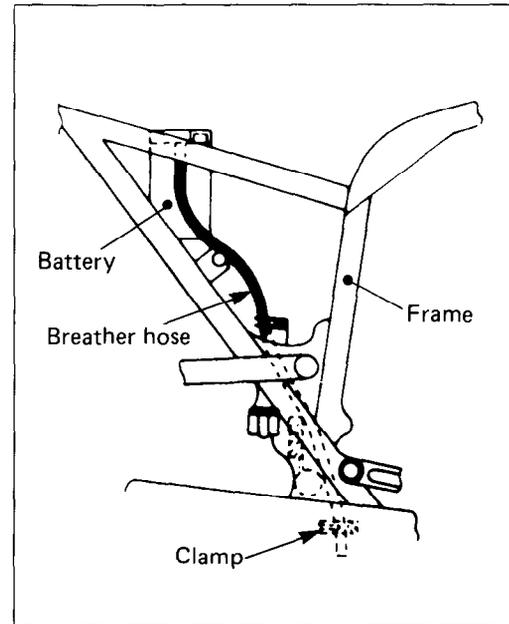


BATTERY

SPECIFICATIONS

Type designation	YB16B-A
Capacity	12V, 57.6 kC (16 Ah)/10HR
Standard electrolyte S.G.	1.28 at 20°C (68°F)

In fitting the battery to the motorcycle, connect the breather hose to the battery vent.



INITIAL CHARGING FILLING ELECTROLYTE

Remove the short sealed tube **(A)** before filling electrolyte. Fill the battery with electrolyte (dilute sulfuric acid solution with acid concentration of 35.0% by weight, having a specific gravity of 1.28 at 20°C (68°F)) up to indicated MAX. LEVEL. Electrolyte should be always cooled below 30°C (86°F) before filling into battery. Leave battery standing for half an hour after filling. Add additional electrolyte if necessary. Charge battery with current as described in the table shown below.

Maximum charging current	1.6A
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CHARGING TIME

The charging time for a new battery is determined by the number of months that have elapsed since the date of manufacture.

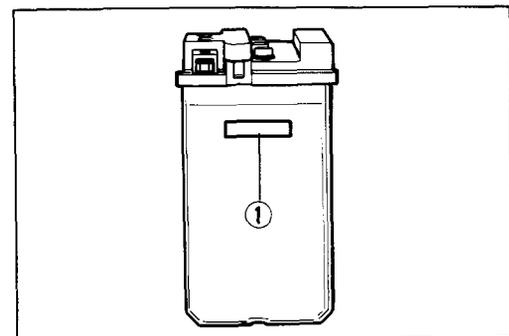
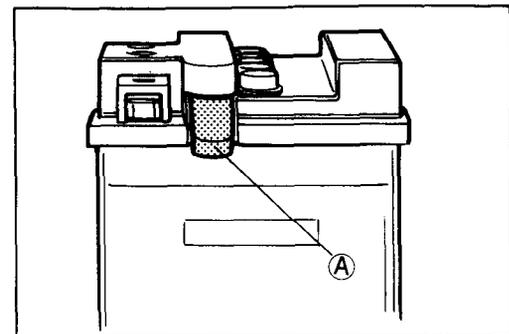
CONFIRMATION FOR DATE OF MANUFACTURE

Date of manufacture is indicated by a three-part number **(1)**, as shown in the illustration, each indicating month, date and year.

Near the end of charging period, adjust the specific gravity of electrolyte to value specified. After charging, adjust the electrolyte level to the MAX. LEVEL with DISTILLED WATER.

SERVICING

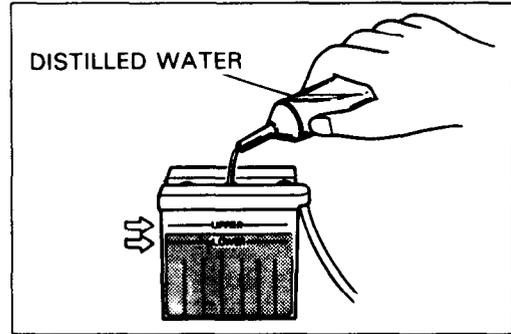
Visually inspect the surface of the battery container. If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one. If the battery terminals are found to be coated with rust or an acidic white powdery substance, then this can be cleaned away with sandpaper.



Check the electrolyte level and add distilled water, as necessary to raise the electrolyte to each cell's MAX. level. Check the battery for proper charge by taking an electrolyte S.G. reading. If the reading is 1.22 or less, as corrected to 20°C (68°F), it means that the battery is still in a run-down condition and needs recharging.

NOTE:

First, remove the ⊖ lead wire.

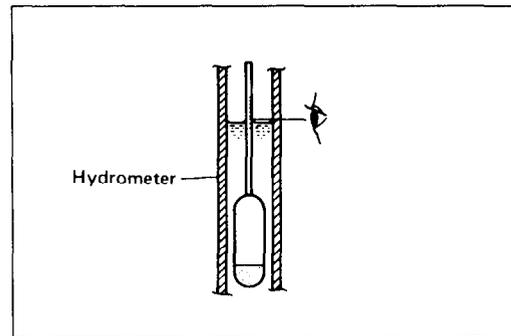


Months after manufacturing	Within 6	Within 9	Within 12	Over 12
Necessary charging hours	20	30	40	60

RECHARGING OPERATION BASED ON S.G. READING

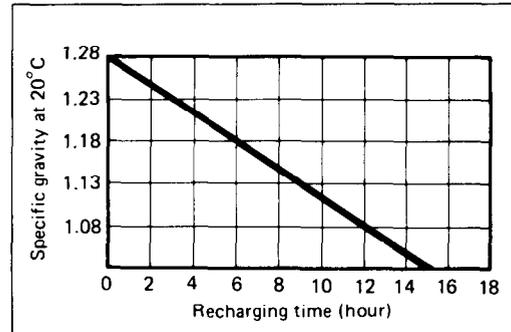
To read the S.G. on the hydrometer, bring the electrolyte in the hydrometer to eye level and read the graduation on the float scale bordering on the meniscus (curved-up portion of electrolyte surface), as shown in figure.

09900-28403 : Hydrometer



Check the reading (as corrected to 20°C) with chart to determine the recharging time in hour by constant-current charging at a charging rate of 1.6 amperes (which is tenth of the capacity of the present battery).

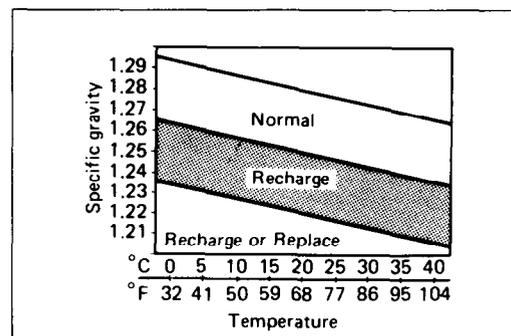
Electrolyte specific gravity	1.28 at 20°C (68°F)
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Be careful not to permit the electrolyte temperature to exceed 45°C (113°F), at any time, during the recharging operation. Interrupt the operation, as necessary, to let the electrolyte cool down. Recharge the battery to the specification.

CAUTION:

Constant-voltage charging, otherwise called "quick" charging, is not recommendable for it could shorten the life of the battery.



SERVICE LIFE

Lead oxide is applied to the pole plates of the battery which will come off gradually during the service. When the bottom of the battery case becomes full of the sediment, the battery cannot be used any more. If the battery is not charged for a long time, lead sulfate is generated on the surface of the pole plates and will deteriorate the performance (sulfation). Replace the battery with new one in such a case. When a battery is left for a long term without using, it is apt to subject to sulfation. When the motorcycle is not used for more than 1 month (especially during the winter season), recharge the battery once a month at least.

WARNING:

- * Before charging a battery, remove the seal cap from each cell.
- * Keep fire and sparks away from a battery being charged.
- * When removing a battery from the motorcycle, be sure to remove the \ominus terminal first.

