Electrical System

Table of Contents

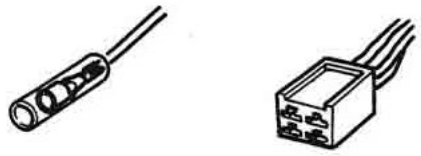
(Continued on next page)

Precautions

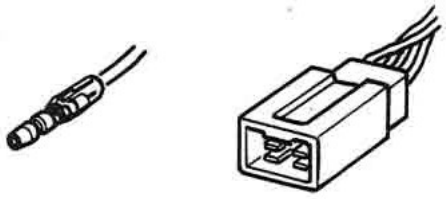
There are numbers of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

- Do not reverse the battery lead connections. This will burn out the diodes in the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- To prevent damage to electrical parts, do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running.
- Because of the large amount of current, never keep the starter switch pushed when the starter motor will not turn over, or the current may burn out the starter motor windings.
- Do not use a meter illumination bulb rated for other than voltage or wattage specified in the wiring diagram, as the meter or gauge panel could be warped by excessive heat radiated from the bulb.
- Take care not to short the leads that are directly connected to the battery positive (+) terminal to the chassis ground.
- Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was brough on by some other item or items, they too must be repaired or replaced, or the new replacement will soon fail again.
- Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.
- Electrical Connectors

Female Connectors



Male Connectors

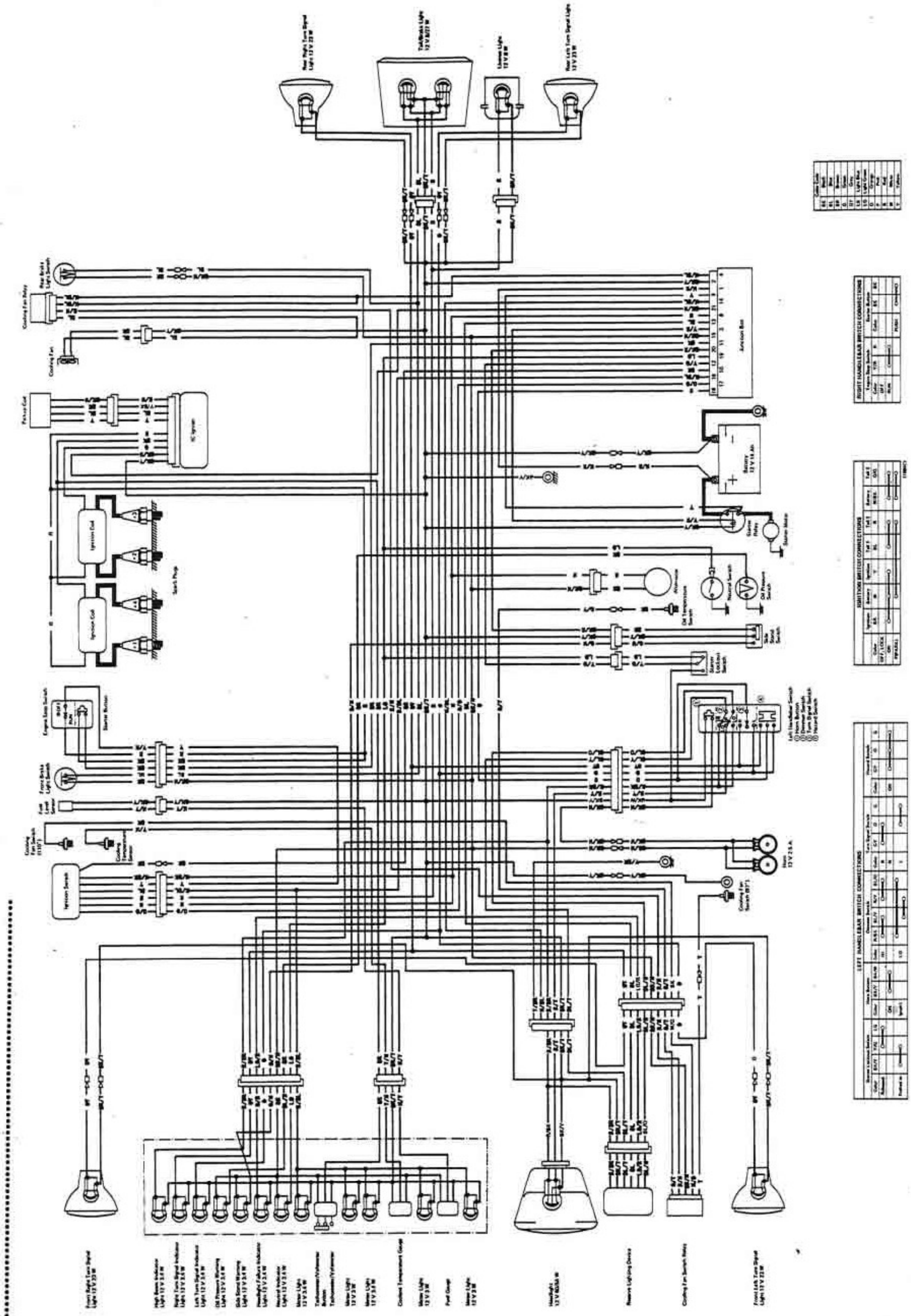


- Color Codes:

BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark green
G	Green
GY	Gray
LB	Light blue
LG	Light green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

- Measure coil and winding resistance when the part is cold (at room temperature).

ZX900-A1, A2 Wiring Diagram (US and Canada)



ZX900-A1, A2 Wiring Diagram (Other than US and Canada)

Identification of Parts

a 1 Ignition Switch
a 2 Engine Stop Switch
a 3 Starter Button
a 4 Headlight Switch
a 5 Dimmer Switch
a 6 Passing Button
a 7 Horn Button
a 8 Turn Signal Switch

b 1 Tachometer/Voltmeter Button
b 2 Starter Lockout Switch
b 3 Neutral Switch
b 4 Side Stand Switch
b 5 Oil Pressure Switch
b 6 Front Brake Light Switch
b 7 Rear Brake Light Switch
b 8 Cooling Fan Switch (97°C)
b 9 Cooling Fan Switch (110°C)
b10 Oil Temperature Switch

c 1 Starter Relay
c 2 Cooling Fan Relay
c 3 Cooling Fan Switch Relay

d 1 Tachometer/Voltmeter
d 2 Fuel Gauge
d 3 Coolant Temperature Gauge

e 1 High Beam Indicator Light 12 V 3.4 W
e 2 Neutral Indicator Light 12 V 3.4 W
e 3 Oil Pressure Warning Light 12 V 3.4 W
e 4 Left Turn Signal Indicator Light 12 V 3.4 W
e 5 Right Turn Signal Indicator Light 12 V 3.4 W
e 6 Side Stand Warning Light 12 V 3.4 W
e 7 Meter Light 12 V 3.4 W or 12 V 3 W

f 1 Headlight 12 V 60/55 W
f 2 City Light 12 V 4 W
f 3 Front Right Turn Signal Light 12 V 21 W Ⓐ Ⓢ 12 V 23 W
f 4 Front Left Turn Signal Light 12 V 21 W Ⓐ Ⓢ 12 V 23 W
f 5 Rear Right Turn Signal Light 12 V 21 W Ⓐ Ⓢ 12 V 23 W
f 6 Rear Left Turn Signal Light 12 V 21 W Ⓐ Ⓢ 12 V 23 W
f 7 Tail/Brake Light 12 V 5/21 W Ⓢ 12 V 8/27 W
f 8 License Light 12 V 5 W Ⓐ Ⓢ 12 V 8 W

g 1 Starter Motor
g 2 Alternator
g 3 Horn 12 V 2.5 A
g 4 Cooling Fan

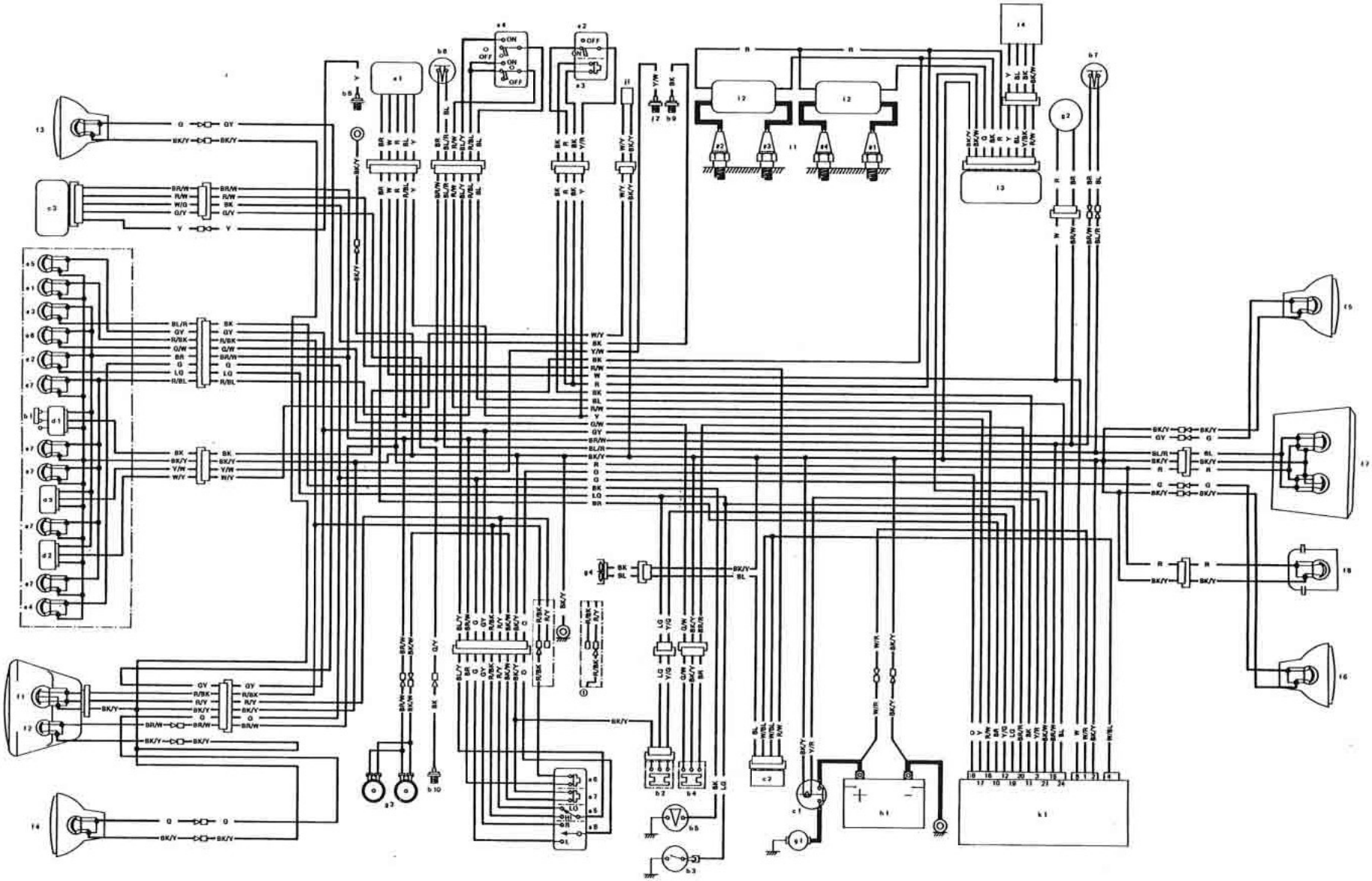
h 1 Battery 12 V 14 AH

i 1 Spark Plug
i 2 Ignition Coil
i 3 Igniter
i 4 Pickup Coil

j 1 Fuel Level Sensor
j 2 Cooling Temperature Sensor

k 1 Junction Box

Ⓐ : Australian model
Ⓘ : Italian model
Ⓢ : South African model



LEFT HANDLEBAR SWITCH CONNECTIONS

	s 3			s 7			s 5			s 9			s 8	
Color	BK/Y	Y/G	LG	Color	BK/Y	BK/W	Color	R/BK	BL/Y	R/Y	Color	GY	O	G	Color	R/BK	BR
Released				ON			HI				R				ON		
				(push)			LO				N				(push)		
Pulled In											L						

IGNITION SWITCH CONNECTIONS

	Lights	Battery	Ignition	Tail 1	Tail 2
Color	BR	W	Y	BL	R
OFF, LOCK					
ON					
P(PARK)					

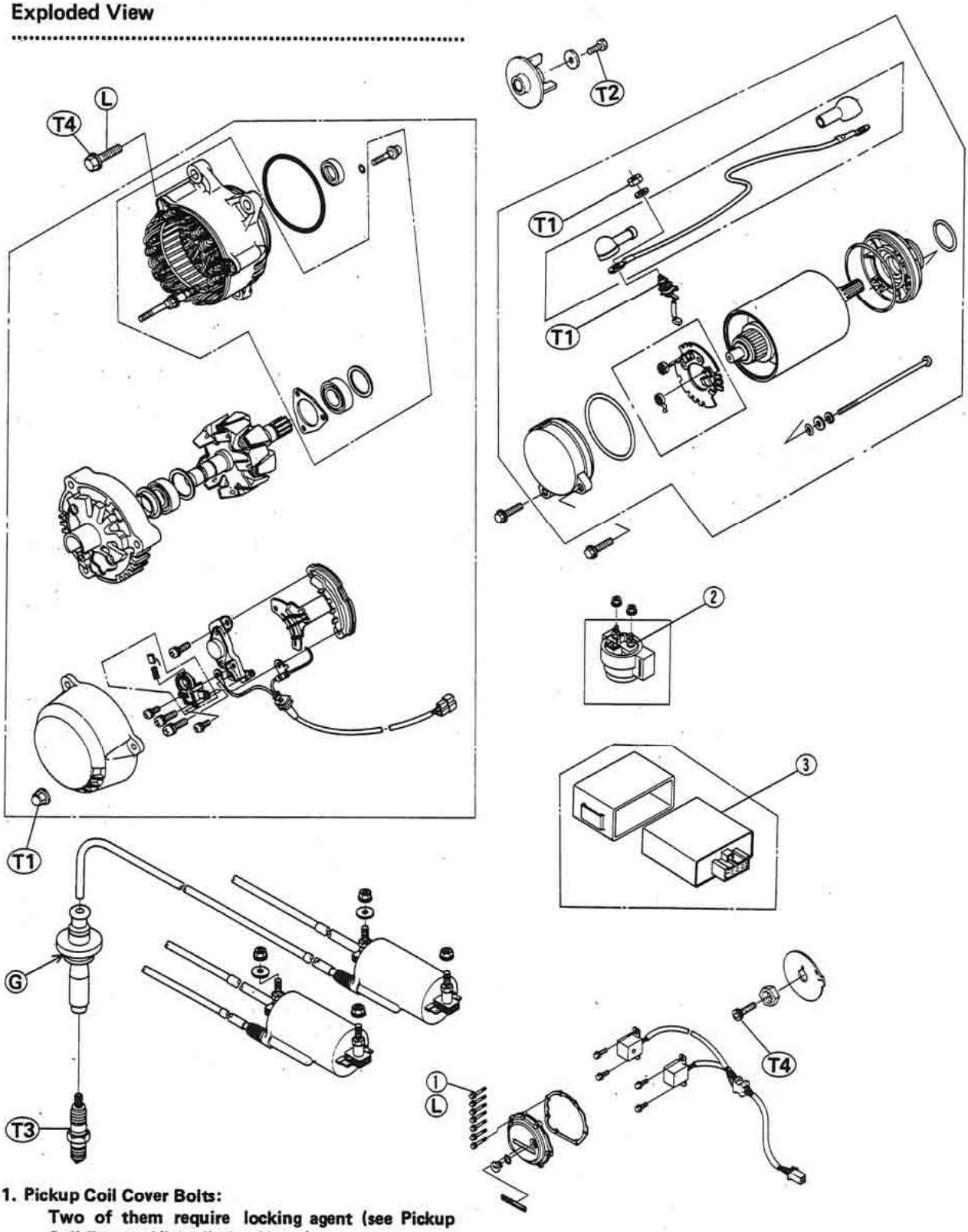
RIGHT HANDLEBAR SWITCH CONNECTIONS

	s 2			s 6					s 4		
Color	Y/R	R	Color	R/W	R/BL	BL	BL/Y	Color	BK	BK
OFF			OFF							
RUN										
			ON					Push		

Color Code	
BK	Black
BL	Blue
BR	Brown
GY	Gray
G	Green
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
R	Red
W	White
Y	Yellow

(1984A, 1987A)

Exploded View

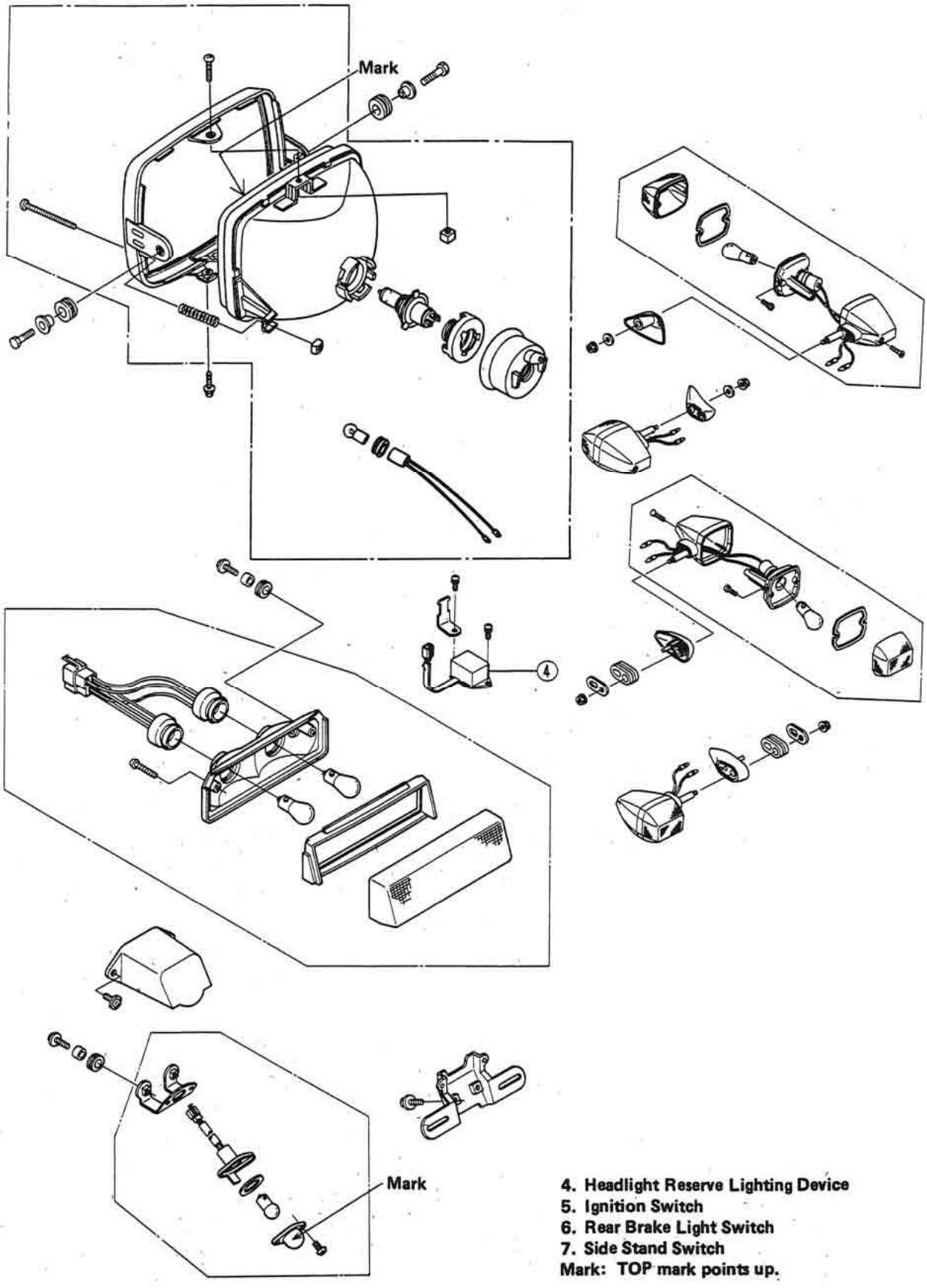


1. Pickup Coil Cover Bolts:
   Two of them require locking agent (see Pickup Coil Removal/Installation Notes)
2. Starter Relay
3. IC Igniter

G : Apply grease.
L : Apply a non-permanent locking agent to the threads.

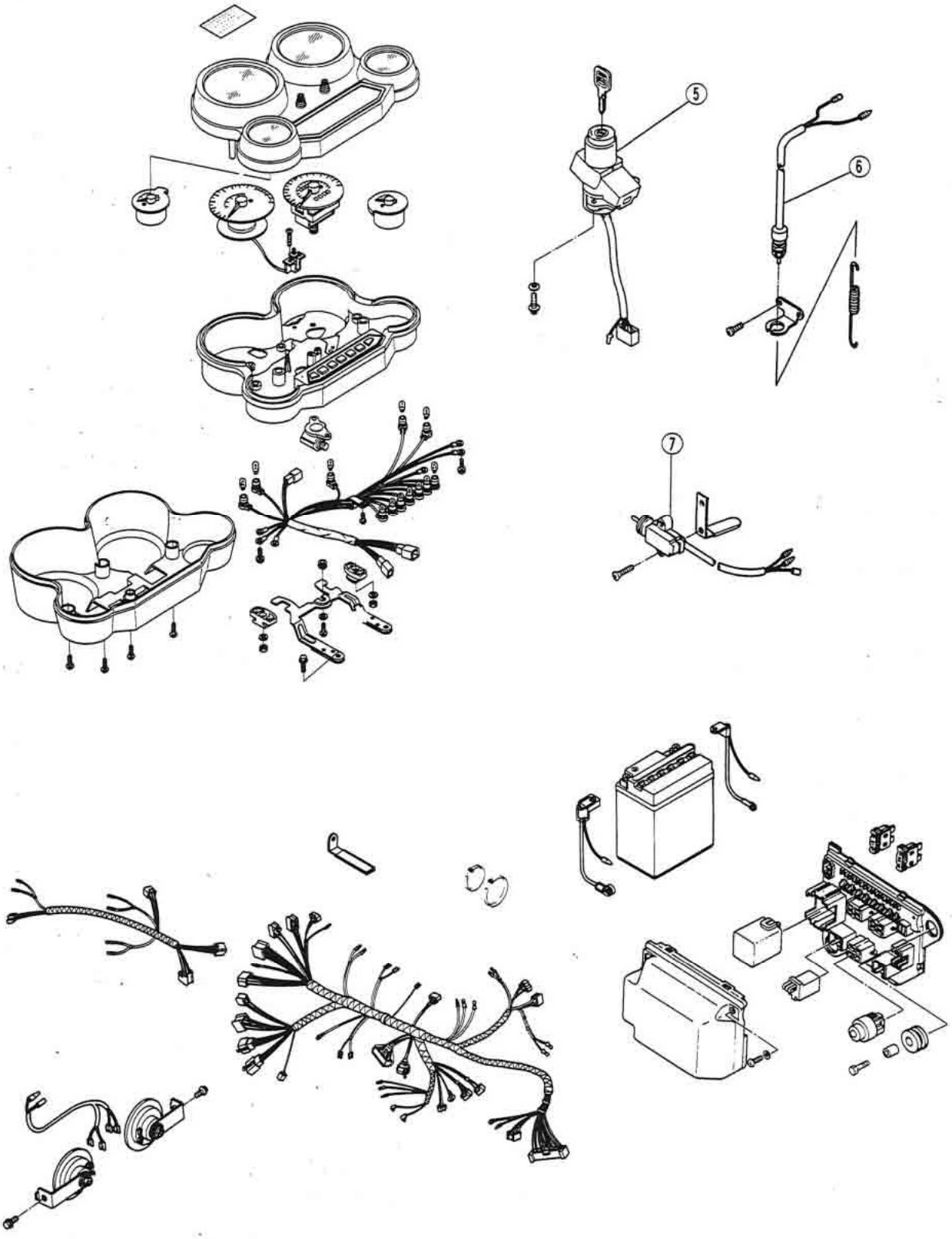
T1: 4.9 N-m (0.50 kg-m, 43 in-lb)
T2: 9.8 N-m (1.0 kg-m, 87 in-lb)
T3: 14 N-m (1.4 kg-m, 10.0 ft-lb)
T4: 25 N-m (2.5 kg-m, 18.0 ft-lb)

Exploded View (Cont.):



4. Headlight Reserve Lighting Device
5. Ignition Switch
6. Rear Brake Light Switch
7. Side Stand Switch

Mark: TOP mark points up.


5
6
7

Specifications

Battery

Type:	12 V 14 Ah
Specific gravity:	1.280 @20°C (68°F)

Alternator

Type:	Three-phase AC, regulator and rectifier contained in one housing
Rated output:	25 · A @6,000 r/min (rpm), 14 V
Charging voltage:	13.5 V @4,000 r/min (rpm) (with Headlight Switch ON if applicable)
Stator coil resistance:	Less than 1.0 Ω
Rotor coil resistance:	About 4 Ω
Slip ring diameter:	Standard: 14.4 mm Service Limit: 14.0 mm
Carbon brush length:	Standard: 10.5 mm Service Limit: 4.5 mm

Ignition System

Ignition timing:	10° BTDC @1,000 r/min (rpm) – 35° BTDC @3,500 r/min (rpm)
Pickup coil resistance:	390 – 590 Ω
Pickup coil air gap:	0.5 – 0.9 mm
Ignition coil:	
3 needle arcing distance:	7 mm or more
Primary winding resistance:	1.8 – 2.8 Ω
Secondary winding resistance:	10 – 16 kΩ
Spark plug gap:	0.6 – 0.7 mm

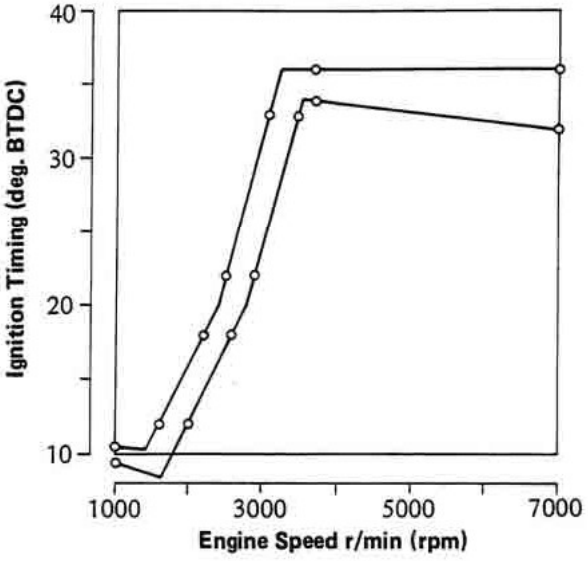
Starter System

Starter motor:	
Carbon brush length:	Standard: 12 mm Service limit: 8.5 mm
Commutator groove Depth:	Standard: 0.45 – 0.75 mm Service Limit: 0.2 mm
Commutator diameter:	Standard: 28 mm Service Limit: 27 mm

Switches and Sensors

Rear brake light switch:	On after about 10 mm pedal travel	
Fan switch (97°C):	Off → On	94 – 100°C (201 – 212°F)
	On → Off	above 90°C (194°F)
Fan switch (110°C):	Off → On	107 – 113°C (225 – 235°F)
	On → Off	above 104°C (219°F)
Oil temperature switch (120°C):		
	On → Off	117 – 123°C (243 – 253°F)
	Off → On	above 113°C (235°F)
Fuel level sensor resistance:		
	Full position	3 – 12 Ω
	Empty position	70 – 120 Ω
Water temperature sensor resistance:		
	80°C (176°F)	about 52 Ω
	100°C (212°F)	about 27 Ω

Ignition Timing/Engine Speed Relationship



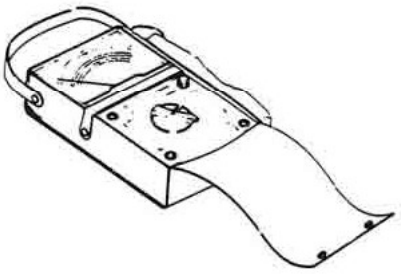
Spark Plug

	Standard	Low Speed Riding	High Speed Riding
US	NGK D8EA or ND X24ES-U	NGK D7EA or ND X22 ES-U	NGK D9EA or ND X27ES-U
Canada	NGK DR8ES-L or ND X24ESR-U	NGK DR7ES or ND X22ESR-U	NGK DR8ES or ND X27ESR-U
Europe except below	NGK DR8ES or ND X27ESR-U	Same as standard	Same as standard
Italy and Other than above	NGK D9EA or ND X27ES-U	Same as standard	Same as standard

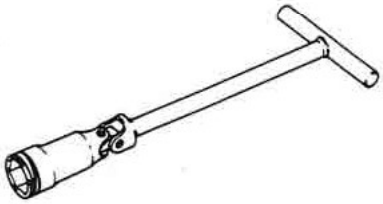
Special Tools

Along with common hand tools, the following more specialized tools are required for complete electrical system servicing.

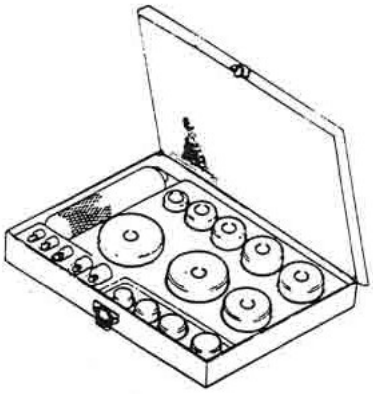
Hand Tester: 57001-1394



Spark Plug Wrench: 57001-1024



Bearing Driver Set: 57001-1129



Battery

Precautions:

Following a few simple rules will greatly extend the life of the battery.

- When the level of the electrolyte in the battery is low, add only distilled water to each cell, until the level is at the upper level line marked on the outside of the battery. Ordinary tap water is not a substitute for distilled water and will shorten the life of the battery.
- Never add sulphuric acid solution to the battery. This will make the electrolyte solution too strong and will ruin the battery within a very short time.
- Avoid quick-charging the battery. A quick-charge will damage the battery plates.
- Never let a good battery stand for more than 30 days without giving it a supplemental charge, and never let a discharged battery stand without charging it. If a battery stands for any length of time, it slowly self-discharges. Once it is discharged, the plates sulphate (turn white), and the battery will no longer take a charge.
- Keep the battery well-charged during cold weather so that the electrolyte does not freeze and crack open the battery. The more discharged the battery becomes, the more easily it freezes.
- Always keep the battery vent hose free of obstruction, and make sure it does not get pinched, crimped, or melted shut by contact with the hot muffler. If battery gases cannot escape through this hose, they will explode the battery.
- DON'T INSTALL THE BATTERY BACKWARDS. The negative side is grounded.

Electrolyte:

Electrolyte Level Inspection

- Remove the battery.
- Visually check the electrolyte level in the battery.

A. Level Lines

★If the level of electrolyte in any cell is below the lower level line on the battery case, add distilled water only to that cell.

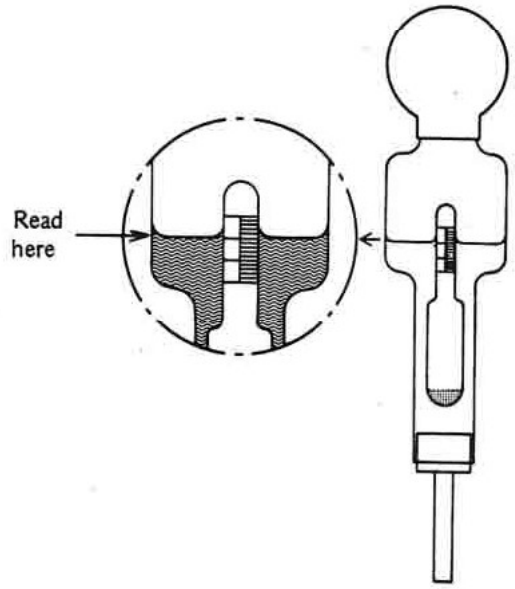
- Install the battery.

Battery Charging:

Battery Condition

●Before charging, check battery condition by testing the specific gravity of the electrolyte in each cell.
○Draw a little fluid from the cell with a hydrometer.
○Read the level of the electrolyte on the floating scale. This is the specific gravity of the electrolyte.

Hydrometer



●Look for sediment and white sulfation inside the cells on the bottom of the plates.

A. Sulfation here B. Sediment here

●See the Battery Troubleshooting Guide in Battery Test Charging.
★If the specific gravity is below 1.20 the battery needs to be charged.

NOTE

○*The specific gravity of the electrolyte varies with changes in temperature, so the specific gravity reading must be corrected for the temperature of the electrolyte.*
○*Celsius: Add 0.007 points to reading for each 10°C above 20°C or subtract 0.007 points for each 10°C below 20°C.*
○*Fahrenheit: Add 0.004 points to reading for each 10°F above 68°F or subtract 0.004 points for each 10°F below 68°F.*

★If the specific gravity of any of the cells is more than 0.050 away from any other reading, the battery will probably not accept a charge. It is generally best to replace a battery in this condition.
★If the specific gravity of all the cells is 1.280 or more the battery is fully charged.

Battery Initial Charging

Before being placed in service, a new battery should be given an initial charging.
●Cut off the sealed end of the battery vent hose and remove the filler caps.
●Fill each cell to the upper level line on the battery case with fresh electrolyte at a temperature of 30°C (86°F) or less. Let the battery stand for about 30 minutes before charging.

NOTE

○*If the electrolyte level drops, add electrolyte to the upper level line before charging.*

●Leaving the caps off the cells, connect the battery to a charger, set the charging rate at 1/10 the battery capacity, and charge it for 10 hours. For example, if the battery is rated at 18 Ah, the charging rate would be 1.8 A.

WARNING

○**Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.**

CAUTION

○**Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat which can warp the plates and cause internal shorting. Higher-than -normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.**

○If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

●Turn the charger off, then disconnect it from the battery.
●Check battery voltage. Battery voltage should be 12 – 13 V.
●Check the specific gravity of each cell with a hydrometer (see Battery Condition).
★If the voltmeter or hydrometer readings are below those specified, additional charging is necessary before the battery can be installed.

Battery Ordinary Charging

●Remove the battery from the motorcycle.

CAUTION

○Always remove the battery from the motorcycle for charging. If the battery is charged while still installed, battery electrolyte may spill and corrode the frame or other parts of the motorcycle.

●Clean off the battery using a baking soda-and-water solution.
○Mix one heaping tablespoon of baking soda in one cup of water.
○Be careful not to get any of the cleaning solution in the battery.
○The terminals must be especially clean.
●If any of the cells are low, fill them to the LOWER level line with distilled water only. The electrolyte will expand during charging, and the level will rise.
●Connect a charger to the battery BEFORE plugging it in or turning it on.

WARNING

○Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

●Set the charge rate and time according to the battery condition previously determined (see Battery Condition), using the table.

CAUTION

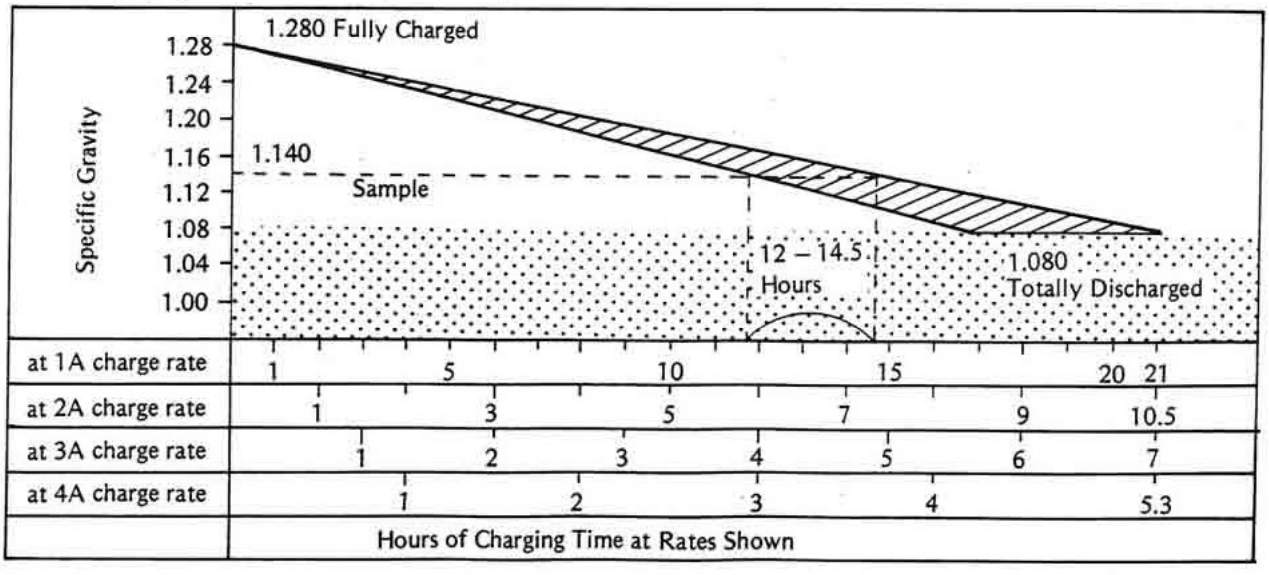
○Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat which can warp the plates and cause internal shorting. Higher-than -normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.
○If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

●Turn the charger off or unplug it, then disconnect it from the battery.
●Check battery condition (See Battery Condition).
★If the battery condition indicates that it is not fully charged, additional charging time is necessary.

Battery Test Charging

●If the battery is suspected of being defective, sulfated, or unable to take a charge, consult the table.

Battery Charging Rate/Time Table (12V 14Ah)



Battery Troubleshooting Guide

	Good Battery	Suspect Battery	Action
Plates	(+) chocolate color (–) gray	white (sulphated); + plates broken or corroded	Replace
Sediment	none, or small amount	sediment up to plates, causing short	Replace
Voltage	above 12 V	below 12 V	Test charge
Electrolyte Level	above plates	below top of plates	Fill and test charge
Specific Gravity	above 1.200 in all cells; no two cells more than 0.020 different	below 1.100, or difference of more than 0.020 between two cells	Test charge

●To test charge a battery, perform the ordinary charging procedure and monitor the battery voltage and other signs as mentioned below.
★If the battery voltage suddenly jumps to over 13 V just after the start of charging, the plates are probably sulfated. A good battery will rise to 12 V immeditely and then gradually go up to 12.5 or 13 V in about 30 min to an hour after the start of charging.
★If one cell produces no gas bubbles or has a very low specific gravity, it is probably shorted.
★If there does not appear to be enough sediment in a cell to short the plates, but that cell has a very low specific gravity after the battery is fully charged, the trouble may be that there is not enough acid in that one cell. In this case only, sulfuric acid solution may be added to correct the specific gravity.
★If a fully charged battery not in use loses its charge after 2 to 7 days; or if the specific gravity drops markedly, the battery is defective. The self-discharge rate of a good battery is only about 1% per day.

Alternator

The alternator contains the following electrical components in its compact housing:
○Alternator stator and rotor
○Rectifier
○Regulator

Alternator Removal/Disassembly:

Alternator Removal

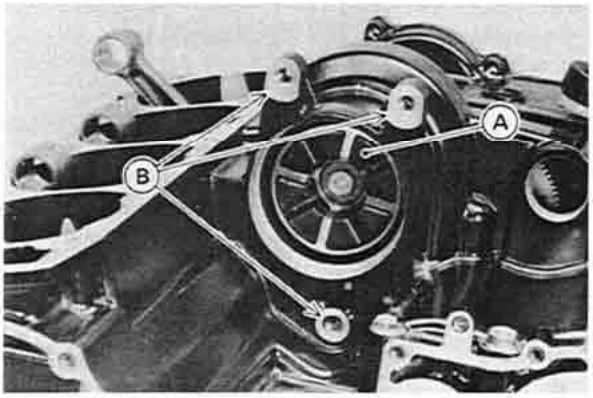
NOTE

○*Alternator removal is not necessary to remove the rectifier, regulator, and carbon brush assembly. They can be removed often removing the alternator end cover.*

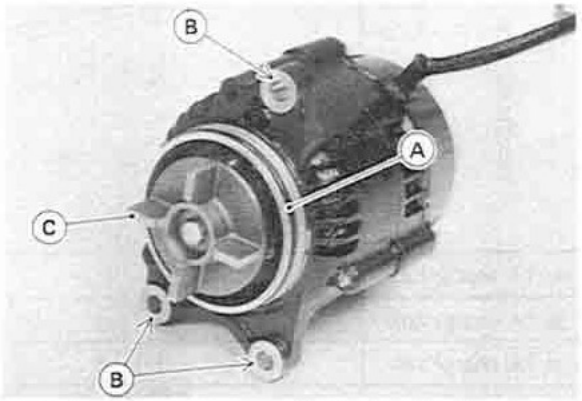
●Disconnect the alternator lead connector.
●Unscrew the alternator mounting bolts and pull the alternator out of the engine. Do not lose the alternator coupling dampers.

Alternator Installation Notes

●Check that the rubber dampers are in place before installing the alternator.
●Clean the alternator legs and crankcase where the alternator is grounded.
●Install the alternator.
○Apply a small amount of engine oil to the rubber dampers and the O-ring.



A. Rubber Damper B. Clean here.



A. O-ring C. Coupling Blades
B. Clean here.

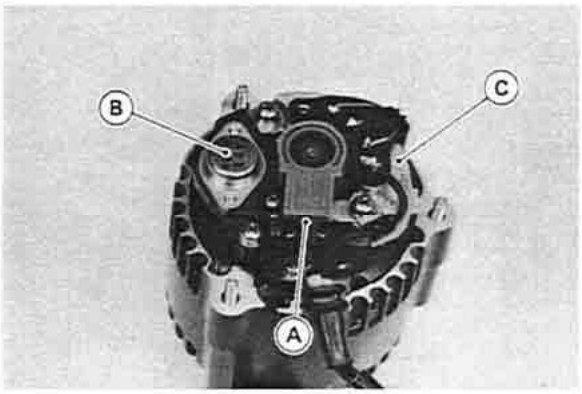
oAlign the blades of the alternator coupling with the slots in the rubber dampers, and temporarily install the alternator with the mounting bolts finger tight.
oApply a non-permanent locking agent to the threads of the alternator mounting bolts.
oScrew in the mounting bolts evenly to engage the couping with the rubber dampers.
oTighten the bolts to the specified torque (see Exploded View)

CAUTION

o**If any resistance is felt when tightening the mounting bolts, stop immediately, and check the alignment of the coupling blades with the slots in the rubber dampers.**

Alternator Disassembly

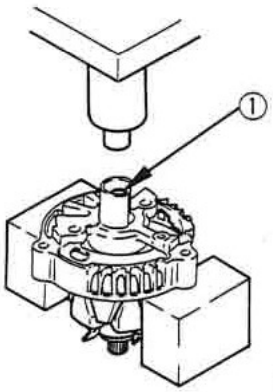
●Remove the cap nuts and take off the end cover. The following parts can be removed.



A. Brush Assembly
B. Regulator
C. Rectifier

oCarbon brush assembly and rubber seal with mounting screws removed.
oRegulator with mounting screws removed.
oRectifier and cover with stator coil windings unsoldered.
oThe alternator lead assembly can be separated from the rectifier by unsoldering the connections.
●Unscrew the bolt holding the alternator coupling, and take off the coupling.
●Cover the splined portion of the rotor shaft with a thin tape to prevent damaging the oil seal lip.
●Unscrew the bearing holder screws, and pull off the RH housing half with the oil seal and stator.
●Press out the rotor shaft from the LH housing half, and remove the rotor with the bearings.

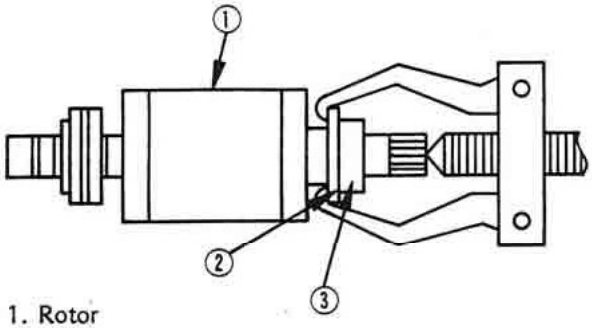
Rotor Removal



1. Rotor Shaft

●To remove the ball bearings, use a suitable puller.
oPull out the RH ball bearing with the bearing holder.

Bearing Removal

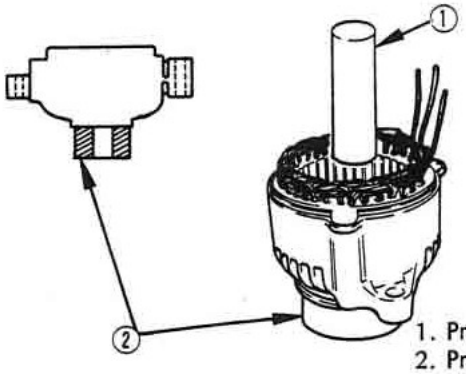


1. Rotor
2. Bearing Holder
3. RH Ball Bearing

Alternator Assembly Notes

●Assembly the parts in the following sequence.
oPosition the RH housing half so that the RH bearing housing is seated on a suitable press fixture.

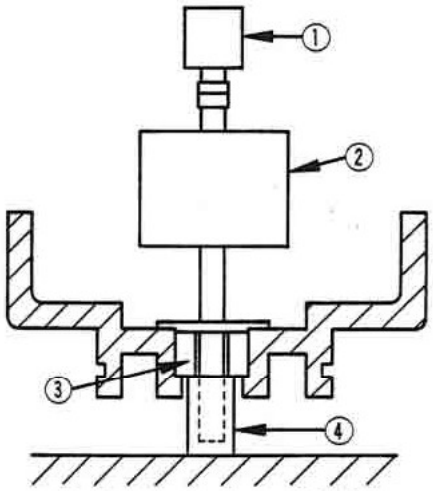
RH Bearing Installation



1. Press
2. Press Fixture

oPress the RH ball bearing into the RH housing half with bearing driver set 57001-1129.
oInstall the bearing holder with its mounting screws. If necessary, repair or replace the holder before installation.
oPosition the RH ball bearing so that the inner race is seated on a suitable press fixture.

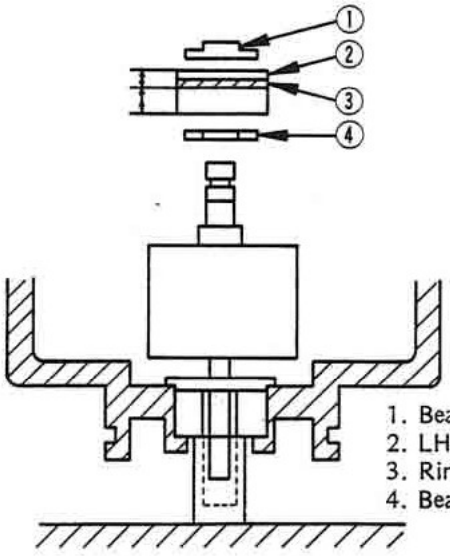
Rotor Installation



1. Press
2. Rotor
3. RH Ball Bearing
4. Press Fixture

oPress the rotor shaft into the RH ball bearing.
oPress the LH ball bearing and bearing covers onto the rotor shaft. The bearing long end from the circlip groove must be faced in.

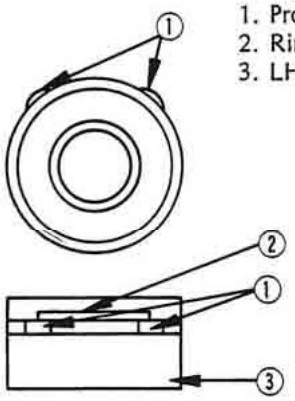
LH Bearing Installation



1. Bearing Cover
2. LH Ball Bearing
3. Ring
4. Bearing Cover

oPosition the LH ball bearing ring so that the projections of it are aligned with the ring positioning groove, and install the LH housing half.

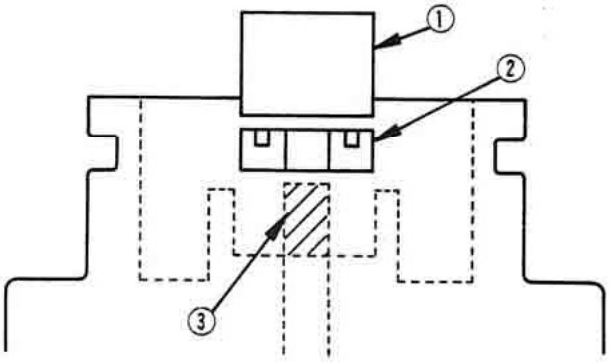
Ball Bearing Ring



1. Projections of Ring
2. Ring Groove
3. LH Ball Bearing

oInstall the oil seal to the RH housing half so that the spring band side of it faces out. Before inserting the rotor shaft right end into the oil seal, splined portion of the shaft must be covered with a thin tape to prevent damaging the oil seal lip.

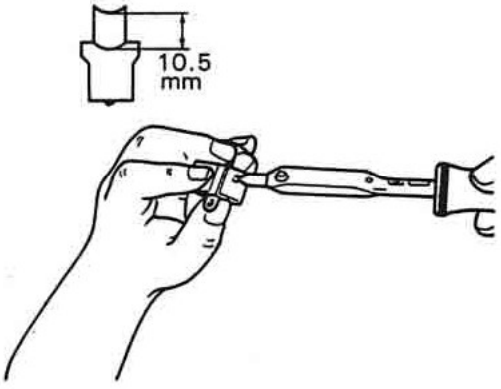
Oil Seal Installation



1. Press 2. Oil Seal 3. Shaft covered with tape

●Solder the carbon brush lead with the brush holder if they were disassembled.

Carbon Brush Installation



●Be careful not to forget to install the rectifier cover and carbon brush rubber seal.
●Tighten the fasteners to the specified torque if required (see Exploded view).

Alternator Troubleshooting:

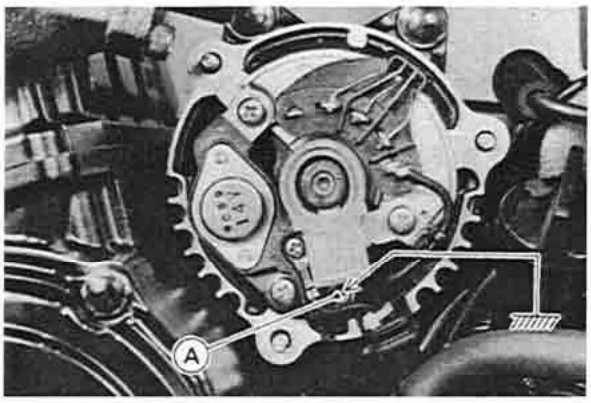
For any charging system problems, always check the charging system wiring first (see Wiring Inspection), and then check the system with the following tests shown in the troubleshooting guide.

Troubleshooting Guide

Test No.	Trouble	Symptoms
1	Battery discharged	Starter not turning
2	Battery overcharged	Electrolyte level lowering quickly
3	Noise	Alternator noise

Test No.1-Battery Discharged

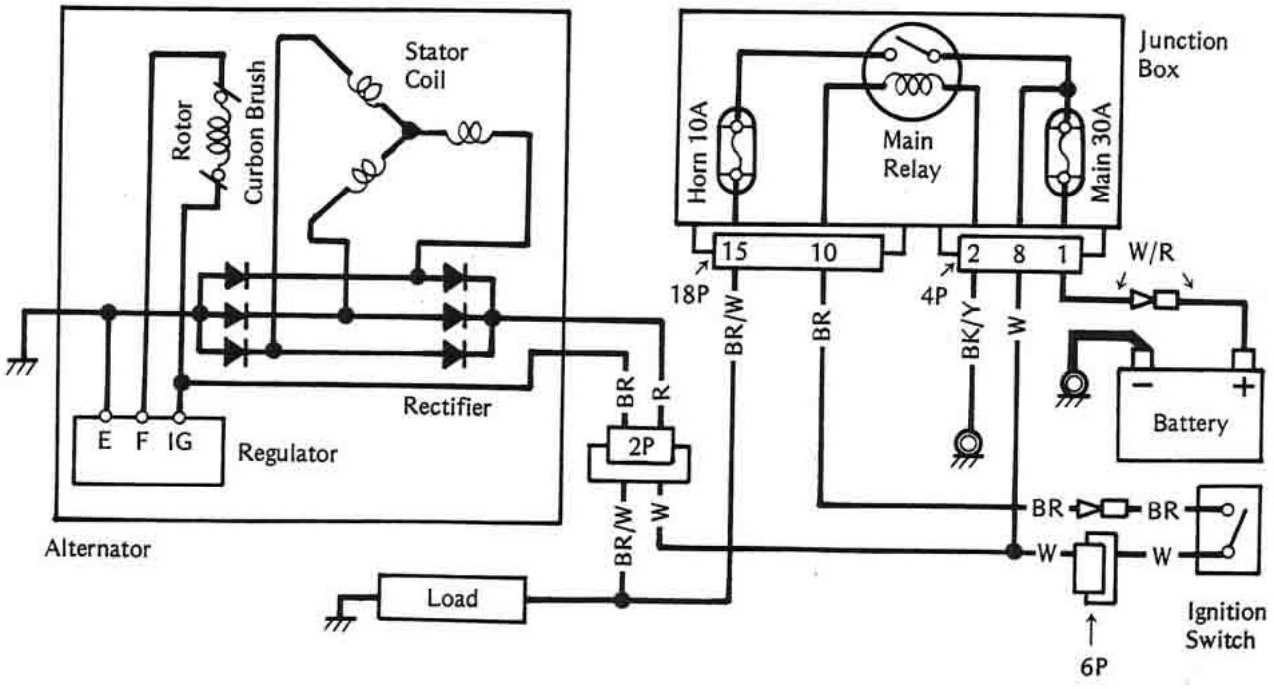
●Remove the nuts holding the alternator cover, and take off the cover.
●Check that the alternator leads and connectors are in good condition.
★If not, repair or replace the damaged parts.
●Replace the discharged battery with a good battery.
●Check battery voltage with the engine running.
★If the battery voltage is higher than 13.5 V, the charging system is in good condition.
★If the battery voltage is lower than 13.5 V, check the following.
●Ground the F terminal of the regulator to the chassis with a auxiliary wire.



A. F Terminal

●Start the engine, and check the battery voltage with the engine running.
★If the battery voltage is higher than 13.5 V, check the following.
○Regulator
★If the battery voltage is lower than 13.5 V, check the following.
○Carbon brushes, Slip rings
○Rectifier
○Stator coil
○Rotor coil

Charging System Circuit

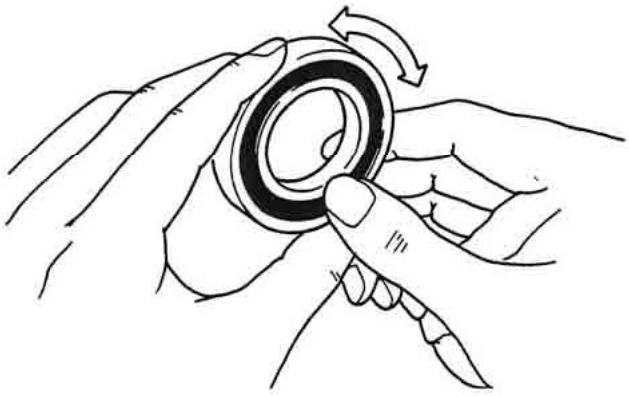


Test No.2-Battery Overcharged
●Check the regulator and/or rotor.
★Repair or replace the damaged parts.

Test No.3-Noise
●Check the ball bearings, stator coil, and/or rectifier if the alternator makes a noise.
★Repair or replace the damaged parts.

Alternator Inspection:
Ball Bearing Inspection
●Turn each bearing back and forth while checking for roughness or binding

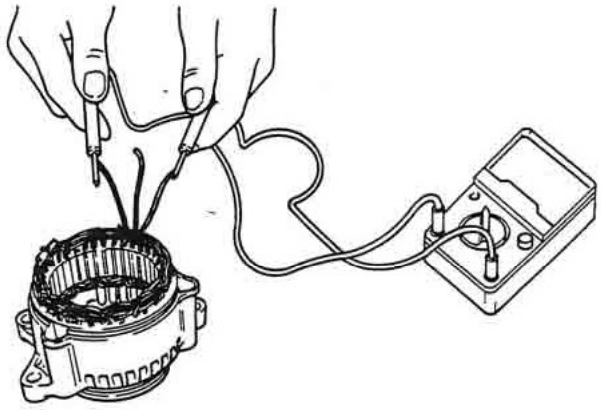
Bearing Inspection



★If roughness or binding is found, replace the bearing.
●Examine the bearing seal for tears or leakage.
★If the seal is torn or is leaking, replace the bearing

Stator Coil Inspection
●Measure the stator coil resistance.
○Connect an ohmmeter between the coil wirings.
○Set the meter to the x 1 Ω range, and read the meter.

Stator Coil Resistance



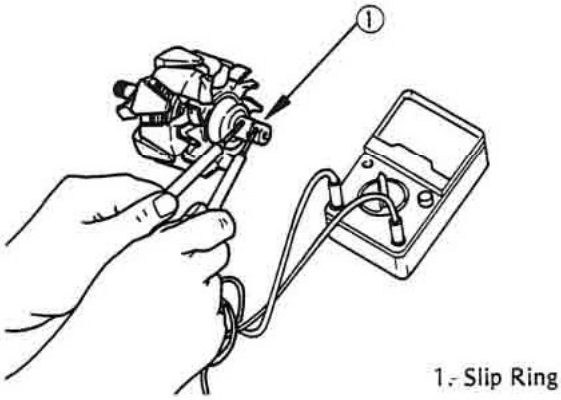
★If the meter does not read as specified, replace the stator coil.

Stator Coil Resistance
Less than 1.0 Ω

●Using the highest ohmmeter range, measure the resistance between the stator coil core and each of the coil windings.
★If there is any reading at all, the stator coil winding has a short and must be replaced.

Rotor Coil Inspection
●Measure the rotor coil resistance.
○Connect an ohmmeter between the slip rings.
○Set the meter to the x 1 Ω range, and read the meter.

Rotor Coil Resistance



1. Slip Ring

★If the meter does not read as specified, replace the rotor.

Rotor Coil Resistance
About 4 Ω

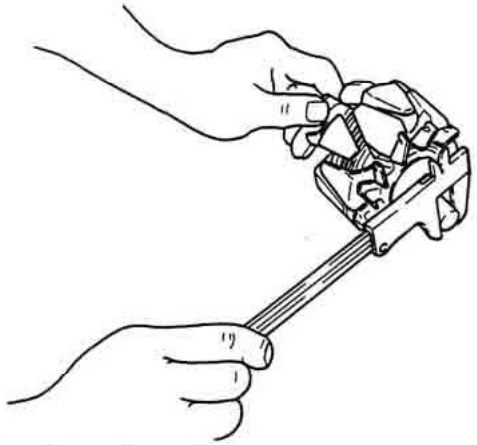
●Using the highest ohmmeter range, measure the resistance between the rotor shaft and each of the slip rings.
★If there is any reading at all, the rotor coil has a short and must be replaced.

Slip Ring Cleaning
●Visually inspect the slip ring for dirt or pitting.
★If necessary, smooth the slip ring with No. 300 – No. 500 emery cloth.

Slip Ring Diameter
●Measure the diameter of the slip ring.
★If the measurement is less than the service limit, replace the rotor.

Slip Ring Diameter
Standard: 14.4 mm
Service Limit: 14.0 mm

Slip Ring Diameter

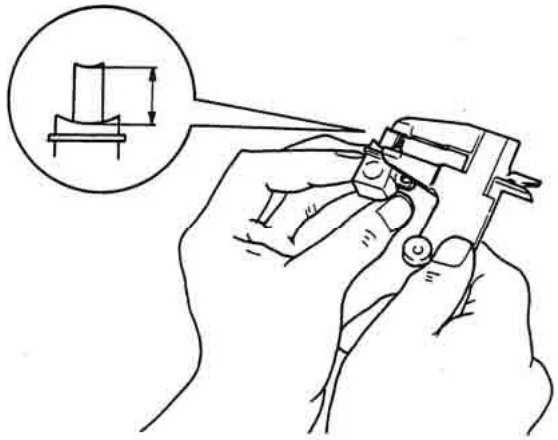


Carbon Brush Length

●Measure the length of both carbon brushes that stick out of the housing.

★If either one is worn down to less than the service limit, replace it.

Carbon Brush Length Measurement



Carbon Brush Length (projected portion)

Standard: 10.5 mm

Service Limit: 4.5 mm

Rectifier Inspection

●Set an ohmmeter to the x 1 kΩ range.

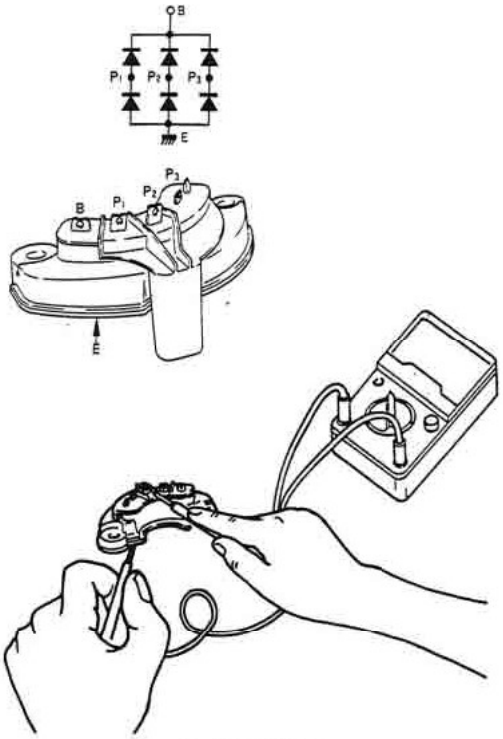
●Connect the ohmmeter to the ends of each diode, and check the resistance in both direction. The resistance should be low in one direction and more than ten times as much in the other direction.

★If any diode shows low or high in both directions, the diode is defective and the rectifier must be replaced.

NOTE

○*The actual meter reading varies with the meter used and the individual diode, but, generally speaking, the lower reading should be from zero to the first 1/2 of the scale.*

Rectifier Inspection



CAUTION

○**If a megger or a meter with a large-capacity battery is used, the rectifier will be damaged.**

Regulator Inspection

●Prepare testing tools.

Test light:	Bulb rated 12 V 3.4 W
Batteries:	Two 12 V batteries
Test wires:	Three auxiliary wires

CAUTION

○**The test light works as an indicator and also a current limiter to protect the regulator from excessive current. Do not use an ammeter instead of a test light.**

●Connect the test light and the 12 V battery to the regulator as shown. The test light should go on at this time.

CAUTION

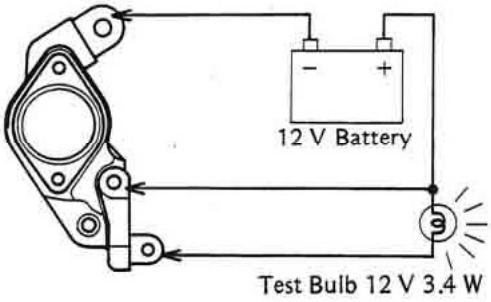
○**Do not contact the regulator metal case with the wires from the battery (+) or (–) terminal during the test.**

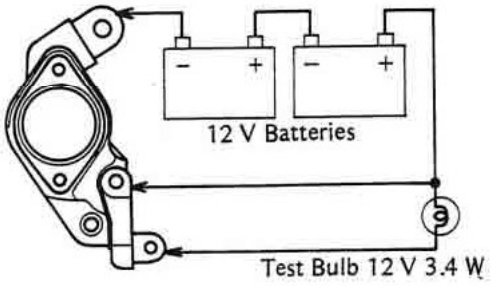
★If the test light does not go on, the regulator is damaged and must be replaced.

●Connect the test light and two 12 V batteries to the regulator as shown. The test light should not go on at this time.

★If the test light goes on, the regulator is damaged and must be replaced.

Regulator Inspection





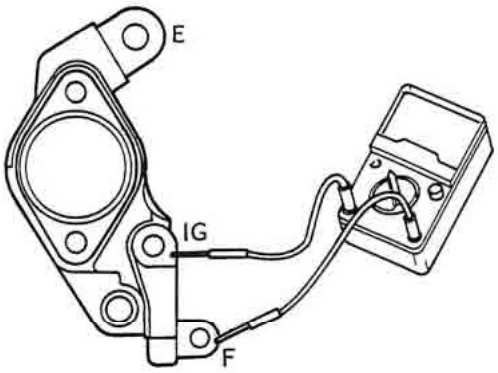
●Check the resistance in both directions between the terminals of the regulator with an ohmmeter as shown.

Regulator Internal Resistance

Meter Range	Connections		Reading
	Meter (+) to	Meter (–) to	
x 100 Ω	F	E	170 Ω
x 1 kΩ	E	F	4 kΩ
x 100 Ω	IG	E	800 Ω
x 1 kΩ	E	IG	2 kΩ
x 1 kΩ	F	IG	2 kΩ
x 100 Ω	IG	F	150 Ω

★Meter readings should be nearly values shown in the table. If the resistance is infinity (no reading) or 0 Ω, the regulator is damaged and must be replaced.

Regulator Inspection



Ignition System

Safety Instructions:

WARNING

○**The ignition system produces extremely high voltage. Do not touch the spark plugs, high tension coils, or spark plug leads while the engine is running, or you could receive a severe electrical shock.**

CAUTION

○**Do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent IC igniter damage.**

○**Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and IC igniter.**

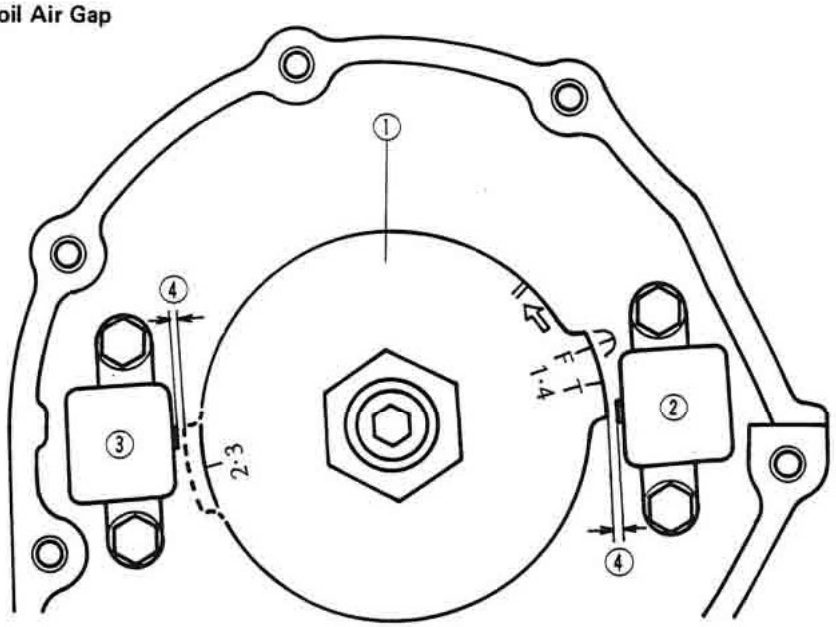
Parts Removal:

Pickup Coil Removal/Installation Notes

●Install the pickup coils so that the air gaps (clearance between the timing rotor projection and the pickup coil core) of both pickup coils are equal.

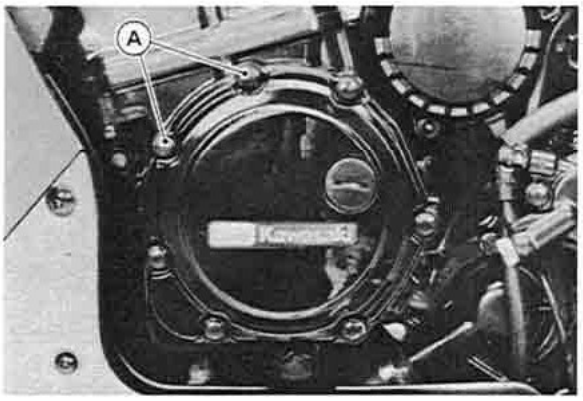
Pickup Coil Air Gap
0.5 – 0.9 mm

Pickup Coil Air Gap



1. Timing Rotor
2. #1 & 4 Pickup Coil
3. #2 & 3 Pickup Coil
4. Air Gap

●Apply a non-permanent locking agent to the threads of two bolts holding the pickup coil cover.



A. Bolts requiring locking agent

Ignition Coil Removal/Installation Notes

●Connect the primary wires to the primary coil terminals as follows:

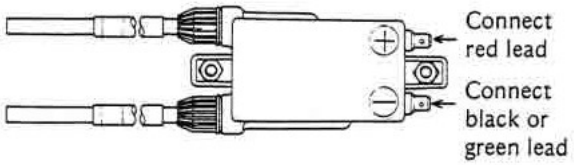
○Black and red wires → No. 1 & 4 ignition coil

○Green and red wires → No. 2 & 3 ignition coil

●The + and – markings next to the primary coil terminals on the ignition coil body indicate the polarity of the terminals. The polarity of the two spark plug leads are as shown when the primary leads are connected as indicated in the figure. But both the primary wires (positive red, and negative black and green) can be connected with either terminal on the ignition coil without changing the engine performance.

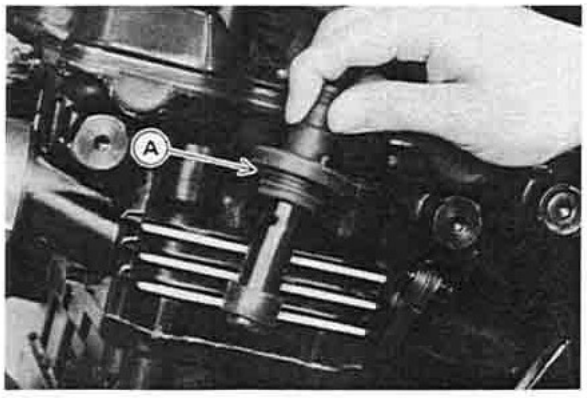
Polarity of Ignition Coil

(–) #1 or #2 spark plug lead



(+) #4 or #3 spark plug lead

●Apply grease to the neck under the flange of the spark plug cap, and put it on the spark plug.



A. Apply grease.

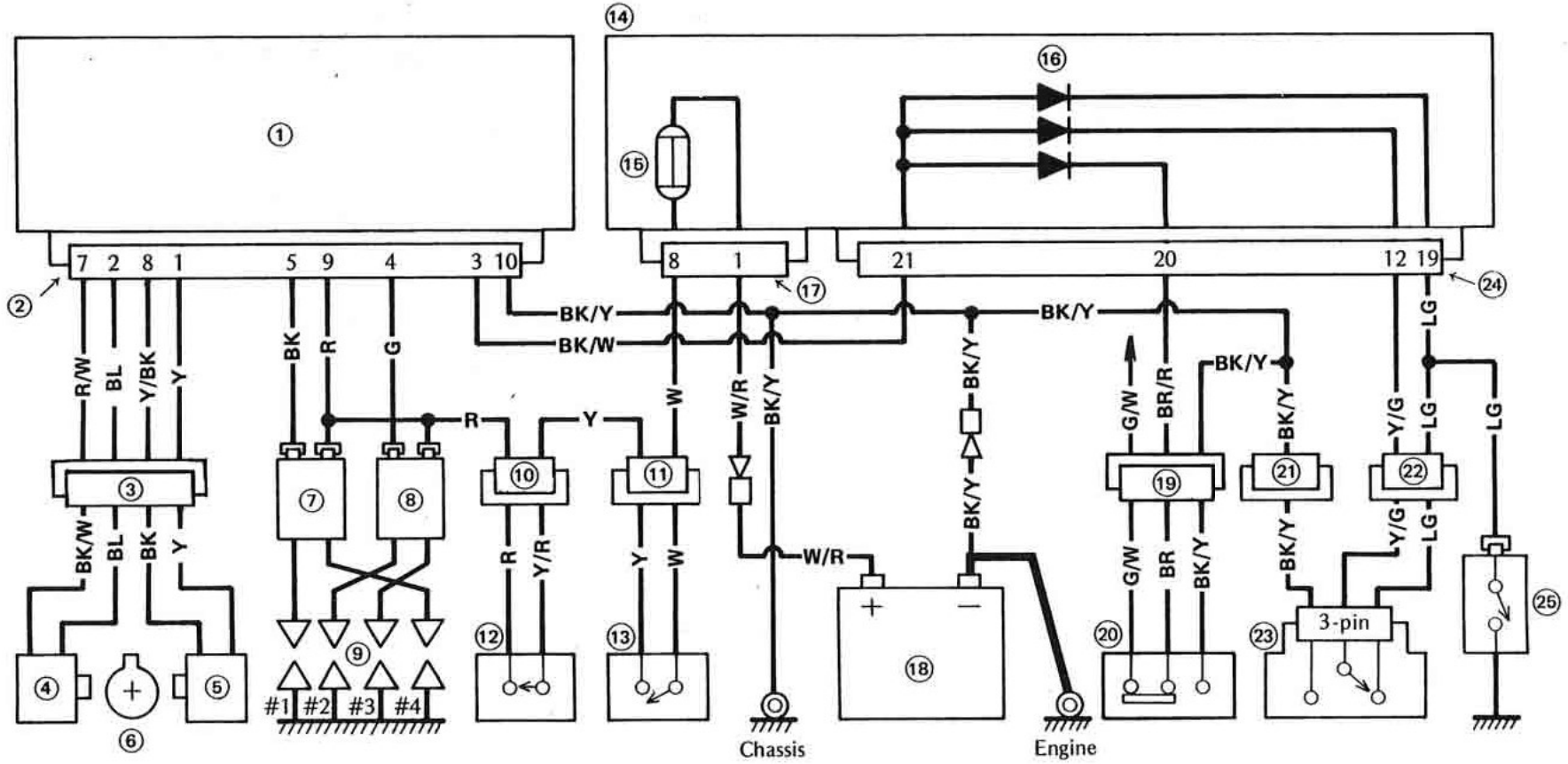
Spark Plug Removal/Installation Note

●Carefully pull the spark plug cap from the spark plug and the unscrew the spark plug.

○If necessary, use spark plug wrench 57001-1024.

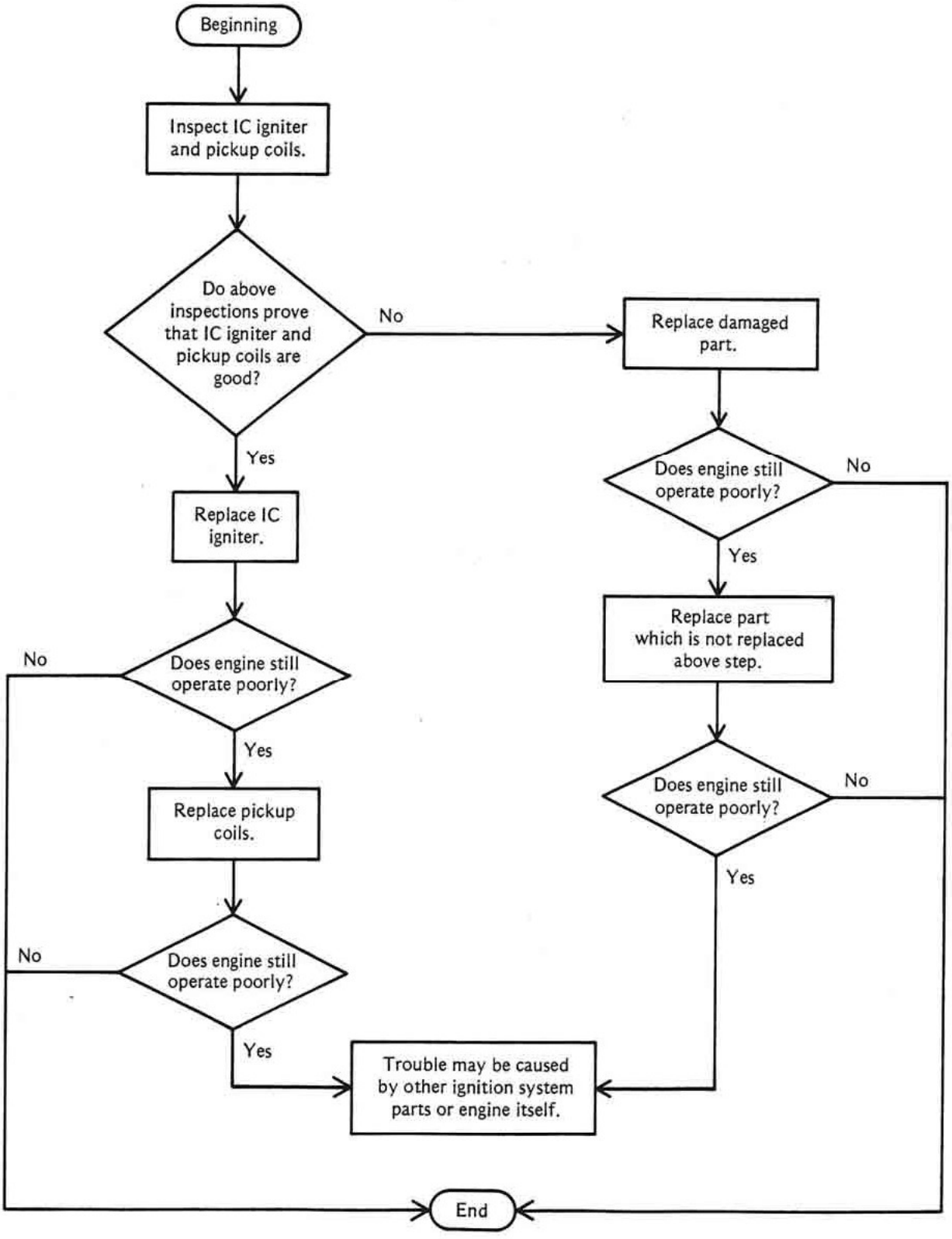
●Tighten the spark plug to the specified torque (see Exploded View).

Ignition System Wiring Diagram



1. IC igniter
2. IC igniter 10-pin connector
3. Pickup coil 4-pin connector
4. Pickup coil for #2 and #3 cylinder
5. Pickup coil for #1 and #4 cylinder
6. Timing rotor
7. Ignition coil for #1 and #4 cylinders
8. Ignition coil for #2 and #3 cylinders
9. Spark Plugs
10. Engine stop switch 4-pin connector (US model: 6-pin connector)
11. Ignition switch 6-pin connector
12. Engine stop switch
13. Ignition switch
14. Junction box
15. 30A fuse
16. Diodes
17. Junction box 4-pin connector
18. Battery
19. Side stand switch 3-pin connector
20. Side stand switch
21. LH switch 9-pin connector
22. Starter lockout switch 2-pin connector
23. Starter lockout switch
24. Junction box 18-pin connector
25. Neutral switch

Ignition System Troubleshooting:



Ignition System Inspection:

For any ignition system problems, always check the ignition system wiring first (see Wiring Inspection).

IC Igniter Inspection

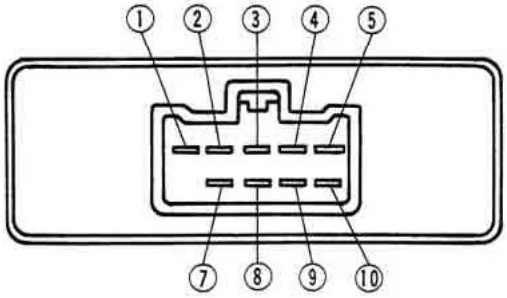
- Remove the IC igniter.
- Set the ohmmeter to the x 1 kΩ range and make the measurements shown in the table.
- ★If the meter readings are not as specified, replace the IC igniter.

CAUTION

○Use only Hand Tester 57001-1394 for this test. A tester other than the Kawasaki Hand Tester may show different readings.

○If a megger or a meter with a large-capacity battery is used, the IC igniter will be damaged.

Terminal No. of IC Igniter



Pickup Coil Inspection

- Disconnect the pickup coil connector.
- Zero the ohmmeter, and connect it to pickup coil leads.
- ★If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

Pickup Coil Resistance
390 – 590 Ω

- Using the highest resistance range of the ohmmeter, measure the resistance between the pickup coil leads and chassis ground.
- ★Any meter reading less than infinity (∞) indicates a short, necessitating replacement of the pickup coil assembly.
- Check the pickup coil air gaps (clearance between the timing rotor projection and the pickup coil core).
- ★If both air gaps are not equal, reposition the pickup coils.

Pickup Coil Air Gap
0.5 – 0.9 mm

Ignition Coil Inspection

Measuring arcing distance:

The most accurate test for determining the condition of the ignition coil is made by measuring arcing distance with a suitable tester for the 3-needle method.

IC Igniter Intenal Resistance*

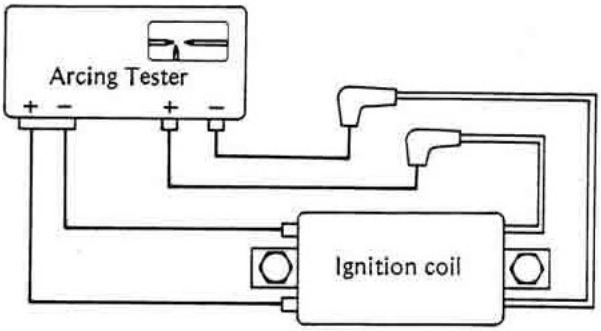
Tester (−) Lead Connection \ Tester (+) Lead Connection	1	2	3	4	5	7	8	9	10
1		A	D	B	B	A	A	B	A
2	A		D	B	B	A	A	B	A
3	D	D		E	E	D	D	B	D
4	∞	∞	∞		∞	∞	∞	∞	∞
5	∞	∞	∞	∞		∞	∞	∞	∞
7	A	A	D	B	B		A	B	A
8	A	A	D	B	B	A		B	A
9	B	B	B	C	C	B	B		A
10	A	A	C	A	A	A	A	A	

Value (kΩ)	
∞	Infinity
A	2 – 6
B	5 – 11
C	9 – 20
D	15 – 28
E	25 – 55

*Measured with hand tester 57001-983. A tester other than the Kawasaki Hand Tester may show different readings.

●Remove the ignition coil.
●Connect the ignition coil (with the spark plug cap left installed at each of the spark plug leads) to the tester, and measure the arcing distance.

Ignition Coil Test



WARNING

○**To avoid extremely high voltage shocks, do not touch the coil or leads.**

★If the distance reading is less than the specified value, the ignition coil or spark plug caps are defective.

Ignition Coil Arcing Distance
7 mm or more

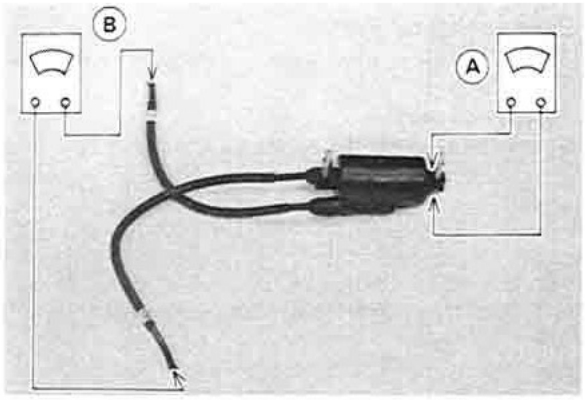
●To determine which part is defective, measure the arcing distance again with the spark plug caps removed from the ignition coil.
★If the arcing distance is subnormal as before, the trouble is with the ignition coil itself. If the arcing distance is now normal, the trouble is with the spark plug caps.

Measuring coil resistance:

If the arcing tester is not available, the coil can be checked for a broken or badly shorted winding with an ohmmeter. However, an ohmmeter cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.

●Disconnect the primary leads from the coil terminals.
●Measure the primary winding resistance.
○Connect an ohmmeter between the coil terminals.
○Set the meter to the x 1 Ω range, and read the meter.
●Measure the secondary winding resistance.
○Pull the spark plug cap off each lead.
○Connect an ohmmeter between the spark plug leads.
○Set the meter to the x 1 kΩ range, and read the meter.
★If the meter does not read as specified, replace the coil.

Ignition Coil Winding Resistance
Primary windings: 1.8 – 2.8 Ω
Secondary windings: 10 – 16 kΩ



A. Measure primary winding resistance.
B. Measure secondary winding resistance.

★If the meter reads as specified, the ignition coil windings are probably good. However, if the ignition system still does not perform as it should after all other components have been checked, test replace the coil with one known to be good.
●Check the spark plug leads for visible damage.
★If any spark plug lead is damaged, replace the coil.

Spark Plug Cleaning and Inspection

●Remove the spark plug.
●Clean the spark plug, preferably in a sandblasting device, and then clean off any abrasive particles. The plug may also be cleaned using a high flash-point solvent and a wire brush or other suitable tool.
★If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard spark plug or its equivalent.

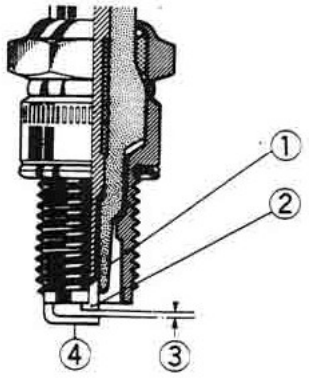
Spark Plug Gap

●Measure the gap with a wire-type thickness gauge.
★If the gap is incorrect, carefully bend the side electrode with a suitable tool to obtain the correct gap.

Spark Plug Gap

0.6 – 0.7 mm

Spark Plug Gap



1. Insulator
2. Center Electrode
3. Plug Gap
4. Side Electrode

Electric Starter System

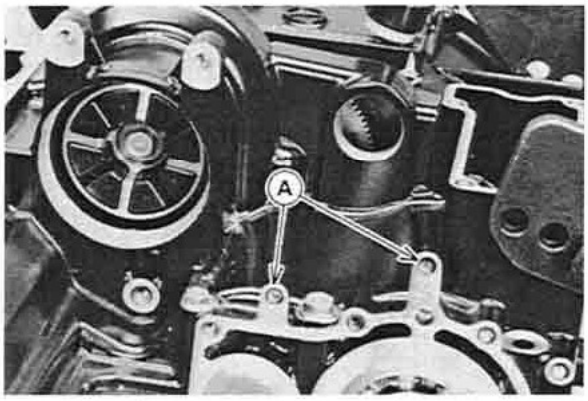
Parts Removal:

Starter Motor Removal/Installation Notes

CAUTION

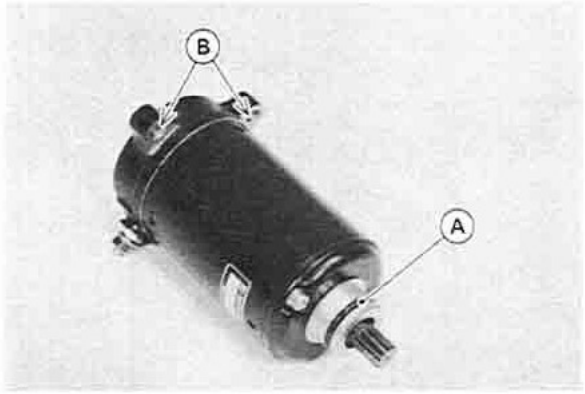
○**Do not tap the starter motor shaft or body. Tapping on the shaft or body could damage the motor.**

●When installing the starter motor, clean the starter motor legs and crankcase where the starter motor is grounded.



A. Clean here.

●Apply a small amount of engine oil to the O-ring.



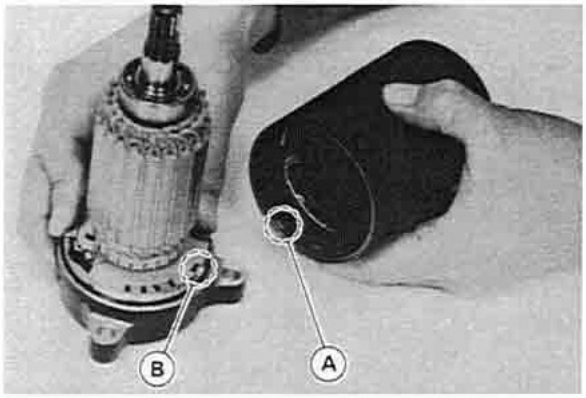
A. O-ring B. Clean here.

●Check and adjust the following items.
Engine Oil
Drive Chain Slack

Starter Motor Disassembly/Assembly Notes

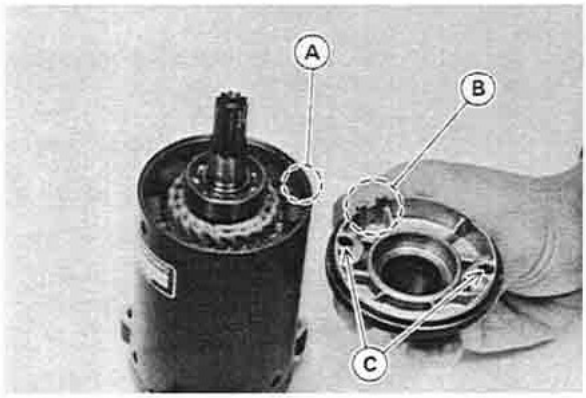
●Before removing or installing the RH end cover, cover the teeth of pinion with a thin tape to prevent the damaging the oil seal.

●Fit the alignment projection of the yoke into the notches of the brush plate and the LH end cover.



A. Projection B. Notches

●Fit one of the projections on the yoke into the groove of the RH end cover, and at the same time align the holes for the end cover screws.



A. Projection C. End Cover Screw Holes
B. Groove

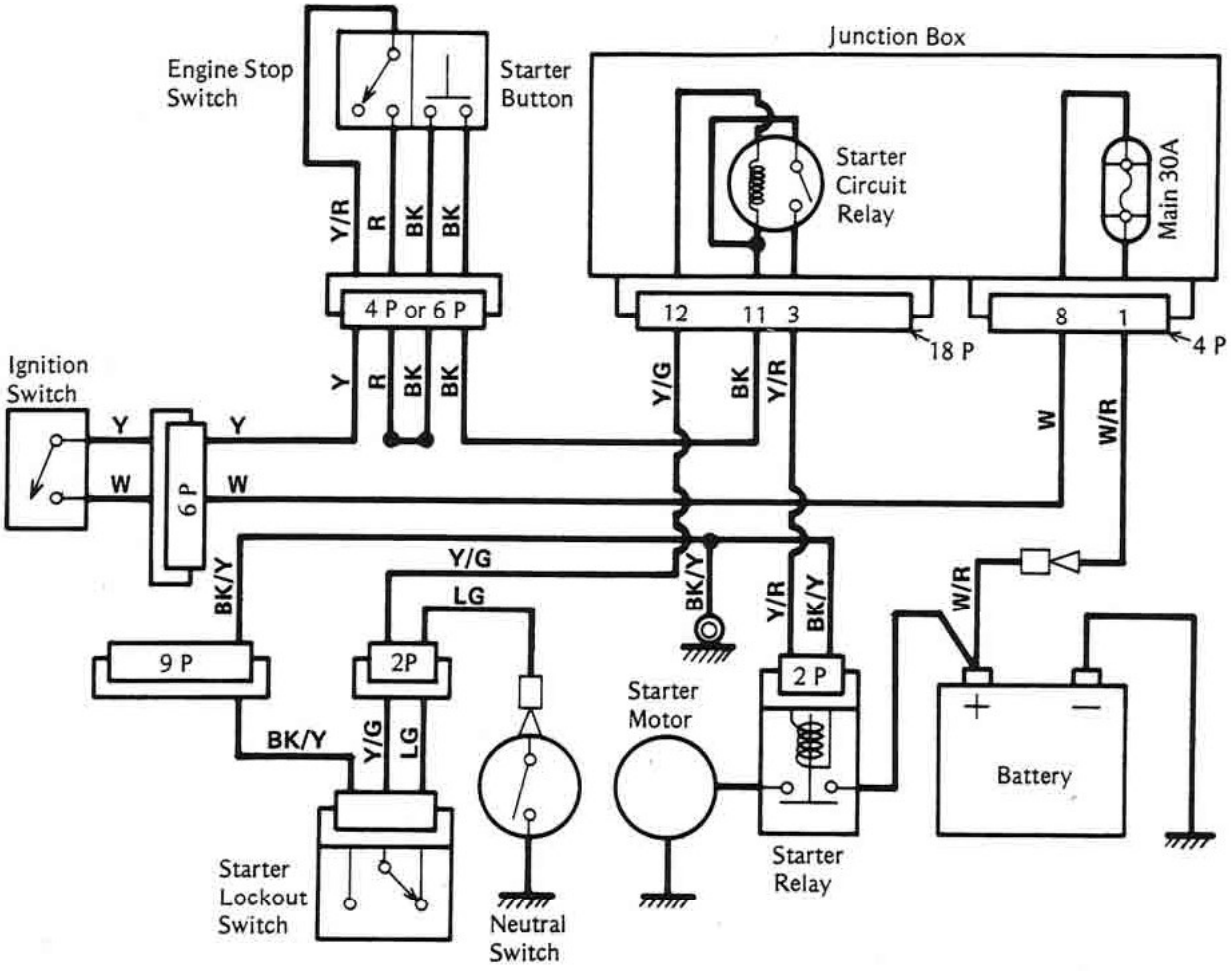
Inspection:

For any electrical starter system problems, always check the electrical starter system wiring first (see Wiring Inspection).

CAUTION

○**Because of the large amount of current, never keep the starter switch pushed any time that the starter motor will not turn over, or the current may burn out the starter motor windings.**

Electric Starter Circuit



Starter Relay Inspection

●Disconnect the starter motor lead and battery positive (+) lead from the starter relay.

CAUTION

○**The battery positive (+) lead with the rubber cap is connected directly to the battery positive (+) terminal even when the ignition switch is off, so take care not to short the removed lead to chassis ground.**

●Using the x 1 Ω ohmmeter range, measure the resistance across the relay terminals.

★If the relay clicks but the meter does not read zero, the relay is defective and must be replaced. If the relay does not click at all, the relay is defective and must be replaced.

★If the relay makes a single clicking sound and the meter reads zero the relay is good. The trouble is in the starter motor or the motor power supply wires.

Switch Position:
Ignition switch ON
Engine stop switch RUN
Starter button ON
Neutral switch ON (Transmission is in Neutral)

Meter Connection:	
Location	**Starter relay terminals (Leads disconnected)**
Meter Range	**x 1 Ω**
Meter Reading:	**0 Ω and relay clicks when starter button is pushed.**

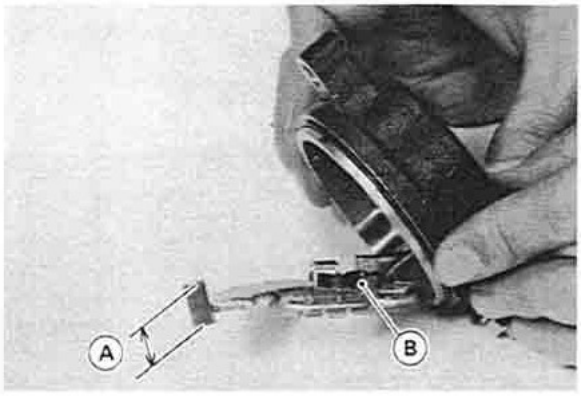
Brush Inspection

●Measure the length of each brush.

★If any is worn down to the service limit, replace all brushes.

Starter Motor Brush Length

Standard:	**12 mm**
Service Limit:	**8.5 mm**



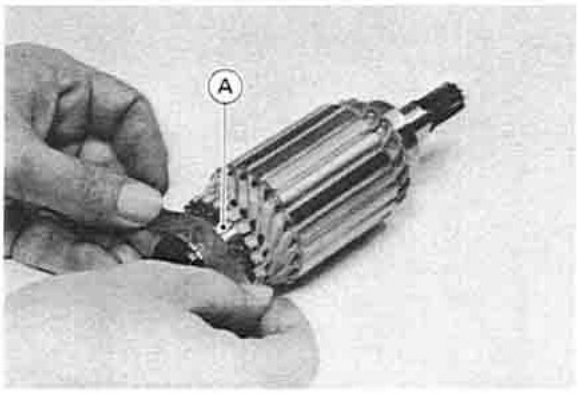
A. Measure brush length. B. Brush Spring

Brush Spring Inspection

●Check that the brush springs are in place and snap the brushes firmly into place.
★If not, reinstall or replace the spring.

Commutator Cleaning and Inspection

●Smooth the commutator surface if necessary with fine emery cloth, and clean out the grooves as illustrated.



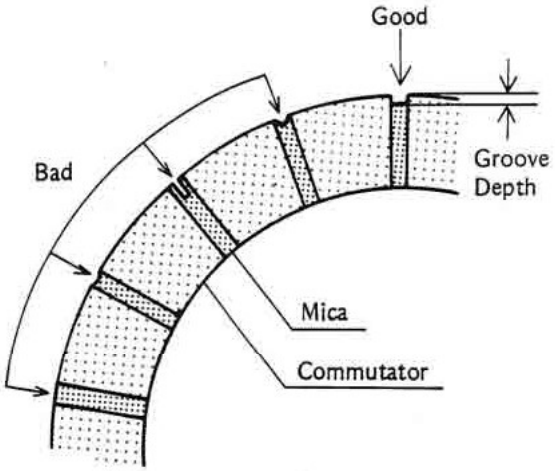
A. Commutator

●Determine as accurately as possible the depth of the grooves between commutator segments.
★Replace the starter motor with a new one if the groove depth is less than the service limit.

Commutator Groove Depth

Standard:	**0.45 – 0.75 mm**
Service Limit:	**0.2 mm**

Commutator



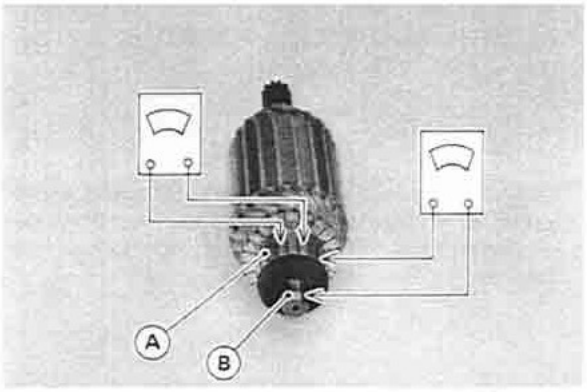
●Measure the diameter of the commutator.
★Replace the starter motor with a new one if the commutator diameter is less than the service limit.

Commutator Diameter

Standard:	**28 mm**
Service Limit:	**27 mm**

Armature Inspection

●Using the x 1 Ω ohmmeter range, measure the resistance between any two commutator segments.
★If there is a high resistance or no reading (∞) between any two segments, a winding is open and the starter motor must be replaced.



A. Segment B. Shaft

●Using the highest ohmmeter range, measure the resistance between the commutator and the shaft.

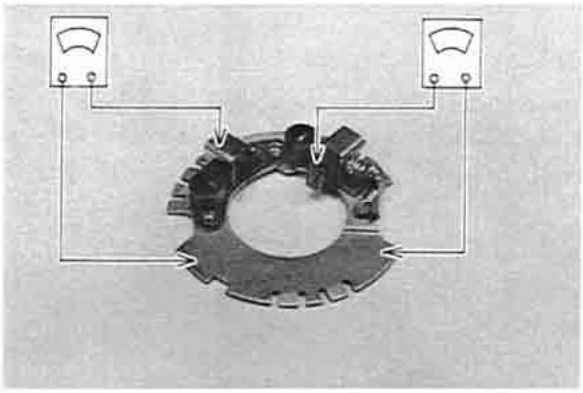
★If there is any reading at all, the armature has a short and the starter motor must be replaced.

Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with an ohmmeter. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.

Brush Plate Inspection

●Using the x 1 Ω ohmmeter range, measure the resistance between the brush and the plate.

★If there is not close to zero ohms, the brush plate has an open and it must be replaced.



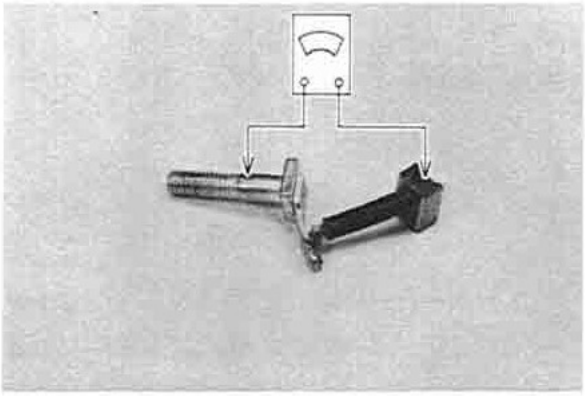
●Using the highest ohmmeter range, measure the resistance between the metal plate and the brush holders.

★If there is any reading at all, the brush holder has a short and the brush plate must be replaced.

Brush and Lead Assembly Inspection

●Using the x 1 Ω ohmmeter range, measure the resistance between the brush and the terminal bolt.

★If there is a high resistance or no reading (∞), a lead is open and the brush and lead assembly must be replaced.

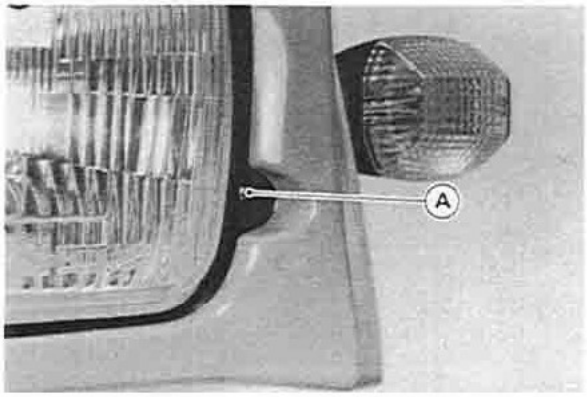


Lighting System

Adjustment:

The headlight beam is adjustable both horizontally and vertically. Headlight aiming must be correctly adjusted for your safe riding as well as oncoming drivers. In most areas it is illegal to ride with improperly adjusted headlights.

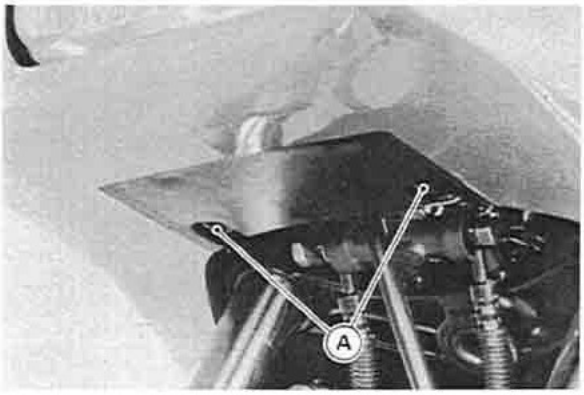
Headlight Beam Horizontal Adjustment



A. Adjusting screw for horizontal adjustment

Headlight Beam Vertical Adjustment

●Remove the bolts holding the cover under the headlight.

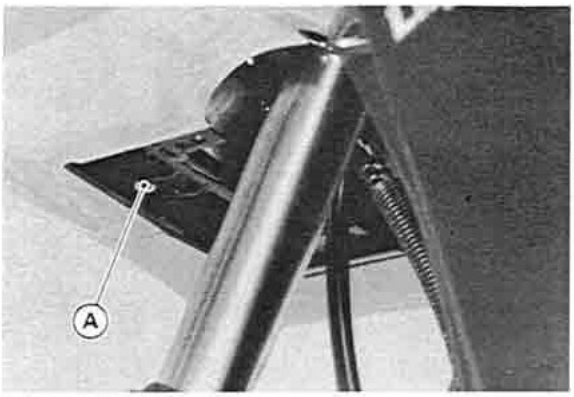


A. Cover Bolts

●Loosen the lower headlight bolt, and adjust the headlight vertically.

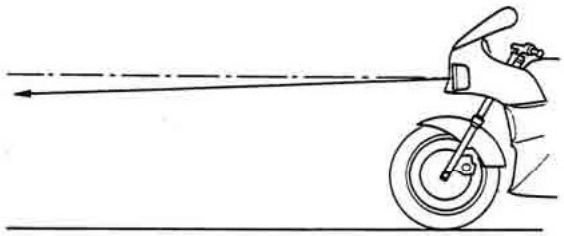
NOTE

○*On high beam, the brightest point should be slightly below horizontal with the motorcycle on its wheels and the rider seated. Adjust the headlight to the proper angle according to local regulations.*



A. Lower Headlight Bolt

Vertical Adjustment



Parts Removal:

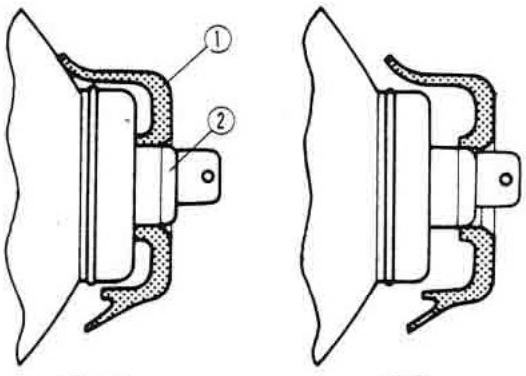
Headlight Bulb Replacement Notes

CAUTION

○**When handling the quartz-halogen bulbs, never touch the glass portion with bare hands. Always use a clean cloth. Oil contamination from hands or dirty rags can reduce bulb life or cause the bulb to explode.**

●Fit the dust cover onto the bulb firmly as shown in the figure.

Dust Cover Installation

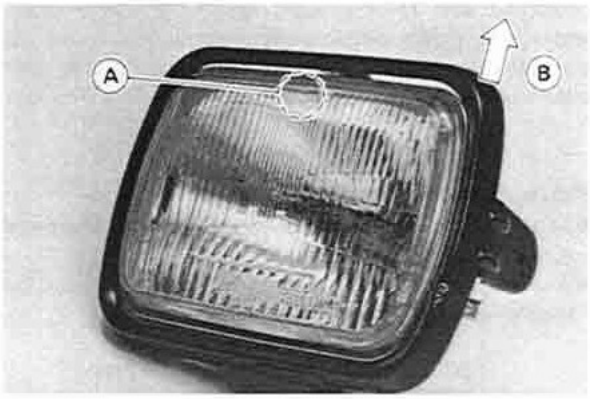


Good Bad

1. Dust Cover
2. Headlight Bulb

Headlight Unit Removal/Installation Note

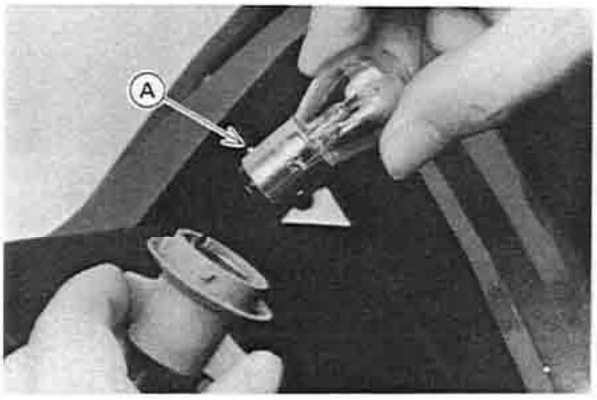
●Install the headlight unit so that the "TOP" mark on the lens points up.



A. Top Mark B. Up

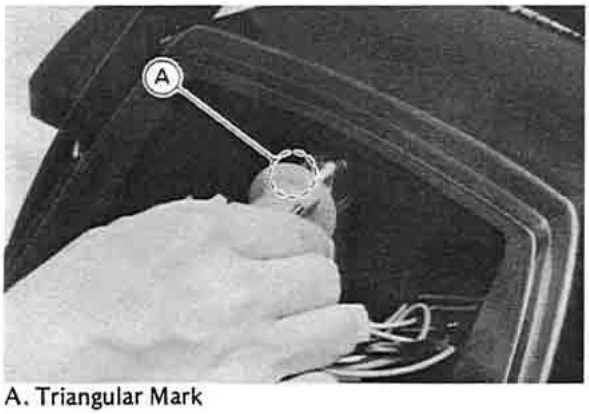
Tail/Brake Light Bulb Replacement Notes

●Insert the new bulb by aligning the pins with the grooves in the walls of the socket so that the pin closest to the bulb base is to the upper right.

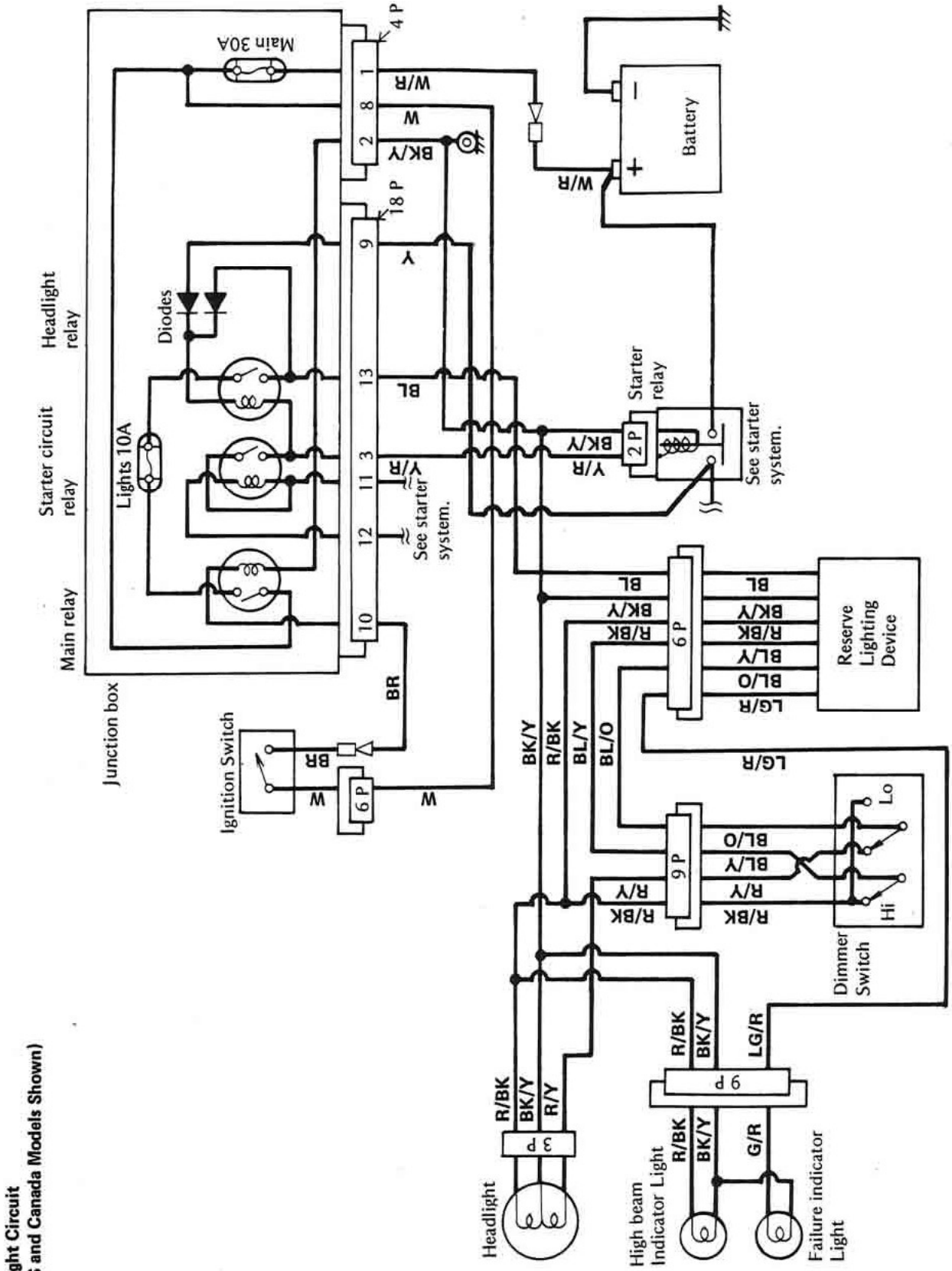


A. Pin Closest to Base.

●Insert the socket by aligning the tangs with the catches in the housing so that the triangular mark points up, and turn it clockwise.



A. Triangular Mark



Headlight Circuit (US and Canada Models Shown)

Tail/Brake Light Lens Removal/Installation Note

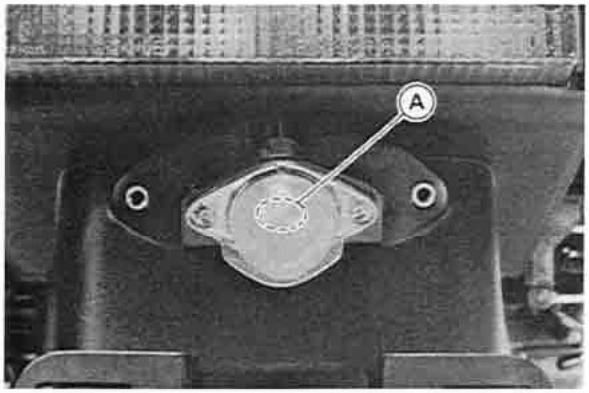
●Be careful not to overtighten the lens mounting screws.

Turn Signal Light Bulb Replacement Note

●Be careful not to overtighten the lens mounting screws.

License Plate Light Bulb Replacement Notes

●Install the bulb socket and lens so that the "TOP" mark on the lens points up.



A. "TOP" Mark

●Be careful not to overtighten the lens and socket mounting screws.

Inspection:

For any lighting system problems, always check the lighting system wiring and the bulbs first (see Wiring Inspection).

Headlight Reserve Lighting System Inspection

The US and Canadian models contain a relay in the headlight circuit. In these models, the headlight does not go on when the ignition switch is first turned on, but the headlight goes on once the starter button is pushed to start the engine, and stays on until the ignition switch is turned off. But the headlight goes out whenever the starter button is pushed to restart the engine after engine stalling.

★If all wirings and components other than the reserve lighting device check out good, the device is defective.

Cooling Fan System

Fan System Circuit Inspection

●Disconnect the female 6-pin connector from the fan switch relay.

●Ground the red/white wire to the engine with a suitable wire.

★If the fan turns, inspect the following.

○Wires and Connectors

○Junction Box Parts

○Fan Switch Relay

○Switches (Fan Switches and Oil Temperature Switch)

★If the fan does not turns, inspect the following.

○Wires and Connectors

○Junction Box Parts

○Fan Relay

○Fan

Fan Inspection

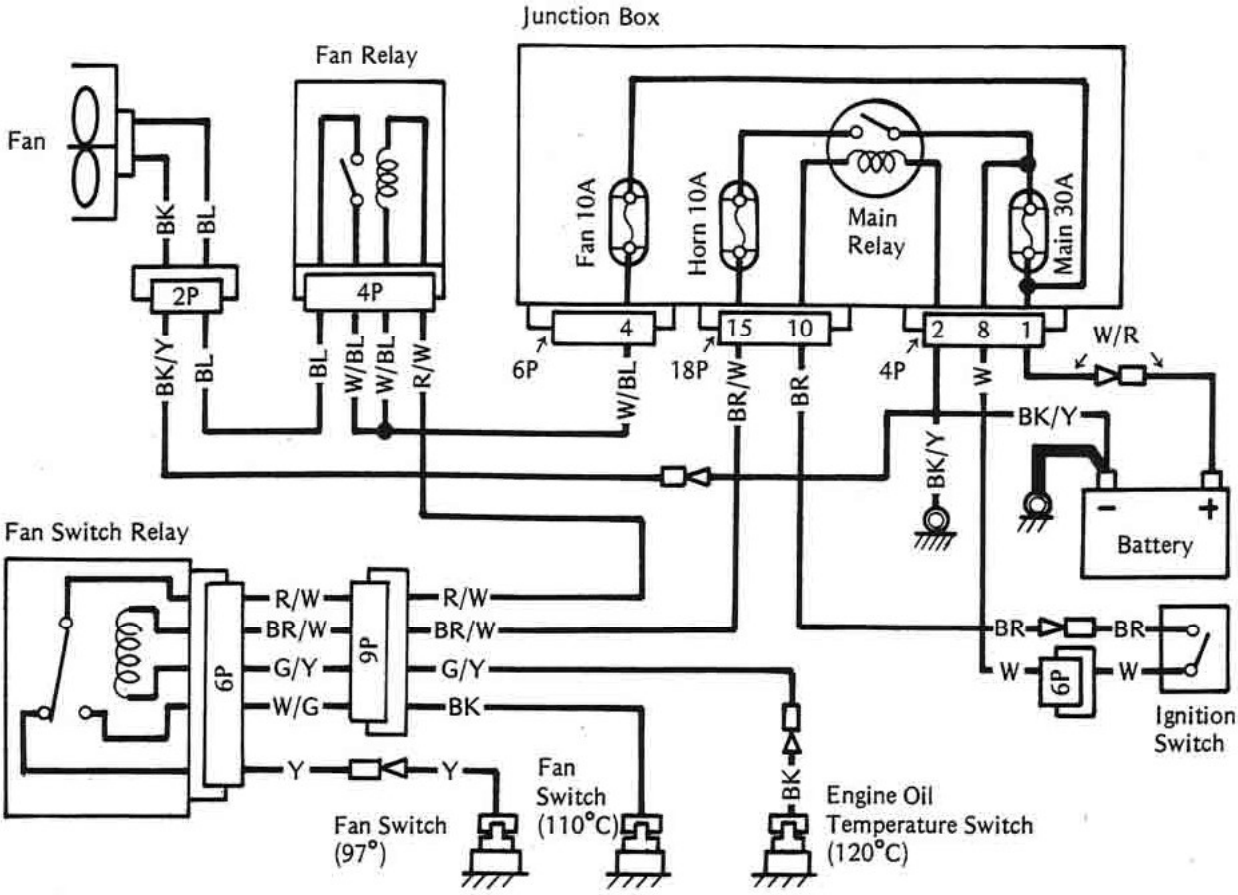
●Disconnect the 2-pin connector of the fan leads.

●Using two auxiliary wires, supply battery power to the fan.

Reserve Lighting System Operation

Headlight	Dimmer Switch Position	Headlight Failure Indicator Light	Reserve Lighting
Both high and low beam filaments are normal	HI	Goes on (hardly visible)	———
	LO	Goes on (hardly visible)	———
High beam filament burned out	HI	Goes on	Low beam comes on.
	LO	Goes on (hardly visible)	———
Low beam filament burned out	HI	Goes on (hardly visible)	———
	LO	Goes on	High beam comes on dimly.

Cooling Fan Circuit



Wire Connections

Blue Lead ⟷ Battery (+)
Black/Yellow Lead ⟷ Battery (–)

★If the fan does not turn at this time, the fan is defective and must be replaced.

Fan Relay Inspection

Refer to the Main, Starter Circuit, and Headlight Relay Inspection in the Junction Box section.

Fan Switch Relay Inspection

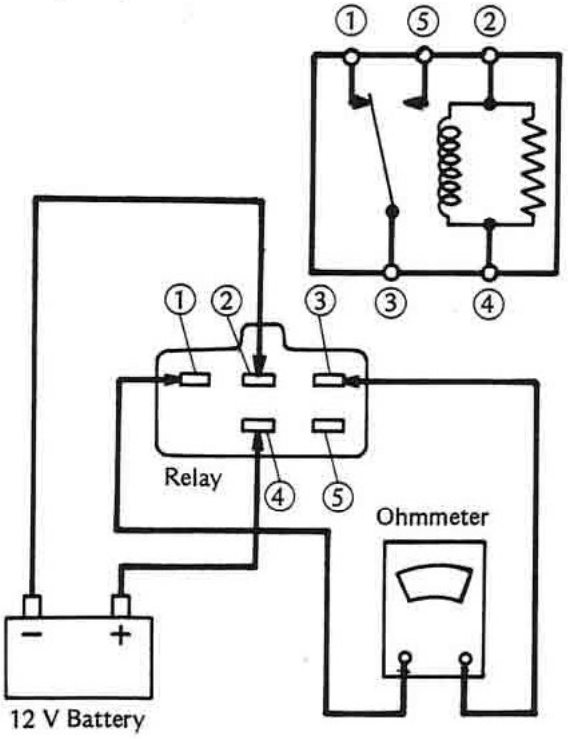
- Remove the relay from the motorcycle.
- Connect an ohmmeter and one 12 V battery to the relay as shown.

★If the relay does not work as specified, the relay is defective.

Testing Relay

	①	③	⑤
	Y	R/W	W/G
When battery is connected		○—○	
When battery is disconnected	○—○		

Testing Relay



Meters and Gauges

Parts Removal:

Meter and Gauge Removal/Installation Note

CAUTION

○**Place the meter or gauge so that the face is up. If a meter or gauge is left upside down or sideways for any length of time it will malfunction.**

Bulb Replacement Notes

●To remove the wedge-base type bulbs (indicator and illumination), pull out the bulb sockets and pull the bulbs off the sockets.

CAUTION

○**Do not use bulbs rated for greater wattage than the specified value, as the meter or gauge panel could become warped by excessive heat radiated from the bulbs.**

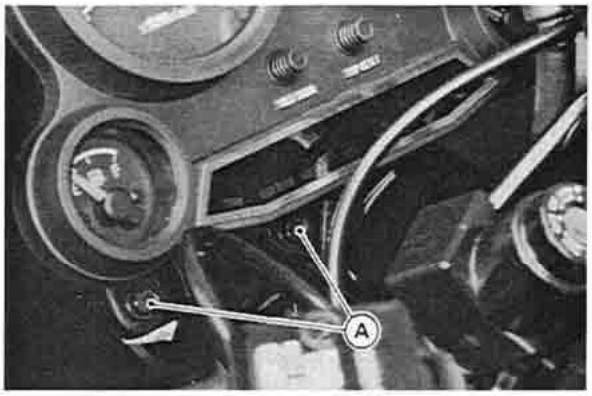
Inspection:

Tach/Voltmeter Inspection

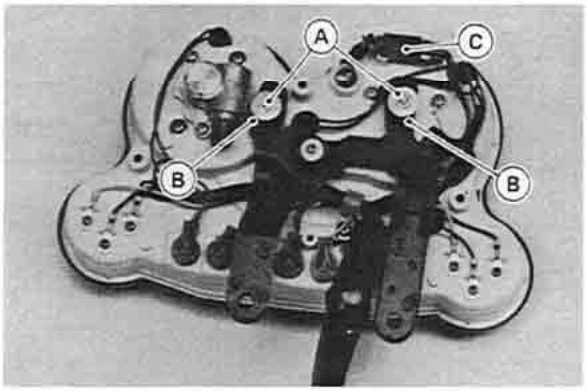
NOTE

○*The Tach/Voltmeter inspection is explained on the assumption that the ignition system operates normally.*

●Check to see that the rubber dampers are installed at the meter mounting bracket.
★Install a new damper where it is absent.
●Check to see that the rubber dampers at the meter mounting bracket are in good condition they should not be hard or cracked.
★Replace any damaged rubber dampers with new ones.
●Check to see that all meter mounting bolts and nuts are tightened securely.
★Tighten the loose fasteners.

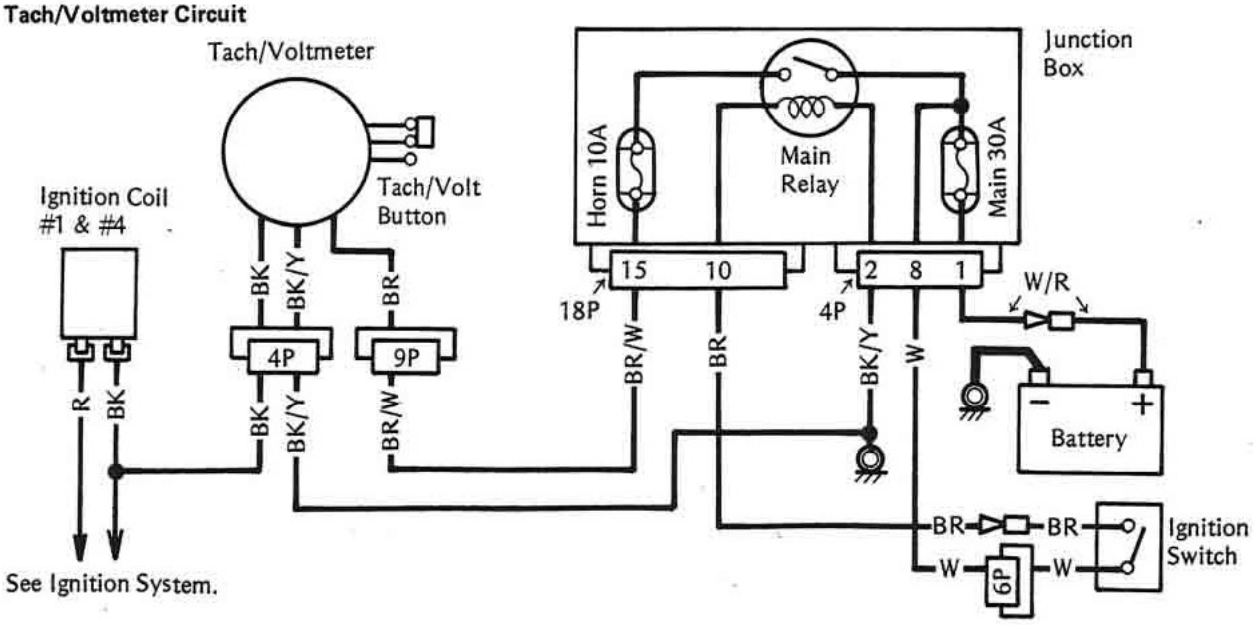


A. Meter Mounting Bolts



A. Meter Mounting Nuts
B. Rubber Damper
C. Tach/Voltmeter 3-pin Connector

Tach/Voltmeter Circuit



●Check the tach/voltmeter circuit wiring (see Wiring Inspection).
★If all wiring and components other than the tach/voltmeter unit check out good, the unit is defective.

Fuel Gauge Operation Inspection

●Prepare an auxiliary wire, and check the operation of the gauge.

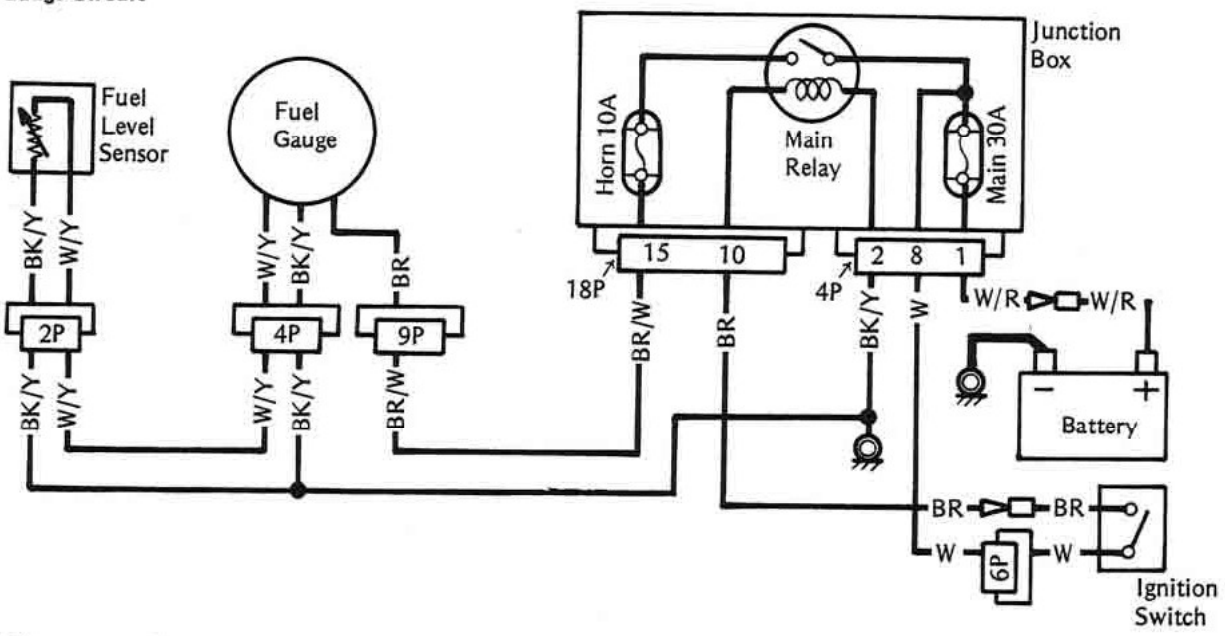
Fuel Gauge Operation Check
Ignition Switch Position: ON
Wire Location: Female 2-pin sensor connector (disconnected)
Results: Gauge should read E when connector wires are opened.
Gauge should read F when connector wires are shorted.

★If the gauge readings are correct, the fuel level sensor is bad. If these readings are not obtained, the trouble is with the gauge and/or wiring.
●Check the fuel gauge circuit wiring (see Wiring Inspection).
★If all wiring and components other than the fuel gauge unit check out good, the unit is defective.

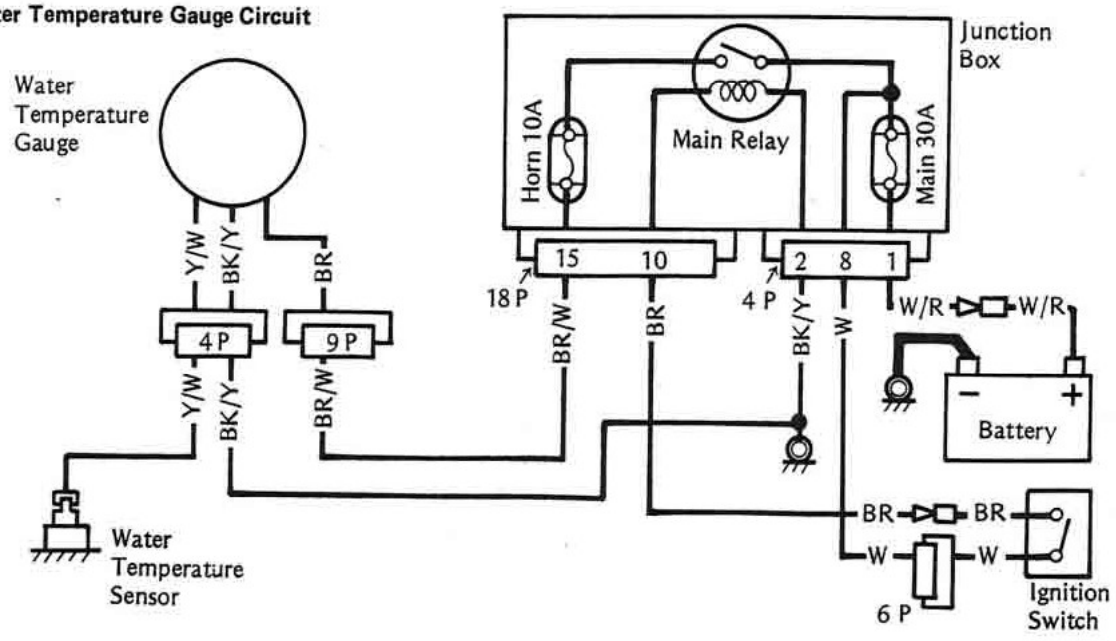
Water Temperature Gauge Operation Inspection

●Prepare an auxiliary wire, and check the operation of the gauge.

Fuel Gauge Circuit



Water Temperature Gauge Circuit



Gauge Operation Test

Ignition Switch Position: ON

Wire Location: Female, Sensor Connector (disconnected)

Results: Gauge should read C when connector wire is opened.
Gauge should read H when connector wire is grounded to engine.

CAUTION

○**Do not ground the wiring longer than necessary. After the needle swings to the H position, stop the test. Otherwise the gauge could be damaged.**

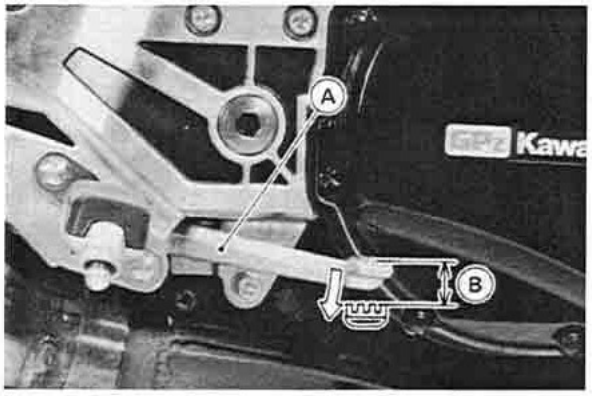
★If the gauge readings are correct, the water temperature sensor is bad. If these readings are not obtained, the trouble is with the gauge and/or wiring.
●Check the water temperature gauge circuit wiring (see Wiring Inspection).
★If all wiring and components other than the water temperature gauge unit check out good, the unit is defective.

Switches and Sensors

Adjustment:

Rear Brake Light Switch Inspection

●Turn on the ignition switch.
●Check the operation of the rear brake light switch by depressing the brake pedal. The brake light should go on after about 10 mm of pedal travel.



A. Rear Brake Pedal B. 10 mm

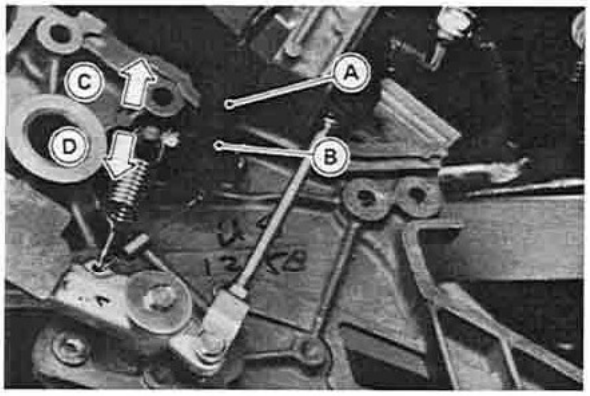
★If it does not, adjust the brake light switch.

Rear Brake Light Switch Adjustment

●Remove the RH footpeg bracket from the frame (see Footpeg Bracket Removal in the Frame chapter).
●Turn the adjusting nut to adjust the switch.

CAUTION

○**To avoid damaging the electrical connections inside the switch, be sure that the switch body does not turn during adjustment.**



A. Rear Brake Light Switch C. Lights sooner.
B. Adjusting Nut D. Lights later.

Parts Removal:

Removal Note

●Refer to the appropriate chapters for the switches and sensors.

Inspection:

Switch Inspection

●Using an ohmmeter, check to see that only the connections shown in the table have continuity (about zero ohms).
★If the switch has an open or short, repair it or replace it with new one.

Starter Lockout Switch Connections

	BK/Y	Y/G	LG
When clutch lever is pulled in	○——	——○	
When clutch lever is released		○——	——○

Ignition Switch Connections

	BR	W	Y	BL	R	W/BK	O/G
OFF, LOCK							
ON	○——	——○——	——○	○——	——○	○——	——○
P(Park)		○——	———	———	——○	○——	——○
						US, Canada	

Dimmer Switch Connections (US, Canada)

	BL/Y	BL/O	R/Y	R/BK
HI	○	○	○	○
LO	○	○	○	○

Dimmer Switch Connections (Other than US, Canada)

	R/BK	BL/Y	R/Y
HI	○	○	
LO		○	○

Turn Signal Switch Connections

	GY	O	G
R	○	○	
N			
L		○	○

Hazard Switch Connections

	GY	O	G
Off ■			
On ▬	○	○	○

Passing Button Connections

	BR	R/BK
Free		
Push on	○	○

Horn Button Connections

	BK/W	BK/Y
Free		
Push on	○	○

Engine Stop Switch Connections

	R	Y/R
OFF		
RUN	○	○

Starter Button Connections

	BK	BK
Free		
Push on	○	○

Headlight Switch Connections

	R/W	R/BL	BL	BL/Y
OFF				
■	○	○		
ON	○	○	○	○

Front Brake Light Switch Connections

	BR	BL
When brake lever is pulled in	○	○

Rear Brake Light Switch Connections

	BR	BL
When brake pedal is pushed down	○	○

Side Stand Switch Connections

	BR	BK/Y	G/W
When side stand is up	○	○	
When side stand is down		○	○

Neutral Switch Connections

	LG	⏚
When transmission is in neutral	○	○
When transmission is not in neutral		

Oil Pressure Switch Connections*

	SW. Terminal	⏚
When engine is stopped	○	○
When engine is running		

* : Engine lubrication system is in good condition.

Engine Oil Temperature Switch Connections

- **Rising temperature: From ON to OFF at 117 – 123°C (243 – 253°F)**
- **Falling temperature: From OFF to ON above 113°C (235°F)**

ON: Less than 0.5 Ω
OFF: More than 1 MΩ

Fan Switch (97°C) Connections

- **Rising temperature: From OFF to ON at 94 – 100°C (201 – 212°F)**
- **Falling temperature: From ON to OFF above 90°C (194°F)**

ON: Less than 0.5 Ω
OFF: More than 1 MΩ

Fan Switch (110°C) Connections

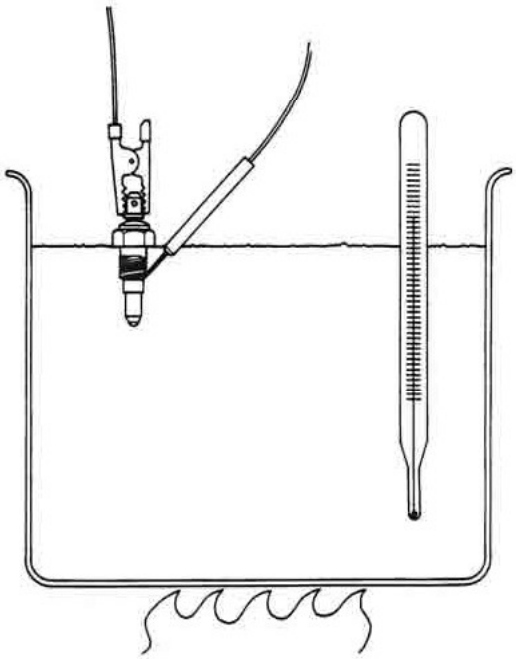
○**Rising temperature: From OFF to ON at 107 – 113°C (225 – 235°F)**

○**Falling temperature: From ON to OFF above 104°C (219°F)**

ON: Less than 0.5 Ω

OFF: More than 1 MΩ

Oil Temperature and Fan Switch Inspection



●Suspend the switch in a container of water so that the temperature-sensing projection and threaded portion are submerged.

NOTE

○*Use oil for the oil temperature switch, and coolant for the 110°C Fan Switch.*

●Suspend an accurate thermometer in the water.

NOTE

○*The switch and thermometer must not touch the container sides or bottom.*

●Place the container over a source of heat and gradually raise the temperature of the water while stirring the water gently.

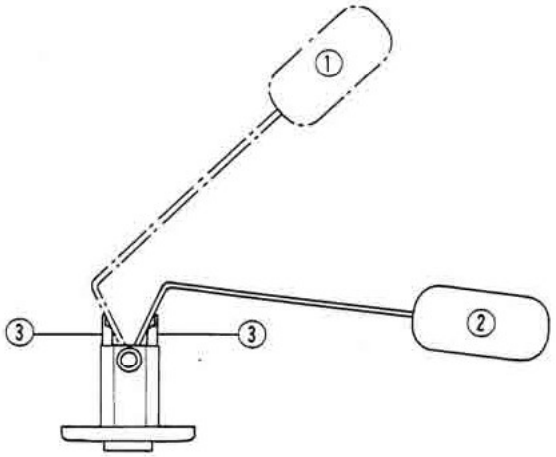
Fuel Level Sensor Inspection

●Remove the fuel level sensor.

●Check that the float moves up and down smoothly without binding. It should go down under its own weight.

★If the float does not move smoothly, replace the sensor.

Fuel Level Sensor



1. Float in full position
2. Float in empty position
3. Float arm stop

●Measure the resistance of the fuel level sensor with an ohmmeter.

★If the ohmmeter does not show the specified values, or the readings do not change smoothly as the float moves up and down, replace the sensor.

Fuel Level Sensor Resistance

Full Position: 3 – 12 Ω

Empty Position: 70 – 120 Ω

●Inspect the leads and 2-pin connector.

★If they show any signs of damage, replace the sensor.

Water Temperature Sensor Inspection

●Remove the water temperature sensor.

●Suspend the sensor in a container of water so that the temperature sensing projection and threaded portion are submerged. The sensor must not touch the container sides or bottom.

●Suspend an accurate thermometer in the water. It must not touch the container, either.

●Place the container over a source of heat and gradually raise the temperature of the water while stirring the water gently.

●Using an ohmmeter, measure the internal resistance of the sensor across the terminal and the body at the temperatures shown in the table.

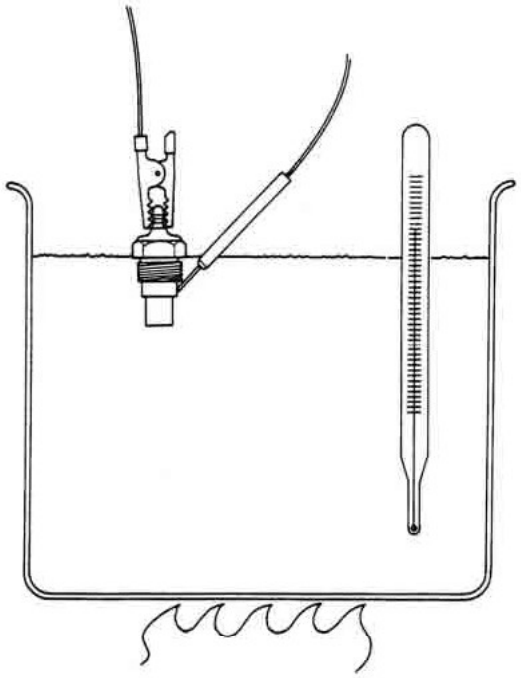
★If the ohmmeter does not show the specified values, replace the sensor.

Internal Resistance of Water Temperature Sensor

80°C (176°F): About 52 Ω

100°C (212°F): About 27 Ω

Water Temperature Sensor Inspection



Junction Box

The junction box contains the following electrical components:
- ○Fuses
- ○Relays
- ○Diodes
- ○ACC 2-Pin Connector

Parts Removal:

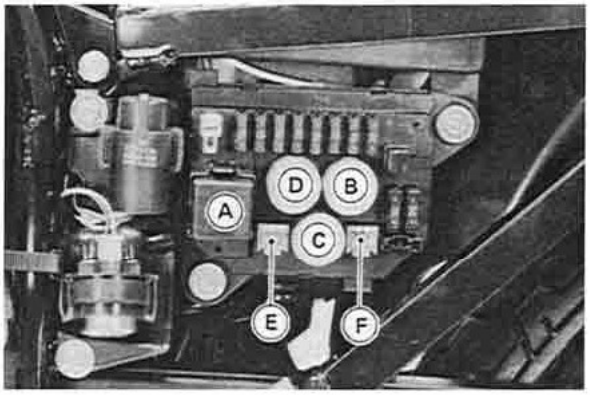
Junction Box Parts Removal Note

- ●Unlock the locking arm(s), and pull the relays and connectors straight off the junction box.

A. Unlock the locking arm(s)

Junction Box Parts Installation Notes

- ●Orient the relays and connectors correctly.
- ●Push the relays and connectors all the way in place until you feel a click.



A. Turn Signal Relay
B. Main Relay
C. Starter Circuit Relay
D. Headlight Relay
E. Diode Assembly for Headlight Relay
F. Diode Assembly for Starter Circuit Relay

Inspection:

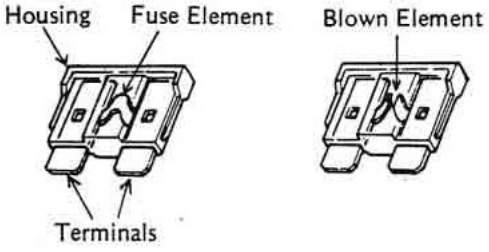
Fuse Inspection

- ●Remove the fuse from the junction box.
- ●Inspect the fuse element.
- ★If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

CAUTION

- ○**When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.**

Fuse



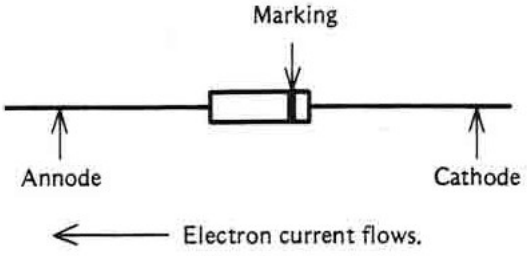
Diode Inspection

- ●Disconnect the diode assembly from the junction box.
- ●Zero the ohmmeter, and connect it to each diode lead to check the resistance in both directions.
- ★The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the diode assembly must be replaced.

NOTE

○*The actual meter reading varies with the meter used and the individual diode, but, generally speaking, the lower reading should be from zero to the first ½ of the scale.*

Polarity of Diode

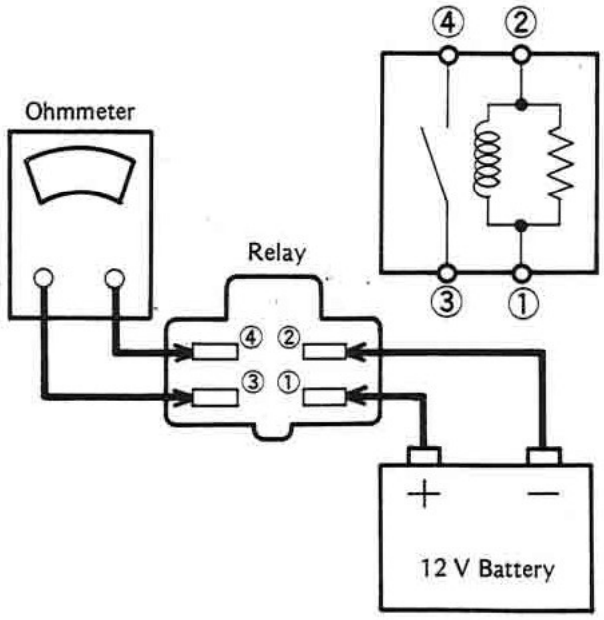


Main, Starter Circuit, and Headlight Relay Inspection

●Remove the relay from the junction box.
●Connect an ohmmeter and one 12 V battery to the relay as shown.
★If the relay does not work as specified, the relay is defective.

Testing Relay
Meter range: 1 Ω range
Criteria:
When battery is connected → 0 Ω
When battery is disconnected → ∞ Ω

Testing Relay

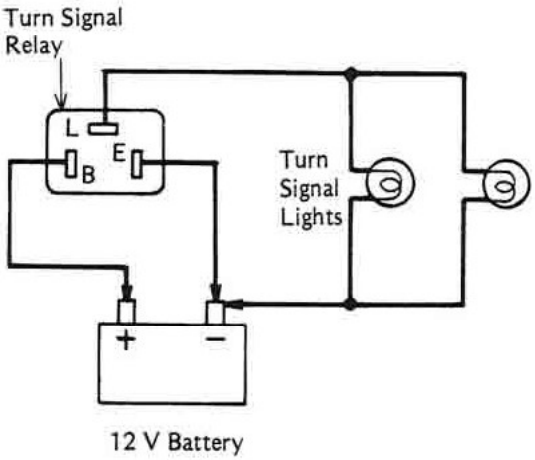


① and ② : Relay Coil Terminals
③ and ④ : Relay Switch Terminals

Turn Signal Relay Inspection

●Remove the turn signal relay from the junction box.
●Connect one 12 V battery and turn signal lights as indicated in the figure, and count how many times the lights flash for one minute.
★If the lights do not flash as specified, replace the turn signal relay.

Testing Turn Signal Relay
(Example: Two lights are connected.)



Testing Turn Signal

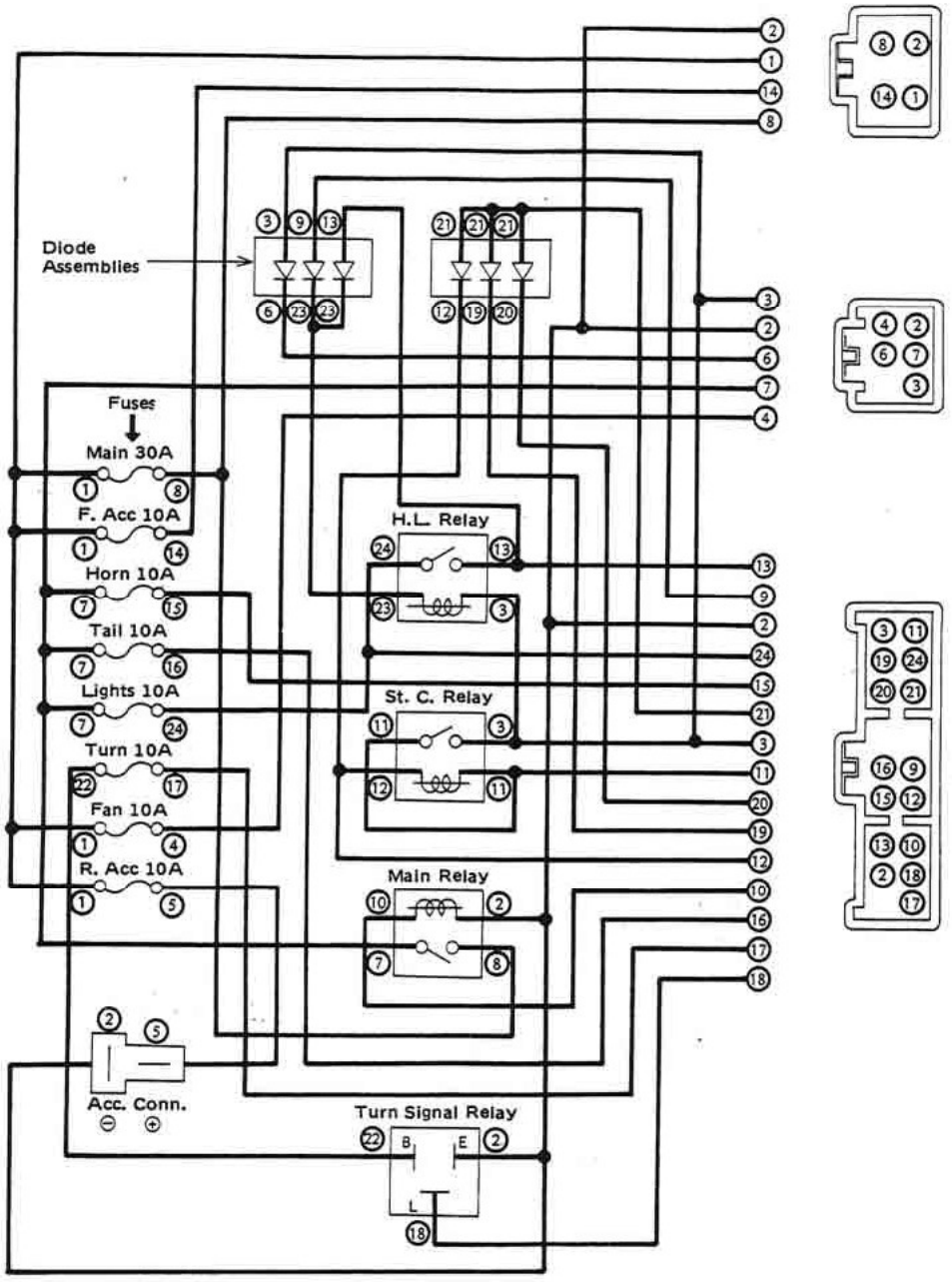
Load		Flashing Times (c/m*)
The Number of Turn Signal Lights	Wattage (W)	
1	21 – 23	More than 150
2	42 – 46	75 – 95
3	63 – 69	
4	84 – 92	

* : Cycle(s) per minute

Junction Box Internal Circuit Inspection

●Remove the junction box from the motorcycle.
●Disconnect all the fuses, relays, diode assemblies, and connectors from the junction box.
●Make sure all connector terminals are clean and tight, and none of them have been bent.
★Clean the dirty terminals, and straighten slightly-bent terminals.
●Check conductivity of the internal circuit. Both terminals of the same number should conduct, and the differently numbered terminals should not conduct.
★If there are any open or short circuits, replace the junction box.

Junction Box Internal Circuit



Electrical Wiring

Wiring Inspection

●Visually inspect the wiring for signs of burning, fraying, etc.

★If any wiring is poor, replace the damaged wiring.

●Pull each connector apart and inspect it for corrosion, dirt, and damage.

★If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.

●Check the wiring for continuity.

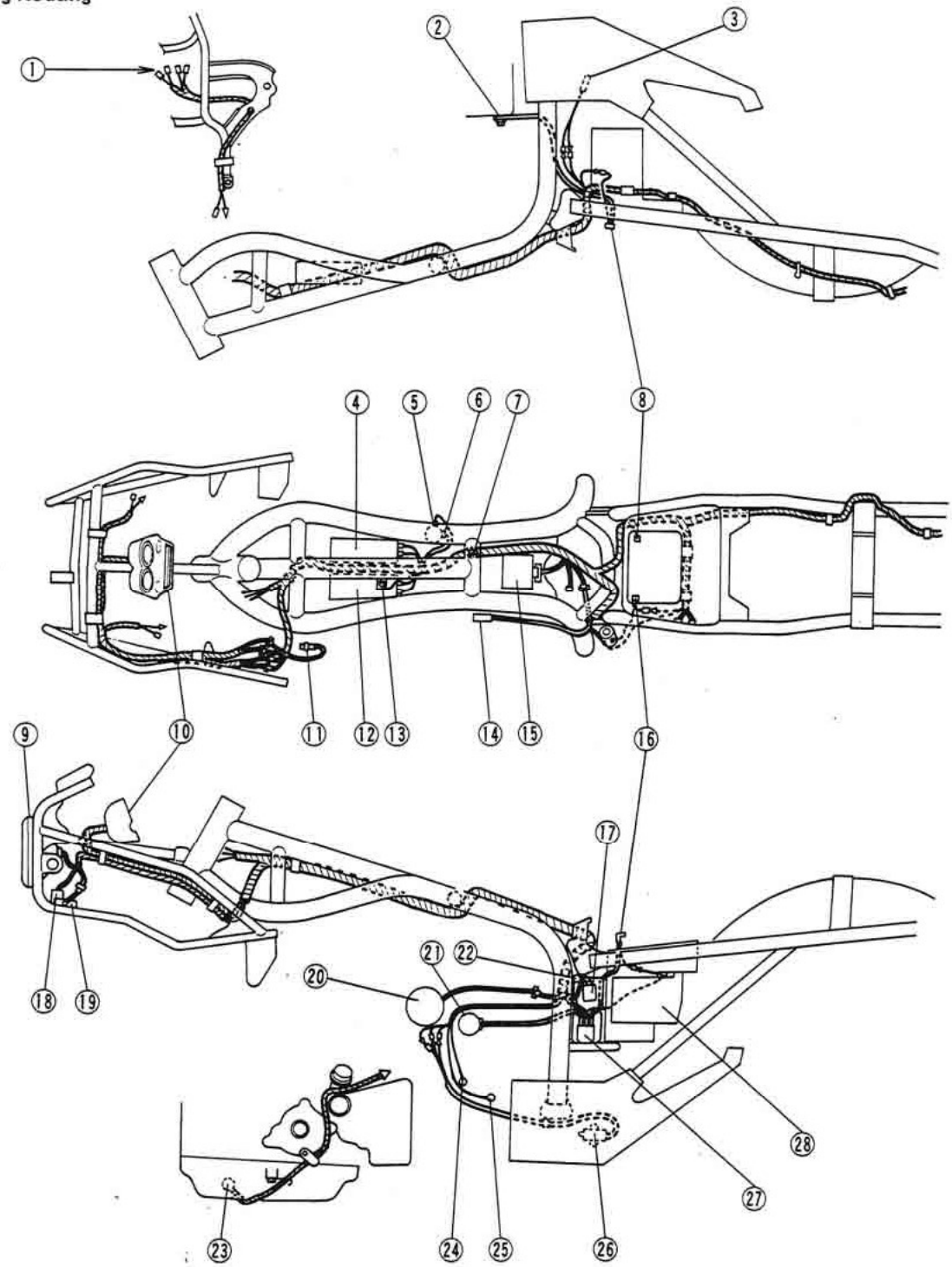
○Use the wiring diagram to find the ends of the lead which is suspected of being a problem.

○Connect an ohmmeter between the ends of the leads.

○Set the meter to the x 1 Ω range, and read the meter.

★If the meter does not read 0 Ω, the lead is defective. Replace the lead or the wiring loom if necessary.

Wiring Routing



1. Horns
2. Ground (Battery –)
3. Rear Brake Light Switch
4. Ignition Coil (#2 & 3)
5. Fan Switch (110°C)
6. Water Temperature Sensor
7. Position Mark (White Tape)
8. Battery ⊖
9. Headlight
10. Meters and Gauges Assembly
11. Fan Switch (97°C)
12. Ignition Coil (#1 & 4)
13. Ground (Main Harness)
14. Pickup Coils
15. IC Igniter
16. Battery ⊕
17. Fan Relay
18. Fan Switch Relay
19. Reserve Lighting Device
20. Alternator
21. Starter Motor
22. Ground (Main Harness)
23. Oil Temperature Switch
24. Neutral Switch
25. Oil Pressure Switch
26. Side Stand Switch
27. Starter Relay
28. Junction Box